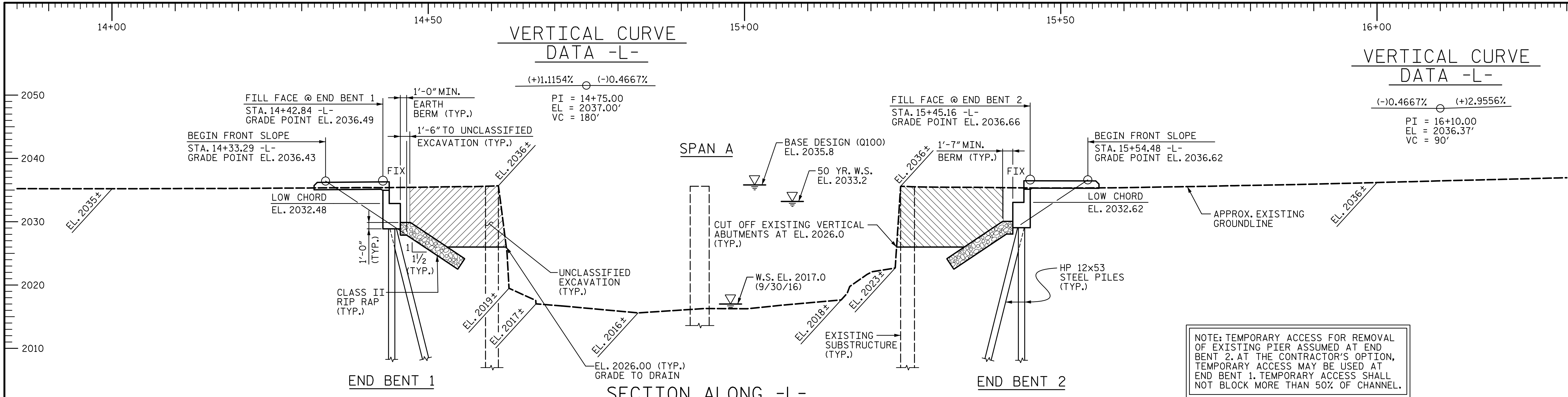


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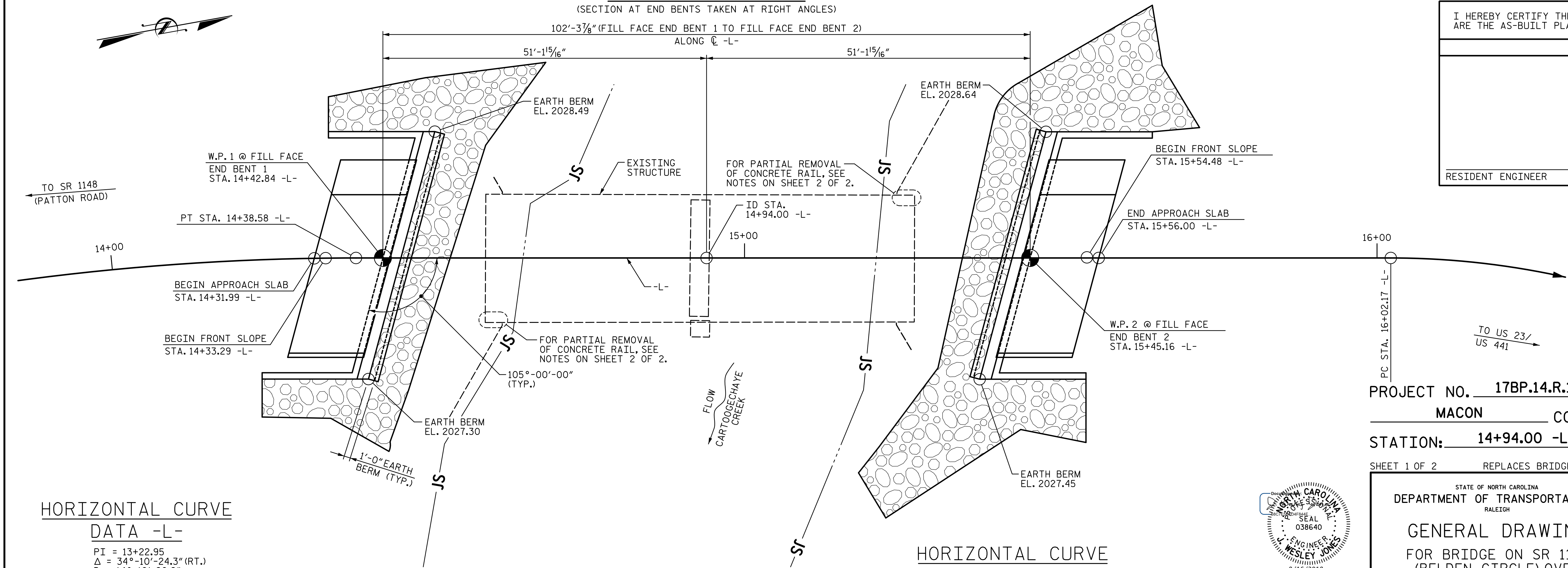
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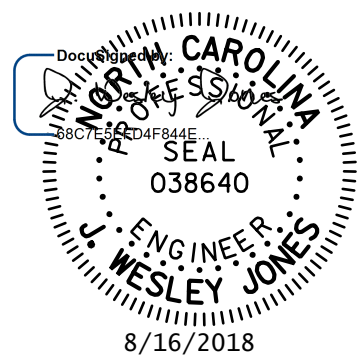
NOTE: TEMPORARY ACCESS FOR REMOVAL OF EXISTING PIER ASSUMED AT END BENT 2. AT THE CONTRACTOR'S OPTION, TEMPORARY ACCESS MAY BE USED AT END BENT 1. TEMPORARY ACCESS SHALL NOT BLOCK MORE THAN 50% OF CHANNEL.

I HEREBY CERTIFY THESE ARE THE AS-BUILT PLANS

RESIDENT ENGINEER



PROJECT NO. **17BP.14.R.154**
MACON COUNTY
STATION: **14+94.00 -L-**
SHEET 1 OF 2 REPLACES BRIDGE NO. 314



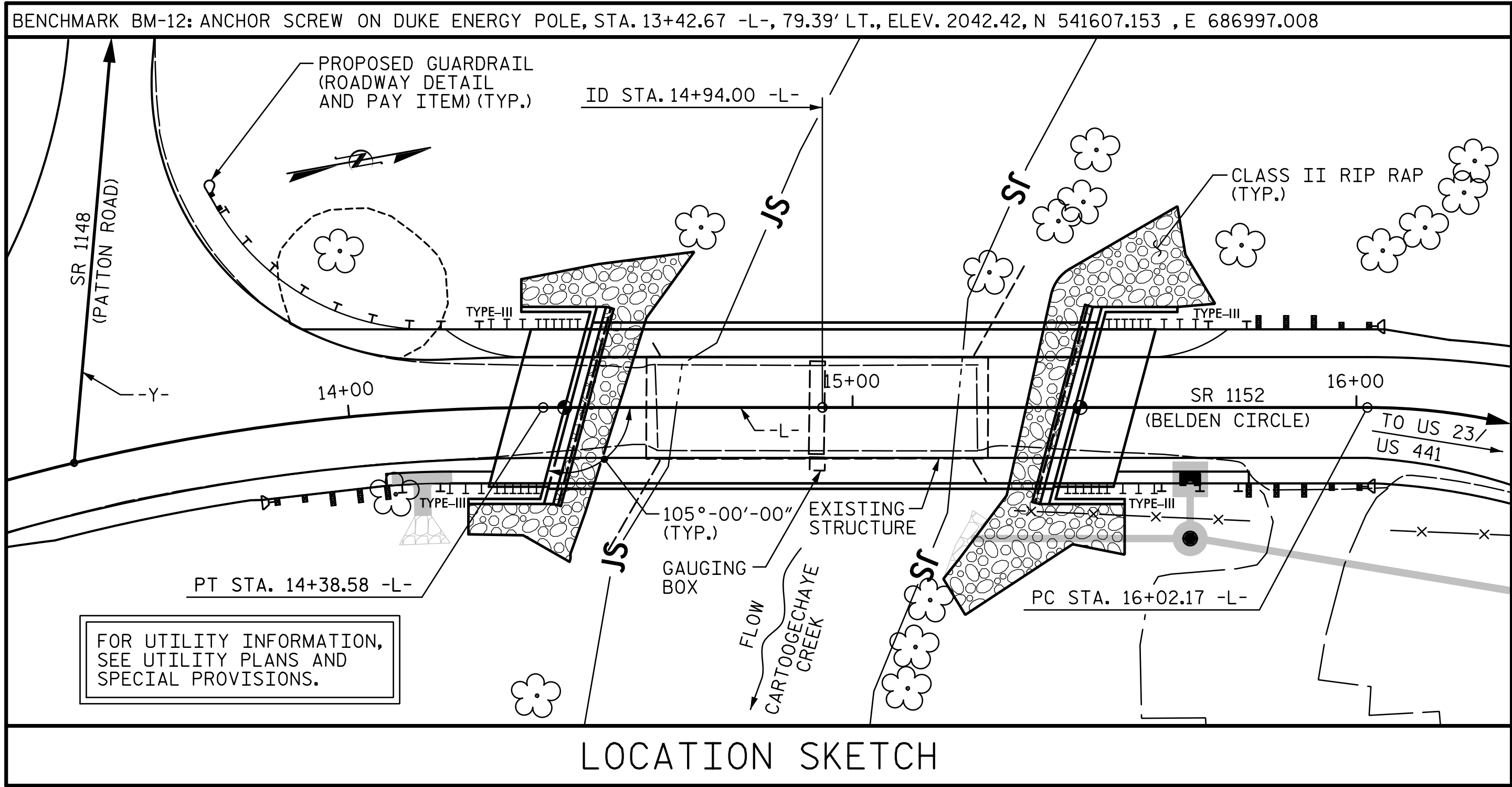
STV 100 YEARS
STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON SR 1152 (BELDEN CIRCLE) OVER CARTOOGECHAYE CREEK BETWEEN SR 1148 AND US 23/US 441					
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-1
					TOTAL SHEETS 21

DRAWN BY : LGH DATE : 5-17
CHECKED BY : JWJ DATE : 6-17
DESIGN ENGINEER OF RECORD : JWJ DATE : 3-18

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TOTAL BILL OF MATERIAL									
	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS AA CONCRETE	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	CU. YDS.	CU. YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE					22.0				1,092
END BENT 1						29.7		4,705	
END BENT 2						29.7		4,705	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	22.0	59.4	LUMP SUM	9,410	1,092

TOTAL BILL OF MATERIAL (CONTINUED)									
	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		THREE BAR METAL RAIL	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS
	EA.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.
SUPERSTRUCTURE				92.2	100.0				11
END BENT 1	7	7	455.0			120	135		
END BENT 2	7	7	525.0			165	185		
TOTAL	14	14	980.0	92.2	100.0	285	320	LUMP SUM	11

DRAWN BY : LGH	DATE : 5-17
CHECKED BY : JWJ	DATE : 5-17
DESIGN ENGINEER OF RECORD : JWJ	DATE : 3-18

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE EXISTING STRUCTURE CONSISTING OF (1) 32'-3"± AND (1) 32'-6"± REINFORCED CONCRETE DECK GIRDER SPANS WITH A CLEAR ROADWAY OF 17'-2" ON REINFORCED CONCRETE ABUTMENTS AND PIER AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. FOR PARTIAL REMOVAL OF ABUTMENTS, SEE SHEET 1 OF 2.

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 SECTIONS OF THE CONCRETE RAIL OF THE EXISTING STRUCTURE WHICH INCLUDE THE HISTORIC PLAQUES ARE TO REMAIN THE PROPERTY OF THE DEPARTMENT. THE CONTRACTOR SHALL REMOVE AND PRESERVE THESE SECTIONS AS DIRECTED BY THE ENGINEER. THIS WORK SHALL BE DONE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS AND INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE".

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 14+94.00 -L-.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA (ON SHEET 1 OF 2) SHALL BE EXCAVATED FOR A DISTANCE FROM THE CENTERLINE OF ROADWAY OF 31'± (LEFT AND RIGHT) AT END BENT 1 AND 57'± (LEFT) AND 34'± (RIGHT) AT END BENT 2, AND TO AN ELEVATION OF 2026.0 AT END BENTS 1 AND 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

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 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

HYDRAULIC DATA

DESIGN DISCHARGE: 8,700 CFS
FREQUENCY OF DESIGN FLOOD: 50 YRS.
DESIGN HIGH WATER ELEVATION: 2033.2
DRAINAGE AREA: 57.1 SQ. MI.
BASE DISCHARGE (Q100): 10,000 CFS
BASE HIGH WATER ELEVATION: 2035.8

OVERTOPPING DATA

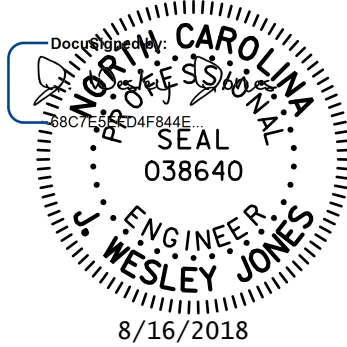
OVERTOPPING DISCHARGE: 12,000 CFS
FREQUENCY OF OVERTOPPING: 100± YRS.
OVERTOPPING FLOOD ELEVATION: 2036.9

PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 2 OF 2



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Charlotte, NC 28202
NC License Number F-0991

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SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE ON SR 1152
(BELDEN CIRCLE) OVER
CARTOOGECHAYE CREEK BETWEEN
SR 1148 AND US 23/US 441

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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					TOTAL SHEETS 21

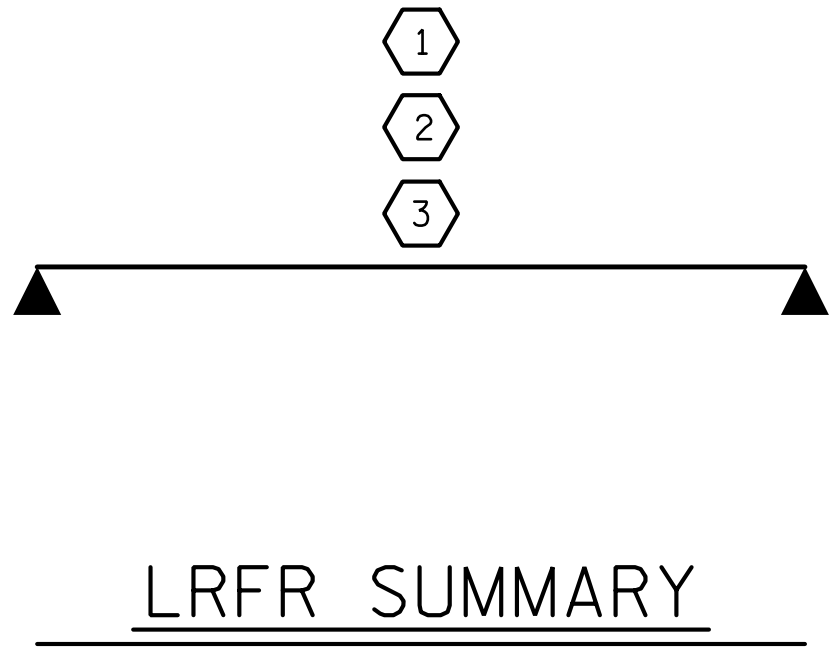
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3/20/2018

J.Jones

ASSEMBLED BY : <u> LGH </u>	DATE : <u> 5-17 </u>
CHECKED BY : <u> JWJ </u>	DATE : <u> 6-17 </u>
DESIGN ENGINEER OF RECORD : <u> JWJ </u>	DATE : <u> 3-18 </u>
DRAWN BY : <u> TMG </u> II//II	
CHECKED BY : <u> AAC </u> II//II	



LOAD AND RESISTANCE FACTOR RATING (LRFD) 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	
							LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.058	--	1.75	0.267	1.29	A	ER	49.224	0.574	1.25	A	ER	9.845	0.80	0.267	1.06	A	ER	49.224	
		HL-93(0pr)	N/A	--	1.621	--	1.35	0.267	1.67	A	ER	49.224	0.574	1.62	A	ER	9.845	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.472	52.983	1.75	0.267	1.79	A	ER	49.224	0.574	1.67	A	ER	9.845	0.80	0.267	1.47	A	ER	49.224	
		HS-20(0pr)	36.000	--	2.168	78.052	1.35	0.267	2.32	A	ER	49.224	0.574	2.17	A	ER	9.845	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.488	47.092	1.4	0.267	5.3	A	ER	49.224	0.574	5.14	A	ER	9.845	0.80	0.267	3.49	A	ER	49.224	
		SNGARBS2	20.000	--	2.527	50.541	1.4	0.267	3.84	A	ER	49.224	0.574	3.6	A	ER	9.845	0.80	0.267	2.53	A	ER	49.224	
		SNAGRIS2	22.000	--	2.364	52.007	1.4	0.267	3.59	A	ER	49.224	0.574	3.32	A	ER	9.845	0.80	0.267	2.36	A	ER	49.224	
		SNCOTTS3	27.250	--	1.734	47.244	1.4	0.267	2.63	A	ER	49.224	0.574	2.56	A	ER	9.845	0.80	0.267	1.73	A	ER	49.224	
		SNAGGRS4	34.925	--	1.421	49.625	1.4	0.267	2.16	A	ER	49.224	0.574	2.09	A	ER	9.845	0.80	0.267	1.42	A	ER	49.224	
		SNS5A	35.550	--	1.391	49.463	1.4	0.267	2.11	A	ER	49.224	0.574	2.1	A	ER	9.845	0.80	0.267	1.39	A	ER	49.224	
		SNS6A	39.950	--	1.265	50.545	1.4	0.267	1.92	A	ER	49.224	0.574	1.9	A	ER	9.845	0.80	0.267	1.27	A	ER	49.224	
		SNS7B	42.000	--	1.204	50.587	1.4	0.267	1.83	A	ER	49.224	0.574	1.85	A	ER	9.845	0.80	0.267	1.20	A	ER	49.224	
	TTST	TNAGRIT3	33.000	--	1.54	50.804	1.4	0.267	2.34	A	ER	49.224	0.574	2.27	A	ER	9.845	0.80	0.267	1.54	A	ER	49.224	
		TNT4A	33.075	--	1.543	51.042	1.4	0.267	2.34	A	ER	49.224	0.574	2.23	A	ER	9.845	0.80	0.267	1.54	A	ER	49.224	
		TNT6A	41.600	--	1.251	52.049	1.4	0.267	1.9	A	ER	49.224	0.574	1.94	A	ER	9.845	0.80	0.267	1.25	A	ER	49.224	
		TNT7A	42.000	--	1.252	52.576	1.4	0.267	1.9	A	ER	49.224	0.574	1.9	A	ER	9.845	0.80	0.267	1.25	A	ER	49.224	
		TNT7B	42.000	--	1.281	53.819	1.4	0.267	1.95	A	ER	49.224	0.574	1.82	A	ER	9.845	0.80	0.267	1.28	A	ER	49.224	
		TNAGRIT4	43.000	--	1.229	52.851	1.4	0.267	1.87	A	ER	49.224	0.574	1.76	A	ER	9.845	0.80	0.267	1.23	A	ER	49.224	
		TNAGT5A	45.000	--	1.164	52.365	1.4	0.267	1.77	A	ER	49.224	0.574	1.73	A	ER	9.845	0.80	0.267	1.16	A	ER	49.224	
		TNAGT5B	45.000	3	1.154	51.925	1.4	0.267	1.75	A	ER	49.224	0.574	1.68	A	ER	9.845	0.80	0.267	1.15	A	ER	49.224	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

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

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

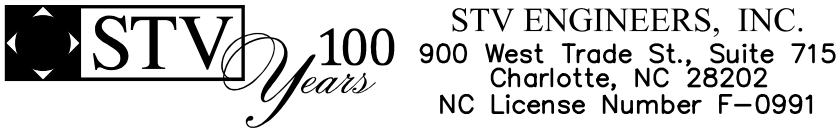
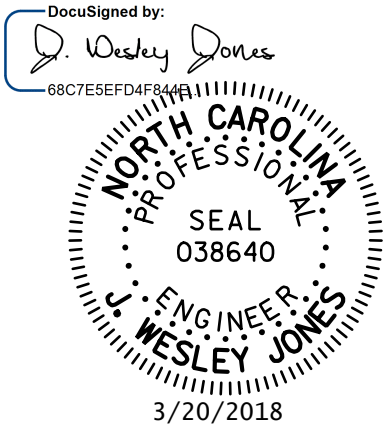
3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

PROJECT NO. 17BP.14.R.154
MACON COUNTY
STATION: 14+94.00 -L-



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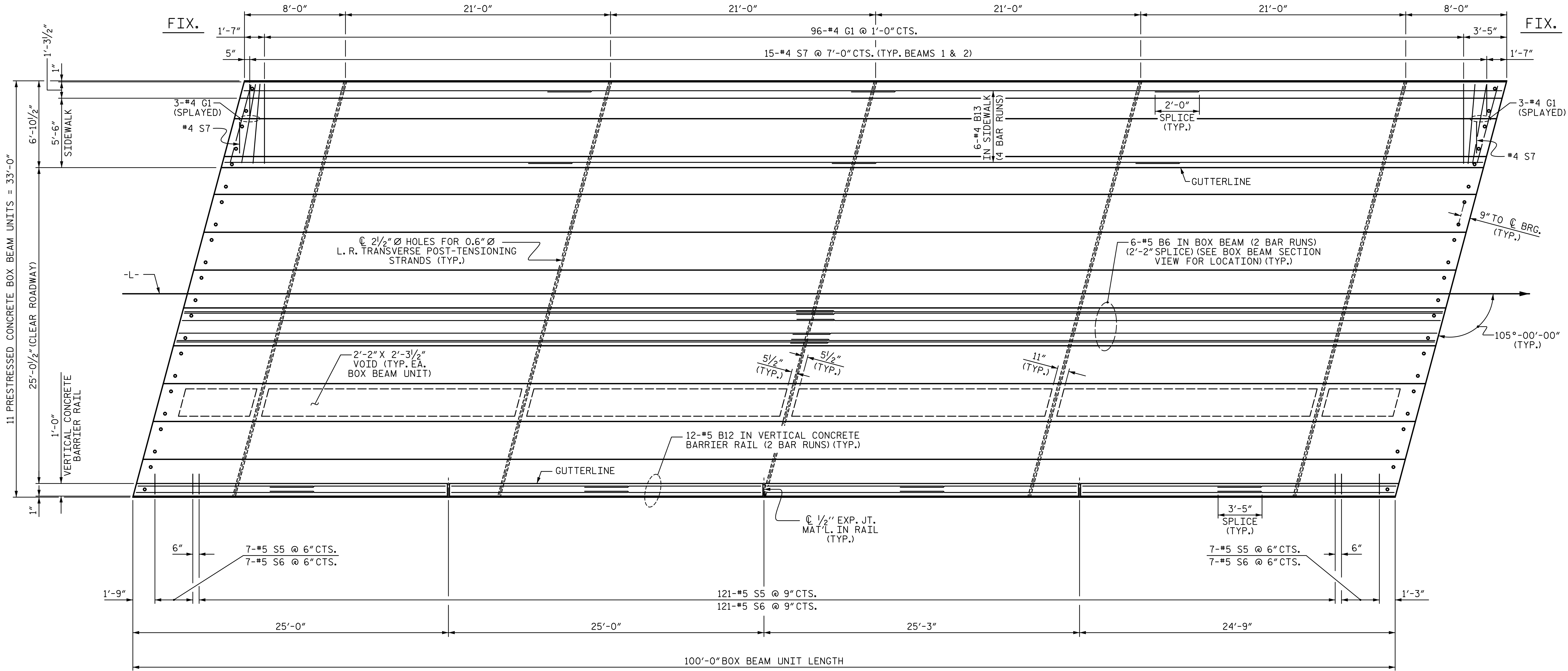
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2			4			21

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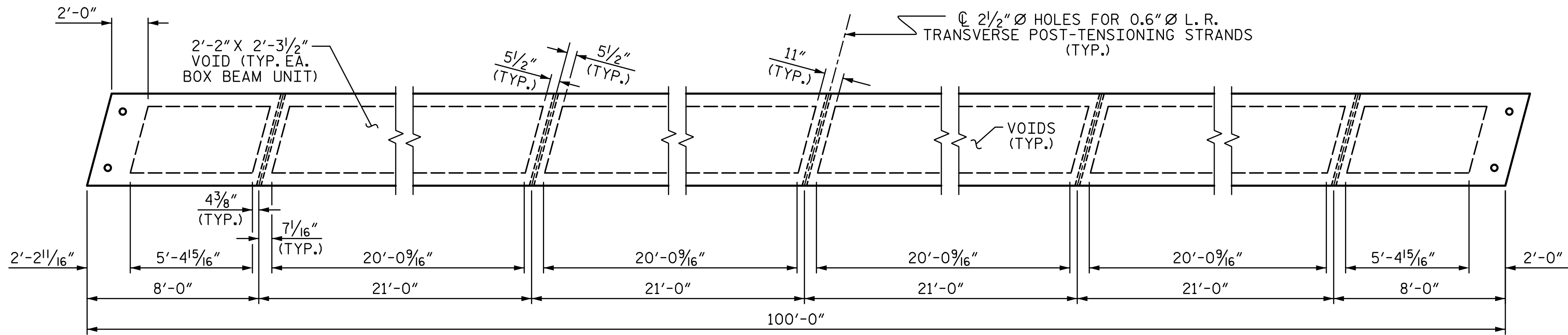
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PLAN OF UNIT



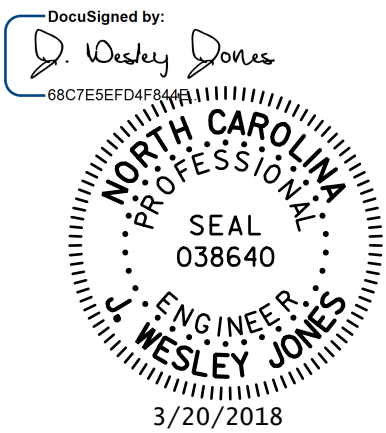
DIAPHRAGM AND VOID LAYOUT

PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 2 OF 6



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 100' UNIT
25'-0 1/2" CLEAR ROADWAY
105° SKEW

DRAWN BY : LGH DATE : 5-17
CHECKED BY : JWJ DATE : 6-17
DESIGN ENGINEER OF RECORD : JWJ DATE : 3-18



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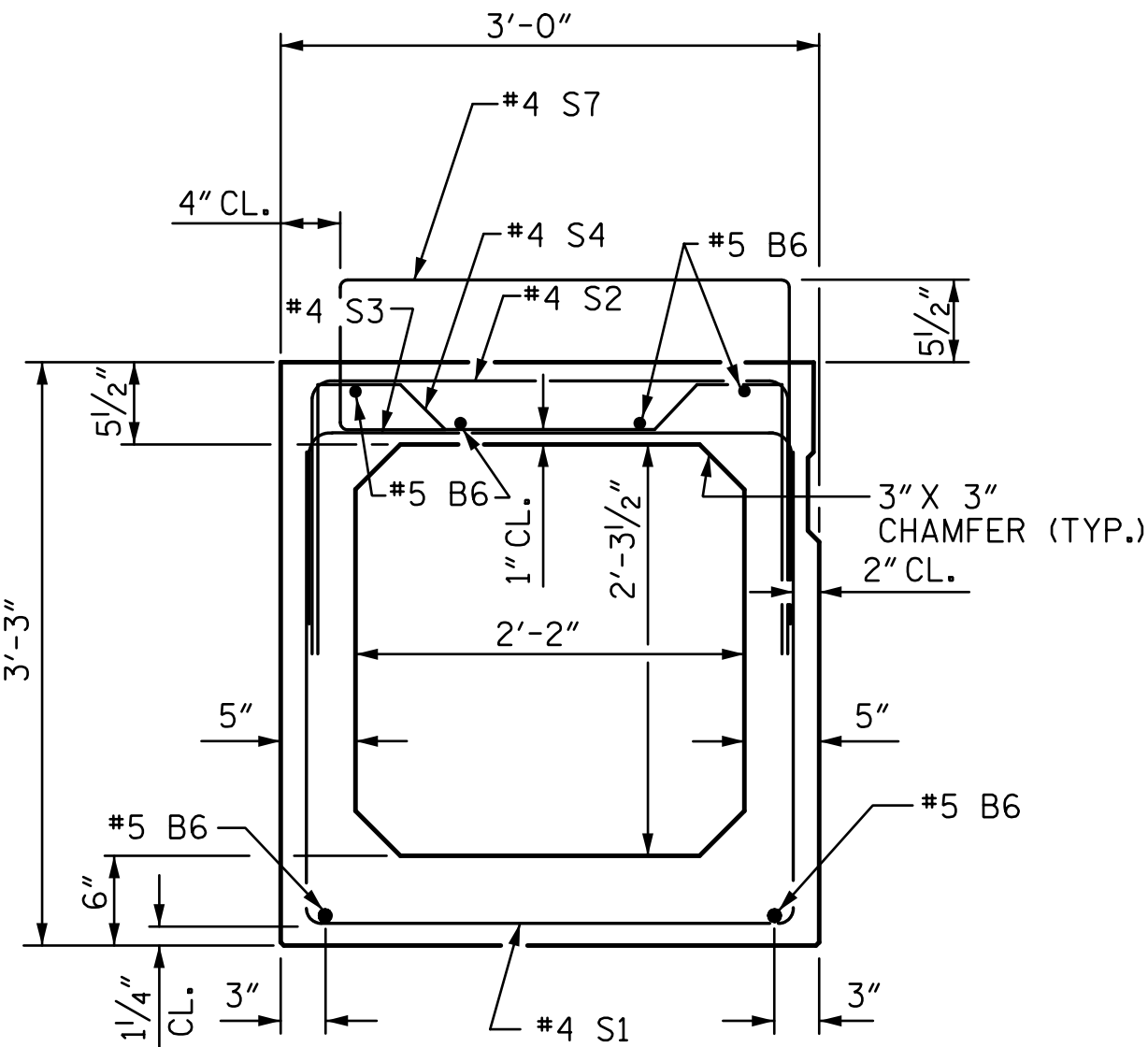
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REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

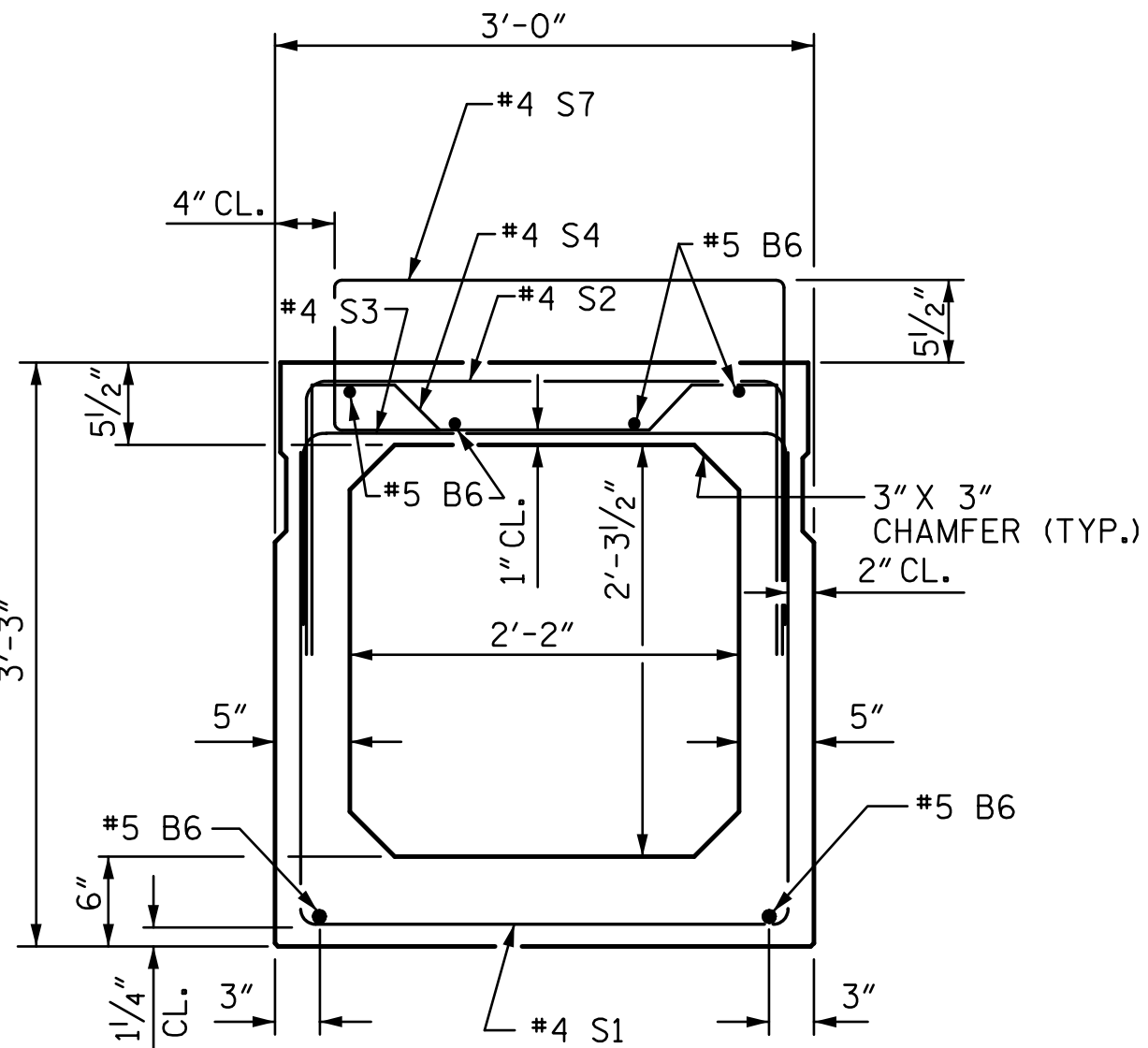
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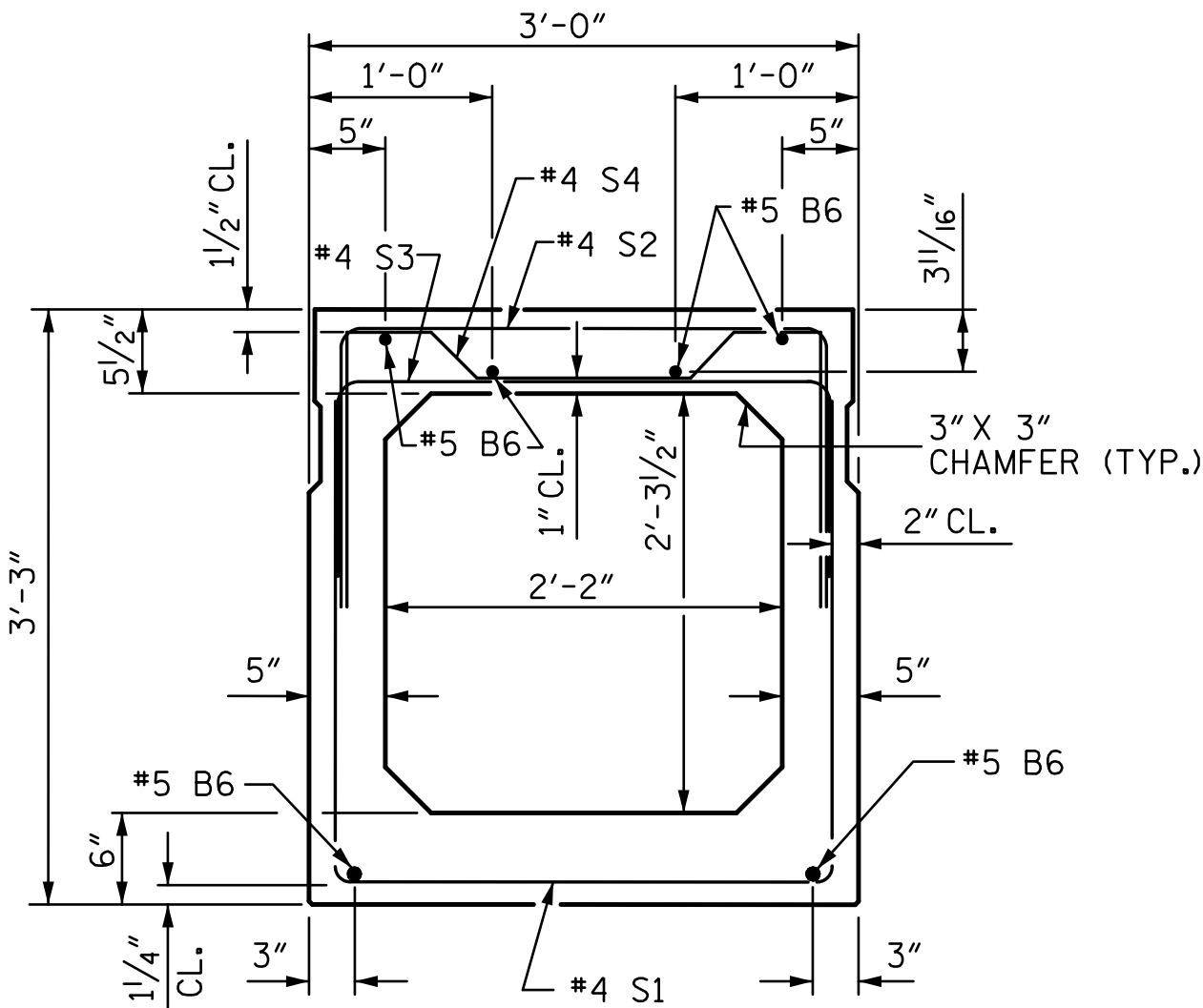
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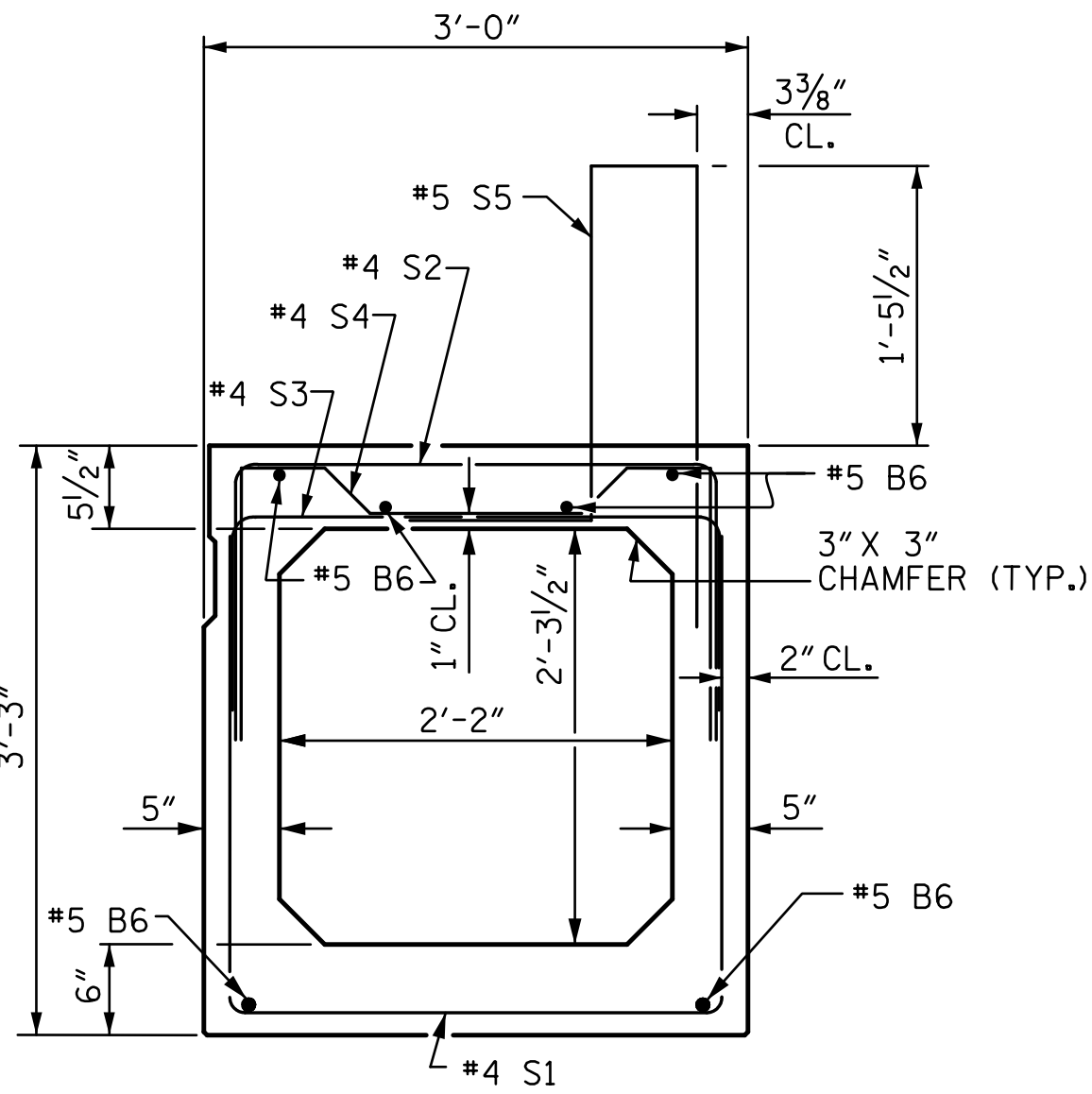
EXTERIOR BOX BEAM 1 SECTION
(STRAND LAYOUT NOT SHOWN)



