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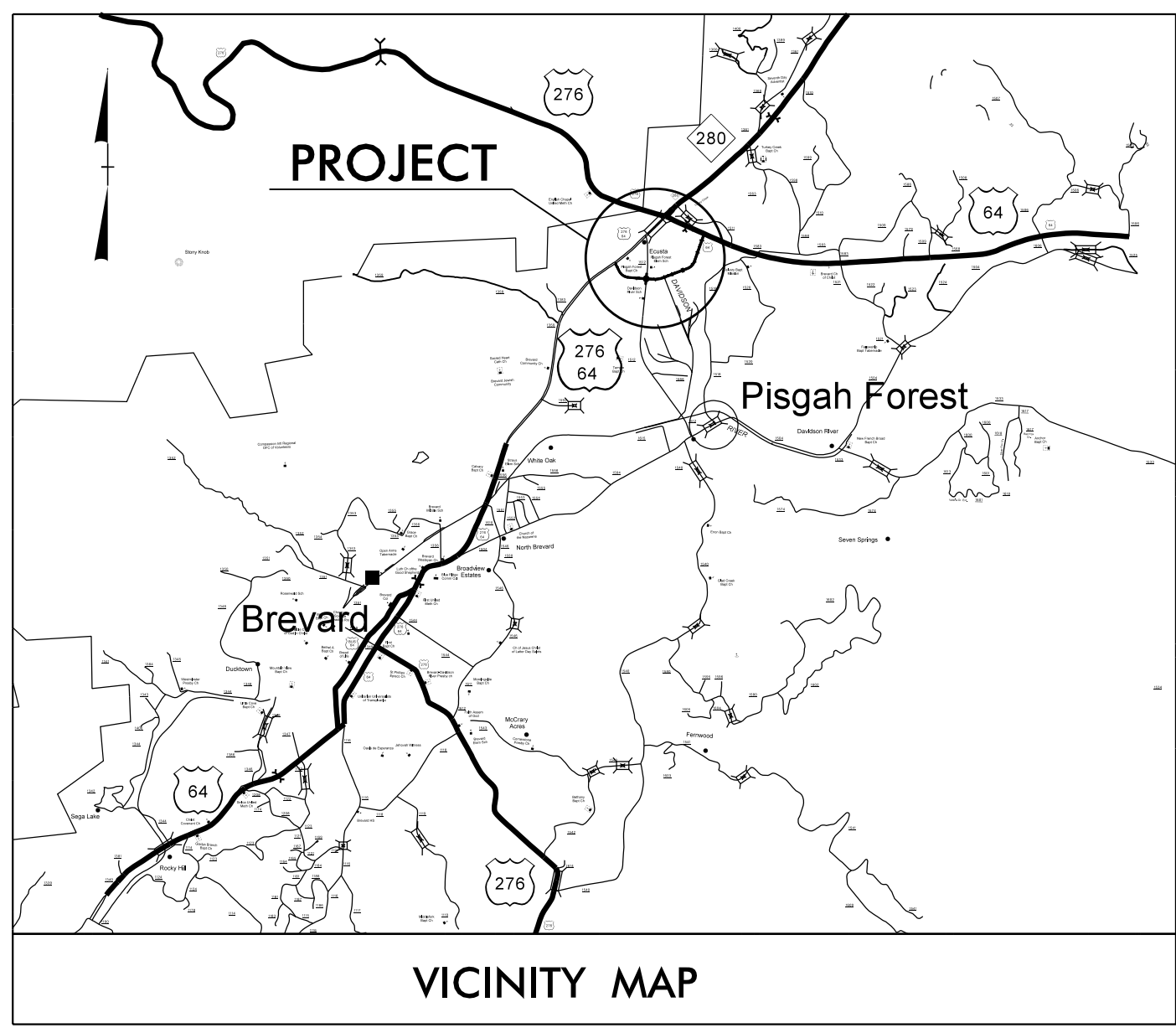
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09/08/16

**TIP PROJECT: R-5605**

**CONTRACT: C203752**

\$\$\$ SYSTEM \$\$\$  
 \$\$\$ DGN \$\$\$  
 \$\$\$ USERNAME \$\$\$



VICINITY MAP

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

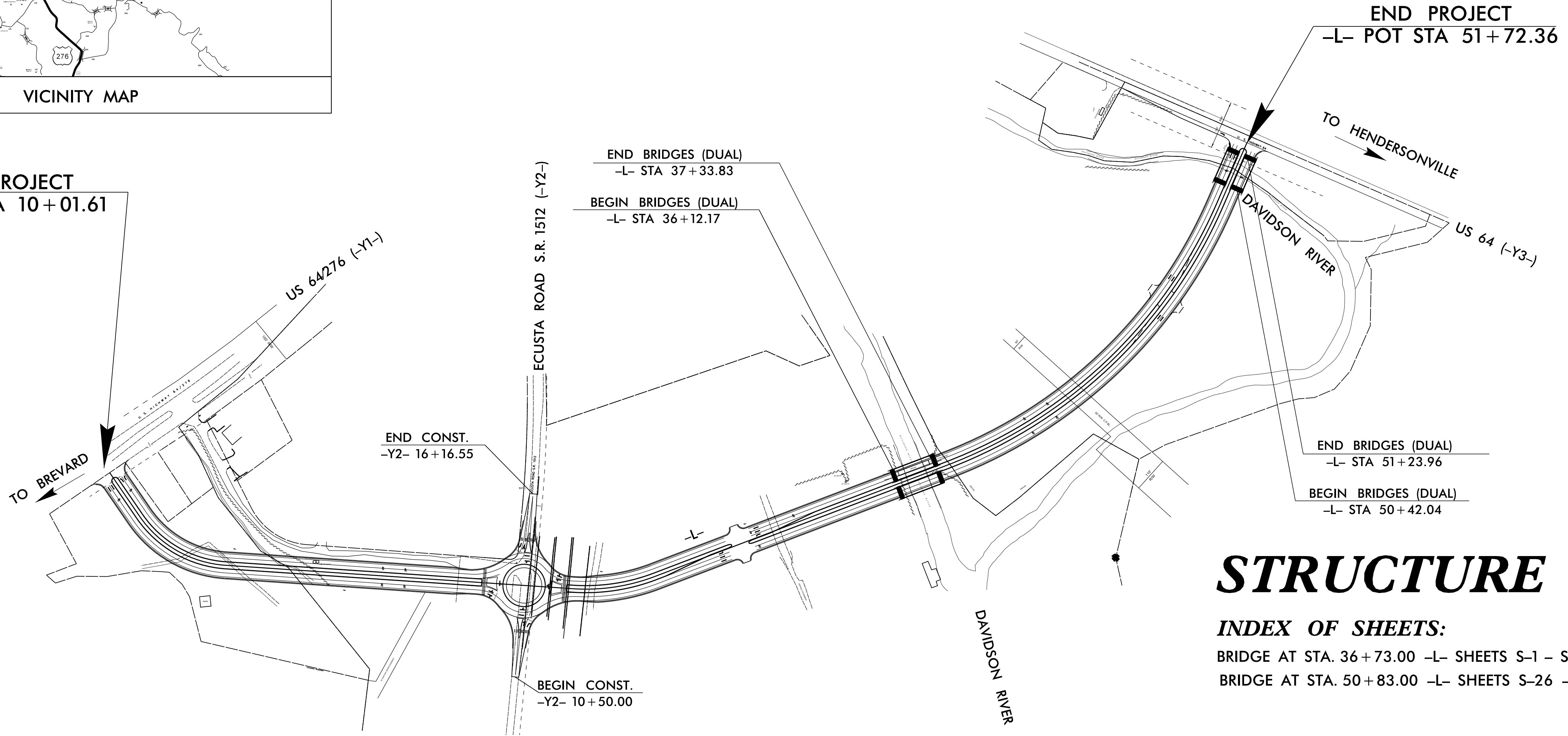
**TRANSYLVANIA COUNTY**

LOCATION: US 64/276 TO US 64, CITY OF BREVARD

TYPE OF WORK: GRADING, CURB & GUTTER, PAVING, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5605		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
43587.1.1		P.E.	
43587.2.1		R/W	
43587.3.1		CONST.	

BEGIN PROJECT  
 -L- POT STA 10+01.61



END BRIDGES (DUAL)  
 -L- STA 37+33.83

BEGIN BRIDGES (DUAL)  
 -L- STA 36+12.17

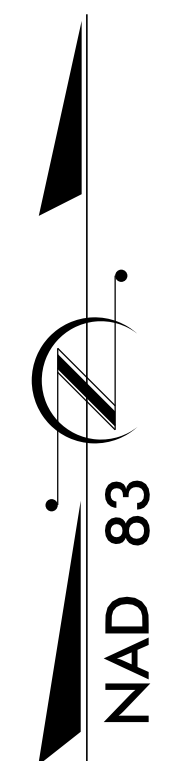
END CONST.  
 -Y2- 16+16.55

BEGIN CONST.  
 -Y2- 10+50.00

END PROJECT  
 -L- POT STA 51+72.36

END BRIDGES (DUAL)  
 -L- STA 51+23.96

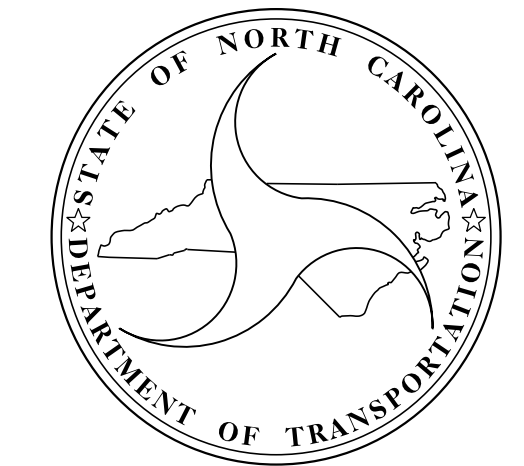
BEGIN BRIDGES (DUAL)  
 -L- STA 50+42.04



**STRUCTURE**

INDEX OF SHEETS:

BRIDGE AT STA. 36+73.00 -L- SHEETS S-1 - S-25  
 BRIDGE AT STA. 50+83.00 -L- SHEETS S-26 - S-51



**DESIGN DATA**

ADT 2012 =	16,600
ADT 2035 =	20,900
DHV =	10 %
D =	55 %
T =	6 % *
V =	30 MPH
* TTST =	4 DUAL 2
CLASS =	COLLECTOR

**PROJECT LENGTH**

LENGTH OF ROADWAY PROJECT R-5605 =	0.751 MI
LENGTH OF STRUCTURES PROJECT R-5605 =	0.039 MI
TOTAL LENGTH OF PROJECT R-5605 =	0.790 MI

Prepared for Division of Highways in the Office of:  
**Mattern and Craig, Inc.**

2012 STANDARD SPECIFICATIONS
G. THOMAS JONES III, PE PROJECT ENGINEER
LETTING DATE: FEBRUARY 16, 2016
STEVEN A. CAMPBELL, PE BRIDGE ENGINEER

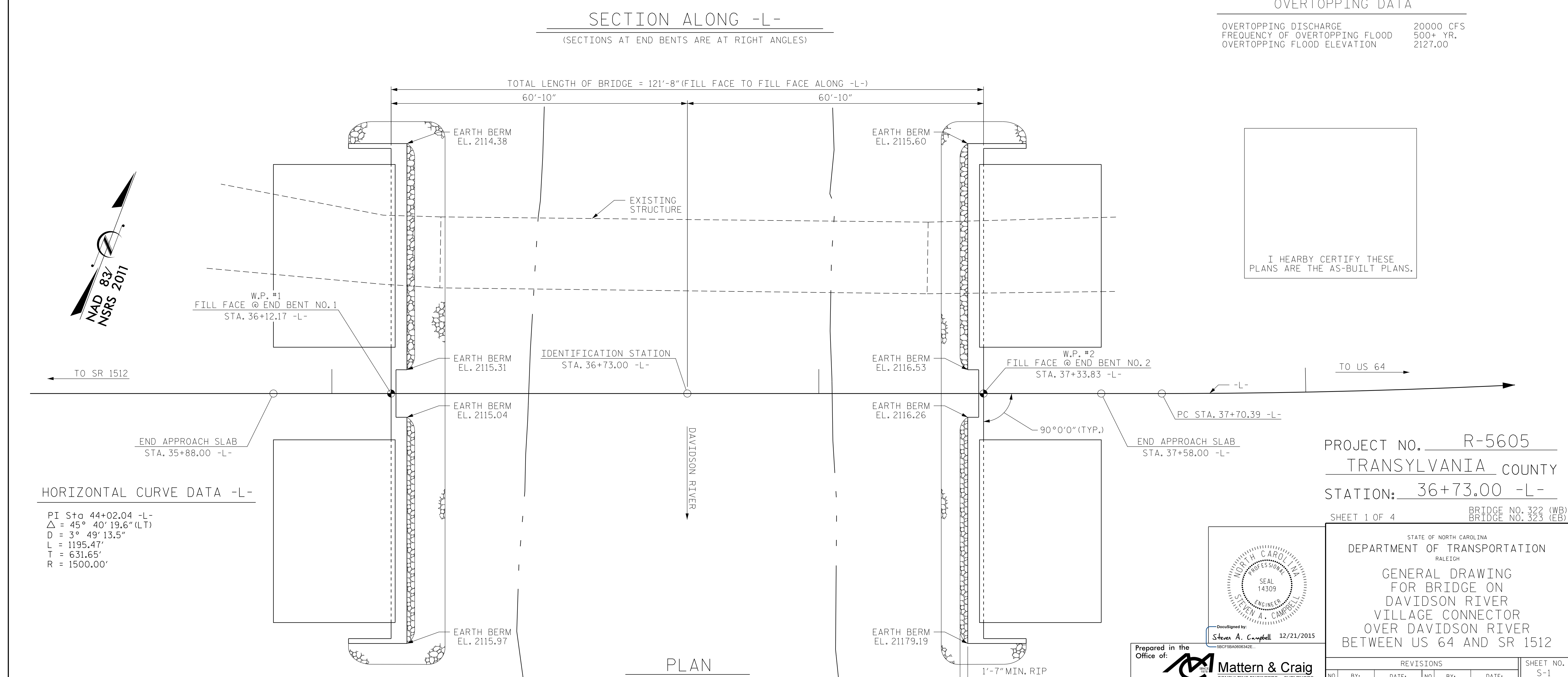
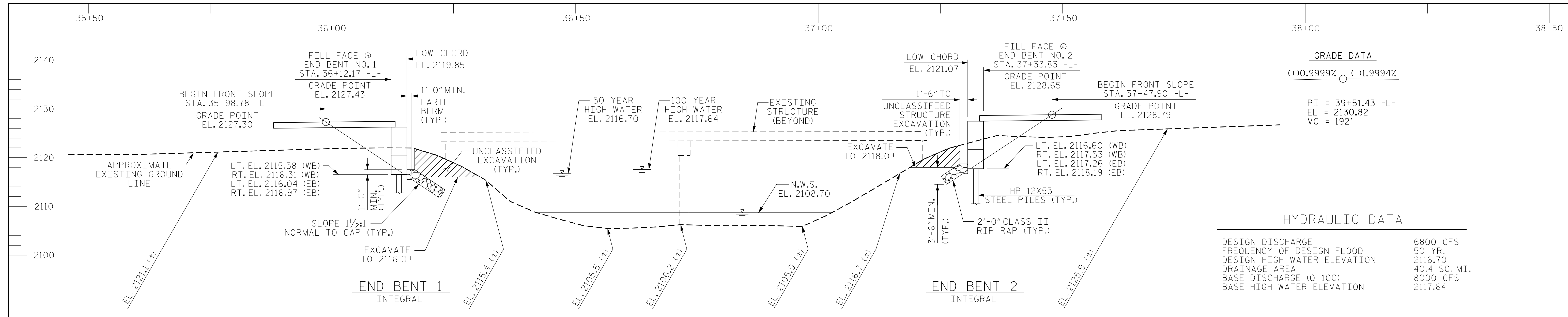
BRIDGE ENGINEER

DocuSigned by:  
 Steven A. Campbell  
 SBFCF5BA0606342E

1/4/2016

PLANS PREPARED BY:

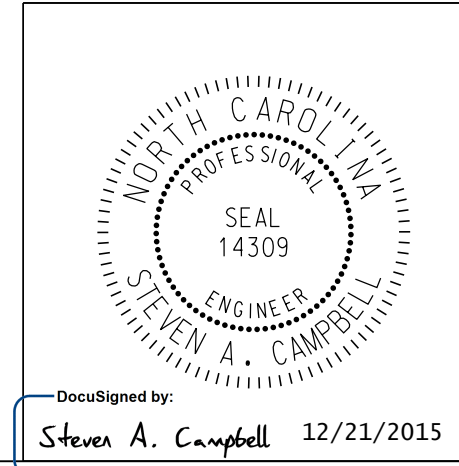
**Mattern & Craig**  
 CONSULTING ENGINEERS • SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562



I HERABY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

SHEET 1 OF 4  
 BRIDGE NO. 322 (WB)  
 BRIDGE NO. 323 (EB)

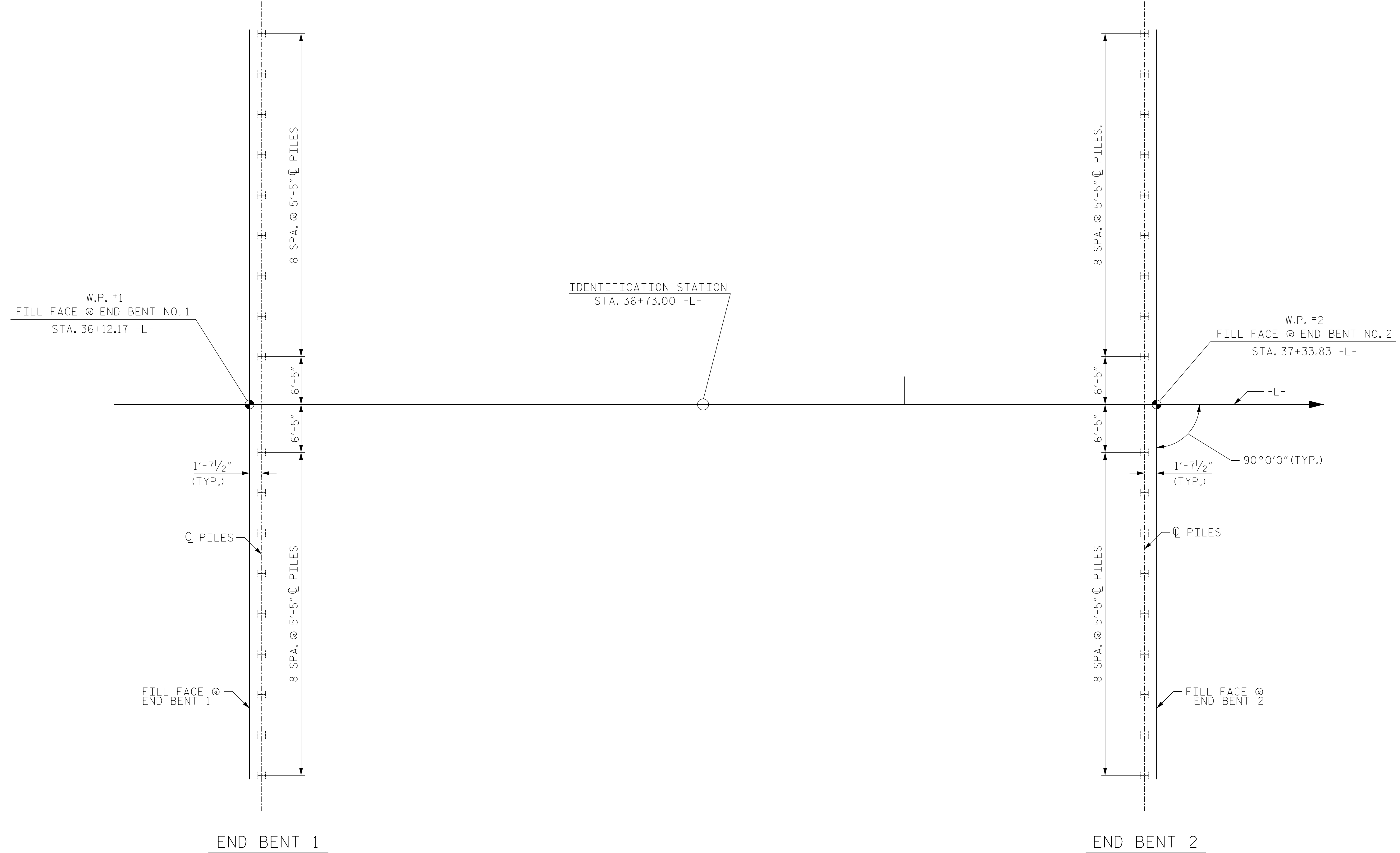
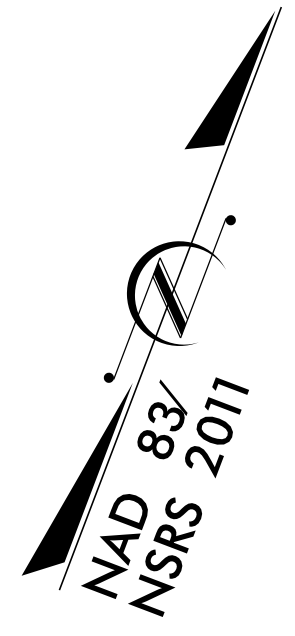


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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON  
 DAVIDSON RIVER  
 VILLAGE CONNECTOR  
 OVER DAVIDSON RIVER  
 BETWEEN US 64 AND SR 1512

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			51

DRAWN BY : PFC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

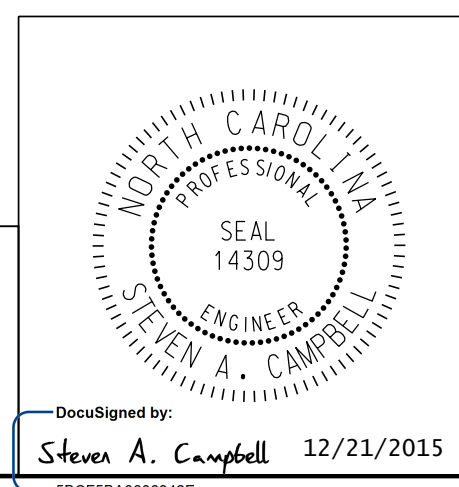


**FOUNDATION LAYOUT PLAN**  
 ALL PILES ARE HP 12 X 53 GRADE 50 STEEL PILES

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON  
 DAVIDSON RIVER  
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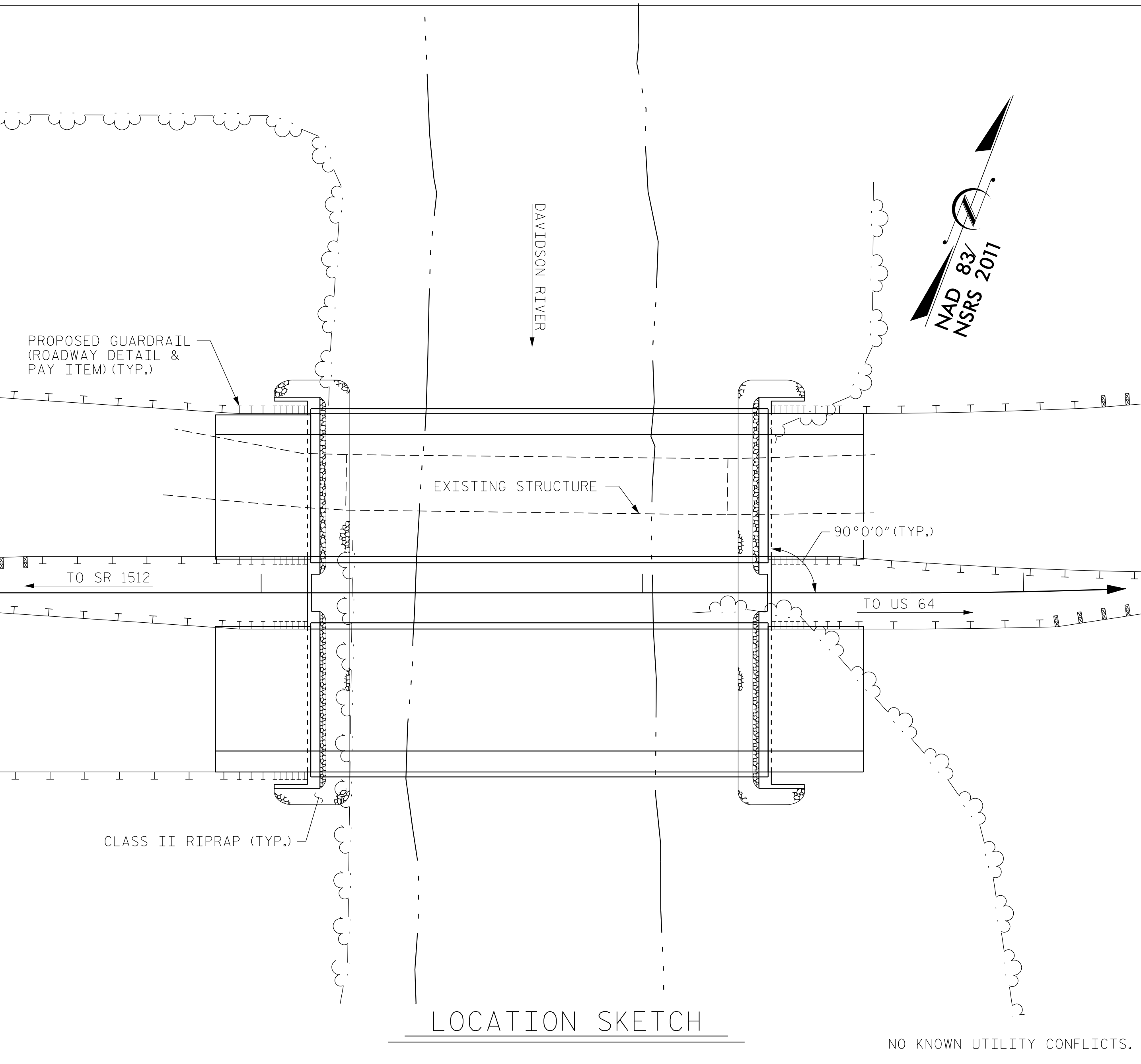
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			51

DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEMTIME\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

DocuSigned by:  
 Steven A. Campbell 12/21/2015

B.M.: NCGS MONUMENT "OLIN" ON ECUSTA RD. -L- STA. 23+66.57 OFFSET 260.73 RT. EL. 2131.91 NAVD 88



**NOTES:**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THE EXISTING STRUCTURE CONSISTING OF 2 SIMPLE SPANS 1 AT 50'-0" AND 1 AT 50'-0"; 14'-0" CLEAR ROADWAY WIDTH, CONCRETE CORED SLAB ON CONCRETE BENT ON CONCRETE CAPS, AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS CURRENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THE LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- THE CONTRACTOR MAY BE PERMITTED TO UTILIZE THE EXISTING STRUCTURE TO ACCESS BOTH SIDES OF THE STREAM DURING CONSTRUCTION OF THE EASTBOUND LANE STRUCTURE. THE EXISTING STRUCTURE SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE WESTBOUND LANE STRUCTURE.
- 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 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 COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 56 FT ± EACH SIDE OF CENTERLINE OF 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.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

**FOUNDATION NOTES:**

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR ALL STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 45 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO.1 (WB CAP AND EB CAP (LT)). THE ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.
- PILE EXCAVATION IS REQUIRED TO INSTALL PILES AT END BENT NO.1 (WB CAP AND EB CAP (LT)). EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 2103.00 (WB CAP AND EB CAP (LT)) AND HAVE AT LEAST 5 FEET OF PENETRATION INTO WEATHERED ROCK OR ROCK. SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO.1 (WB CAP AND EB CAP (LT)).
- IF NECESSARY, PREDRILL PILE LOCATIONS AT END BENT NO.1 (EB CAP (RT)). INSTALL PILES AT END BENT NO.1 (EB CAP (RT.)) TO ELEVATION 2107.00 WITH EQUIPMENT THAT WILL RESULT IN A MAXIMUM PREDRILLING DIAMETER OF 12". FOR PREDRILLING PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION.
- OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NOS. 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

**TOTAL BILL OF MATERIAL**

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINF. STEEL	72" PRESTRESSED CONCRETE GIRDERS	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	RIIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	PDA TESTING	PILE EXCAVATION IN-SOIL	PILE EXCAVATION NOT IN-SOIL	PREDRILLING FOR PILES	ASBESTOS ASSESSMENT
	LUMP SUM	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	NO. LIN.FT.	NO. LIN.FT.	NO.	LIN.FT.	LIN.FT.	TONS	SQ. YDS.	LUMP SUM	EACH	LF	LF	LF	LUMP SUM
SUPERSTRUCTURE	LUMP SUM		9835	9860		LUMP SUM		10 1198.3			225	240			LUMP SUM					
END BENT NO.1		LUMP SUM			57.3		7429		18 360	18			114	127			150	40	50	
END BENT NO.2		LUMP SUM			57.3		7429		18 475	18			82	92						
TOTAL	LUMP SUM	LUMP SUM	9835	9860	114.6	LUMP SUM	14858	10 1198.3	36 835	36	225	240	196	219	LUMP SUM	1	150	40	50	LUMP SUM

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON  
 DAVIDSON RIVER  
 VILLAGE CONNECTOR  
 OVER DAVIDSON RIVER  
 BETWEEN US 64 AND SR 1512

DRAWN BY : PFC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS - SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4562

SEAL  
 14309  
 ENGINEER  
 STEVEN A. CAMPBELL  
 8/14/2016  
 -SICF5BA080634E-

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			51

LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.33	--	1.75	0.805	1.36	118.4'	ER	59.2	0.838	1.70	118.4'	I	28.6	0.80	0.805	<b>1.33</b>	118.4'	ER	59.2		
	HL-93 (OPERATING)	N/A		1.76	--	1.35	0.805	1.76	118.4'	ER	59.2	0.838	2.31	118.4'	I	28.6	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.94	69.750	1.75	0.805	1.97	118.4'	ER	59.2	0.838	2.41	118.4'	I	28.6	0.80	0.805	<b>1.94</b>	118.4'	ER	59.2		
	HS-20 (OPERATING)	36.000		2.56	92.020	1.35	0.805	2.56	118.4'	ER	59.2	0.838	3.13	118.4'	I	28.6	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13,500		4.68	63.113	1.40	0.805	5.99	118.4'	ER	59.2	0.838	7.41	118.4'	I	28.6	0.80	0.805	4.68	118.4'	ER	59.2	
		SNGARBS2	20,000		3.35	67.000	1.40	0.805	4.28	118.4'	ER	59.2	0.838	5.19	118.4'	I	28.6	0.80	0.805	3.35	118.4'	ER	59.2	
		SNAGRIS2	22,000		3.11	68.475	1.40	0.805	3.98	118.4'	ER	59.2	0.838	4.79	118.4'	I	28.6	0.80	0.805	3.11	118.4'	ER	59.2	
		SNCOTTS3	27,250		2.33	63.356	1.40	0.805	2.97	118.4'	ER	59.2	0.838	3.69	118.4'	I	28.6	0.80	0.805	2.33	118.4'	ER	59.2	
		SNAGGRS4	34,925		1.89	65.921	1.40	0.805	2.41	118.4'	ER	59.2	0.838	3.00	118.4'	I	28.6	0.80	0.805	1.89	118.4'	ER	59.2	
		SNS5A	35,550		1.85	65.768	1.40	0.805	2.36	118.4'	ER	59.2	0.838	3.01	118.4'	I	28.6	0.80	0.805	1.85	118.4'	ER	59.2	
		SNS6A	39,950		1.68	66.916	1.40	0.805	2.14	118.4'	ER	59.2	0.838	2.73	118.4'	I	28.6	0.80	0.805	1.68	118.4'	ER	59.2	
	SNS7B	42,000		1.60	67.200	1.40	0.805	2.04	118.4'	ER	59.2	0.838	2.66	118.4'	I	28.6	0.80	0.805	1.60	118.4'	ER	59.2		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.04	67.238	1.40	0.805	2.60	118.4'	ER	59.2	0.838	3.27	118.4'	I	28.6	0.80	0.805	2.04	118.4'	ER	59.2	
		TNT4A	33,075		2.04	67.390	1.40	0.805	2.61	118.4'	ER	59.2	0.838	3.21	118.4'	I	28.6	0.80	0.805	2.04	118.4'	ER	59.2	
		TNT6A	41,600		1.65	68.640	1.40	0.805	2.10	118.4'	ER	59.2	0.838	2.79	118.4'	I	28.6	0.80	0.805	1.65	118.4'	ER	59.2	
		TNT7A	42,000		1.65	69.300	1.40	0.805	2.10	118.4'	ER	59.2	0.838	2.73	118.4'	I	28.6	0.80	0.805	1.65	118.4'	ER	59.2	
		TNT7B	42,000		1.68	70.350	1.40	0.805	2.14	118.4'	ER	59.2	0.838	2.61	118.4'	I	28.6	0.80	0.805	1.68	118.4'	ER	59.2	
		TNAGRIT4	43,000		1.61	69.338	1.40	0.805	2.06	118.4'	ER	59.2	0.838	2.54	118.4'	I	28.6	0.80	0.805	1.61	118.4'	ER	59.2	
TNAGT5A		45,000		1.53	68.625	1.40	0.805	1.96	118.4'	ER	59.2	0.838	2.50	118.4'	I	28.6	0.80	0.805	1.53	118.4'	ER	59.2		
TNAGT5B	45,000		③	1.53	68.625	1.40	0.805	1.95	118.4'	ER	59.2	0.838	2.41	118.4'	I	28.6	0.80	0.805	<b>1.53</b>	118.4'	ER	59.2		

**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.

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

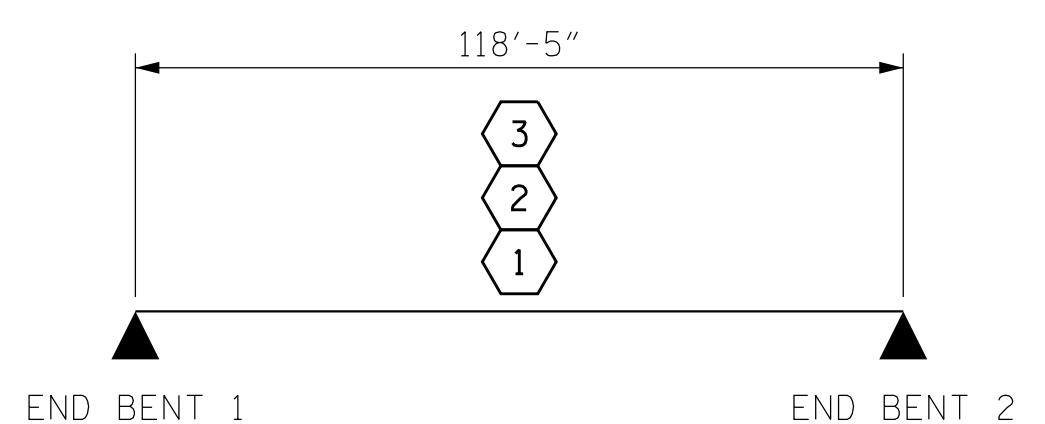
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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

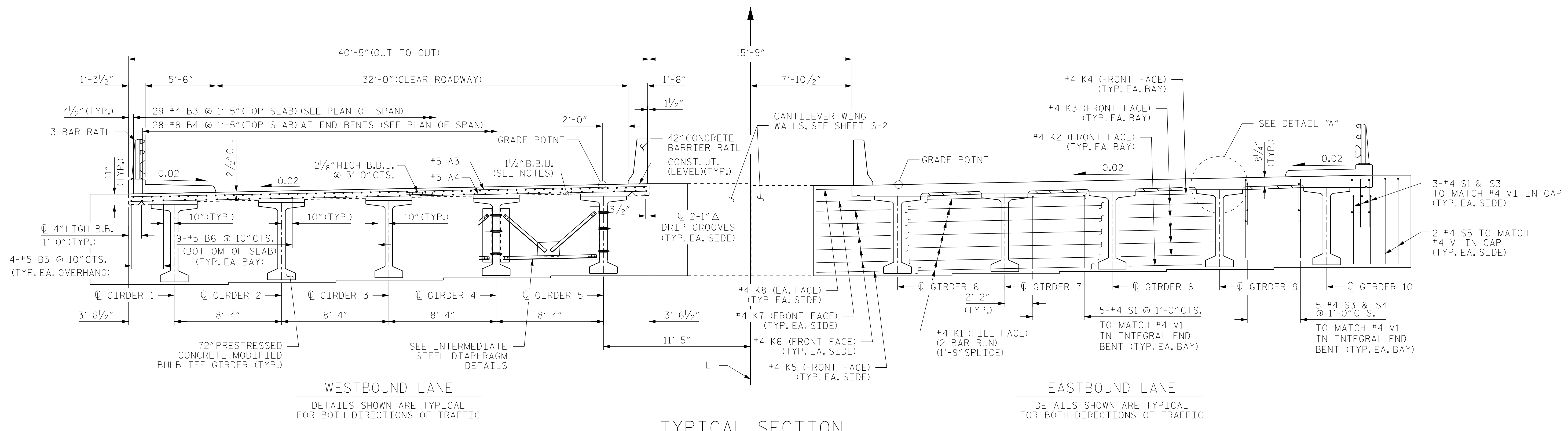
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			51

ASSEMBLED BY : PFC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15  
 DRAWN BY : MAA 1/08 REV. 11/2/08RR MAA/GM  
 CHECKED BY : GM/DI 2/08 REV. 10/17/11 MAA/GM

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS • SURVEYORS  
 FROM LICENSE No. G-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 • FAX (828) 254-4582

Steven A. Campbell 12/21/2015  
SEAL 14309 ENGINEER

\*\*\*\*\*SYSTEM TIME\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

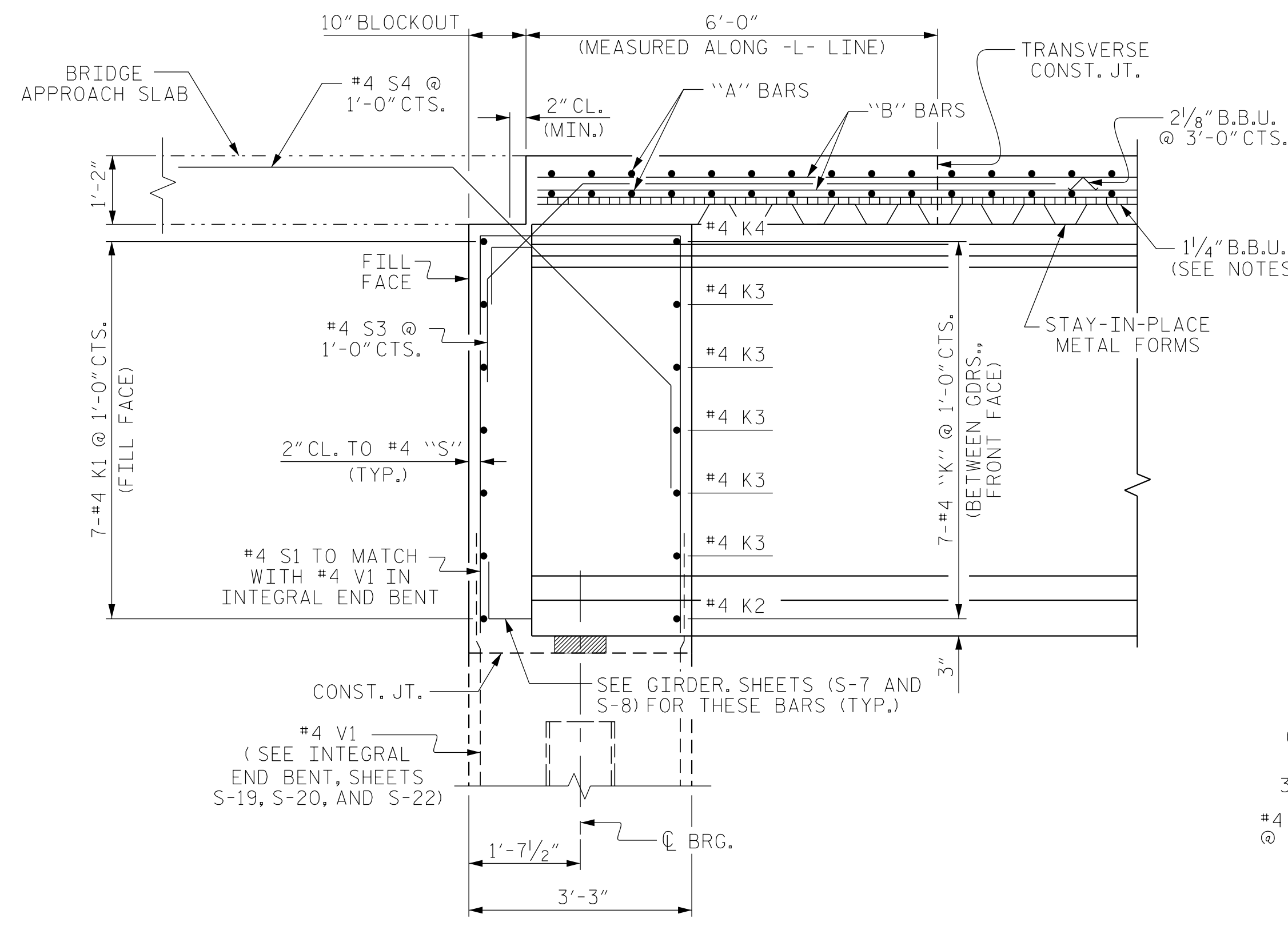


TYPICAL SECTION  
SHOWING ABUTMENT WALL AT END BENT, WINGS, APPROACH SLAB BLOCKOUT, AND SIP FORMS NOT SHOWN FOR CLARITY.

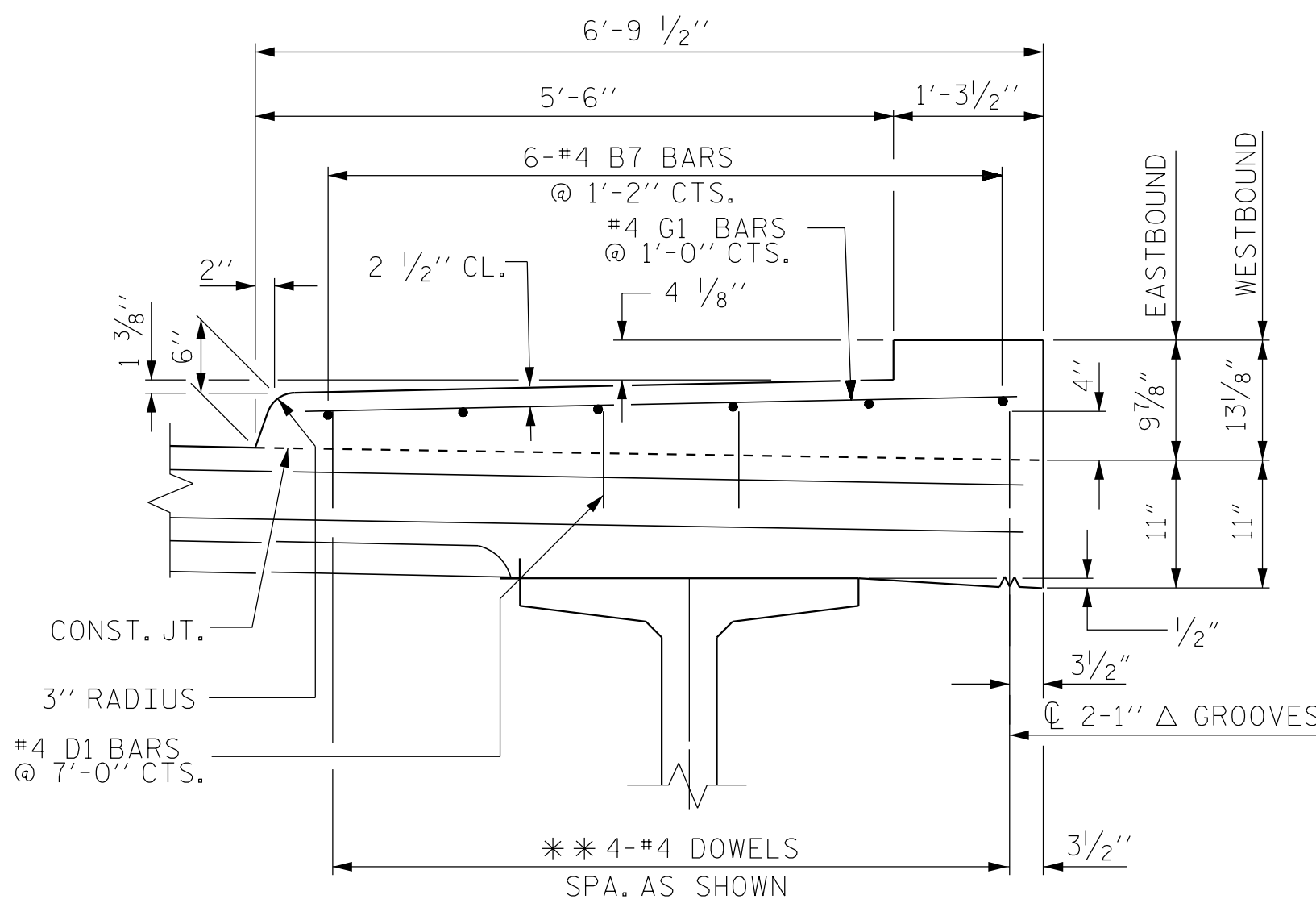
NOTES

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.) AT 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.

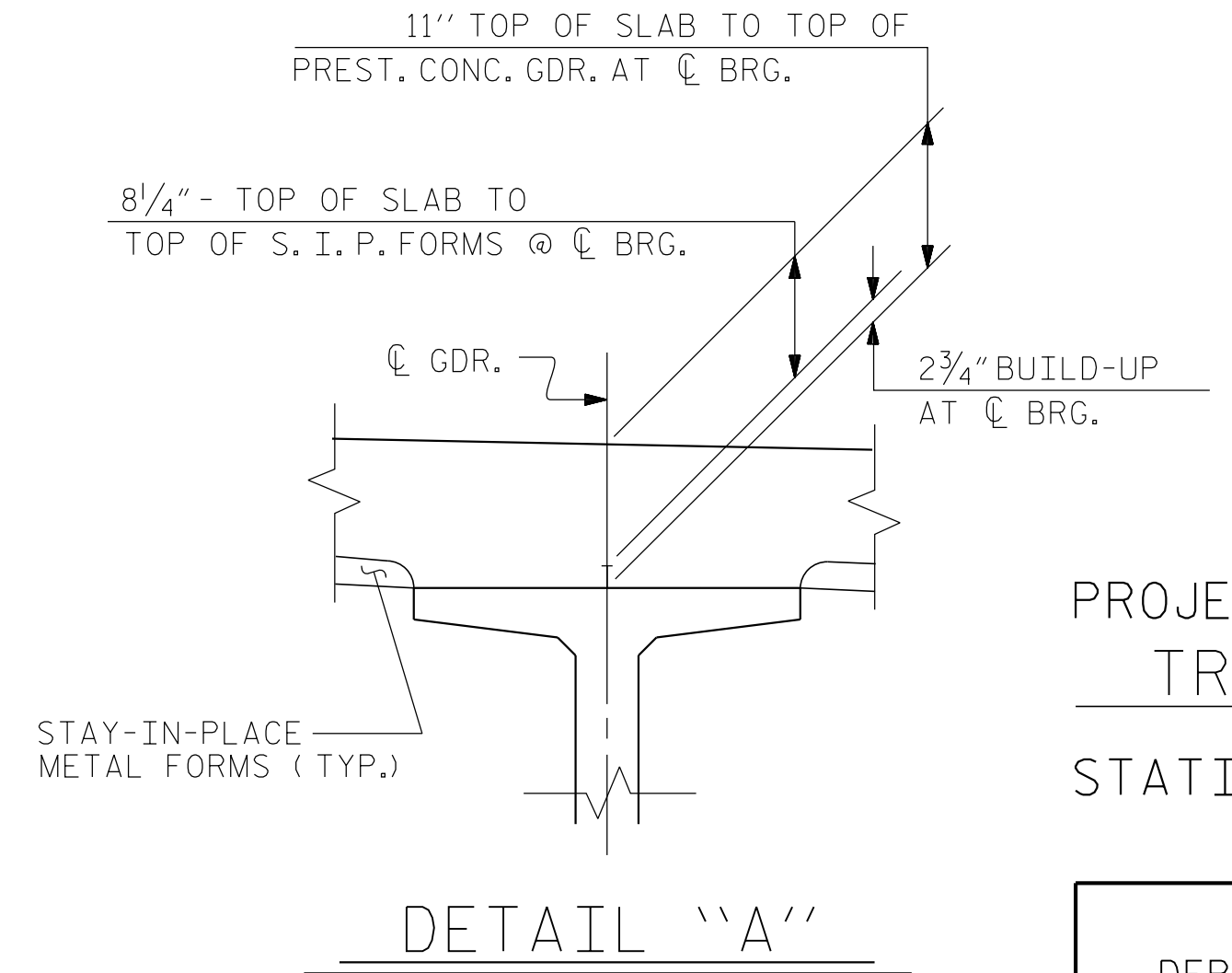


SECTION THRU INTEGRAL END BENT



SECTION THRU SIDEWALK

\*\* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.



DETAIL "A"

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

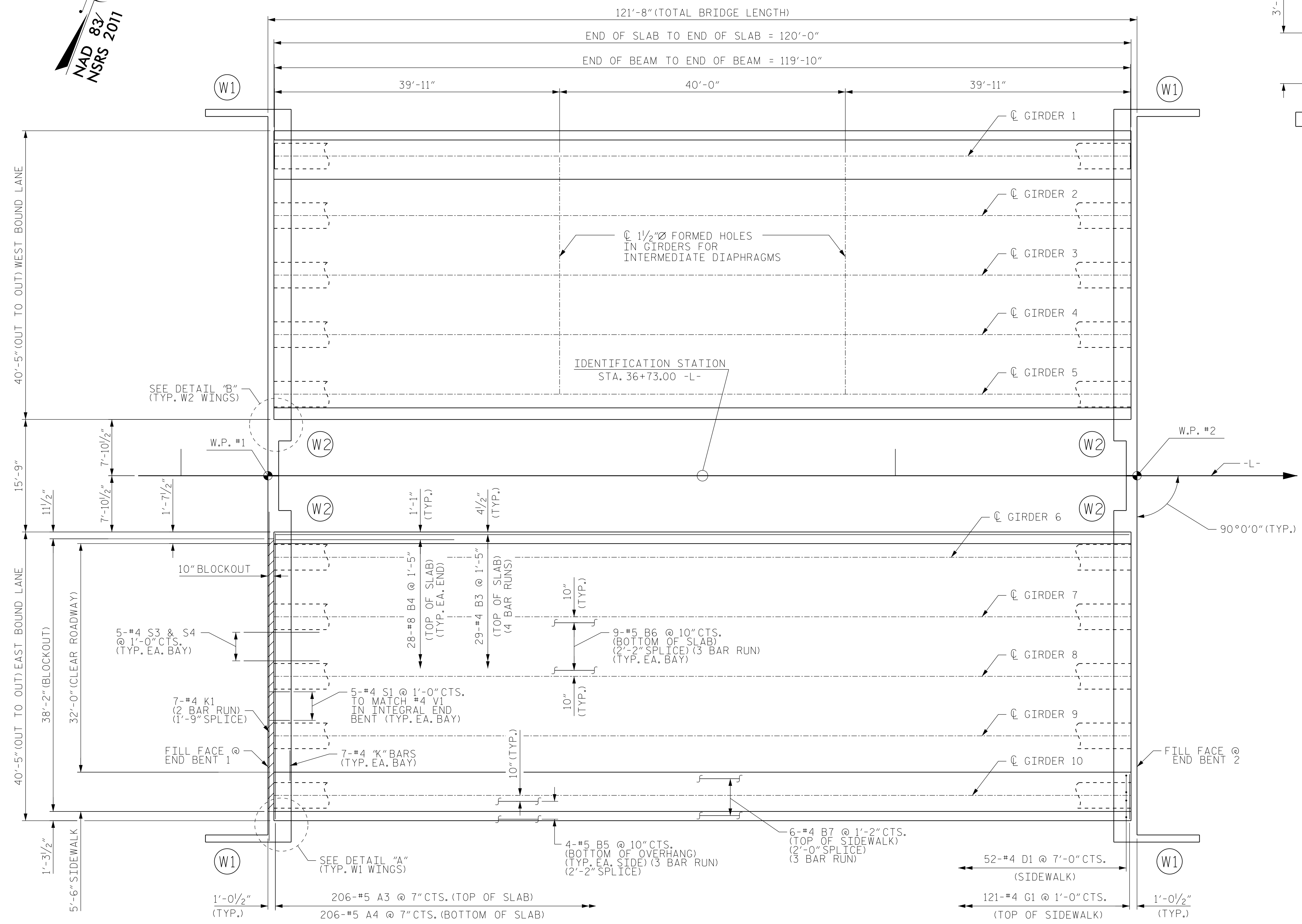
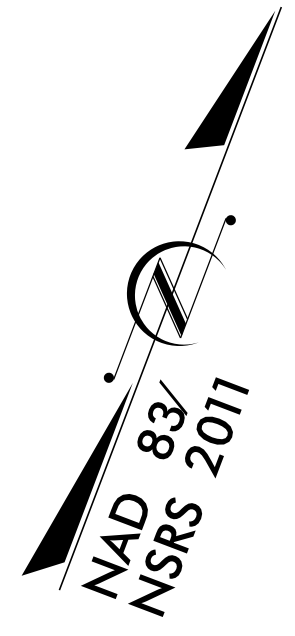
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
TYPICAL SECTION					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					51

DRAWN BY : PEC DATE : 8/15  
CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEM\*\*\*\*\*  
\*\*\*\*\*DCN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

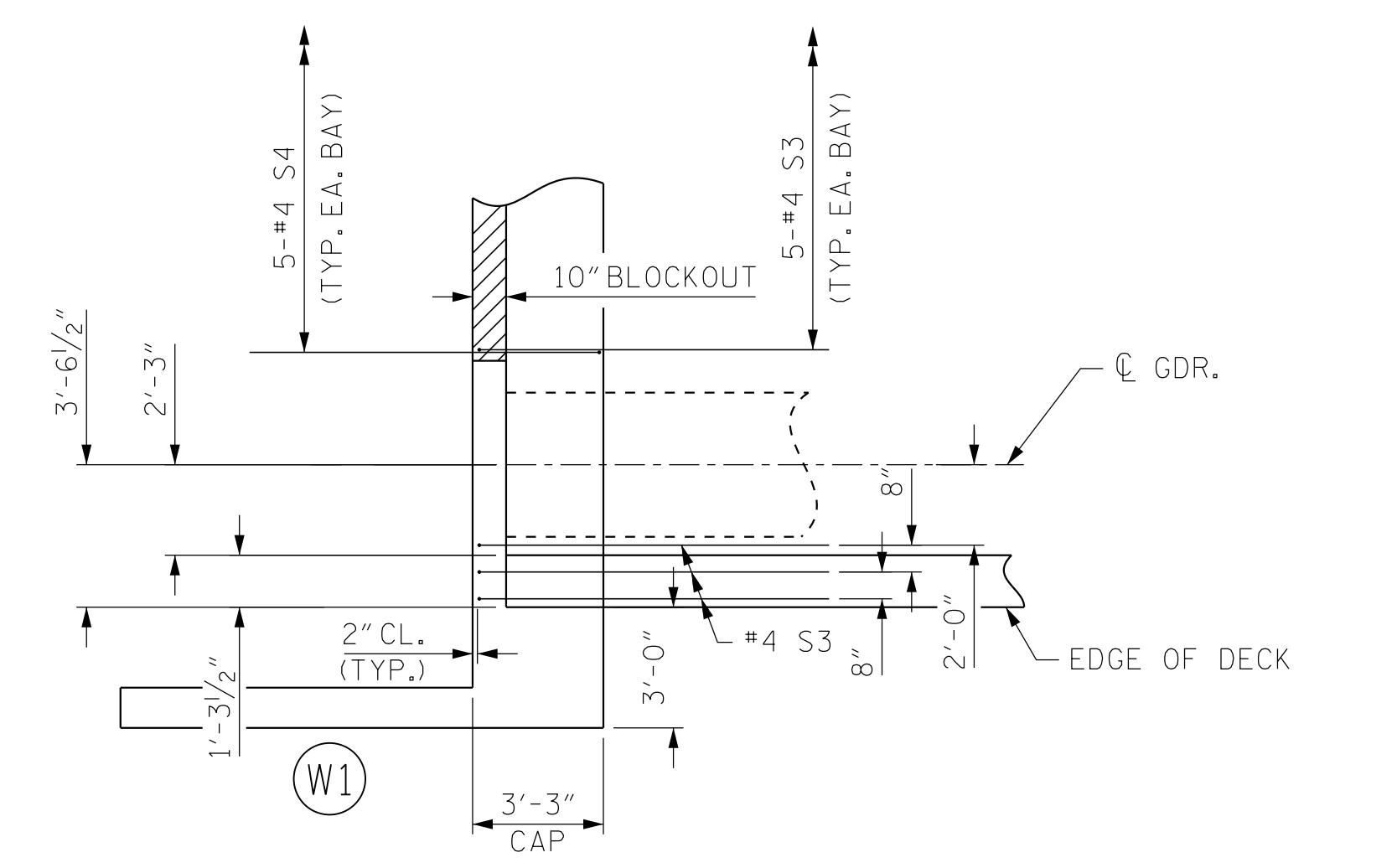
Prepared in the Office of:  
**Mattern & Craig**  
CONSULTING ENGINEERS - SURVEYORS  
FIRM LICENSE NO. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 - FAX (828) 254-4582

DocuSigned by:  
**Steven A. Campbell** 12/21/2015

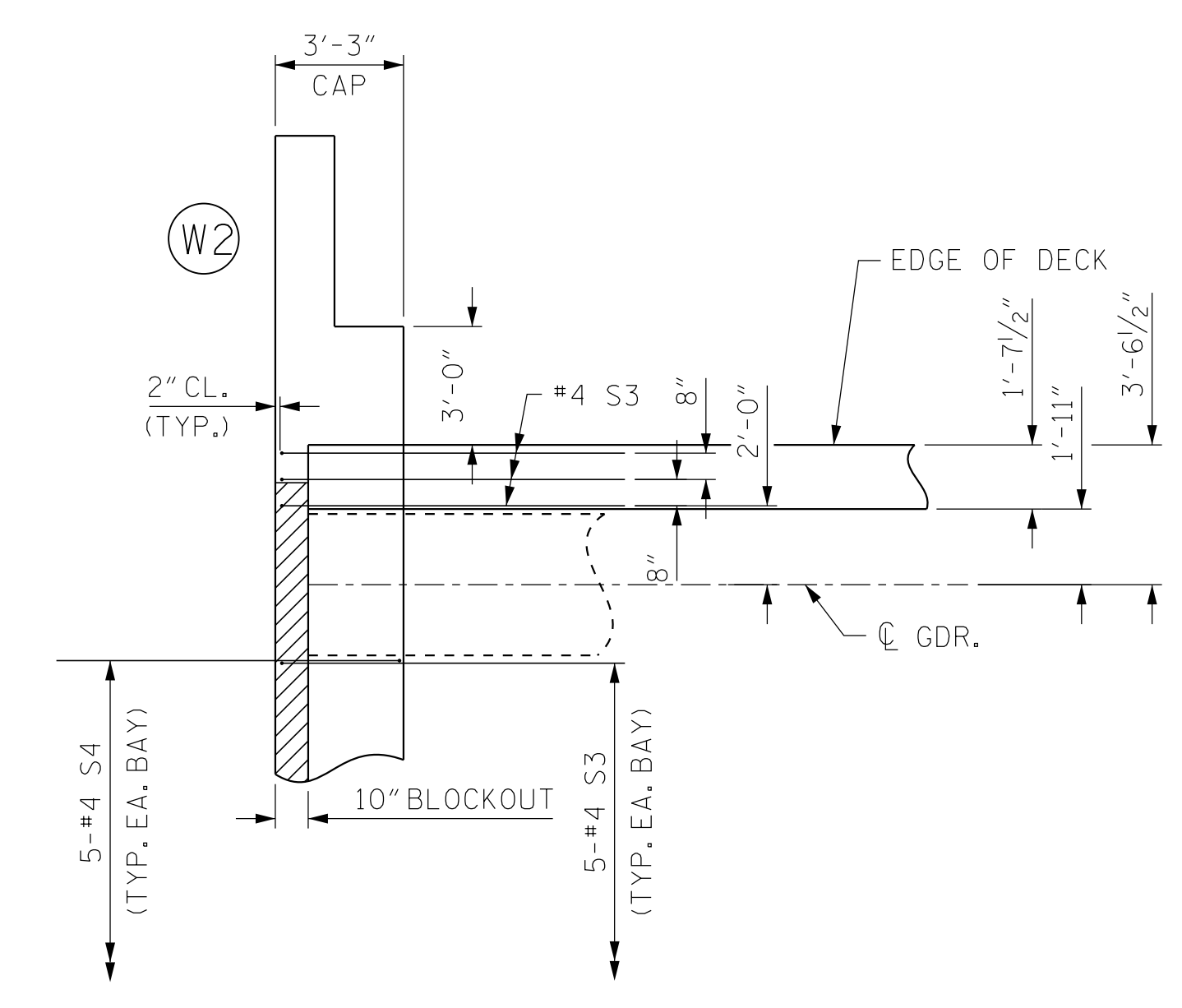


PLAN

REINFORCING AT END BENT NO. 1 IS TYPICAL FOR BOTH CAPS AND BOTH END BENTS



DETAIL "A"



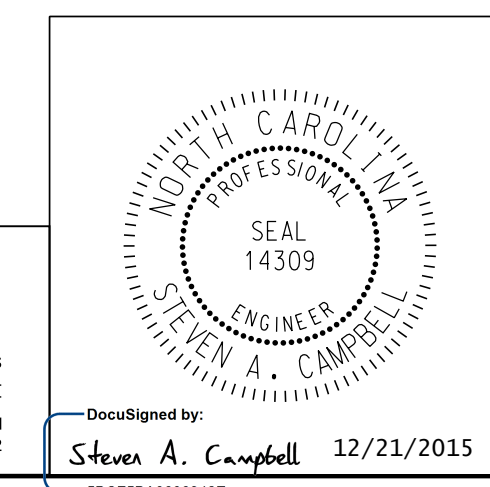
DETAIL "B"

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			51



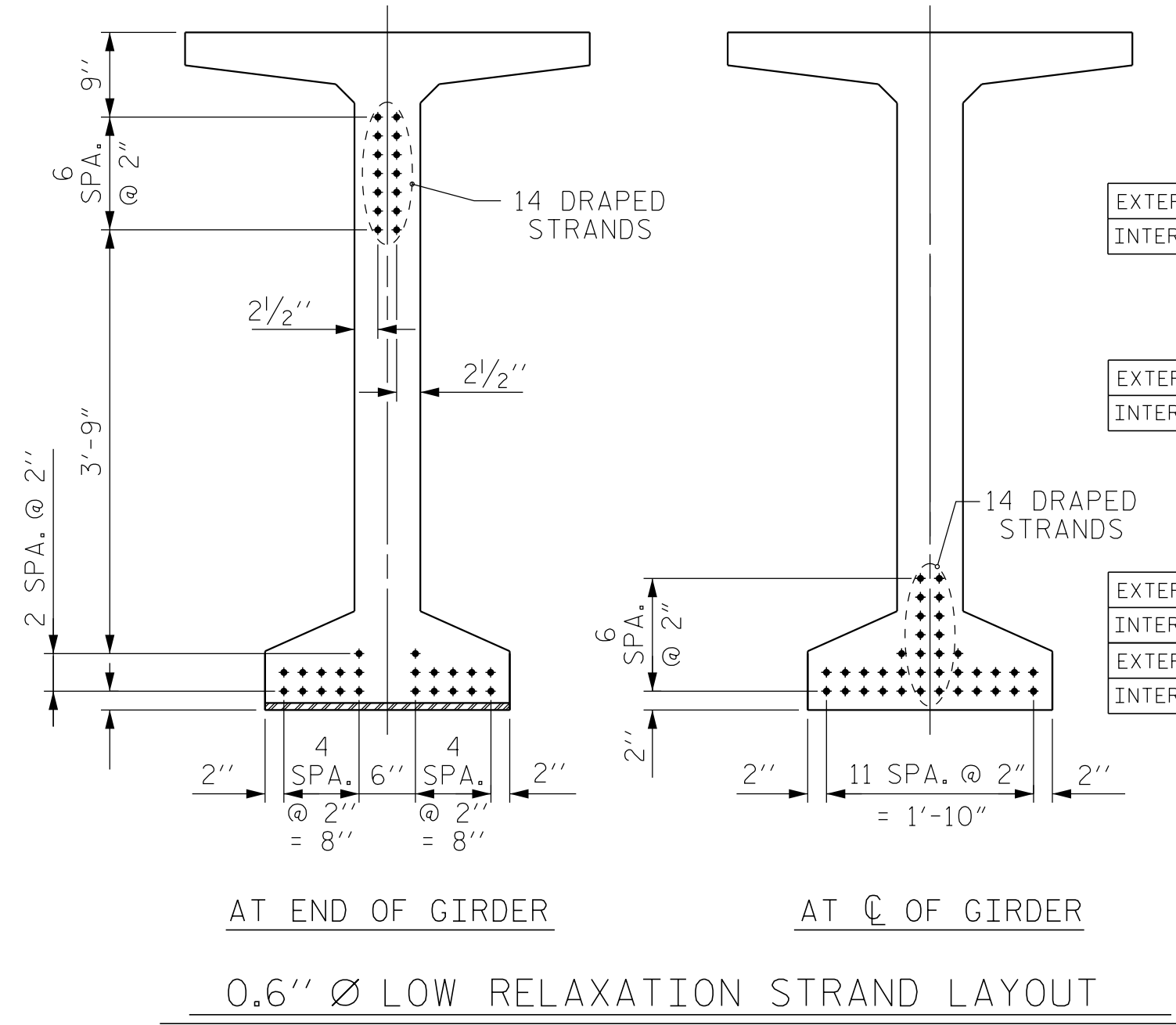
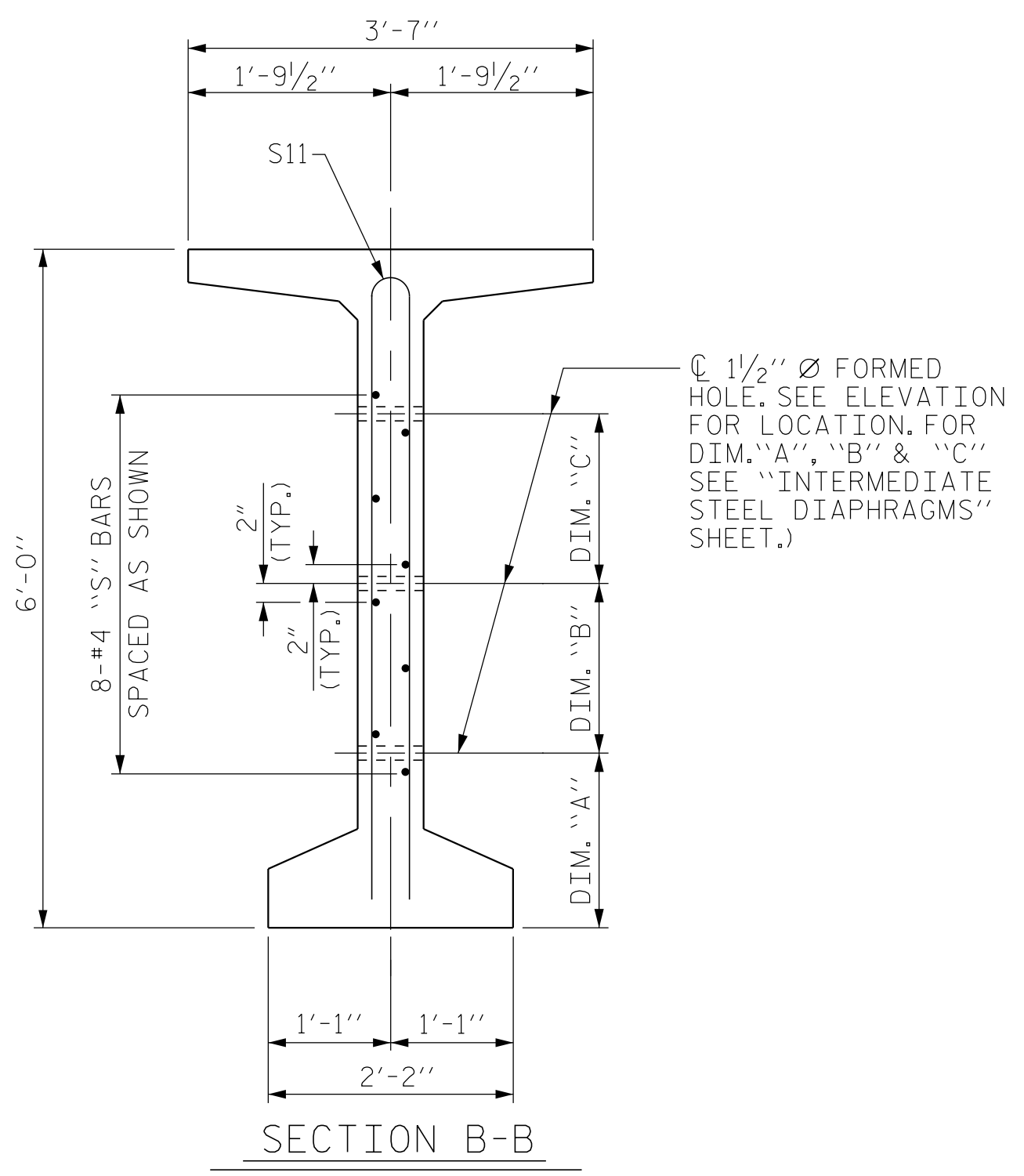
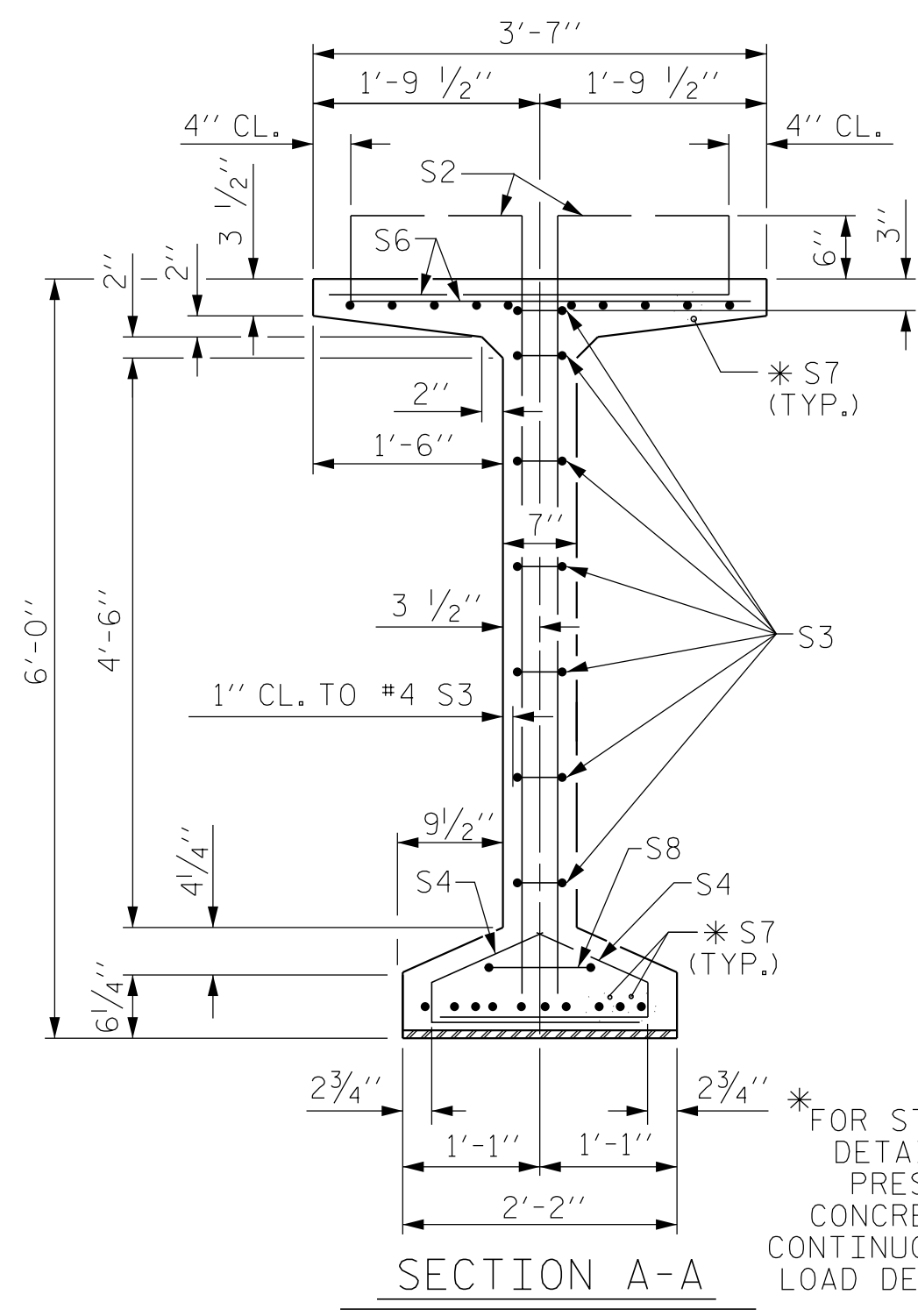
Prepared in the Office of:

**Mattern & Craig**  
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 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

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 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



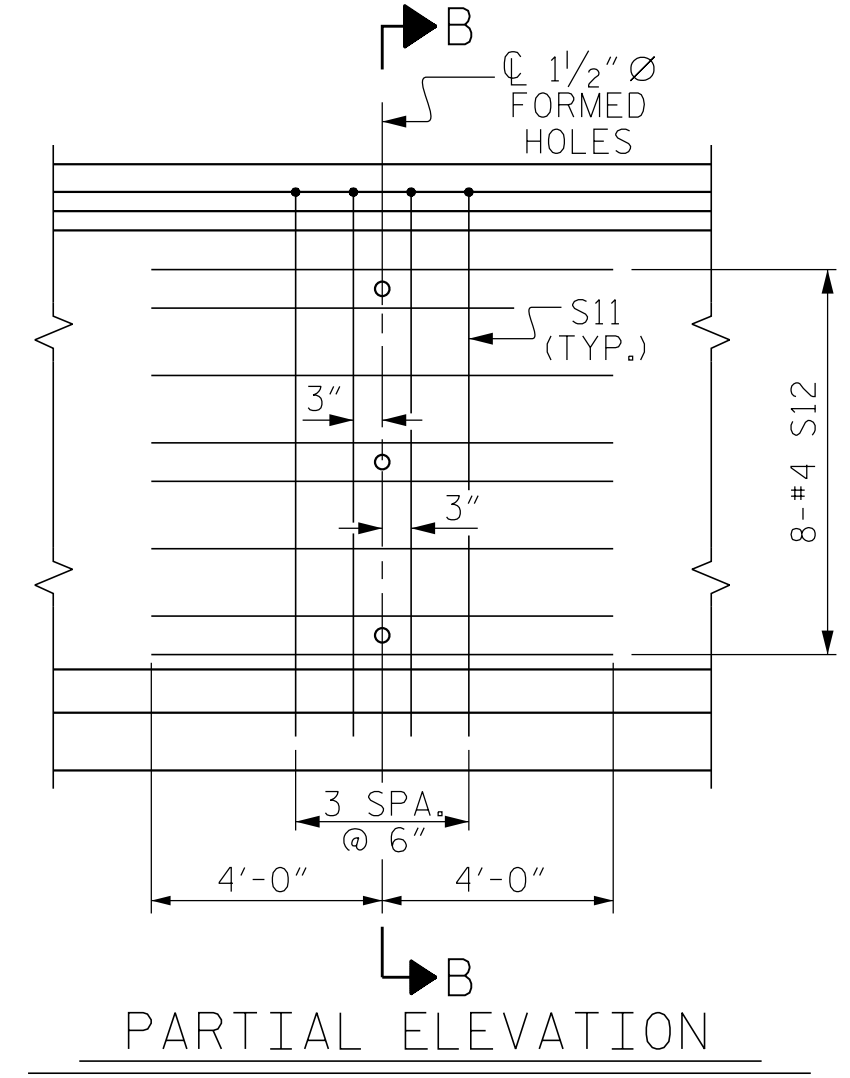
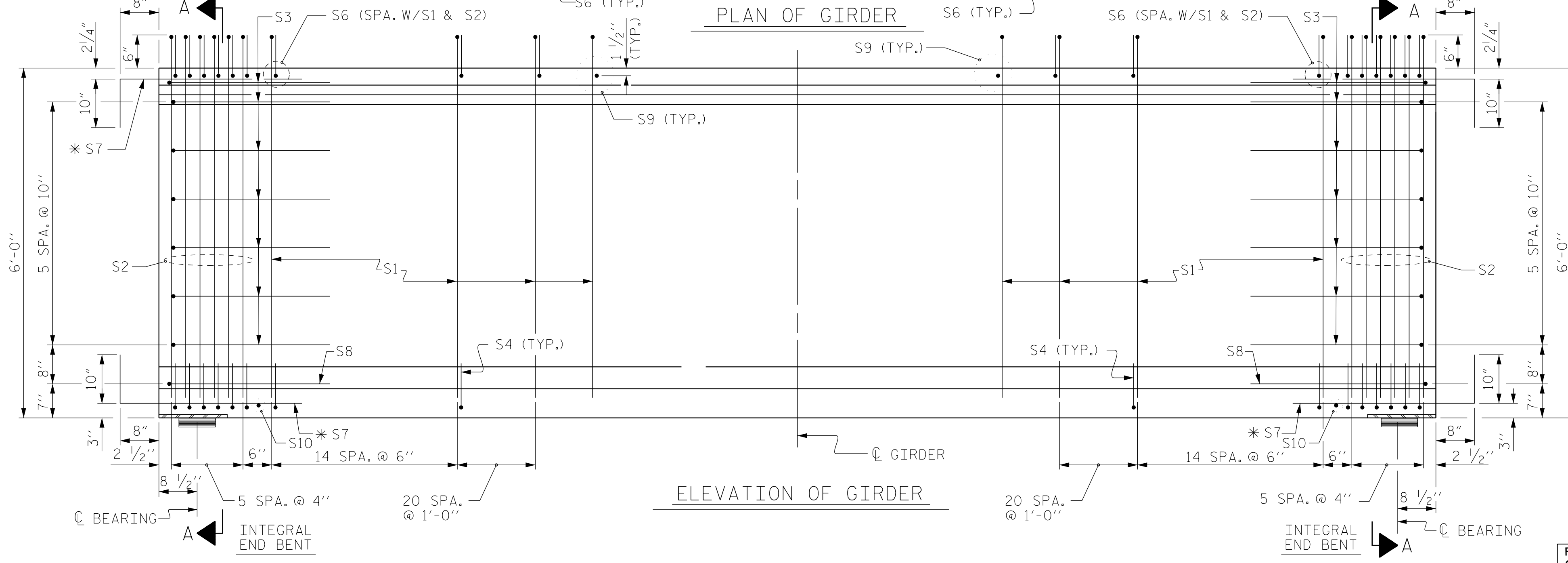
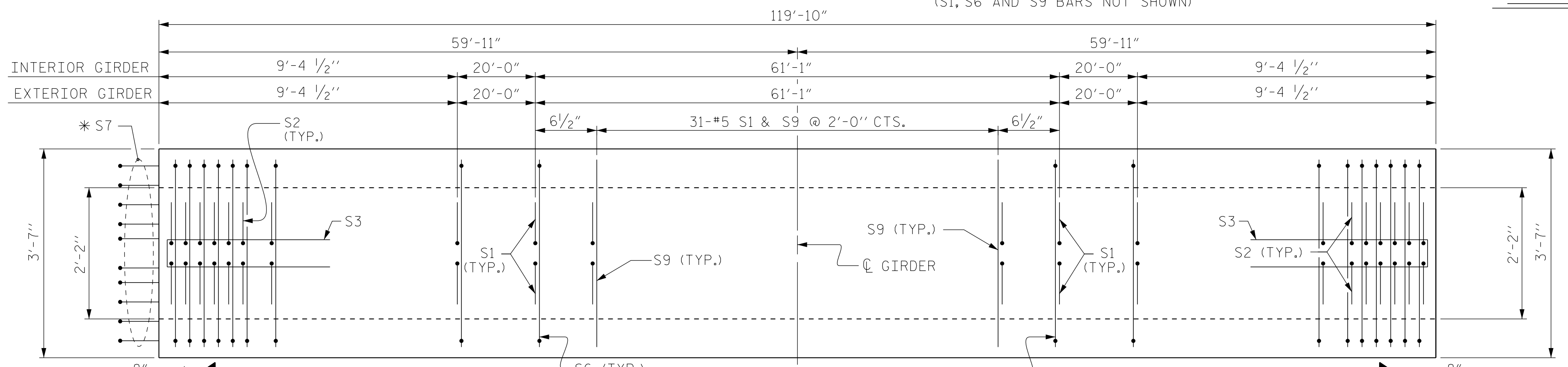
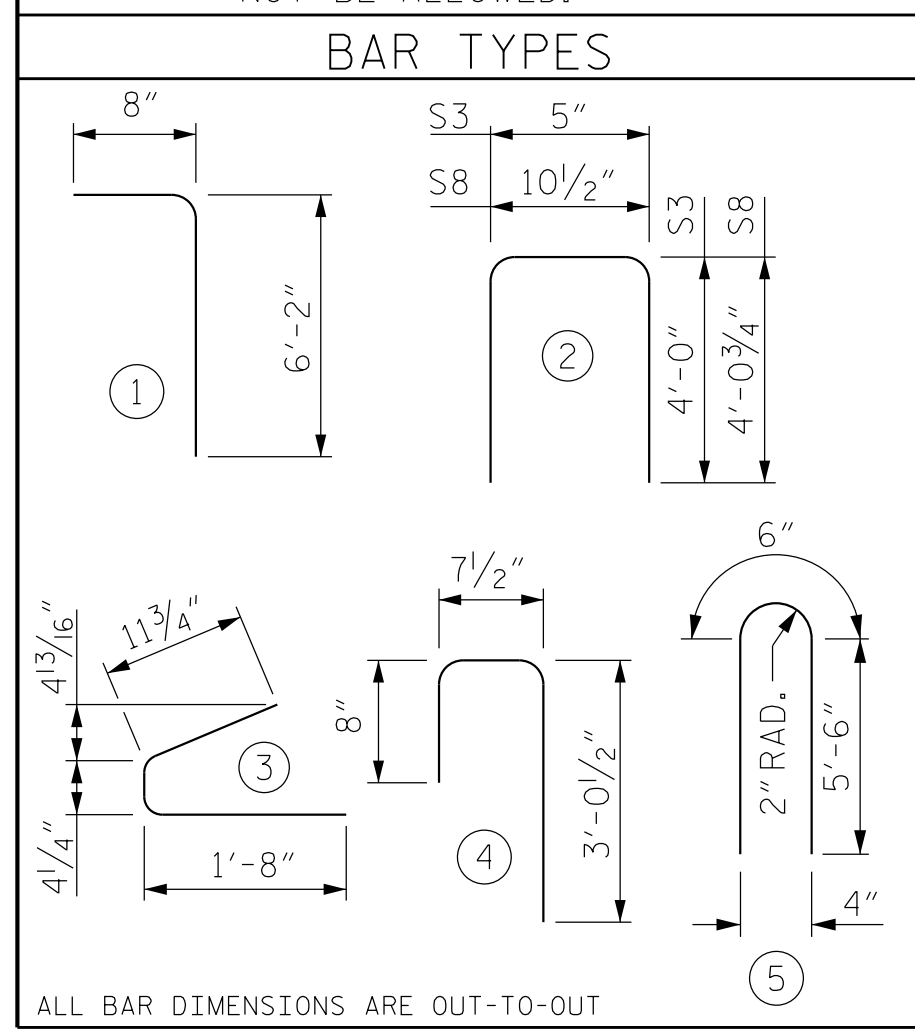


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
EXTERIOR GDR. S1	202	#4	1	6'-10"	922
INTERIOR GDR. S1	202	#4	1	6'-10"	922
S2	24	#5	1	6'-10"	171
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
EXTERIOR GDR. S6	164	#5	4	4'-4"	741
INTERIOR GDR. S6	164	#5	4	4'-4"	741
* S7	40	#5	STR	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	31	#5	STR	3'-3"	105
S10	2	#3	STR	1'-10"	1
EXTERIOR GDR. S11	8	#5	5	11'-6"	96
INTERIOR GDR. S11	8	#5	5	11'-6"	96
EXTERIOR GDR. S12	16	#4	STR	8'-0"	86
INTERIOR GDR. S12	16	#4	STR	8'-0"	86

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



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL (LB.)	7,500 PSI CONCRETE (C.Y.)	0.6" Ø L.R. STRANDS (No.)
EXTERIOR GIRDER	2541	25.7	36
INTERIOR GIRDER	2541	25.7	36

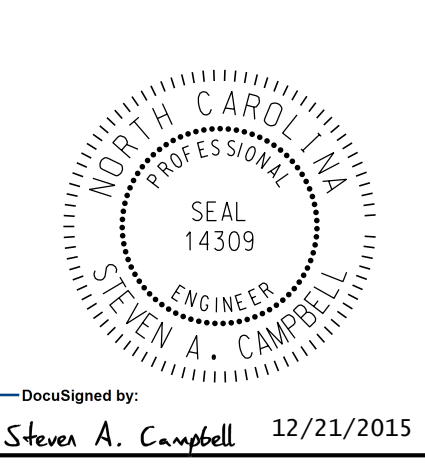
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
10	119'-10"	1198'-4"

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 72" PRESTRESSED CONCRETE  
 MODIFIED BULB TEE  
 CONTINUOUS FOR LIVE LOAD

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : EEM 2/6/97	REV. 10/1/11 MAA/GM
CHECKED BY : VAP 2/6/97	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

Prepared in the Office of:  
  
**Mattern & Craig**  
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 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4562



REVISIONS						SHEET NO. S-7
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 51
2			4			

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,500 PSI.

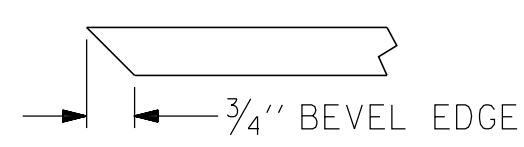
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

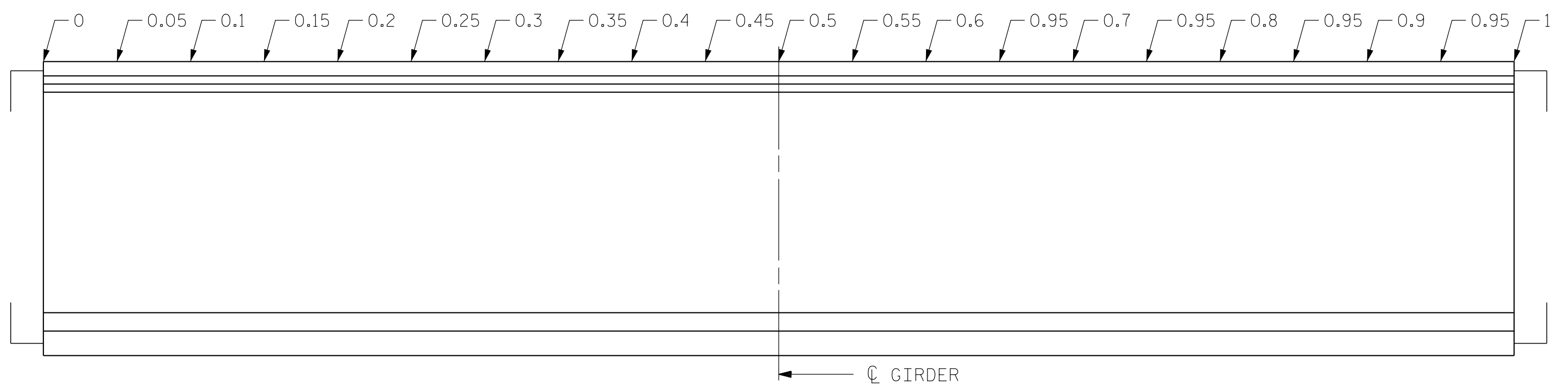
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

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.



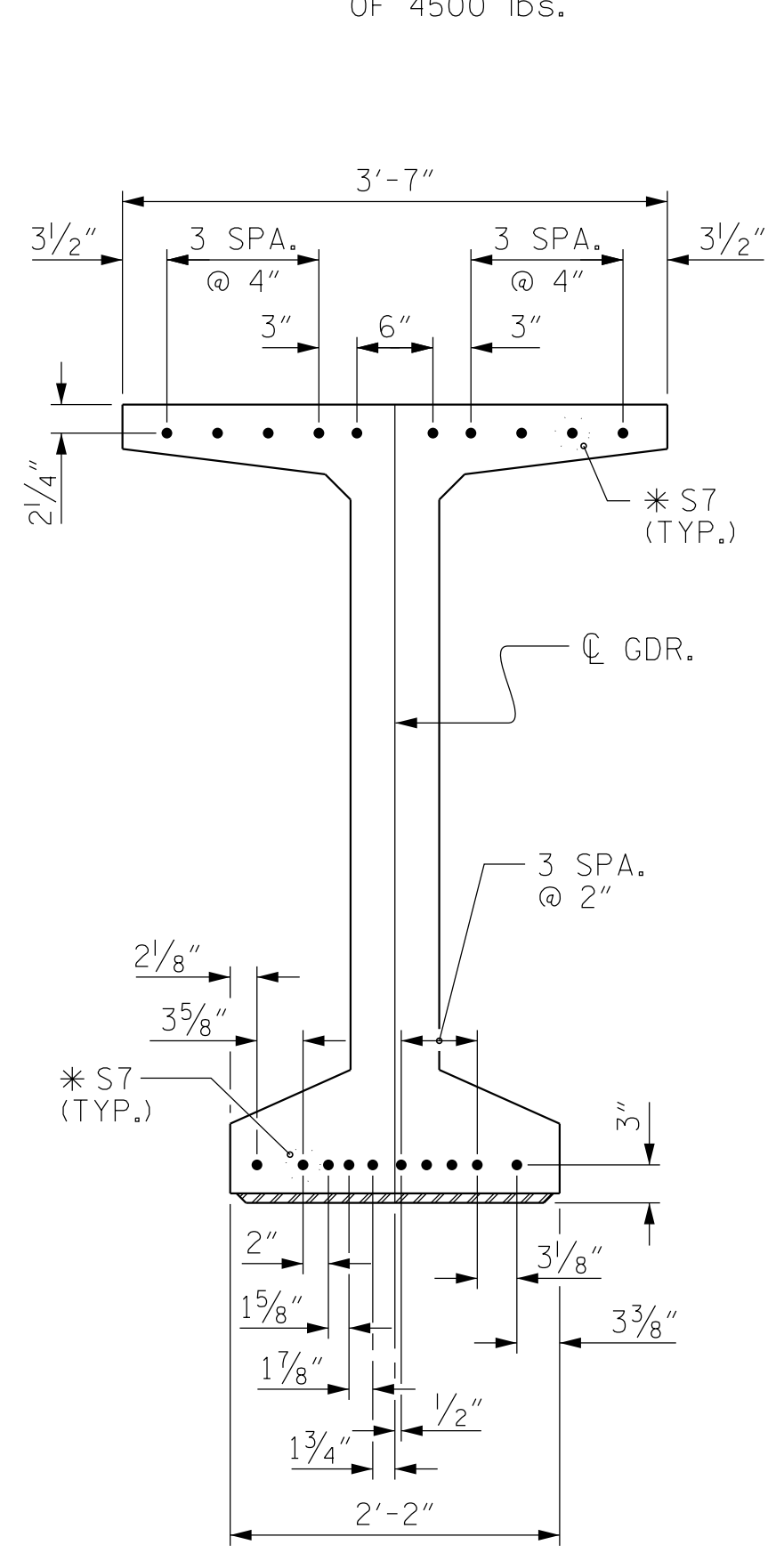
SECTION "F"  
(SEE NOTES)



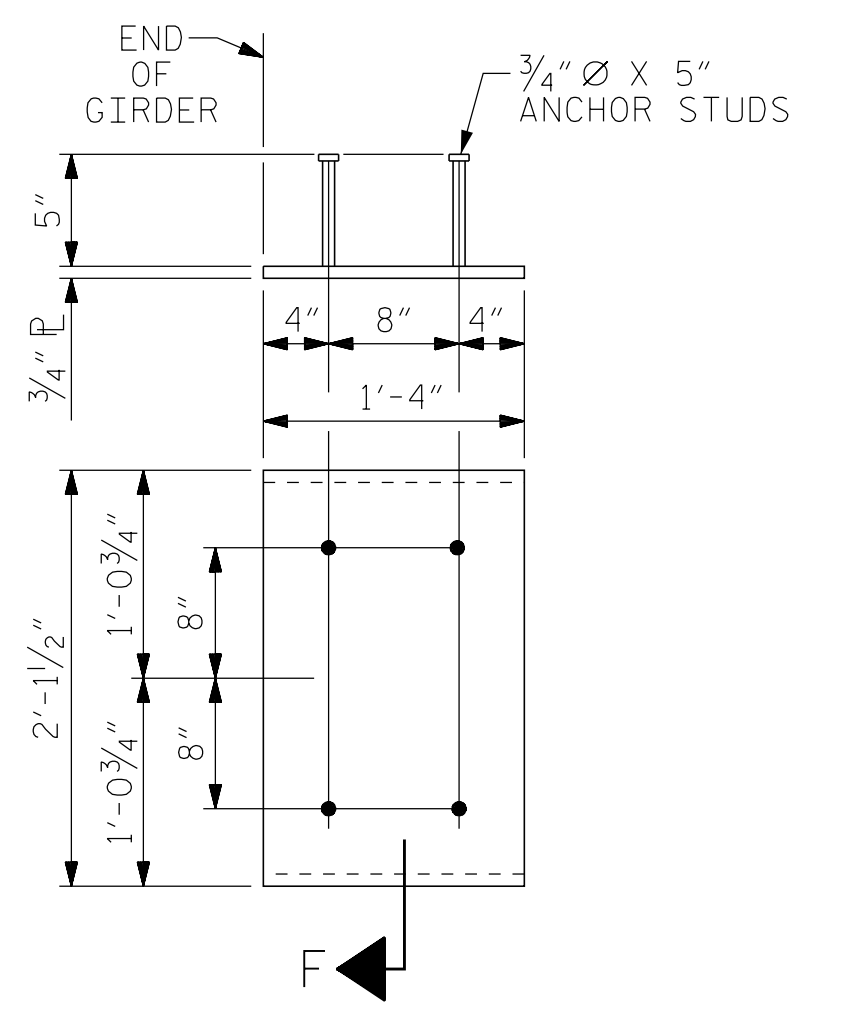
GIRDER DIAGRAM FOR D.L. DEFLECTION TABLE  
(SEE TABLE FOR GIRDERS)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION		GIRDERS 1 AND 10																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1
CAMBER ( GIRDER ALONE IN PLACE )		0.000	0.046	0.092	0.133	0.167	0.198	0.224	0.247	0.260	0.266	0.272	0.266	0.260	0.247	0.224	0.198	0.167	0.133	0.092	0.046	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.		0.000	0.020	0.040	0.058	0.075	0.090	0.103	0.114	0.121	0.124	0.127	0.124	0.121	0.114	0.103	0.090	0.075	0.058	0.040	0.020	0.000
FINAL CAMBER		0	5/16	9/16	13/16	1	13/16	13/8	1 1/2	19/16	19/16	15/8	19/16	19/16	1 1/2	13/8	13/16	1	13/16	9/16	5/16	0
0.6" Ø LOW RELAXATION		GIRDERS 2 AND 9																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1
CAMBER ( GIRDER ALONE IN PLACE )		0.000	0.046	0.092	0.133	0.167	0.198	0.224	0.247	0.260	0.266	0.272	0.266	0.260	0.247	0.224	0.198	0.167	0.133	0.092	0.046	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.		0.000	0.020	0.040	0.058	0.075	0.090	0.103	0.114	0.121	0.124	0.127	0.124	0.121	0.114	0.103	0.090	0.075	0.058	0.040	0.020	0.000
FINAL CAMBER		0	5/16	9/16	13/16	1	13/16	13/8	1 1/2	19/16	19/16	15/8	19/16	19/16	1 1/2	13/8	13/16	1	13/16	9/16	5/16	0
0.6" Ø LOW RELAXATION		GIRDERS 3 AND 8																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1
CAMBER ( GIRDER ALONE IN PLACE )		0.000	0.046	0.092	0.133	0.167	0.198	0.224	0.247	0.260	0.266	0.272	0.266	0.260	0.247	0.224	0.198	0.167	0.133	0.092	0.046	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.		0.000	0.021	0.043	0.063	0.081	0.097	0.111	0.123	0.130	0.133	0.137	0.133	0.130	0.123	0.111	0.097	0.081	0.063	0.043	0.021	0.000
FINAL CAMBER		0	5/16	9/16	3/4	15/16	1 1/8	1 1/4	1 3/8	1 7/16	1 7/16	1 1/2	1 7/16	1 7/16	1 3/8	1 1/4	1 1/8	15/16	3/4	9/16	5/16	0
0.6" Ø LOW RELAXATION		GIRDERS 4 AND 7																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1
CAMBER ( GIRDER ALONE IN PLACE )		0.000	0.046	0.092	0.133	0.167	0.198	0.224	0.247	0.260	0.266	0.272	0.266	0.260	0.247	0.224	0.198	0.167	0.133	0.092	0.046	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.		0.000	0.021	0.043	0.063	0.081	0.097	0.111	0.123	0.130	0.133	0.137	0.133	0.130	0.123	0.111	0.097	0.081	0.063	0.043	0.021	0.000
FINAL CAMBER		0	5/16	9/16	3/4	15/16	1 1/8	1 1/4	1 3/8	1 7/16	1 7/16	1 1/2	1 7/16	1 7/16	1 3/8	1 1/4	1 1/8	15/16	3/4	9/16	5/16	0
0.6" Ø LOW RELAXATION		GIRDERS 5 AND 6																				
TWENTIETH POINTS		0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	1
CAMBER ( GIRDER ALONE IN PLACE )		0.000	0.046	0.092	0.133	0.167	0.198	0.224	0.247	0.260	0.266	0.272	0.266	0.260	0.247	0.224	0.198	0.167	0.133	0.092	0.046	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.		0.000	0.021	0.043	0.063	0.081	0.097	0.111	0.123	0.130	0.133	0.137	0.133	0.130	0.123	0.111	0.097	0.081	0.063	0.043	0.021	0.000
FINAL CAMBER		0	5/16	9/16	3/4	15/16	1 1/8	1 1/4	1 3/8	1 7/16	1 7/16	1 1/2	1 7/16	1 7/16	1 3/8	1 1/4	1 1/8	15/16	3/4	9/16	5/16	0

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



DETAIL "C"  
(FOR 63" & 72" MODIFIED BULB TEES)



EMBEDDED PLATE "B-1" DETAILS  
FOR AASHTO TYPE IV GIRDER AND  
63" & 72" MODIFIED BULB TEES  
(2 REQ'D PER GIRDER)

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

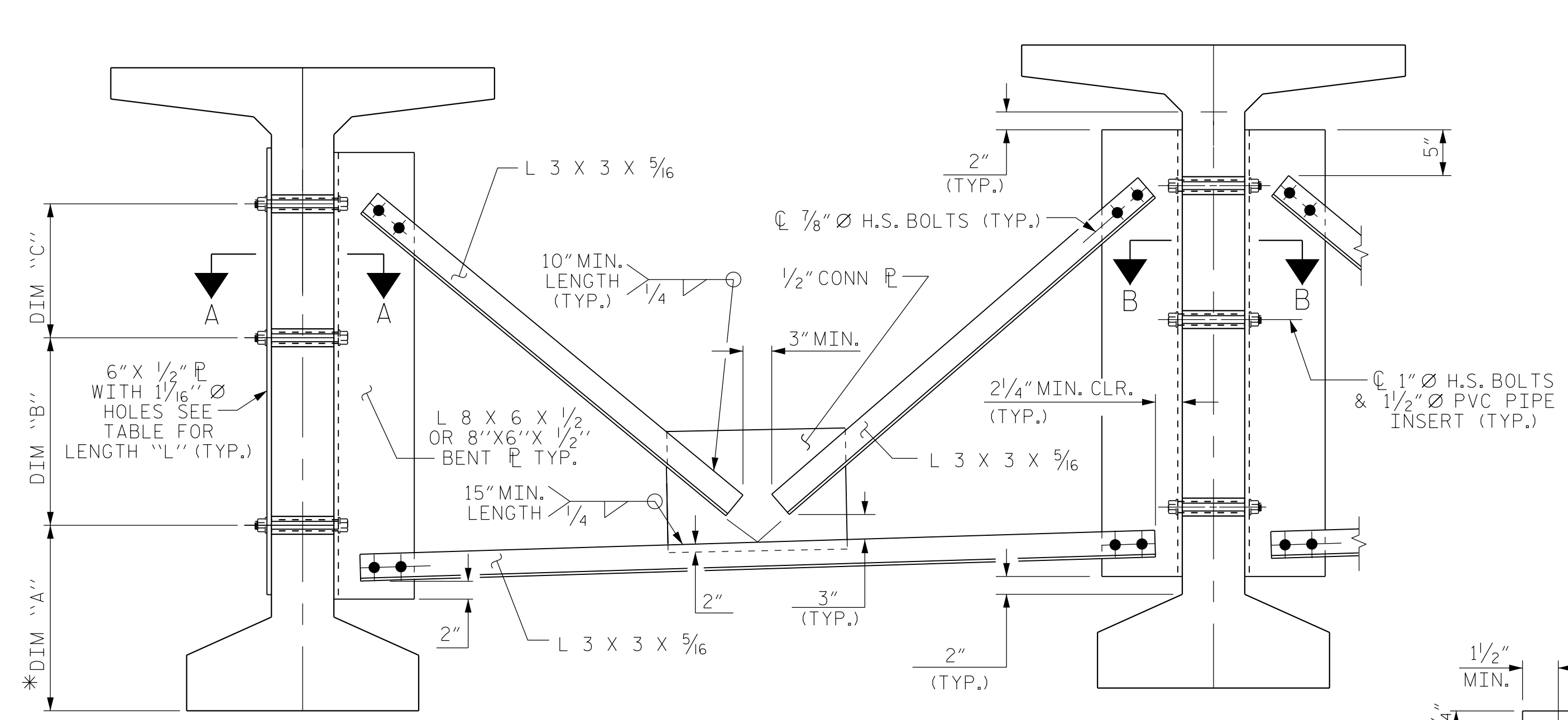
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
DETAILS

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	ELR 11/91	REV. 10/1/11	MAA/CM
CHECKED BY :	GRP 11/91	REV. 1/15	MAA/TMG
		REV. 2/15	MAA/TMG

Prepared in the Office of:  
**Mattern & Craig**  
CONSULTING ENGINEERS - SURVEYORS  
FIRM LICENSE NO. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 - FAX (828) 254-4562

Professional Engineer Seal for Steven A. Campbell, License No. 14309, State of North Carolina.

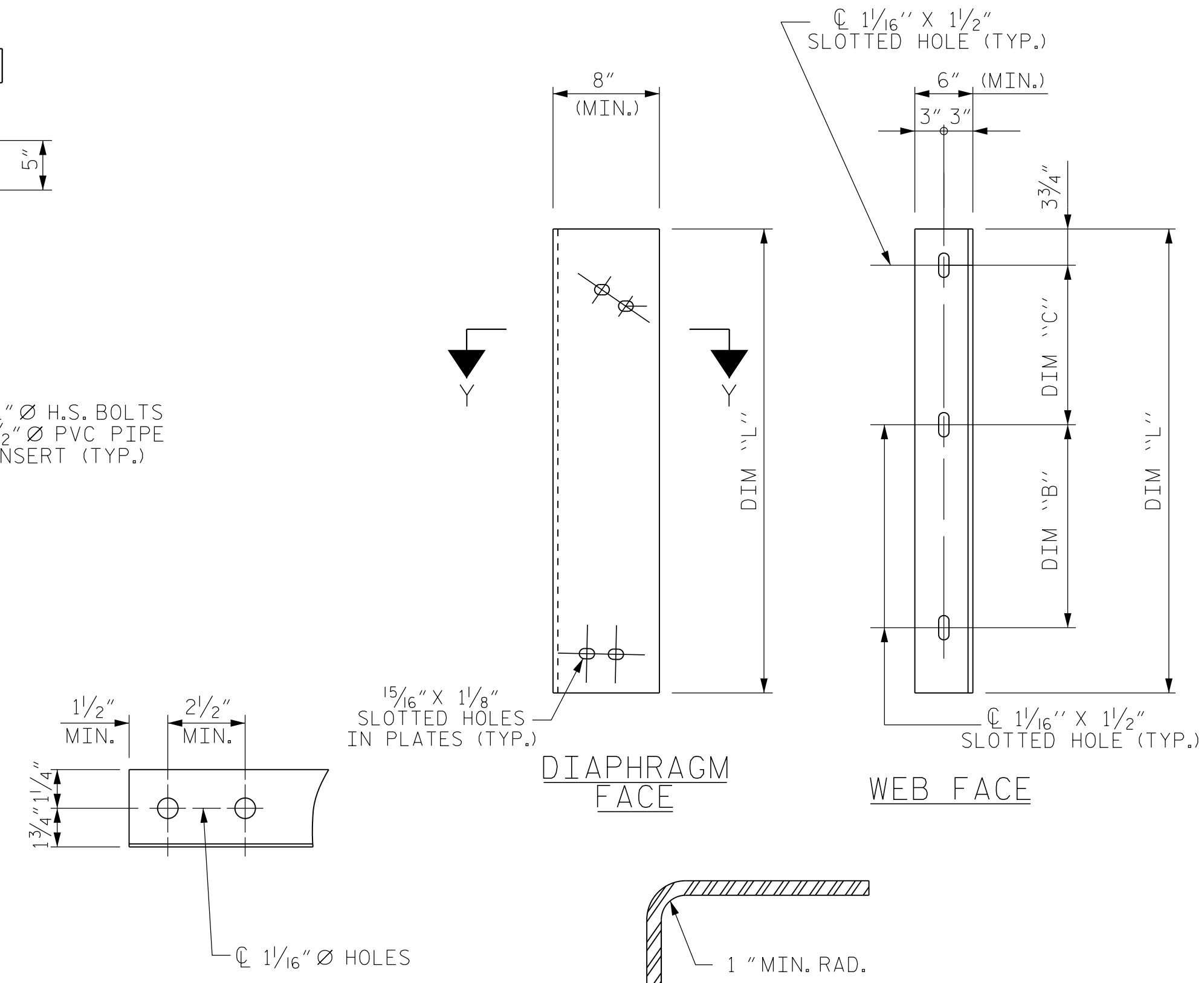
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			51



**EXTERIOR GIRDER**                      **INTERIOR GIRDER**

**PART SECTION AT INTERMEDIATE DIAPHRAGM**  
(63" BULB TEE OR 72" BULB TEE GIRDER SHOWN)

\*DIM "A" IS BASED ON INTERMEDIATE DIAPHRAGMS LOCATED 40'-0" FROM THE END OF THE GIRDER AND THE STRANDS FOLLOWING THE PATTERN SHOWN ON SHEET S-7. PRECASTER TO VERIFY DIM "A".



**ANGLE END**  
(L 3 x 3 x 5/16)

**SECTION Y-Y**  
1" MIN. RAD.

**CONNECTOR PLATE DETAIL**

**STRUCTURAL STEEL NOTES**

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE 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, 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.

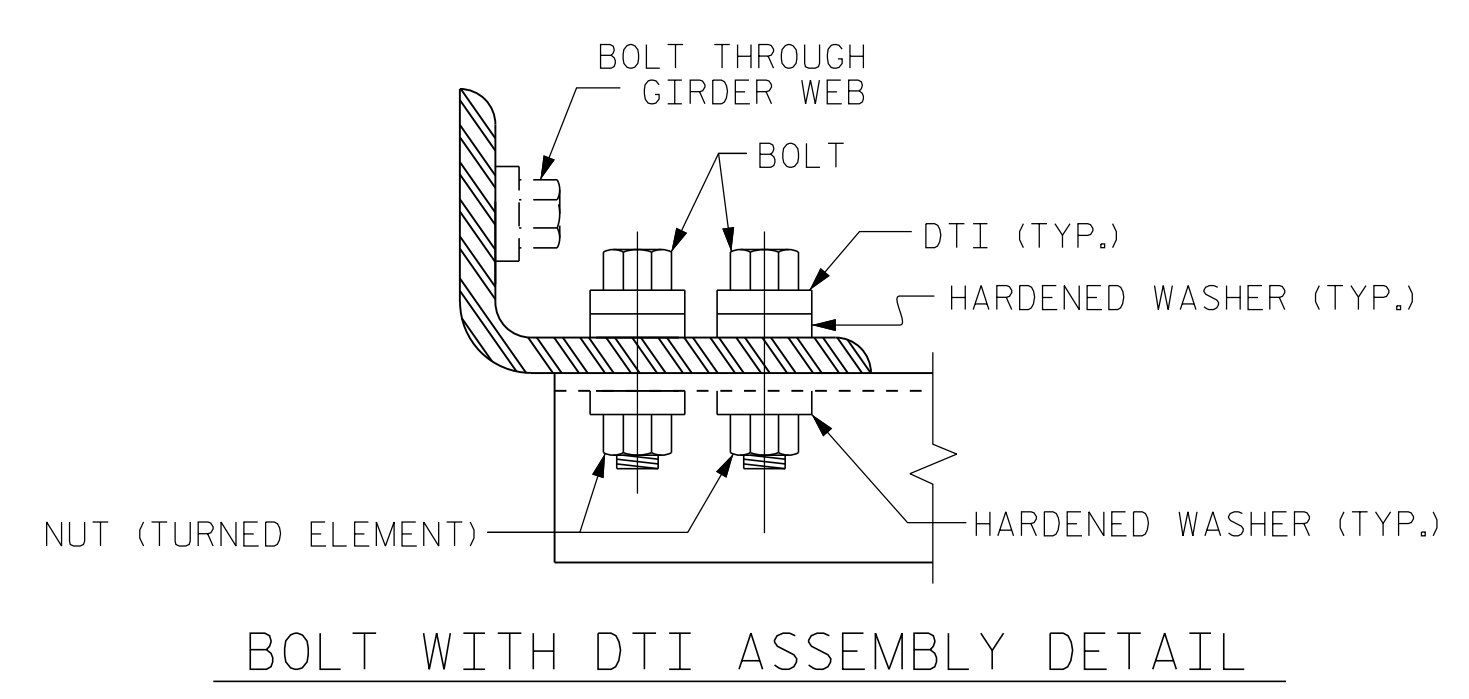
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

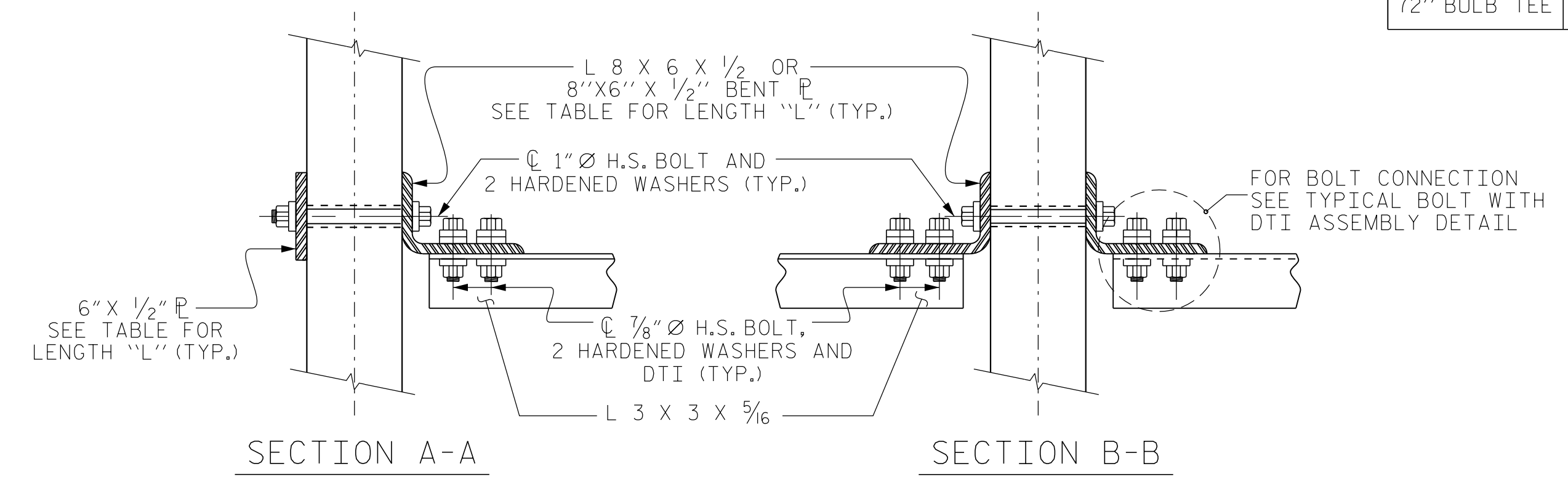
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

**TABLE**

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	2'-2"	1'-4 3/8"	1'-4 3/8"	4'-2"



**BOLT WITH DTI ASSEMBLY DETAIL**



**SECTION A-A**                      **SECTION B-B**

**CONNECTION DETAILS**

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : RWW 11/09	ADDED 11/23/09R
CHECKED BY : GM 11/09	REV. 10/1/11 MAA/GM

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

Prepared in the Office of:

**Mattern & Craig**  
 CONSULTING ENGINEERS & SURVEYORS  
 FIRM LICENSE No. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

DocuSigned by:  
**Steven A. Campbell** 12/21/2015

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 63" & 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

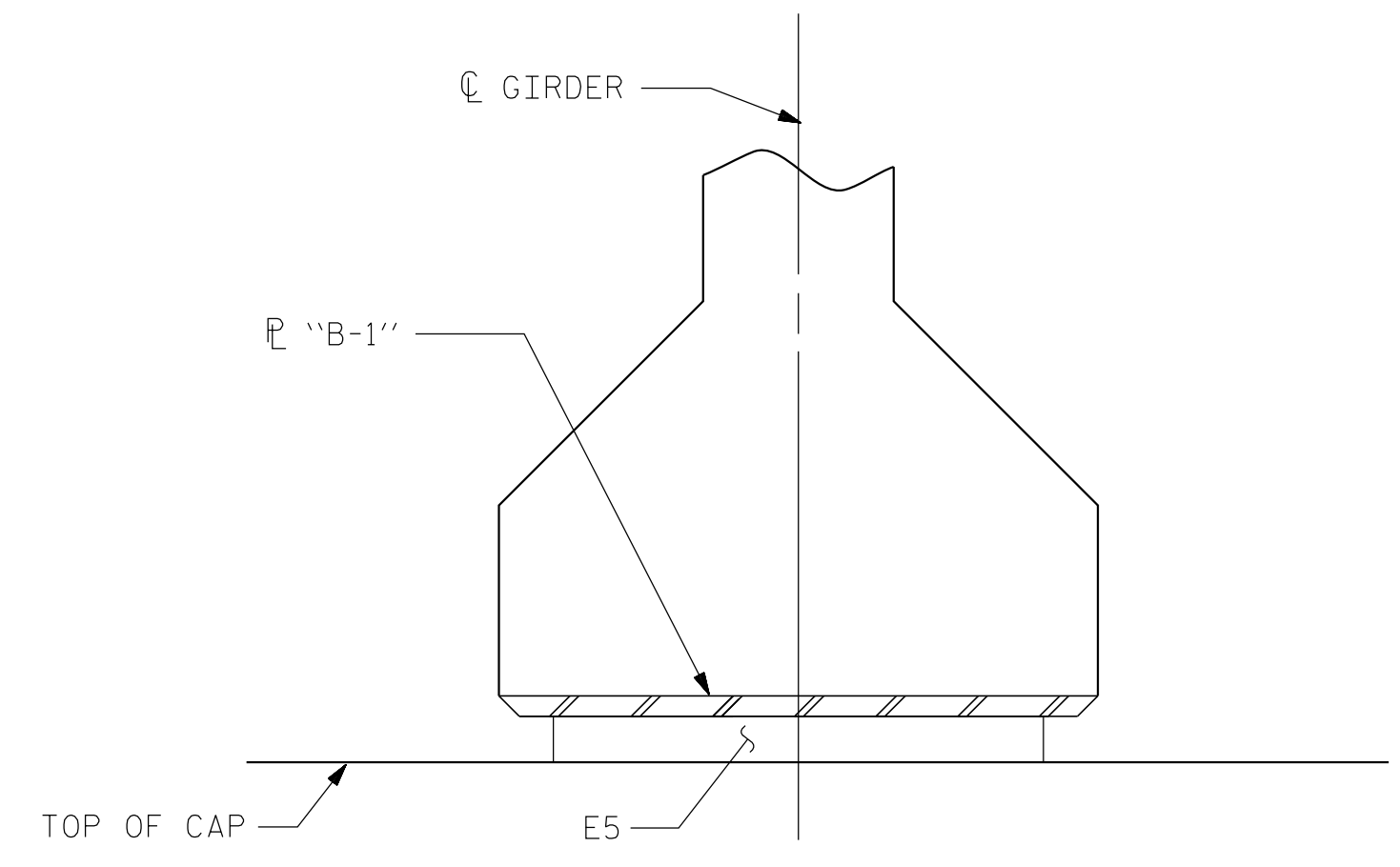
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			51

NOTES

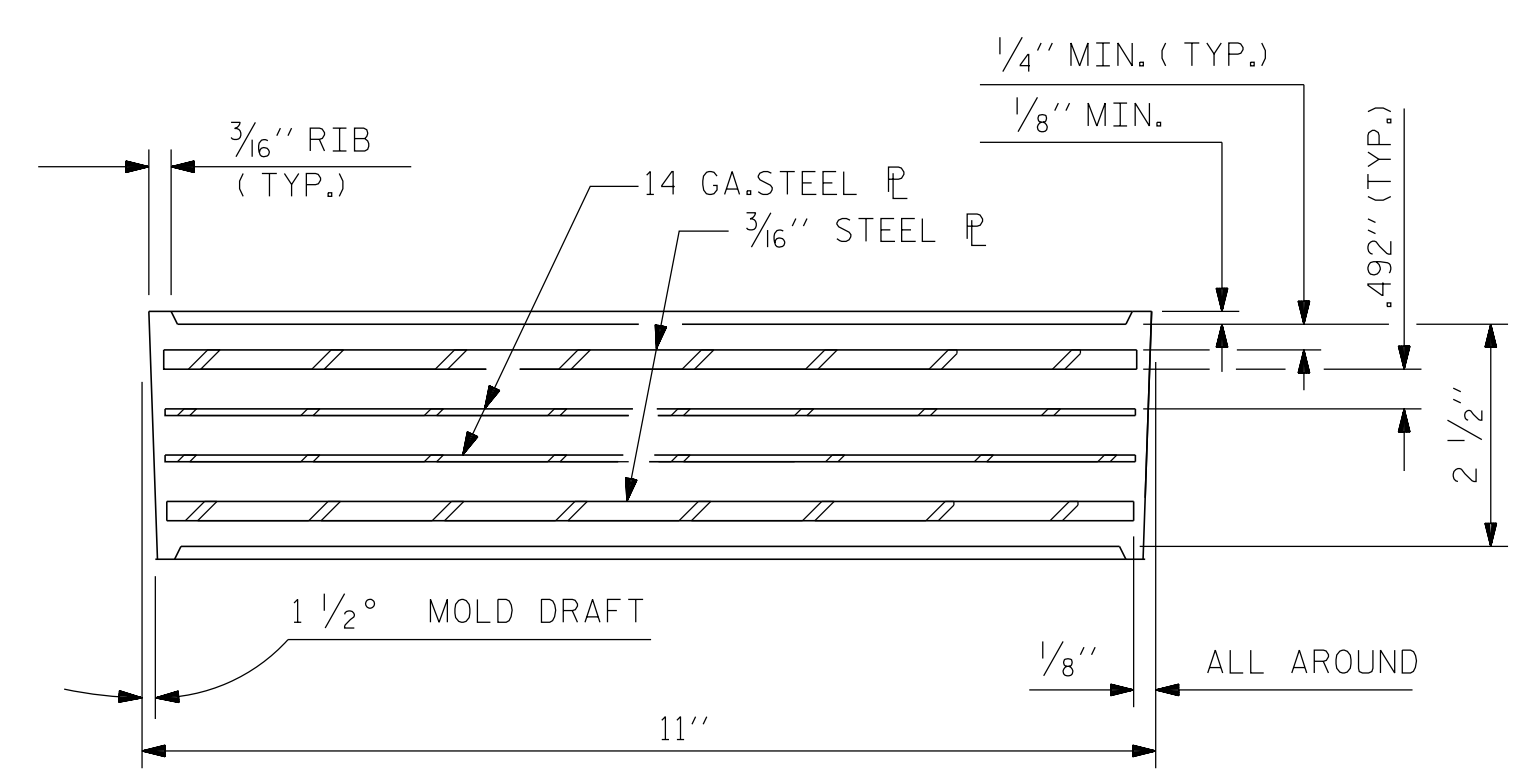
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

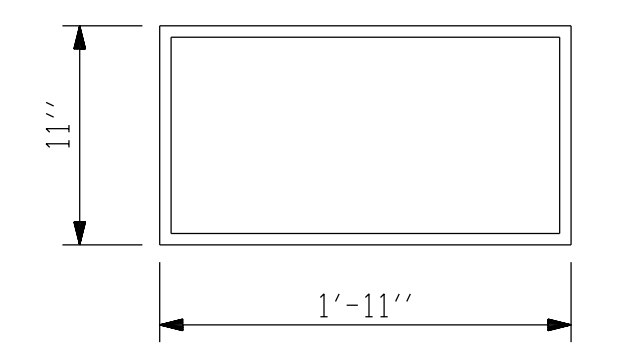
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E5 (20 REQ'D )  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE VI

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k
TYPE VI	420 k
TYPE VII	470 k

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

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

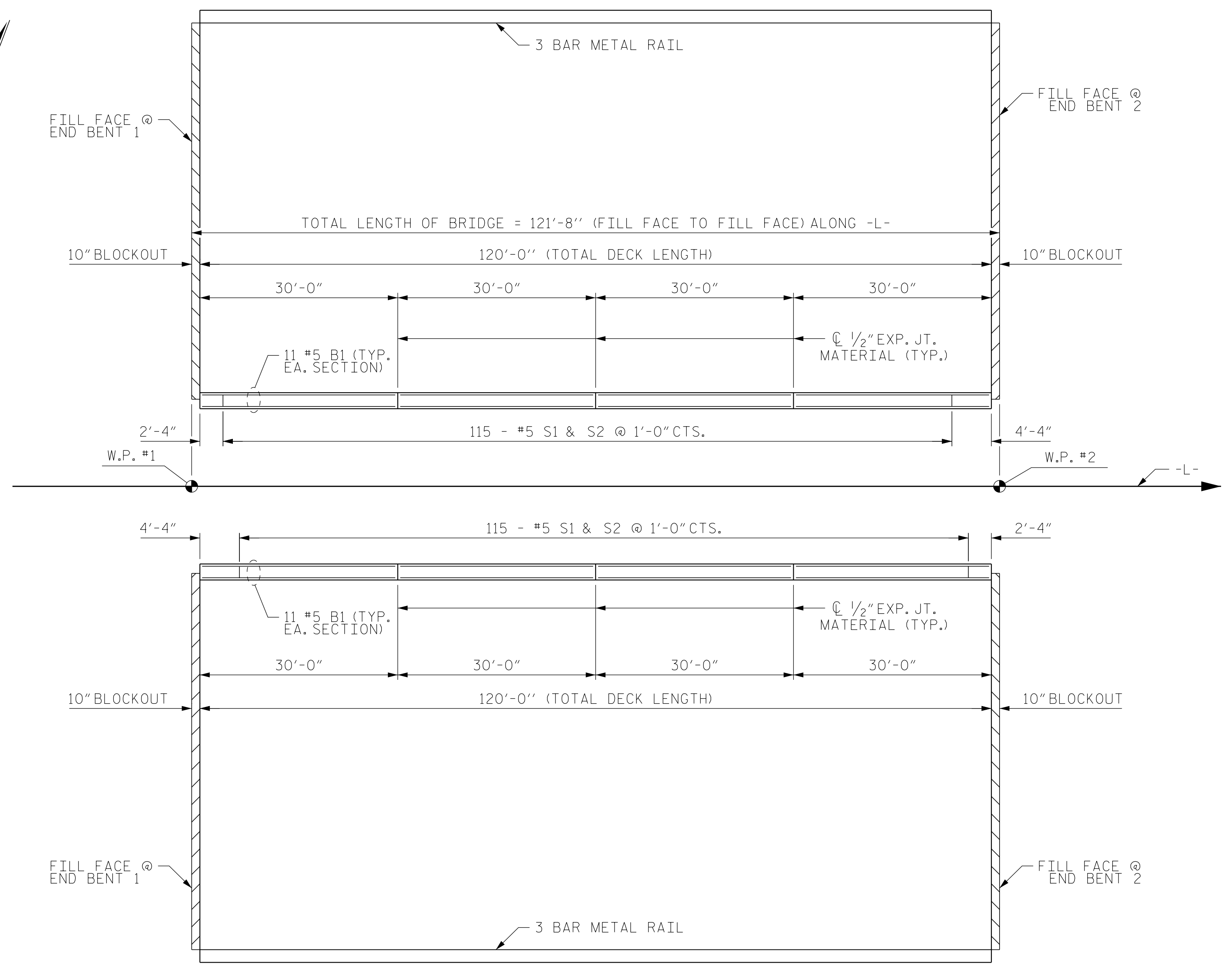
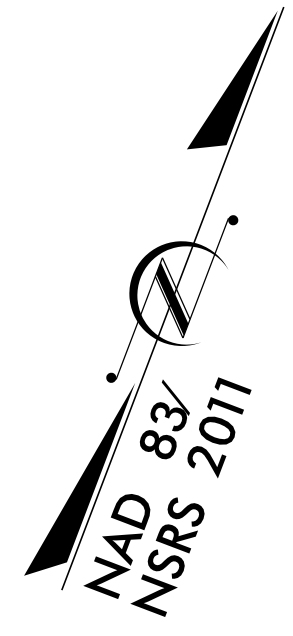
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CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	EEM 2/97	REV. 5/11/06	TLA/GM
CHECKED BY :	VAP 2/97	REV. 10/1/11	MAA/GM
		REV. 6/13	AAC/MAA

Prepared in the Office of:

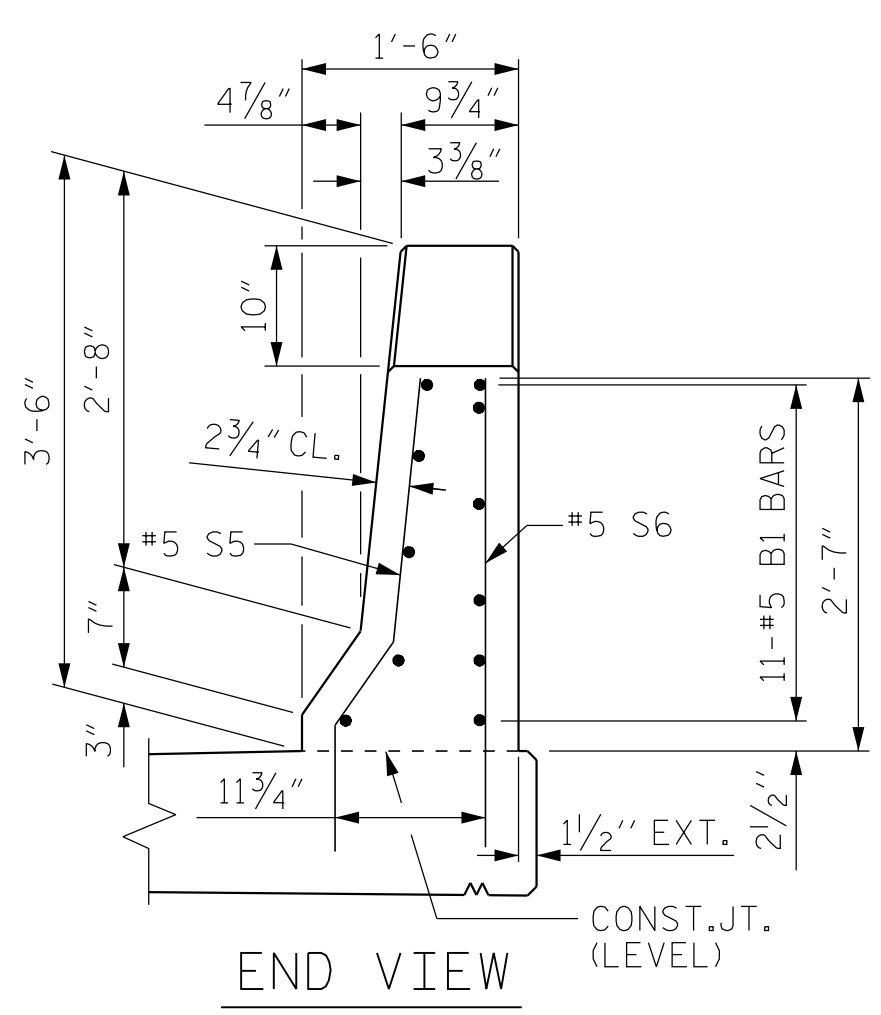
**Mattern & Craig**  
CONSULTING ENGINEERS + SURVEYORS  
FIRM LICENSE NO. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 - FAX (828) 254-4562

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			51

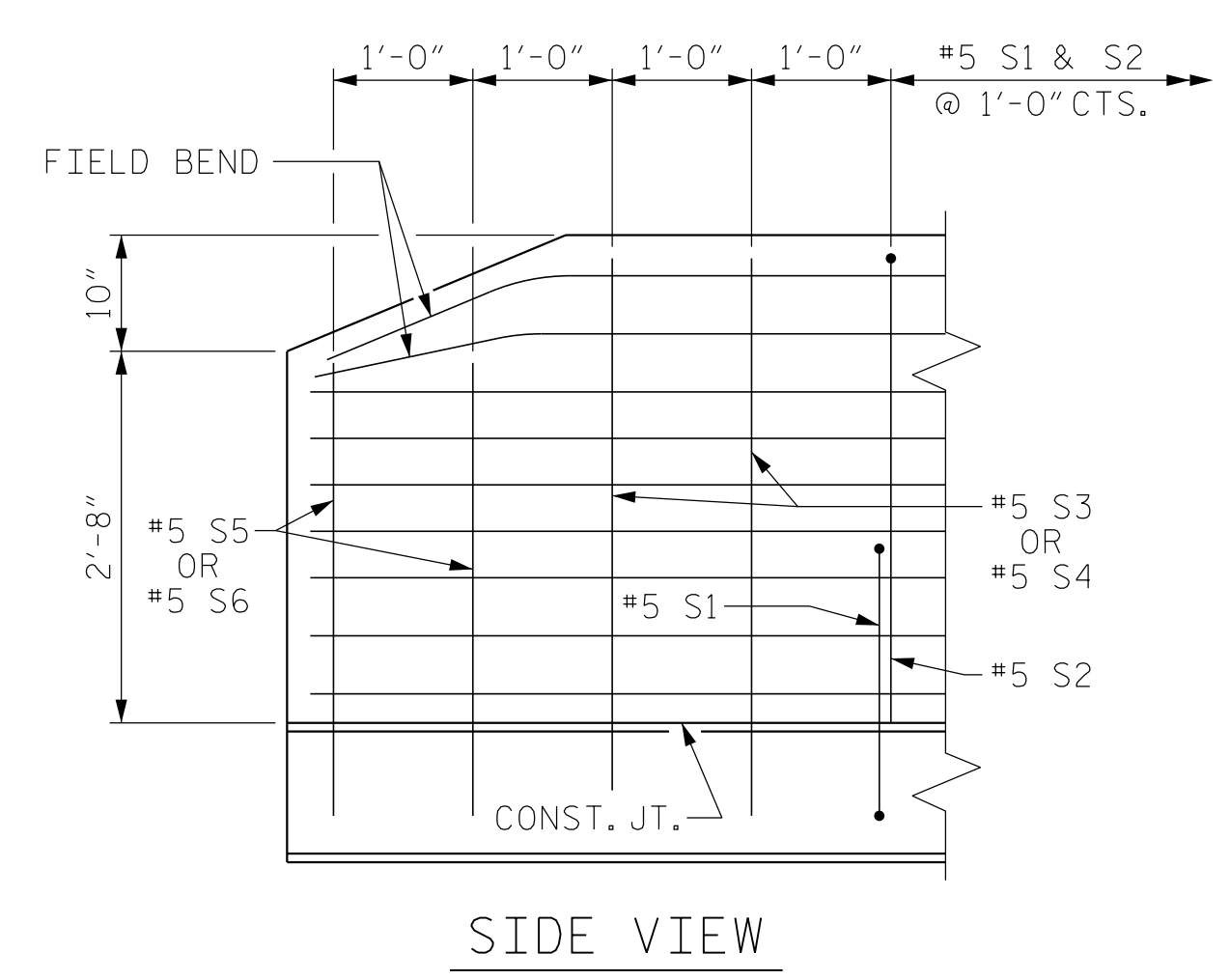
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\*\*\*\*\*DCN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*



PLAN

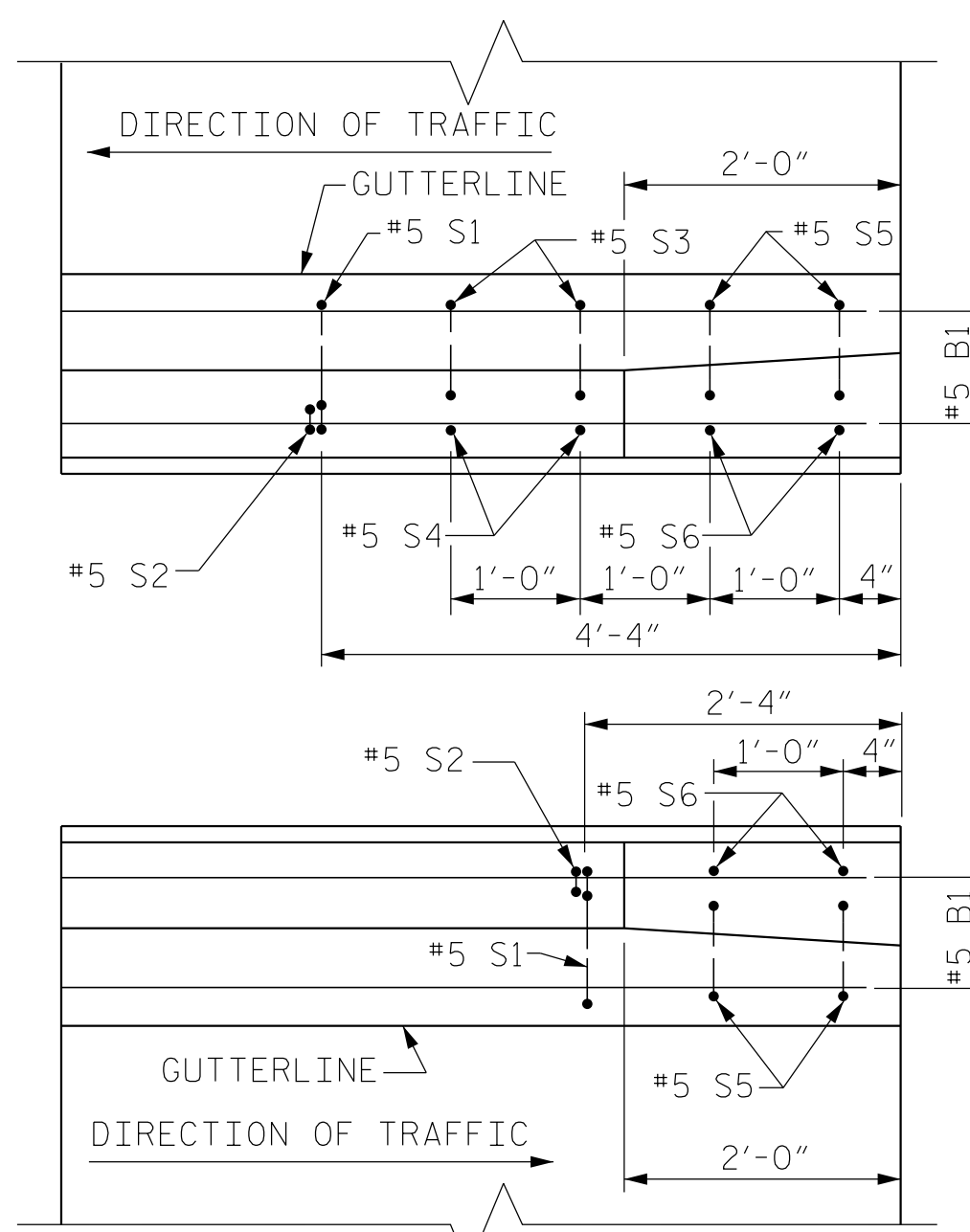


END VIEW

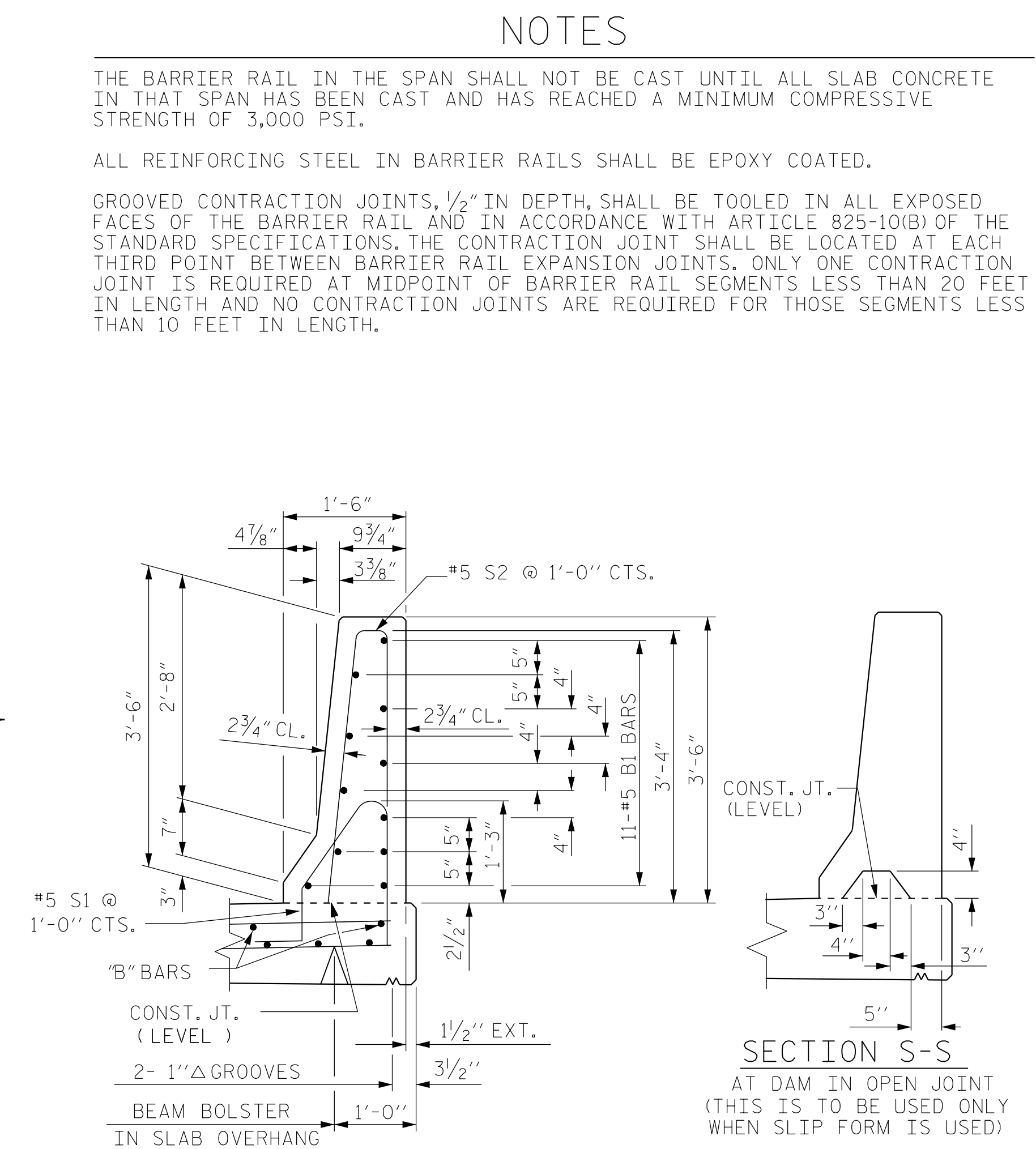


SIDE VIEW

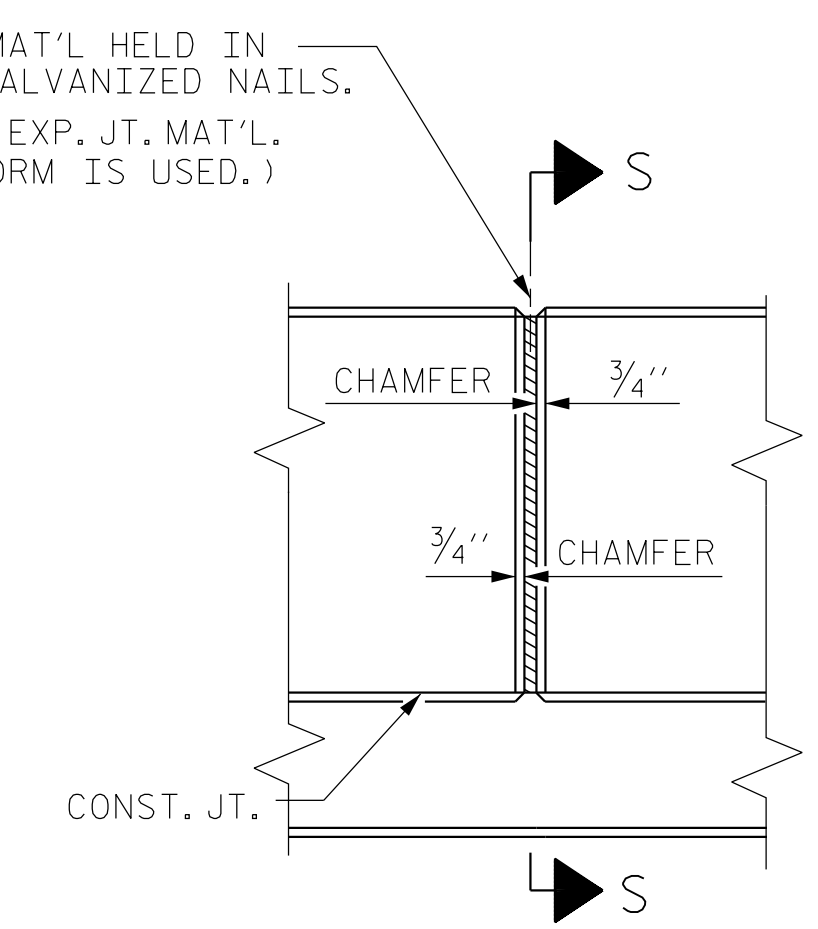
END OF RAIL DETAILS



PLAN



SECTION THRU RAIL



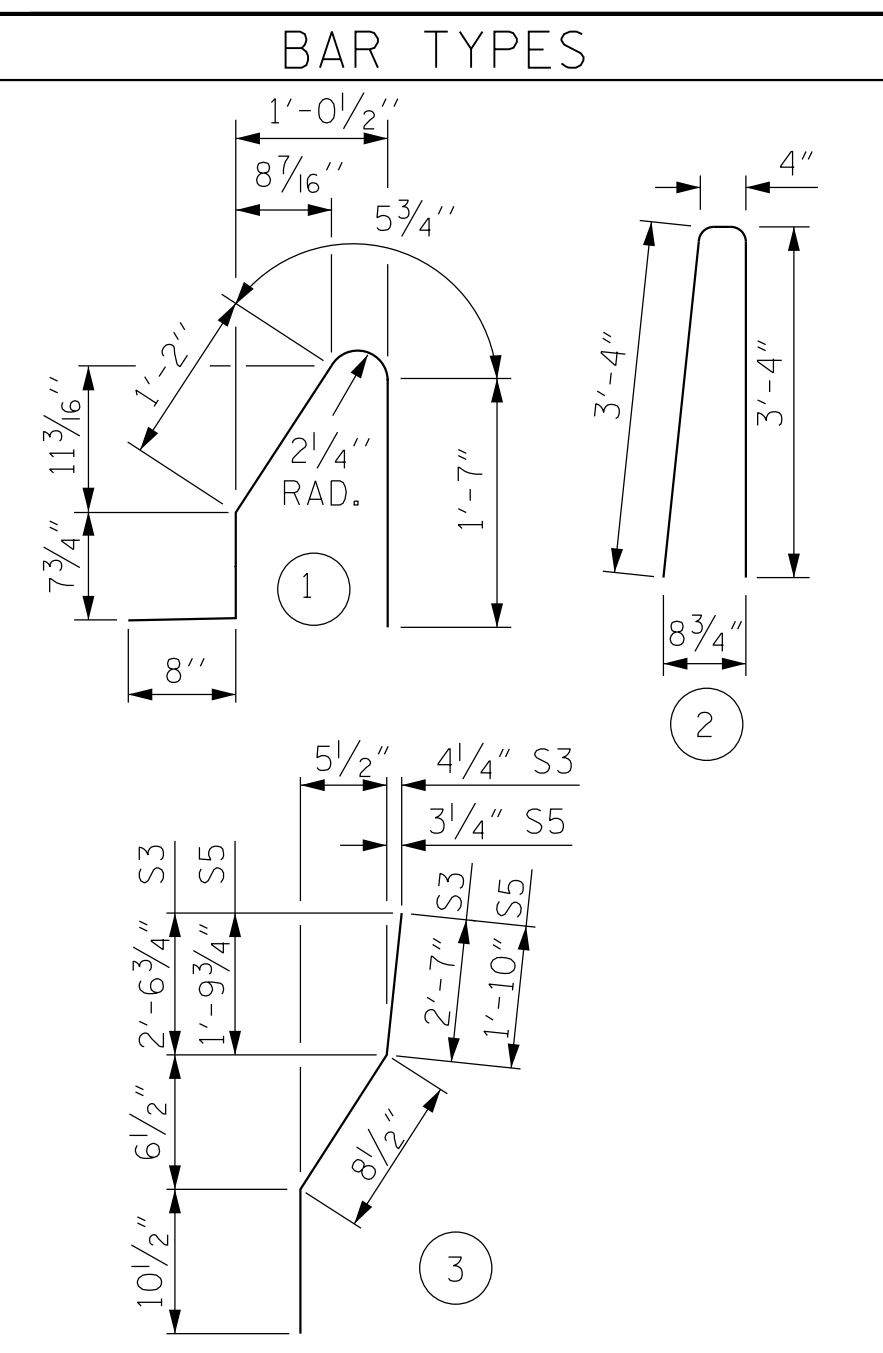
ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	230	#5	1	4'-7"	1101
* S2	230	#5	2	7'-0"	1681
* S3	4	#5	3	4'-2"	18
* S4	4	#5	STR	4'-0"	17
* S5	8	#5	3	3'-5"	29
* S6	8	#5	STR	3'-3"	28
* B1	88	#5	STR	29'-8"	2725
* EPOXY COATED REINFORCING STEEL				5,599	LBS.
CLASS AA CONCRETE				33	CU. YDS.
CONCRETE BARRIER RAIL				240	LIN. FT.

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	ARB 5/87	REV. 10/11/11	MAA/GM
CHECKED BY :	SJD 9/87	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

\*\*\*\*\*SYSTEM\*\*\*\*\*  
\*\*\*\*\*DON\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

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(828) 254-2201 - FAX (828) 254-4562

DocuSigned by:  
**Steven A. Campbell** 12/21/2015

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

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

SHEET NO.	S-11
TOTAL SHEETS	51

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

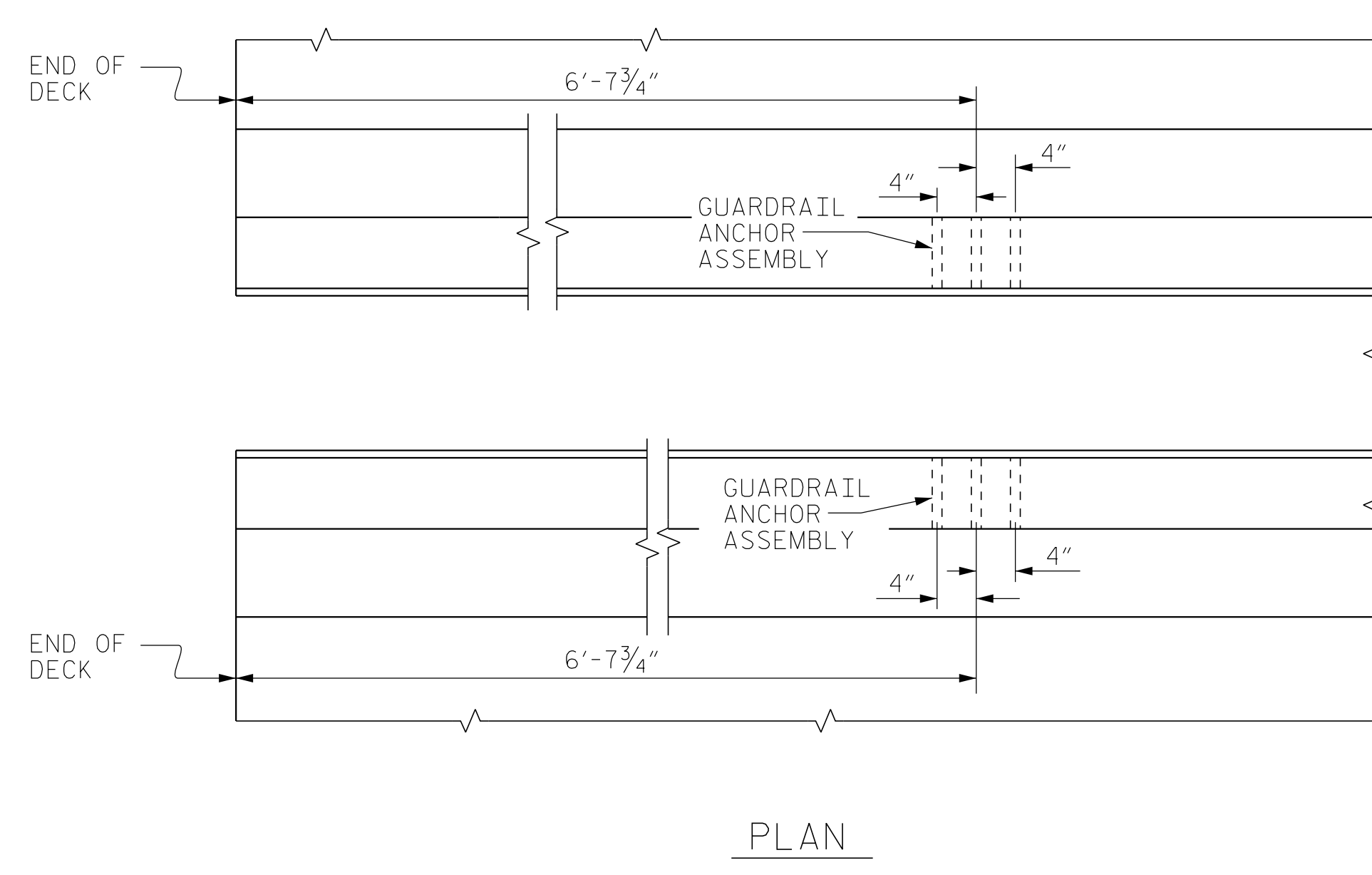
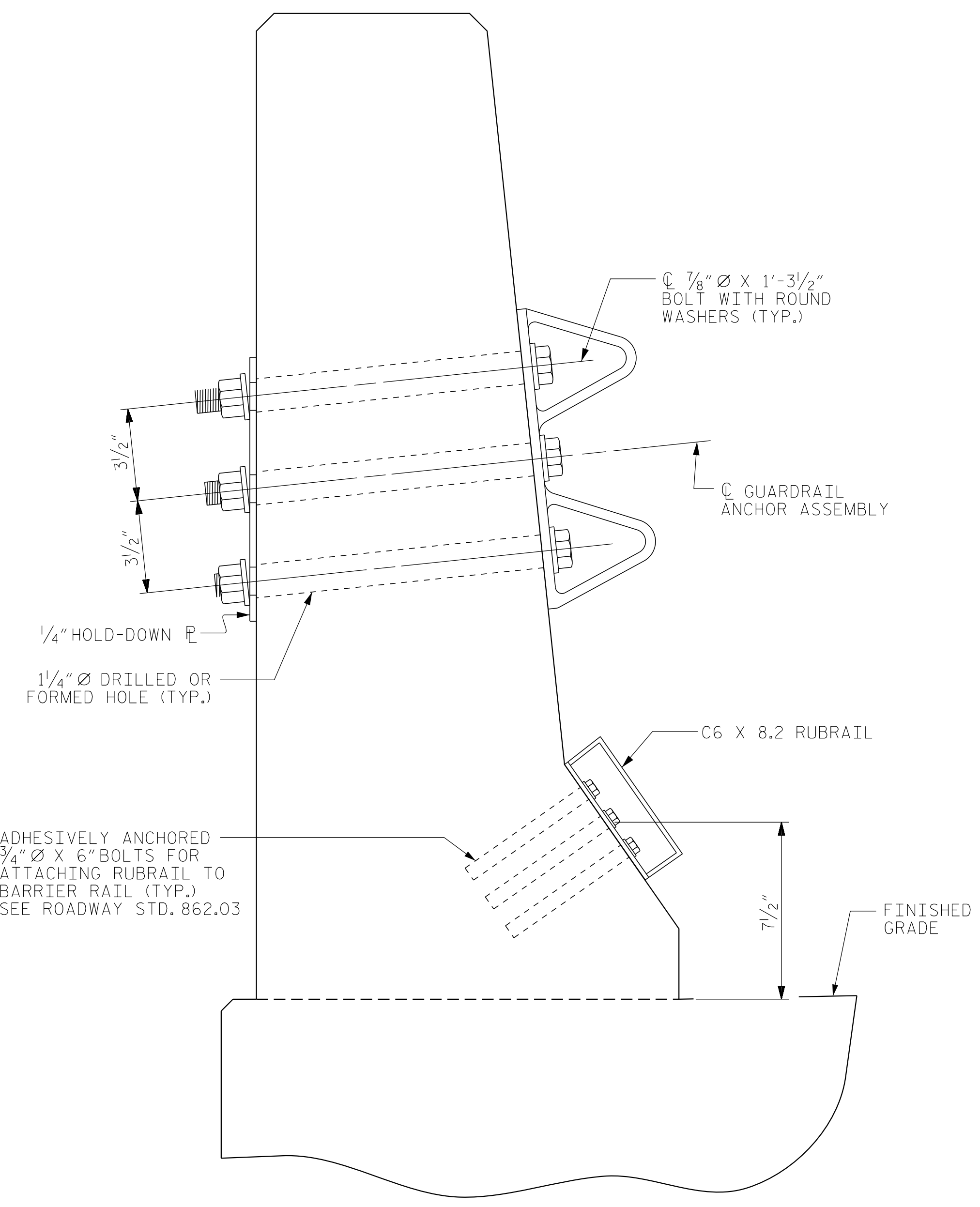
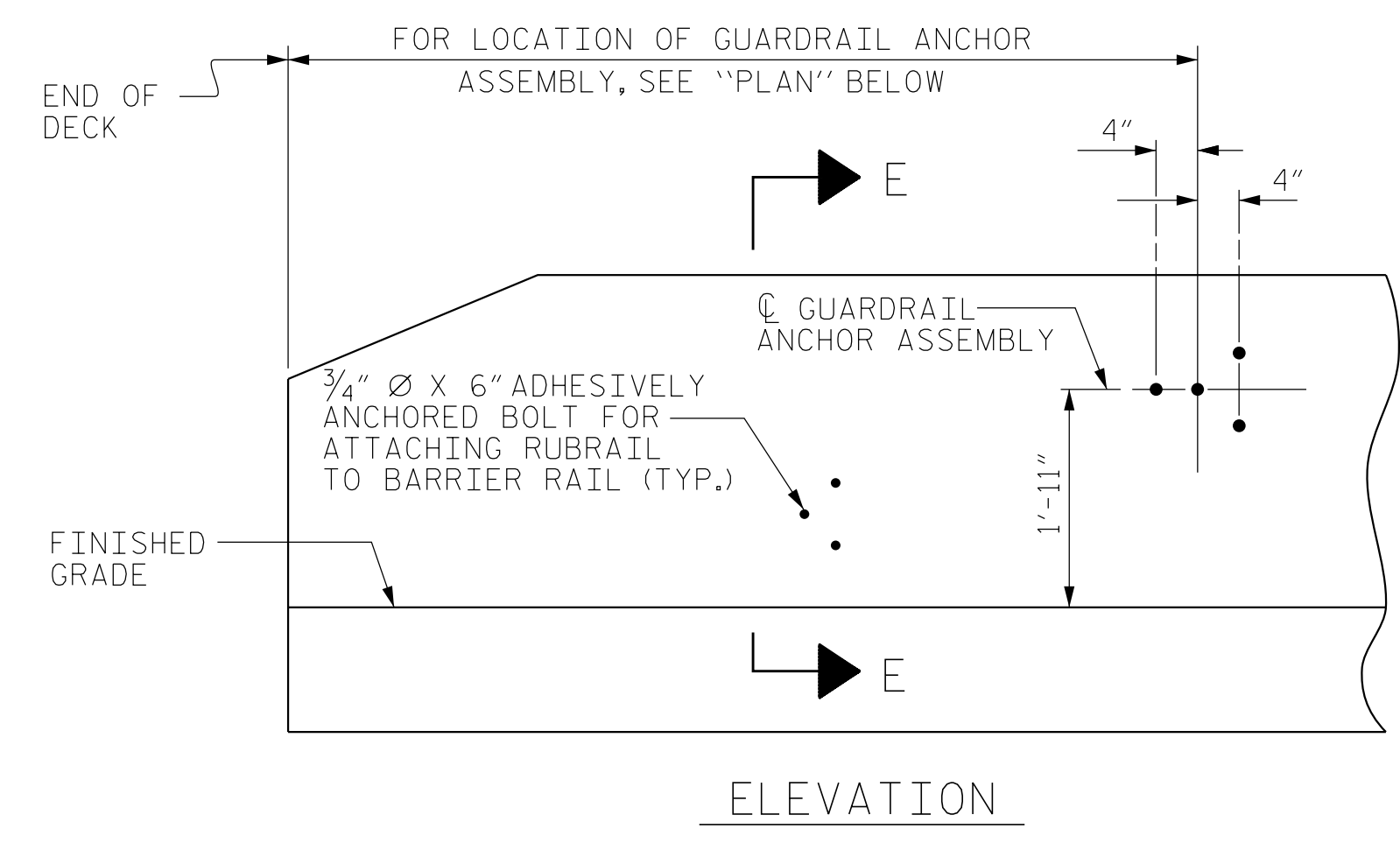
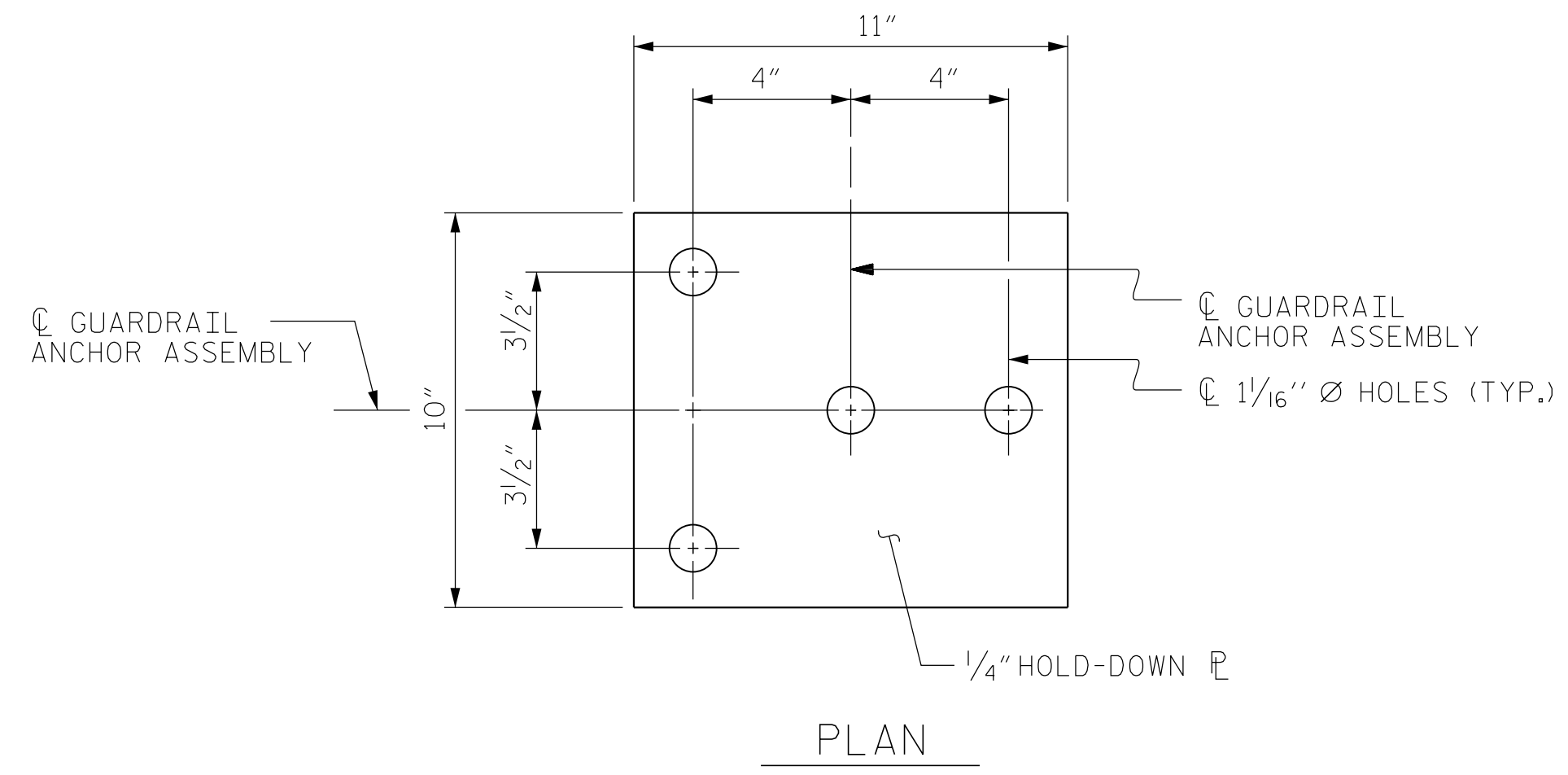
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

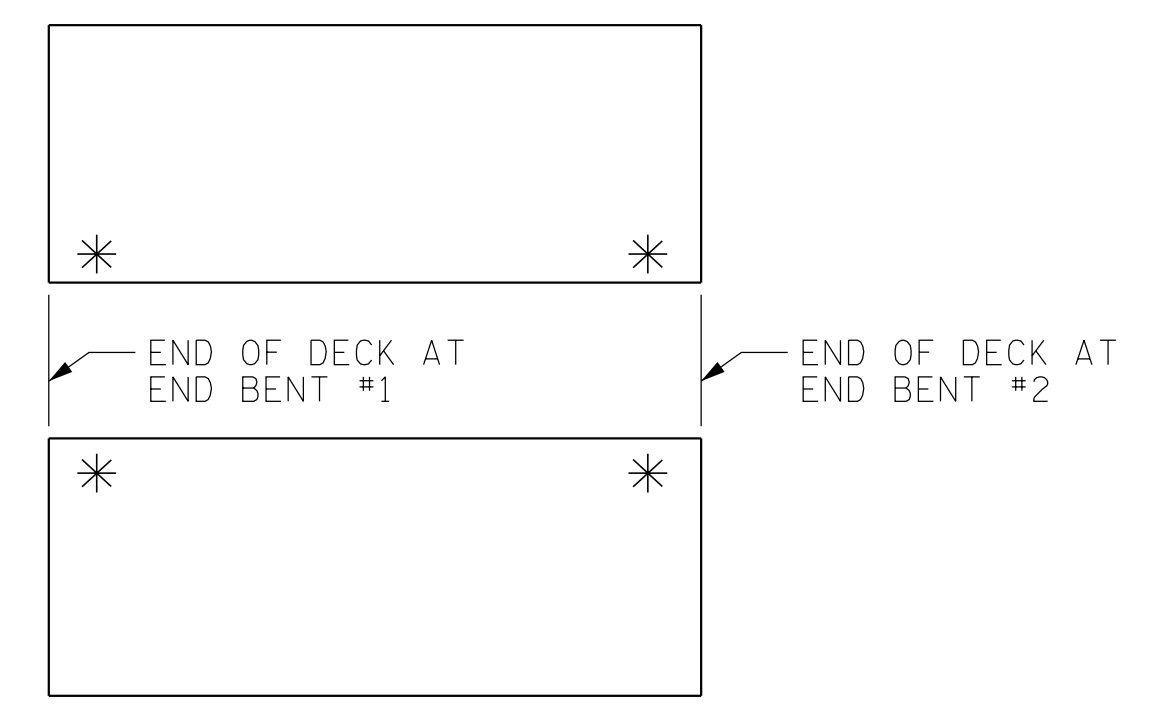
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

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



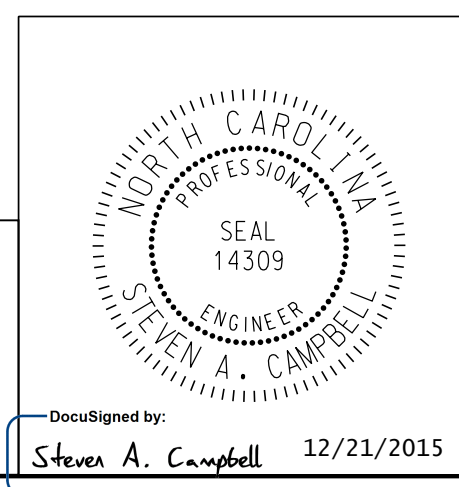
LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS  
\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

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



Prepared in the Office of:  
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 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 • FAX (828) 254-4562

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	51
1			3			51
2			4			

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : TLA 5/06	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

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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 B221 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. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

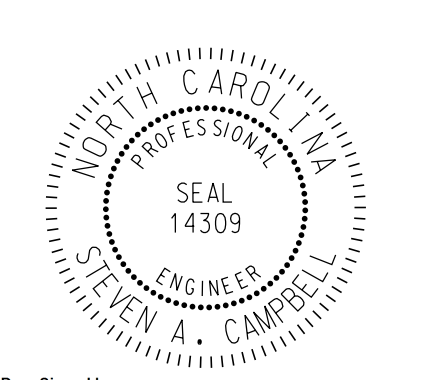
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

PAY LENGTH = 225 LIN.FT.

Prepared in the Office of:



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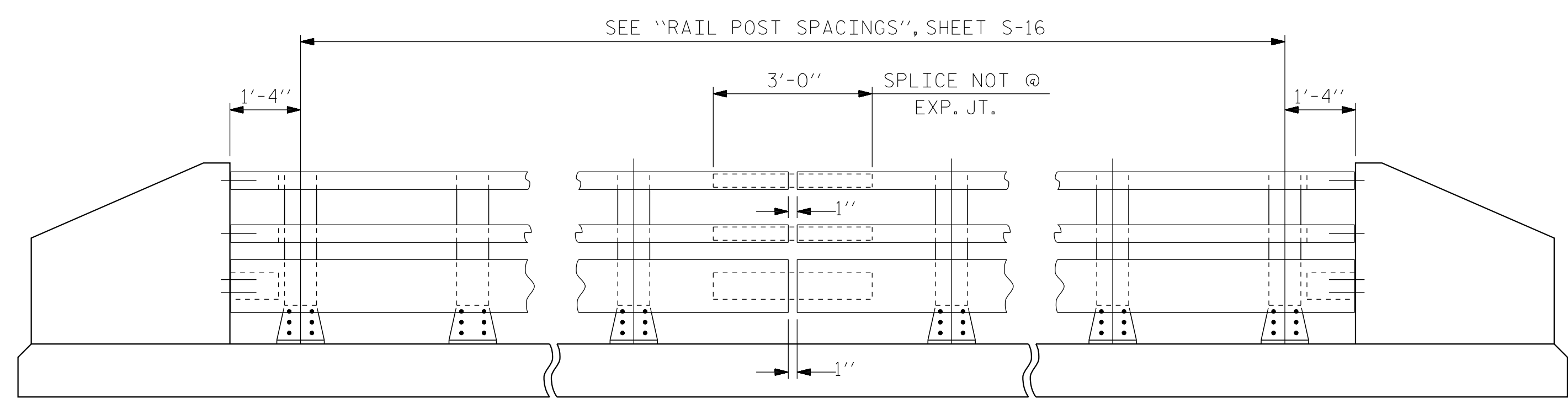


DocuSigned by:  
**Steven A. Campbell** 12/21/2015  
SBCF58A009342E

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TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

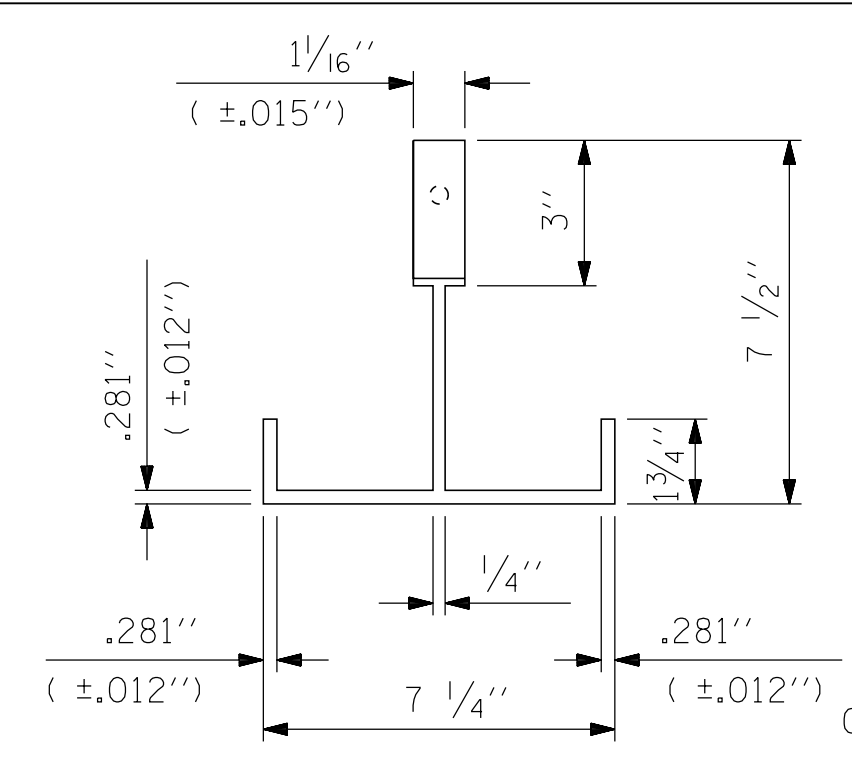
SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 3 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-13
					TOTAL SHEETS 51

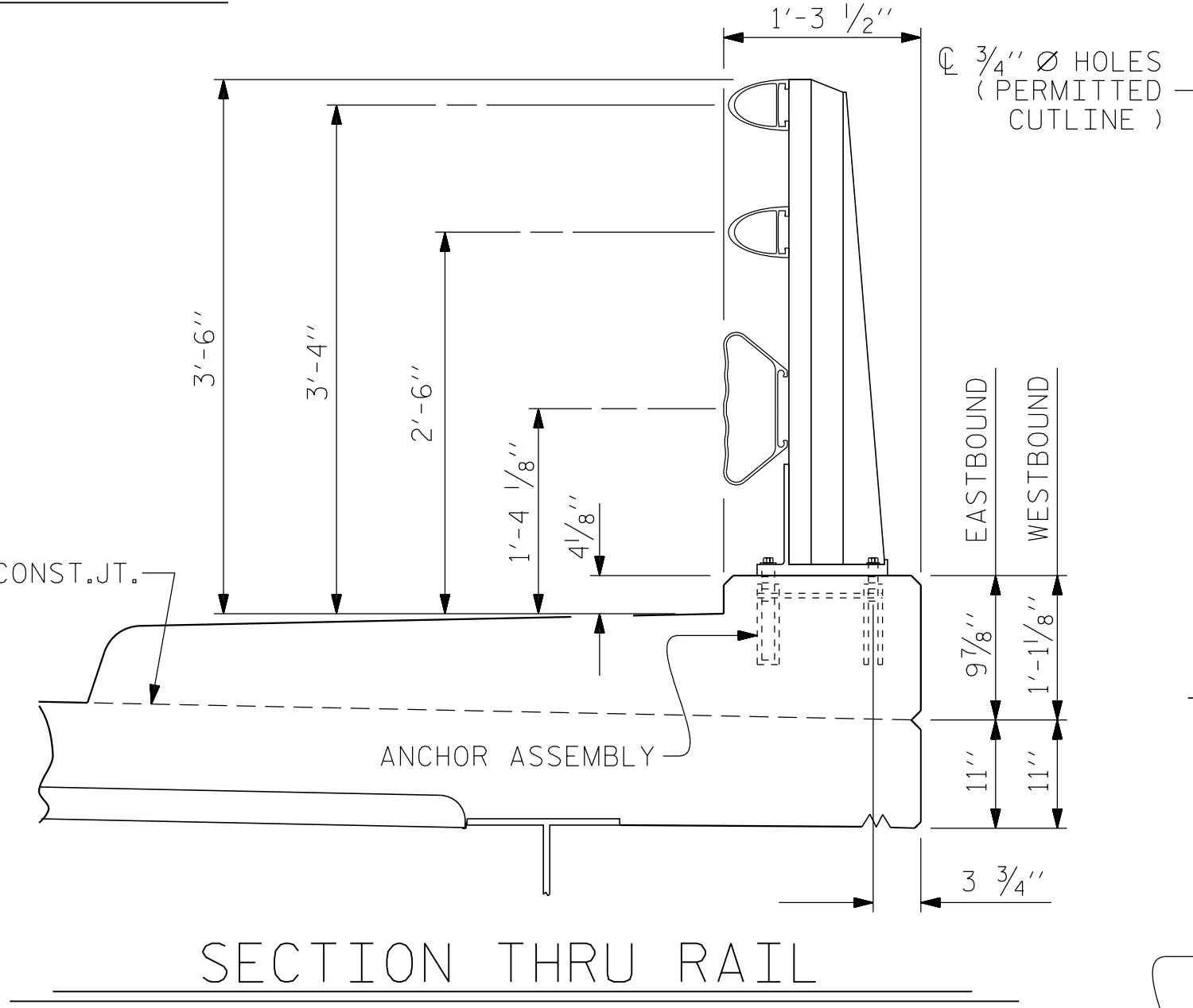


ELEVATION

NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

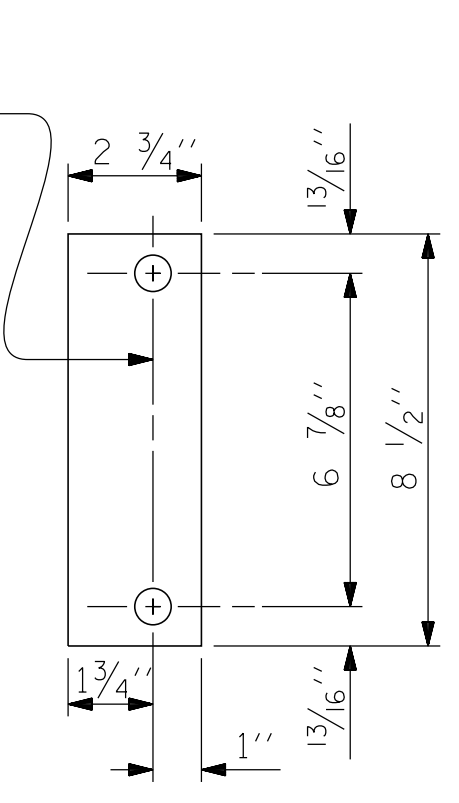


PLAN

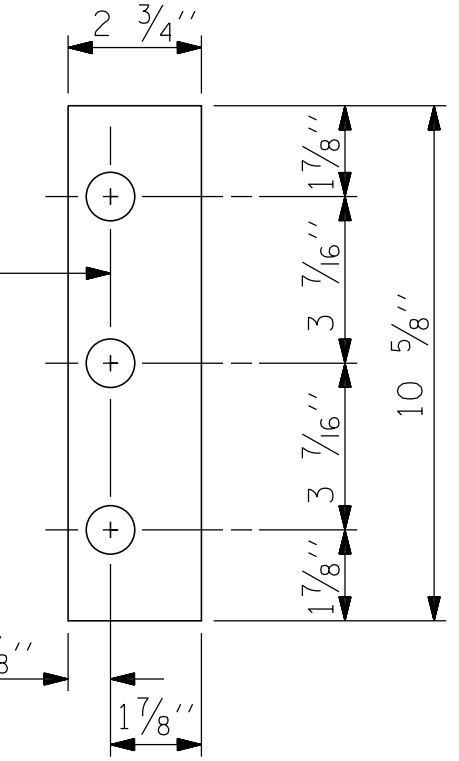


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6

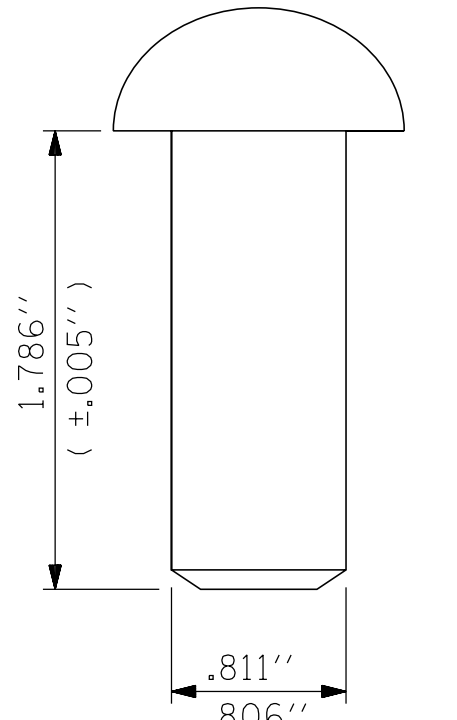


REAR PLATE

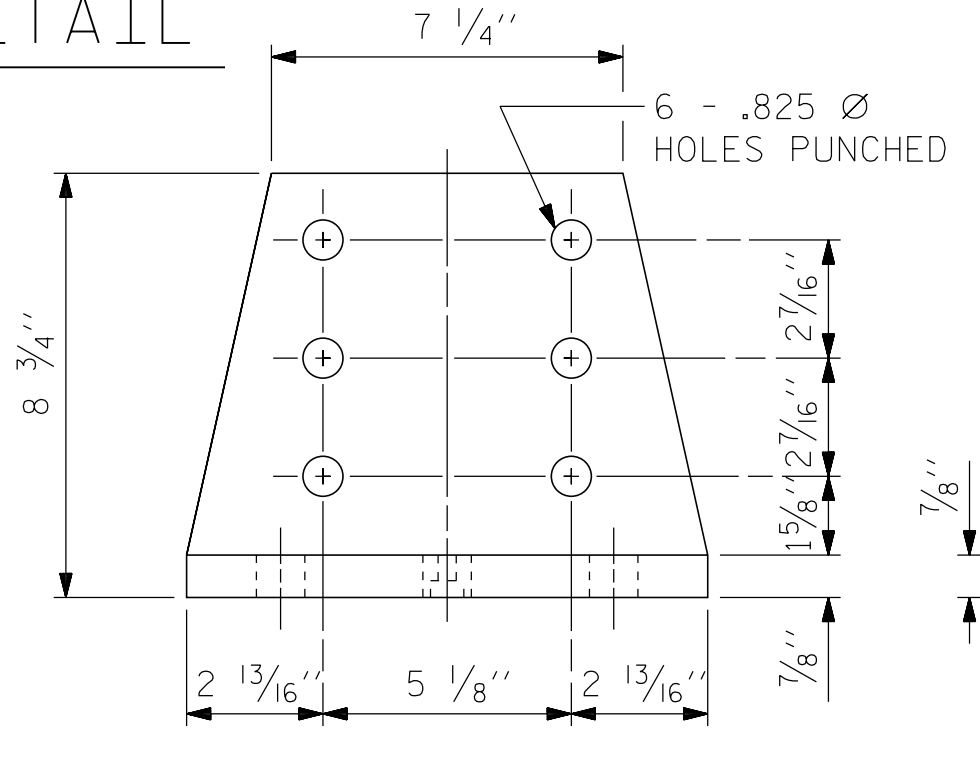


FRONT PLATE SHIM DETAILS

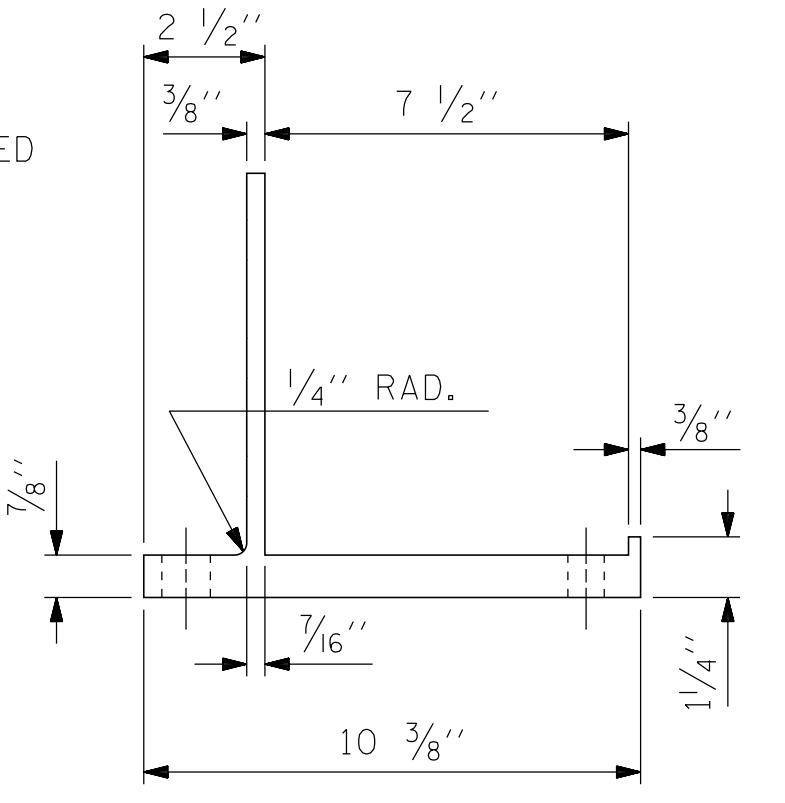
NOTE:  
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



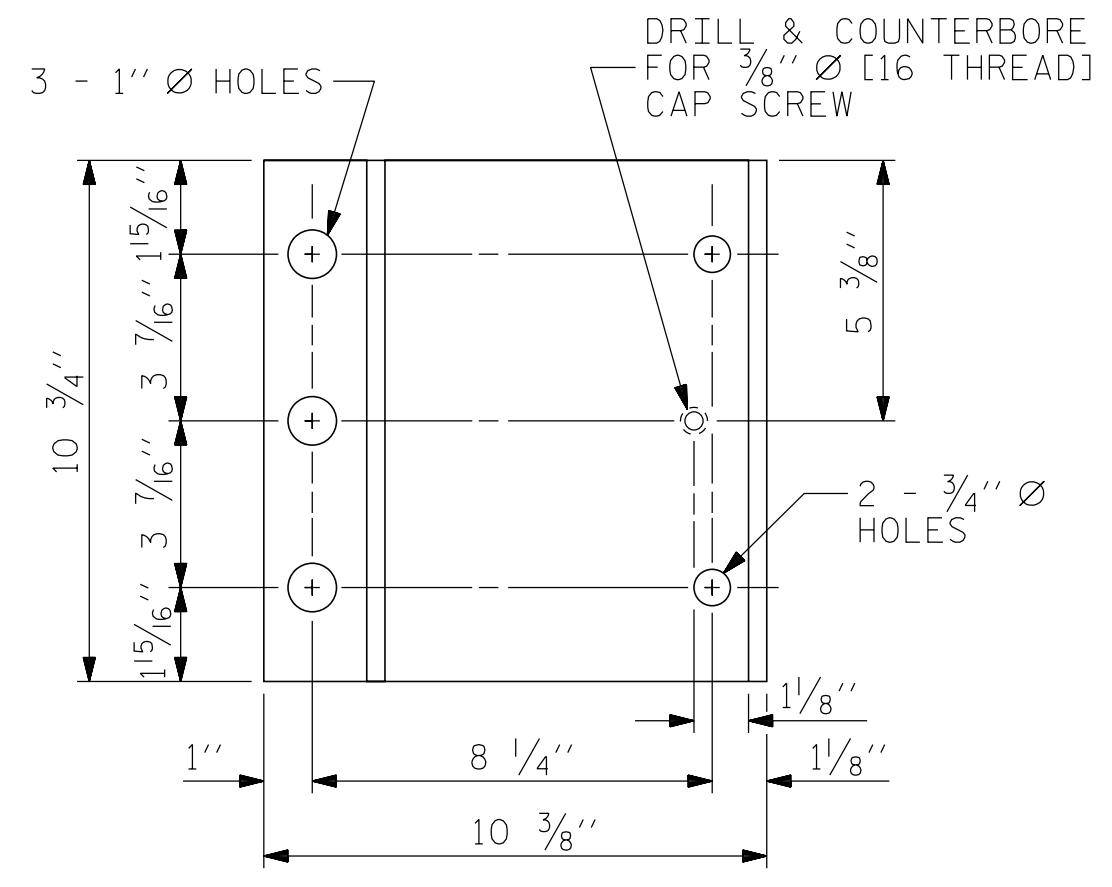
RIVET DETAIL



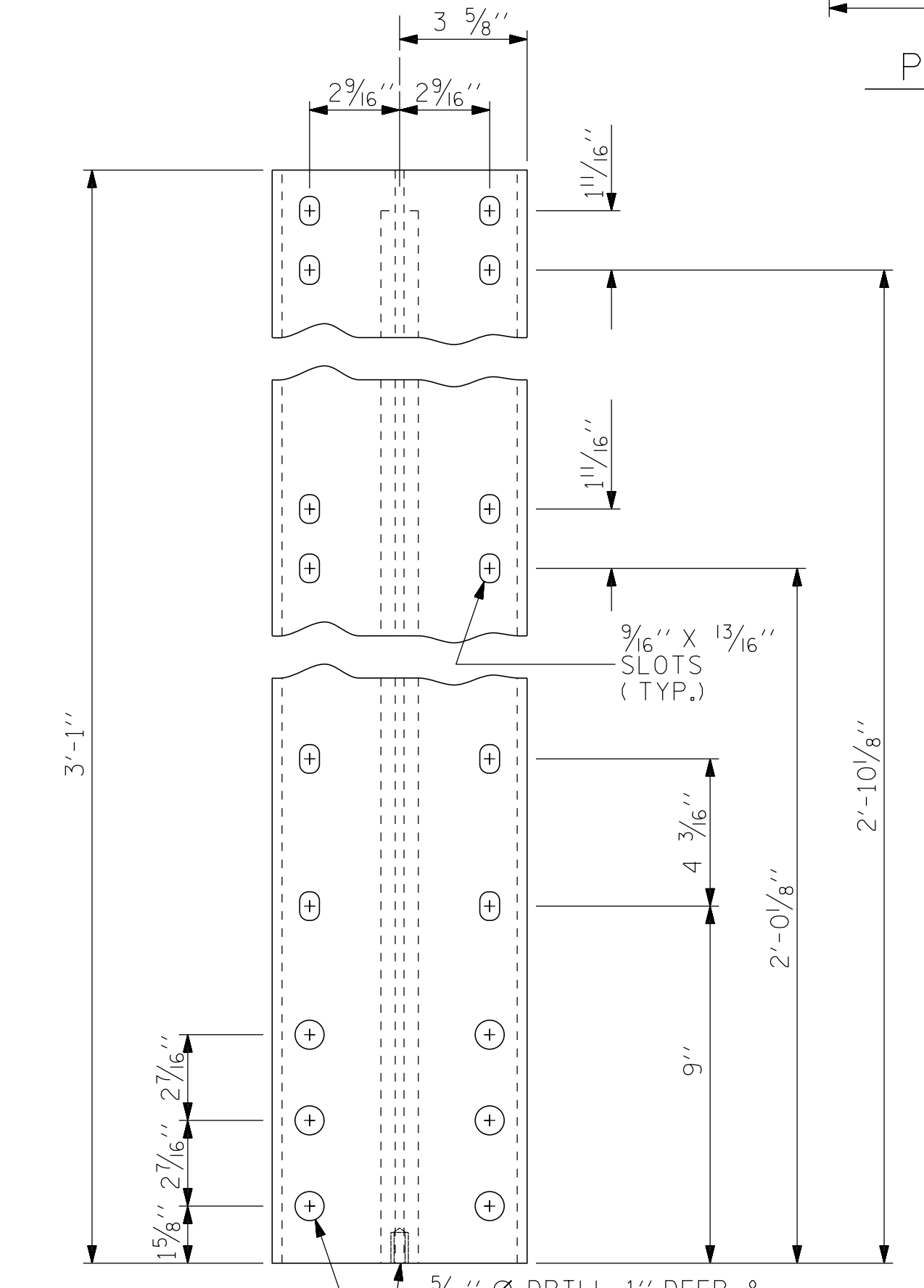
FRONT ELEVATION



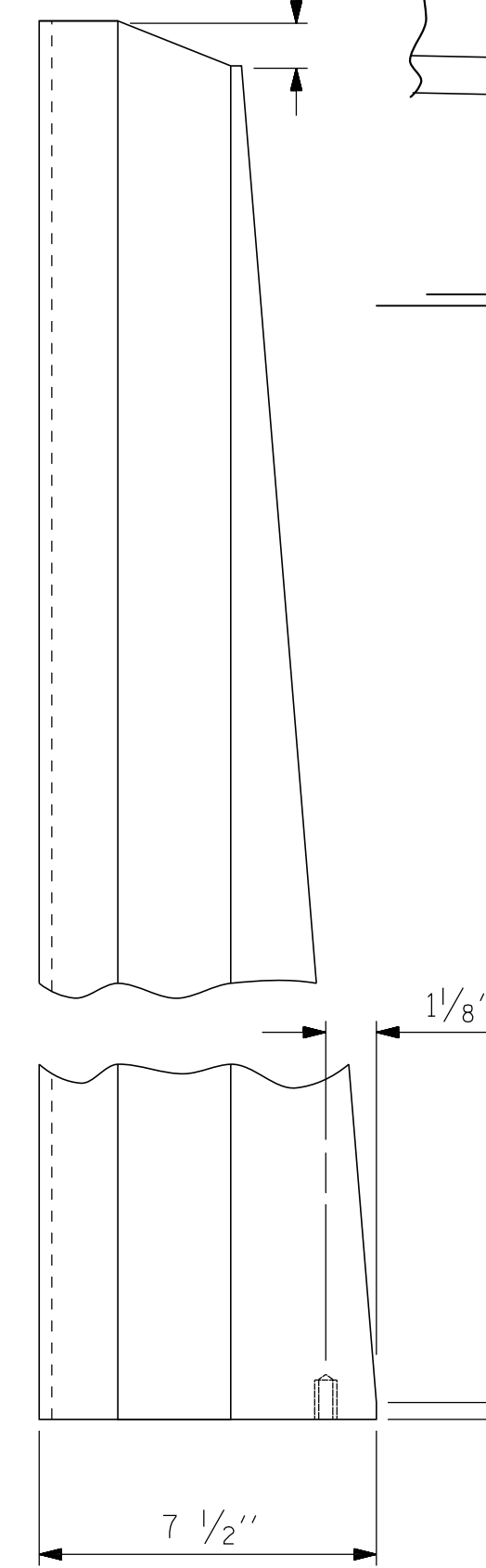
SIDE ELEVATION



PLAN



FRONT ELEVATION



SIDE ELEVATION

DETAILS OF POST

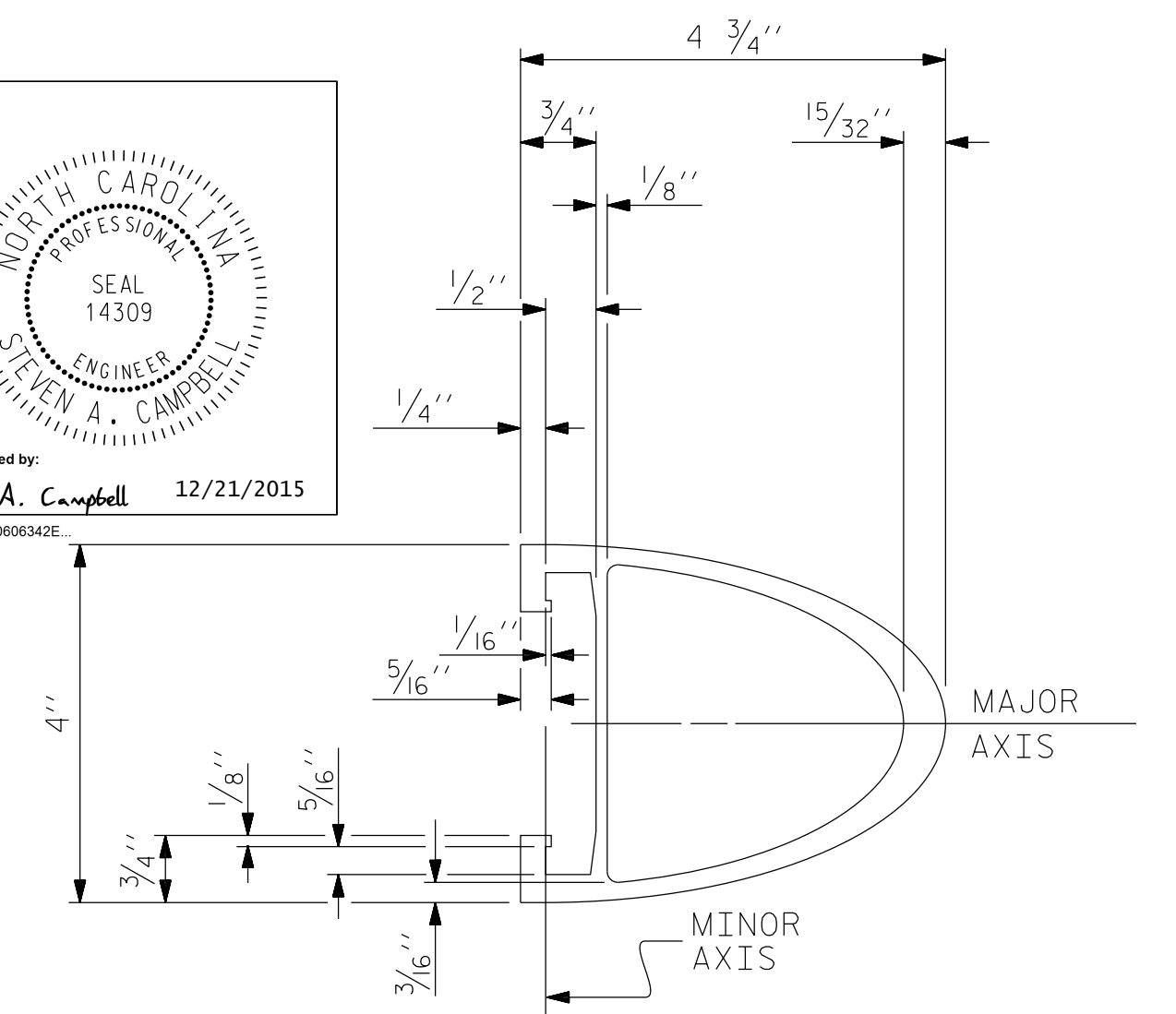
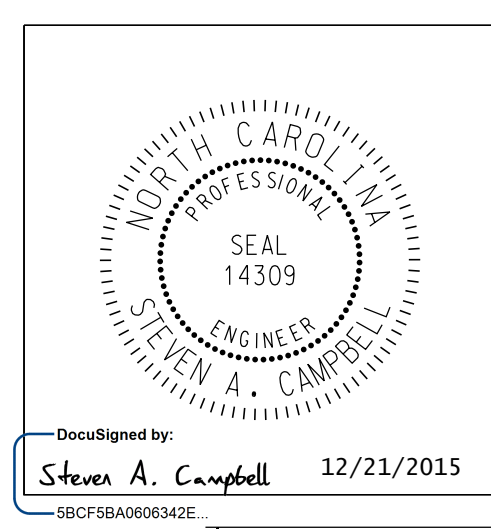
6 - .825" Ø HOLES PUNCHED FOR RIVETS  
3/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP 7/8" DEEP FOR 3/8" Ø X 1 1/2" STAINLESS STEEL CAP SCREW

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	JMB 1/88	REV. 5/7/03	RWW/JTE
CHECKED BY :	GGH 1/88	REV. 5/1/06	TLA/GM
		REV. 10/1/11	MAA/GM

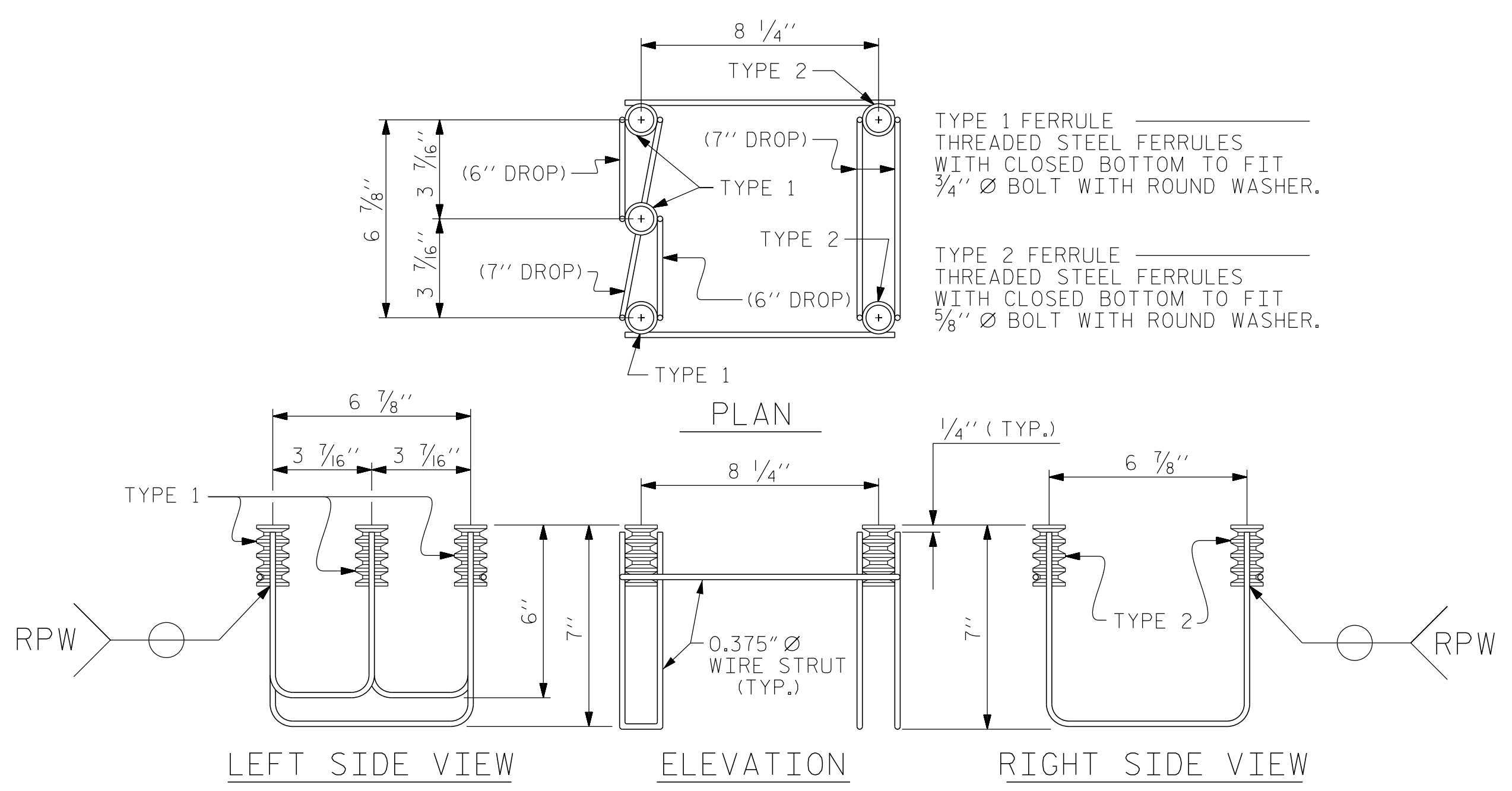
NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

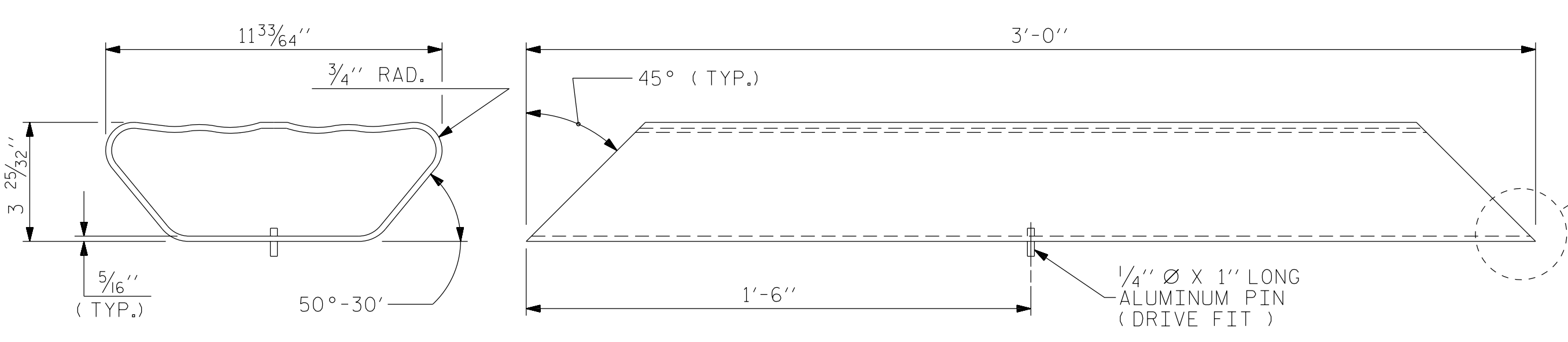
- THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 1/4" FOR 5/8" FERRULES.
  - 3 - 3/4" Ø X 2 1/2" BOLTS 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.
  - 2 - 5/8" Ø X 2 1/4" 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 5/8" Ø X 2 1/4" 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.
  - 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.
  - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
  - 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.
  - BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



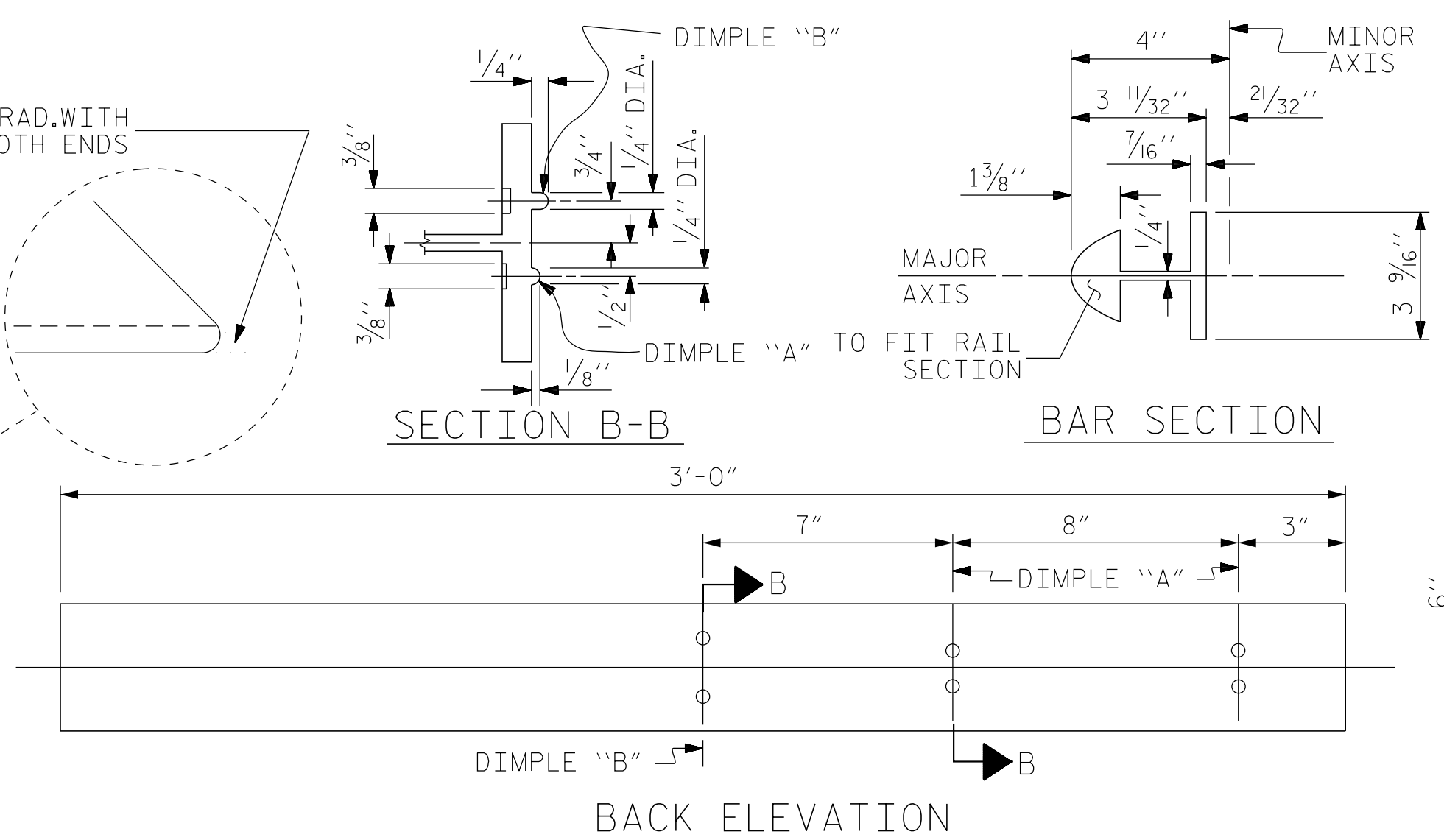
TOP & MIDDLE RAIL SECTION



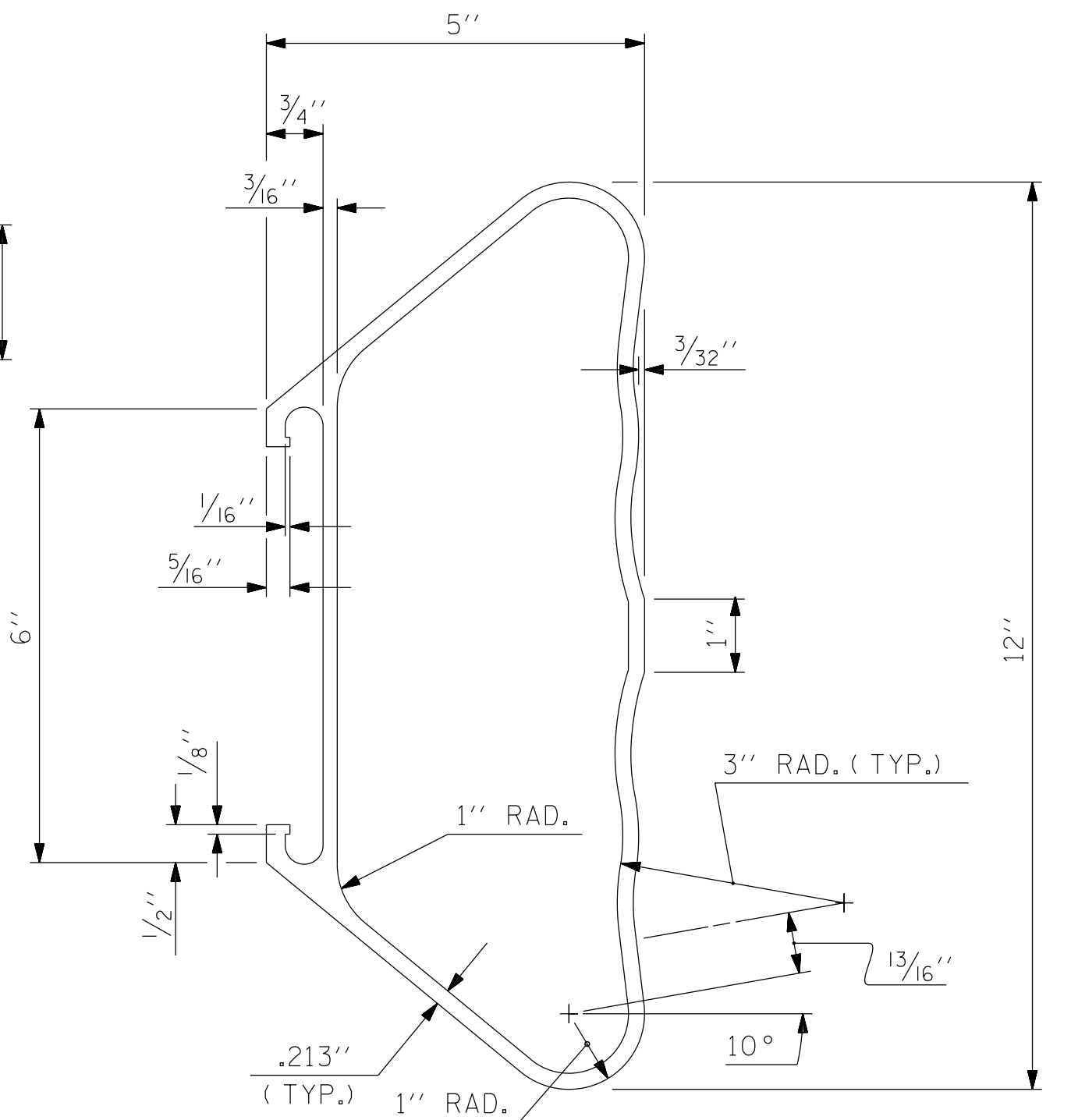
5-BOLT METAL RAIL ANCHOR ASSEMBLY  
(40 ASSEMBLIES REQUIRED)



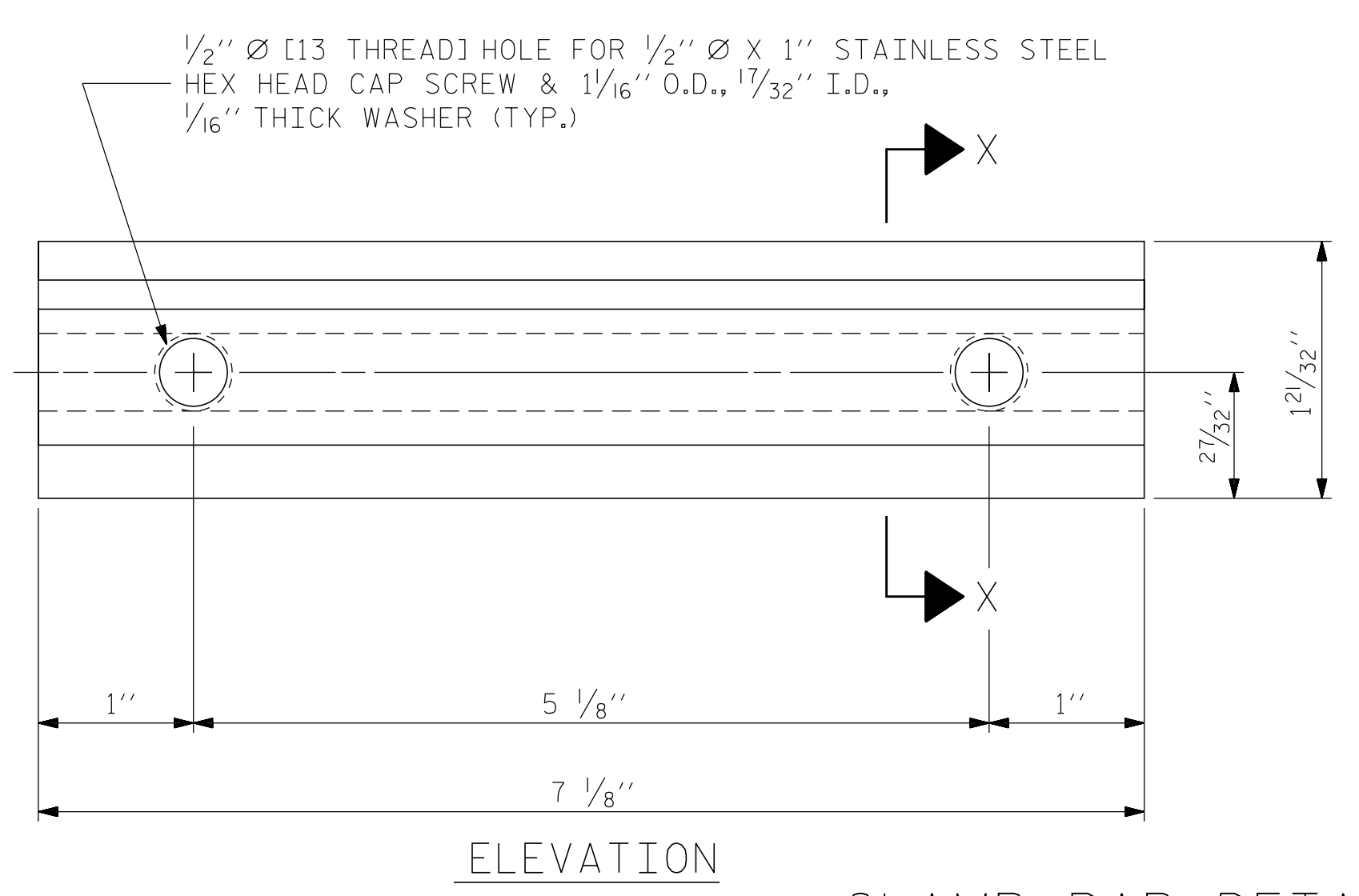
BOTTOM RAIL EXPANSION BAR



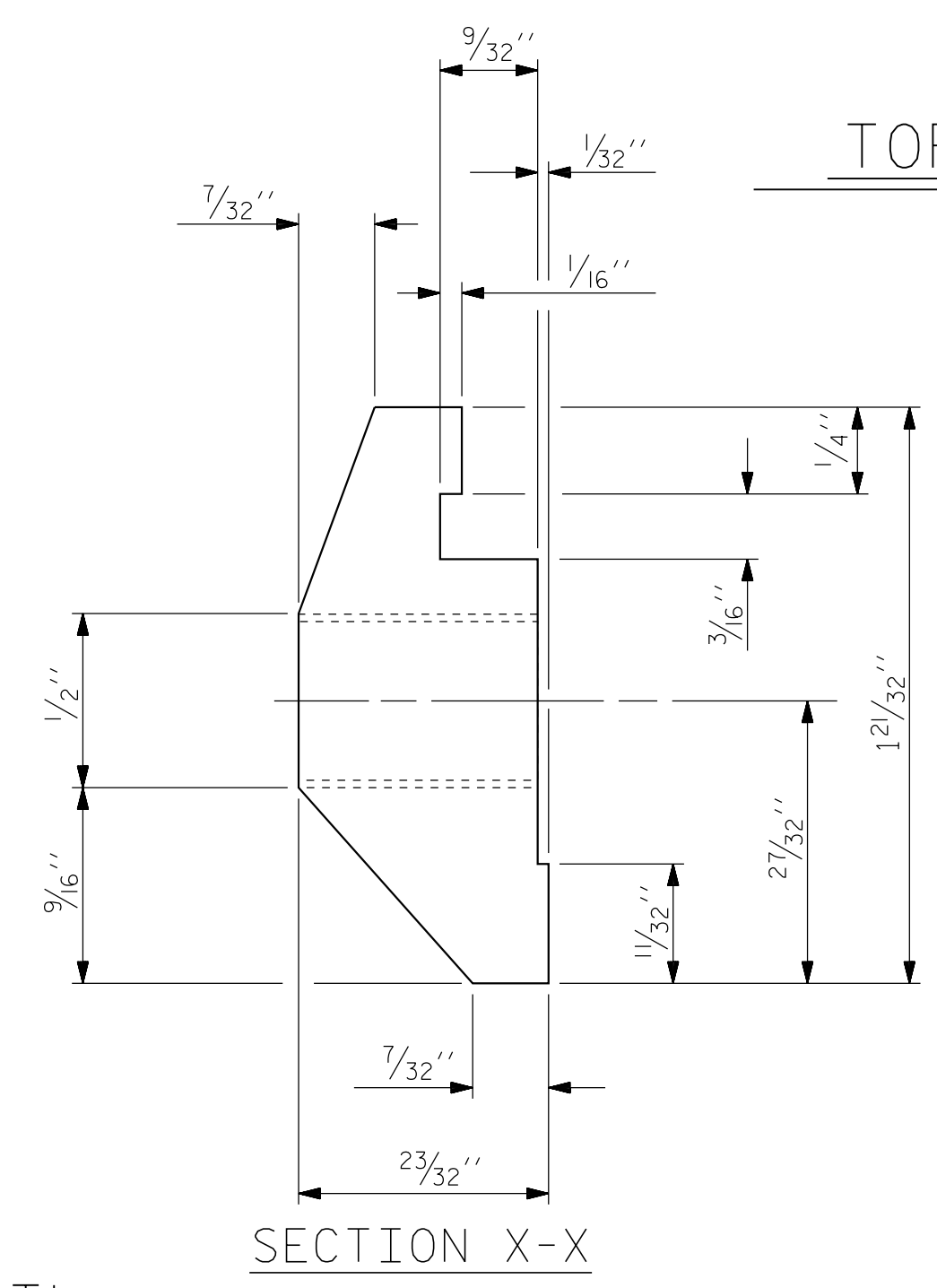
TOP & MIDDLE RAIL EXPANSION BAR



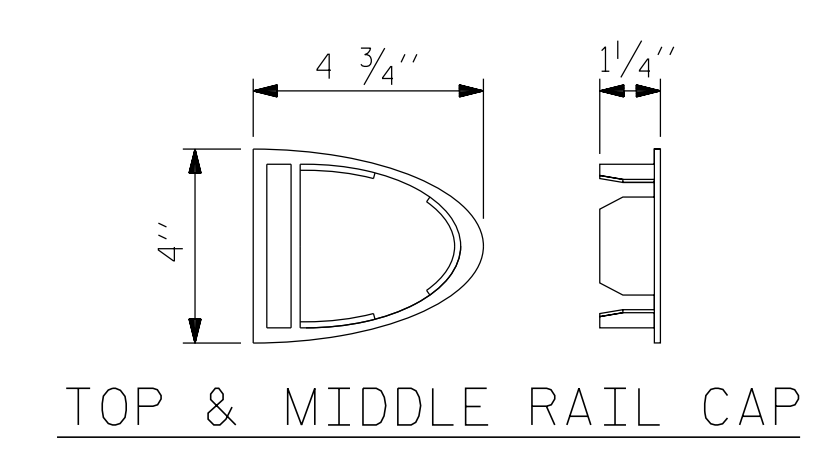
BOTTOM RAIL SECTION



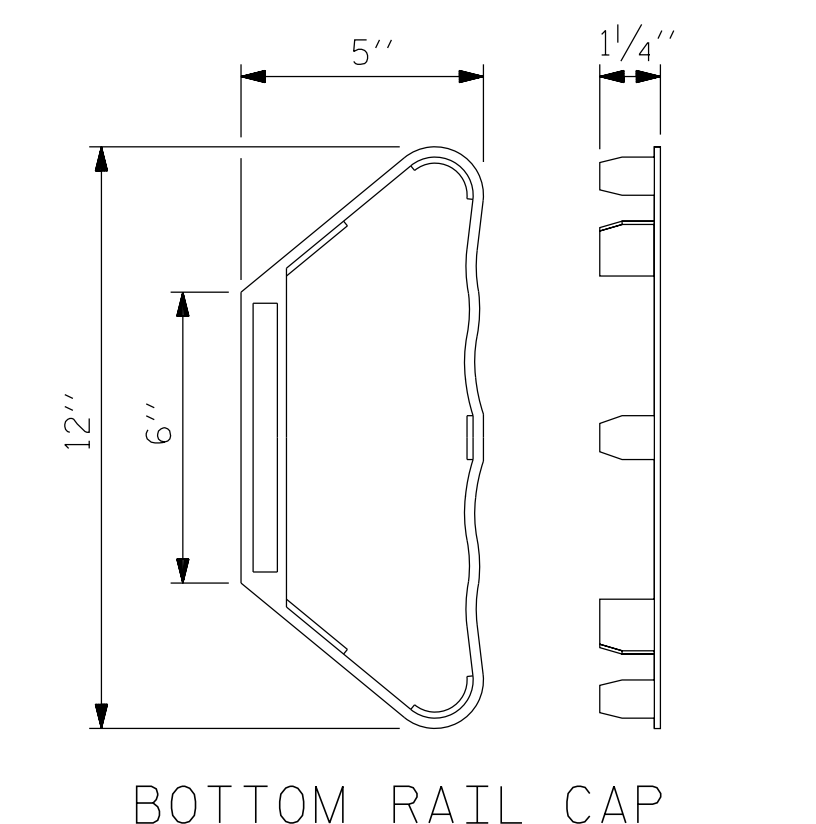
CLAMP BAR DETAIL  
(6 REQUIRED PER POST)



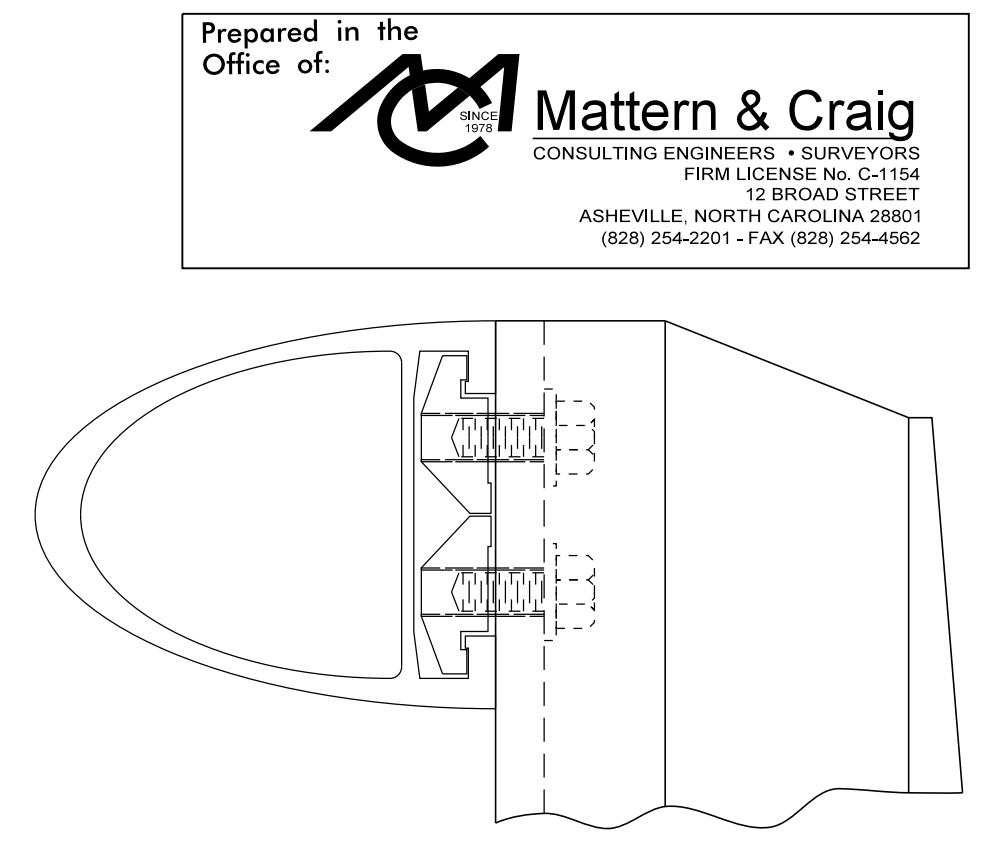
SECTION X-X



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY  
(MIDDLE & BOTTOM RAIL ARE SIMILAR)



PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

SHEET 2 OF 3

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

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			51



NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60° F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS (STD. No. BMR6).

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 3 BAR METAL RAIL.

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.

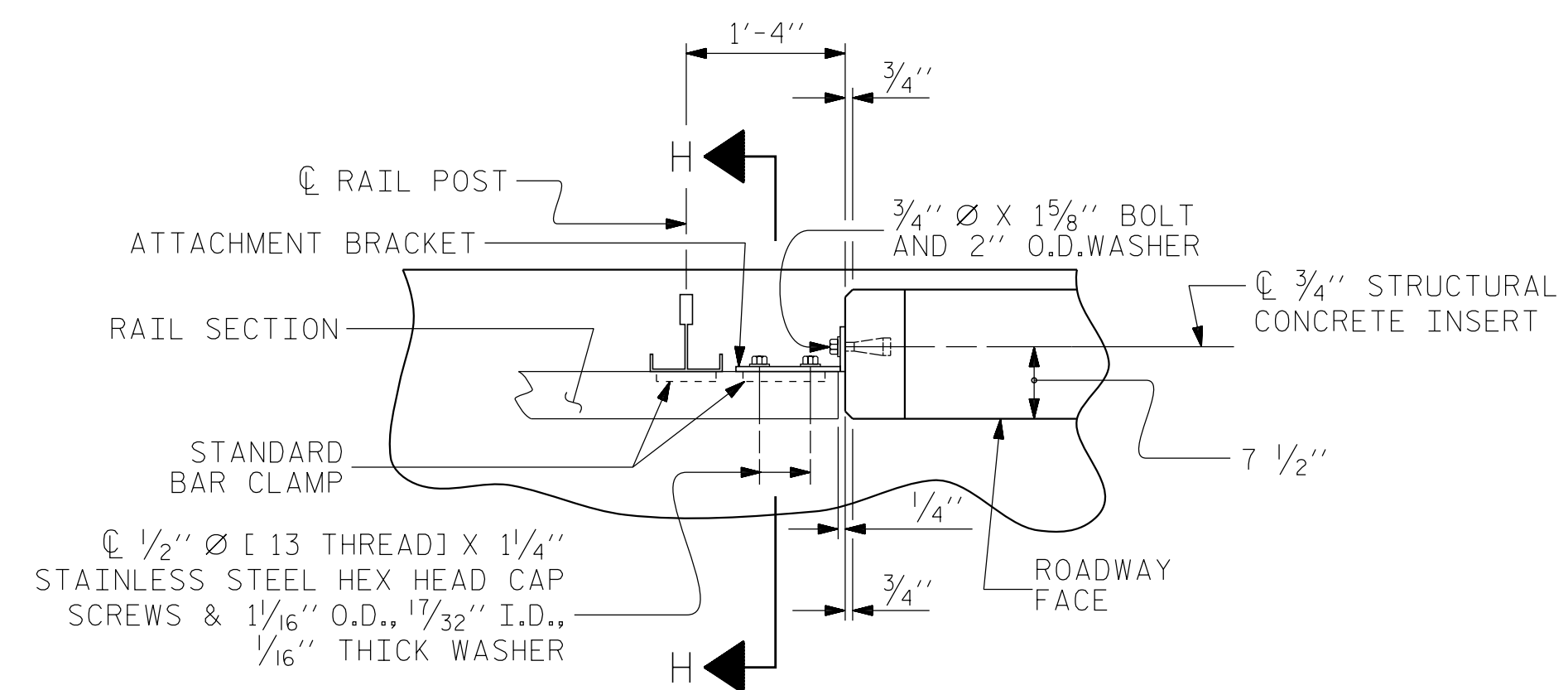
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT 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.

NOTES

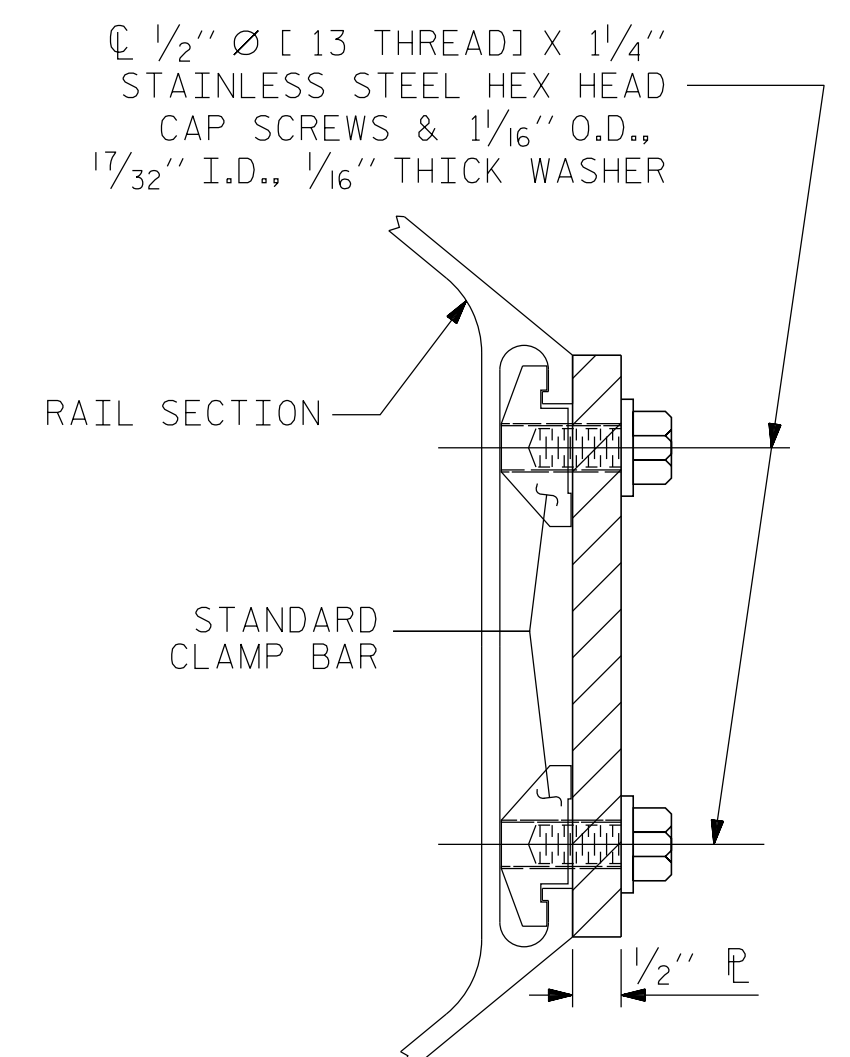
STRUCTURAL CONCRETE INSERT

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

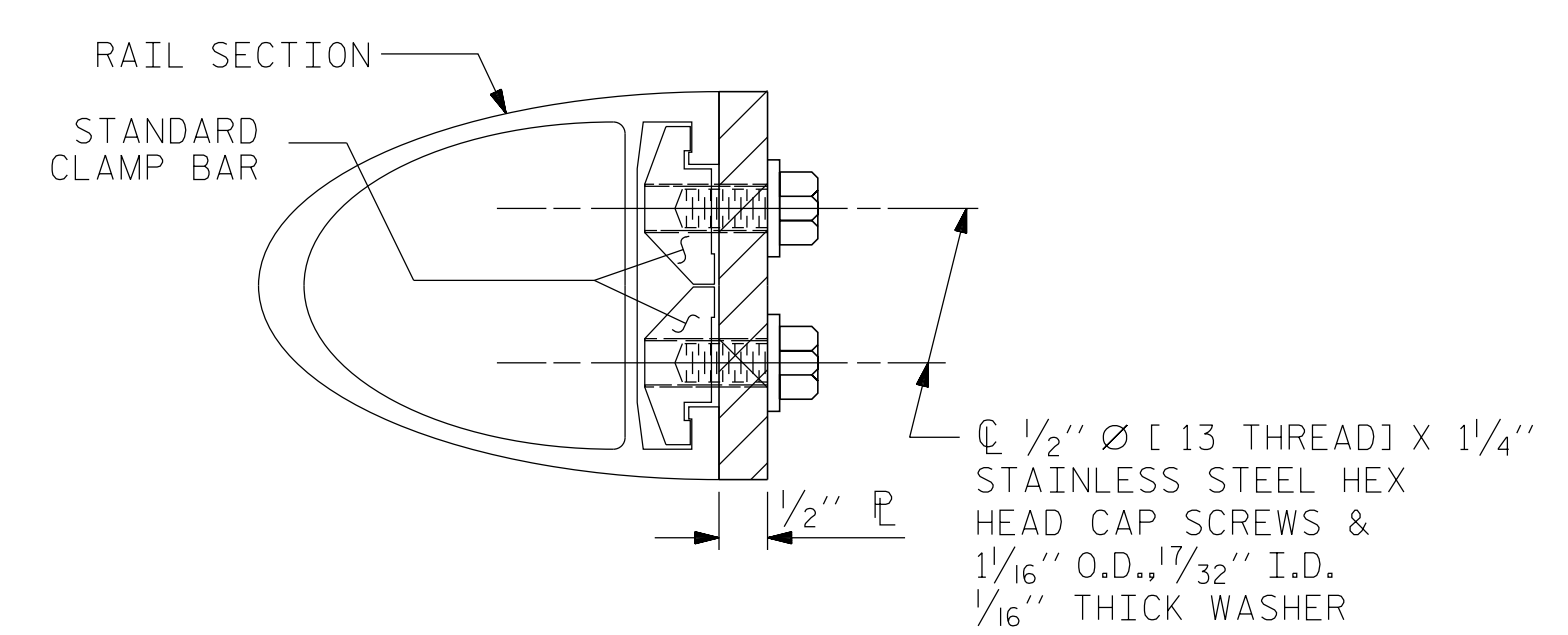
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
- B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER, THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



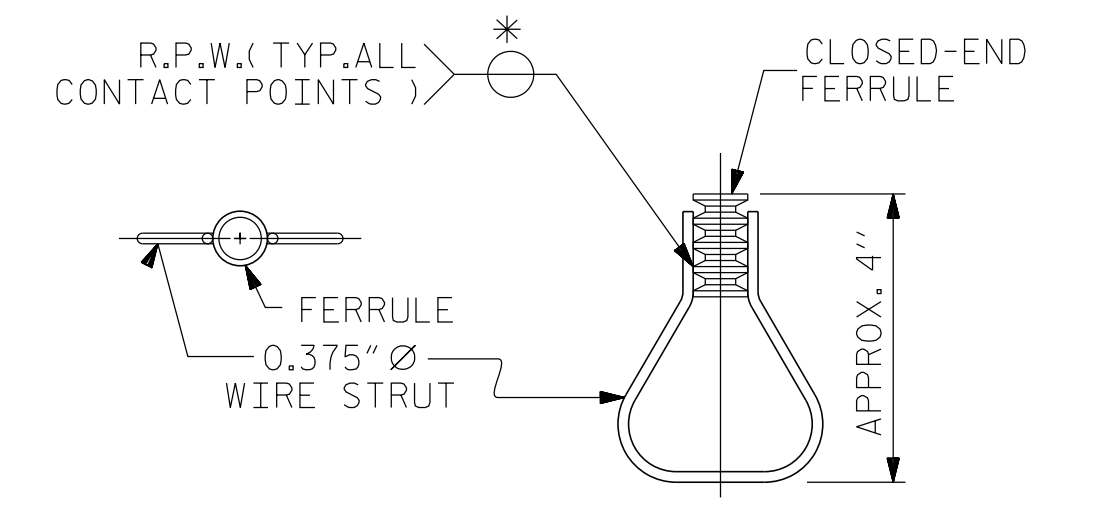
PLAN OF RAIL AND END POST  
(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



SECTION H-H  
(FOR BOTTOM RAIL)

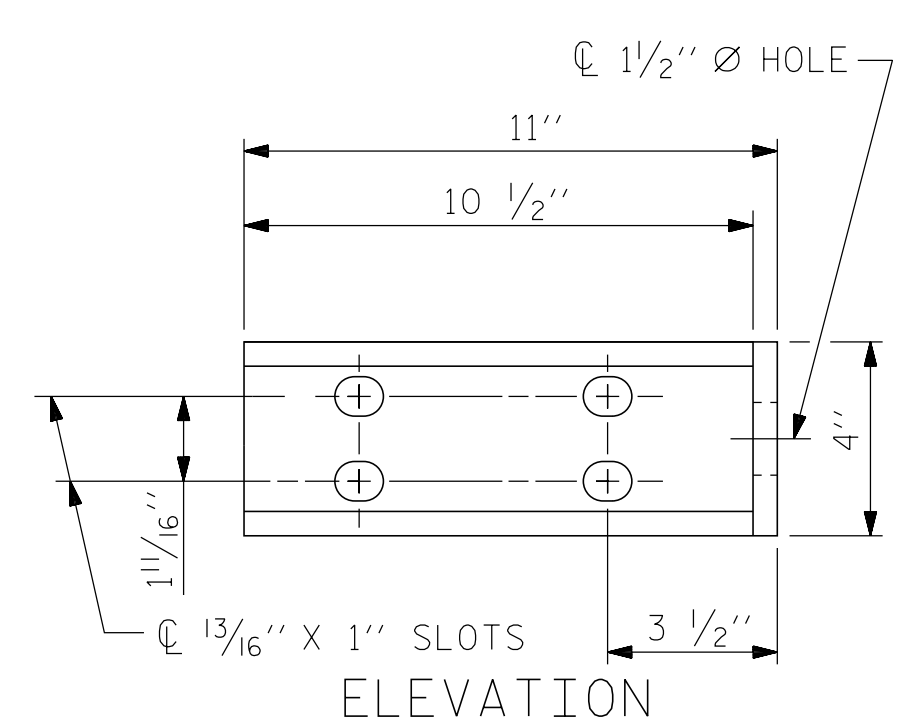


SECTION H-H  
(FOR TOP & MIDDLE RAIL)

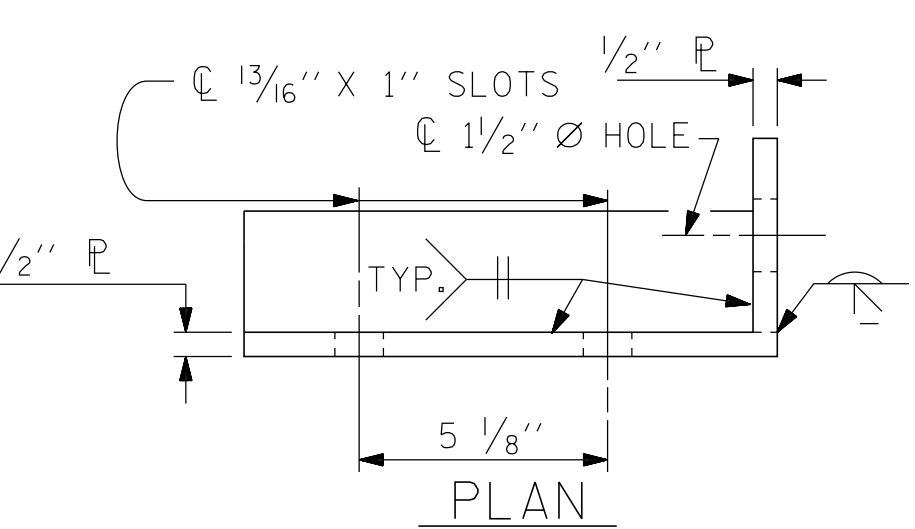


STRUCTURAL CONCRETE INSERT

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

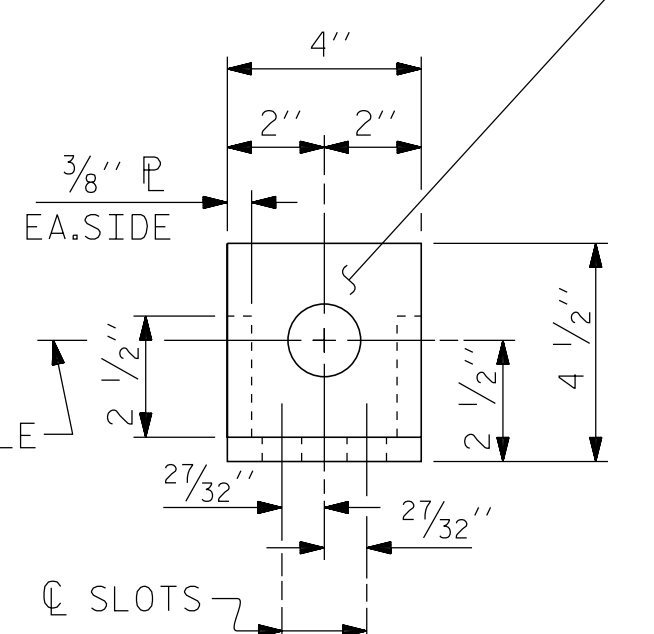


ELEVATION

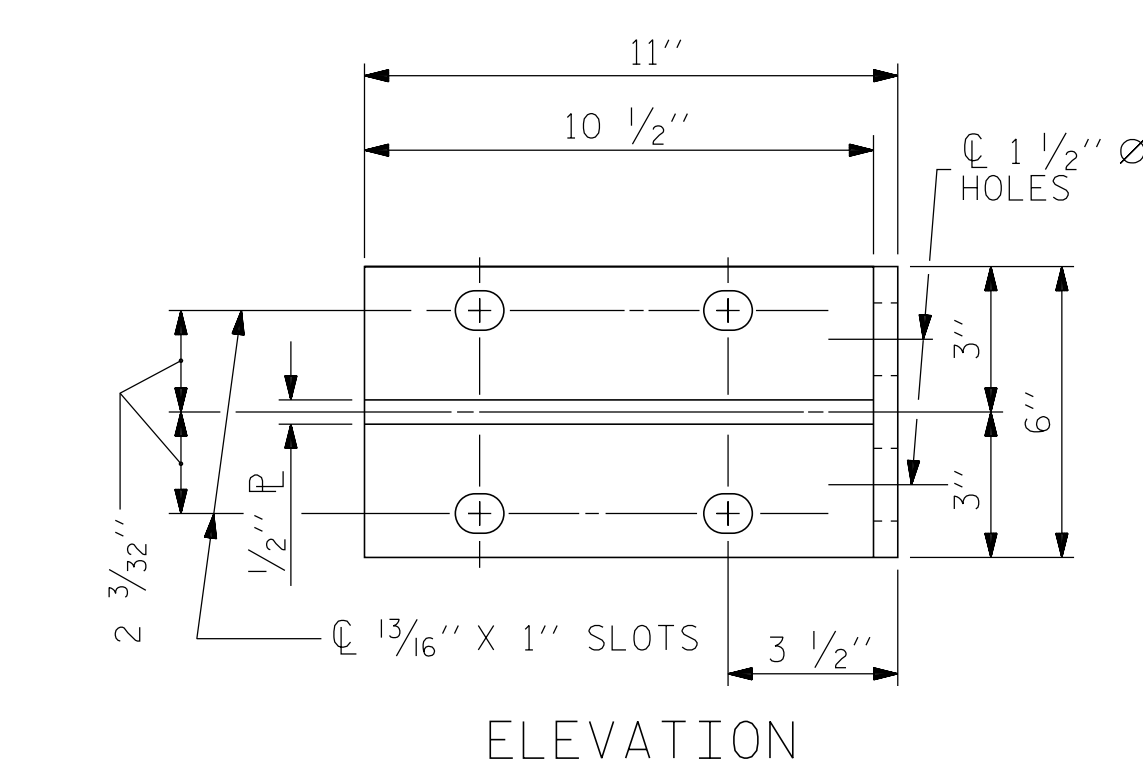


PLAN

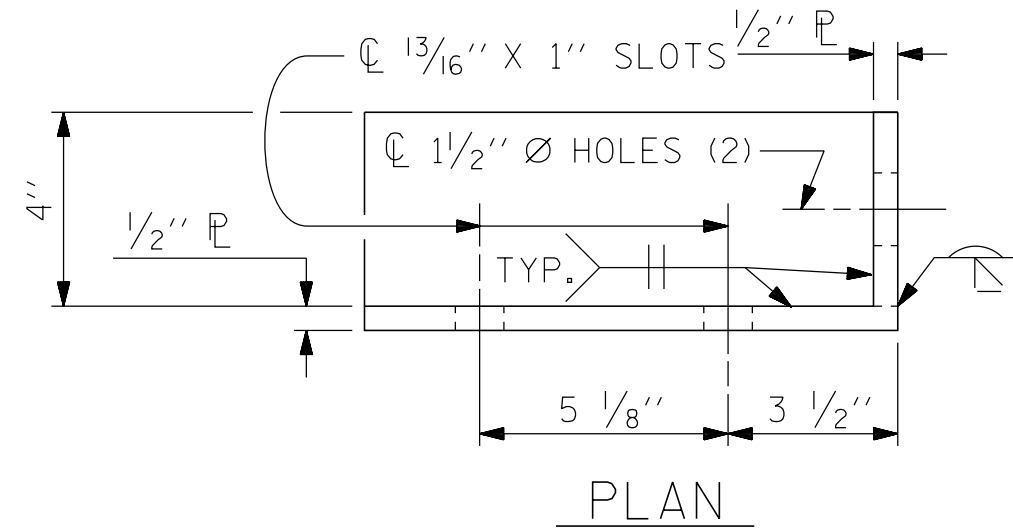
ANGLE TO BE MADE FROM 1/2" X 4" X 11" P AND 1/2" X 4" X 4" P



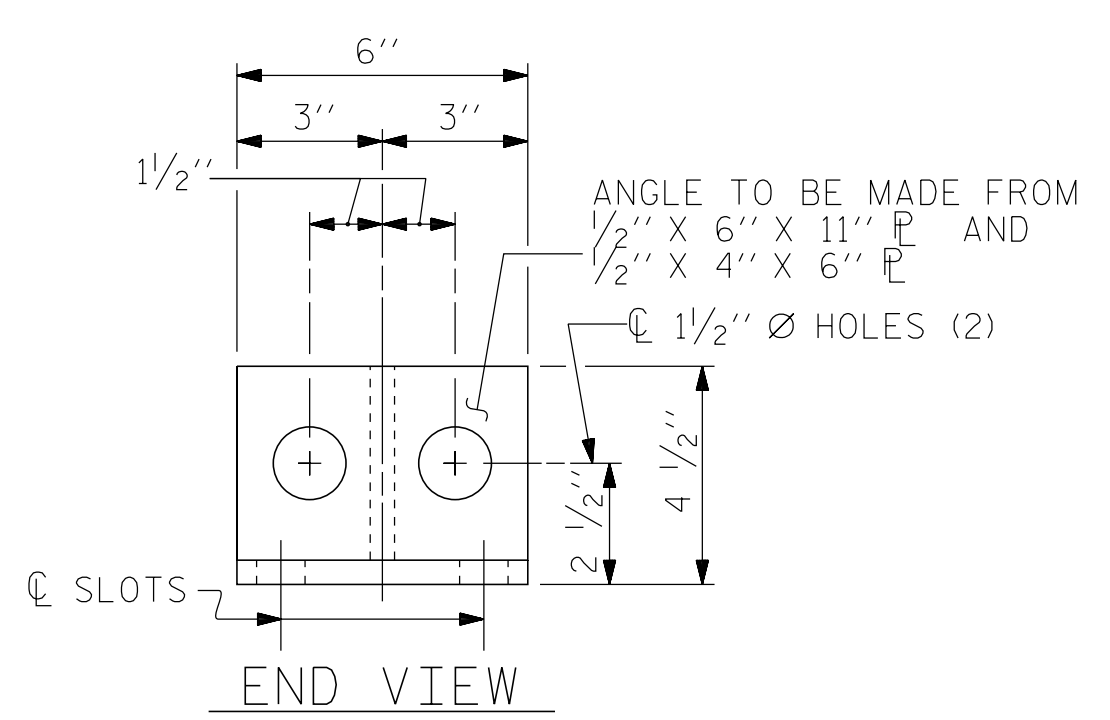
END VIEW  
(FIX. AND EXP.)



ELEVATION



PLAN



END VIEW

DETAILS FOR ATTACHMENT BRACKET  
(BOTTOM RAIL ONLY)

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
3 BAR METAL RAIL

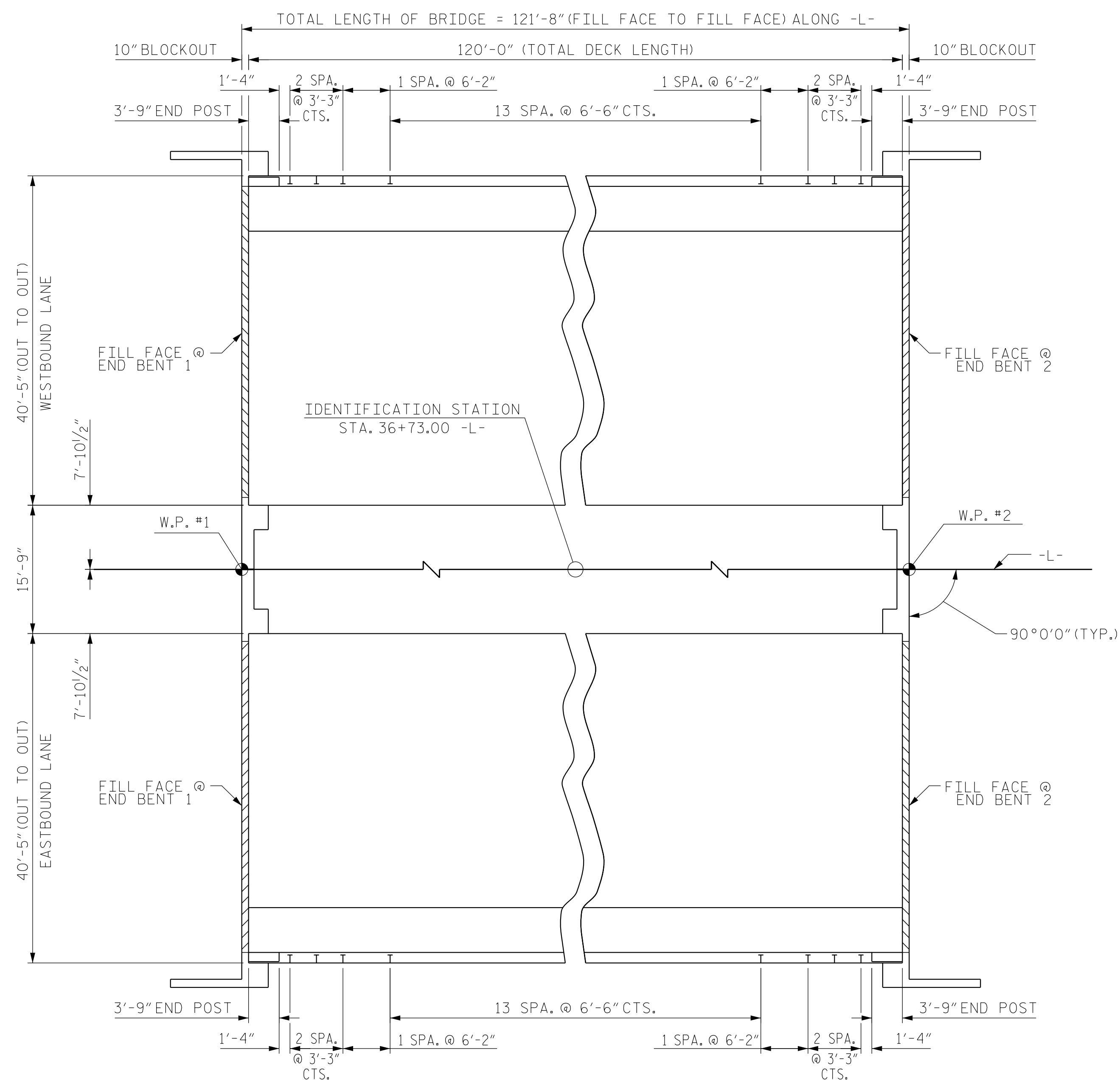
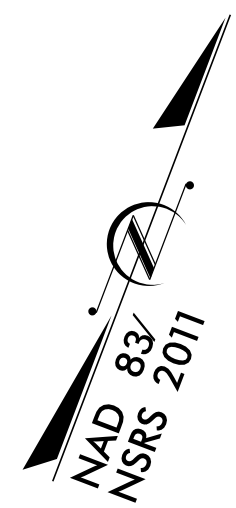
ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/11/11 MAA/GM

Prepared in the Office of:

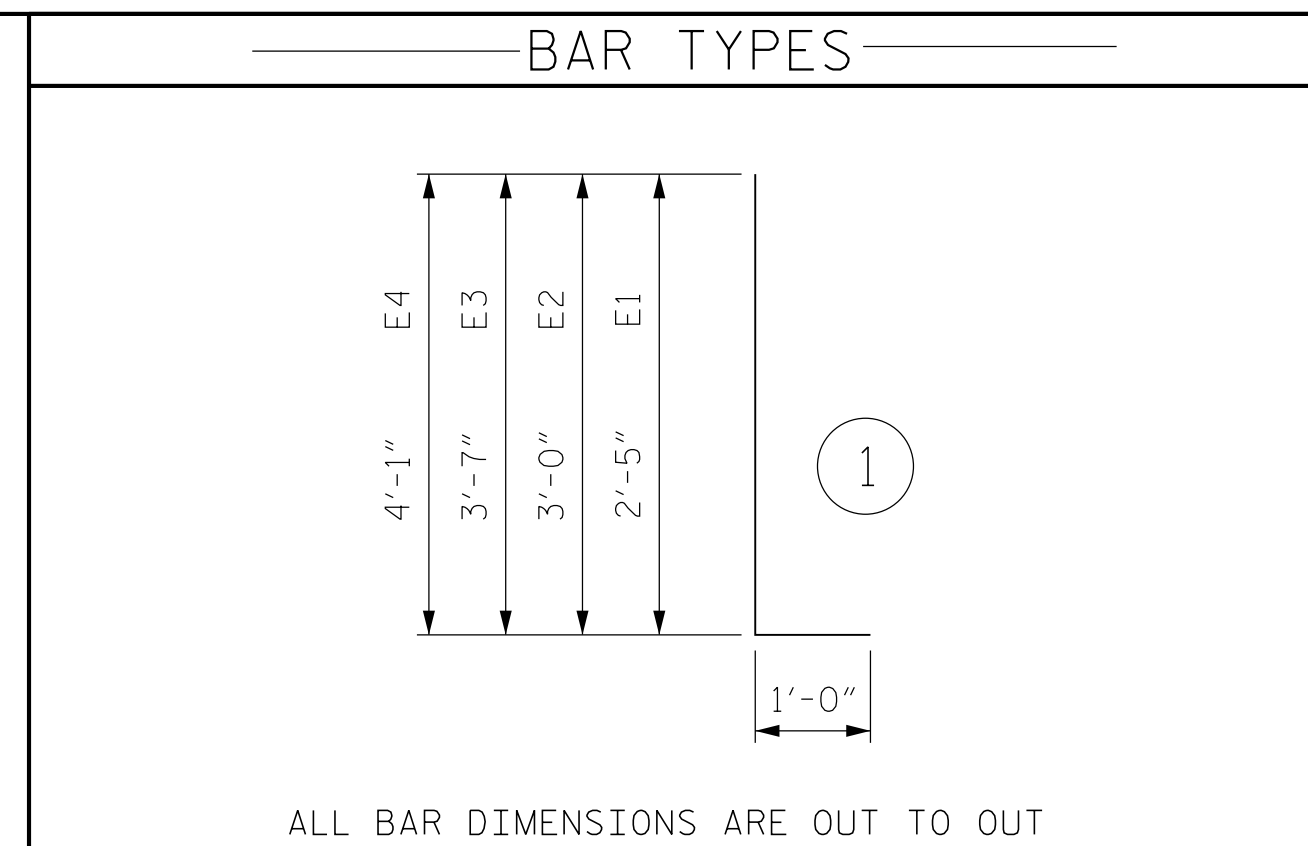
**Mattern & Craig**  
CONSULTING ENGINEERS - SURVEYORS  
FIRM LICENSE No. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 - FAX (828) 254-4562

Seal of Steven A. Campbell, Professional Engineer, No. 14309, State of North Carolina.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			51



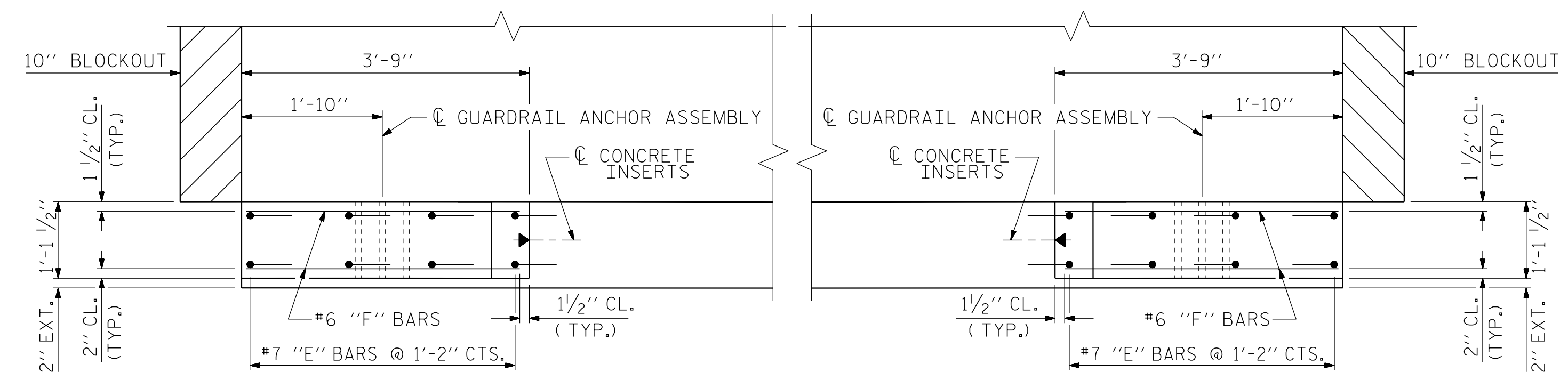
PLAN OF RAIL POST SPACING



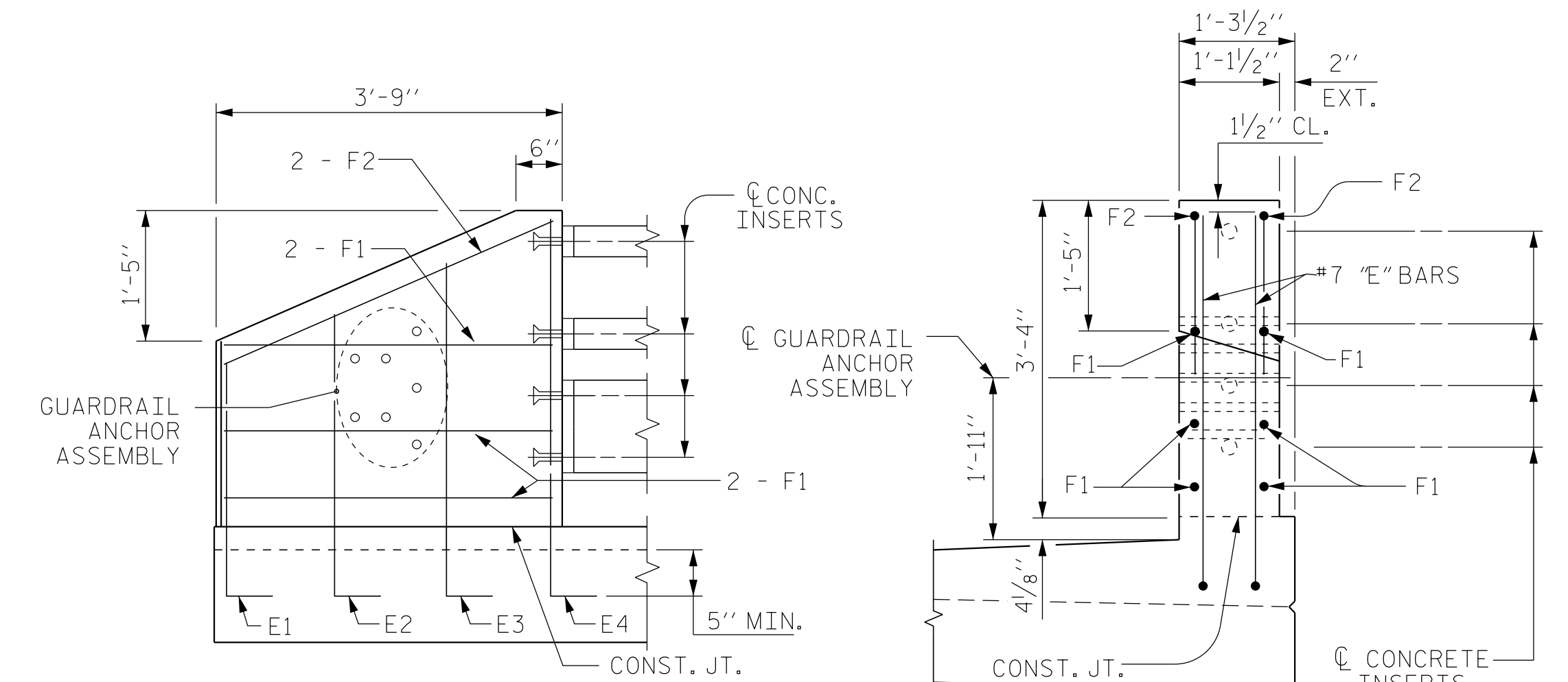
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL						
ONE END POST (4 REQ'D)						
	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
*	E1	2	#7	1	3'-5"	14
*	E2	2	#7	1	4'-0"	16
*	E3	2	#7	1	4'-7"	19
*	E4	2	#7	1	5'-1"	21
*	F1	6	#6	STR	3'-5"	31
*	F2	2	#6	STR	3'-8"	11
* EPOXY COATED REINFORCING STEEL					=	112 LBS.
CLASS AA CONCRETE					=	0.4 C.Y.

NOTE: PAYMENT FOR CONCRETE END POSTS SHALL BE INCLUDED IN THE PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".



PLAN



ELEVATION

END VIEW

END POST DETAILS

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

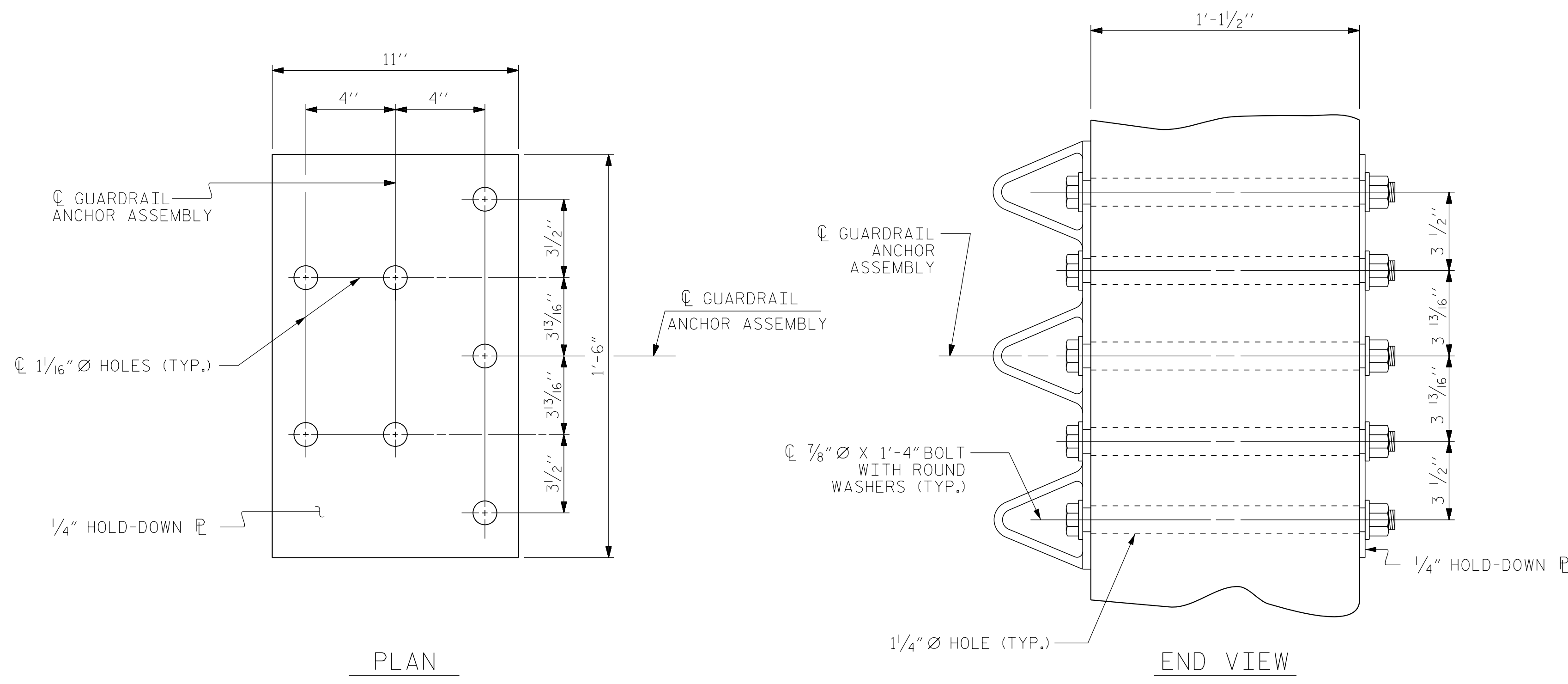
DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

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 (828) 254-2201 - FAX (828) 254-4582

DocuSigned by:  
  
 Steven A. Campbell 12/21/2015

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE RAIL POST SPACINGS & END POST DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-16
					TOTAL SHEETS 51



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.

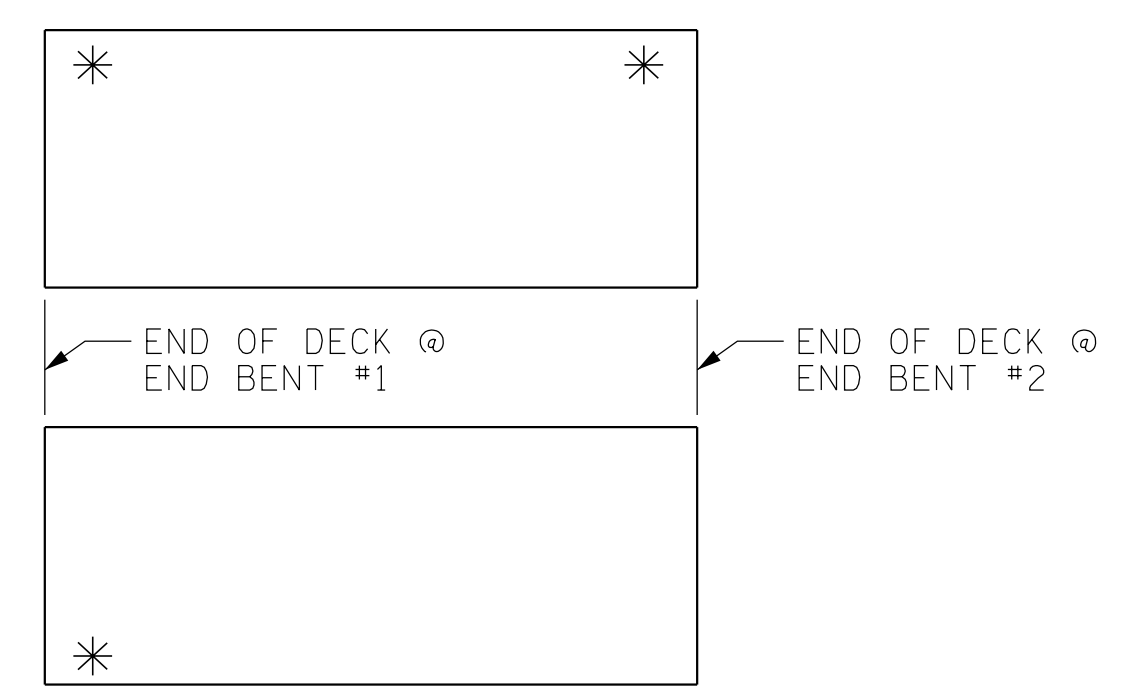
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

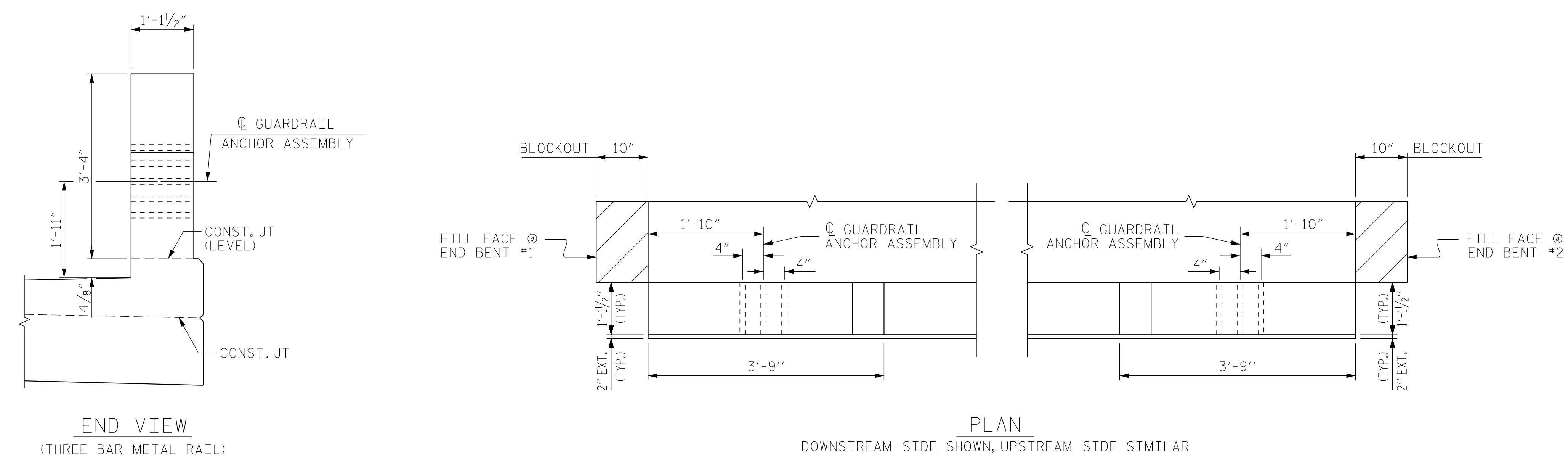
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

THE 1/4" 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. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

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

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	MAA 5/10	REV. 10/1/11	MAA/GM
CHECKED BY :	GM 5/10	REV. 12/5/11	MAA/GM
		REV. 6/13	MAA/GM

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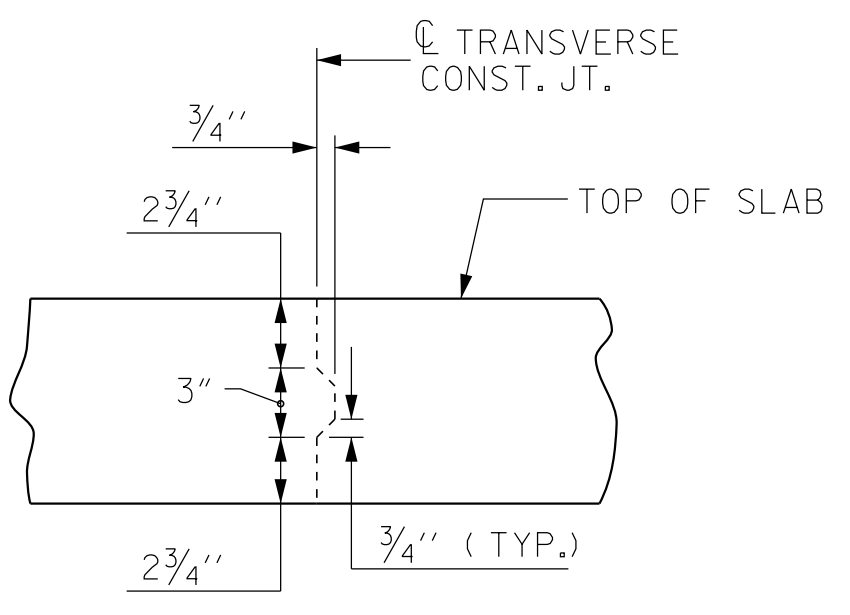
**Matter & Craig**  
CONSULTING ENGINEERS • SURVEYORS  
FIRM LICENSE No. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
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**Steven A. Campbell** 12/21/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			51

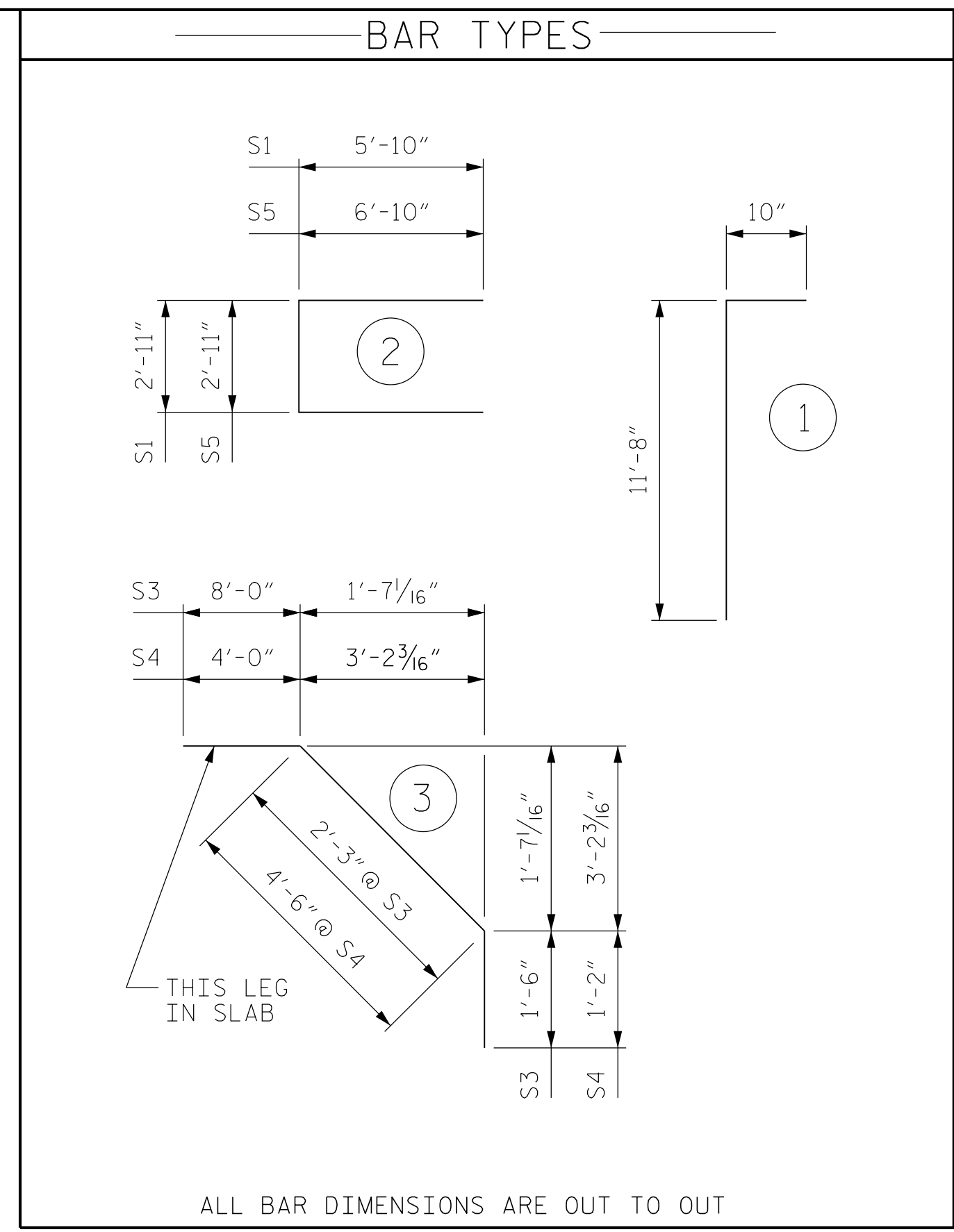
**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

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"			



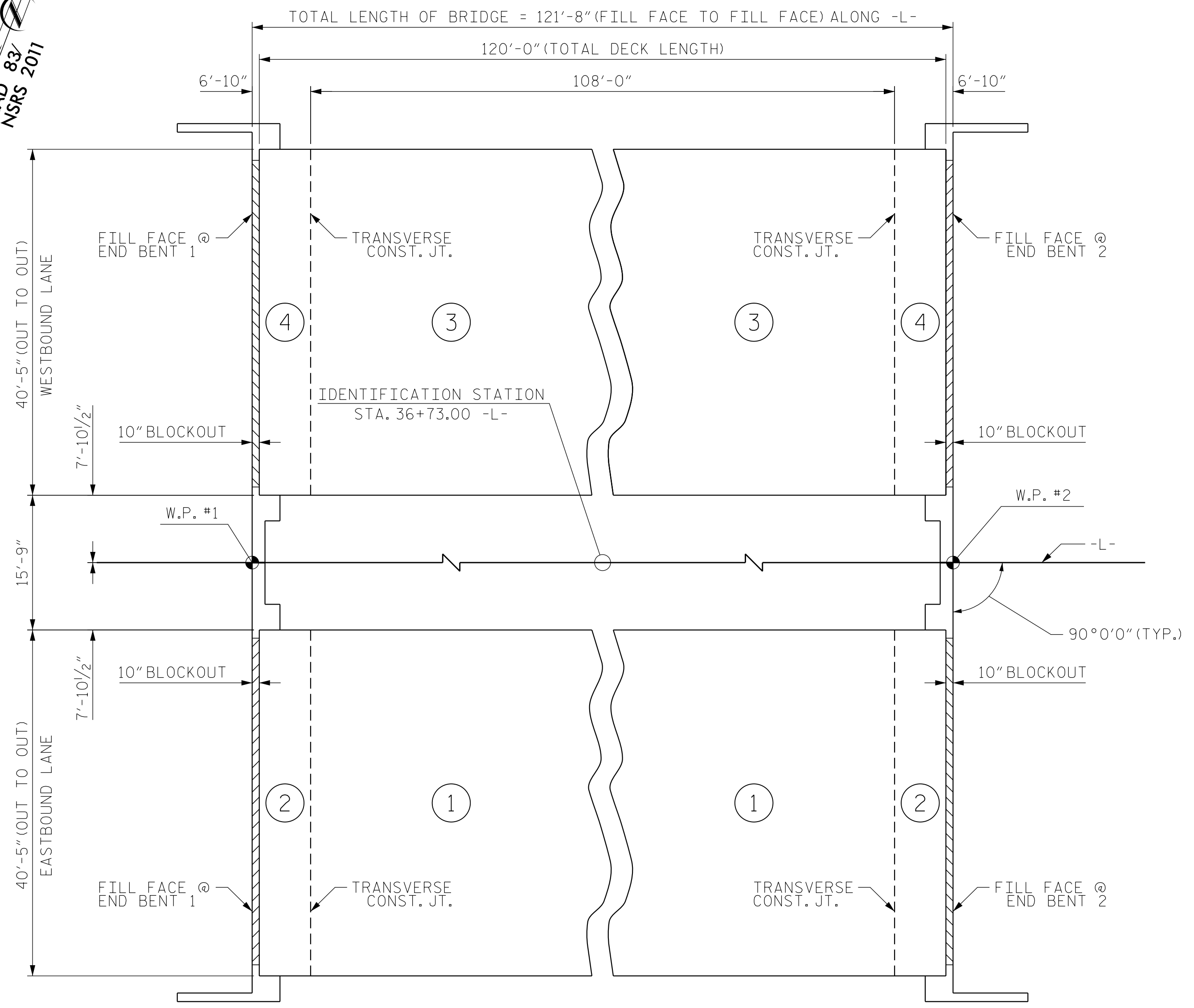
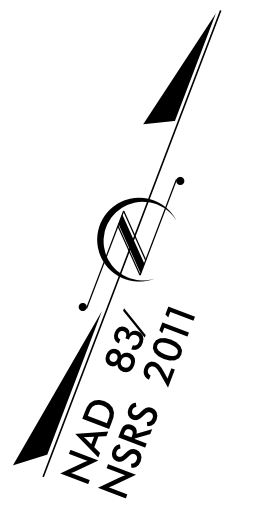
**TRANSVERSE CONSTRUCTION JOINT DETAIL**

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



BILL OF MATERIAL						
	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*	A3	412	#5	STR	40'-0"	17201
	A4	412	#5	STR	40'-0"	17201
*	B3	232	#4	STR	32'-0"	4960
*	B4	112	#8	STR	25'-0"	7482
	B5	48	#5	STR	42'-0"	2105
	B6	216	#5	STR	42'-0"	9469
*	B7	36	#4	STR	32'-0"	770
*	D1	144	#4	STR	0'-10"	81
*	G1	242	#4	STR	6'-2"	997
	H1	112	#5	1	12'-6"	1462
	H2	112	#7	STR	10'-0"	2292
	K1	56	#4	STR	24'-0"	898
	K2	16	#4	STR	5'-10"	63
	K3	80	#4	STR	7'-5"	397
	K4	16	#4	STR	4'-5"	48
	K5	8	#4	STR	4'-1"	22
	K6	40	#4	STR	4'-11"	132
	K7	8	#4	STR	3'-5"	19
	K8	16	#4	STR	2'-8"	29
	S1	104	#4	2	14'-7"	1014
*	S3	104	#4	3	11'-9"	817
*	S4	80	#4	3	9'-8"	517
	S5	16	#4	2	16'-7"	178

\* DENOTES EPOXY COATED REINF. STEEL



**POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9,835)**

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	132.3		
POUR 2	81.3		
POUR 3	132.3		
POUR 4	81.3		
POUR 5 *	20.9		
POUR 6 *	16.7		
TOTALS**	464.2	35,329	32,825

\* QUANTITY FOR POUR 5 IS FOR THE SIDEWALK ON THE NORTH SIDE OF THE STRUCTURE. QUANTITY FOR POUR 6 IS FOR THE SIDEWALK ON THE SOUTH SIDE OF THE STRUCTURE.

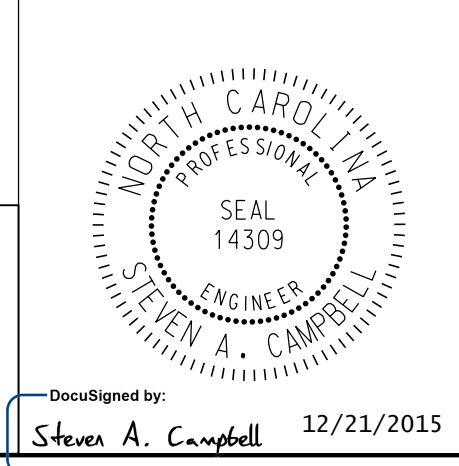
\*\* QUANTITIES FOR BARRIER RAIL AND THE END POSTS FOR THE METAL RAILS ARE NOT INCLUDED.

NOTE: THE UPPER PORTION OF THE END BENT WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE.

GROOVING BRIDGE FLOORS	
APPROACH SLABS	2,900 SQ.FT.
BRIDGE DECK	6,960 SQ.FT.
TOTAL	9,860 SQ.FT.

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BILL OF MATERIAL  
 & POUR SEQUENCE

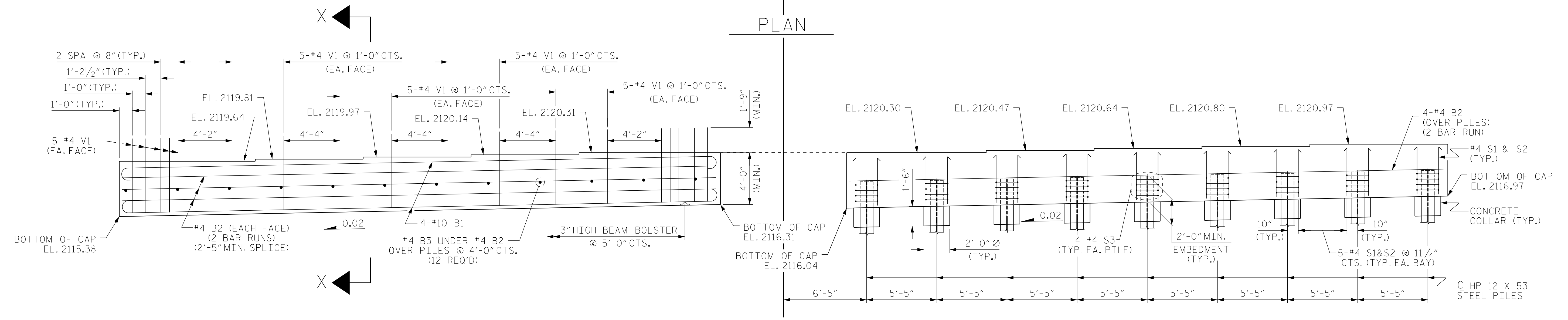
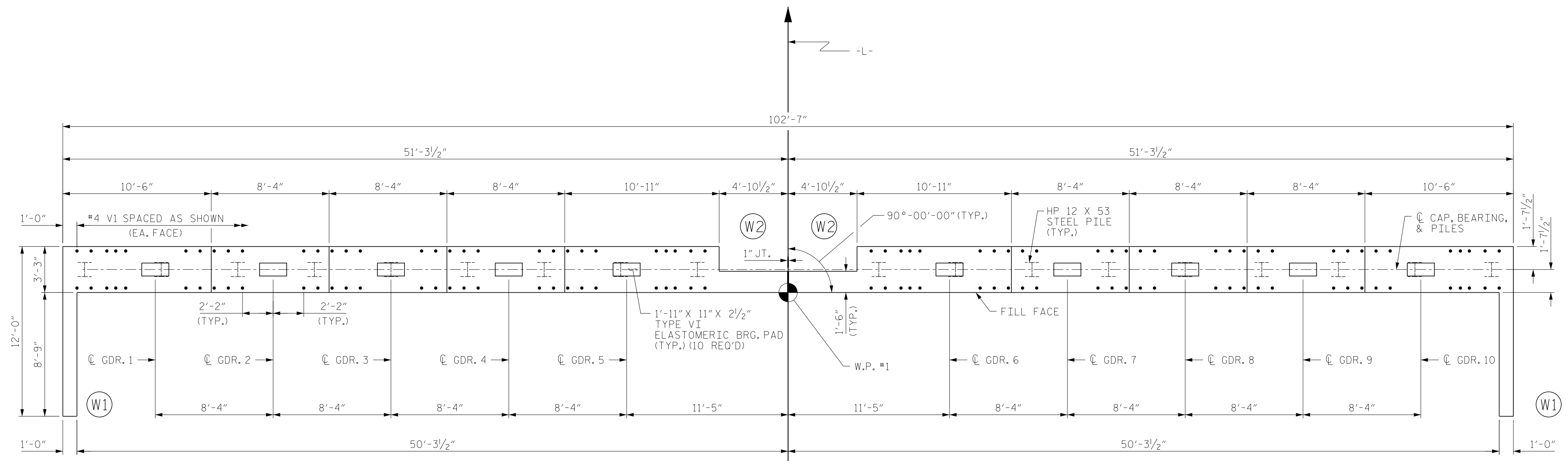


Prepared in the Office of:  
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 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			51

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
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

\*\*\*\*\*SYSTEMTIME\*\*\*\*\*  
 \*\*\*\*\*DOWNS\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



WESTBOUND LANE  
DETAILS SHOWN ARE TYPICAL FOR BOTH DIRECTIONS OF TRAFFIC

EASTBOUND LANE  
DETAILS SHOWN ARE TYPICAL FOR BOTH DIRECTIONS OF TRAFFIC

FOR WINGS, SEE SHEET 3 OF 4.  
FOR SECTION X-X, SEE SHEET 4 OF 4.  
CONCRETE COLLARS AND STEEL PILES NOT SHOWN IN PLAN VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

SHEET 1 OF 4

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR V1 BARS.
- FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.
- FOR WING DETAILS, SEE SHEET 3 OF 4.
- THE TOP OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

DRAWN BY : PEC DATE : 8/15  
CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEM\*\*\*\*\*  
\*\*\*\*\*DCN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

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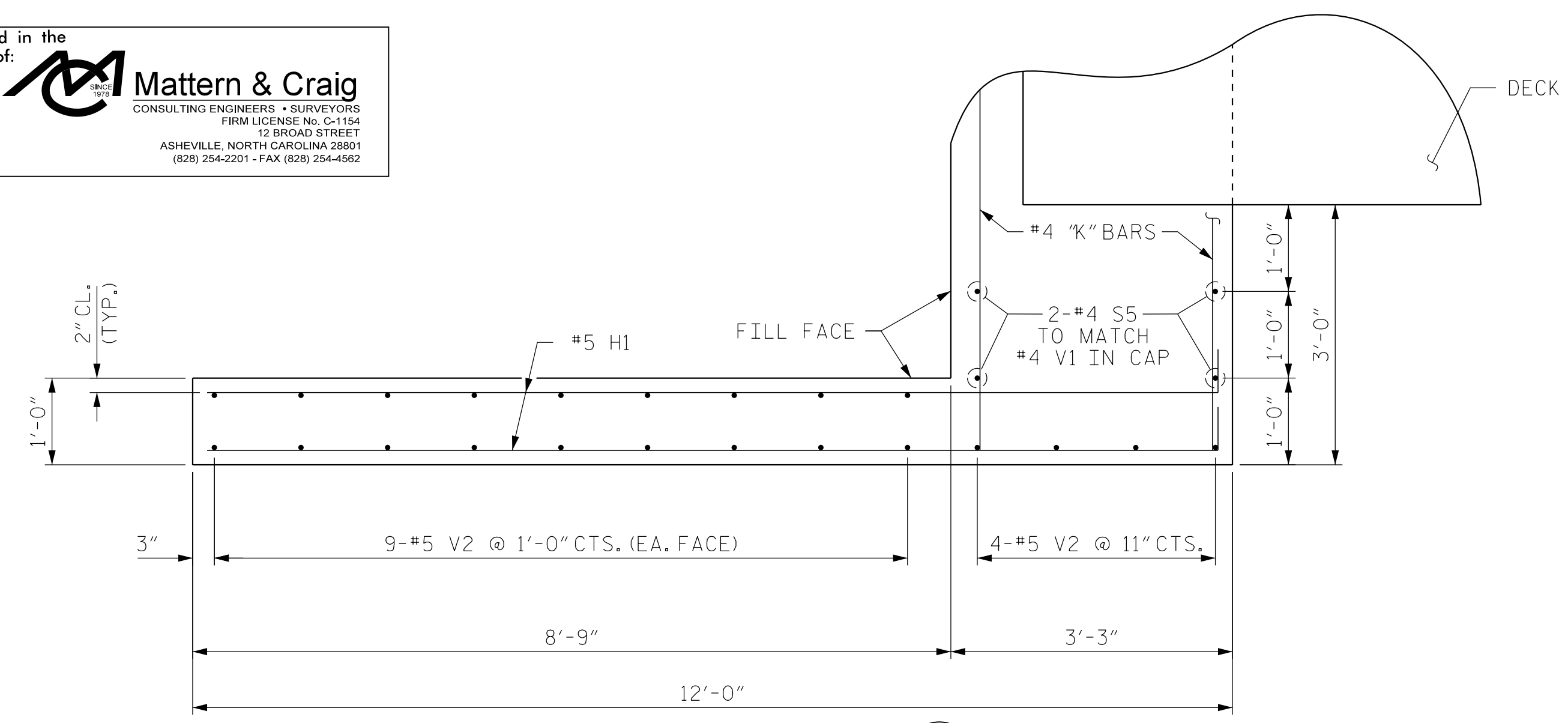
DocuSigned by:  
**Steven A. Campbell** 12/21/2015

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

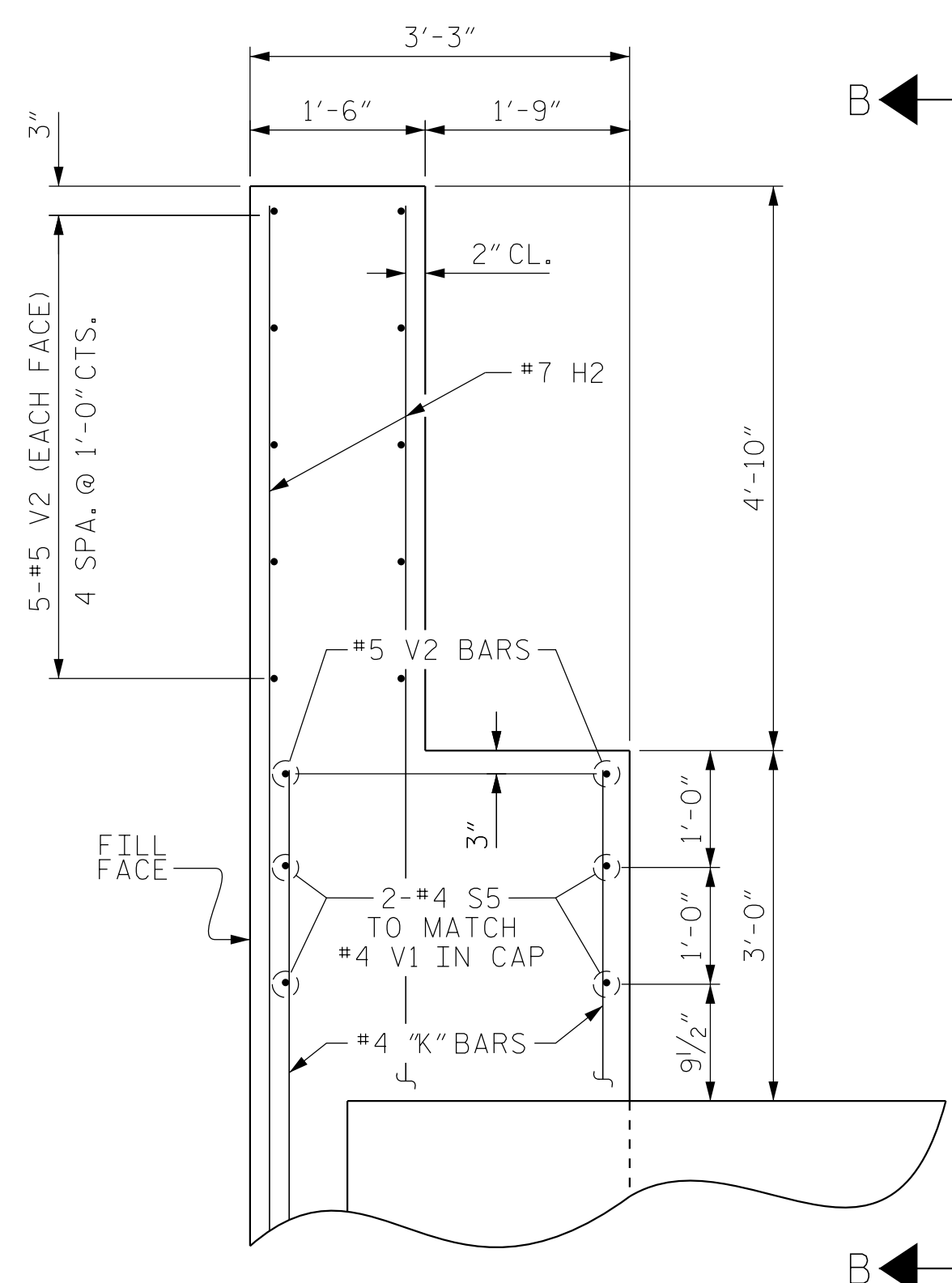
SUBSTRUCTURE  
END BENT No. 1  
(INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			51

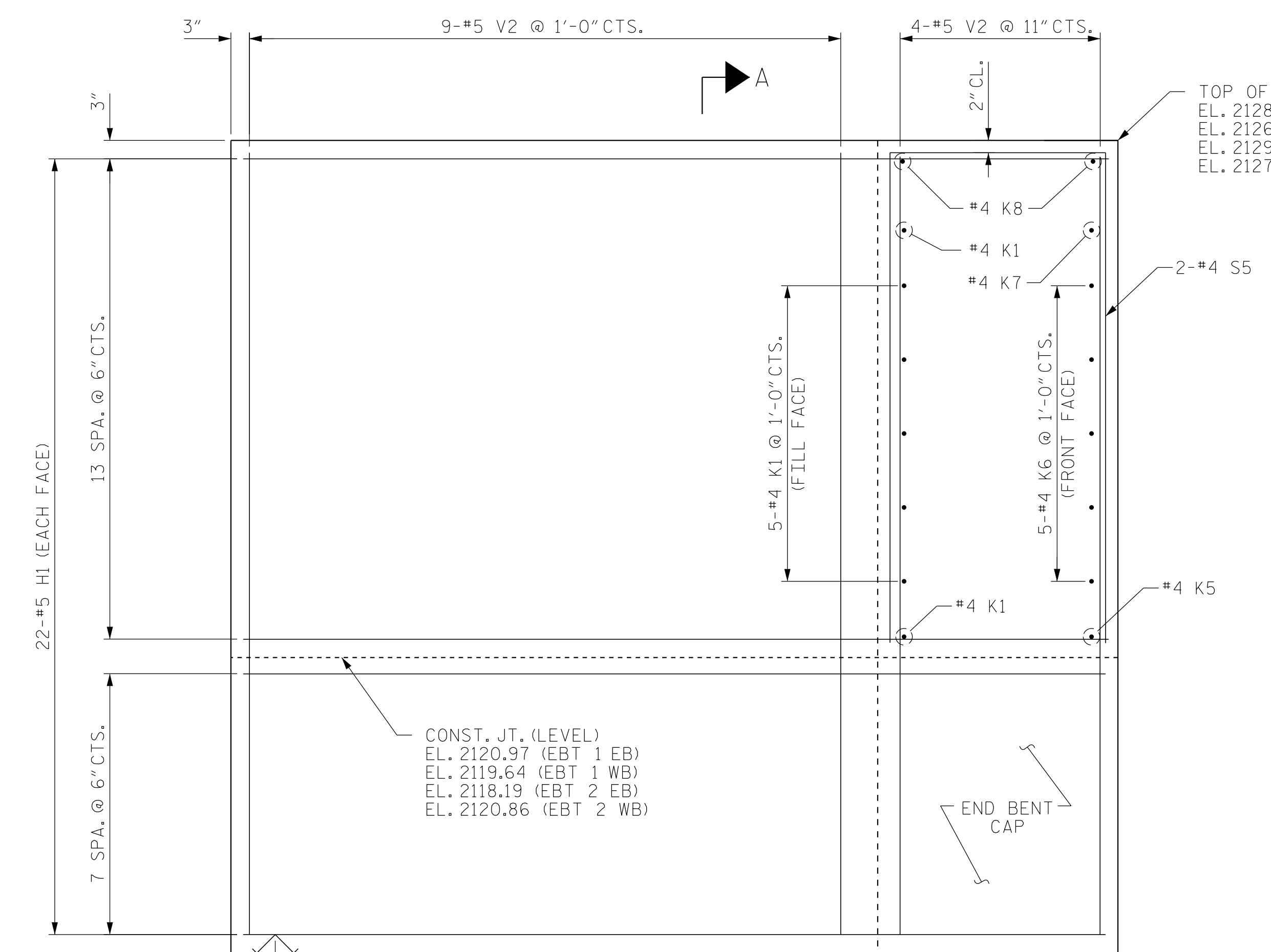




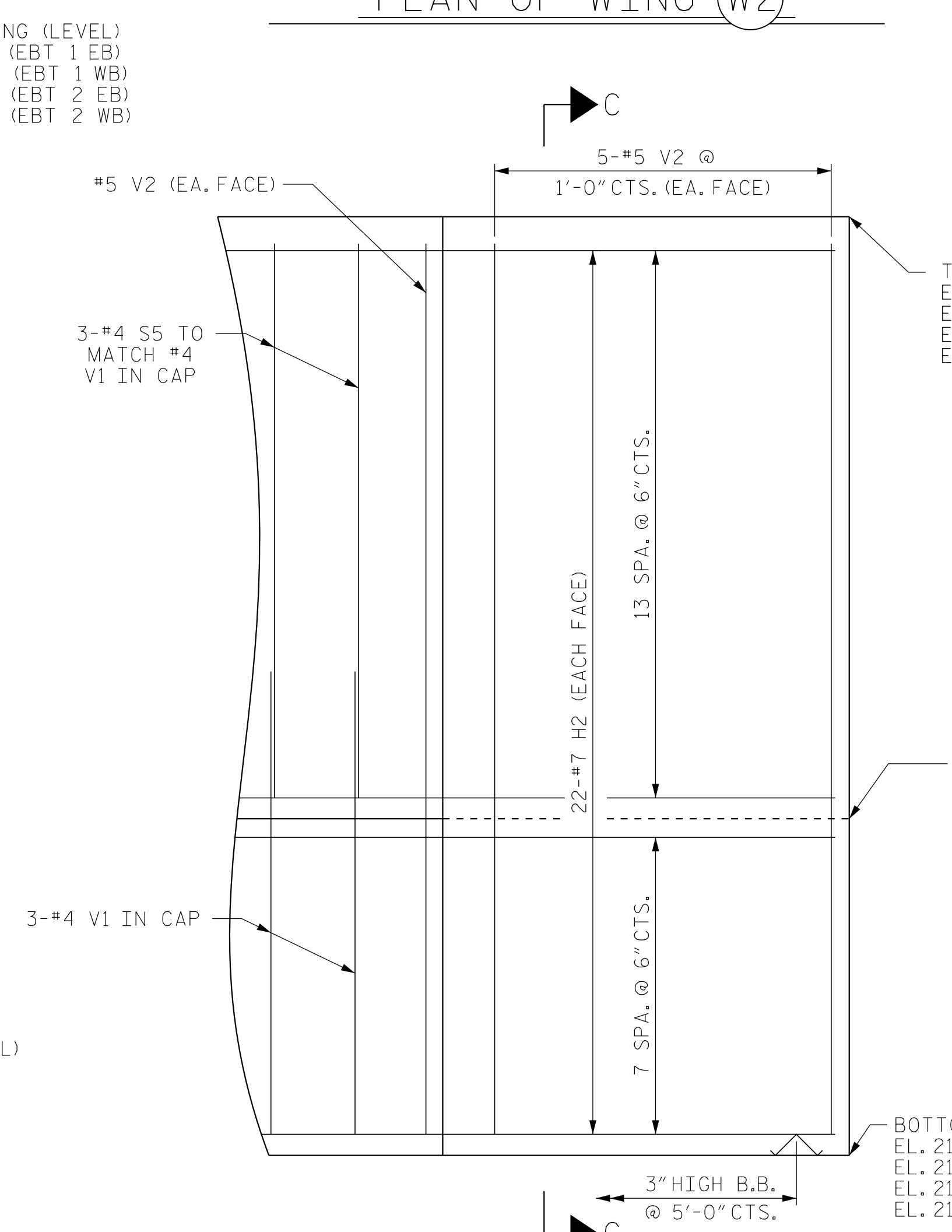
PLAN OF WING (W1)



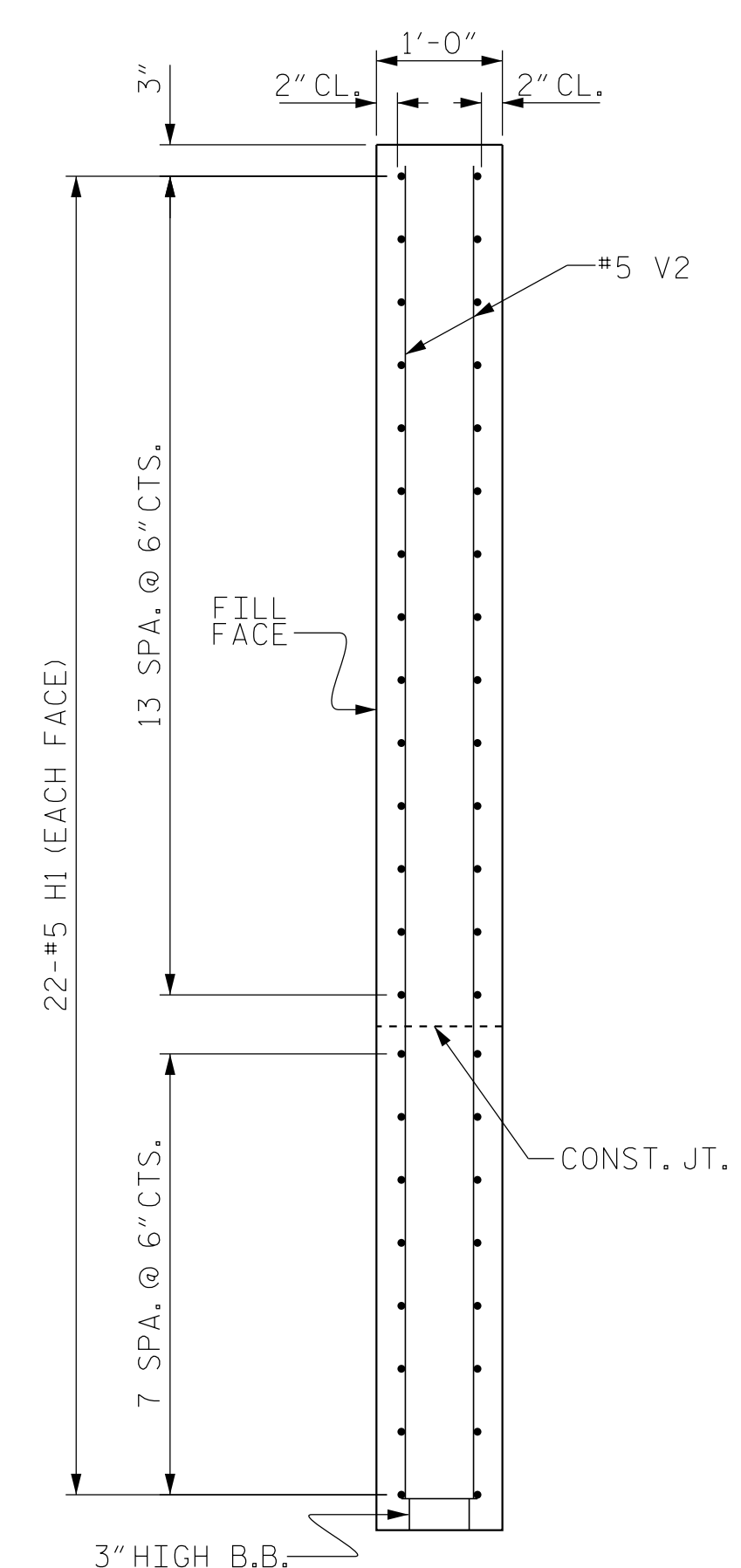
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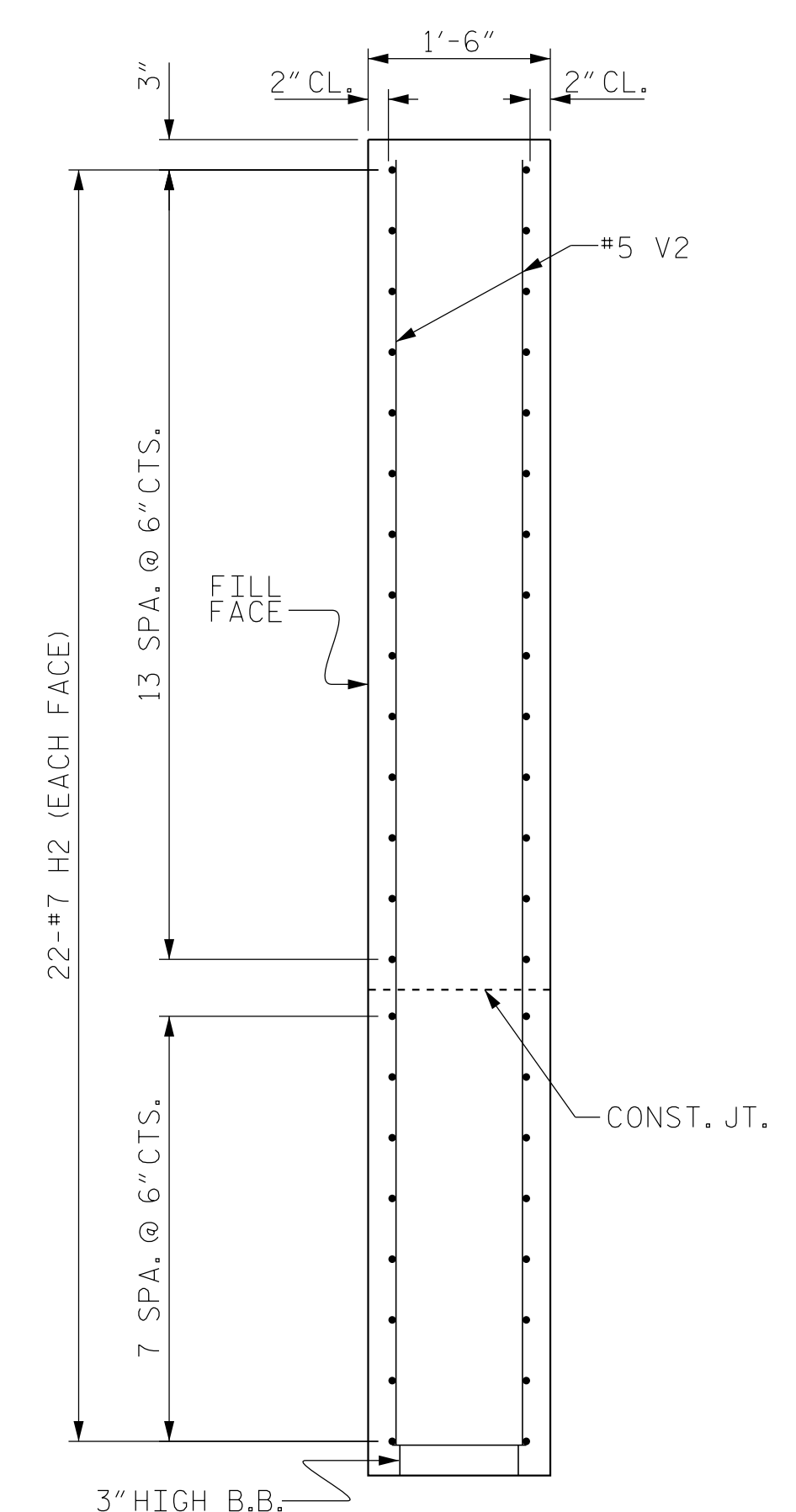
ELEVATION OF WING (W1)



ELEVATION B-B OF WING (W2)



SECTION A-A



SECTION C-C

NOTES

ALL MATERIALS BELOW THE CONSTRUCTION JOINTS ARE INCLUDED IN THE END BENT BILL OF MATERIAL, SEE SHEET 4 OF 4, ALL MATERIALS ABOVE THE CONSTRUCTION JOINTS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL, SEE SHEET NO. S-18.

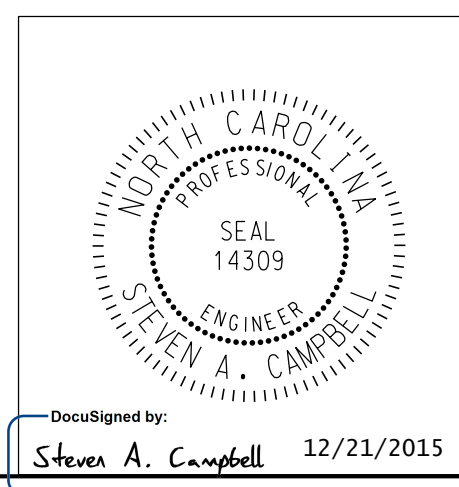
EBT = END BENT  
EB = EASTBOUND  
WB = WESTBOUND

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT  
WING DETAILS

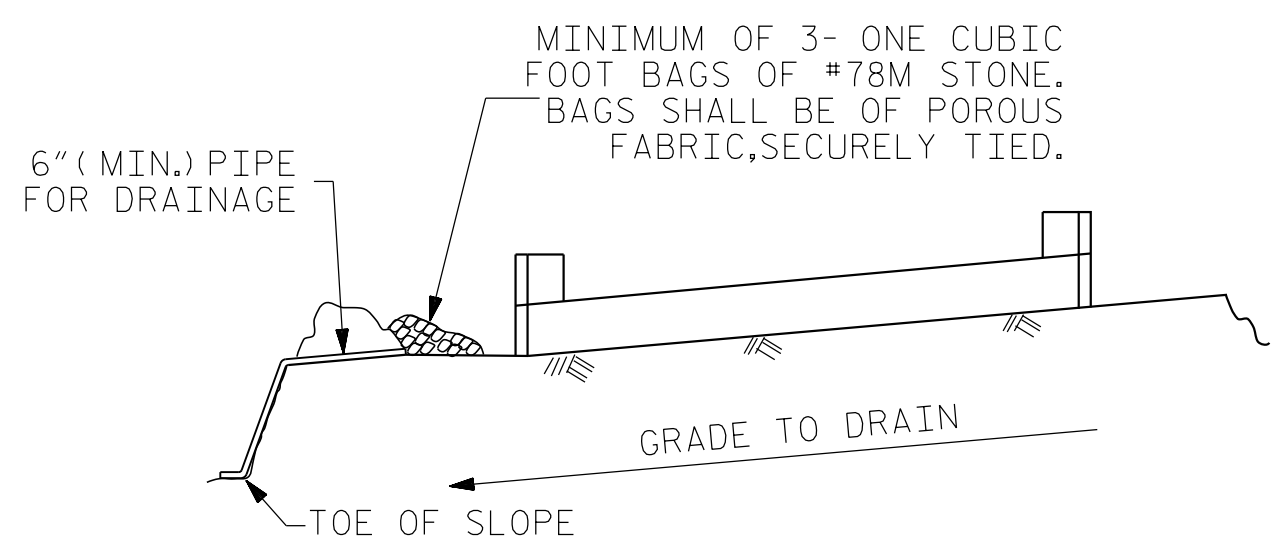


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	
2			4			51	

DRAWN BY : PEC DATE : 8/15  
CHECKED BY : CMT DATE : 8/15

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DocuSigned by:  
Steven A. Campbell 12/21/2015

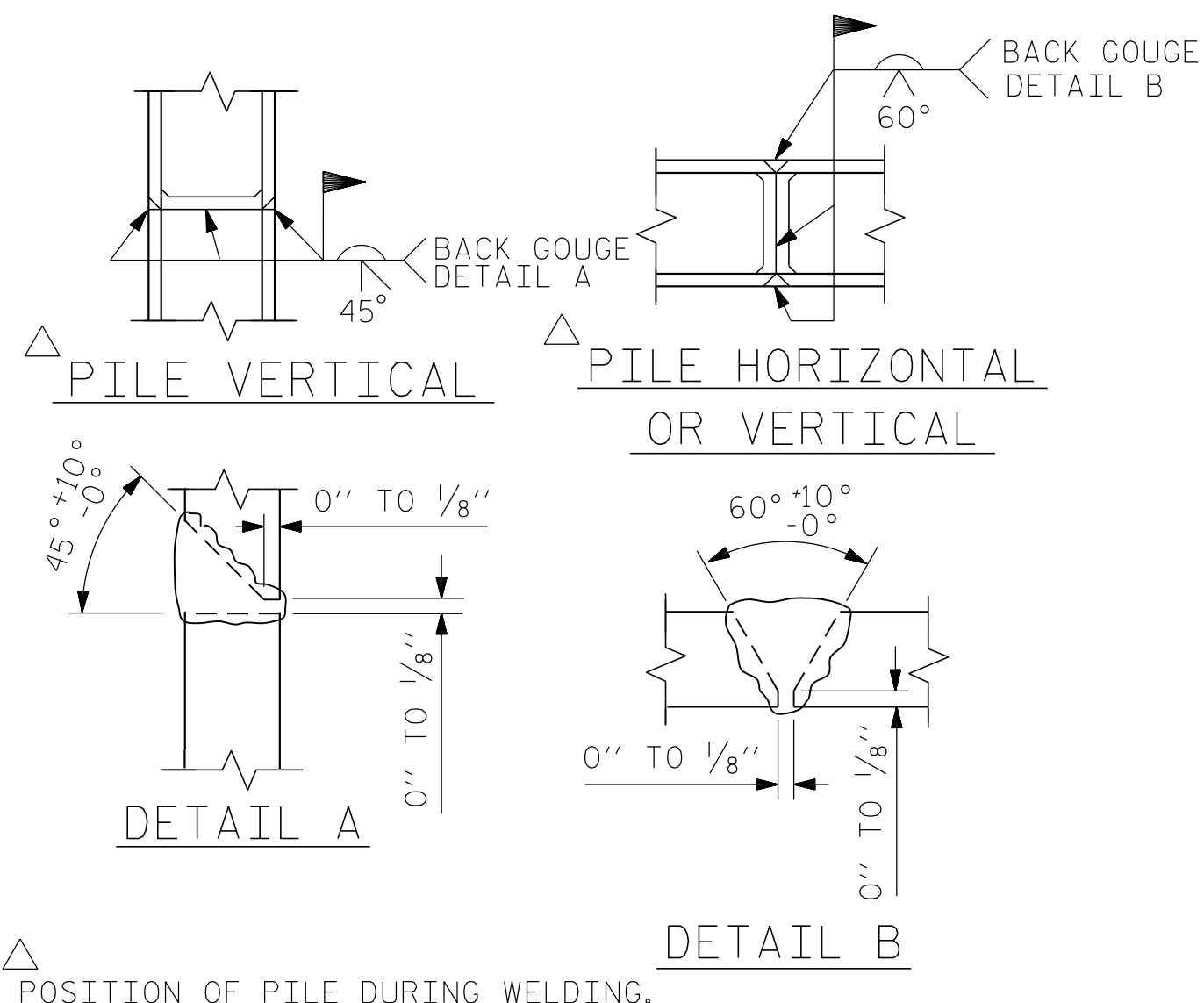


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

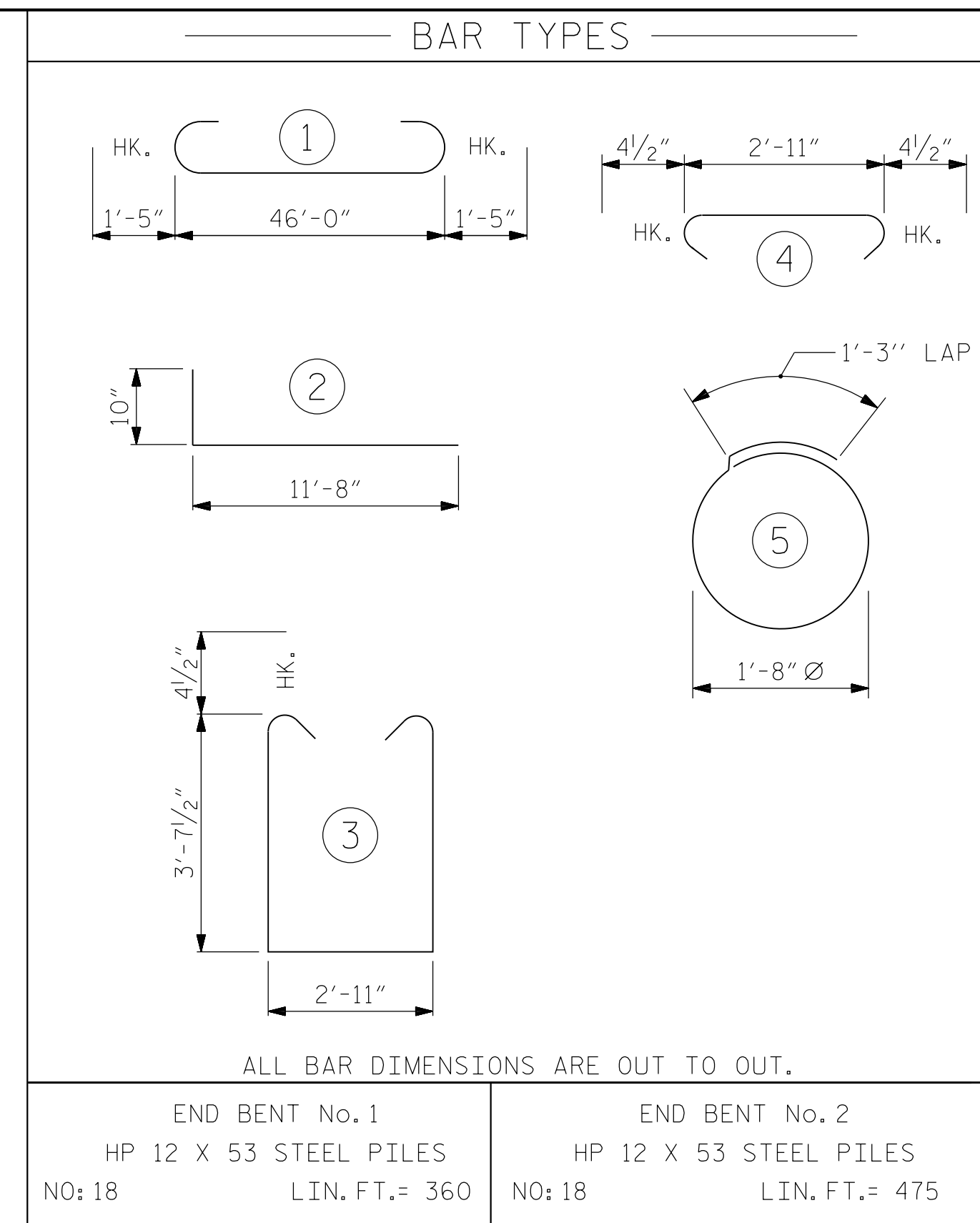
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

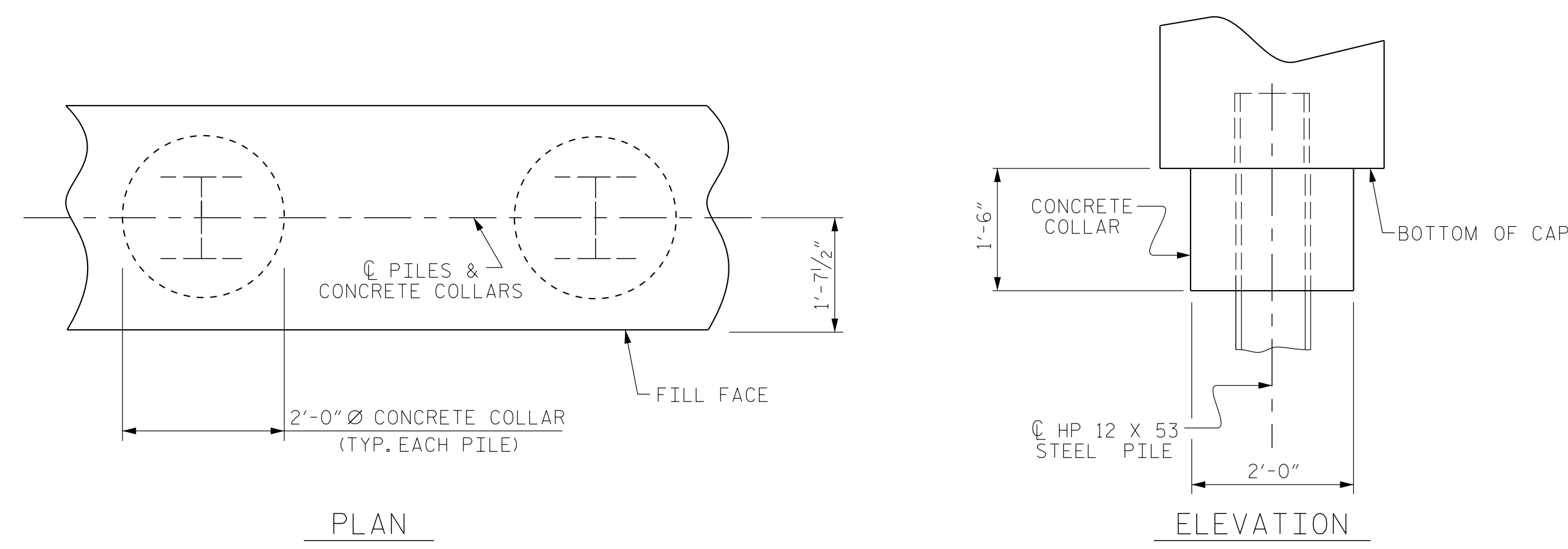


PILE SPLICE DETAILS

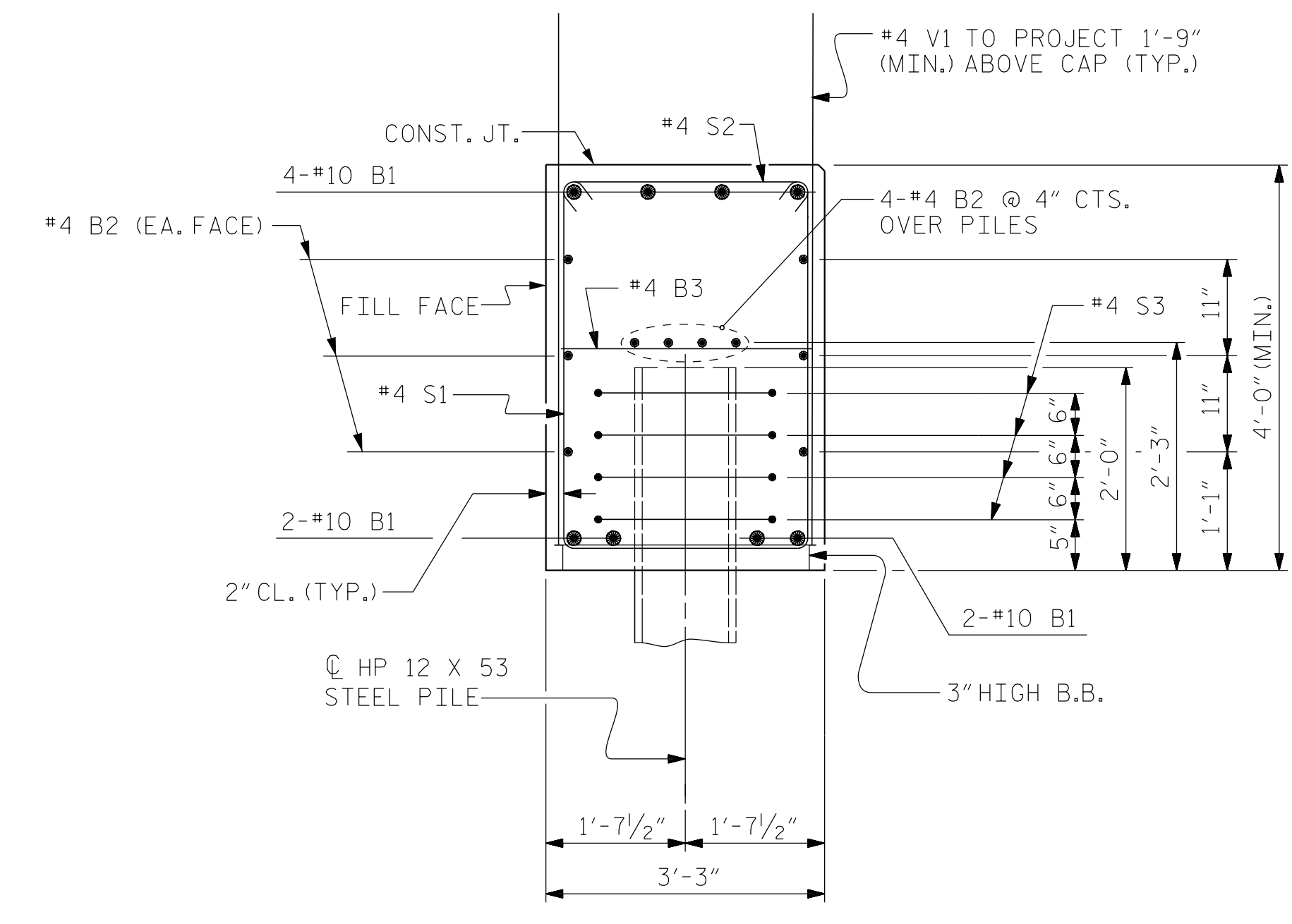


END BENT No. 1 HP 12 X 53 STEEL PILES NO: 18 LIN. FT.= 360	END BENT No. 2 HP 12 X 53 STEEL PILES NO: 18 LIN. FT.= 475
--	--

BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10		48'-10"	3376
B2	40	#4	STR	24'-4"	651
B3	24	#4	STR	2'-11"	47
H1	32	#5		12'-6"	418
H2	32	#7	STR	10'-0"	655
S1	84	#4		10'-11"	613
S2	84	#4		3'-8"	206
S3	72	#4		6'-6"	313
V1	120	#4	STR	6'-0"	481
V2	68	#5	STR	9'-5"	669
REINFORCING STEEL (FOR ONE END BENT)					7,429 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					57.3 C.Y.
TOTAL CLASS A CONCRETE					57.3 C.Y.



CORROSION PROTECTION FOR STEEL PILES DETAIL  
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-  
SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT No. 1 & 2  
DETAILS

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : WJH 12/11	REV. 8/14 MAA/TMG
CHECKED BY : AAC 12/11	

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\*\*\*\*\*USERNAME\*\*\*\*\*

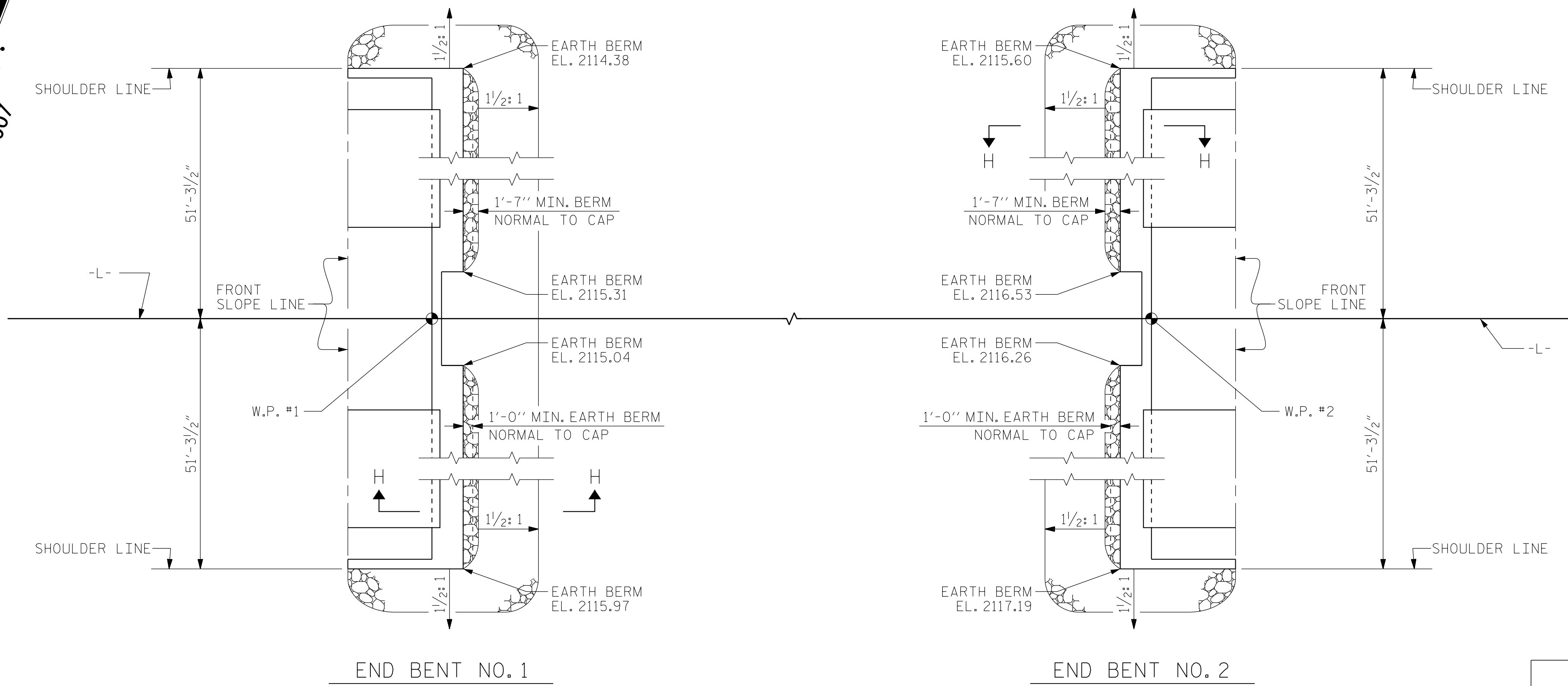
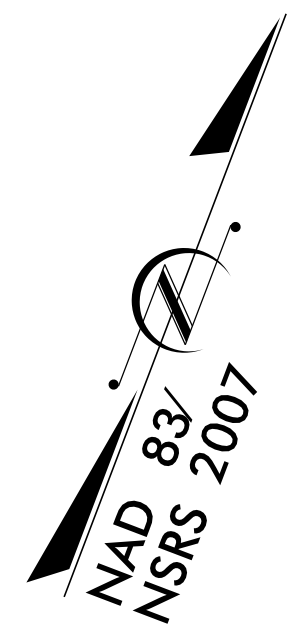
Prepared in the Office of:

**Mattern & Craig**  
CONSULTING ENGINEERS & SURVEYORS  
FIRM LICENSE NO. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 - FAX (828) 254-4582

Seal of Steven A. Campbell, Engineer, State of North Carolina, License No. 14309.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			51

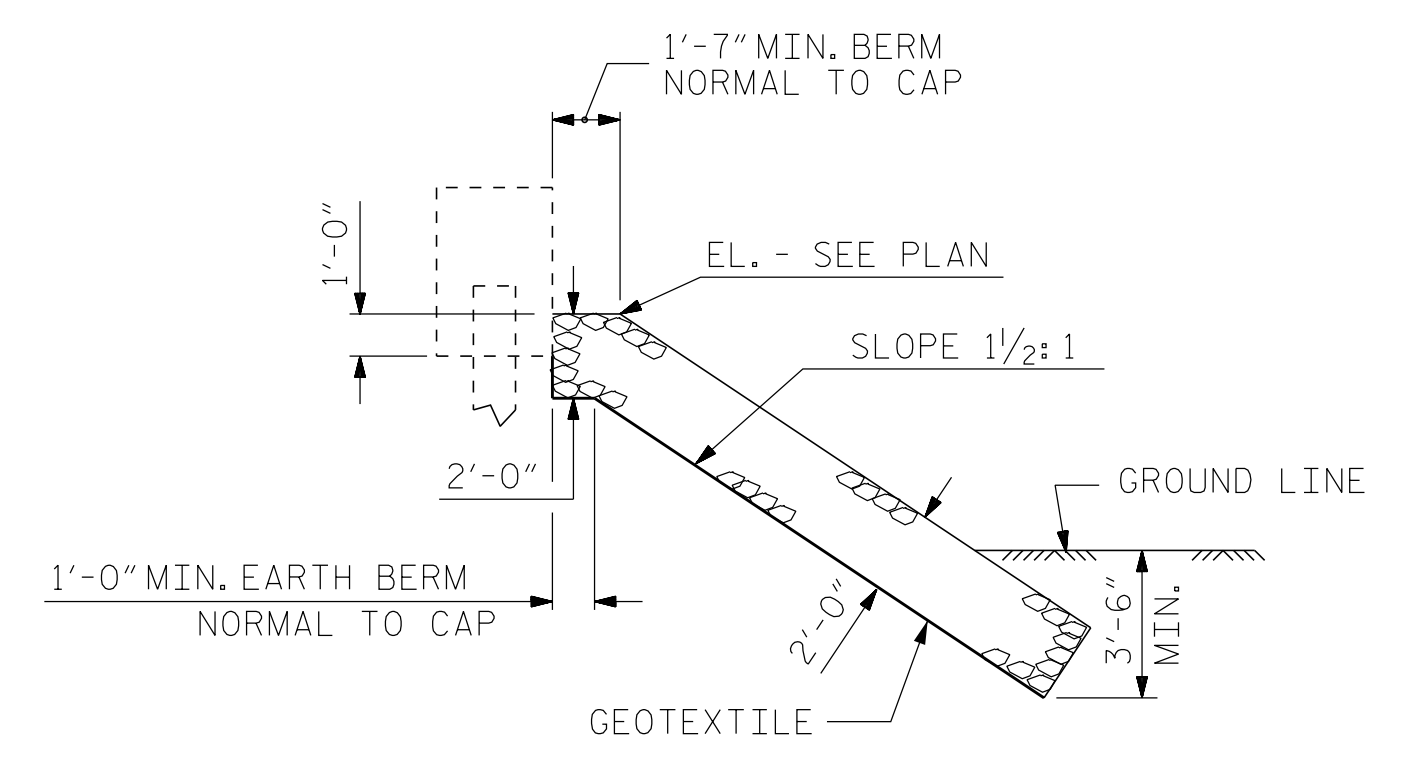




PLAN

NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

ESTIMATED QUANTITIES		
BRIDGE @ STA. 36+73.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	114	127
END BENT 2	82	92



SECTION H-H  
BERM RIP RAPPED

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 36+73.00 -L-

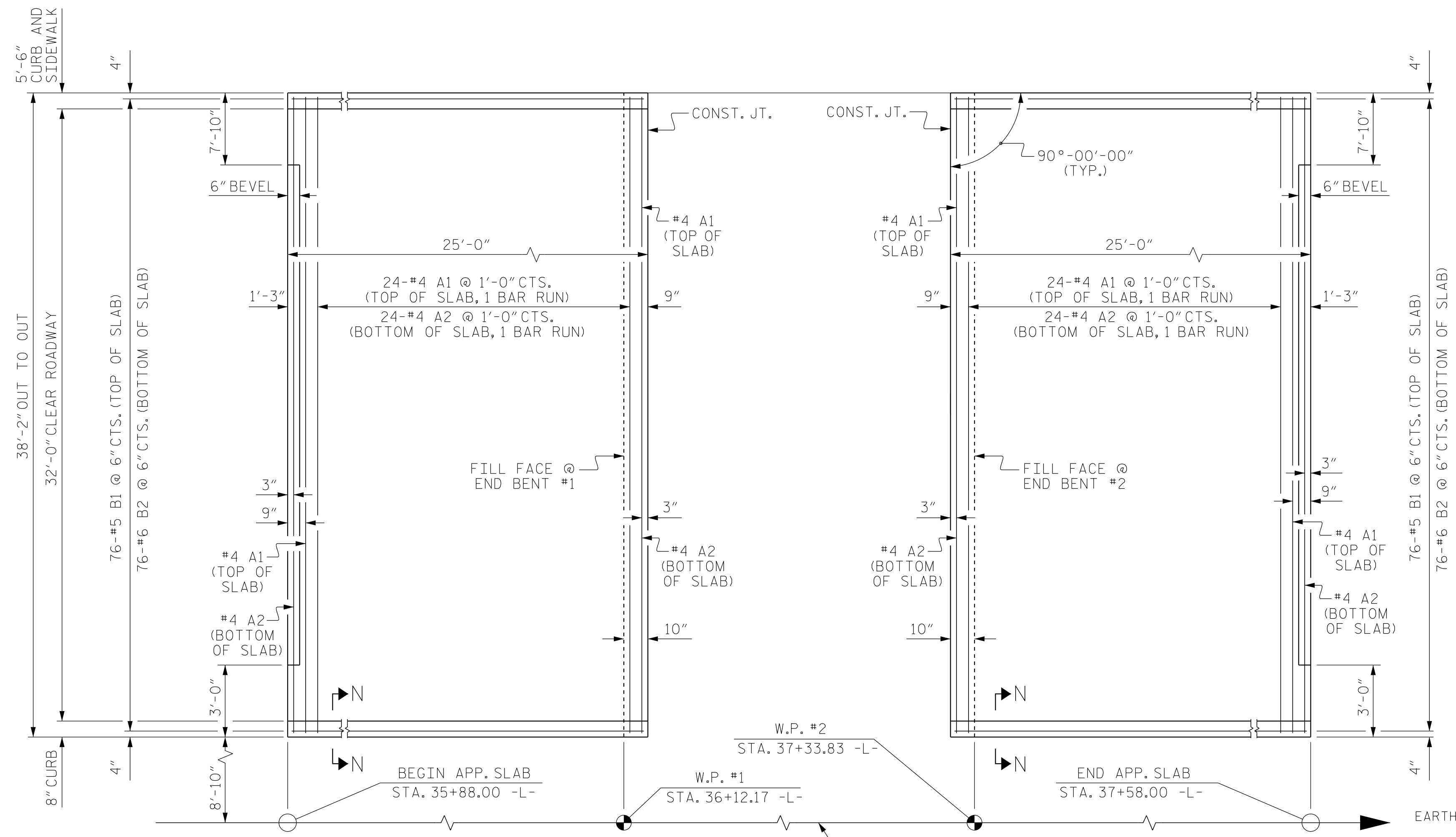
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CHECKED BY : CMT	DATE : 8/15
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

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\*\*\*\*\*SDGN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

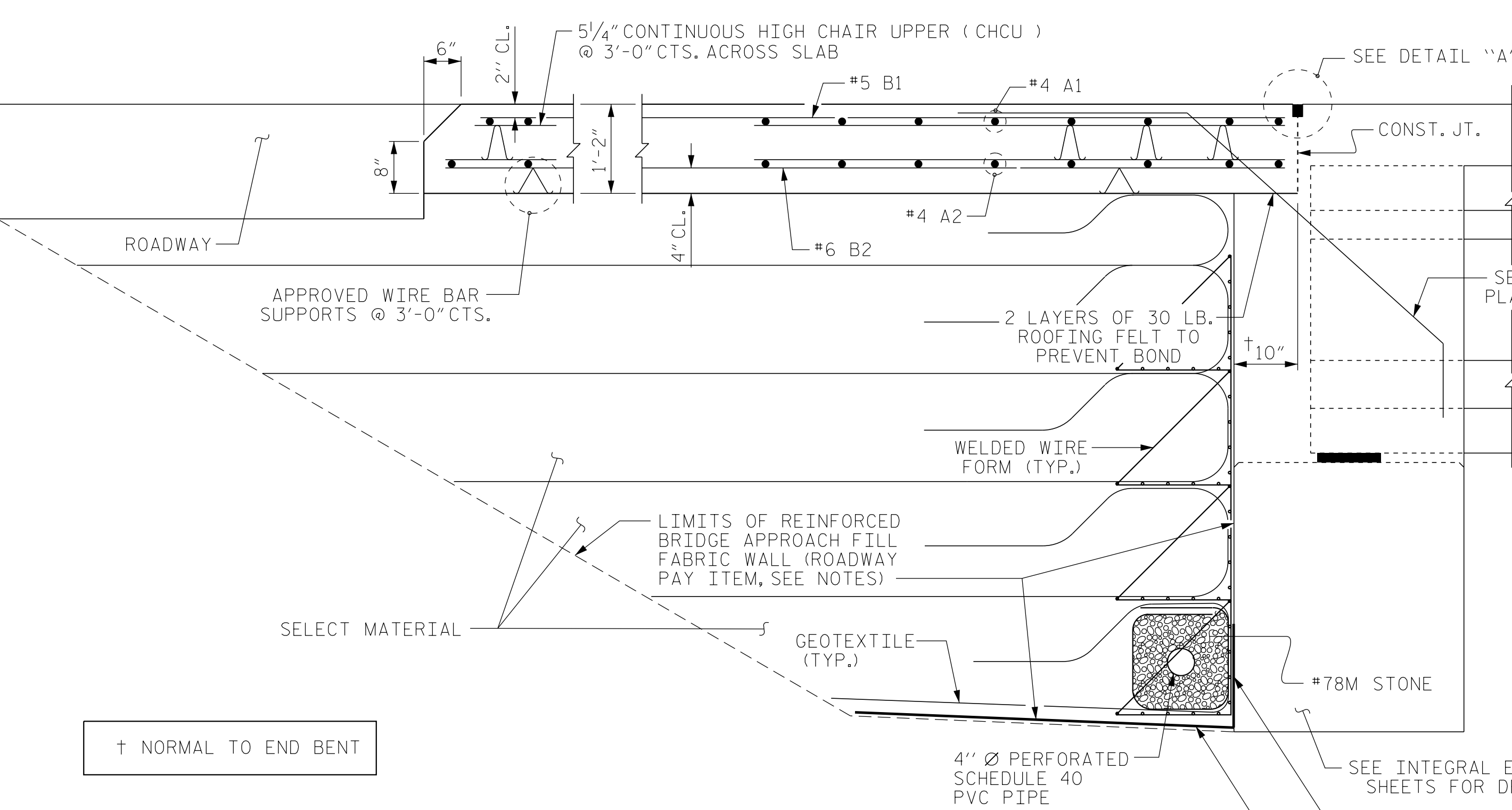
Prepared in the Office of:

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			51



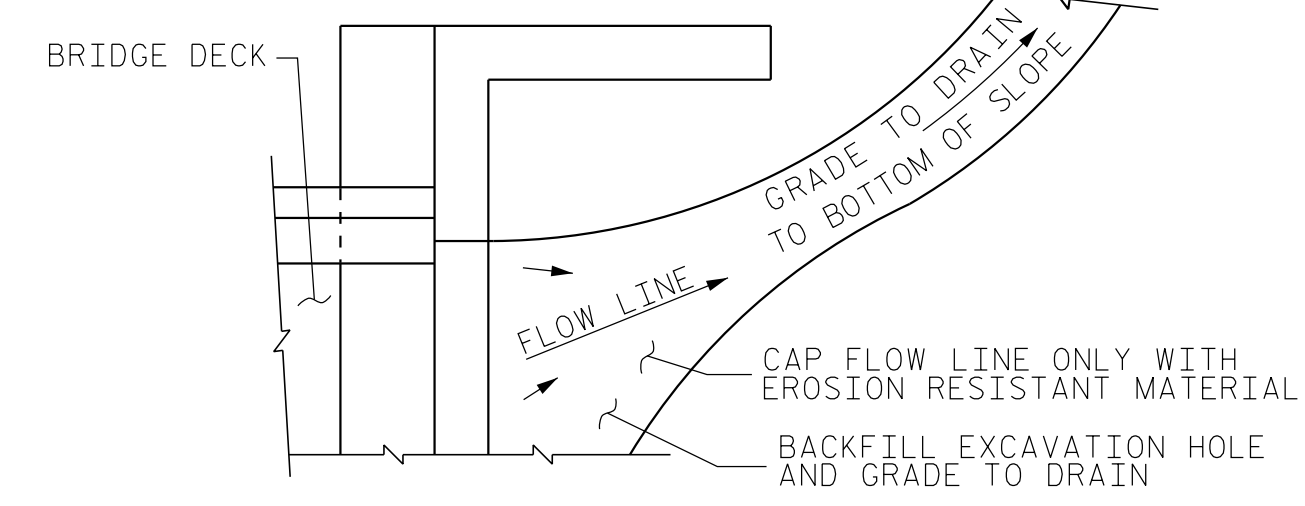
PLAN @ END BENT #1 PLAN @ END BENT #2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

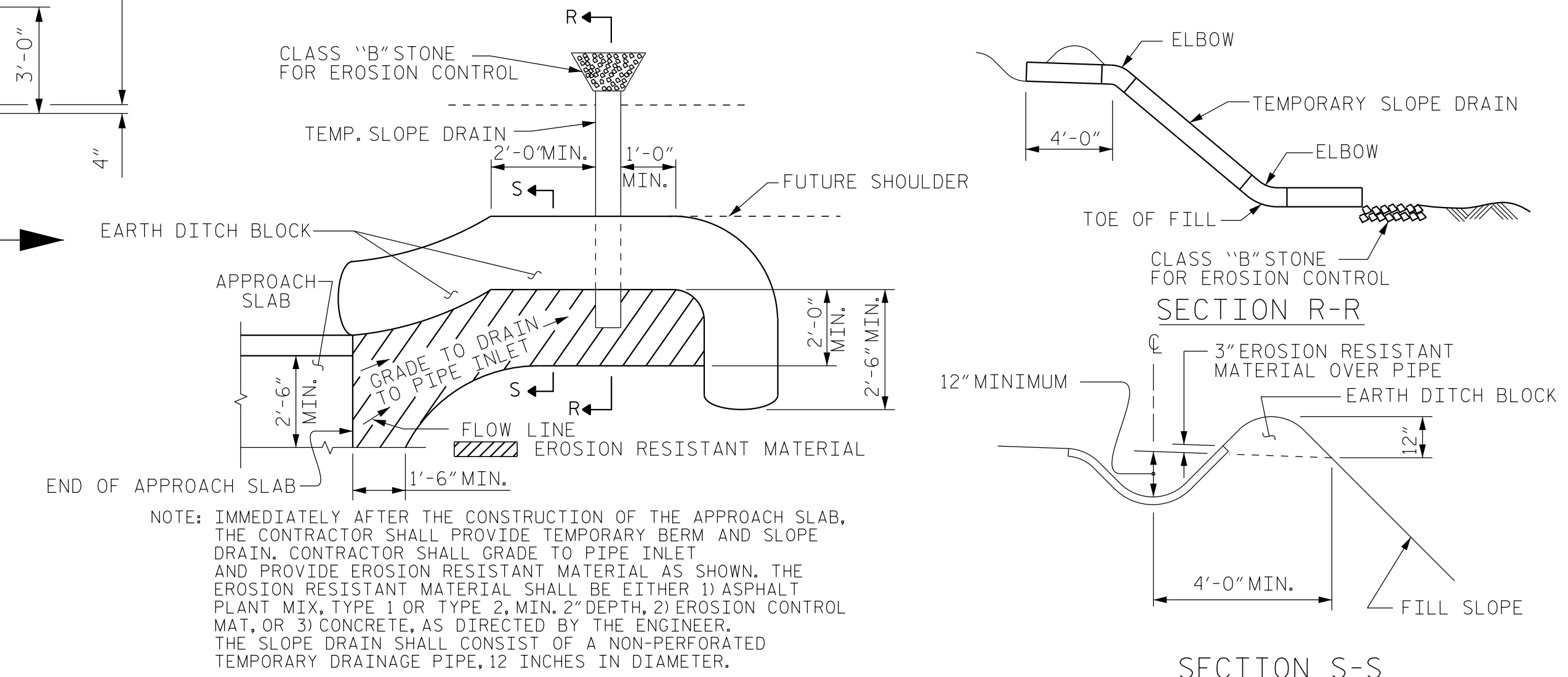
NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.  
 FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, 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 PLAN.  
 THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS TO NOT MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

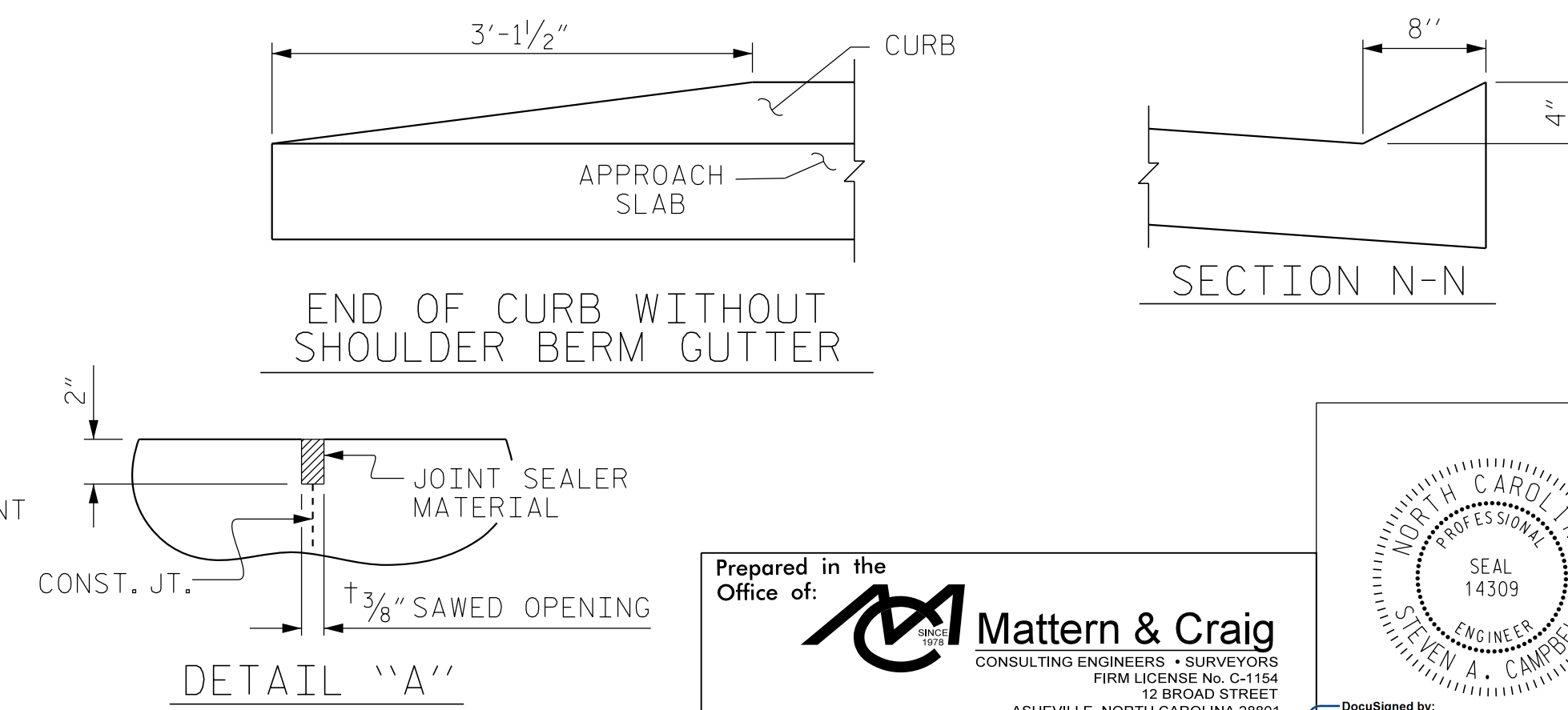


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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



END OF CURB WITHOUT SHOULDER BERM GUTTER

DETAIL "A"

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (4 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	37'-10"	658
A2	26	#4	STR	37'-10"	658
* B1	76	#5	STR	24'-2"	1917
B2	76	#6	STR	24'-8"	2818
REINFORCING STEEL				LBS.	3,476
* EPOXY COATED REINFORCING STEEL				LBS.	2,575
CLASS AA CONCRETE				C. Y.	41.2

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	TLA	REV. 10/1/11	MAA/GM
CHECKED BY :	GM	REV. 12/21/11	MAA/GM
		REV. 6/13	MAA/GM

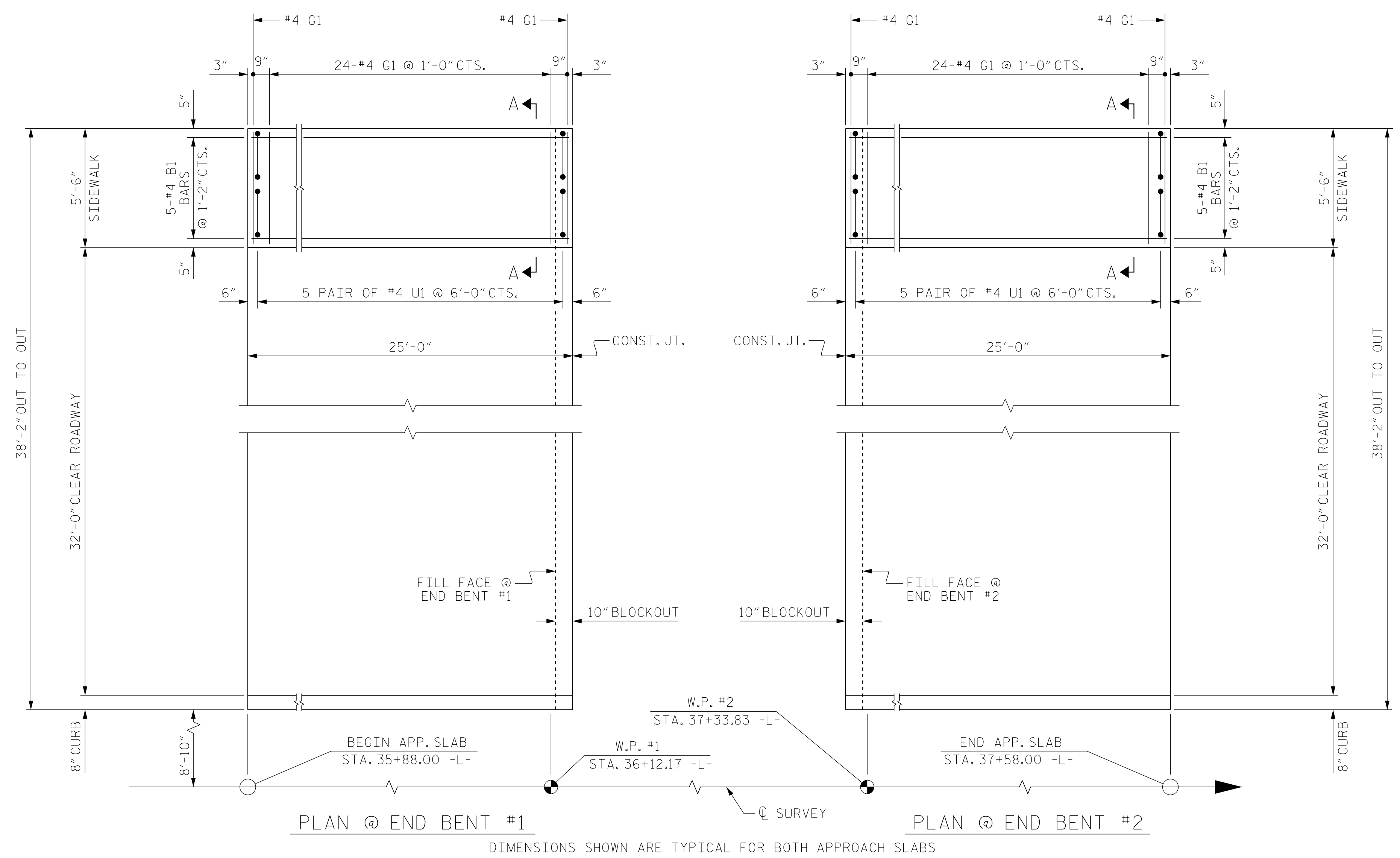
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PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-  
 SHEET 1 OF 2

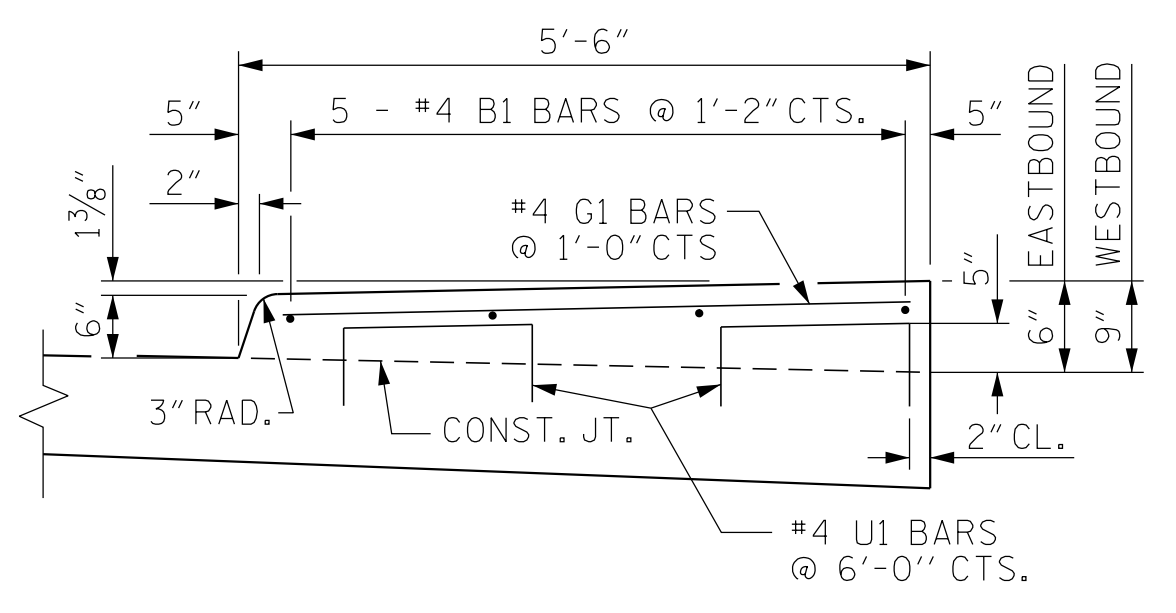
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

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

SHEET NO. S-24  
 TOTAL SHEETS 51



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION A-A

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
SIDEWALK FOR ONE APPROACH SLAB (4 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	5	#4	STR	24'-8"	83
* G1	26	#4	STR	5'-0"	87
* U1	10	#4	1	3'-6"	24
* EPOXY COATED REINFORCING STEEL				LBS.	194
CLASS AA CONCRETE				C. Y.	3.3

NOTES

SIDEWALK ON APPROACH SLAB SHALL BE PAID FOR IN BRIDGE APPROACH SLAB PAY ITEM.

THE #4 U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER THE APPROACH SLAB HAS BEEN FINISHED.

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 36+73.00 -L-

SHEET 2 OF 2

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

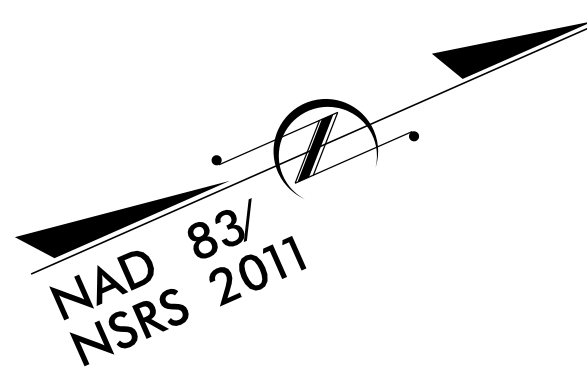
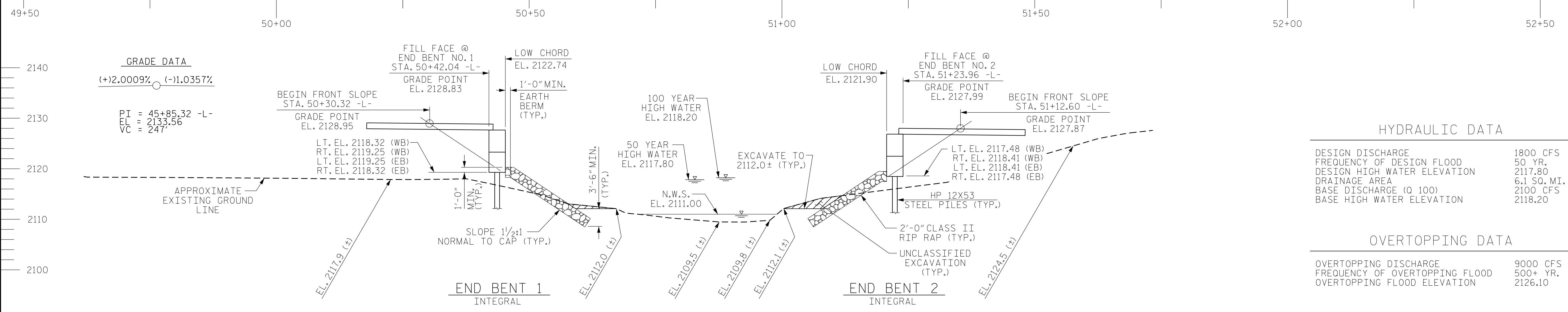
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25	
1			3			TOTAL SHEETS	51
2			4				

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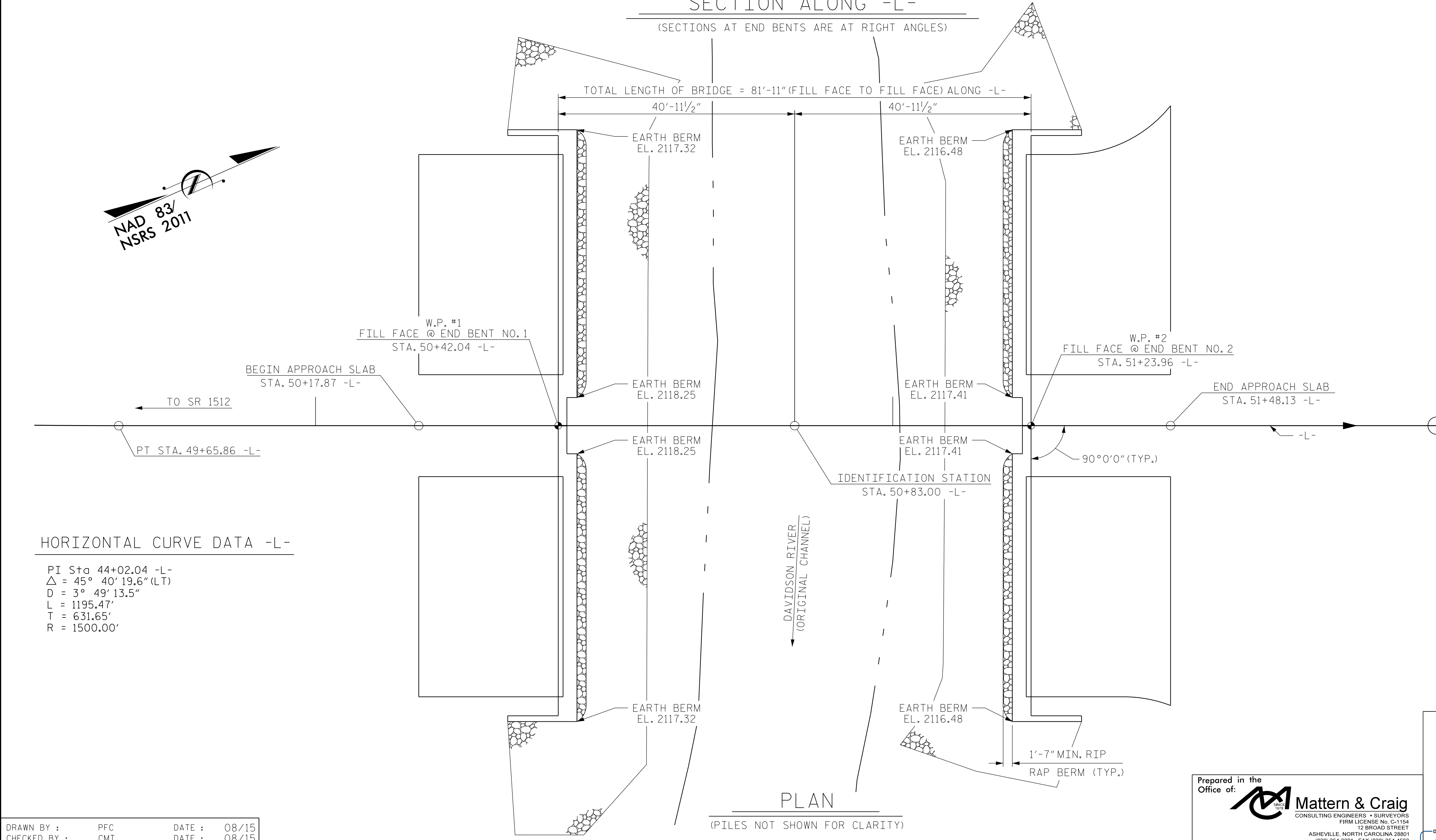
Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS • SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 • FAX (828) 254-4562

DocuSigned by:  
  
**Steven A. Campbell** 12/21/2015

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I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.



PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 1 OF 4  
 BRIDGE NO. 324 (WB)  
 BRIDGE NO. 325 (EB)

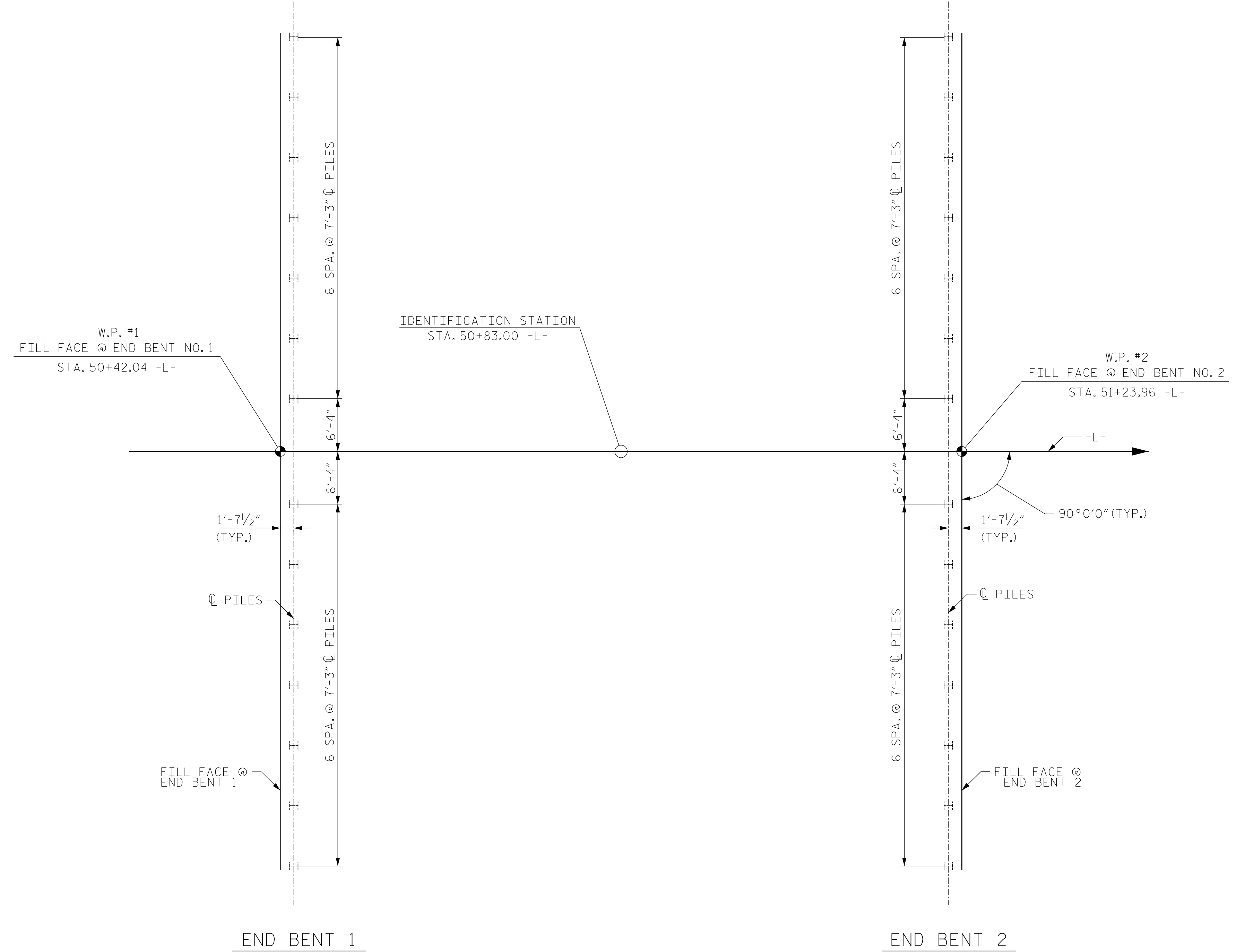
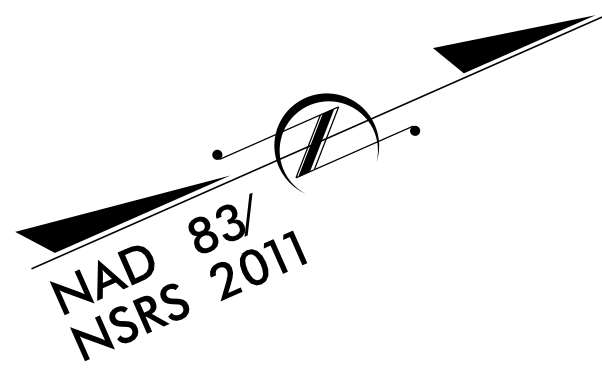
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON DAVIDSON  
 RIVER VILLAGE CONNECTOR  
 OVER DAVIDSON RIVER  
 (ORIGINAL CHANNEL)  
 BETWEEN US 64 AND SR 1512

DRAWN BY : PFC DATE : 08/15  
 CHECKED BY : CMT DATE : 08/15

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS - SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4562

SEVEN A. CAMPBELL  
 ENGINEER  
 DocuSigned by:  
 Steven A. Campbell 12/21/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			51



### FOUNDATION LAYOUT PLAN

ALL PILES ARE HP 12 X 53 GRADE 50 STEEL PILES

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON DAVIDSON  
 RIVER VILLAGE CONNECTOR  
 OVER DAVIDSON RIVER  
 (ORIGINAL CHANNEL)  
 BETWEEN US 64 AND SR 1512

DRAWN BY : PEC DATE : 8/15  
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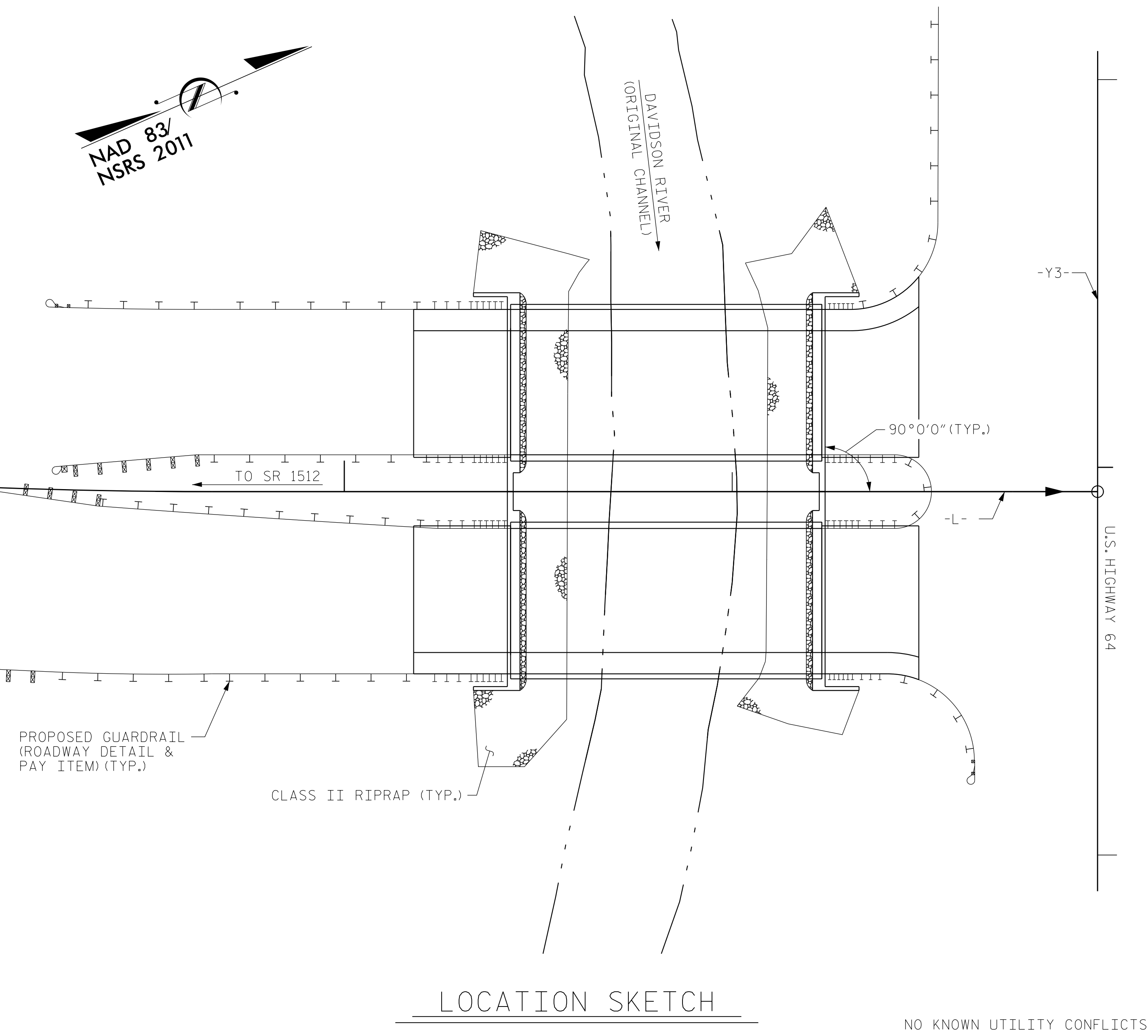
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			51

B.M.: NCGS MONUMENT "OLIN" ON ECUSTA RD. -L- STA. 23+66.57 OFFSET 260.73 RT. EL. 2131.91 NAVD 88



**NOTES:**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 56 FT± EACH SIDE OF CENTERLINE OF 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.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

**FOUNDATION NOTES:**

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR ALL STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION.
- OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NOS. 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

**TOTAL BILL OF MATERIAL**

	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		HP 12 X 53 STEEL PILES		STEEL PILE POINTS	THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	EACH	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	NO.	LIN.FT.	NO.	LIN.FT.	LIN.FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE			6622	7555		LUMP SUM		10	800.83				145.5	160.5			LUMP SUM
END BENT NO.1					57.3		7126			14	350	14			238	264	
END BENT NO.2					57.3		7126			14	385	14			215	239	
TOTAL	1	LUMP SUM	6622	7555	114.6	LUMP SUM	14252	10	800.83	28	735	28	145.5	160.5	453	503	LUMP SUM

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON DAVIDSON RIVER VILLAGE CONNECTOR OVER DAVIDSON RIVER (ORIGINAL CHANNEL) BETWEEN US 64 AND SR 1512

DRAWN BY : PFC      DATE : 08/15  
 CHECKED BY : CMT      DATE : 08/15

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS • SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 • FAX (828) 254-4692

NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEVEN A. CAMPBELL  
 SEAL 14309

DocuSigned by:  
**Steven A. Campbell** 12/21/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			51

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT					SHEAR					LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (FF)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.40	--	1.75	0.805	1.82	78.7'	ES	39.3	0.838	1.40	78.7'	I	11.2	0.80	0.805	<b>1.69</b>	78.7'	ES	39.3		
	HL-93 (OPERATING)	N/A		1.87	--	1.35	0.805	2.36	78.7'	ES	39.3	0.838	1.87	78.7'	I	11.2	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.80	64.800	1.75	0.805	2.42	78.7'	ES	39.3	0.838	1.82	78.7'	I	11.2	0.80	0.805	<b>1.80</b>	78.7'	ES	39.3		
	HS-20 (OPERATING)	36.000		2.36	85.061	1.35	0.805	3.14	78.7'	ES	39.3	0.838	2.36	78.7'	I	11.2	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H		5.15	69.525	1.40	0.805	6.93	78.7'	ES	39.3	0.838	5.44	78.7'	I	11.2	0.80	0.805	5.15	78.7'	ES	39.3		
		SNGARBS2	20.000	3.80	76.000	1.40	0.805	5.12	78.7'	ES	39.3	0.838	3.86	78.7'	I	11.2	0.80	0.805	3.80	78.7'	ES	39.3		
		SNAGRIS2	22.000	3.58	78.839	1.40	0.805	4.83	78.7'	ES	39.3	0.838	3.58	78.7'	I	11.2	0.80	0.805	3.59	78.7'	ES	39.3		
		SNCOTTS3	27.250	2.56	69.828	1.40	0.805	3.45	78.7'	ES	39.3	0.838	2.71	78.7'	I	11.2	0.80	0.805	2.56	78.7'	ES	39.3		
		SNAGGRS4	34.925	2.13	74.216	1.40	0.805	2.87	78.7'	ES	39.3	0.838	2.25	78.7'	I	11.2	0.80	0.805	2.13	78.7'	ES	39.3		
		SNS5A	35.550	2.08	73.766	1.40	0.805	2.81	78.7'	ES	39.3	0.838	2.28	78.7'	I	11.2	0.80	0.805	2.08	78.7'	ES	39.3		
		SNS6A	39.950	1.90	75.905	1.40	0.805	2.57	78.7'	ES	39.3	0.838	2.07	78.7'	I	11.2	0.80	0.805	1.90	78.7'	ES	39.3		
	SNS7B	42.000	1.81	76.125	1.40	0.805	2.44	78.7'	ES	39.3	0.838	2.03	78.7'	I	11.2	0.80	0.805	1.81	78.7'	ES	39.3			
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.33	76.725	1.40	0.805	3.13	78.7'	ES	39.3	0.838	2.47	78.7'	I	11.2	0.80	0.805	2.33	78.7'	ES	39.3	
		TNT4A	33.075		2.33	76.899	1.40	0.805	3.14	78.7'	ES	39.3	0.838	2.40	78.7'	I	11.2	0.80	0.805	2.33	78.7'	ES	39.3	
		TNT6A	41.600		1.90	79.040	1.40	0.805	2.56	78.7'	ES	39.3	0.838	2.16	78.7'	I	11.2	0.80	0.805	1.90	78.7'	ES	39.3	
		TNT7A	42.000		1.90	79.800	1.40	0.805	2.57	78.7'	ES	39.3	0.838	2.12	78.7'	I	11.2	0.80	0.805	1.90	78.7'	ES	39.3	
		TNT7B	42.000		1.96	82.425	1.40	0.805	2.64	78.7'	ES	39.3	0.838	1.99	78.7'	I	11.2	0.80	0.805	1.96	78.7'	ES	39.3	
		TNAGRIT4	43.000		1.88	80.625	1.40	0.805	2.53	78.7'	ES	39.3	0.838	1.93	78.7'	I	11.2	0.80	0.805	1.88	78.7'	ES	39.3	
TNAGT5A		45.000		1.78	79.875	1.40	0.805	2.38	78.7'	ES	39.3	0.838	1.91	78.7'	I	11.2	0.80	0.805	1.78	78.7'	ES	39.3		
TNAGT5B	45.000	③	1.75	78.750	1.40	0.805	2.36	78.7'	ES	39.3	0.838	1.83	78.7'	I	11.2	0.80	0.805	<b>1.75</b>	78.7'	ES	39.3			

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.

① CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

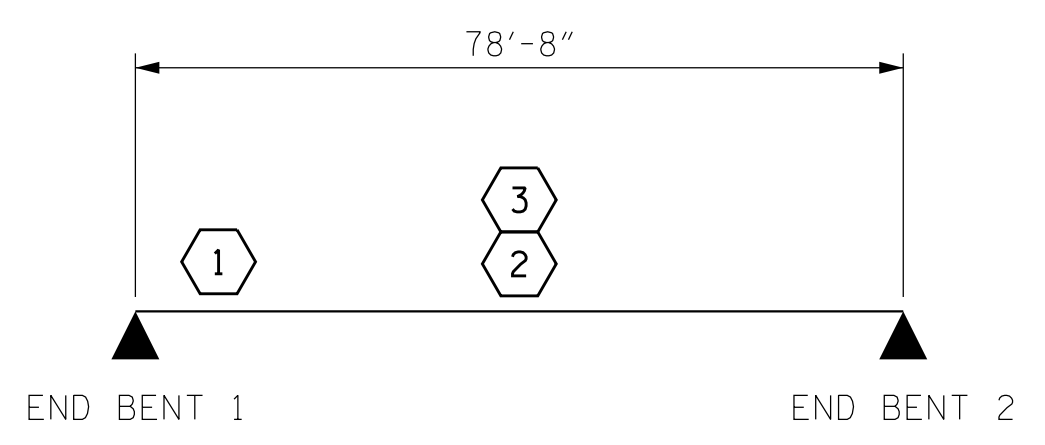
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER  
 EL - EXTERIOR LEFT GIRDER  
 ER - EXTERIOR RIGHT GIRDER  
 ES - EXTERIOR UNDER SIDEWALK GIRDER



LRFR SUMMARY

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 4 OF 4

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

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	MAA	1/08	REV. 11/2/08RR
CHECKED BY :	GM/DI	2/08	REV. 10/1/11

Prepared in the Office of:

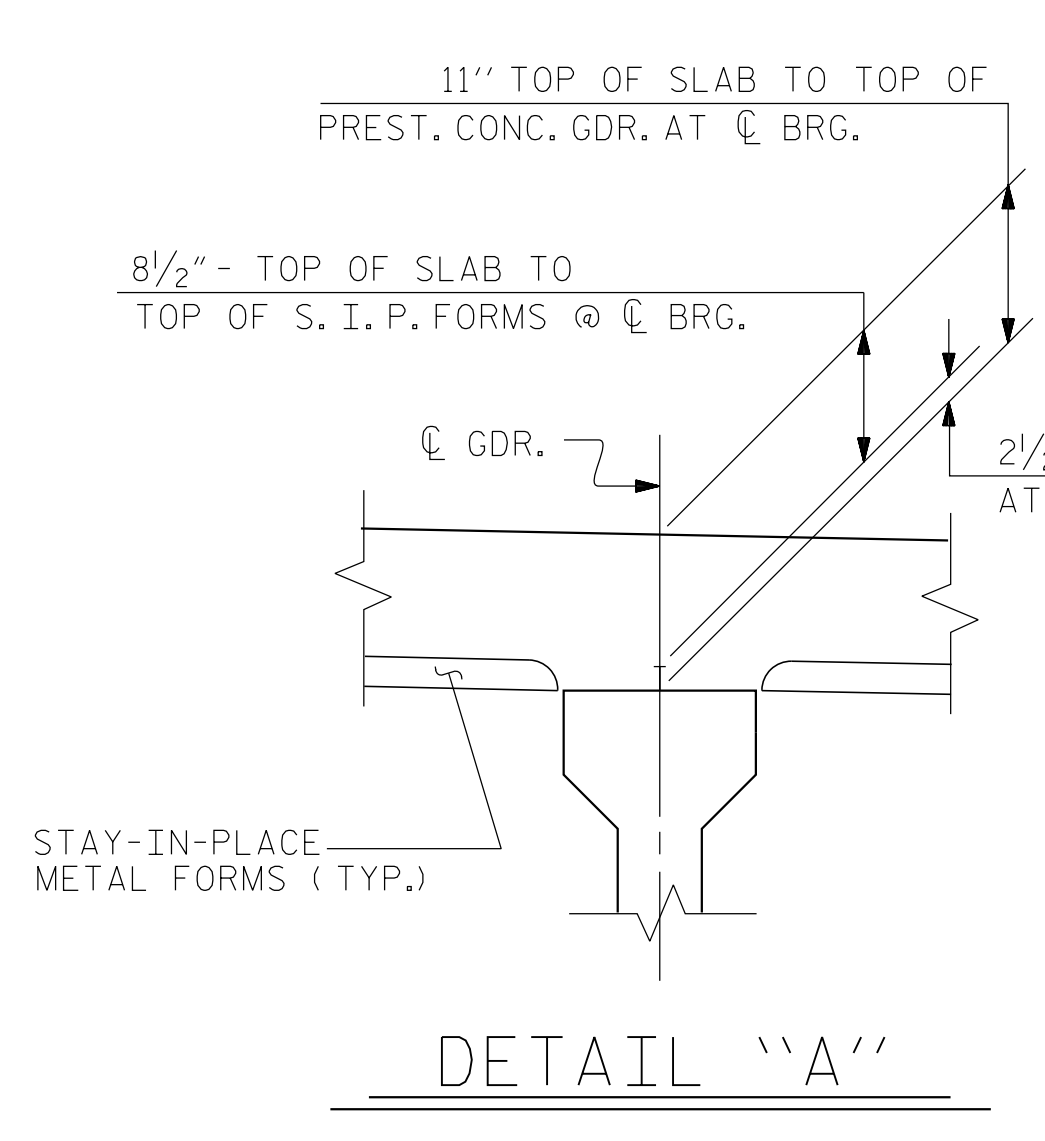
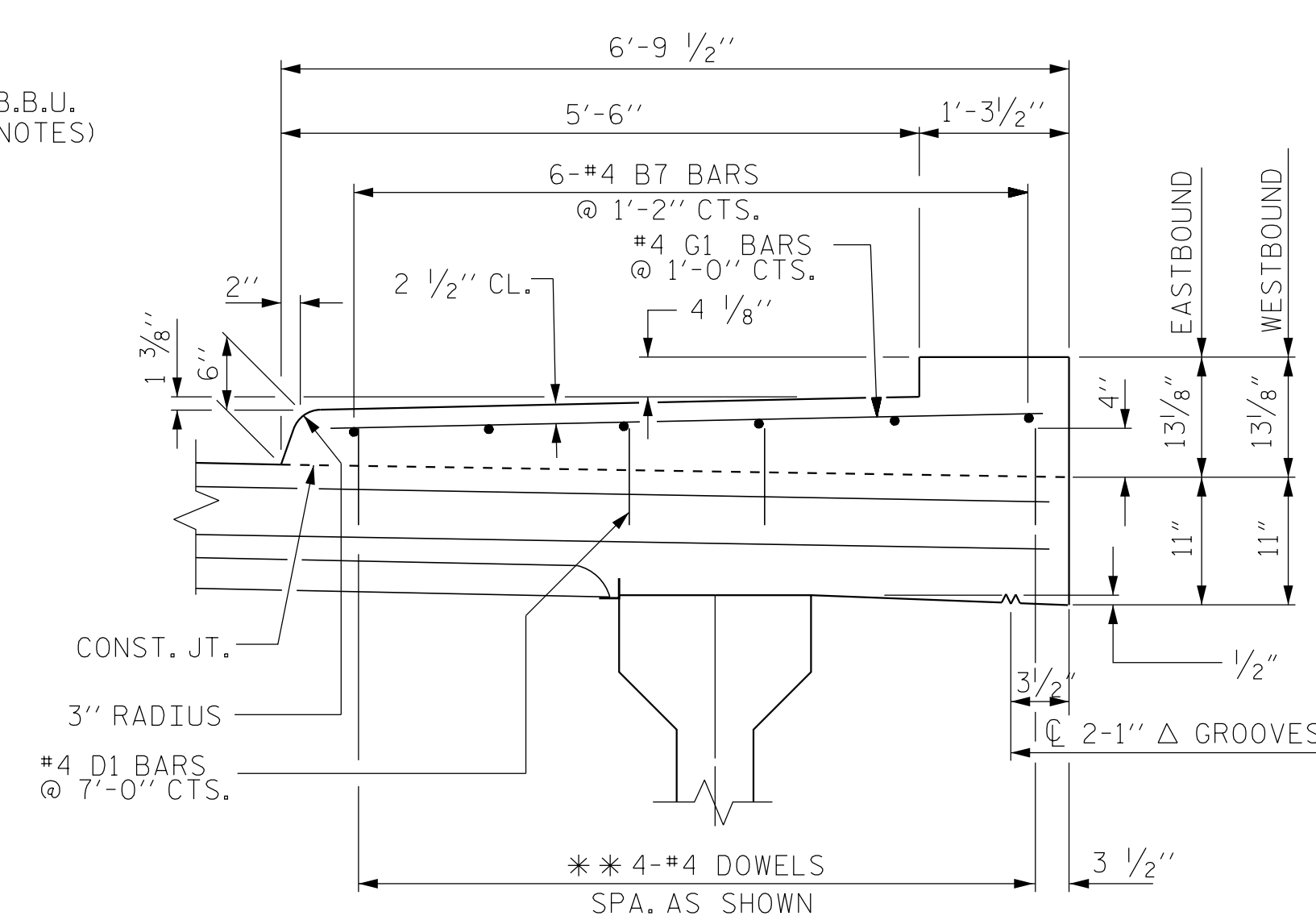
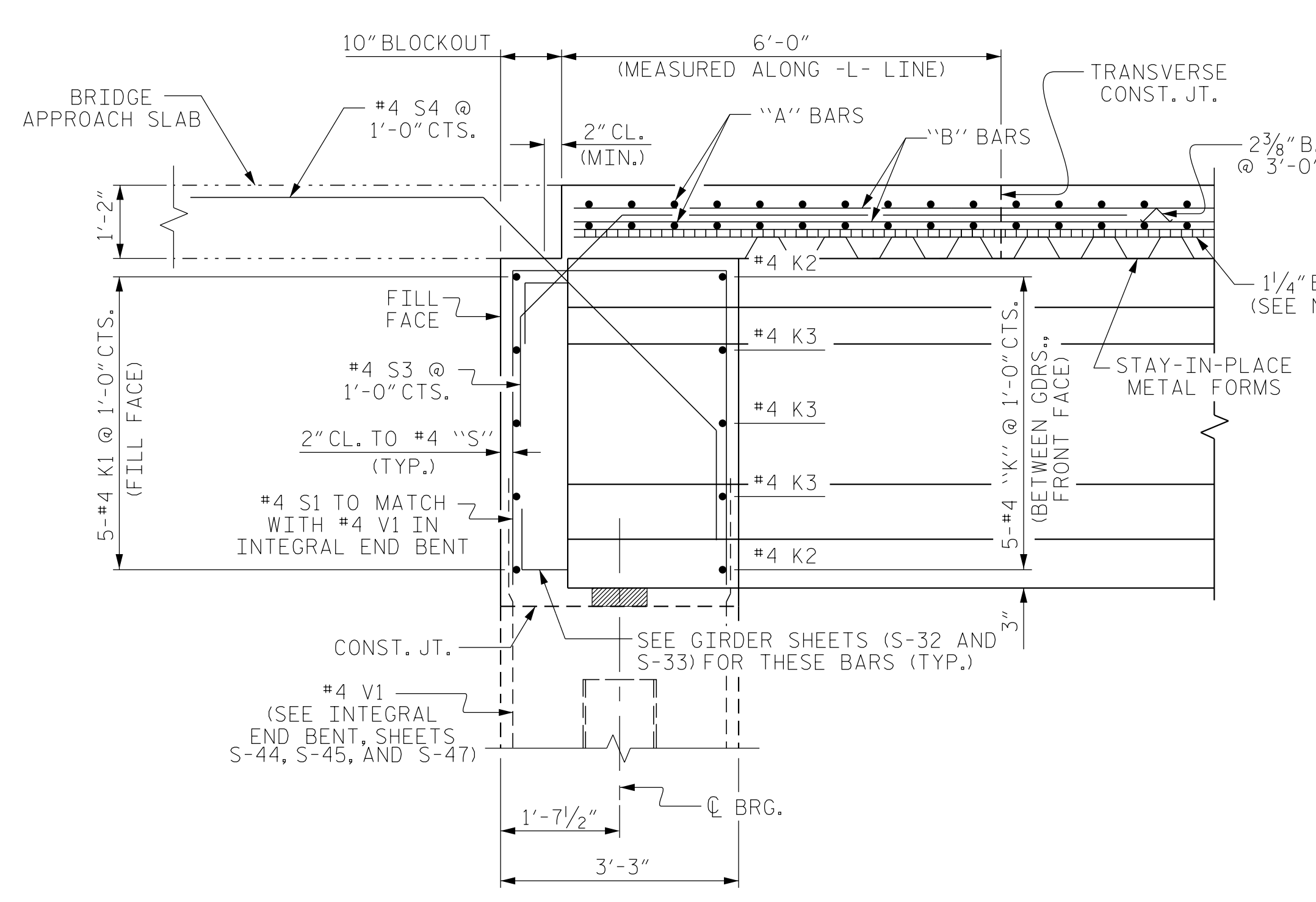
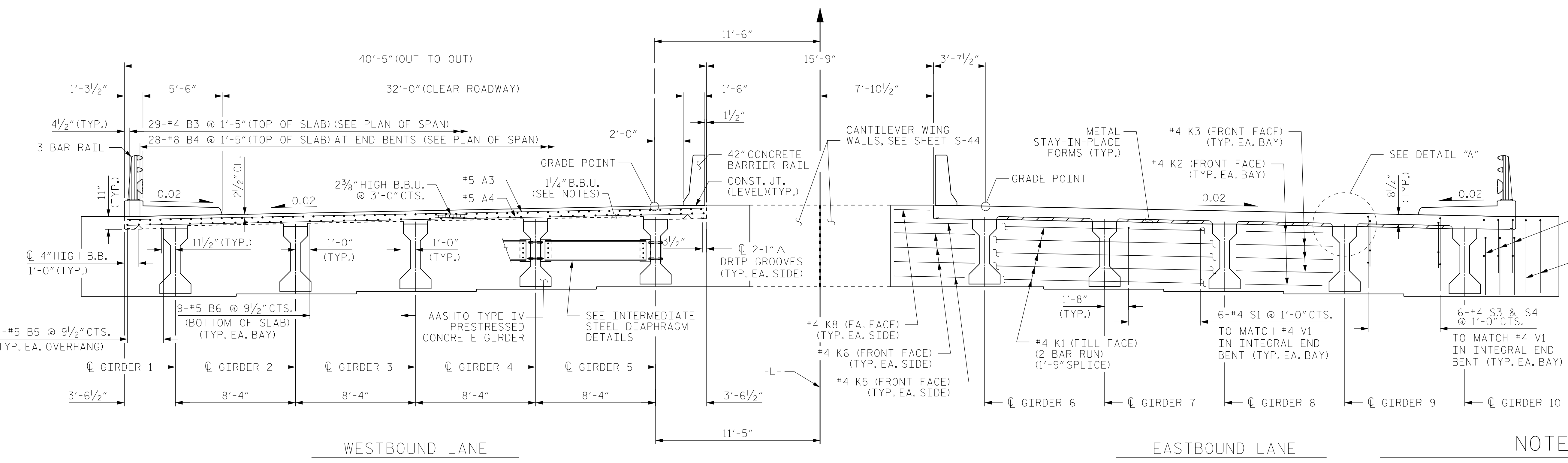
**Mattern & Craig**  
 CONSULTING ENGINEERS & SURVEYORS  
 FIRM LICENSE NO. G-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 • FAX (828) 254-4582

DocuSigned by:  
 Steven A. Campbell 12/21/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			51

\*\*\*\*\*SYSTEM TIME\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

STD. NO. LRFR1



PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			51

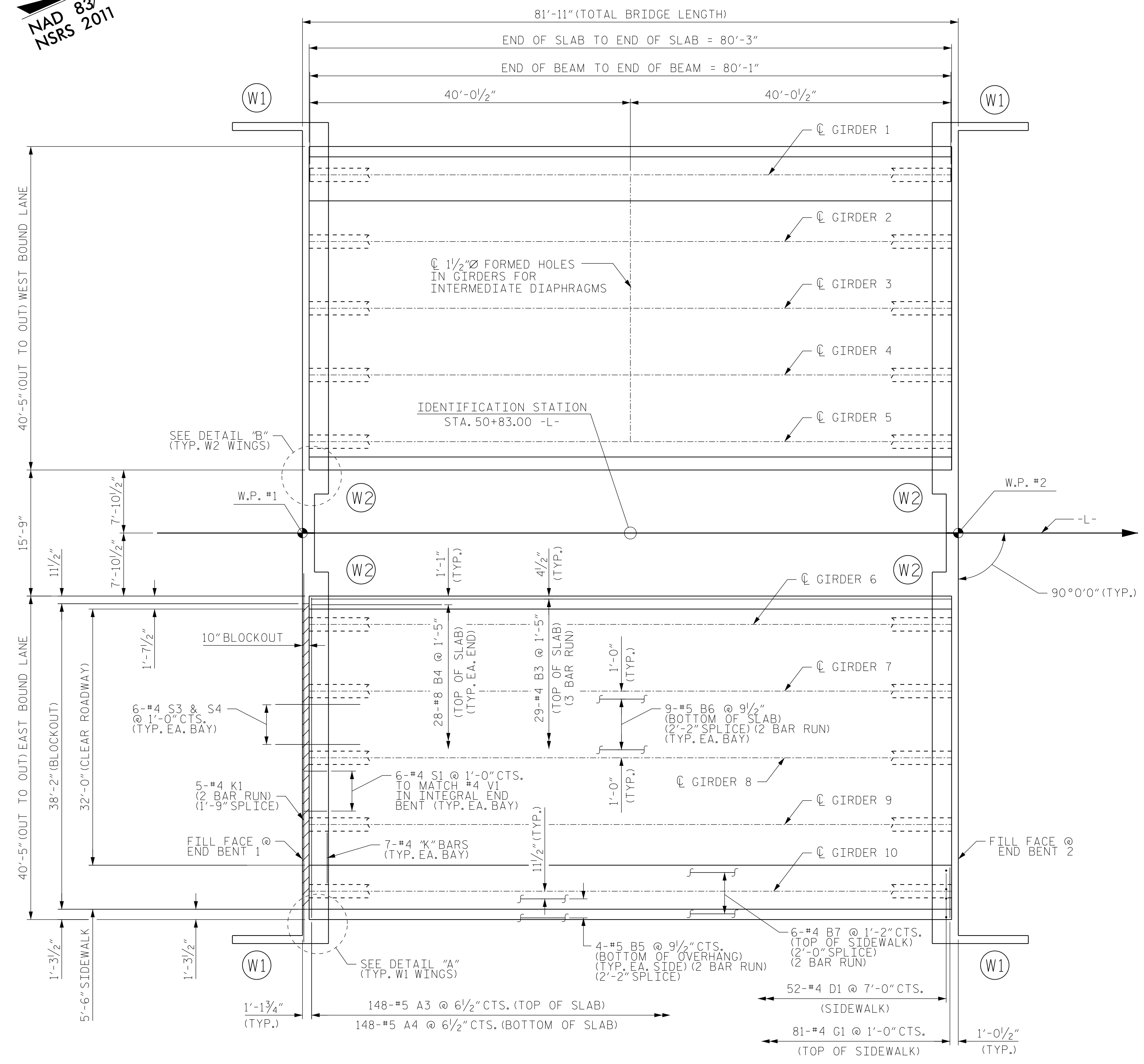
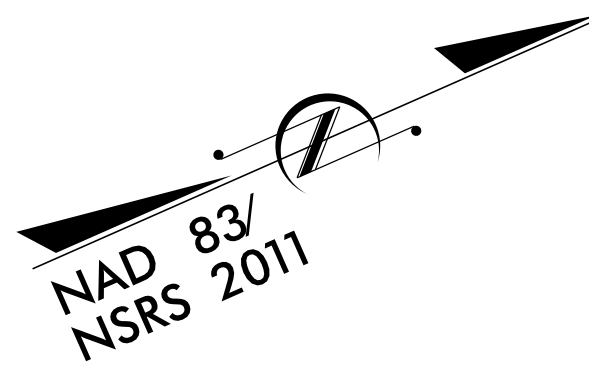
DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS & SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

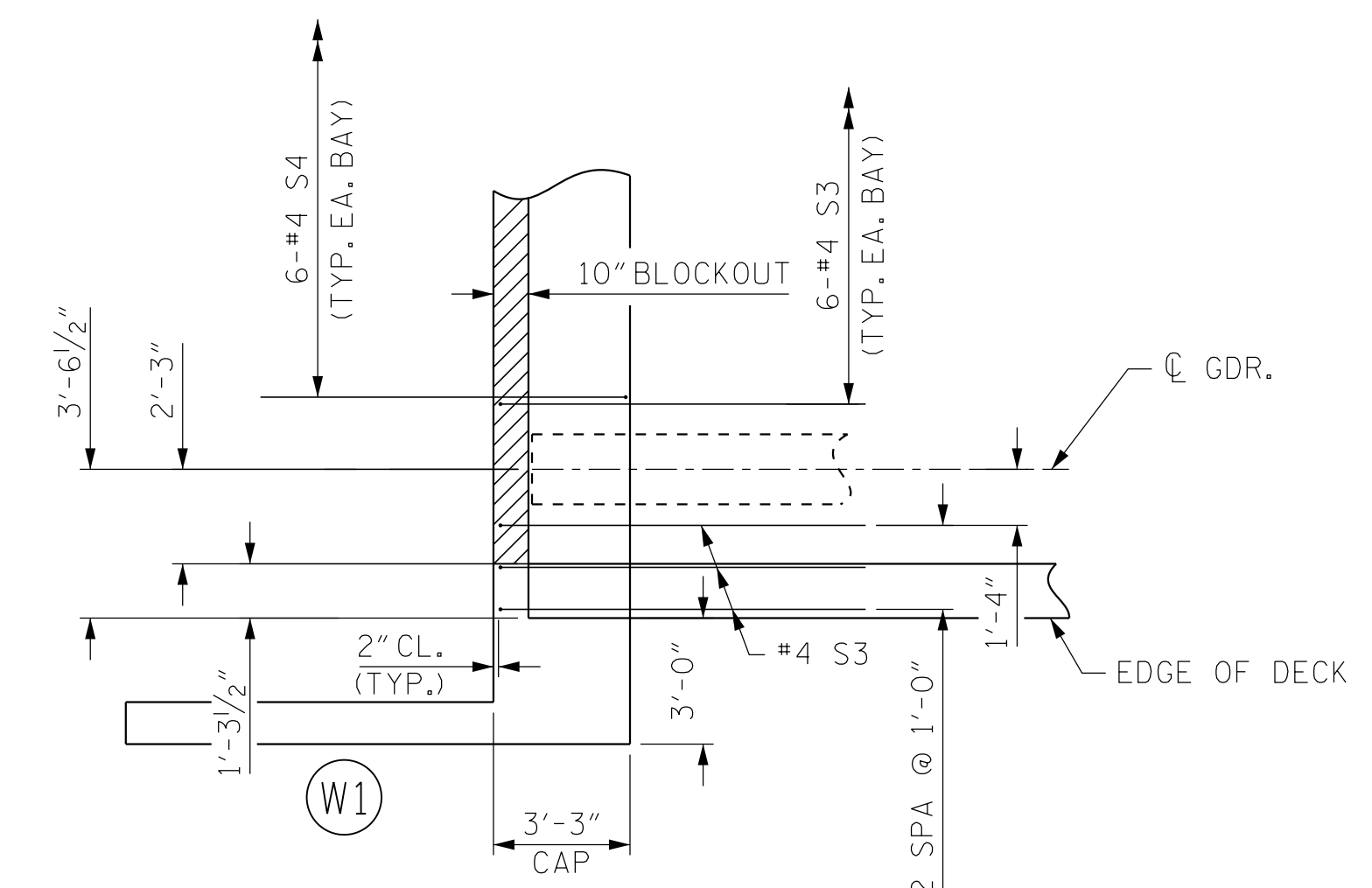
DocuSigned by:  
  
**Steven A. Campbell**  
 12/21/2015



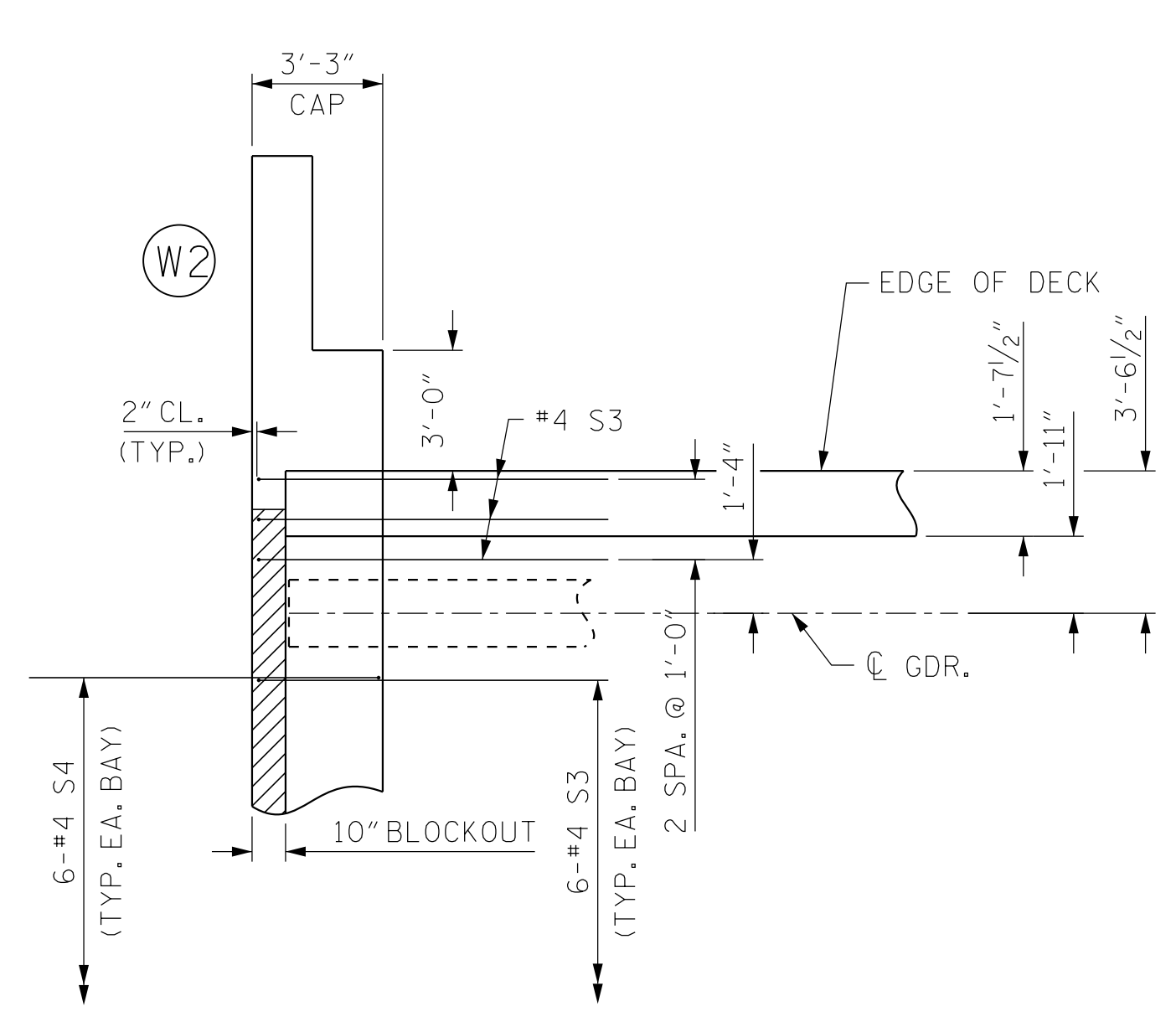


PLAN

REINFORCING AT END BENT NO. 1 IS TYPICAL FOR BOTH CAPS AND BOTH END BENTS



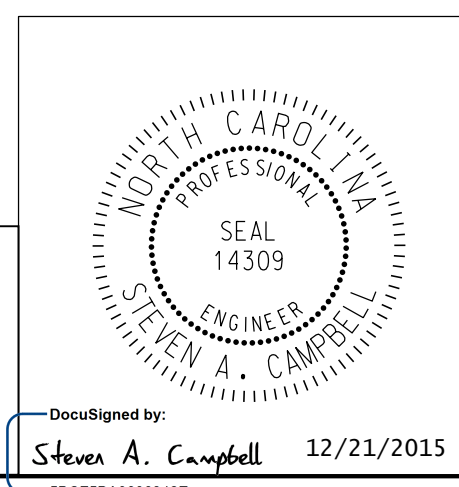
DETAIL "A"



DETAIL "B"

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

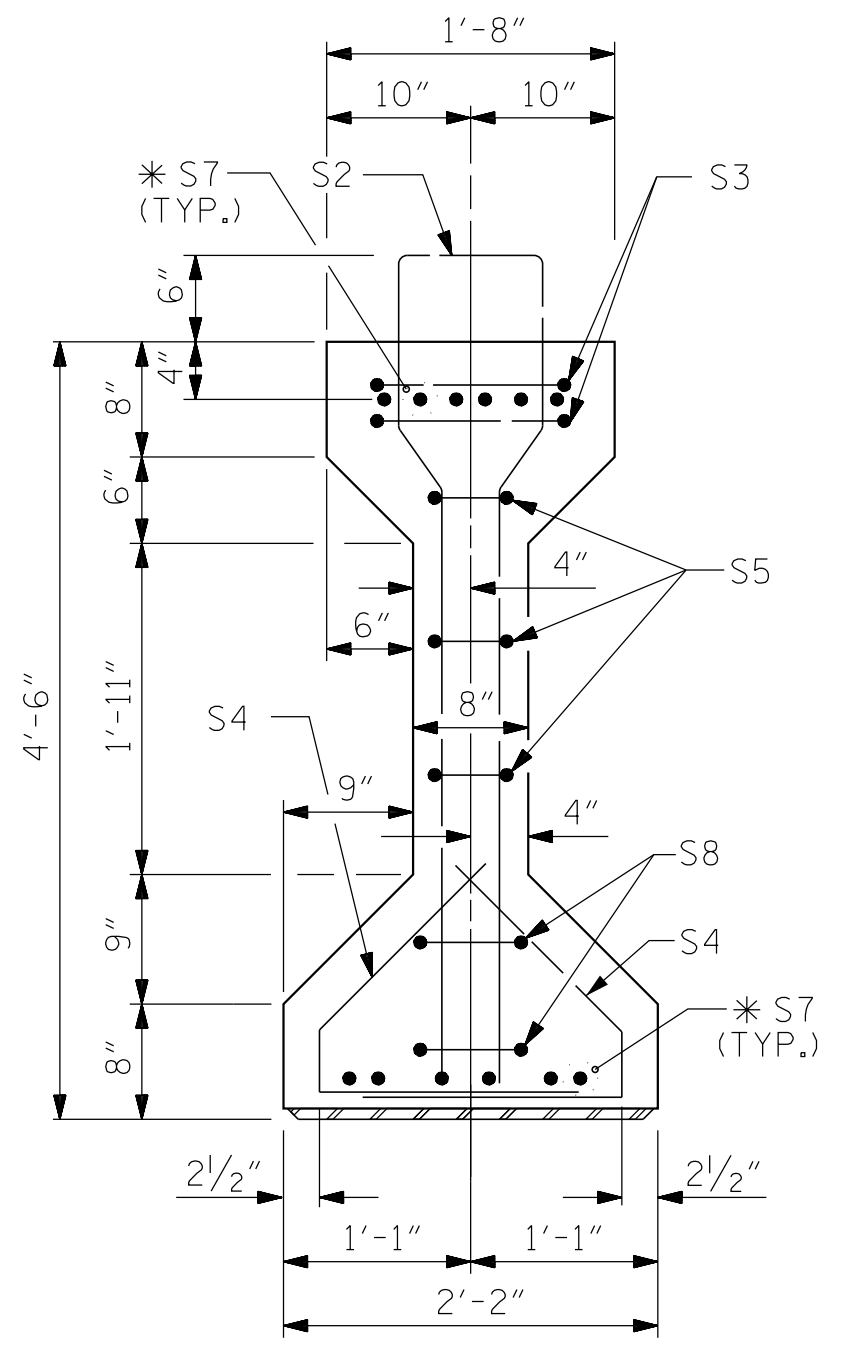
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN					
REVISIONS					SHEET NO. S-31
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS 51					



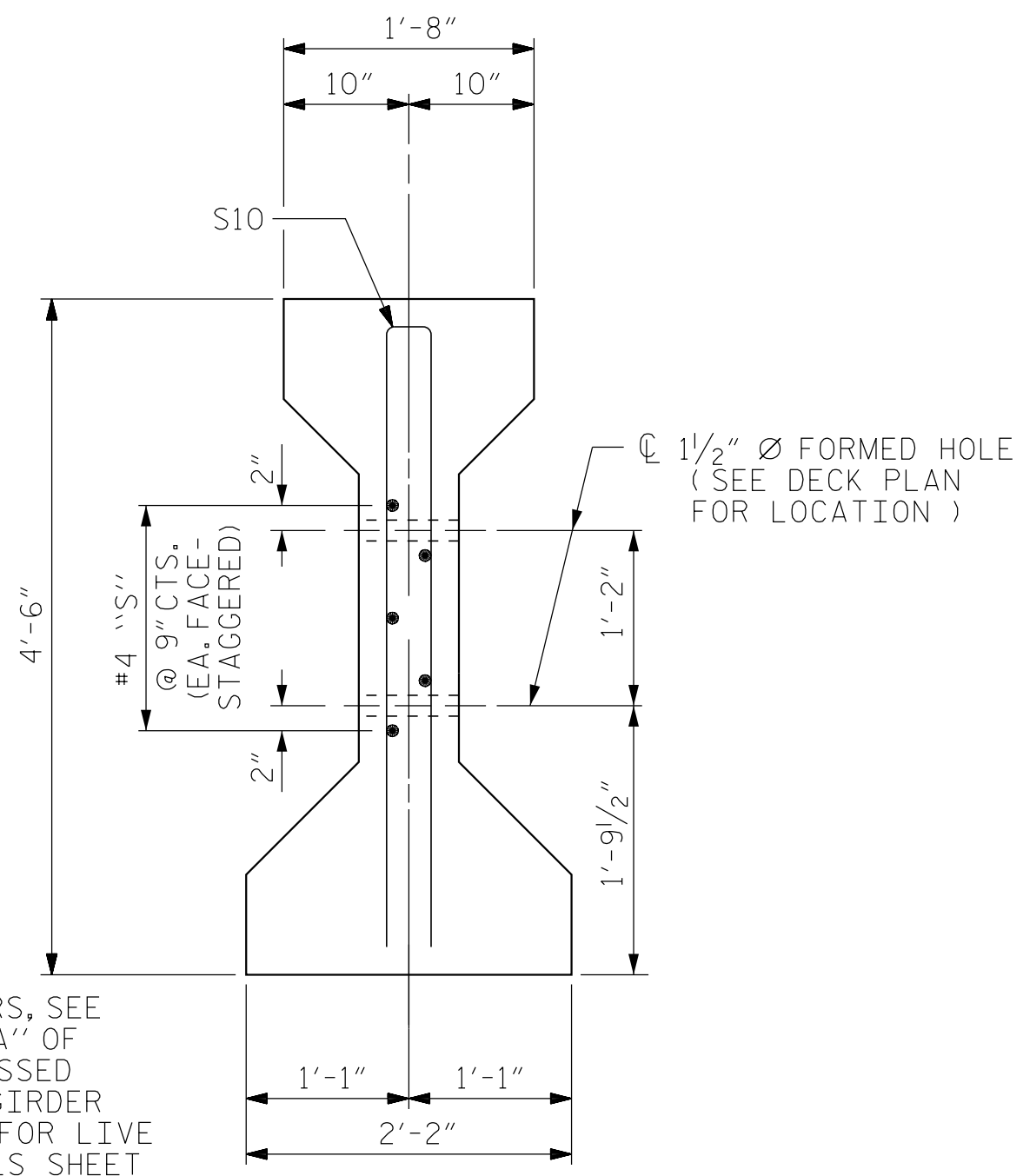
Prepared in the Office of:  
  
**Mattern & Craig**  
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 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

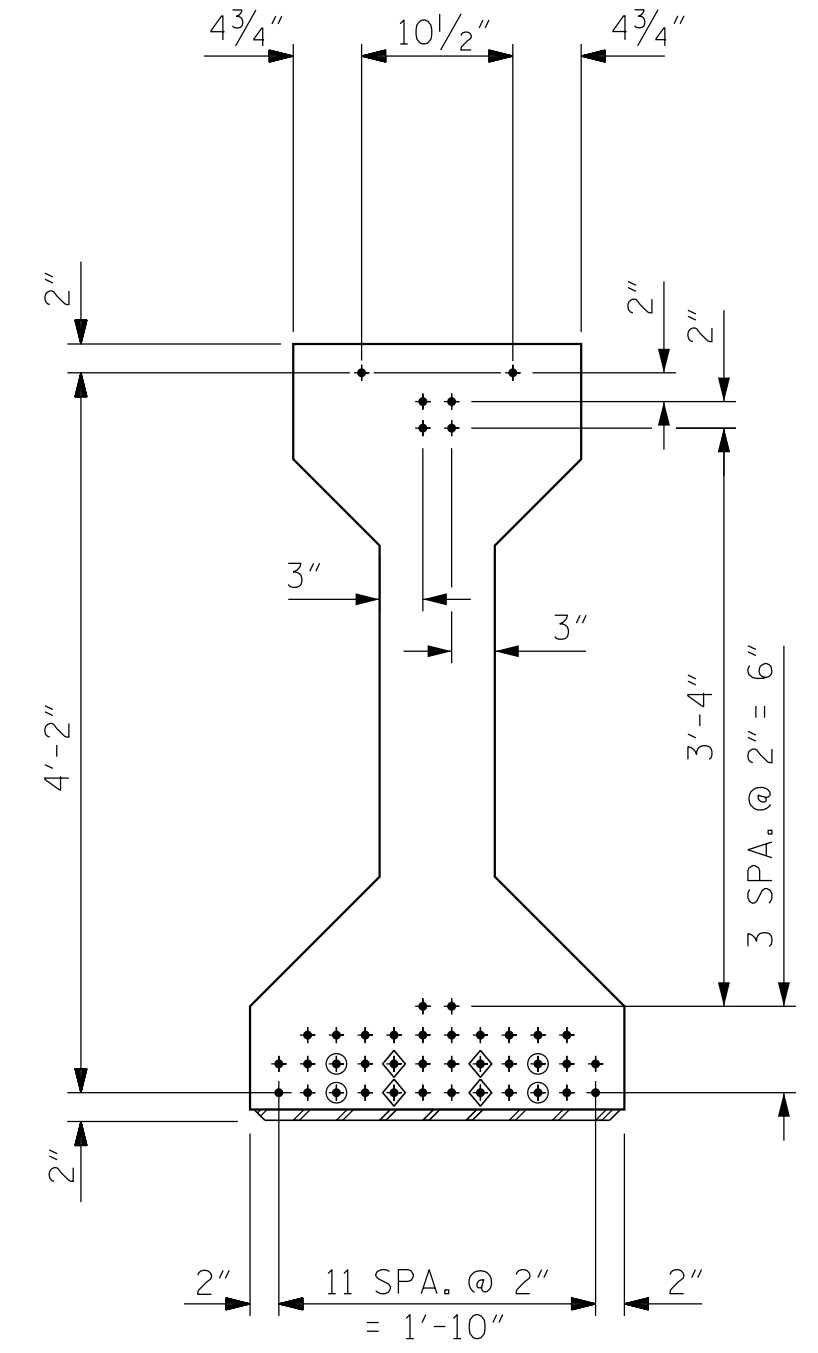
\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



SECTION A-A

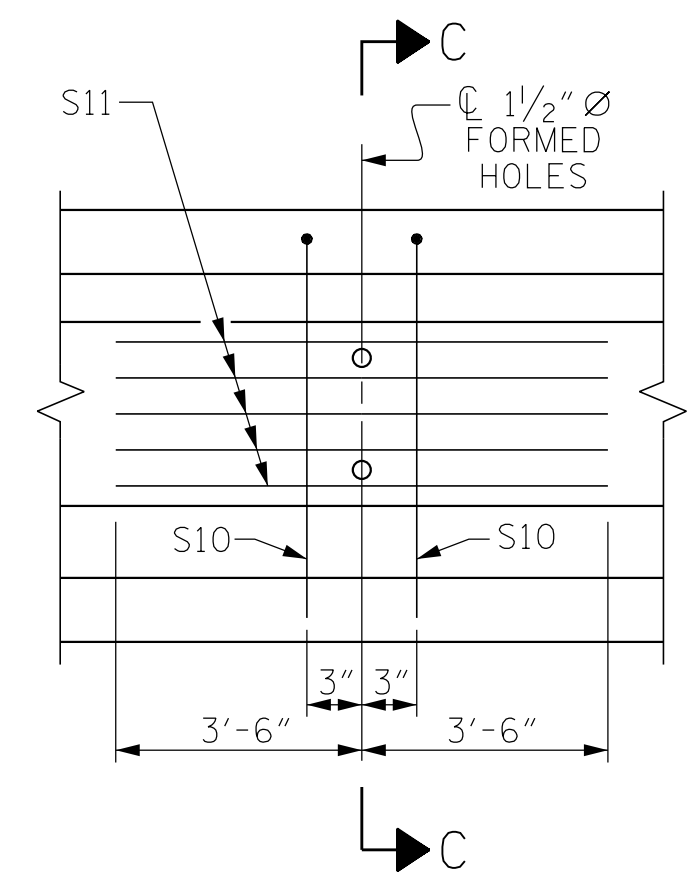


SECTION C-C  
(S1 BARS NOT SHOWN)

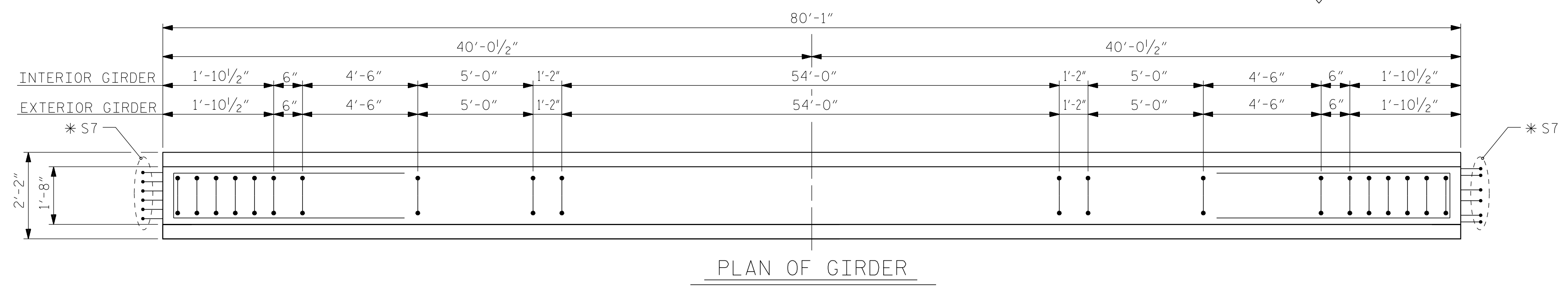


0.5" Ø LOW RELAXATION STRAND LAYOUT

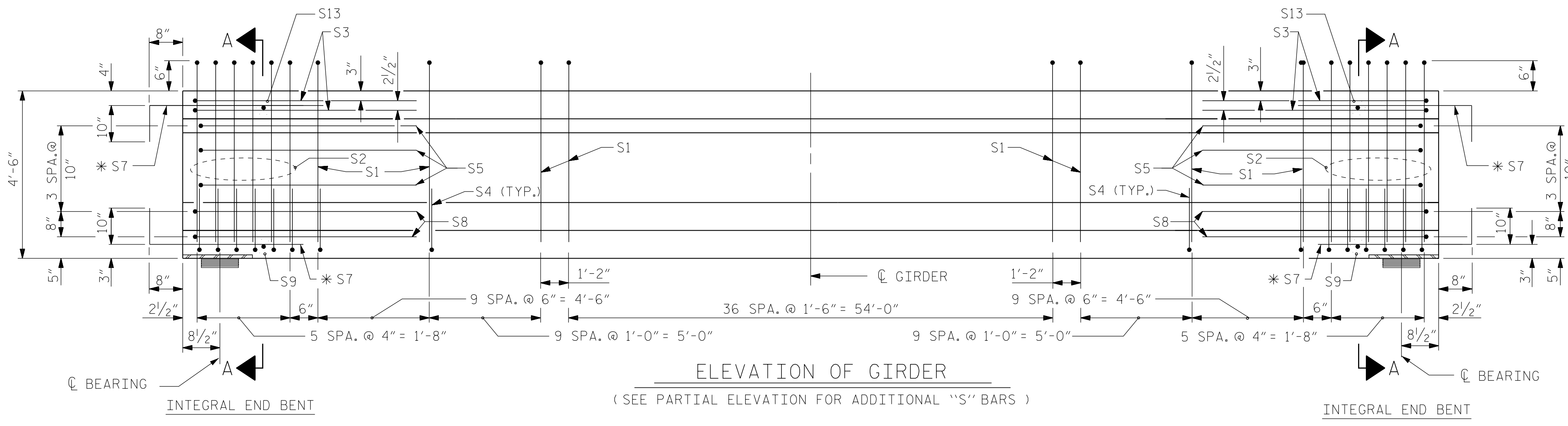
- DEBONDING LEGEND**
- FULLY BONDED STRANDS
  - STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
  - ◇ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 THROUGH 10.



PLAN OF GIRDER



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

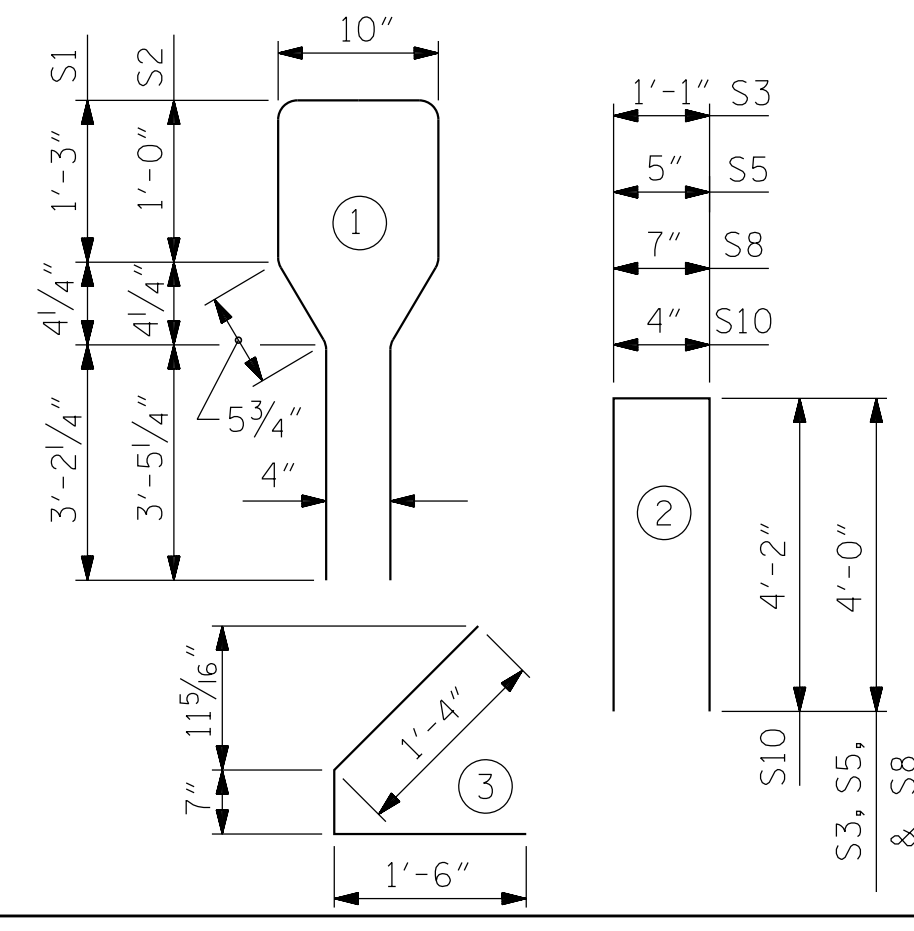
0.5" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.153	41,300	30,980

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
EXTERIOR GDR.	S1	75	#4	1	10'-8"	534
INTERIOR GDR.	S1	75	#4	1	10'-8"	534
	S2	12	#6	1	10'-8"	192
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	* S7	24	#5	STR	3'-8"	92
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	2	#5	2	8'-8"	18
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	24
INTERIOR GDR.	S11	5	#4	STR	7'-0"	24
	S13	2	#3	STR	1'-4"	1

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

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	6,000 PSI CONCRETE	0.5" Ø L. R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1089	16.3	42
INTERIOR GIRDER	1089	16.3	42

**GIRDERS REQUIRED**

NUMBER	LENGTH	TOTAL LENGTH
10	80'-1"	800'-10"

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

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

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

Prepared in the Office of:

**Mattern & Craig**  
 CONSULTING ENGINEERS - SURVEYORS  
 FIRM LICENSE NO. C-1154  
 2 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4562

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**Steven A. Campbell** 12/21/2015

REVISIONS						SHEET NO. S-32
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 51
2			4			

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

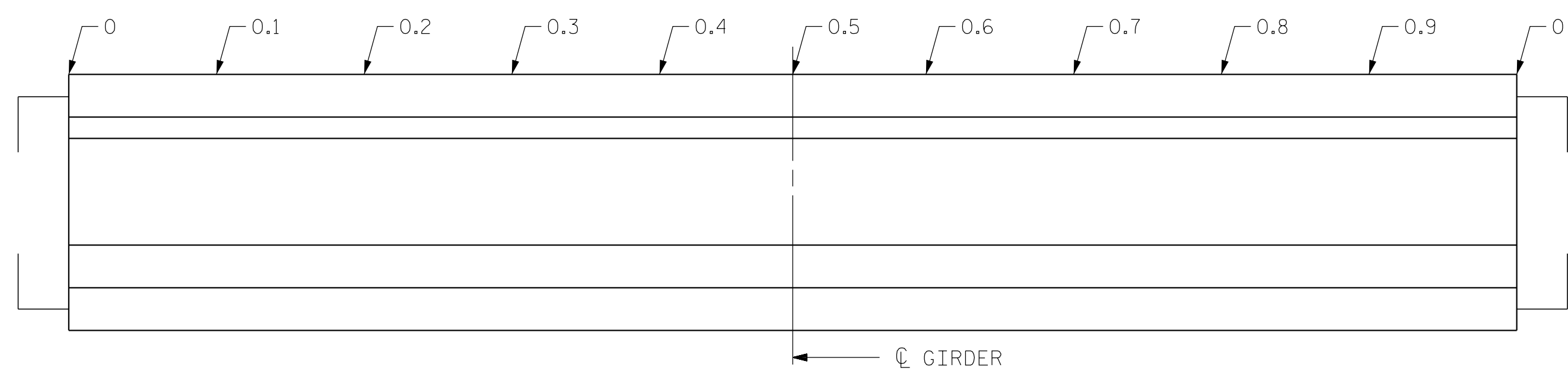
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,800 PSI.

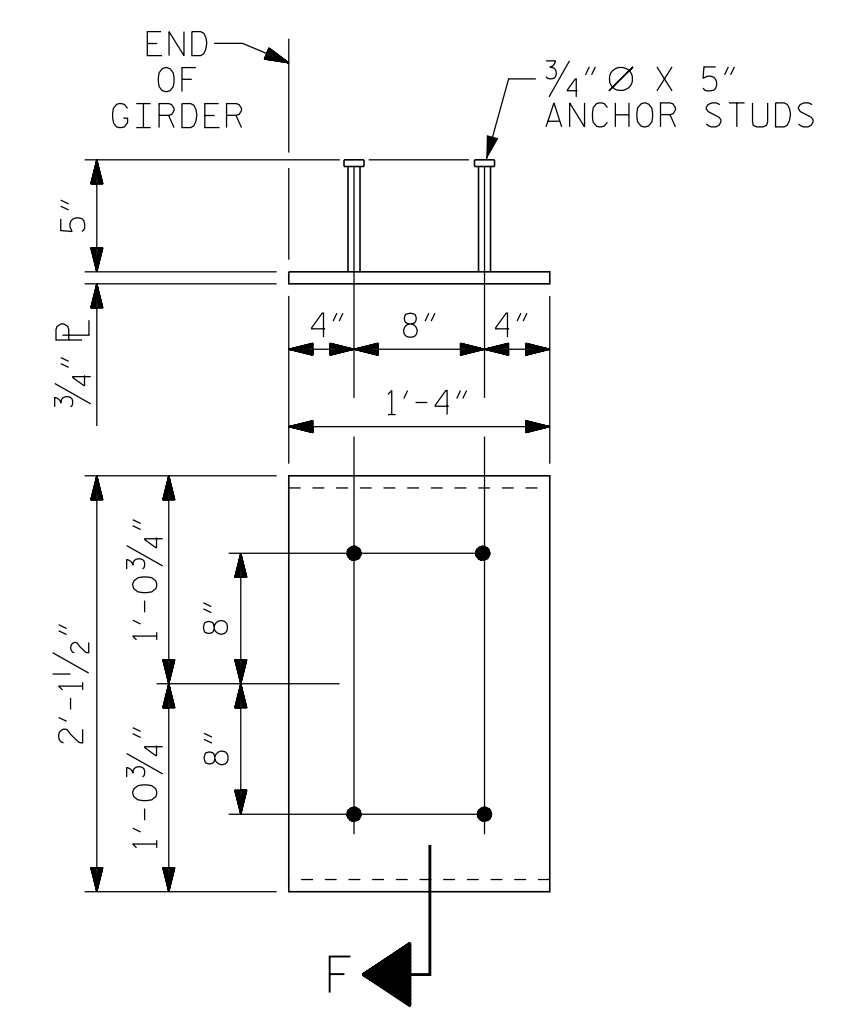
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

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



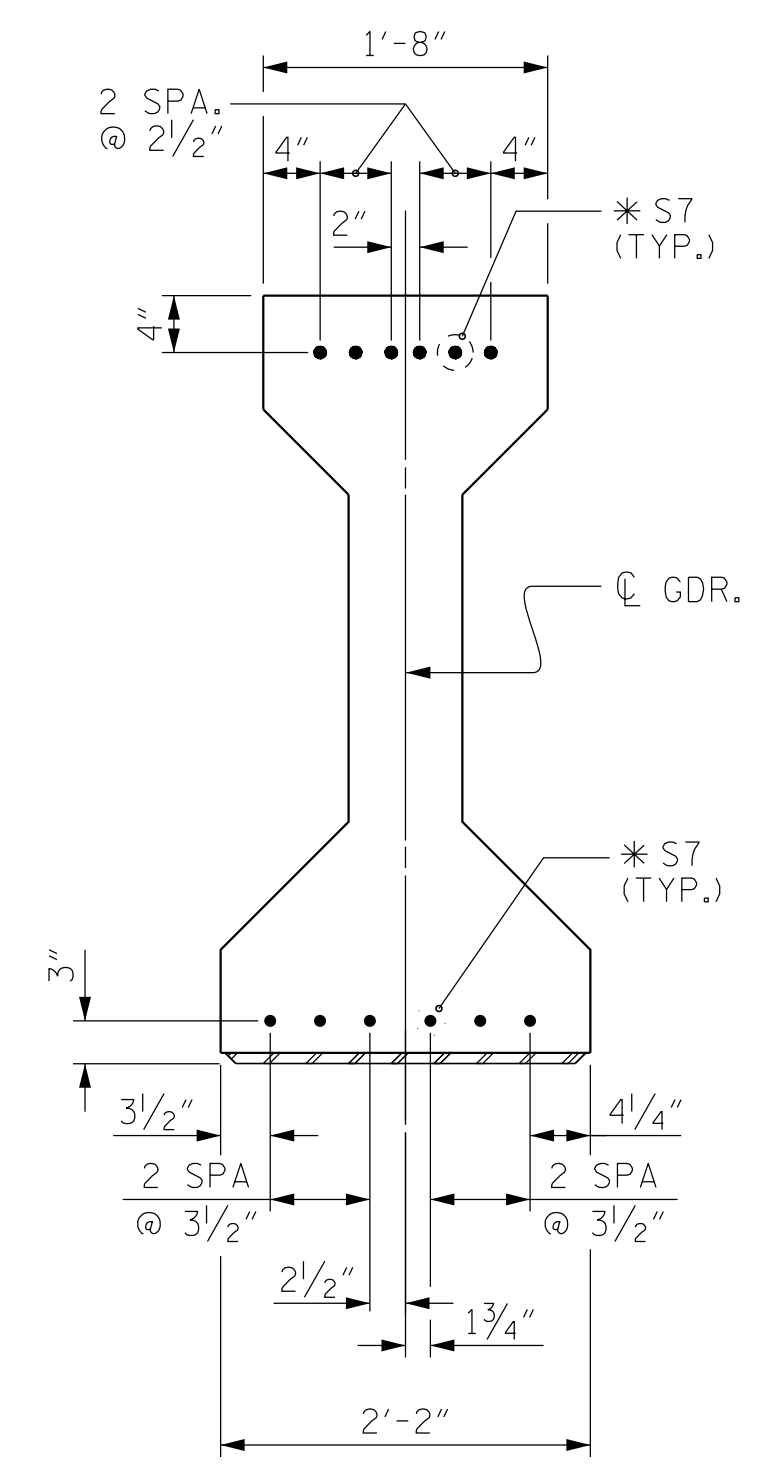
GIRDER DIAGRAM FOR D.L. DEFLECTION TABLE  
(SEE TABLE FOR GIRDERS)



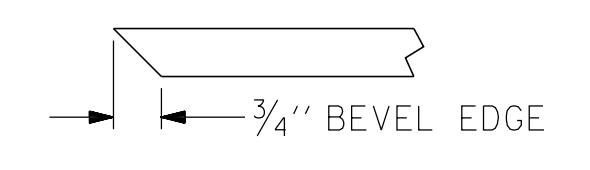
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND 63" & 72" MODIFIED BULB TEES  
(2 REQ'D PER GIRDER)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS												
1/2" Ø LOW RELAXATION	GIRDERS 1 AND 10											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
	CAMBER ( GIRDER ALONE IN PLACE )	0.000	0.049	0.086	0.111	0.126	0.130	0.126	0.111	0.086	0.049	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.020	0.039	0.053	0.062	0.065	0.062	0.053	0.039	0.020	0.000
	FINAL CAMBER	0	5/16	9/16	11/16	3/4	13/16	3/4	11/16	9/16	5/16	0
1/2" Ø LOW RELAXATION	GIRDERS 2 AND 9											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
	CAMBER ( GIRDER ALONE IN PLACE )	0.000	0.049	0.086	0.111	0.126	0.130	0.126	0.111	0.086	0.049	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.022	0.042	0.057	0.067	0.070	0.067	0.057	0.042	0.022	0.000
	FINAL CAMBER	0	5/16	9/16	5/8	11/16	11/16	11/16	5/8	9/16	5/16	0
1/2" Ø LOW RELAXATION	GIRDERS 3 AND 8											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
	CAMBER ( GIRDER ALONE IN PLACE )	0.000	0.049	0.086	0.111	0.126	0.130	0.126	0.111	0.086	0.049	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.023	0.044	0.060	0.070	0.073	0.070	0.060	0.044	0.023	0.000
	FINAL CAMBER	0	5/16	1/2	5/8	11/16	11/16	11/16	5/8	1/2	5/16	0
1/2" Ø LOW RELAXATION	GIRDERS 4 AND 7											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
	CAMBER ( GIRDER ALONE IN PLACE )	0.000	0.049	0.086	0.111	0.126	0.130	0.126	0.111	0.086	0.049	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.023	0.044	0.060	0.070	0.073	0.070	0.060	0.044	0.023	0.000
	FINAL CAMBER	0	5/16	1/2	5/8	11/16	11/16	11/16	5/8	1/2	5/16	0
1/2" Ø LOW RELAXATION	GIRDERS 5 AND 6											
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
	CAMBER ( GIRDER ALONE IN PLACE )	0.000	0.049	0.086	0.111	0.126	0.130	0.126	0.111	0.086	0.049	0.000
	* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.019	0.036	0.050	0.058	0.061	0.058	0.050	0.036	0.019	0.000
	FINAL CAMBER	0	3/8	5/8	3/4	13/16	13/16	13/16	3/4	5/8	3/8	0

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



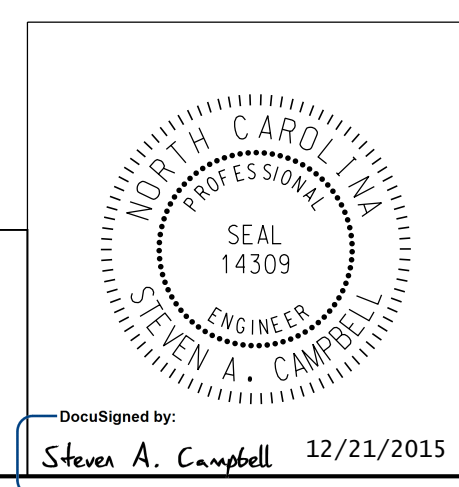
DETAIL "A"  
(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"  
(SEE NOTES)

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 50+83.00 -L-

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:	TOTAL SHEETS
1			3			51
2			4			

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	ELR 11/91	REV. 10/1/11	MAA/CM
CHECKED BY :	GRP 11/91	REV. 1/15	MAA/TMG
		REV. 2/15	MAA/TMG

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CONSULTING ENGINEERS - SURVEYORS  
FIRM LICENSE NO. C-1154  
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**STRUCTURAL STEEL NOTES**

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.  
TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED 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.

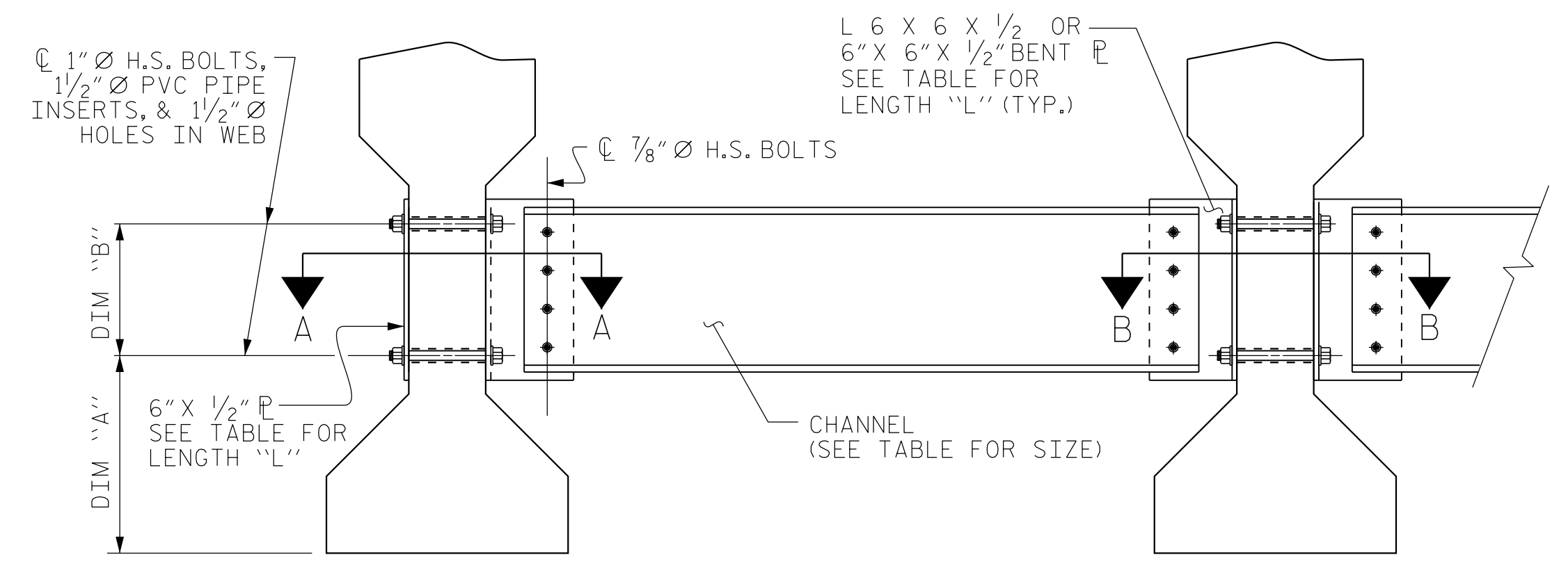
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

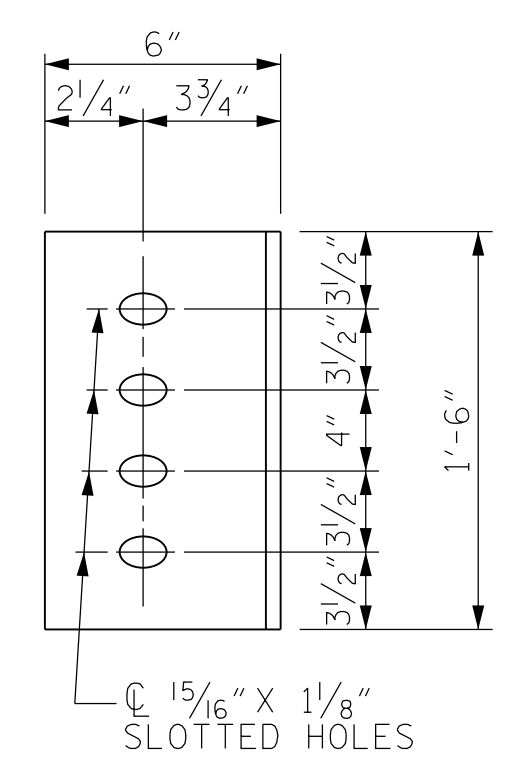
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

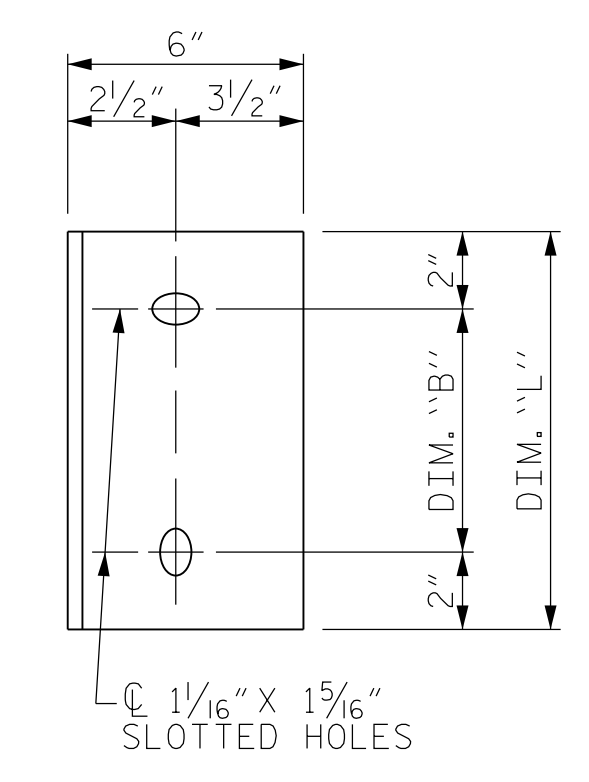
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



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

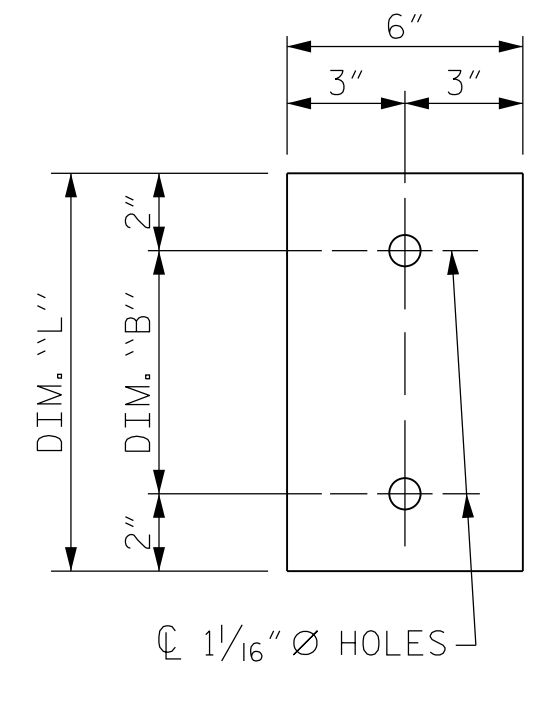


**DIAPHRAGM FACE**  
(TYPE III OR TYPE IV GDR.)

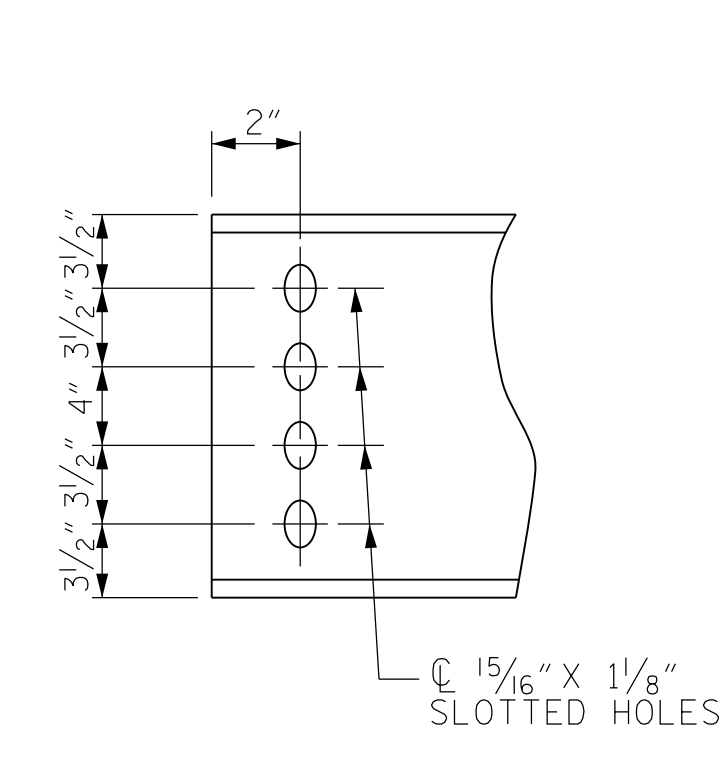


**WEB FACE**

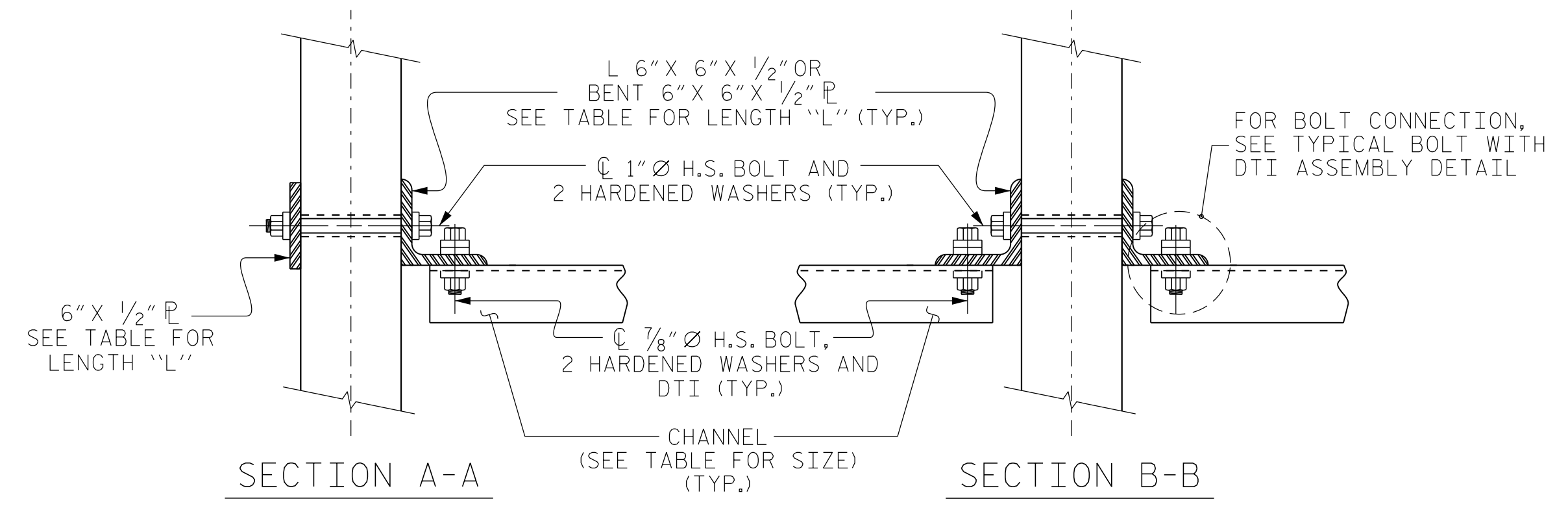
**CONNECTOR PLATE DETAILS**



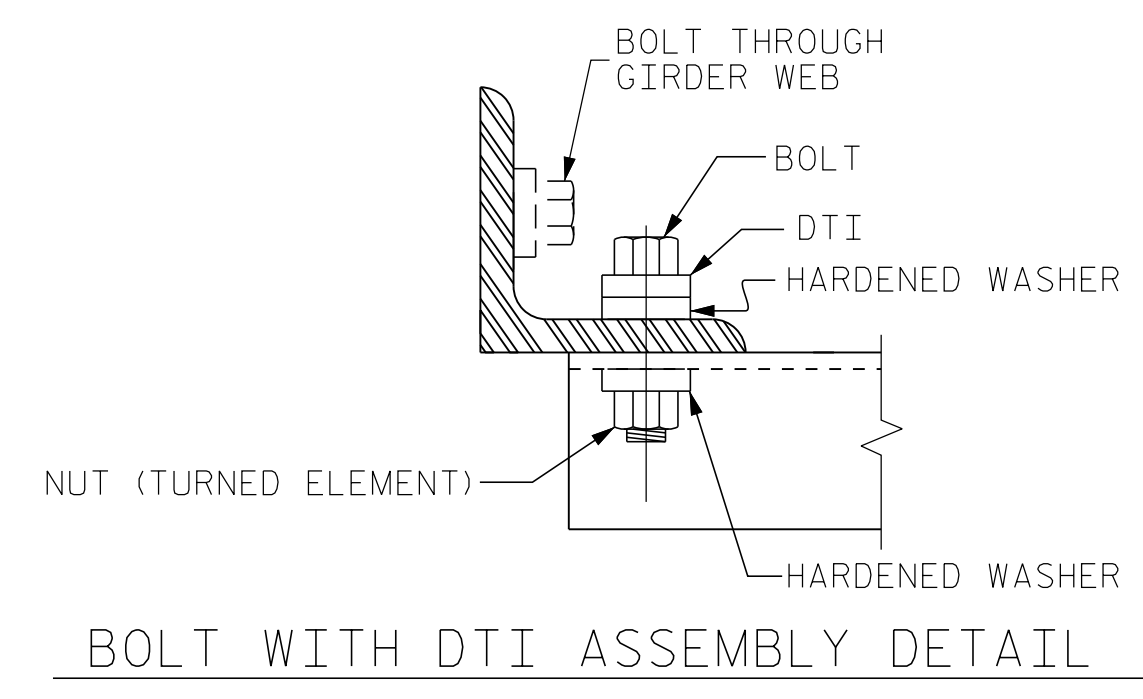
**PLATE DETAILS**



**CHANNEL END**  
(TYPE III OR TYPE IV GDR.)



**CONNECTION DETAILS**



**BOLT WITH DTI ASSEMBLY DETAIL**

**TABLE**

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
II	MC 12 x 31	1'-2 1/2"	10"	1'-2"
III	MC 18 x 42.7	1'-5"	1'-2"	1'-6"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
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

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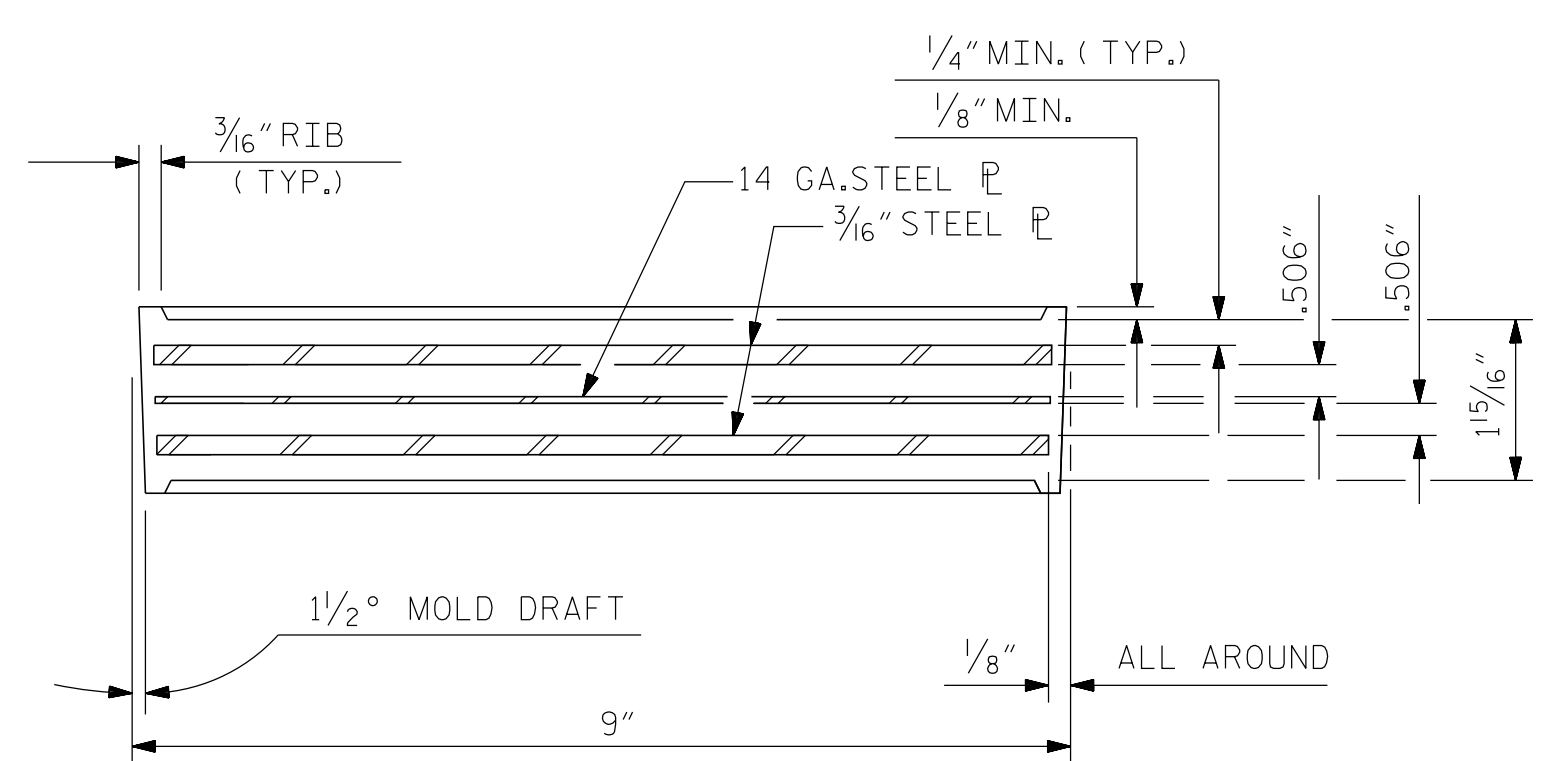
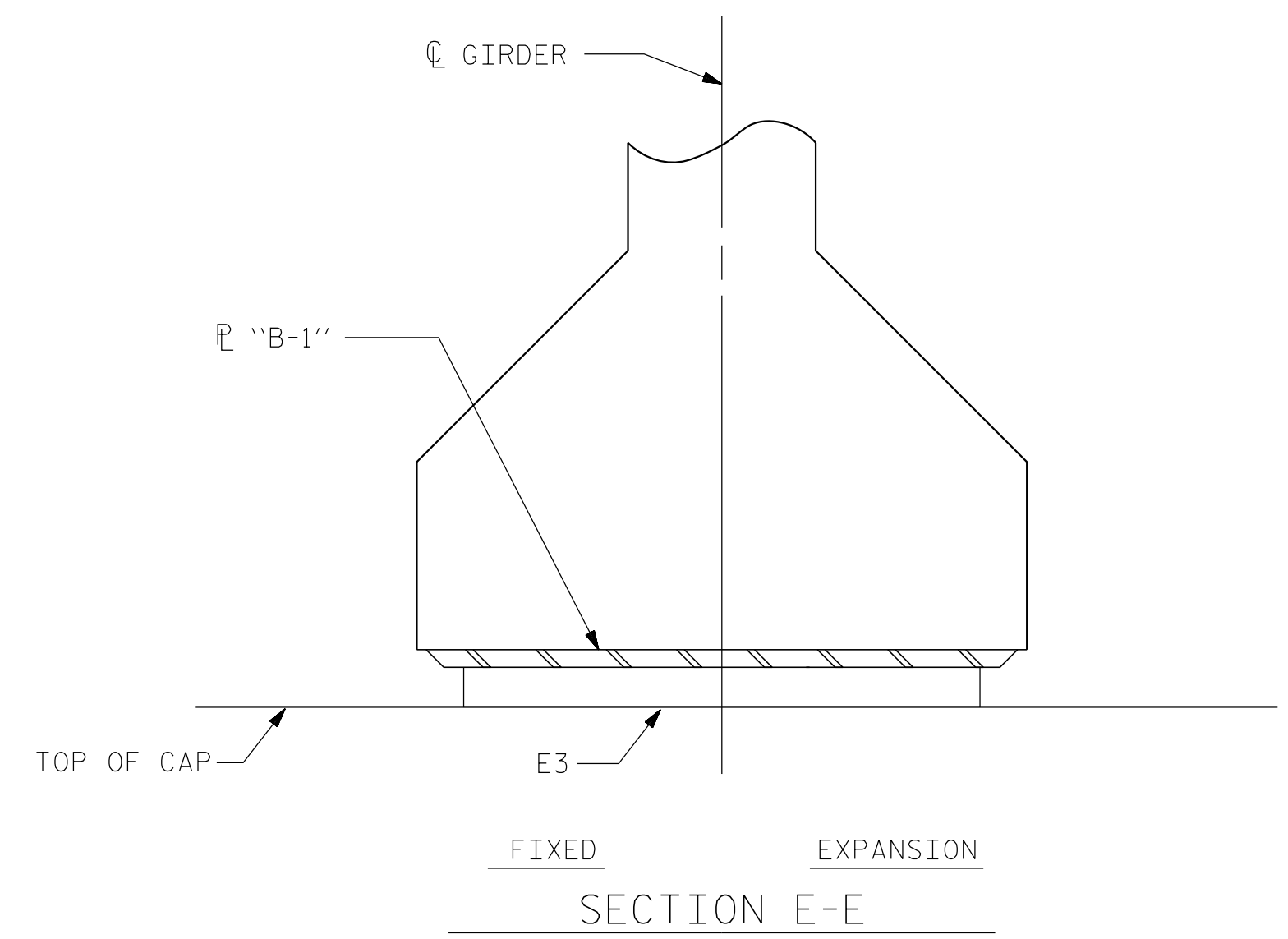
DocuSigned by:  
  
 Steven A. Campbell 12/21/2015

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

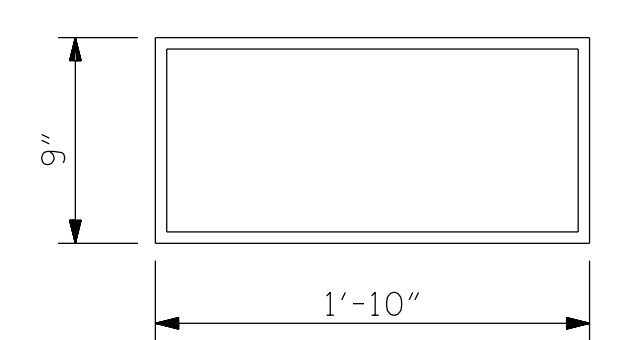
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			51
2			4			

NOTES

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



E3 (20 REQ'D )  
 PLAN VIEW OF ELASTOMERIC BEARING  
 TYPE IV

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE II	145 k
TYPE III	205 k
TYPE IV	225 k

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

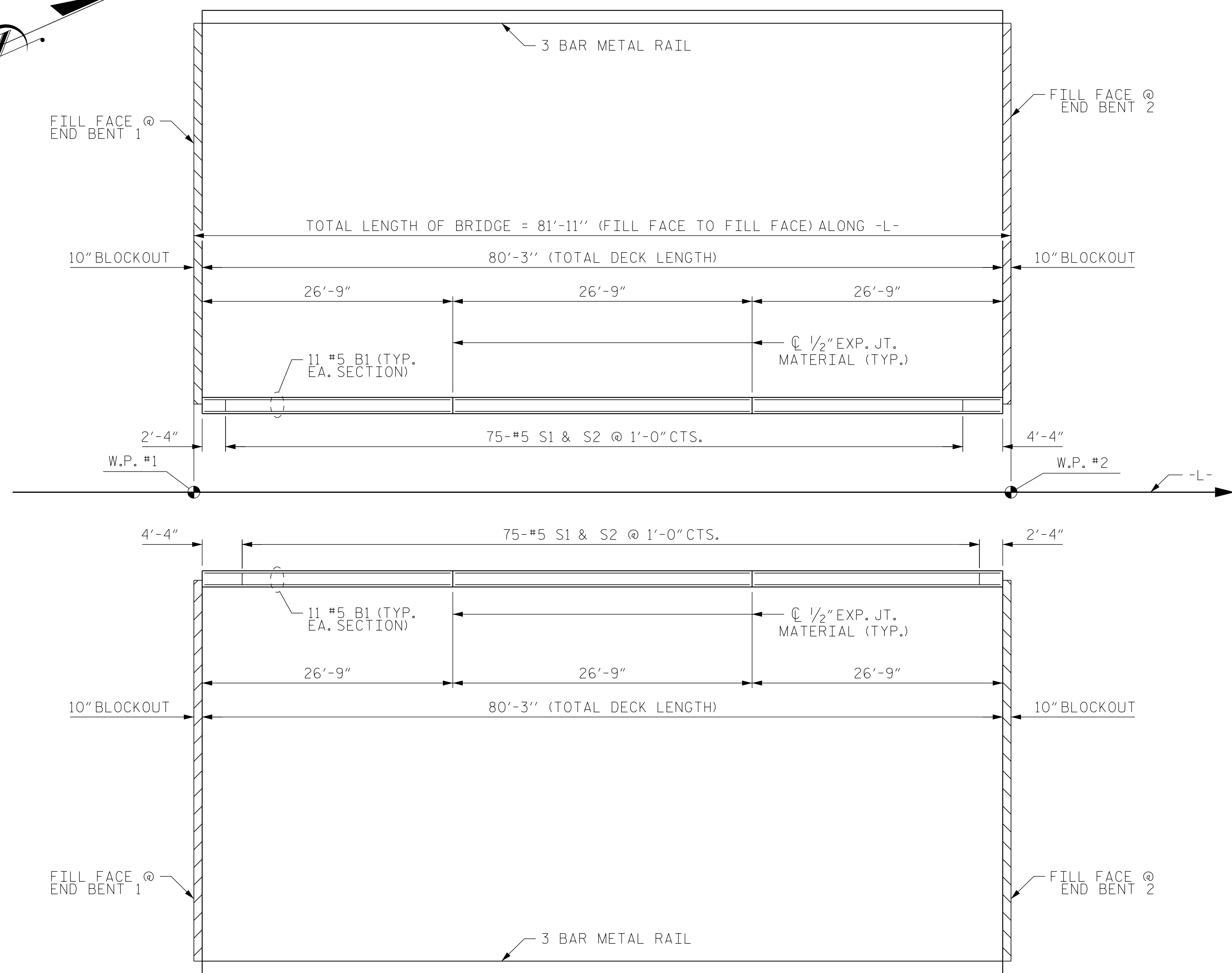
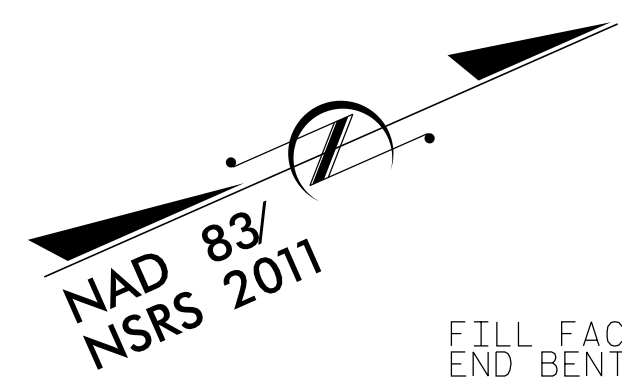
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CHECKED BY : CMT	DATE : 8/15
DRAWN BY : WJH 8/89	REV. 10/1/11 MAA/OM
CHECKED BY : CRK 8/89	REV. 6/13 AAC/MAA
	REV. 1/15 MAA/TMG

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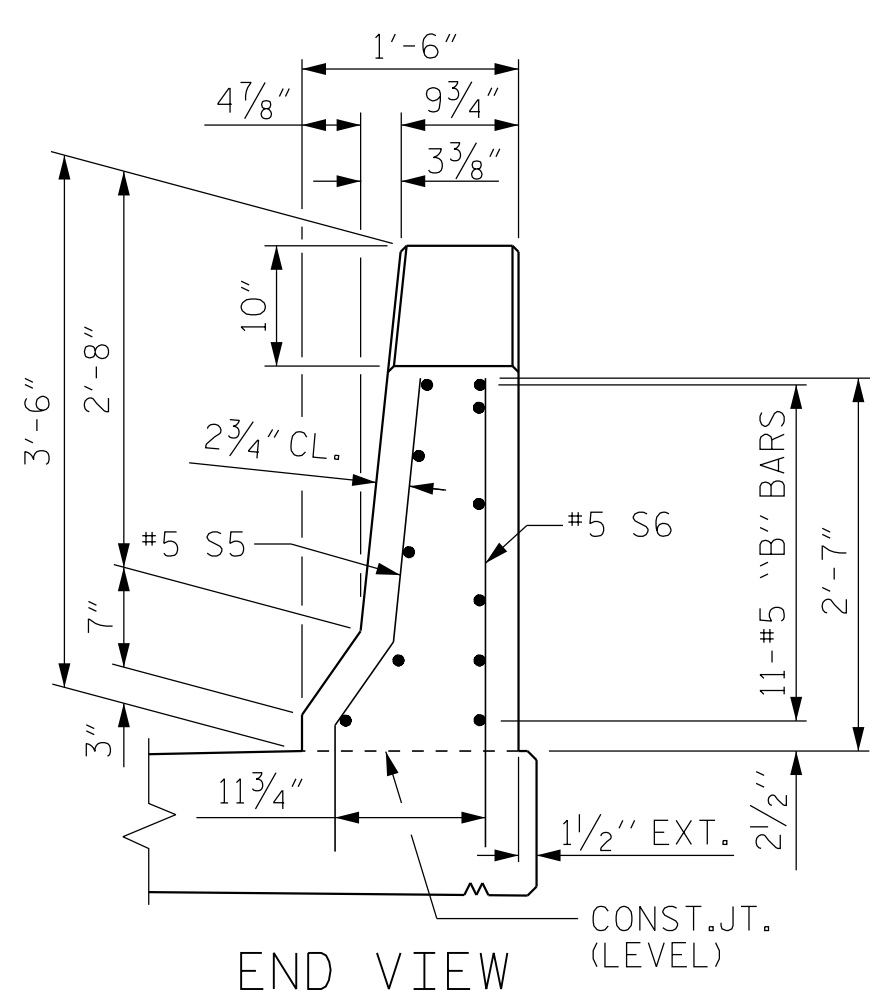
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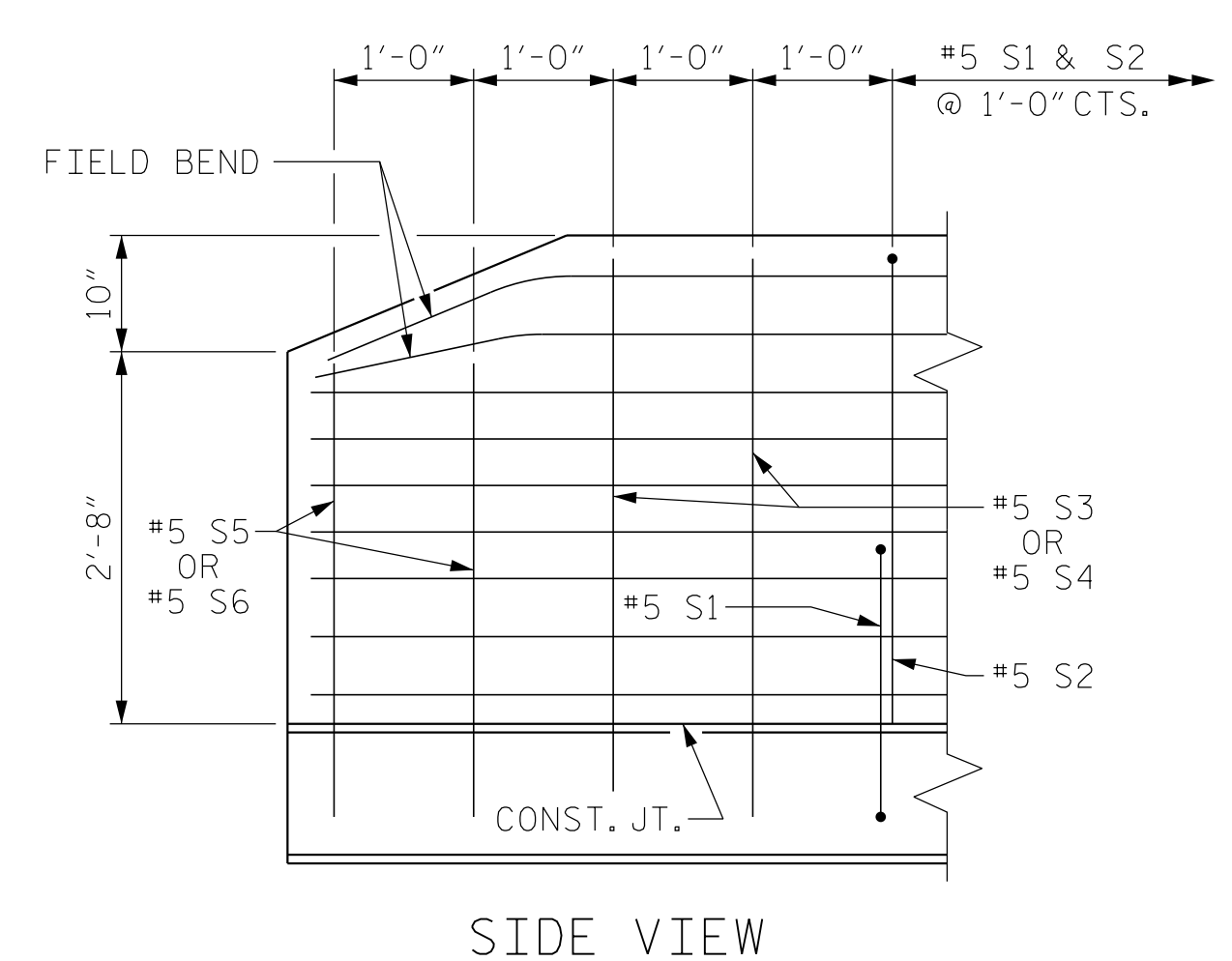
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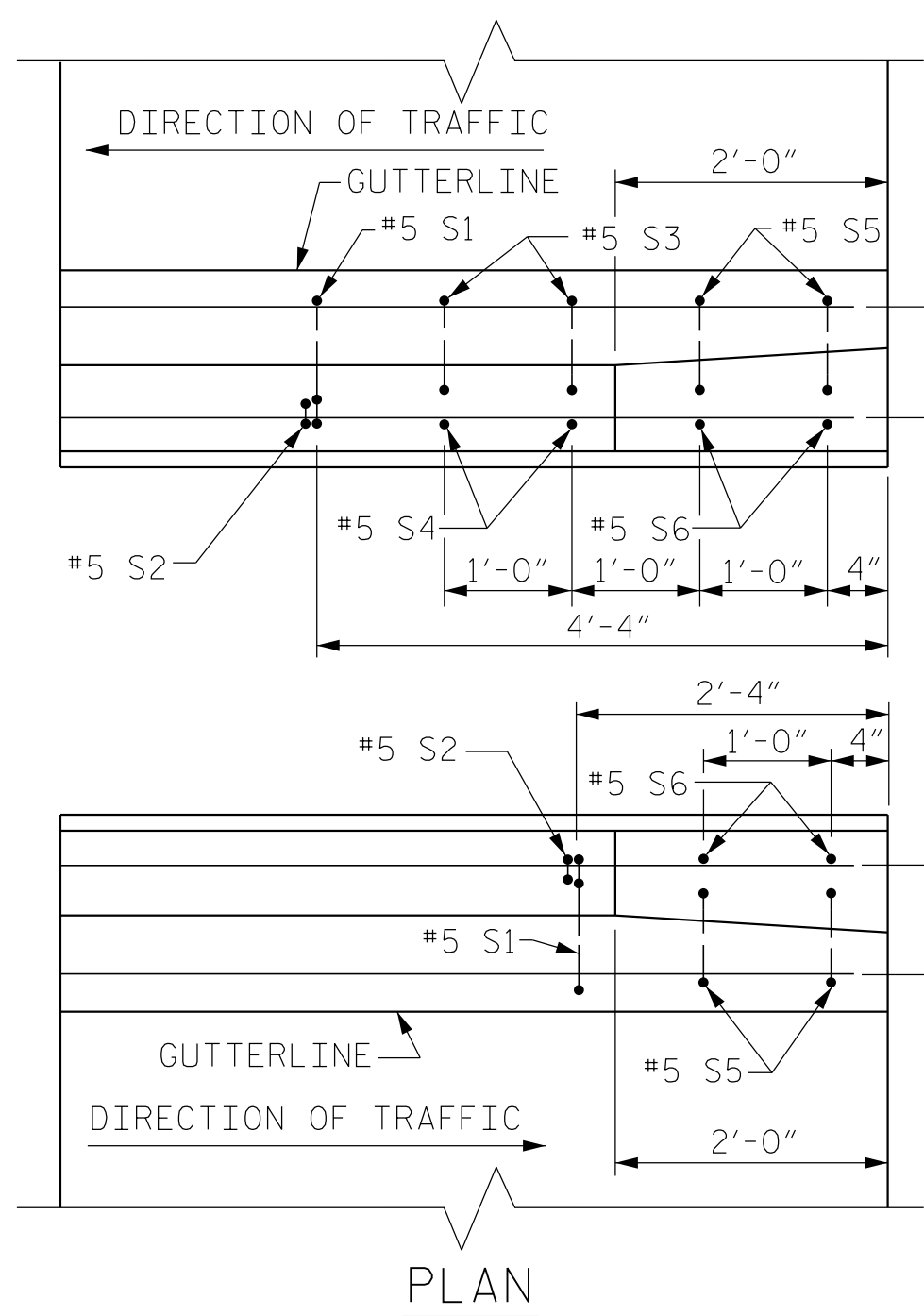
PLAN



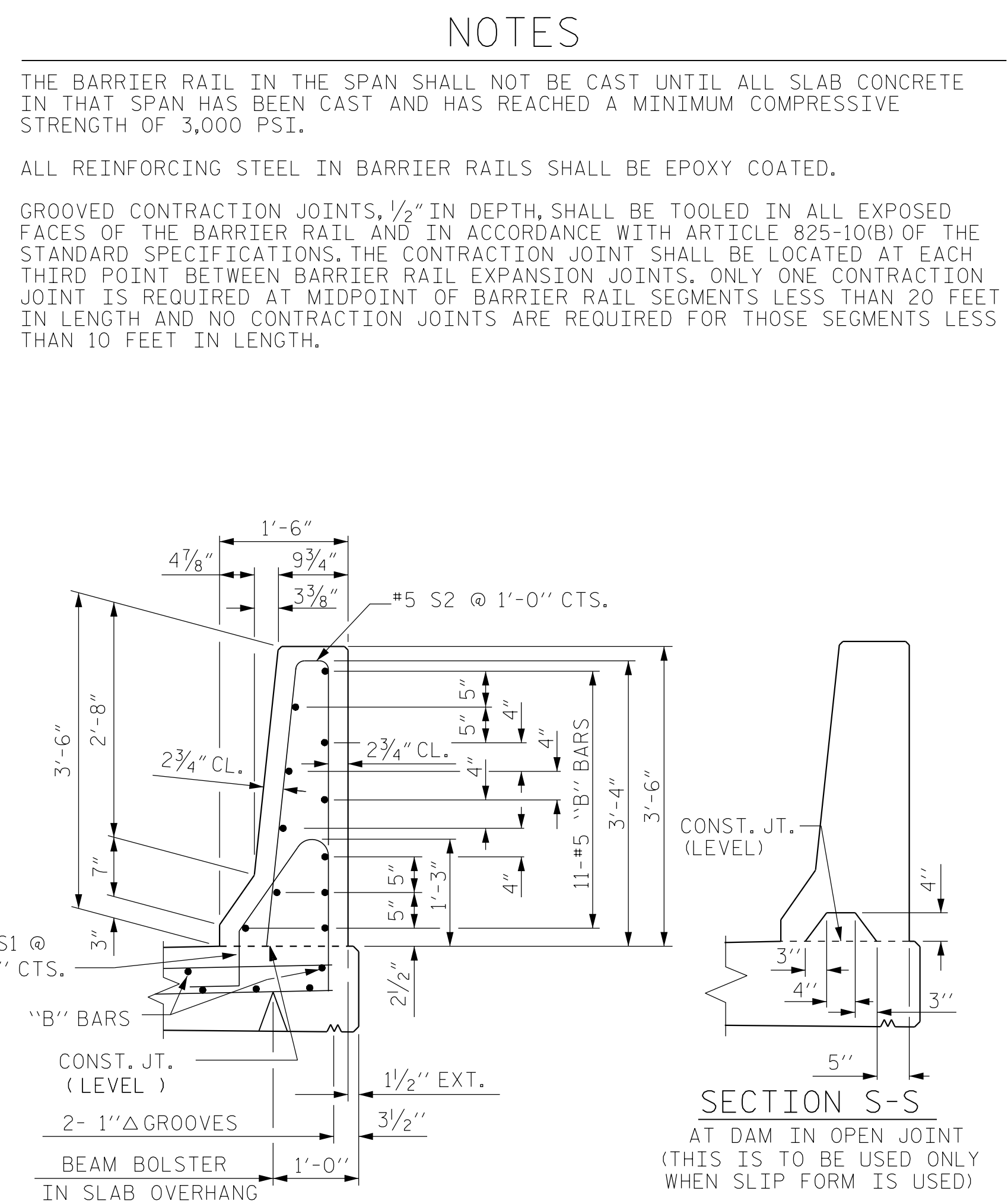
END VIEW



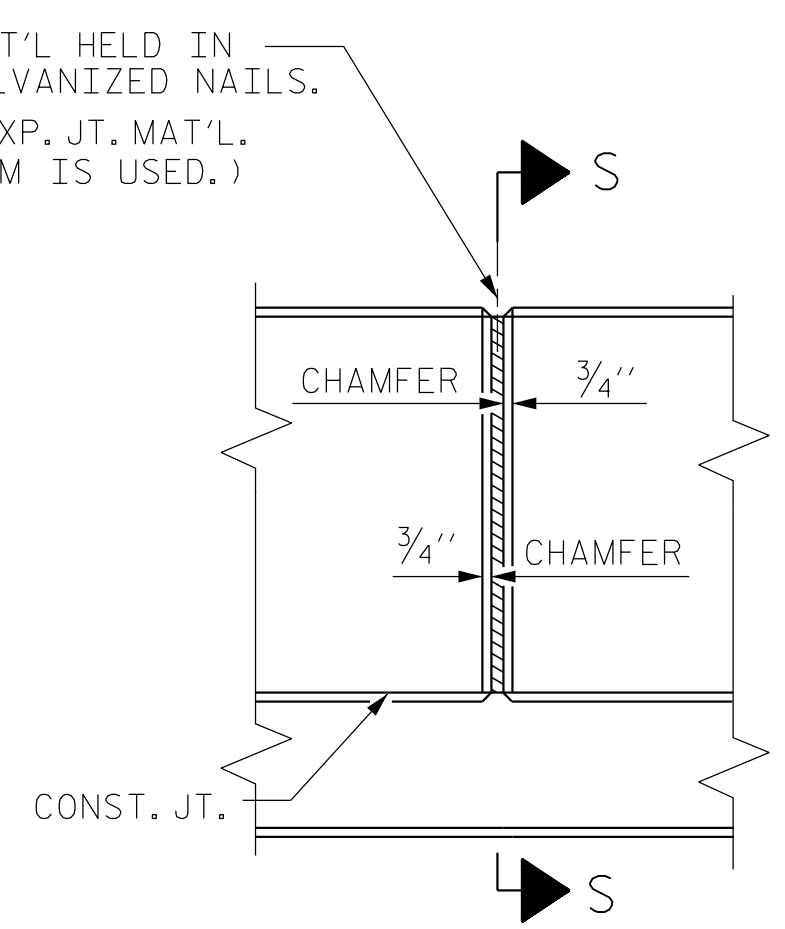
SIDE VIEW



PLAN



SECTION THRU RAIL



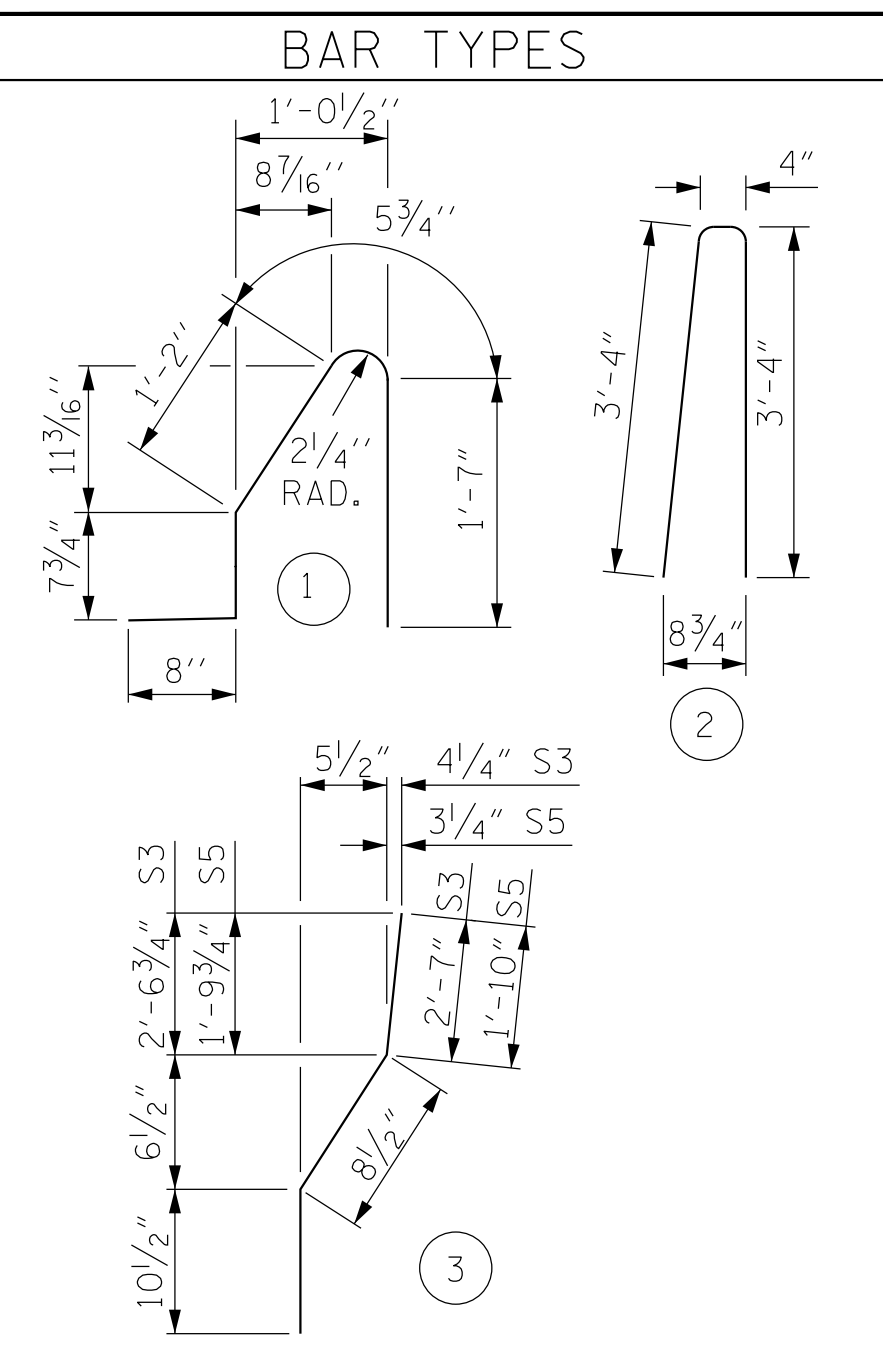
ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	150	#5	1	4'-7"	718
* S2	150	#5	2	7'-0"	1096
* S3	4	#5	3	4'-2"	18
* S4	4	#5	STR	4'-0"	17
* S5	8	#5	3	3'-5"	29
* S6	8	#5	STR	3'-3"	28
* B1	66	#5	STR	26'-3"	1809
* EPOXY COATED REINFORCING STEEL				3,715	LBS.
CLASS AA CONCRETE				22	CU. YDS.
CONCRETE BARRIER RAIL				160.5	LIN. FT.

ASSEMBLED BY :	PFC	DATE :	8/15
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DRAWN BY :	ARB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY :	SJD 9/87	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

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DocuSigned by:  
**Steven A. Campbell** 12/21/2015  
SBCPSB0006342E

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SHEET NO.	S-36
TOTAL SHEETS	51

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

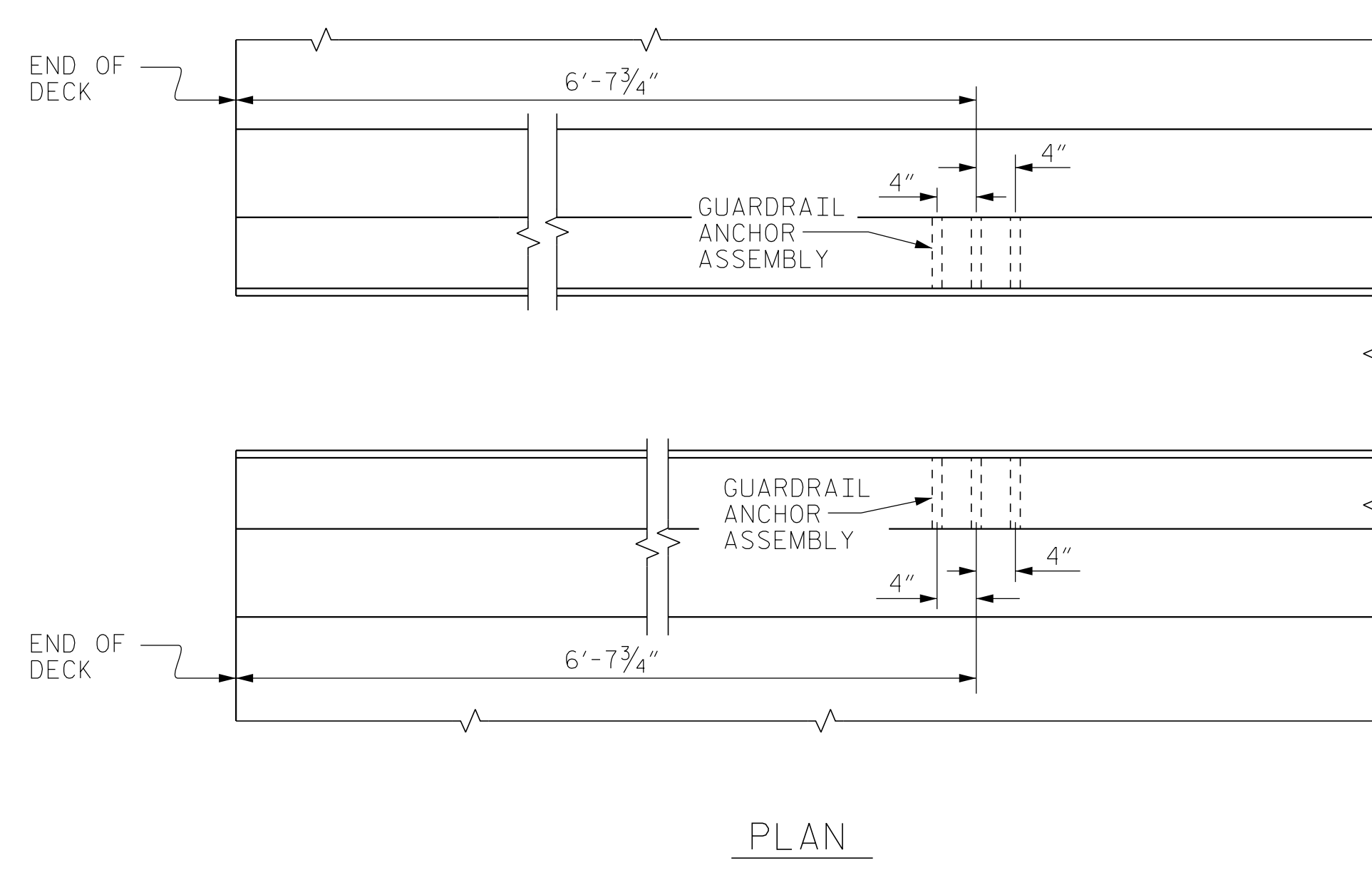
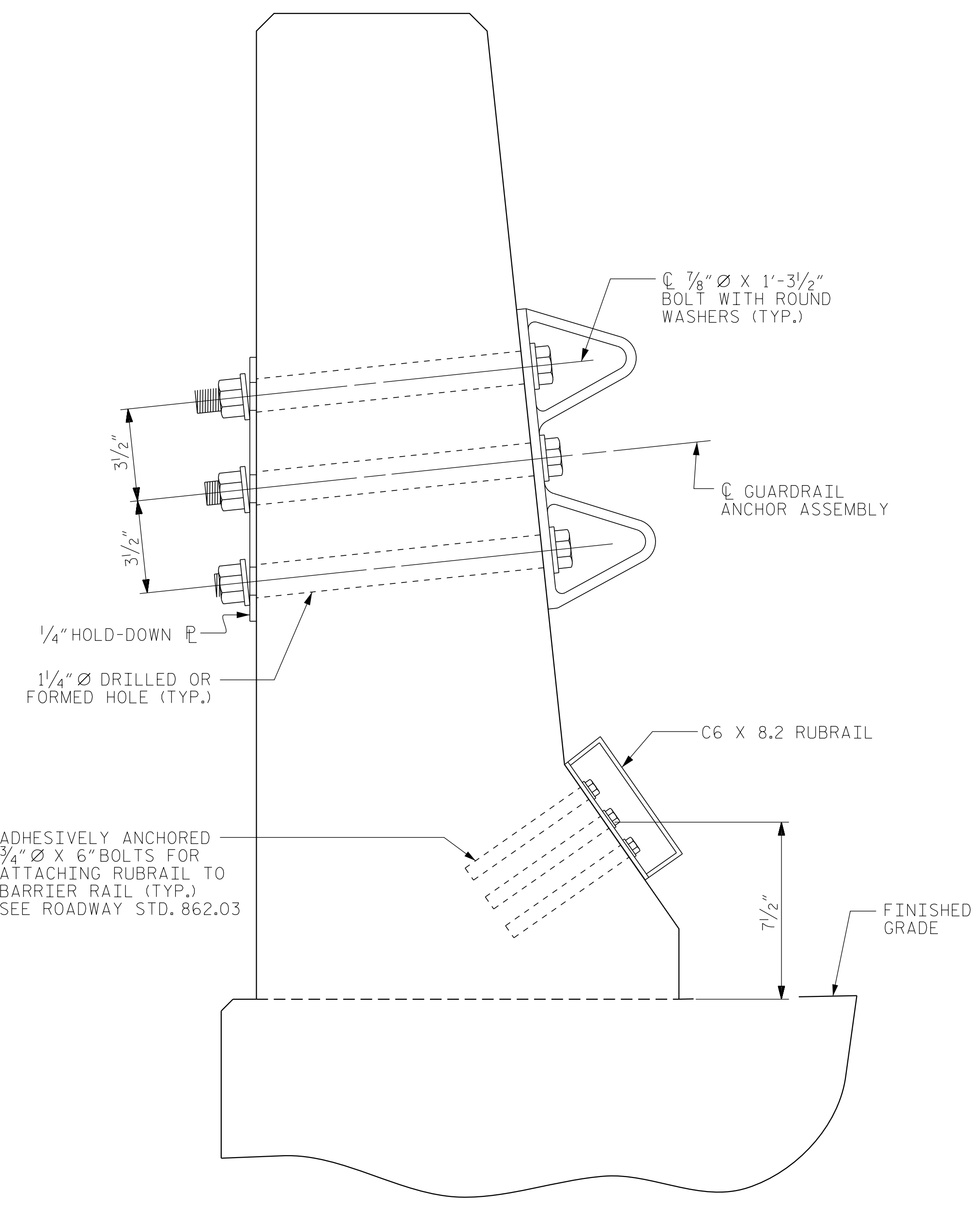
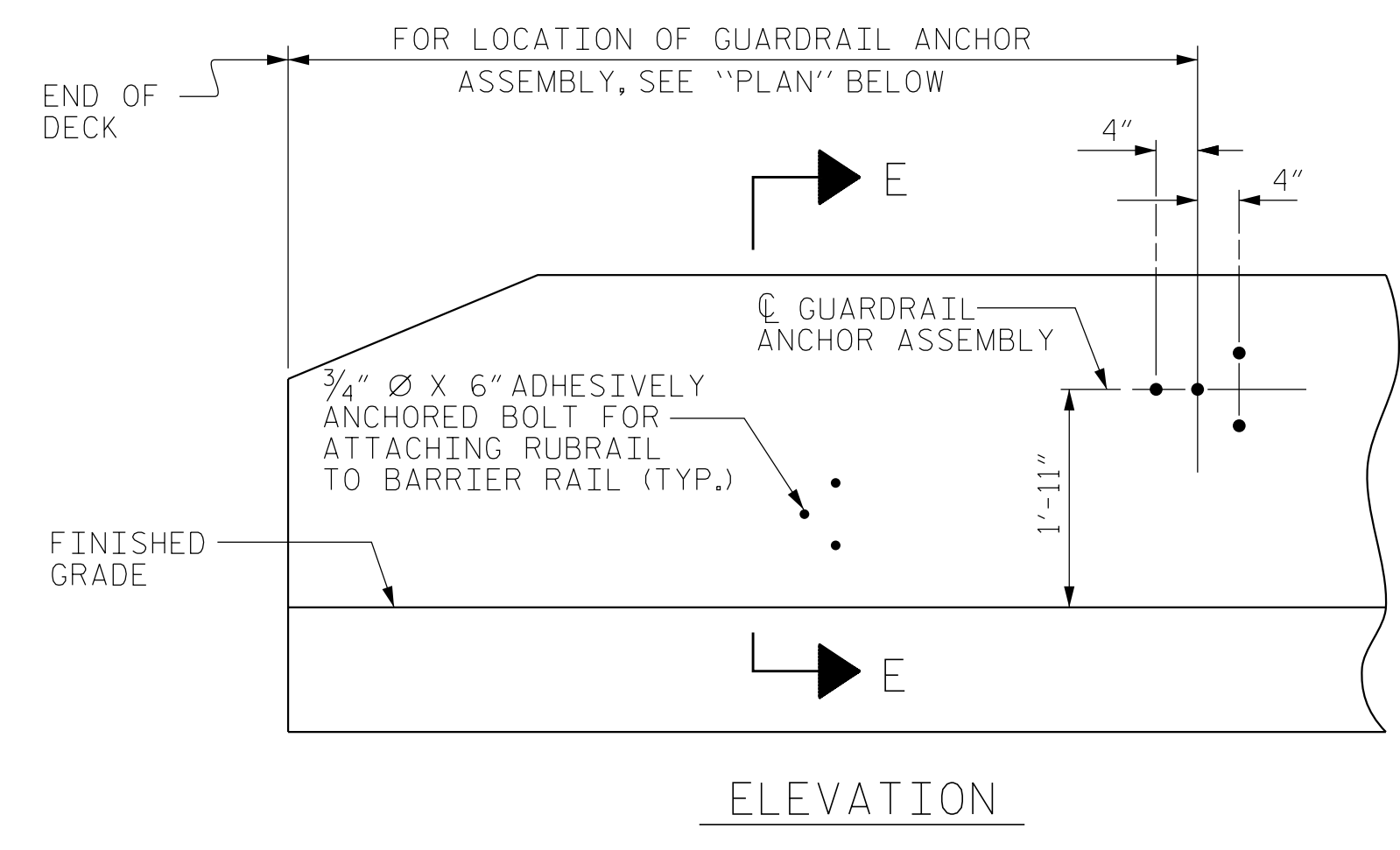
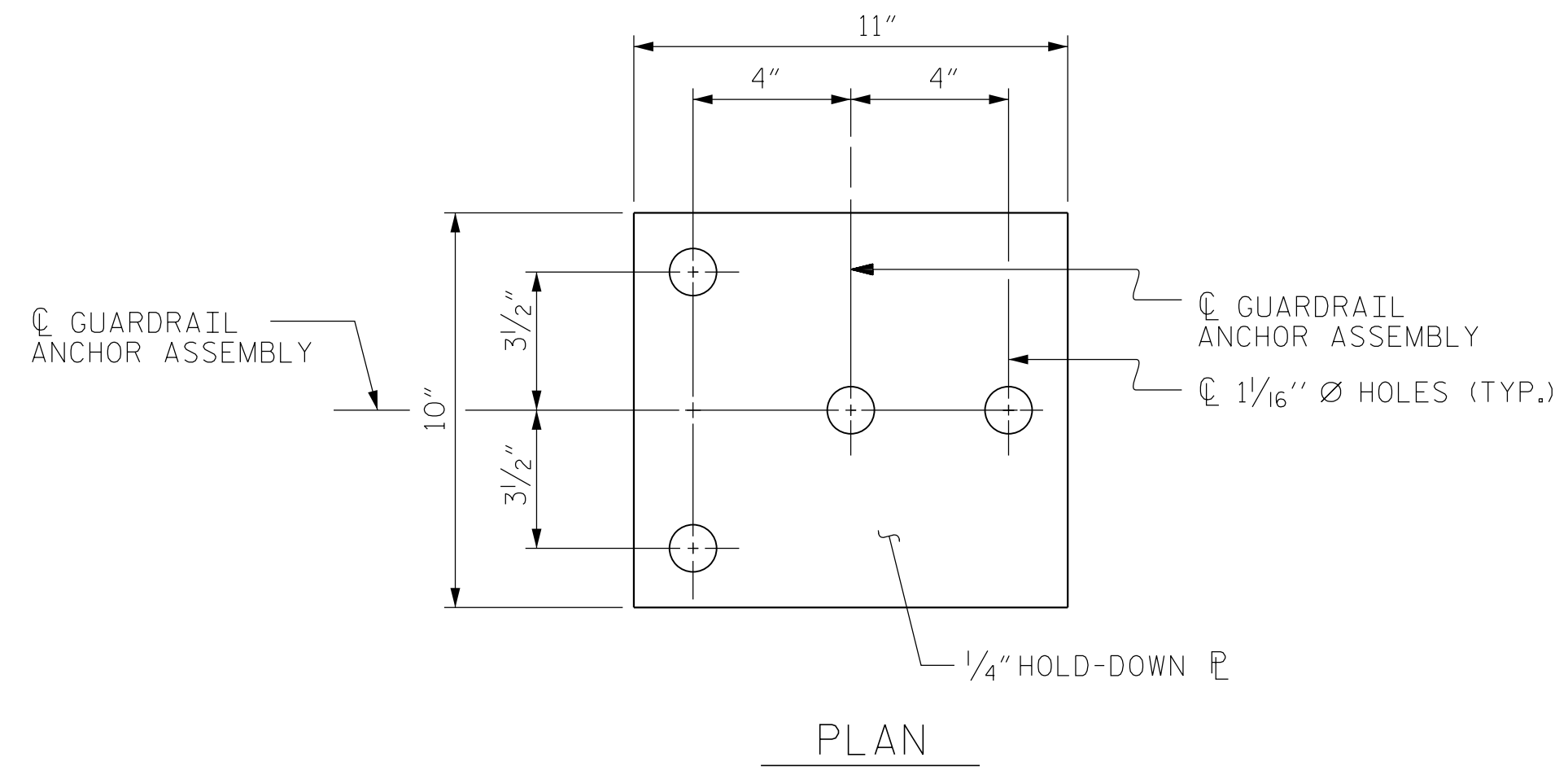
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

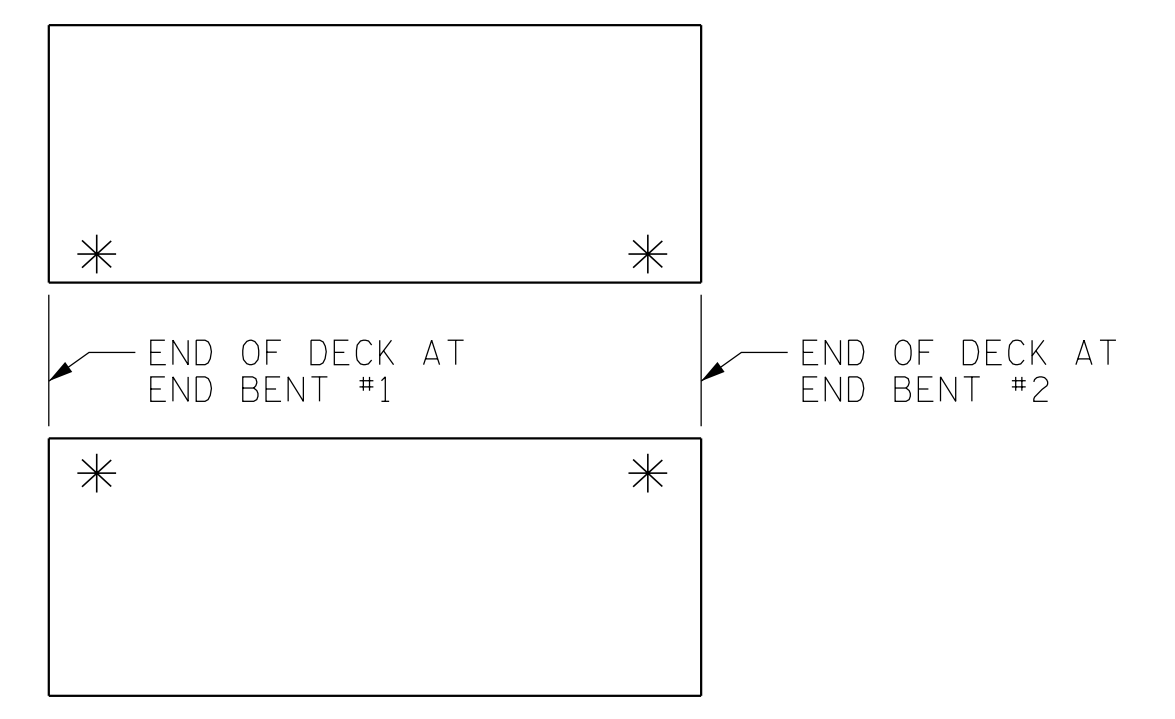
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

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

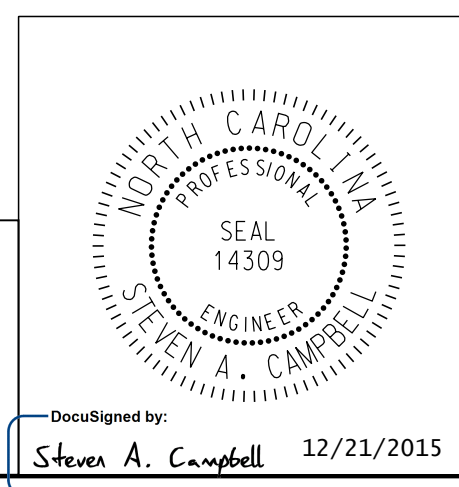


LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT #1 SHOWN, END BENT #2 SIMILAR.



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



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1			3			51
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CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	TLA 5/06	REV. 10/1/11	MAA/GM
CHECKED BY :	GM 5/06	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

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### 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 B221 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. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

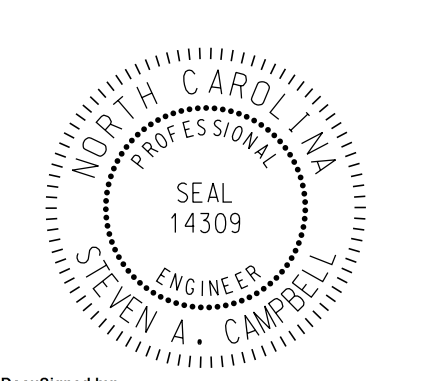
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

PAY LENGTH = 145.5 LIN.FT.

Prepared in the Office of:



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**Steven A. Campbell** 12/21/2015  
SBCF58A009342E

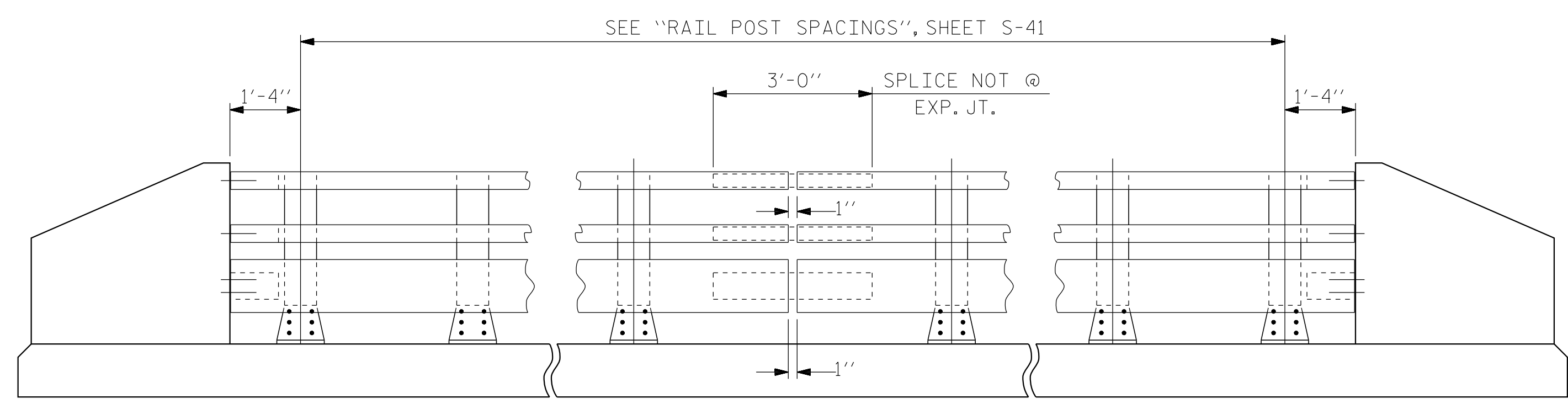
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SHEET 1 OF 3

STATE OF NORTH CAROLINA  
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RALEIGH  
STANDARD  
**3 BAR METAL RAIL**

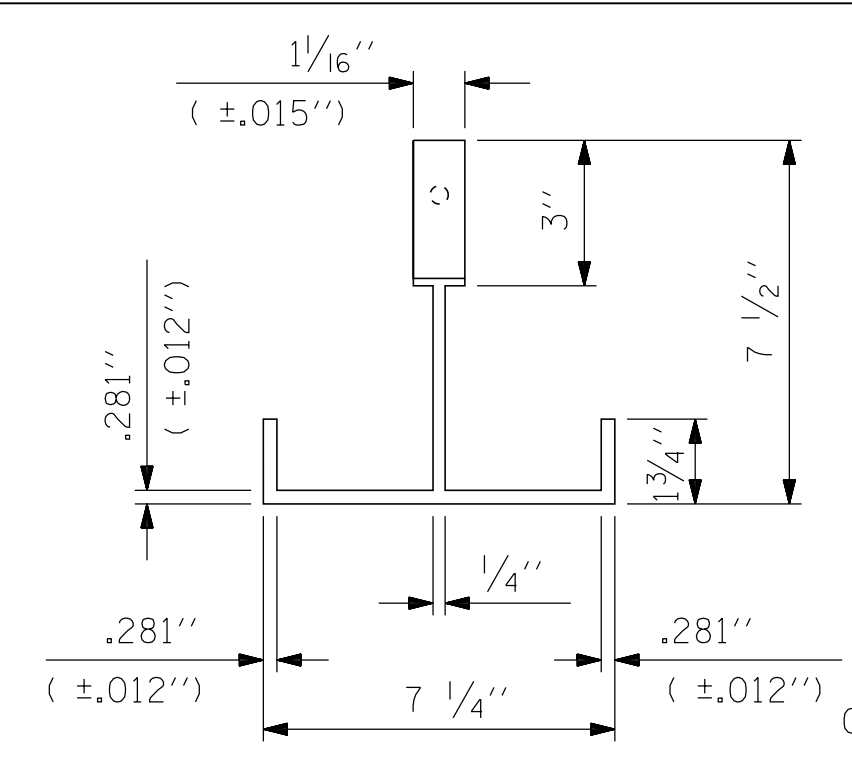
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2			4			

STD. NO. BMR5

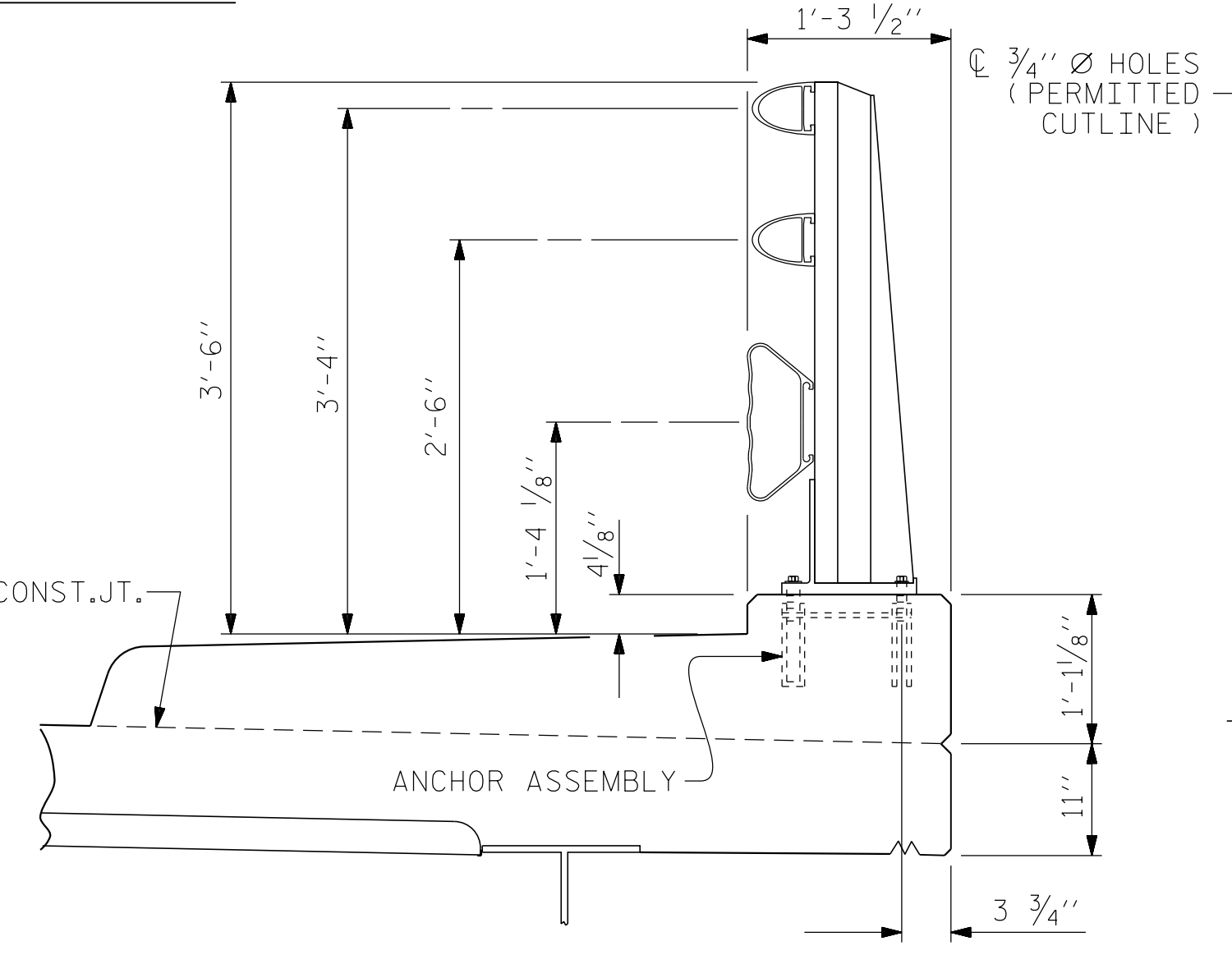


ELEVATION

NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

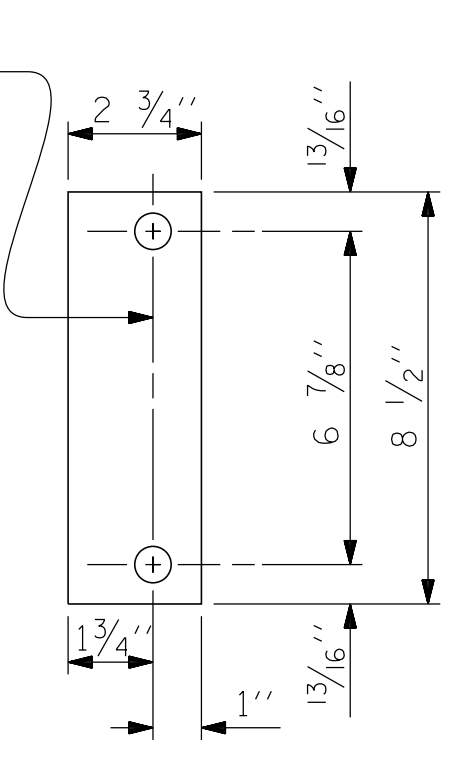


PLAN

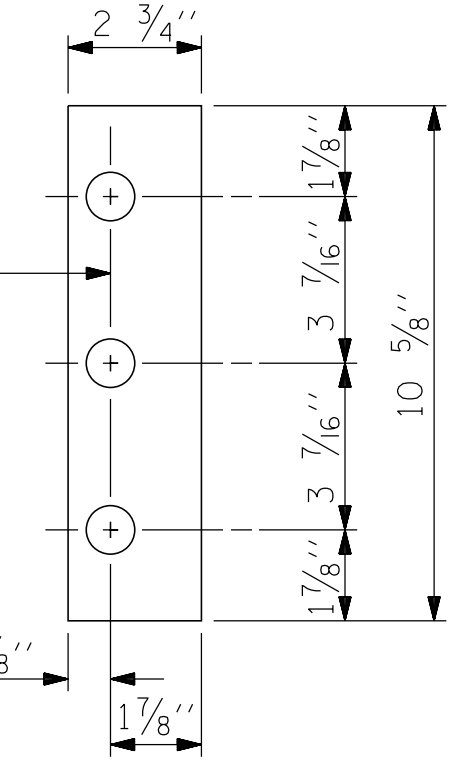


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6

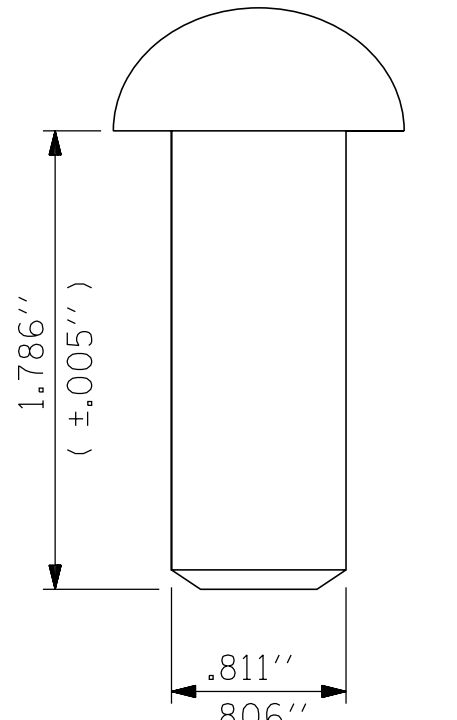


REAR PLATE

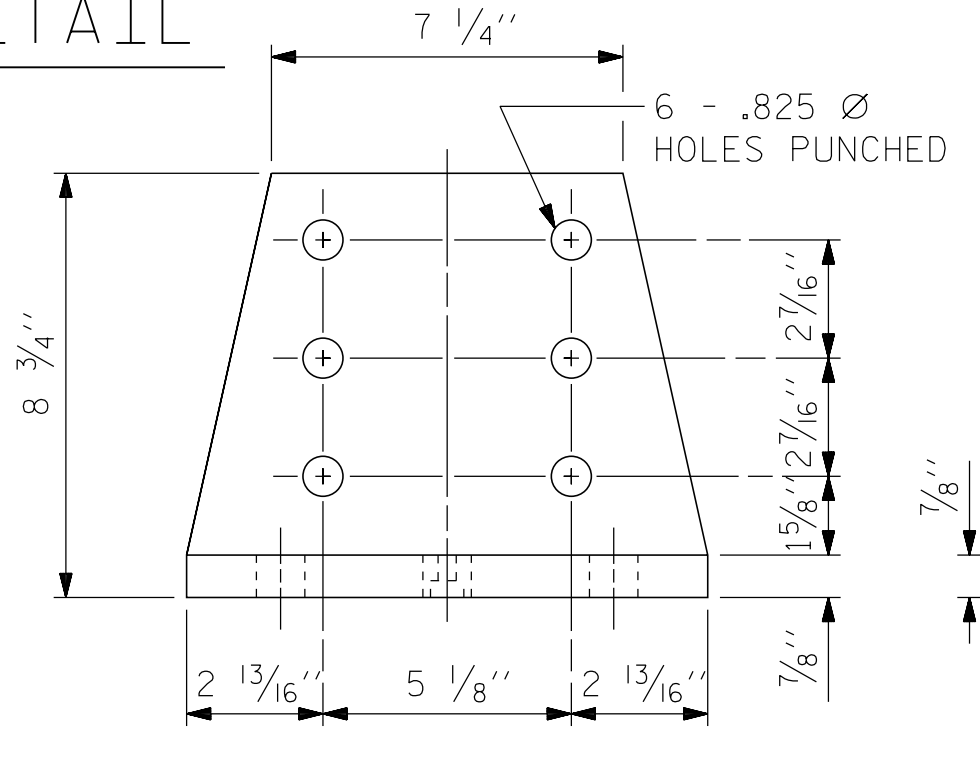


FRONT PLATE SHIM DETAILS

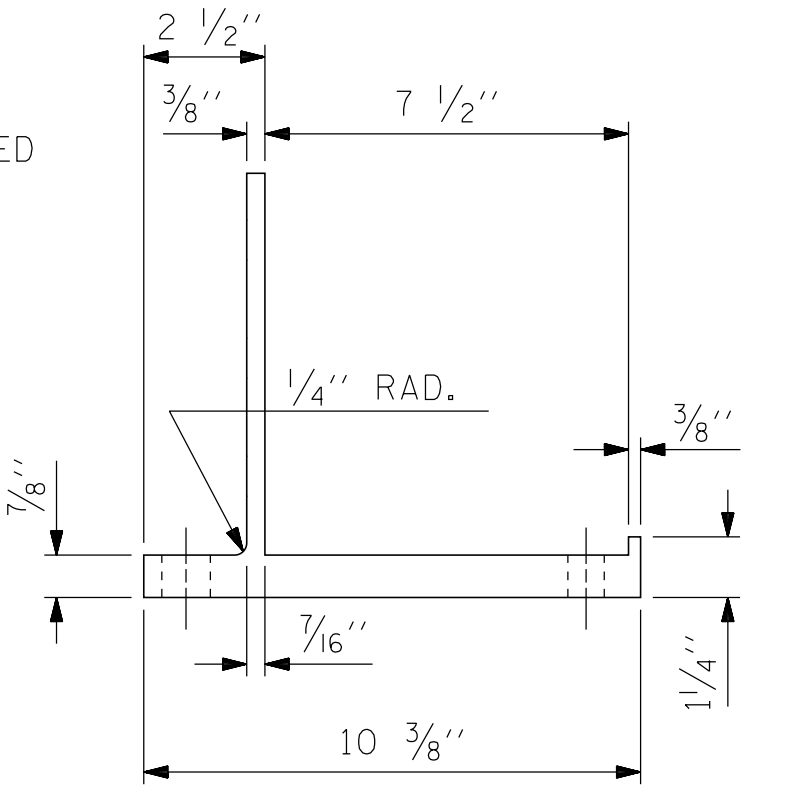
NOTE:  
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



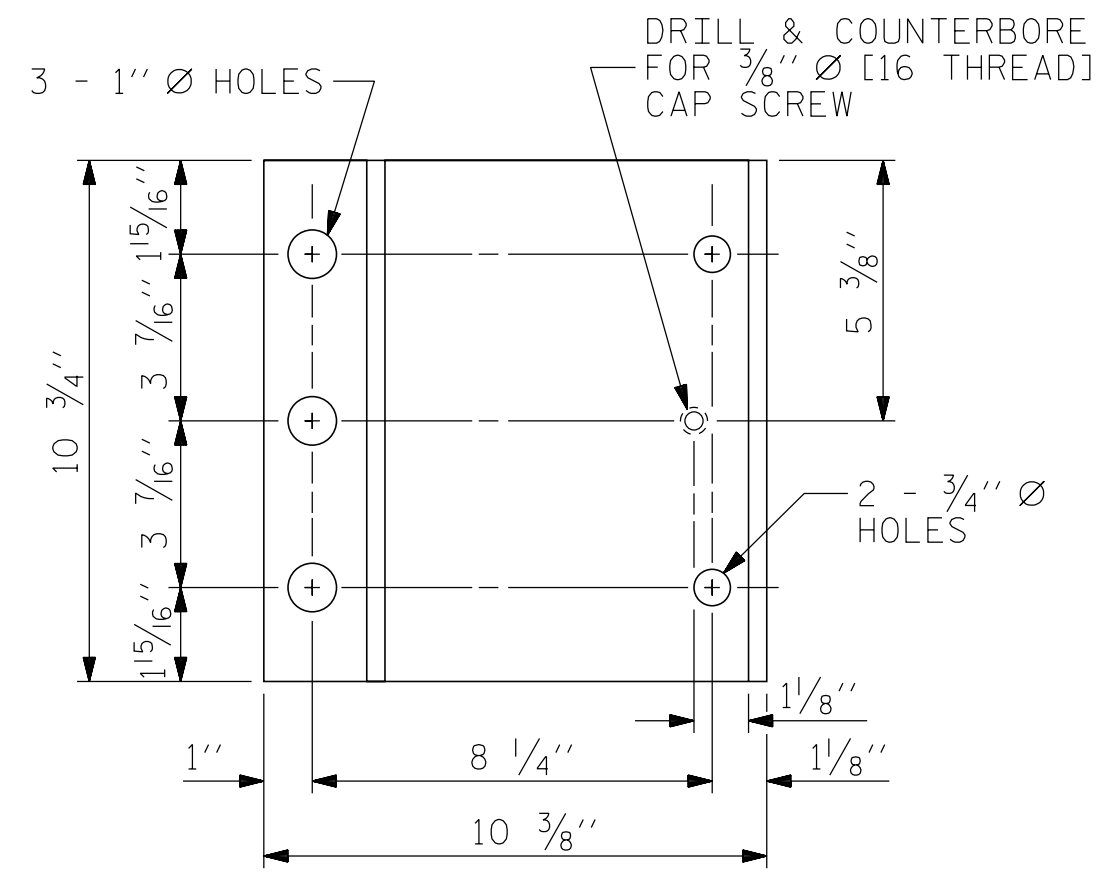
RIVET DETAIL



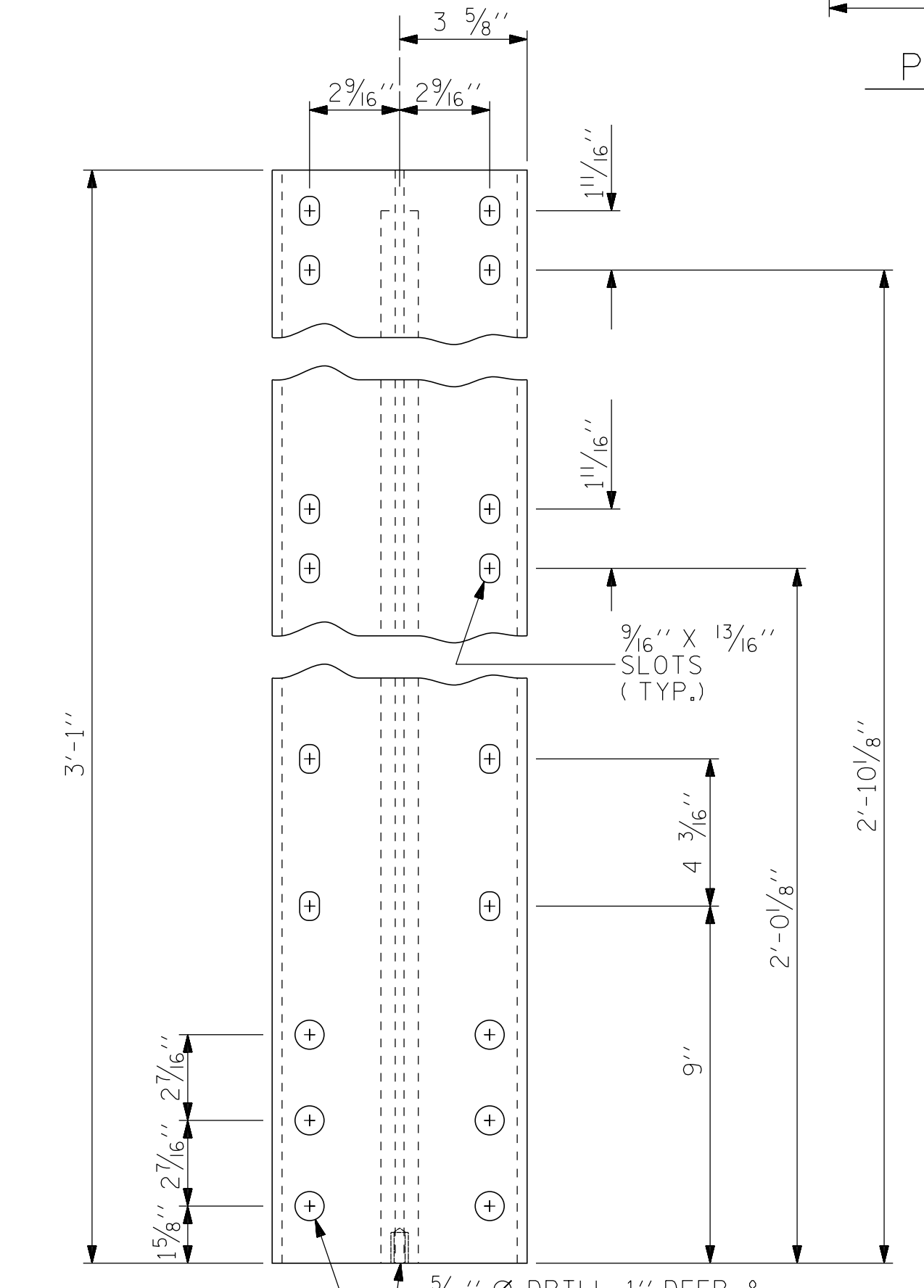
FRONT ELEVATION



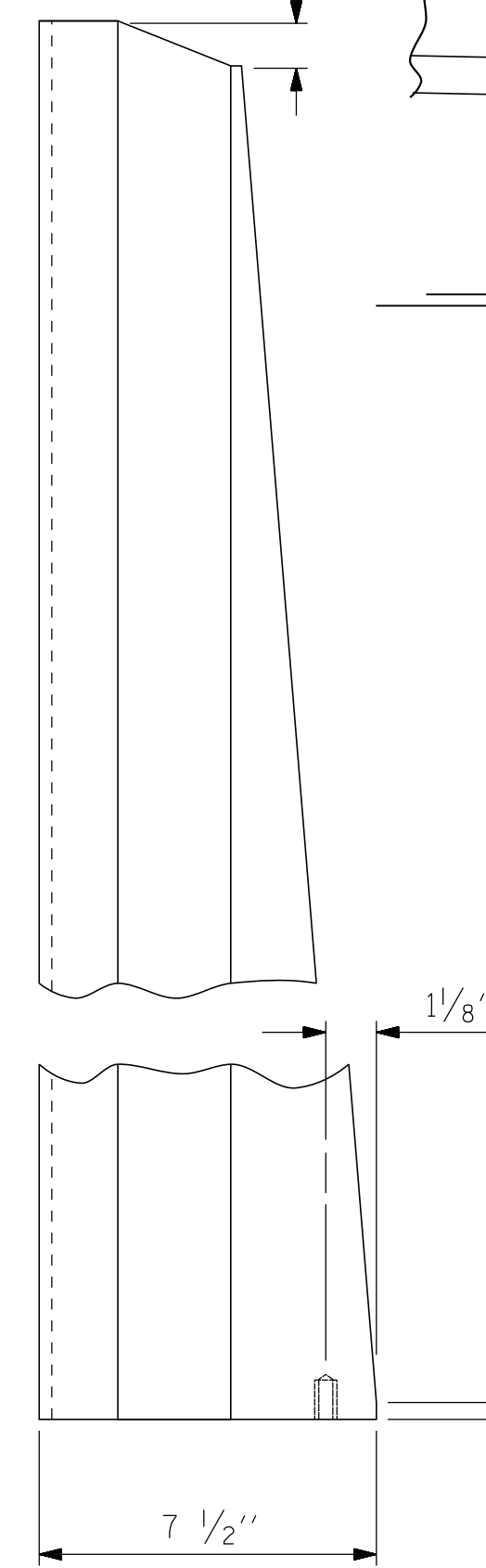
SIDE ELEVATION



PLAN



FRONT ELEVATION



SIDE ELEVATION

DETAILS OF POST

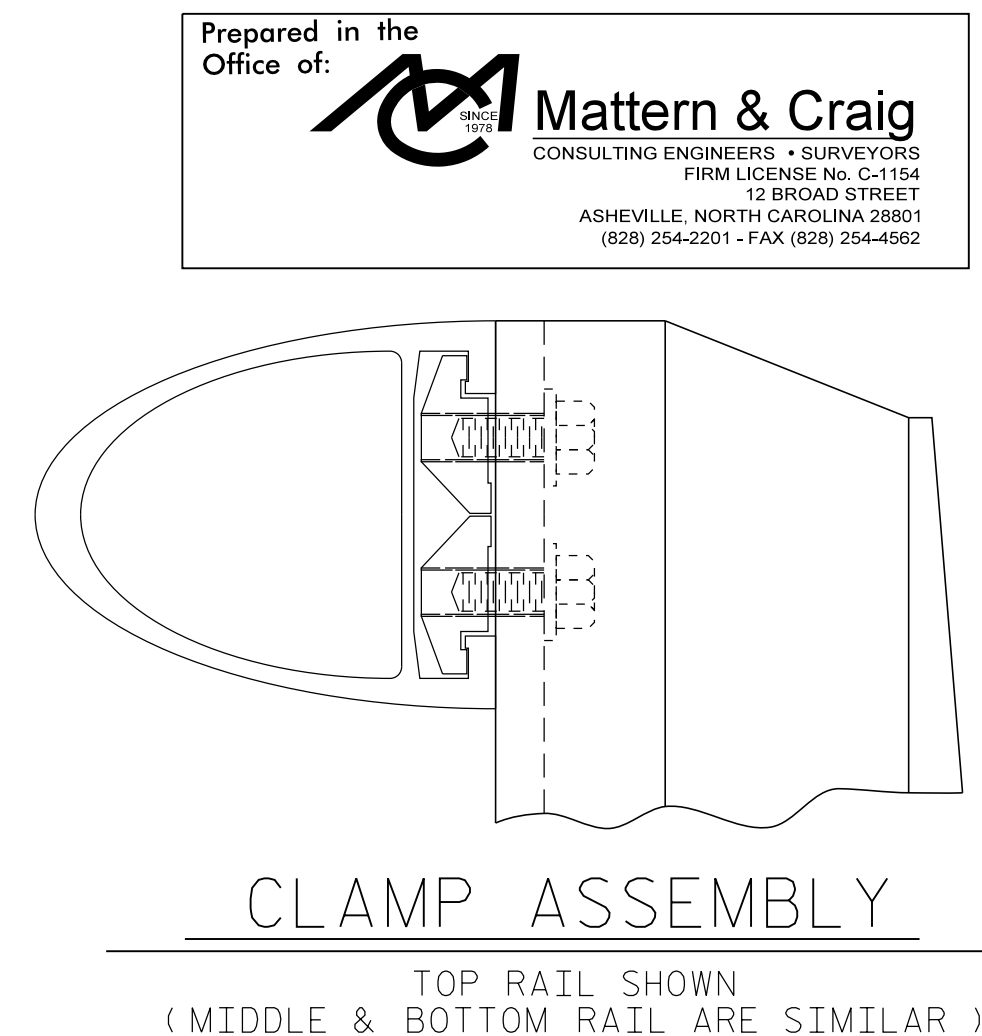
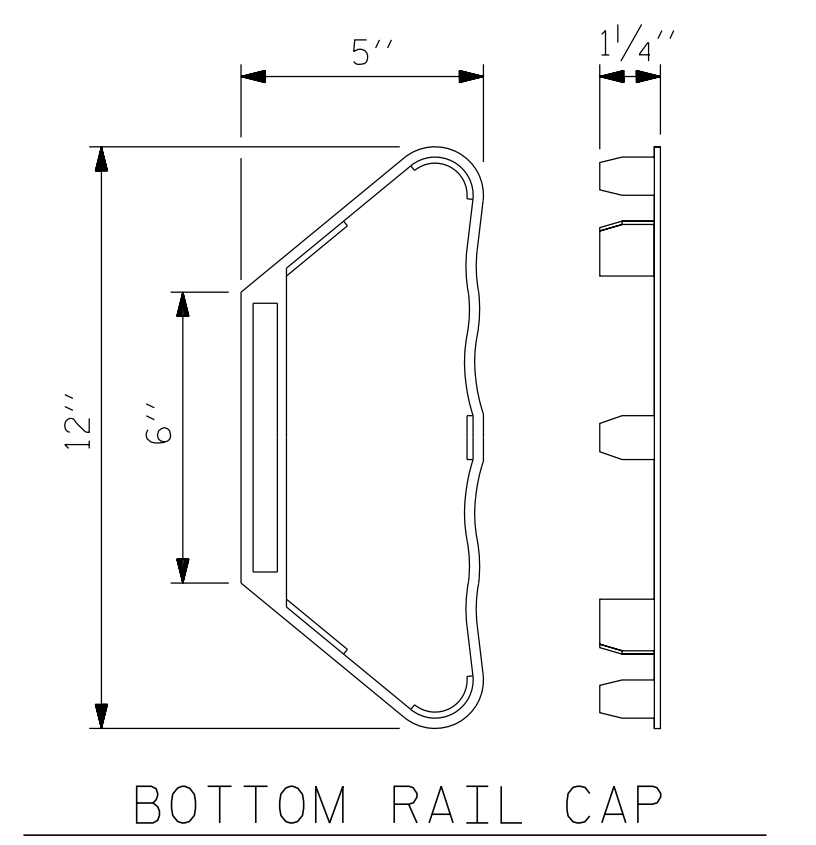
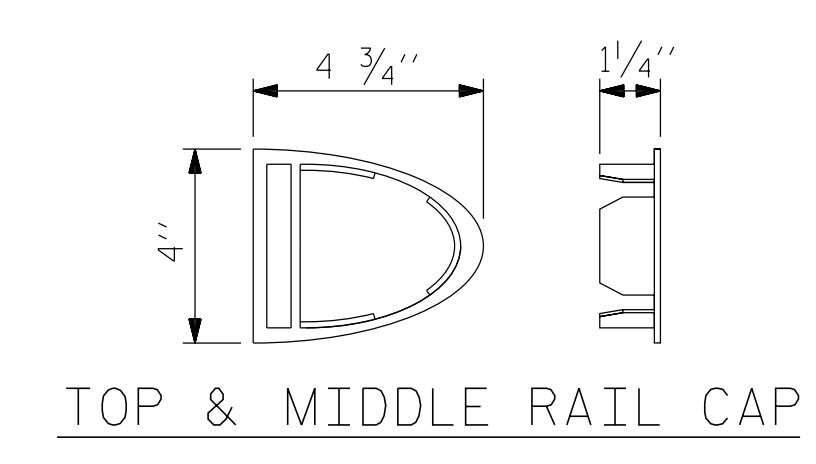
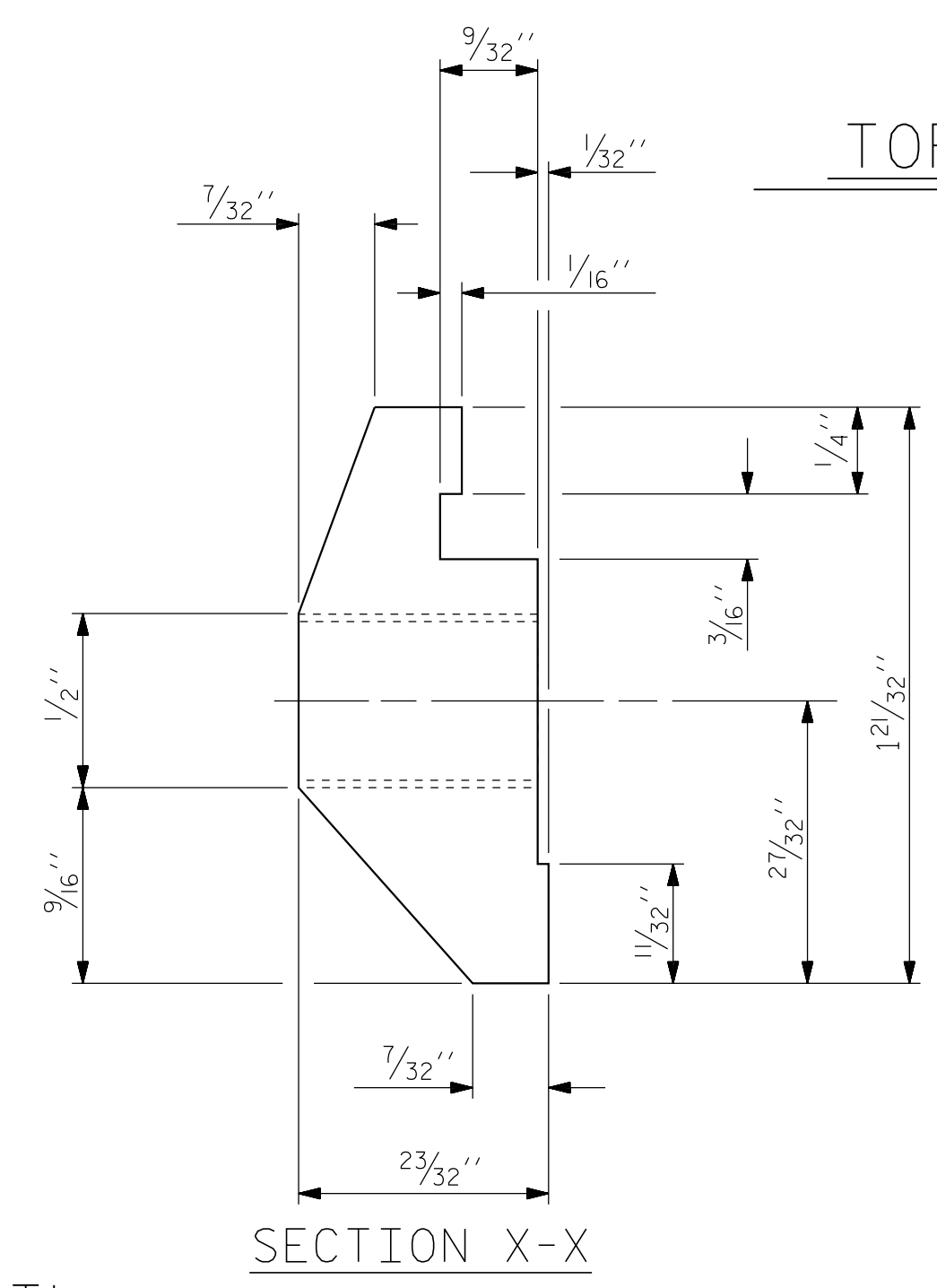
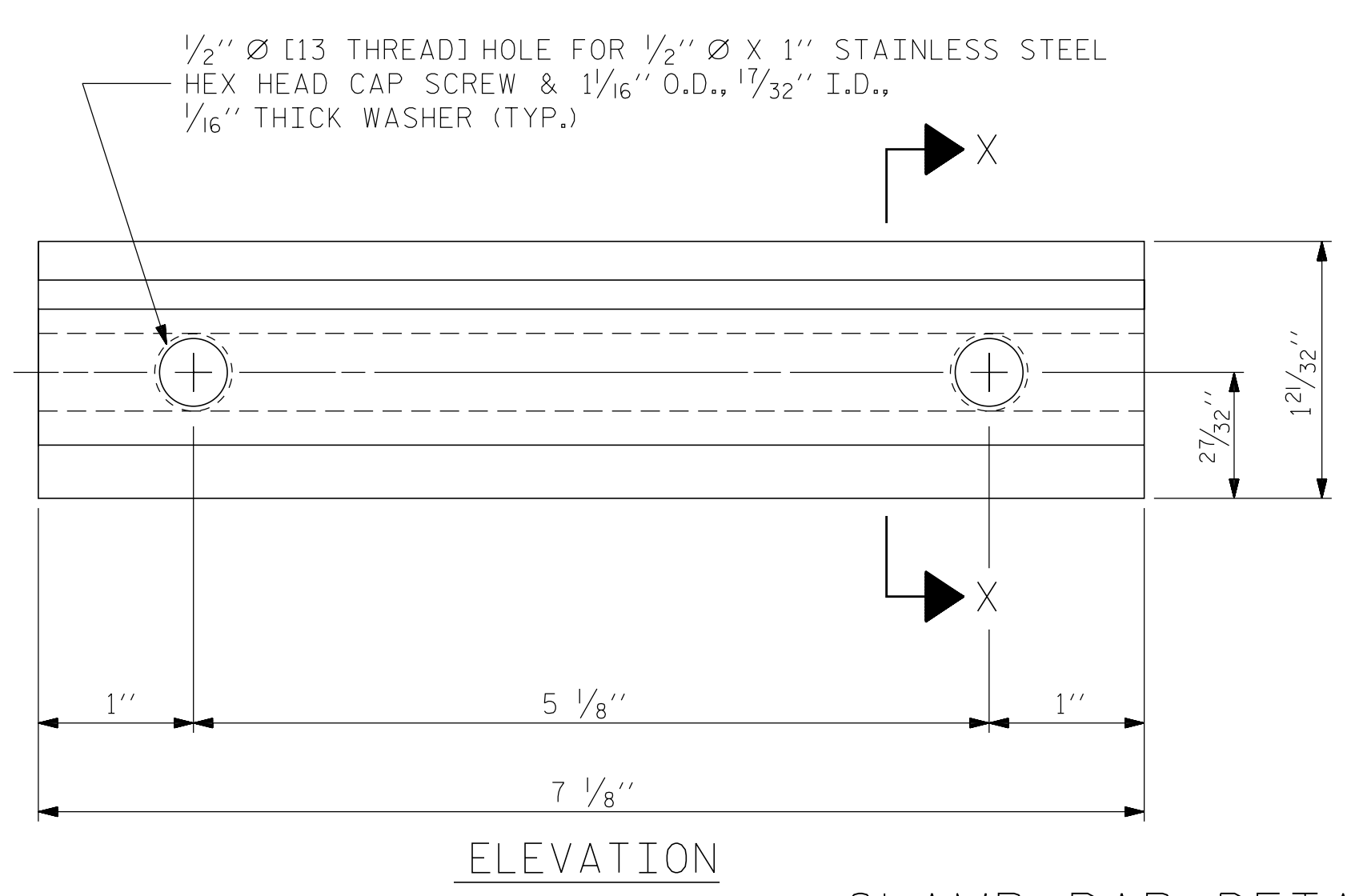
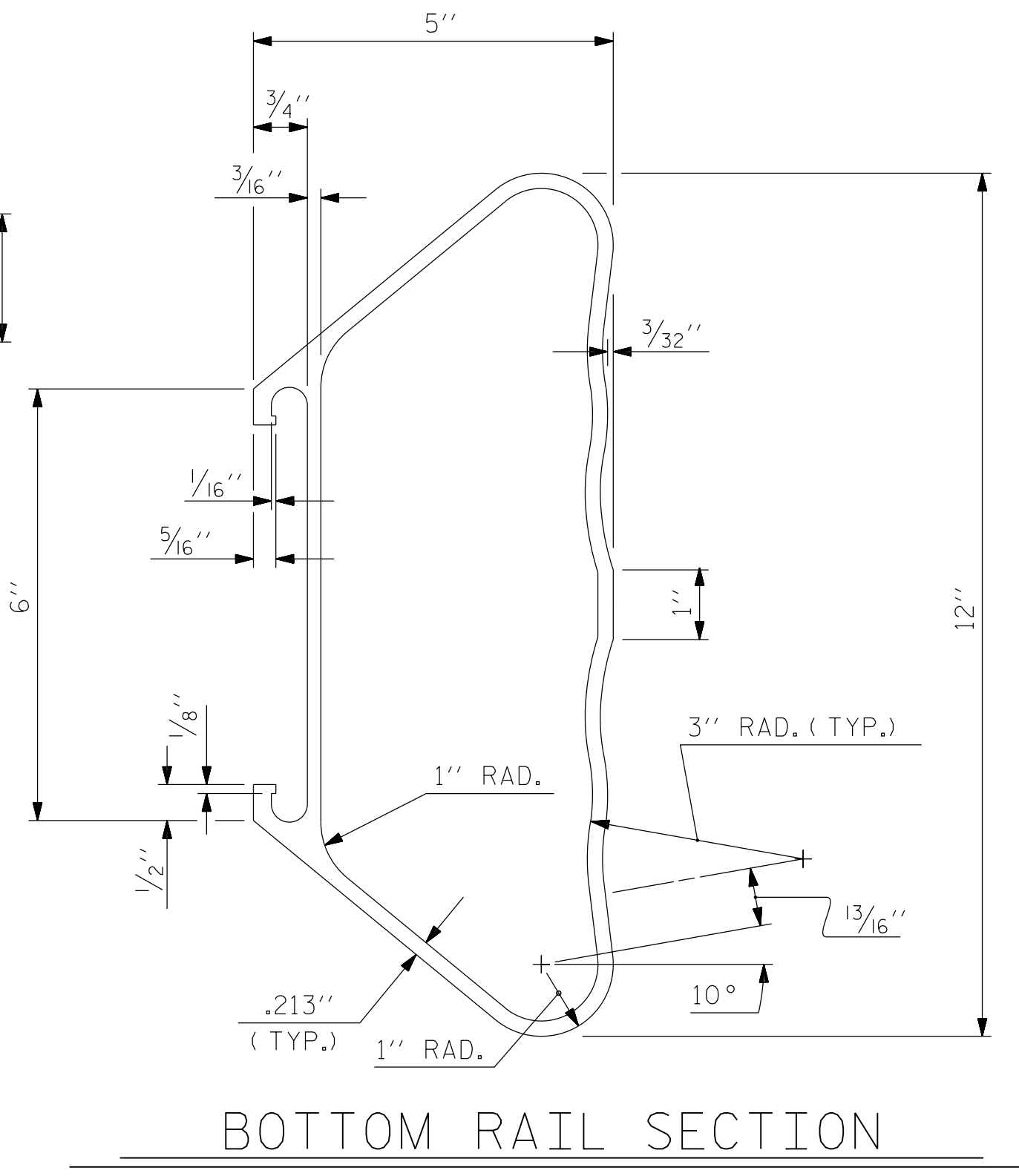
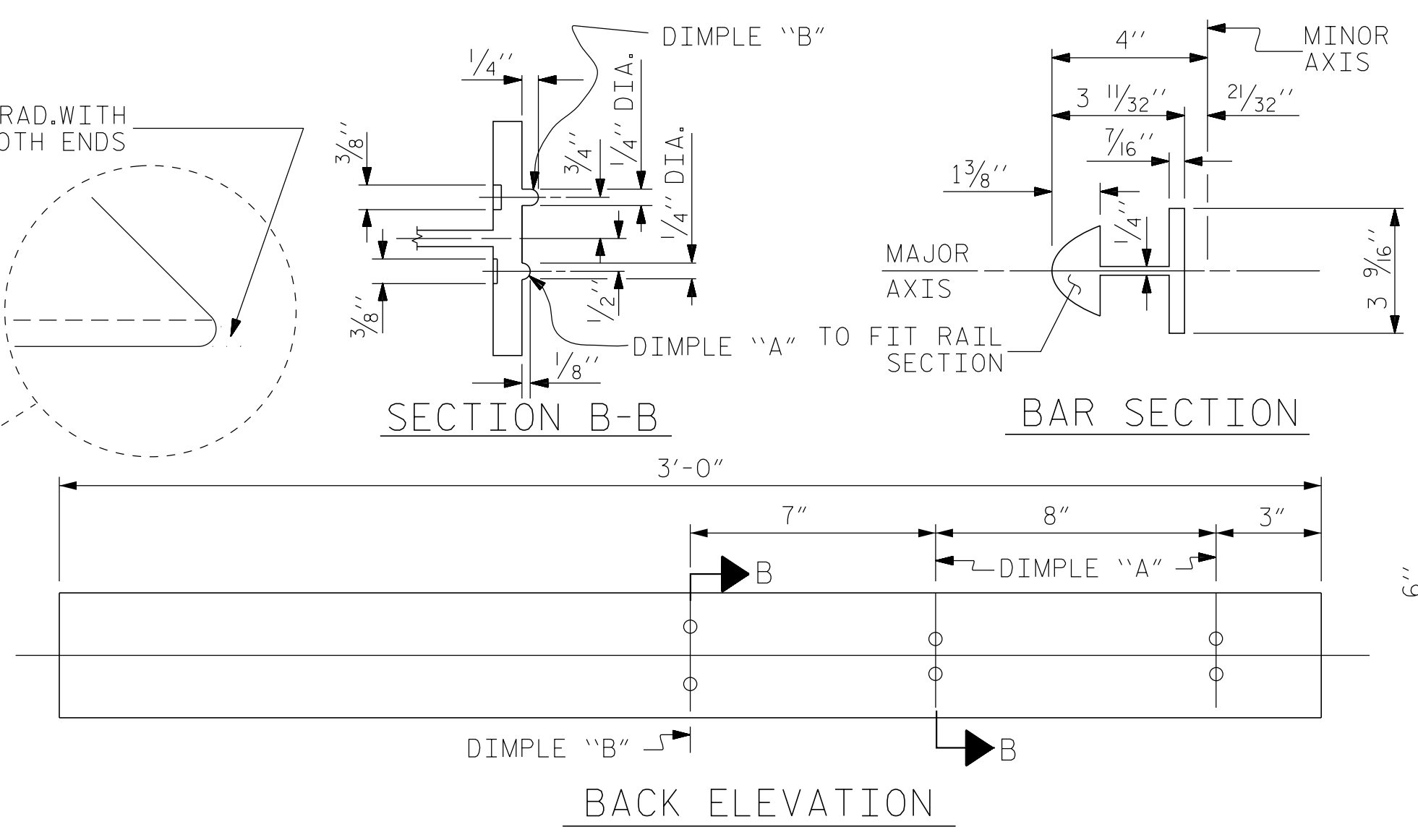
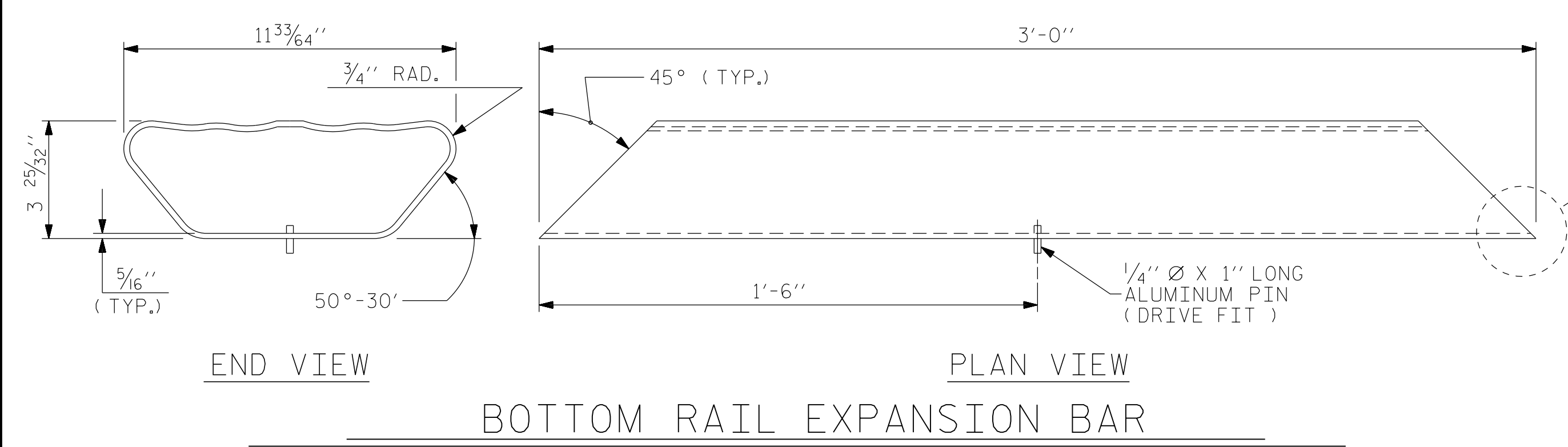
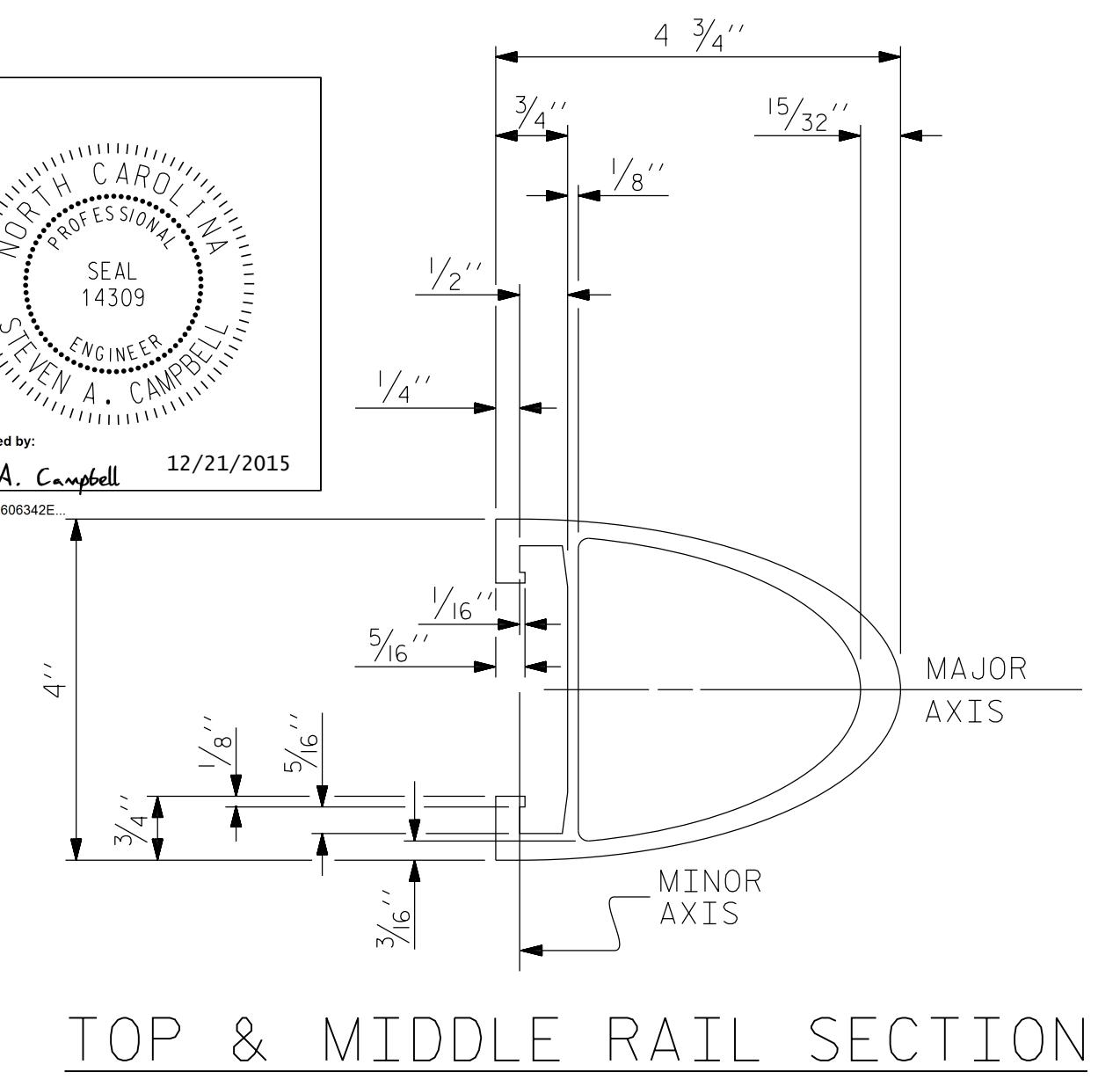
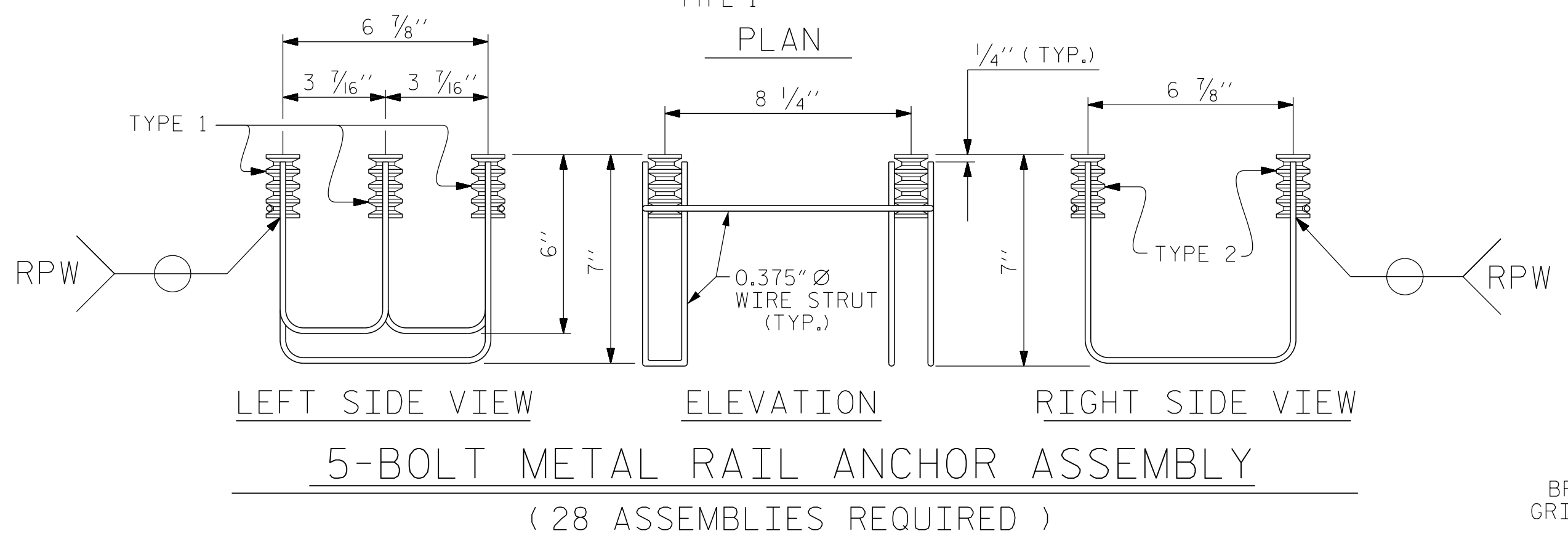
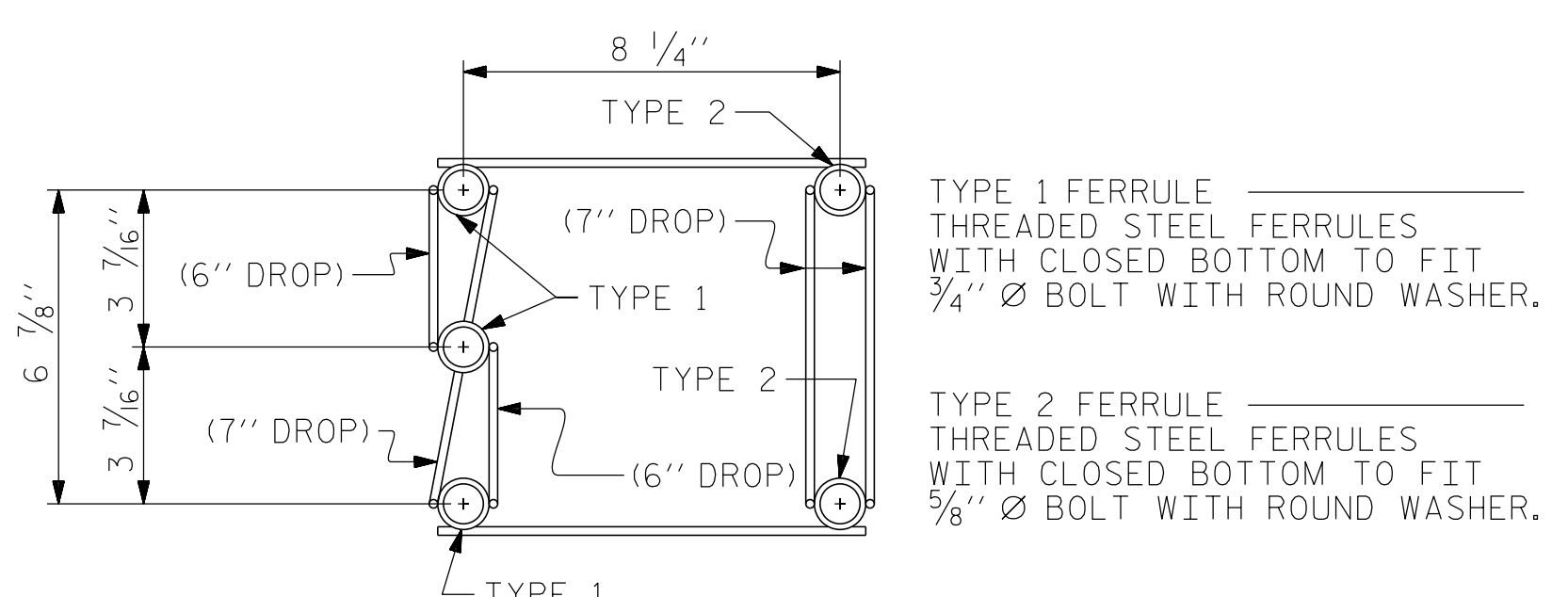
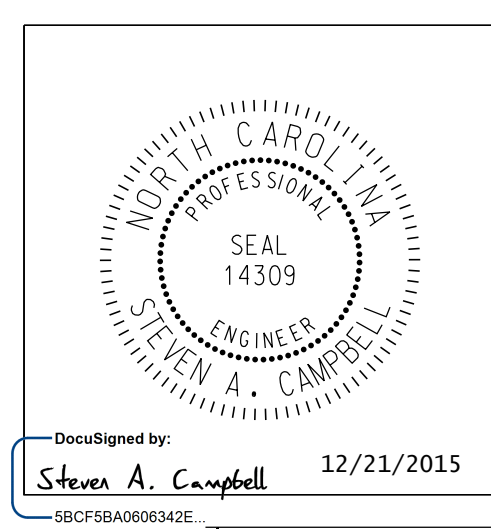
ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

- THE STRUCTURAL CONCRETE ANCHOR 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 2" FOR 3/4" FERRULES AND 1 1/4" FOR 5/8" FERRULES.
  - 3 - 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.
  - 2 - 5/8" Ø X 2 1/4" 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 5/8" Ø X 2 1/4" 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.
  - 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.
  - THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
  - 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.
  - BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



Prepared in the Office of:  
**Mattern & Craig**  
CONSULTING ENGINEERS • SURVEYORS  
FIRM LICENSE NO. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 • FAX (828) 254-4562

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 50+83.00 -L-  
SHEET 2 OF 3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			51

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60° F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS (STD. No. BMR6).

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 3 BAR METAL RAIL.

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.

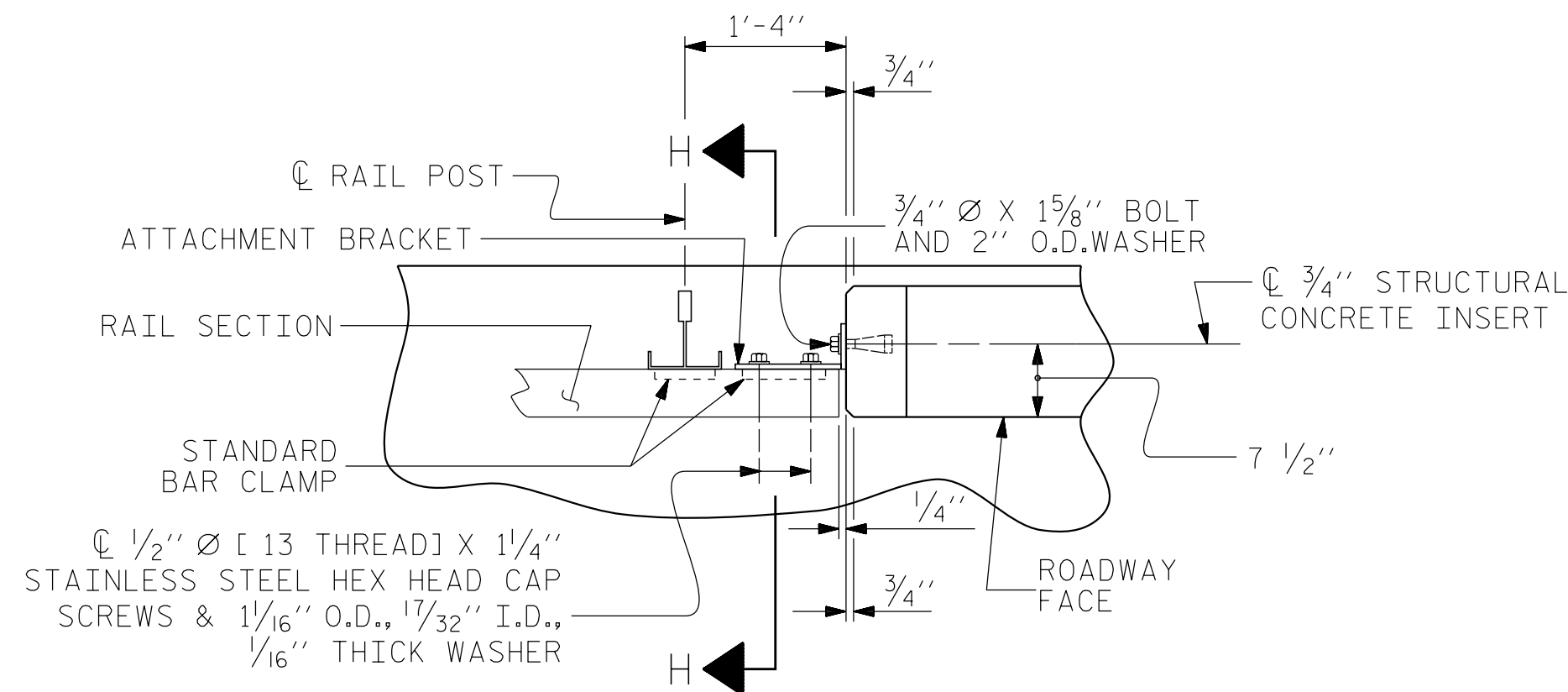
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT 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.

NOTES

STRUCTURAL CONCRETE INSERT

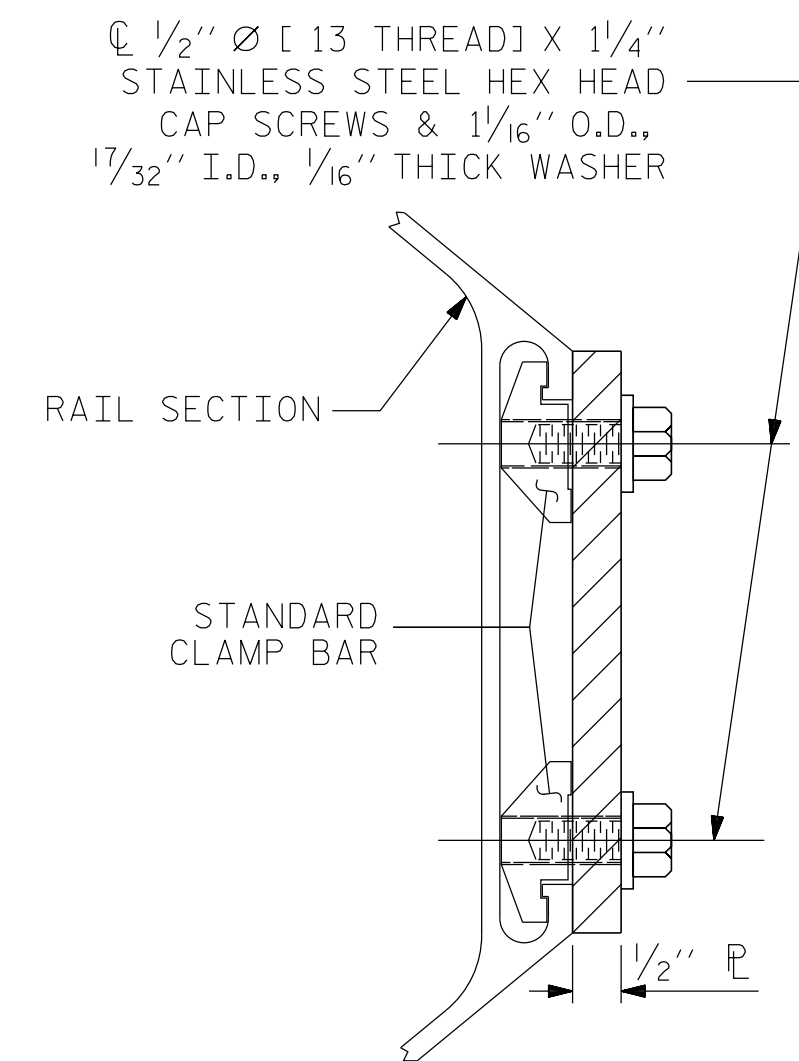
THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
- B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER, THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/8" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



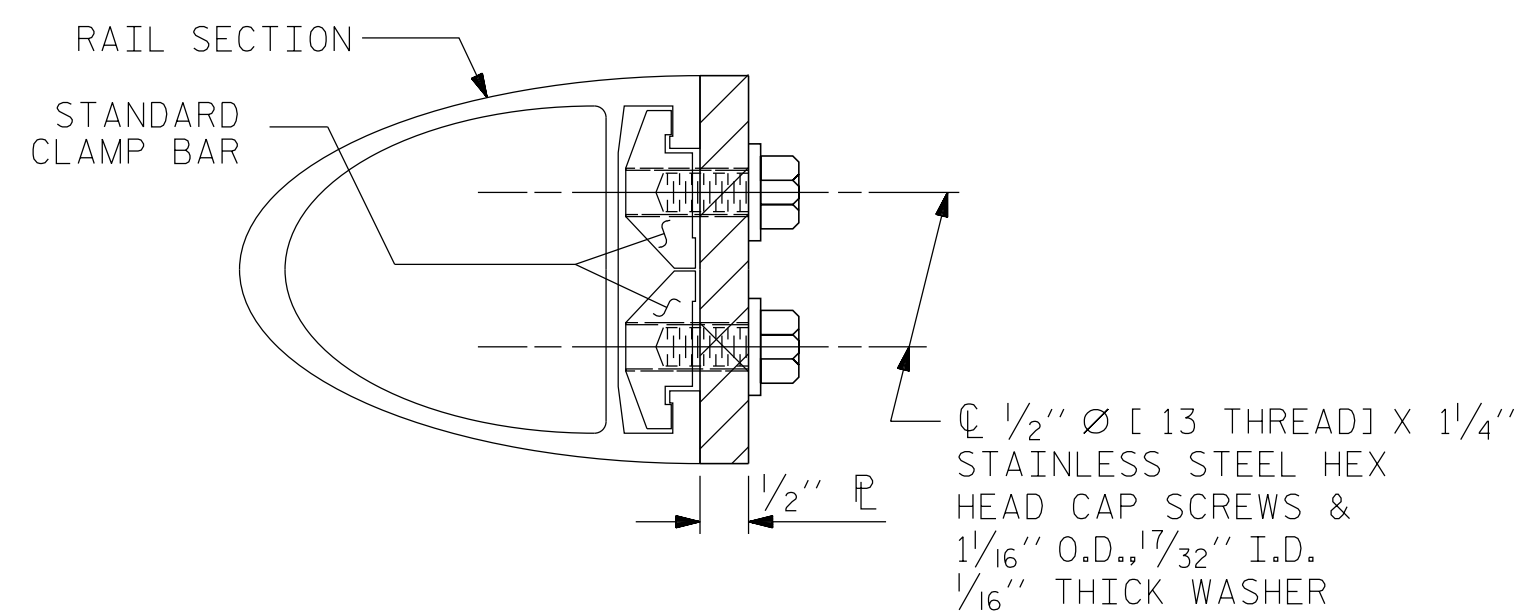
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" P NOT SHOWN FOR CLARITY)



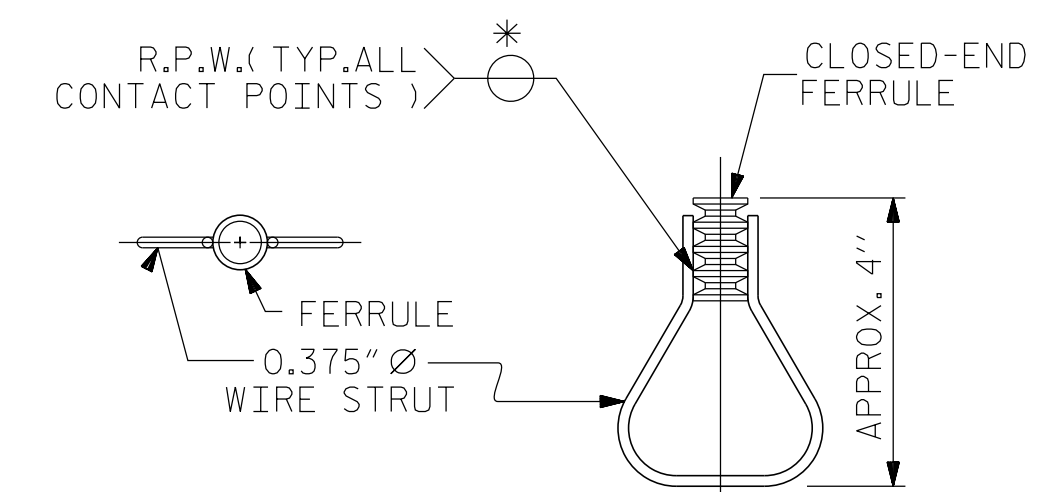
SECTION H-H

(FOR BOTTOM RAIL)



SECTION H-H

(FOR TOP & MIDDLE RAIL)



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

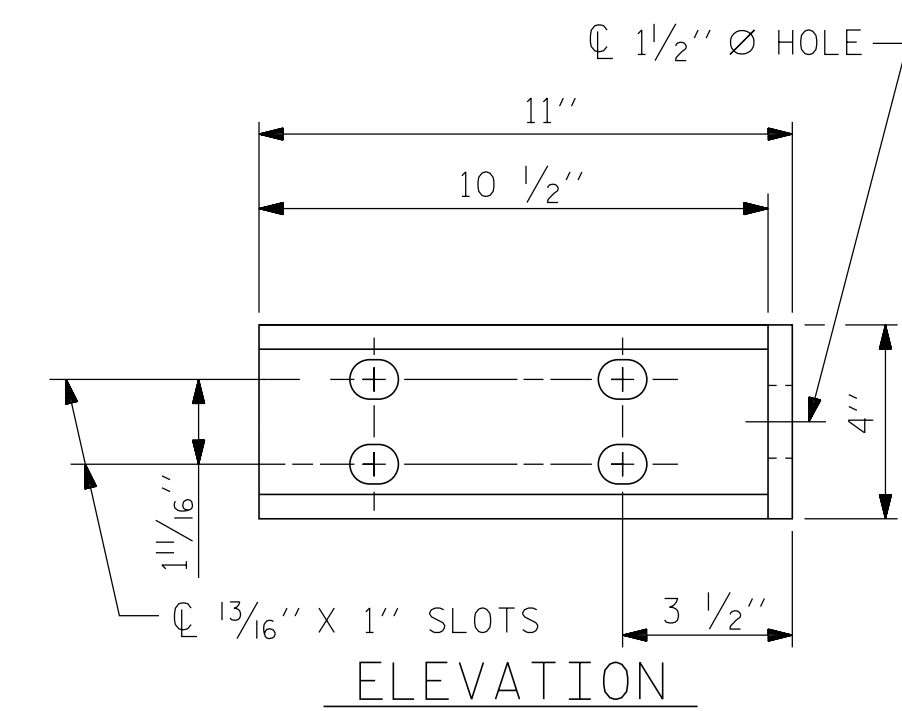
PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 3 OF 3

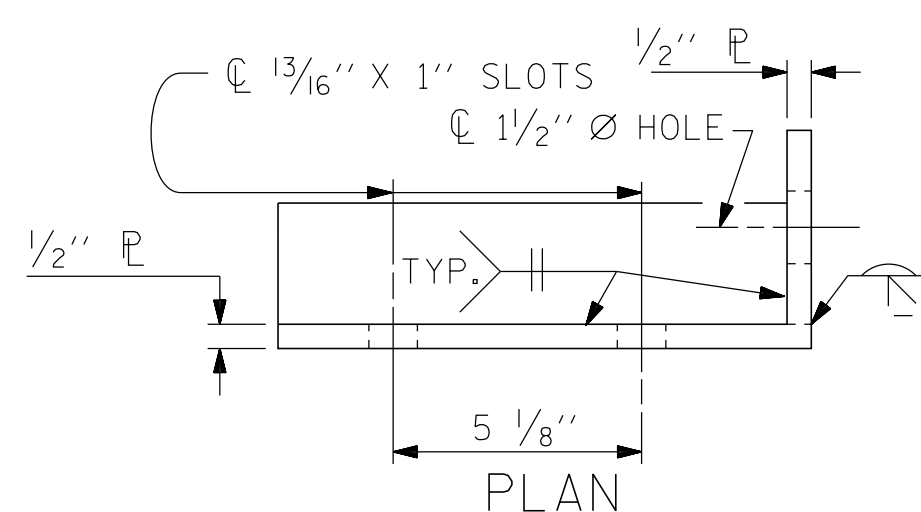
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD

3 BAR METAL RAIL

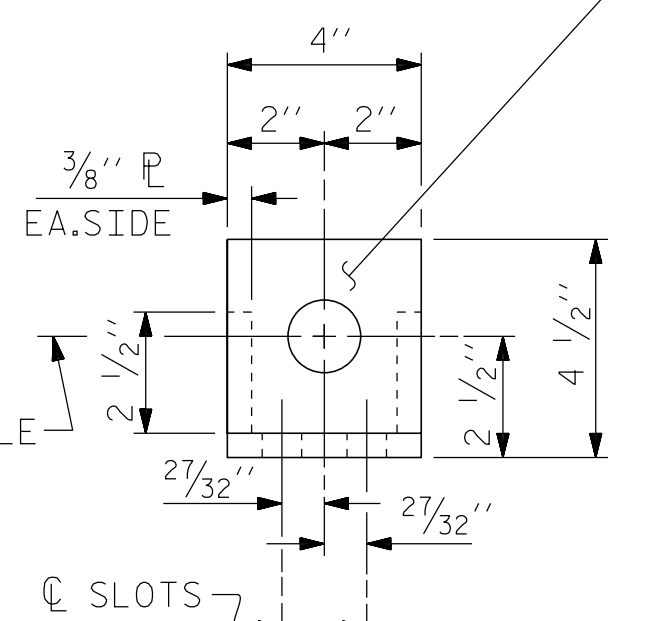


ELEVATION



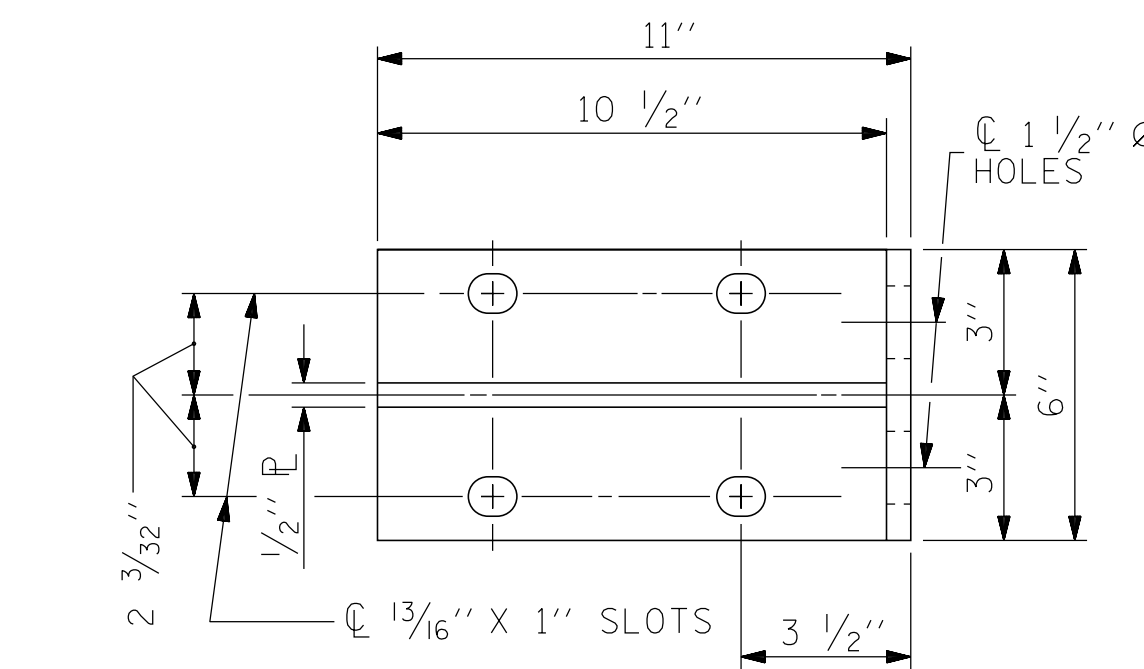
PLAN

ANGLE TO BE MADE FROM 1/2" X 4" X 11" P AND 1/2" X 4" X 4" P

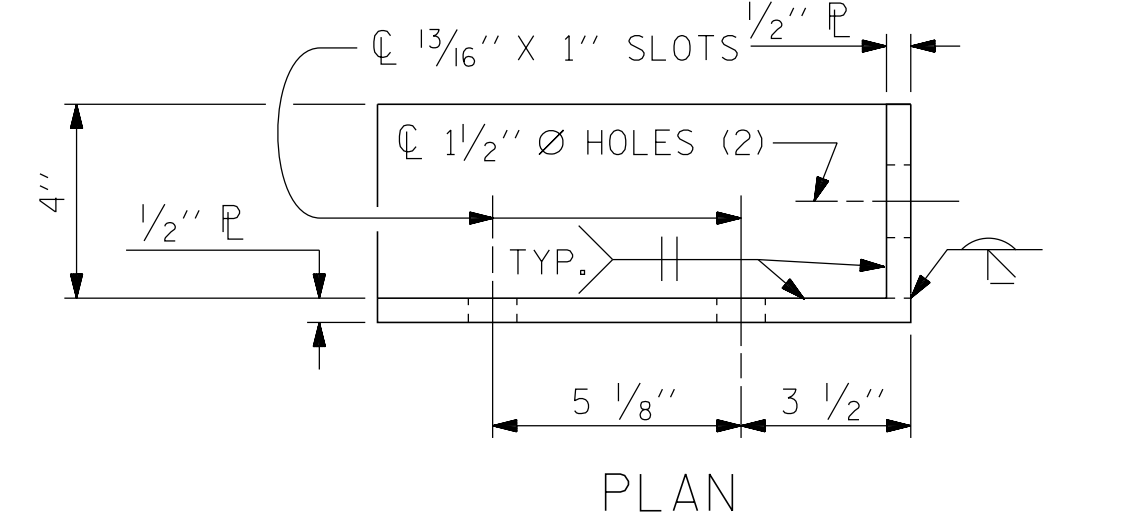


END VIEW

(FIX. AND EXP.)



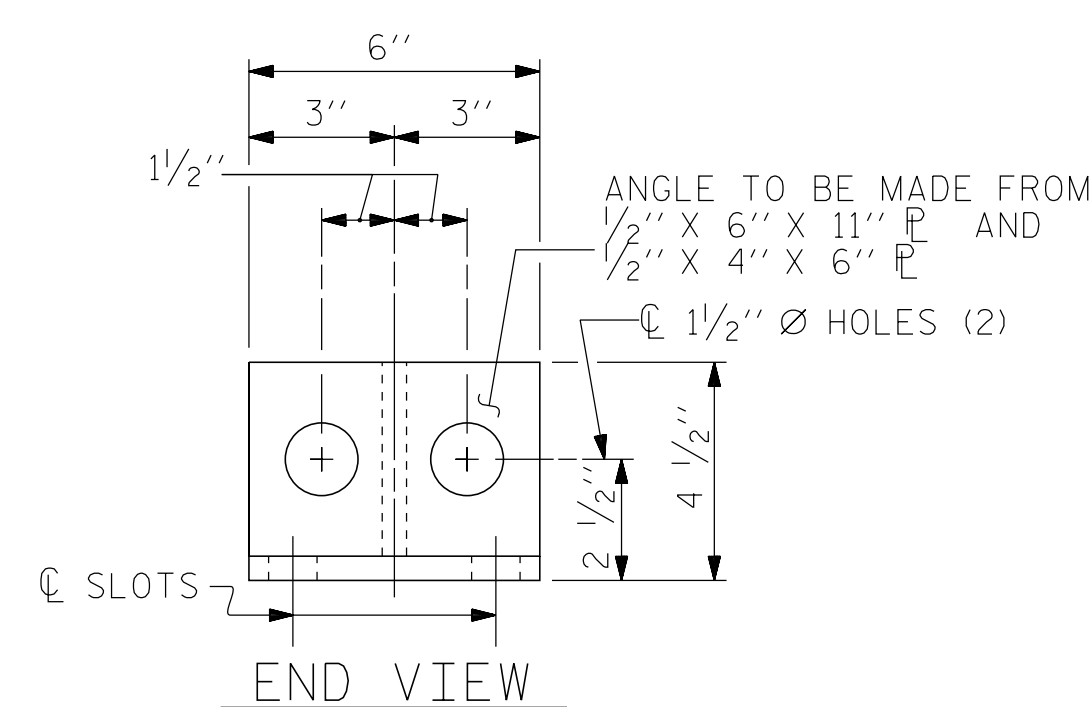
ELEVATION



PLAN

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



END VIEW

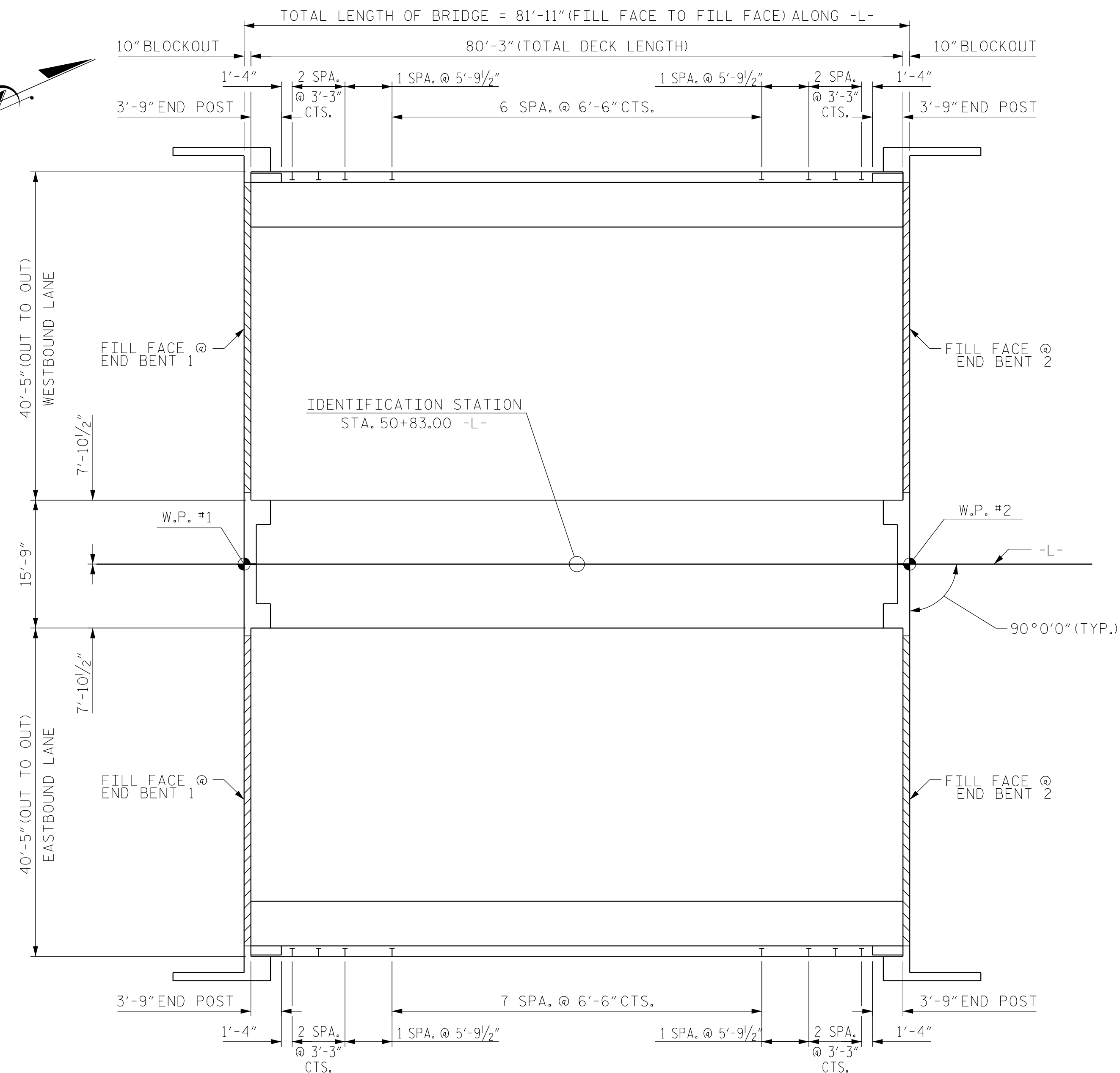
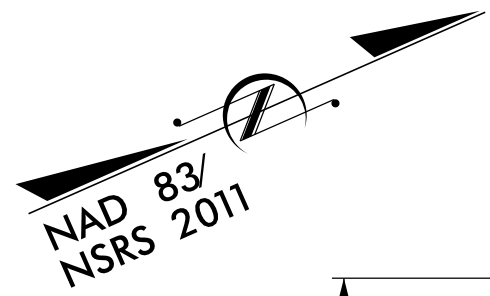
Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS - SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4562

Seal of Steven A. Campbell, Professional Engineer, License No. 14309, State of North Carolina. Signed 12/21/2015.

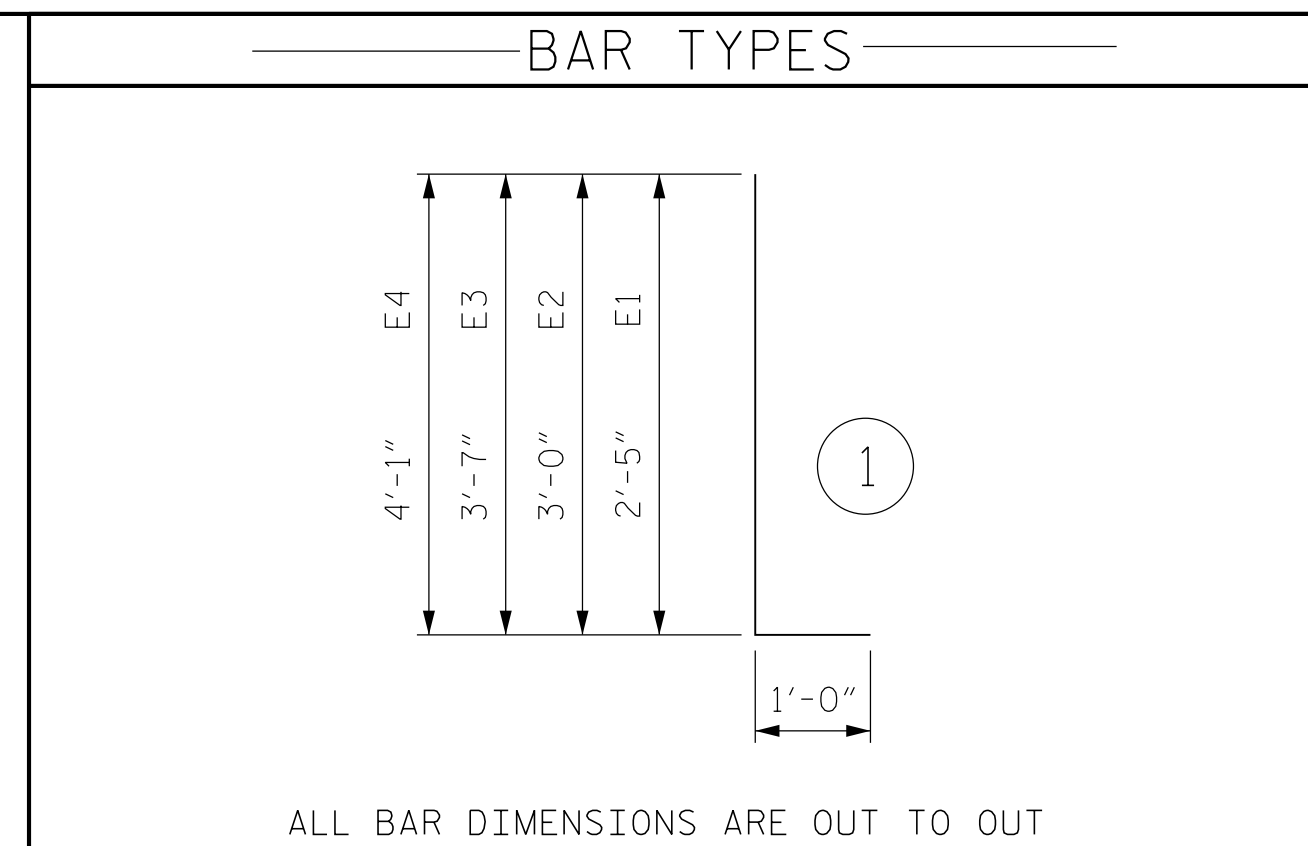
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			51

STD. NO. BMR7

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : JMB 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : GGH 1/88	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



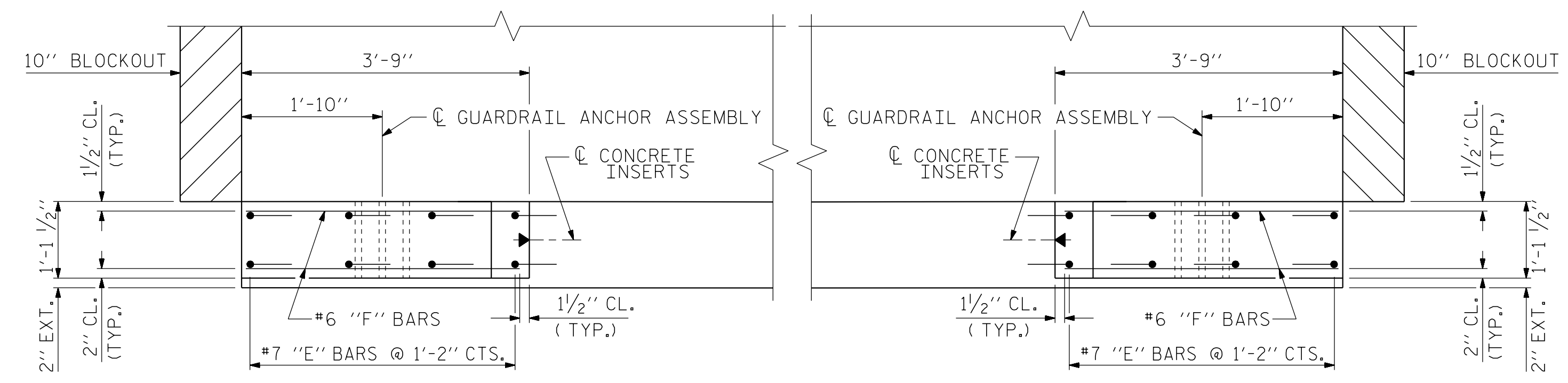
PLAN OF RAIL POST SPACING



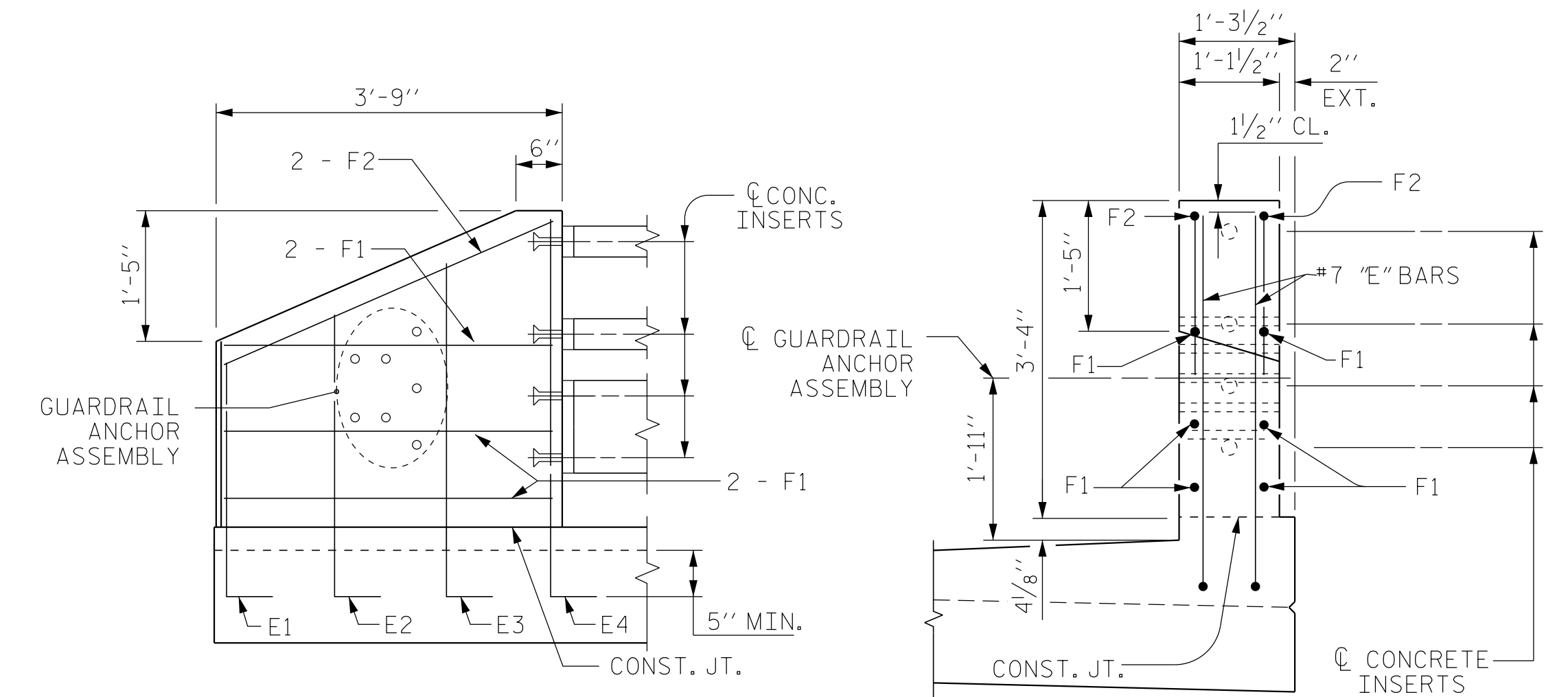
BILL OF MATERIAL						
ONE END POST (4 REQ'D)						
	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
*	E1	2	#7	1	3'-5"	14
*	E2	2	#7	1	4'-0"	16
*	E3	2	#7	1	4'-7"	19
*	E4	2	#7	1	5'-1"	21
*	F1	6	#6	STR	3'-5"	31
*	F2	2	#6	STR	3'-8"	11
* EPOXY COATED REINFORCING STEEL					=	112 LBS.
CLASS AA CONCRETE					=	0.4 C.Y.

ALL BAR DIMENSIONS ARE OUT TO OUT

NOTE: PAYMENT FOR CONCRETE END POSTS SHALL BE INCLUDED IN THE PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".



PLAN



ELEVATION

END VIEW

END POST DETAILS

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

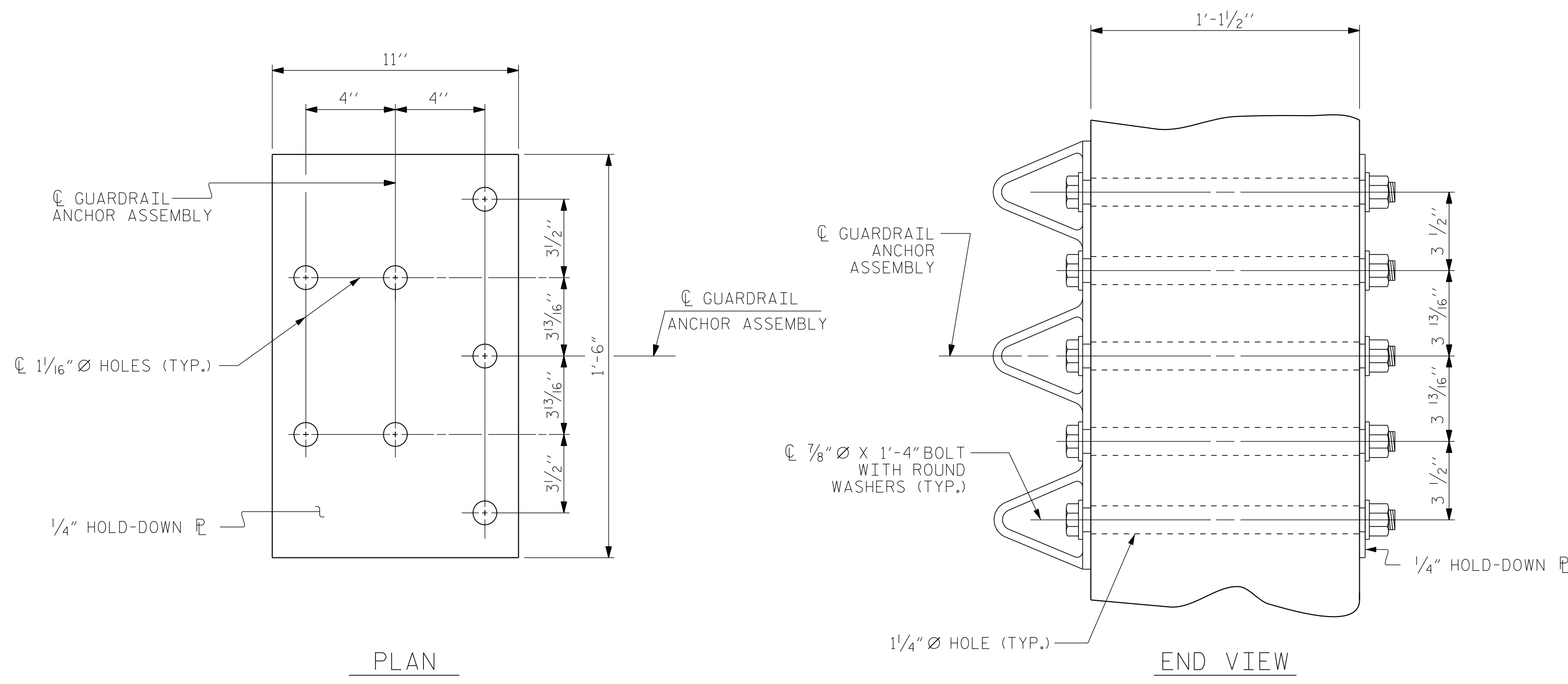
DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS & SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

DocuSigned by:  
  
 Steven A. Campbell 12/21/2015  
 SBCFBA0806342E

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
RAIL POST SPACINGS & END POST DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-41
					TOTAL SHEETS 51



PLAN  
END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

**NOTES**

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

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

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

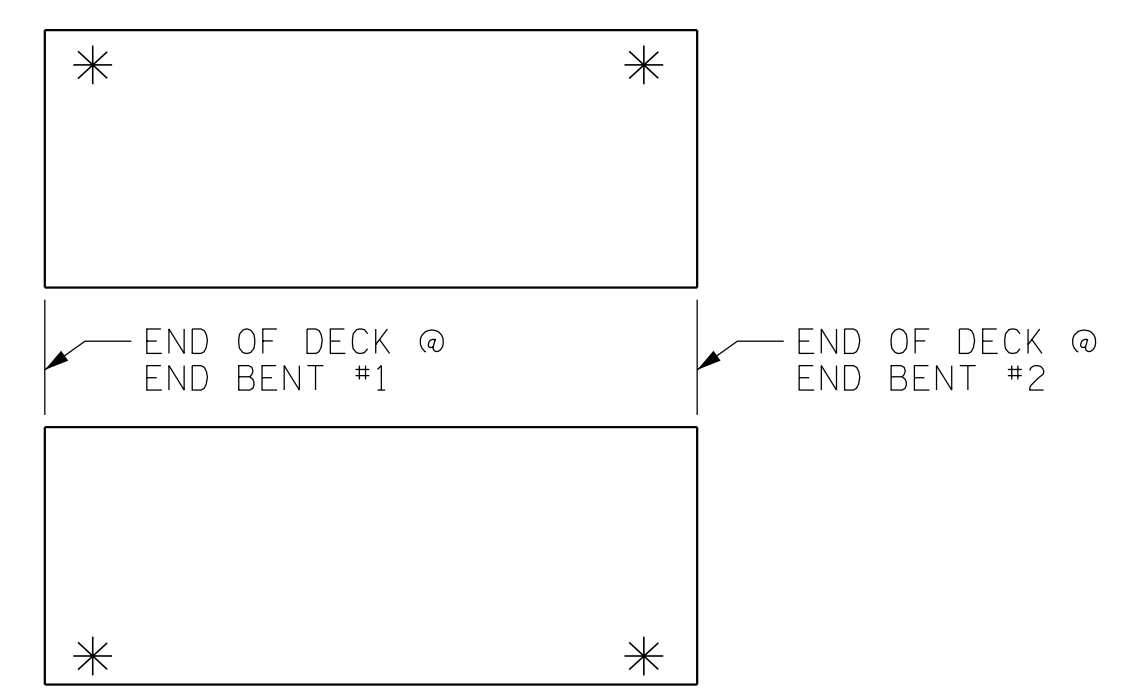
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

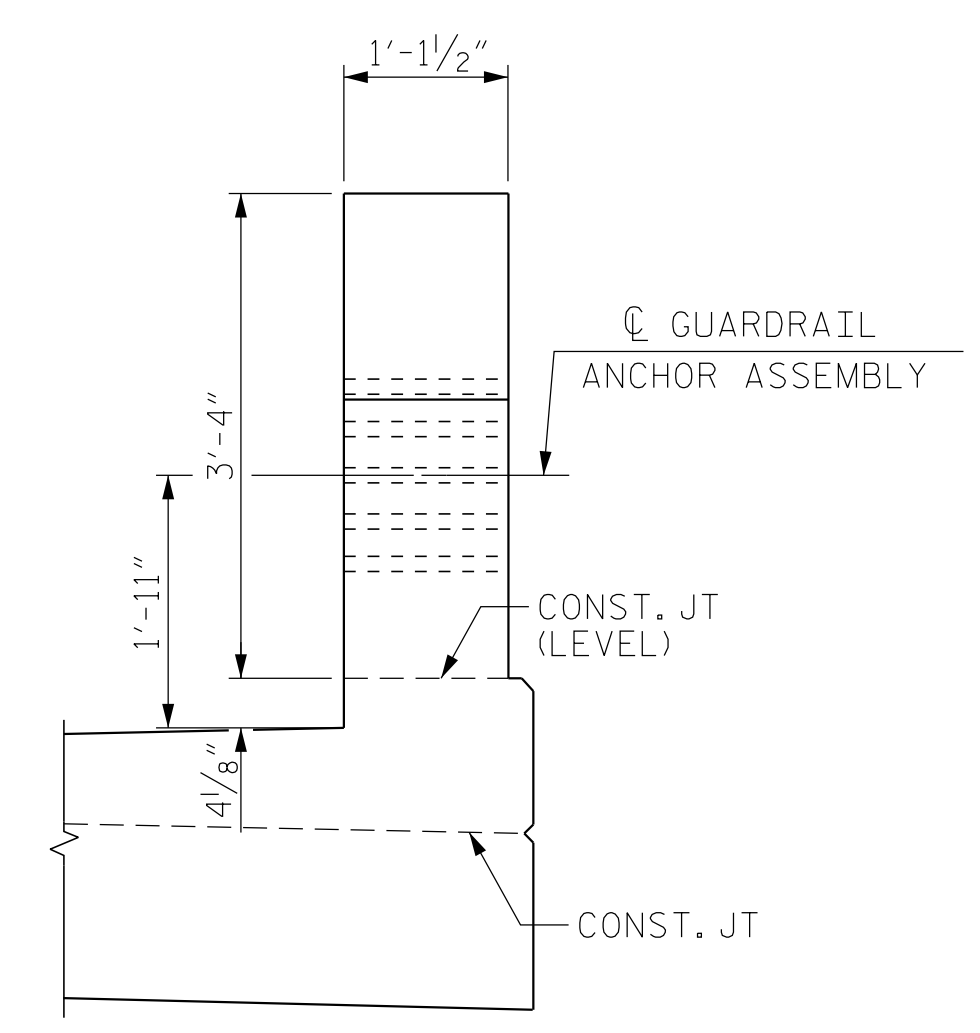
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

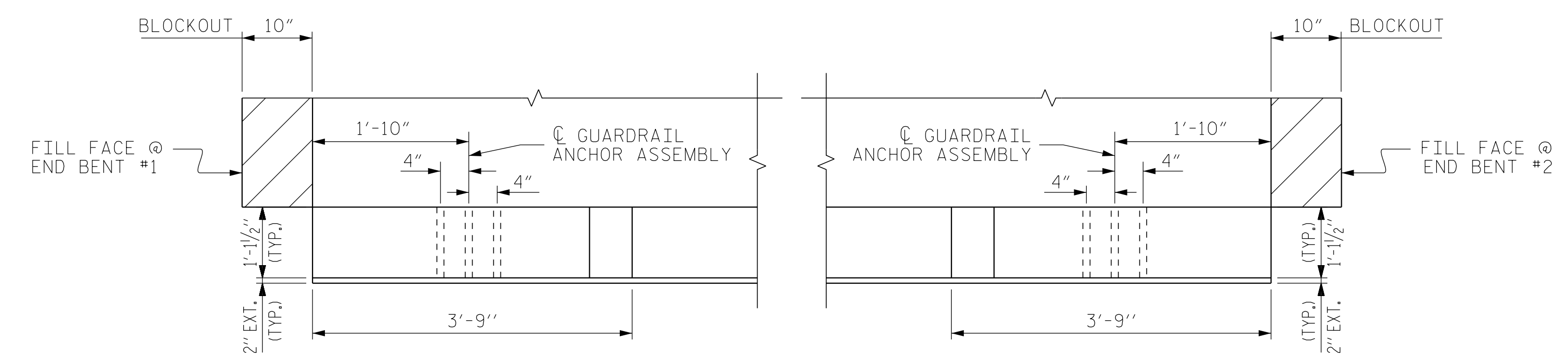


SKETCH SHOWING POINTS OF ATTACHMENT

\*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW  
(THREE BAR METAL RAIL)



PLAN  
DOWNSTREAM SIDE SHOWN, UPSTREAM SIDE SIMILAR

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

ASSEMBLED BY :	PFC	DATE :	8/15
CHECKED BY :	CMT	DATE :	8/15
DRAWN BY :	MAA 5/10	REV. 10/1/11	MAA/GM
CHECKED BY :	GM 5/10	REV. 12/5/11	MAA/GM
		REV. 6/13	MAA/GM

Prepared in the Office of:

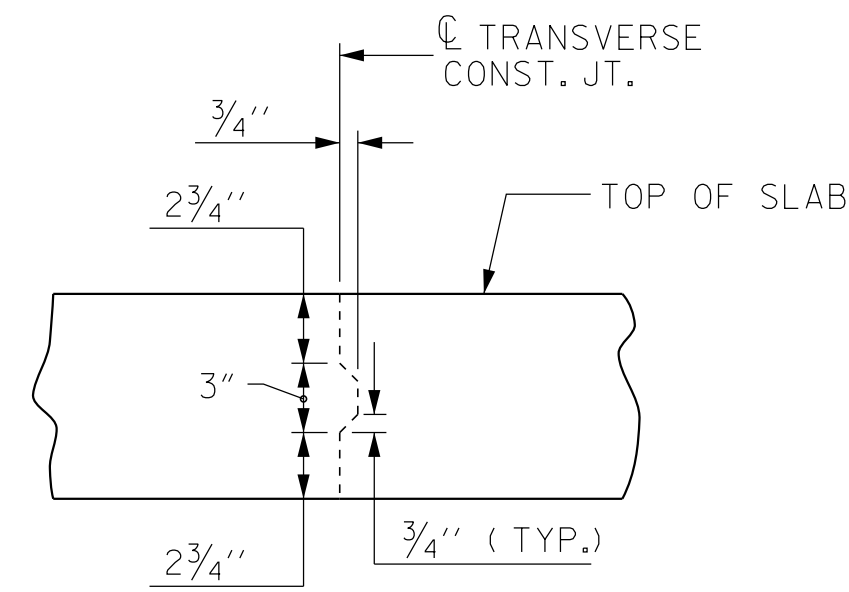
**Mattern & Craig**  
 CONSULTING ENGINEERS + SURVEYORS  
 FIRM LICENSE No. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28601  
 (828) 254-2201 - FAX (828) 254-4562

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-42
1			3			TOTAL SHEETS
2			4			51

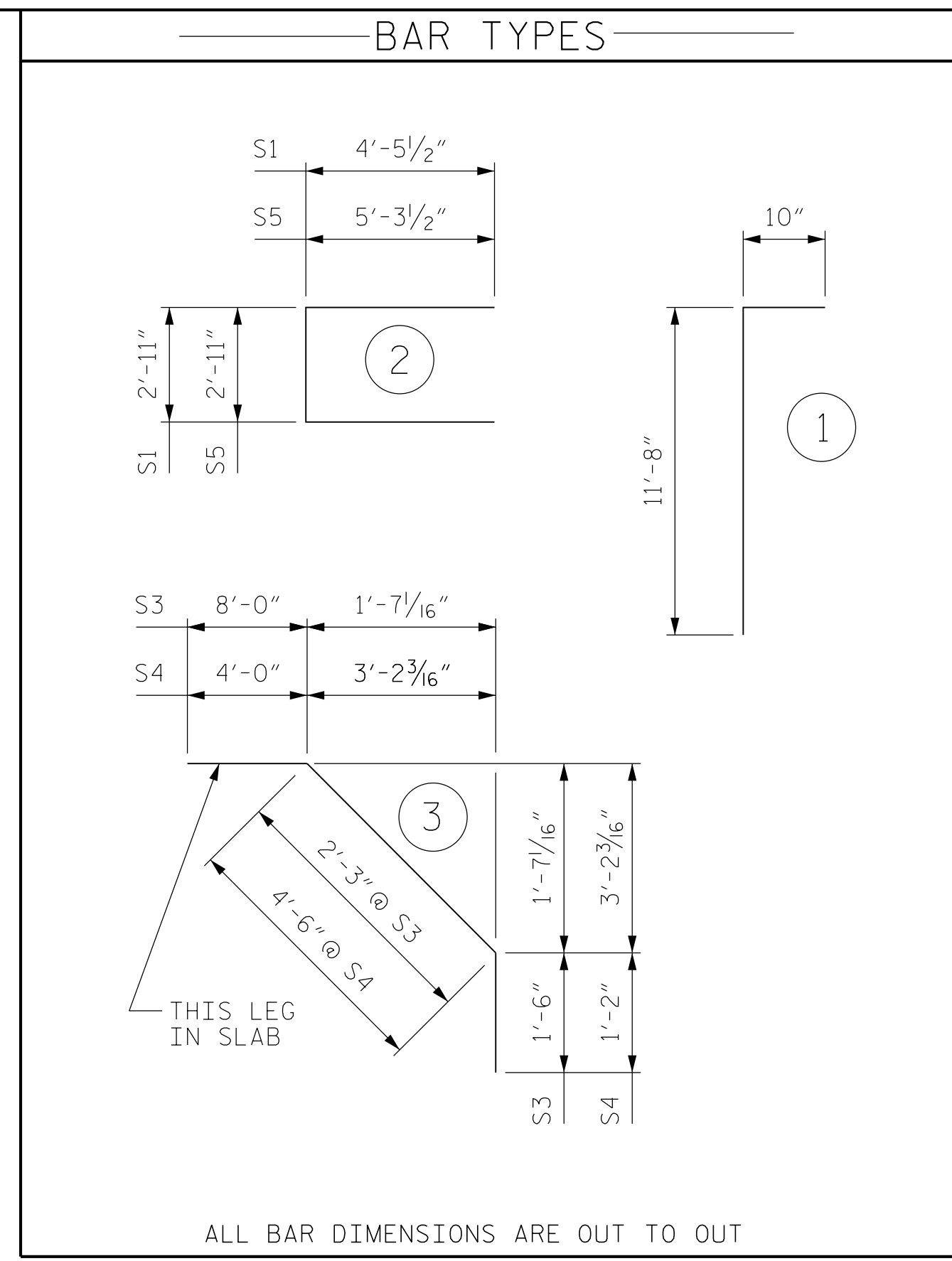
**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

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"			



**TRANSVERSE CONSTRUCTION JOINT DETAIL**

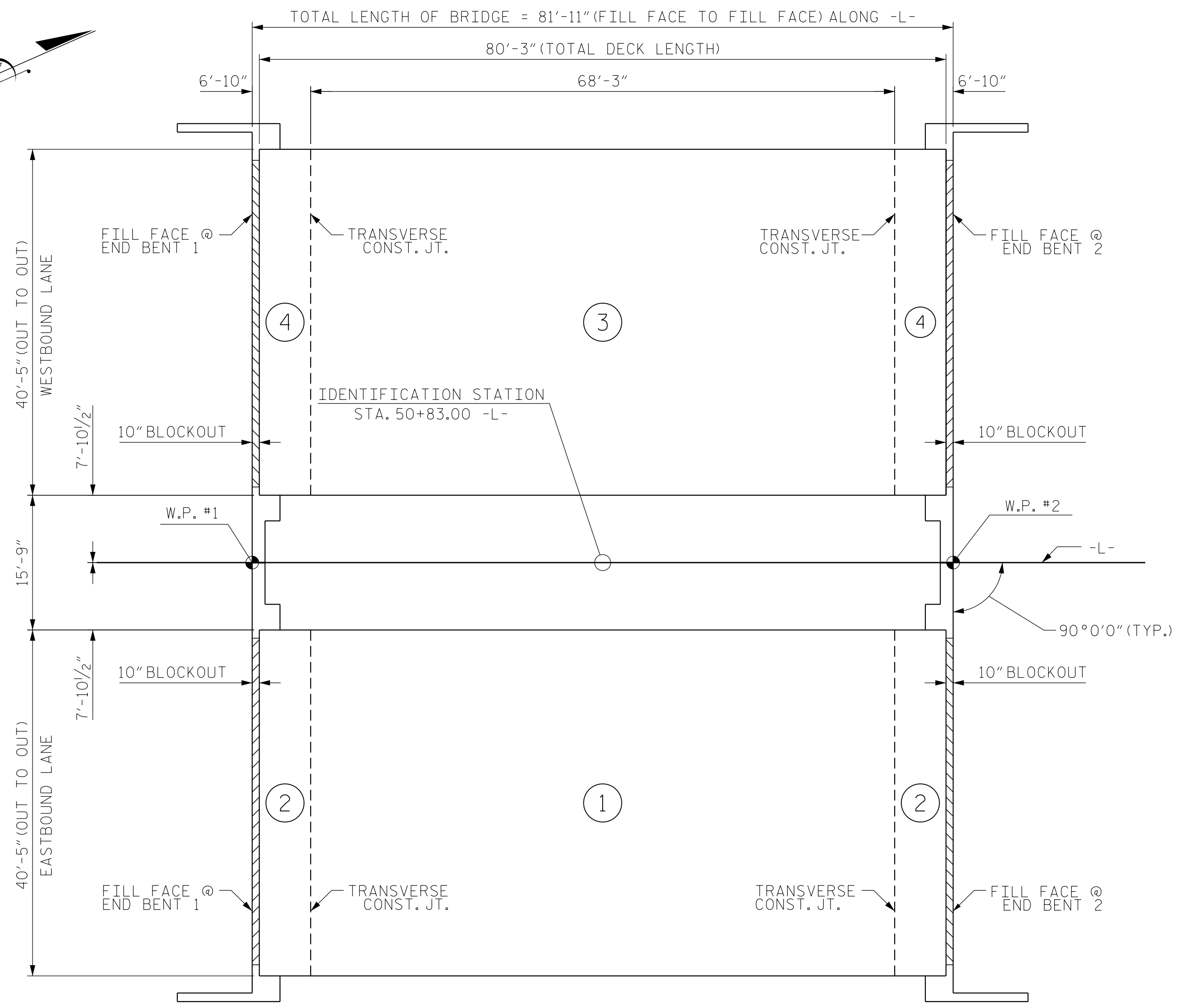
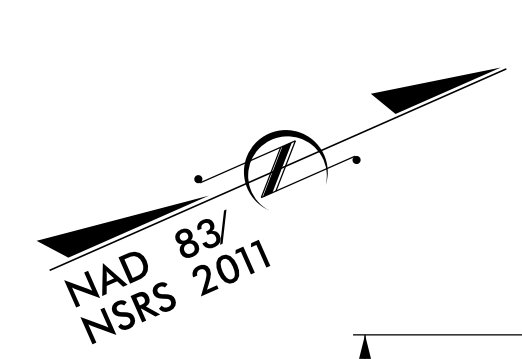
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



**BILL OF MATERIAL**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	296	#5	STR	40'-0"	12358
A4	296	#5	STR	40'-0"	12358
* B3	174	#4	STR	28'-7"	3323
* B4	112	#8	STR	16'-6"	4938
B5	32	#5	STR	41'-10"	1398
B6	144	#5	STR	41'-10"	6288
* B7	24	#4	STR	28'-7"	459
* D1	104	#4	STR	0'-10"	58
* G1	162	#4	STR	6'-2"	668
H1	88	#5	1	12'-6"	1149
H2	88	#6	STR	9'-0"	1191
K1	40	#4	STR	24'-0"	642
K2	32	#4	STR	5'-10"	125
K3	48	#4	STR	7'-4"	236
K5	16	#4	STR	5'-1"	55
K6	24	#4	STR	5'-10"	94
K8	16	#4	STR	2'-8"	29
S1	120	#4	2	11'-10"	949
* S3	120	#4	3	11'-9"	942
* S4	96	#4	3	9'-8"	620
S5	24	#4	2	13'-6"	217

\* DENOTES EPOXY COATED REINF. STEEL



**POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 6,622)**

**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	79.7		
POUR 2	69.6		
POUR 3	79.7		
POUR 4	69.6		
POUR 5 *	14.4		
POUR 6 *	14.4		
TOTALS**	327.4	24,731	23,366

\* QUANTITIES FOR POUR 5 AND POUR 6 ARE FOR THE SIDEWALKS ON EACH SIDE OF THE STRUCTURE.

\*\* QUANTITIES FOR BARRIER RAIL AND THE END POSTS FOR THE METAL RAILS ARE NOT INCLUDED.

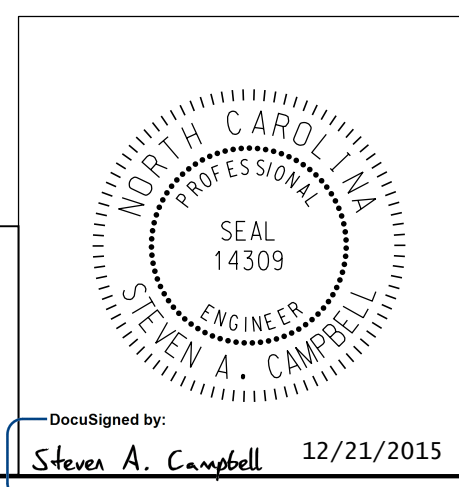
NOTE: THE UPPER PORTION OF THE END BENT WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE.

**GROOVING BRIDGE FLOORS**

APPROACH SLABS	2,900 SQ.FT.
BRIDGE DECK	4,655 SQ.FT.
TOTAL	7,555 SQ.FT.

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BILL OF MATERIAL  
 & POUR SEQUENCE



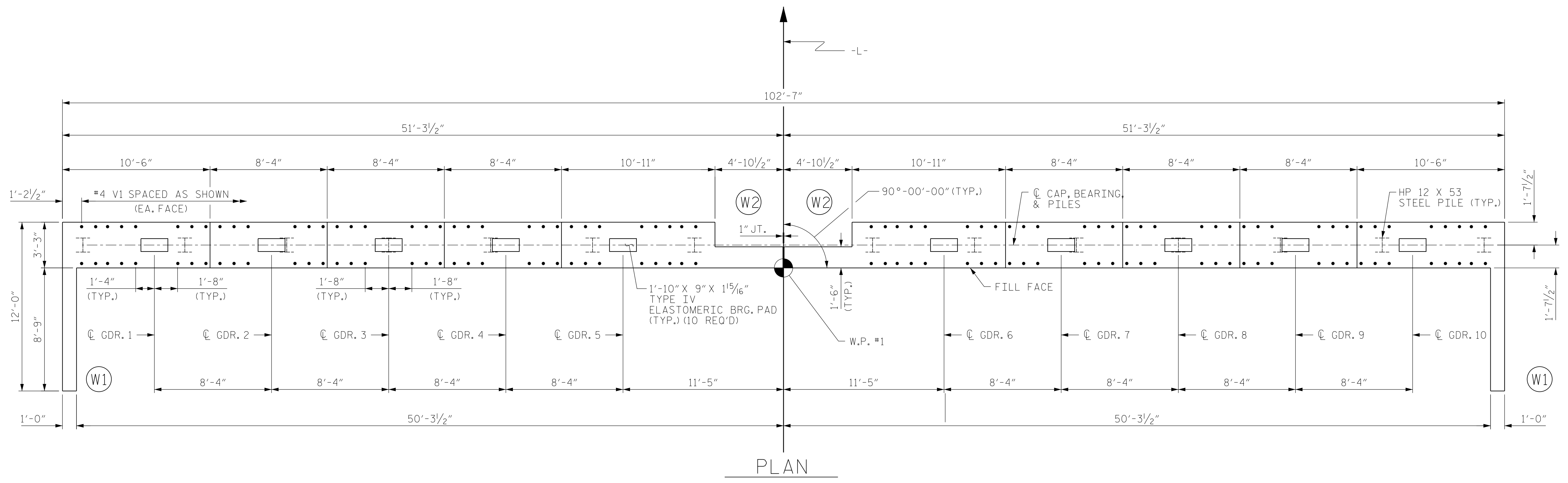
Prepared in the Office of:  
**Mattern & Craig**  
 CONSULTING ENGINEERS & SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

REVISIONS

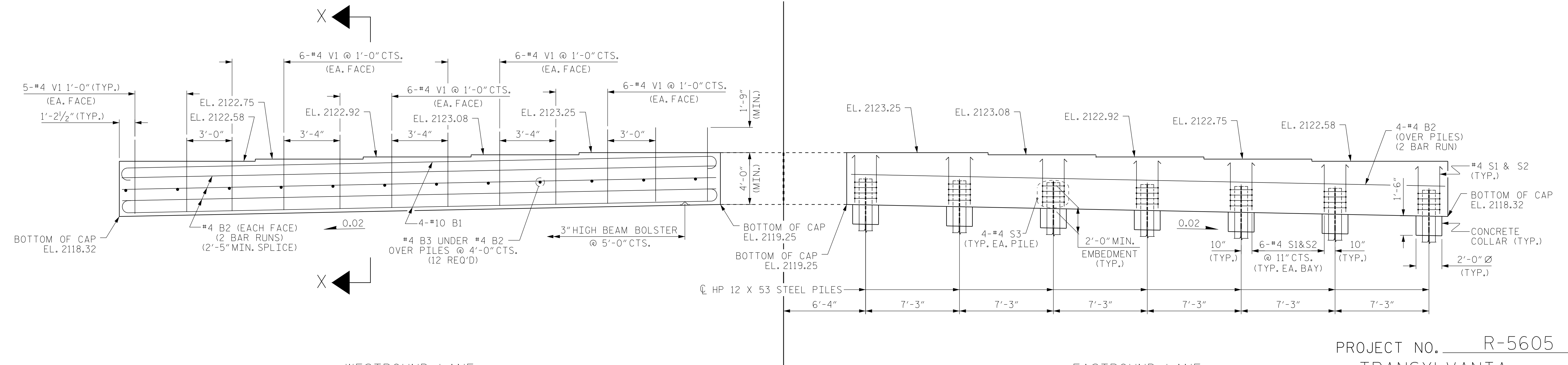
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1			3		
2			4		

SHEET NO. S-43  
 TOTAL SHEETS 51

ASSEMBLED BY : PFC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15  
 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

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR V1 BARS.
- FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.
- FOR WING DETAILS, SEE SHEET 3 OF 4.
- THE TOP OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR WINGS SEE SHEET 3 OF 4.  
 FOR SECTION X-X, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1  
 (INTEGRAL)

DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

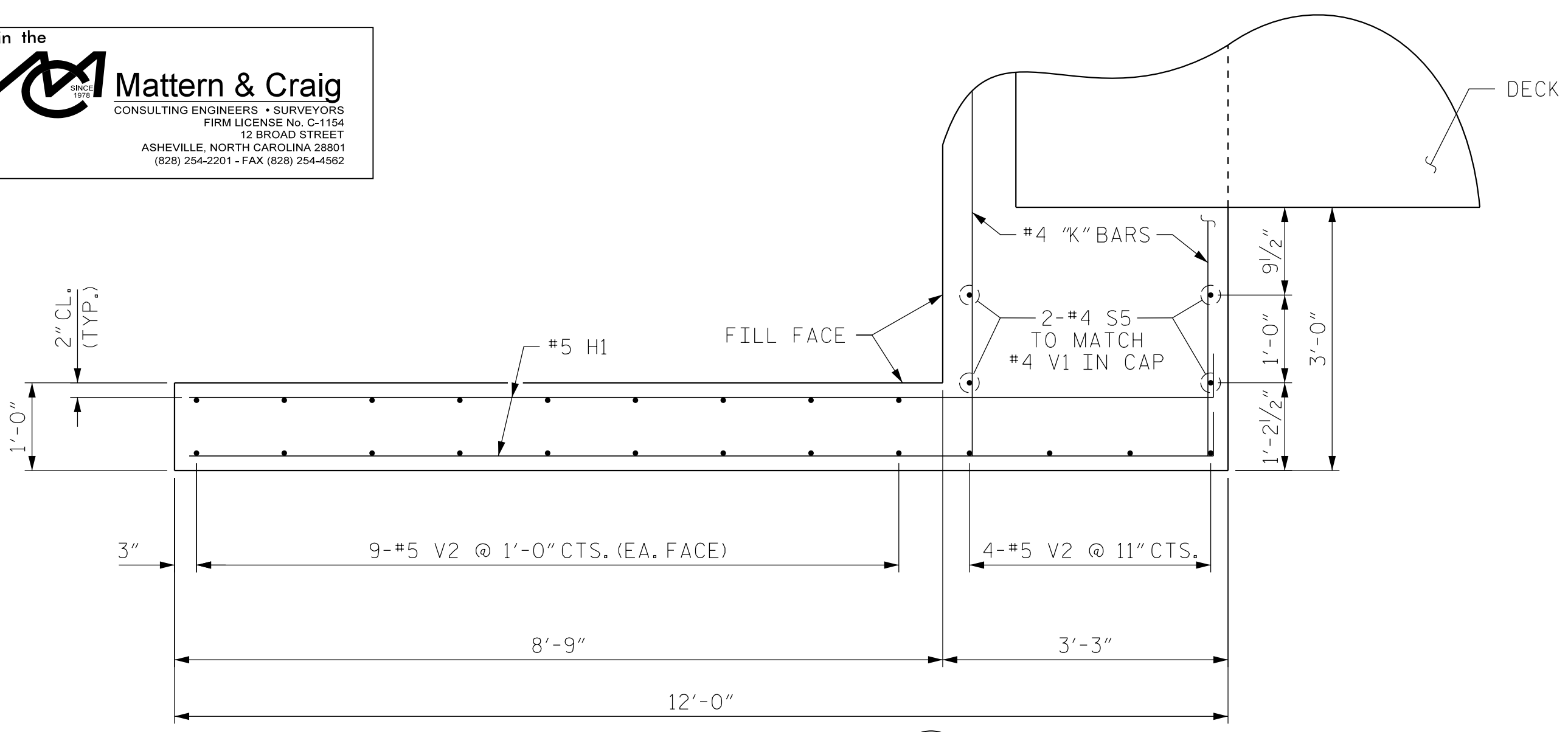
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 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4582

DocuSigned by:  
  
 Steven A. Campbell 12/21/2015

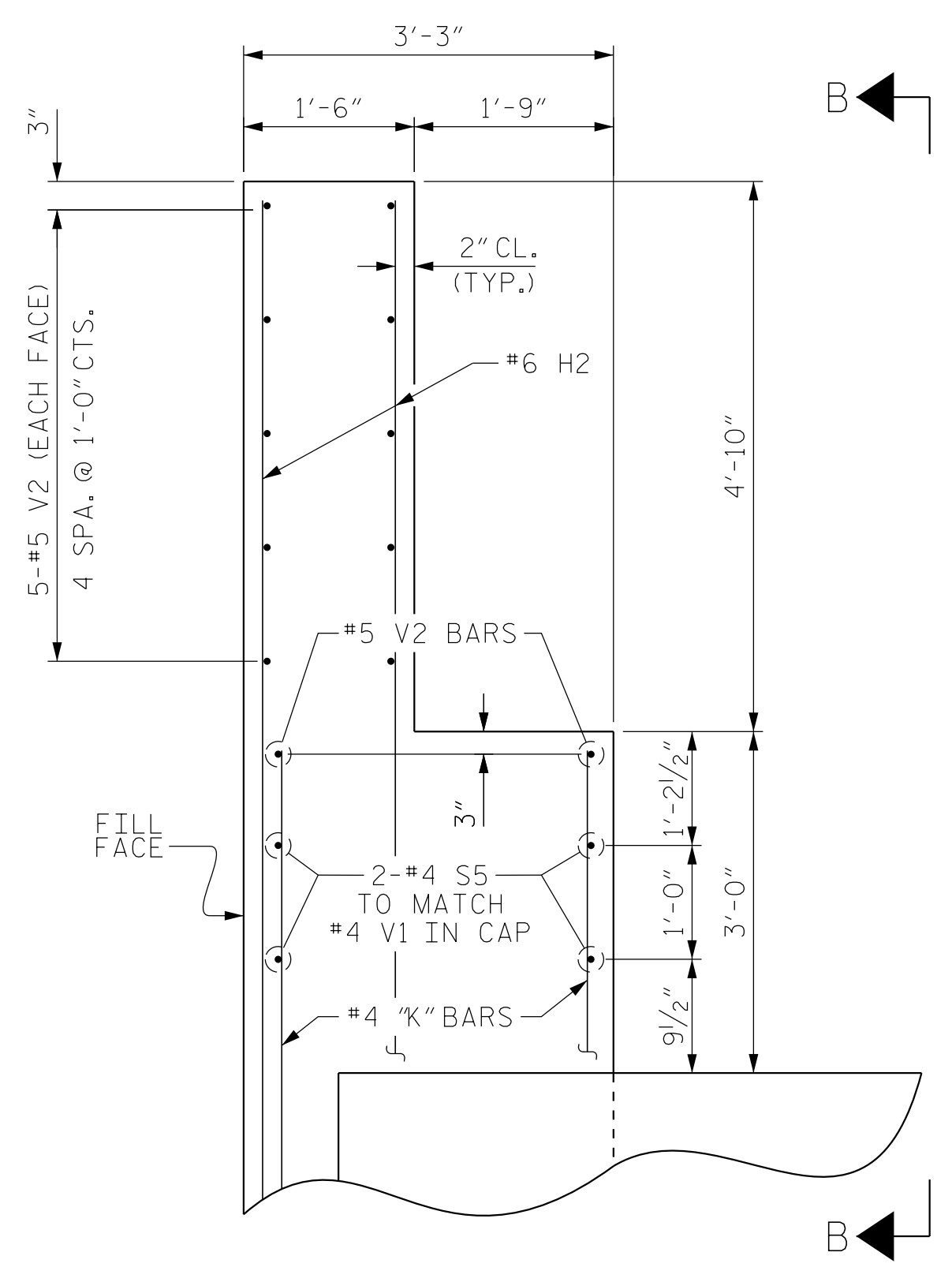
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-44	
1			3			TOTAL SHEETS	51
2			4				



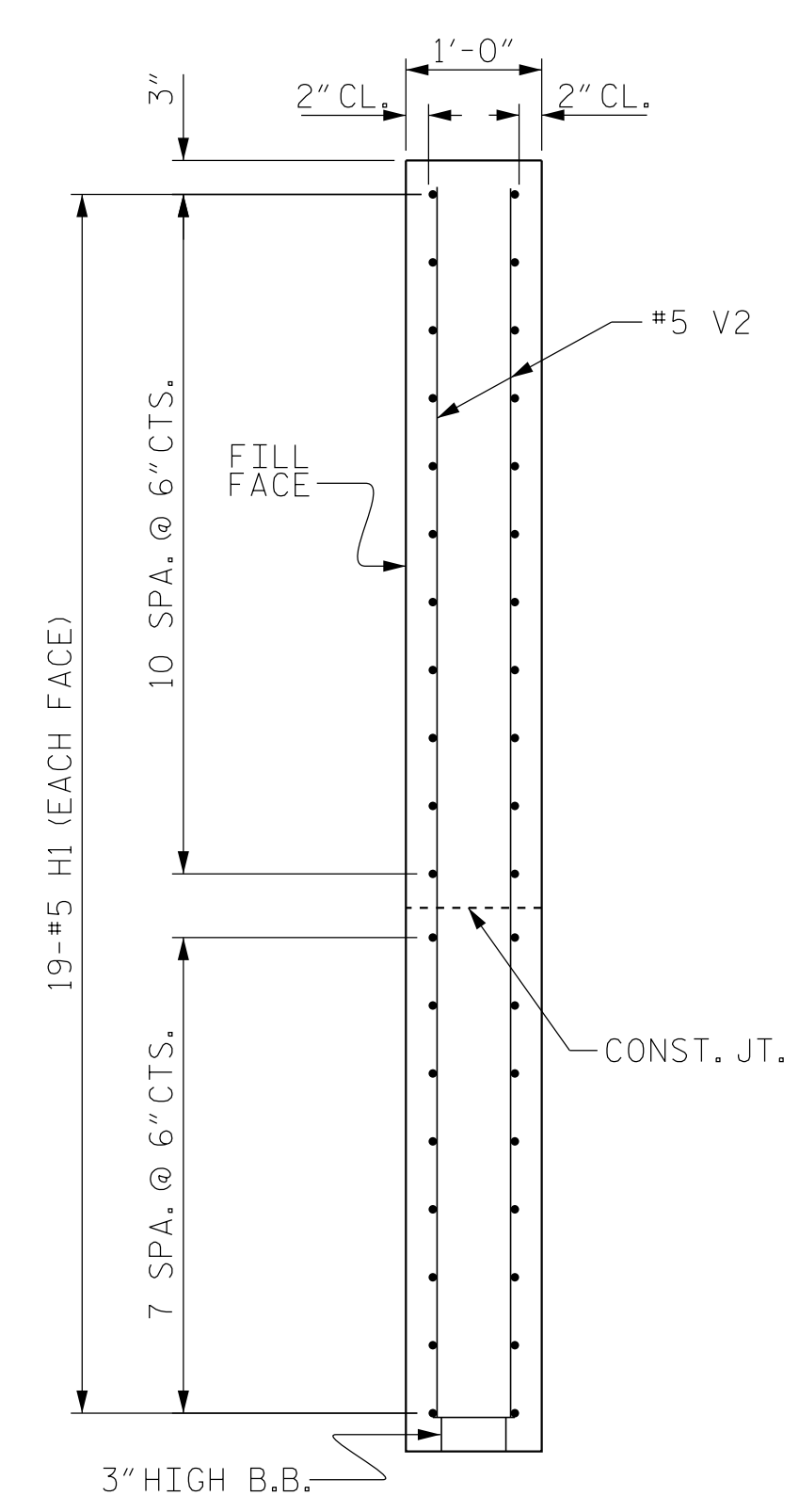
Prepared in the Office of:  
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 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 • FAX (828) 254-4562



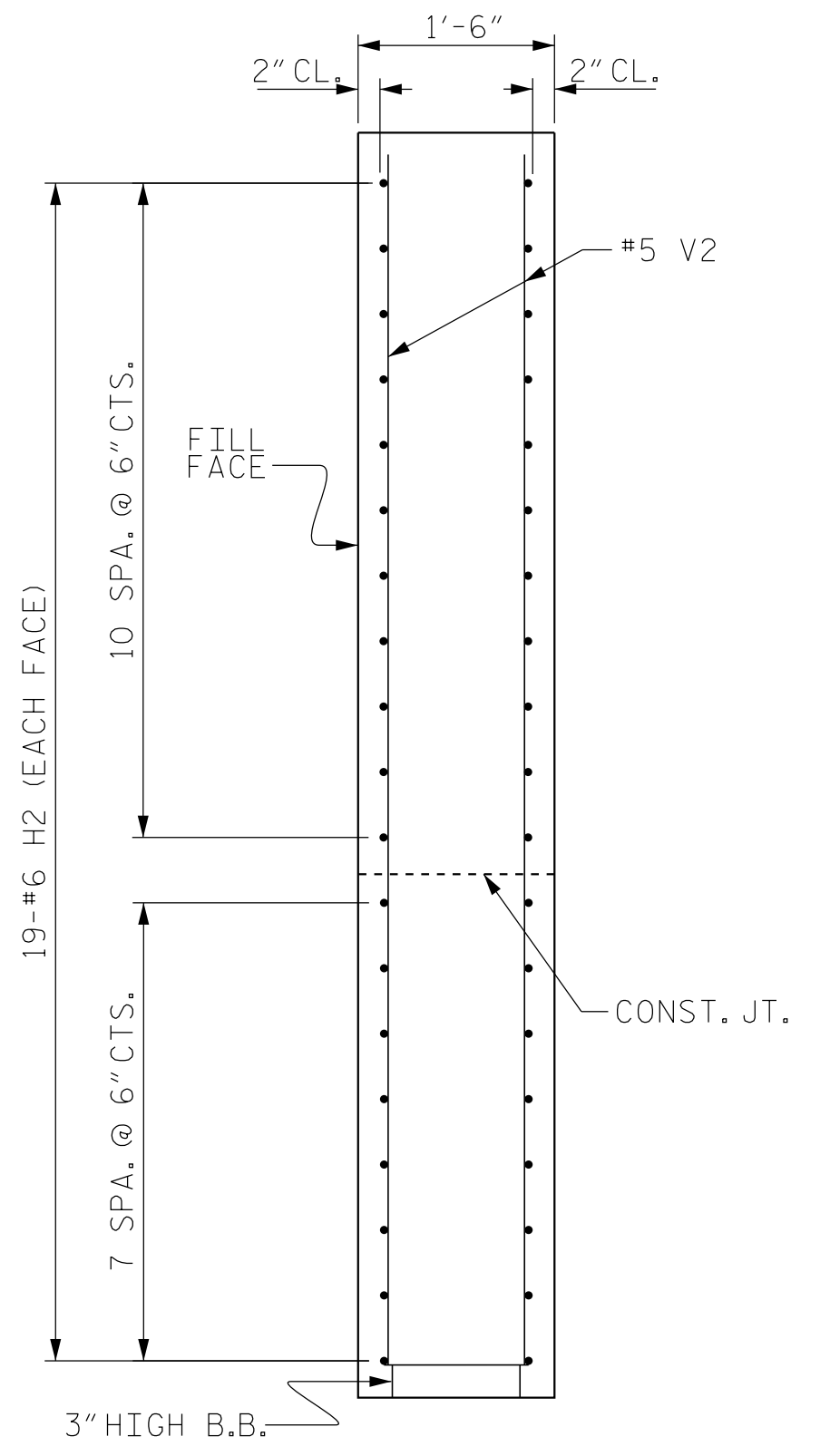
PLAN OF WING (W1)



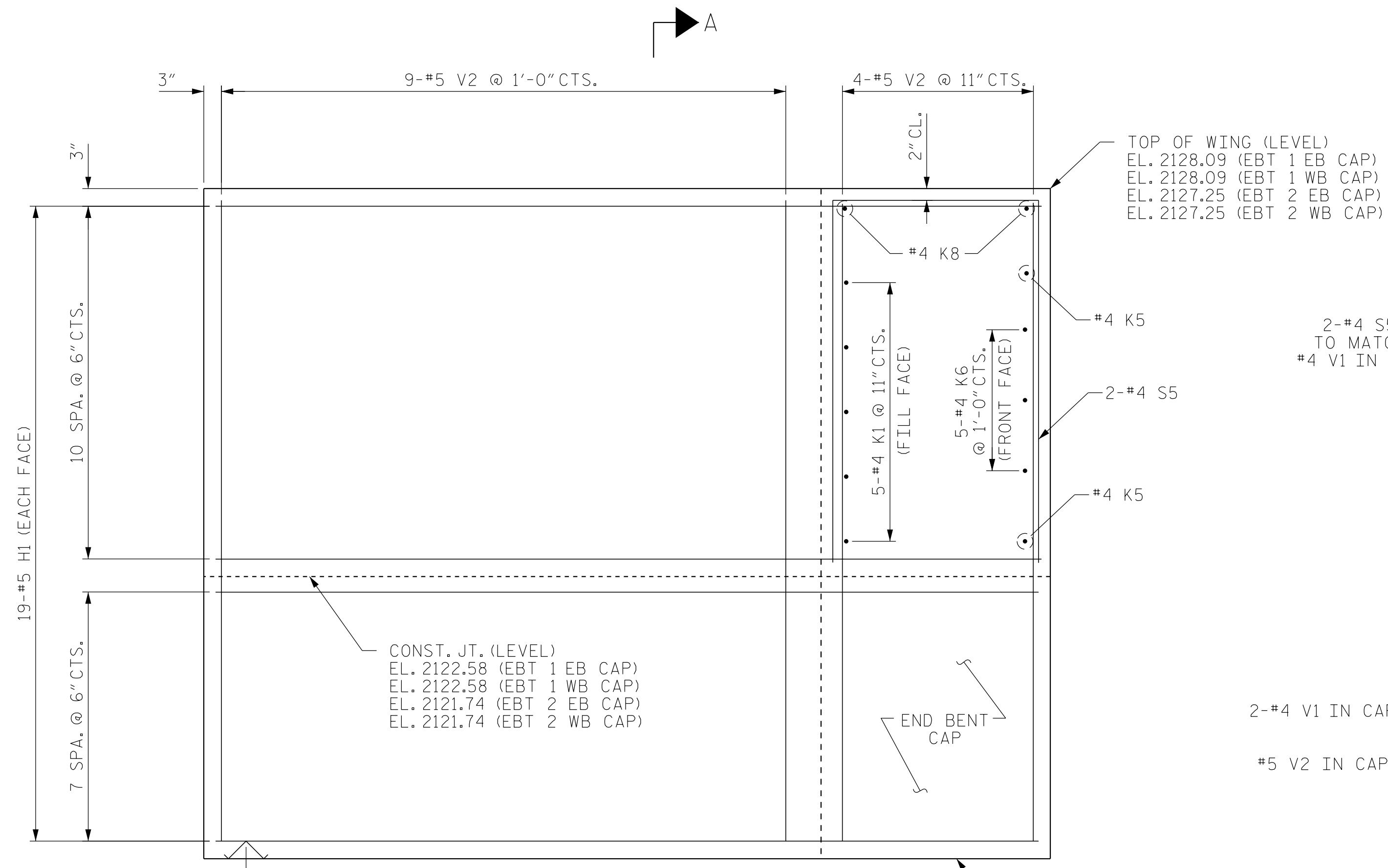
PLAN OF WING (W2)



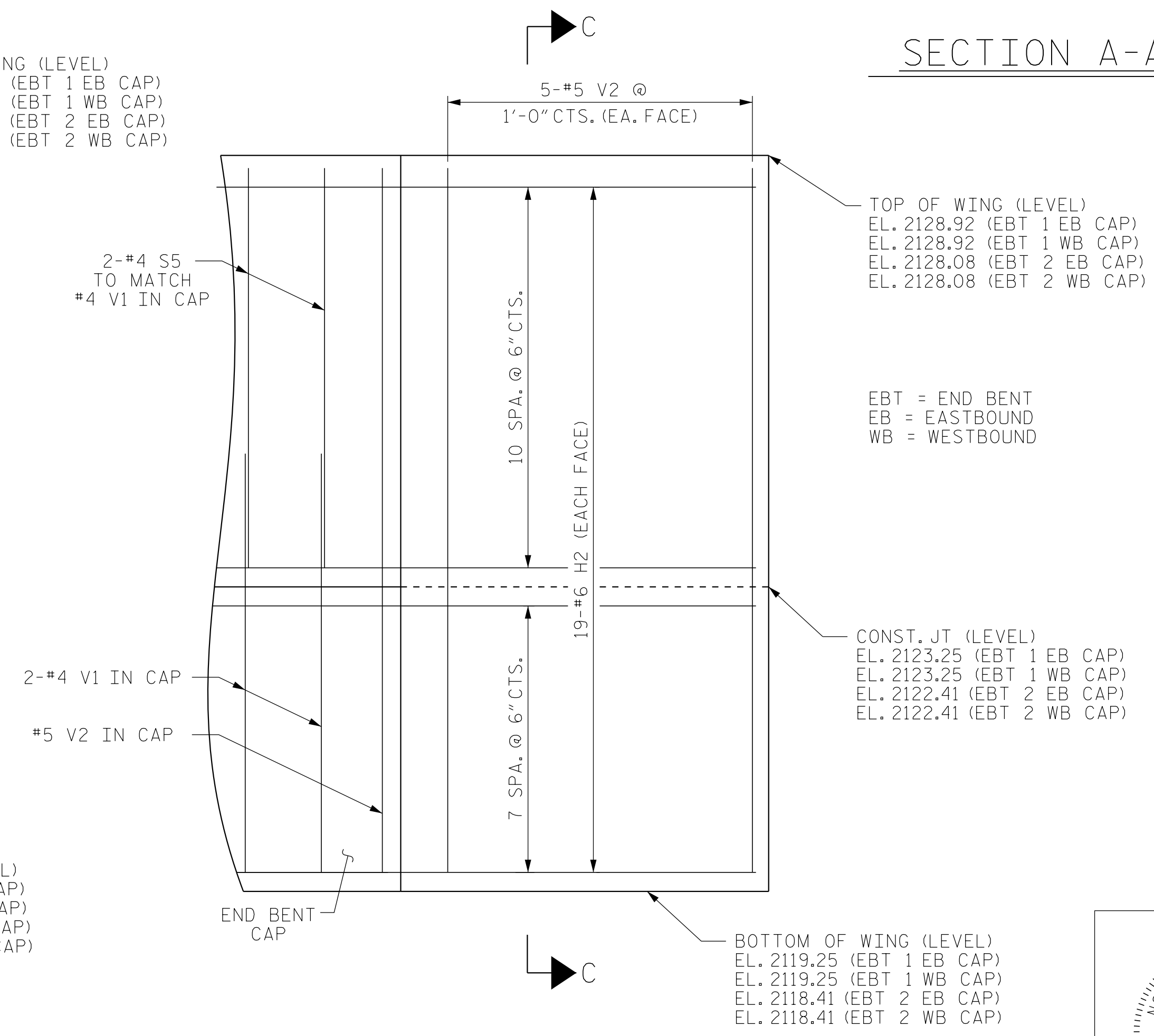
SECTION A-A



SECTION C-C



ELEVATION OF WING (W1)



ELEVATION B-B WING (W2)

NOTES

ALL MATERIALS BELOW THE CONSTRUCTION JOINTS ARE INCLUDED IN THE END BENT BILL OF MATERIAL, SEE SHEET 4 OF 4. ALL MATERIALS ABOVE THE CONSTRUCTION JOINTS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL, SEE SHEET NO. S-41.

EBT = END BENT  
 EB = EASTBOUND  
 WB = WESTBOUND

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT  
 WING DETAILS

SEAL  
 14309  
 ENGINEER  
 STEVEN A. CAMPBELL  
 NORTH CAROLINA PROFESSIONAL SEAL

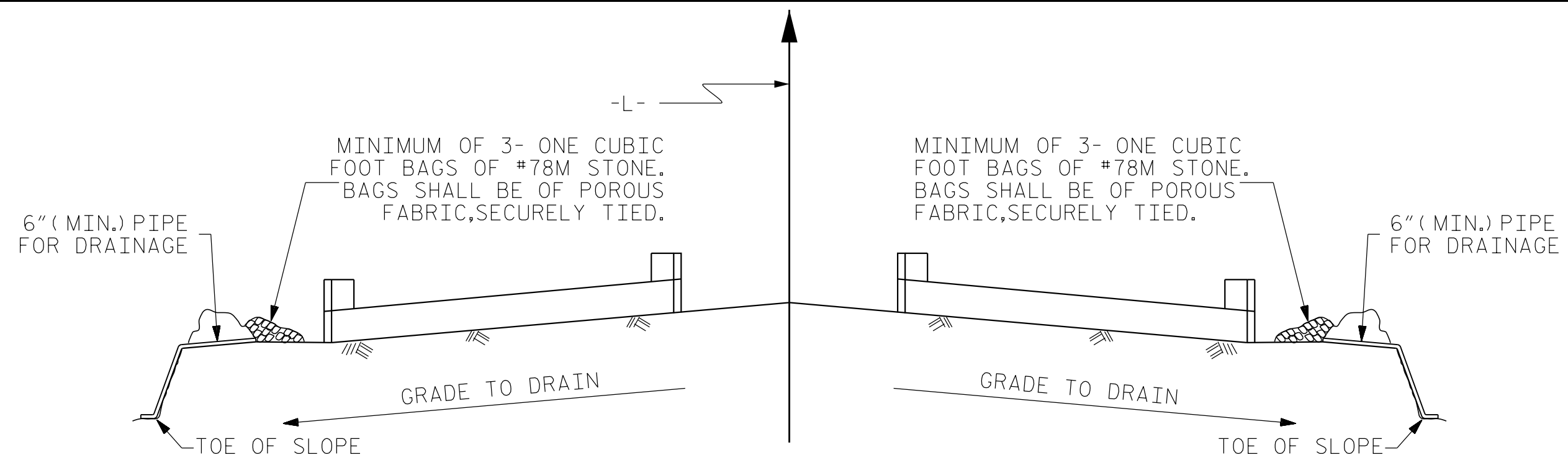
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-46	
1			3			TOTAL SHEETS	51
2			4				

DRAWN BY : PEC DATE : 8/15  
 CHECKED BY : CMT DATE : 8/15

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

DocuSigned by:  
 Steven A. Campbell 12/21/2015



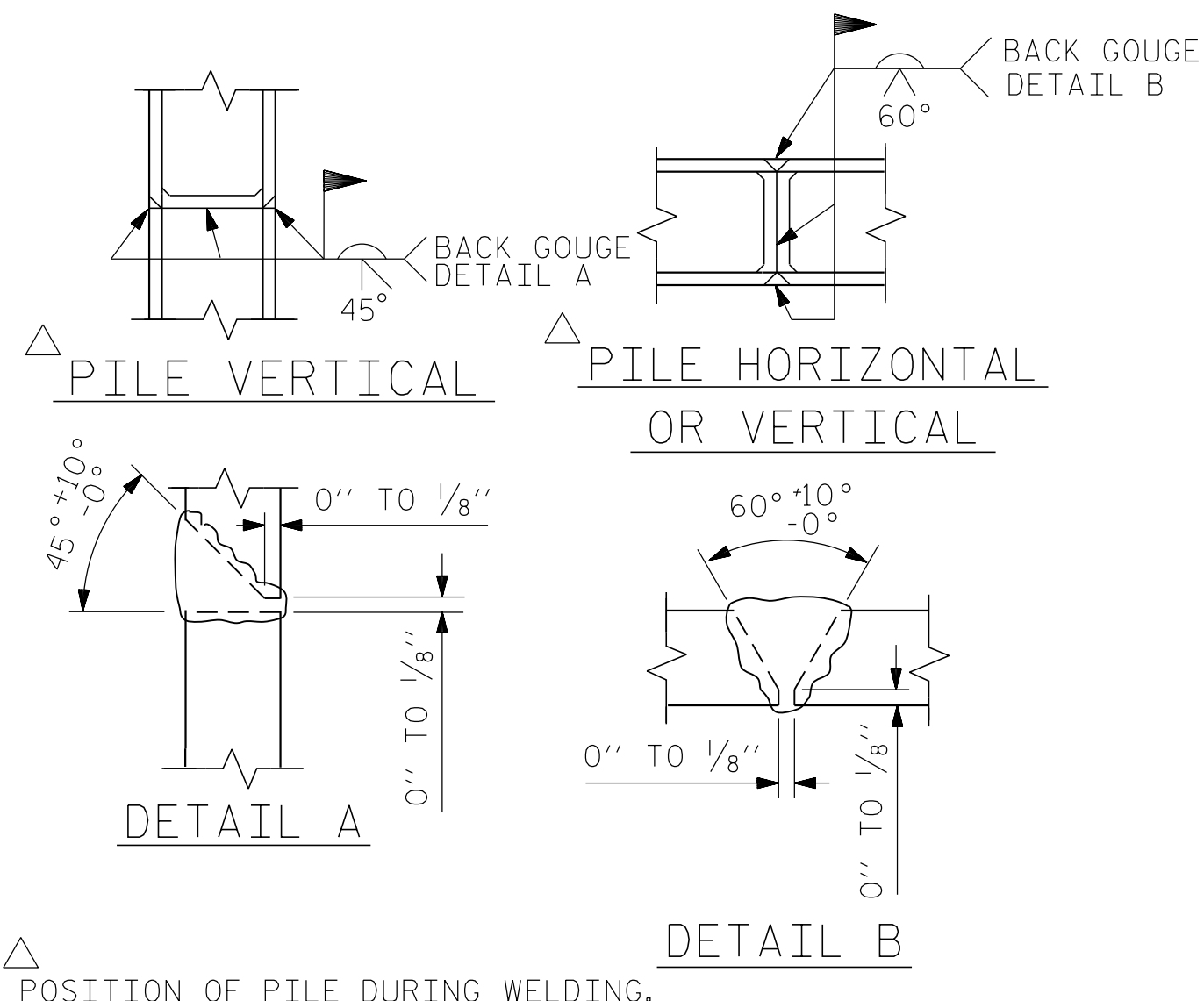


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS

BAR TYPES

1: HK. 1'-5" 46'-0" 1'-5"

2: 10" 11'-8"

3: 4 1/2" HK. 3'-7 1/2" 2'-11"

4: 4 1/2" 2'-11" 4 1/2" HK. HK.

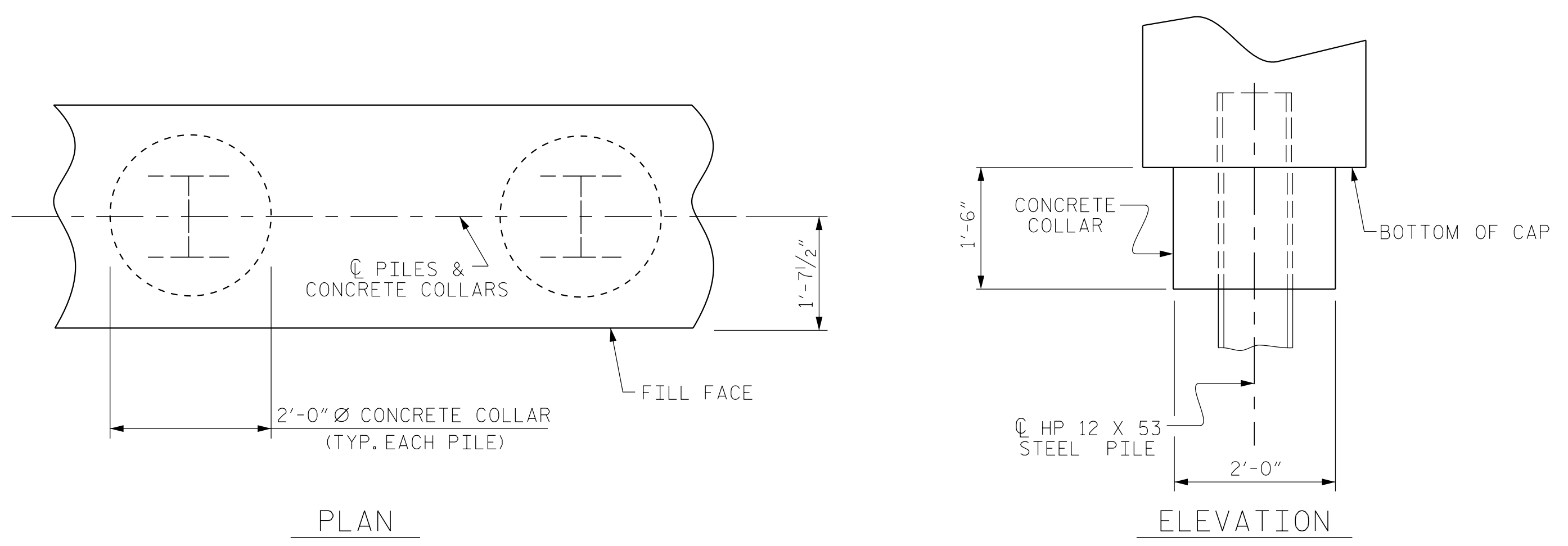
5: 1'-3" LAP 1'-8" Ø

ALL BAR DIMENSIONS ARE OUT TO OUT.

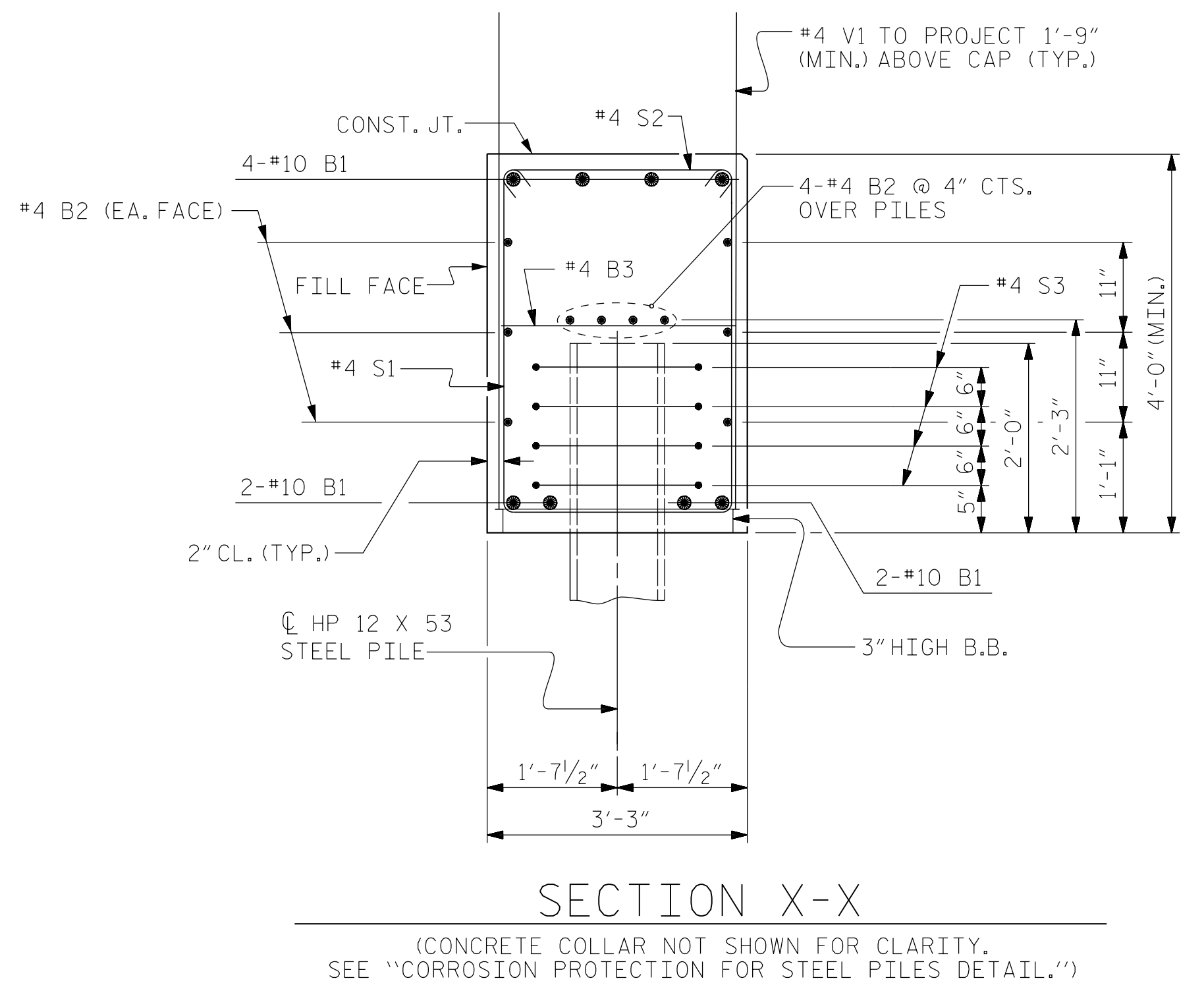
END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 14	NO: 14
LIN. FT.= 350	LIN. FT.= 385

BILL OF MATERIAL FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10		48'-10"	3376
B2	40	#4	STR	24'-4"	651
B3	24	#4	STR	2'-11"	47
H1	32	#5		12'-6"	418
H2	32	#6	STR	9'-0"	433
S1	76	#4		10'-11"	555
S2	76	#4		3'-8"	187
S3	56	#4		6'-6"	244
V1	136	#4	STR	6'-0"	546
V2	68	#5	STR	9'-5"	669
REINFORCING STEEL (FOR ONE END BENT)					7,126 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					57.3 C.Y.
TOTAL CLASS A CONCRETE					57.3 C.Y.



CORROSION PROTECTION FOR STEEL PILES DETAIL  
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 50+83.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 1 & 2  
DETAILS

ASSEMBLED BY : PFC	DATE : 8/15
CHECKED BY : CMT	DATE : 8/15
DRAWN BY : WJH 12/11	REV. 8/14 MAA/TMG
CHECKED BY : AAC 12/11	

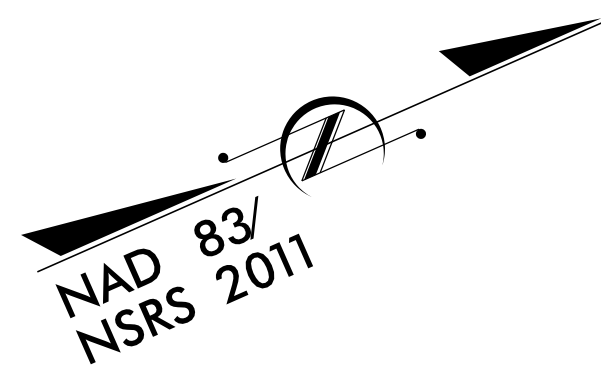
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\*\*\*\*\*DCN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

Prepared in the Office of:

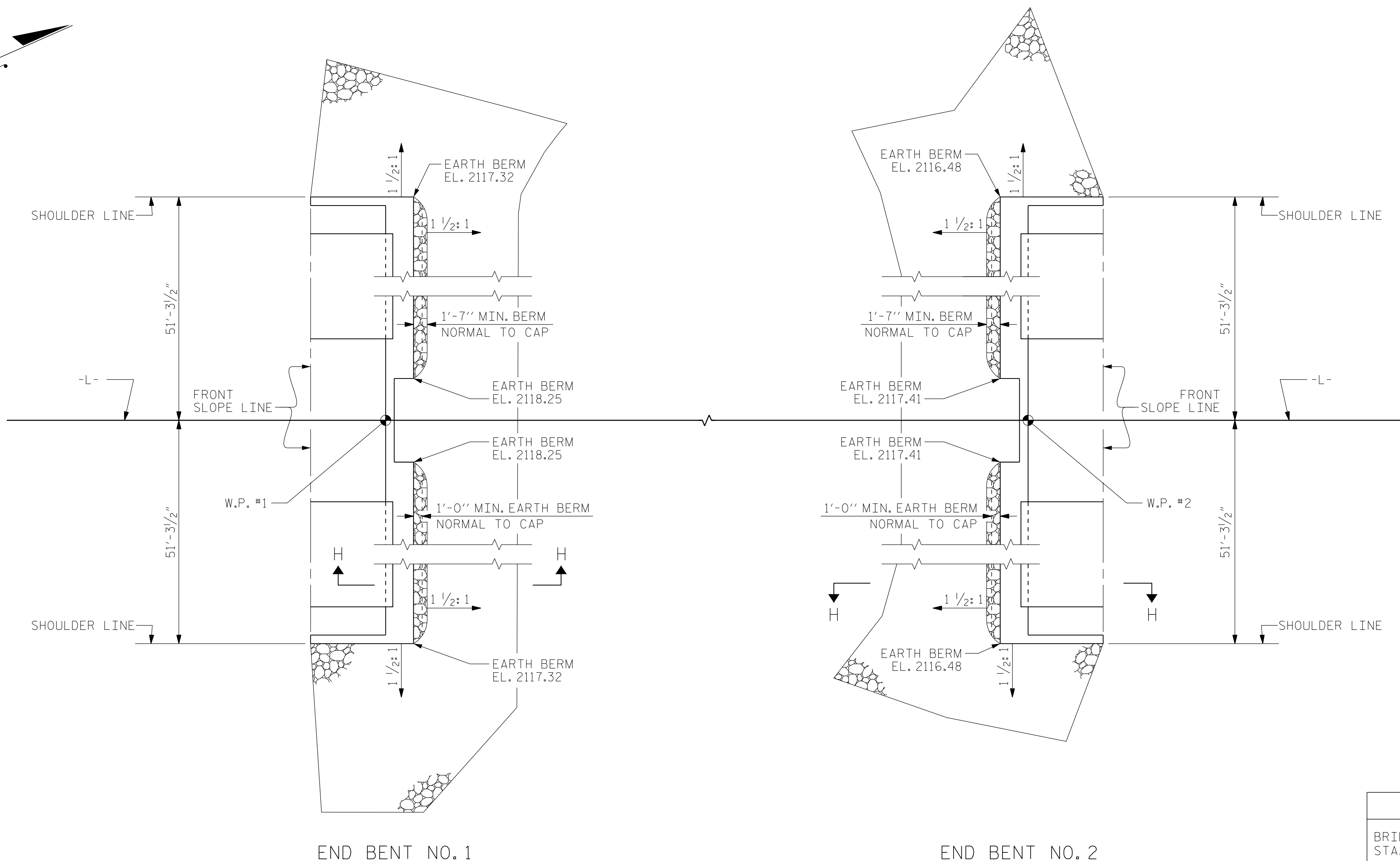
**Mattern & Craig**  
CONSULTING ENGINEERS & SURVEYORS  
FIRM LICENSE NO. C-1154  
12 BROAD STREET  
ASHEVILLE, NORTH CAROLINA 28801  
(828) 254-2201 - FAX (828) 254-4582

DocuSigned by:  
**Steven A. Campbell** 12/21/2015

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			51

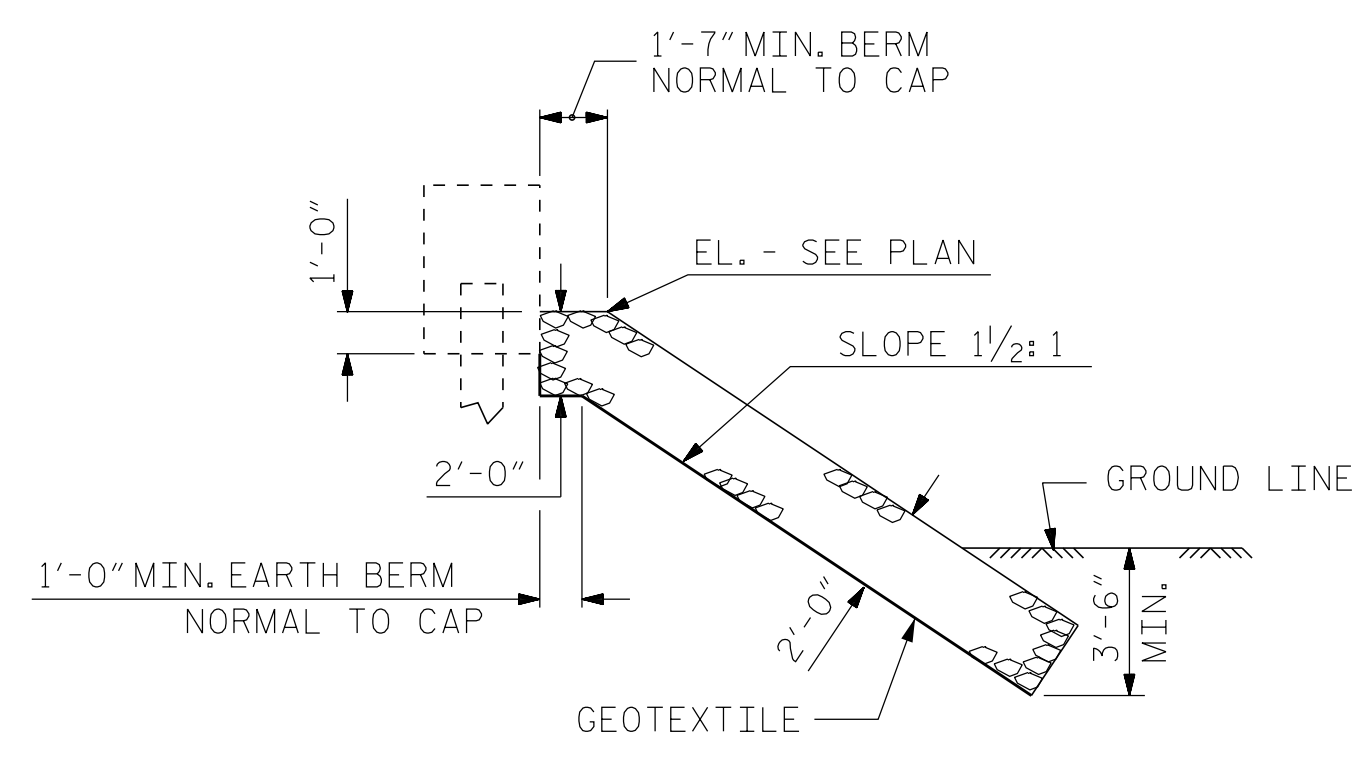


NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 50+83.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	238	264
END BENT 2	215	239



SECTION H-H  
BERM RIP RAPPED

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
STATION: 50+83.00 -L-

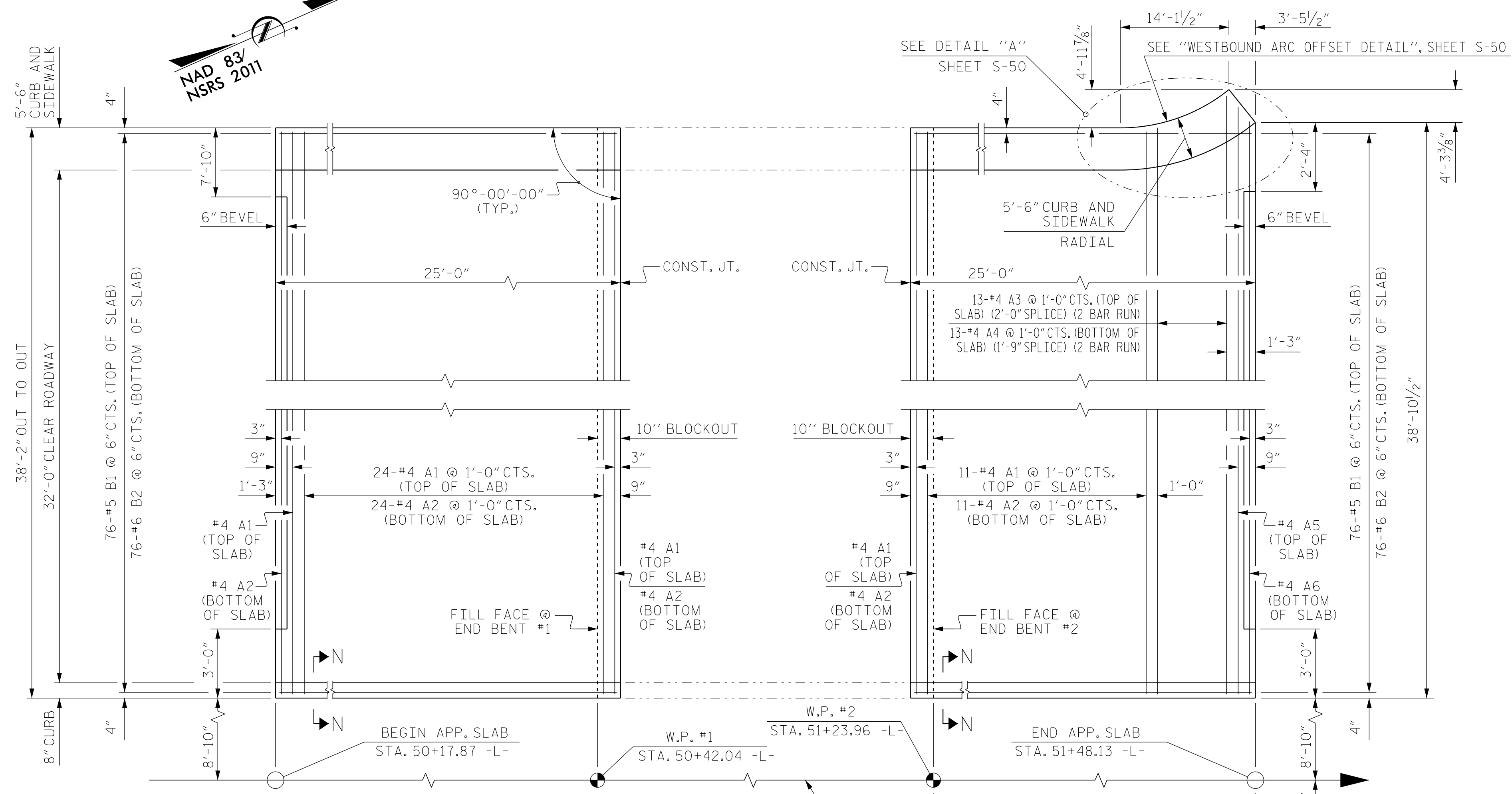
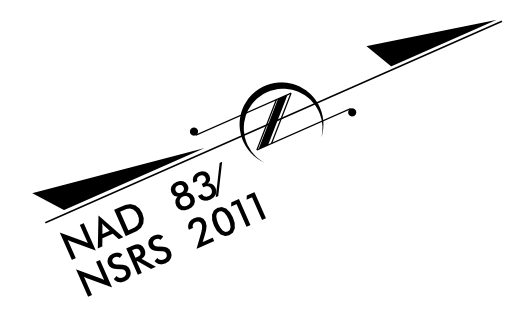
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CHECKED BY : CMT	DATE : 8/15
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

\*\*\*\*\*SYTIME\*\*\*\*\*  
\*\*\*\*\*SDGN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

Prepared in the Office of:

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			51

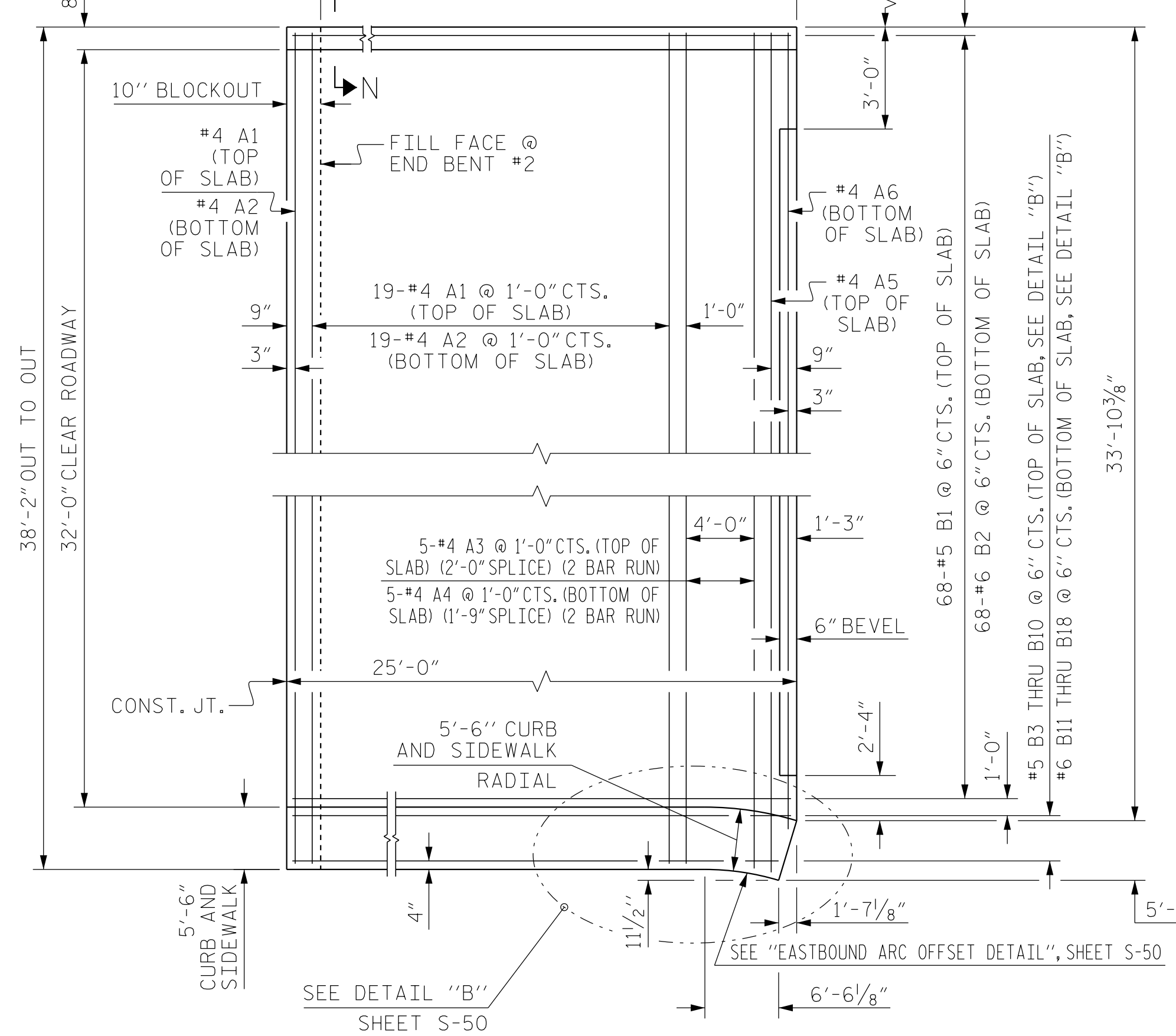
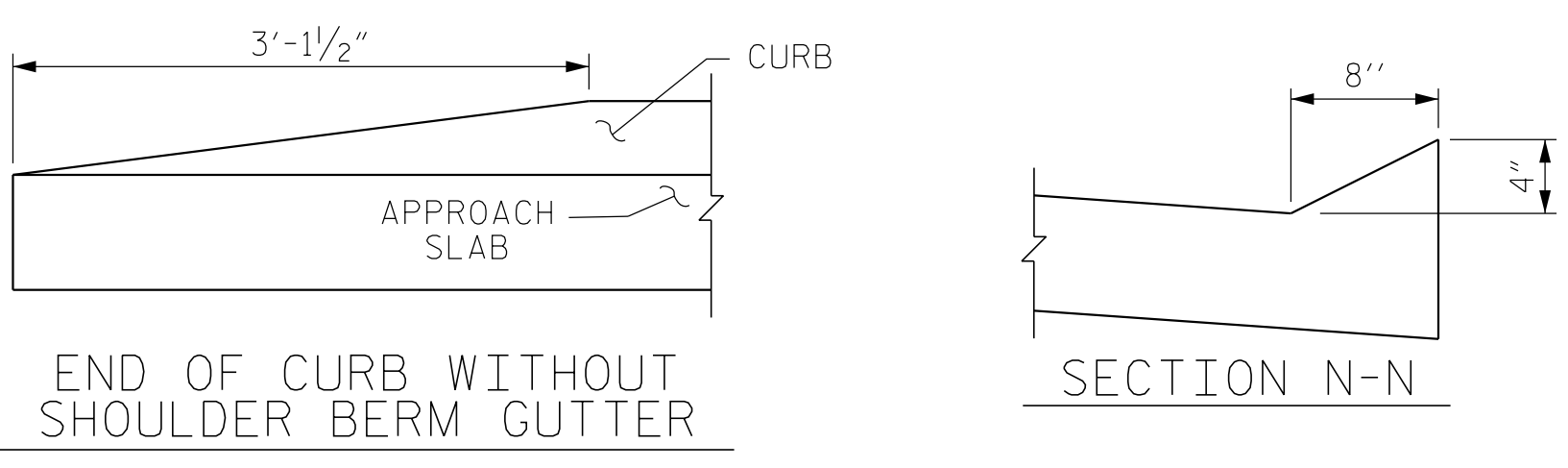


**PLAN @ END BENT #1**  
DIMENSIONS SHOWN ABOVE ARE TYPICAL FOR BOTH APPROACH SLABS AT END BENT #1

**PLAN @ END BENT #2**

**NOTES**

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, 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 OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.



**BILL OF MATERIAL**  
FOR ONE APPROACH SLAB AT END BENT 1 (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	37'-10"	658
A2	26	#4	STR	37'-10"	658
* B1	76	#5	STR	24'-2"	1917
B2	76	#6	STR	24'-8"	2818
REINFORCING STEEL					LBS. 3,476
* EPOXY COATED REINFORCING STEEL					LBS. 2,575
CLASS AA CONCRETE					C. Y. 41.2

**BILL OF MATERIAL**  
FOR WESTBOUND APPROACH SLAB AT END BENT 2 (1 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	12	#4	STR	37'-10"	304
A2	12	#4	STR	37'-10"	304
* A3	26	#4	STR	22'-3"	387
A4	26	#4	STR	22'-3"	387
* A5	1	#4	STR	39'-5"	27
A6	1	#4	STR	38'-9"	26
* B1	76	#5	STR	24'-2"	1917
B2	76	#6	STR	24'-8"	2818
* B3	1	#5	STR	7'-3"	8
* B4	1	#5	STR	12'-3"	13
* B5	1	#5	STR	10'-0"	11
* B6	1	#5	STR	9'-8"	11
* B7	1	#5	STR	11'-5"	12
* B8	1	#5	STR	9'-2"	10
* B9	1	#5	STR	8'-11"	10
* B10	1	#5	STR	8'-7"	9
* B11	1	#5	STR	12'-7"	14
* B12	1	#5	STR	5'-11"	7
* B13	1	#5	STR	3'-9"	4
* B14	1	#5	STR	4'-0"	5
B15	1	#6	STR	7'-3"	11
B16	1	#6	STR	12'-3"	19
B17	1	#6	STR	10'-0"	16
B18	1	#6	STR	9'-8"	15
B19	1	#6	STR	11'-5"	18
B20	1	#6	STR	9'-2"	14
B21	1	#6	STR	8'-11"	14
B22	1	#6	STR	8'-7"	13
B23	1	#6	STR	12'-7"	19
B24	1	#6	STR	5'-11"	9
B25	1	#6	STR	3'-9"	6
B26	1	#6	STR	4'-0"	7
* B27	1	#5	STR	5'-4"	6
B28	1	#6	STR	5'-4"	9
REINFORCING STEEL					LBS. 3,361
* EPOXY COATED REINFORCING STEEL					LBS. 2,736
CLASS AA CONCRETE					C. Y. 41.2

**BILL OF MATERIAL**  
FOR EASTBOUND APPROACH SLAB AT END BENT 2 (1 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	12	#4	STR	37'-10"	304
A2	12	#4	STR	37'-10"	304
* A3	26	#4	STR	22'-3"	387
A4	26	#4	STR	22'-3"	387
* A5	1	#4	STR	39'-5"	27
A6	1	#4	STR	38'-9"	26
* B1	76	#5	STR	24'-2"	1917
B2	76	#6	STR	24'-8"	2818
* B3	1	#5	STR	7'-3"	8
* B4	1	#5	STR	12'-3"	13
* B5	1	#5	STR	10'-0"	11
* B6	1	#5	STR	9'-8"	11
* B7	1	#5	STR	11'-5"	12
* B8	1	#5	STR	9'-2"	10
* B9	1	#5	STR	8'-11"	10
* B10	1	#5	STR	8'-7"	9
* B11	1	#5	STR	12'-7"	14
* B12	1	#5	STR	5'-11"	7
* B13	1	#5	STR	3'-9"	4
* B14	1	#5	STR	4'-0"	5
B15	1	#6	STR	7'-3"	11
B16	1	#6	STR	12'-3"	19
B17	1	#6	STR	10'-0"	16
B18	1	#6	STR	9'-8"	15
B19	1	#6	STR	11'-5"	18
B20	1	#6	STR	9'-2"	14
B21	1	#6	STR	8'-11"	14
B22	1	#6	STR	8'-7"	13
B23	1	#6	STR	12'-7"	19
B24	1	#6	STR	5'-11"	9
B25	1	#6	STR	3'-9"	6
B26	1	#6	STR	4'-0"	7
* B27	1	#5	STR	5'-4"	6
B28	1	#6	STR	5'-4"	9
REINFORCING STEEL					LBS. 3,705
* EPOXY COATED REINFORCING STEEL					LBS. 2,755
CLASS AA CONCRETE					C. Y. 42.6

**BILL OF MATERIAL**  
FOR EASTBOUND APPROACH SLAB AT END BENT 2 (1 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	20	#4	STR	37'-10"	506
A2	20	#4	STR	37'-10"	506
* A7	10	#4	STR	20'-4"	136
A8	10	#4	STR	20'-4"	136
* A9	1	#4	STR	35'-7"	24
A10	1	#4	STR	33'-11"	23
* B1	68	#5	STR	24'-2"	1716
B2	68	#6	STR	24'-8"	2521
* B29	1	#5	STR	24'-6"	26
* B30	1	#5	STR	24'-4"	26
* B31	1	#5	STR	24'-2"	26
* B32	1	#5	STR	24'-0"	26
* B33	1	#5	STR	23'-11"	25
* B34	1	#5	STR	23'-9"	25
* B35	1	#5	STR	23'-7"	25
* B36	1	#5	STR	23'-5"	25
B37	1	#6	STR	24'-6"	37
B38	1	#6	STR	24'-4"	37
B39	1	#6	STR	24'-2"	37
B40	1	#6	STR	24'-0"	37
B41	1	#6	STR	23'-11"	36
B42	1	#6	STR	23'-9"	36
B43	1	#6	STR	23'-7"	36
B44	1	#6	STR	23'-5"	36
* B45	1	#5	STR	3'-10"	5
B46	1	#6	STR	3'-10"	6
* B47	1	#5	STR	2'-0"	3
B48	1	#6	STR	2'-0"	4
* B49	1	#5	STR	5'-7"	6
B50	1	#6	STR	5'-7"	9
REINFORCING STEEL					LBS. 3,361
* EPOXY COATED REINFORCING STEEL					LBS. 2,736
CLASS AA CONCRETE					C. Y. 41.2

PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 1 OF 3  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT

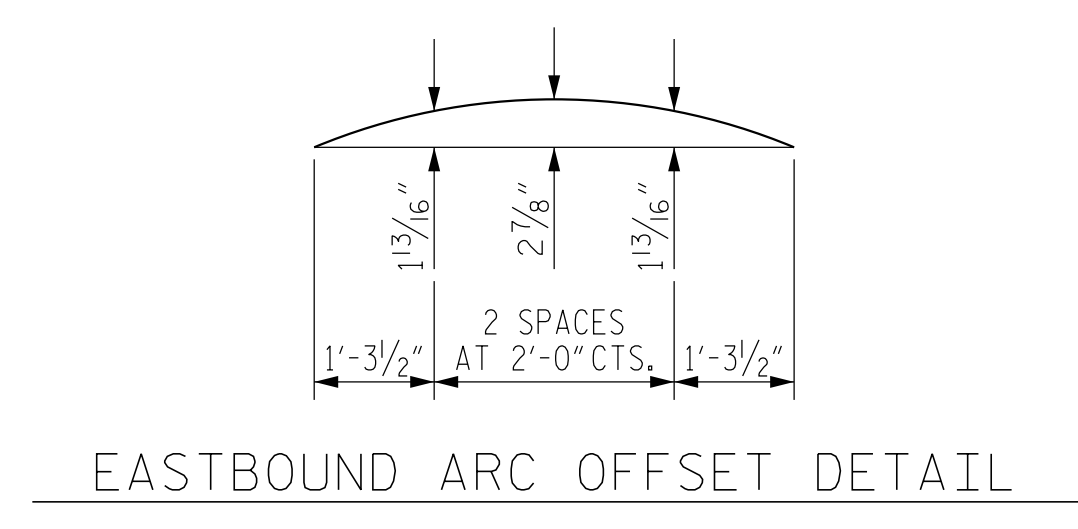
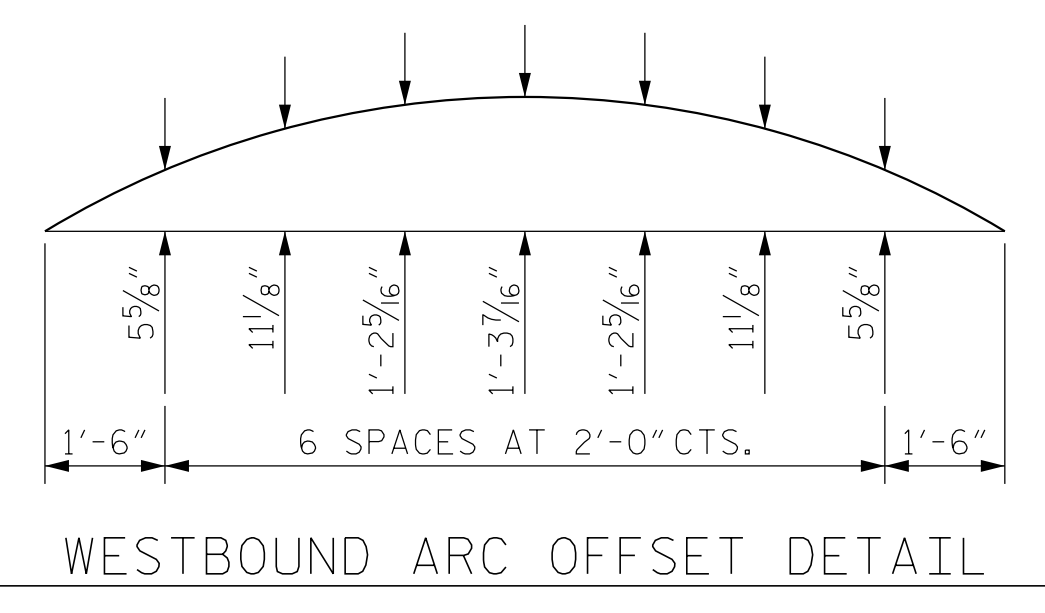
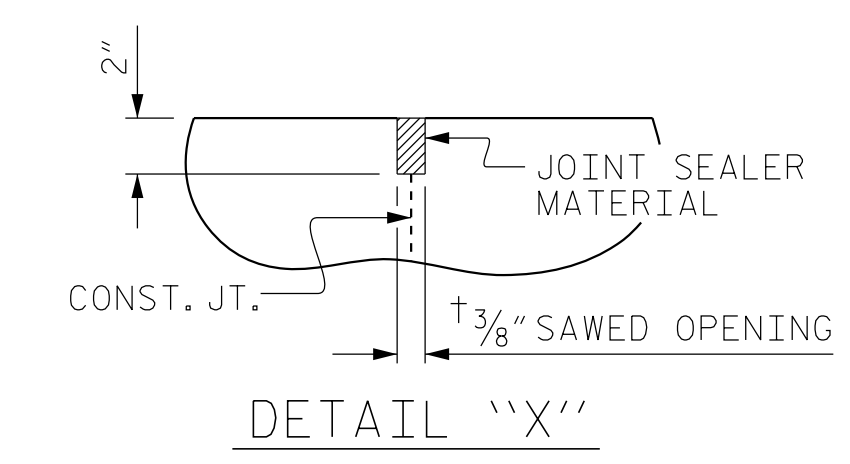
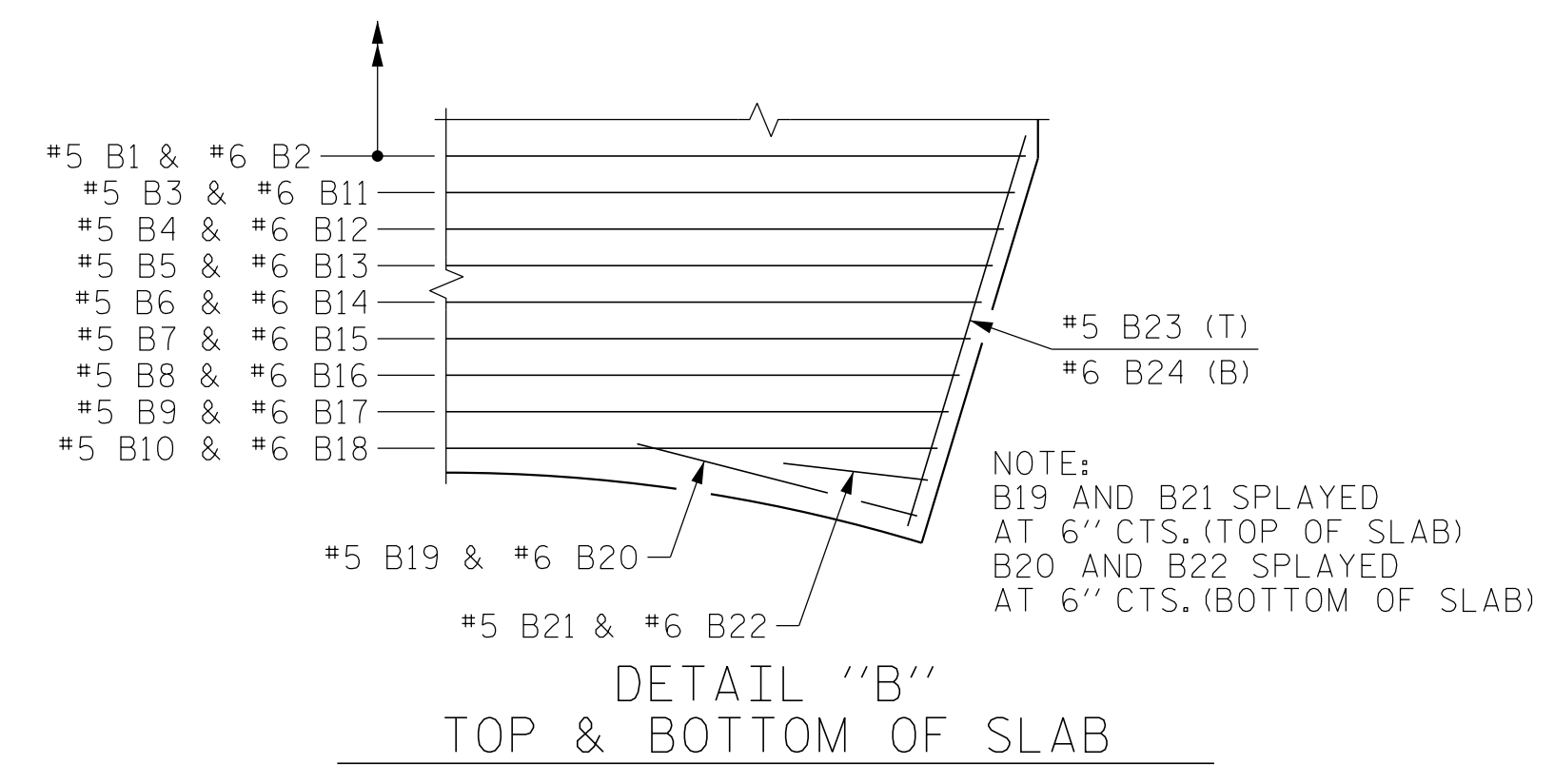
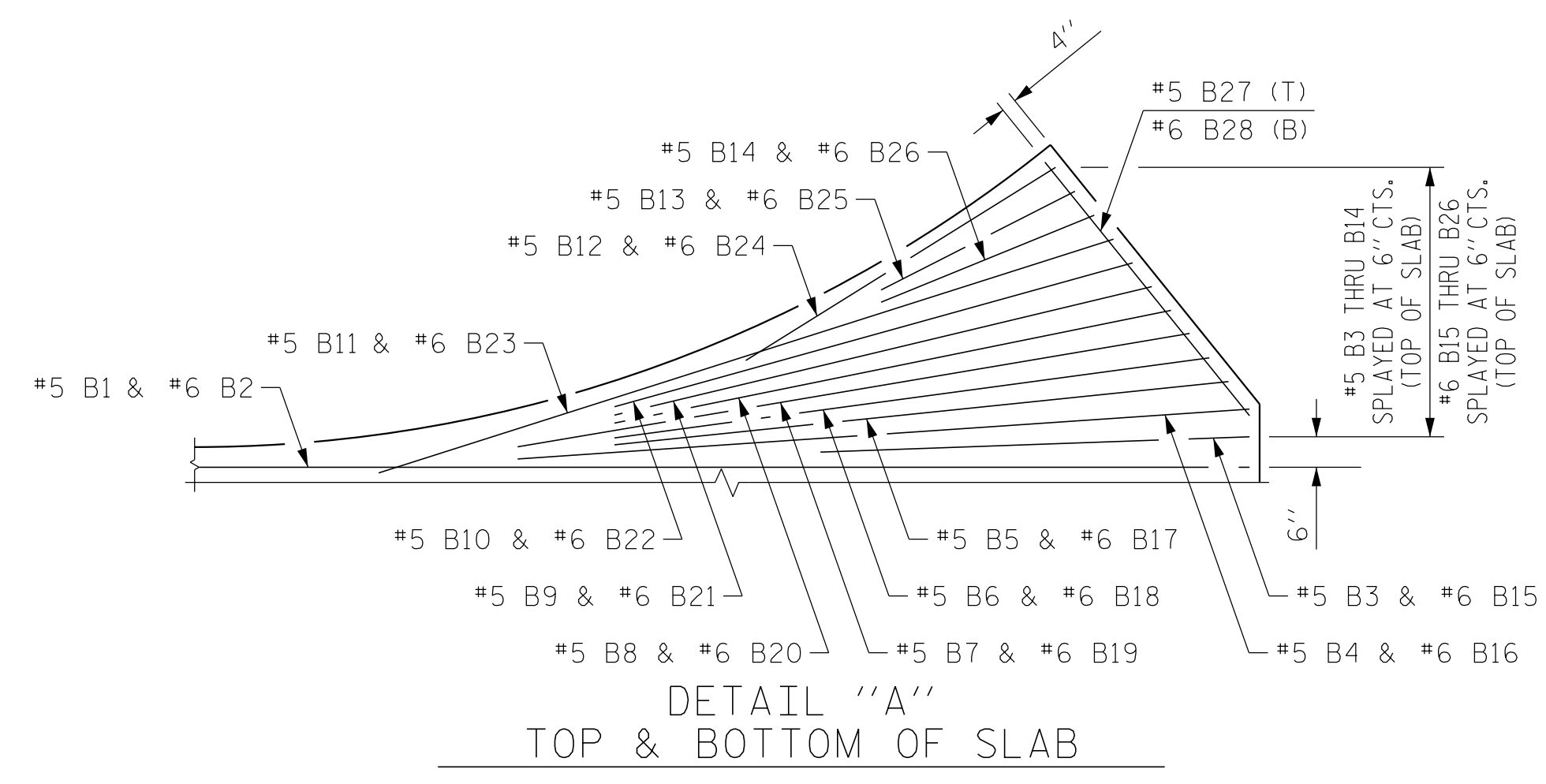
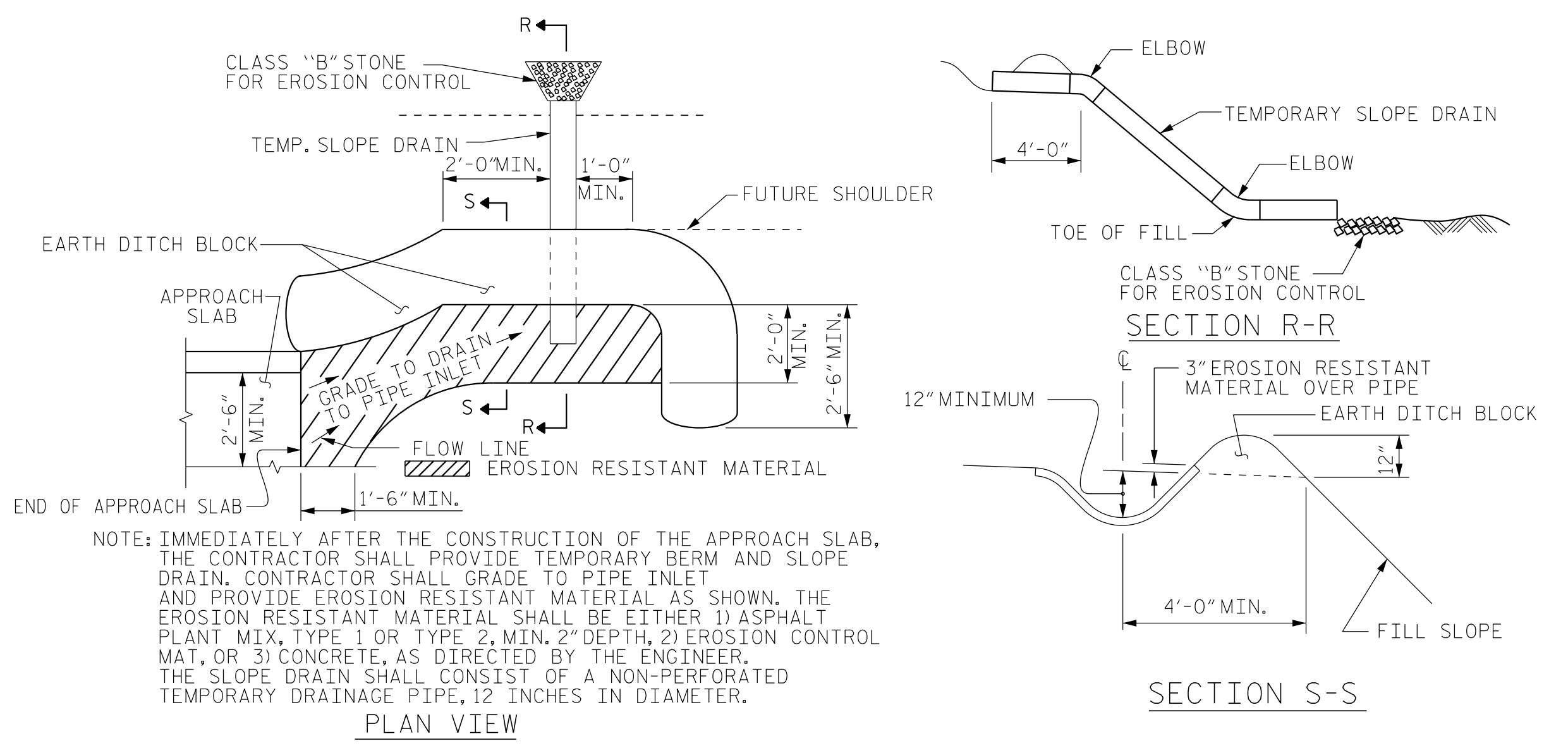
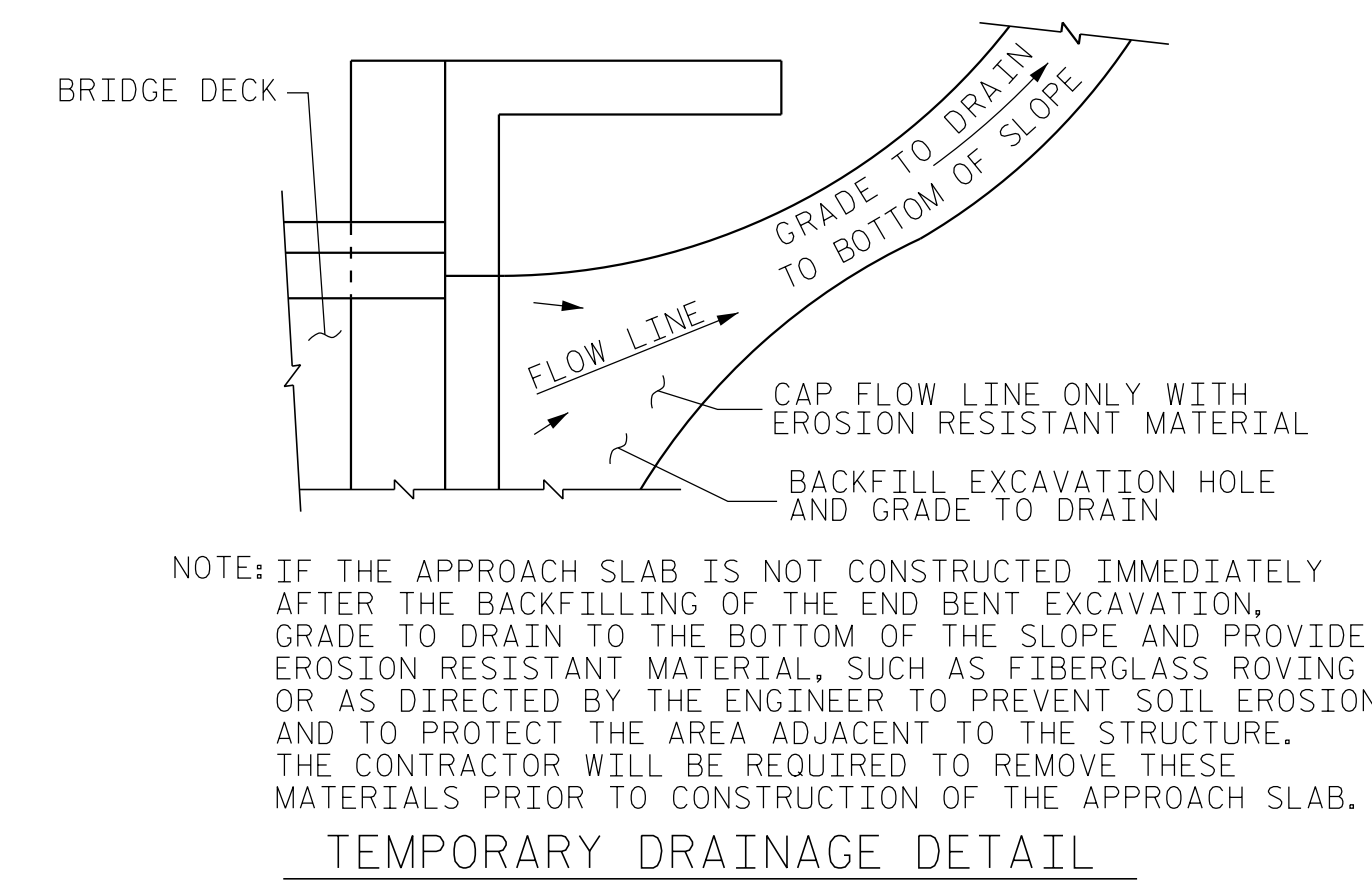
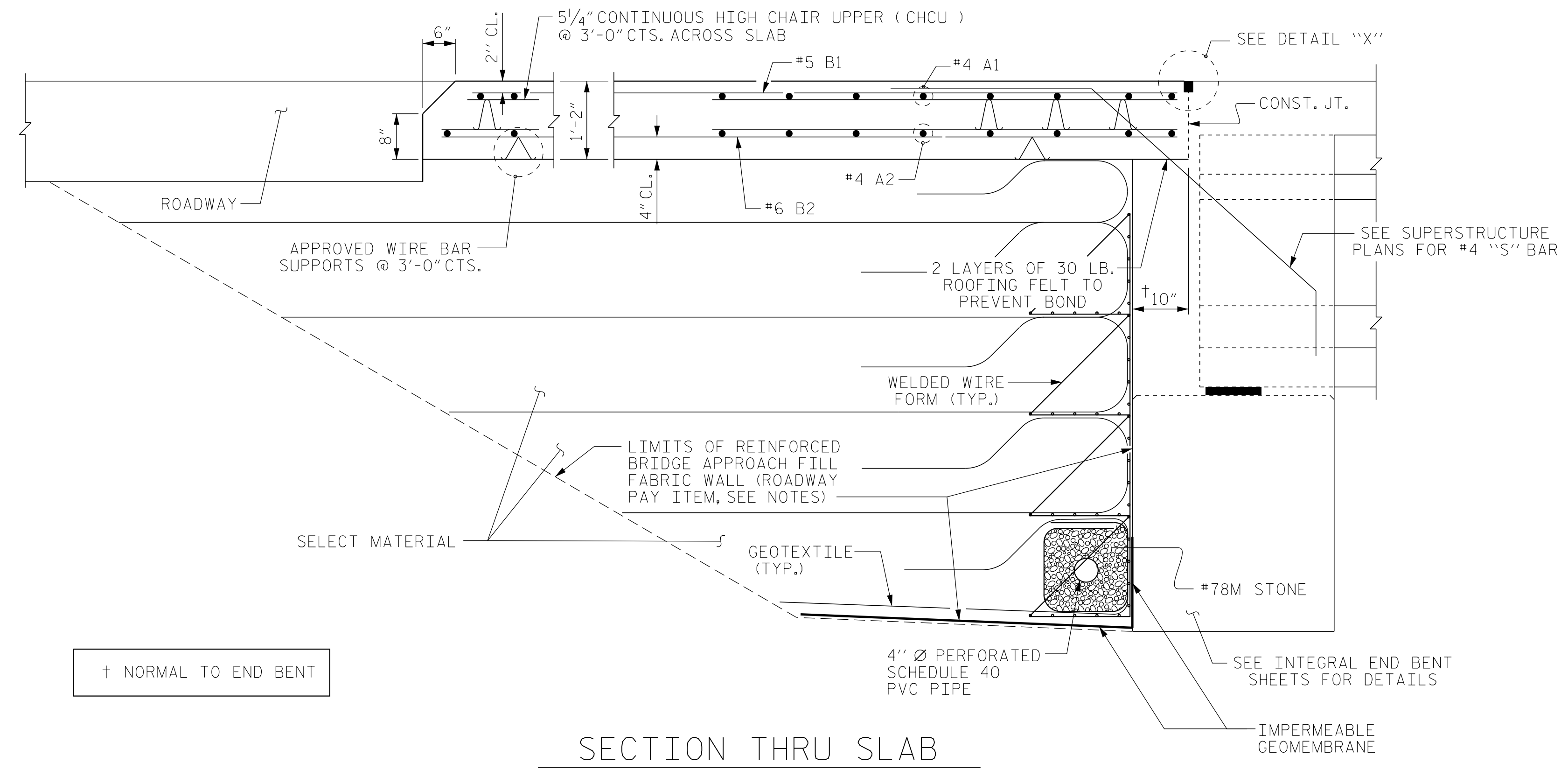
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CHECKED BY :	GM 5/06	REV. 12/21/11	MAA/GM
		REV. 6/13	MAA/GM

Prepared in the Office of:  
  
**Mattern & Craig**  
 CONSULTING ENGINEERS - SURVEYORS  
 FIRM LICENSE NO. C-1154  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201 - FAX (828) 254-4562

Professional Engineer Seal for Steven A. Campbell, License No. 14309, State of North Carolina. Date: 12/21/2015.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			51

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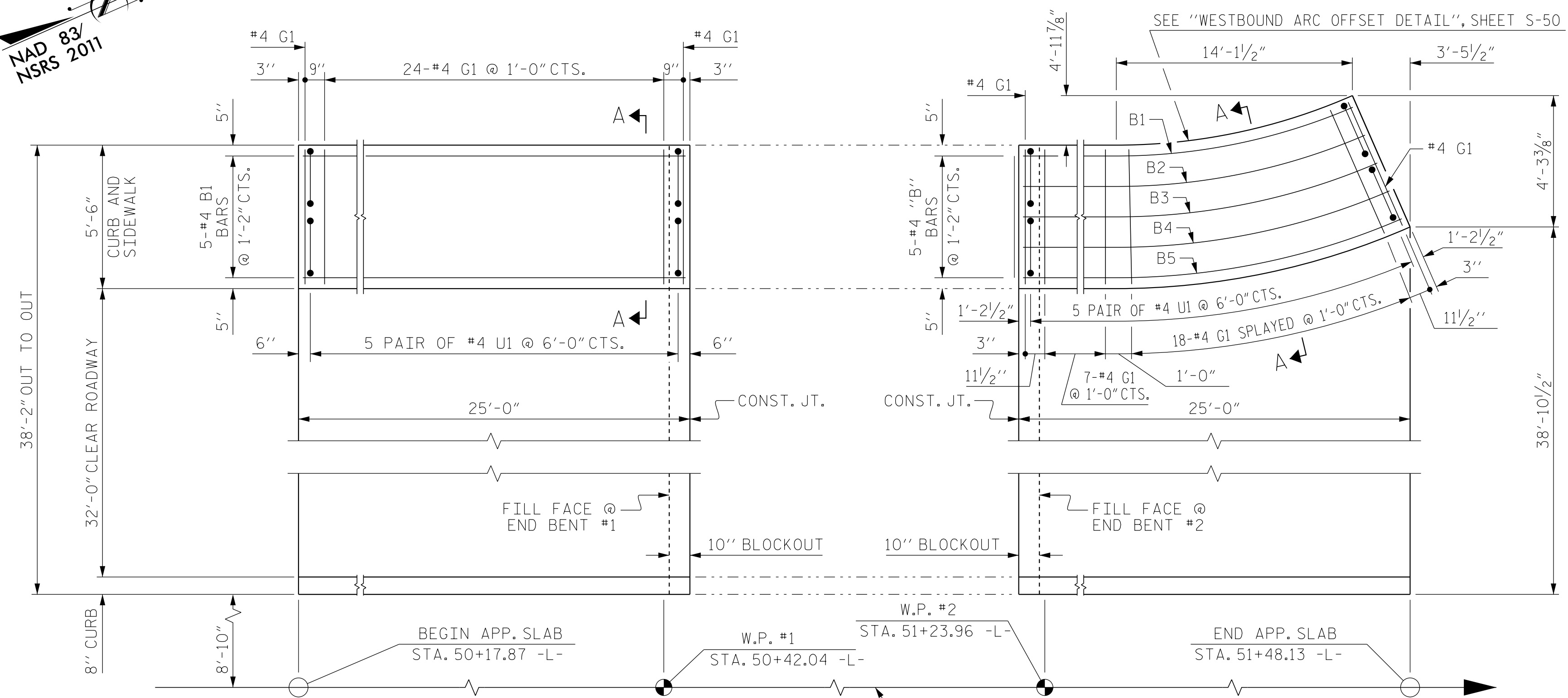
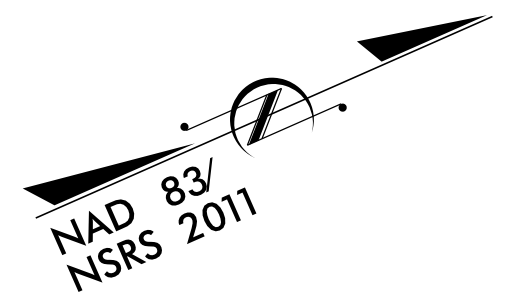
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Professional Engineer Seal  
 STEVEN A. CAMPBELL  
 SEAL 14309  
 Signed by: Steven A. Campbell 12/21/2015

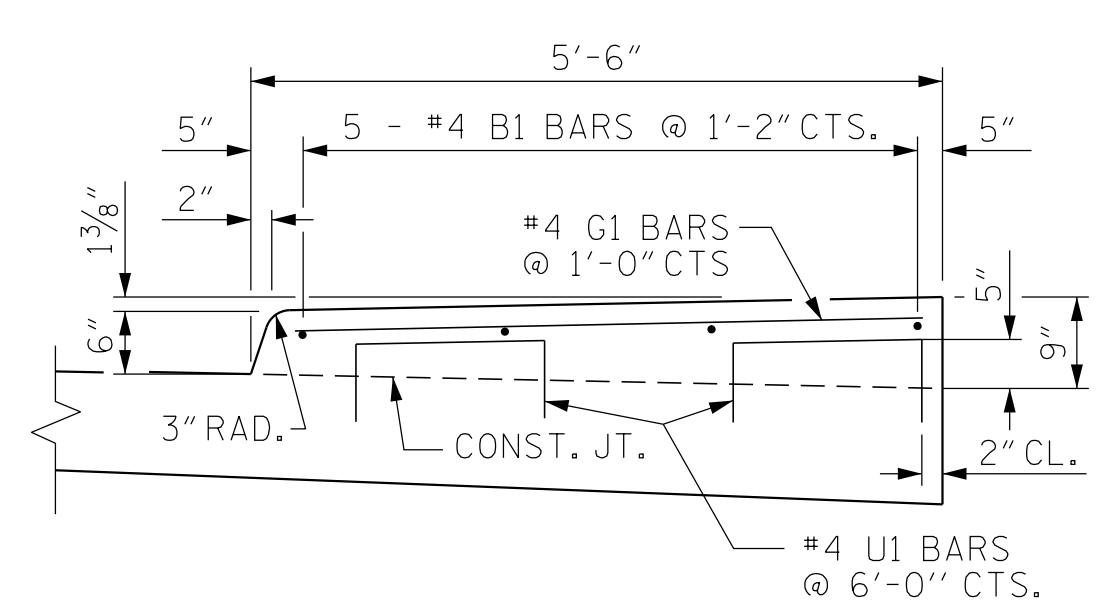
PROJECT NO. R-5605  
 TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 2 OF 3

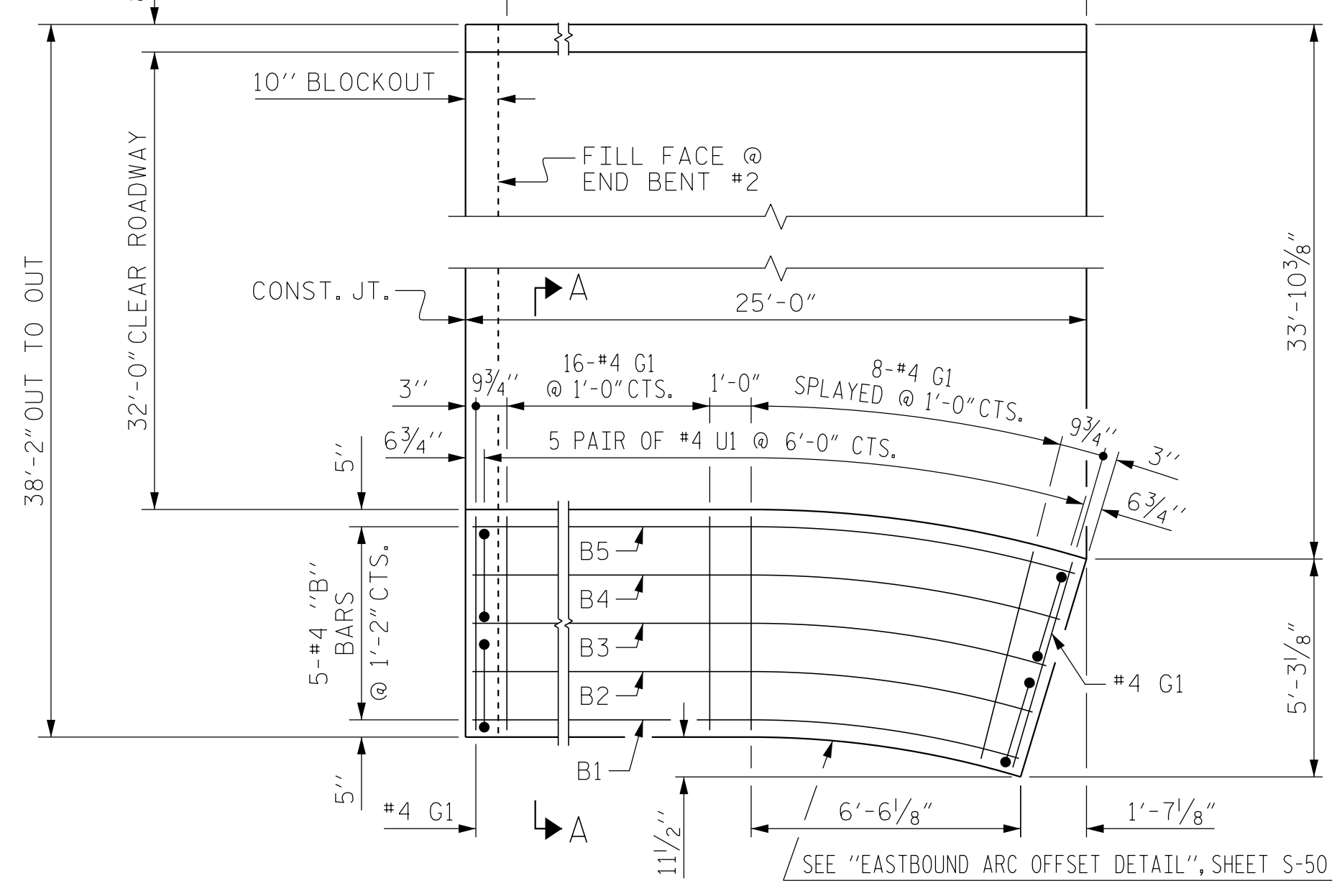
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			51



**PLAN @ END BENT #1**  
DIMENSIONS SHOWN ABOVE ARE TYPICAL FOR BOTH APPROACH SLABS AT END BENT #1



**SECTION A-A**



**PLAN @ END BENT #2**

BAR TYPES					
ALL BAR DIMENSIONS ARE OUT TO OUT.					

BILL OF MATERIAL					
FOR ONE APPROACH SLAB SIDEWALK AT END BENT 1 (2 REQ'D)					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B51	5	#4	STR	24'-8"	83
* G1	26	#4	STR	5'-0"	87
* U1	10	#4	1	3'-6"	24
* EPOXY COATED REINFORCING STEEL				LBS.	194
CLASS AA CONCRETE				C. Y.	3.3

BILL OF MATERIAL					
FOR WESTBOUND APPROACH SLAB SIDEWALK AT END BENT 2 (1 REQ'D)					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B52	1	#4	STR	22'-8"	16
* B53	1	#4	STR	23'-5"	16
* B54	1	#4	STR	24'-2"	17
* B55	1	#4	STR	25'-0"	17
* B56	1	#4	STR	25'-10"	18
* G1	27	#4	STR	5'-0"	91
* U1	10	#4	1	3'-6"	24
* EPOXY COATED REINFORCING STEEL				LBS.	199
CLASS AA CONCRETE				C. Y.	3.3

BILL OF MATERIAL					
FOR EASTBOUND APPROACH SLAB SIDEWALK AT END BENT 2 (1 REQ'D)					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B57	1	#4	STR	23'-3"	16
* B58	1	#4	STR	23'-7"	16
* B59	1	#4	STR	23'-11"	16
* B60	1	#4	STR	24'-3"	17
* B61	1	#4	STR	24'-8"	17
* G1	26	#4	STR	5'-0"	87
* U1	10	#4	1	3'-6"	24
* EPOXY COATED REINFORCING STEEL				LBS.	193
CLASS AA CONCRETE				C. Y.	3.2

**NOTES**

- SIDEWALK ON APPROACH SLAB SHALL BE PAID FOR IN BRIDGE APPROACH SLAB PAY ITEM.
- THE #4 U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER THE APPROACH SLAB HAS BEEN FINISHED.
- THE #4 "B" BARS FOR THE APPROACH SIDEWALKS ON THE APPROACH SLABS AT END BENT #2 SHALL BE FIELD BENT TO ACHIEVE REQUIRED RADIUS.

PROJECT NO. R-5605  
TRANSYLVANIA COUNTY  
 STATION: 50+83.00 -L-

SHEET 3 OF 3

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			51

DRAWN BY : PEC DATE : 8/15  
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DocuSigned by:  
**Steven A. Campbell** 12/21/2015

\*\*\*\*\*SYSTEMTIME\*\*\*\*\*  
 \*\*\*\*\*DCN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

