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TIP PROJECT: B-5352

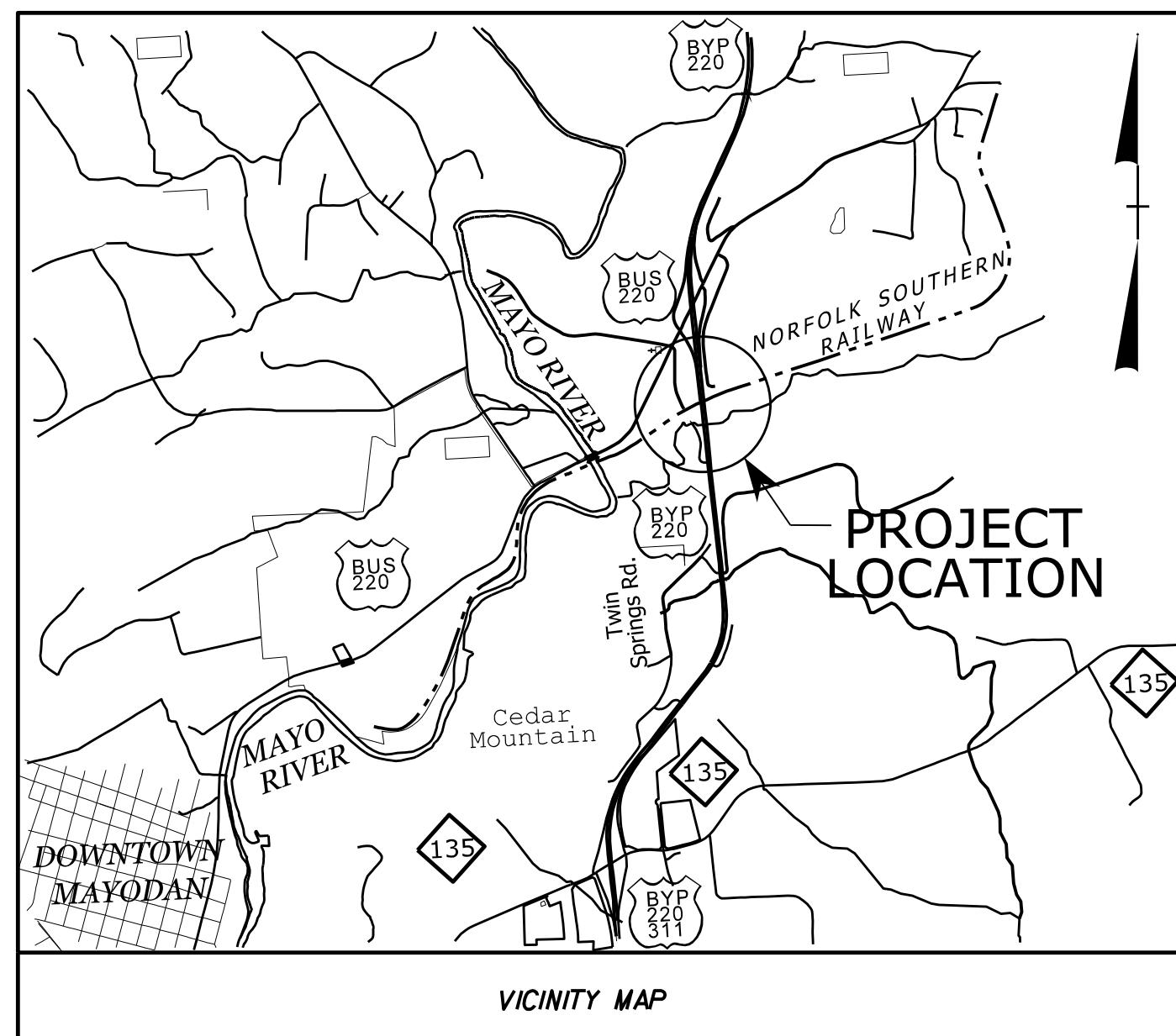
CONTRACT: C204101

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROCKINGHAM COUNTY

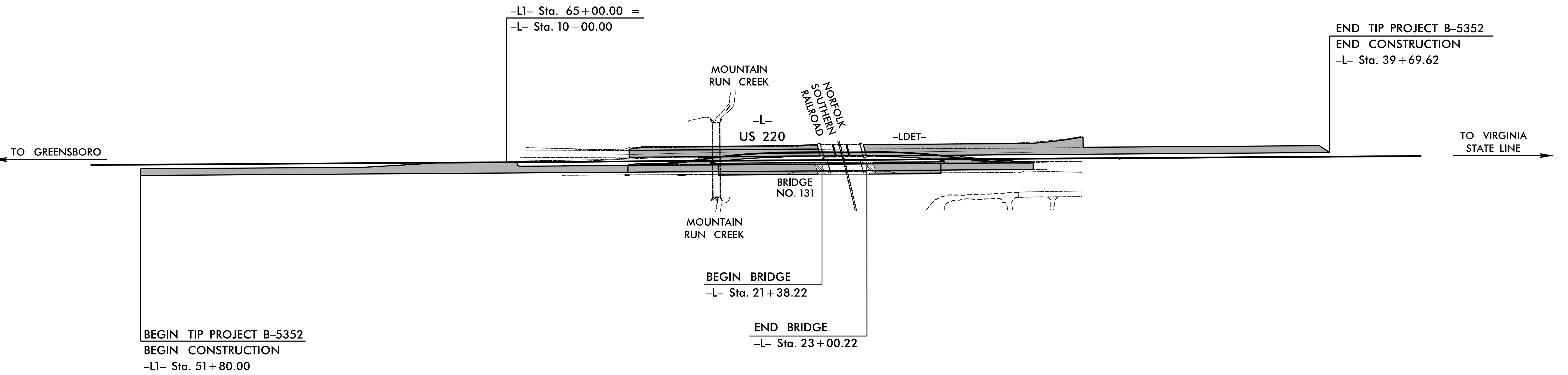
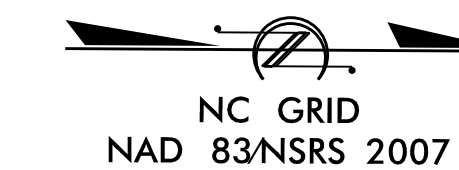
LOCATION: BRIDGE NO. 131 ON US 220 NBL OVER NORFOLK SOUTHERN RAILROAD

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



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5352		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46066.1.1	BRNHS-0220(67)	P.E.	
46066.2.1	BRNHS-0220(67)	RIGHT-OF-WAY	
46066.2.1	BRNHS-0220(67)	UTILITIES	
46066.3.1	BRNHS-0220(67)	CONSTRUCTION	

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



STRUCTURES

DESIGN DATA

ADT 2018 = 19336 VPD
 ADT 2040 = 30100 VPD
 DHV = 11%
 D = 55%
 T = 23%*
 V = 65 MPH
 V_{DET} = 55 MPH
 * TTST=14% DUAL=9%
 FUNC CLASS= RURAL FREEWAY
 (FUTURE INTERSTATE)
 "STATEWIDE TIER"

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5352 = 0.781 MILES
 LENGTH STRUCTURES TIP PROJECT B-5352 = 0.031 MILES
 TOTAL LENGTH TIP PROJECT B-5352 = 0.812 MILES

PLANS PREPARED FOR
THE NCDOT BY:

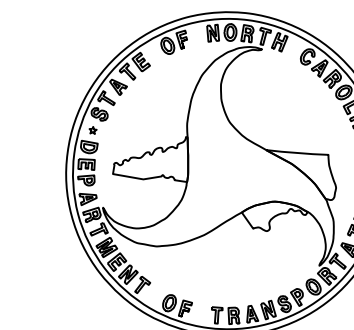


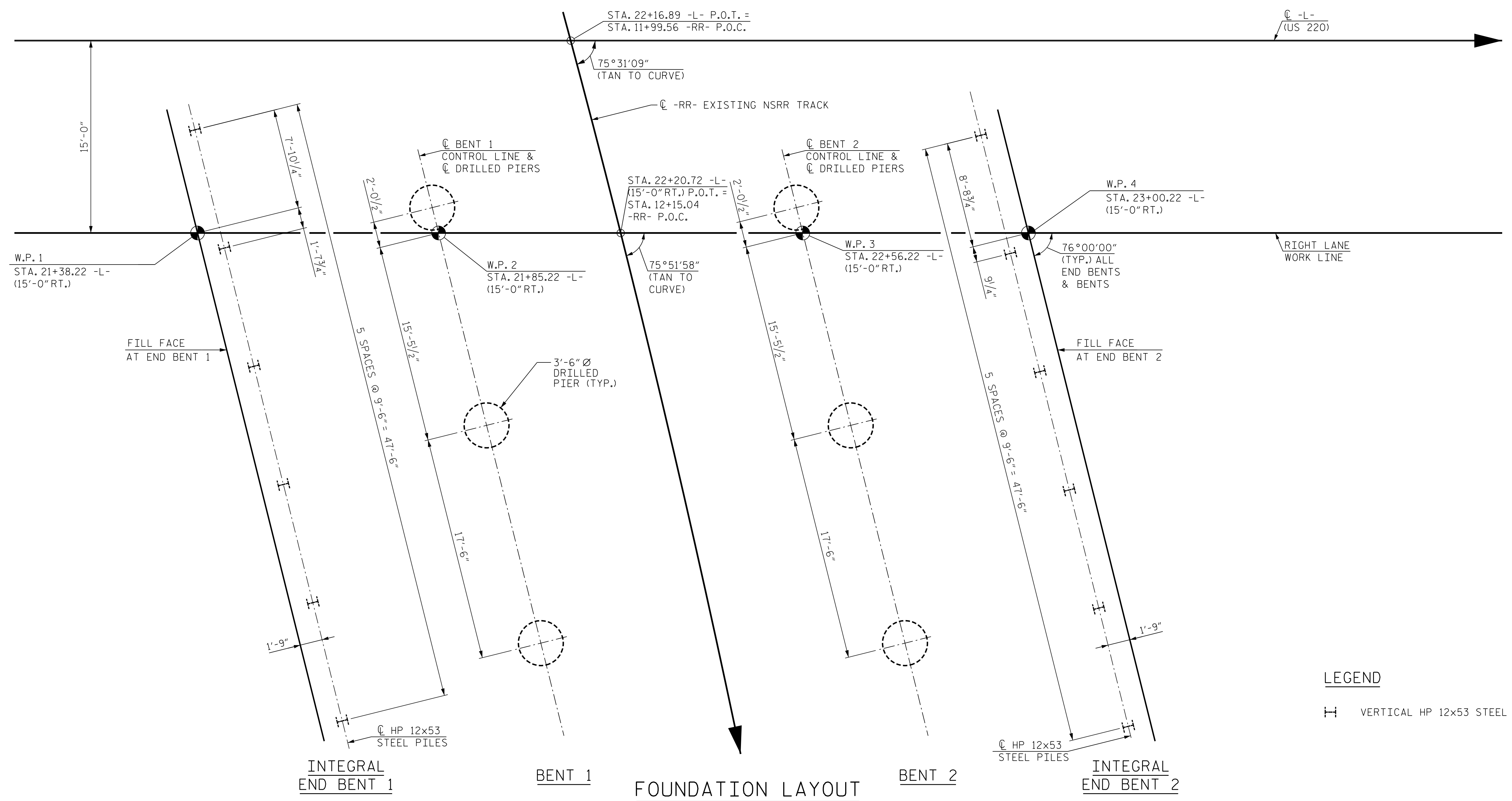
2018 STANDARD SPECIFICATIONS

LETTING DATE:
MAY 15, 2018



DocuSigned by:
Matthew Newbessel
84E318F9E30749E... 2/20/2018





LEGEND
 VERTICAL HP 12x53 STEEL PILE

FOUNDATION LAYOUT

ALL PILES ARE HP 12x53 STEEL PILES.
 DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES.

FOUNDATION NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- DRILLED-IN PILES ARE REQUIRED FOR END BENT NO.1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 666 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO.1.
- TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 395 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 10 TSF.

- INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 645 FT WITH THE REQUIRED TIP RESISTANCE.
- DRILLED PIERS AT BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 390 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 5 TSF.
- INSTALL DRILLED PIERS AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 656 FT (LT), 651 FT (CL), AND 651 FT (RT) WITH THE REQUIRED TIP RESISTANCE.
- SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DRILLED PIER EXCAVATIONS AT BENT NO.1 AND BENT NO.2 WILL EXTEND INTO MATERIAL THAT DETERIORATES WHEN EXPOSED TO THE ELEMENTS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE AND PLACE CONCRETE IMMEDIATELY AFTER THE EXCAVATION IS COMPLETED.

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOUNDATION LAYOUT



DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018
 04E318F9E30749E

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

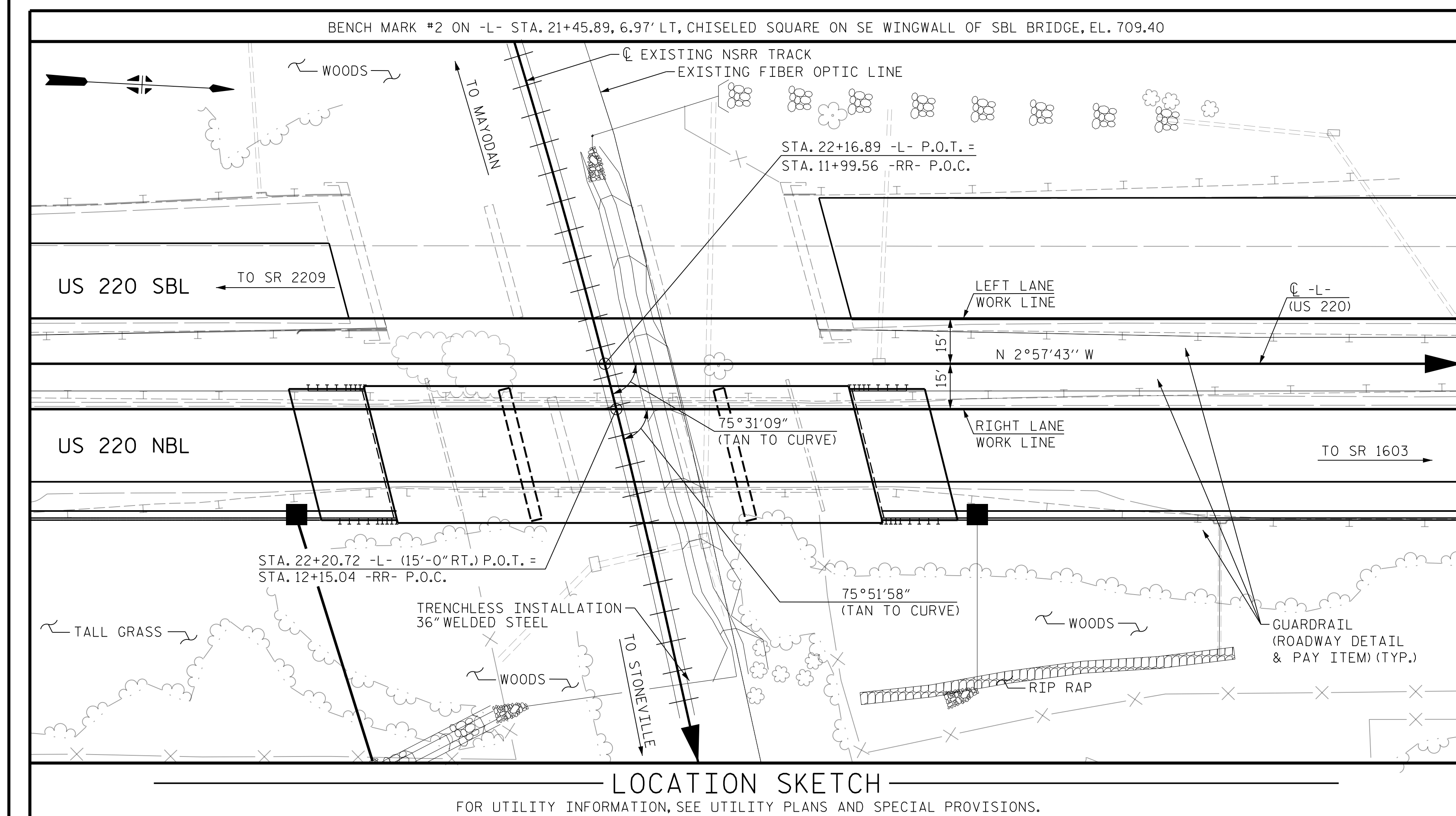
DRAWN BY : D. H. CARTER DATE : FEB 2018
 CHECKED BY : M. T. NEIHEISEL DATE : FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE : FEB 2018

ICA Engineering, Inc.
 555 Fayetteville St.,
 Suite 900
 Raleigh, NC 27601
 NC License No: F-0258

PLOT DRIVER: NCDOT STRUCTURES DEFAULT PLOTTER.PH
 USER: dcarter DATE: 2/19/2018 TIME: 1:41:45 PM
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TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STATION 22+16.89 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6" DIA. DRILLED PIER IN SOIL	3'-6" DIA. DRILLED PIER NOT IN SOIL	PDA TESTING	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 22+16.89 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, AT STATION 22+16.89 -L-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	36" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS		
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	EA.	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN.FT.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	SQ.YDS.	LUMP SUM
SUPERSTRUCTURE											7,331	8,136		LUMP SUM			18	948.38							LUMP SUM
END BENT NO. 1			160	70											4,923			6	6	300				306	
BENT NO. 1					76.8	30									15,585	3,774									
BENT NO. 2					72.4	24									14,617	3,375									
END BENT NO. 2															4,915			6	6	270	6		341		
TOTAL	LUMP SUM	LUMP SUM	160	70	149.2	54	1	1	1	LUMP SUM	7,331	8,136	146.8	LUMP SUM	40,040	7,149	18	948.38	12	12	570	6	320.6	647	LUMP SUM



GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

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

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR REMOVAL OF EXISTING STRUCTURE AT STATION 22+16.89."

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 22 FT TO THE LEFT, AND 51 FT TO THE RIGHT, OF THE RIGHT LANE WORK LINE AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL RAILROAD SECTION HAS BEEN EXCAVATED.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (1 @ 40'-3", 1 @ 40'-0", 1 @ 40'-3") WITH A REINFORCED CONCRETE DECK AND 2.5 IN WEARING SURFACE; ON STEEL W33-130 I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 28.0 FT; ON REINFORCED CONCRETE SPILL THROUGH ABUTMENTS AND REINFORCED CONCRETE CAP AND COLUMN BENTS LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

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

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

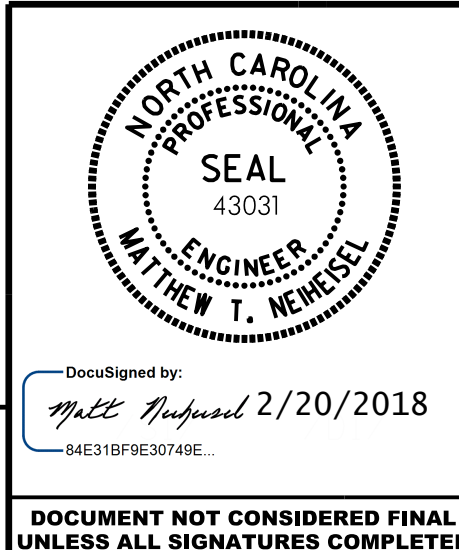
PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LOCATION SKETCH
AND GENERAL NOTES

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



DocuSigned by:
Matthew Neiheisel 2/20/2018
 84E318F9E30749E

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ICA Engineering, Inc.
555 Fayetteville St.,
Suite 900
Raleigh, NC 27601
NC License No: F-0258

DRAWN BY : D. H. CARTER DATE : FEB 2018
 CHECKED BY : M. T. NEIHEISEL DATE : FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE : FEB 2018

PLOT DRIVER: NCDOT_STRUCTURES_DEFAULT_PLOTTER.plt PENTABLE: NCDOT_STRUCTURES_DEFAULT_PEN.tbl
 USER: dcarter DATE: 2/19/2018 TIME: 1:41:51 PM
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVE-LOAD FACTORS (γ _L)	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ _L)	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.73	1.14	A	I	22.1	0.85	1.24	A	I	13.0	0.80	0.70	1.14	B	E	34.4		
	HL-93 (OPERATING)	N/A		1.48	--	1.35	0.73	1.48	A	I	22.1	0.85	2.23	A	I	13.0	N/A	---	---	---	---	---		
	HS-20 (INVENTORY)	36.000	②	1.40	50.400	1.75	0.73	1.40	A	I	22.1	0.85	1.69	A	I	31.2	0.80	0.70	1.49	B	E	34.4		
	HS-20 (OPERATING)	36.000		1.81	65.160	1.35	0.73	1.81	A	I	22.1	0.85	3.09	A	I	13.0	N/A	---	---	---	---	---		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.11	41.985	1.40	0.73	3.42	A	I	22.1	0.85	6.63	A	I	40.2	0.80	0.73	3.11	A	I	22.1	
		SNGARBS2	20.000		2.49	49.800	1.40	0.73	2.76	A	I	22.1	0.85	4.87	A	I	3.9	0.80	0.70	2.49	B	E	34.4	
		SNAGRIS2	22.000		2.36	51.920	1.40	0.73	2.69	A	I	17.5	0.85	4.59	A	I	40.2	0.80	0.70	2.36	B	E	34.4	
		SNCOTTS3	27.250		1.55	42.238	1.40	0.73	1.71	A	I	22.1	0.85	2.99	A	I	13.0	0.80	0.73	1.55	A	I	22.1	
		SNAGGRS4	34.925		1.37	47.847	1.40	0.73	1.51	A	I	22.1	0.85	2.34	A	I	13.0	0.80	0.73	1.37	A	I	22.1	
		SNS5A	35.550		1.33	47.282	1.40	0.73	1.47	A	I	22.1	0.85	2.68	A	I	13.0	0.80	0.73	1.33	A	I	22.1	
		SNS6A	39.950		1.24	49.538	1.40	0.73	1.38	A	I	22.1	0.85	2.31	A	I	13.0	0.80	0.70	1.24	B	E	34.4	
		SNS7B	42.000		1.19	49.980	1.40	0.73	1.32	A	I	22.1	0.85	2.45	A	I	13.0	0.80	0.70	1.19	B	E	34.4	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.52	50.160	1.40	0.73	1.70	A	I	22.1	0.85	3.20	A	I	40.2	0.80	0.70	1.52	B	E	34.4	
		TNT4A	33.075		1.53	50.605	1.40	0.73	1.71	A	I	22.1	0.85	2.90	A	I	13.0	0.80	0.70	1.53	B	E	34.4	
		TNT6A	41.600		1.25	52.000	1.40	0.73	1.44	A	I	22.1	0.85	2.69	A	I	13.0	0.80	0.70	1.25	B	E	34.4	
		TNT7A	42.000		1.26	52.920	1.40	0.73	1.47	A	I	22.1	0.85	2.28	A	I	13.0	0.80	0.70	1.26	B	E	34.4	
		TNT7B	42.000		1.30	54.600	1.40	0.73	1.53	A	I	22.1	0.85	2.19	A	I	13.0	0.80	0.70	1.30	B	E	34.4	
		TNAGRIT4	43.000		1.24	53.320	1.40	0.73	1.45	A	I	22.1	0.85	2.00	A	I	13.0	0.80	0.70	1.24	B	E	34.4	
TNAGR5A	45.000		1.17	52.650	1.40	0.73	1.35	A	I	22.1	0.85	2.25	A	I	13.0	0.80	0.70	1.17	B	E	34.4			
TNAGR5B	45.000		③	1.15	51.750	1.40	0.73	1.32	A	I	22.1	0.85	1.75	A	I	13.0	0.80	0.70	1.15	B	E	34.4		

LOAD FACTORS:

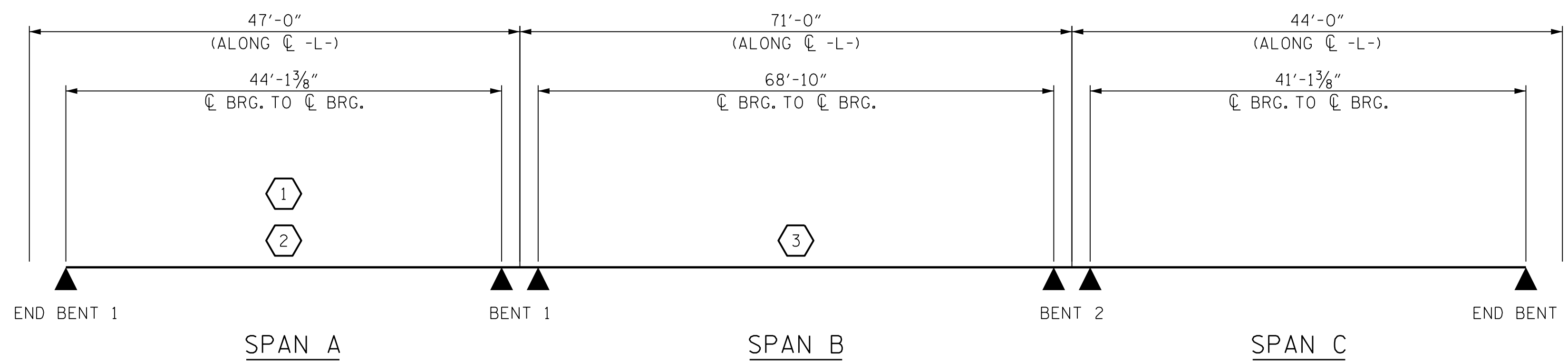
DESIGN LOAD RATING FACTORS	LIMIT STATE	γ _{DC}	γ _{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

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.

DISTANCE FROM LEFT END OF SPAN IS GIVEN WITH RESPECT TO THE CENTERLINE OF BEARING AND IS MEASURED ALONG THE CONTROLLING GIRDER.



③ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR GIRDER

PROJECT NO. B-5352

ROCKINGHAM COUNTY

STATION: P.O.T. 22+16.89 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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



DocuSigned by:
Matthew Neiheisel 2/20/2018

REVISIONS

BY:	DATE:	NO.	BY:	DATE:
		③		
		④		

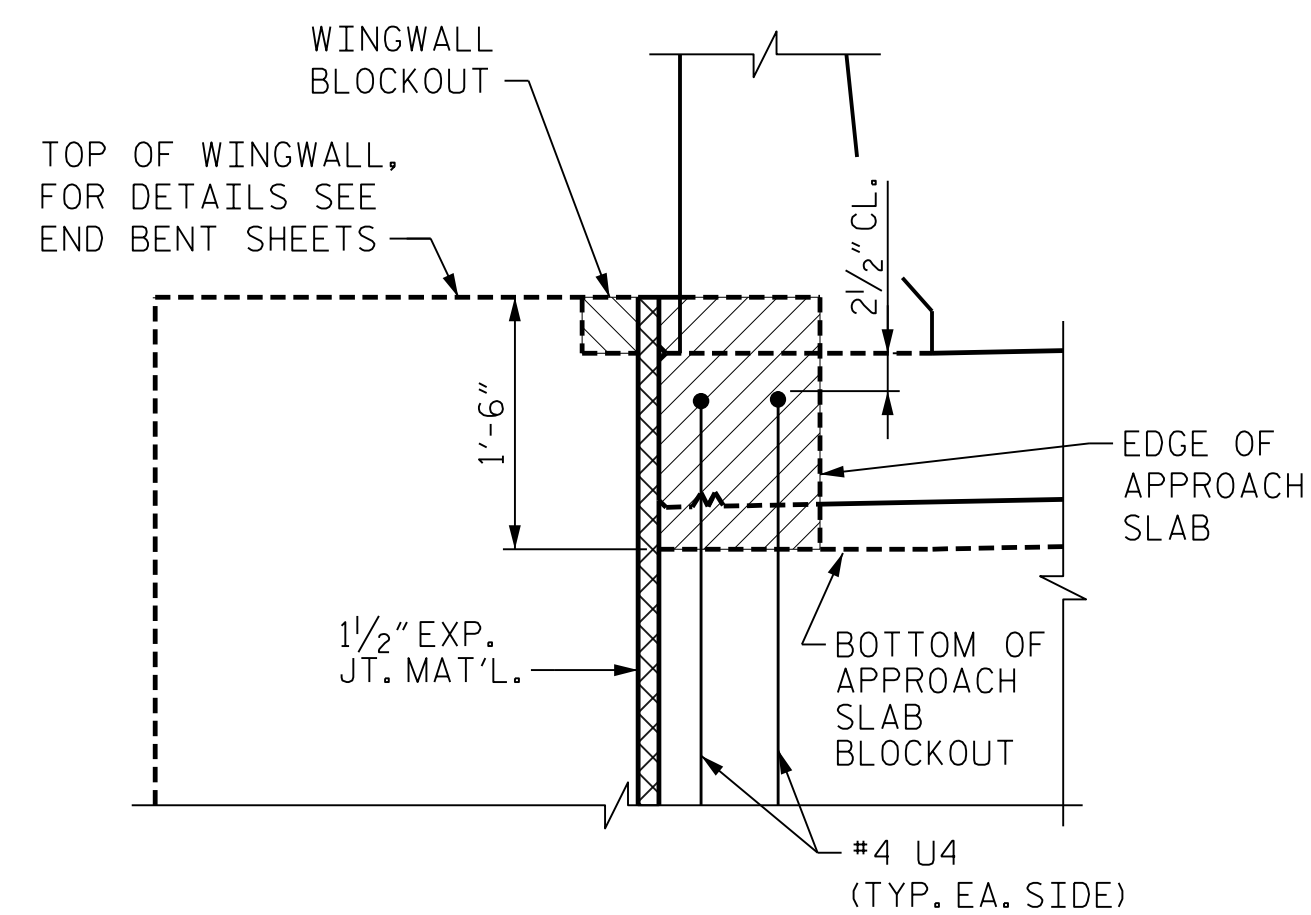
SHEET NO.
S-4
TOTAL SHEETS
37

DRAWN BY : D. H. CARTER DATE : FEB 2018
 CHECKED BY : M. T. NEIHEISEL DATE : FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE : FEB 2018

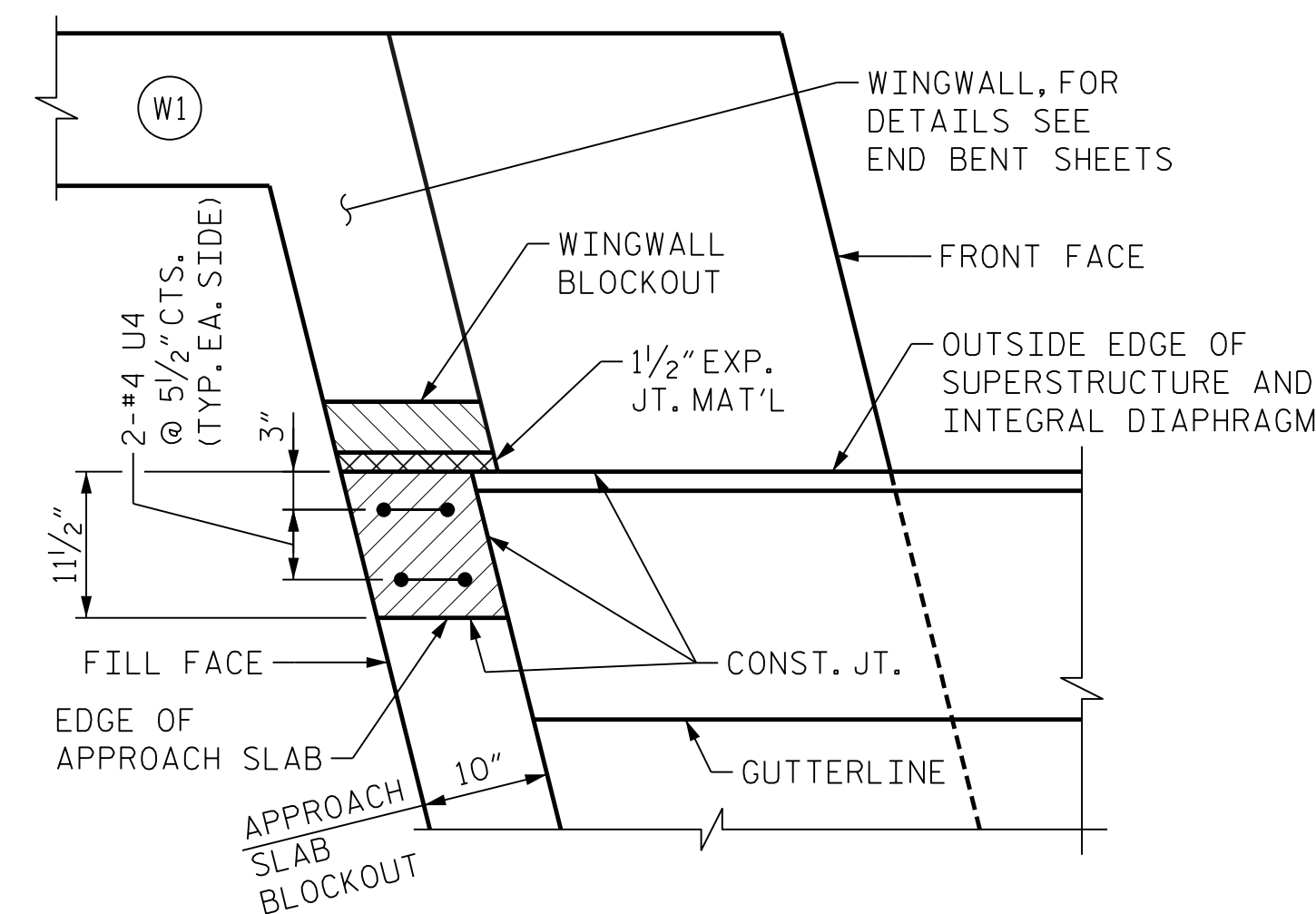
ICA Engineering, Inc.
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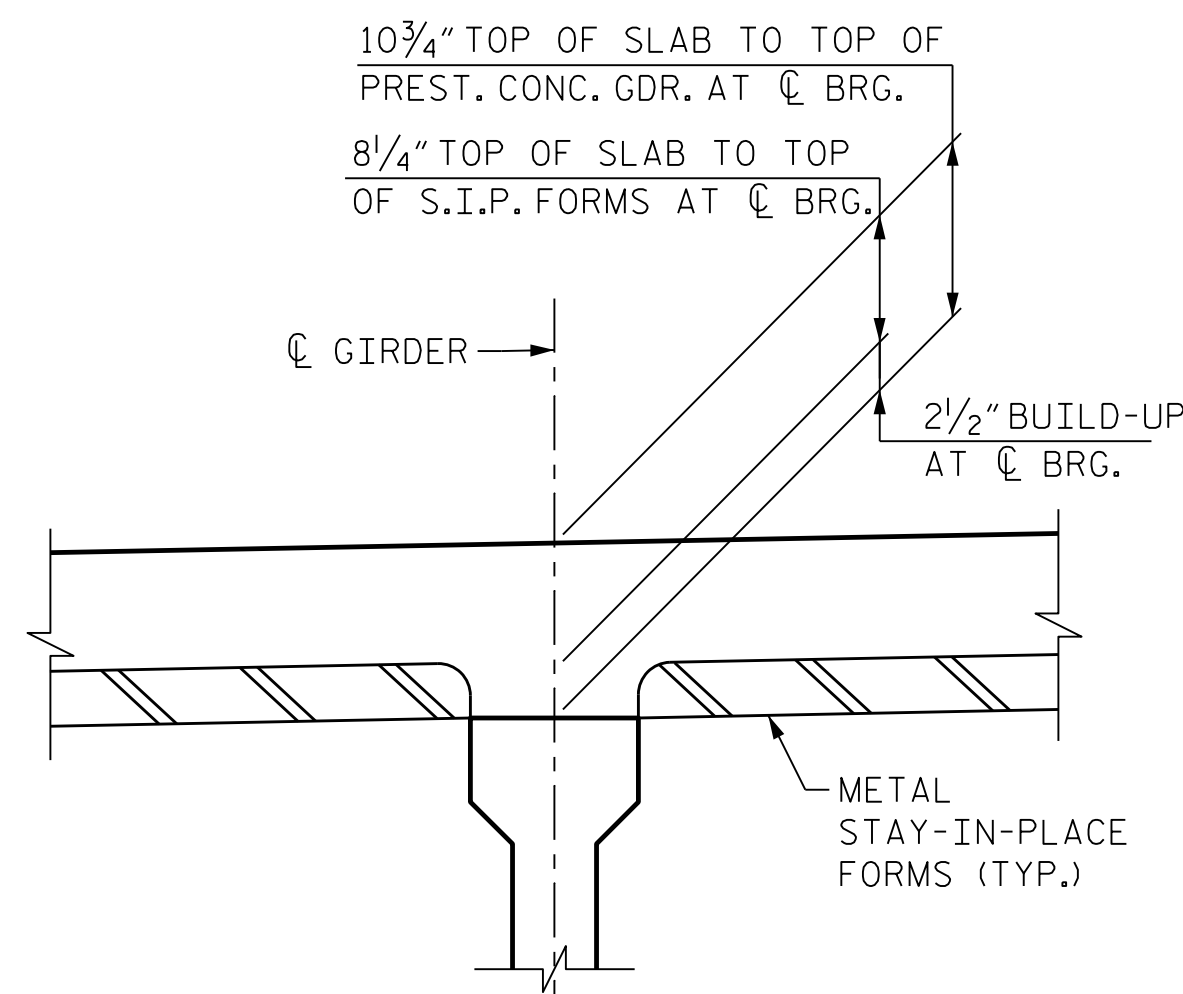


BLOCKOUT DETAIL - ELEVATION VIEW



BLOCKOUT DETAIL - PLAN VIEW

END BENT 1 SHOWN, END BENT 2 SIMILAR.



DETAIL "A"

(TYPICAL EACH GIRDER @ EACH BENT)

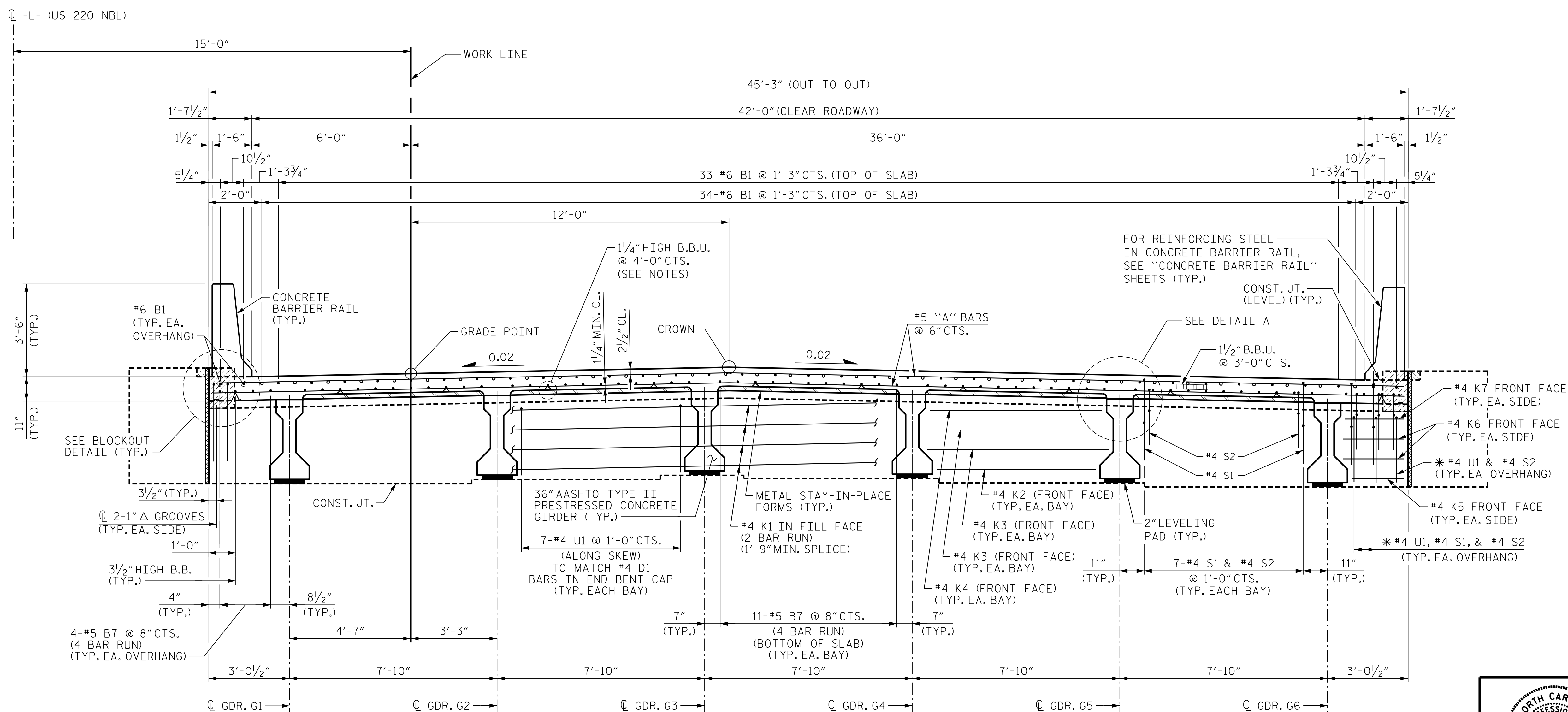
NOTES:

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

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

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

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



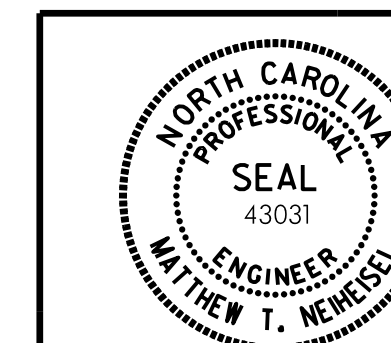
TYPICAL SECTION AT INTEGRAL END BENTS

* TO MATCH #4 D1 BARS IN END BENT CAP

PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTIONS



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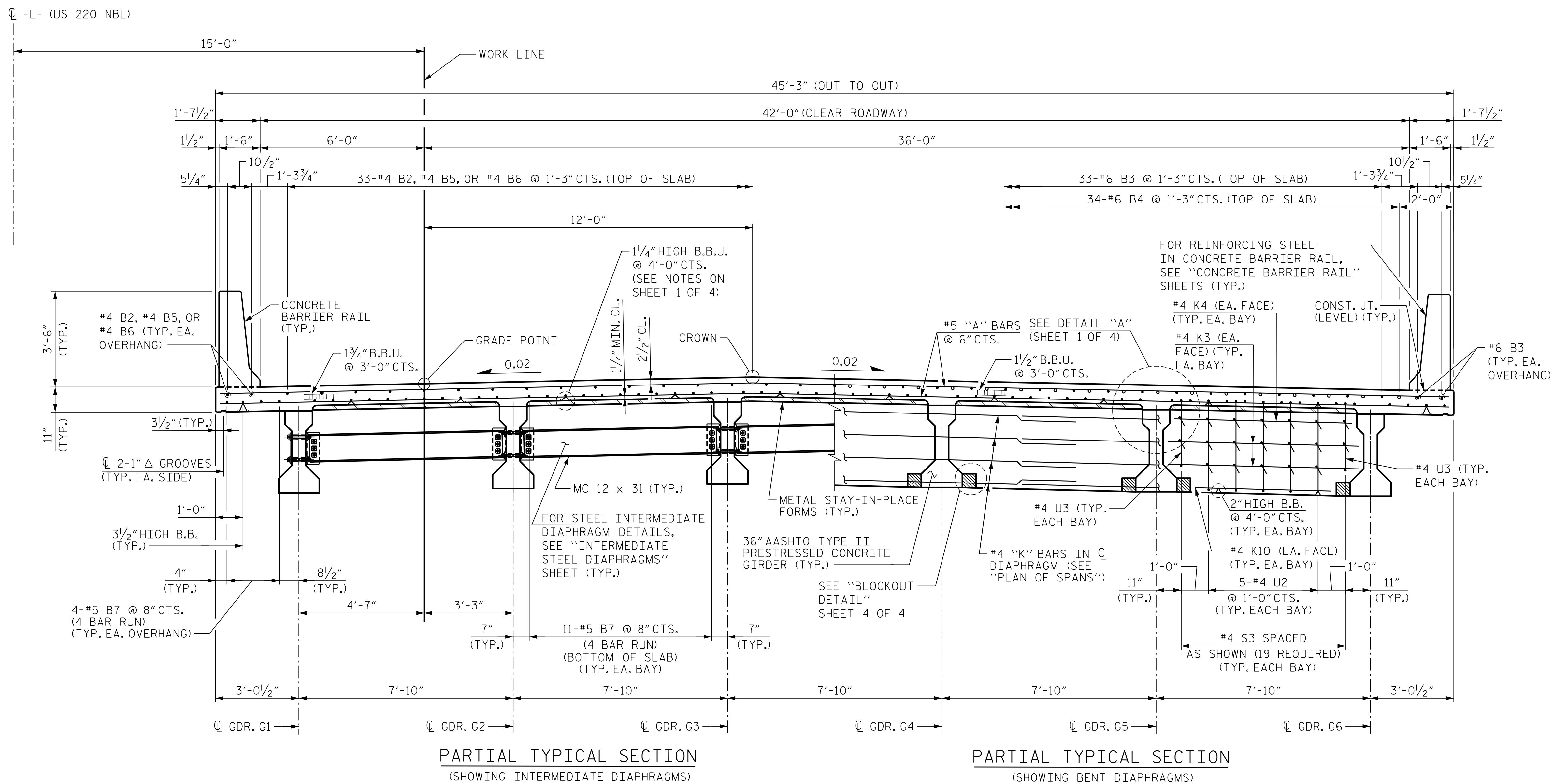
REVISIONS				SHEET NO.	
BY:	DATE:	NO.	BY:	DATE:	S-5
		3			TOTAL SHEETS
		4			37

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NOTES:
FOR ADDITIONAL NOTES, SEE SHEET 1 OF 4.



PARTIAL TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)

PARTIAL TYPICAL SECTION
(SHOWING BENT DIAPHRAGMS)

TYPICAL SECTION

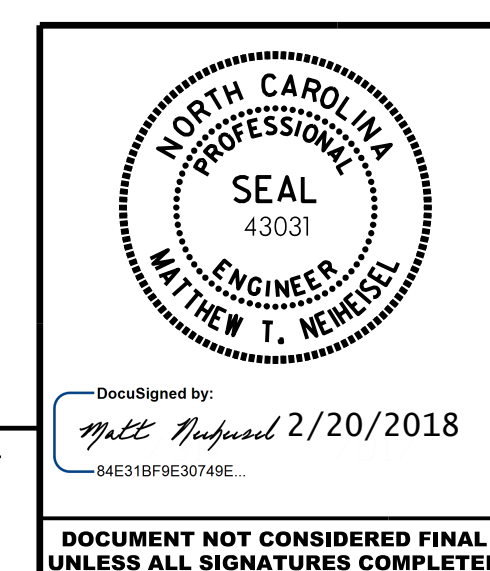
PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTIONS

REVISIONS				SHEET NO.
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		3		
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SHEET NO. S-6
TOTAL SHEETS 37

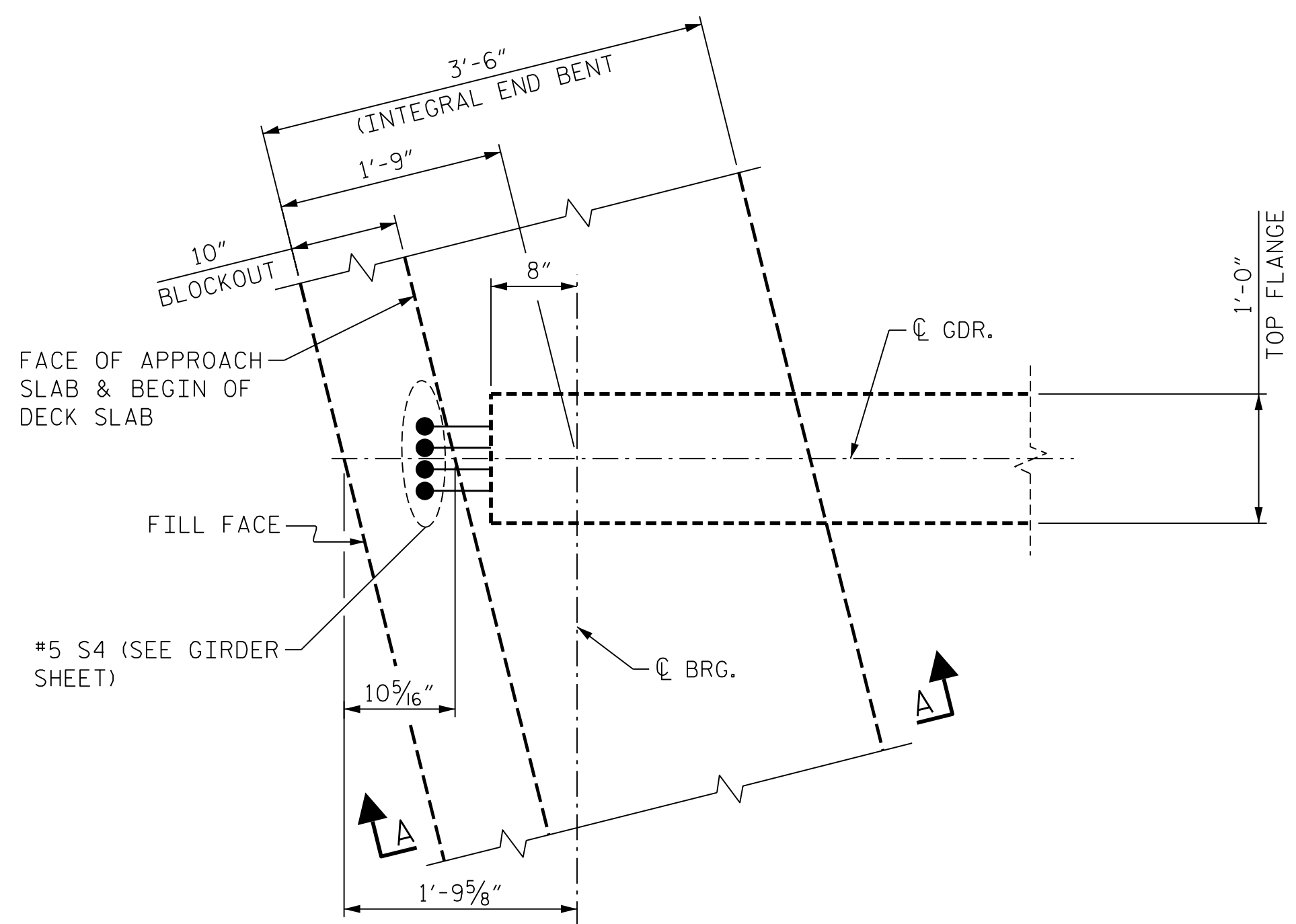


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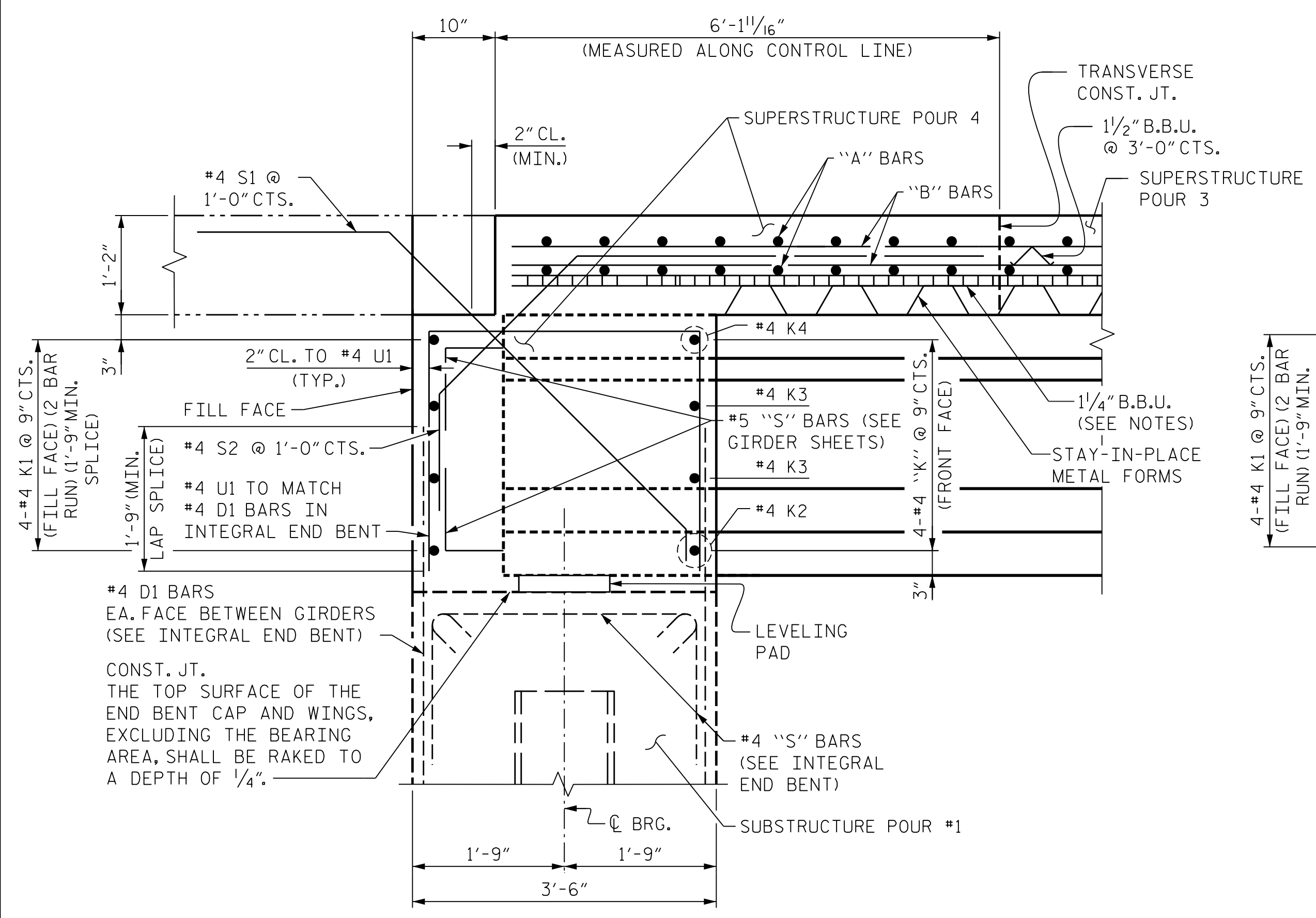
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CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
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NOTES:
FOR ADDITIONAL NOTES, SEE SHEET 1 OF 4.

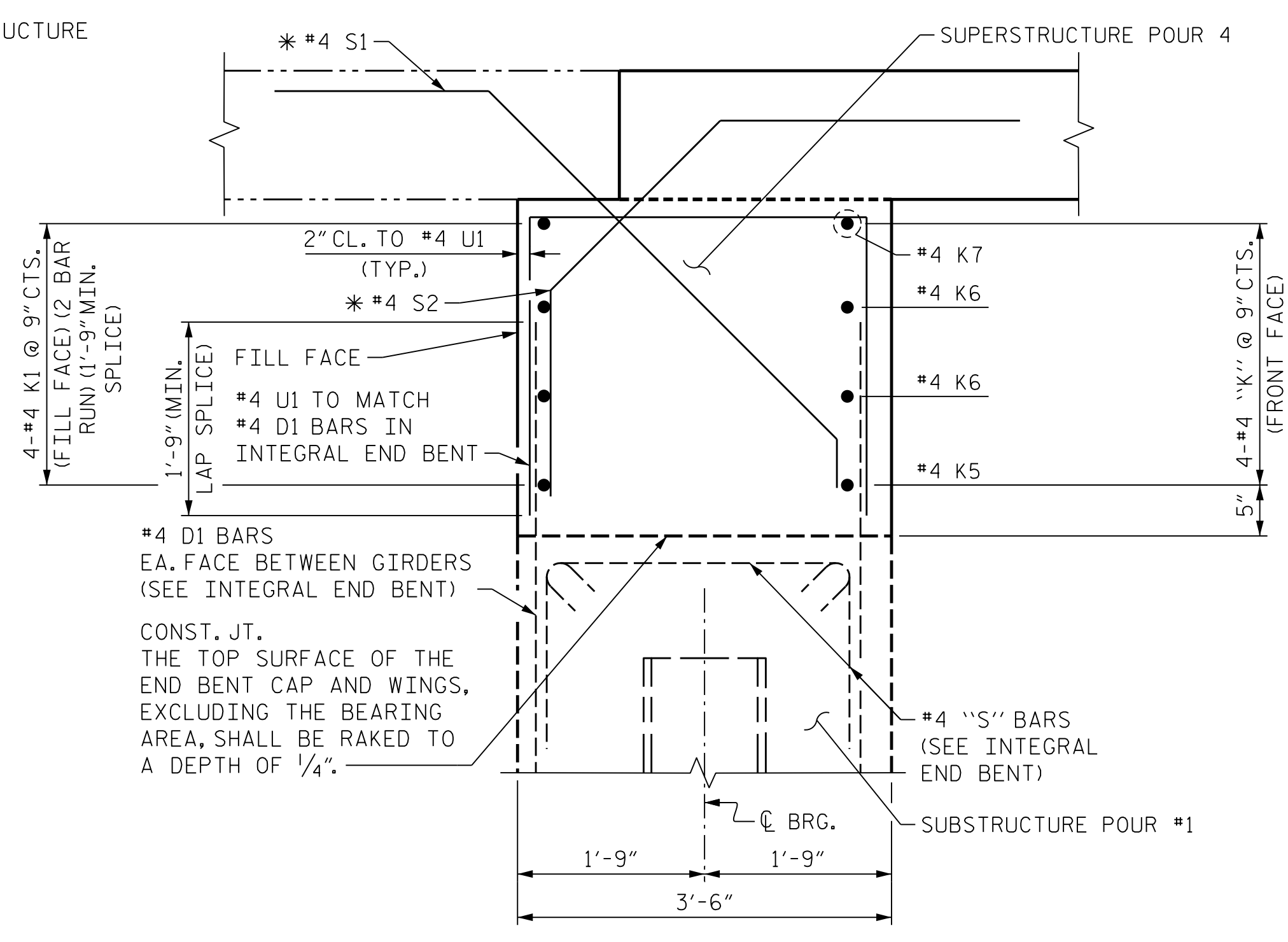


PLAN OF GIRDER AT INTEGRAL END BENT 1



SECTION A-A
SECTION THROUGH INTEGRAL END BENT 1
INSIDE OF GIRDERS

(DIMENSIONS ARE PERPENDICULAR TO CAP UNLESS NOTED OTHERWISE)
END BENT 1 SHOWN, END BENT 2 SIMILAR

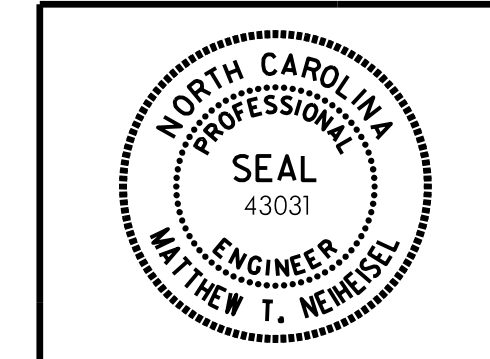


SECTION THROUGH INTEGRAL END BENT 1
OUTSIDE OF GIRDERS

(DIMENSIONS ARE PERPENDICULAR TO CAP UNLESS NOTED OTHERWISE)
END BENT 1 SHOWN, END BENT 2 SIMILAR
* TO MATCH D1 BARS IN END BENT CAP

PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION DETAILS



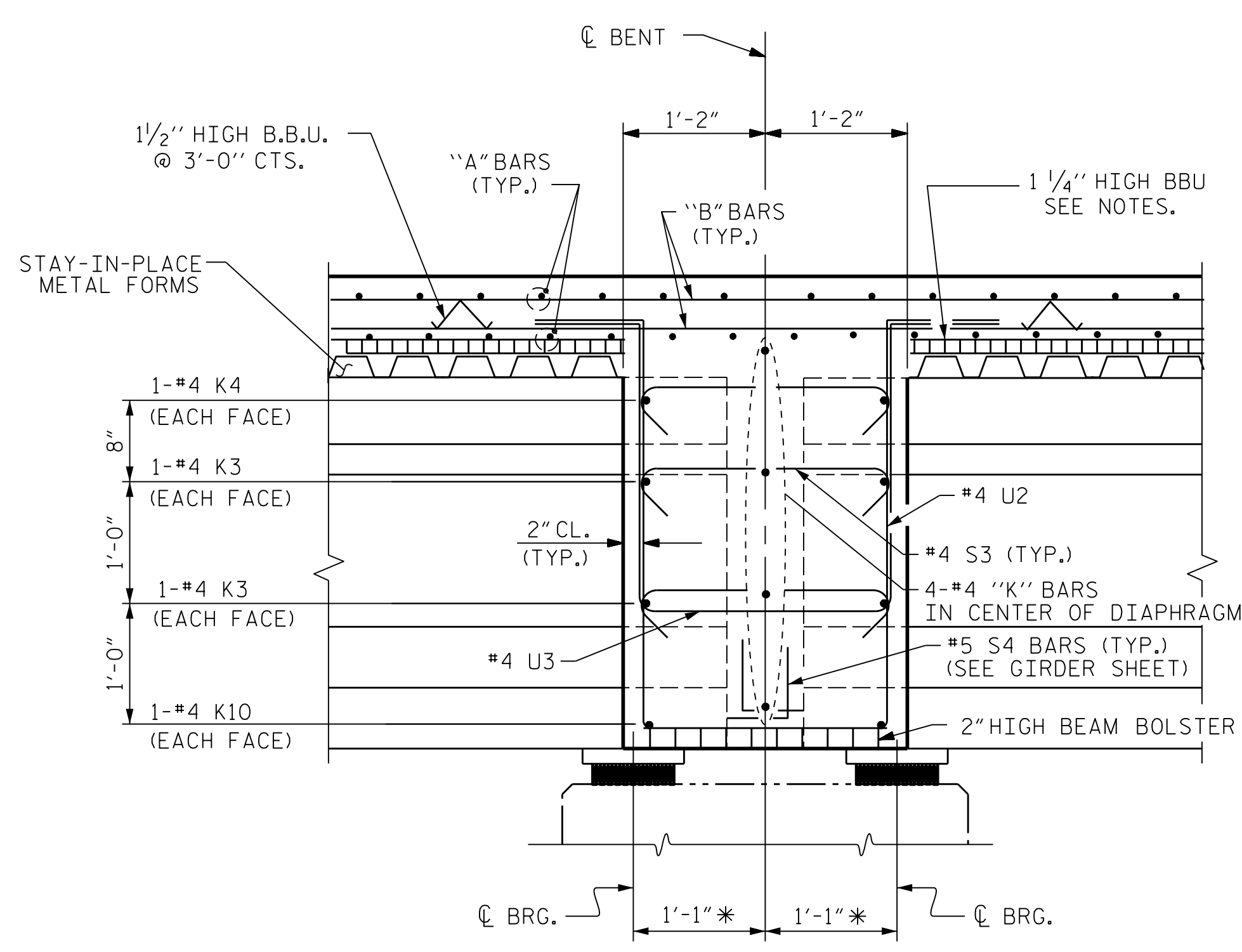
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44E31BF9E30749E

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BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
		3			S-7
		4			TOTAL SHEETS 37

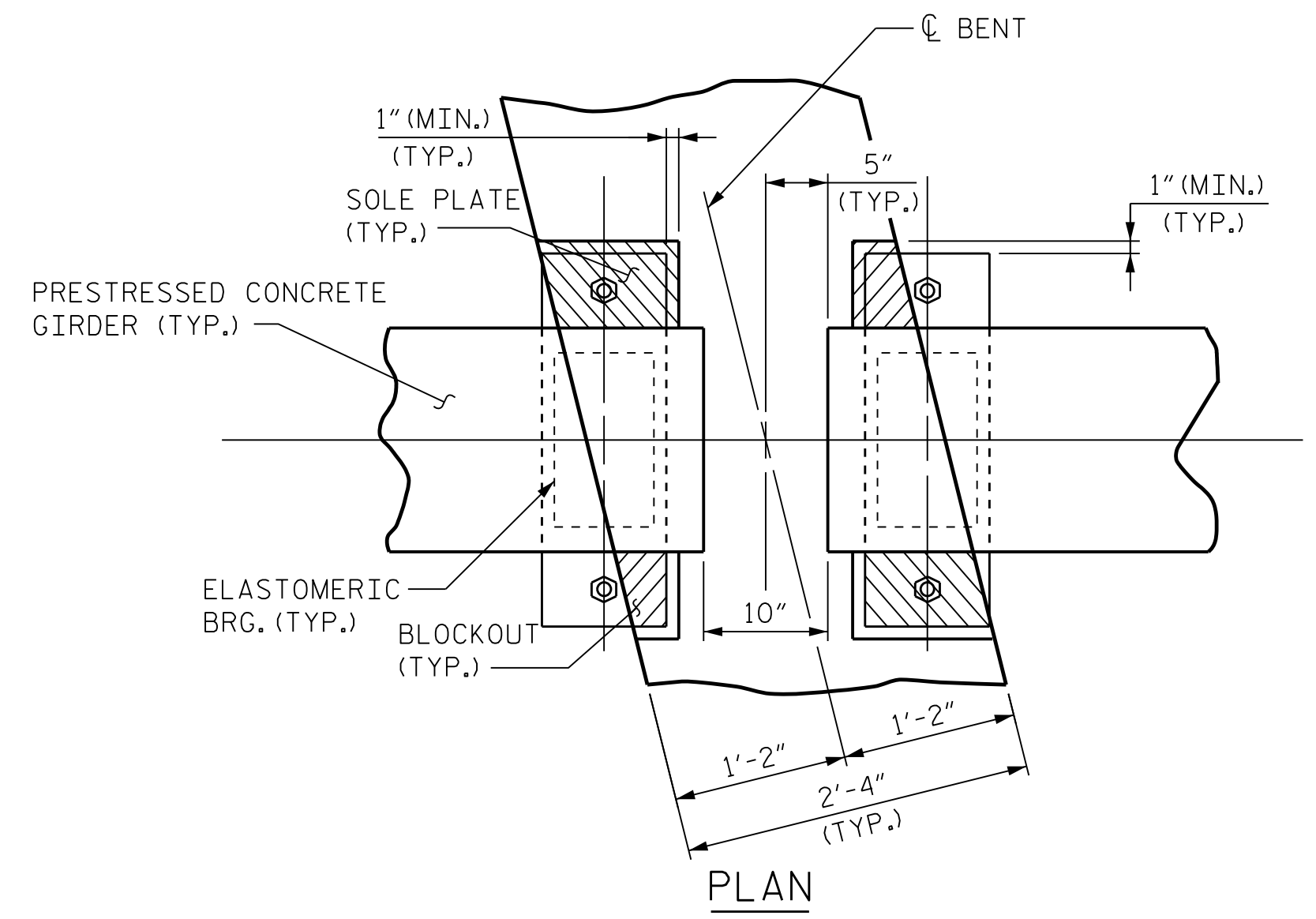
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Raleigh, NC 27601
NC License No: F-0258

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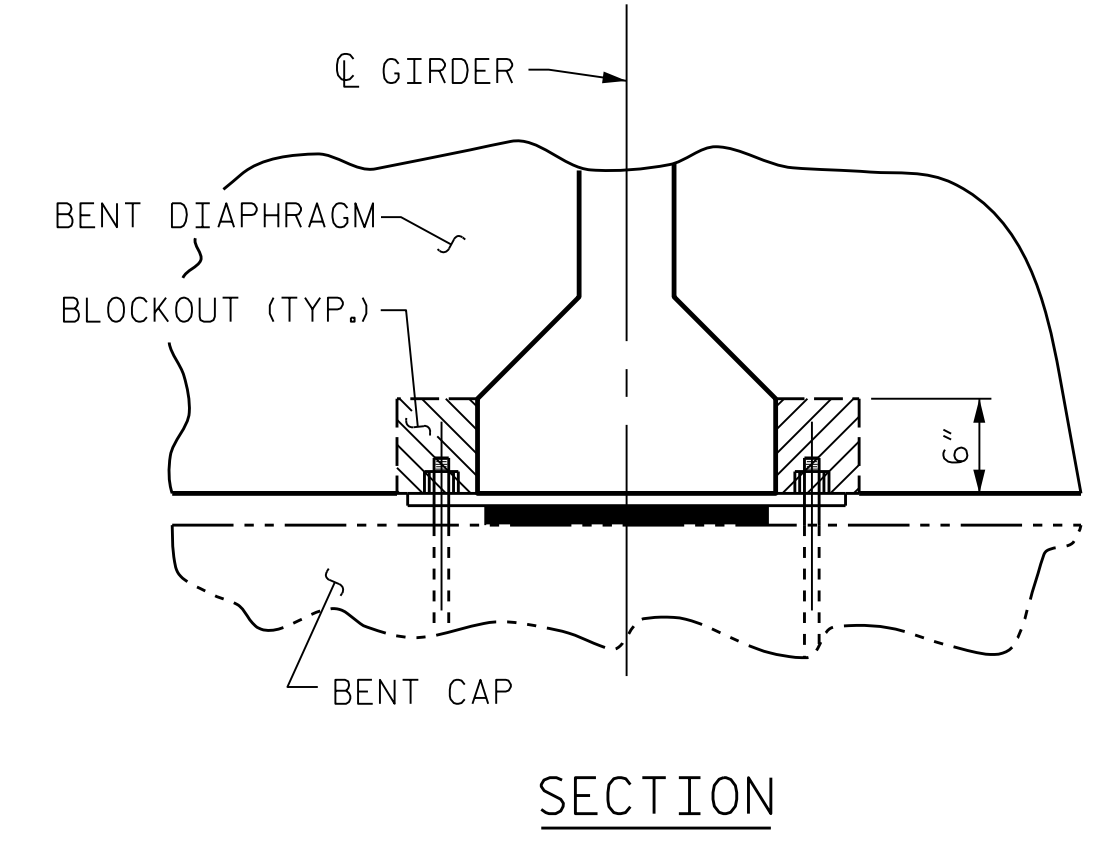
NOTES:
FOR ADDITIONAL NOTES, SEE SHEET 1 OF 4.



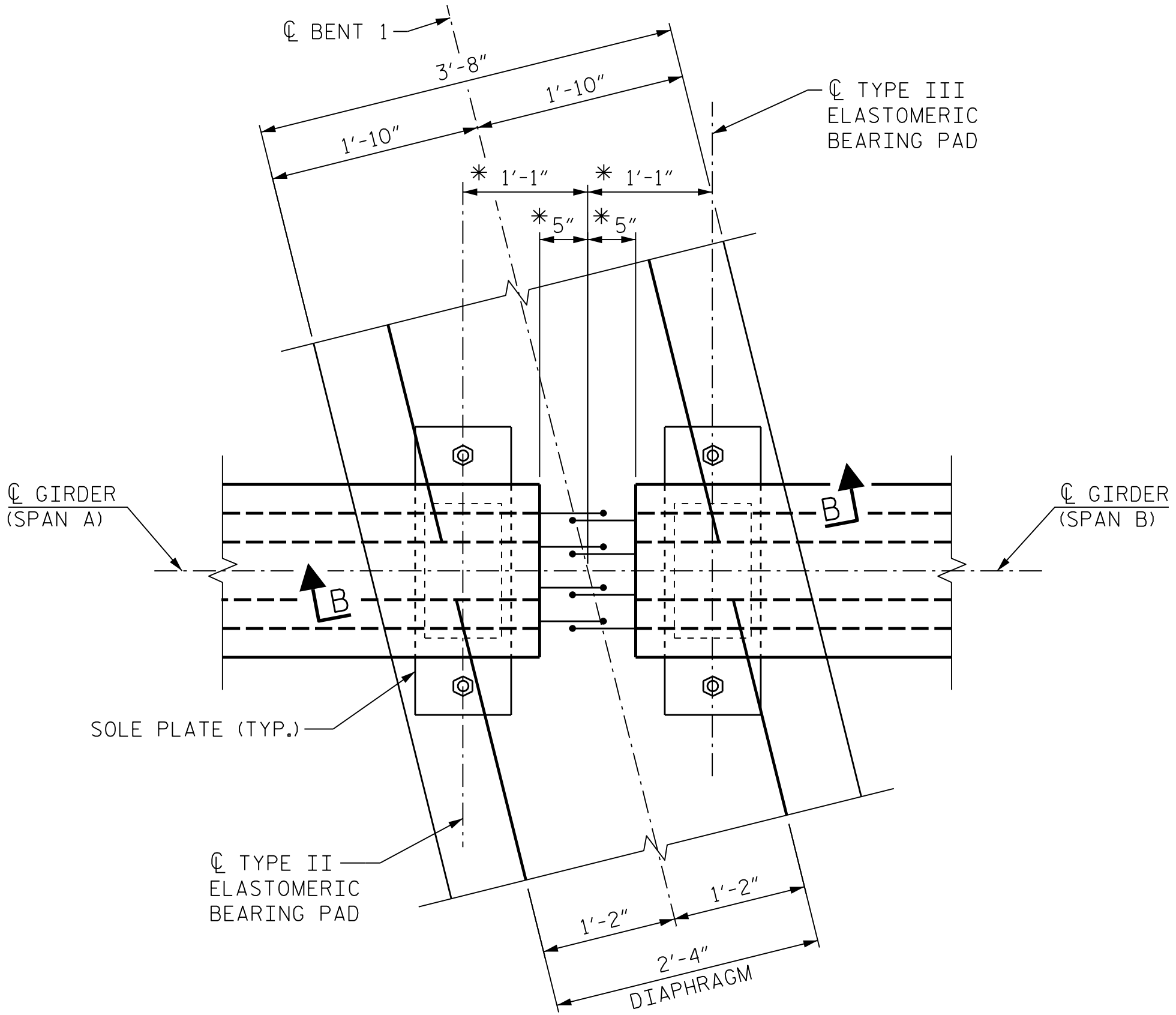
SECTION B-B
SECTION THRU BENT DIAPHRAGM
(DIMENSIONS SHOWN ARE NORMAL TO THE BENT)
* MEASURED ALONG ϕ GIRDER



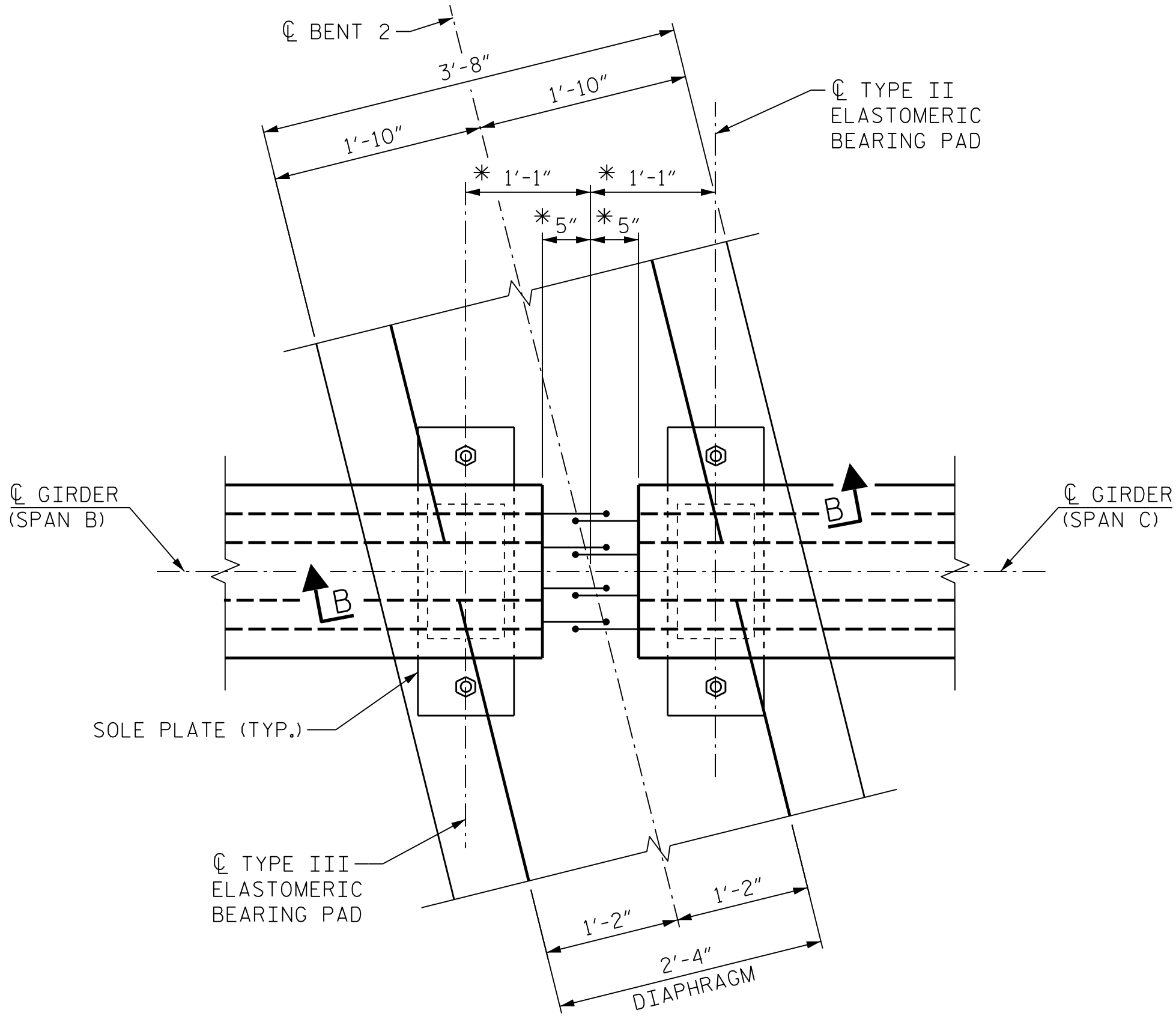
BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION



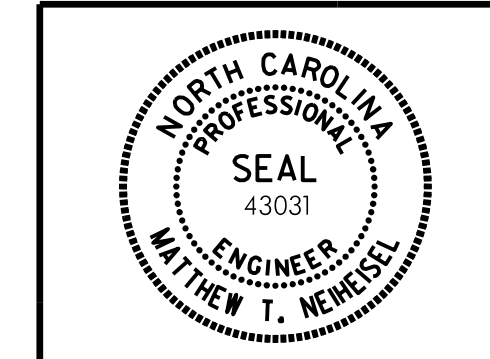
PLAN DETAIL OF BENT 1 DIAPHRAGM
(CONTINUOUS DECK SLAB NOT SHOWN FOR CLARITY)
* MEASURED ALONG ϕ GIRDER



PLAN DETAIL OF BENT 2 DIAPHRAGM
(CONTINUOUS DECK SLAB NOT SHOWN FOR CLARITY)
* MEASURED ALONG ϕ GIRDER

PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-
SHEET 4 OF 4

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE
TYPICAL SECTION DETAILS



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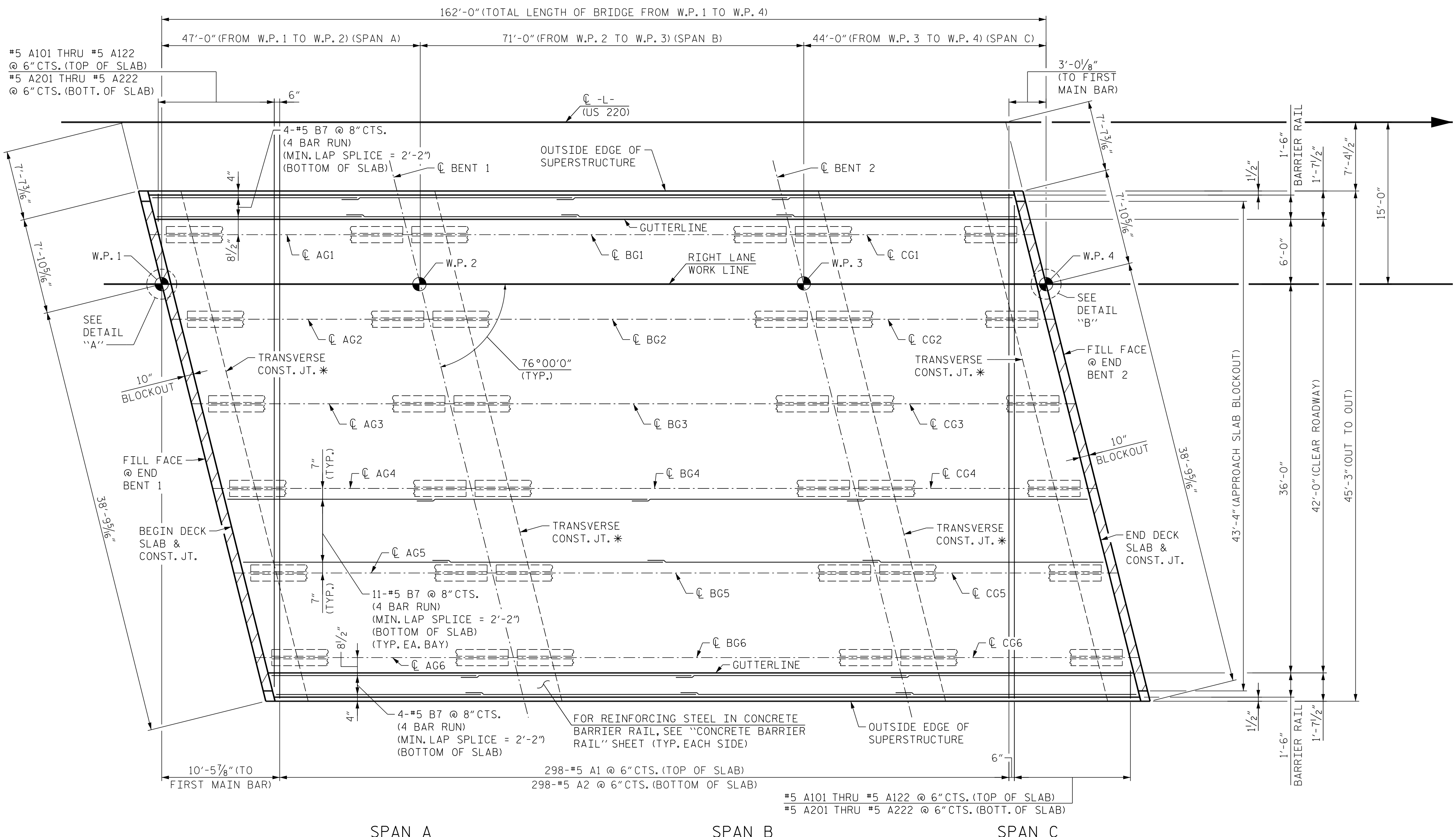
REVISIONS				SHEET NO.
BY:	DATE:	NO.	BY:	DATE:
		3		
		4		

TOTAL SHEETS: 37

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CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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SPAN A

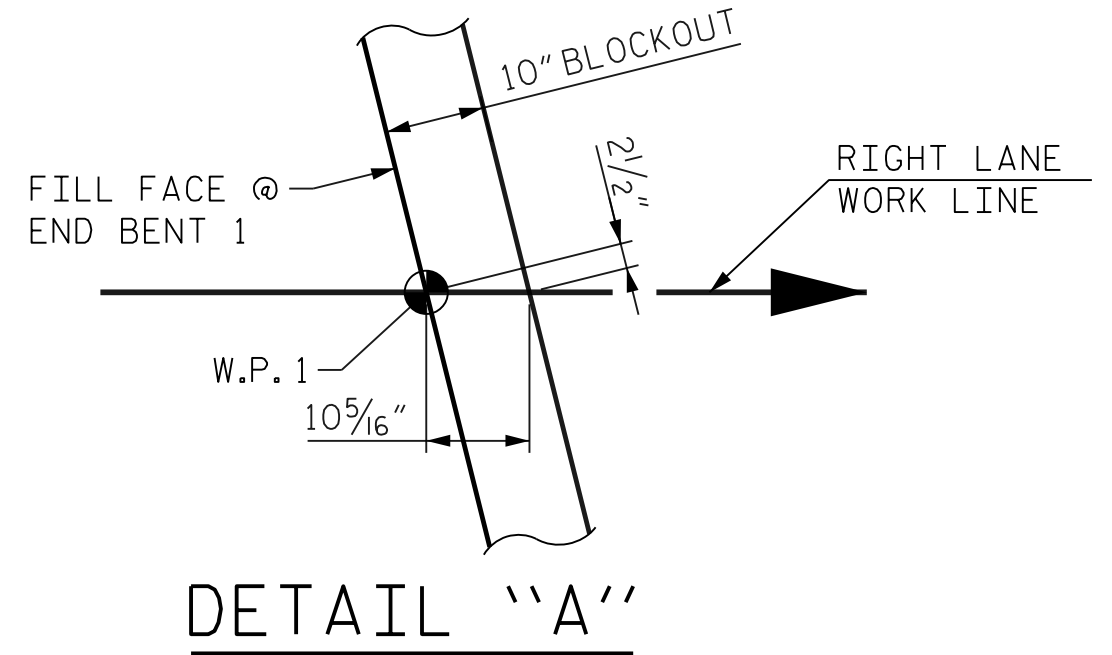
SPAN B

SPAN C

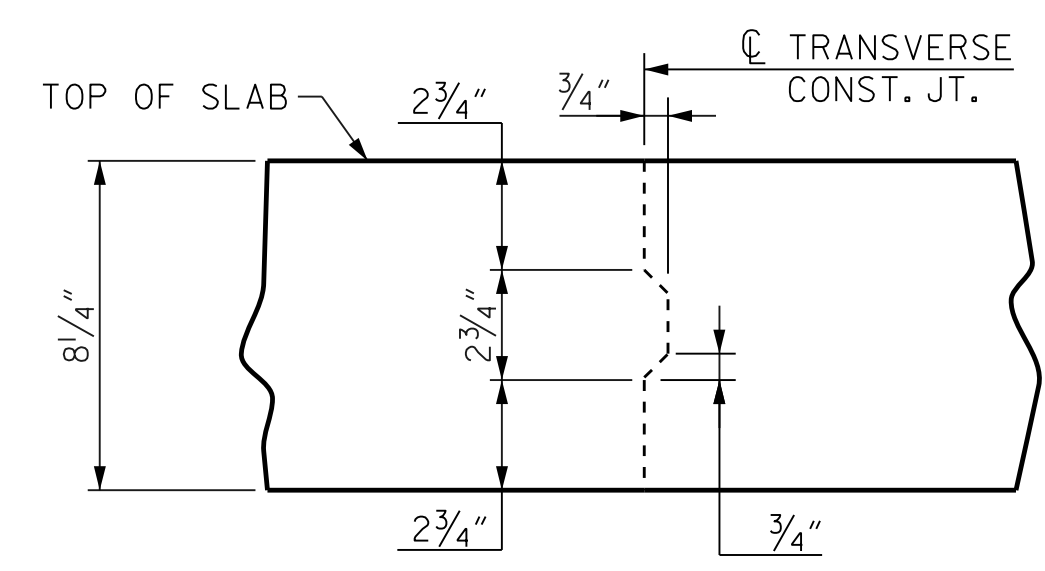
* FOR LOCATION OF TRANSVERSE JOINTS, SEE "BILL OF MATERIAL", SHEET 1 OF 2.

PLAN OF SPANS A, B, & C

FOR REINFORCING STEEL IN END BENTS, SEE "PLAN OF SPAN DETAILS" SHEET. FOR LONGITUDINAL BARS IN TOP OF SLAB, SEE "B BAR LAYOUT" SHEET.

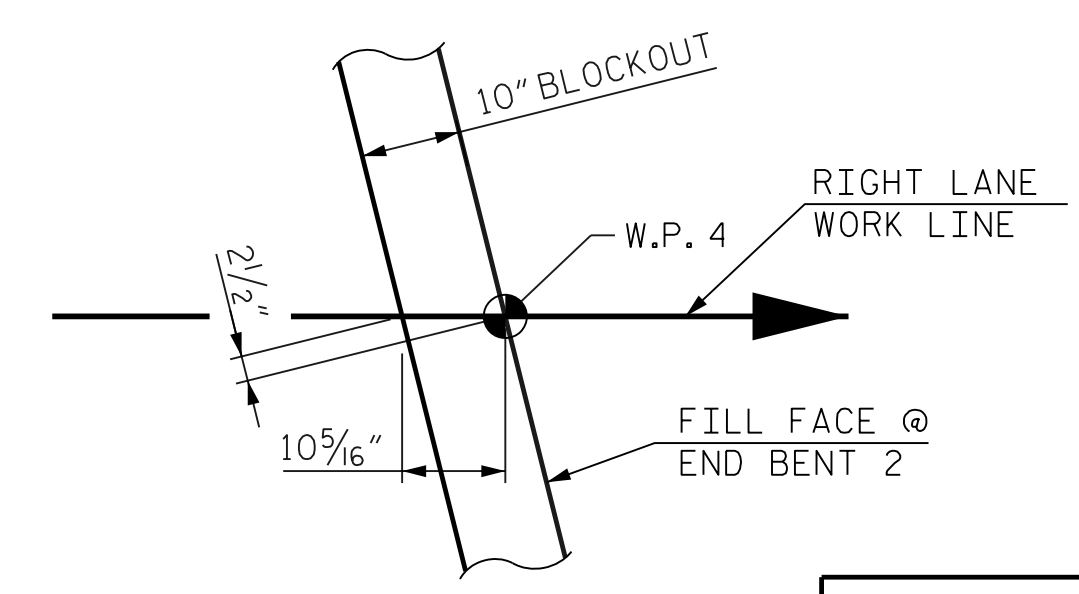


DETAIL "A"



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



DETAIL "B"

PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
A, B, & C



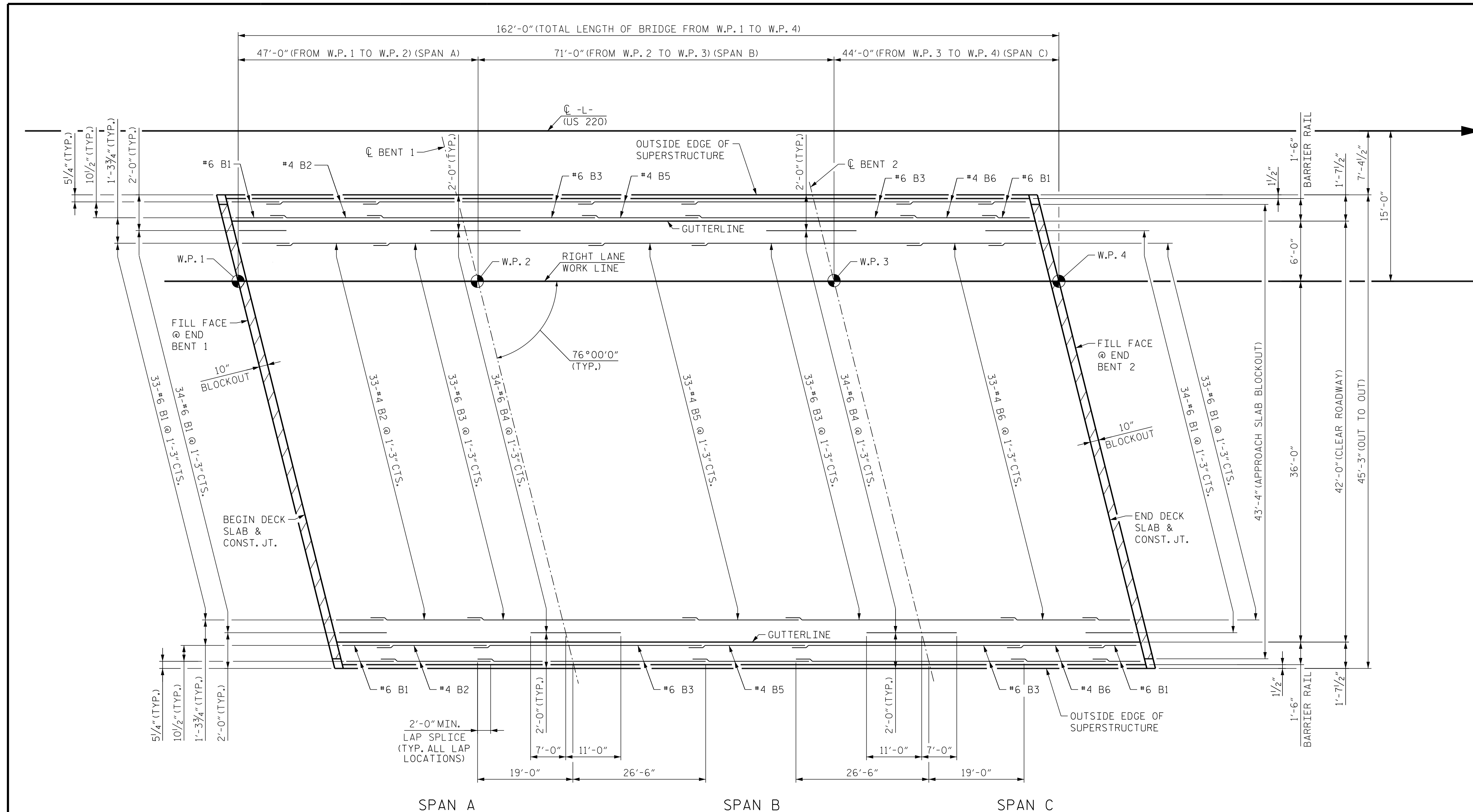
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BY:	DATE:	NO.	BY:	DATE:		SHEET NO.
		3				TOTAL SHEETS
		4				37

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DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL
DATE: FEB 2018
DATE: FEB 2018
DATE: FEB 2018



PLAN OF TOP OF SLAB "B" BAR LAYOUT

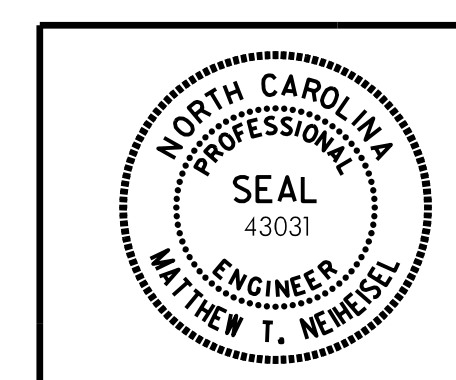
PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
 "B" BAR LAYOUT

REVISIONS				SHEET NO.
BY:	DATE:	NO.	DATE:	S-10
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		4		37

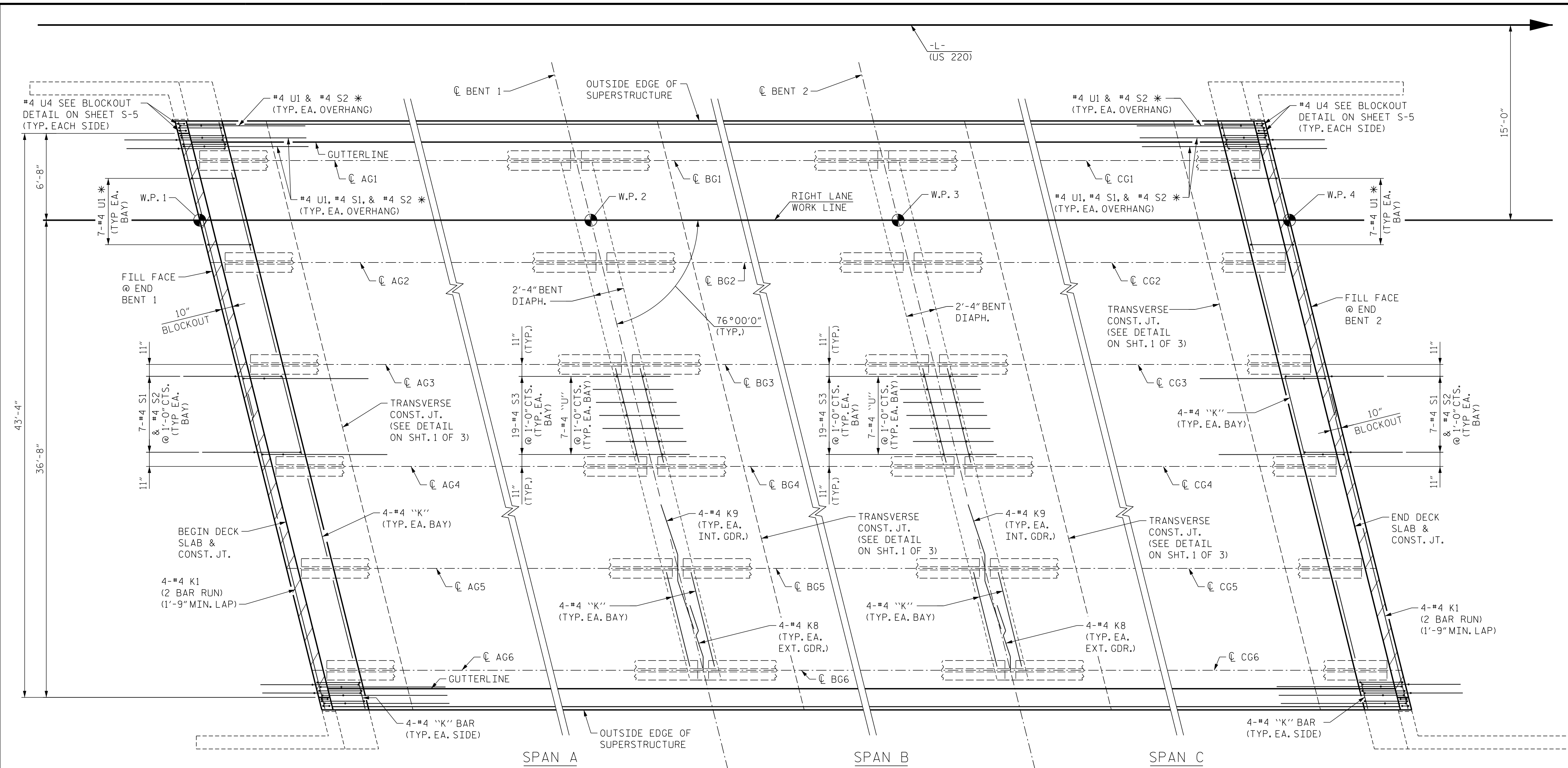


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PLAN OF UPPER END BENT CAP AND BENT DIAPHRAGMS

* TIE TO #4 D1 BARS FROM END BENT CAP

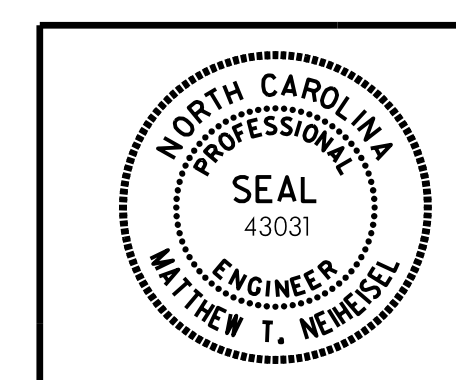
PROJECT NO. B-5352

ROCKINGHAM COUNTY

STATION: P.O.T. 22+16.89 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN
DETAILS



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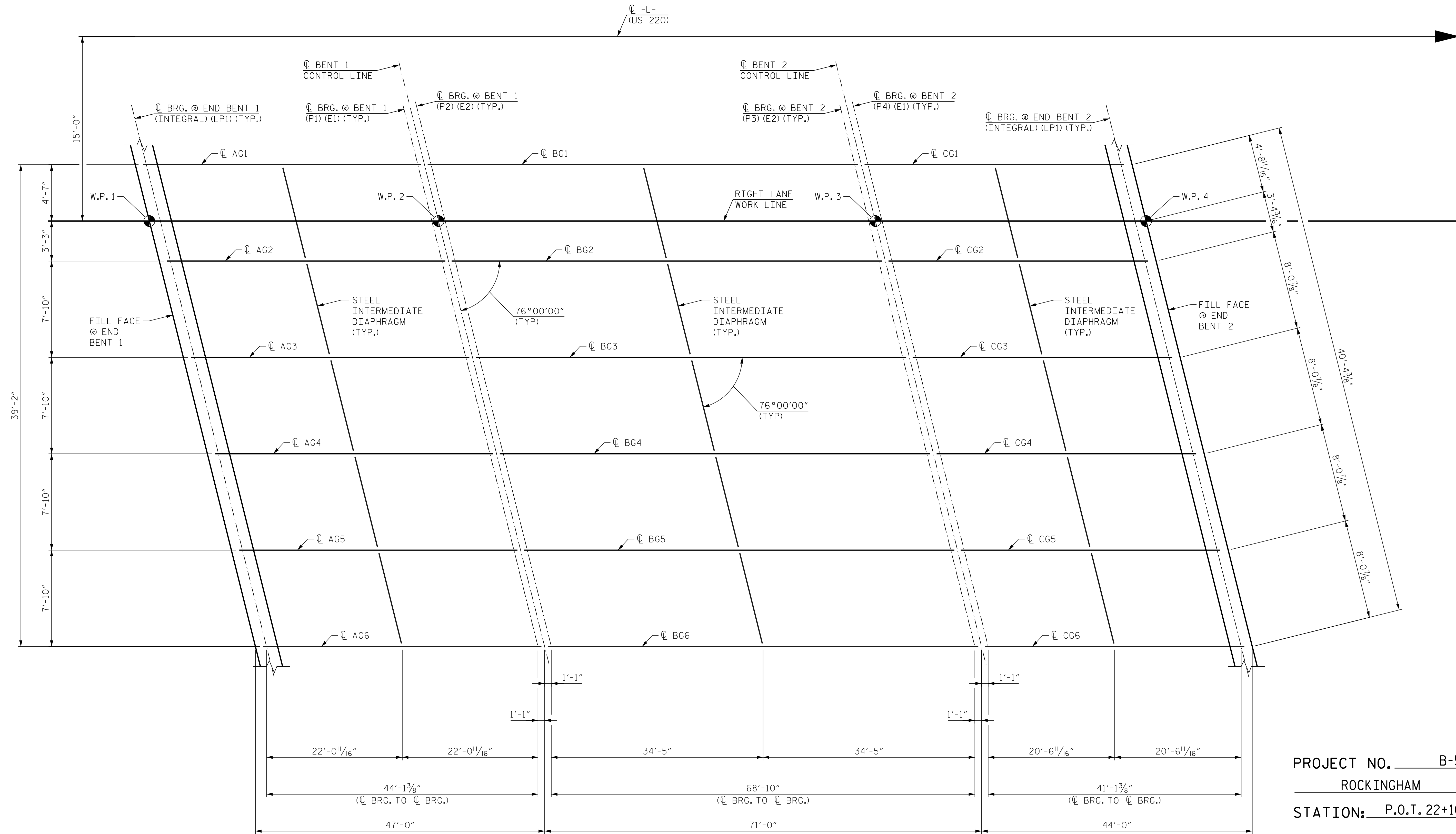
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DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE : FEB 2018

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CL -L-
(US 220)



PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-

SPAN A SPAN B SPAN C

FRAMING PLAN

END BENT 1, BENT 1, BENT 2, AND END BENT 2 ARE PARALLEL

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
FRAMING PLAN
SPANS A, B & C



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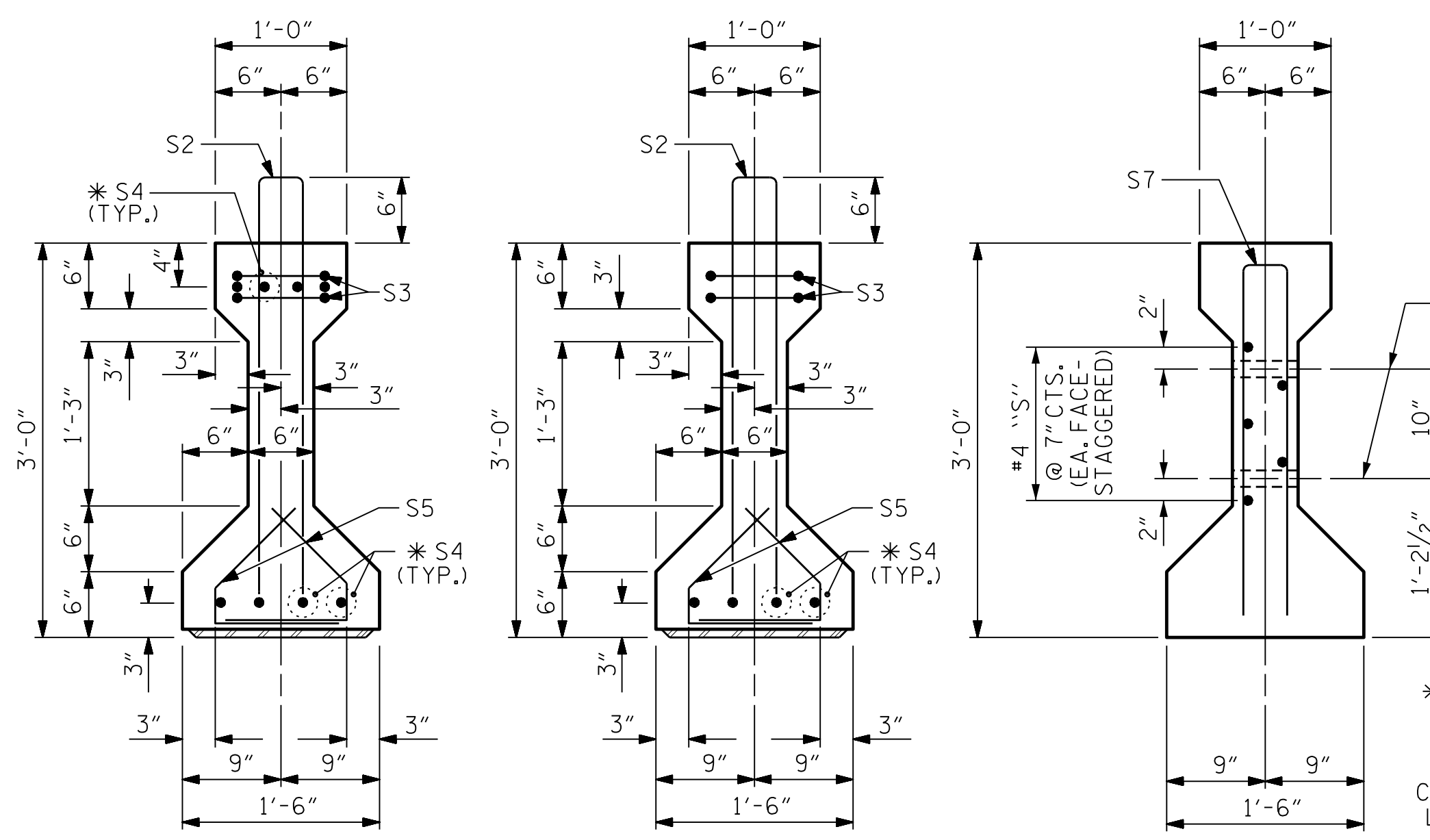
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BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 37	
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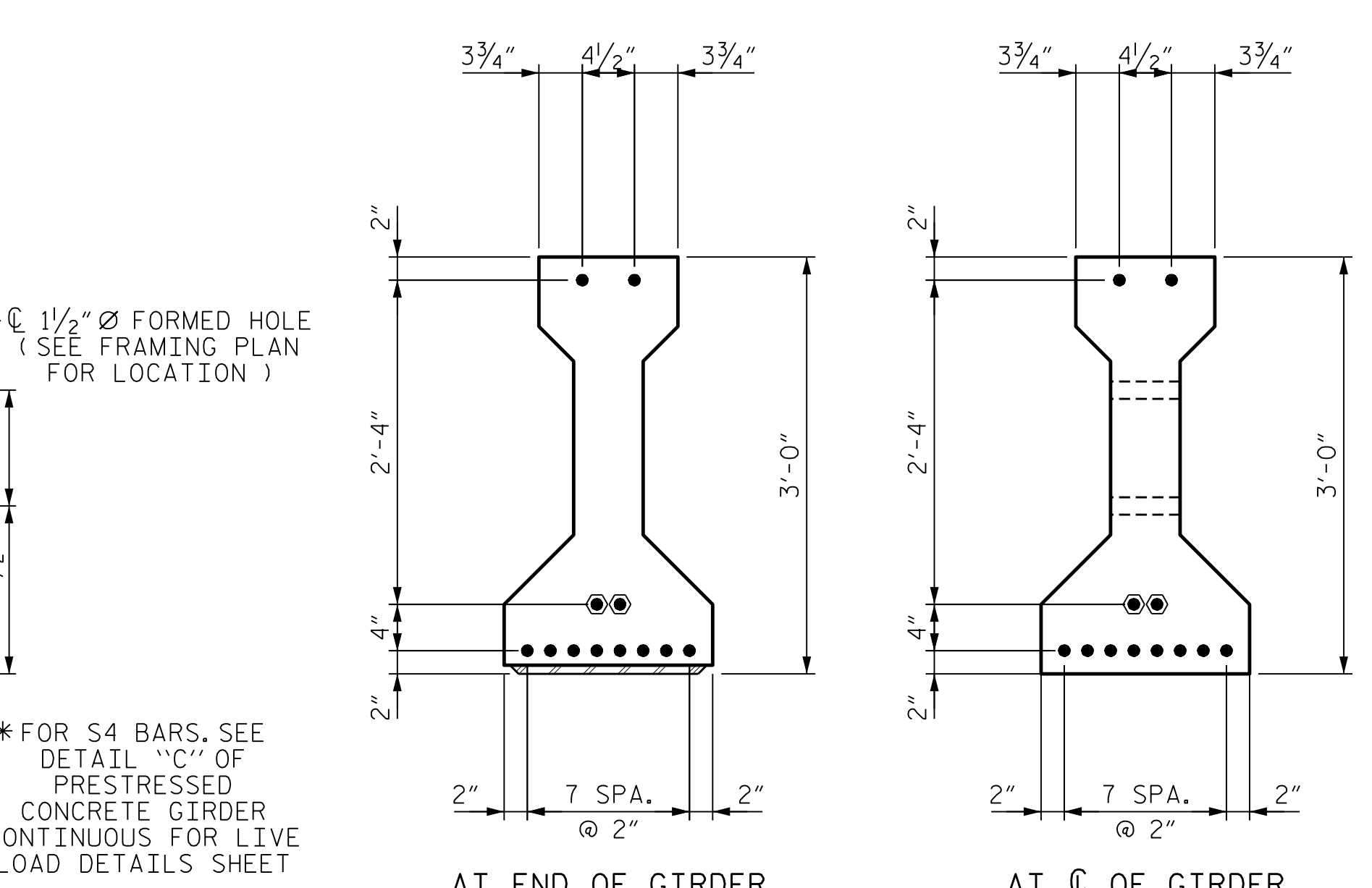
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DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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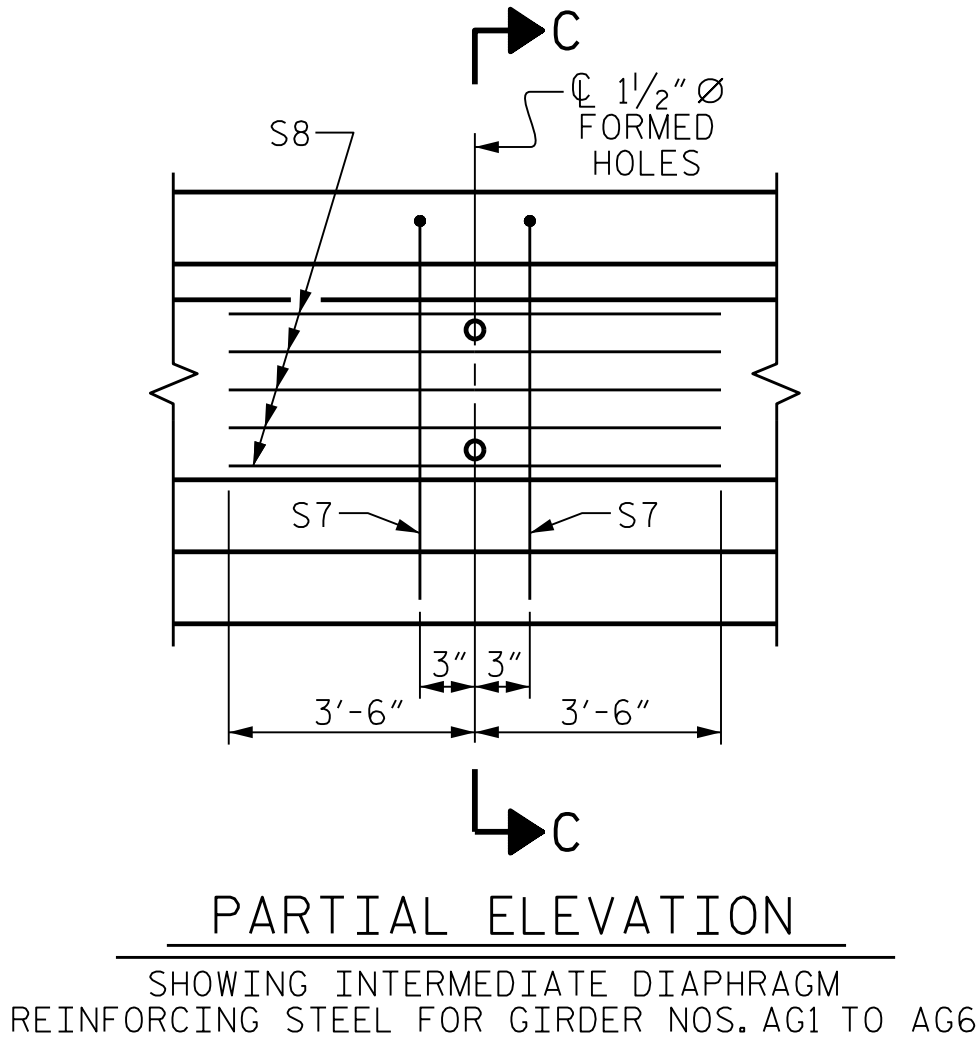
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SECTION A-A SECTION B-B SECTION C-C
(S1 BARS NOT SHOWN)

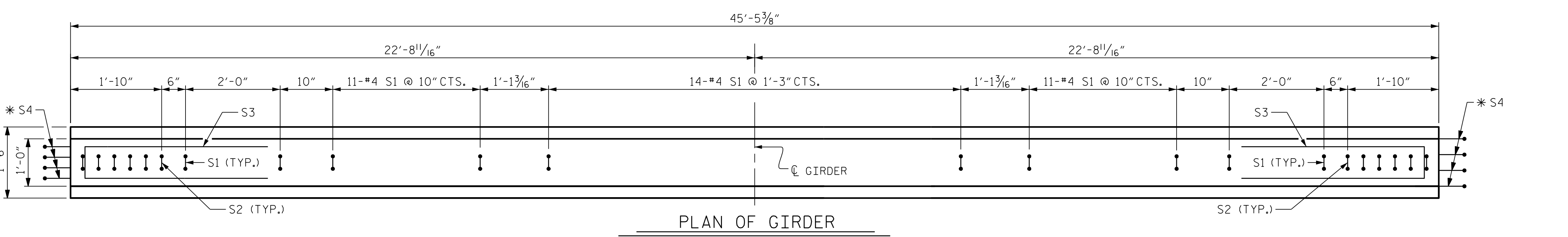


AT END OF GIRDER AT \bar{C} OF GIRDER
0.6" \bar{O} LOW RELAXATION STRAND LAYOUT

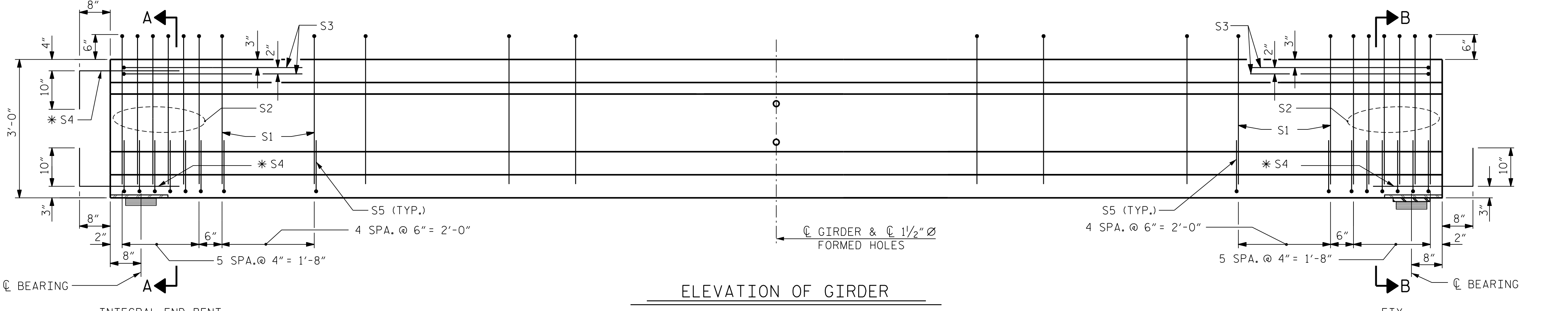


PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER NOS. AG1 TO AG6

DEBONDING LEGEND
 • FULLY BONDED STRANDS
 ○ SLACK STRANDS TO BE TENSIONED TO 4500 LBS (MAX)



PLAN OF GIRDER



ELEVATION OF GIRDER

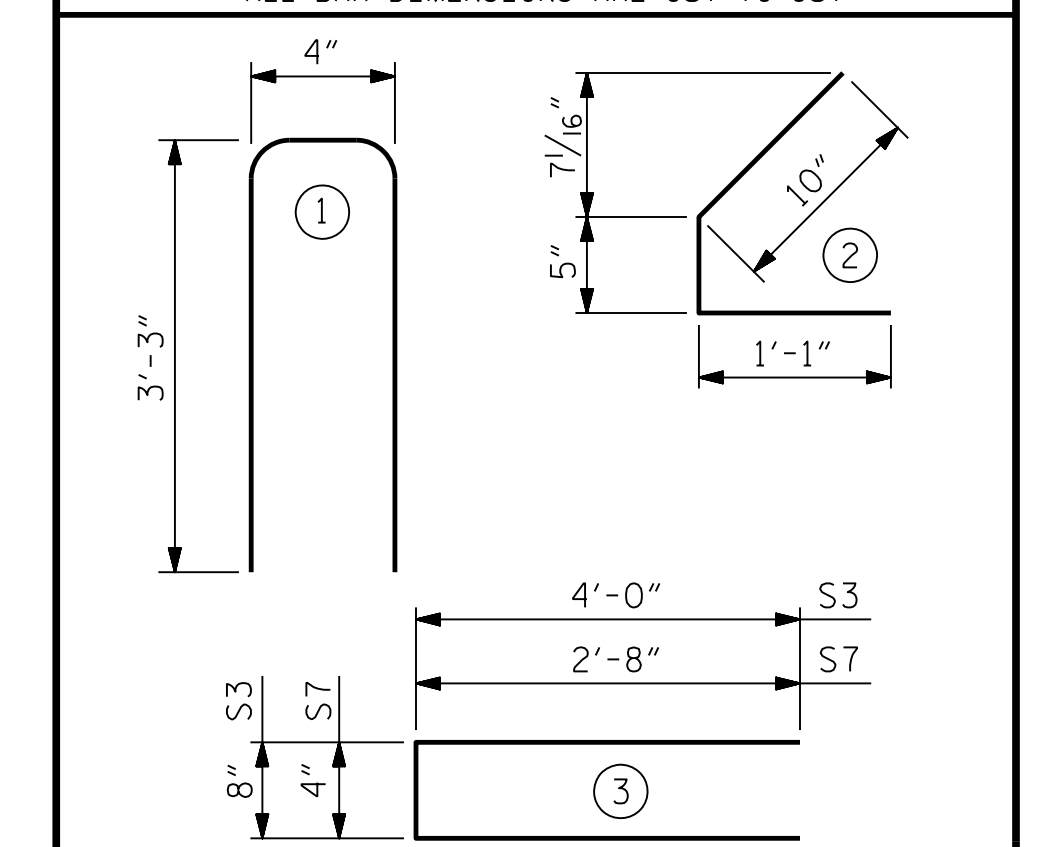
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
 *FOR S4 BARS SEE DETAIL "C" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET.

0.6" \bar{O} 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	46	#4	1	6'-10"	210
S2	12	#5	1	6'-10"	86
S3	4	#4	3	8'-8"	23
*S4	12	#5	STR	3'-8"	46
S5	44	#4	2	2'-4"	69
S7	2	#5	3	5'-8"	12
S8	5	#4	STR	7'-0"	23

* NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
 ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	9500 PSI CONCRETE	0.6" \bar{O} L. R. STRANDS	
LB.	C.Y.	No.	
469	4.3	12	

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
6	45'-5 3/8"	272'-8 1/4"

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 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-

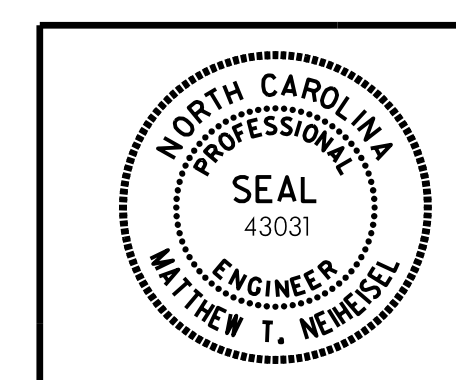
SHEET 1 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 AASHTO TYPE II
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN A

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

SHEET NO. S-13
 TOTAL SHEETS 37



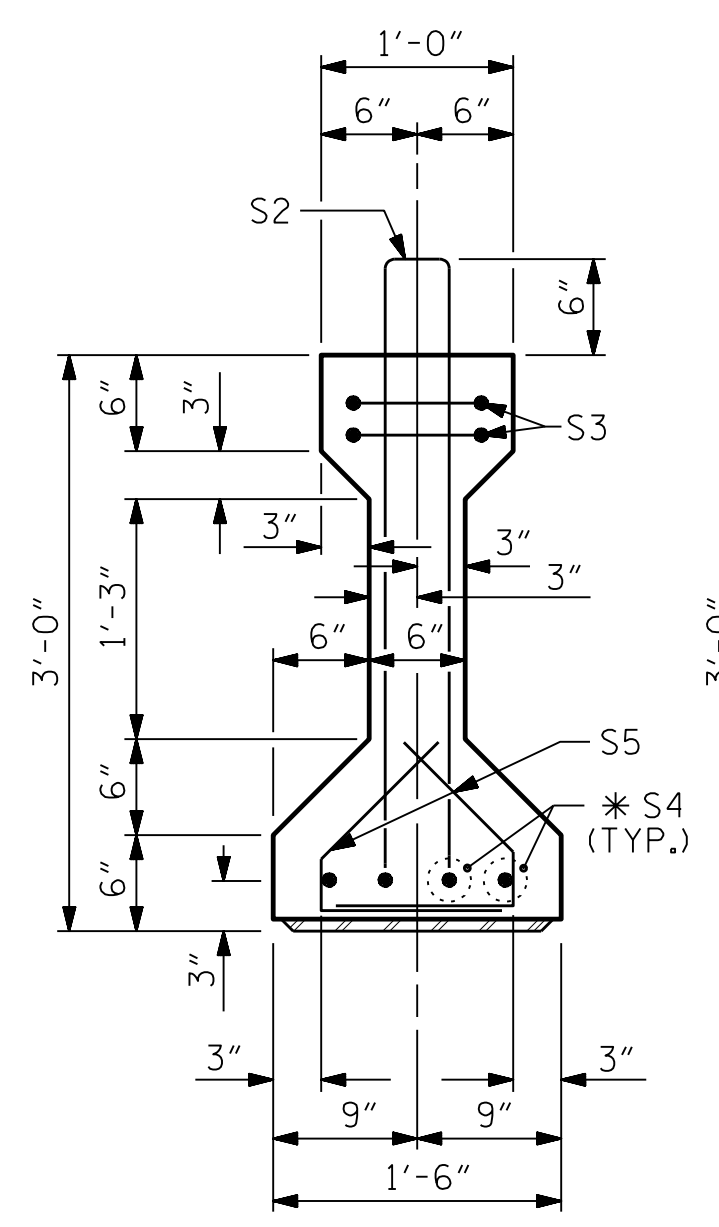
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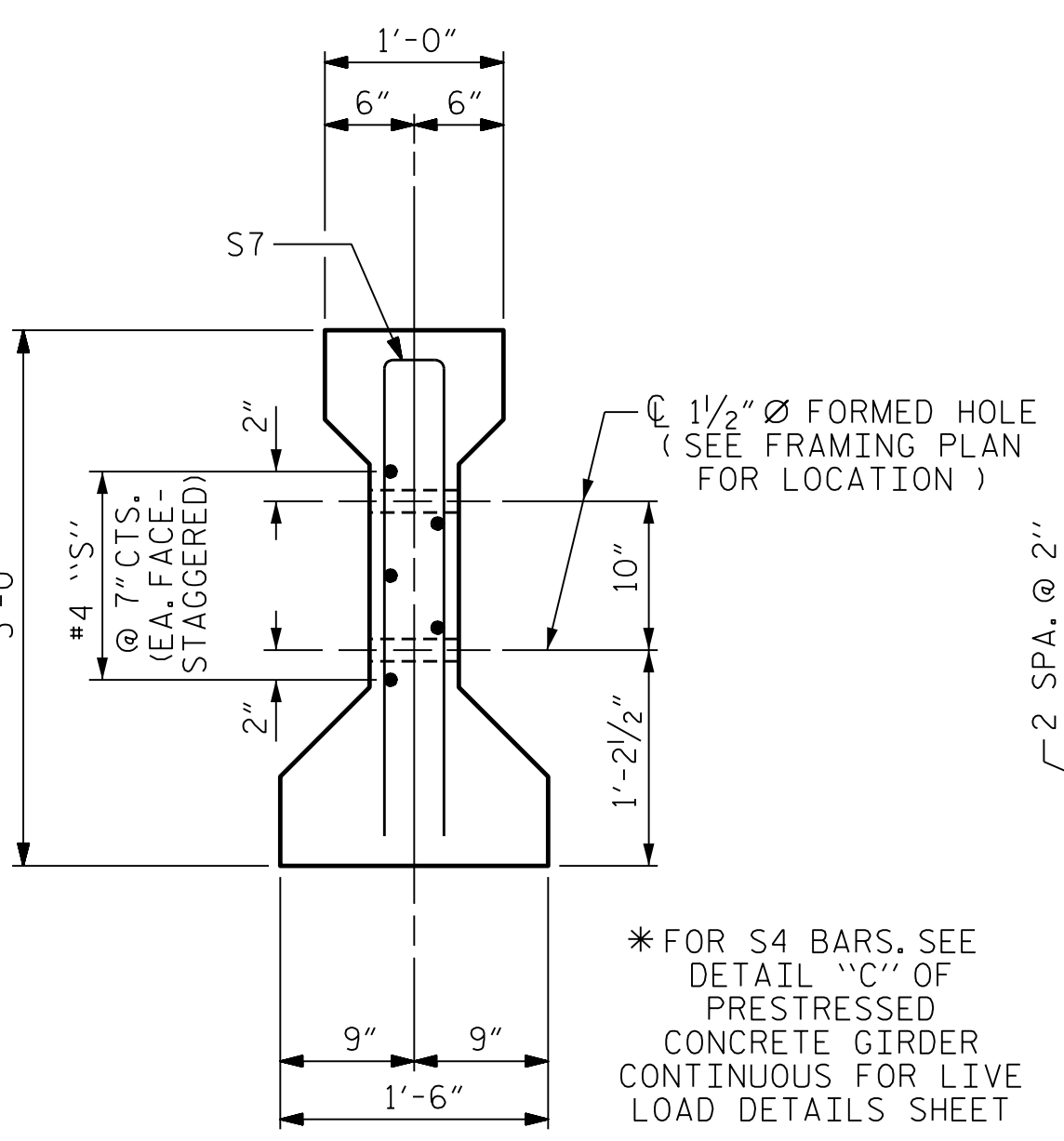
DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
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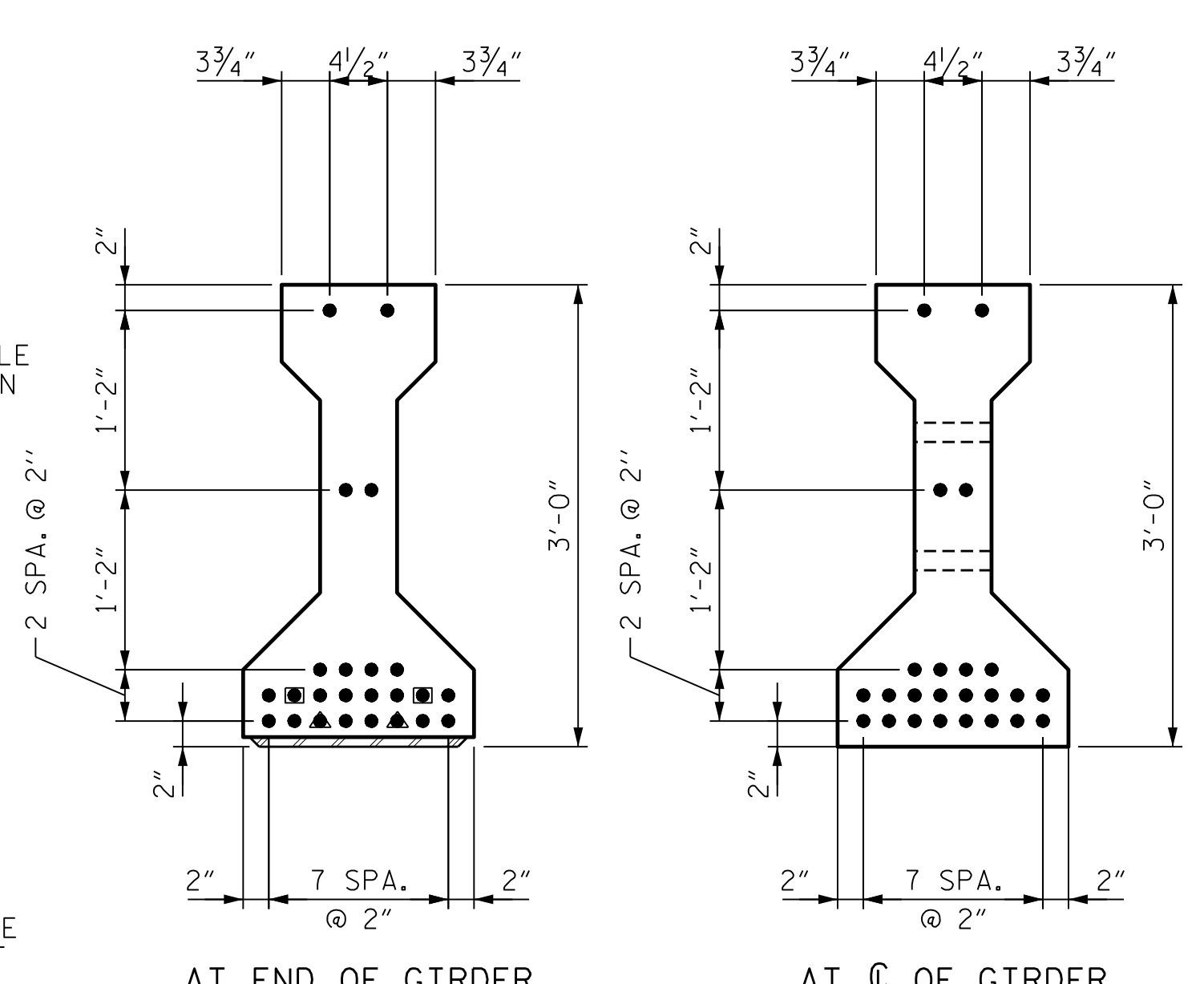
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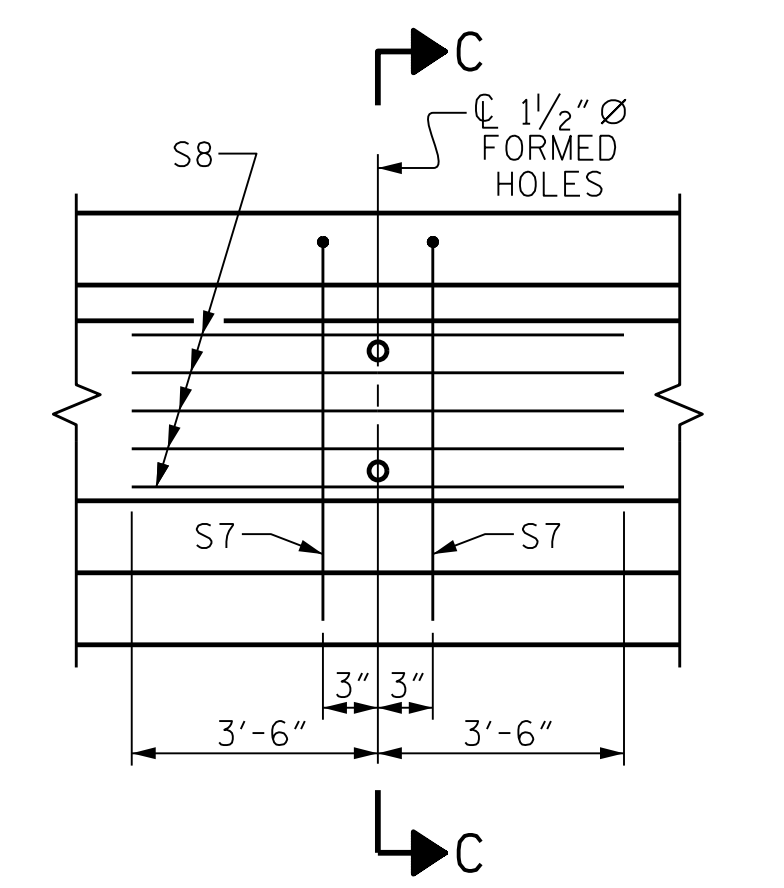
SECTION B-B



SECTION C-C
(S1 BARS NOT SHOWN)

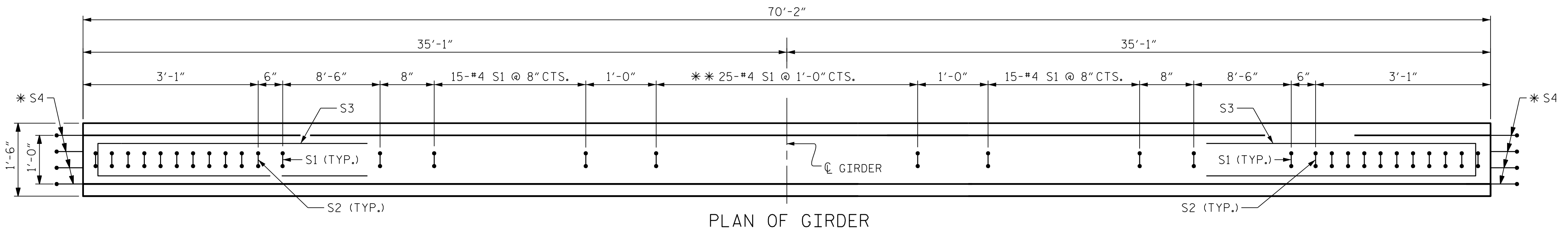


0.6" Ø LOW RELAXATION STRAND LAYOUT

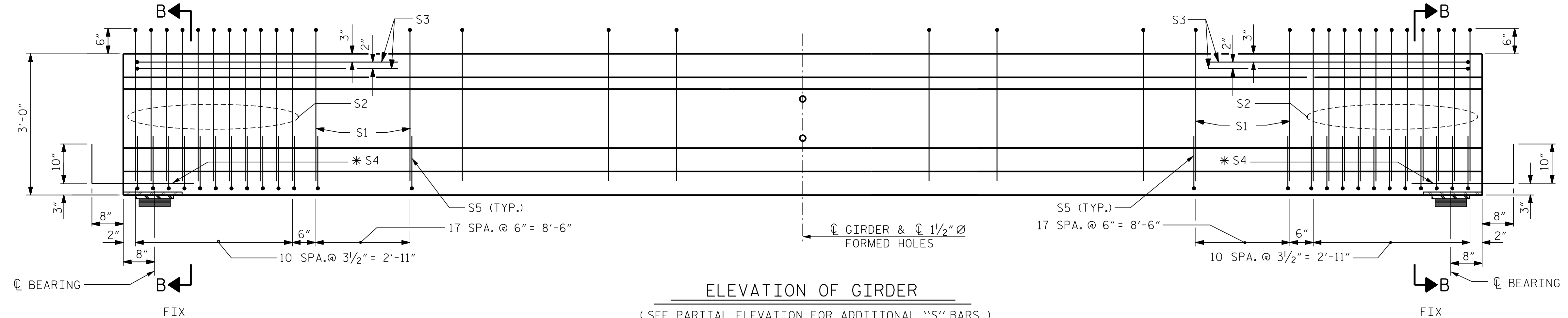


PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER NOS. BG1 TO BG6

- DEBONDING LEGEND
- FULLY BONDED STRANDS
 - ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - ◼ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
 *FOR S4 BARS SEE DETAIL "C" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET.
 ** THE #4 S1 BAR AT CL GIRDER MAY BE SHIFTED AS NECESSARY TO AVOID THE 1/2" Ø FORMED HOLES.

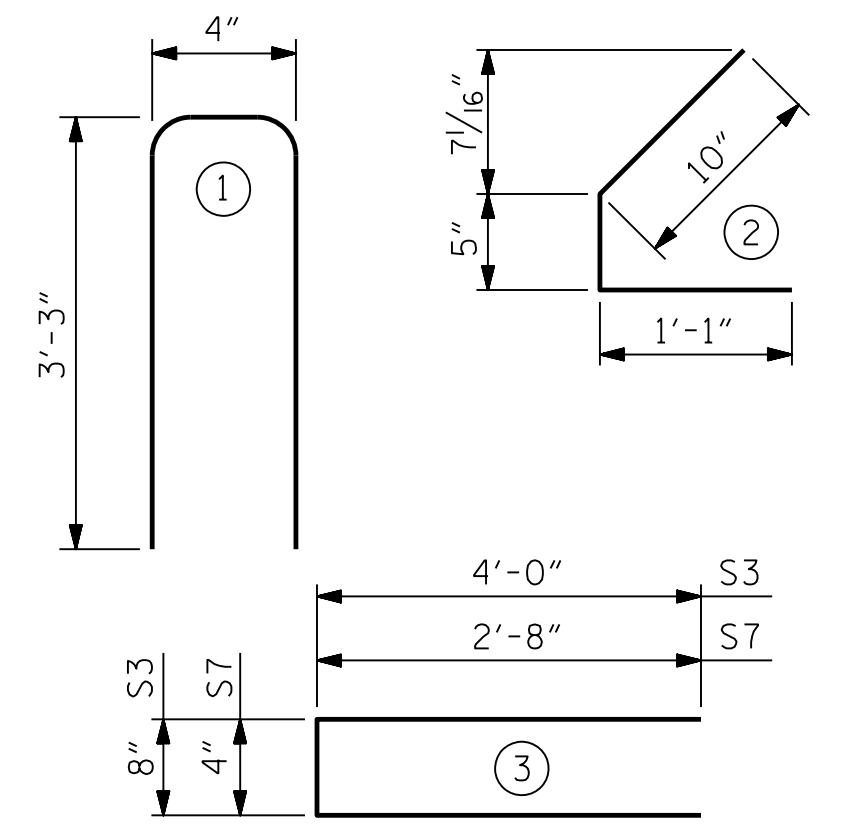
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	91	#4	1	6'-10"	415
S2	22	#5	1	6'-10"	157
S3	4	#4	3	8'-8"	23
*S4	8	#5	STR	3'-8"	31
S5	116	#4	2	2'-4"	181
S7	2	#5	3	5'-8"	12
S8	5	#4	STR	7'-0"	23

* NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

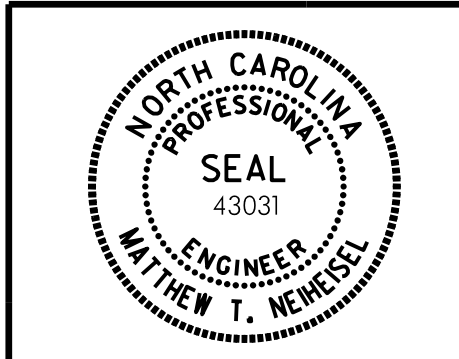
REINFORCING STEEL	9500 PSI CONCRETE	0.6" Ø L. R. STRANDS
LB.	C.Y.	No.
842	6.7	24

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	70'-2"	421'-0"

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-

SHEET 2 OF 5



DocuSigned by:
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 2/20/2018
 84E31BF9E30749E

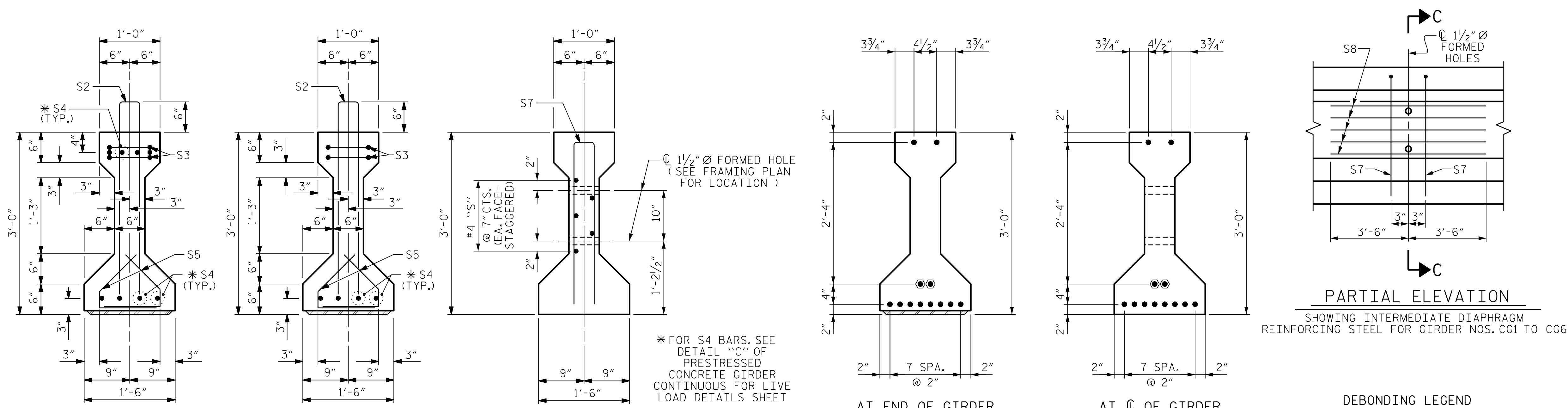
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 AASHTO TYPE II
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN B

REVISIONS				SHEET NO.	
BY:	DATE:	NO.	BY:	DATE:	S-14
		3			TOTAL SHEETS
		4			37

DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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 555 Fayetteville St.,
 Suite 900
 Raleigh, NC 27601
 NC License No: F-0258

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



SECTION A-A

SECTION B-B

SECTION C-C
(S1 BARS NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT
AT END OF GIRDER AT C OF GIRDER

PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER NOS. CG1 TO CG6

- DEBONDING LEGEND
- FULLY BONDED STRANDS
 - ⊙ SLACK STRANDS TO BE TENSIONED TO 4500 LBS (MAX)

0.6" Ø L. R. GRADE 270 STRANDS

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

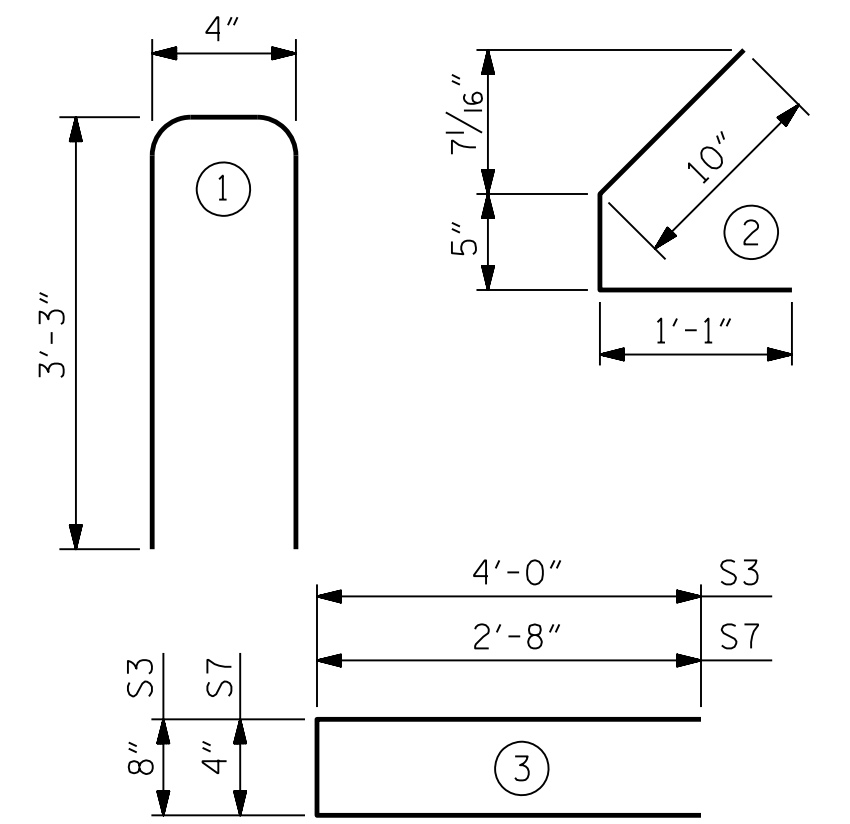
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	38	#4	1	6'-10"	173
S2	12	#5	1	6'-10"	86
S3	4	#4	3	8'-8"	23
*S4	12	#5	STR	3'-8"	46
S5	44	#4	2	2'-4"	69
S7	2	#5	3	5'-8"	12
S8	5	#4	STR	7'-0"	23

* NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

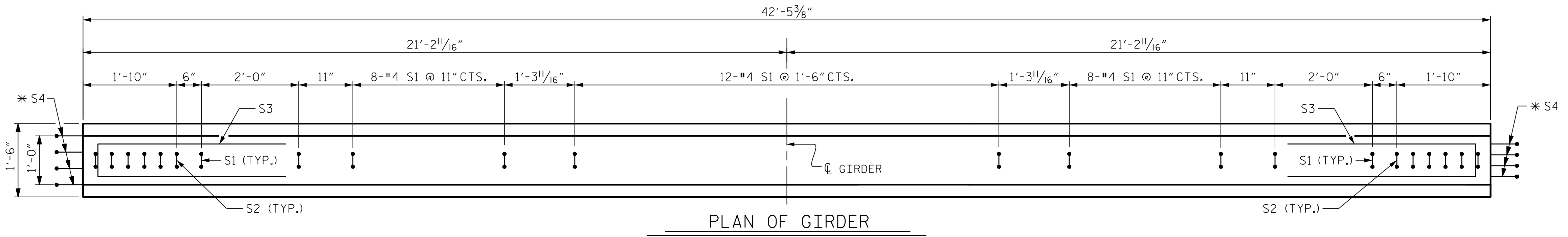


QUANTITIES FOR ONE GIRDER

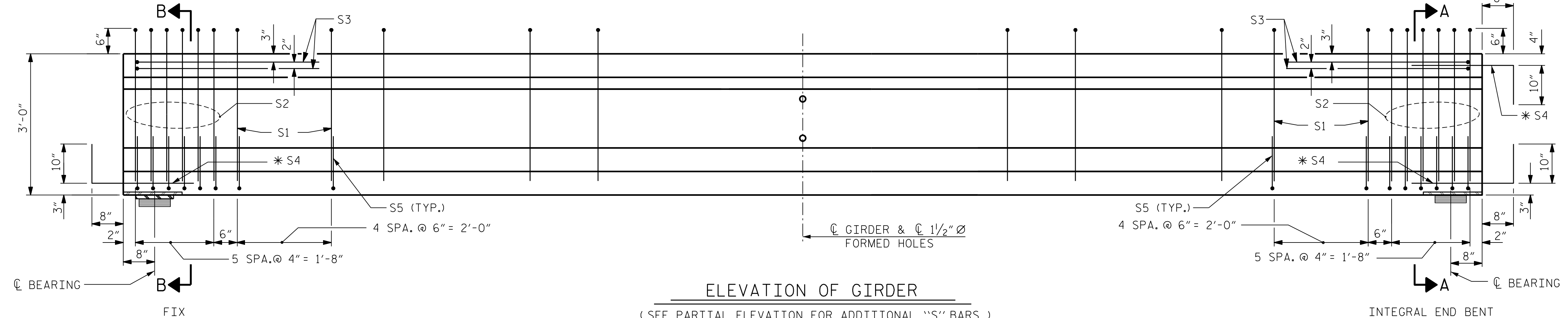
REINFORCING STEEL	9500 PSI CONCRETE	0.6" Ø L. R. STRANDS
LB.	C.Y.	No.
432	4.0	12

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	42'-5 3/8"	254'-8 1/4"



PLAN OF GIRDER



ELEVATION OF GIRDER

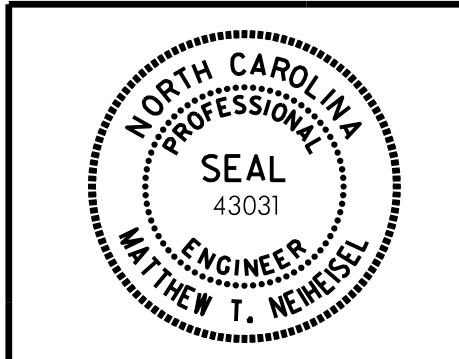
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
* FOR S4 BARS SEE DETAIL "C" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET.

PROJECT NO. B-5352

ROCKINGHAM COUNTY

STATION: P.O.T. 22+16.89 -L-

SHEET 3 OF 5



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
AASHTO TYPE II
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN C

REVISIONS

BY:	DATE:	NO.	BY:	DATE:
		3		
		4		

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TOTAL SHEETS 37

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NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

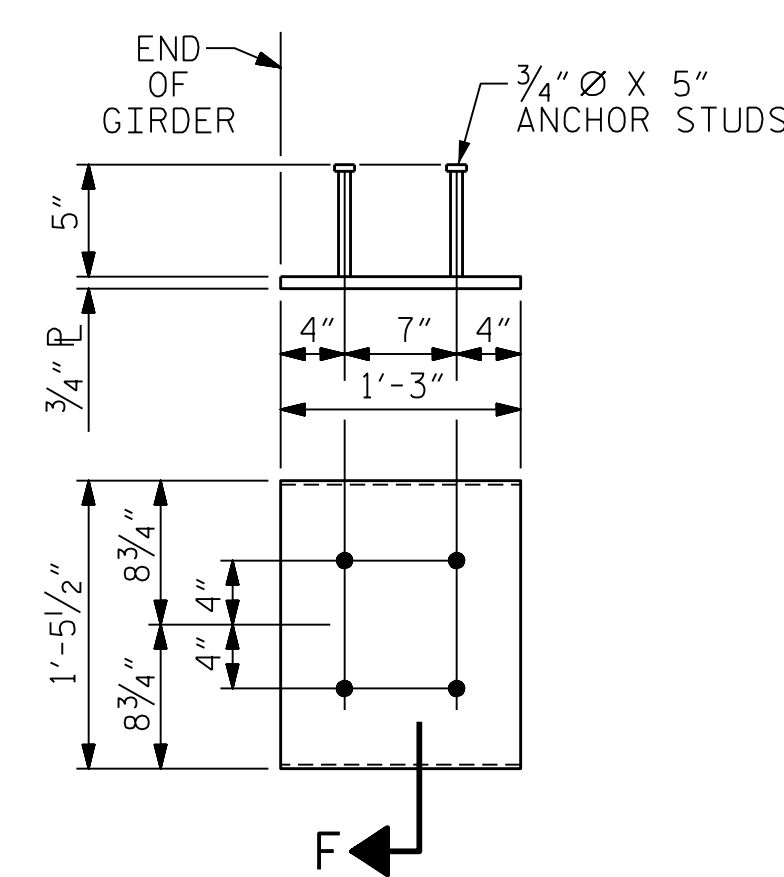
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7300 PSI.

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

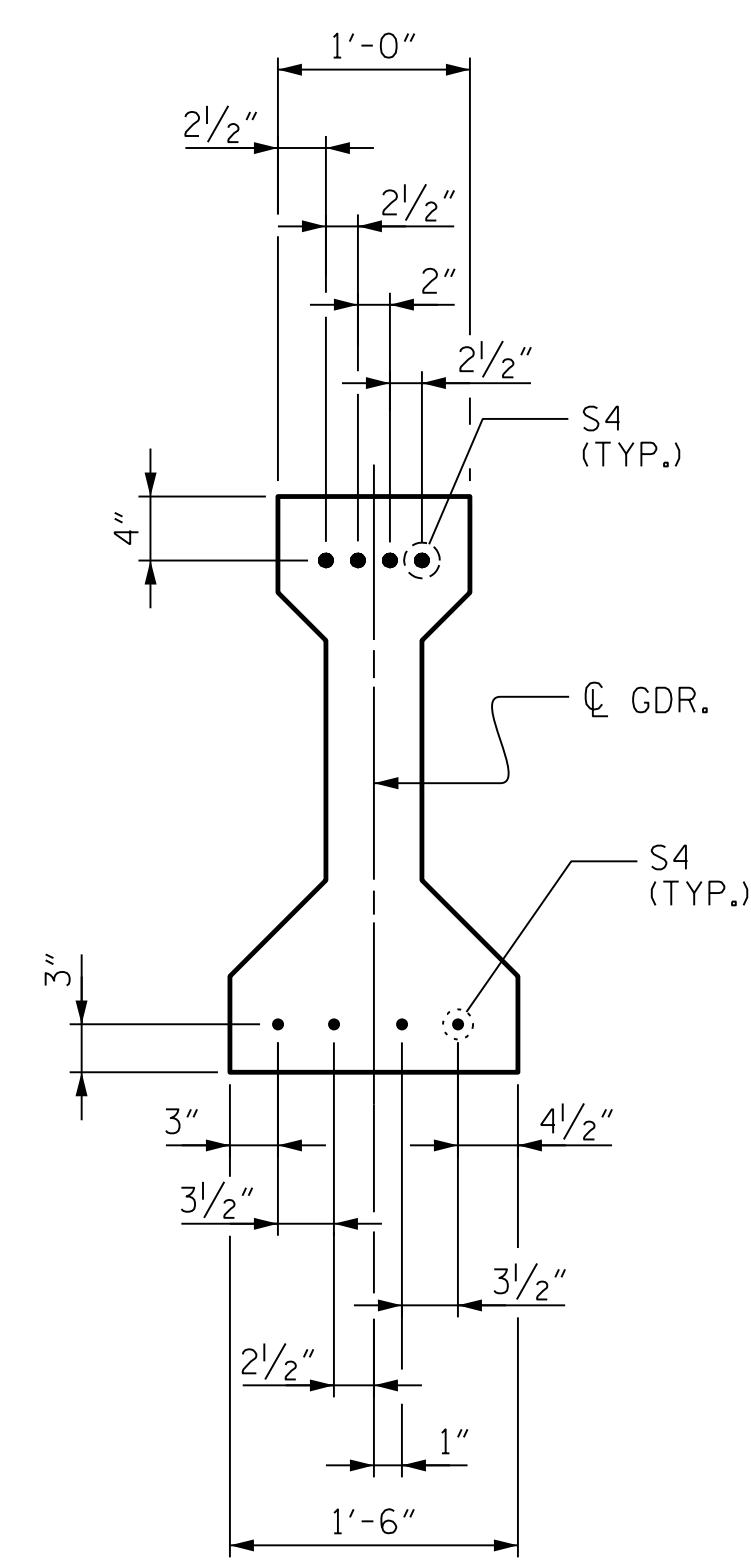
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

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.

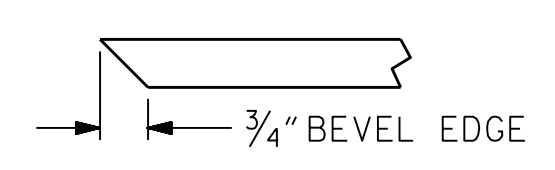


EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE II GIRDER

(2 REQ'D PER GIRDER)



DETAIL "C"



SECTION "F"

(SEE NOTES)

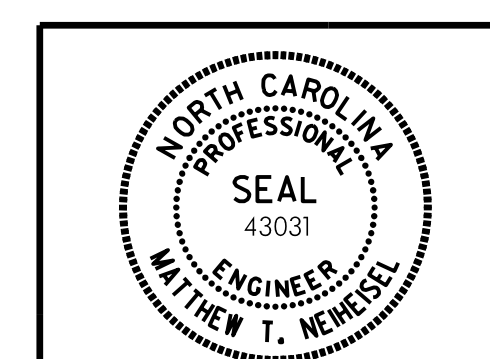
PROJECT NO. B-5352

ROCKINGHAM COUNTY

STATION: P.O.T. 22+16.89 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS



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Matthew Neiheisel 2/20/2018

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DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS - SPAN "A"												
GIRDER		TENTH POINTS										
		0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
EXTERIOR GIRDERS	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.012	0.022	0.030	0.035	0.037	0.035	0.030	0.022	0.012	0
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0	0.007	0.014	0.019	0.023	0.024	0.023	0.019	0.014	0.007	0
	FINAL CAMBER ↑	0"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	0"
INTERIOR GIRDERS	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.012	0.022	0.030	0.035	0.037	0.035	0.030	0.022	0.012	0
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0	0.007	0.014	0.020	0.024	0.025	0.024	0.020	0.014	0.007	0
	FINAL CAMBER ↑	0"	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0"

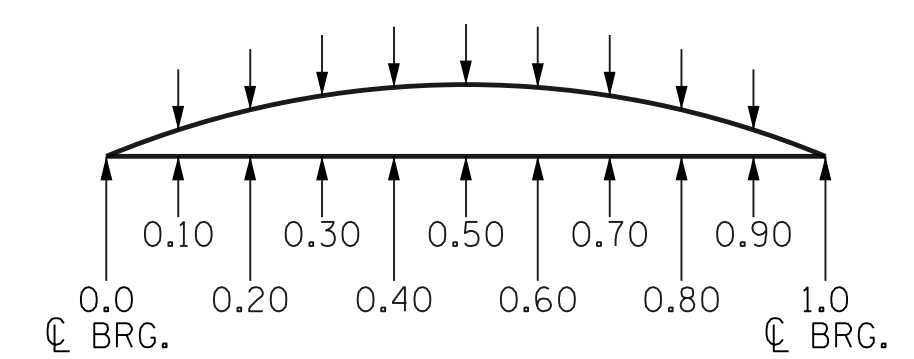
* INCLUDES FUTURE WEARING SURFACE IN SUPER IMPOSED DEAD LOAD.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS - SPAN "B"												
GIRDER		TENTH POINTS										
		0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
EXTERIOR GIRDERS	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0	0.041	0.083	0.115	0.136	0.143	0.136	0.115	0.083	0.041	0
	FINAL CAMBER ↑	0"	1/4"	7/16"	5/8"	11/16"	3/4"	11/16"	5/8"	7/16"	1/4"	0"
INTERIOR GIRDERS	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.064	0.121	0.166	0.194	0.204	0.194	0.166	0.121	0.064	0
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0	0.043	0.086	0.120	0.142	0.149	0.142	0.120	0.086	0.043	0
	FINAL CAMBER ↑	0"	1/4"	7/16"	9/16"	5/8"	11/16"	5/8"	9/16"	7/16"	1/4"	0"

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

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS - SPAN "C"												
GIRDER		TENTH POINTS										
		0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.0
EXTERIOR GIRDERS	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.011	0.020	0.028	0.033	0.034	0.033	0.028	0.020	0.011	0
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0	0.005	0.010	0.015	0.017	0.018	0.017	0.015	0.010	0.005	0
	FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/16"	0"
INTERIOR GIRDERS	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.011	0.020	0.028	0.033	0.034	0.033	0.028	0.020	0.011	0
	DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0	0.005	0.011	0.015	0.018	0.019	0.018	0.015	0.011	0.005	0
	FINAL CAMBER ↑	0"	1/16"	1/8"	1/8"	3/16"	3/16"	3/16"	1/8"	1/8"	1/16"	0"

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



SCHEMATIC CAMBER ORDINATES AT GIRDER TENTH POINTS

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 5 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 GIRDER
 CAMBER AND DEFLECTION
 TABLES**

REVISIONS				SHEET NO.
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		3		
		4		
TOTAL SHEETS				37

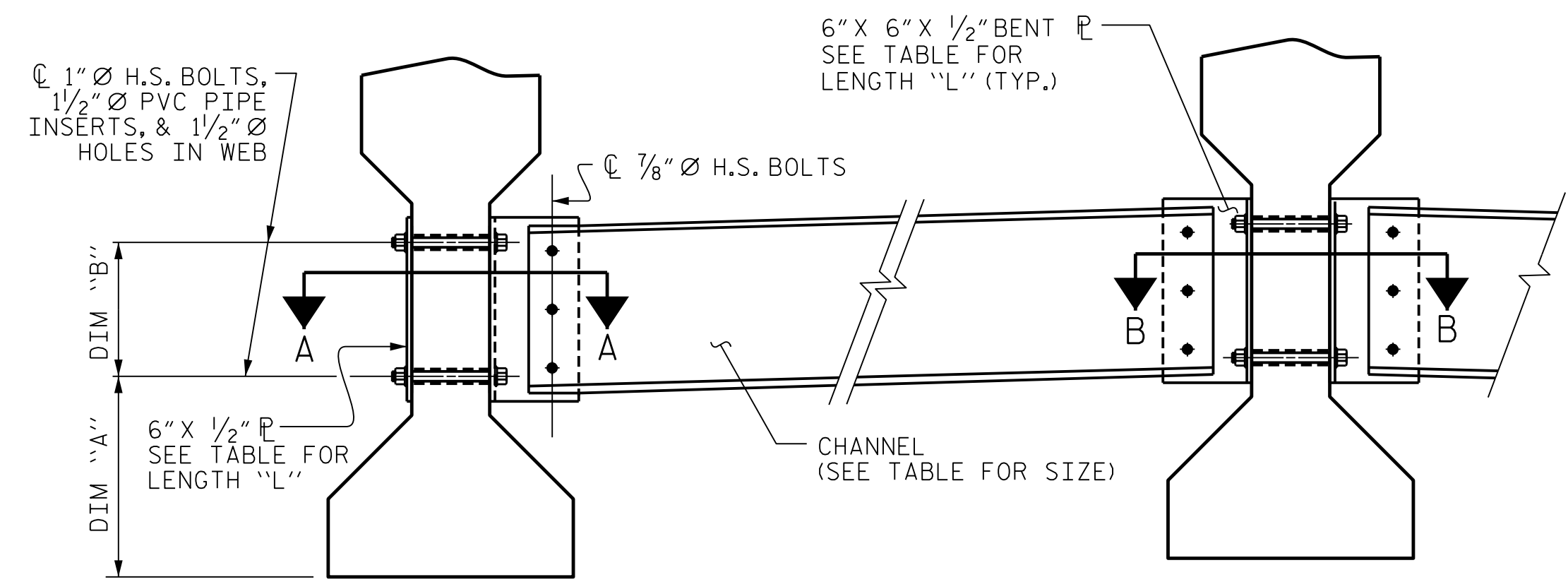
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Matthew T. Neiheisel 2/20/2018
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**NORTH CAROLINA
 PROFESSIONAL
 SEAL
 43031
 ENGINEER
 MATTHEW T. NEIHEISEL**

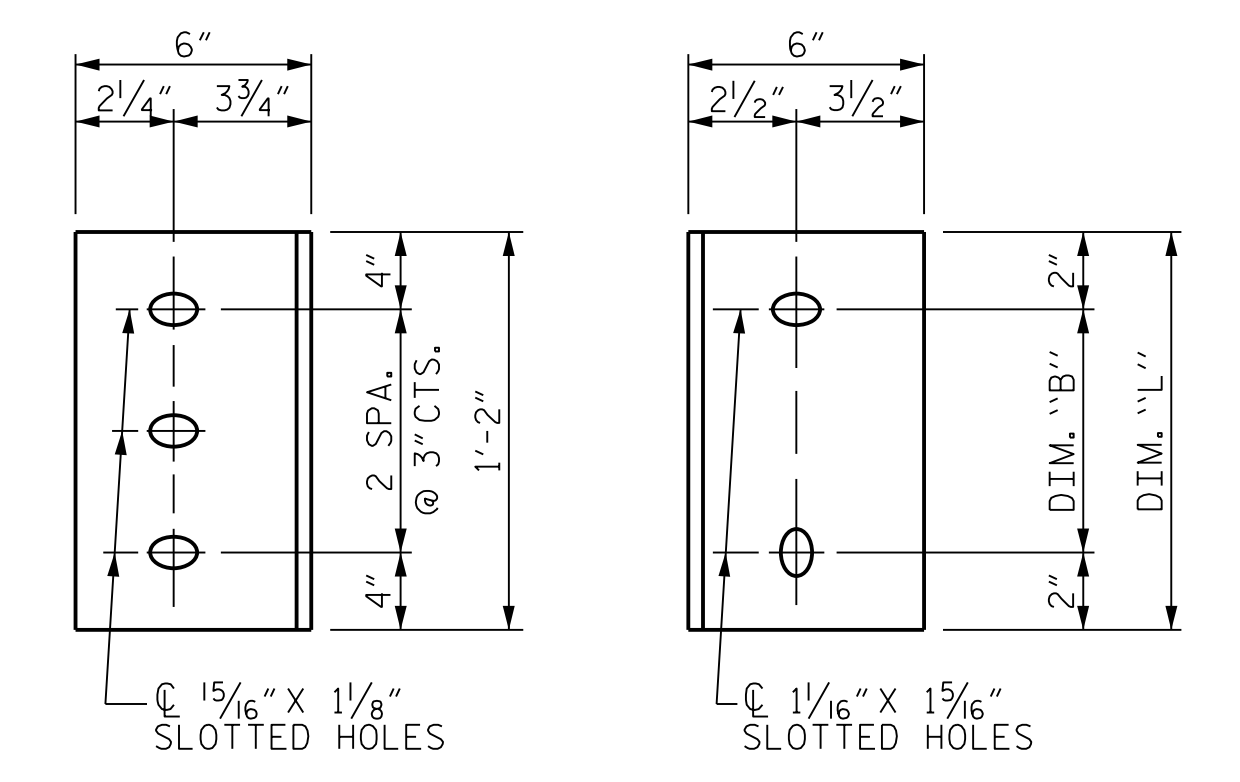
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EXTERIOR GIRDER
INTERIOR GIRDER
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE
WEB FACE
CONNECTOR PLATE DETAILS

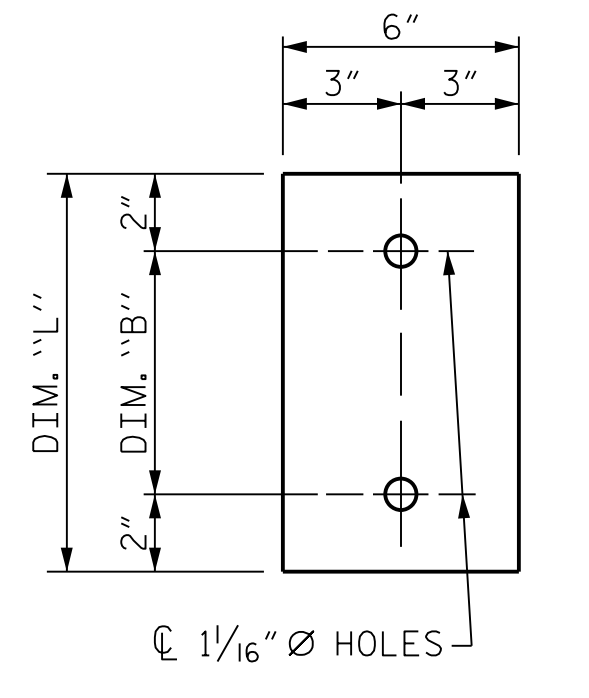
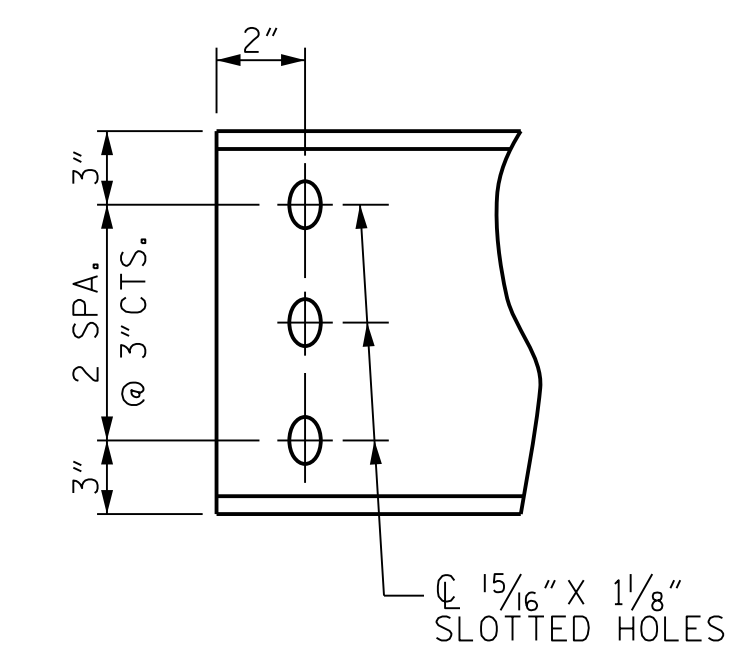
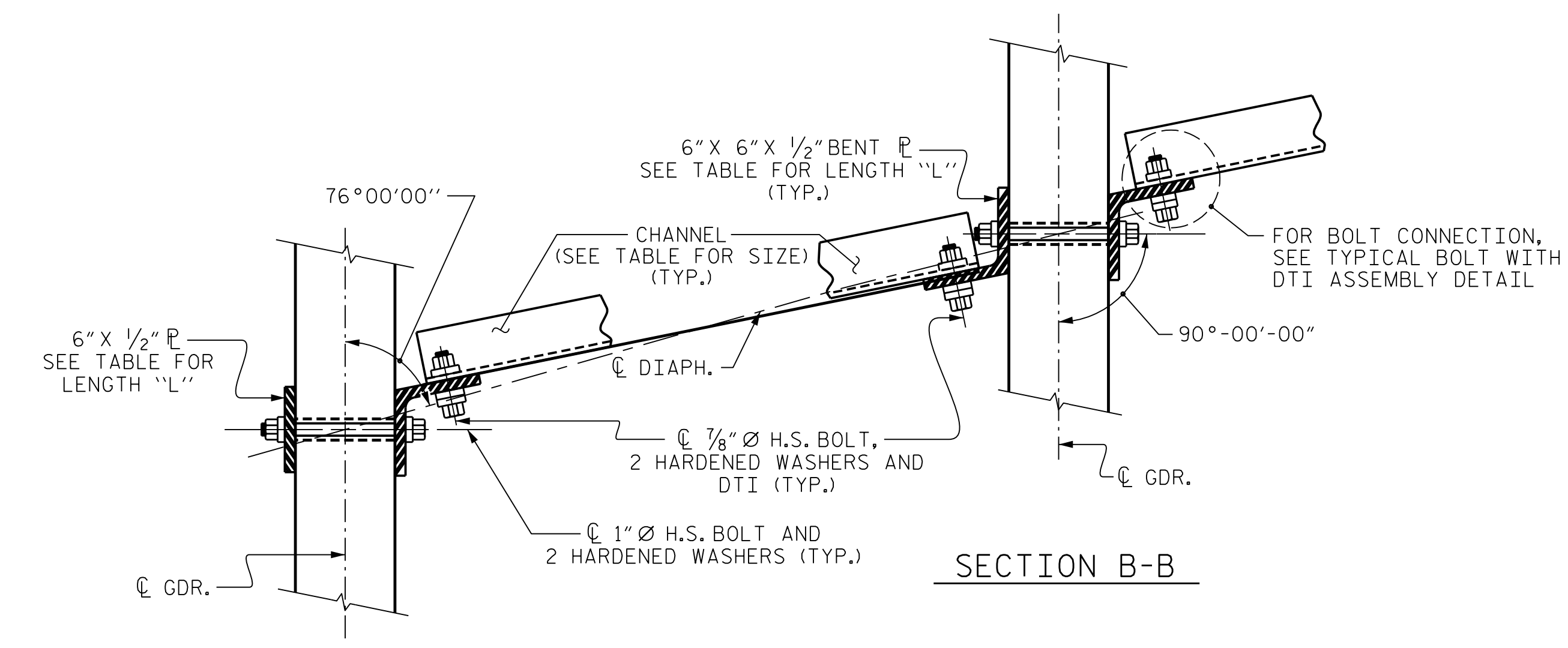


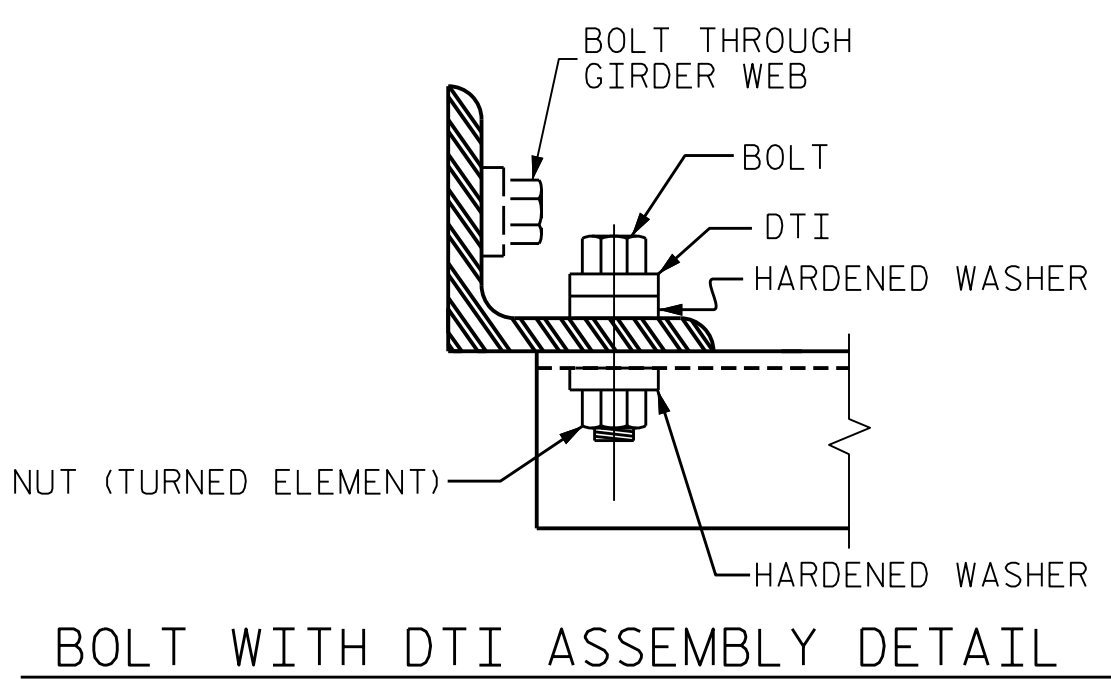
PLATE DETAILS



CHANNEL END



SECTION A-A
SECTION B-B
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 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 1/4" PROJECTION BEYOND THE NUT.