INTERIOR BOX BEAM 2 SECTION
(STRAND LAYOUT NOT SHOWN)

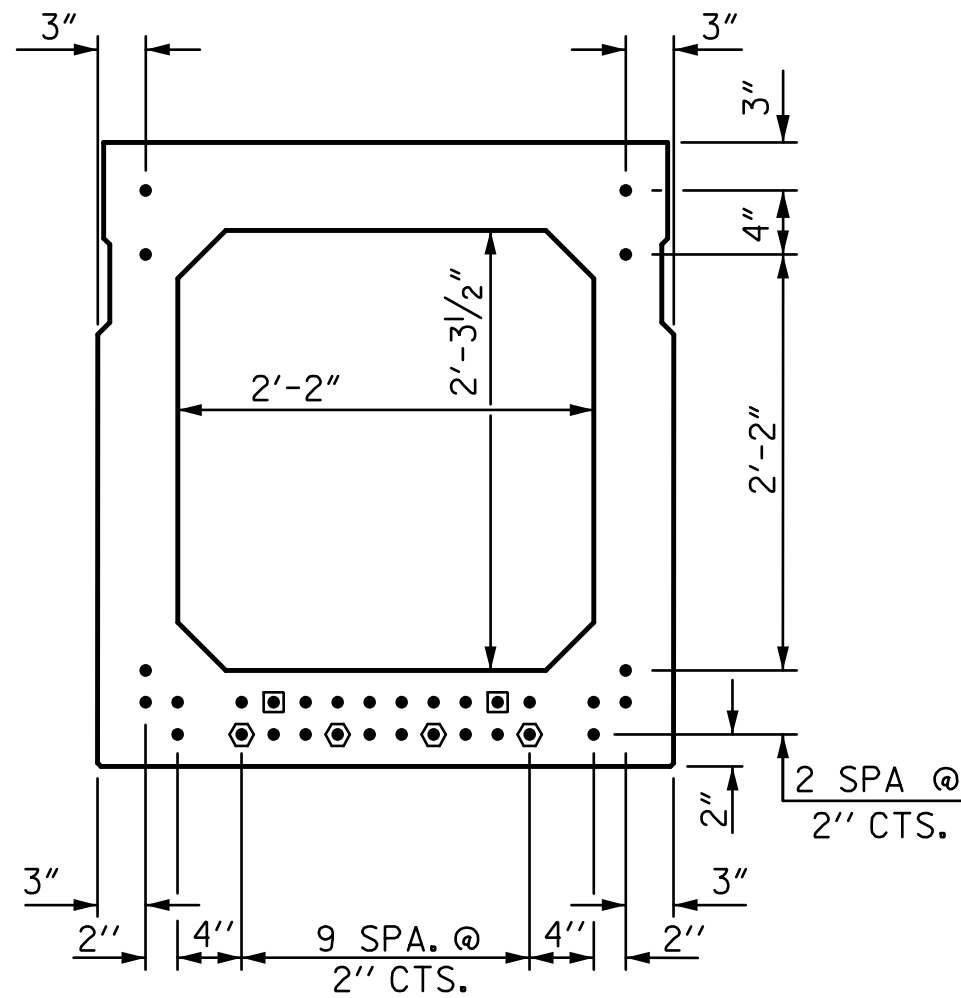


INTERIOR BOX BEAMS 3-10 SECTION
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM 11 SECTION
(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



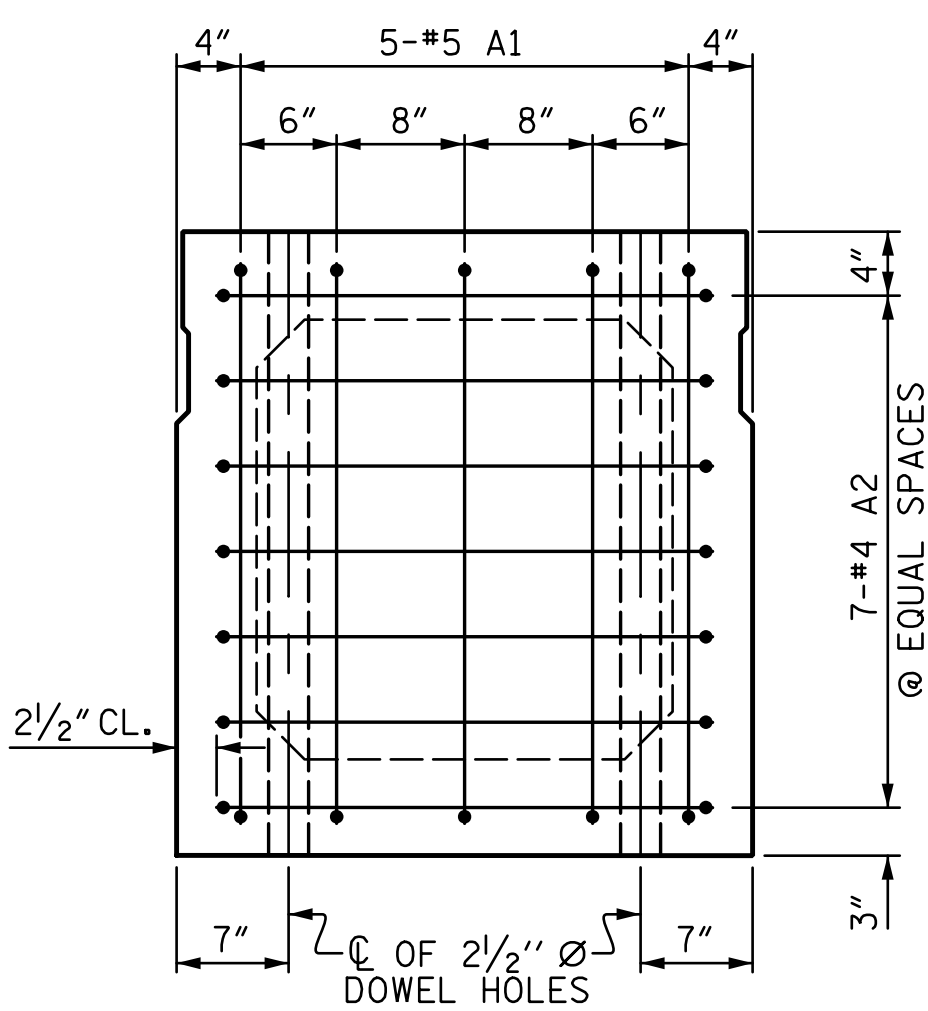
TYPICAL STRAND LOCATION
(32 STRANDS REQUIRED)

DEBONDING LEGEND

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

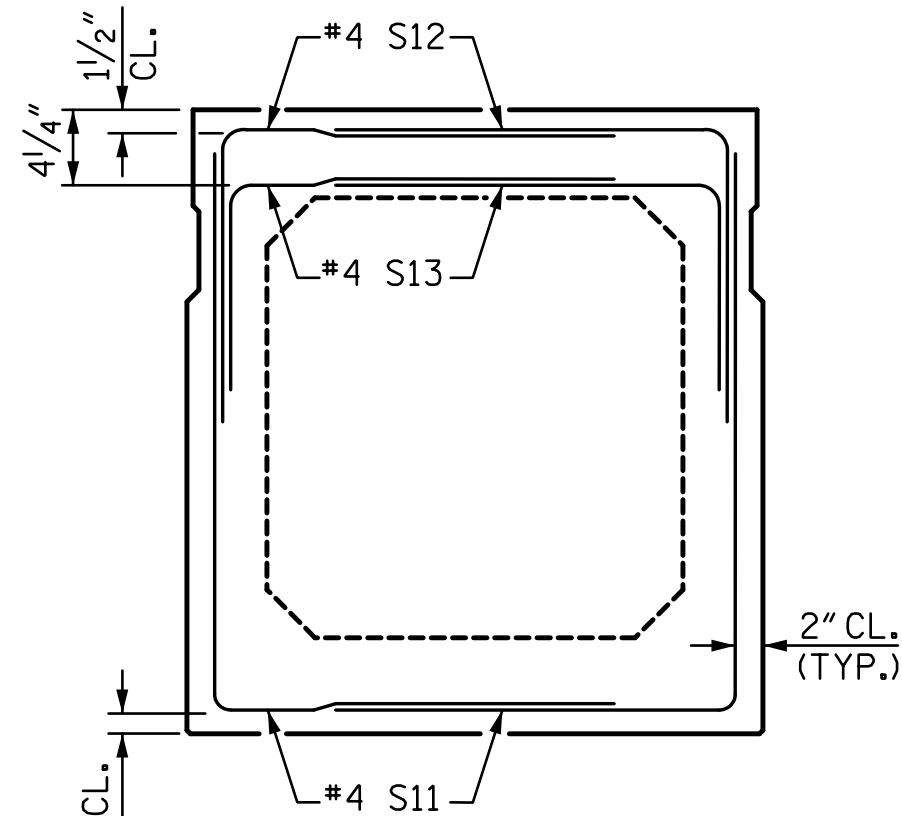
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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



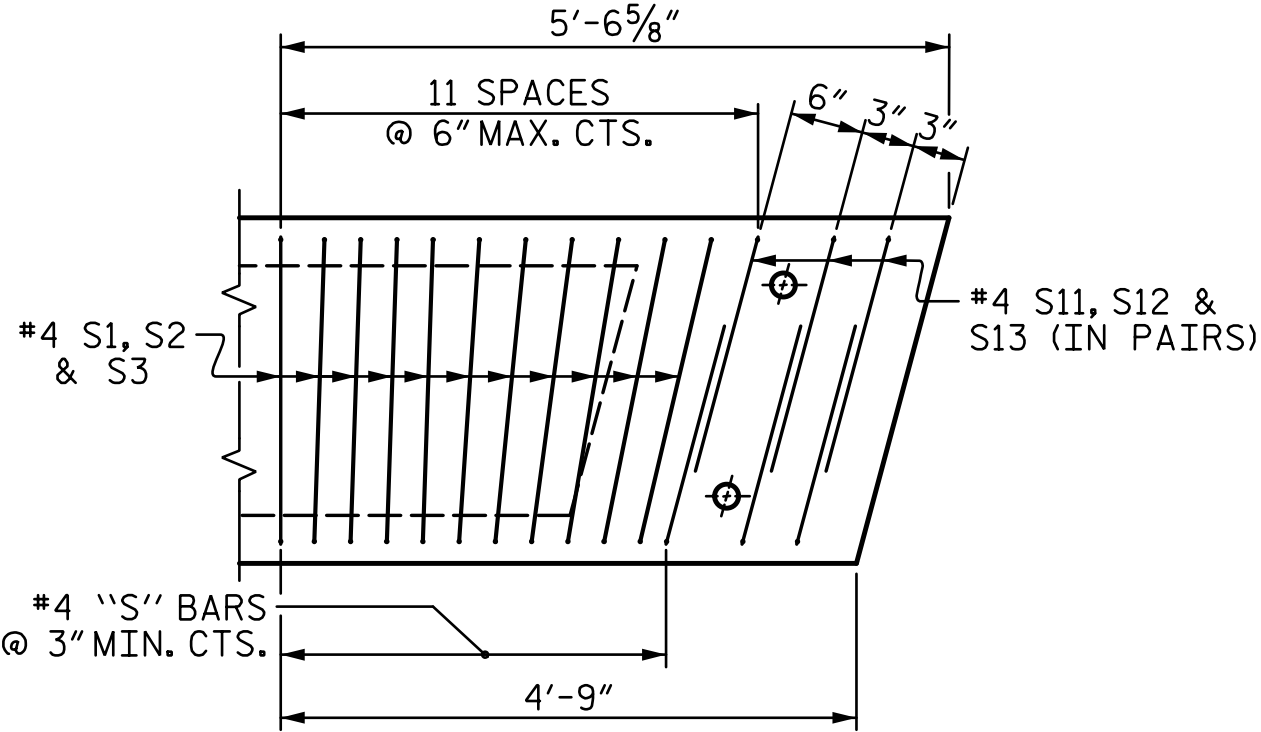
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES.
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



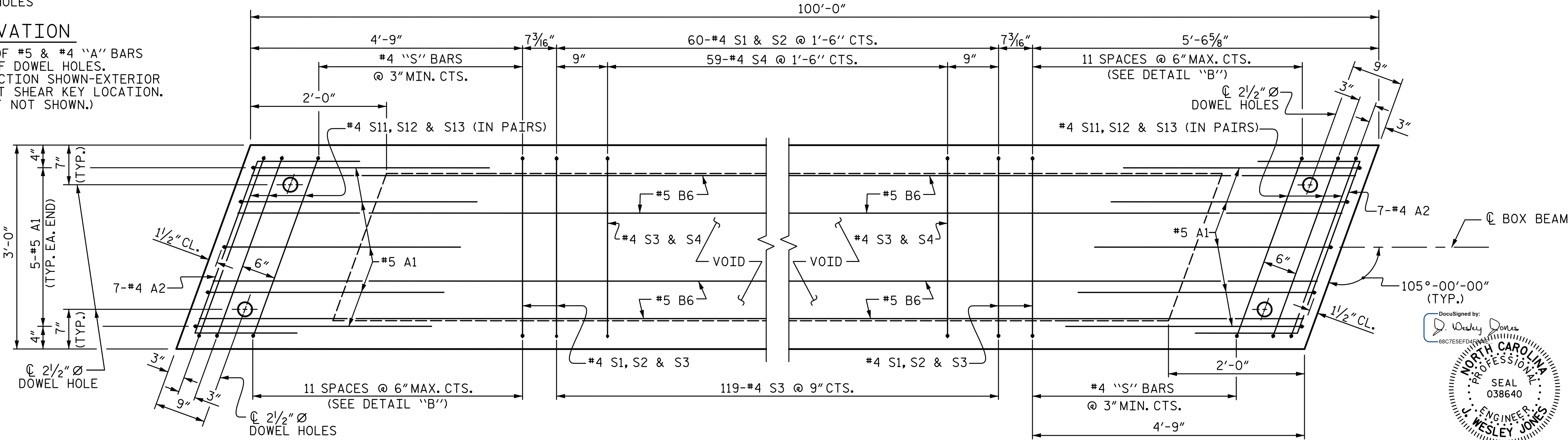
END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)



DETAIL "B"

"B" BARS AND "A" BARS NOT SHOWN.



PLAN OF BOX BEAM

BARS IN BEAMS FOR SIDEWALK AND RAIL NOT SHOWN. SEE "PLAN OF UNIT" FOR SPACING.
FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".
FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".



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900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

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PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT

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

S-6
TOTAL SHEETS 21

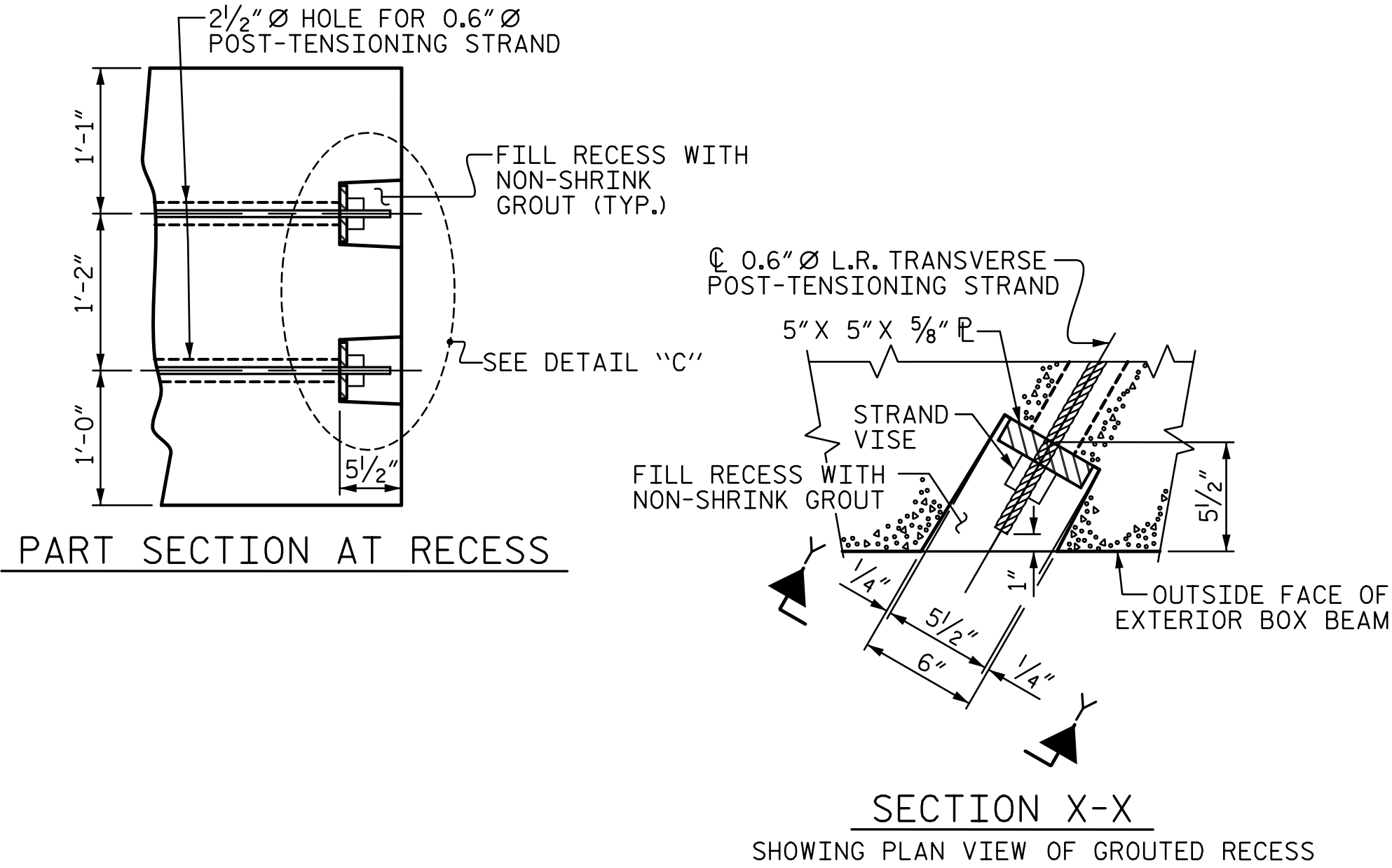
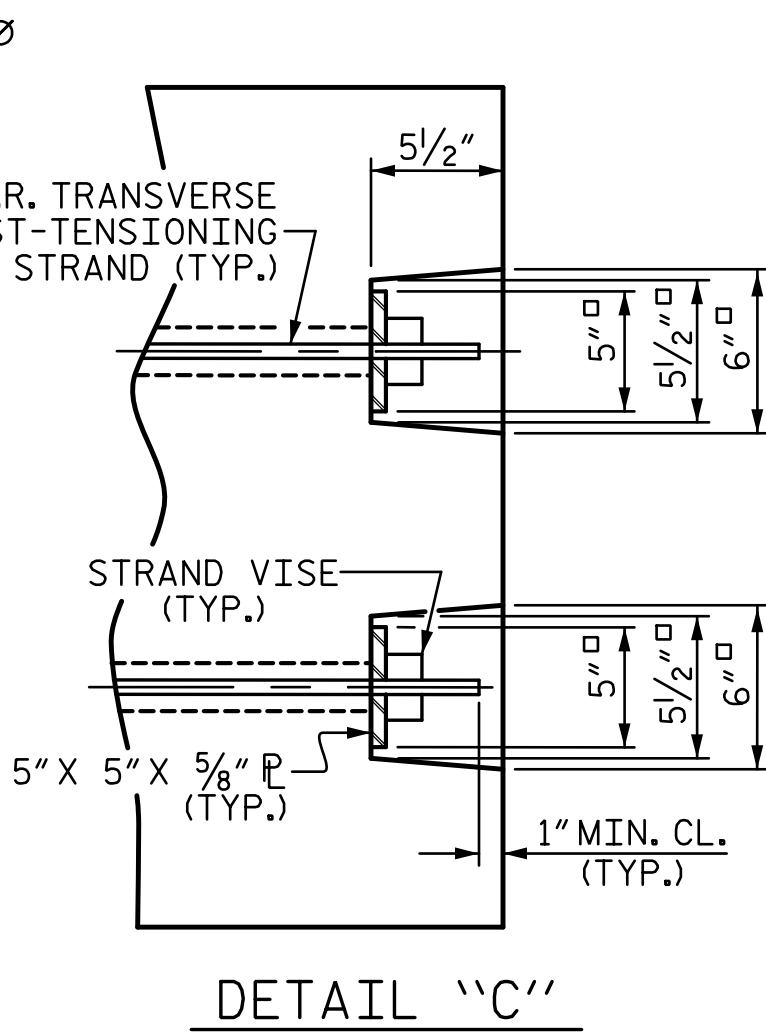
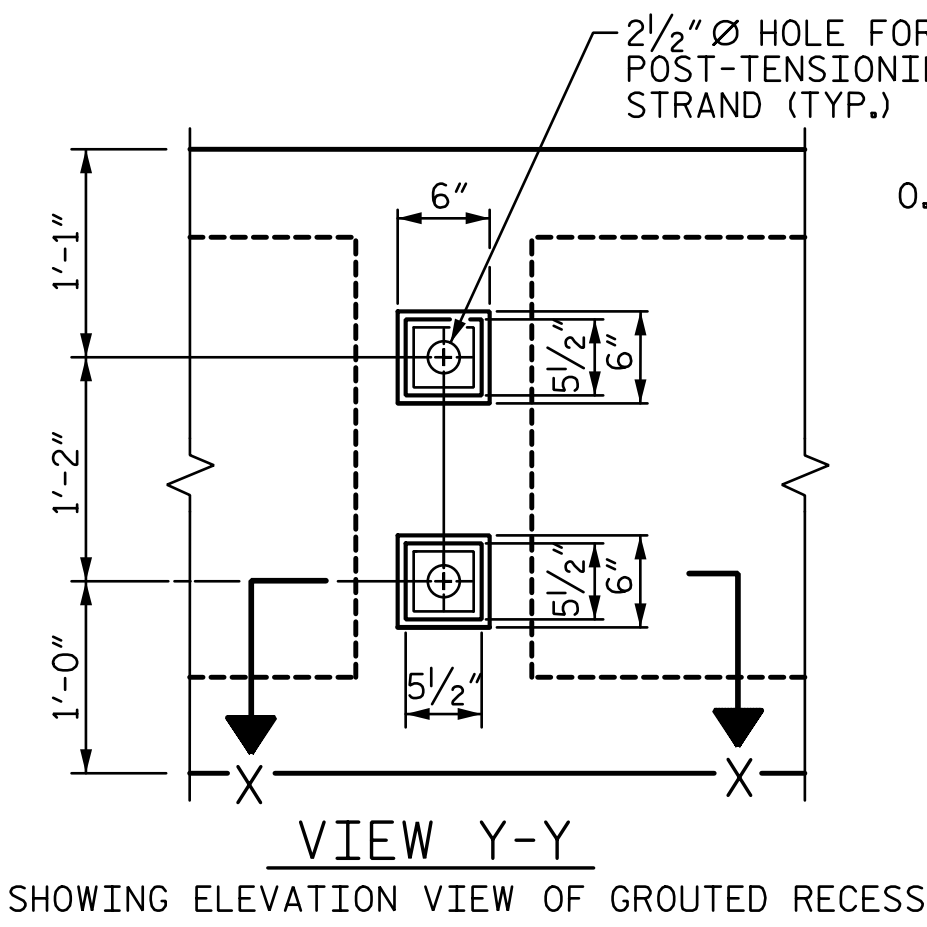
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CHECKED BY : JWJ	DATE : 6-17
DESIGN ENGINEER OF RECORD : JWJ	DATE : 3-18

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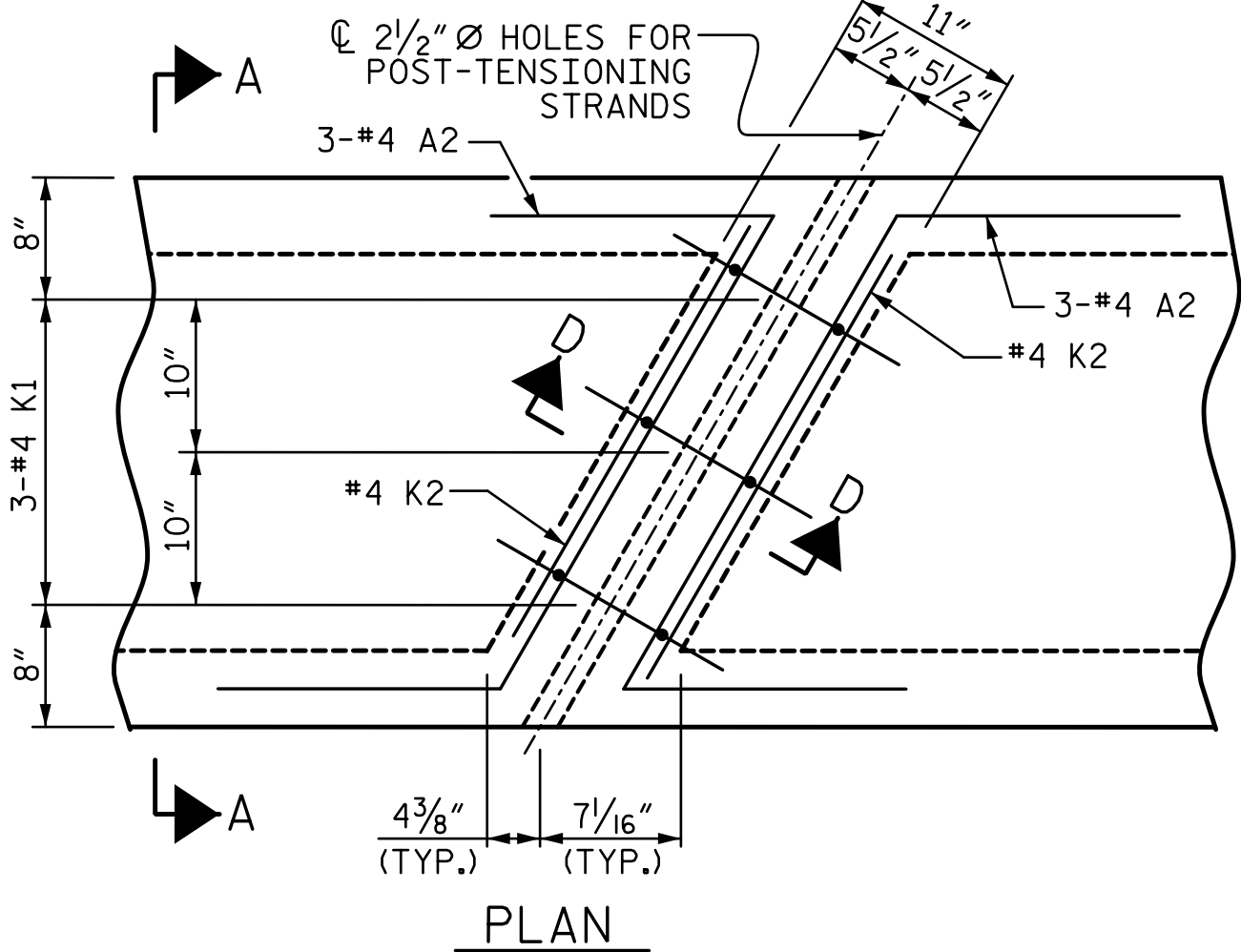
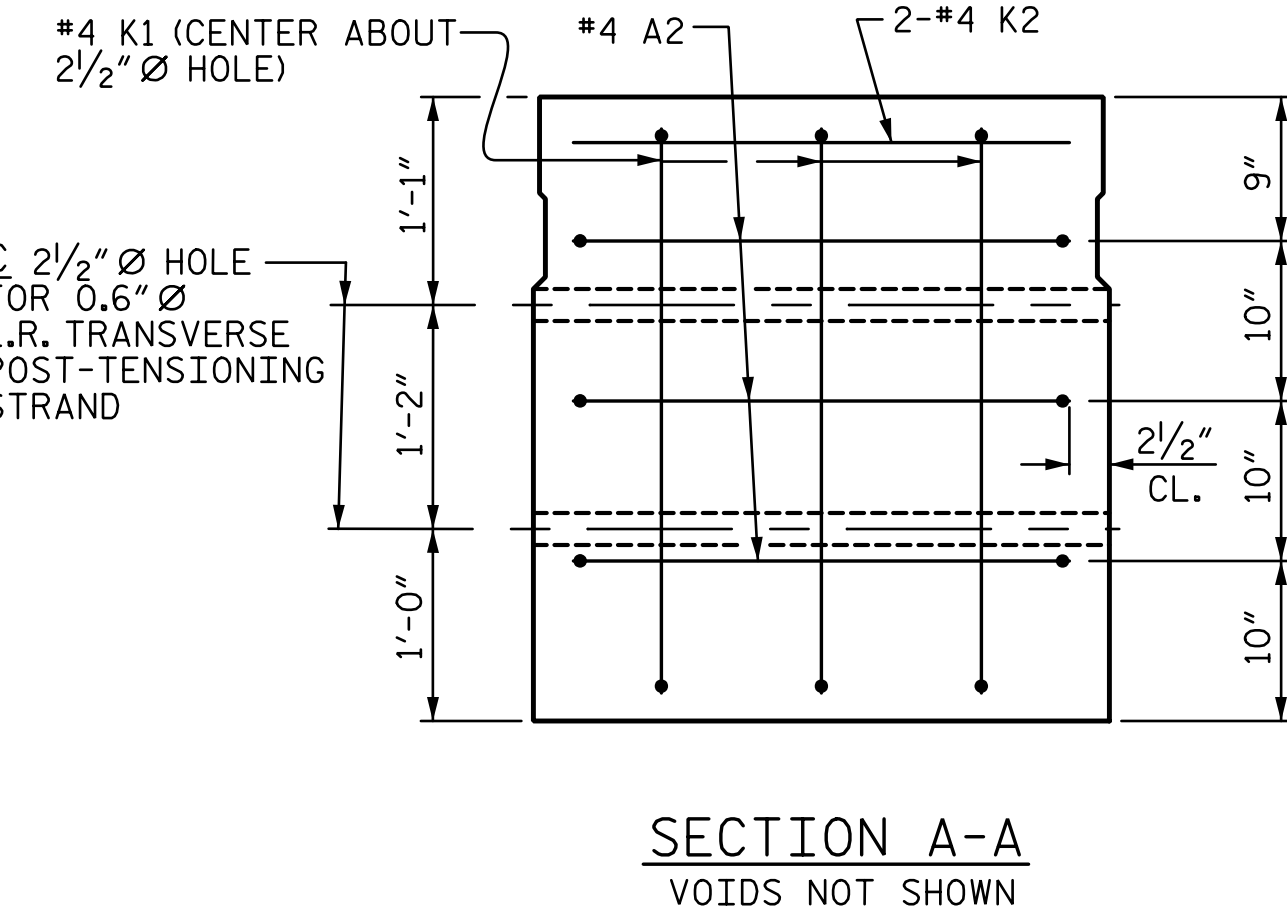
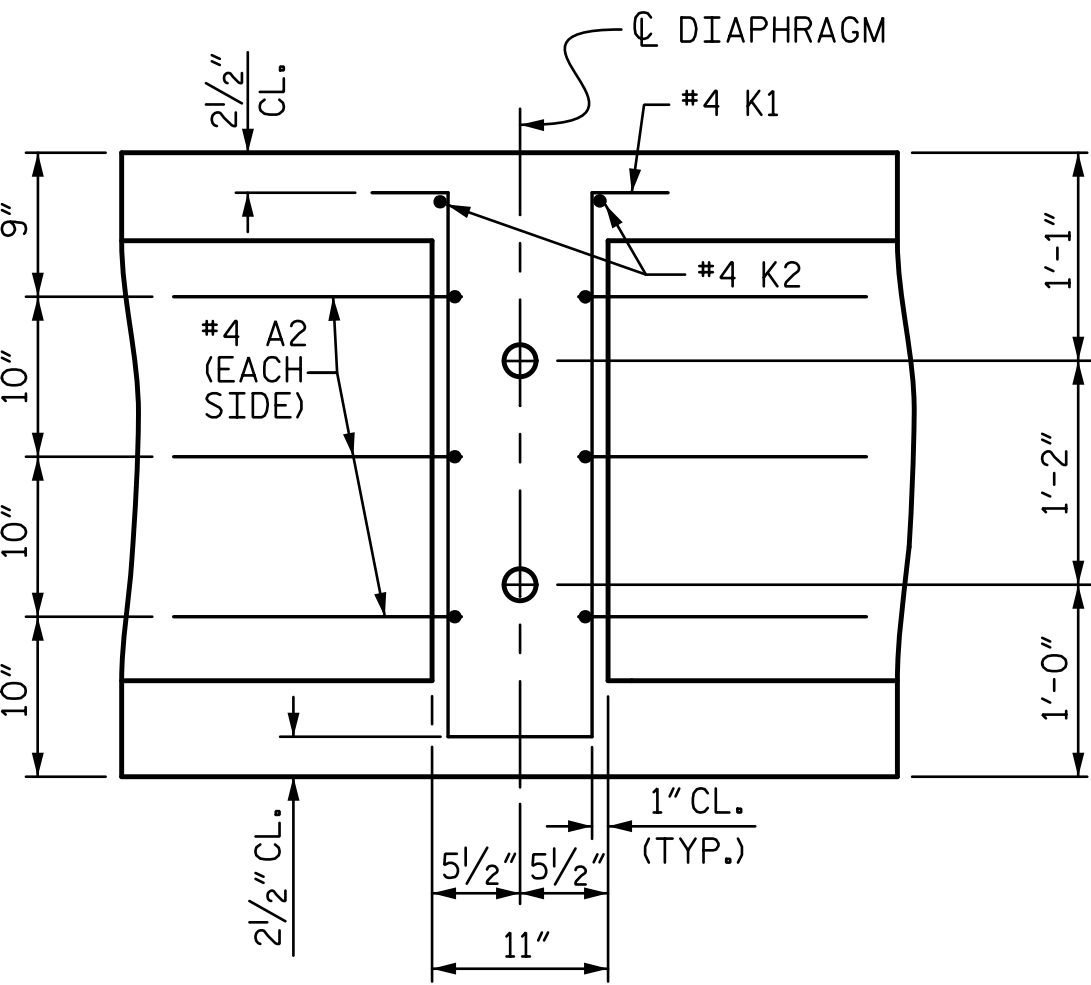
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Jones

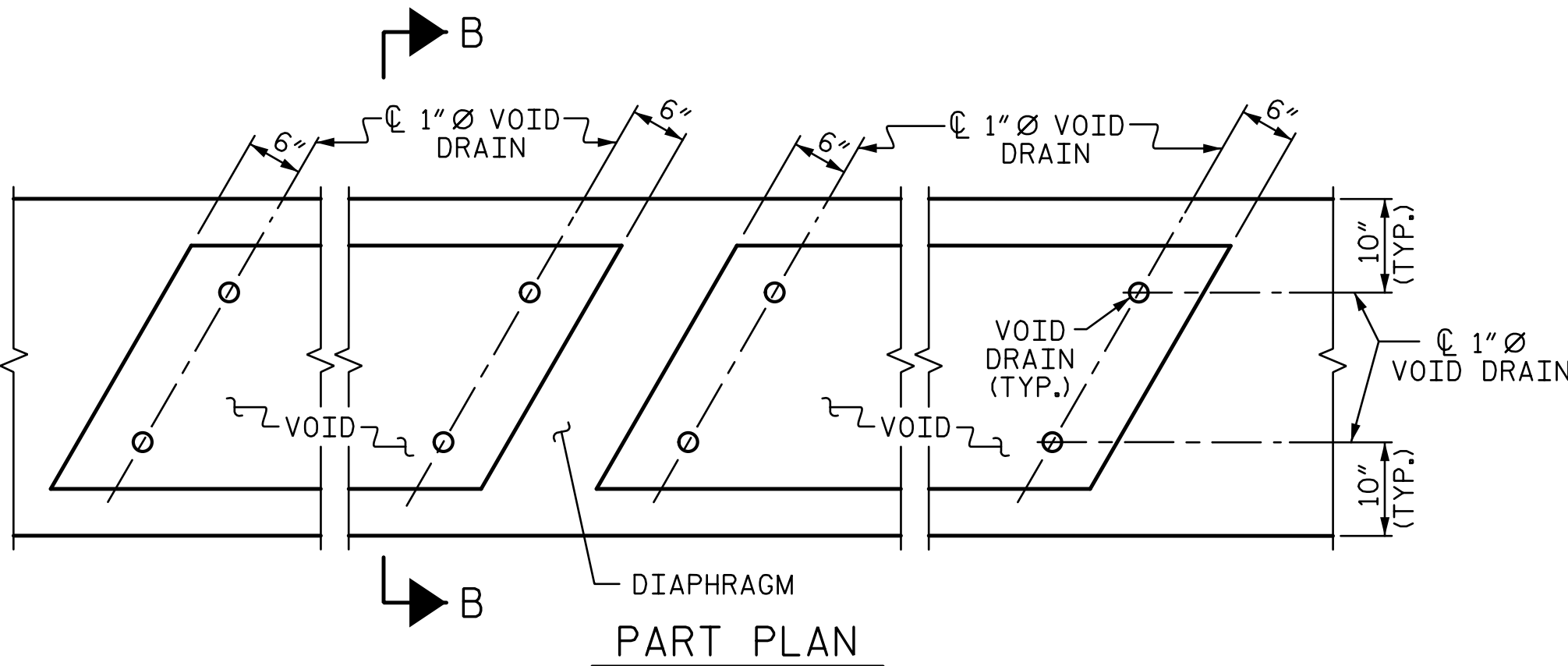
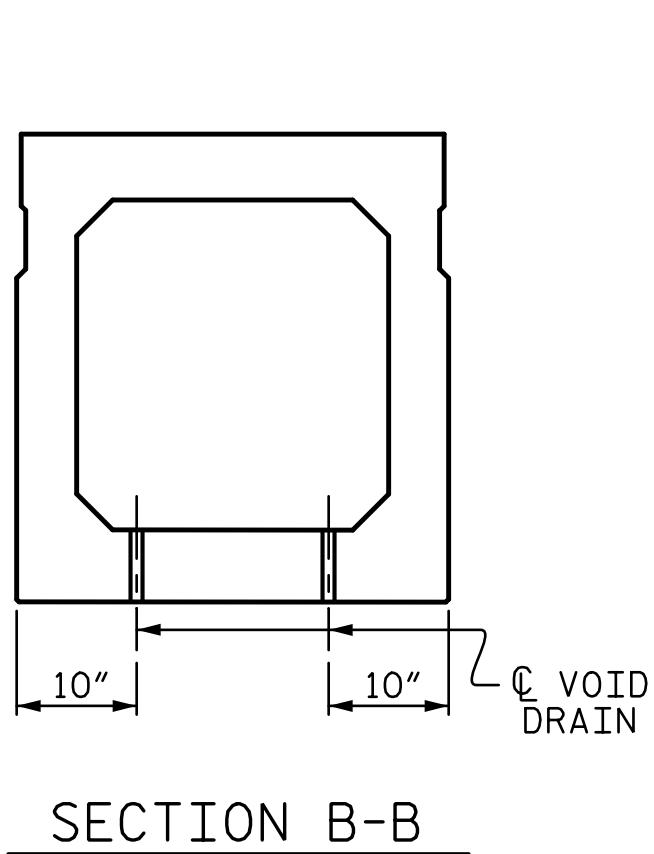


GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM



DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2 1/2" Ø HOLE.

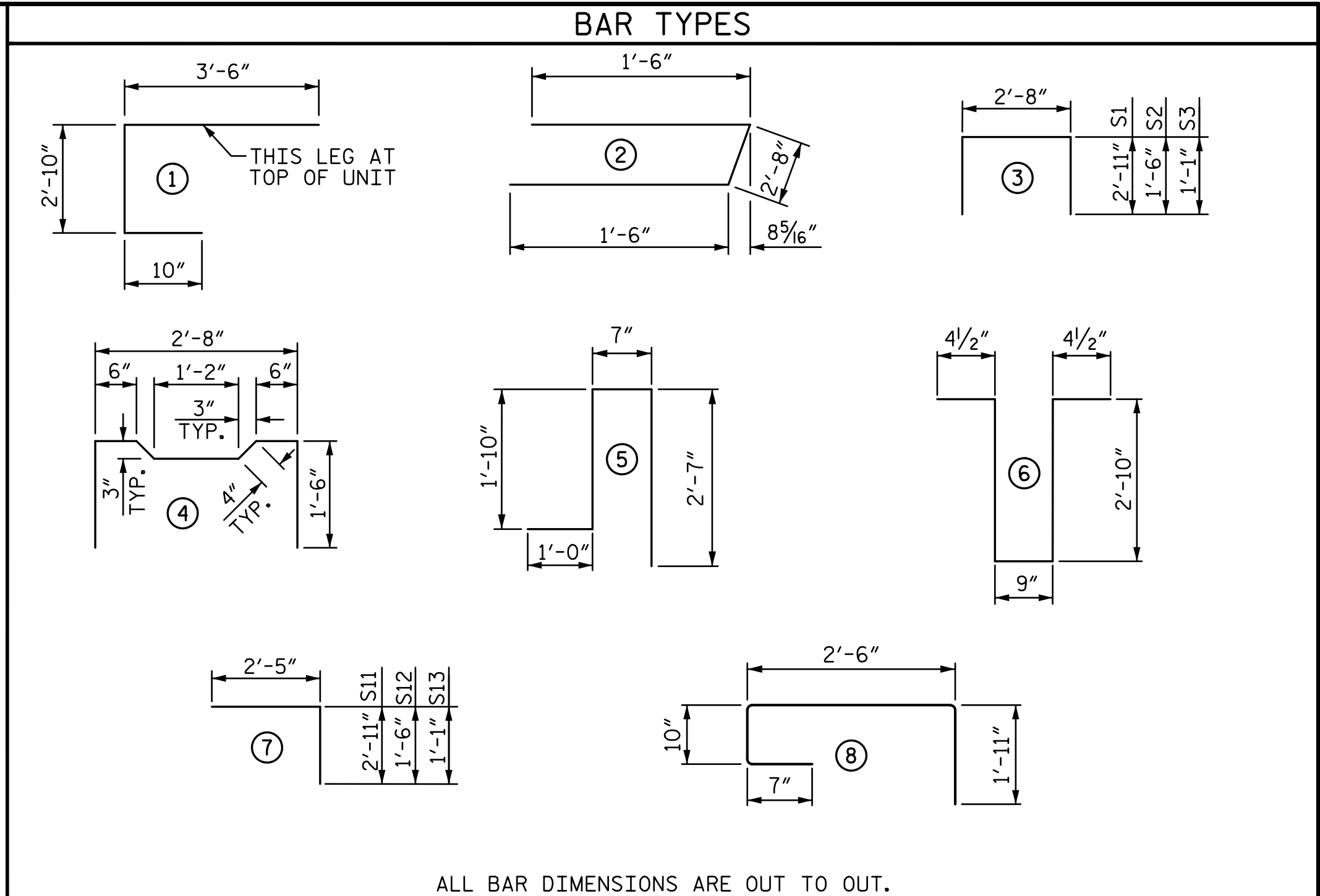


VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" X 3'-3"
100' BOX BEAM UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	7/8" ↓
FINAL CAMBER	1 1/8" ↑

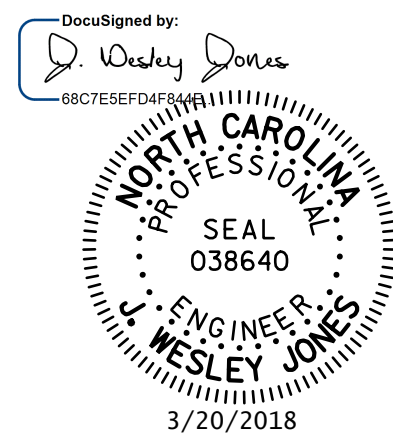
** INCLUDES FUTURE WEARING SURFACE



ALL BAR DIMENSIONS ARE OUT TO OUT.											
BILL OF MATERIAL FOR ONE BOX BEAM SECTION											
				EXTERIOR UNIT (BEAM 1)		INTERIOR UNIT (BEAM 2)		INTERIOR UNIT (BEAMS 3-10)		EXTERIOR UNIT (BEAM 11)	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-8"	167	5'-8"	167	5'-8"	167	5'-8"	167
B6	12	#5	STR	50'-11"	637	50'-11"	637	50'-11"	637	50'-11"	637
K1	15	#4	6	7'-2"	72	7'-2"	72	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17	2'-7"	17	2'-7"	17
S1	82	#4	3	8'-6"	466	8'-6"	466	8'-6"	466	8'-6"	466
S2	82	#4	3	5'-8"	310	5'-8"	310	5'-8"	310	5'-8"	310
S3	141	#4	3	4'-10"	455	4'-10"	455	4'-10"	455	4'-10"	455
S4	59	#4	4	5'-10"	230	5'-10"	230	5'-10"	230	5'-10"	230
S11	12	#4	7	5'-4"	43	5'-4"	43	5'-4"	43	5'-4"	43
S12	12	#4	7	3'-11"	31	3'-11"	31	3'-11"	31	3'-11"	31
S13	12	#4	7	3'-6"	28	3'-6"	28	3'-6"	28	3'-6"	28
* S5	135	#5	5	--	--	--	--	--	--	6'-0"	845
* S7	15	#4	8	5'-10"	58	5'-10"	58	--	--	--	--
REINFORCING STEEL				2531 LBS.		2531 LBS.		2531 LBS.		2531 LBS.	
* EPOXY COATED REINF. STEEL				58 LBS.		58 LBS.		845 LBS.		845 LBS.	
7500 P.S.I. CONCRETE				19.6 CU. YDS.		19.4 CU. YDS.		19.4 CU. YDS.		19.6 CU. YDS.	
0.6"Ø L.R. STRANDS				No.	32	No.	32	No.	32	No.	32

PROJECT NO. 17BP.14.R.154
MACON COUNTY
STATION: 14+94.00 -L-

SHEET 4 OF 6

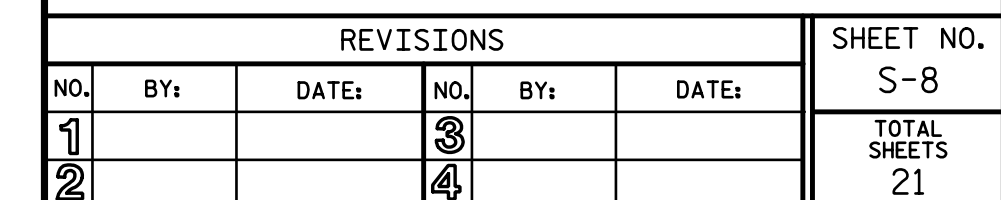


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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 21

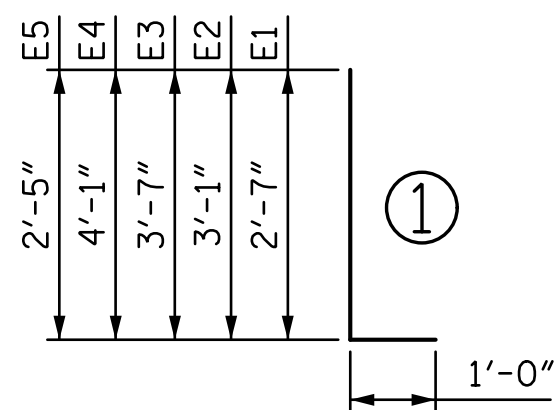
DRAWN BY : LGH DATE : 5-17
CHECKED BY : JWJ DATE : 6-17
DESIGN ENGINEER OF RECORD : JWJ DATE : 3-18





THREE BAR METAL RAIL					
BILL FOR ONE END POST					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*E1	2	#7	1	3'-7"	15
*E2	2	#7	1	4'-1"	17
*E3	2	#7	1	4'-7"	19
*E4	2	#7	1	5'-1"	21
*E5	1	#7	1	3'-5"	7
*F1	1	#6	STR	2'-8"	4
*F2	2	#6	STR	3'-9"	11
*F3	1	#6	STR	4'-1"	6
*F4	1	#6	STR	2'-8"	4
*F5	2	#6	STR	3'-6"	11
*F6	1	#6	STR	3'-10"	6

BAR TYPES



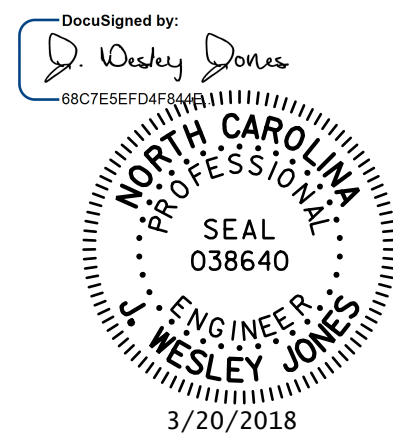
END POST FOR THREE BAR METAL RAIL

PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 6 OF 6



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT

REVISIONS						SHEET NO. S-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

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FINAL UNLESS ALL
SIGNATURES COMPLETED

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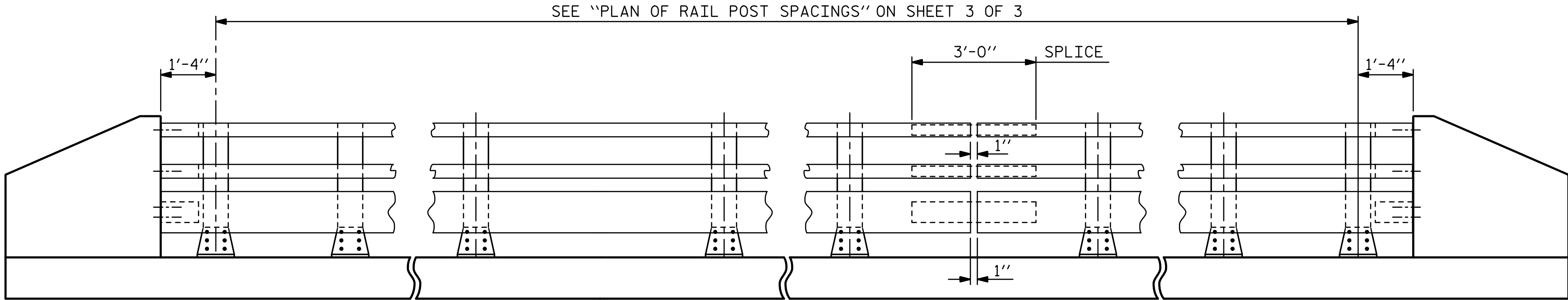
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Jones

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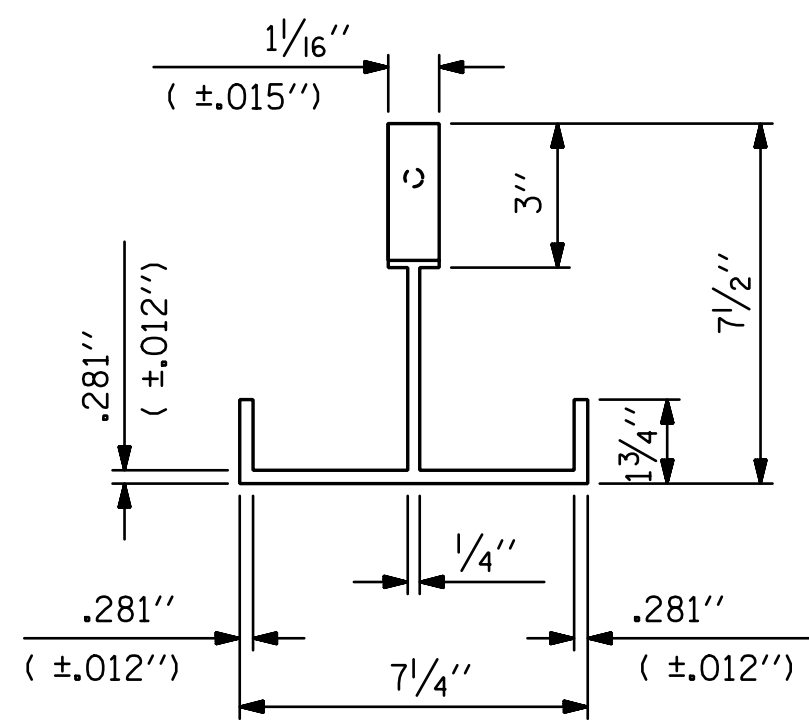
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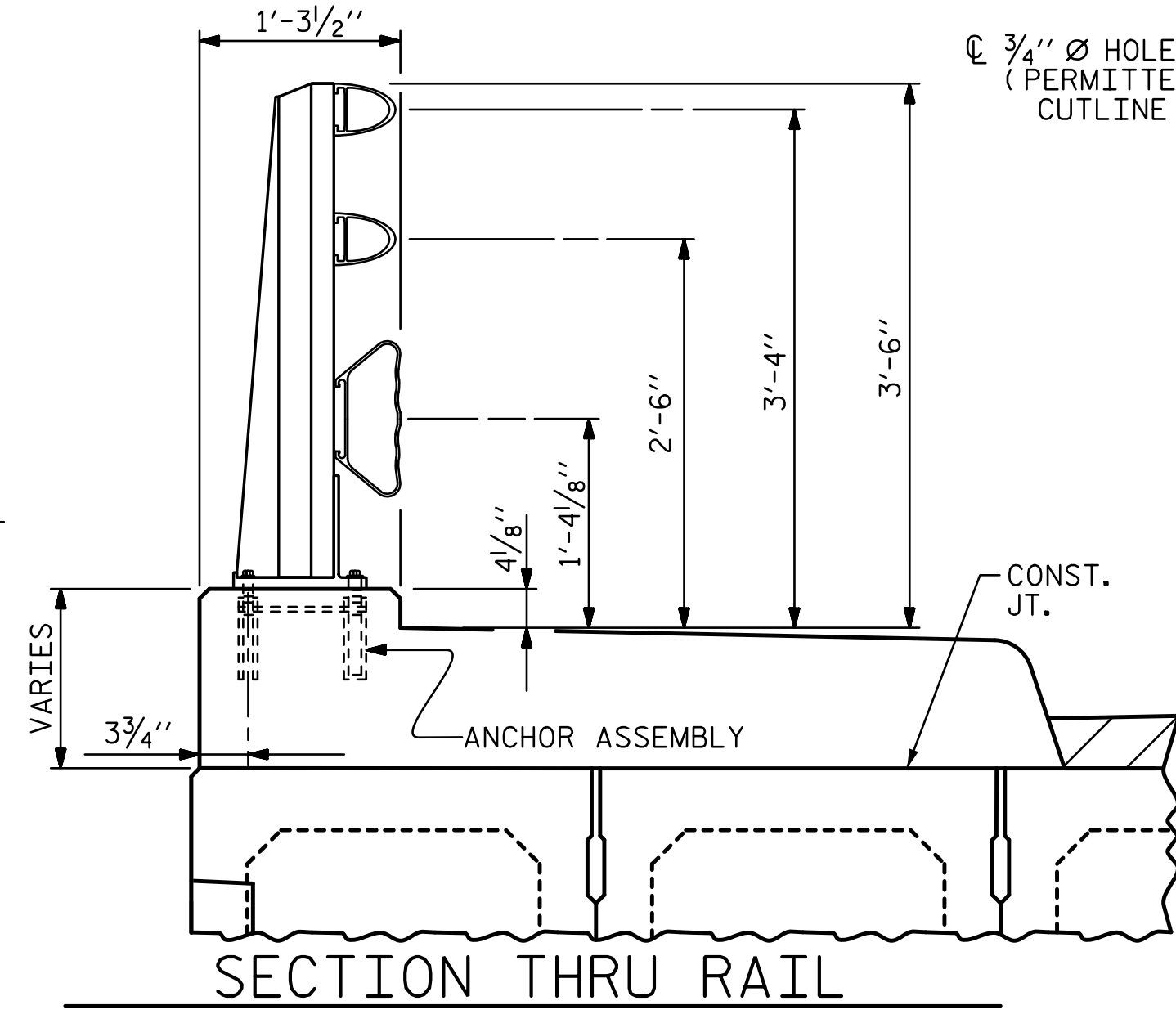


NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST,
SEE SHEET 3 OF 3.

ELEVATION

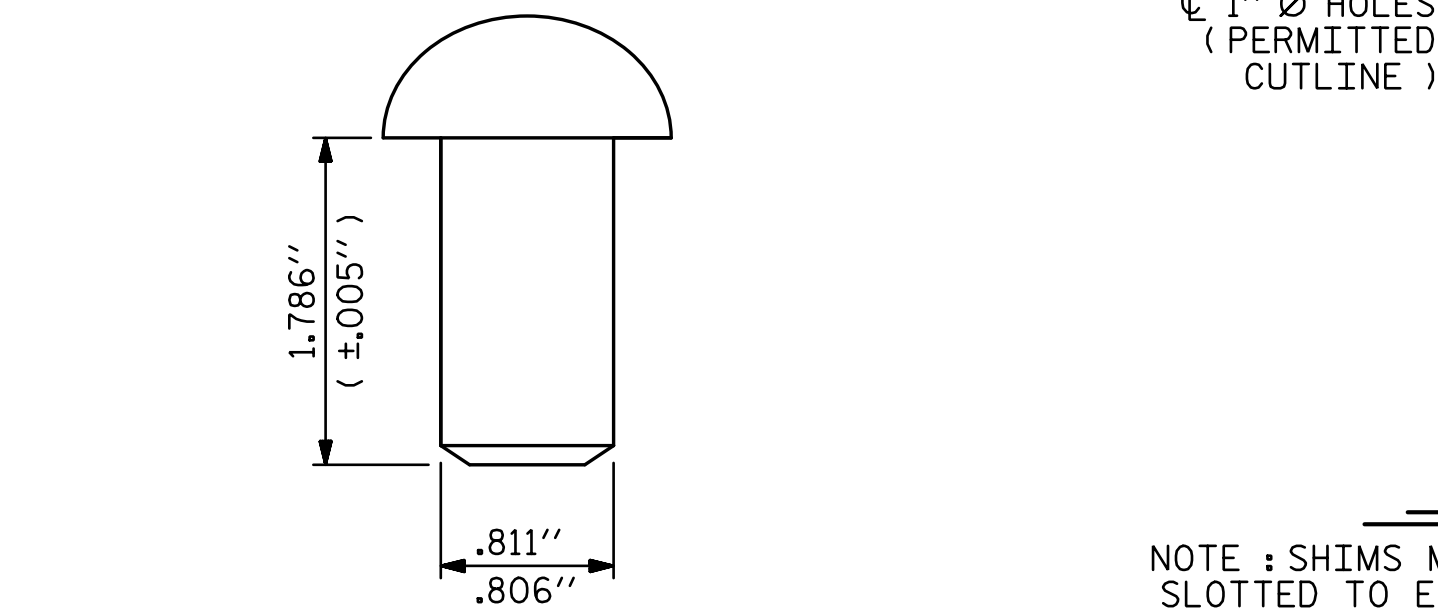


PLAN

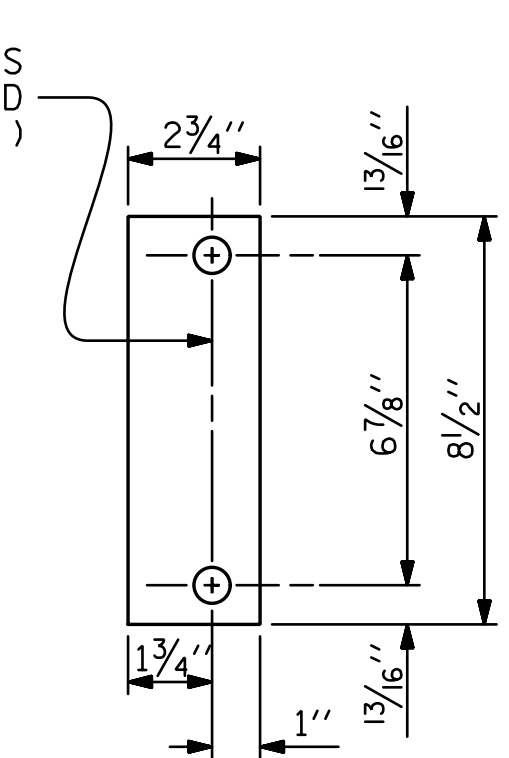


SECTION THRU RAIL

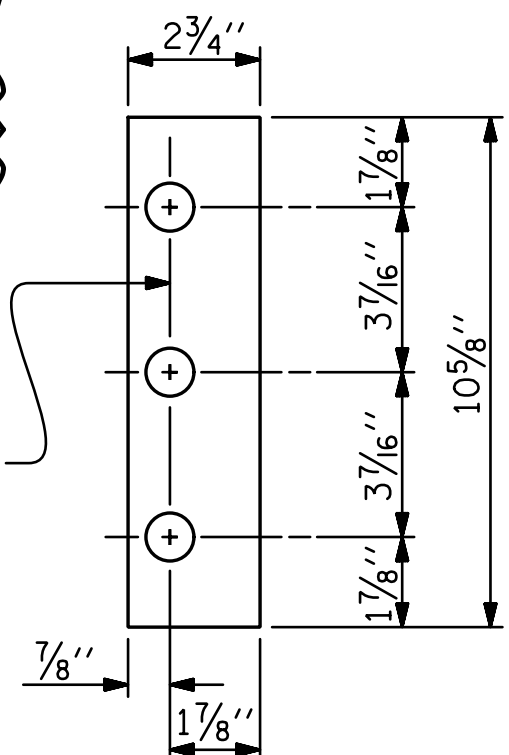
FOR ANCHOR ASSEMBLY, SEE SHEET 2 OF 3.



RIVET DETAIL

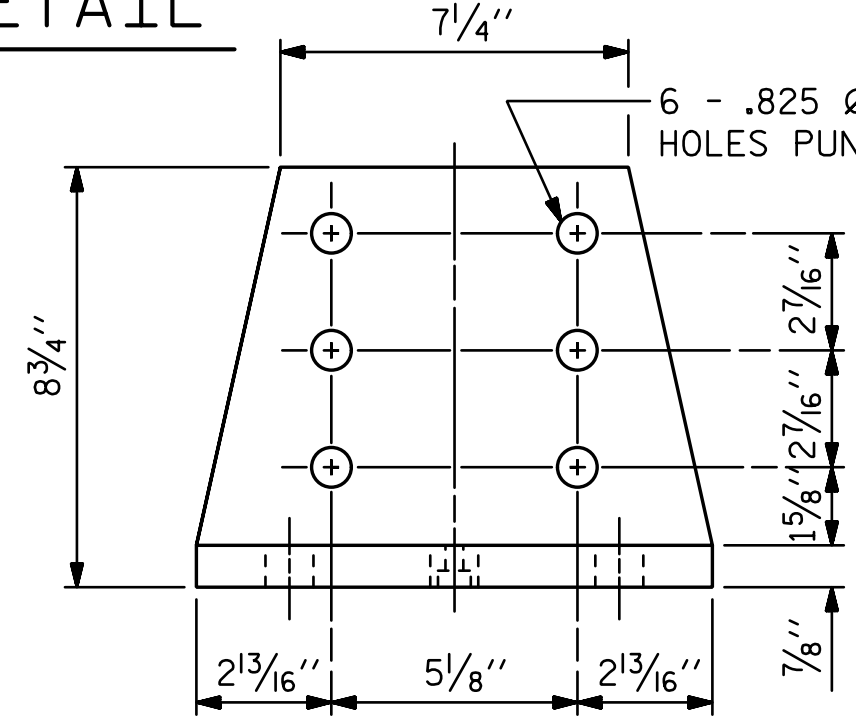


REAR PLATE

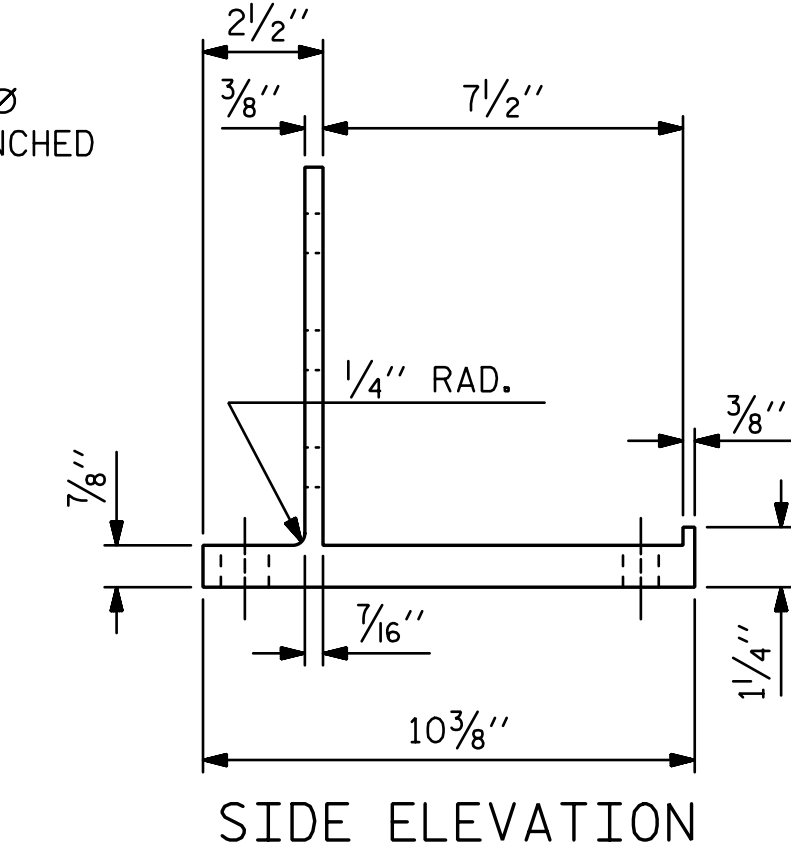


FRONT PLATE SHIM DETAILS

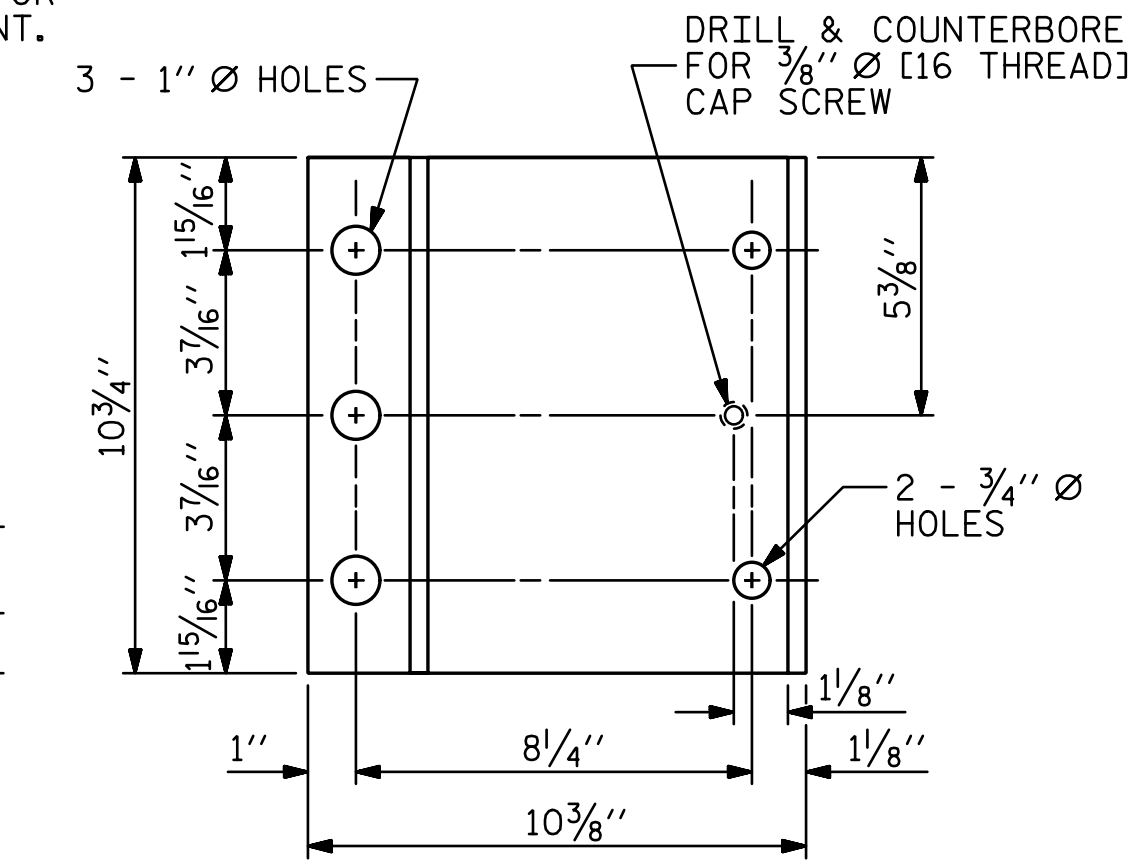
NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR
SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS



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NC License Number F-0991

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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 SHEET 3 OF 3.

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.

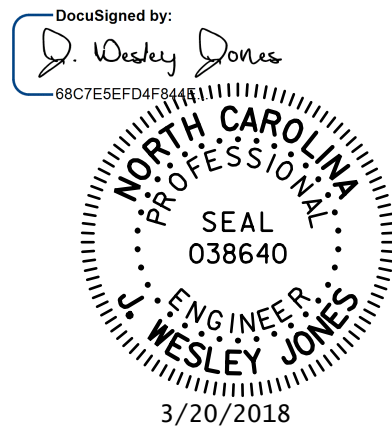
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

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 = 92.2 LIN.FT.



PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

ASSEMBLED BY : LGH	DATE : 5-17
CHECKED BY : JWJ	DATE : 6-17
DESIGN ENGINEER OF RECORD : JWJ	DATE : 3-18
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:
1			3	
2			4	
TOTAL SHEETS				21

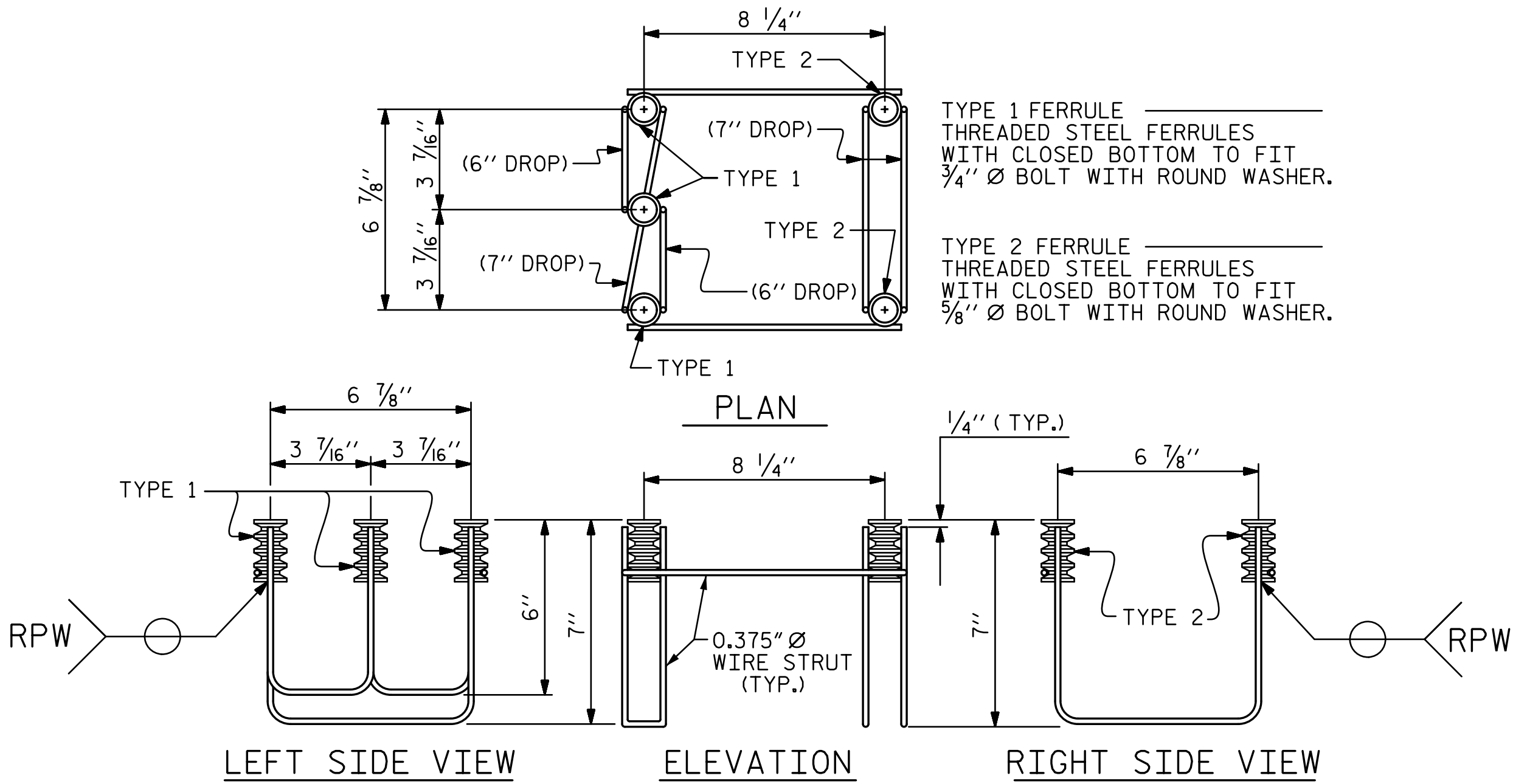
STD. NO. BMR5

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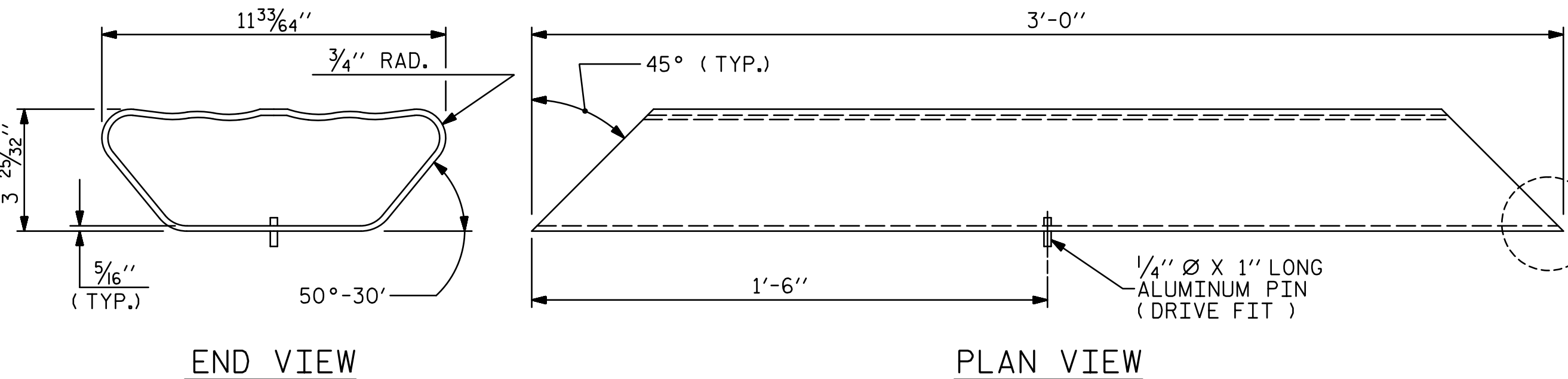
3/20/2018

Jones

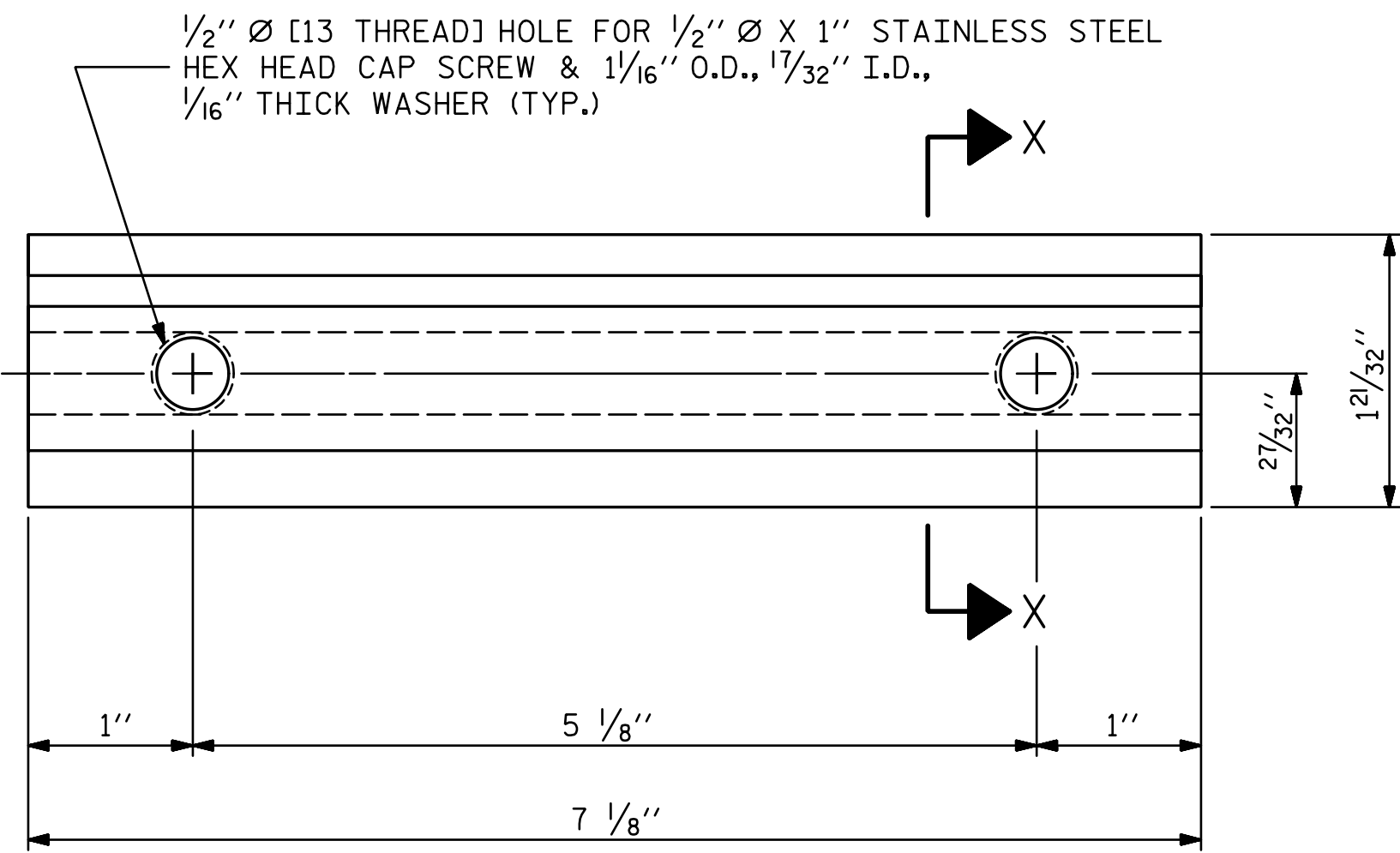


5-BOLT METAL RAIL ANCHOR ASSEMBLY

(17 ASSEMBLIES REQUIRED)

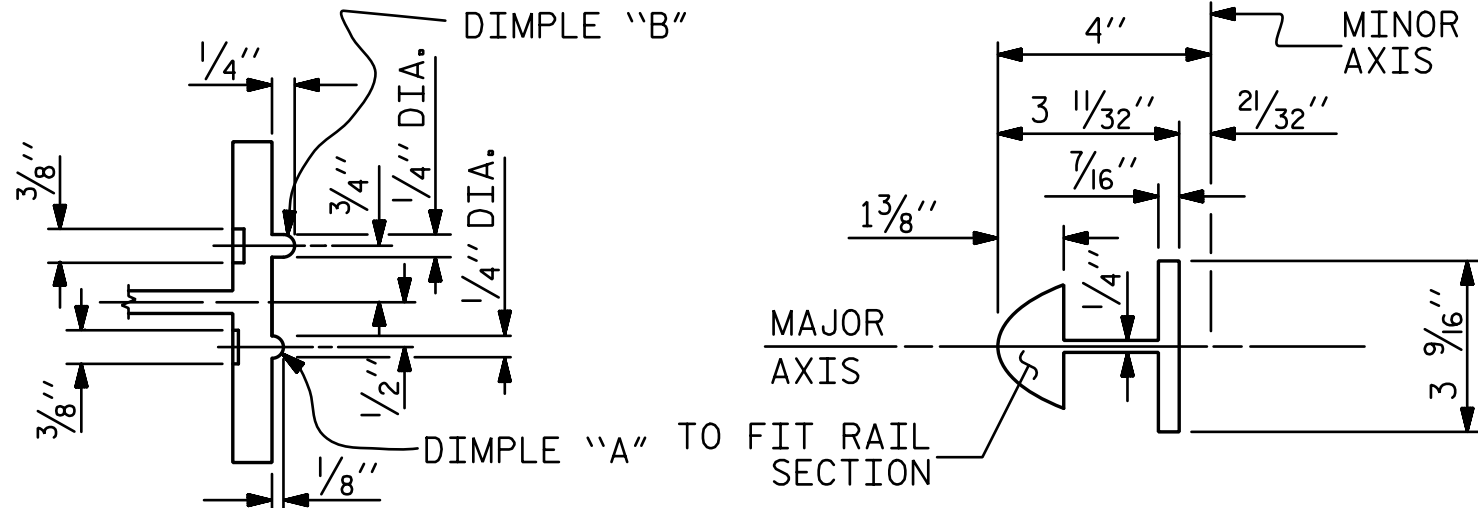
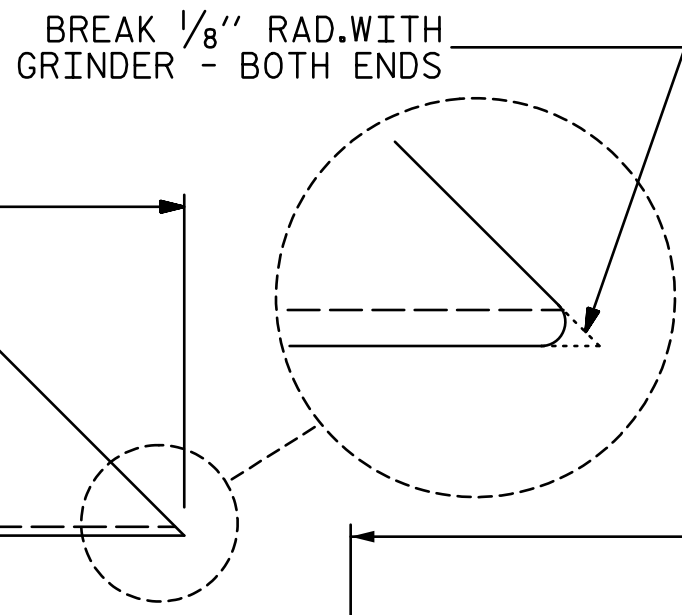


BOTTOM RAIL EXPANSION BAR



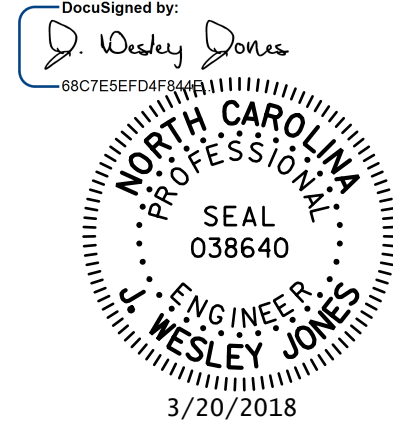
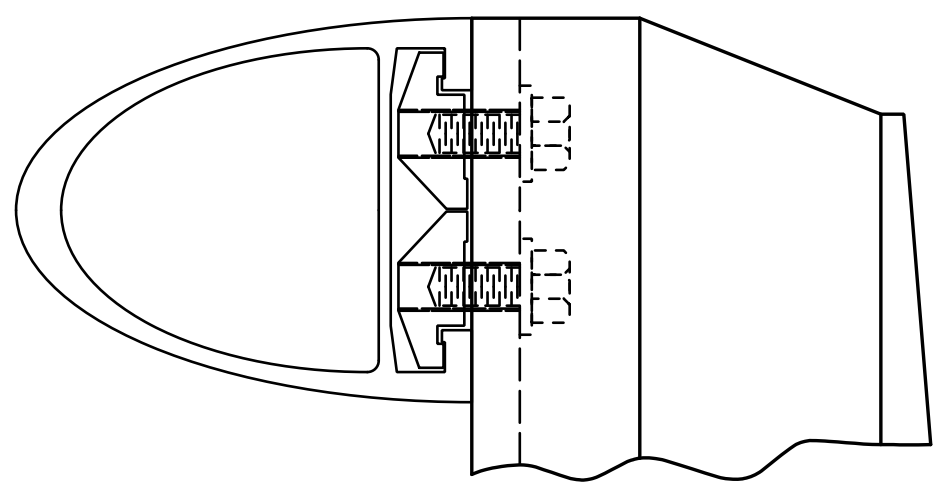
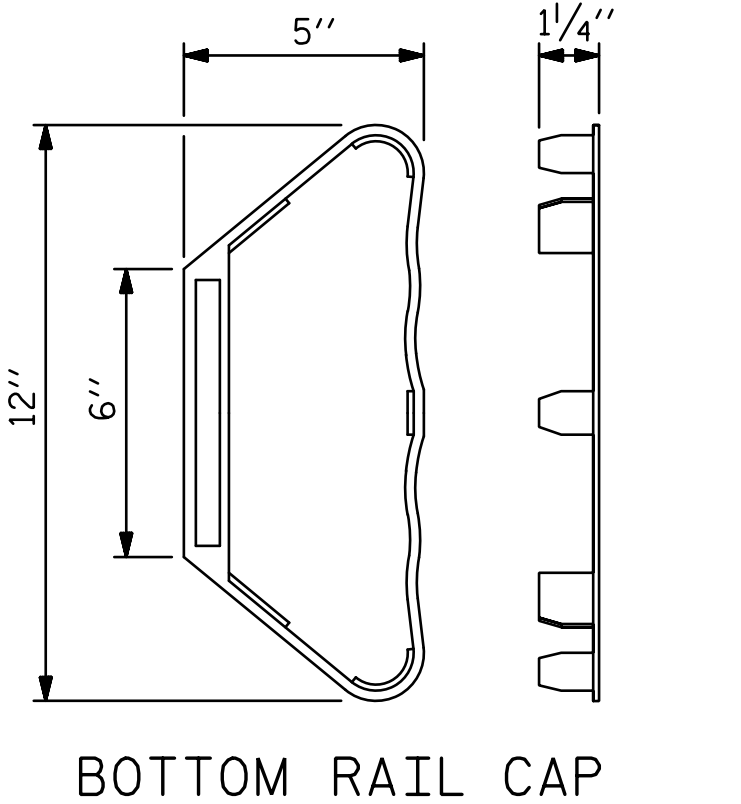
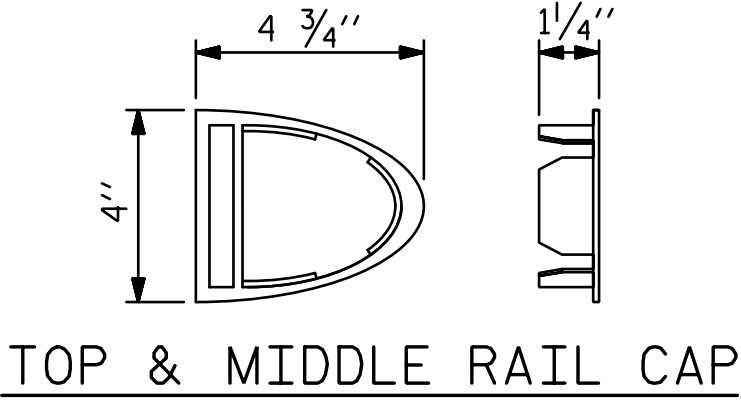
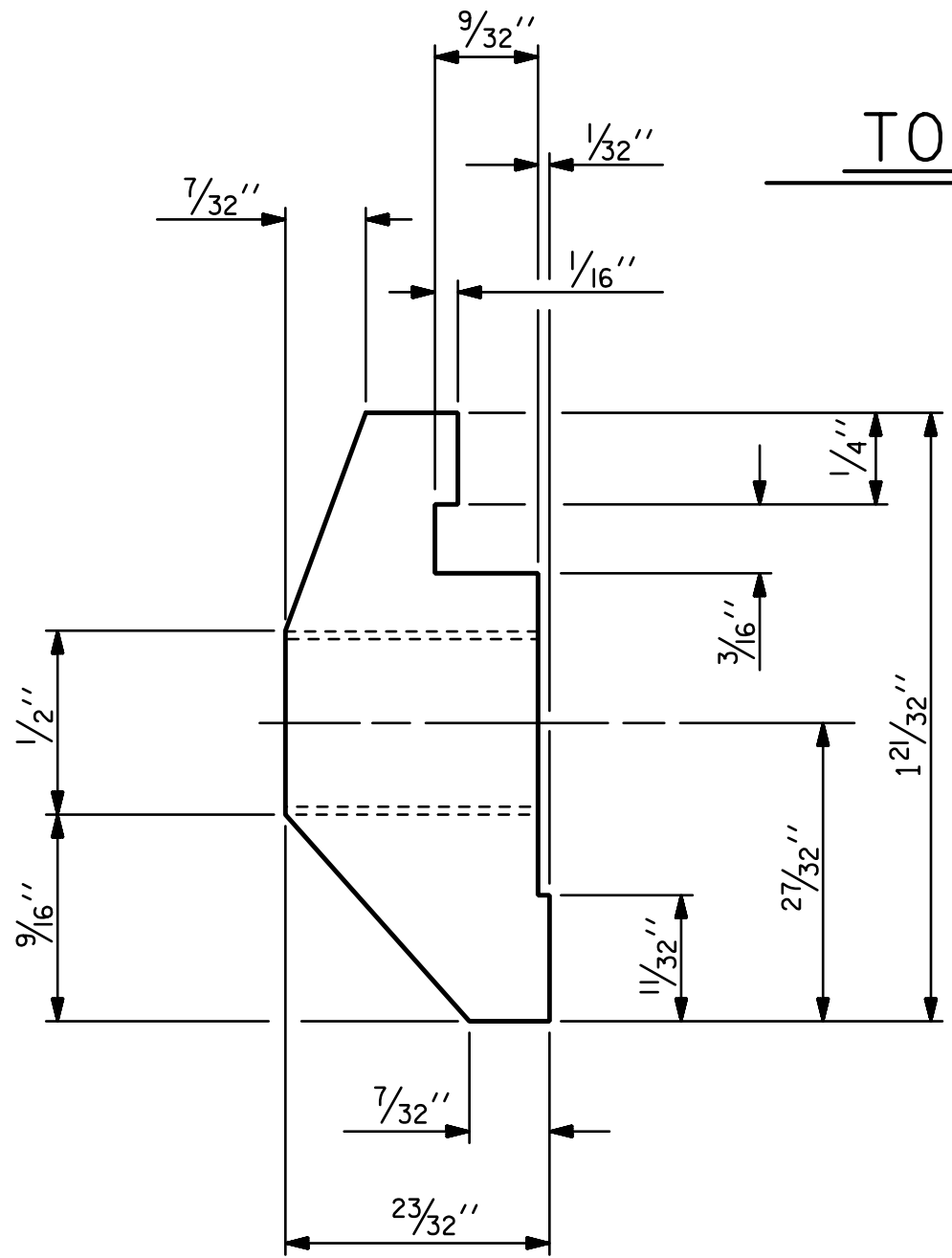
CLAMP BAR DETAIL

(6 REQUIRED PER POST)



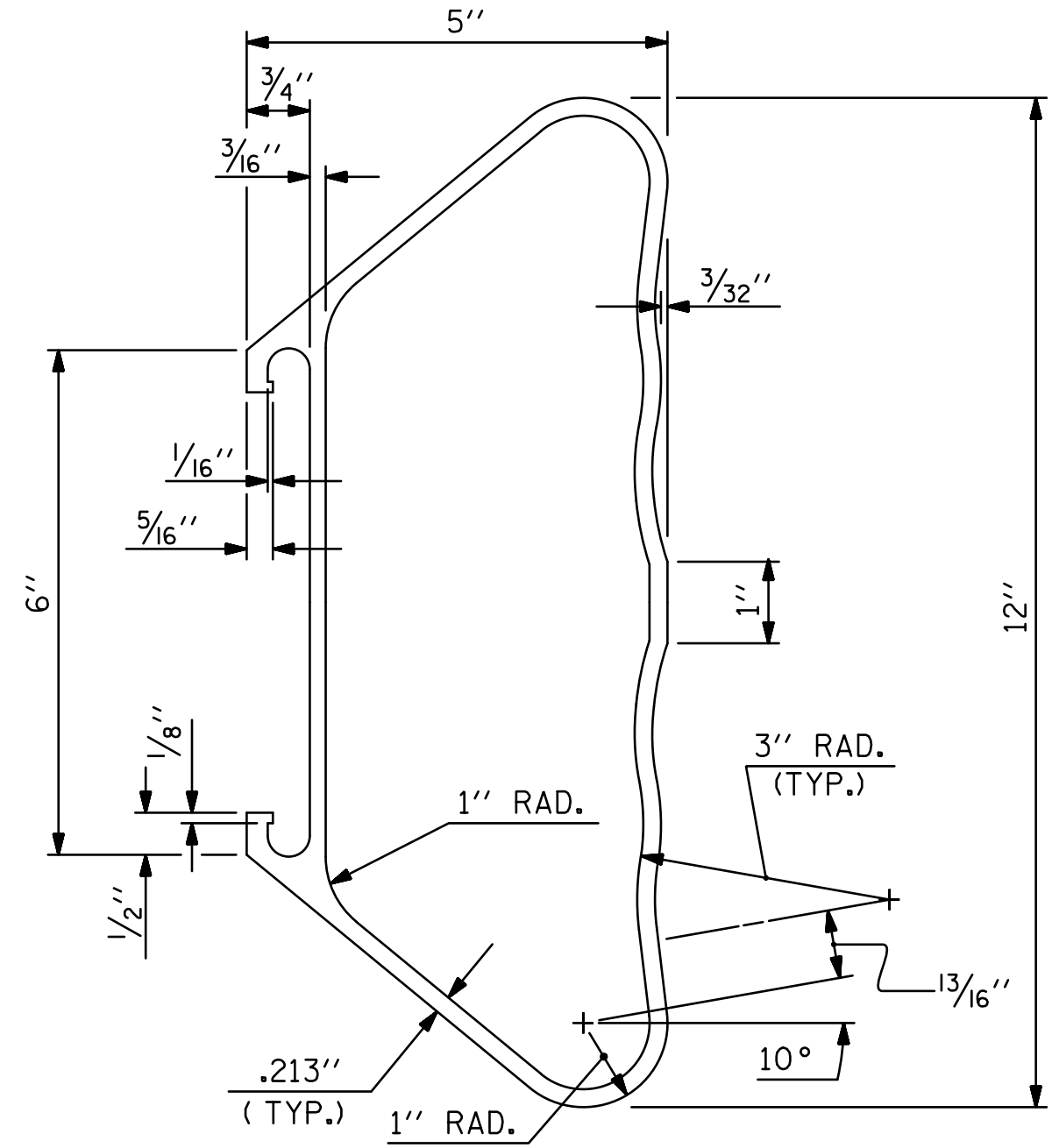
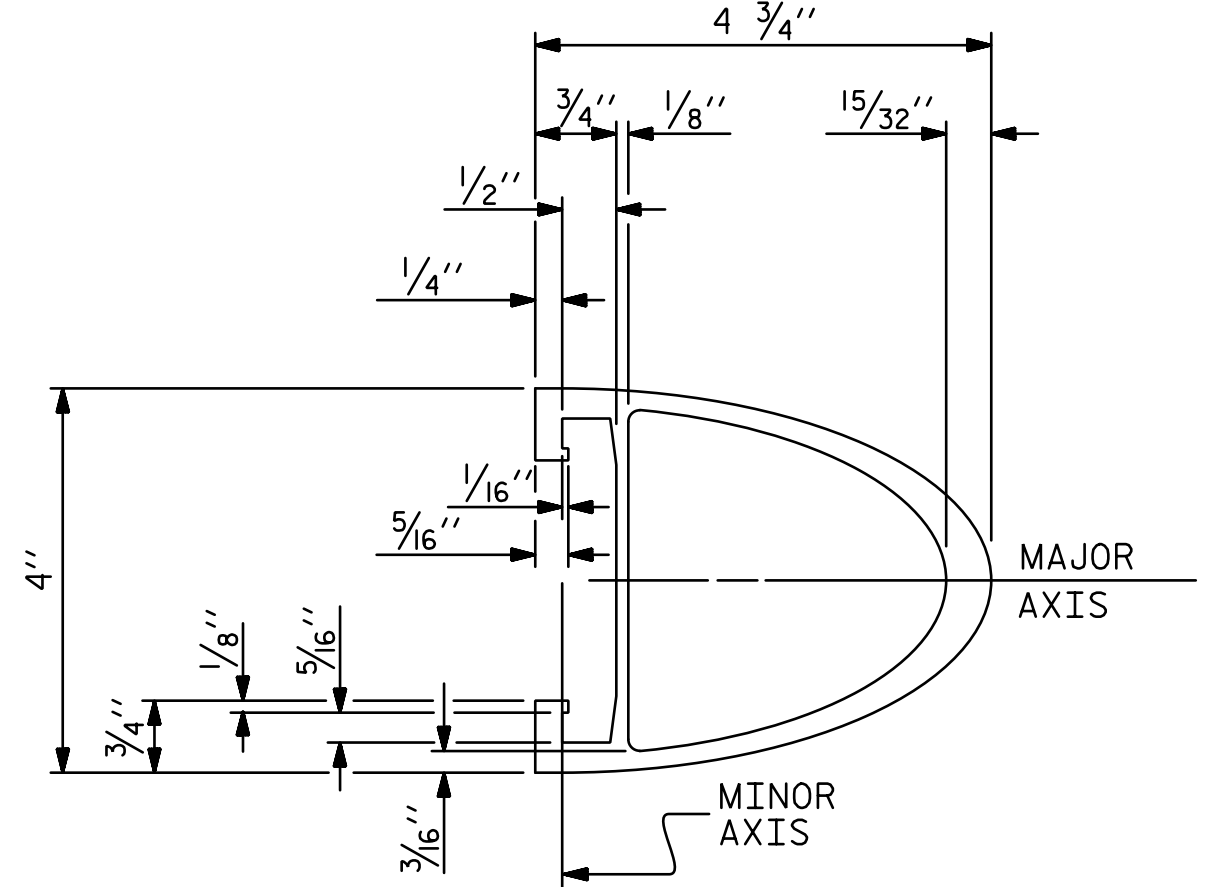
BACK ELEVATION

TOP & MIDDLE RAIL EXPANSION BAR



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PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

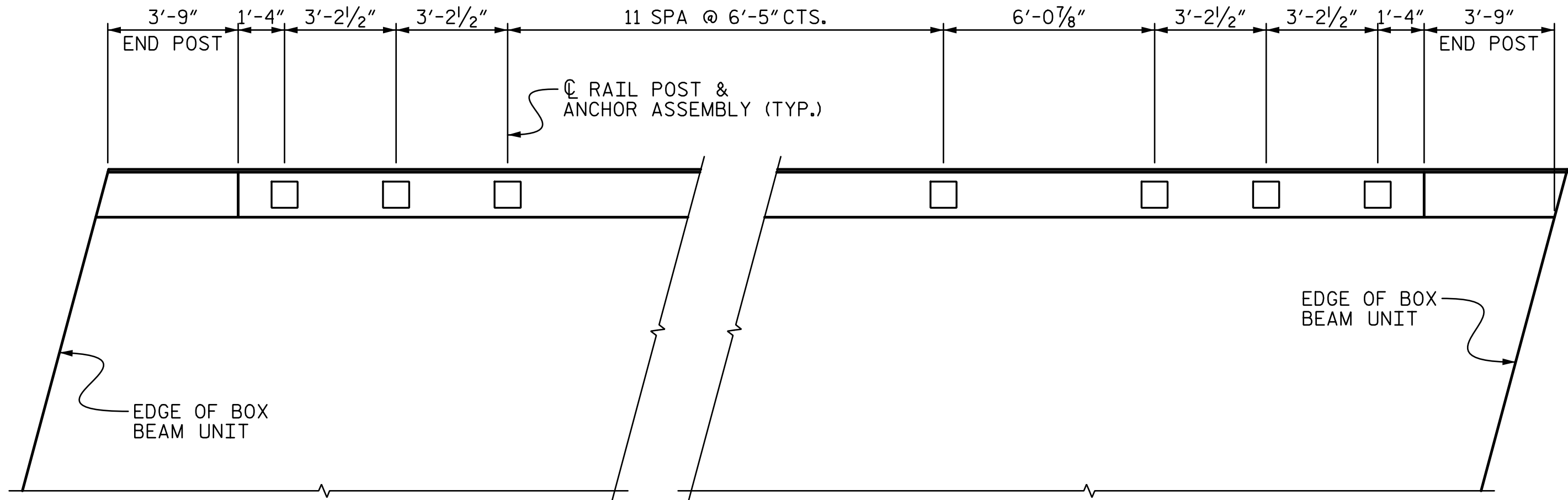
STANDARD

3 BAR METAL RAIL

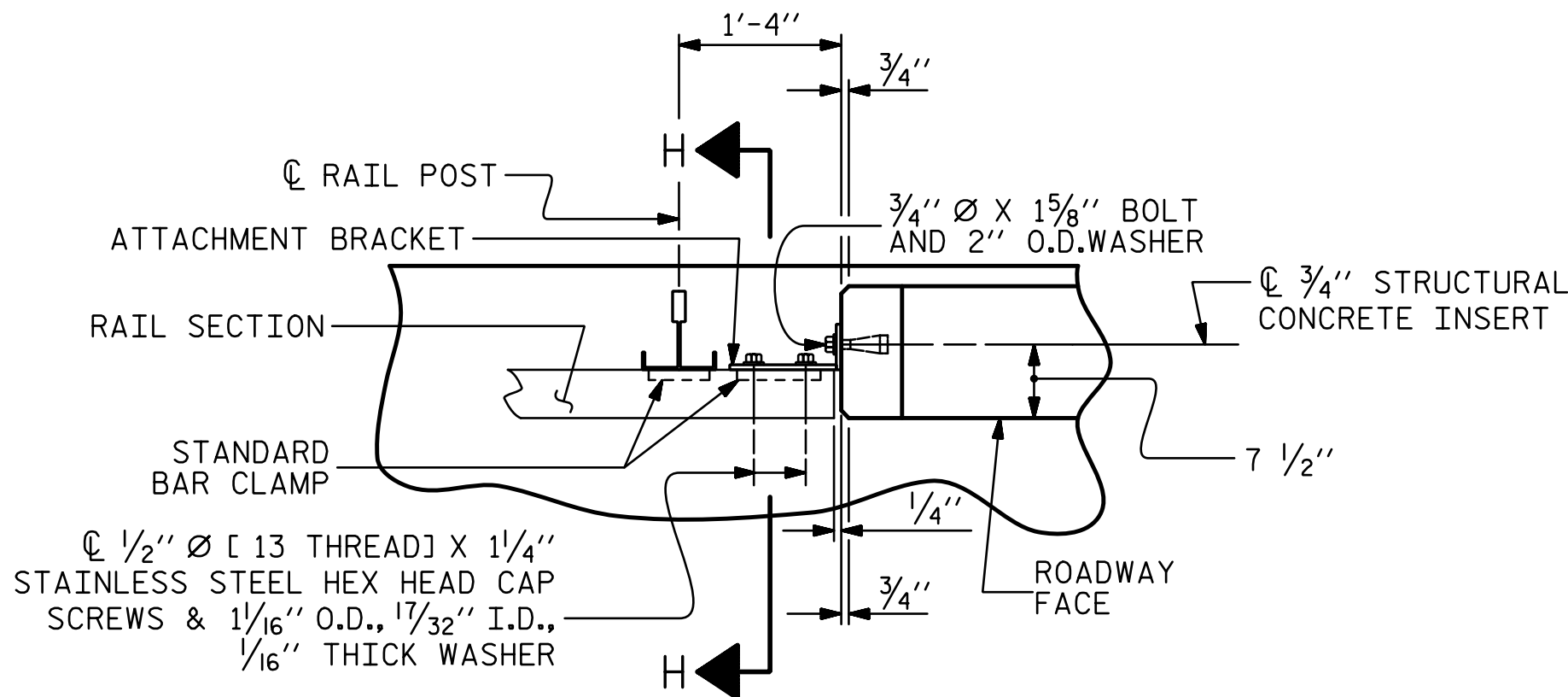
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					21

STD. NO. BMR6

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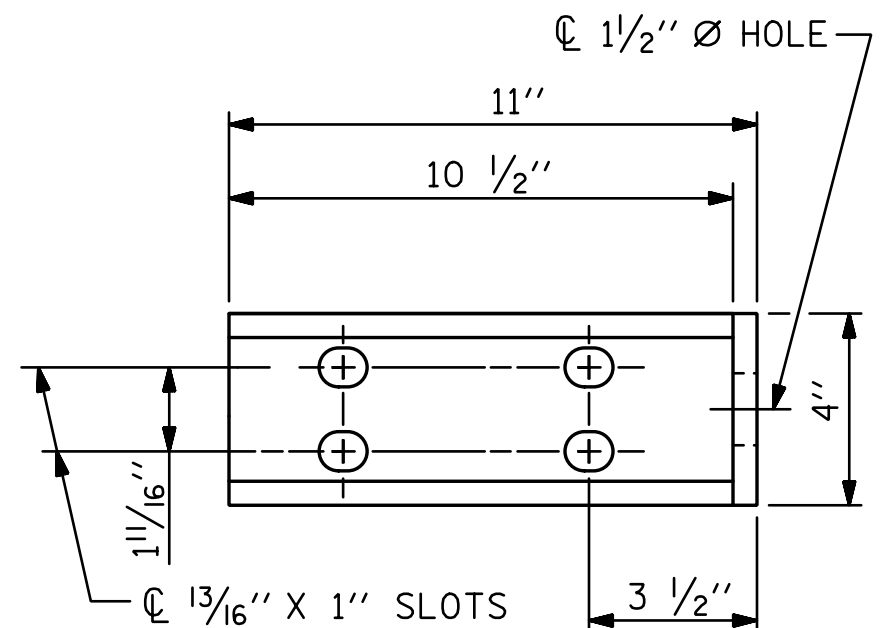


PLAN OF RAIL POST SPACINGS

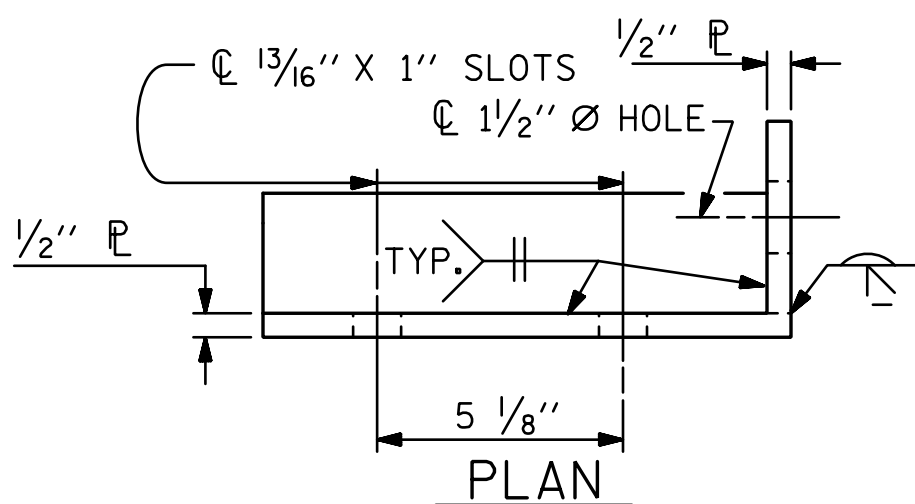


PLAN OF RAIL AND END POST

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



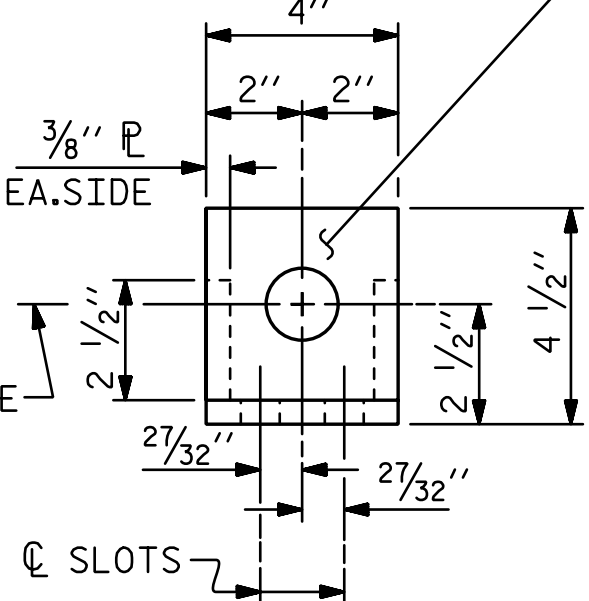
ELEVATION



DETAILS FOR ATTACHMENT BRACKET

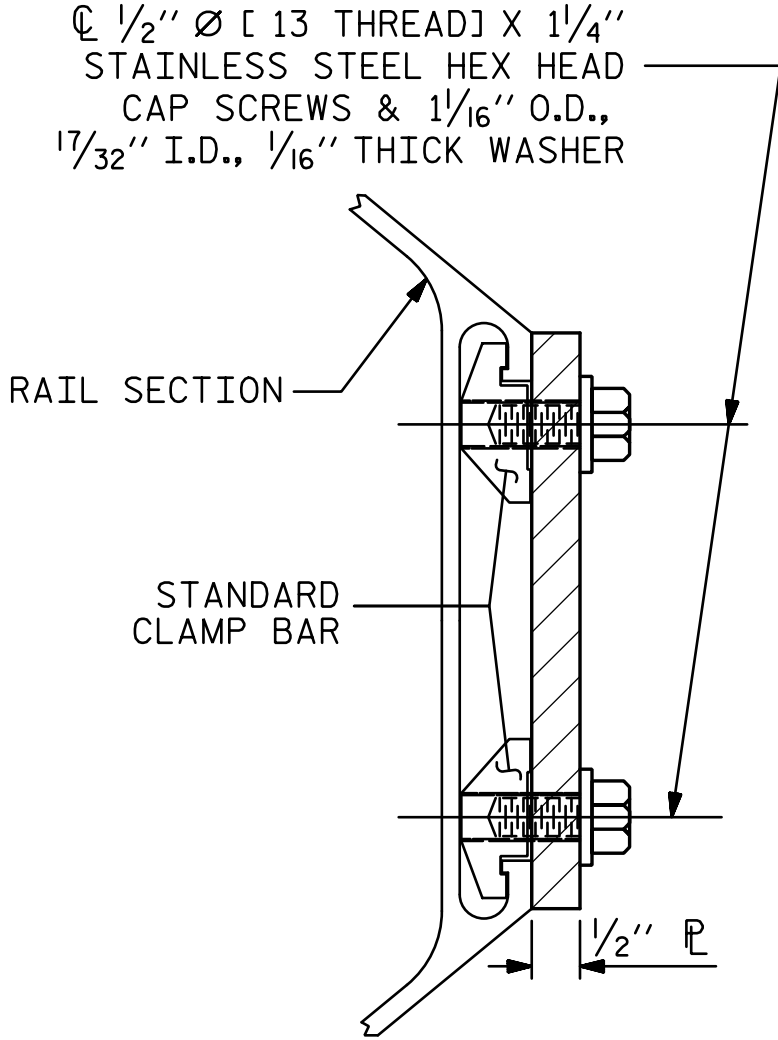
(TOP & MIDDLE RAIL ONLY)

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



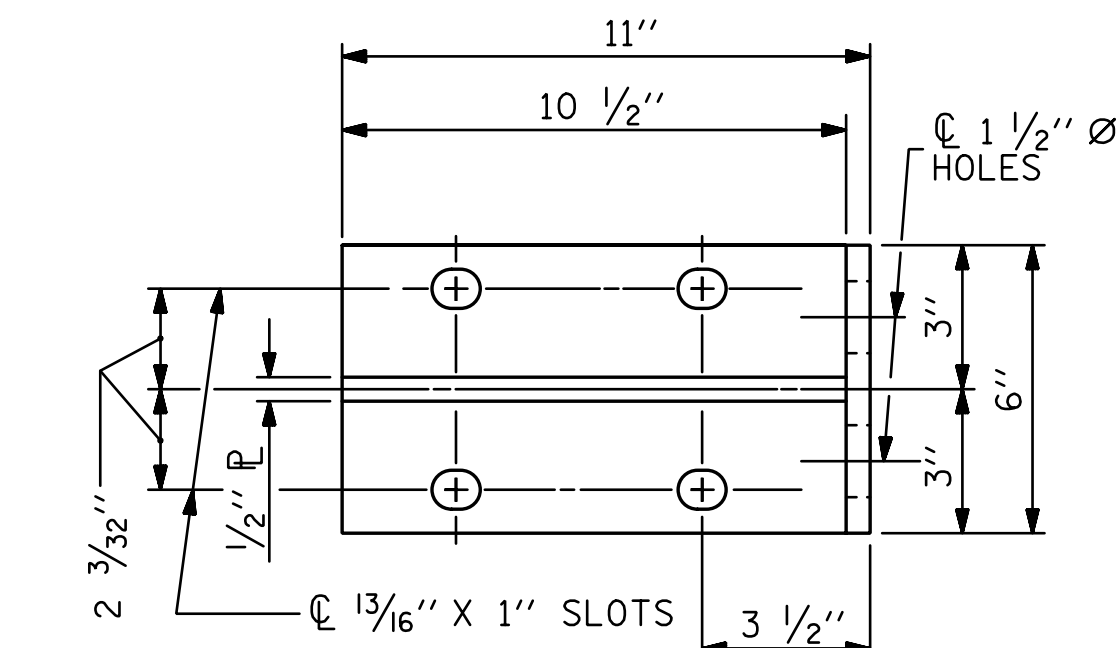
END VIEW

(FIX. AND EXP.)

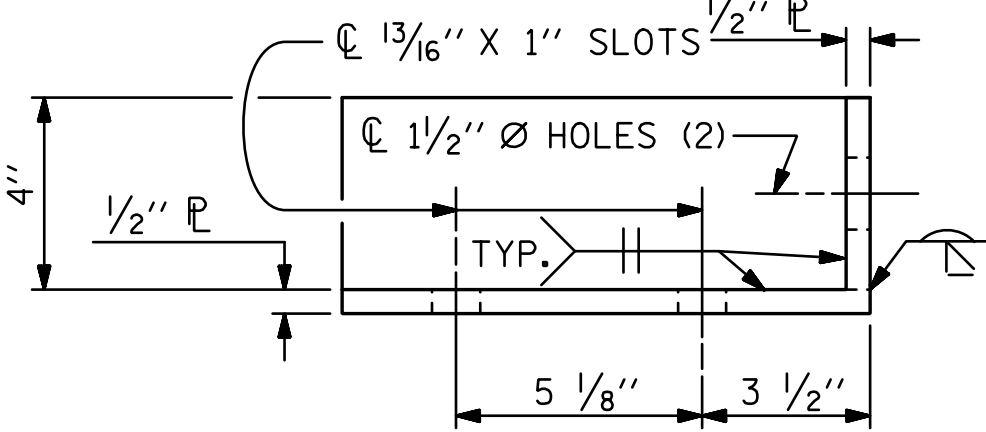


SECTION H-H

(FOR BOTTOM RAIL)

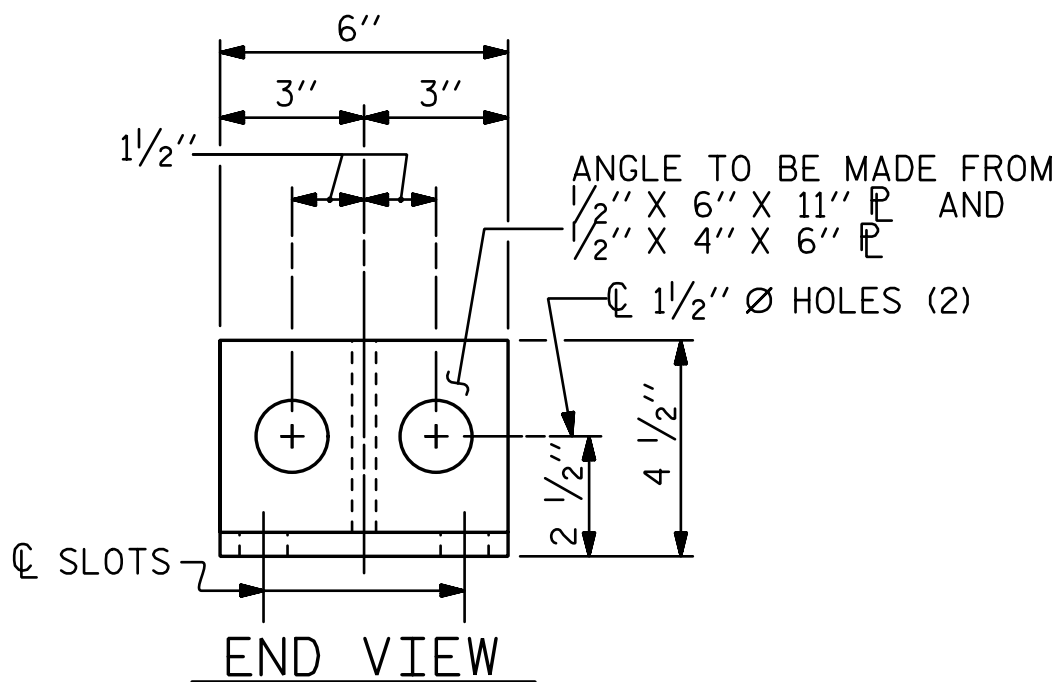


ELEVATION



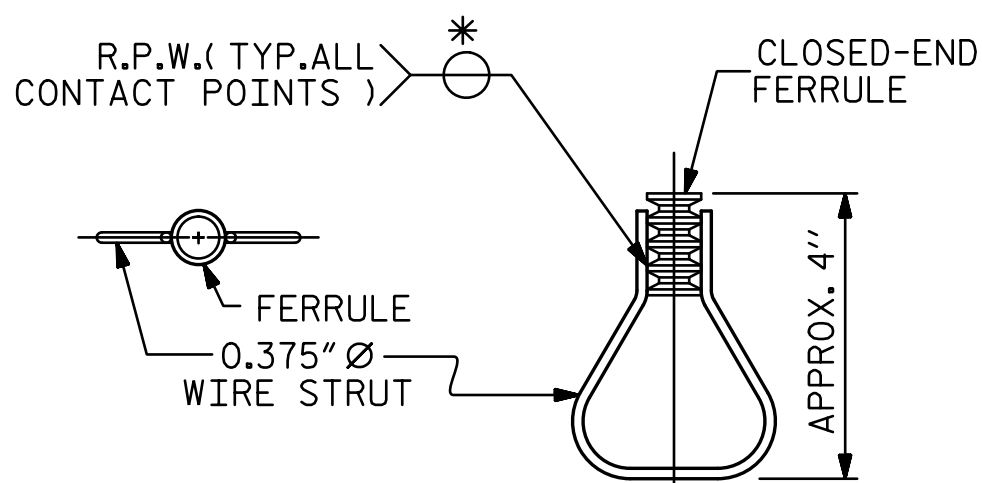
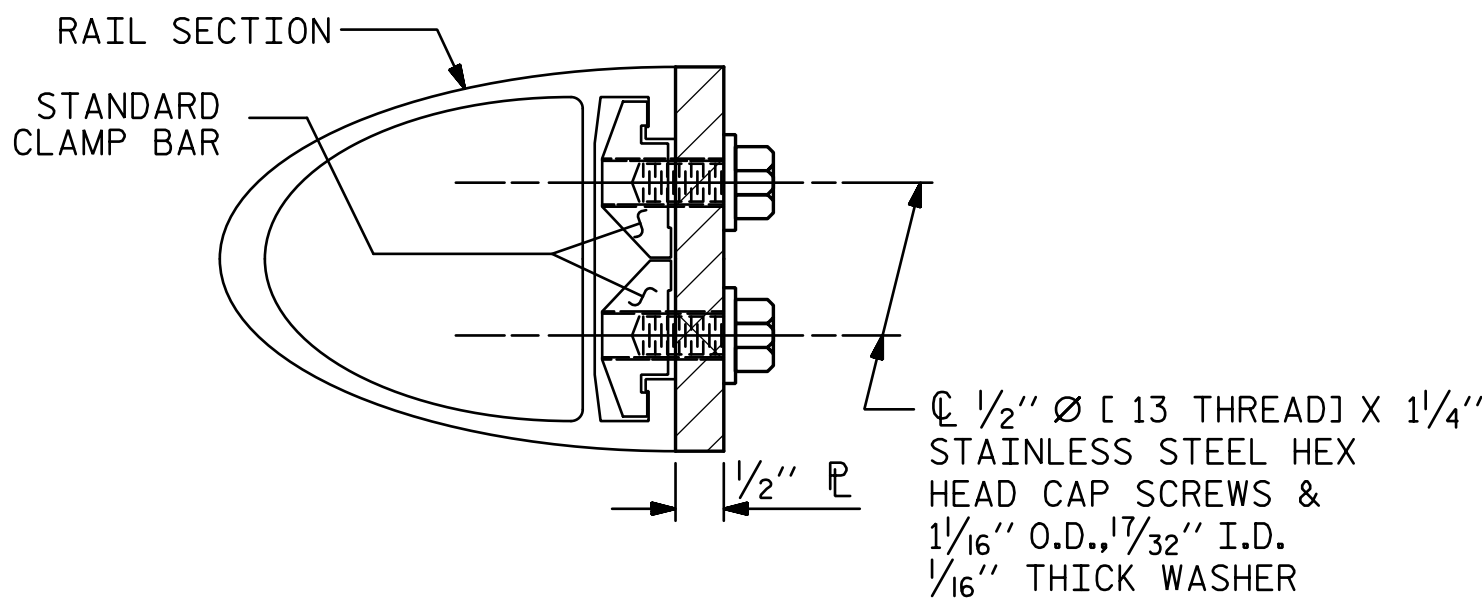
DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



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.

PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

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

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 (SHEET 2 OF 3).

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:

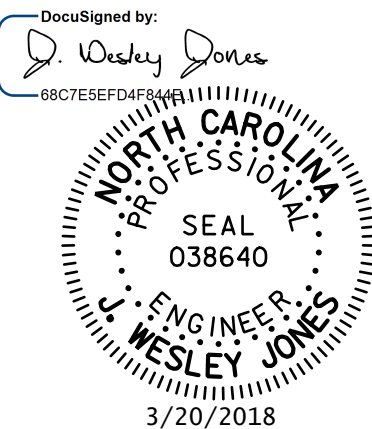
A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".

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 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

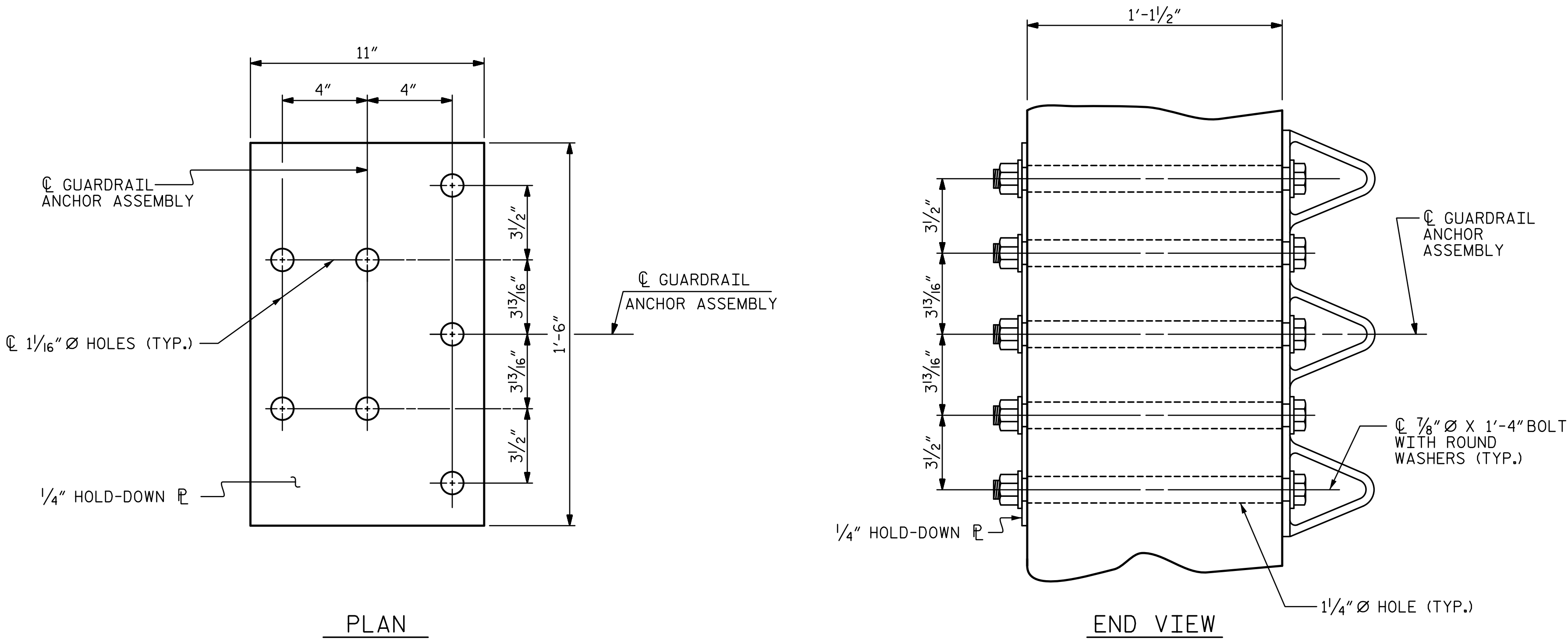


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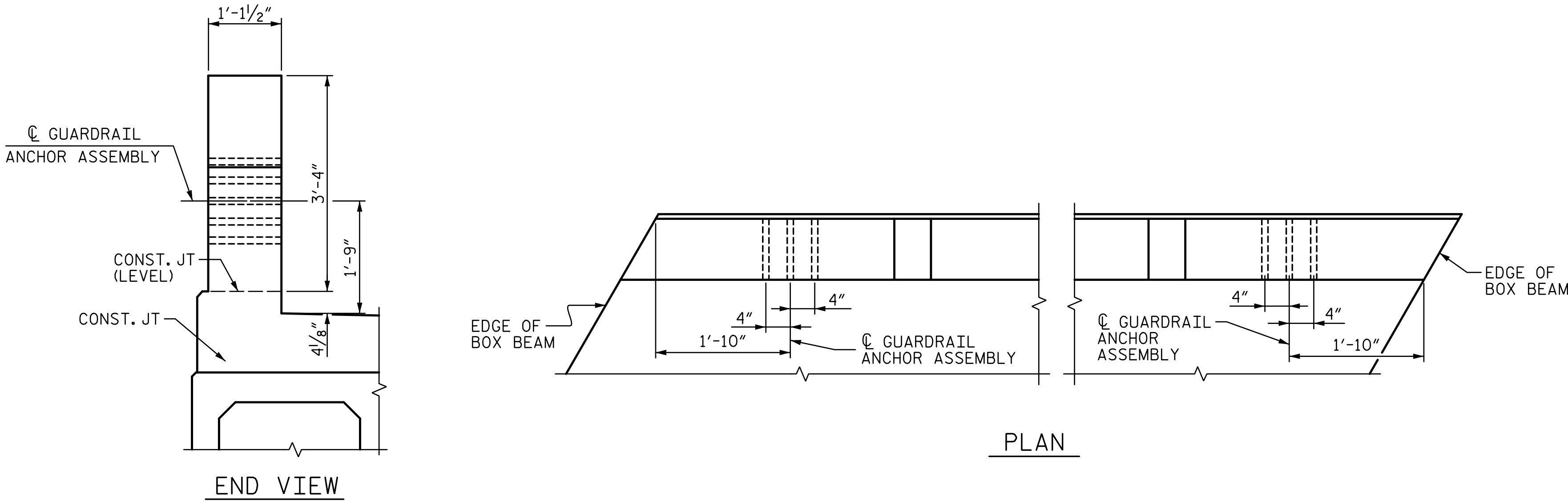


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GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST

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.

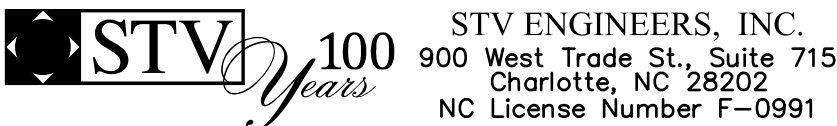
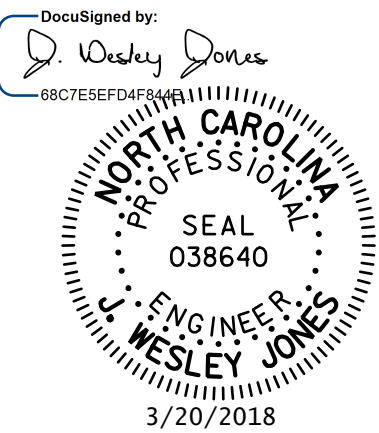


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. 17BP.14.R.154
MACON COUNTY
STATION: 14+94.00 -L-

SHEET 1 OF 2



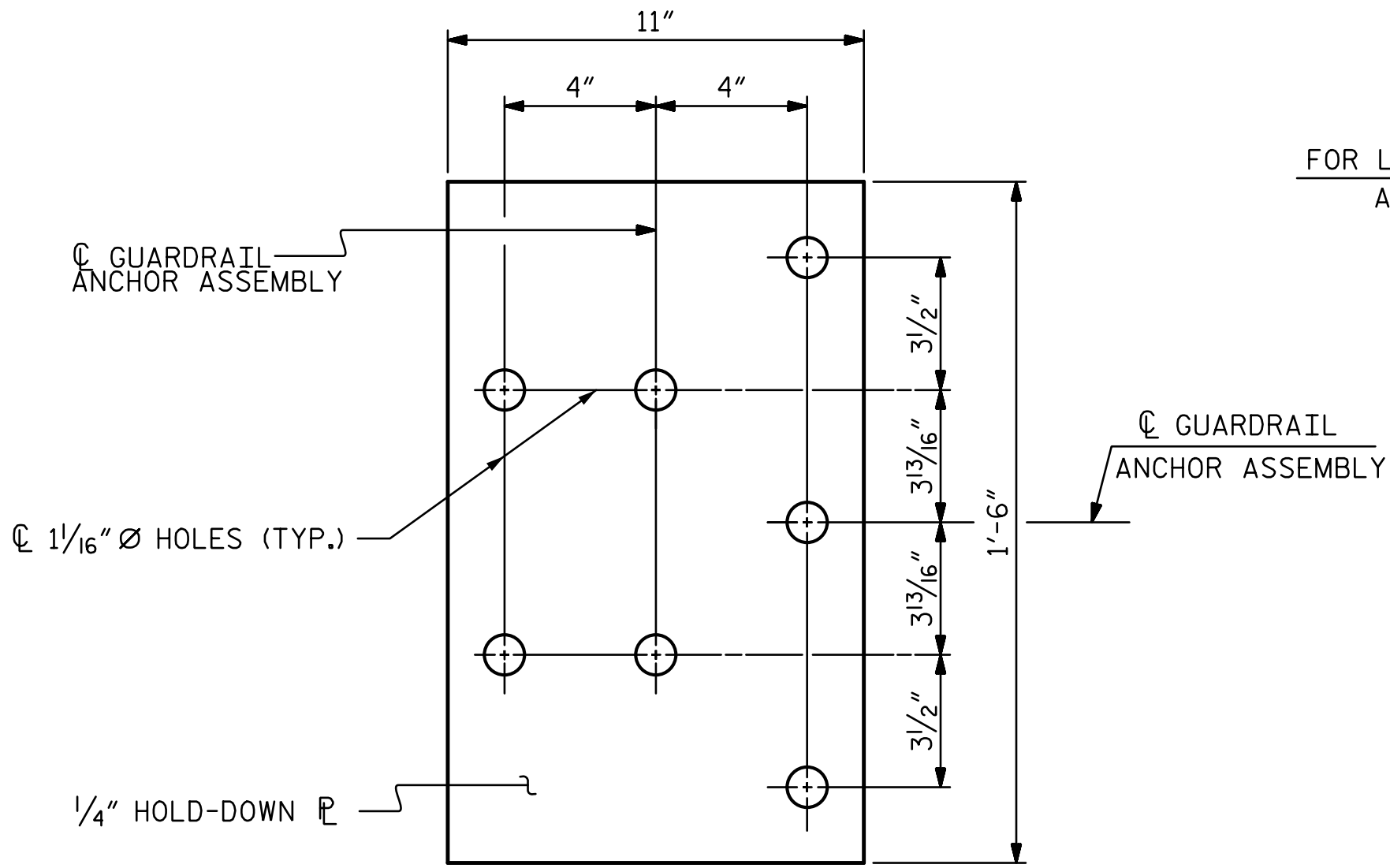
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
DETAILS FOR
METAL RAILS

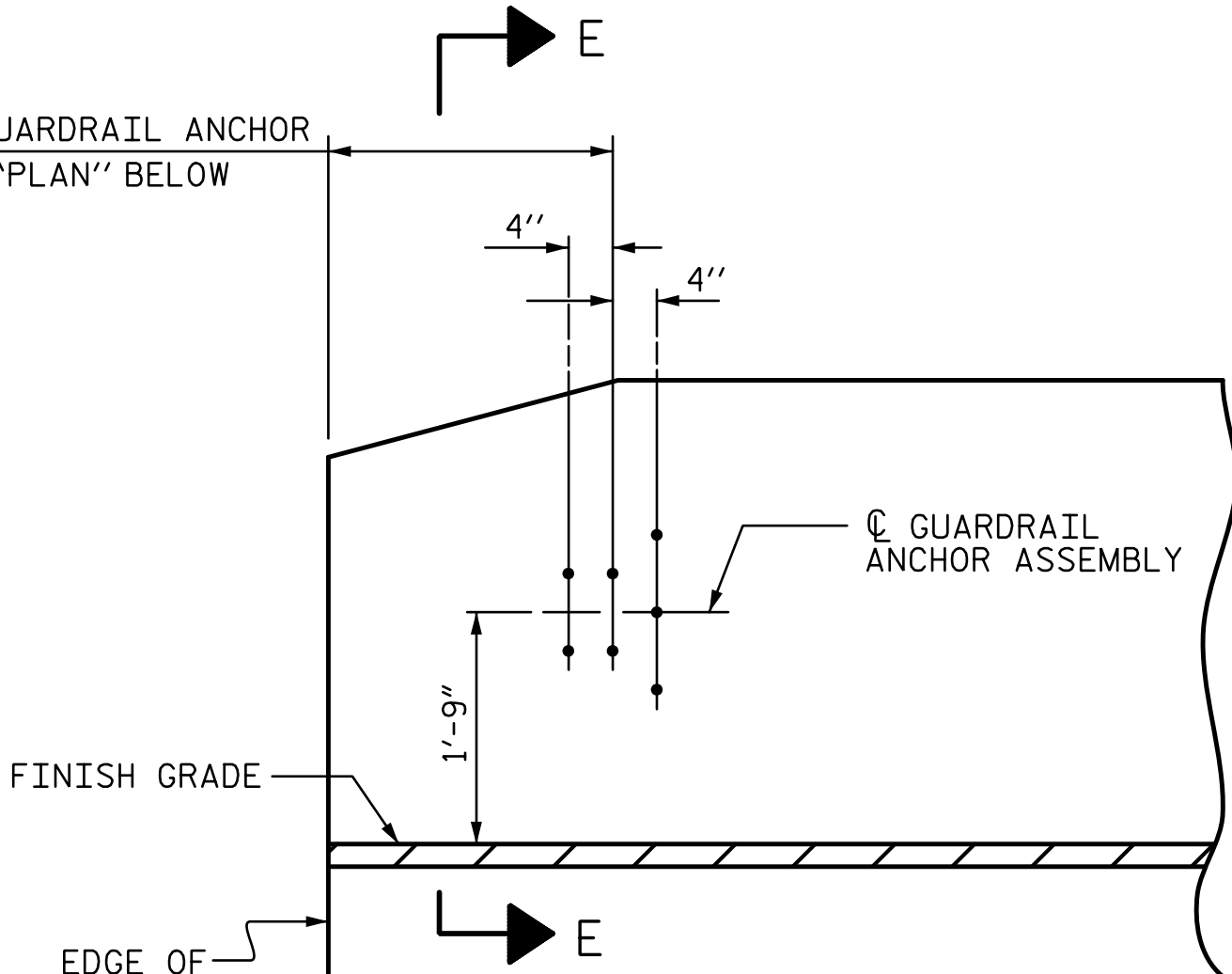
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				S-13	
				TOTAL SHEETS 21	

STD. NO. GRA3

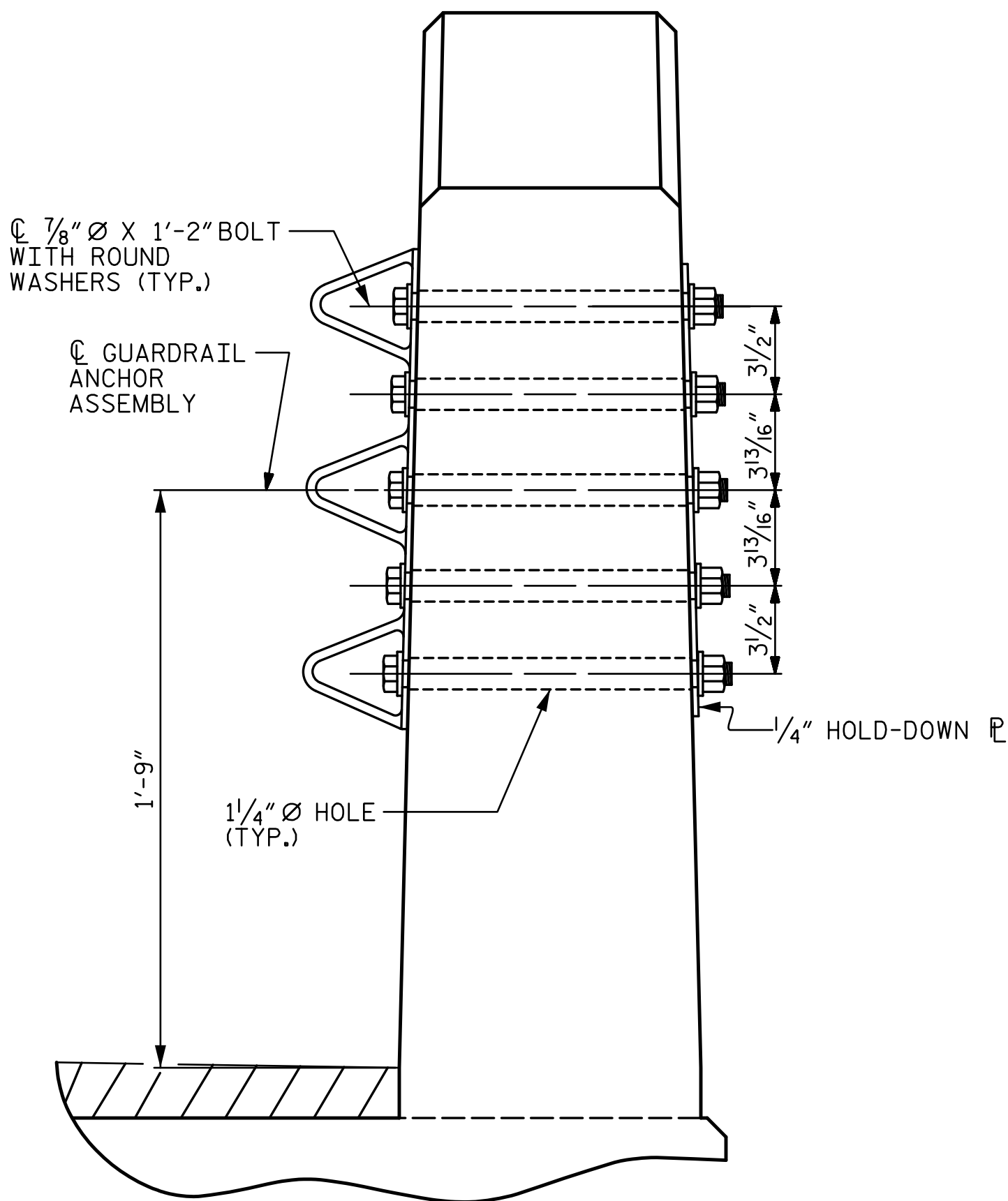
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CHECKED BY : JWJ	DATE : 6-17
DESIGN ENGINEER OF RECORD : JWJ	DATE : 3-18
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG



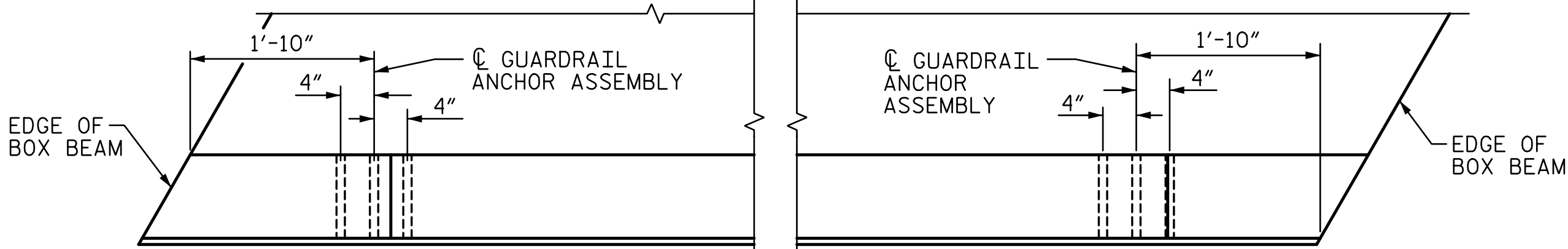
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



ELEVATION



GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

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 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 VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL 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

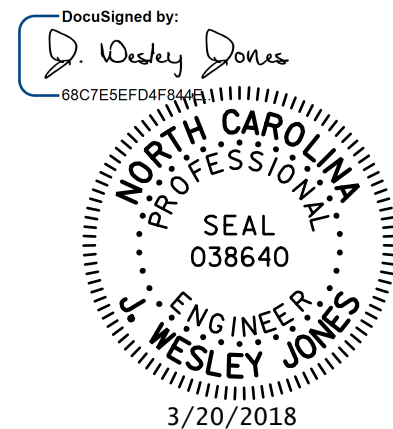
* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-

SHEET 2 OF 2



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DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE
DETAILS FOR VERTICAL
CONCRETE BARRIER RAIL

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-14
2			4			TOTAL SHEETS 21



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DESIGN ENGINEER OF RECORD :	JWJ	DATE :	3-18



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DocuSigned by:
D. Wesley Jones
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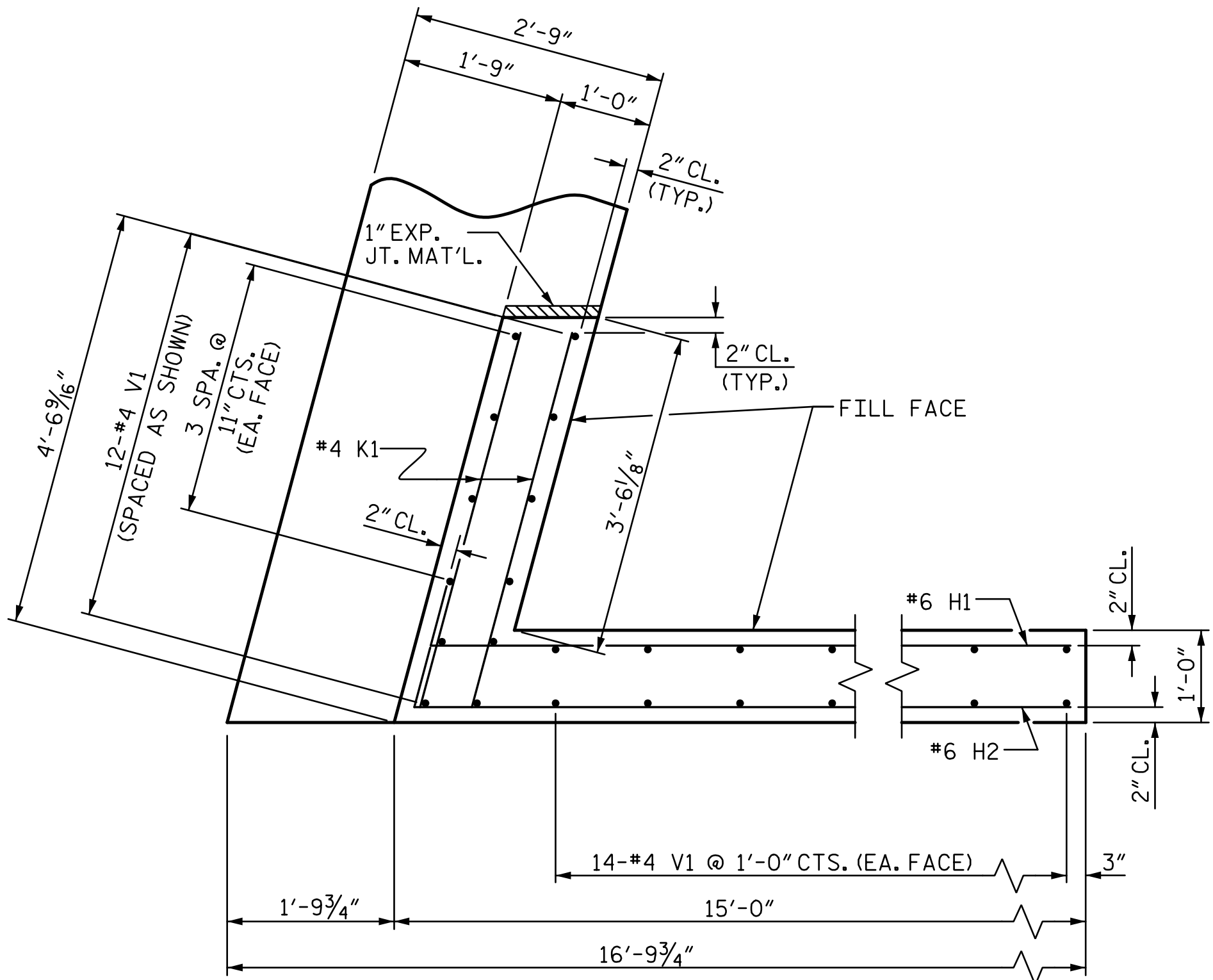
NORTH CAROLINA
PROFESSIONAL
SEAL
038640
J. ENGINEER
WESLEY JONES
3/20/2018

FOR WING DETAILS, SEE SHEET 2 OF 5.

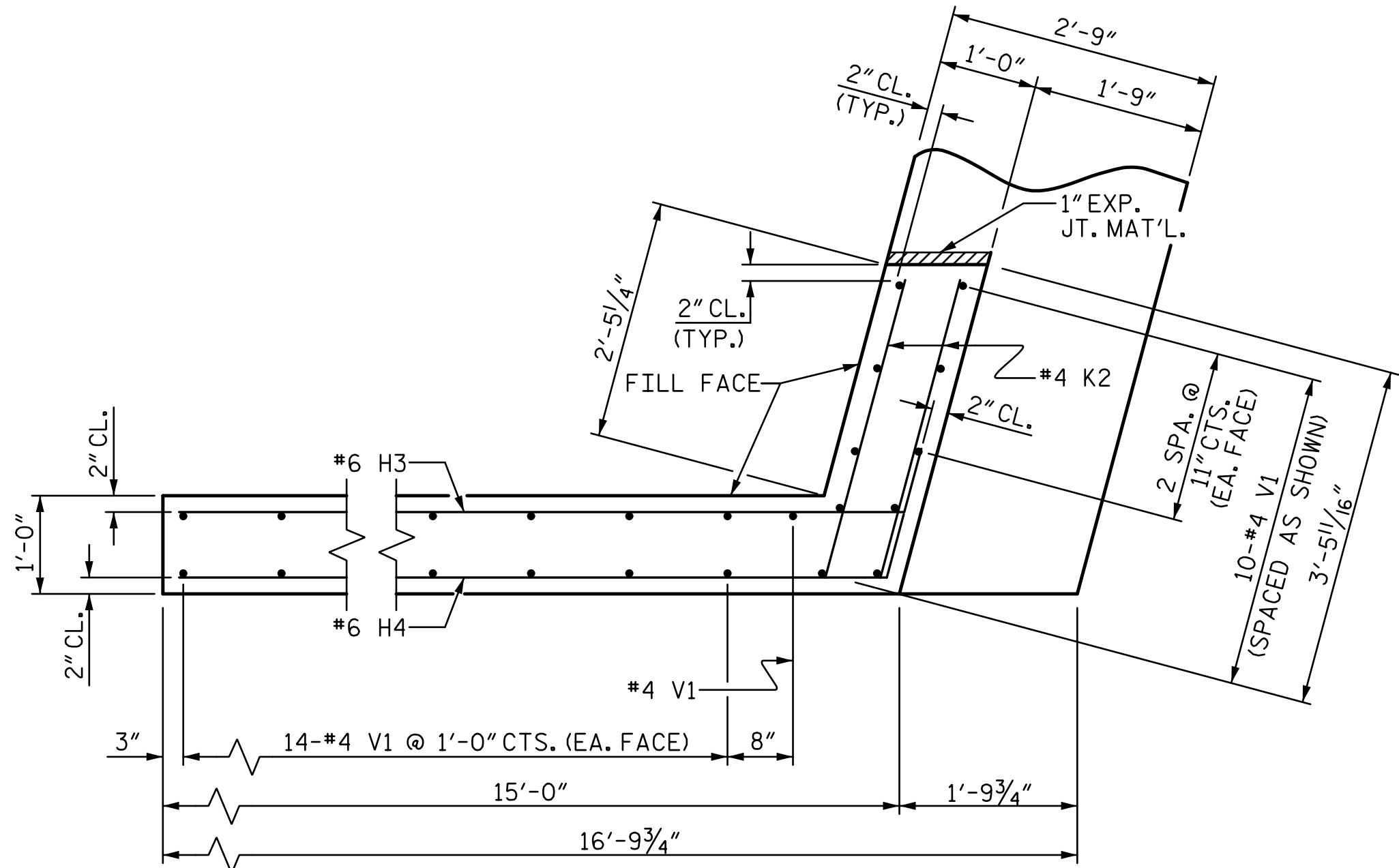
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

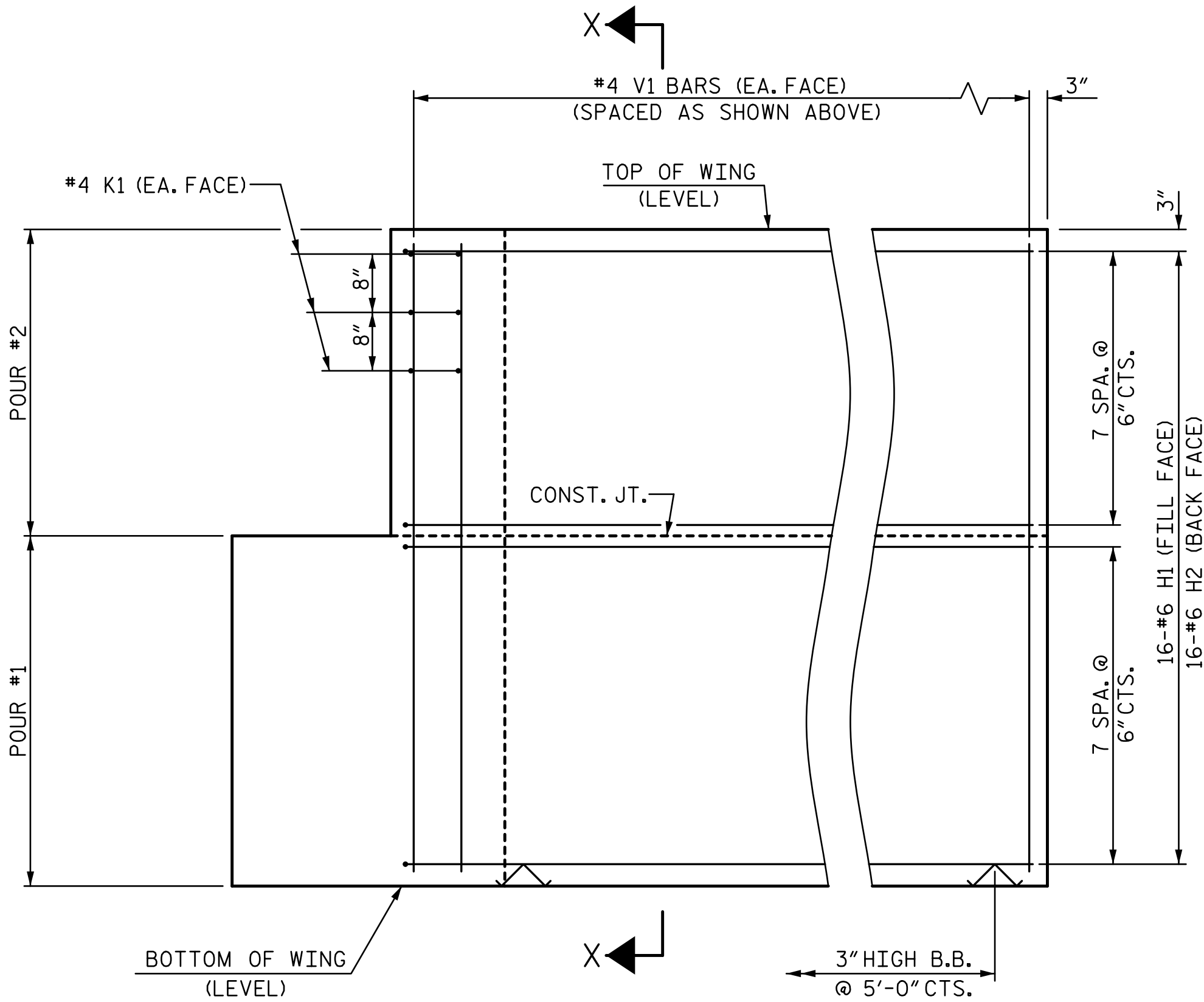
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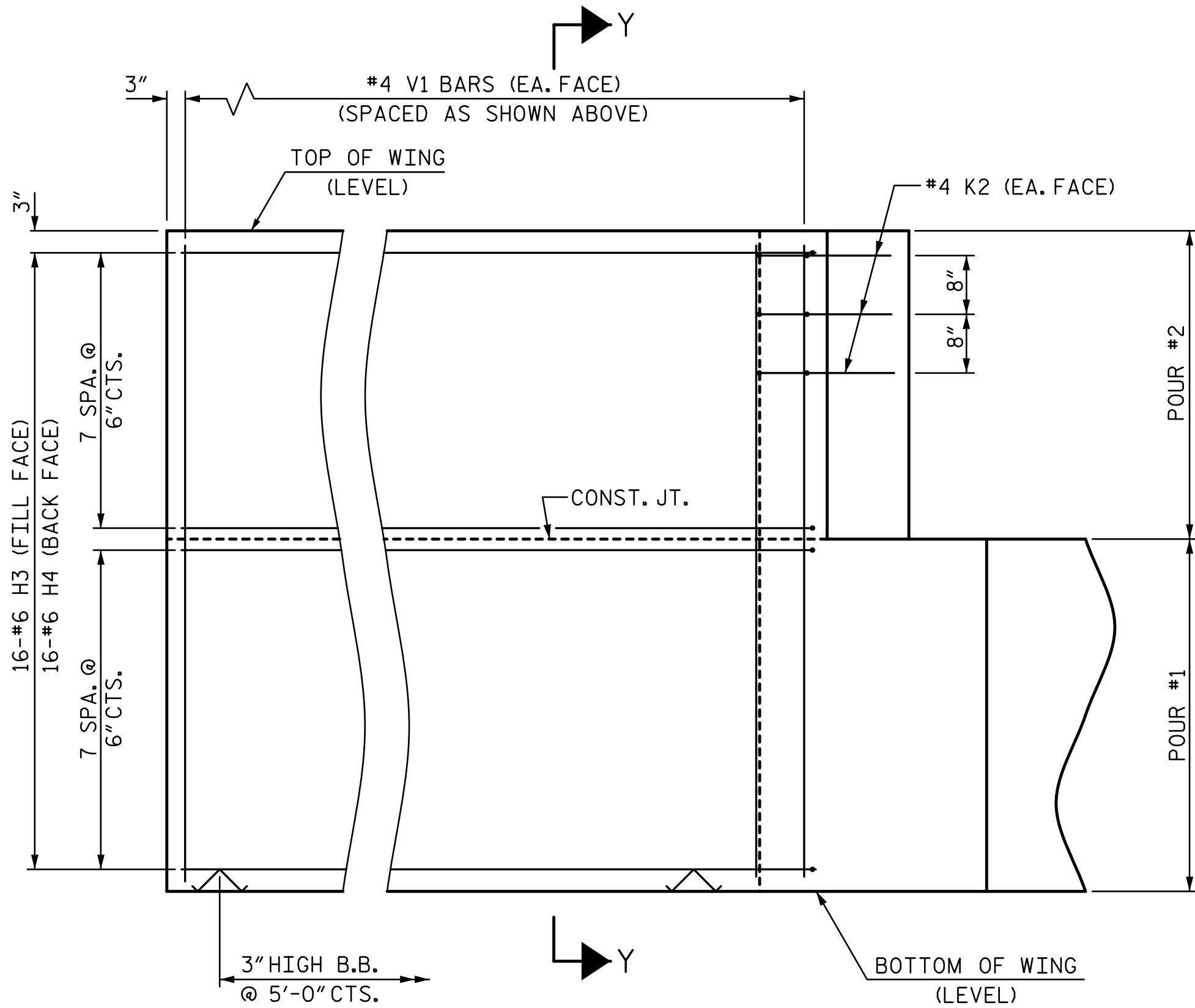
PLAN OF WING (W1)



PLAN OF WING (W2)

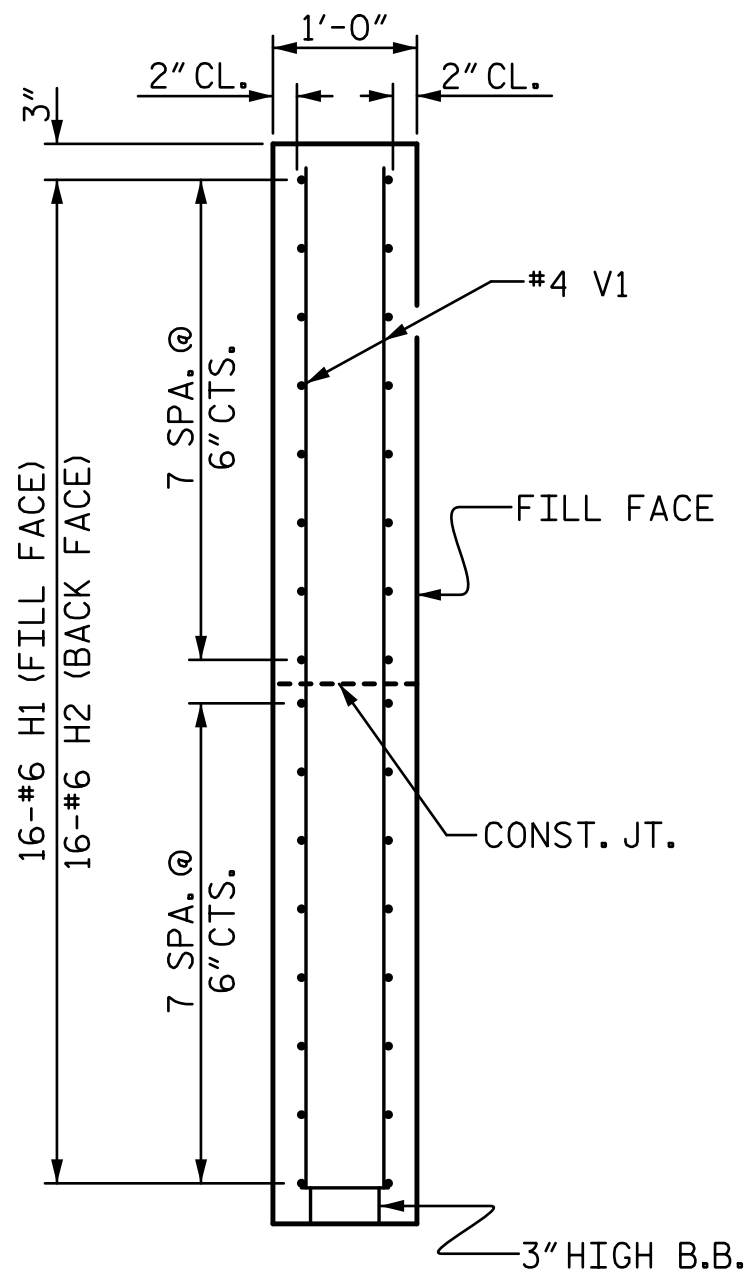


ELEVATION OF WING (W1)

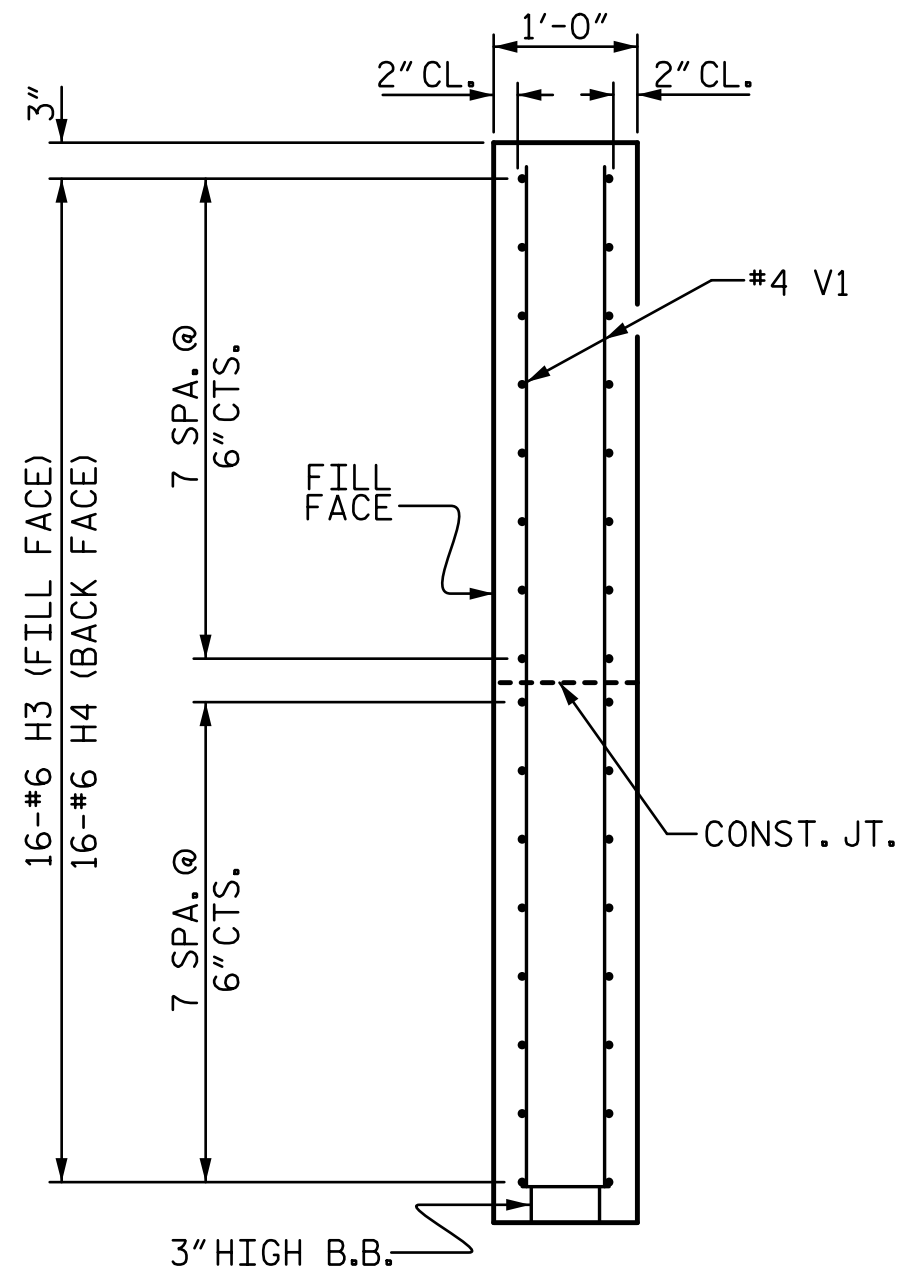


ELEVATION OF WING (W2)

WING DETAILS



SECTION X-X



SECTION Y-Y

PROJECT NO. 17BP.14.R.154

MACON COUNTY

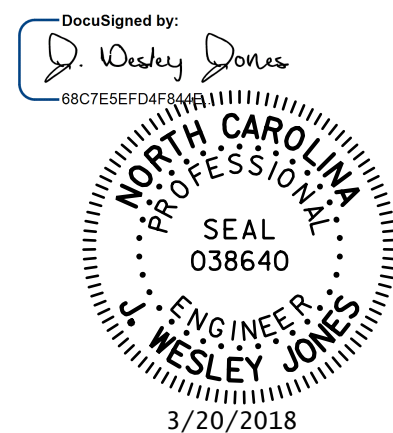
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SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
WING DETAILS

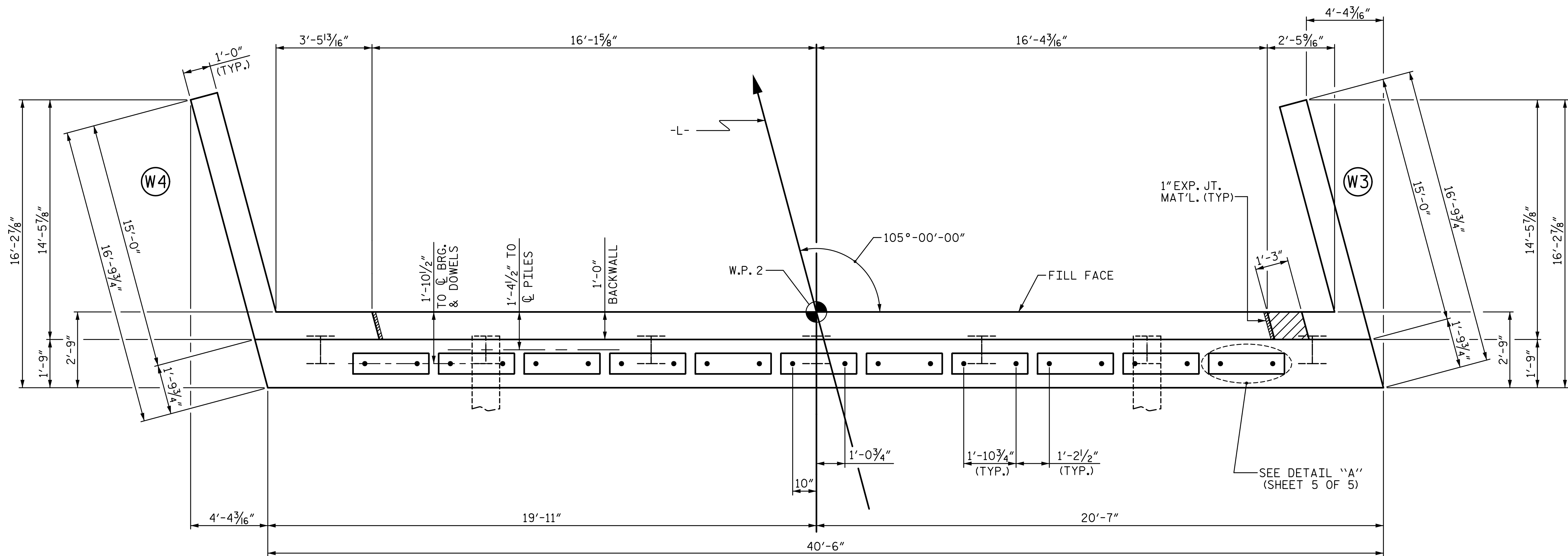
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TOTAL SHEETS						21



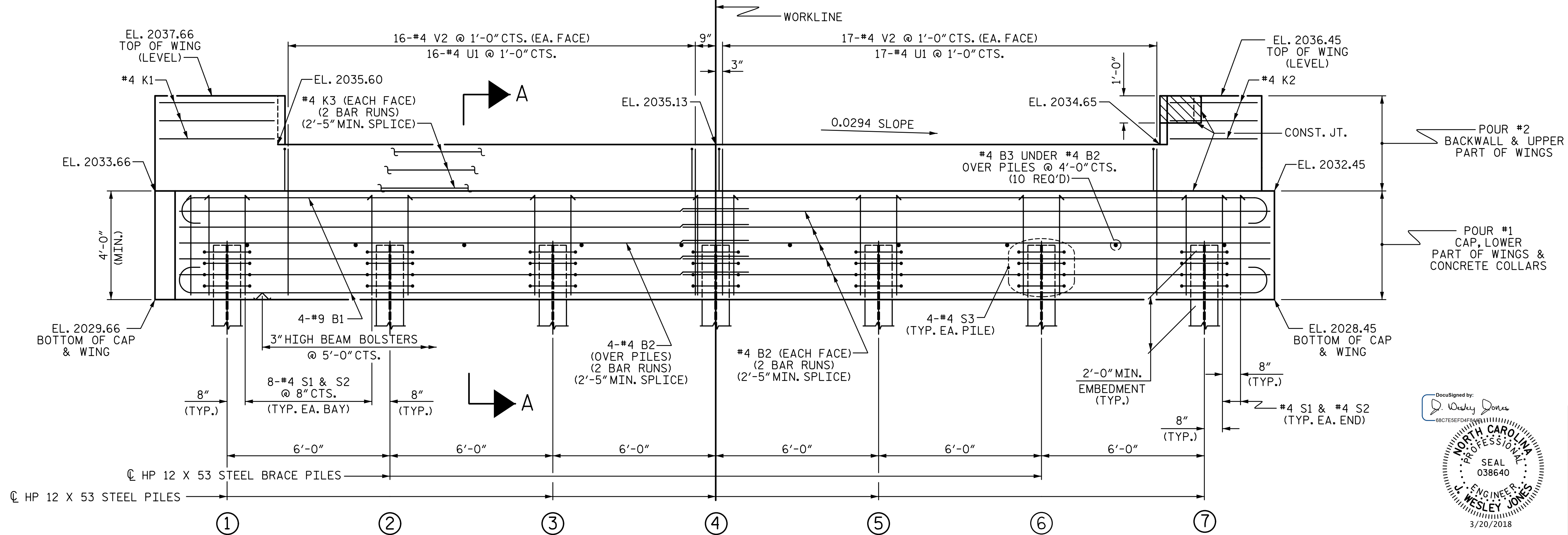
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DESIGN ENGINEER OF RECORD : JWJ DATE : 3-18



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 5 OF 5.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 5 OF 5.

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NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 5.

FOR WING DETAILS, SEE SHEET 4 OF 5.

TOP OF PILE ELEVATIONS	
①	2031.59
②	2031.42
③	2031.24
④	2031.06
⑤	2030.89
⑥	2030.71
⑦	2030.54

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MACON COUNTY

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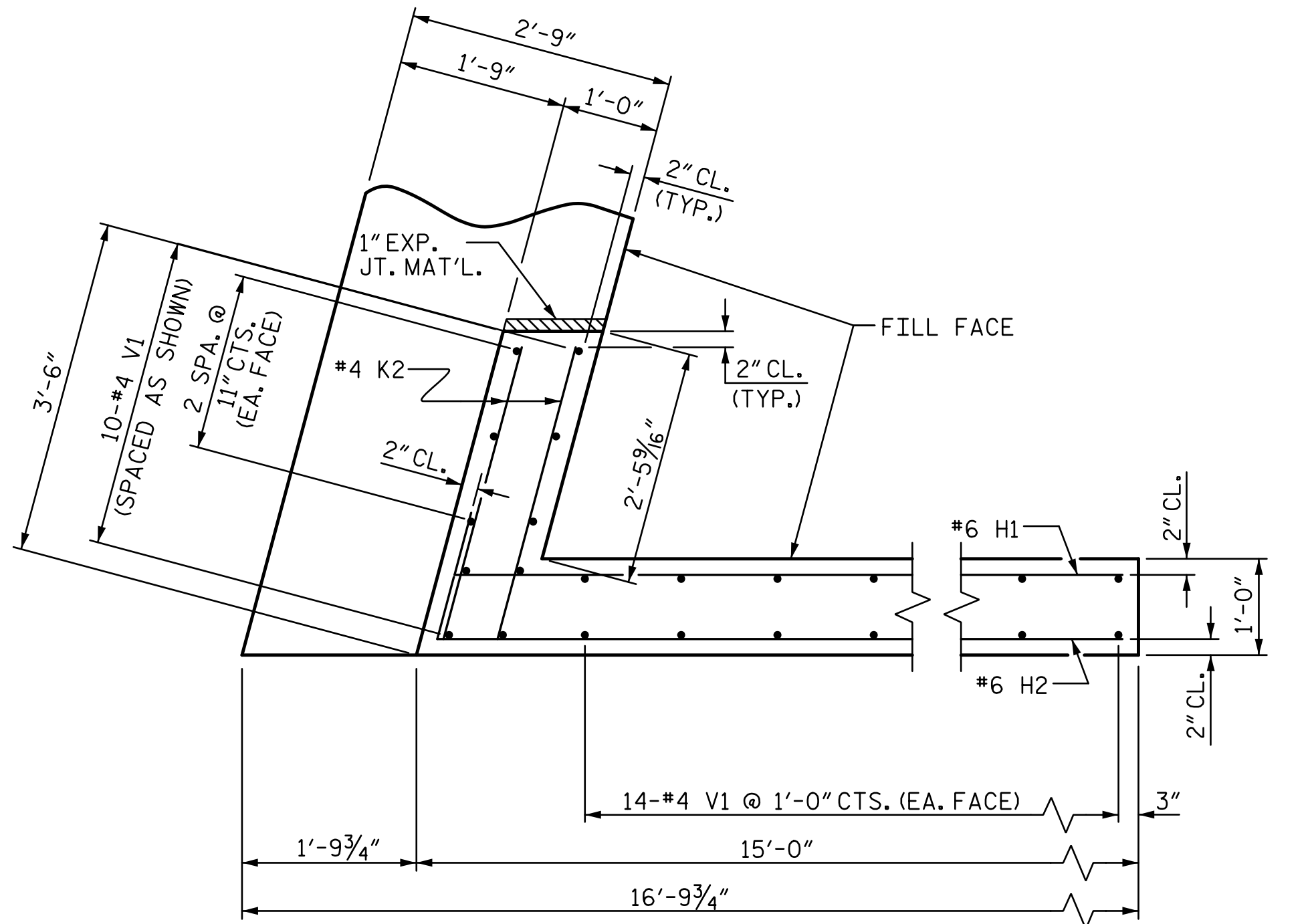
SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

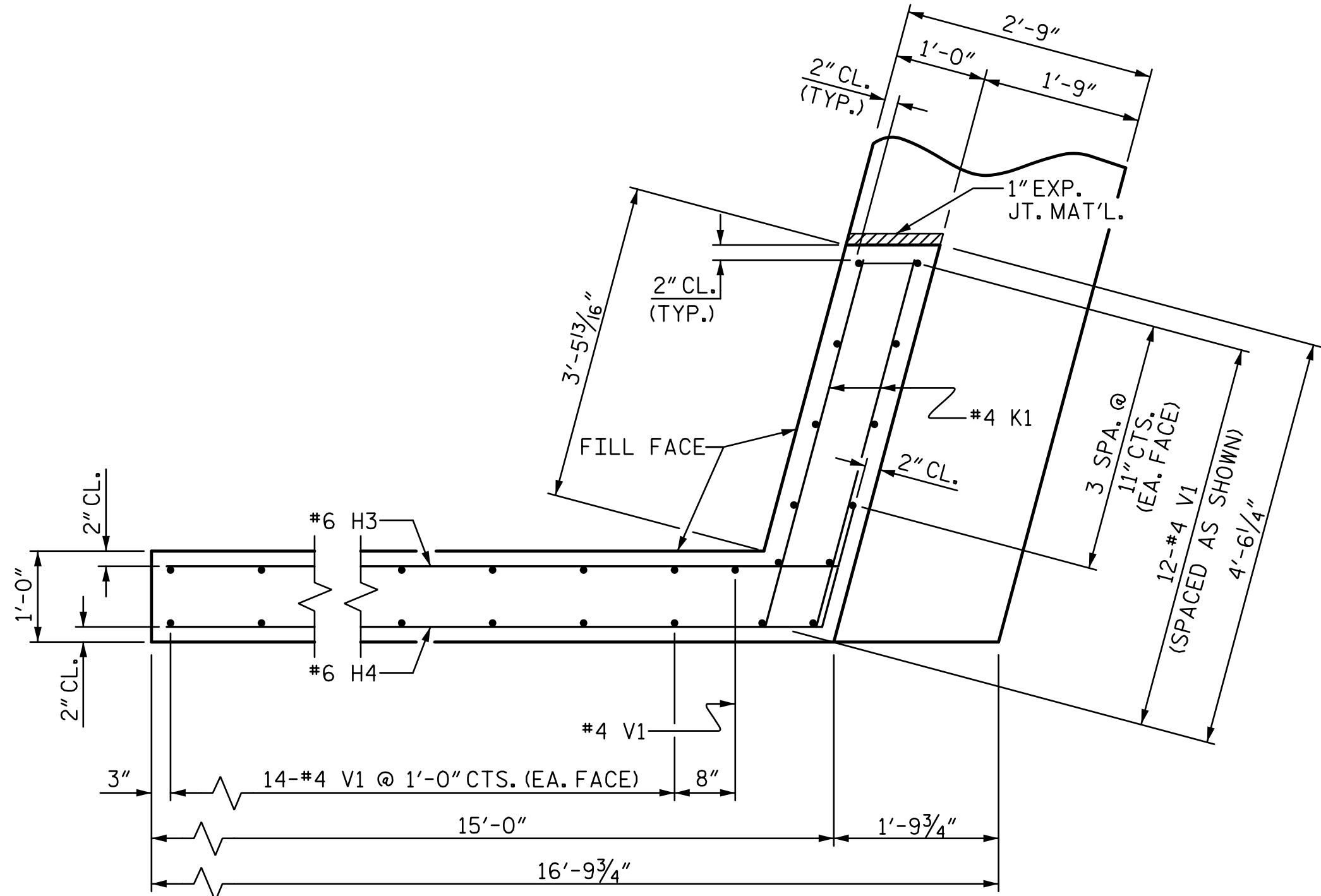
SUBSTRUCTURE
END BENT 2

REVISIONS						SHEET NO. S-17
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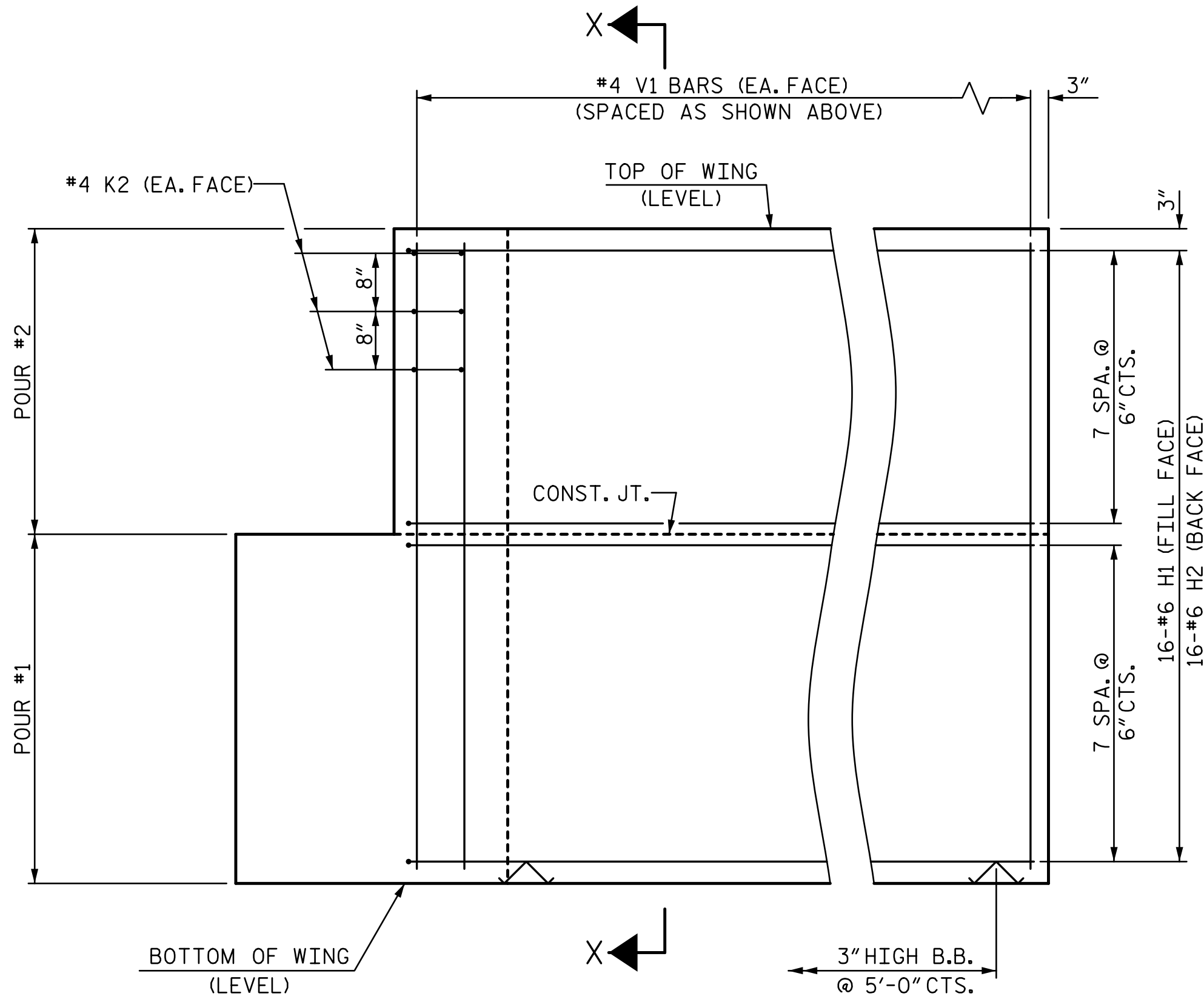
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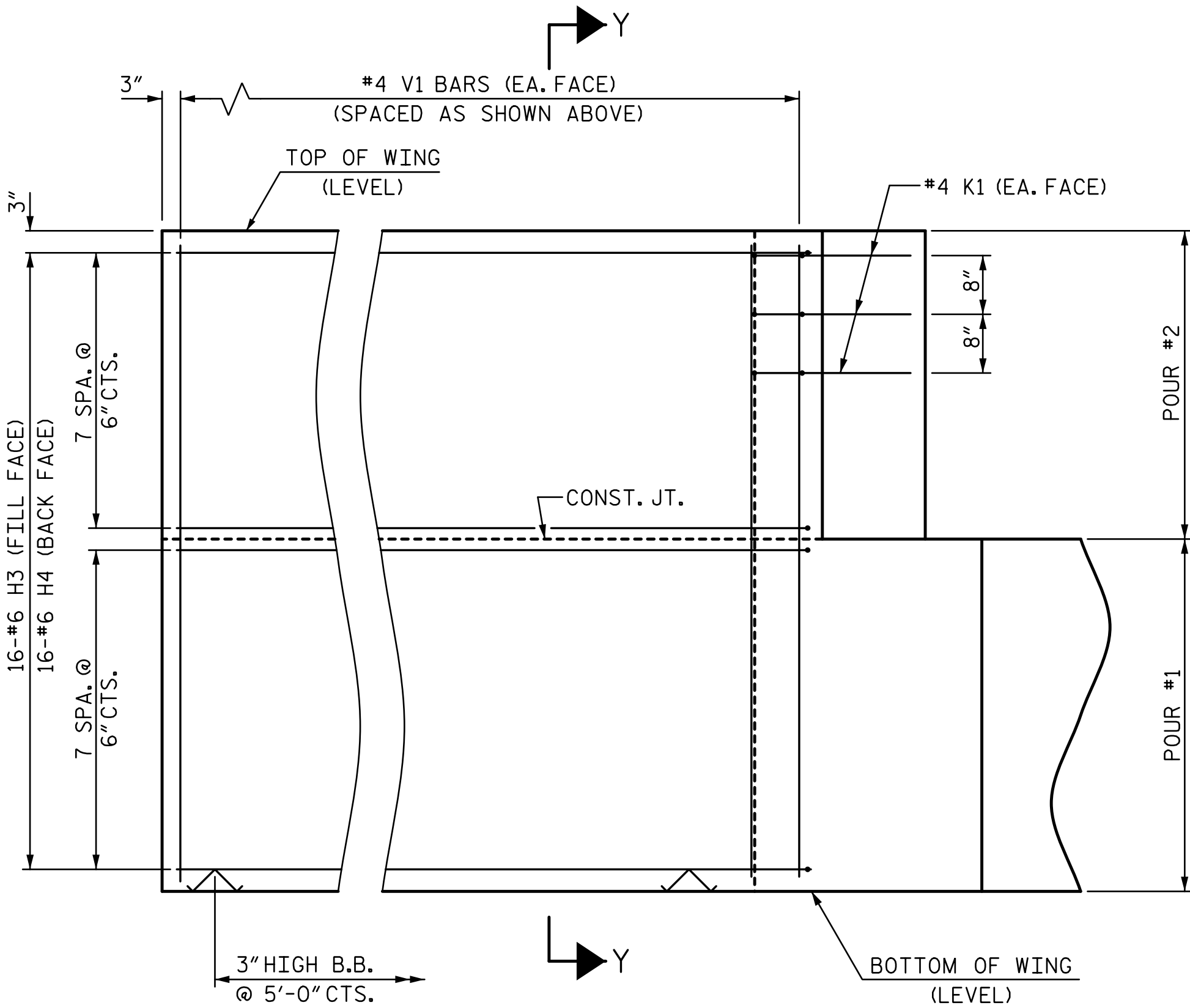
PLAN OF WING (W3)



PLAN OF WING (W4)

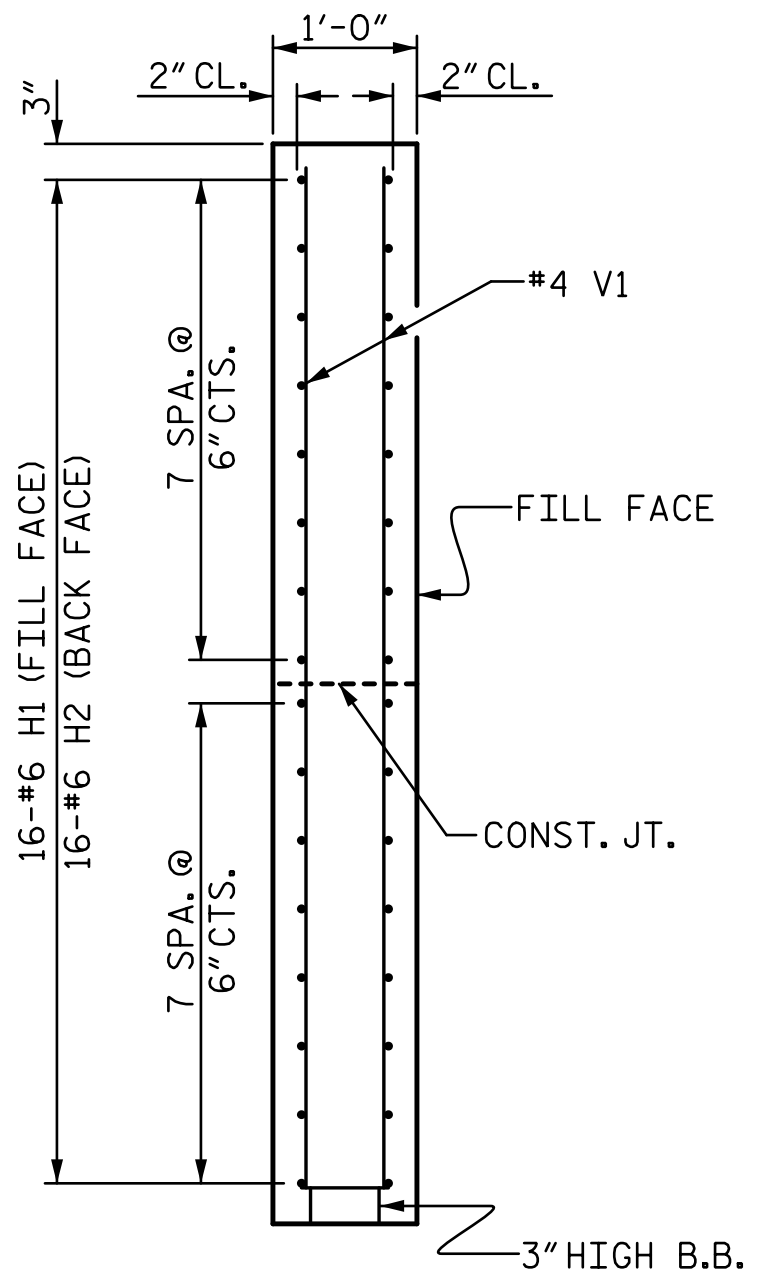


ELEVATION OF WING (W3)

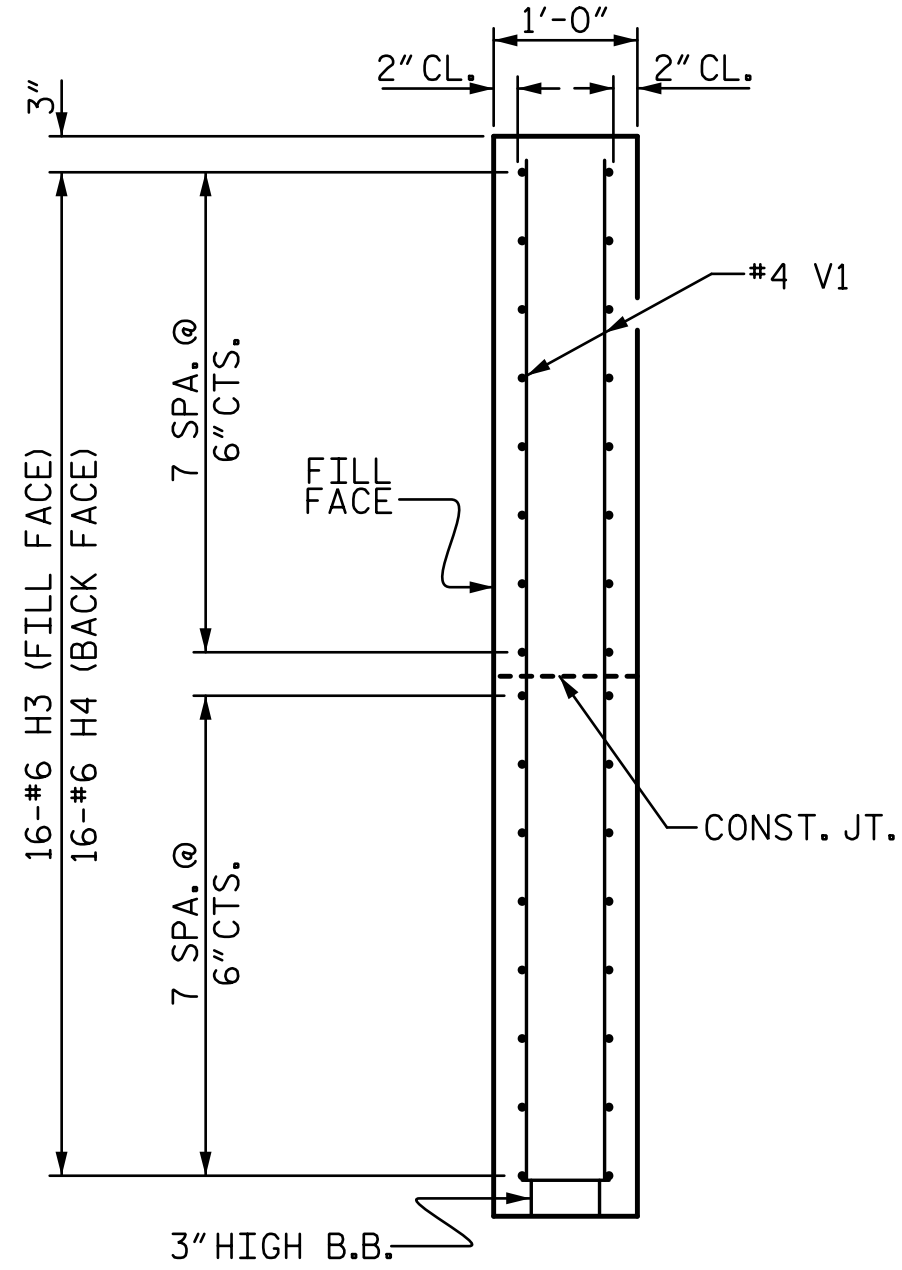


ELEVATION OF WING (W4)

WING DETAILS



SECTION X-X

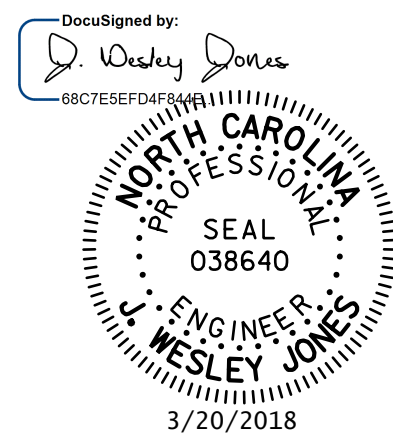


SECTION Y-Y

PROJECT NO. 17BP.14.R.154
MACON COUNTY
STATION: 14+94.00 -L-

SHEET 4 OF 5

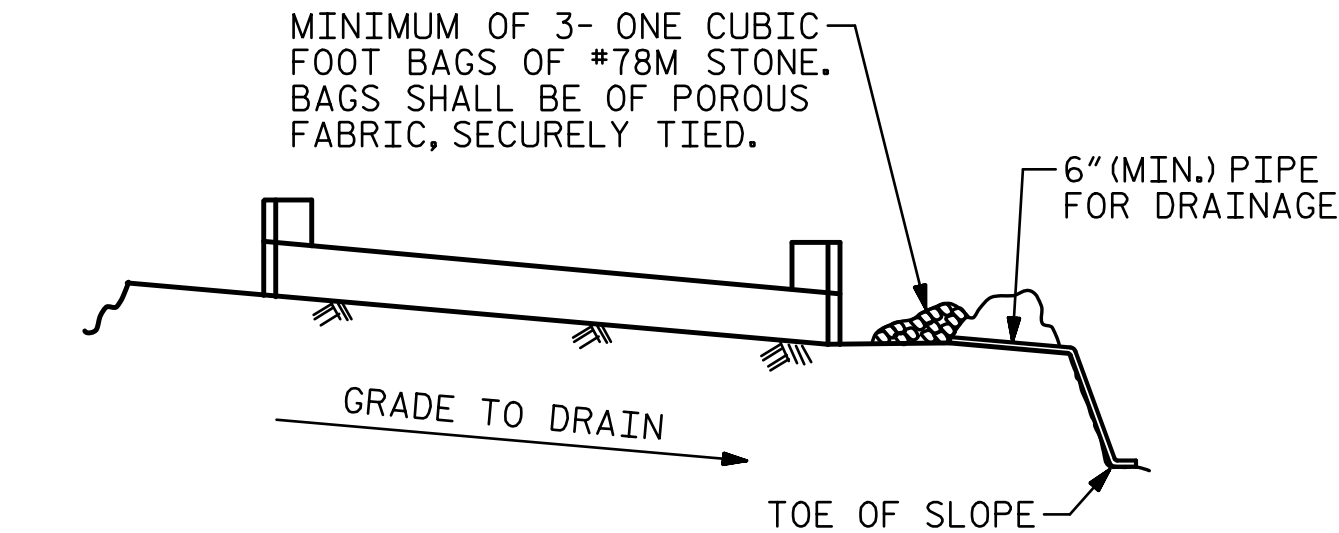
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-18	
SUBSTRUCTURE END BENT 2 WING DETAILS						TOTAL SHEETS 21	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
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2			4				



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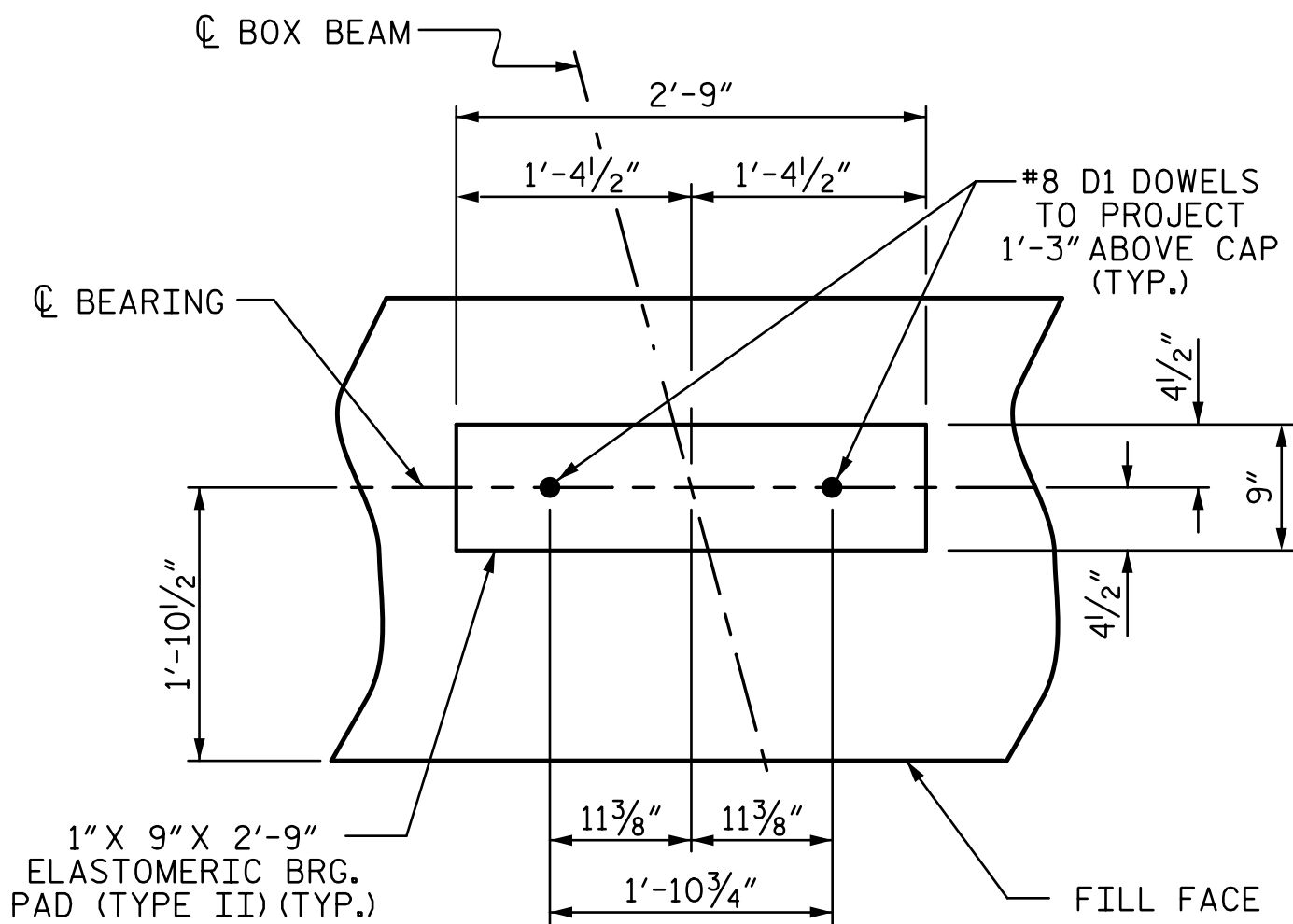


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

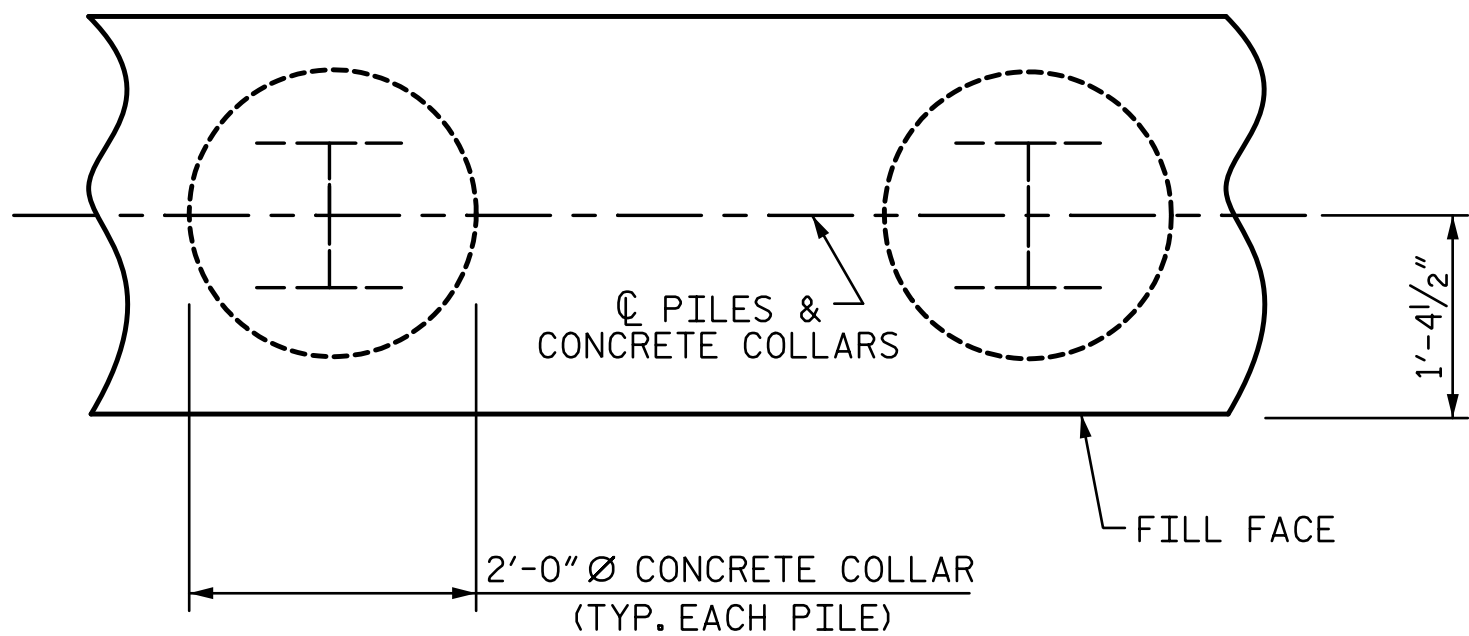
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

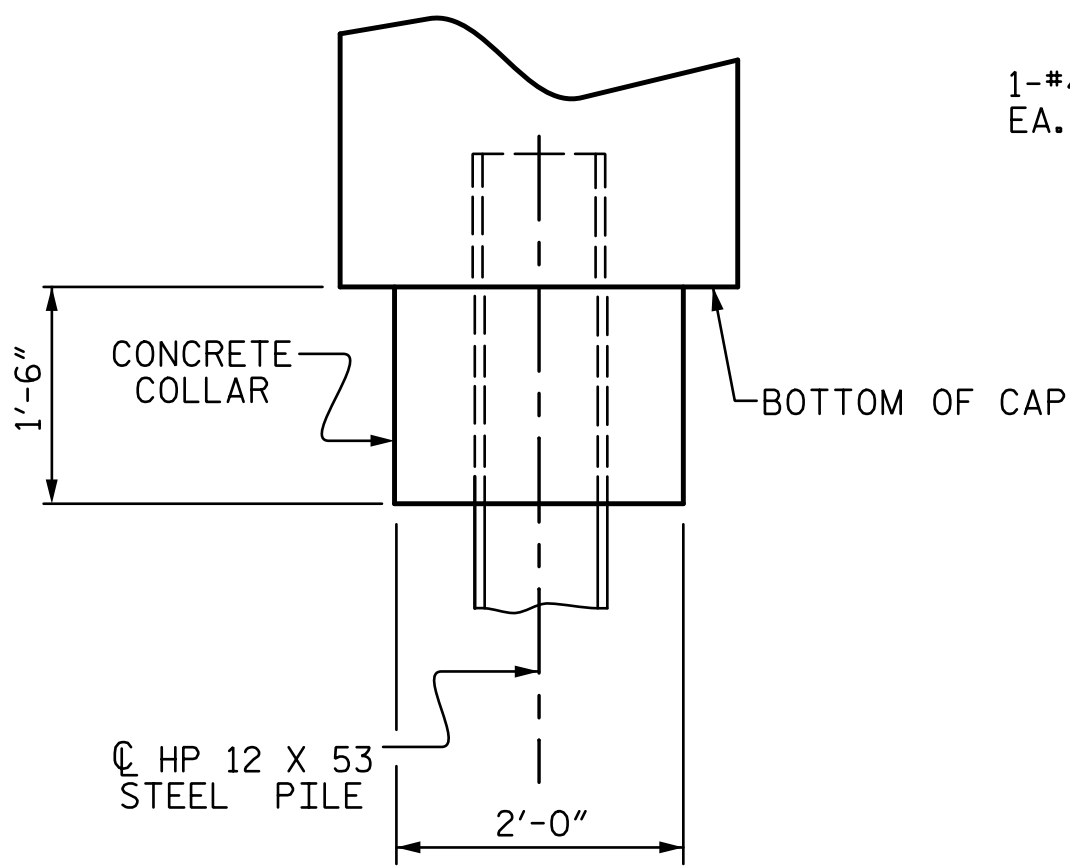


DETAIL "A"

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



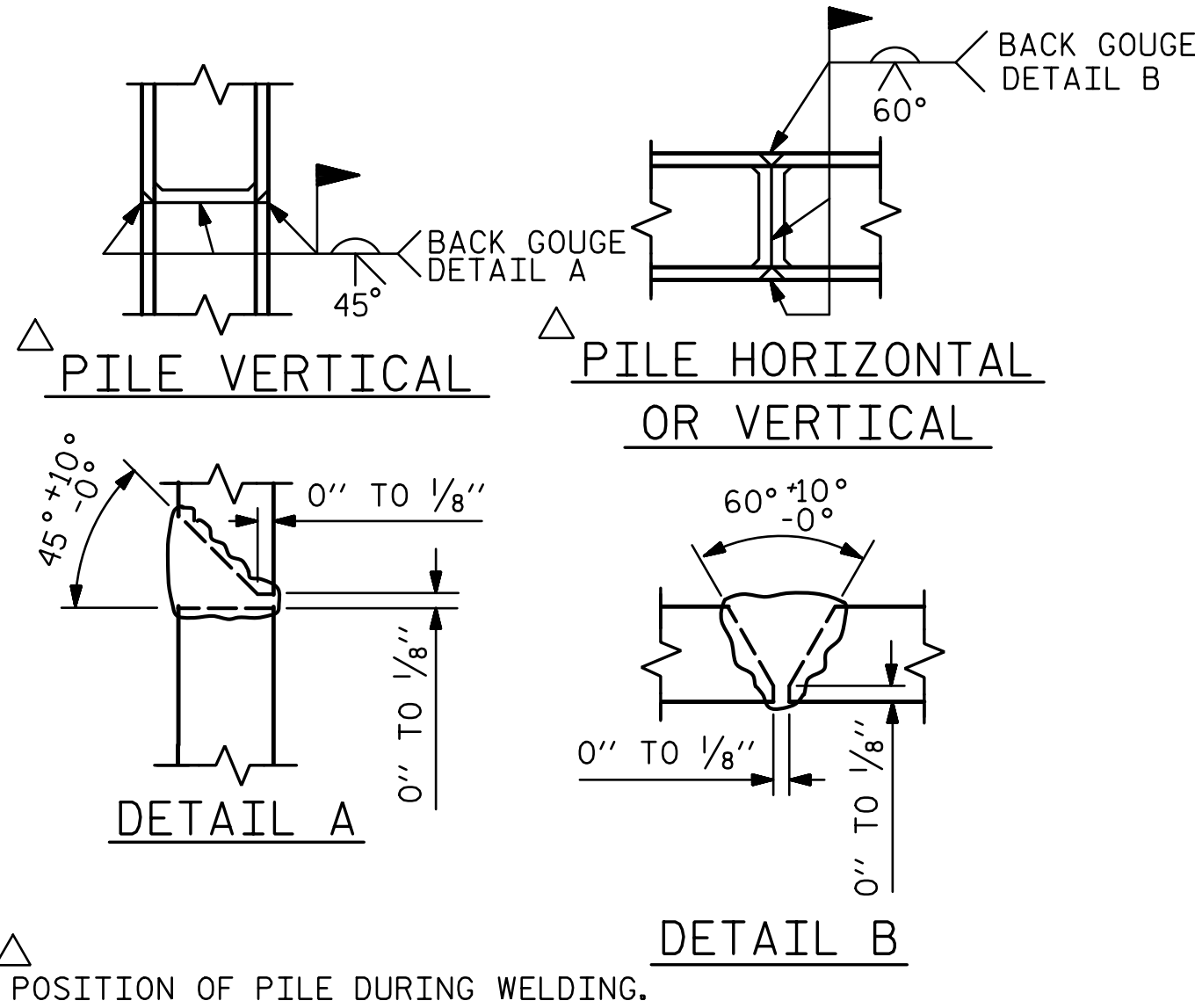
PLAN



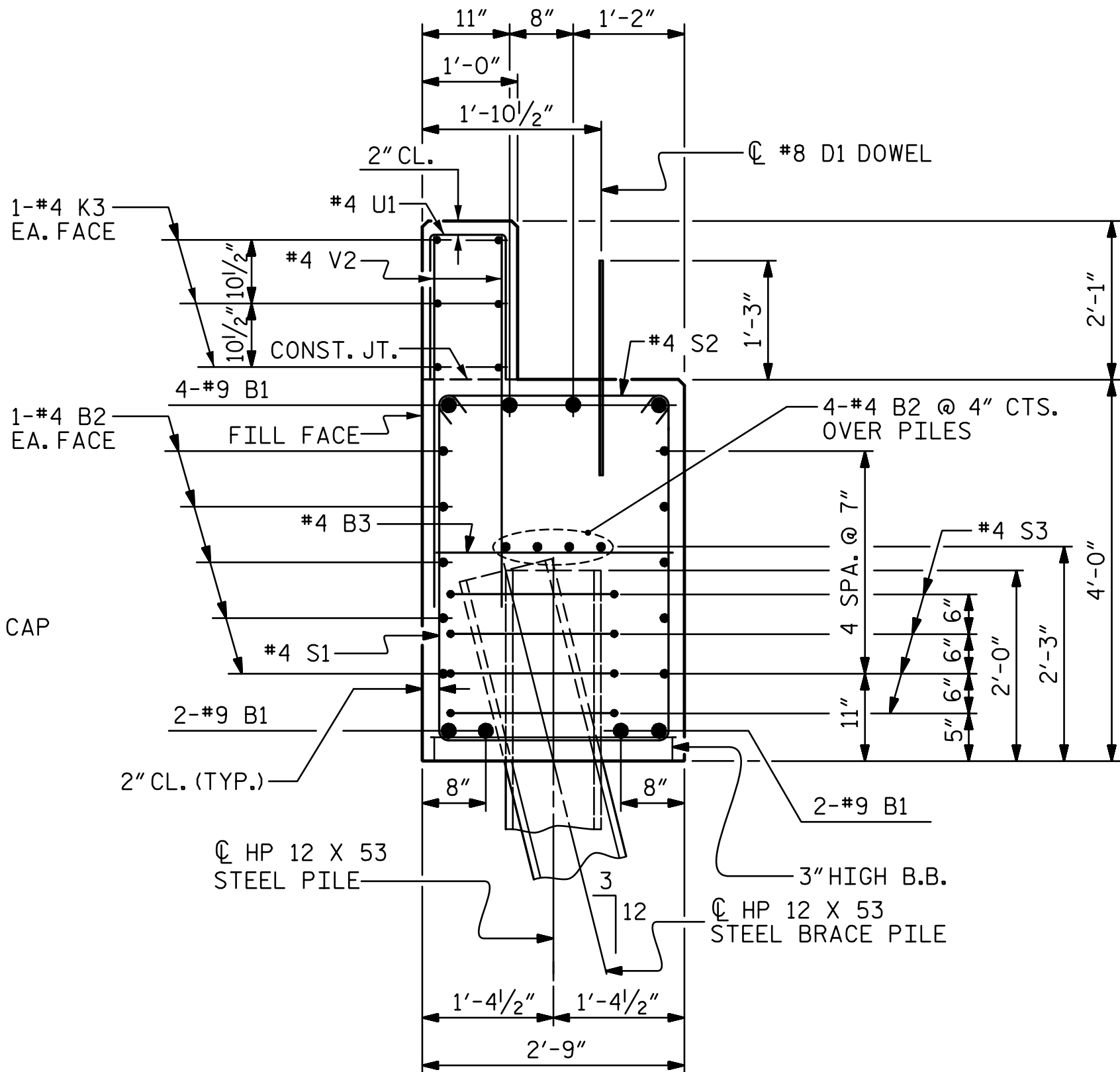
ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



PILE SPLICE DETAILS



SECTION A-A

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

BAR TYPES	
ALL BAR DIMENSIONS ARE OUT TO OUT.	
END BENT 1 HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 455.0	END BENT 2 HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 525.0
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7

BILL OF MATERIAL					
FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	①	42'-6"	1156
B2	28	#4	STR	21'-4"	399
B3	10	#4	STR	2'-5"	16
D1	22	#8	STR	2'-3"	132
H1	16	#6	②	15'-1"	362
H2	16	#6	②	15'-3"	366
H3	16	#6	③	15'-6"	372
H4	16	#6	③	15'-4"	368
K1	6	#4	STR	4'-2"	17
K2	6	#4	STR	3'-1"	12
K3	12	#4	STR	21'-4"	171
S1	52	#4	④	10'-5"	362
S2	52	#4	⑤	3'-2"	110
S3	28	#4	⑥	6'-6"	122
U1	33	#4	⑦	3'-8"	81
V1	79	#4	STR	7'-8"	405
V2	66	#4	STR	5'-9"	254
REINFORCING STEEL (FOR ONE END BENT)					4,705 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					21.9 C.Y.
POUR #2 BACKWALL & UPPER PART OF WINGS					7.8 C.Y.
TOTAL CLASS A CONCRETE					29.7 C.Y.

PROJECT NO. 17BP.14.R.154
MACON COUNTY
STATION: 14+94.00 -L-

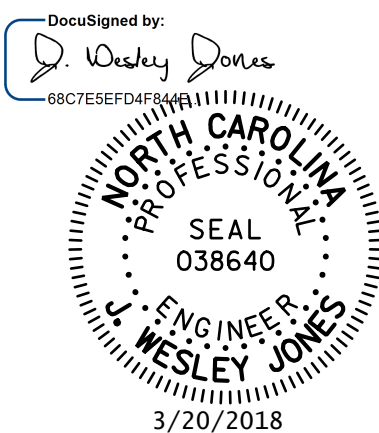
SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENTS 1 & 2
DETAILS

REVISIONS				SHEET NO.
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1			3	
2			4	
TOTAL SHEETS				21

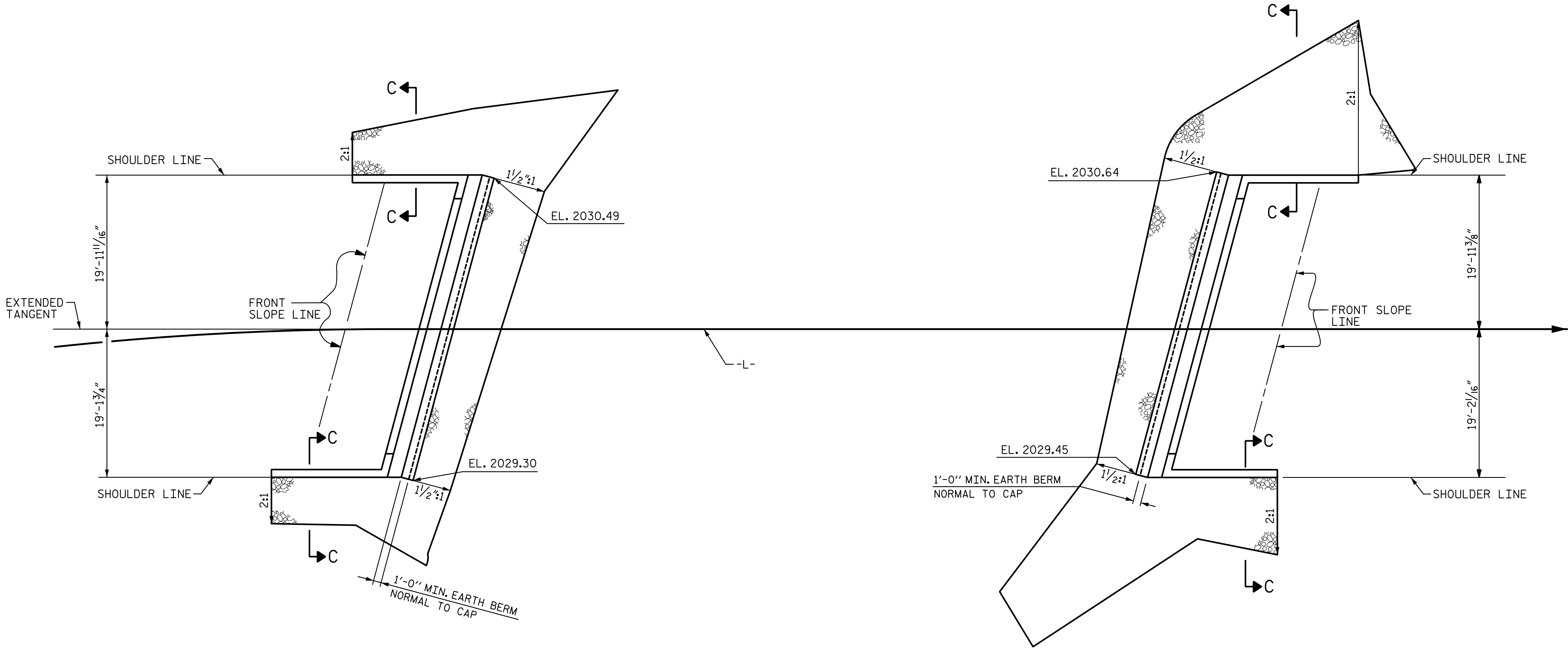


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NC License Number F-0991

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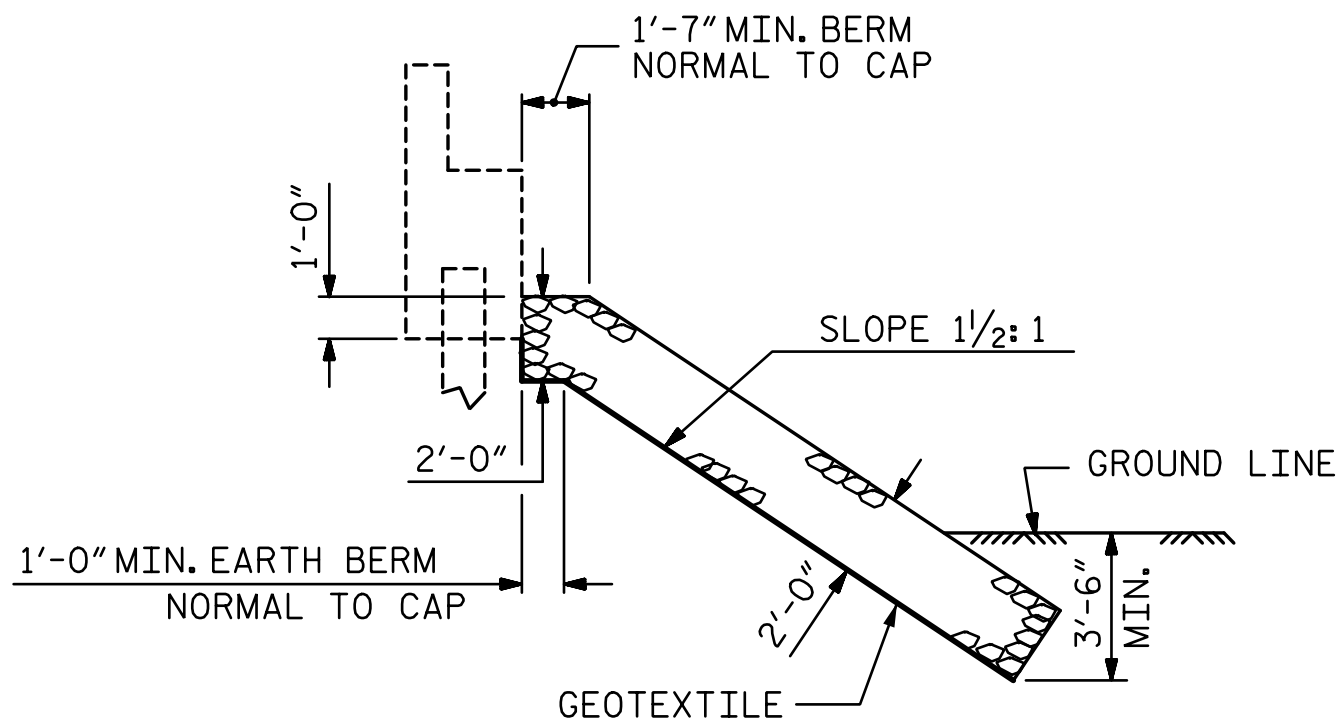
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CHECKED BY :	JWJ	DATE :	6-17
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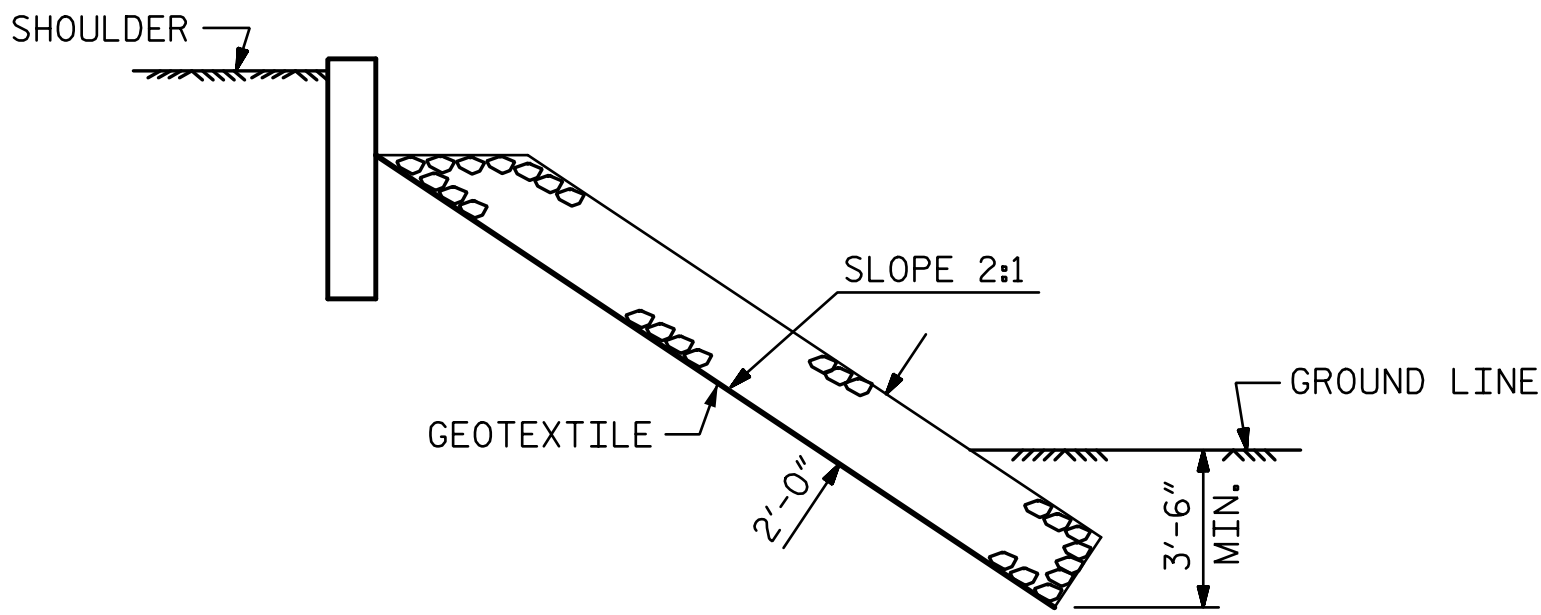


PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 14+94.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	120	135
END BENT 2	165	185

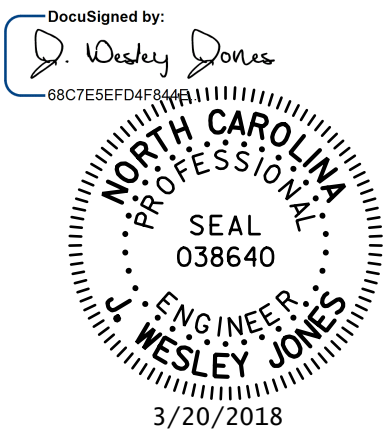


SECTION C-C
BERM RIP RAPPED



SECTION C-C

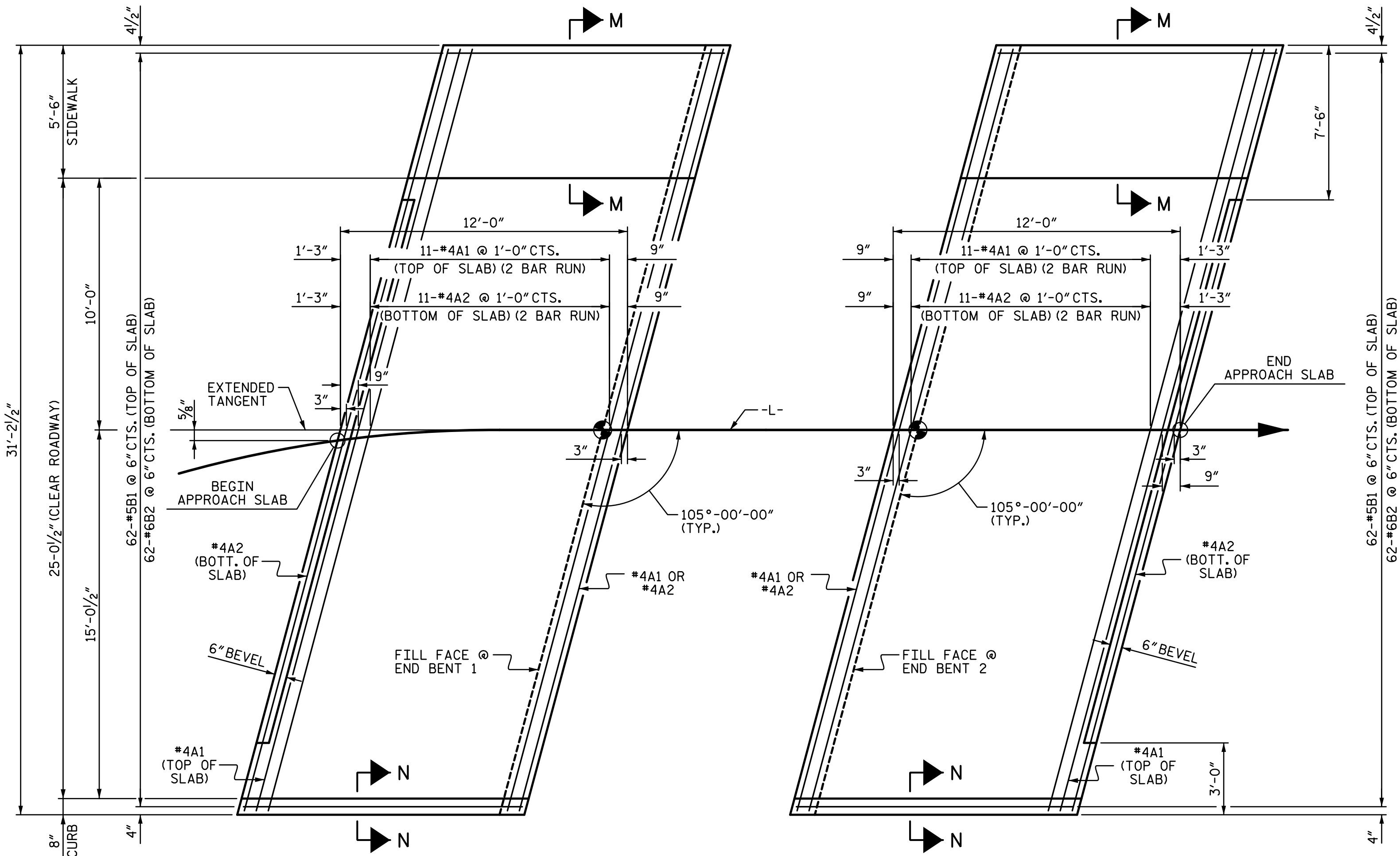
PROJECT NO. 17BP.14.R.154
MACON COUNTY
STATION: 14+94.00 -L-



STV 100 Years
STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

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SIGNATURES COMPLETED

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

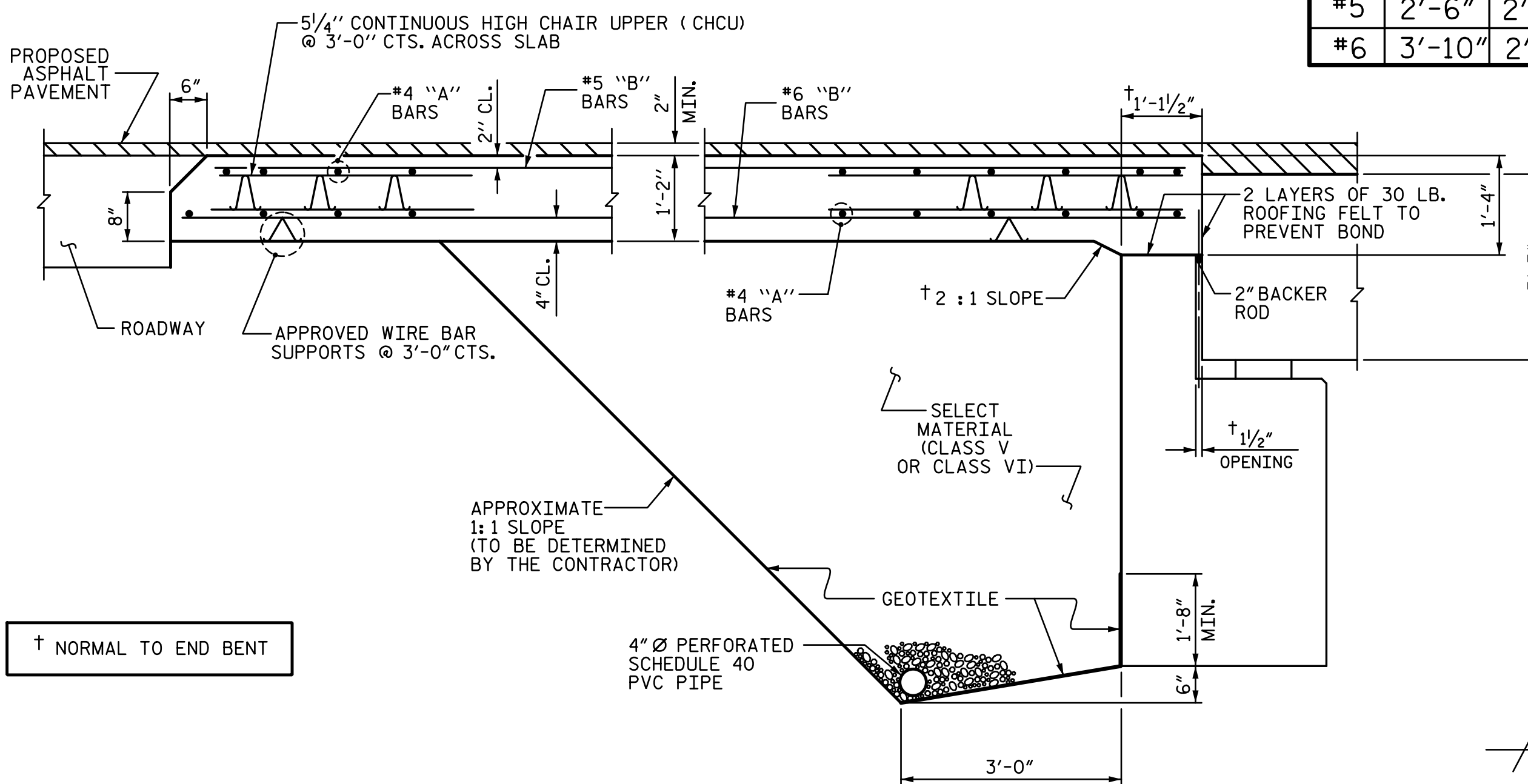


PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.

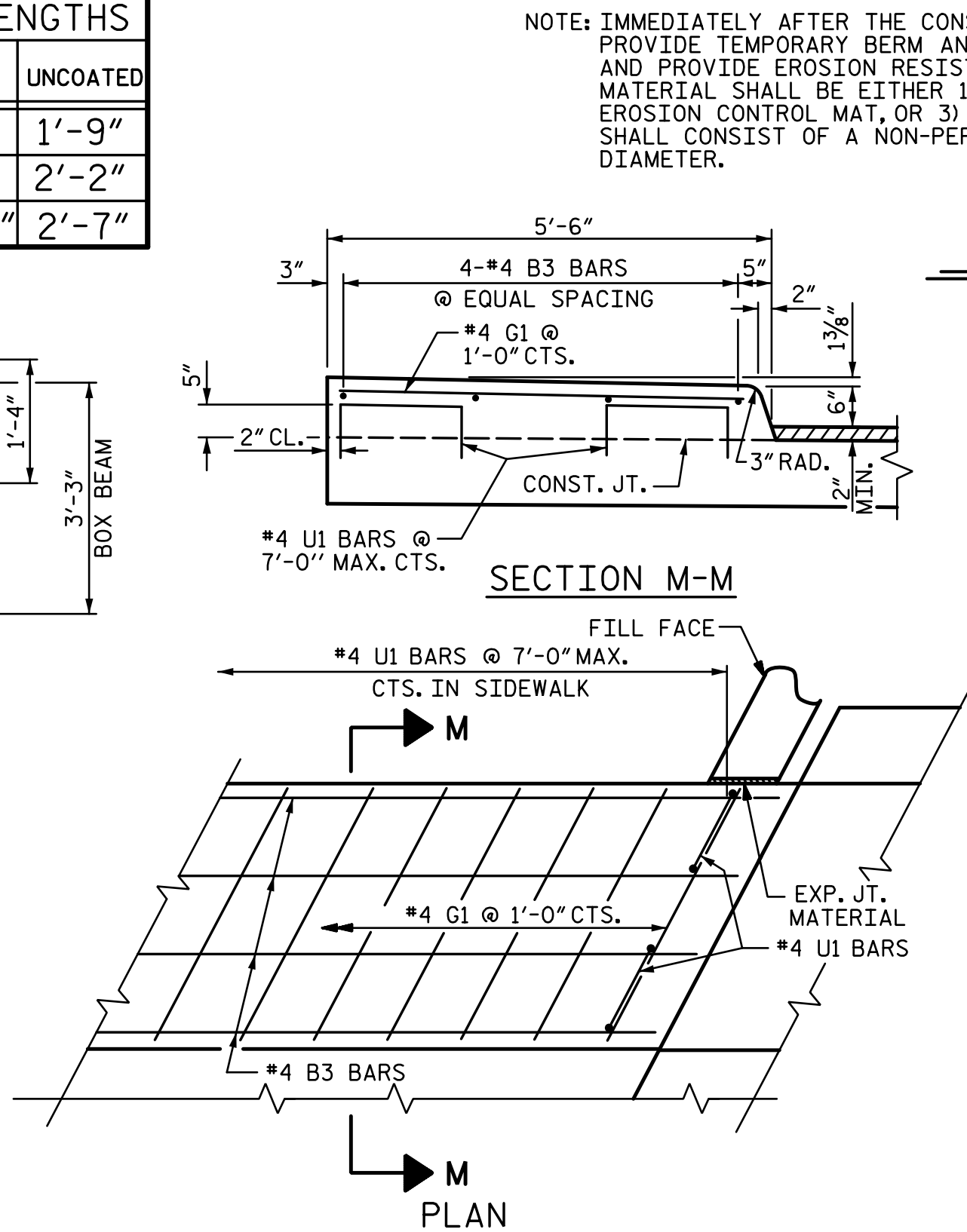
SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)

DRAWN BY :	LGH	DATE :	5-17
CHECKED BY :	JWJ	DATE :	6-17
DESIGN ENGINEER OF RECORD :	JWJ	DATE :	3-18



DETAILS OF SIDEWALK ON APPROACH SLAB

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

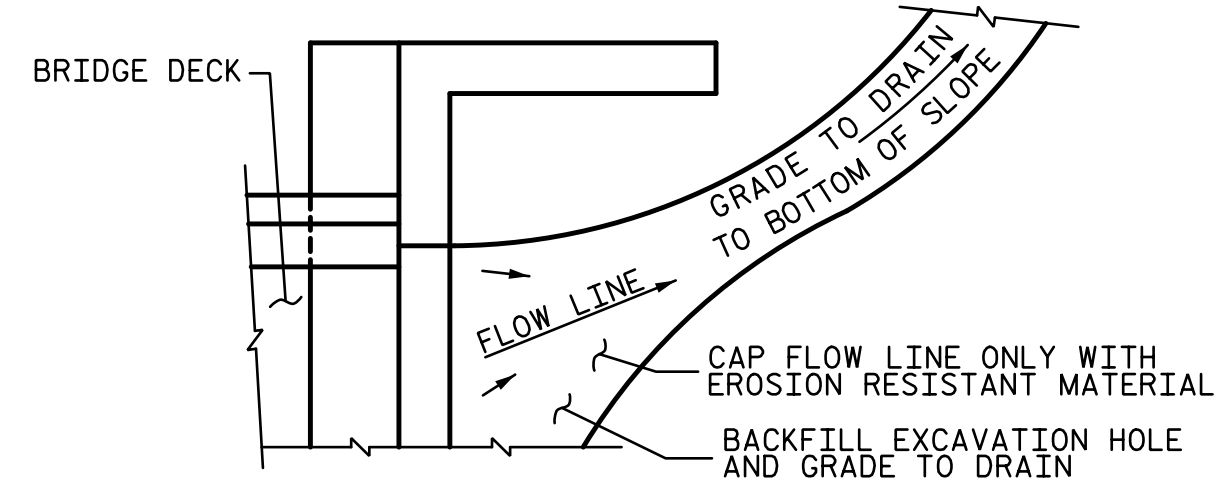
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

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

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

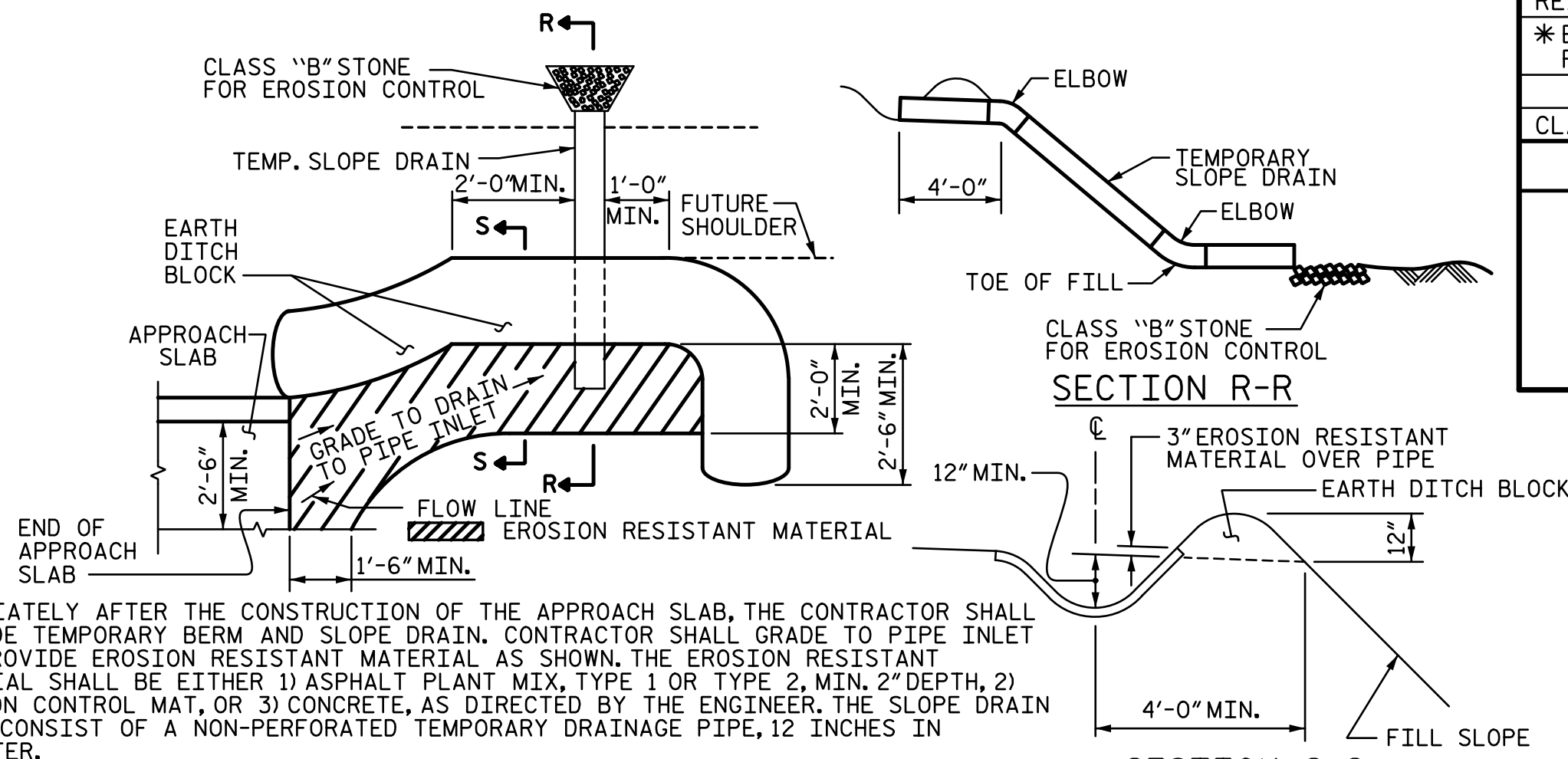
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



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

TEMPORARY DRAINAGE DETAIL

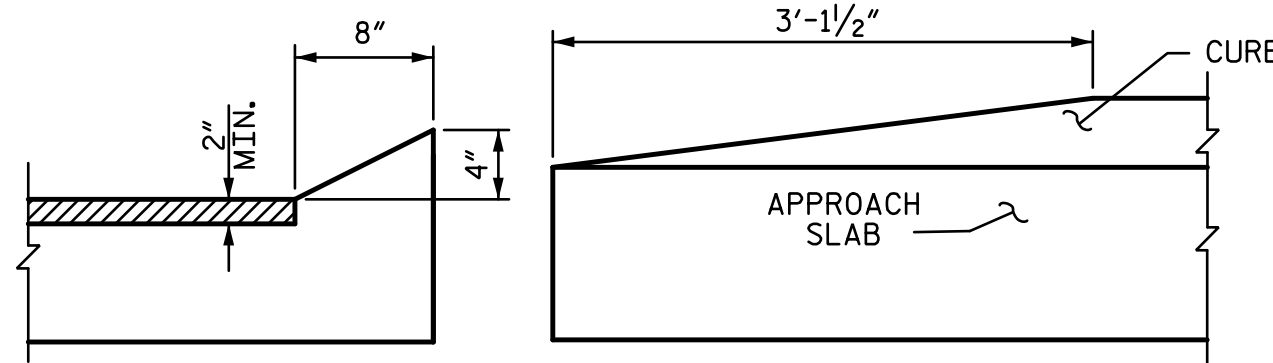


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED.)



SECTION N-N

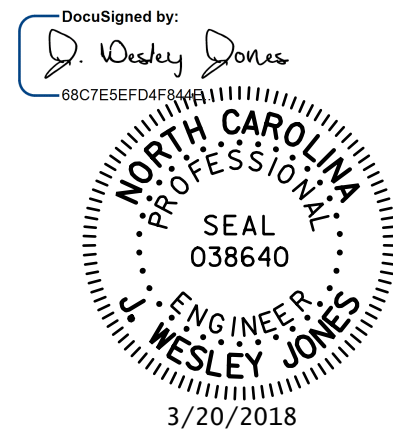
END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. 17BP.14.R.154

MACON COUNTY

STATION: 14+94.00 -L-



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BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	17'-0"	295
A2	26	#4	STR	16'-11"	294
*B1	62	#5	STR	11'-1"	717
B2	62	#6	STR	11'-7"	1,079
*B3	4	#4	STR	11'-7"	31
*G1	12	#4	STR	5'-2"	41
*U1	6	#4	①	3'-0"	12

REINFORCING STEEL	LBS.	1,373
*EPOXY COATED REINFORCING STEEL	LBS.	1,096

CLASS AA CONCRETE	C. Y.	18.0
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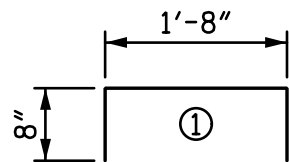
APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	17'-0"	295
A2	26	#4	STR	16'-11"	294
*B1	62	#5	STR	11'-1"	717
B2	62	#6	STR	11'-7"	1,079
*B3	4	#4	STR	11'-7"	31
*G1	12	#4	STR	5'-2"	41
*U1	6	#4	①	3'-0"	12

REINFORCING STEEL	LBS.	1,373
*EPOXY COATED REINFORCING STEEL	LBS.	1,096

CLASS AA CONCRETE	C. Y.	18.0
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BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN