

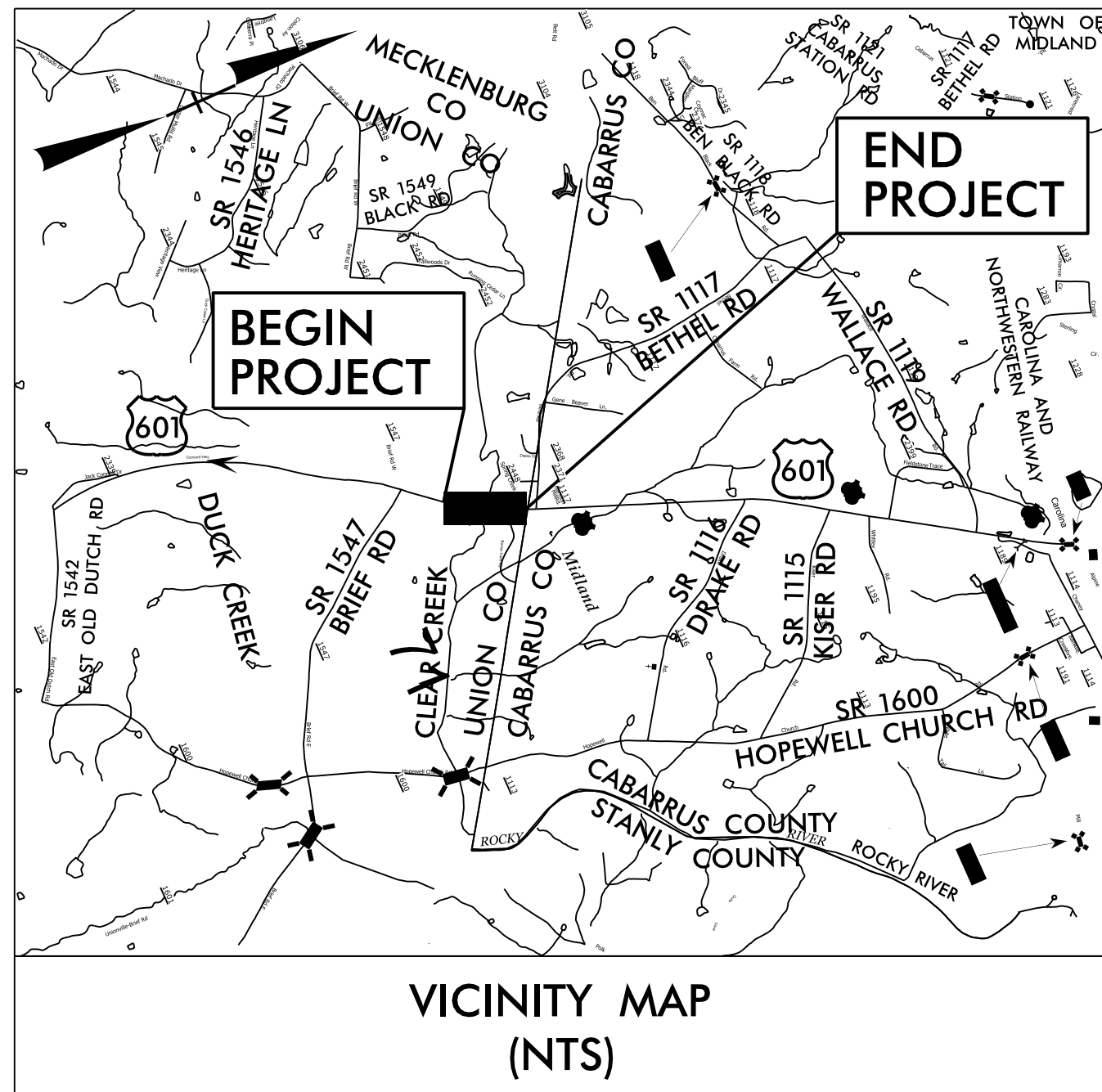
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TIP PROJECT: B-5371

CONTRACT: C204064



VICINITY MAP
(NTS)

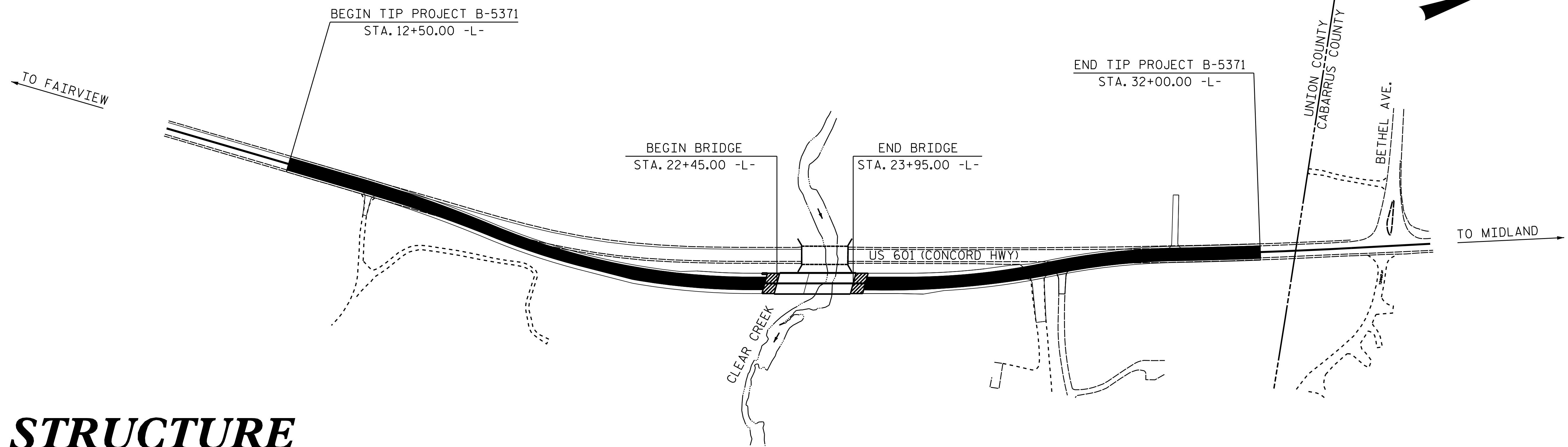
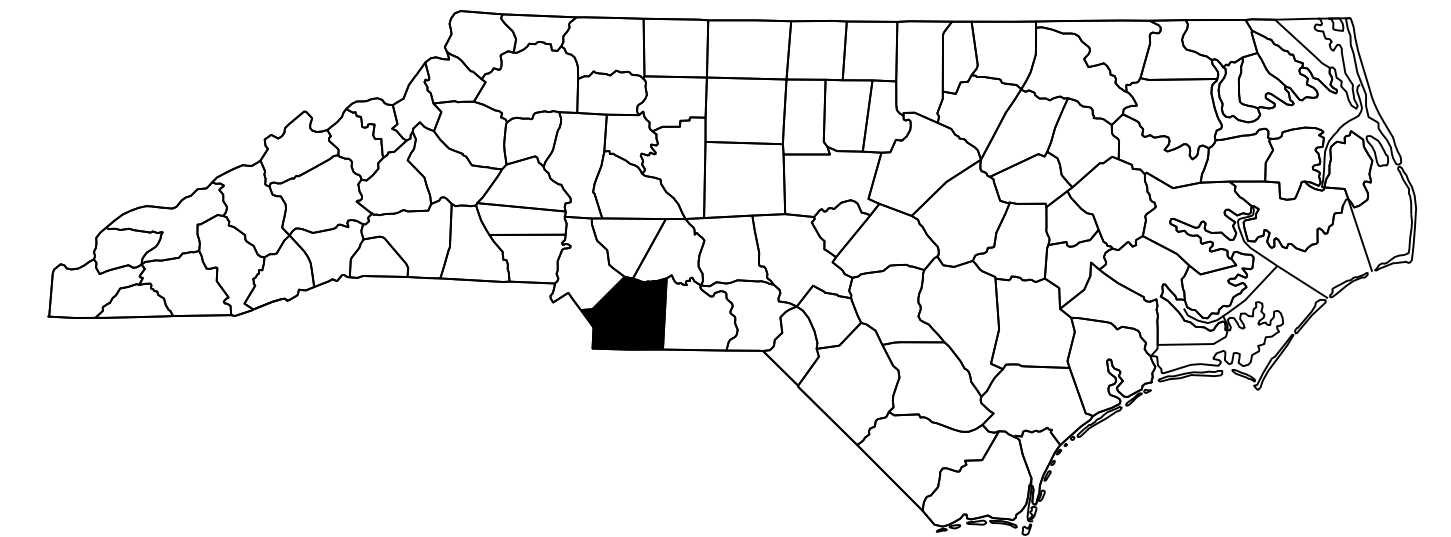
STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

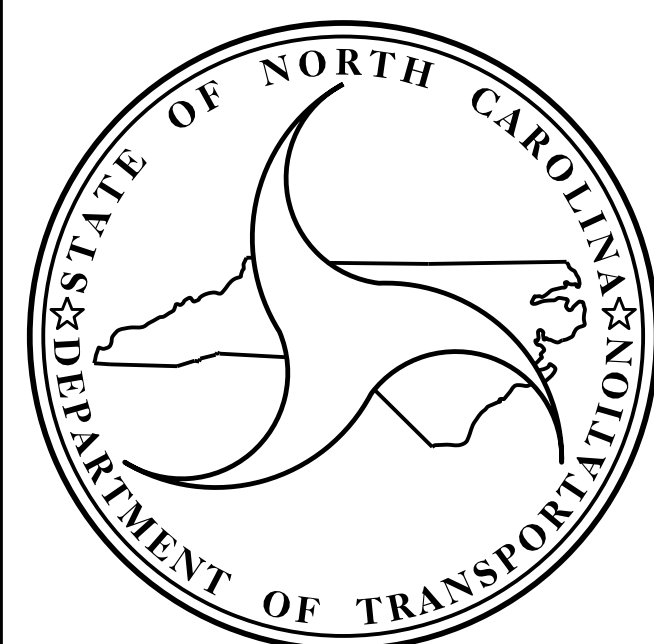
UNION COUNTY

LOCATION: BRIDGE NO. 71 OVER CLEAR CREEK ON US 601
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5371		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46086.1.1	BRSTP-0601 (21)	P.E.	
46086.1.1		RW & UTILITIES	
46086.1.1		CONST.	



STRUCTURE



DESIGN DATA

ADT 2018 =	7,641
ADT 2038 =	13,005
K =	10 %
D =	55 %
T =	20 % *
V =	60 MPH
* TTST = 11% DUAL 9%	
FUNC CLASS =	
MINOR ARTERIAL	
REGIONAL TIER	

PROJECT LENGTH

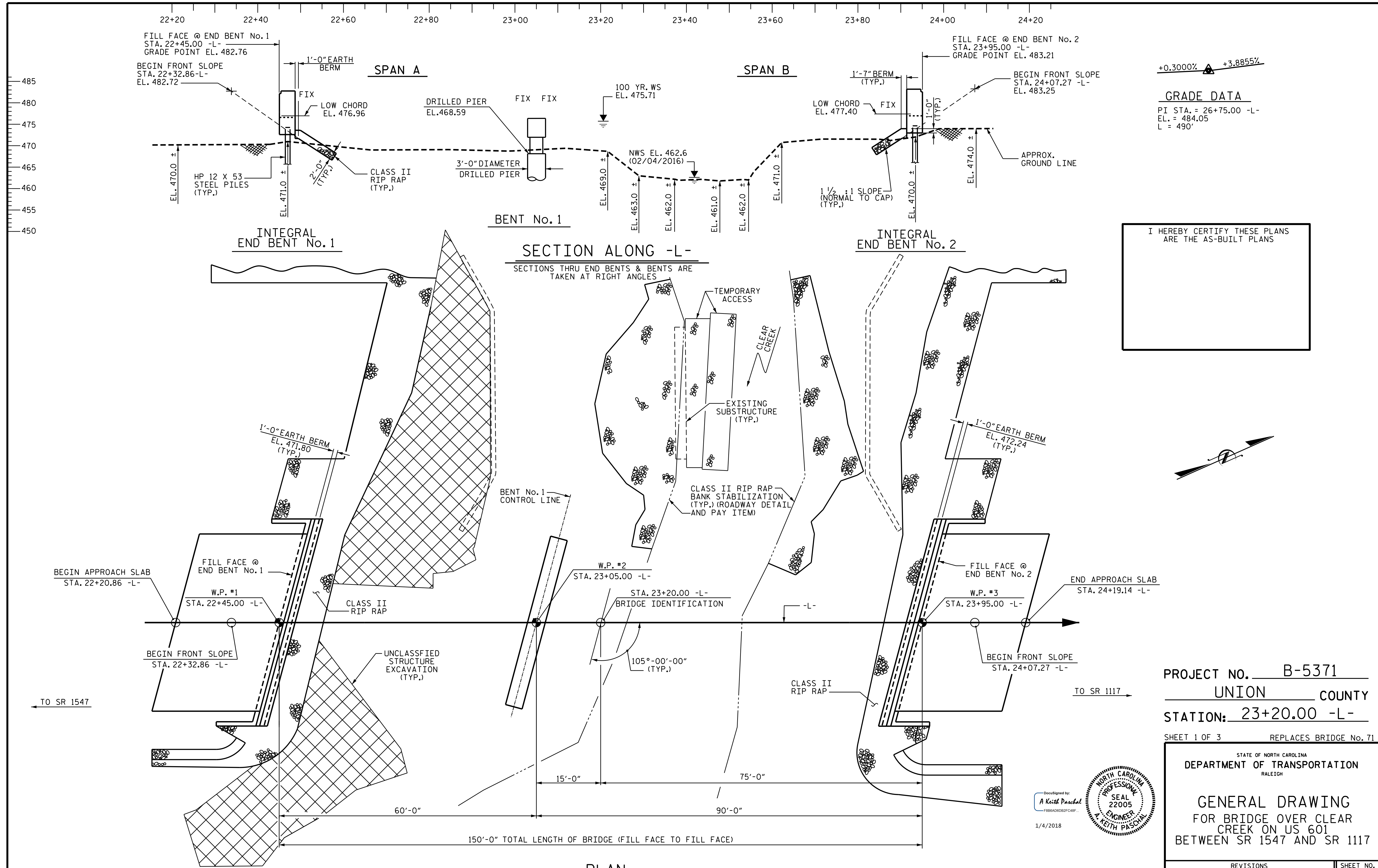
LENGTH OF ROADWAY TIP PROJECT B-5371 = 0.341 MILES
LENGTH OF STRUCTURE TIP PROJECT B-5371 = 0.028 MILES
TOTAL LENGTH OF TIP PROJECT B-5371 = 0.369 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

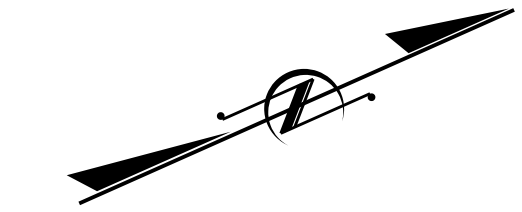
LETTING DATE :
FEBRUARY 20, 2018

A. KEITH PASCHAL, PE
PROJECT ENGINEER



GRADE DATA
 PI STA. = 26+75.00 -L-
 EL. = 484.05
 L = 490'

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



PROJECT NO. B-5371
UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 71

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE OVER CLEAR
 CREEK ON US 601
 BETWEEN SR 1547 AND SR 1117

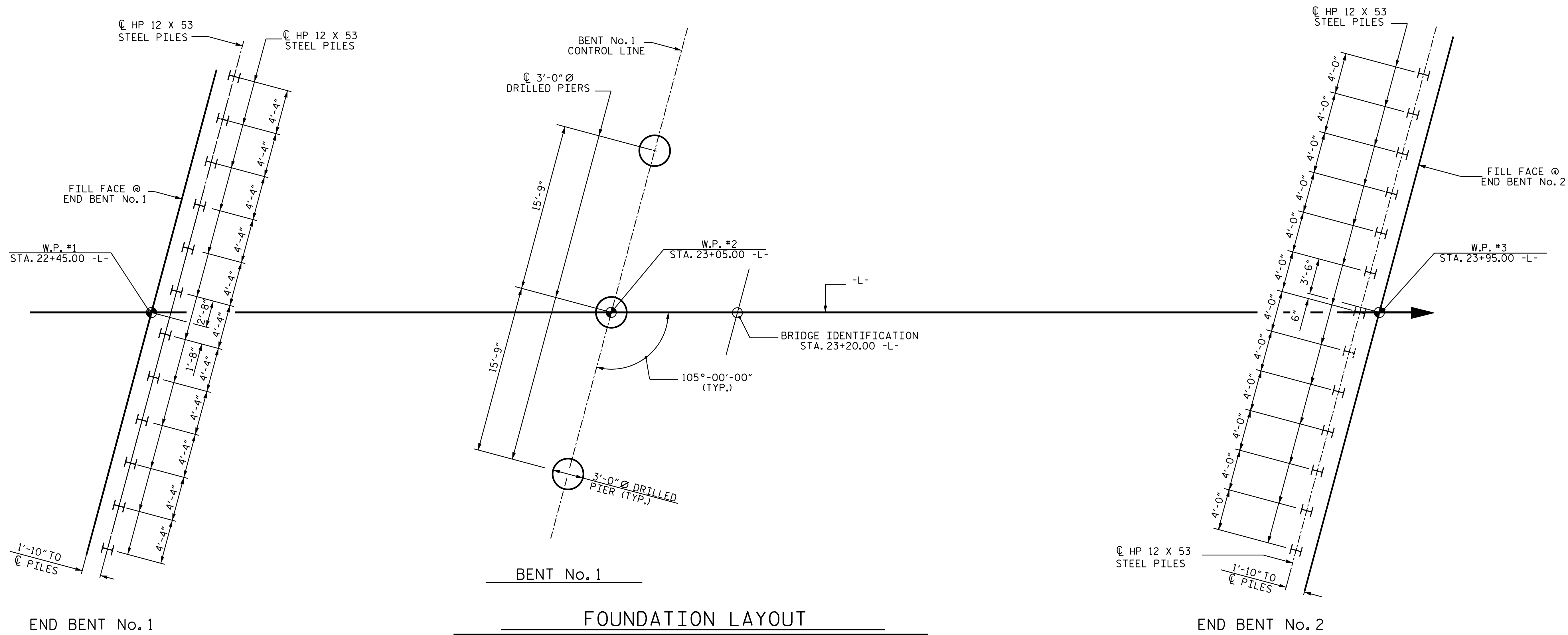


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			29

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : H. T. BARBOUR DATE : 10-20-17
 CHECKED BY : H. A. LOCKLEAR DATE : 10-31-17

PLAN
 (PILES & COLUMNS NOT SHOWN FOR CLARITY)



FOUNDATION LAYOUT

ALL PILES ARE HP 12 X 53 STEEL PILES.
 DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF PILE AT BOTTOM OF CAP.

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.

DRIVE PILES AT END BENT No. 1 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 445 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 50 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT No. 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 460 WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

INSTALL DRILLED PIERS AT BENT No. 1 TO A TIP ELEVATION NO HIGHER THAN 444, SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 10 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT No. 1 IS ELEVATION 457. 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.

PILES AT END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.

DRIVE PILES AT END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 108 TONS PER PILE.

PILE EXCAVATION IS REQUIRED TO INSTALL PILES AT END BENT No. 2. EXCAVATE HOLES AT PILE LOCATIONS TO 463. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT No. 2

PROJECT NO. B-5371
UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

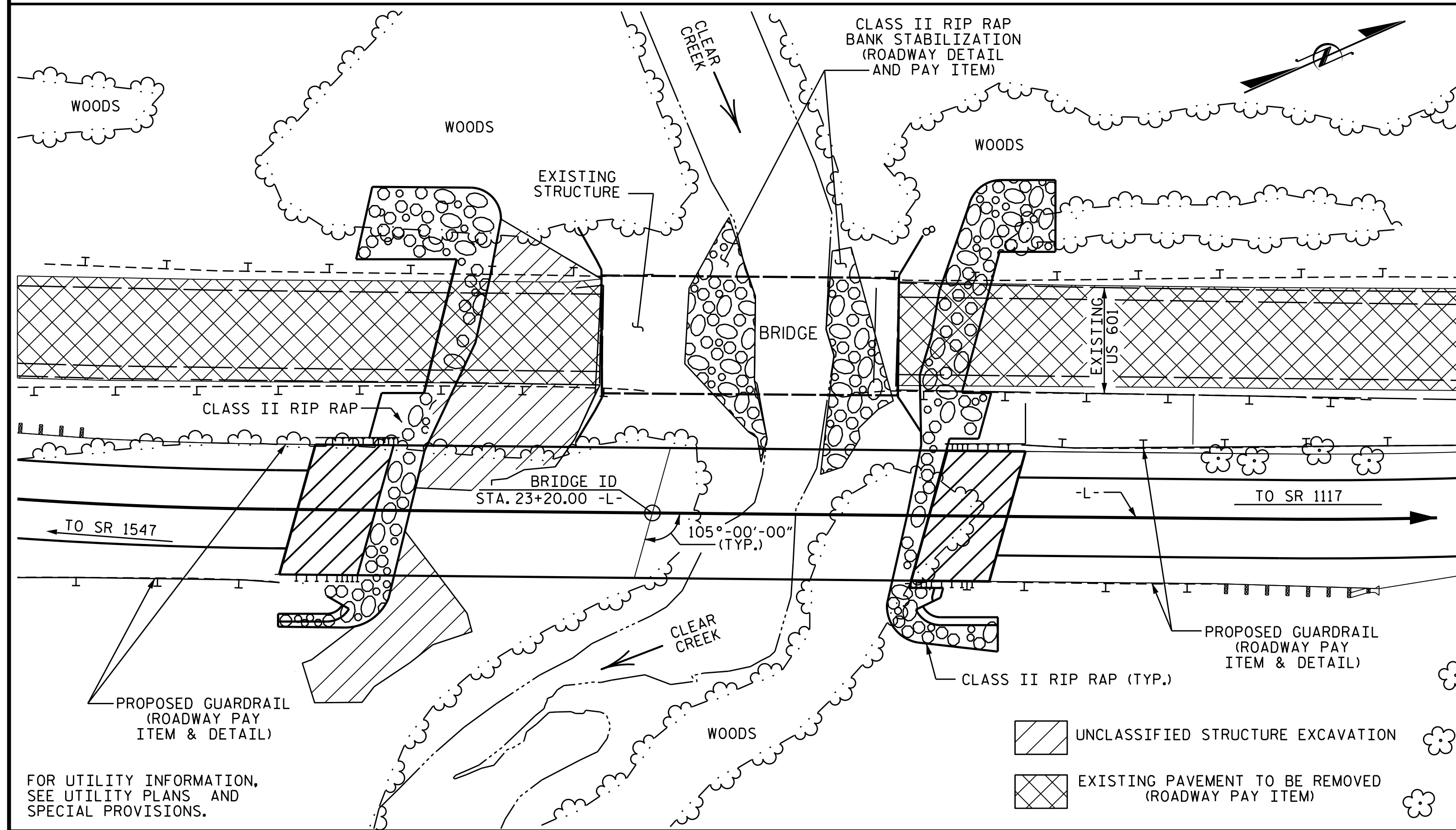
GENERAL DRAWING
 FOR BRIDGE OVER
 CLEAR CREEK ON US 601
 BETWEEN
 SR 1547 AND SR 1117



DRAWN BY :	M. POOLE	DATE :	10-17
CHECKED BY :	M. G. CHEEK	DATE :	10-17
DESIGN ENGINEER OF RECORD:	H.A. LOCKLEAR	DATE :	6-17

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

BENCHMARK #2 : RAILROAD SPIKE IN ROOT OF 36" OAK TREE, STA, 25+87.71 -L-, OFFSET LT 105.37, EL. 472.99



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

- UNCLASSIFIED STRUCTURE EXCAVATION
- EXISTING PAVEMENT TO BE REMOVED (ROADWAY PAY ITEM)

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 70 FT. LT. & 50 FT. RT. OF CENTERLINE ROADWAY 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.

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

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 2 SPANS (1 @ 42'-3 1/2" 1 @ 42'-3") ON REINFORCED CONCRETE DECK WITH 1.5" ASPHALT WEARING SURFACE, ON 5 LINES OF W27X84 I-BEAMS @ 8'-0" CTS. WITH A CLEAR ROADWAY WIDTH OF 36'-0" ON REINFORCED CONCRETE ABUTMENTS ON SPREAD FOOTINGS AND REINFORCED CONCRETE ROUNDED NOSE POST AND WEB BENT LOCATED UPSTREAM THE PROPOSED SITE 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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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 AT STA. 23+20.00 -L-.

HYDRAULIC DATA

DESIGN DISCHARGE	= 4500 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS
DESIGN HIGH WATER ELEVATION	= 474.9 FT
DRAINAGE AREA	= 22.4 SQ. MI.
BASE DISCHARGE (Q100)	= 5206 CFS
BASE HIGH WATER ELEVATION	= 475.71 FT

OVERTOPPING DATA

OVERTOPPING DISCHARGE	= 12000 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 479.3 FT

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-0" Ø DRILLED PIERS IN SOIL	3'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIERS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	LUMP SUM	SQ. FT.	SQ. FT.
SUPERSTRUCTURE										6488	7179
END BENT 1									LUMP SUM		
BENT 1					31.00	43.00	28.80	1			
END BENT 2			63.00	80.00					LUMP SUM		
TOTAL	LUMP SUM	LUMP SUM	63.00	80.00	31.00	43.00	28.80	1	LUMP SUM	6488	7179

	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 STEEL PILES	HP 12x53 STEEL PILES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	CU. YDS.	LUMP SUM	LBS.	LBS.	NO. LIN. FT.	EA.	NO. LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		LUMP SUM			8 587.16			300.00			LUMP SUM	
END BENT 1	41.9		4365			12	12 240		318	355		
BENT 1	30.2		9883	1493								
END BENT 2	42.6		4416			13	13 195		314	346		
TOTAL	114.7	LUMP SUM	18664	1493	8 587.16	25	25 435	300.00	632	701	LUMP SUM	LUMP SUM

PROJECT NO. B-5371
 UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER CLEAR
 CREEK ON US 601
 BETWEEN SR 1547 AND SR 1117



1/4/2018

DRAWN BY : H. T. BARBOUR DATE : 10-11-17
 CHECKED BY : H. A. LOCKLEAR DATE : 10-31-17

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								SERVICE III LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR				MOMENT										
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.05	--	1.75	0.889	1.50	B	2	43.49	1.126	1.95	B	2	43.49	0.8	0.889	1.05	B	2	43.49		
	HL-93 (OPERATING)	N/A		1.05	--	1.35	0.889	1.94	B	2	43.49	1.126	2.53	B	2	43.49	N/A	0.889	1.05	B	2	43.49		
	HS-20 (INVENTORY)	36.00	②	1.36	48.83	1.75	0.986	1.55	A	2	28.49	1.122	1.65	A	2	22.79	0.8	0.986	1.36	A	2	28.49		
	HS-20 (OPERATING)	36.00		1.36	48.83	1.35	0.986	2.00	A	2	28.49	1.122	2.13	A	2	22.79	N/A	0.986	1.36	A	2	28.49		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13.50		2.89	39.05	1.40	0.986	4.12	A	2	28.49	1.122	4.31	A	2	22.79	0.8	0.986	2.89	A	2	28.49	
		SNGARBS2	20.00		2.23	44.52	1.40	0.986	3.17	A	2	28.49	1.122	3.24	A	2	22.79	0.8	0.986	2.23	A	2	28.49	
		SNAGRIS2	22.00		2.14	47.06	1.40	0.986	3.05	A	2	28.49	1.122	3.08	A	2	22.79	0.8	0.986	2.14	A	2	28.49	
		SNCOTTS3	27.25		1.44	39.28	1.40	0.986	2.05	A	2	28.49	1.122	2.17	A	2	22.79	0.8	0.986	1.44	A	2	28.49	
		SNAGGRS4	34.93		1.23	43.00	1.40	0.986	1.75	A	2	28.49	1.122	1.92	A	2	22.79	0.8	0.986	1.23	A	2	28.49	
		SNS5A	35.55		1.20	42.74	1.40	0.986	1.71	A	2	28.49	1.122	2.02	A	2	22.79	0.8	0.986	1.20	A	2	28.49	
		SNS6A	39.95		1.12	44.53	1.40	0.986	1.59	A	2	28.49	1.122	1.90	A	2	22.79	0.8	0.986	1.12	A	2	28.49	
	SNS7B	42.00		1.06	44.60	1.40	0.986	1.51	A	2	28.49	1.122	1.95	A	2	22.79	0.8	0.986	1.06	A	2	28.49		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.00		1.36	44.97	1.40	0.986	1.94	A	2	28.49	1.122	2.21	A	2	22.79	0.8	0.986	1.36	A	2	28.49	
		TNT4A	33.08		1.37	45.37	1.40	0.986	1.95	A	2	28.49	1.122	2.10	A	2	22.79	0.8	0.986	1.37	A	2	28.49	
		TNT6A	41.60		1.13	48.58	1.40	0.986	1.61	A	2	28.49	1.122	1.76	A	2	22.79	0.8	0.986	1.13	A	2	28.49	
		TNT7A	42.00		1.06	47.70	1.40	0.986	1.51	A	2	28.49	1.122	1.85	A	2	22.79	0.8	0.986	1.06	A	2	28.49	
		TNT7B	42.00	③	1.04	46.91	1.40	0.986	1.49	A	2	28.49	1.122	1.67	A	2	22.79	0.8	0.986	1.04	A	2	28.49	
		TNAGRIT4	43.00		1.13	47.13	1.40	0.986	1.61	A	2	28.49	1.122	2.25	A	2	22.79	0.8	0.986	1.13	A	2	28.49	
TNAGT5A		45.00		1.15	48.08	1.40	0.986	1.63	A	2	28.49	1.122	2.02	A	2	22.79	0.8	0.986	1.15	A	2	28.49		
TNAGT5B	45.00		1.20	50.21	1.40	0.986	1.70	A	2	28.49	1.122	1.84	A	2	22.79	0.8	0.986	1.20	A	2	28.49			
FATIGUE	HL-93 (INVENTORY)	$\gamma_{LL}=0.75$																						

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.
ALLOWABLE STRESS FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93) **

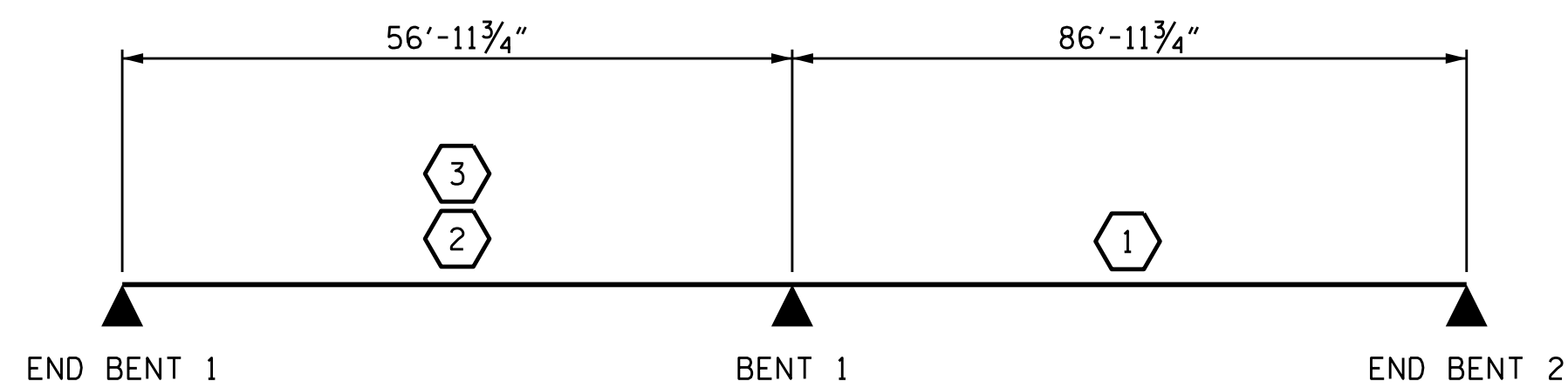
② DESIGN LOAD RATING (HS-20) **

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
DIMENSIONS SHOWN ARE BEARING TO BEARING.

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-



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

ASSEMBLED BY : A. SORSENGINH	DATE : 3/2017
CHECKED BY : M. G. CHEEK	DATE : 9/2017
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/17/11 MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	REVISIONS						SHEET NO. S-4 TOTAL SHEETS 29
	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			

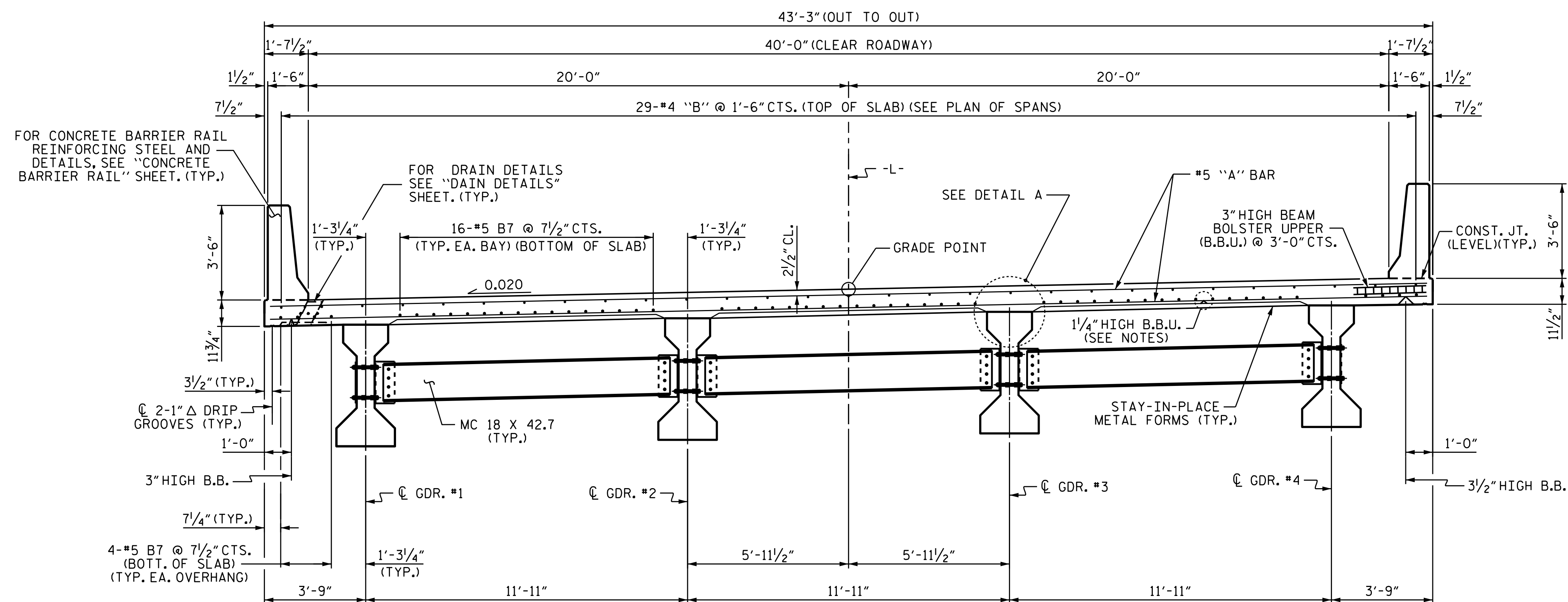
NOTES

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

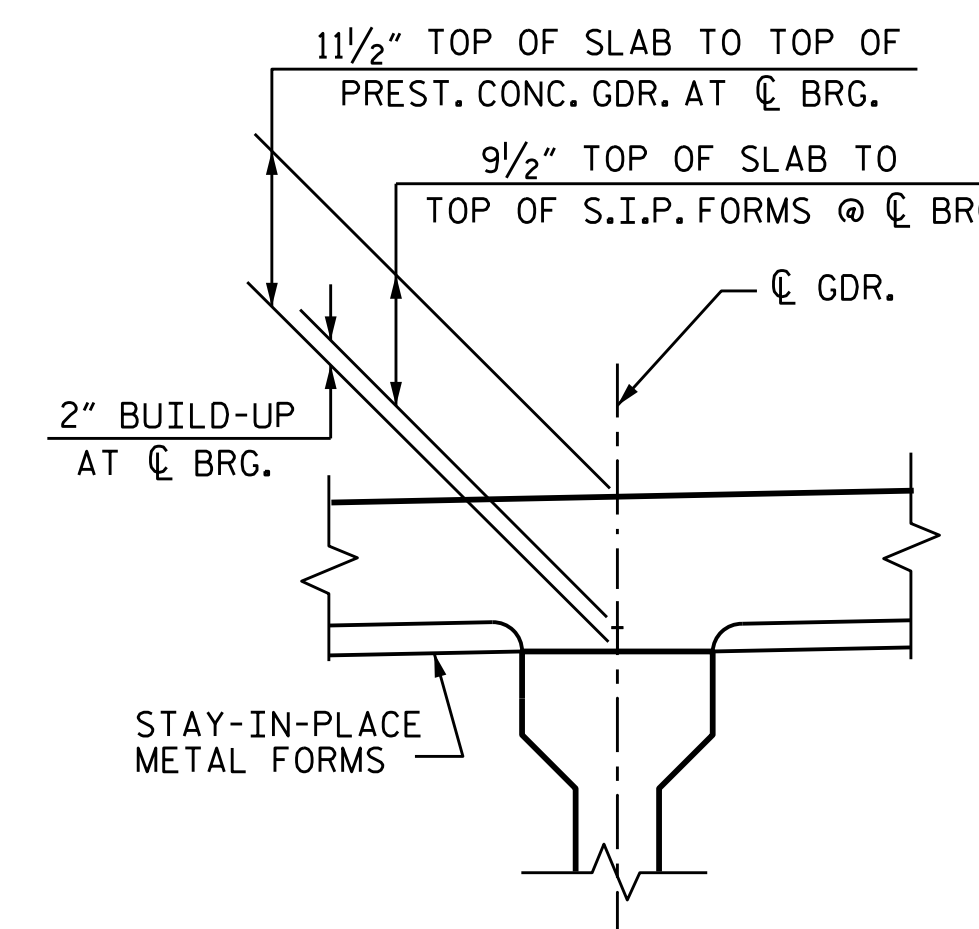
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

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

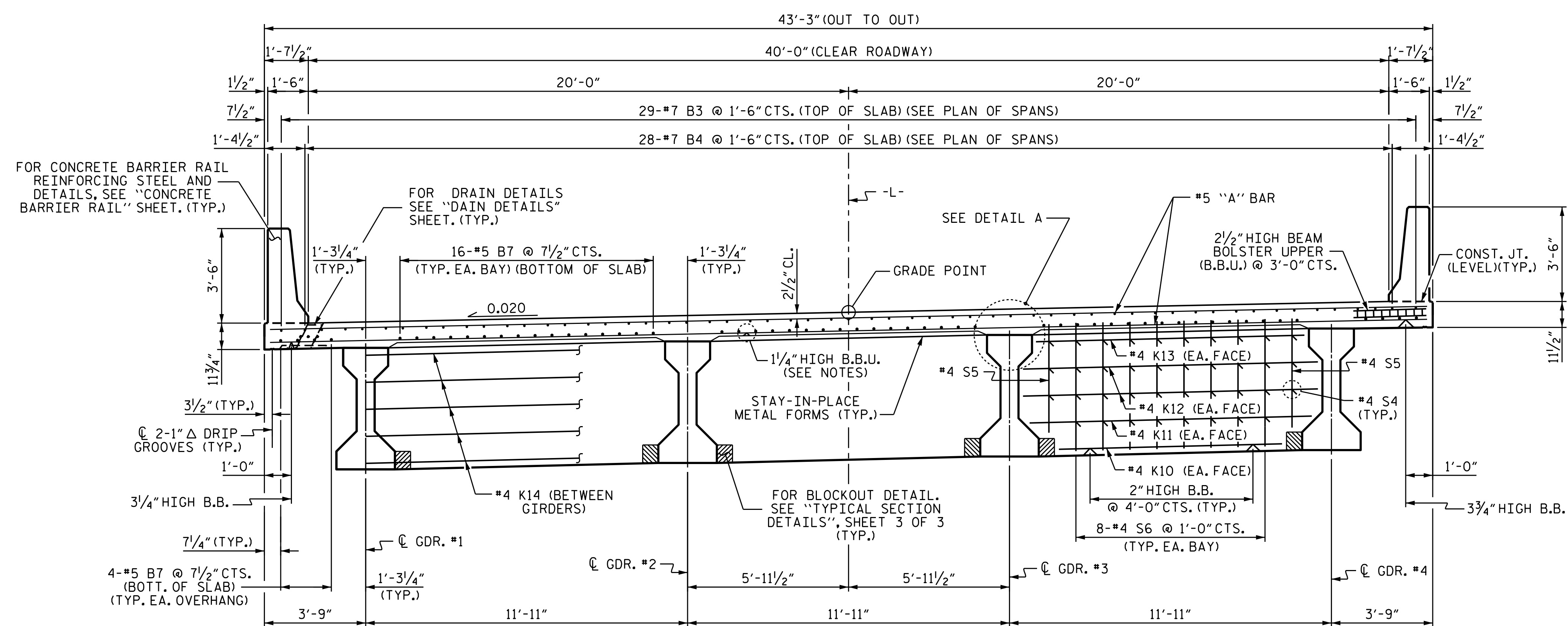
PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2"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



AT INTERMEDIATE DIAPHRAGMS
TYPICAL SECTION



DETAIL A



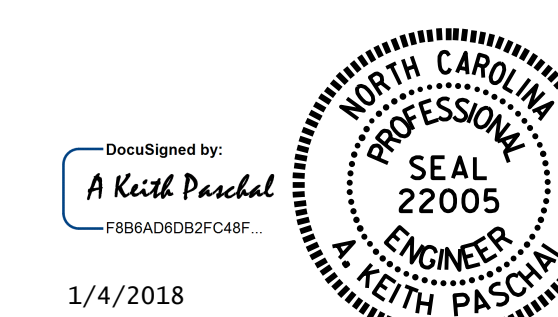
AT BENT DIAPHRAGMS
TYPICAL SECTION

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

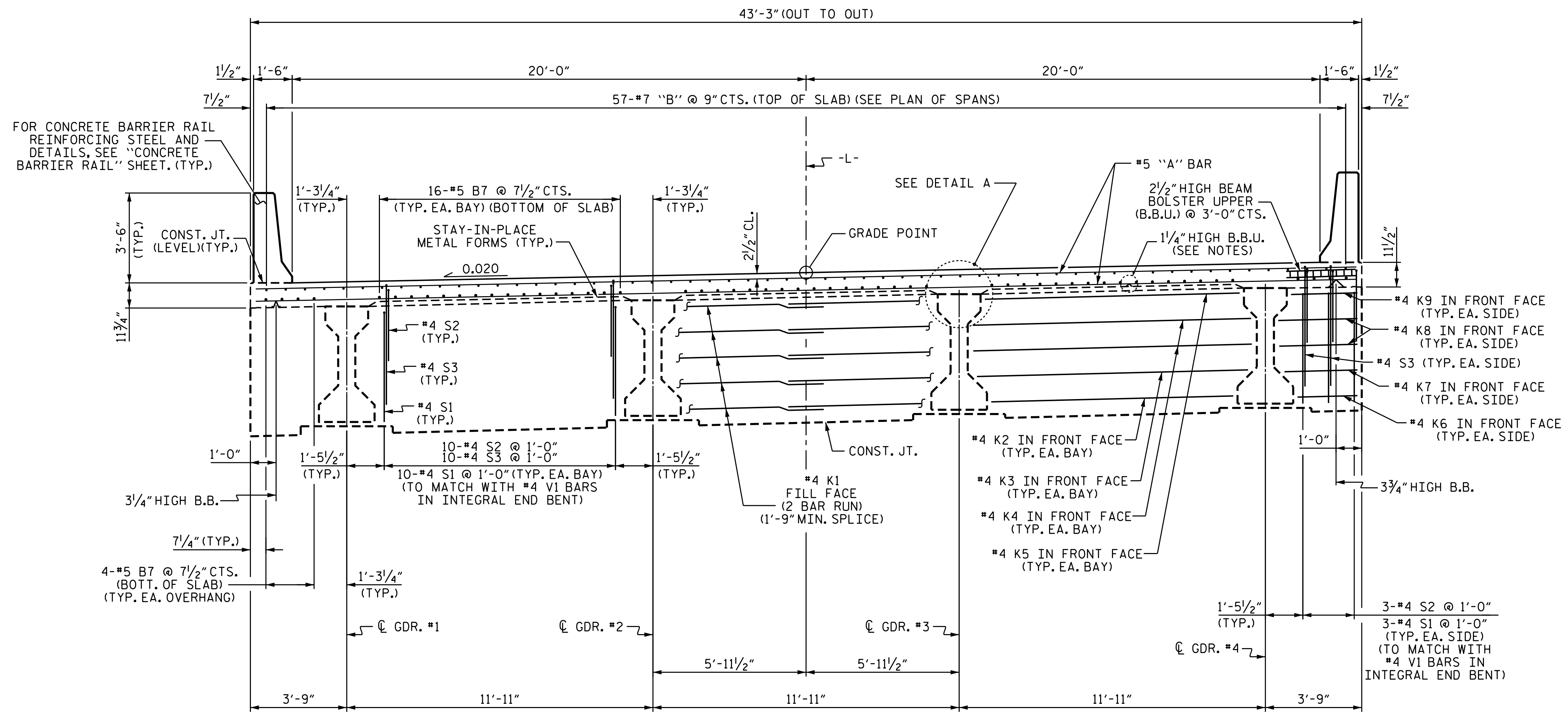
SUPERSTRUCTURE
TYPICAL SECTIONS



DRAWN BY : A. SORSENGINH DATE : 2/2017
CHECKED BY : M. G. CHEEK DATE : 9/2017
DESIGN ENGINEER OF RECORD: G. KOUICHEKI DATE : 9/2017