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

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

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

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

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
II	MC 12 x 31	1'-2 1/2"	10"	1'-2"

PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
INTERMEDIATE
STEEL DIAPHRAGMS
FOR AASHTO TYPE II
PRESTRESSED CONCRETE
GIRDERS**

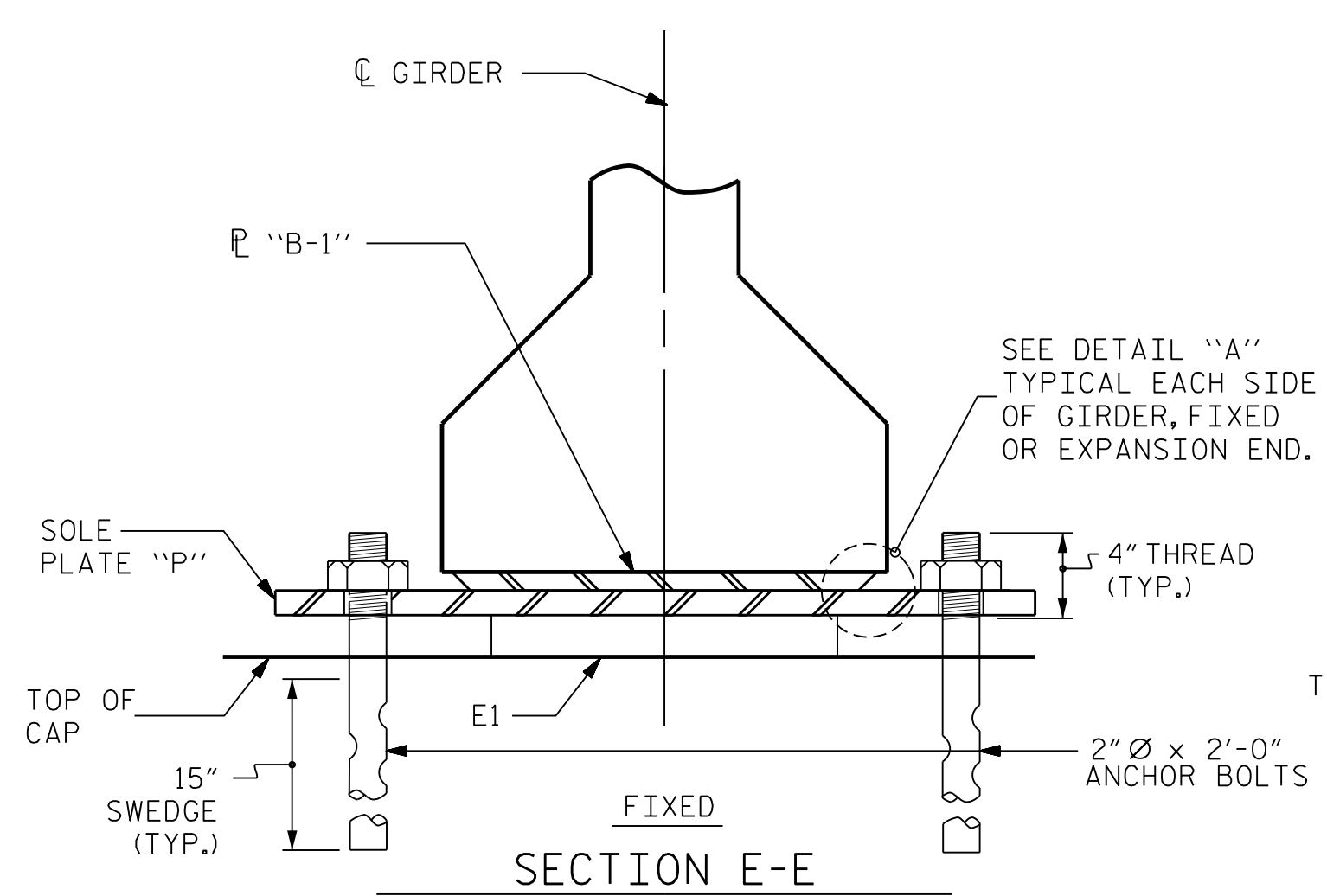
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BY:	DATE:	NO.	DATE:	5-18
		3		TOTAL SHEETS
		4		37

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DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

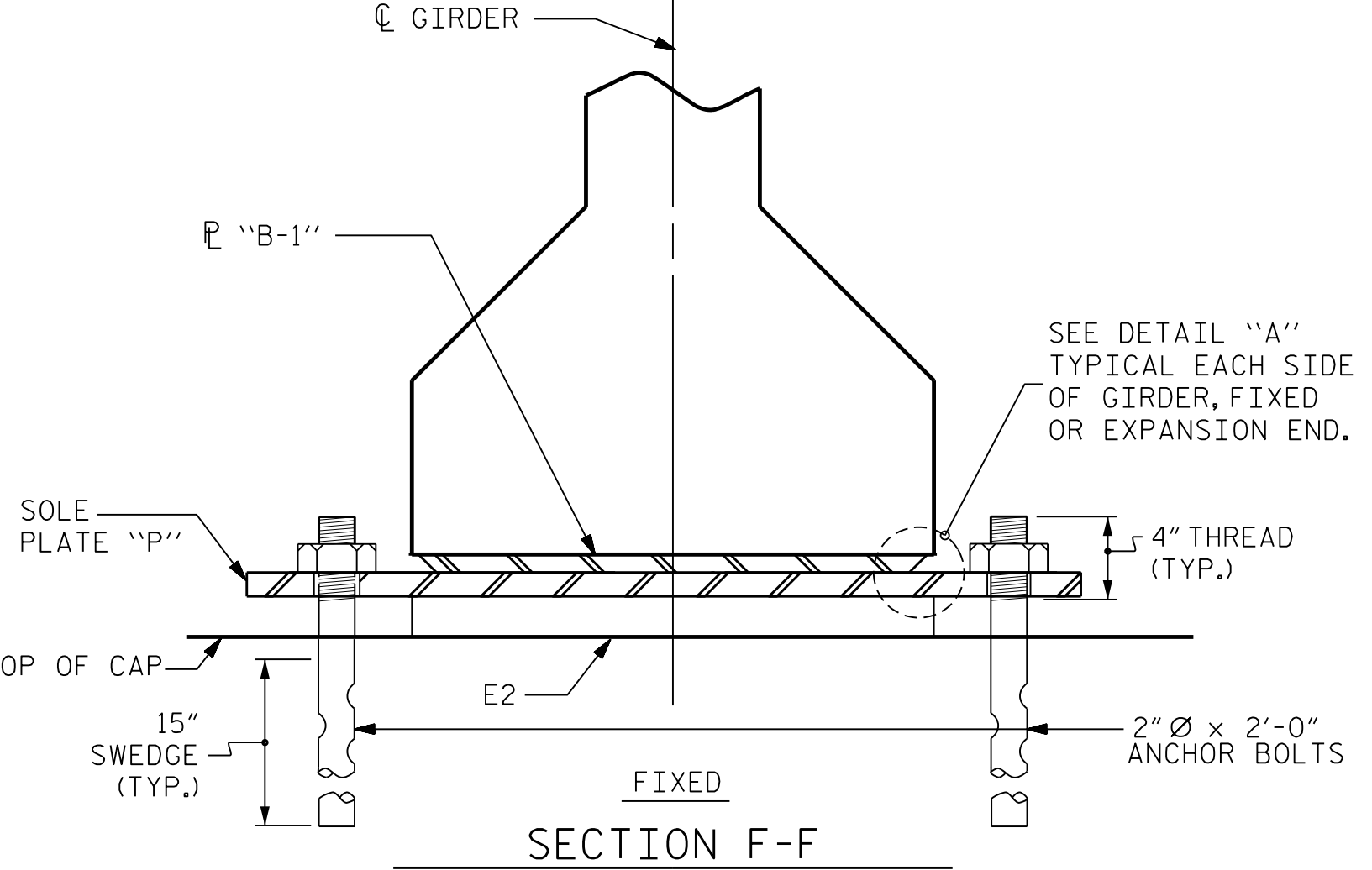
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Raleigh, NC 27601
NC License No: F-0258

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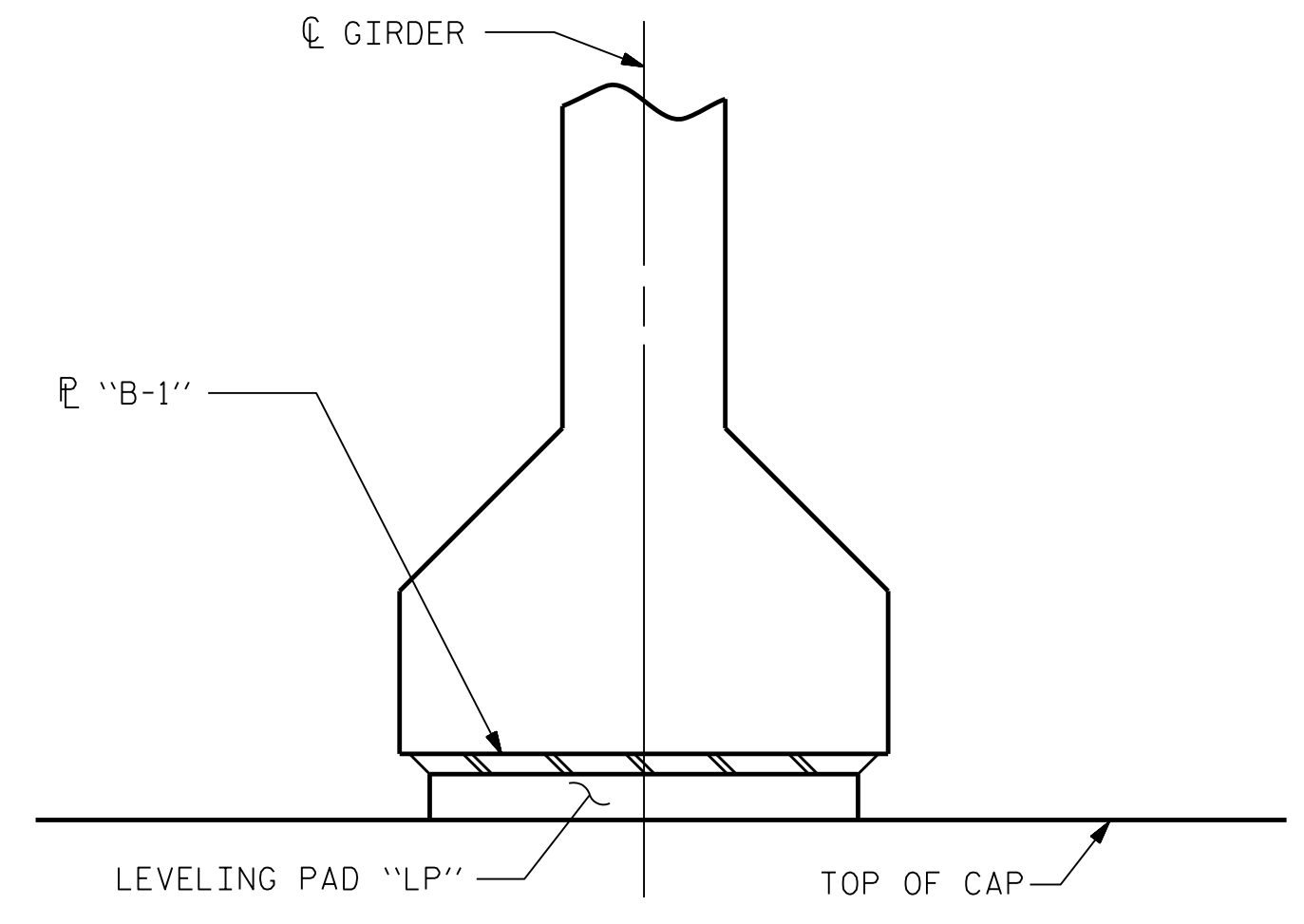
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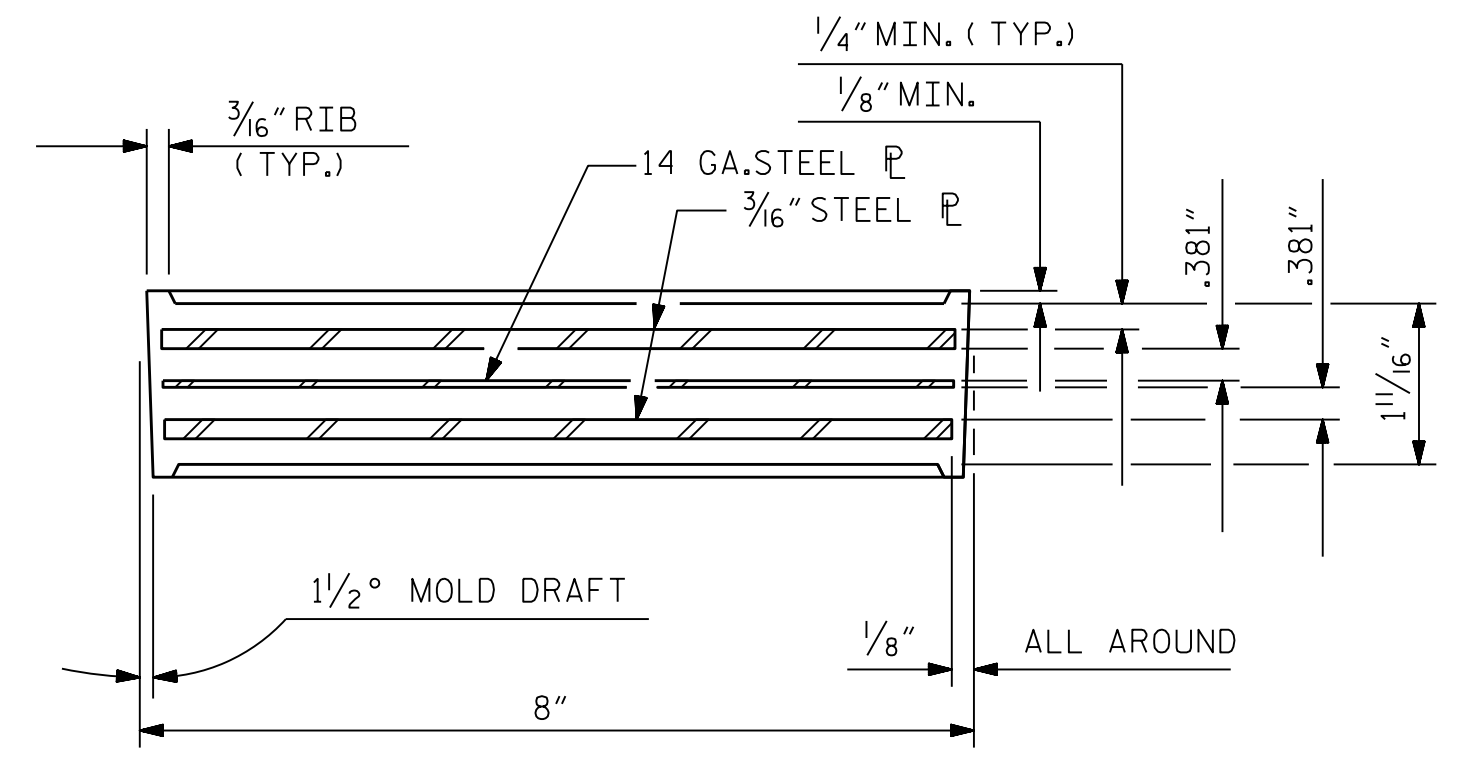
SECTION E-E



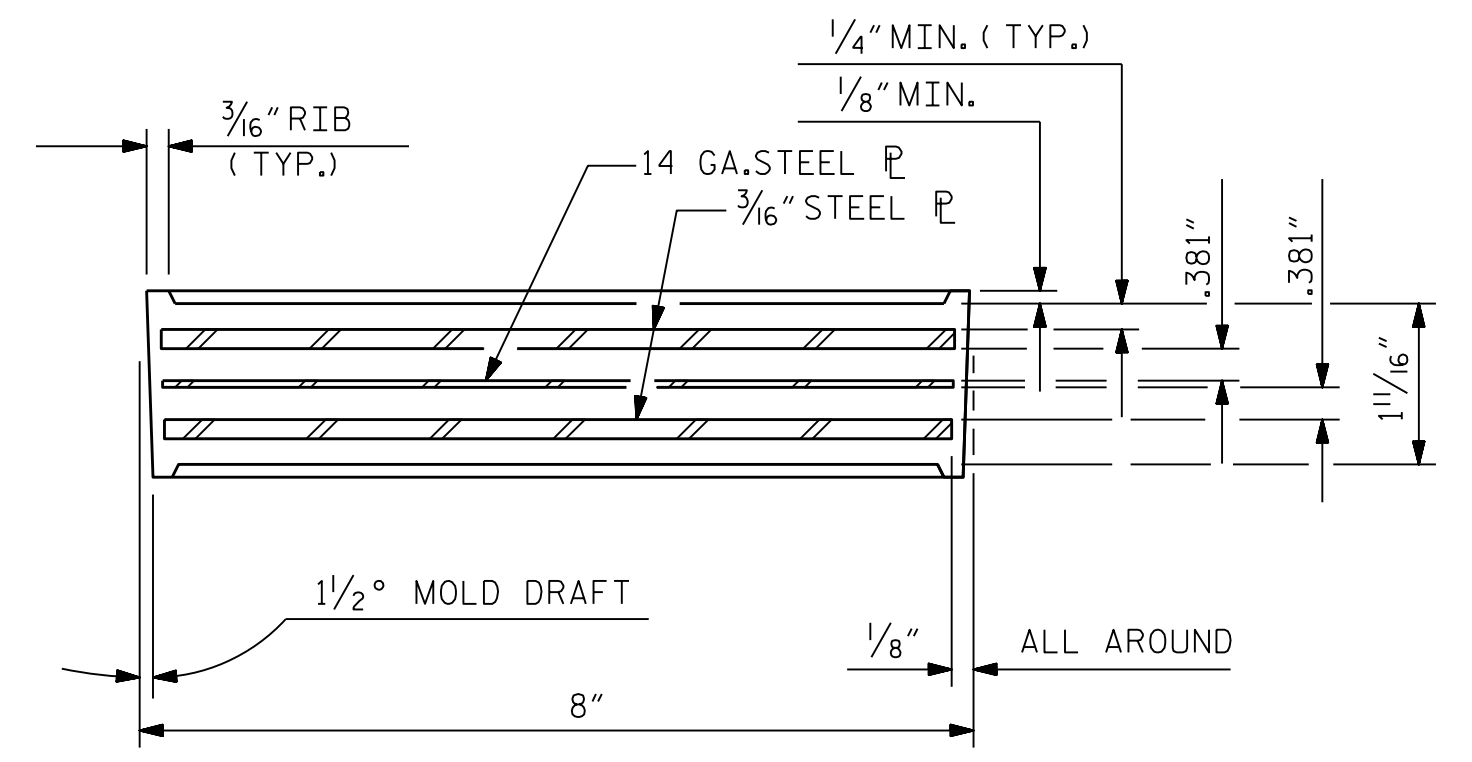
SECTION F-F



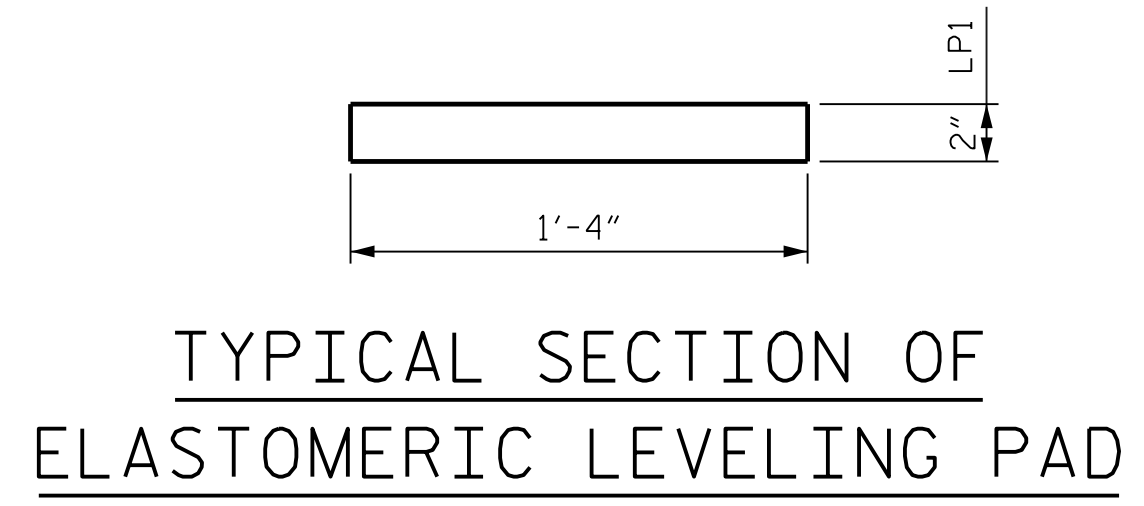
SECTION B-B



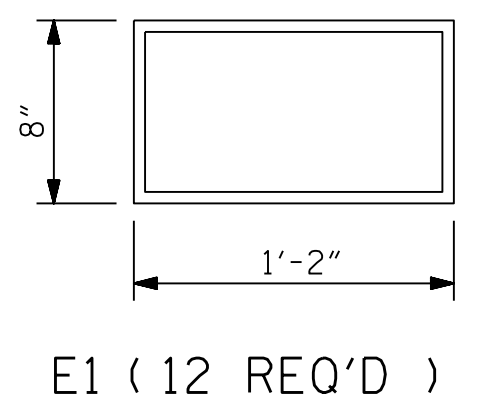
TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL SECTION OF ELASTOMERIC BEARINGS

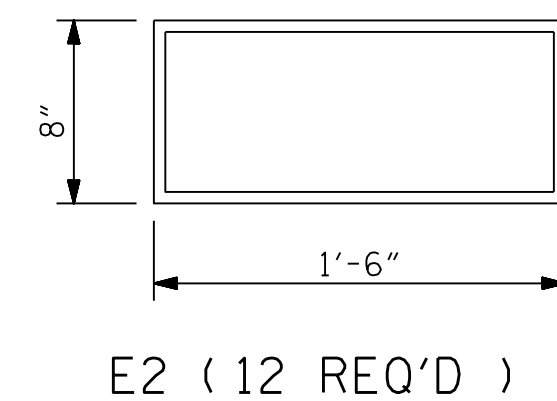


TYPICAL SECTION OF ELASTOMERIC LEVELING PAD



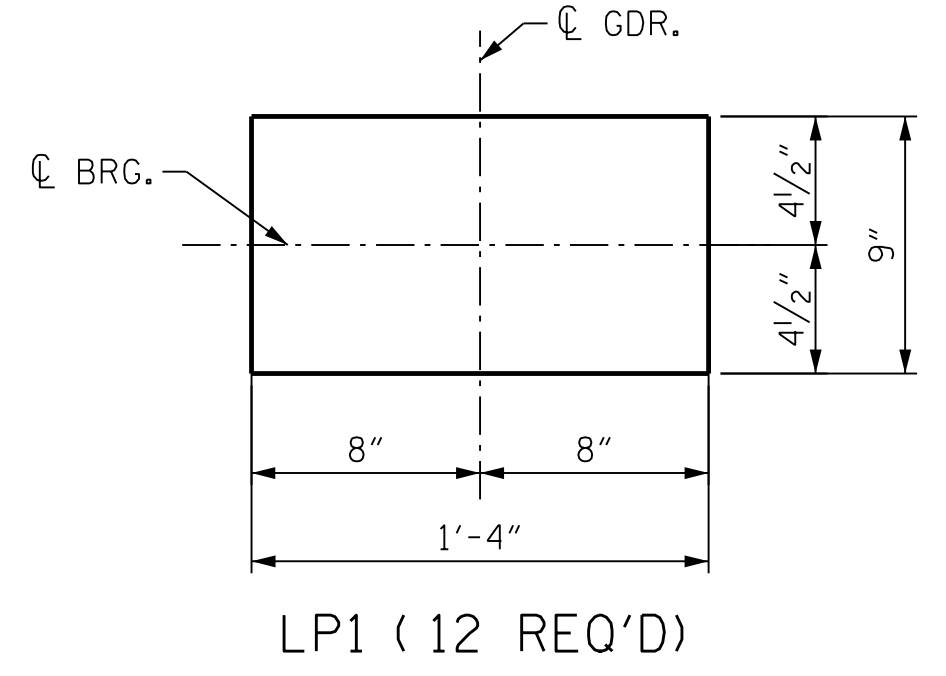
PLAN VIEW OF ELASTOMERIC BEARING

TYPE II



PLAN VIEW OF ELASTOMERIC BEARING

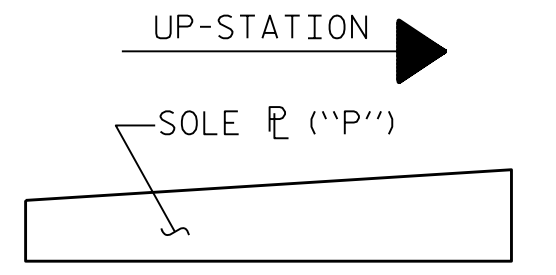
TYPE III



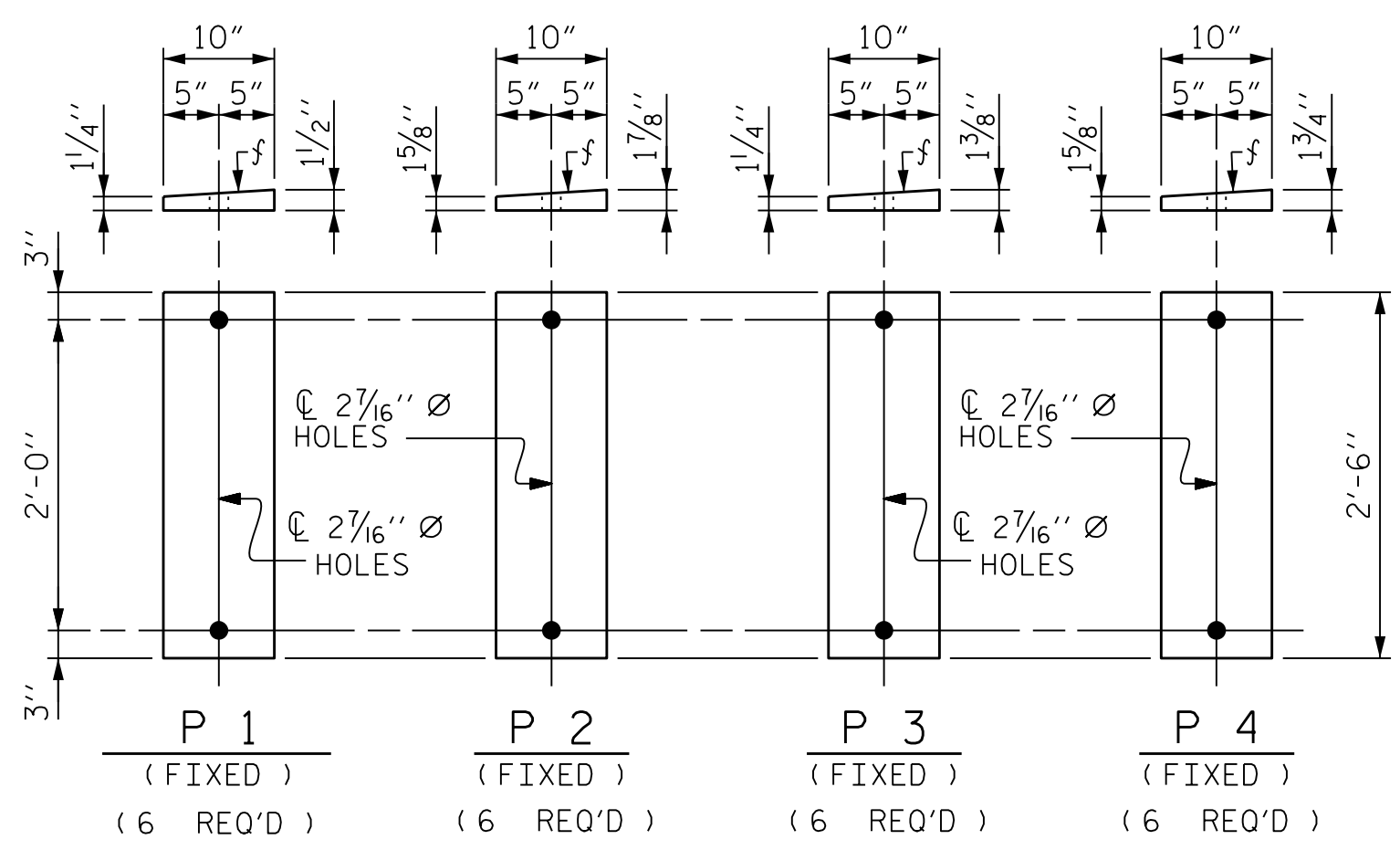
PLAN VIEW OF ELASTOMERIC LEVELING PAD

(LEVELING PADS SHALL BE 60 DUROMETER HARDNESS)

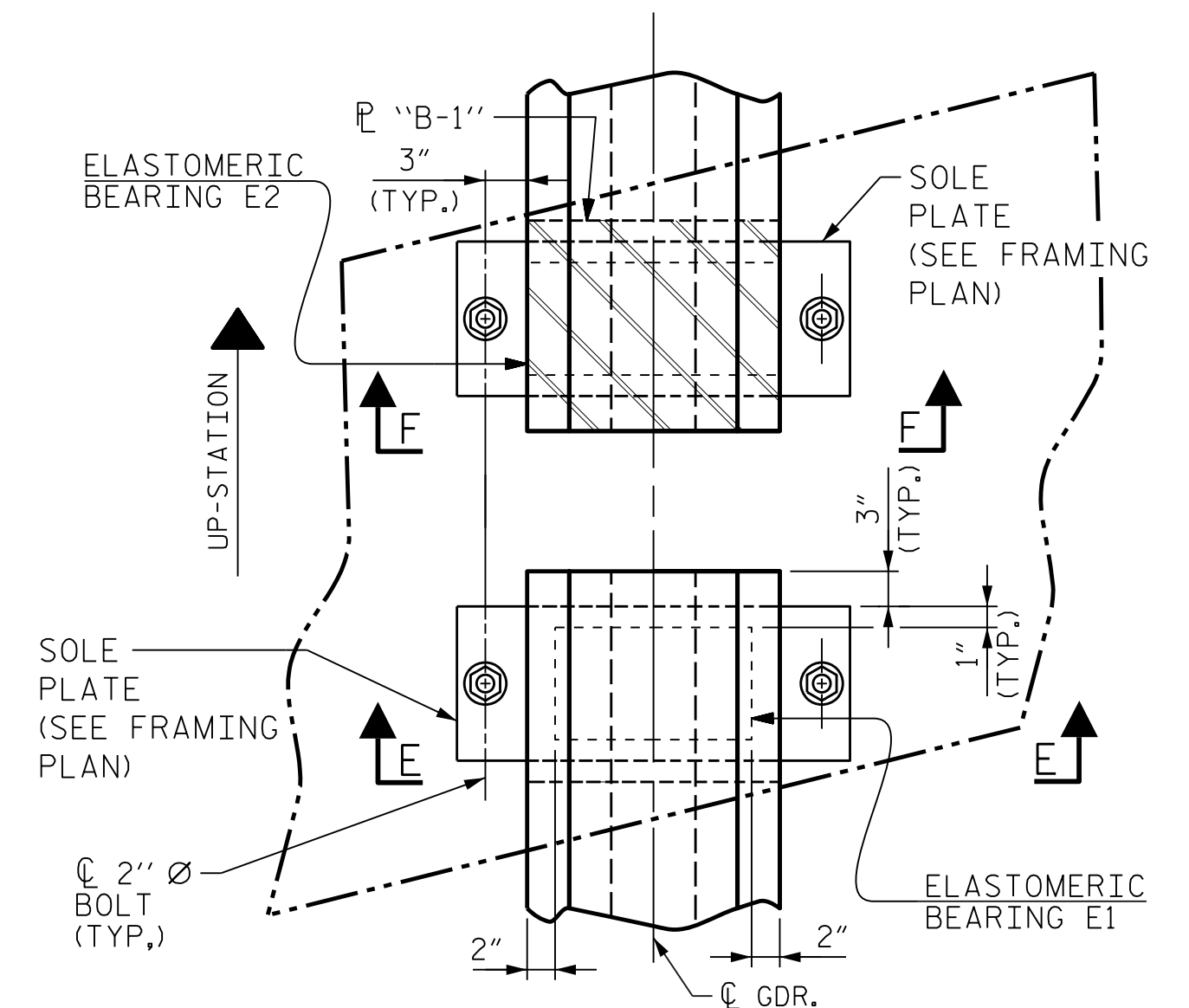
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	145 K
TYPE III	205 K



SOLE PLATE PLACEMENT DETAIL

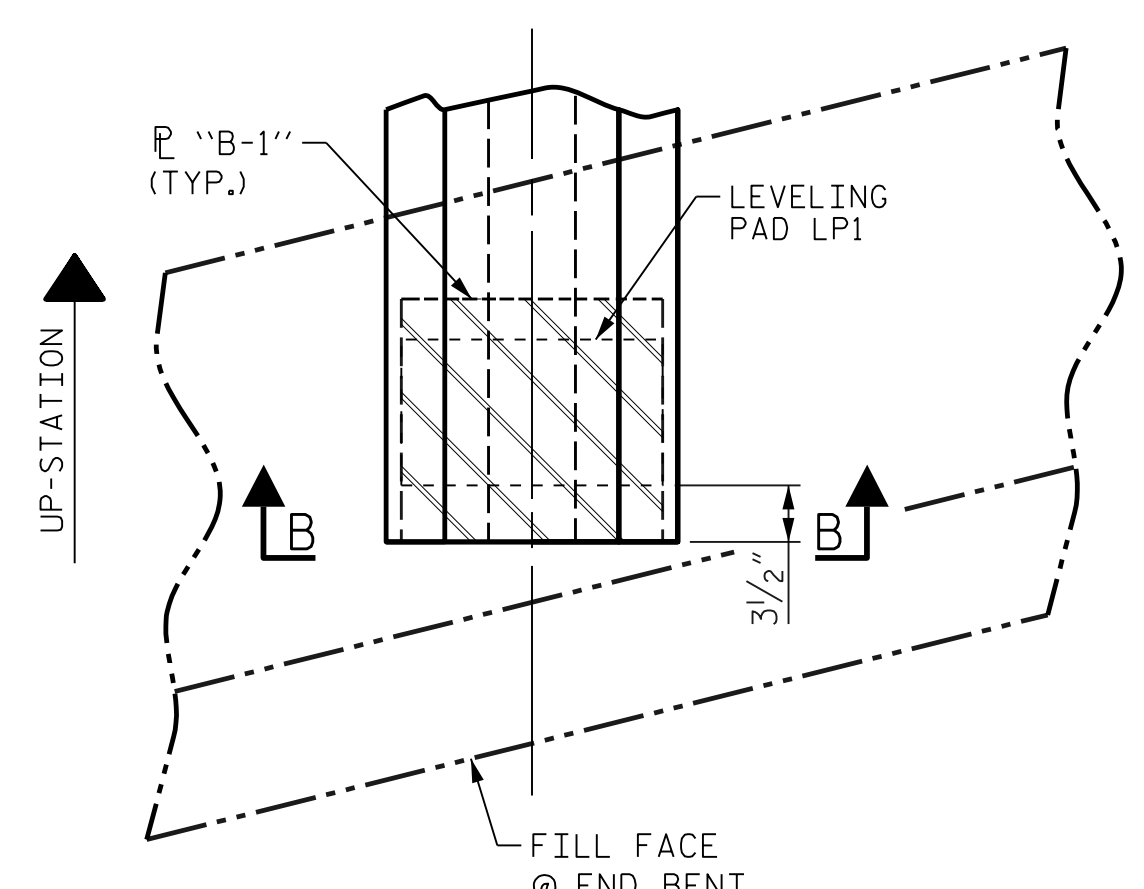


SOLE PLATE DETAILS ("P")



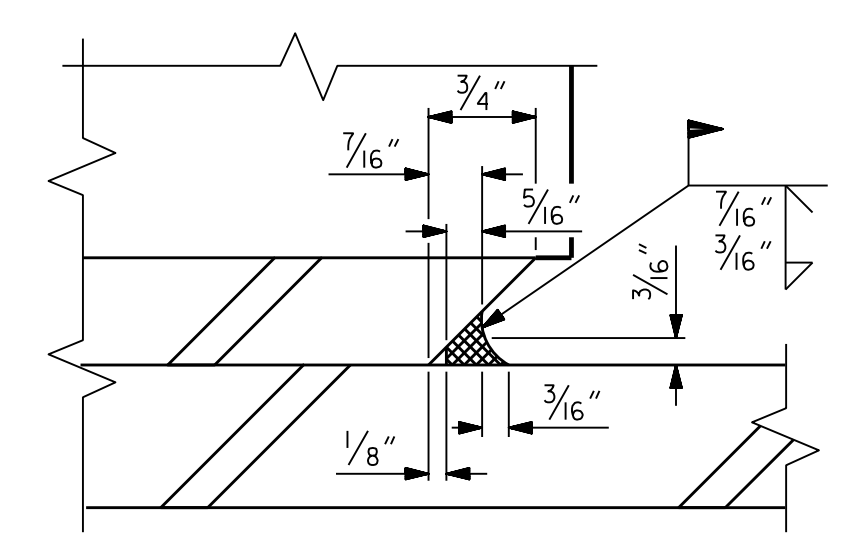
PLAN VIEW AT BENT

BENT 1 SHOWN, BENT 2 SIMILAR



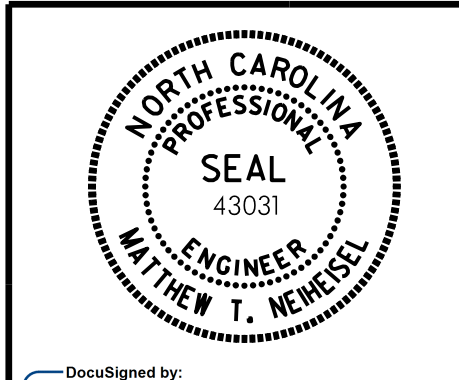
PLAN AT END BENT

END BENT 1 SHOWN, END BENT 2 SIMILAR



DETAIL "A"

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-



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 84E318F9E3074E

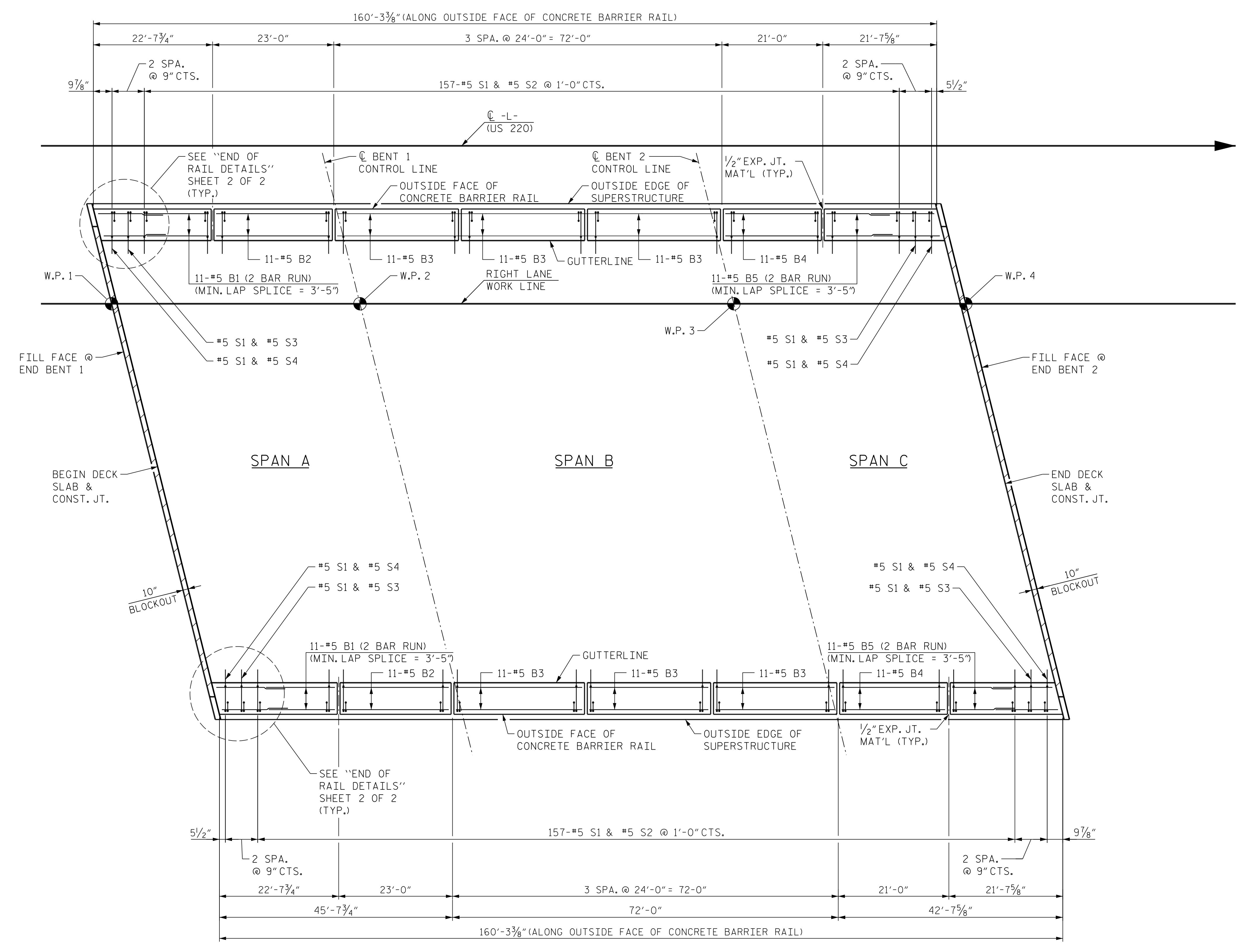
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE					
REVISIONS					
BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
		3			5-19
		4			TOTAL SHEETS 37

DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018



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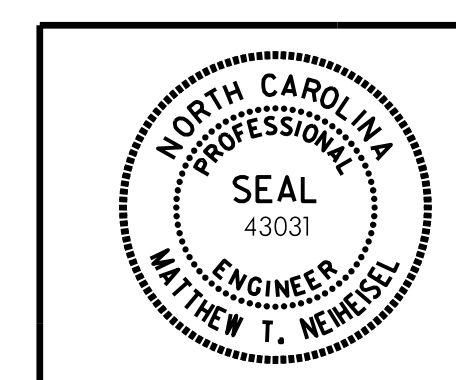
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN OF BARRIER RAIL - SPANS A, B, & C

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 PLAN OF CONCRETE
 BARRIER RAIL
 SPANS A, B, & C



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 2/20/2018
 44E318F9E30749E

REVISIONS				SHEET NO.
BY:	DATE:	NO.	DATE:	S-20
		3		TOTAL SHEETS
		4		37

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 FILE: ... \Structures\dgm\Final\CAD\0600

DRAWN BY : D. H. CARTER DATE : FEB 2018
 CHECKED BY : M. T. NEIHEISEL DATE : FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE : FEB 2018

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NOTES

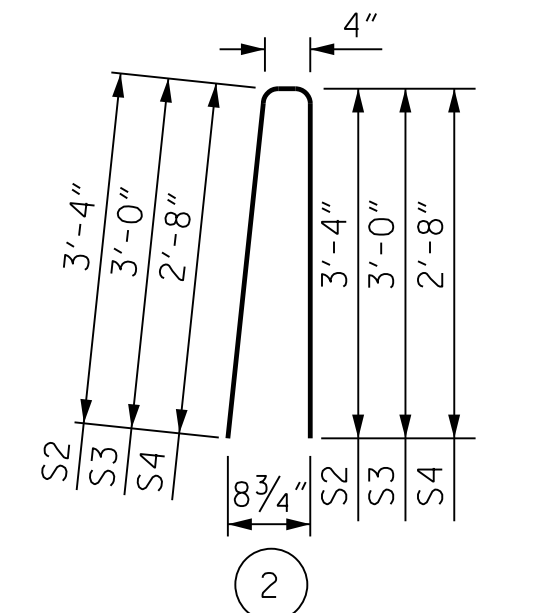
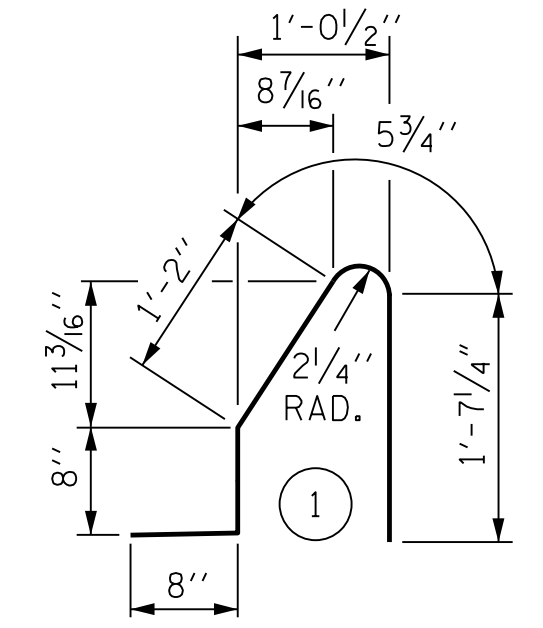
THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE #5 S1 AND S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL.

BAR TYPES



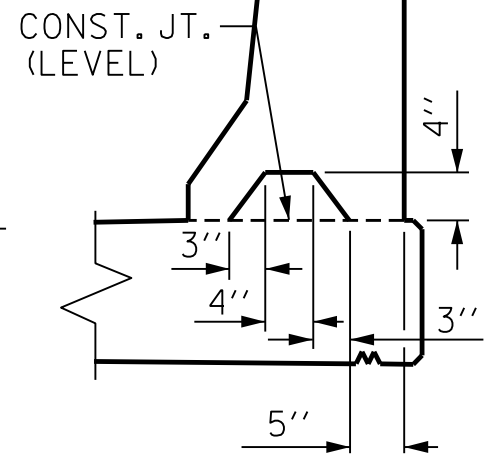
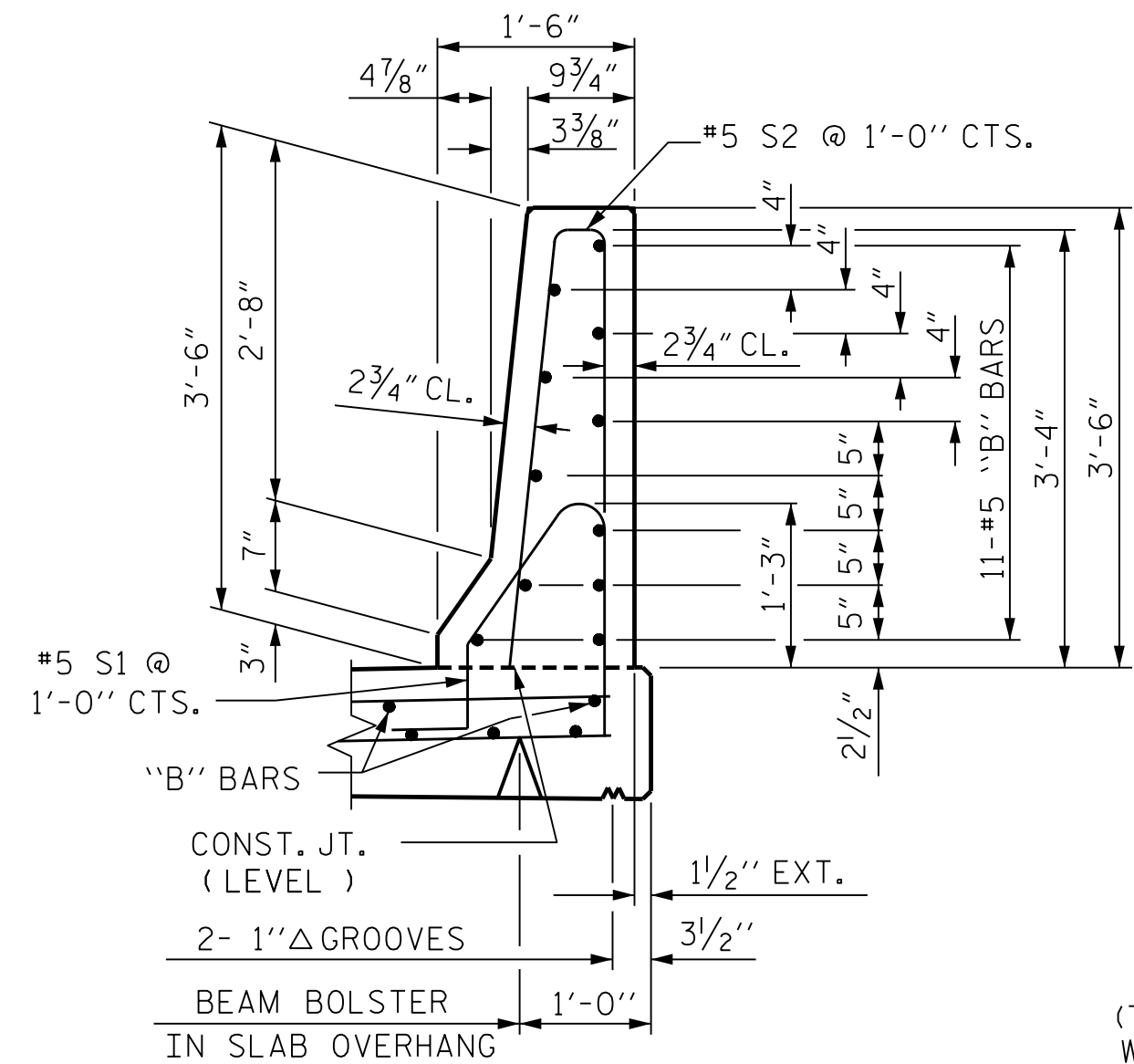
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

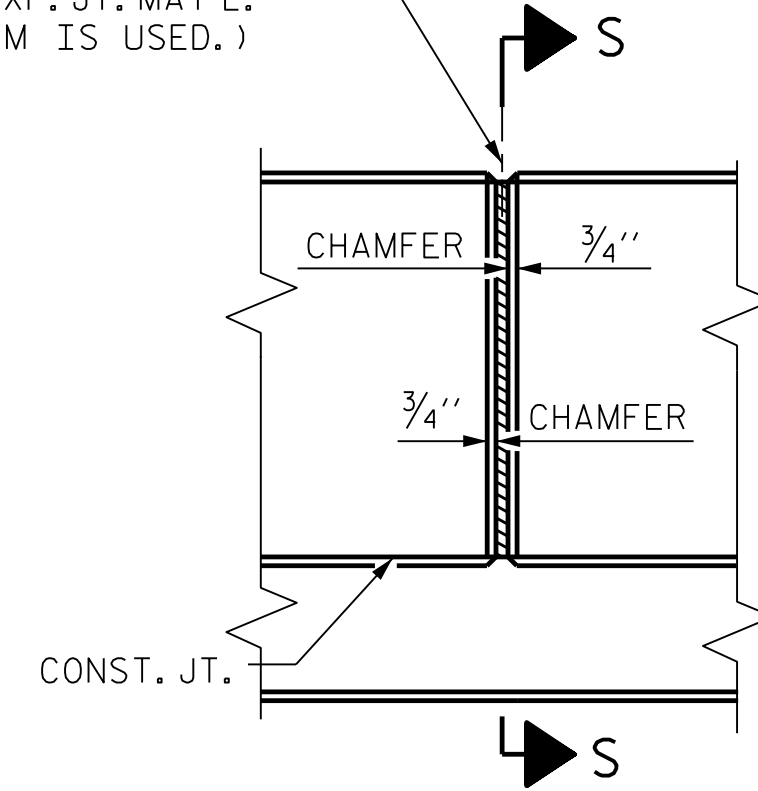
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	44	#5	STR	13'-1"	600
* B2	22	#5	STR	22'-8"	520
* B3	66	#5	STR	23'-8"	1,629
* B4	22	#5	STR	20'-8"	474
* B5	44	#5	STR	12'-7"	577
* S1	322	#5	1	4'-7"	1,539
* S2	314	#5	2	7'-0"	2,293
* S3	4	#5	2	6'-4"	26
* S4	4	#5	2	5'-8"	24

* EPOXY COATED REINFORCING STEEL	7,682 LBS.
CLASS AA CONCRETE	43.5 CU. YDS.
CONCRETE BARRIER RAIL	320.6 LIN. FT.



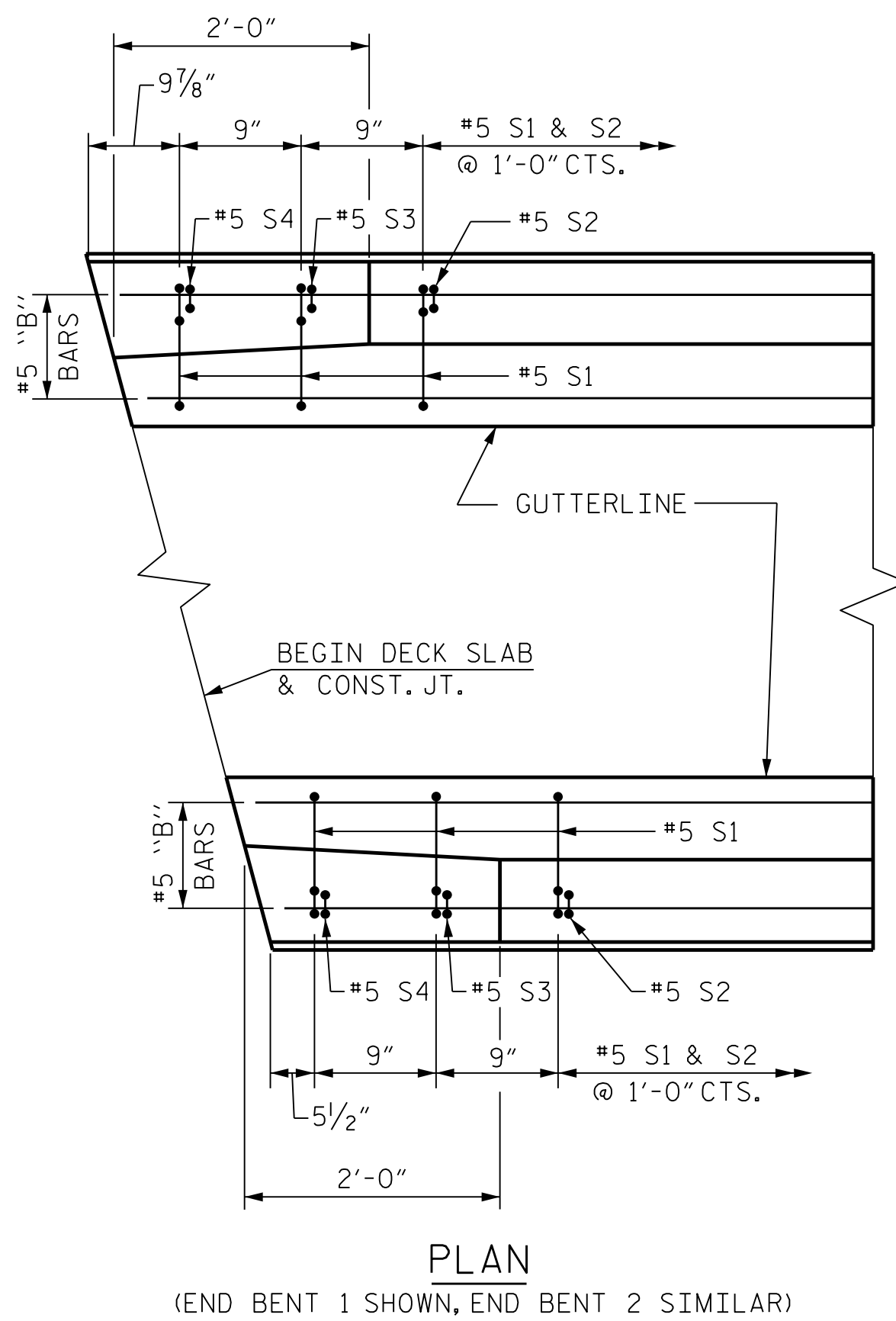
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)

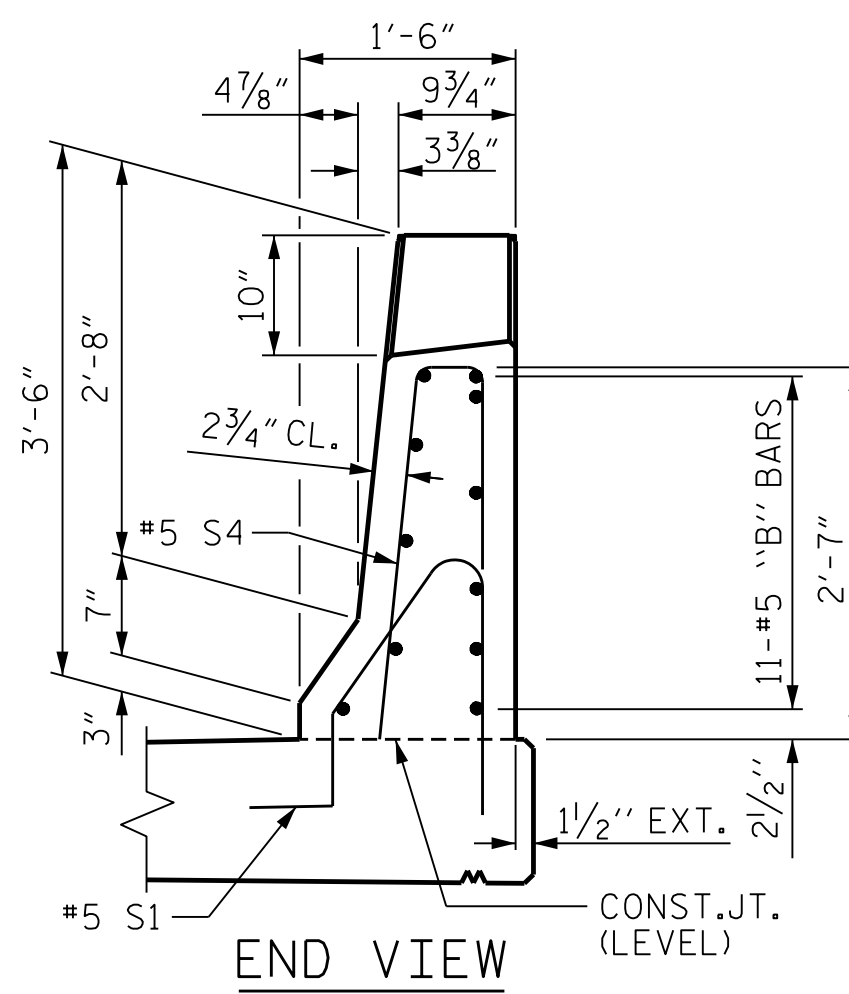


ELEVATION AT EXPANSION JOINTS

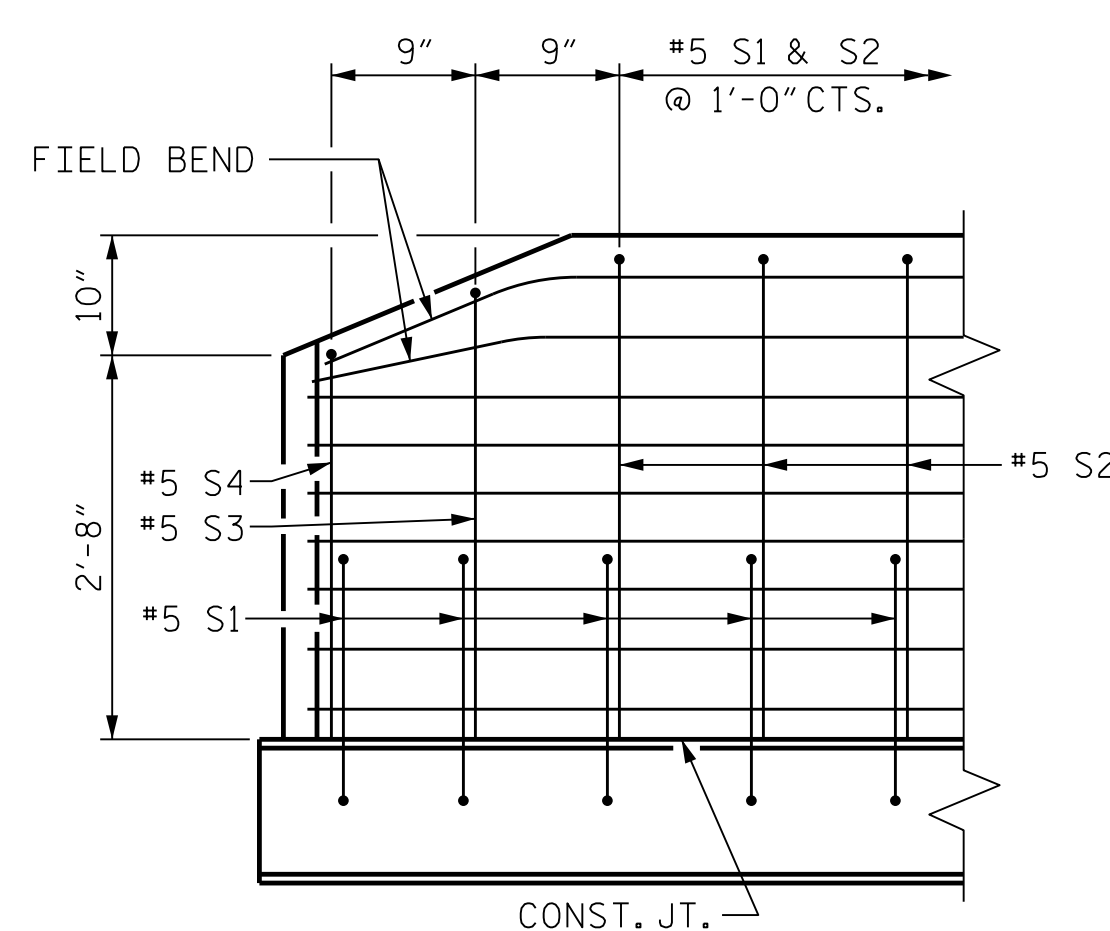
BARRIER RAIL DETAILS



PLAN
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



END VIEW



SIDE VIEW

END OF RAIL DETAILS

DRAWN BY : D. H. CARTER DATE : FEB 2018
 CHECKED BY : M. T. NEIHEISEL DATE : FEB 2018
 DESIGN ENGINEER OF RECORD : M. T. NEIHEISEL DATE : FEB 2018



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 Matthew T. Neiheisel
 2/20/2018
 04E318F9E30749E

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**STANDARD
 CONCRETE
 BARRIER RAIL
 DETAILS**

REVISIONS						SHEET NO.
BY:	DATE:	NO.	BY:	DATE:		S-21
		3				TOTAL SHEETS
		4				37

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 PENTABLE: NCDOT STRUCTURES DEFAULT PEN.FBI
 USER: dcarter DATE: 2/19/2018 TIME: 1:44:02 PM
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NOTES

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

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

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

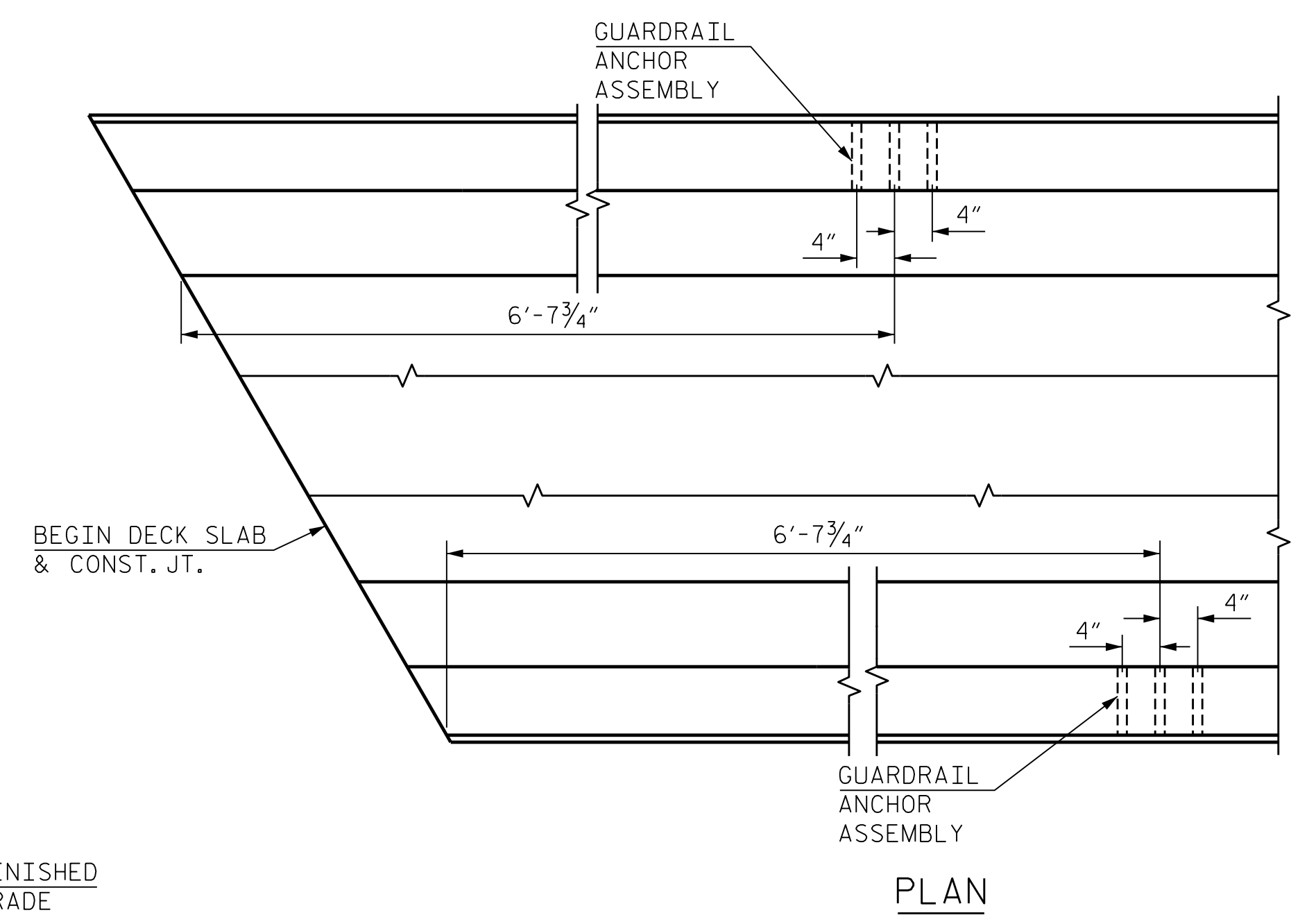
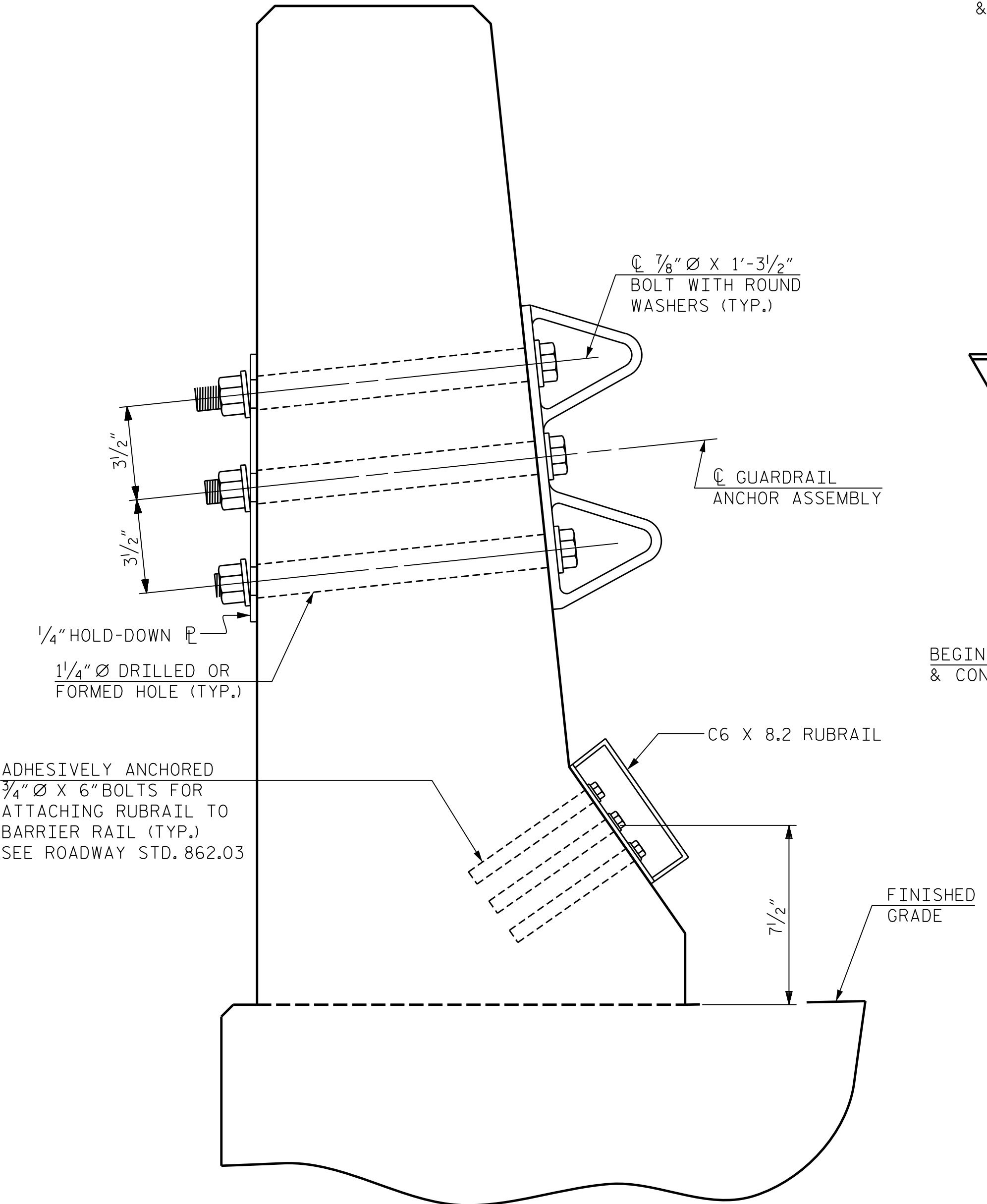
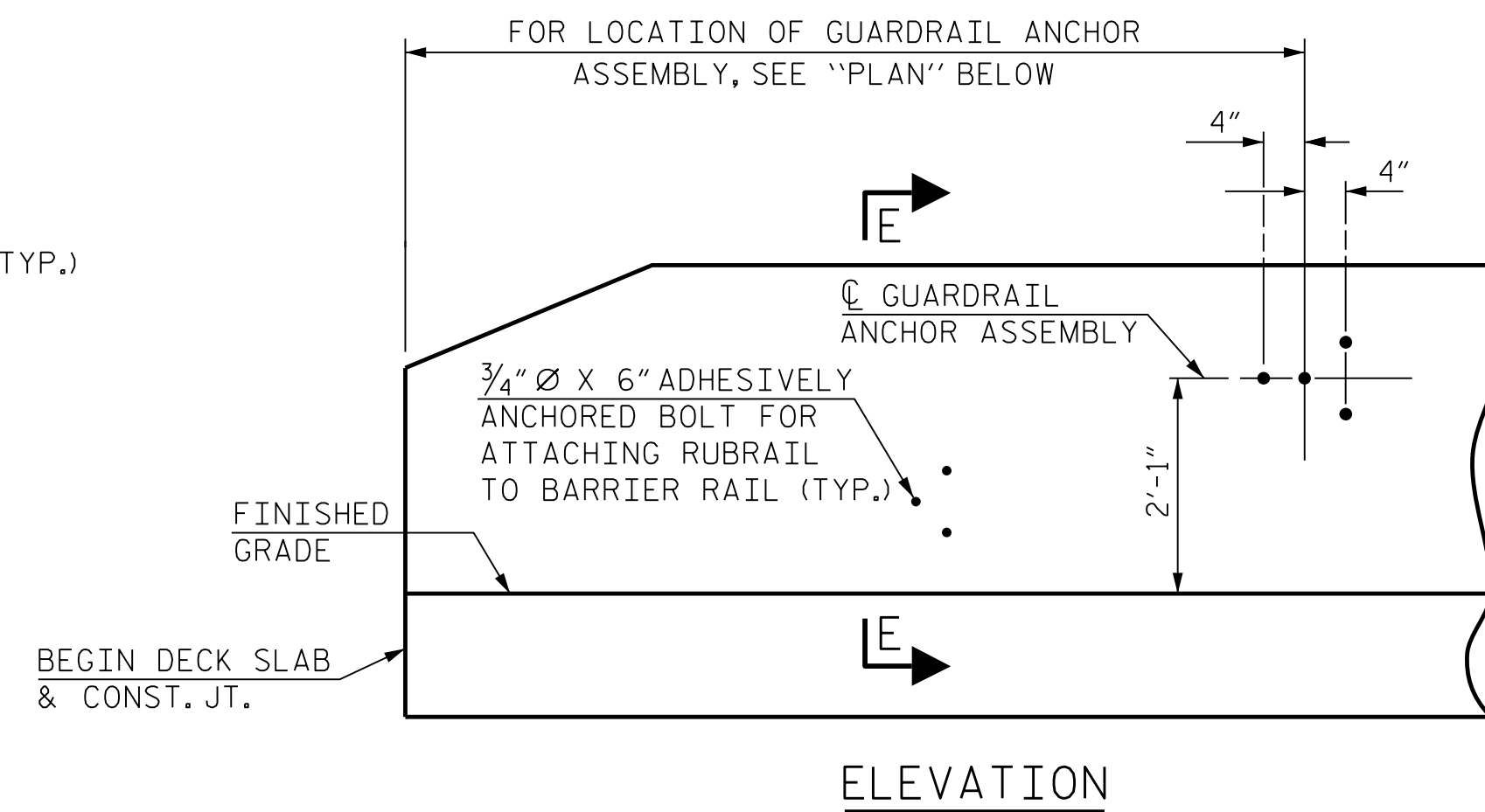
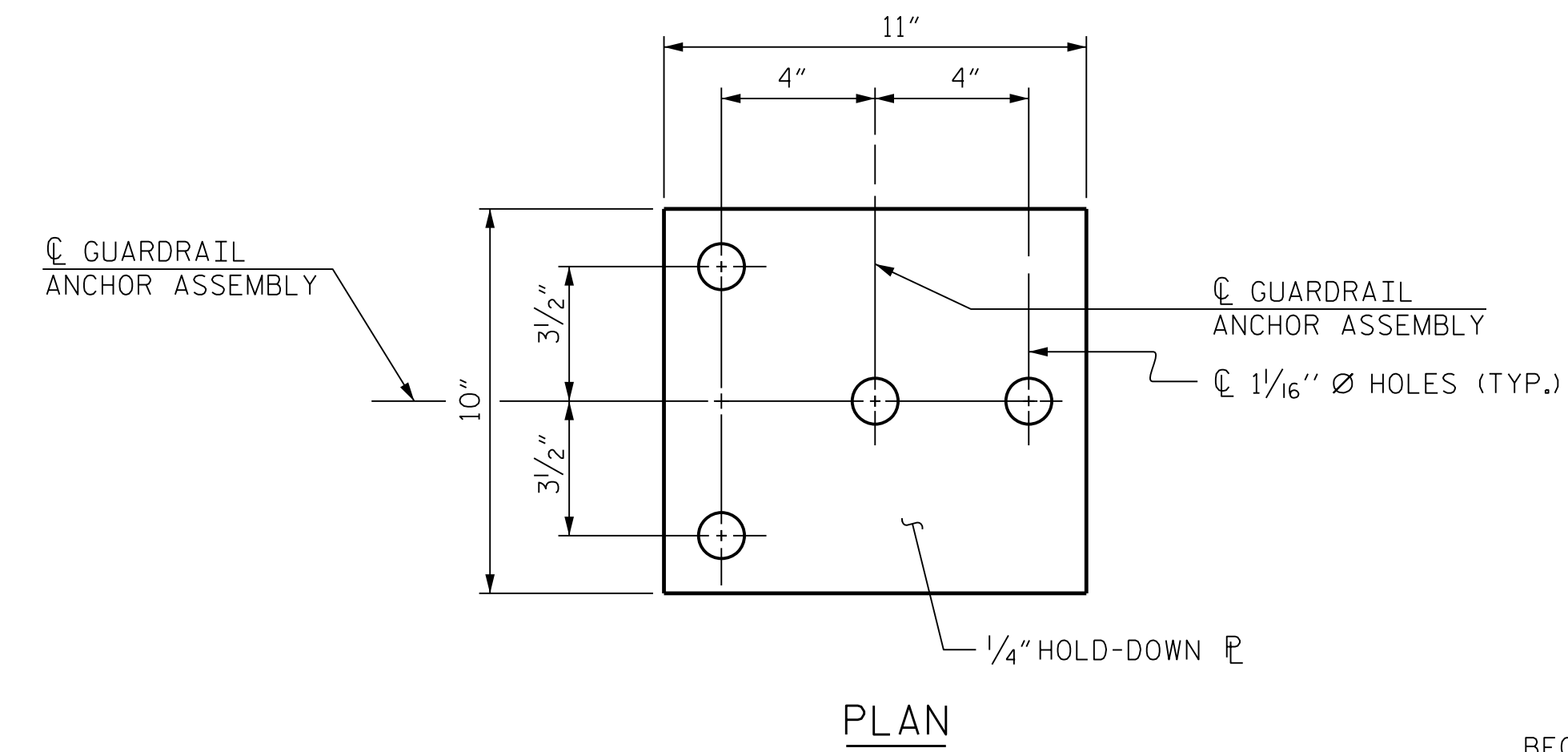
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



LOCATION OF ANCHORS FOR GUARDRAIL
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD
 GUARDRAIL ANCHORAGE
 FOR BARRIER RAIL



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 2/20/2018
 84E31BF9E30749E

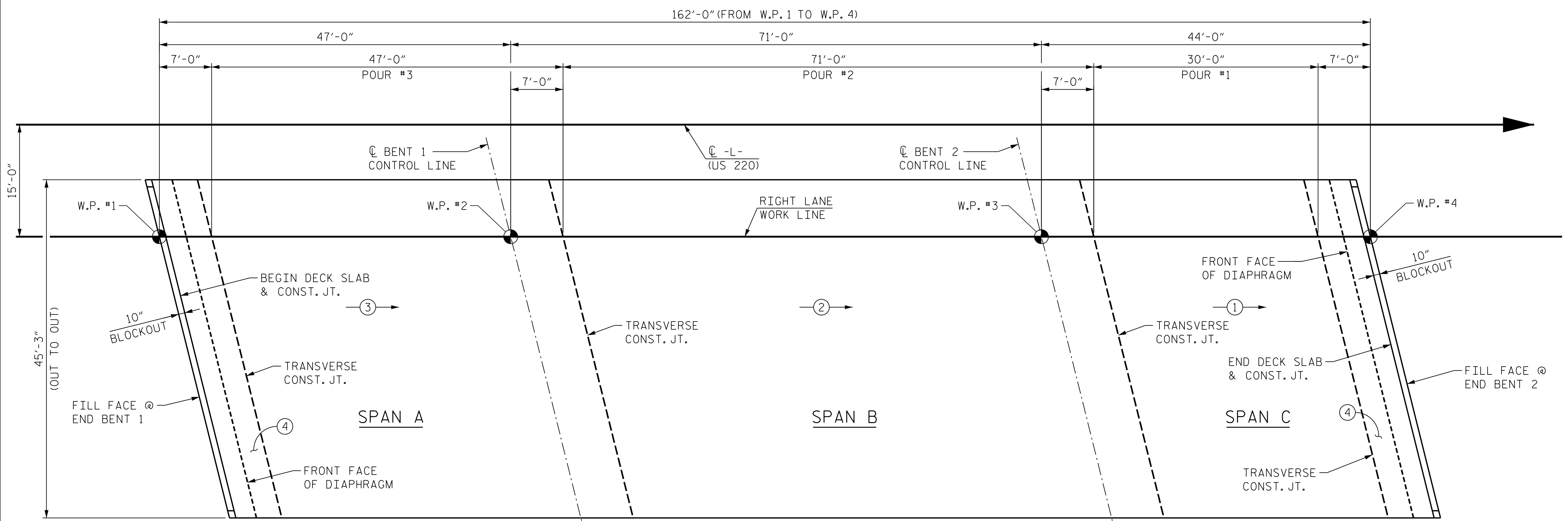
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BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS 37	
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		4				

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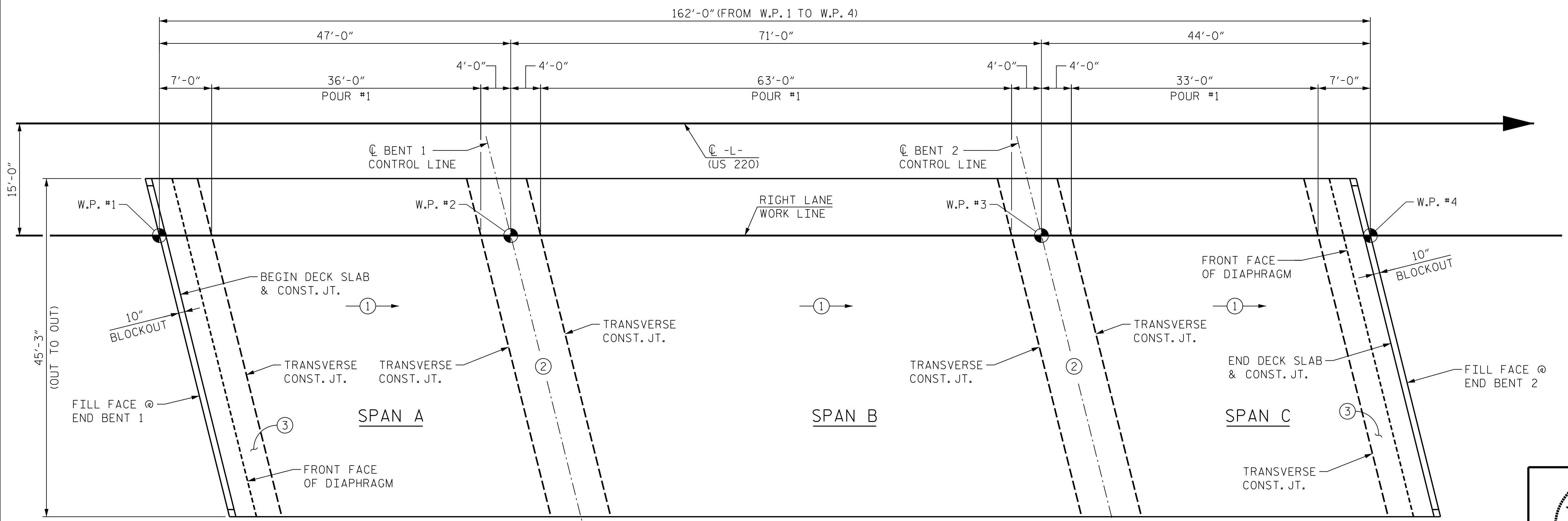
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DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

SECTION E-E
 GUARDRAIL ANCHOR ASSEMBLY DETAILS



POURING SEQUENCE
 —③→ DENOTES POUR NUMBER AND DIRECTION



OPTIONAL POURING SEQUENCE
 —①→ DENOTES POUR NUMBER AND DIRECTION

POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI.

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 BILL OF MATERIAL

REVISIONS				SHEET NO.
BY:	DATE:	NO.	BY:	DATE:
		③		
		④		

TOTAL SHEETS: 37

DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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 USER: dcarter
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SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	40.4		
POUR 2	106.2		
POUR 3	73.8		
POUR 4	52.2		
TOTALS**	272.6	28,381	26,645

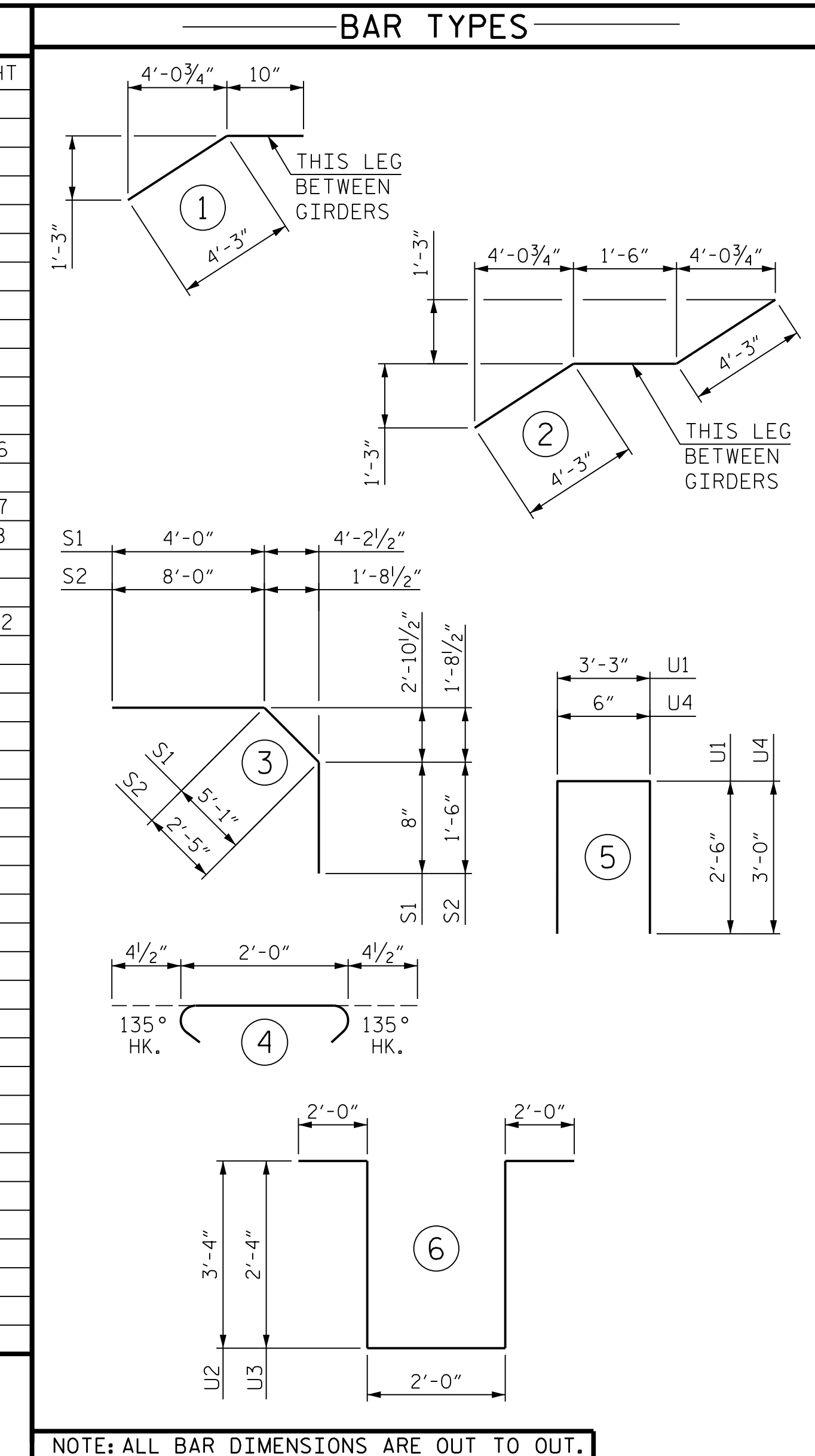
** QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

BAR SIZE	SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS				
	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

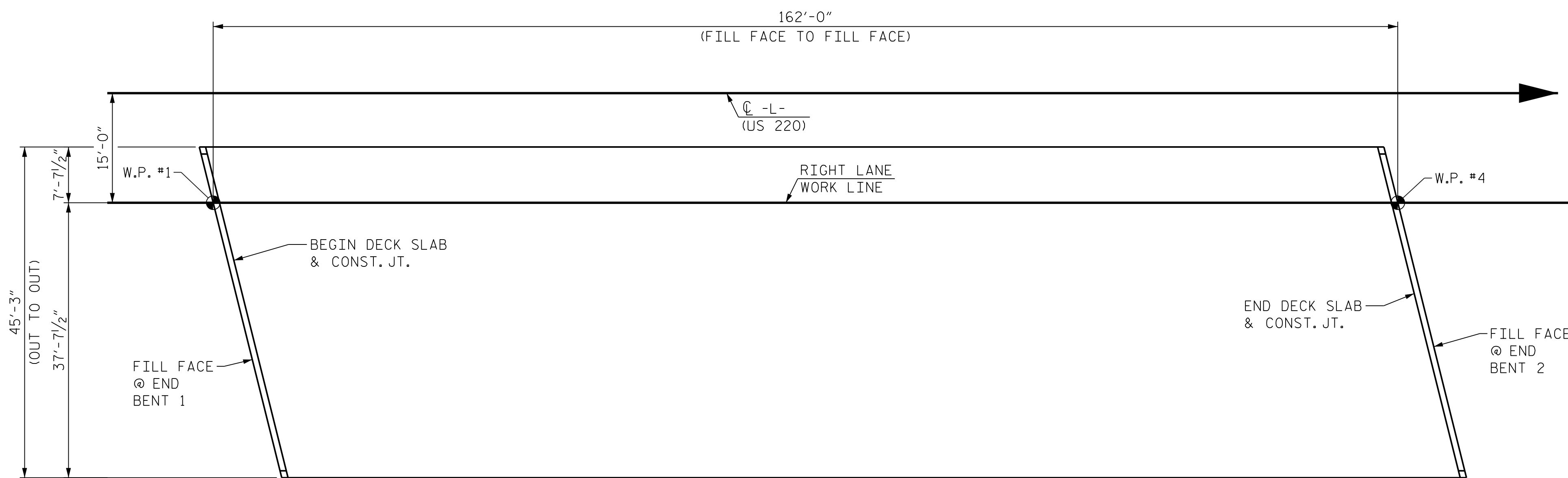
GROOVING BRIDGE FLOORS	
APPROACH SLABS	1,898 SQ.FT.
BRIDGE DECK	6,238 SQ.FT.
TOTAL	8,136 SQ.FT.

REINFORCING BAR SCHEDULE						REINFORCING BAR SCHEDULE					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	298	#5	STR	44'-11"	13,961	A212	2	#5	STR	21'-4"	45
A2	298	#5	STR	44'-11"	13,961	A213	2	#5	STR	19'-4"	40
						A214	2	#5	STR	17'-4"	36
* A101	2	#5	STR	43'-5"	91	A215	2	#5	STR	15'-4"	32
* A102	2	#5	STR	41'-5"	86	A216	2	#5	STR	13'-4"	28
* A103	2	#5	STR	39'-5"	82	A217	2	#5	STR	11'-4"	24
* A104	2	#5	STR	37'-5"	78	A218	2	#5	STR	9'-4"	19
* A105	2	#5	STR	35'-4"	74	A219	2	#5	STR	7'-4"	15
* A106	2	#5	STR	33'-4"	70	A220	2	#5	STR	5'-4"	11
* A107	2	#5	STR	31'-4"	65	A221	2	#5	STR	3'-3"	7
* A108	2	#5	STR	29'-4"	61	A222	2	#5	STR	1'-3"	3
* A109	2	#5	STR	27'-4"	57						
* A110	2	#5	STR	25'-4"	53	* B1	142	#6	STR	9'-6"	2,026
* A111	2	#5	STR	23'-4"	49	* B2	37	#4	STR	21'-8"	536
* A112	2	#5	STR	21'-4"	45	* B3	74	#6	STR	45'-6"	5,057
* A113	2	#5	STR	19'-4"	40	* B4	68	#6	STR	18'-0"	1,838
* A114	2	#5	STR	17'-4"	36	* B5	37	#4	STR	22'-0"	544
* A115	2	#5	STR	15'-4"	32	* B6	37	#4	STR	18'-8"	461
* A116	2	#5	STR	13'-4"	28	B7	252	#5	STR	41'-8"	10,952
* A117	2	#5	STR	11'-4"	24						
* A118	2	#5	STR	9'-4"	19	K1	16	#4	STR	24'-1"	257
* A119	2	#5	STR	7'-4"	15	K2	10	#4	STR	6'-2"	41
* A120	2	#5	STR	5'-4"	11	K3	60	#4	STR	7'-1"	284
* A121	2	#5	STR	3'-3"	7	K4	30	#4	STR	6'-8"	134
* A122	2	#5	STR	1'-3"	3	K5	4	#4	STR	2'-0"	5
A201	2	#5	STR	43'-5"	91	K6	8	#4	STR	2'-5"	13
A202	2	#5	STR	41'-5"	86	K7	4	#4	STR	2'-3"	6
A203	2	#5	STR	39'-5"	82	K8	16	#4	STR	5'-1"	54
A204	2	#5	STR	37'-5"	78	K9	32	#4	STR	10'-0"	214
A205	2	#5	STR	35'-4"	74	K10	20	#4	STR	5'-0"	67
A206	2	#5	STR	33'-4"	70						
A207	2	#5	STR	31'-4"	65	* S1	78	#4	STR	9'-9"	508
A208	2	#5	STR	29'-4"	61	* S2	82	#4	STR	11'-11"	653
A209	2	#5	STR	27'-4"	57	S3	190	#4	STR	2'-9"	349
A210	2	#5	STR	25'-4"	53						
A211	2	#5	STR	23'-4"	49	U1	82	#4	STR	8'-3"	452
						U2	50	#4	STR	12'-8"	423
						U3	20	#4	STR	10'-8"	143
						* U4	8	#4	STR	6'-6"	35

REINFORCING STEEL 28,381 LBS.
* EPOXY COATED REINFORCING STEEL 26,645 LBS.



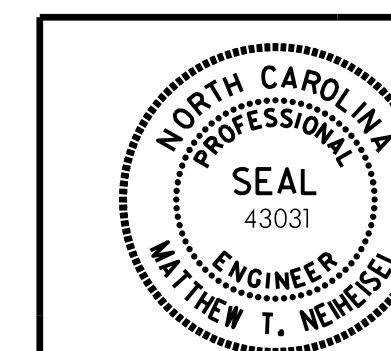
NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.



LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 7,331)

DRAWN BY : D. H. CARTER DATE : FEB 2018
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DESIGN ENGINEER OF RECORD : M. T. NEIHEISEL DATE : FEB 2018

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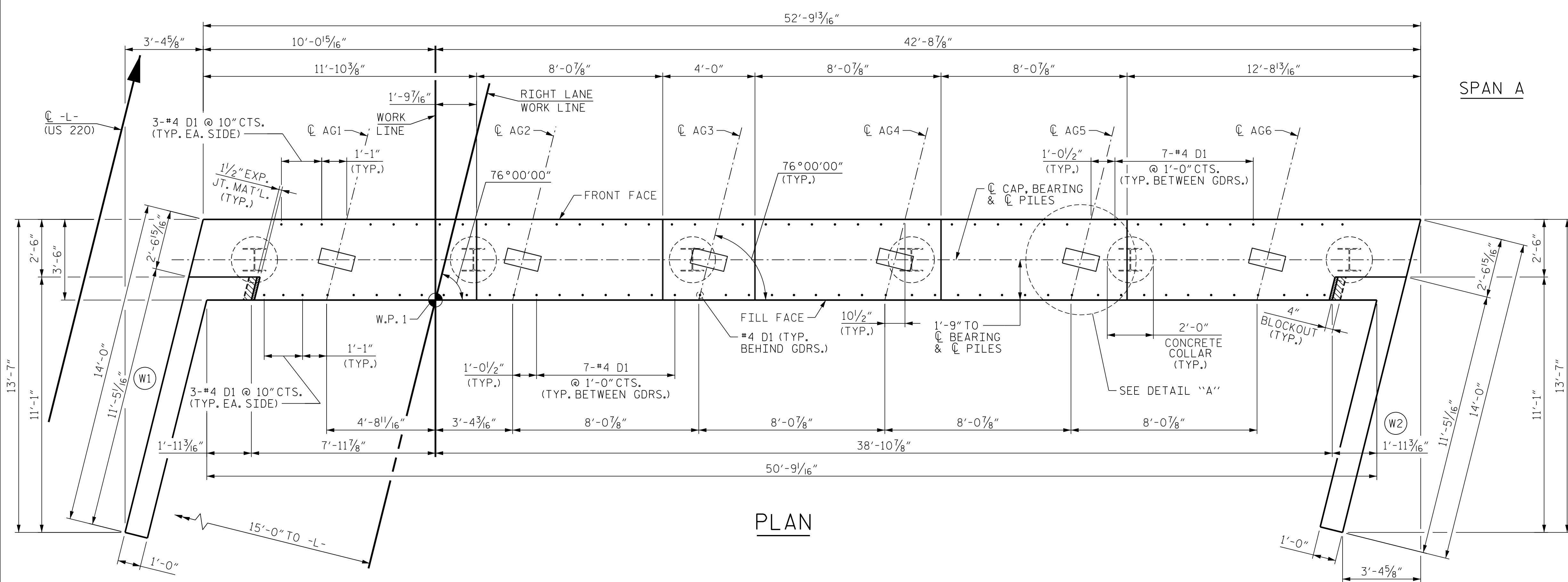


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2/20/2018
44E318F9E30749E

PROJECT NO. B-5352
ROCKINGHAM COUNTY
STATION: P.O.T. 22+16.89 -L-
SHEET 2 OF 2

REVISIONS						SHEET NO.
BY:	DATE:	NO.	BY:	DATE:		S-24
		3				TOTAL SHEETS
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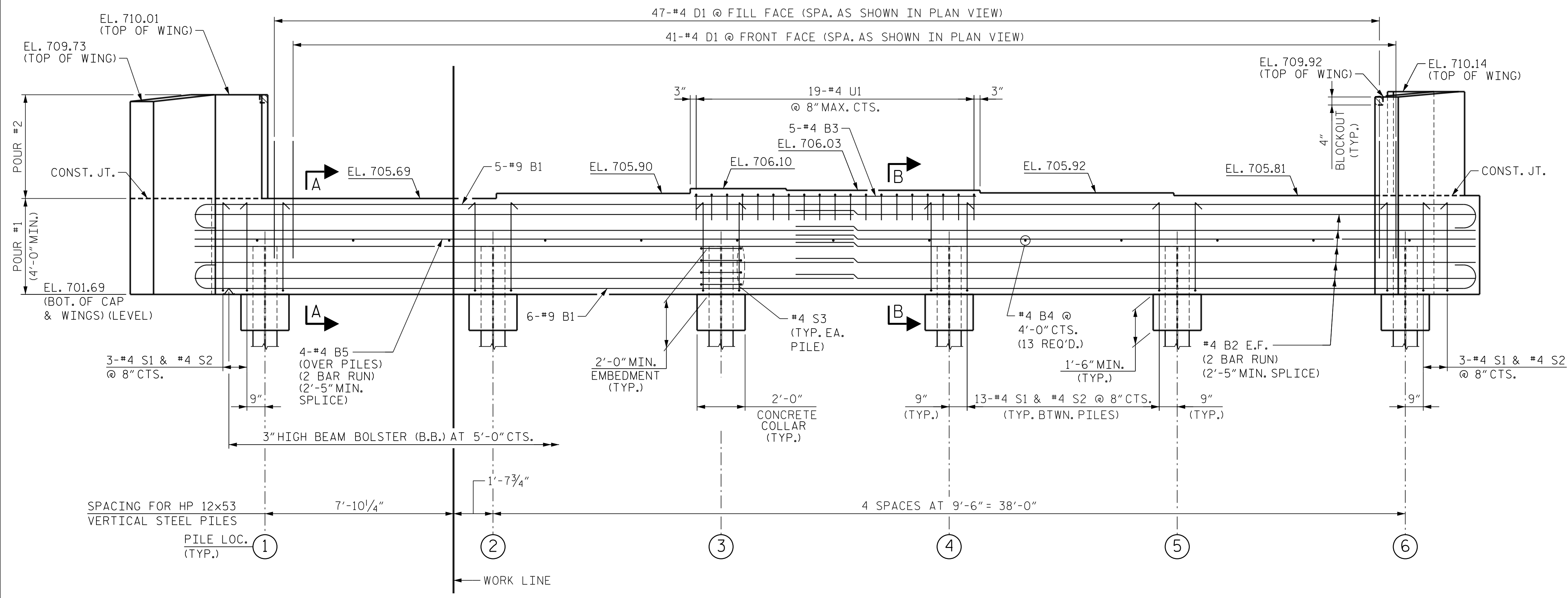


PLAN

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

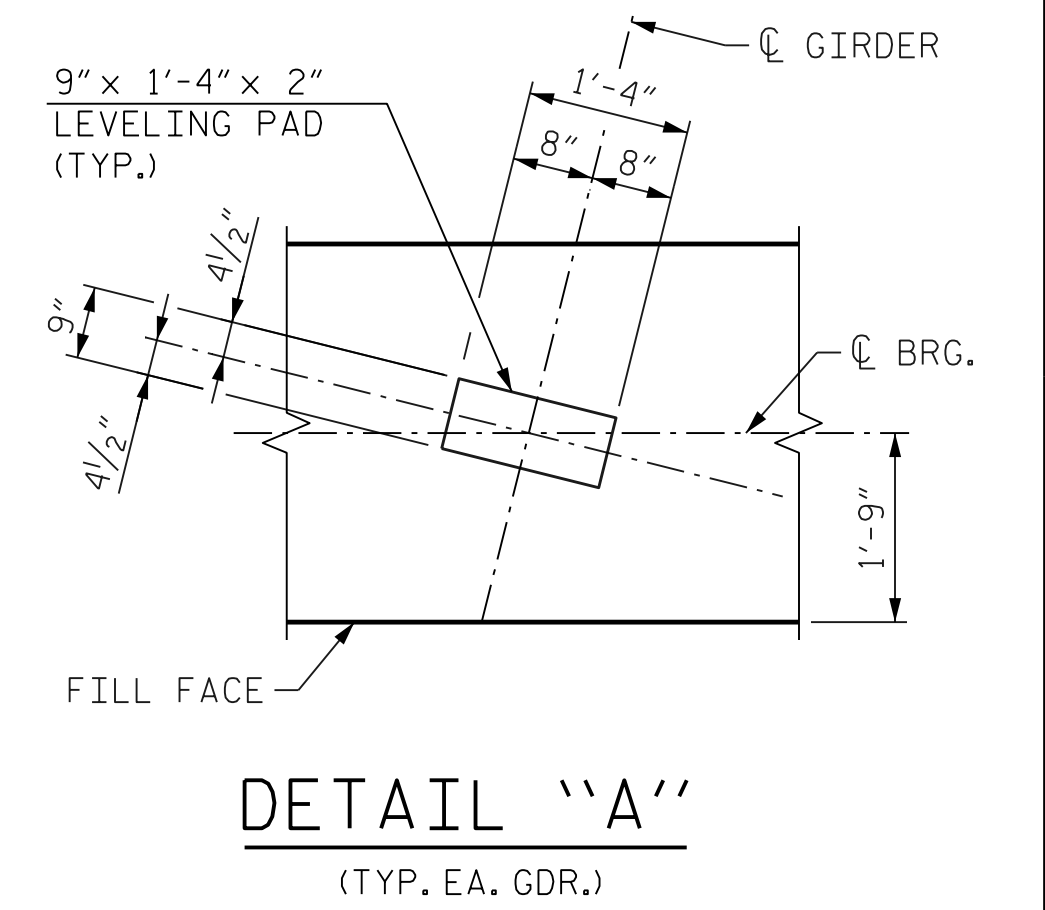
FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

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



ELEVATION

E.F. = EACH FACE

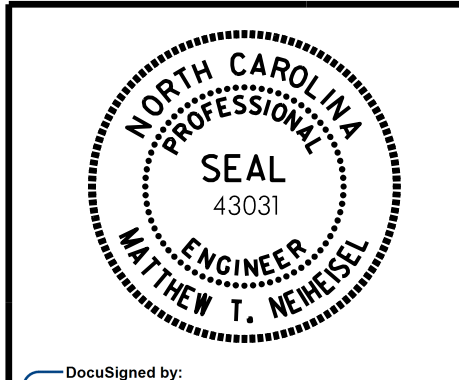


DETAIL "A"
(TYP. EA. GDR.)

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 PLAN AND ELEVATION



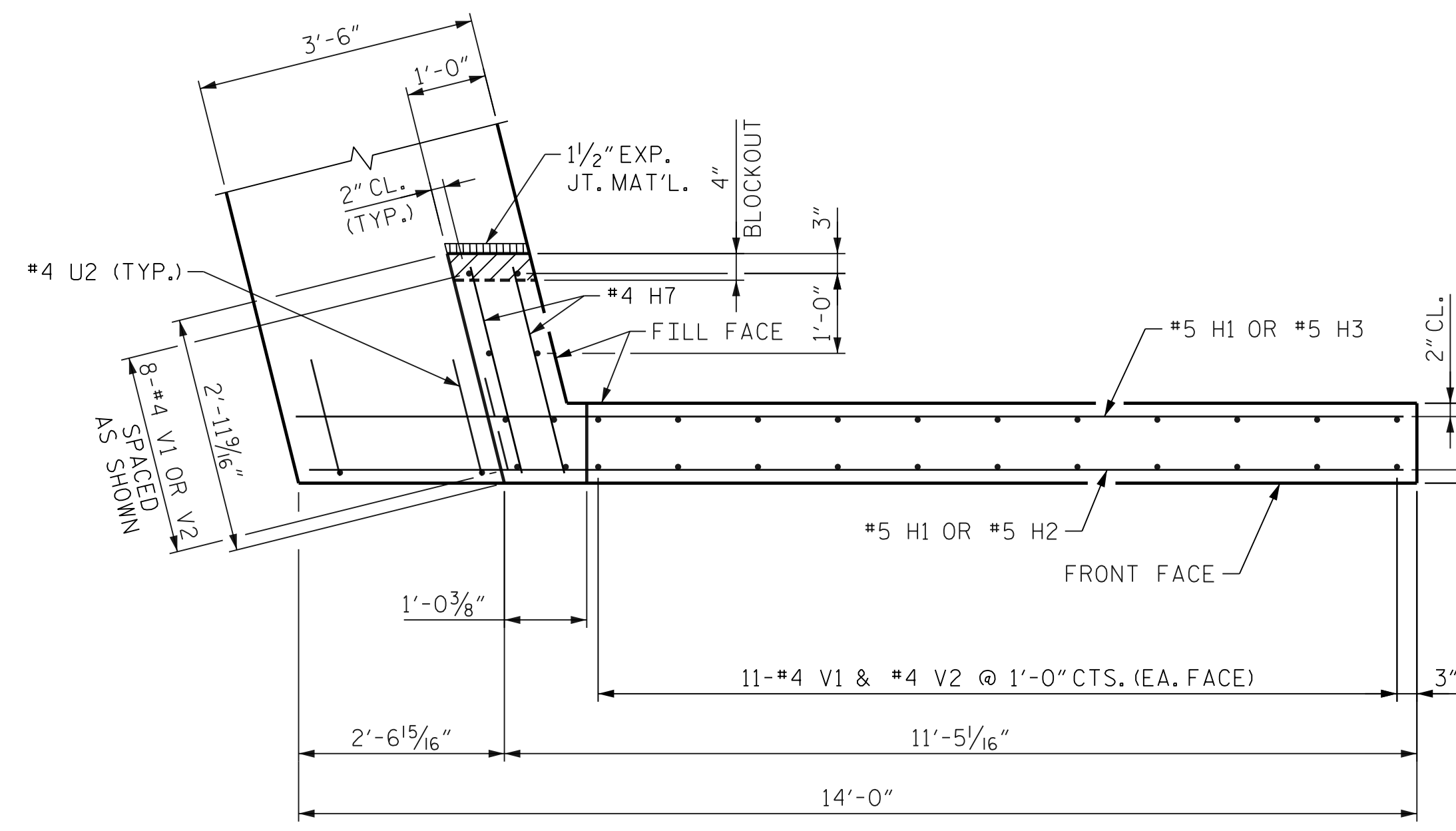
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BY:	DATE:	NO.	BY:	DATE:		S-25
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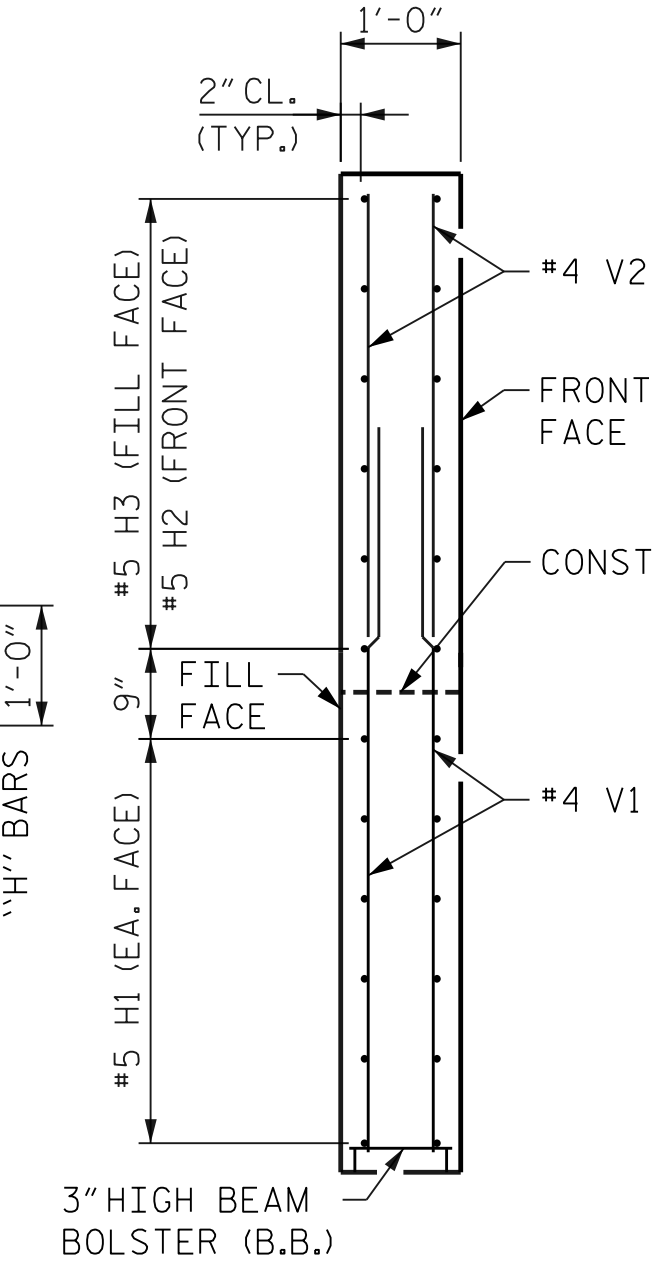
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 Raleigh, NC 27601
 NC License No: F-0258

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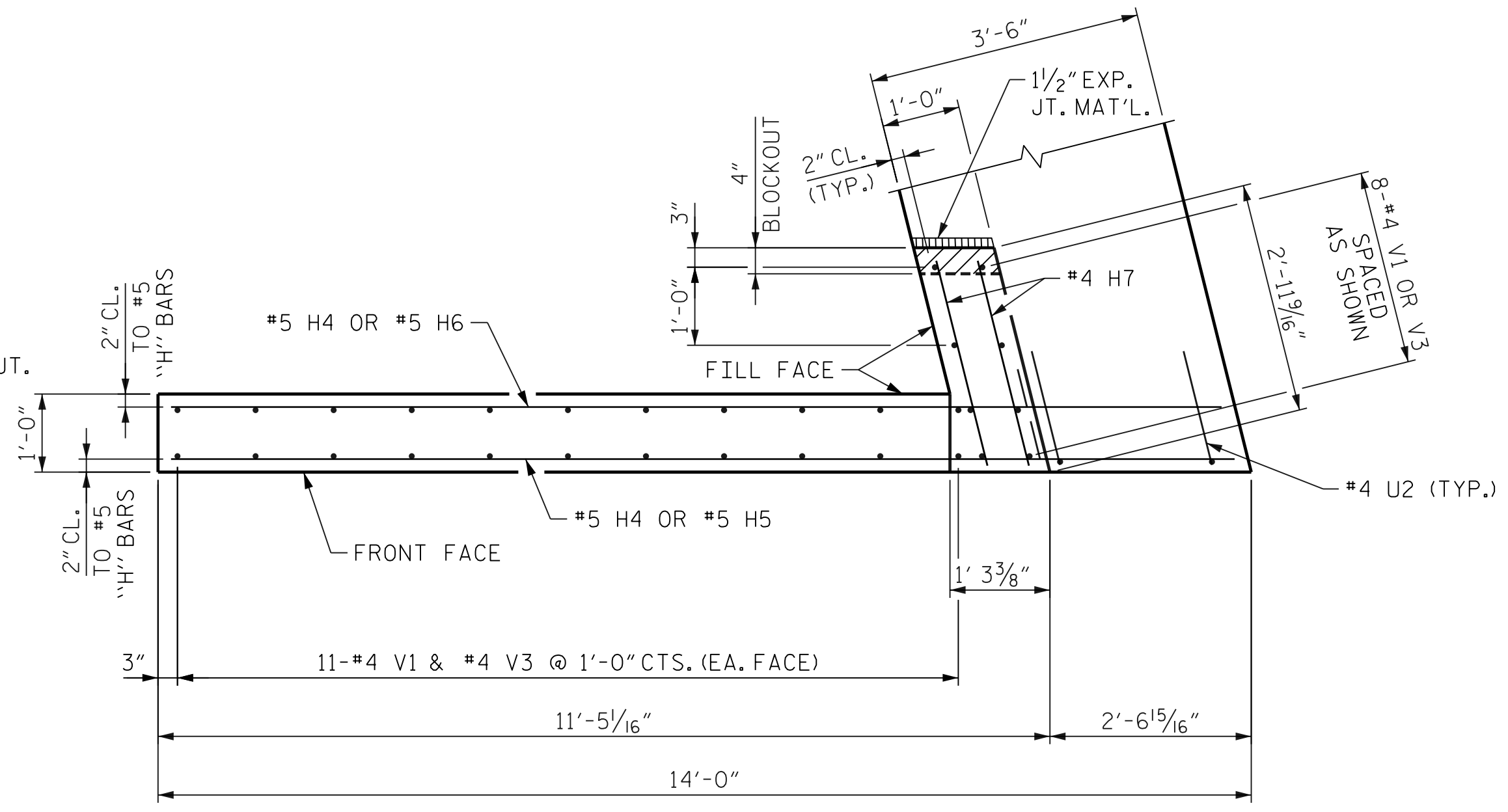
DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018



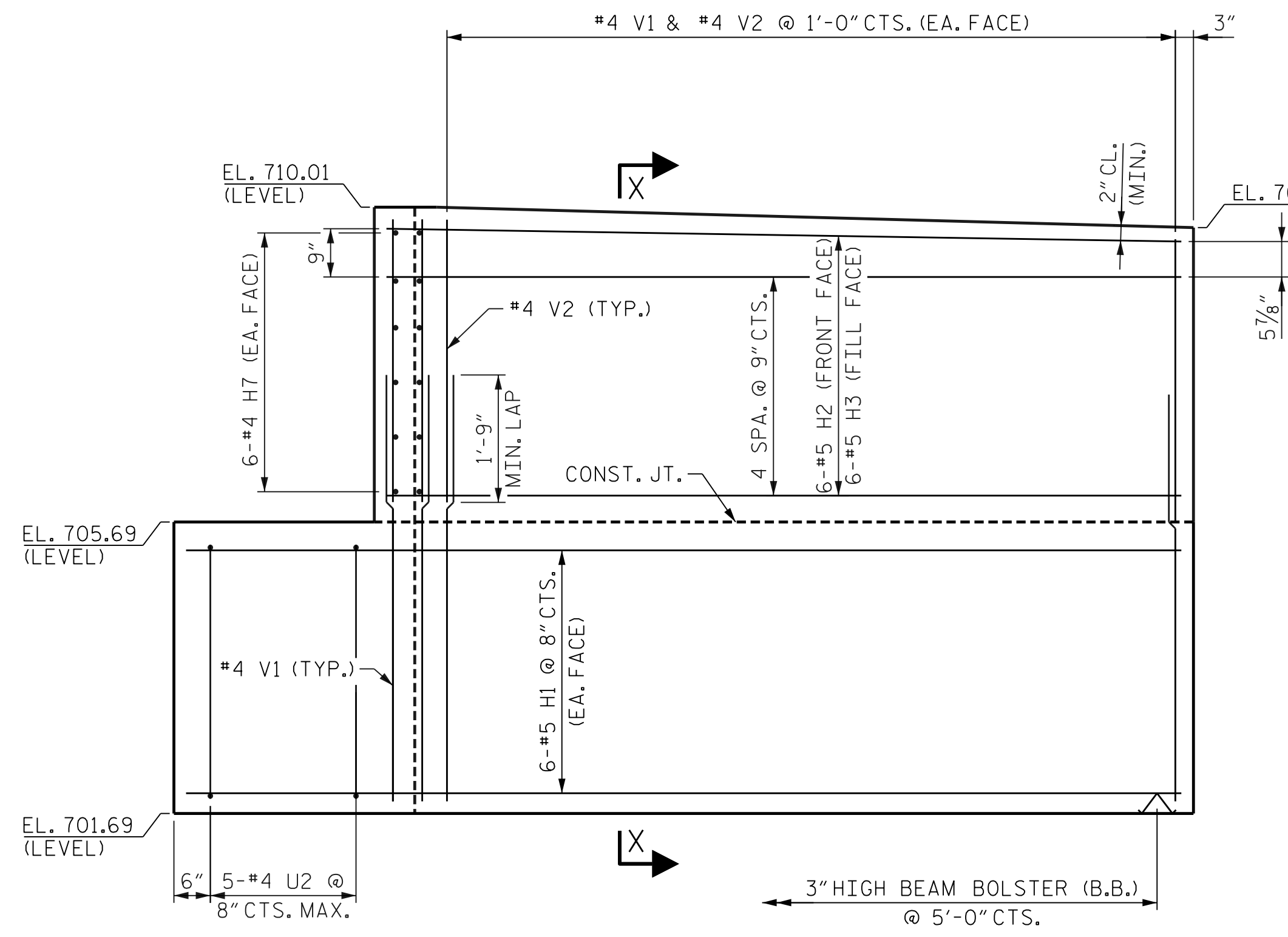
PLAN OF WING (W1)



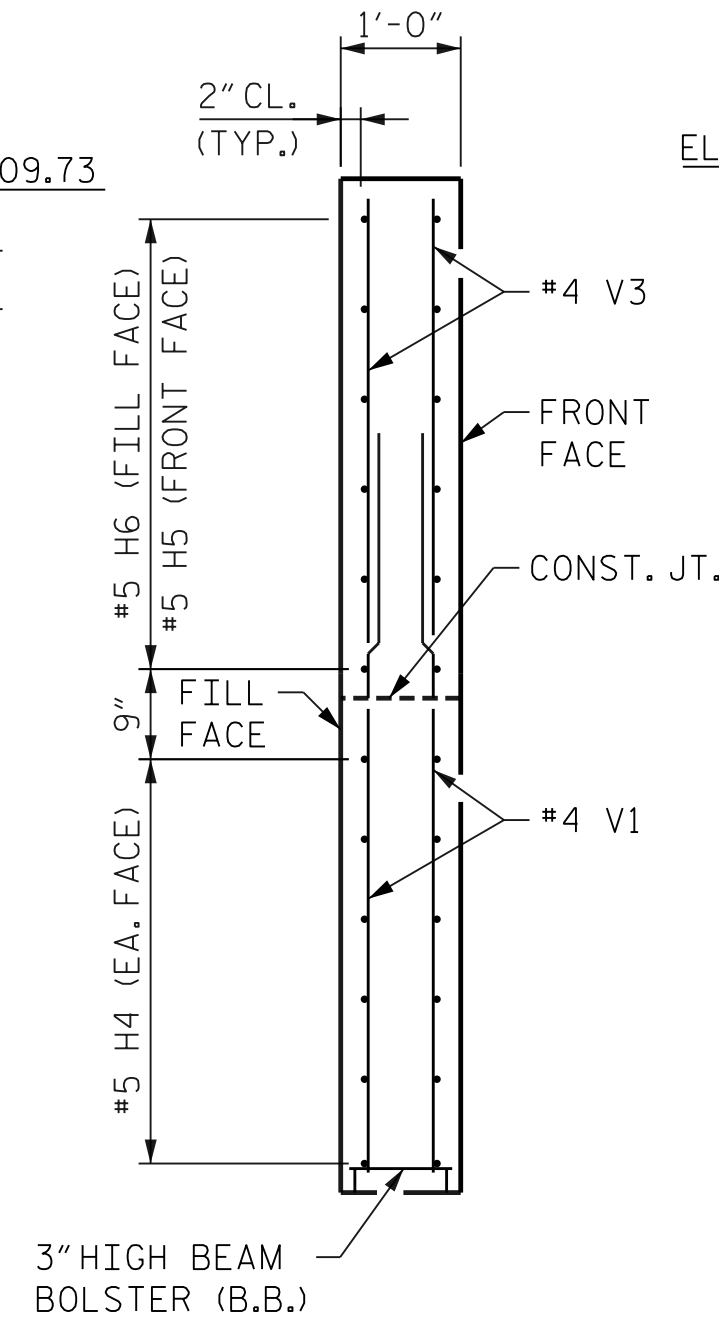
SECTION X-X



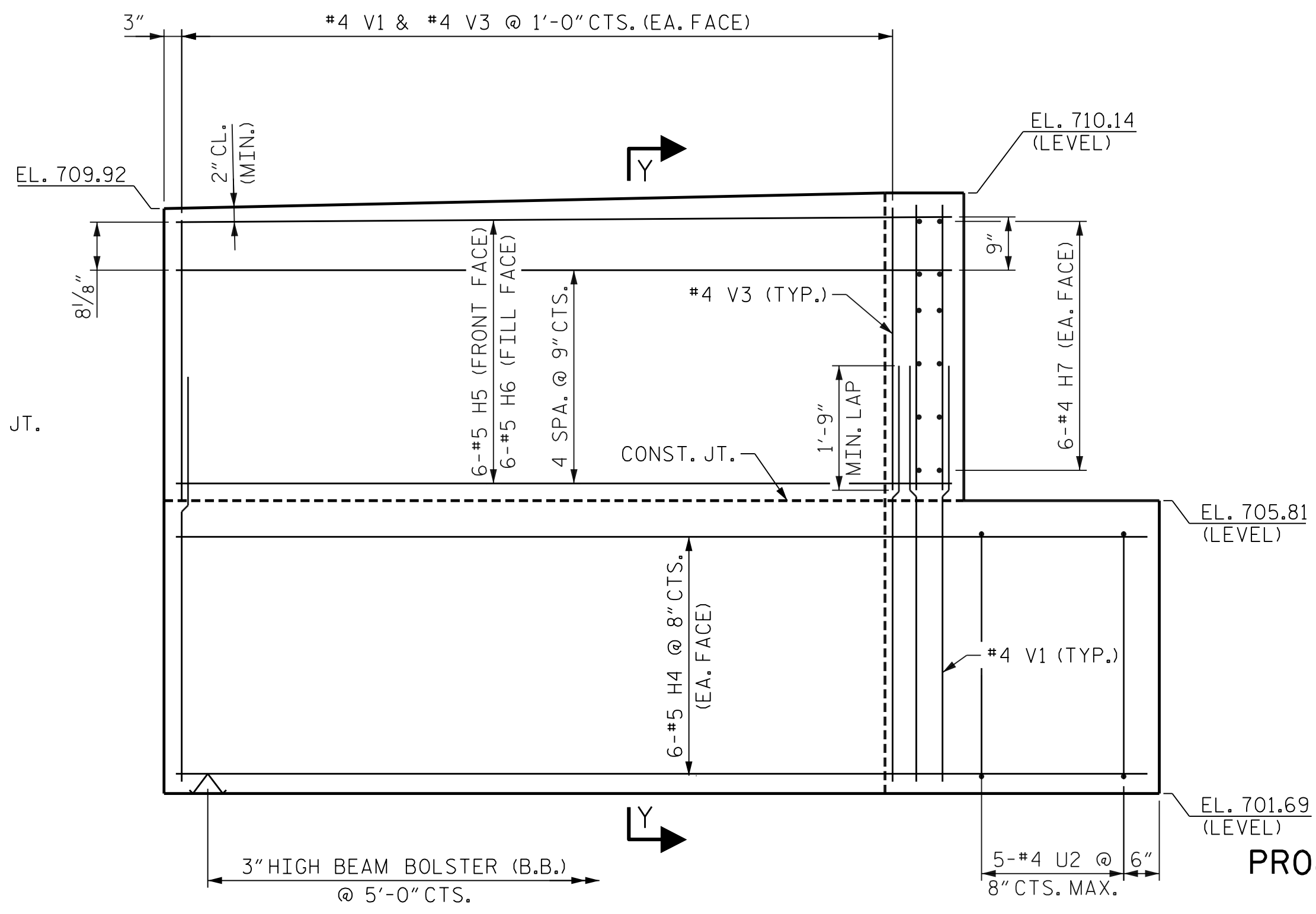
PLAN OF WING (W2)



ELEVATION OF WING (W1)



SECTION Y-Y



ELEVATION OF WING (W2)

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 WING WALL DETAILS

REVISIONS			
BY:	DATE:	NO.	SHEET NO.
		3	S-26
		4	TOTAL SHEETS 37

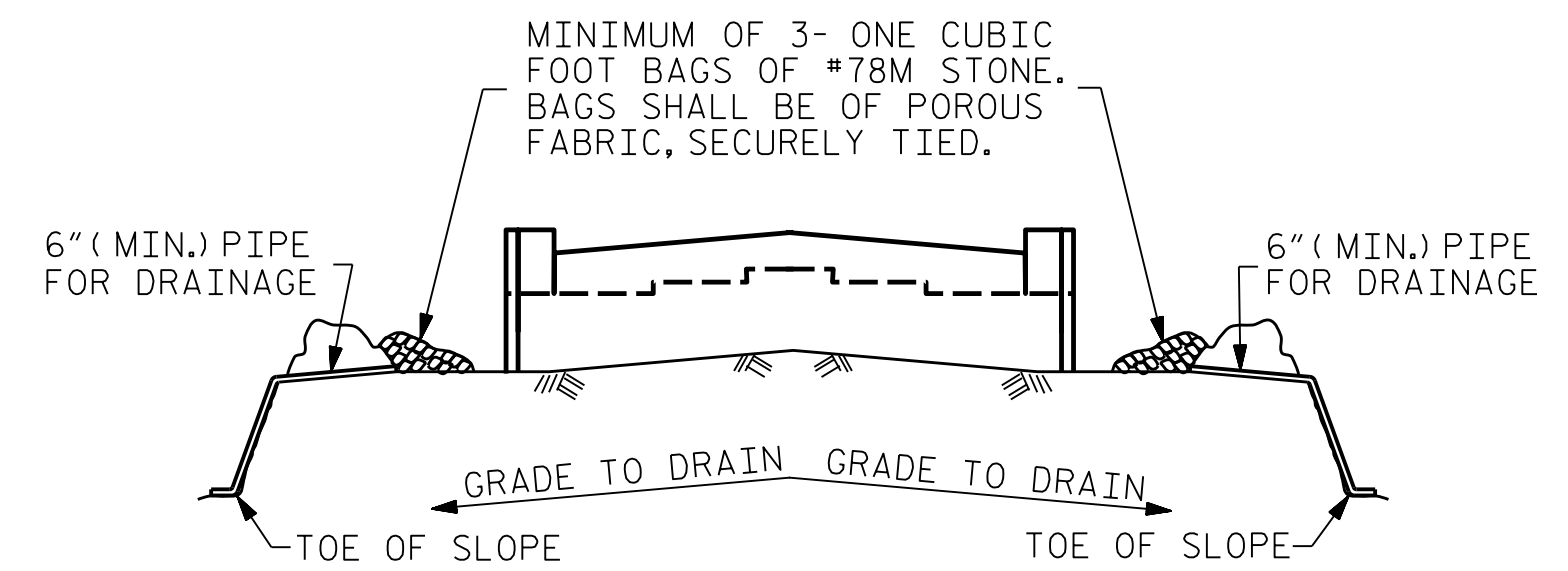


DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018

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 Raleigh, NC 27601
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DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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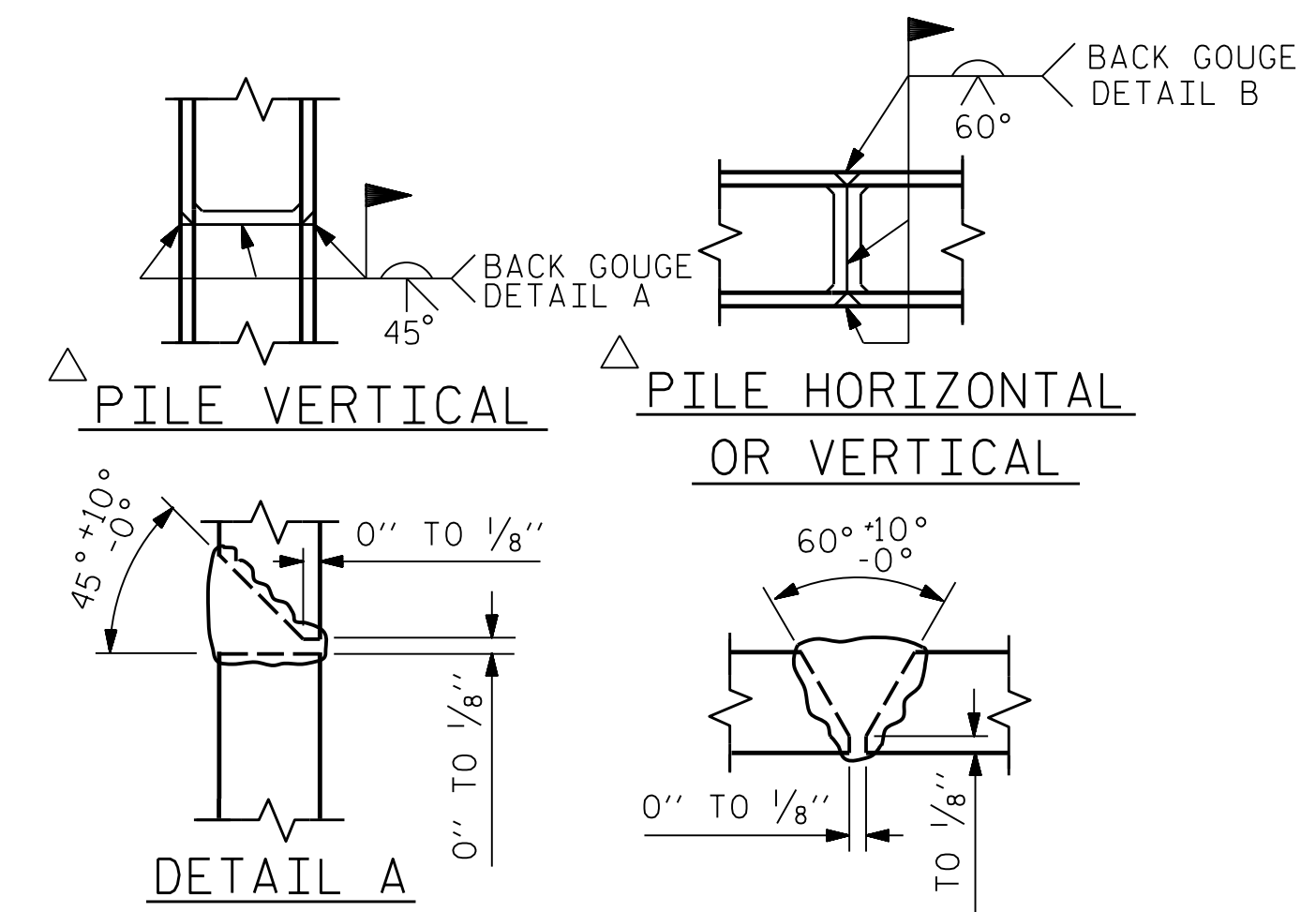


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

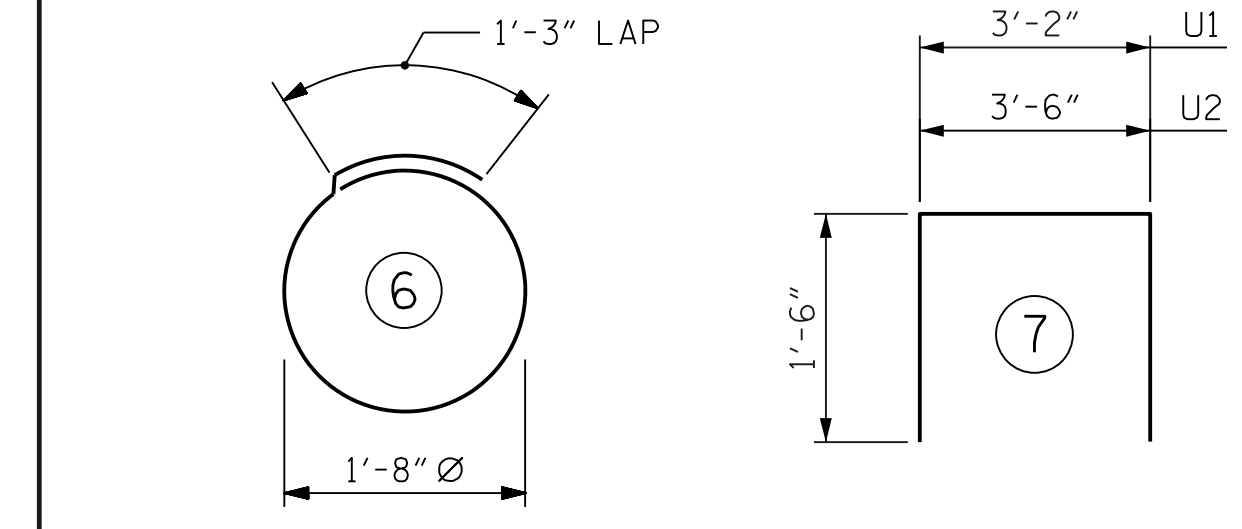
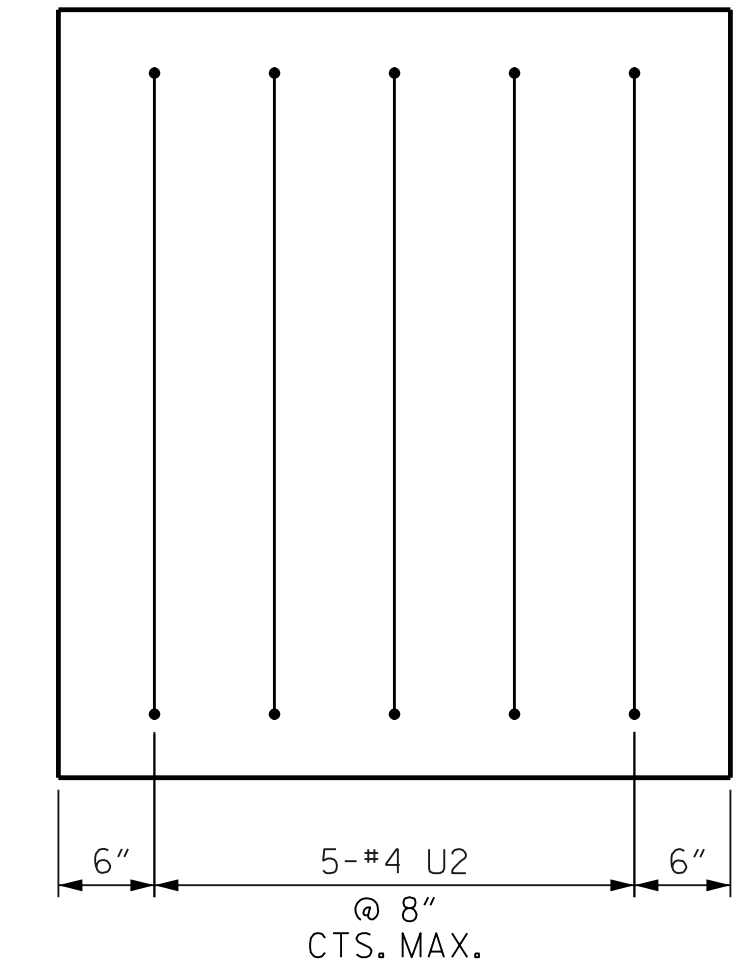
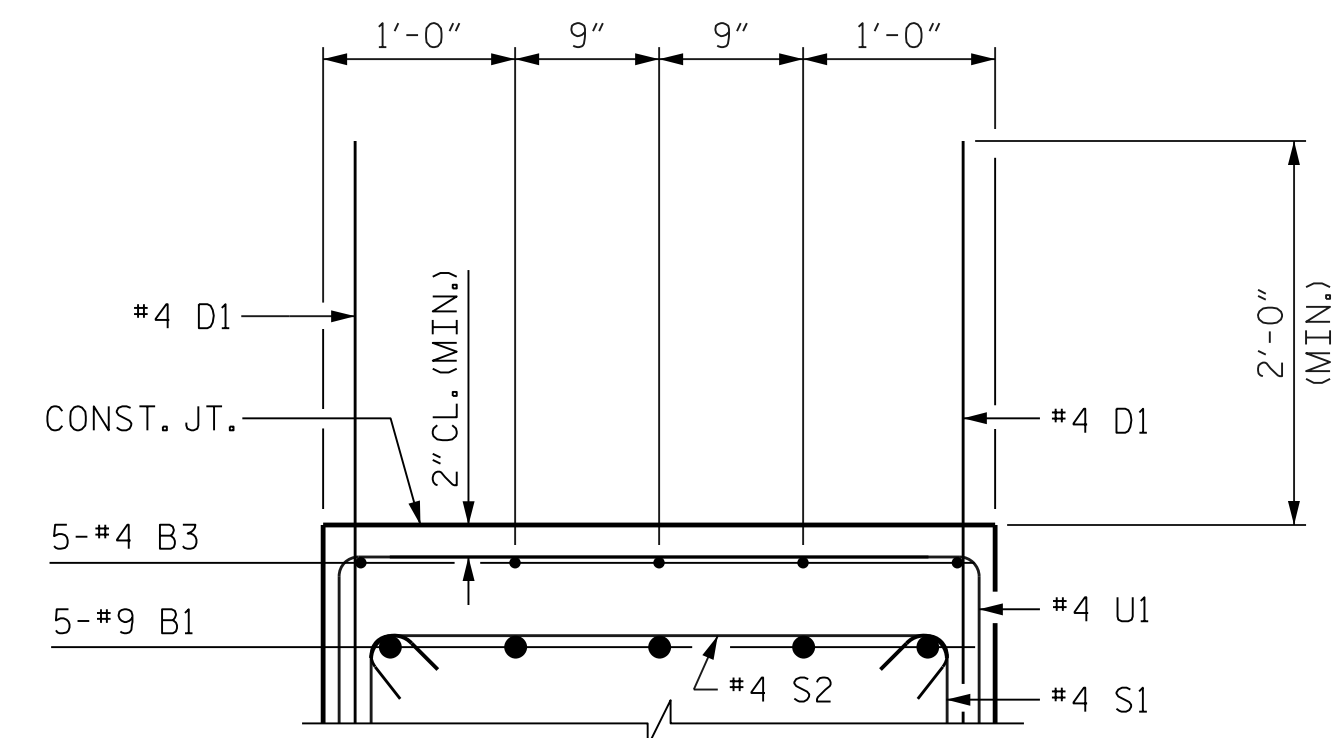
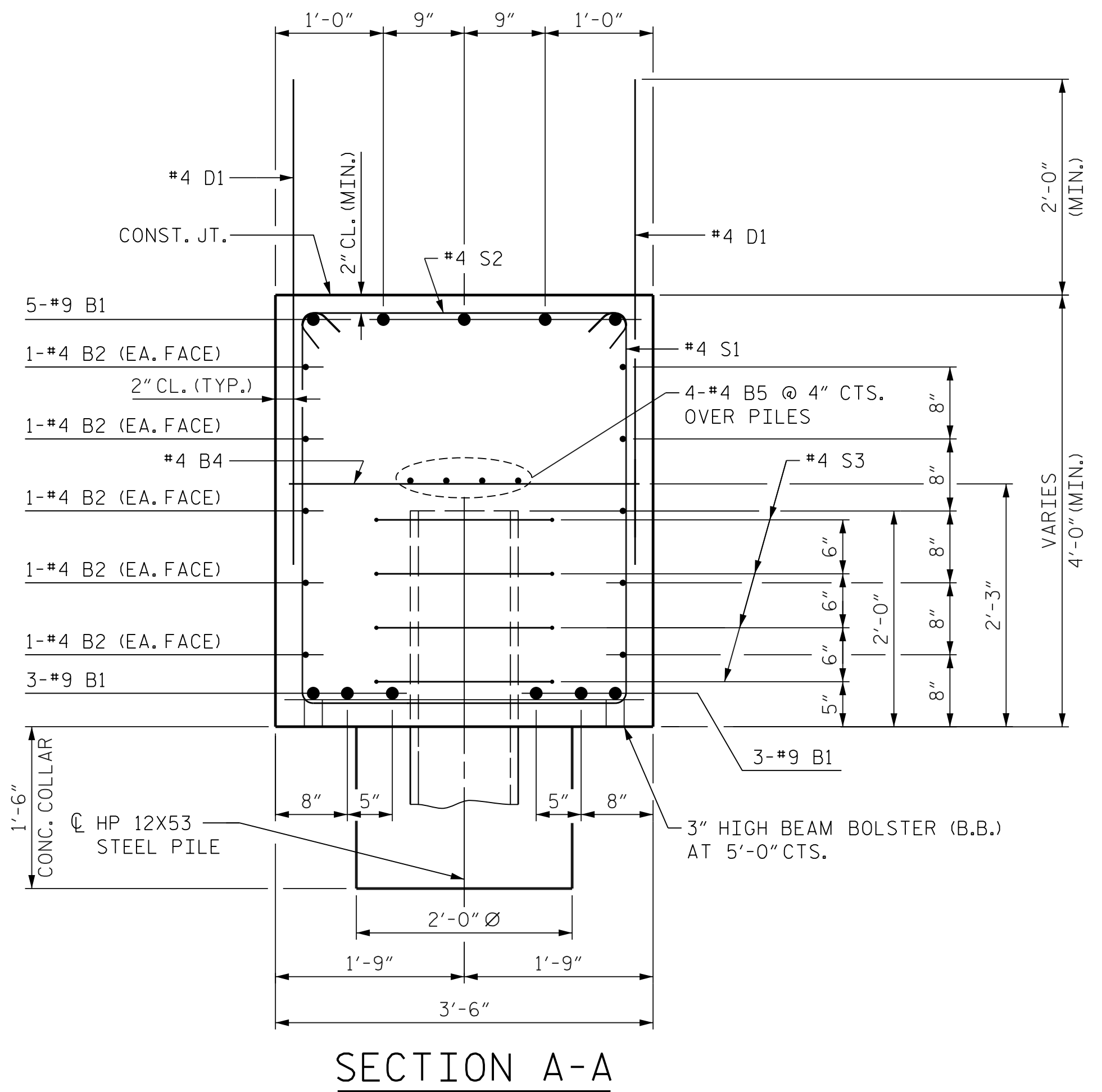
TEMPORARY DRAINAGE AT END BENT



POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES		BILL OF MATERIAL					
		END BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT			
B1	#9	1	54'-11"	2054			
B2	#4	STR	27'-6"	368			
B3	#5	#4	STR	11'-8"			
B4	13	#4	STR	3'-2"			
B5	8	#4	STR	27'-6"			
D1	#8	#4	STR	4'-6"			
H1	12	#5	STR	13'-8"			
H2	6	#5	2	11'-11"			
H3	6	#5	2	12'-1"			
H4	12	#5	STR	13'-5"			
H5	6	#5	3	11'-10"			
H6	6	#5	3	11'-8"			
H7	24	#4	STR	2'-7"			
S1	71	#4	4	11'-2"			
S2	71	#4	5	3'-11"			
S3	24	#4	6	6'-6"			
U1	19	#4	7	6'-2"			
U2	10	#4	7	6'-6"			
V1	60	#4	STR	6'-0"			
V2	30	#4	STR	3'-9"			
V3	30	#4	STR	3'-11"			
				REINFORCING STEEL		4,923 LBS.	
CLASS A CONCRETE							
POUR 1				(CAP, LOWER WINGS & COLLARS)		32.8 C.Y.	
POUR 2				(UPPER WINGS)		4.3 C.Y.	
TOTAL CONCRETE						37.1 C.Y.	
HP 12 x 53 STEEL PILES							
				NO.		6	
				L.F.		300	
PILE EXCAVATION							
				IN SOIL		L.F. 160	
				NOT IN SOIL		L.F. 70	
PILE DRIVING EQUIPMENT							
				SETUP FOR HP 12 X 53			
				STEEL PILES		EA. 6	



NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 3 OF 3



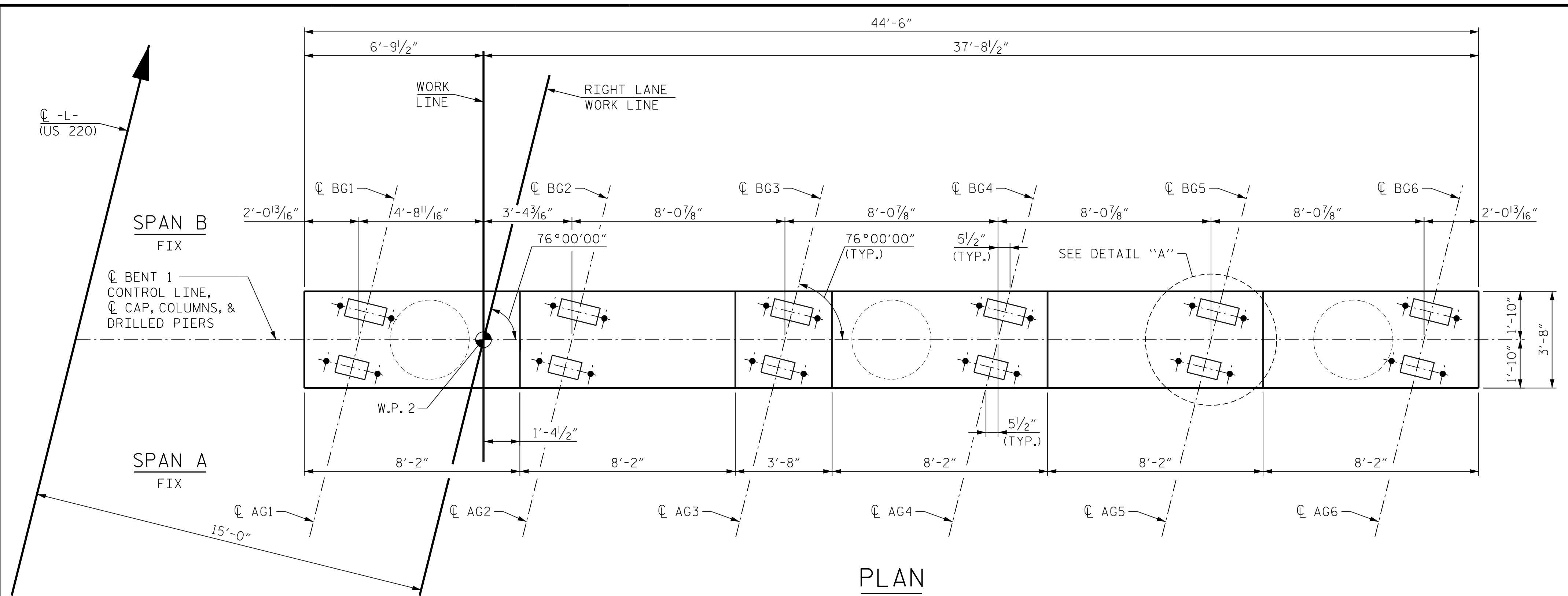
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
 END BENT 1
 MISCELLANEOUS DETAILS
 AND BILL OF MATERIAL

REVISIONS				SHEET NO.	
BY:	DATE:	NO.	BY:	DATE:	S-27
		3			TOTAL SHEETS
		4			37

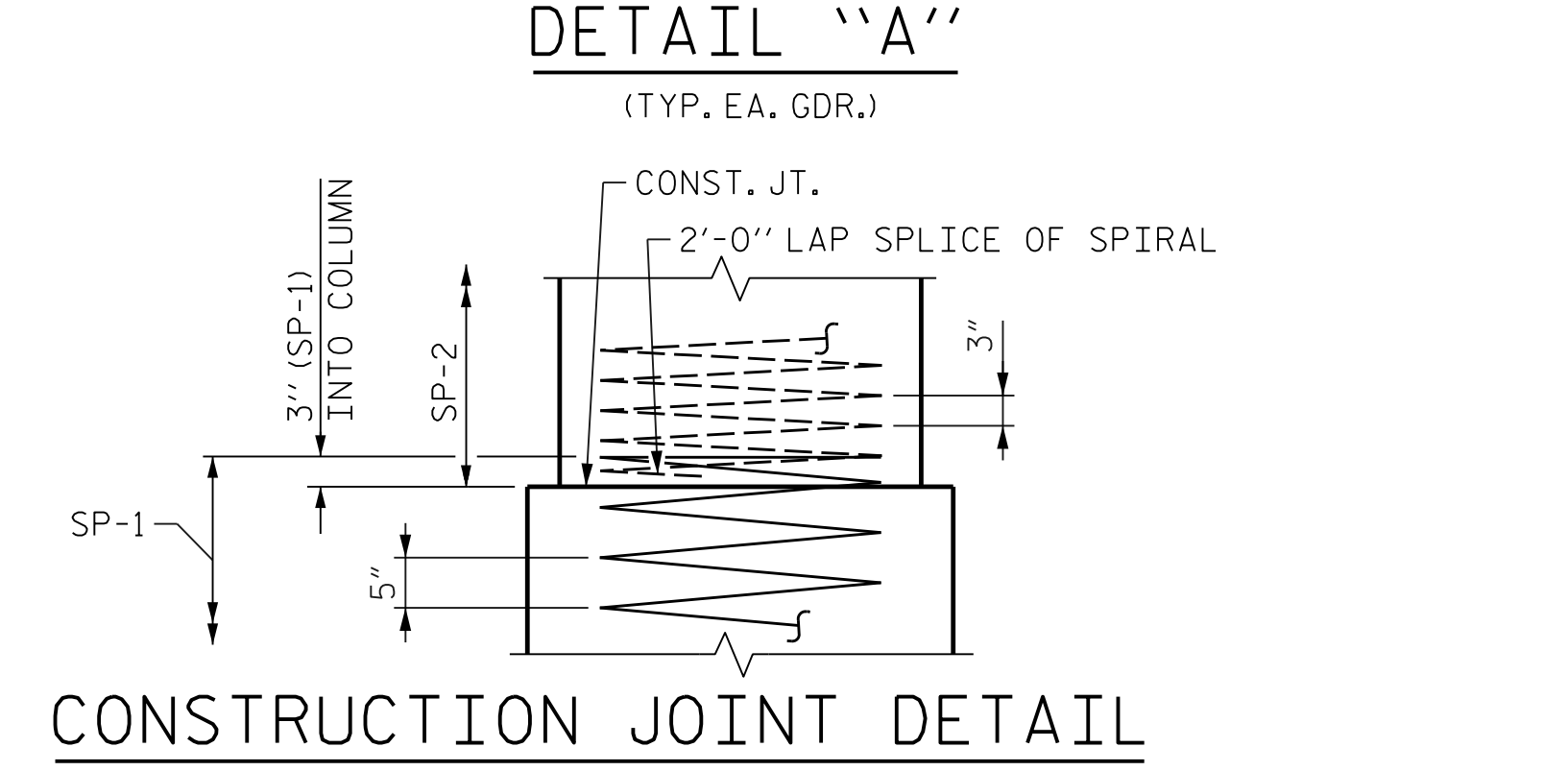
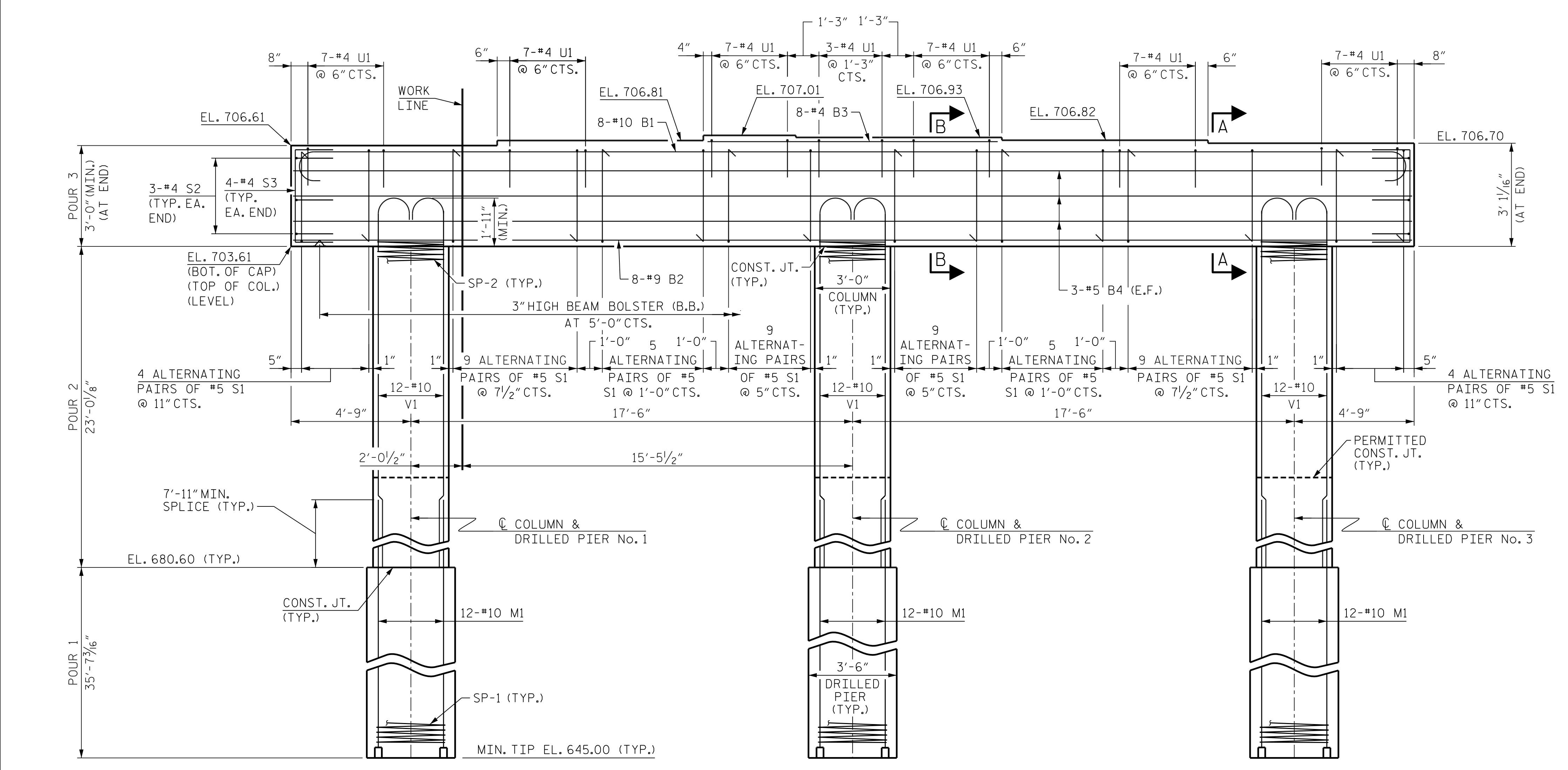
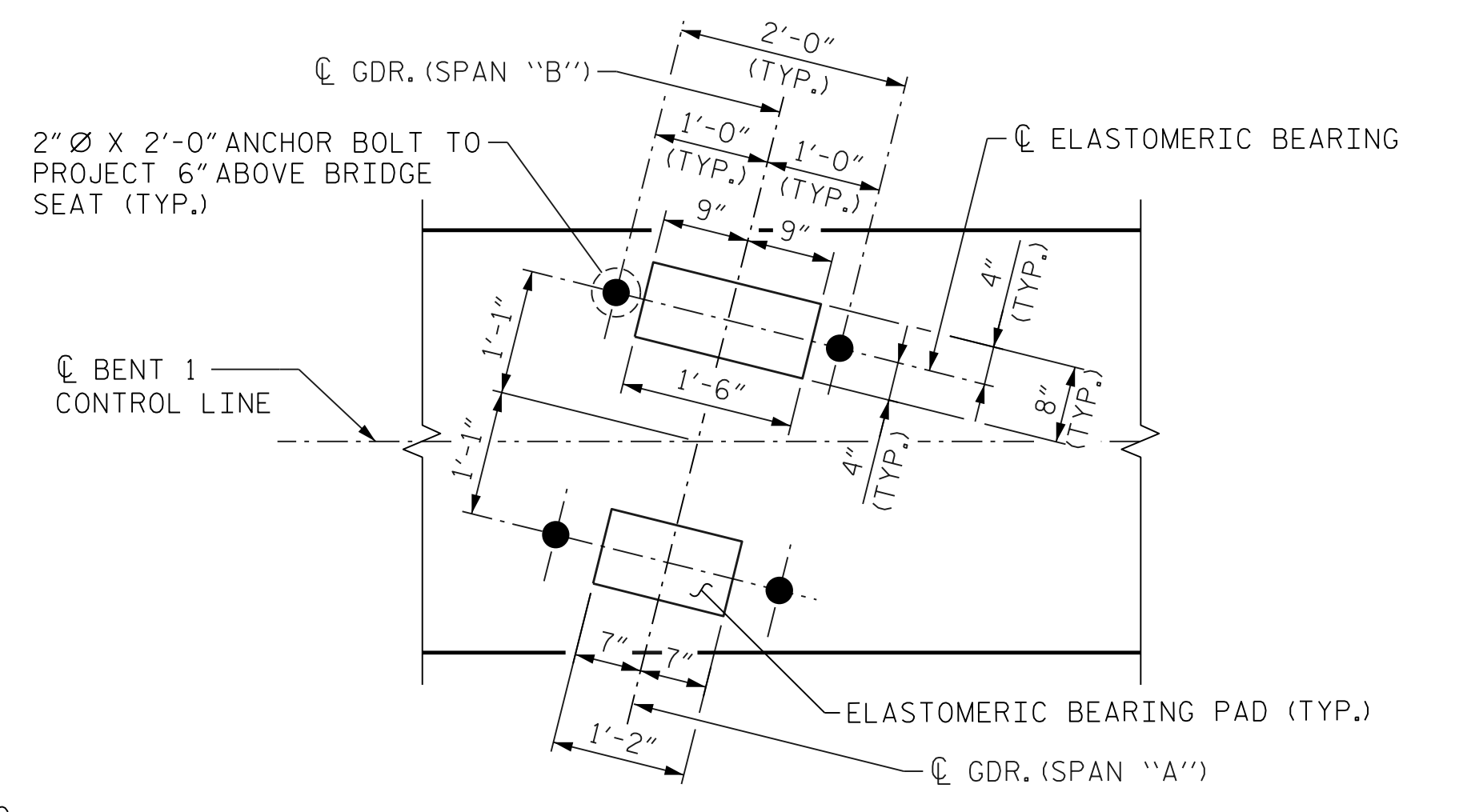
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DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018



NOTES:
 HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
 STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
 THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.
 FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
 THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
 FOR SECTION A-A AND SECTION B-B SEE SHEET 2 OF 2.



PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 1 OF 2

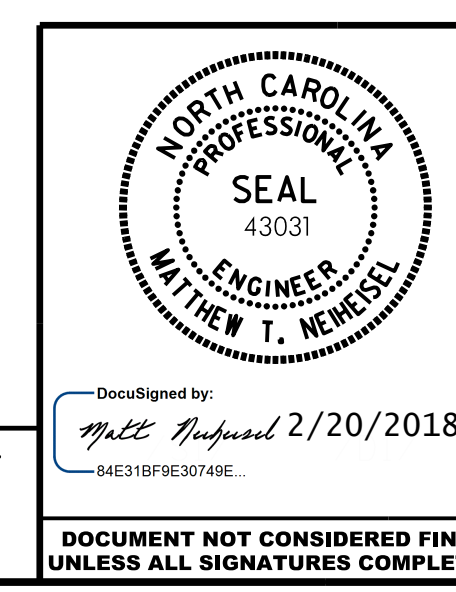
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1
 PLAN AND ELEVATION

REVISIONS

BY:	DATE:	NO.	BY:	DATE:
		3		
		4		

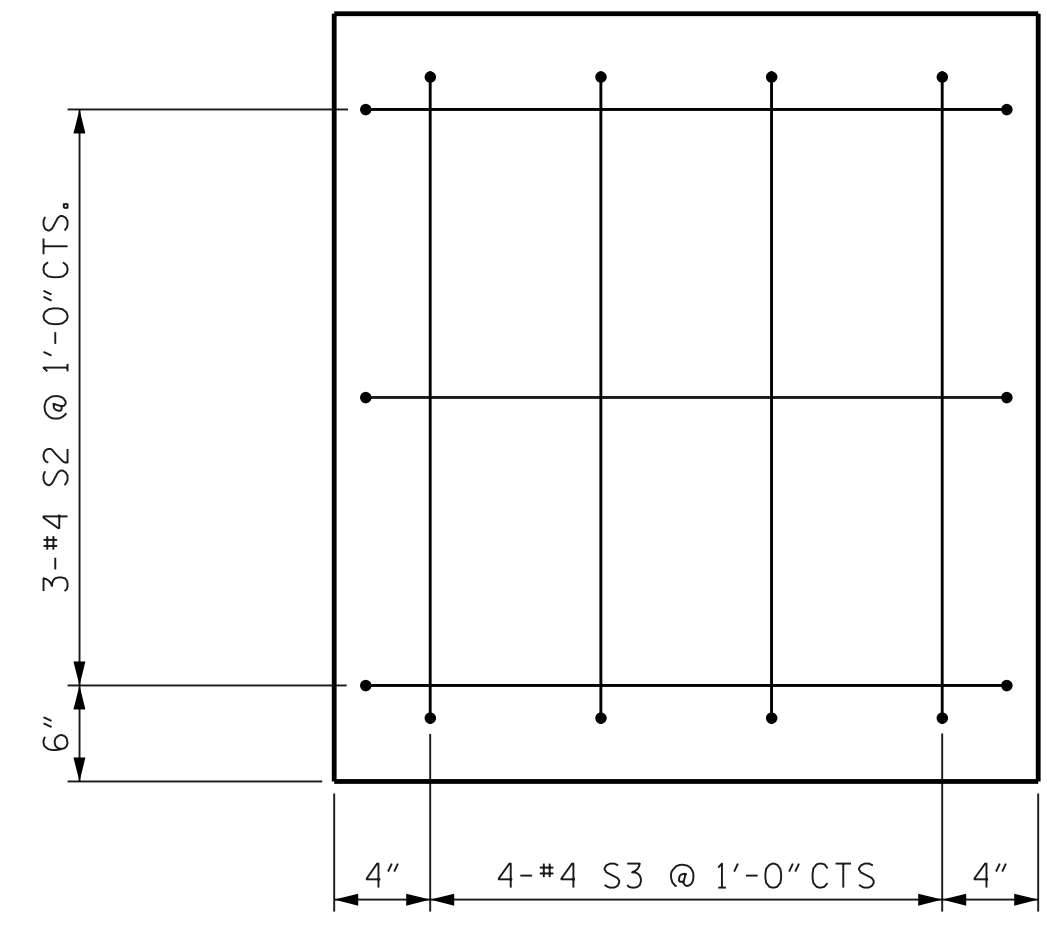
SHEET NO. S-28
 TOTAL SHEETS 37



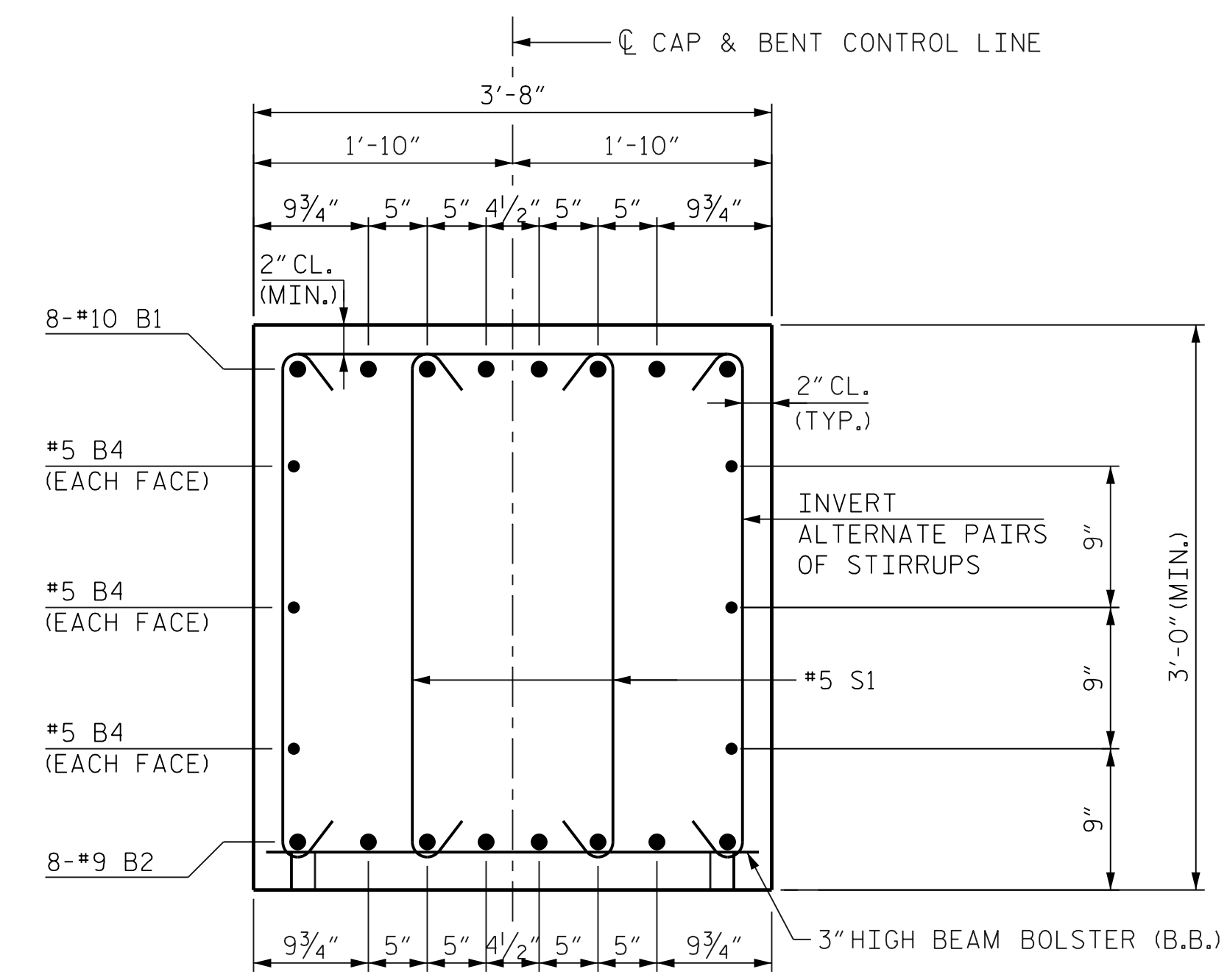
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 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

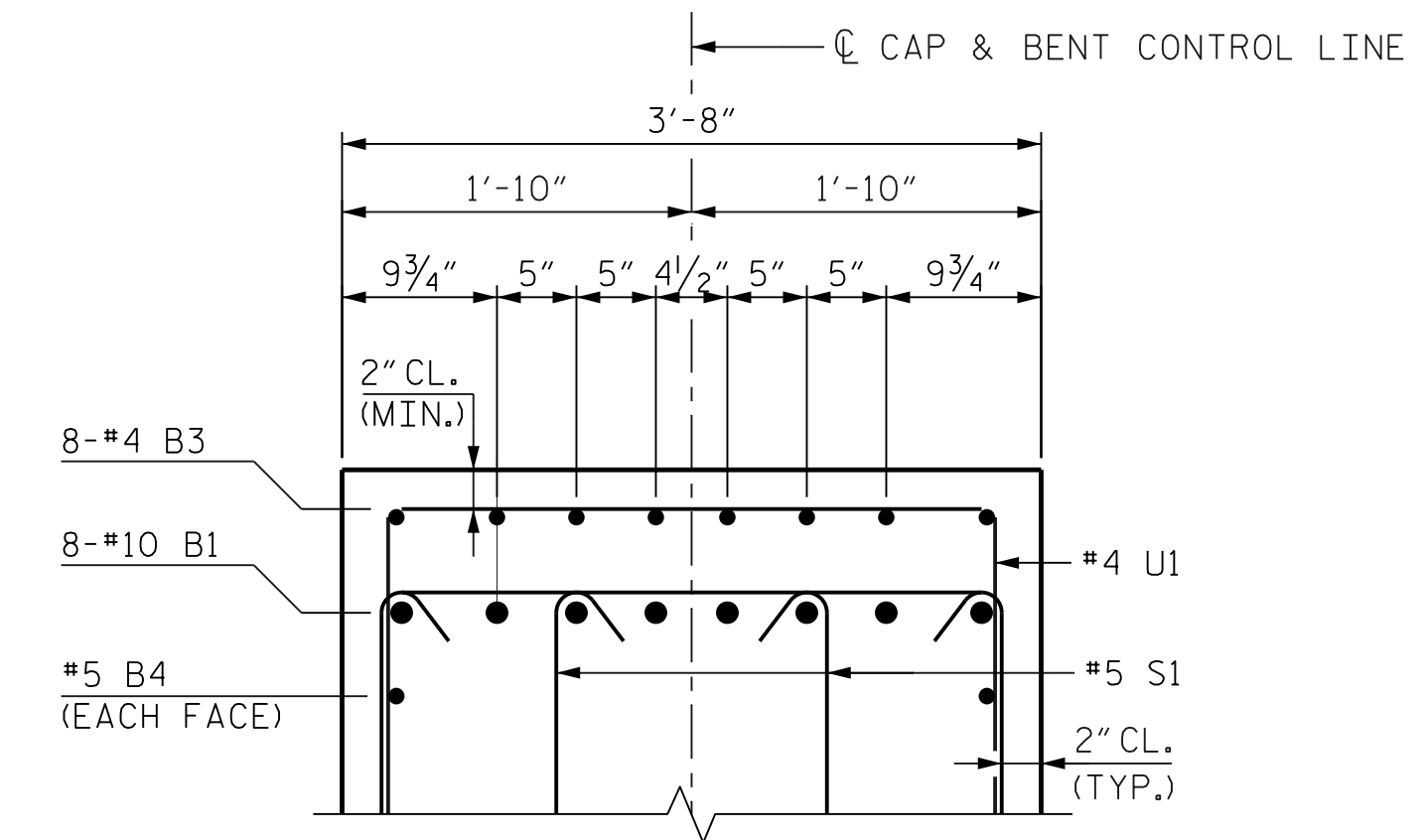
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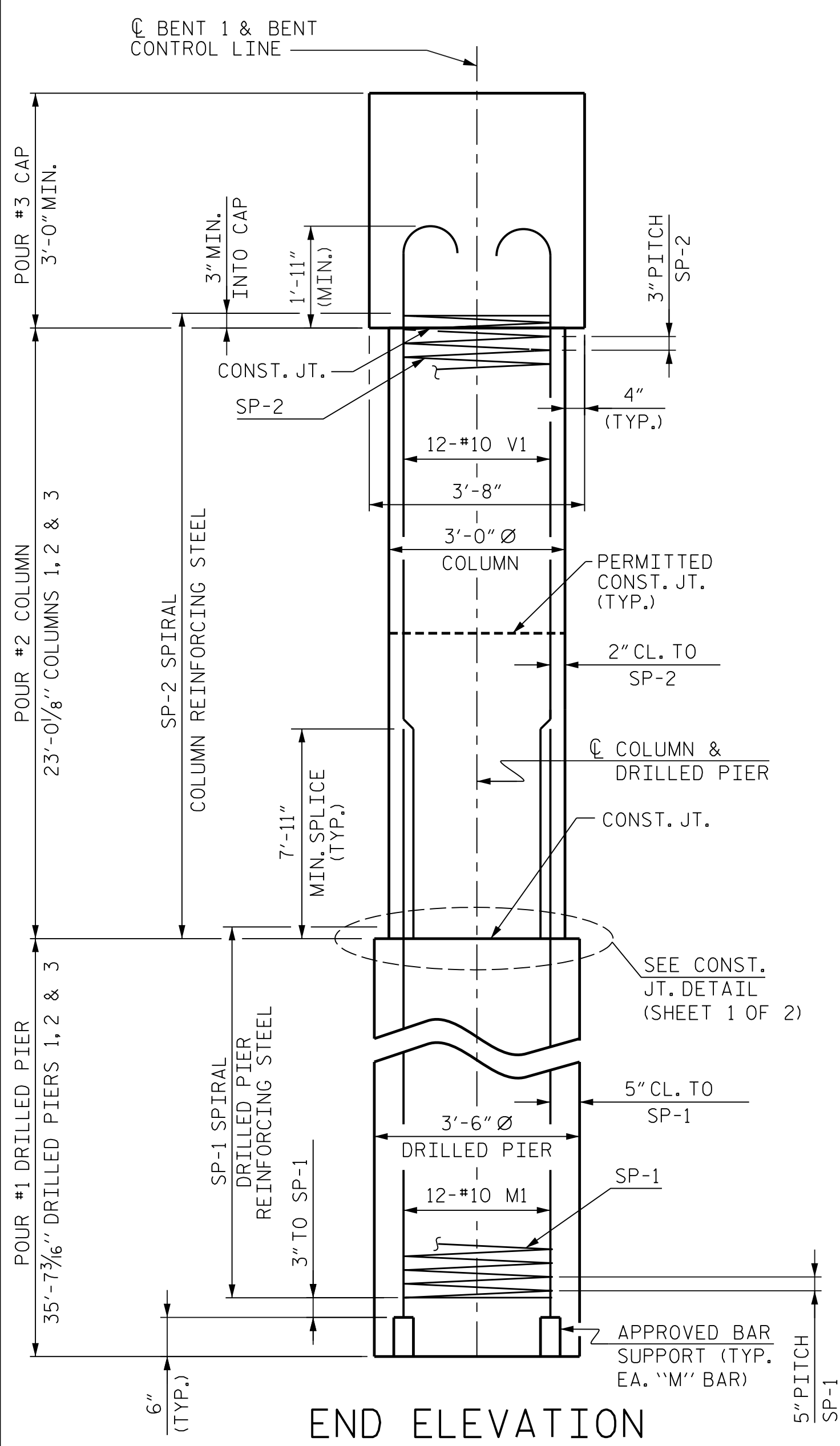
END OF CAP DETAIL
(TYPICAL BOTH ENDS)



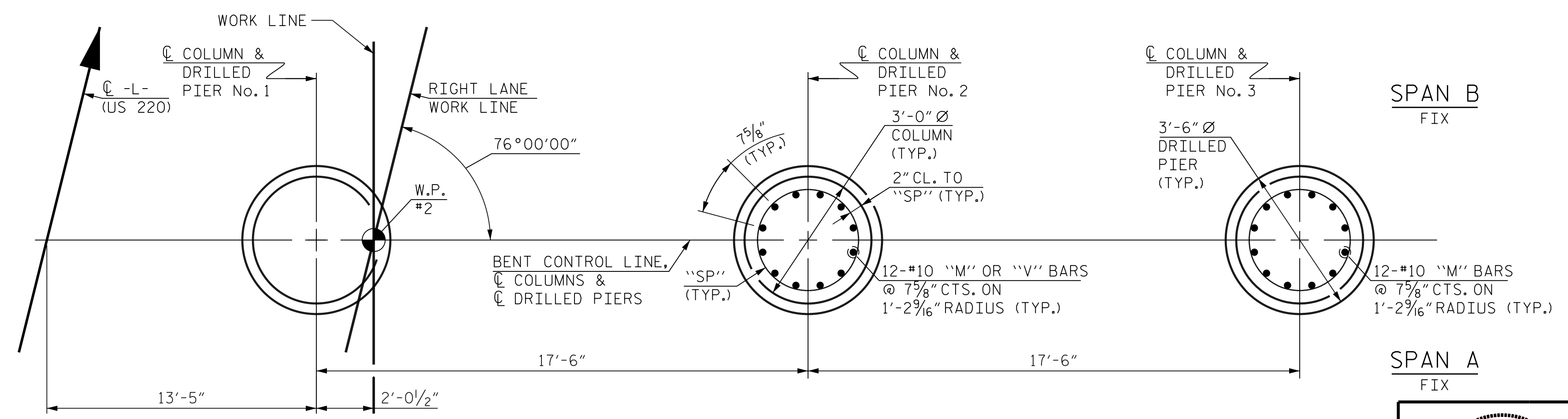
SECTION A-A



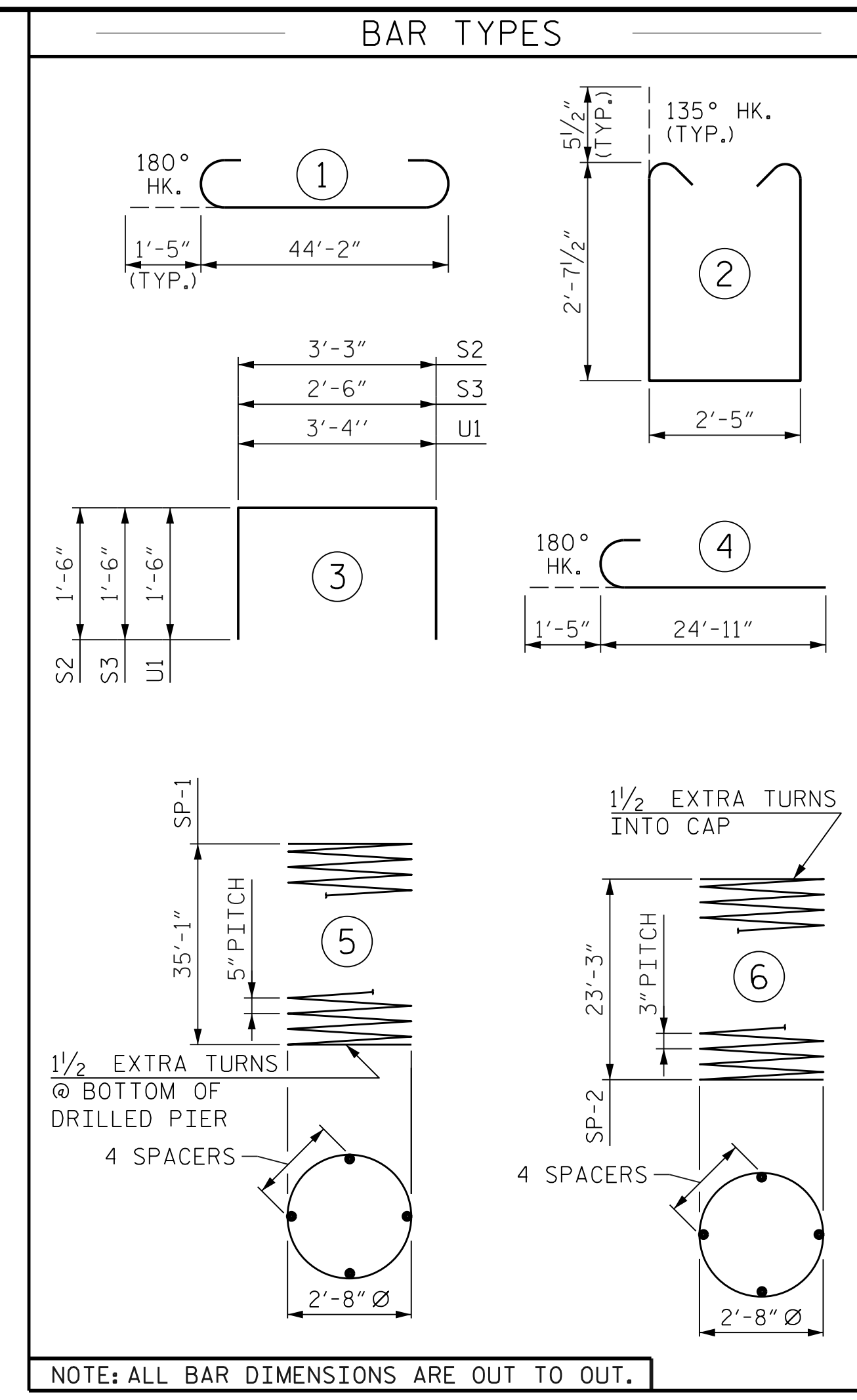
SECTION B-B



END ELEVATION



PLAN OF DRILLED PIERS & COLUMNS
(DETAILS ARE TYPICAL EACH DRILLED PIER & COLUMN)



NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10		47'-0"	1,618
B2	8	#9	STR	44'-2"	1,201
B3	8	#4	STR	11'-5"	61
B4	6	#5	STR	44'-2"	276
M1	36	#10	STR	46'-1"	7,139
S1	108	#5	2	8'-7"	967
S2	6	#4	3	6'-3"	25
S3	8	#4	3	5'-6"	29
U1	45	#4	3	6'-4"	190
V1	36	#10	4	26'-4"	4,079
REINFORCING STEEL					15,585 LBS.
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP-1	3	*	5	705'-4"	2,207
SP-2	3	**	6	781'-9"	1,567
SPIRAL COLUMN REINFORCING STEEL					3,774 LBS.
CLASS A CONCRETE					
POUR 2 (COLUMNS)					18.1 C.Y.
POUR 3 (CAP)					19.2 C.Y.
TOTAL					37.3 C.Y.
DRILLED PIERS					
POUR 1 (DRILLED PIERS)					38.1 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL					30.0 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL					76.8 LIN. FT.
CSL TUBES					445.2 LIN. FT.

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
BENT 1
DETAILS AND
BILL OF MATERIAL

DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018

REVISIONS

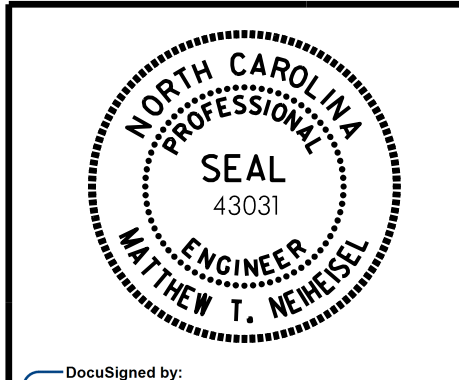
NO.	DATE	BY	DATE
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4			

SHEET NO. S-29
 TOTAL SHEETS 37

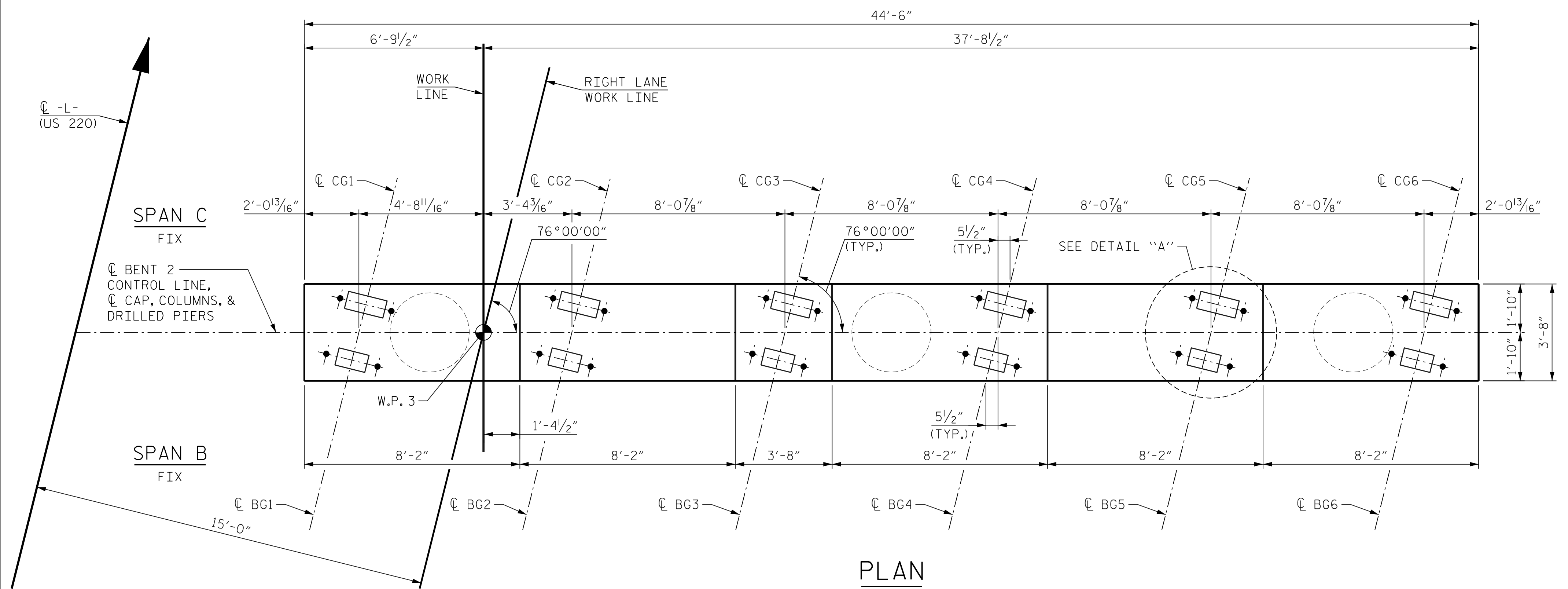
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 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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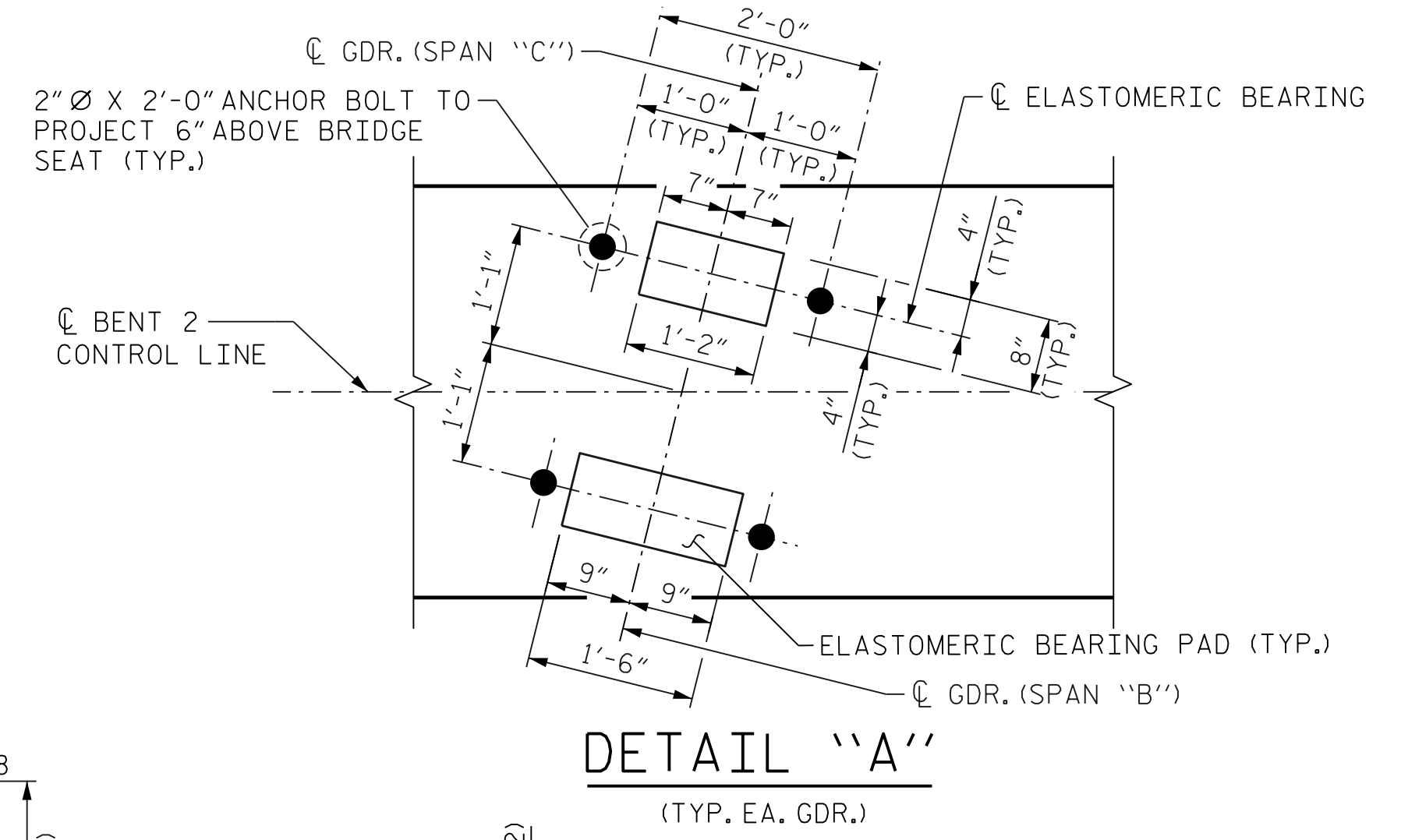


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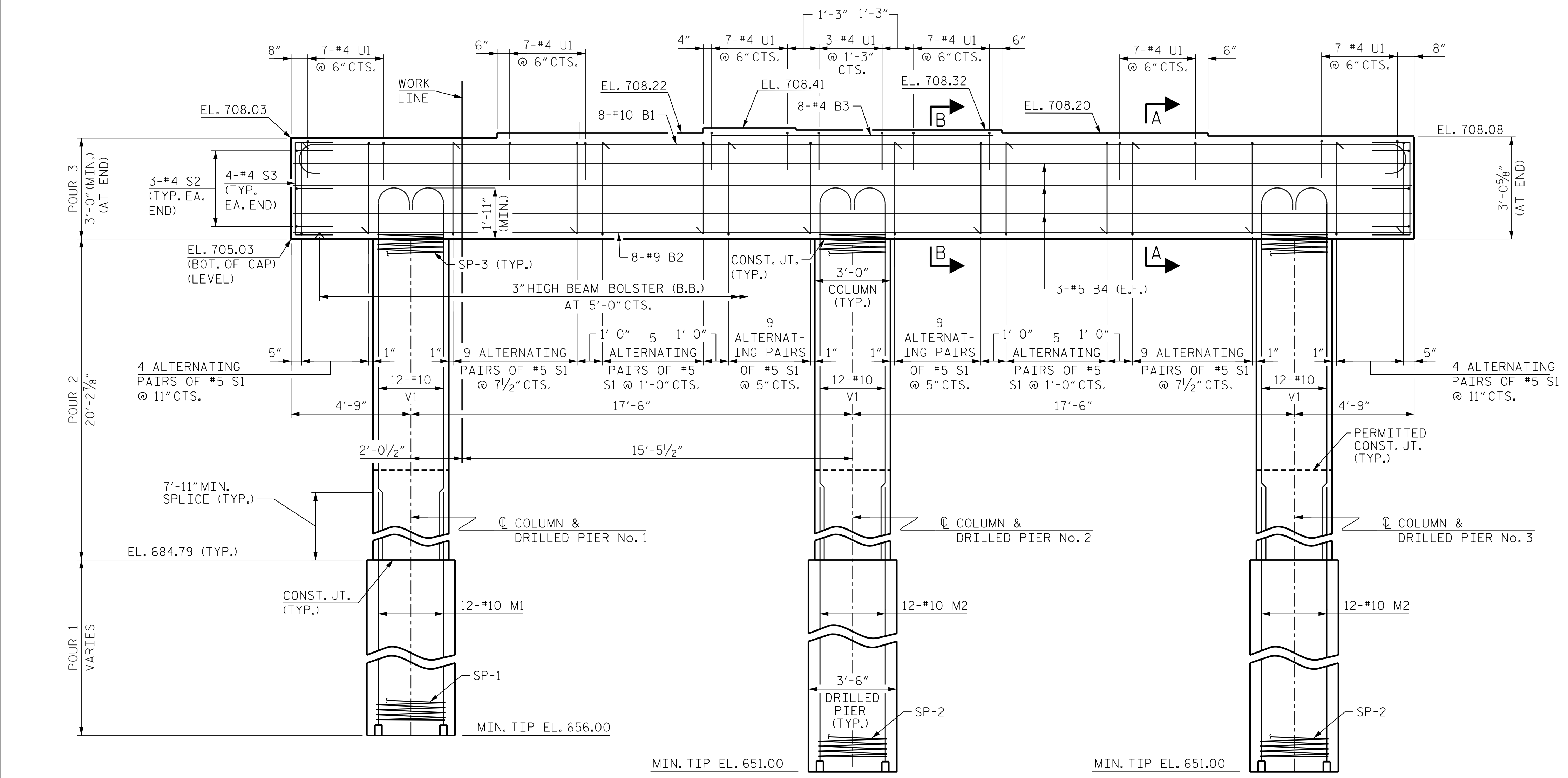


PLAN

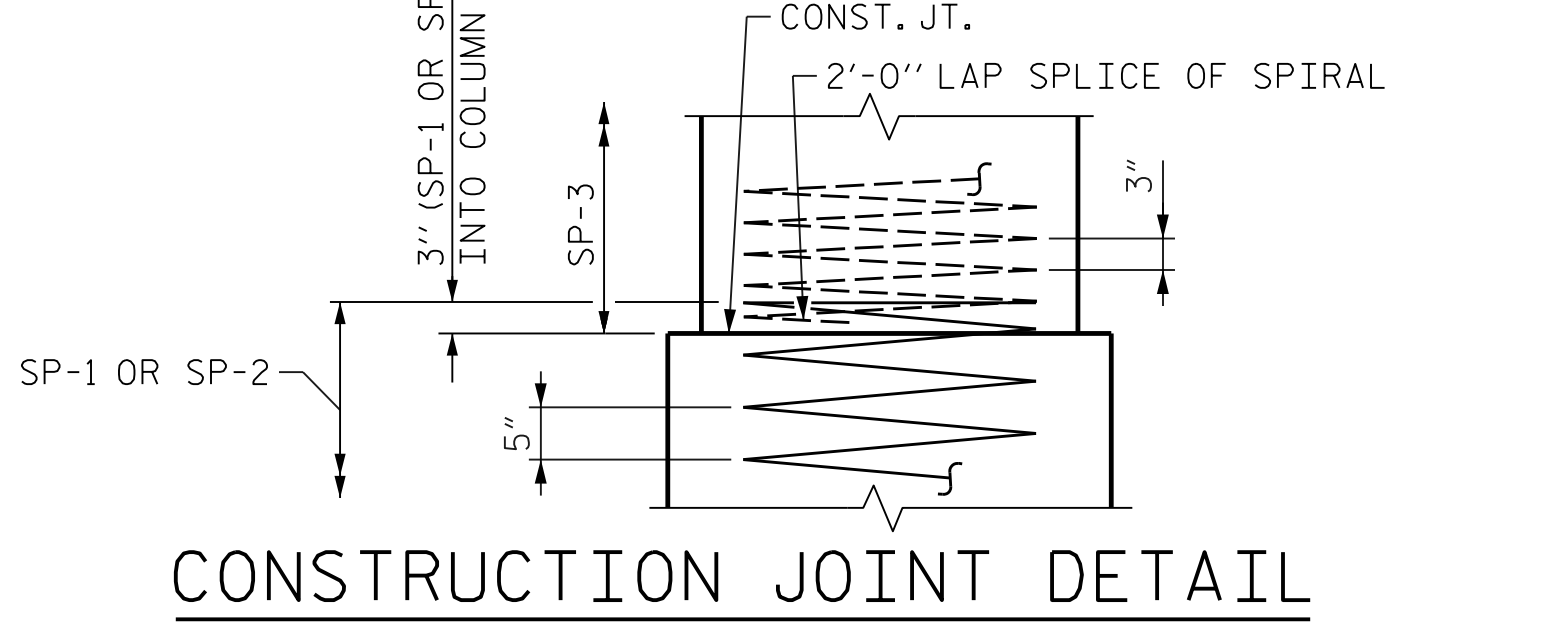
NOTES:
 HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
 STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
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 FOR SECTION A-A AND SECTION B-B SEE SHEET 2 OF 2.



DETAIL "A"



ELEVATION



CONSTRUCTION JOINT DETAIL

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
BENT 2
PLAN AND ELEVATION

DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018

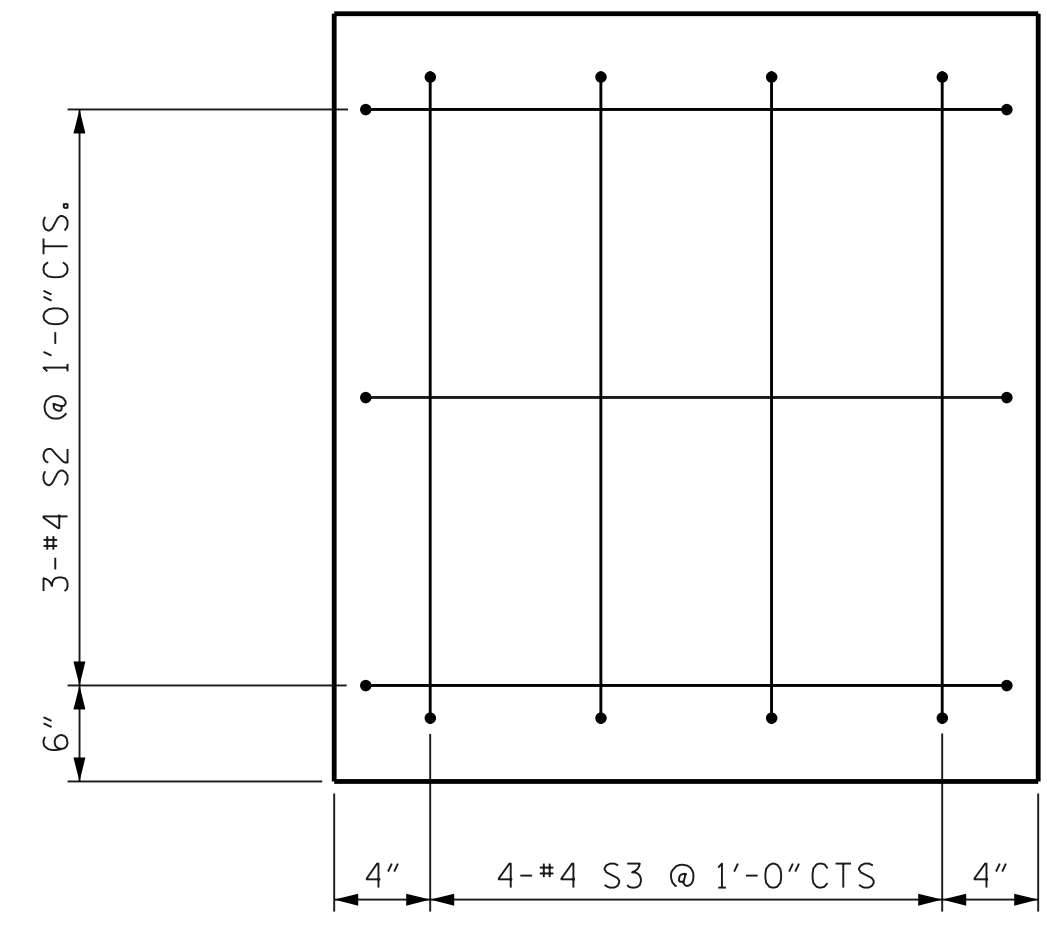
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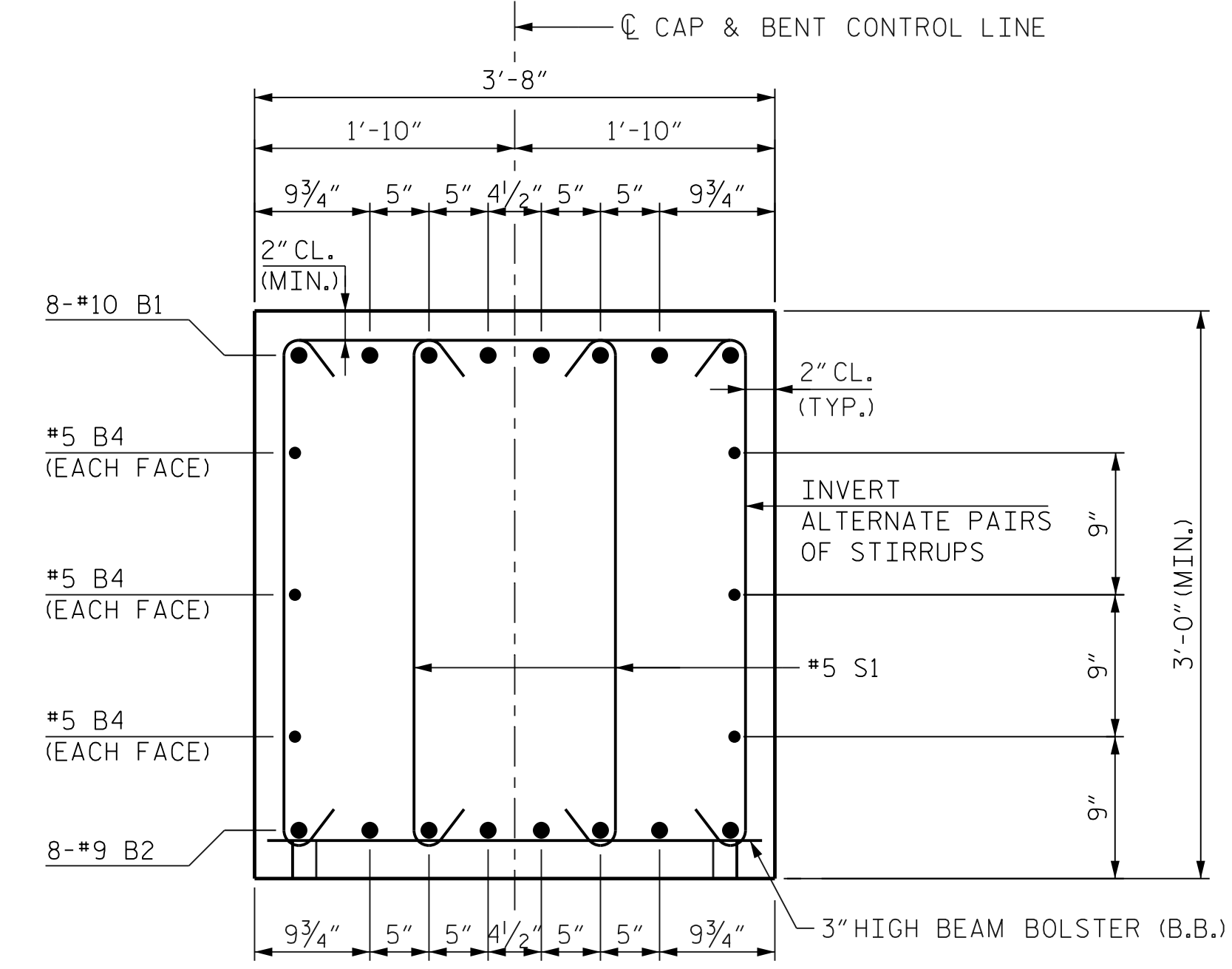
ICA Engineering, Inc.
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 Raleigh, NC 27601
 NC License No: F-0258

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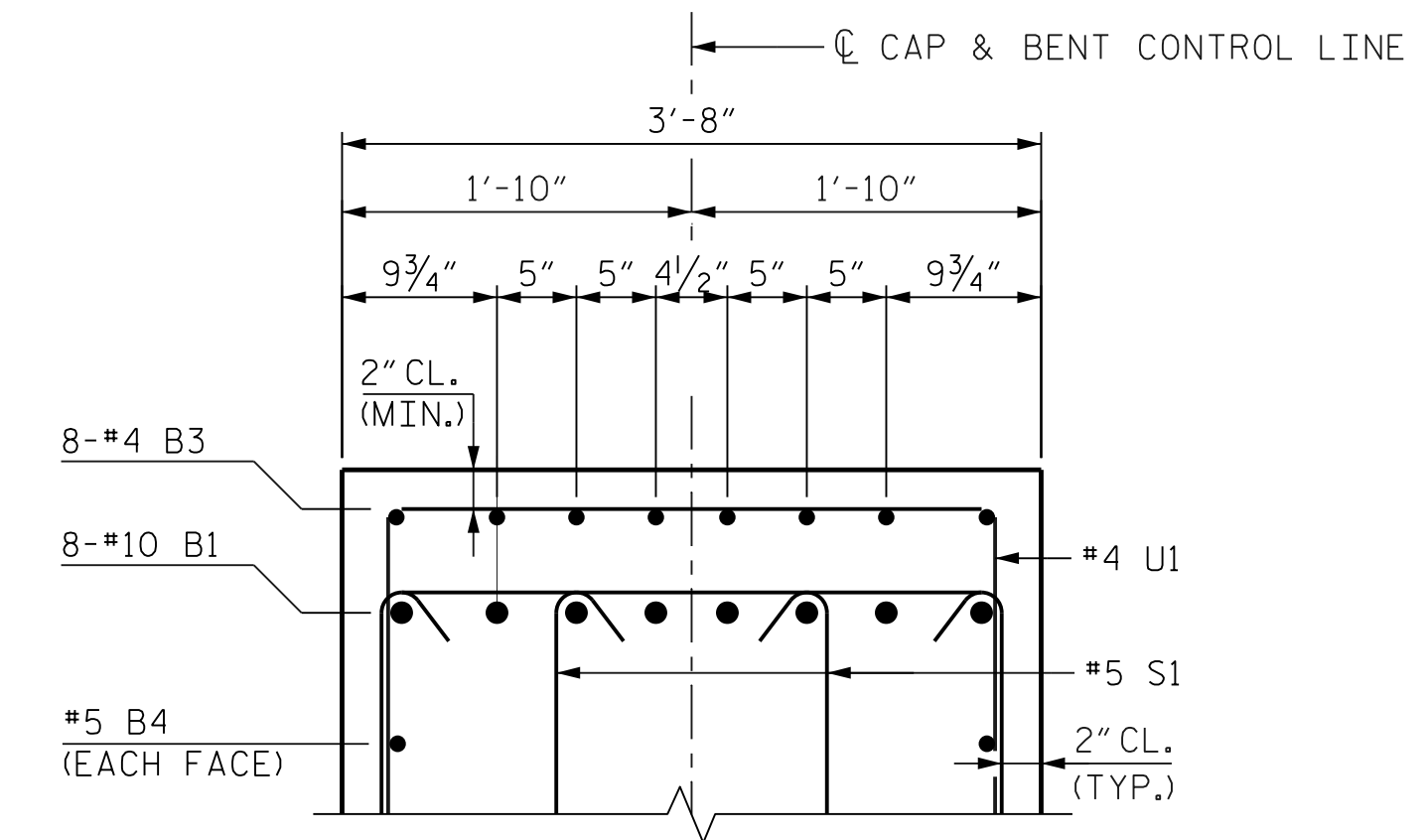
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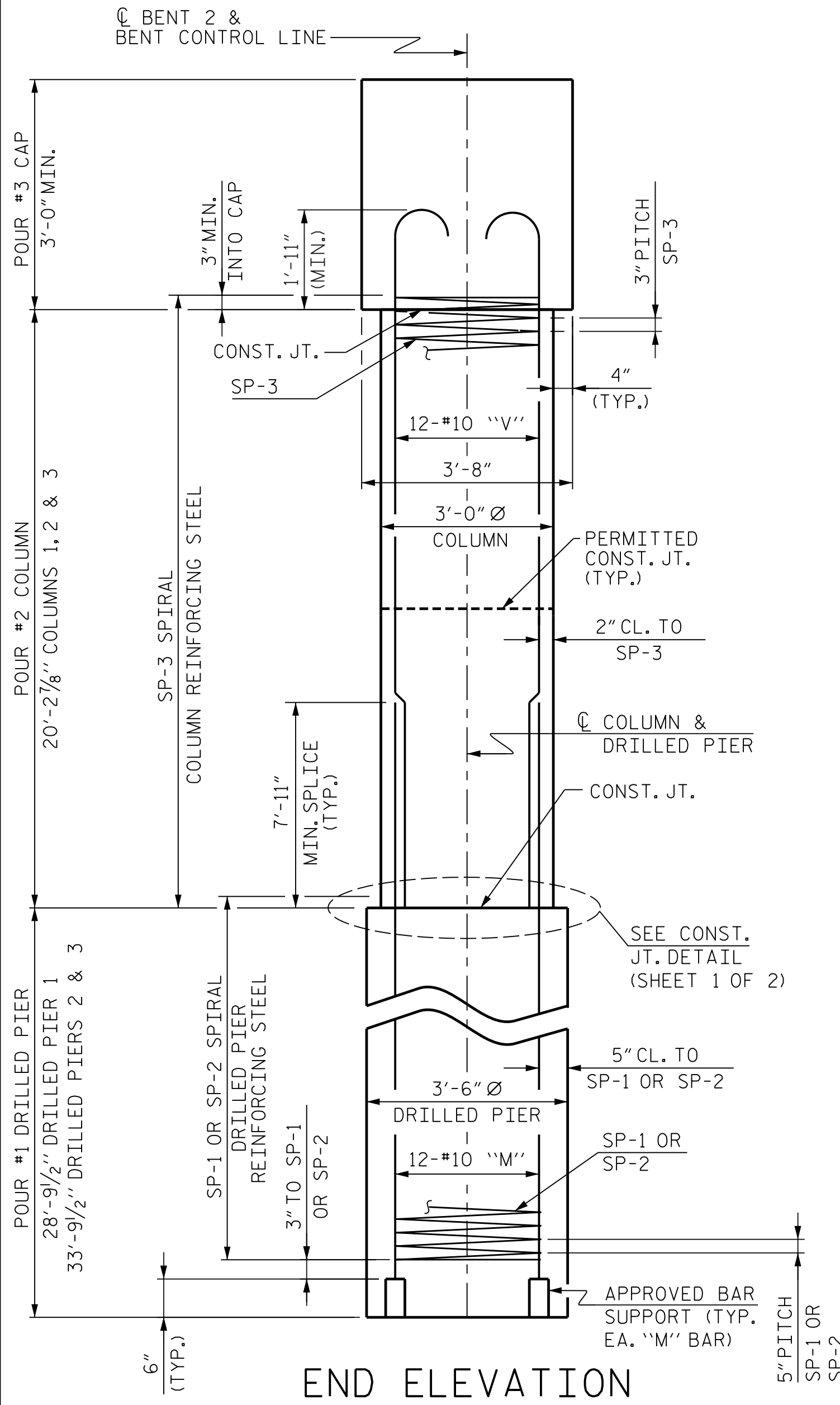
END OF CAP DETAIL
(TYPICAL BOTH ENDS)



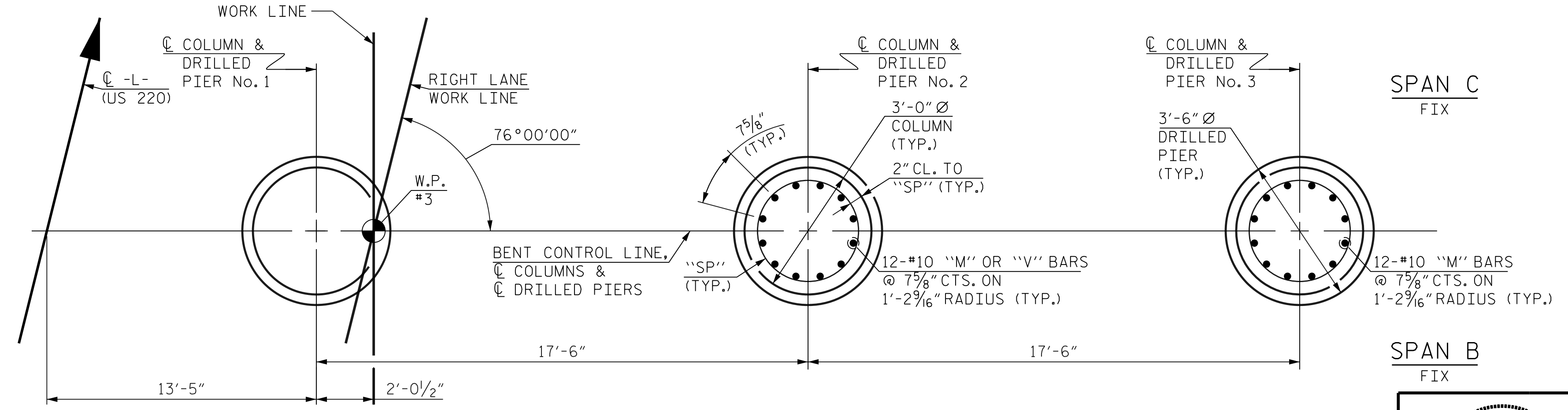
SECTION A-A



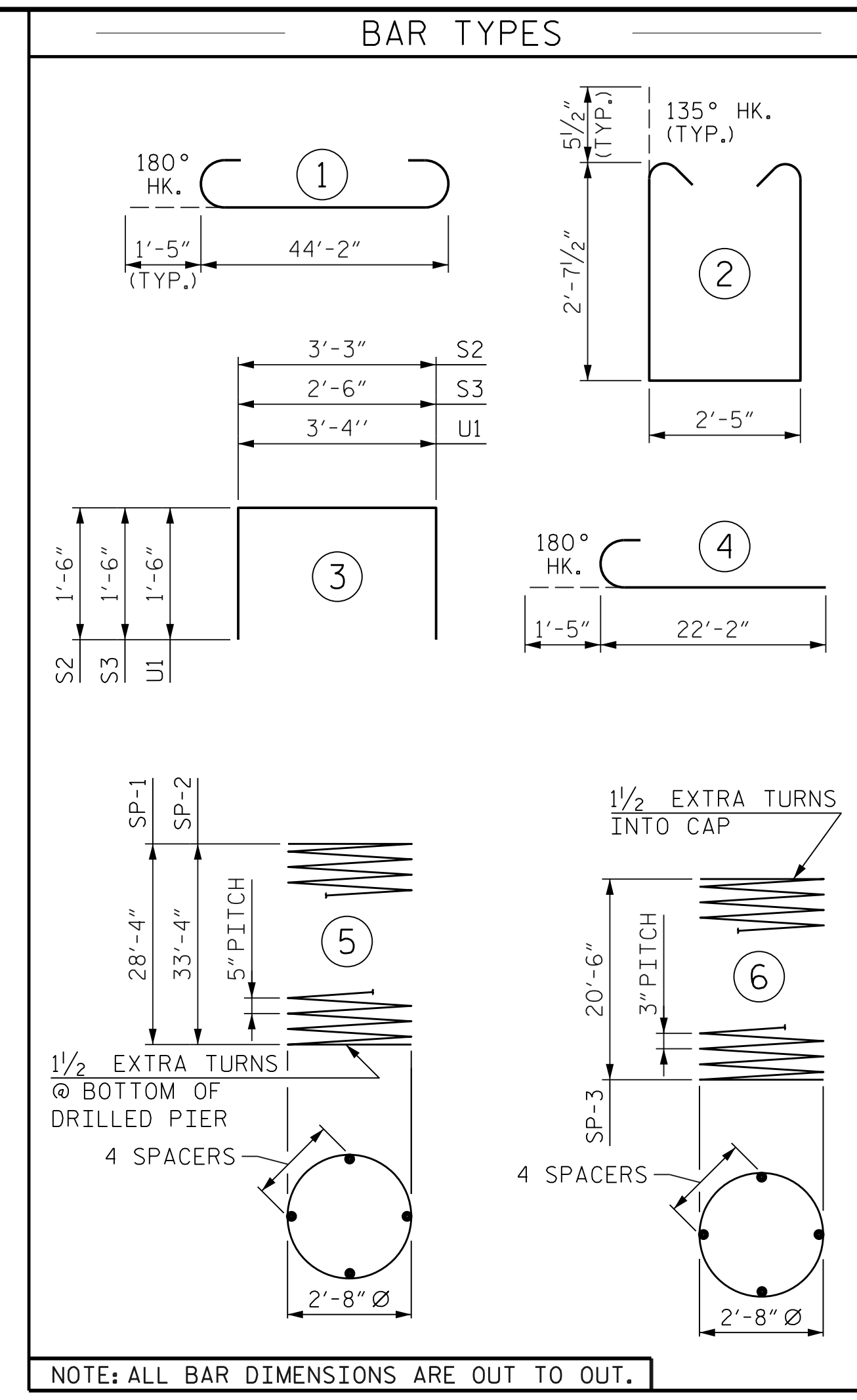
SECTION B-B



END ELEVATION



PLAN OF DRILLED PIERS & COLUMNS
(DETAILS ARE TYPICAL EACH DRILLED PIER & COLUMN)



NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10		47'-0"	1,618
B2	8	#9	STR	44'-2"	1,201
B3	8	#4	STR	11'-5"	61
B4	6	#5	STR	44'-2"	276
M1	12	#10	STR	39'-3"	2,027
M2	24	#10	STR	44'-3"	4,570
S1	108	#5	2	8'-7"	967
S2	6	#4	3	6'-3"	25
S3	8	#4	3	5'-6"	29
U1	45	#4	3	6'-4"	190
V1	36	#10	4	23'-7"	3,653
REINFORCING STEEL					14,617 LBS.
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP-1	1	*	5	571'-8"	596
SP-2	2	*	5	670'-4"	1,398
SP-3	3	**	6	688'-11"	1,381
SPIRAL COLUMN REINFORCING STEEL					3,375 LBS.
*SP-1 & SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
**SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE					
POUR 2 (COLUMNS)					15.9 C.Y.
POUR 3 (CAP)					19.1 C.Y.
TOTAL					35.0 C.Y.
DRILLED PIERS					
POUR 1 (DRILLED PIERS)					34.3 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL					24.0 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL					72.4 LIN. FT.
CSL TUBES					403.5 LIN. FT.

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
BENT 2
DETAILS AND
BILL OF MATERIAL

REVISIONS				SHEET NO.
BY:	DATE:	NO.	BY:	DATE:
		3		
		4		

DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018

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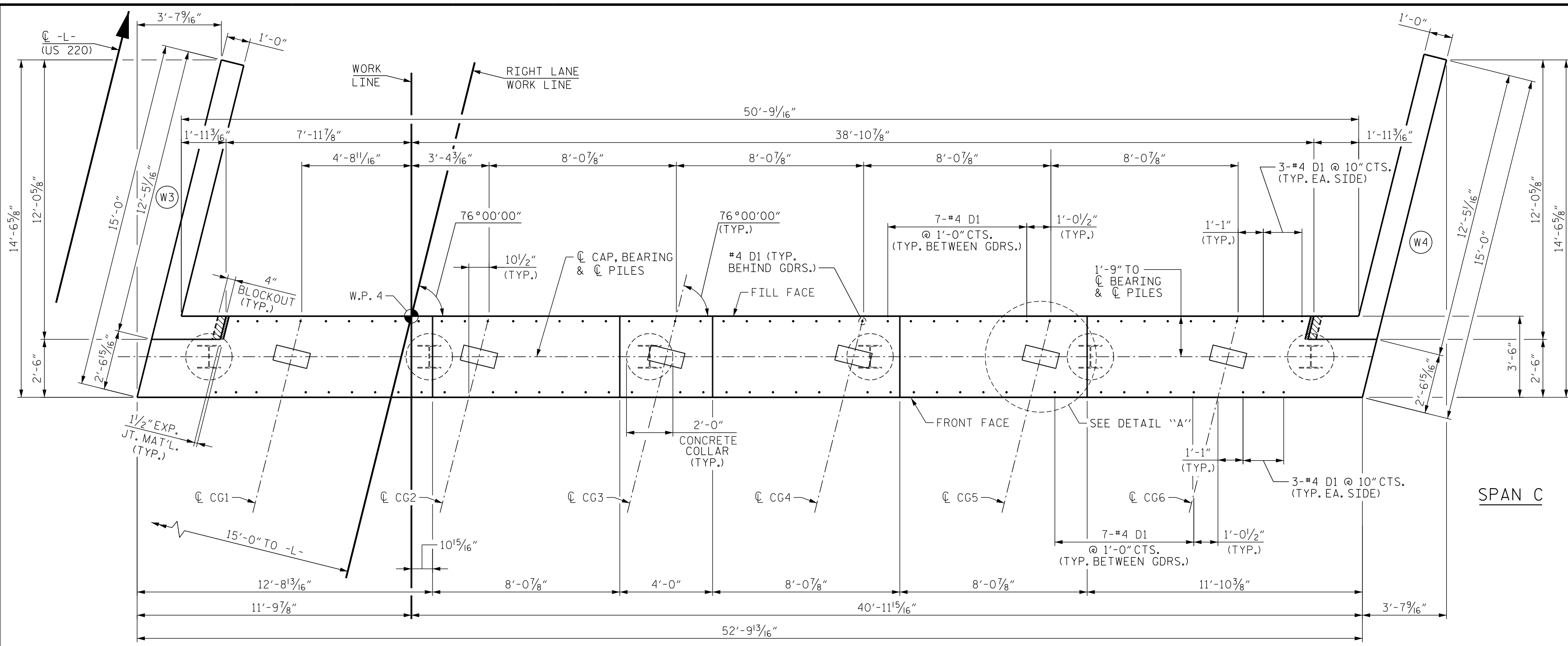
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TOTAL SHEETS: 37

DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
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 Suite 900
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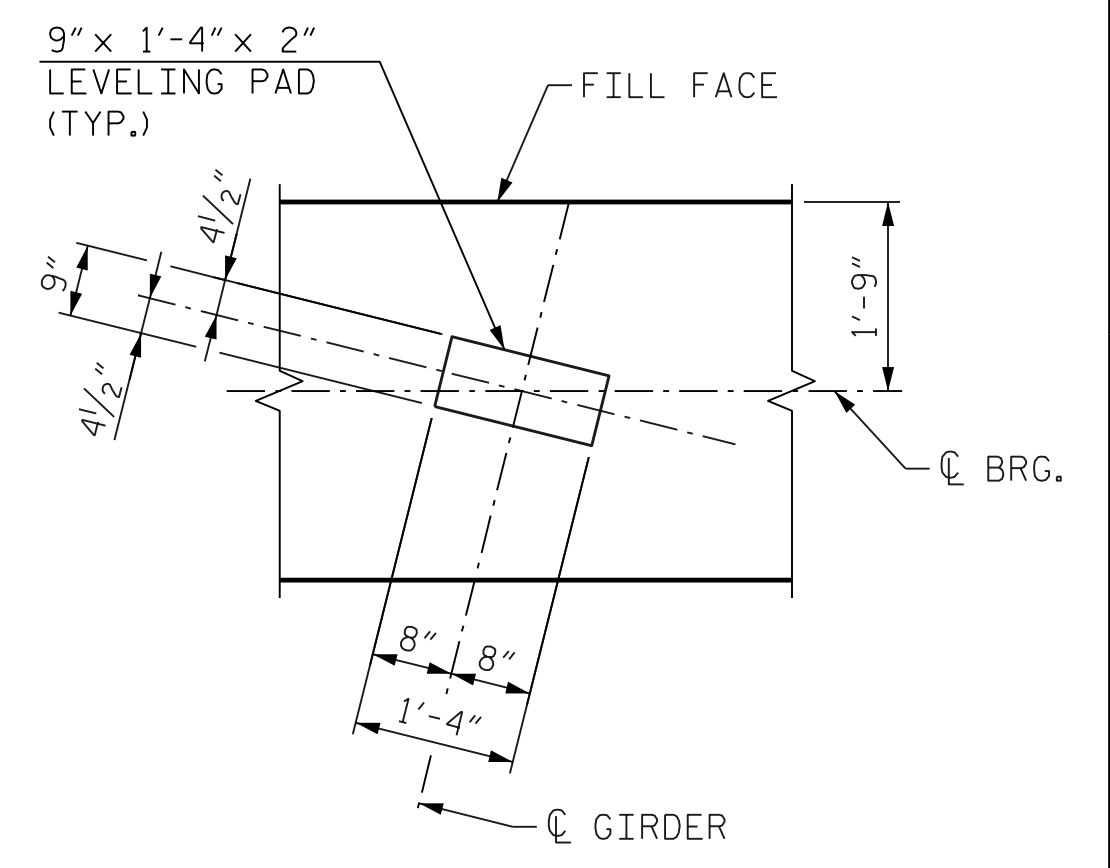


PLAN

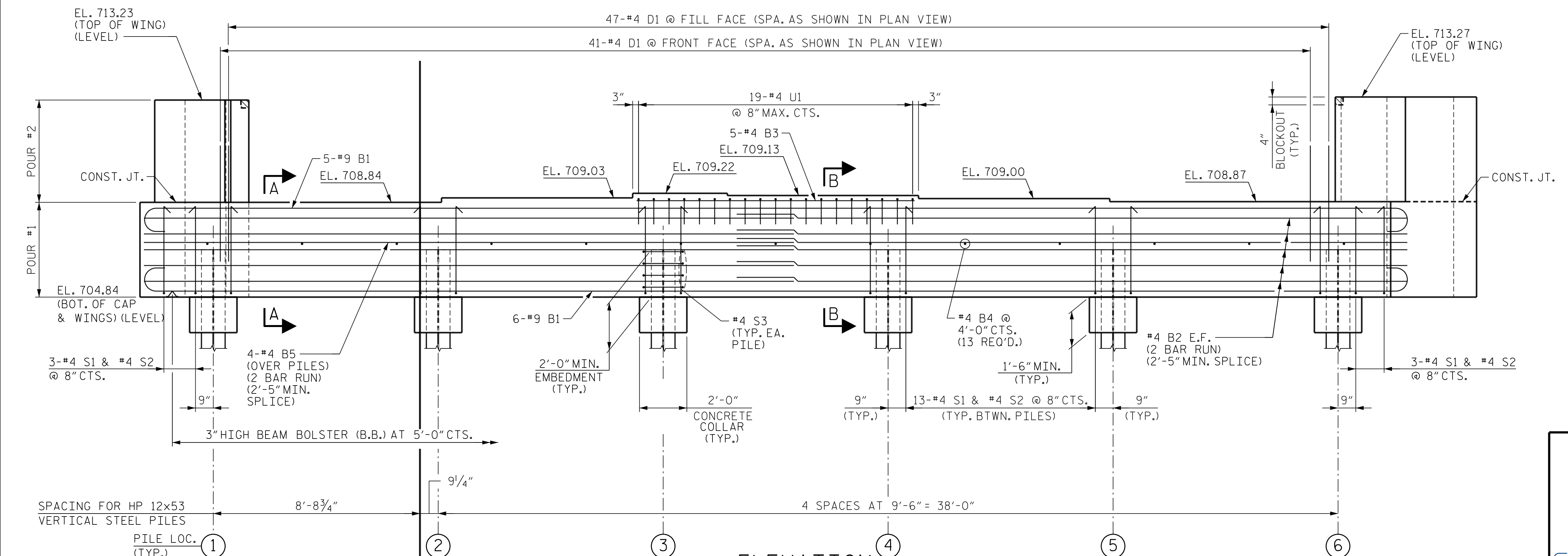
NOTES:
 THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4\".

FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

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



DETAIL "A"
(TYP. EA. GDR.)

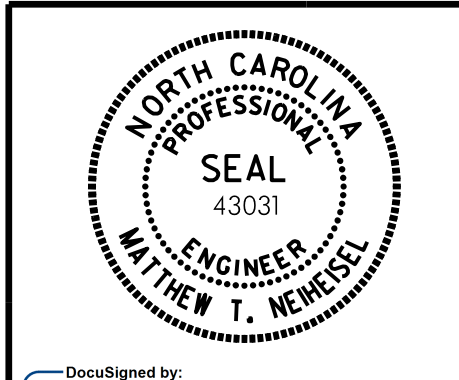


ELEVATION
E.F. = EACH FACE

PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 2
PLAN AND ELEVATION



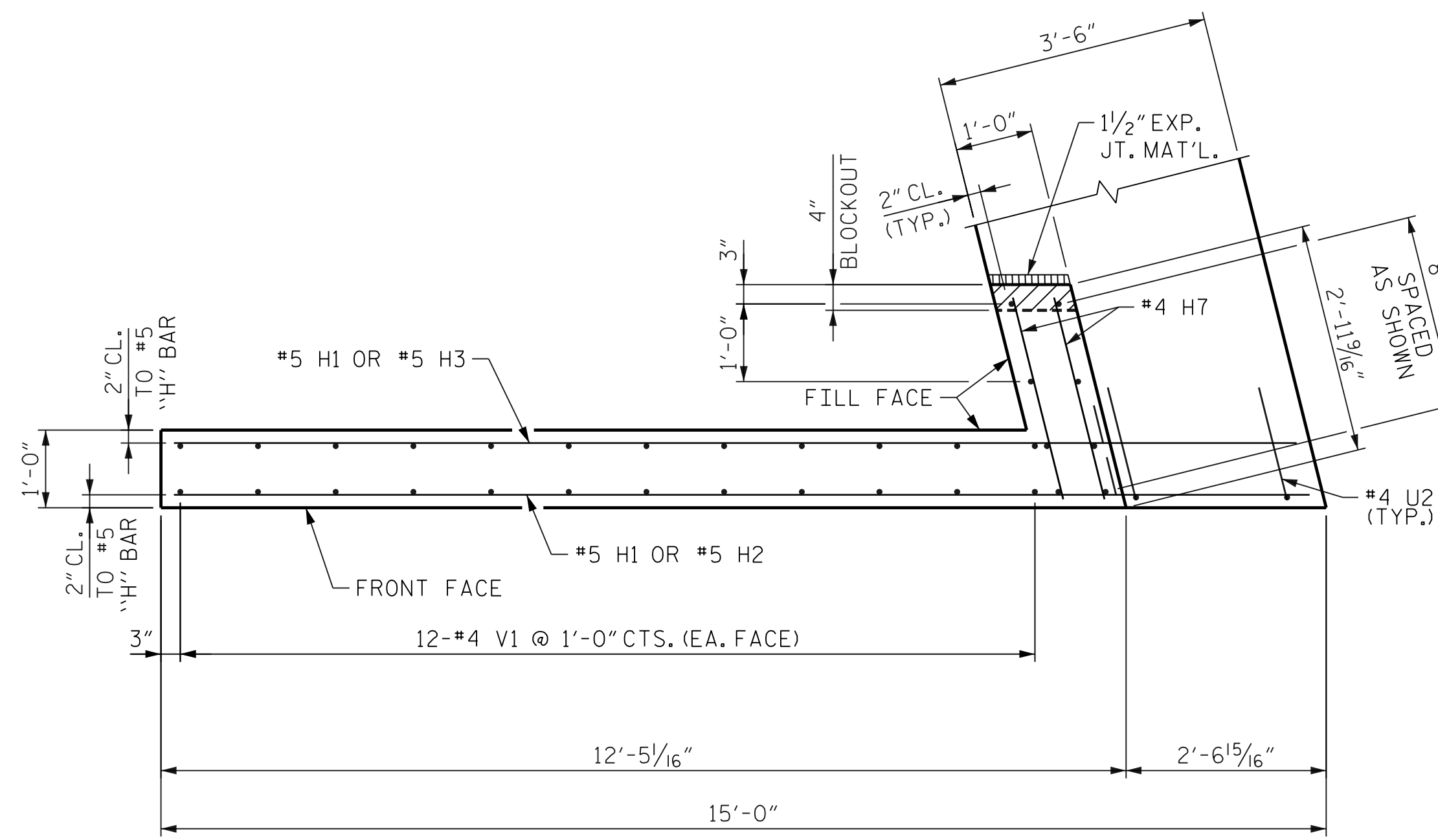
DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018

REVISIONS				SHEET NO.	
BY:	DATE:	NO.	BY:	DATE:	S-32
		3			TOTAL SHEETS
		4			37

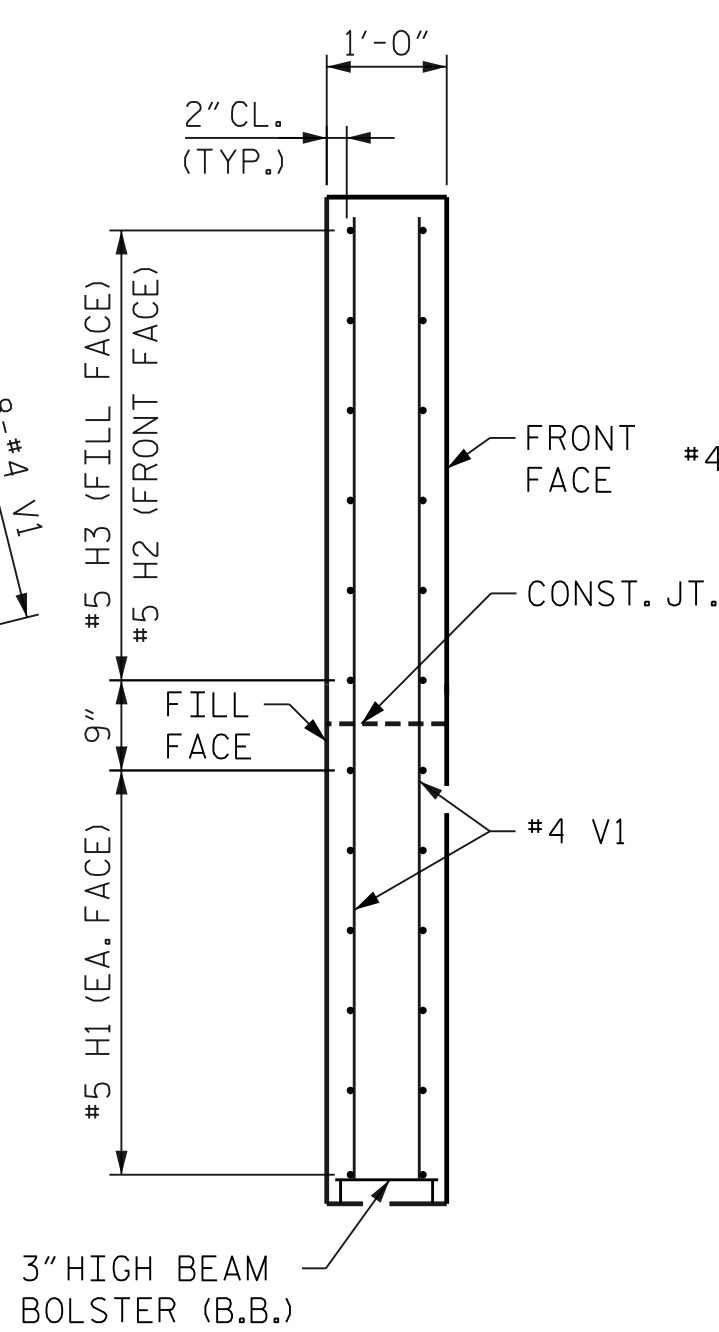
DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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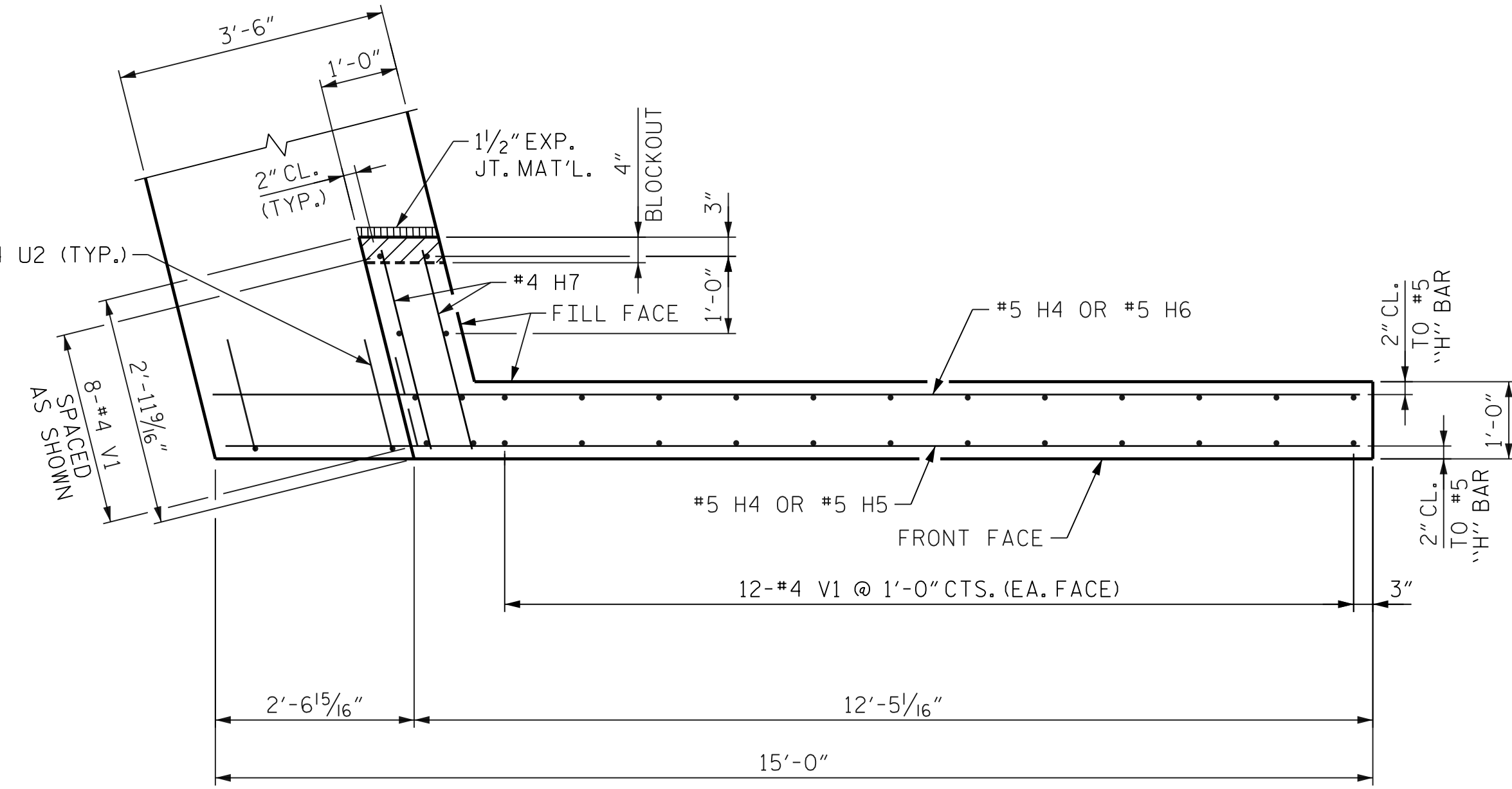
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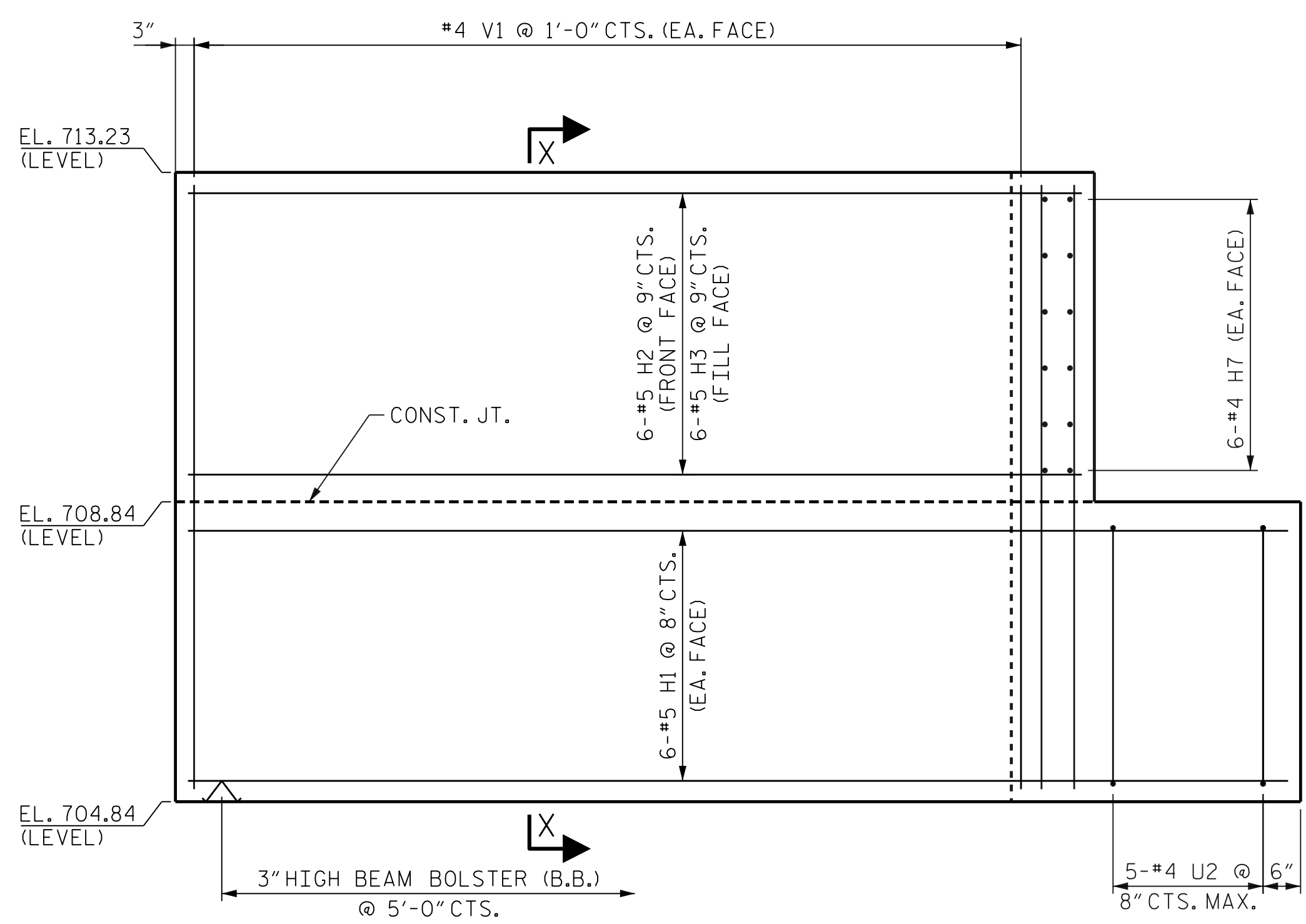
PLAN OF WING (W3)



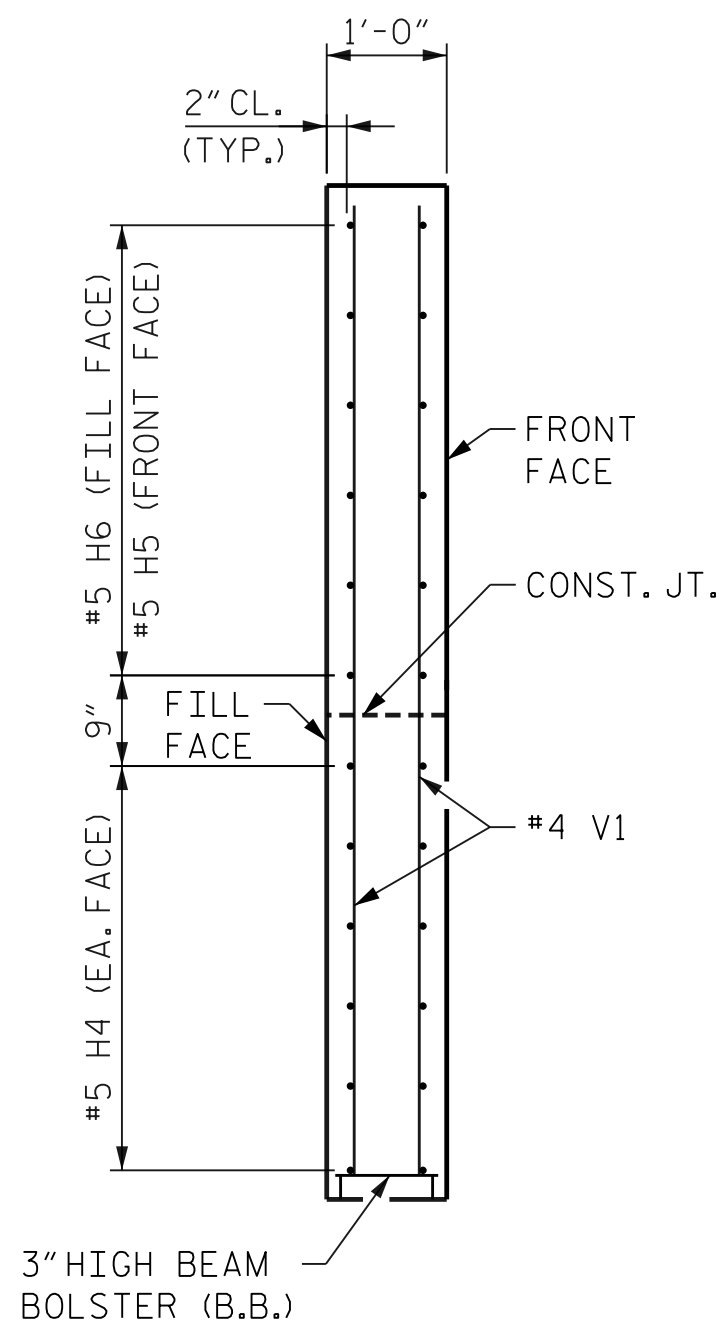
SECTION X-X



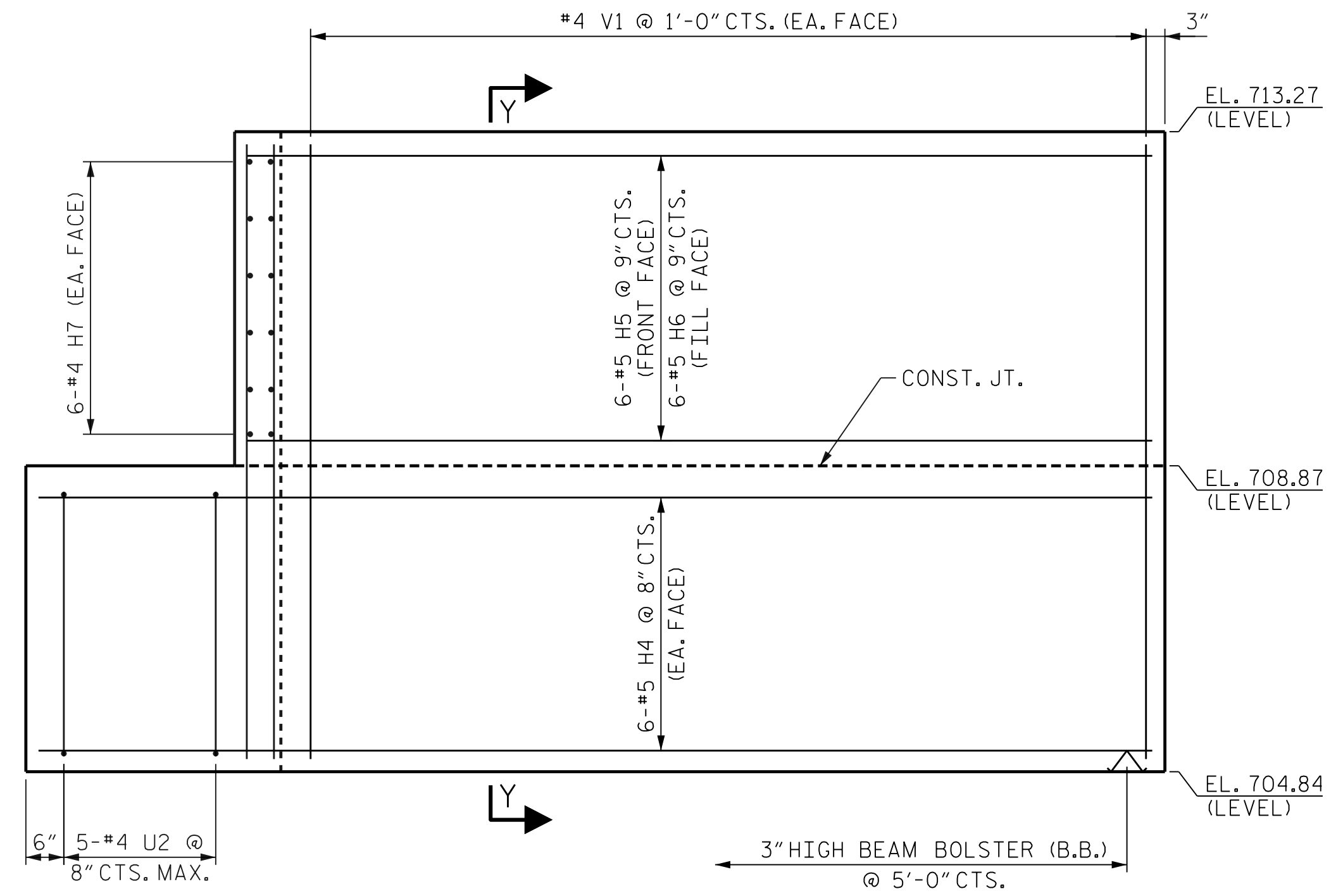
PLAN OF WING (W4)



ELEVATION OF WING (W3)



SECTION Y-Y



ELEVATION OF WING (W4)

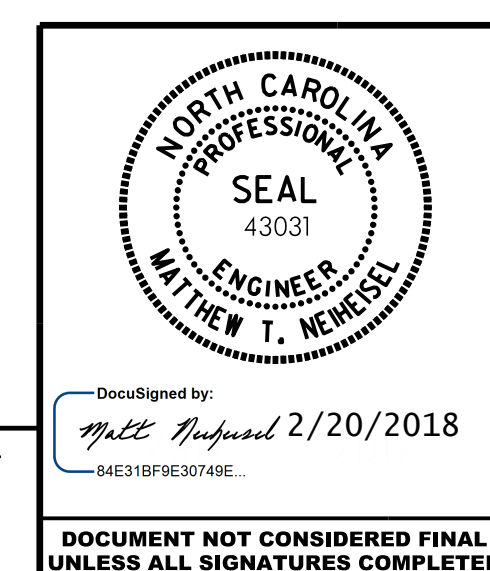
PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2
 WING WALL DETAILS

REVISIONS			
BY:	DATE:	NO.	DATE:
		3	
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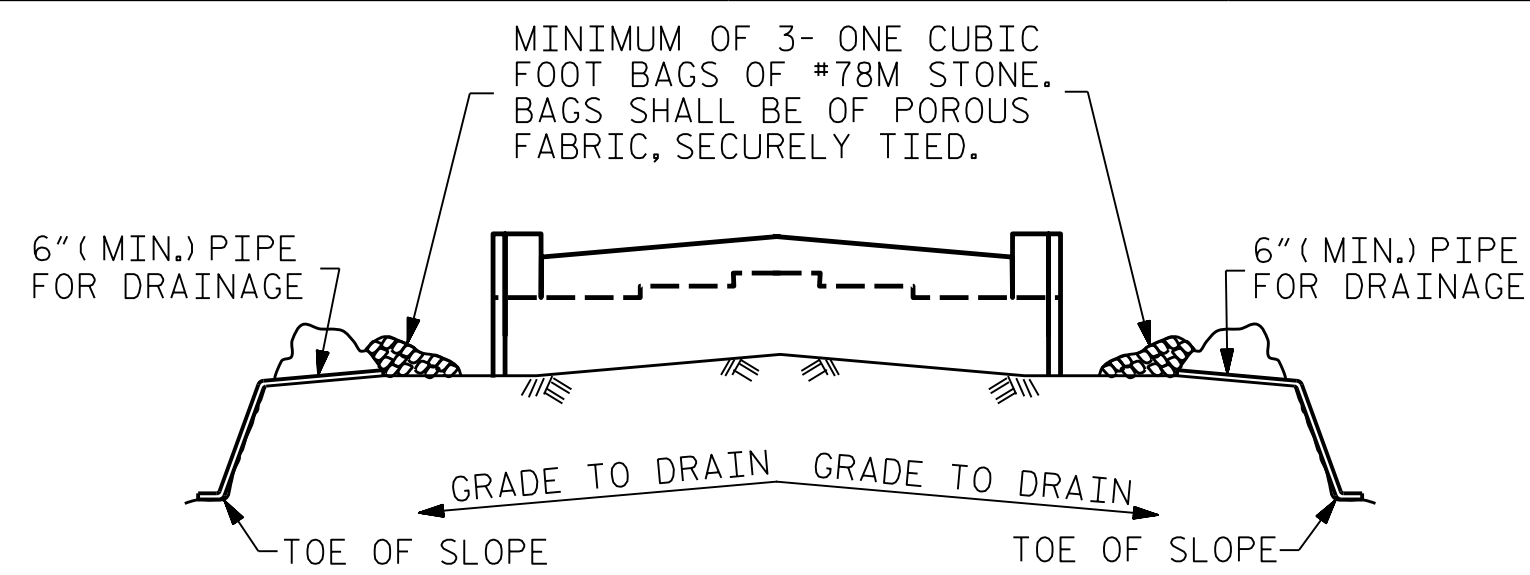
SHEET NO. S-33
 TOTAL SHEETS 37



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 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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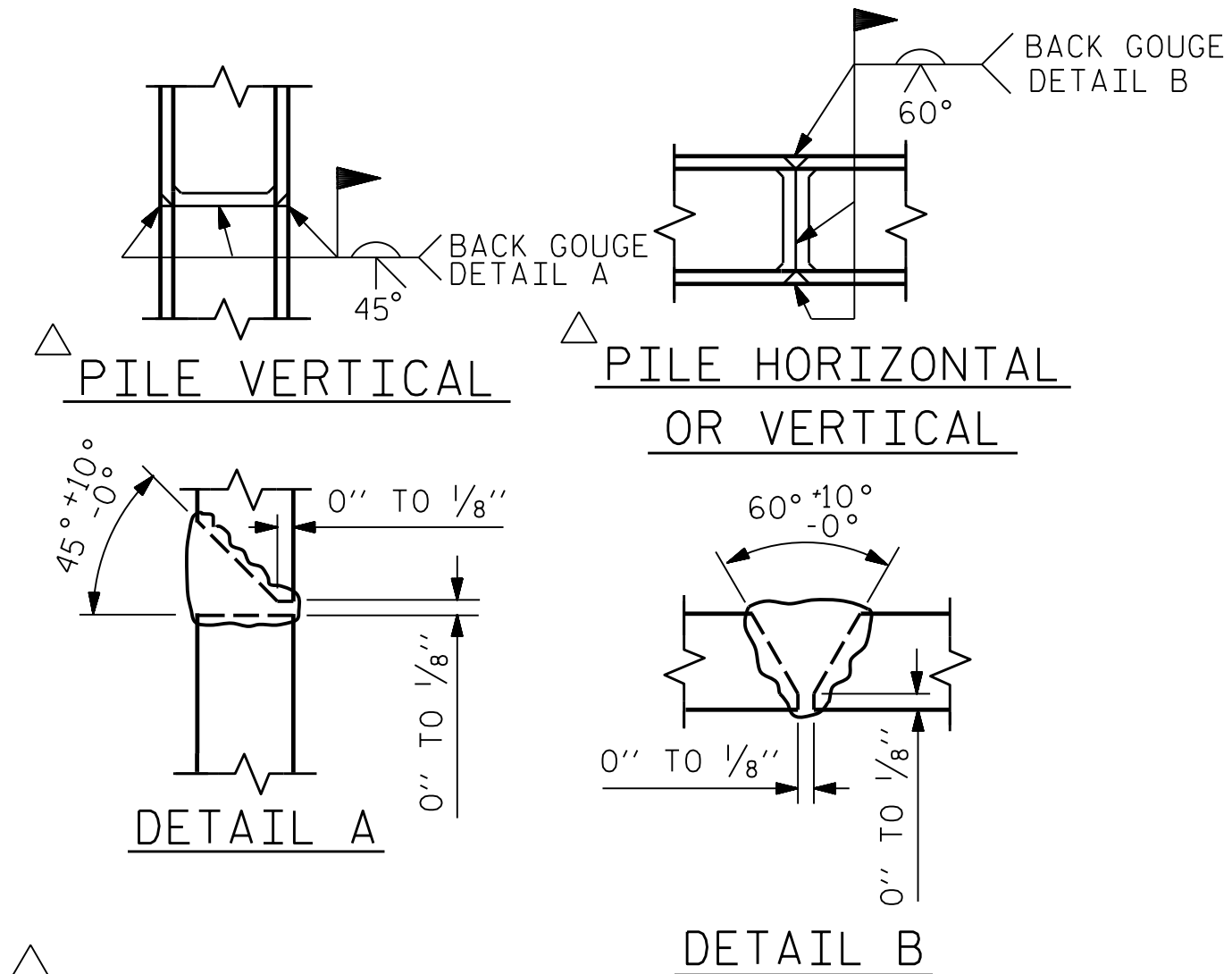


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

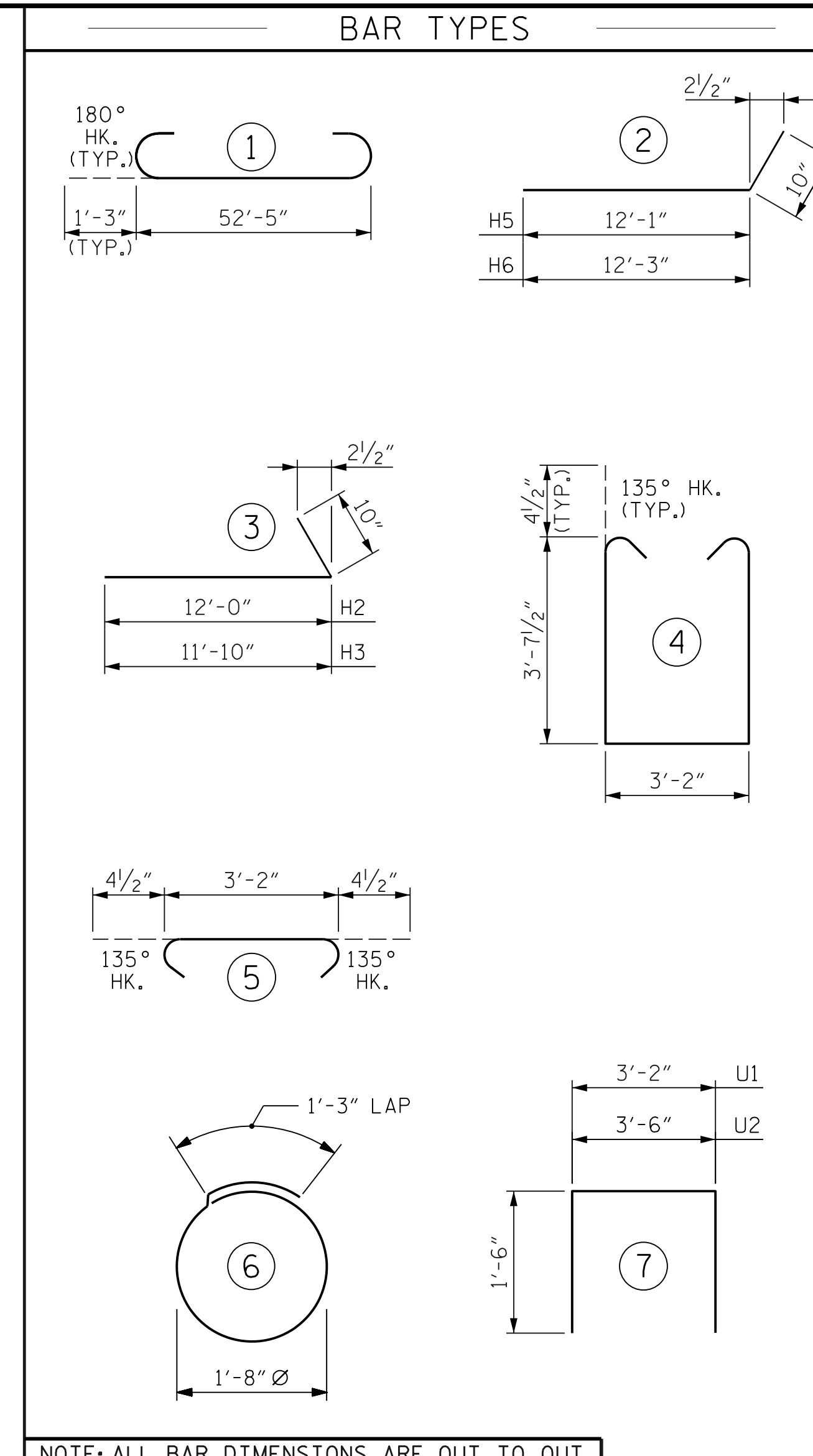
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

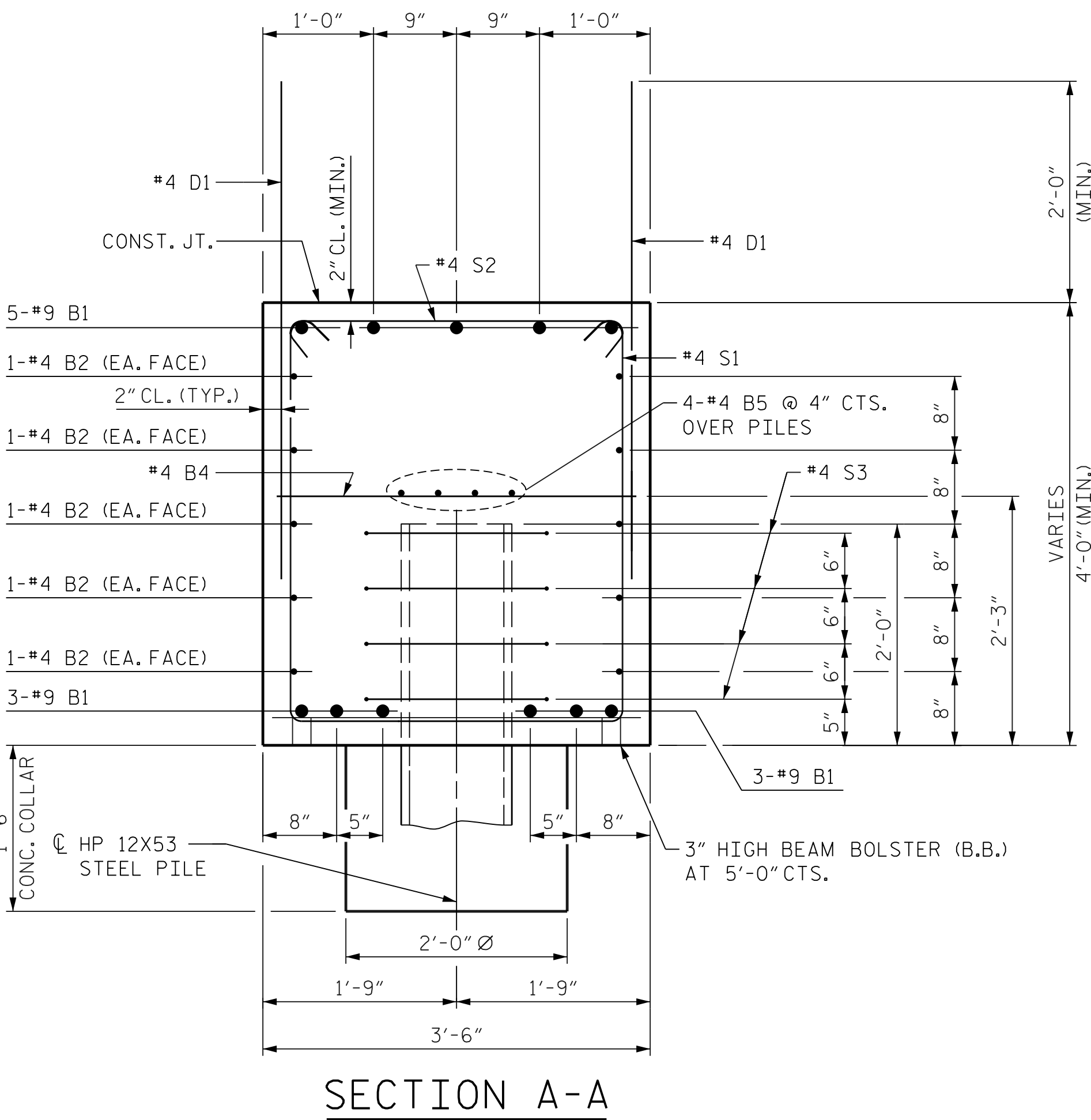
TEMPORARY DRAINAGE AT END BENT



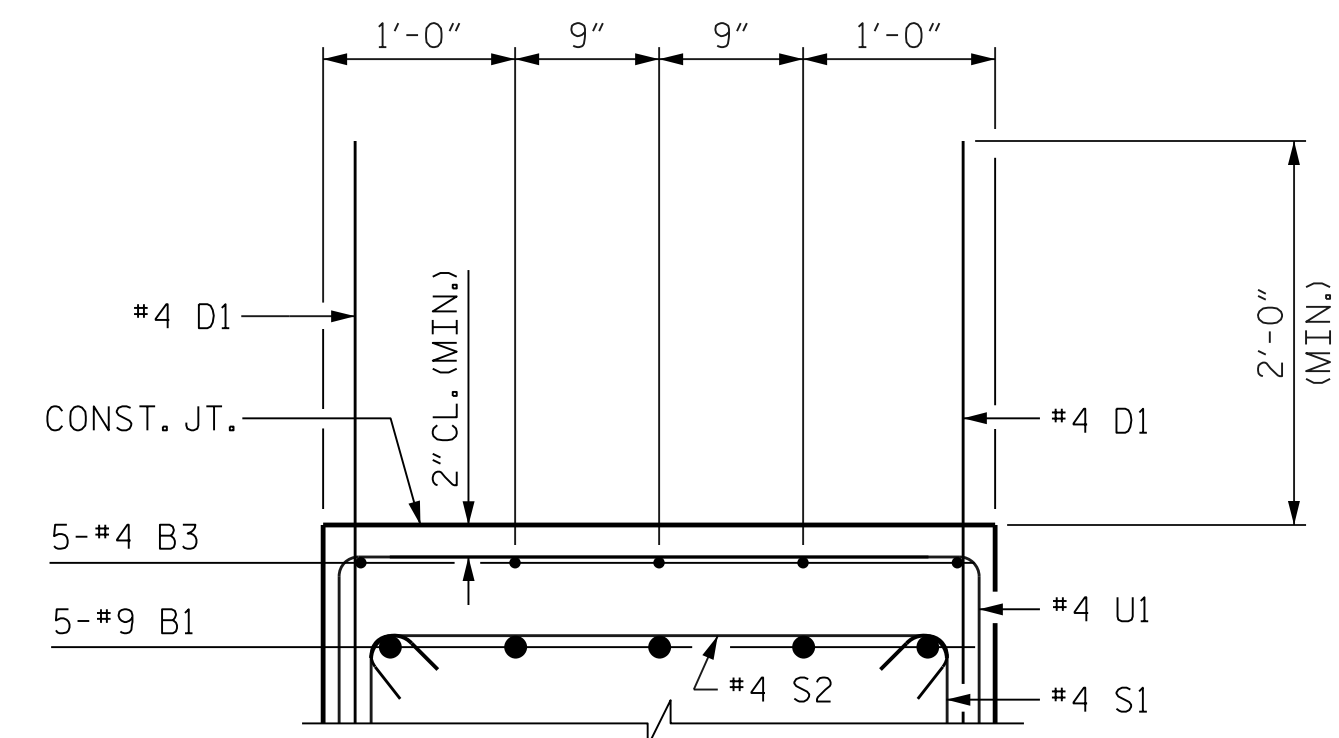
PILE SPLICE DETAILS



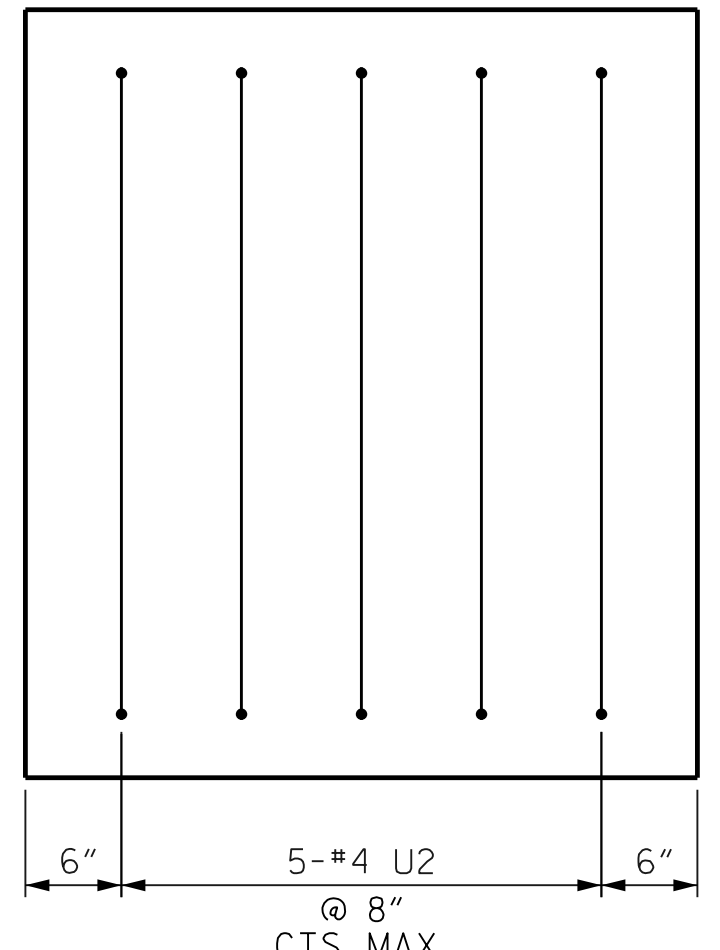
NOTE: ALL BAR DIMENSIONS ARE OUT TO OUT.



SECTION A-A



SECTION B-B



END VIEW

BILL OF MATERIAL					
END BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#9	1	54'-11"	2054	
B2	#4	STR	27'-6"	368	
B3	#4	STR	11'-8"	39	
B4	#4	STR	3'-2"	28	
B5	#4	STR	27'-6"	147	
D1	#4	STR	4'-6"	265	
H1	#5	STR	14'-5"	181	
H2	#5	3	12'-10"	81	
H3	#5	3	12'-8"	80	
H4	#5	STR	14'-8"	184	
H5	#5	2	12'-11"	81	
H6	#5	2	13'-1"	82	
H7	#4	STR	2'-7"	42	
S1	#4	4	11'-2"	530	
S2	#4	5	3'-11"	186	
S3	#4	6	6'-6"	105	
U1	#4	7	6'-2"	79	
U2	#4	7	6'-6"	44	
V1	#4	STR	7'-11"	339	
REINFORCING STEEL				4,915 LBS.	
CLASS A CONCRETE					
POUR 1 (CAP, LOWER WINGS & COLLARS)				32.7 C.Y.	
POUR 2 (UPPER WINGS)				4.7 C.Y.	
TOTAL CONCRETE				37.4 C.Y.	
HP 12 x 53 STEEL PILES					
				NO.	6
				L.F.	270
STEEL PILE POINTS				EA.	6
PILE DRIVING EQUIPMENT					
SETUP FOR HP 12 X 53 STEEL PILES				EA.	6

PROJECT NO. B-5352

ROCKINGHAM COUNTY

STATION: P.O.T. 22+16.89 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
MISCELLANEOUS DETAILS
AND BILL OF MATERIAL

REVISIONS				SHEET NO.
BY:	DATE:	NO.	DATE:	S-34
		3		TOTAL SHEETS 37
		4		

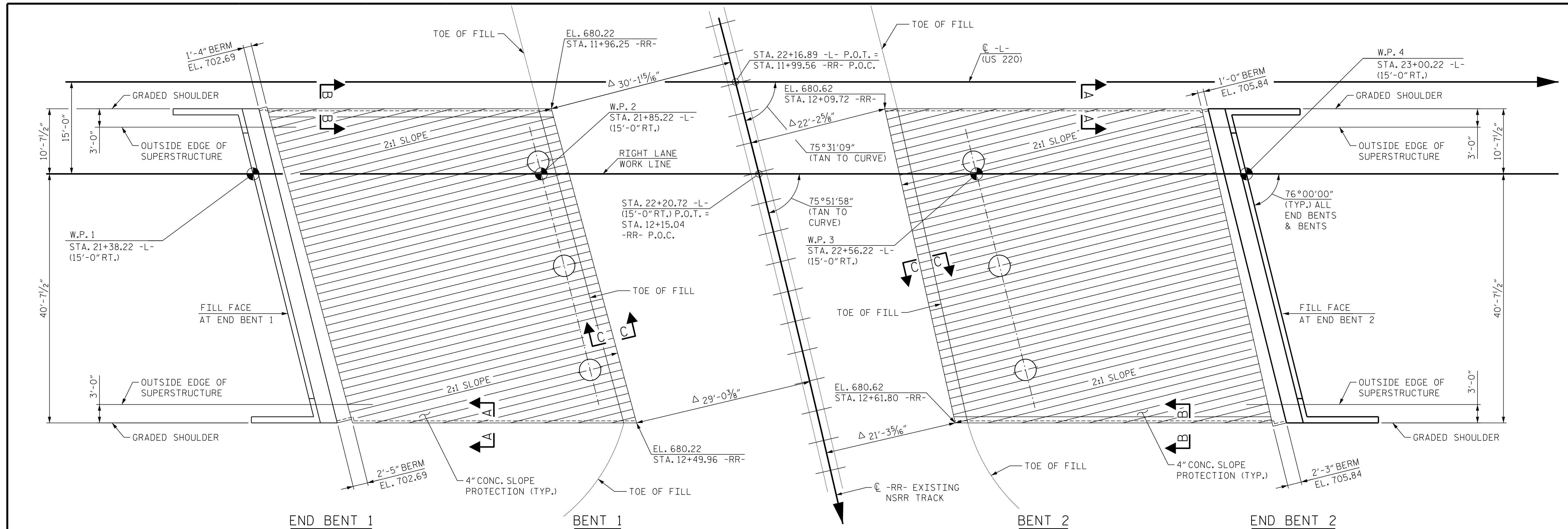
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555 Fayetteville St., Suite 900
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NC License No: F-0258

DocuSigned by:
Matthew T. Neiheisel
2/20/2018
44E318F9E30749E

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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DRAWN BY: D. H. CARTER DATE: FEB 2018
CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

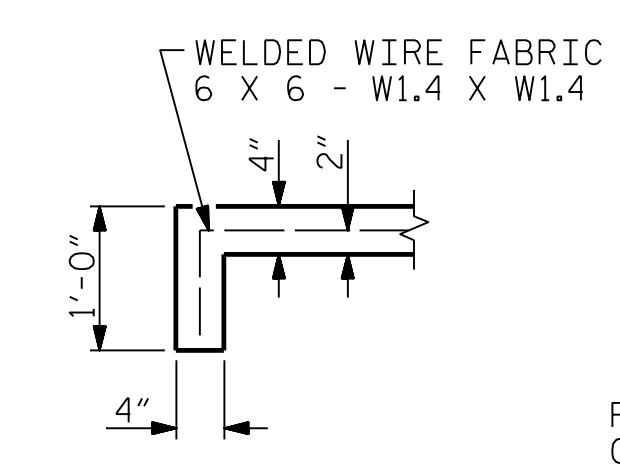


PLAN

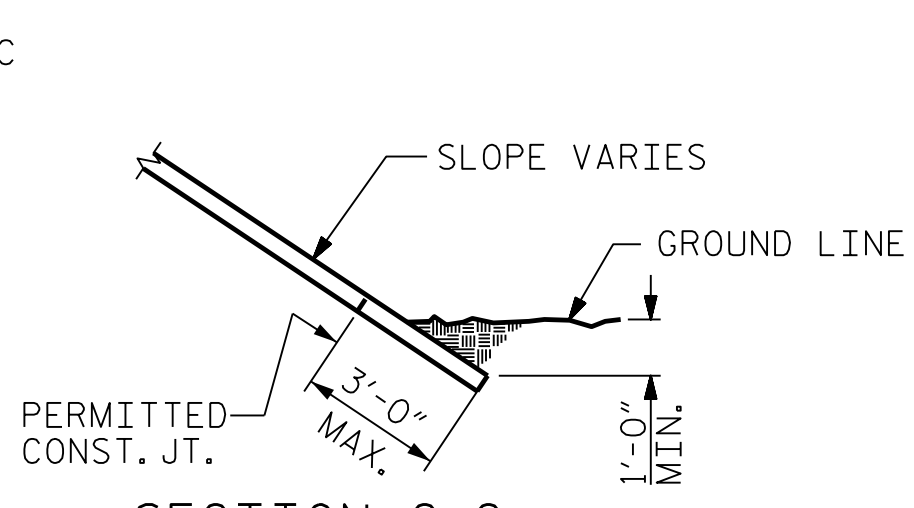
△ RADIAL DIMENSION

BRIDGE @ STA. 22+16.89 C -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	306	551
END BENT 2	341	613

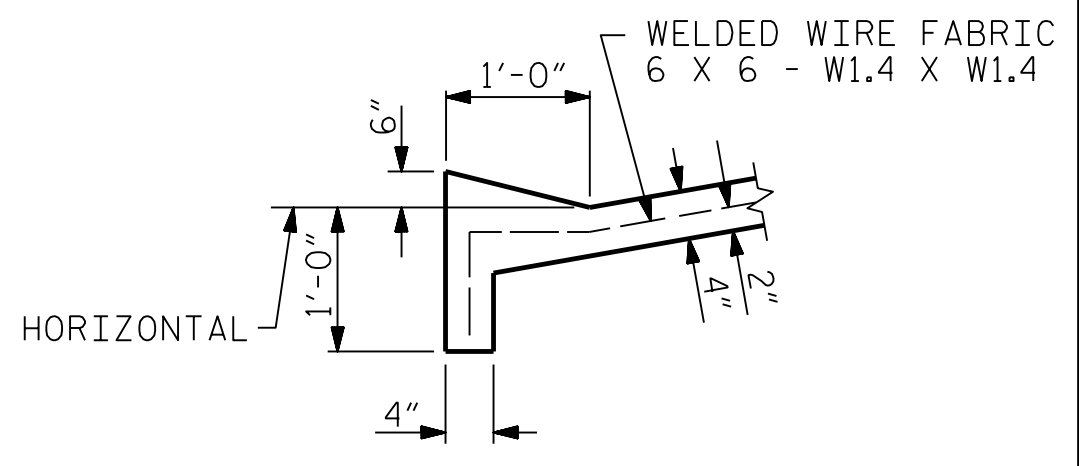
* QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION A-A



SECTION C-C

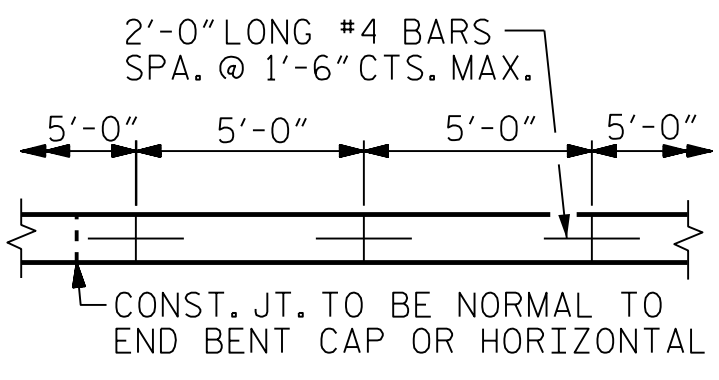


SECTION B-B

GENERAL NOTES

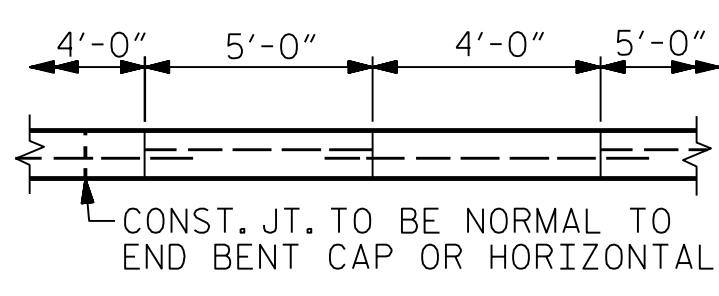
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.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

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



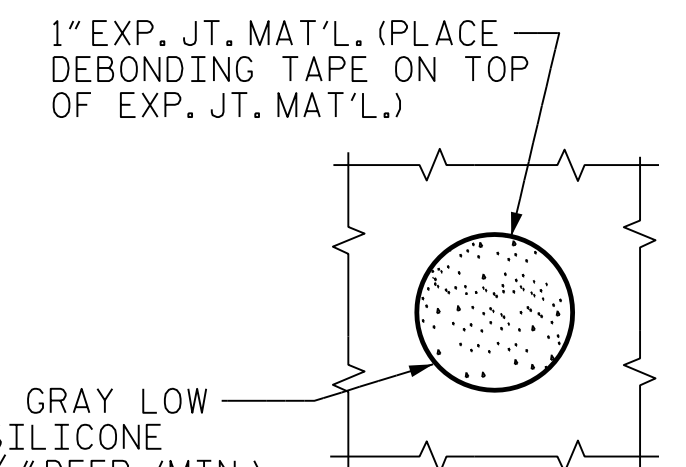
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



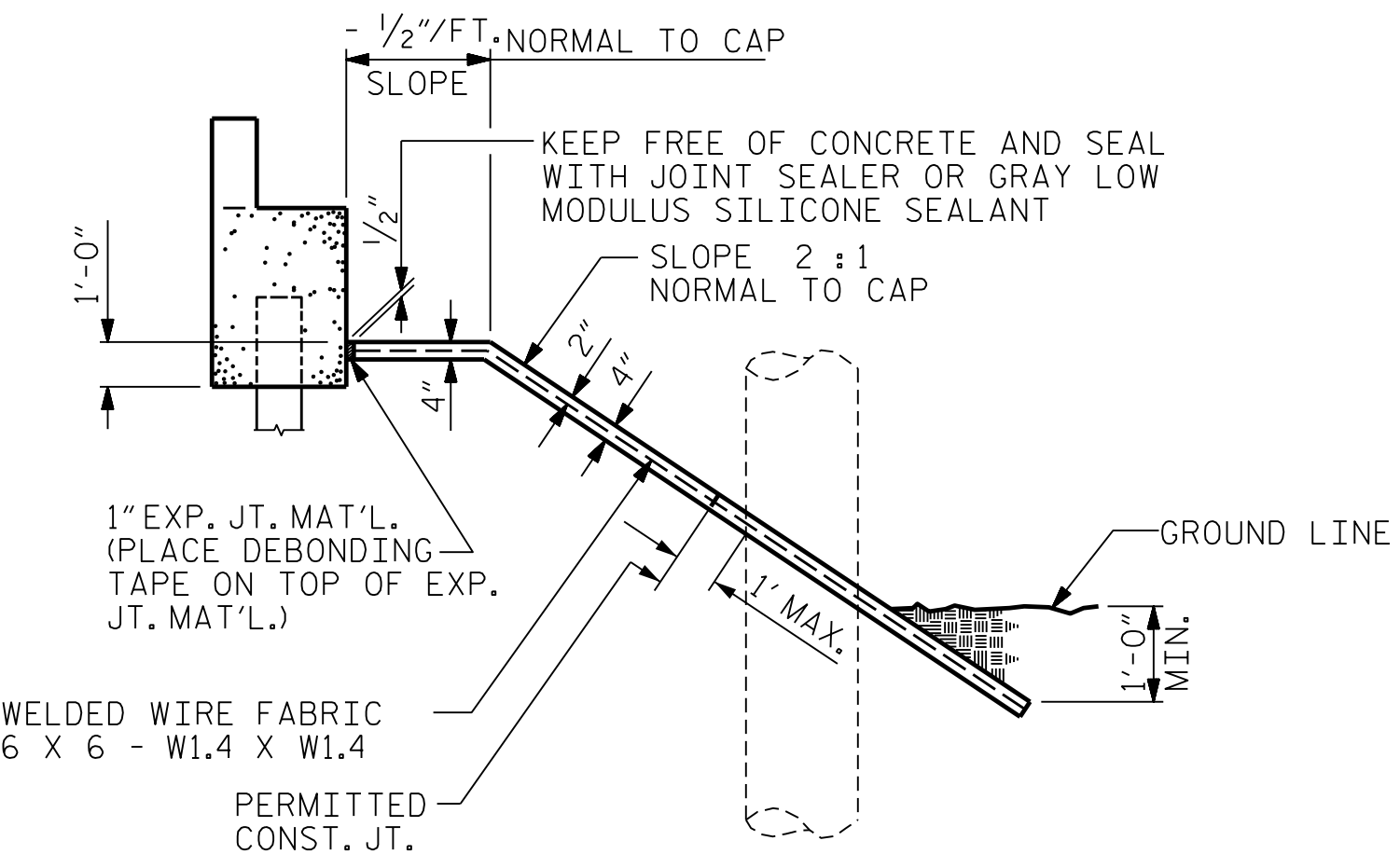
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN

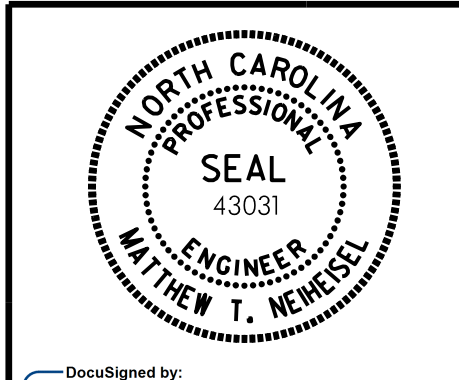
SEAL WITH GRAY LOW MODULUS SILICONE SEALANT, 1/2" DEEP (MIN.)



SECTION ALONG C RAILROAD

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD SLOPE PROTECTION DETAILS



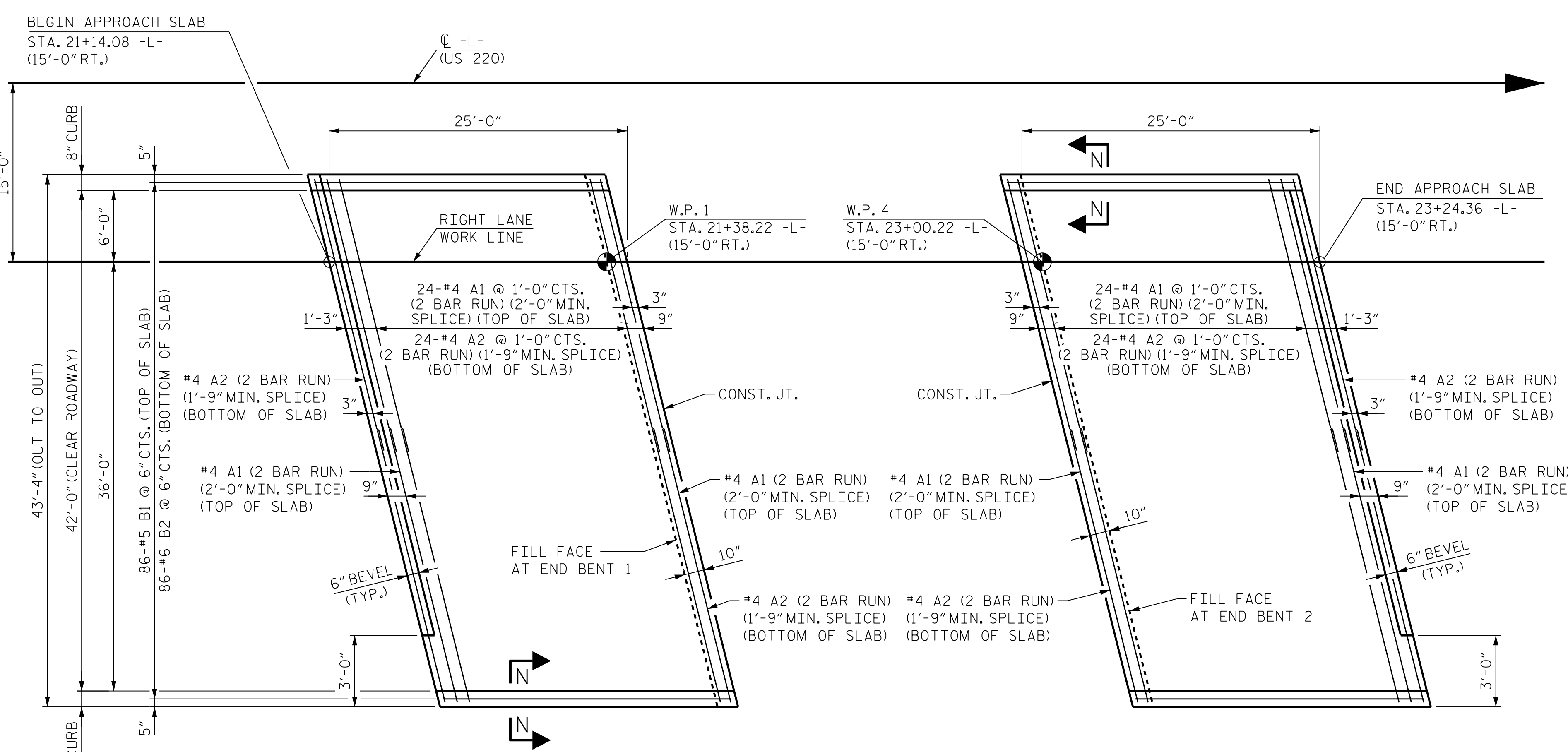
DocuSigned by:
 Matthew T. Neiheisel
 2/20/2018

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		4				

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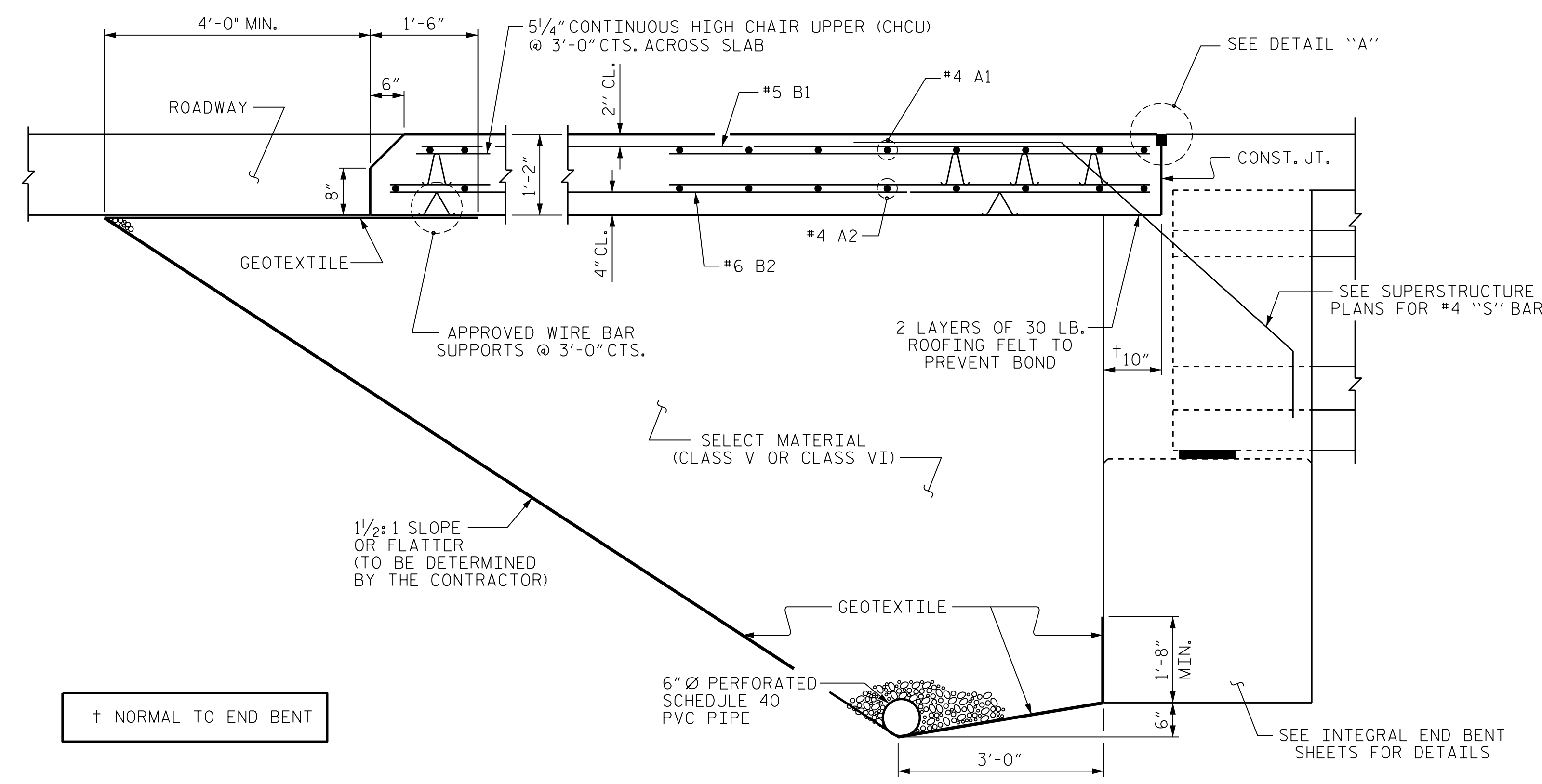
DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

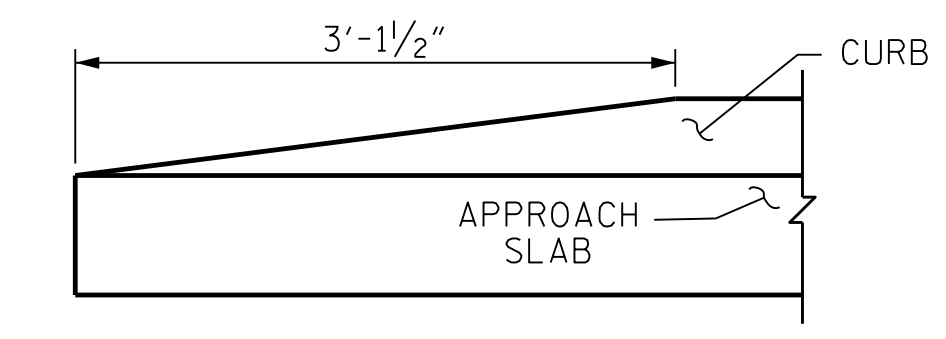
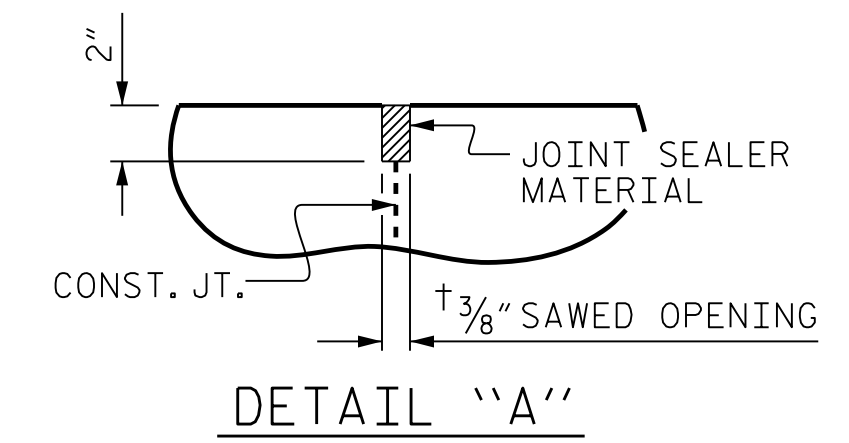


SECTION THRU SLAB

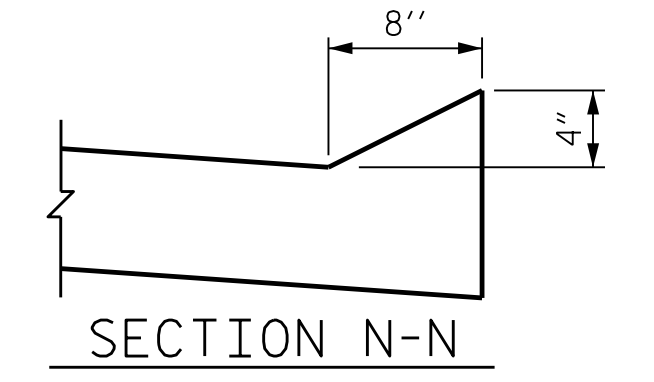
(TYPE I - STANDARD APPROACH FILL)

NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.
- AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.



END OF CURB WITHOUT SHOULDER BERM GUTTER



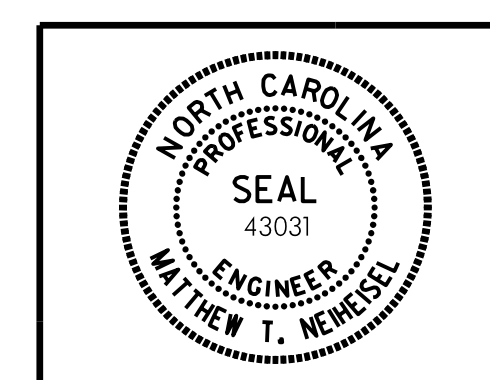
SECTION N-N

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	23'- 2"	805
A2	52	#4	STR	23'- 1"	802
* B1	86	#5	STR	24'- 2"	2,168
B2	86	#6	STR	24'- 8"	3,186
REINFORCING STEEL					3,988 LBS.
* EPOXY COATED REINFORCING STEEL					2,973 LBS.
CLASS AA CONCRETE					46.8 C.Y.

PROJECT NO. B-5352
 ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR INTEGRAL ABUTMENT



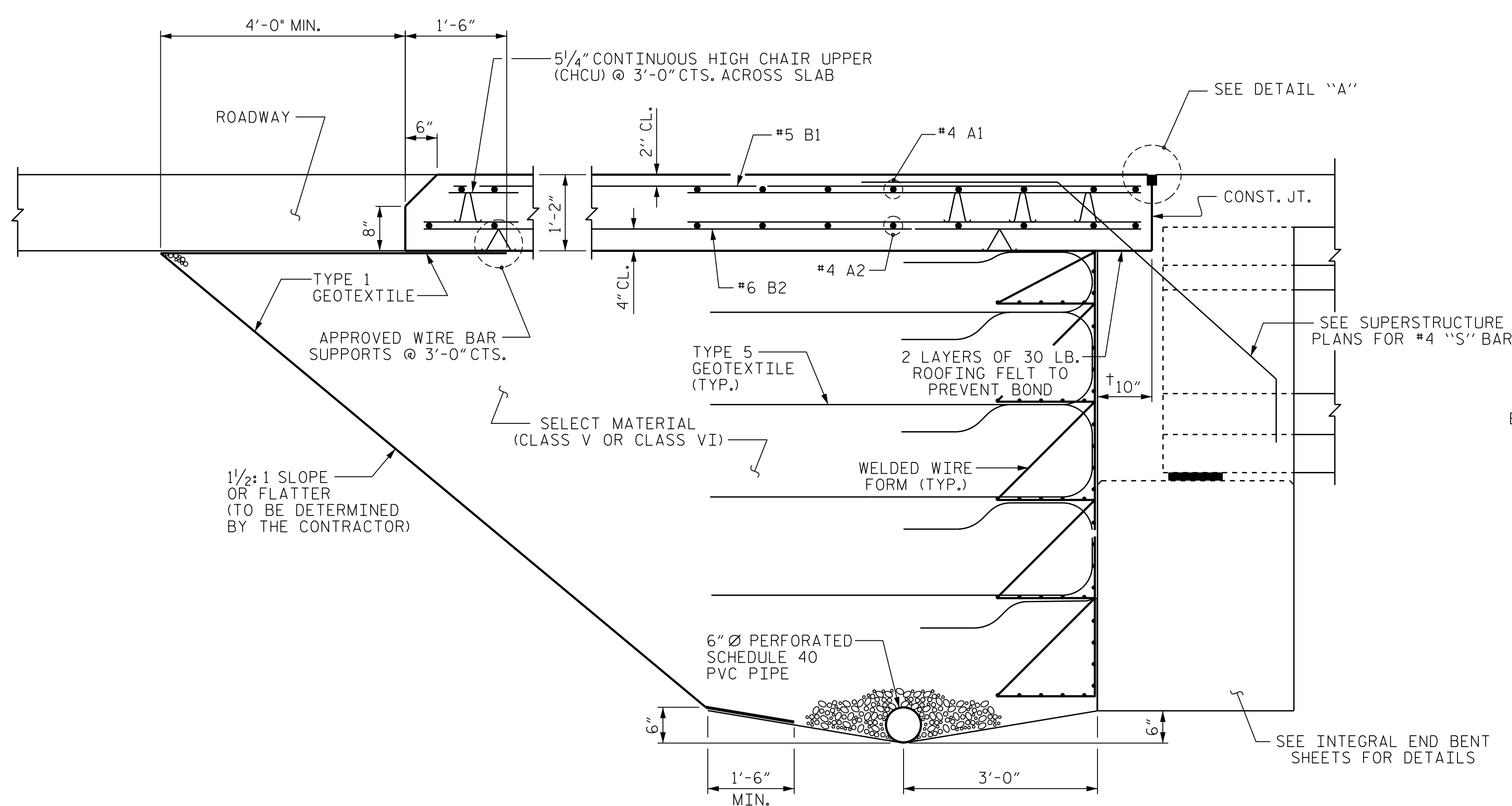
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 Matthew T. Neiheisel
 2/20/2018
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BY:	DATE:	NO.	BY:	DATE:	S-36
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		4			

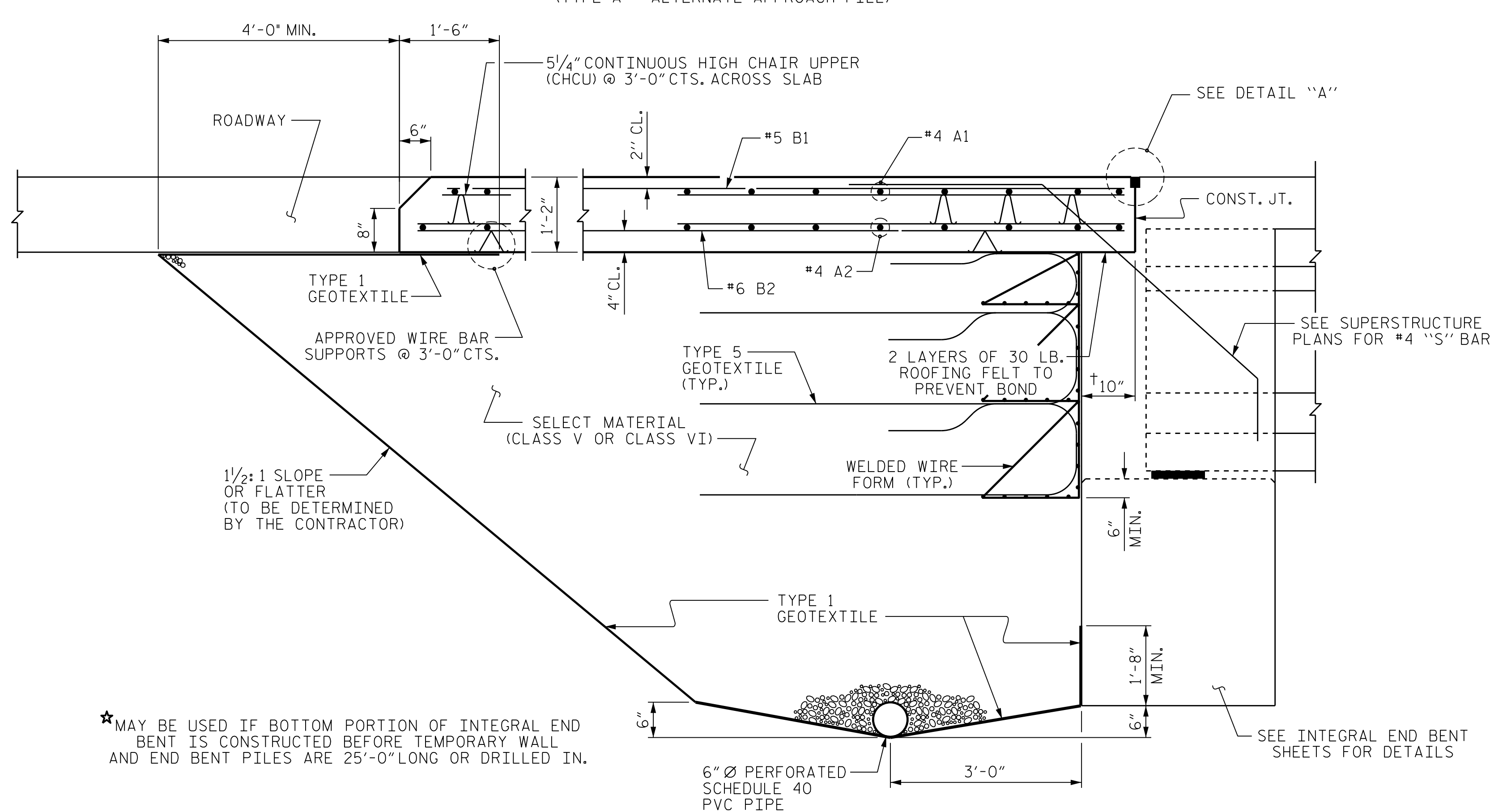


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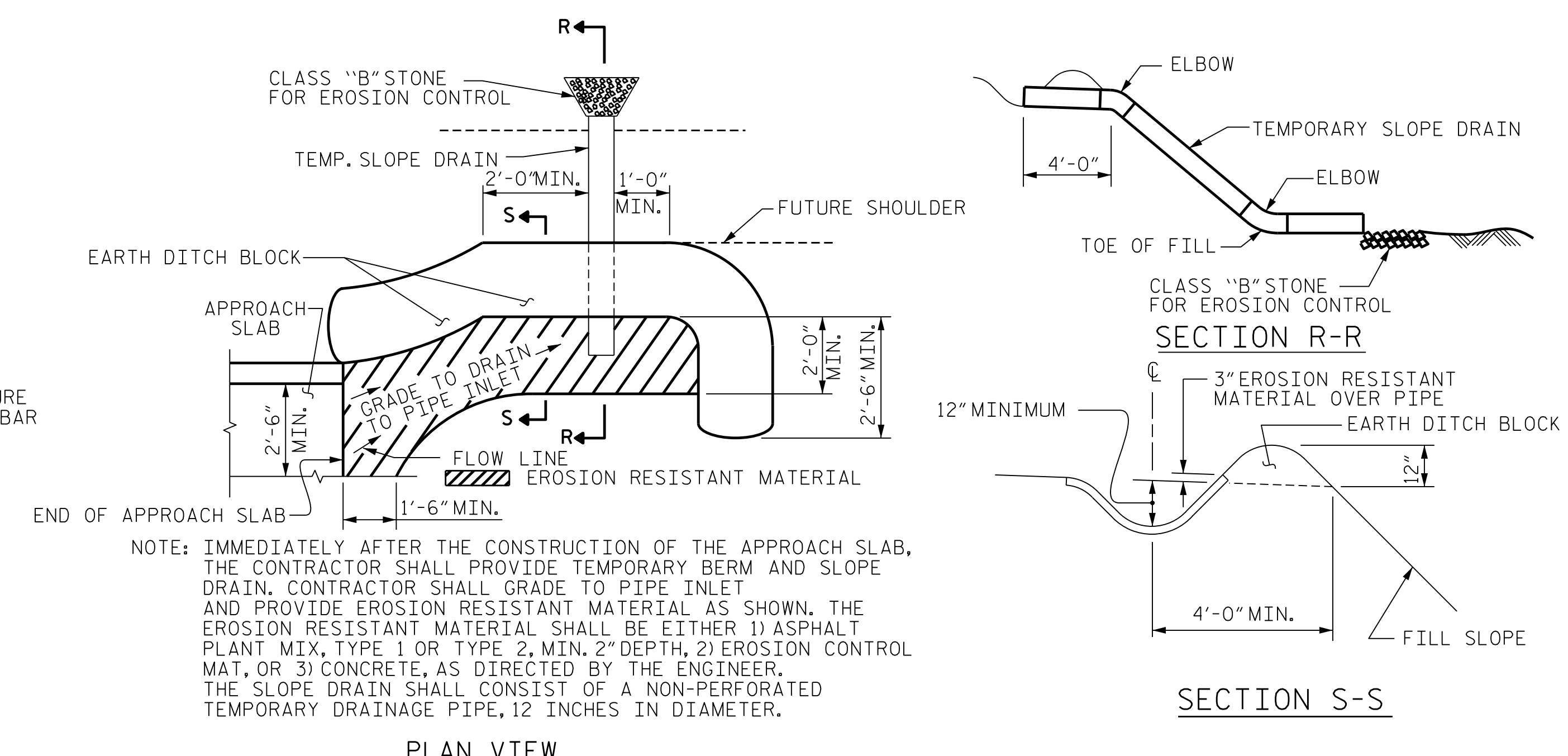
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 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018



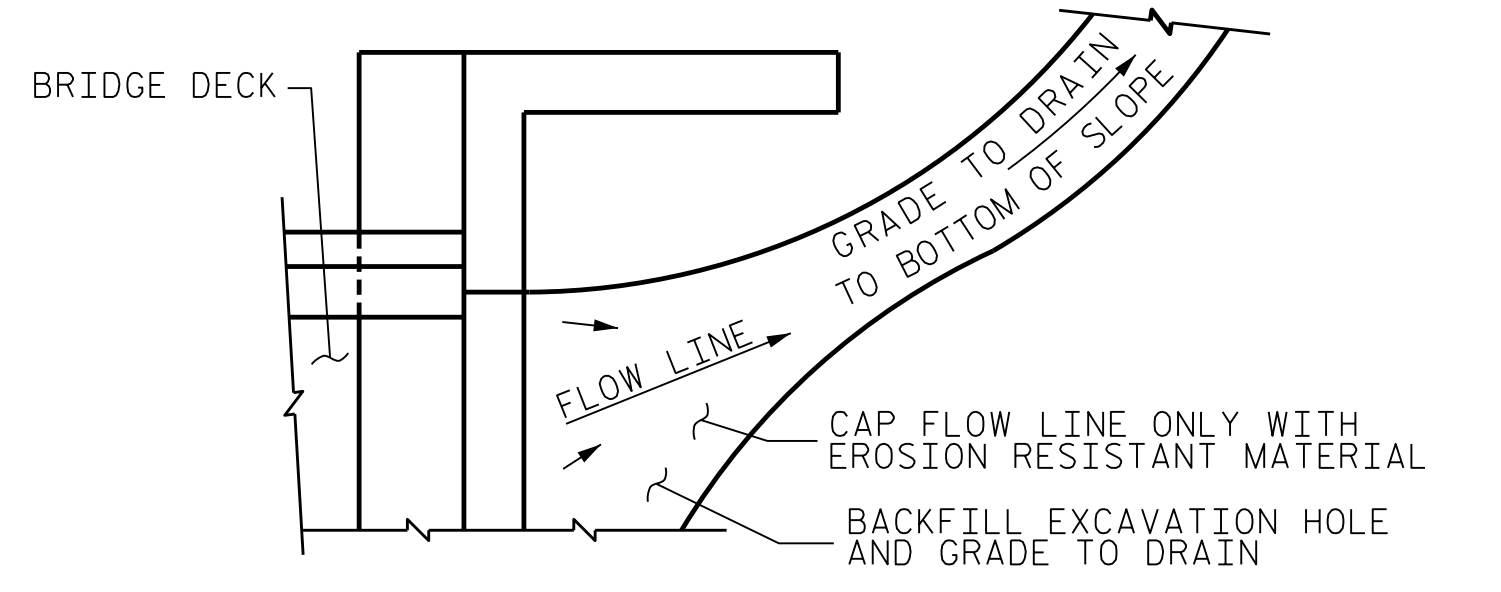
SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)



SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

NOTES

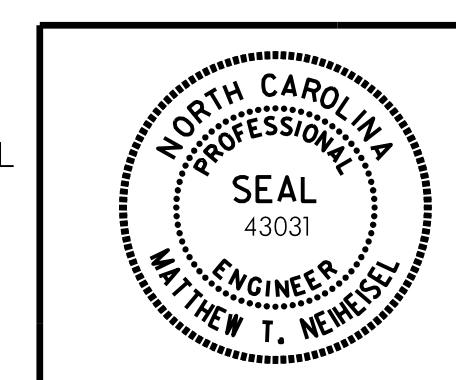
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
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PROJECT NO. B-5352
ROCKINGHAM COUNTY
 STATION: P.O.T. 22+16.89 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS

REVISIONS					
BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
		3			5-37
		4			TOTAL SHEETS 37



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DRAWN BY: D. H. CARTER DATE: FEB 2018
 CHECKED BY: M. T. NEIHEISEL DATE: FEB 2018
 DESIGN ENGINEER OF RECORD: M. T. NEIHEISEL DATE: FEB 2018

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$ " 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. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

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