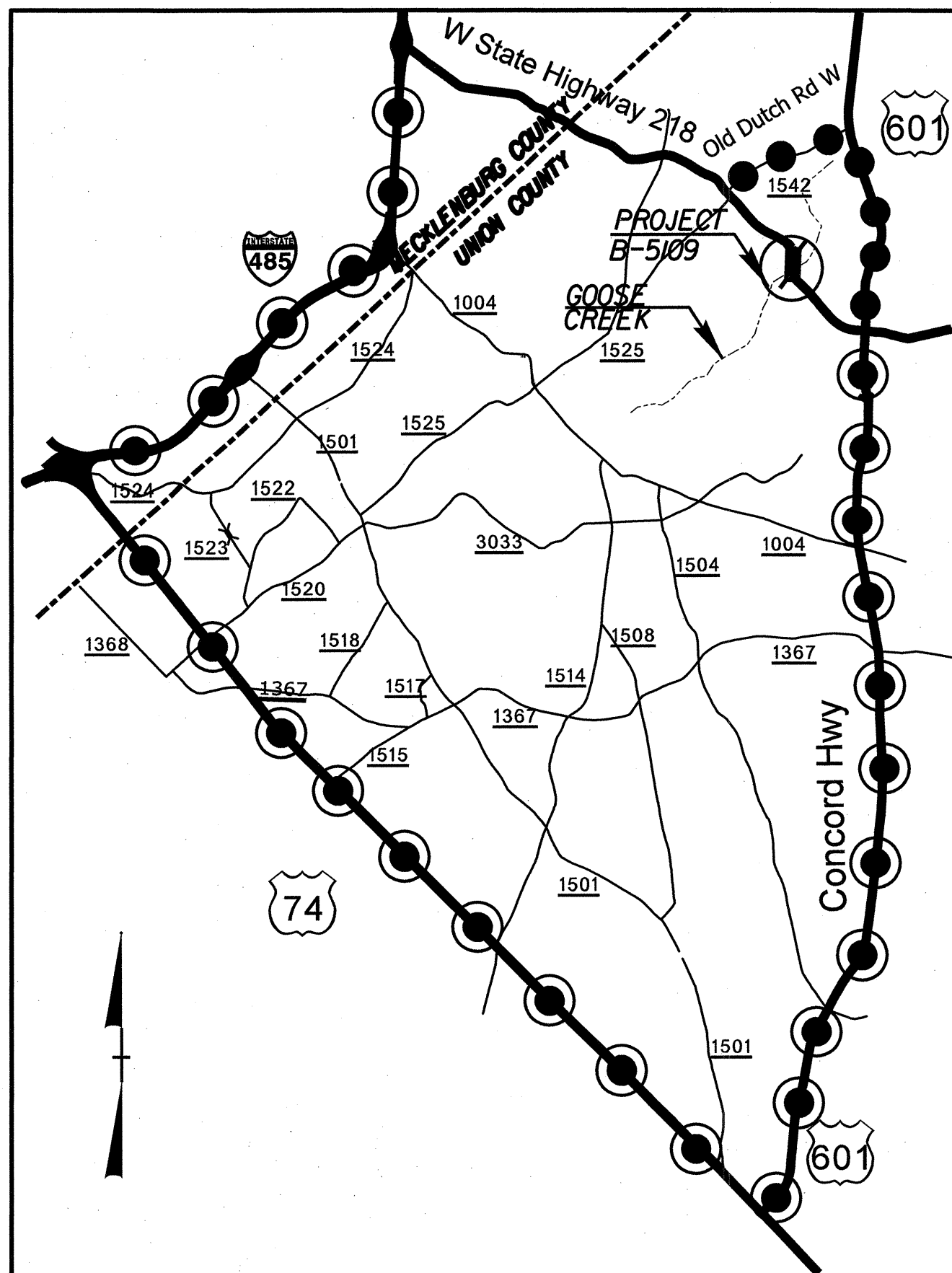


TIP NO: B-5109

CONTRACT: C203263

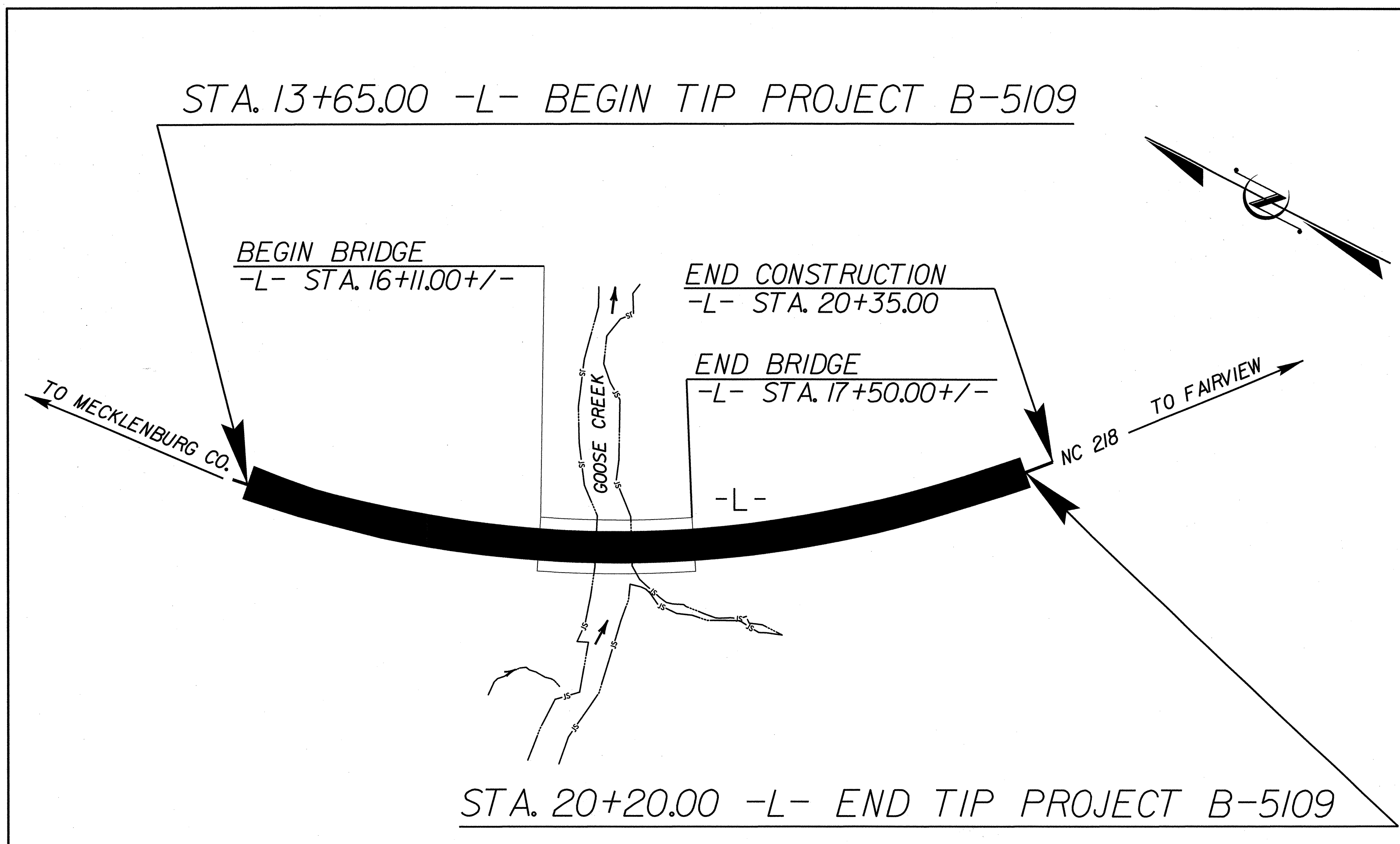
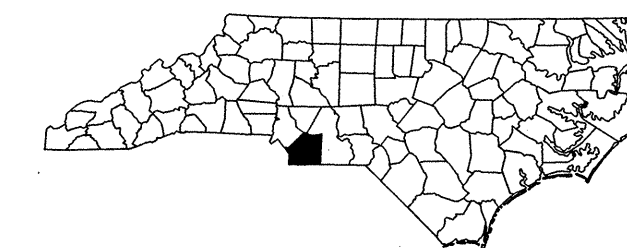


- DETOUR ROUTE
- TRUCKS DETOUR ROUTE

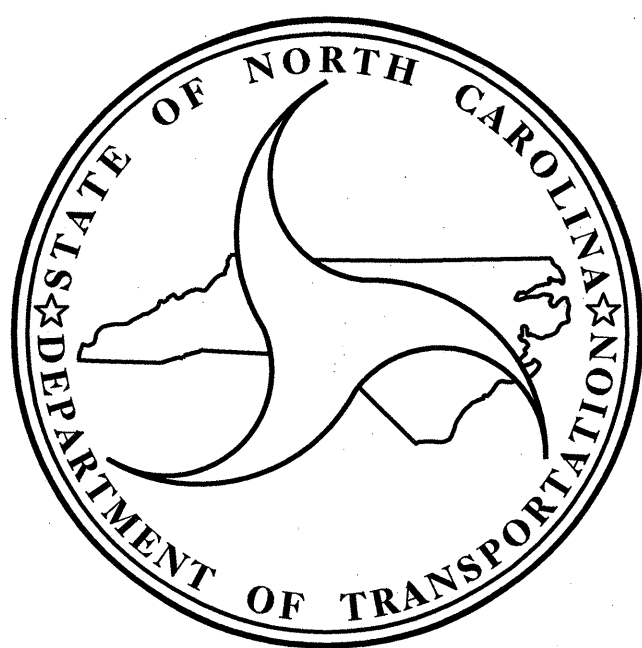
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
UNION COUNTY

LOCATION: BRIDGE NO. 29 ON NC 218 OVER GOOSE CREEK
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5109		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
42246.1.1	BRSTP-0218(7)	PE	
42246.2.1	BRSTP-0218(7)	RW, UTILITIES	
42246.3.FR1	BRSTP-0218(7)	CONST.	



STRUCTURE



DESIGN DATA

ADT 2013 =	8,480
ADT 2035 =	15,500
DHV =	12 %
D =	65 %
T =	17 % *
V =	60 MPH
*(TTST 8% + DUAL 9%)	
MAJOR COLLECTOR REGIONAL TIER	

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5109 =	0.098 MILES
LENGTH OF STRUCTURE TIP PROJECT B-5109 =	0.026 MILES
TOTAL OF LENGTH TIP PROJECT B-5109 =	0.124 MILES

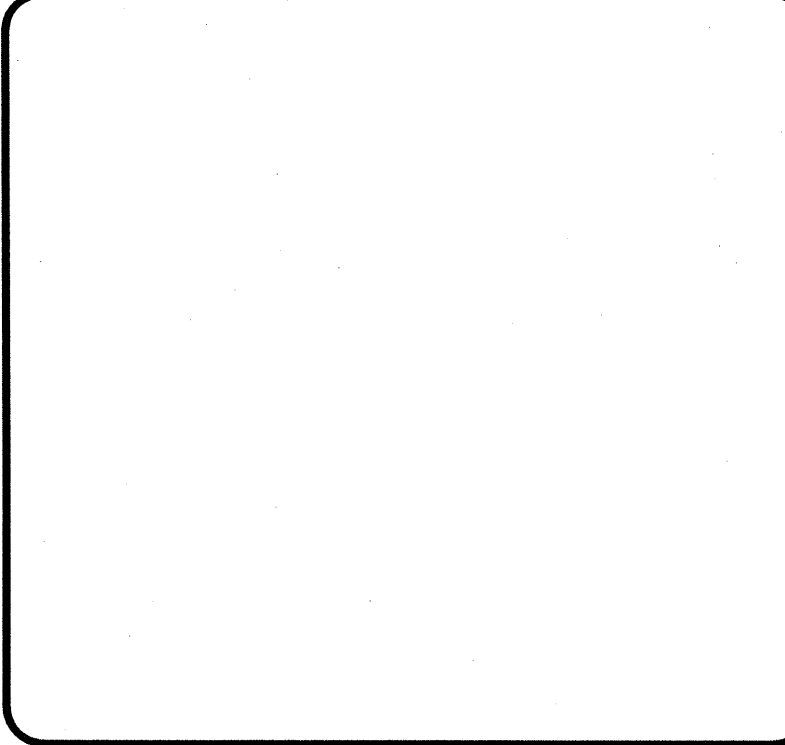
2012 STANDARD SPECIFICATIONS

LETTING DATE :
NOVEMBER 19, 2013

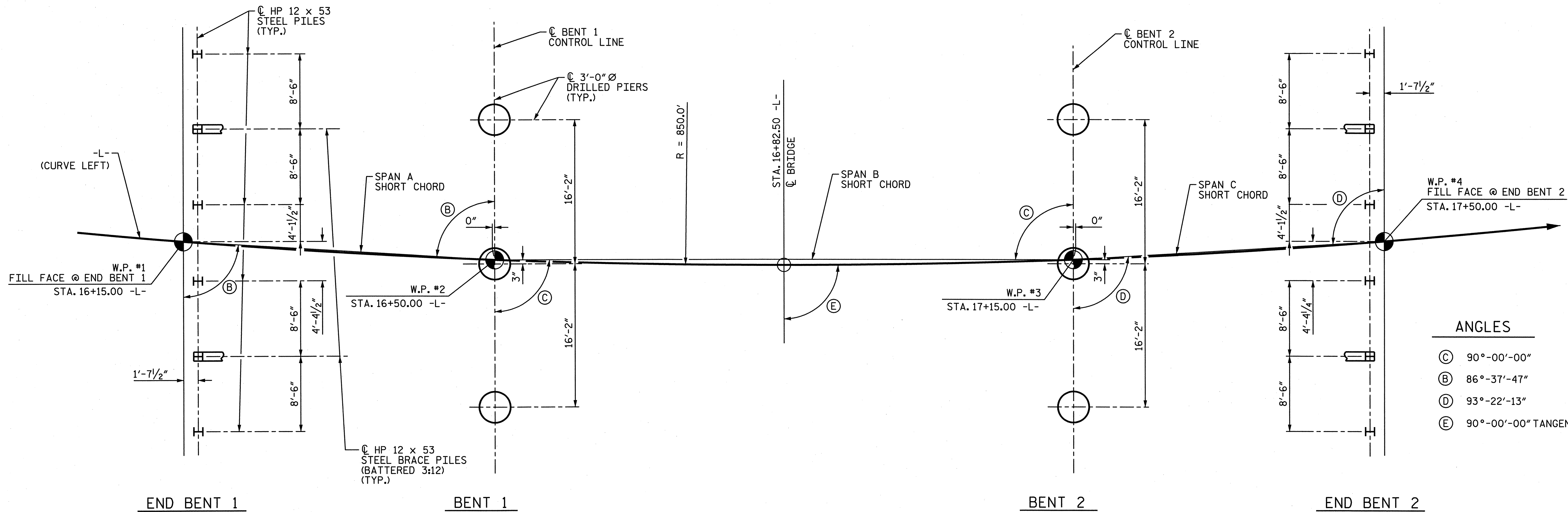
WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100 • Cary, NC 27513 • 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

Satrajit Das, Ph.D., P.E.
Project Engineer

Nicholas Pierce, P.E.
Project Design Engineer



DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



ANGLES

- (C) 90°-00'-00"
- (B) 86°-37'-47"
- (D) 93°-22'-13"
- (E) 90°-00'-00" TANGENT TO CURVE

FOUNDATION LAYOUT PLAN

(ALL BENTS & END BENTS ARE PARALLEL)

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 167 TONS PER PILE.

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

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 473.0 FT AND WITH THE REQUIRED TIP RESISTANCE.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 335.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30.0 TSF.

PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 487.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASING.

THE SCOUR CRITICAL ELEVATION AT BENT 1 IS ELEVATION 484.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 335.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30.0 TSF.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 479.0 FT. (LT), 477.0 FT (CT), 475.0 FT (RT) AND WITH THE REQUIRED TIP RESISTANCE.

PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. IF REQUIRED, DO NOT EXTEND CASING BELOW ELEVATION 488.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASING.

THE SCOUR CRITICAL ELEVATION AT BENT 2 IS ELEVATION 484.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS ARE REQUIRED FOR DRILLED PIERS AT BENTS 1 AND 2. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT IS REQUIRED FOR DRILLED PIERS AT BENTS 1 AND 2. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 167 TONS PER PILE.

DRAWN BY : M. HOBBS DATE : 06/12
 CHECKED BY : N. PIERCE DATE : 07/12

8/30/2013
 R:\122022_B-5109_Union County_NC\Structures\Drafting\General\Drawing\B5109_SD_G02.dgn
 usmh04386

WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

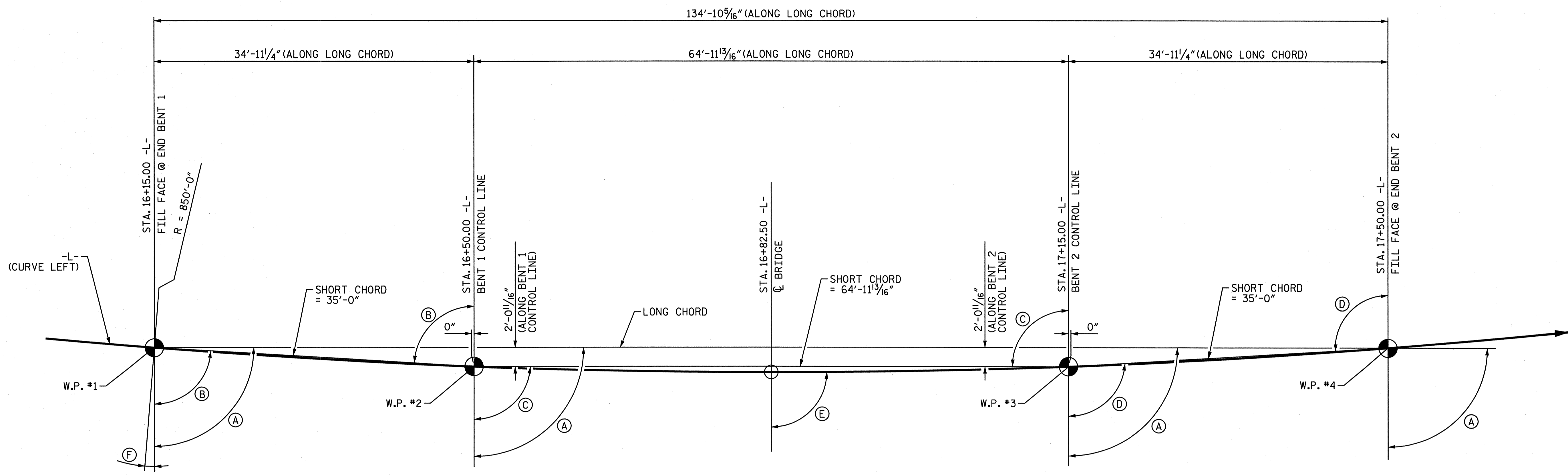
PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 218
 OVER GOOSE CREEK
 BETWEEN SR 1543 AND SR 2323

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-2
1			3			TOTAL SHEETS
2			4			40



LONG CHORD LAYOUT
(ALL BENTS & END BENTS ARE PARALLEL)

ANGLES

- (A) 90°-00'-00"
- (B) 86°-37'-47"
- (C) 90°-00'-00"
- (D) 93°-22'-13"
- (E) 90°-00'-00" TANGENT TO CURVE
- (F) 4°-32'-60"

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 218
 OVER GOOSE CREEK
 BETWEEN SR 1543 AND SR 2323



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

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

DRAWN BY : M. HOBBS DATE : 06/12
 CHECKED BY : N. PIERCE DATE : 07/12

5/15/2013
 R:\122022-B-5109_Union County_NC\Structures\Drafting\General_Drawing\B5109_SD_GD3.dgn
 usmh04386

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 16+82.50 -L-	3'-0" Ø DRILLED PIERS IN SOIL	3'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	36" PRESTRESSED CONCRETE GIRDERS	HP 12 X 53 STEEL PILES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	CONST. MAINT & REMOVAL OF TEMP. ACCESS		
	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	No.	LIN. FT.	No.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE									5,653	6,622					15	652.81			250.78	265.67					
END BENT 1											38.1		4,501			6	120				112	124			
BENT 1		20.3	34	12.3	3	3					21.2		9,542	1,341											
BENT 2		19.5	28	14.5	3	3					20.1		8,645	1,120											
END BENT 2											39.3		4,448			6	60				98	109			
TOTAL	LUMP SUM	39.8	62	26.8	6	6	1	LUMP SUM	5,653	6,622	118.7	LUMP SUM	27,136	2,461	15	652.81	12	180	250.78	265.67	210	233	LUMP SUM	LUMP SUM	LUMP SUM

GENERAL DRAWING 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 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.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+82.50 -L-."

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 45 FT. EACH SIDE 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.

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 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.

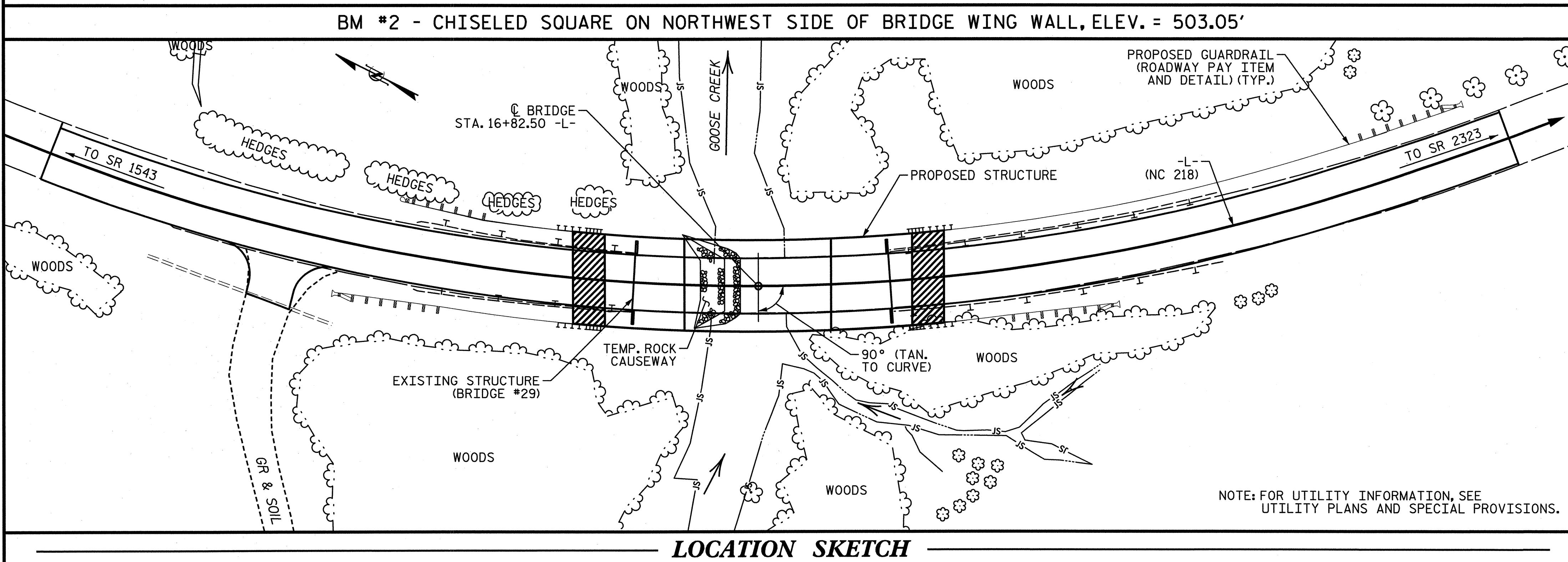
THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES".

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS @ 37'-9", 37'-6", & 37'-9" WITH A REINFORCED CONCRETE DECK ON STEEL BEAMS; 24'-0" CLEAR ROADWAY WIDTH ON REINFORCED CONCRETE END BENTS WITH STEEL PILES; REINFORCED CONCRETE POST & BEAM INTERIOR BENTS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS THE RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 16+82.50 -L-.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.



NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

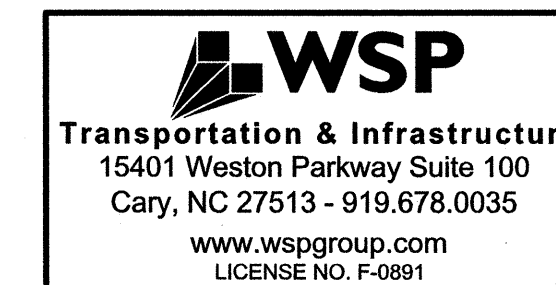
SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON NC 218
 OVER GOOSE CREEK
 BETWEEN SR 1543 AND SR 2323

DRAWN BY : M. HOBBS DATE : 06/12
 CHECKED BY : N. PIERCE DATE : 07/12



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-4
2			4			TOTAL SHEETS 40

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVE-LOAD FACTORS (%LL)	MOMENT					SHEAR					LIVE-LOAD FACTORS (%LL)	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.01	--	1.75	0.816	1.30	B	ER	31.4	0.787	1.30	B	I	5.7	0.80	0.816	1.01	B	ER	31.4		
	HL-93 (OPERATING)	N/A		1.69	--	1.35	0.816	1.69	B	ER	31.4	0.787	1.71	B	I	5.7	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.30	47	1.75	0.816	1.67	B	ER	31.4	0.787	1.64	B	I	5.7	0.80	0.816	1.30	B	ER	31.4		
	HS-20 (OPERATING)	36.000		2.15	77	1.35	0.816	2.17	B	ER	31.4	0.787	2.15	B	I	5.7	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.87	39	1.40	0.816	4.61	B	ER	31.4	0.787	5.23	B	I	5.7	0.80	0.816	2.87	B	ER	31.4	
		SNGARBS2	20.000		2.17	43	1.40	0.816	3.48	B	ER	31.4	0.787	3.74	B	I	5.7	0.80	0.816	2.17	B	ER	31.4	
		SNAGRIS2	22.000		2.07	46	1.40	0.816	3.32	B	ER	31.4	0.787	3.48	B	I	5.7	0.80	0.816	2.07	B	ER	31.4	
		SNCOTTS3	27.250		1.43	39	1.40	0.816	2.30	B	ER	31.4	0.787	2.42	B	I	5.7	0.80	0.816	1.43	B	ER	31.4	
		SNAGGRS4	34.925		1.21	42	1.40	0.816	1.94	B	ER	31.4	0.787	2.01	B	I	5.7	0.80	0.816	1.21	B	ER	31.4	
		SNS5A	35.550		1.18	42	1.40	0.816	1.89	B	ER	31.4	0.787	1.99	B	I	5.7	0.80	0.816	1.18	B	ER	31.4	
		SNS6A	39.950		1.09	44	1.40	0.816	1.74	B	ER	31.4	0.787	1.81	B	I	5.7	0.80	0.816	1.09	B	ER	31.4	
	SNS7B	42.000		1.03	43	1.40	0.816	1.66	B	ER	31.4	0.787	1.79	B	I	5.7	0.80	0.816	1.03	B	ER	31.4		
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		1.33	44	1.40	0.816	2.13	B	ER	31.4	0.787	2.19	B	I	5.7	0.80	0.816	1.33	B	ER	31.4	
		TNT4A	33.075		1.33	44	1.40	0.816	2.14	B	ER	31.4	0.787	2.17	B	I	5.7	0.80	0.816	1.33	B	ER	31.4	
		TNT6A	41.600		1.09	45	1.40	0.816	1.76	B	ER	31.4	0.787	2.00	B	I	5.7	0.80	0.816	1.09	B	ER	31.4	
		TNT7A	42.000		1.10	46	1.40	0.816	1.77	B	ER	31.4	0.787	1.89	B	I	5.7	0.80	0.816	1.10	B	ER	31.4	
		TNT7B	42.000		1.15	48	1.40	0.816	1.84	B	ER	31.4	0.787	1.74	B	I	5.7	0.80	0.816	1.15	B	ER	31.4	
		TNAGRIT4	43.000		1.09	47	1.40	0.816	1.74	B	ER	31.4	0.787	1.73	B	I	5.7	0.80	0.816	1.09	B	ER	31.4	
TNAGT5A		45.000		1.02	46	1.40	0.816	1.64	B	ER	31.4	0.787	1.80	B	I	5.7	0.80	0.816	1.02	B	ER	31.4		
TNAGT5B	45.000		③	1.01	45	1.40	0.816	1.62	B	ER	31.4	0.787	1.64	B	I	5.7	0.80	0.816	1.01	B	ER	31.4		

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

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

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

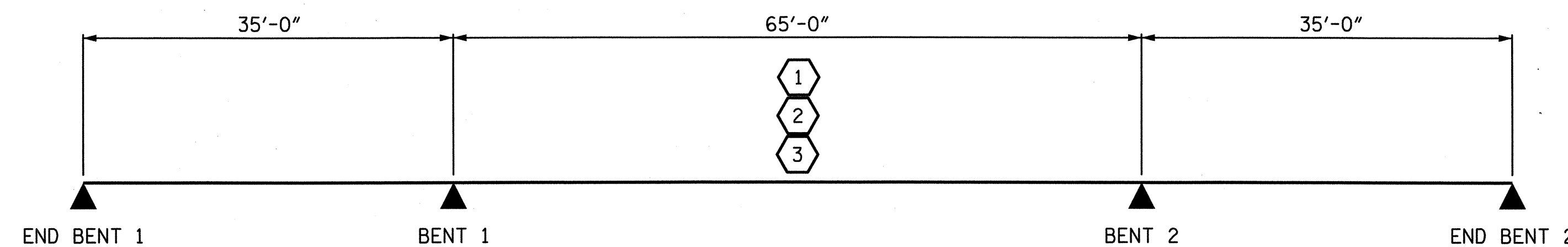
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

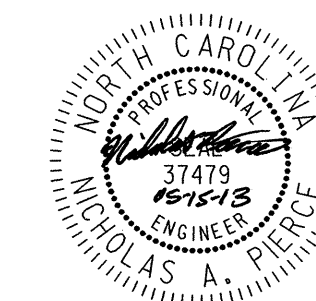
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

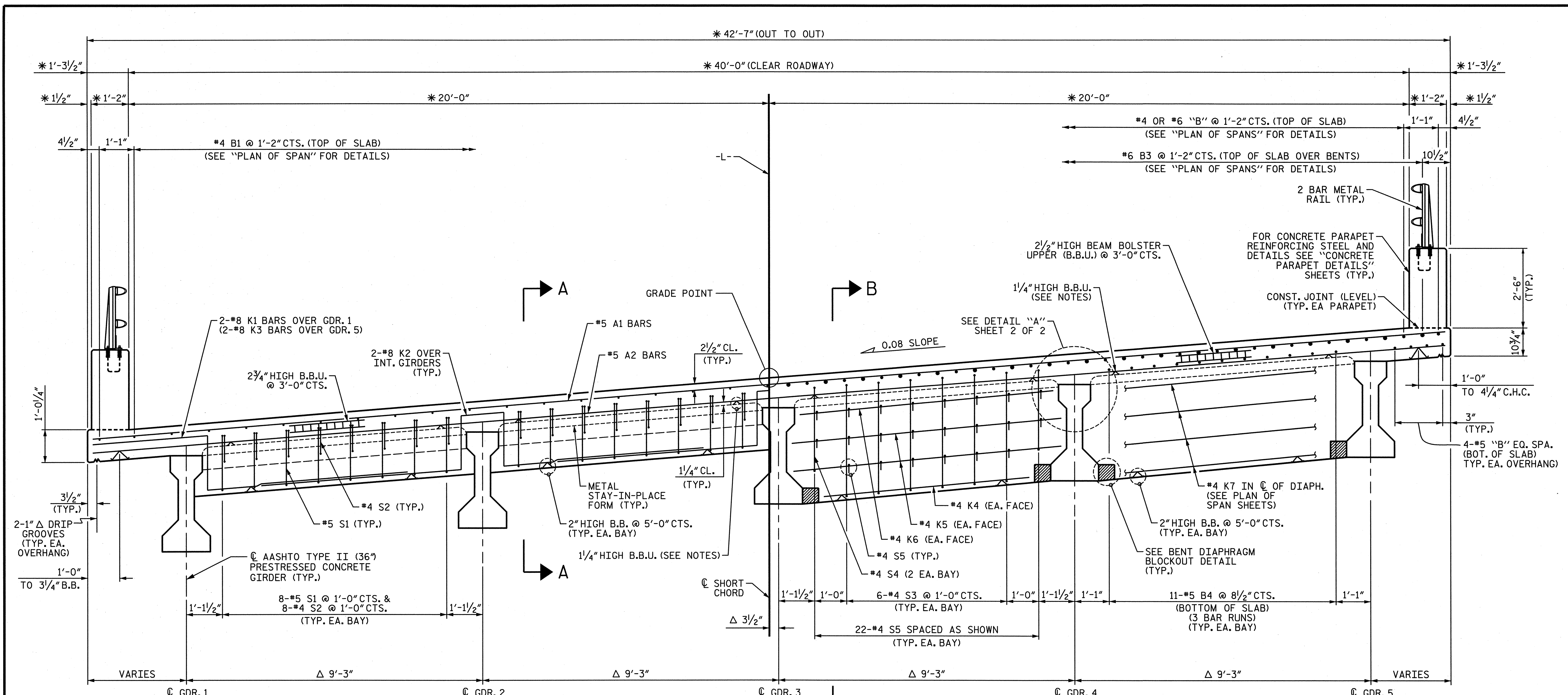


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspells.com
 LICENSE NO. F-0891

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

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	40
1			3			
2			4			

ASSEMBLED BY : N. PIERCE	DATE : 02/13
CHECKED BY : E. NOLTING	DATE : 02/13
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM



HALF-SECTION AT END BENT DIAPHRAGMS HALF-SECTION AT BENT DIAPHRAGMS (SHOWING CONTINUOUS FOR LIVE LOAD DIAPHRAGMS)

TYPICAL SECTION

* - RADIAL DIMENSIONS
 Δ - DIMENSIONED PARALLEL FROM SHORT CHORD

NOTES:

- 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.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.
- 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.
- FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGM FOR TYPE II PRESTRESSED CONCRETE GIRDER" SHEET.
- THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET AND END POSTS.

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

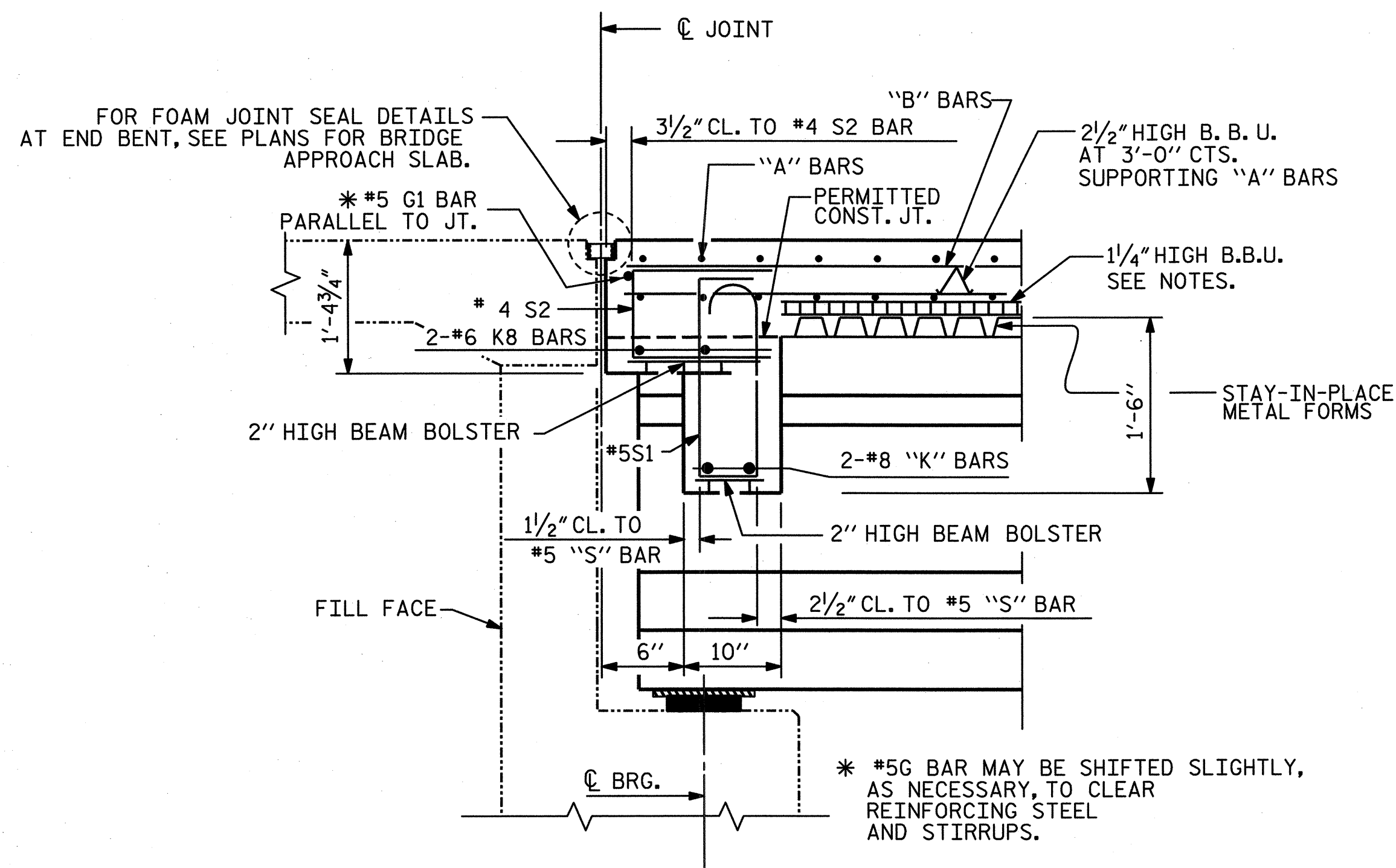
SHEET 1 OF 2



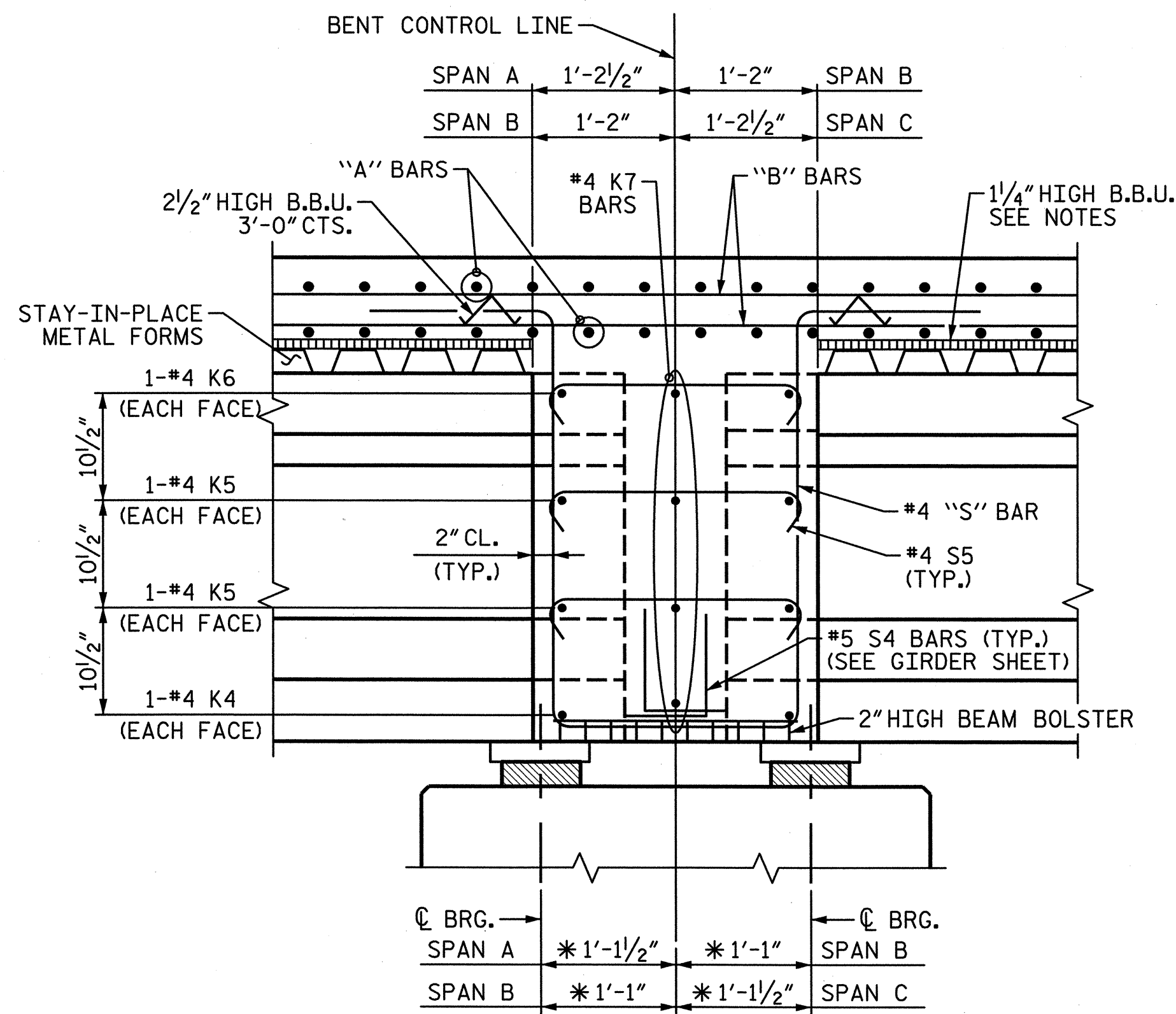
WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
TYPICAL SECTION					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-6
					TOTAL SHEETS 40

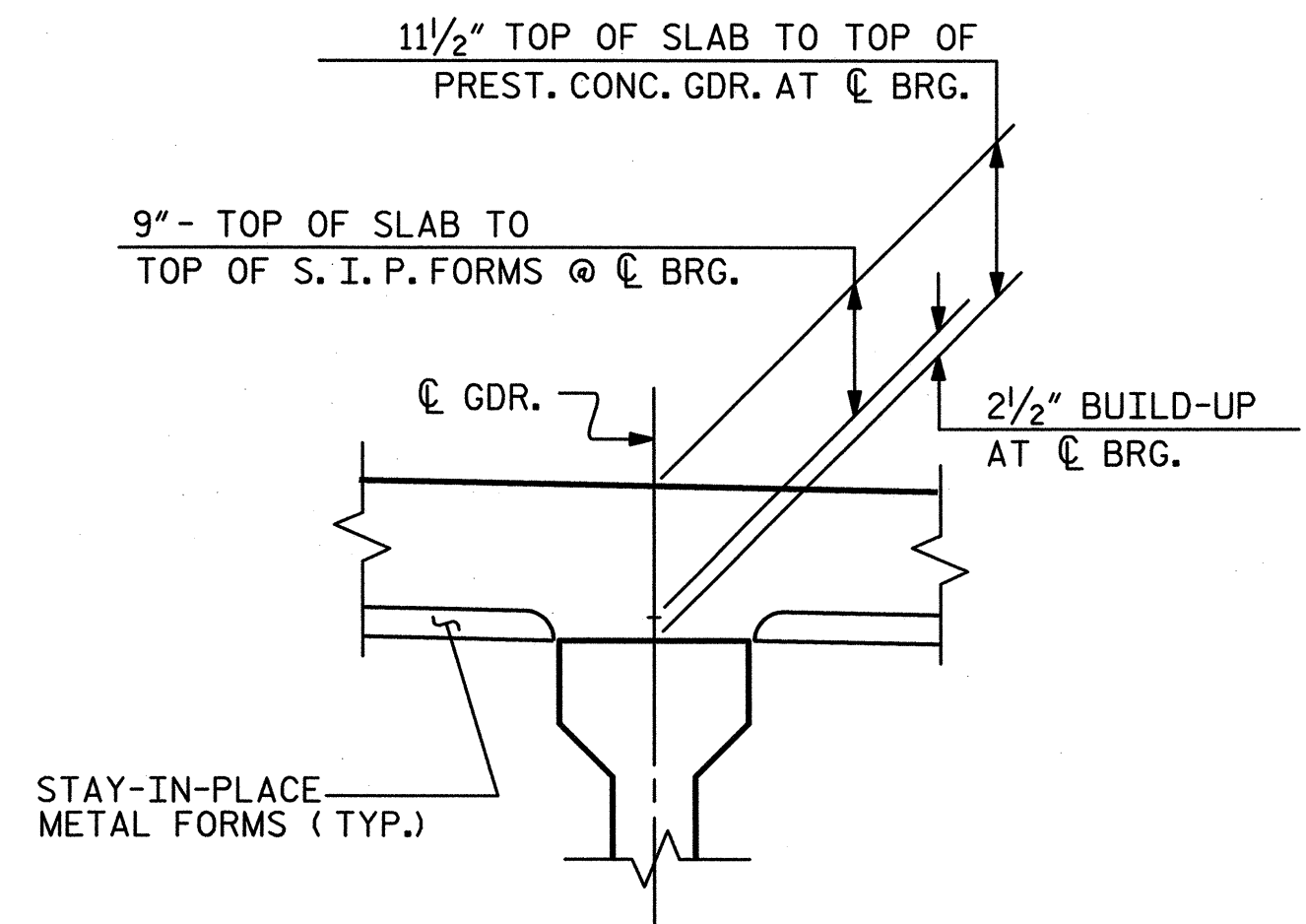
DRAWN BY: M. HOBBS DATE: 07/12
 CHECKED BY: N. PIERCE DATE: 07/12



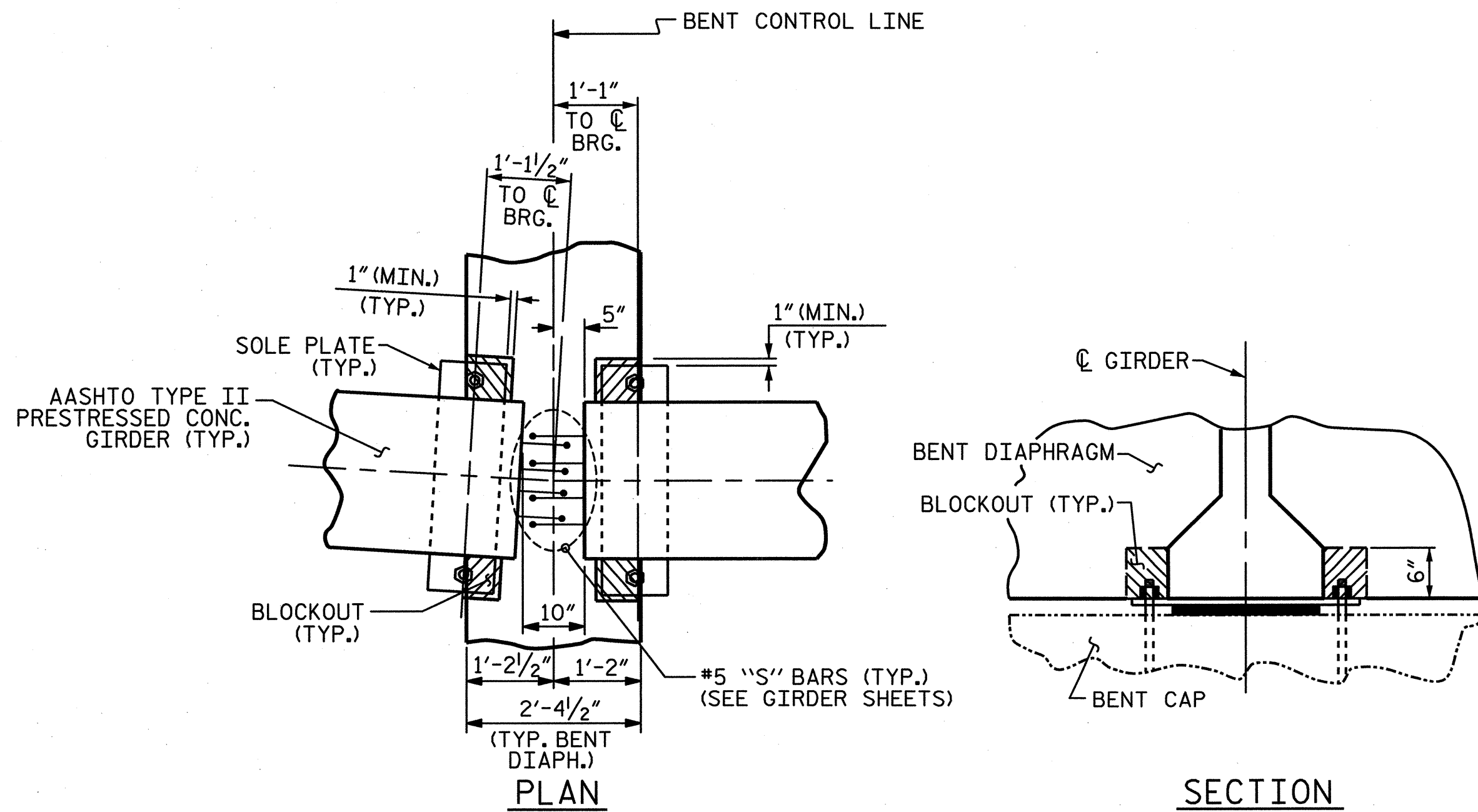
SECTION A-A



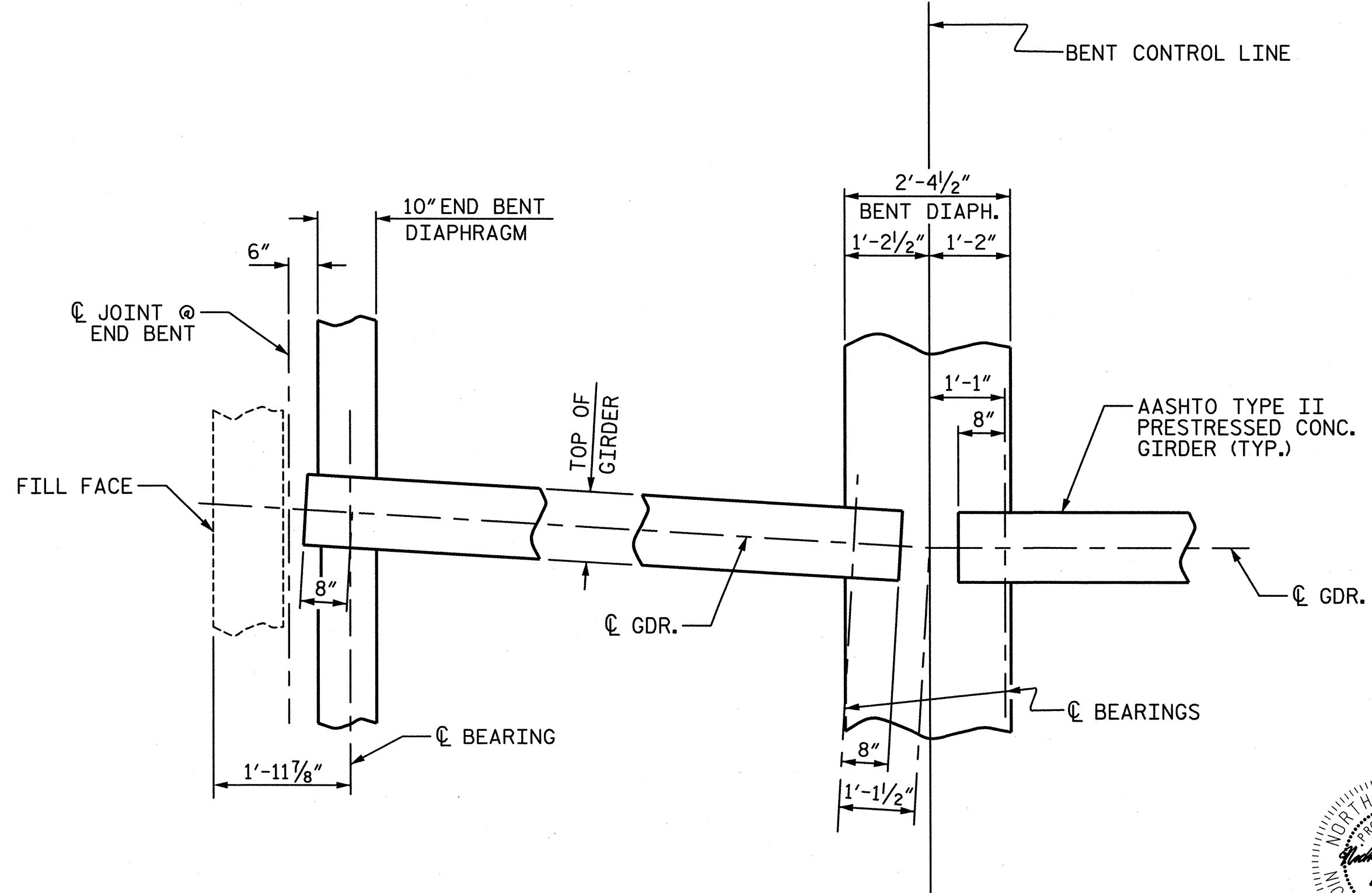
SECTION B-B
(* MEASURED ALONG G GIRDER)



DETAIL "A"



BENT DIAPHRAGM BLOCKOUT DETAIL

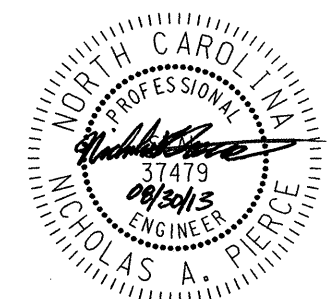


PLAN OF DIAPHRAGMS

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TYPICAL SECTION
 DETAILS



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			40

DRAWN BY : M. HOBBS DATE : 07/12
 CHECKED BY : N. PIERCE DATE : 07/12

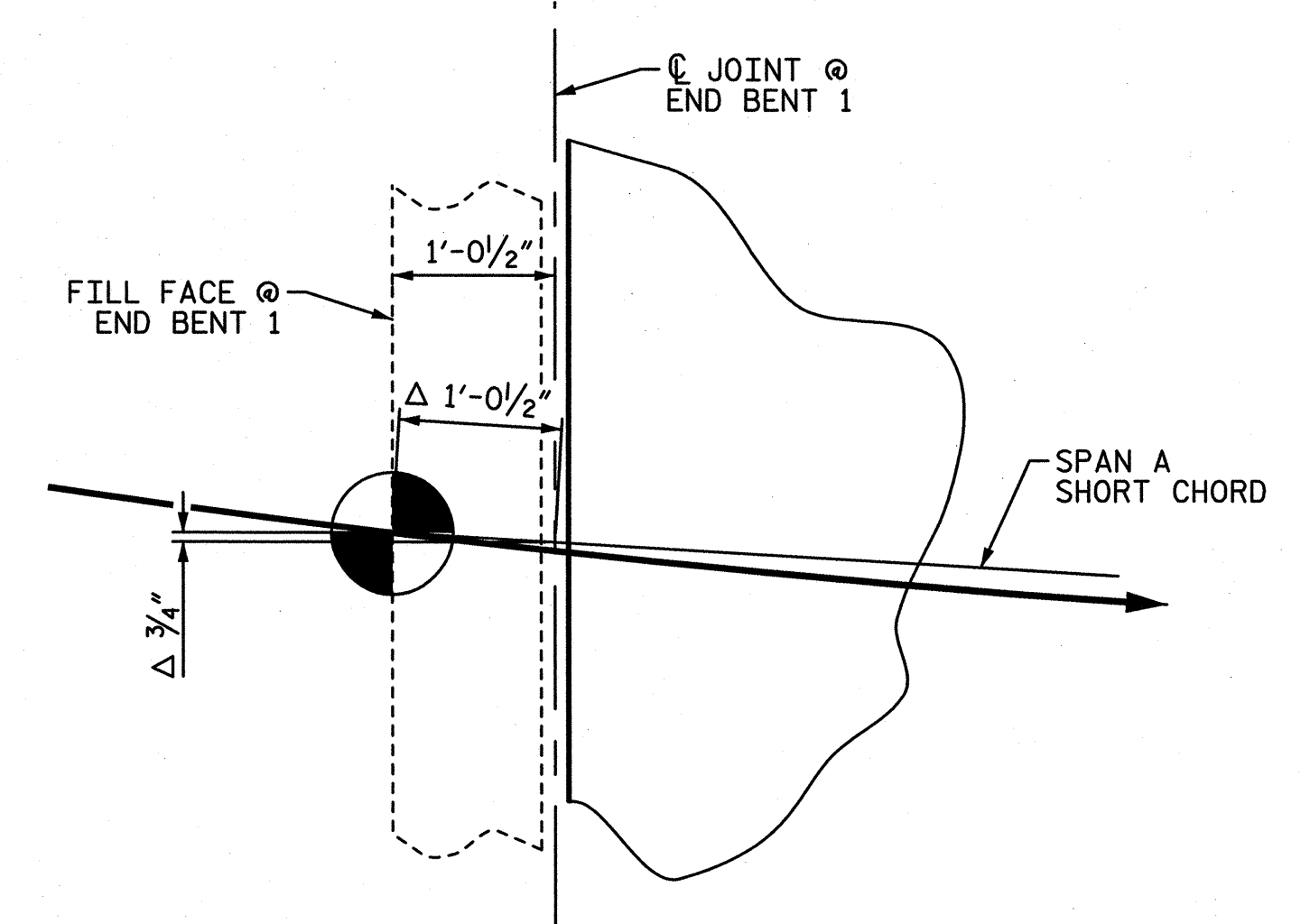
NOTES:

FOR PARAPET REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEETS.

*5 "A" BARS ARE TO BE PLACED PARALLEL TO END BENTS AND BENTS AT 6" CTS. MEASURED ALONG THE LONG CHORD.

FOR SECTION VIEW OF DIAPHRAGMS, SEE "TYPICAL SECTION" SHEET 2 OF 2.

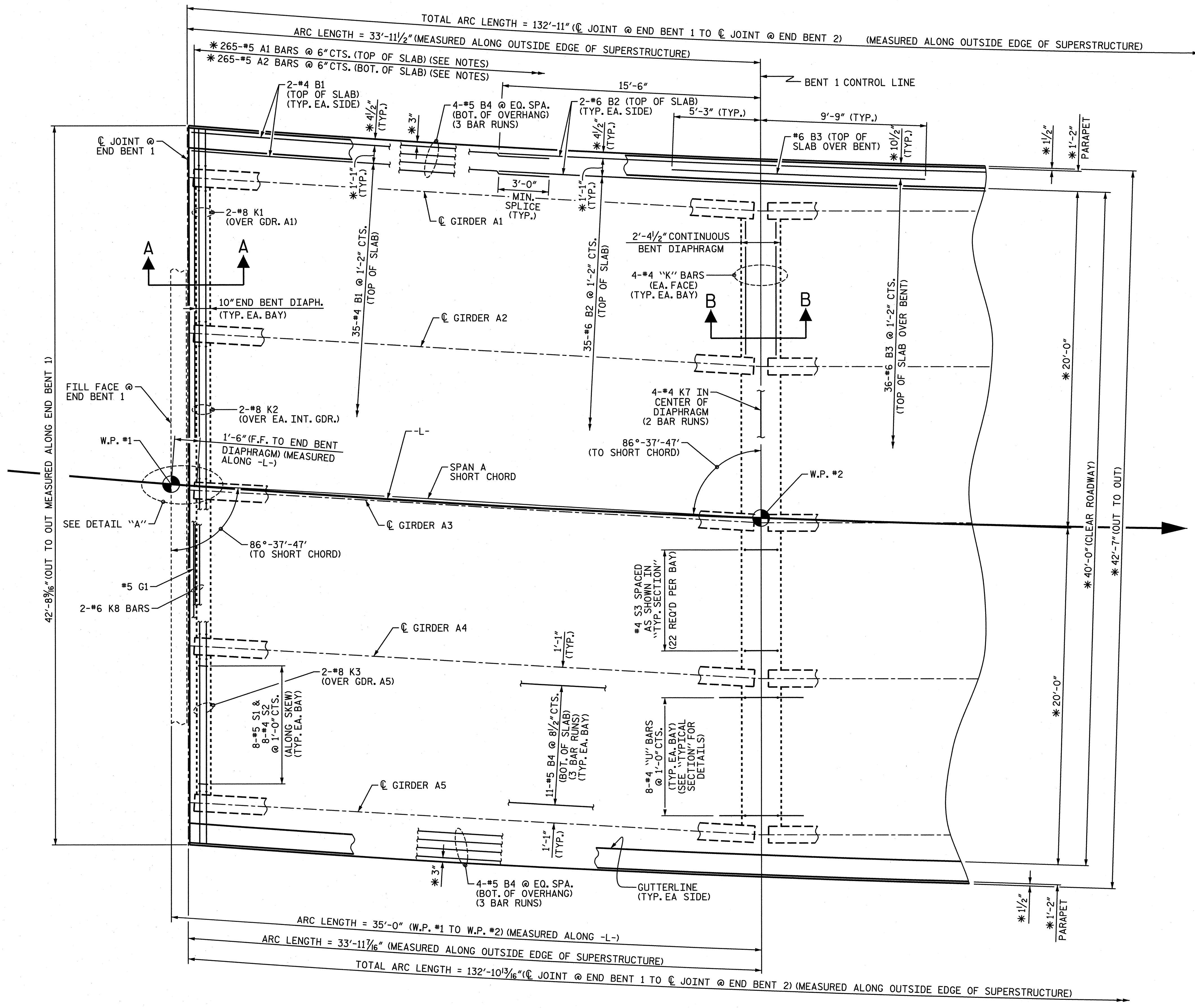
FOR ARC OFFSETS, SEE "SUPERSTRUCTURE ARC OFFSETS" SHEETS 1 OF 1.



DETAIL "A"

(SIMILAR AT END BENT 2)

Δ - INTERSECTION OF ϕ JOINT AND SHORT CHORD TO WORK POINT.



PLAN OF SPAN A

* - RADIAL DIMENSION

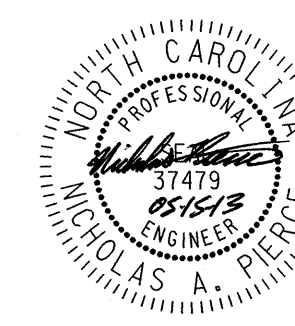
PROJECT NO. B-5109

UNION COUNTY

STATION: 16+82.50 -L-

SHEET 1 OF 3

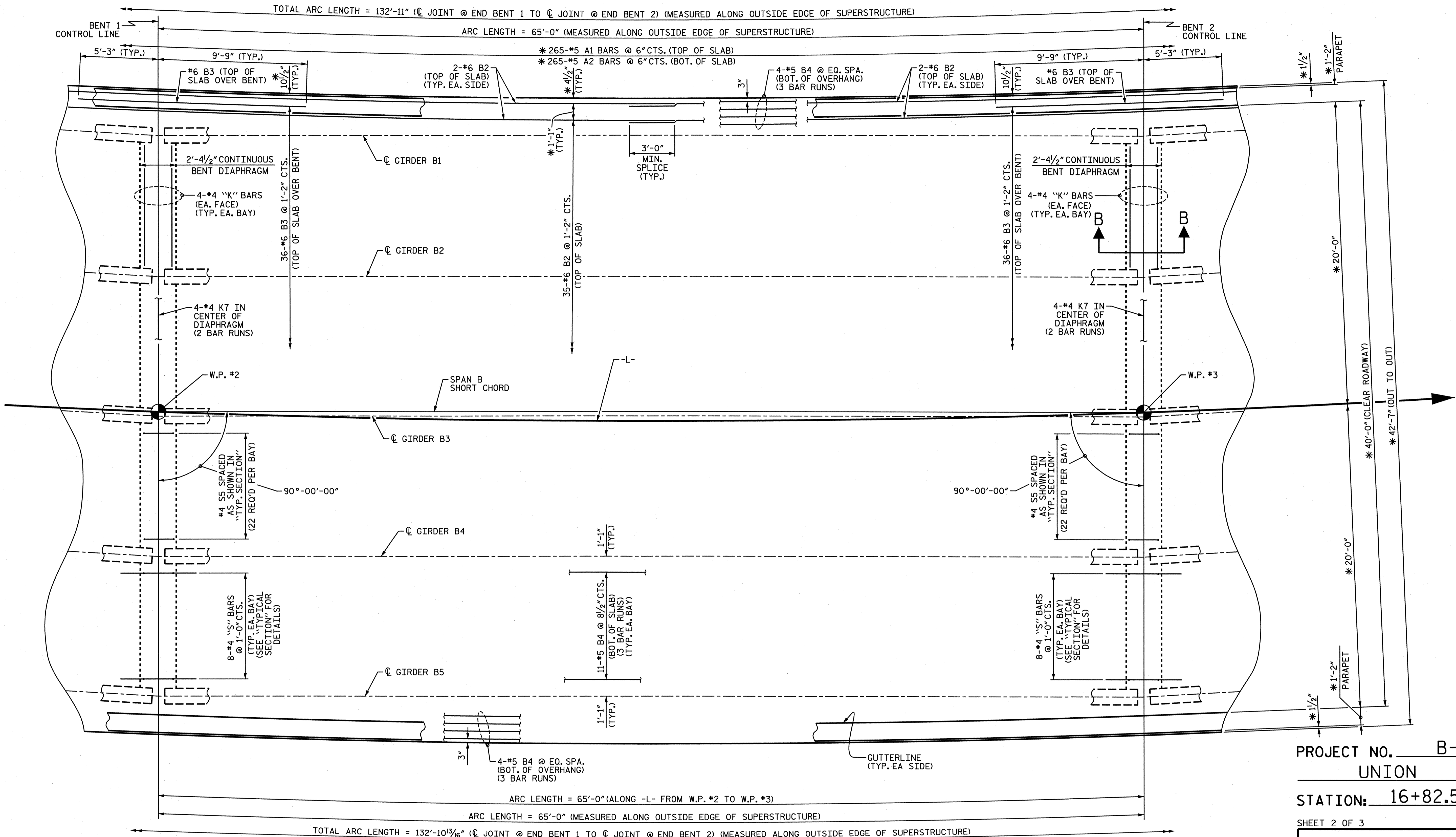
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A



WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			40

DRAWN BY: M. HOBBS DATE: 07/12
CHECKED BY: N. PIERCE DATE: 07/12



PLAN OF SPAN B

(FOR NOTES, SEE SHEET 1 OF 3)

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN B

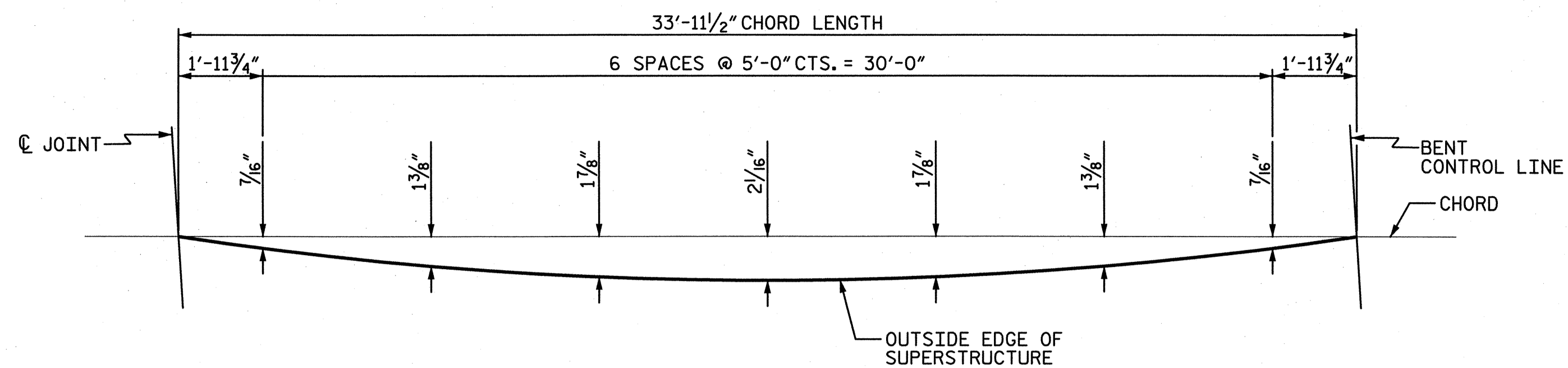


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

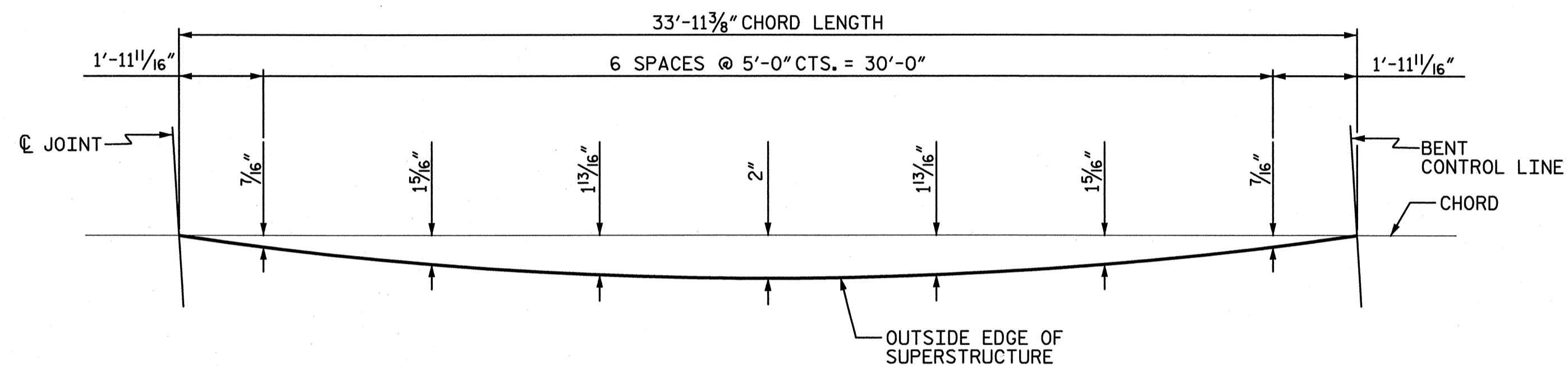
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			40

DRAWN BY : M. HOBBS DATE : 07/12
 CHECKED BY : N. PIERCE DATE : 07/12

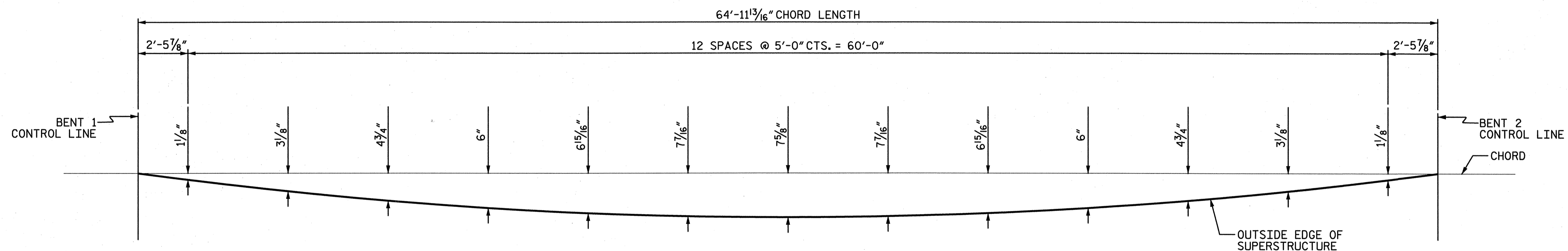
5/15/2013
 R:\220222_B-5109_Union County_NC\Structures\Drafting\Superstructure\B5109.SD.S2.dgn
 usmh04386



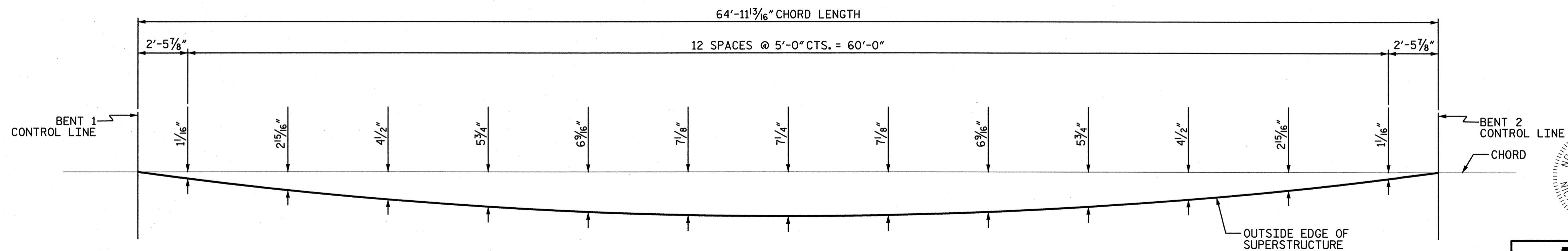
SPAN A & C OUTSIDE LEFT OVERHANG ARC OFFSET
(SPAN C IS MIRRORED)



SPAN A & C OUTSIDE RIGHT OVERHANG ARC OFFSET
(SPAN C IS MIRRORED)

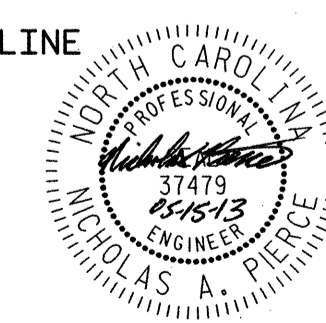


SPAN B OUTSIDE LEFT OVERHANG ARC OFFSET



SPAN B OUTSIDE RIGHT OVERHANG ARC OFFSET

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

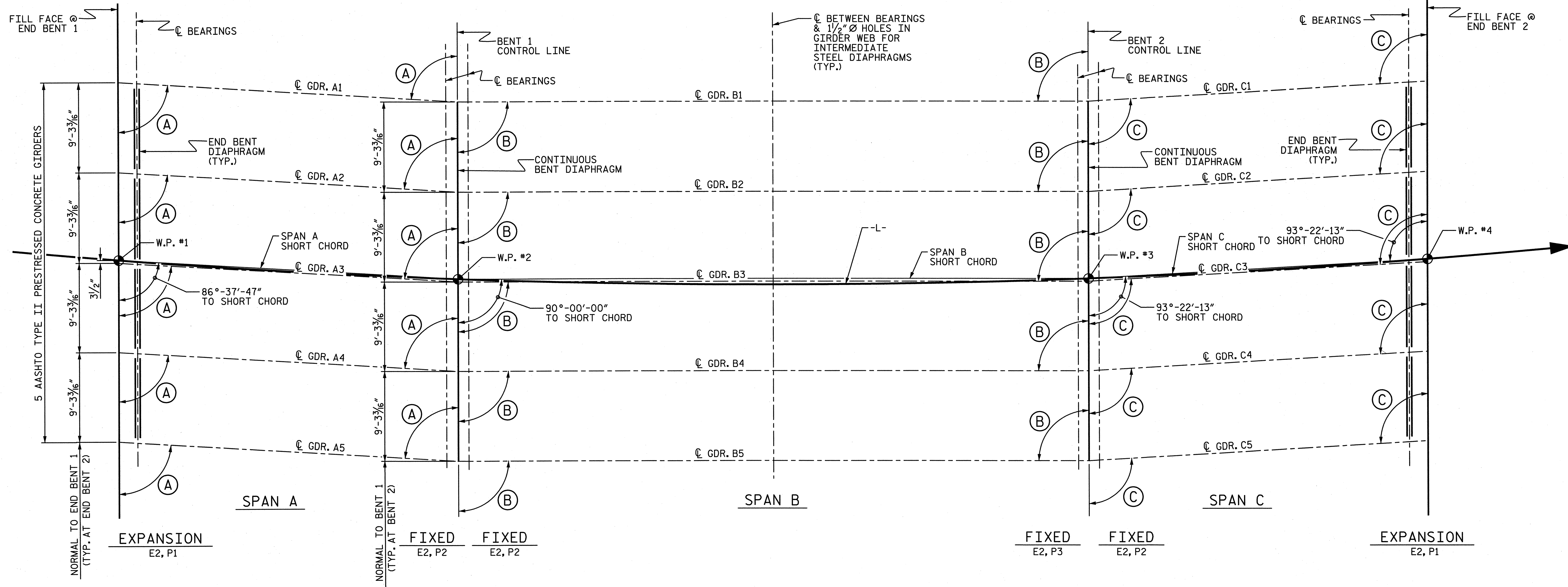


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-11	
SUPERSTRUCTURE ARC OFFSETS						TOTAL SHEETS 40	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

DRAWN BY : M. HOBBS DATE : 07/12
 CHECKED BY : N. PIERCE DATE : 07/12

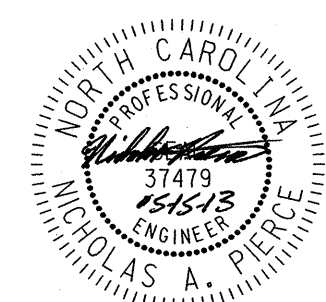
5/15/2013
 R:\122022_B-5109_Union County_NC\Structures\Drafting\Superstructure\B5109_SD_A0.dgn
 usmh04386



GIRDER LAYOUT

- ANGLES**
- (A) 86°-37'-47"
 - (B) 90°-00'-00"
 - (C) 93°-22'-13"

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

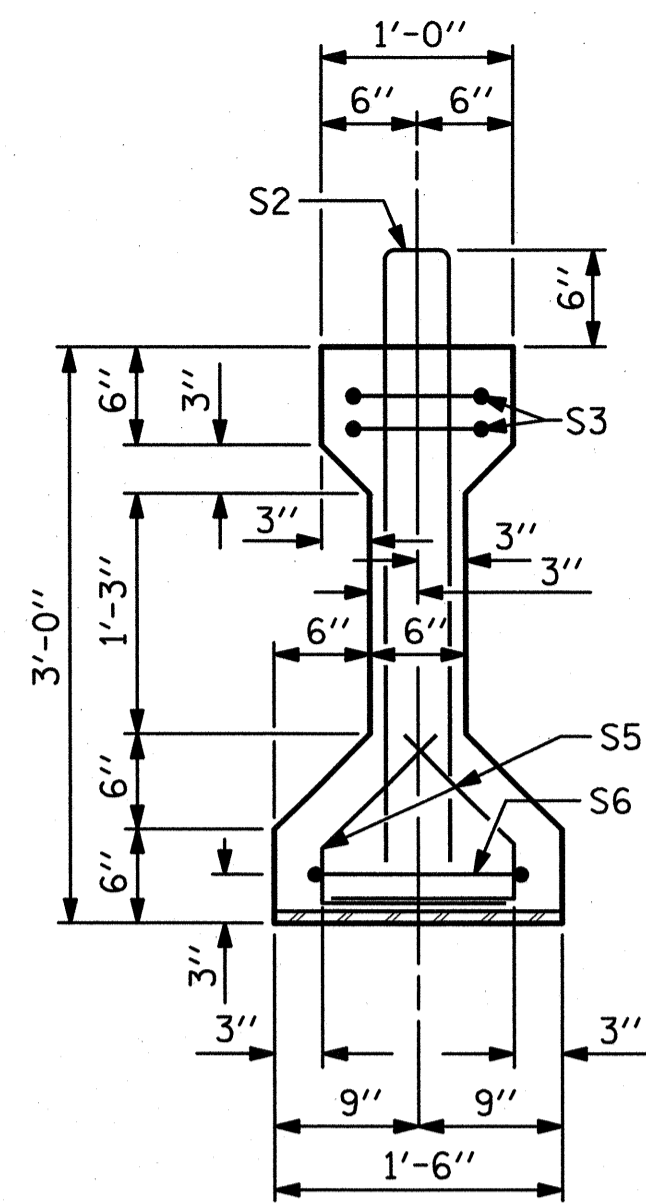


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

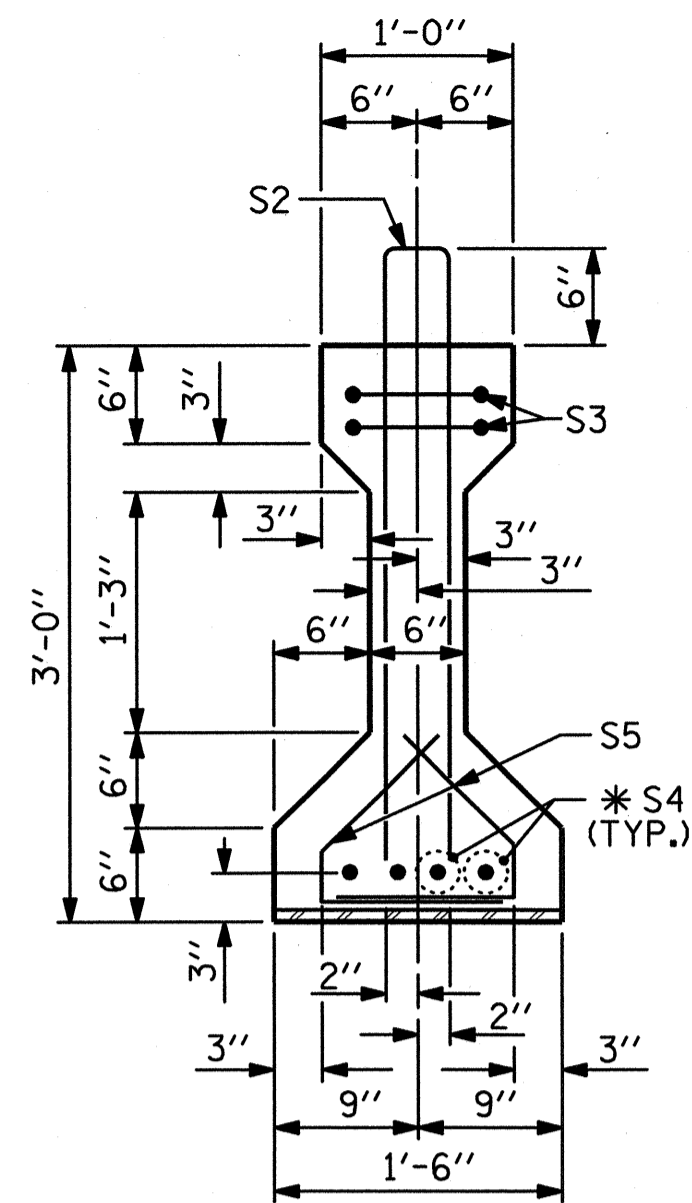
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-12
SUPERSTRUCTURE GIRDER LAYOUT						
REVISIONS						TOTAL SHEETS 40
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY : M. HOBBS DATE : 07/12
 CHECKED BY : N. PIERCE DATE : 07/12

5/15/2013
 R:\122022_B-5109_Union County_NC\Structures\Drafting\Superstructure\B5109_SD_FP.dgn
 usmh04386

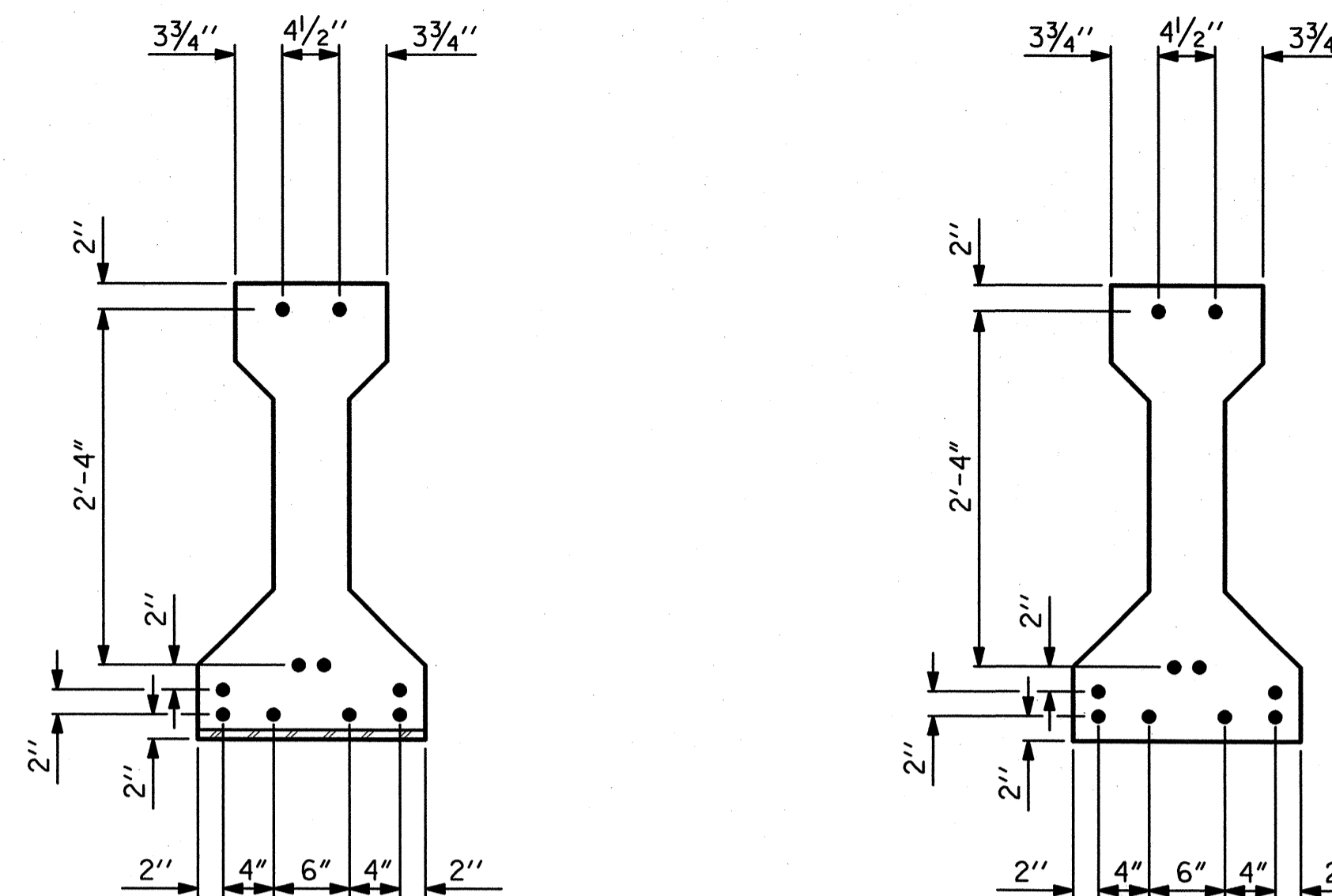


SECTION A-A



SECTION B-B

* FOR S4 BARS, SEE
DETAIL "A" OF
PRESTRESSED
CONCRETE GIRDER
CONTINUOUS FOR LIVE
LOAD DETAILS SHEET
(SHEET 3 OF 4)



AT END OF GIRDER

AT CL OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

0.6" Ø L. R. GRADE 270 STRANDS

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

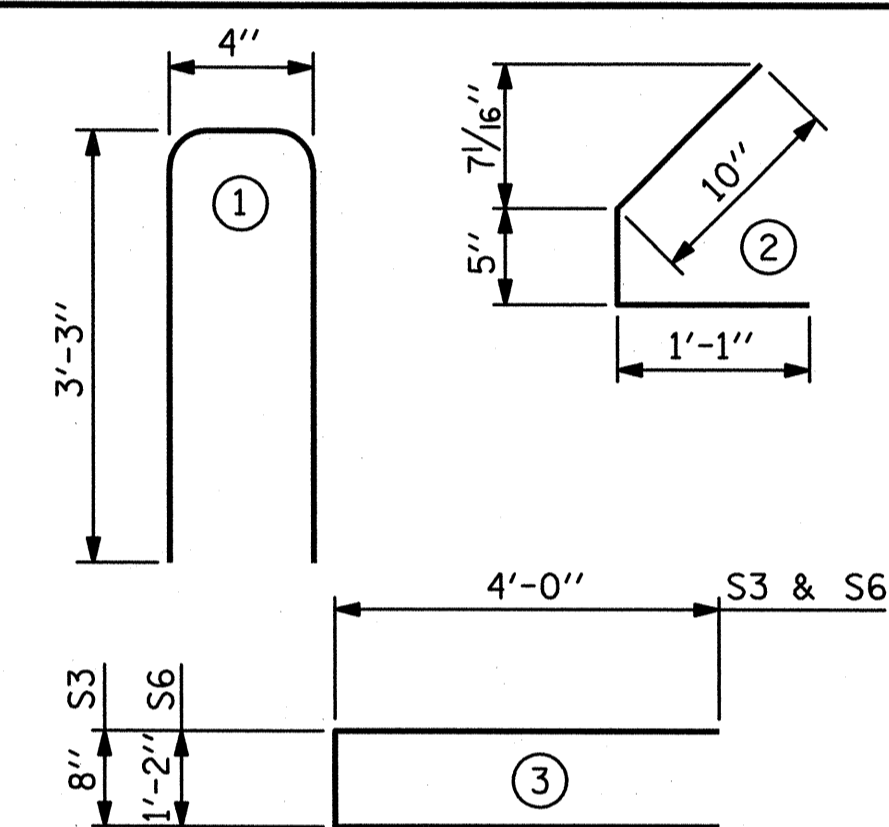
REINFORCING STEEL
FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	38	#4	1	6'-10"	173
S2	12	#5	1	6'-10"	86
S3	4	#4	3	8'-8"	23
*S4	4	#5	STR	3'-8"	15
S5	72	#4	2	2'-4"	112
S6	1	#4	3	9'-2"	6

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	5000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GIRDER QUANTITY	415	3.2	10

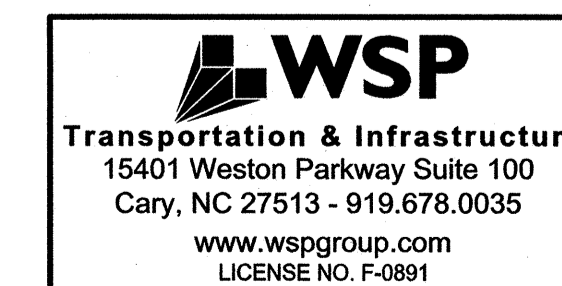
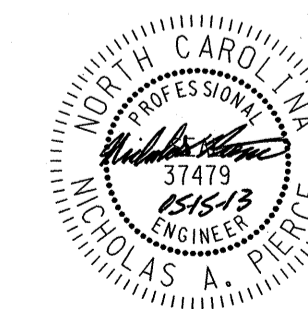
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
10	33'-2 1/2"	332.08

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

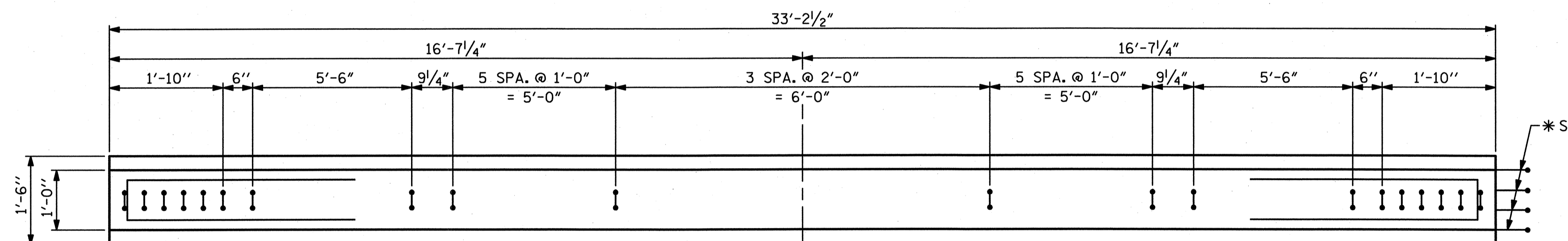
SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
AASHTO TYPE II
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPANS A & C

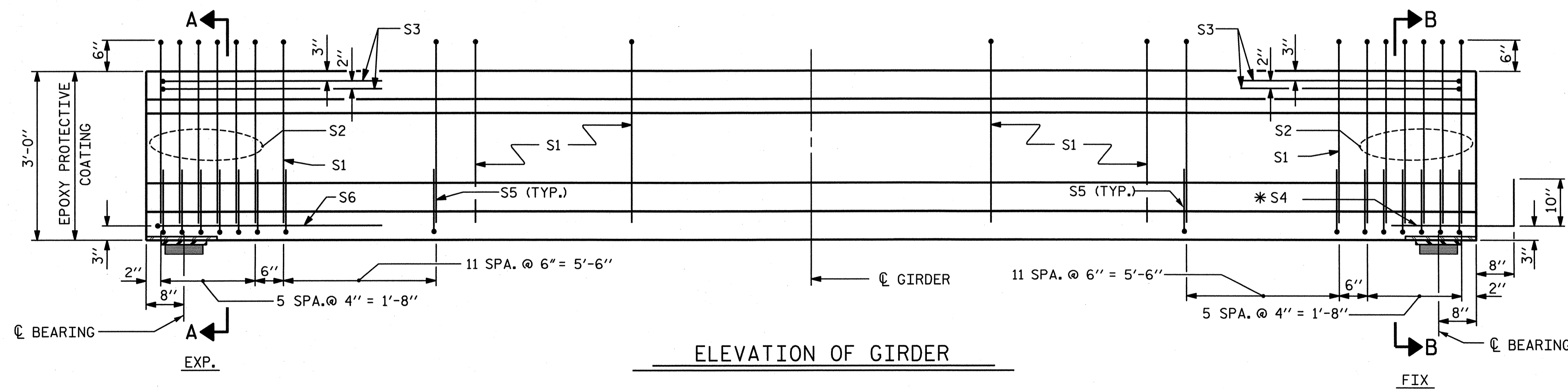


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			40

STD. NO. PCG4

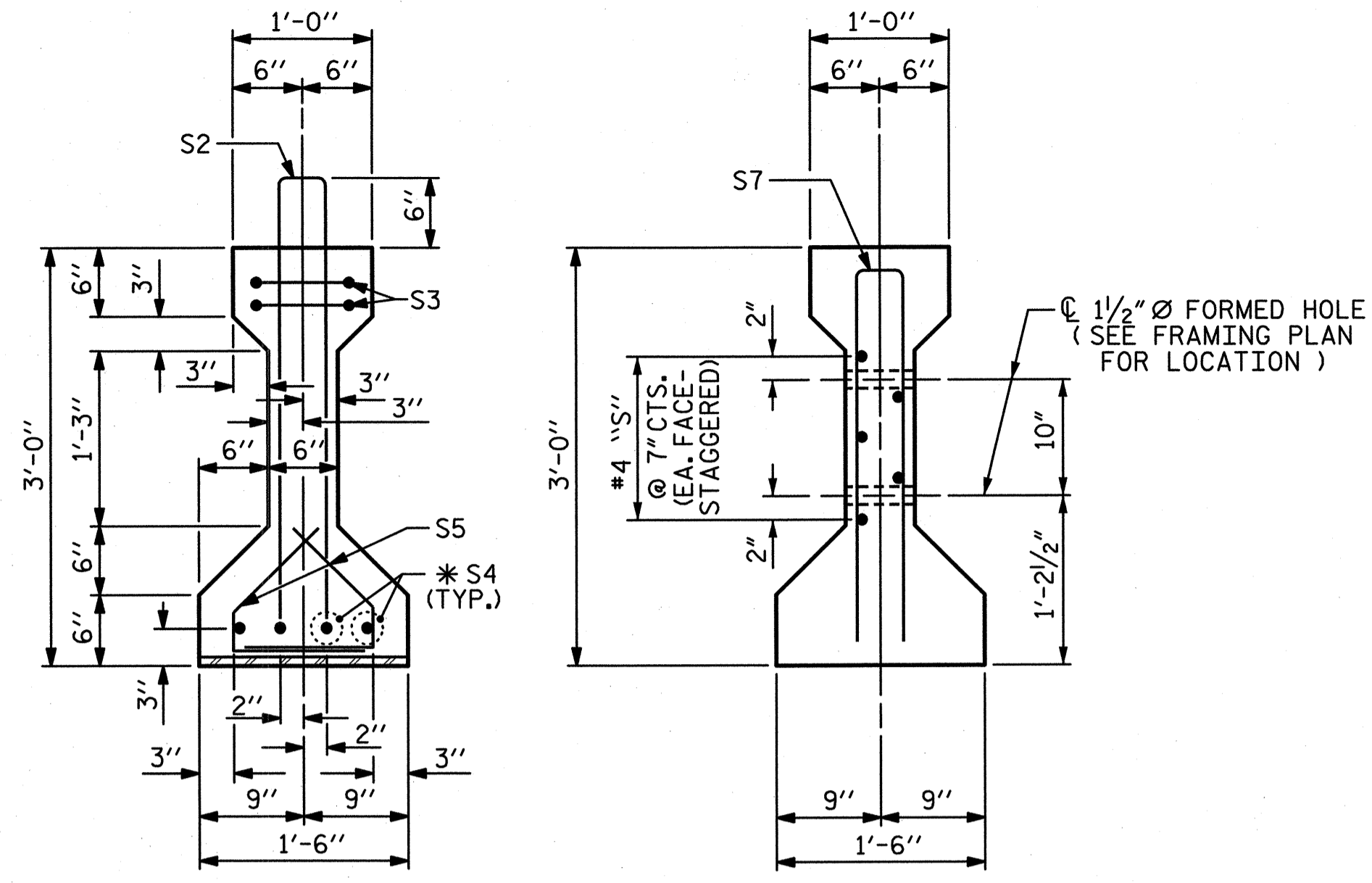


PLAN OF GIRDER



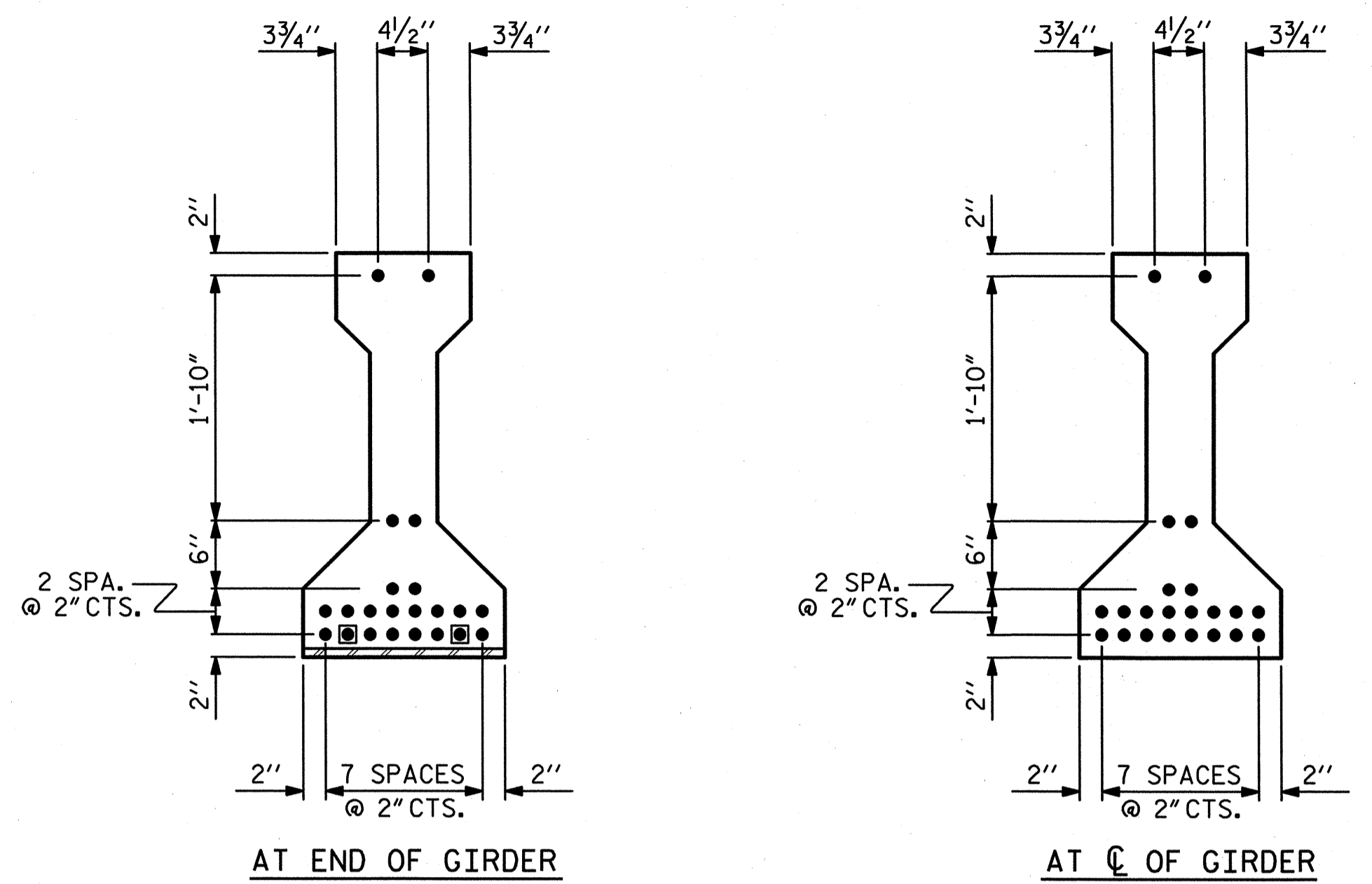
ELEVATION OF GIRDER

ASSEMBLED BY : NAP	DATE : 07/12
CHECKED BY : MAH	DATE : 07/12
DRAWN BY : ELR 8/91	REV. 10/17/00R RWW/LES
CHECKED BY : GRP 8/91	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM



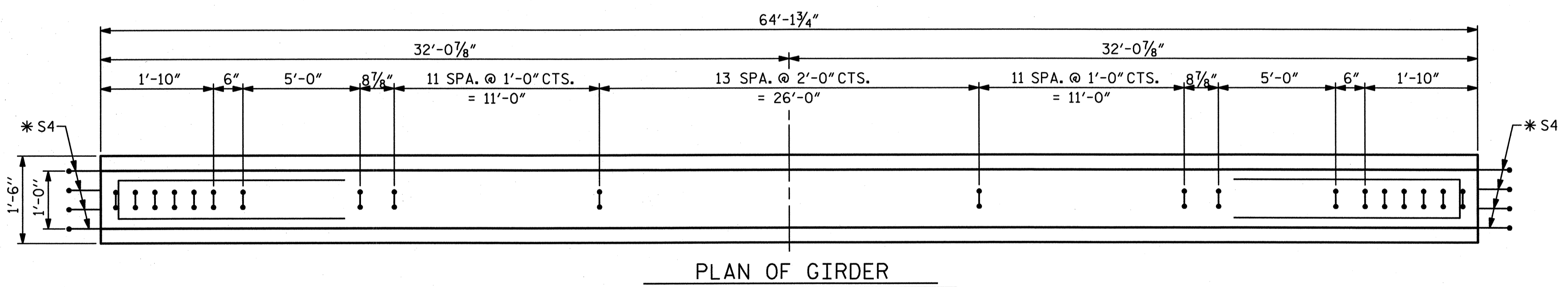
SECTION B-B
 * FOR S4 BARS, SEE
 DETAIL "B" OF
 PRESTRESSED
 CONCRETE GIRDER
 CONTINUOUS FOR LIVE
 LOAD DETAILS SHEET
 (SHEET 3 OF 4)

SECTION C-C
 (S1 BARS NOT SHOWN)

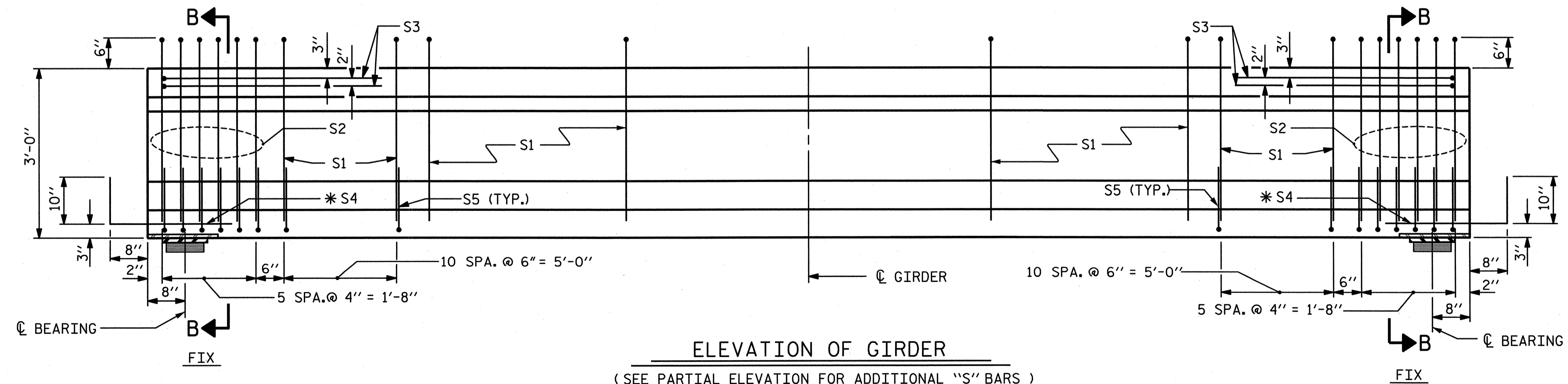


0.6" Ø LOW RELAXATION STRAND LAYOUT

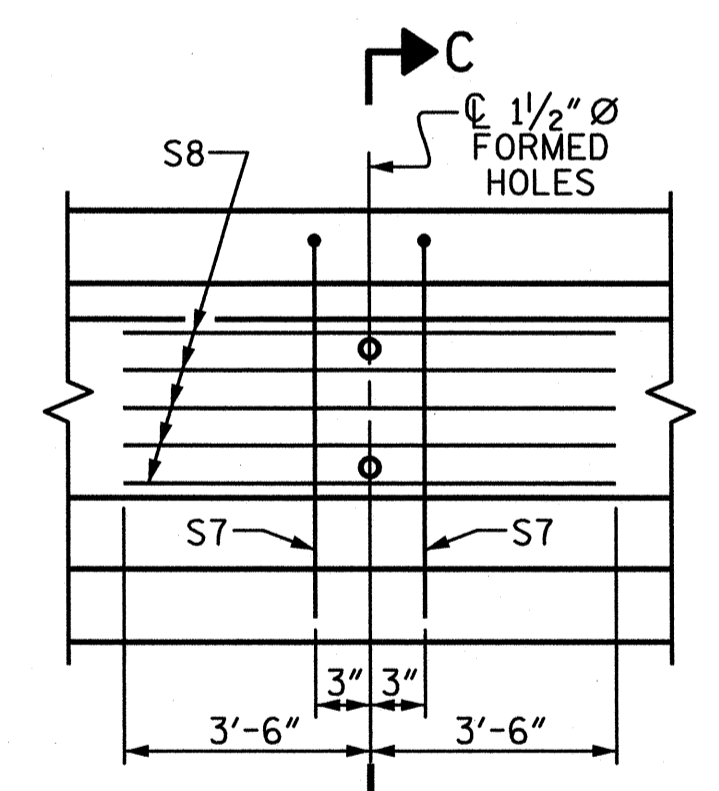
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER



PLAN OF GIRDER



ELEVATION OF GIRDER
 (SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION
 SHOWING INTERMEDIATE DIAPHRAGM
 REINFORCING STEEL FOR GIRDER

0.6" Ø L. R. GRADE 270 STRANDS

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

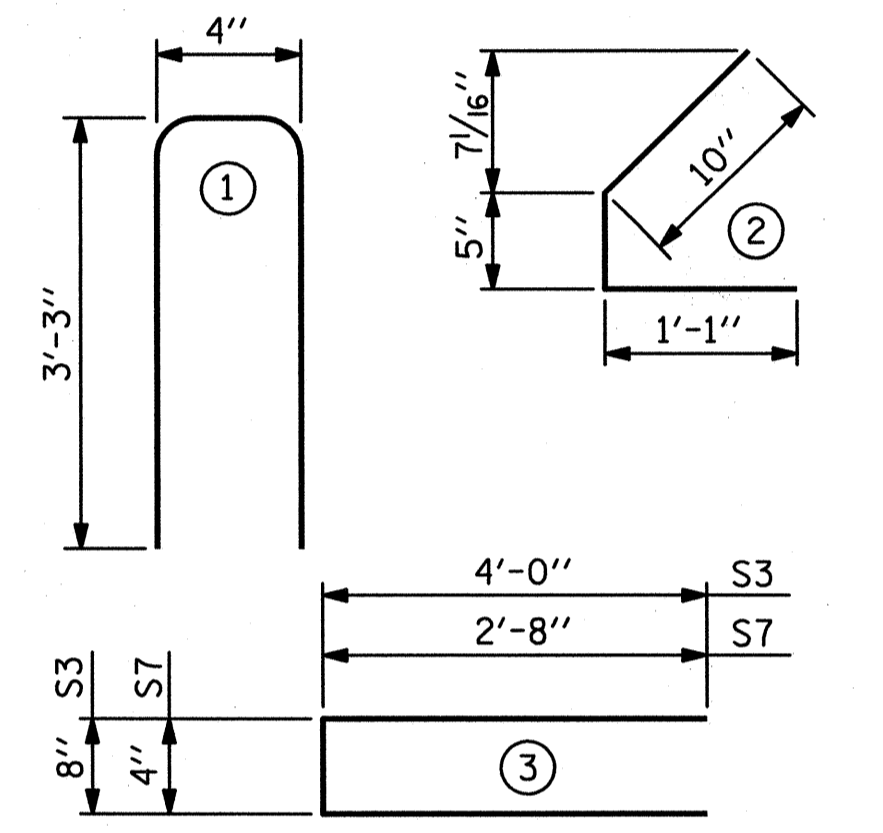
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	58	#4	1	6'-10"	265
S2	12	#5	1	6'-10"	86
S3	4	#4	3	8'-8"	23
*S4	8	#5	STR	3'-8"	31
S5	68	#4	2	2'-4"	106
S7	2	#5	3	5'-8"	12
S8	5	#4	STR	7'-0"	23

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
GIRDER QUANTITY	546	6.1	22

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	64'-1 3/4"	320.73

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 4

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

REVISIONS

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

SHEET NO. S-14
 TOTAL SHEETS 40

ASSEMBLED BY : MAH DATE : 07/12
 CHECKED BY : NAP DATE : 07/12

DRAWN BY : ELR 8/91 REV. 10/17/00R RWW/LES
 CHECKED BY : GRP 8/91 REV. 5/1/06R TLA/GM
 REV. 10/1/11 MAA/GM



NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

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.

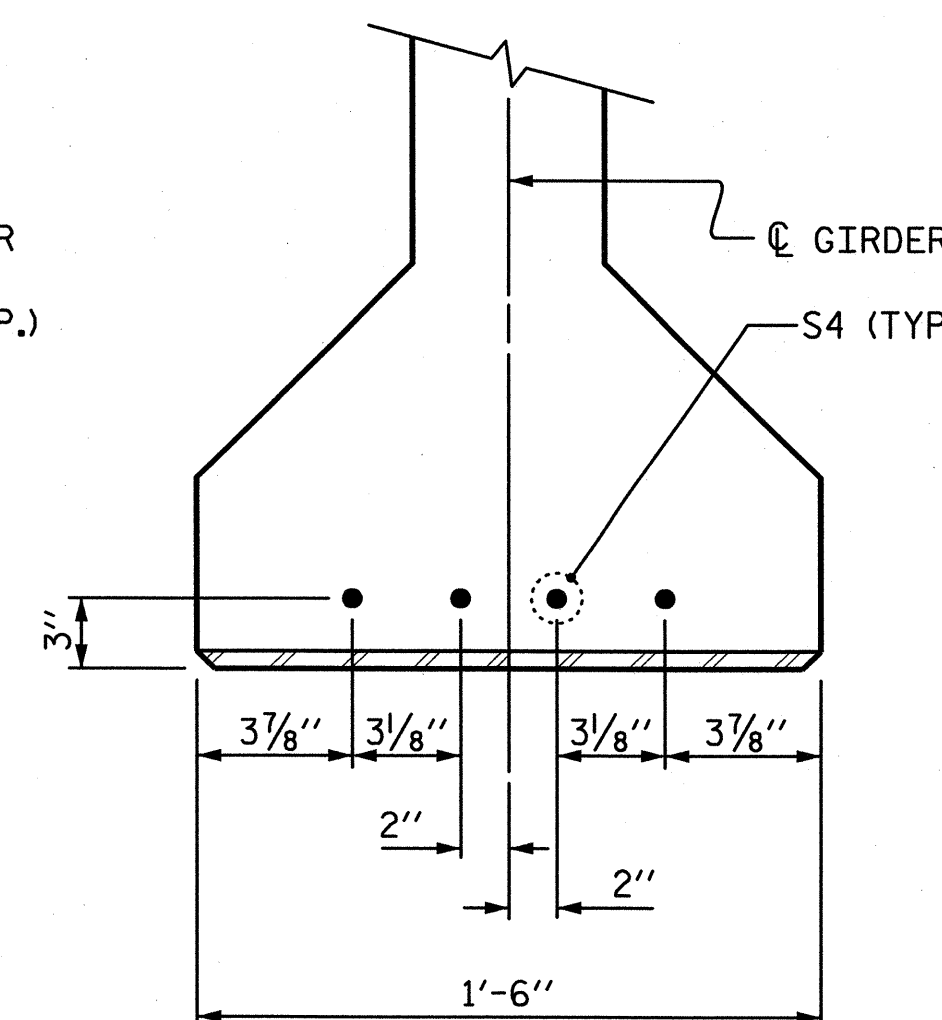
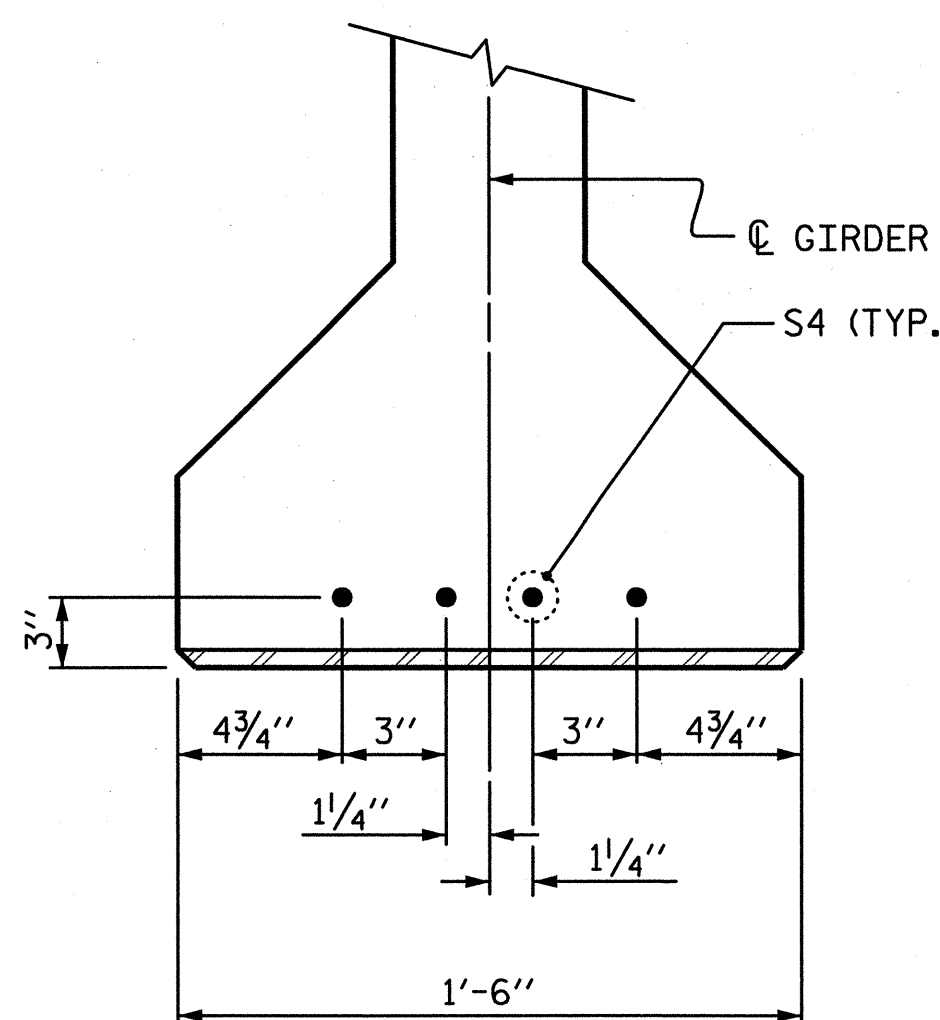
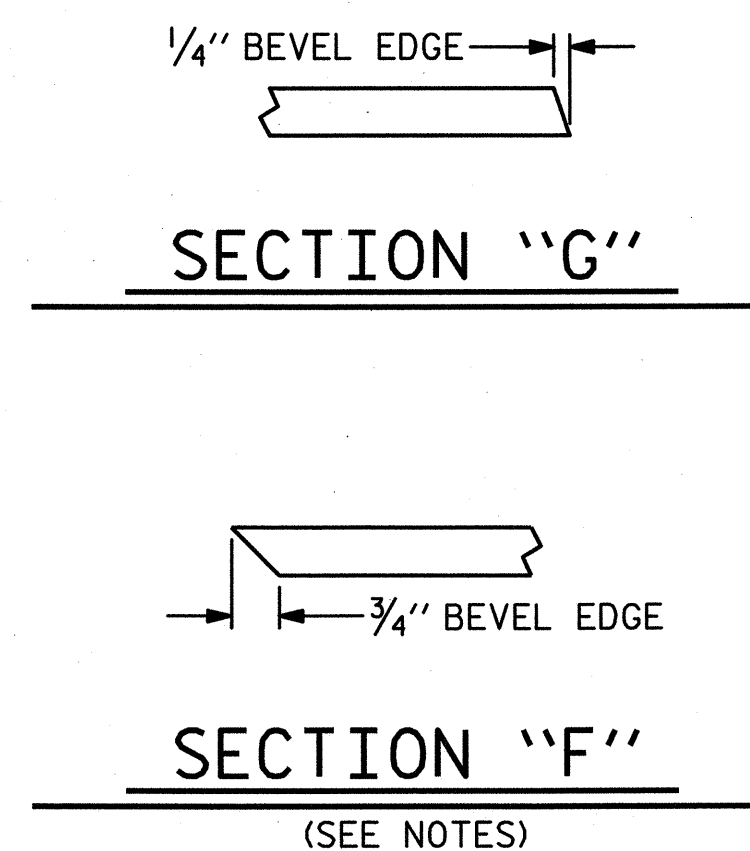
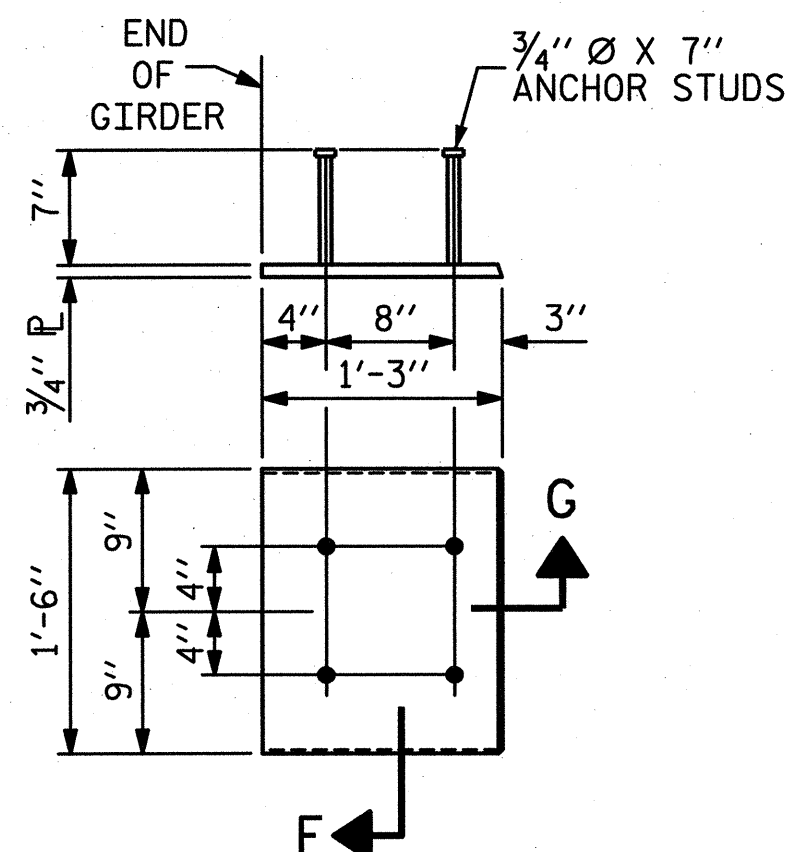
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPAN A & C GIRDERS AND 7000 PSI FOR SPAN B GIRDERS.

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".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

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



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

(2 REQ'D PER GIRDER)

DETAIL "A"

(SEE "AASHTO TYPE II PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPANS A & C") (SHEET 1 OF 4)

DETAIL "B"

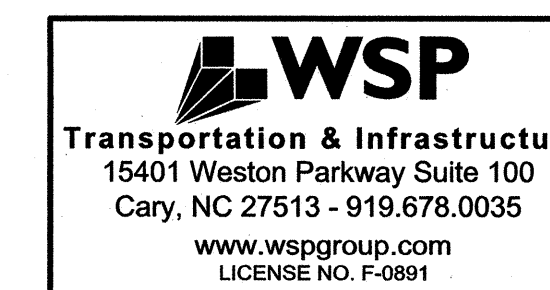
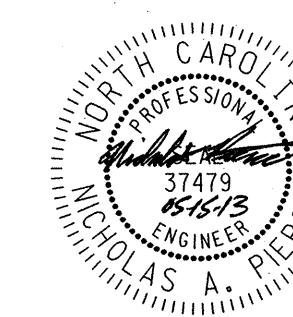
(SEE "AASHTO TYPE II PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN B") (SHEET 2 OF 4)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																							
SPAN A & C																							
0.6" Ø LOW RELAXATION	GIRDER A1, A5, C1, & C5										GIRDER A2, A3, A4, C2, C3, & C4												
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	0.012	0.022	0.029	0.033	0.034	0.033	0.029	0.022	0.012	0	0	0.012	0.022	0.029	0.033	0.034	0.033	0.029	0.022	0.012	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.003	0.006	0.009	0.011	0.003	0.011	0.009	0.006	0.006	0	0	0.003	0.007	0.010	0.012	0.012	0.012	0.010	0.007	0.003	0
FINAL CAMBER	↑	0	1/8"	3/16"	1/4"	1/4"	1/4"	1/4"	3/16"	1/8"	0	0	0	1/8"	3/16"	1/4"	1/4"	1/4"	1/4"	3/16"	1/8"	0	
SPAN B																							
0.6" Ø LOW RELAXATION	GIRDER B1 & B5										GIRDER B2, B3, & B4												
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	0.092	0.163	0.215	0.246	0.256	0.246	0.215	0.163	0.092	0	0	0.092	0.163	0.215	0.246	0.256	0.246	0.215	0.163	0.092	
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.039	0.077	0.106	0.125	0.132	0.125	0.106	0.076	0.039	0	0	0.042	0.084	0.116	0.137	0.144	0.137	0.116	0.084	0.042	0
FINAL CAMBER	↑	0	5/8"	1 1/16"	1 5/16"	1 7/16"	1 1/2"	1 7/16"	1 5/16"	1 1/16"	5/8"	0	0	5/8"	15/16"	1 3/16"	1 5/16"	1 5/16"	1 5/16"	1 3/16"	15/16"	5/8"	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-5109
UNION COUNTY
STATION: 16+82.50-L-

SHEET 3 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15	
1			3			TOTAL SHEETS	
2			4			40	

ASSEMBLED BY : NAP	DATE : 01/13
CHECKED BY : MAH	DATE : 01/13
DRAWN BY : ELR 11/91	REV. 7/10/01RR LES/RDR
CHECKED BY : GRP 11/91	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

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 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.

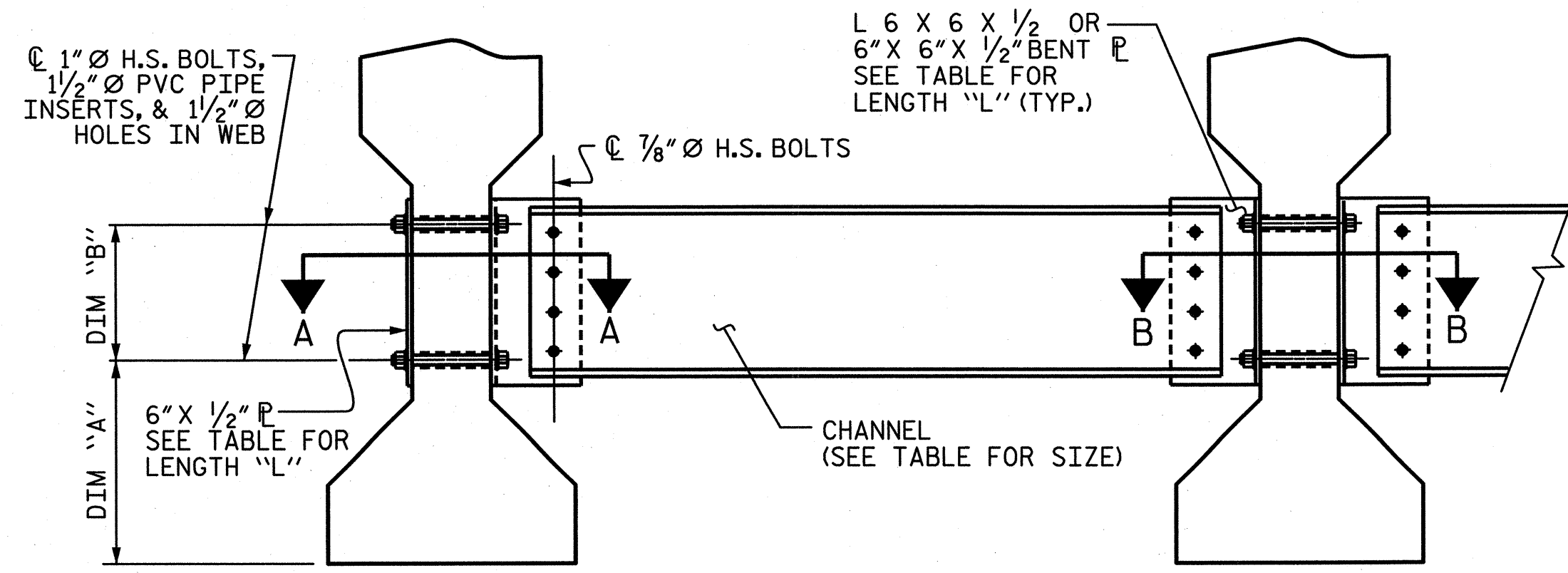
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

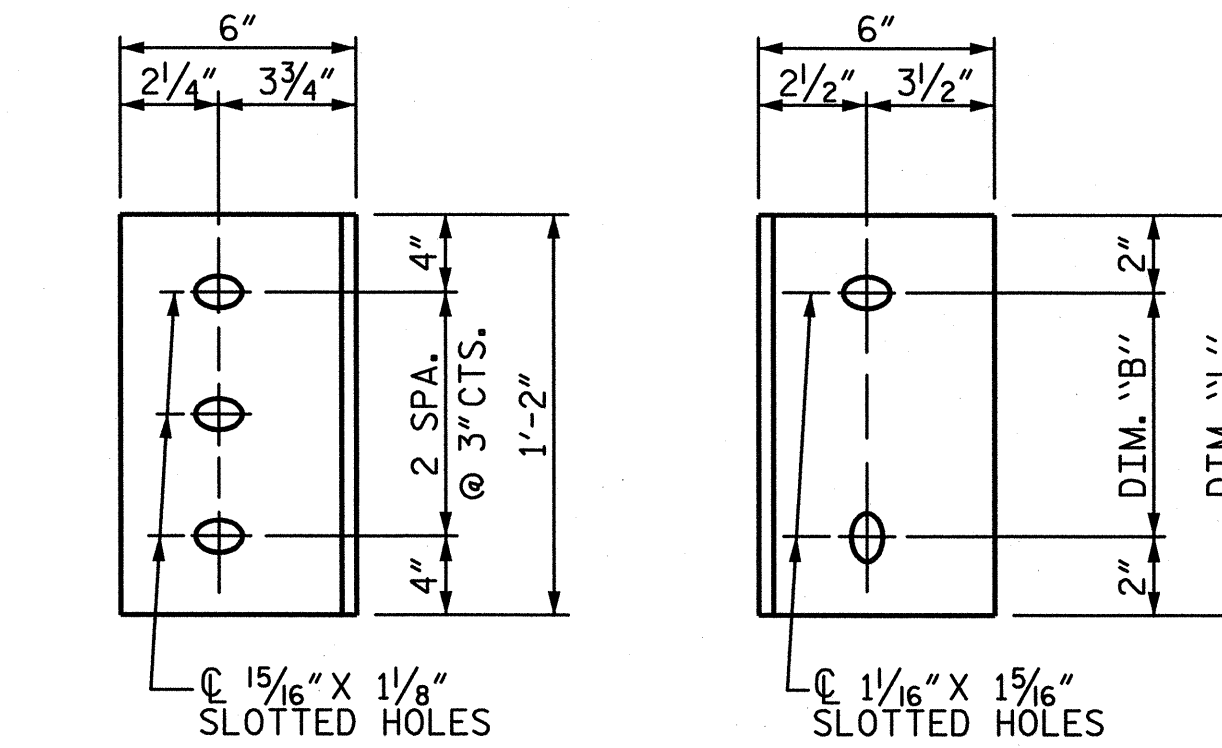
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

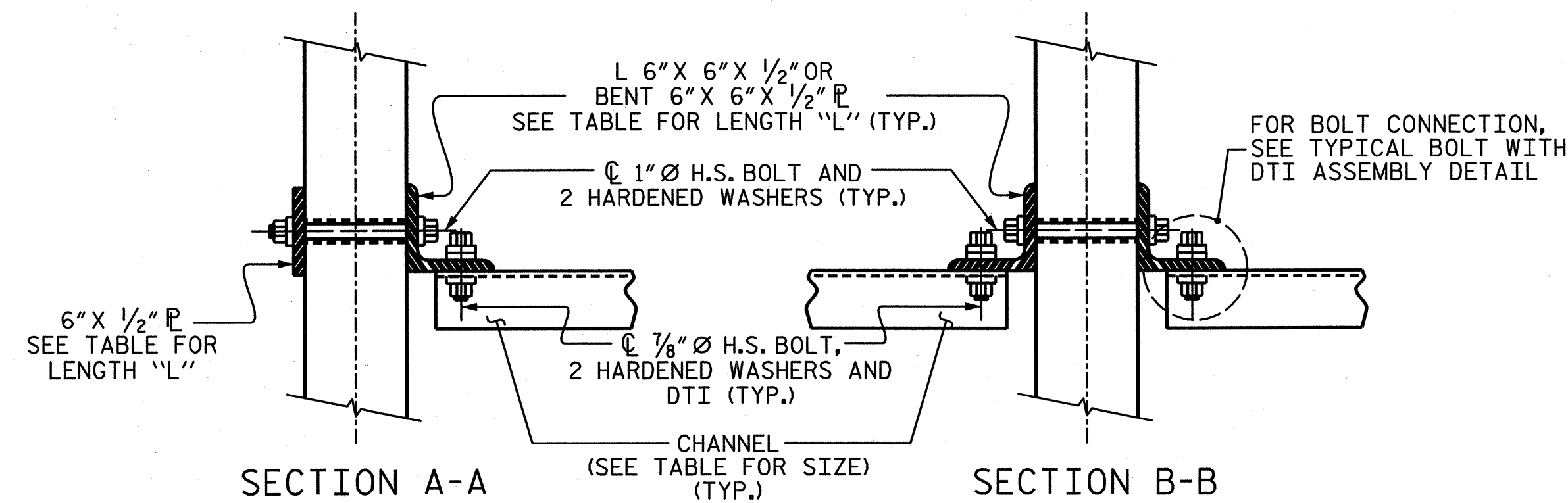
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER **INTERIOR GIRDER**
PART SECTION AT INTERMEDIATE DIAPHRAGM
 (TYPE III OR TYPE IV GIRDER SHOWN)



DIAPHRAGM FACE **WEB FACE**
CONNECTOR PLATE DETAILS



SECTION A-A **SECTION B-B**
CONNECTION DETAILS
 (FOR SKEW = 90°)

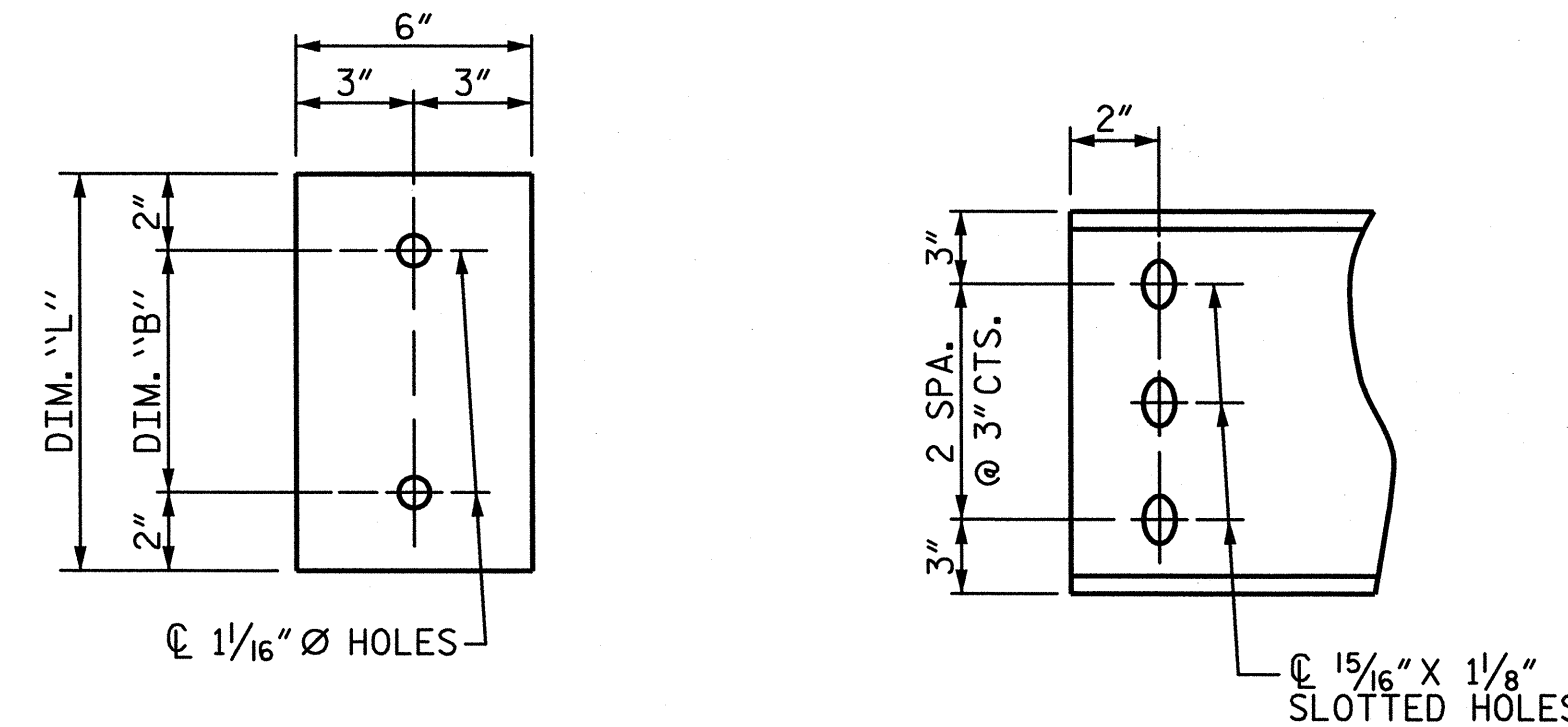
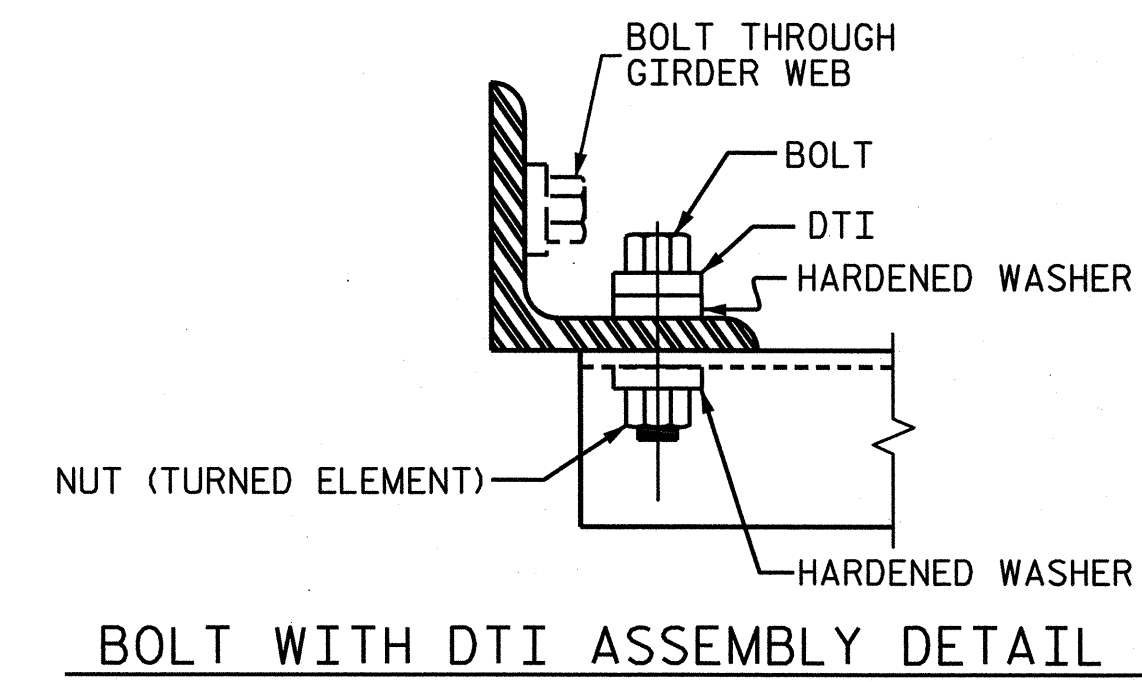


PLATE DETAILS **CHANNEL END**

TABLE

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



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 4 OF 4



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : MAH	DATE : 07/12
CHECKED BY : NAP	DATE : 07/12
DRAWN BY : TLA 6/05	ADDED 10/21/05
CHECKED BY : VC 6/05	REV. 5/1/06RRR KMM/GM
	REV. 10/1/11 MAA/GM

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.

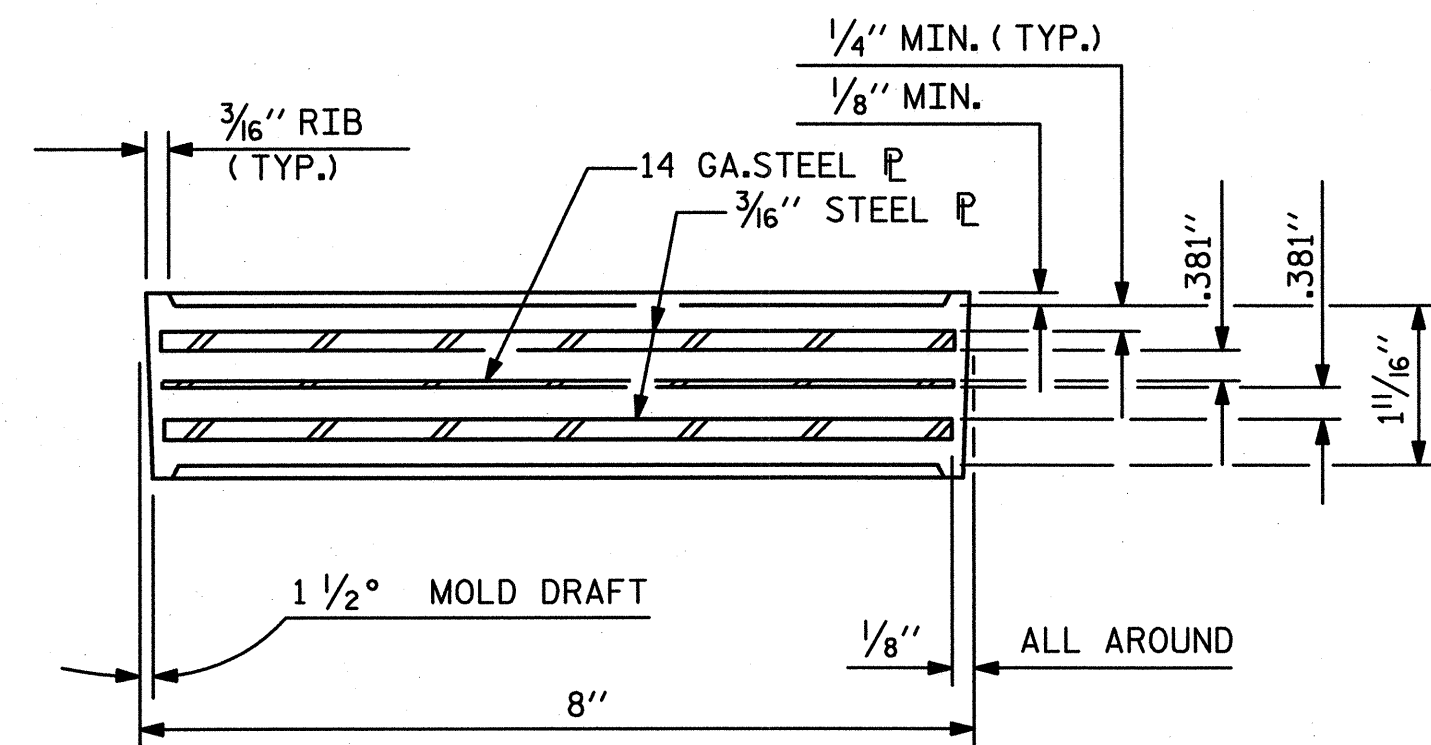
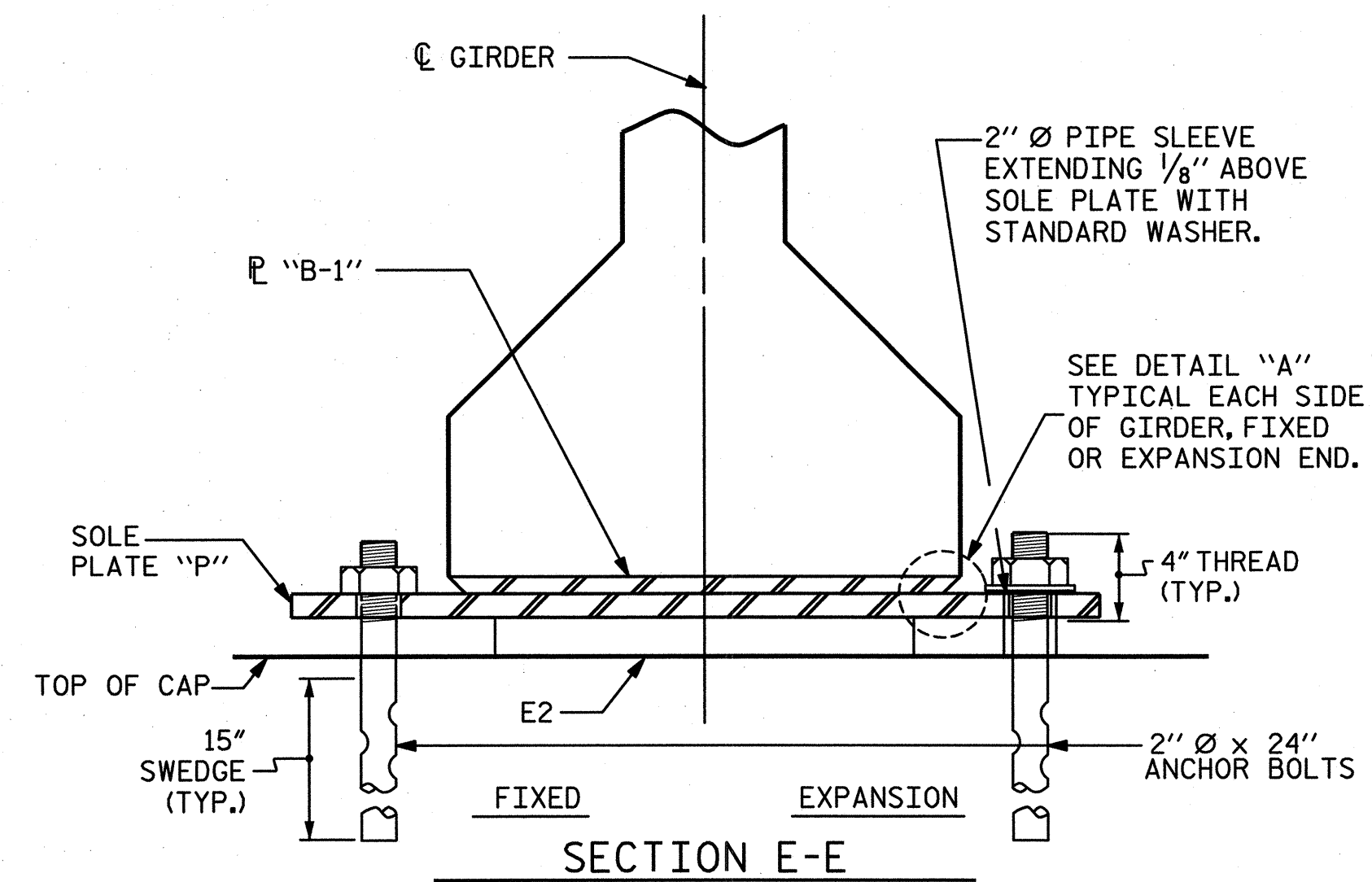
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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.

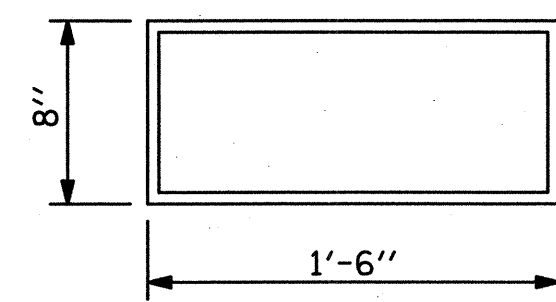
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

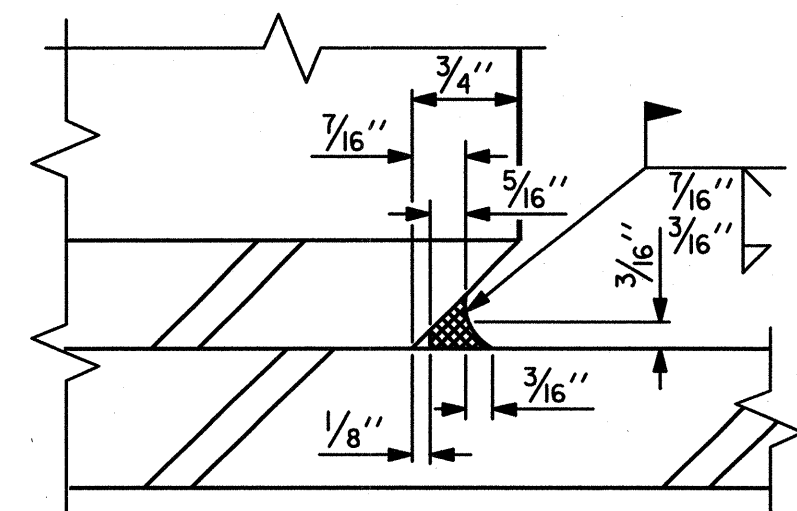
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



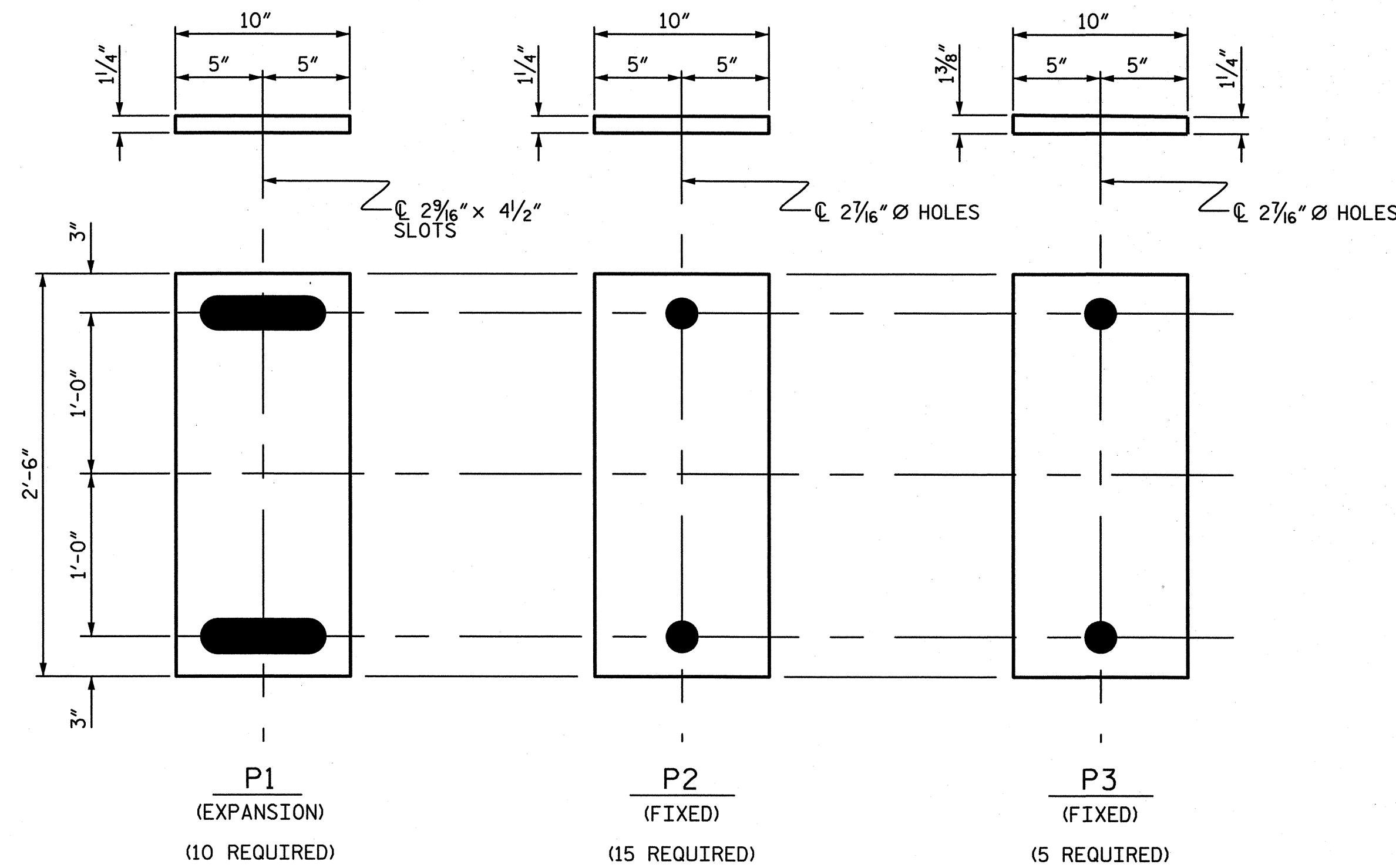
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (30 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE III

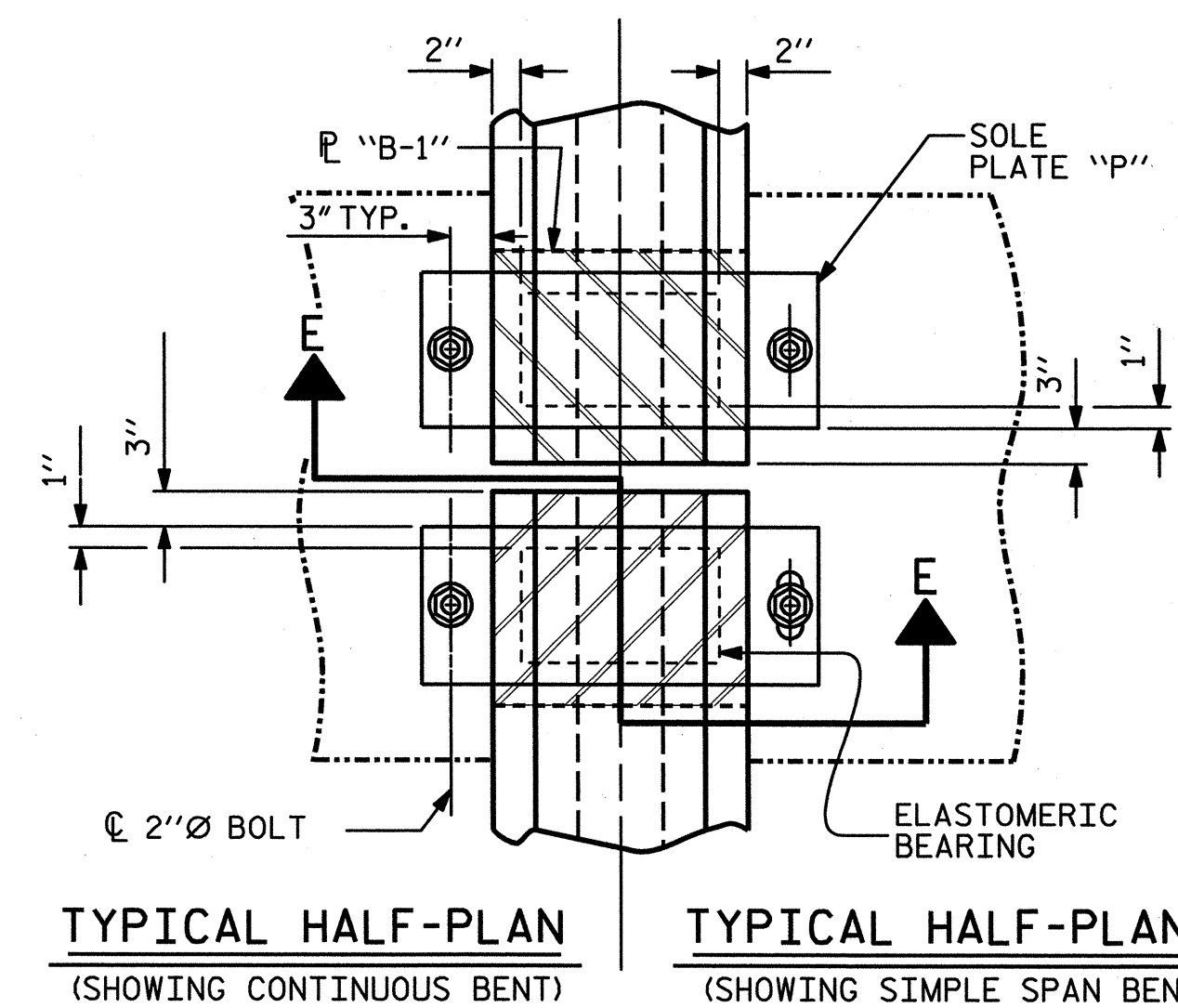


DETAIL "A"



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT) TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

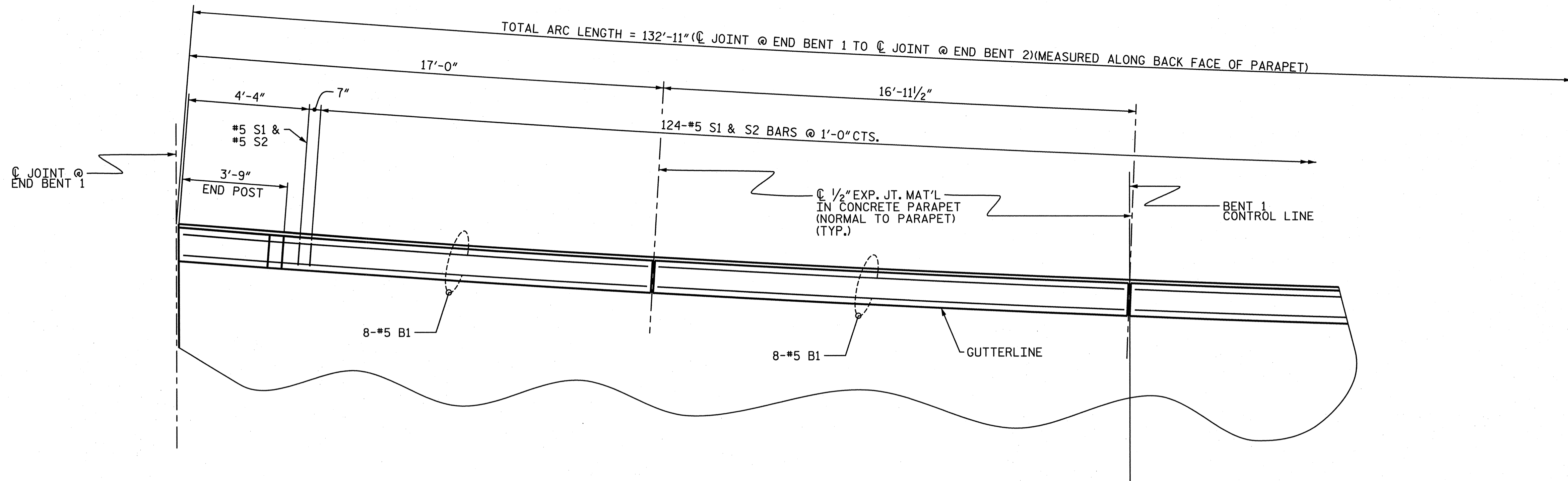


WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

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

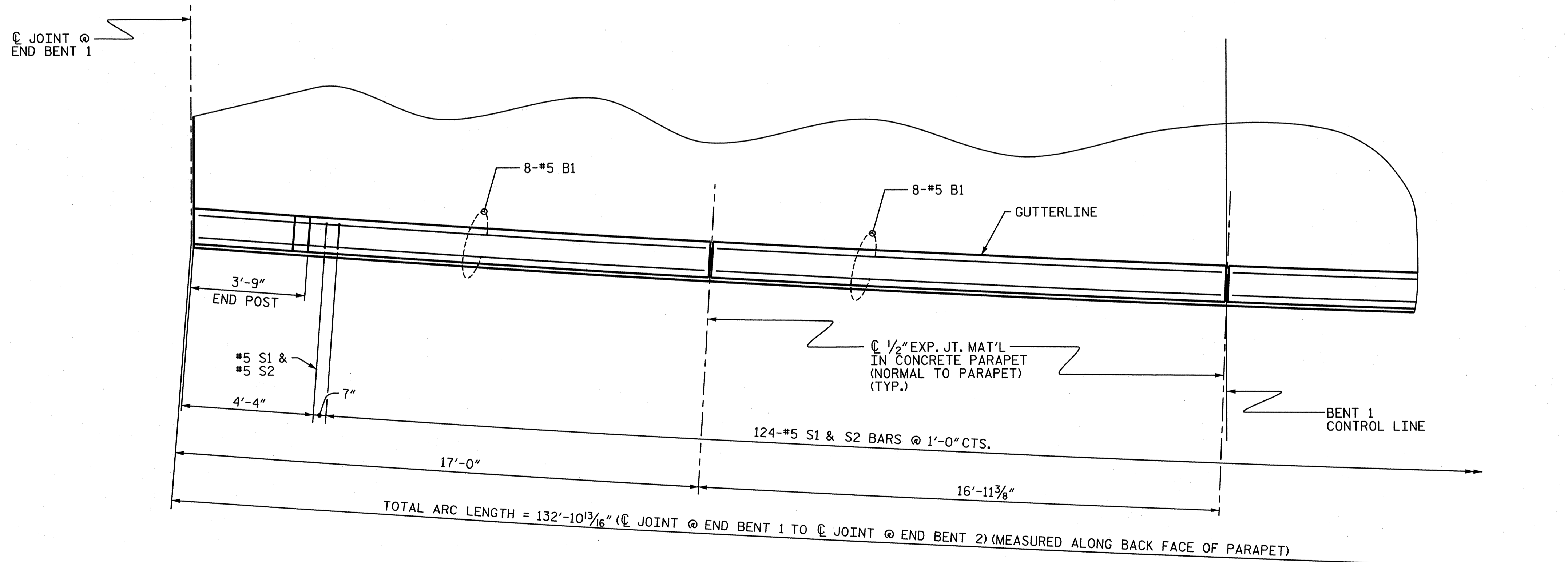
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17	TOTAL SHEETS
1			3				40
2			4				

ASSEMBLED BY : MAH	DATE : 02/13
CHECKED BY : NAP	DATE : 02/13
DRAWN BY : WJH 8/89	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 8/89	REV. 10/1/11 MAA/GM
	REV. 10/24/12 AAC/MAA



PLAN OF LEFT SIDE SPAN A

(ALL DIMENSIONS ARE MEASURED ALONG BACK FACE OF CONCRETE PARAPET.)



PLAN OF RIGHT SIDE SPAN A

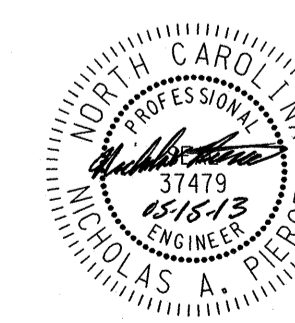
(ALL DIMENSIONS ARE MEASURED ALONG BACK FACE OF CONCRETE PARAPET.)

PROJECT NO. B-5109

UNION COUNTY

STATION: 16+82.50 -L-

SHEET 1 OF 4

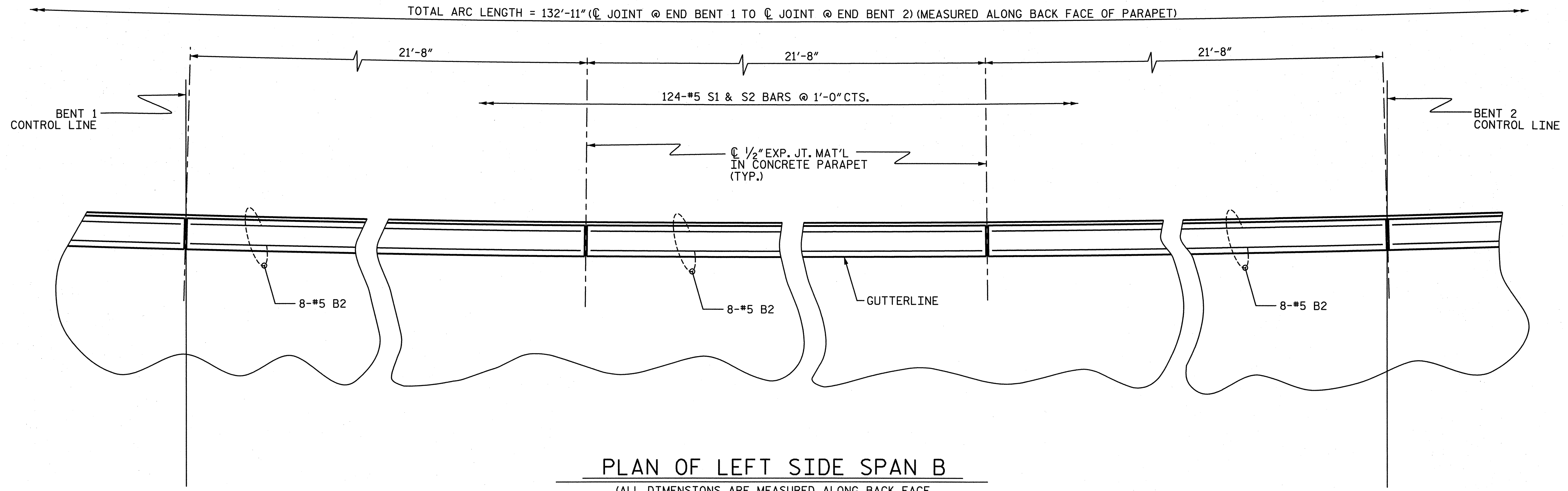


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

STATE OF NORTH CAROLINA						SHEET NO. S-18
DEPARTMENT OF TRANSPORTATION						
RALEIGH						TOTAL SHEETS 40
SUPERSTRUCTURE						
CONCRETE PARAPET DETAILS SPAN A						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

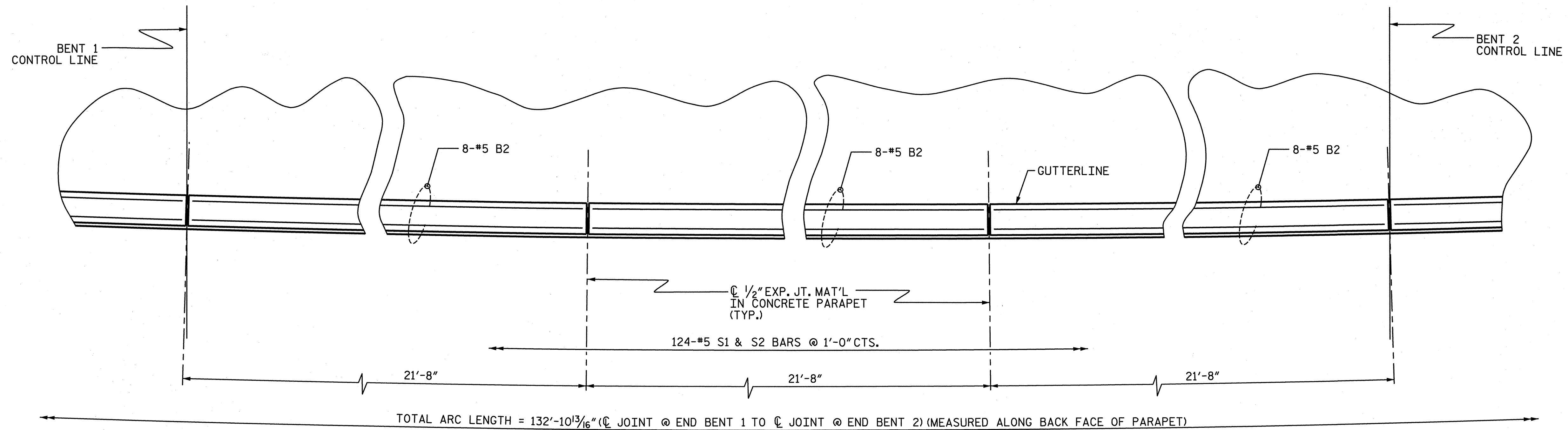
DRAWN BY: M. HOBBS DATE: 07/12
 CHECKED BY: N. PIERCE DATE: 07/12

5/15/2013
 R:\122022-B-5109_Union County_NC\Structures\Drafting\Superstructure\B5109_SD_BR.dgn
 usmh04386



PLAN OF LEFT SIDE SPAN B

(ALL DIMENSIONS ARE MEASURED ALONG BACK FACE OF CONCRETE PARAPET.)



PLAN OF RIGHT SIDE SPAN B

(ALL DIMENSIONS ARE MEASURED ALONG BACK FACE OF CONCRETE PARAPET.)

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 4

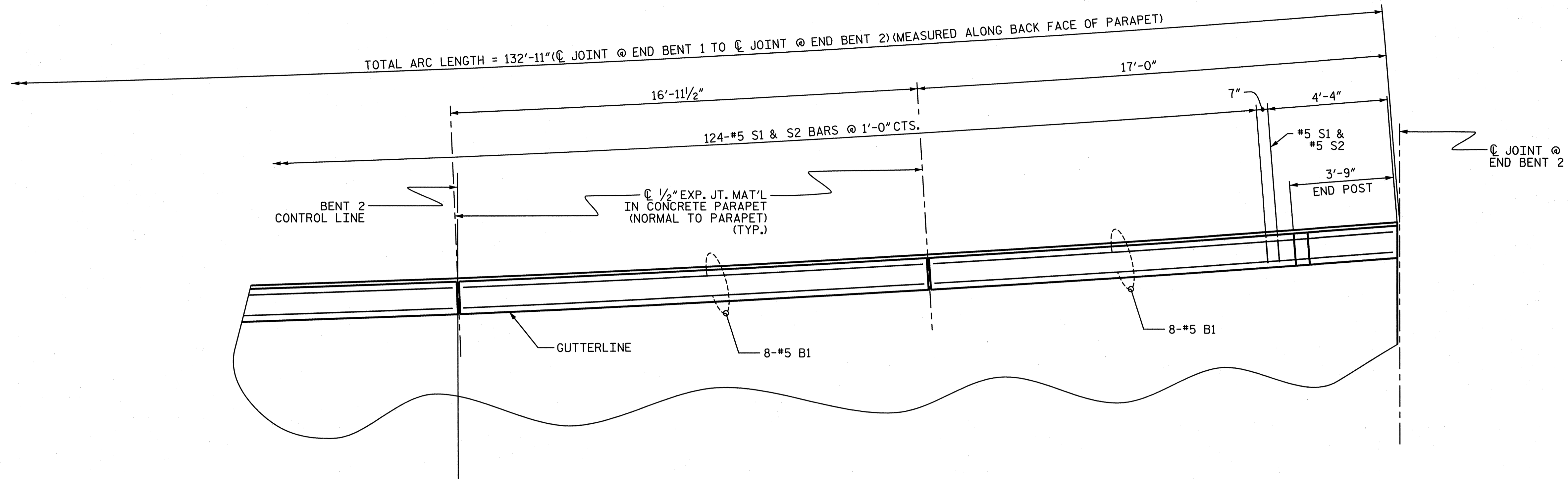


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE PARAPET
 DETAILS
 SPAN B

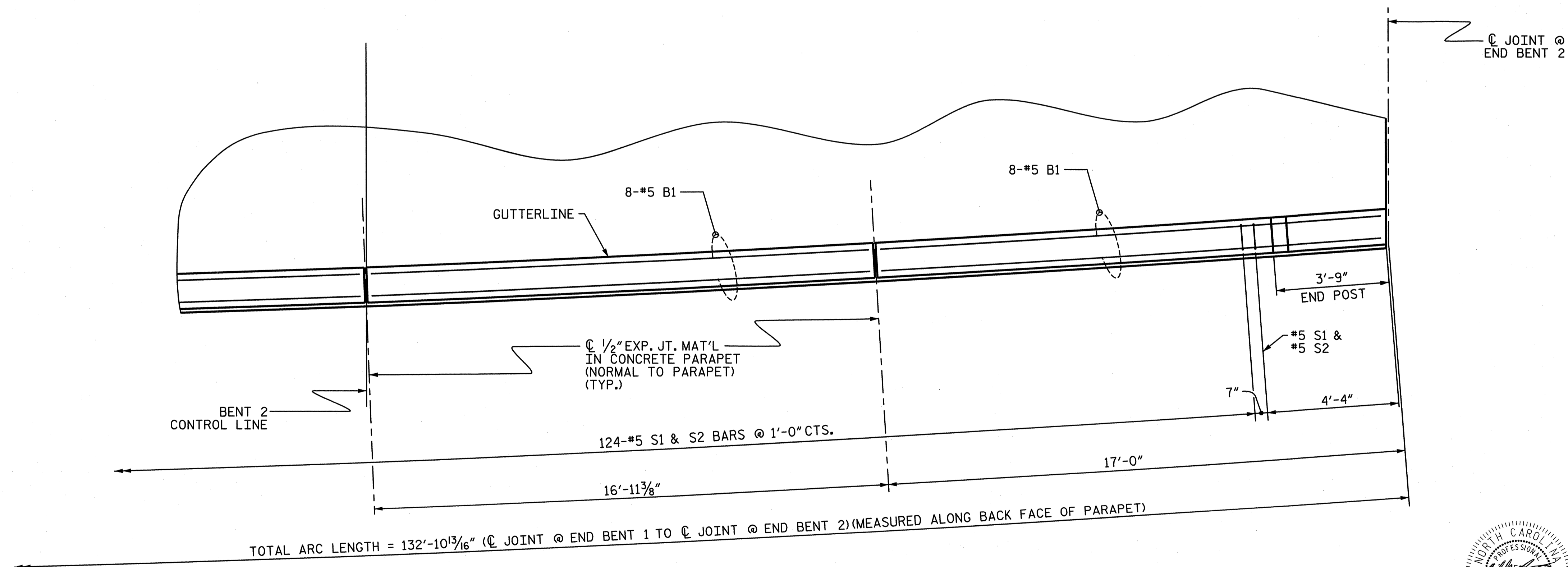
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			40

DRAWN BY : M. HOBBS DATE : 07/12
 CHECKED BY : N. PIERCE DATE : 07/12



PLAN OF LEFT SIDE SPAN C

(ALL DIMENSIONS ARE MEASURED ALONG BACK FACE OF CONCRETE PARAPET.)

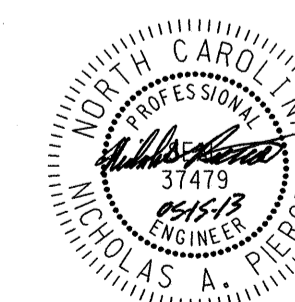


PLAN OF RIGHT SIDE SPAN C

(ALL DIMENSIONS ARE MEASURED ALONG BACK FACE OF CONCRETE PARAPET.)

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 3 OF 4

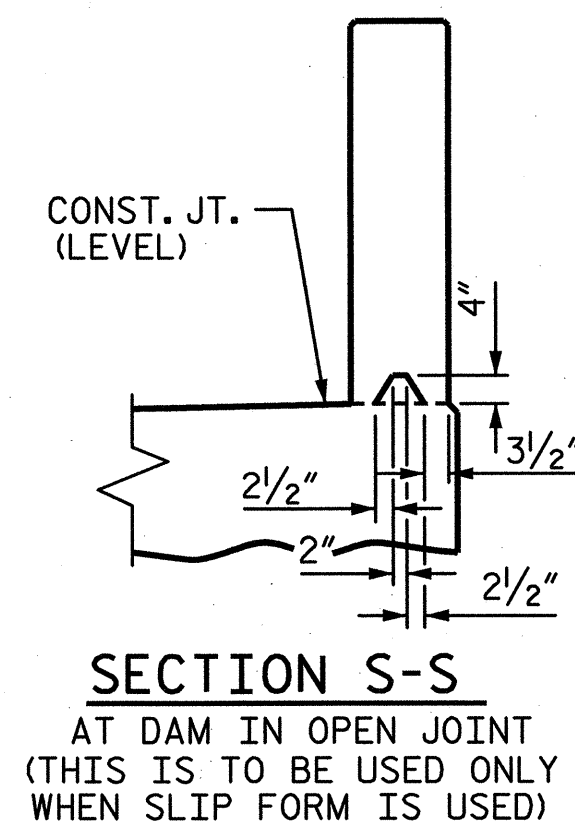


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

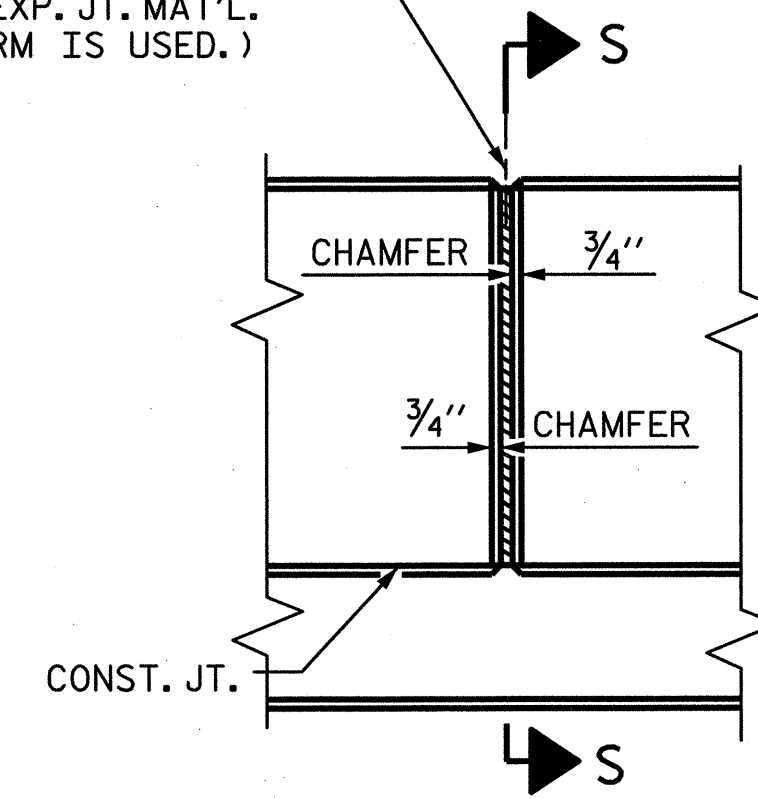
STATE OF NORTH CAROLINA						SHEET NO.
DEPARTMENT OF TRANSPORTATION						S-20
RALEIGH						TOTAL SHEETS
SUPERSTRUCTURE						40
CONCRETE PARAPET						
DETAILS						
SPAN C						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY : M. HOBBS DATE : 07/12
 CHECKED BY : N. PIERCE DATE : 07/12

5/15/2013
 R:\122022-B-5109-Union County-NC\Structures\Drafting\Superstructure\B5109.SD_BR3.dgn
 usmh04386



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



ELEVATION AT EXPANSION JOINTS

PARAPET DETAILS

NOTES:

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

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

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 PARAPET.

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

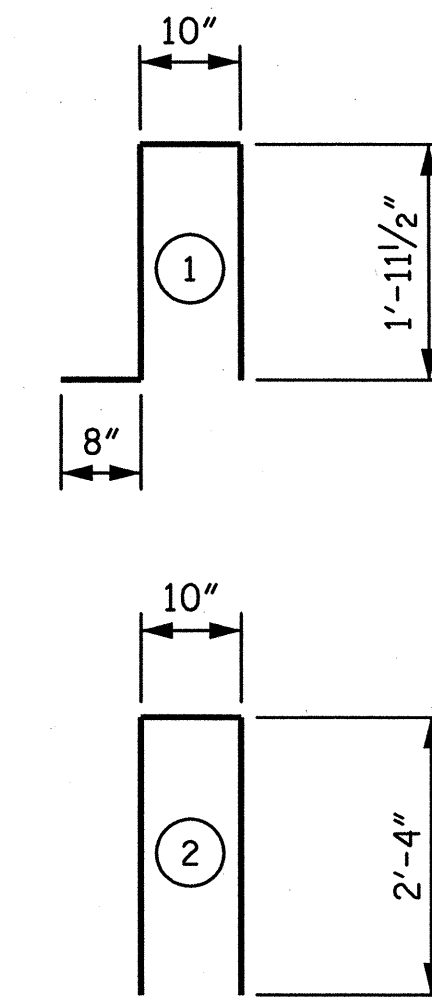
THE JOINTS IN THE DECK AT THE END BENTS SHALL BE SAWED PRIOR TO CASTING OF THE PARAPET.

THE #5 S3 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

GROOVED CONTRACTION JOINTS 1/2" DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF PARAPET 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.

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

BAR TYPES



BILL OF MATERIAL

FOR PARAPET AND END POST

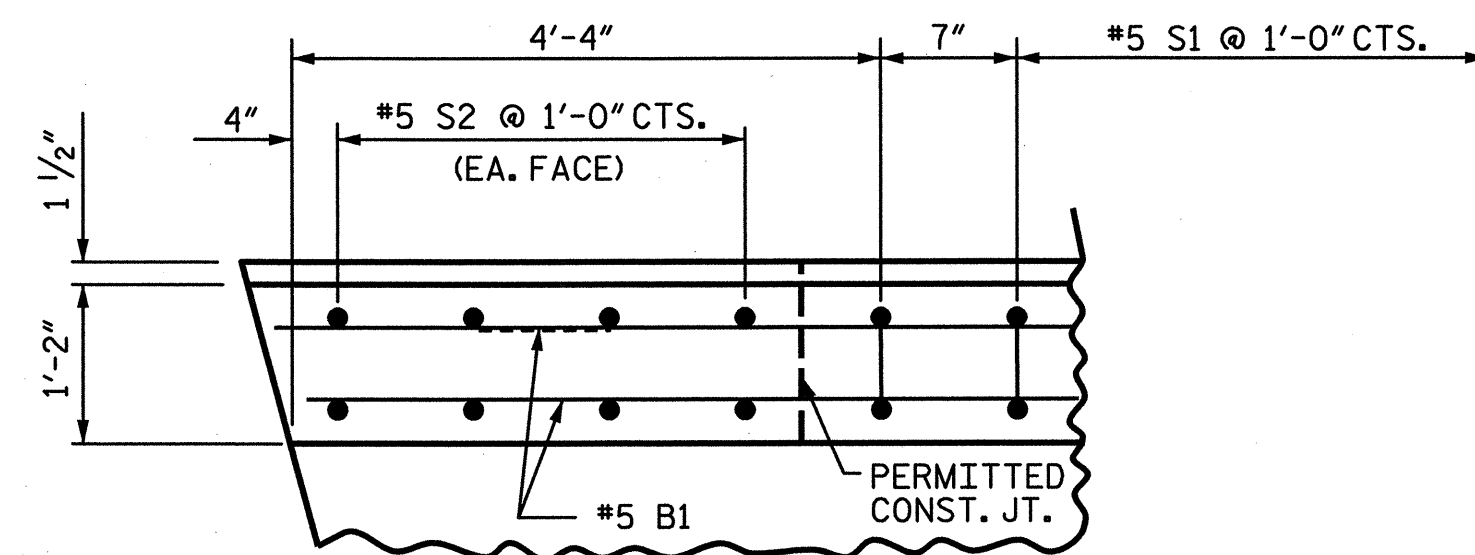
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	64	#5	STR	16'-6"	1101
* B2	48	#5	STR	21'-3"	1064
* E1	8	#7	STR	2'-5"	40
* E2	8	#7	STR	2'-11"	48
* E3	8	#7	STR	3'-5"	56
* E4	8	#7	STR	3'-11"	64
* E5	8	#7	STR	4'-4"	71
* F1	8	#6	STR	1'-10"	22
* F2	8	#6	STR	3'-0"	36
* F3	8	#6	STR	3'-8"	44
* S1	252	#5	1	5'-5"	1424
* S2	252	#5	2	5'-6"	1446
* S3	32	#5	STR	3'-0"	100

* EPOXY COATED REINFORCING STEEL 5,516 LBS.

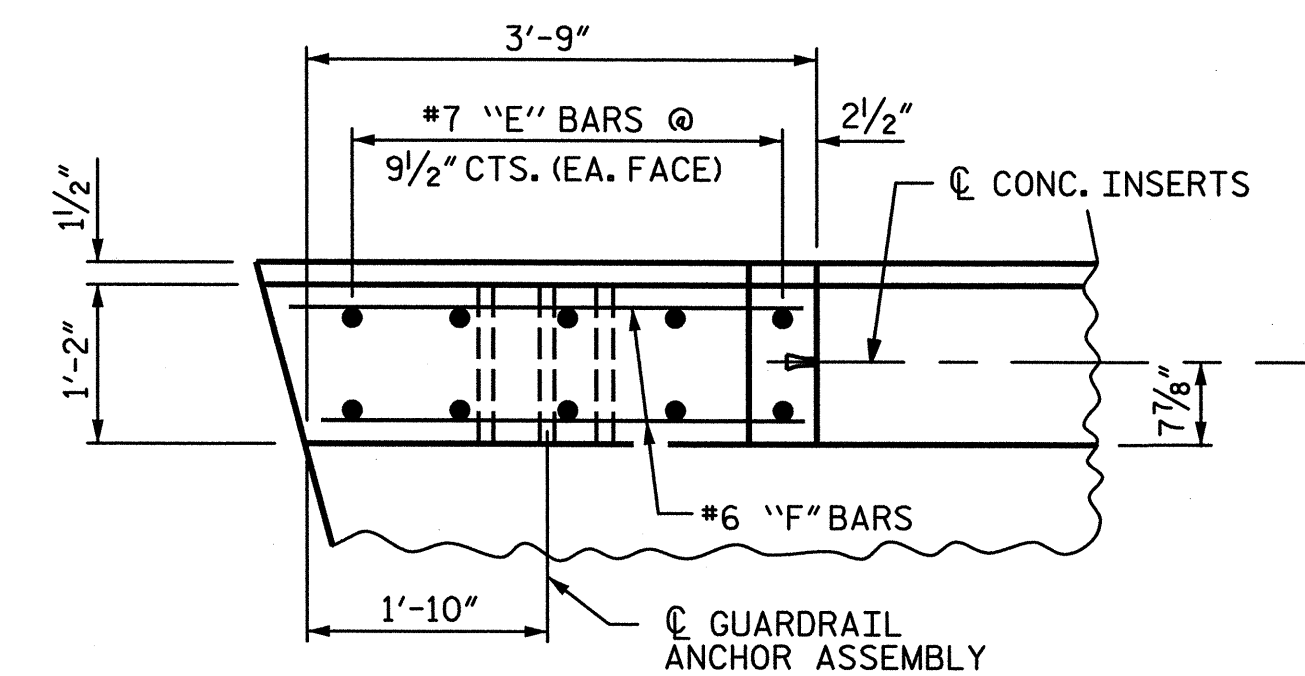
CLASS AA CONCRETE 29.5 CU. YDS.

1'-2" X 2'-6" CONCRETE PARAPET 265.67 LIN. FT.

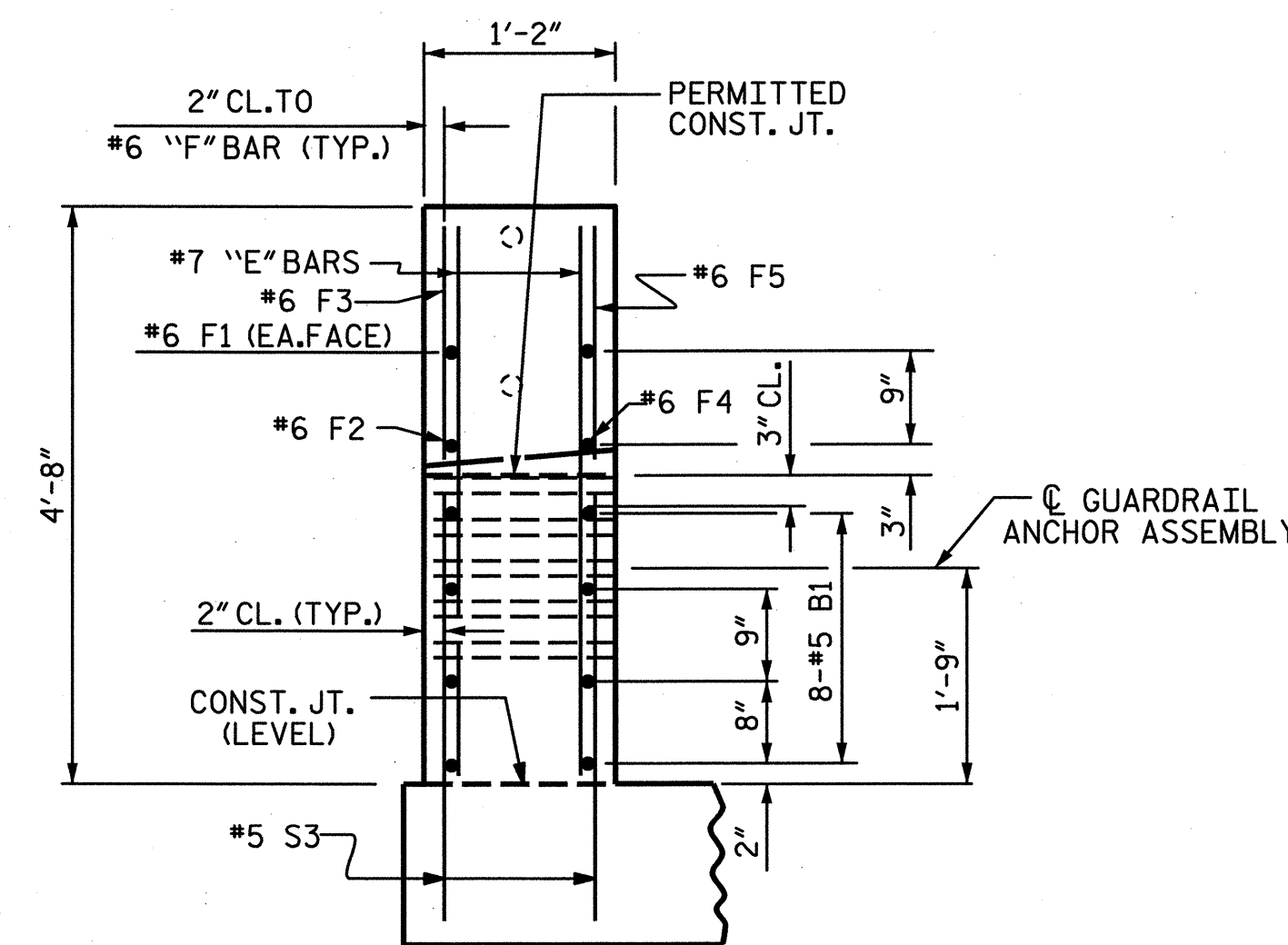
ALL BAR DIMENSIONS ARE OUT TO OUT



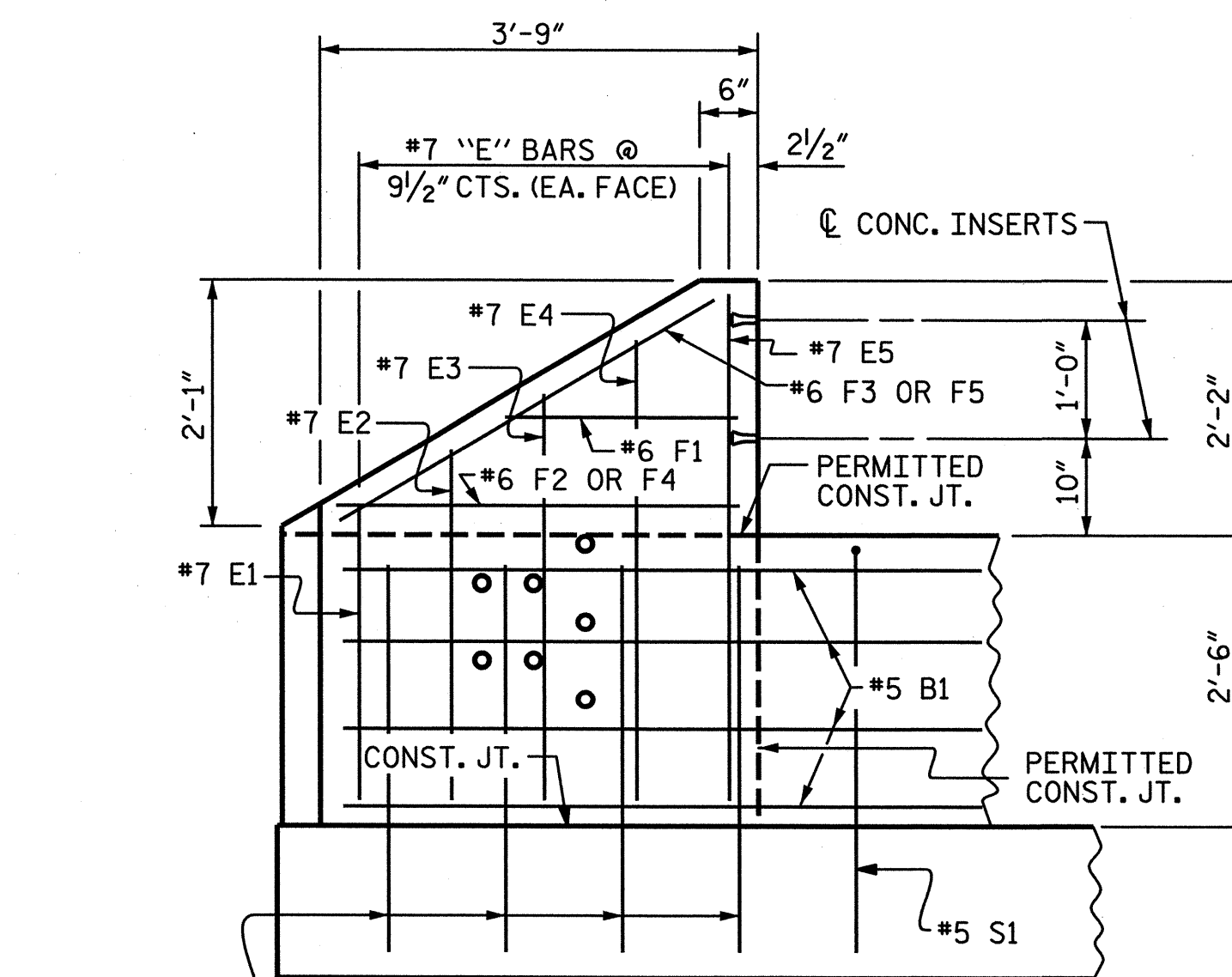
PLAN OF PARAPET



PLAN OF END POST



END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

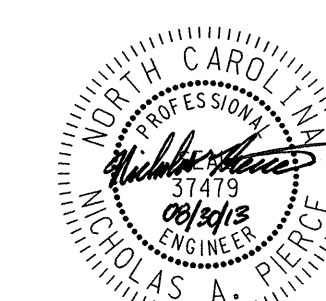
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. B-5109

UNION COUNTY

STATION: 16+82.50 -L-

SHEET 4 OF 4



WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
CONCRETE PARAPET
DETAILS

REVISIONS

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

SHEET NO. S-21
TOTAL SHEETS 40

DRAWN BY: M. HOBBS DATE: 07/12
CHECKED BY: N. PIERCE DATE: 07/12

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.

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.

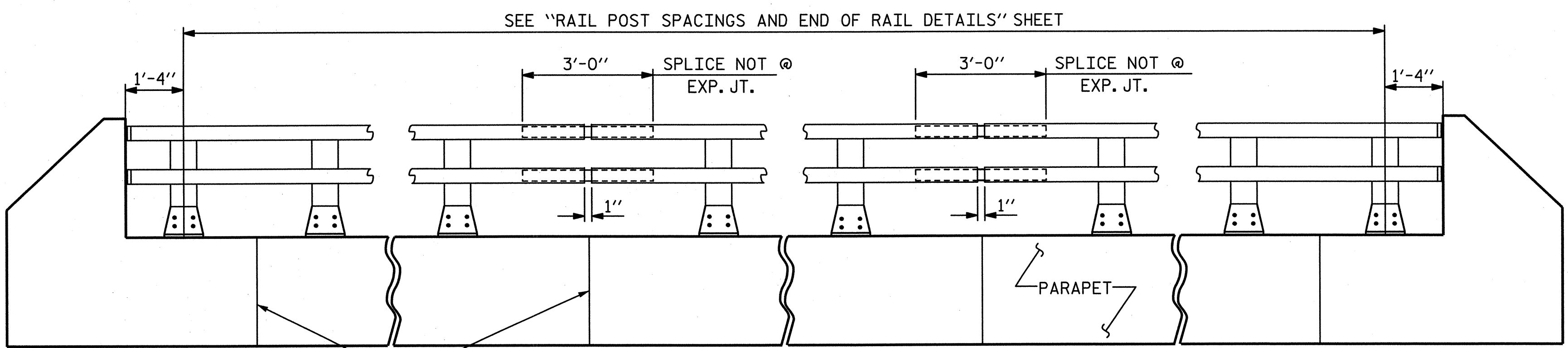
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

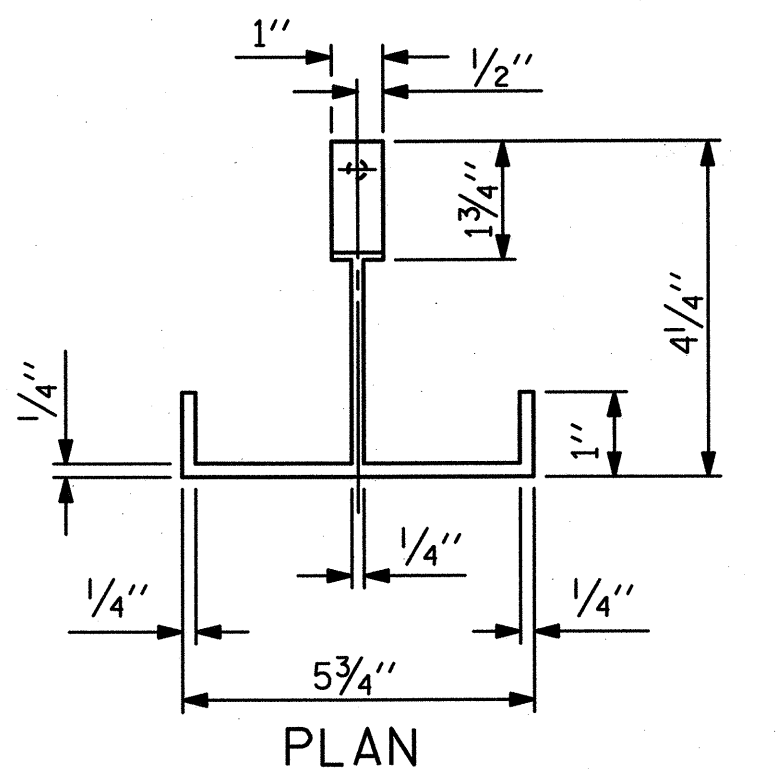
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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.

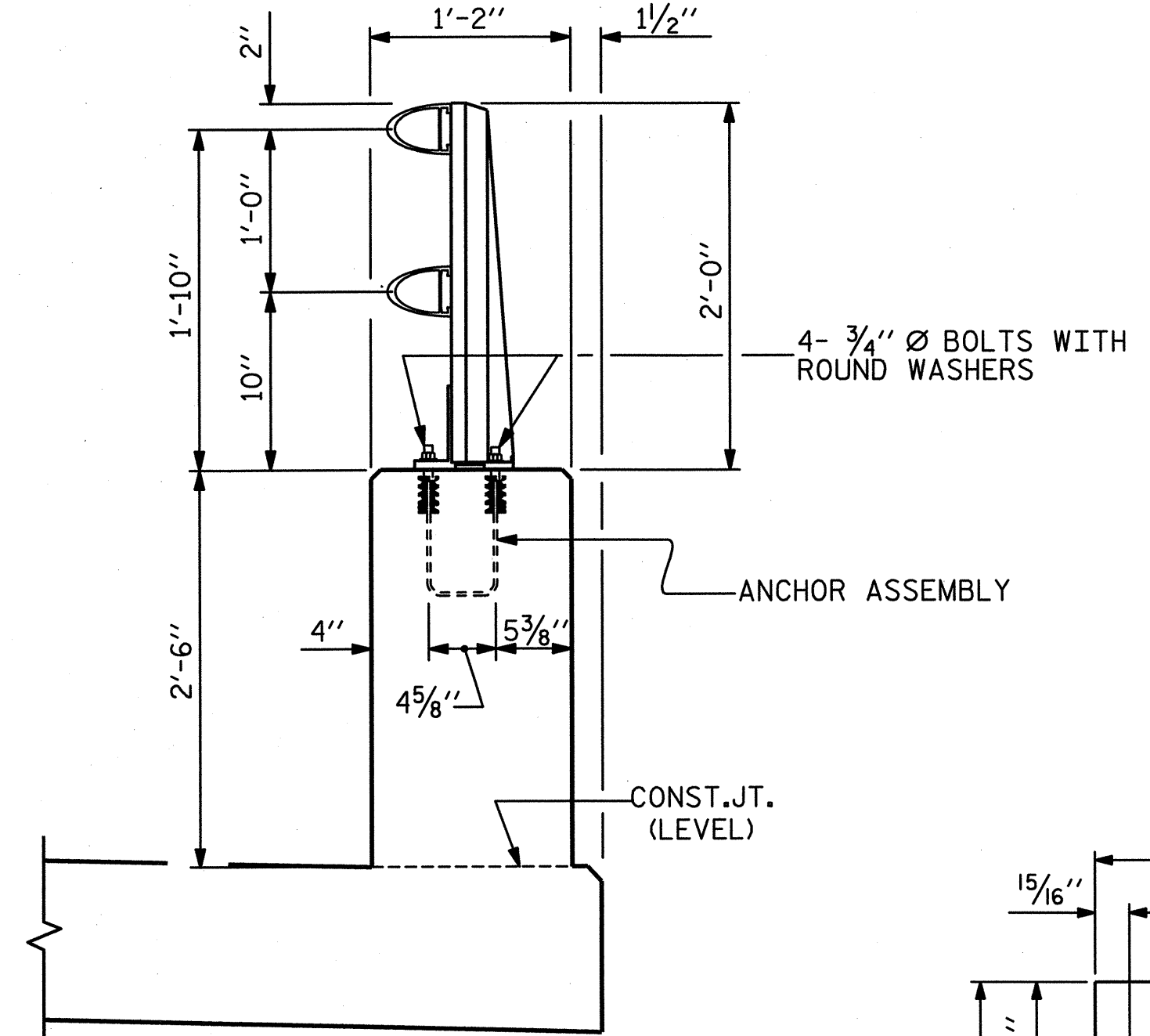
PAY LENGTH = 250.78 LIN. FT.



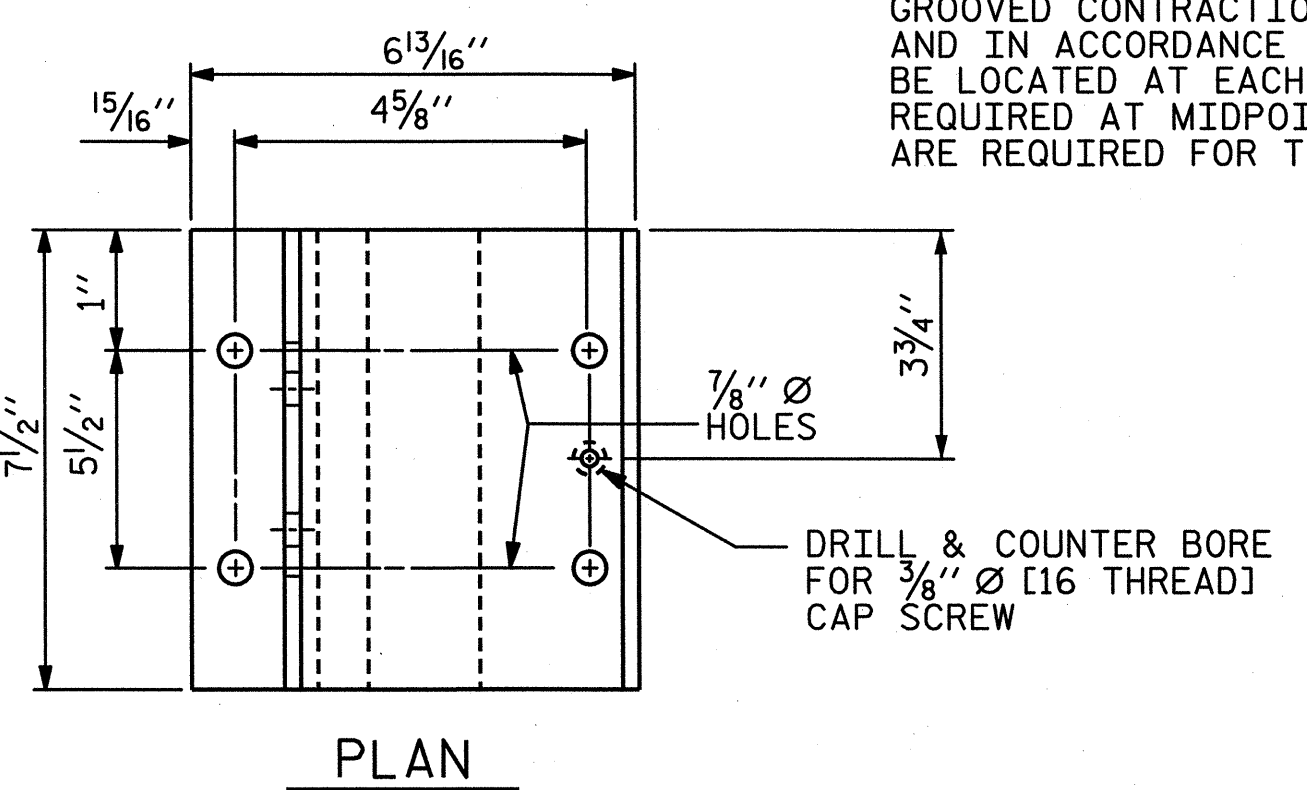
ELEVATION
NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



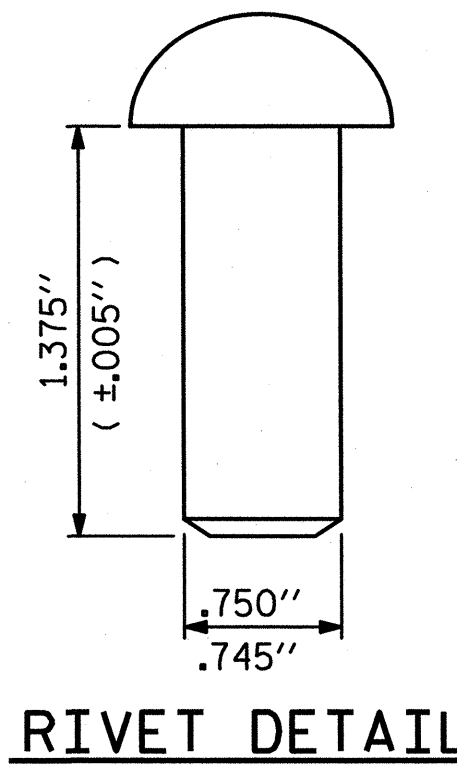
PLAN



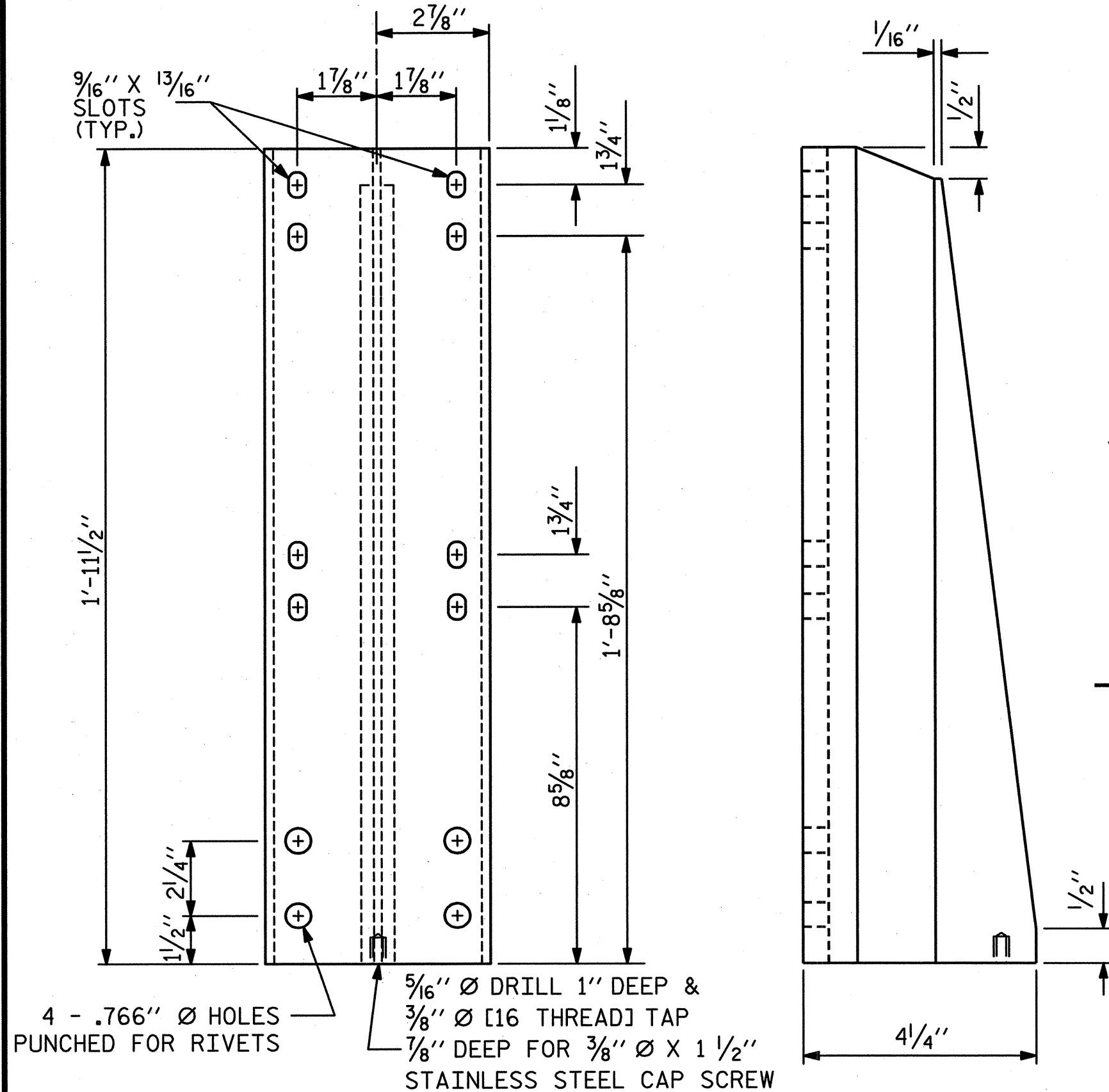
SECTION THRU PARAPET AND RAIL



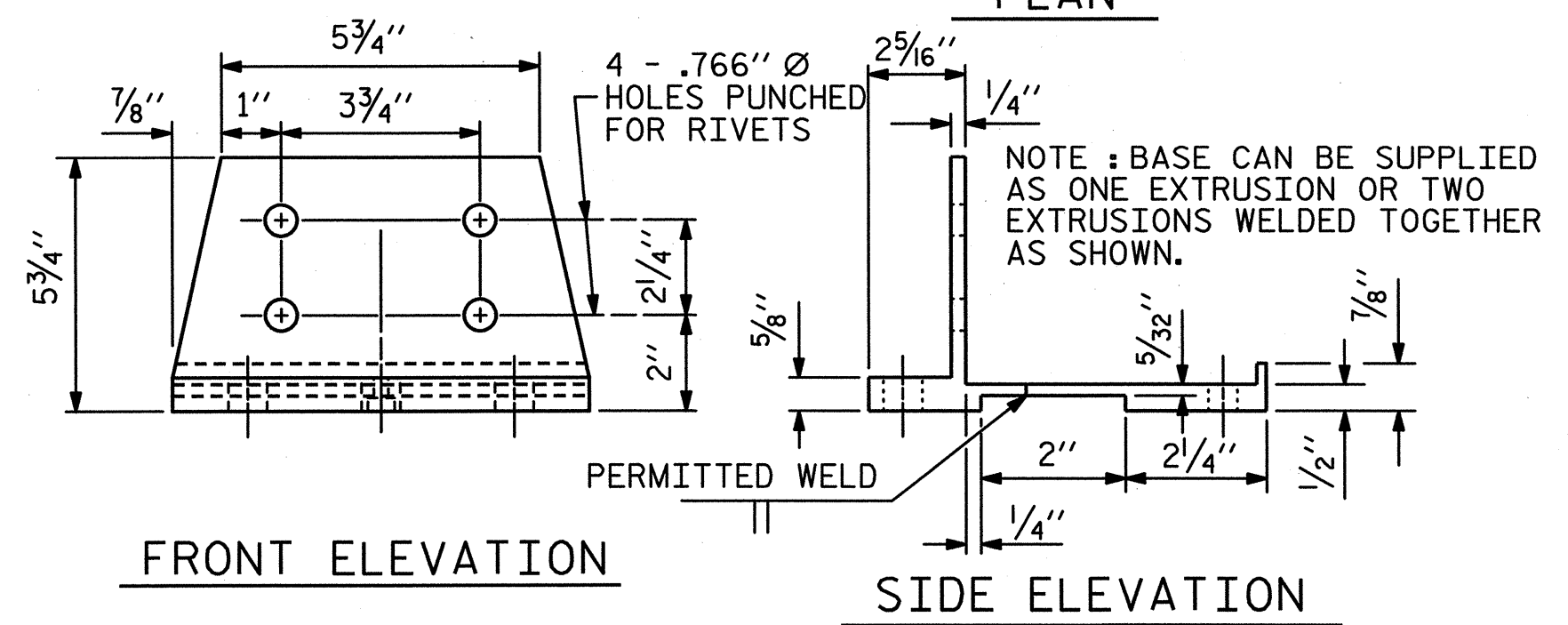
PLAN



RIVET DETAIL



FRONT ELEVATION **SIDE ELEVATION**
DETAILS OF POST



FRONT ELEVATION **SIDE ELEVATION**
POST BASE DETAILS

ASSEMBLED BY : MAH	DATE : 07/12
CHECKED BY : NAP	DATE : 07/12
DRAWN BY : EEM 6/94	REV. 5/7/03R RWW/JTE
CHECKED BY : RGW 6/94	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				STANDARD		2 BAR METAL RAIL	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	
1			3			S-22	
2			4			TOTAL SHEETS 40	

NOTES

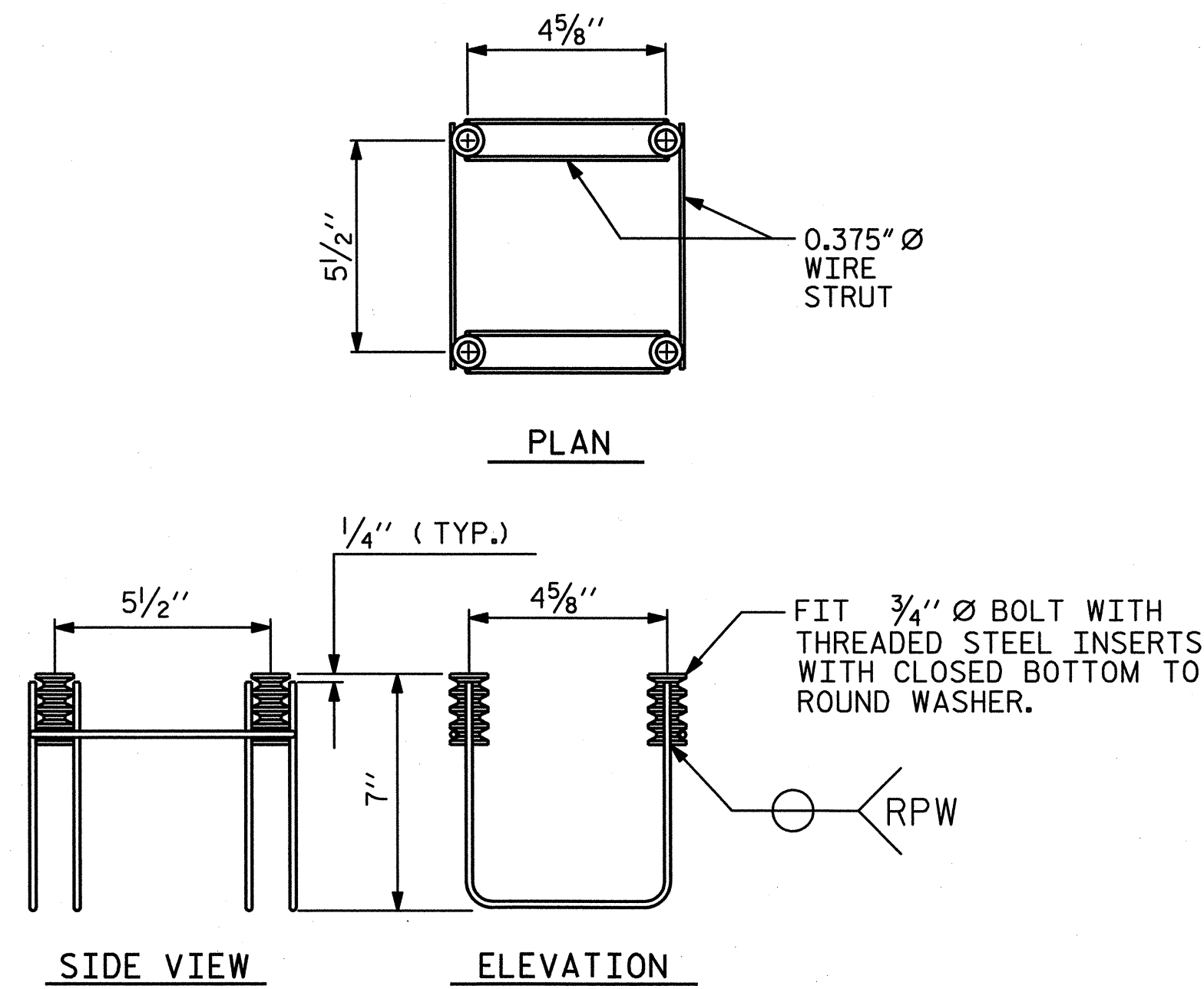
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

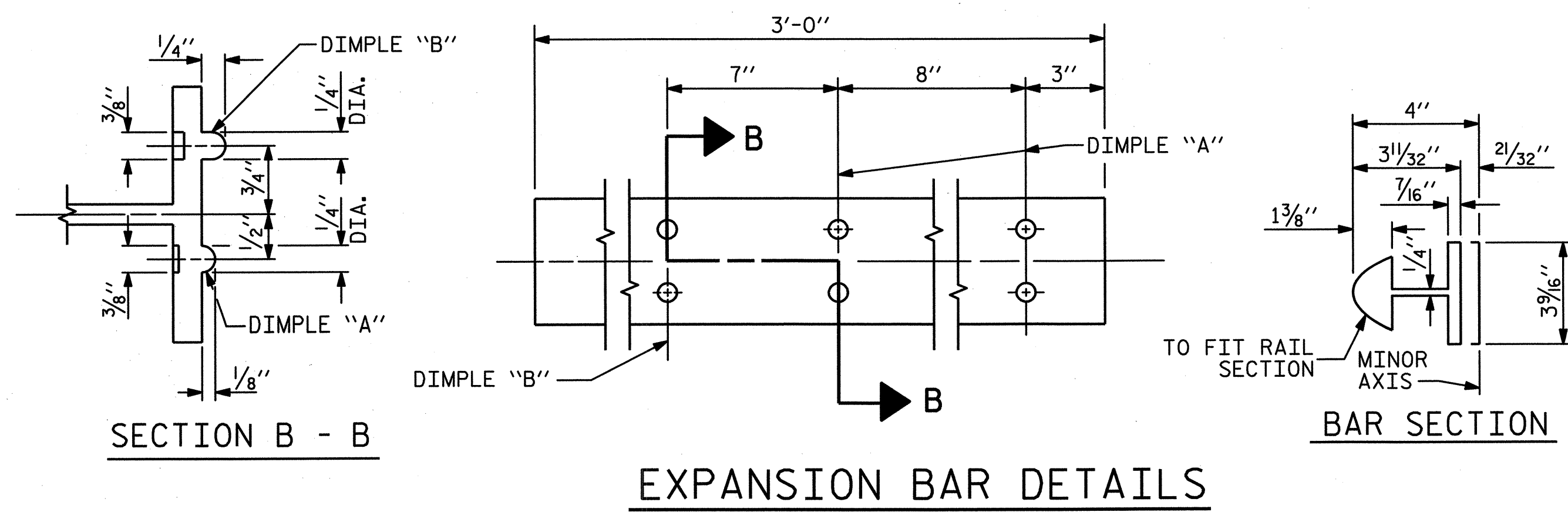
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

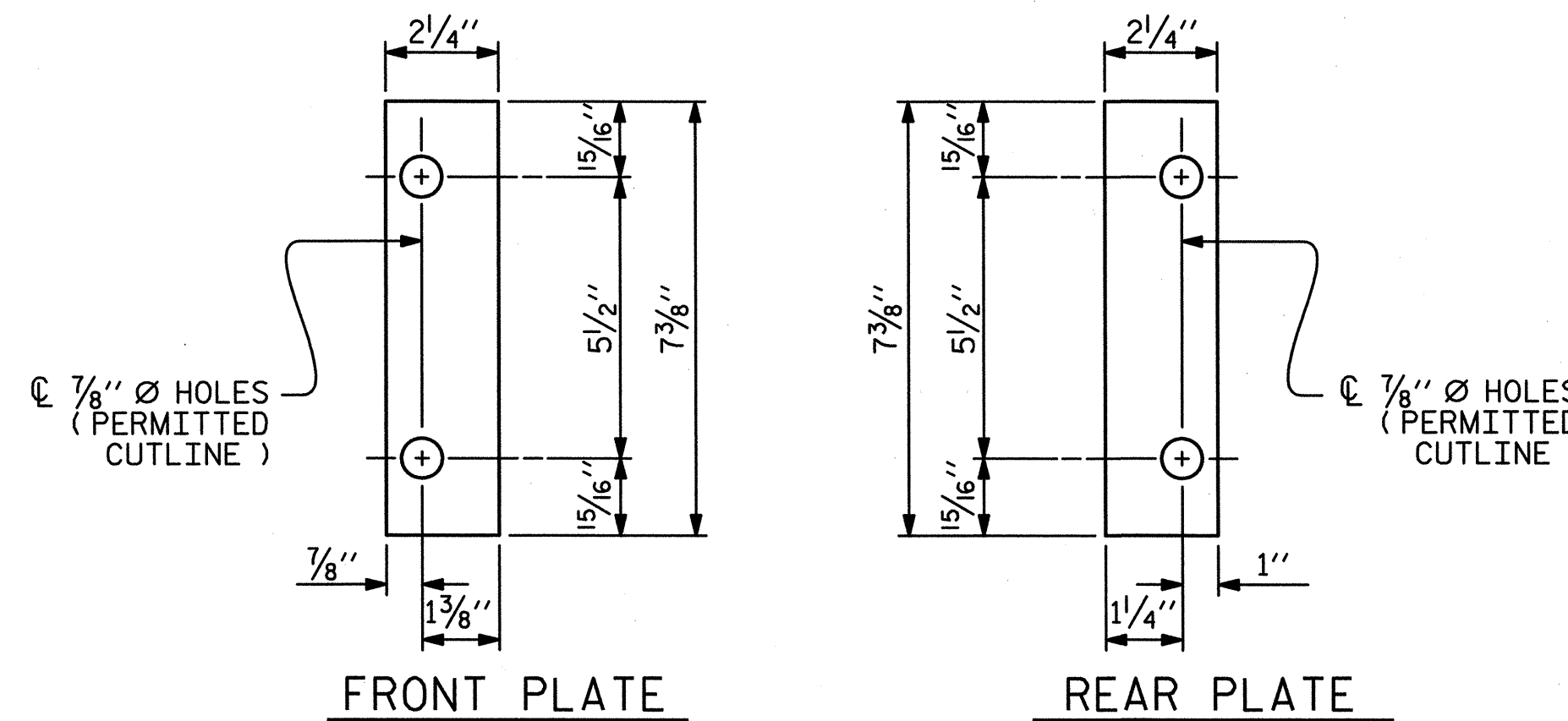


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(44 ASSEMBLIES REQUIRED)

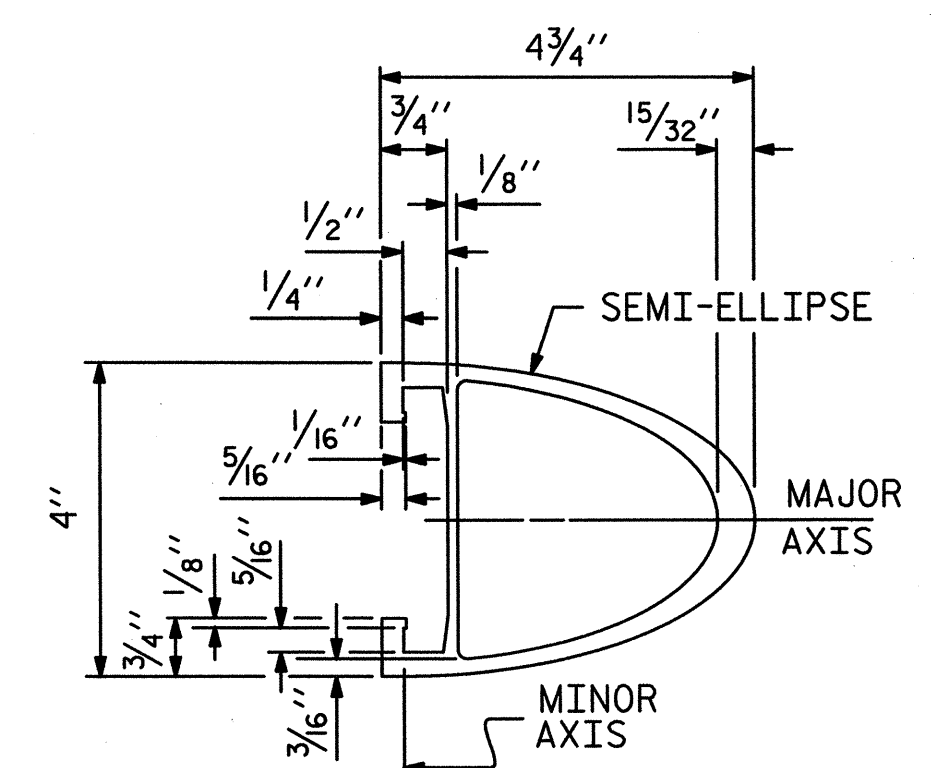


EXPANSION BAR DETAILS

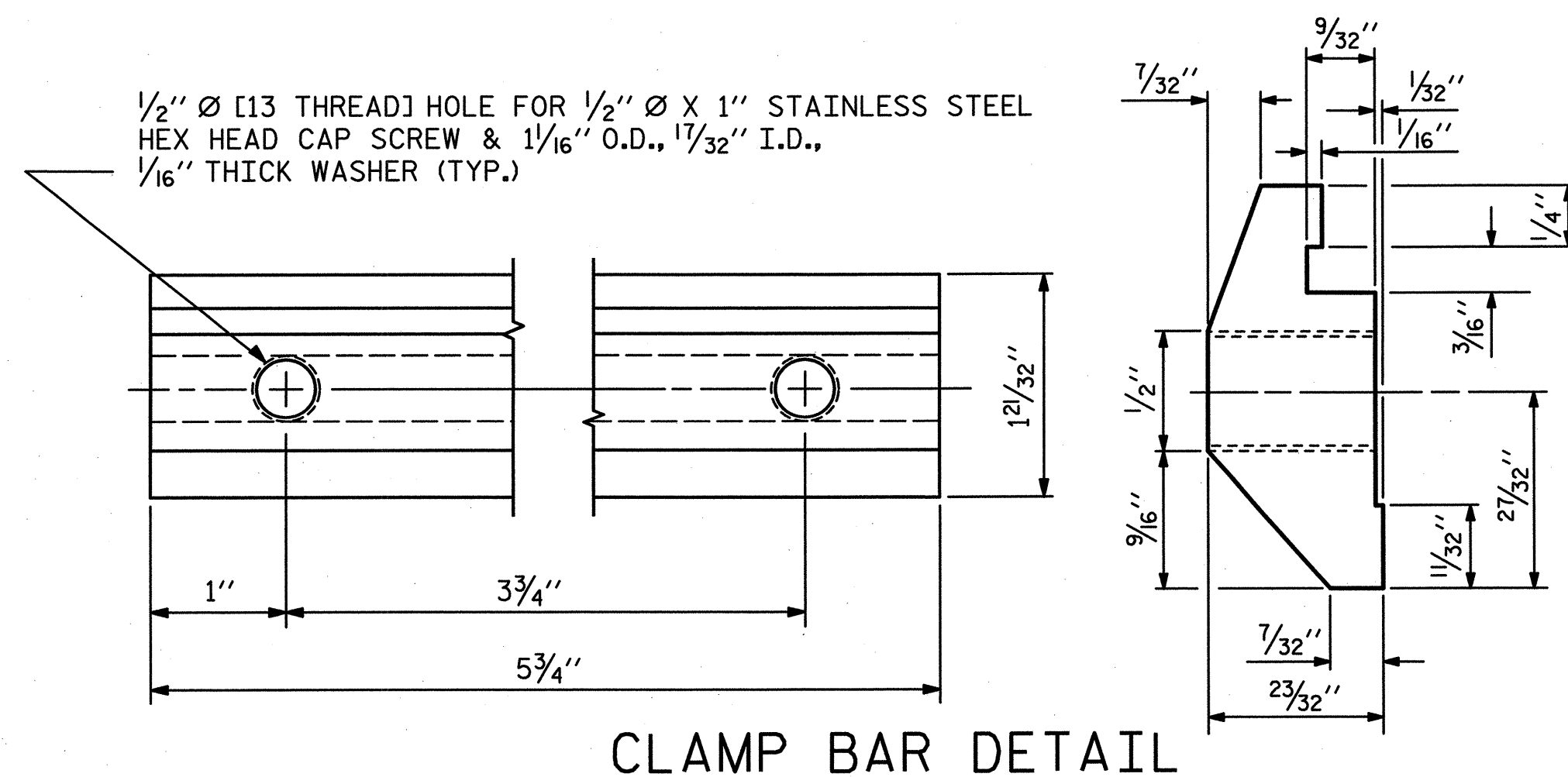


SHIM DETAILS

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

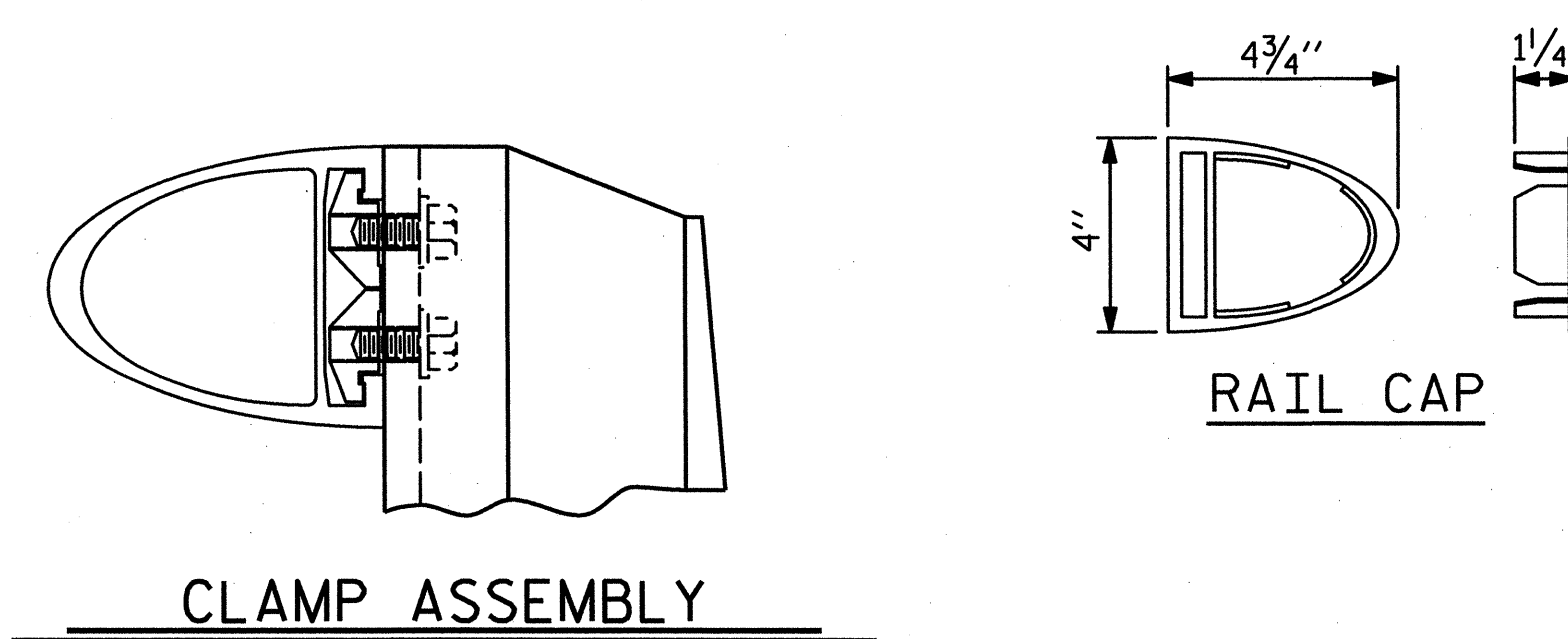


RAIL SECTION

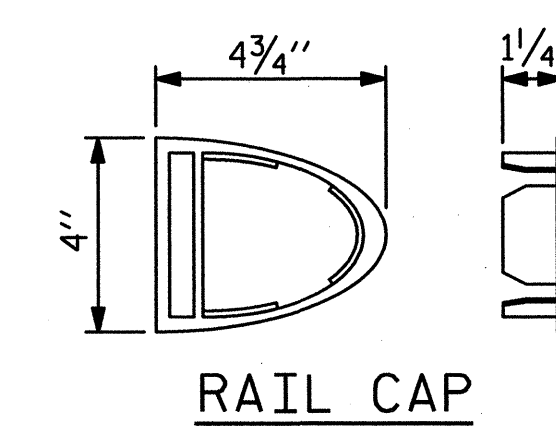


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

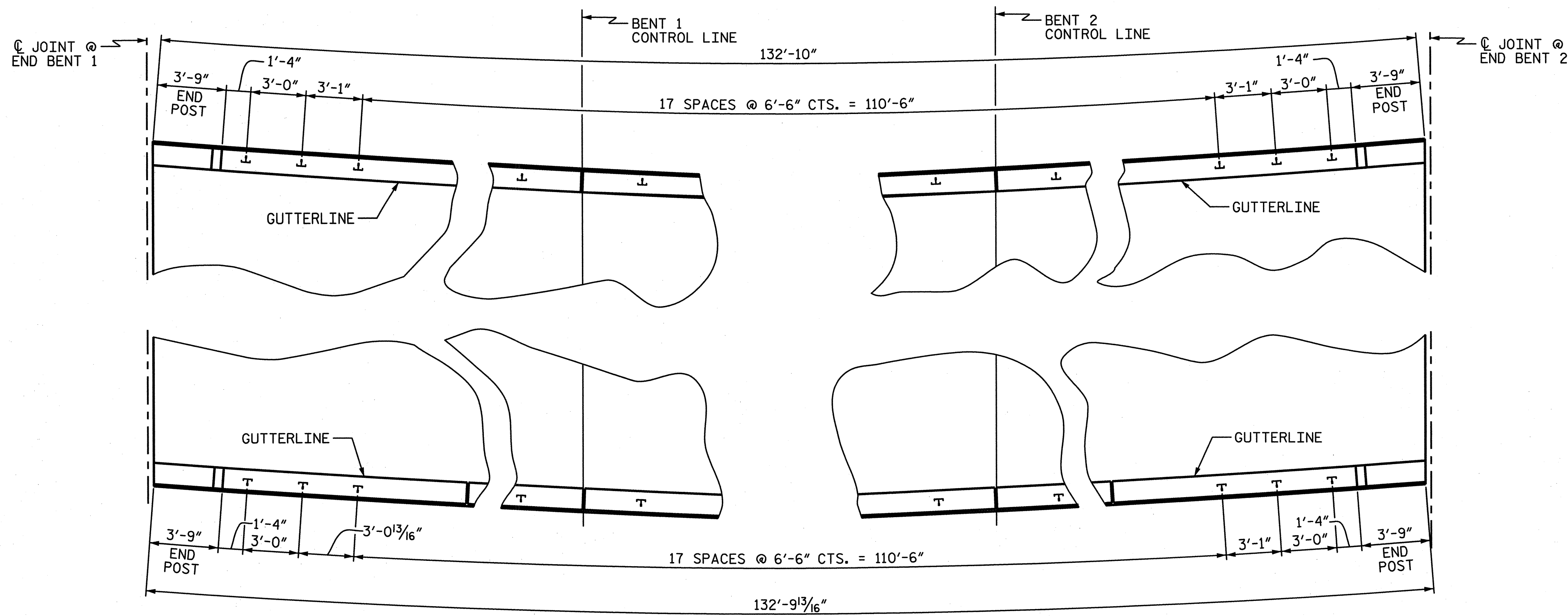
PROJECT NO. B-5109
 UNION _____ COUNTY _____
 STATION: 16+82.50 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 2 BAR METAL RAIL

WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0881

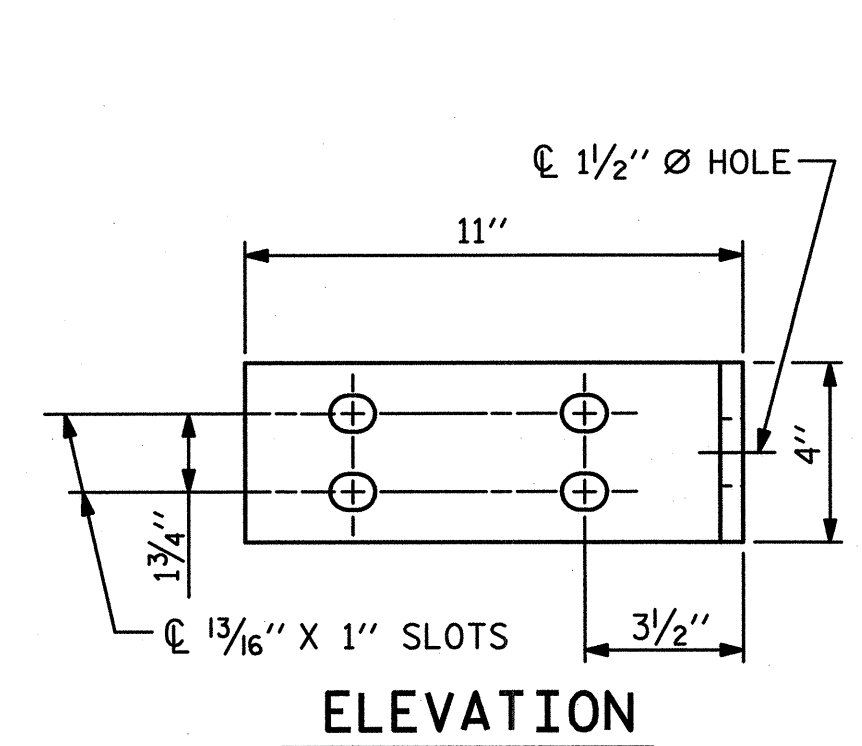
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23	
1			3			TOTAL SHEETS	
2			4			40	

ASSEMBLED BY : MAH	DATE : 07/12
CHECKED BY : NAP	DATE : 07/12
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

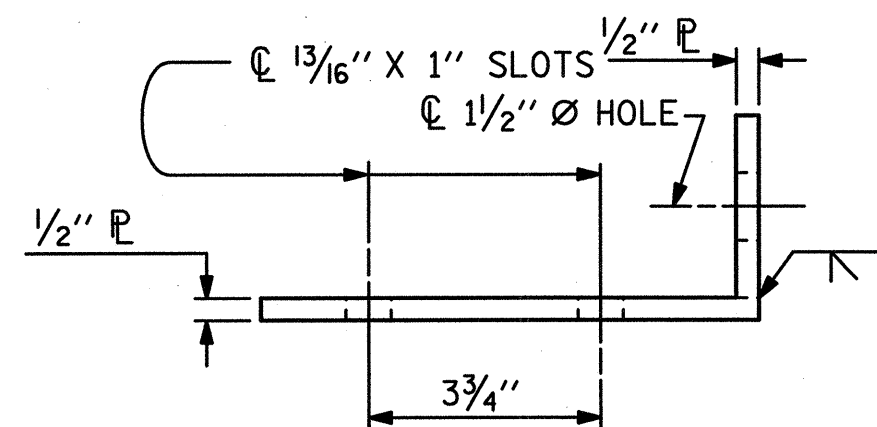


PLAN OF RAIL POST SPACINGS

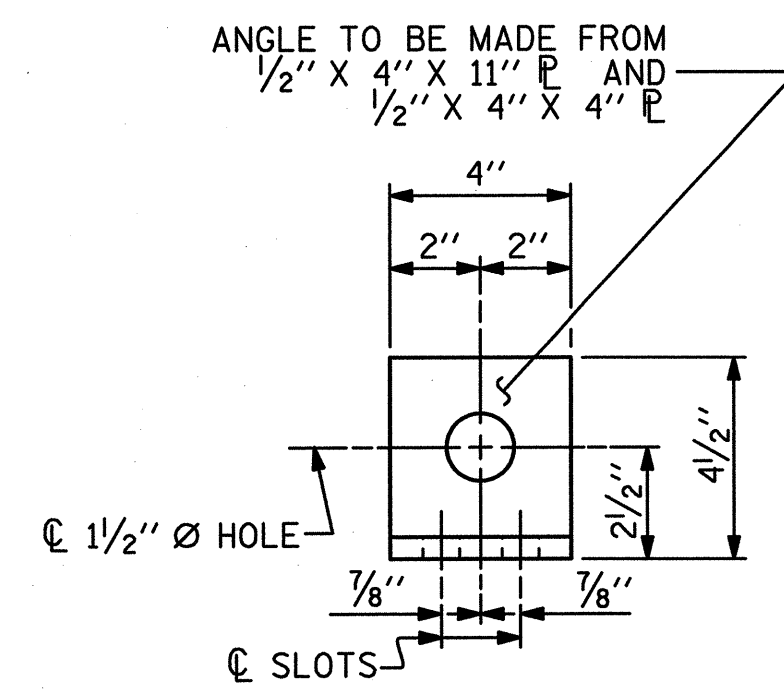
(DIMENSIONS ARE MEASURED ALONG THE ARC AT THE BACK FACE OF PARAPET)



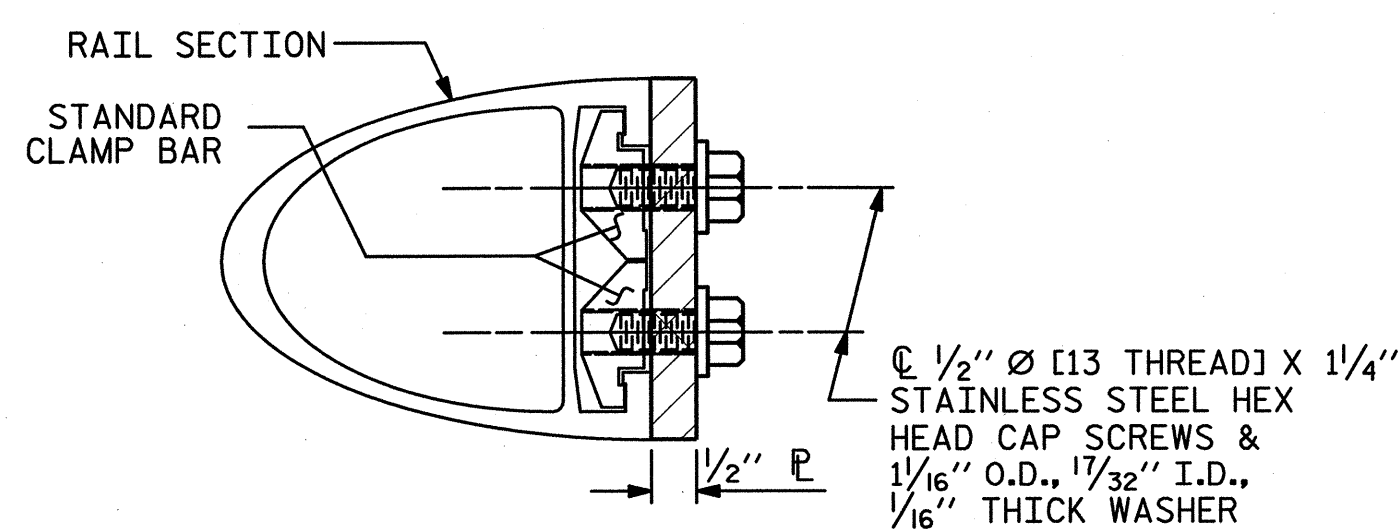
ELEVATION



TOP VIEW



END VIEW (FIX AND EXP.)



SECTION H-H (FIX)

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

- NOTES**
STRUCTURAL CONCRETE INSERT
- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 - 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - 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.

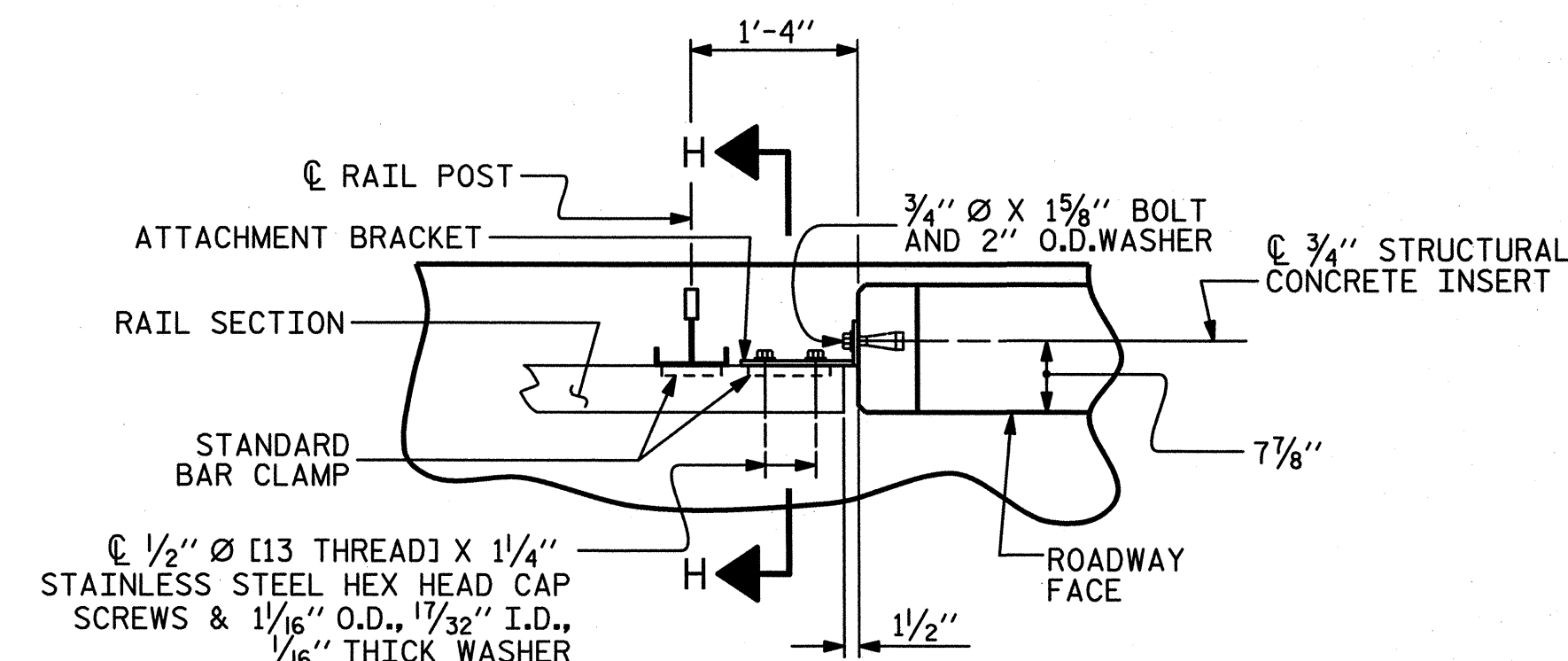
- NOTES**
METAL RAIL TO END POST CONNECTION
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
 - 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.
 - STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

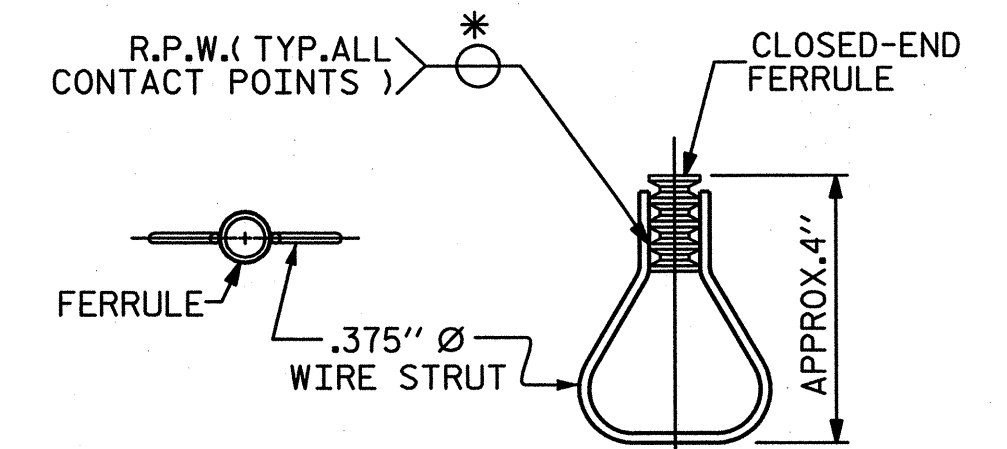
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

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



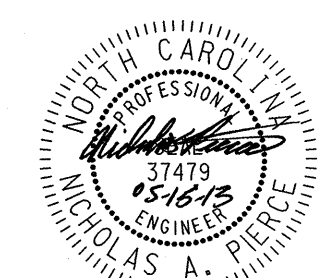
PLAN - RAIL AND END POST



PLAN ELEVATION
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

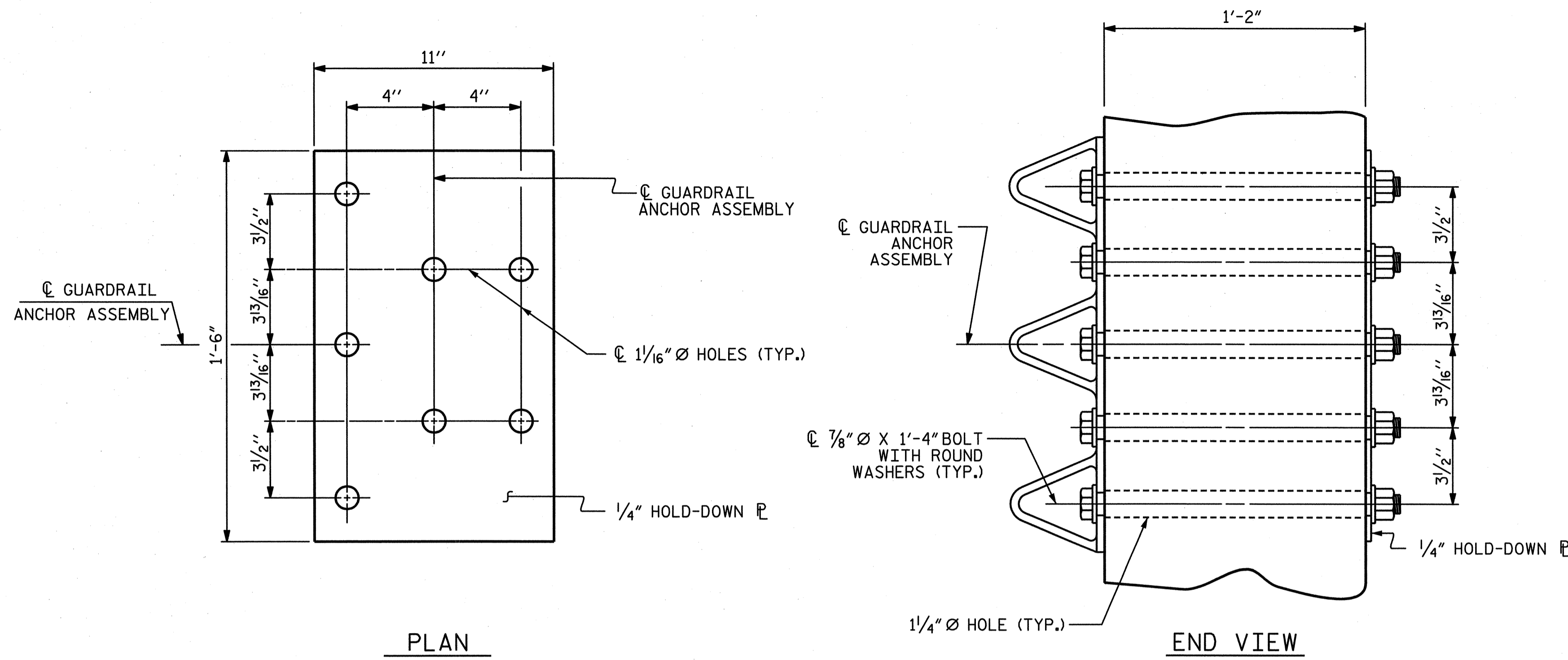


WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

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

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24	
1			3			TOTAL SHEETS	
2			4			40	

ASSEMBLED BY : MAH	DATE : 02/13
CHECKED BY : NAP	DATE : 02/13
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

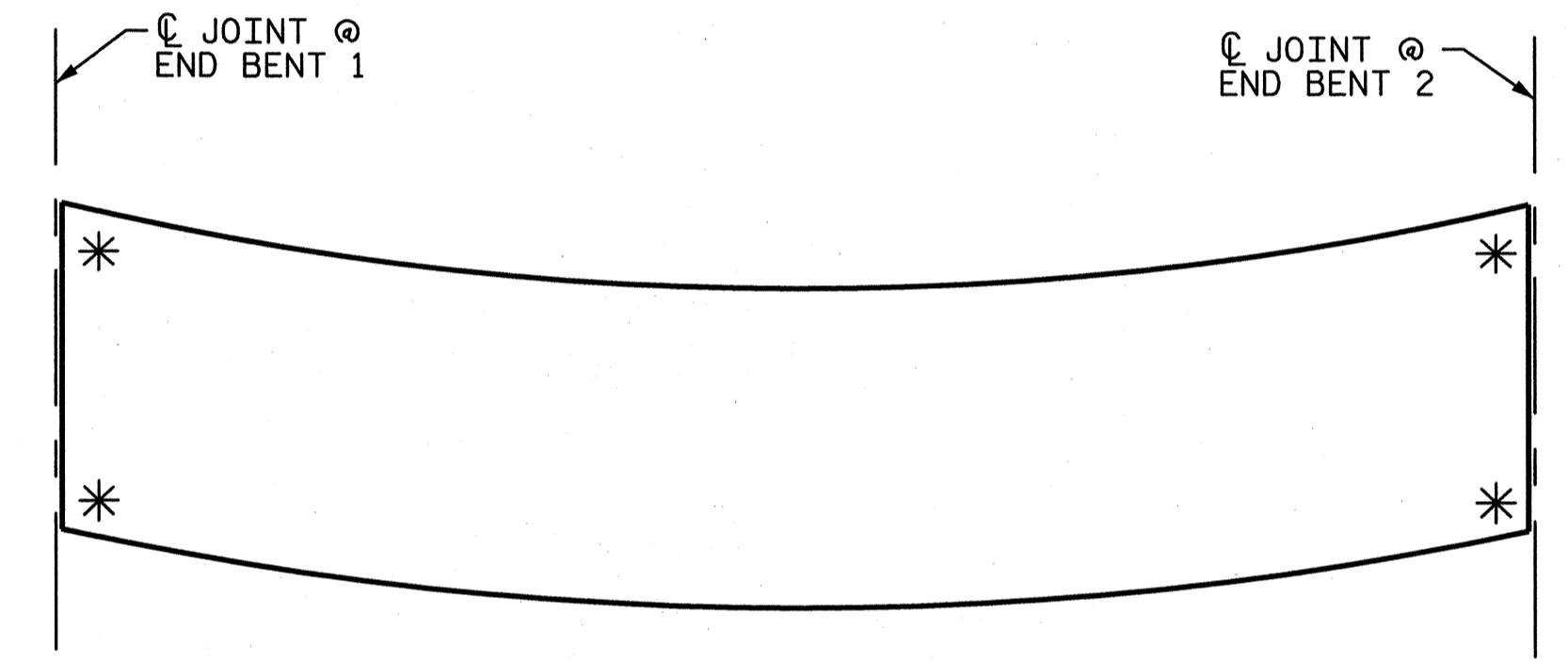
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

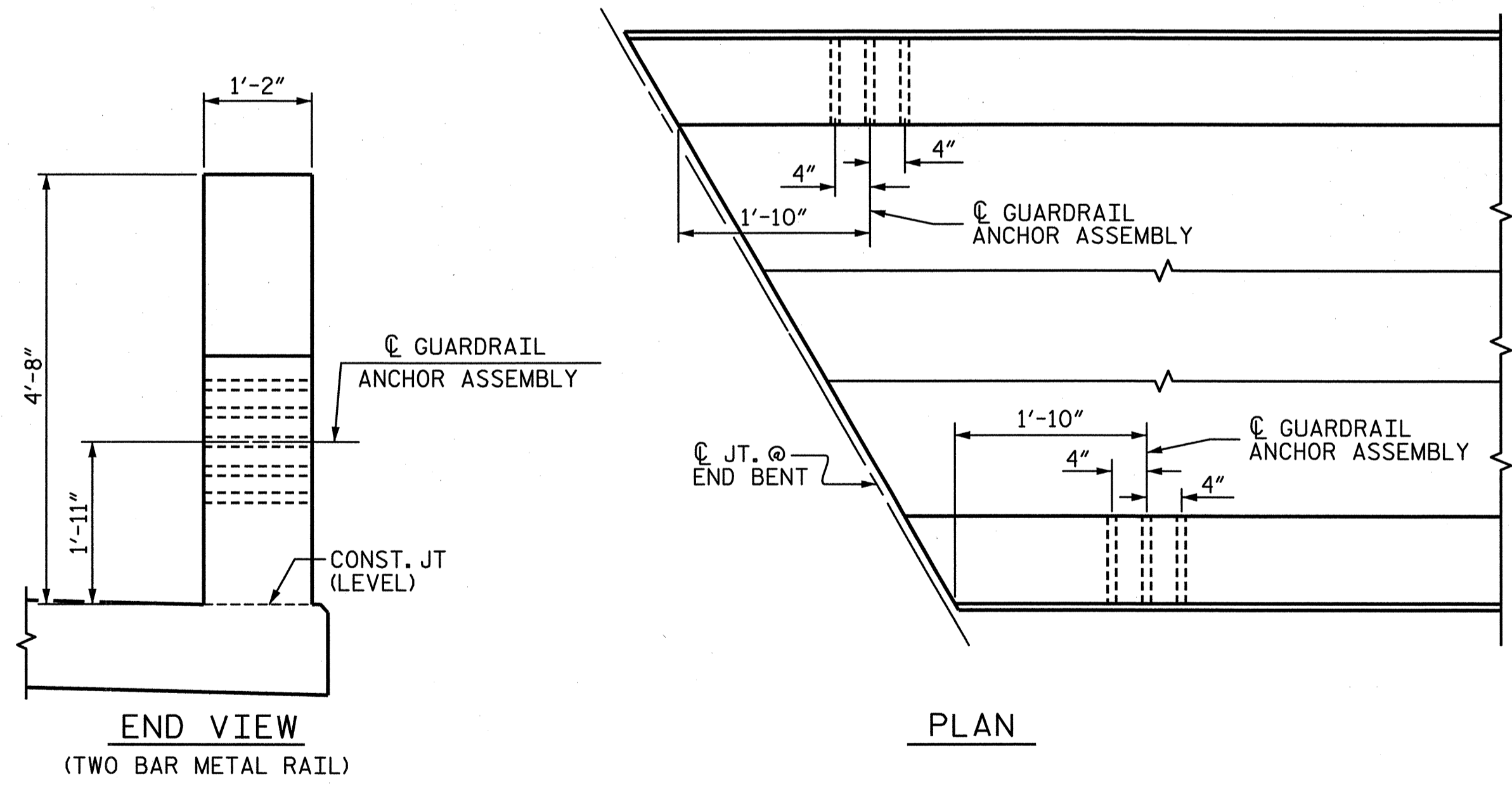
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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



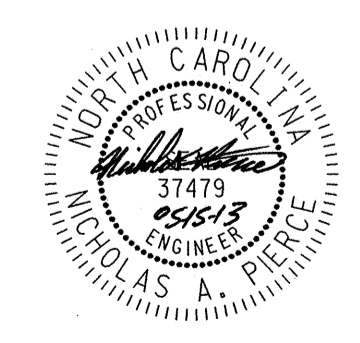
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

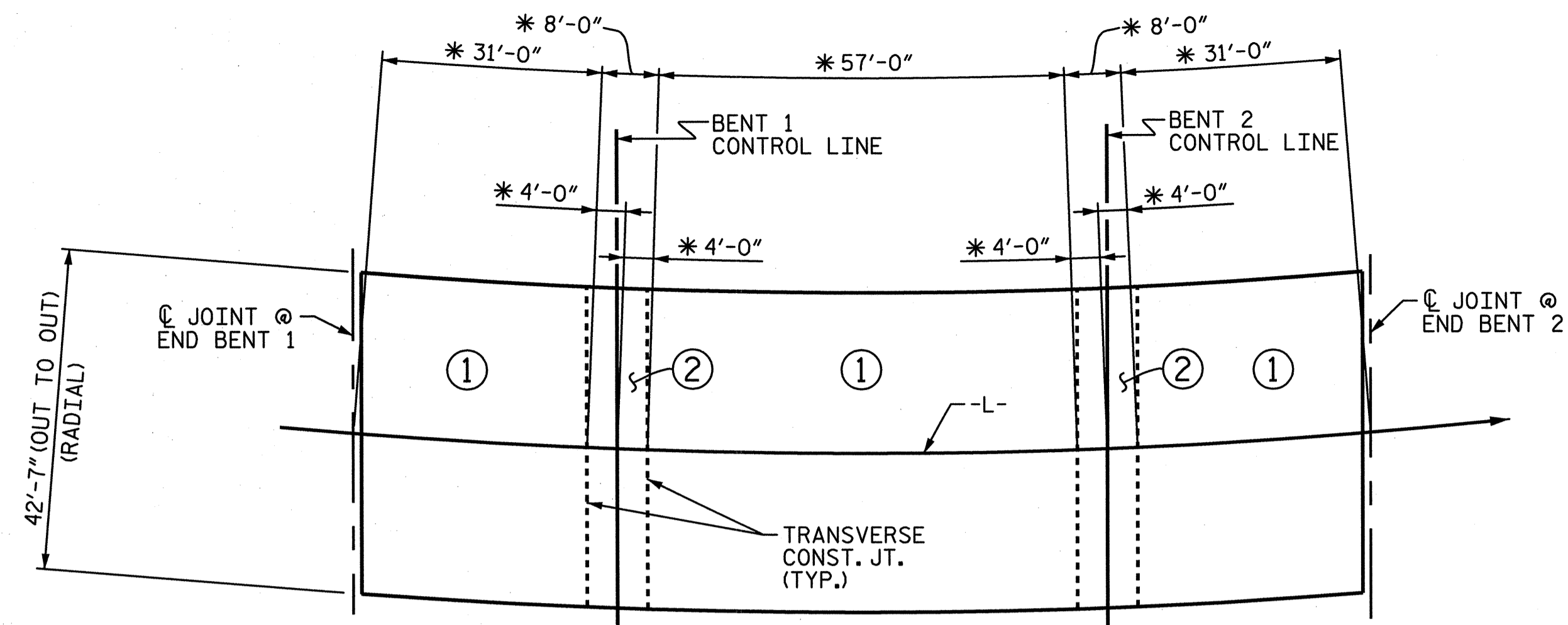


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			40

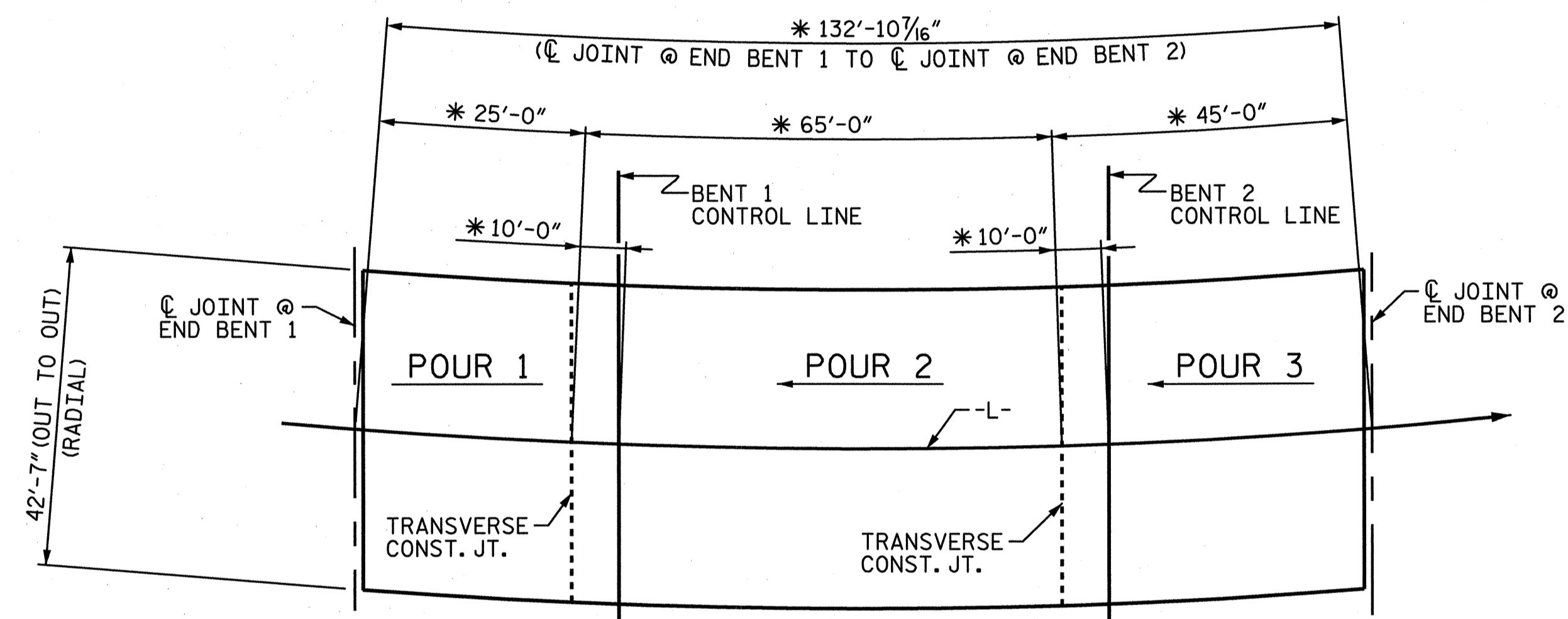
ASSEMBLED BY : MAH	DATE : 02/13
CHECKED BY : NAP	DATE : 02/13
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	REV. 10/1/11 MAA/GM
	REV. 12/5/11 MAA/GM



* - MEASURED ALONG -L-

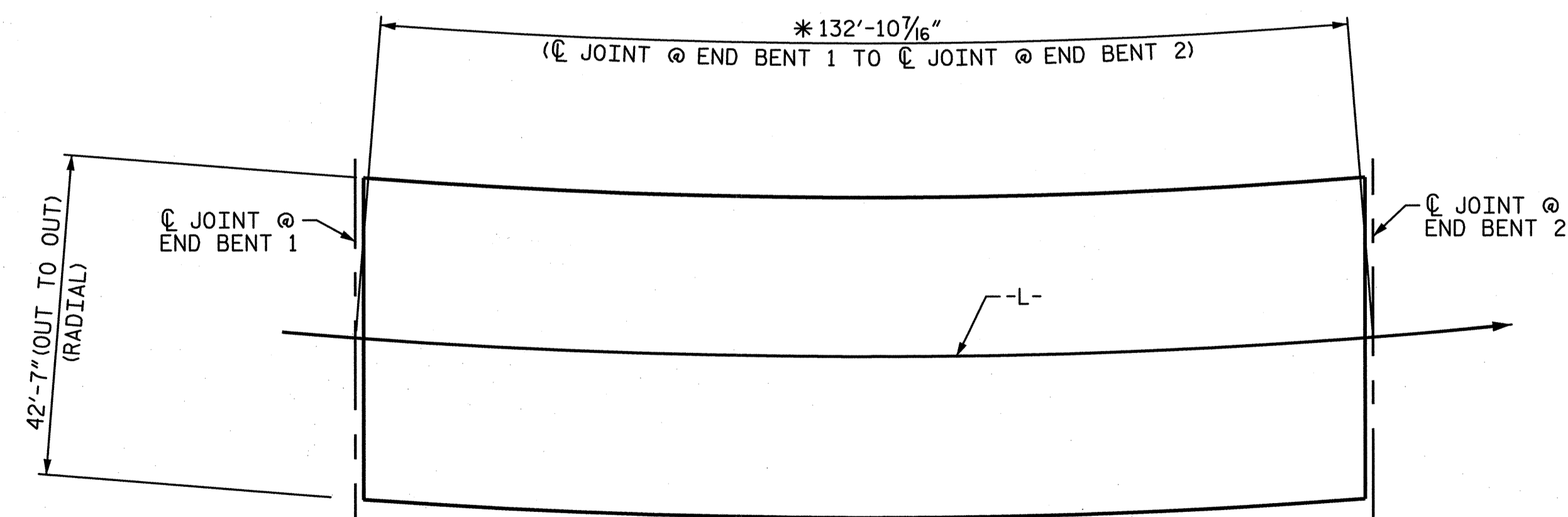
OPTIONAL POURING SEQUENCE

POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3,000 PSI.



* - MEASURED ALONG -L-

POURING SEQUENCE



* - MEASURED ALONG -L-

LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 5,653)

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	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"			

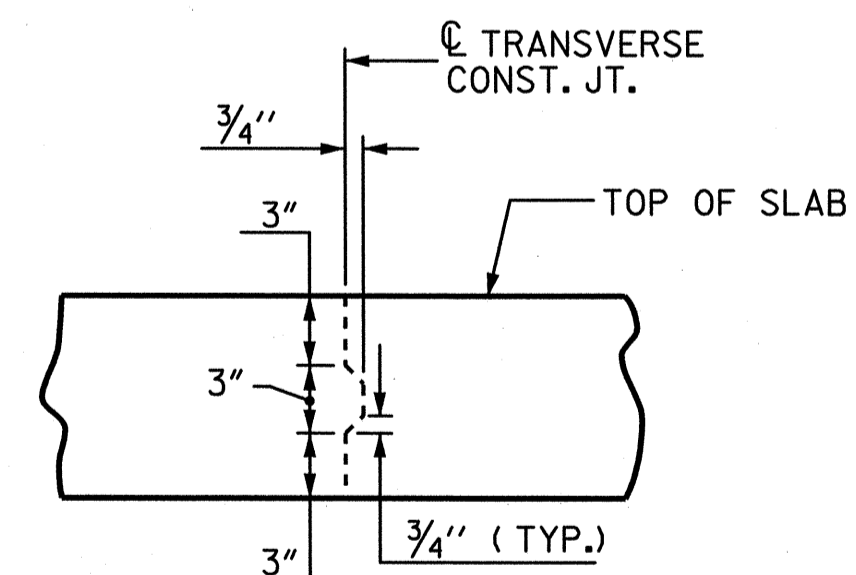
BILL OF MATERIAL

SPANS A, B & C

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	265	#5	STR	42'-4"	11701
A2	265	#5	STR	42'-4"	11701
*B1	74	#4	STR	20'-2"	997
*B2	74	#6	STR	49'-7"	5511
*B3	72	#6	STR	15'-0"	1622
B4	156	#5	STR	45'-8"	7430
*G1	2	#5	STR	42'-4"	88
*K1	4	#8	1	11'-0"	117
*K2	12	#8	2	17'-11"	574
*K3	4	#8	1	11'-10"	126
K4	16	#4	STR	6'-5"	69
K5	32	#4	STR	8'-4"	178
K6	16	#4	STR	7'-11"	85
K7	16	#4	STR	19'-5"	208
*K8	4	#6	STR	42'-4"	254
*S1	64	#5	3	5'-2"	345
*S2	64	#4	4	2'-4"	100
*S3	48	#4	5	11'-10"	379
*S4	16	#4	5	10'-1"	108
S5	176	#4	6	2'-9"	323
REINFORCING STEEL				LBS.	19,994
*EPOXY COATED REINFORCING STEEL				LBS.	21,922

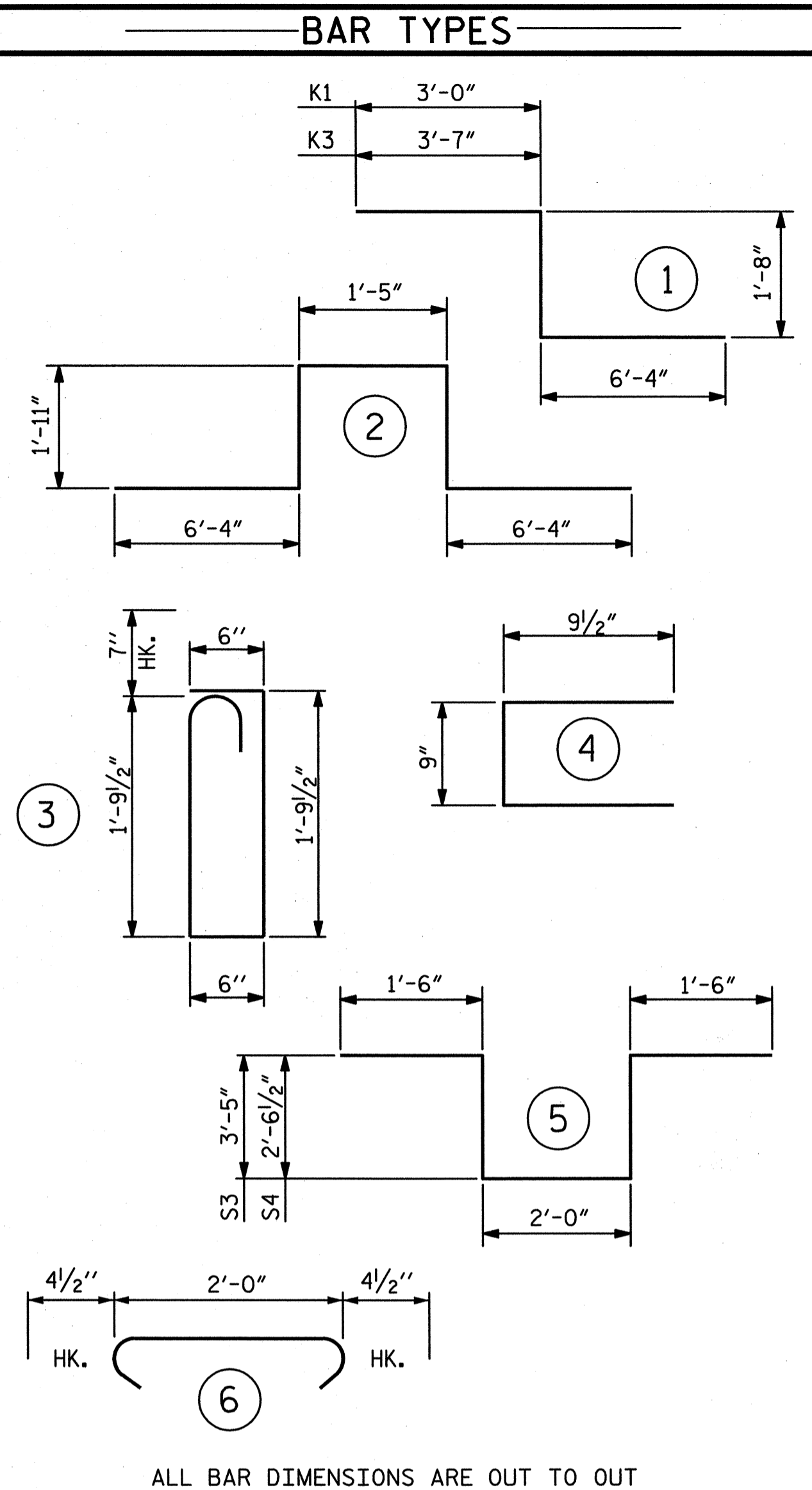
GROOVING BRIDGE FLOORS

APPROACH SLABS	1,754 SQ.FT.
BRIDGE DECK	4,868 SQ.FT.
TOTAL	6,622 SQ.FT.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



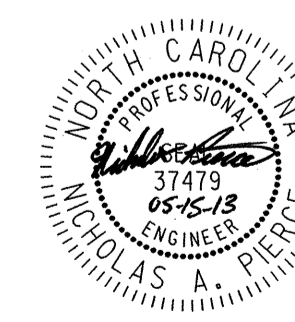
ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR #1	36.5		
POUR #2	99.1		
POUR #3	73.7		
TOTALS**	209.3	19,994	21,922

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

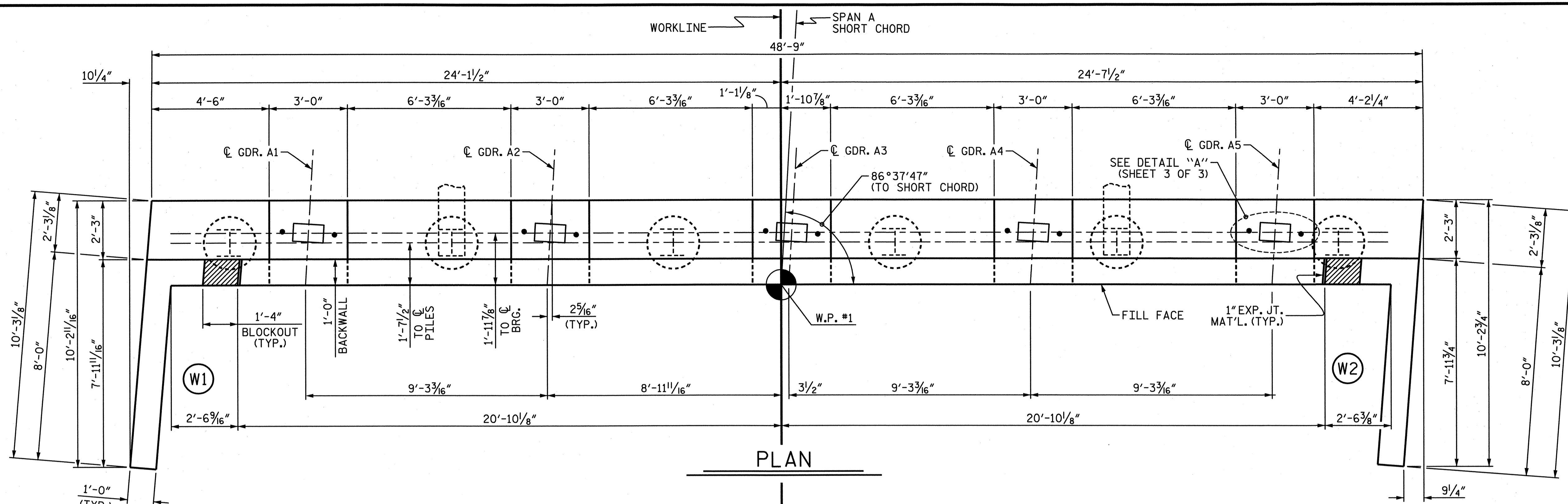
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 BILL OF MATERIAL

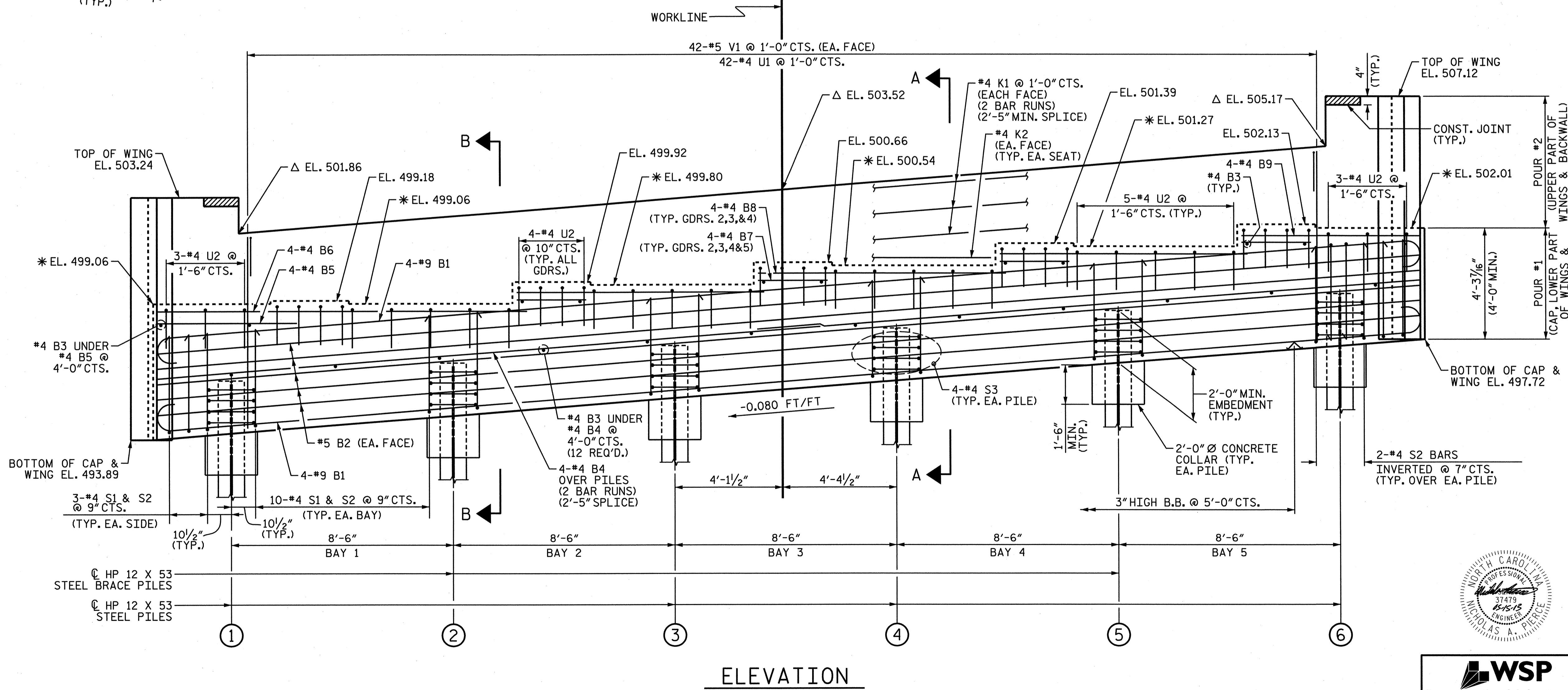
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			40

STD. NO. BOM2

ASSEMBLED BY : MAH	DATE : 02/13
CHECKED BY : NAP	DATE : 02/13
DRAWN BY : JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



PLAN



ELEVATION

NOTES:

- * FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.
- Δ THIS ELEVATION TAKEN ON FILL FACE OF BACKWALL
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE OF THE CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL, PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.
- INSTALL 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.
- *5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.
- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

TOP OF PILE ELEVATIONS	
①	496.18
②	496.84
③	497.51
④	498.18
⑤	498.84
⑥	499.51

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 1 OF 3

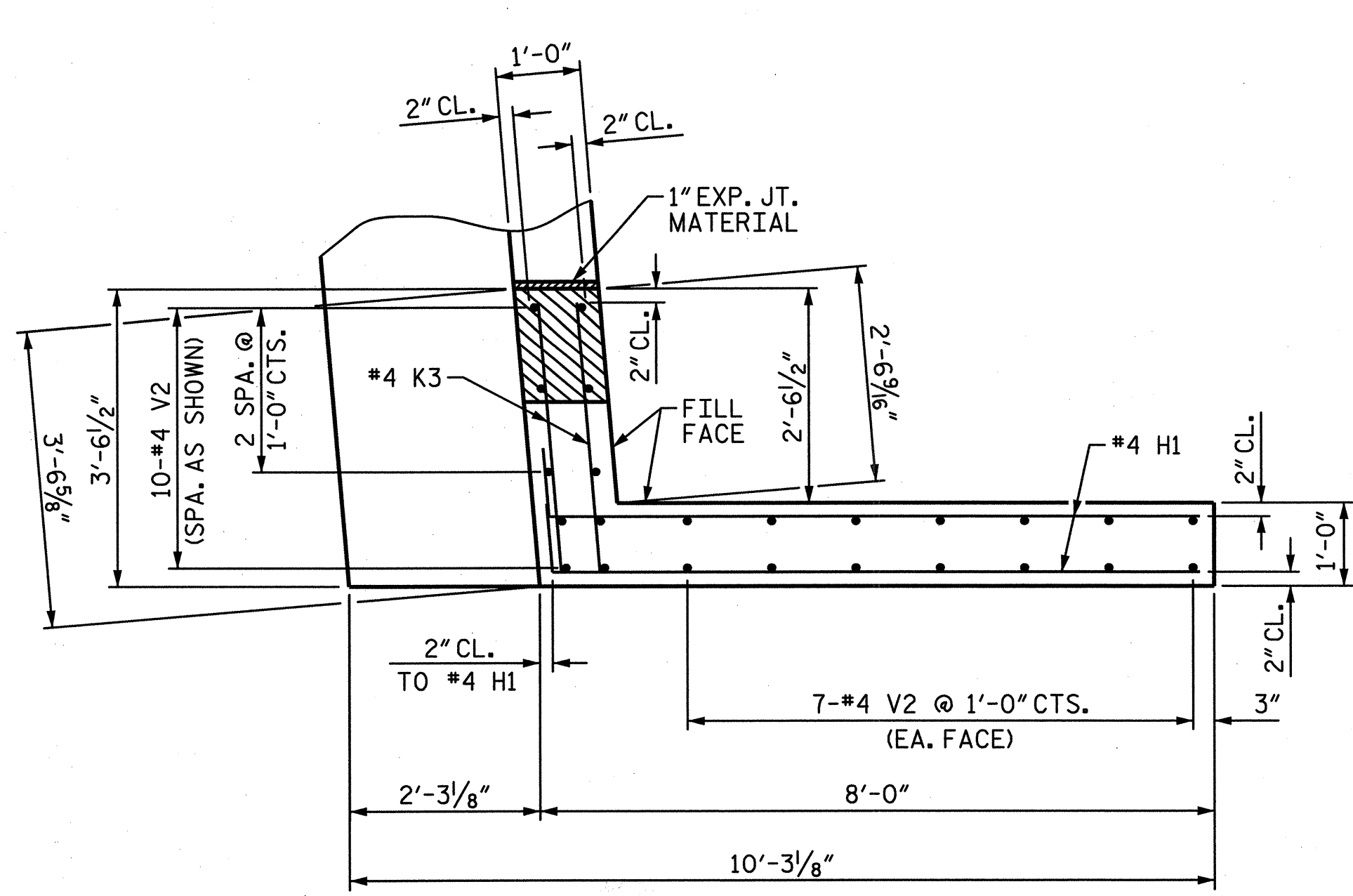
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1**

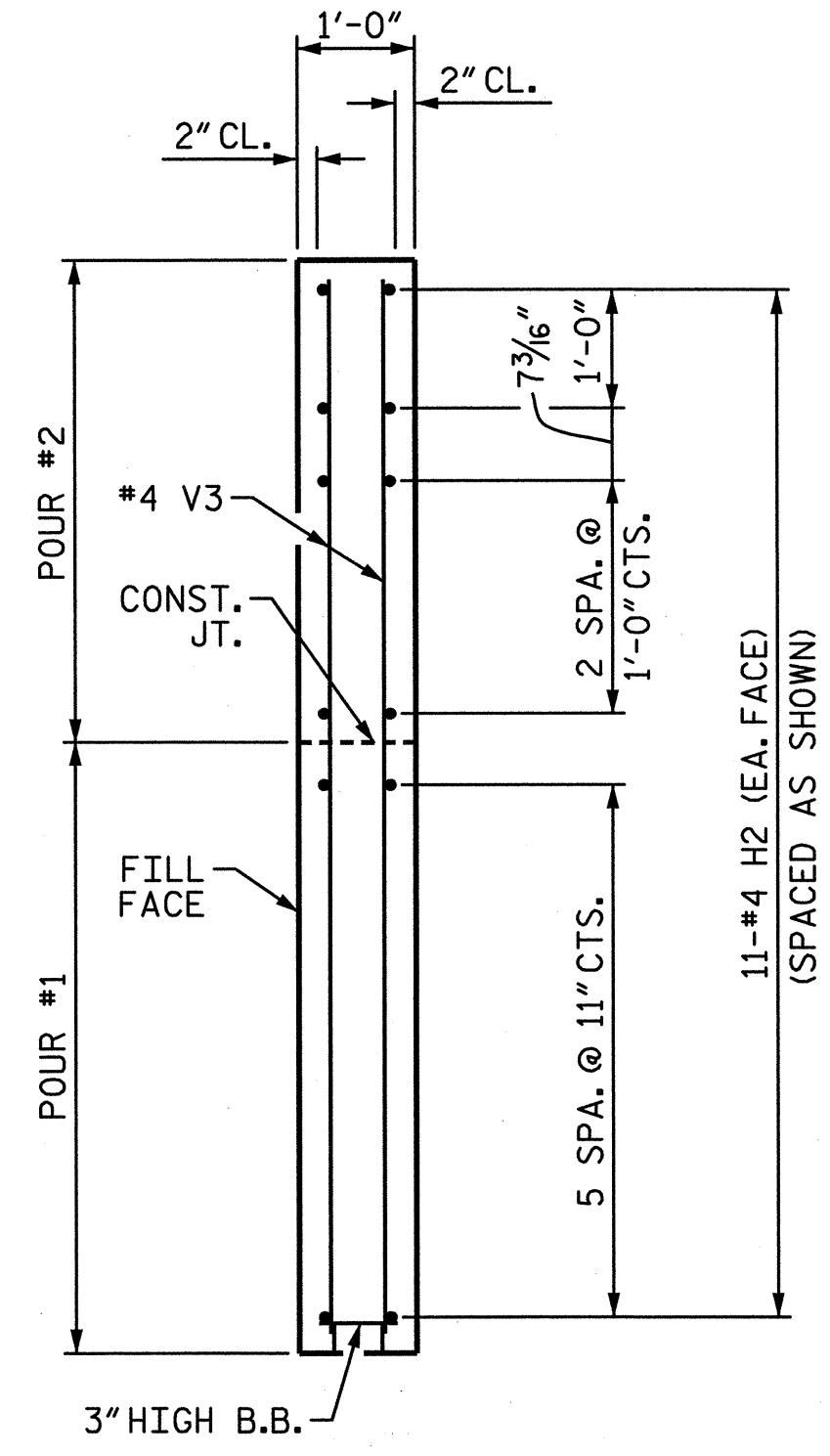
WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

REVISIONS						SHEET NO. S-27
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 40
2			4			

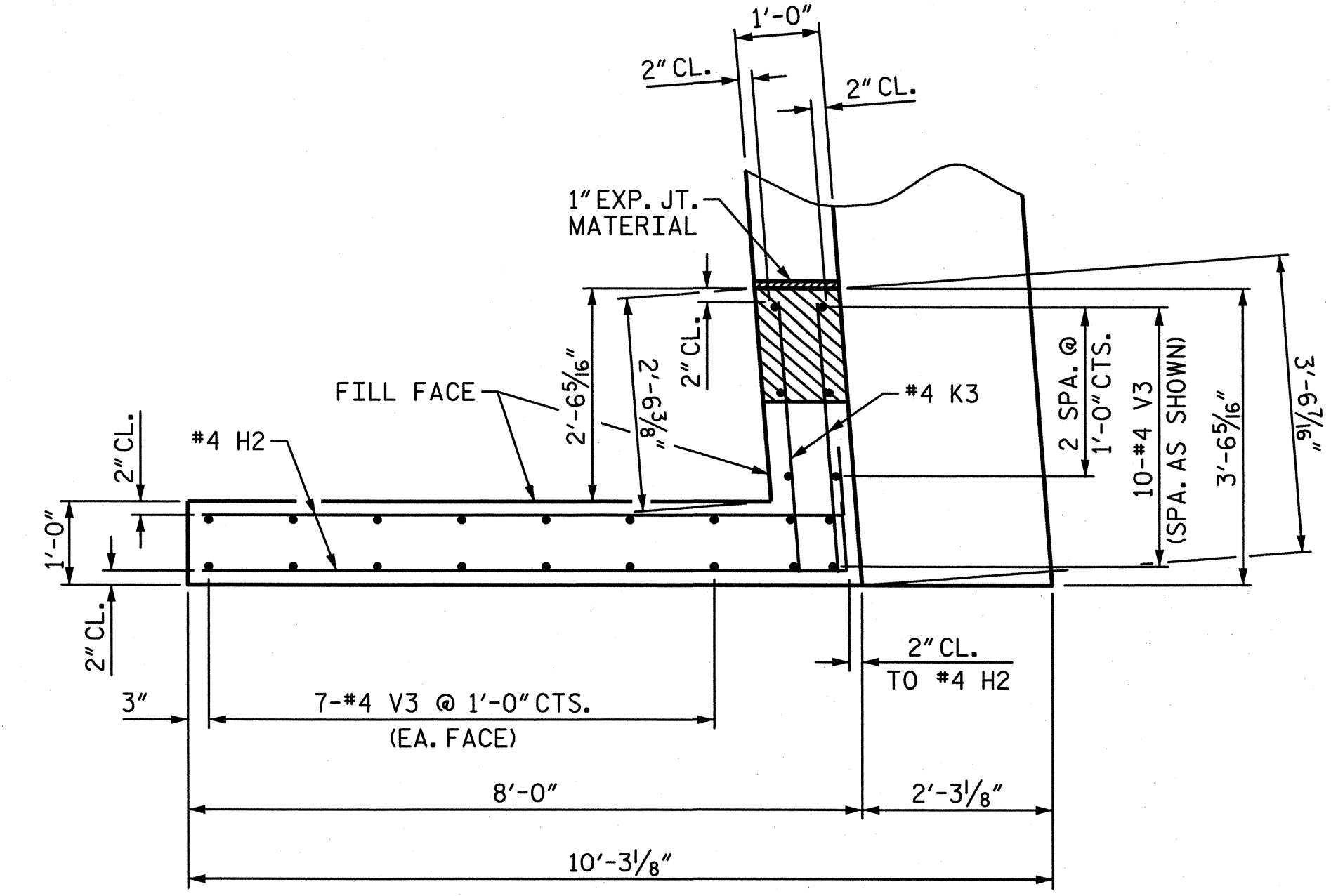
DRAWN BY : M. HOBBS DATE : 12/2012
 CHECKED BY : N. PIERCE DATE : 12/2012



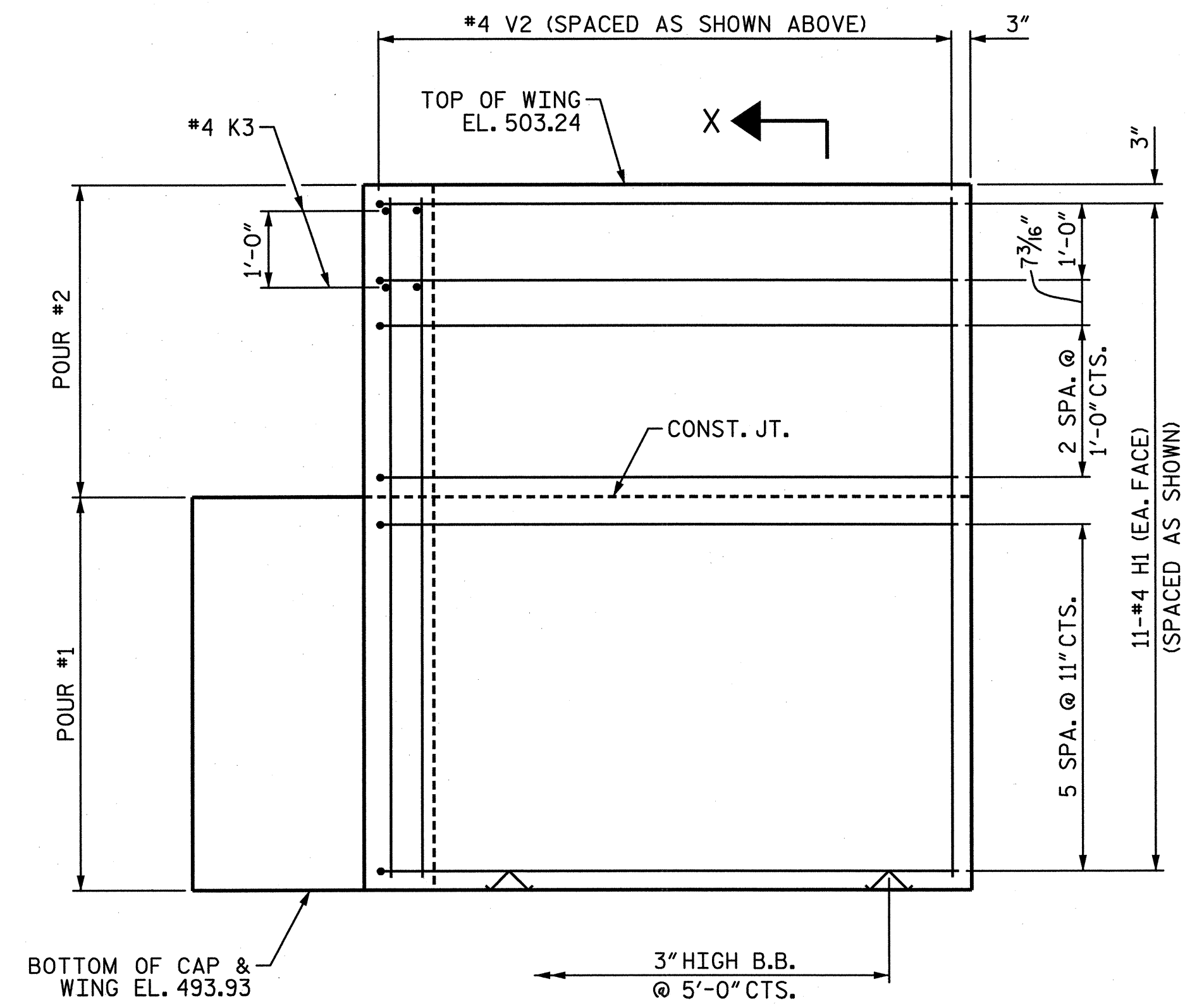
PLAN OF WING (W1)



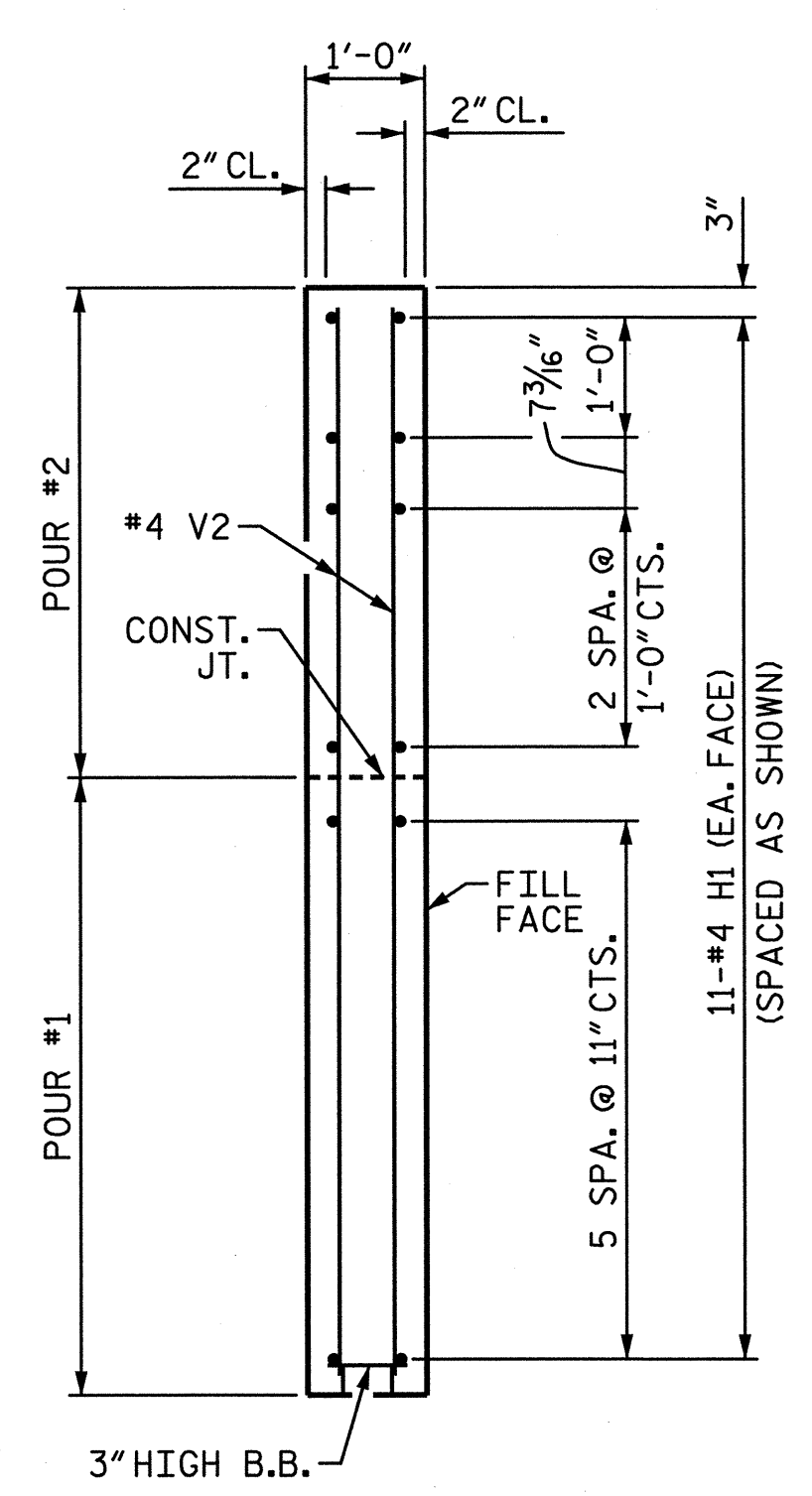
SECTION Y-Y



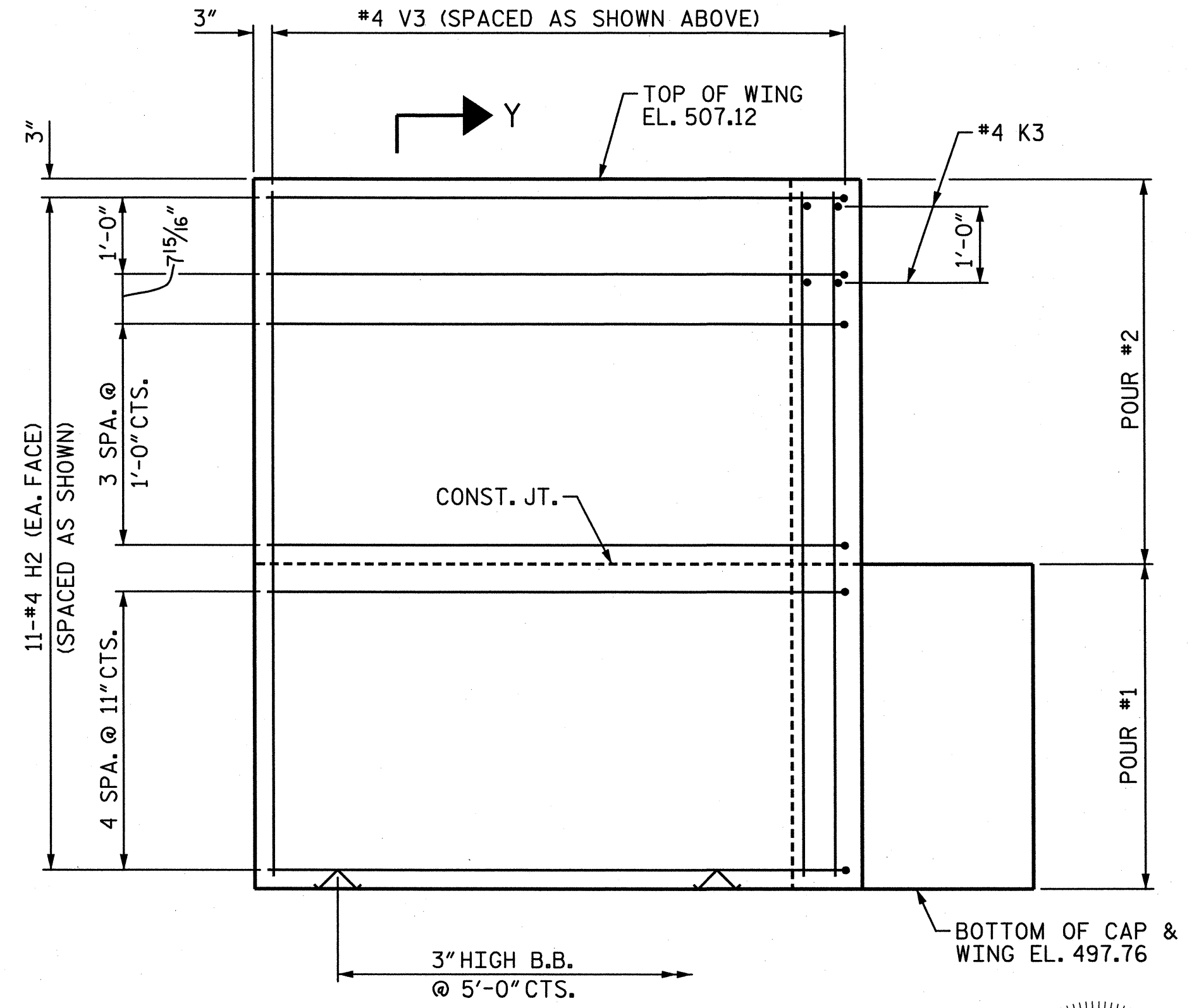
PLAN OF WING (W2)



ELEVATION OF WING (W1)



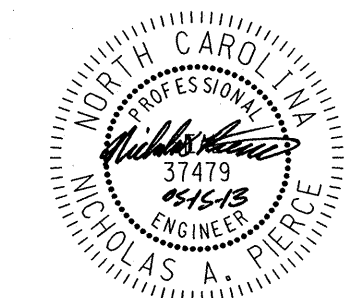
SECTION X-X



ELEVATION OF WING (W2)

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

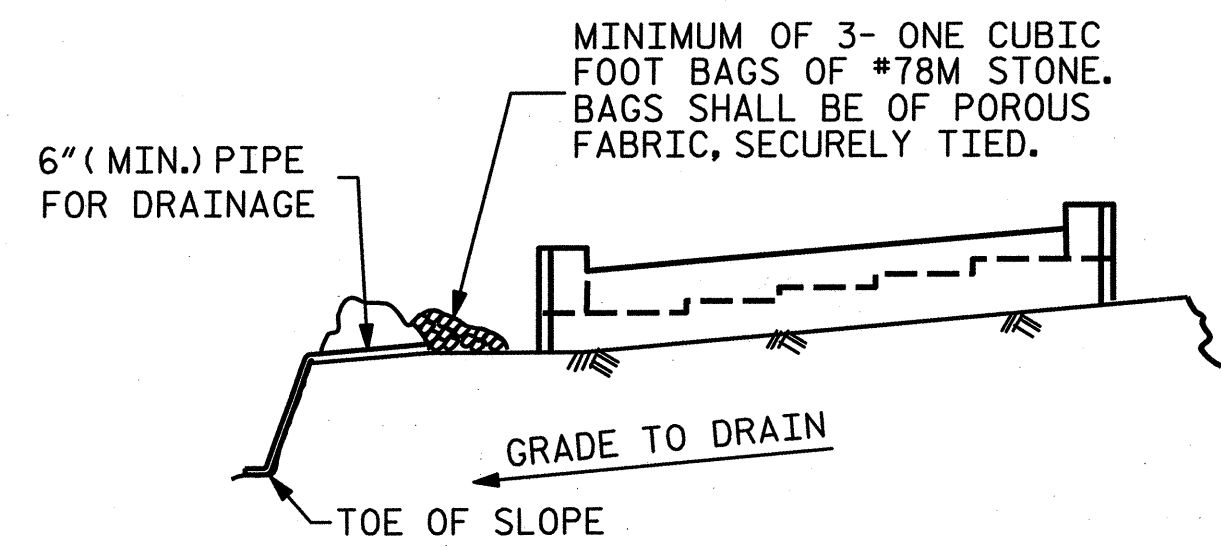
SHEET 2 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28	
1			3			TOTAL SHEETS	
2			4			40	

DRAWN BY: M. HOBBS DATE: 12/2012
 CHECKED BY: N. PIERCE DATE: 12/2012

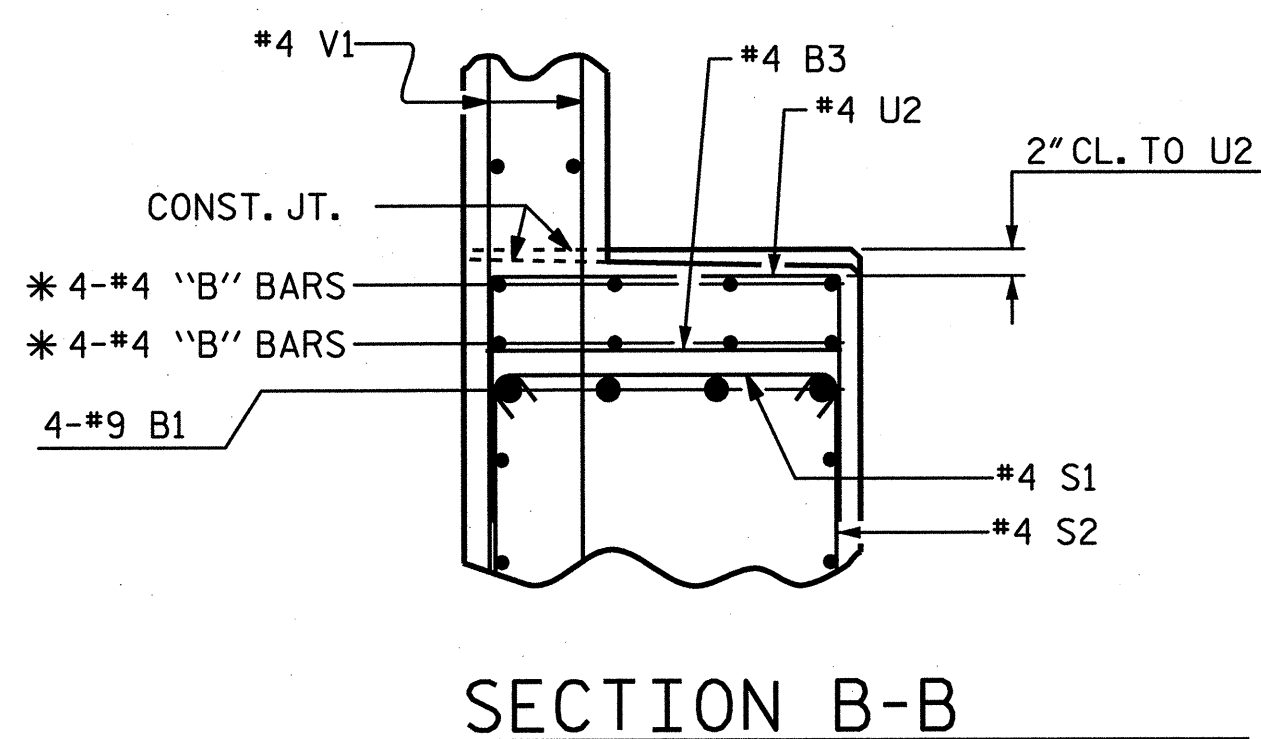
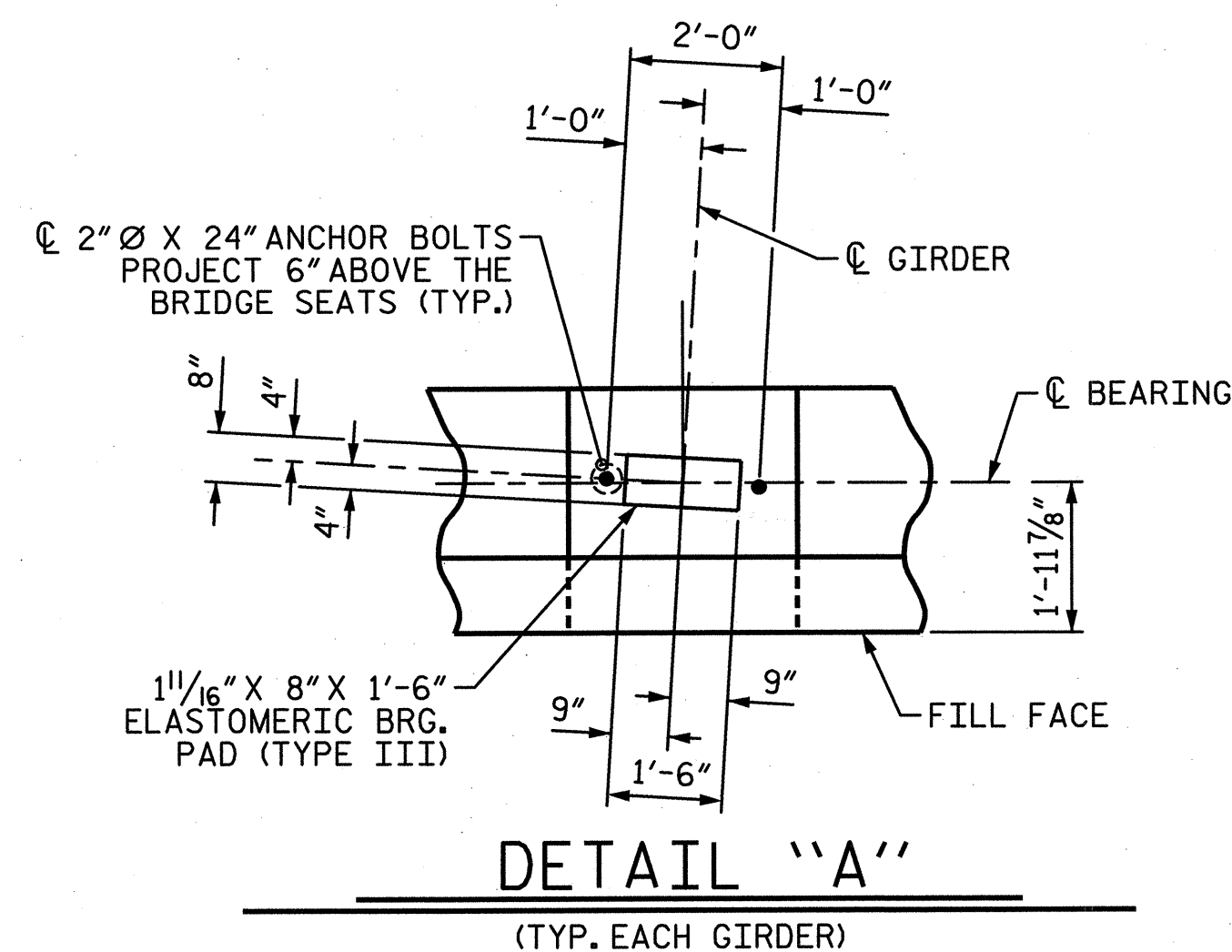


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

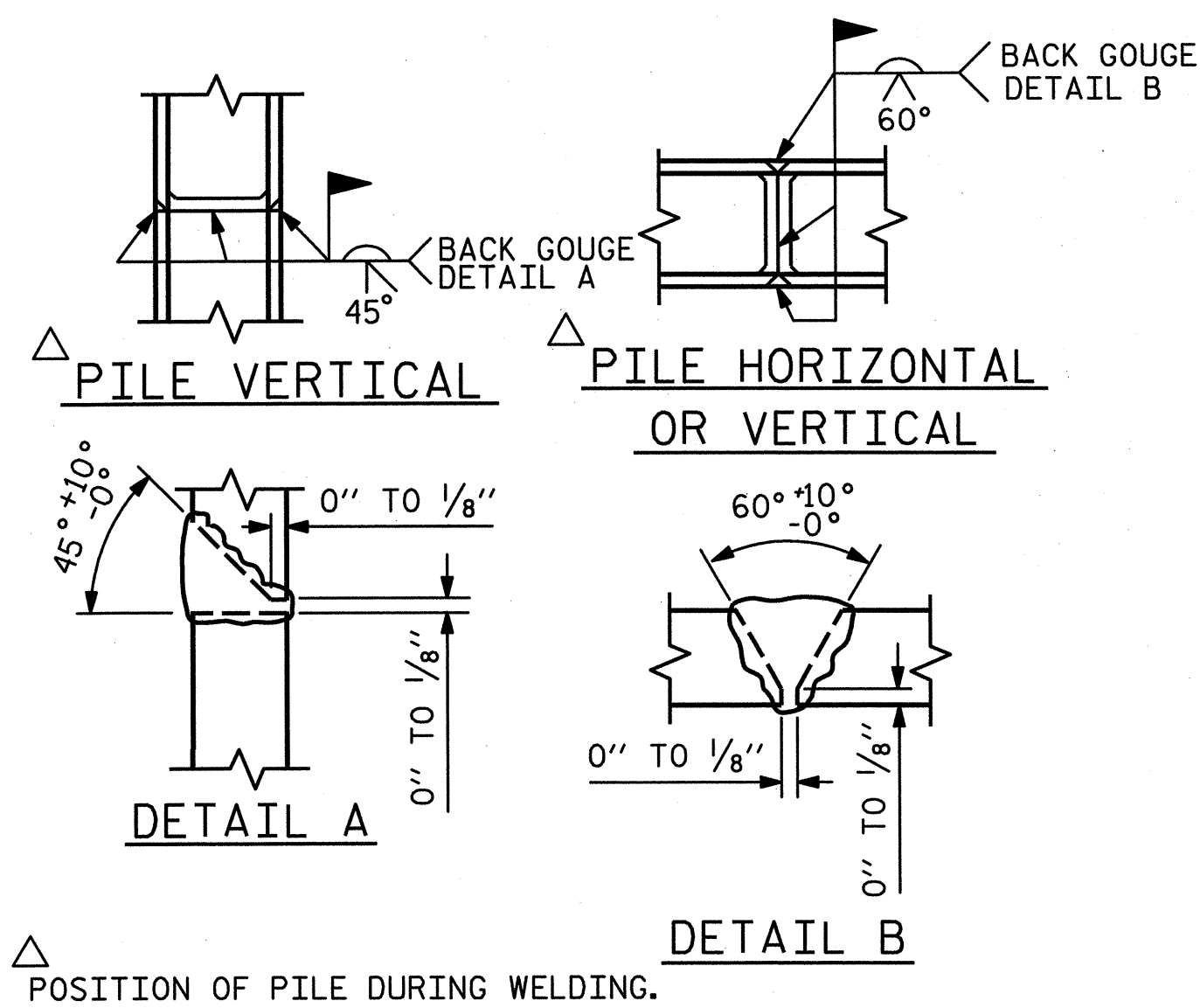
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

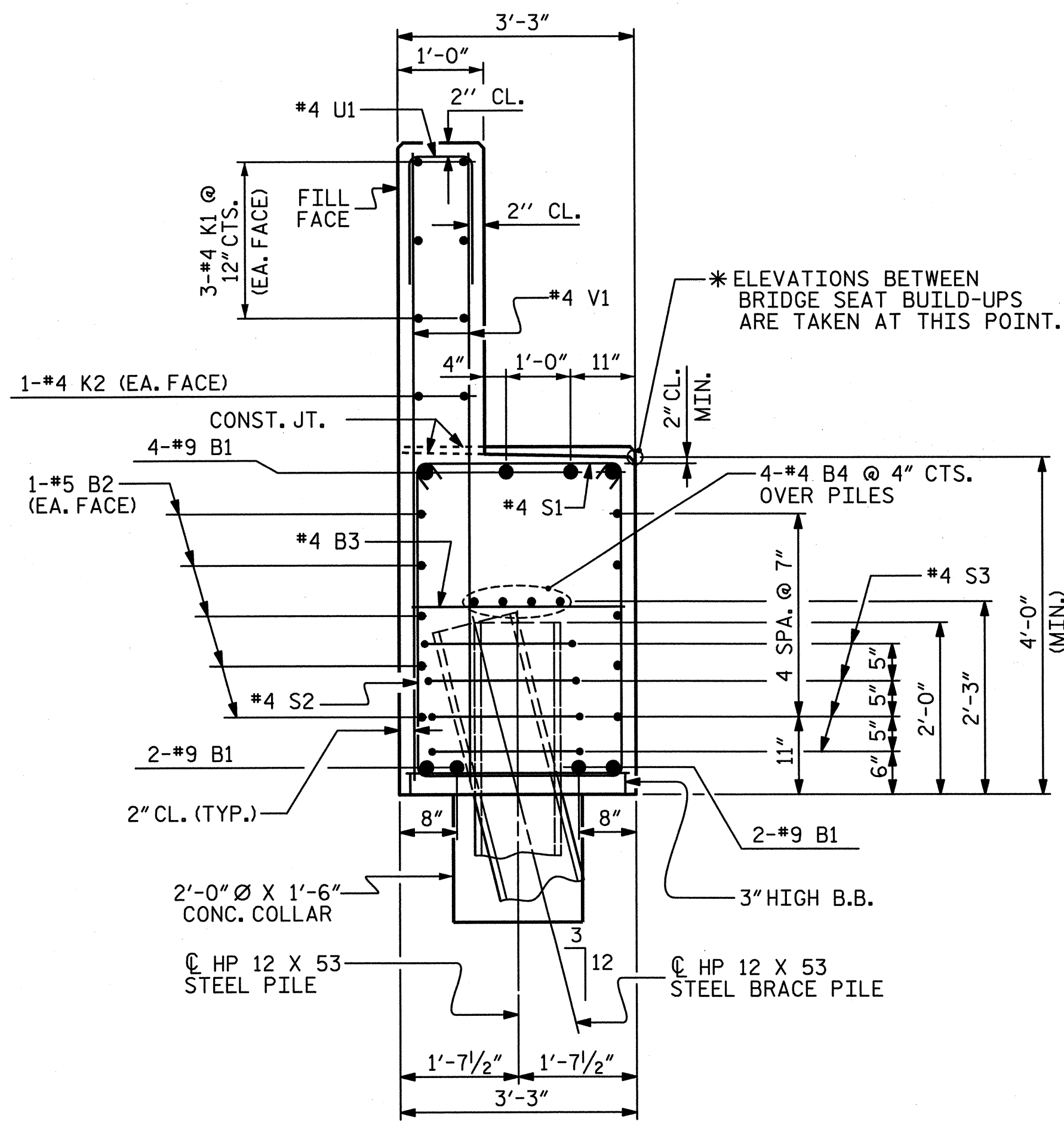
TEMPORARY DRAINAGE AT END BENT



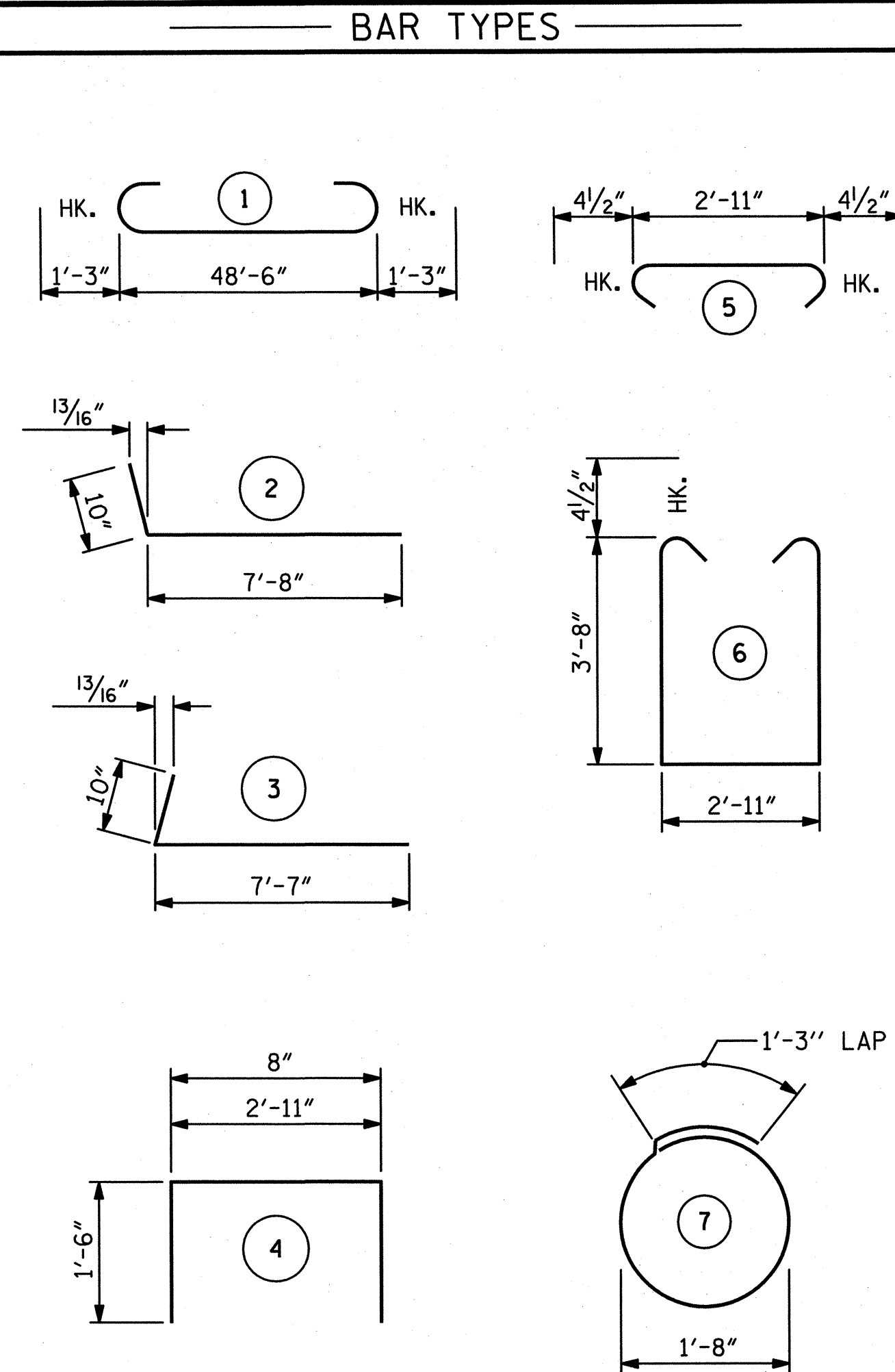
* - FOR "B" BAR CALLOUTS @ GIRDERS, SEE ELEVATION, SHEET 1 OF 3.



PILE SPLICE DETAILS



SECTION A-A



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	51'-0"	1387
B2	10	#5	STR	48'-6"	506
B3	22	#4	STR	27'-11"	43
B4	8	#4	STR	25'-5"	136
B5	4	#4	STR	5'-4"	14
B6	4	#4	STR	14'-2"	38
B7	16	#4	STR	2'-8"	29
B8	12	#4	STR	9'-6"	76
B9	4	#4	STR	6'-10"	18
H1	22	#4	2	8'-6"	125
H2	22	#4	3	8'-5"	124
K1	12	#4	STR	25'-6"	204
K2	10	#4	STR	9'-0"	60
K3	8	#4	STR	3'-2"	17
S1	56	#4	5	3'-8"	137
S2	68	#4	6	11'-0"	500
S3	24	#4	7	6'-6"	104
U1	42	#4	4	3'-8"	103
U2	46	#4	4	5'-11"	182
V1	84	#4	STR	7'-4"	411
V2	24	#4	STR	8'-11"	143
V3	24	#4	STR	9'-0"	144
REINFORCING STEEL				4,501	LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP, LOWER WINGS, & CONCRETE COLLARS)				29.64	C.Y.
POUR #2 (BACKWALL & UPPER WINGS)				8.44	C.Y.
TOTAL CLASS A CONCRETE				38.08	C.Y.
HP 12 X 53 STEEL PILES				No. = 6	120 LIN. FT.

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-
SHEET 3 OF 3



WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 40

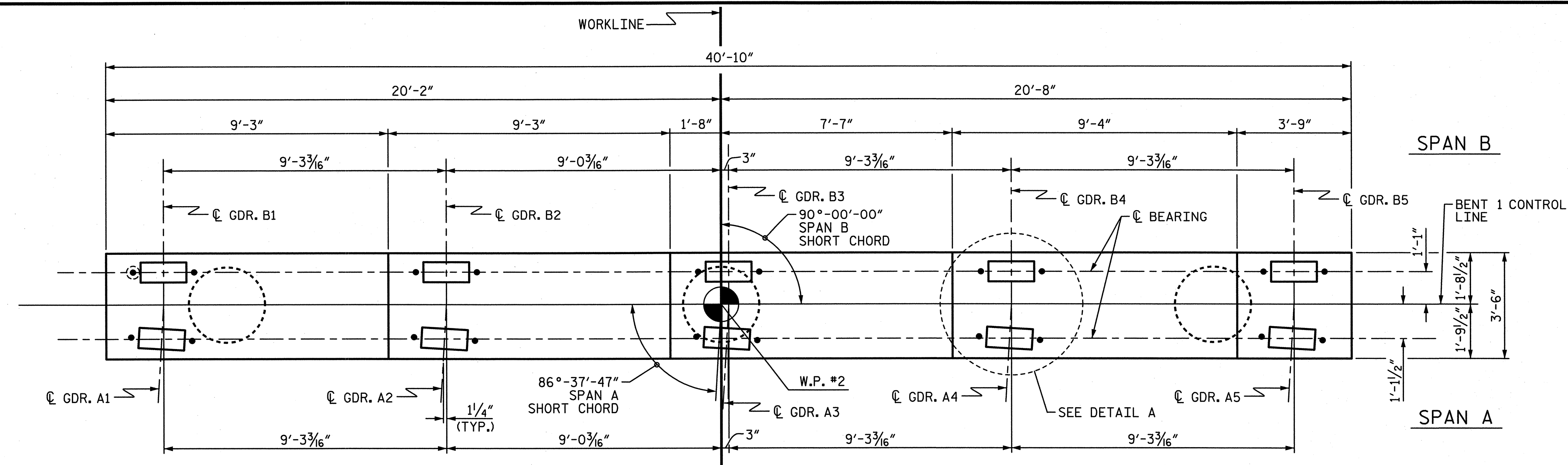
NOTES:

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

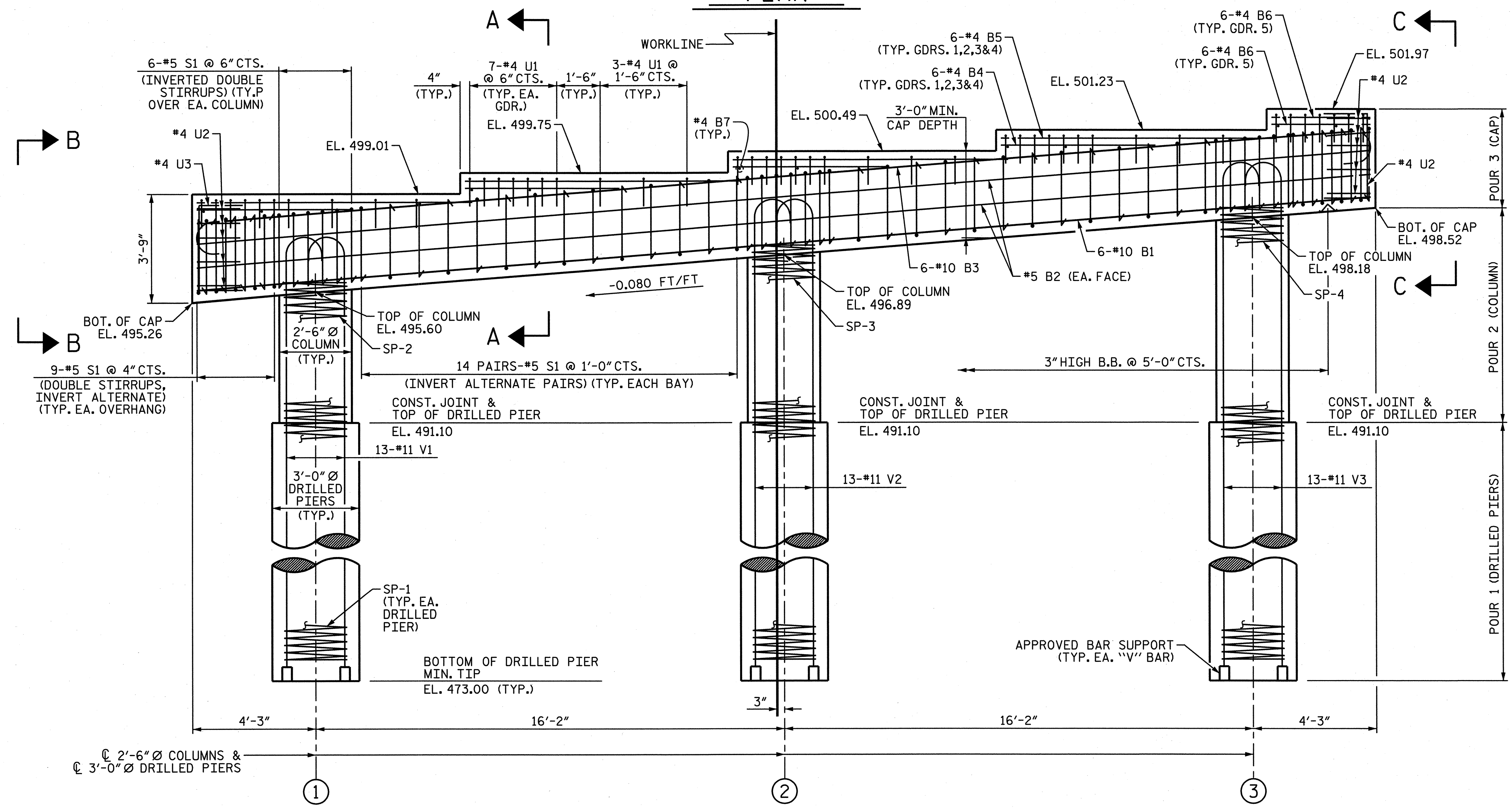
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

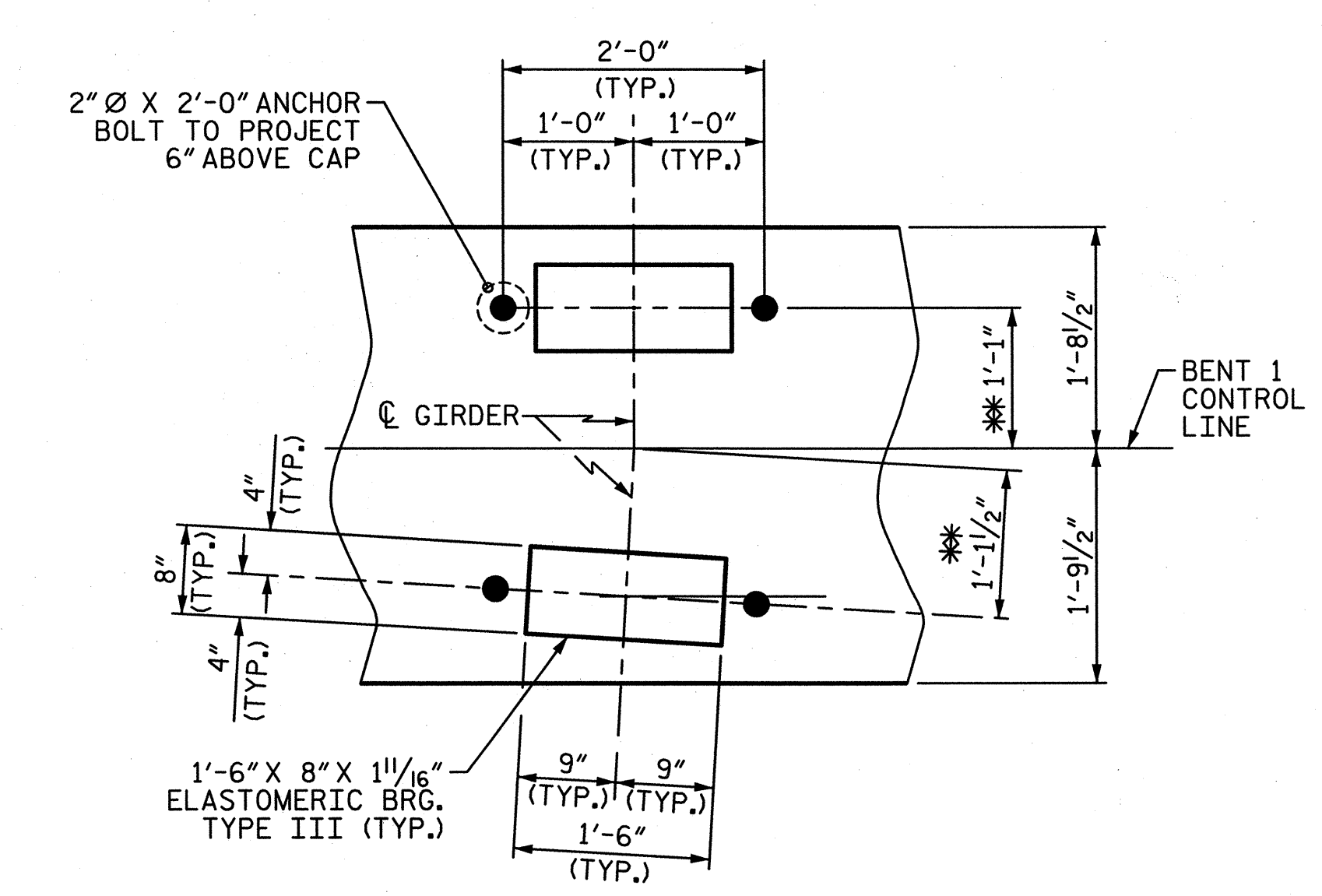
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.



PLAN



ELEVATION



DETAIL A

(DIMENSIONS ARE TYPICAL EACH BEARING)
* MEASURED ALONG Q GIRDER

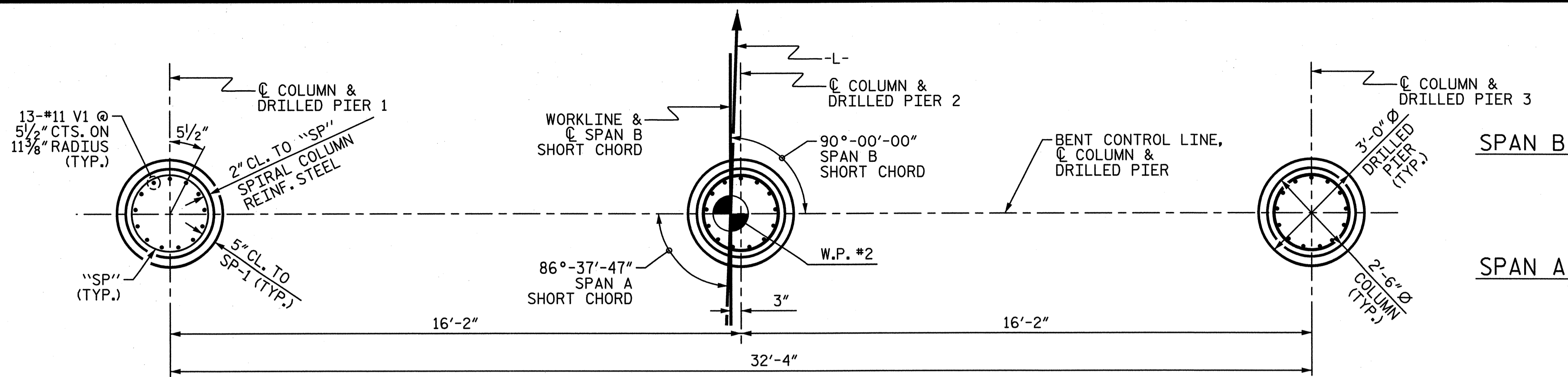
PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 1 OF 2

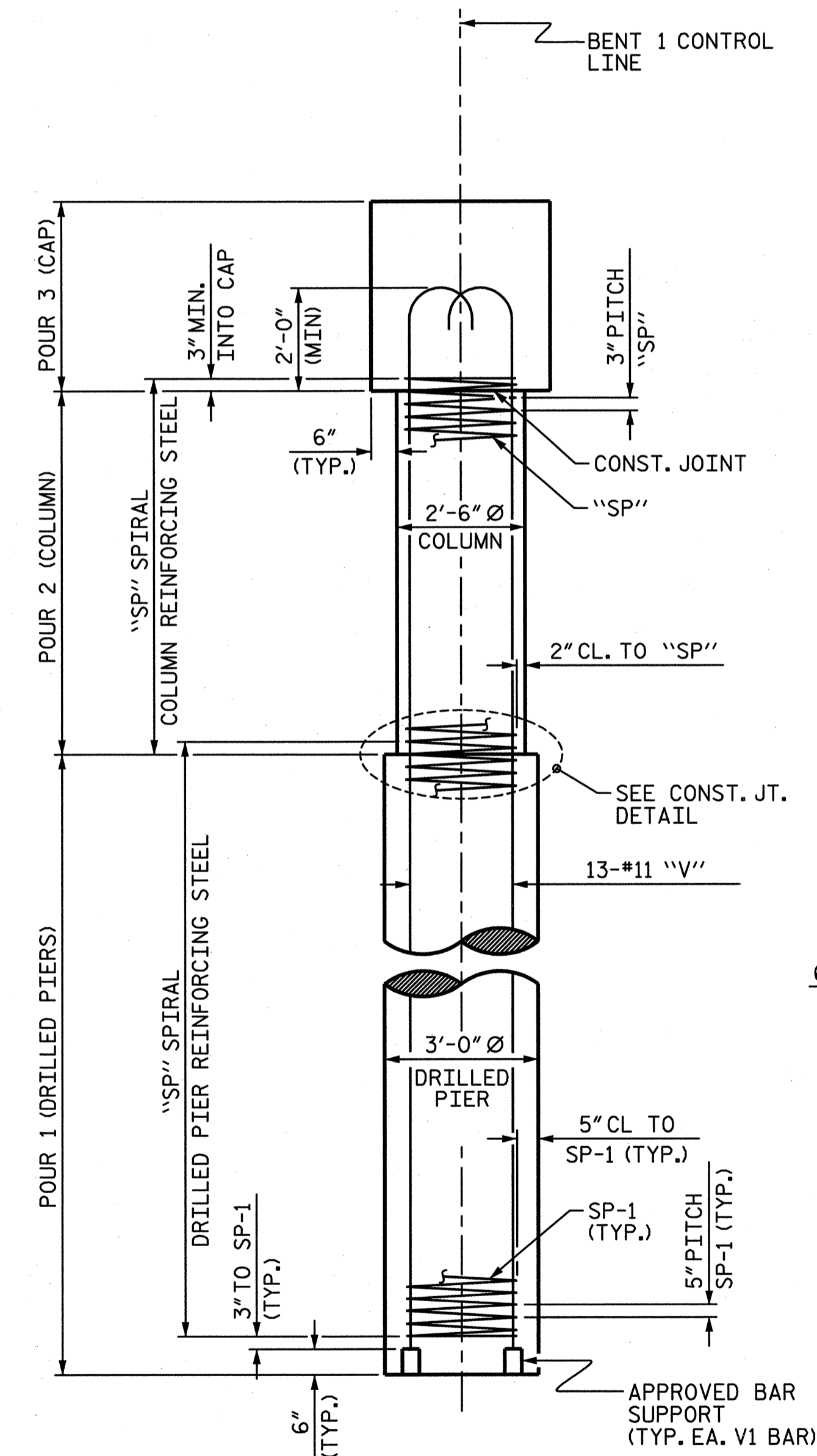
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
SHEET NO. S-30					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 40

WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

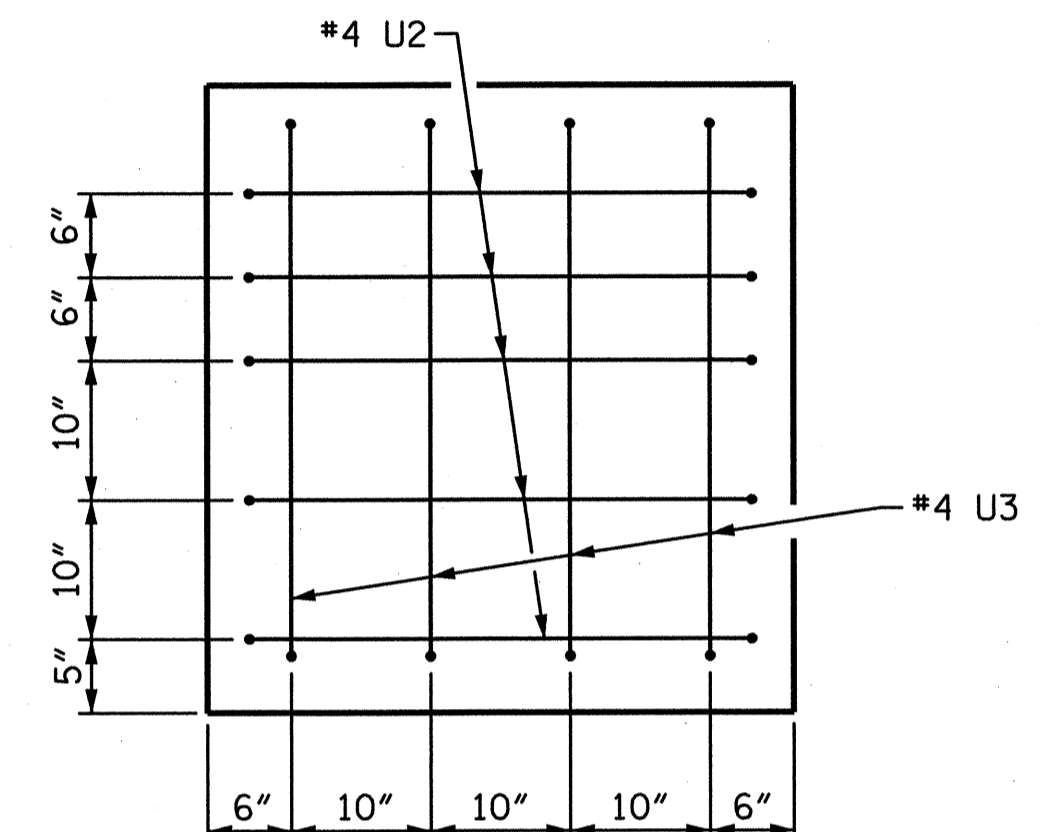
DRAWN BY : M. HOBBS DATE : 01/2013
 CHECKED BY : N. PIERCE DATE : 01/2013



PLAN OF DRILLED PIERS & COLUMNS

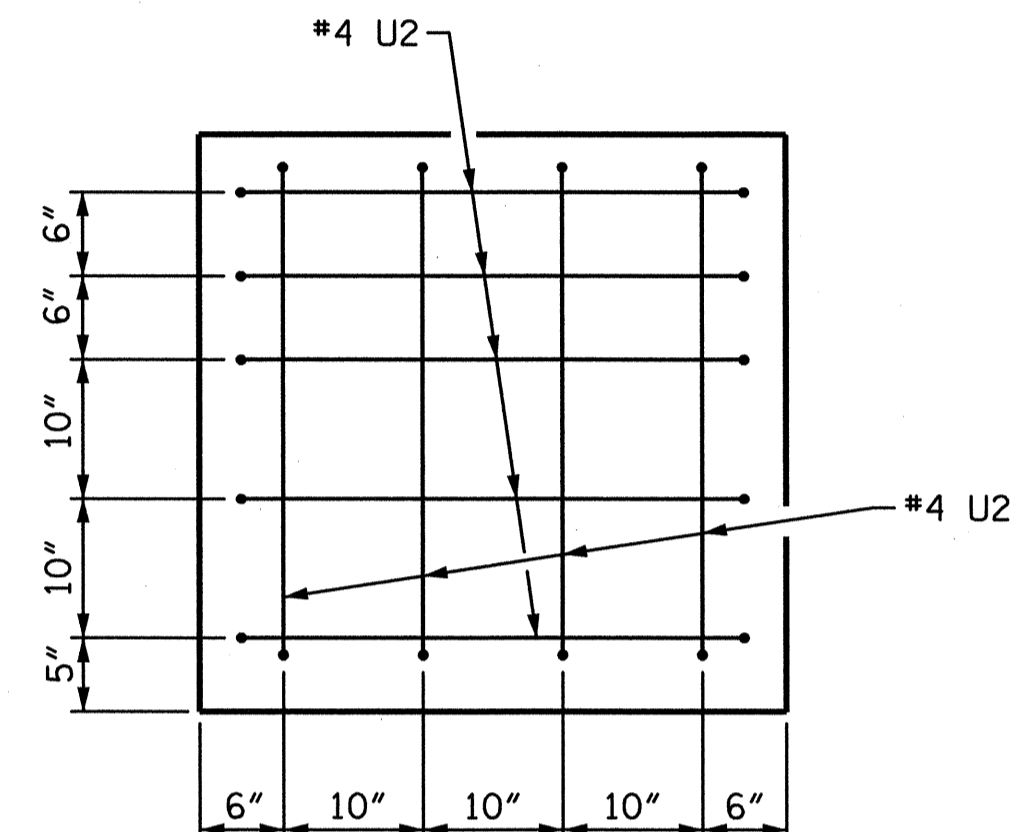


END ELEVATION



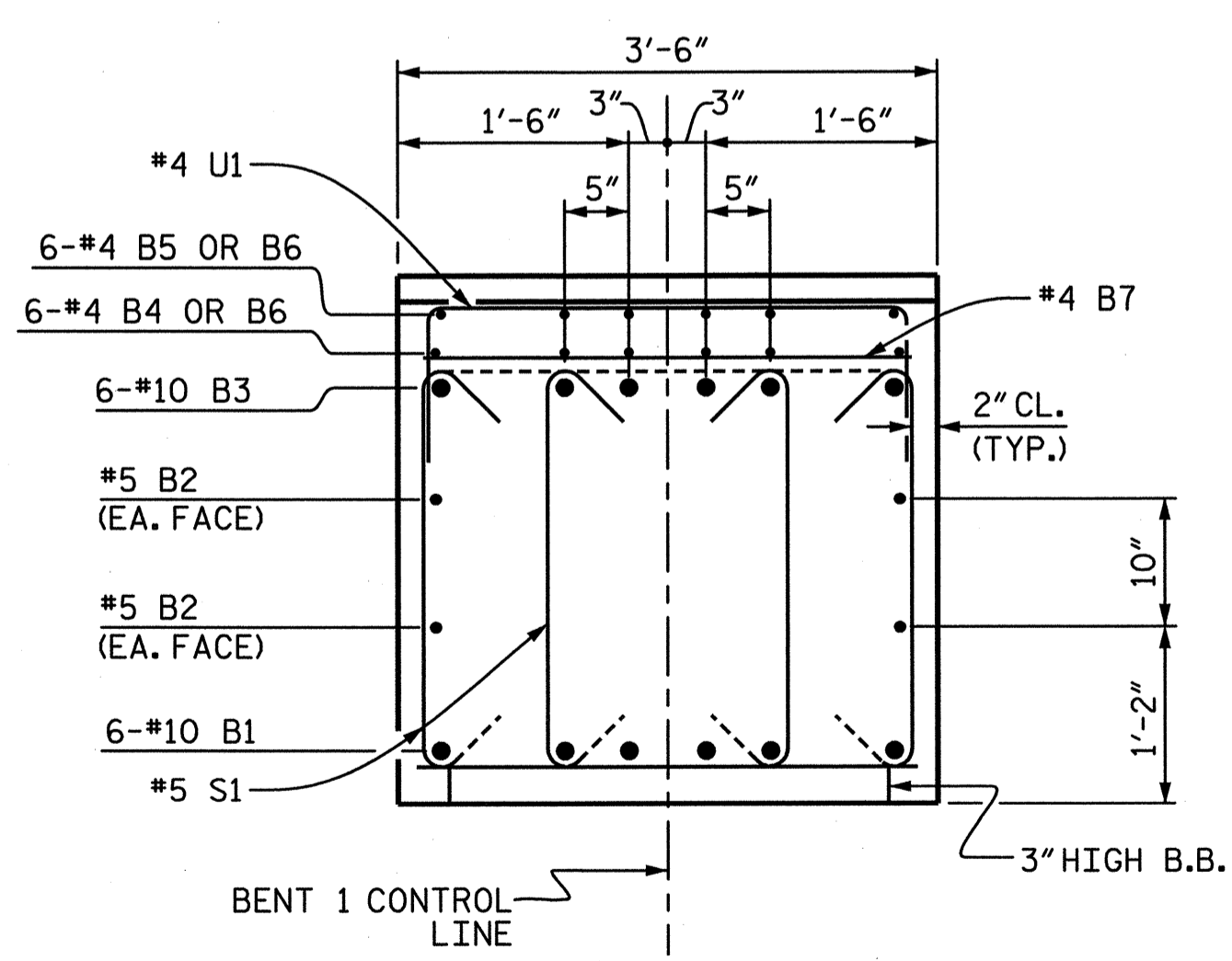
NOTES:
2" MIN. CONCRETE COVER FROM END OF CAP REQUIRED FOR ALL #4 "U" BARS
#4 "U" BARS MAY BE SHIFTED UP TO 2" TO CLEAR "B" BARS

VIEW B-B

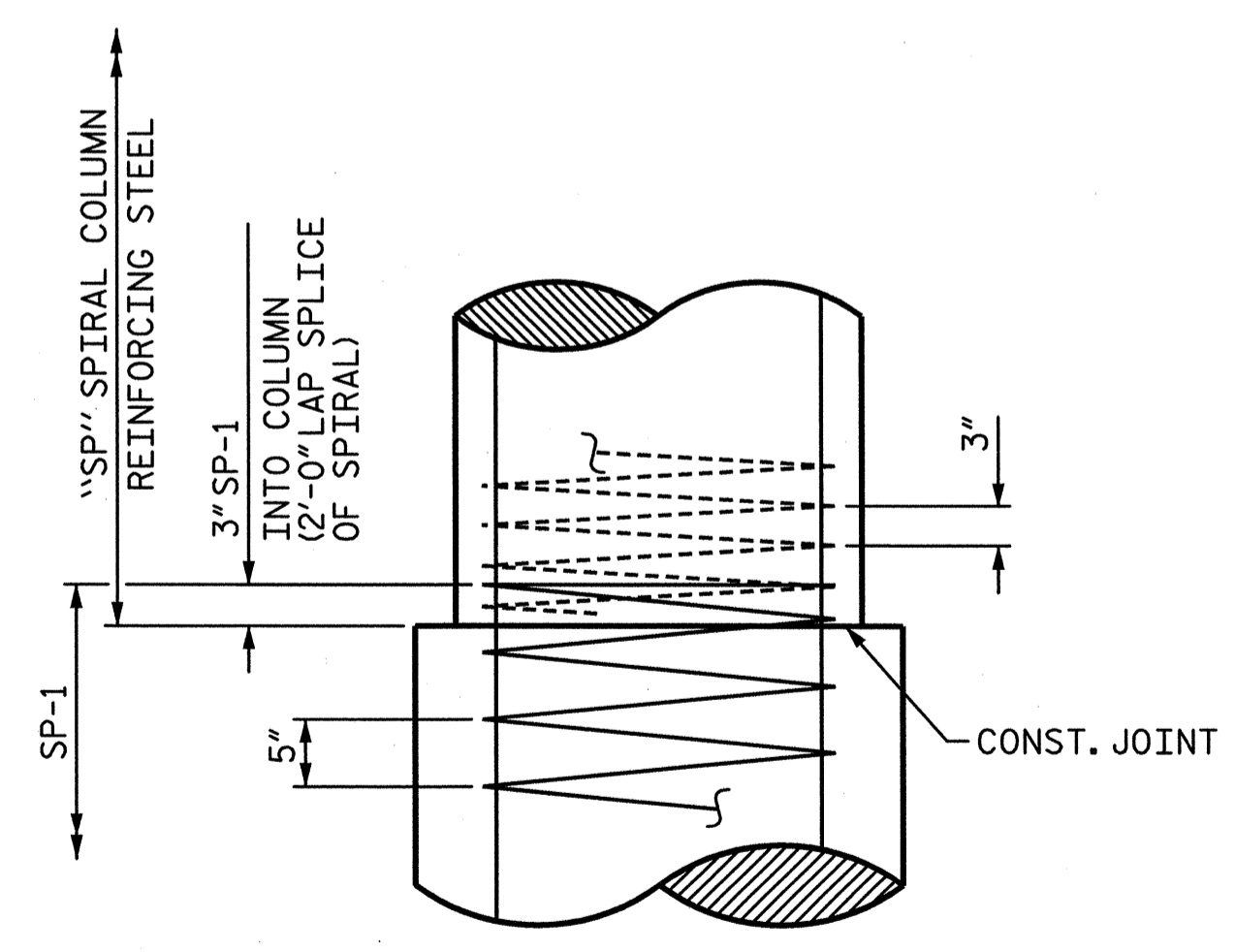


NOTES:
2" MIN. CONCRETE COVER FROM END OF CAP REQUIRED FOR ALL #4 "U" BARS
#4 "U" BARS MAY BE SHIFTED UP TO 2" TO CLEAR "B" BARS

VIEW C-C



SECTION A-A



CONSTRUCTION JOINT DETAIL

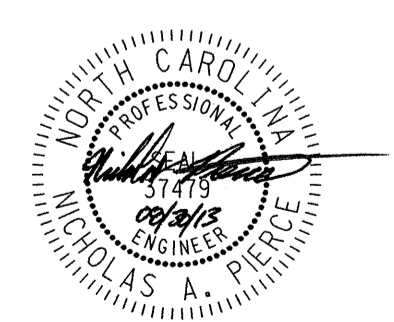
BAR TYPES				BILL OF MATERIAL			
				BENT 1			
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT			
B1	#6	STR	40'-7"	1,048			
B2	#5	STR	40'-7"	169			
B3	#6	STR	43'-5"	1,121			
B4	#4	STR	5'-4"	86			
B5	#4	STR	9'-6"	152			
B6	#4	STR	3'-5"	27			
B7	#4	STR	3'-2"	21			
				REINFORCING STEEL LBS. 9,542			
SP-1	3	*	5	312'-10"	979		
SP-2	1	**	6	147'-0"	98		
SP-3	1	**	6	180'-5"	121		
SP-4	1	**	6	213'-9"	143		
				SPIRAL COLUMN REINFORCING STEEL LBS. 1,341			
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.							
** THE SP-2, SP-3 & SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.							
CLASS A CONCRETE BREAKDOWN							
POUR 2 (COLUMNS)				3.22 C.Y.			
POUR 3 (CAP)				17.99 C.Y.			
TOTAL CLASS A CONCRETE				21.21 C.Y.			
3'-0" Ø DRILLED PIERS:							
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)				14.27 CY			
3'-0" Ø DRILLED PIER IN SOIL				20.3 LIN. FT.			
3'-0" Ø DRILLED PIER NOT IN SOIL				34.0 LIN. FT.			
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER				12.3 LIN. FT.			
CSL TUBES				236.00 LIN. FT.			

ALL BAR DIMENSIONS ARE OUT TO OUT.

DRAWN BY: M. HOBBS DATE: 01/2013
CHECKED BY: N. PIERCE DATE: 01/2013

8/30/2013
R:\122022_B-5109_Union County_NC\Structures\Drafting\Substructure\B5109_SD_B1_2.dgn
usmh04386

WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891



PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-31
TOTAL SHEETS 40

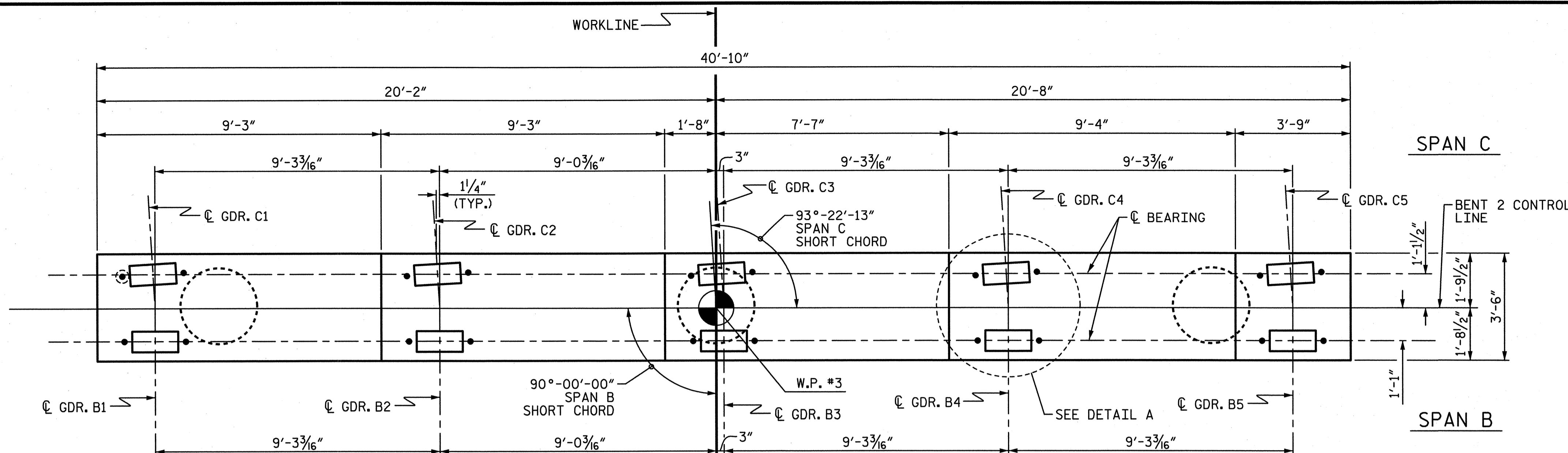
NOTES:

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

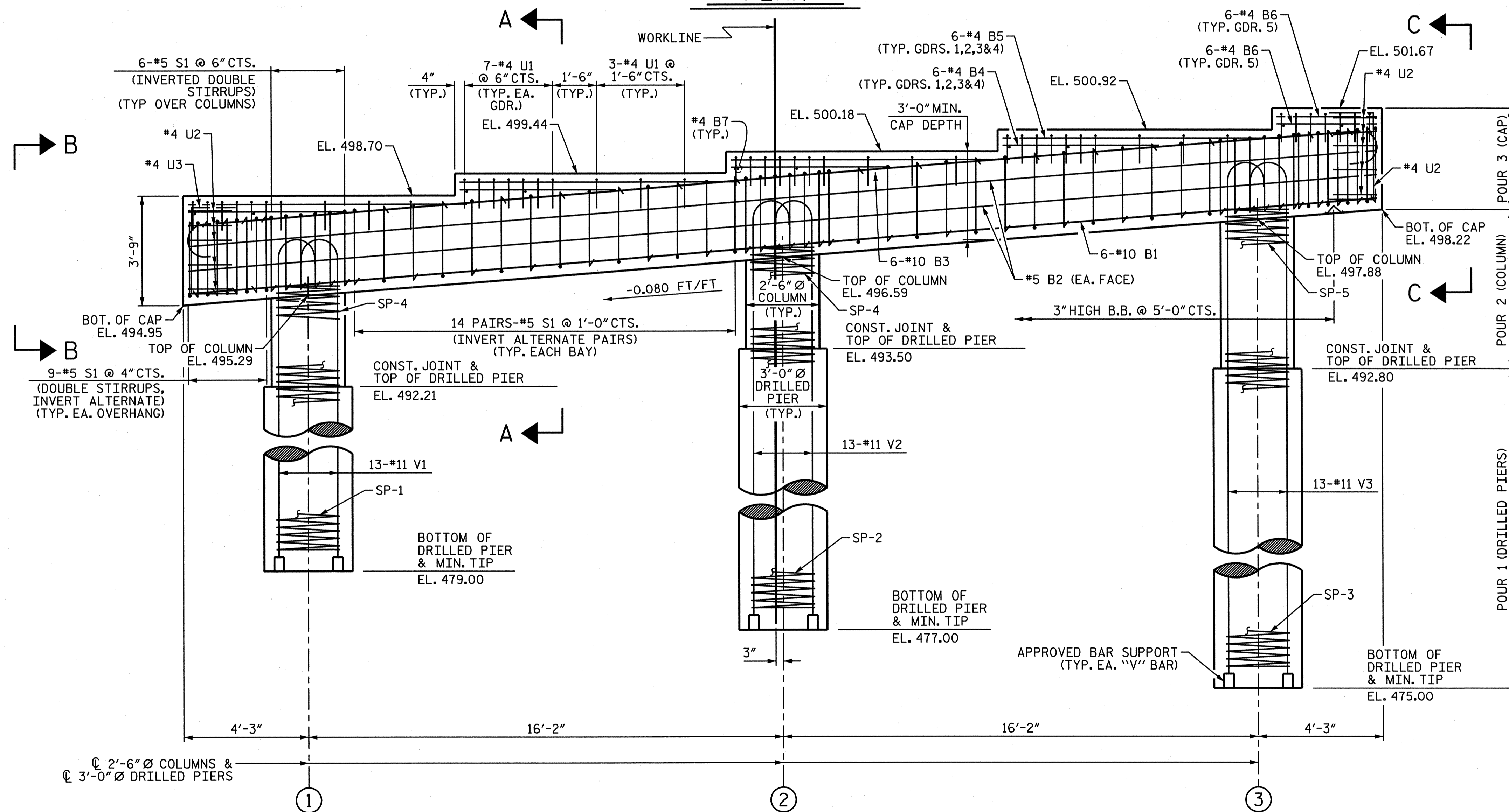
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

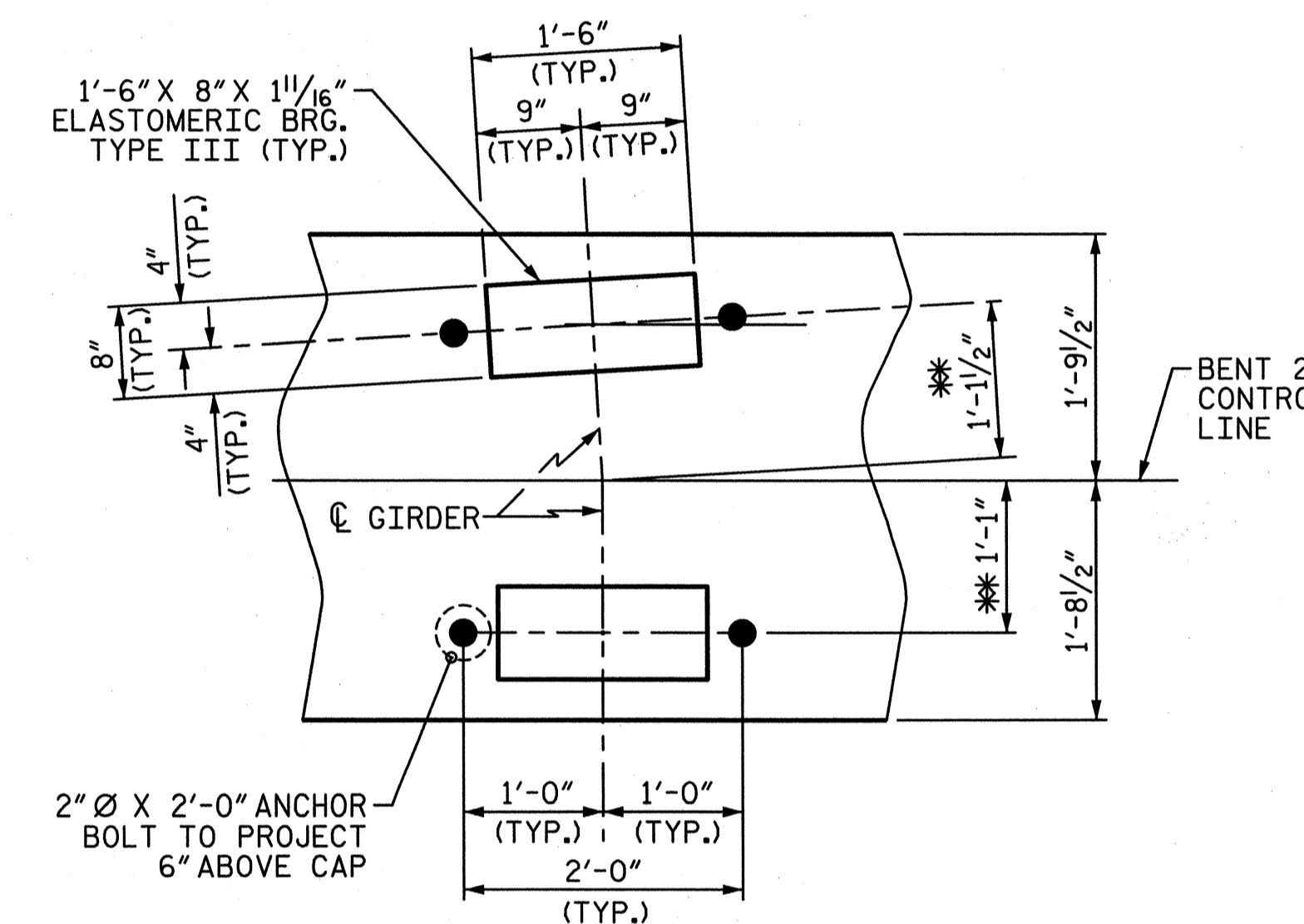
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.



PLAN



ELEVATION



DETAIL A

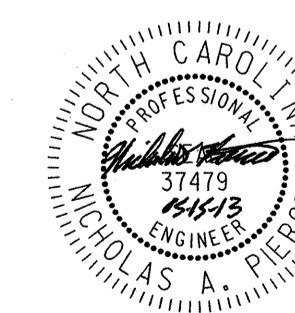
(DIMENSIONS ARE TYPICAL EACH BEARING)
* MEASURED ALONG \bar{C} GIRDER

PROJECT NO. B-5109

UNION COUNTY

STATION: 16+82.50 -L-

SHEET 1 OF 2



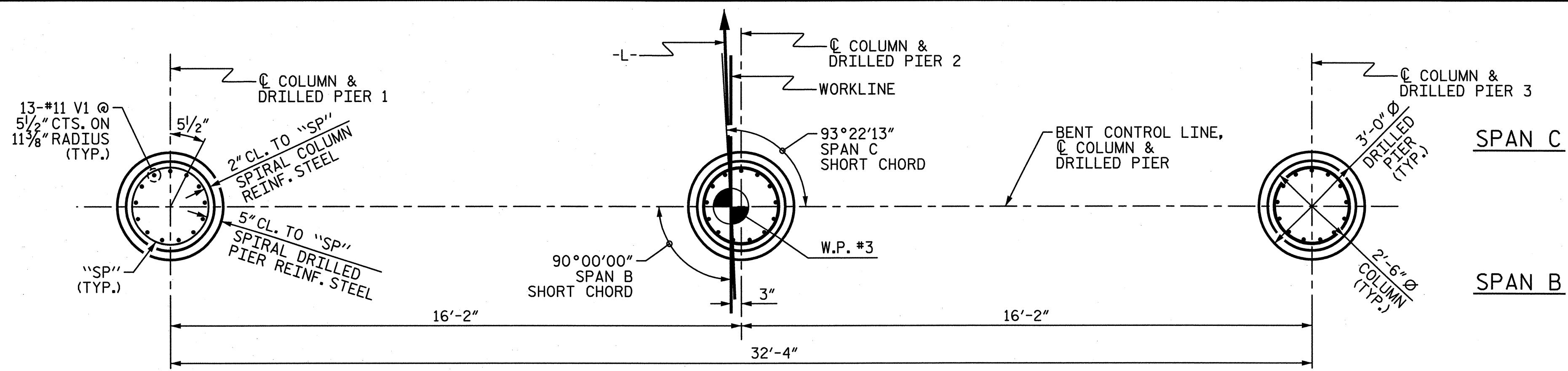
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUBSTRUCTURE
BENT 2**

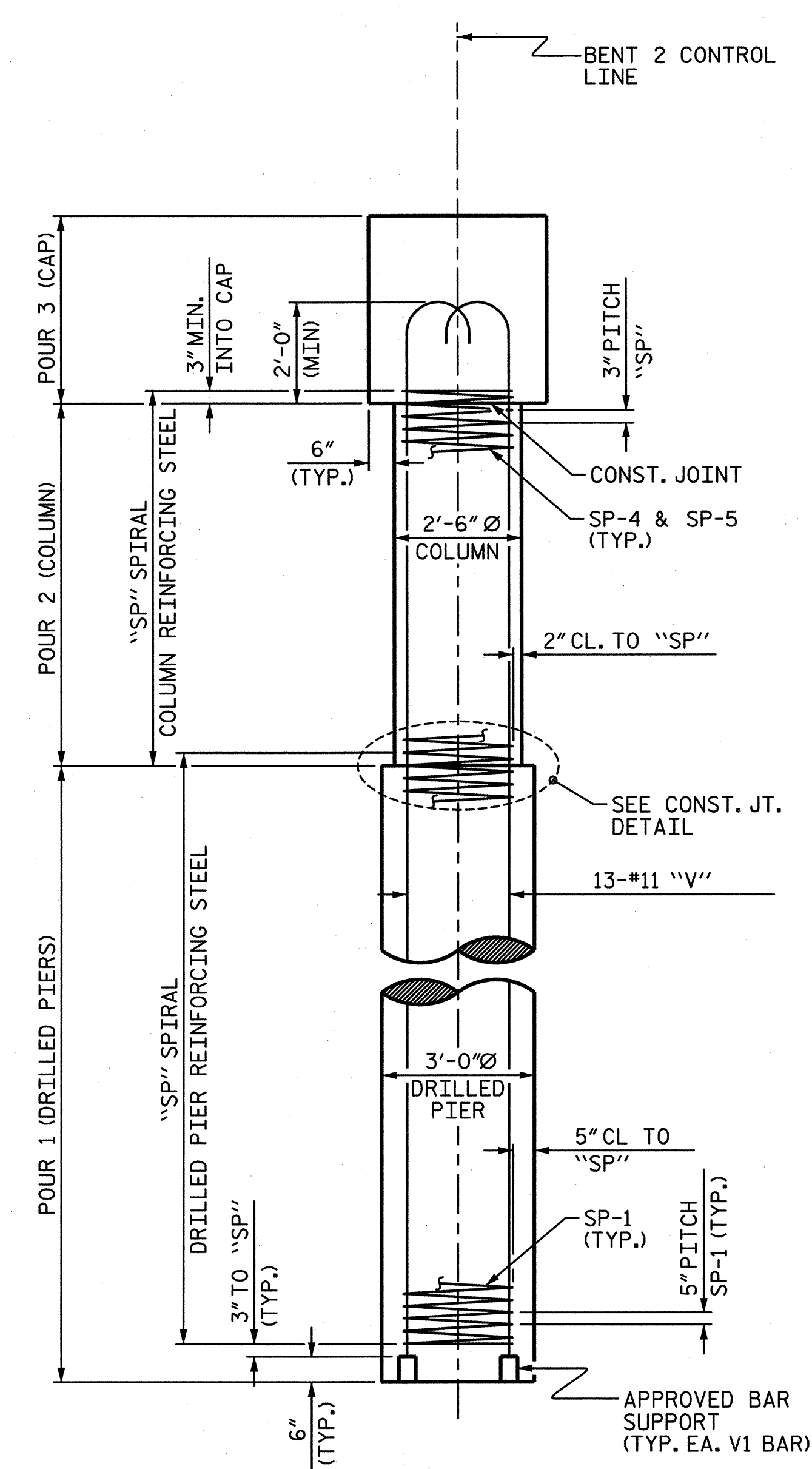
WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			40

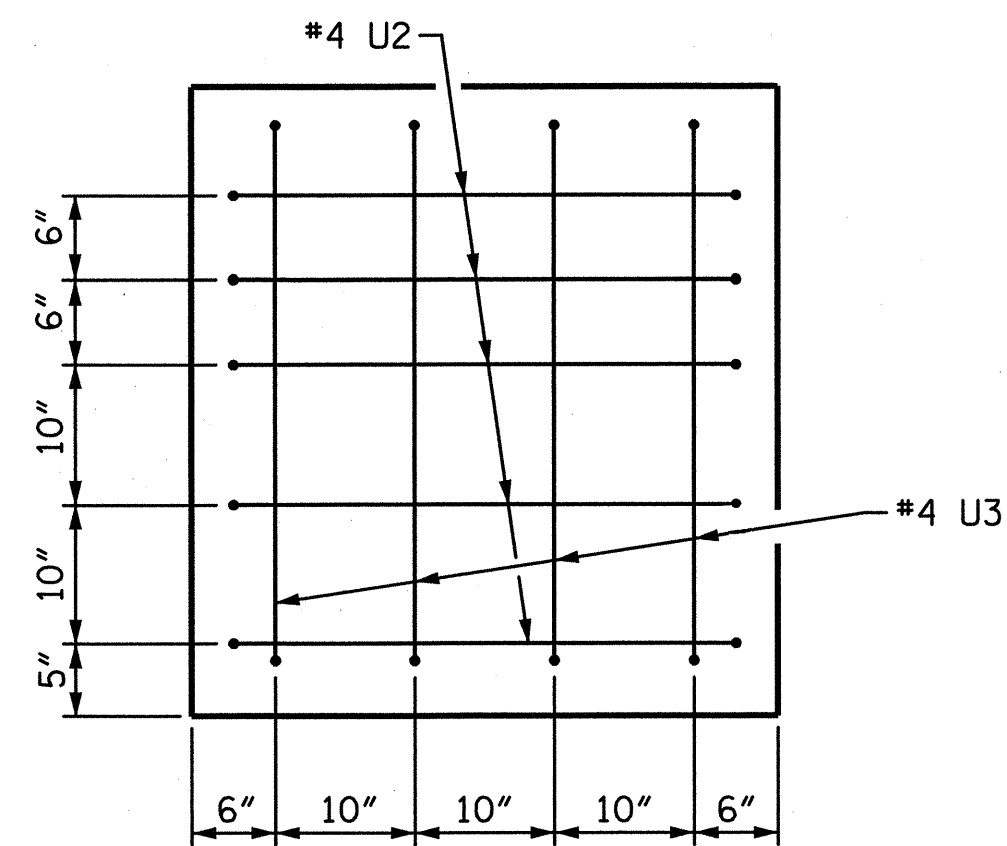
DRAWN BY : M. HOBBS DATE : 01/2013
CHECKED BY : N. PIERCE DATE : 01/2013



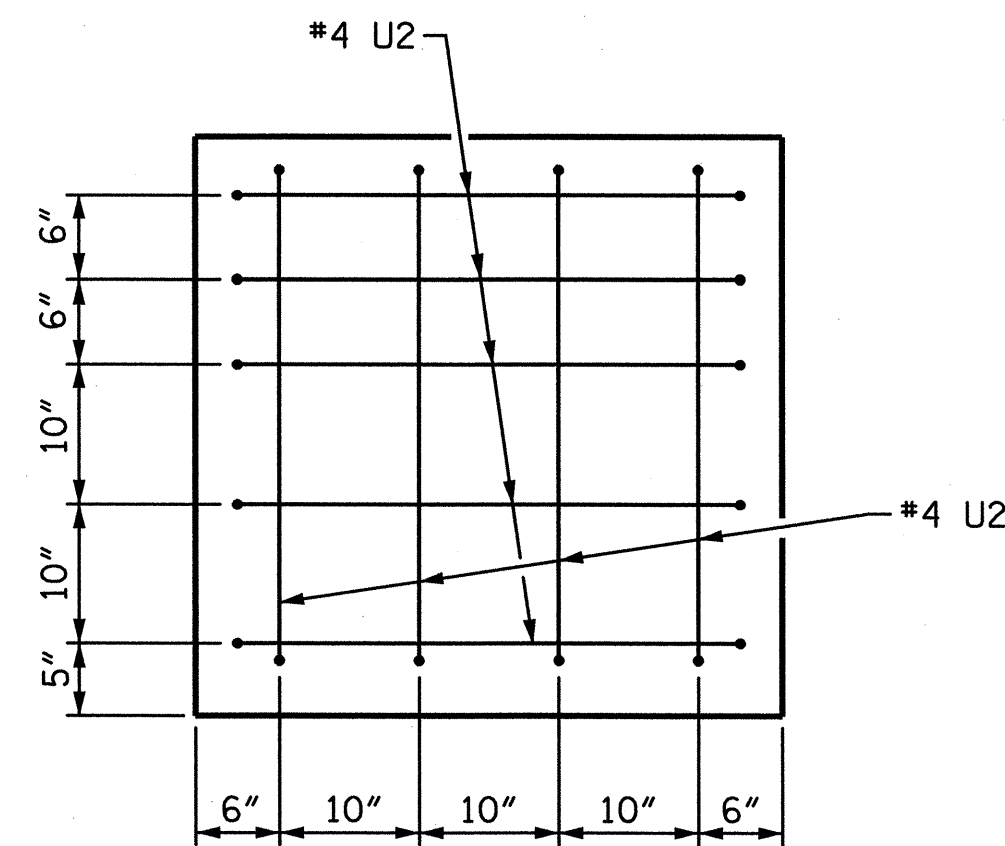
PLAN OF DRILLED PIERS & COLUMNS



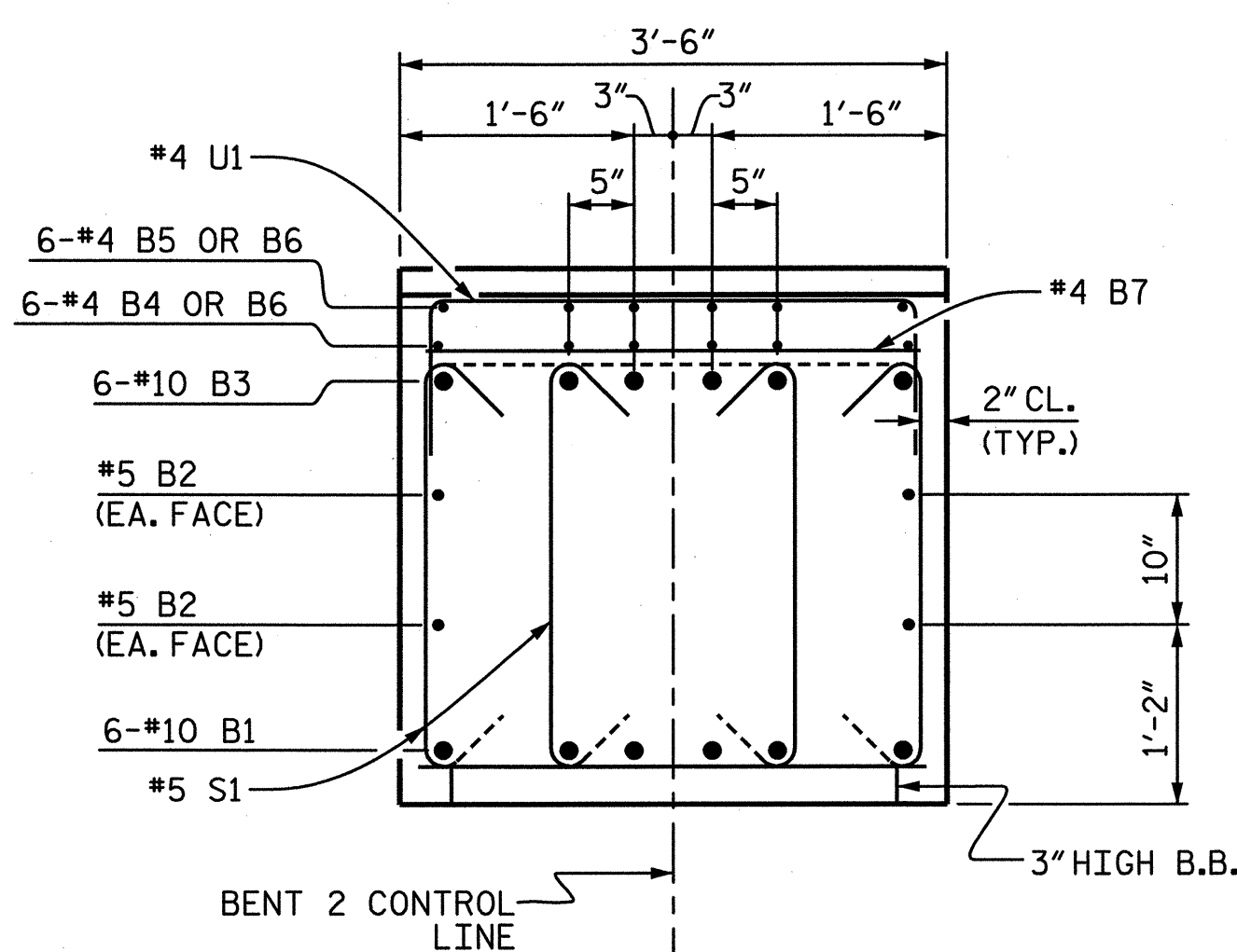
END ELEVATION



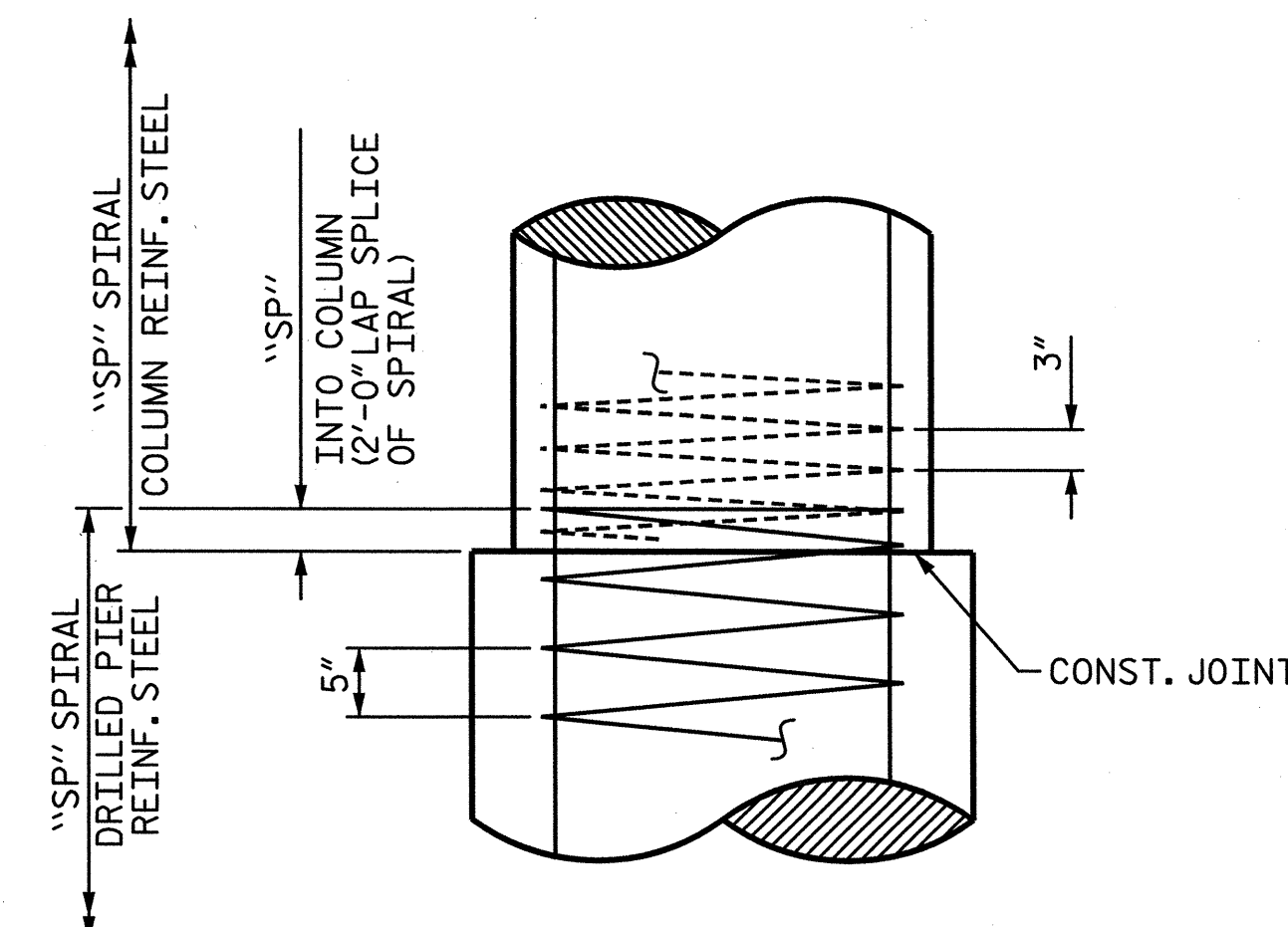
VIEW B-B



VIEW C-C

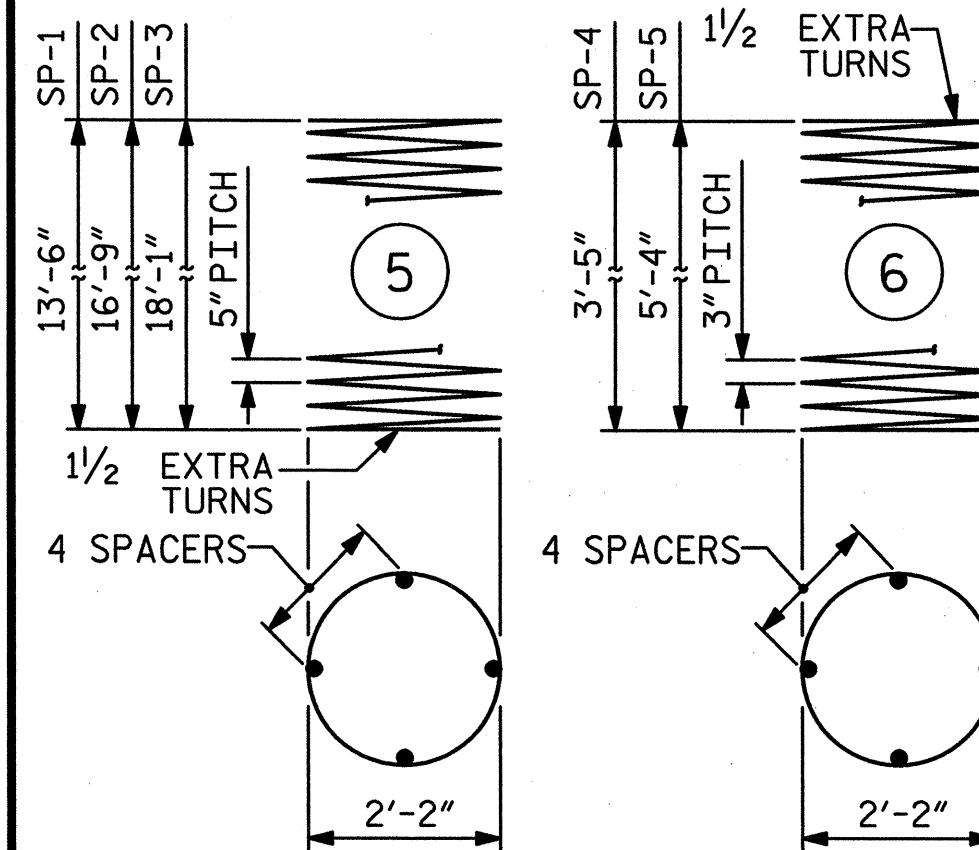
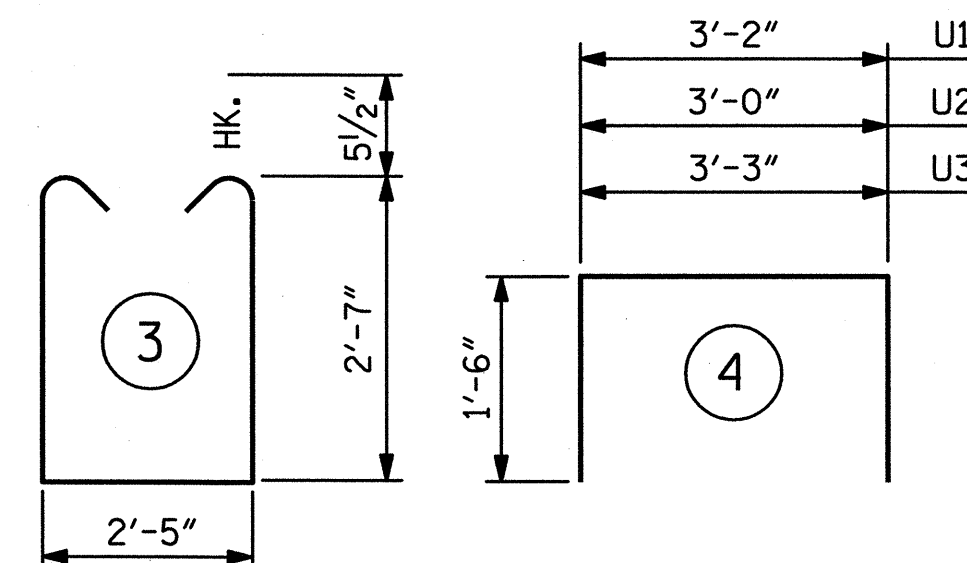
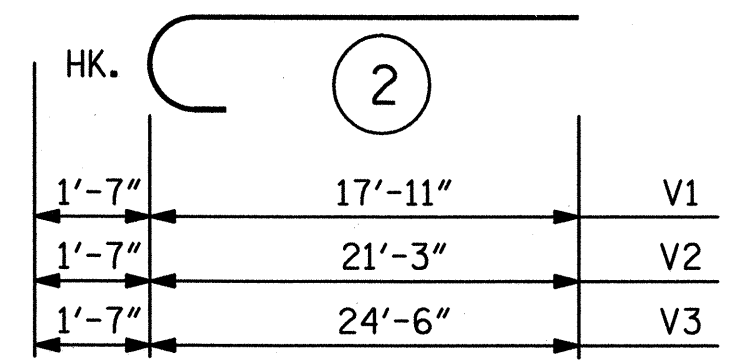
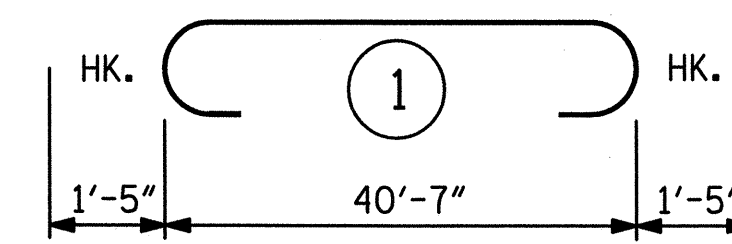


SECTION A-A



CONSTRUCTION JOINT DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	6	#10	STR	40'-7"	1,048
B2	4	#5	STR	40'-7"	169
B3	6	#10	1	43'-5"	1,121
B4	24	#4	STR	5'-4"	86
B5	24	#4	STR	9'-6"	152
B6	12	#4	STR	3'-5"	27
B7	10	#4	STR	3'-2"	21
S1	116	#5	3	8'-6"	1,028
U1	47	#4	4	6'-2"	194
U2	14	#4	4	6'-0"	56
U3	4	#4	4	6'-3"	17
V1	13	#11	2	19'-6"	1,347
V2	13	#11	2	22'-10"	1,577
V3	13	#11	2	26'-1"	1,802

REINFORCING STEEL					LBS.
SP-1	1	*	5	233'-0"	243
SP-2	1	*	5	286'-3"	299
SP-3	1	*	5	306'-3"	319
SP-4	2	**	6	113'-7"	152
SP-5	1	**	6	160'-4"	107

SPIRAL COLUMN REINFORCING STEEL					LBS.
SP-1	1	*	5	233'-0"	243
SP-2	1	*	5	286'-3"	299
SP-3	1	*	5	306'-3"	319
SP-4	2	**	6	113'-7"	152
SP-5	1	**	6	160'-4"	107

* THE SP-1, SP-2 & SP-3 SPIRAL REINF. STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.
 ** THE SP-4 & SP-5 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE BREAKDOWN

POUR 2 (COLUMNS)	2.07 C.Y.
POUR 3 (CAP)	17.99 C.Y.
TOTAL CLASS A CONCRETE	20.06 C.Y.

3'-0" Ø DRILLED PIERS:

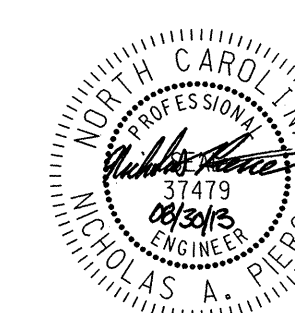
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)	12.44 CY
3'-0" Ø DRILLED PIER IN SOIL	19.5 LIN. FT.
3'-0" Ø DRILLED PIER NOT IN SOIL	28.0 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	14.5 LIN. FT.
CSL TUBES	208.04 LIN. FT.

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 2



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

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

DRAWN BY: M. HOBBS DATE: 01/2013
 CHECKED BY: N. PIERCE DATE: 01/2013

NOTES:

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.

Δ THIS ELEVATION TAKEN ON FILL FACE OF BACKWALL

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

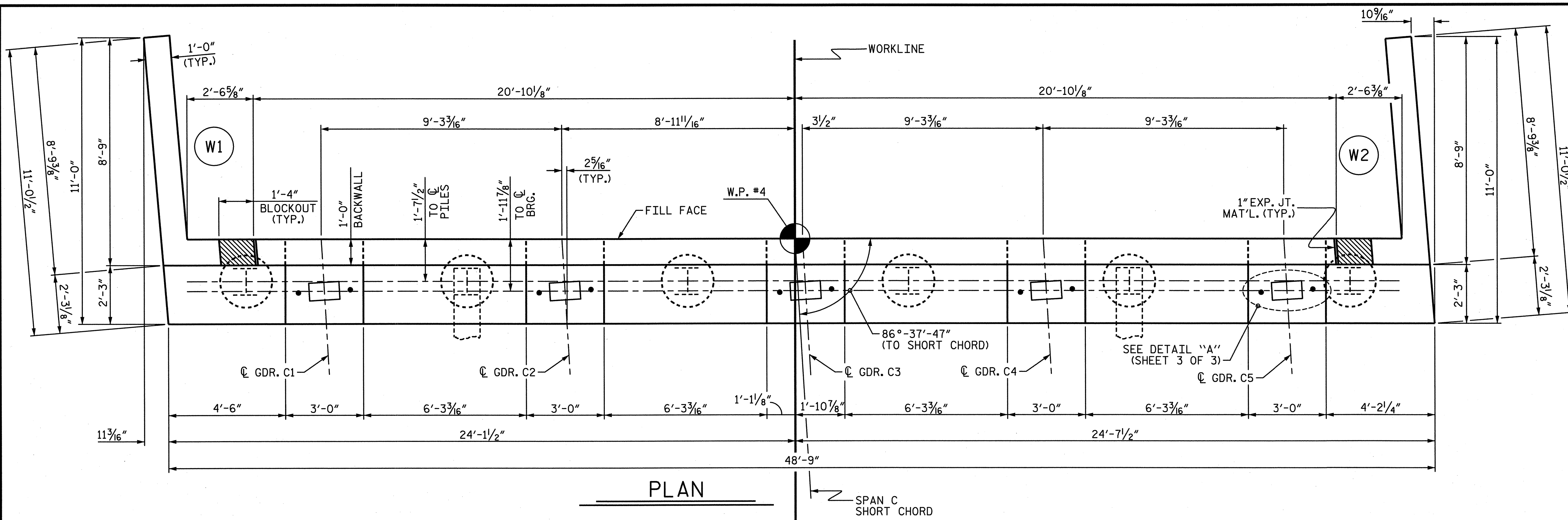
THE TOP SURFACE OF THE CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL, PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

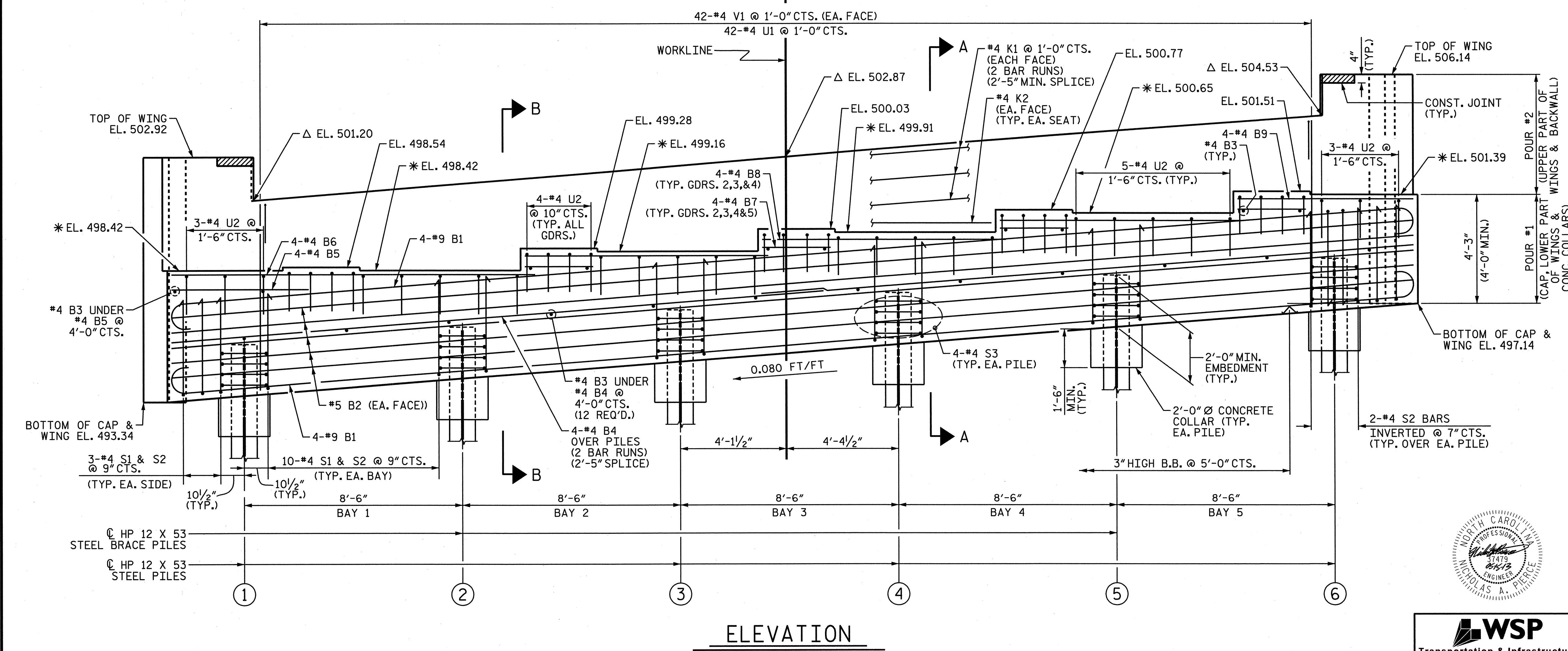
INSTALL THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

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



PLAN



ELEVATION

TOP OF PILE ELEVATIONS	
①	495.62
②	496.28
③	496.94
④	497.61
⑤	498.27
⑥	498.93

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

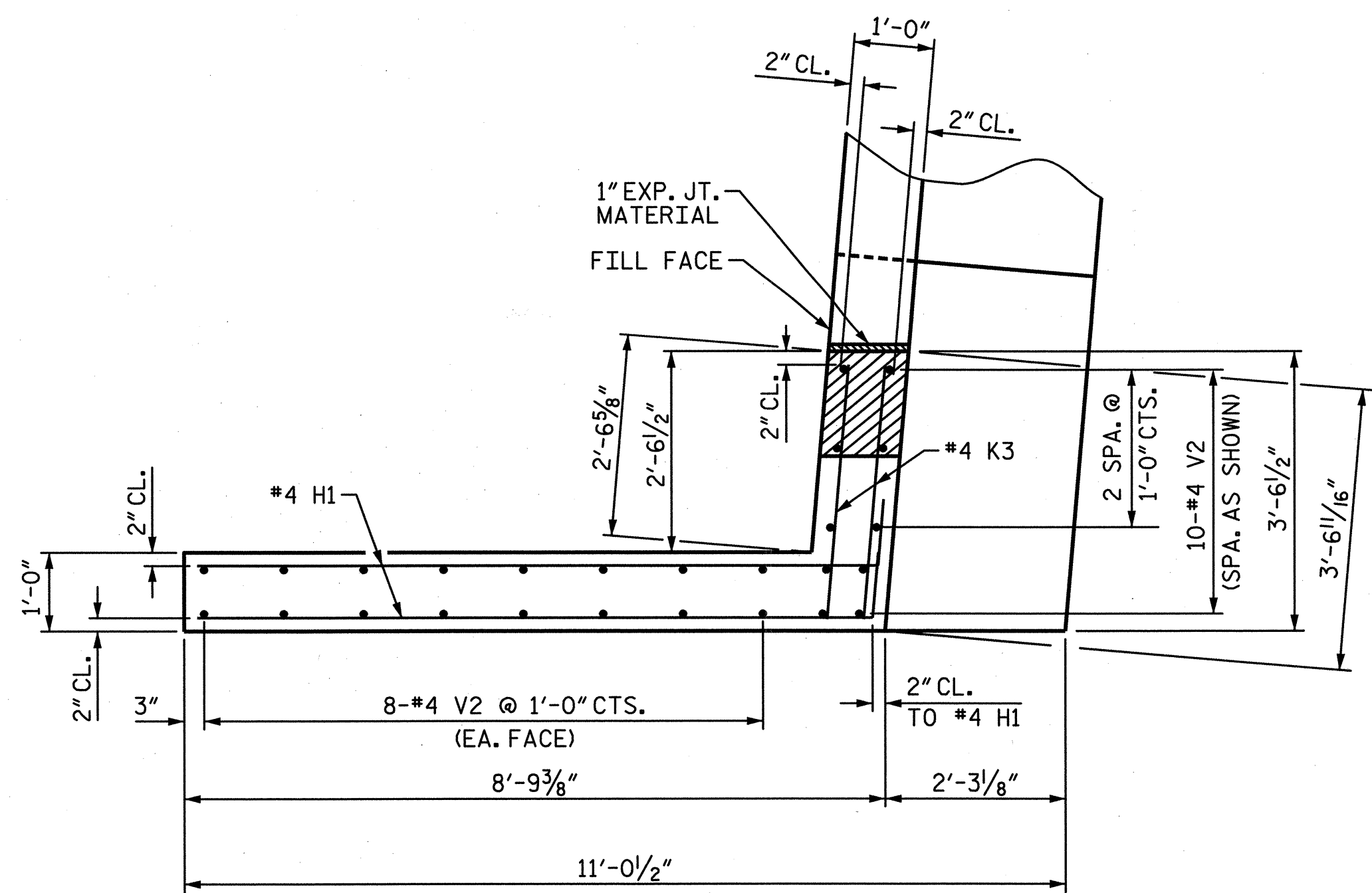
SHEET 1 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE
END BENT 2



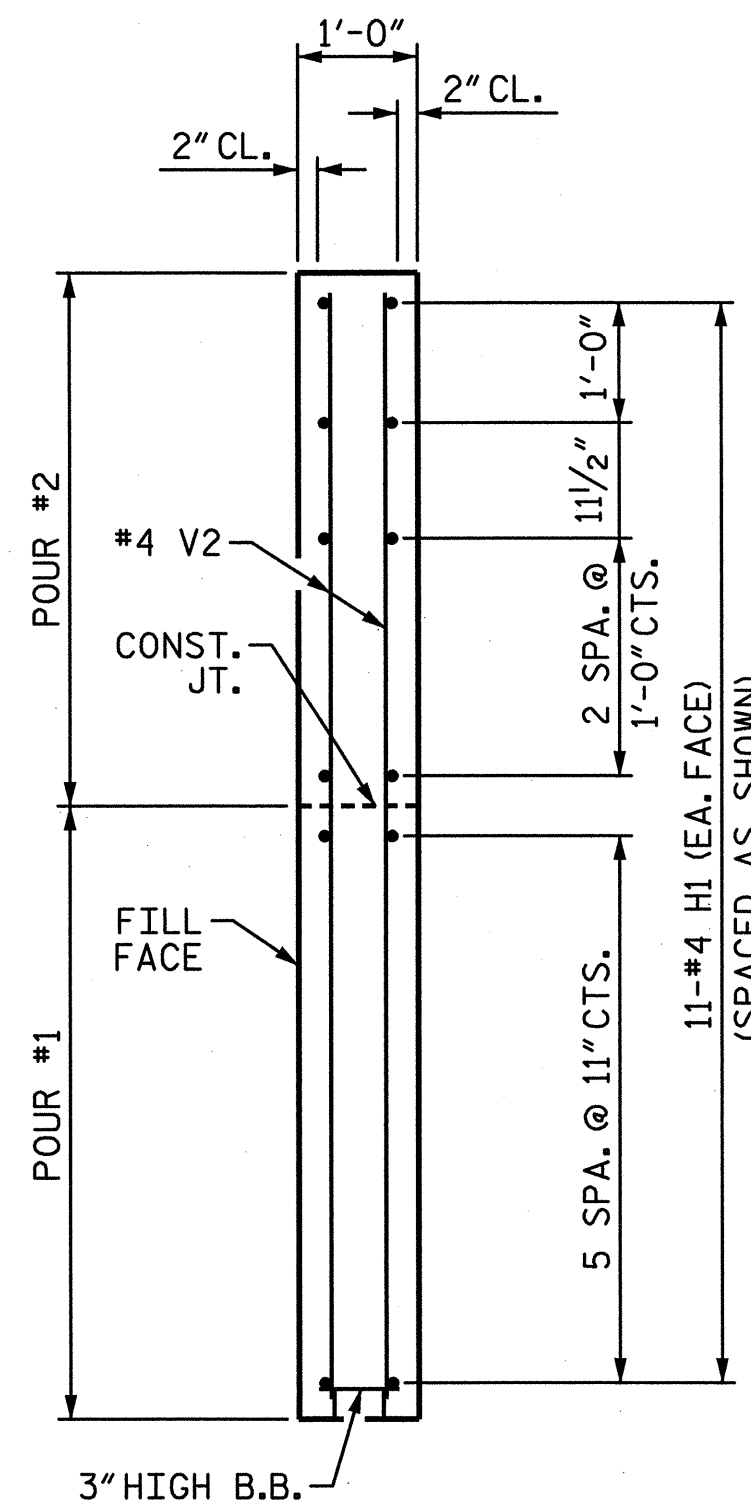
WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0881

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34	
1			3			TOTAL SHEETS	
2			4			40	

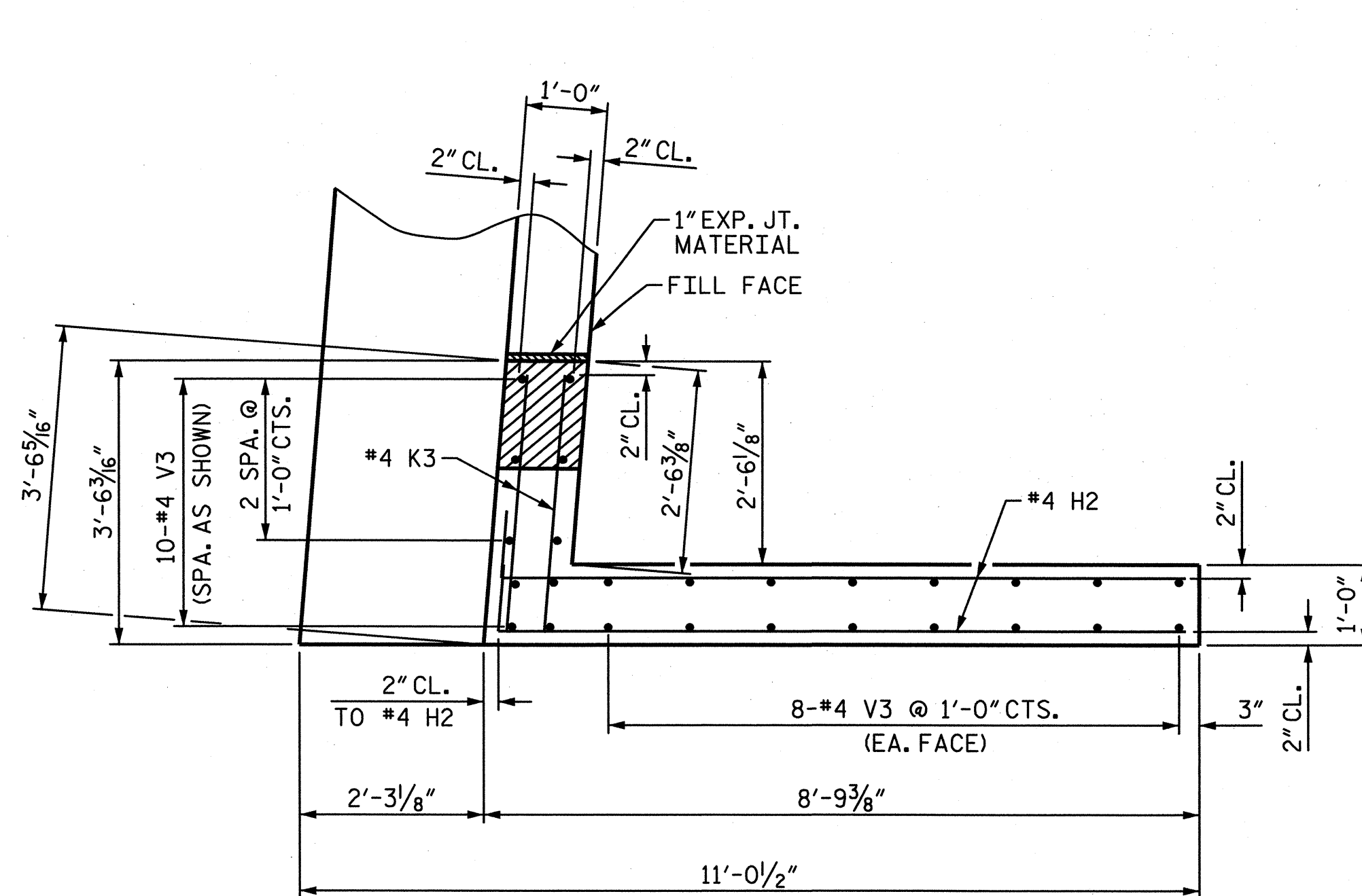
DRAWN BY : M. HOBBS DATE : 01/2013
 CHECKED BY : N. PIERCE DATE : 01/2013



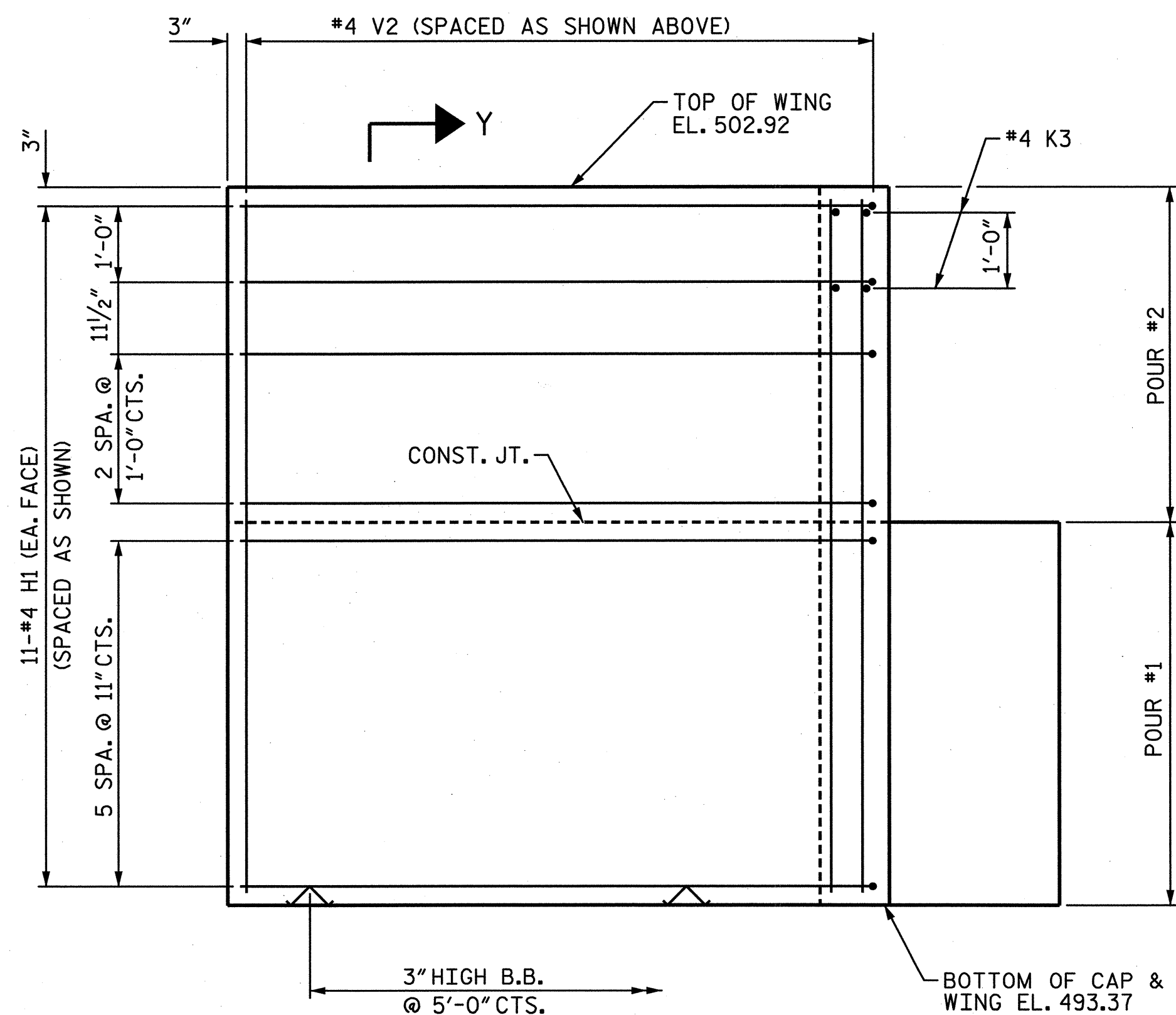
PLAN OF WING (W1)



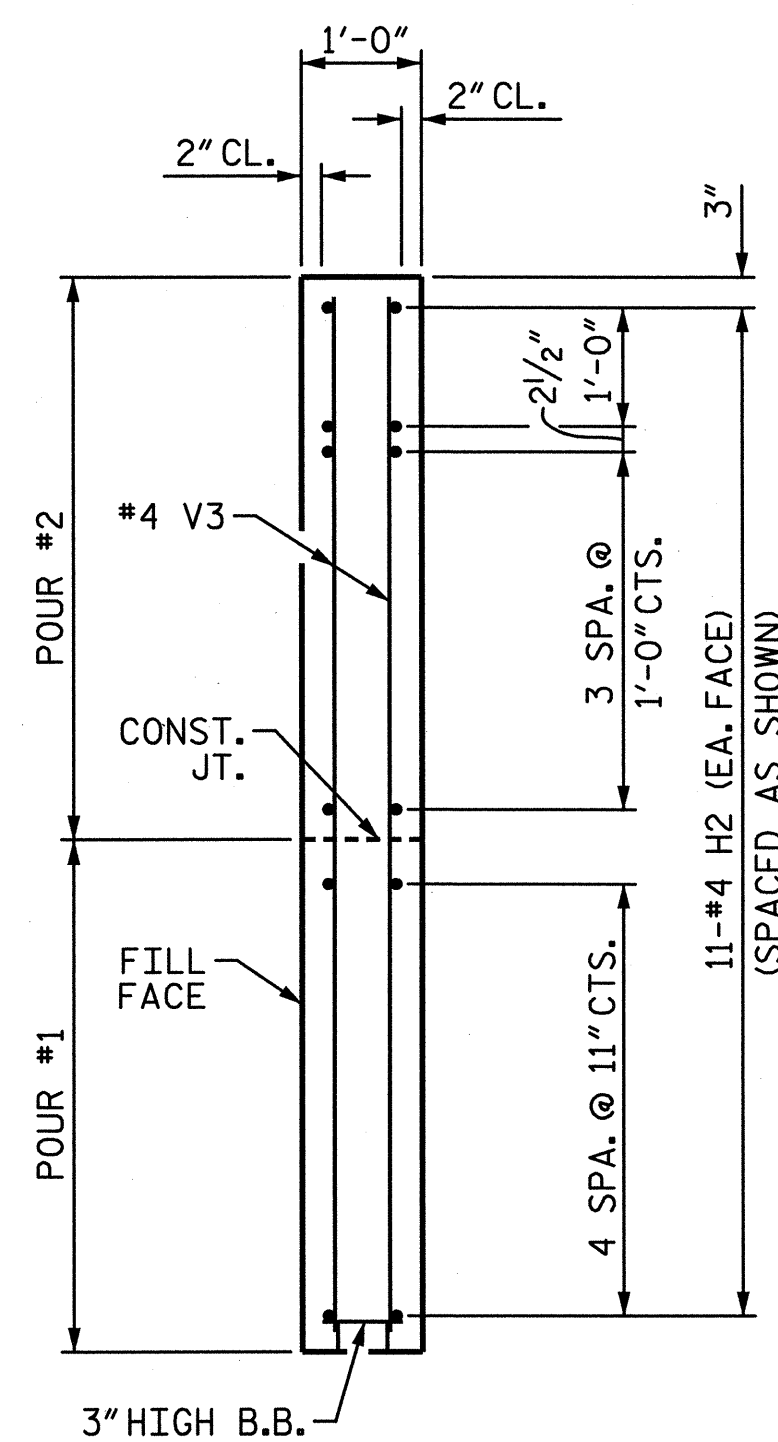
SECTION Y-Y



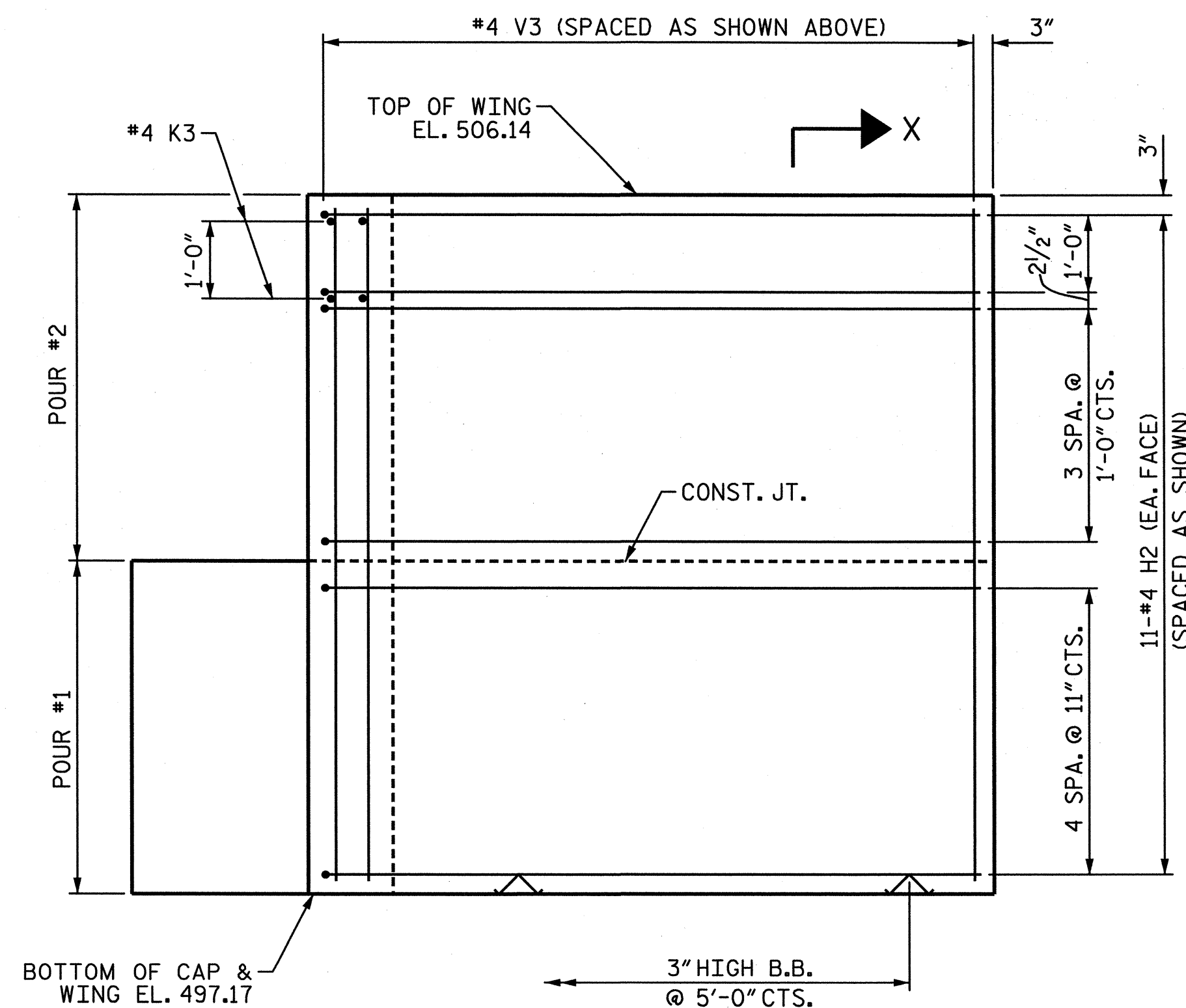
PLAN OF WING (W2)



ELEVATION OF WING (W1)



SECTION X-X



ELEVATION OF WING (W2)

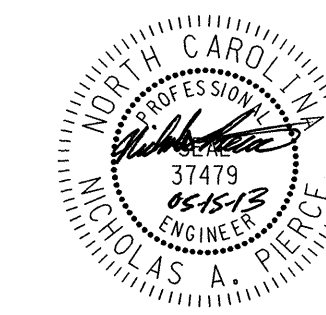
PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

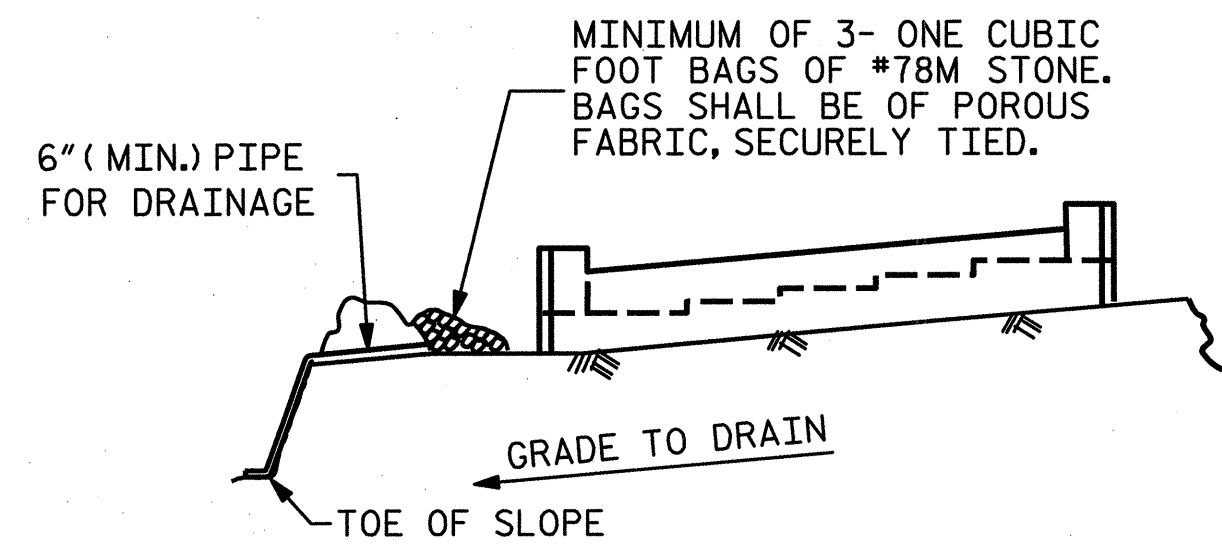
SUBSTRUCTURE
 END BENT 2

DRAWN BY: M. HOBBS DATE: 01/2013
 CHECKED BY: N. PIERCE DATE: 01/2013



WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			40

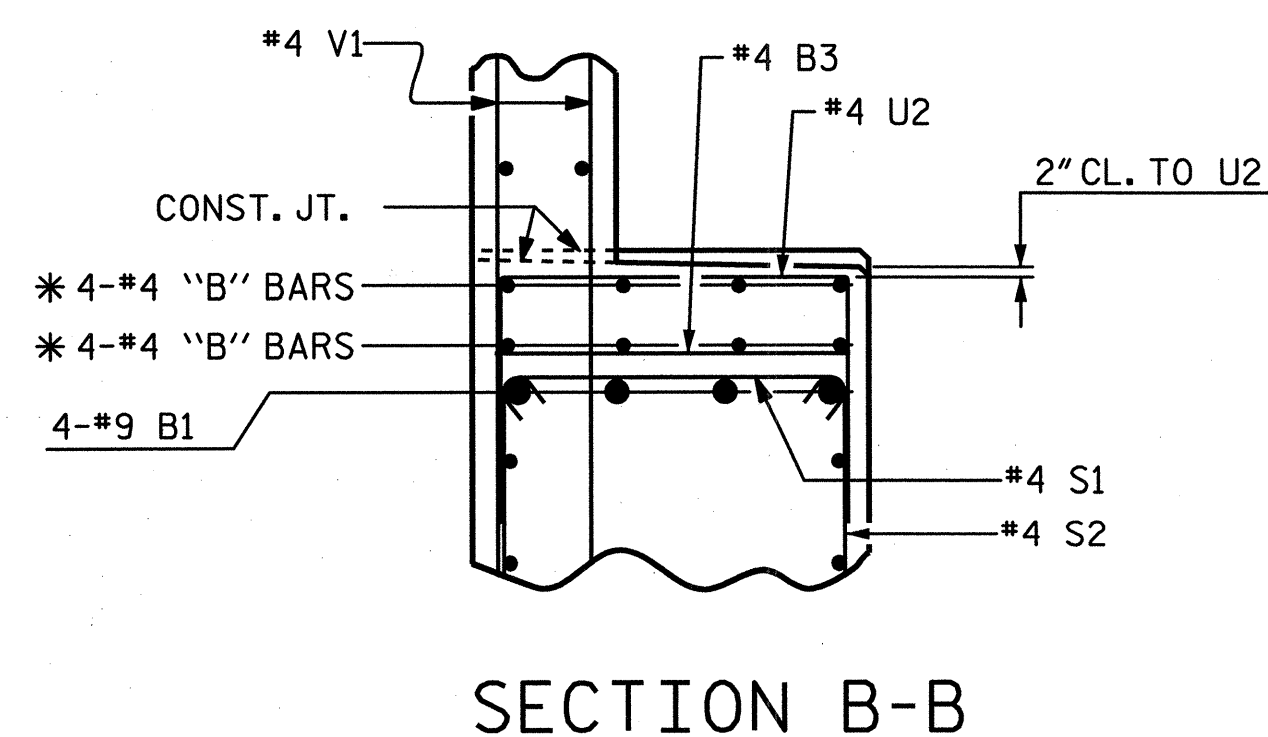
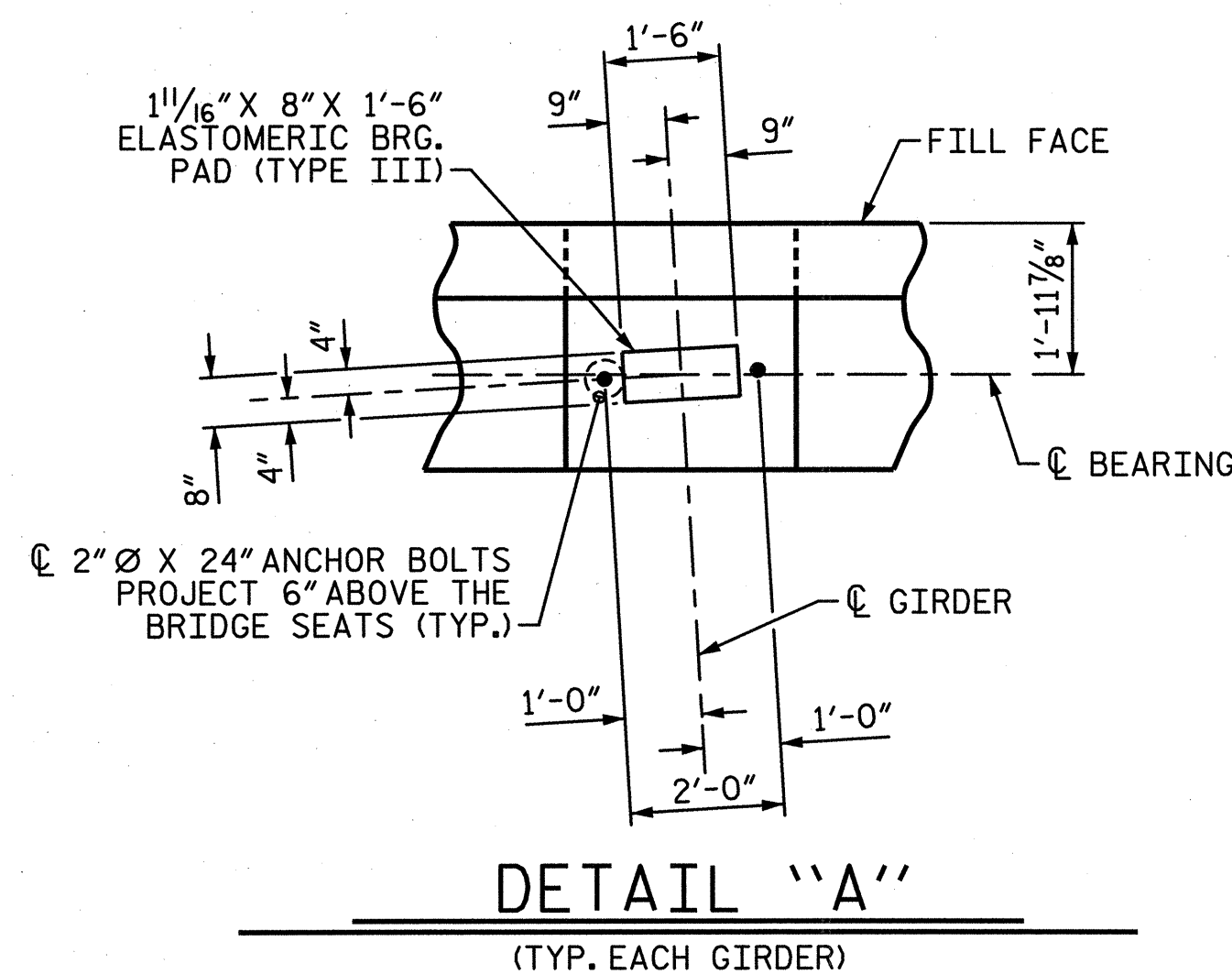


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

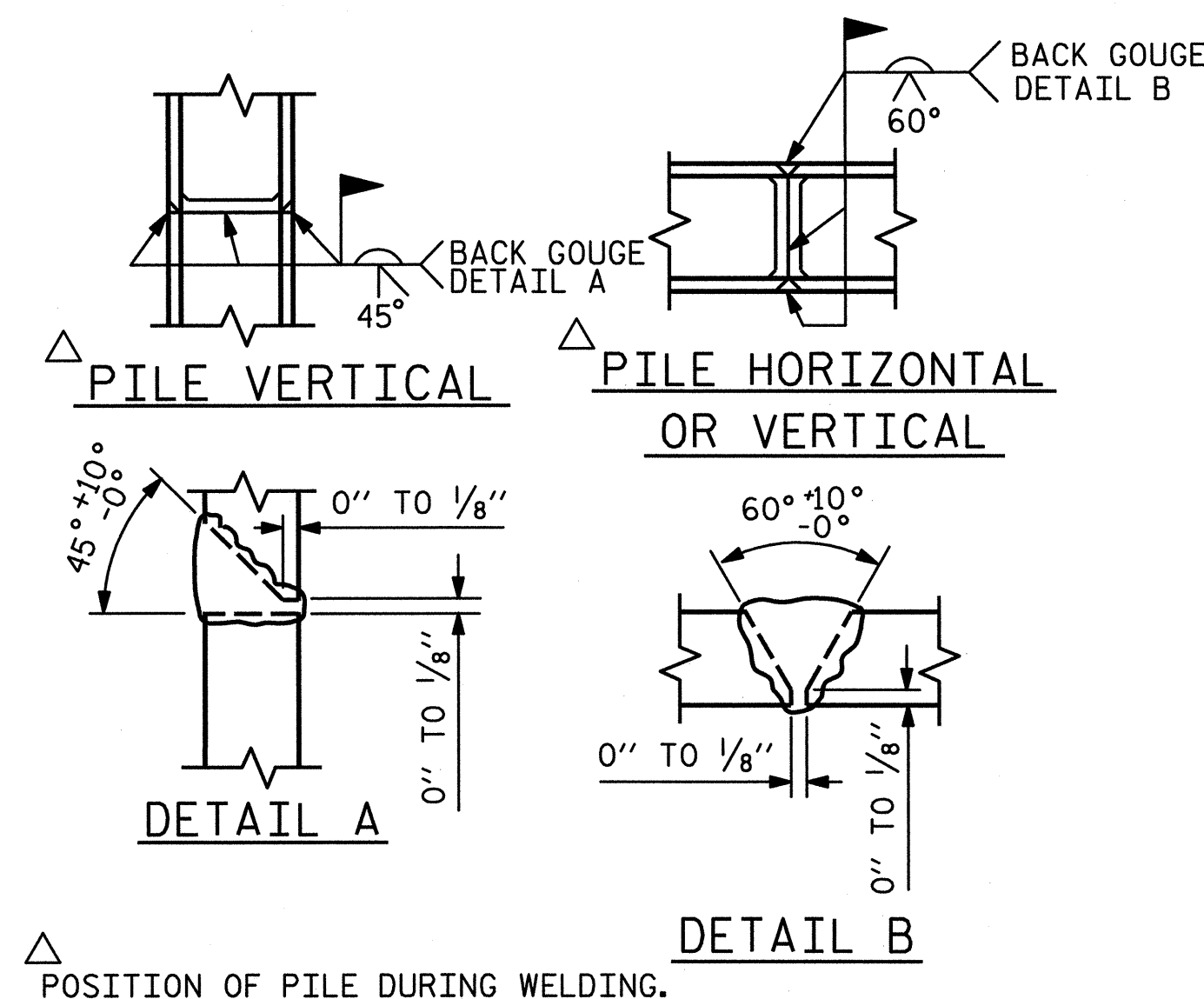
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

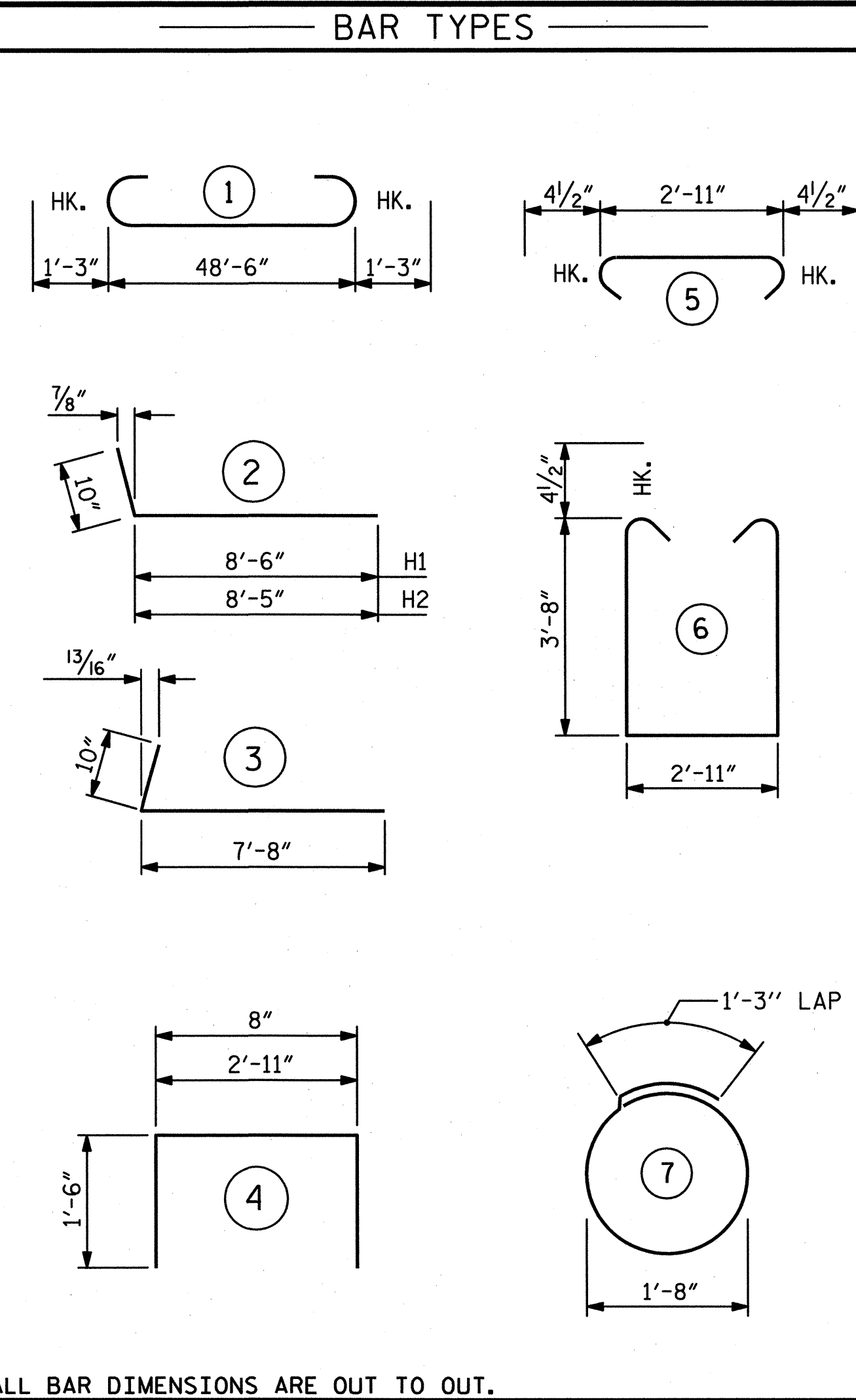
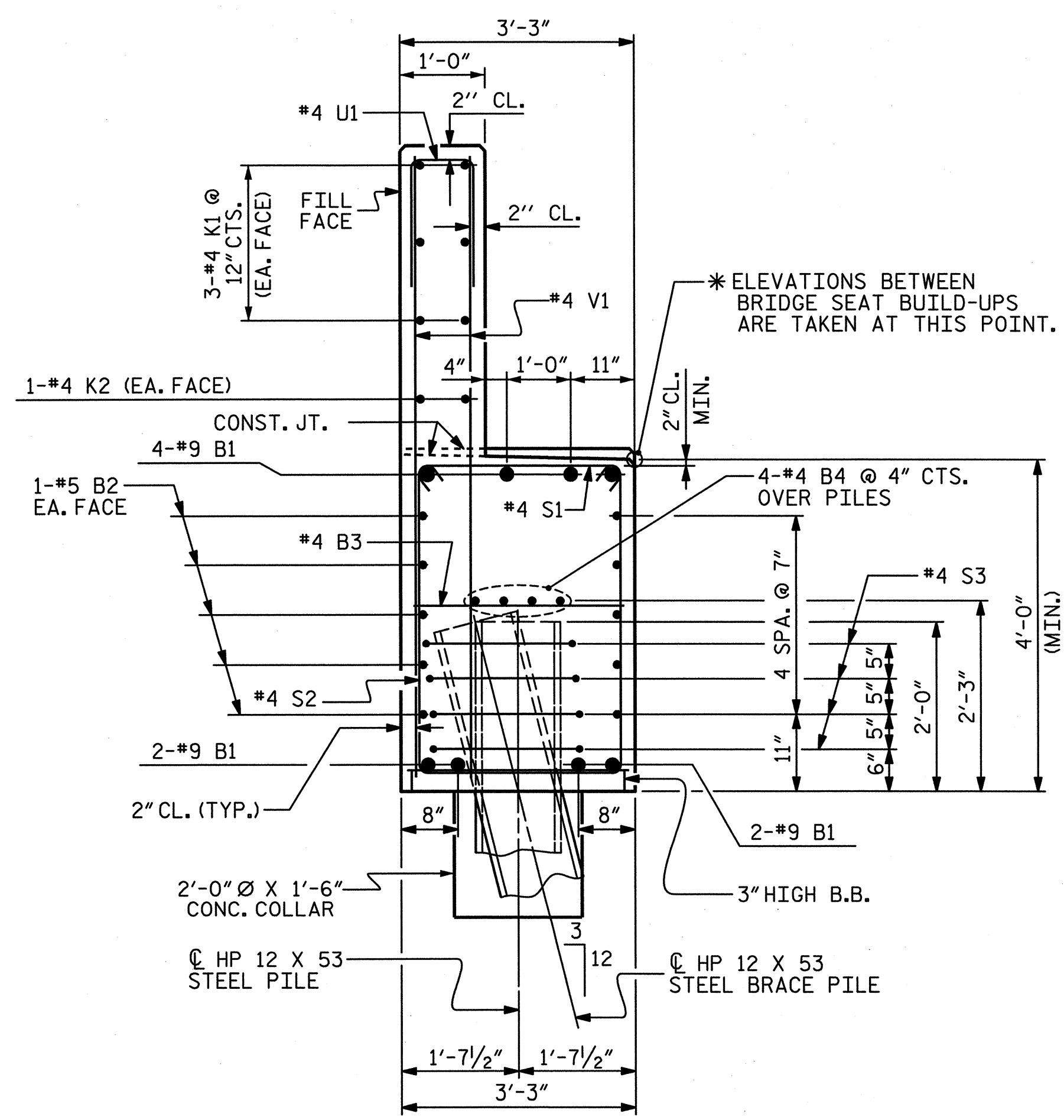
TEMPORARY DRAINAGE AT END BENT



* - FOR "B" BAR CALLOUTS @ GIRDERS, SEE ELEVATION, SHEET 1 OF 3.



PILE SPLICE DETAILS



BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		51'-0"	1387
B2	10	#5	STR	48'-6"	506
B3	22	#4	STR	2'-11"	43
B4	8	#4	STR	25'-5"	136
B5	4	#4	STR	5'-4"	14
B6	4	#4	STR	14'-2"	38
B7	16	#4	STR	2'-8"	29
B8	12	#4	STR	9'-6"	76
B9	4	#4	STR	6'-10"	18
H1	22	#4		9'-4"	137
H2	22	#4		9'-3"	136
K1	12	#4	STR	25'-6"	204
K2	10	#4	STR	9'-0"	60
K3	8	#4	STR	3'-2"	17
S1	56	#4		3'-8"	137
S2	56	#4		11'-0"	411
S3	24	#4		6'-6"	104
U1	42	#4		3'-8"	103
U2	46	#4		5'-11"	182
V1	84	#4	STR	7'-2"	402
V2	26	#4	STR	9'-2"	159
V3	26	#4	STR	8'-7"	149
REINFORCING STEEL					4,448 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP, LOWER WINGS, & CONCRETE COLLARS)					30.54 C.Y.
POUR #2 (BACKWALL & UPPER WINGS)					8.79 C.Y.
TOTAL CLASS A CONCRETE					39.33 C.Y.
HP 12 X 53 STEEL PILES					
No. = 6					60 LIN. FT.

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2

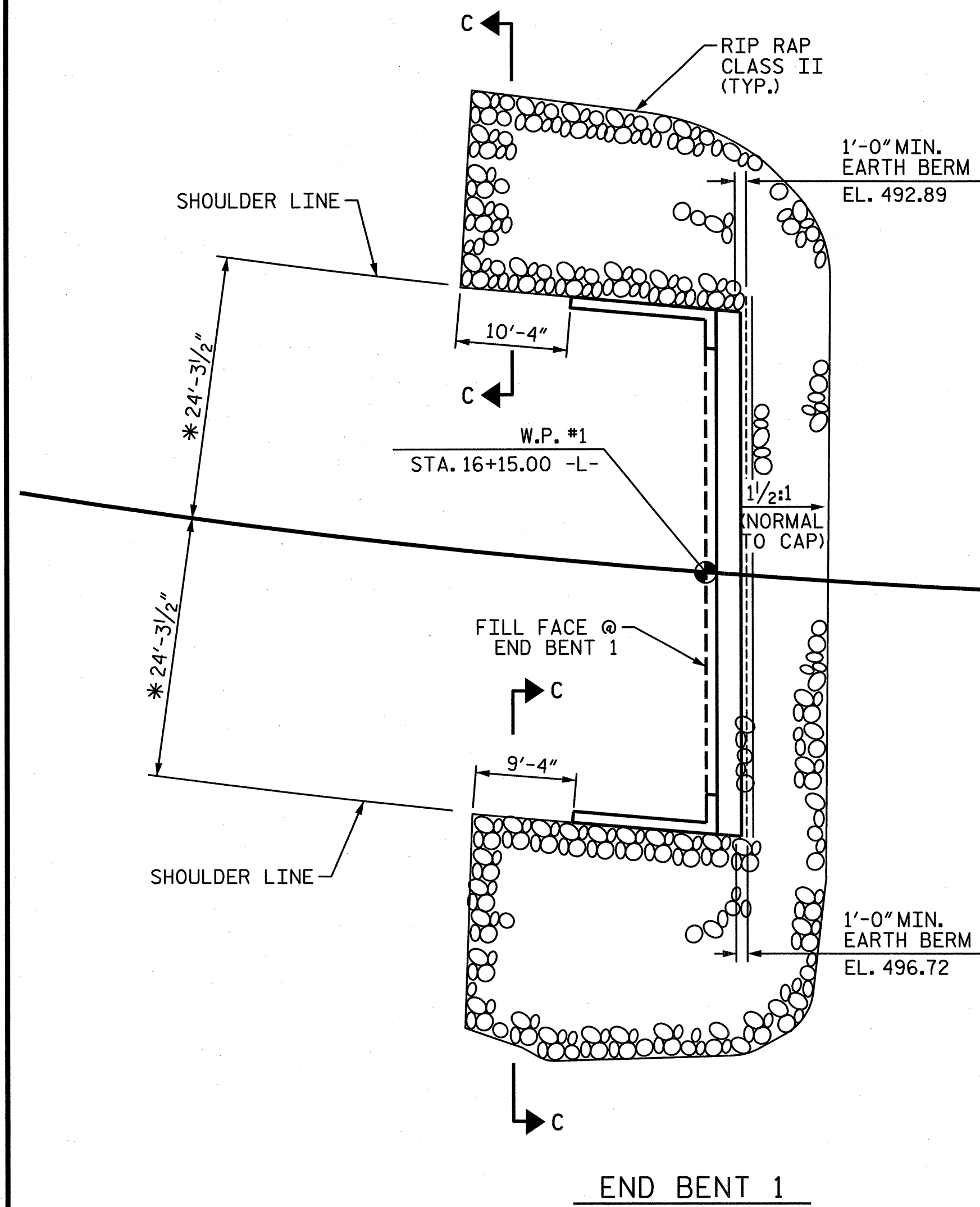


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

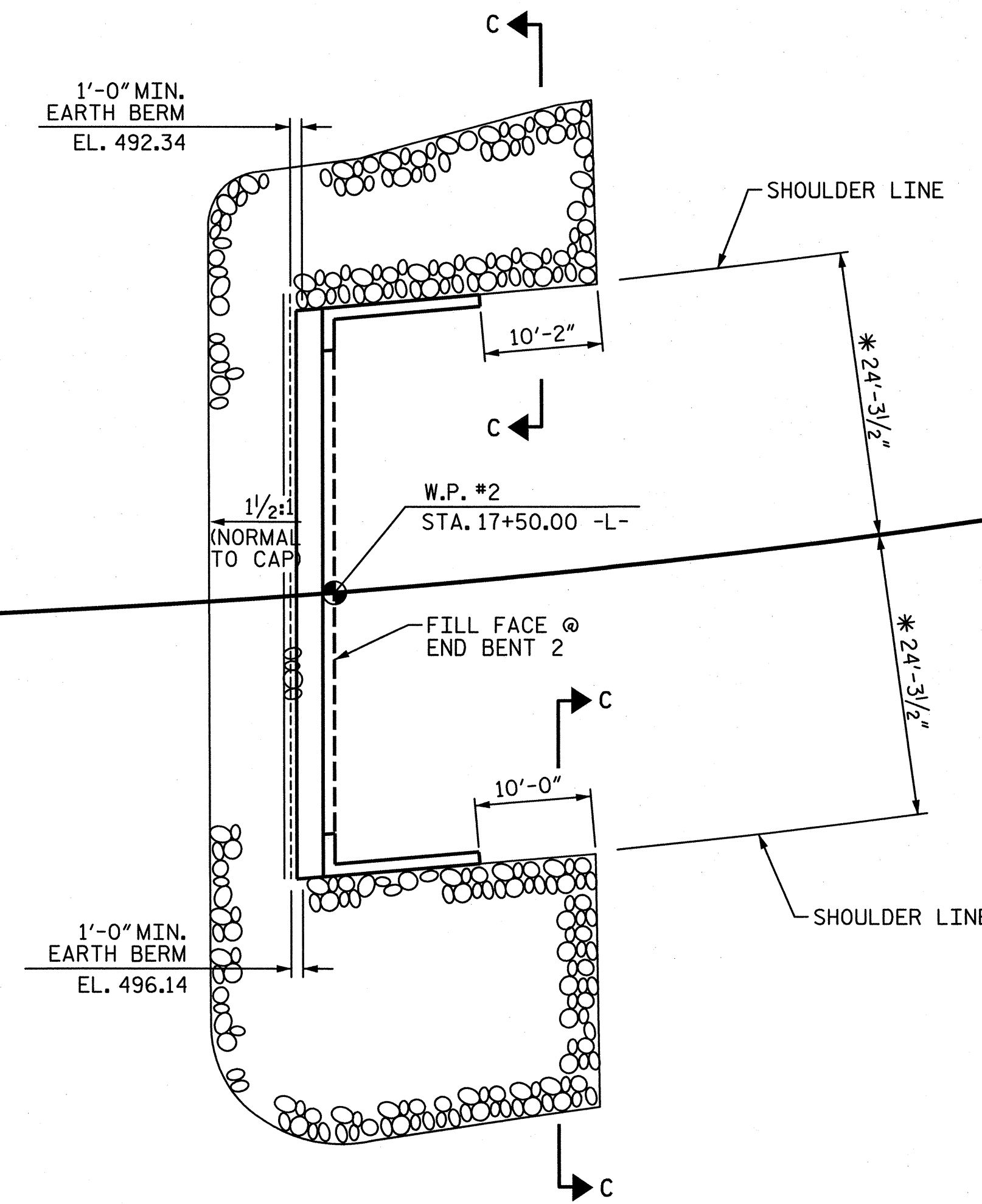
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS 40
2			4			

DRAWN BY : M. HOBBS DATE : 01/2013
 CHECKED BY : N. PIERCE DATE : 01/2013

NOTES :
 FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.
 * RADIAL DIMENSIONS



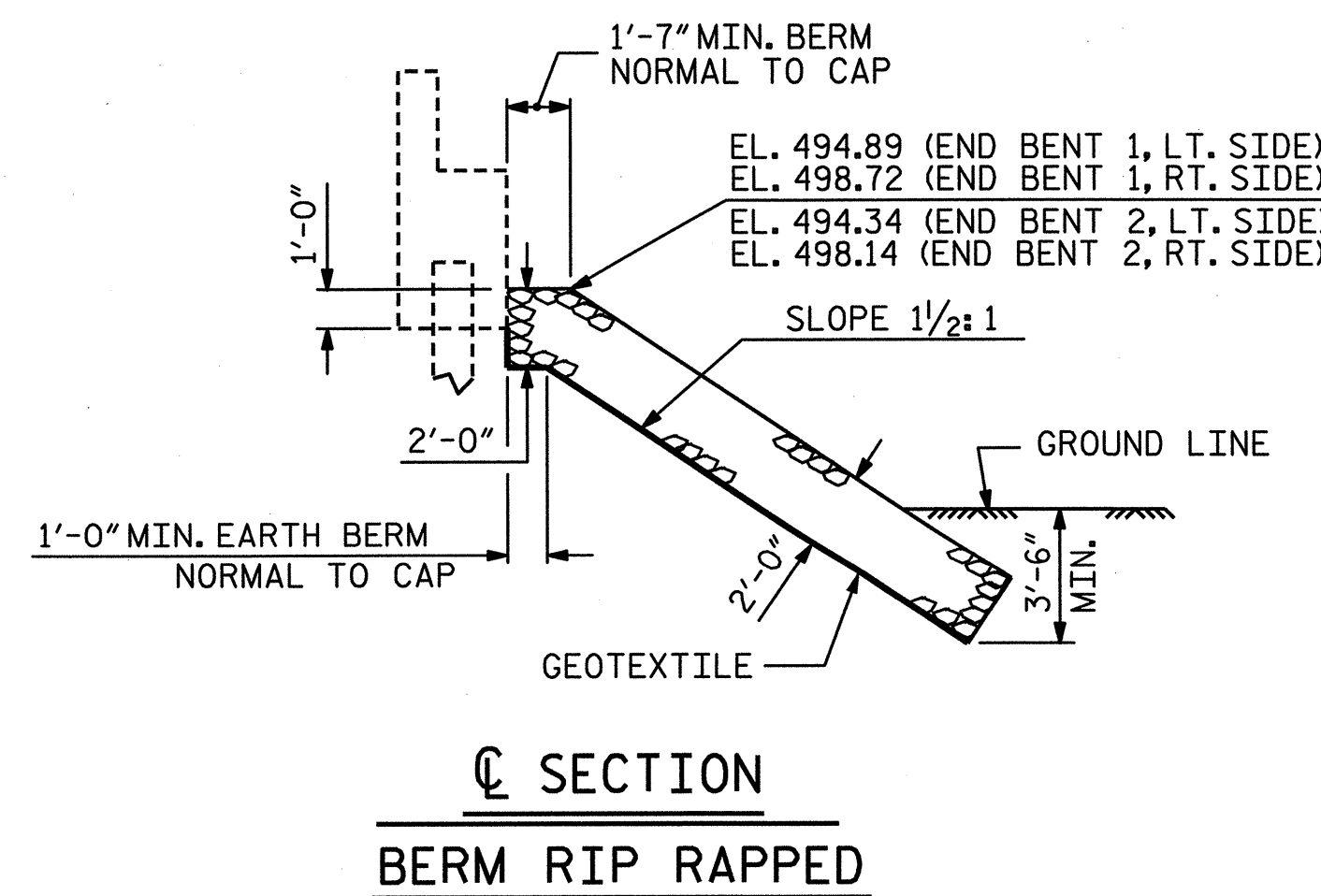
END BENT 1



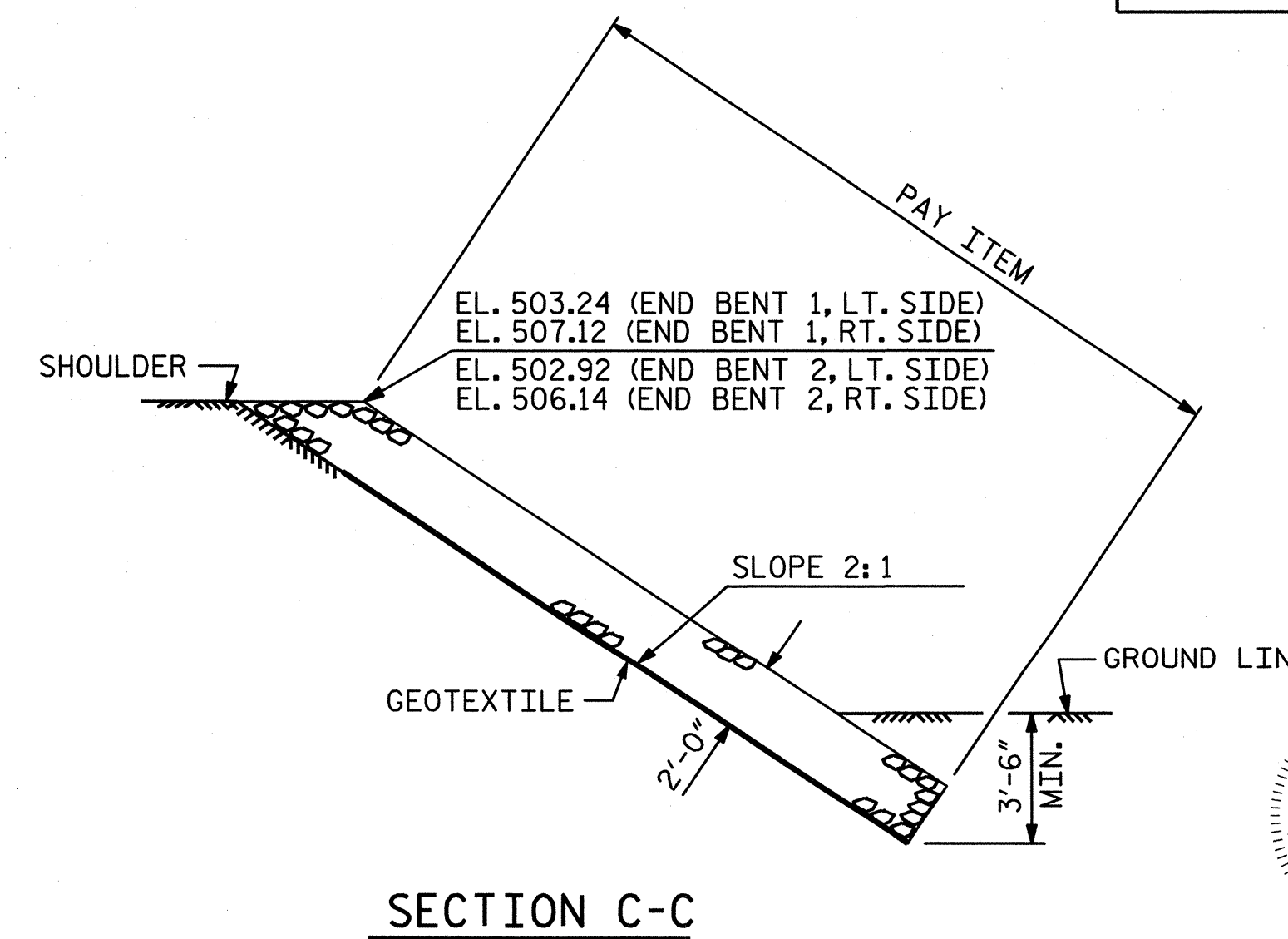
END BENT 2

PLAN OF RIP RAP

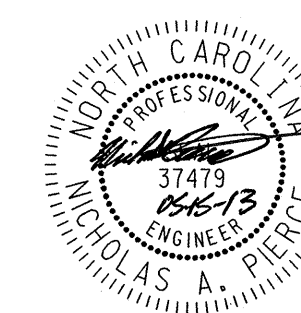
ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+82.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	112.0	124
END BENT 2	98.0	109



SECTION C-C
 BERM RIP RAPPED



SECTION C-C



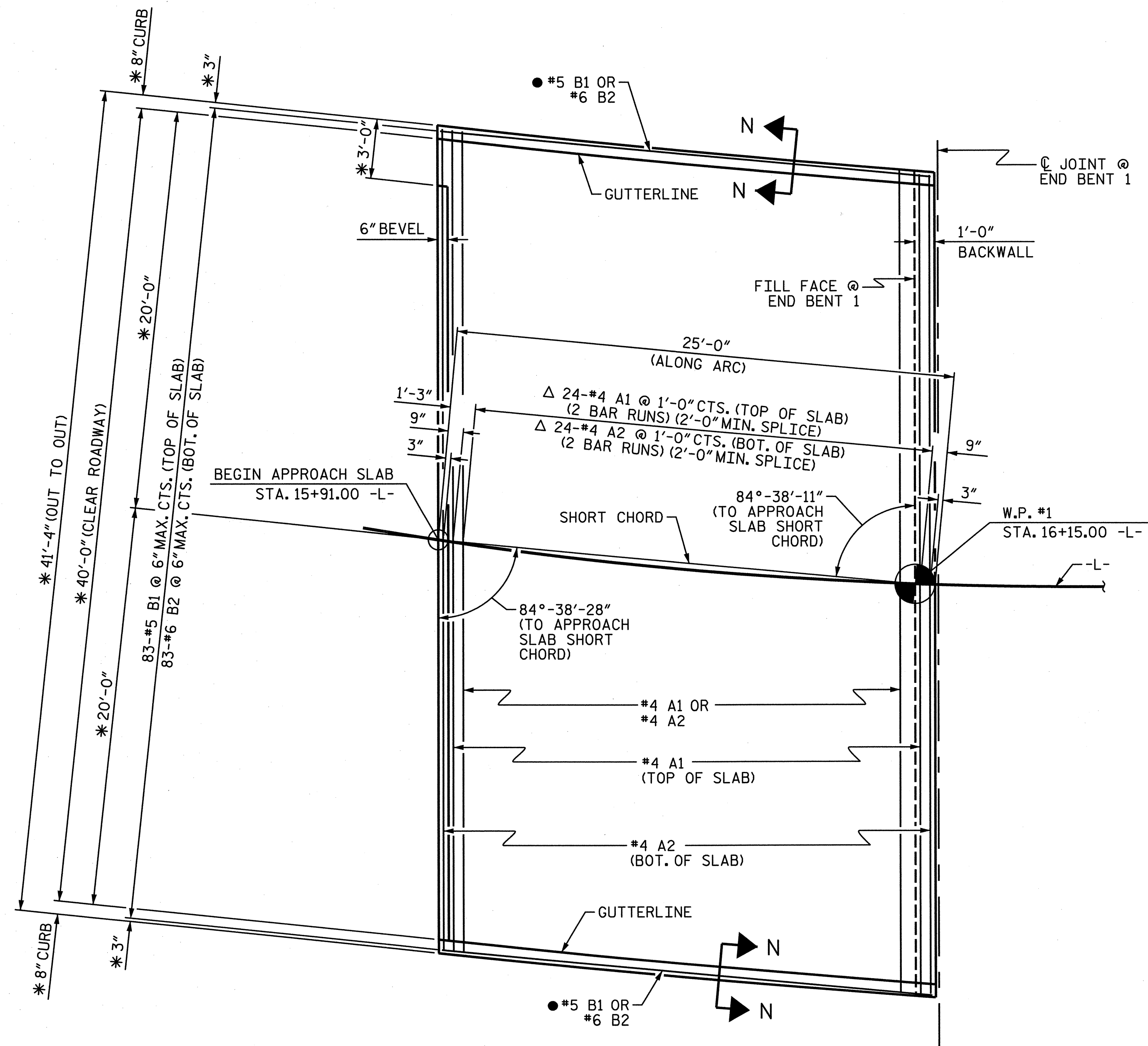
WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

PROJECT NO. B-5109
UNION COUNTY
 STATION: 16+82.50 -L-

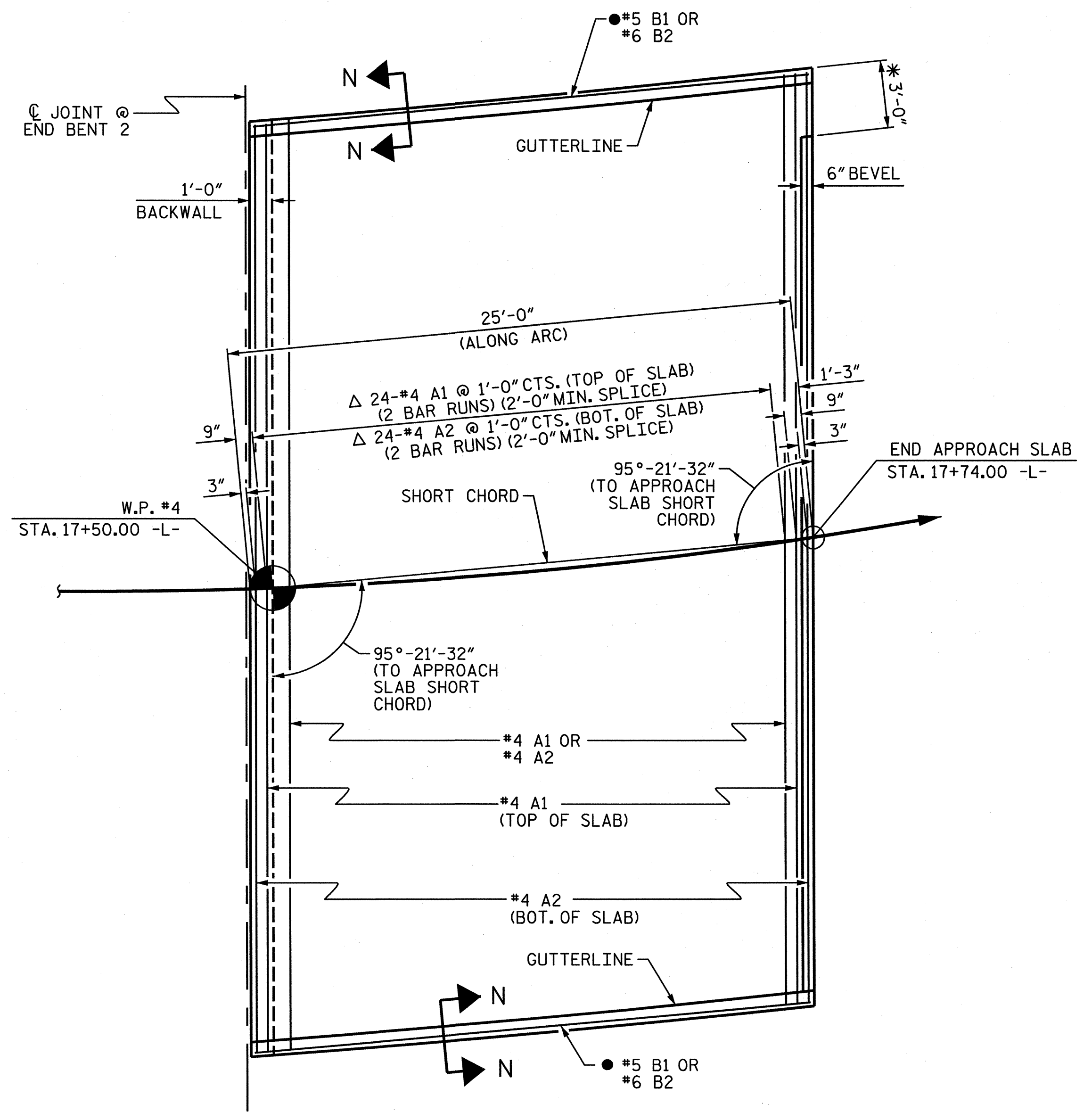
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RIP RAP DETAILS

ASSEMBLED BY : MAH	DATE : 03/13
CHECKED BY : NAP	DATE : 03/13
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

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



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



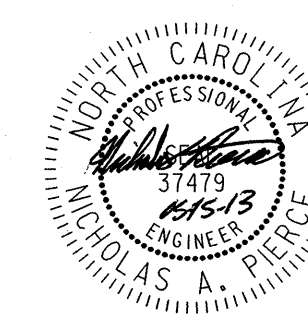
PLAN @ END BENT 2
(DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS)

NOTES:

- * - MEASURED RADIALLY.
- Δ - "A" BARS ARE SPACED ALONG APPROACH SLAB SHORT CHORD AND PLACED PARALLEL TO FILL FACE.
- - ADJUST "B" BARS TO MAINTAIN 2" MIN. CLEAR ALONG ARC

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

SHEET 1 OF 3



WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-38
2			4			40

DRAWN BY: M. HOBBS DATE: 02/13
CHECKED BY: N. PIERCE DATE: 02/13

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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 SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET AND END POST.

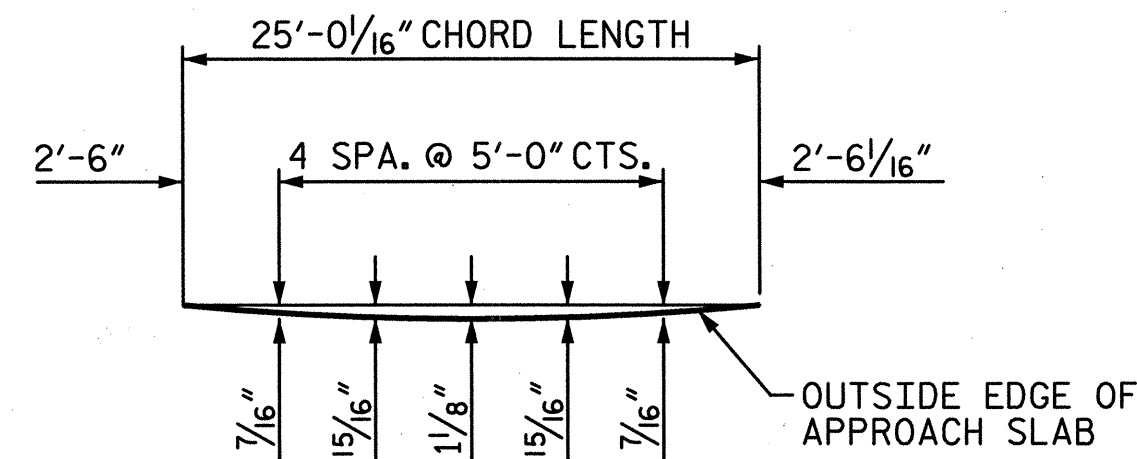
WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

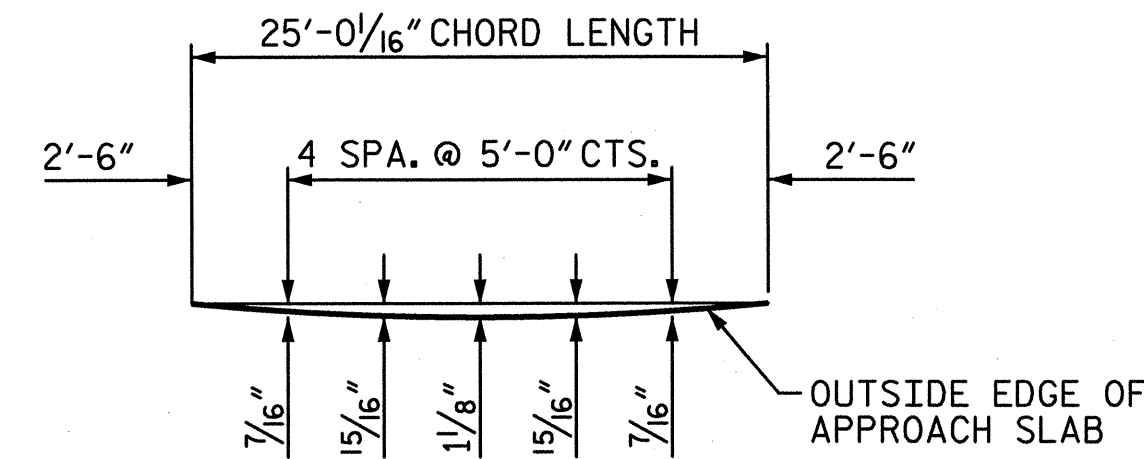
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

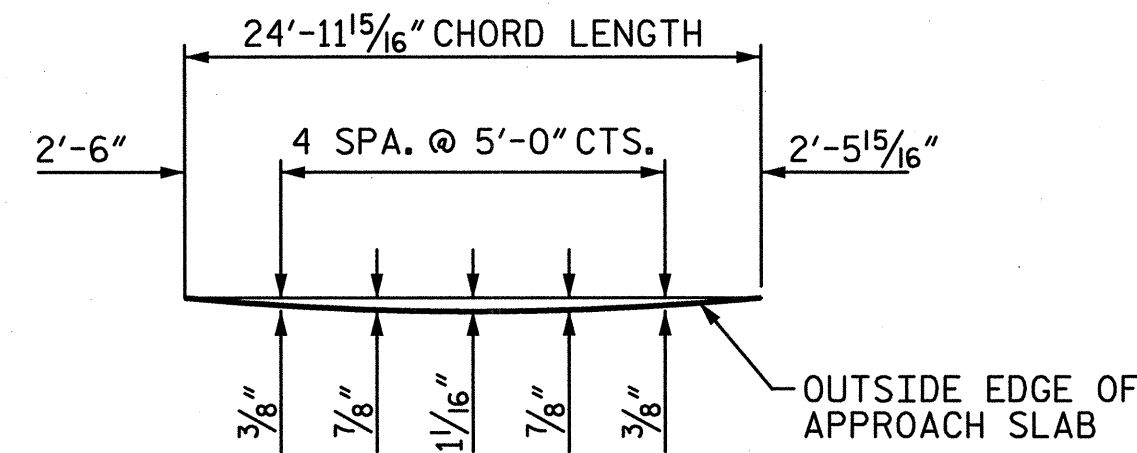
BILL OF MATERIAL					
APPROACH SLAB AT EB 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	21'-8"	724
A2	52	#4	STR	21'-8"	753
*B1	83	#5	STR	23'-7"	2042
B2	83	#6	STR	24'-7"	3065
REINFORCING STEEL					LBS. 3,818
*EPOXY COATED REINFORCING STEEL					LBS. 2,766
CLASS AA CONCRETE					C. Y. 44.75
APPROACH SLAB AT EB 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	21'-8"	724
A2	52	#4	STR	21'-8"	753
*B1	83	#5	STR	23'-7"	2042
B2	83	#6	STR	24'-7"	3065
REINFORCING STEEL					LBS. 3,818
*EPOXY COATED REINFORCING STEEL					LBS. 2,766
CLASS AA CONCRETE					C. Y. 44.75



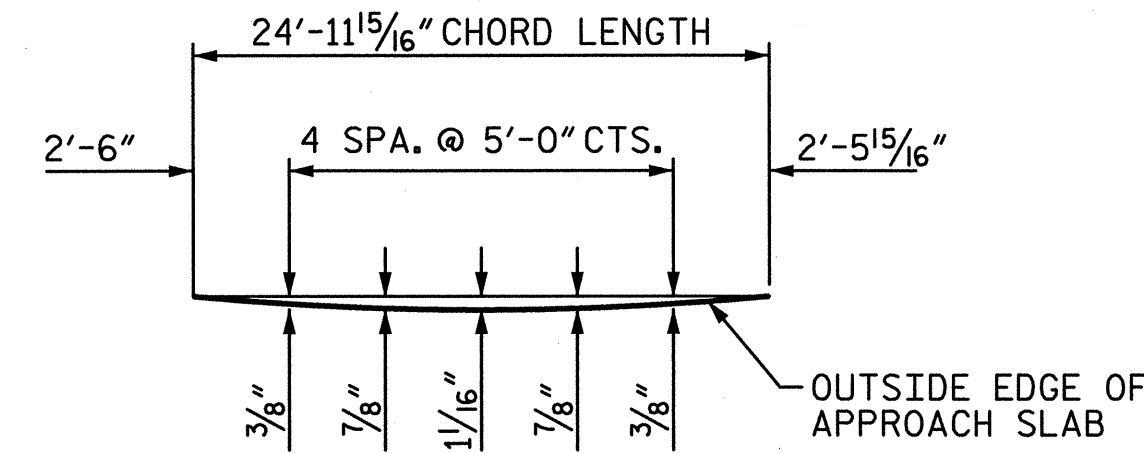
LEFT SIDE



LEFT SIDE



RIGHT SIDE

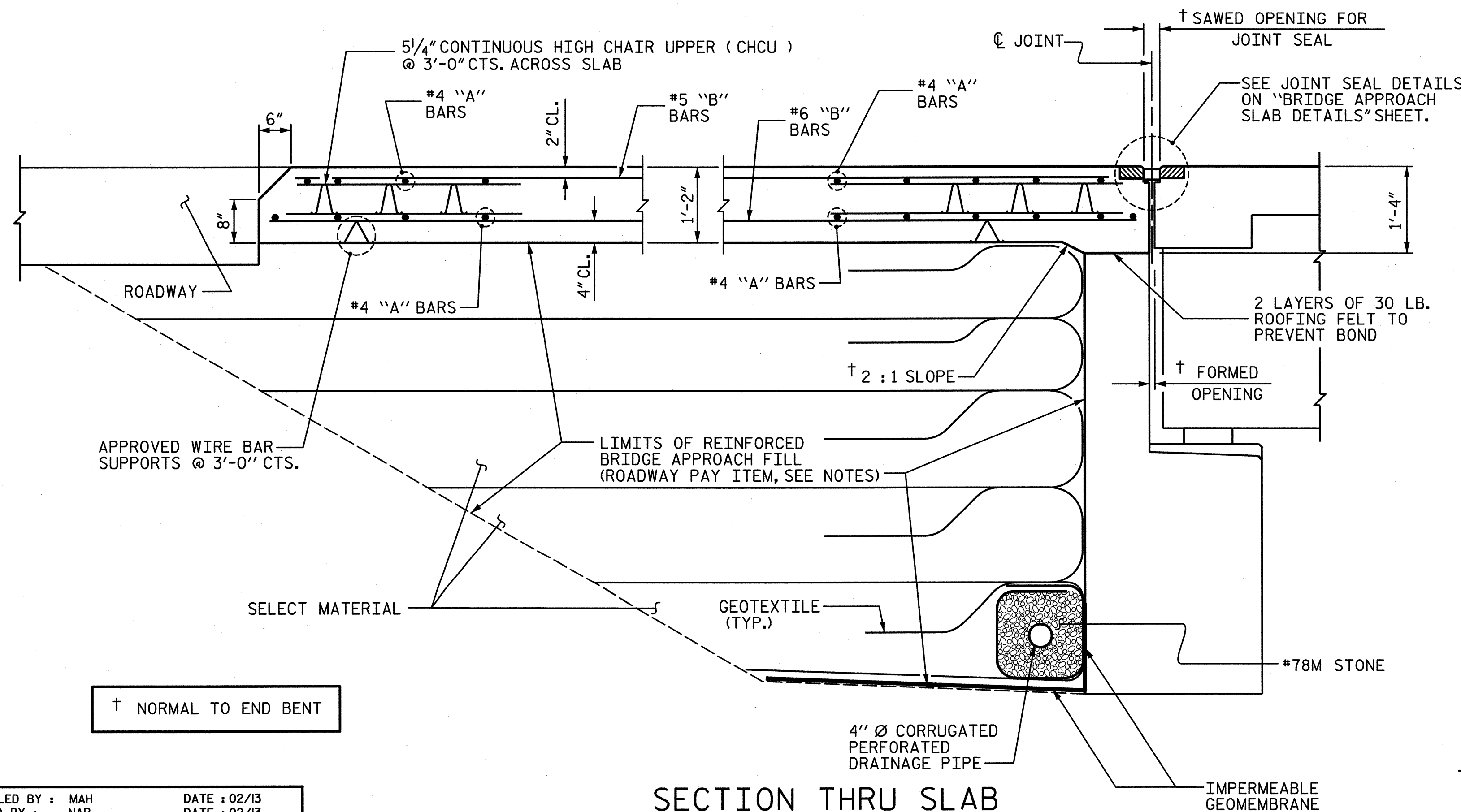


RIGHT SIDE

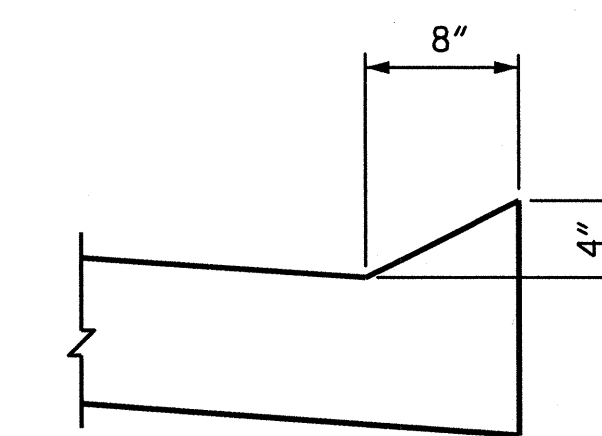
ARC OFFSETS @ END BENT 1

ARC OFFSETS @ END BENT 2

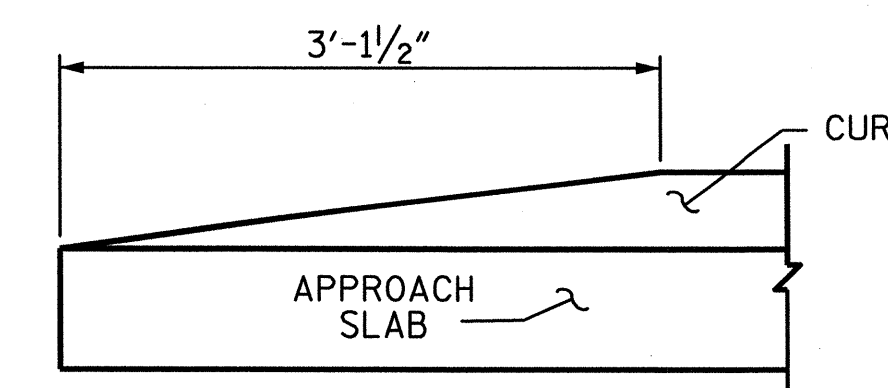
SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



SECTION THRU SLAB



SECTION N-N

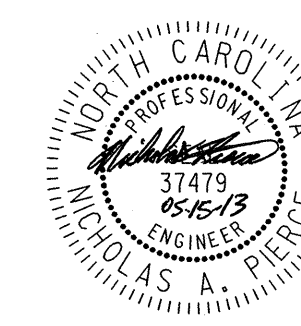


END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. B-5109
 UNION COUNTY
 STATION: 16+82.50 -L-

SHEET 2 OF 3

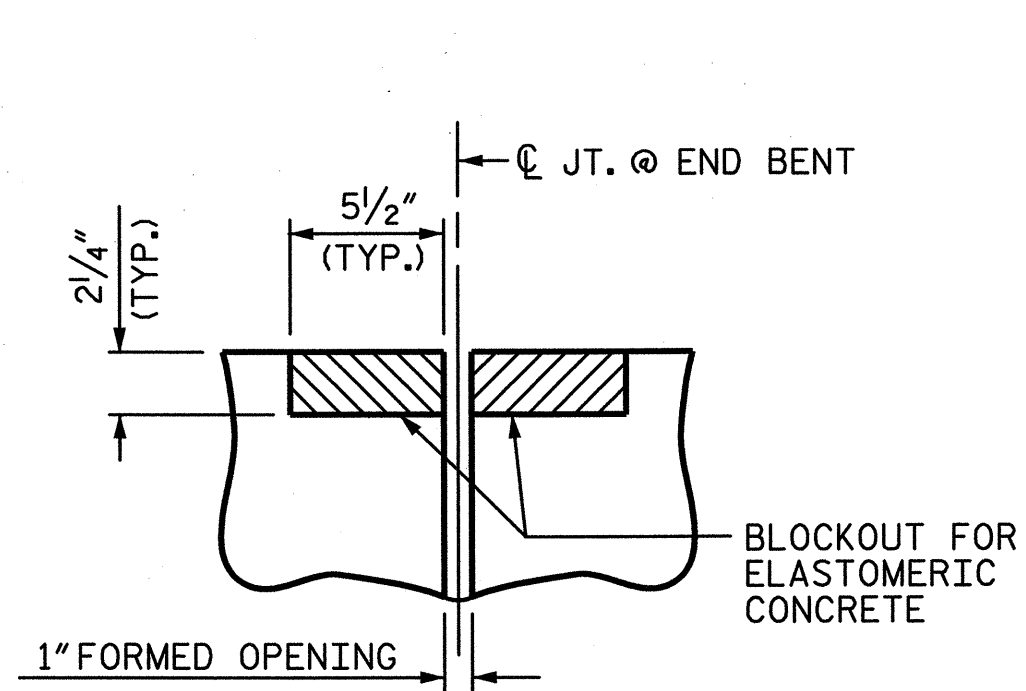


WSP
 Transportation & Infrastructure
 15401 Weston Parkway Suite 100
 Cary, NC 27513 - 919.678.0035
 www.wspgroup.com
 LICENSE NO. F-0891

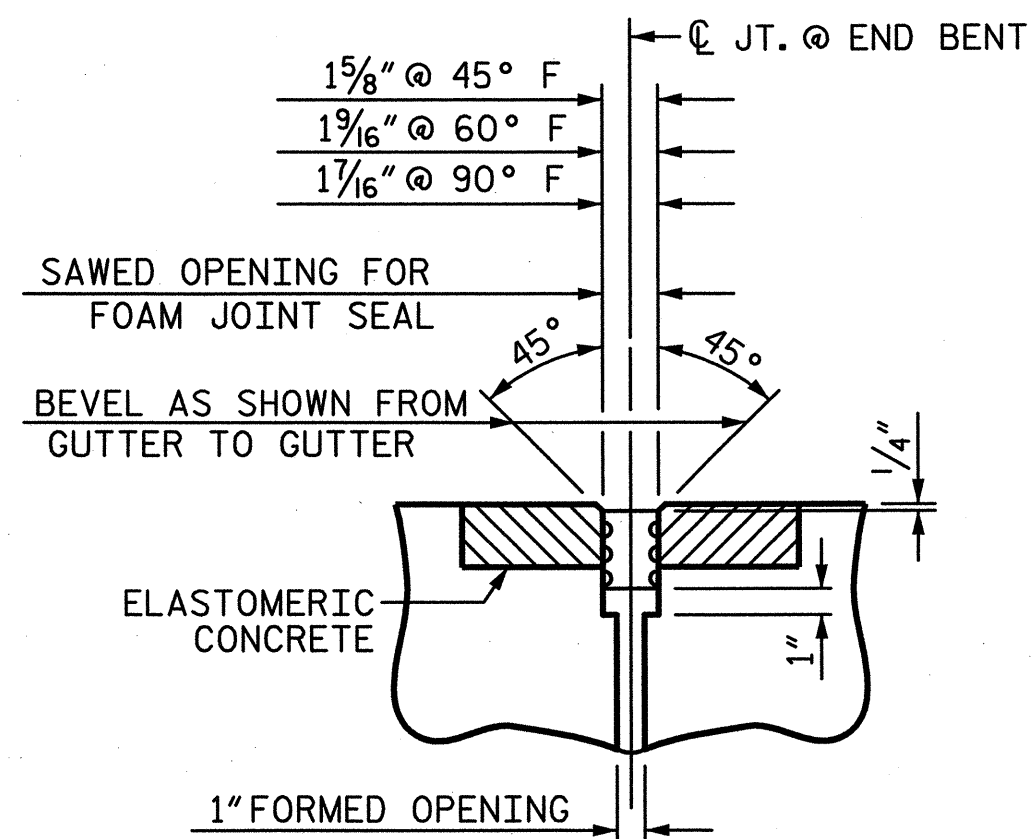
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39	
1			3			TOTAL SHEETS 40	
2			4				

ASSEMBLED BY: MAH	DATE: 02/13
CHECKED BY: NAP	DATE: 02/13
DRAWN BY: EEM 3/95	REV. 5/1/06RR KMM/GM
CHECKED BY: VAP 3/95	REV. 10/1/11 MAA/GM
	REV. 12/2/11 MAA/GM



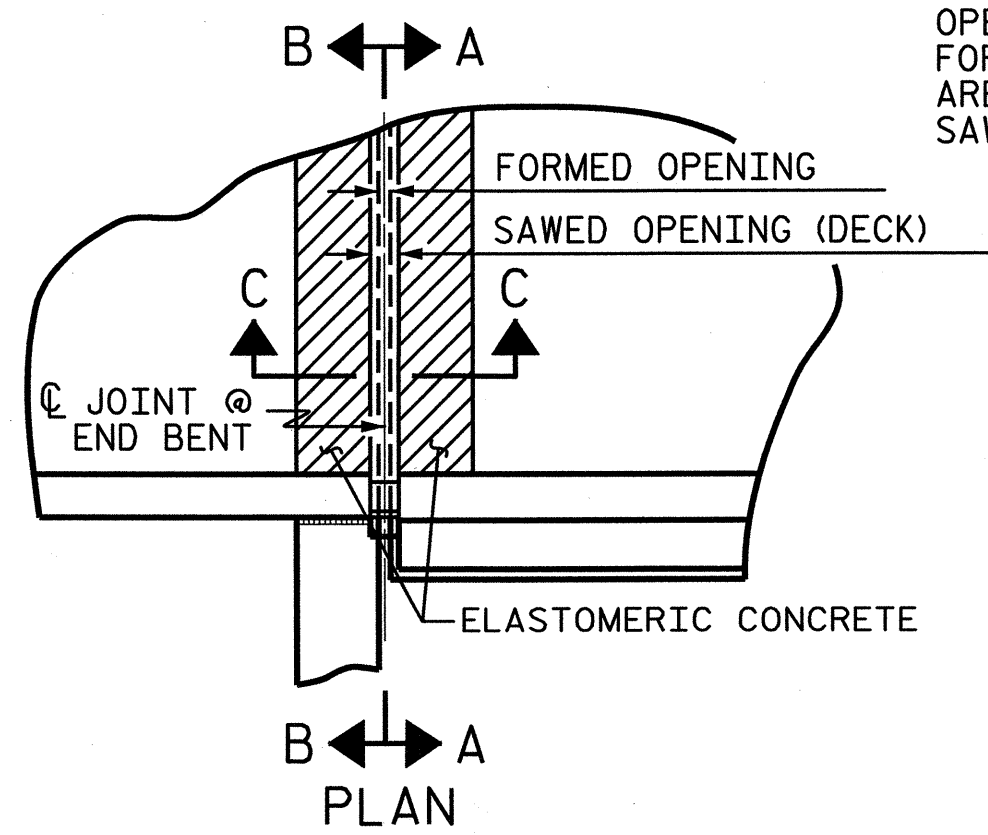
SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)

ELASTOMERIC CONCRETE	
END BENT	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.90
2	6.90
TOTAL	13.80

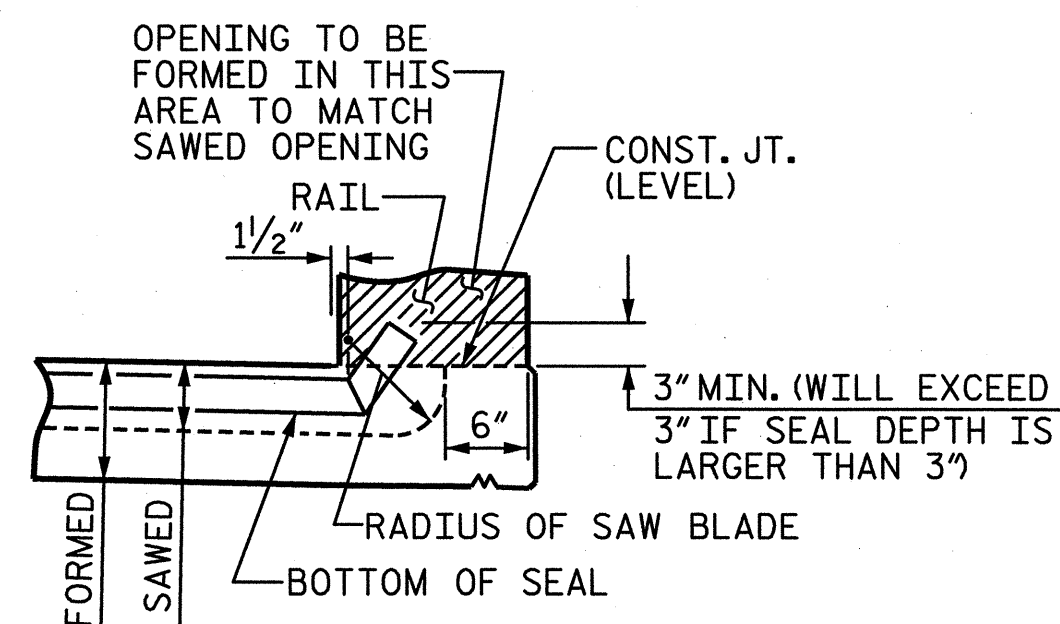
* BASED ON THE MINIMUM BLOCKOUT SHOWN.



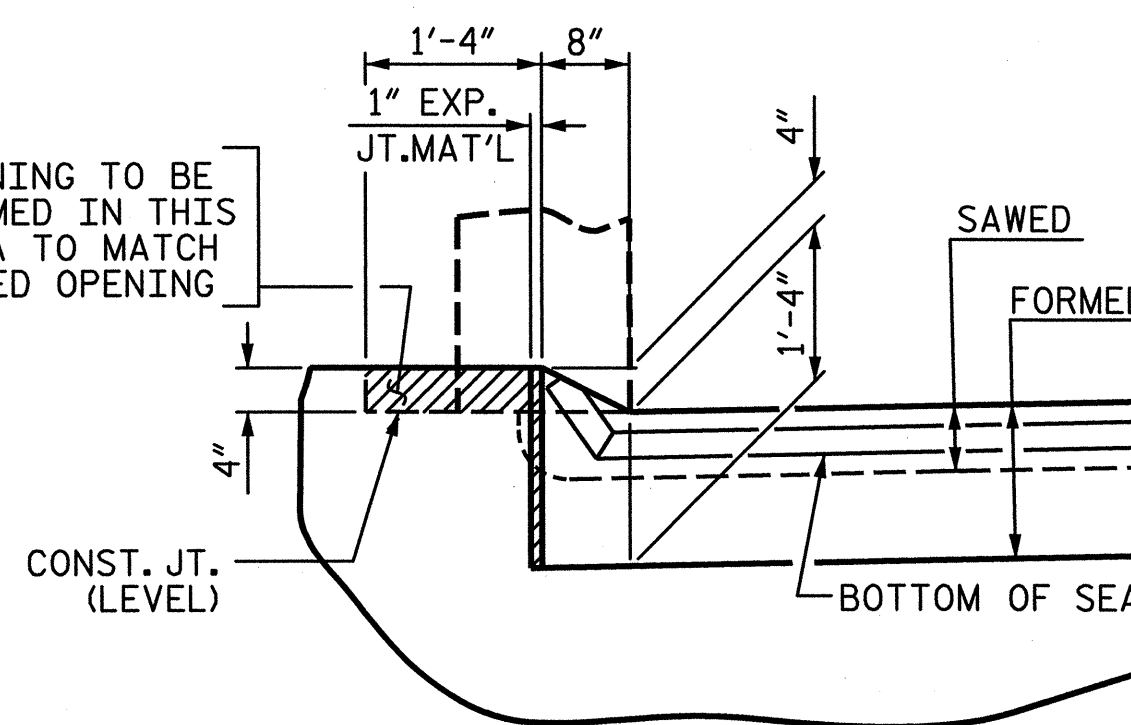
JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO PARAPET.

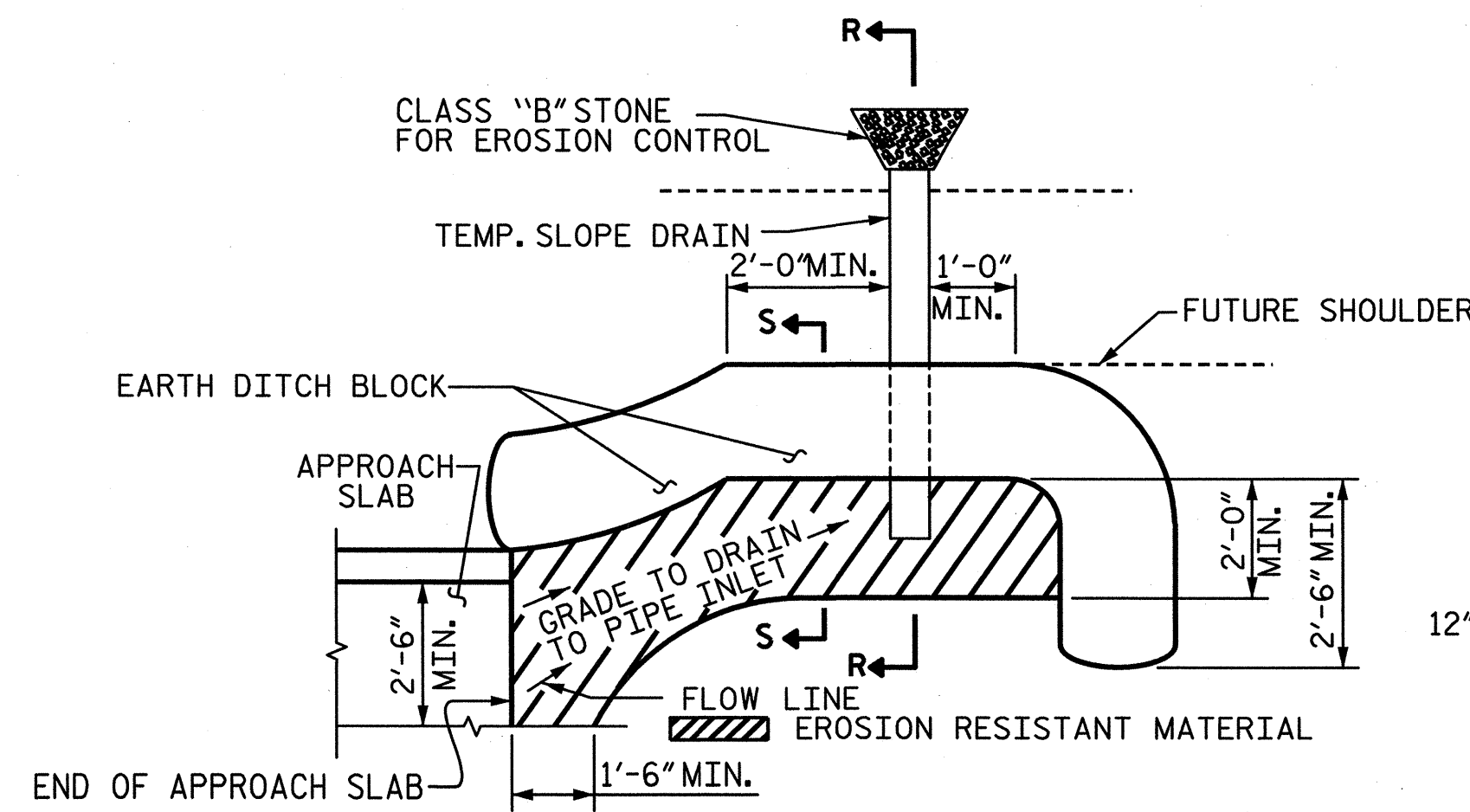
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET.



SECTION A-A



SECTION B-B

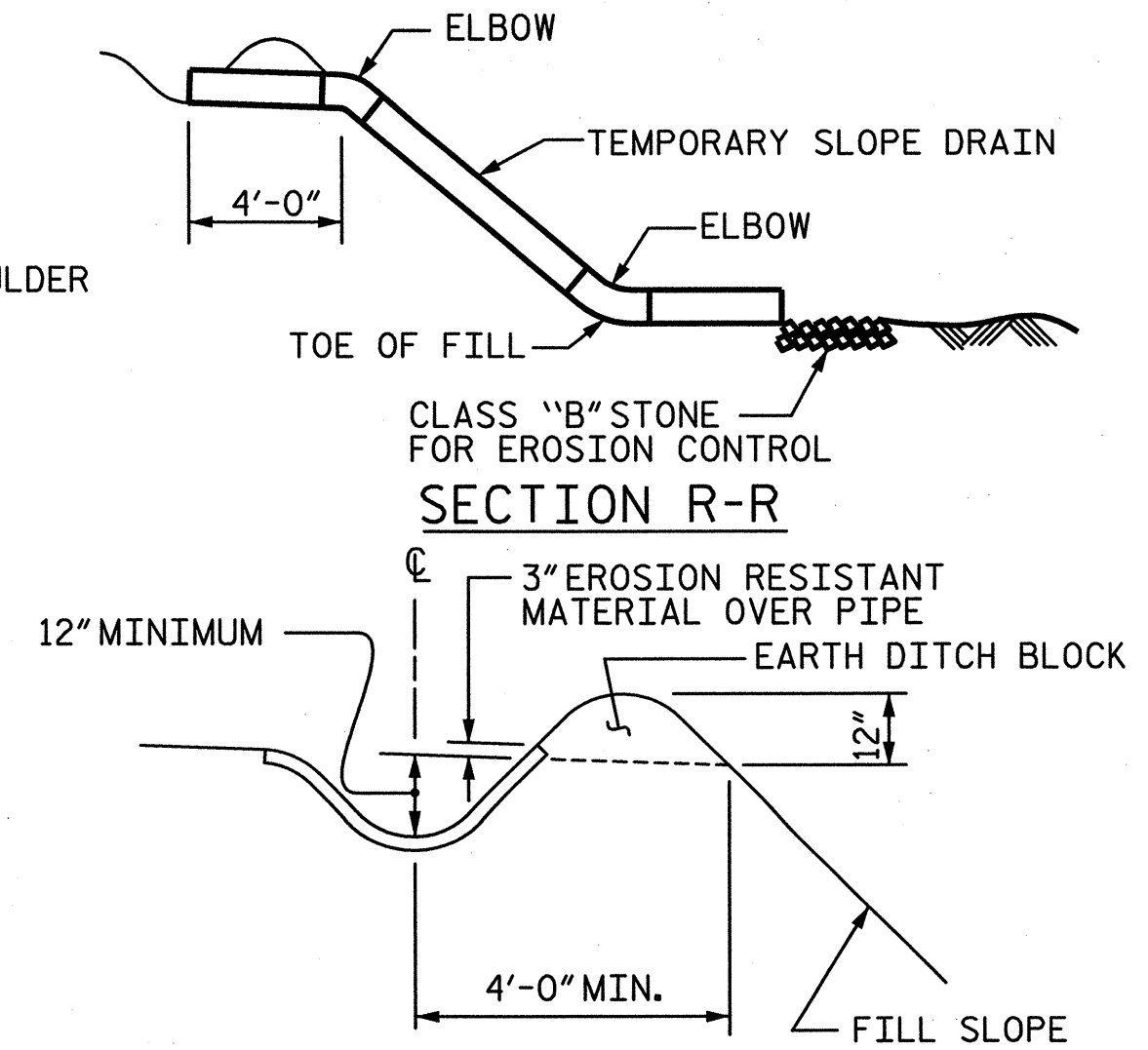


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

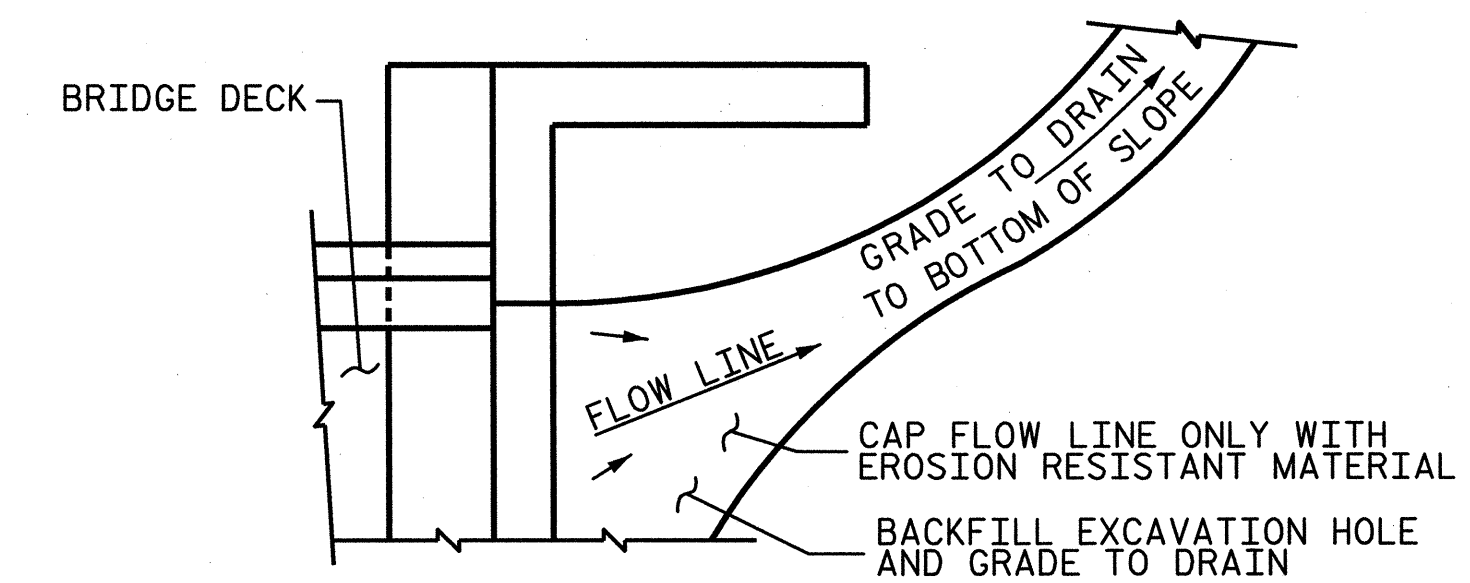
PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION S-S

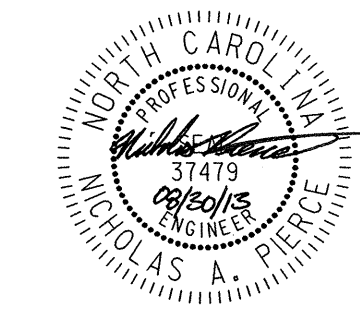


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

PROJECT NO. B-5109
UNION COUNTY
STATION: 16+82.50 -L-

SHEET 3 OF 3



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

WSP
Transportation & Infrastructure
15401 Weston Parkway Suite 100
Cary, NC 27513 - 919.678.0035
www.wspgroup.com
LICENSE NO. F-0891

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

ASSEMBLED BY : MAH	DATE : 11/12
CHECKED BY : NAP	DATE : 11/12
DRAWN BY : FCJ 11/88	REV. 5/7/03 RWW/JTE
CHECKED BY : ARB 11/88	REV. 5/1/06RRR MAA/KMM
	REV. 10/1/11 MAA/GM

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 2012 "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