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2			4			29



AT INTEGRAL END BENTS
TYPICAL SECTION

PROJECT NO. B-5371
UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTIONS

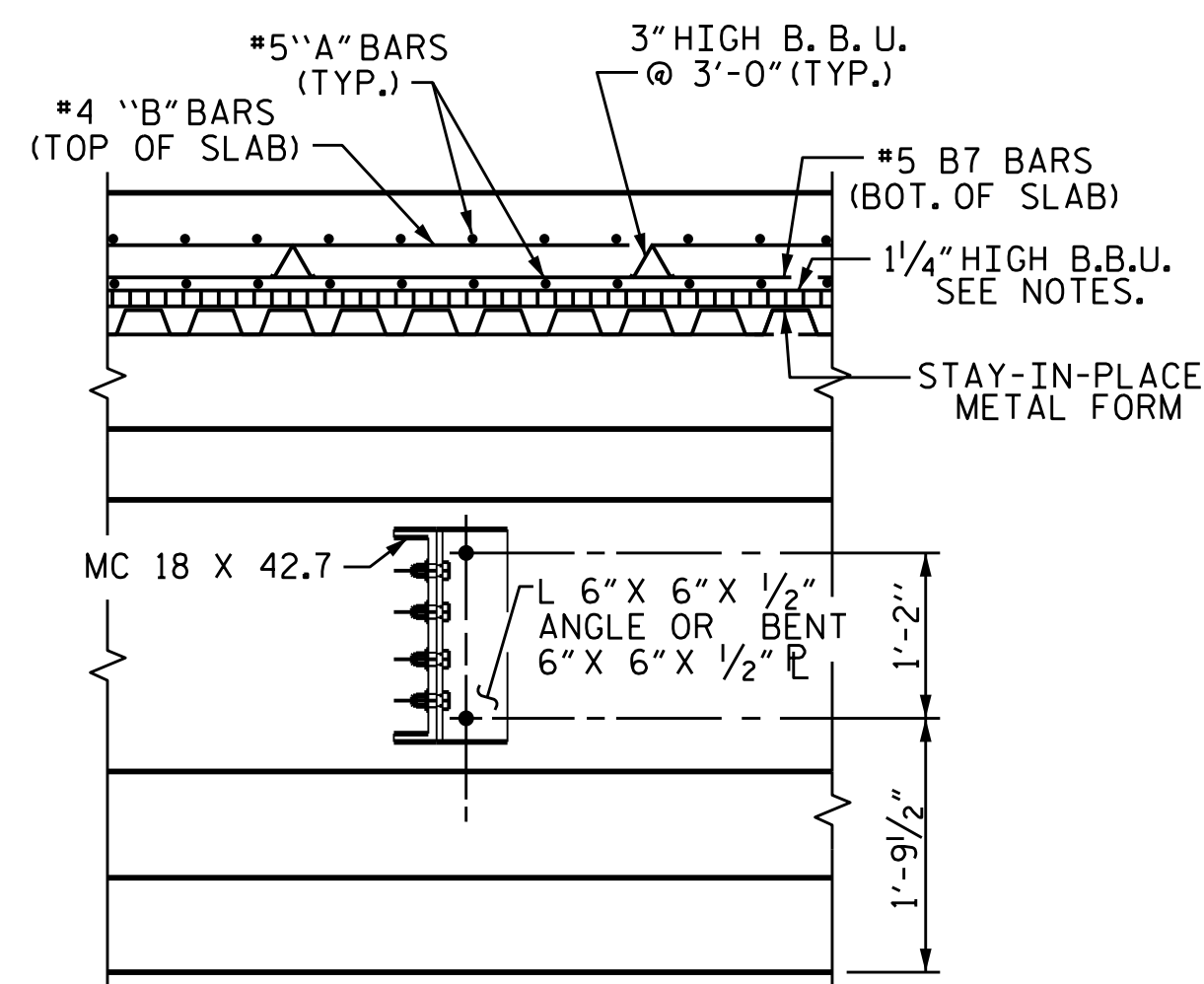


DocuSigned by:
 A Keith Paschal
 1/4/2018

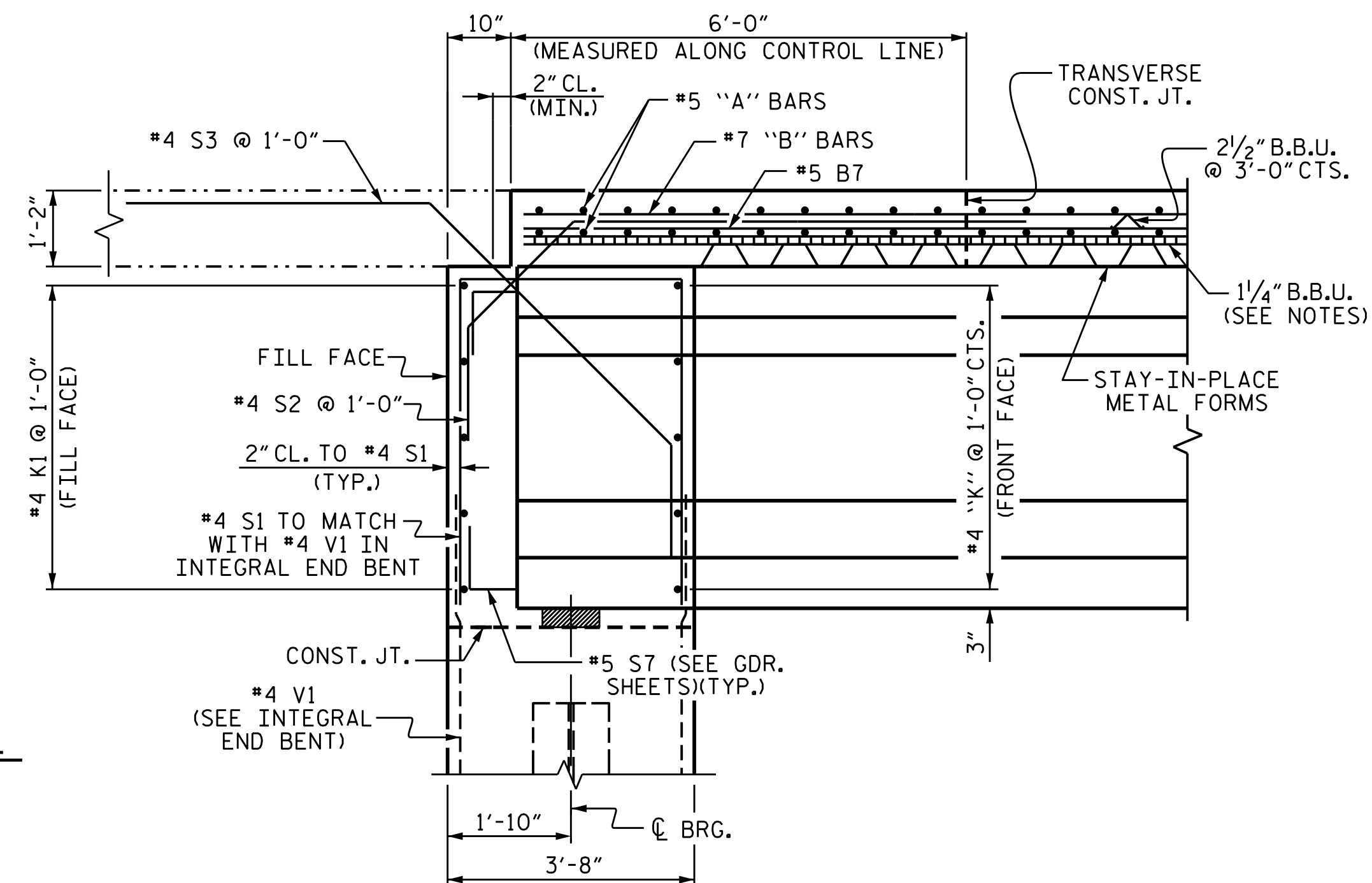
DRAWN BY : A. SORSENGINH DATE : 2/2017
 CHECKED BY : M. G. CHEEK DATE : 9/2017
 DESIGN ENGINEER OF RECORD: G. KOUCHEKI DATE : 9/2017

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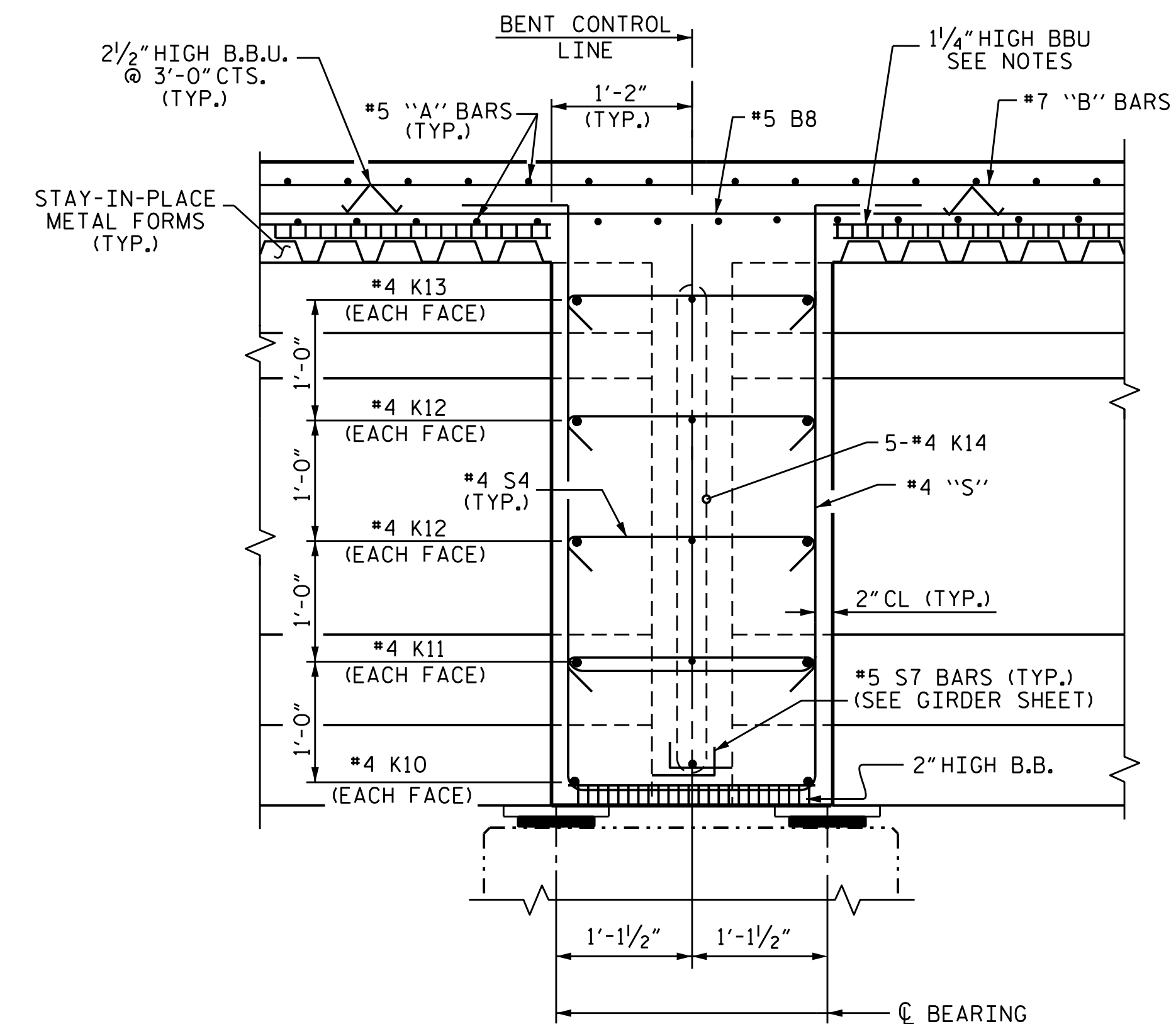
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			29



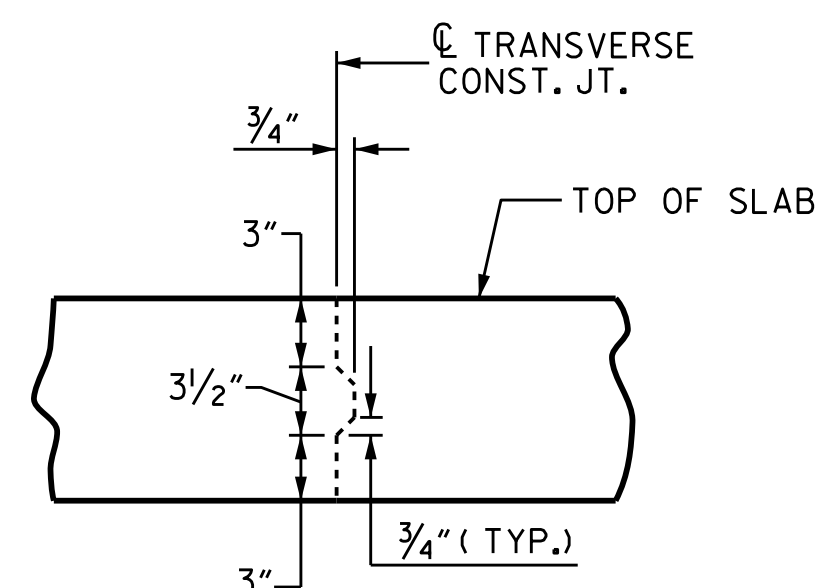
SECTION AT INTERMEDIATE STEEL DIAPHRAGM



END OF GIRDER DETAIL AT INTEGRAL END BENT

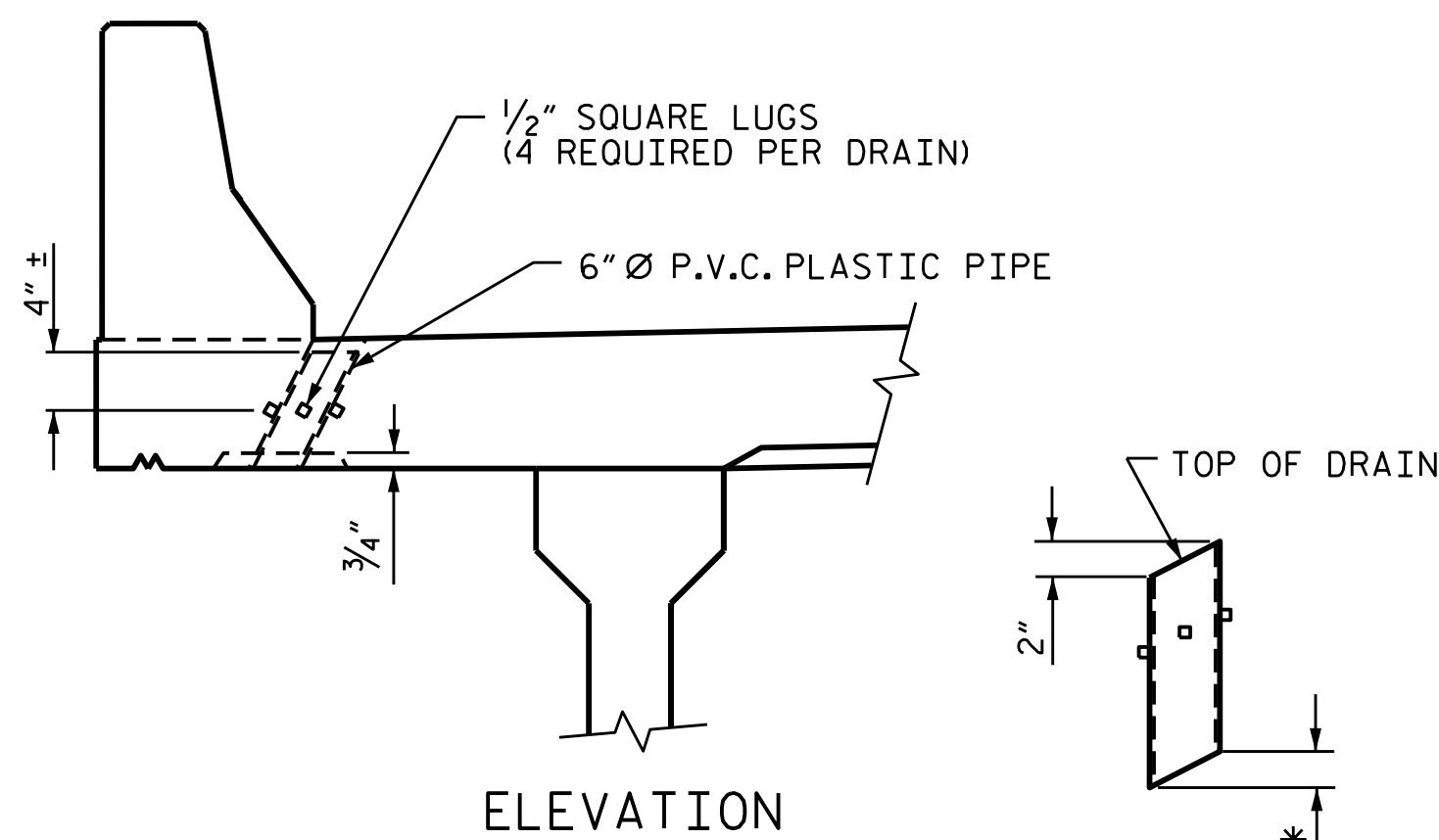


SECTION AT BENT DIAPHRAGM



TRANSVERSE CONSTRUCTION JOINT DETAIL

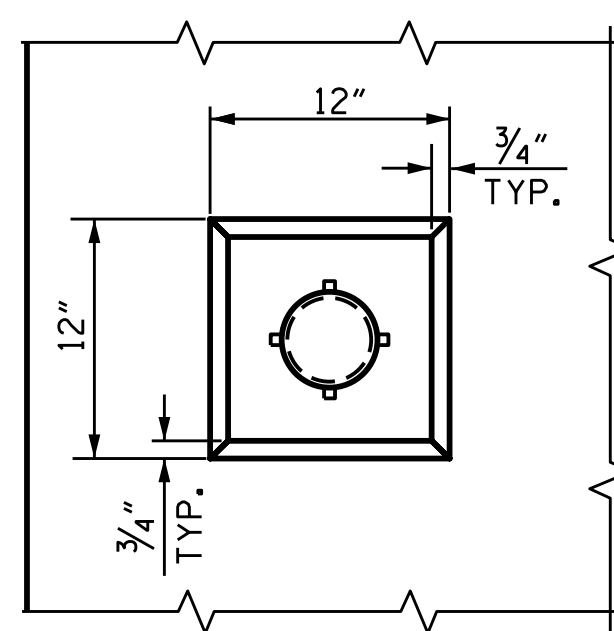
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



ELEVATION

** TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (7 DRAINS REQUIRED)

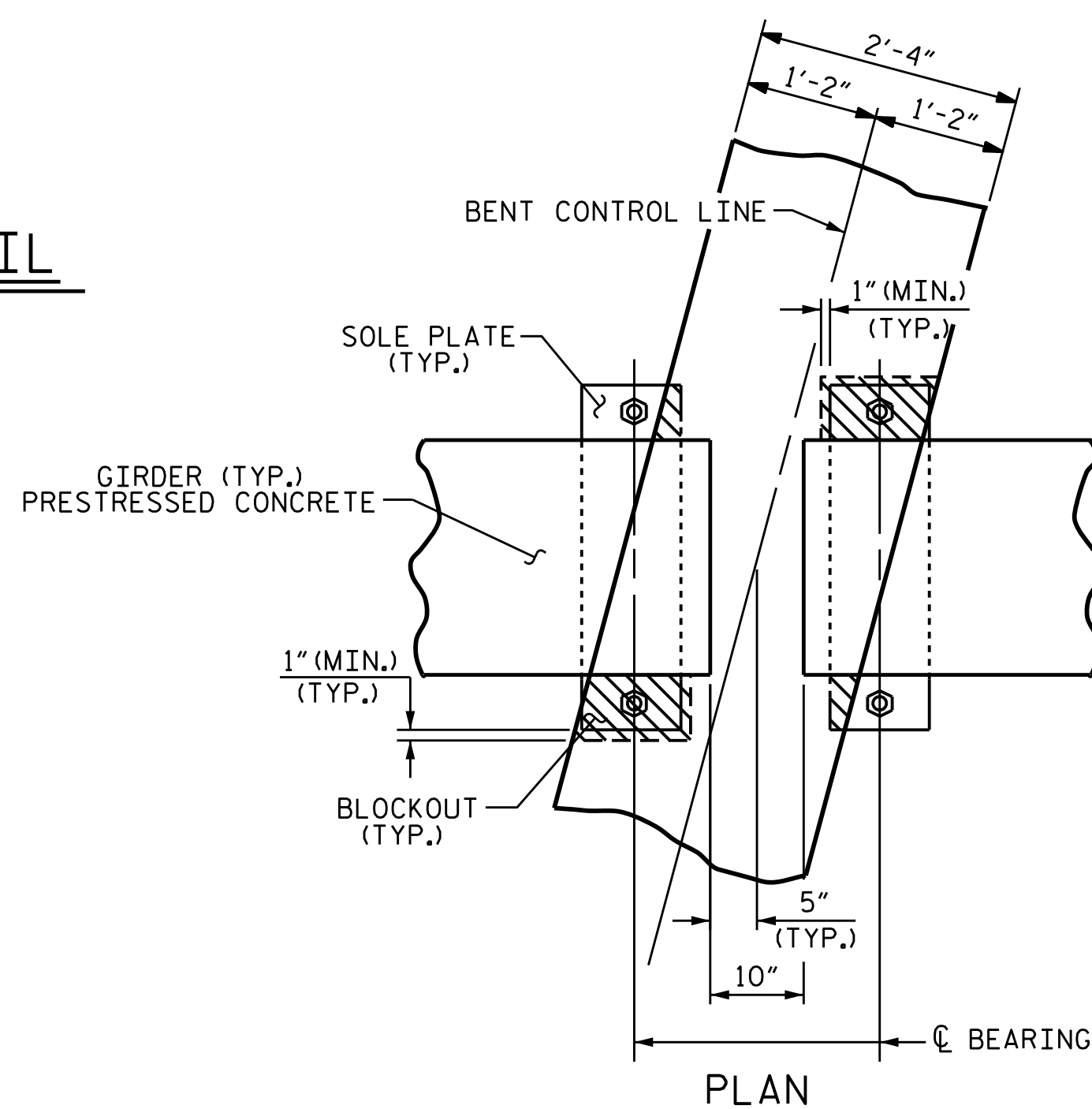
PIPE DETAIL



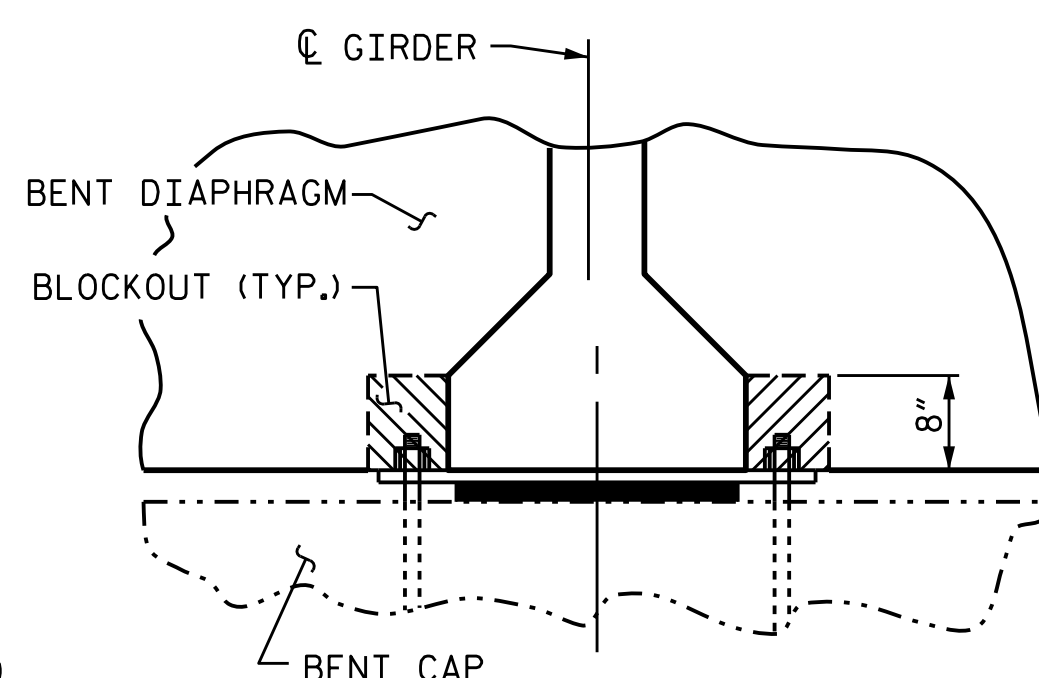
PLAN OF RECESS

TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.
4-1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.
THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS

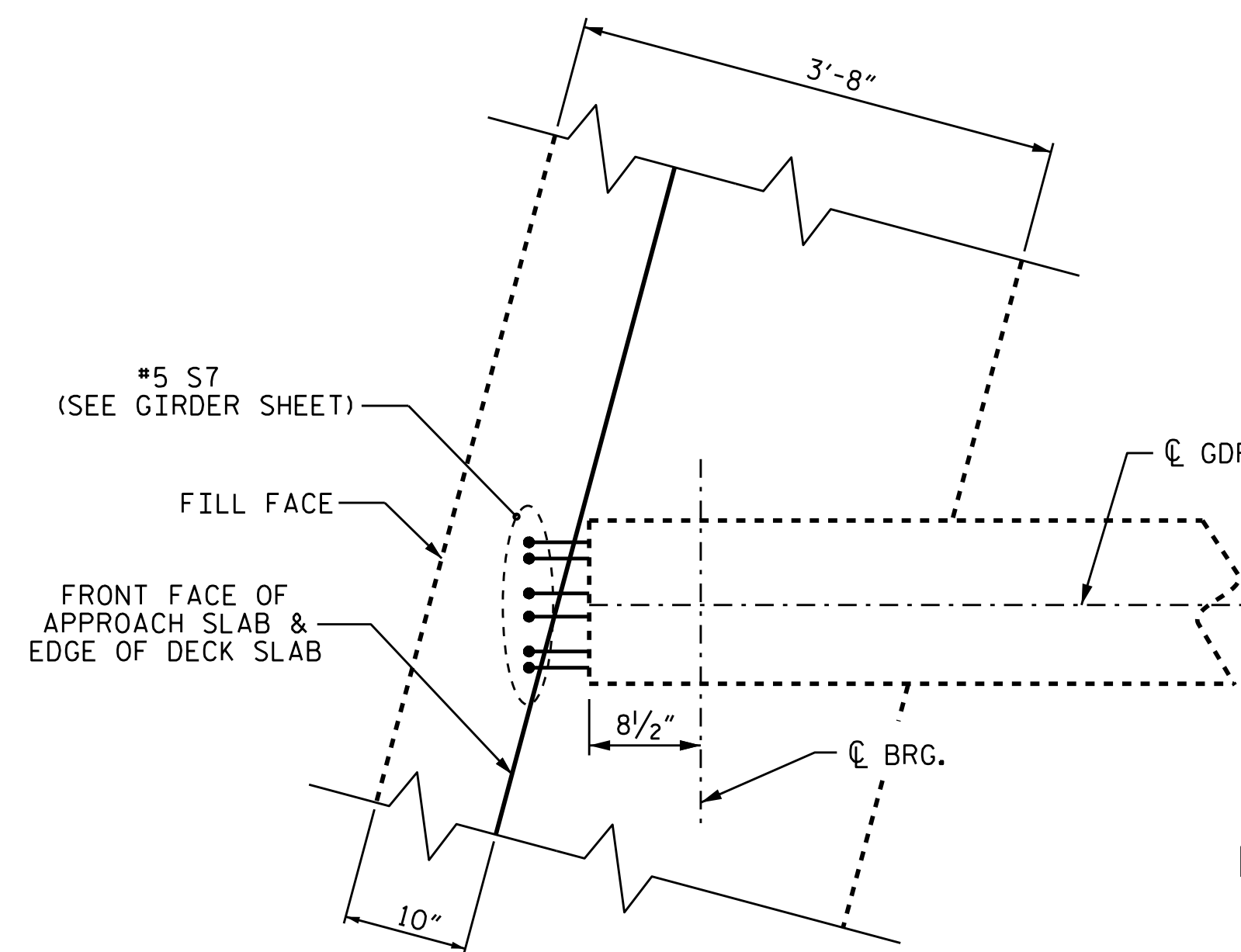


PLAN



SECTION

BENT DIAPHRAGM BLOCKOUT DETAIL



PLAN OF GIRDER AT INTEGRAL END BENT

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
DETAILS

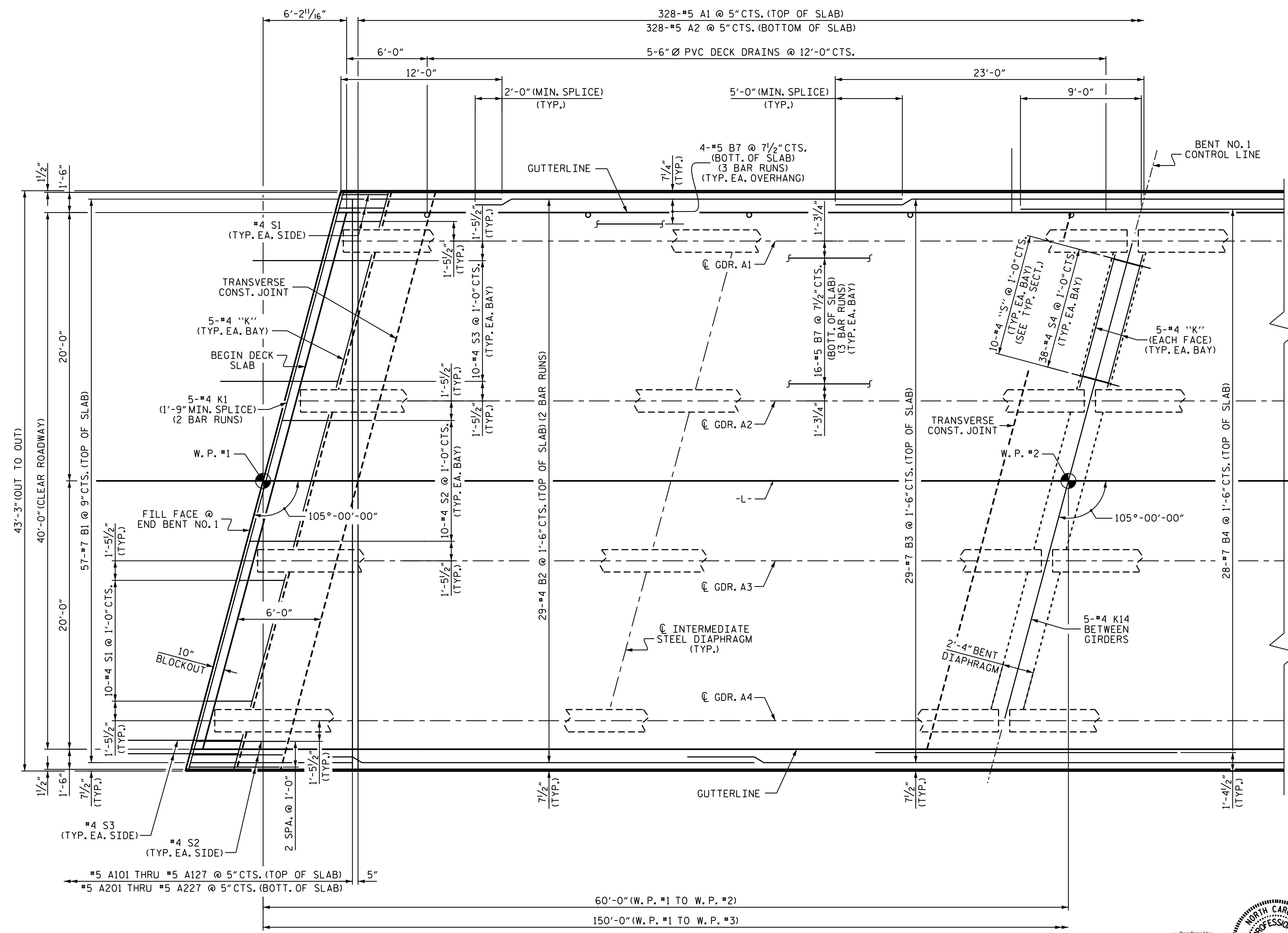


1/4/2018

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1			3			TOTAL SHEETS
2			4			29

DRAWN BY : A. SORSENGINH DATE : 2/2017
CHECKED BY : M. G. CHEEK DATE : 9/2017



PLAN OF SPAN A
 FOR INTERMEDIATE STEEL DIAPHRAGMS,
 SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET.

PROJECT NO. B-5371
UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 1 OF 2



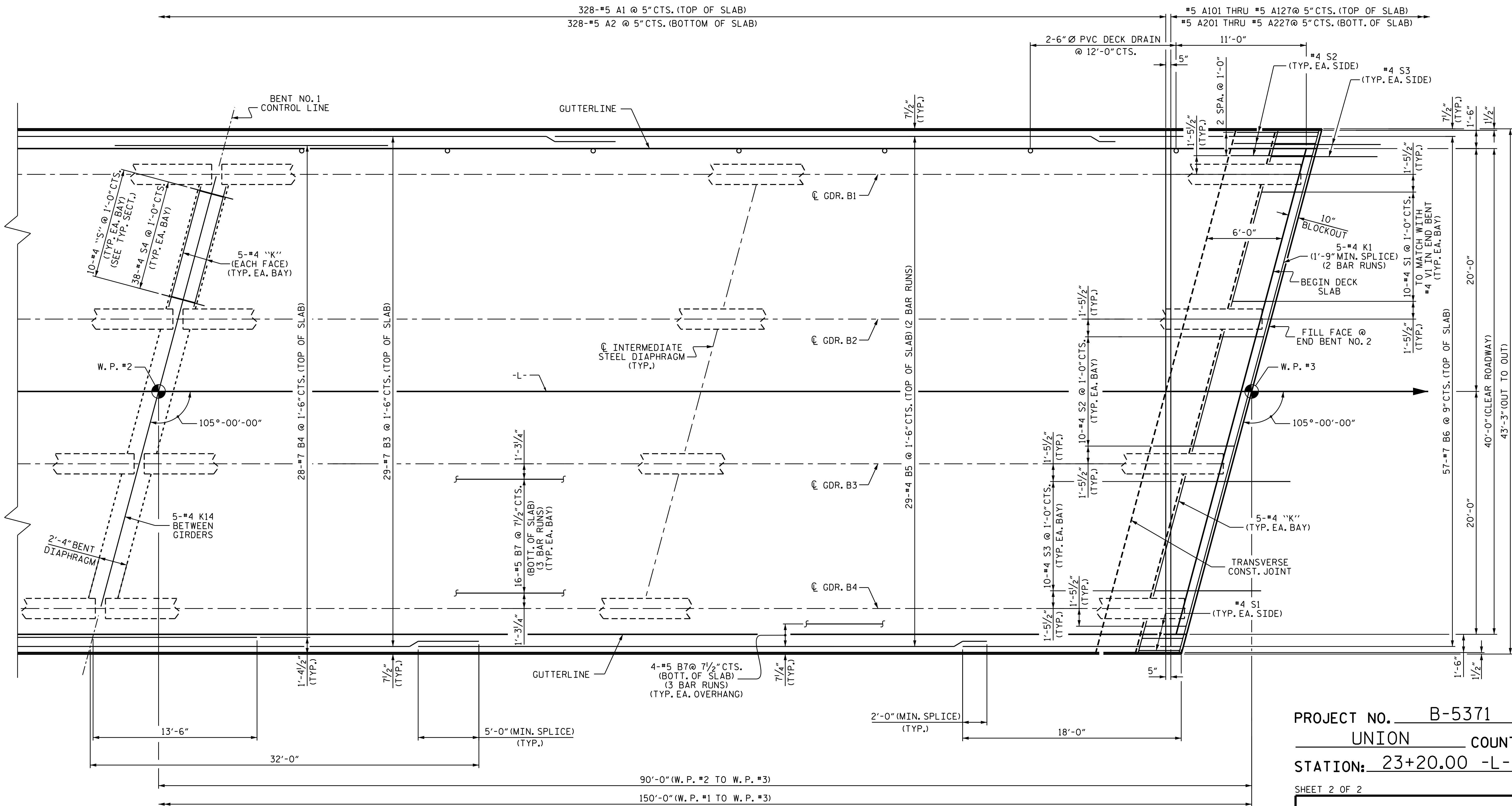
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 PLAN OF SPANS**

DRAWN BY : A. SORSENGINH DATE : 2/2017
 CHECKED BY : M. G. CHEEK DATE : 9/2017
 DESIGN ENGINEER OF RECORD: G. KOUICHEKI DATE : 9/2017

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			29



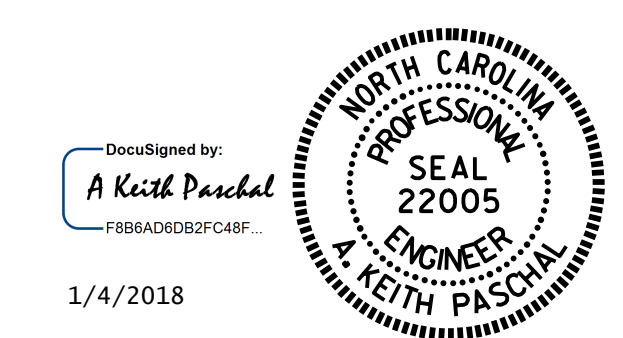
PLAN OF SPAN B
FOR INTERMEDIATE STEEL DIAPHRAGMS,
SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET.

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

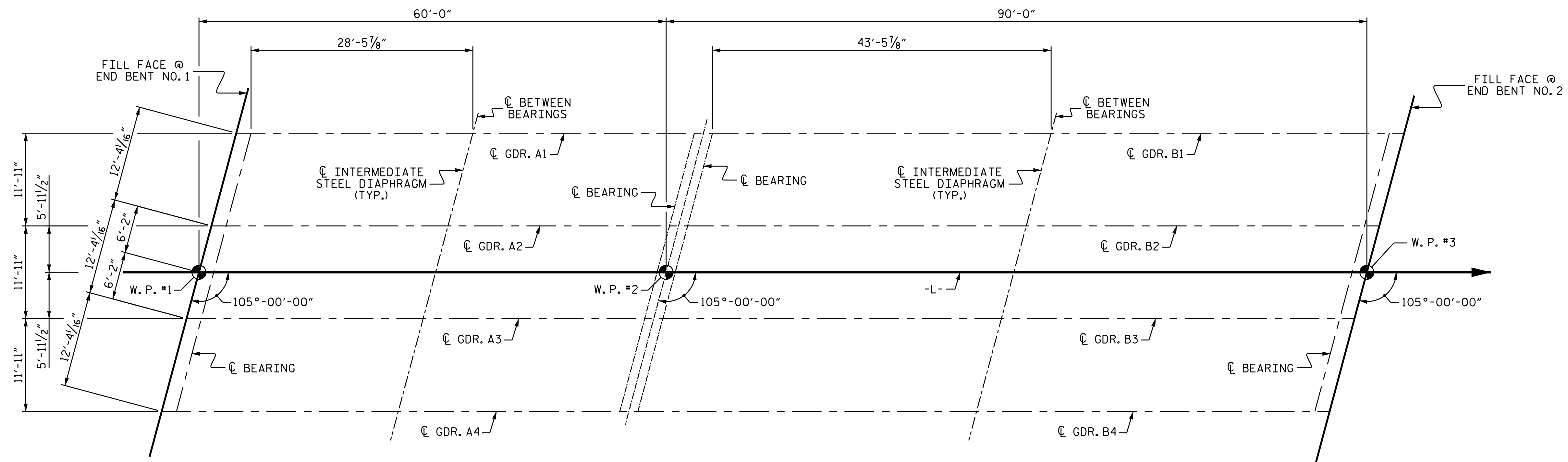
SUPERSTRUCTURE
PLAN OF SPANS



1/4/2018

DRAWN BY : A. SORSENGINH DATE : 2/2017
CHECKED BY : M. G. CHEEK DATE : 9/2017
DESIGN ENGINEER OF RECORD: G. KOUICHEKI DATE : 9/2017

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			29



FIX.
E1

FIX.
E2, P1 FIX.
E2, P1

FIX.
E1

SPAN A

SPAN B

FRAMING PLAN

FOR SOLE PLATES, SEE "ELASTOMERIC BEARINGS" SHEET.

