

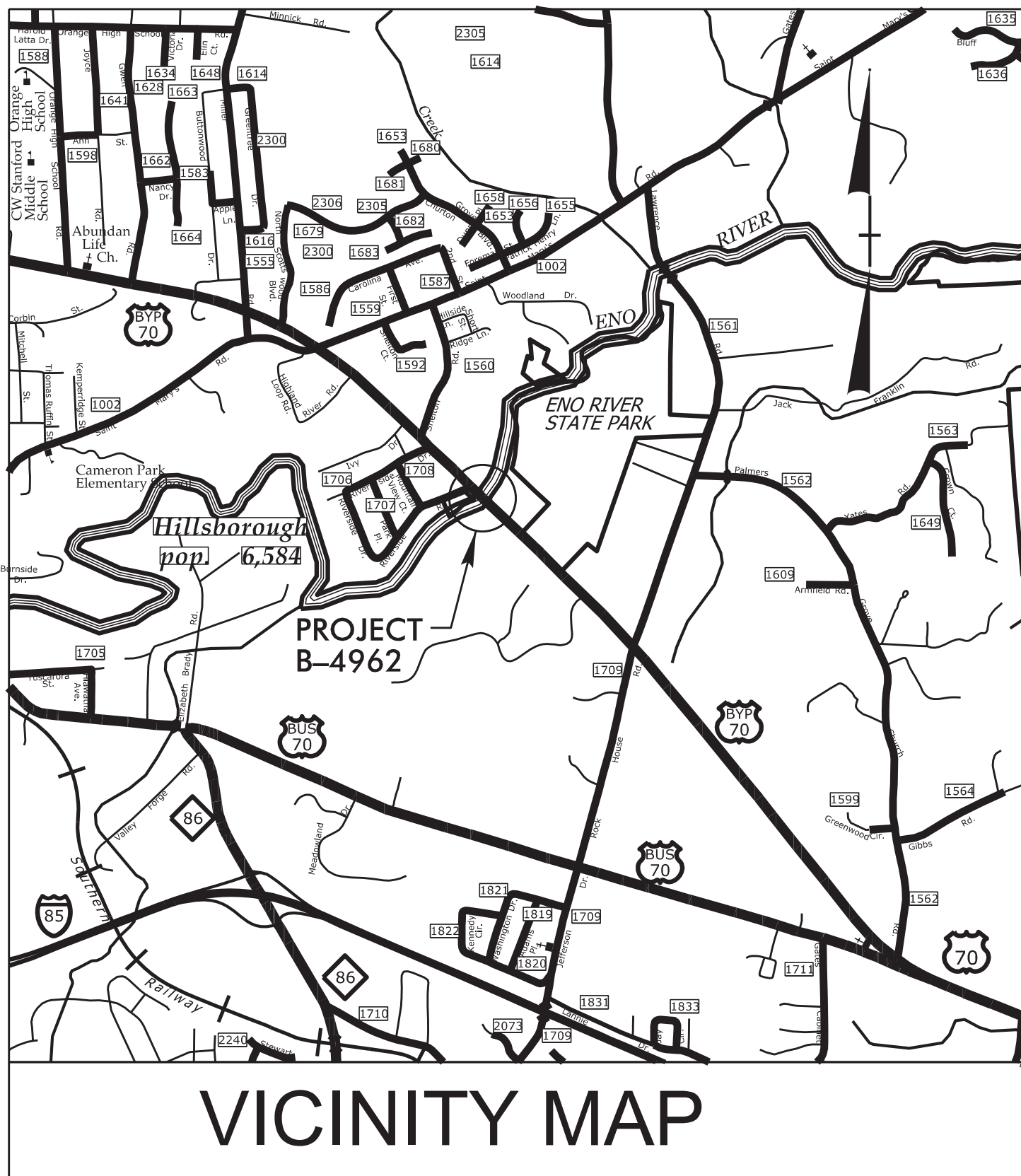
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TIP PROJECT: B-4962

CONTRACT: C204078



VICINITY MAP

STRUCTURES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

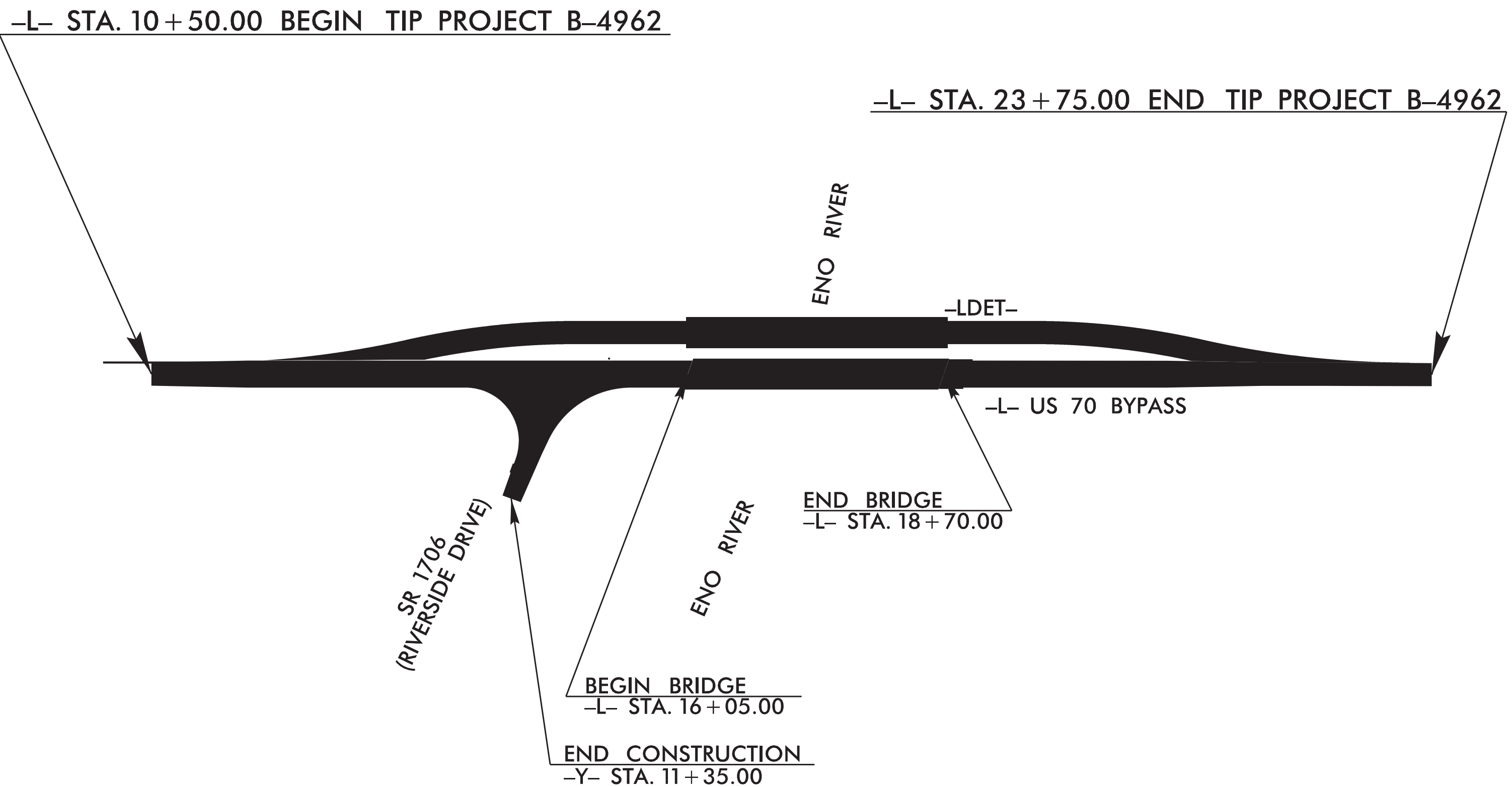
ORANGE COUNTY

LOCATION: BRIDGE NO. 46 OVER ENO RIVER ON US 70 BYPASS

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT

EXTENSION, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4962		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40174.1.1	BRSTP-0070(120)	P.E.	
40174.2.1		ROW & UTILITIES	
40174.3.1		CONSTRUCTION	



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2018 =	15000
ADT 2038 =	19000
K =	10 %
D =	70 %
T =	5 % *
V =	50 MPH
V _{DET} =	40 MPH
*TTST =	2% DUAL = 3%
FUNC CLASS =	MINOR ARTERIAL "REGIONAL TIER"

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4962 =	0.201 MILES
LENGTH STRUCTURE TIP PROJECT B-4962 =	0.050 MILES
TOTAL LENGTH OF TIP PROJECT B-4962 =	0.251 MILES

Prepared for:
STRUCTURES MANAGEMENT UNIT
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

LETTING DATE:
APRIL 16, 2019

EMILY E. MURRAY, PE
PROJECT ENGINEER

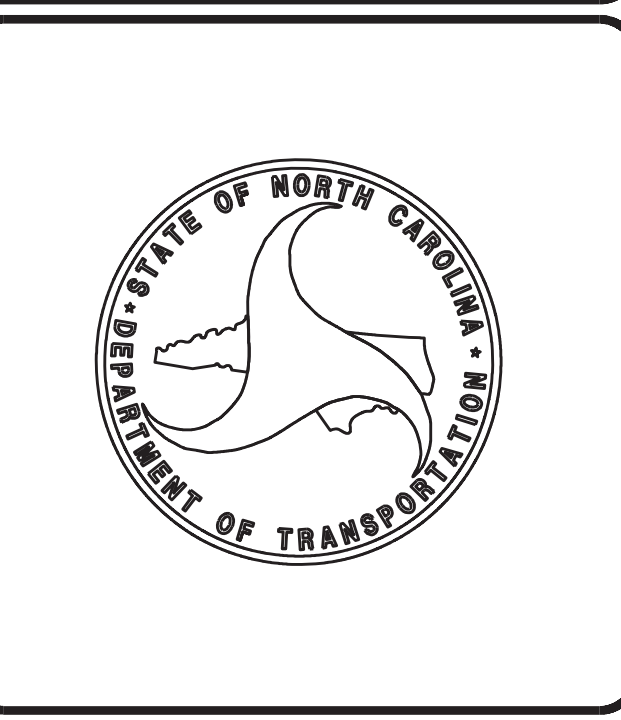
DONALD R. SMITH, PE
PROJECT DESIGN ENGINEER

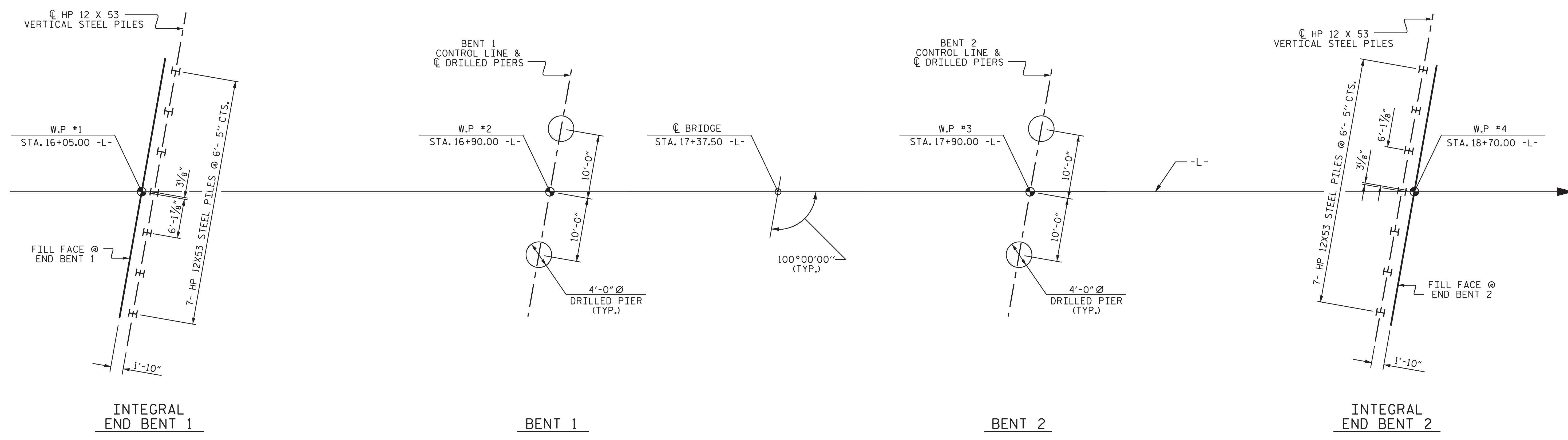
DAVID STUTTS, PE
NCDOT CONTACT

Prepared in the Office of:

VOLKERT

5540 Centerview Drive, Suite 305
Raleigh, NC 27606
Tel. 919-854-0344 Fax. 919-854-0355
NC License No. F-0765





FOUNDATION LAYOUT

DIMENSIONS LOCATING DRILLED PIERS ARE SHOWN TO DRILLED PIER CENTERLINES.

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.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DRILLED PIERS AT BENT NO.1 AND BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 585 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.
- INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 475 FT (LEFT) AND 470 FT (RIGHT) WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 9 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- INSTALL DRILLED PIERS AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 469.5 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 9.5 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO.1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 483.6 FT (LEFT) AND 479 FT (RIGHT) WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.
- PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO.2. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 479 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.
- THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 AND BENT NO.2 IS ELEVATION 478 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- 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.

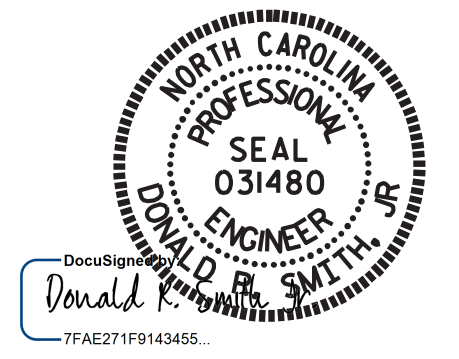
PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 70
 BYPASS OVER THE ENO RIVER
 BETWEEN SR 1002 & SR 1561



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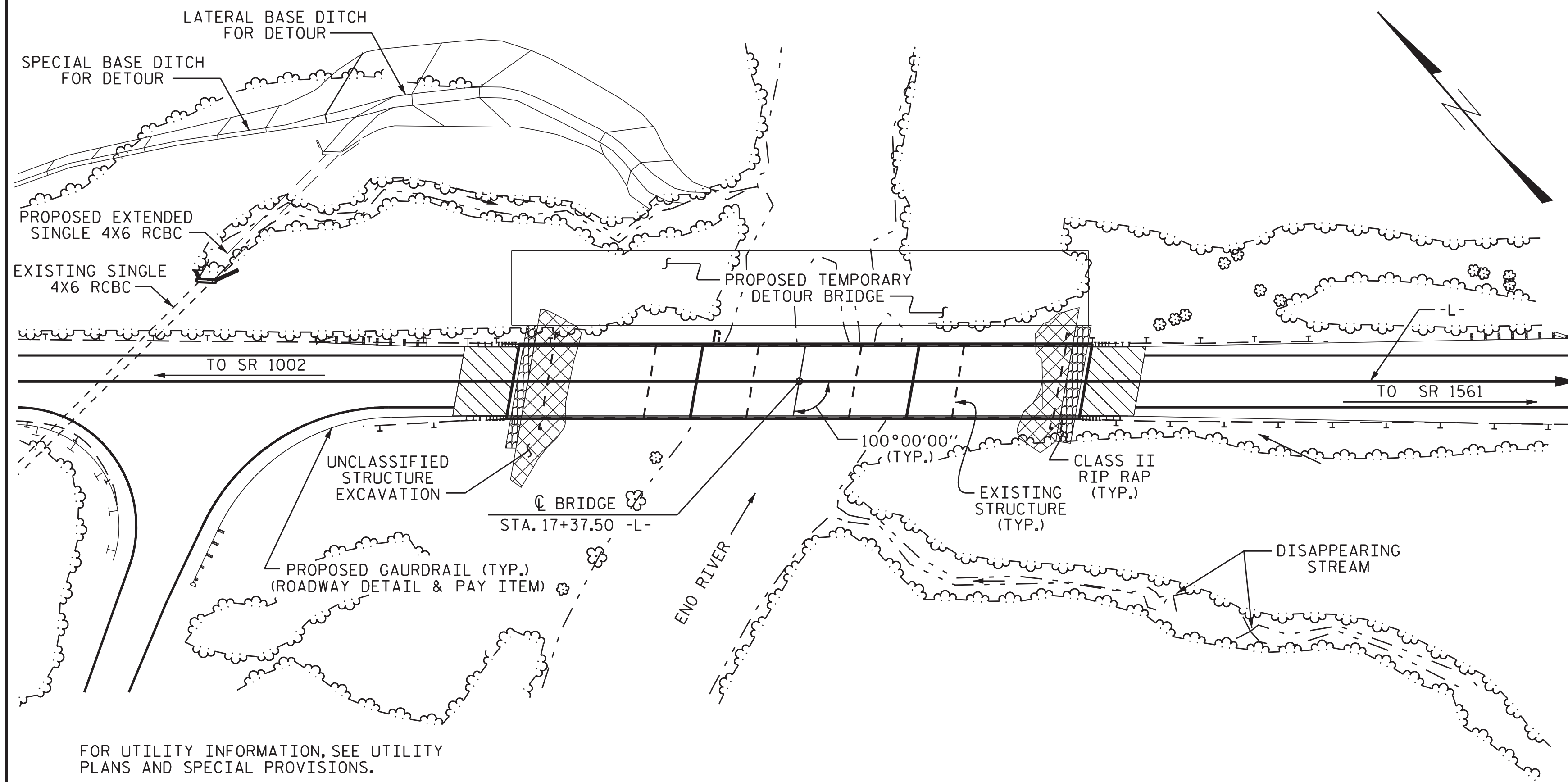
2/14/2019

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-2
2			4			47

DRAWN BY :	J.R. MCROY	DATE :	10/18
CHECKED BY :	D.R. SMITH	DATE :	10/18
DESIGN ENGINEER OF RECORD:	P.N. HOLDER	DATE :	10/18

BM #1: RAILROAD SPIKE IN 36" POPLAR, 152' RT. OF STA. 15+12.36 -L-, ELEV. = 512.36, DATUM: NAVD 88



LOCATION SKETCH

NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- 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.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT. LEFT OF CENTERLINE ROADWAY AND 50 FT. RIGHT OF CENTERLINE ROADWAY AT END BENT 1 AND 35 FT. EACH SIDE OF CENTERLINE ROADWAY AT END BENT 2 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.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 16+42.00 -LDET- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS. TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.
- THE EXISTING STRUCTURE CONSISTING OF 5 @ 47'-6" SPANS OF REINFORCED CONCRETE DECK GIRDERS ON REINFORCED CONCRETE ABUTMENT END BENTS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS WITH 33'-8" CLEAR ROADWAY WIDTH LOCATED AT THE SAME LOCATION AS THE PROPOSED BRIDGE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY 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 THIS 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.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE CLOSE PROXIMITY OF THE TEMPORARY SHORING TO THE PROPOSED END BENTS. SHORING MUST BE INSTALLED ACCURATELY IN ACCORDANCE WITH TRAFFIC CONTROL PLANS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE, AND REMOVAL OF TEMPORARY STRUCTURE	CONSTRUCTION MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS	CONSTRUCTION MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'- 0" DIA. DRILLED PIERS IN SOIL		4'- 0" DIA. DRILLED PIERS NOT IN SOIL		PERMANENT STEEL CASING FOR 4'- 0" DIA. DRILLED PIER	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS
						NO.	LIN. FT.	NO.	LIN. FT.					
SUPERSTRUCTURE													9165	9027
END BENT NO. 1														
BENT NO. 1						2	9	2	18	9.4				
BENT NO. 2						2	8.8	2	20	9.8				
END BENT NO. 2														
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	4	17.8	4	38	19.2	4	LUMP SUM	9165	9027

HYDRAULIC DATA

DESIGN DISCHARGE	= 8700 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 492.7 FT.
DRAINAGE AREA	= 73.4 SQ. MI.
BASE DISCHARGE (Q100)	= 10000 C.F.S.
BASE HIGH WATER ELEVATION	= 493.8 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 78000 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEARS
OVERTOPPING FLOOD ELEVATION	= 522.0 FT.
OVERTOPPING FLOOD STATION	= 13+87.24 -L-

PROJECT NO. B-4962

ORANGE COUNTY

STATION: 17+37.50 -L-

SHEET 3 OF 3

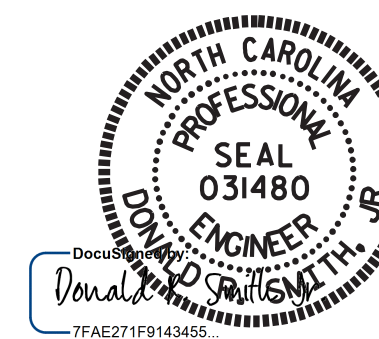
	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 PILES	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	TWO BAR METAL RAIL	1'- 2" X 2'- 6" CONCRETE PARAPET	RIP RAP CLASS II (2'- 0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
					NO.	LIN. FT.		NO.	LIN. FT.						
SUPERSTRUCTURE					12	1044.2									LUMP SUM
END BENT NO. 1	34.3		5122				7	7	140	7			40	45	
BENT NO. 1	46.6		10561	2070											
BENT NO. 2	50.4		11358	2394											
END BENT NO. 2	34.9		5198				7	7	105	7			54	60	
TOTAL	166.2	LUMP SUM	32239	4464	12	1044.2	14	14	245	14	510.70	526.63	94	105	LUMP SUM

DRAWN BY : D. A. GLADDEN DATE : 3/18
 CHECKED BY : D. R. SMITH DATE : 3/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18

14-FEB-2019 09:44
 *****DN*****
 emily.murray AT C-037614

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2/14/2019

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON US 70
 BYPASS OVER THE ENO RIVER
 BETWEEN SR 1002 AND SR 1561

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			47

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING Ⓝ	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	Ⓛ	1.25	--	1.75	0.833	1.41	A	EL	41.00	0.855	1.78	A	EL	7.60	0.80	0.833	1.25	A	EL	41.00		
	HL-93 (OPERATING)	N/A		1.83	--	1.35	0.833	1.83	A	EL	41.00	0.855	2.34	A	EL	7.60	N/A	0.833	--	--	--	--		
	HS-20 (INVENTORY)	36.000	Ⓜ	1.69	60.8	1.75	0.833	1.90	A	EL	41.00	0.855	2.33	A	EL	7.60	0.80	0.833	1.69	A	EL	41.00		
	HS-20 (OPERATING)	36.000		2.46	88.6	1.35	0.833	2.46	A	EL	41.00	0.855	3.05	A	EL	7.60	N/A	0.833	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.16	42.7	1.40	0.833	5.99	A	EL	41.00	0.855	7.85	A	EL	7.60	0.80	0.833	3.16	A	EL	41.00	
		SNGARBS2	20.000		2.30	46.0	1.40	0.833	4.36	A	EL	41.00	0.855	5.50	A	EL	7.60	0.80	0.833	2.30	A	EL	41.00	
		SNAGRIS2	22.000		2.15	47.3	1.40	0.833	4.07	A	EL	41.00	0.855	5.08	A	EL	7.60	0.80	0.833	2.15	A	EL	41.00	
		SNCOTTS3	27.250		1.55	42.2	1.40	0.833	2.94	A	EL	41.00	0.855	3.86	A	EL	7.60	0.80	0.833	1.55	A	EL	41.00	
		SNAGGRS4	34.925		1.28	44.7	1.40	0.833	2.43	A	EL	41.00	0.855	3.15	A	EL	7.60	0.80	0.833	1.28	A	EL	41.00	
		SNS5A	35.550		1.25	44.4	1.40	0.833	2.38	A	EL	41.00	0.855	3.17	A	EL	7.60	0.80	0.833	1.25	A	EL	41.00	
		SNS6A	39.950		1.15	45.9	1.40	0.833	2.17	A	EL	41.00	0.855	2.87	A	EL	7.60	0.80	0.833	1.15	A	EL	41.00	
	SNS7B	42.000		1.09	45.8	1.40	0.833	2.07	A	EL	41.00	0.855	2.81	A	EL	7.60	0.80	0.833	1.09	A	EL	41.00		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.40	46.2	1.40	0.833	2.65	A	EL	41.00	0.855	3.45	A	EL	7.60	0.80	0.833	1.40	A	EL	41.00	
		TNT4A	33.075		1.40	46.3	1.40	0.833	2.65	A	EL	41.00	0.855	3.38	A	EL	7.60	0.80	0.833	1.40	A	EL	41.00	
		TNT6A	41.600		1.14	47.4	1.40	0.833	2.16	A	EL	41.00	0.855	2.97	A	EL	7.60	0.80	0.833	1.14	A	EL	41.00	
		TNT7A	42.000		1.14	47.9	1.40	0.833	2.16	A	EL	41.00	0.855	2.91	A	EL	7.60	0.80	0.833	1.14	A	EL	41.00	
		TNT7B	42.000		1.17	49.1	1.40	0.833	2.22	A	EL	41.00	0.855	2.75	A	EL	7.60	0.80	0.833	1.17	A	EL	41.00	
		TNAGRIT4	43.000		1.12	48.2	1.40	0.833	2.13	A	EL	41.00	0.855	2.66	A	EL	7.60	0.80	0.833	1.12	A	EL	41.00	
TNAGT5A		45.000		1.06	47.7	1.40	0.833	2.01	A	EL	41.00	0.855	2.63	A	EL	7.60	0.80	0.833	1.06	A	EL	41.00		
TNAGT5B	45.000		Ⓝ	1.05	47.3	1.40	0.833	1.99	A	EL	41.00	0.855	2.53	A	EL	7.60	0.80	0.833	1.05	A	EL	41.00		

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

- 1.
- 2.
- 3.
- 4.

Ⓝ CONTROLLING LOAD RATING

Ⓛ DESIGN LOAD RATING (HL-93)

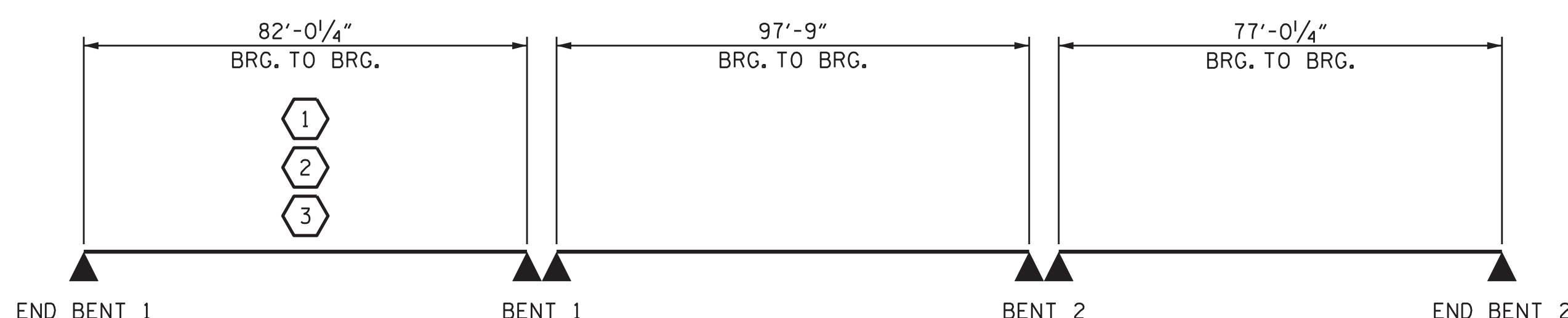
Ⓜ DESIGN LOAD RATING (HS-20)

Ⓝ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

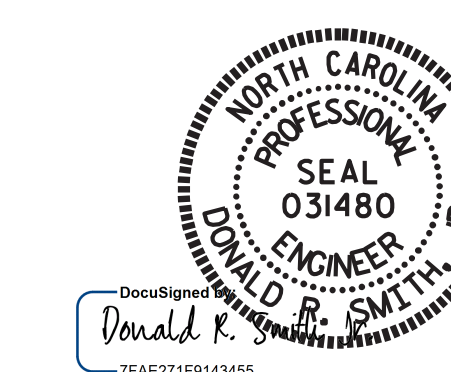
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-



2/14/2019

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

ASSEMBLED BY : P.N.HOLDER
 CHECKED BY : D.R.SMITH
 DESIGN ENGINEER OF RECORD: P.N.HOLDER

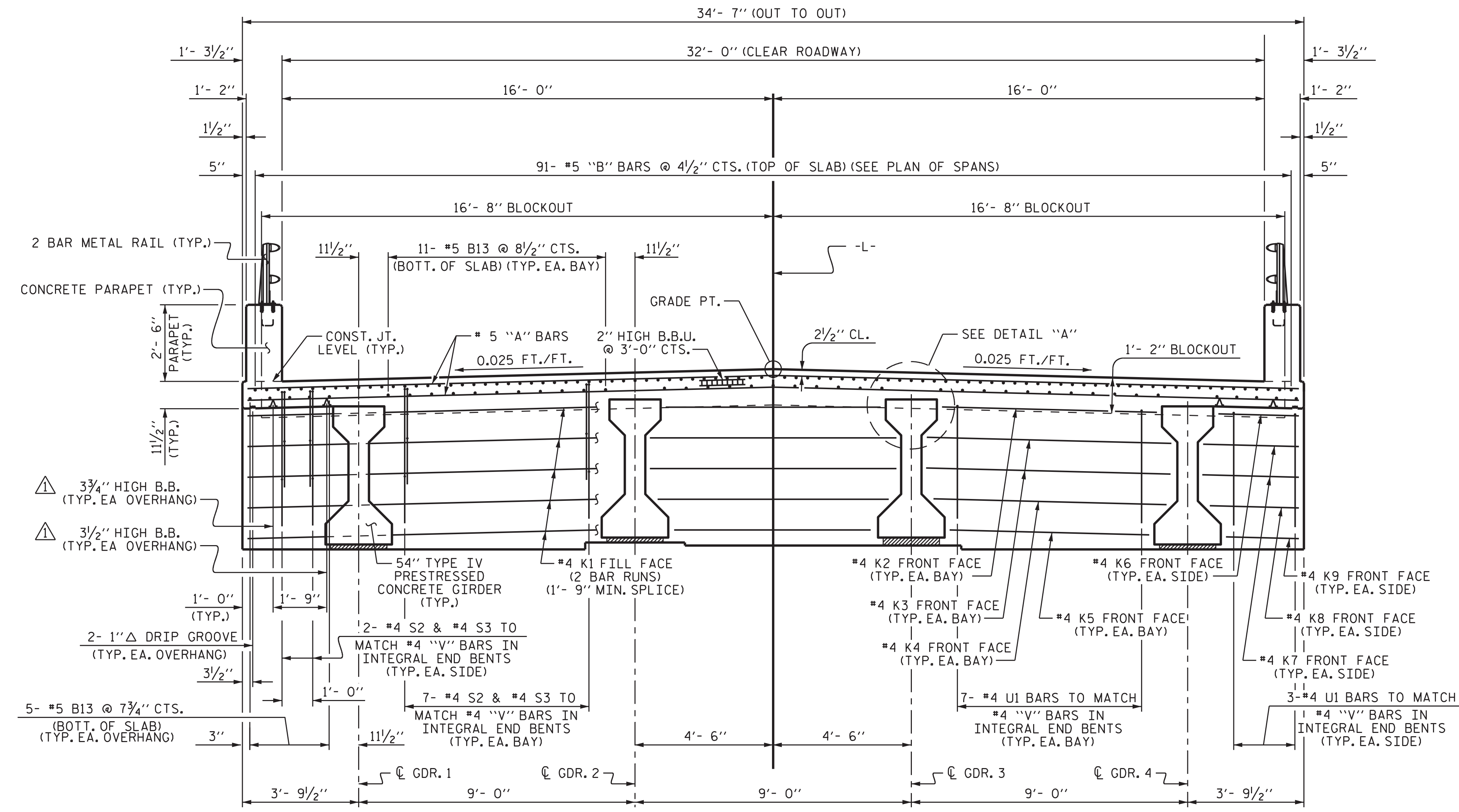
DATE : 09/18
 DATE : 09/18
 DATE : 10/18

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REVISIONS						SHEET NO. S-4
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 47
2			4			



TYPICAL SECTION AT INTEGRAL END BENT

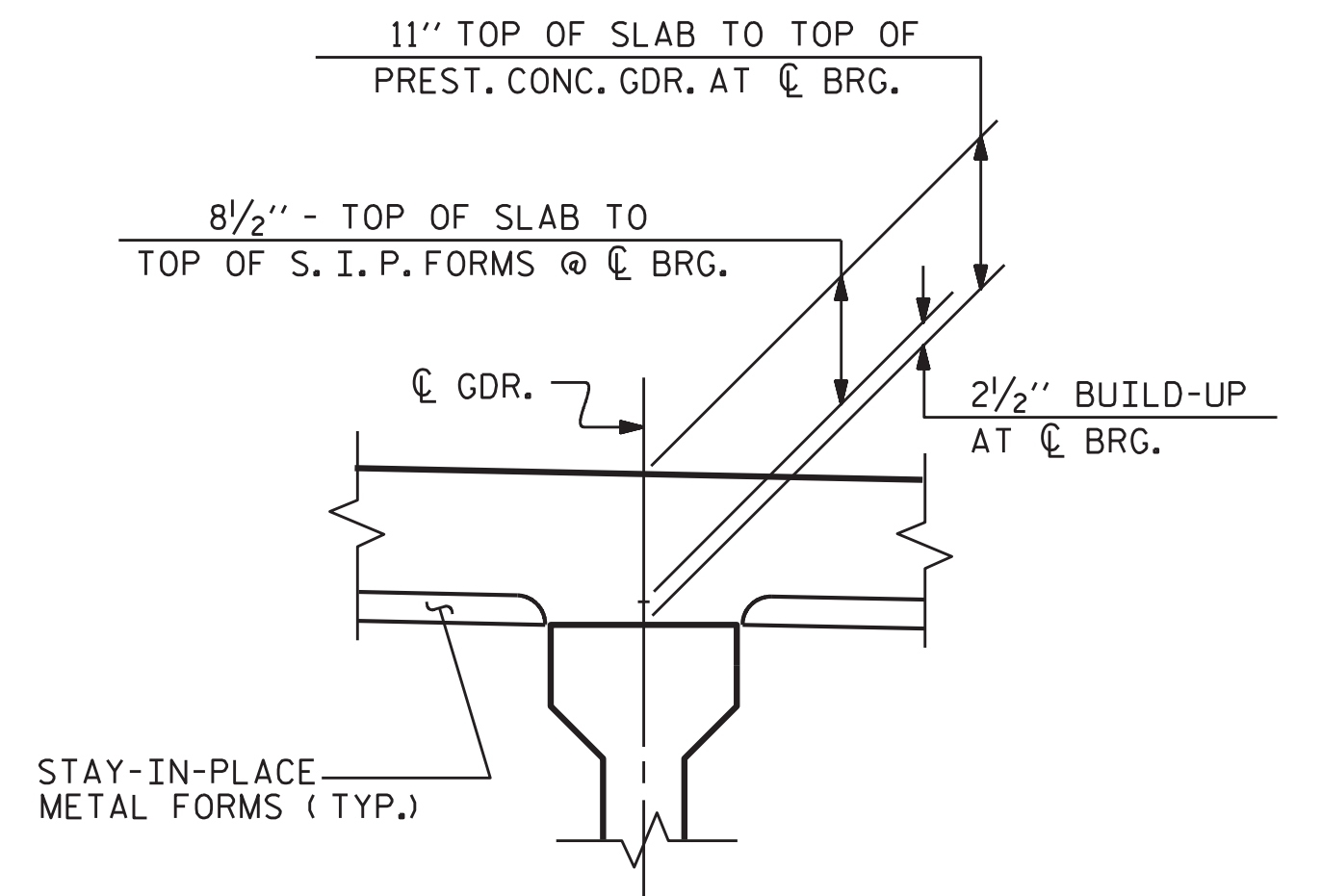
NOTES:

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

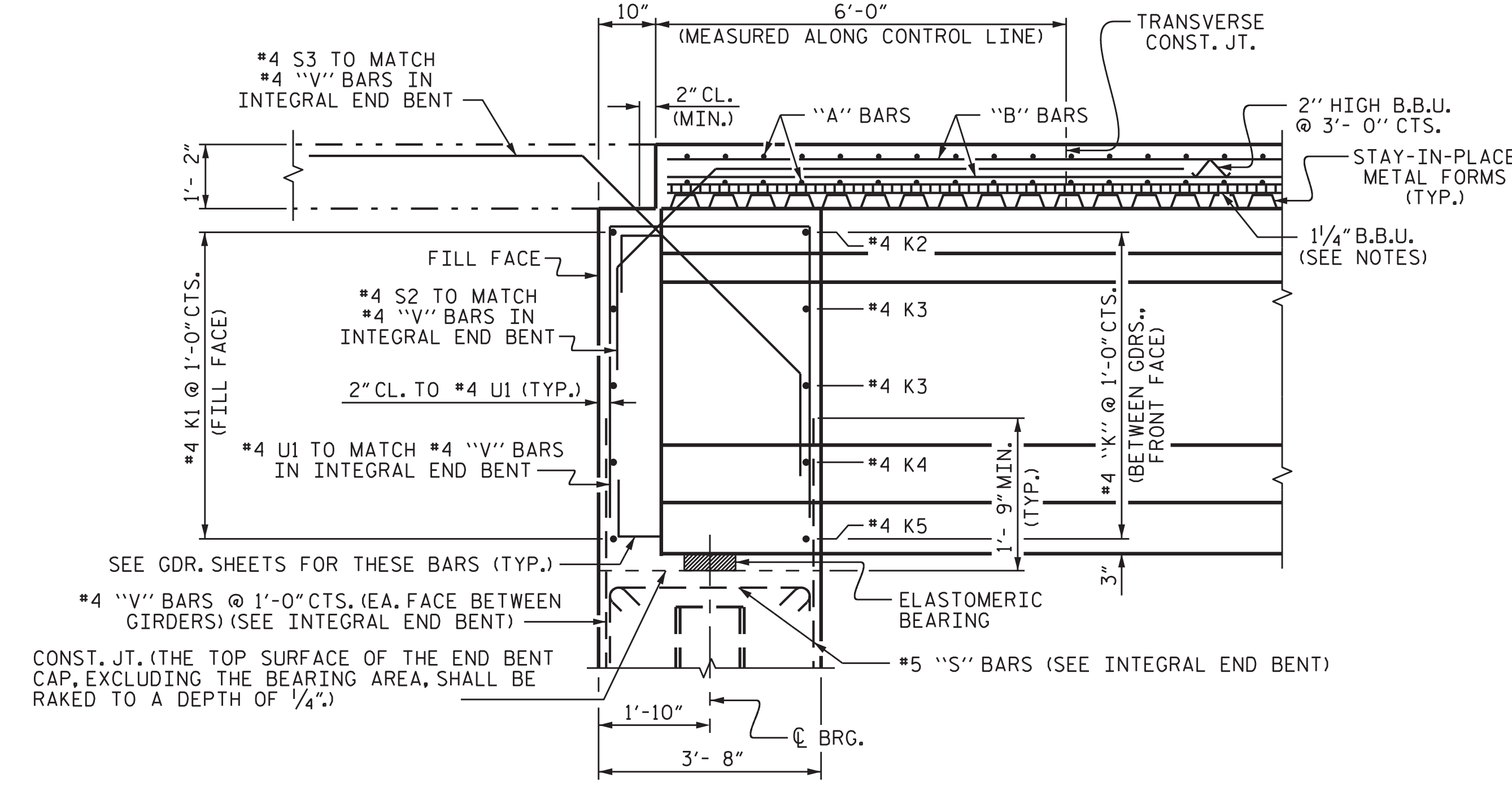
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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



DETAIL "A"



SECTION THROUGH INTEGRAL END BENT

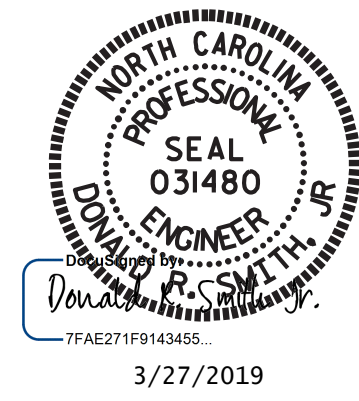
△ ADDED BEAM BOLSTER HEIGHT IN BOTTOM OF OVERHANGS.

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

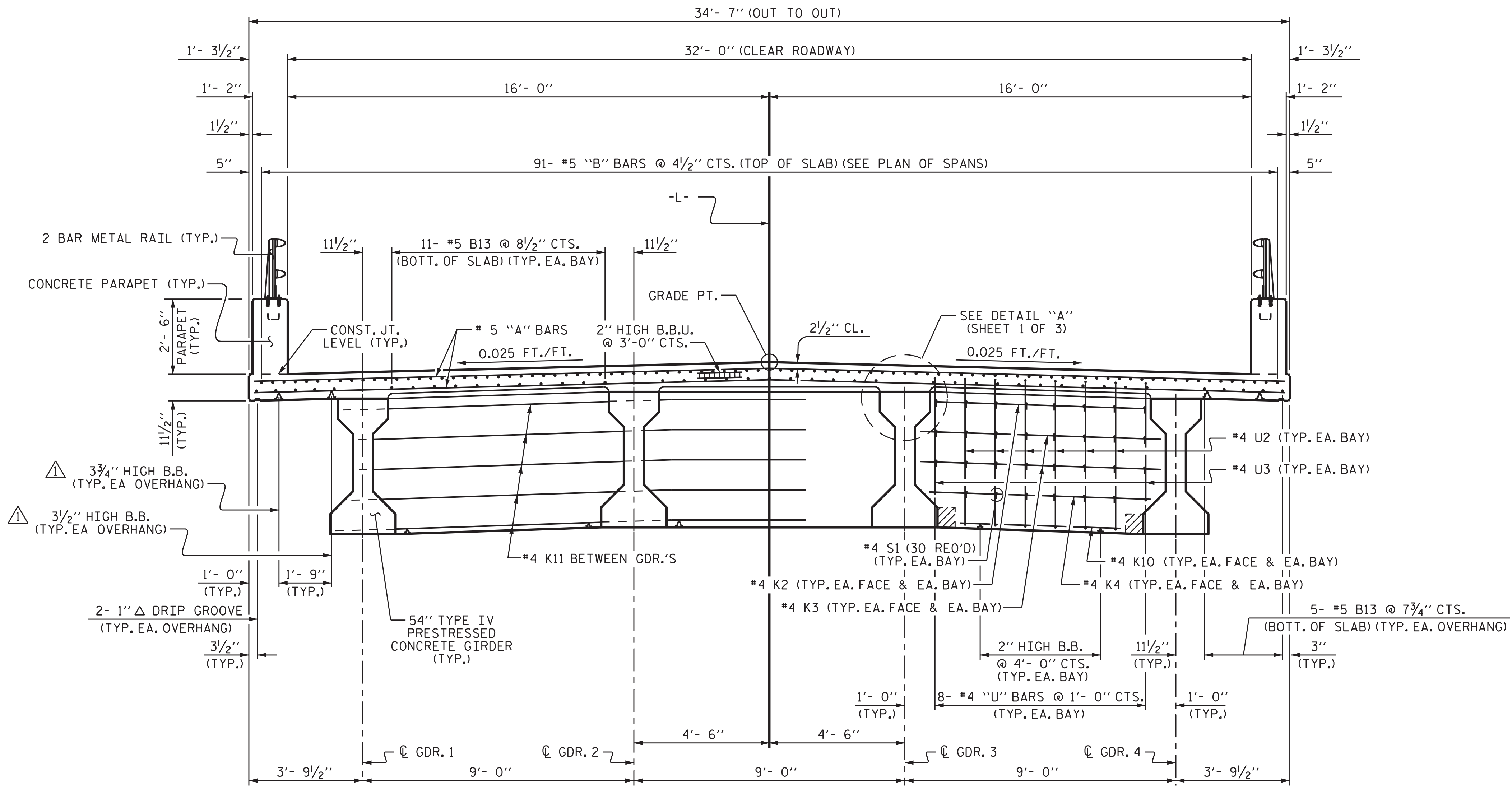
**SUPERSTRUCTURE
 TYPICAL SECTION**



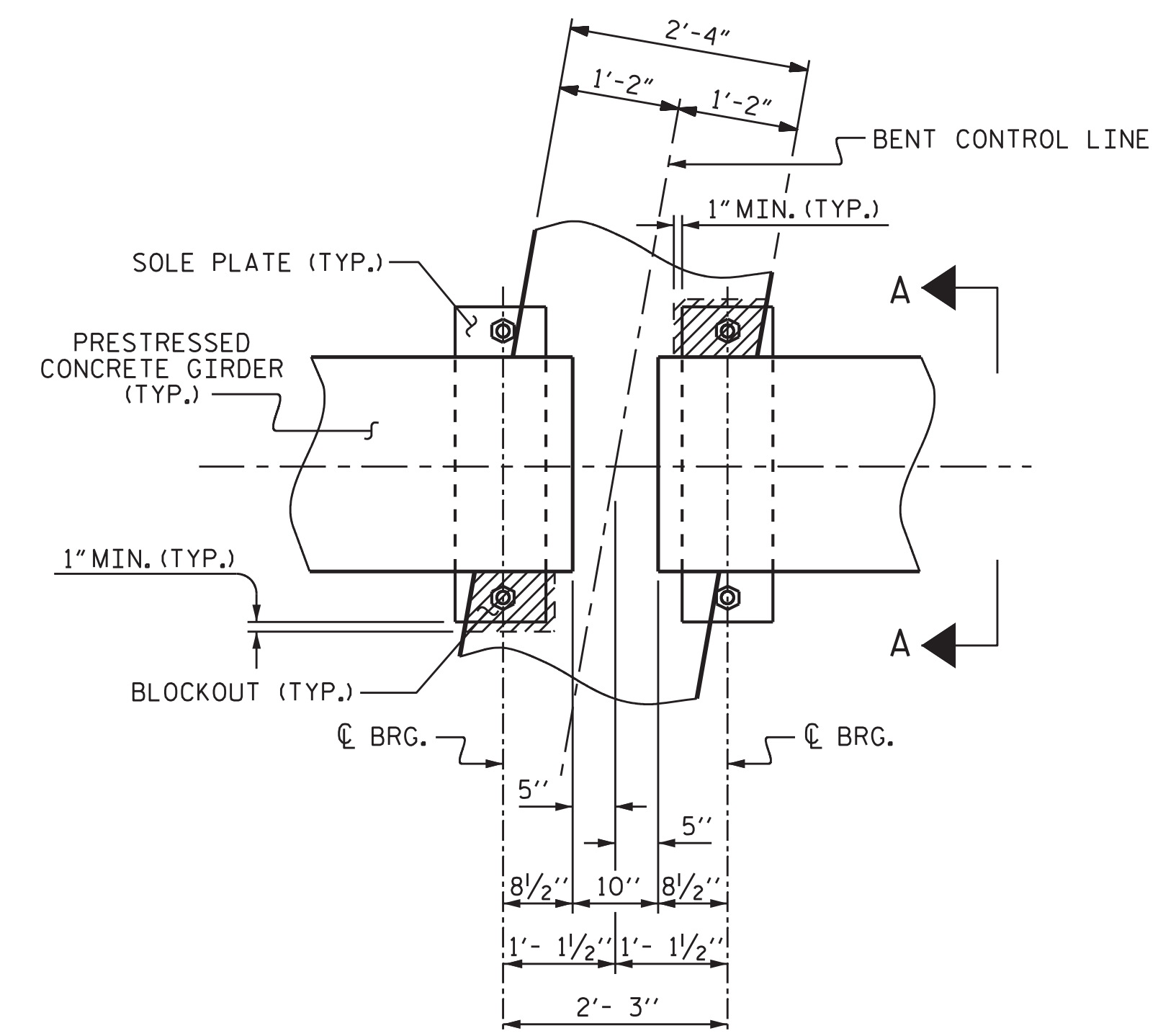
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 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1	D.A.G.	3/27/19	3			TOTAL SHEETS
2			4			47

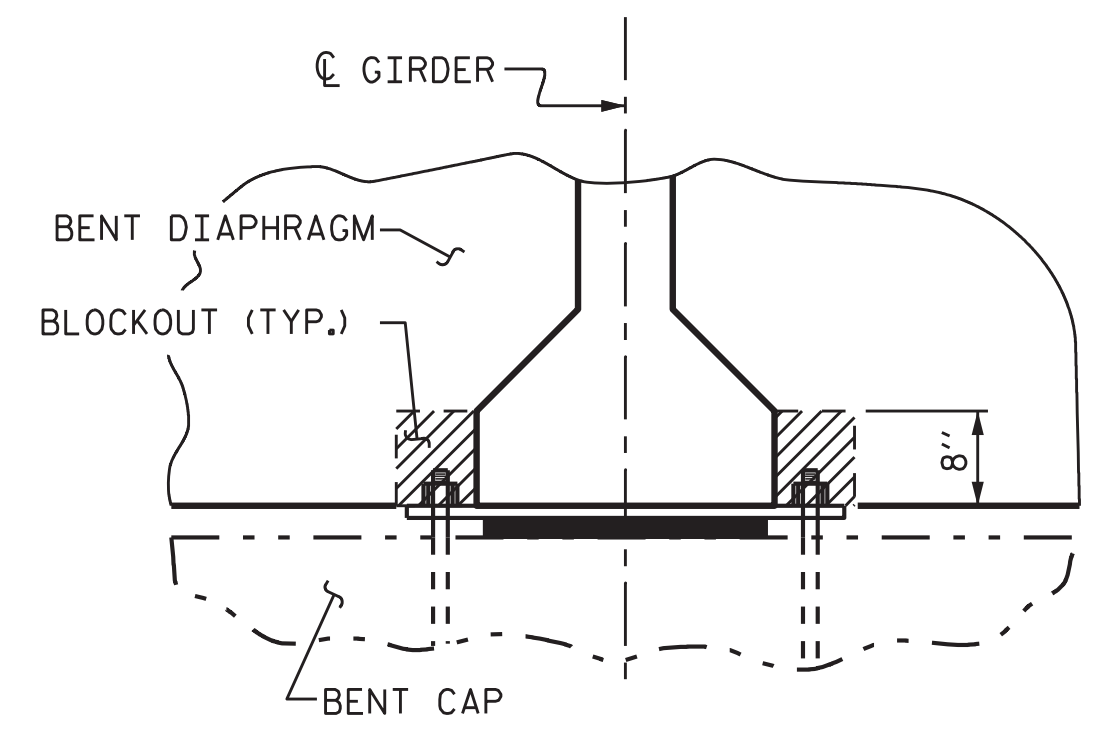
DRAWN BY: D. A. GLADDEN DATE: 3/18
 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18



TYPICAL SECTION AT BENT DIAPHRAGM

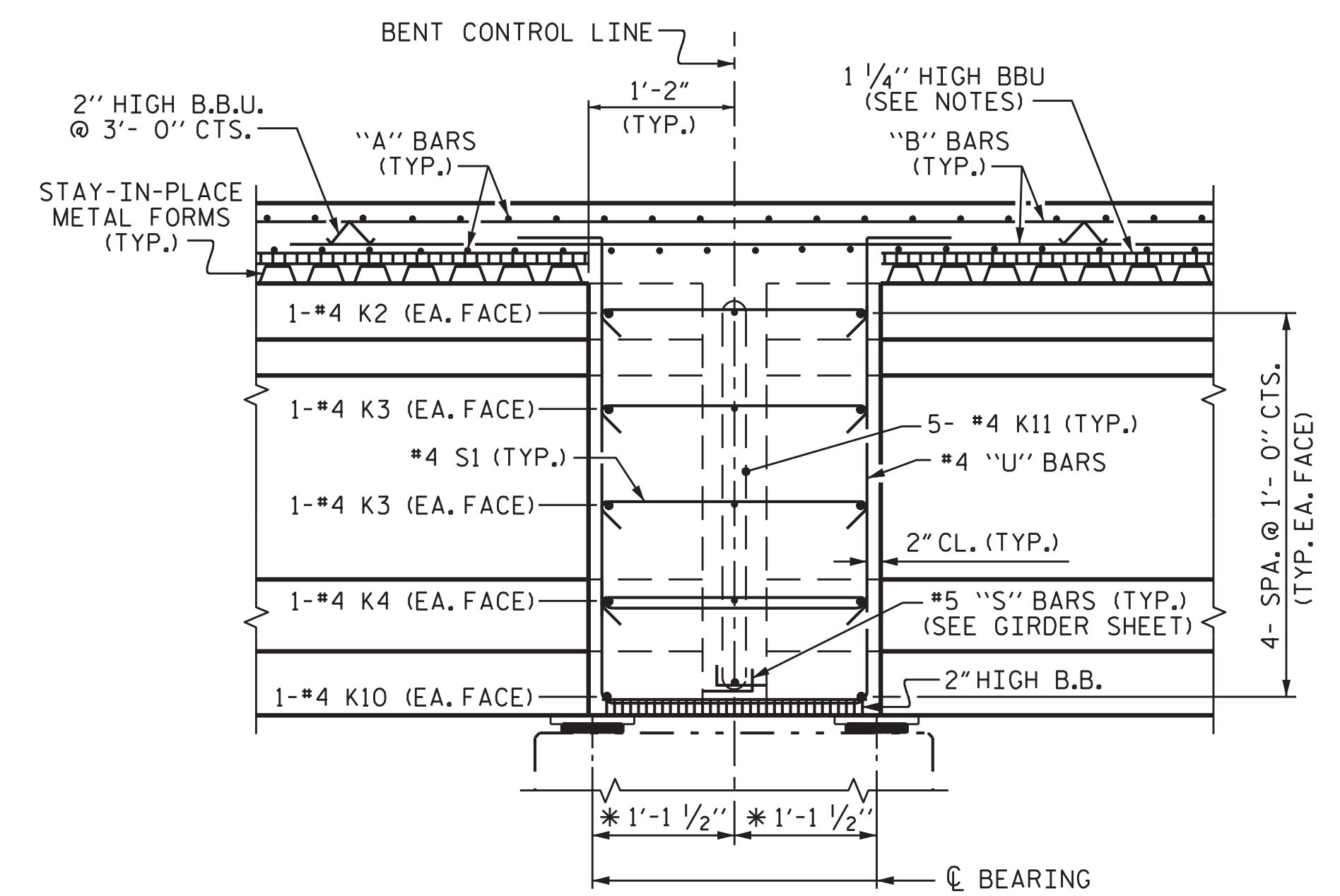


PLAN



SECTION A-A

BENT DIAPHRAGM BLOCKOUT DETAIL



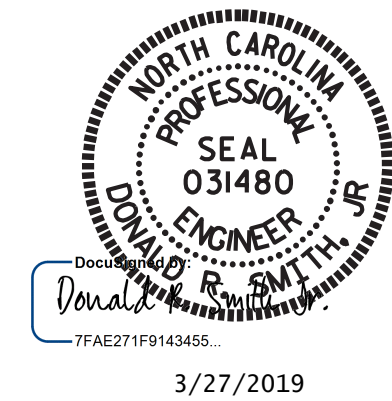
SECTION THRU BENT DIAPHRAGM

* MEASURED ALONG GIRDER

⚠️ ADDED BEAM BOLSTER HEIGHT IN BOTTOM OF OVERHANGS.

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 3



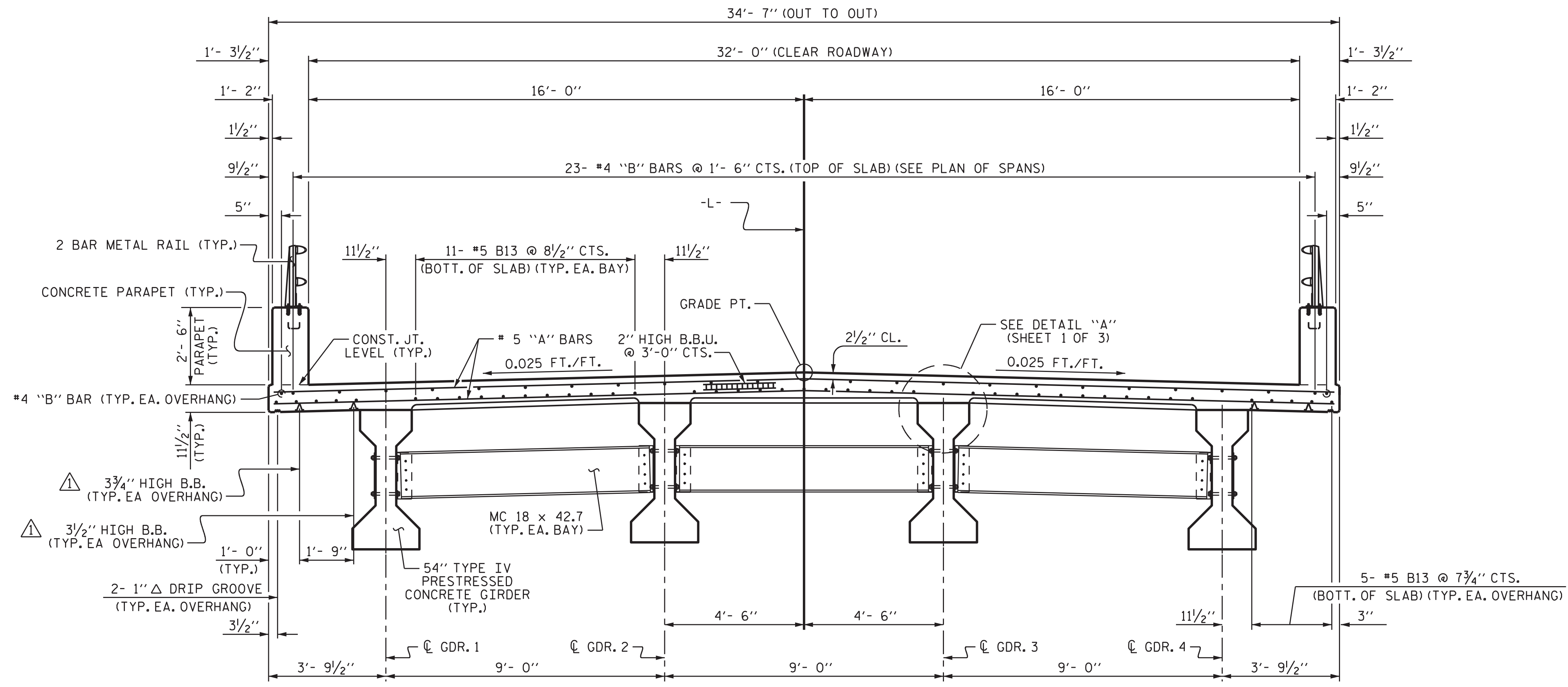
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION

DRAWN BY: D. A. GLADDEN DATE: 3/18
 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18

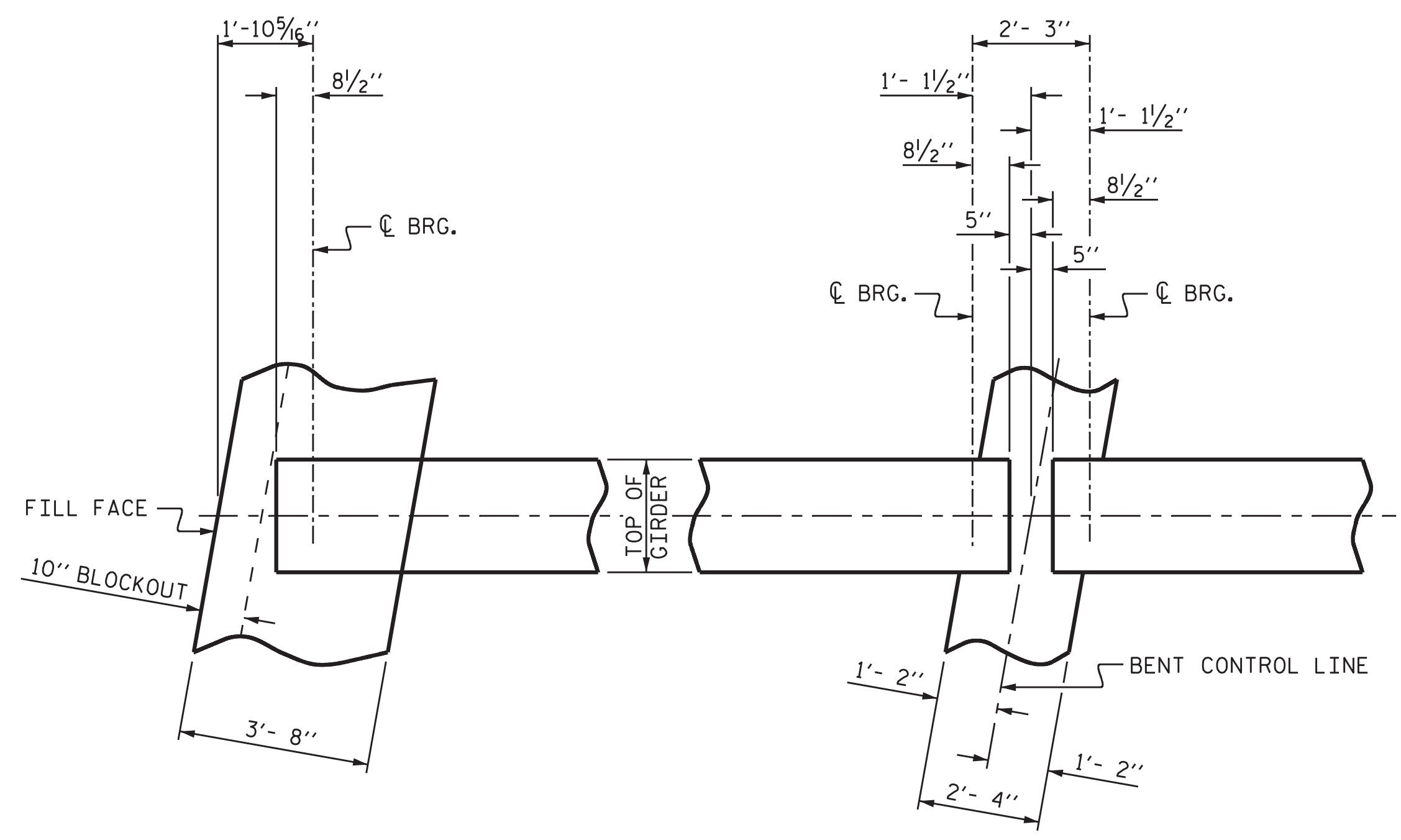
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DOCUMENT NOT CONSIDERED
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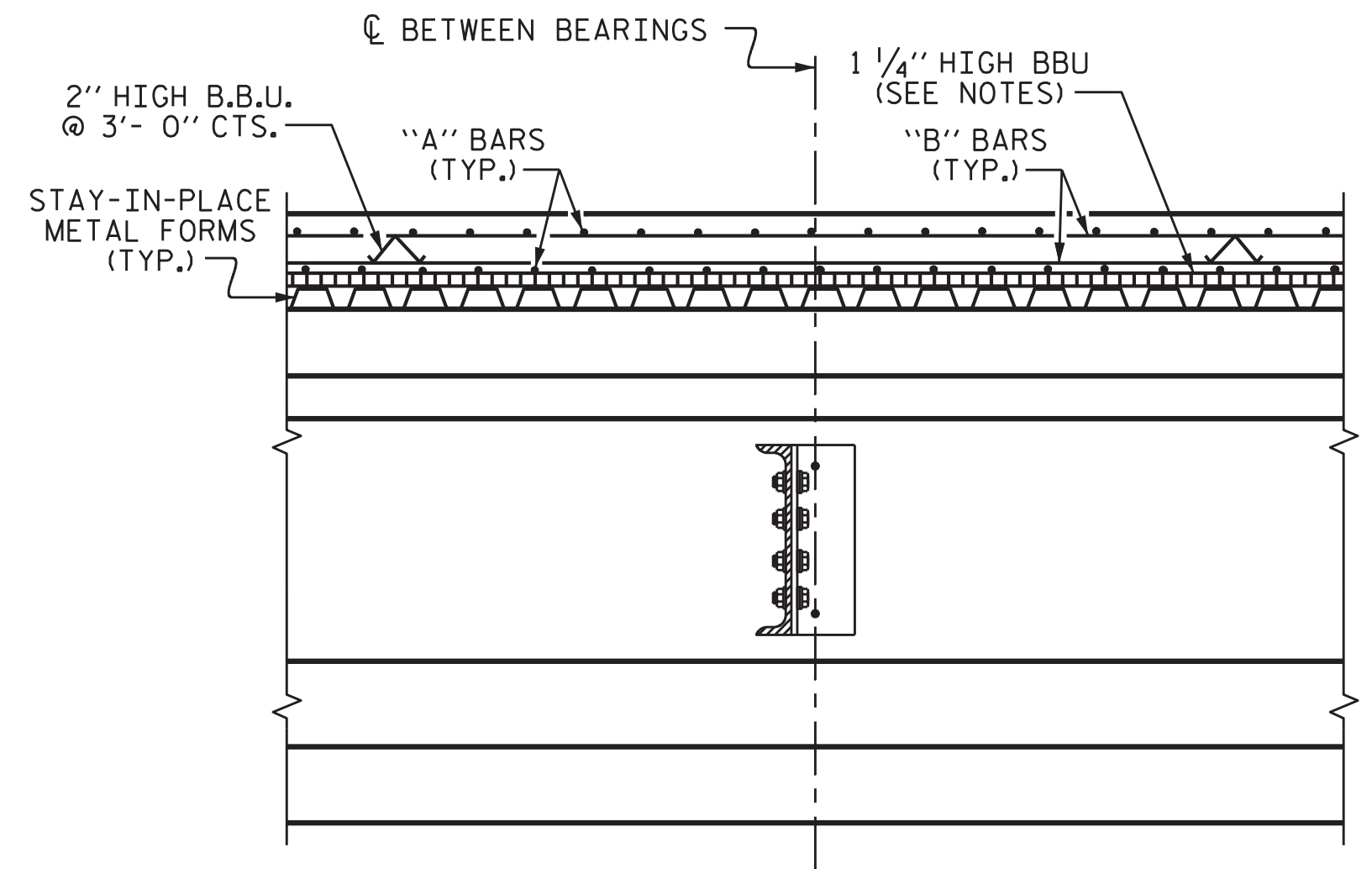
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1	D.A.G.	3/27/19	3			TOTAL SHEETS
2			4			47



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM



PLAN OF GIRDER



SECTION THRU INTERMEDIATE DIAPHRAGM

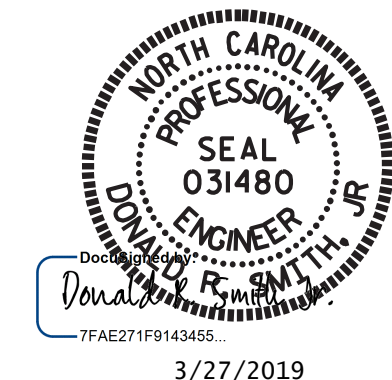
△ ADDED BEAM BOLSTER HEIGHT IN BOTTOM OF OVERHANGS.

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE
 TYPICAL SECTION



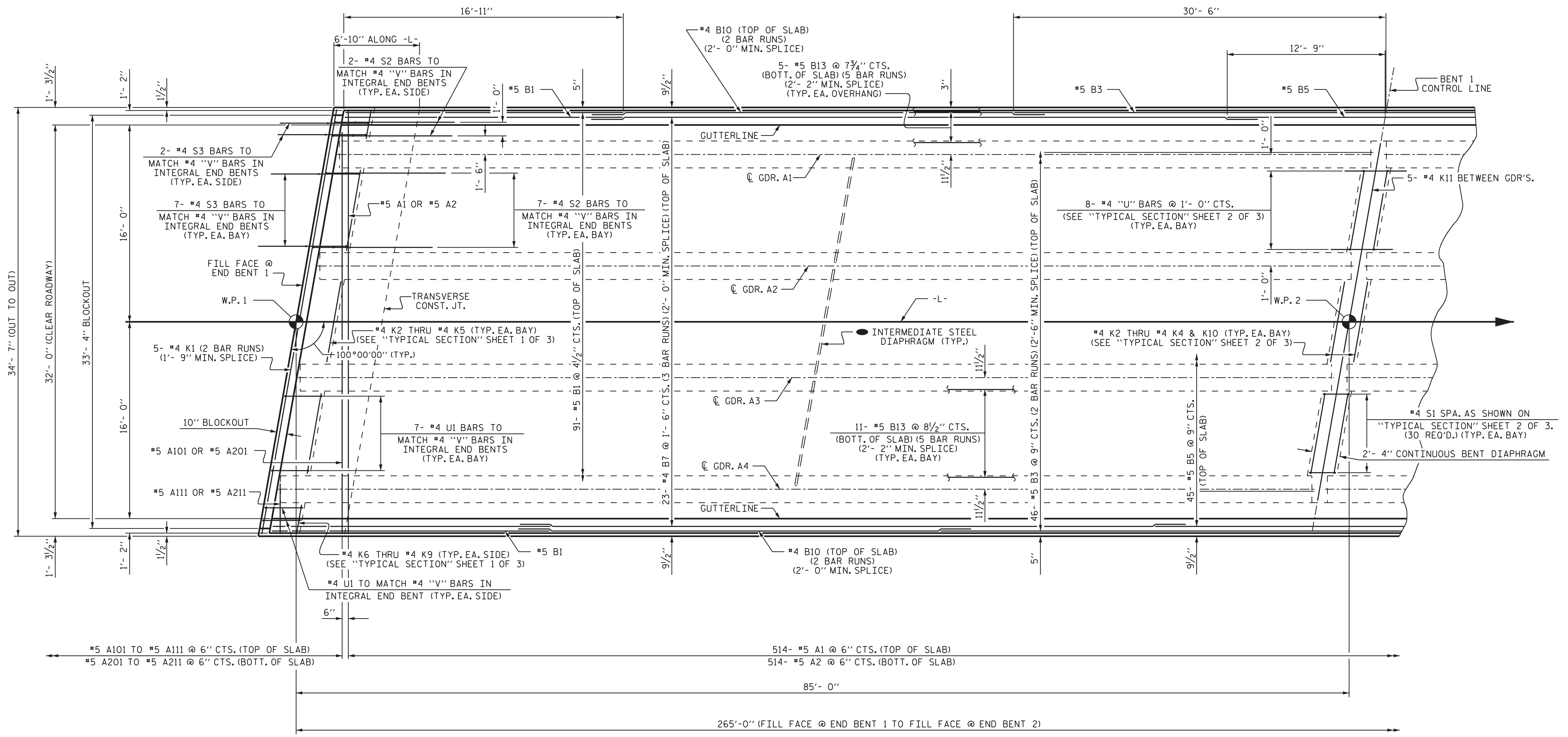
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DRAWN BY: D. A. GLADDEN DATE: 3/18
 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18

DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1	D.A.G.	3/27/19	3			TOTAL SHEETS
2			4			47



PLAN OF SPAN A

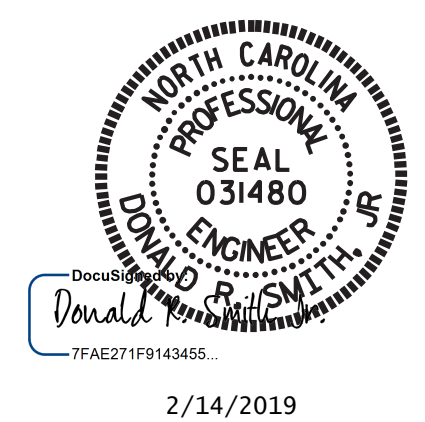
● SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. B-4962
 ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 PLAN OF SPAN A**



2/14/2019

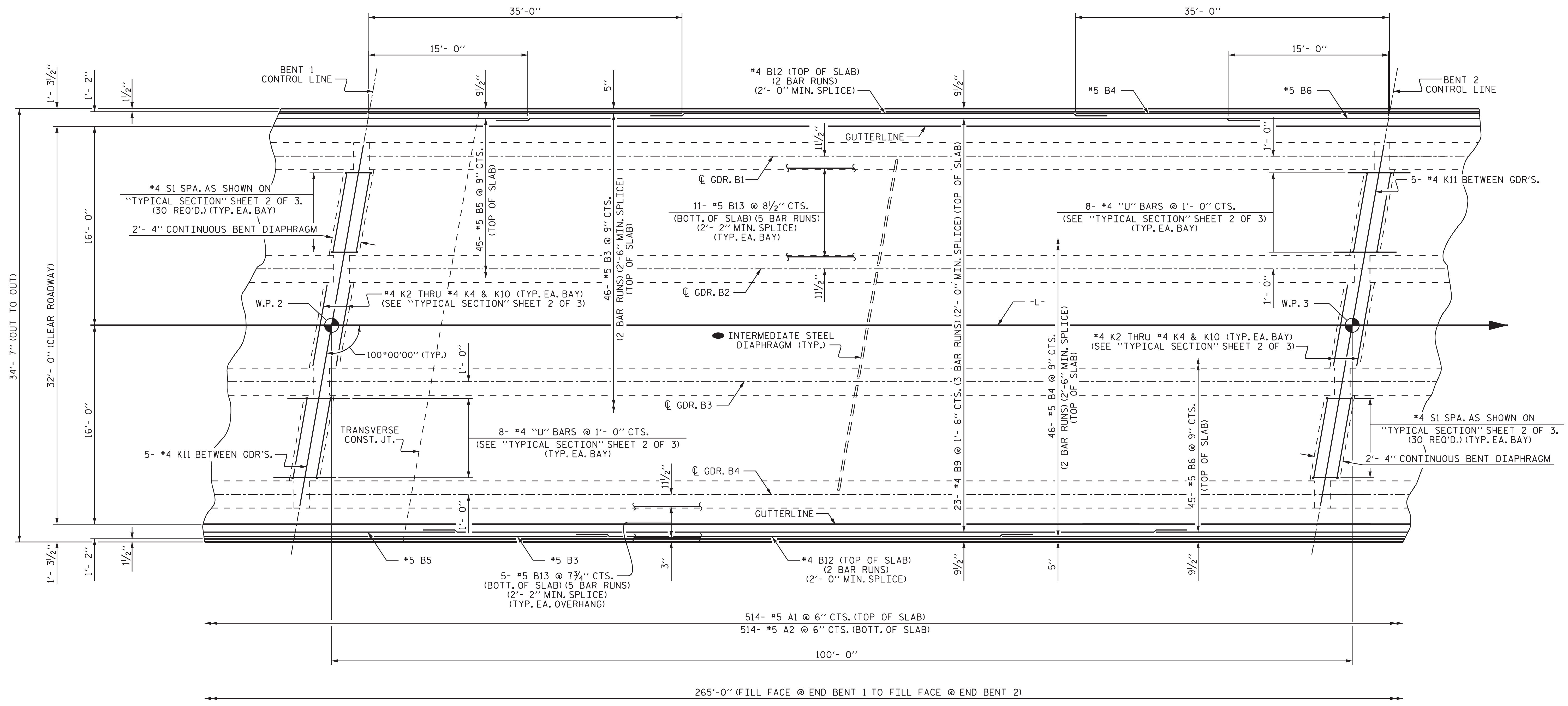


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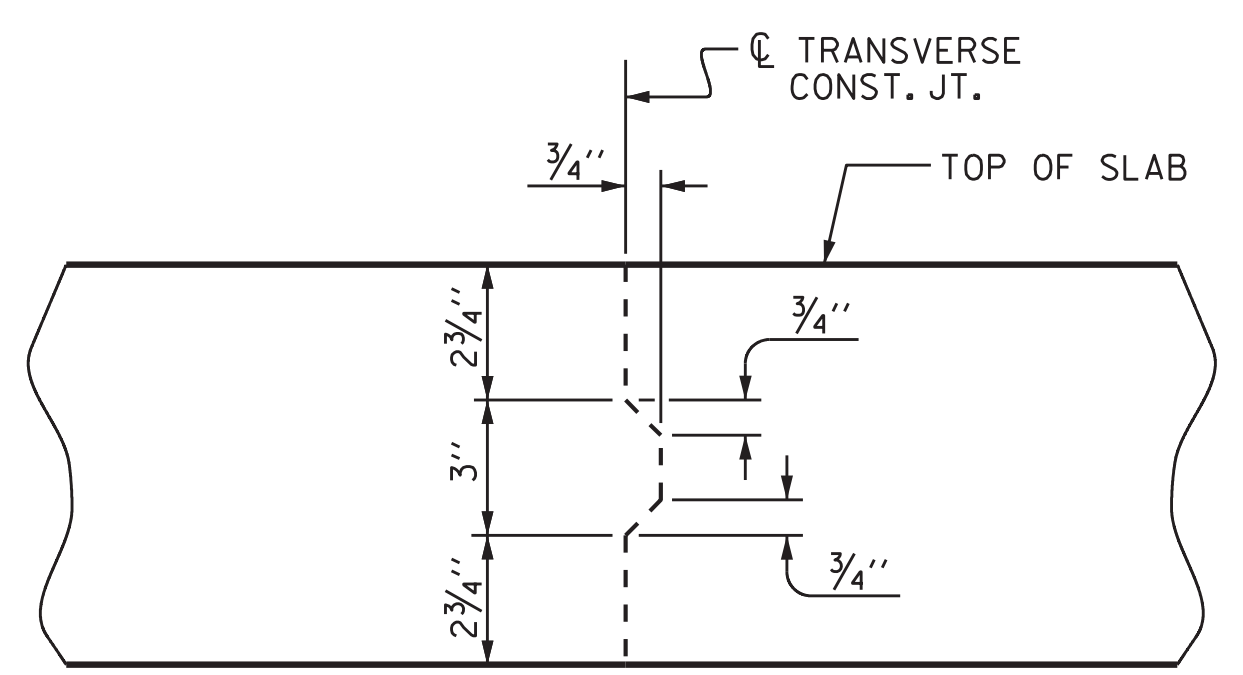
DRAWN BY: D. A. GLADDEN DATE: 3/18
 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			47



PLAN OF SPAN B

● SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".



TRANSVERSE CONSTRUCTION JOINT DETAIL

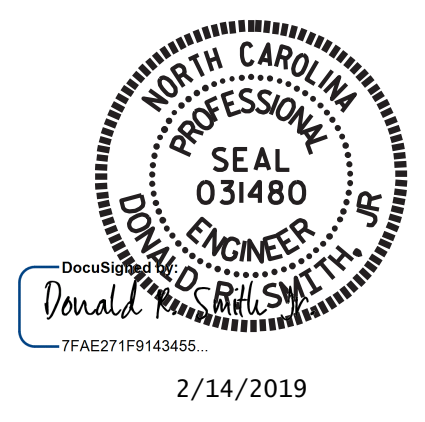
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
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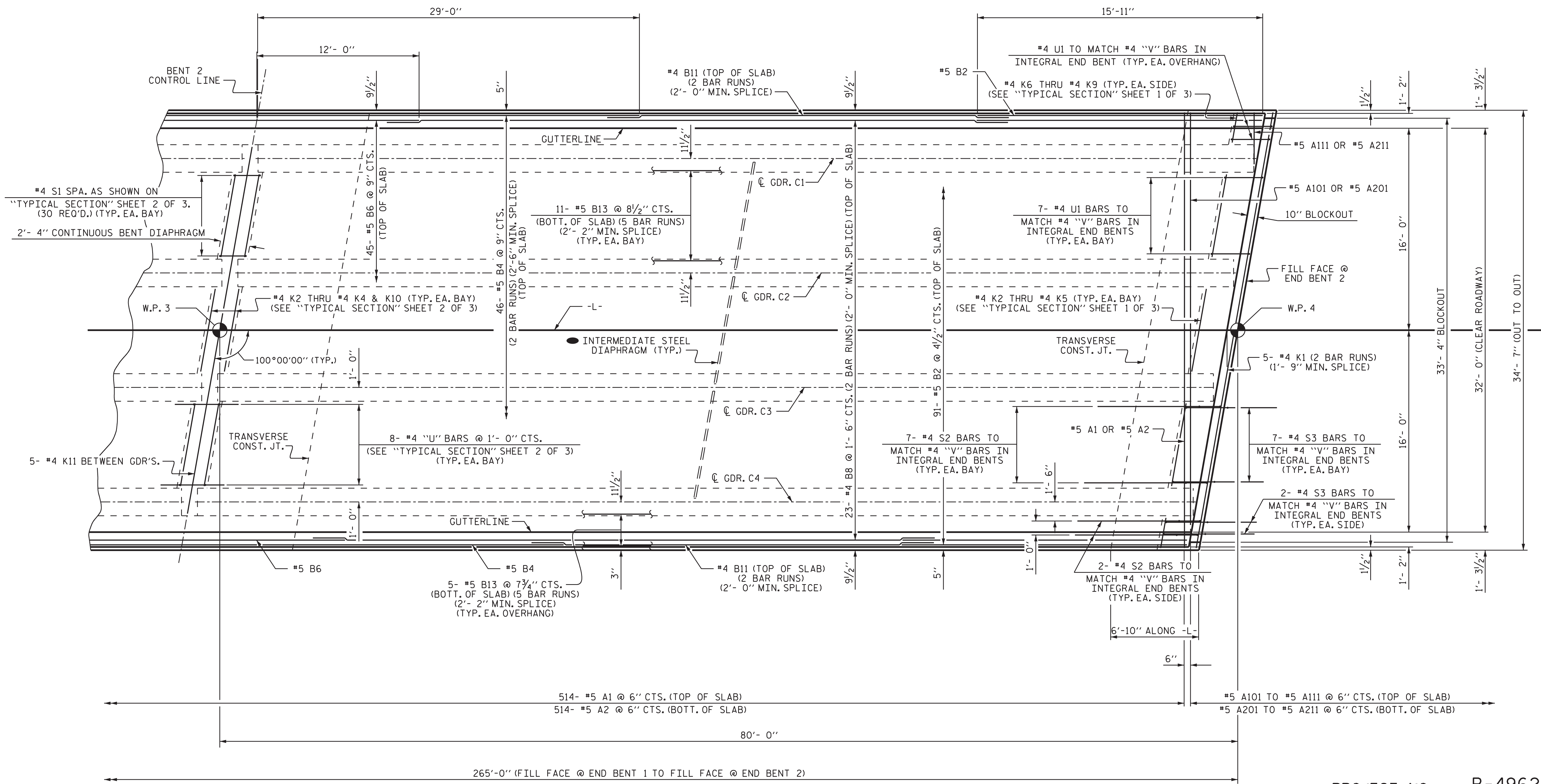
**SUPERSTRUCTURE
 PLAN OF SPAN B**



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 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			47



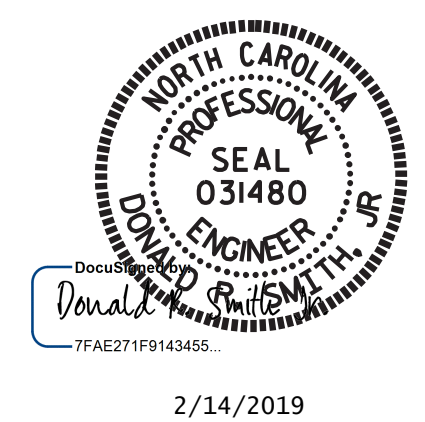
PLAN OF SPAN C
 ● SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

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**SUPERSTRUCTURE
 PLAN OF SPAN C**



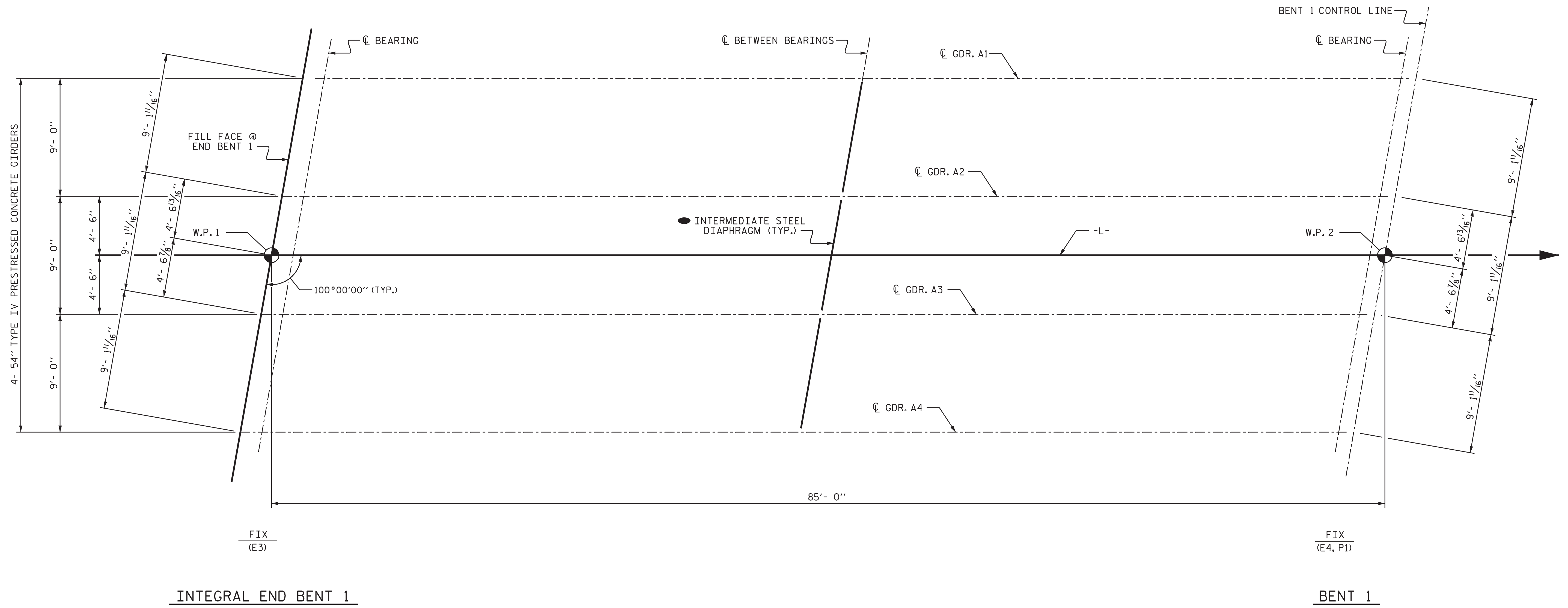
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			47

DRAWN BY :	D. A. GLADDEN	DATE :	3/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD:	P. N. HOLDER	DATE :	10/18

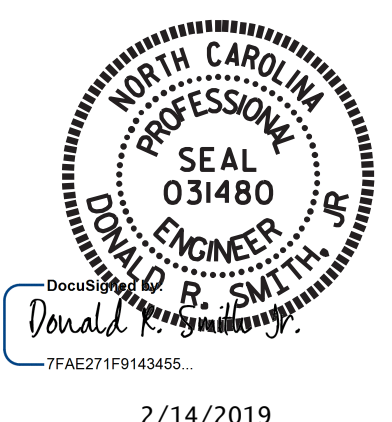


GIRDER LAYOUT (SPAN A)

● SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 1 OF 3



2/14/2019

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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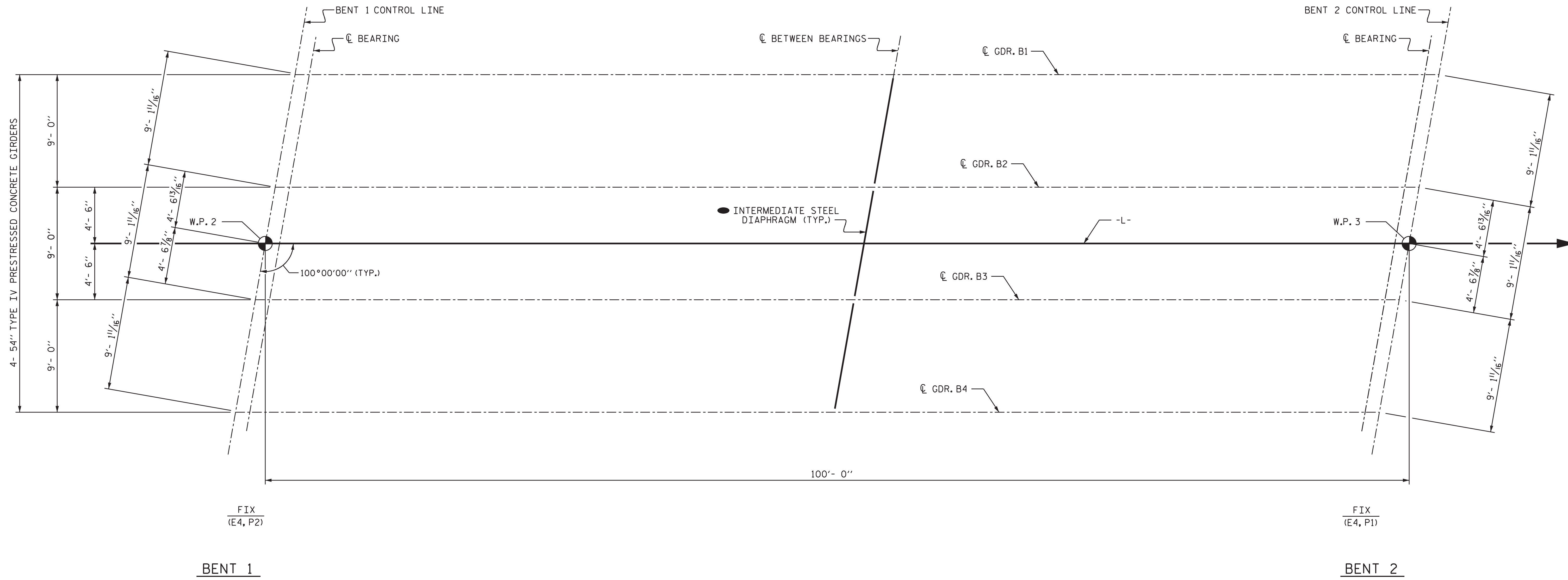
**SUPERSTRUCTURE
 GIRDER LAYOUT**

DRAWN BY: D. A. GLADDEN DATE: 3/18
 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			47



GIRDER LAYOUT (SPAN B)

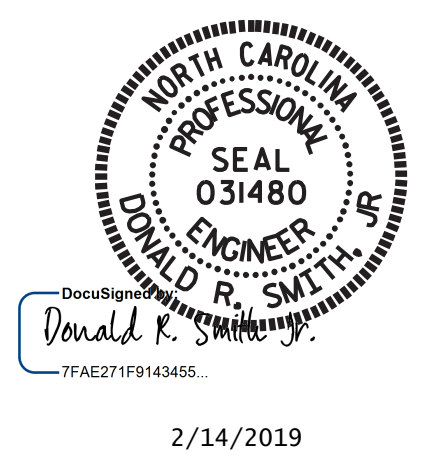
● SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 GIRDER LAYOUT**



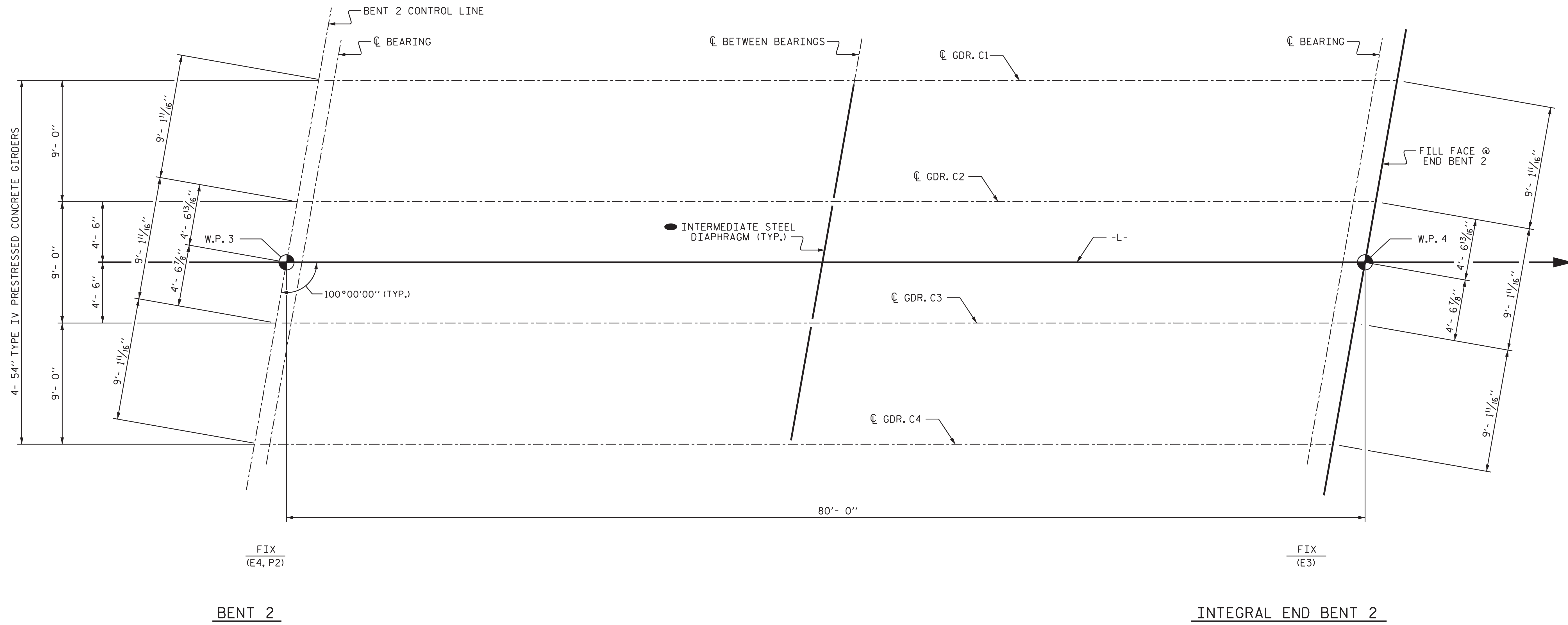
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			47

DRAWN BY :	D. A. GLADDEN	DATE :	3/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD:	P. N. HOLDER	DATE :	10/18

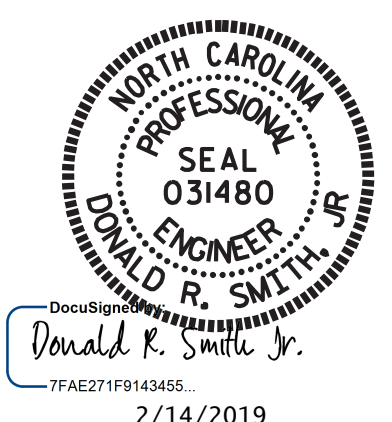


GIRDER LAYOUT (SPAN C)

● SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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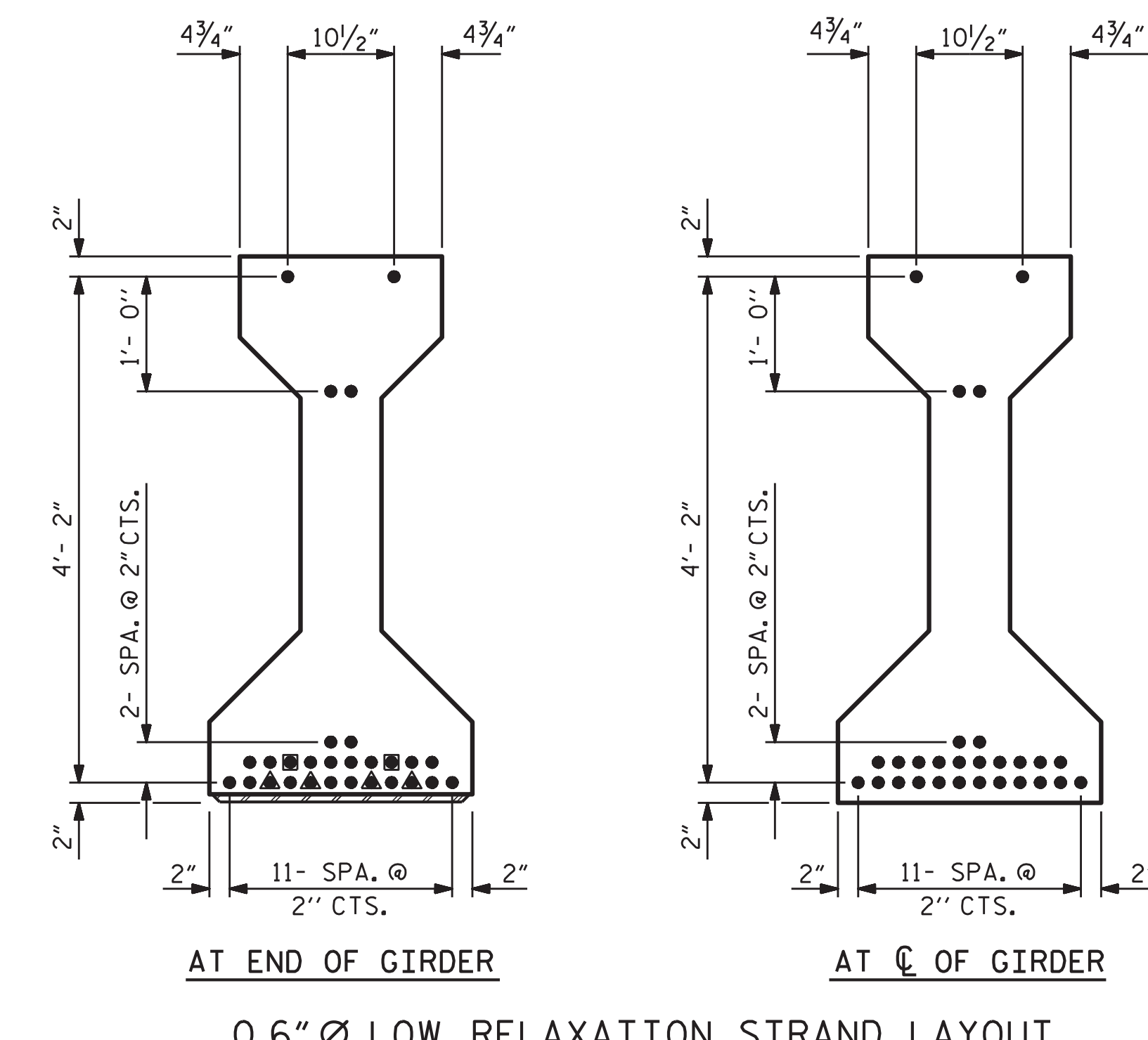
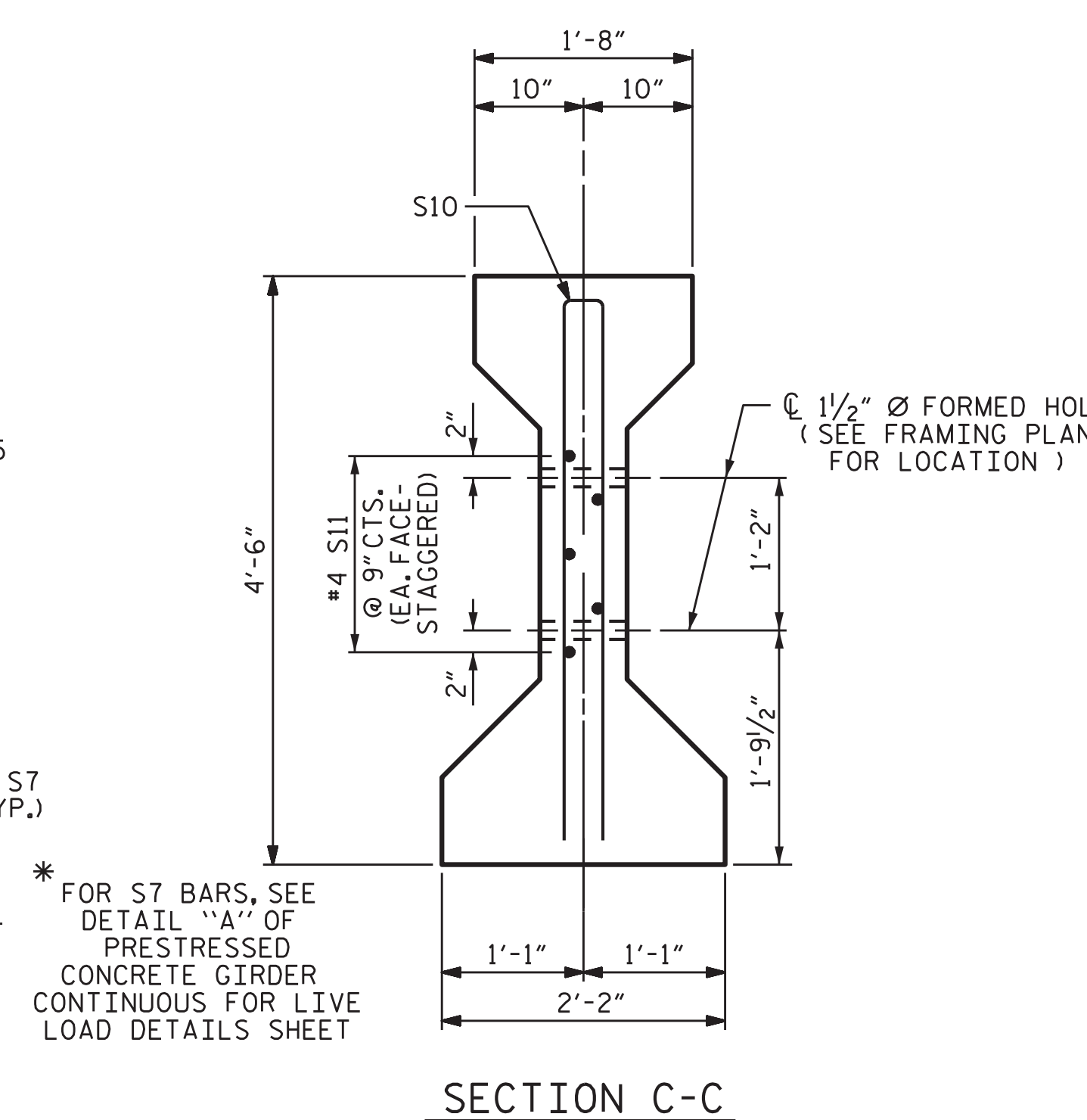
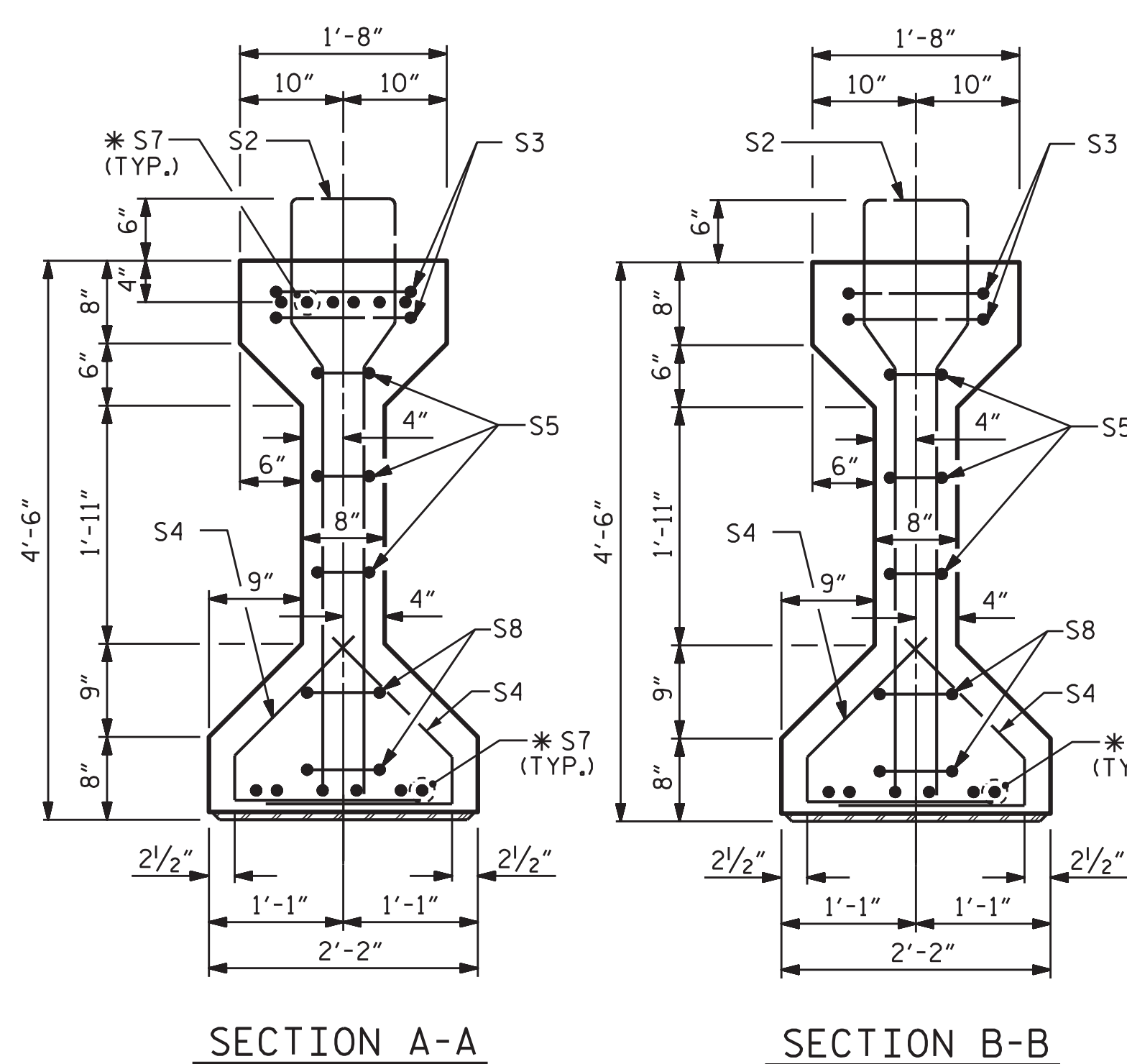
**SUPERSTRUCTURE
 GIRDER LAYOUT**

DRAWN BY :	D. A. GLADDEN	DATE :	3/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD:	P. N. HOLDER	DATE :	10/18

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			47

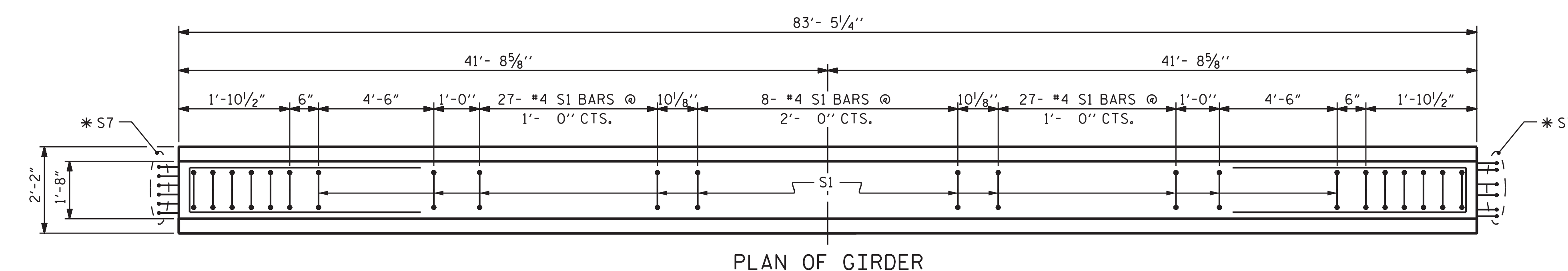
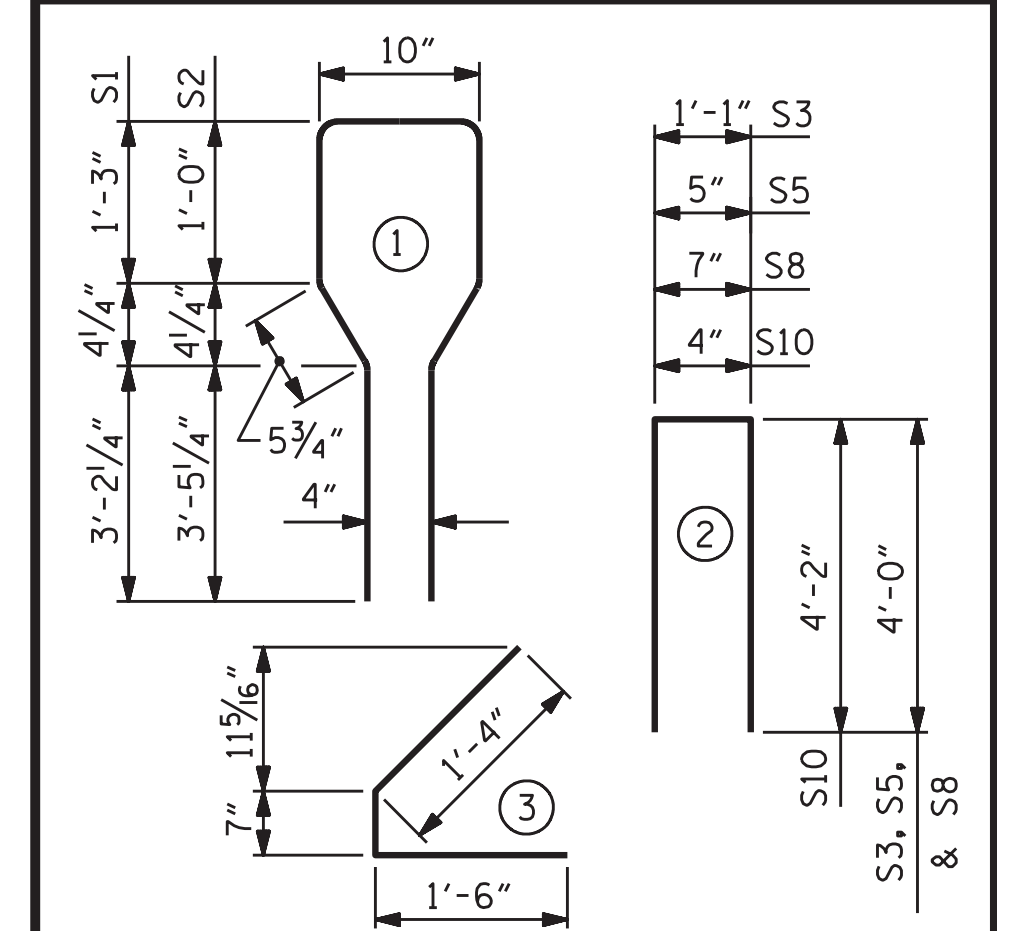


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	82	#4	1	10'-8"	584
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

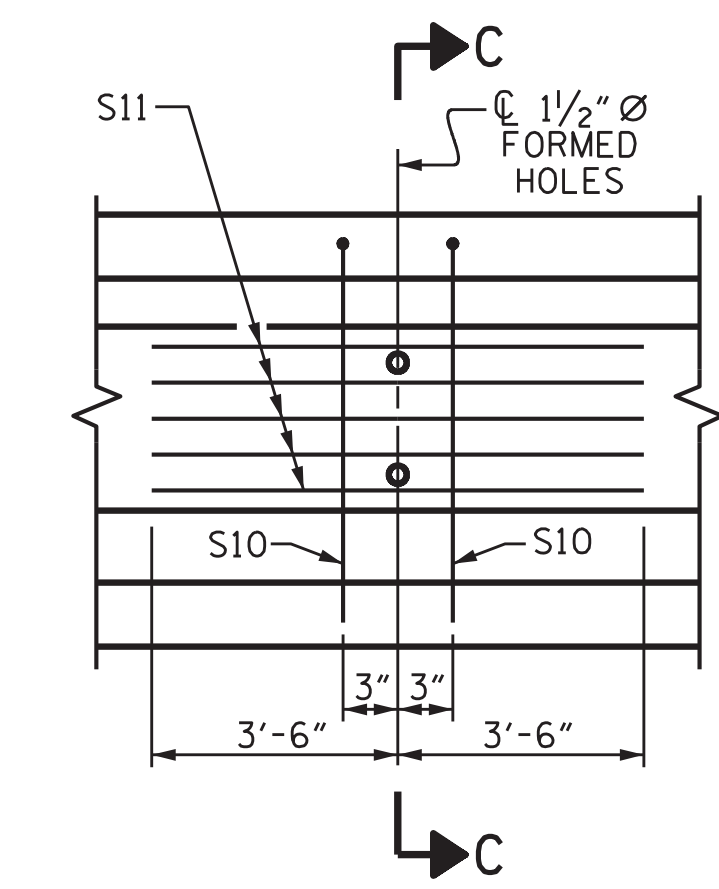
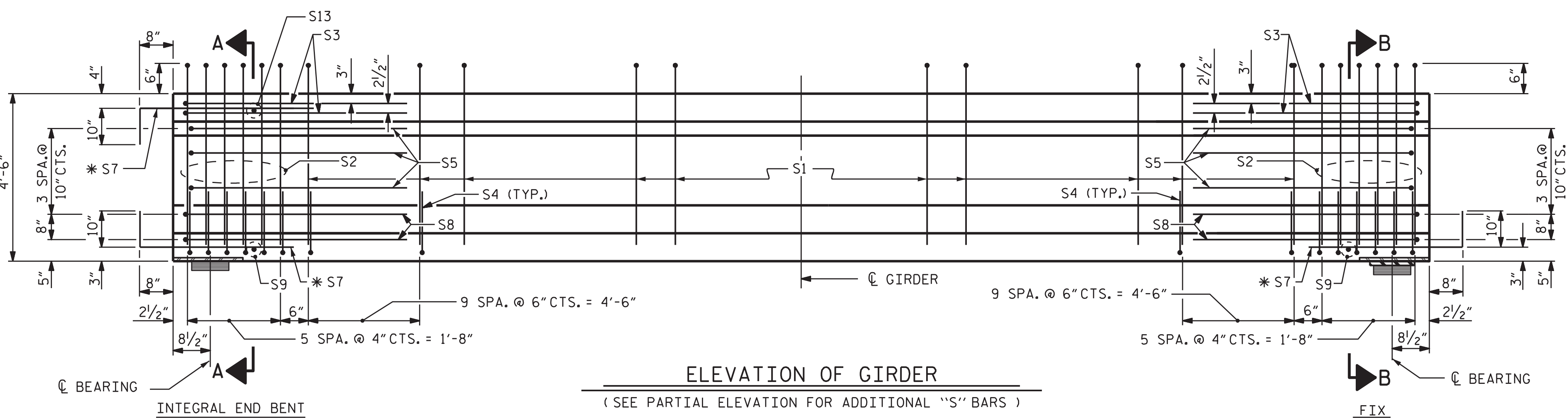
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT



DEBONDING LEGEND

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 10'- 0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'- 0" FROM END OF GIRDER



QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	6500 PSI CONCRETE	0.6" Ø L. R. STRANDS	
	LBS.	C.Y.	No.
1115	16.9	28	

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	83'- 5/4"	333'- 9"

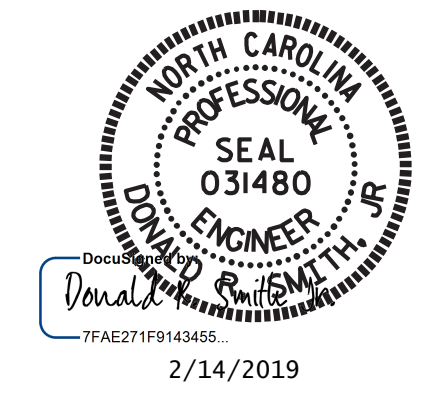
PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 (SPAN A)

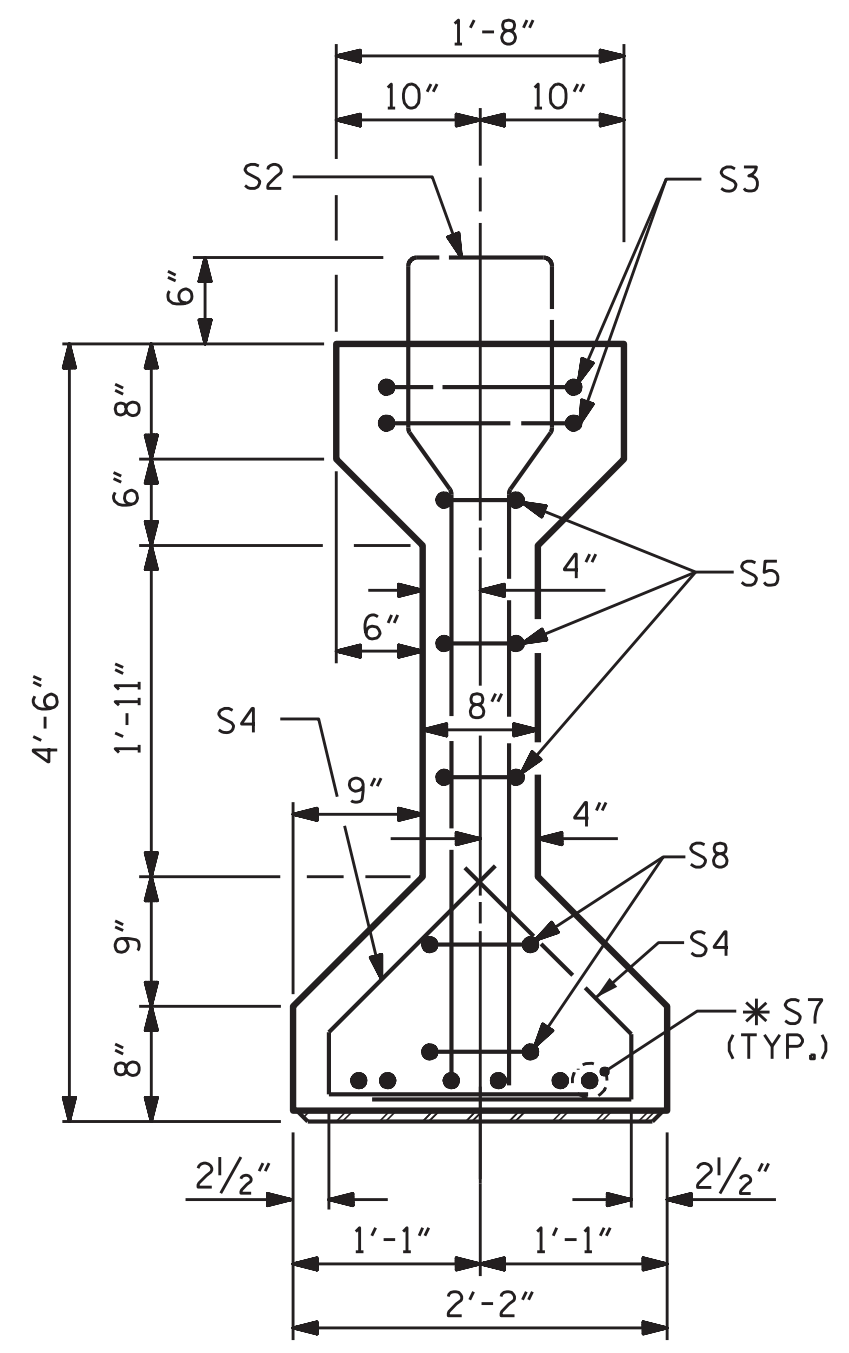
ASSEMBLED BY :	D. A. GLADDEN	DATE :	4/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD :	P. N. HOLDER	DATE :	10/18
DRAWN BY :	ELR 8/91	MAA/GM	
CHECKED BY :	GRP 8/91	REV. 10/1/11	MAA/TMG
		REV. 1/15	MAA/THC
		REV. 12/17	

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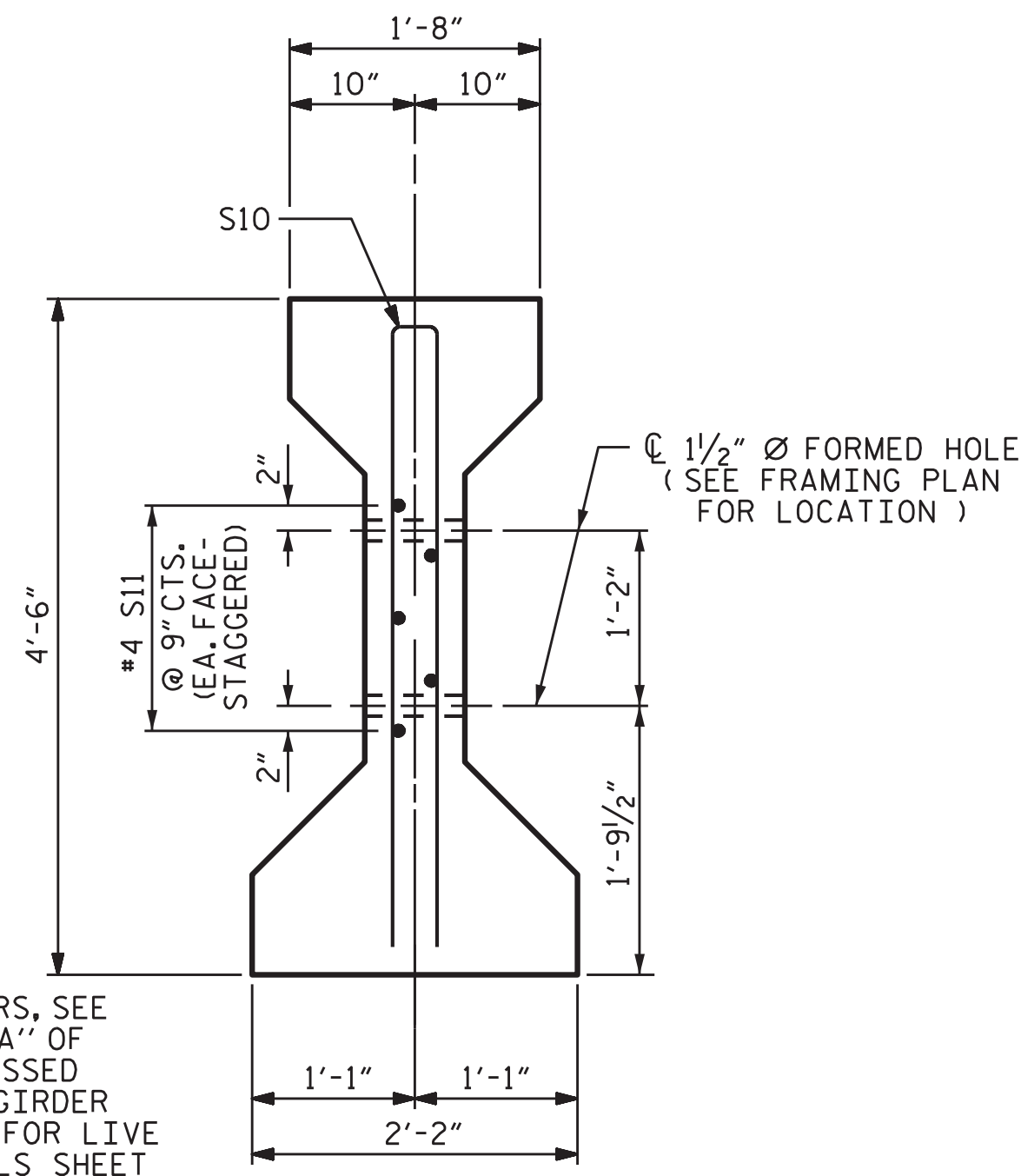


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

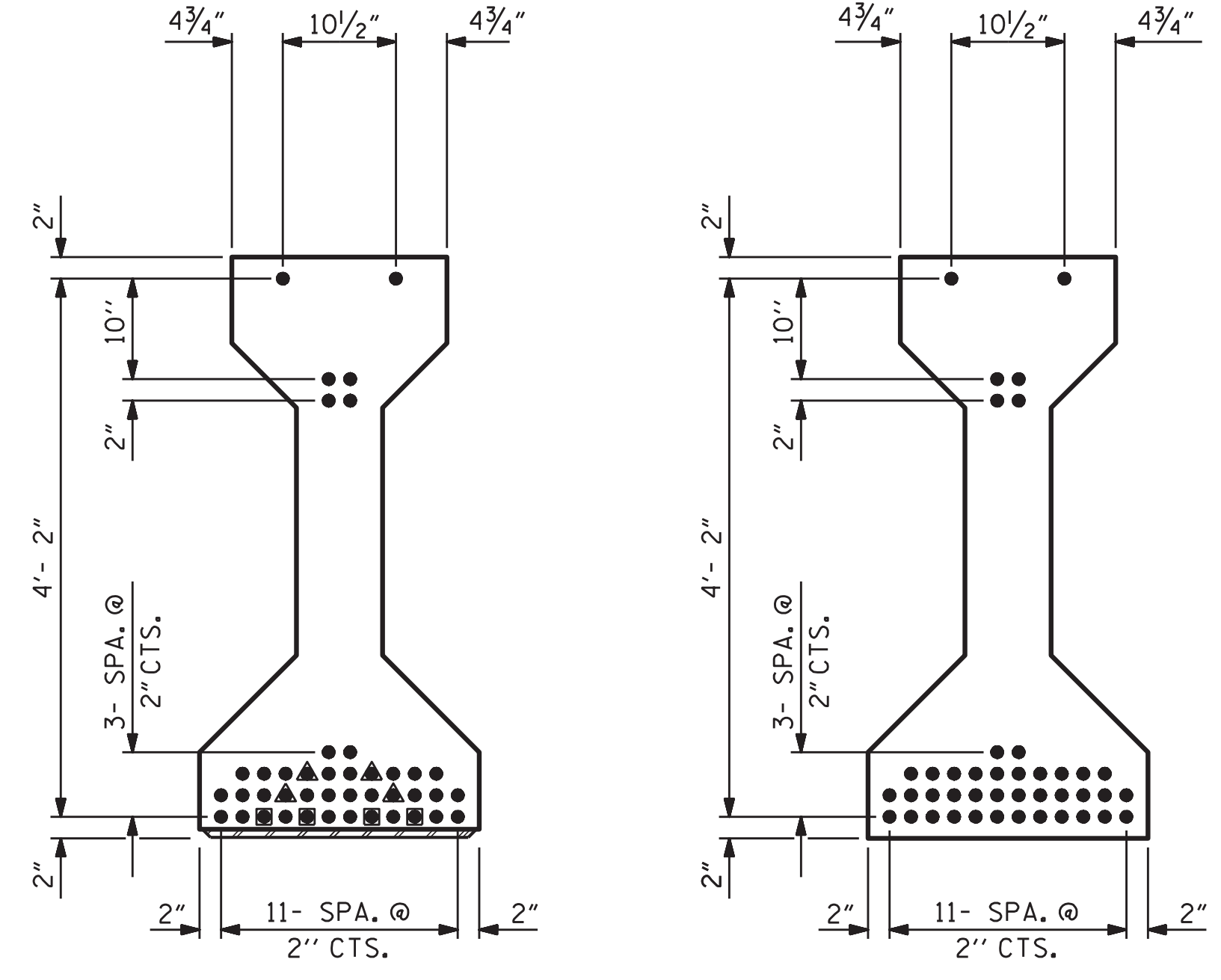
REVISIONS						SHEET NO. S-14
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 47
2			4			



SECTION B-B



SECTION C-C
(S1 BARS NOT SHOWN)



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

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

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 8'- 0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'- 0" FROM END OF GIRDER

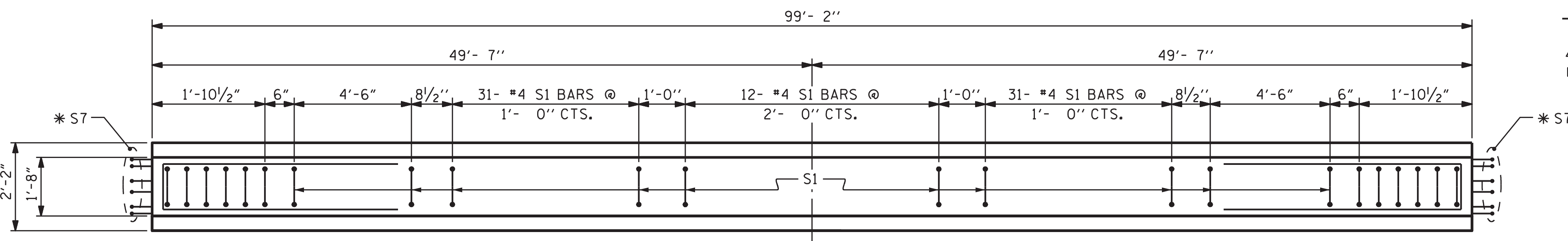
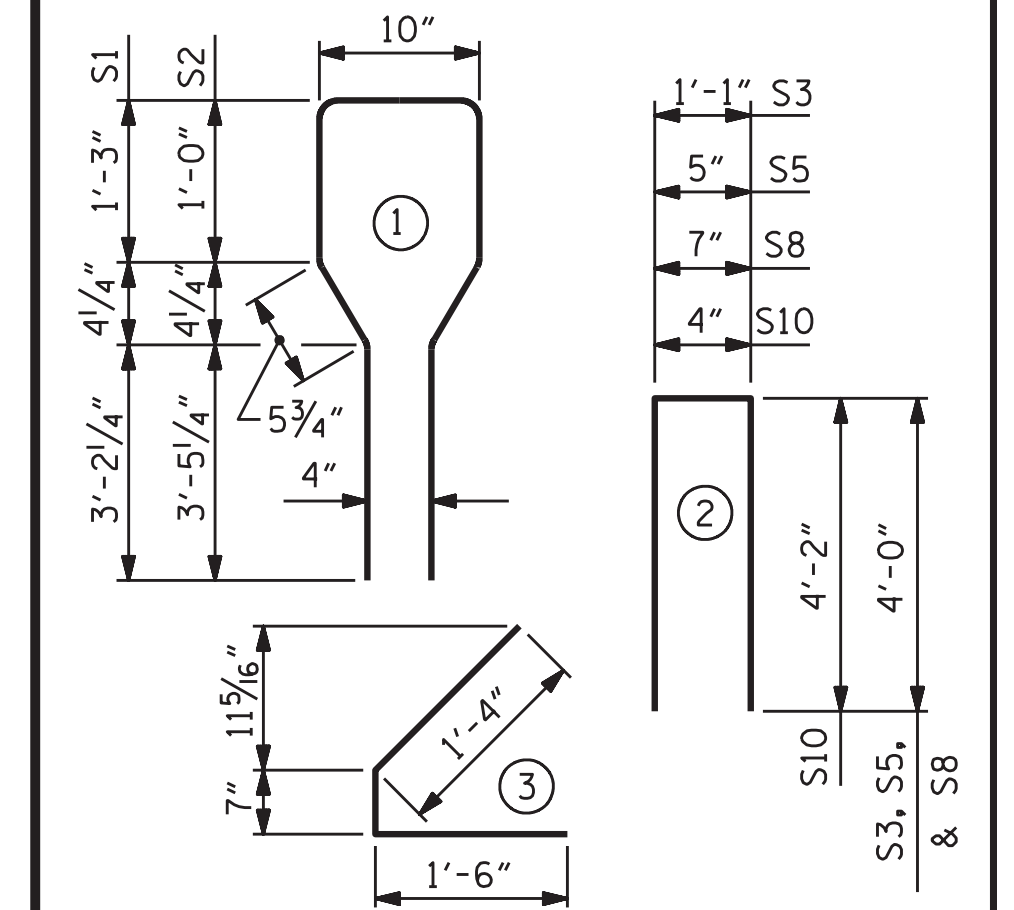
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	94	#4	1	10'-8"	670
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
* S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

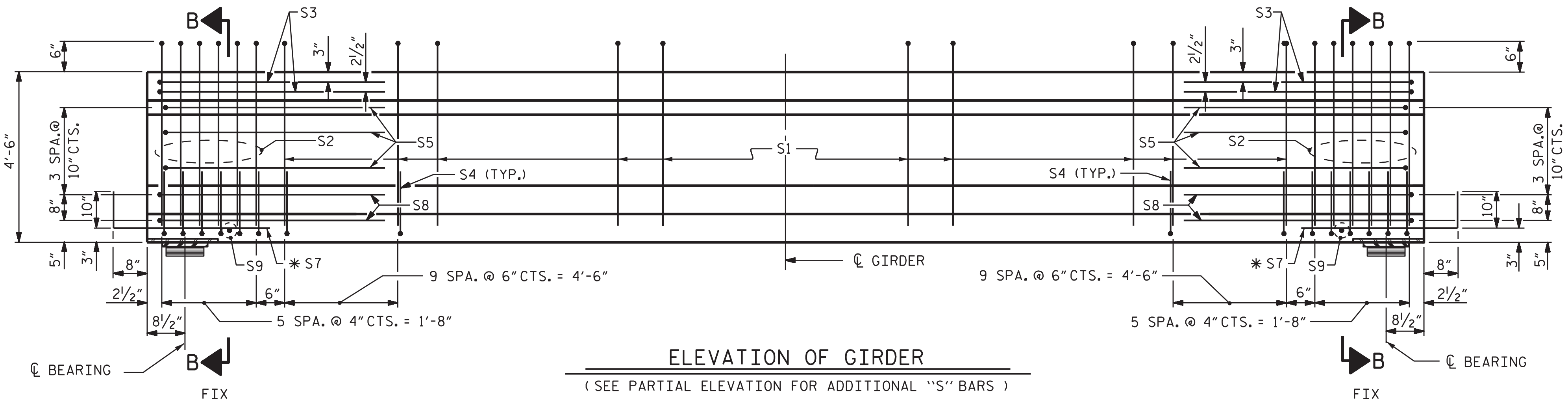
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

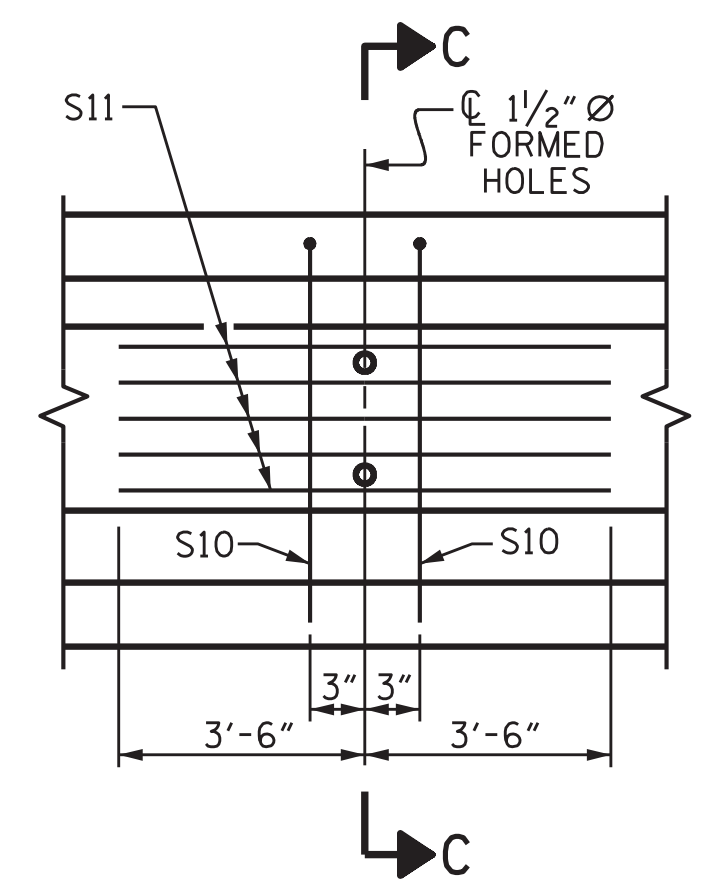


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

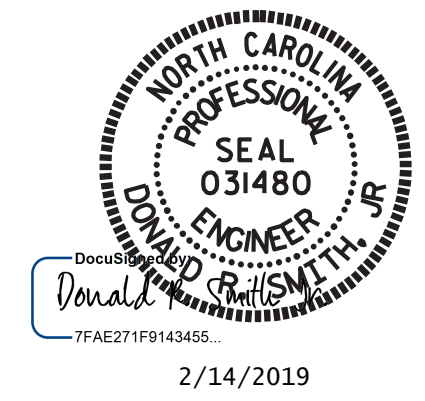
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS

QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	6500 PSI CONCRETE	0.6" Ø L. R. STRANDS
LBS.	C.Y.	No.
1177	20.1	42

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	99'- 2"	396'- 8"

PROJECT NO. B-4962
ORANGE COUNTY
STATION: 17+37.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
(SPAN B)

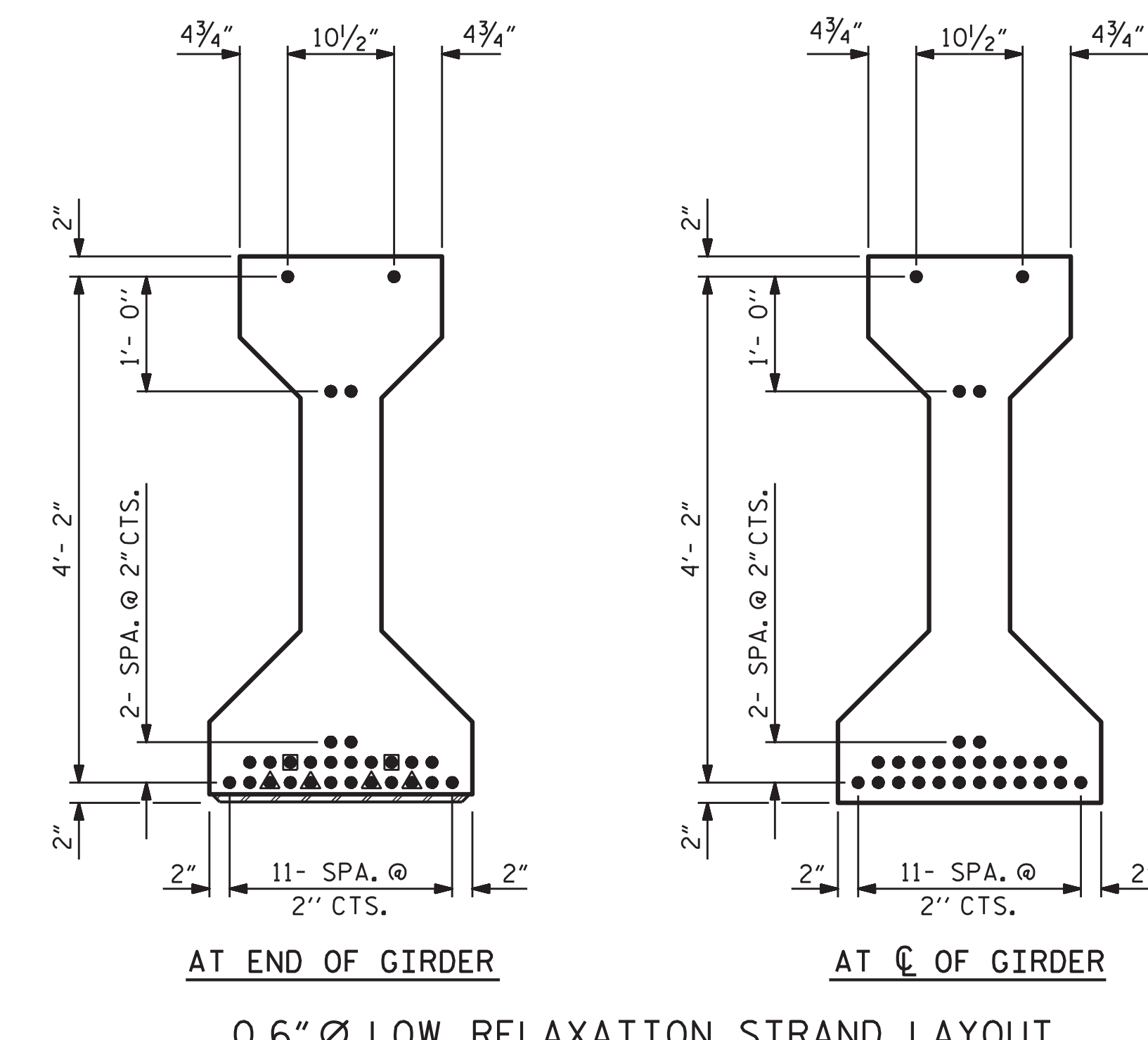
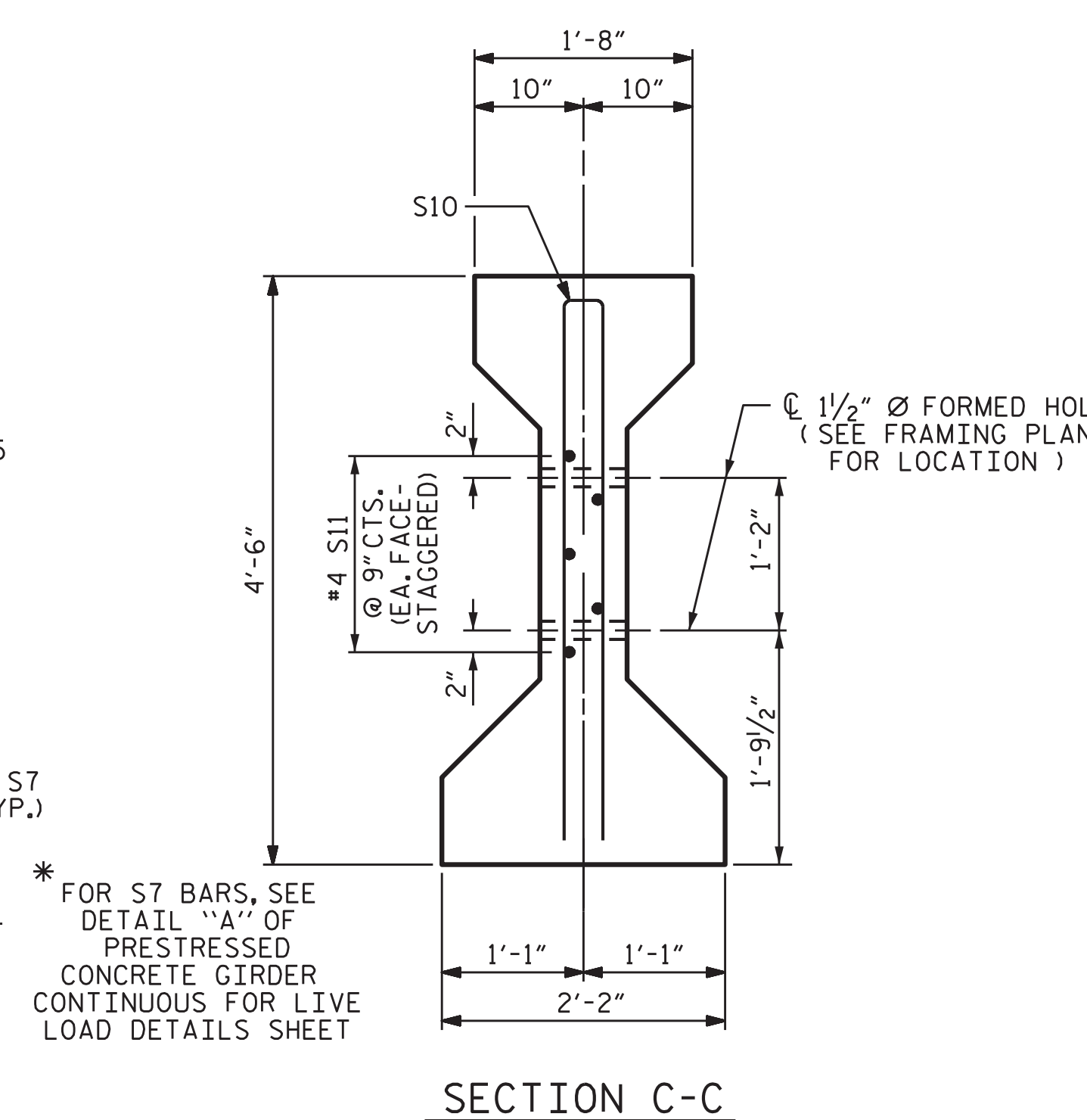
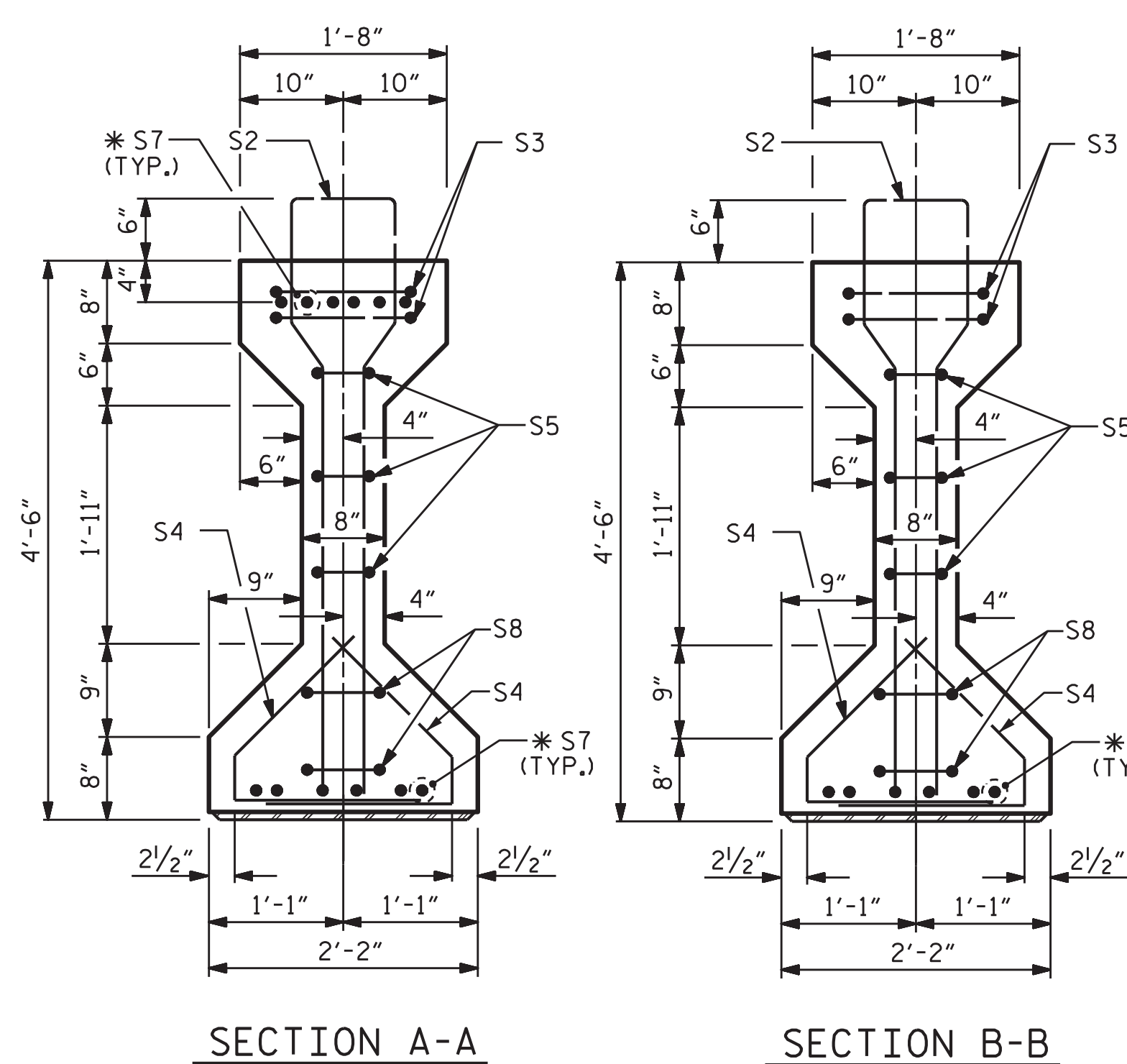


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ASSEMBLED BY : D. A. GLADDEN	DATE : 4/18
CHECKED BY : D. R. SMITH	DATE : 9/18
DESIGN ENGINEER OF RECORD : P. N. HOLDER	DATE : 10/18
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

REVISIONS						SHEET NO. S-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 47
2			4			

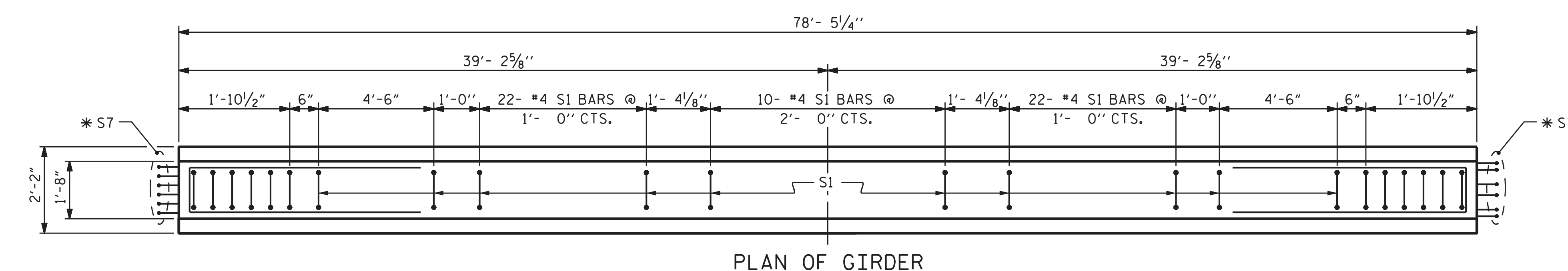
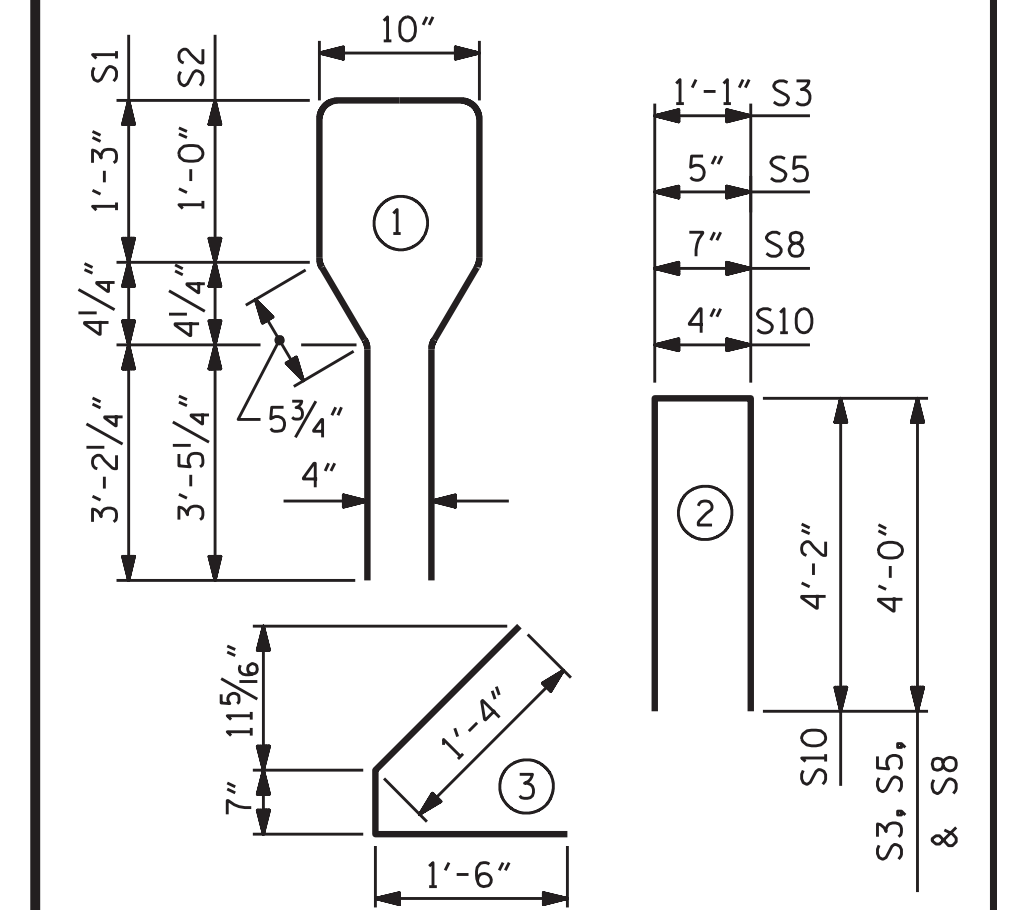


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	74	#4	1	10'-8"	527
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

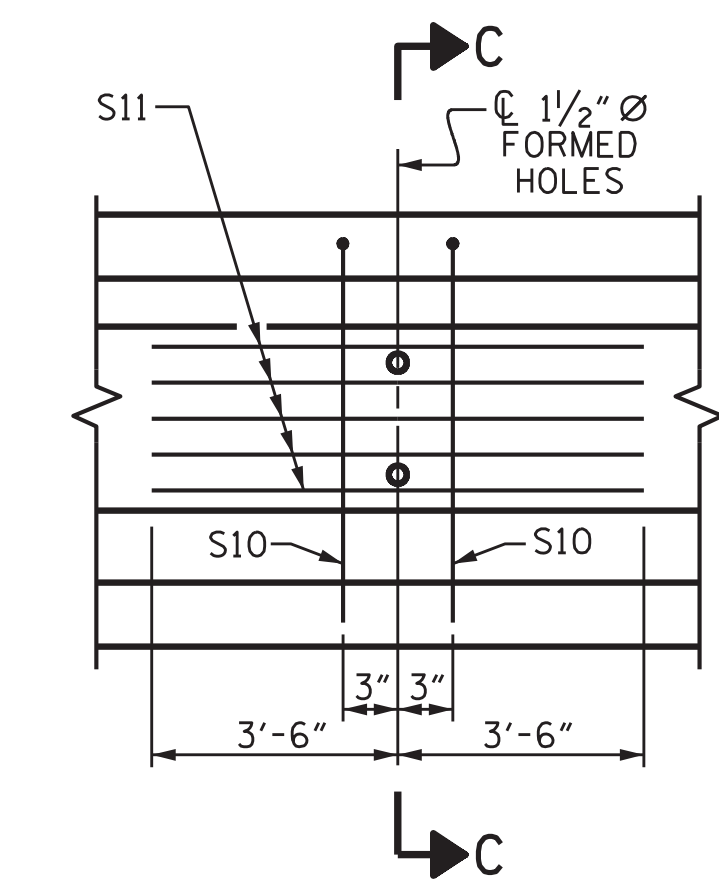
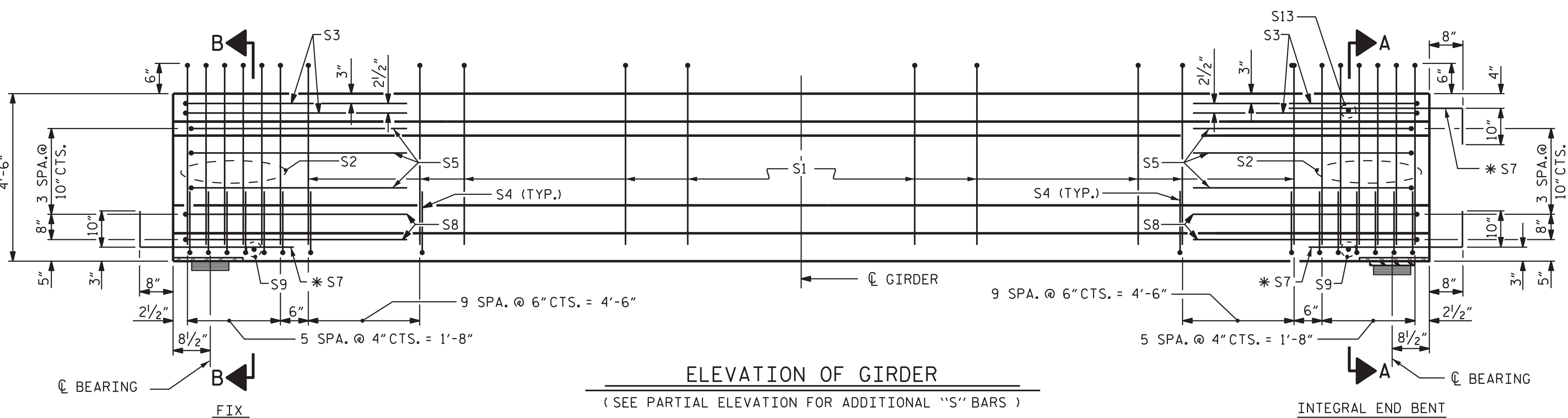
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT



DEBONDING LEGEND

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 10'- 0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'- 0" FROM END OF GIRDER



QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	6500 PSI CONCRETE	0.6" Ø L. R. STRANDS	
LBS.	C.Y.	No.	
1058	15.9	28	

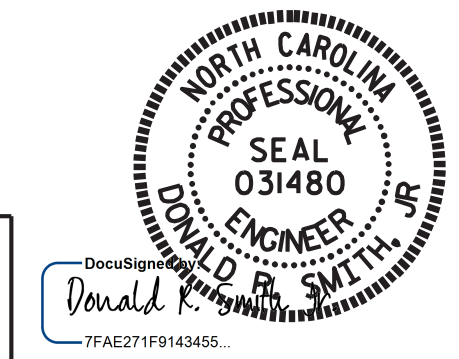
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	78'- 5/4"	313'- 9"

PROJECT NO. B-4962
ORANGE COUNTY
STATION: 17+37.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
(SPAN C)

ASSEMBLED BY :	D. A. GLADDEN	DATE :	4/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD :	P. N. HOLDER	DATE :	10/18
DRAWN BY :	ELR 8/91	MAA/GM	
CHECKED BY :	GRP 8/91	REV. 10/1/11	MAA/TMG
		REV. 1/15	MAA/THC
		REV. 12/17	

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REVISIONS						SHEET NO. S-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 47
2			4			

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.

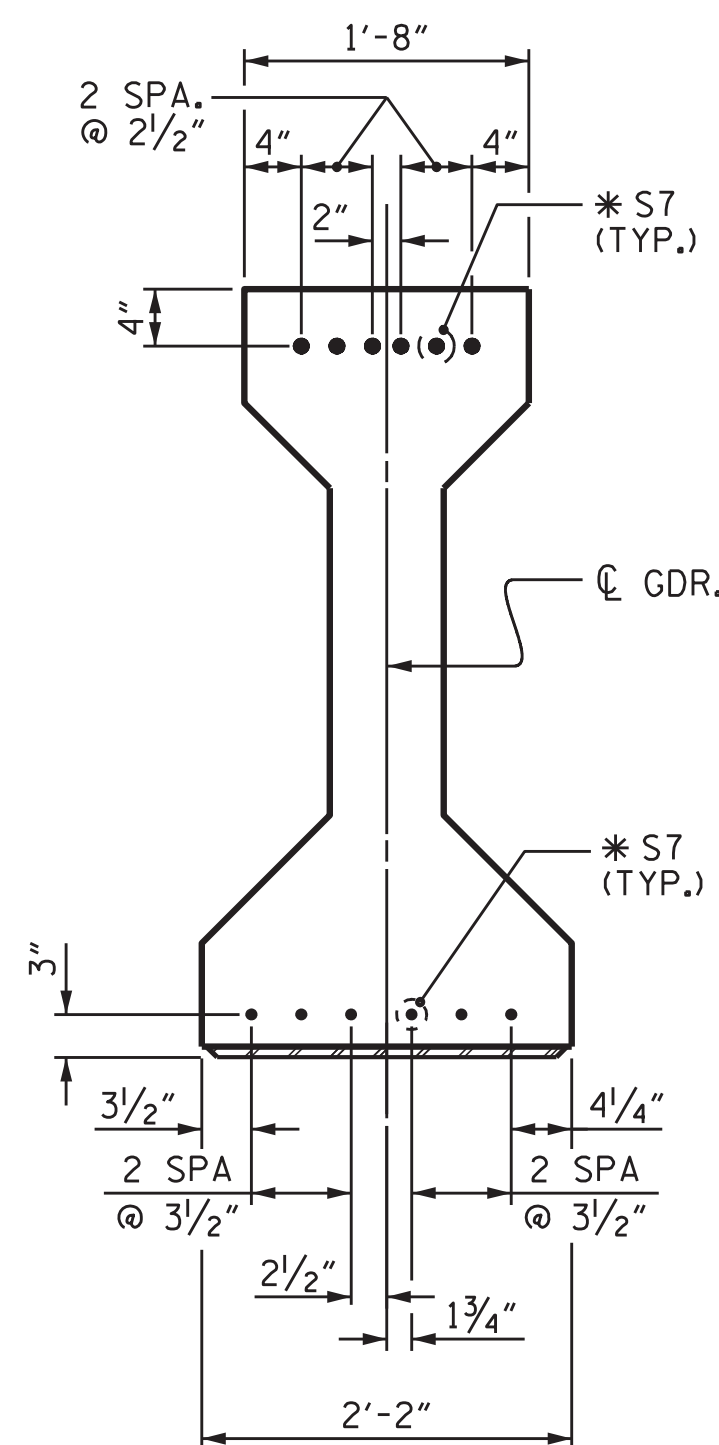
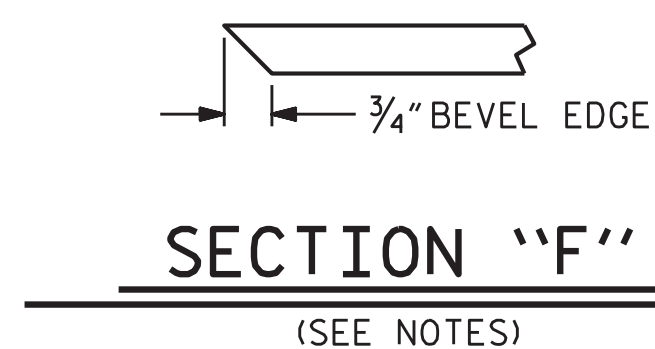
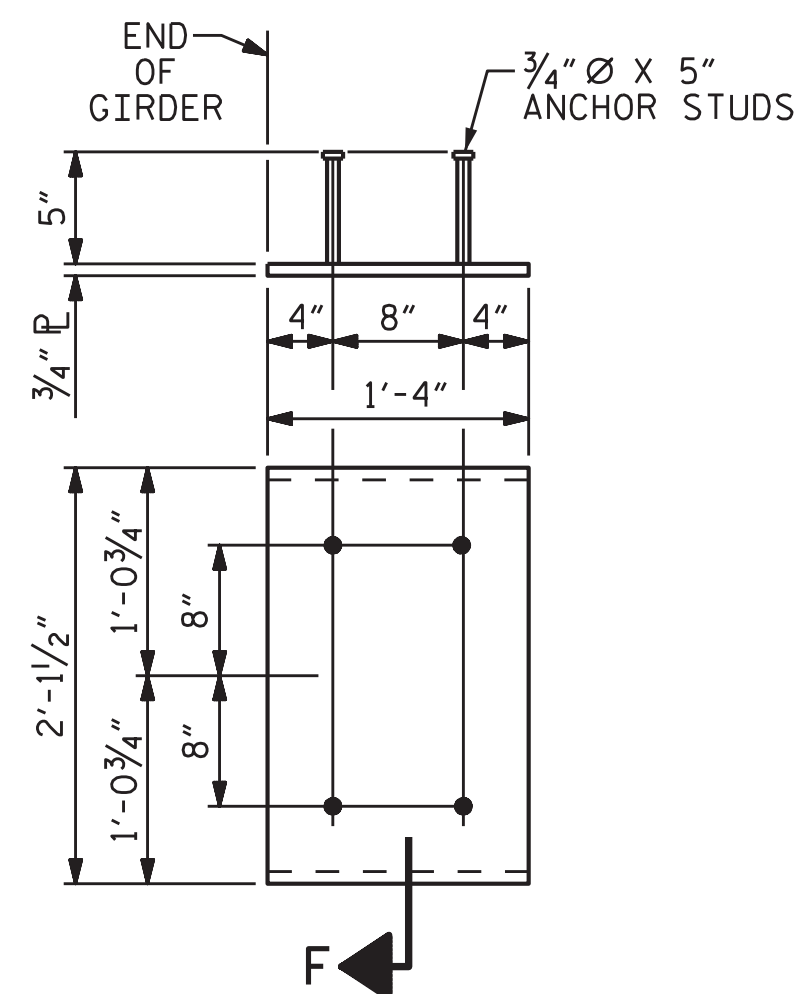
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5200 PSI FOR SPAN A AND SPAN C.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5900 PSI FOR SPAN B.

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 IV GIRDER

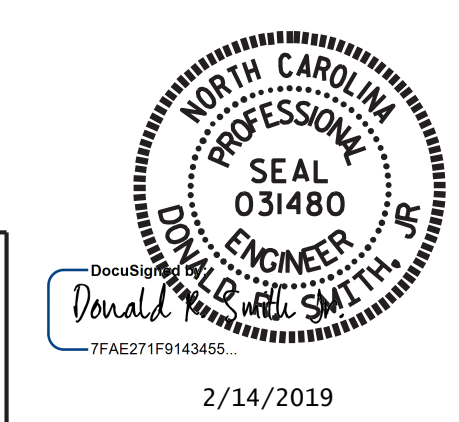
(2 REQ'D PER GIRDER)

DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

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



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1			3			47
2			4			

ASSEMBLED BY :	D. A. GLADDEN	DATE :	4/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD :	P. N. HOLDER	DATE :	10/18
DRAWN BY :	ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY :	GRP 8/91	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

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.

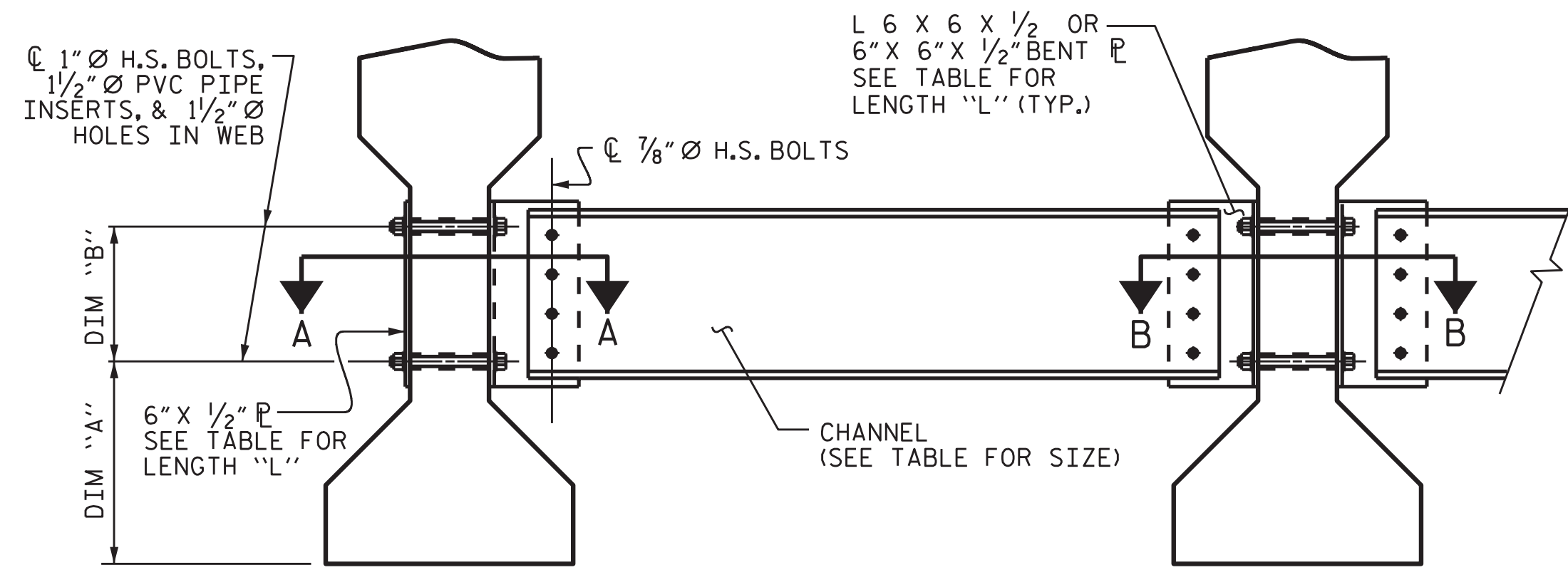
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.

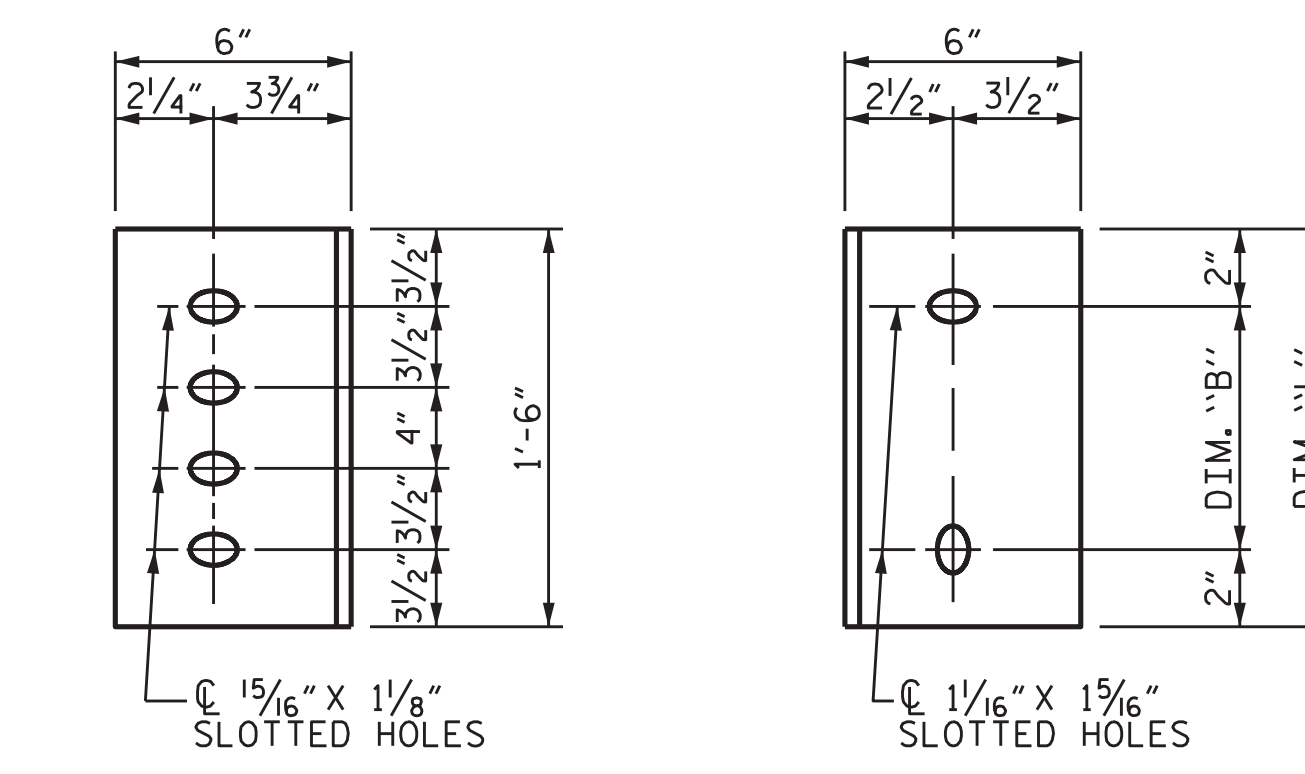
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER

INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE

WEB FACE

CONNECTOR PLATE DETAILS

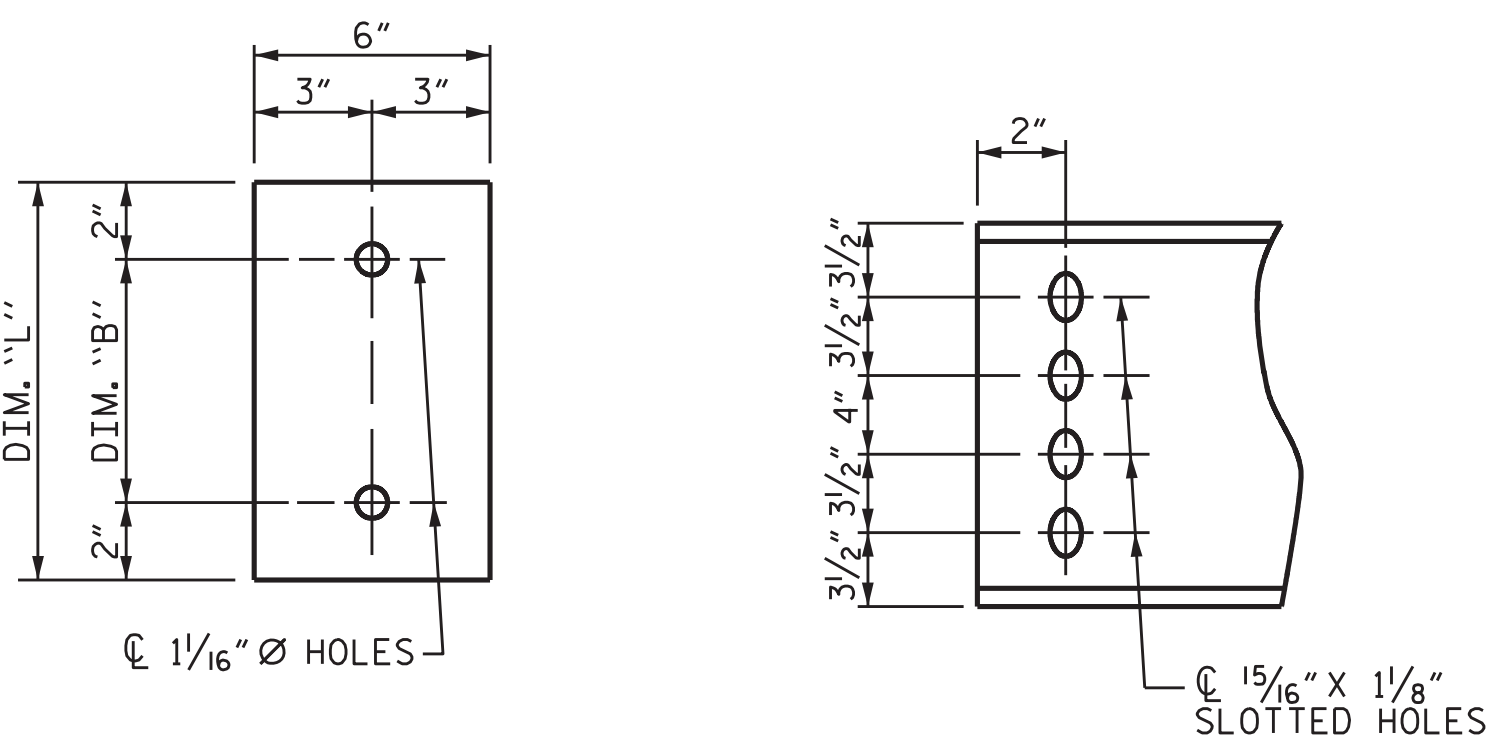
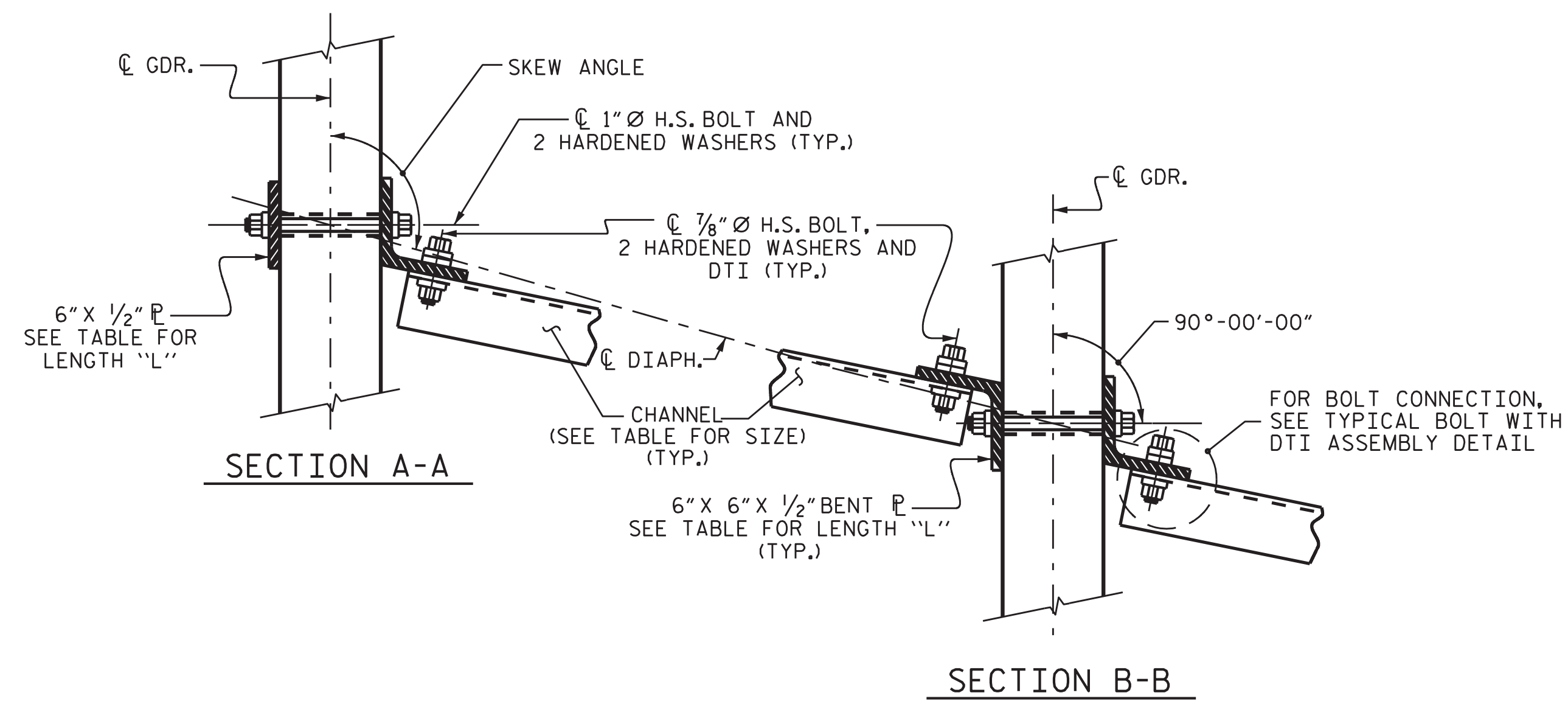
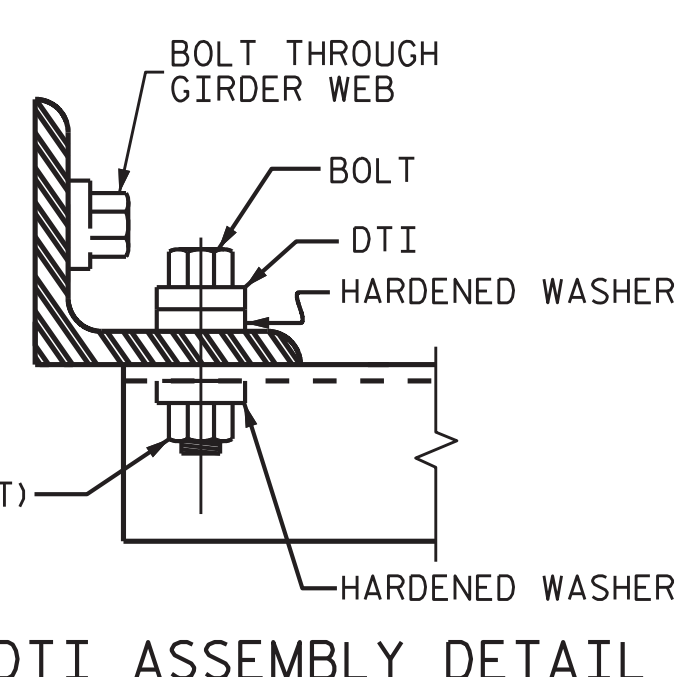


PLATE DETAILS

CHANNEL END



CONNECTION DETAILS



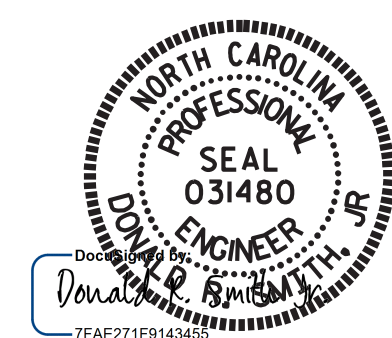
BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 INTERMEDIATE
 STEEL DIAPHRAGMS
 FOR TYPE IV PRESTRESSED
 CONCRETE GIRDERS



2/14/2019

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1			3			47
2			4			

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CHECKED BY : D. R. SMITH	DATE : 9/18
DESIGN ENGINEER OF RECORD : P. N. HOLDER	DATE : 10/18
DRAWN BY : TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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

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

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

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

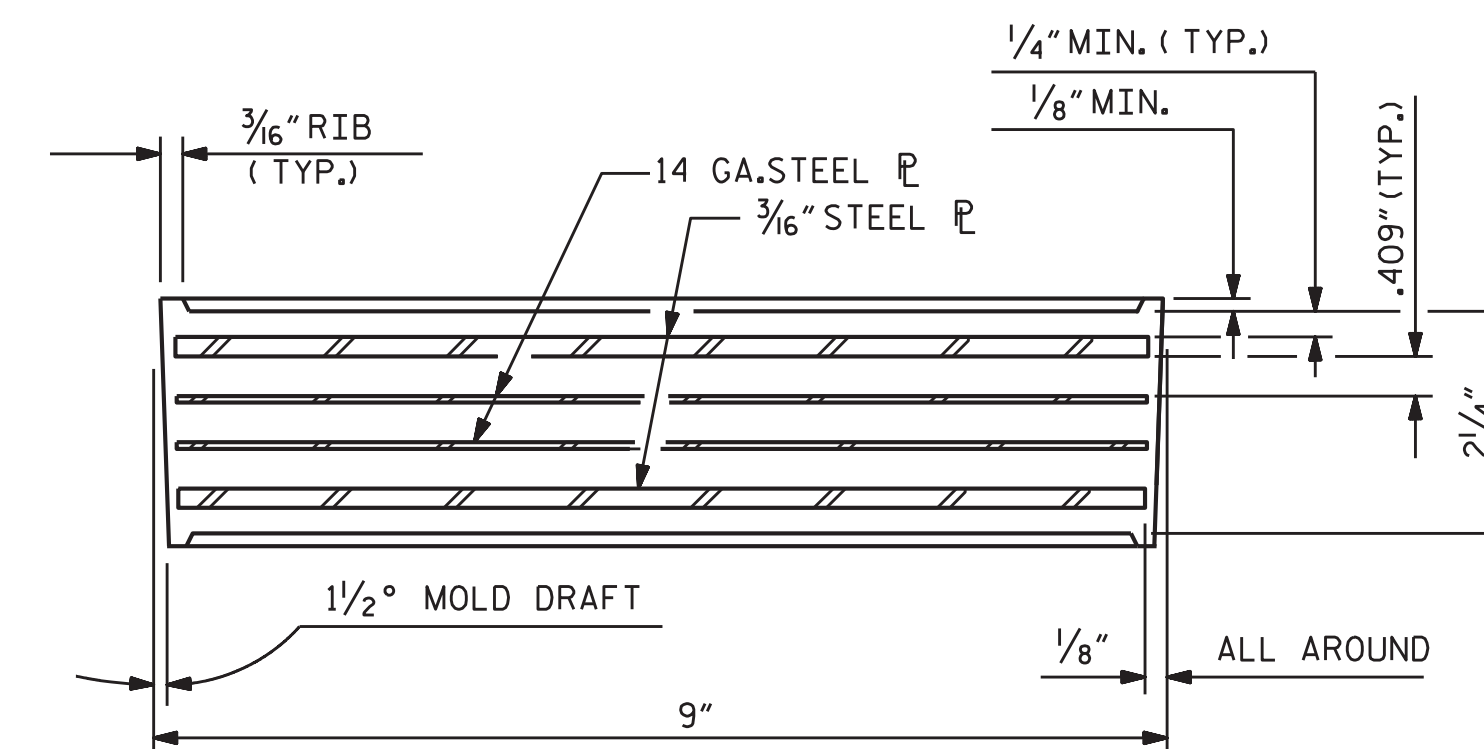
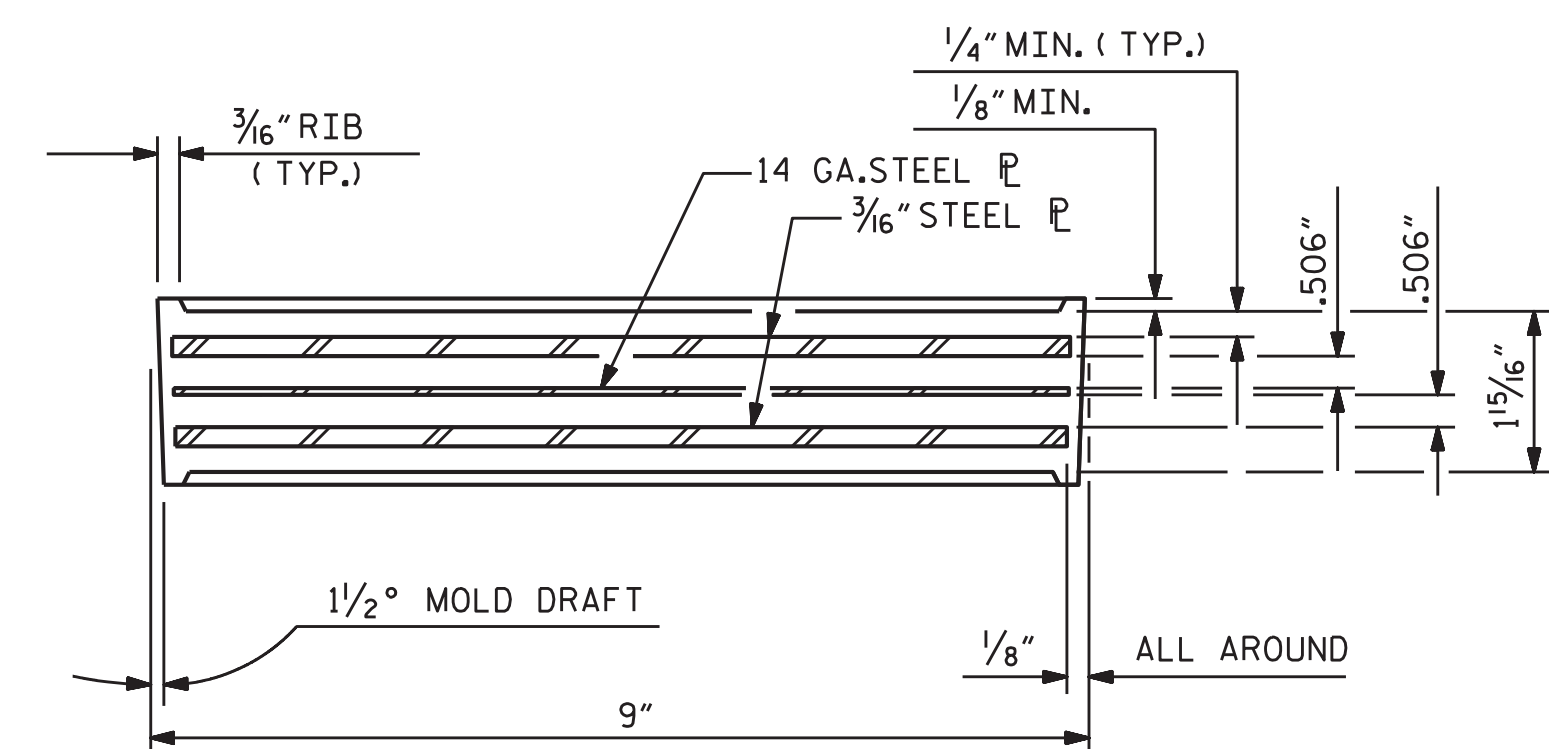
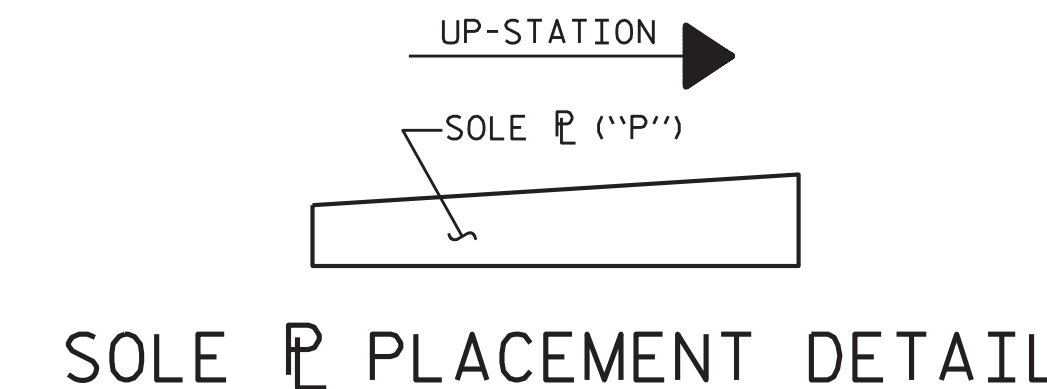
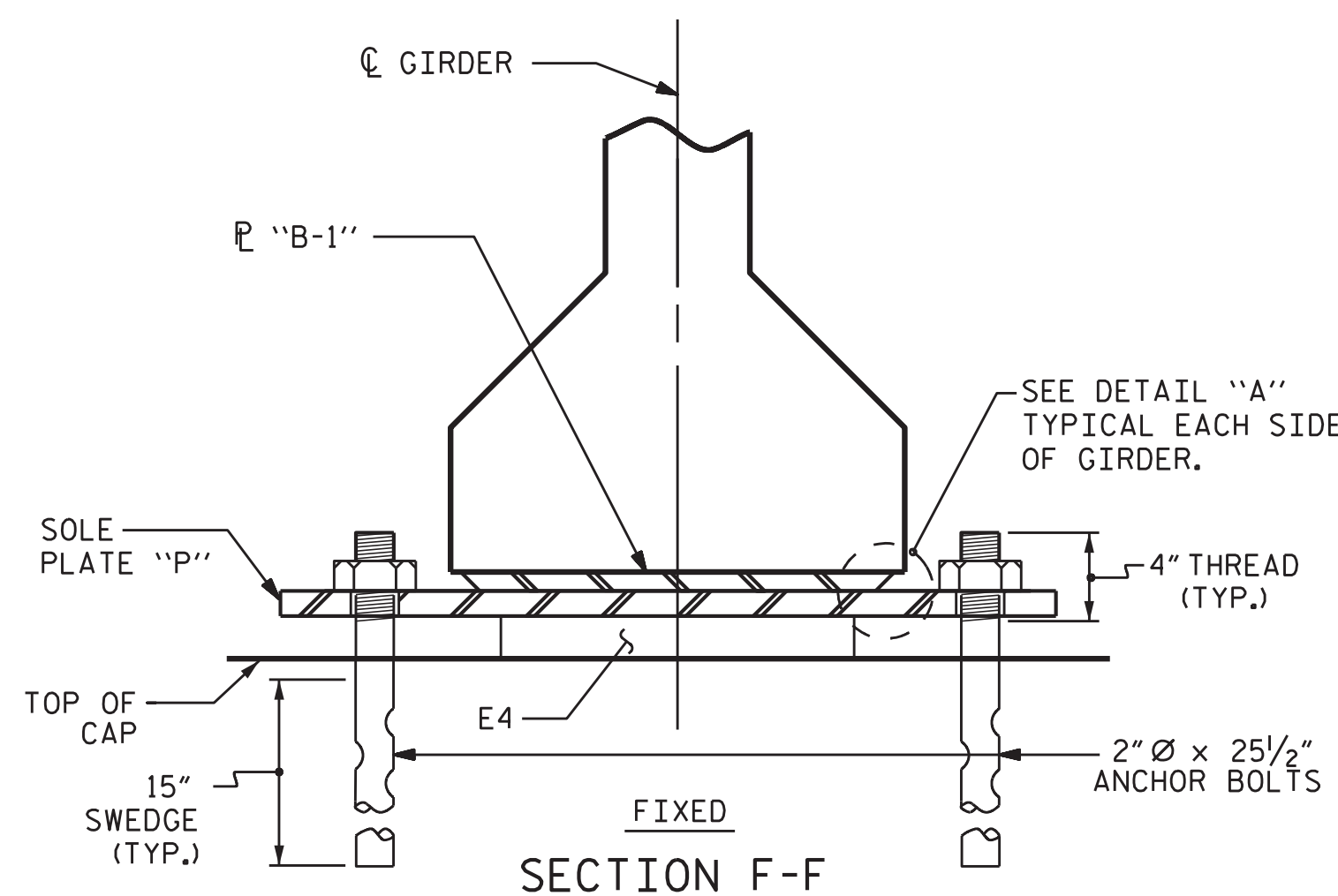
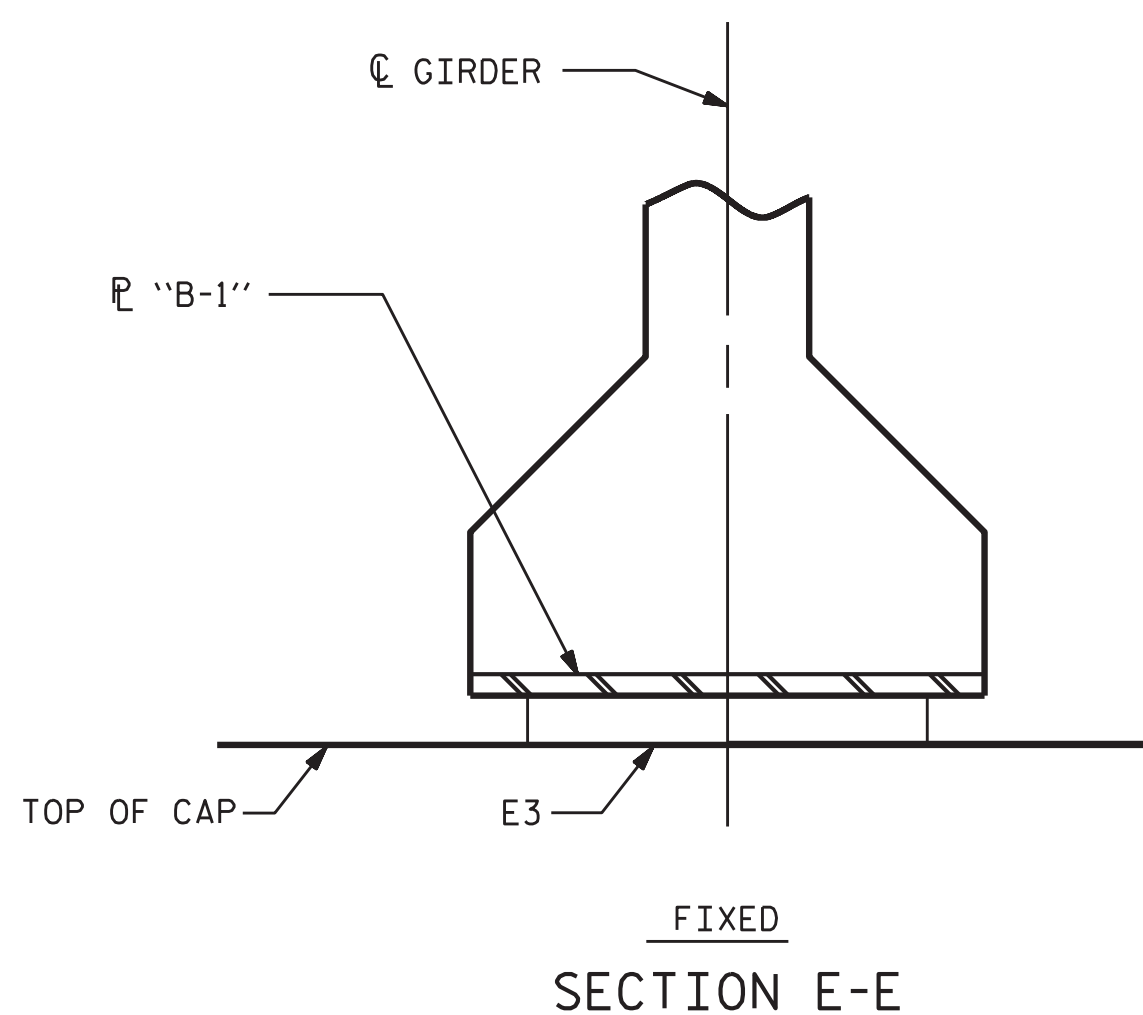
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

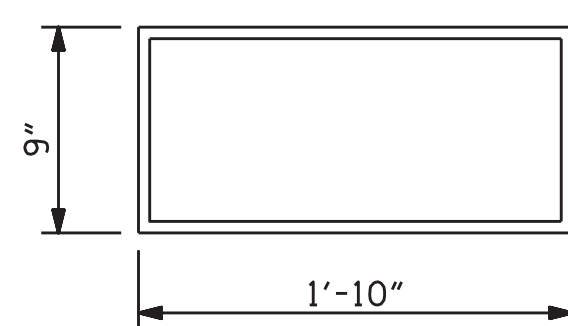
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



TYPICAL SECTION OF ELASTOMERIC BEARINGS

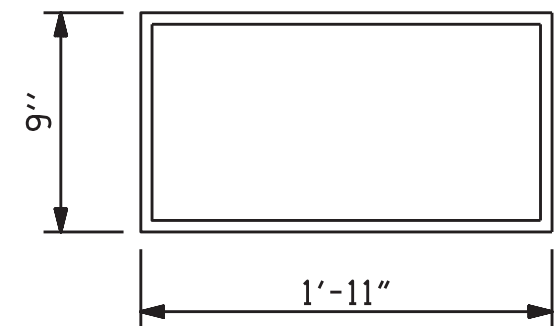
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

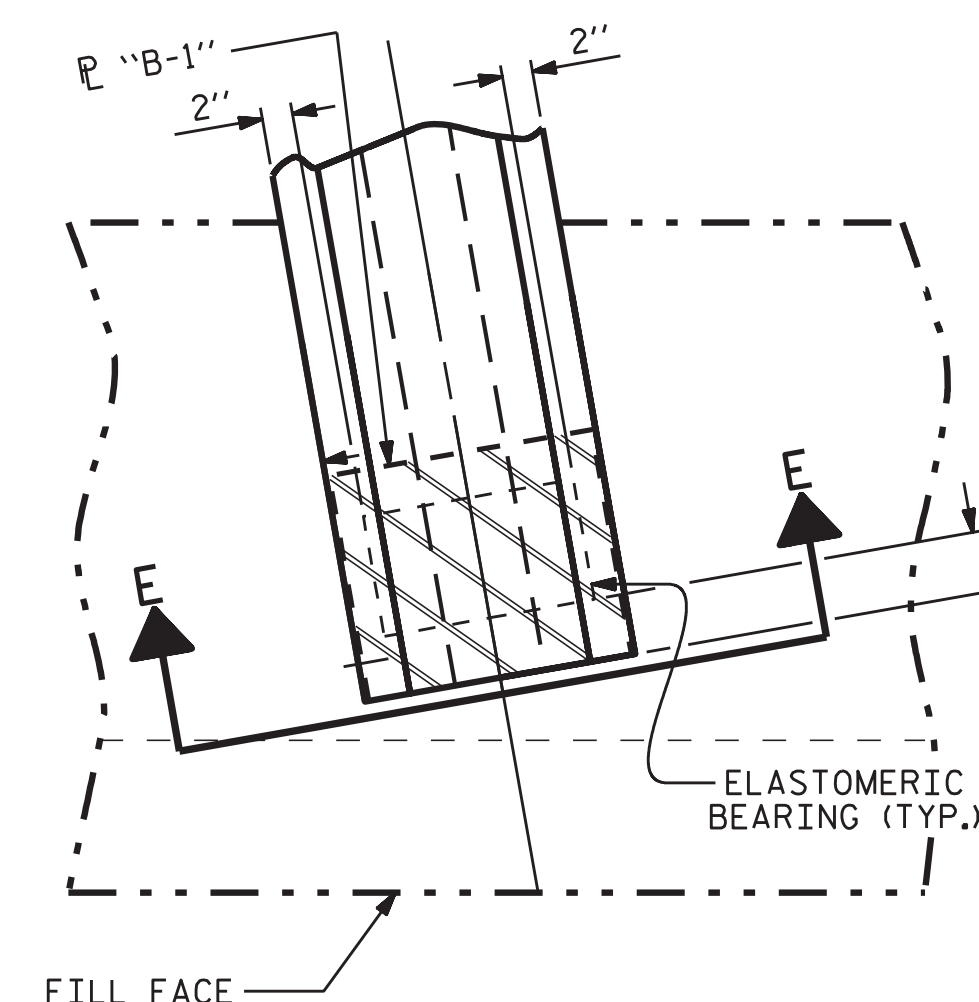
TYPE IV



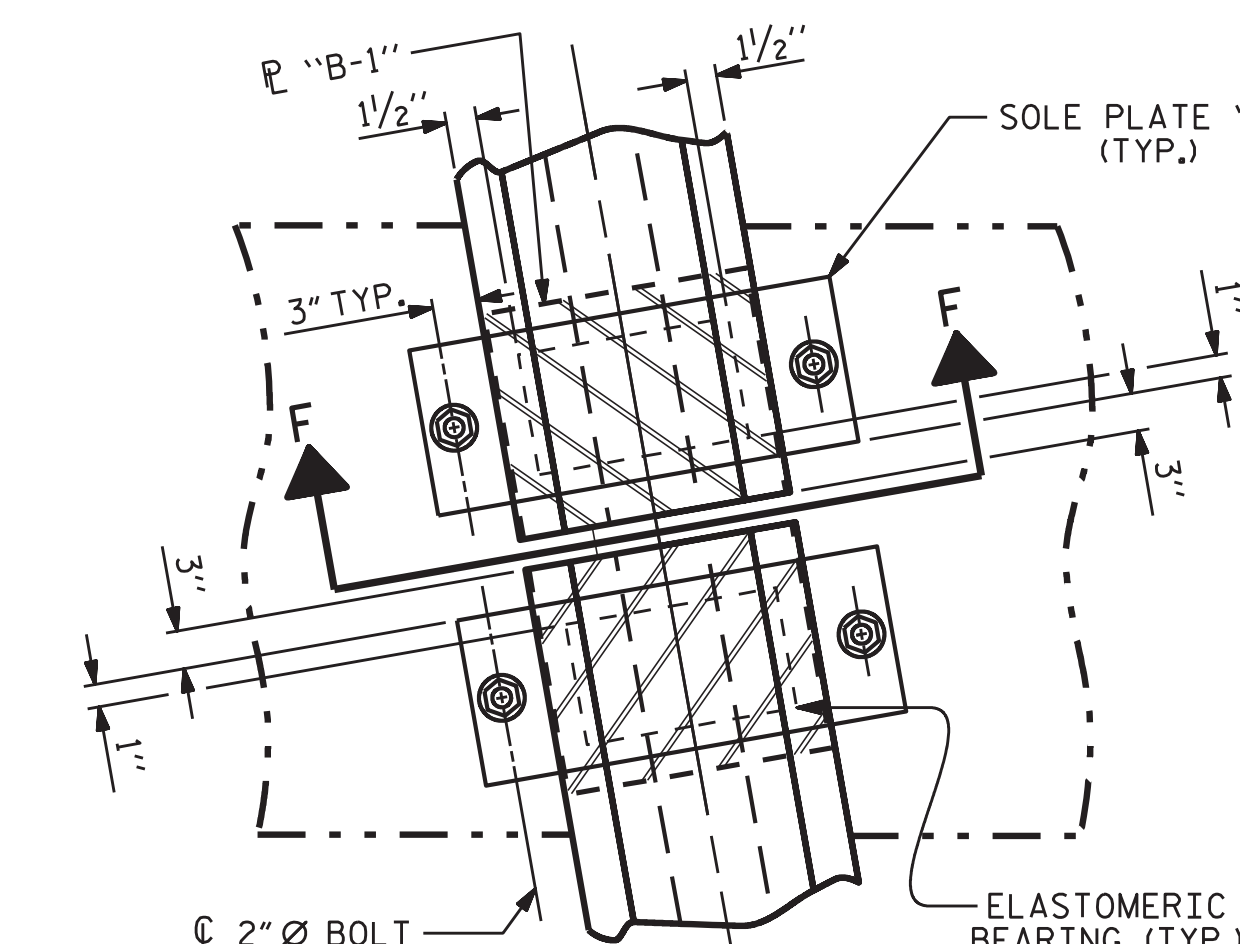
E4 (16 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

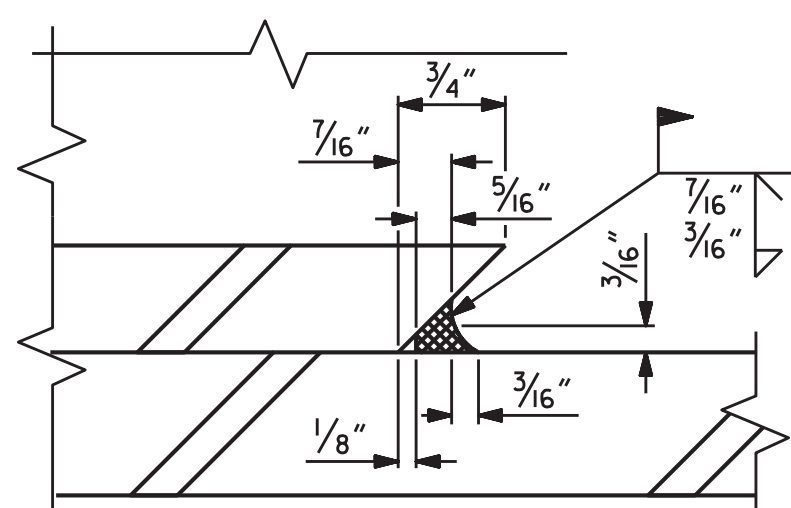
TYPE V



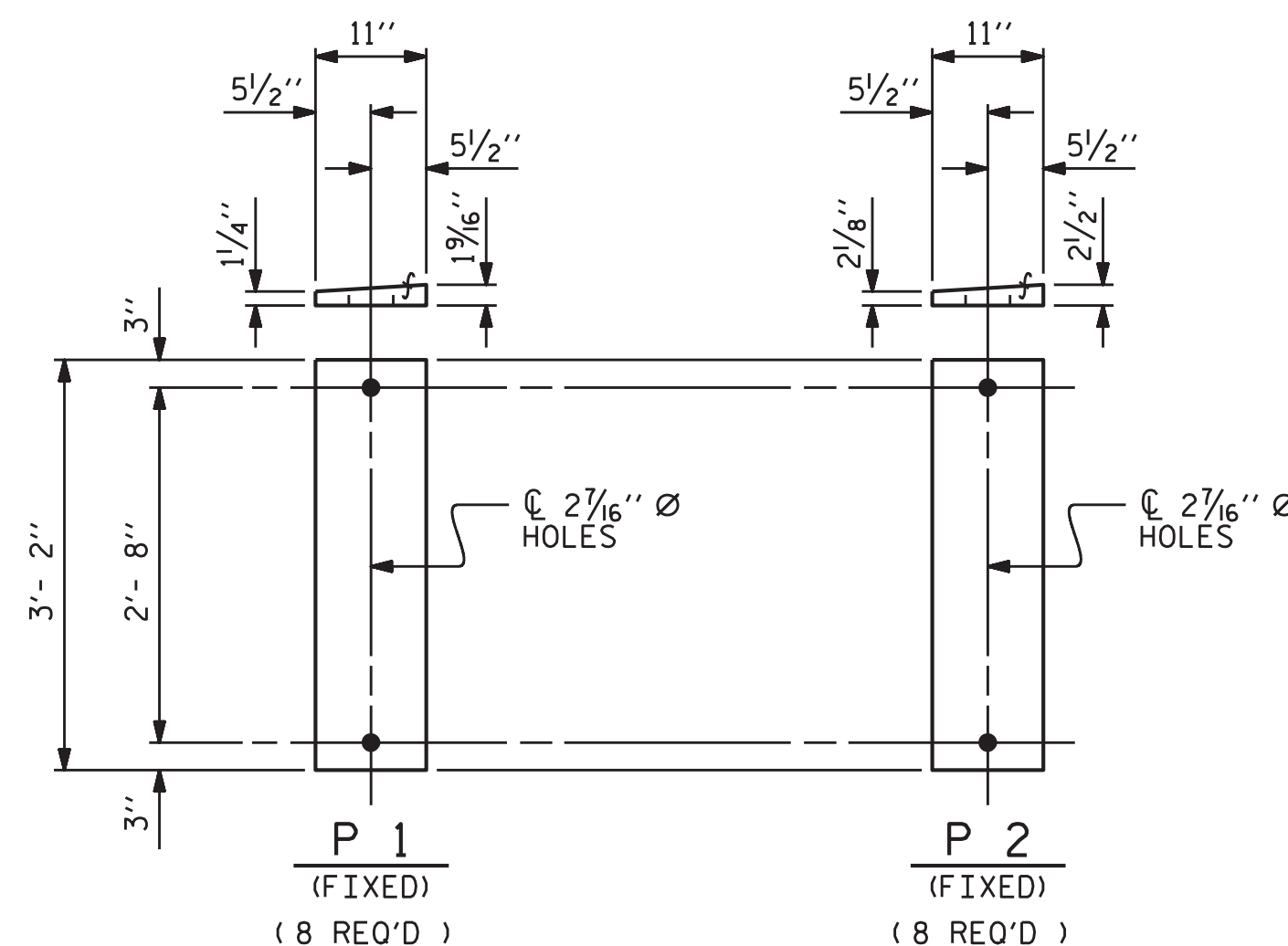
TYPICAL PLAN (SHOWING INTEGRAL END BENT)



TYPICAL PLAN (SHOWING CONTINUOUS BENT)



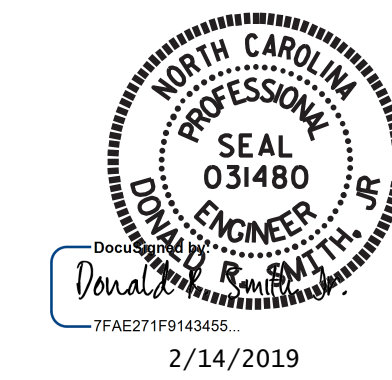
DETAIL "A"



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE V	365 k

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						STANDARD ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19	
1			3			TOTAL SHEETS 47	
2			4				

ASSEMBLED BY : D. A. GLADDEN	DATE : 4/18
CHECKED BY : D. R. SMITH	DATE : 9/18
DESIGN ENGINEER OF RECORD : P. N. HOLDER	DATE : 10/18
DRAWN BY : WJH 8/89	REV. 6/13 AAC/MAA
CHECKED BY : CRK 8/89	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																							
0.6" Ø LOW RELAXATION	SPAN A																						
	GIRDERS 1 & 4											GIRDERS 2 & 3											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.038	0.072	0.098	0.115	0.121	0.115	0.098	0.072	0.038	0.000	0.000	0.038	0.072	0.098	0.115	0.121	0.115	0.098	0.072	0.038	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.025	0.050	0.069	0.081	0.085	0.081	0.069	0.050	0.025	0.000	0.000	0.027	0.053	0.074	0.087	0.092	0.087	0.074	0.053	0.027	0.000
FINAL CAMBER	↑	0.000	1/8"	1/4"	3/8"	7/16"	7/16"	7/16"	3/8"	1/4"	1/8"	0.000	0.000	1/8"	1/4"	5/16"	5/16"	3/8"	5/16"	5/16"	1/4"	1/8"	0.000

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																							
0.6" Ø LOW RELAXATION	SPAN B																						
	GIRDERS 1 & 4											GIRDERS 2 & 3											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.071	0.134	0.183	0.215	0.225	0.215	0.183	0.134	0.071	0.000	0.000	0.071	0.134	0.183	0.215	0.225	0.215	0.183	0.134	0.071	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.051	0.100	0.138	0.162	0.171	0.162	0.138	0.100	0.051	0.000	0.000	0.055	0.107	0.148	0.175	0.184	0.175	0.148	0.107	0.055	0.000
FINAL CAMBER	↑	0.000	1/4"	7/16"	9/16"	5/8"	5/8"	5/8"	9/16"	7/16"	1/4"	0.000	0.000	3/16"	9/16"	7/16"	1/2"	1/2"	1/2"	7/16"	9/16"	3/16"	0.000

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

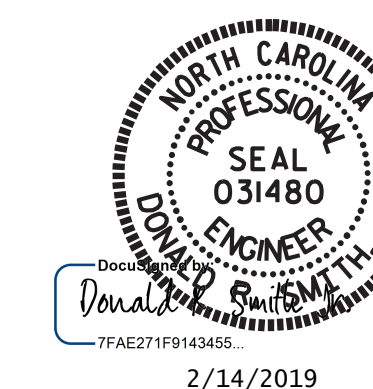
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																							
0.6" Ø LOW RELAXATION	SPAN C																						
	GIRDERS 1 & 4											GIRDERS 2 & 3											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.036	0.069	0.094	0.110	0.115	0.110	0.094	0.069	0.036	0.000	0.000	0.036	0.069	0.094	0.110	0.115	0.110	0.094	0.069	0.036	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.020	0.039	0.053	0.063	0.066	0.063	0.053	0.039	0.020	0.000	0.000	0.021	0.042	0.058	0.068	0.071	0.068	0.058	0.042	0.021	0.000
FINAL CAMBER	↑	0.000	3/16"	3/8"	1/2"	9/16"	9/16"	9/16"	1/2"	3/8"	3/16"	0.000	0.000	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0.000

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

PROJECT NO. B-4962
ORANGE COUNTY
STATION: 17+37.50 -L-

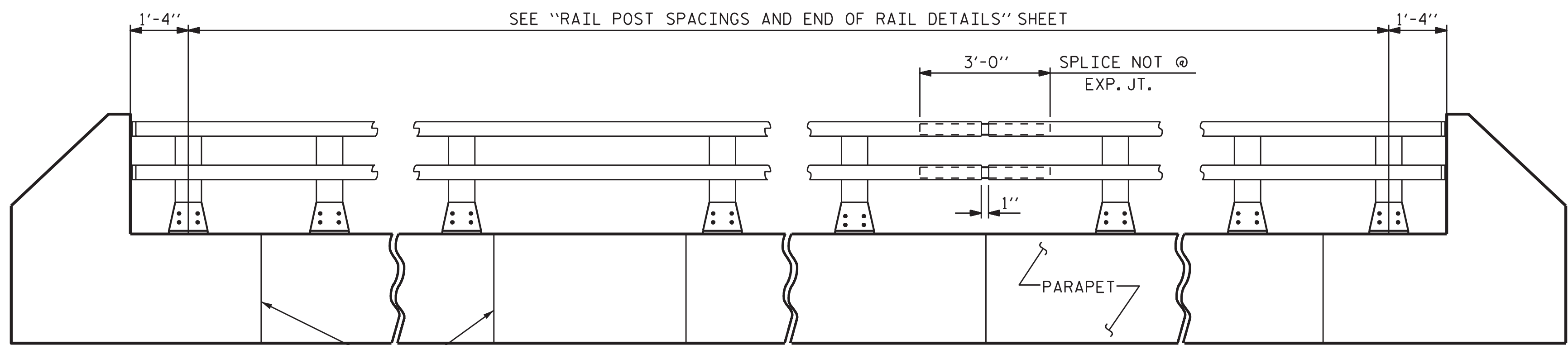
ASSEMBLED BY :	D. A. GLADDEN	DATE :	4/18
CHECKED BY :	D. R. SMITH	DATE :	9/18
DESIGN ENGINEER OF RECORD :	P. N. HOLDER	DATE :	10/18
DRAWN BY :	ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY :	GRP 8/91	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

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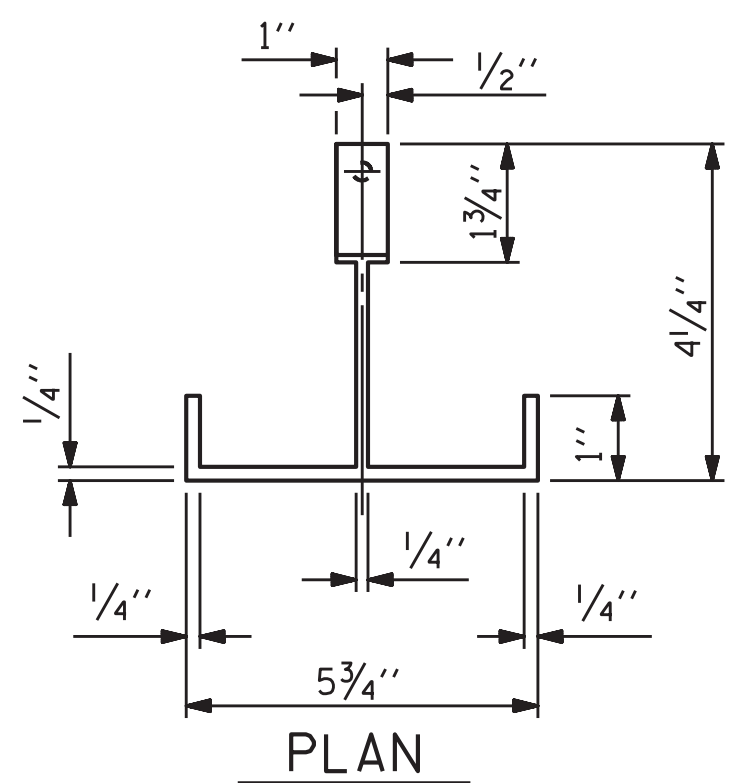
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUPERSTRUCTURE DEAD LOAD DEFLECTIONS						S-20
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	47
1			3			
2			4			

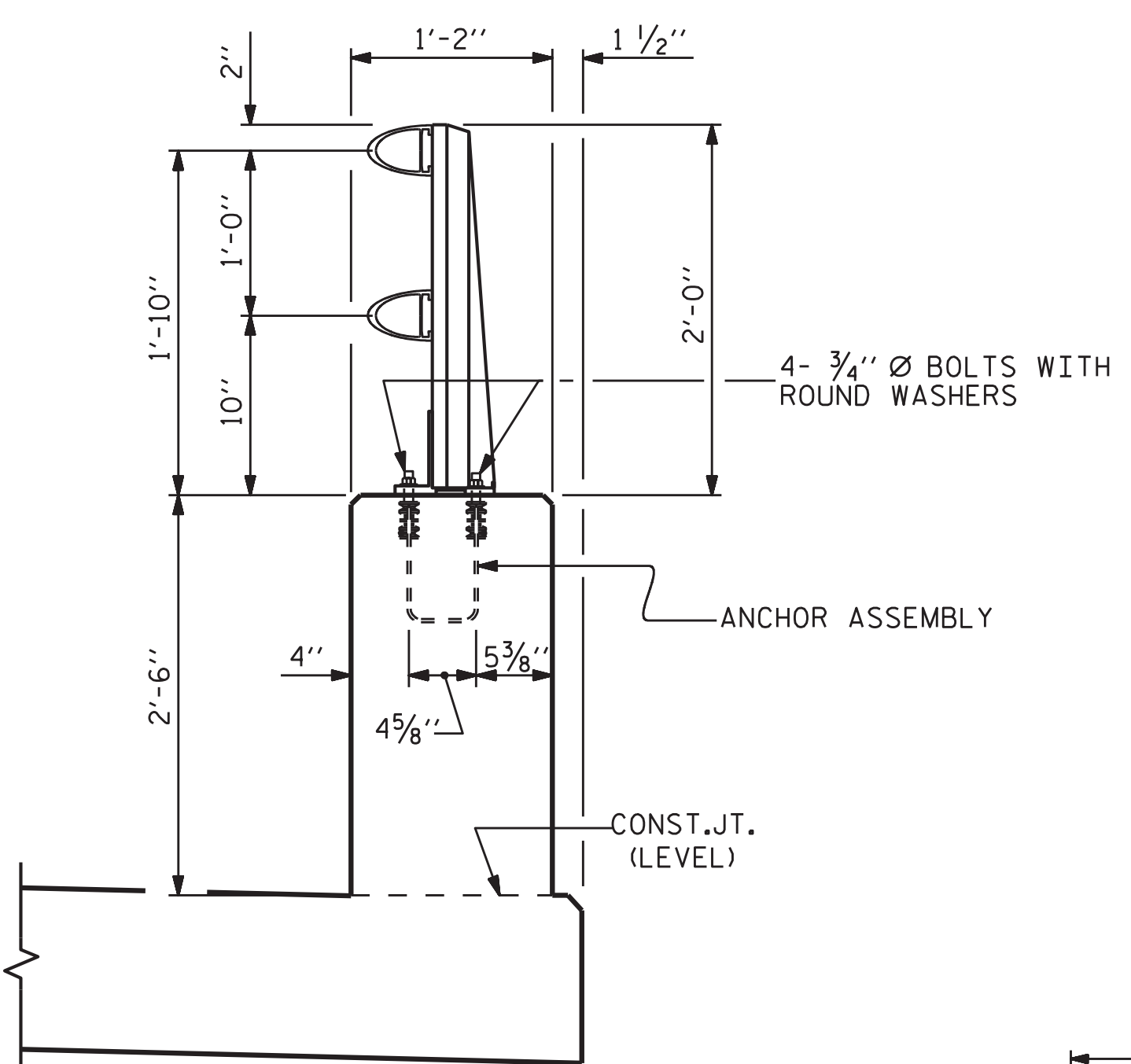


ELEVATION

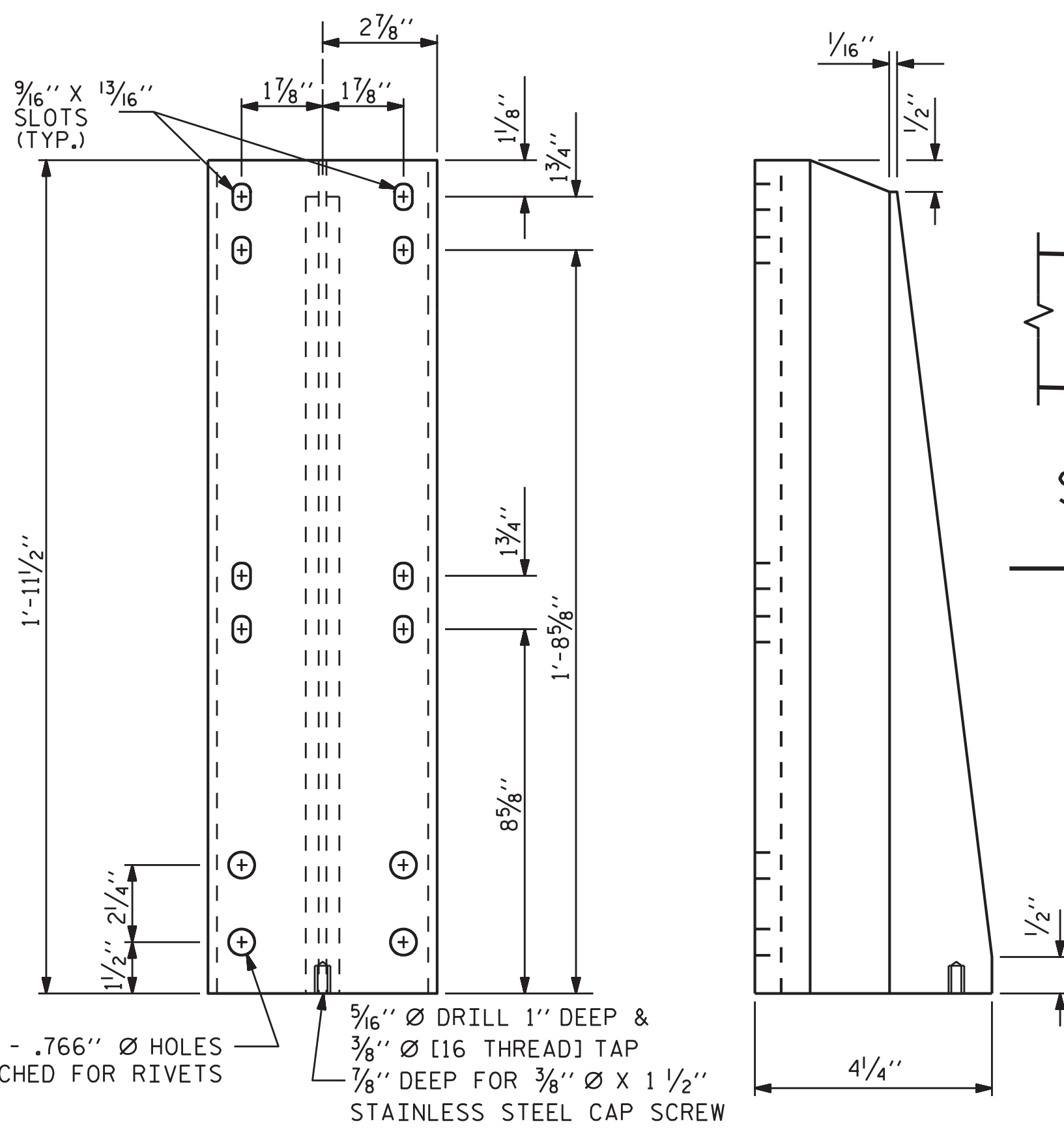
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN



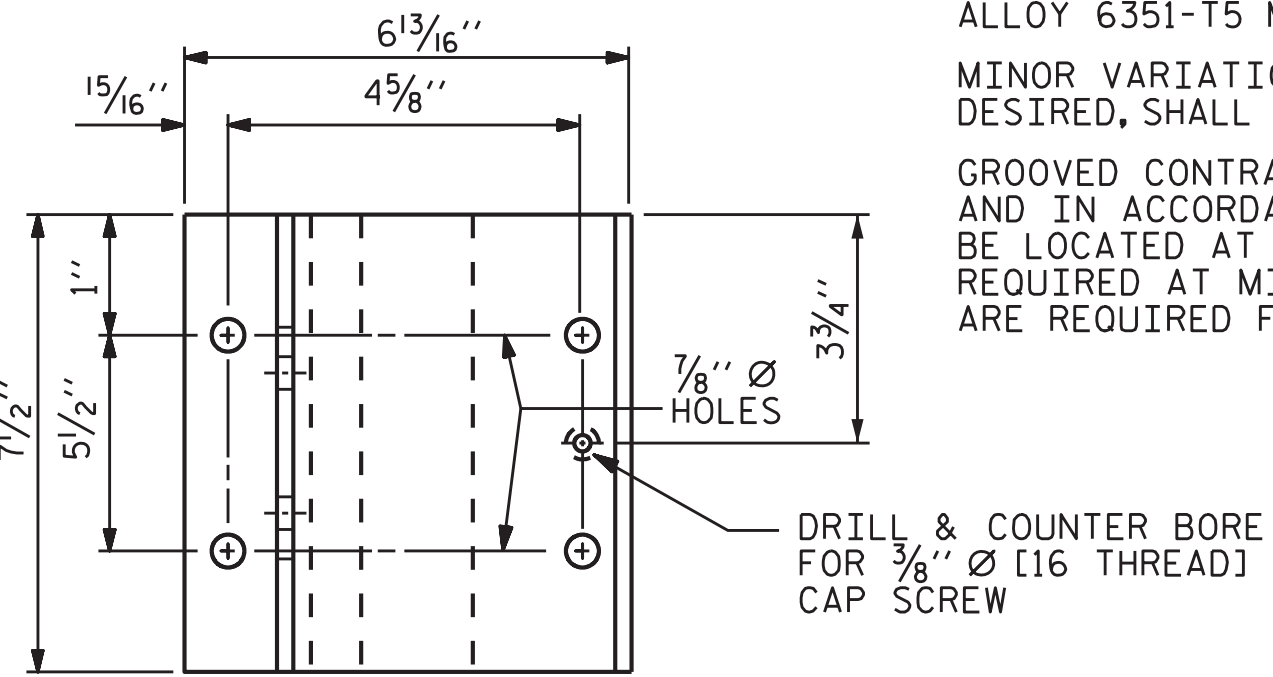
SECTION THRU PARAPET AND RAIL



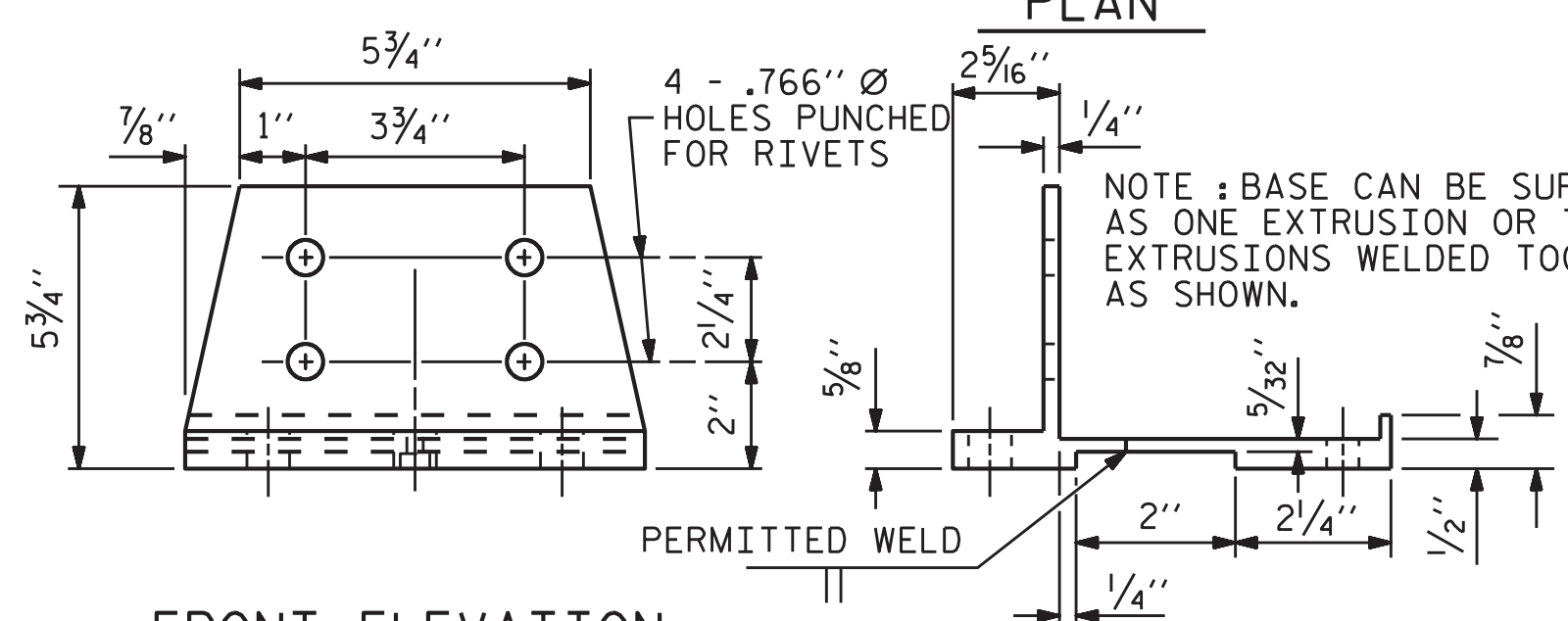
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



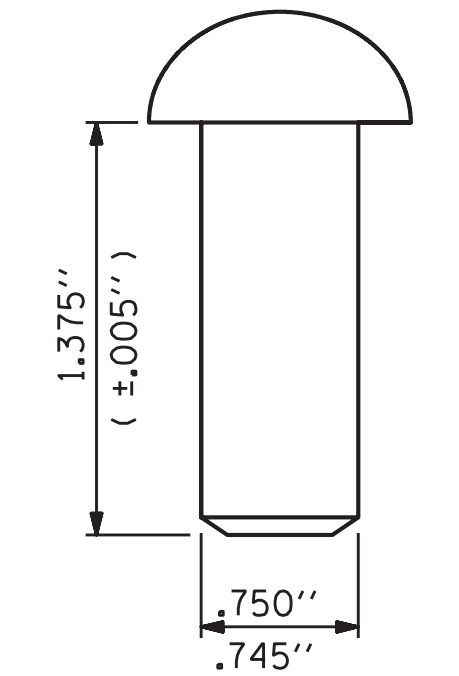
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



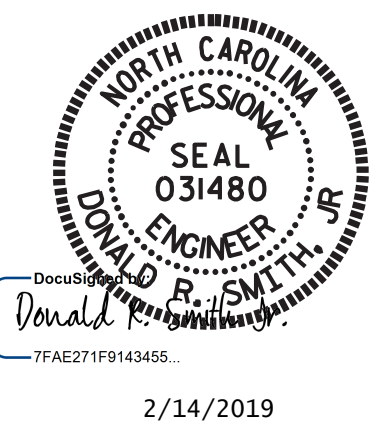
RIVET DETAIL

PAY LENGTH = 510.70 LIN. FT.

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-21
STANDARD 2 BAR METAL RAIL						TOTAL SHEETS 47
REVISIONS						NO. BY: DATE: NO. BY: DATE: NO. BY: DATE:
1			3			
2			4			



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 SIGNATURES COMPLETED

ASSEMBLED BY : D. A. GLADDEN	DATE : 4/18
CHECKED BY : D. R. SMITH	DATE : 9/18
DRAWN BY : EEM 6/94	REV. 10/11 MAA/GM
CHECKED BY : RCW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

NOTES

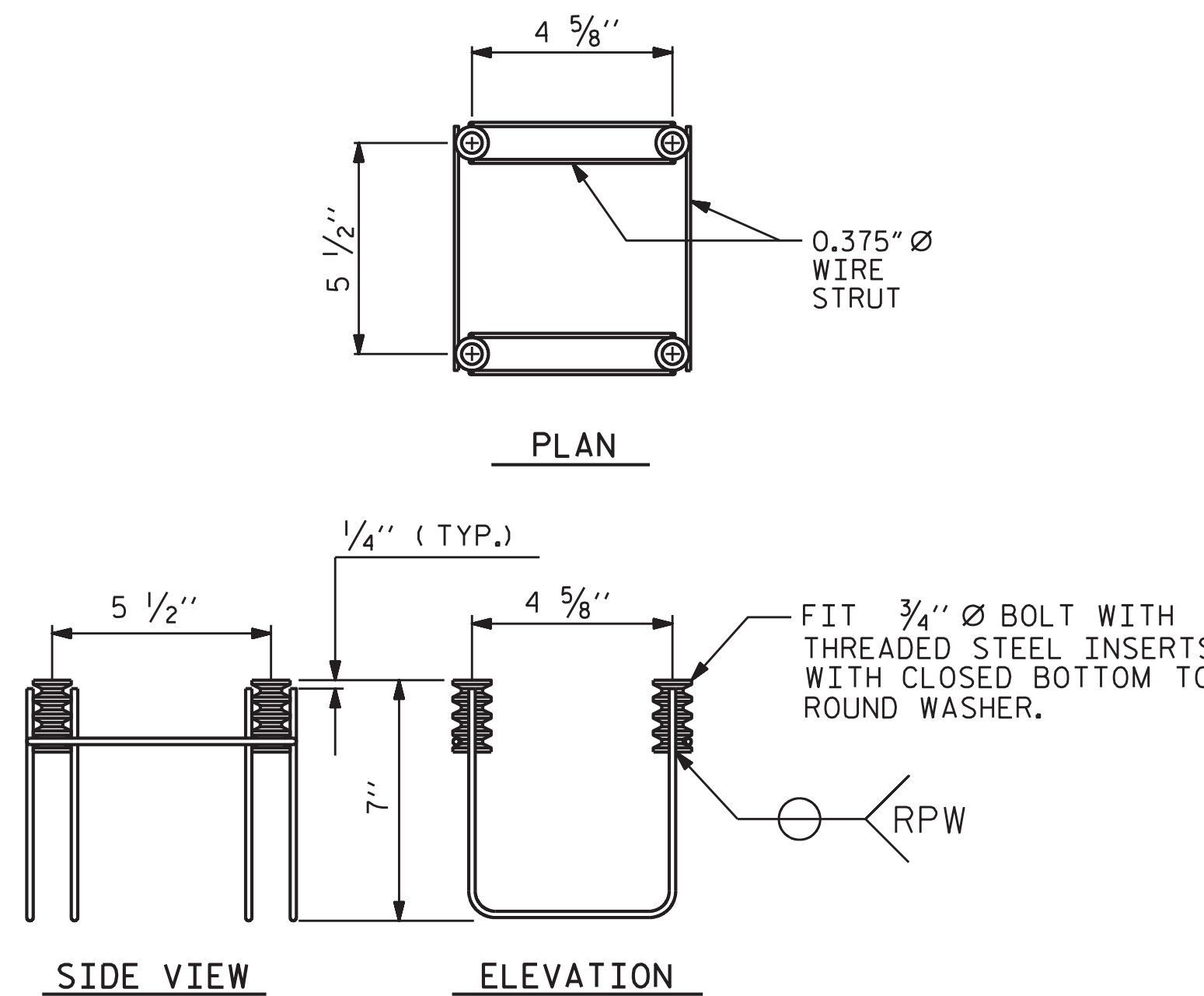
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

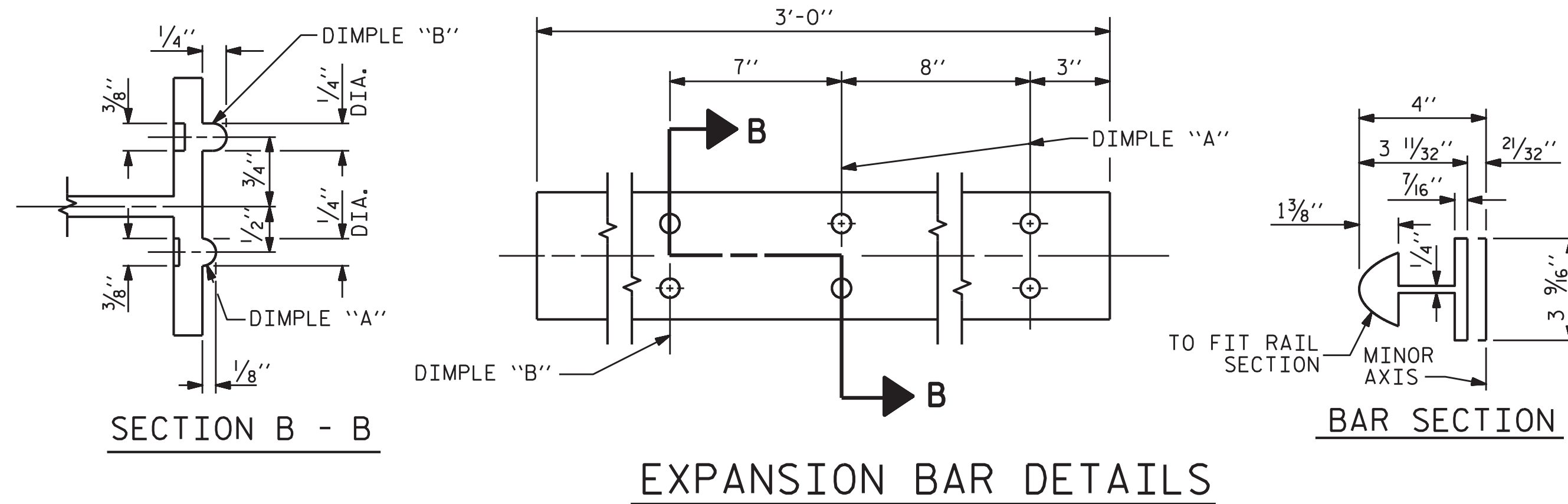
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

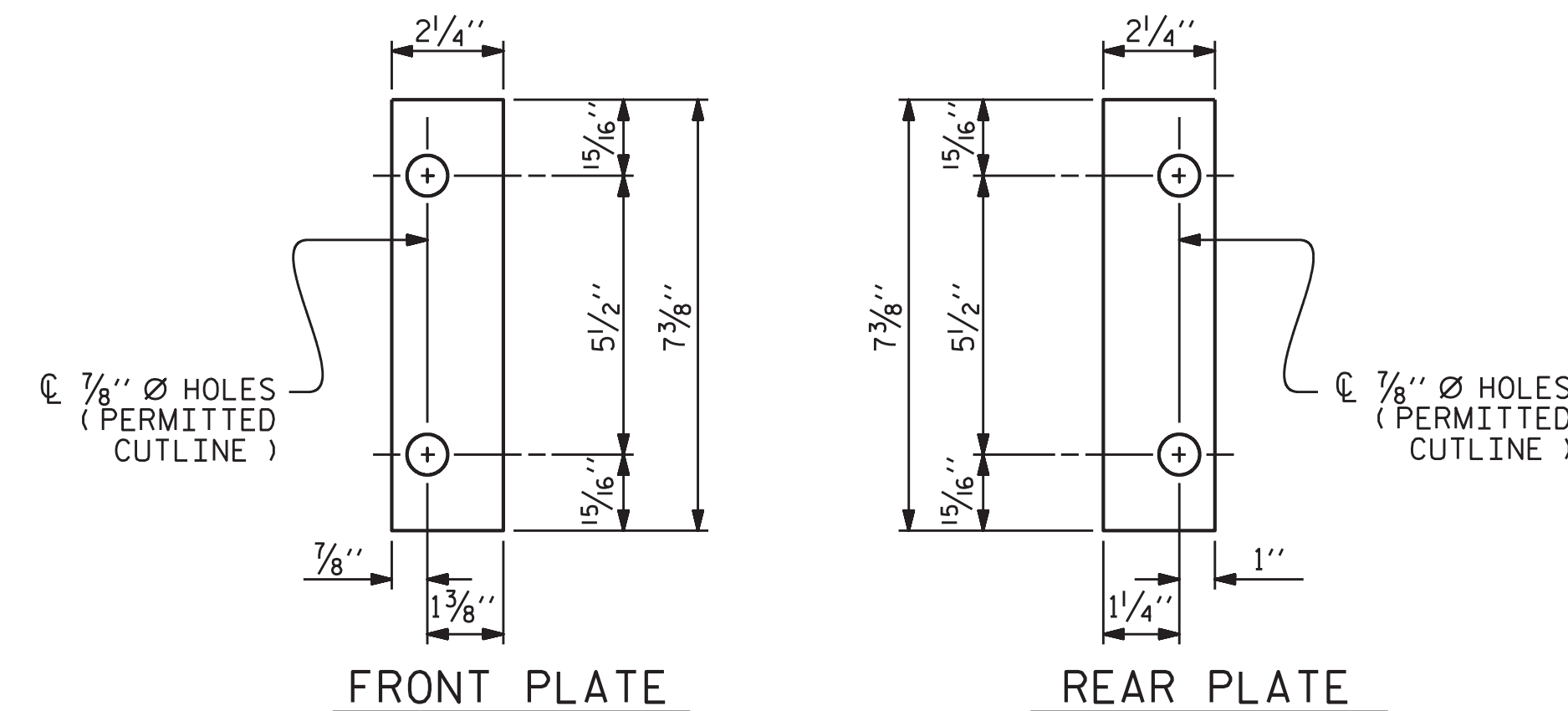


4-BOLT METAL RAIL ANCHOR ASSEMBLY

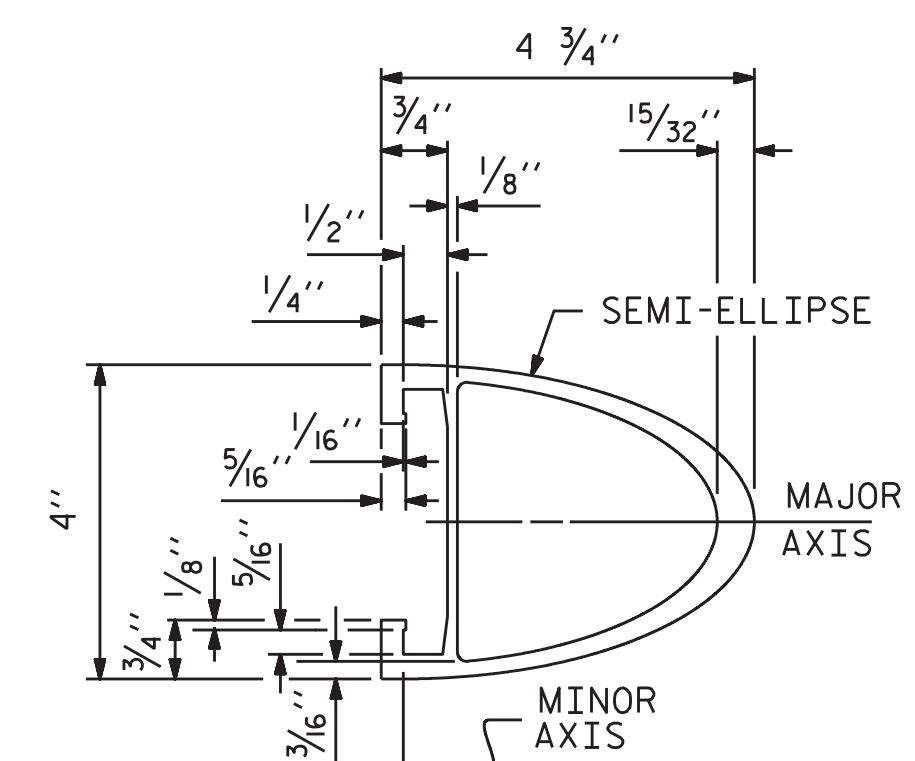
(86 ASSEMBLIES REQUIRED)



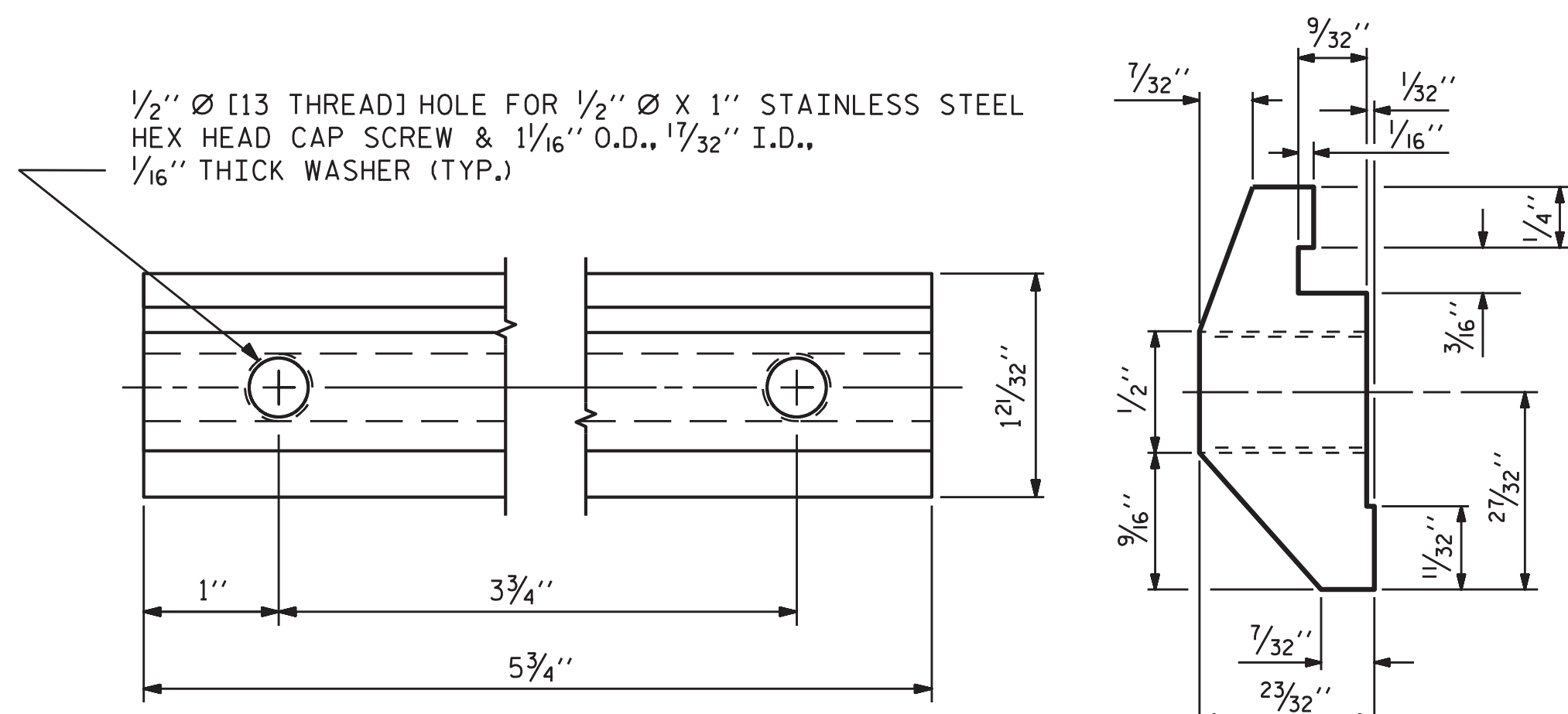
EXPANSION BAR DETAILS



SHIM DETAILS

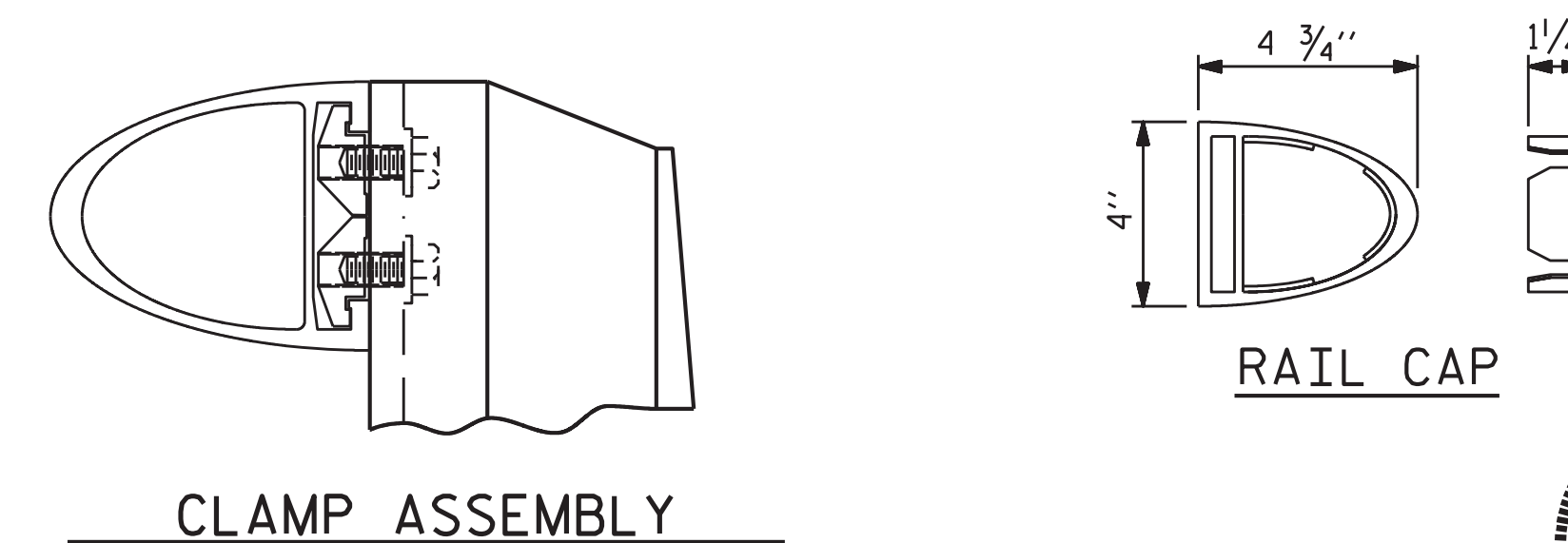


RAIL SECTION



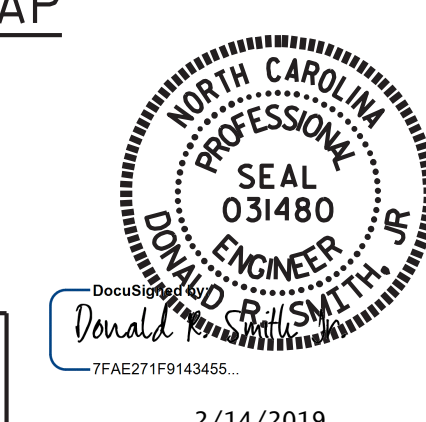
CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

RAIL CAP



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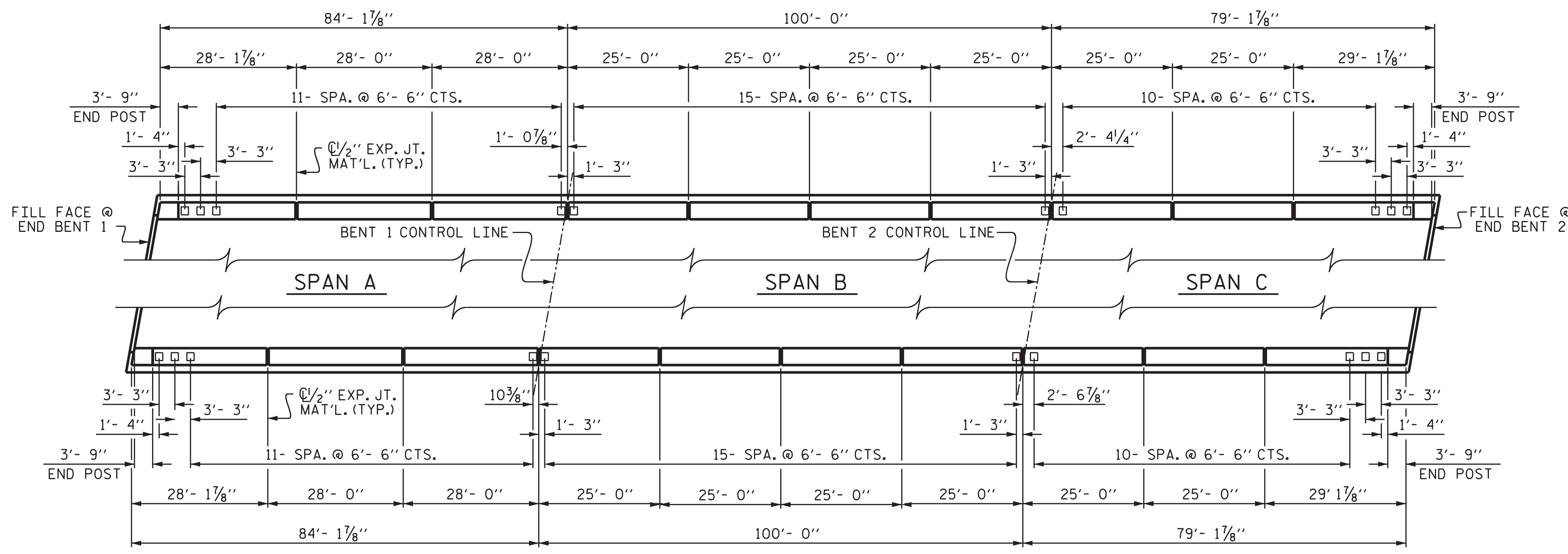
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4962
ORANGE COUNTY
STATION: 17+37.50 -L-

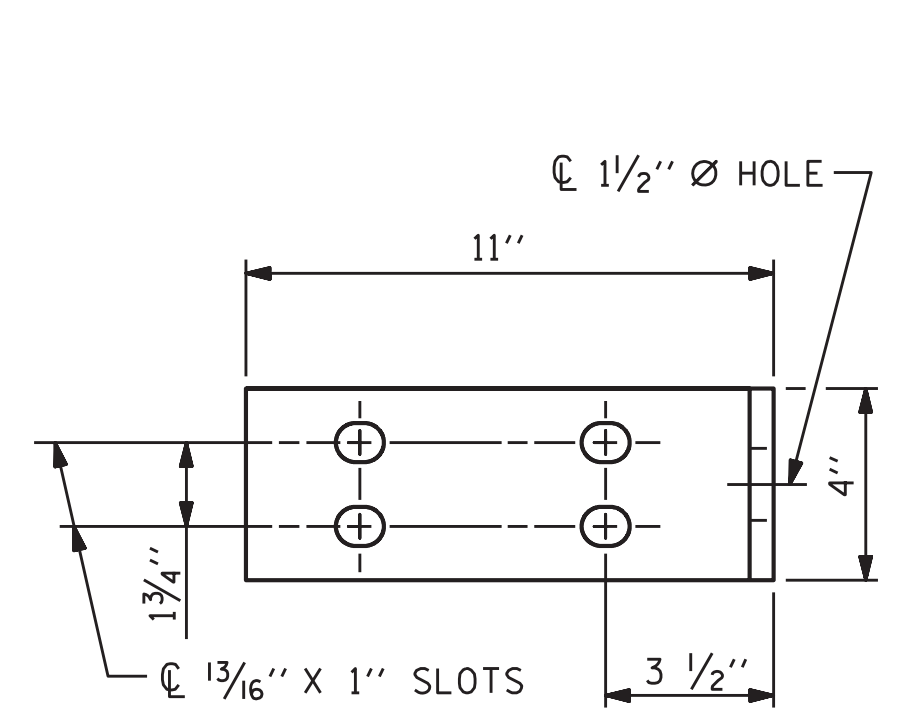
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-22
STANDARD 2 BAR METAL RAIL						TOTAL SHEETS 47
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

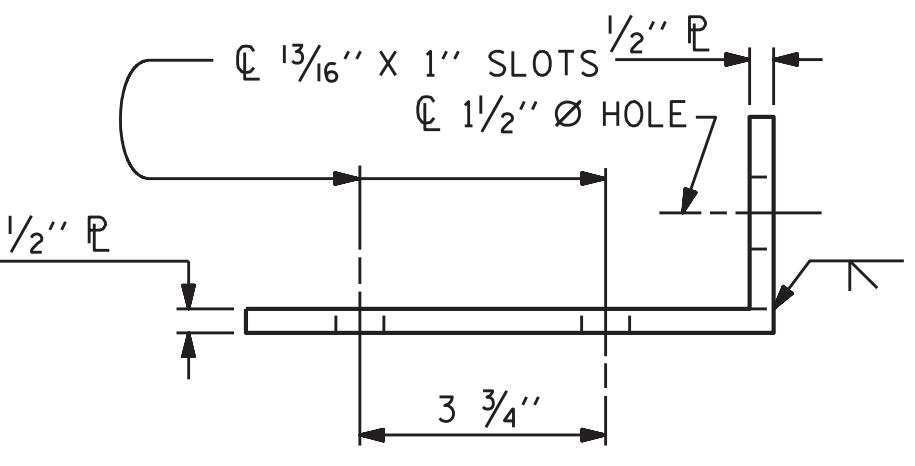
ASSEMBLED BY : <u>D. A. GLADDEN</u>	DATE : <u>4/18</u>
CHECKED BY : <u>D. R. SMITH</u>	DATE : <u>9/18</u>
DRAWN BY : <u>EEM 6/94</u>	REV. 5/1/06R KMM/GM
CHECKED BY : <u>RCW 6/94</u>	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



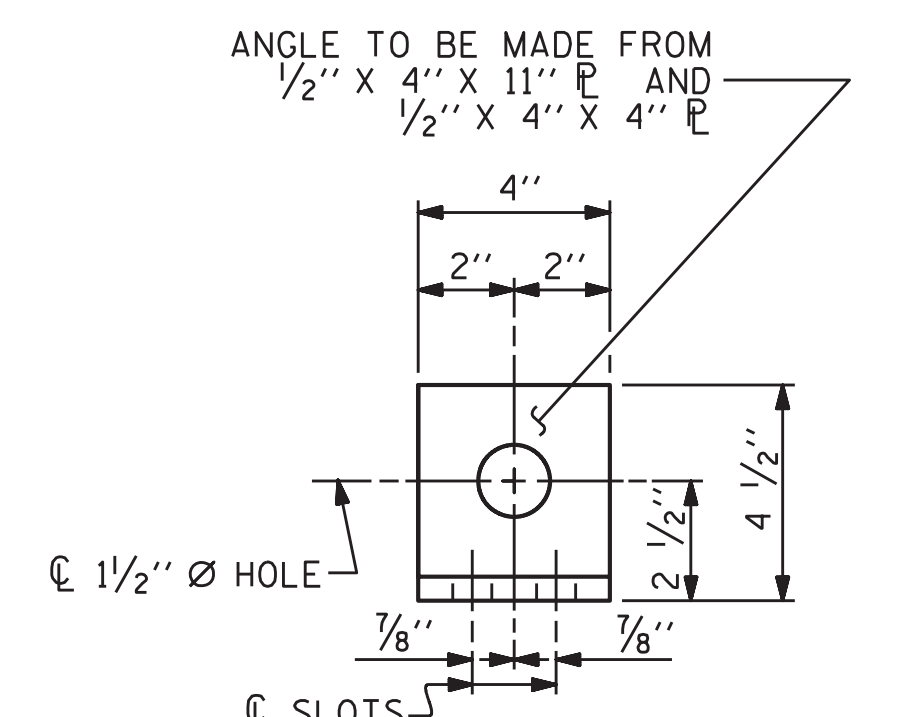
PLAN OF RAIL POST SPACINGS



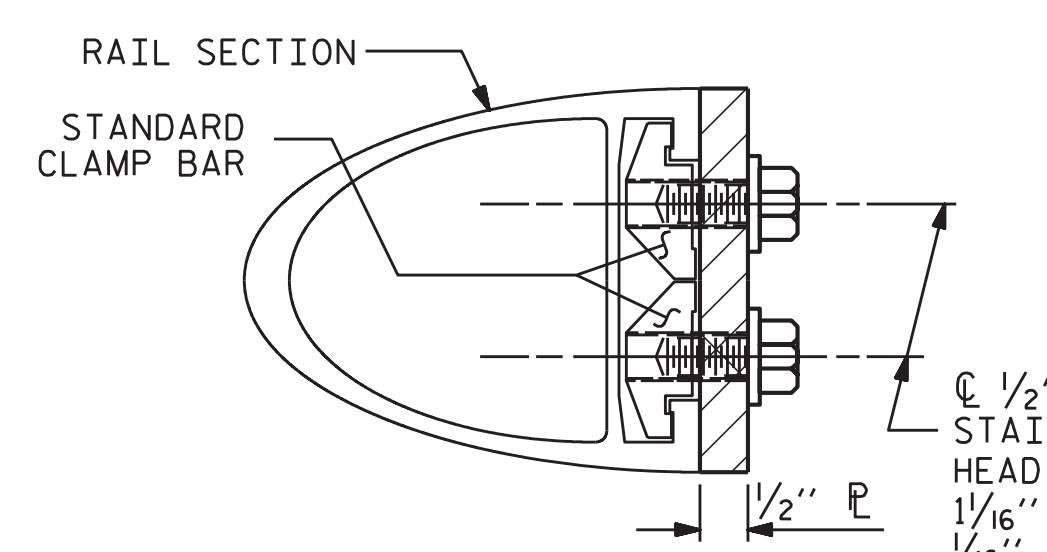
ELEVATION



TOP VIEW

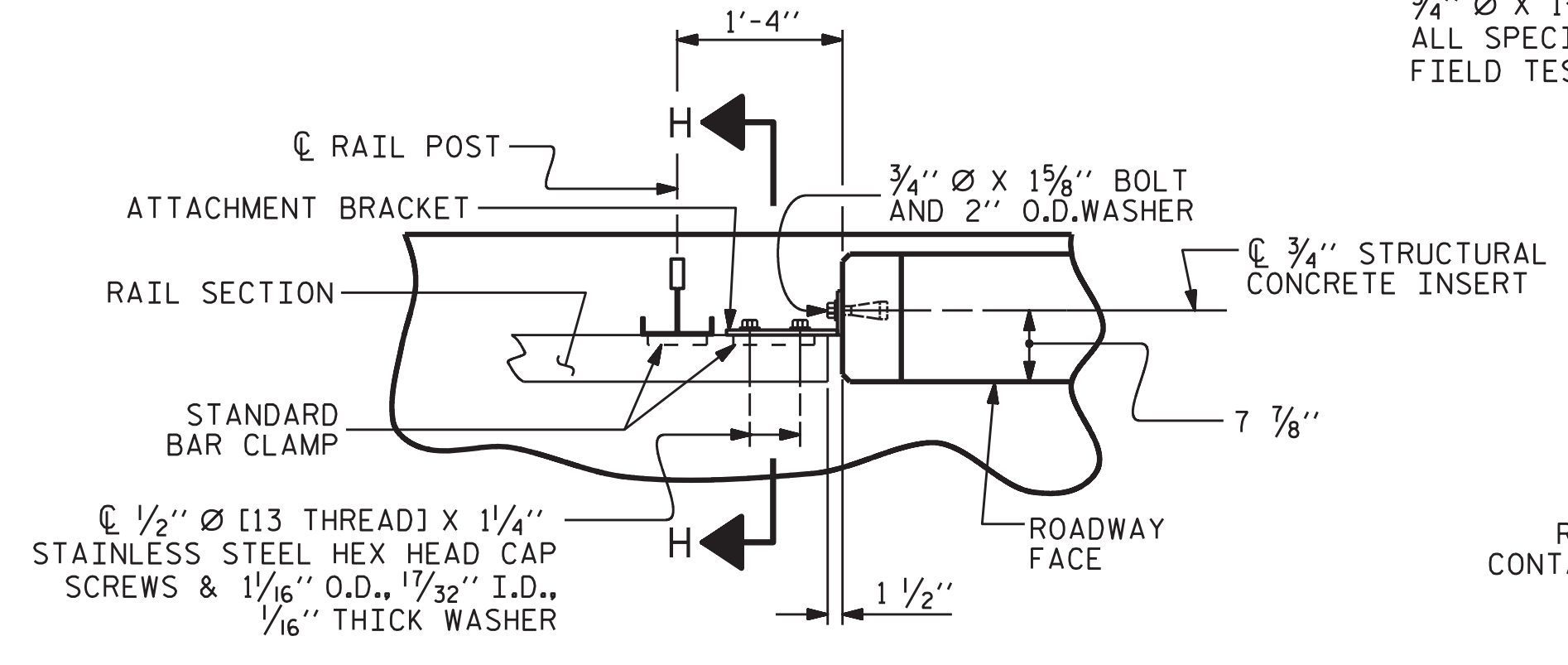


END VIEW (FIX AND EXP.)

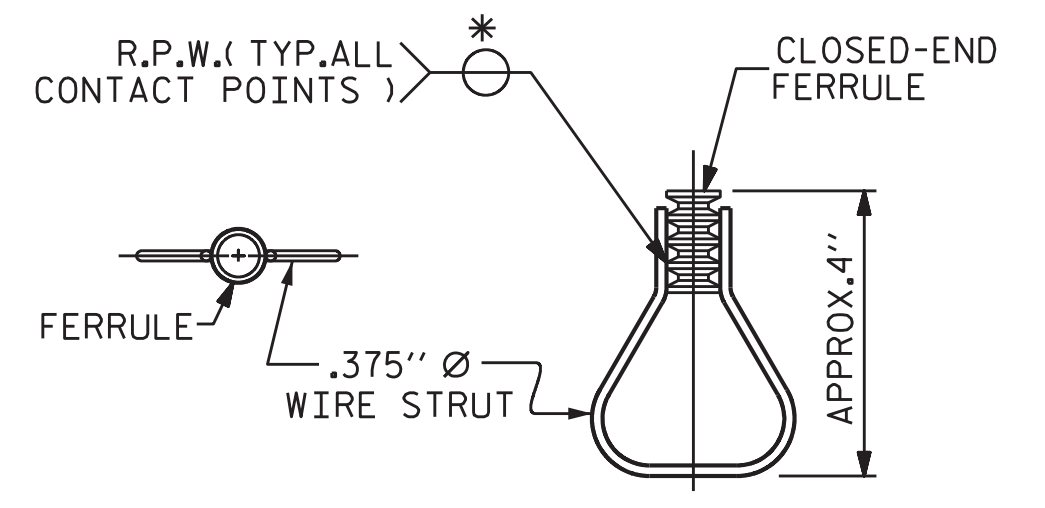


SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
 - B. 1 - 3/4" Ø X 1 1/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 1/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" BOLT SHALL HAVE N.C. THREADS.
 - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
 - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

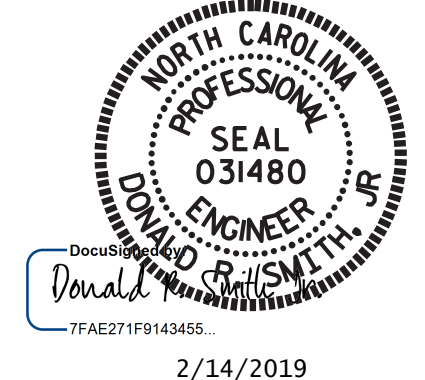
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

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

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS**
 FOR ONE OR TWO BAR METAL RAILS

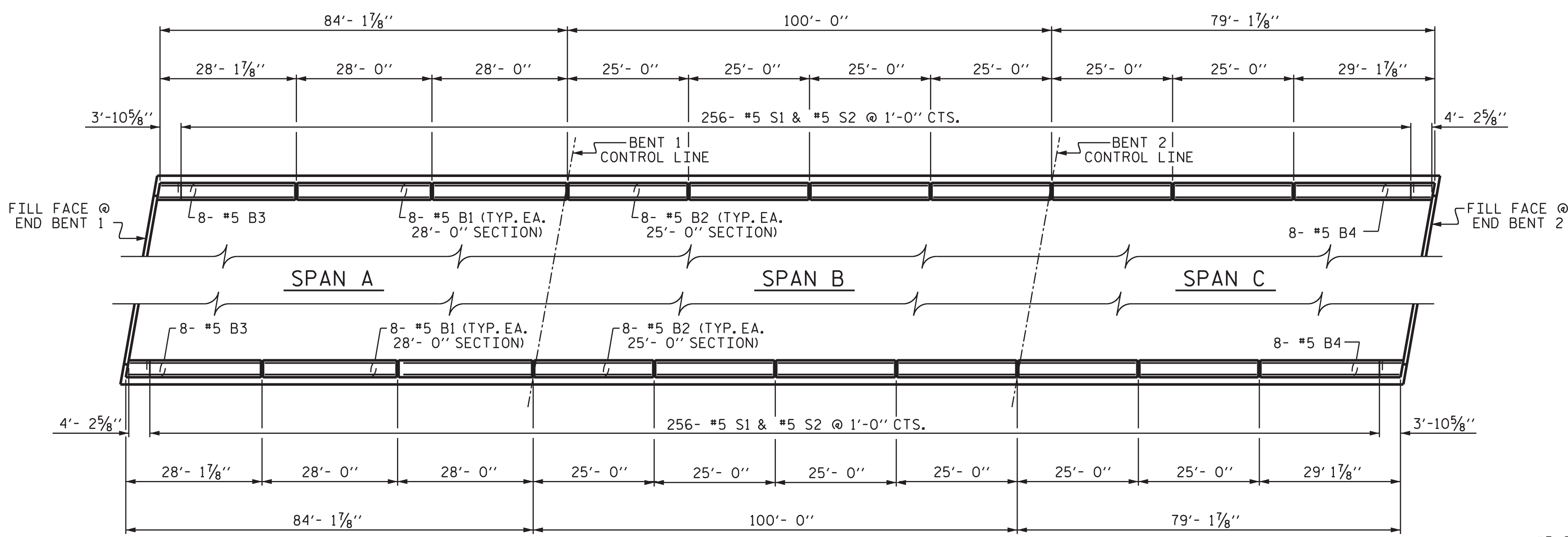


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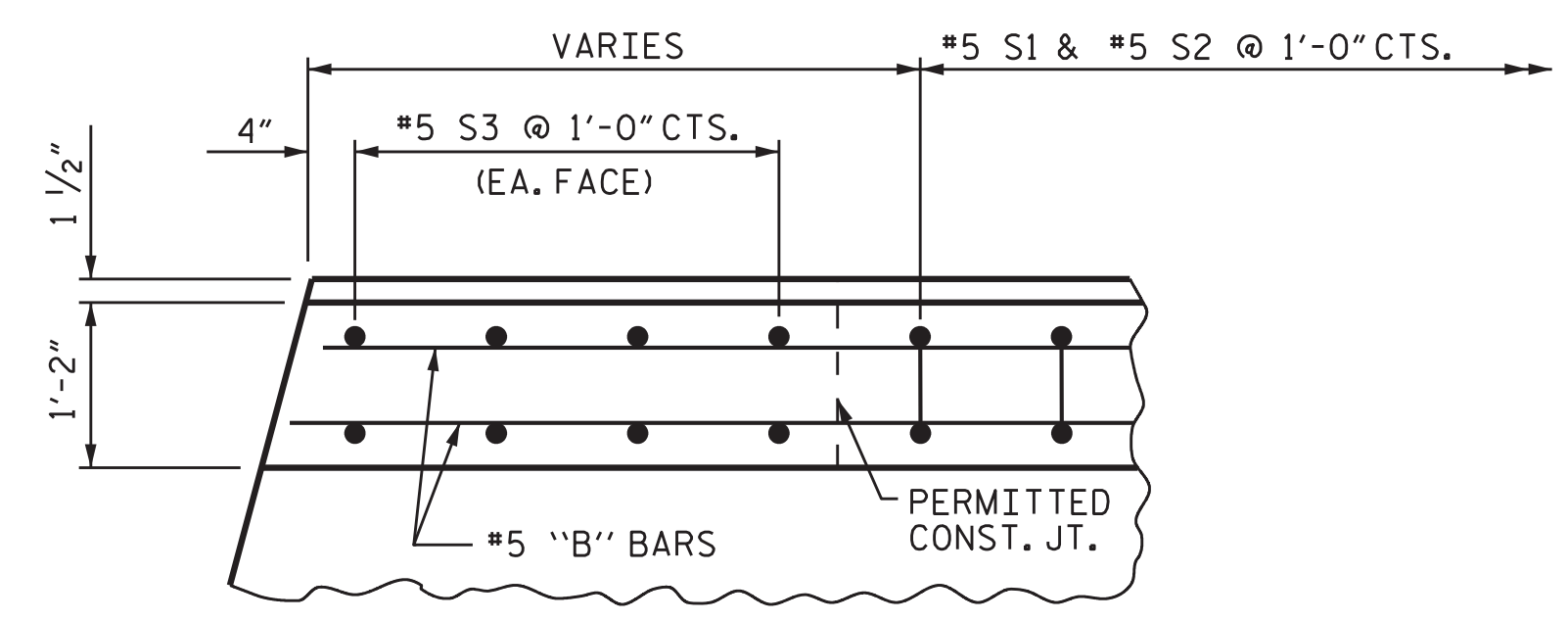
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
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2			4			

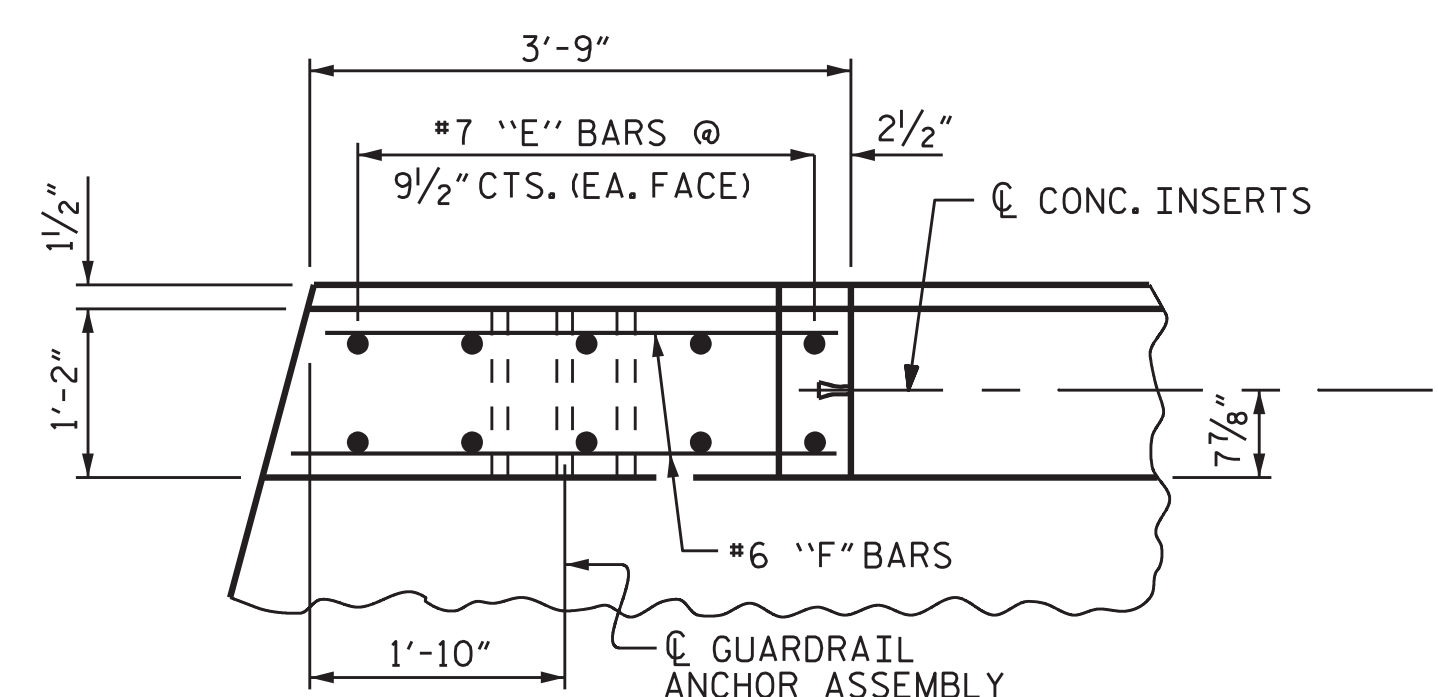
ASSEMBLED BY : <u>D. A. GLADDEN</u> DATE : <u>4/18</u>
CHECKED BY : <u>D. R. SMITH</u> DATE : <u>9/18</u>
DRAWN BY : <u>FCJ</u> 1/88
CHECKED BY : <u>CRK</u> 3/89
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC



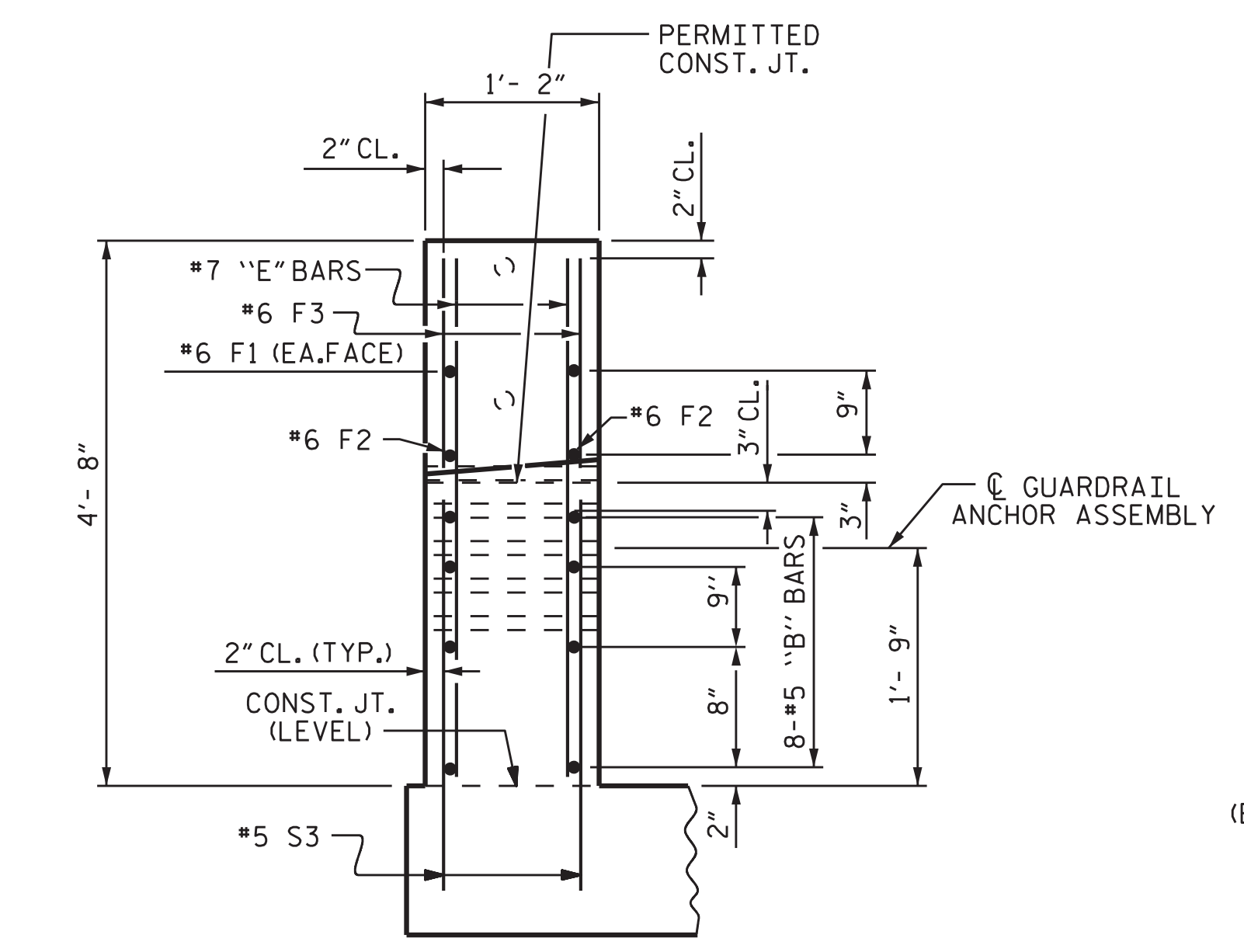
PLAN OF PARAPET



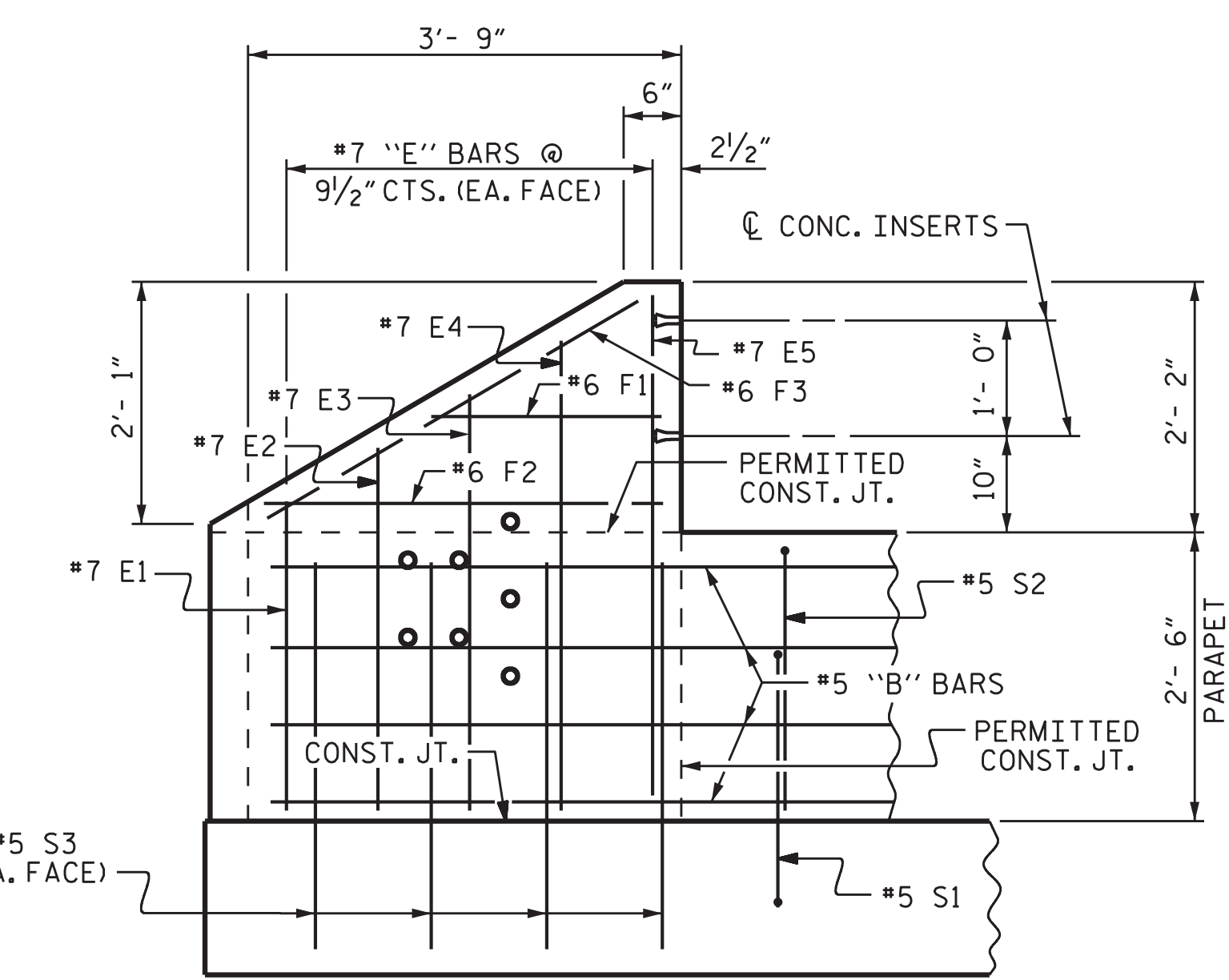
PLAN OF PARAPET



PLAN OF END POST



END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

NOTES

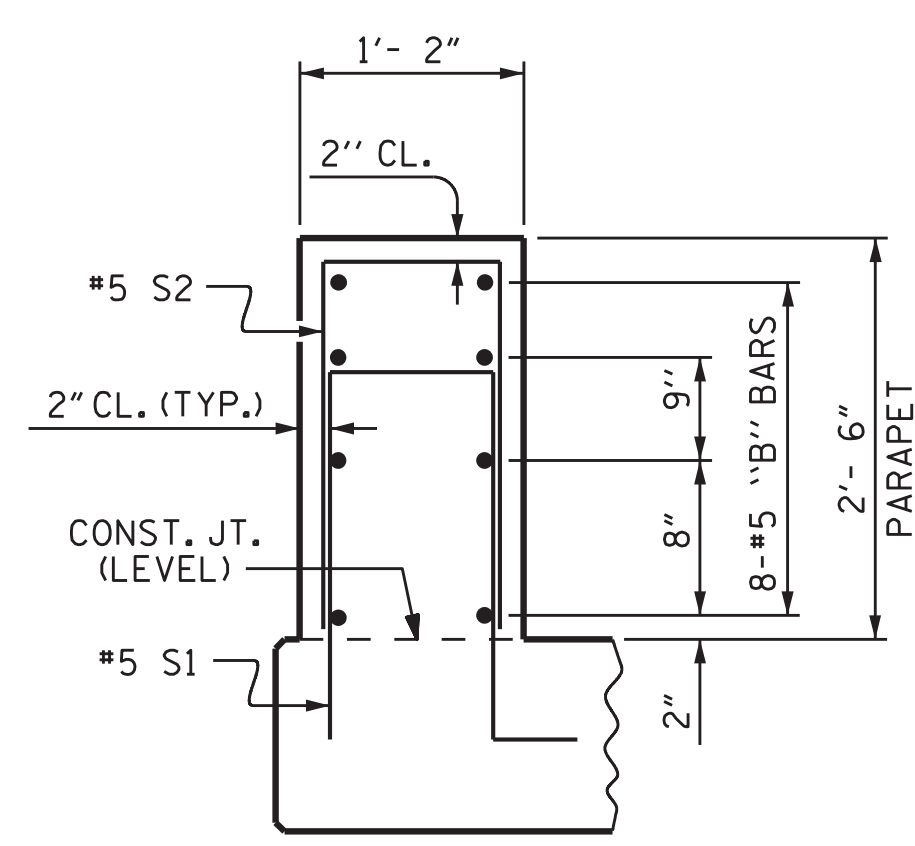
CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN PARAPET AND END POSTS SHALL BE EPOXY COATED.

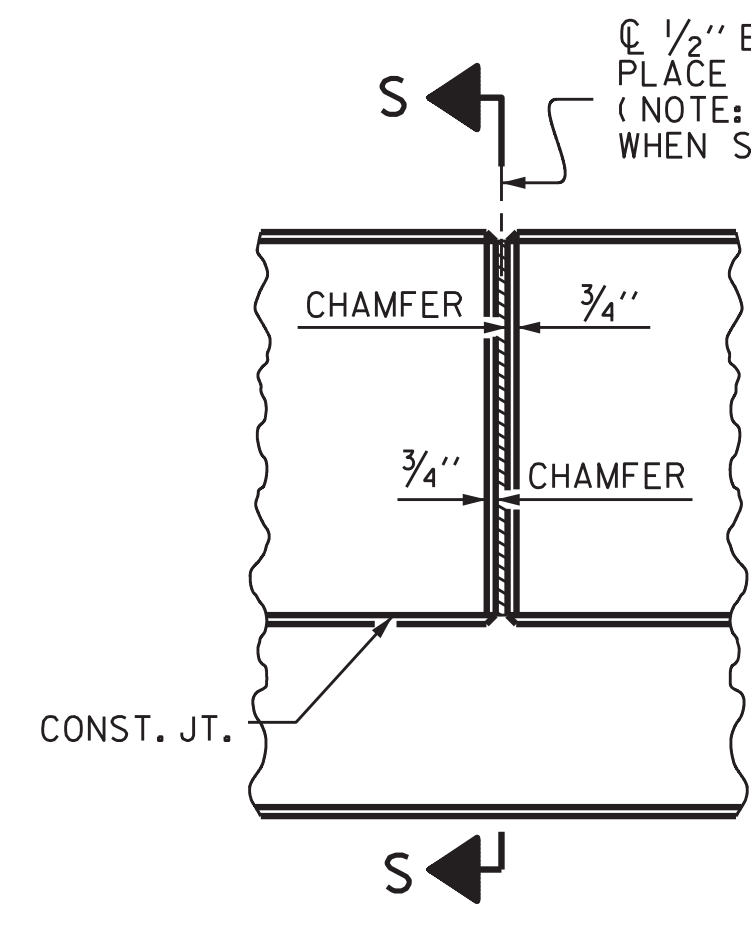
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACE OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT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

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

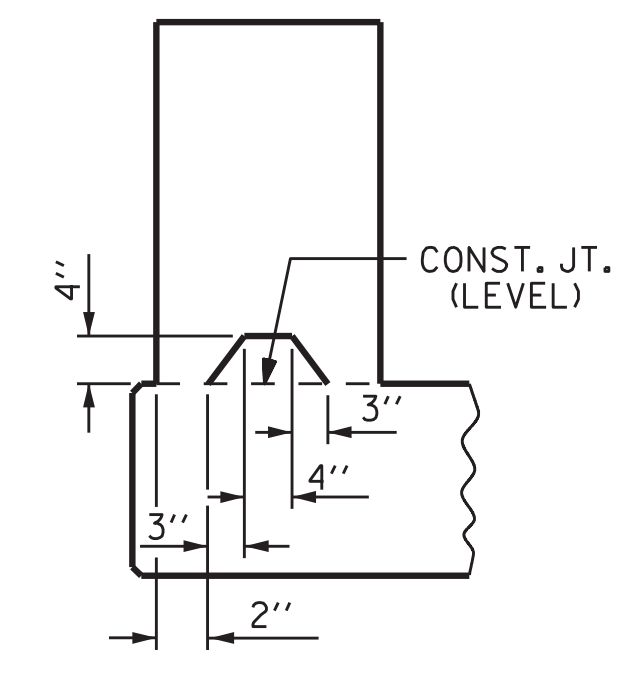
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.



SECTION THROUGH PARAPET

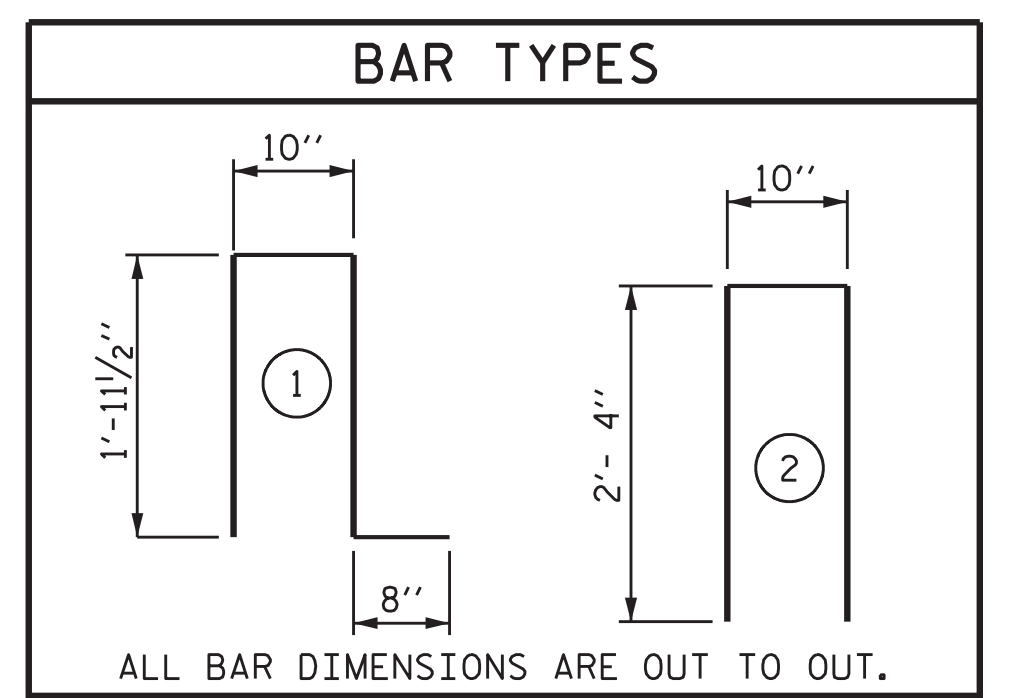


ELEVATION AT EXPANSION JOINTS



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

CONCRETE PARAPET DETAILS



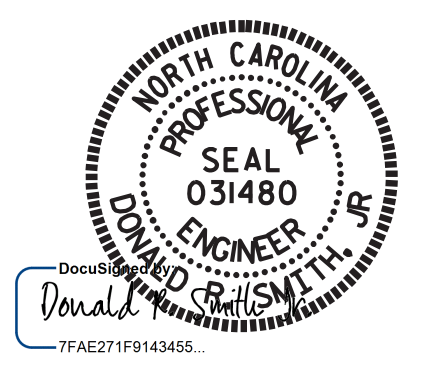
BILL OF MATERIAL FOR PARAPET AND END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	32	#5	STR	27'- 7"	921
* B2	96	#5	STR	24'- 7"	2461
* B3	16	#5	STR	27'- 9"	463
* B4	16	#5	STR	28'- 9"	480
* E1	8	#7	STR	2'- 6"	41
* E2	8	#7	STR	3'- 0"	49
* E3	8	#7	STR	3'- 6"	57
* E4	8	#7	STR	4'- 0"	65
* E5	8	#7	STR	4'- 4"	71
* F1	8	#6	STR	1'- 11"	23
* F2	8	#6	STR	3'- 2"	38
* F3	8	#6	STR	3'- 6"	42
* S1	512	#5	1	5'- 5"	2893
* S2	512	#5	2	5'- 6"	2937
* S3	32	#5	STR	3'- 0"	100
* EPOXY COATED REINFORCING STEEL					10,641 LBS.
CLASS AA CONCRETE					57.8 CU. YDS.
CONCRETE PARAPET					526.63 LIN. FT.

PROJECT NO. **B-4962**
ORANGE COUNTY
 STATION: **17+37.50 -L-**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CONCRETE PARAPET AND END POST DETAILS



2/14/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS 47
2			4			

DRAWN BY: D. A. GLADDEN DATE: 4/18
 CHECKED BY: D. R. SMITH DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18

NOTES

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

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

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

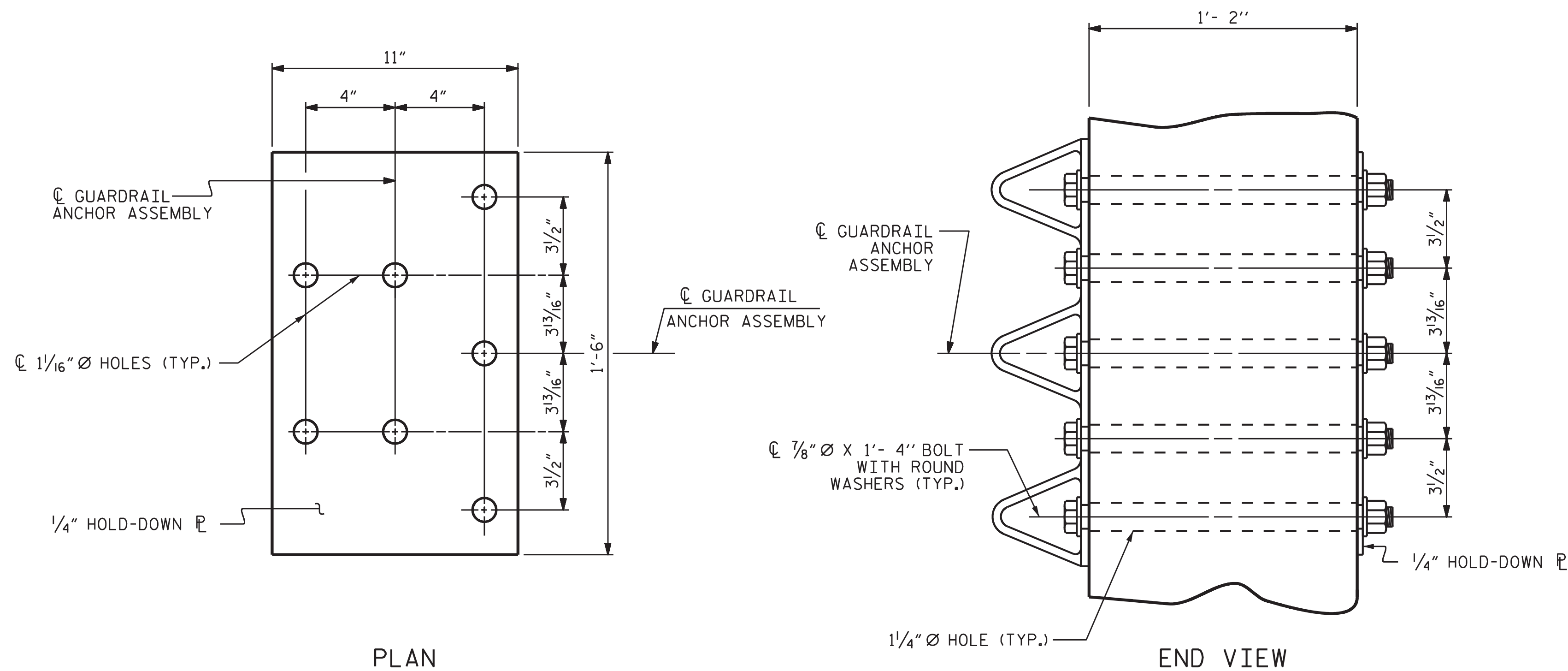
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

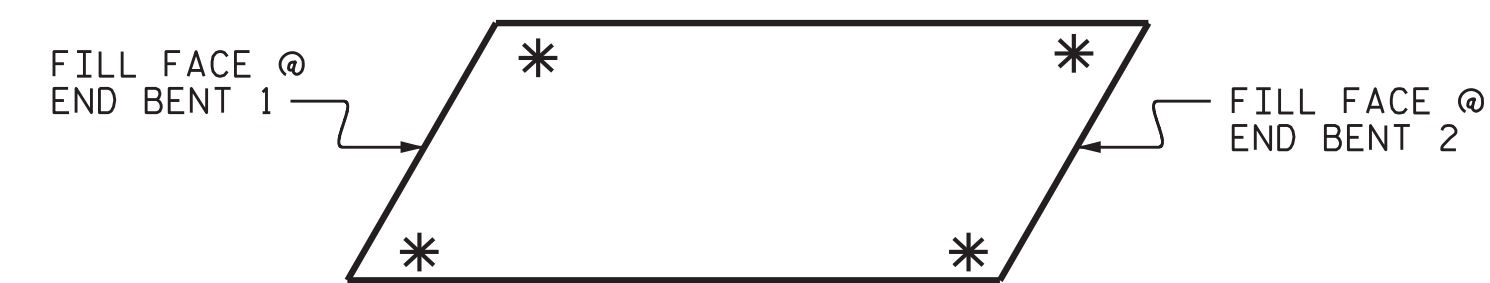
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

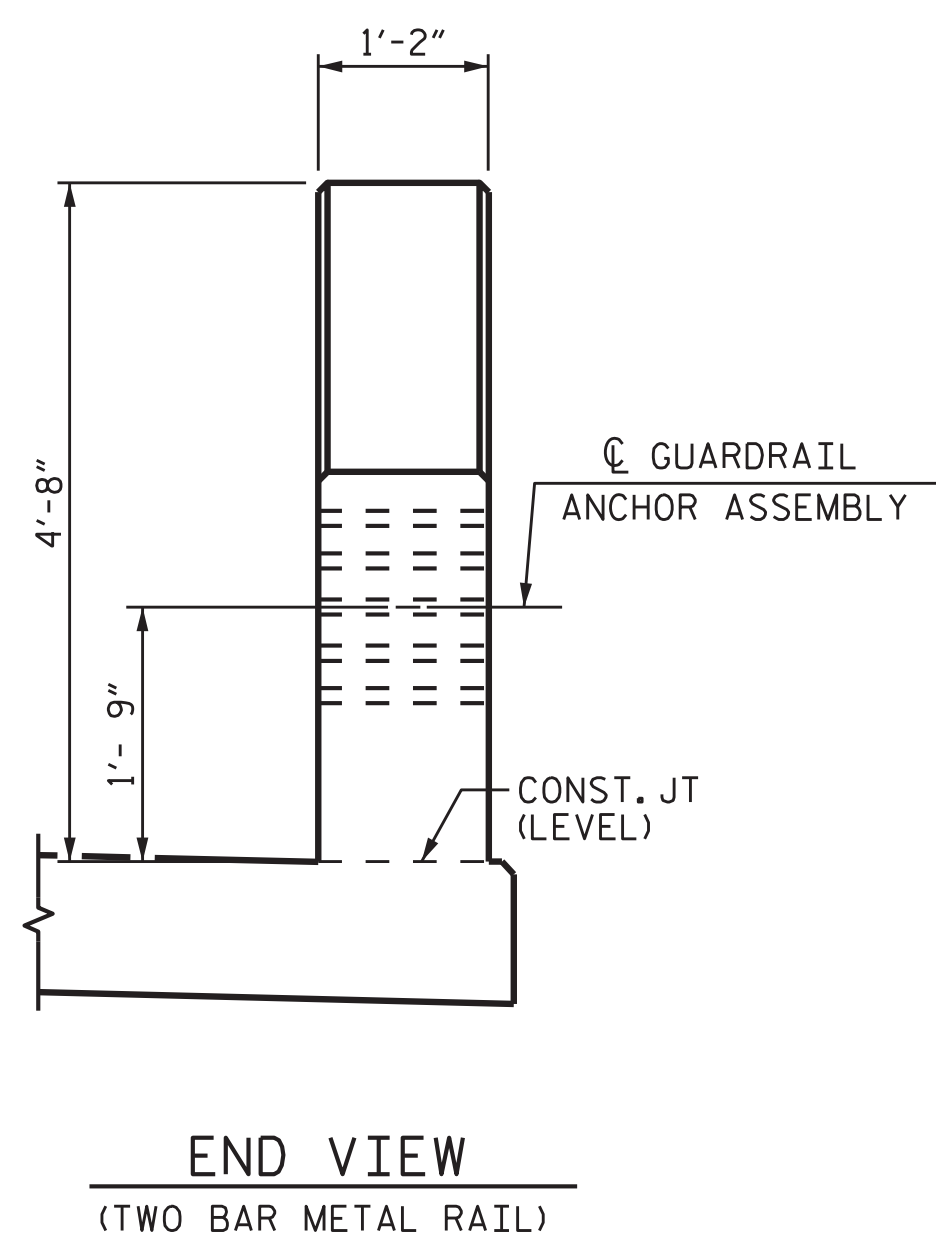


GUARDRAIL ANCHOR ASSEMBLY DETAILS

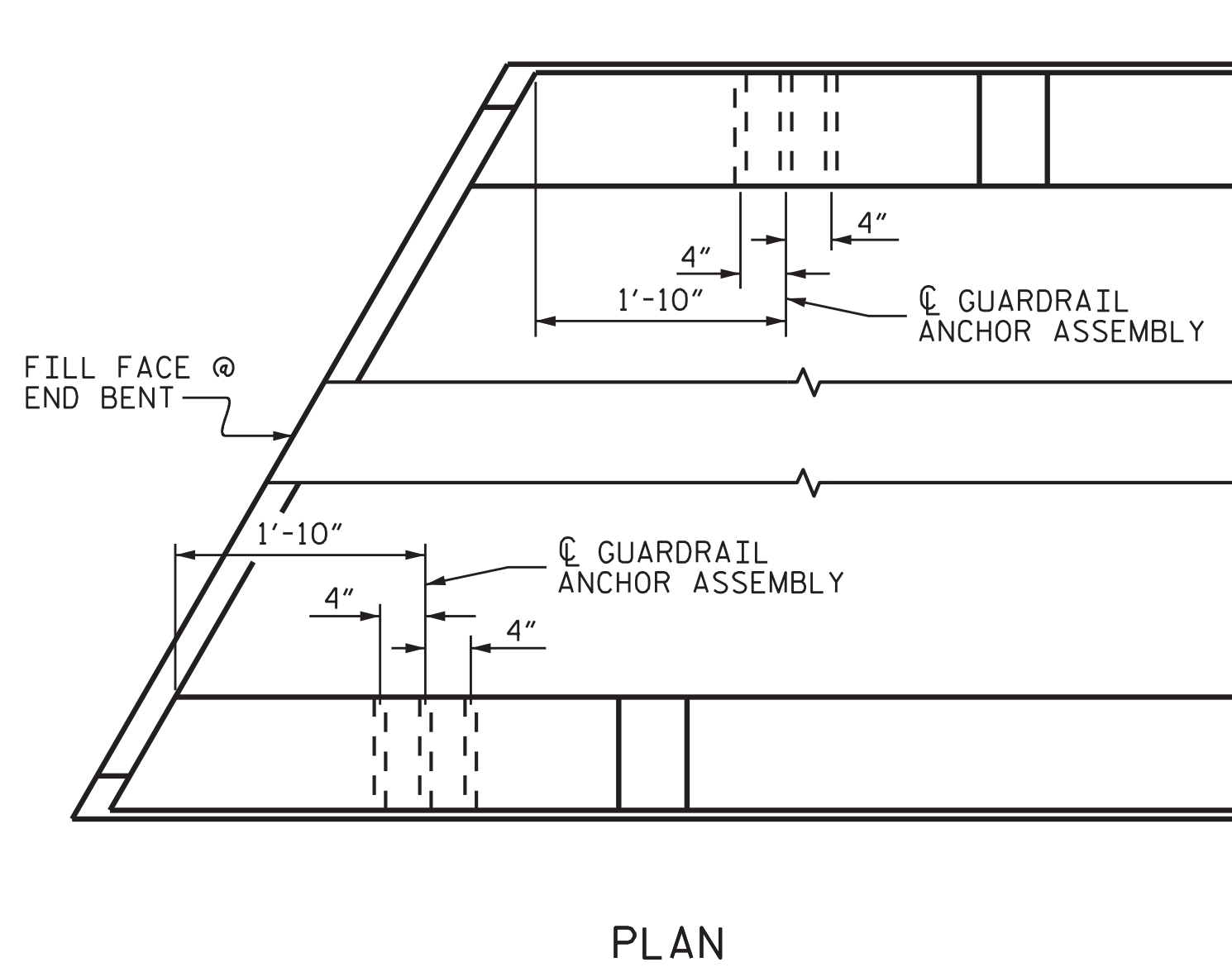


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



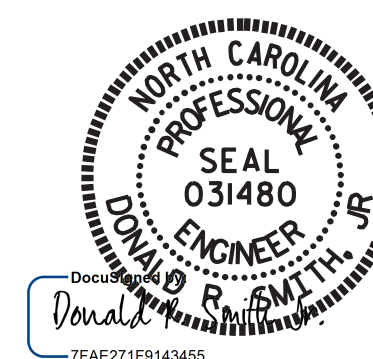
END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-



2/14/2019

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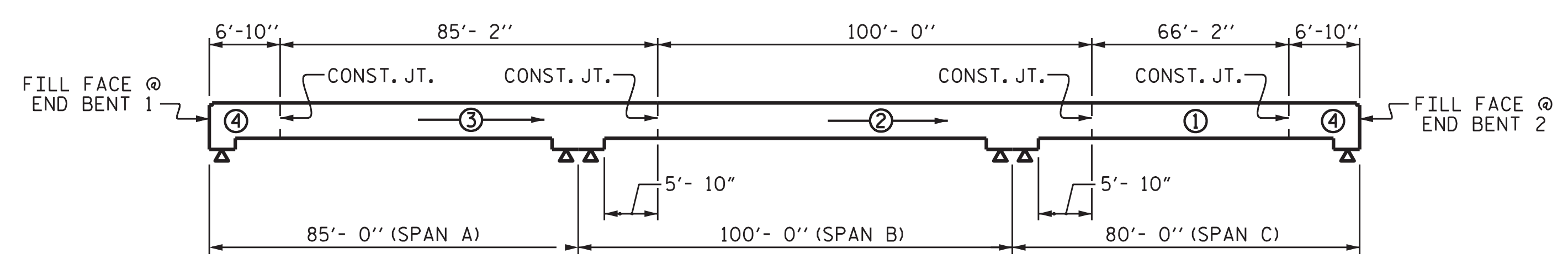
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 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS

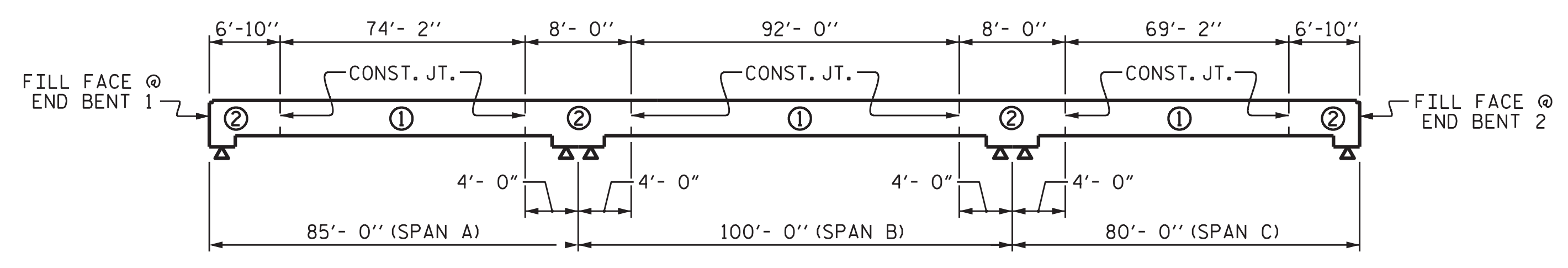
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2			4			

STD. NO. GRA3

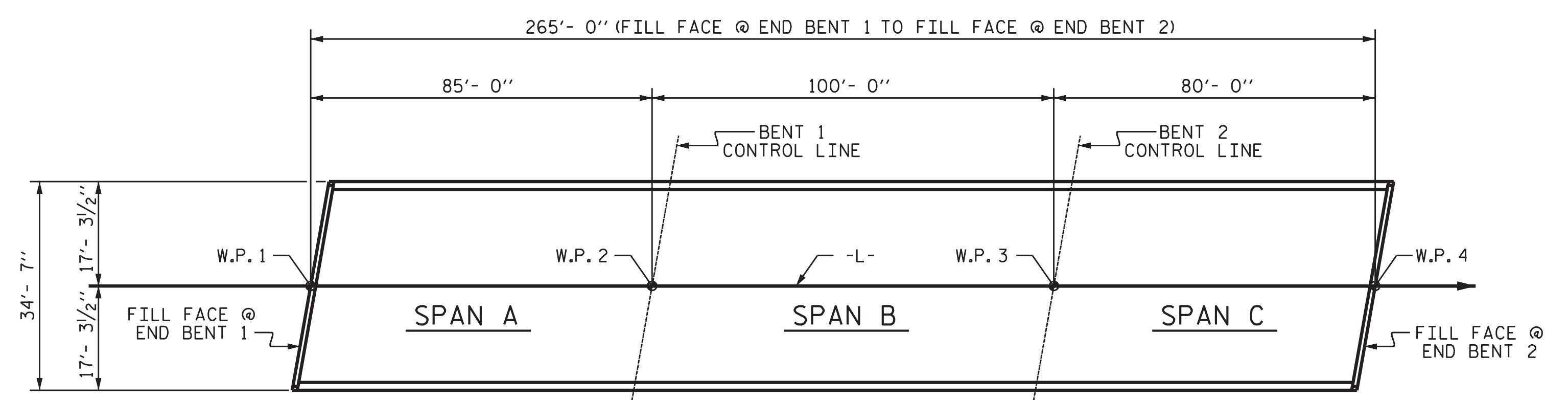
ASSEMBLED BY : <u>D. A. GLADDEN</u>	DATE : <u>4/18</u>
CHECKED BY : <u>D. R. SMITH</u>	DATE : <u>9/18</u>
DRAWN BY : <u>MAA</u>	5/10
CHECKED BY : <u>GM</u>	5/10
REV. 1/15	MAA/TMG
REV. 12/17	MAA/THC
REV. 5/18	MAA/THC



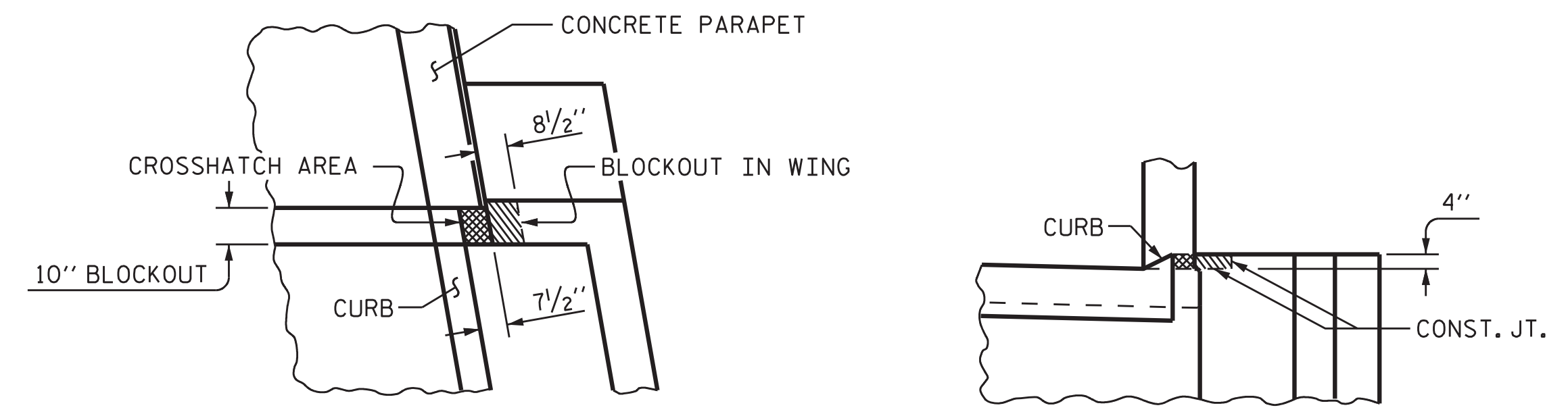
POURING SEQUENCE



OPTIONAL POURING SEQUENCE



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9,165)

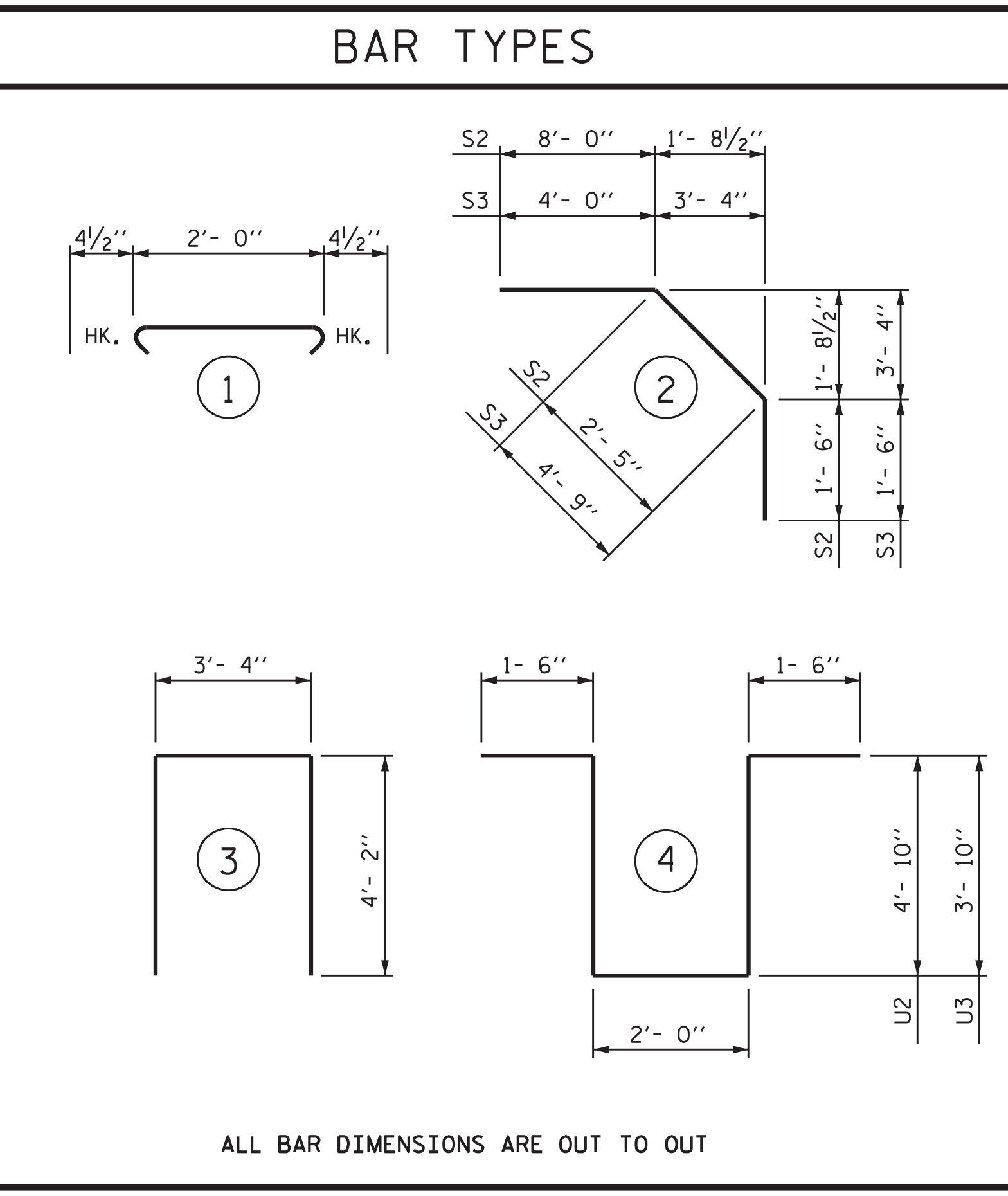


PLAN ELEVATION

BLOCKOUT IN WING WALL

CONCRETE SHALL BE POURED IN THE CROSS-HATCHED AREA TO MATCH THE TOP OF CURB AND INTEGRAL END BENT WING ELEVATION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THE CONCRETE IN THESE AREAS SHALL BE PLACED AT THE SAME TIME THE THE BLOCKOUTS IN THE END BENT WINGS ARE POURED.

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	514	5	STR	34'- 3"	18361
A2	514	5	STR	34'- 3"	18361
* A101	2	5	STR	32'- 3"	67
* A102	2	5	STR	29'- 5"	61
* A103	2	5	STR	26'- 7"	55
* A104	2	5	STR	23'- 9"	50
* A105	2	5	STR	20'-11"	44
* A106	2	5	STR	18'- 1"	38
* A107	2	5	STR	15'- 3"	32
* A108	2	5	STR	12'- 5"	26
* A109	2	5	STR	9'- 7"	20
* A110	2	5	STR	6'- 9"	14
* A111	2	5	STR	3'-11"	8
A201	2	5	STR	32'- 3"	67
A202	2	5	STR	29'- 5"	61
A203	2	5	STR	26'- 7"	55
A204	2	5	STR	23'- 9"	50
A205	2	5	STR	20'-11"	44
A206	2	5	STR	18'- 1"	38
A207	2	5	STR	15'- 3"	32
A208	2	5	STR	12'- 5"	26
A209	2	5	STR	9'- 7"	20
A210	2	5	STR	6'- 9"	14
A211	2	5	STR	3'-11"	8
* B1	91	5	STR	16'- 9"	1590
* B2	91	5	STR	15'- 9"	1495
* B3	92	5	STR	34'- 0"	3263
* B4	92	5	STR	33'- 3"	3191
* B5	45	5	STR	27'- 9"	1302
* B6	45	5	STR	27'- 0"	1267
* B7	69	4	STR	20'-10"	960
* B8	46	4	STR	28'- 8"	881
* B9	69	4	STR	26'- 0"	1198
* B10	4	4	STR	21'- 5"	57
* B11	4	4	STR	20'- 2"	54
* B12	4	4	STR	18'- 0"	48
B13	215	5	STR	54'- 4"	12184
K1	20	4	STR	18'- 4"	245
K2	18	4	STR	7'- 1"	85
K3	36	4	STR	8'- 1"	194
K4	18	4	STR	7'- 4"	88
K5	6	4	STR	6'- 7"	26
K6	4	4	STR	2'- 8"	7
K7	8	4	STR	3'- 2"	17
K8	4	4	STR	2'-10"	8
K9	4	4	STR	2'- 4"	6
K10	12	4	STR	5'- 2"	41
K11	10	4	STR	27'- 9"	185
S1	180	4	1	2'- 9"	331
* S2	50	4	2	11'-11"	398
* S3	50	4	2	10'- 3"	342
U1	54	4	3	11'- 8"	421
U2	36	4	4	14'- 8"	353
U3	12	4	4	12'- 8"	102



ALL BAR DIMENSIONS ARE OUT TO OUT

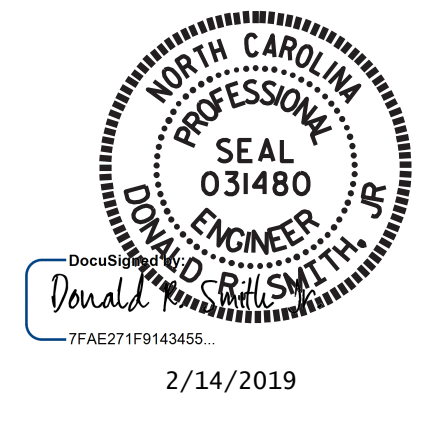
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"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

— SUPERSTRUCTURE BILL OF MATERIAL —			
	CLASS AA CONCRETE (CU.YDS.)	REINFORCING STEEL (LBS.)	* EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	70.6		
POUR 2	116.9		
POUR 3	101.0		
POUR 4	54.4		
TOTALS**	342.9	33,069	34,822

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1401 SO.FT.
BRIDGE DECK	7626 SO.FT.
TOTAL	9027 SO.FT.

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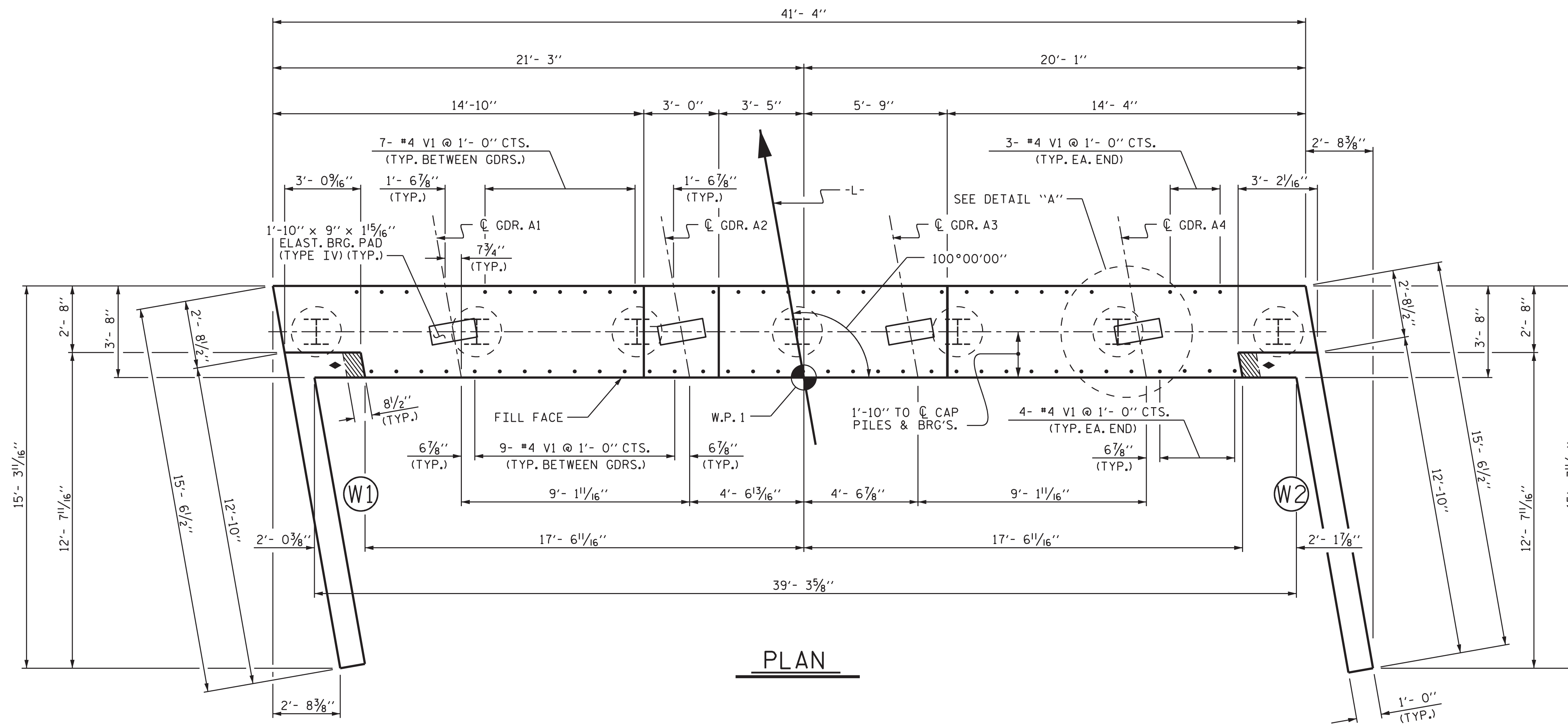


PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

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

ASSEMBLED BY : D. A. GLADDEN DATE : 4/18
 CHECKED BY : D. R. SMITH DATE : 9/18
 DESIGN ENGINEER OF RECORD : P. N. HOLDER DATE : 10/18

REVISIONS						SHEET NO. S-26
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1			3			TOTAL SHEETS 47
2			4			



PLAN

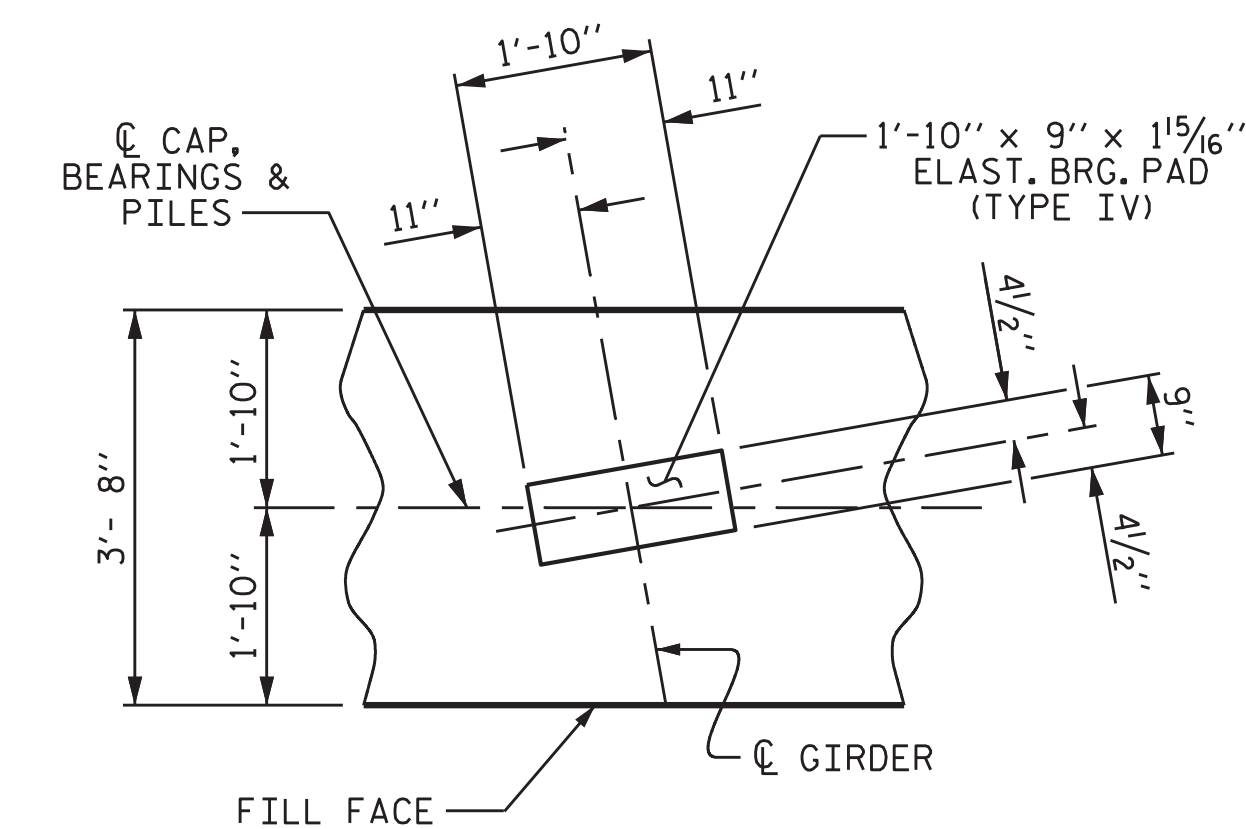
NOTES:

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

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO AVOID #4 V1 BARS IN CAP.

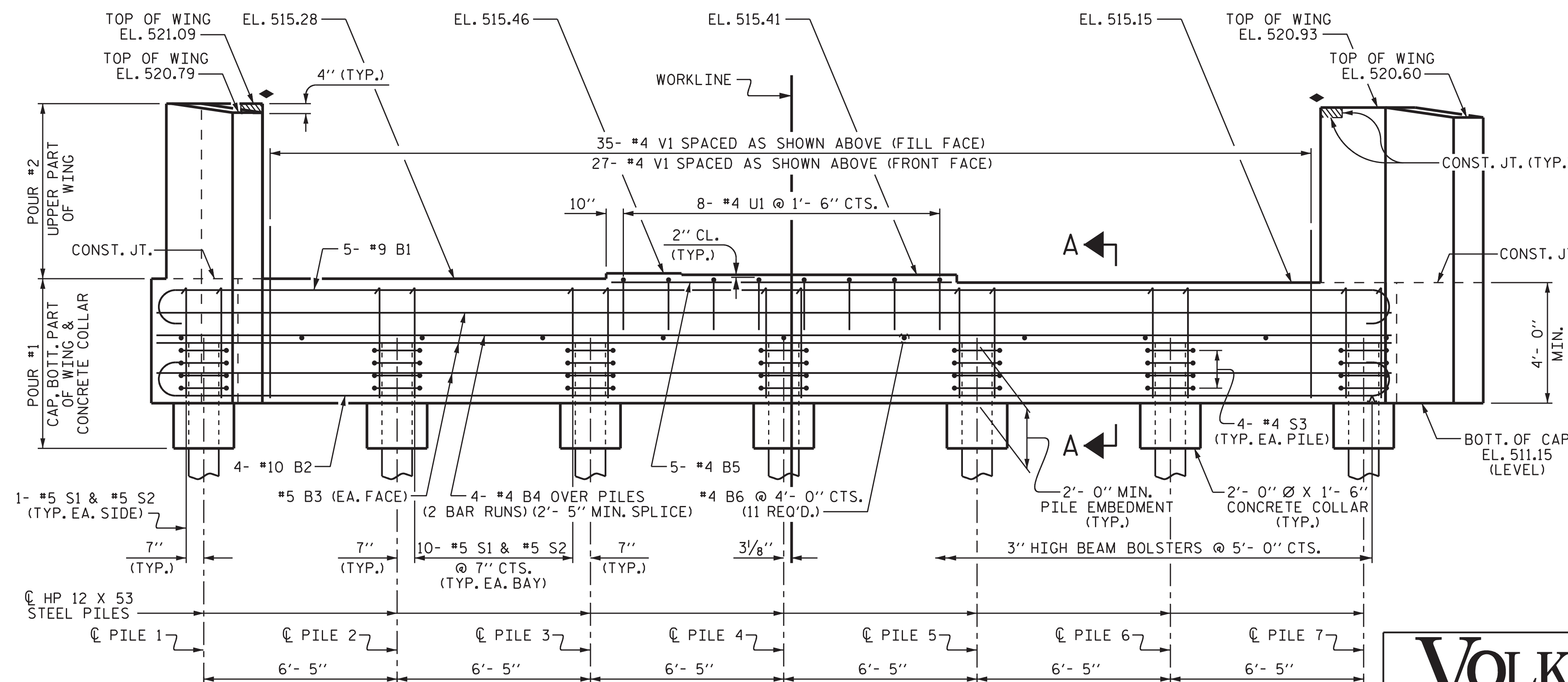
THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR BLOCKOUT IN WING WALL, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.



DETAIL "A"

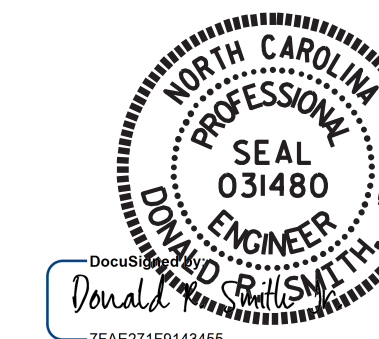
(TYP. EA. GIRDER)



ELEVATION

PROJECT NO. B-4962
ORANGE COUNTY
STATION: 17+37.50 -L-

SHEET 1 OF 3



2/14/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1

DRAWN BY : D. A. GLADDEN DATE : 3/18
CHECKED BY : J. R. McROY DATE : 9/18
DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18

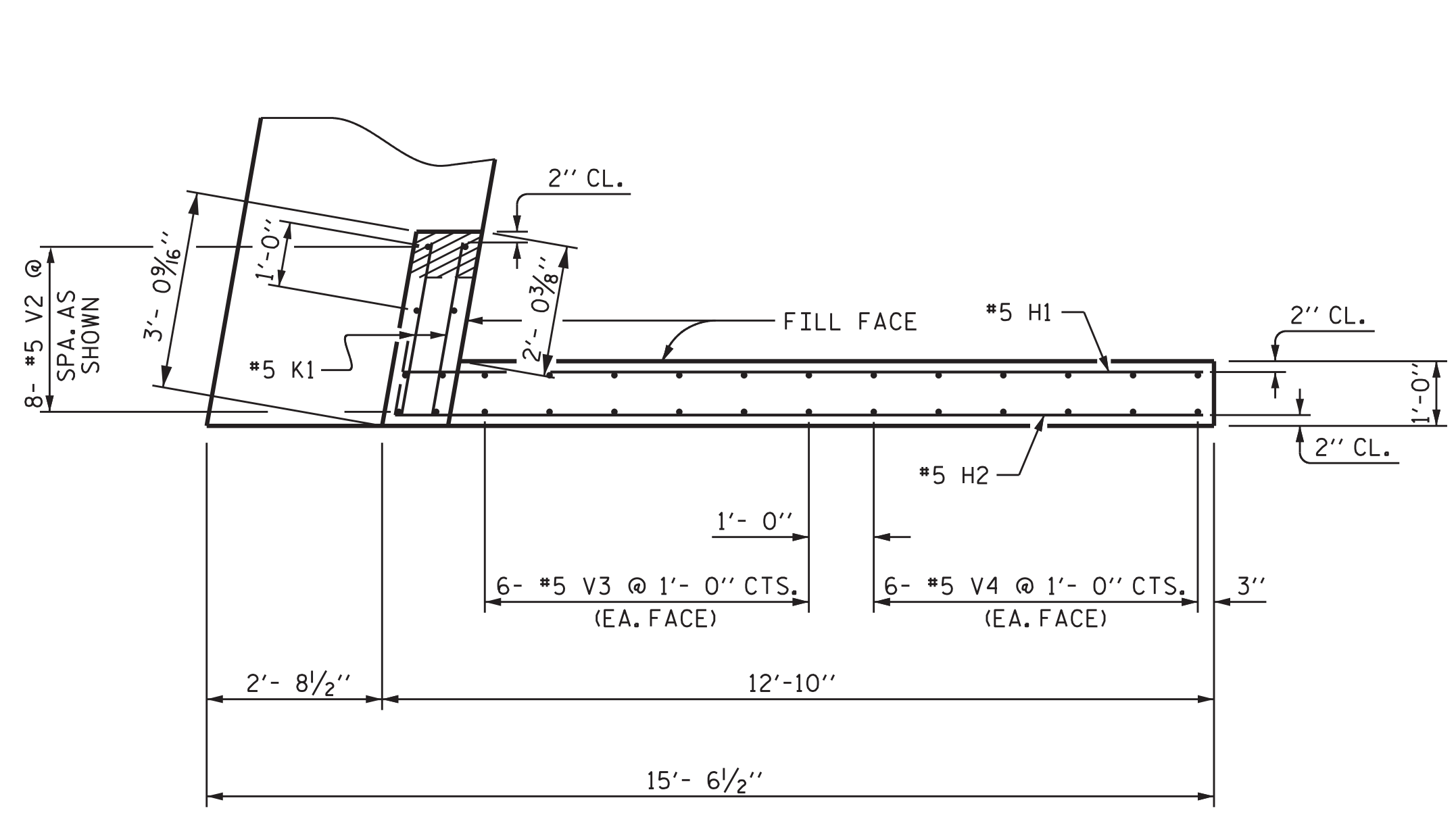
29-JAN-2019 18:35
emily.murray AT C-037614

VOLKERT

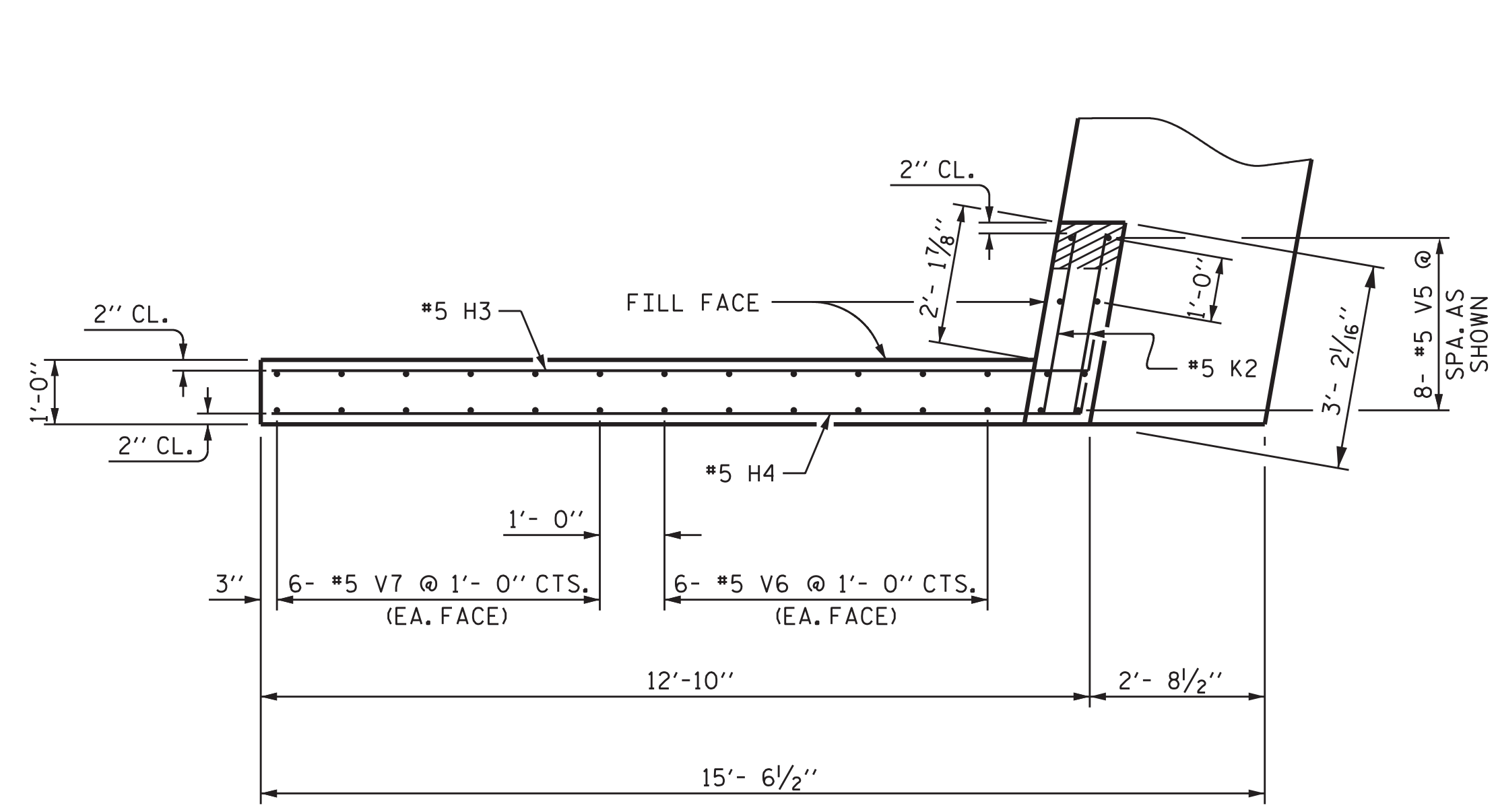
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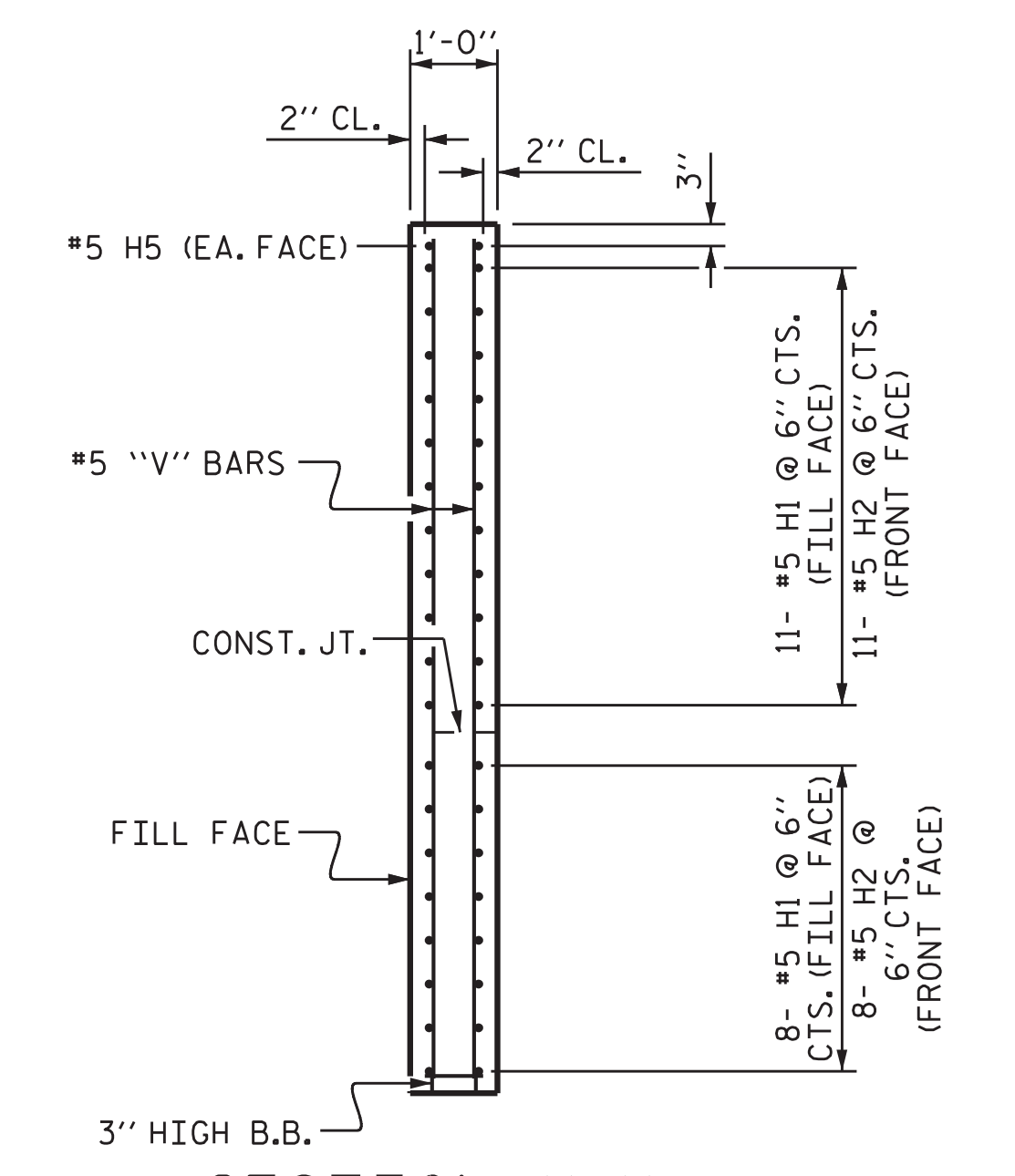
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			47



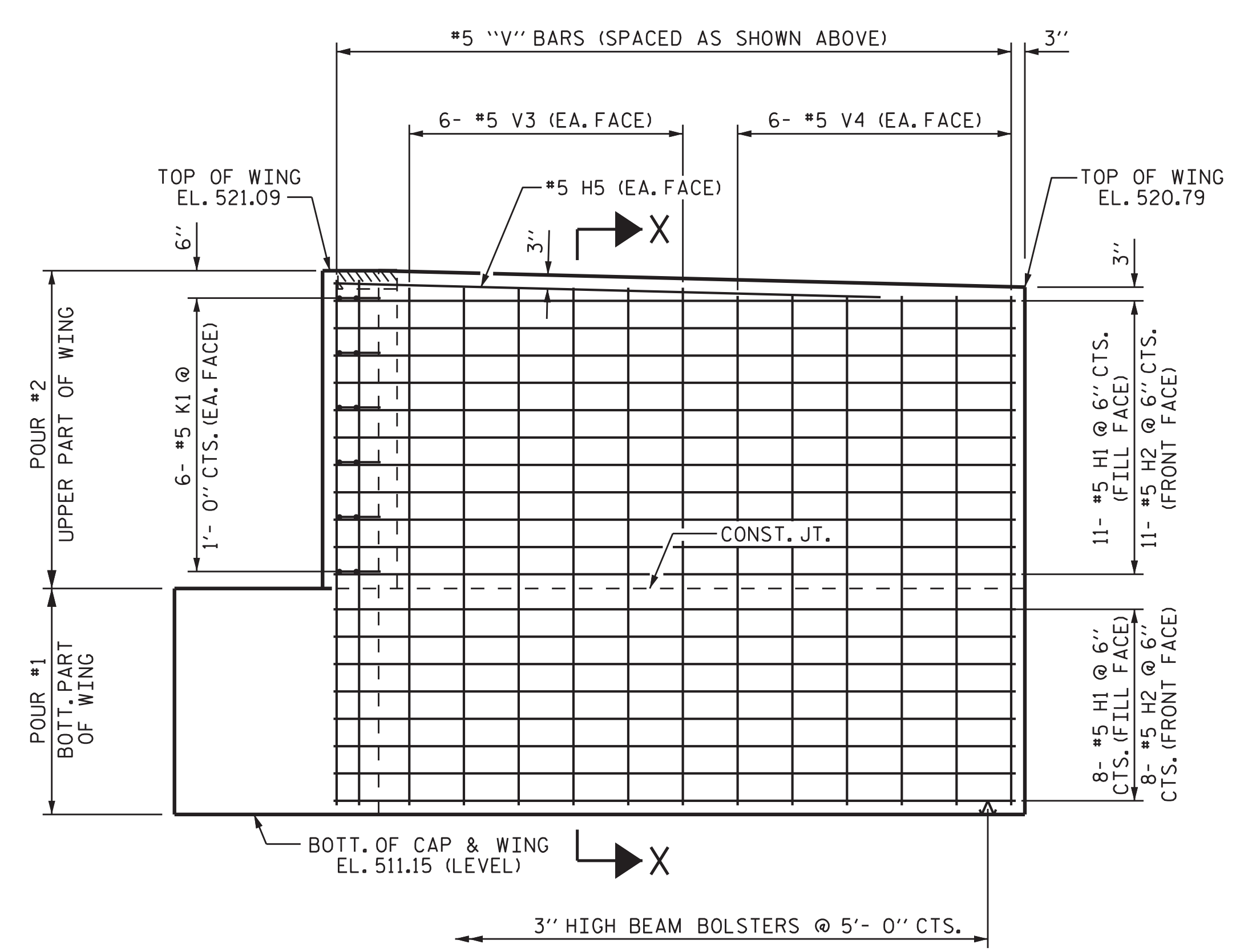
PLAN OF WING 1



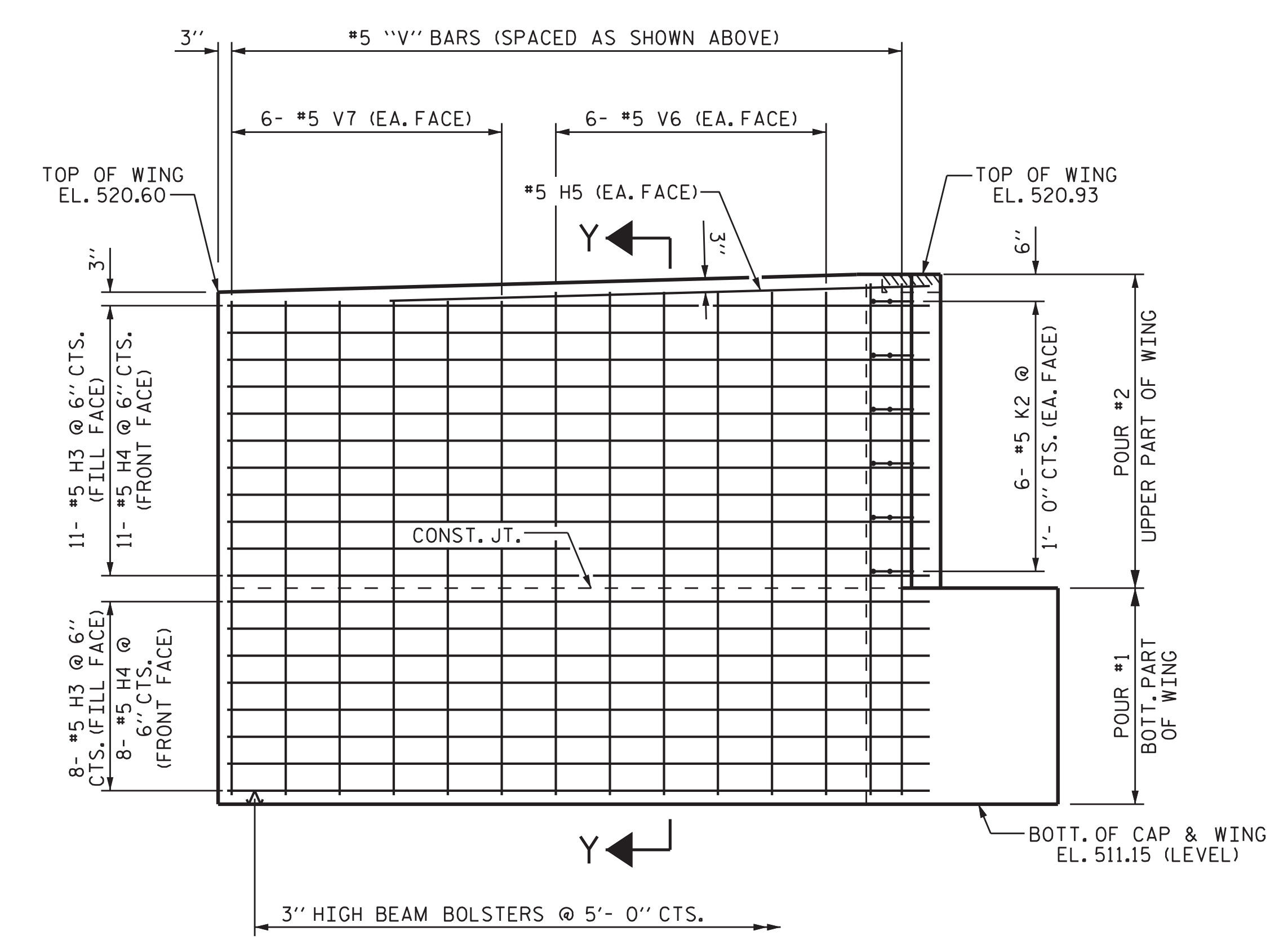
PLAN OF WING 2



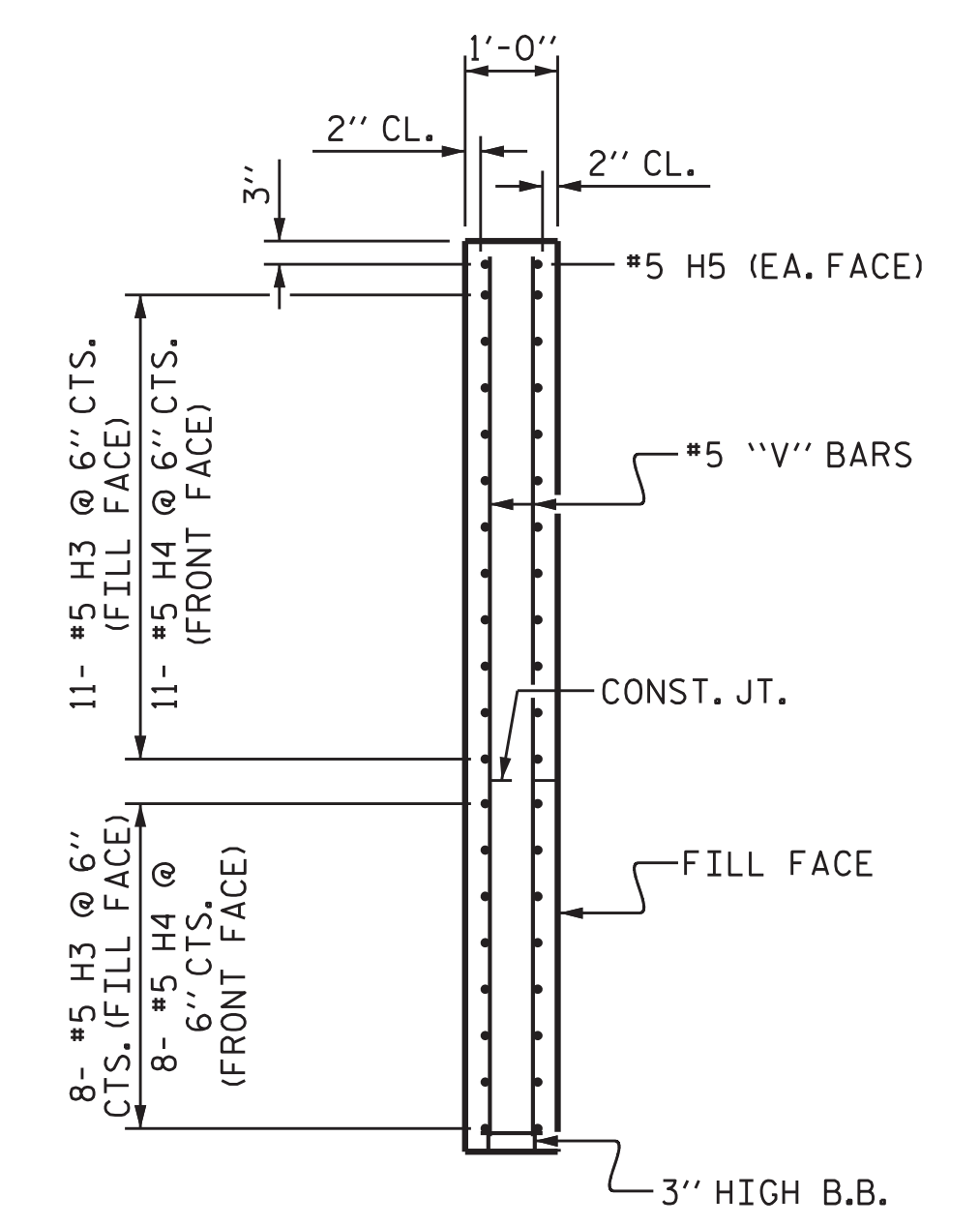
SECTION X-X



ELEVATION OF WING 1



ELEVATION OF WING 2



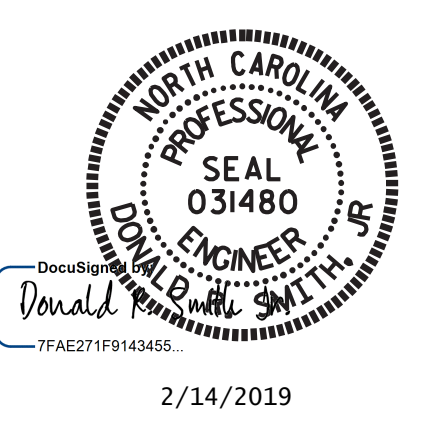
SECTION Y-Y

PROJECT NO. B-4962
 ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 INTEGRAL
 END BENT 1**

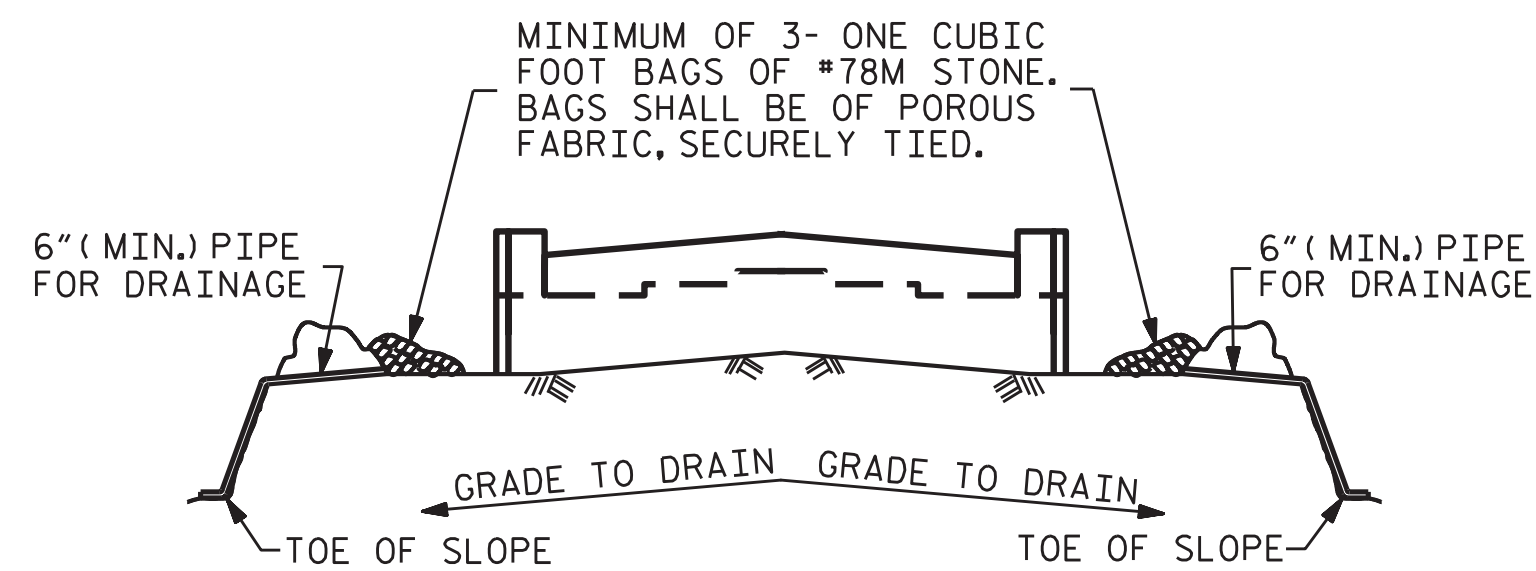


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1			3			TOTAL SHEETS 47
2			4			

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DRAWN BY: <u>D. A. GLADDEN</u>	DATE: <u>3/18</u>
CHECKED BY: <u>J. R. McROY</u>	DATE: <u>9/18</u>
DESIGN ENGINEER OF RECORD: <u>P. N. HOLDER</u>	DATE: <u>10/18</u>

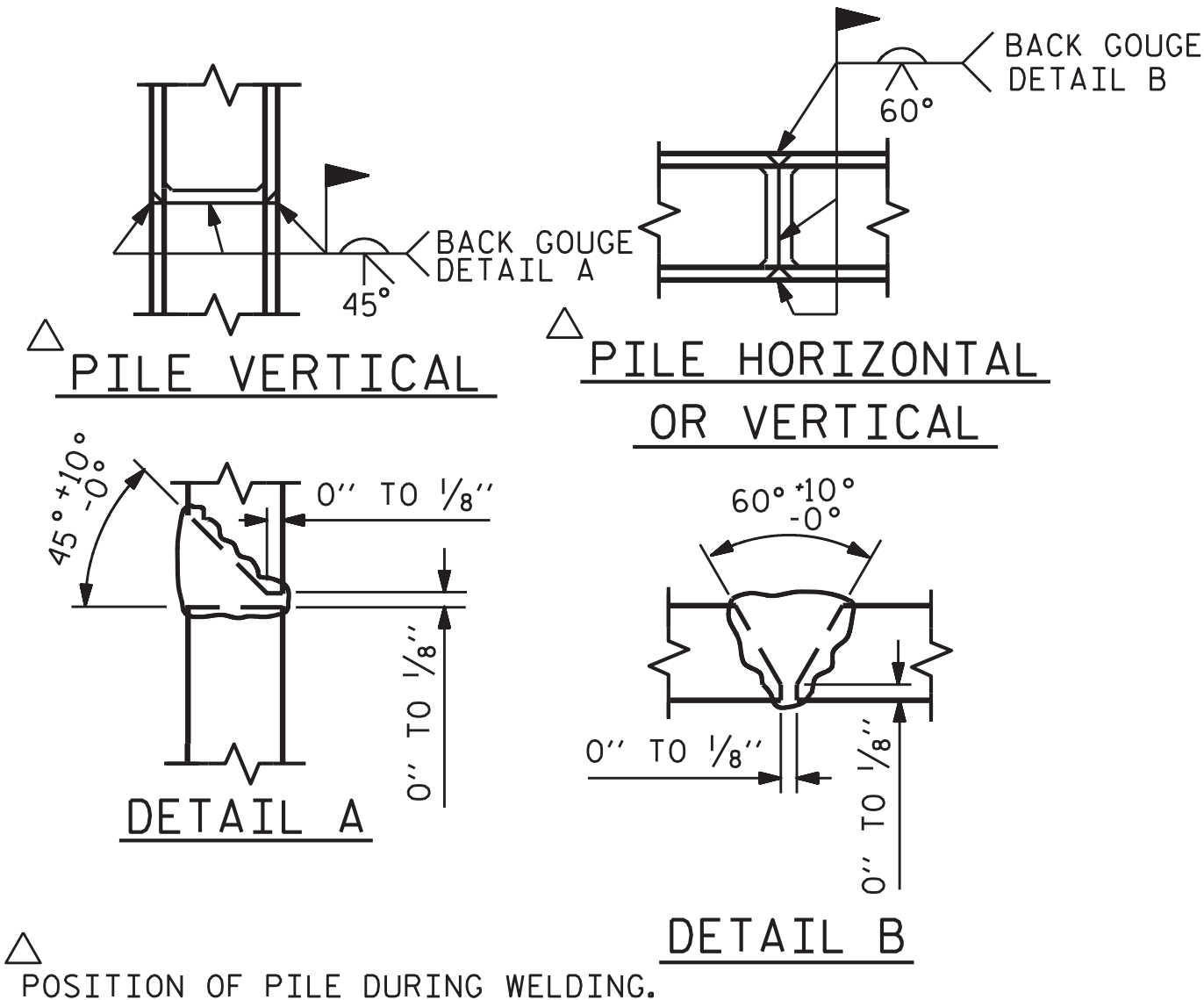


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

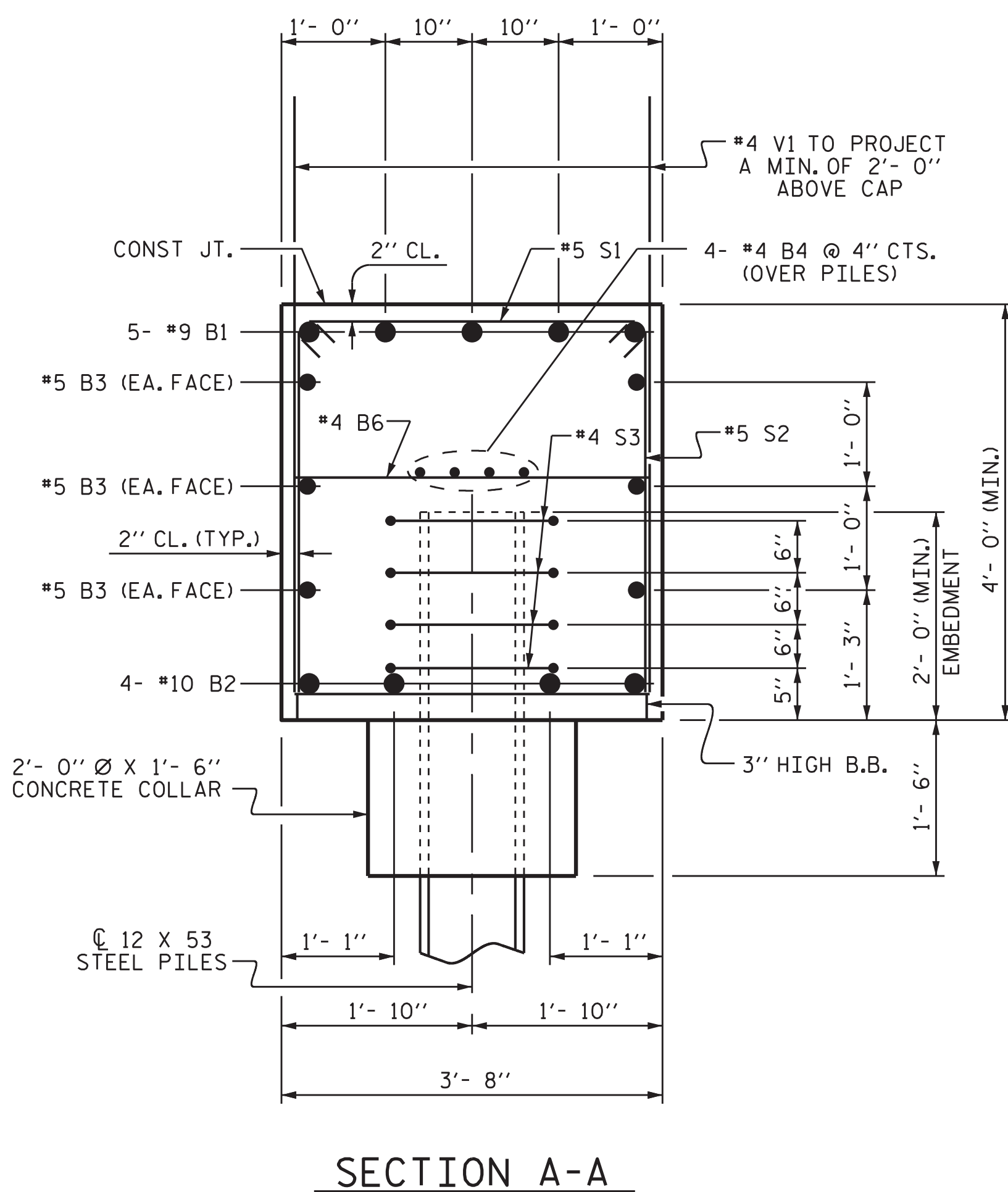
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

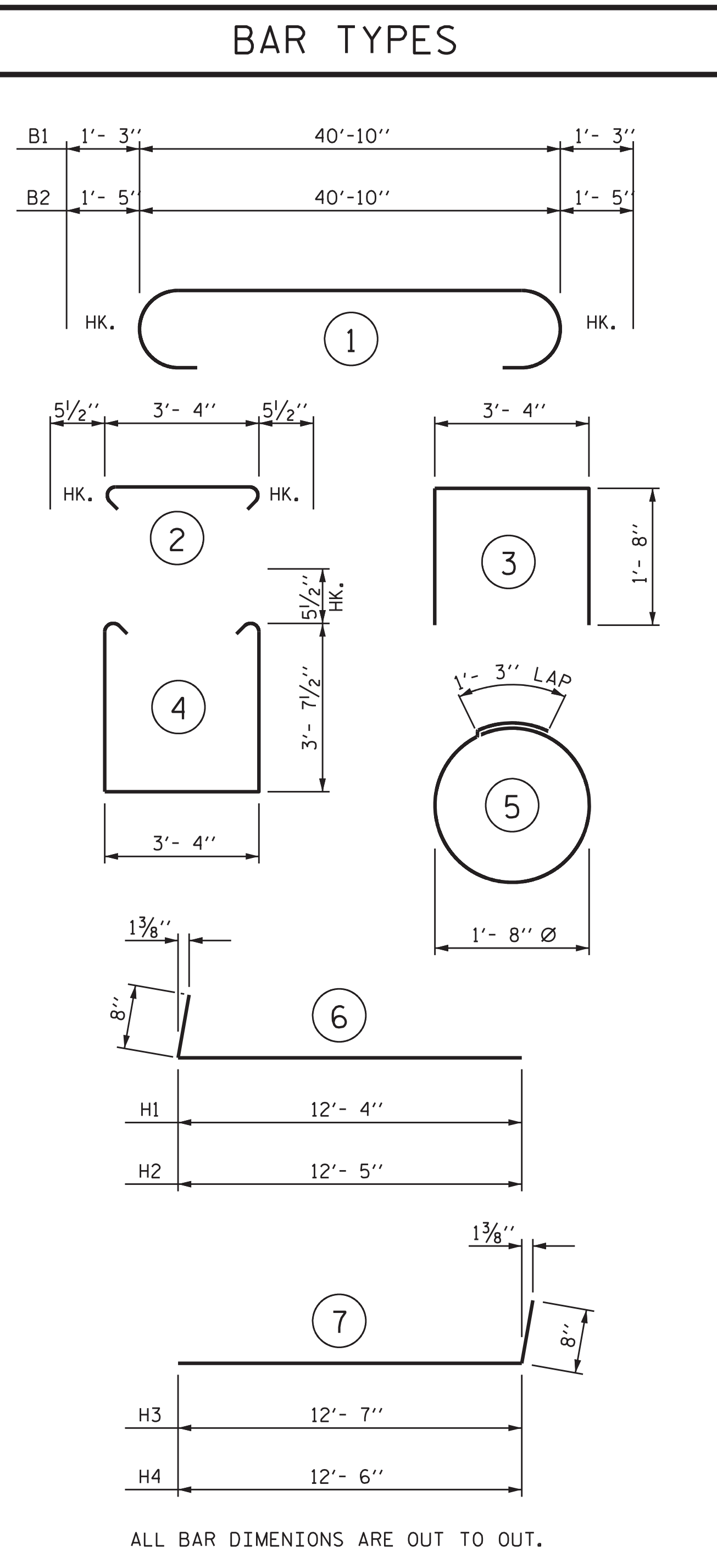
TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS



BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	1	43'- 4"	737
B2	4	10	1	43'- 8"	752
B3	6	5	STR	41'- 0"	257
B4	8	4	STR	21'- 9"	116
B5	5	4	STR	11'- 8"	39
B6	11	4	STR	3'- 4"	24
H1	19	5	6	13'- 0"	258
H2	19	5	6	13'- 1"	259
H3	19	5	7	13'- 3"	263
H4	19	5	7	13'- 2"	261
H5	4	5	STR	10'- 0"	42
K1	12	5	STR	2'- 7"	32
K2	12	5	STR	2'- 9"	34
S1	62	5	2	4'- 3"	275
S2	62	5	4	11'- 6"	744
S3	28	4	5	6'- 6"	122
U1	8	4	3	6'- 8"	36
V1	62	4	STR	6'- 0"	248
V2	8	5	STR	9'- 7"	80
V3	12	5	STR	9'- 5"	118
V4	12	5	STR	9'- 3"	116
V5	8	5	STR	9'- 5"	79
V6	12	5	STR	9'- 3"	116
V7	12	5	STR	9'- 1"	114
REINFORCING STEEL					5122 LBS.
CLASS A CONCRETE					
POUR 1: CAP, LOWER PART OF WINGS AND CONCRETE COLLARS					28.0 C.Y.
POUR 2: UPPER PART OF WINGS					6.3 C.Y.
TOTAL					34.3 C.Y.
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					
HP 12 X 53 STEEL PILES					EA. 7
NO. 7					140 LIN. FT.
STEEL PILE POINTS					NO. 7

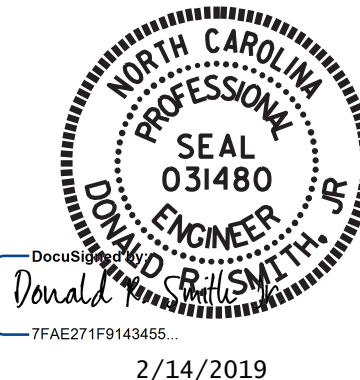


PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 INTEGRAL
 END BENT 1**



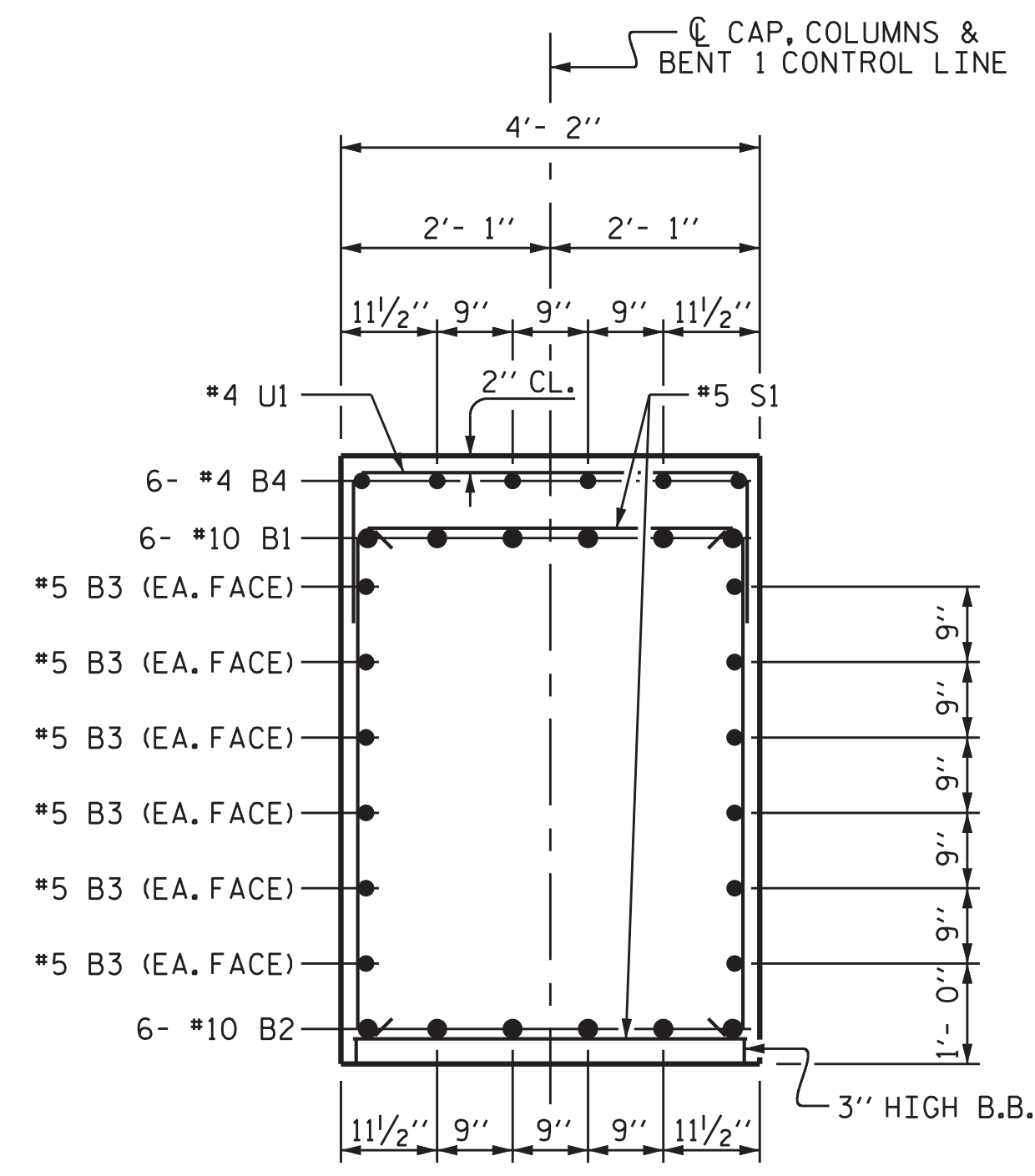
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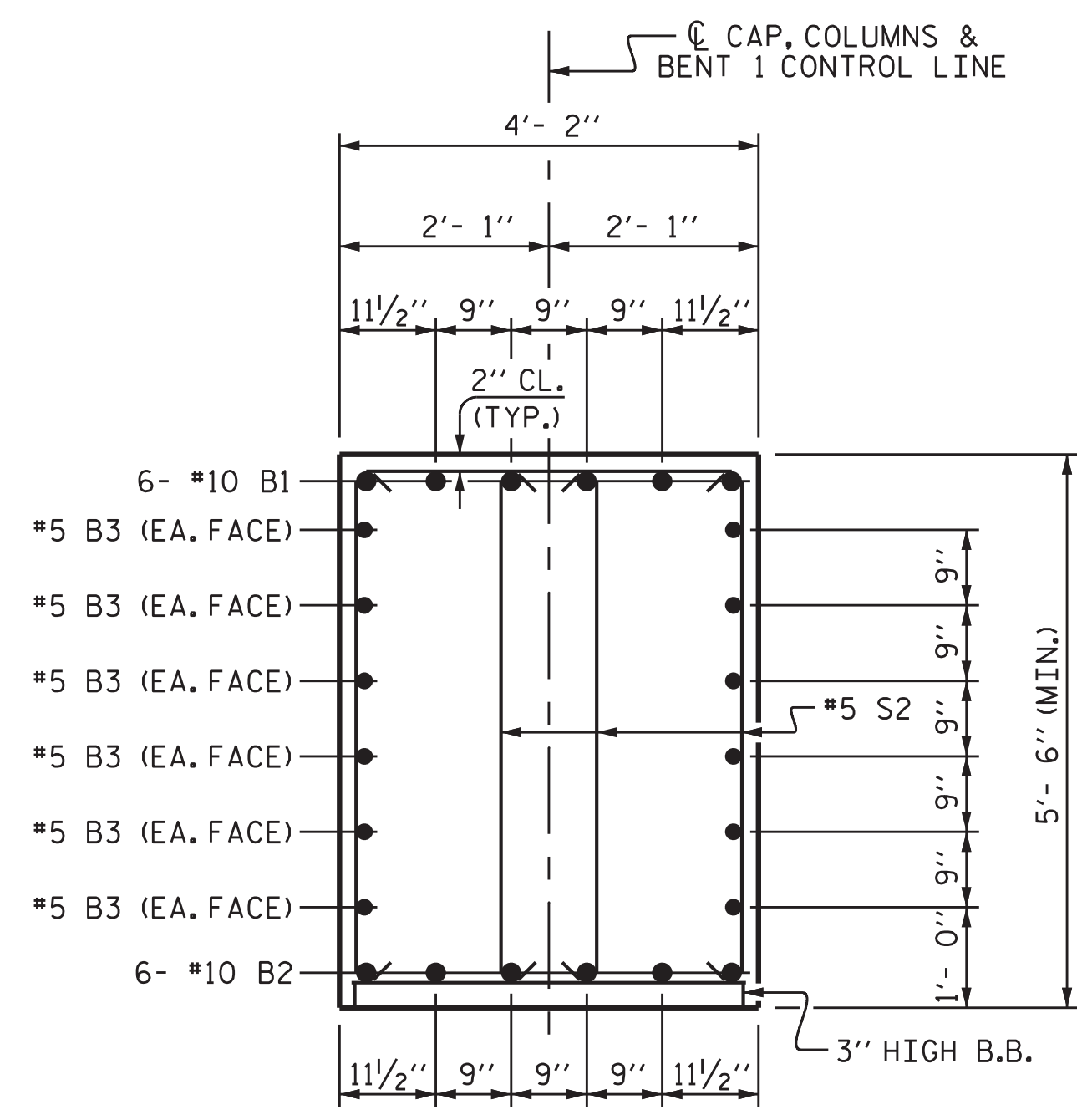
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1			3			TOTAL SHEETS 47
2			4			

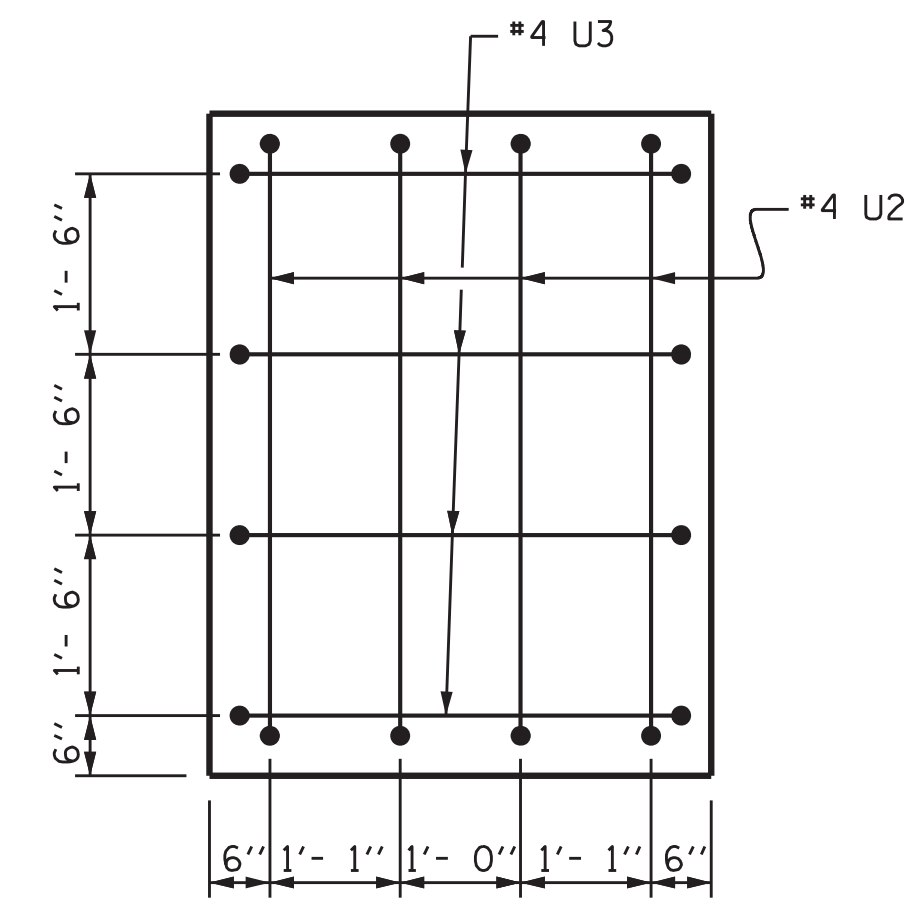
DRAWN BY : D. A. GLADDEN DATE : 8/18
 CHECKED BY : J. R. McROY DATE : 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18



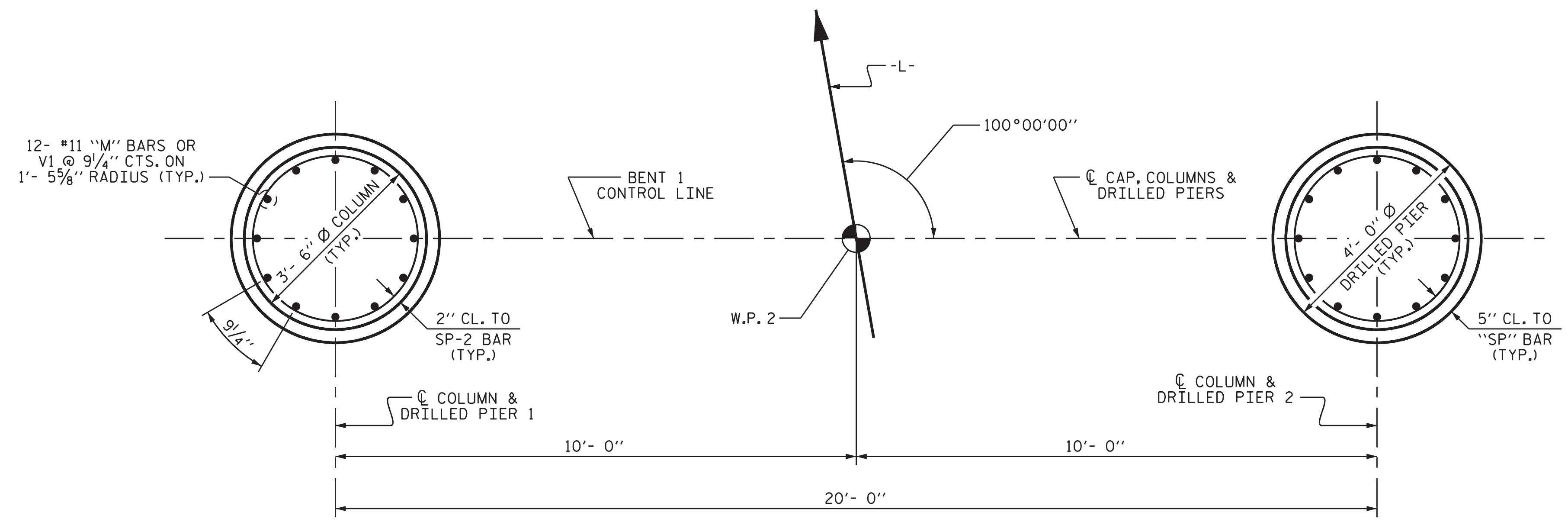
SECTION A-A



SECTION B-B



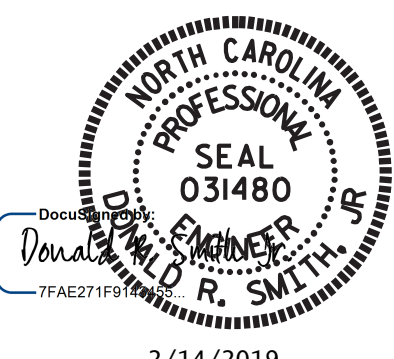
VIEW X-X



PLAN OF DRILLED PIERS & COLUMNS AT BENT 1

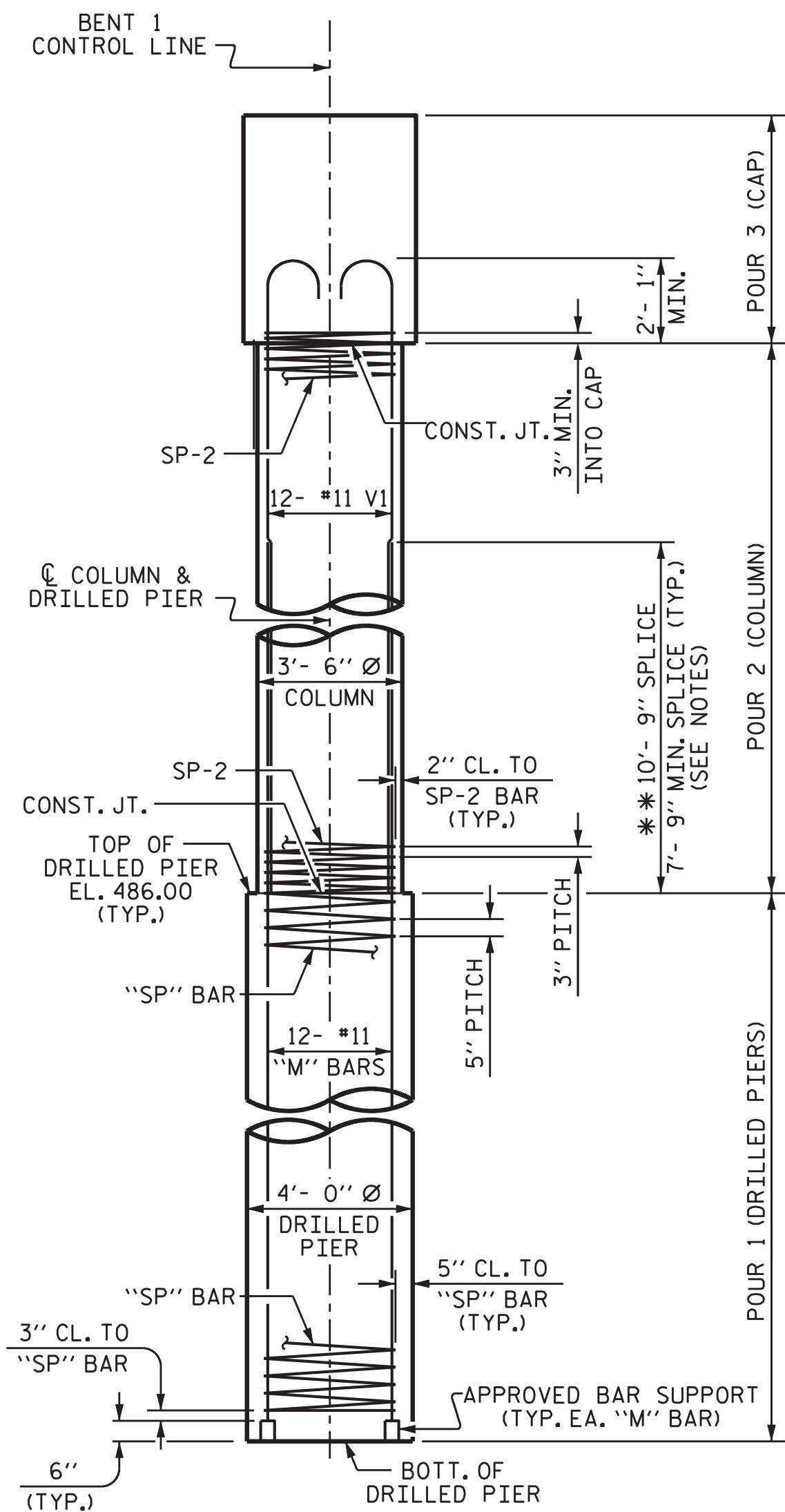
PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
SHEET NO. S-31					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 47



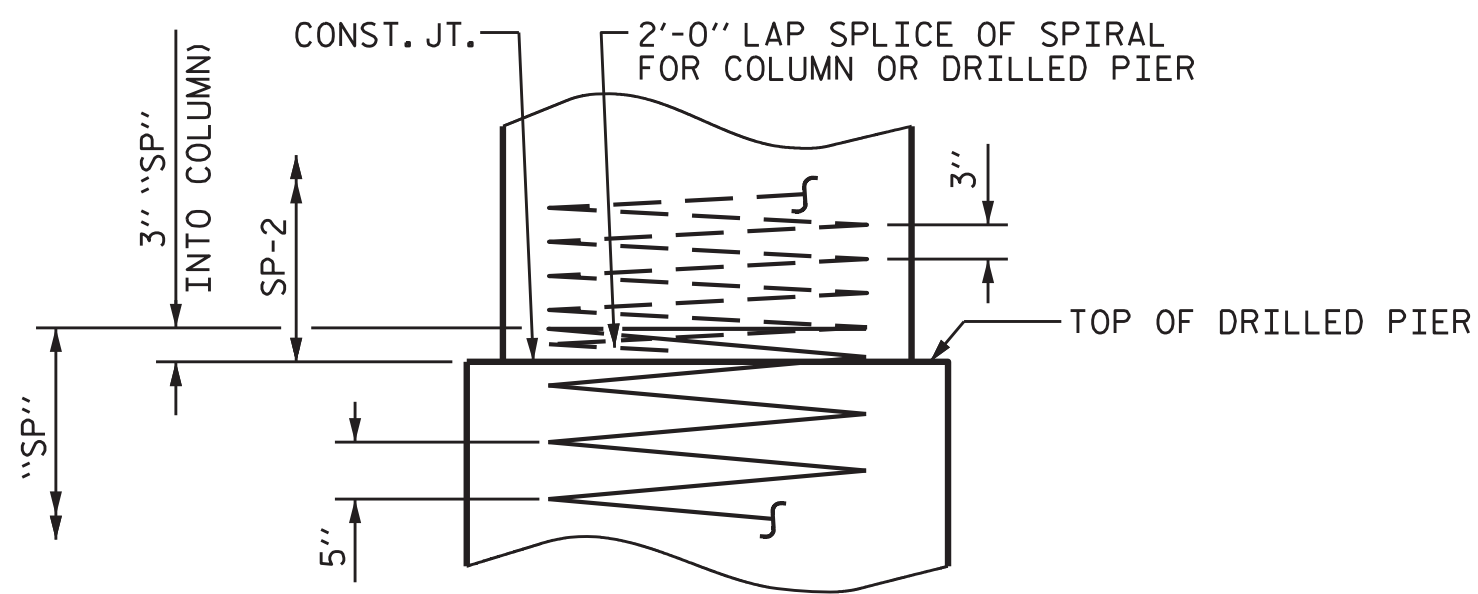
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 5540 Centerview Drive, Suite 305
 Raleigh, NC 27606
 Tel. 919-854-0344 Fax. 919-854-0355
 NC License No. F-0765

DRAWN BY : D. A. GLADDEN DATE : 8/18
 CHECKED BY : J. R. McROY DATE : 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18



END ELEVATION

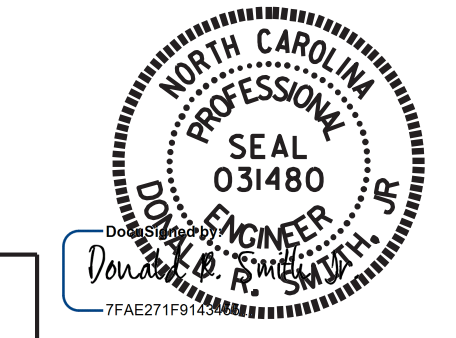
BAR TYPES				BILL OF MATERIAL			
<p style="text-align: center;">①</p>	<p style="text-align: center;">②</p>	<p style="text-align: center;">③</p>	<p style="text-align: center;">④</p>	<p style="text-align: center;">⑤</p>	<p style="text-align: center;">⑥</p>		
<p style="text-align: center;">S1 S2</p>	<p style="text-align: center;">U1 U2 U3</p>	ALL BAR DIMENSIONS ARE OUT TO OUT.					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	6	10	1	34'- 4"	886		
B2	6	10	STR	31'- 8"	818		
B3	12	5	STR	31'- 8"	396		
B4	6	4	STR	13'- 0"	52		
M1	12	11	STR	21'- 3"	1355		
M2	12	11	STR	26'- 3"	1674		
S1	21	5	3	15'- 0"	329		
S2	72	5	3	13'- 7"	1020		
U1	35	4	6	6'-10"	160		
U2	8	4	6	7'-11"	42		
U3	8	4	6	6'- 8"	36		
V1	24	11	2	29'- 9"	3793		
REINFORCING STEEL					10561	LBS.	
SP-1	1	**	4	262'- 0"	273		
SP-2	2	*	5	1048'- 5"	1401		
SP-3	1	**	4	379'- 7"	396		
SPIRAL COLUMN REINFORCING STEEL					2070	LBS.	
* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.							
** THE SP-1 AND SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.							
CLASS A CONCRETE							
POUR 2: COLUMNS						18.6	C.Y.
POUR 3: CAP						28.0	C.Y.
TOTAL						46.6	C.Y.
DRILLED PIERS							
DRILLED PIER CONCRETE							
POUR 1: DRILLED PIERS						12.6	C.Y.
4'- 0" Ø DRILLED PIERS IN SOIL						9	LIN. FT.
4'- 0" Ø DRILLED PIERS NOT IN SOIL						18	LIN. FT.
PERMANENT STEEL CASING FOR 4'- 0" Ø DRILLED PIER 1						9.4	LIN. FT.
CSL TUBES						120	LIN. FT.



CONSTRUCTION JOINT DETAIL

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 3 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
BENT 1



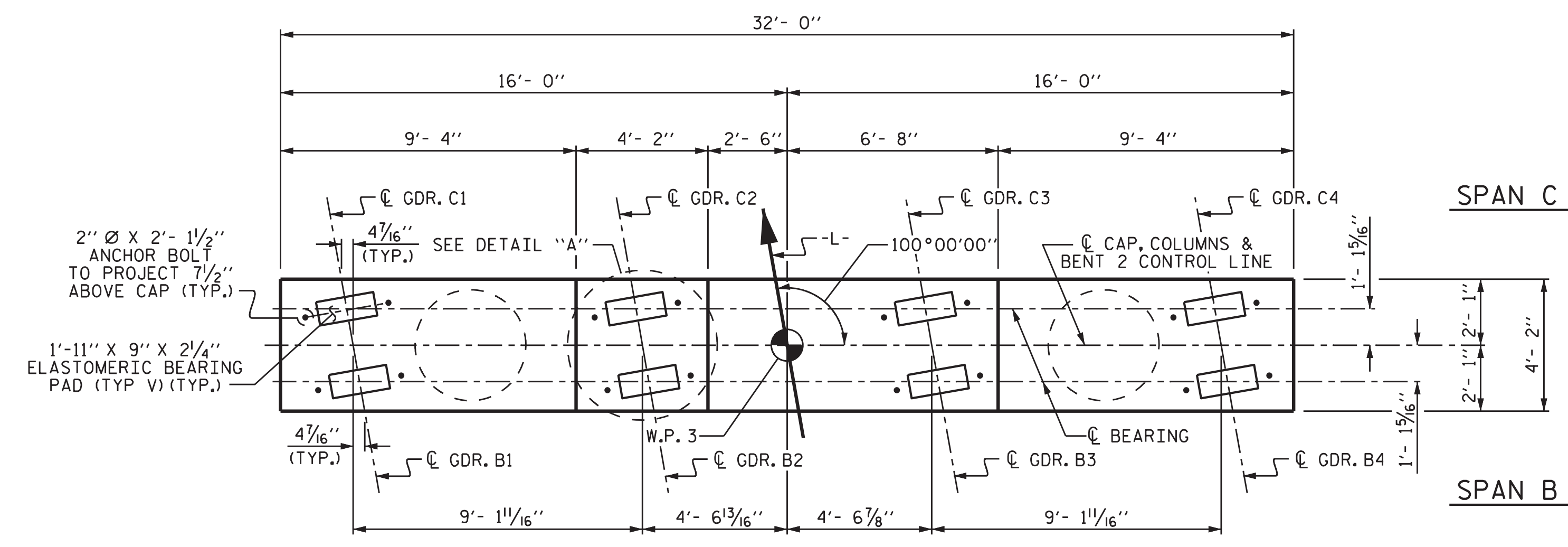
2/14/2019

DRAWN BY : D. A. GLADDEN DATE : 8/18
 CHECKED BY : J. R. McROY DATE : 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18

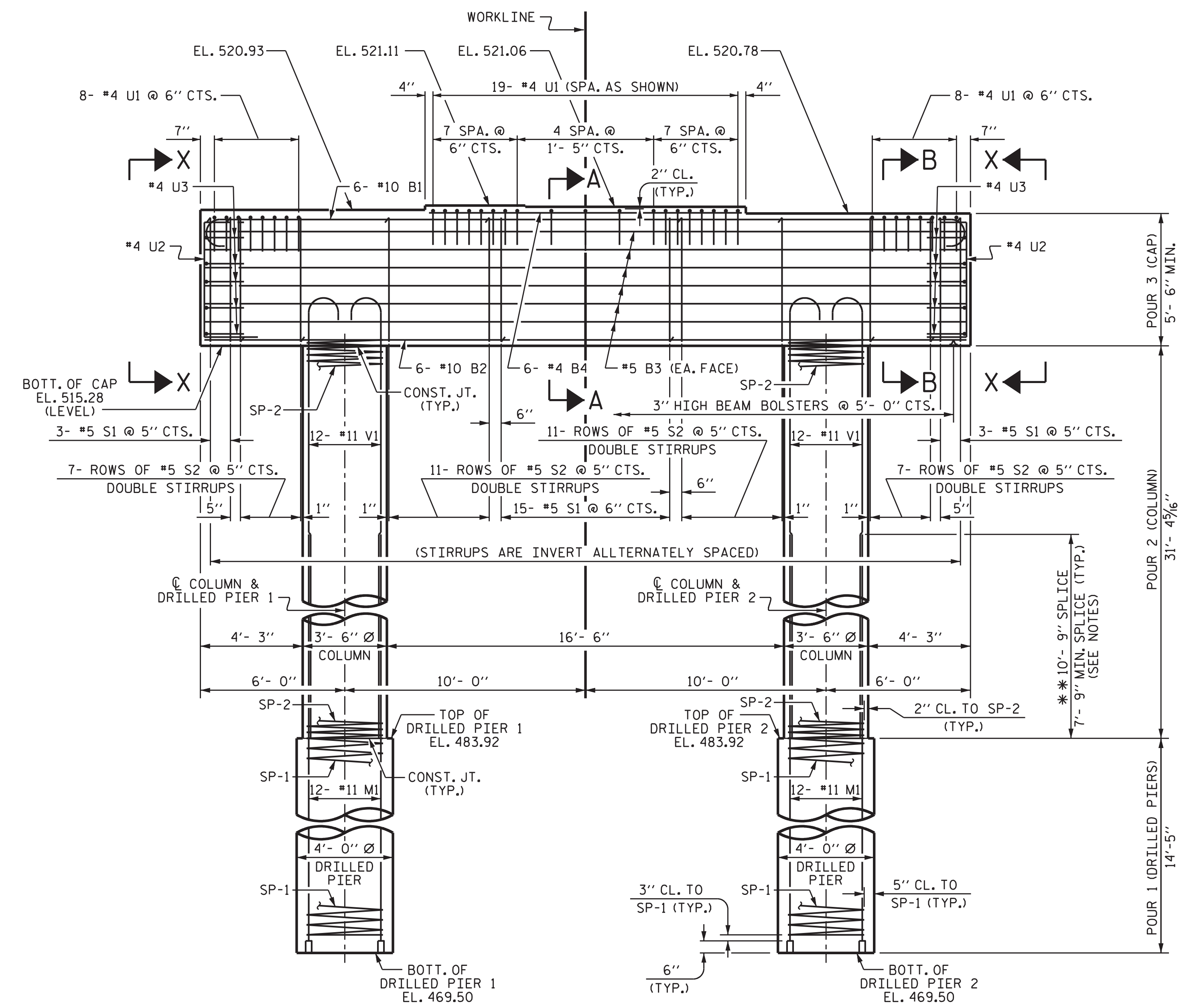
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DOCUMENT NOT CONSIDERED
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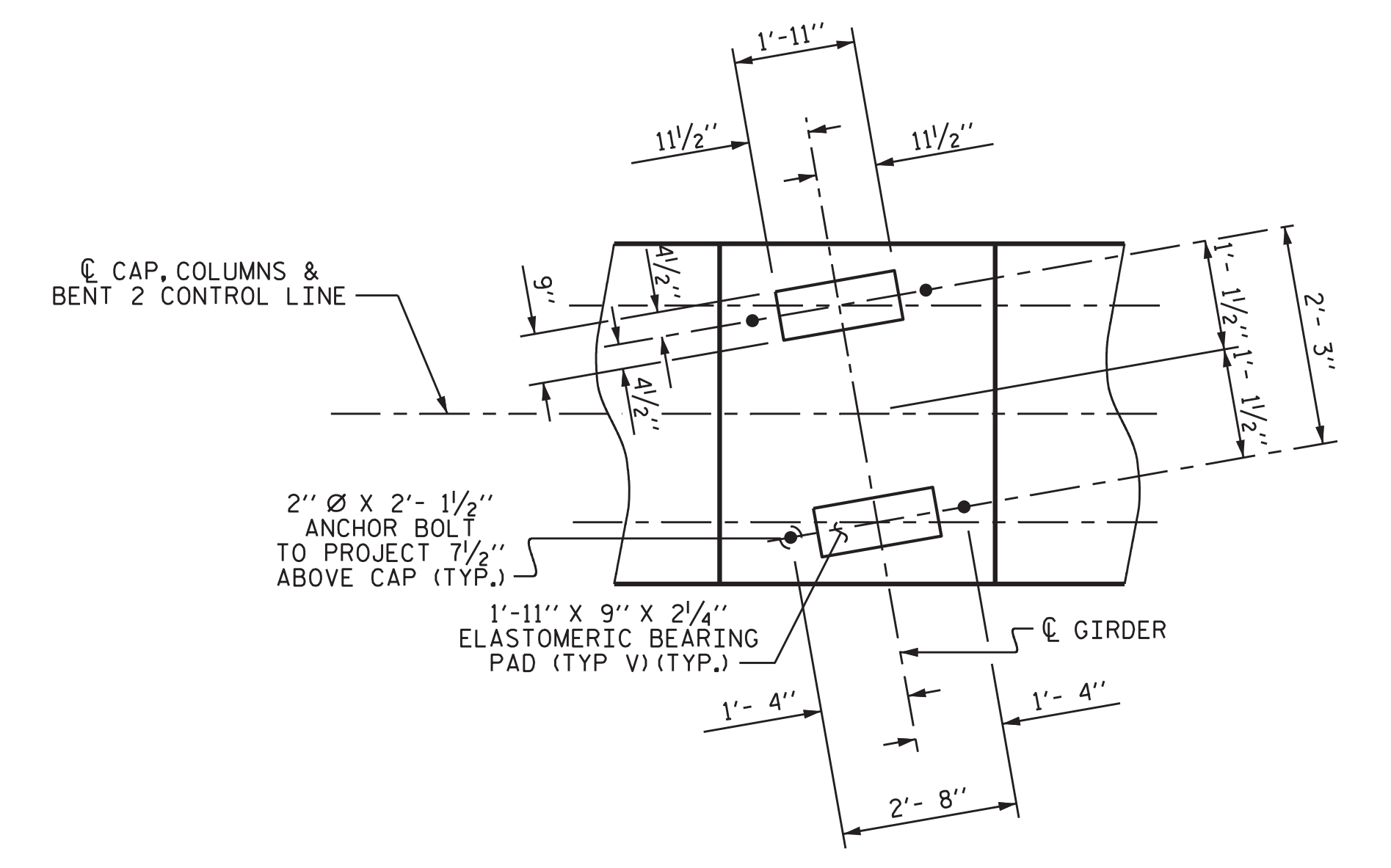
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			47



PLAN



ELEVATION



DETAIL "A"

NOTES:

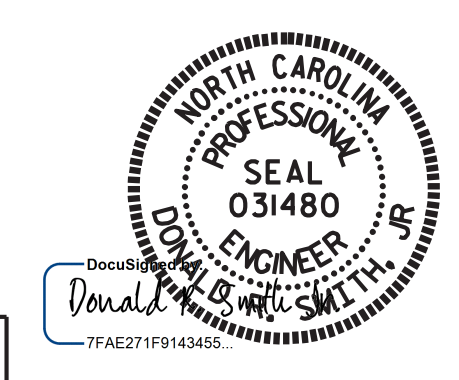
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL" OR "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".
- ** THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 2**



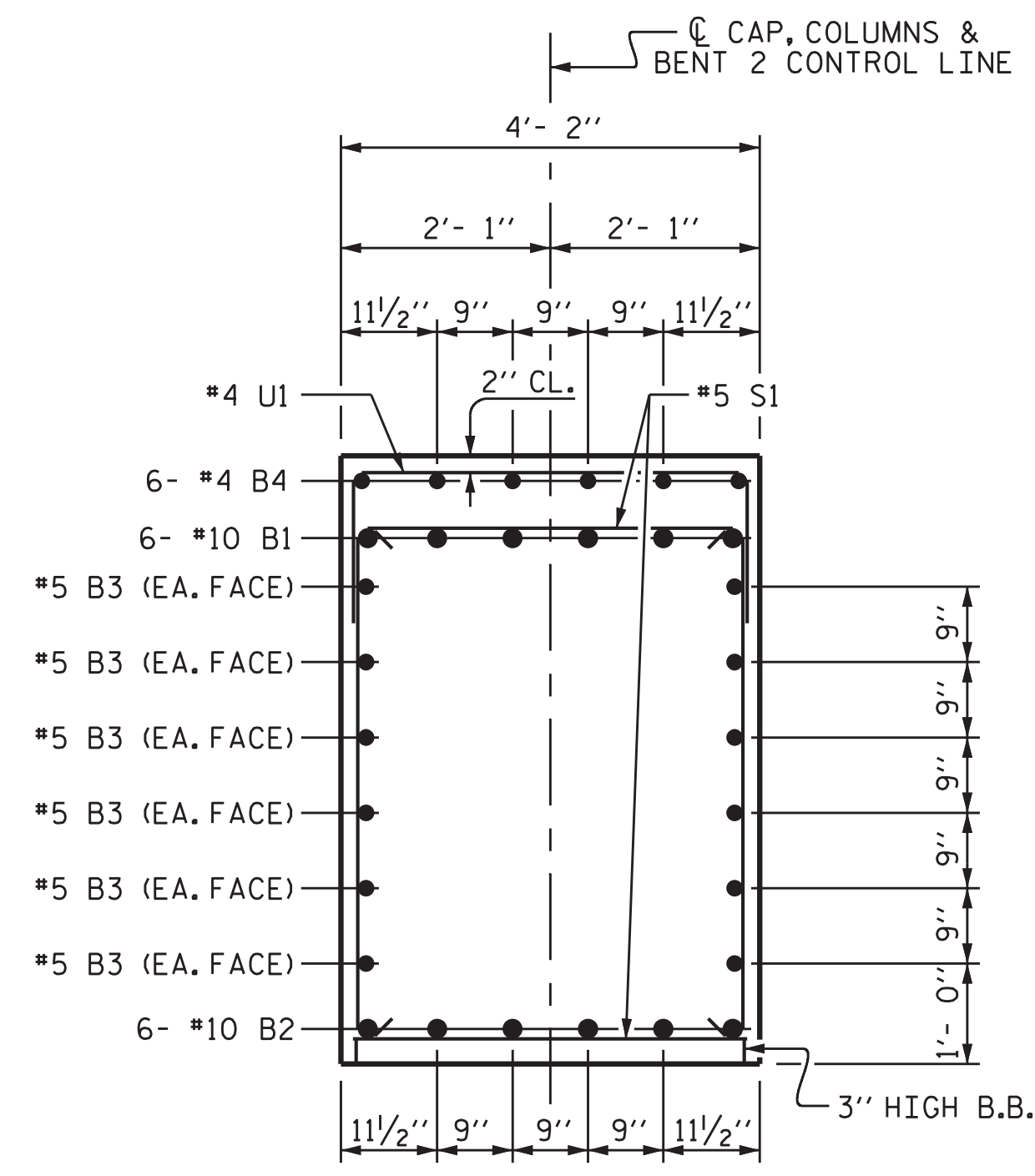
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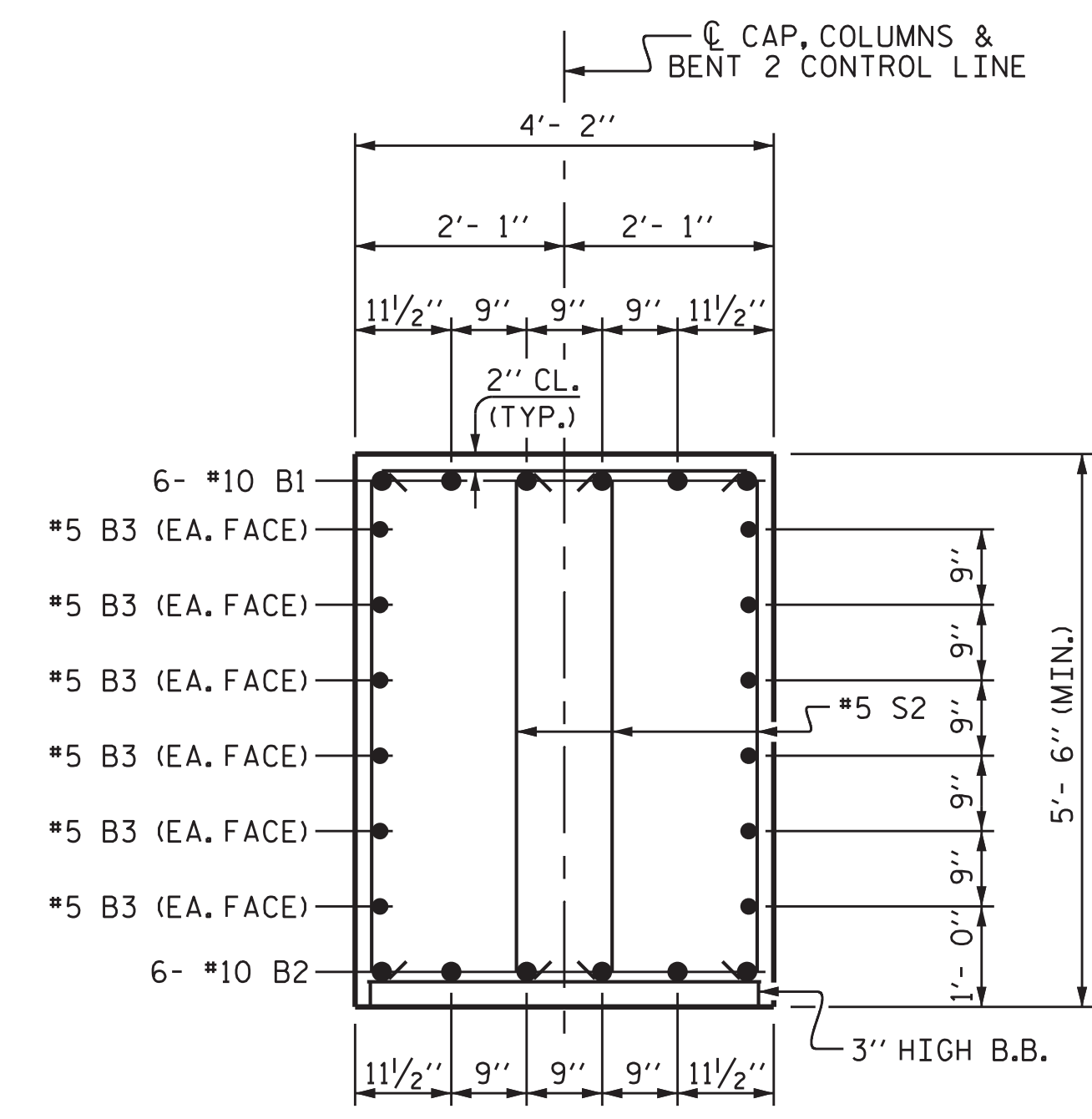
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			47

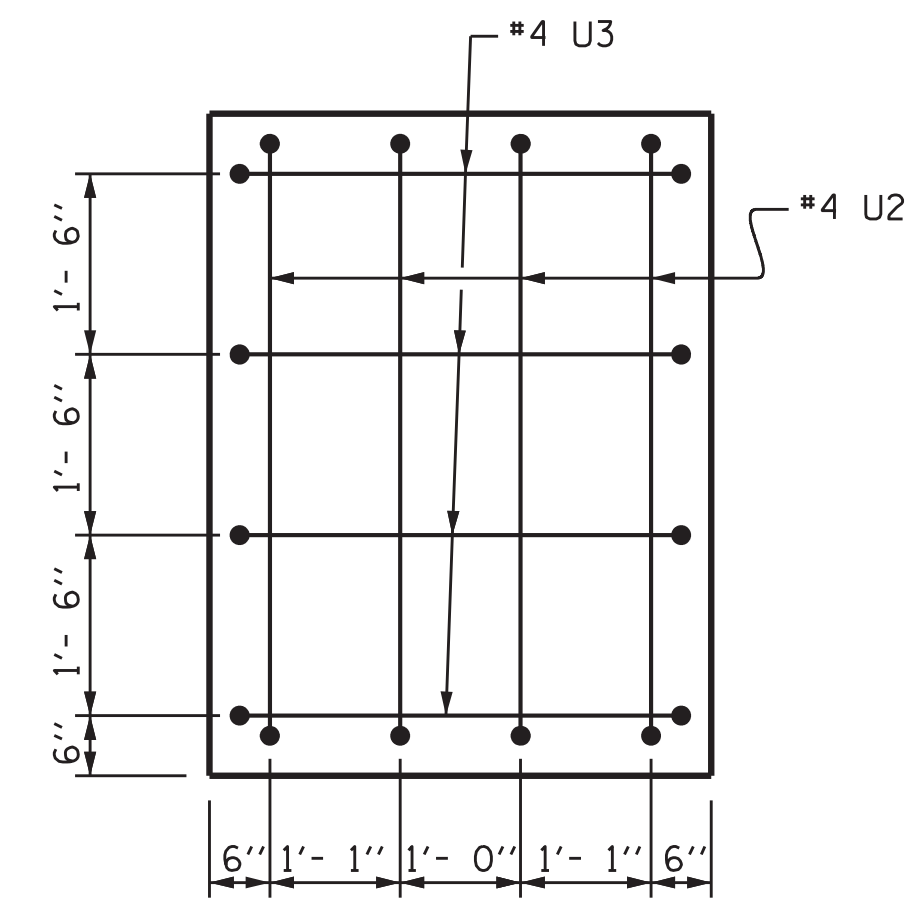
DRAWN BY: D. A. GLADDEN DATE: 8/18
 CHECKED BY: J. R. McROY DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18



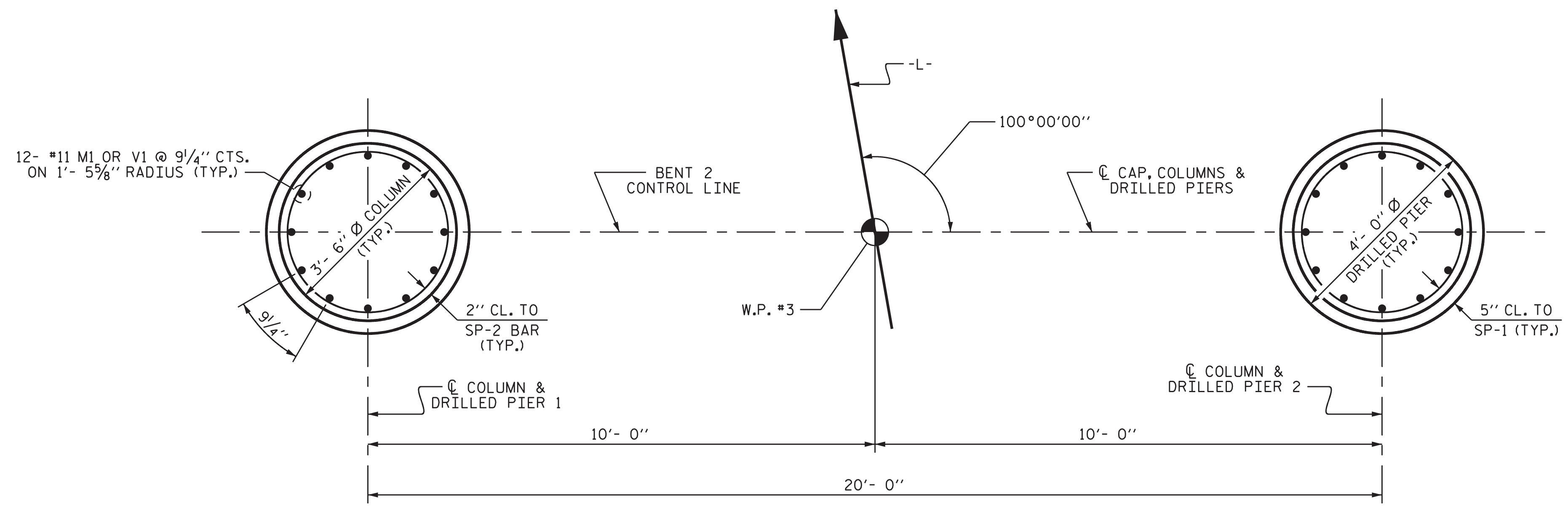
SECTION A-A



SECTION B-B



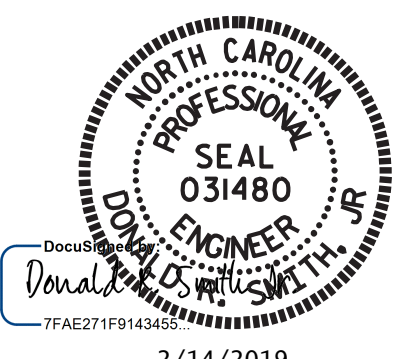
VIEW X-X



PLAN OF DRILLED PIERS & COLUMNS AT BENT 2

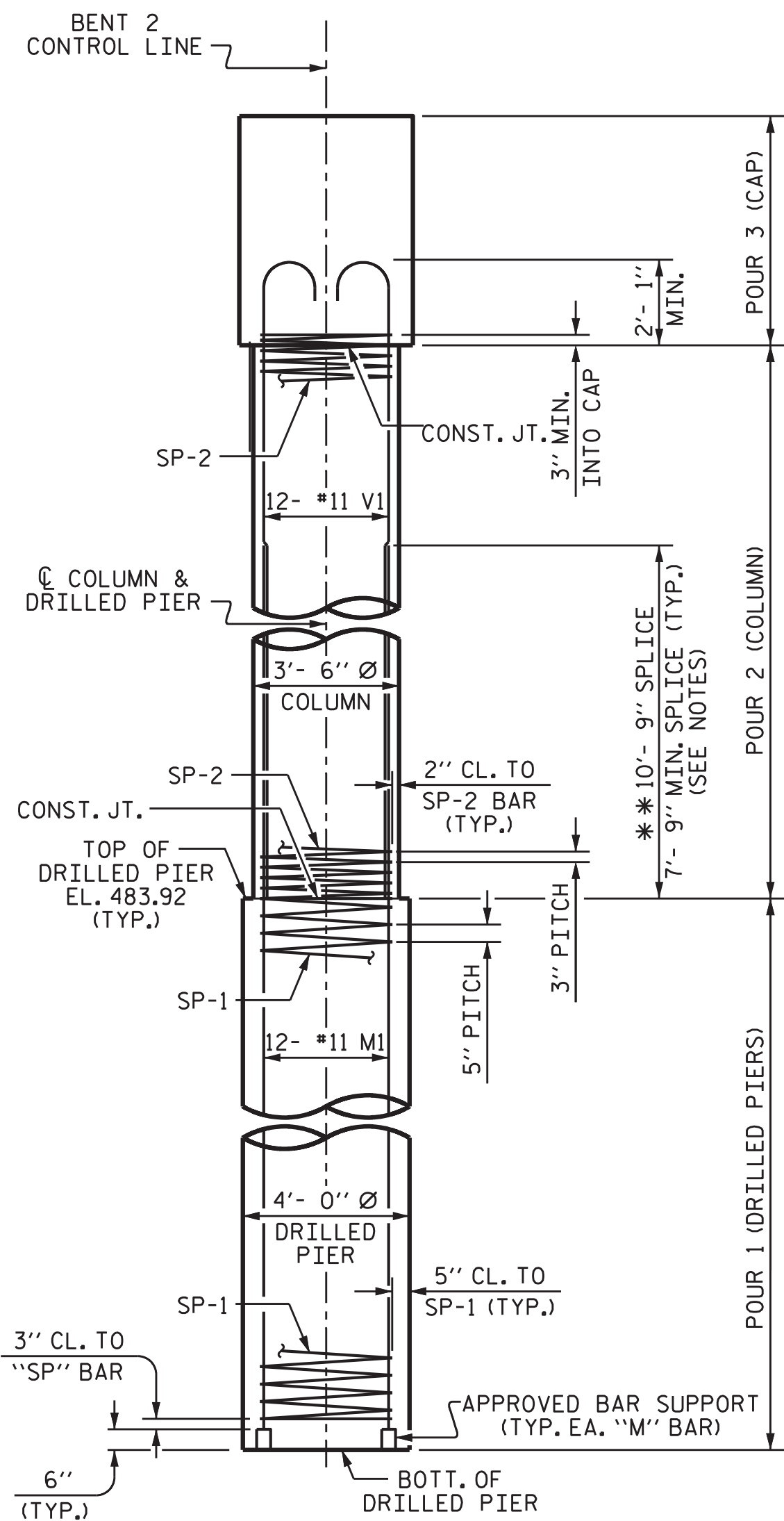
PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-
 SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-34
					TOTAL SHEETS 47



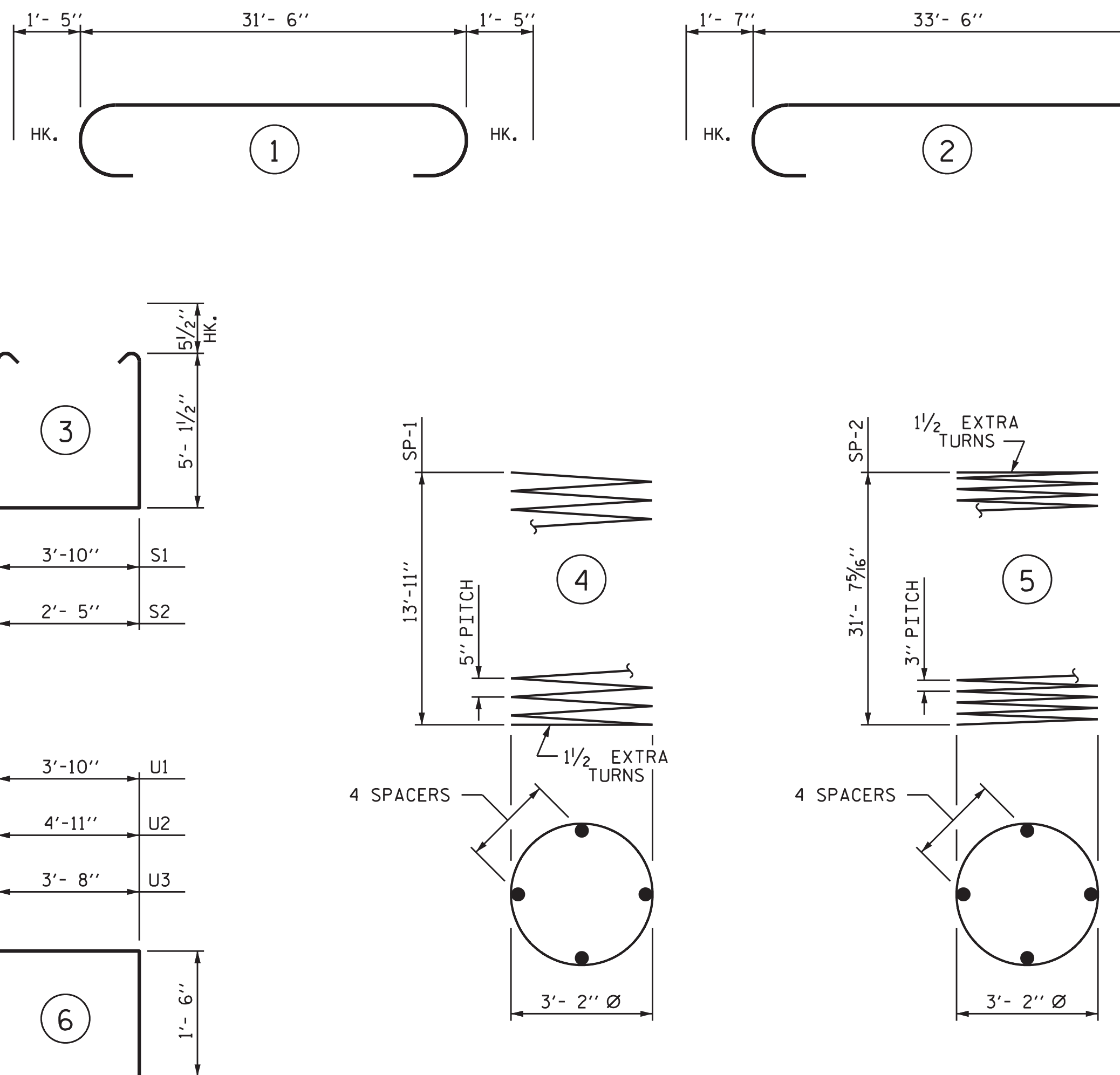
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DRAWN BY: D. A. GLADDEN DATE: 8/18
 CHECKED BY: J. R. McROY DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18



END ELEVATION

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	10	1	34'- 4"	886
B2	6	10	STR	31'- 8"	818
B3	12	5	STR	31'- 8"	396
B4	6	4	STR	13'- 0"	52
M1	24	11	STR	24'- 8"	3145
S1	21	5	3	15'- 0"	329
S2	72	5	3	13'- 7"	1020
U1	35	4	6	6'-10"	160
U2	8	4	6	7'-11"	42
U3	8	4	6	6'- 8"	36
V1	24	11	2	35'- 1"	4474
REINFORCING STEEL					11358 LBS.

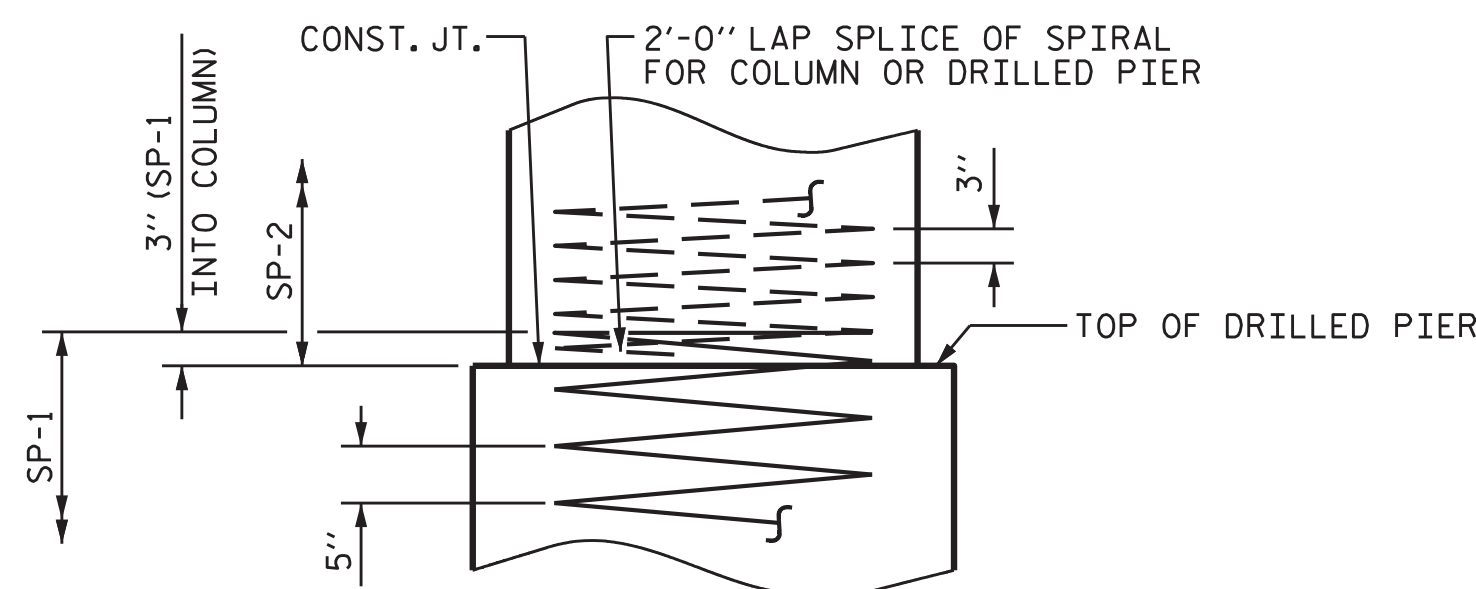
SP-1	2	**	4	342'-10"	715
SP-2	2	*	5	1257'- 1"	1679
SPIRAL COLUMN REINFORCING STEEL					2394 LBS.

* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.
 ** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE		
POUR 2: COLUMNS		22.4 C.Y.
POUR 3: CAP		28.0 C.Y.
TOTAL		50.4 C.Y.

DRILLED PIERS

DRILLED PIER CONCRETE		
POUR 1: DRILLED PIERS		13.4 C.Y.
4'- 0" Ø DRILLED PIERS IN SOIL	8.8	LIN. FT.
4'- 0" Ø DRILLED PIERS NOT IN SOIL	20	LIN. FT.
PERMANENT STEEL CASING FOR 4'- 0" Ø DRILLED PIERS	9.8	LIN. FT.
CSL TUBES	127.3	LIN. FT.



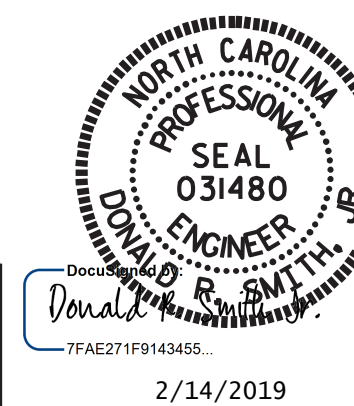
CONSTRUCTION JOINT DETAIL

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 2**



2/14/2019

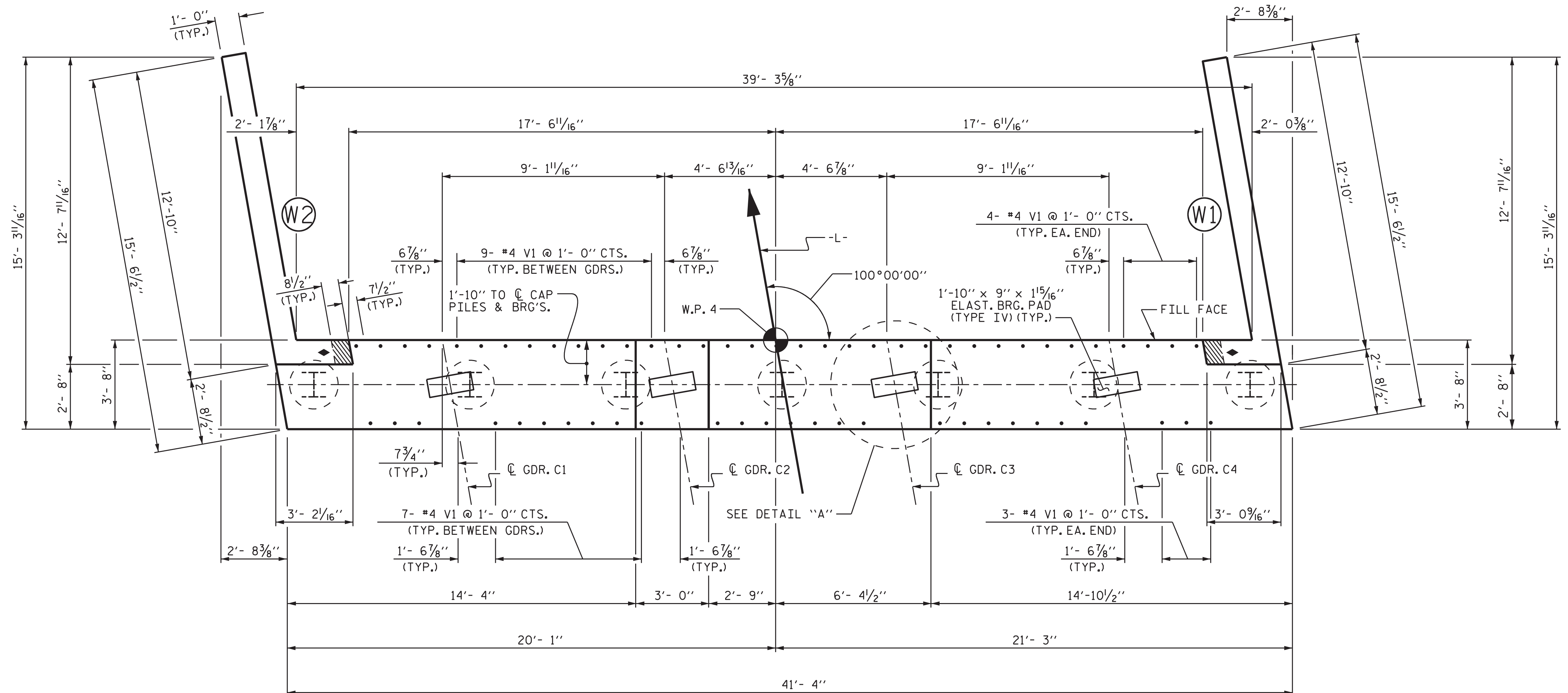
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			47

DRAWN BY : D. A. GLADDEN DATE : 8/18
 CHECKED BY : J. R. McROY DATE : 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18

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PLAN

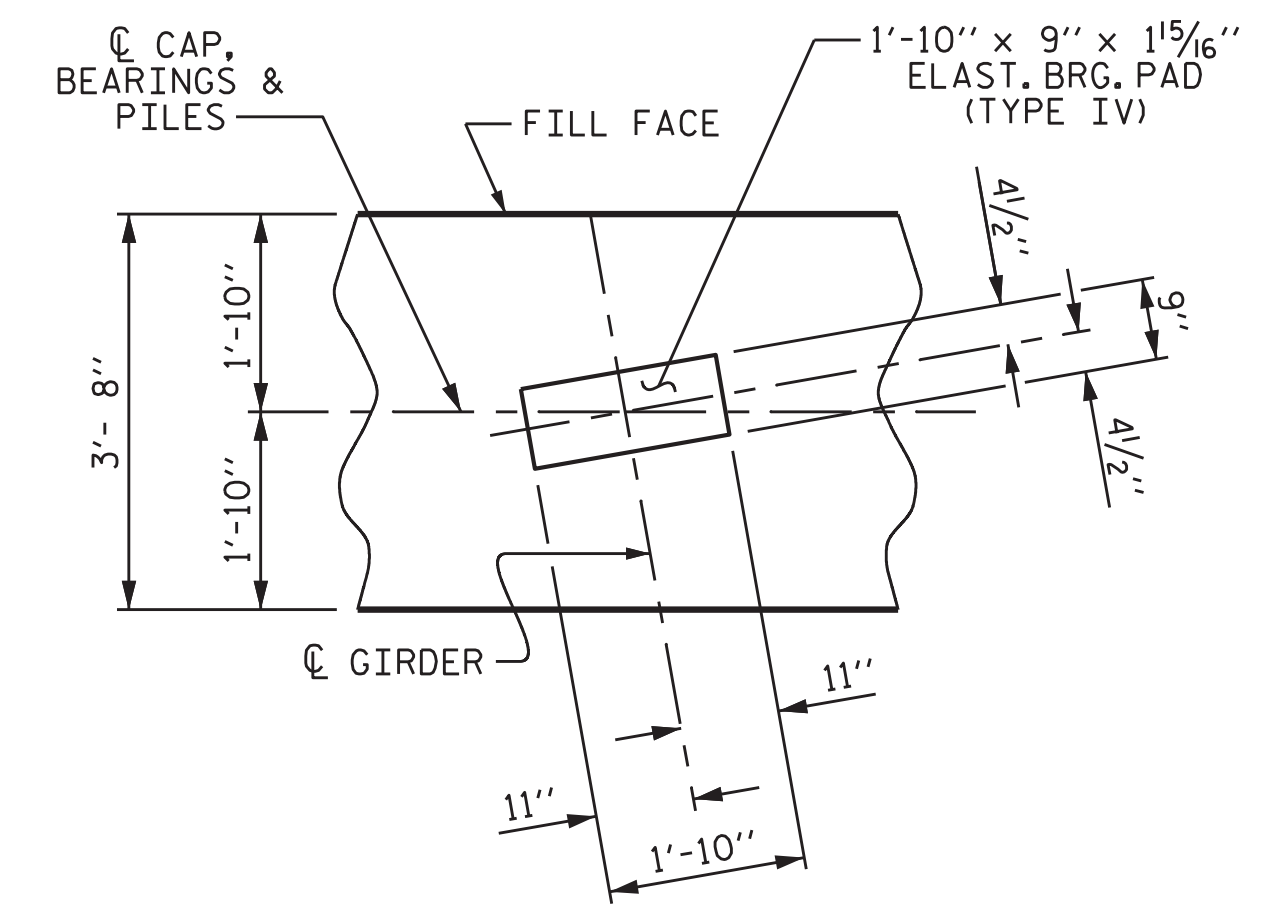
NOTES:

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

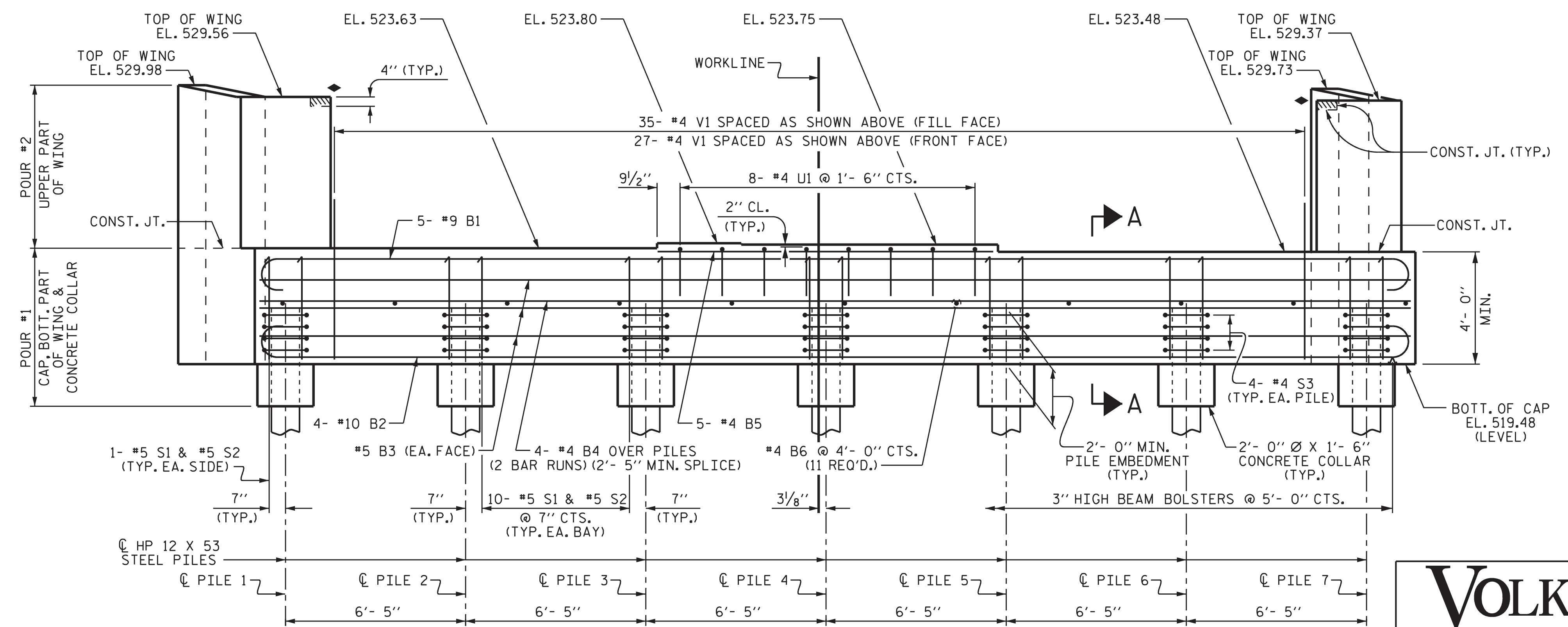
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO AVOID #4 V1 BARS IN CAP.

THE CONCRETE IN THE SHADED AREA OF THE WINGS SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

♦ FOR BLOCKOUT IN WING WALL, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.



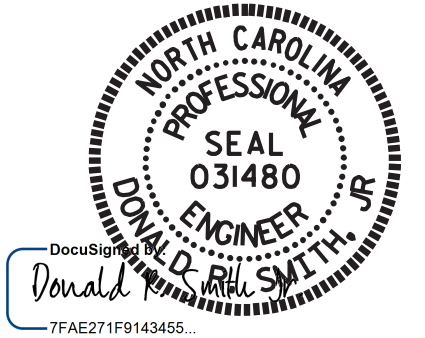
DETAIL "A"
(TYP. EA. GIRDER)



ELEVATION

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 1 OF 3



2/14/2019

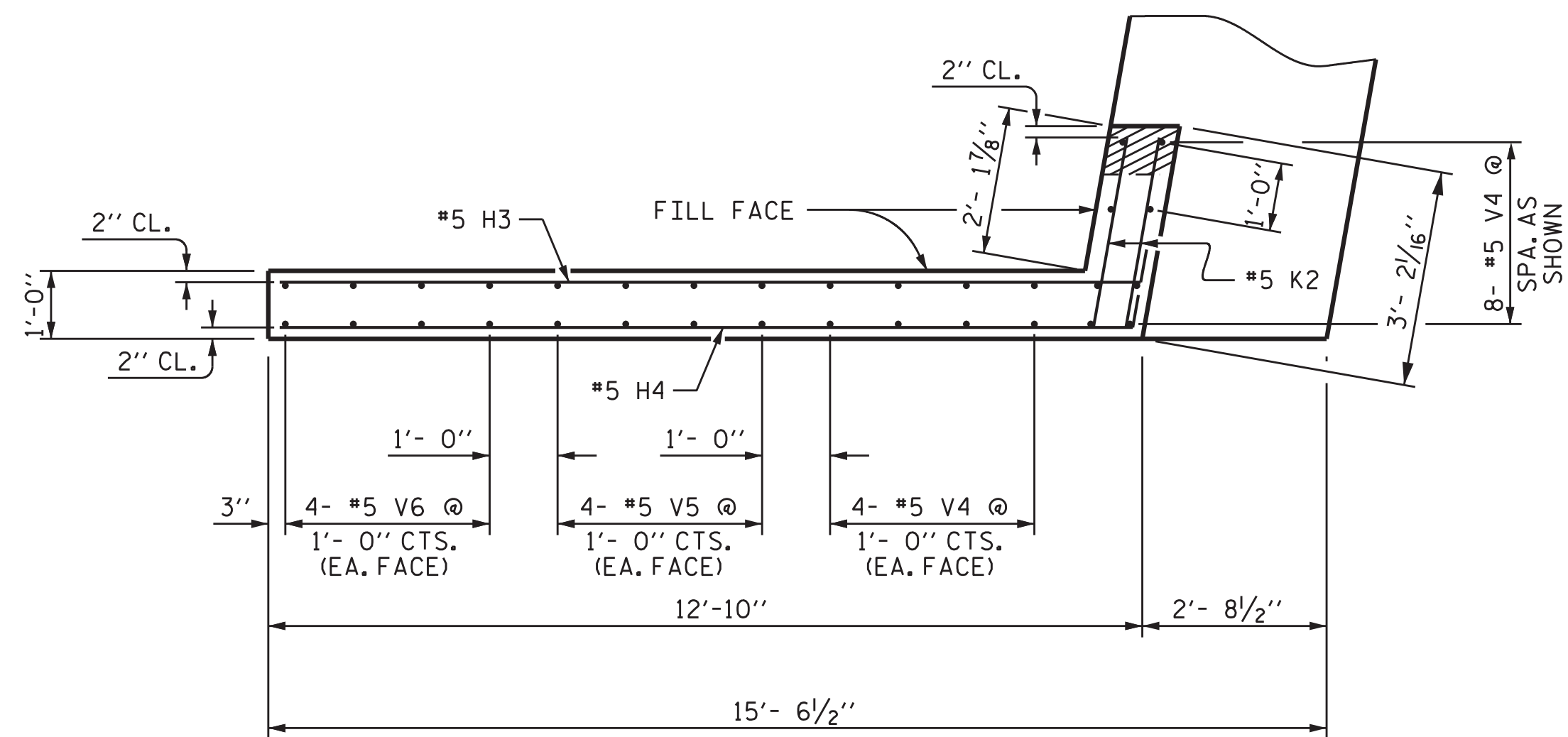
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 INTEGRAL
 END BENT 2**

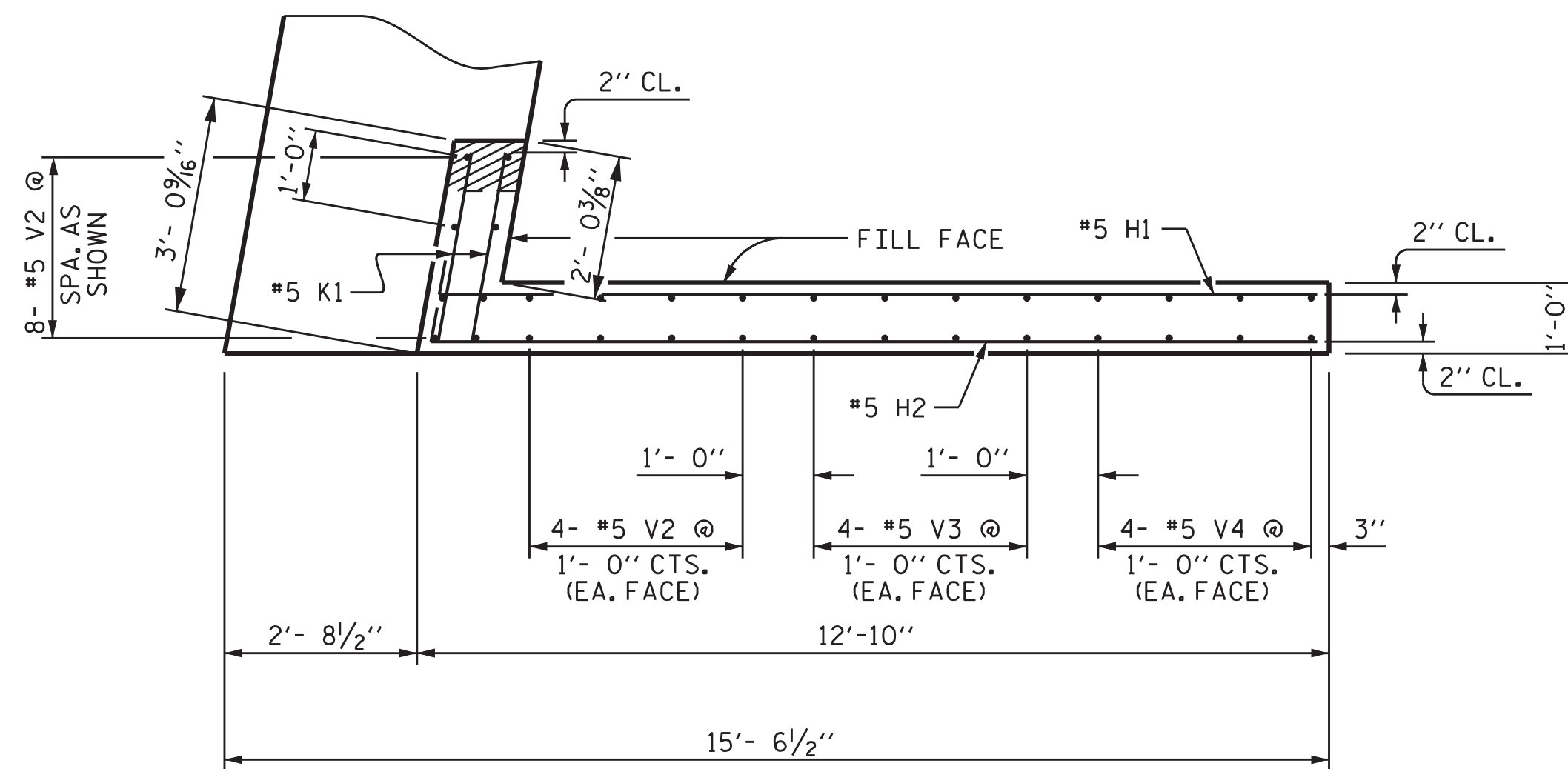
DRAWN BY : D. A. GLADDEN DATE : 3/18
 CHECKED BY : J. R. McROY DATE : 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE : 10/18

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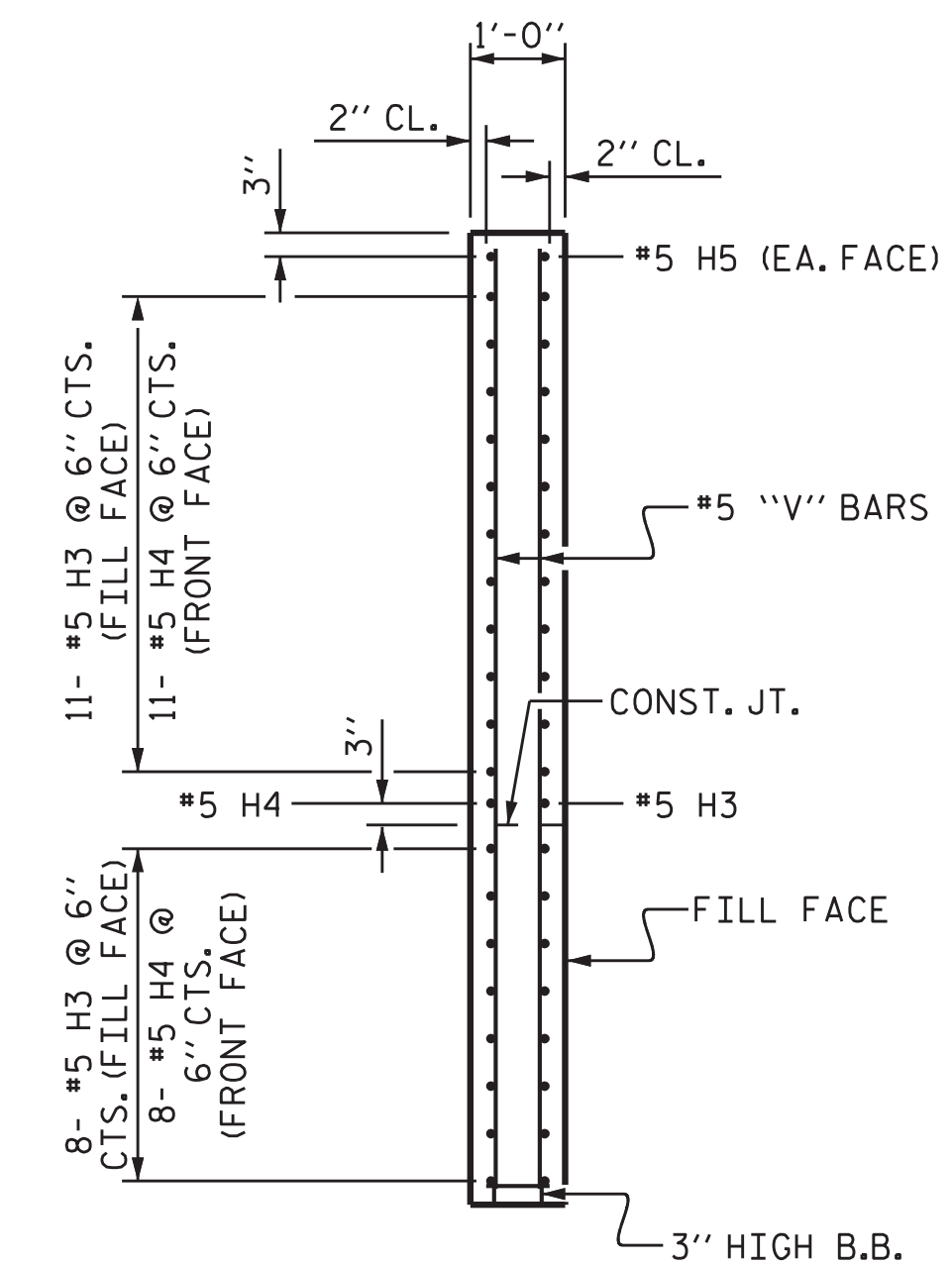
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			47



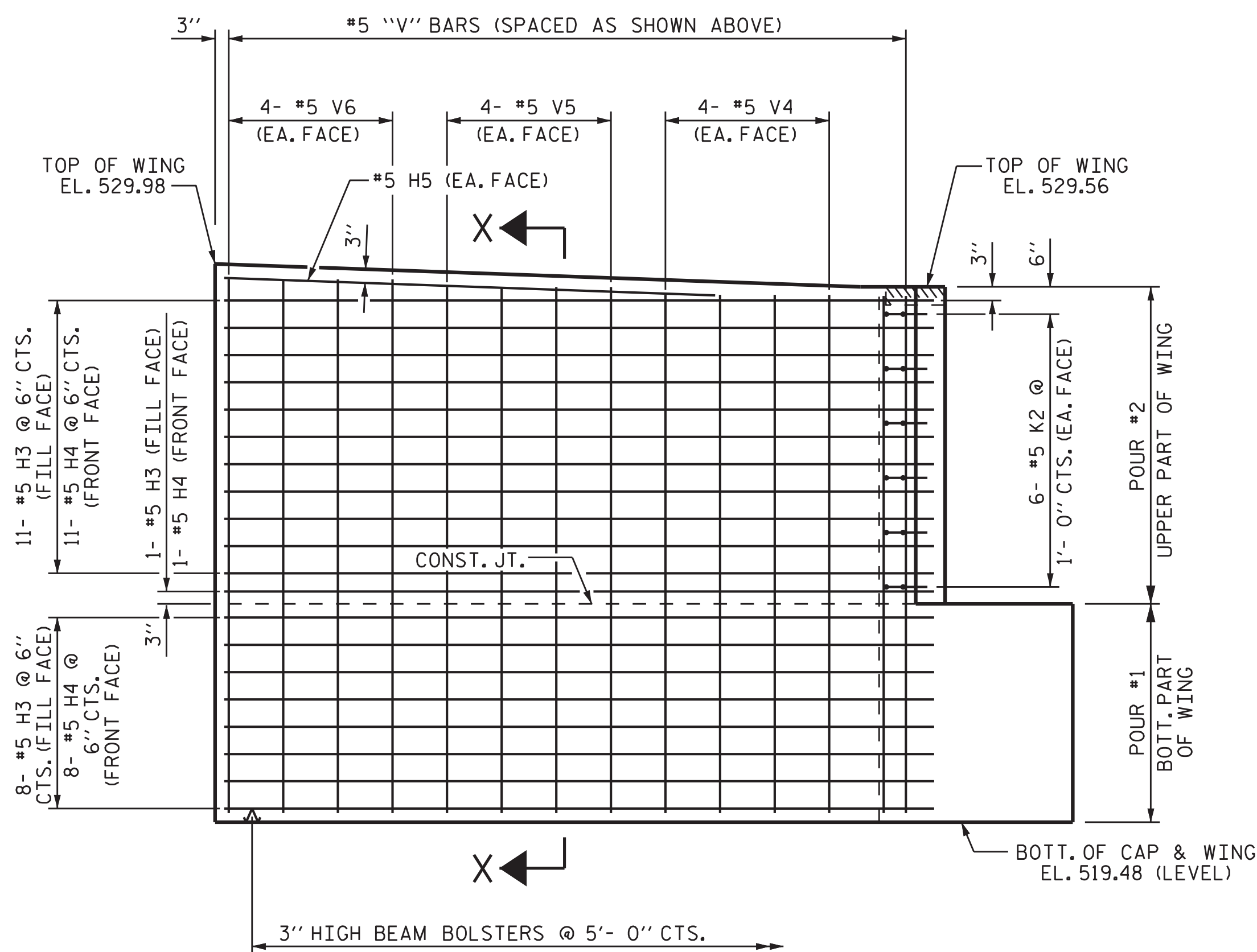
PLAN OF WING 2



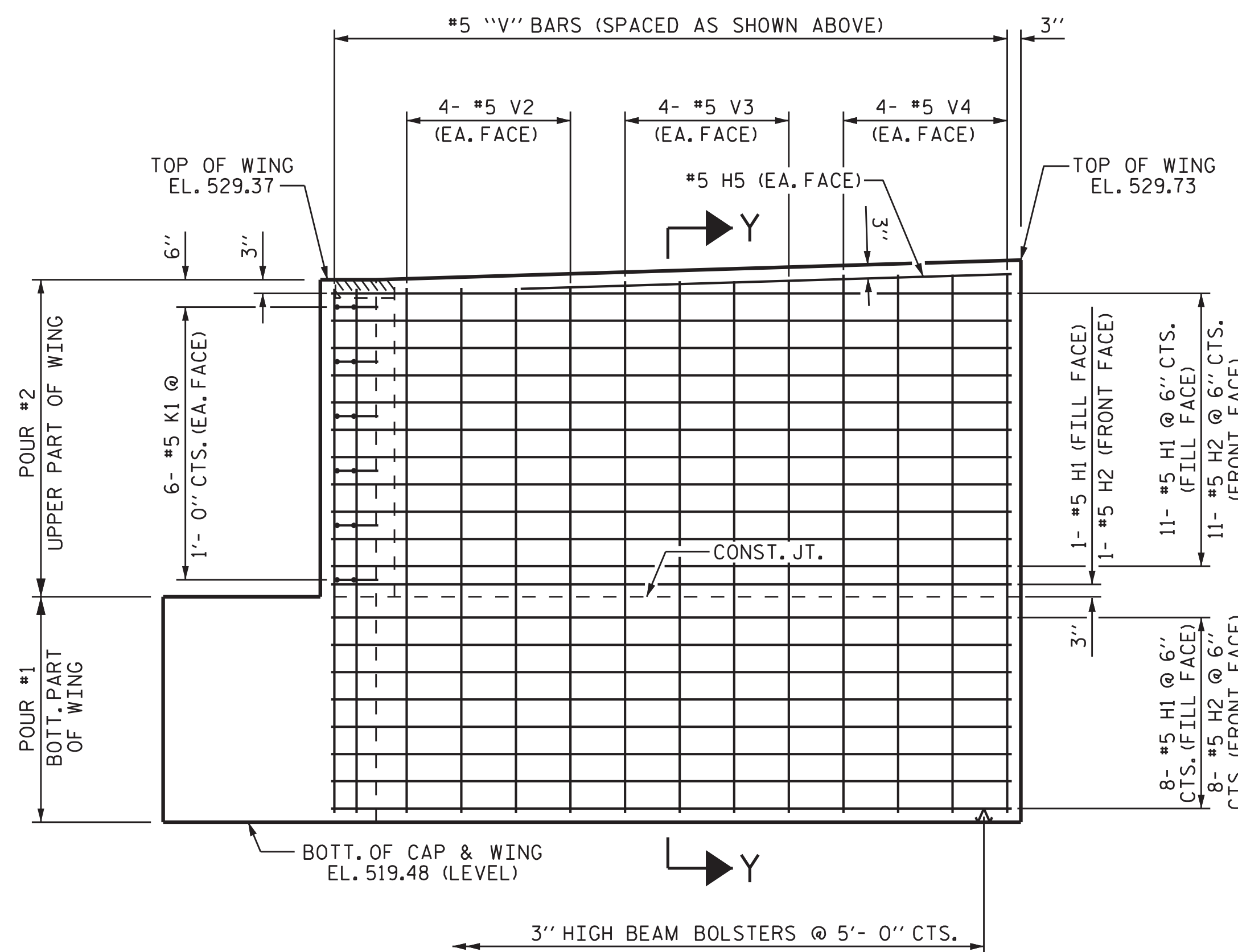
PLAN OF WING 1



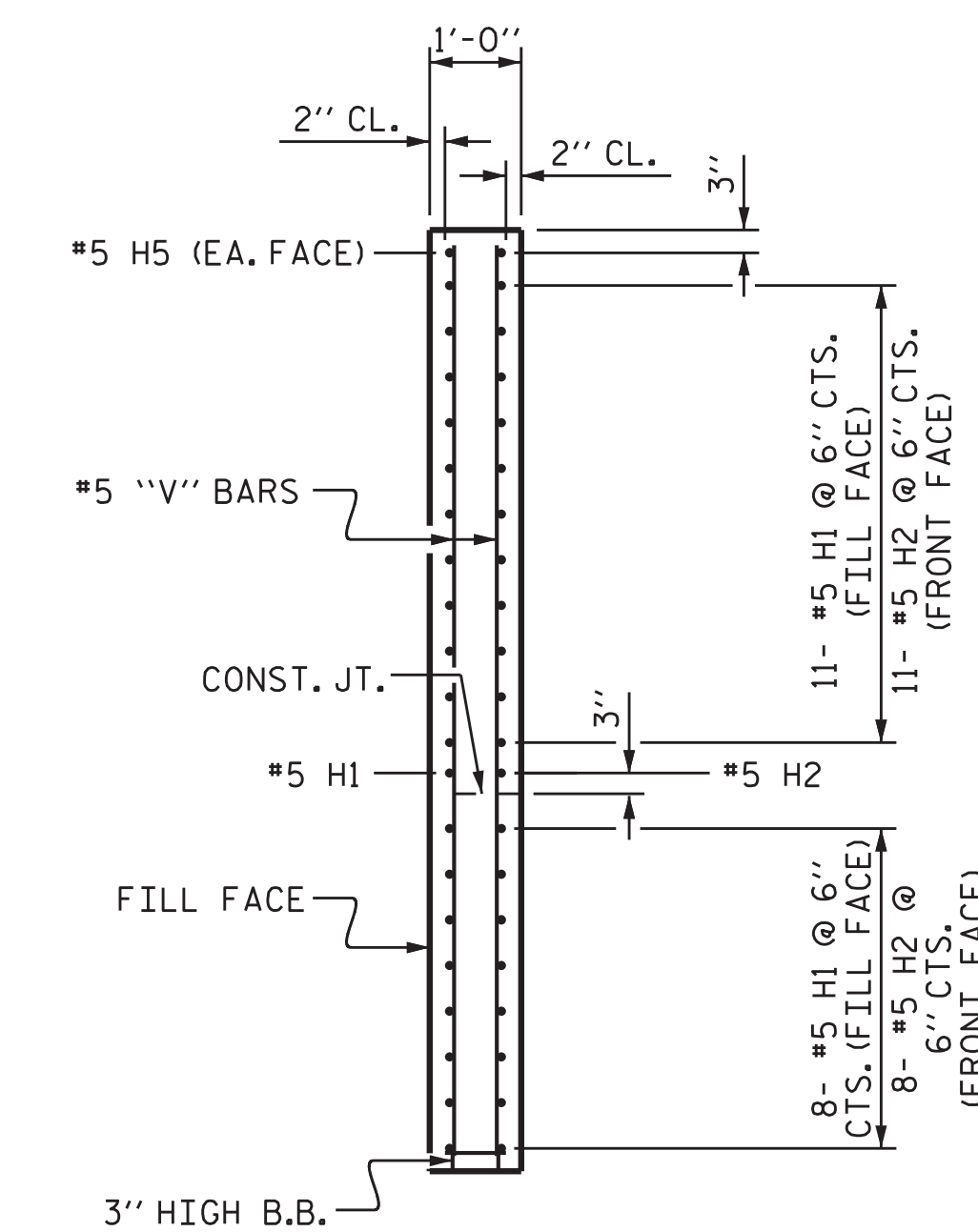
SECTION X-X



ELEVATION OF WING 2



ELEVATION OF WING 1



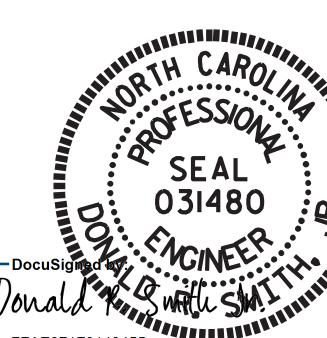
SECTION Y-Y

PROJECT NO. B-4962
 ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 INTEGRAL
 END BENT 2



2/14/2019

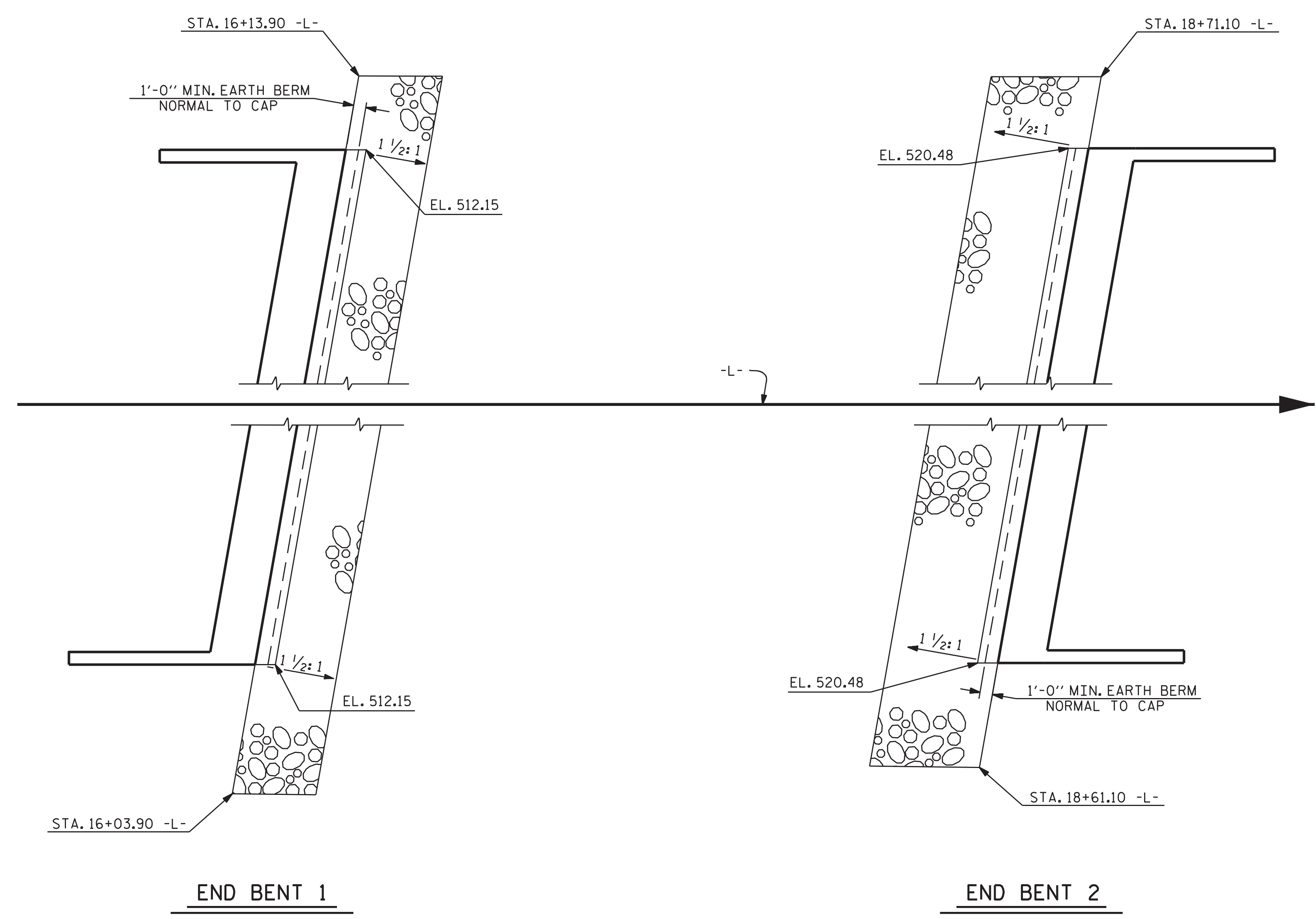
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REVISIONS						SHEET NO. S-37
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 47
2			4			

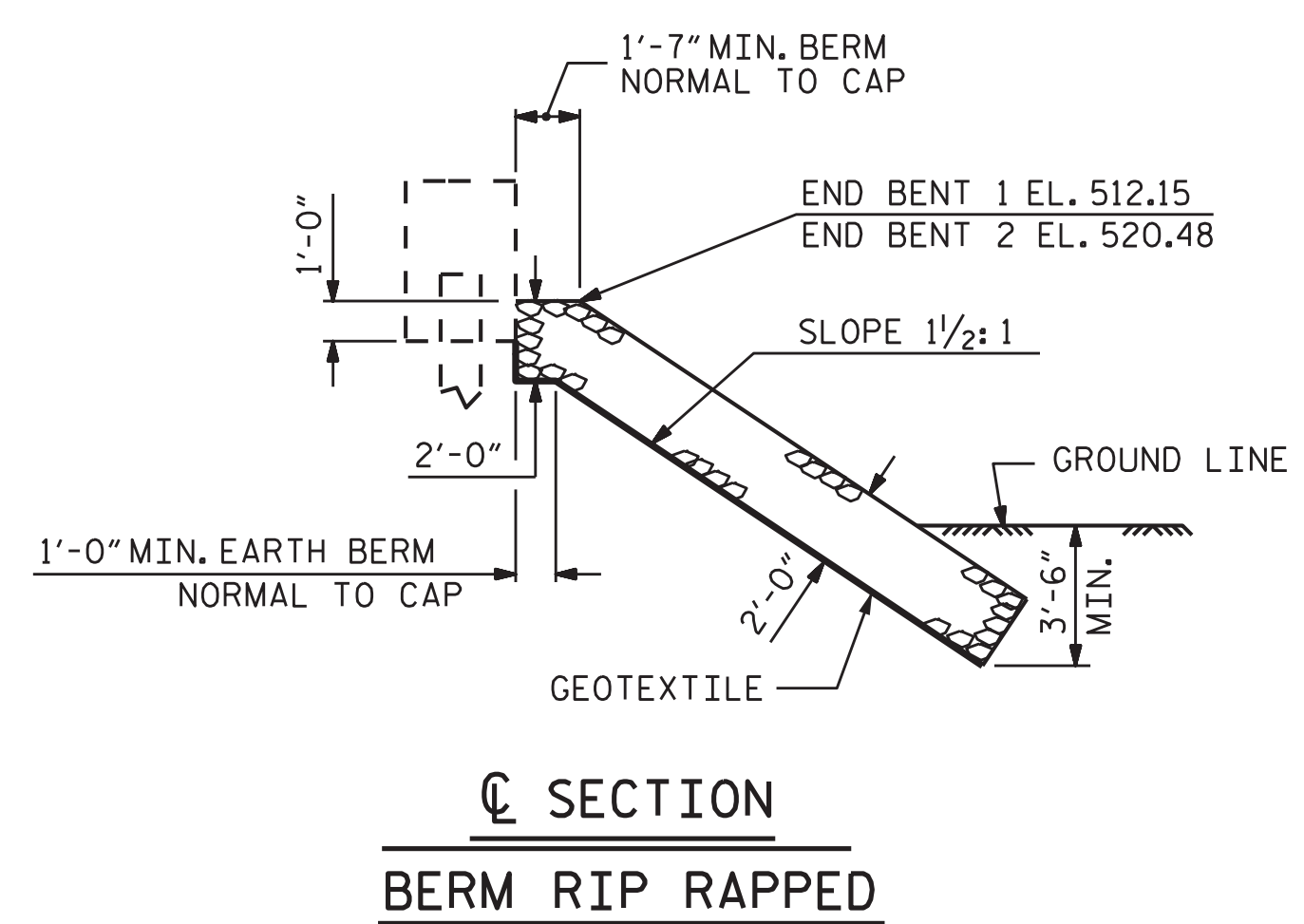
DRAWN BY: D. A. GLADDEN DATE: 3/18
 CHECKED BY: J. R. McROY DATE: 9/18
 DESIGN ENGINEER OF RECORD: P. N. HOLDER DATE: 10/18



NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

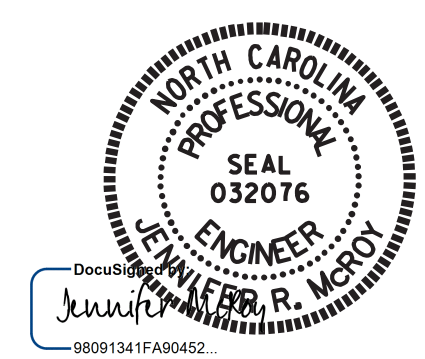
ESTIMATED QUANTITIES		
BRIDGE @ STA. 17+37.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	40	45
END BENT 2	54	60

PLAN



SECTION
BERM RIP RAPPED

PROJECT NO. B-4962
ORANGE COUNTY
STATION: 17+37.50 -L-



2/14/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

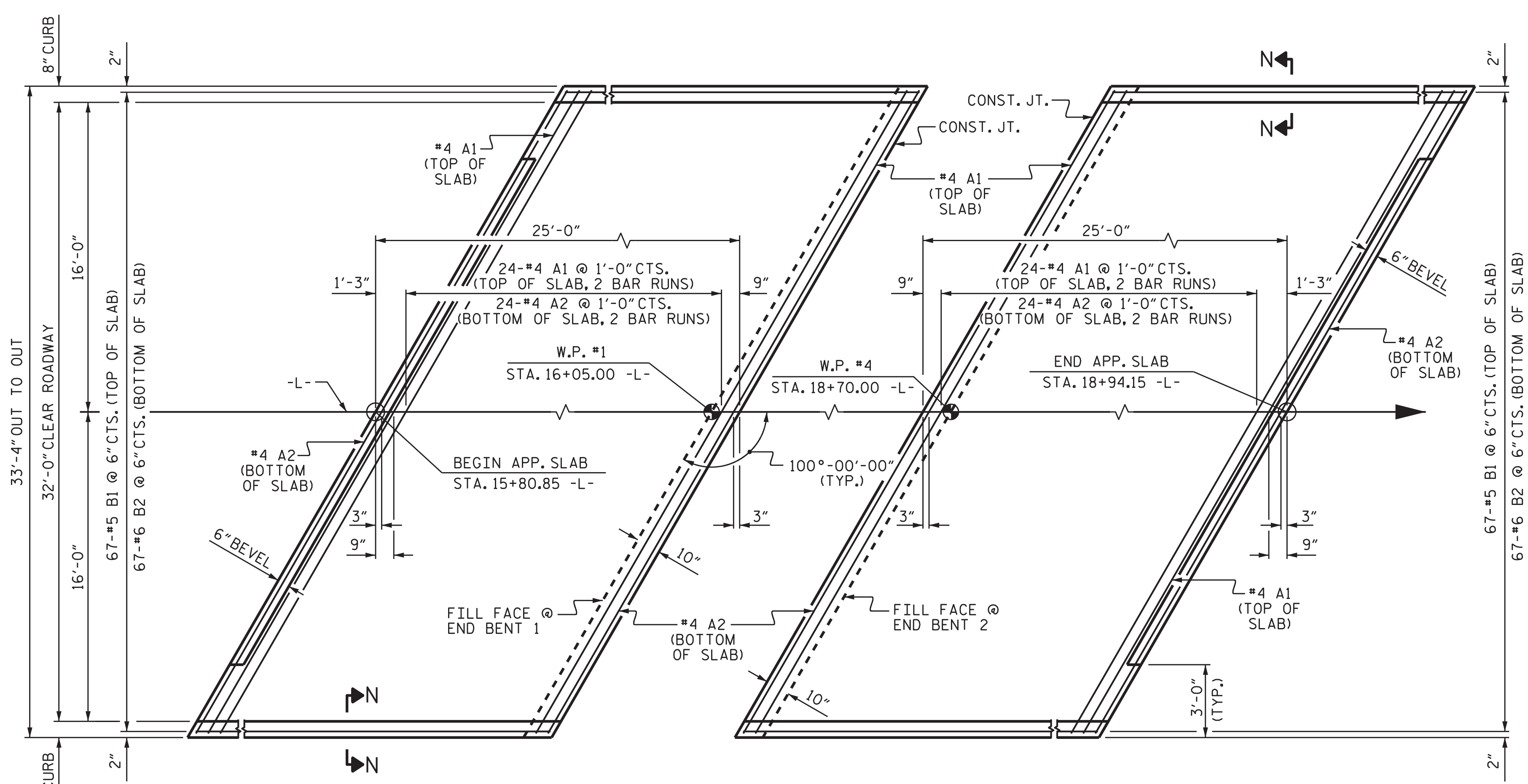
RIP RAP DETAILS

ASSEMBLED BY : P.N.HOLDER	DATE : 04/18
CHECKED BY : J.R.MCROY	DATE : 09/18
DRAWN BY : REK 1/84	REV. 10/1/11 MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11 MAA/GM
	REV. 12/17 MAA/THC

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			47
2			4			



PLAN @ END BENT 1
 PLAN @ END BENT 2
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

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

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

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

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

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

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

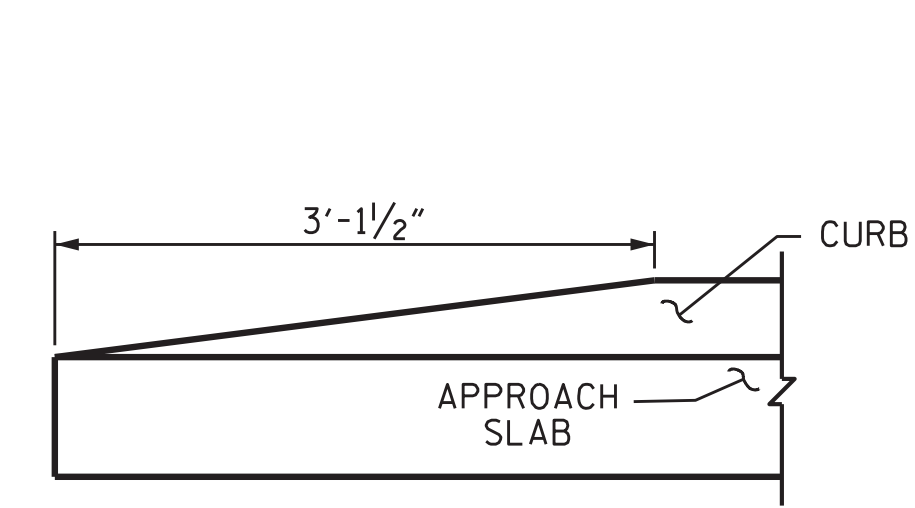
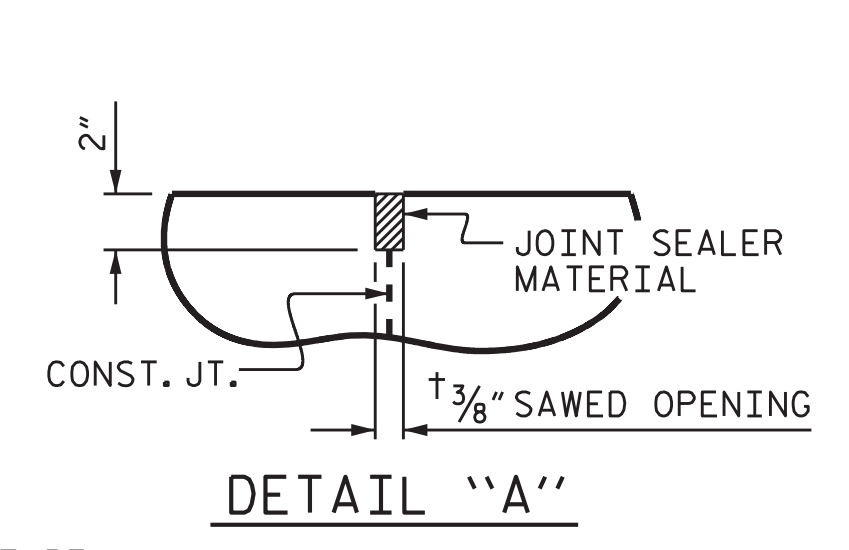
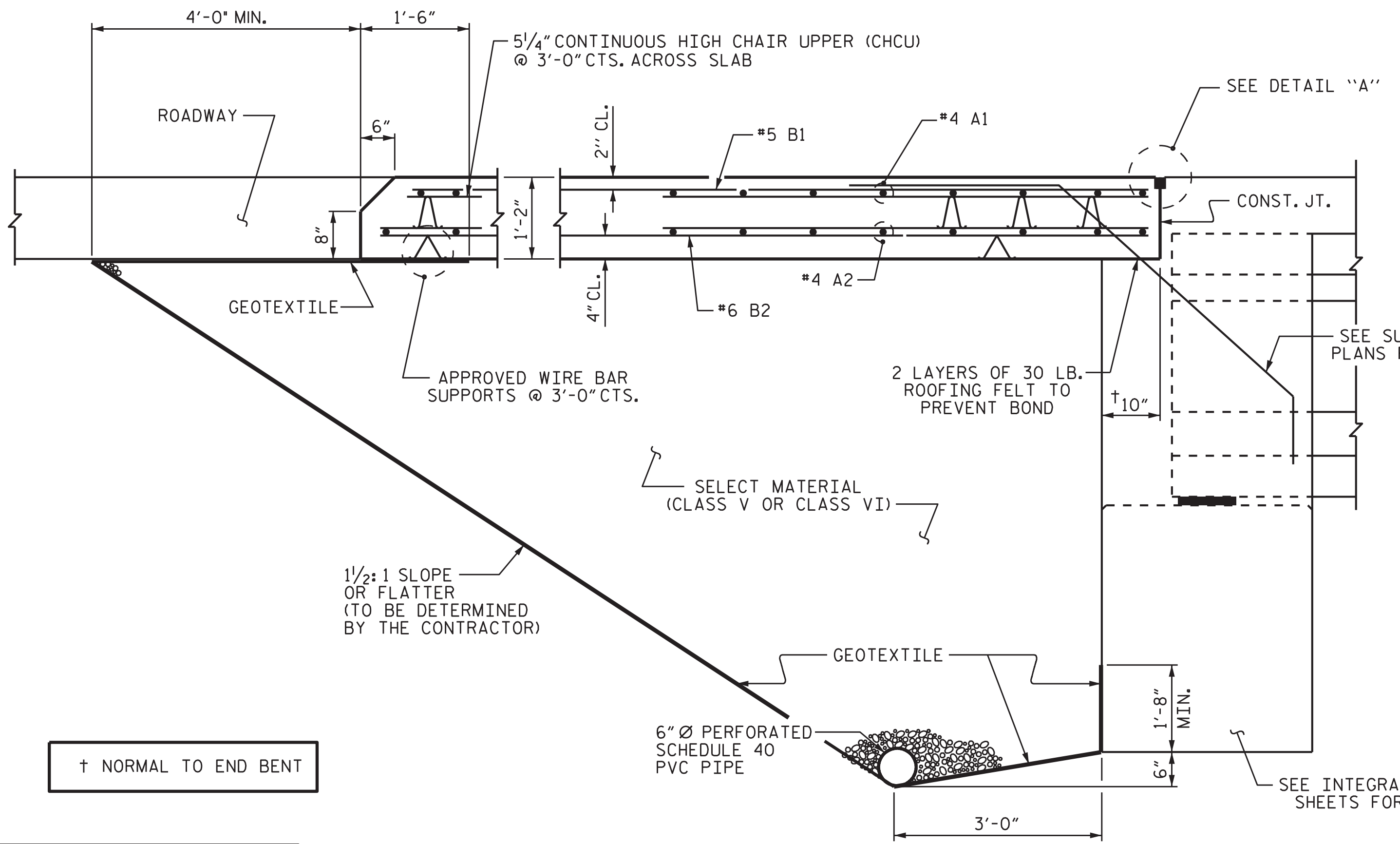
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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

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

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	17'-9"	617
A2	52	#4	STR	17'-8"	614
* B1	67	#5	STR	24'-2"	1689
B2	67	#6	STR	24'-8"	2482
REINFORCING STEEL				LBS.	3096
* EPOXY COATED REINFORCING STEEL				LBS.	2305
CLASS AA CONCRETE				C. Y.	35.9

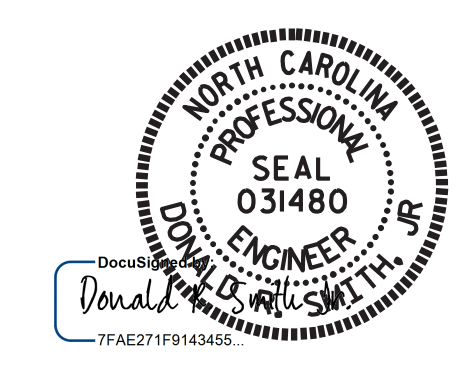
SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



SECTION THRU SLAB
 (TYPE I - STANDARD APPROACH FILL)

PROJECT NO. B-4962
 ORANGE COUNTY
 STATION: 17+37.50 -L-
 SHEET 1 OF 2

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

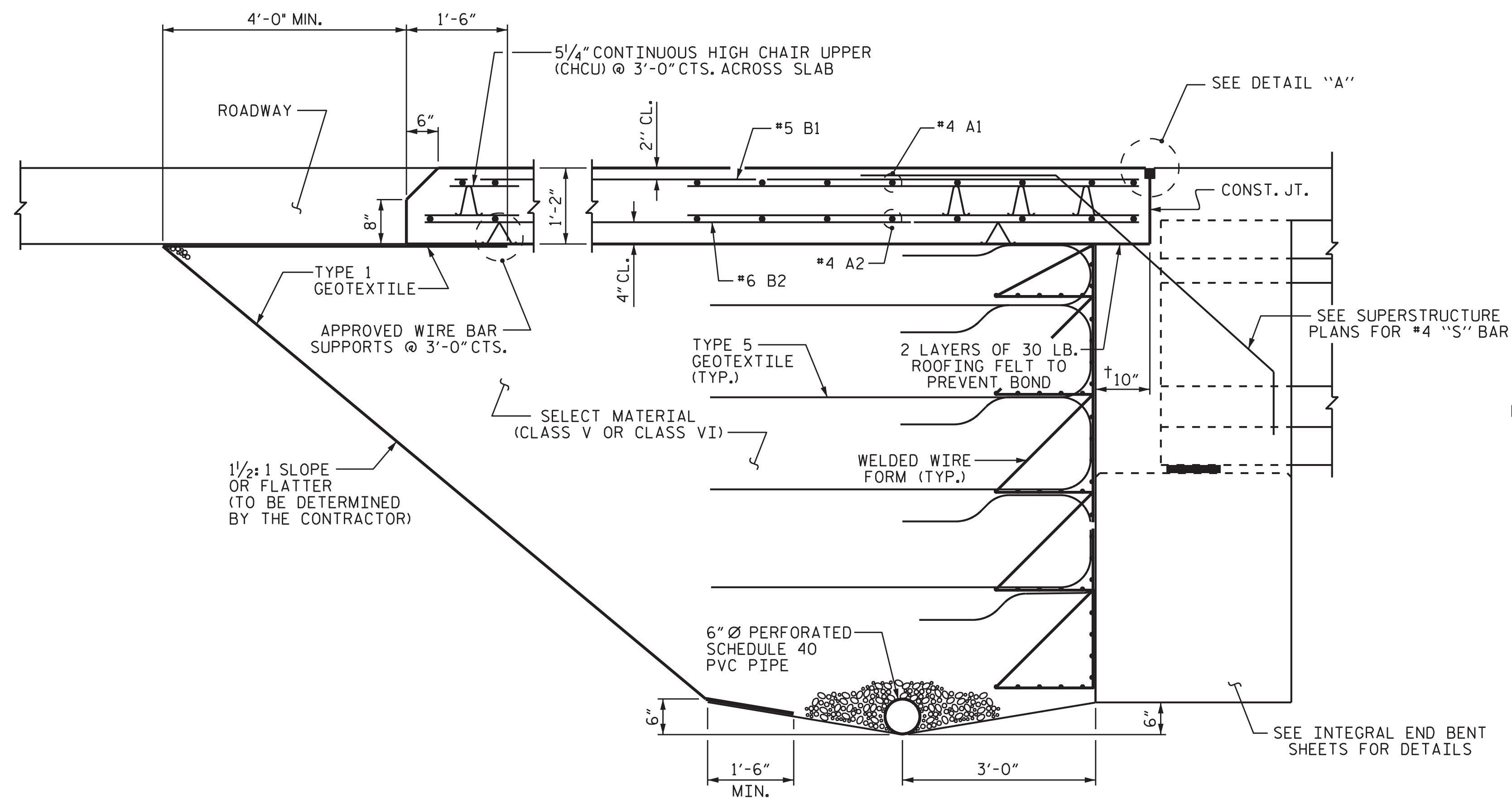


2/14/2019

ASSEMBLED BY : PNH	DATE : 04/18
CHECKED BY : RGB	DATE : 08/18
DRAWN BY : TLA	10/05
CHECKED BY : GM	5/06
REV. 12/21/11	MAA/GM
REV. 6/13	MAA/GM
REV. 12/17	MAA/THC

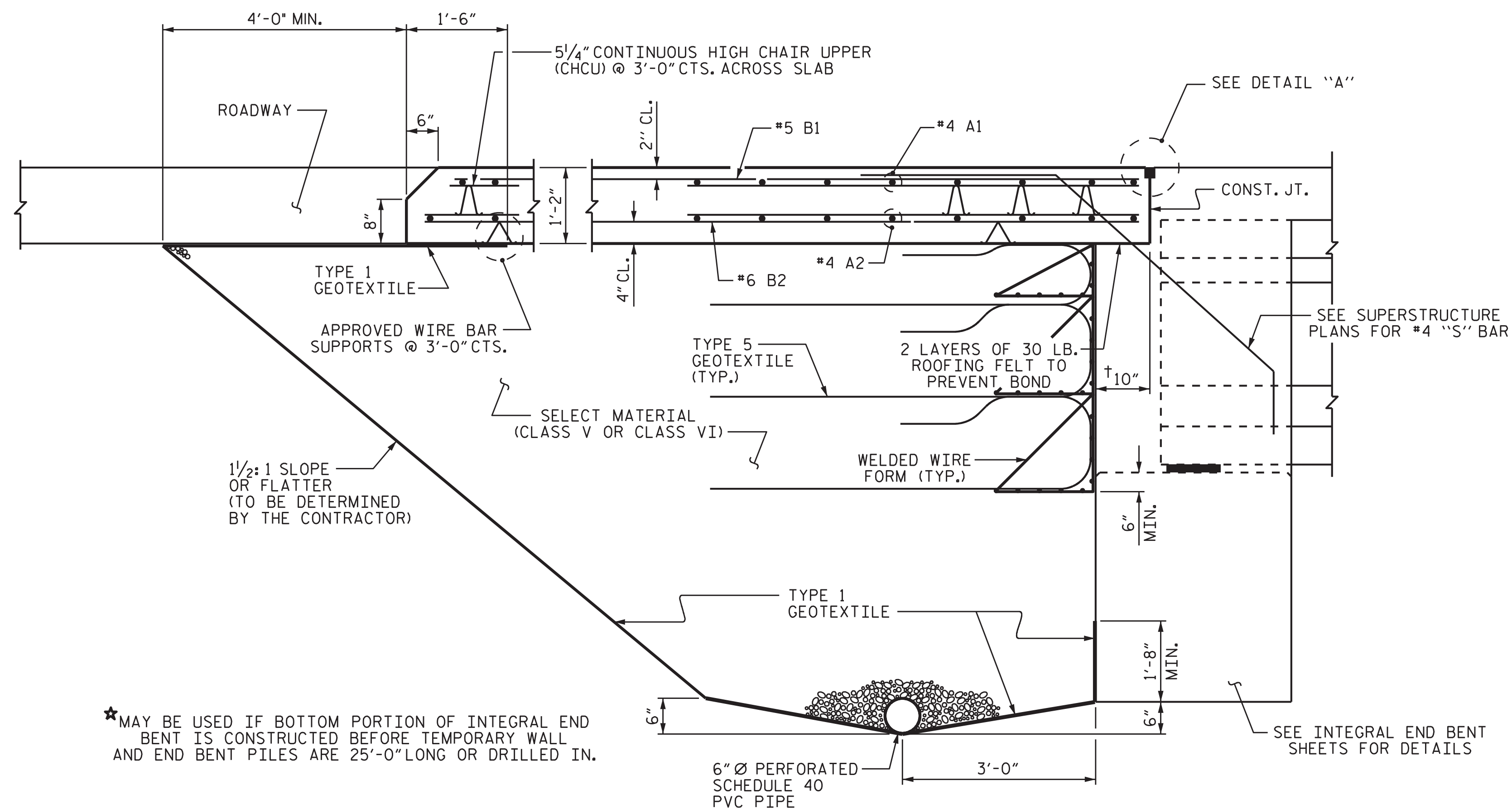
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-40
2			4			47

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



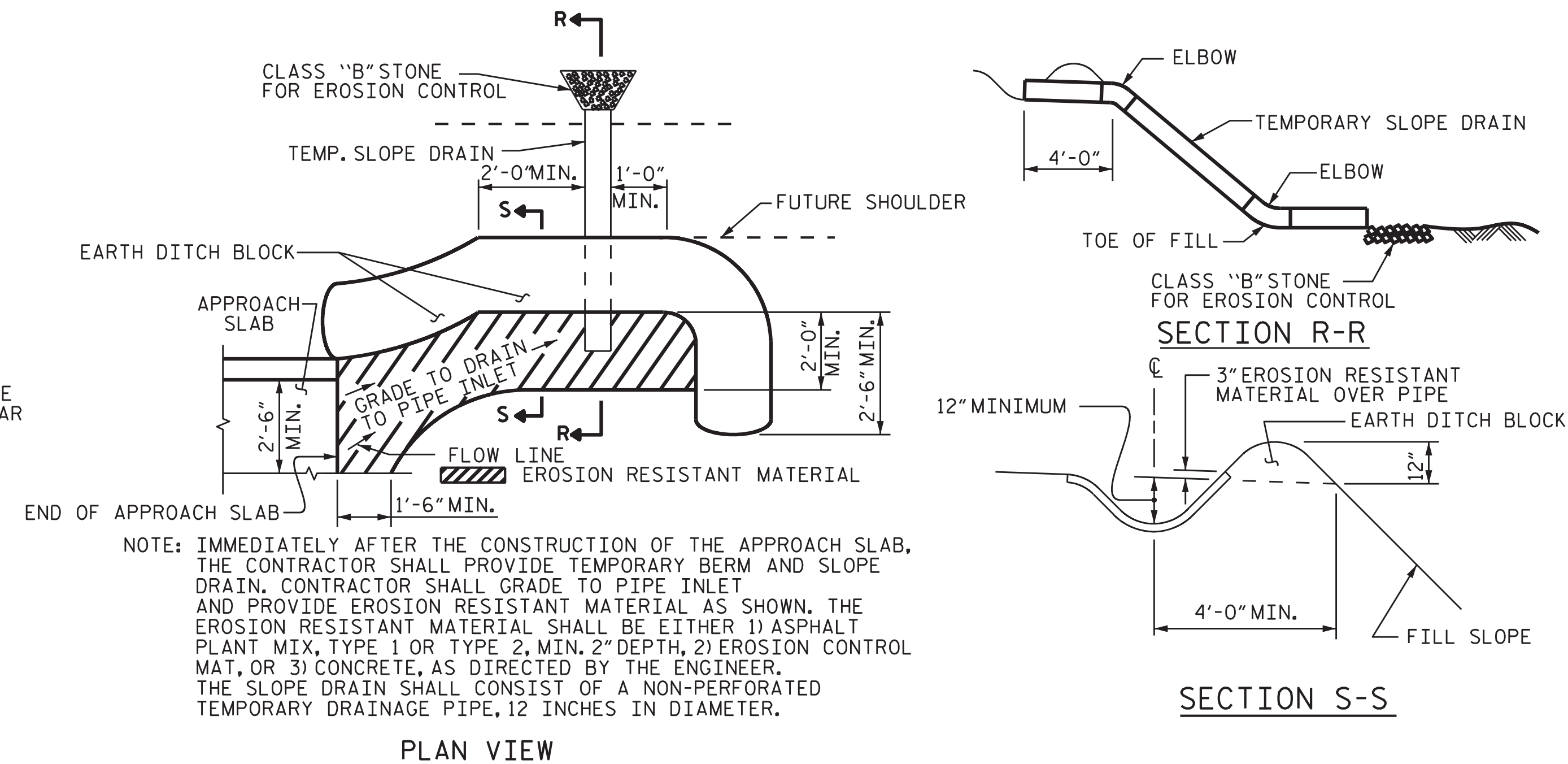
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



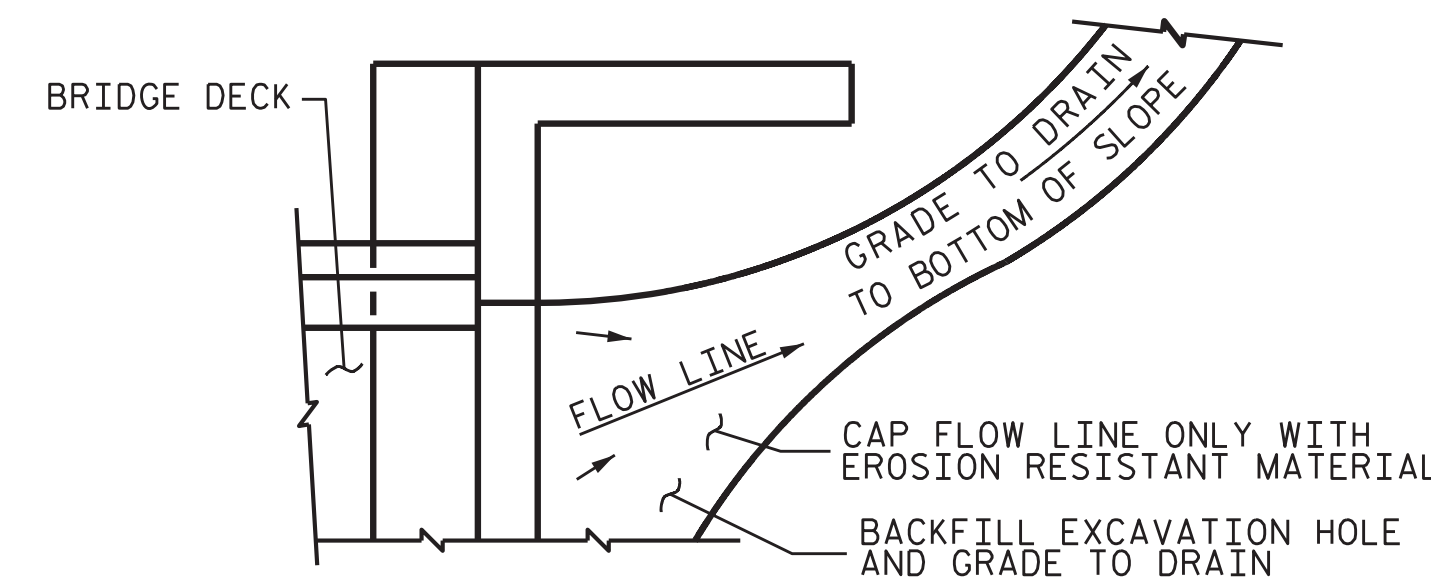
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

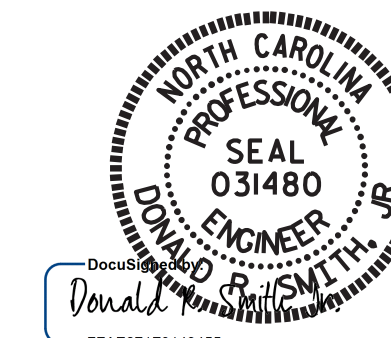


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.



2/14/2019

PROJECT NO. B-4962
ORANGE COUNTY
 STATION: 17+37.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41	
1			3			TOTAL SHEETS	
2			4			47	

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STD. NO. BAS5

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