PROJECT NO. B-5371
 _____ UNION _____ COUNTY
 STATION: 23+20.00 -L-



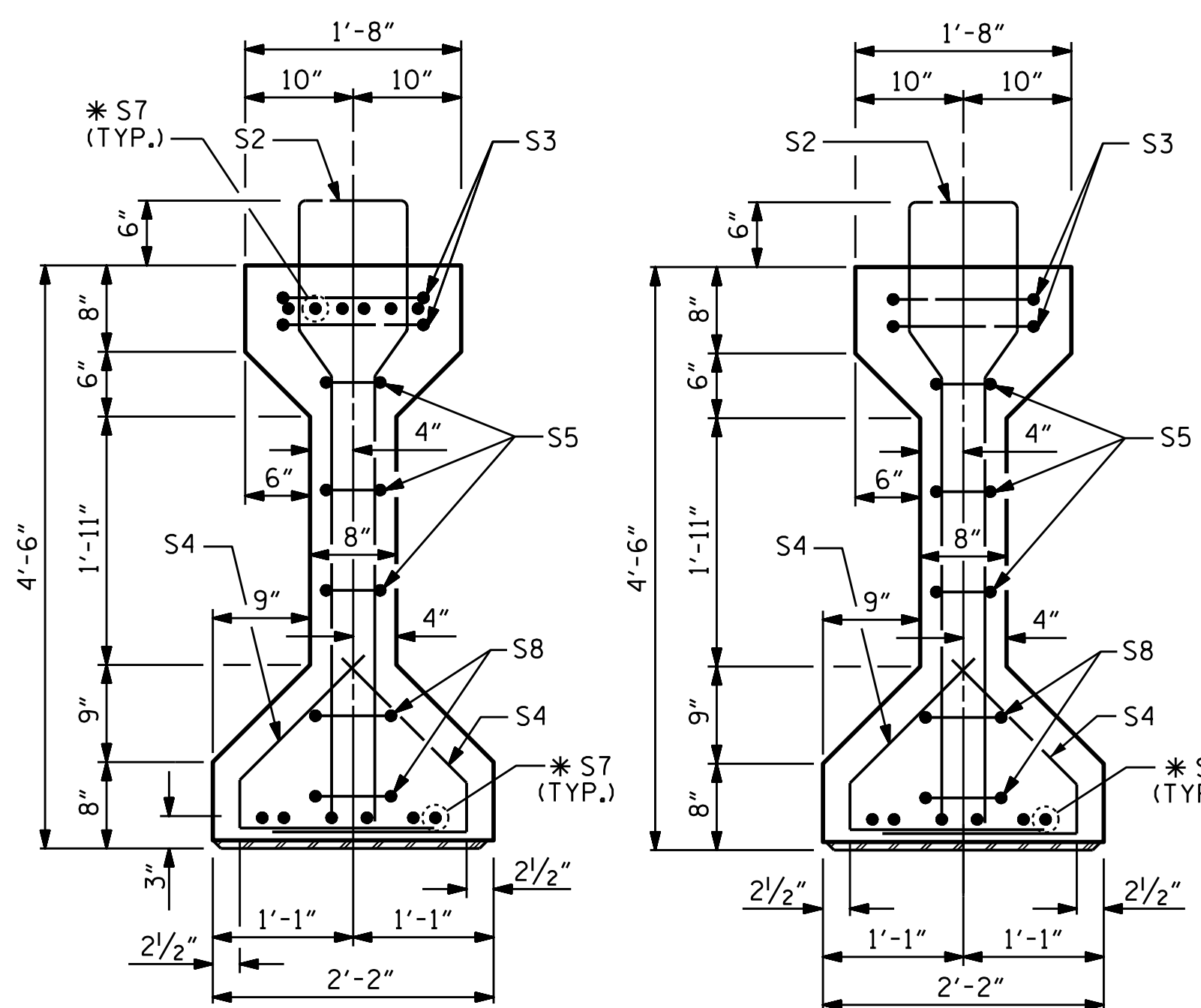
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 FRAMING PLAN**

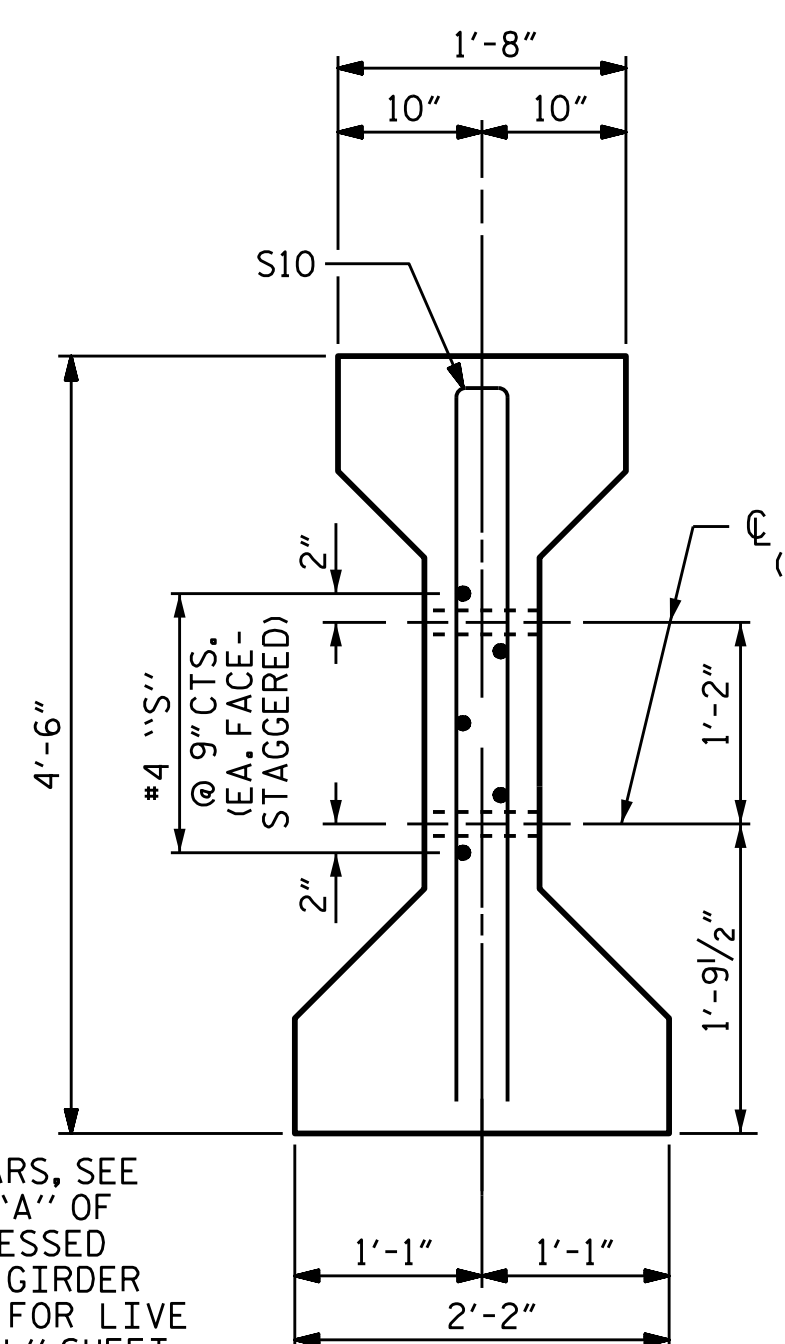
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 DESIGN ENGINEER OF RECORD: G. KOUICHEKI DATE : 9/2017

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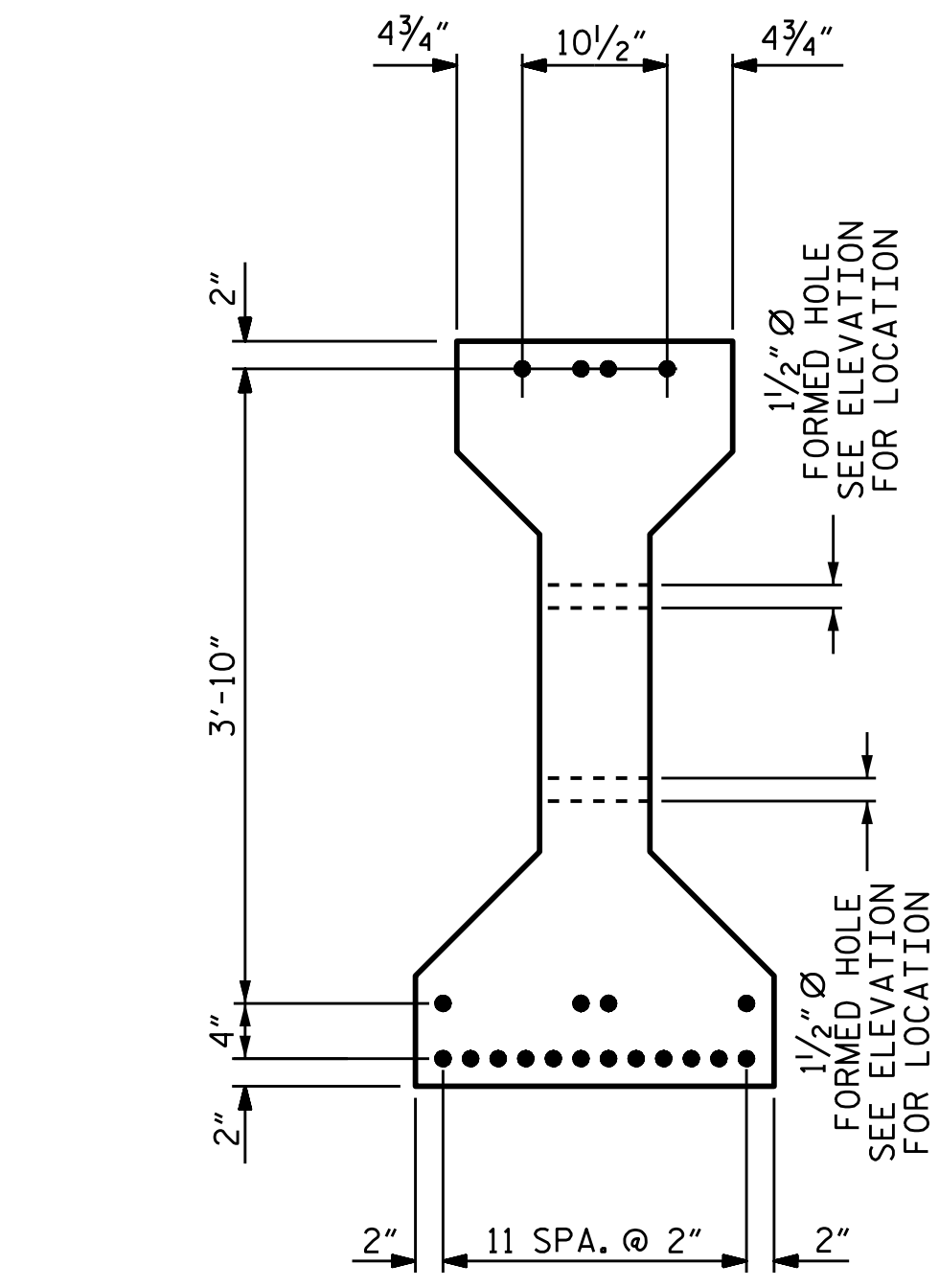
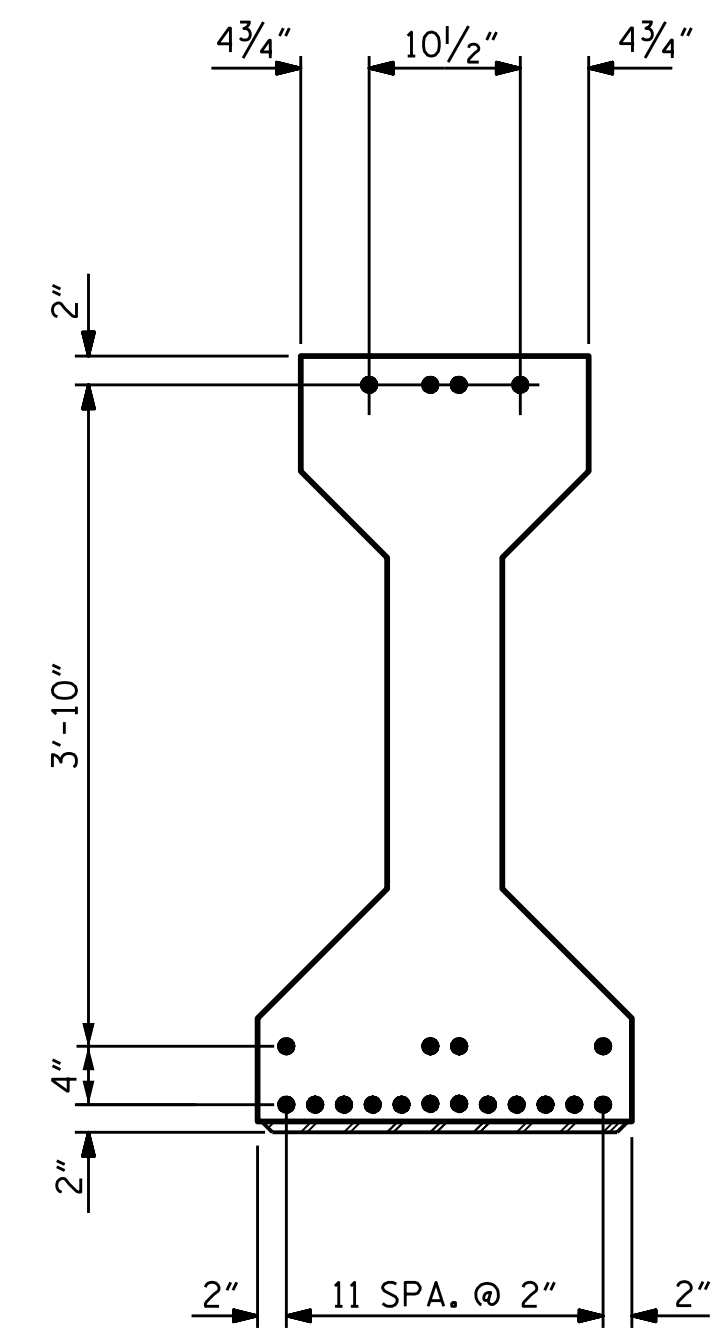
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			29



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



1/2" Ø FORMED HOLE
(SEE FRAMING PLAN
FOR LOCATION)



SECTION A-A

SECTION B-B

SECTION C-C
(S1 BARS NOT SHOWN)

AT END OF GIRDER

AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

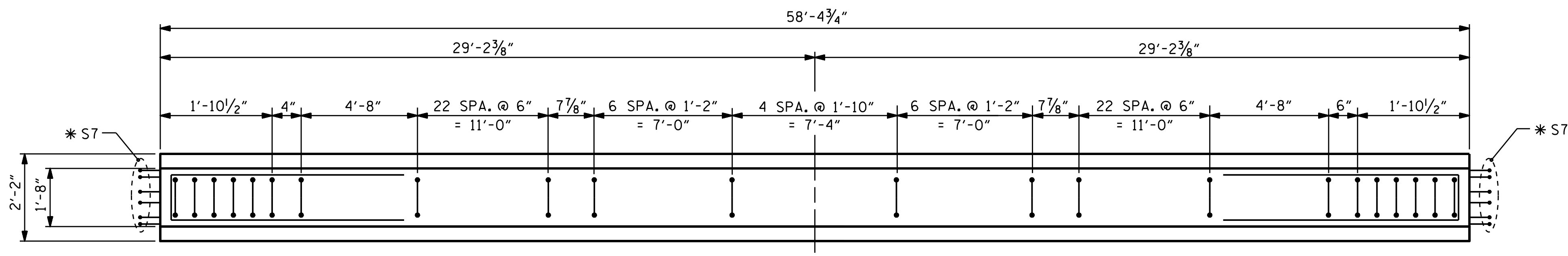
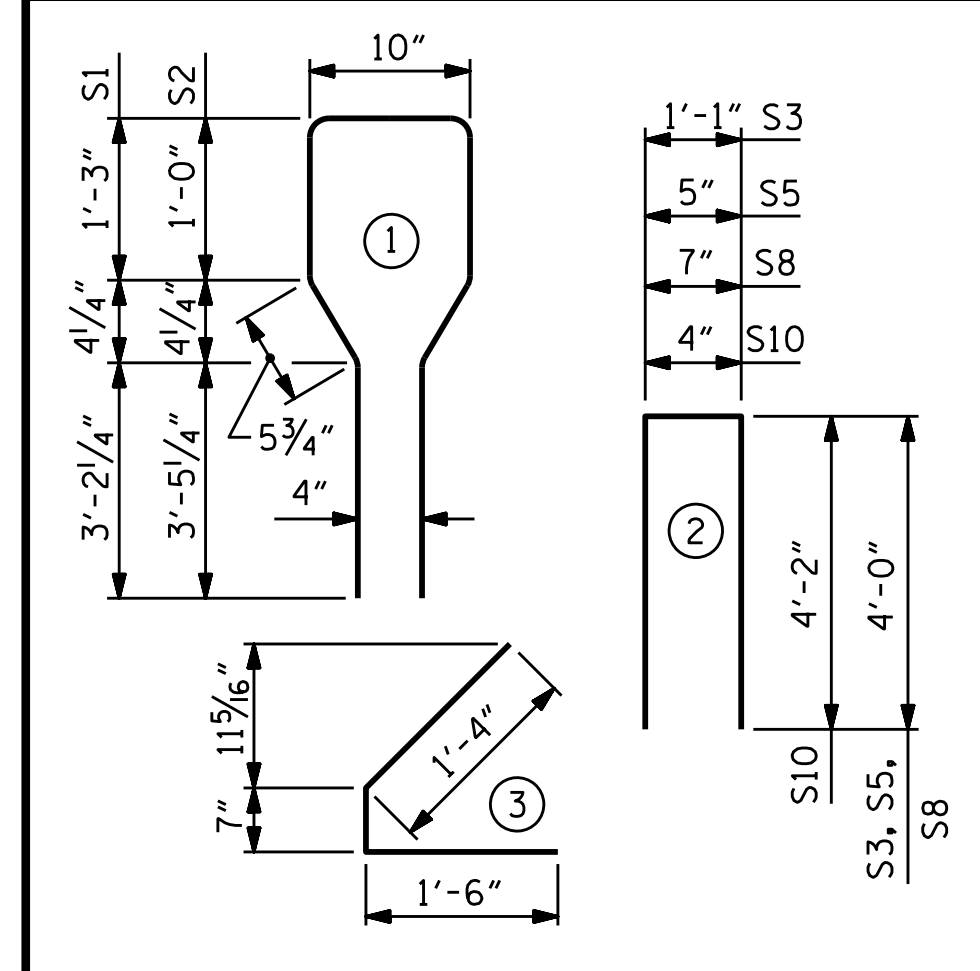
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	91	#4	1	10'-8"	648
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	84	#4	3	3'-5"	192
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

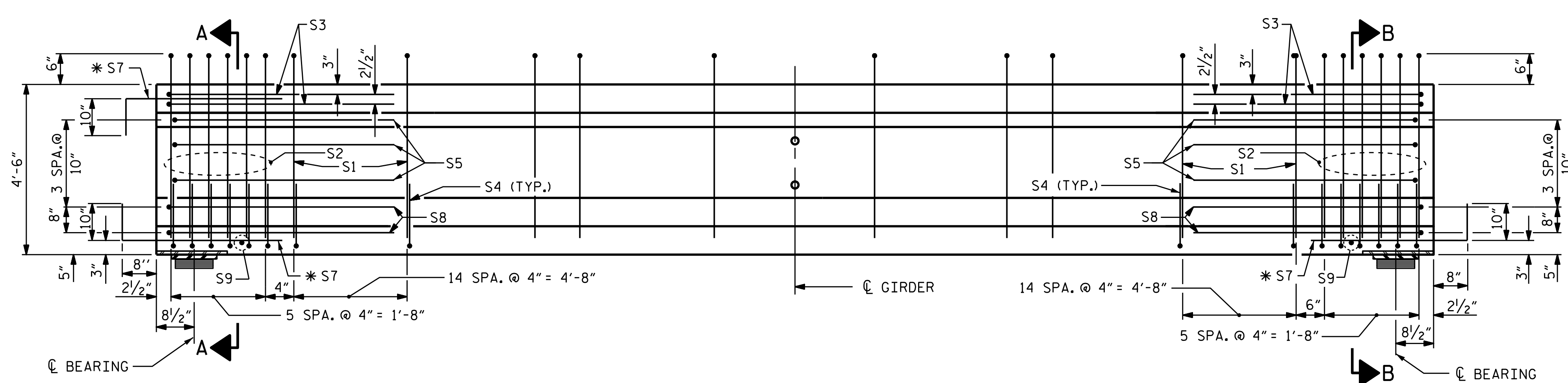
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

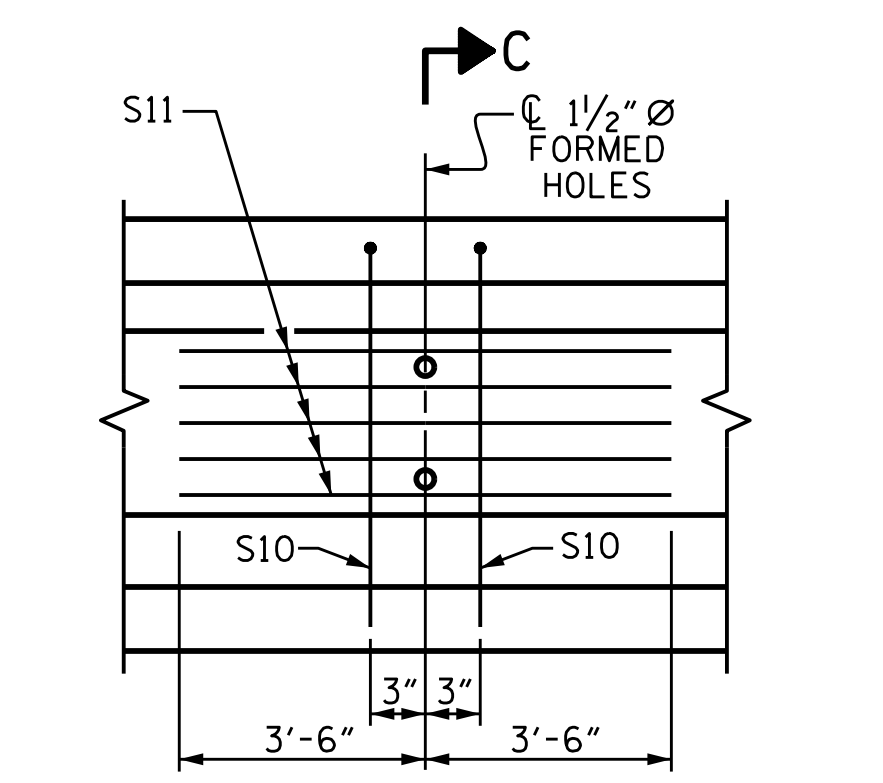


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-4

	REINFORCING STEEL	5000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
SPAN A	1224	11.9	18

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	58'-4 3/4"	233.58

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 1 OF 2

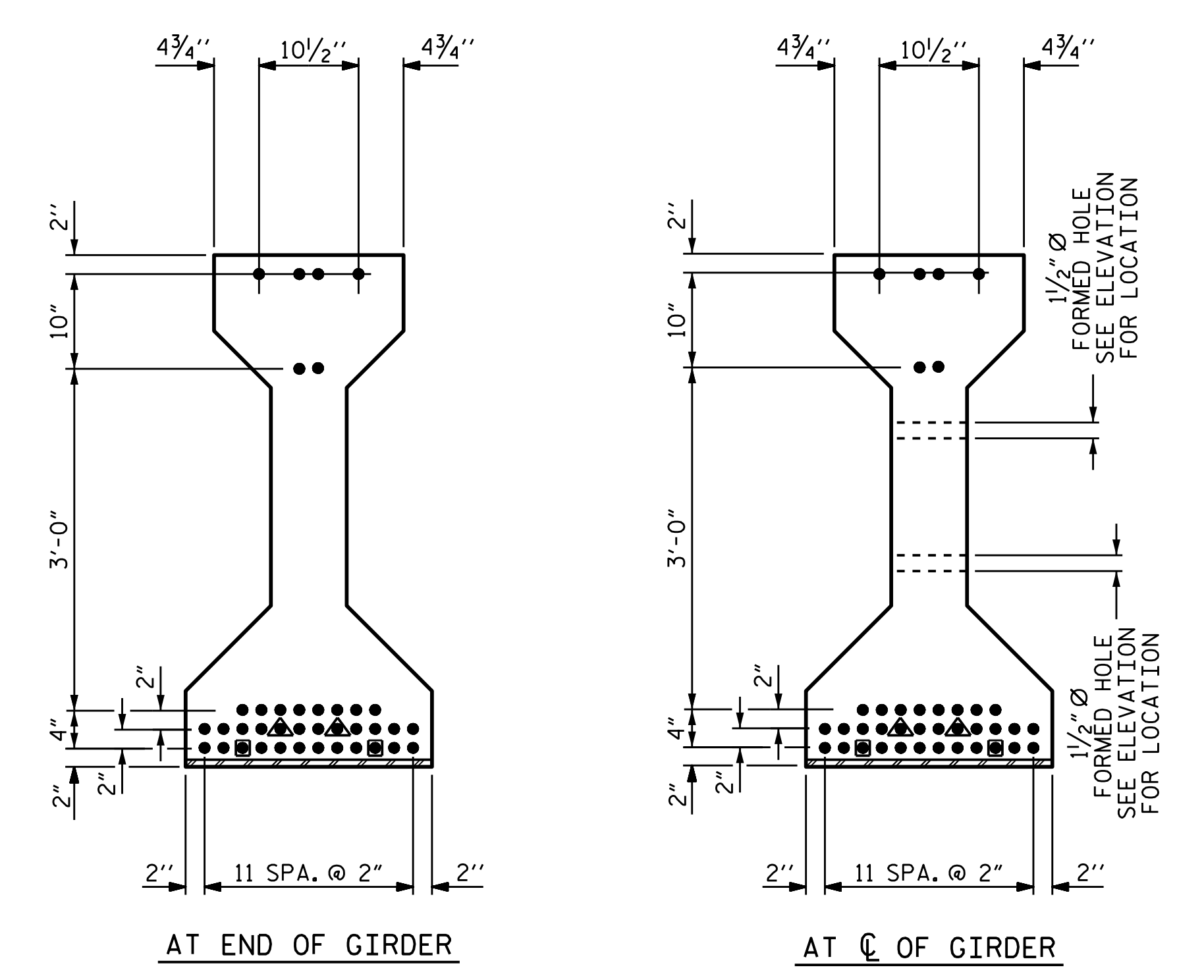
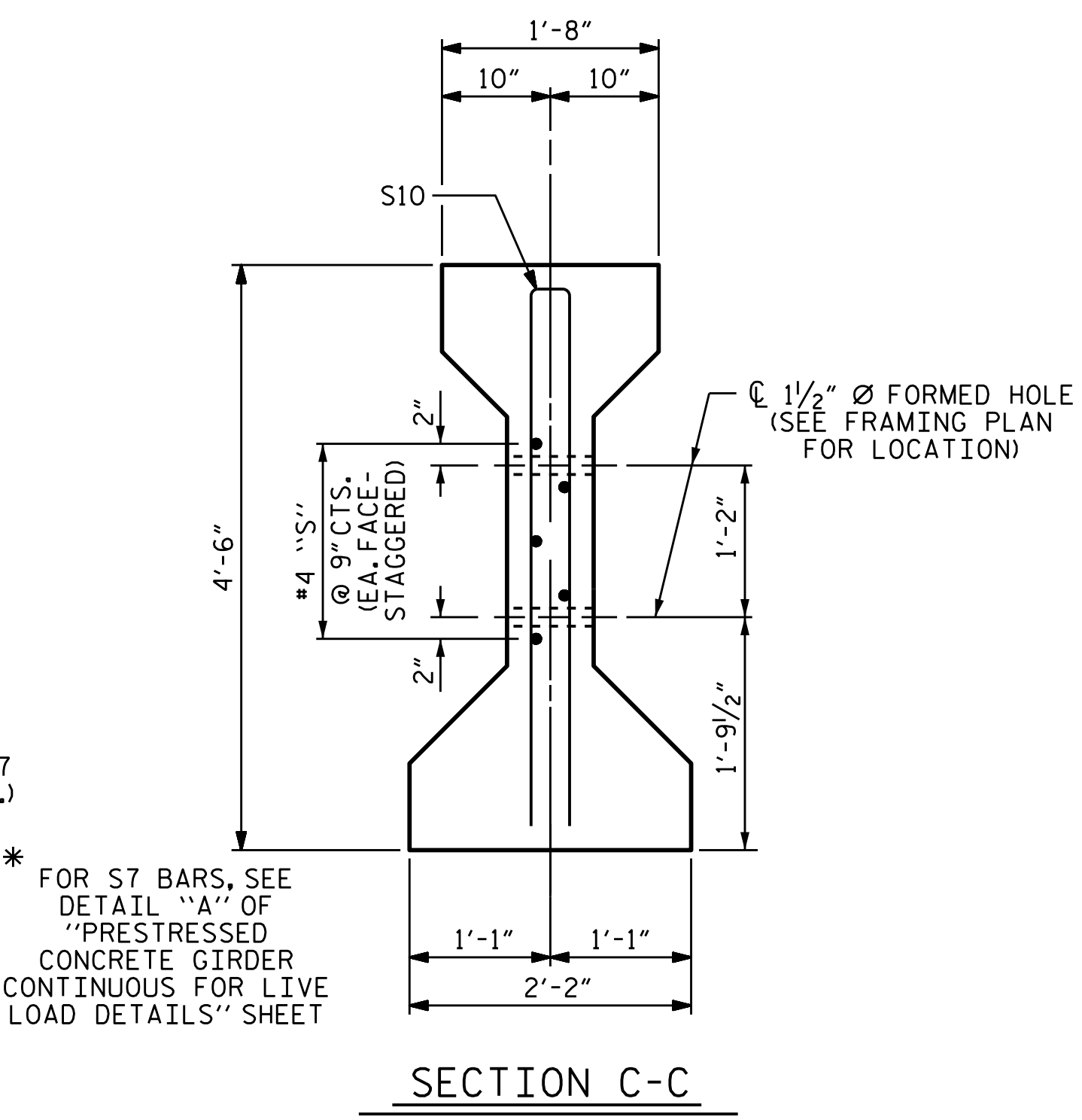
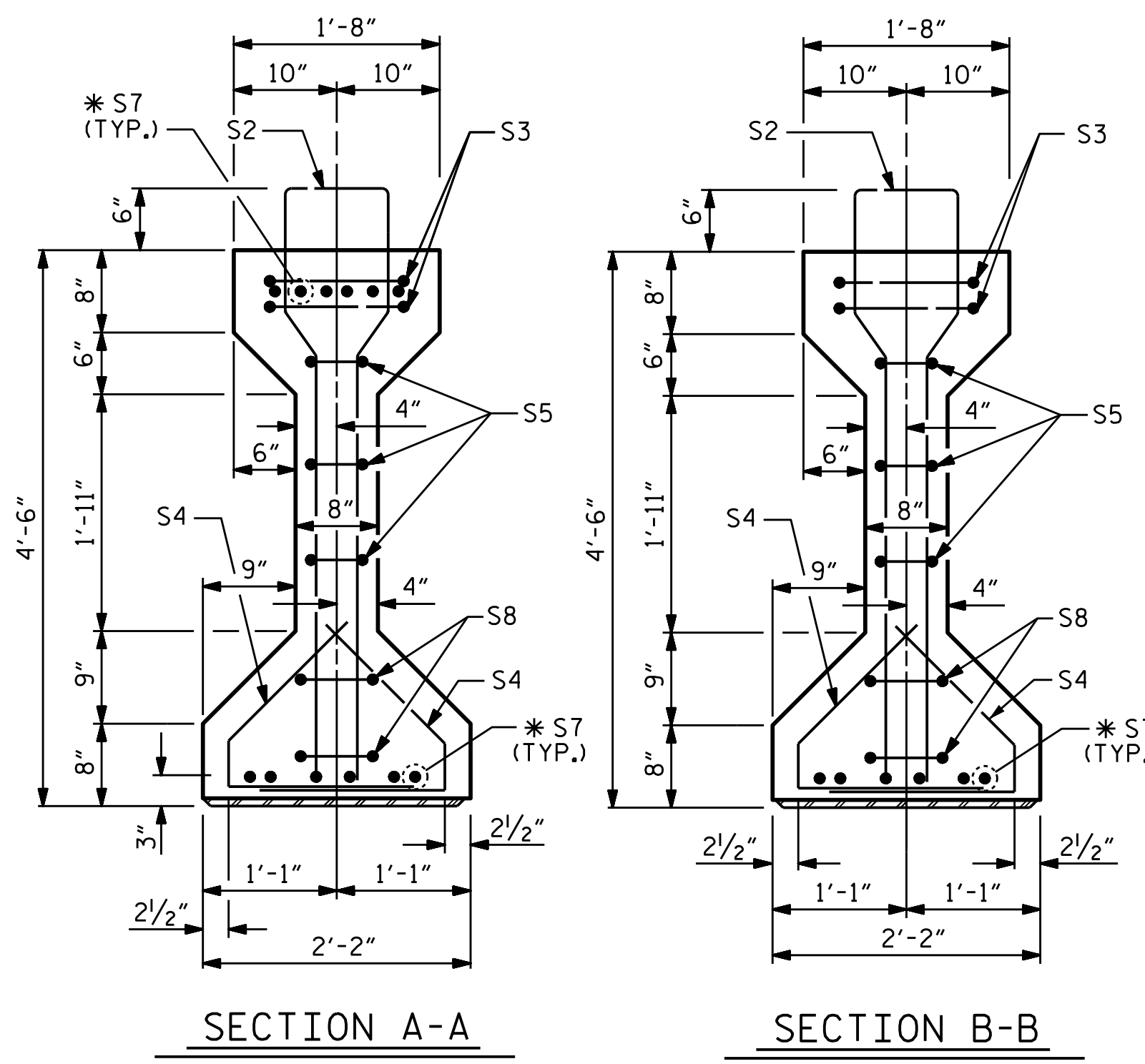
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN A



DRAWN BY : A. SORSENGIN	DATE : 2/2017
CHECKED BY : M. G. CHEEK	DATE : 9/2017
DESIGN ENGINEER OF RECORD : G. KOUCHEKI	DATE : 9/2017
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

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REVISIONS						SHEET NO. S-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 29
2			4			



0.6" Ø LOW RELAXATION STRAND LAYOUT

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

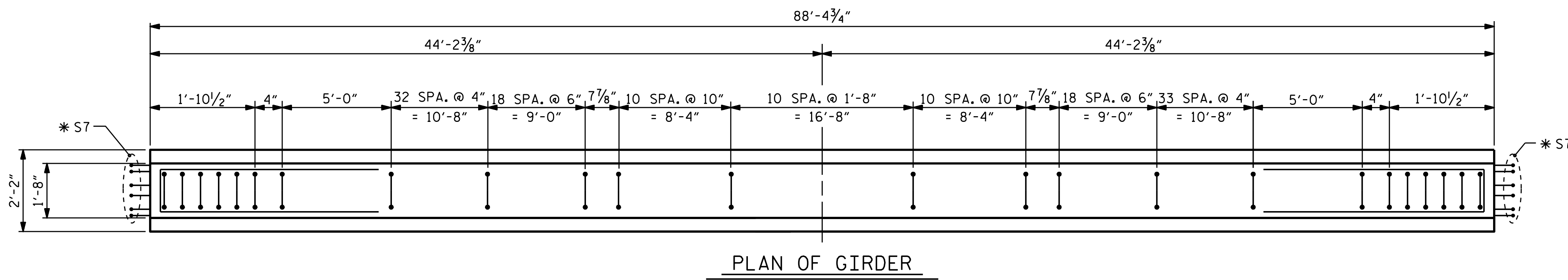
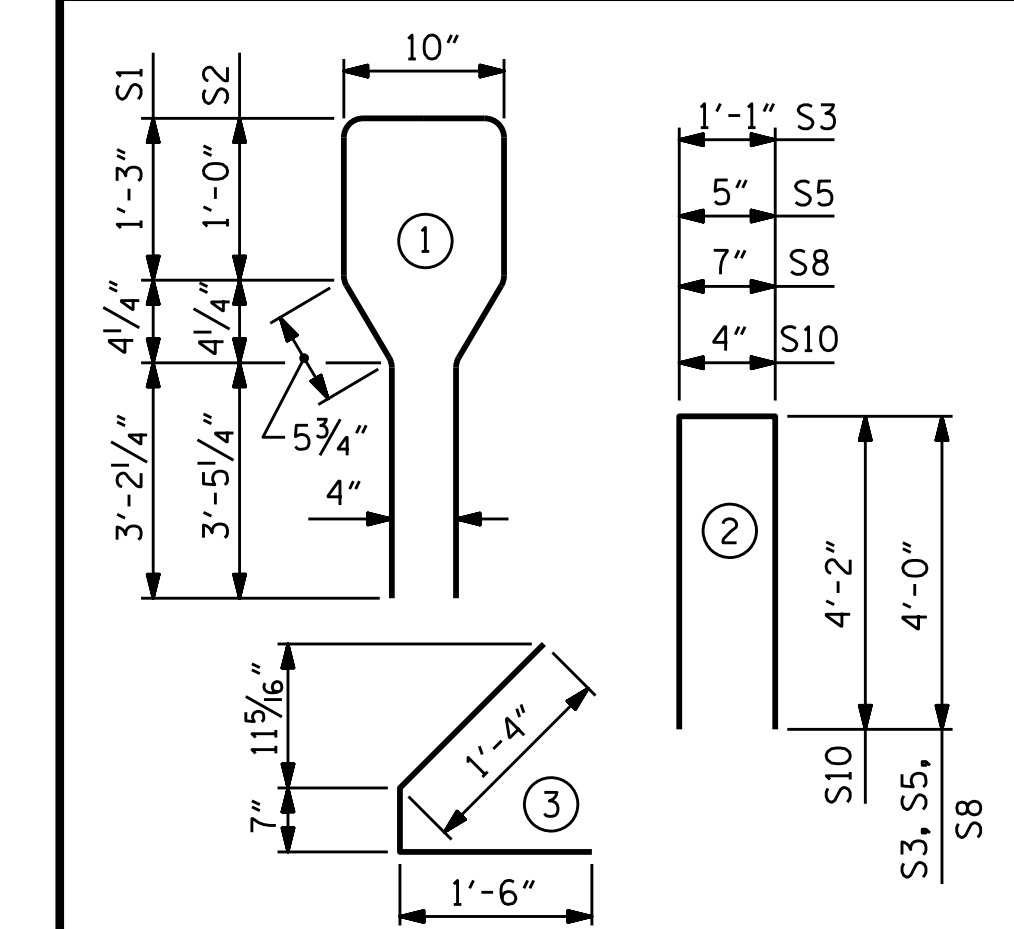
DEBONDING LEGEND

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

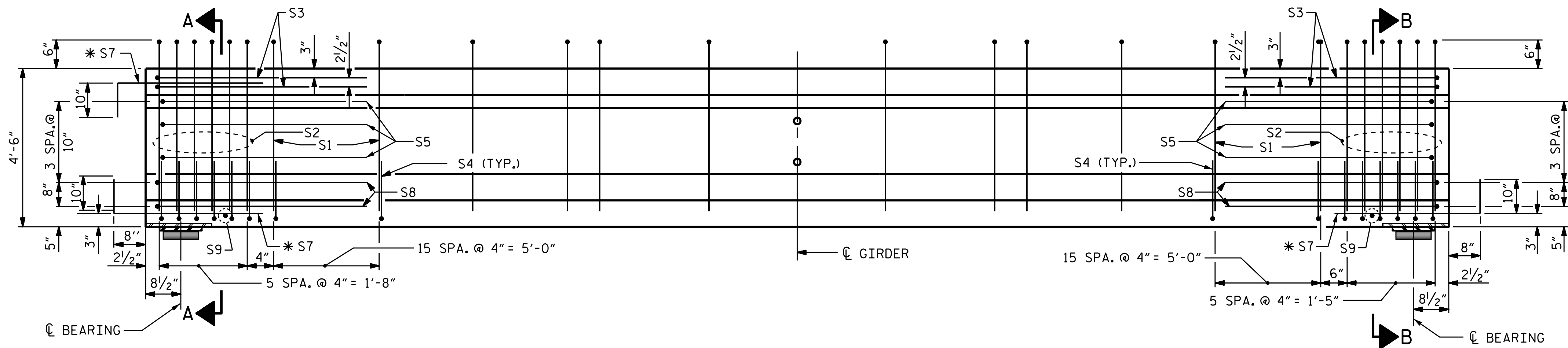
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	163	#4	1	10'-8"	1161
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	88	#4	3	3'-5"	201
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

* 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", SHEET 1 OF 2, FOR ADDITIONAL "S" BARS)

	QUANTITIES FOR ONE GIRDER		
	REINFORCING STEEL LB.	7500 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
SPAN B	1746	17.9	38

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	88'-4 3/4"	353.58

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B



DRAWN BY : A. SORSENGIN	DATE : 2/2017
CHECKED BY : M. G. CHEEK	DATE : 9/2017
DESIGN ENGINEER OF RECORD : G. KOUCHEKI	DATE : 9/2017
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

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REVISIONS					SHEET NO. S-12
BY:	DATE:	NO.	BY:	DATE:	
		3			TOTAL SHEETS 29
		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.

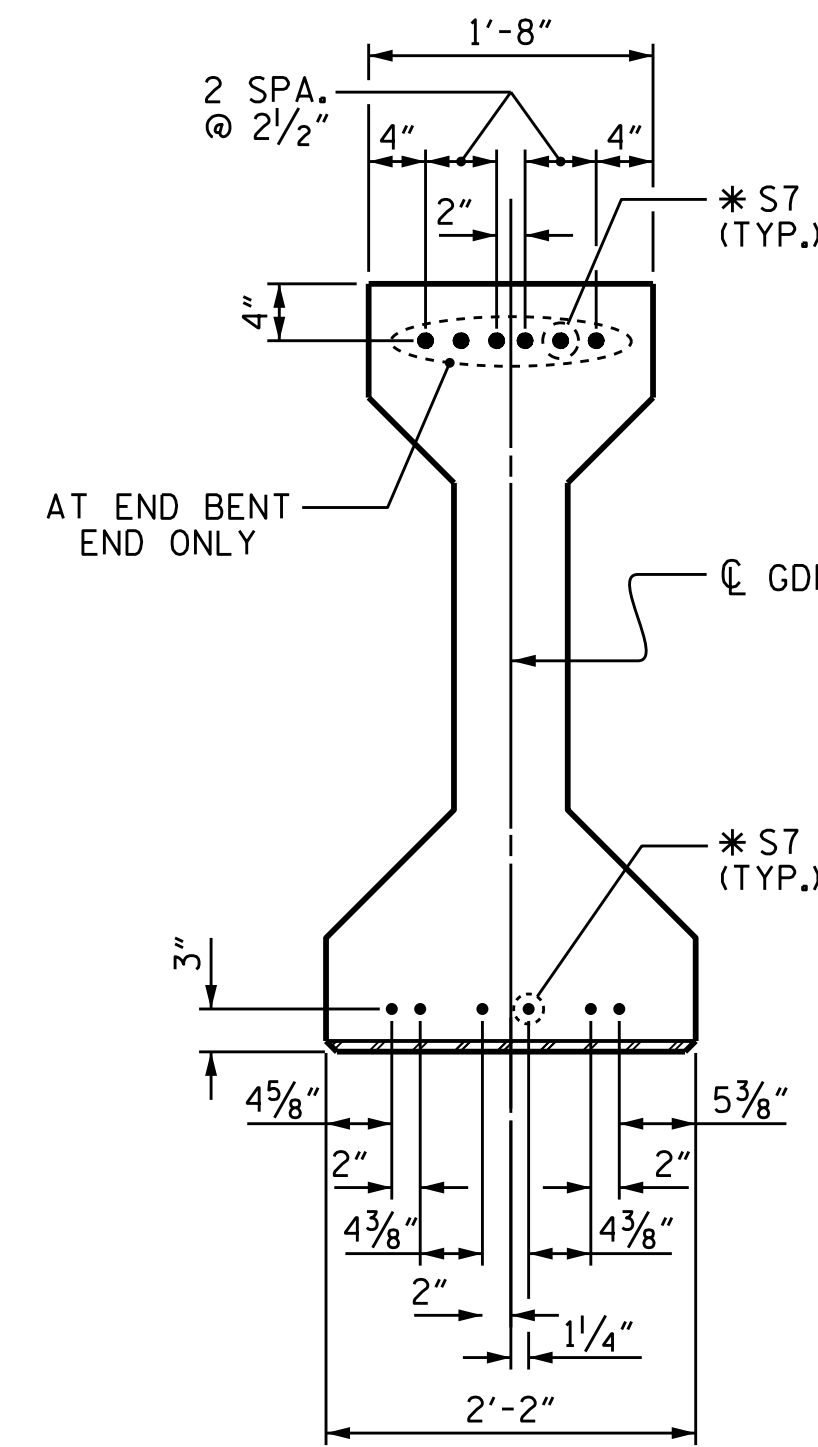
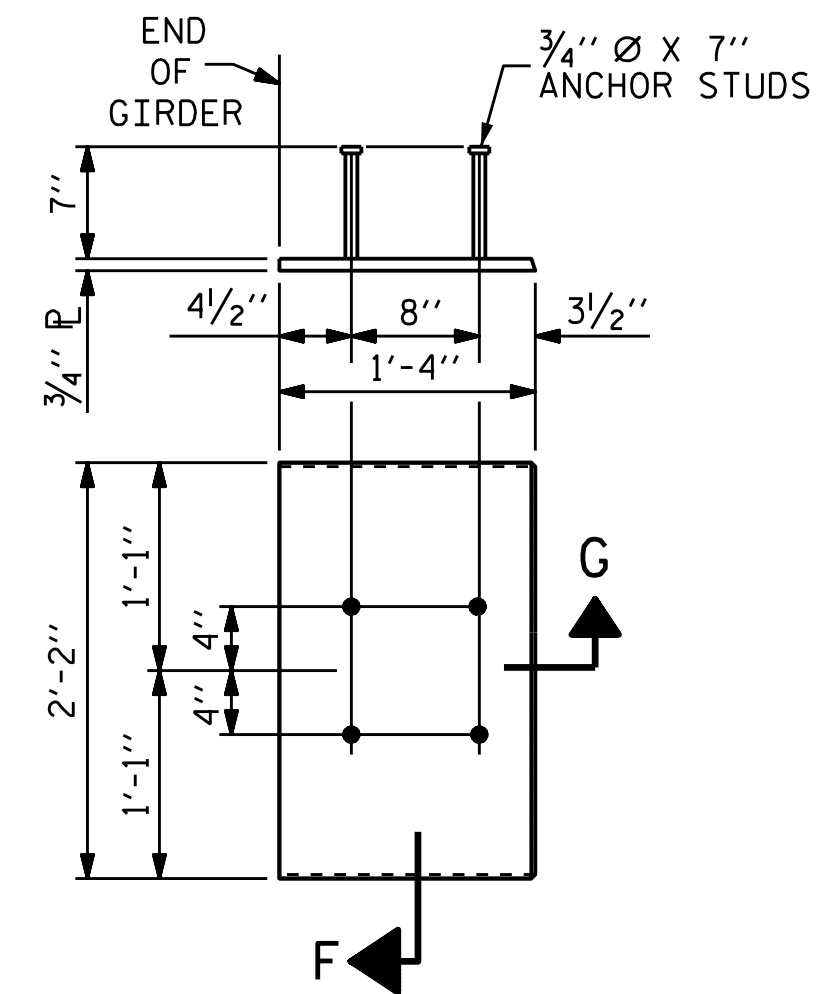
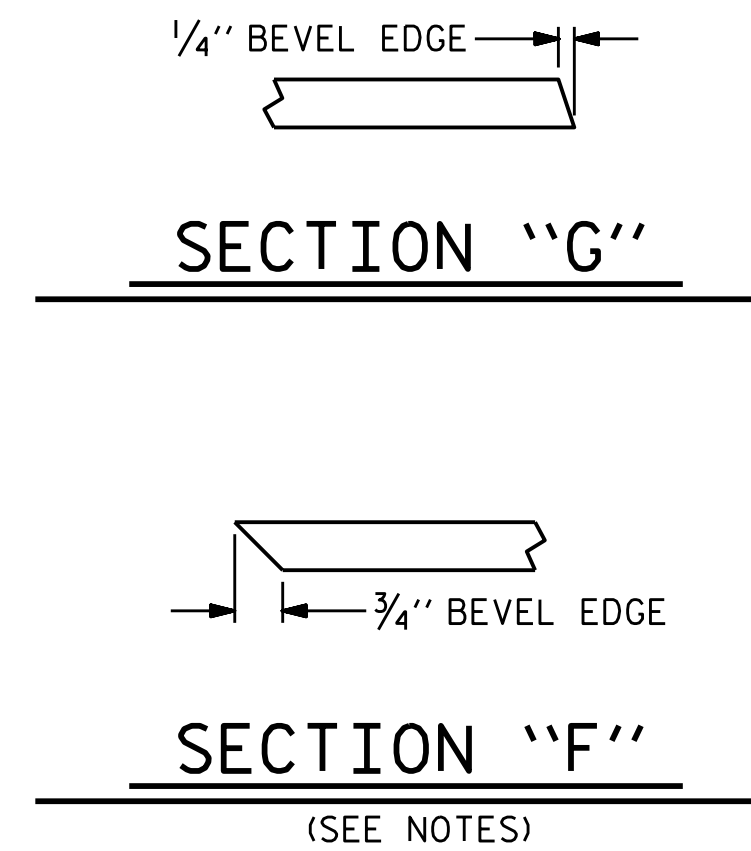
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPAN A AND 5,800 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"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A

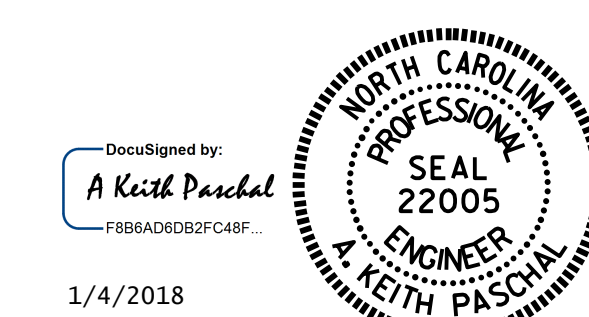
0.6" Ø LOW RELAXATION	GIRDER #1 AND #4											GIRDERS #2 AND #3											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.015	0.029	0.040	0.046	0.049	0.046	0.040	0.029	0.015	0	0	0.015	0.029	0.040	0.046	0.049	0.046	0.040	0.029	0.015	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.007	0.014	0.020	0.023	0.024	0.023	0.020	0.014	0.007	0	0	0.004	0.018	0.024	0.029	0.039	0.029	0.024	0.018	0.008	0
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	1/4"	5/16"	1/4"	1/4"	3/16"	1/16"	0	0	1/16"	1/8"	3/16"	3/16"	1/4"	3/16"	3/16"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS B

0.6" Ø LOW RELAXATION	GIRDER #1 AND #4											GIRDERS #2 AND #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	0.052	0.098	0.134	0.157	0.165	0.157	0.134	0.098	0.052	0	0	0.052	0.098	0.134	0.157	0.165	0.157	0.134	0.098	0.052	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.038	0.073	0.099	0.116	0.122	0.116	0.099	0.073	0.038	0	0	0.045	0.085	0.116	0.136	0.142	0.136	0.116	0.085	0.045	0
FINAL CAMBER	↑	0	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0	0	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0

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

PROJECT NO. B-5371
UNION COUNTY
 STATION: 23+20.00 -L-



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

ASSEMBLED BY : A. SORSENGINH	DATE : 2/2017
CHECKED BY : M. G. CHEEK	DATE : 9/2017
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/TMG
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG

NO.	REVISIONS						SHEET NO.
	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	
1			3			S-13	
2			4			29	

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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 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 AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE 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.

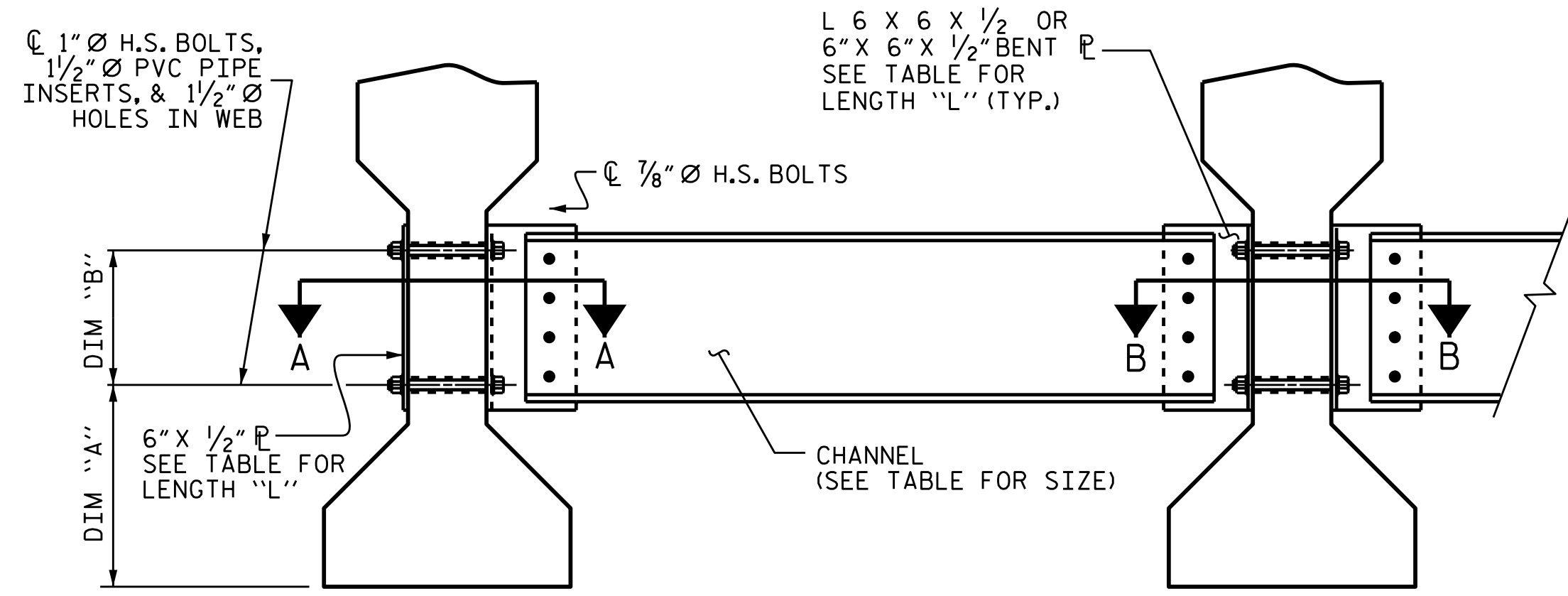
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

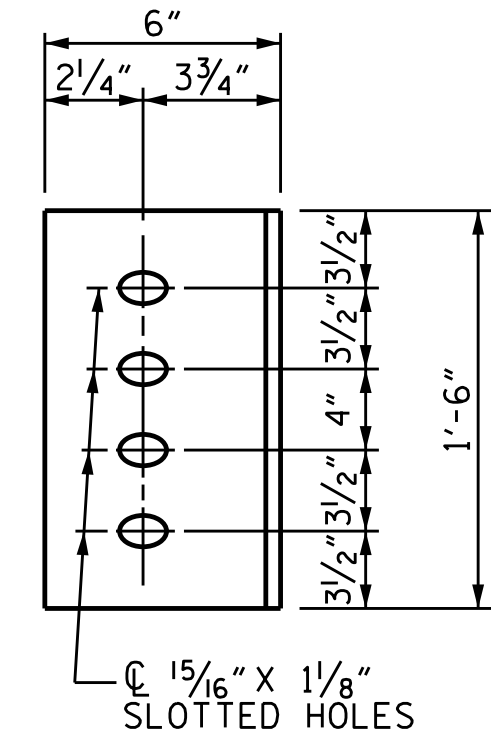
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

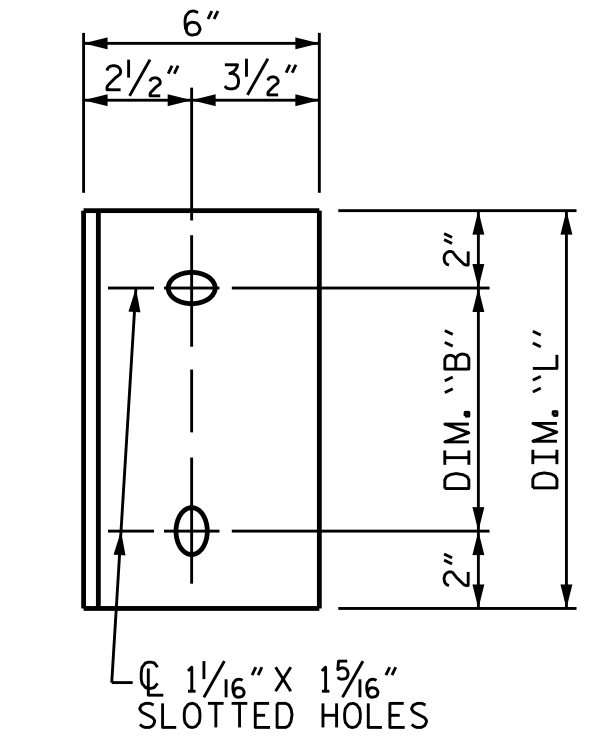
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS

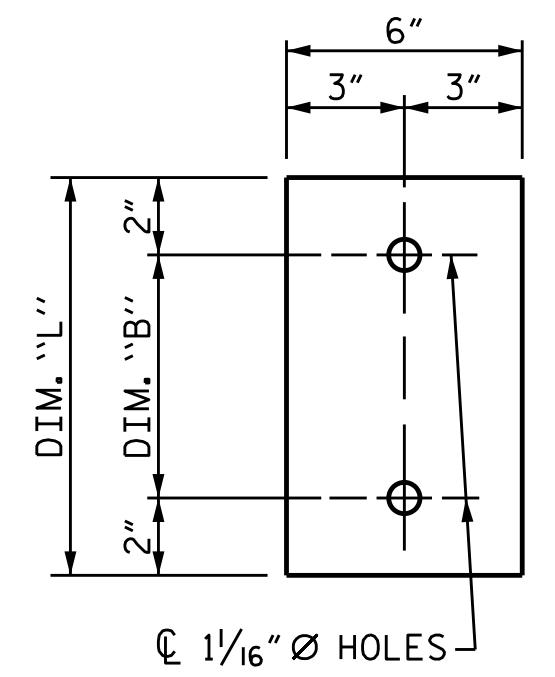
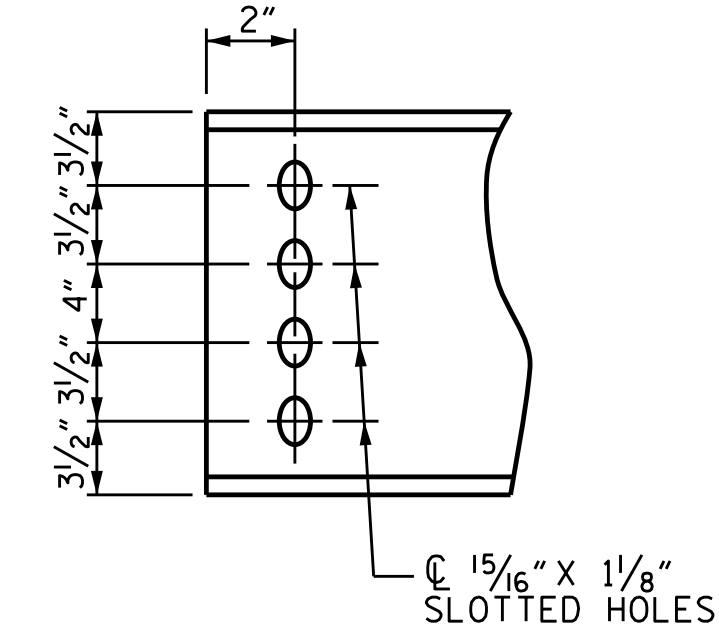
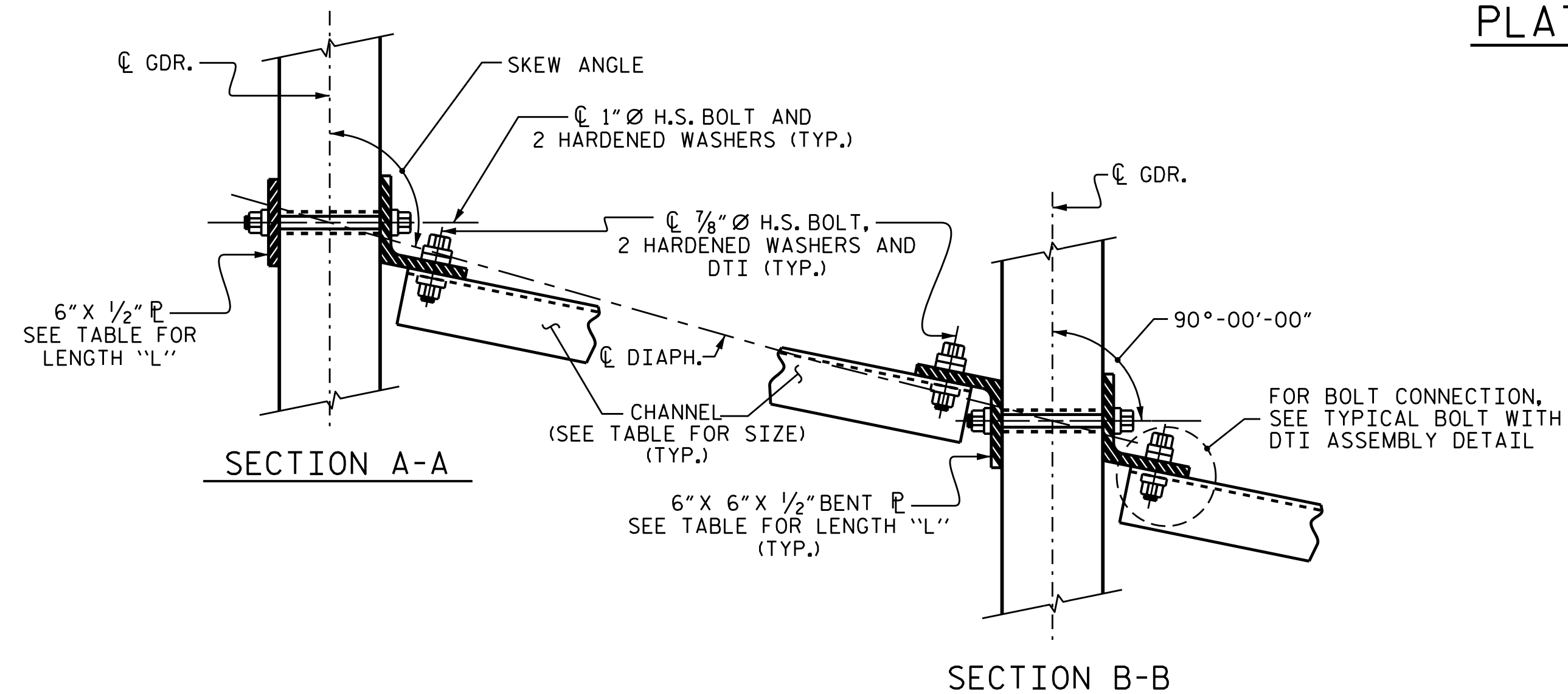


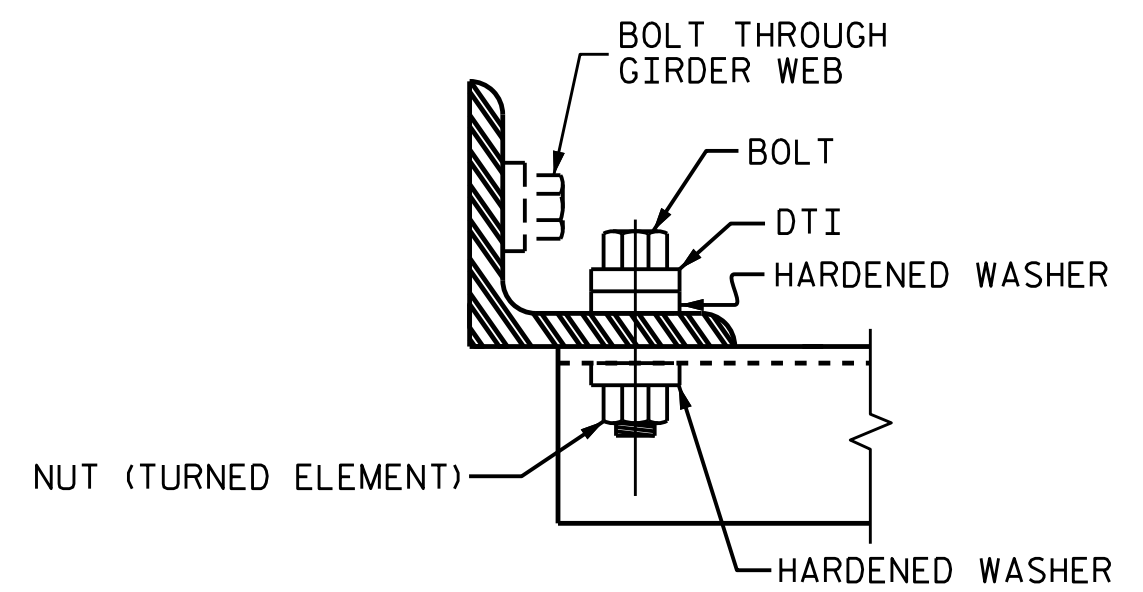
PLATE DETAILS



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-5371
 UNION COUNTY
 STATION: 23+20.00 -L-



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

ASSEMBLED BY : A. SORSENGINH	DATE : 2/2017
CHECKED BY : M. G. CHEEK	DATE : 9/2017
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			29

NOTES

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

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

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

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

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

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

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

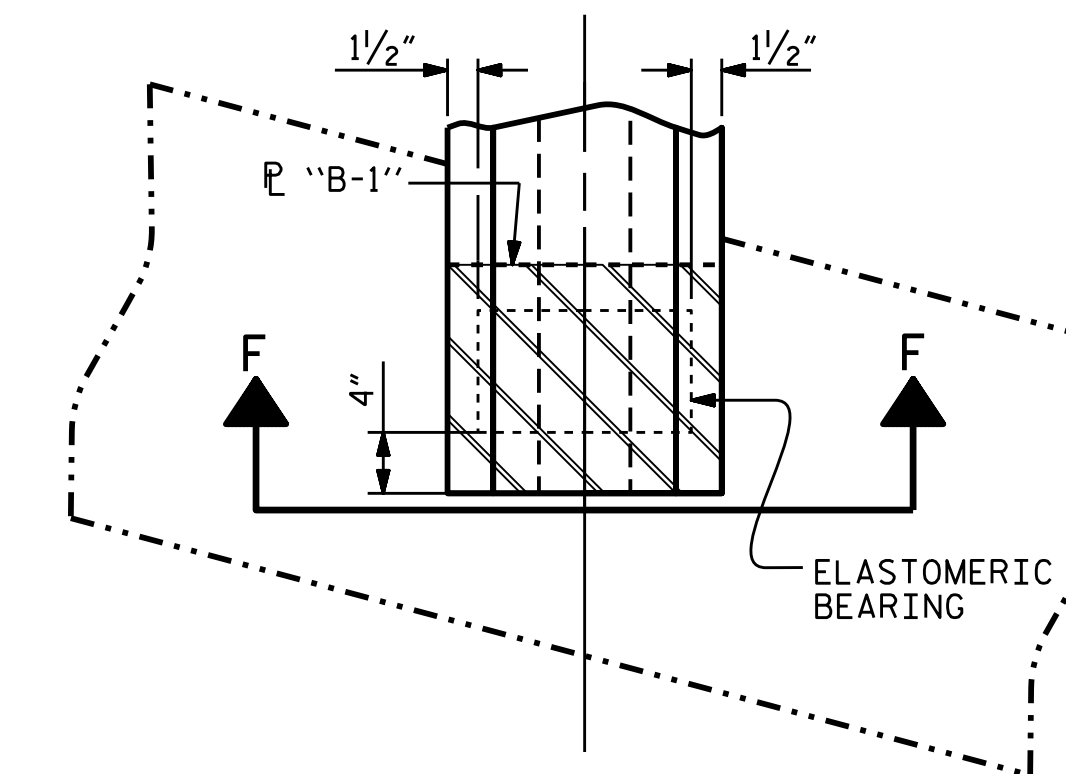
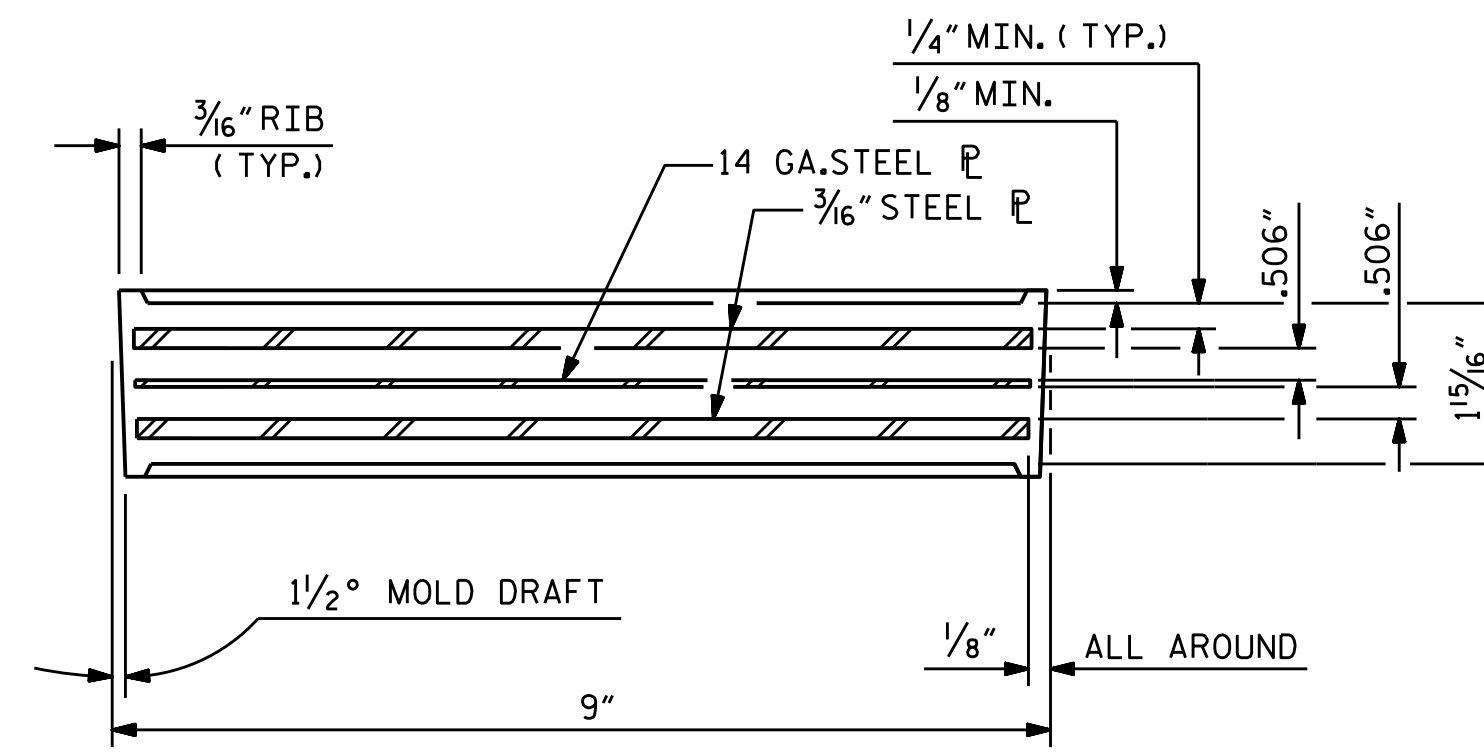
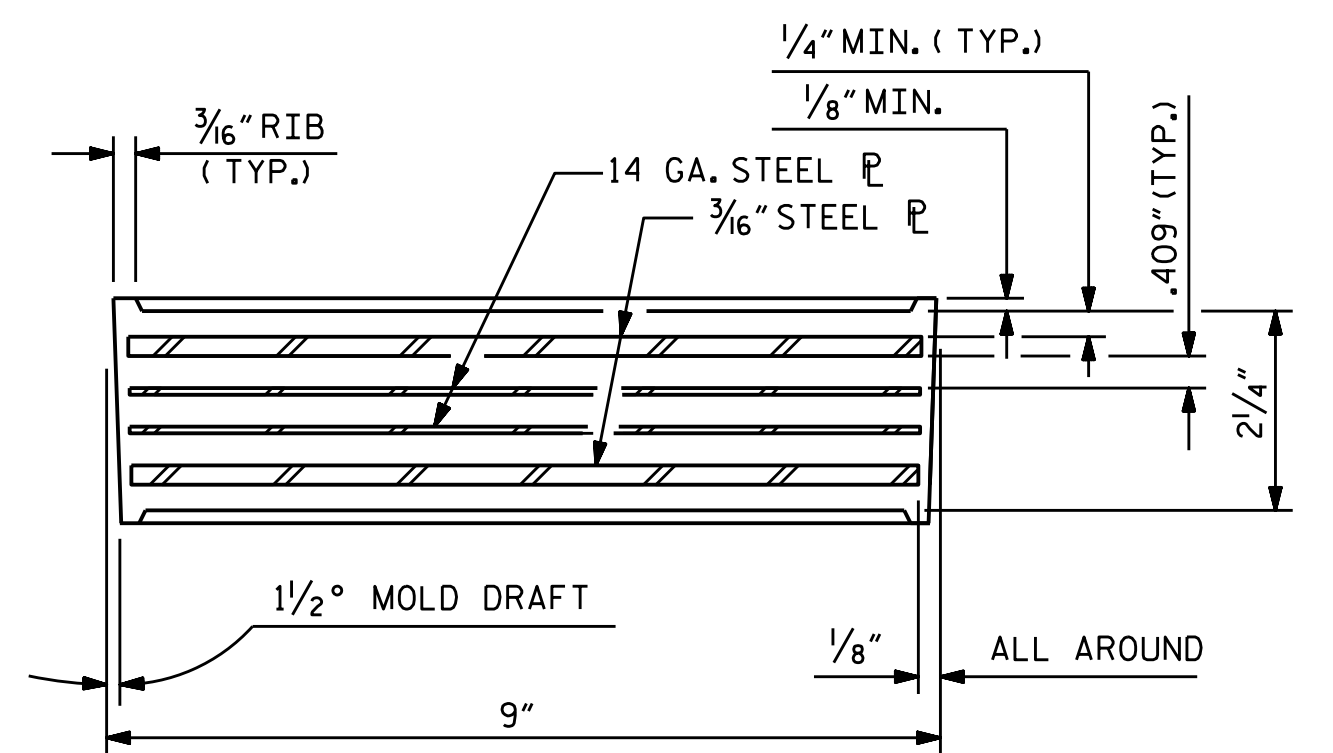
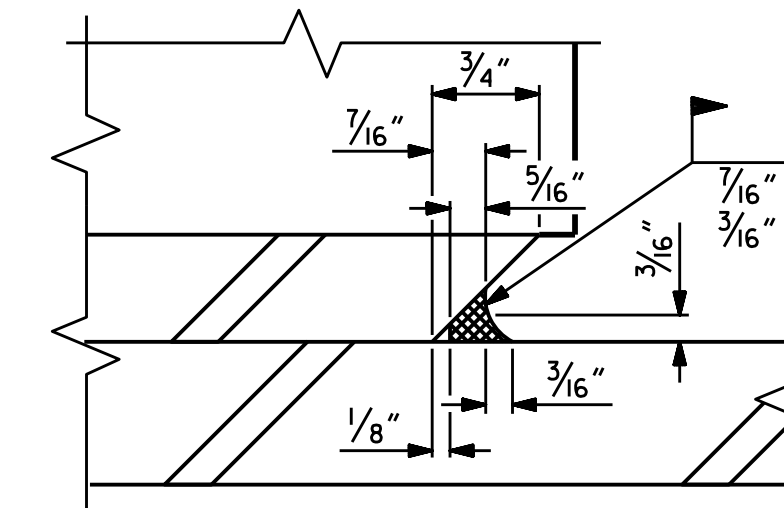
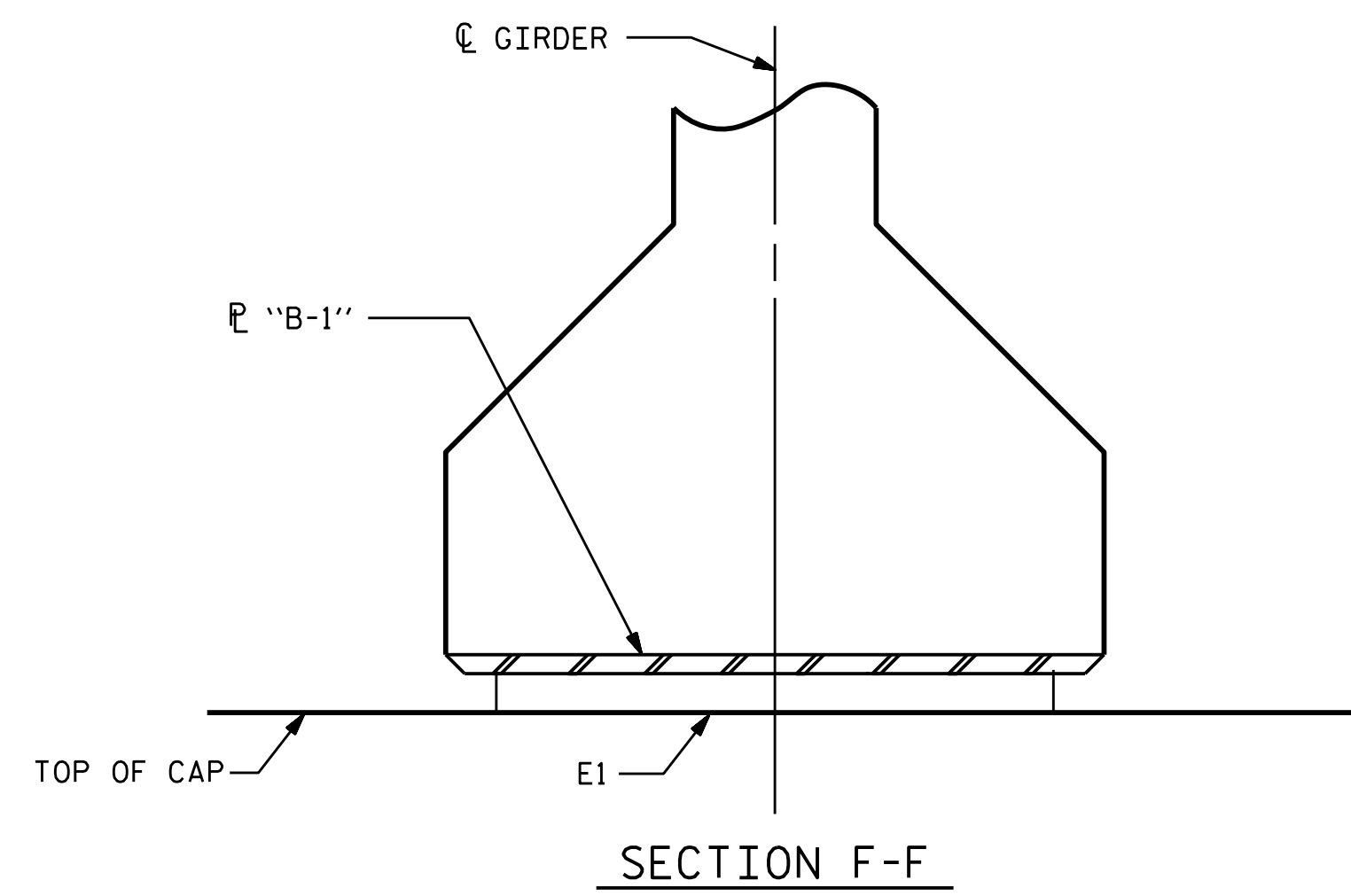
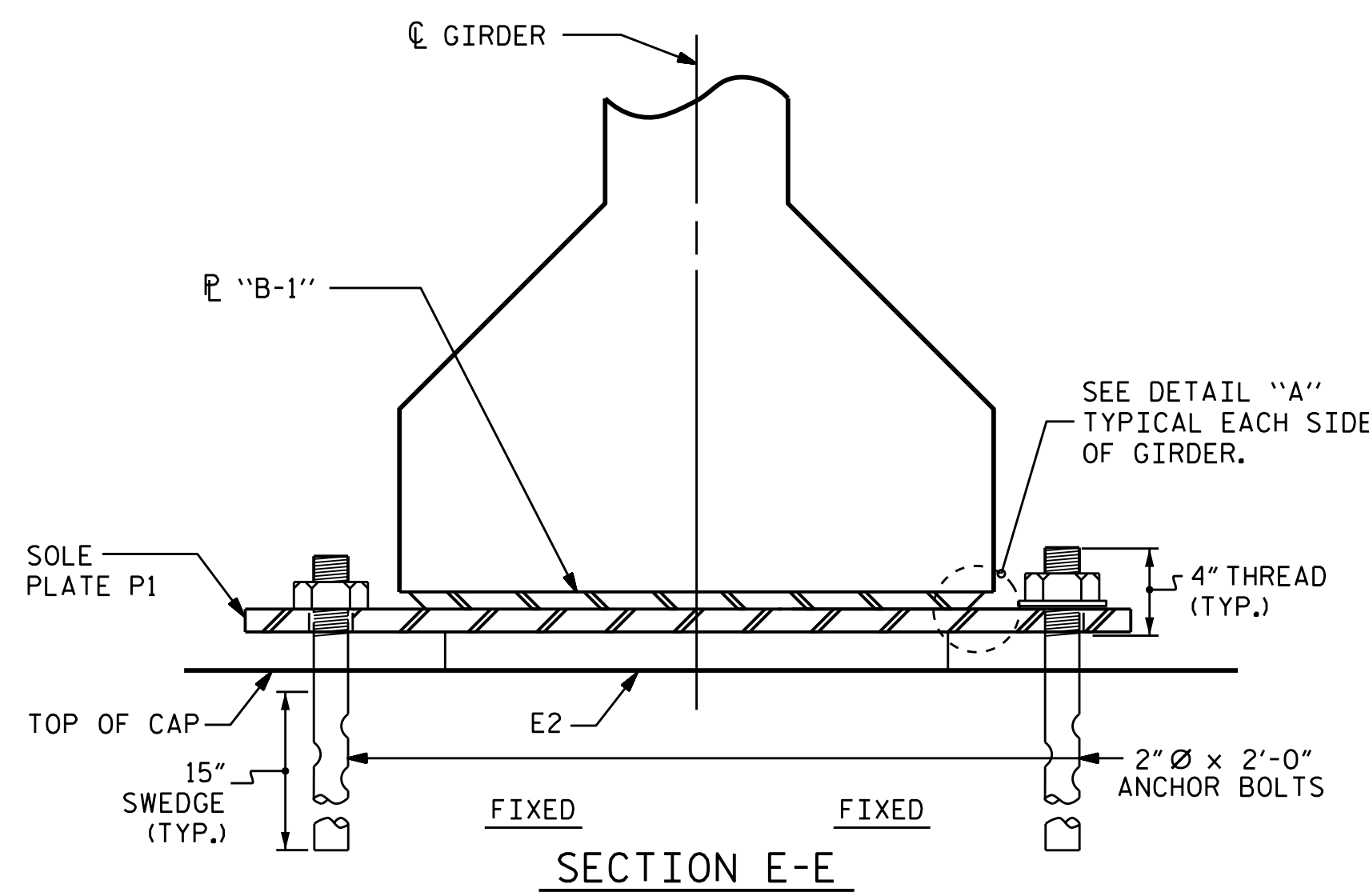
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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.

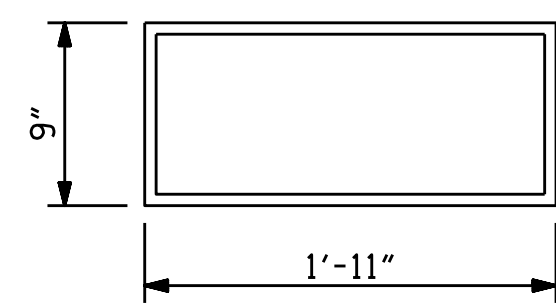
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k



TYPICAL SECTION OF ELASTOMERIC BEARINGS

TYPICAL SECTION OF ELASTOMERIC BEARINGS

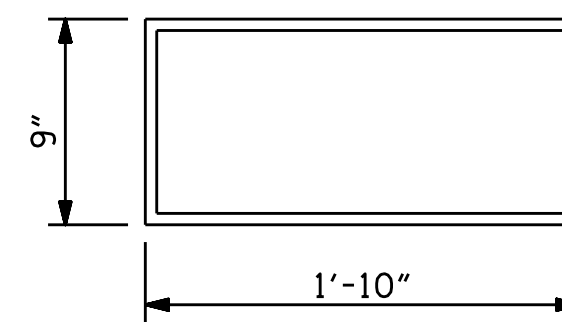
TYPICAL HALF-PLAN
(AT INTEGRAL END BENT)



E2 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

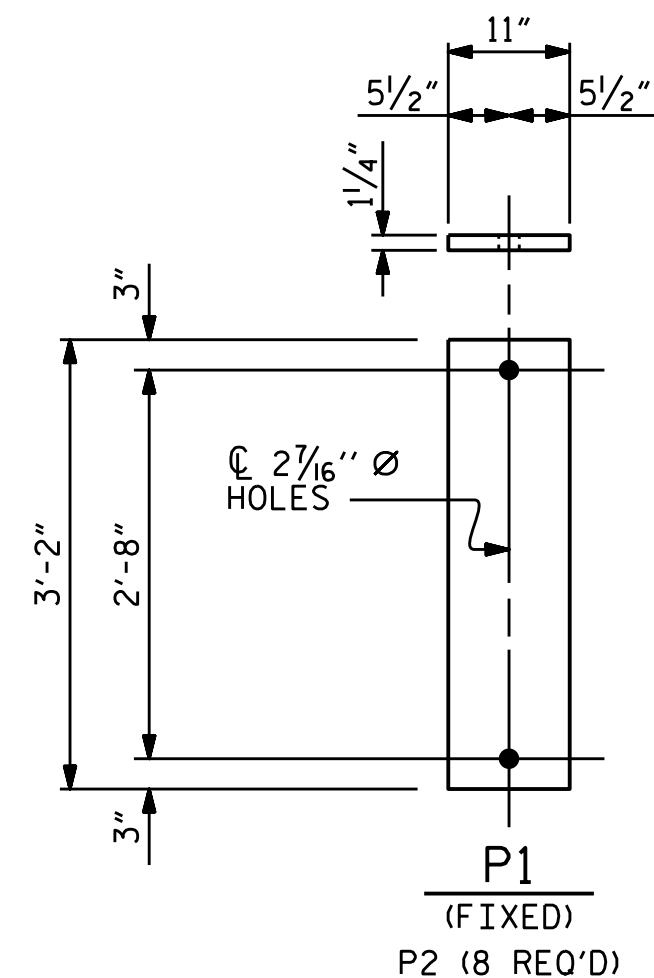
TYPE V
AT BENT ONLY



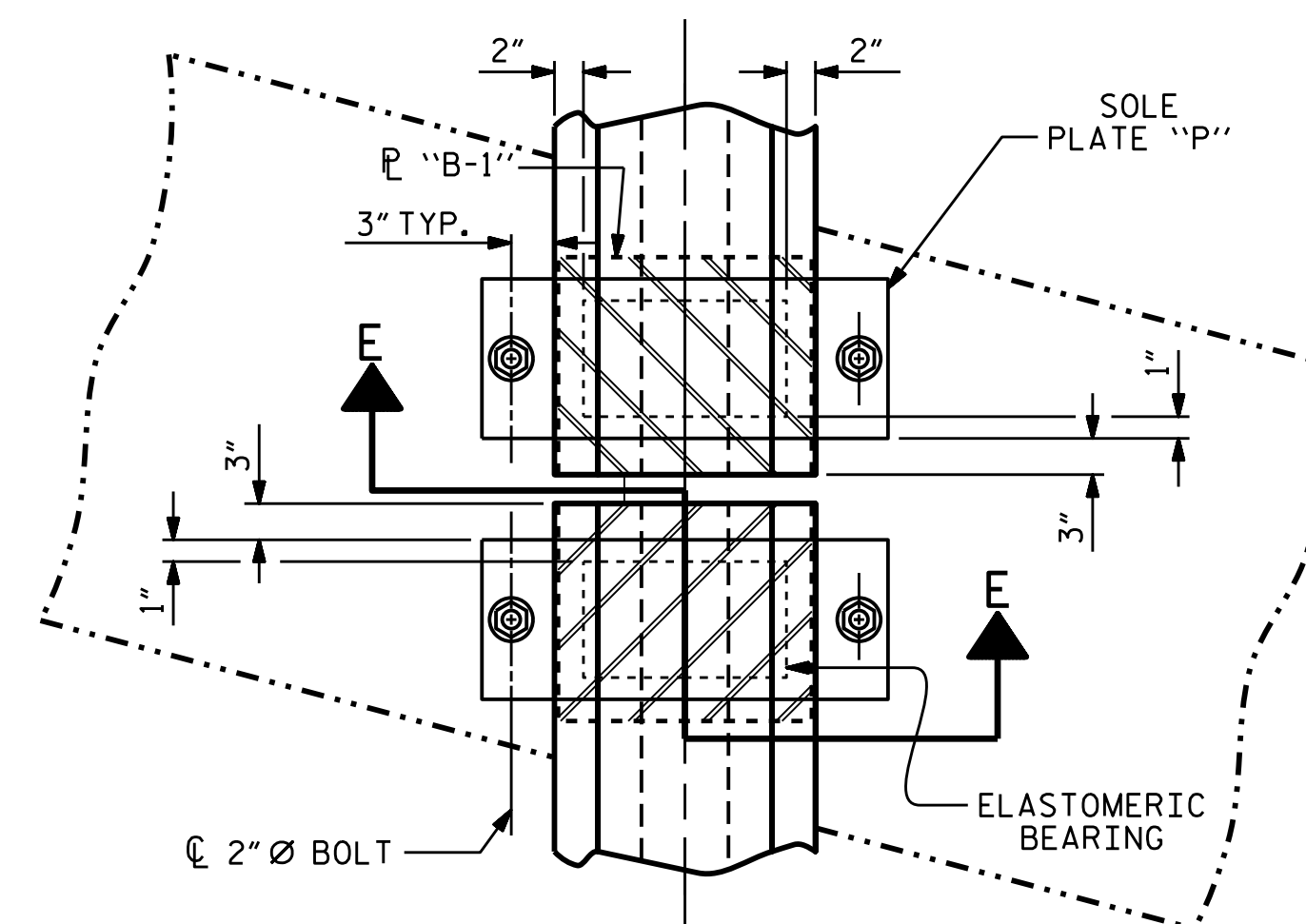
E1 (8 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV
AT END BENT ONLY



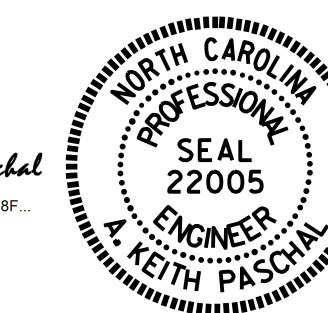
SOLE PLATE DETAILS (P1)



TYPICAL HALF-PLAN
(SHOWING CONTINUOUS BENT)

DocuSigned by:
A Keith Paschal
F886AD8D2FC48F...

1/4/2018



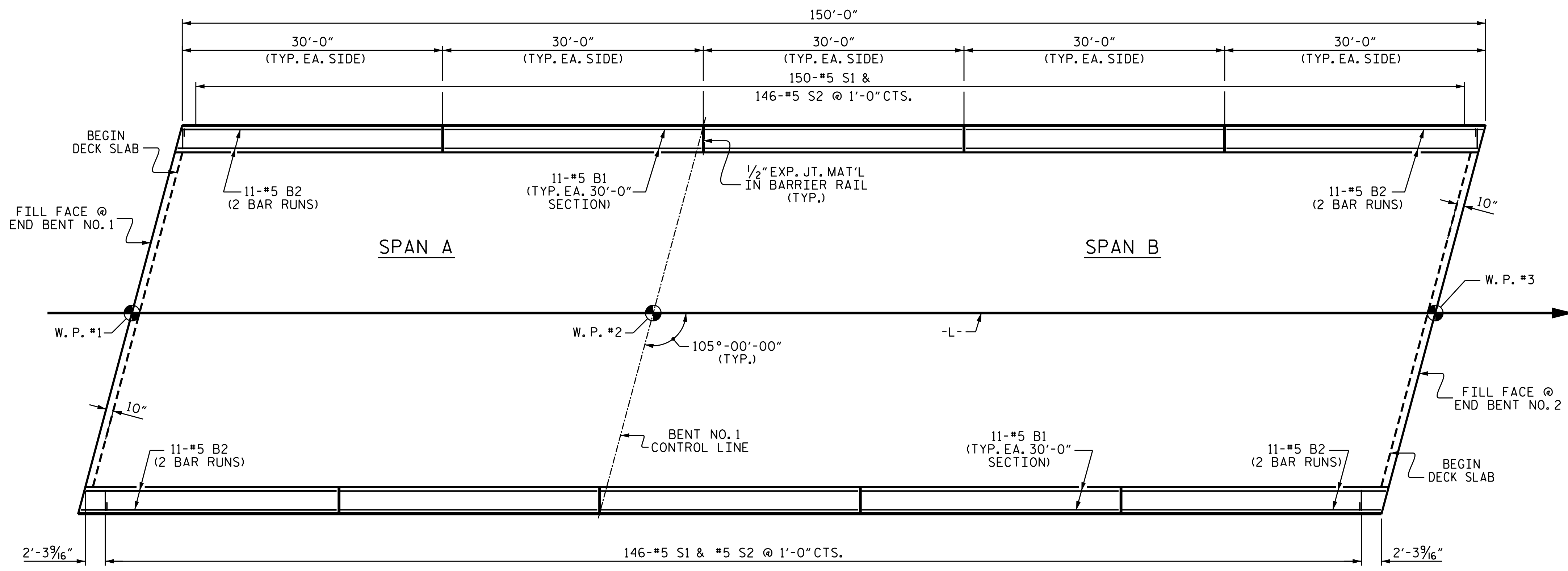
PROJECT NO. B-5371
 UNION COUNTY
STATION: 23+20.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
**ELASTOMERIC BEARING
DETAILS**
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE

ASSEMBLED BY : A. SORSENGINH	DATE : 2/2017
CHECKED BY : M. G. CHEEK	DATE : 9/2017
DRAWN BY : WJH 8/89	REV. 10/1/11 MAA/GM
CHECKED BY : CRK 8/89	REV. 6/13 AAC/MAA
	REV. 1/15 MAA/TMG

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SIGNATURES COMPLETED

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1			3			TOTAL SHEETS
2			4			29



PLAN

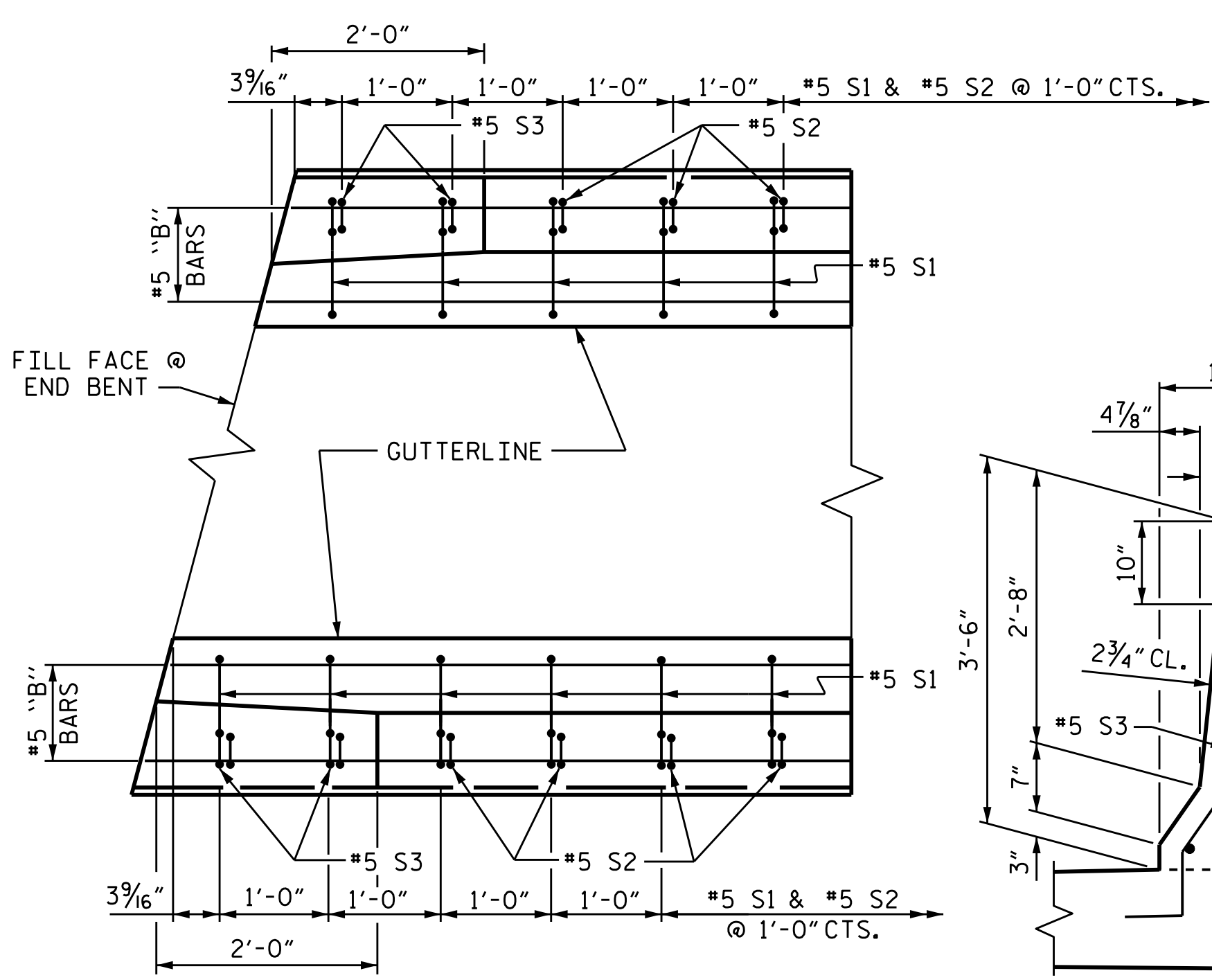
NOTES

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

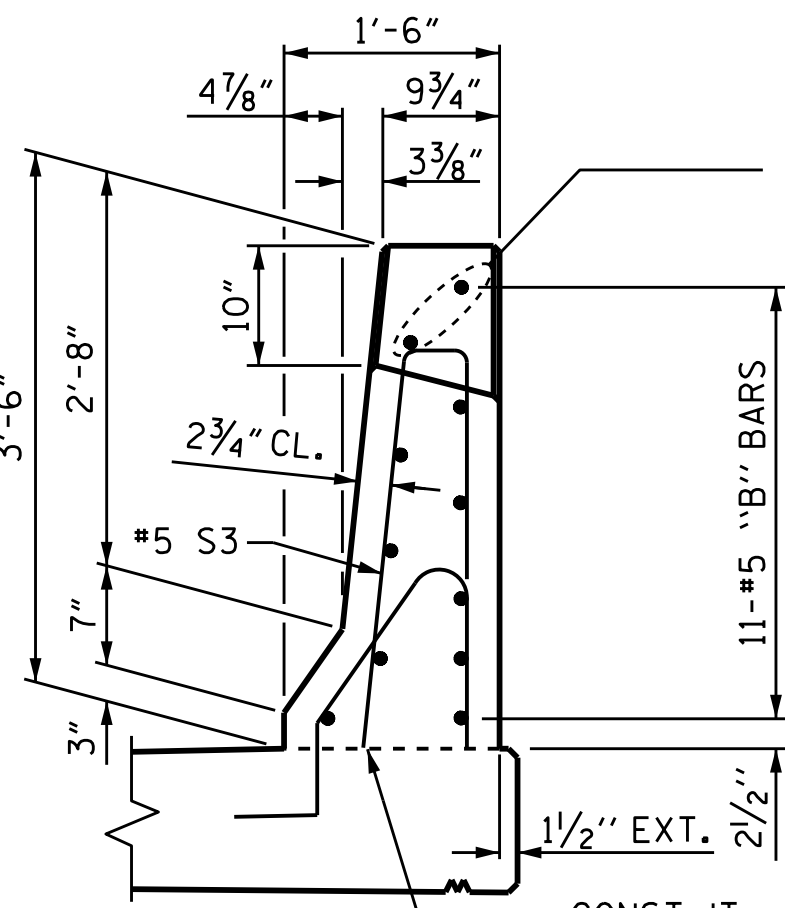
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

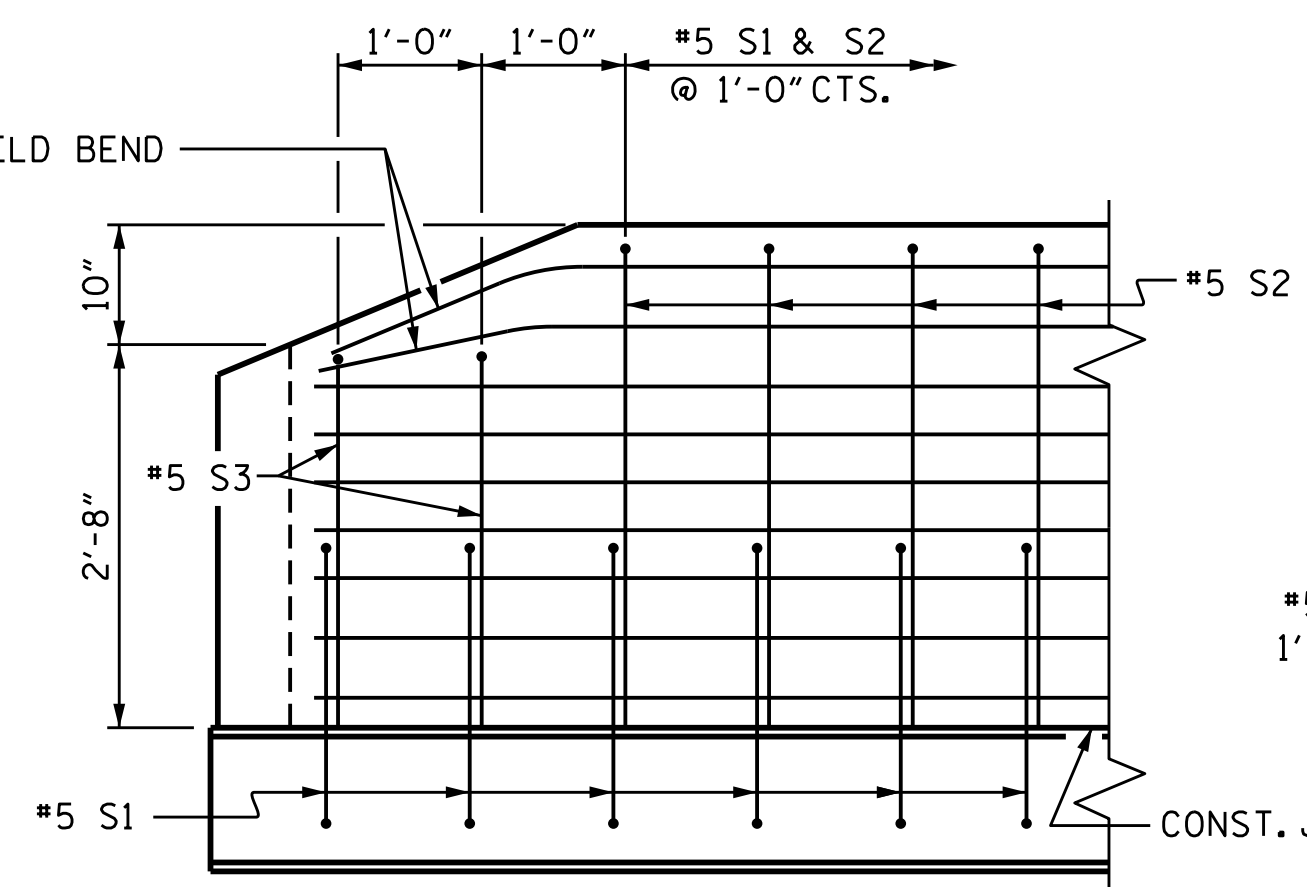
THE #5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN RAIL.



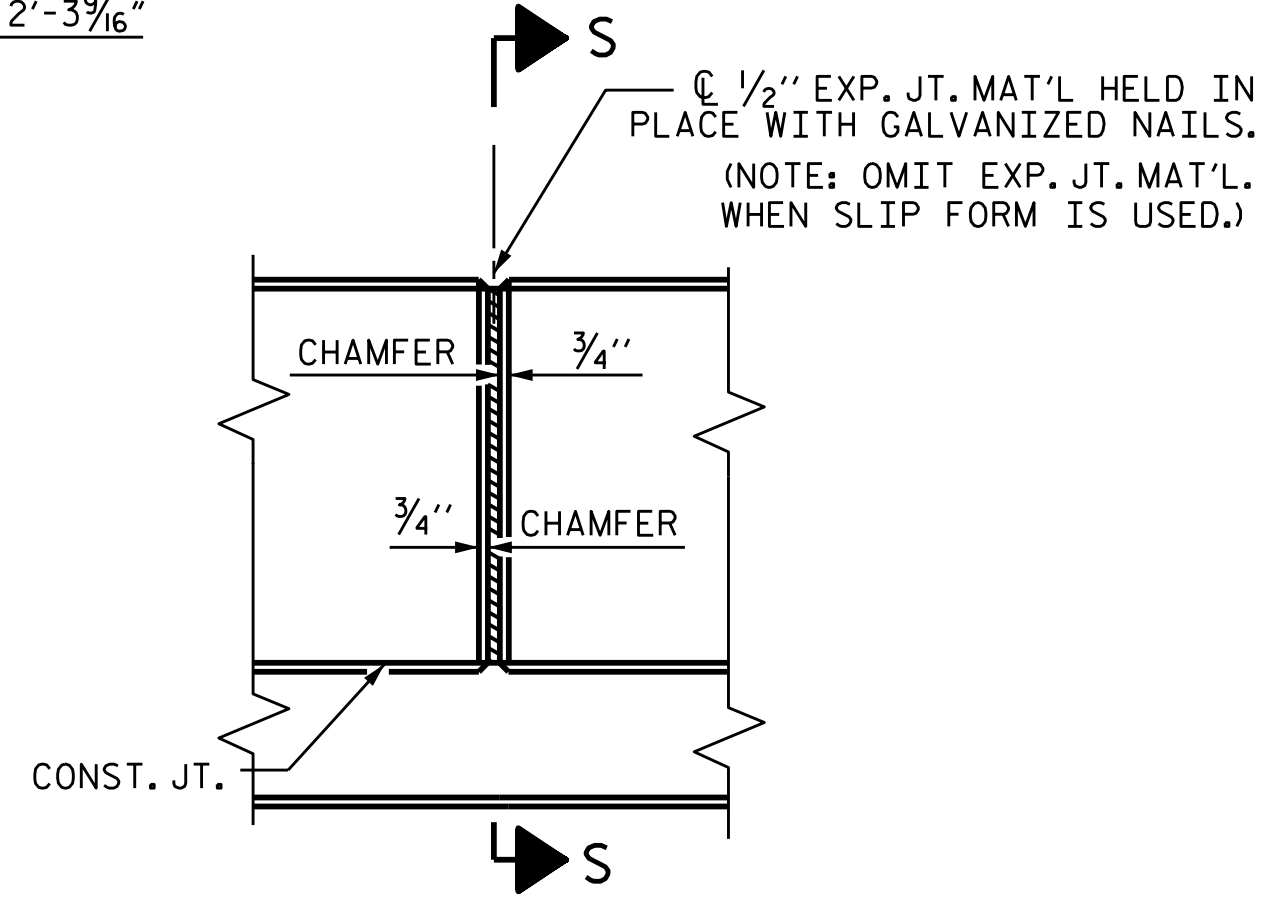
PLAN



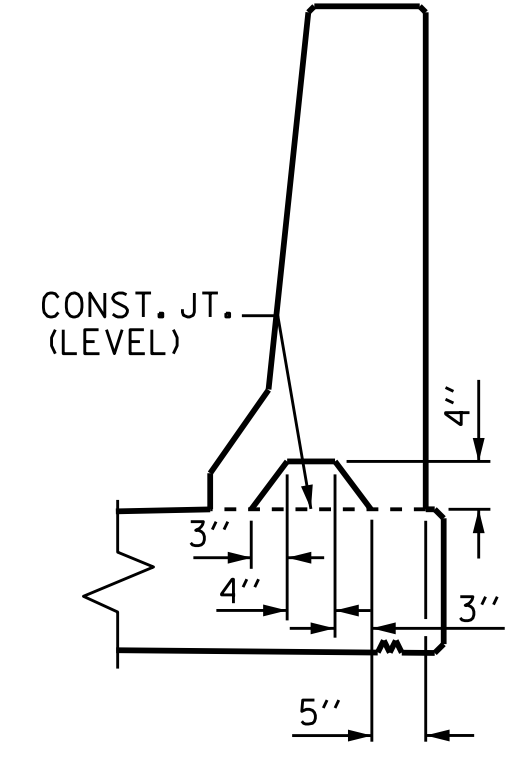
END VIEW



SIDE VIEW

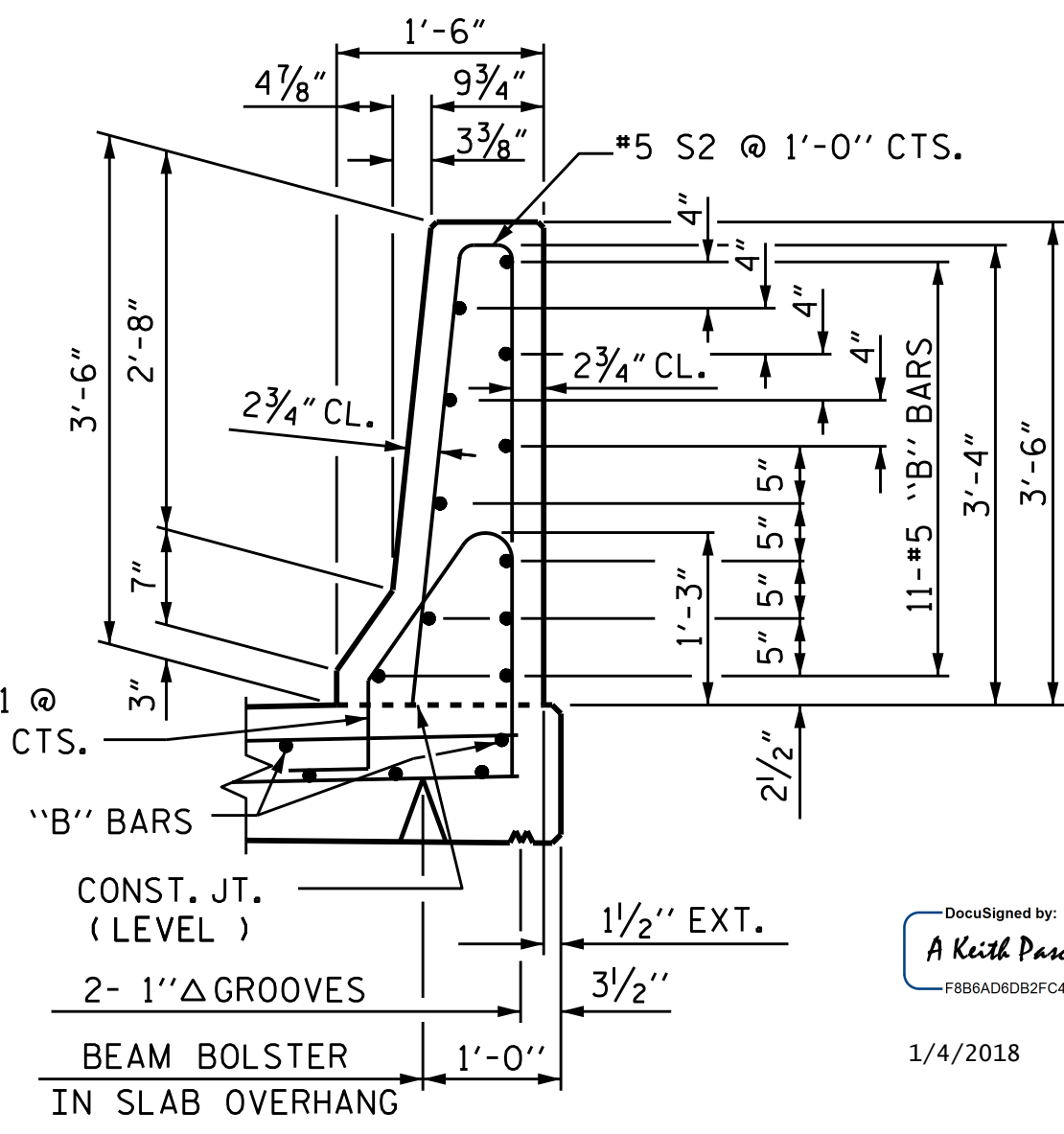


ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

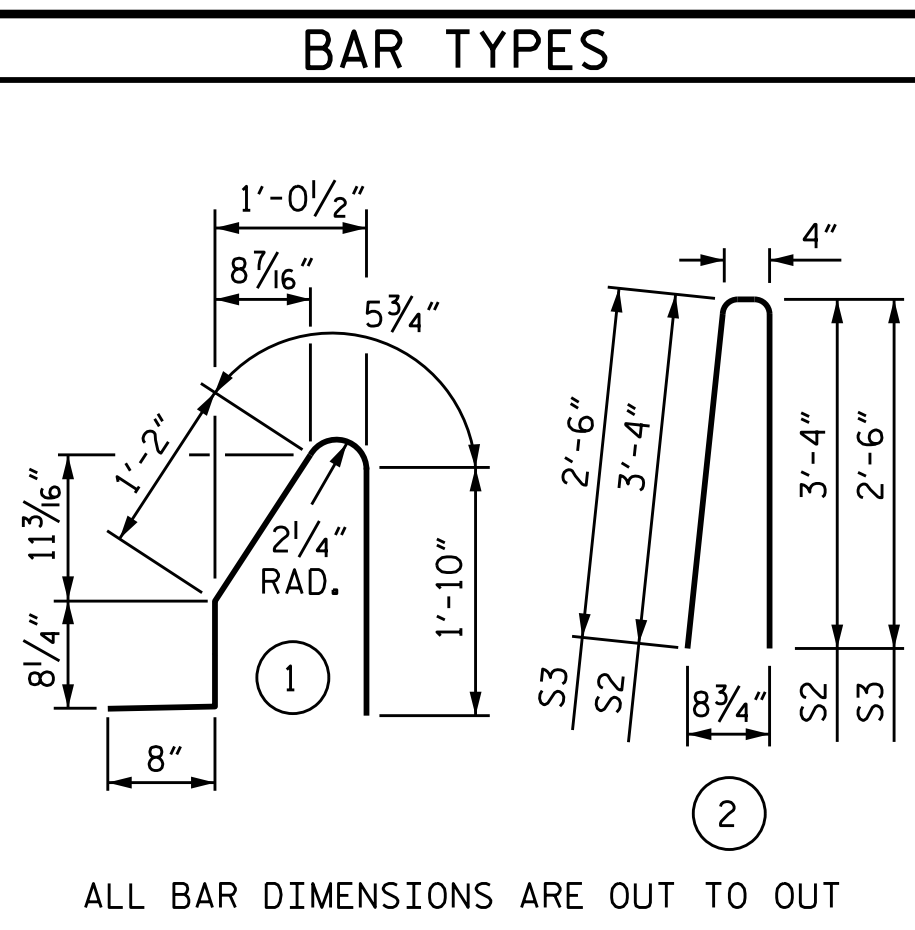


SECTION THRU RAIL
BARRIER RAIL DETAILS

DocuSigned by:
A Keith Paschal
F3B8A0D85FCA8F
1/4/2018



BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	66	#5	STR	29'-8"	2042
* B2	88	#5	STR	16'-9"	1537
* S1	300	#5	1	4'-10"	1512
* S2	292	#5	2	7'-0"	2132
* S3	8	#5	2	5'-4"	45
* EPOXY COATED REINFORCING STEEL					7268 LBS.
CLASS AA CONCRETE					40.8 CU. YDS.
CONCRETE BARRIER RAIL					300.00 LIN. FT.



ALL BAR DIMENSIONS ARE OUT TO OUT

DRAWN BY : A. SORSENGINH DATE : 2/2017
CHECKED BY : M. G. CHEEK DATE : 9/2017

03-JAN-2018 11:10
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kpaschal

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-
SHEET 1 OF 2

REVISIONS						SHEET NO.
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2			4			29

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CONCRETE BARRIER RAIL

NOTES

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

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

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

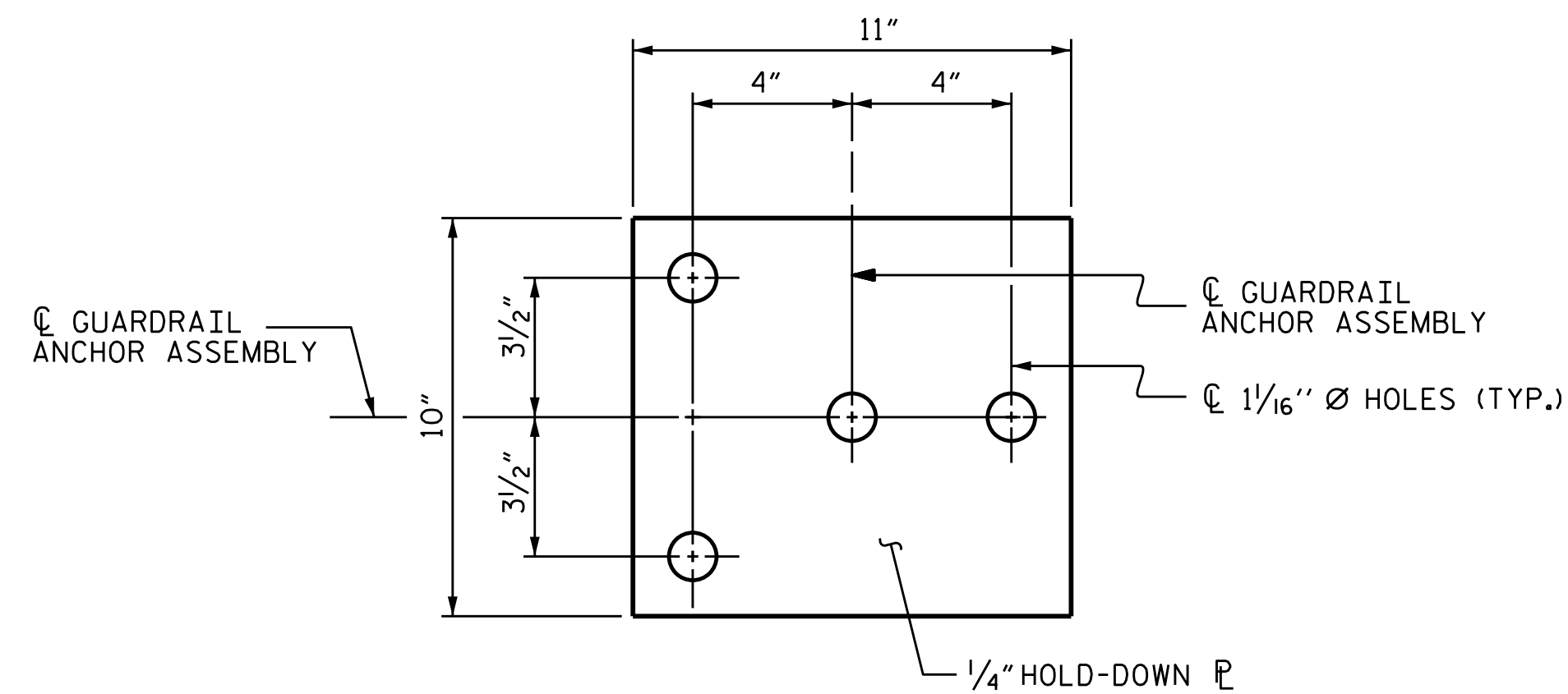
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

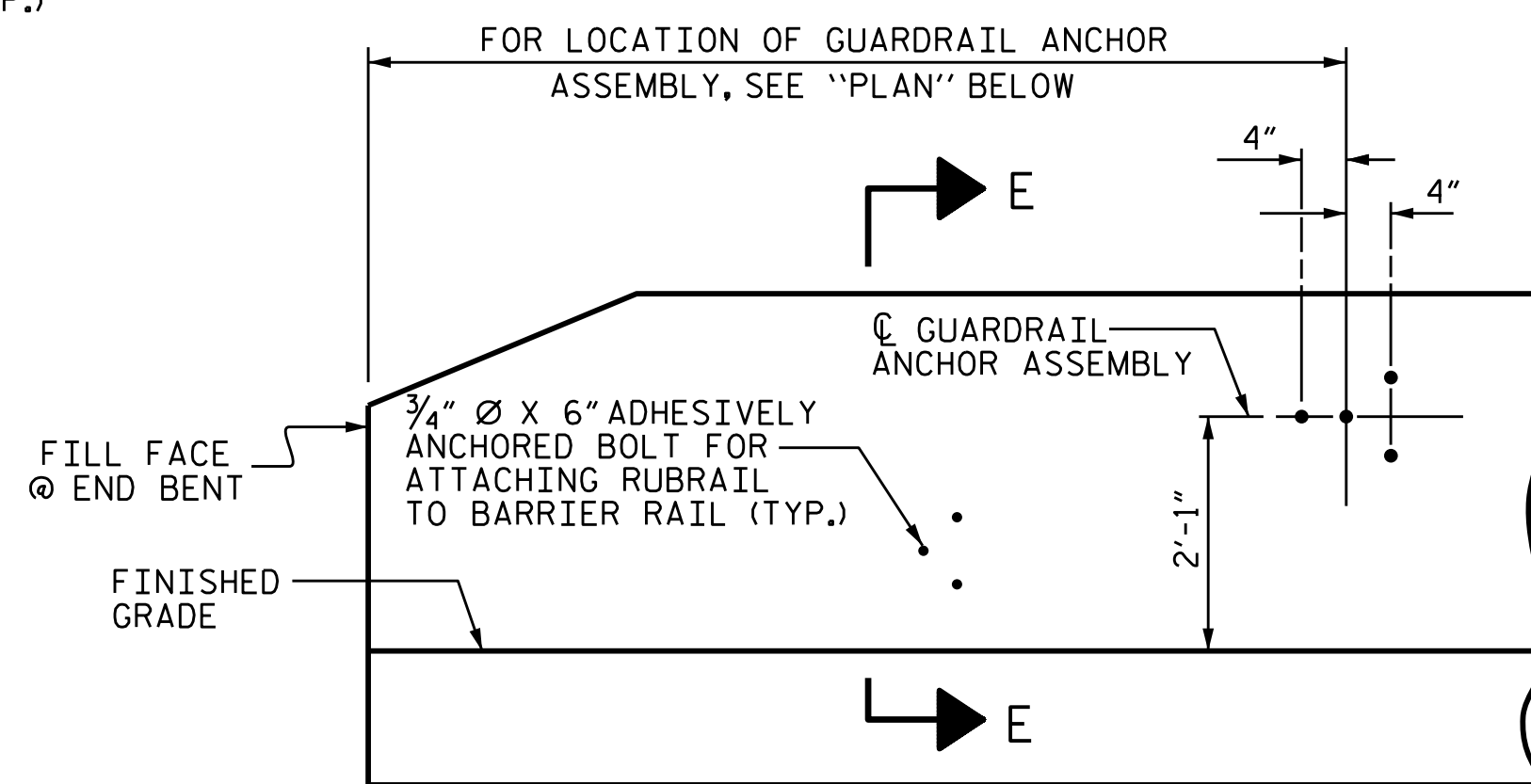
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

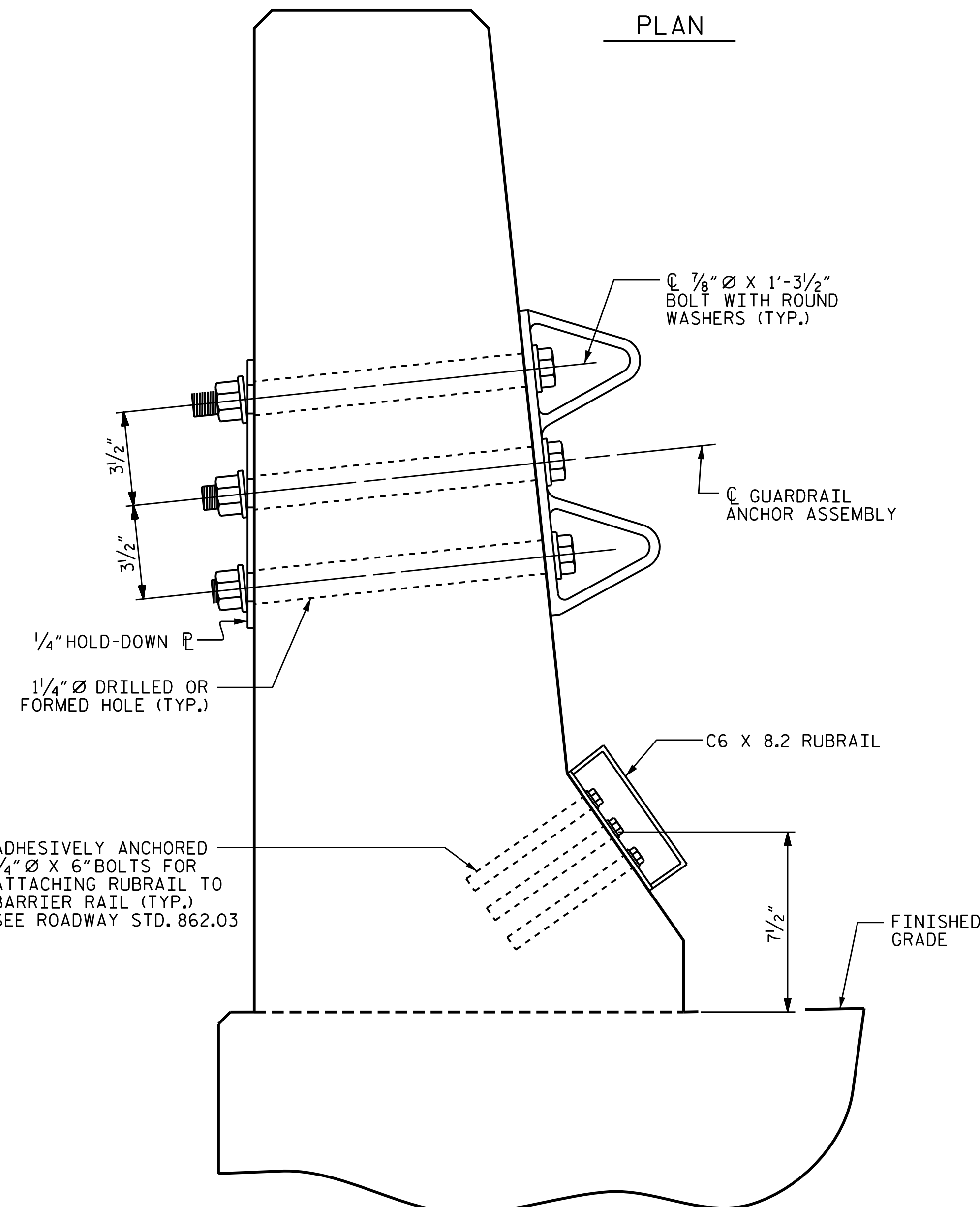
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



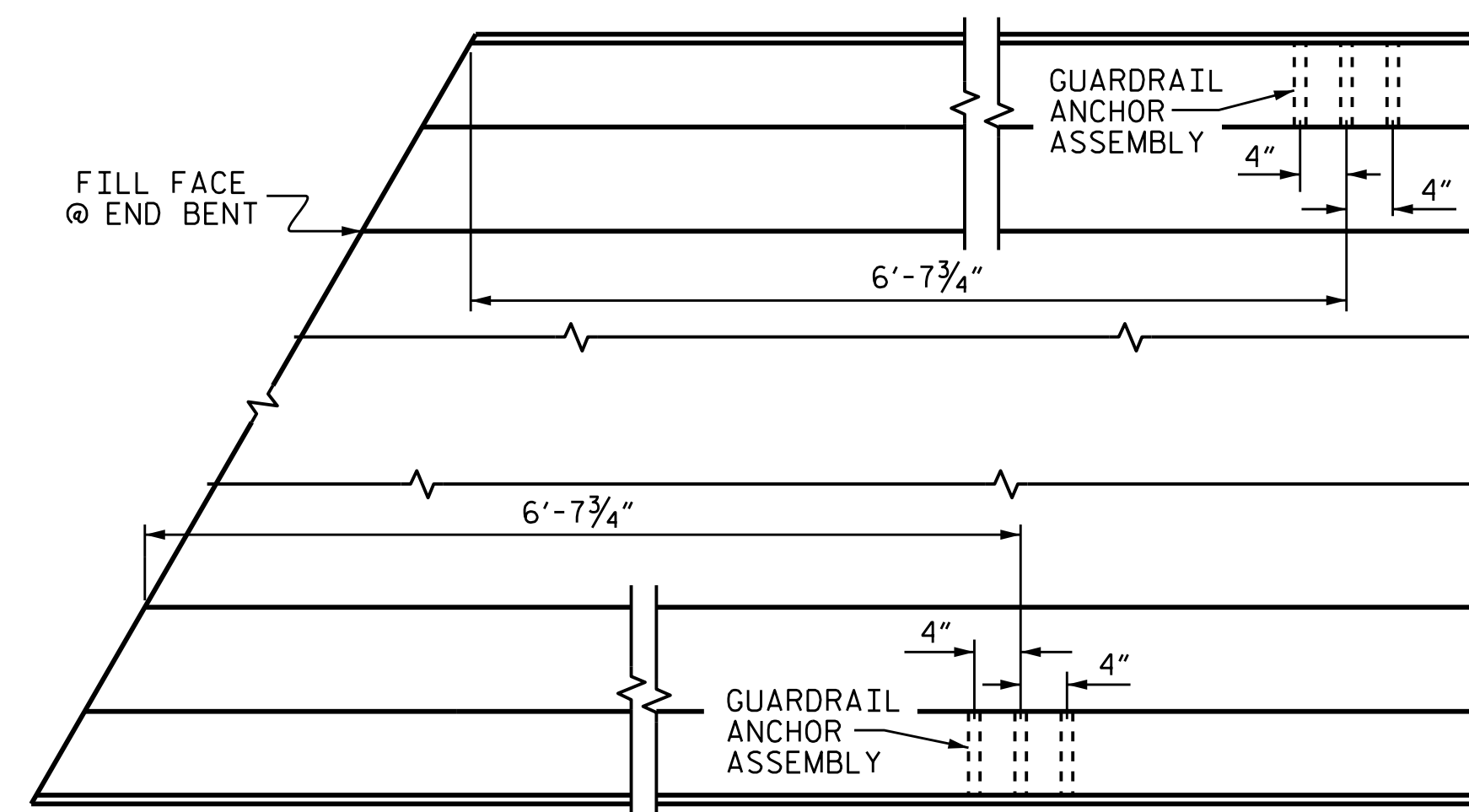
PLAN



ELEVATION



SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

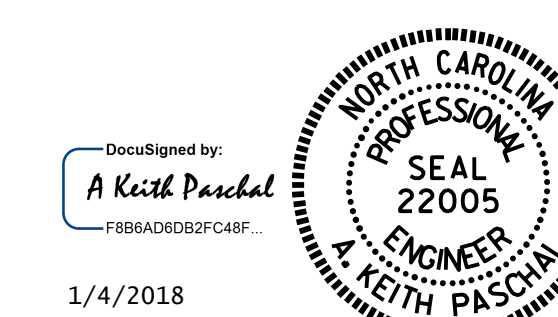
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL



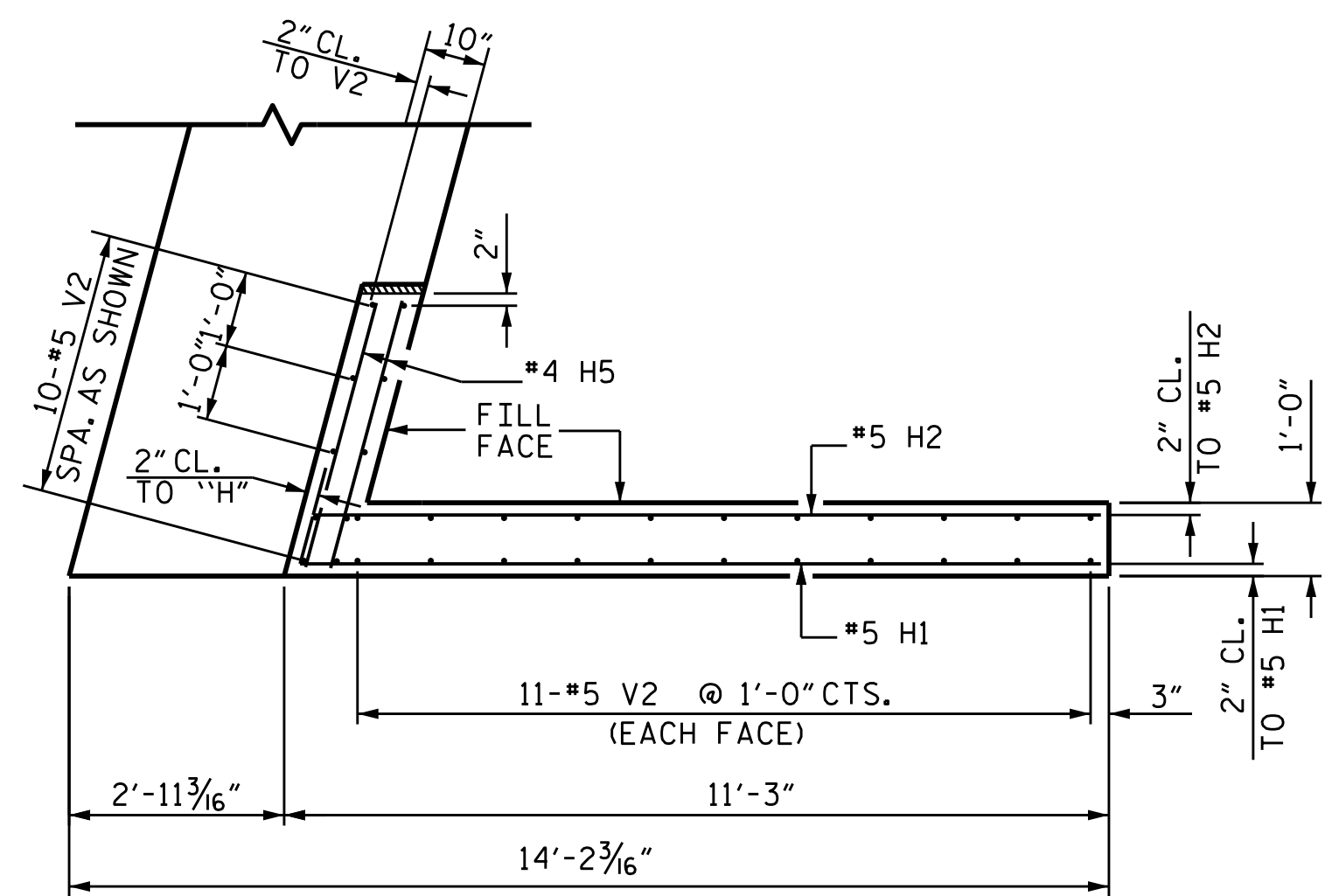
ASSEMBLED BY :	A. SORSENGINH	DATE :	2/2017
CHECKED BY :	M. G. CHEEK	DATE :	9/2017
DRAWN BY :	TLA 5/06	REV. 10/1/11	MAA/GM
CHECKED BY :	GM 5/06	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

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kpaschal

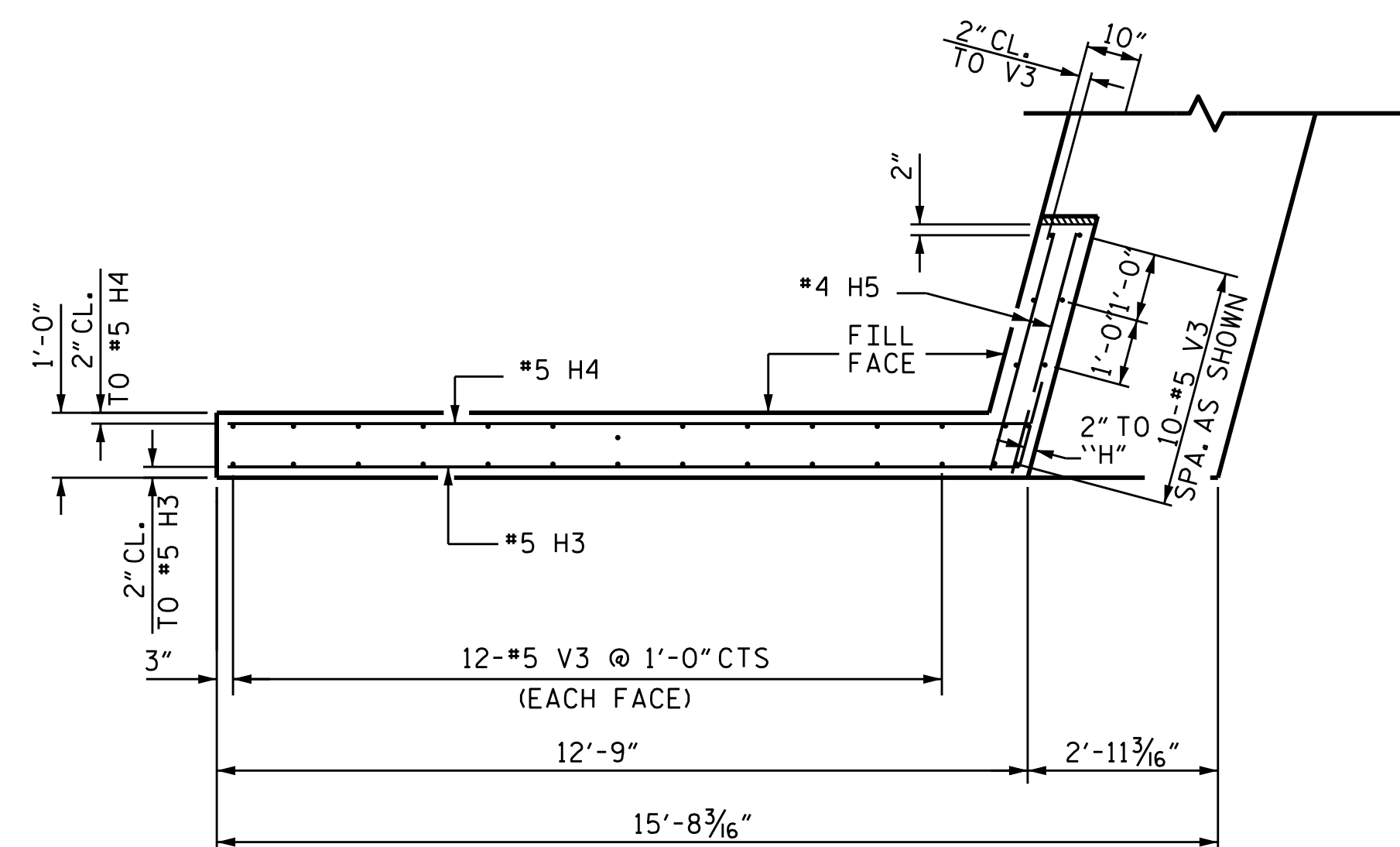
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2			4			29

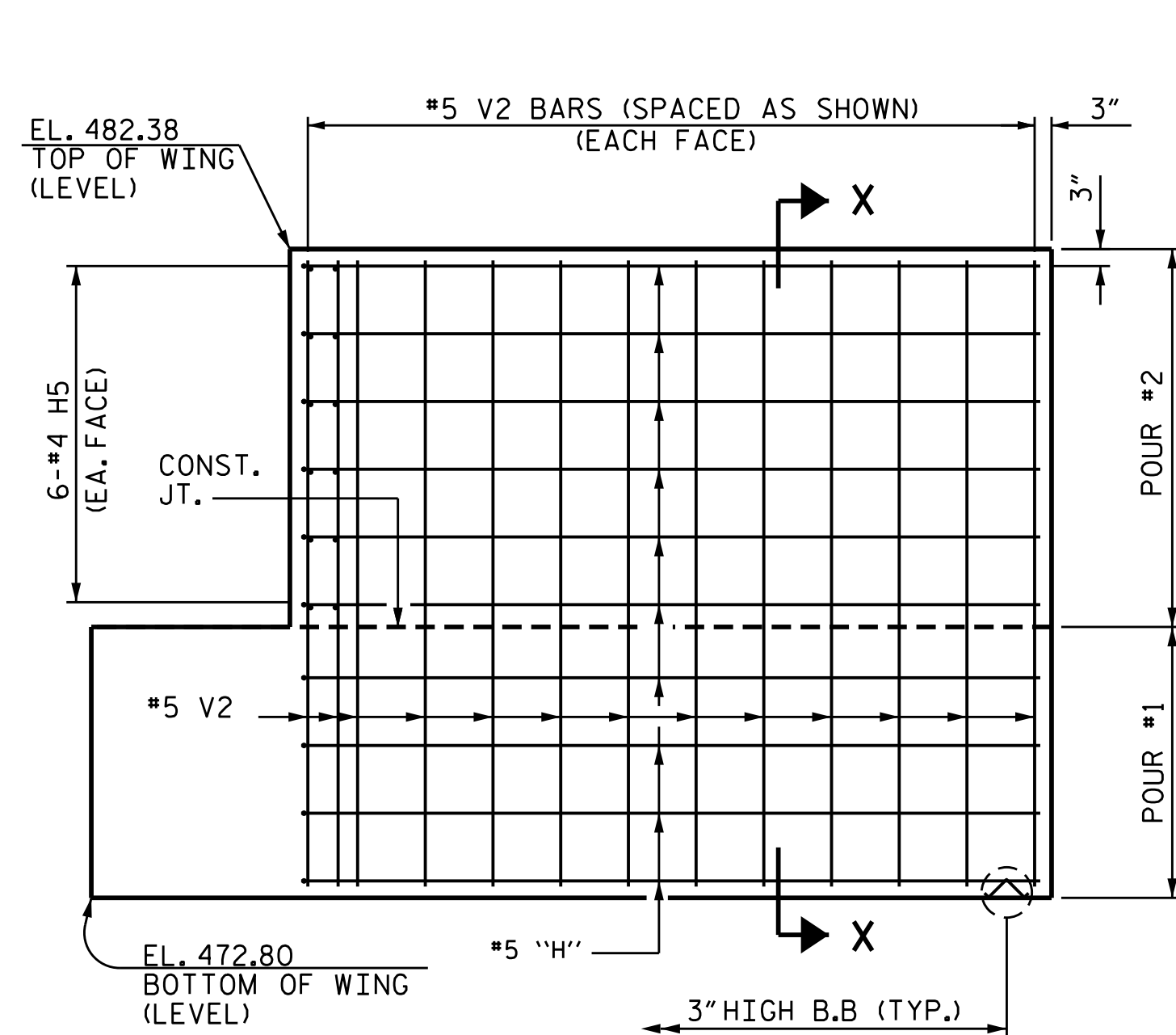
STD. NO. GRA2



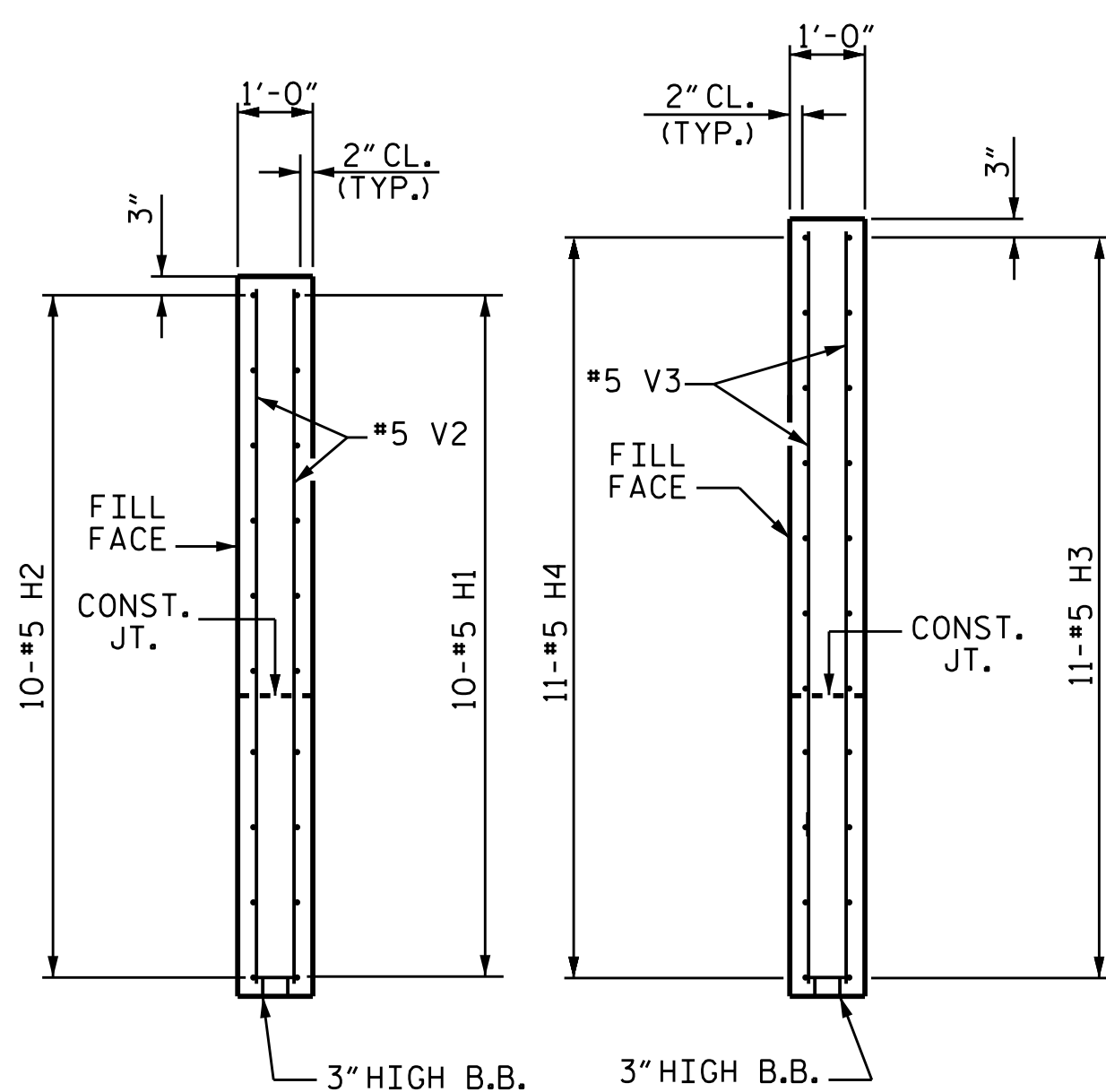
PLAN OF WING - W1



PLAN OF WING - W2

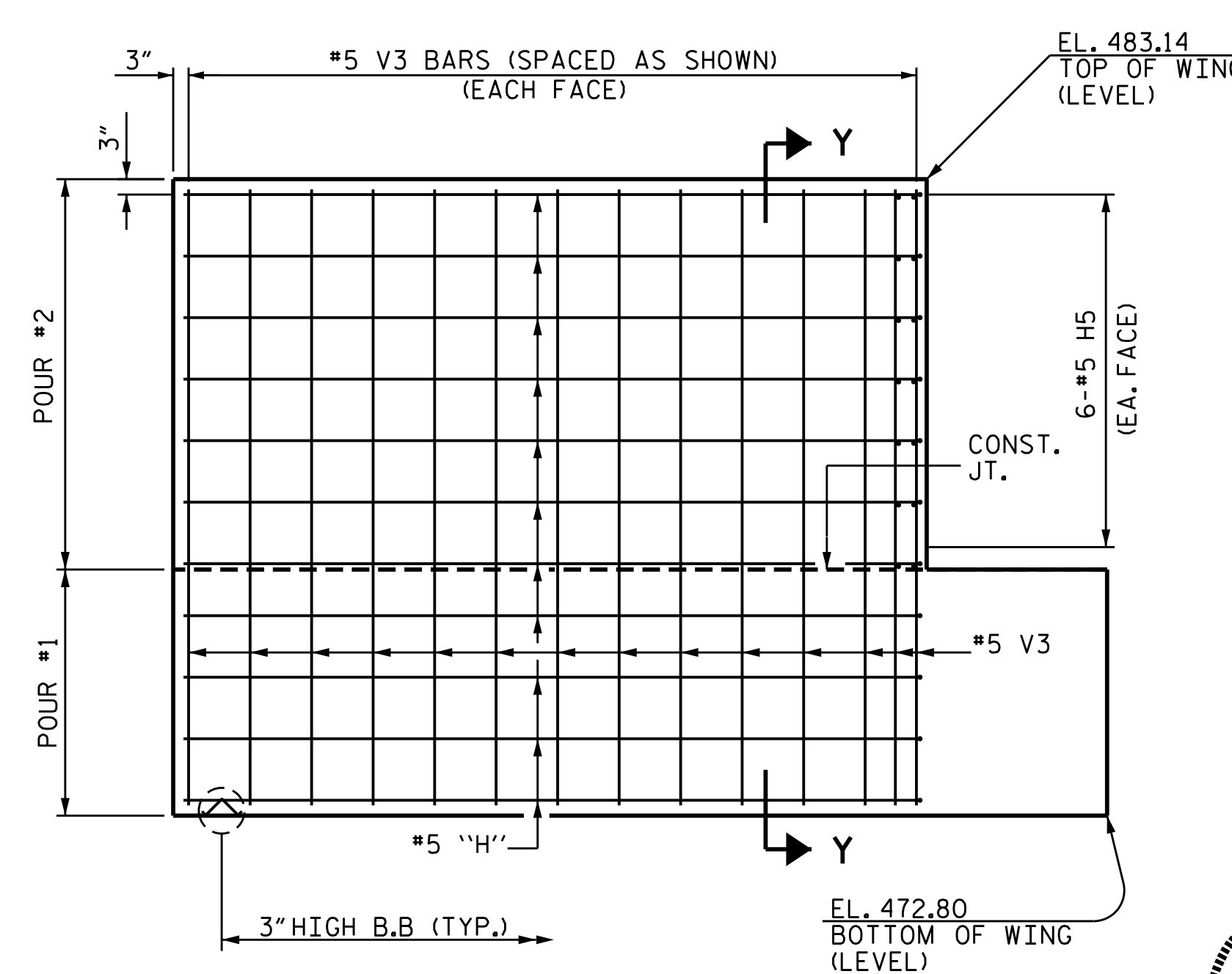


ELEVATION OF WING - W1



SECTION X-X

SECTION Y-Y



ELEVATION OF WING - W2

Designed by:
A Keith Paschal
Professional Engineer
F388408065FC48F
1/4/2018



PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 2 OF 3

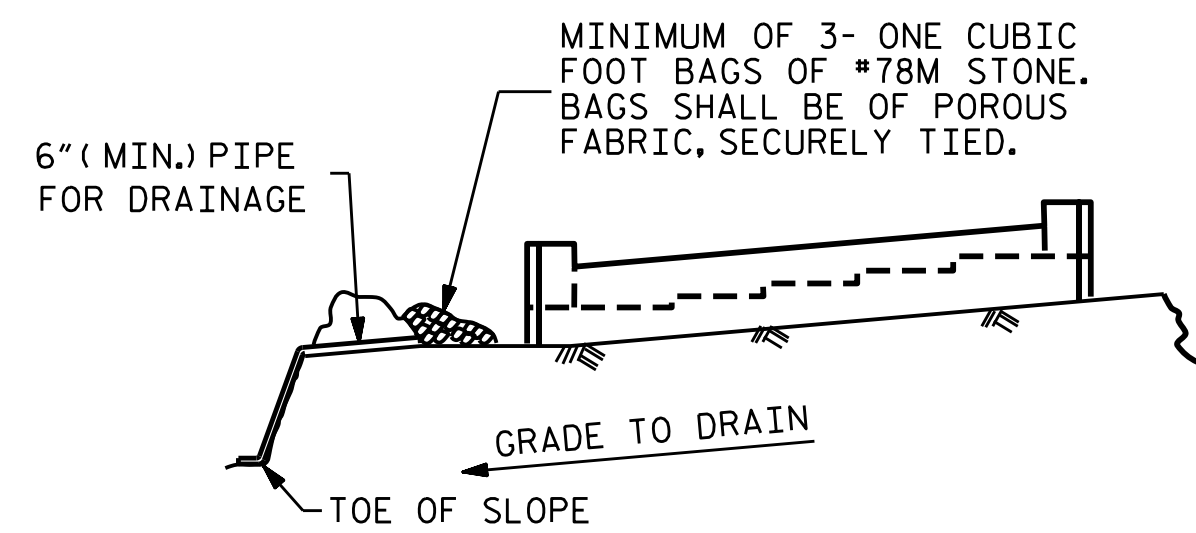
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT No. 1

DRAWN BY : M. POOLE DATE : 3-2017
CHECKED BY : G. KOUCHEKI DATE : 6-2017
DESIGN ENGINEER OF RECORD: H. LOCKLEAR DATE : 6-2017

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FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			29

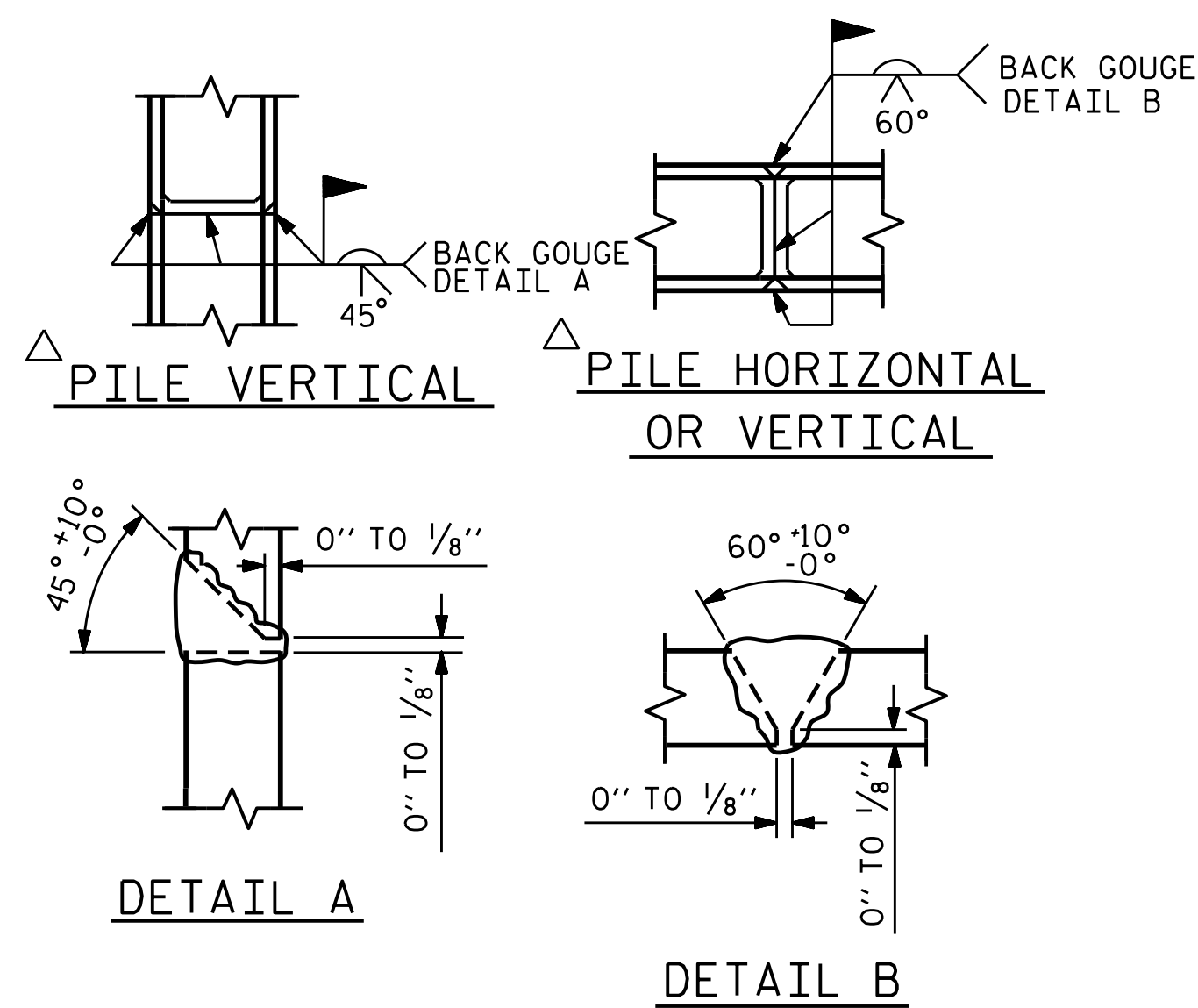


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

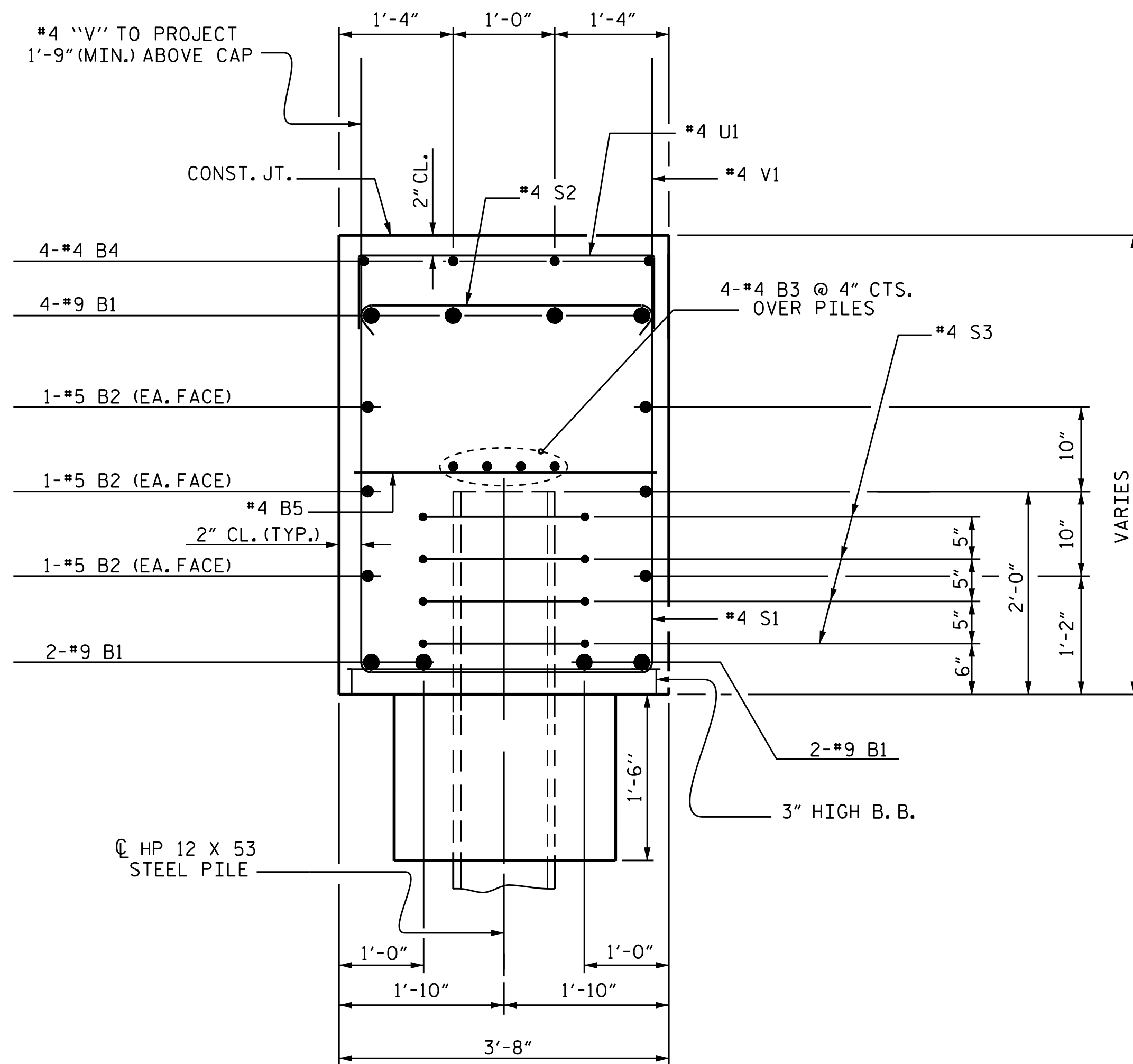
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

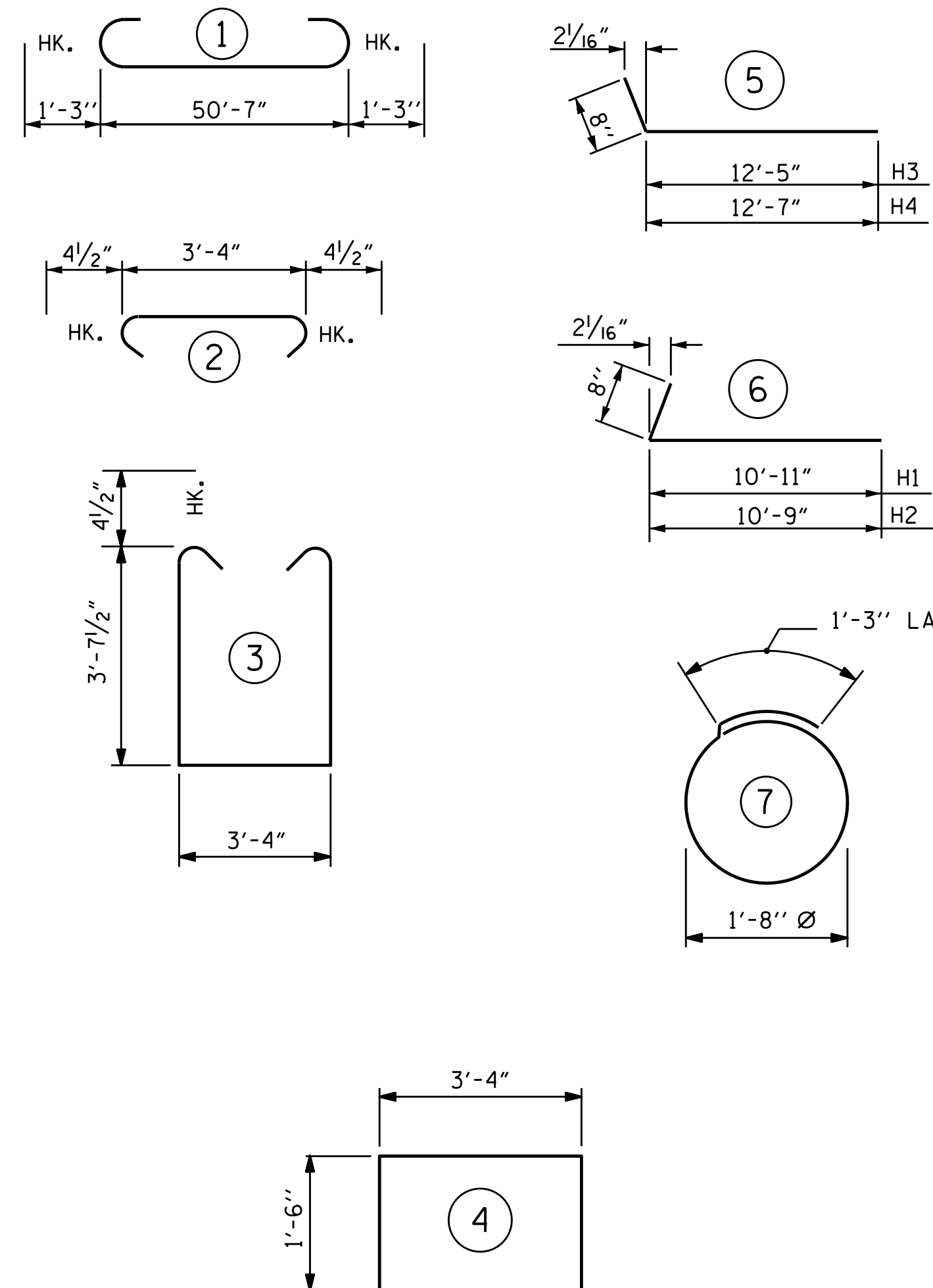


SECTION A-A

DRAWN BY : M. POOLE DATE : 3-2017
 CHECKED BY : G. KOUCHEKI DATE : 6-2017
 DESIGN ENGINEER OF RECORD: H. LOCKLEAR DATE : 6-2017

03-JAN-2018 11:10 E:\TIP\Projects-B\B5371\Structures\Final Plans\401.045.B5371.SMU. E1.3.021.890071.dgn kpaschal

BAR TYPES



BILL OF MATERIAL

END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	53'-1"	1444
B2	6	5	STR	50'-9"	318
B3	8	4	STR	26'-8"	143
B4	4	4	STR	20'-8"	55
B5	13	4	STR	3'-4"	29
H1	10	5	6	11'-7"	121
H2	10	5	6	11'-5"	119
H3	11	5	5	13'-1"	150
H4	11	5	5	13'-3"	152
H5	24	4	STR	4'-3"	68
S1	59	4	3	11'-4"	447
S2	59	4	2	4'-1"	161
S3	48	4	7	6'-6"	208
U1	16	4	4	6'-4"	68
V1	64	4	STR	5'-3"	224
V2	32	5	STR	9'-2"	306
V3	34	5	STR	9'-11"	352

REINFORCING STEEL 4365 LBS.

CLASS A CONCRETE
 POUR #1 : CAP, BOTTOM PORTION OF WINGS & COLLARS 35.7 C.Y.
 POUR #2 : TOP PORTION OF WINGS 6.2 C.Y.
 TOTAL 41.9 C.Y.

HP 12 X 53 STEEL PILES
 NO.: 12 240 LIN. FT.

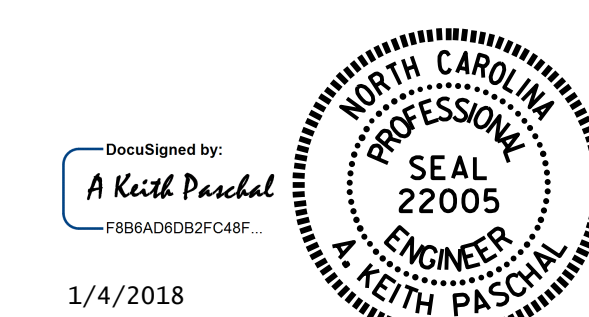
PILE DRIVING EQUIPMENT
 SETUP FOR HP 12 X 53
 STEEL PILES No.: 12

PROJECT NO. B-5371
 UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

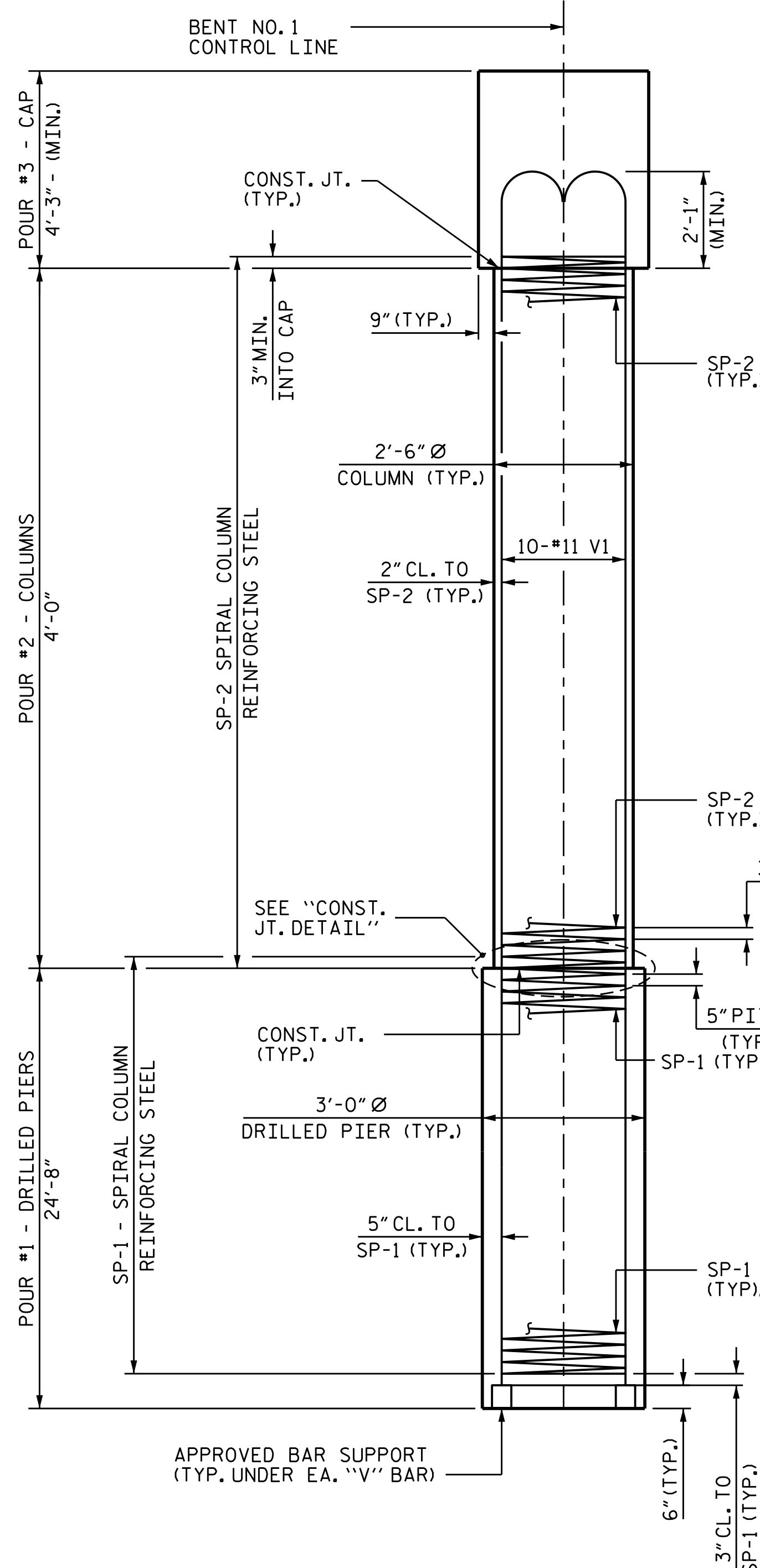
SUBSTRUCTURE
 INTEGRAL
 END BENT No. 1



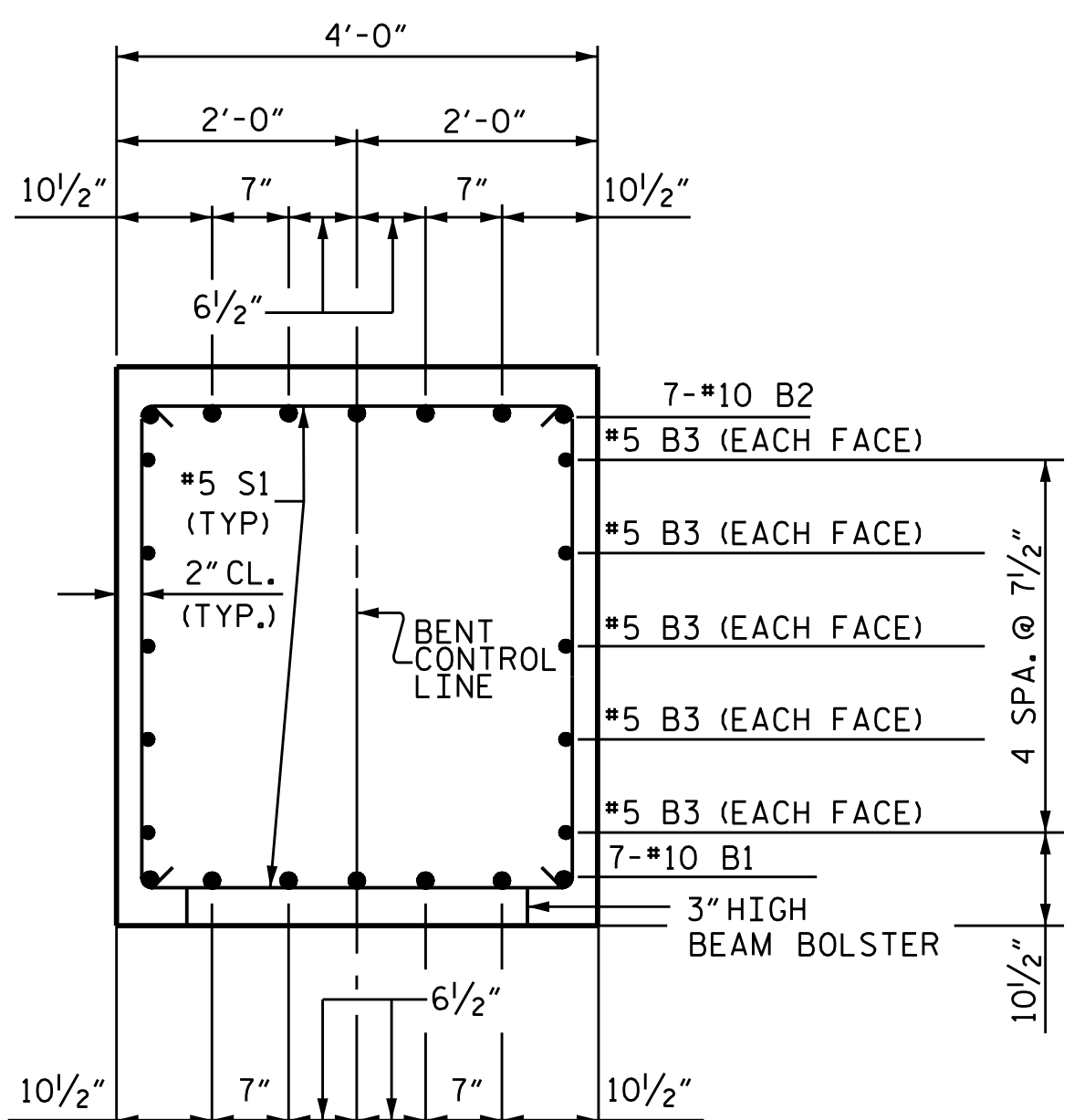
1/4/2018

DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

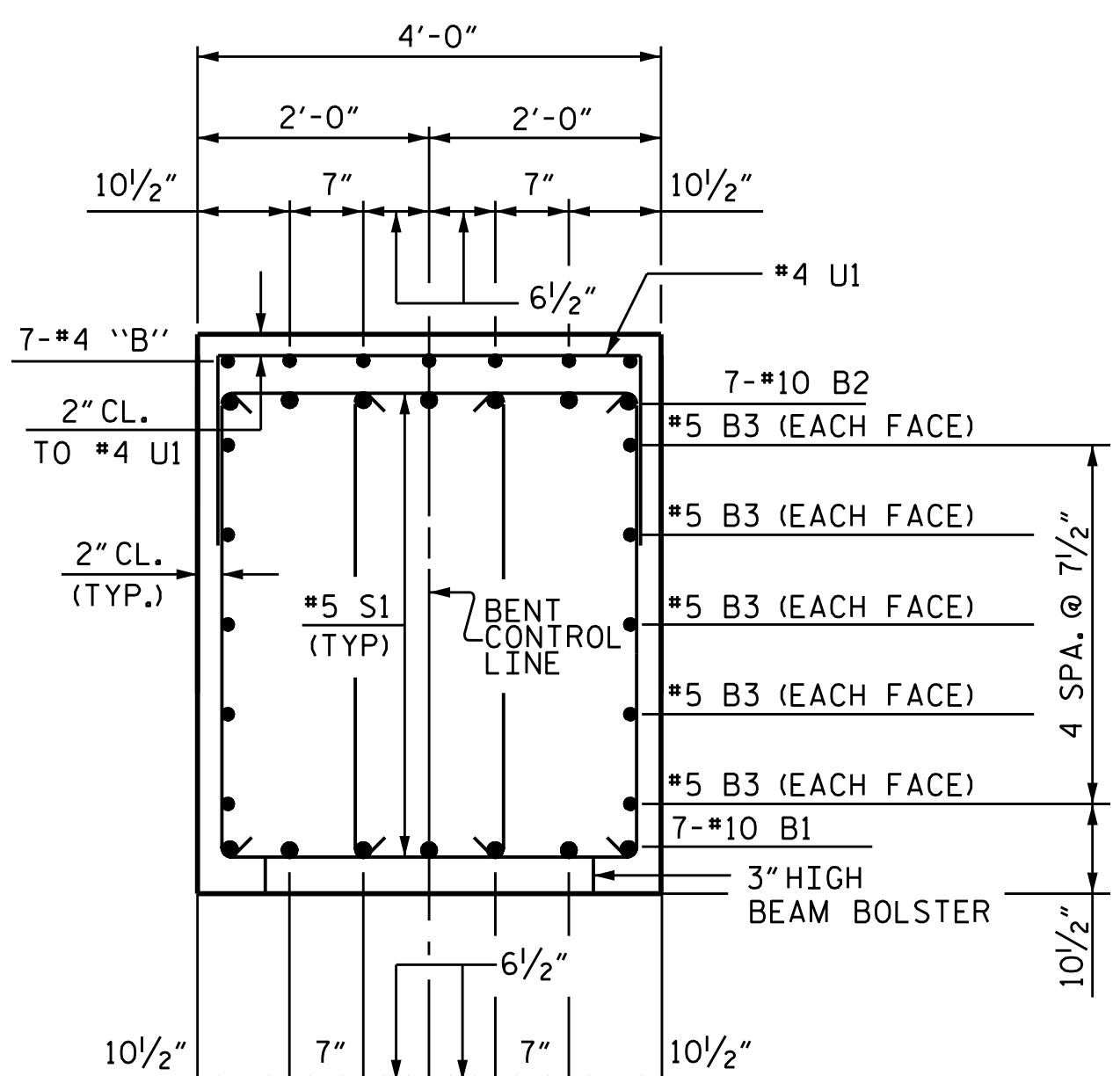
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS 29
2			4			



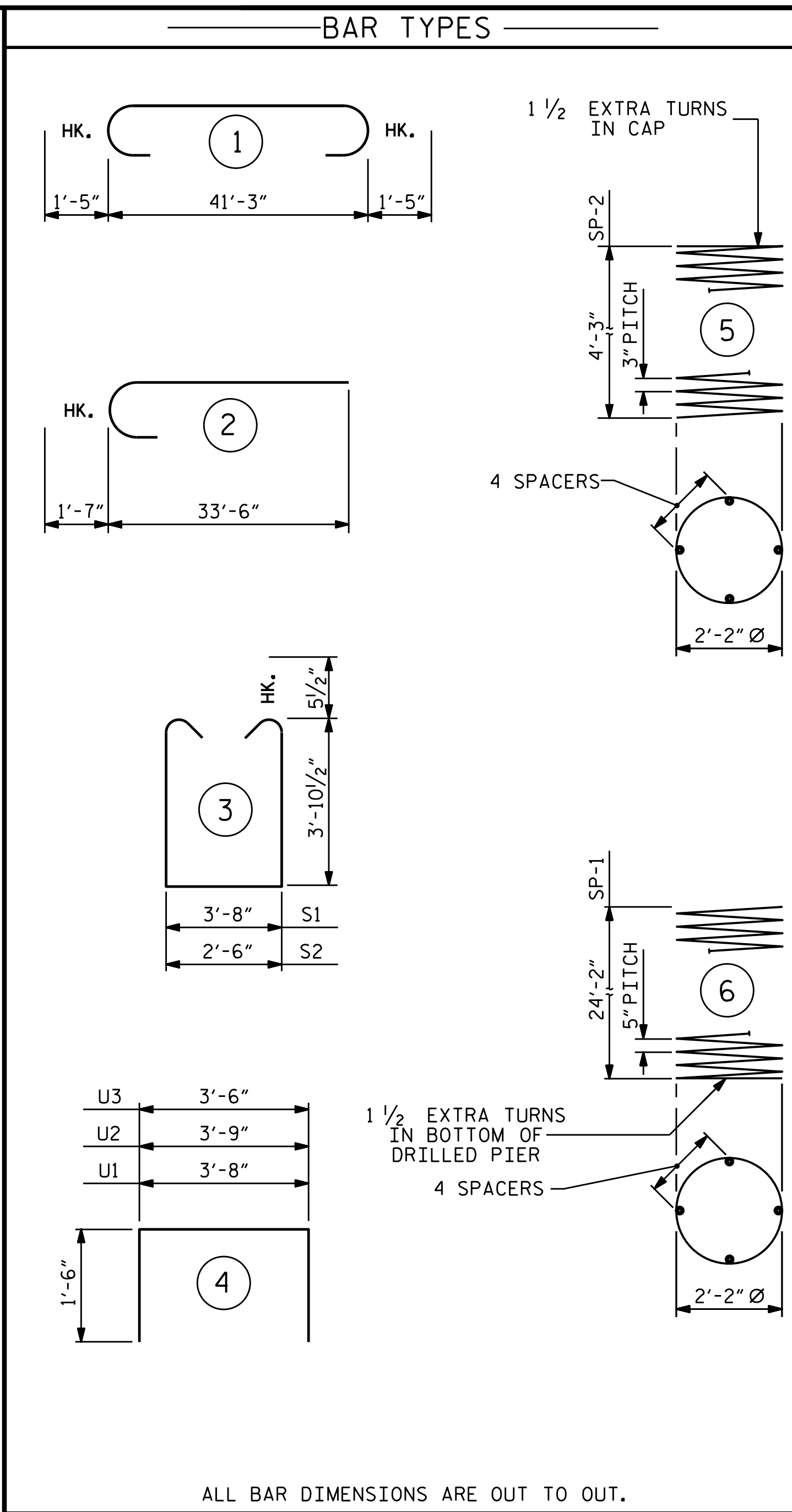
END OF CAP ELEVATION
(TYP. EA. END)



SECTION A-A



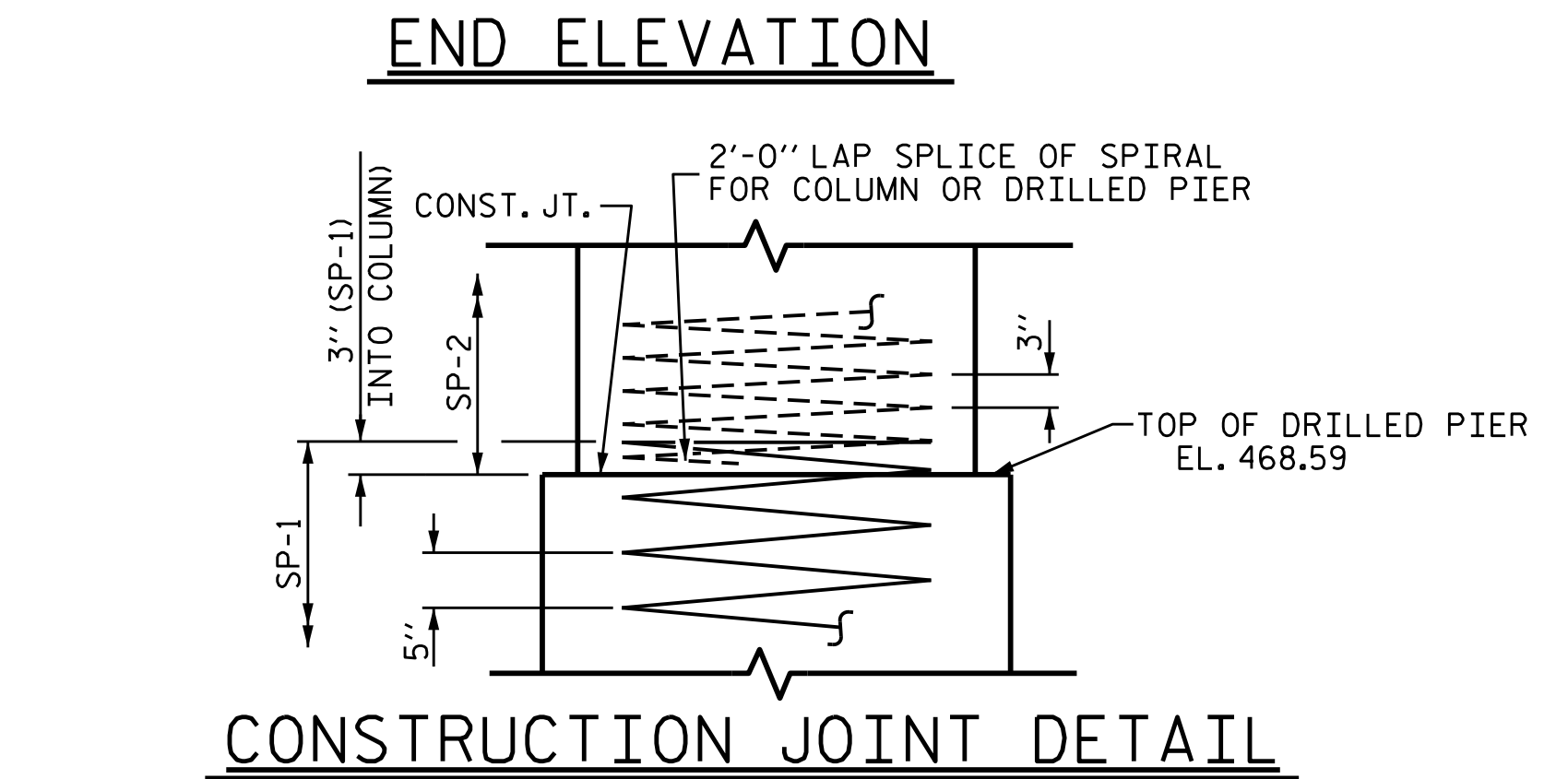
SECTION B-B



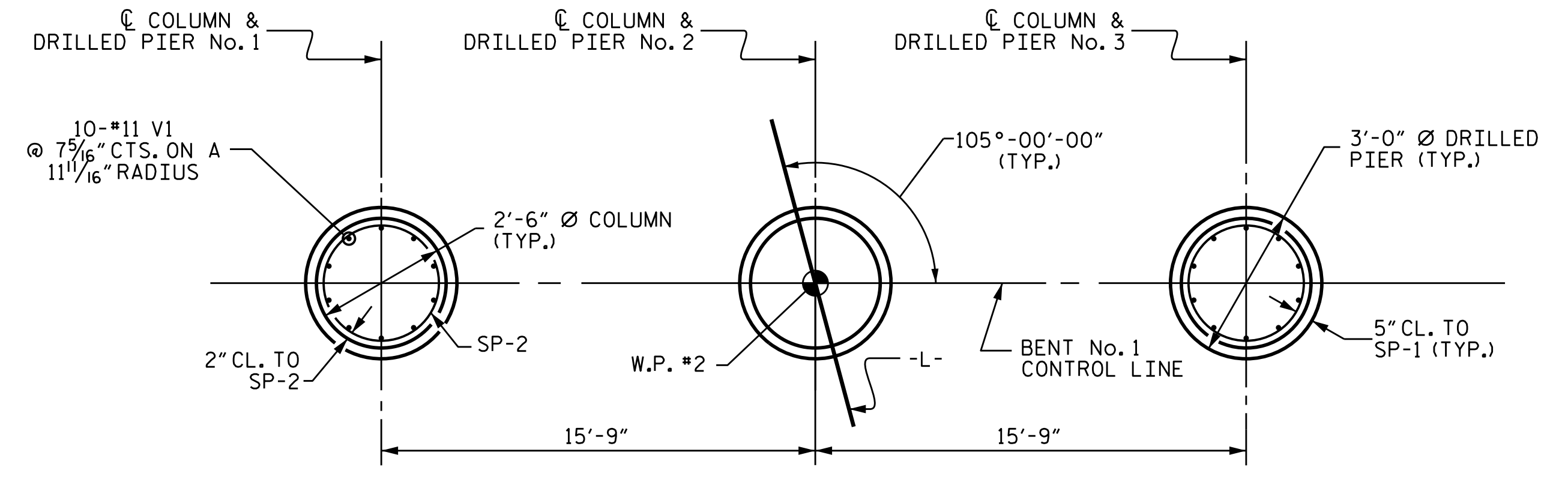
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
BENT No. 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#10	STR	41'-5"	1248
B2	7	#10	1	44'-1"	1328
B3	10	#5	STR	41'-5"	432
B4	14	#4	STR	12'-4"	115
B5	7	#4	STR	4'-2"	19
S1	36	#5	3	12'-4"	463
S2	36	#5	3	11'-2"	419
U1	44	#4	4	6'-8"	196
U2	8	#4	4	6'-9"	36
U3	8	#4	4	6'-6"	35
V1	30	#11	2	35'-1"	5592
REINFORCING STEEL					9883 LBS.
SPIRAL COLUMN REINFORCING STEEL					
SP-1	3	**	6	397'-9"	1245
SP-2	3	*	5	123'-8"	248
TOTAL SPIRAL COLUMN REINFORCING STEEL					1493 LBS.
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
*** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					

CLASS A CONCRETE BREAKDOWN	
POUR #2 - COLUMNS	2.2 CU. YDS.
POUR #3 - CAP	28.0 CU. YDS.
TOTAL CLASS A CONCRETE	30.2 CU. YDS.
DRILLED PIERS:	
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	19.4 CU. YDS.
3'-0" Ø DRILLED PIERS IN SOIL	31.00 LIN. FT.
3'-0" Ø DRILLED PIERS NOT IN SOIL	43.00 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIERS	28.80 LIN. FT.
CSL TUBES	326.00 LIN. FT.



CONSTRUCTION JOINT DETAIL



PLAN OF DRILLED PIERS & COLUMNS
(REINFORCING STEEL IS TYPICAL FOR EACH COLUMN & DRILLED PIER)

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE BENT NO. 1



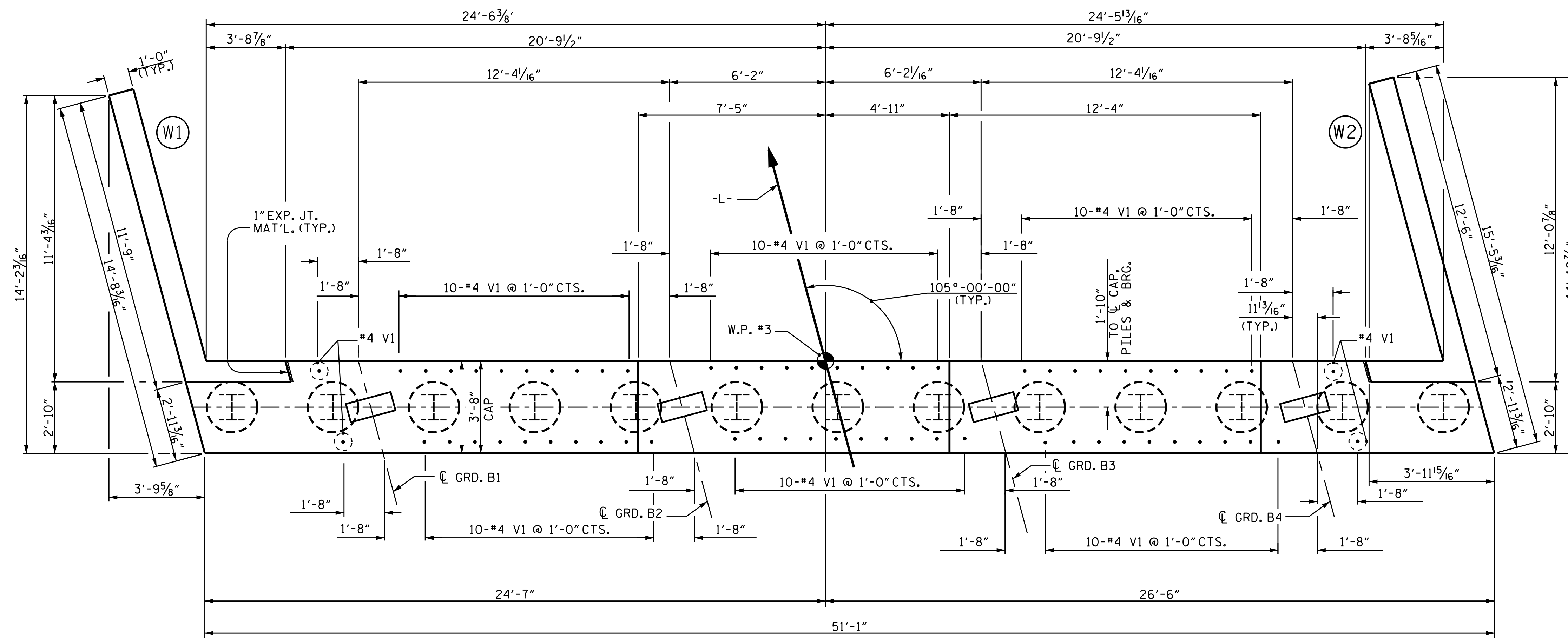
DocuSigned by:
A Keith Paschal
F8B6A0D065FC68F
1/4/2018

DRAWN BY: H.A. LOCKLEAR DATE: 10-17
CHECKED BY: M.G. CHEEK DATE: 10-17
DESIGN ENGINEER OF RECORD: E.K. POPE DATE: 10-17

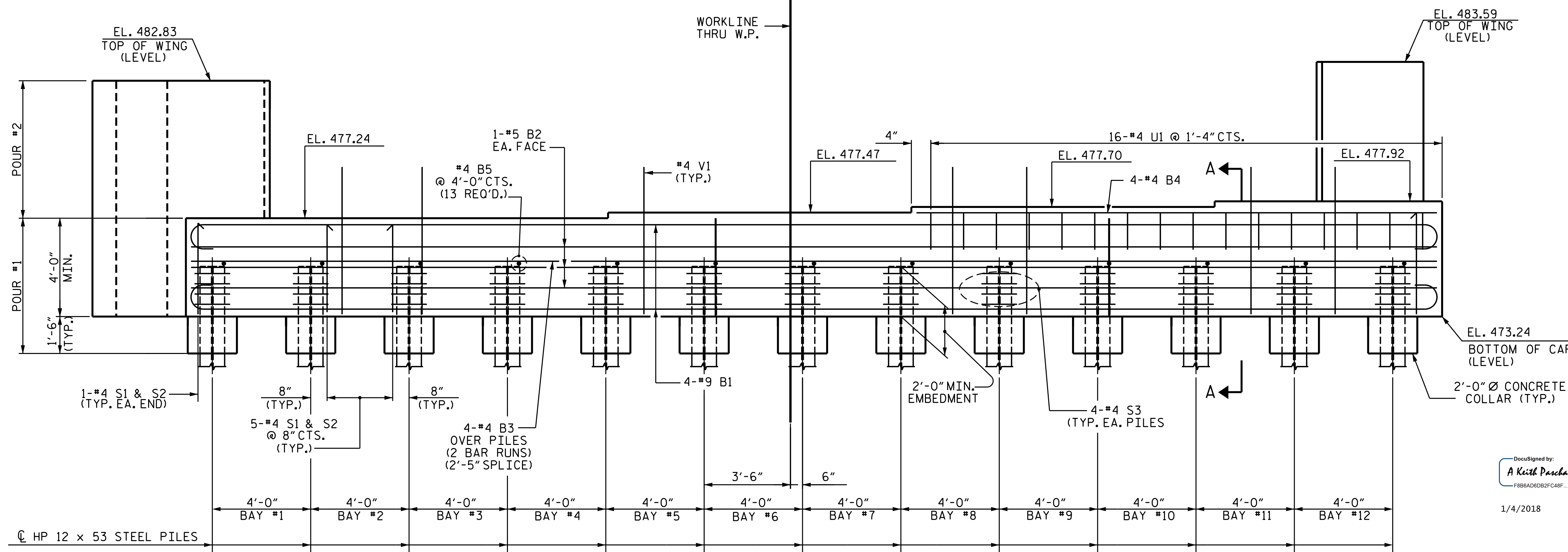
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS 29
2			4			

NOTES

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



PLAN



ELEVATION

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

PROJECT NO. B-5371
 UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 INTEGRAL
 END BENT No. 2

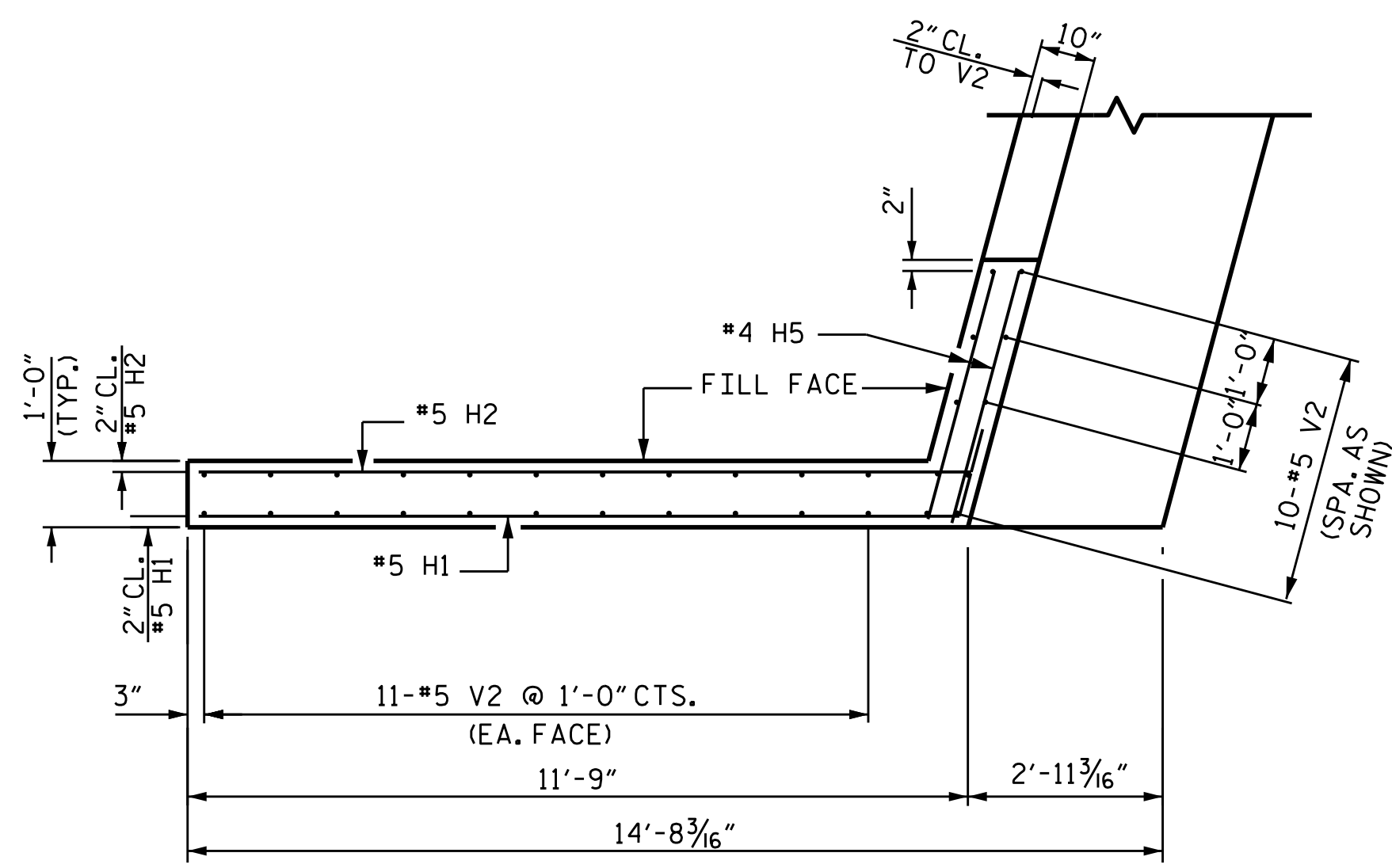


DocuSigned by:
 A Keith Paschal
 F5B8A0D865FC86F
 1/4/2018

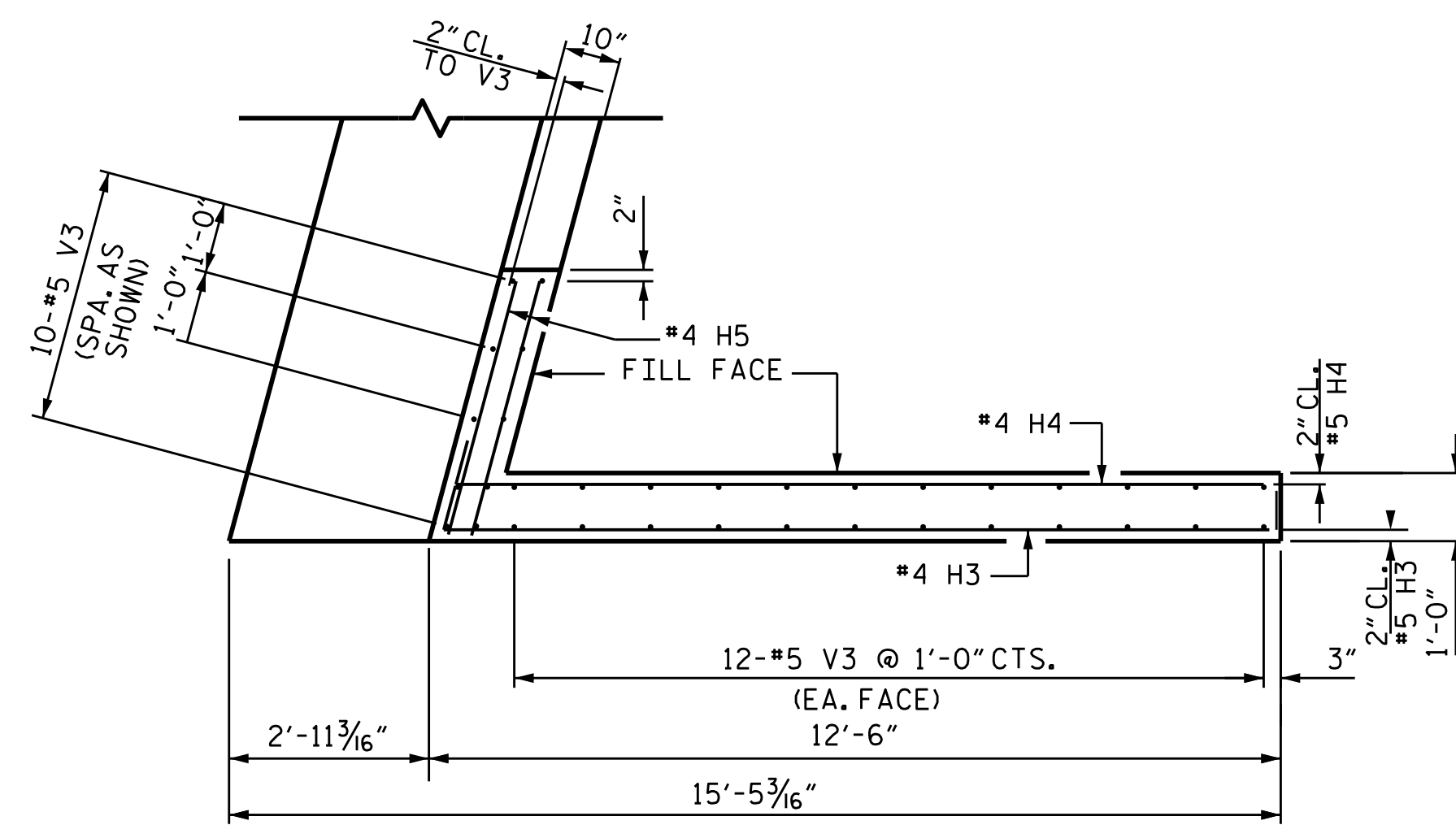
DRAWN BY: H.A. LOCKLEAR DATE: 3/2017
 CHECKED BY: G. KOUCHEKI DATE: 6/2017
 DESIGN ENGINEER OF RECORD: H. LOCKLEAR DATE: 6/2017

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

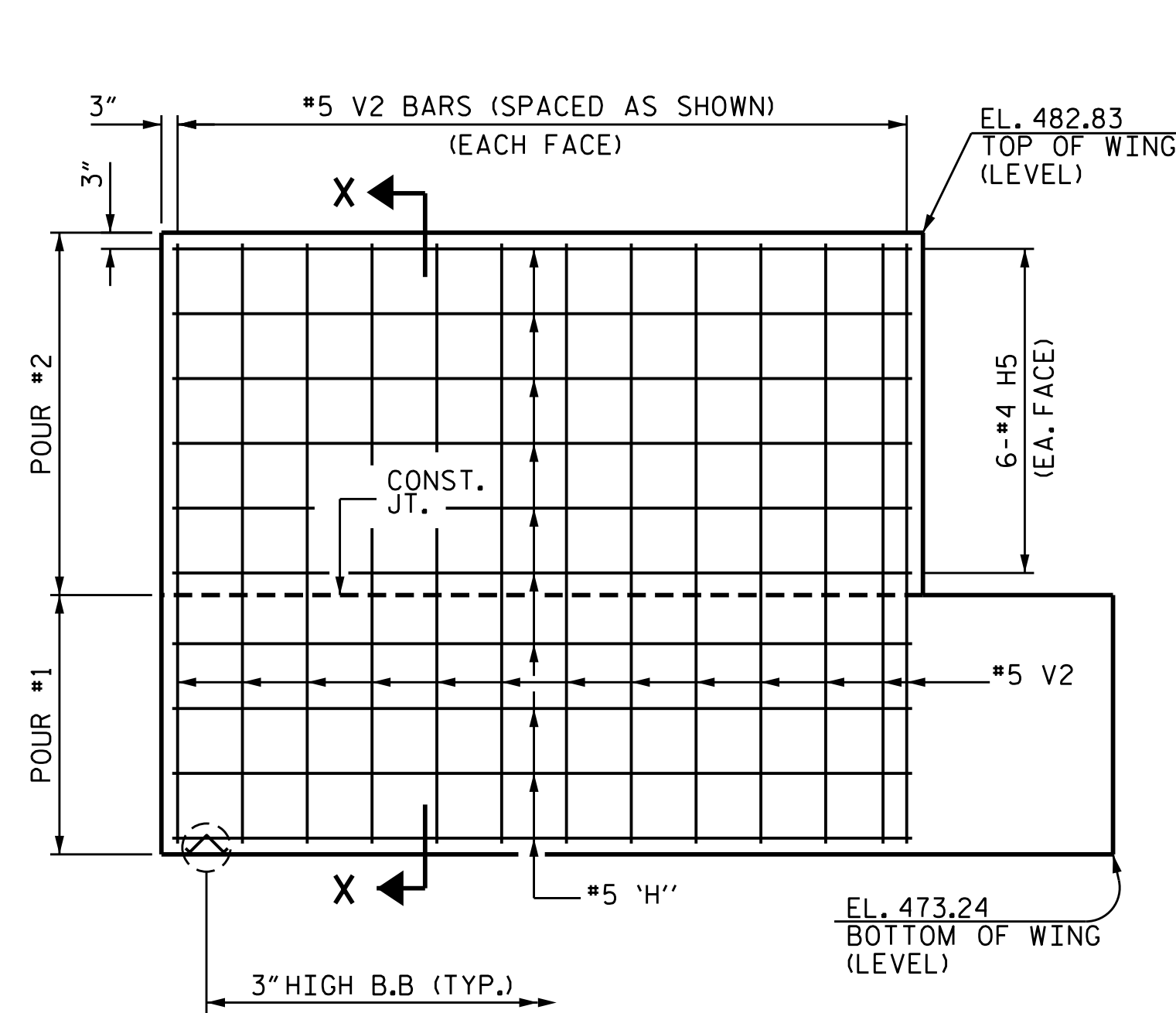
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			29



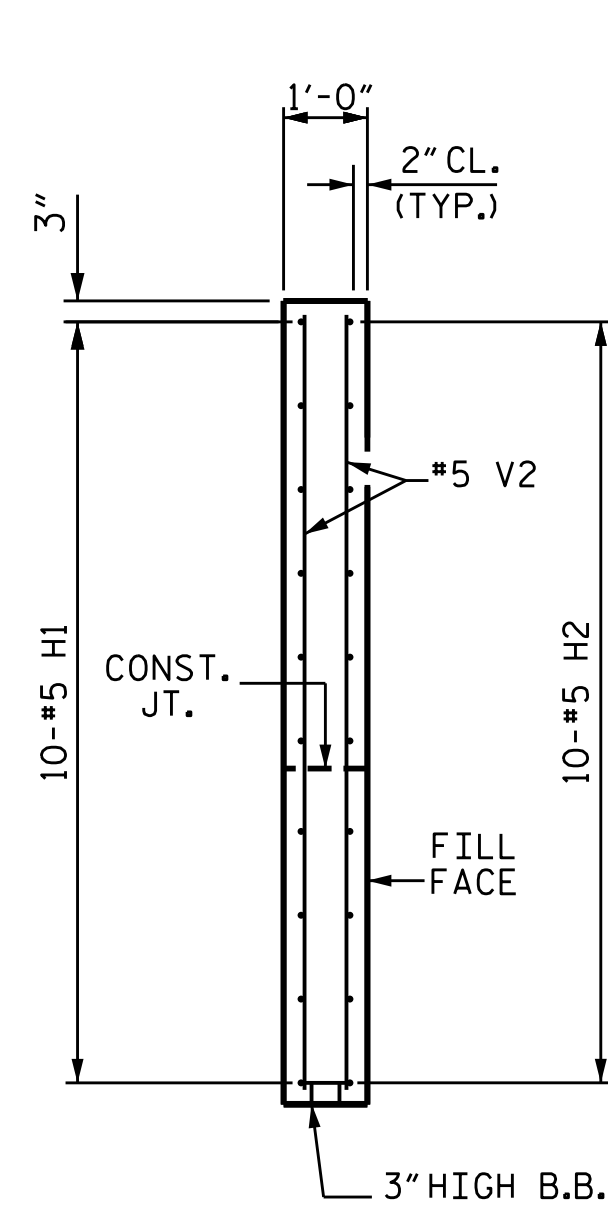
PLAN OF WING - W1



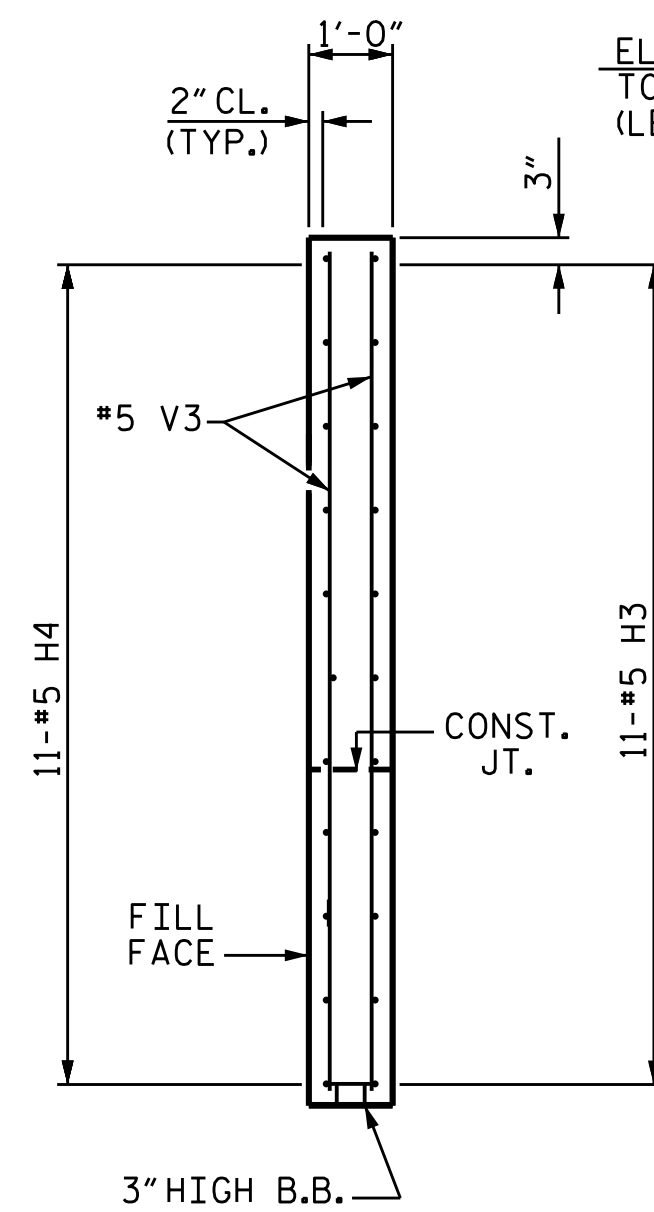
PLAN OF WING - W2



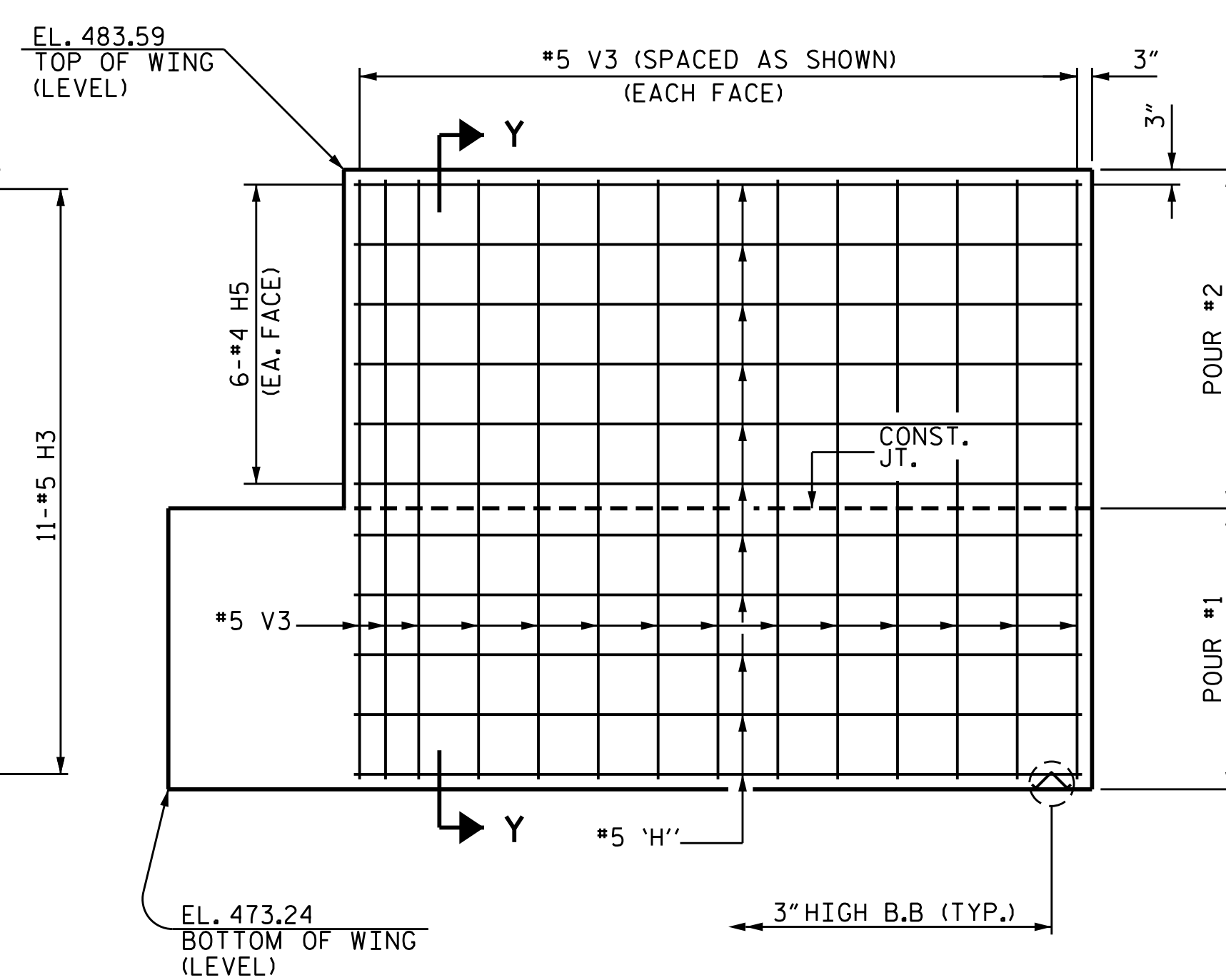
ELEVATION OF WING - W1



SECTION X-X



SECTION Y-Y



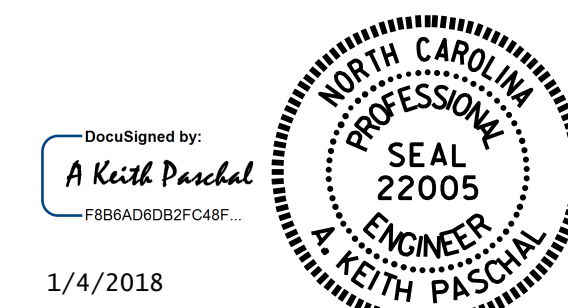
ELEVATION OF WING - W2

PROJECT NO. B-5371
UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 INTEGRAL
 END BENT No. 2

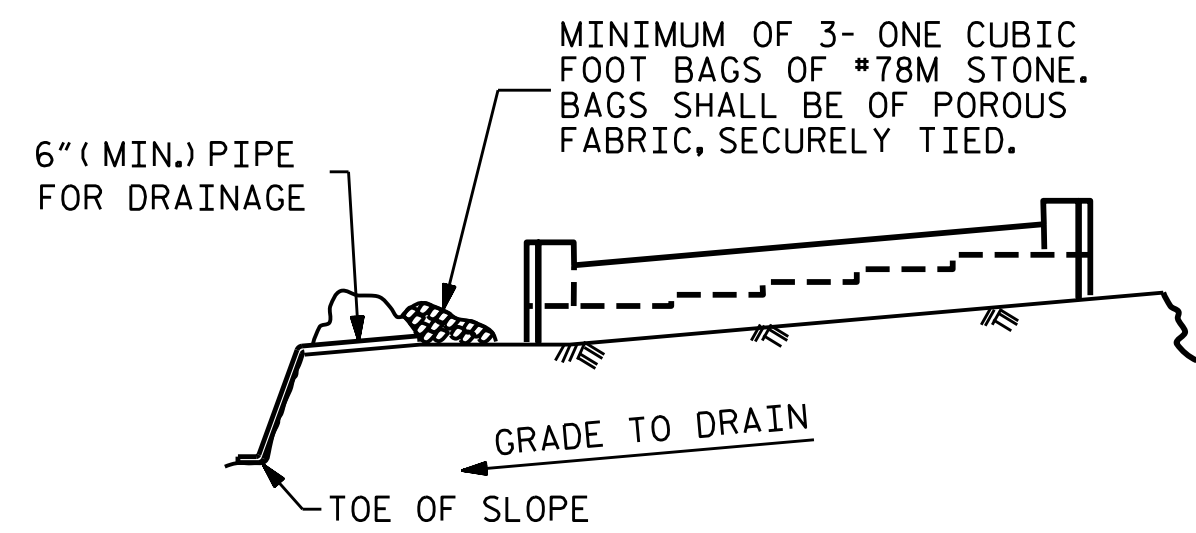


1/4/2018

DRAWN BY : M. POOLE DATE : 3-2017
 CHECKED BY : G. KOUCHEKI DATE : 6-2017
 DESIGN ENGINEER OF RECORD: H. LOCKLEAR DATE : 6-2017

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			29

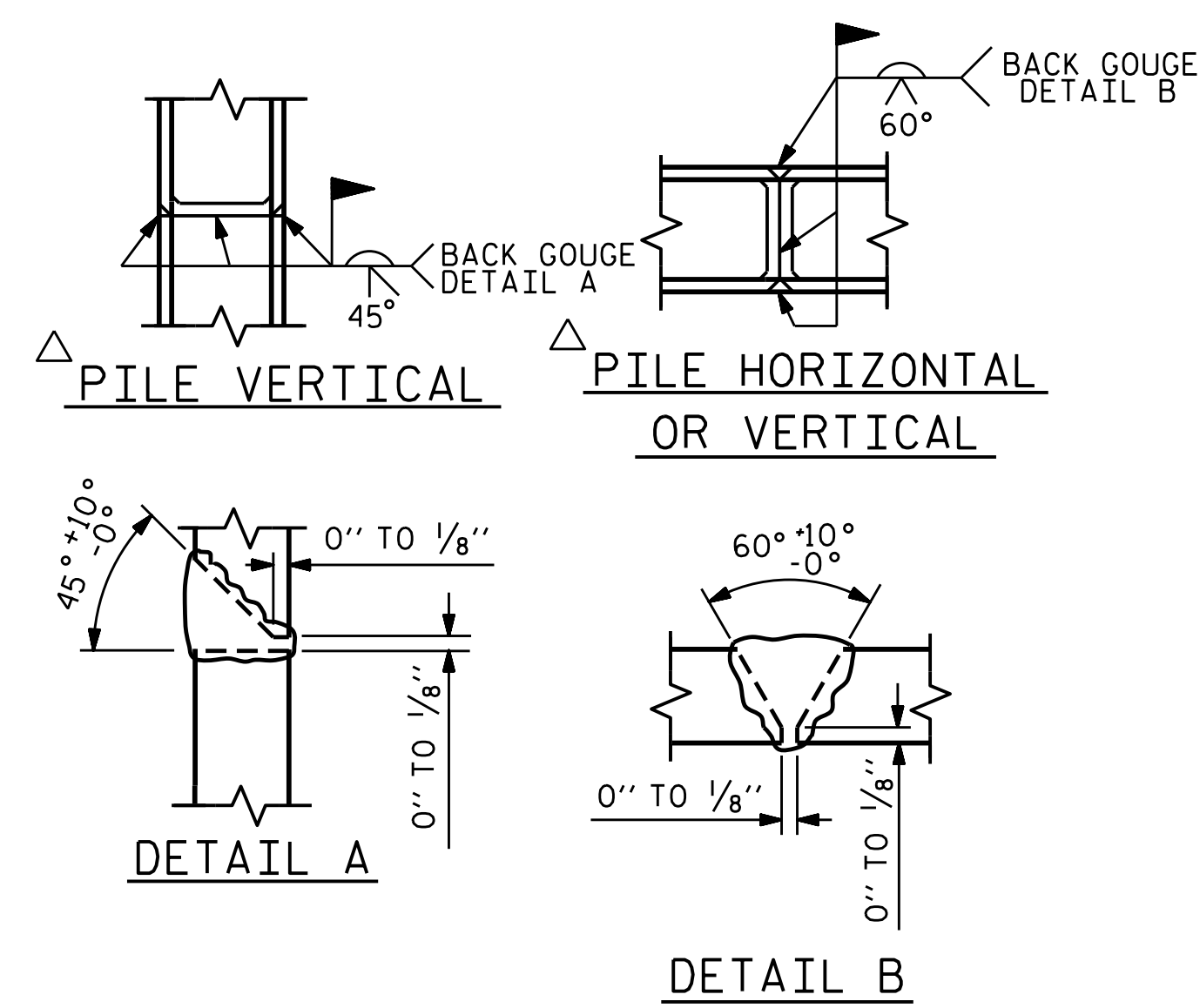


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

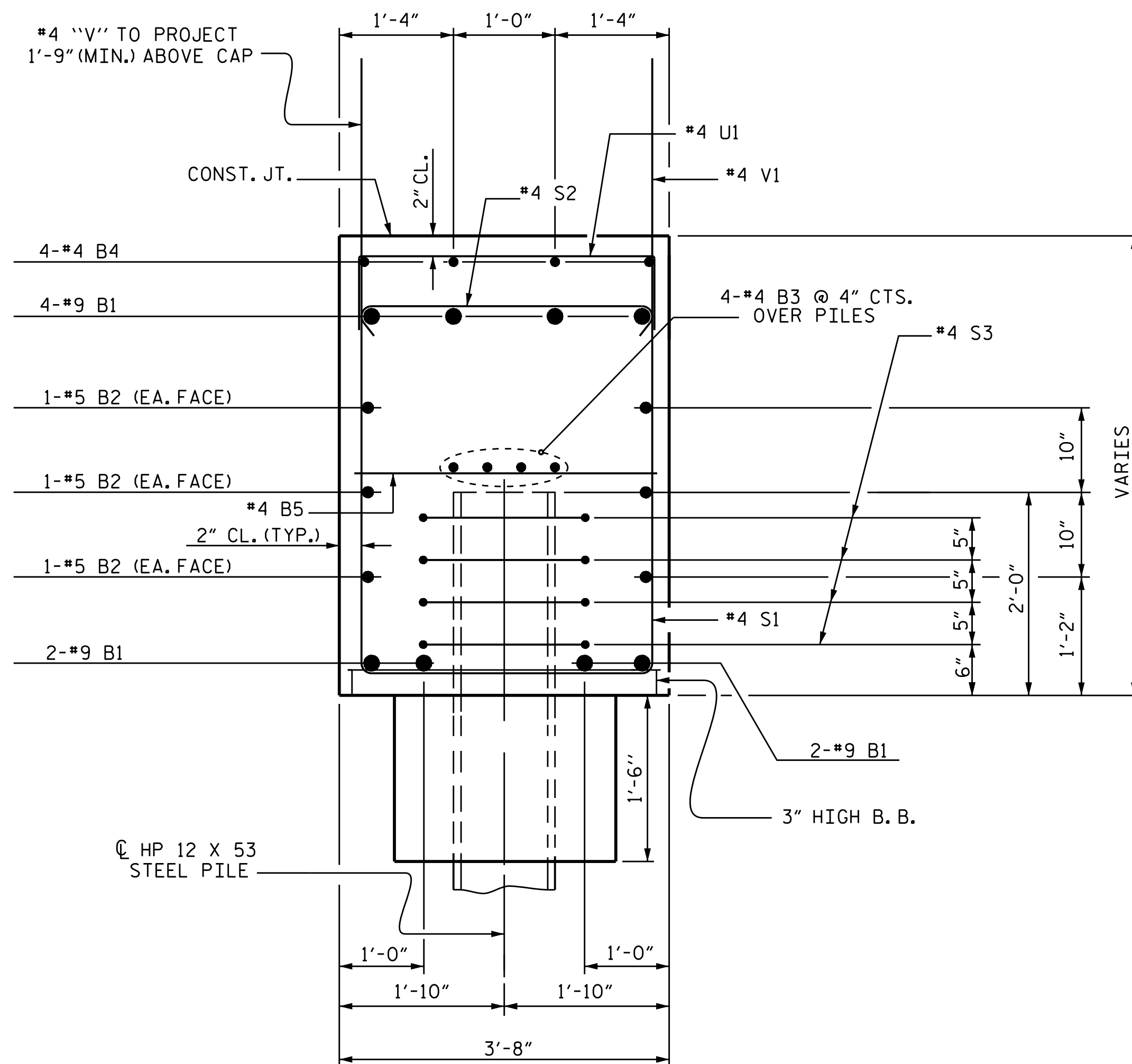
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

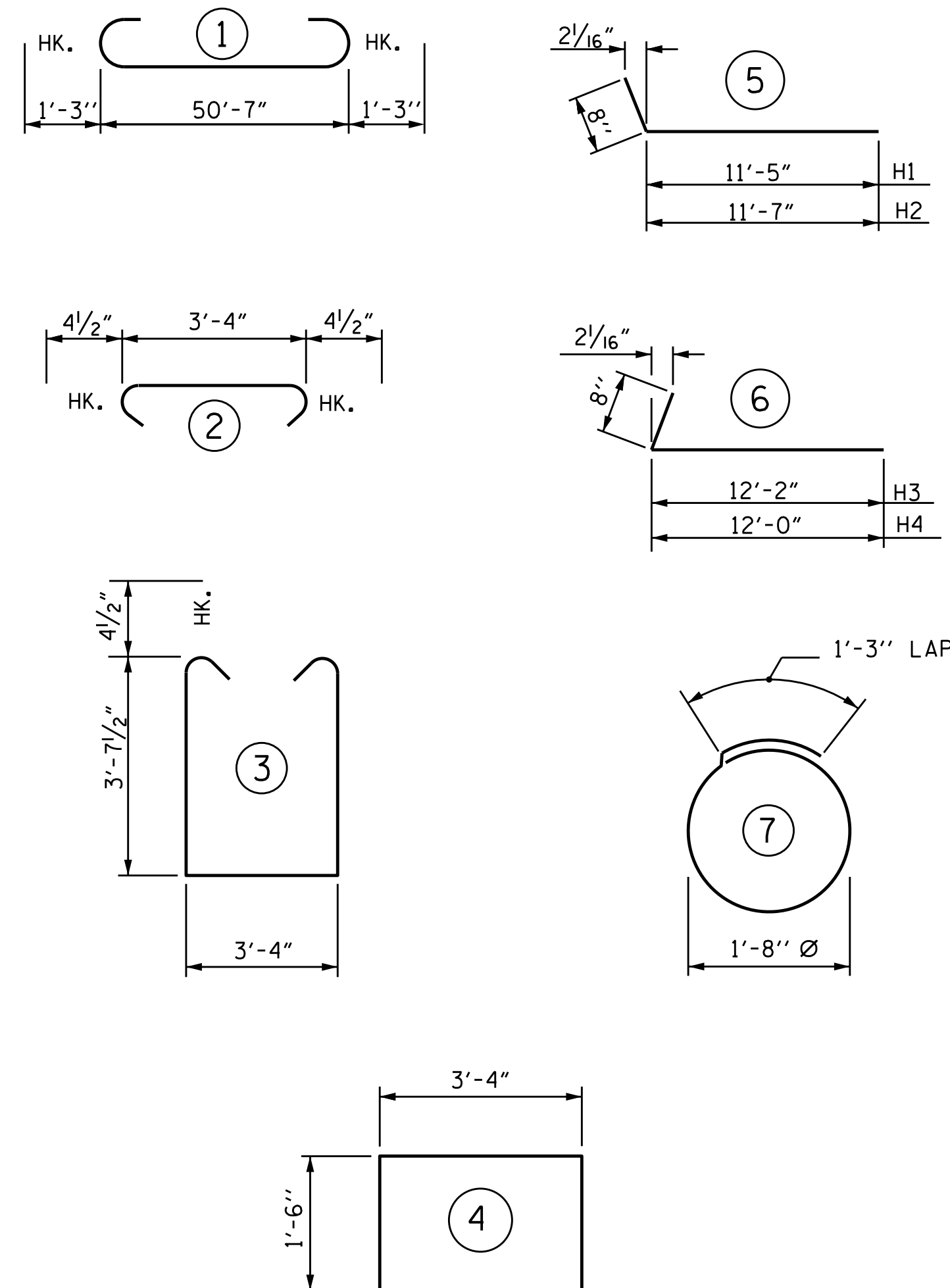


SECTION A-A

DRAWN BY : M. POOLE DATE : 3-2017
 CHECKED BY : G. KOUCHEKI DATE : 6-2017
 DESIGN ENGINEER OF RECORD : H. LOCKLEAR DATE : 6-2017

03-JAN-2018 11:10
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 kpaschal

BAR TYPES



BILL OF MATERIAL

END BENT No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9		53'-1"	1444
B2	6	5	STR	50'-9"	318
B3	8	4	STR	26'-8"	143
B4	4	4	STR	20'-3"	54
B5	13	4	STR	3'-4"	29
H1	10	5		12'-1"	126
H2	10	5		12'-3"	128
H3	11	5		12'-10"	147
H4	11	5		12'-8"	145
H5	24	4	STR	4'-3"	68
S1	62	4	3	11'-4"	469
S2	62	4	2	4'-1"	169
S3	52	4	7	6'-6"	226
U1	16	4	4	6'-4"	68
V1	64	4	STR	5'-3"	224
V2	32	5	STR	9'-2"	306
V3	34	5	STR	9'-11"	352
REINFORCING STEEL					4416 LBS.
CLASS A CONCRETE					
POUR #1 : CAP, BOTTOM PORTION OF WINGS & COLLARS 36.4 C.Y.					
POUR #2 : TOP PORTION OF WINGS 6.2 C.Y.					
TOTAL					42.6 C.Y.
HP 12 X 53 STEEL PILES					
NO.: 13					195 LIN. FT.
PILE DRIVING EQUIPMENT					
SETUP FOR HP 12 X 53					
STEEL PILES					No.: 13
PILE EXCAVATION					
IN SOIL					63.00 LIN. FT.
NOT IN SOIL					80.00 LIN. FT.

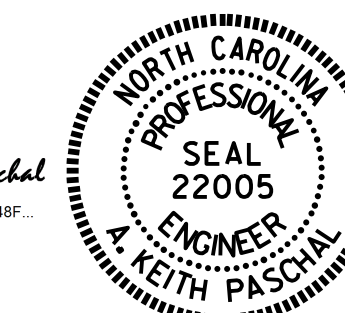
PROJECT NO. B-5371
 UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 INTEGRAL
 END BENT No. 2

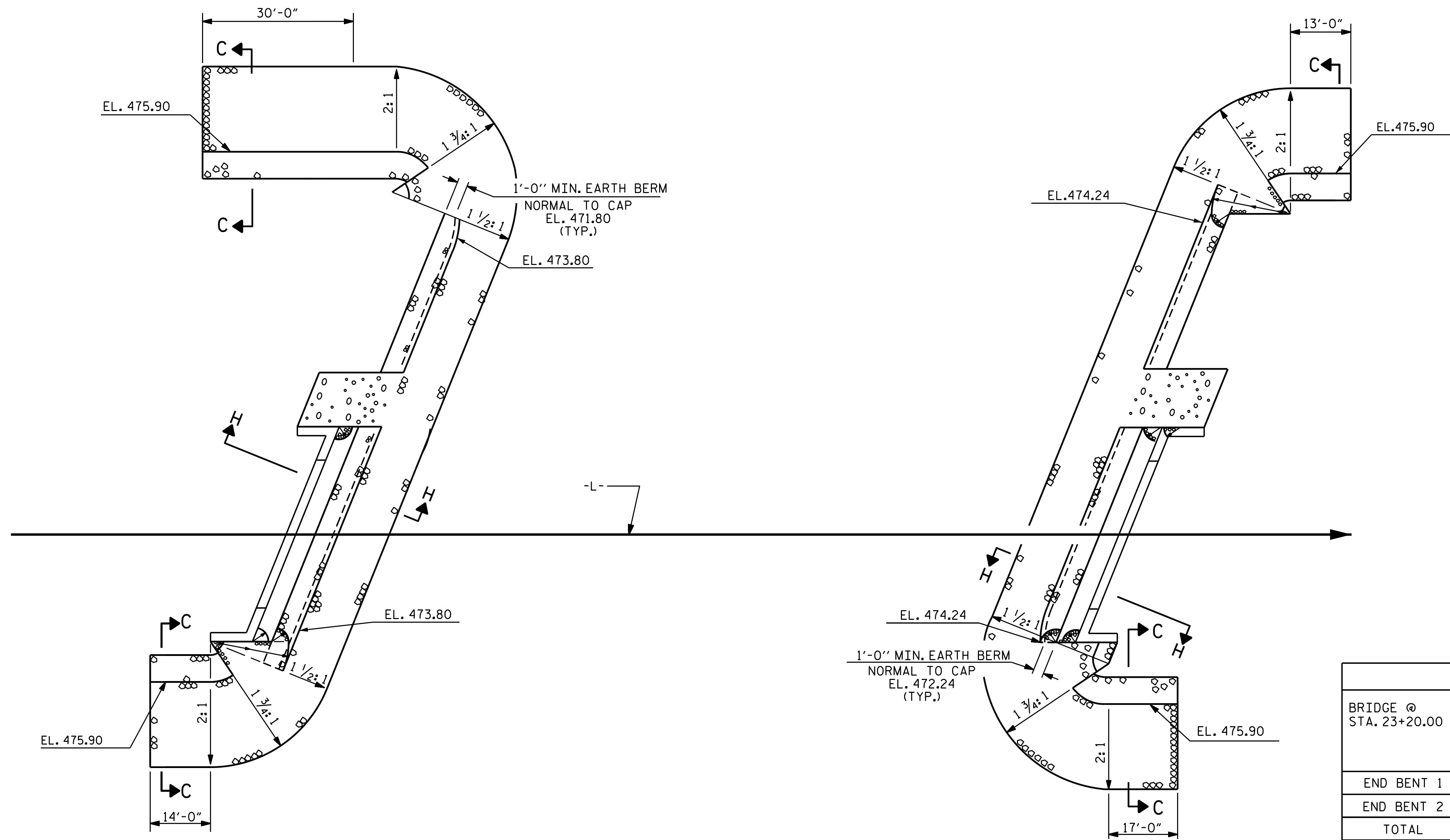
Designed by:
 A Keith Paschal
 F880AD02FC48F...



1/4/2018

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			29

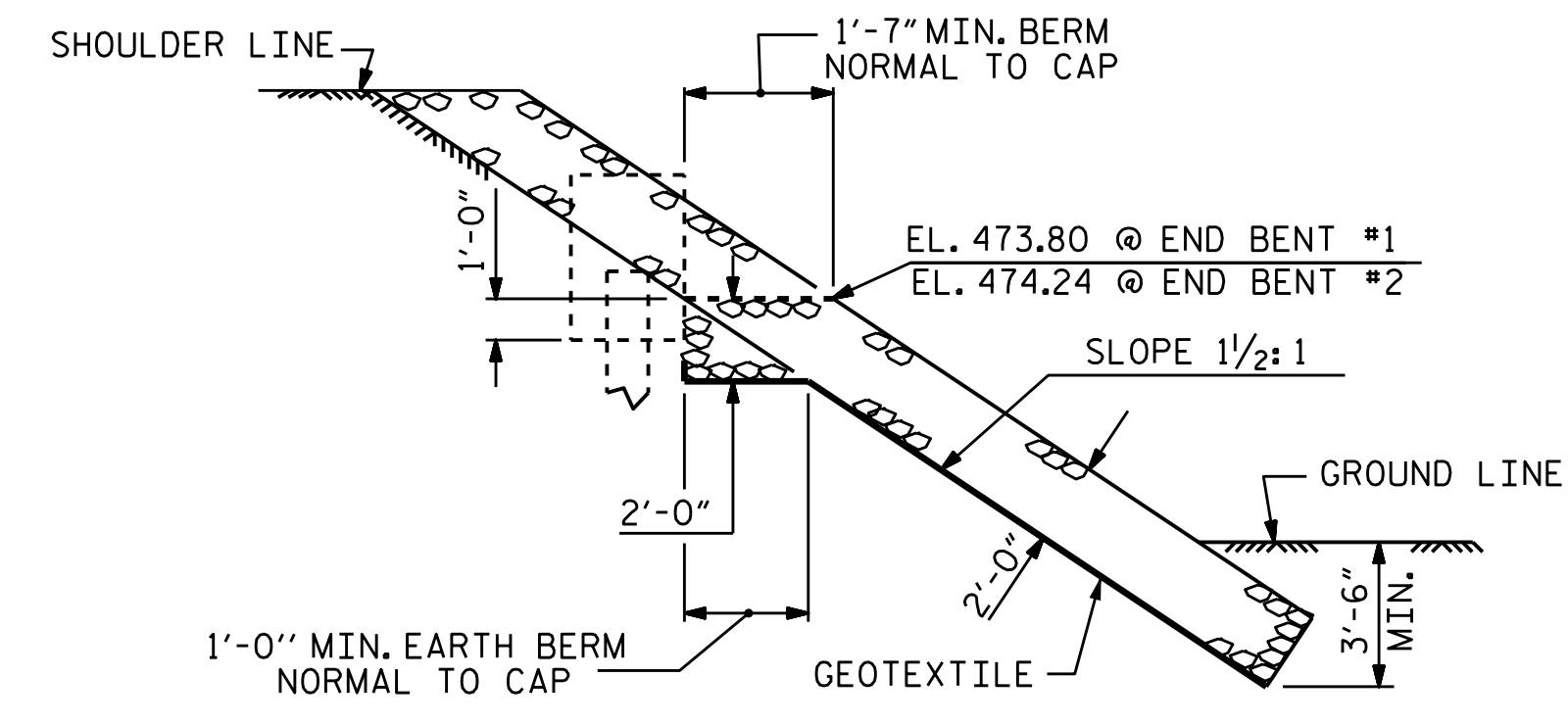


END BENT NO. 1

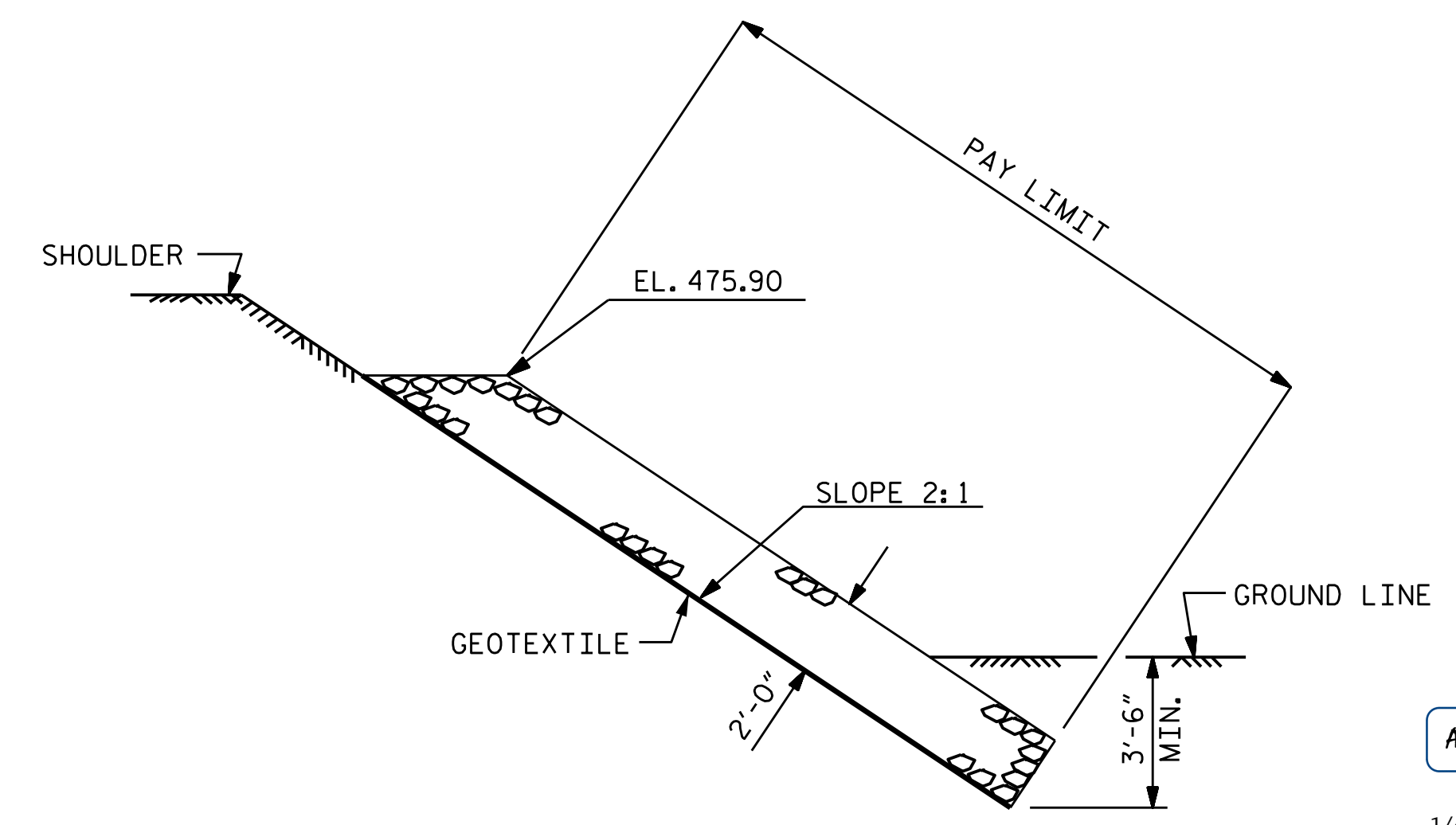
END BENT NO. 2

PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 23+20.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	318	355
END BENT 2	314	346
TOTAL	632	701



SECTION H-H



SECTION C-C

PROJECT NO. B-5371
 _____ UNION _____ COUNTY
 STATION: 23+20.00 -L-



DocuSigned by:
 A Keith Paschal
 1/4/2018

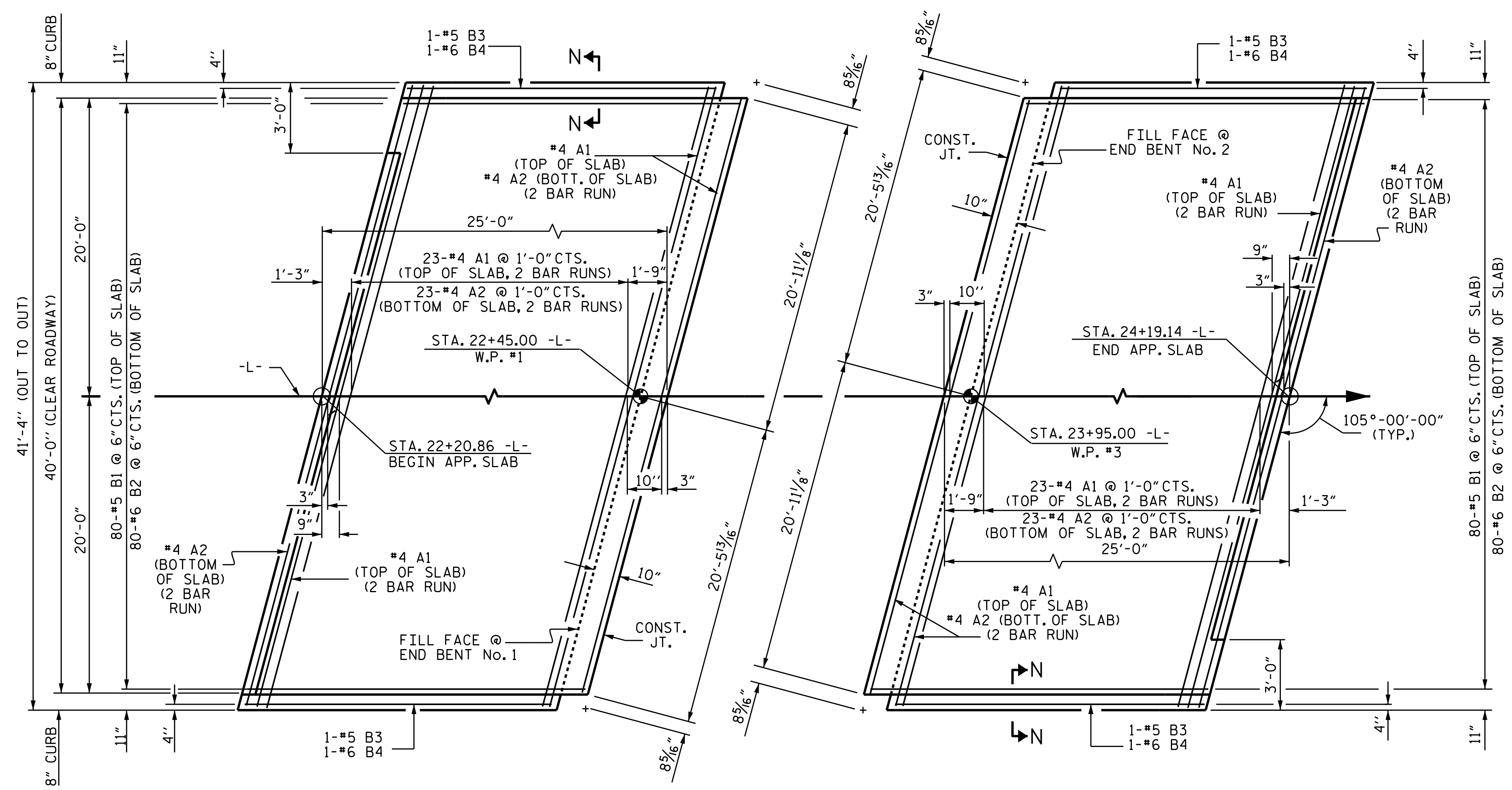
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

— RIP RAP DETAILS —

ASSEMBLED BY : G. KOUCHEKI	DATE : 10/24/17
CHECKED BY : HT. BARBOUR	DATE : 10/27/17
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			29



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.

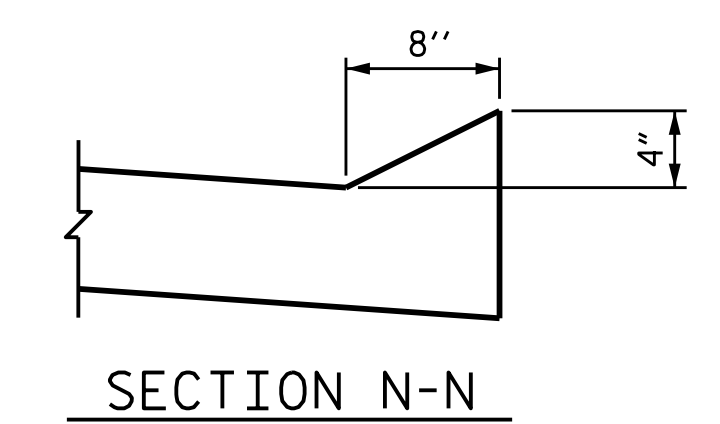
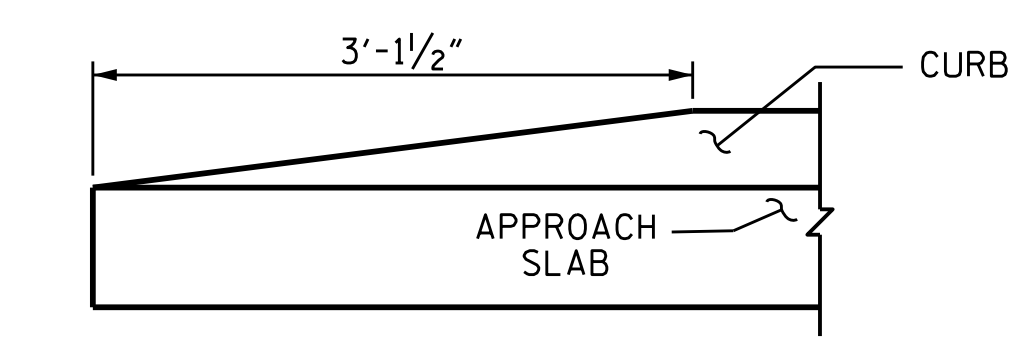
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

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

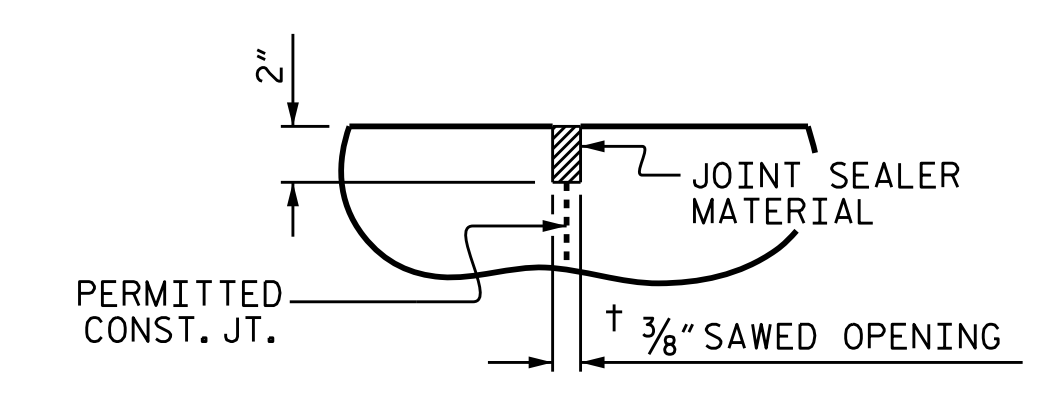
BILL OF MATERIAL						
FOR ONE APPROACH SLAB (2 REQ'D)						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	52	#4	STR	22'-3"	744	
A2	52	#4	STR	22'-2"	741	
* B1	80	#5	STR	24'-3"	2023	
B2	80	#6	STR	24'-8"	2964	
* B3	2	#5	STR	23'-9"	50	
B4	2	#6	STR	23'-9"	71	
REINFORCING STEEL				3776 LBS.		
* EPOXY COATED REINFORCING STEEL				2817 LBS.		
CLASS AA CONCRETE				45.5 C.Y.		

* THESE BARS ARE EPOXY COATED

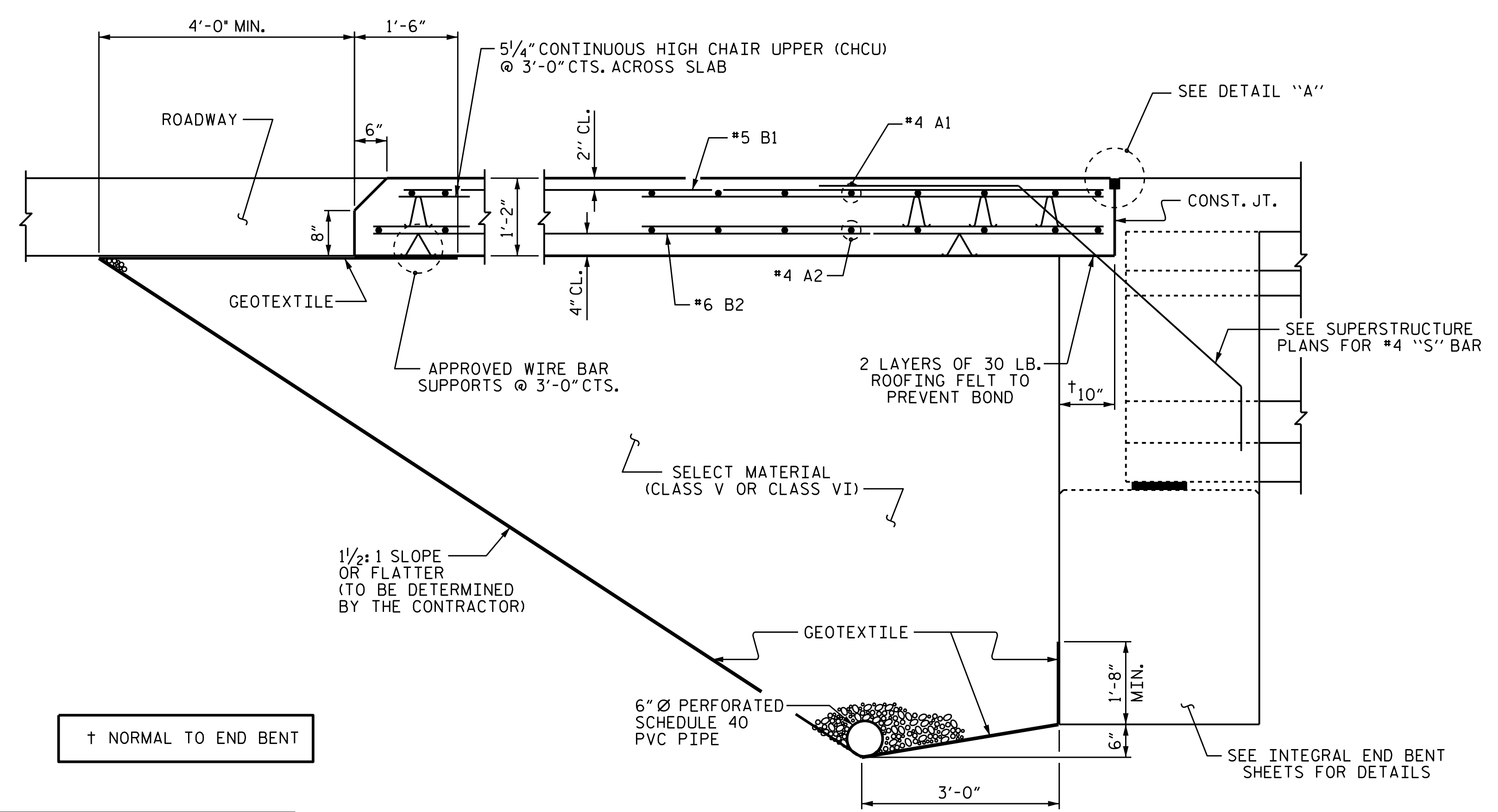
SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



END OF CURB WITHOUT SHOULDER BERM GUTTER



DETAIL "A"



SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)

PROJECT NO. B-5371
UNION COUNTY
STATION: 23+20.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH
SLAB FOR
INTEGRAL ABUTMENT

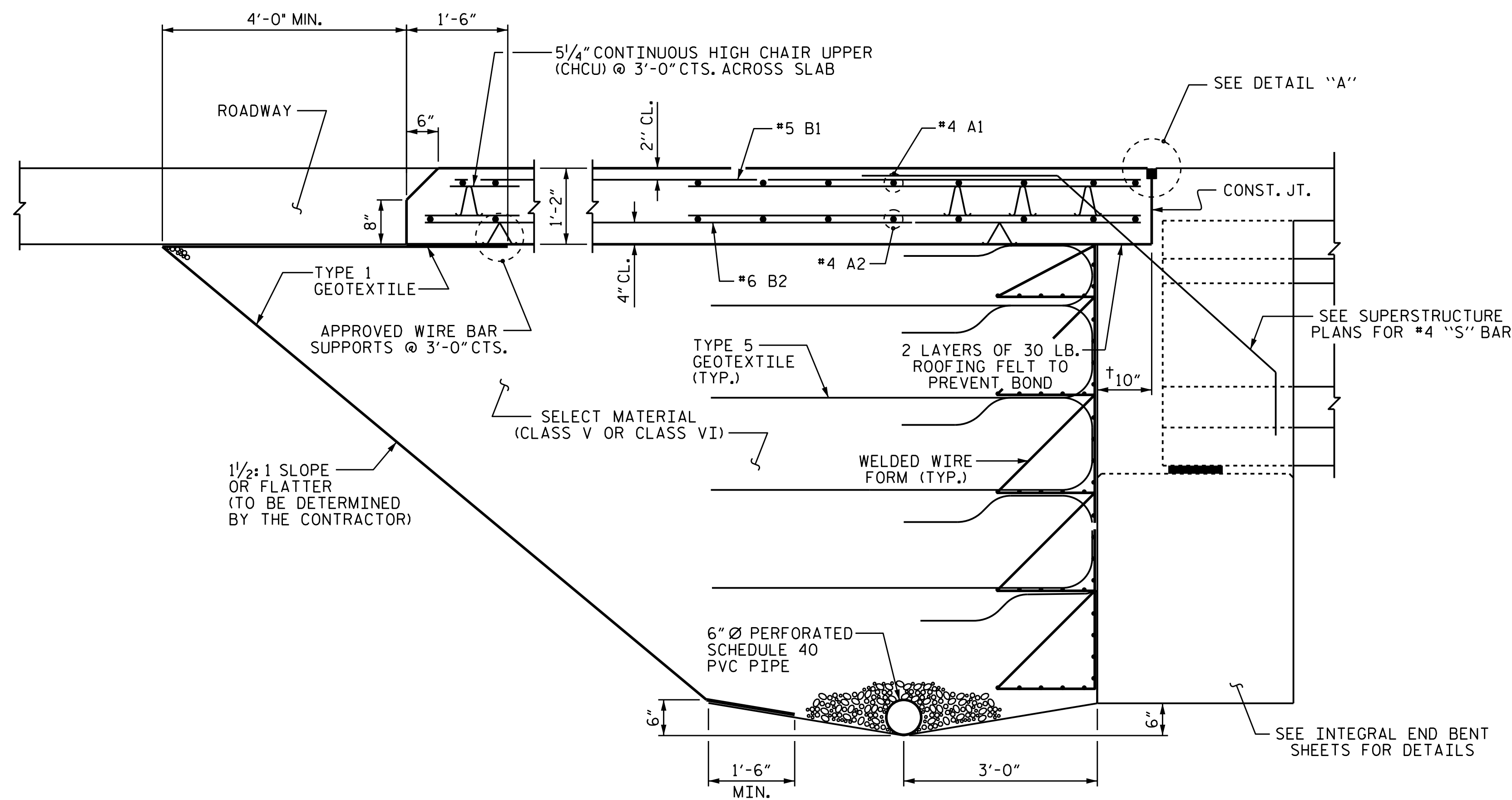
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-28
2			4			TOTAL SHEETS 29

ASSEMBLED BY : H. T. BARBOUR DATE : 11-17
CHECKED BY : A. SORSENGINH DATE : 11-17
DRAWN BY : TLA 10/05 REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06 REV. 6/13 MAA/GM
REV. 10/17 MAA/THC

DocuSigned by:
A Keith Paschal
F0B6A0D83FC4F...
1/4/2018

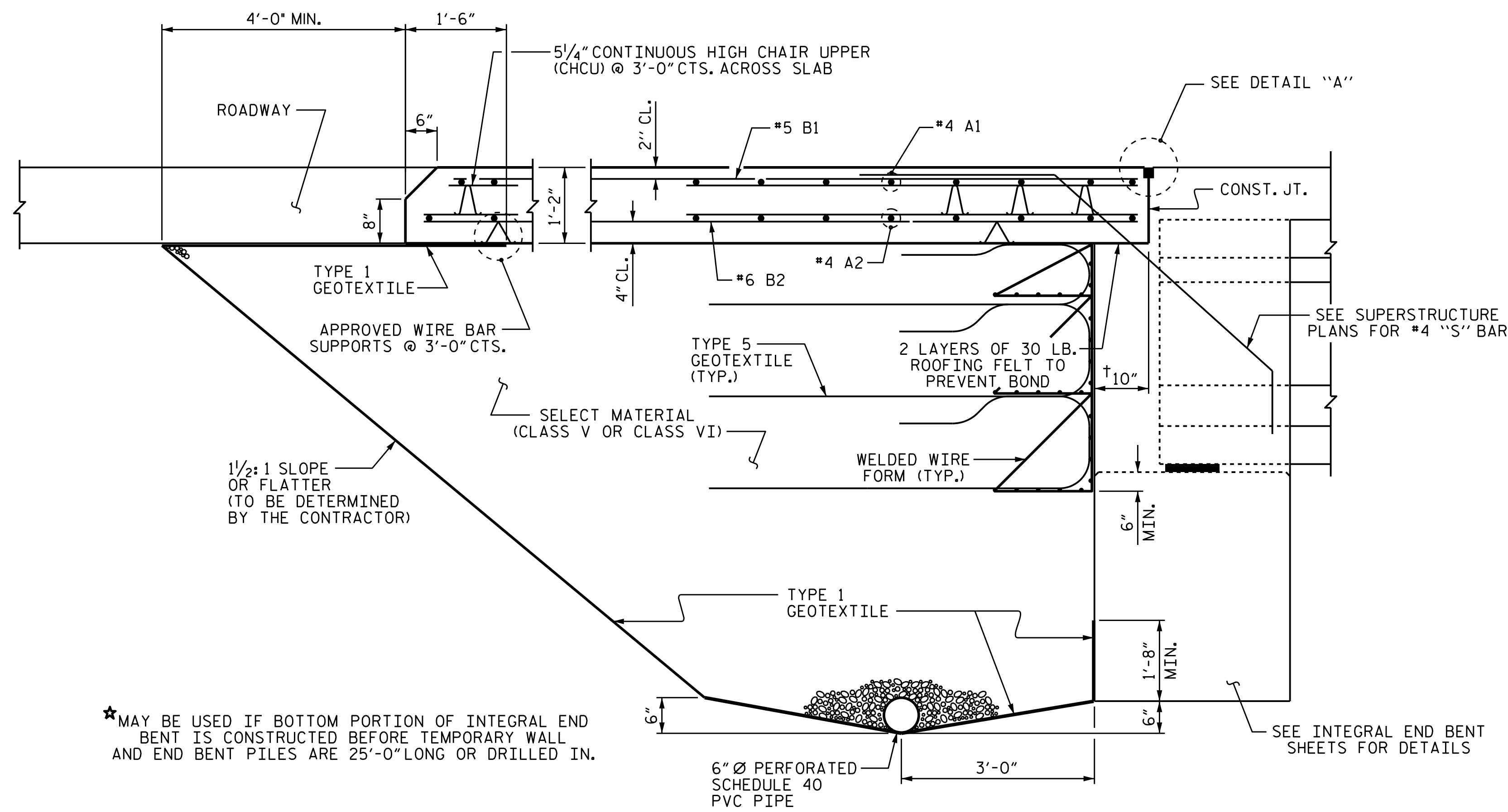
PROFESSIONAL ENGINEER
NORTH CAROLINA
SEAL 22005
A KEITH PASCHAL

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SIGNATURES COMPLETED



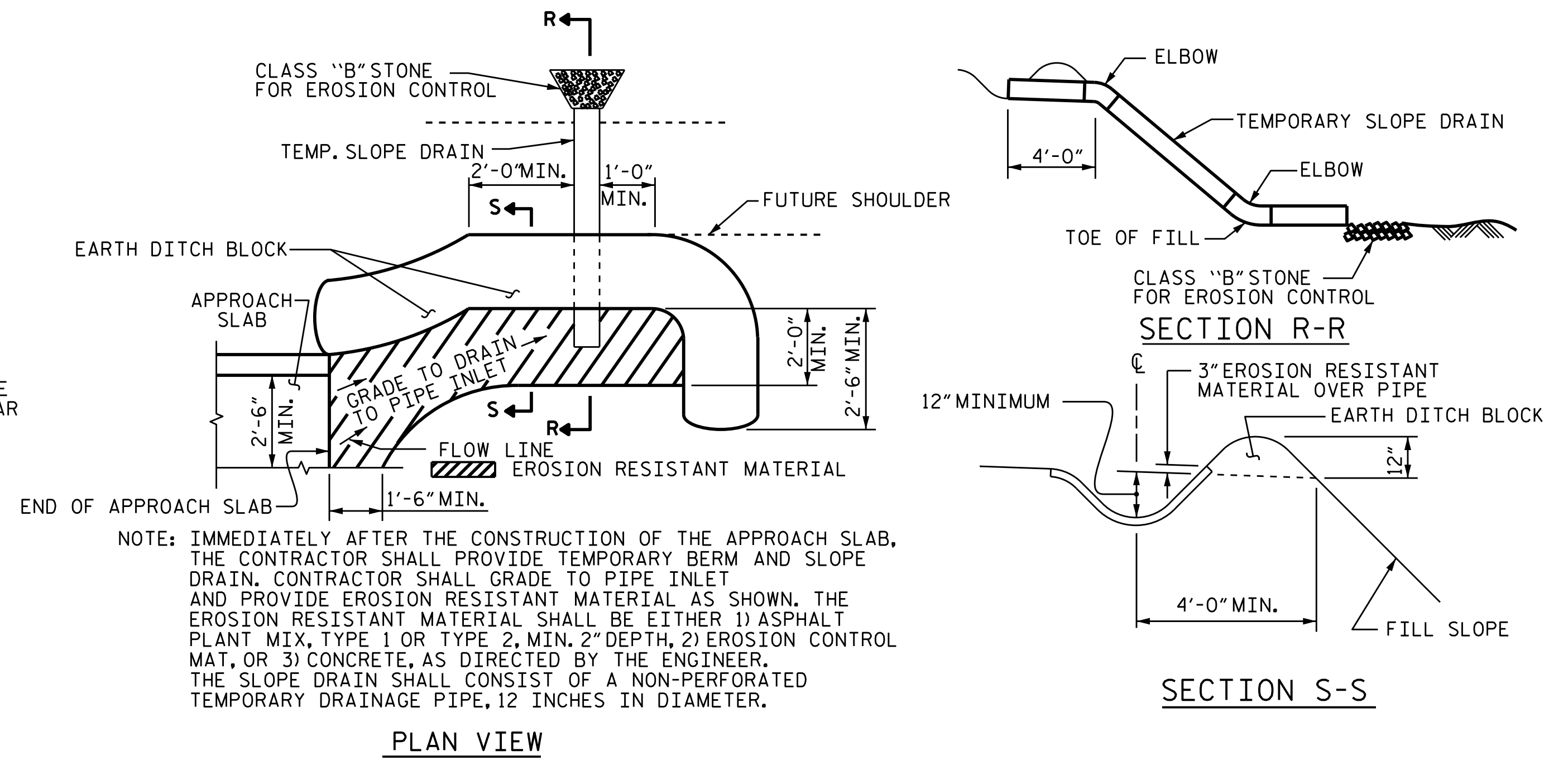
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



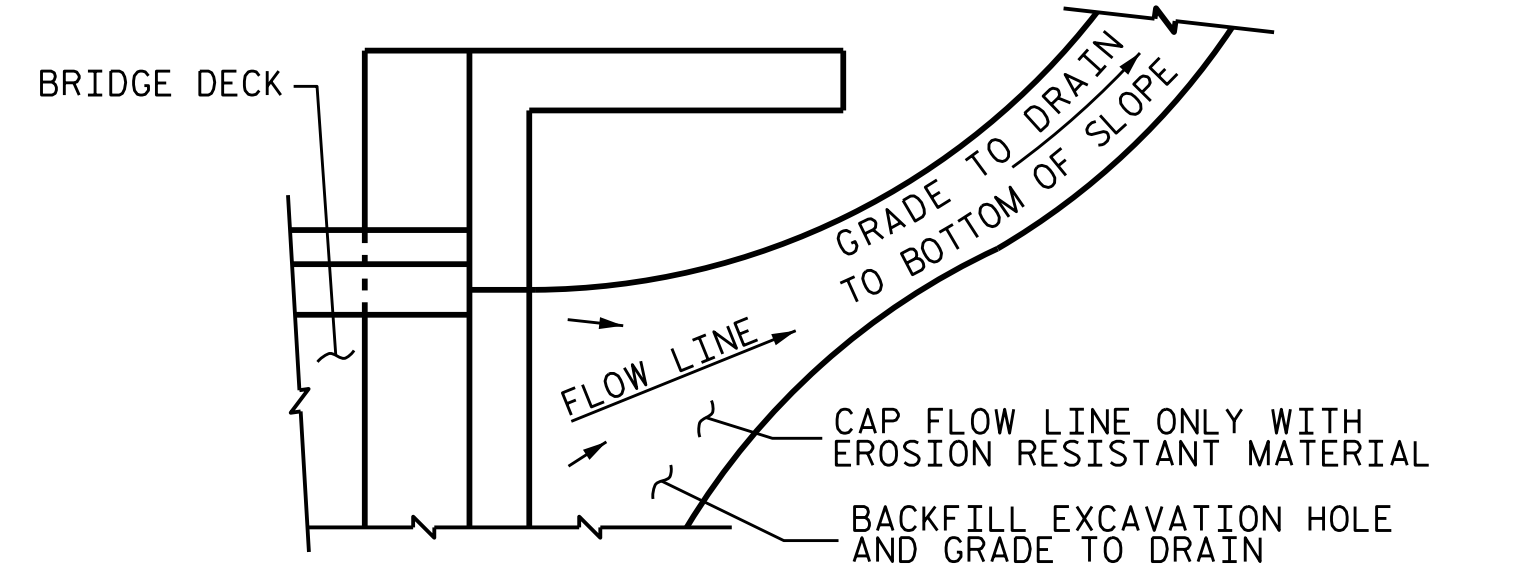
SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

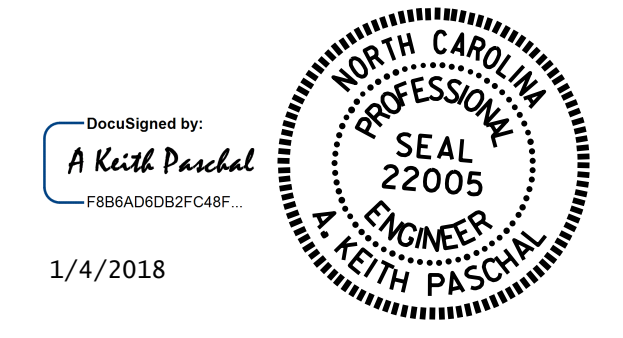


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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



PROJECT NO. B-5371
 UNION COUNTY
 STATION: 23+20.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH SLAB
 FOR
 INTEGRAL ABUTMENT

ASSEMBLED BY : H. T. BARBOUR	DATE : 11-17
CHECKED BY : A. SORSENGINH	DATE : 11-17
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 10/17 MAA/THC

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN