

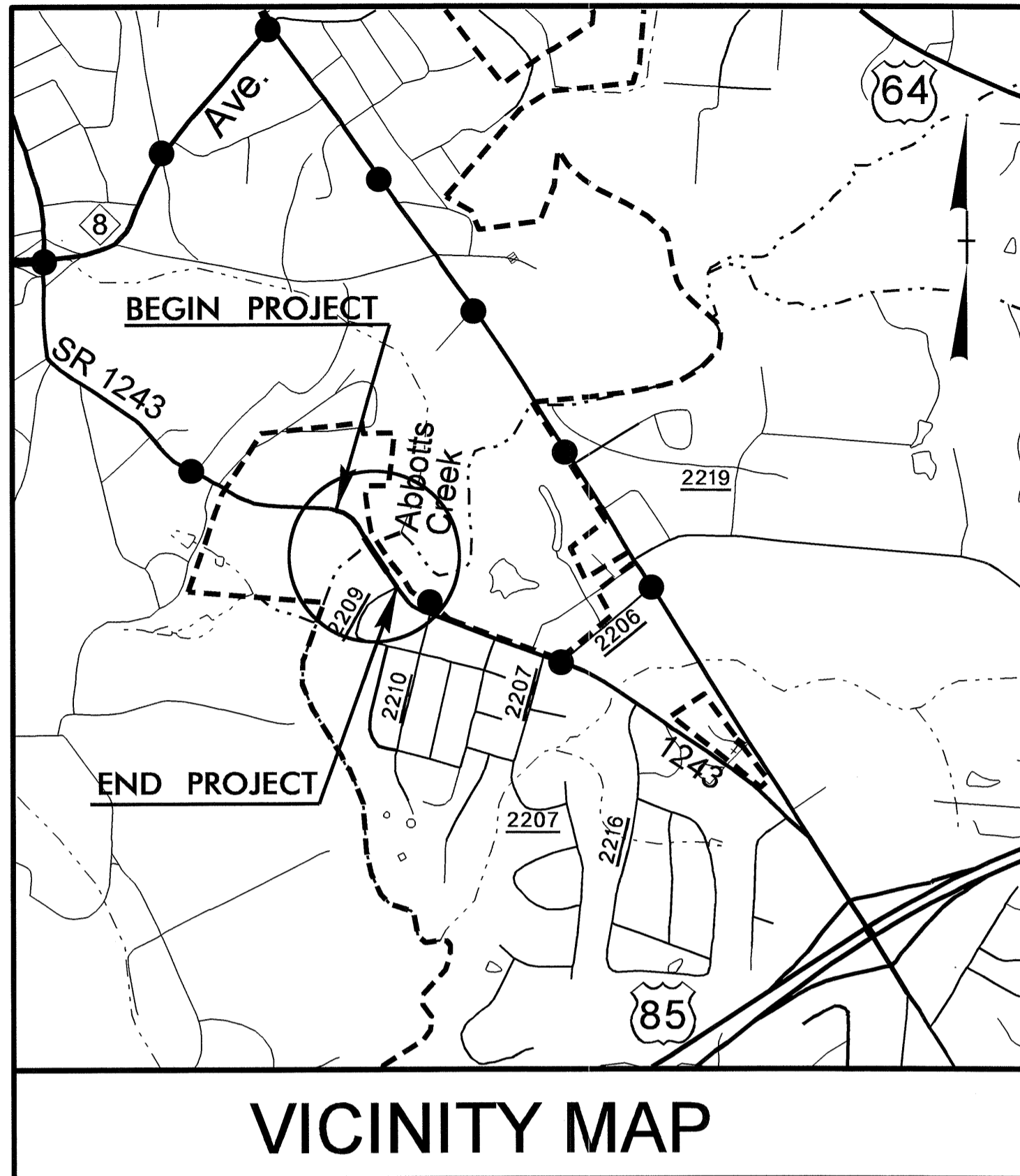
**CONTRACT: C202738 TIP PROJECT: B-4498**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4498		
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
33731.1.1	BRSTP-1243(3)	P.E.	
33731.2.1	BRSTP-1243(3)	UTIL. & RW	
33731.3.1	BRSTP-1243(3)	CONST.	

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

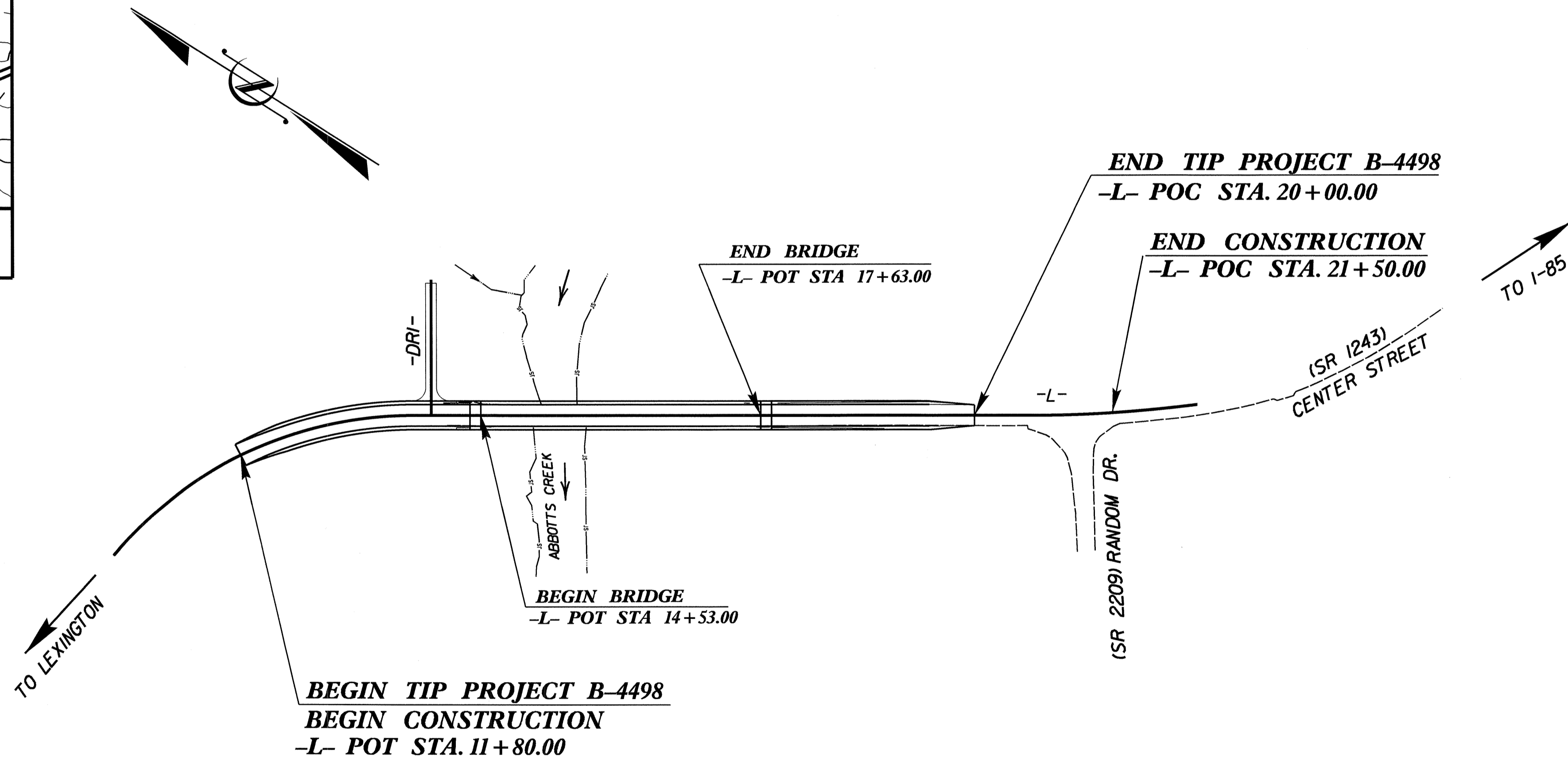
**DAVIDSON COUNTY**

**LOCATION: BRIDGE 199 ON SR 1243 (CENTER STREET) OVER ABBOTTS CREEK**  
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE**

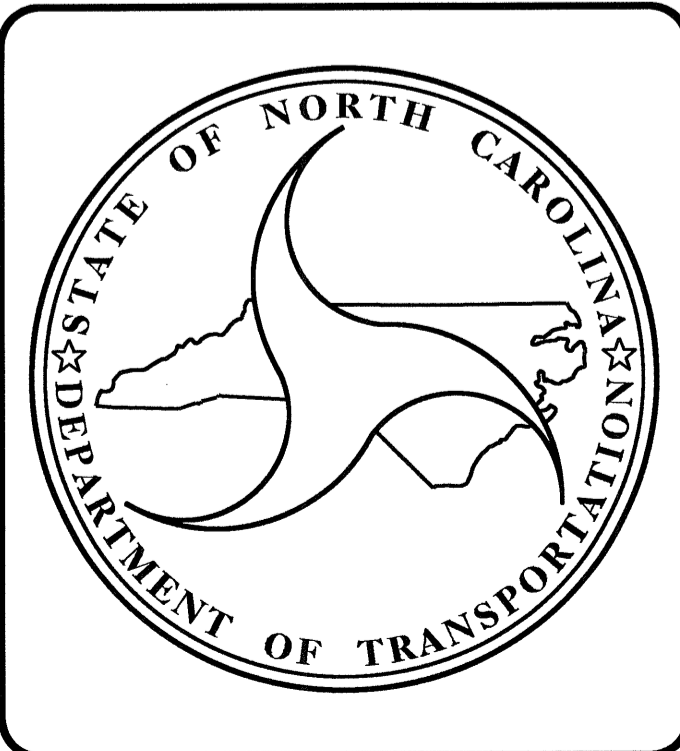


VICINITY MAP

●●●●●●●● DETOUR ROUTE



**STRUCTURE**



**DESIGN DATA**

ADT 2011	=	6270
ADT 2031	=	7962
DHV	=	12 %
D	=	65 %
T	=	4 % *
V	=	45 MPH
* TTST 1%		DUAL 3%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4498	=	0.096 mi.
LENGTH STRUCTURE TIP PROJECT B-4498	=	0.059 mi.
TOTAL LENGTH TIP PROJECT B-4498	=	0.155 mi.

Prepared In the Office of:

**DIVISION OF HIGHWAYS**

2006 STANDARD SPECIFICATIONS

LETTING DATE	<u>APRIL 17, 2012</u>
J. C. FRYE, P.E.	PROJECT ENGINEER
T. H. FANG, P.E.	PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT  
 1000 BIRCH RIDGE DR.  
 RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

\_\_\_\_\_  
 STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION

APPROVED \_\_\_\_\_  
 DIVISION ADMINISTRATOR

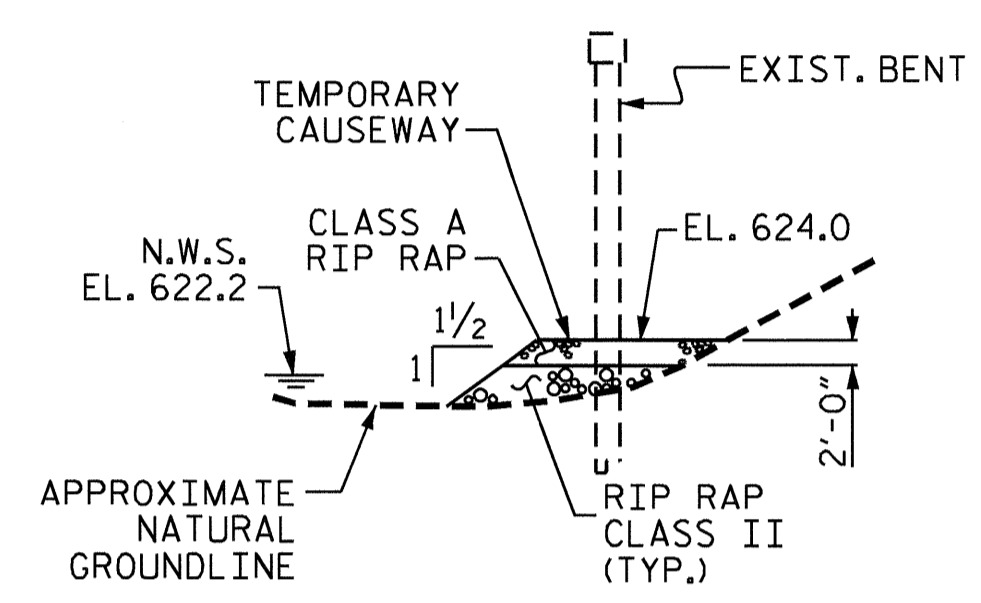
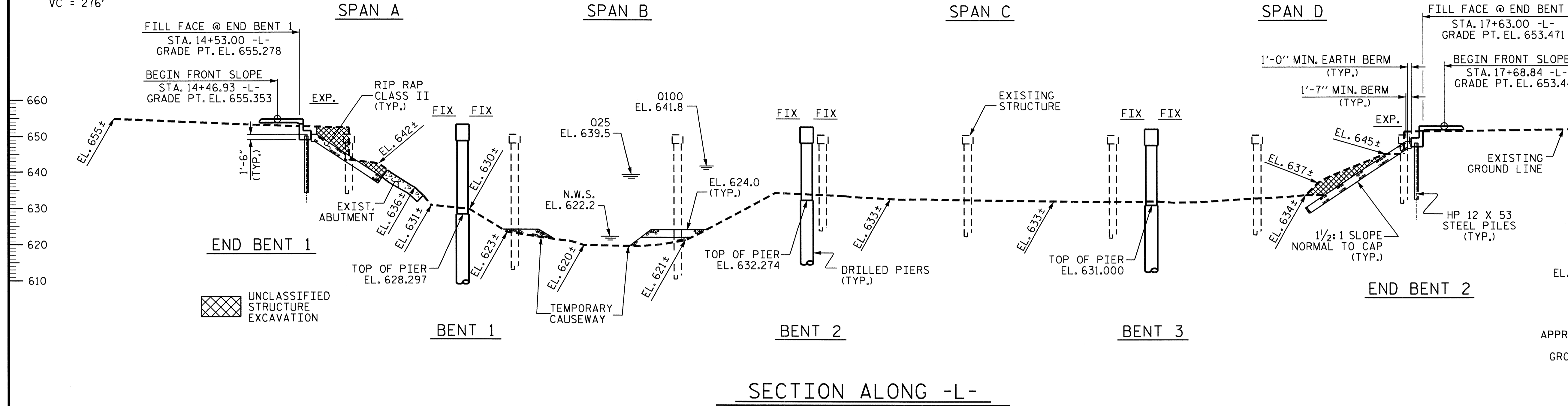
DATE \_\_\_\_\_

GRADE DATA

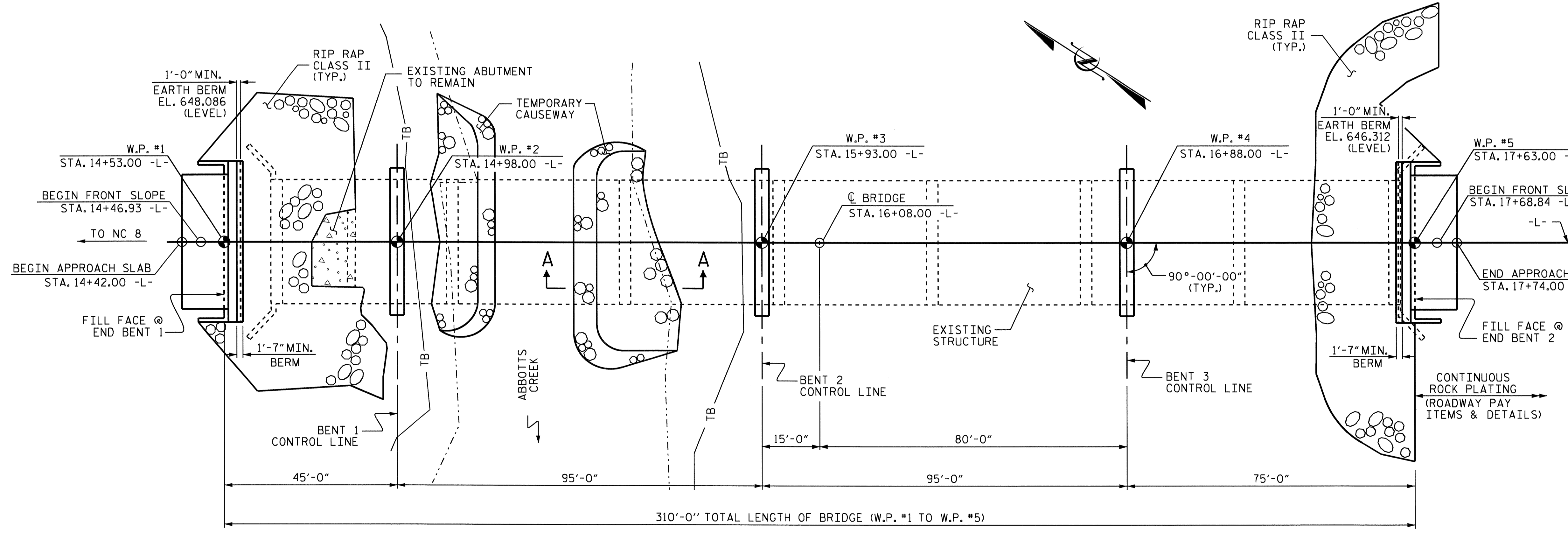
-6.1651%  
-0.5512%  
PI STA. 13+46.00 -L-  
EL. 655.77'  
VC = 276'

GRADE DATA

-0.5512%  
+3.4188%  
PI STA. 18+64.00 -L-  
EL. 652.92'  
VC = 196'



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

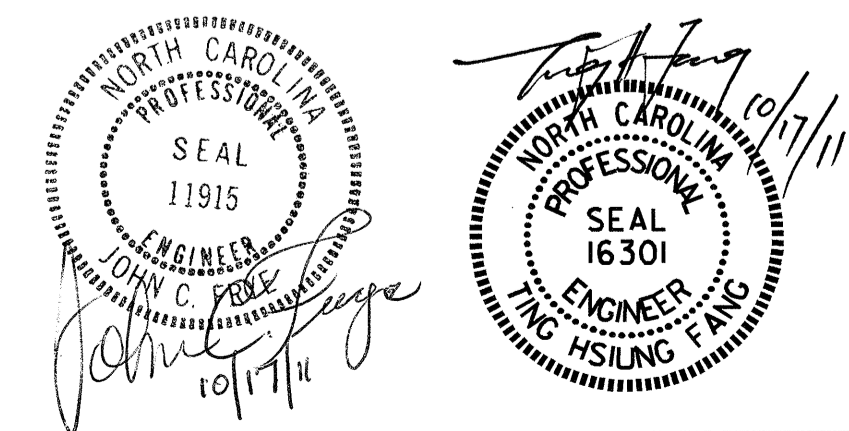


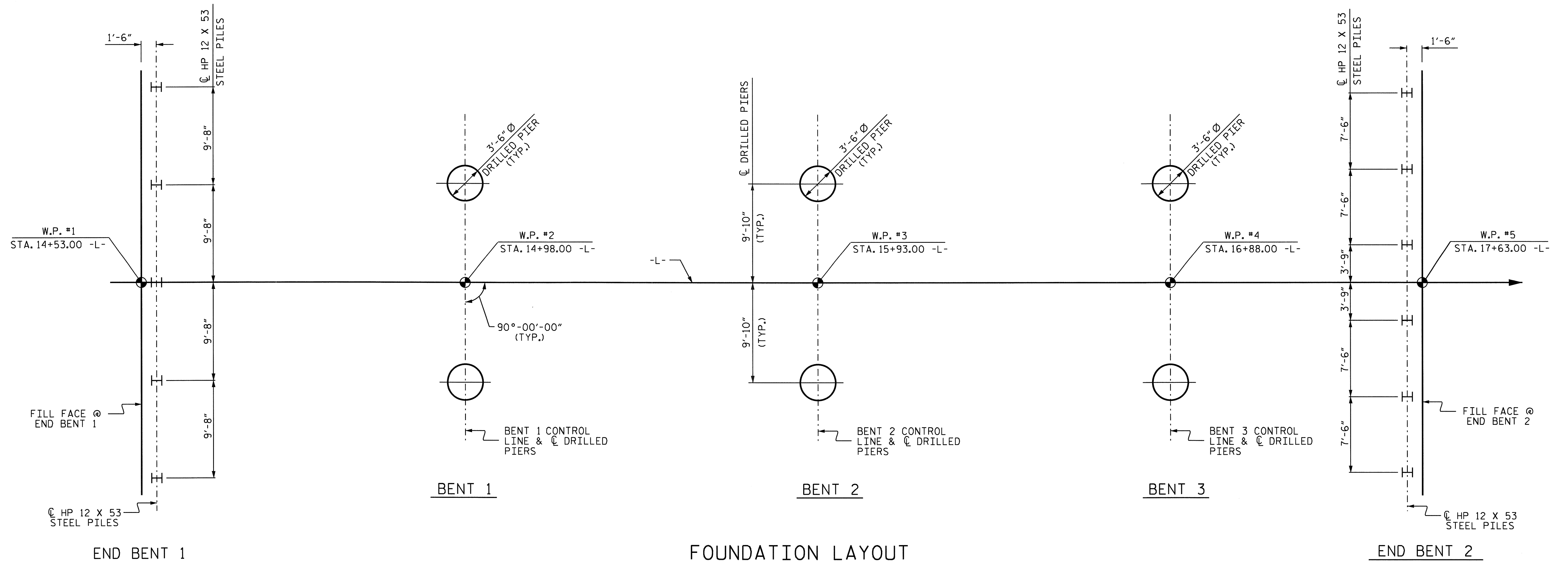
PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-  
SHEET 1 OF 3 REPLACES BRIDGE No. 199

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING					
BRIDGE OVER ABBOTTS CREEK ON SR 1243 BETWEEN NC 8 AND SR 2209					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS
					33

DRAWN BY : Z. H. BROWN DATE : 8/12/09  
CHECKED BY : W. A. DAVIS DATE : 9/1/09

17-OCT-2011 12:10  
K:\TIP\Projects-B\B4498\Structures\Final Plans\B-4498.sd.gdn  
Tfang





**NOTES**

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 167 TONS PER PILE.

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 535.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30.0 TSF.

PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND CASING BELOW ELEVATION 616.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASING.

INSTALL DRILLED PIERS AT BENT 1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 601.0 FT. AND SATISFY THE REQUIRED END RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 612.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 670.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30.0 TSF.

PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. IF REQUIRED, DO NOT EXTEND CASING BELOW ELEVATION 616.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASING.

INSTALL DRILLED PIERS AT BENT 2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 589.0 FT. (LT), 599.0 FT. (RT) AND SATISFY THE REQUIRED END RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 611.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRILLED PIERS AT BENT 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 615.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30.0 TSF.

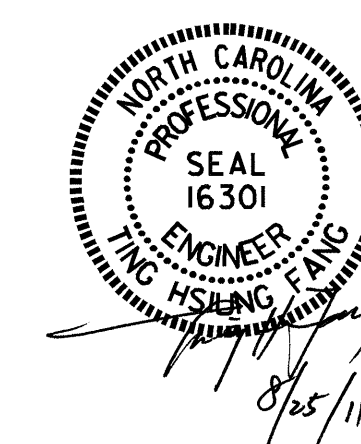
PERMANENT STEEL CASING MAY BE REQUIRED FOR DRILLED PIERS AT BENT 3. IF REQUIRED, DO NOT EXTEND CASING BELOW ELEVATION 618.0 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASING.

INSTALL DRILLED PIERS AT BENT 3 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 601.0 FT. (LT), 596.0 FT. (RT) AND SATISFY THE REQUIRED END RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 3 IS ELEVATION 608.0 FT. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. SEE DRILLED PIER SPECIAL PROVISION.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 183 TONS PER PILE.



PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**GENERAL DRAWING**

BRIDGE OVER ABBOTTS  
CREEK ON SR 1243 BETWEEN  
NC 8 AND SR 2209

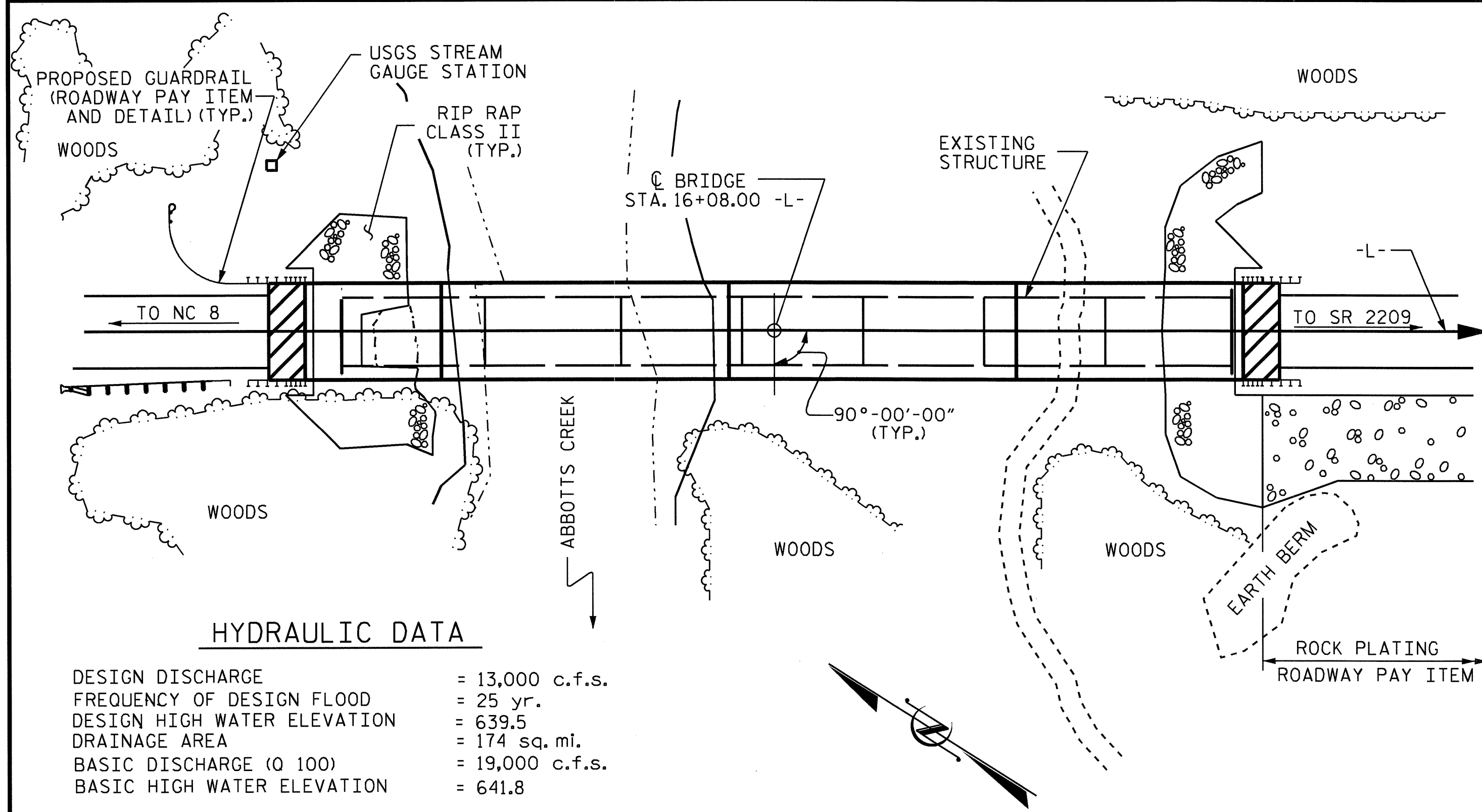
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : H. B. SHAH DATE : 12/31/09  
CHECKED BY : T. H. FANG DATE : 1/11/10

TOTAL BILL OF MATERIAL

	CONST. MAINT. & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES	TWO BAR METAL RAIL	1'-2" X 2'-11" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS		
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	TON	SO. YD.	LUMP SUM	NO.	LIN. FT.	
SUPERSTRUCTURE													600.50	615.5			LUMP SUM	48	3,688.5	
END BENT 1								20.8		3,033		5	100		280	400				
BENT 1			25	30	24.6			34.0		9,820	1,964									
BENT 2			33	44	32.5			31.7		10,491	2,211									
BENT 3			26	39	26.0			32.1		9,949	2,005									
END BENT 2								21.0		3,113		6	240		250	360				
TOTAL	LUMP SUM	LUMP SUM	84	113	83.1	1	LUMP SUM	139.6	LUMP SUM	36,406	6,180	11	340	600.50	615.5	530	760	LUMP SUM	48	3,688.5

BM#2 : RR SPIKE IN BASE OF 20" BIRCH TREE, -L- STA. 14+90.72, 101.71' LT., ELEV. 617.62'



HYDRAULIC DATA

DESIGN DISCHARGE = 13,000 c.f.s.  
 FREQUENCY OF DESIGN FLOOD = 25 yr.  
 DESIGN HIGH WATER ELEVATION = 639.5  
 DRAINAGE AREA = 174 sq. mi.  
 BASIC DISCHARGE (Q 100) = 19,000 c.f.s.  
 BASIC HIGH WATER ELEVATION = 641.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 26,000+ c.f.s.  
 FREQUENCY OF OVERTOPPING FLOOD = 500+ yr.  
 OVERTOPPING FLOOD ELEVATION = 653.4

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.

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

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

IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+08.00 -L-".

THE EXISTING STRUCTURE CONSISTING OF 7 SPANS; 2 @ 45'-0", 5 @ 40'-0" WITH A CLEAR ROADWAY WIDTH OF 26'-0" AND REINFORCED CONCRETE DECK ON I-BEAMS; SUBSTRUCTURE ABUTMENT 1: RC STUB, END BENT 2 & BENT 3 THRU 6: RC CAP AND STEEL PILE, BENT 1 & 2: RC POST & BEAM AND LOCATED ON THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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 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 COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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 16+08.00 -L-.

UNCLASSIFIED STRUCTURE EXCAVATION AT END BENT 1 SHALL BE AS SHOWN ON SHEET S-1 AND THE RIP RAP DETAILS SHEET AS DIRECTED BY THE ENGINEER. UNCLASSIFIED STRUCTURE EXCAVATION AT END BENT 2 SHALL BE THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 AND SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT. LEFT AND 45 FT. RIGHT OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

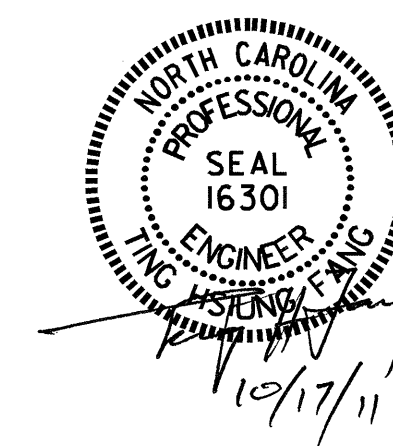
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.



PROJECT NO. B-4498  
 DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING

BRIDGE OVER ABBOTTS  
 CREEK ON SR 1243 BETWEEN  
 NC 8 AND SR 2209

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

DRAWN BY : H. B. SHAH DATE : 12/22/09  
 CHECKED BY : T. H. FANG DATE : 1/11/10

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.158	--	1.75	0.268	1.30	B	EL	46.688	0.489	1.25	B	EL	4.669	0.80	0.268	1.16	B	EL	46.688		
	HL-93 (OPERATING)	N/A		1.618	--	1.35	0.268	1.68	B	EL	46.688	0.489	1.62	B	EL	4.669	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36,000	②	1.592	57,302	1.75	0.268	1.78	B	EL	46.688	0.489	1.67	B	EL	4.669	0.80	0.268	1.59	B	EL	46.688		
	HS-20 (OPERATING)	36,000		2.162	77,845	1.35	0.268	2.31	B	EL	46.688	0.489	2.16	B	EL	4.669	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		3.745	50,564	1.40	0.268	5.24	B	EL	46.688	0.489	5.13	B	EL	4.669	0.80	0.268	3.75	B	EL	46.688	
		SNGARBS2	20,000		2.725	54,497	1.40	0.268	3.81	B	EL	46.688	0.489	3.59	B	EL	4.669	0.80	0.268	2.72	B	EL	46.688	
		SNAGRIS2	22,000		2.554	56,179	1.40	0.268	3.57	B	EL	46.688	0.489	3.31	B	EL	4.669	0.80	0.268	2.55	B	EL	46.688	
		SNCOTTS3	27,250		1.862	50,737	1.40	0.268	2.61	B	EL	46.688	0.489	2.55	B	EL	4.669	0.80	0.268	1.86	B	EL	46.688	
		SNAGGRS4	34,925		1.530	53,450	1.40	0.268	2.14	B	EL	46.688	0.489	2.08	B	EL	4.669	0.80	0.268	1.53	B	EL	46.688	
		SNS5A	35,550		1.498	53,264	1.40	0.268	2.10	B	EL	46.688	0.489	2.09	B	EL	4.669	0.80	0.268	1.50	B	EL	46.688	
		SNS6A	39,950		1.364	54,501	1.40	0.268	1.91	B	EL	46.688	0.489	1.89	B	EL	4.669	0.80	0.268	1.36	B	EL	46.688	
	SNS7B	42,000		1.299	54,549	1.40	0.268	1.82	B	EL	46.688	0.489	1.84	B	EL	4.669	0.80	0.268	1.30	B	EL	46.688		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.661	54,798	1.40	0.268	2.32	B	EL	46.688	0.489	2.27	B	EL	4.669	0.80	0.268	1.66	B	EL	46.688	
		TNT4A	33,075		1.665	55,071	1.40	0.268	2.33	B	EL	46.688	0.489	2.22	B	EL	4.669	0.80	0.268	1.67	B	EL	46.688	
		TNT6A	41,600		1.352	56,227	1.40	0.268	1.89	B	EL	46.688	0.489	1.93	B	EL	4.669	0.80	0.268	1.35	B	EL	46.688	
		TNT7A	42,000		1.353	56,834	1.40	0.268	1.89	B	EL	46.688	0.489	1.90	B	EL	4.669	0.80	0.268	1.35	B	EL	46.688	
		TNT7B	42,000		1.387	58,266	1.40	0.268	1.94	B	EL	46.688	0.489	1.81	B	EL	4.669	0.80	0.268	1.39	B	EL	46.688	
		TNAGRIT4	43,000		1.329	57,150	1.40	0.268	1.86	B	EL	46.688	0.489	1.76	B	EL	4.669	0.80	0.268	1.33	B	EL	46.688	
TNAGT5A		45,000		1.258	56,591	1.40	0.268	1.76	B	EL	46.688	0.489	1.73	B	EL	4.669	0.80	0.268	1.26	B	EL	46.688		
TNAGT5B	45,000		③	1.246	56,085	1.40	0.268	1.74	B	EL	46.688	0.489	1.68	B	EL	4.669	0.80	0.268	1.25	B	EL	46.688		

### LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	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)

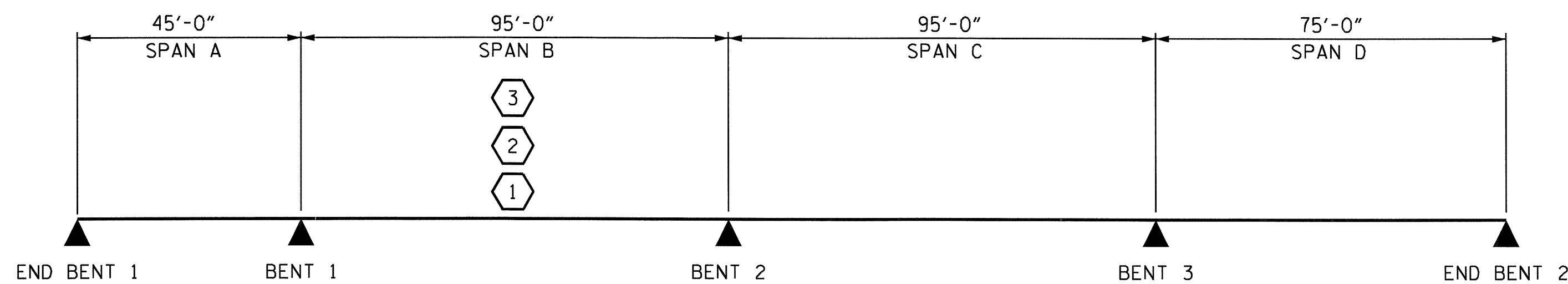
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

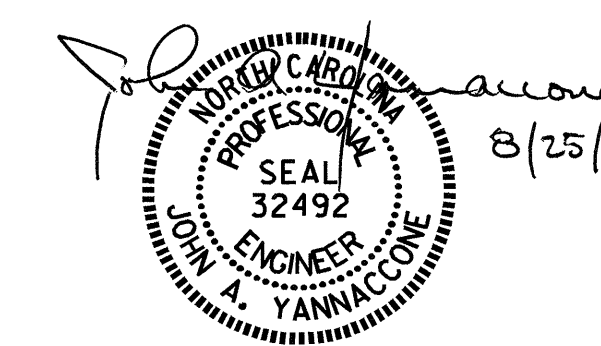
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GIRDER LOCATION

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



PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-



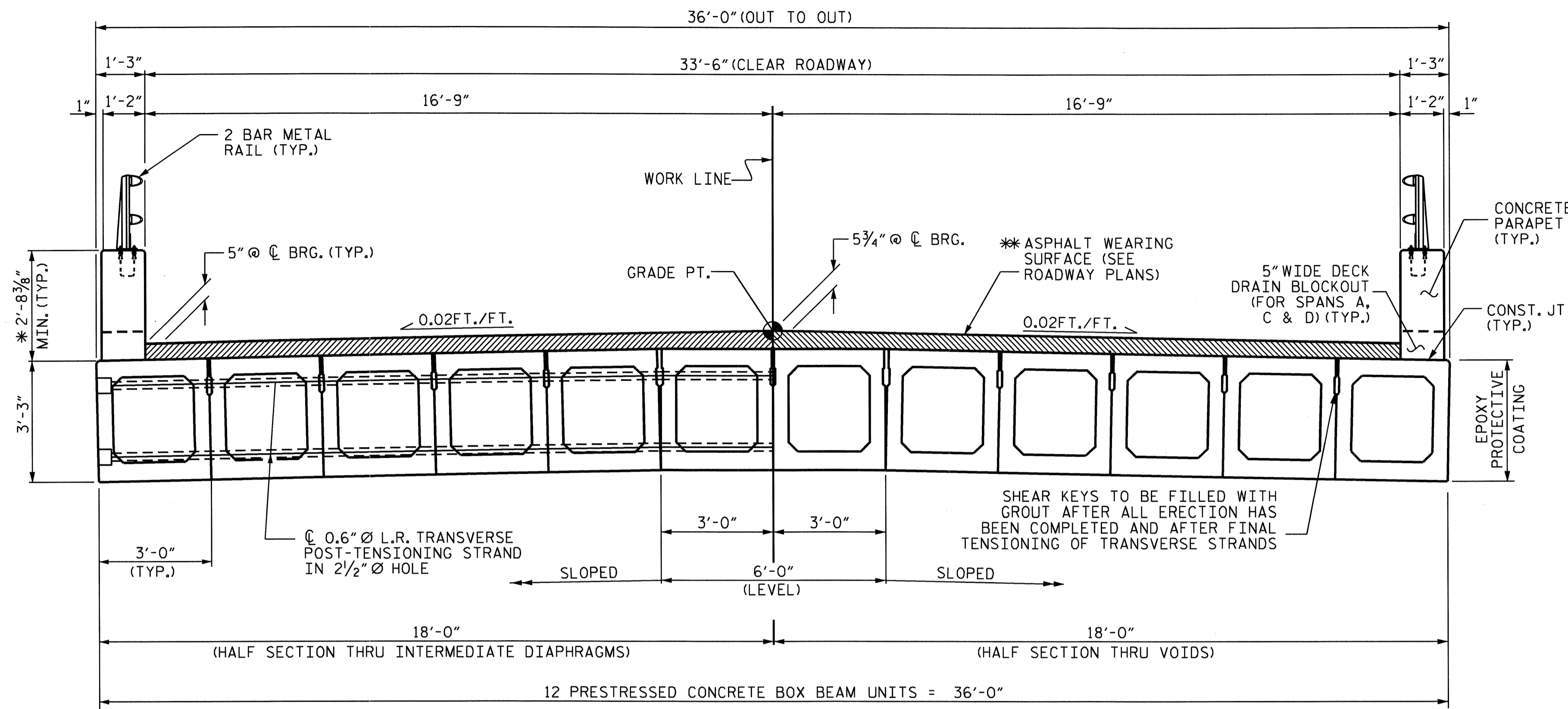
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : RAMAN PATEL DATE : 02-19-10  
 CHECKED BY : E.I. OMILE DATE : 03-30-10  
 DRAWN BY : MAA 1/08 REV. 11/2/08R MAA/GM  
 CHECKED BY : GM/DI 2/08

25-AUG-2011 08:28  
 Y:\TIP\Projects-B\B4498\Structures\Final Plans\B-4498.sd.LRFR.dgn  
 qtnguyen

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

STD. NO. LRFR1



**TYPICAL SECTION**

\* THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

\* SEE ASPHALT WEARING SURFACE THICKNESS TABLE  
\* SEE PARAPET HEIGHT TABLE

**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 CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT. THE 2 1/2" Ø DOWEL HOLES AT EXPANSION ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH JOINT SEALER MATERIAL TO 1/2" ABOVE THE TOP OF DOWELS AND THEN FILLED WITH GROUT.

THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULUS SILICONE SEALANT. THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPAN A; 4600 PSI FOR SPANS B, C & D.

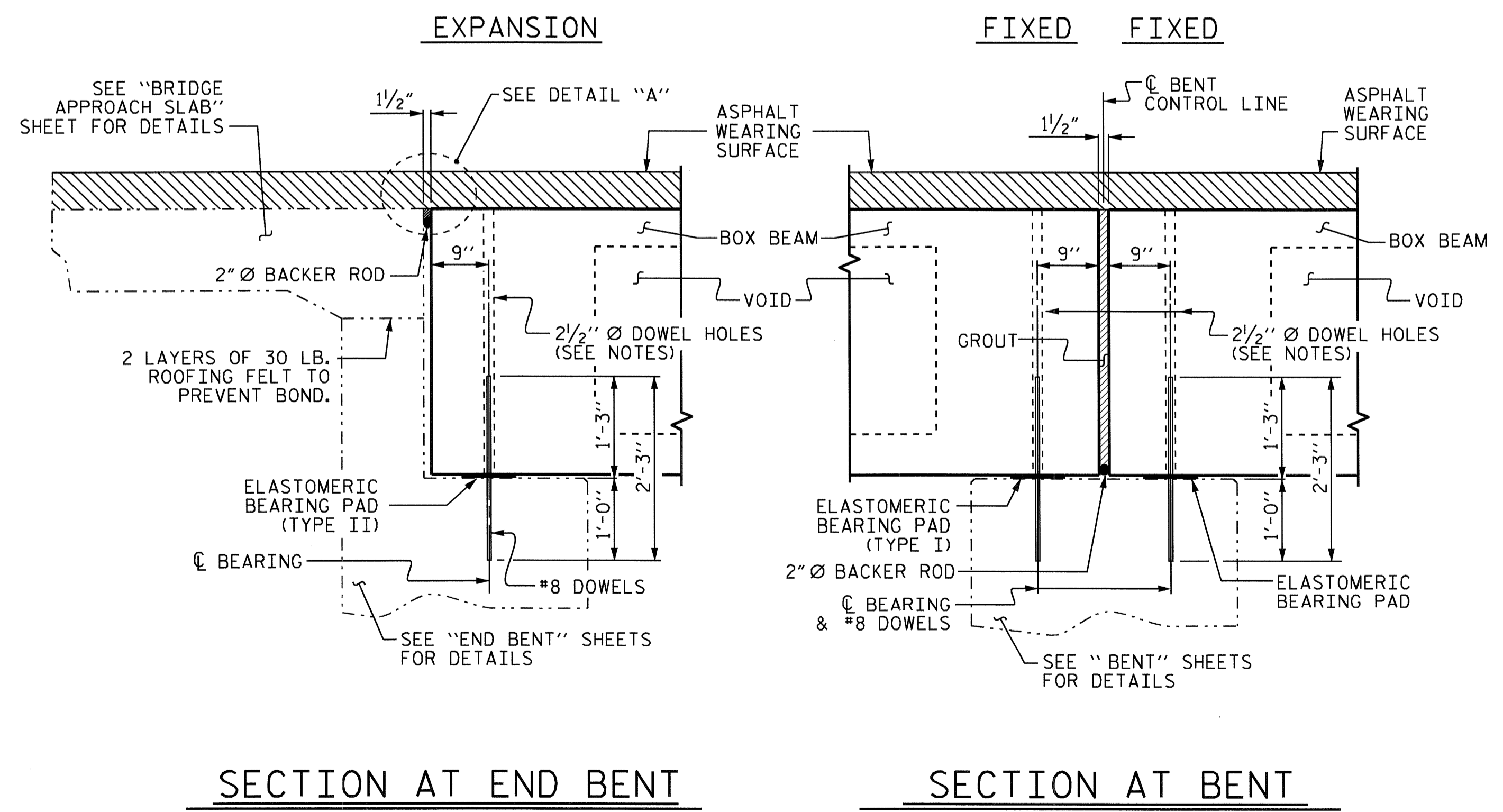
ALL REINFORCING STEEL IN PARAPETS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS AND ON EXTERIOR FACES OF EXTERIOR BOX BEAMS.

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

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.



**SECTION AT END BENT**

**SECTION AT BENT**

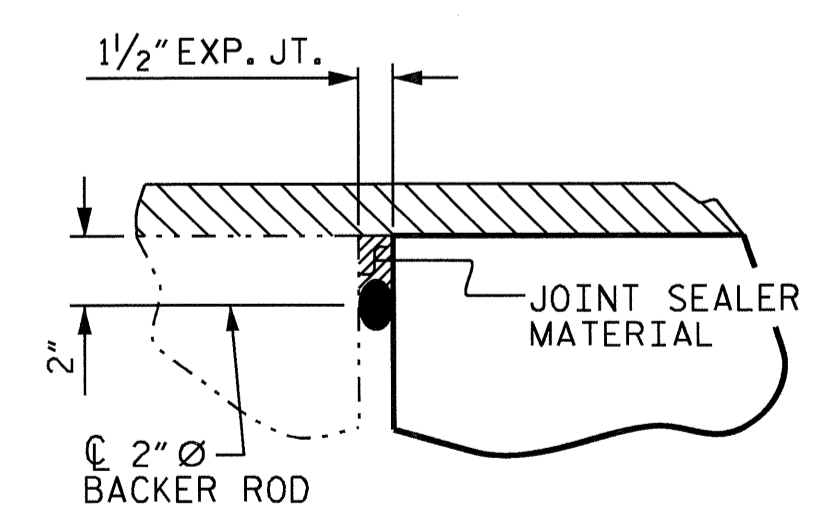
**ASPHALT WEARING SURFACE THICKNESS TABLE**  
BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

SPAN	** AT C BEARINGS		** AT MID-SPAN	
	GUTTERS	GRADE PT.	GUTTERS	GRADE PT.
A	5"	5 3/4"	4 1/4"	5"
B	5"	5 3/4"	2 3/8"	3 1/8"
C	5"	5 3/4"	2 3/8"	3 1/8"
D	5"	5 3/4"	3 1/4"	4"

NOTE: THICKNESS VARIES BETWEEN C BEARING AND MID-SPAN FOR ALL SPANS.

**PARAPET HEIGHT TABLE**  
BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

SPAN	* AT C BEARINGS	* AT MID-SPAN
A	2'-11"	2'-10 1/4"
B	2'-11"	2'-8 3/8"
C	2'-11"	2'-8 3/8"
D	2'-11"	2'-9 1/4"

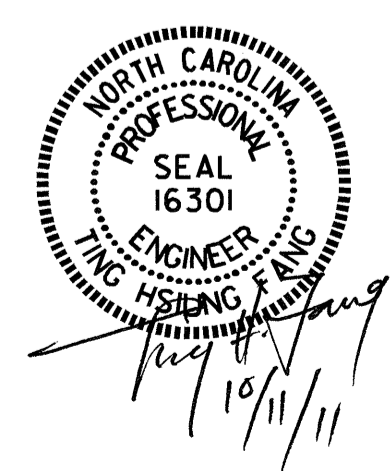


**DETAIL "A"**

PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

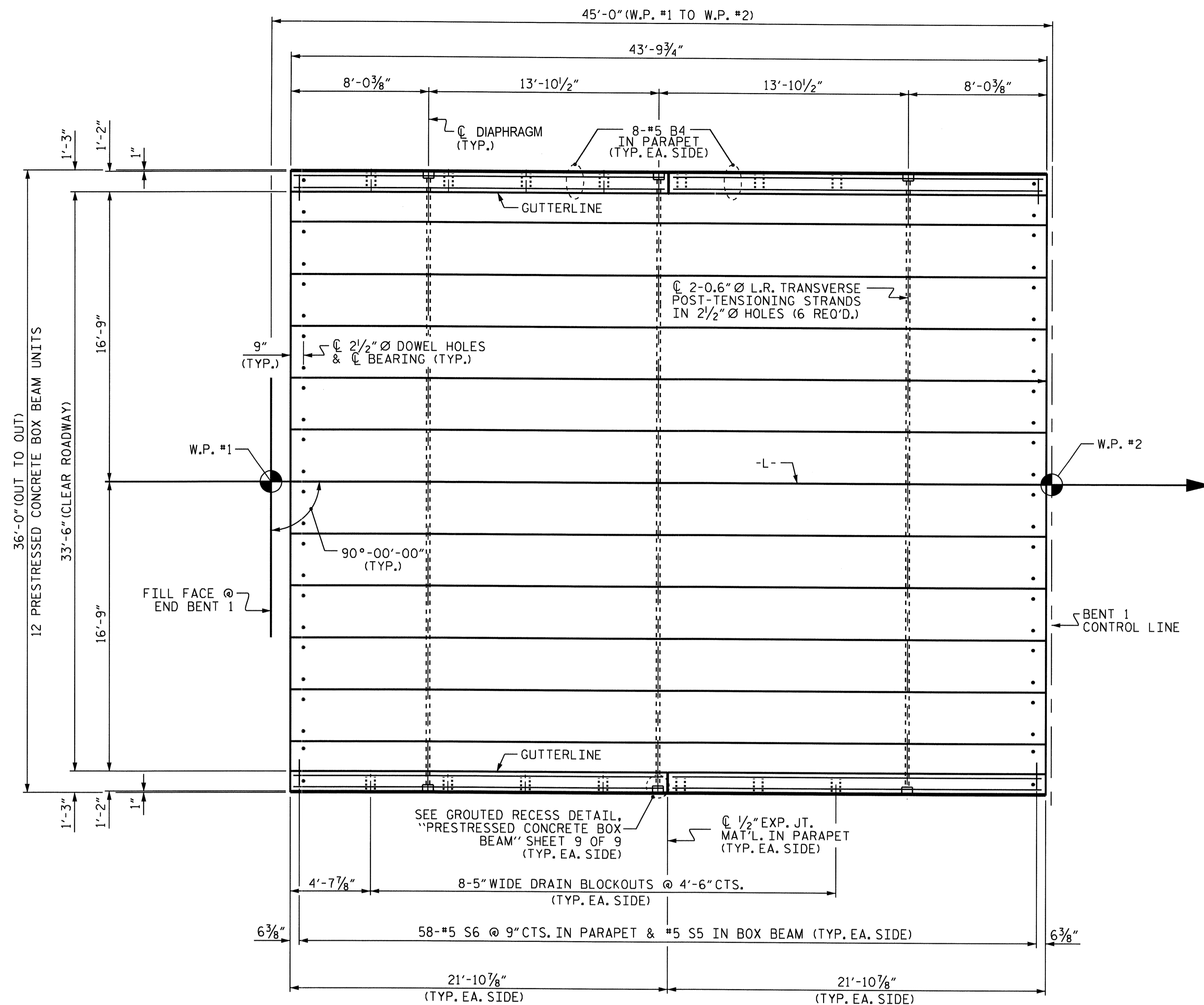
SHEET 1 OF 9

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT

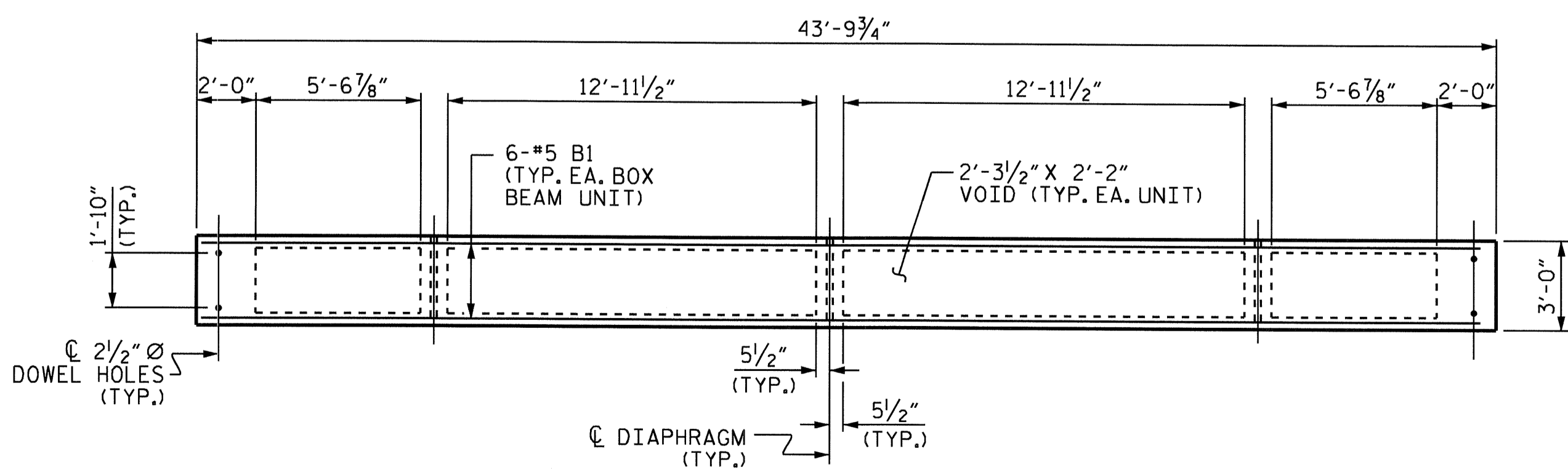


DRAWN BY : HARISH SHAH DATE : 3-01-10  
CHECKED BY : O.T. NGUYEN DATE : 3-31-10

REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 33
2			4			



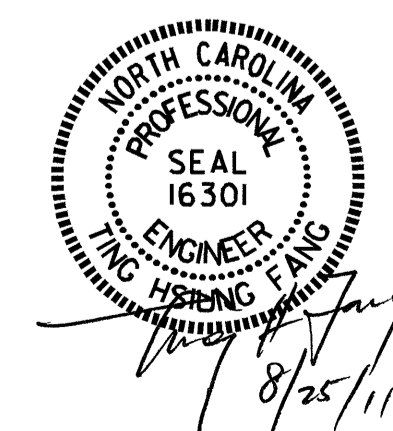
PLAN OF SPAN A



PLAN OF BOX BEAM UNIT - SPAN A  
SHOWING LOCATION OF VOIDS AND DIAPHRAGMS

PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 2 OF 9

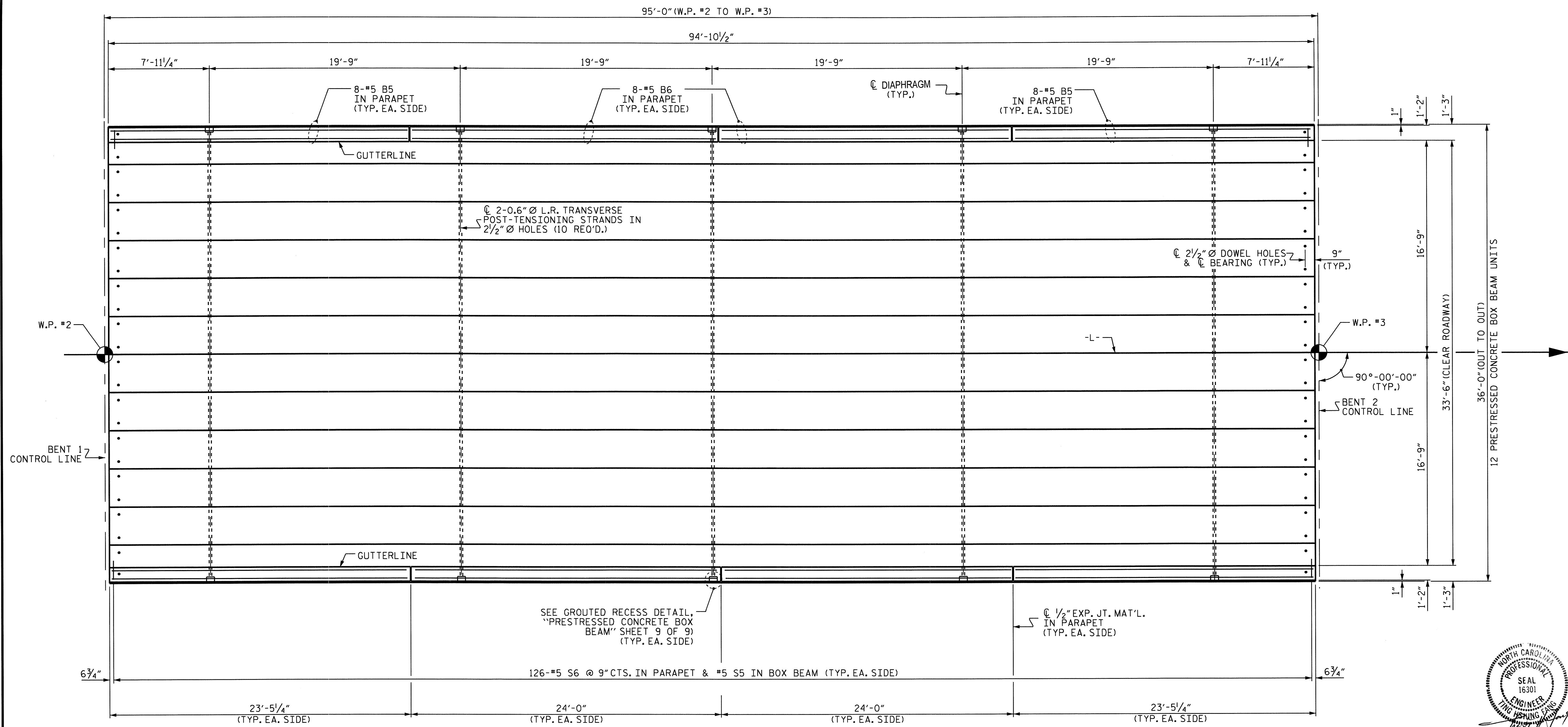
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN  
 SPAN A



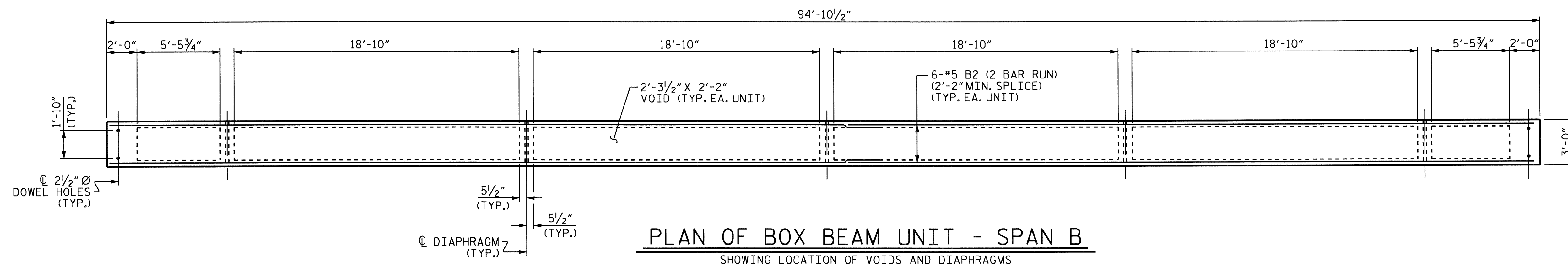
DRAWN BY : HARISH SHAH DATE : 3-01-10  
 CHECKED BY : O.T. NGUYEN DATE : 3-31-10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			33

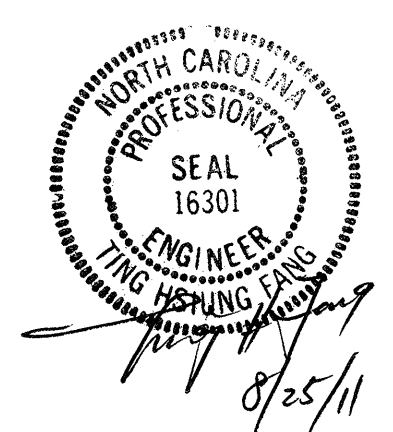
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 qtnguyen



PLAN OF SPAN B



PLAN OF BOX BEAM UNIT - SPAN B  
SHOWING LOCATION OF VOIDS AND DIAPHRAGMS



PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 3 OF 9

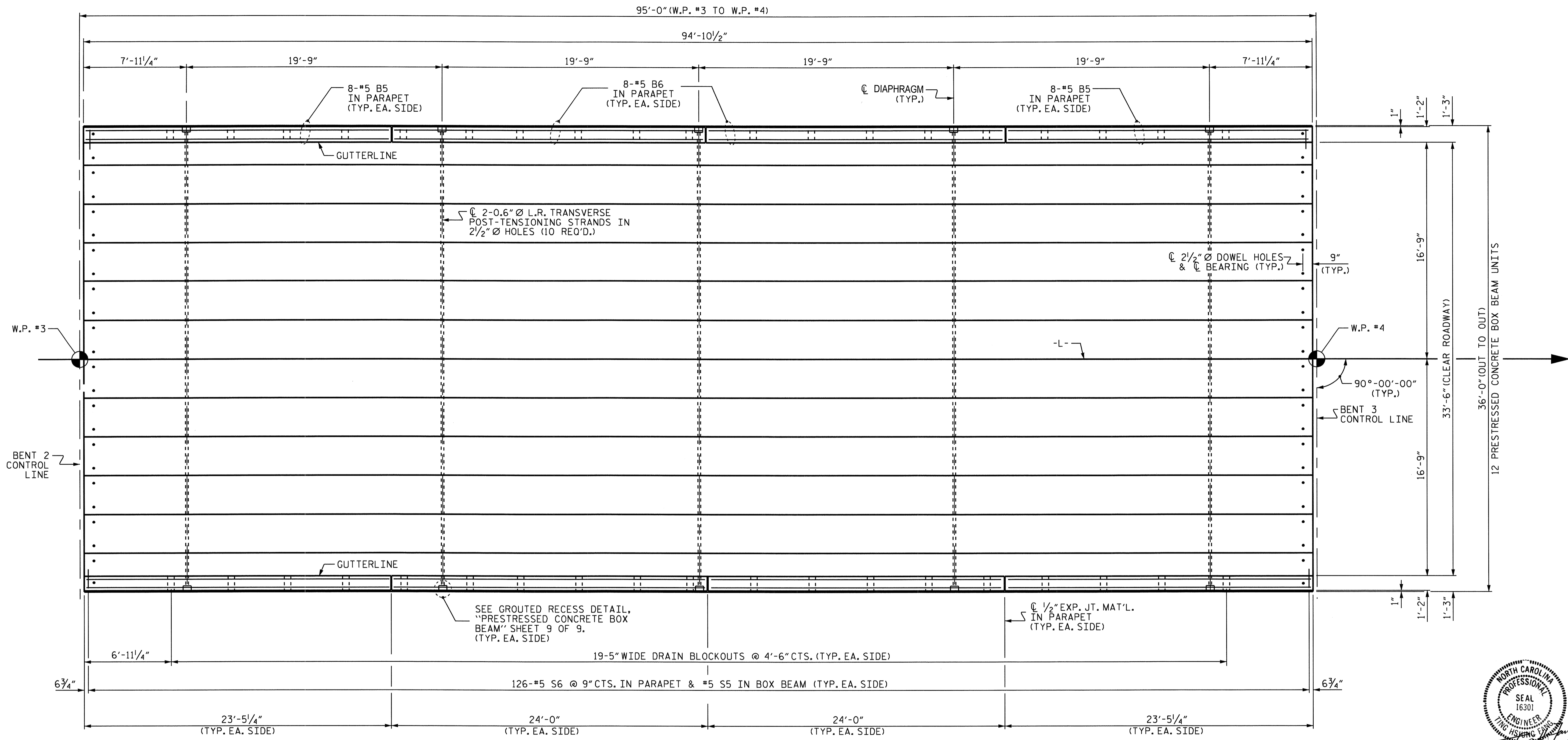
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN  
 SPAN B

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7	
1			3			TOTAL SHEETS	33
2			4				

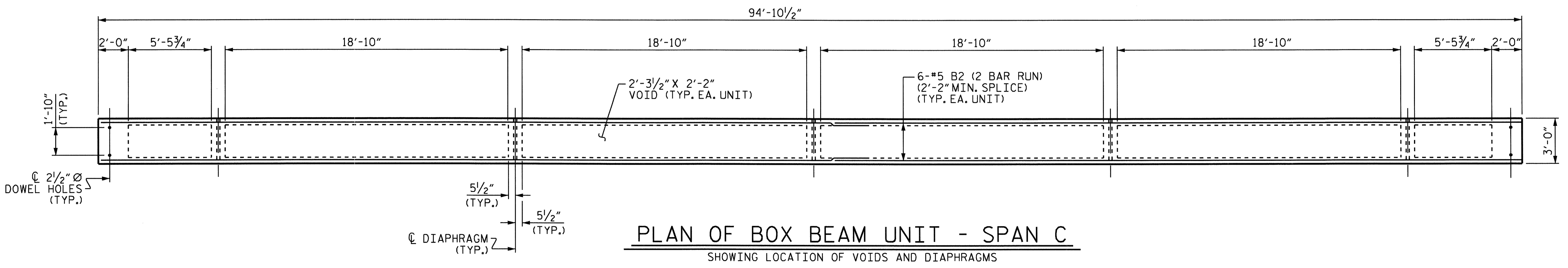
DRAWN BY: HARISH SHAH DATE: 3-2-10  
 CHECKED BY: Q.T. NGUYEN DATE: 3-31-10

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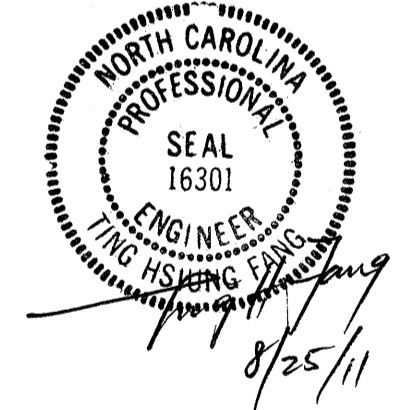




PLAN OF SPAN C



PLAN OF BOX BEAM UNIT - SPAN C  
SHOWING LOCATION OF VOIDS AND DIAPHRAGMS

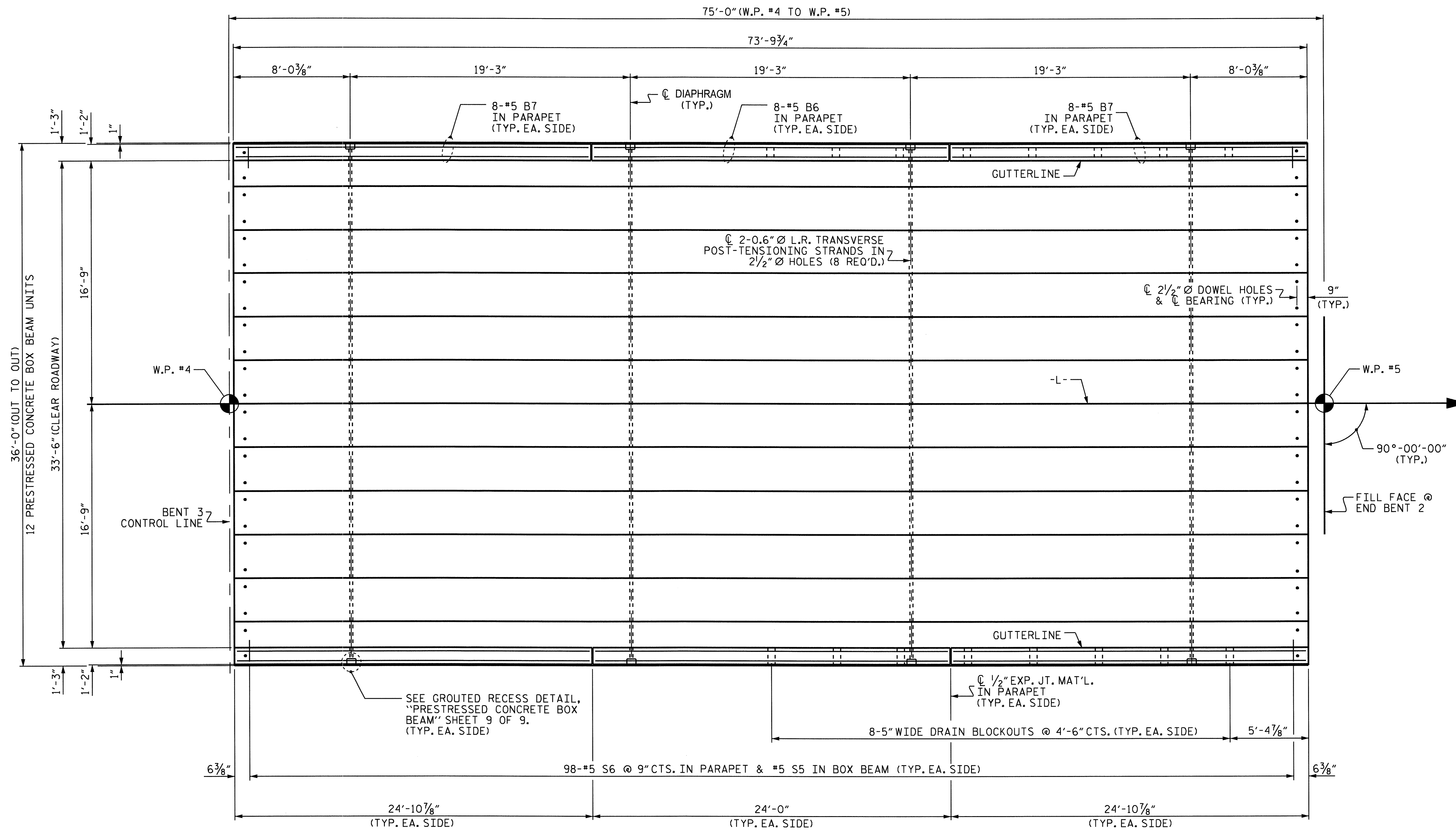


PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 4 OF 9

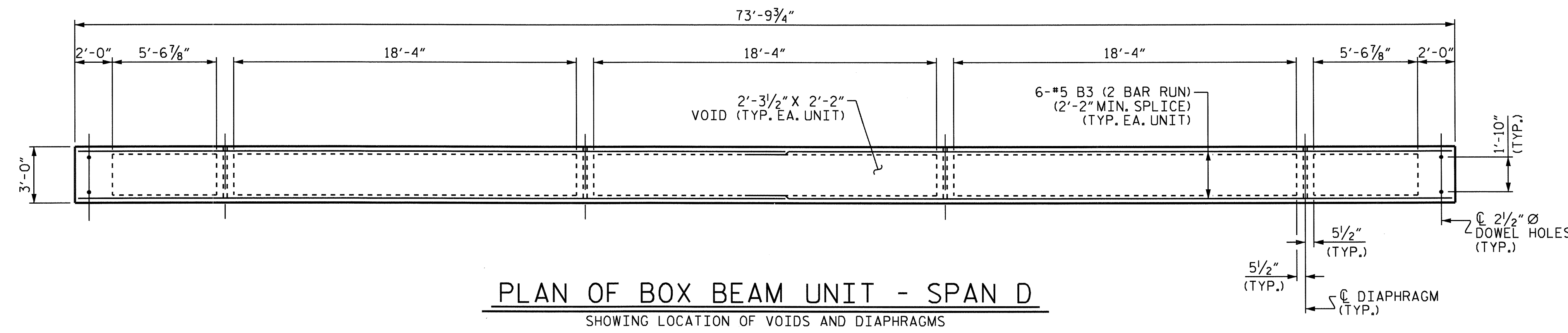
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-8	
SUPERSTRUCTURE						TOTAL SHEETS 33	
PLAN OF SPAN SPAN C							
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

DRAWN BY: HARISH SHAH DATE: 3-2-10  
 CHECKED BY: O.T. NGUYEN DATE: 3-31-10

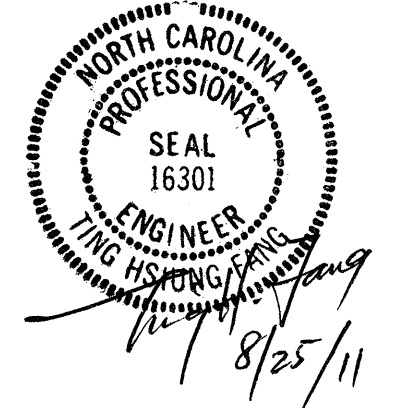
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 qtnguyen



PLAN OF SPAN D



PLAN OF BOX BEAM UNIT - SPAN D  
SHOWING LOCATION OF VOIDS AND DIAPHRAGMS



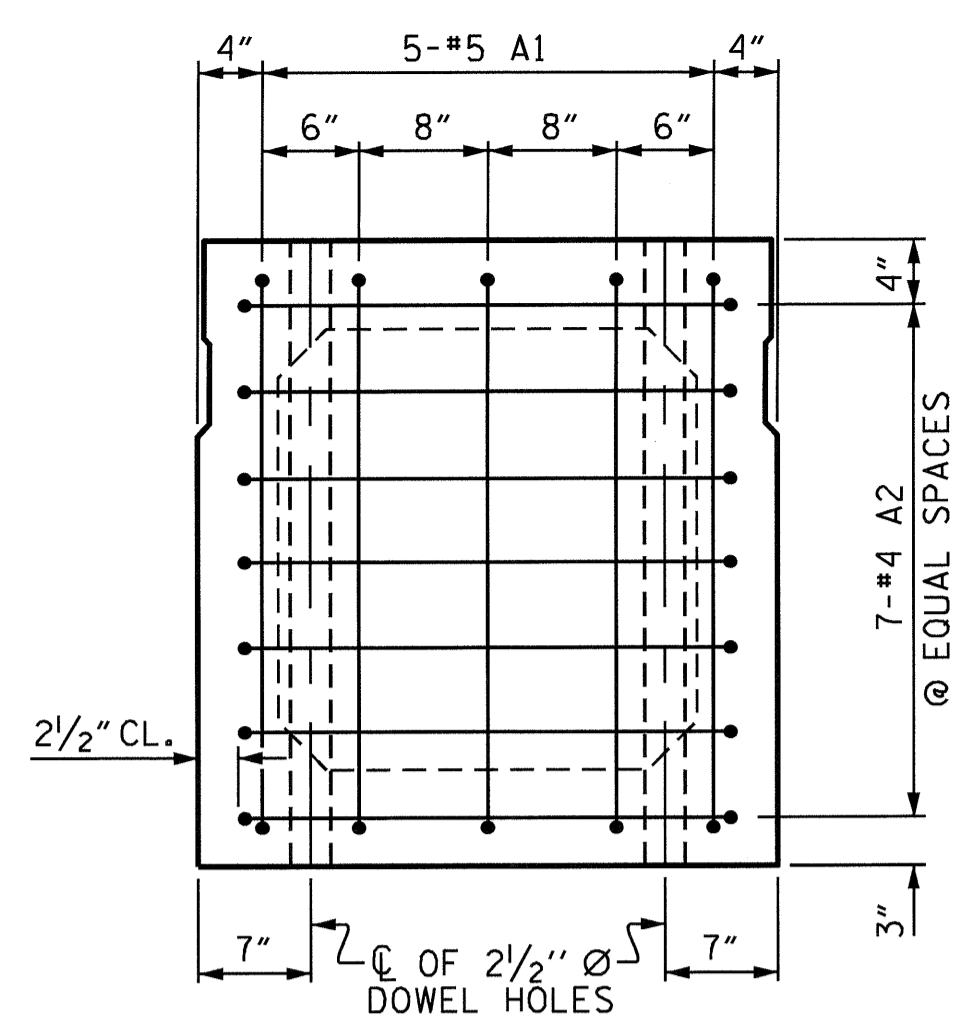
PROJECT NO. B-4498  
 DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 5 OF 9

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

REVISIONS						SHEET NO. S-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 33
2			4			

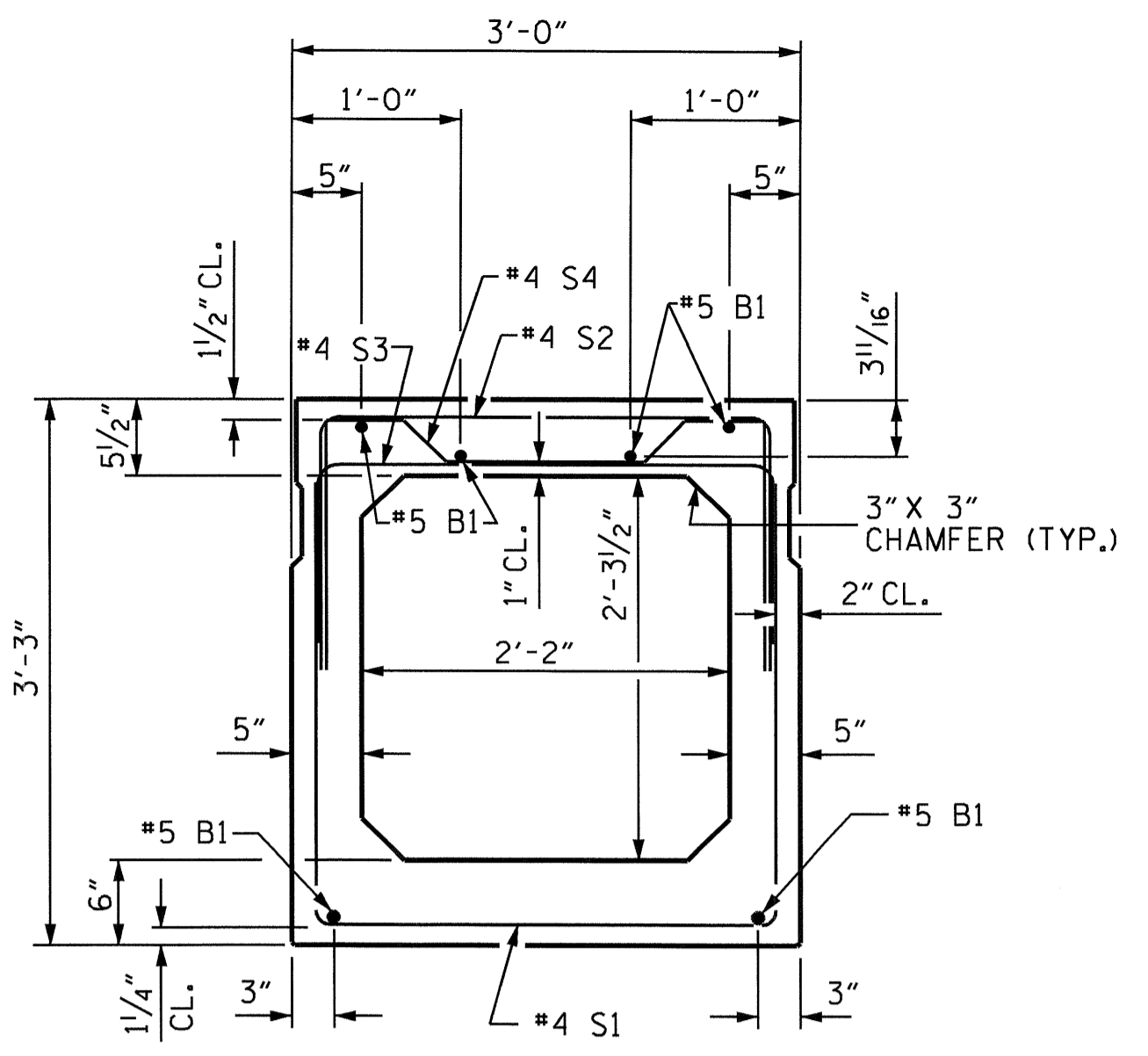
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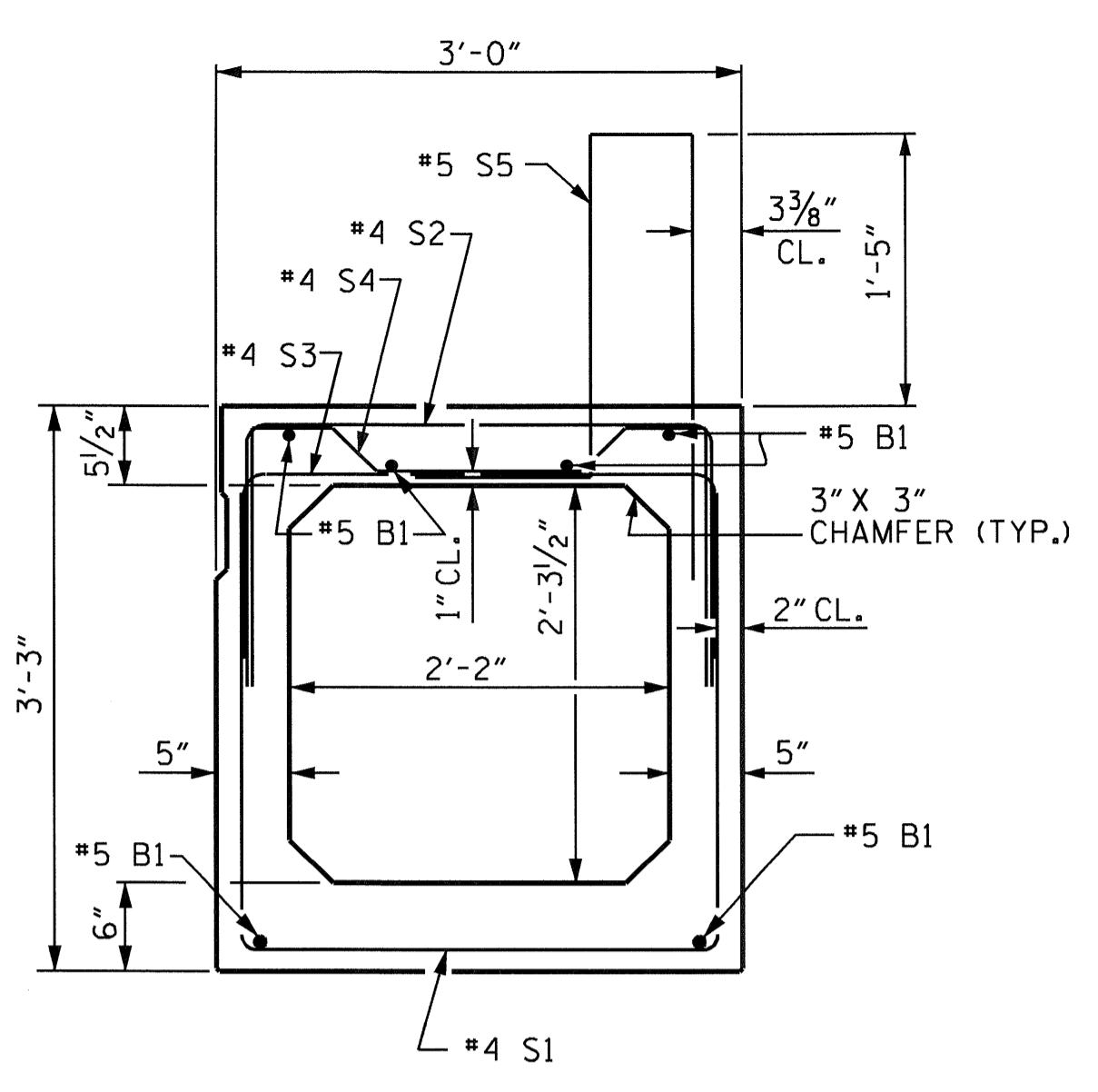
**END ELEVATION**

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.)



**INTERIOR BOX BEAM SECTION**

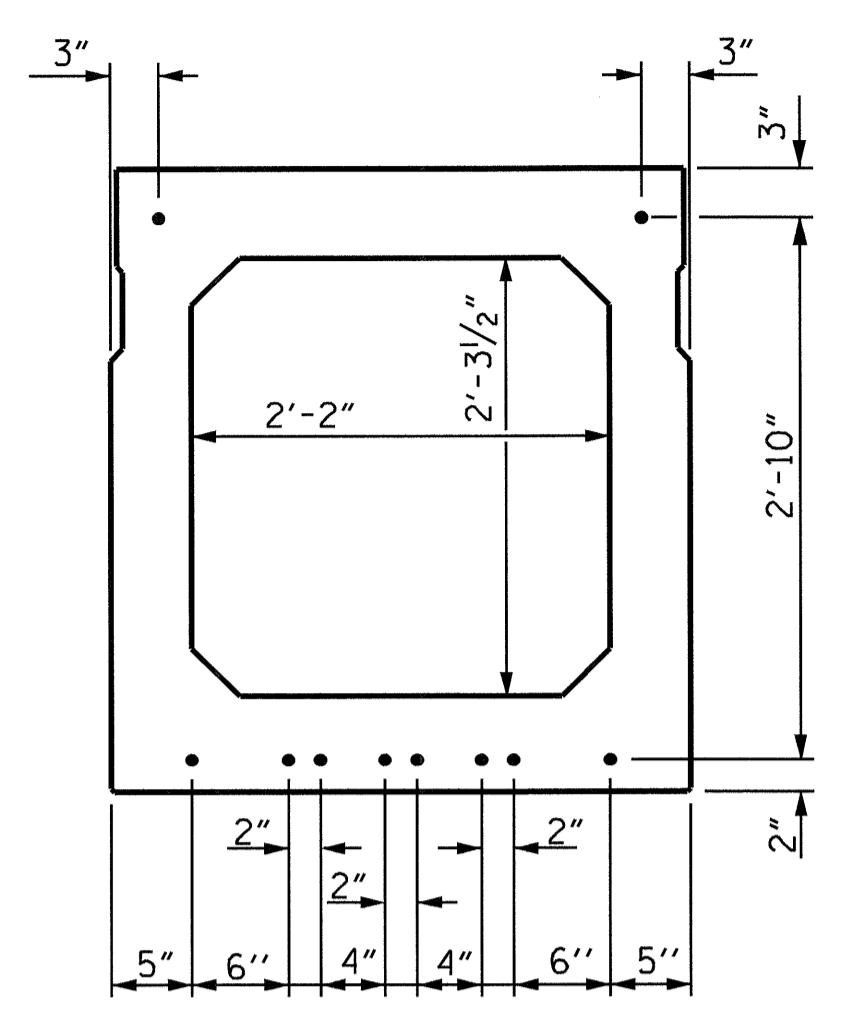
(STRAND LAYOUT NOT SHOWN)



**EXTERIOR BOX BEAM SECTION**

(STRAND LAYOUT NOT SHOWN)

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



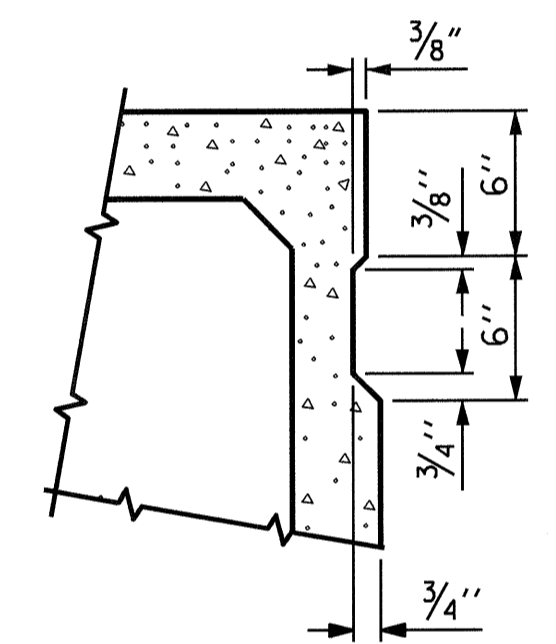
**TYPICAL STRAND LOCATION**

(10 STRANDS REQUIRED)  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

- FULLY BONDED STRANDS

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



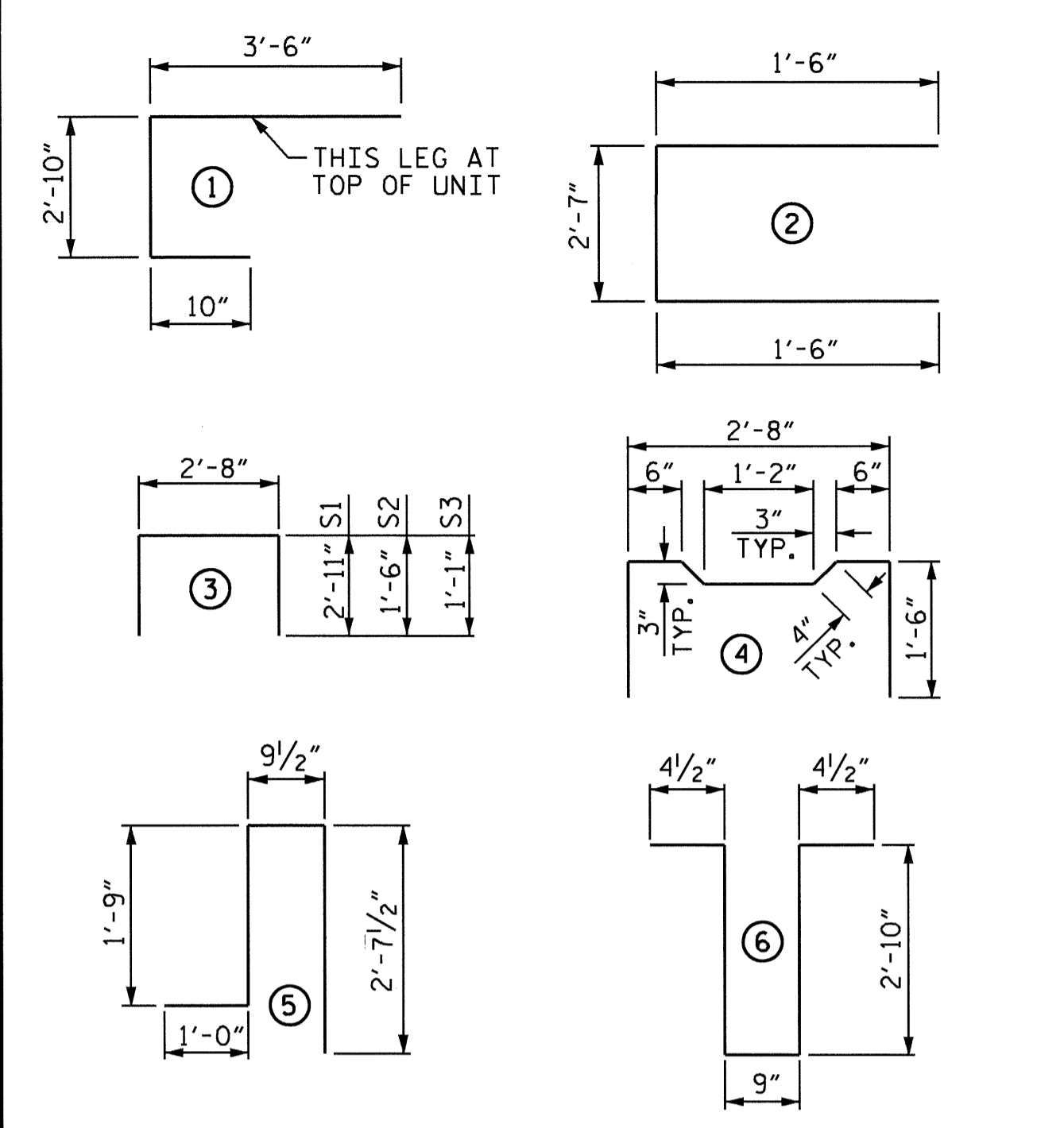
**SHEAR KEY DETAIL**

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

DEAD LOAD DEFLECTION AND CAMBER	
	0.6" Ø L.R. STRAND
	SPAN A
CAMBER (BEAM ALONE IN PLACE)	5/16"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD	1/16"
FINAL CAMBER	1/4"

BOX BEAM UNITS REQUIRED			
SPAN A			
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	43'-9 3/4"	87'-7 1/2"
INTERIOR	10	43'-9 3/4"	438'-1 1/2"
TOTAL	12		525'-9"

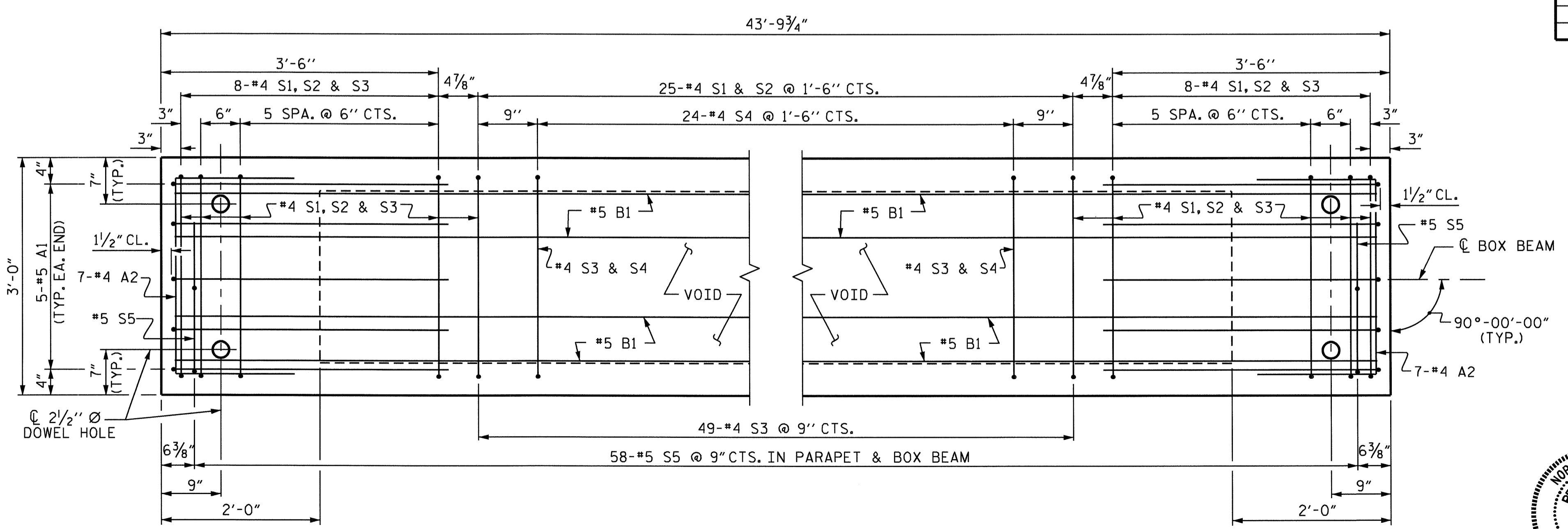
**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

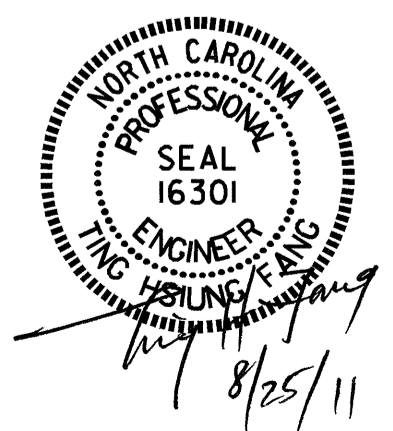
**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	32	#4	2	5'-7"	119	5'-7"	119
B1	6	#5	STR	43'-5"	272	43'-5"	272
K1	9	#4	6	7'-2"	43	7'-2"	43
K2	6	#4	STR	2'-7"	10	2'-7"	10
S1	41	#4	3	8'-6"	233	8'-6"	233
S2	41	#4	3	5'-8"	155	5'-8"	155
S3	65	#4	3	4'-10"	210	4'-10"	210
S4	24	#4	4	5'-10"	94	5'-10"	94
*S5	58	#5	5	6'-2"	373	--	--
REINFORCING STEEL				1211	LBS.	1211	LBS.
*EPOXY COATED REINF. STEEL				373	LBS.	--	--
5000 P.S.I. CONCRETE				9.0	CU. YDS.	9.0	CU. YDS.
0.6" Ø L.R. STRANDS				No. 10		No. 10	



**PLAN OF BOX BEAM**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.



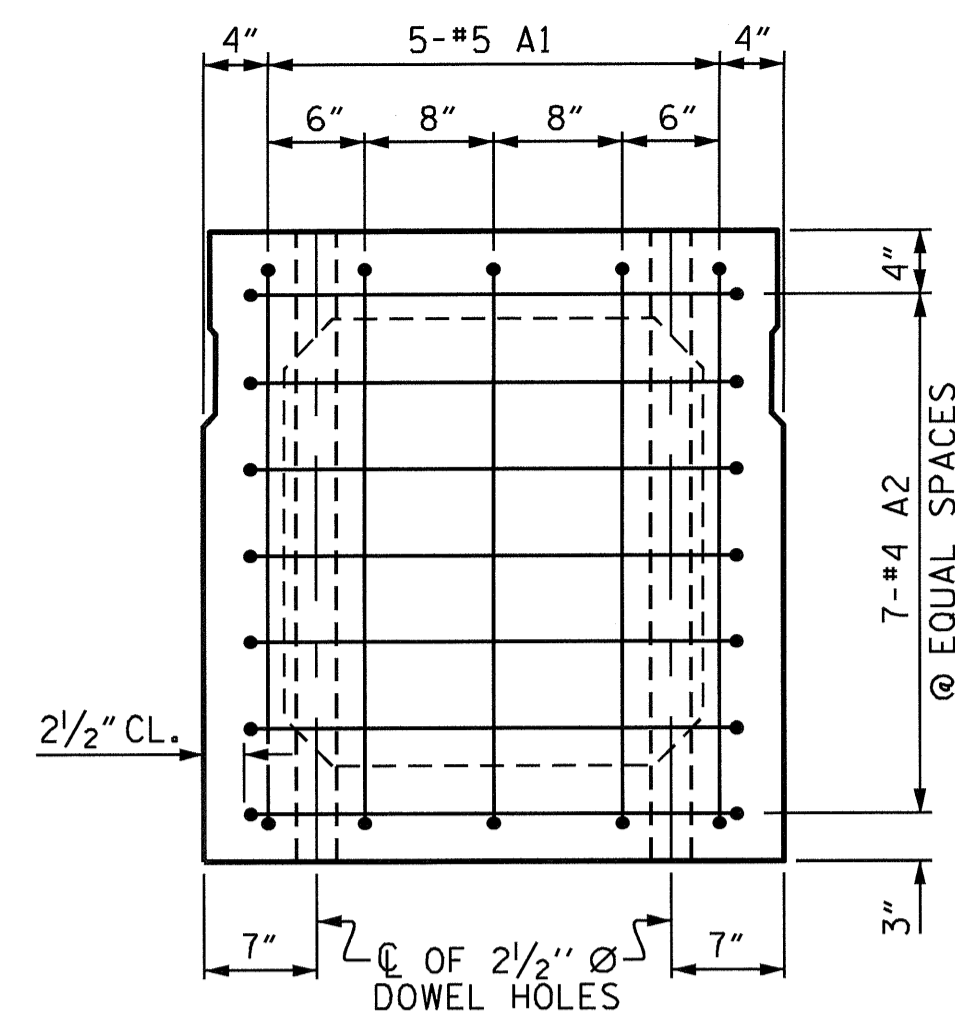
PROJECT NO. B-4498  
 DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH			
STANDARD			
3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT SPAN A			
REVISIONS			SHEET NO.
NO.	BY:	DATE:	S-10
1			TOTAL SHEETS
2			33

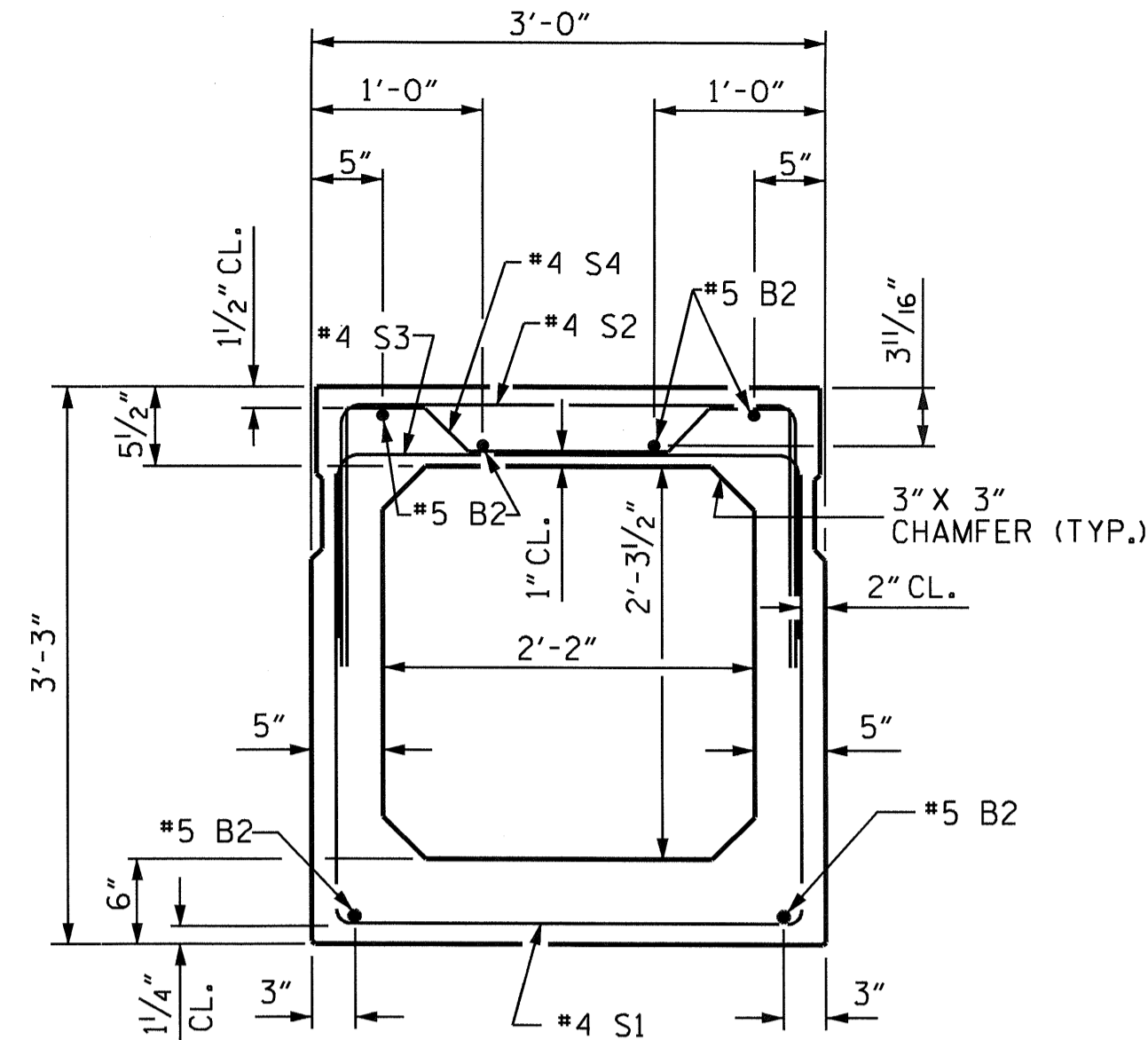
ASSEMBLED BY : HARISH SHAH DATE : 3-4-10  
 CHECKED BY : Q.T. NGUYEN DATE : 3-31-10  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05

ADDED 7/11/05  
 REV. 5/1/06 TLA/GM



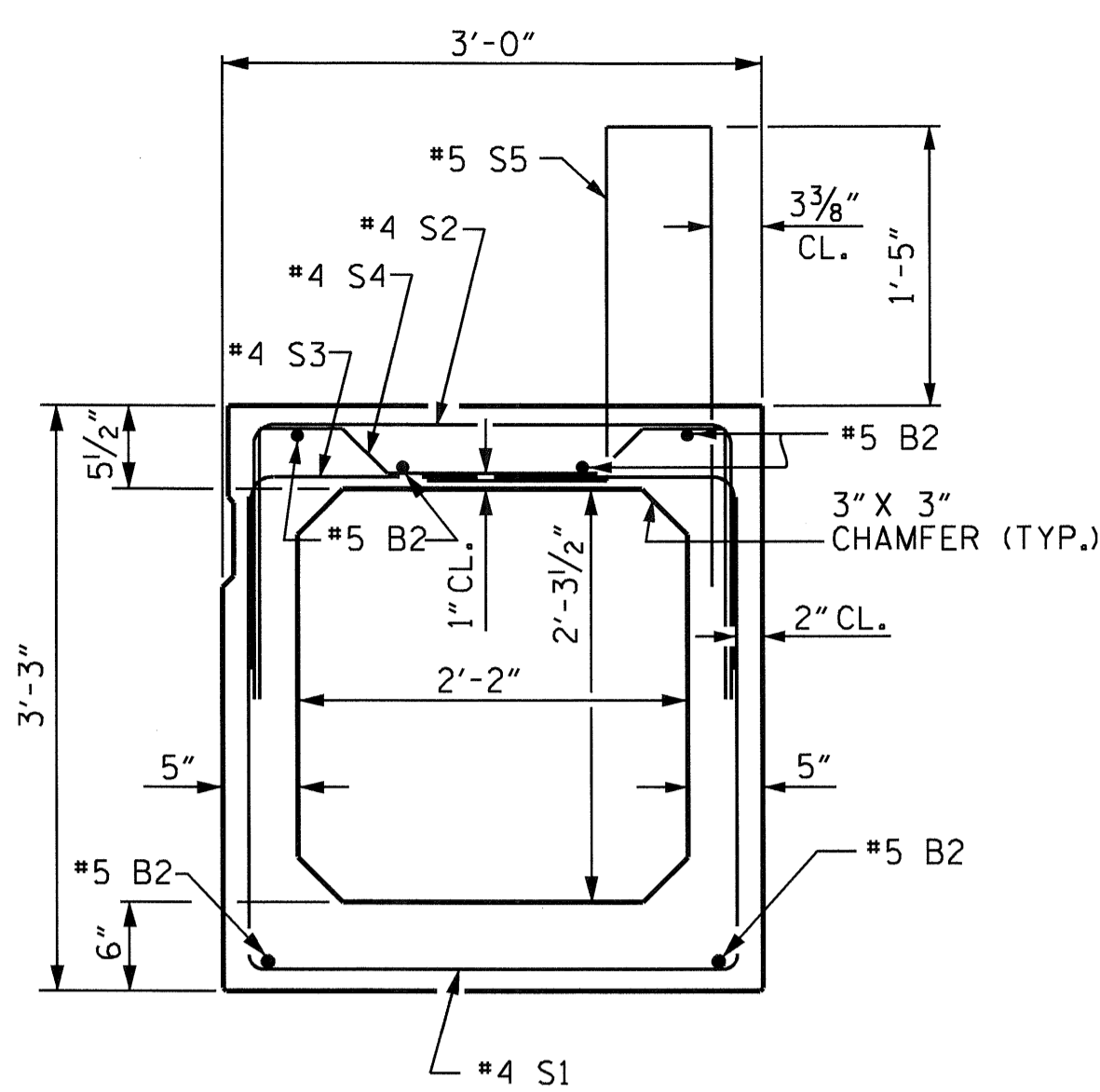
**END ELEVATION**

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.)



**INTERIOR BOX BEAM SECTION**

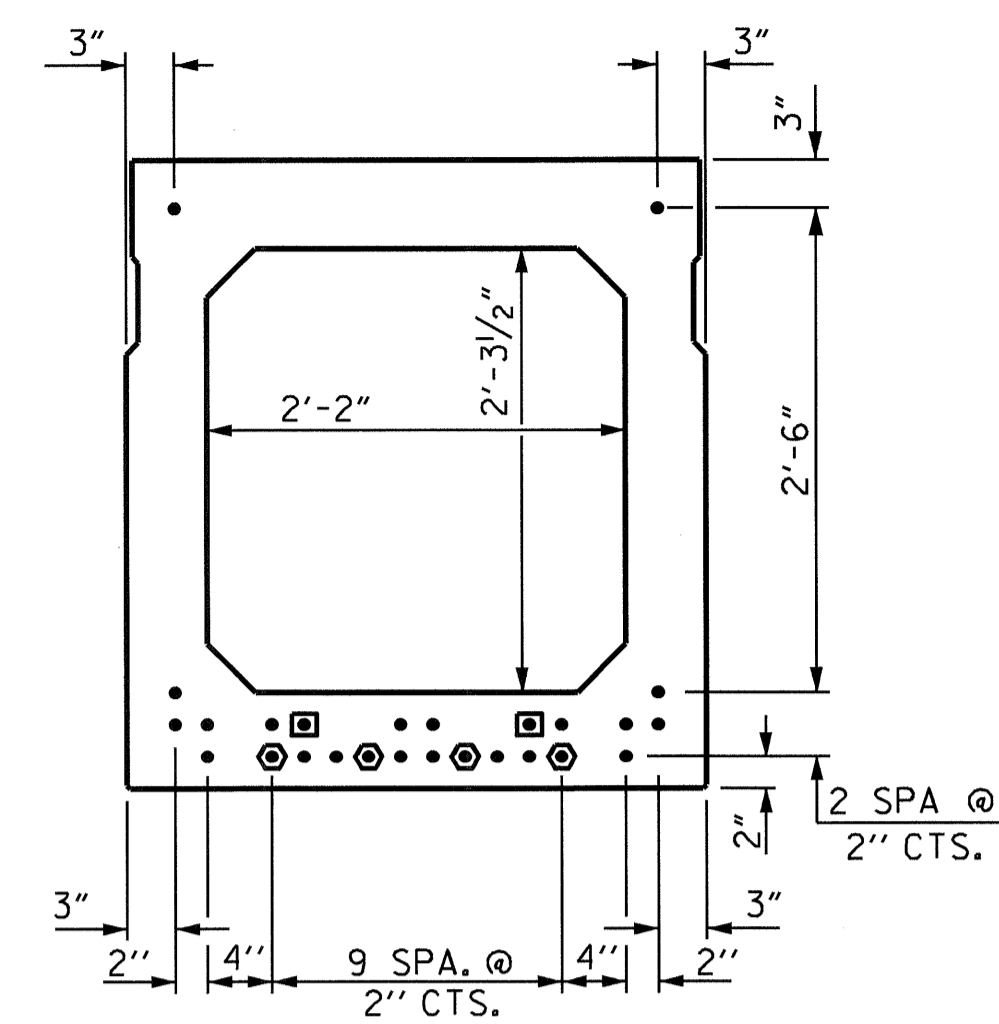
(STRAND LAYOUT NOT SHOWN)



**EXTERIOR BOX BEAM SECTION**

(STRAND LAYOUT NOT SHOWN)

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



**TYPICAL STRAND LOCATION**

(26 STRANDS REQUIRED)  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

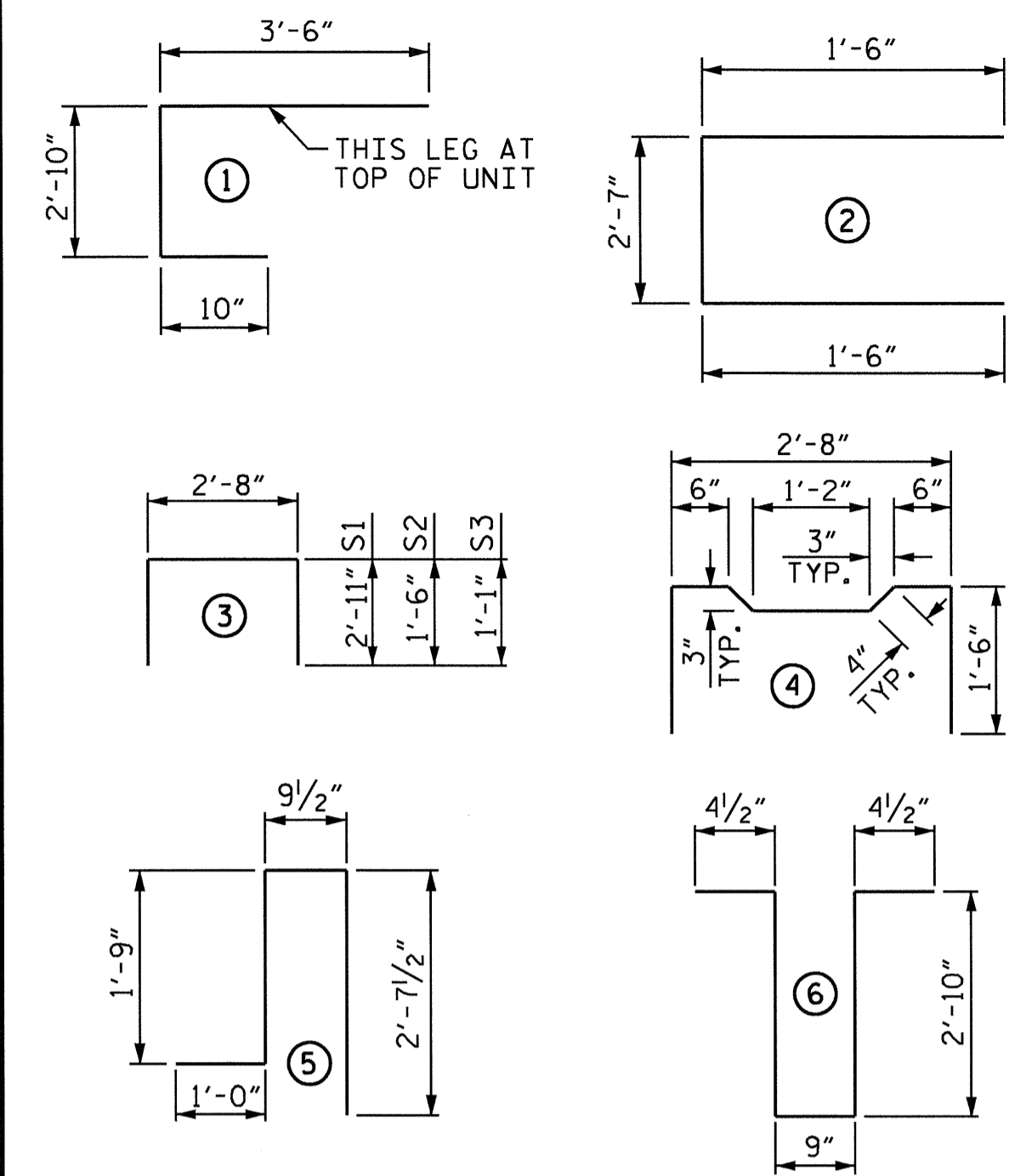
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

**GRADE 270 STRANDS**

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

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.

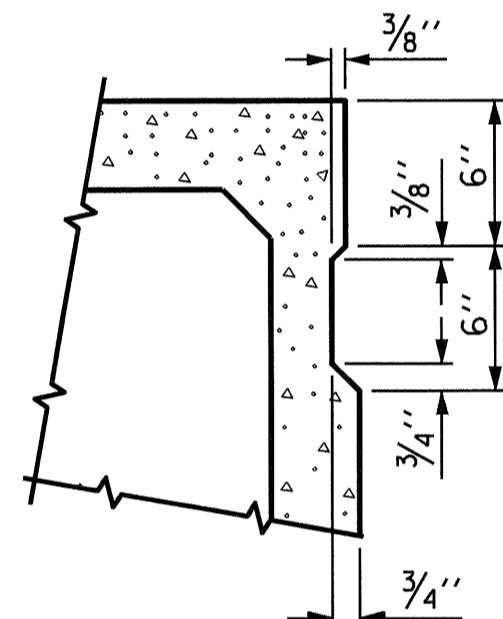
**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-7"	164	5'-7"	901
B2	12	#5	STR	48'-4"	605	48'-4"	605
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	75	#4	3	8'-6"	426	8'-6"	426
S2	75	#4	3	5'-8"	284	5'-8"	284
S3	133	#4	3	4'-10"	429	4'-10"	429
S4	58	#4	4	5'-10"	226	5'-10"	226
* S5	126	#5	5	6'-2"	810	--	--
REINFORCING STEEL				2298 LBS.		2298 LBS.	
* EPOXY COATED REINF. STEEL				810 LBS.		--	
6000 P.S.I. CONCRETE				18.4 CU. YDS.		18.4 CU. YDS.	
0.6" Ø L.R. STRANDS				No. 26		No. 26	

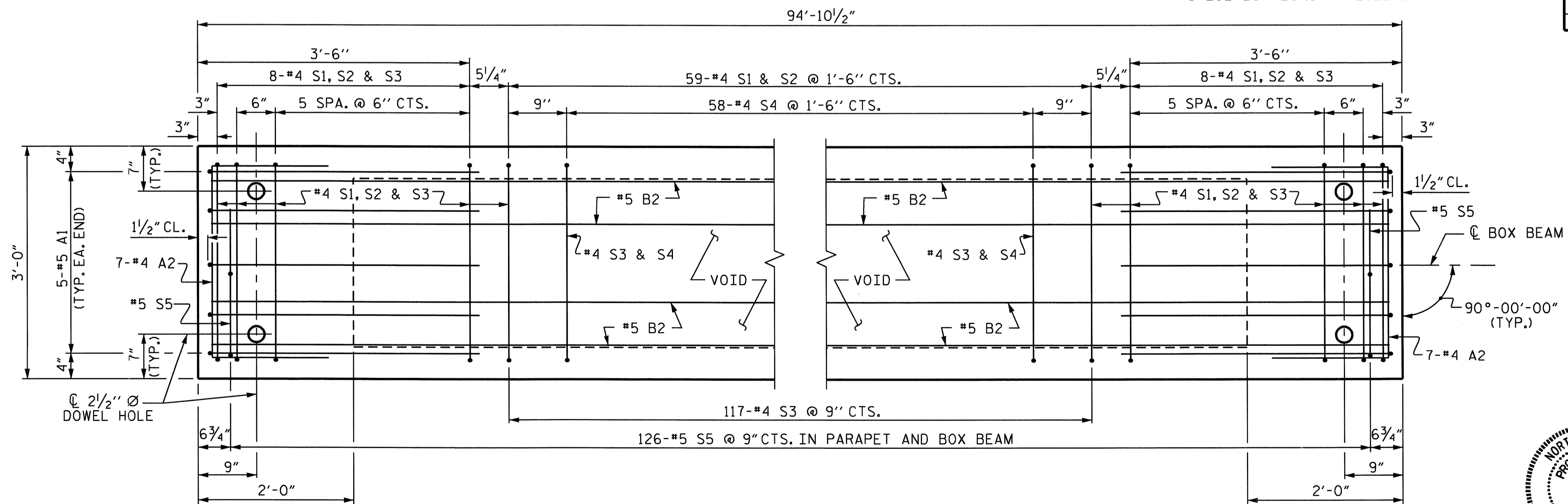


**SHEAR KEY DETAIL**

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

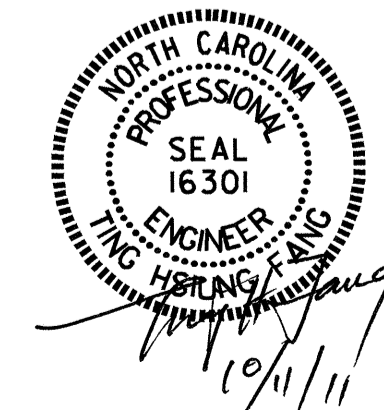
DEAD LOAD DEFLECTION AND CAMBER	
	0.6" Ø L.R. STRAND
	SPANS B & C
CAMBER (BEAM ALONE IN PLACE)	3 7/16"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD	3/4"
FINAL CAMBER	2 11/16"

BOX BEAM UNITS REQUIRED				
SPAN B				
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH	
EXTERIOR	2	94'-10 1/2"	189'-9"	
INTERIOR	10	94'-10 1/2"	948'-9"	
TOTAL	12		1138'-6"	
SPAN C				
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH	
EXTERIOR	2	94'-10 1/2"	189'-9"	
INTERIOR	10	94'-10 1/2"	948'-9"	
TOTAL	12		1138'-6"	



**PLAN OF BOX BEAM**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.



PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

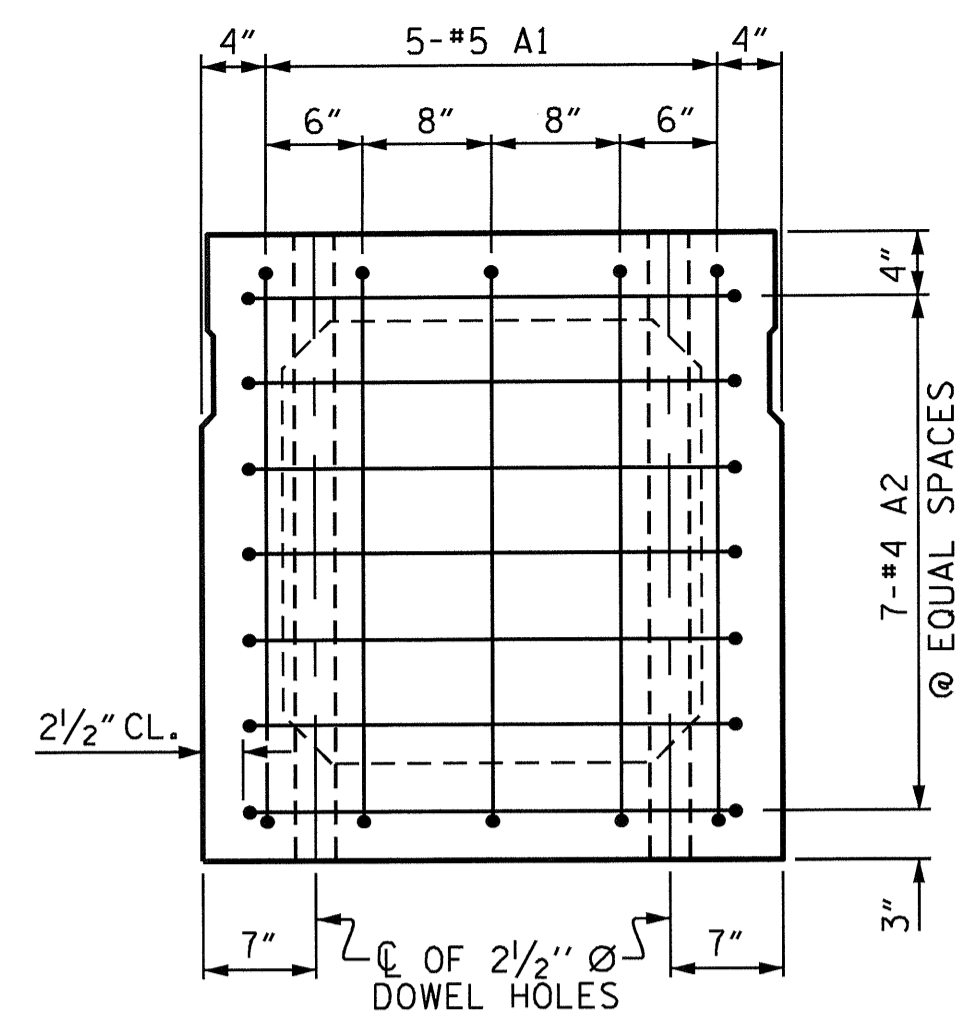
SHEET 7 OF 9

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT  
SPAN B & C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			33

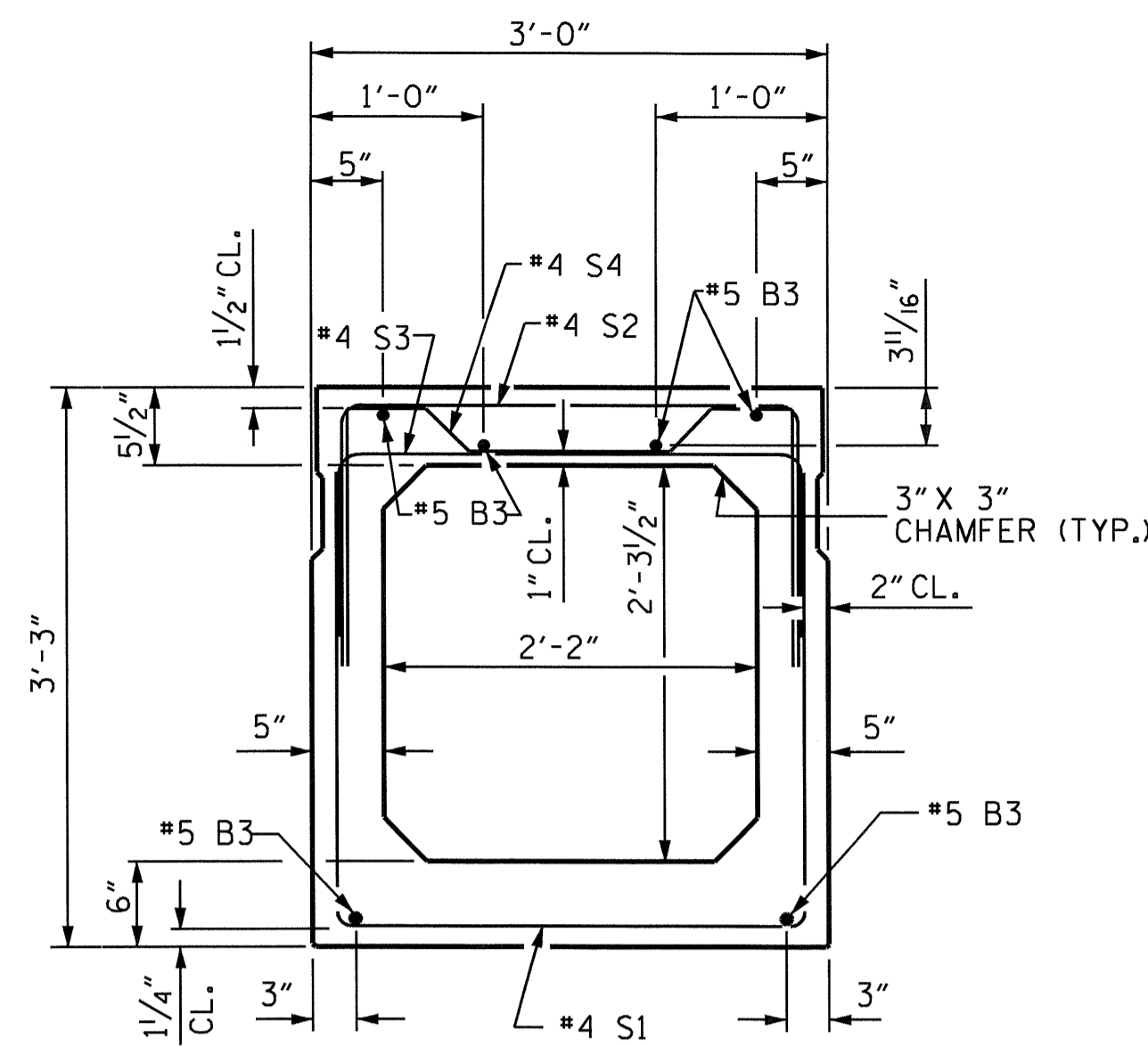
STD. NO. PCBB6

ASSEMBLED BY :	HARISH SHAH	DATE :	3-04-10
CHECKED BY :	O.T. NGUYEN	DATE :	3-31-10
DRAWN BY :	TLA 5/05	ADDED :	7/11/05
CHECKED BY :	GM 6/05	REV. :	5/1/06
			TLA/GM

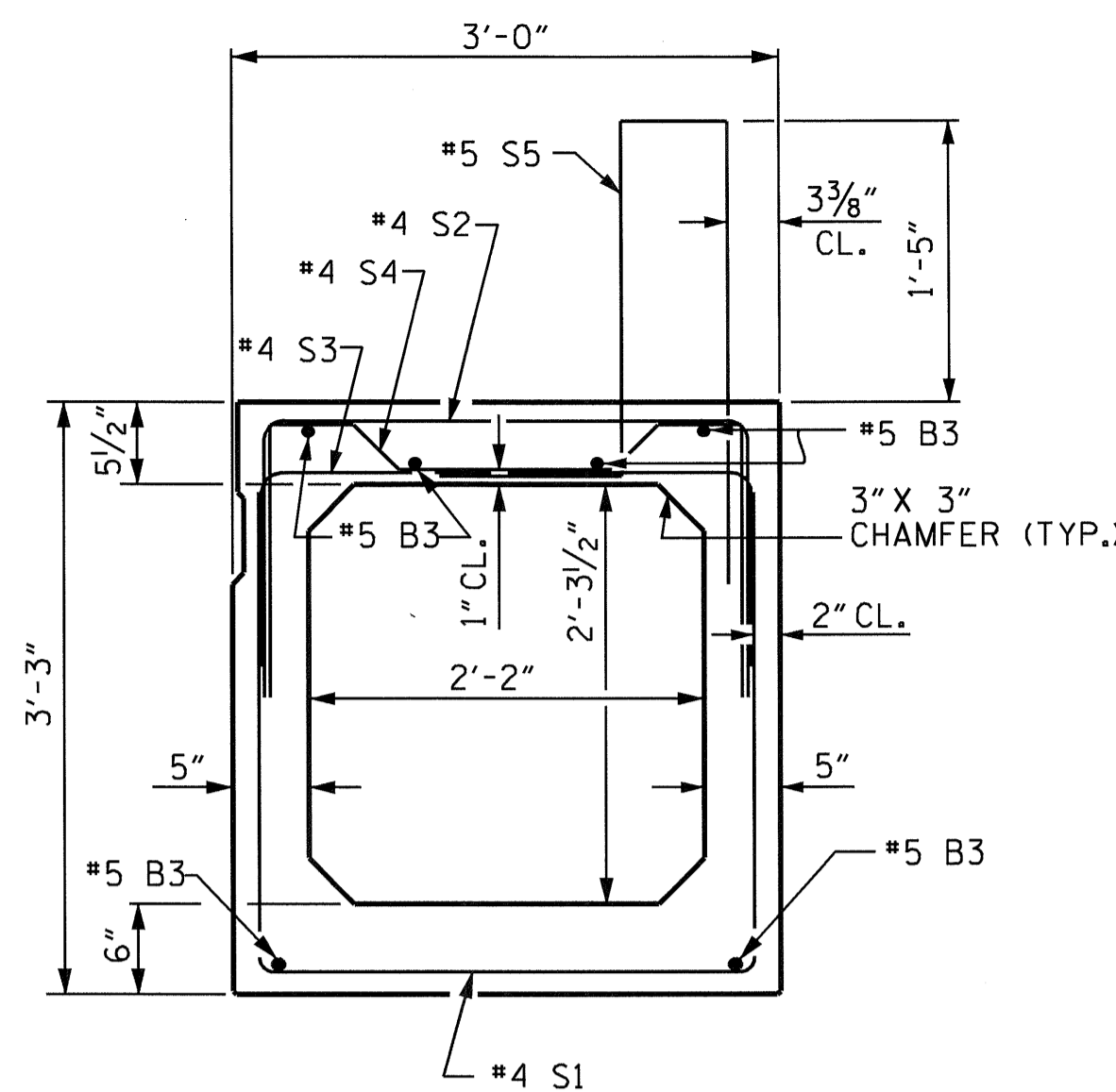


**END ELEVATION**

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.)

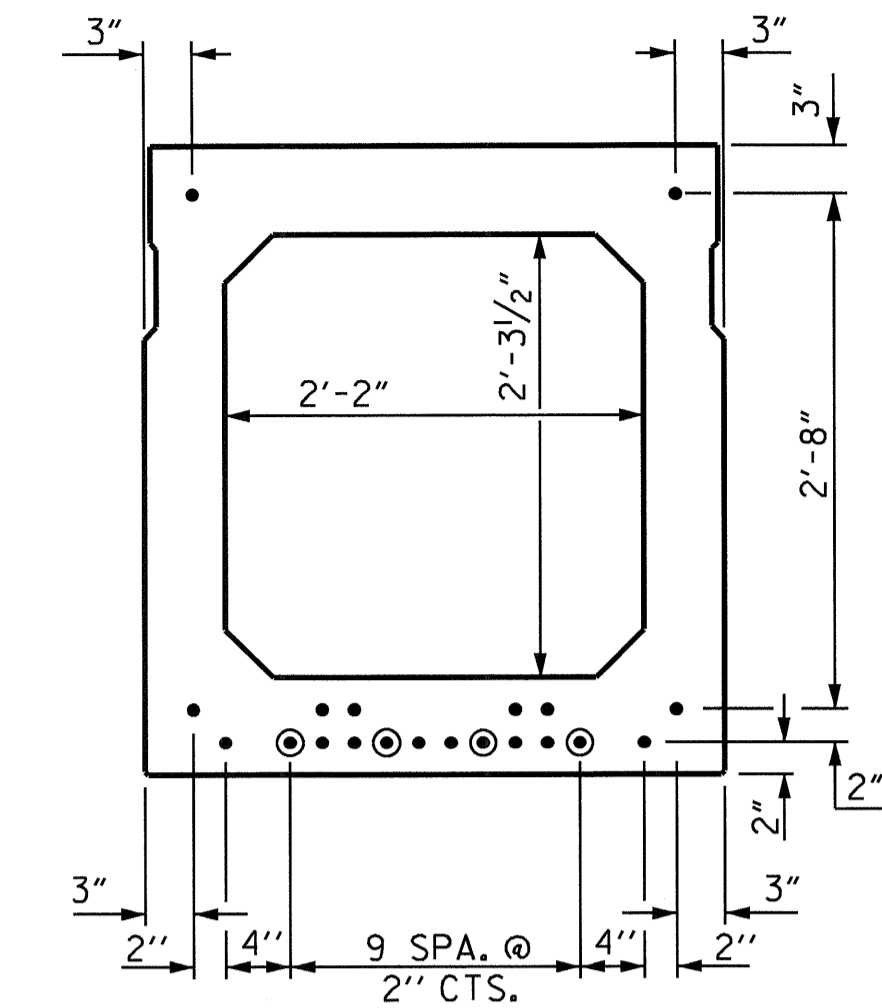


**INTERIOR BOX BEAM SECTION**  
(STRAND LAYOUT NOT SHOWN)



**EXTERIOR BOX BEAM SECTION**  
(STRAND LAYOUT NOT SHOWN)

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



**TYPICAL STRAND LOCATION**

(20 STRANDS REQUIRED)  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

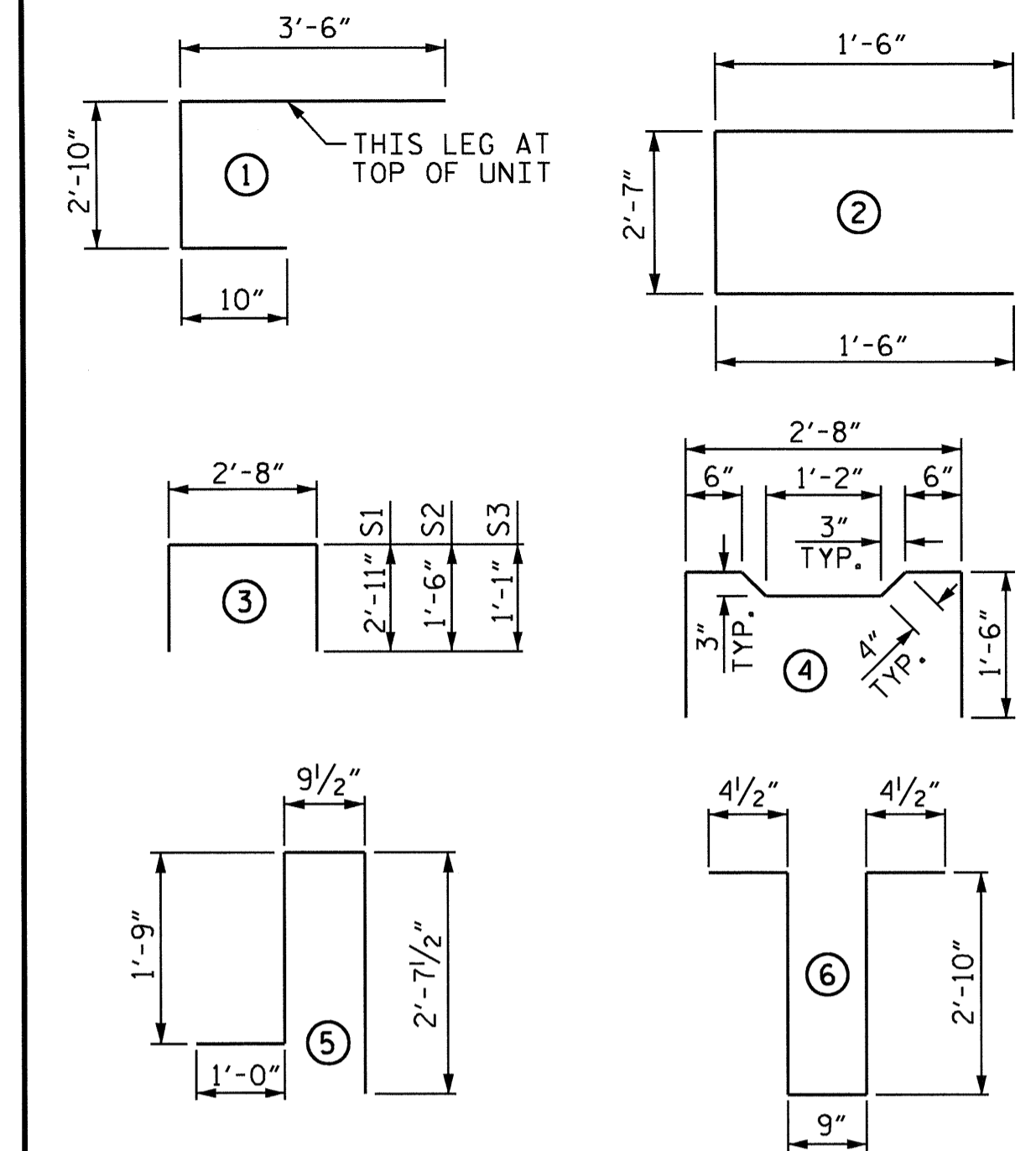
- FULLY BONDED STRANDS
- ⊙ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER

**GRADE 270 STRANDS**

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

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.

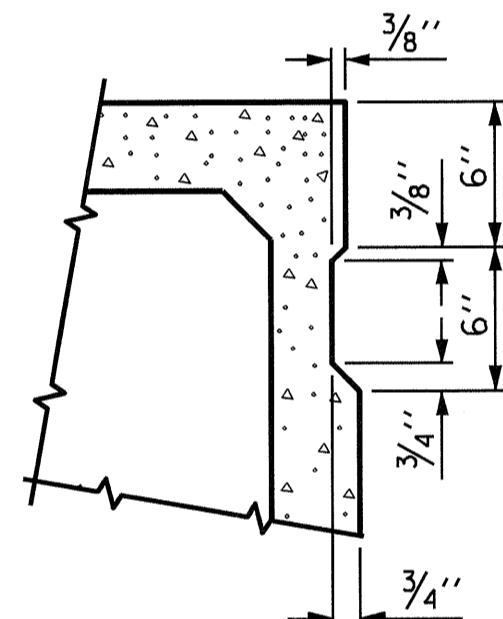
**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	38	#4	2	5'-7"	142	5'-7"	142
B3	12	#5	STR	37'-10"	474	37'-10"	474
K1	12	#4	6	7'-2"	57	7'-2"	57
K2	8	#4	STR	2'-7"	14	2'-7"	14
S1	61	#4	3	8'-6"	346	8'-6"	346
S2	61	#4	3	5'-8"	231	5'-8"	231
S3	105	#4	3	4'-10"	339	4'-10"	339
S4	44	#4	4	5'-10"	171	5'-10"	171
* S5	98	#5	5	6'-2"	630	--	--
REINFORCING STEEL				1849 LBS.		1849 LBS.	
* EPOXY COATED REINF. STEEL				630 LBS.		--	
6000 P.S.I. CONCRETE				14.5 CU. YDS.		14.5 CU. YDS.	
0.6" Ø L.R. STRANDS				No. 20		No. 20	

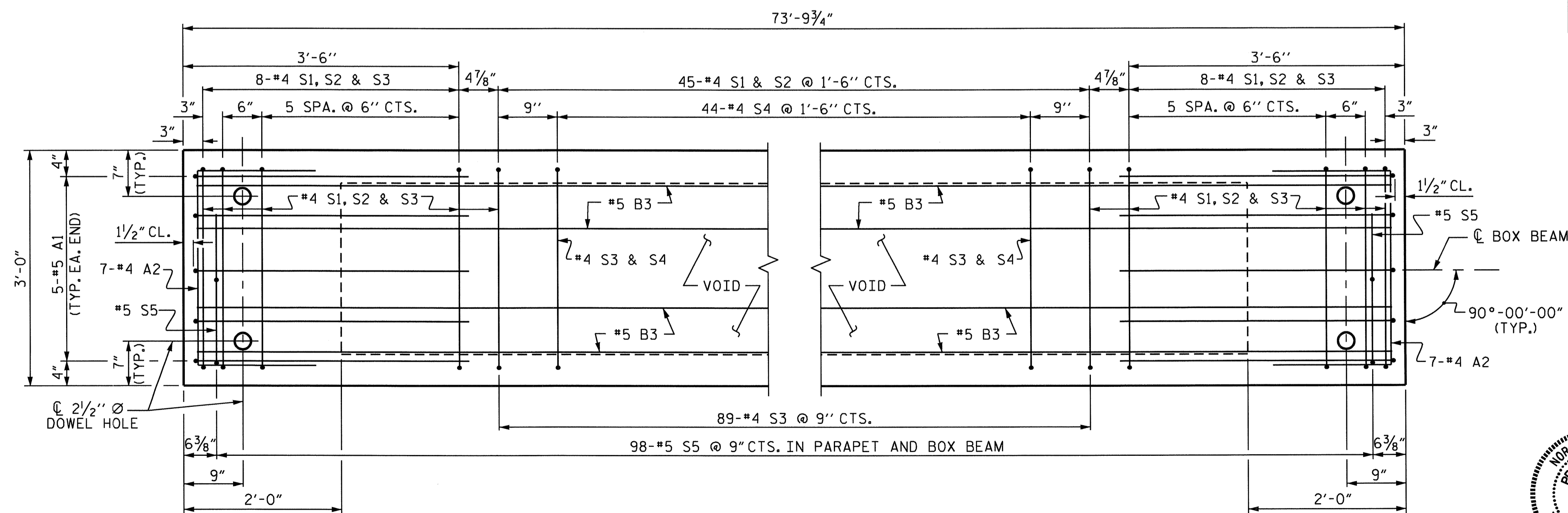


**SHEAR KEY DETAIL**

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

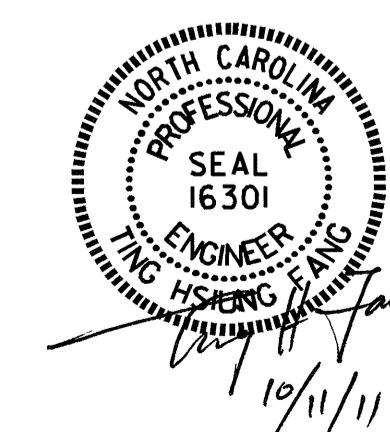
DEAD LOAD DEFLECTION AND CAMBER	
	0.6" Ø L.R. STRAND
	SPAN D
CAMBER (BEAM ALONE IN PLACE)	2"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD	1/4"
FINAL CAMBER	1 3/4"

BOX BEAM UNITS REQUIRED			
SPAN D			
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	73'-9 3/4"	147'-7 1/2"
INTERIOR	10	73'-9 3/4"	738'-1 1/2"
TOTAL	12		885'-9"



**PLAN OF BOX BEAM**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.



PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

SHEET 8 OF 9

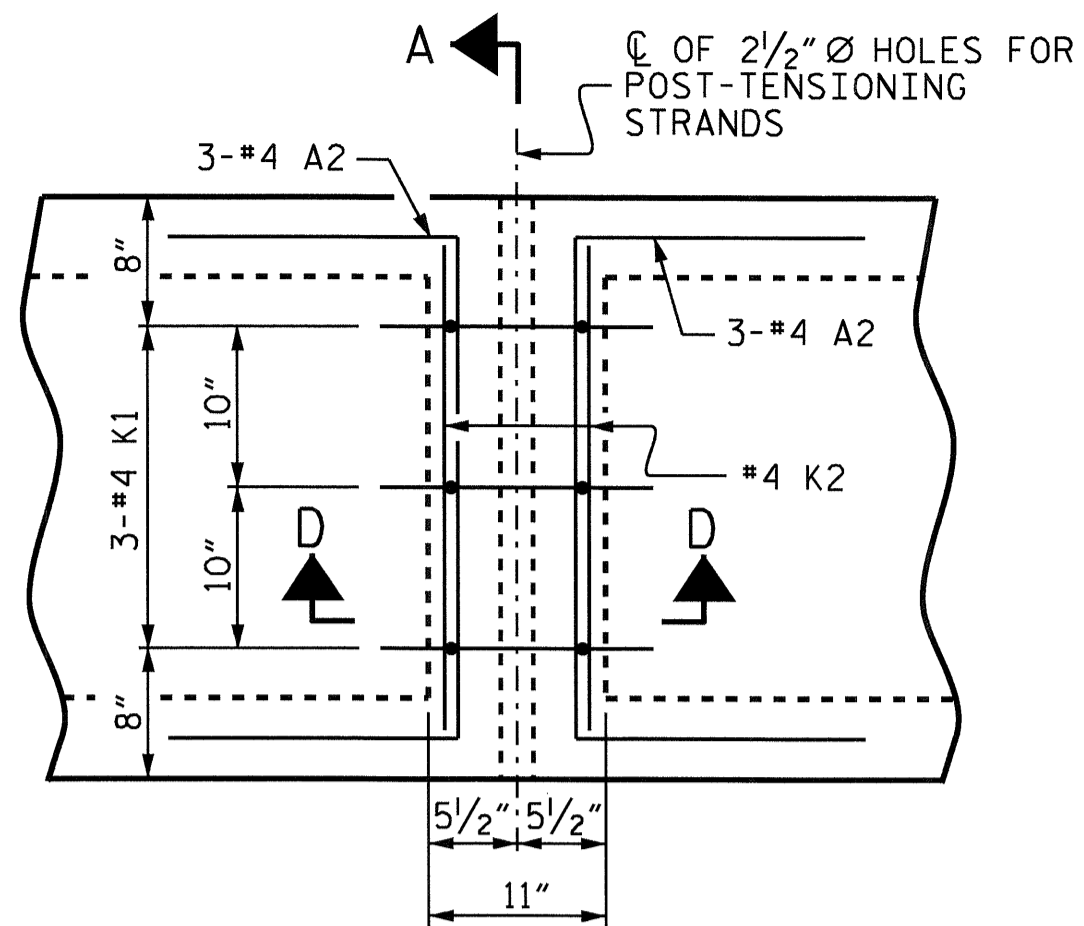
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT  
SPAN D

**REVISIONS**

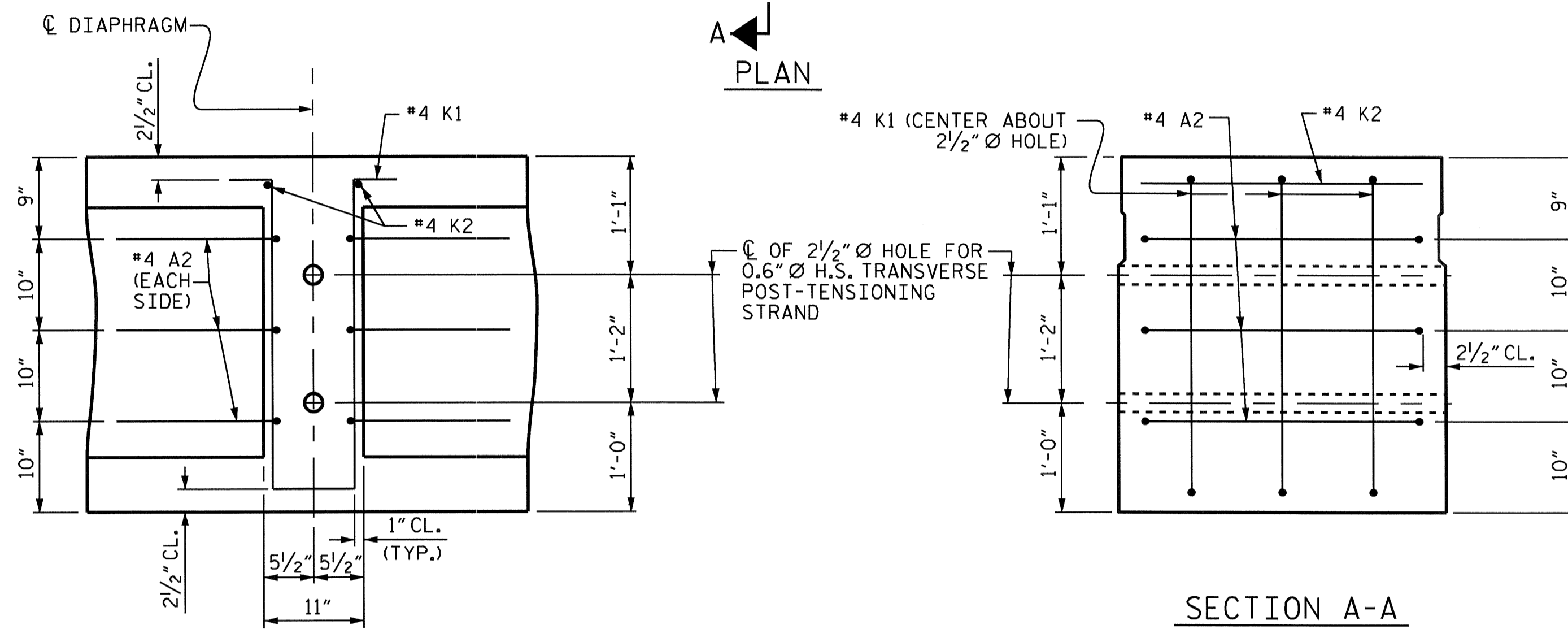
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-12
TOTAL SHEETS	33

ASSEMBLED BY :	HARISH SHAH	DATE :	3-04-10
CHECKED BY :	Q.T. NGUYEN	DATE :	3-31-10
DRAWN BY :	TLA 5/05	ADDED :	7/11/05
CHECKED BY :	GM 6/05	REV. :	5/1/06



PLAN

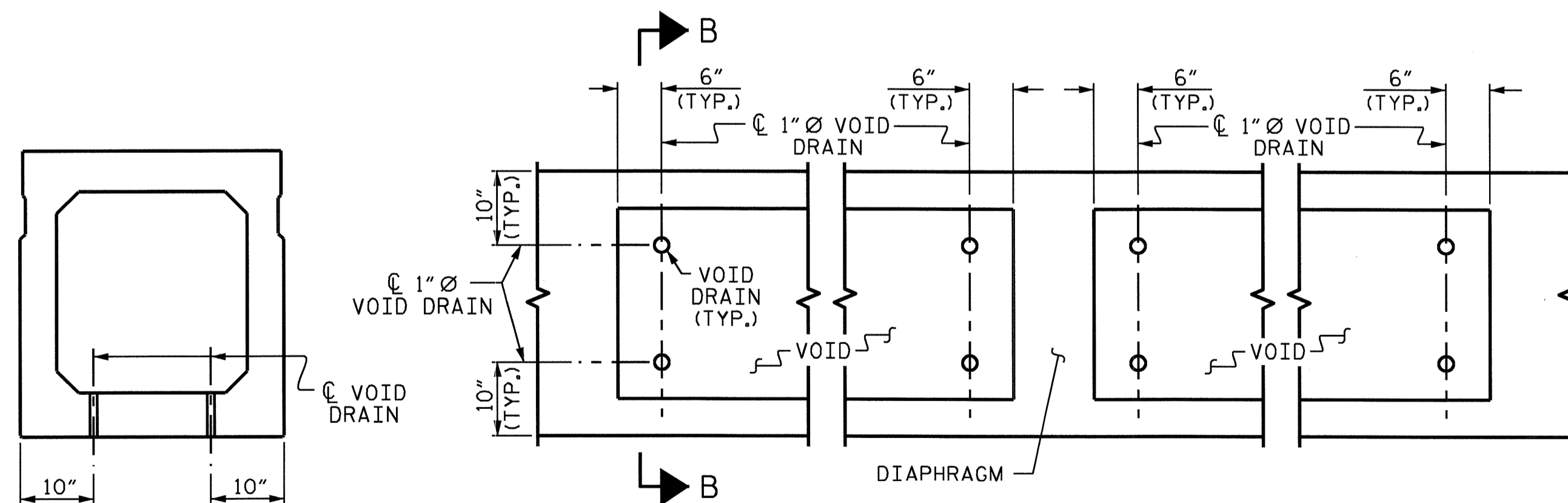


SECTION A-A  
VOIDS NOT SHOWN

SECTION D-D

DIAPHRAGM DETAILS

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

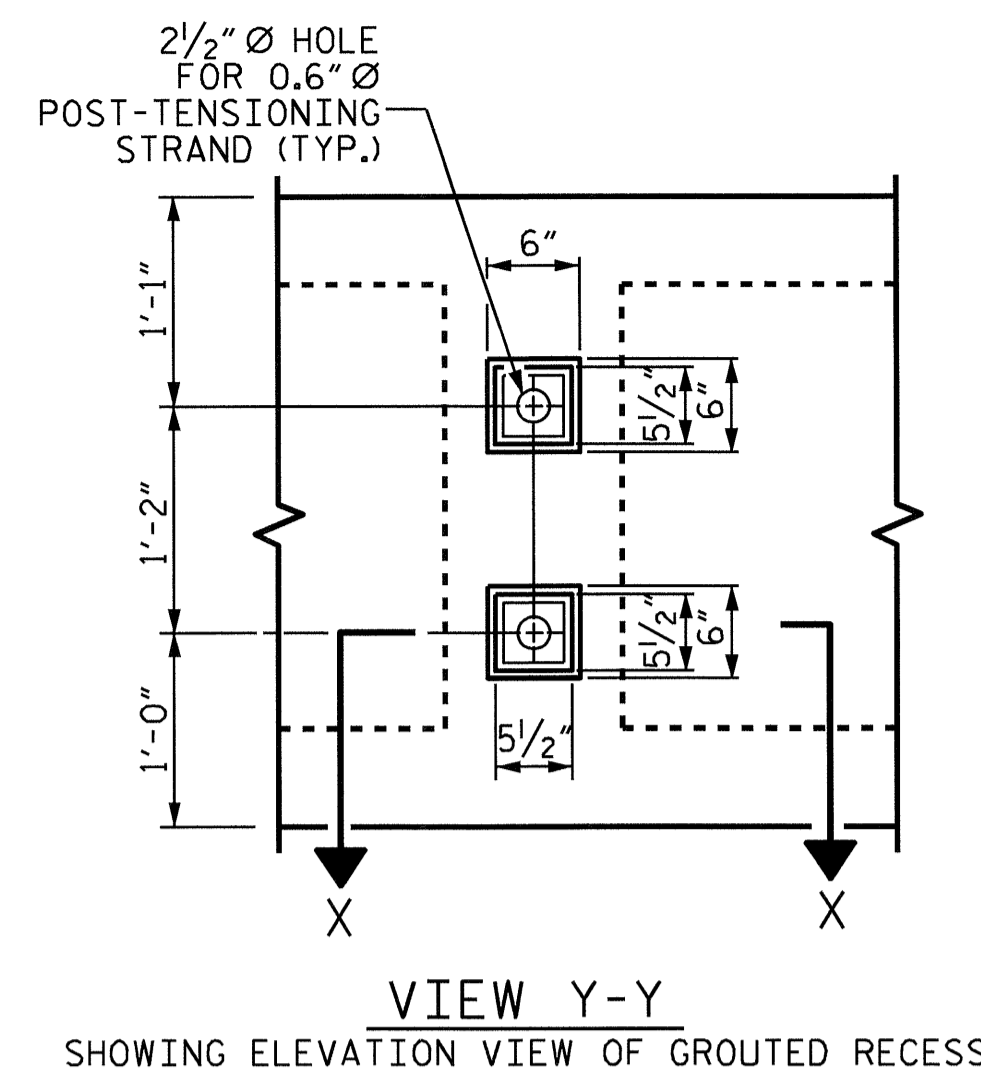


SECTION B-B

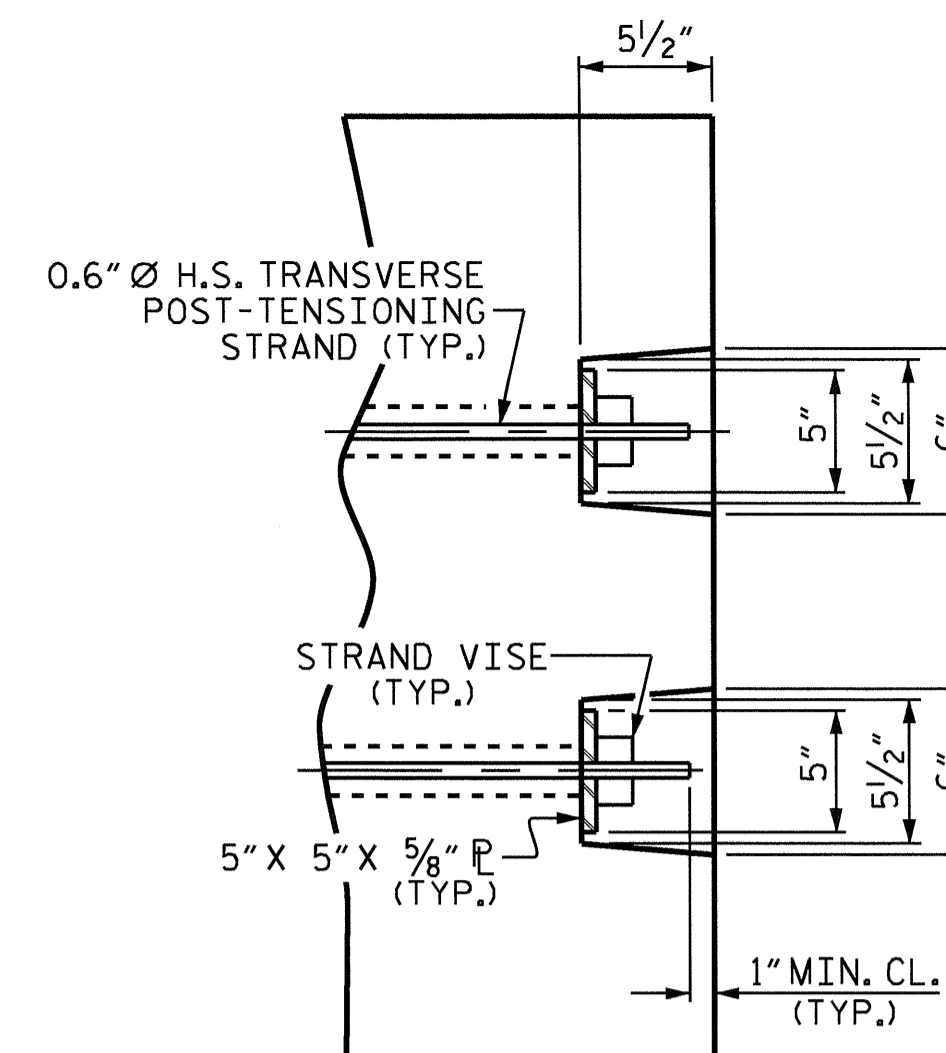
PART PLAN

VOID DRAIN DETAILS

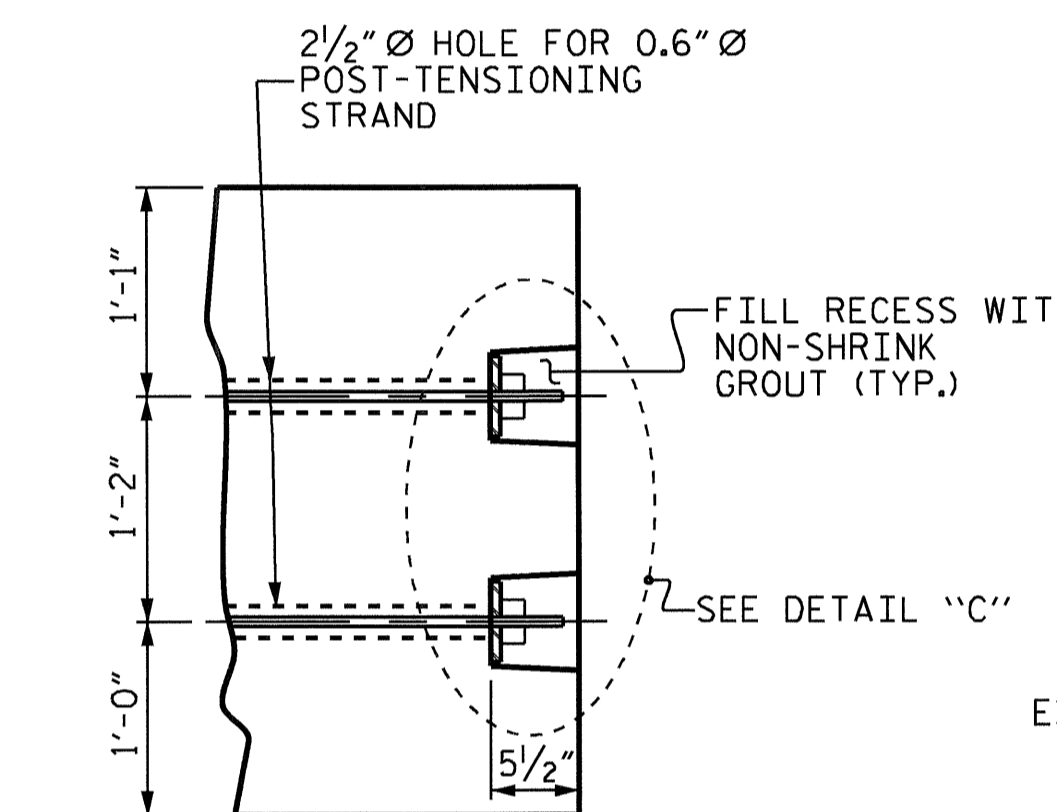
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)



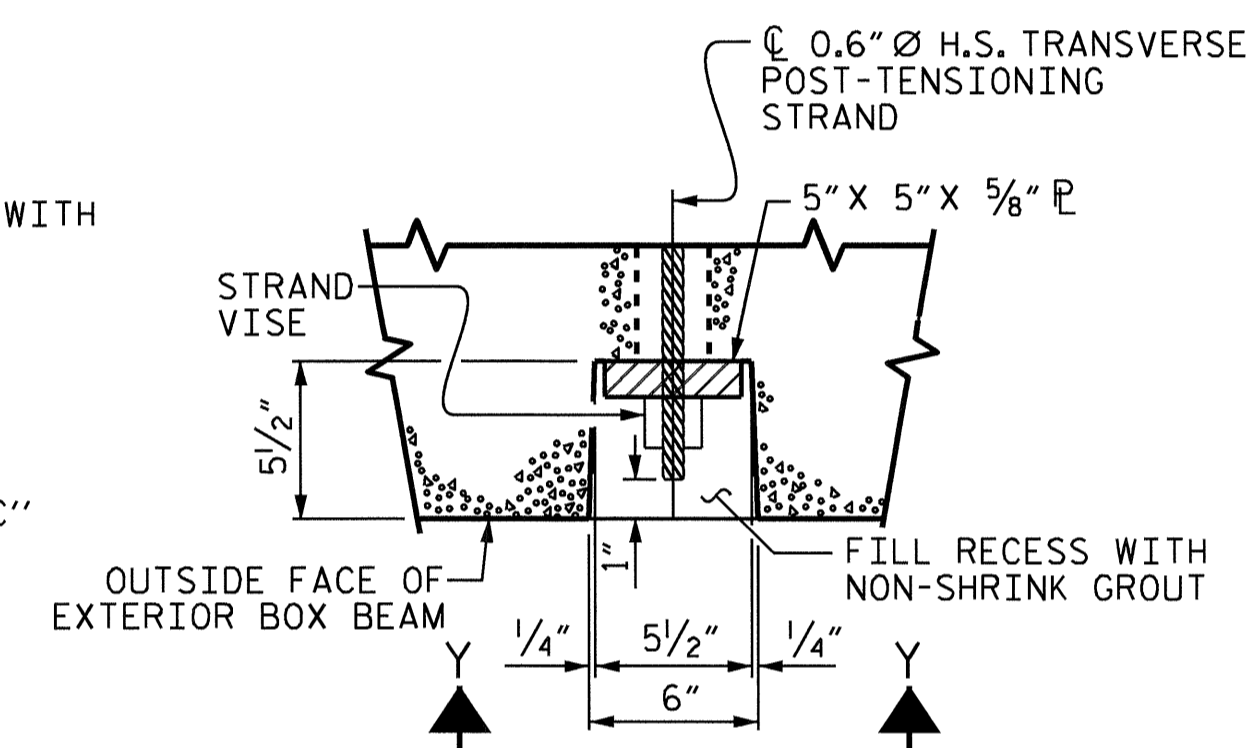
VIEW Y-Y  
SHOWING ELEVATION VIEW OF GROUDED RECESS



DETAIL "C"



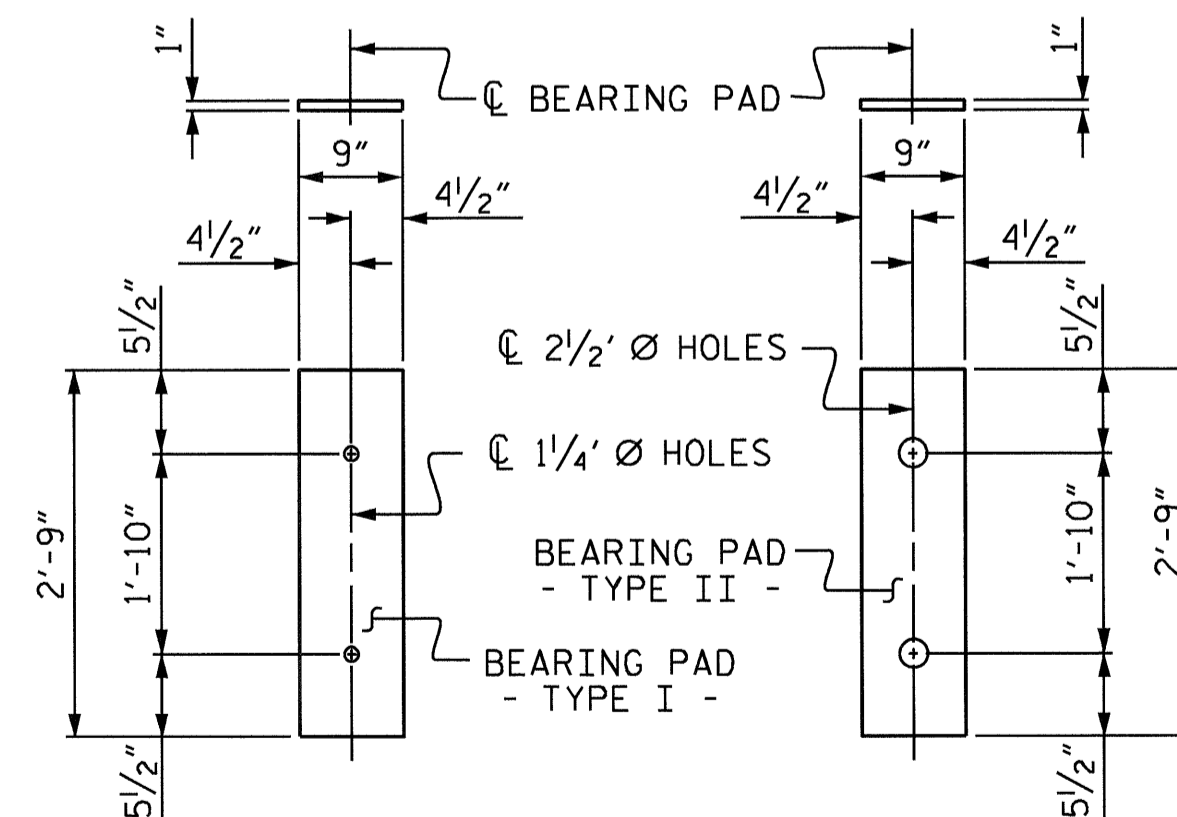
PART SECTION AT RECESS



SECTION X-X

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

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS



FIXED END  
(TYPE I - 72 REQ'D)

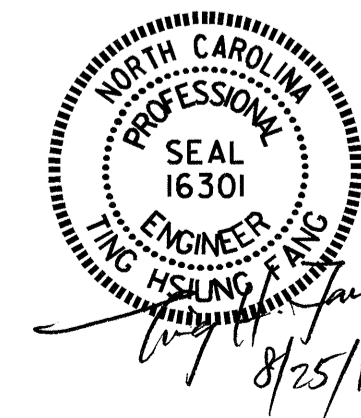
EXPANSION END  
(TYPE II - 24 REQ'D)

ELASTOMERIC BEARING DETAILS

PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS 33
2			4			

ASSEMBLED BY : HARISH SHAH	DATE : 3-2-10
CHECKED BY : Q.T. NGUYEN	DATE : 3-31-10
DRAWN BY : TLA	5/05
CHECKED BY : GM	6/05
ADDED	7/11/05
REV.	5/11/06
	TLA/GM

**NOTES**

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

**ALUMINUM RAILS**

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

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

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

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

**GENERAL NOTES**

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

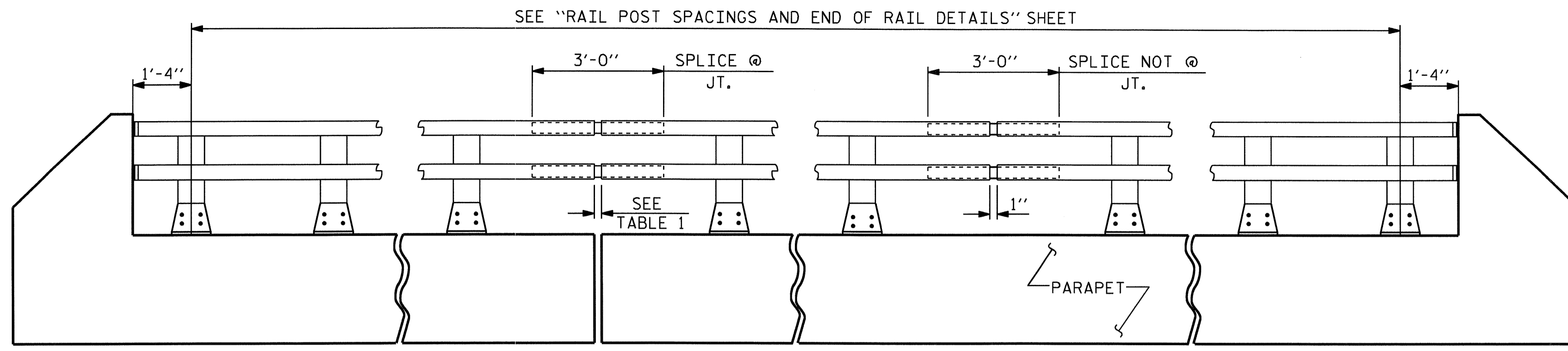
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

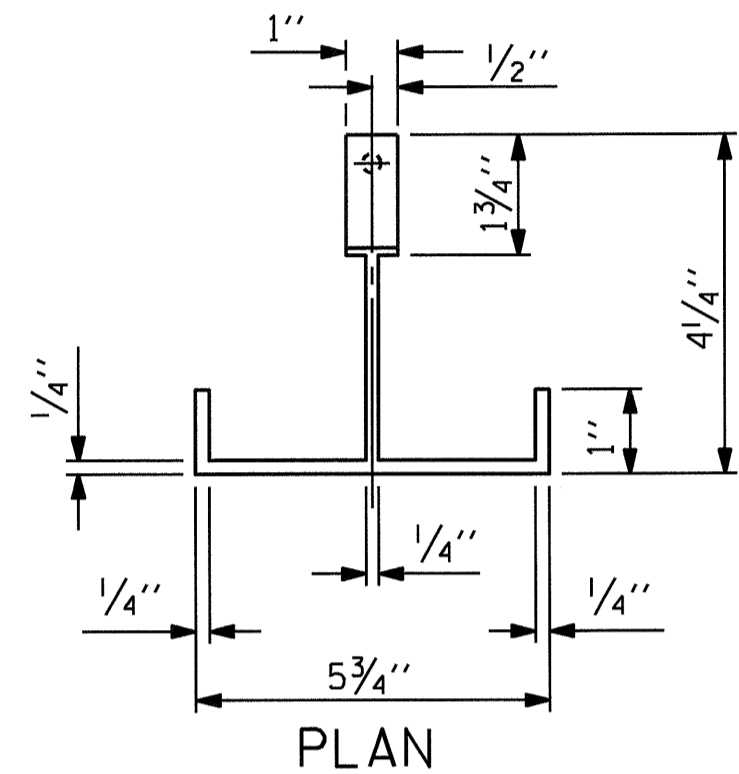
PAY LENGTH = 600.50 LIN. FT.



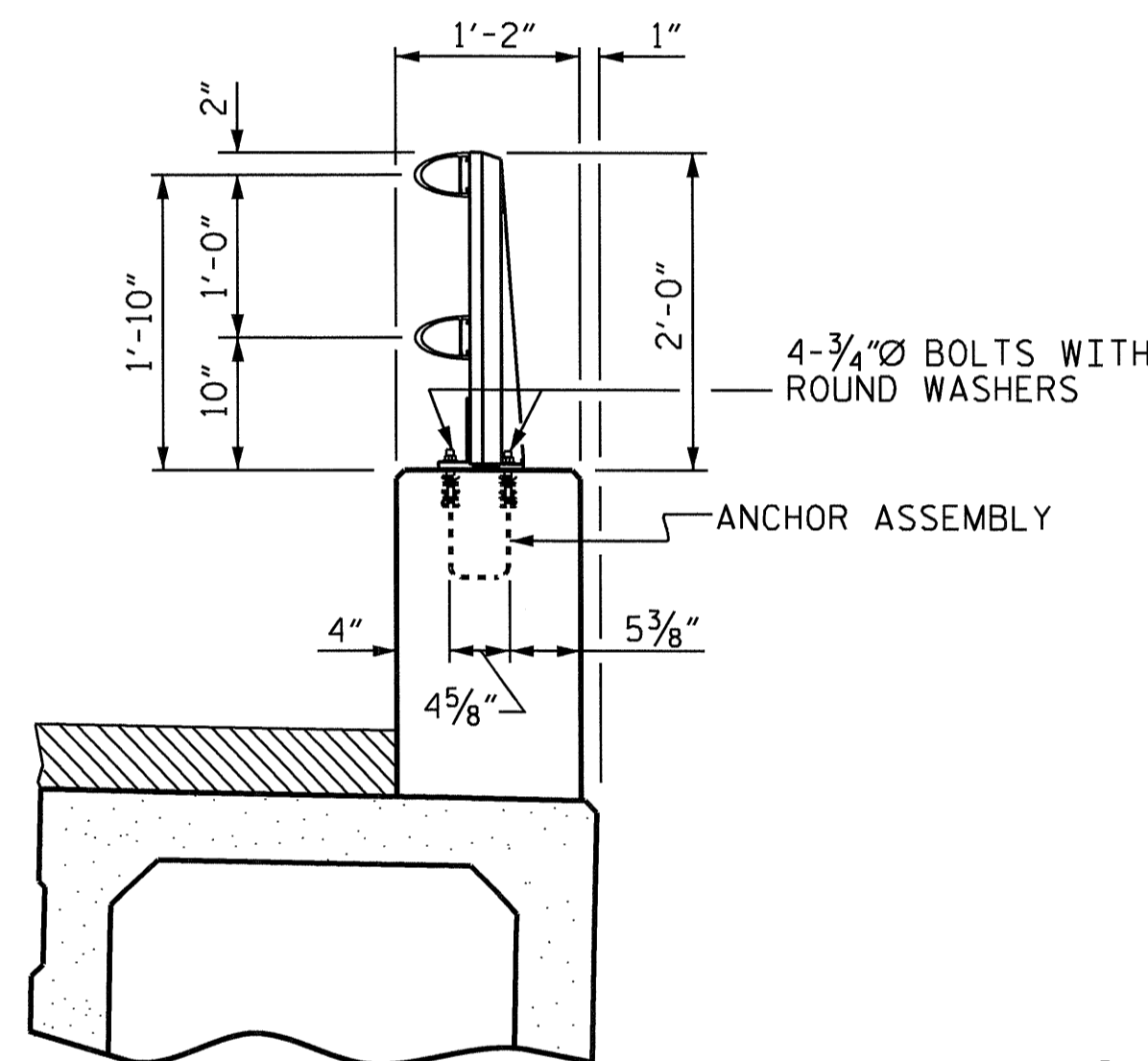
**ELEVATION**

NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

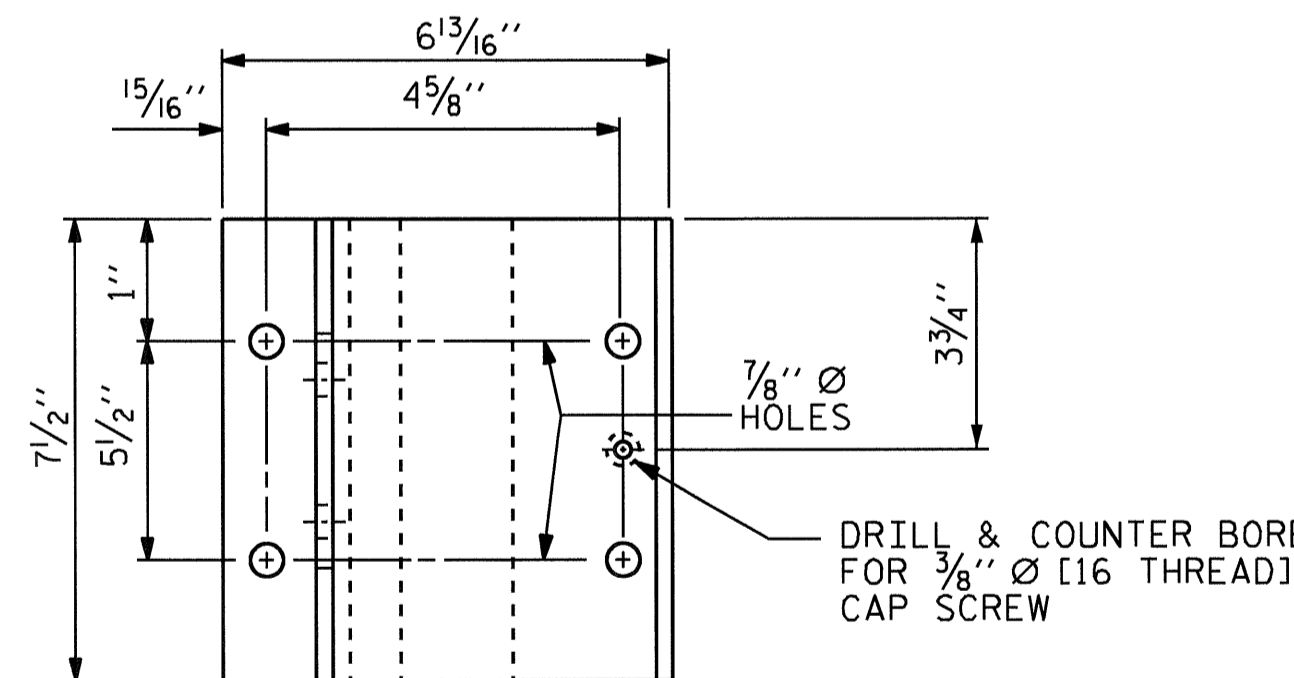
CL JT. @	RAIL OPENING
BENT 1	1 1/2"
BENT 2	1 1/2"
BENT 3	1 1/2"



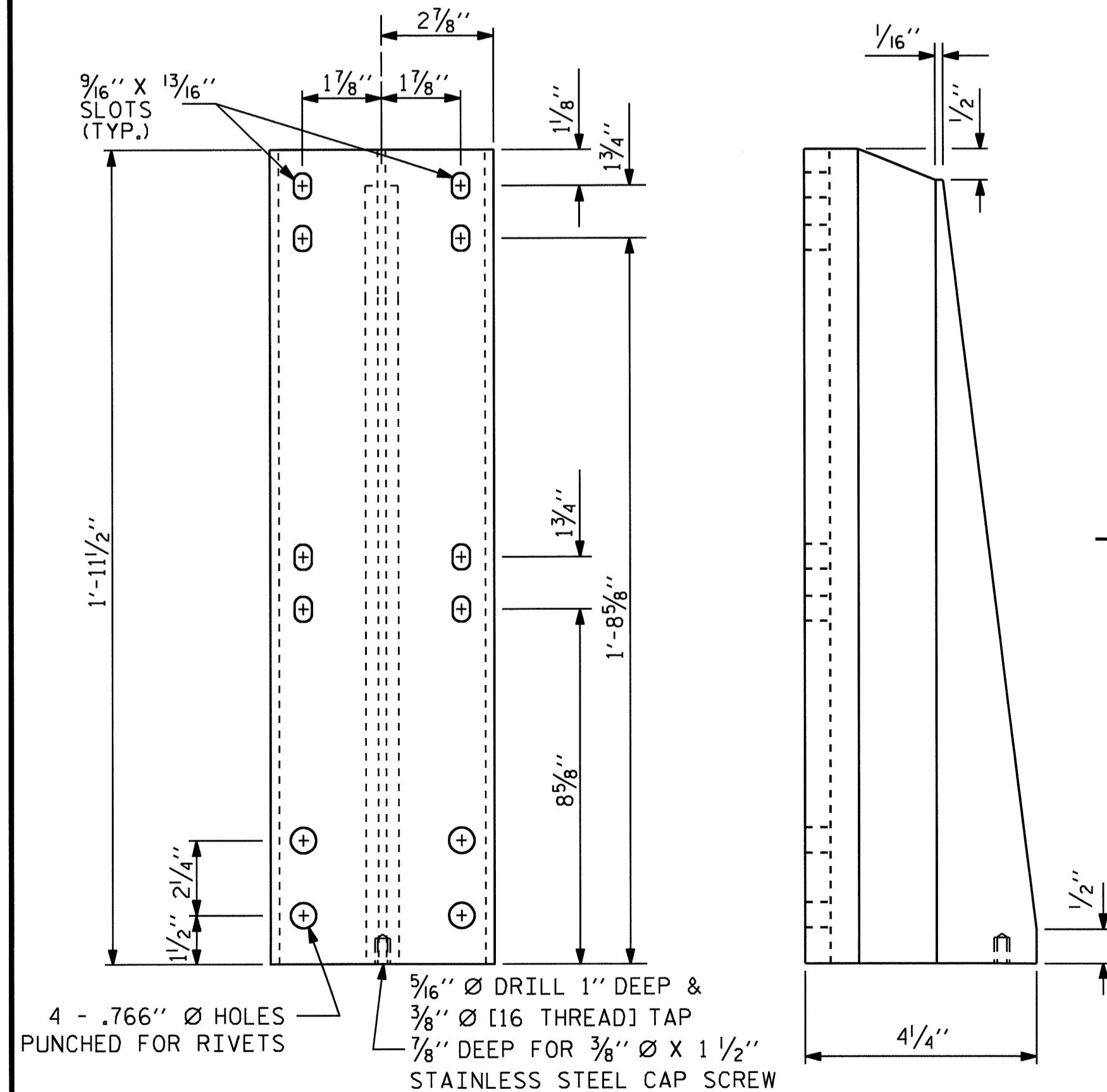
**PLAN**



**SECTION THRU PARAPET AND RAIL**



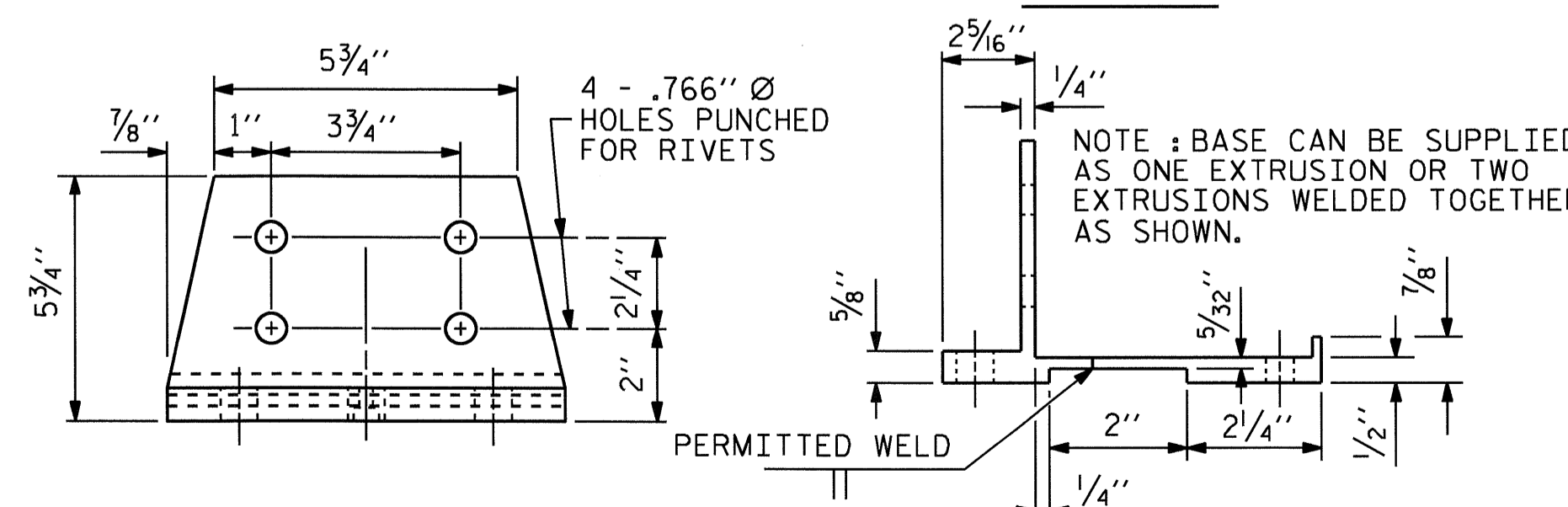
**PLAN**



**FRONT ELEVATION**

**SIDE ELEVATION**

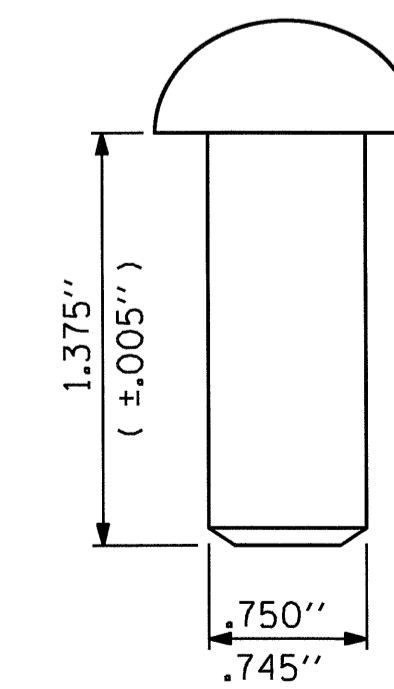
**DETAILS OF POST**



**FRONT ELEVATION**

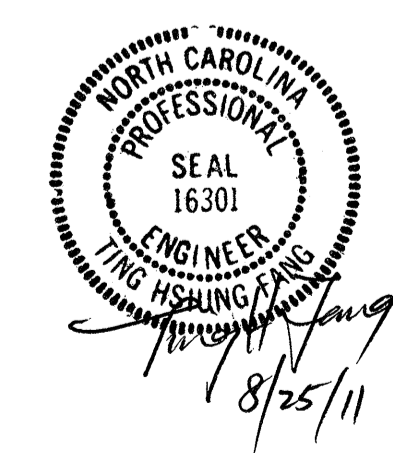
**SIDE ELEVATION**

**POST BASE DETAILS**



**RIVET DETAIL**

ASSEMBLED BY: HARISH SHAH DATE: 4-5-10  
 CHECKED BY: O.T. NGUYEN DATE: 3-31-10  
 DRAWN BY: EEM 6/94 REV. 10/17/00 LES/RDR  
 CHECKED BY: RGW 6/94 REV. 5/7/03R RWW/JTE  
 REV. 5/1/06 TLA/GM



PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 1 OF 2

REVISIONS						SHEET NO. S-14
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 33
2			4			

STD. NO. BMR3

NOTES

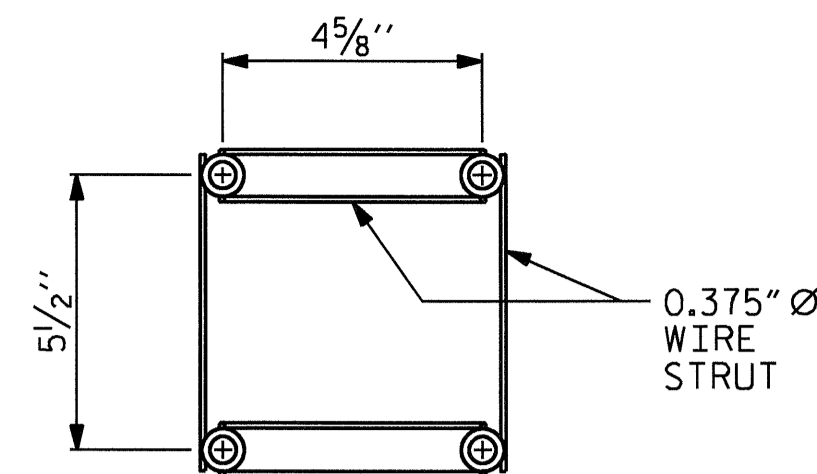
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

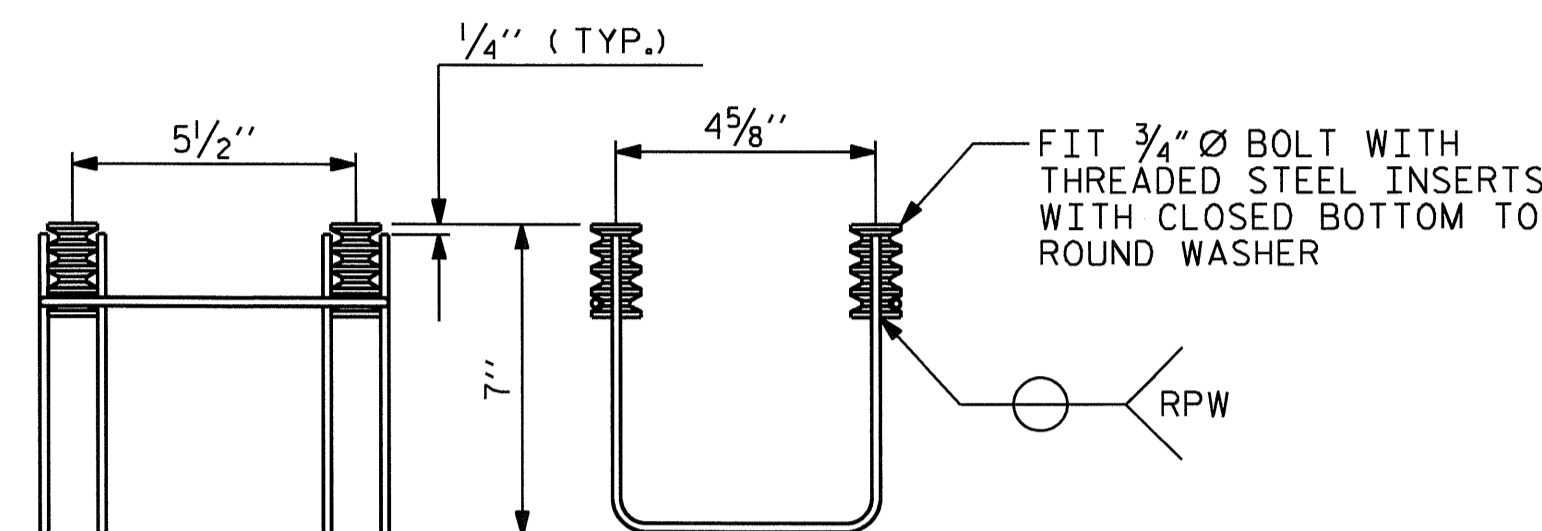
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT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

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

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



PLAN

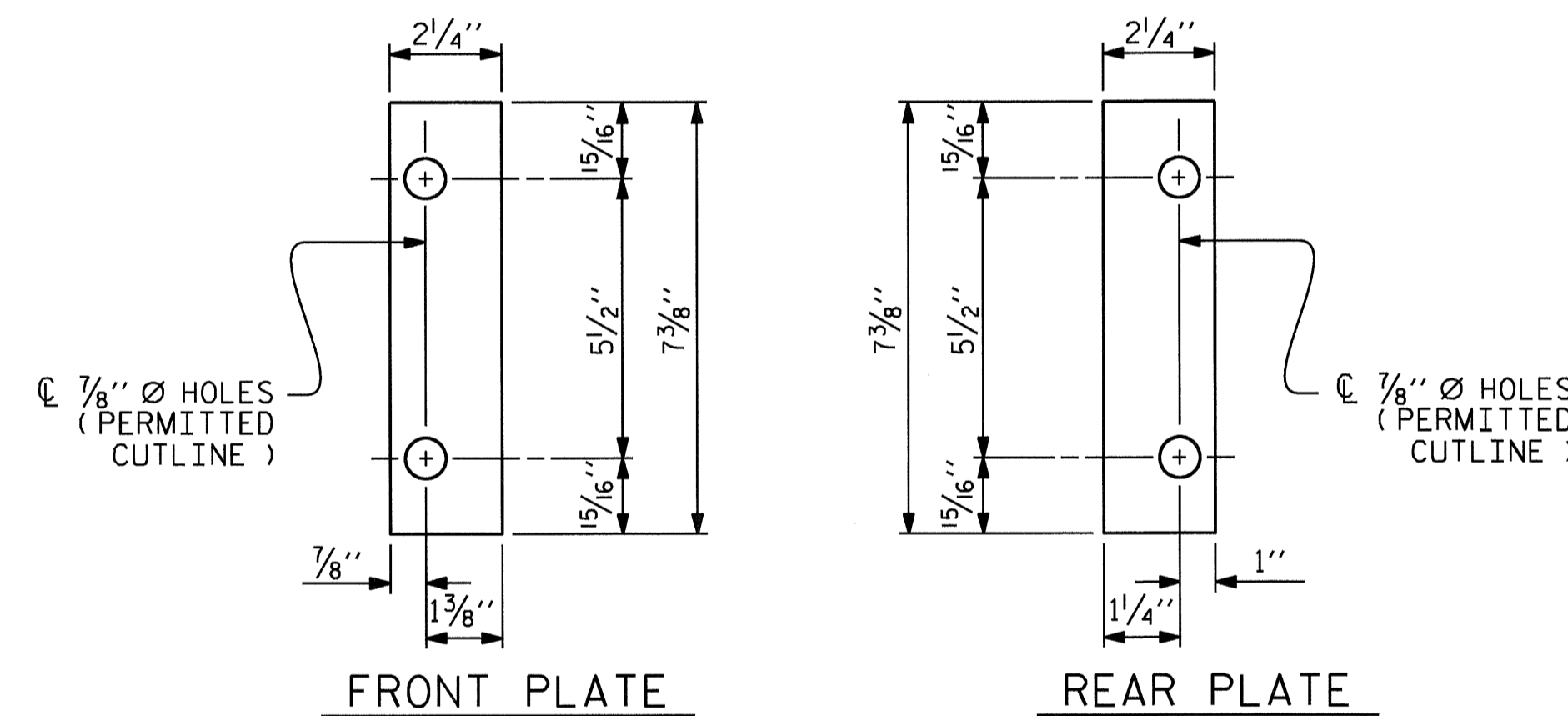


SIDE VIEW ELEVATION

MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) : 1 3/4"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 98 ASSEMBLIES REQUIRED )

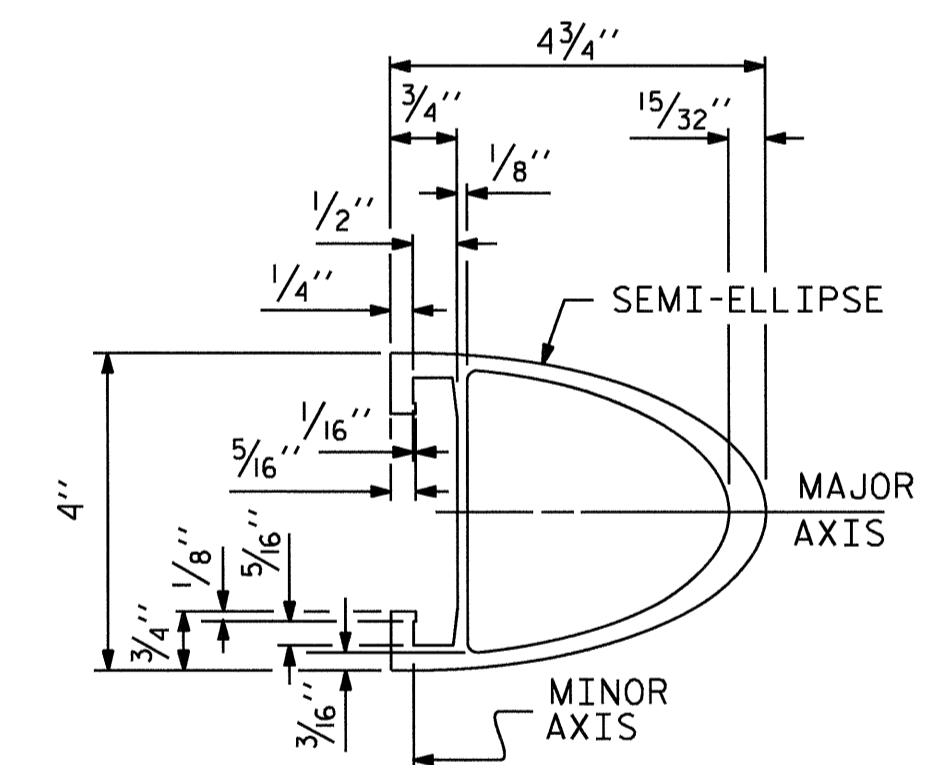


FRONT PLATE

REAR PLATE

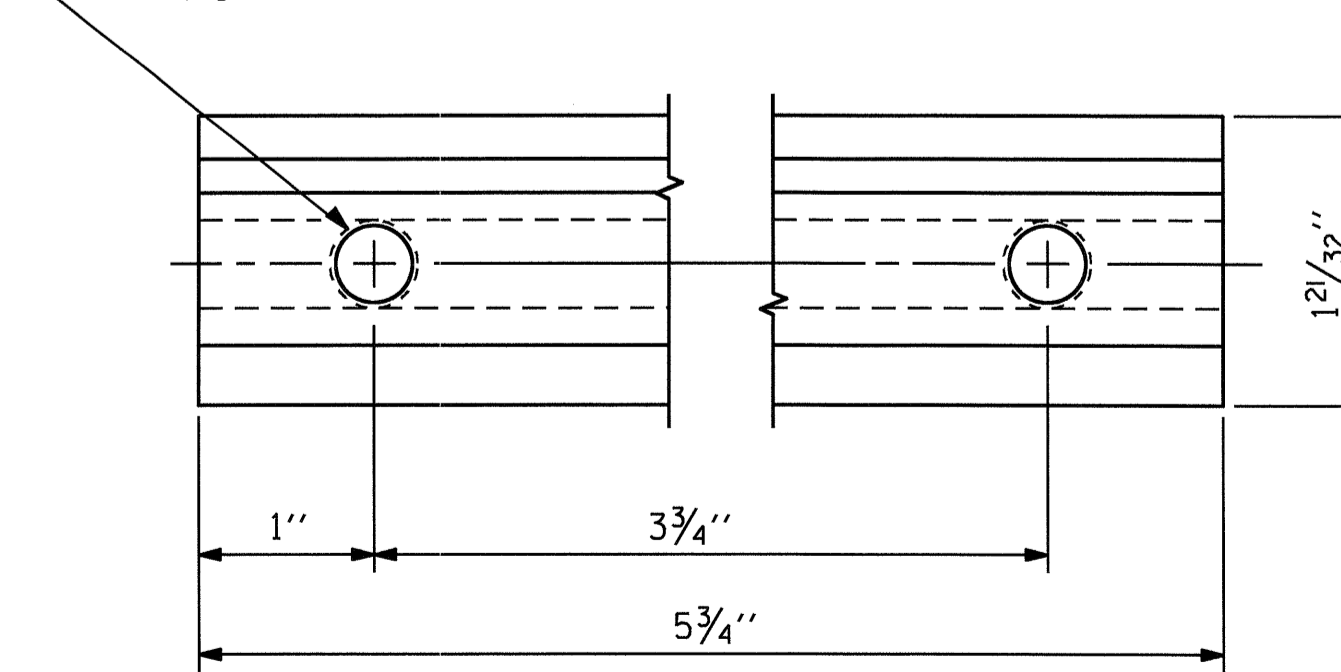
SHIM DETAILS

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



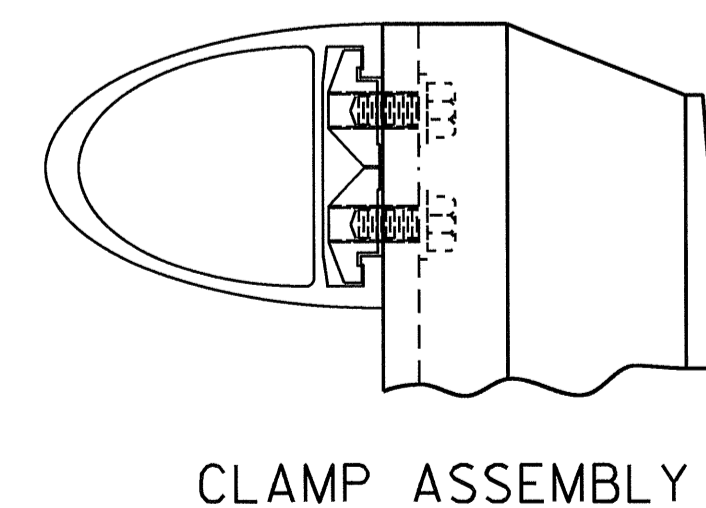
RAIL SECTION

1/2" Ø [13 THREAD] HOLE FOR 1/2" Ø X 1" STAINLESS STEEL HEX HEAD CAP SCREW & 1/16" O.D., 1 7/32" I.D., 1/16" THICK WASHER (TYP.)

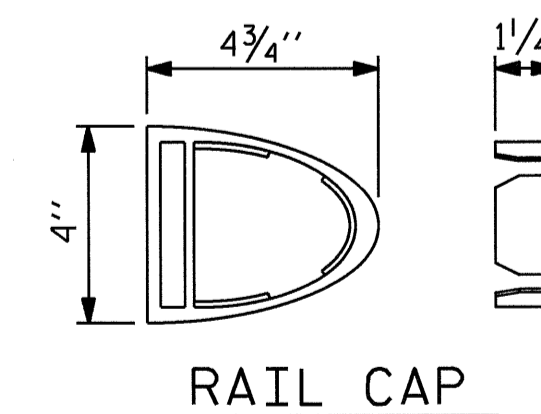


CLAMP BAR DETAIL

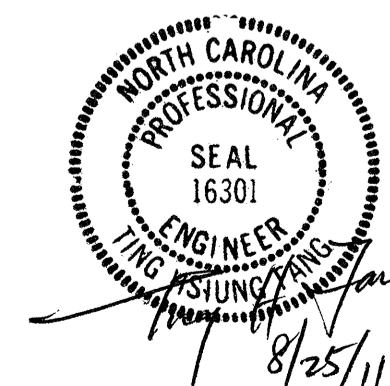
( 4 REQUIRED PER POST )



CLAMP ASSEMBLY



RAIL CAP



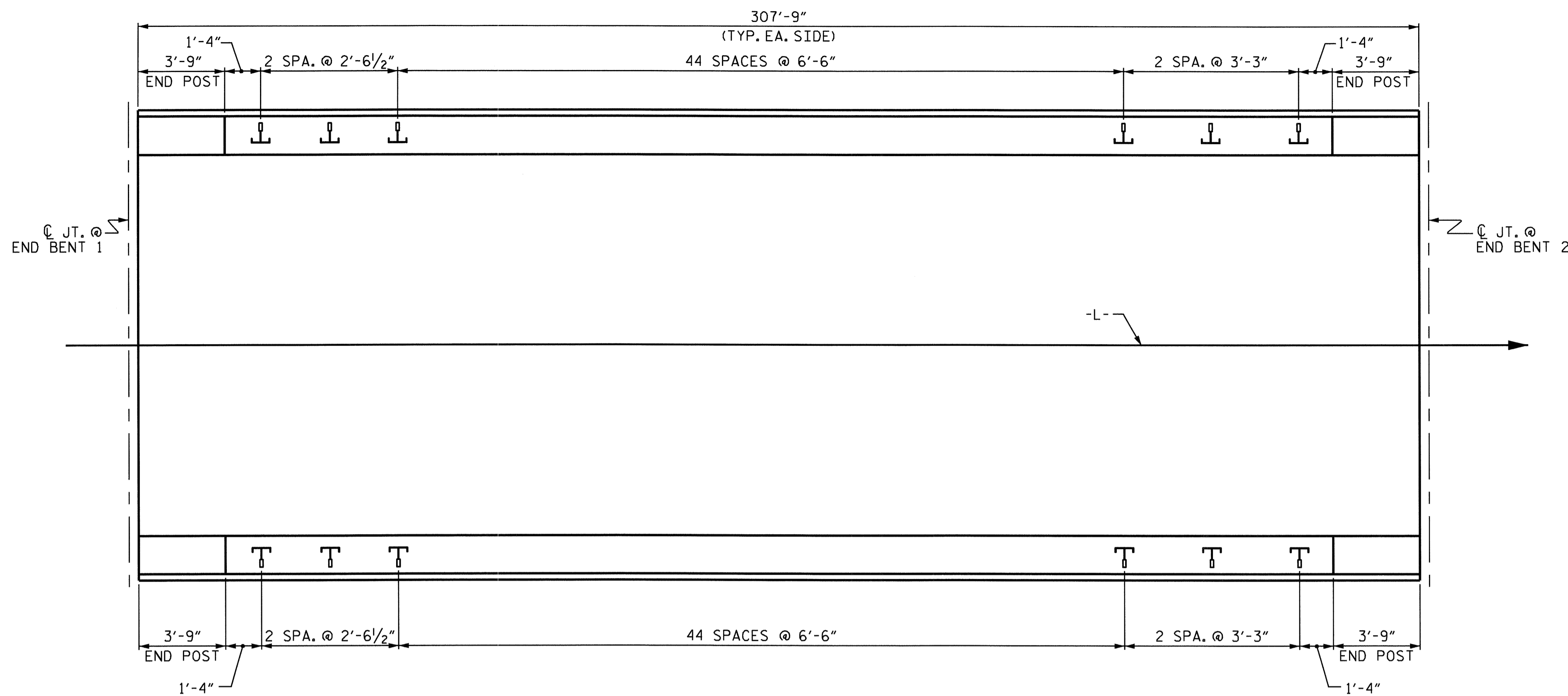
PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 2 OF 2

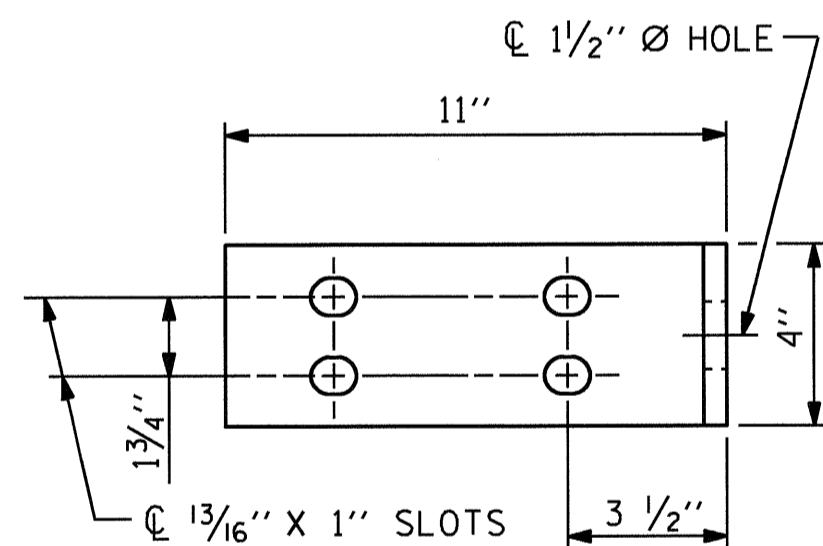
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-15
STANDARD 2 BAR METAL RAIL						TOTAL SHEETS 33
REVISIONS						NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			4
2			4			

ASSEMBLED BY : HARISH SHAH	DATE : 4-5-10
CHECKED BY : O.T. NGUYEN	DATE : 3-31-10
DRAWN BY : EEM	6/94
CHECKED BY : RGW	6/94
REV. 2/6/97	EEM/RGW
REV. 8/16/99	MAB/LES
REV. 5/1/06R	KMM/GM

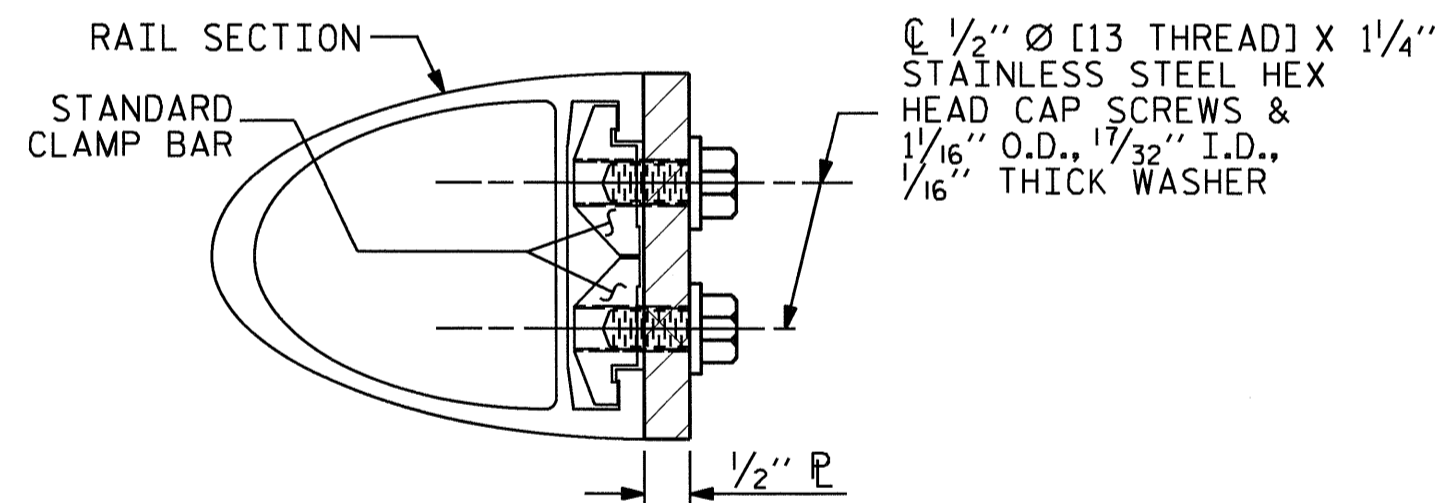




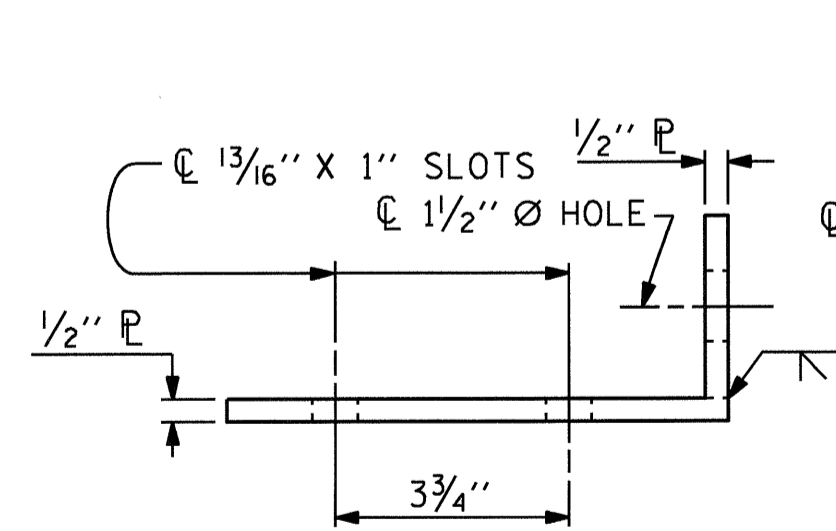
PLAN OF RAIL POST SPACINGS



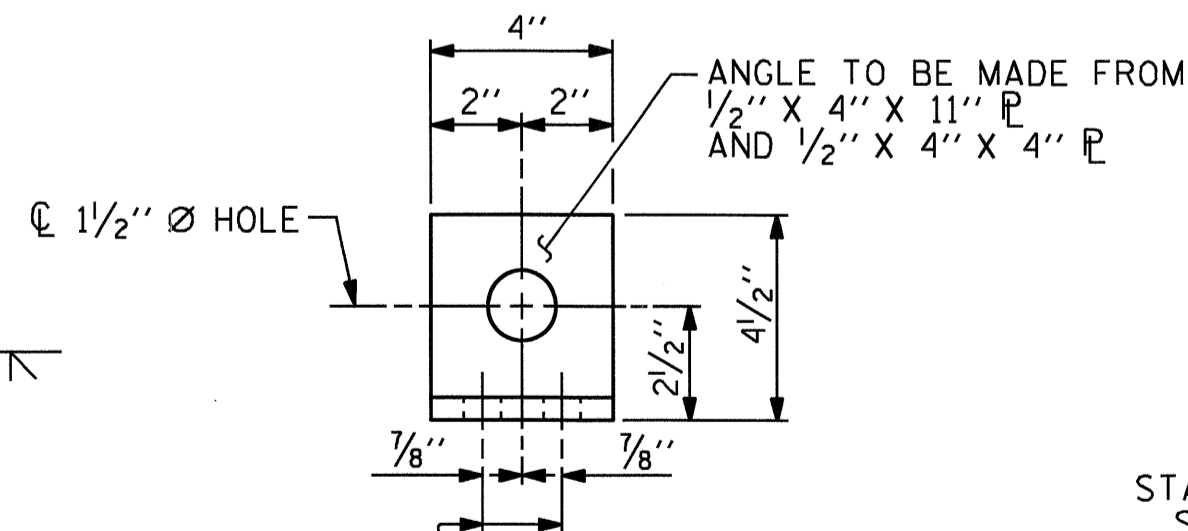
ELEVATION



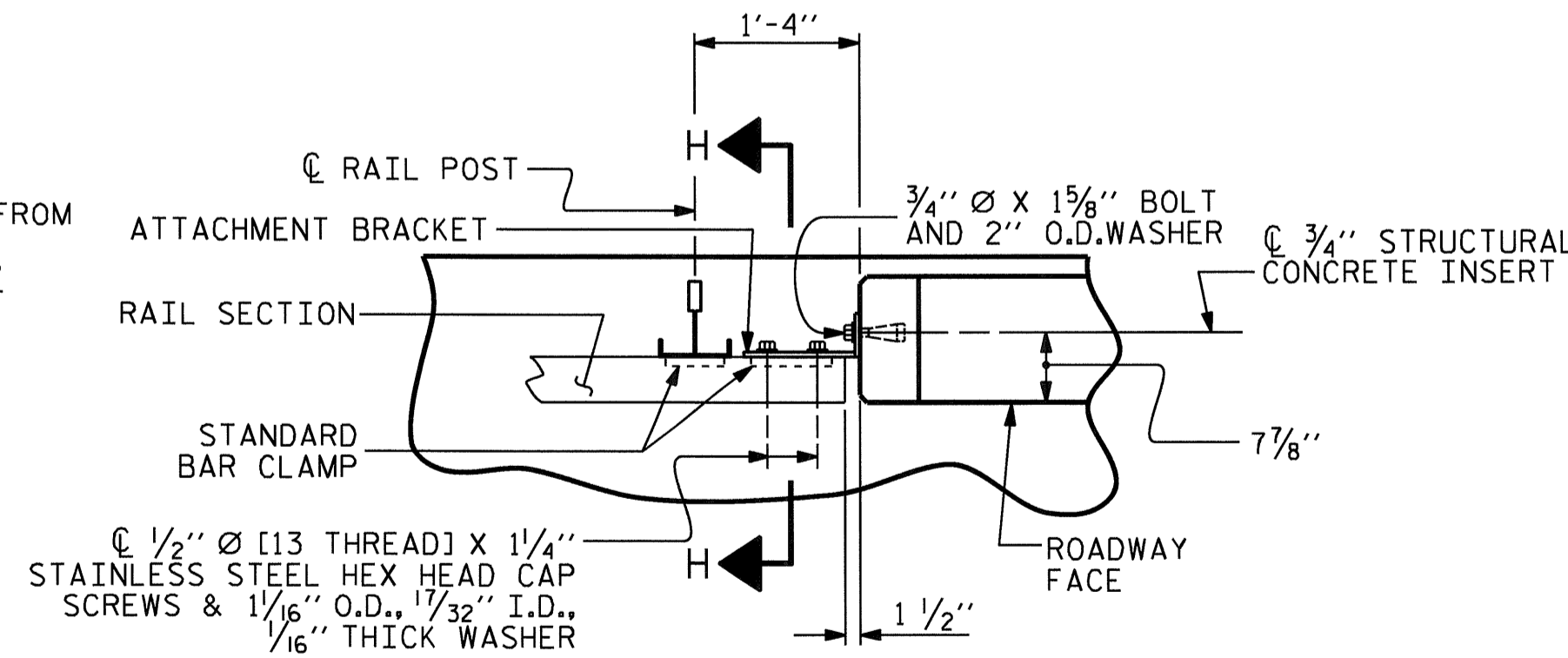
SECTION H-H



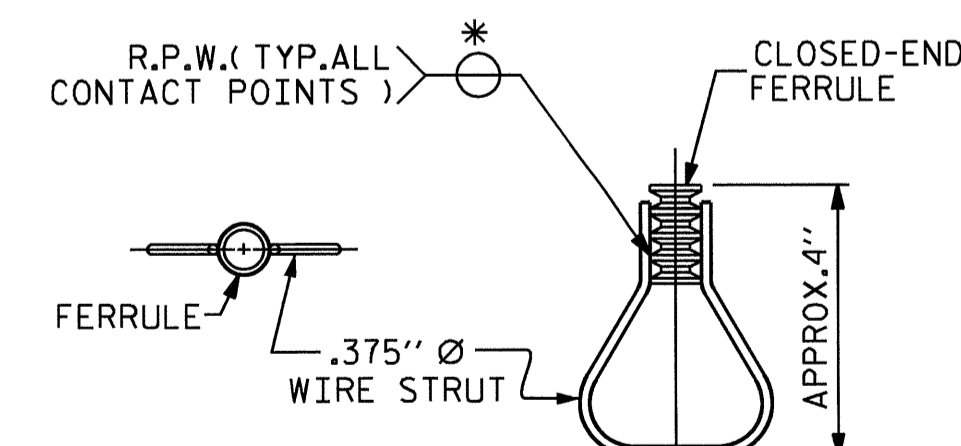
TOP VIEW



END VIEW (FIX)



PLAN - RAIL AND END POST



PLAN ELEVATION  
STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 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.

NOTES

METAL RAIL TO END POST CONNECTION

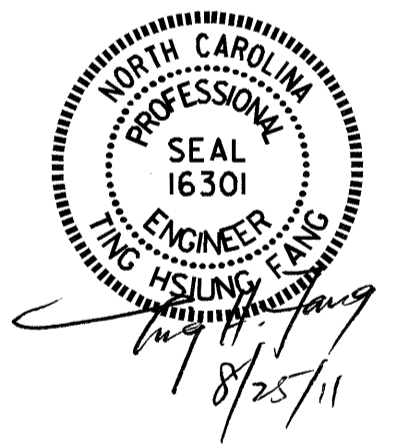
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 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°.
  - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

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

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 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.

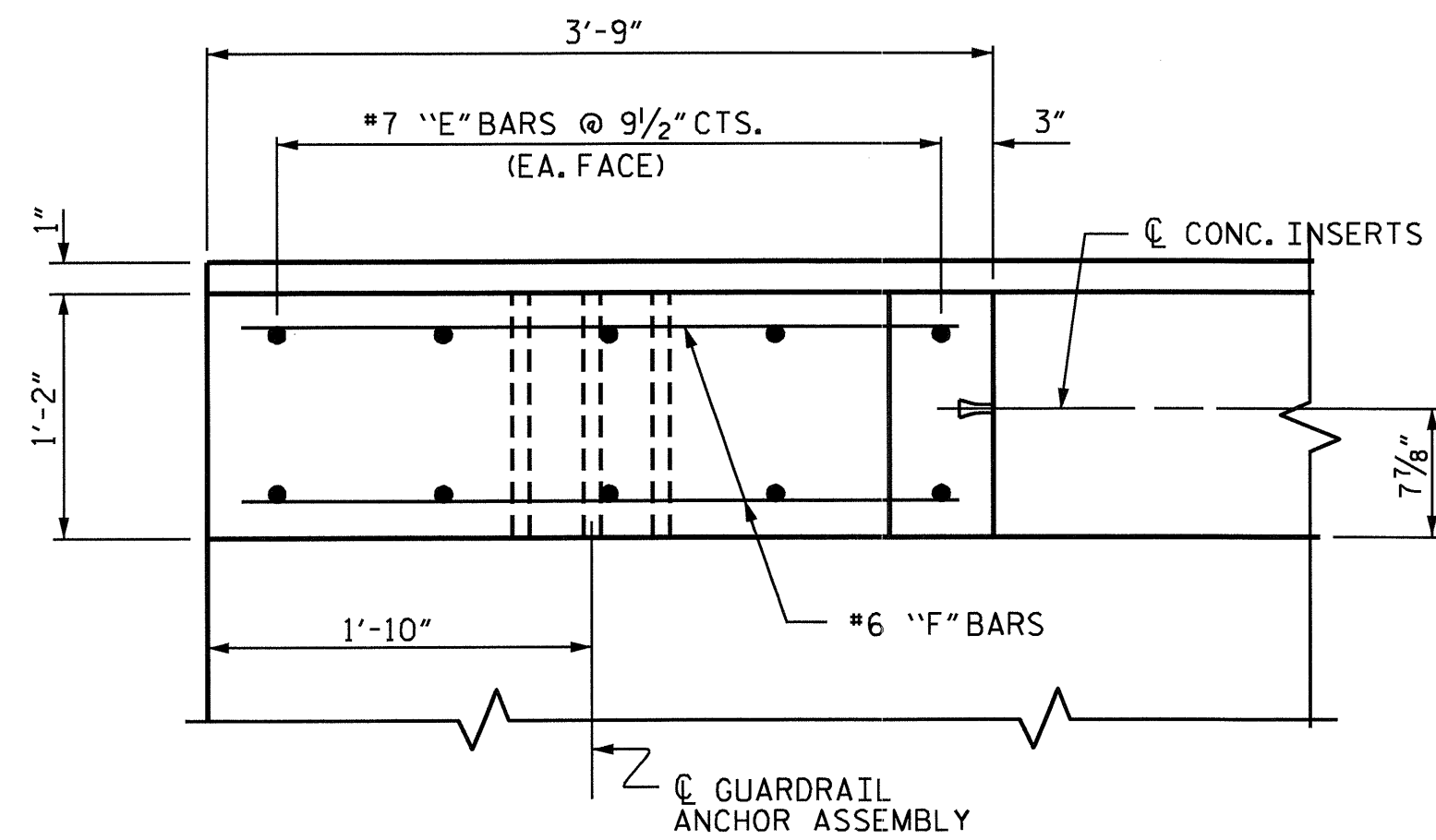


PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

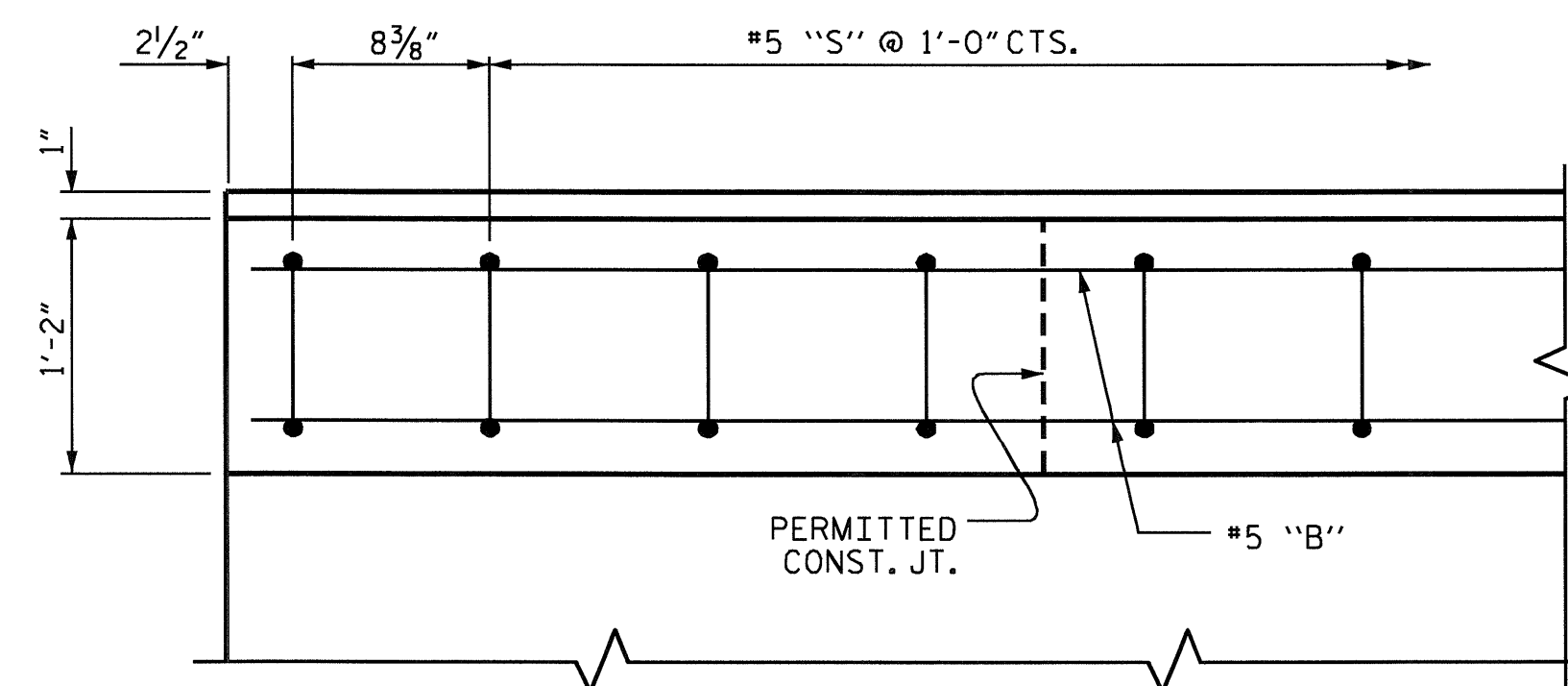
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS 33
2			4			

ASSEMBLED BY : HARISH SHAH	DATE : 4-5-10
CHECKED BY : O.T. NGUYEN	DATE : 3-31-10
DRAWN BY : FCJ 1/88	REV. 10/17/00 LES/RDR
CHECKED BY : CRK 3/89	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM



PLAN OF END POST

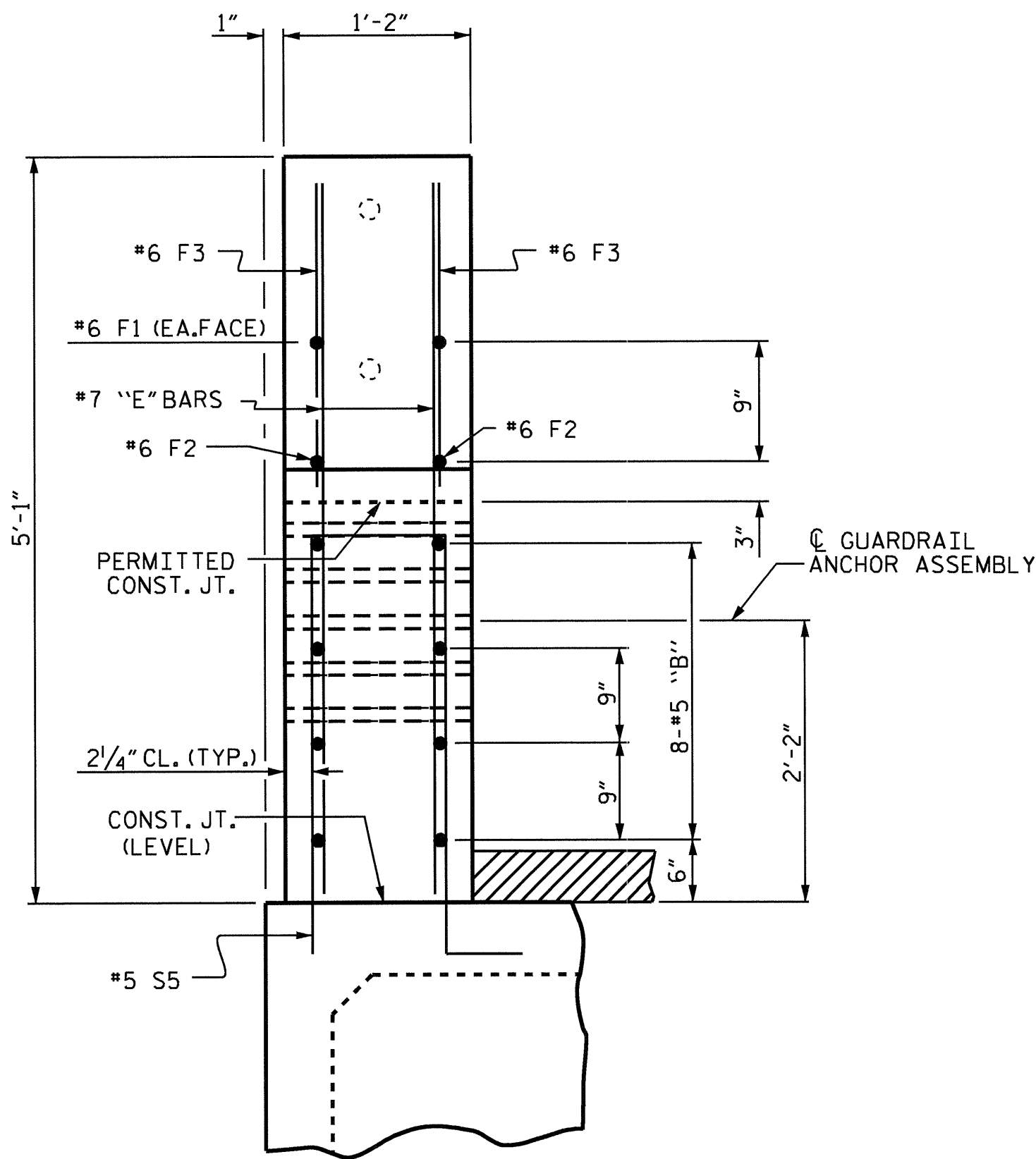


PLAN OF PARAPET

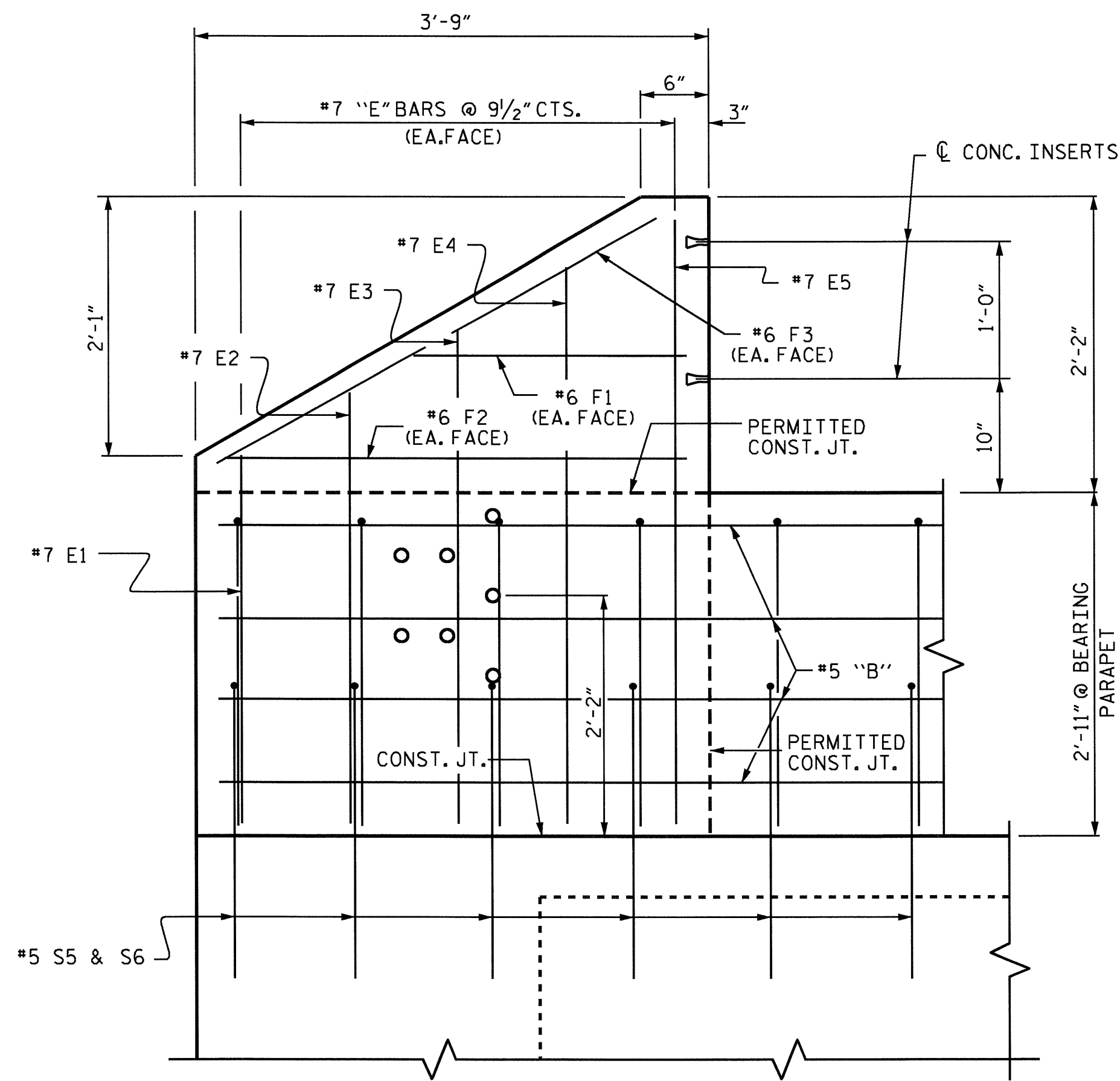
BAR TYPE		BILL OF MATERIAL				
		2 PARAPETS AND 4 END POSTS				
		BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
*B4	32	#5	STR	21'-6"	718	
*B5	64	#5	STR	23'-1"	1541	
*B6	80	#5	STR	23'-8"	1975	
*B7	32	#5	STR	24'-6"	818	
*E1	8	#7	STR	2'-10"	46	
*E2	8	#7	STR	3'-4"	55	
*E3	8	#7	STR	3'-10"	63	
*E4	8	#7	STR	4'-4"	71	
*E5	8	#7	STR	4'-8"	76	
*F1	8	#6	STR	1'-10"	22	
*F2	8	#6	STR	3'-0"	36	
*F3	8	#6	STR	3'-8"	44	
*S6	816	#5	1	5'-7"	4752	
*EPOXY COATED REINFORCING STEEL				LBS.	10,216	
CLASS AA CONCRETE				CU. YDS.	77.4	
1'-2" X 2'-11" CONCRETE PARAPET				LIN. FT.	615.5	

ALL BAR DIMENSIONS ARE OUT TO OUT

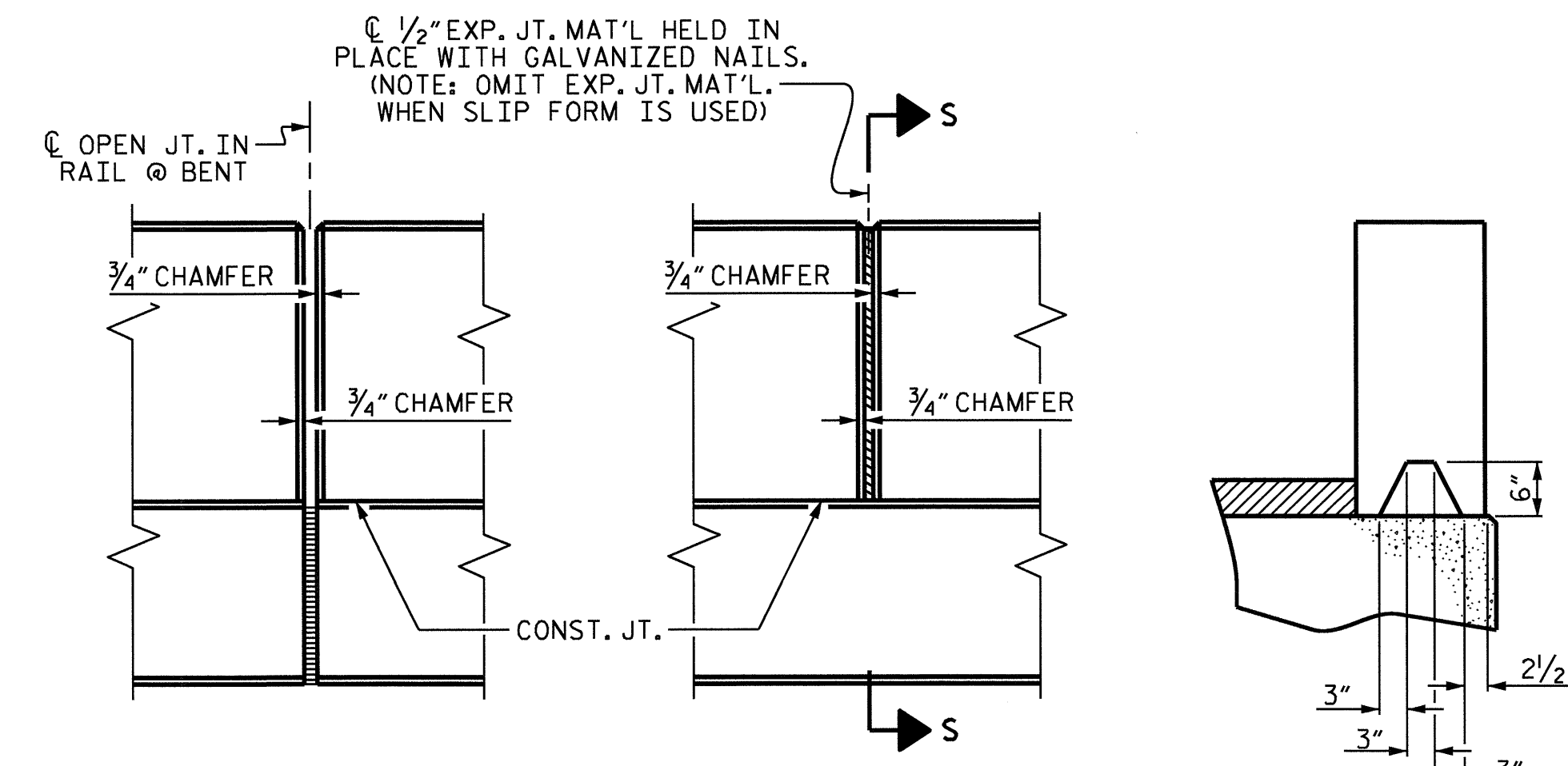
THE REINFORCING STEEL & CONCRETE IN THE END POSTS IS INCLUDED IN THE UNIT PRICE BID FOR THE CONCRETE PARAPET.



END VIEW



ELEVATION



ELEVATION AT EXPANSION JOINTS

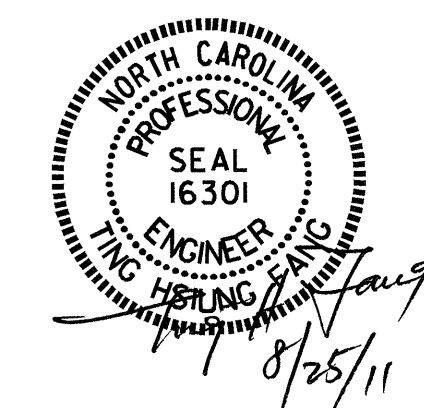
SECTION S-S

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

PARAPET AND END POST FOR TWO BAR METAL RAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

PROJECT NO. B-4498  
 DAVIDSON COUNTY  
 STATION: 16+08.00 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE					
1'-2" X 2'-9" CONCRETE PARAPET AND END POST					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-17
					TOTAL SHEETS 33

DRAWN BY: O. T. NGUYEN DATE: 7/15/11  
 CHECKED BY: T. H. FANG DATE: 7/18/11

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.

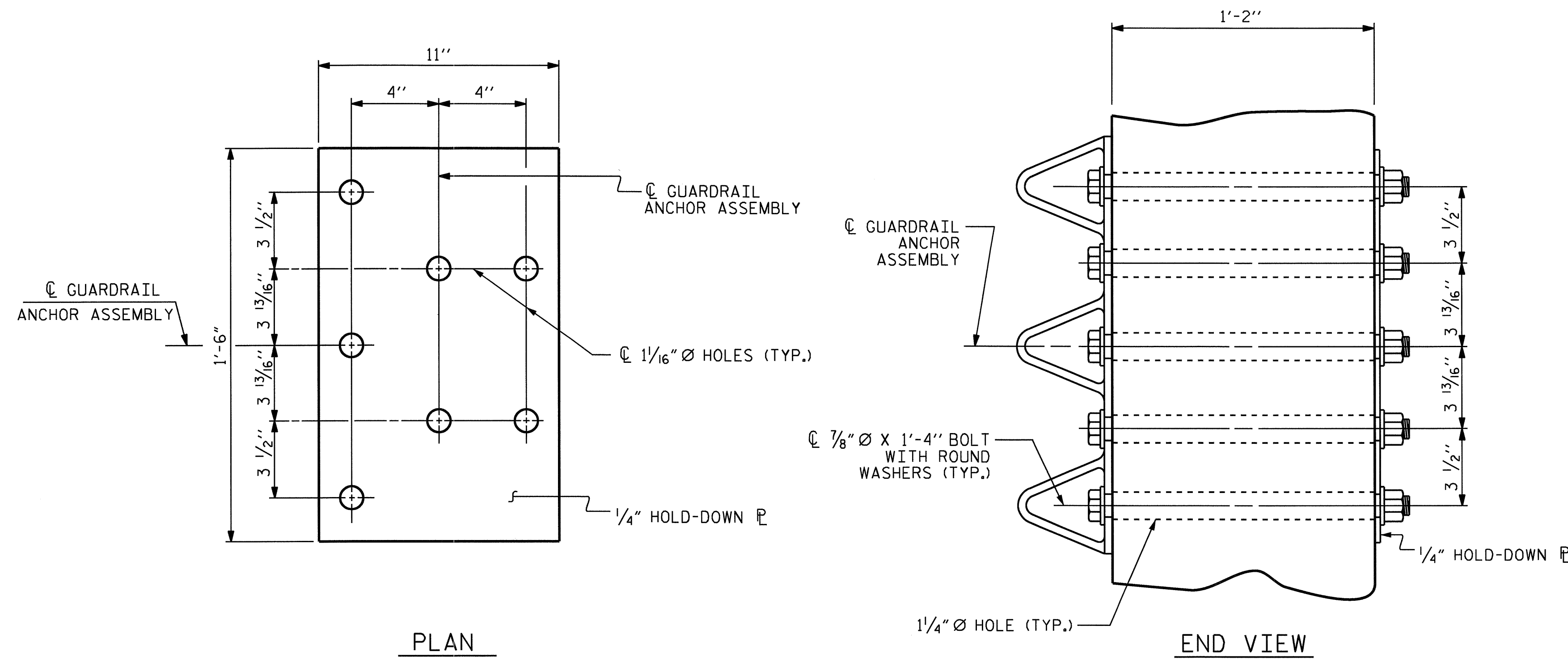
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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

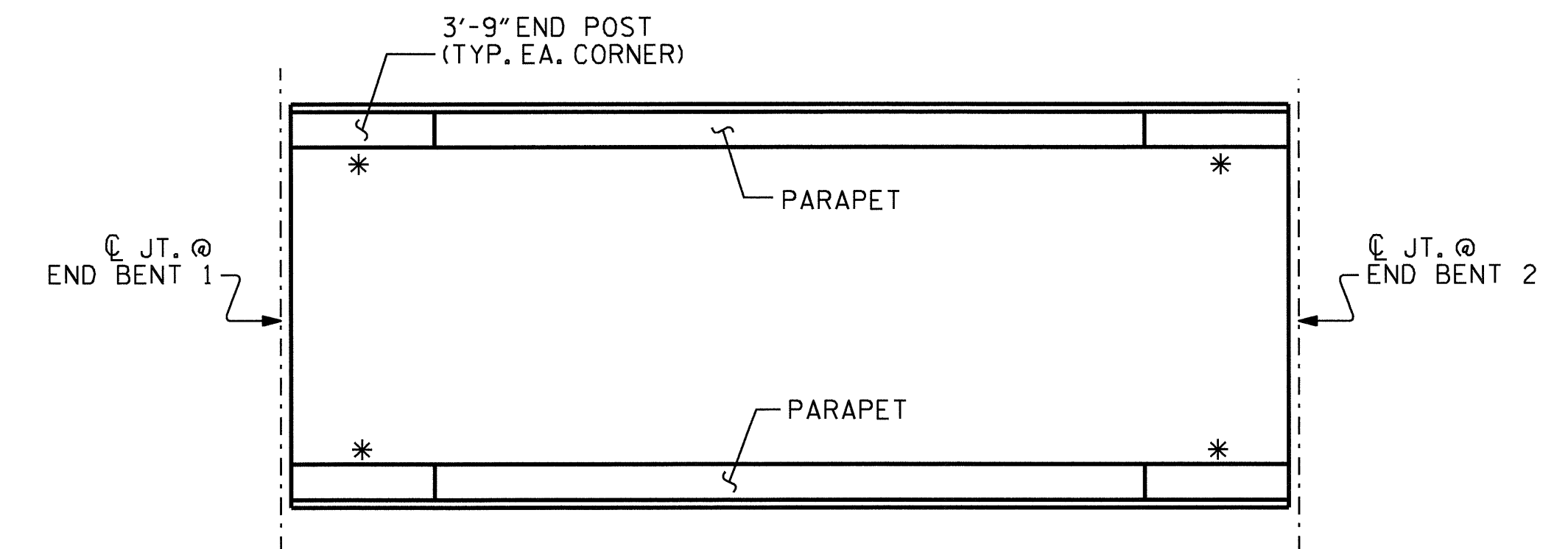
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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.

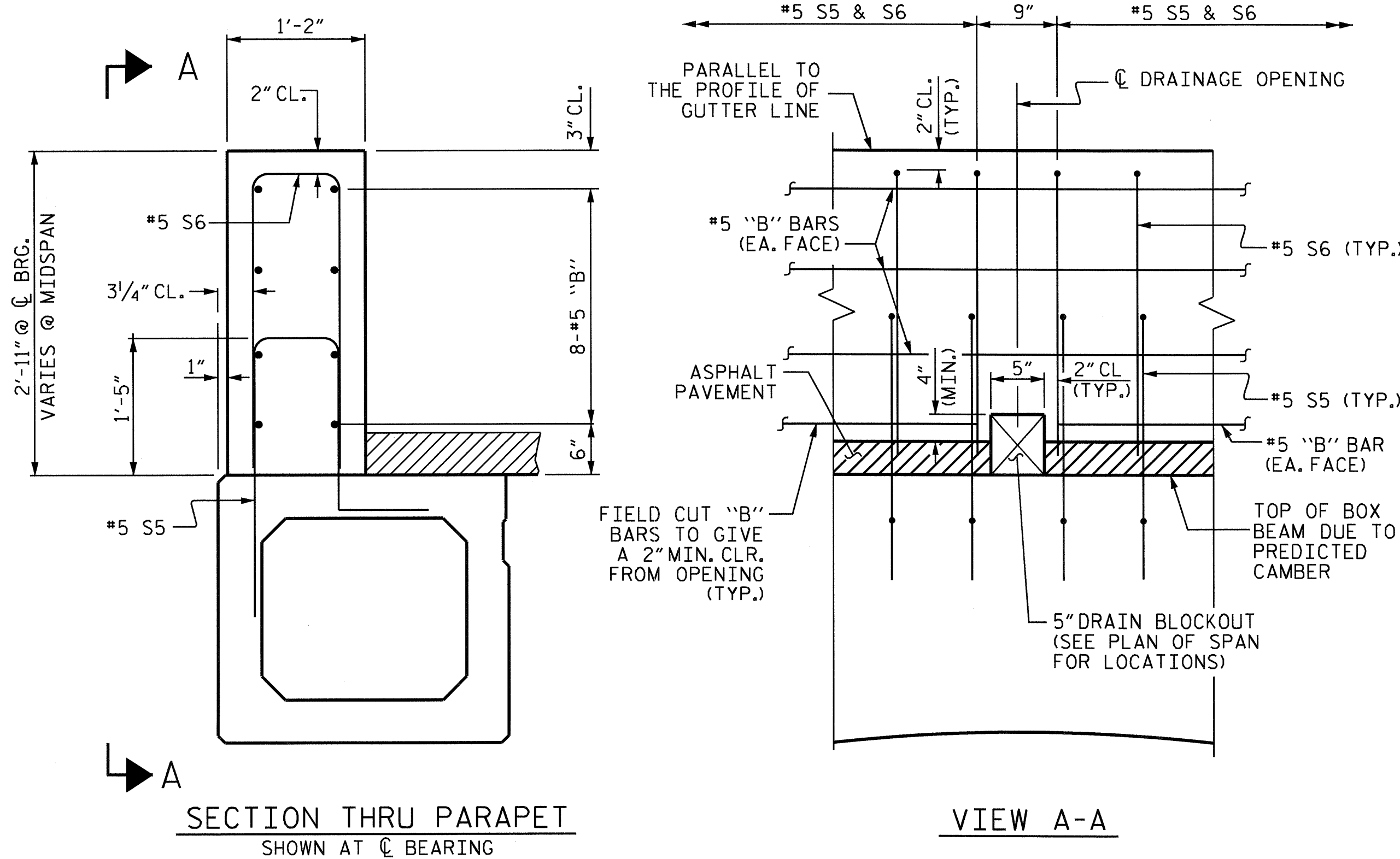


GUARDRAIL ANCHOR ASSEMBLY DETAILS



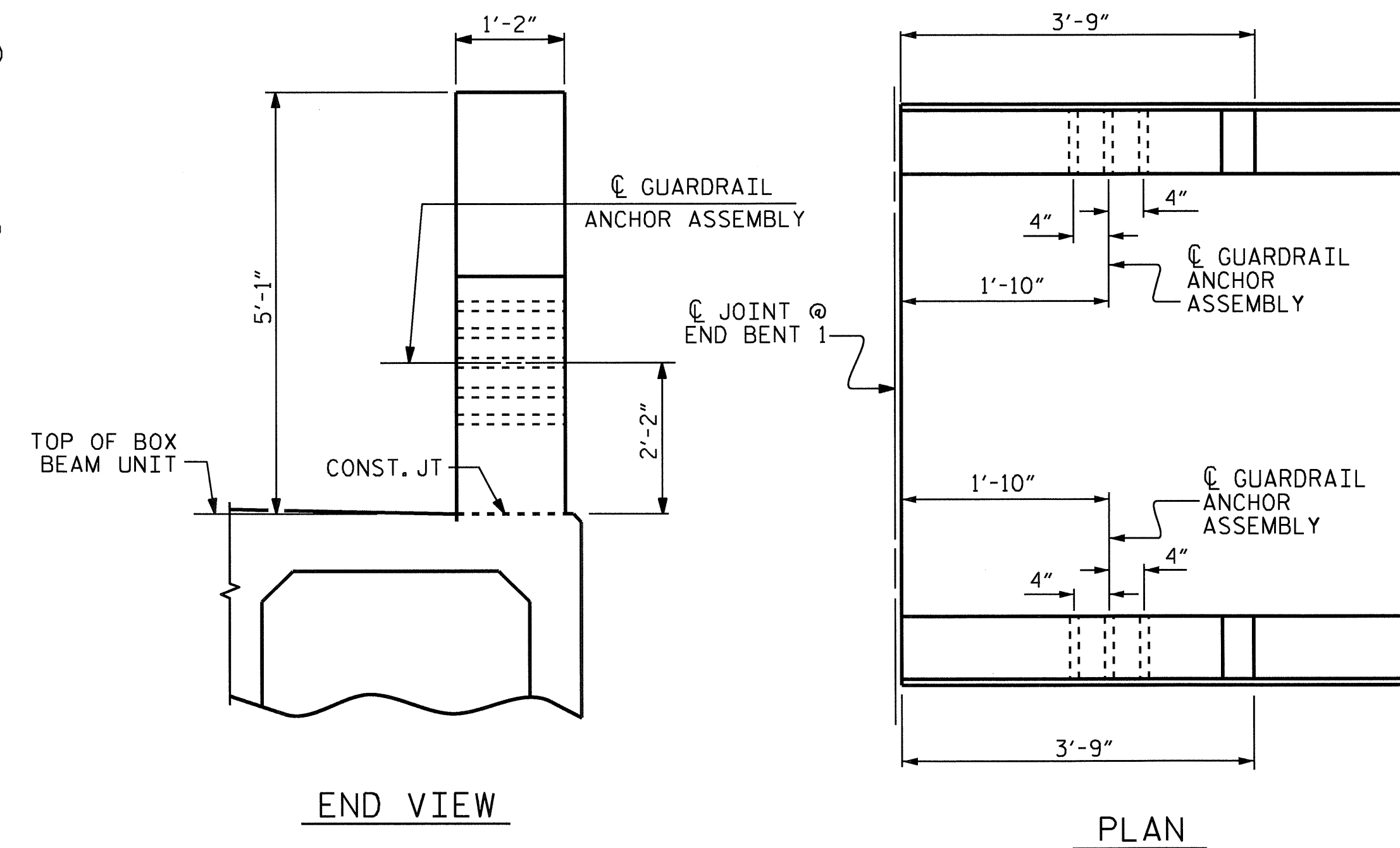
SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



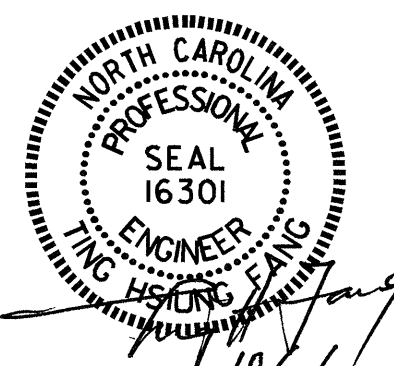
CONCRETE PARAPET DETAILS

FOR PLAN VIEW OF CONCRETE PARAPET, SEE "PLAN OF SPAN" SHEETS.



LOCATION OF GUARDRAIL ANCHOR AT END POST

END BENT 1 SHOWN, END BENT 2 SIMILAR

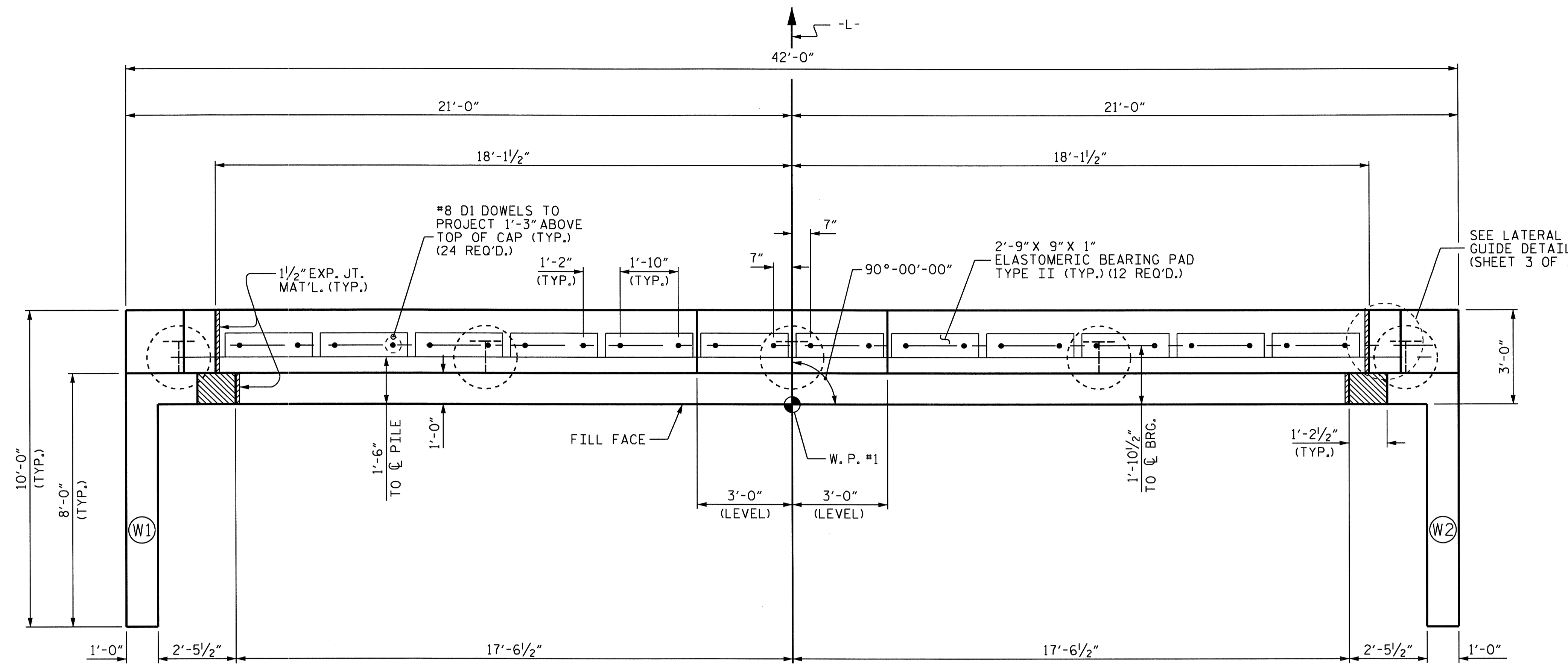


PROJECT NO. B-4498  
 DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

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

ASSEMBLED BY : HARISH SHAH	DATE : 4-5-10
CHECKED BY : O.T. NGUYEN	DATE : 3-31-10
DRAWN BY : EEM	6/94
CHECKED BY : RGW	6/94
REV. 10/17/00	RWW/LES
REV. 5/7/03	RWW/JTE
REV. 5/1/06	TLA/GM

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



PLAN

NOTES

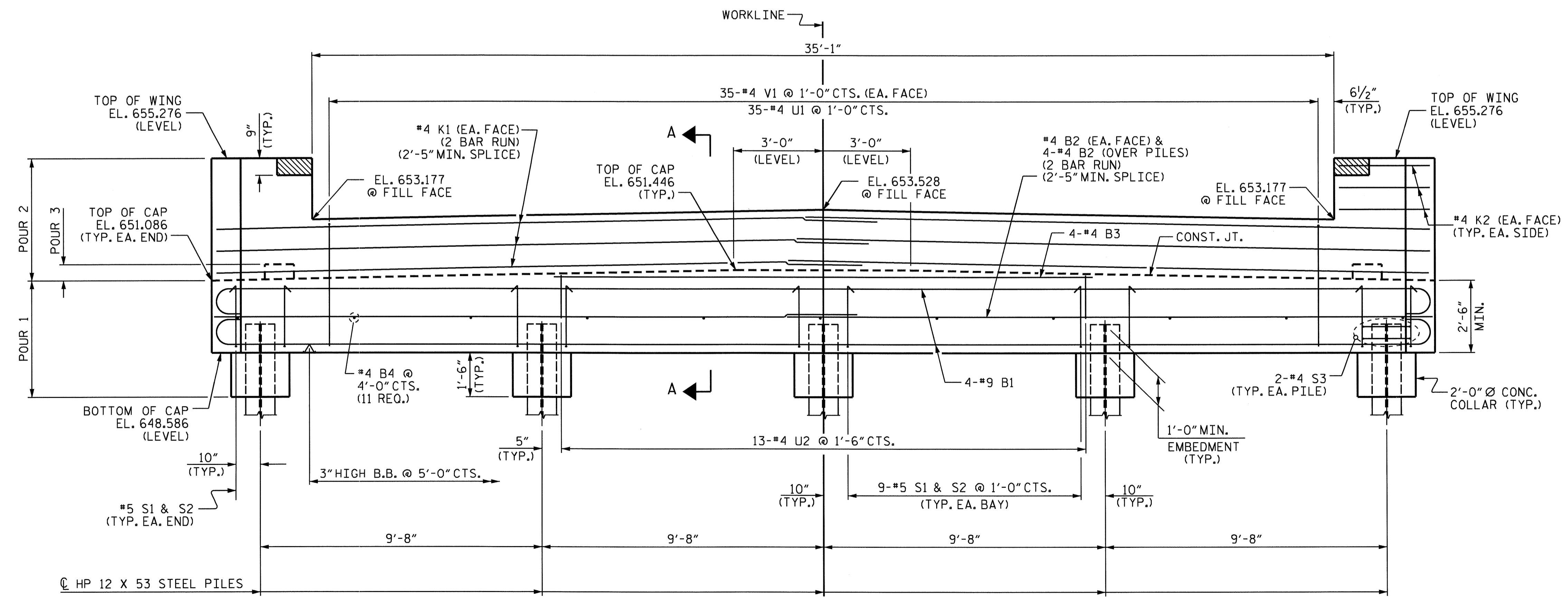
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #8 D1 DOWELS.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

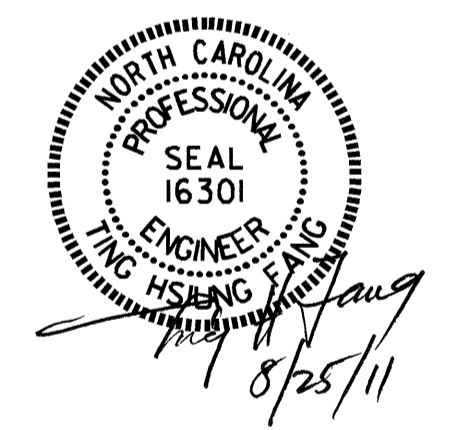
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDES IF APPROVED BY THE ENGINEER.

SEE LATERAL GUIDE DETAILS (SHEET 3 OF 3)



ELEVATION

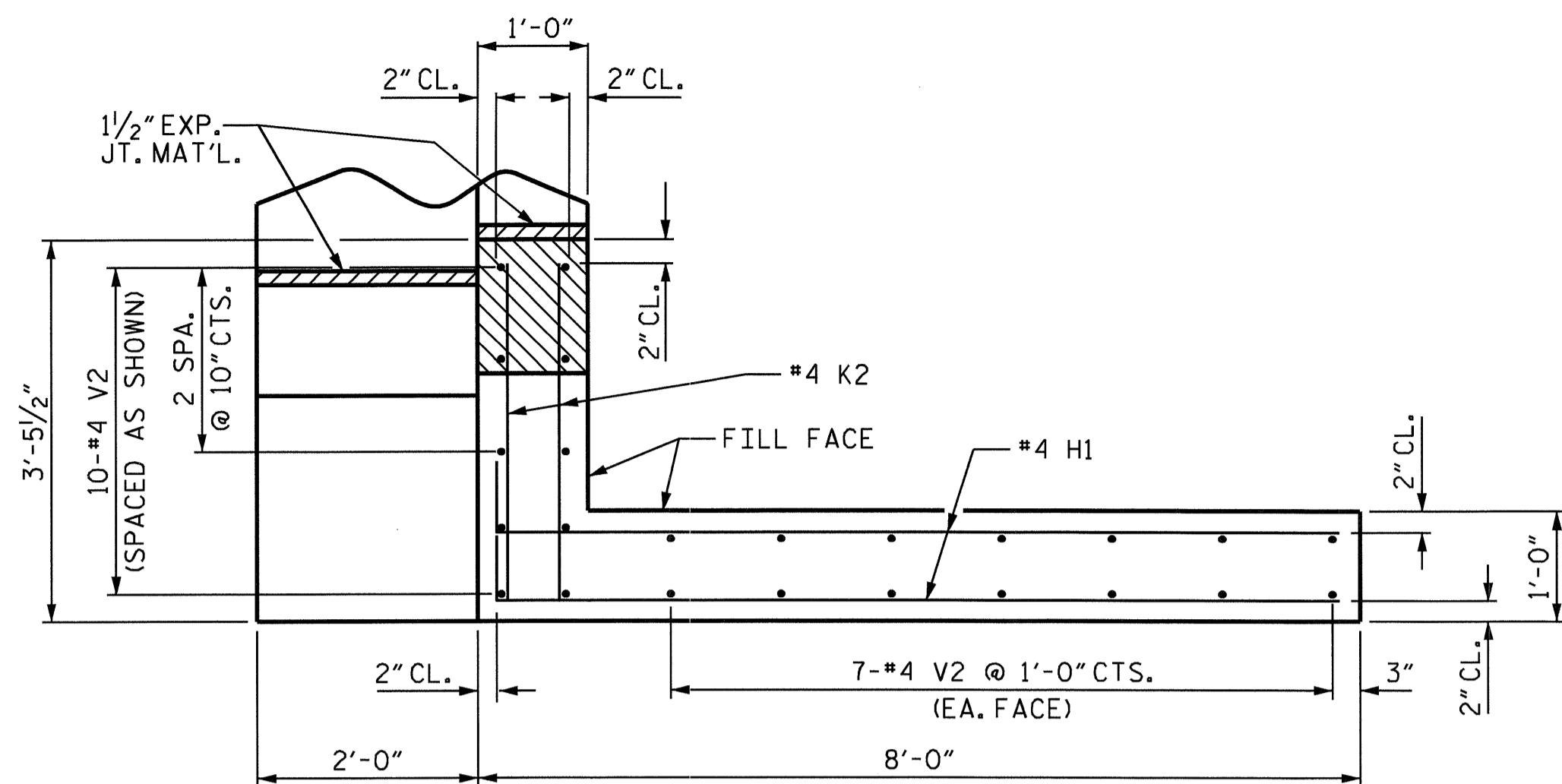


PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 1 OF 3

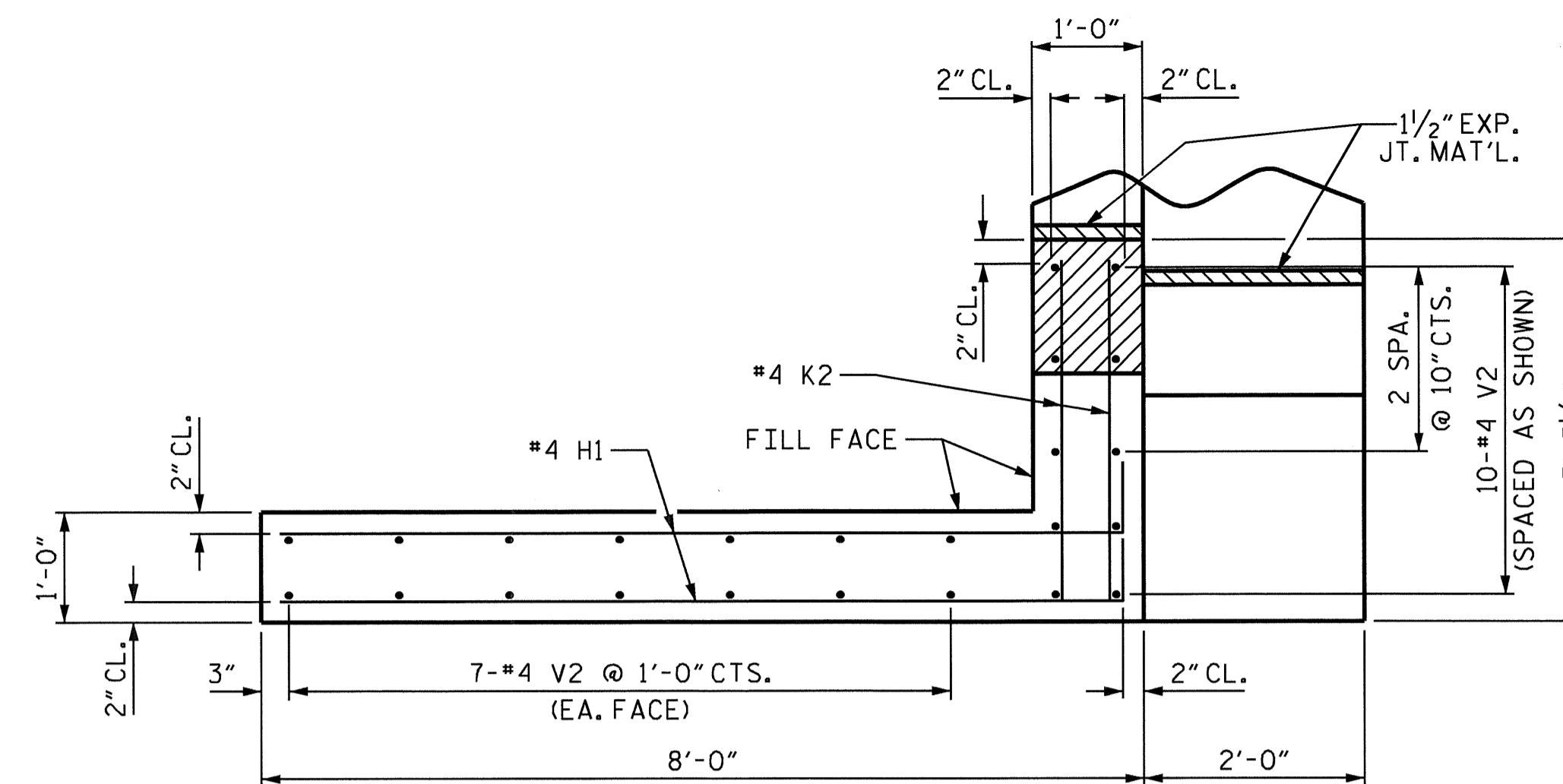
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE						S-19
END BENT 1						TOTAL SHEETS
						33
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY : RAMAN PATEL DATE : 2/22/10  
 CHECKED BY : Z.H. BROWN DATE : 5-21-10

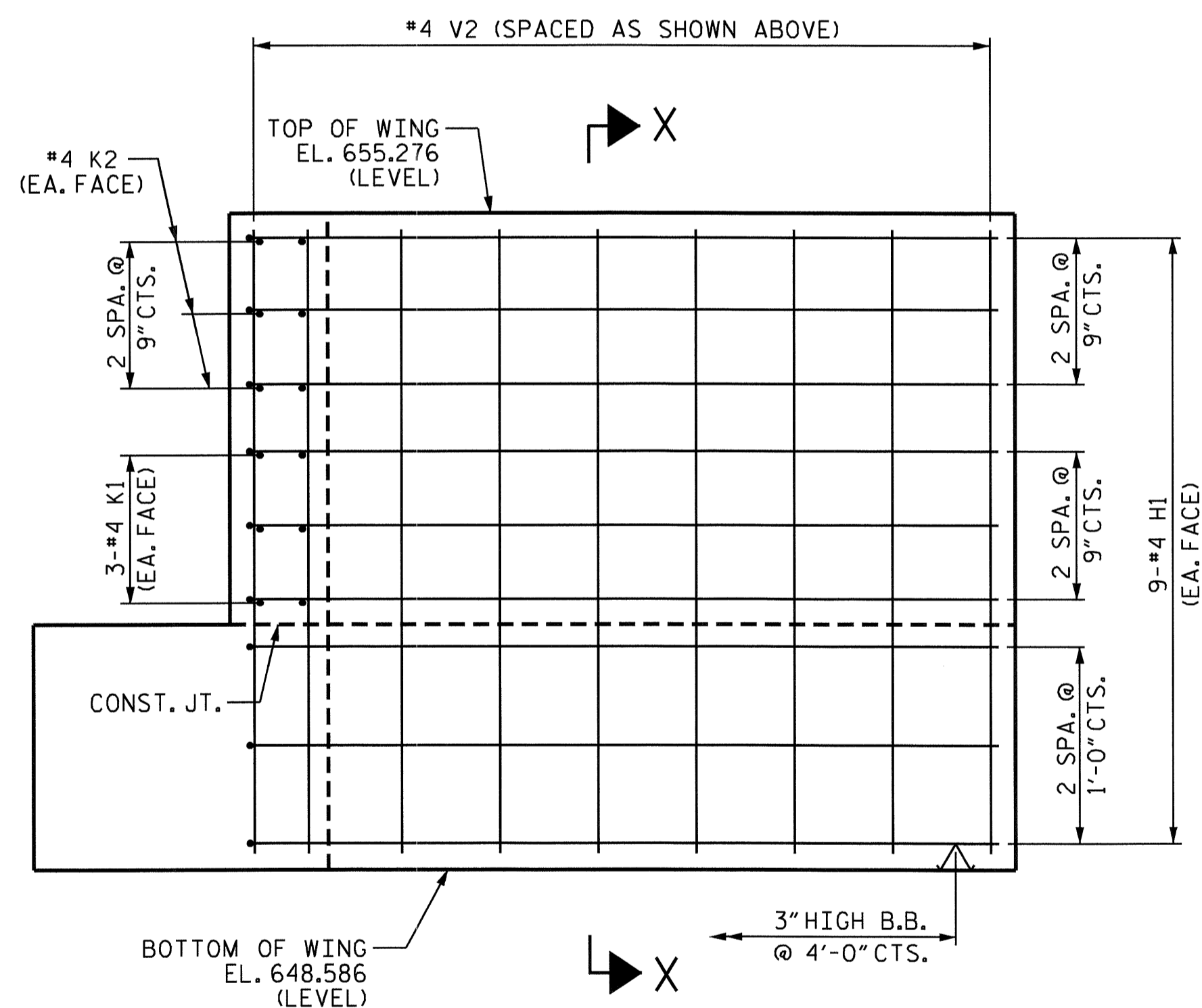
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 qtnguyen



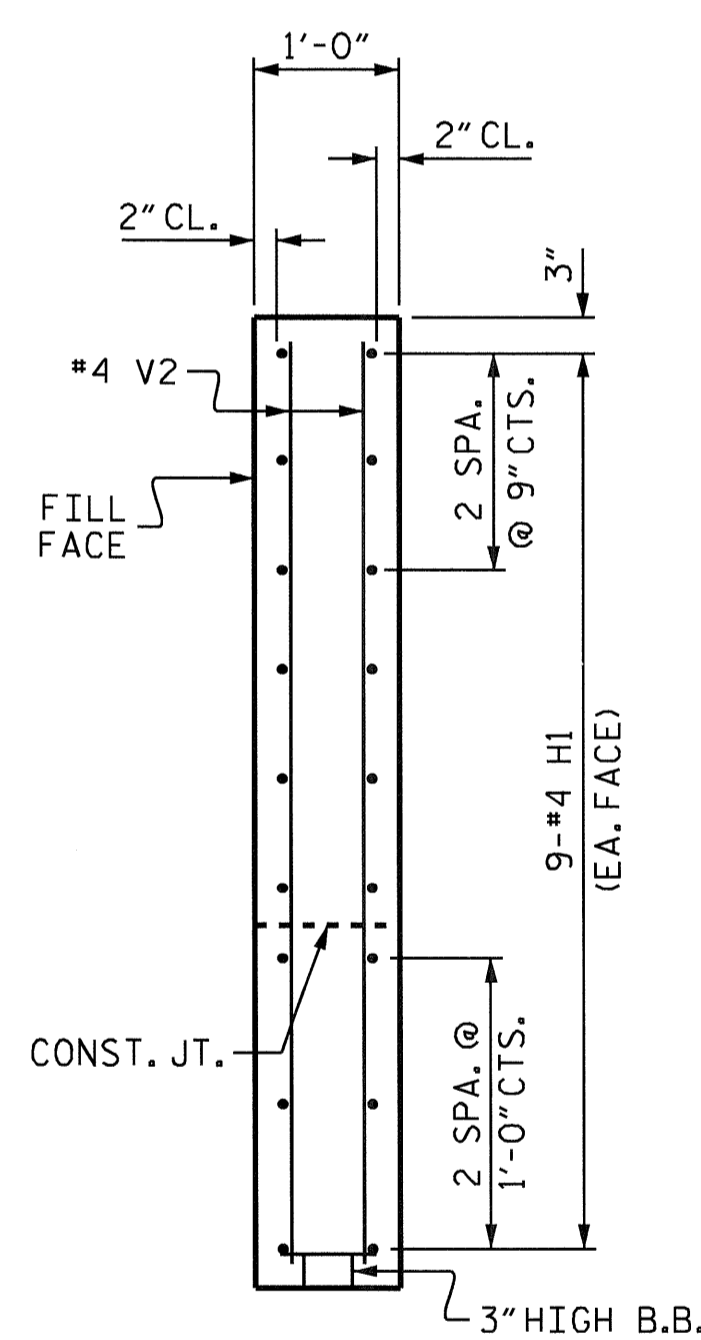
PLAN OF WING W1



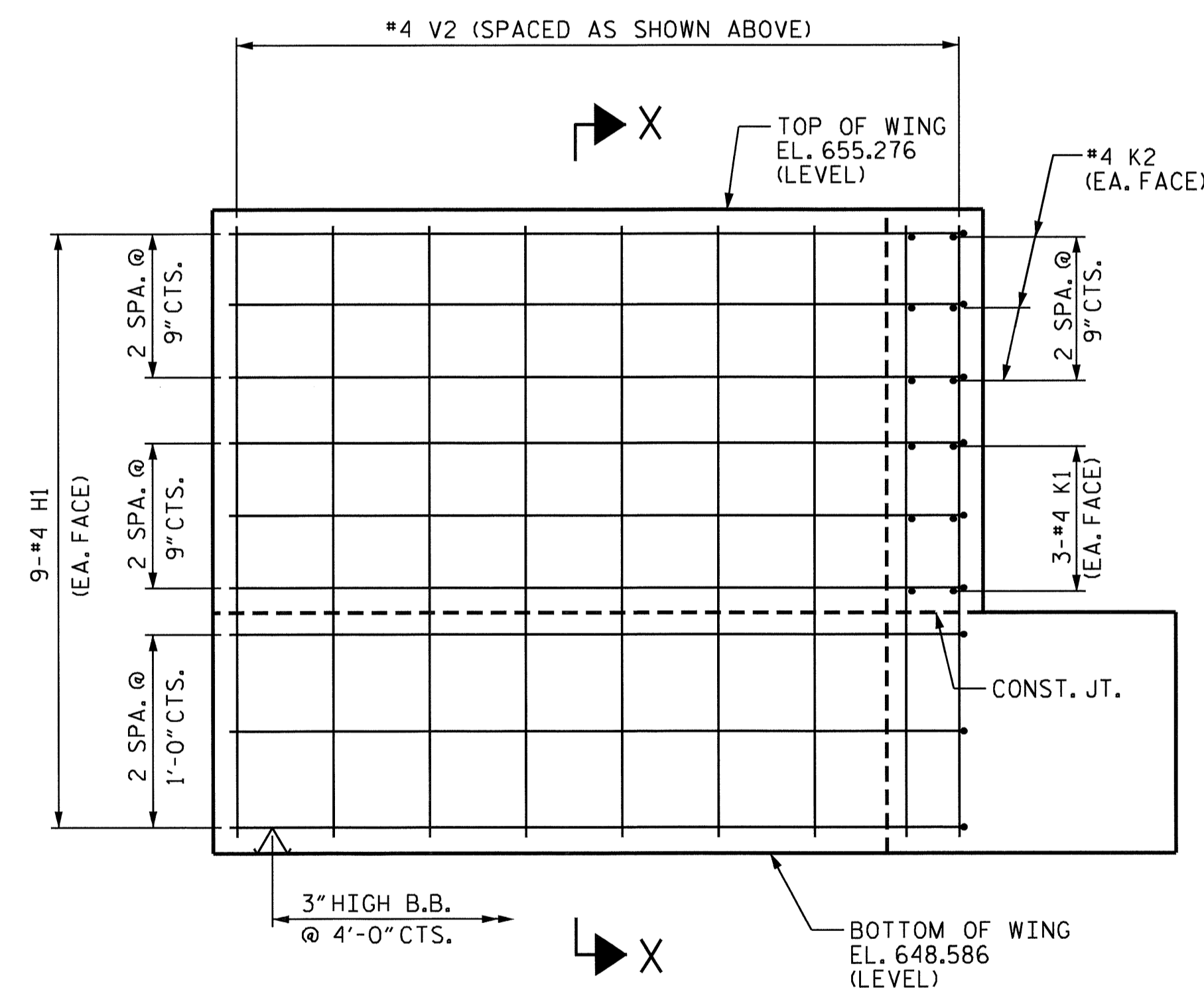
PLAN OF WING W2



ELEVATION OF WING W1



SECTION X-X

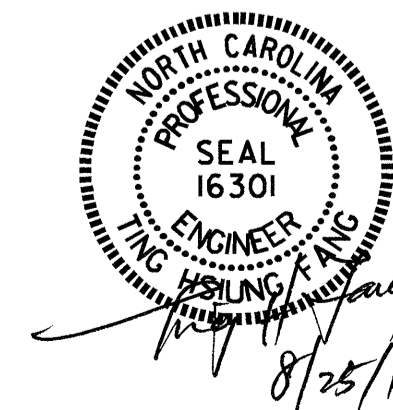


ELEVATION OF WING W2

PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1

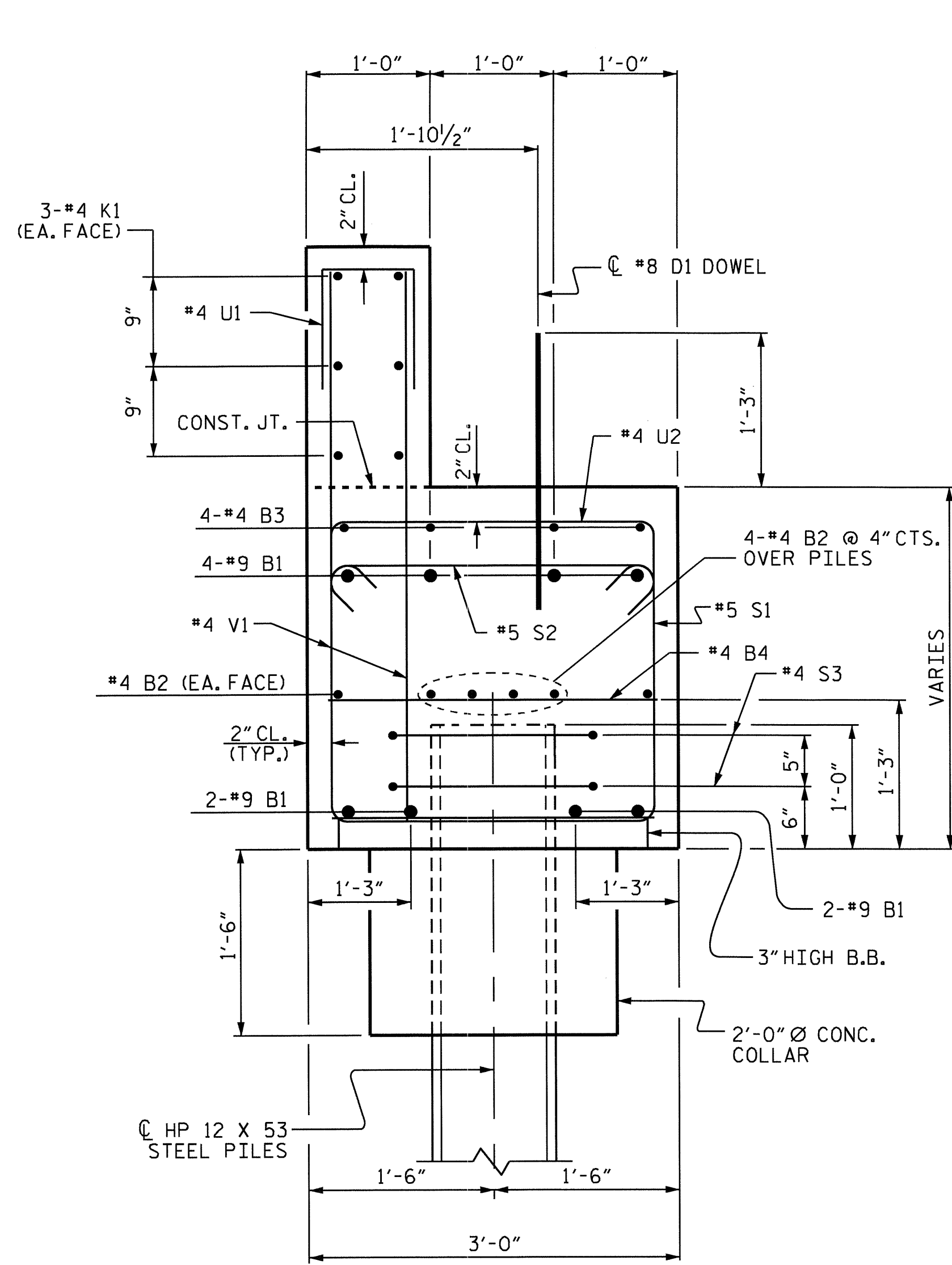


DRAWN BY : RAMAN PATEL DATE : 2/24/10  
 CHECKED BY : Z.H. BROWN DATE : 5-21-10

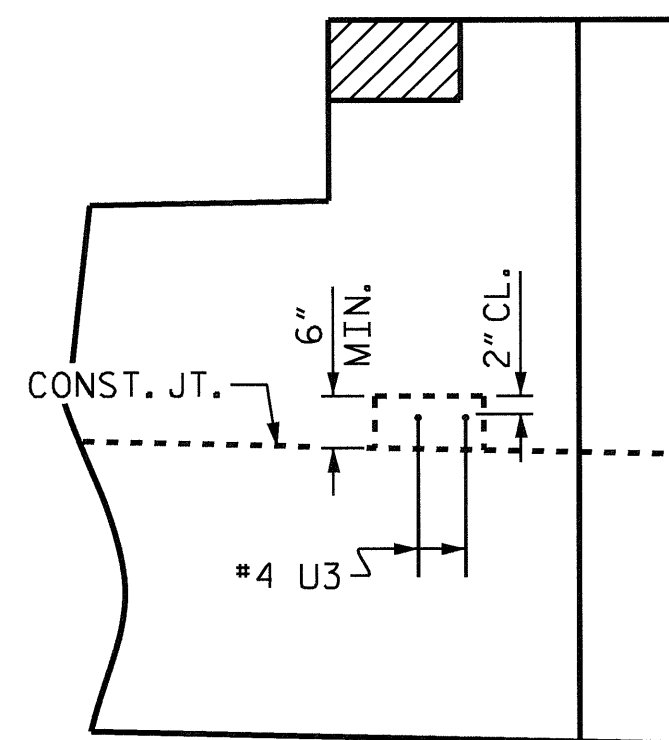
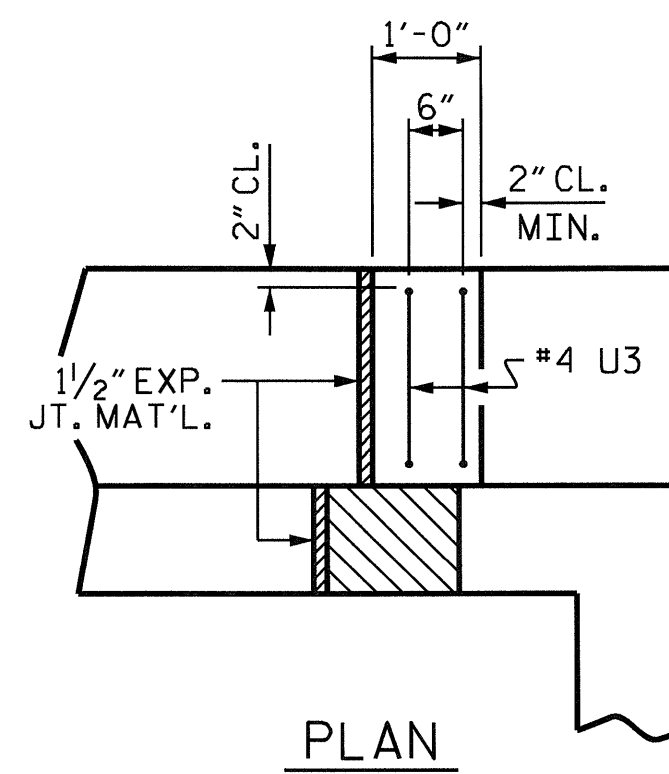
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 qtnguyen

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
1			3			TOTAL SHEETS	33
2			4				

NC009



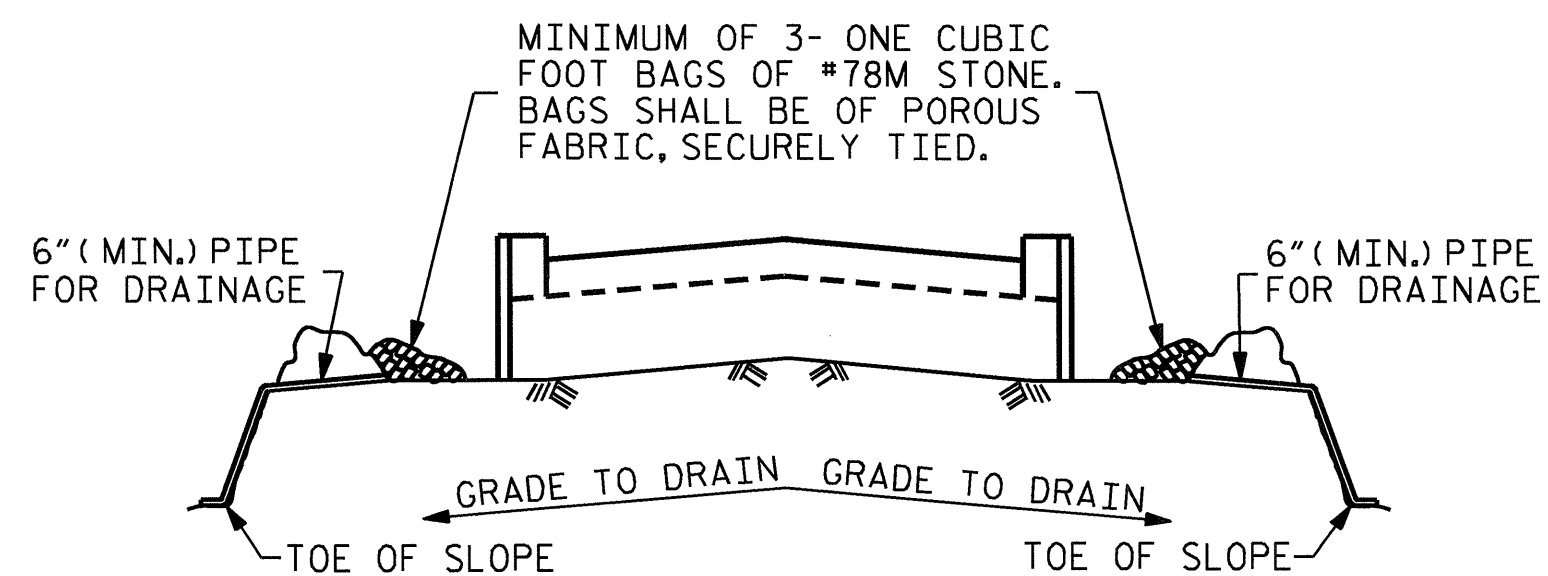
SECTION A-A



PLAN

ELEVATION

LATERAL GUIDE DETAILS  
(EACH END SIMILAR)



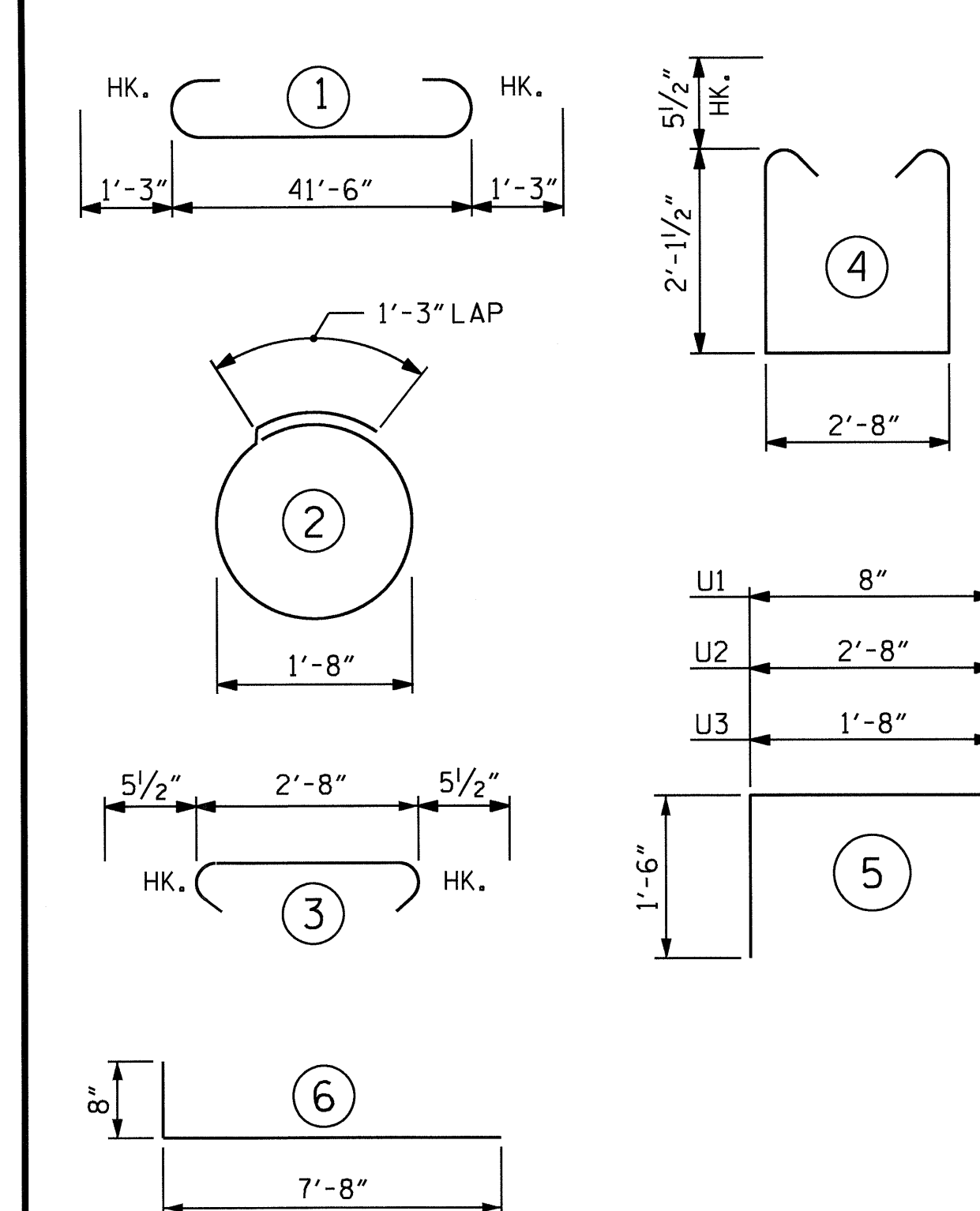
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

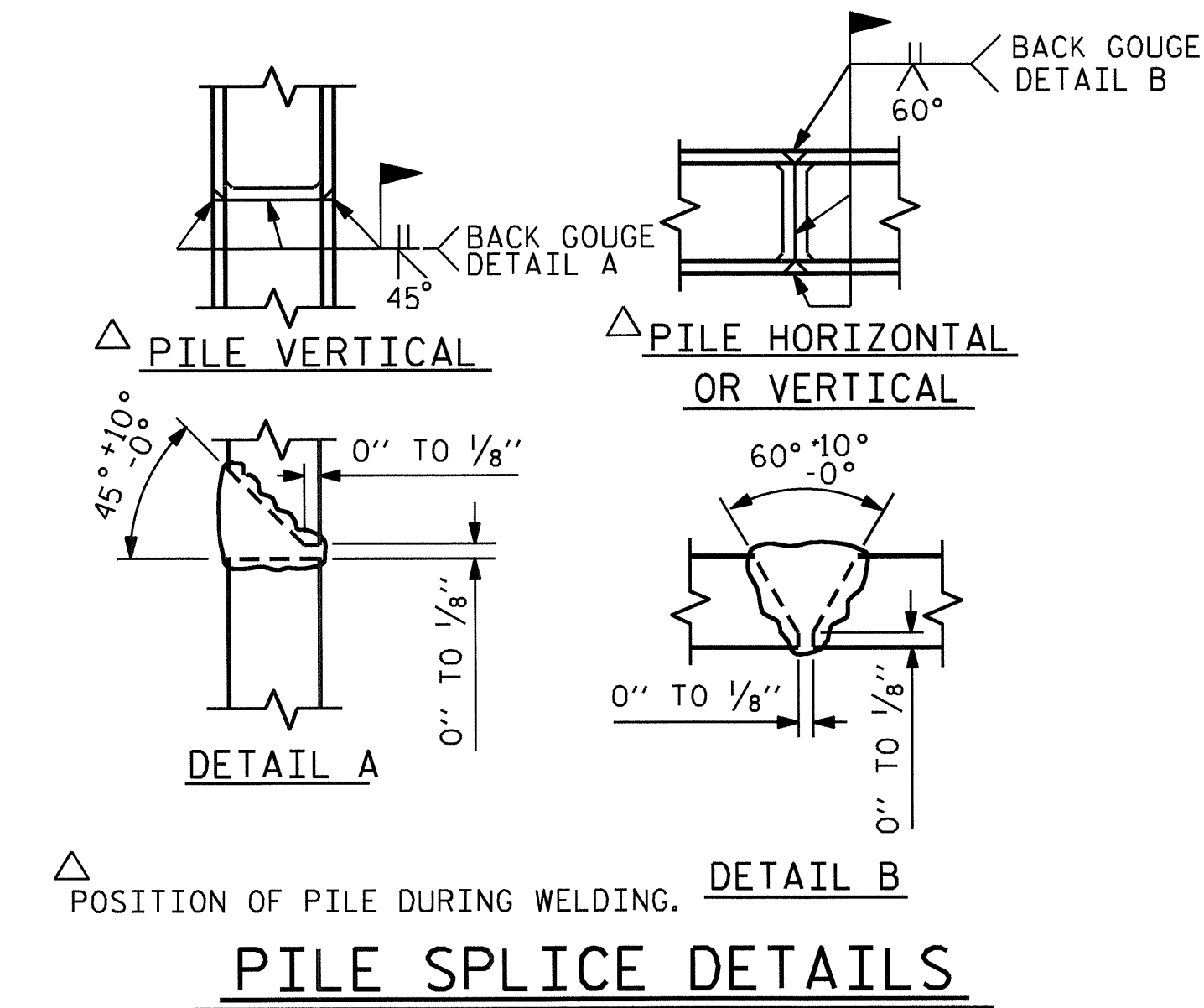
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

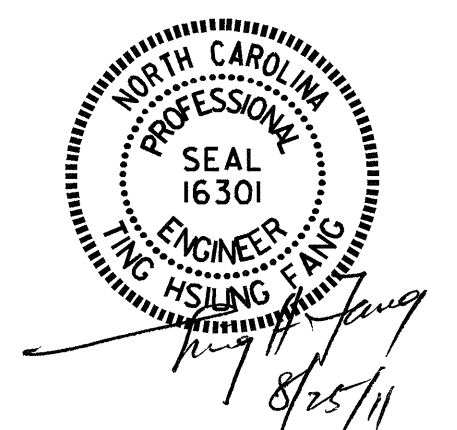
BILL OF MATERIAL					
END BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#9	1	44'-0"	1197	
B2	#4	STR	22'-1"	177	
B3	#4	STR	18'-6"	49	
B4	#4	STR	2'-8"	20	
D1	#8	STR	2'-3"	144	
H1	#4	6	8'-4"	200	
K1	#4	STR	22'-1"	177	
K2	#4	STR	3'-1"	25	
S1	#5	4	7'-10"	310	
S2	#5	3	3'-7"	142	
S3	#4	2	6'-6"	43	
U1	#4	5	3'-8"	86	
U2	#4	5	5'-8"	49	
U3	#4	5	4'-8"	12	
V1	#4	STR	4'-3"	199	
V2	#4	STR	6'-4"	203	
REINFORCING STEEL				LBS.	3033
CLASS A CONC. BREAKDOWN					
POUR 1 CONCRETE COLLARS, CAP & LOWER WINGS				C.Y.	14.8
POUR 2 UPPER WINGS & BACKWALL				C.Y.	5.9
POUR 3 LATERAL GUIDES				C.Y.	0.1
TOTAL				C.Y.	20.8
HP 12 X 53 STEEL PILES				LIN. FT. =	100



ALL BAR DIMENSIONS ARE OUT TO OUT.



POSITION OF PILE DURING WELDING. PILE SPLICE DETAILS

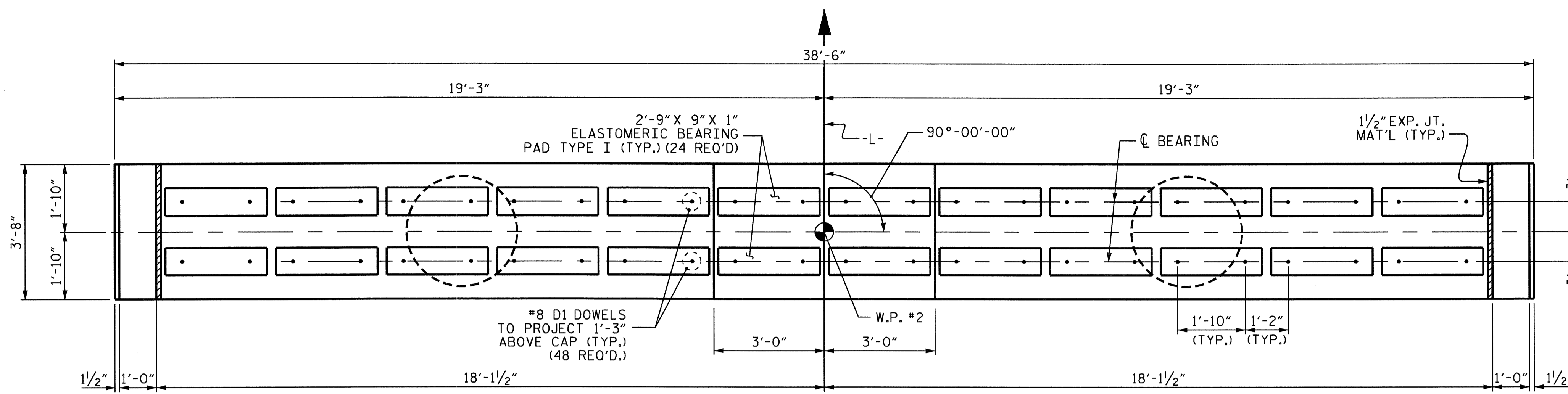


PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

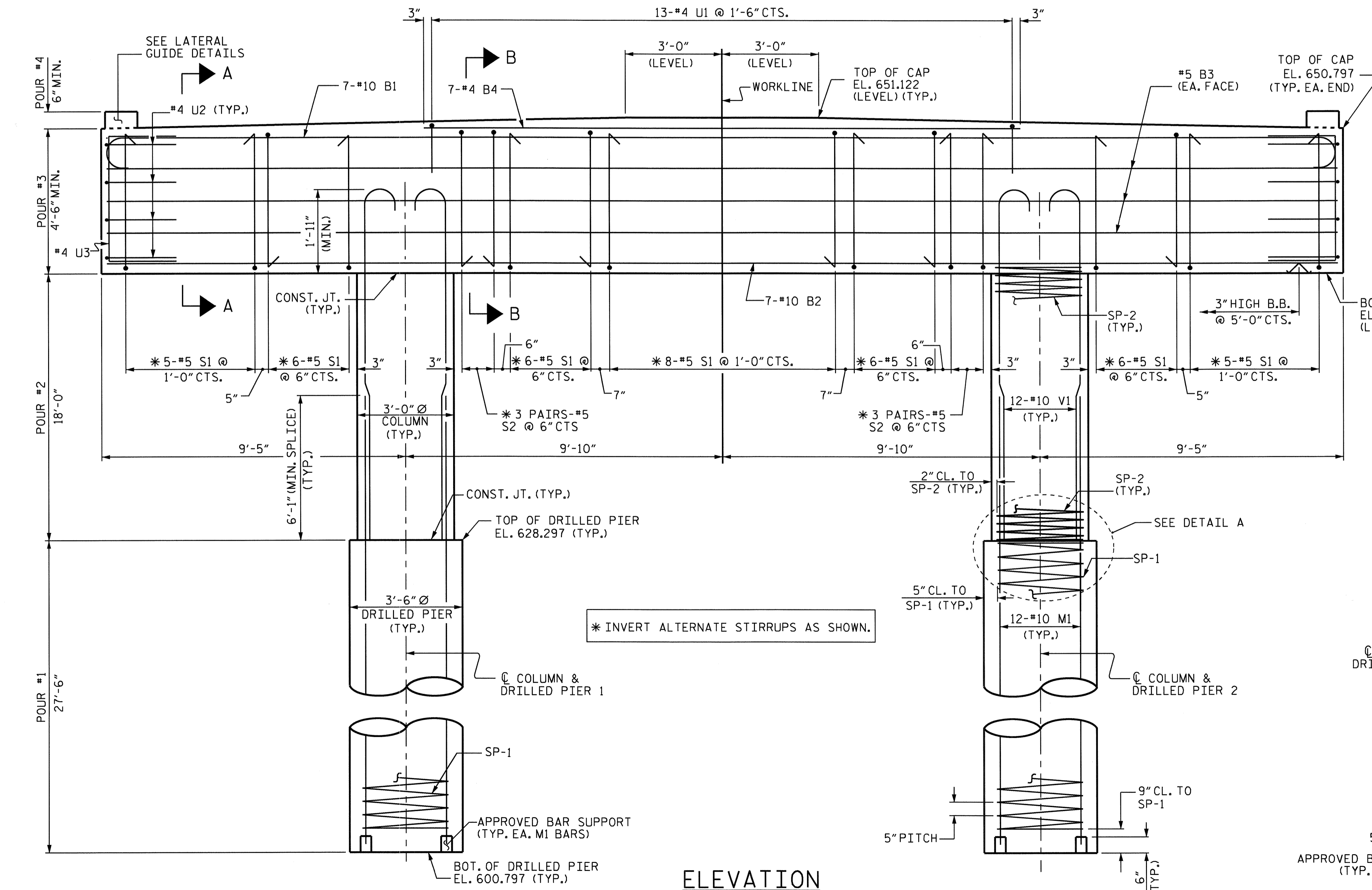
SHEET 3 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS 33
2			4			

DRAWN BY: RAMAN PATEL DATE: 2/24/10  
CHECKED BY: Z.H. BROWN DATE: 5-21-10



**PLAN**

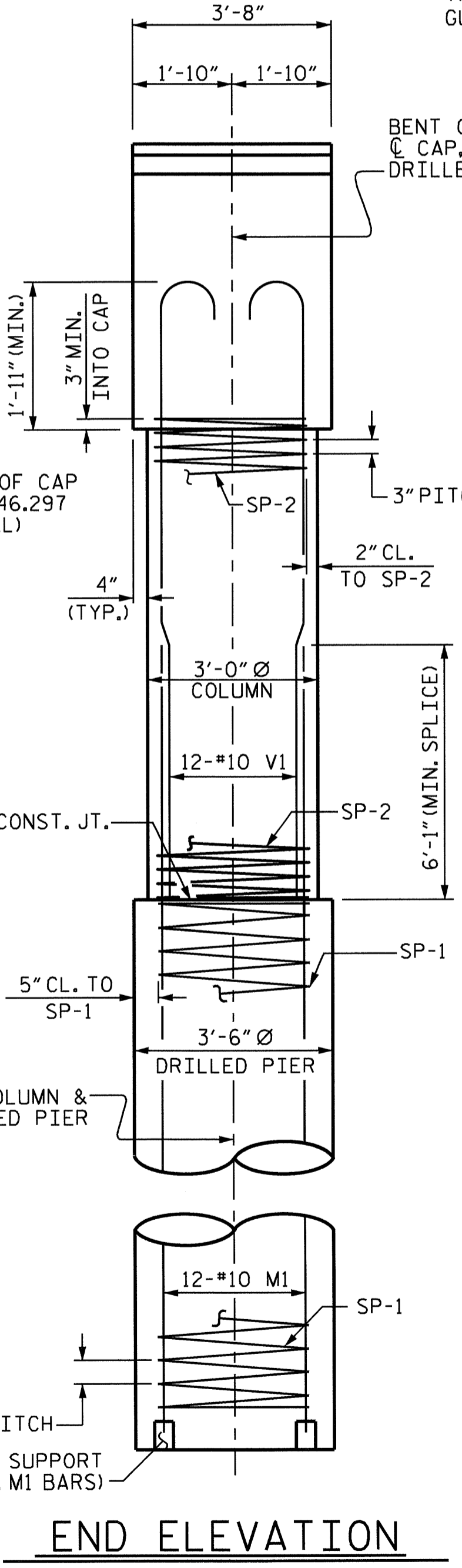


**ELEVATION**

REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER AND COLUMN

**SPAN B**

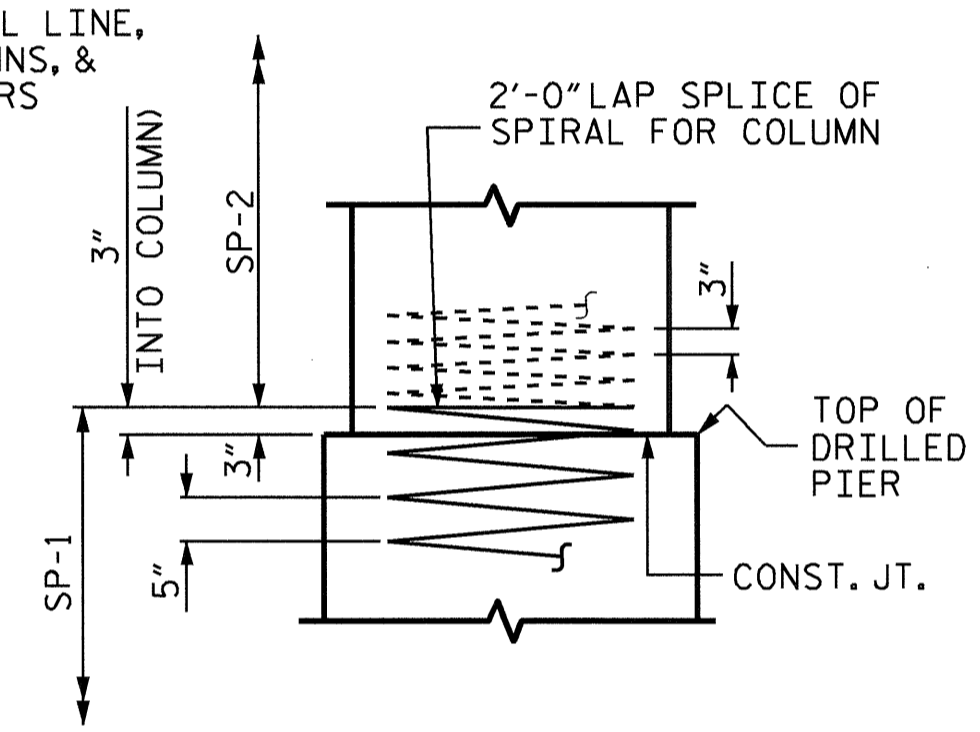
**SPAN A**



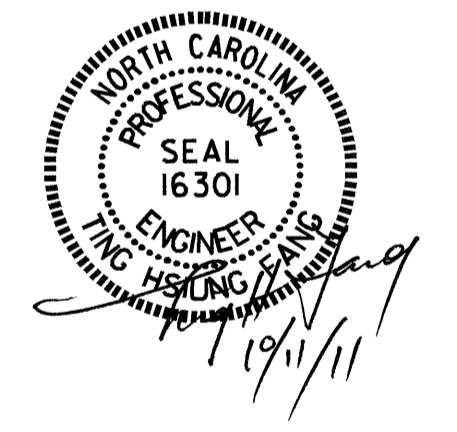
**END ELEVATION**

**NOTES**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.
- THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.
- THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDES IF APPROVED BY THE ENGINEER.



**DETAIL A**



PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

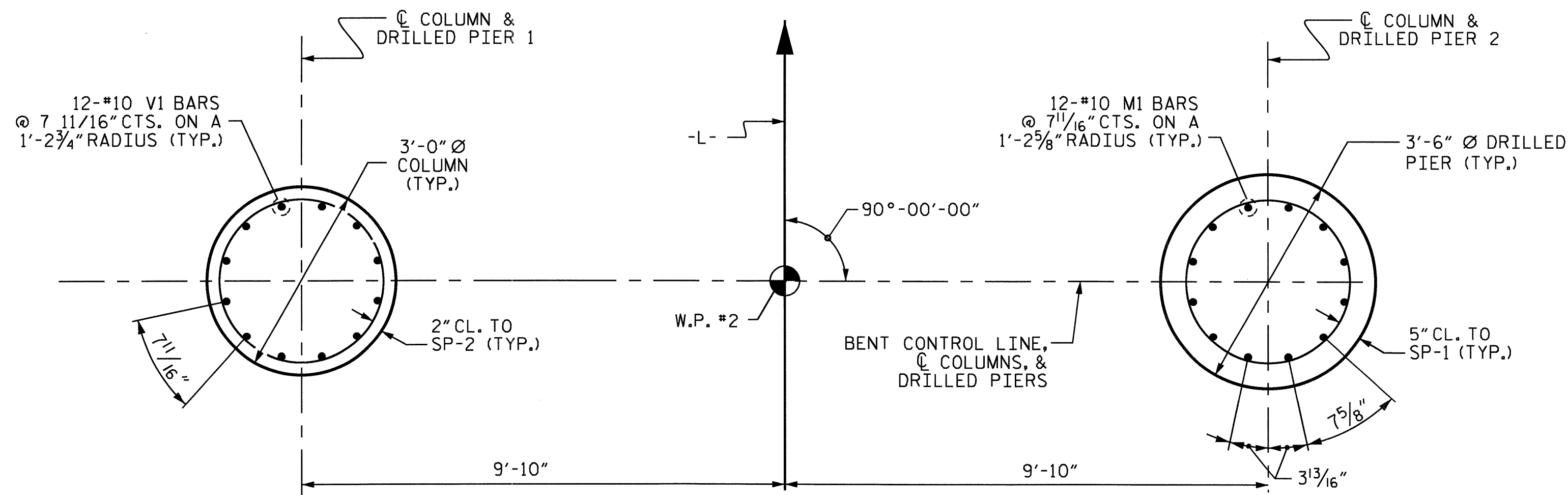
SHEET 1 OF 2

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

SHEET NO.  
S-22  
TOTAL SHEETS  
33

DRAWN BY: HARISH SHAH DATE: 6-4-10  
 CHECKED BY: I. H. FANG DATE: 2-23-11

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 tfang

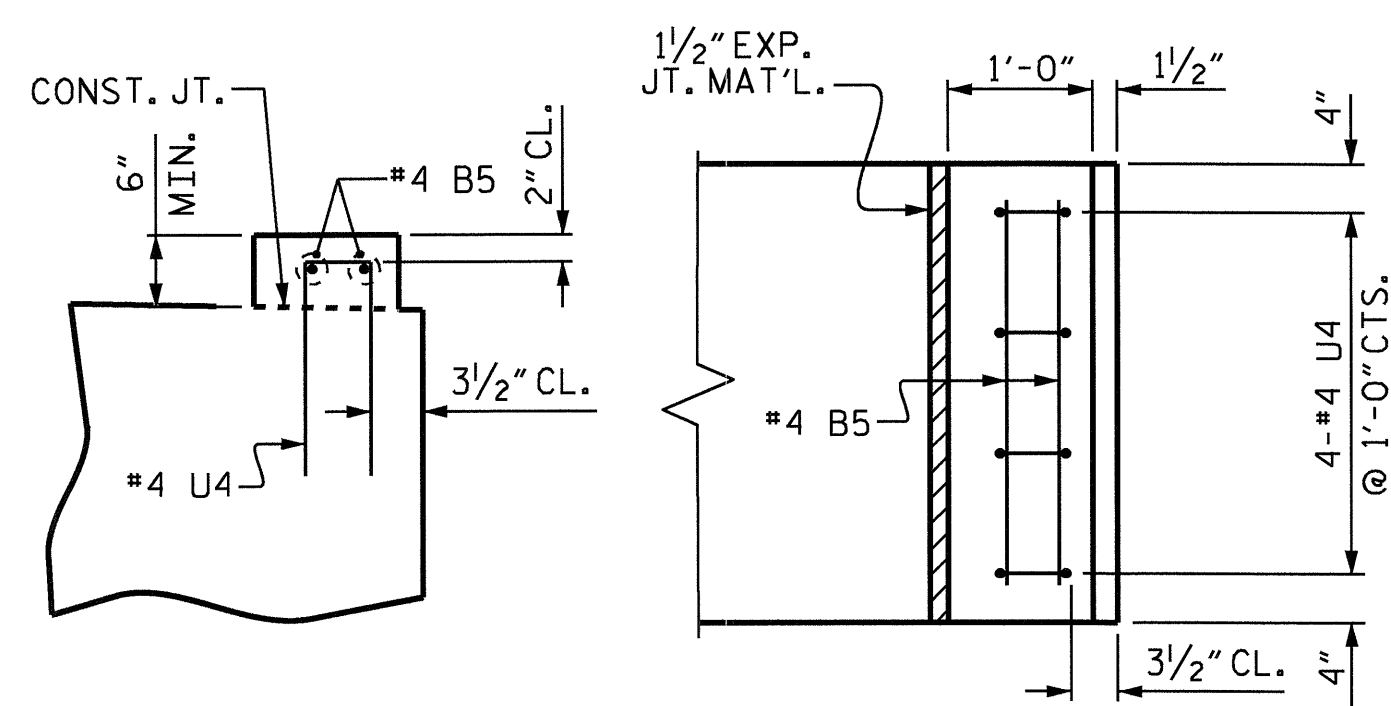


COLUMN

DRILLED PIER

PLAN OF COLUMN & DRILLED PIERS

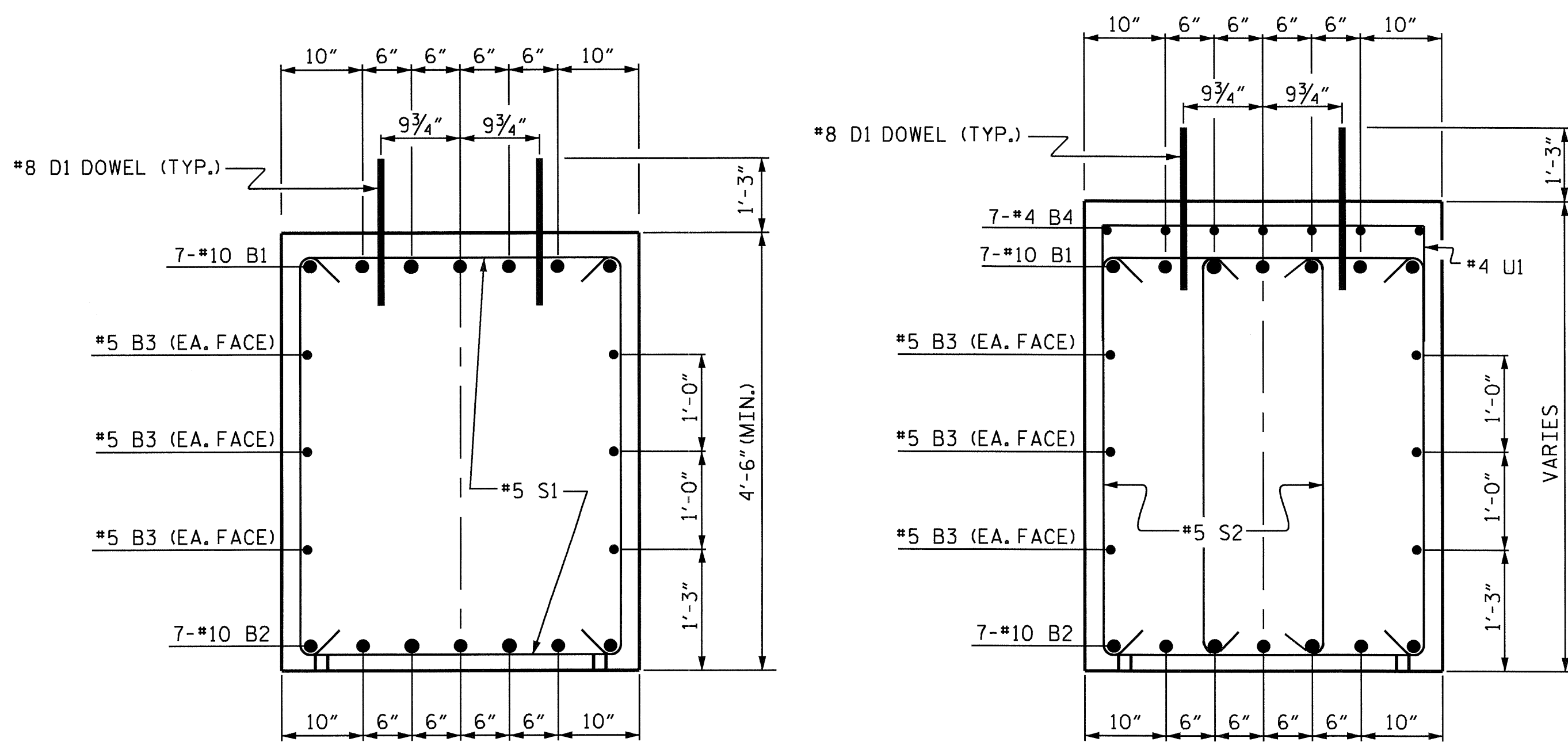
(REINFORCING STEEL & DIMENSIONS ARE TYPICAL FOR EACH COLUMN & DRILLED PIER)



ELEVATION

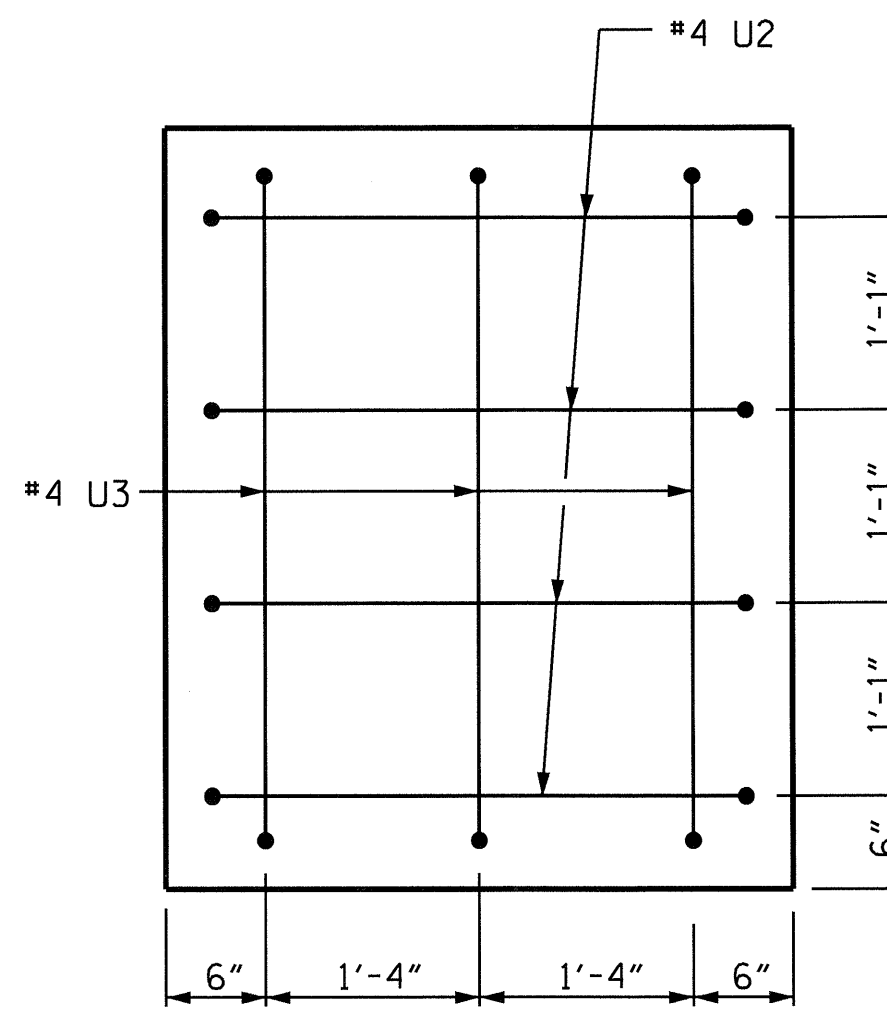
PLAN

LATERAL GUIDE DETAILS

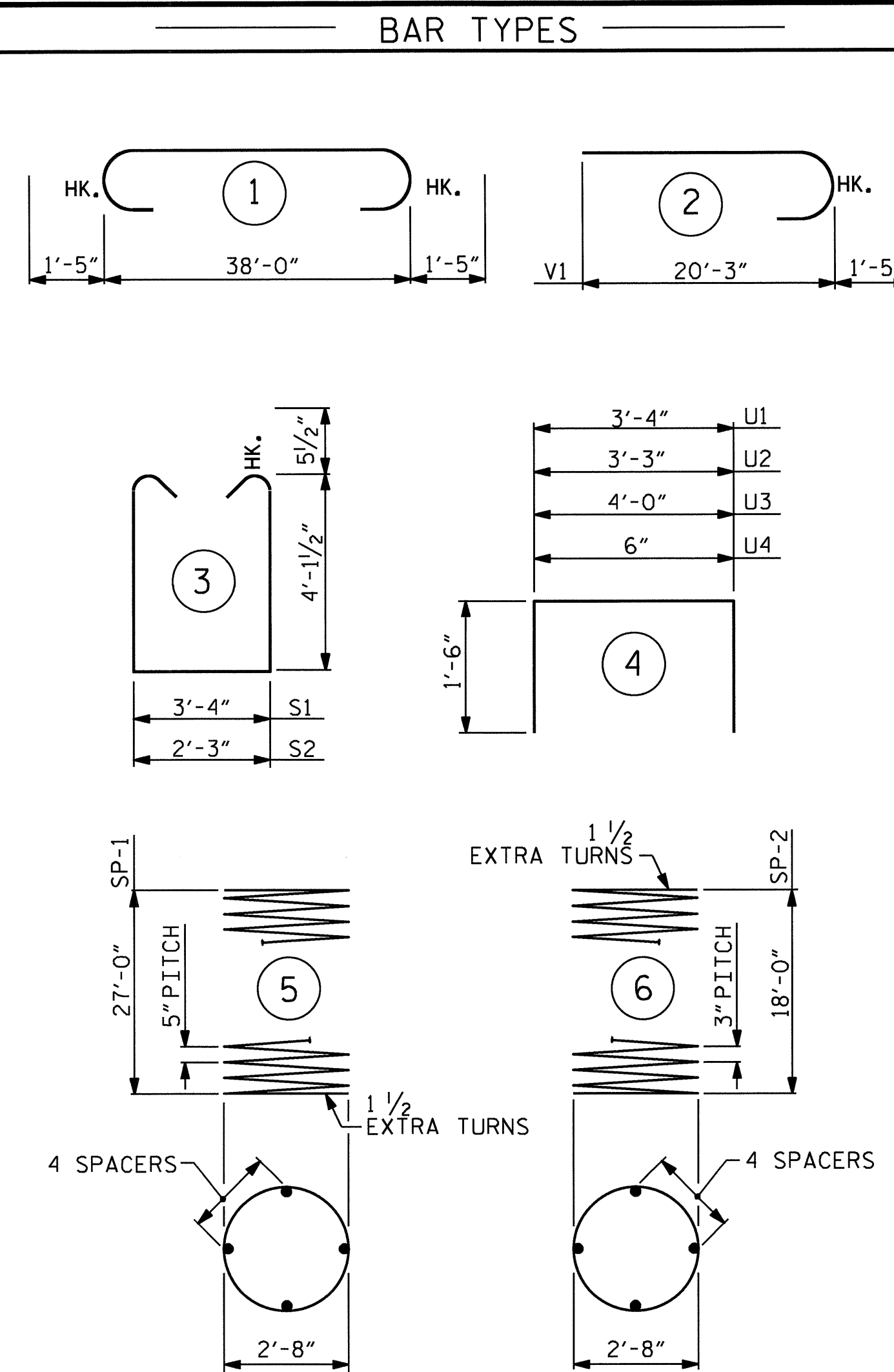


SECTION A-A

SECTION B-B



END VIEW  
(TYP. EA. END)



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#10	1	40'-10"	1230
B2	7	#10	STR	38'-2"	1150
B3	6	#5	STR	38'-2"	239
B4	7	#4	STR	18'-6"	87
B5	4	#4	STR	3'-4"	9

D1	48	#8	STR	2'-3"	289
M1	24	#10	STR	36'-4"	3443

S1	42	#5	3	12'-6"	548
S2	12	#5	3	11'-5"	143

U1	13	#4	4	6'-4"	55
U2	8	#4	4	6'-3"	33
U3	6	#4	4	7'-0"	28
U4	8	#4	4	3'-6"	19

V1	24	#10	2	21'-8"	2238
----	----	-----	---	--------	------

REINFORCING STEEL LBS. 9,820

SP-1	2	*	5	550'-0"	1147
SP-2	2	**	6	611'-4"	817

SPIRAL COLUMN REINFORCING STEEL LBS. 1964

CLASS A CONCRETE			
POUR #2 - COLUMNS		CU. YDS.	9.4
POUR #3 - CAP		CU. YDS.	24.5
POUR #4 - LATERAL GUIDES		CU. YDS.	0.1
TOTAL		CU. YDS.	34.0

DRILLED PIER QUANTITIES:			
DRILLED PIER CONCRETE			
POUR #1 - DRILLED PIERS		CU. YDS.	19.6
3'-6" Ø DRILLED PIERS		LIN. FT.	25.0
IN SOIL			
3'-6" Ø DRILLED PIERS		LIN. FT.	30.0
NOT IN SOIL			
PERMANENT STEEL CASING		LIN. FT.	24.6
FOR 3'-6" Ø DRILLED PIERS			
CSL TUBES		LIN. FT.	240.0

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

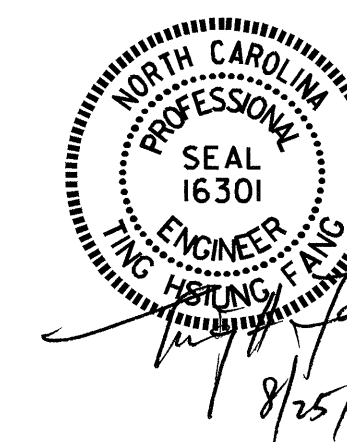
\*\* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE

BENT 1



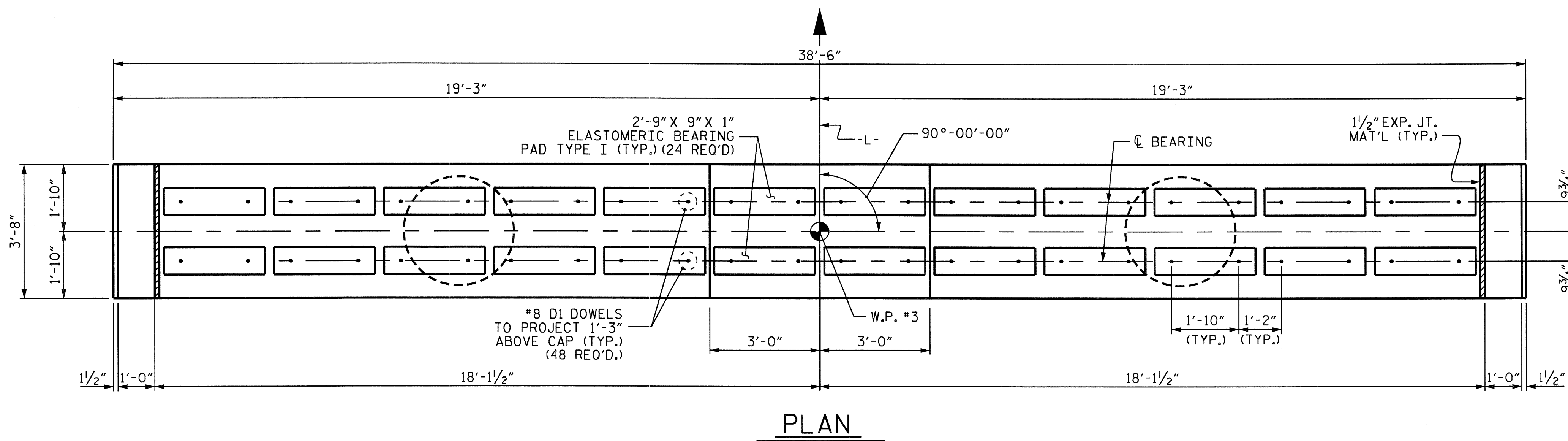
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS 33

DRAWN BY: HARISH SHAH DATE: 6-4-10  
CHECKED BY: T.H. FANG DATE: 2-23-11

25-AUG-2011 08:27  
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qtnguyen





**PLAN**

**SPAN C**

**SPAN B**

**NOTES**

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

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

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

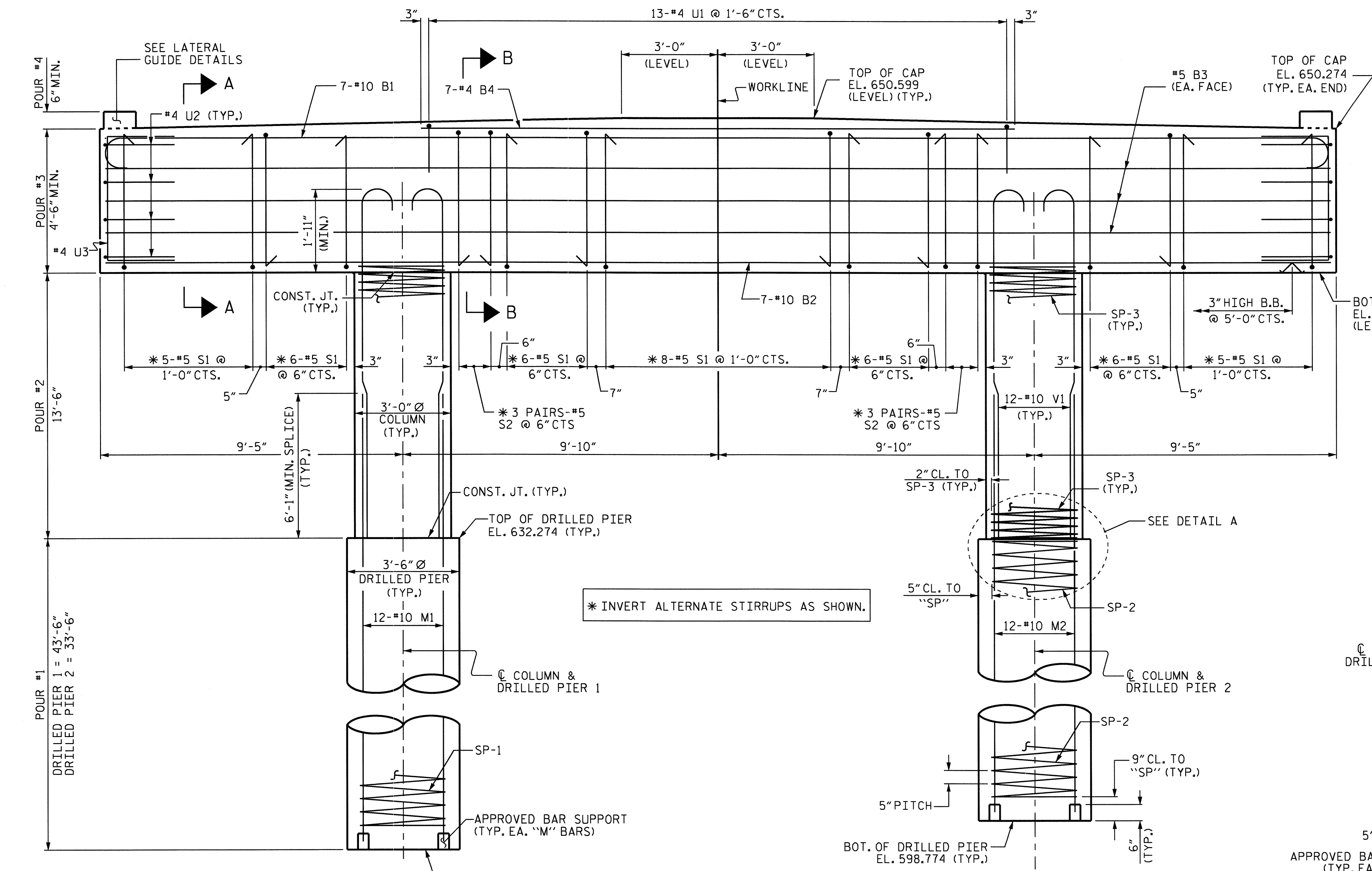
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.

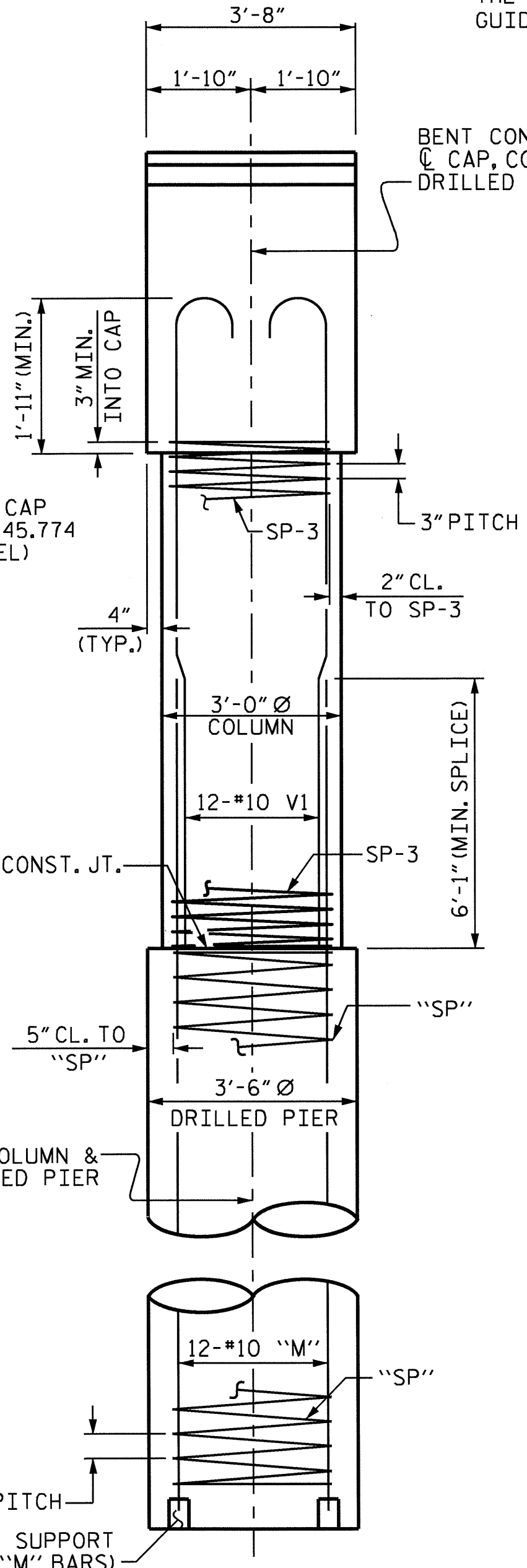
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

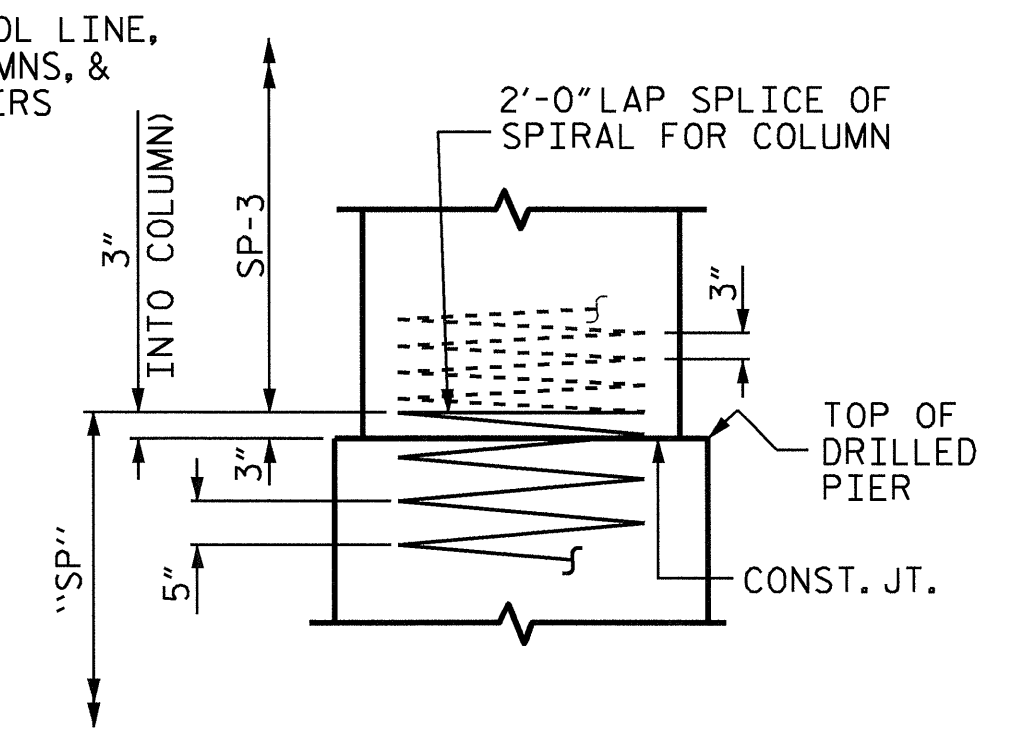
THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDES IF APPROVED BY THE ENGINEER.



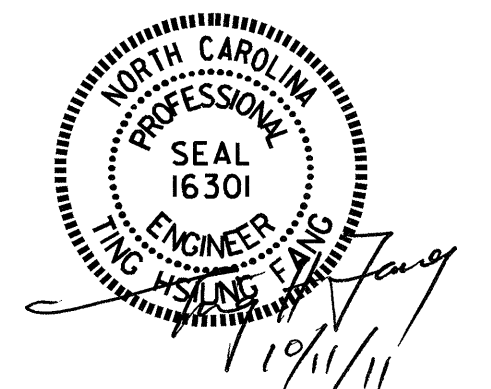
**ELEVATION**



**END ELEVATION**



**DETAIL A**

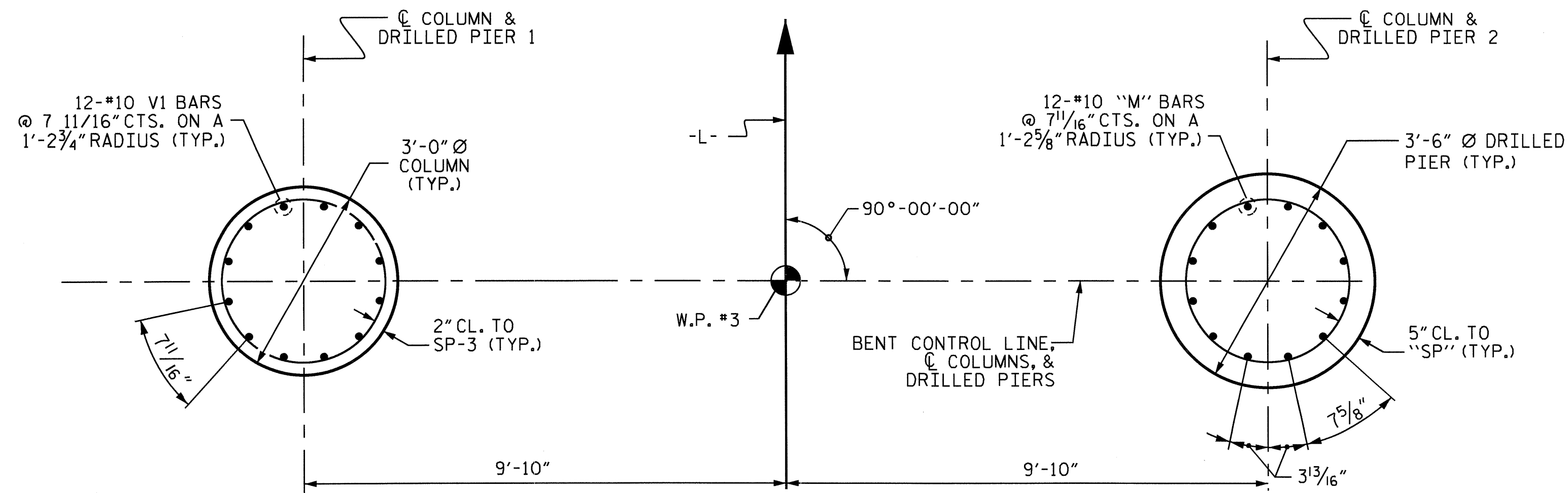


PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 1 OF 2

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

REVISIONS						SHEET NO.	
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2			4			33	

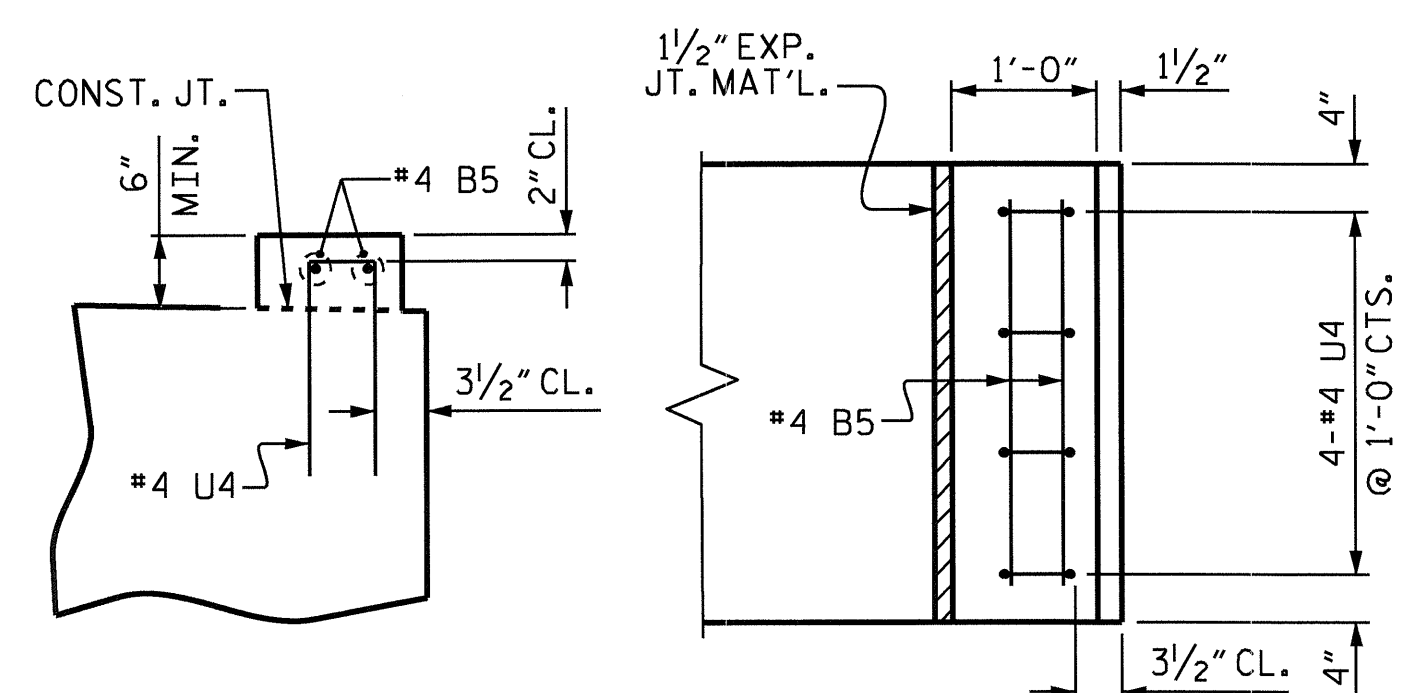
DRAWN BY : HARISH SHAH DATE : 6-4-10  
 CHECKED BY : T. H. FANG DATE : 2-23-11



COLUMN DRILLED PIER

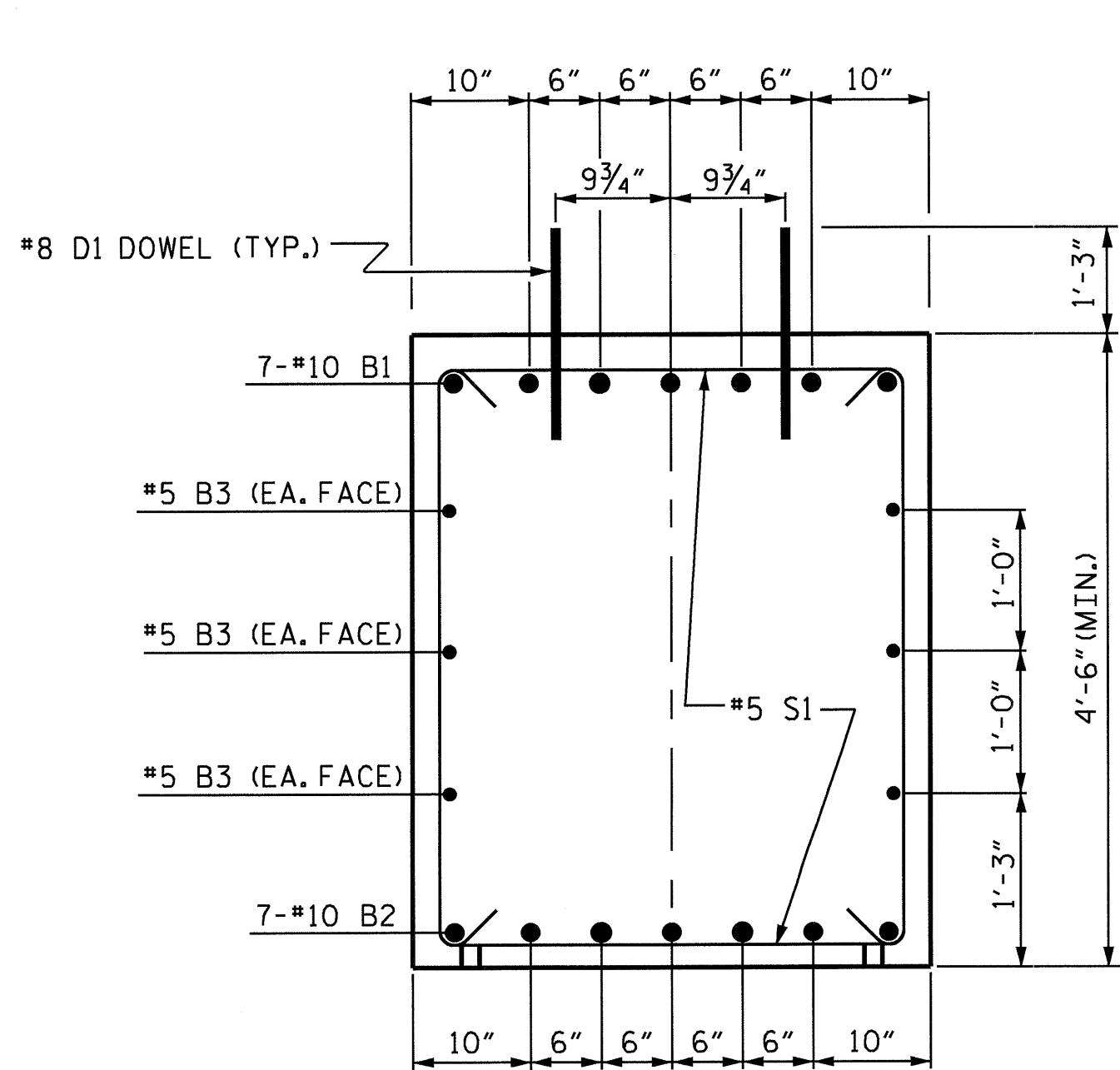
PLAN OF COLUMN & DRILLED PIERS

(REINFORCING STEEL & DIMENSIONS ARE TYPICAL FOR EACH COLUMN & DRILLED PIER)

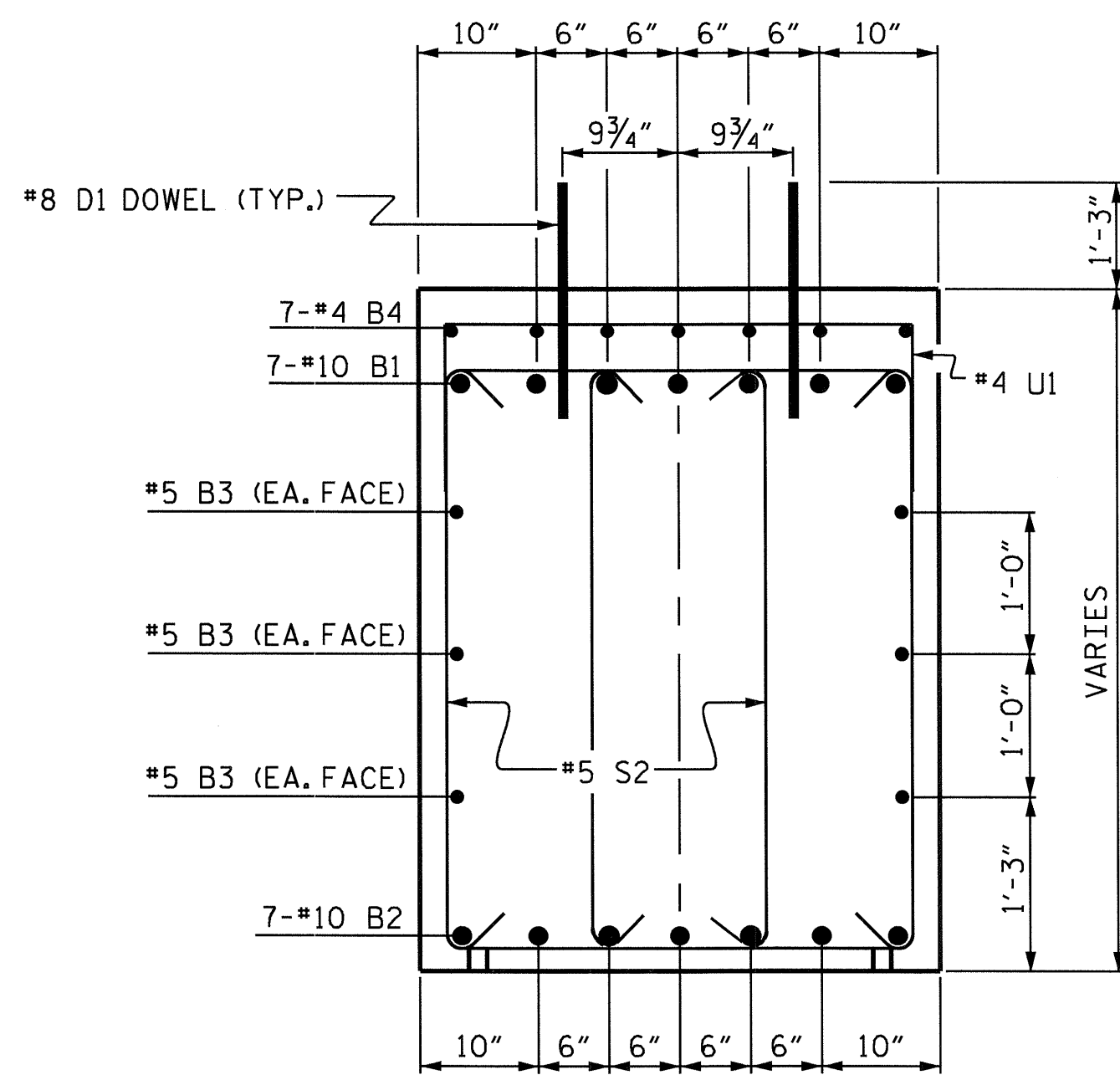


ELEVATION PLAN

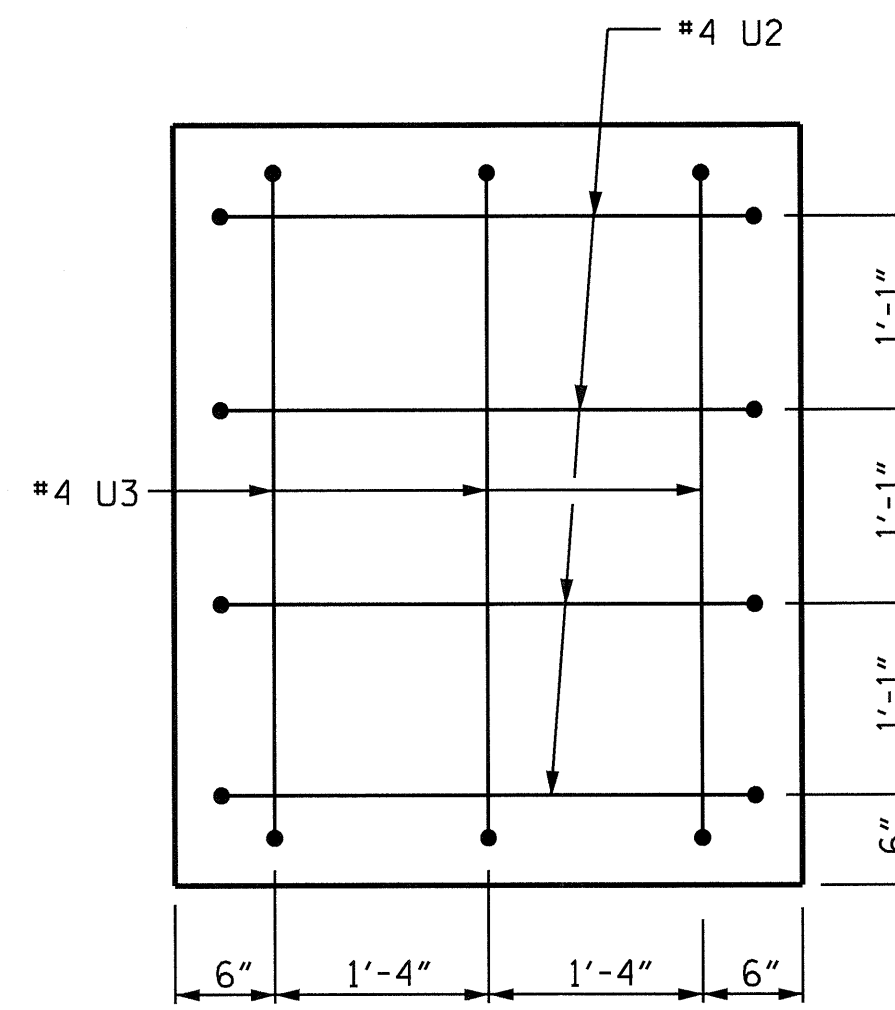
LATERAL GUIDE DETAILS



SECTION A-A

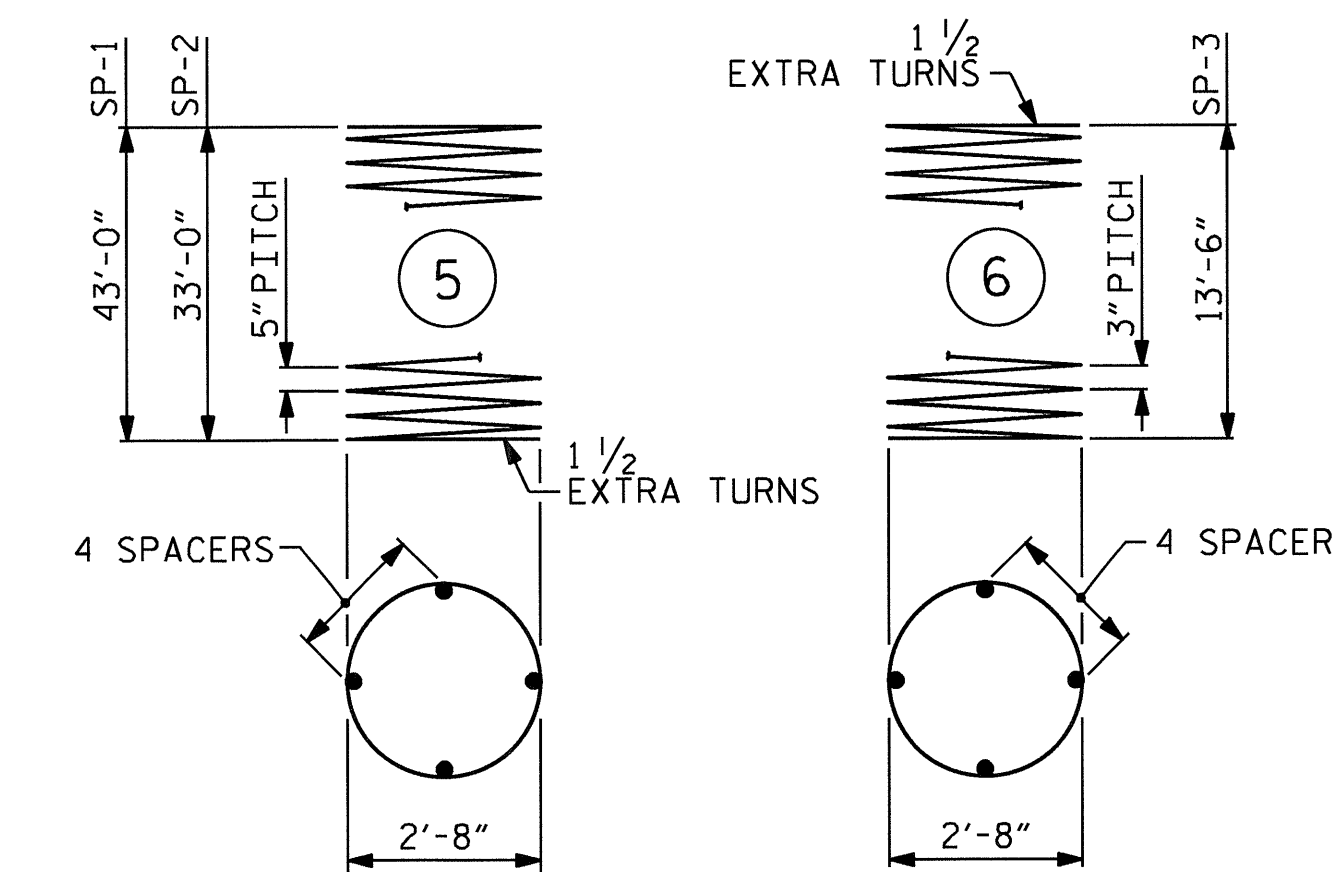
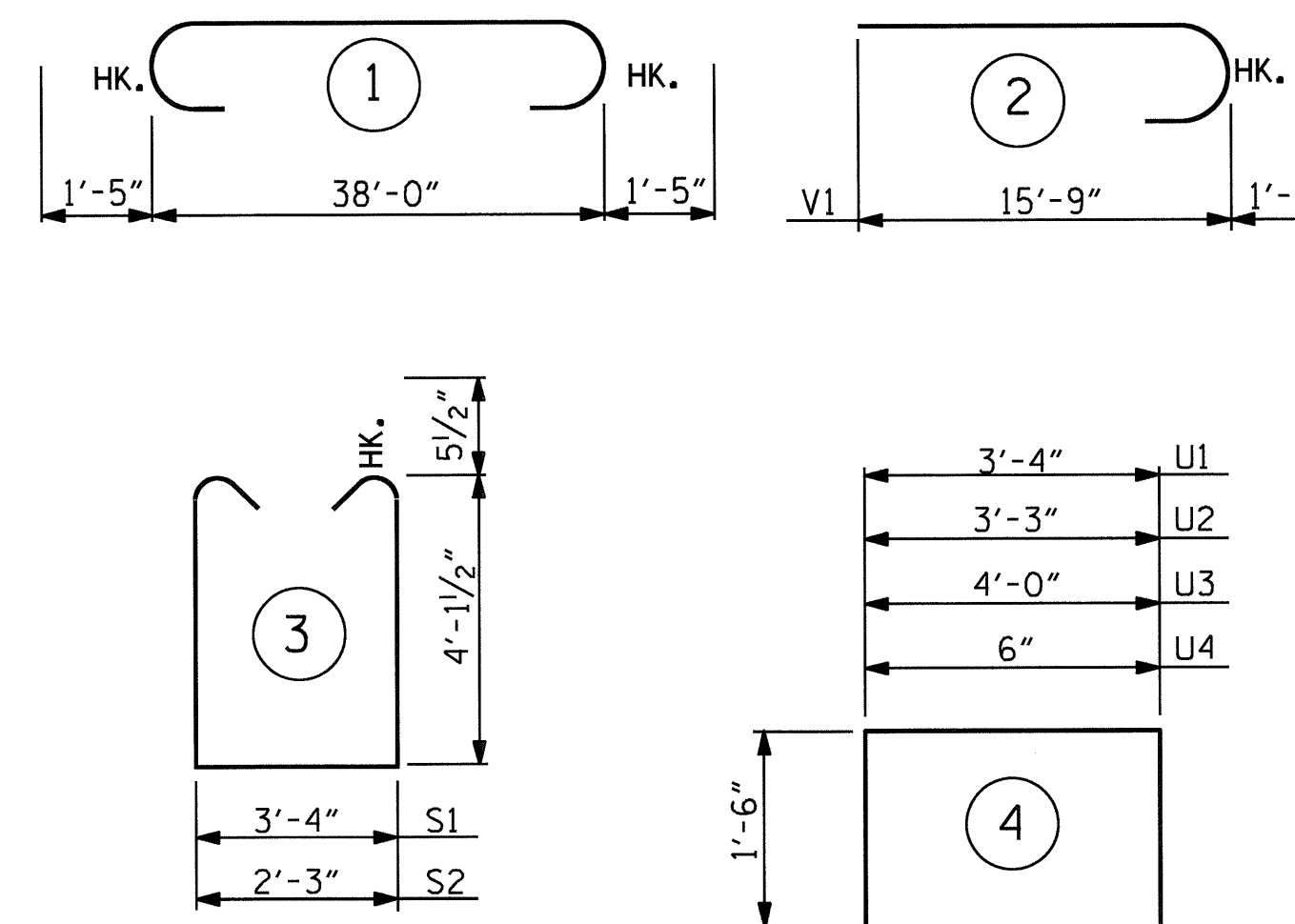


SECTION B-B



END VIEW (TYP. EA. END)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#10	1	40'-10"	1230
B2	7	#10	STR	38'-2"	1150
B3	6	#5	STR	38'-2"	239
B4	7	#4	STR	18'-6"	87
B5	4	#4	STR	3'-4"	9
D1	48	#8	STR	2'-3"	289
M1	12	#10	STR	52'-4"	2702
M2	12	#10	STR	42'-4"	2186
S1	42	#5	3	12'-6"	548
S2	12	#5	3	11'-5"	143
U1	13	#4	4	6'-4"	55
U2	8	#4	4	6'-3"	33
U3	6	#4	4	7'-0"	28
U4	8	#4	4	3'-6"	19
V1	24	#10	2	17'-2"	1773

REINFORCING STEEL LBS. 10,491

SP-1	1	*	5	861'-10"	899
SP-2	1	*	5	664'-10"	693
SP-3	2	**	6	463'-2"	618

SPIRAL COLUMN REINFORCING STEEL LBS. 2,211

CLASS A CONCRETE		CU. YDS.	
POUR #2 - COLUMNS		7.1	
POUR #3 - CAP		24.5	
POUR #4 - LATERAL GUIDES		0.1	
TOTAL		31.7	

DRILLED PIER QUANTITIES:			
DRILLED PIER CONCRETE			
POUR #1 - DRILLED PIERS	CU. YDS.	27.5	
3'-6" Ø DRILLED PIERS IN SOIL	LIN. FT.	33.0	
3'-6" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	44.0	
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	LIN. FT.	32.5	
CSL TUBES	LIN. FT.	328.0	

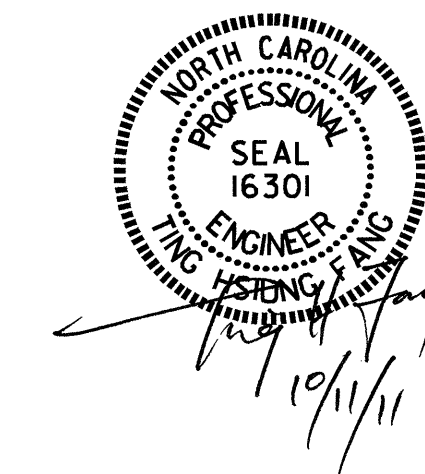
\* THE SP-1 AND SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

\*\* THE SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
BENT 2

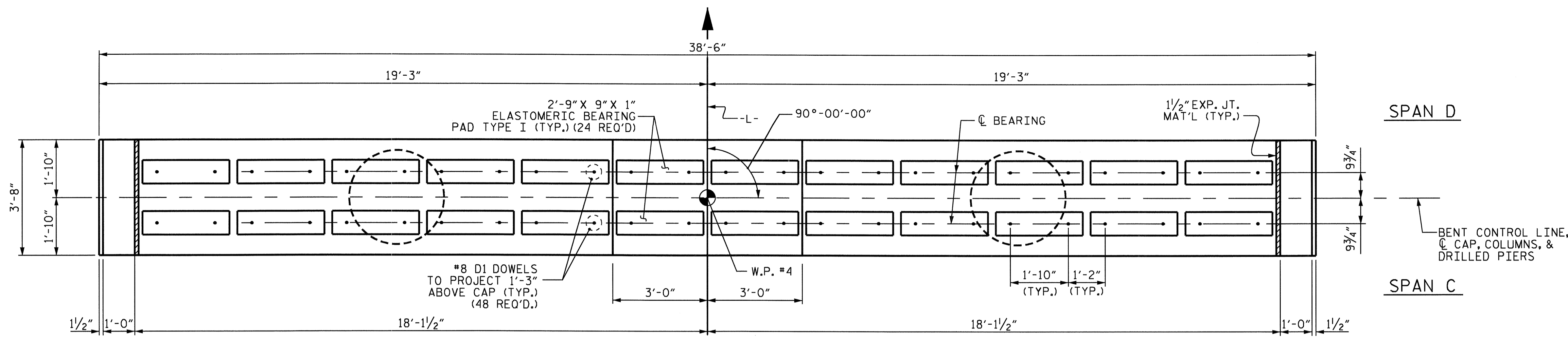


DRAWN BY: HARISH SHAH DATE: 6-4-10  
CHECKED BY: T. H. FANG DATE: 2-23-11

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

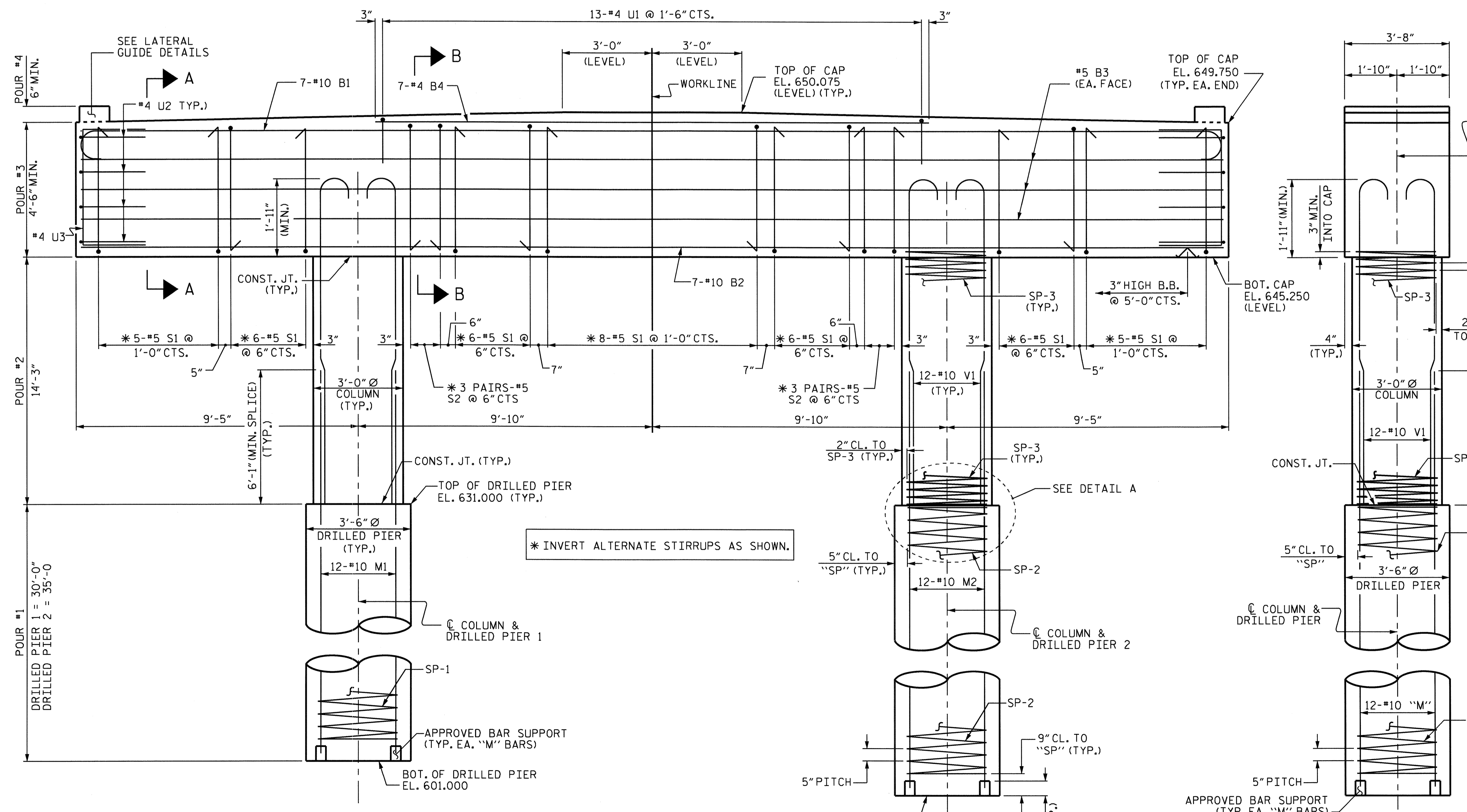
TOTAL SHEETS: 33



**PLAN**

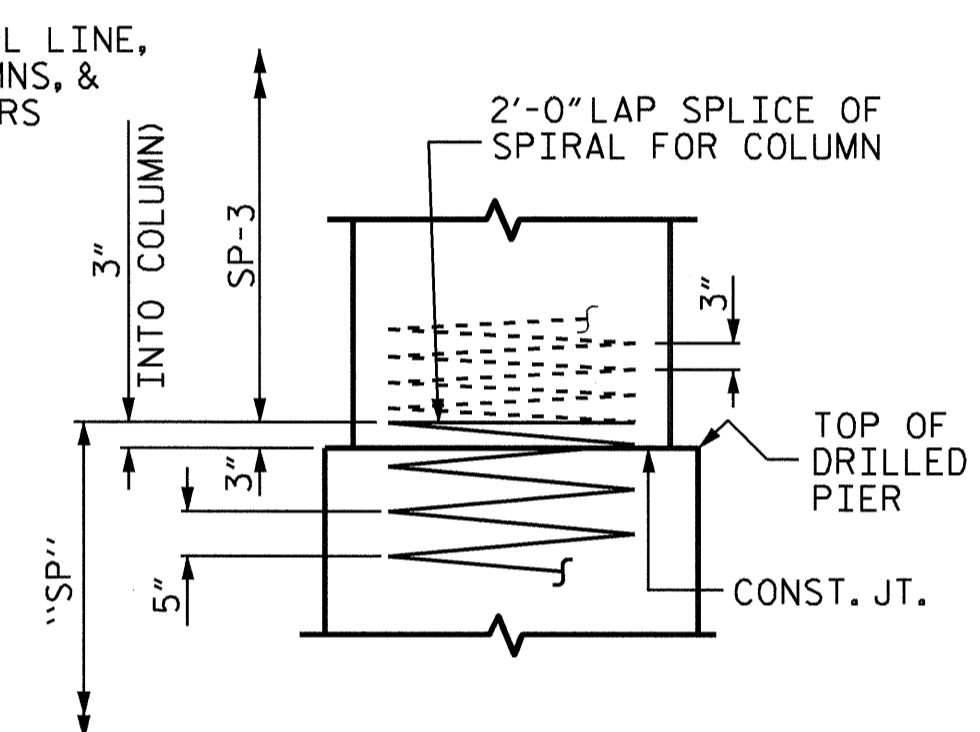
**NOTES**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIER WILL NOT BE PERMITTED.
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.
- THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.
- THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDES IF APPROVED BY THE ENGINEER.

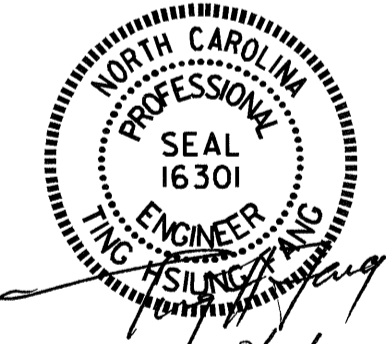


**ELEVATION**

**END ELEVATION**



**DETAIL A**



PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

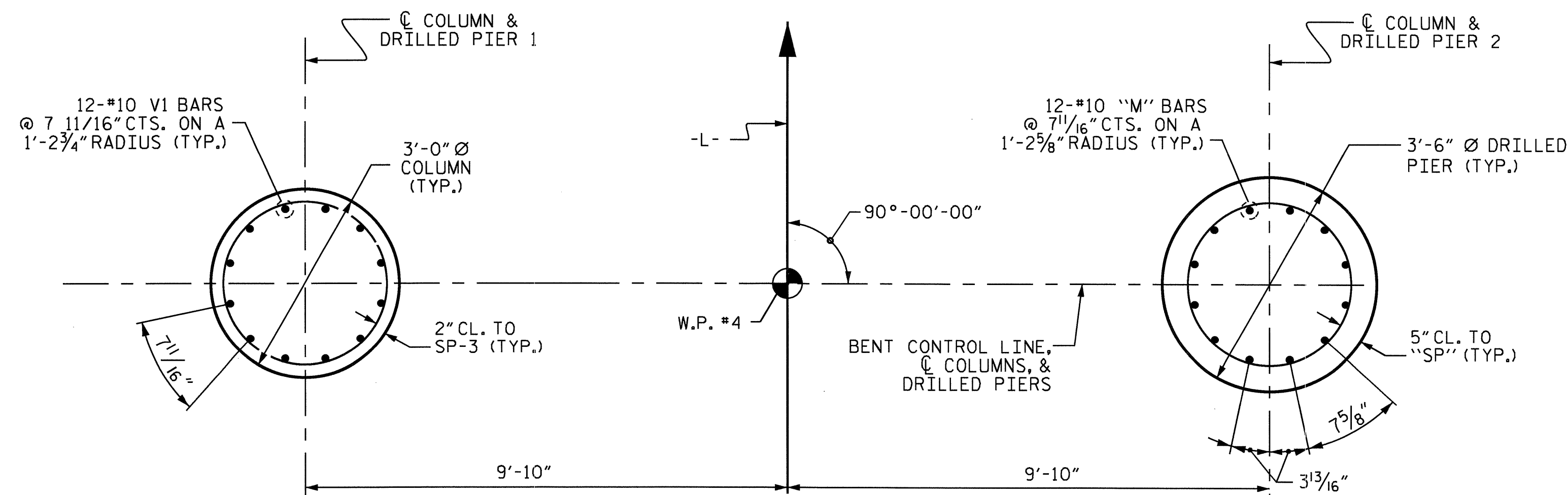
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**BENT 3**

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26	
1			3			TOTAL SHEETS 33	
2			4				

DRAWN BY: HARISH SHAH DATE: 6-4-10  
 CHECKED BY: I. H. FANG DATE: 2-23-11

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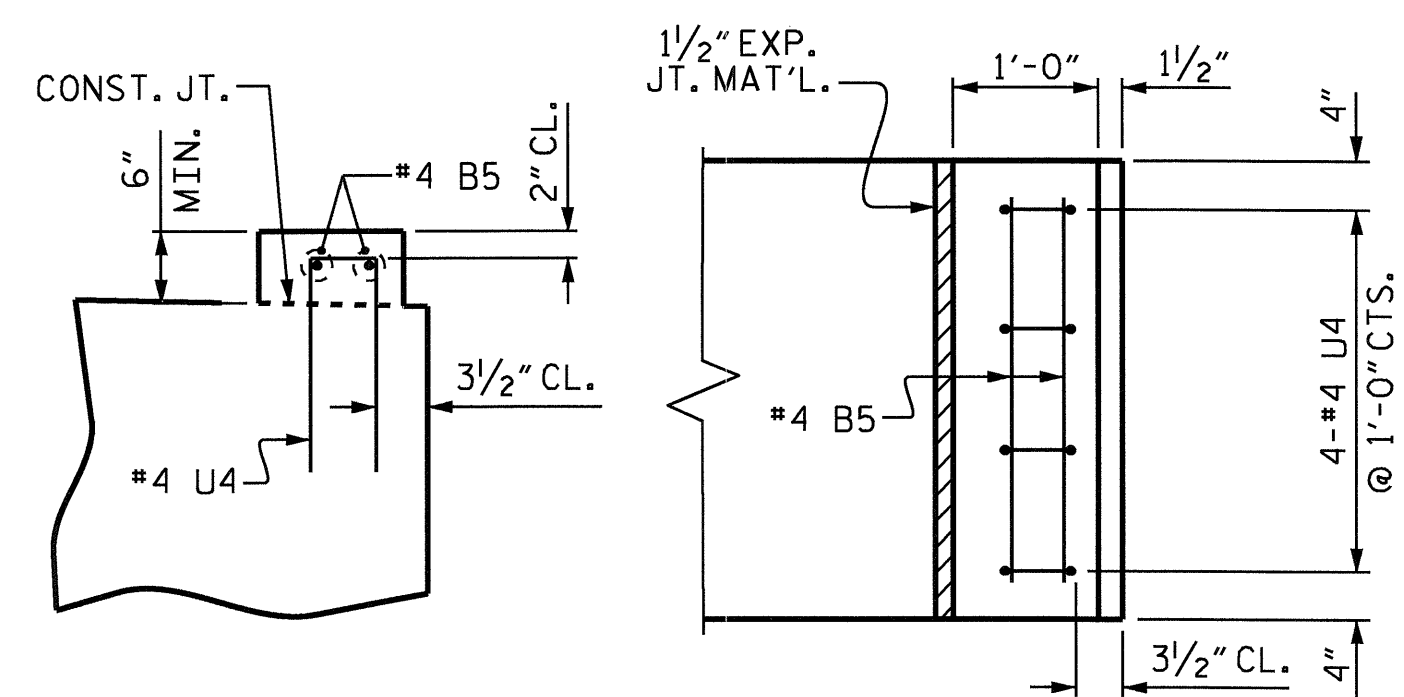


COLUMN

DRILLED PIER

PLAN OF COLUMN & DRILLED PIERS

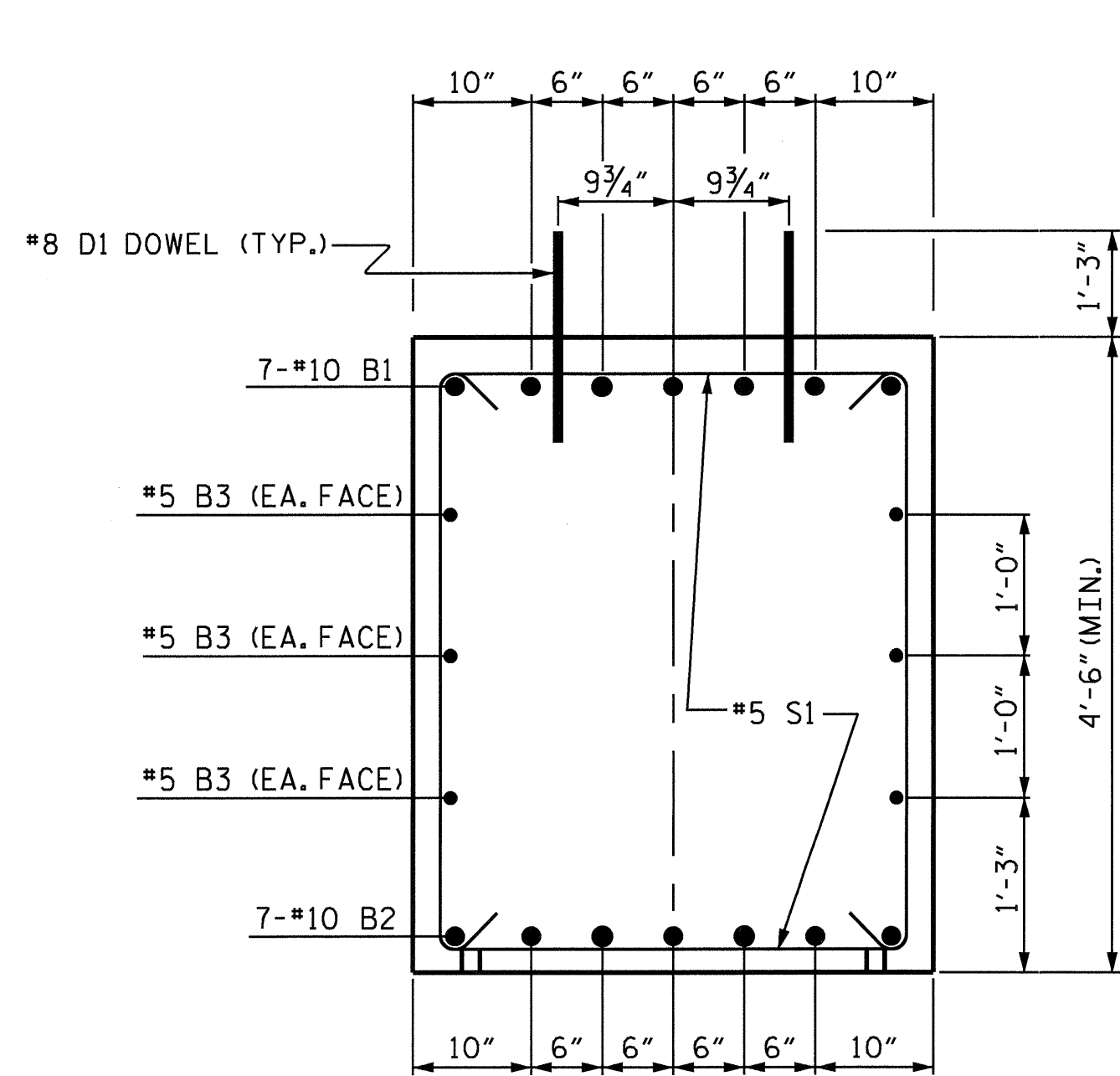
(REINFORCING STEEL & DIMENSIONS ARE TYPICAL FOR EACH COLUMN & DRILLED PIER)



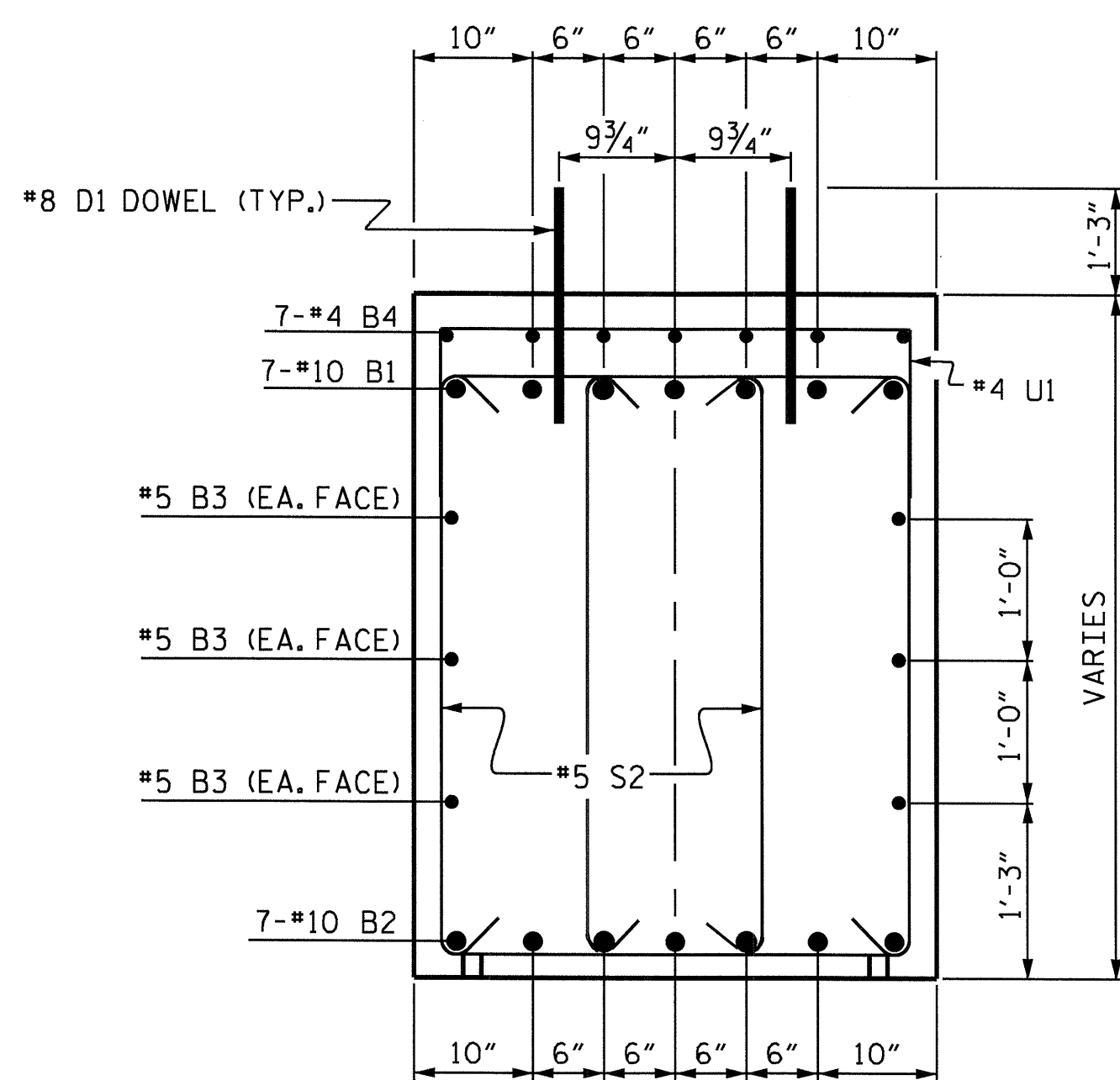
ELEVATION

PLAN

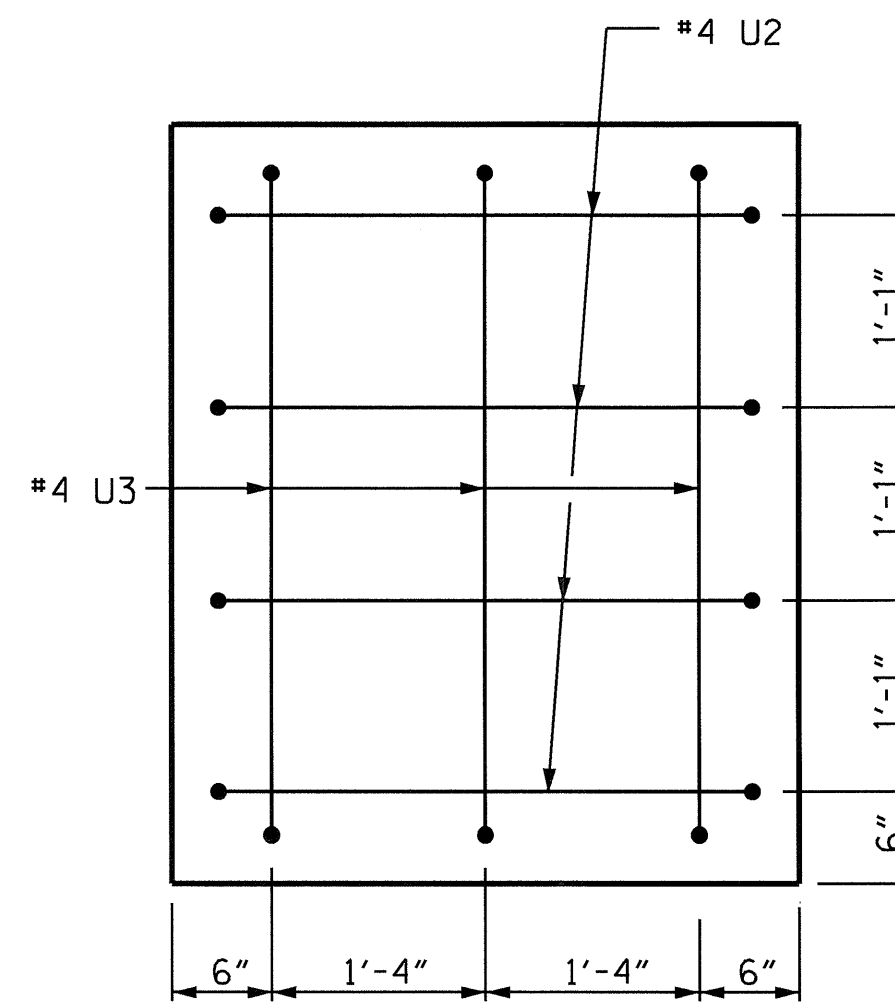
LATERAL GUIDE DETAILS



SECTION A-A

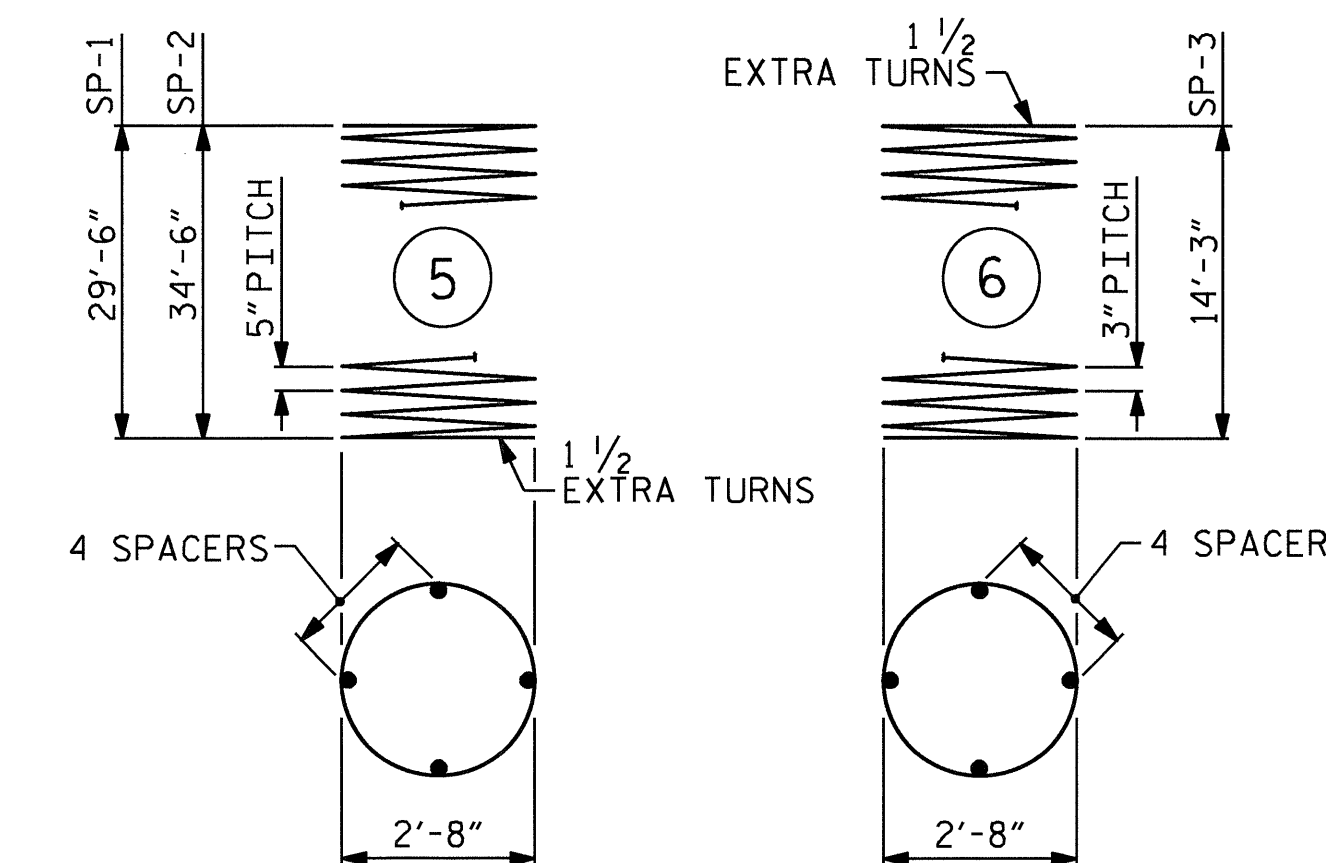
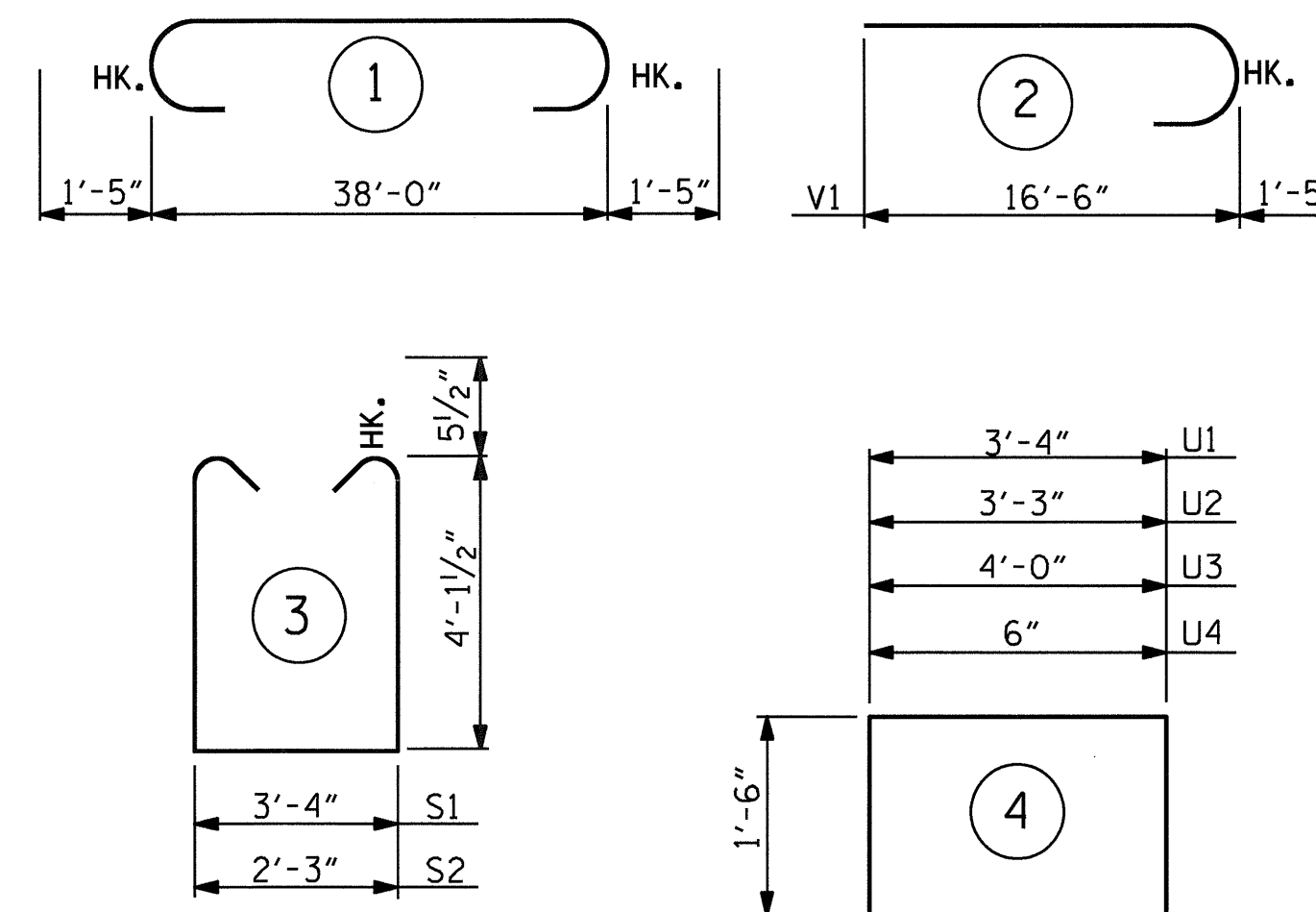


SECTION B-B



END VIEW  
(TYP. EA. END)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 3

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#10	1	40'-10"	1230
B2	7	#10	STR	38'-2"	1150
B3	6	#5	STR	38'-2"	239
B4	7	#4	STR	18'-6"	87
B5	4	#4	STR	3'-4"	9
D1	48	#8	STR	2'-3"	289
M1	12	#10	STR	38'-10"	2005
M2	12	#10	STR	43'-10"	2263
S1	42	#5	3	12'-6"	548
S2	12	#5	3	11'-5"	143
U1	13	#4	4	6'-4"	55
U2	8	#4	4	6'-3"	33
U3	6	#4	4	7'-0"	28
U4	8	#4	4	3'-6"	19
V1	24	#10	2	17'-11"	1851

REINFORCING STEEL LBS. 9,949

SP-1	1	*	5	599'-3"	625
SP-2	1	*	5	697'-6"	728
SP-3	2	**	6	487'-10"	652

SPIRAL COLUMN REINFORCING STEEL LBS. 2,005

CLASS A CONCRETE			
POUR #2 - COLUMNS	CU. YDS.	7.5	
POUR #3 - CAP	CU. YDS.	24.5	
POUR #4 - LATERAL GUIDES	CU. YDS.	0.1	
TOTAL	CU. YDS.	32.1	

DRILLED PIER QUANTITIES:			
DRILLED PIER CONCRETE			
POUR #1 - DRILLED PIERS	CU. YDS.	23.2	
3'-6" Ø DRILLED PIERS IN SOIL	LIN. FT.	26.0	
3'-6" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	39.0	
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	LIN. FT.	26.0	
CSL TUBES	LIN. FT.	280.0	

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

\*\* THE SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. B-4498  
DAVIDSON COUNTY  
STATION: 16+08.00 -L-

SHEET 2 OF 2

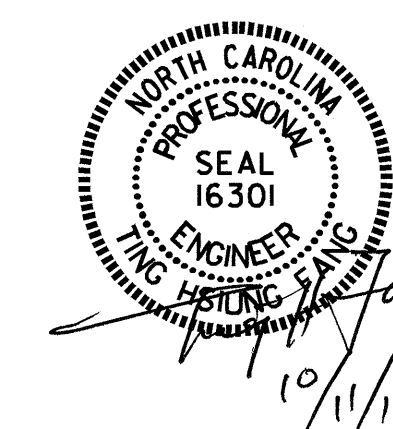
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DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE

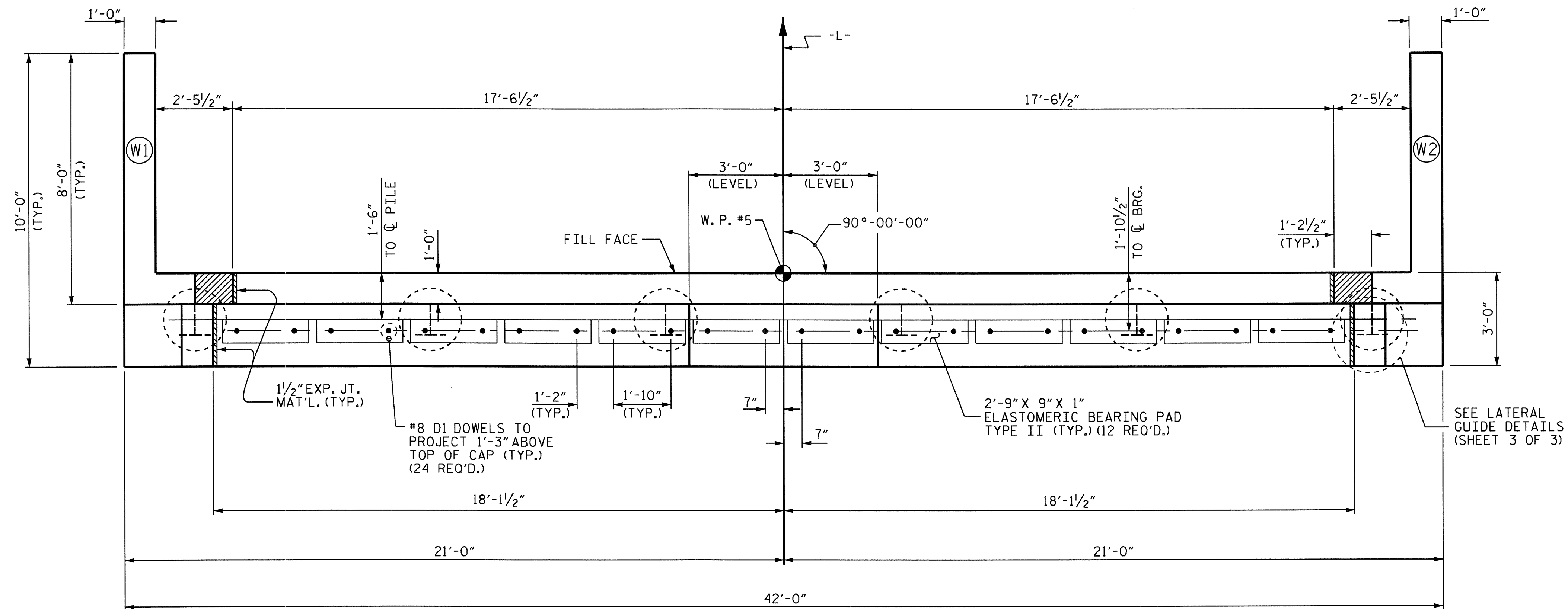
BENT 3

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
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2			4			TOTAL SHEETS 33

DRAWN BY: HARISH SHAH DATE: 6-4-10  
CHECKED BY: T. H. FANG DATE: 2-23-11





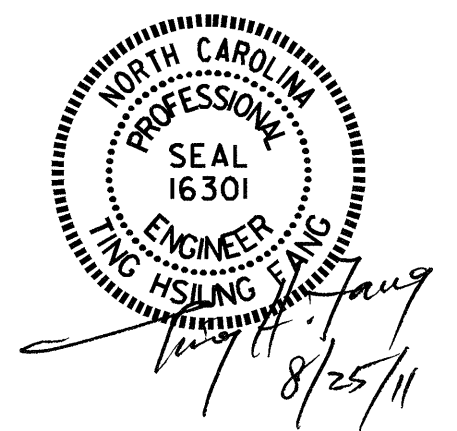
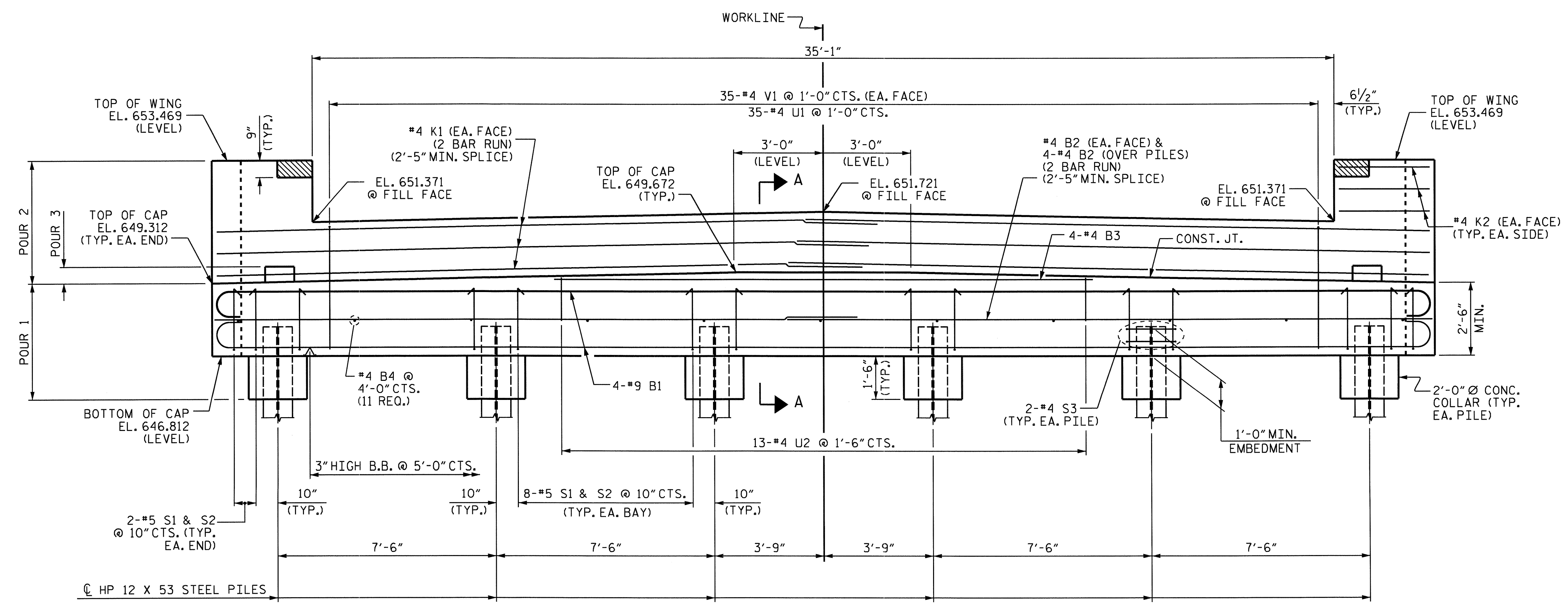
**NOTES**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #8 D1 DOWELS.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE BOX BEAM UNITS ARE IN PLACE.

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

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDES IF APPROVED BY THE ENGINEER.

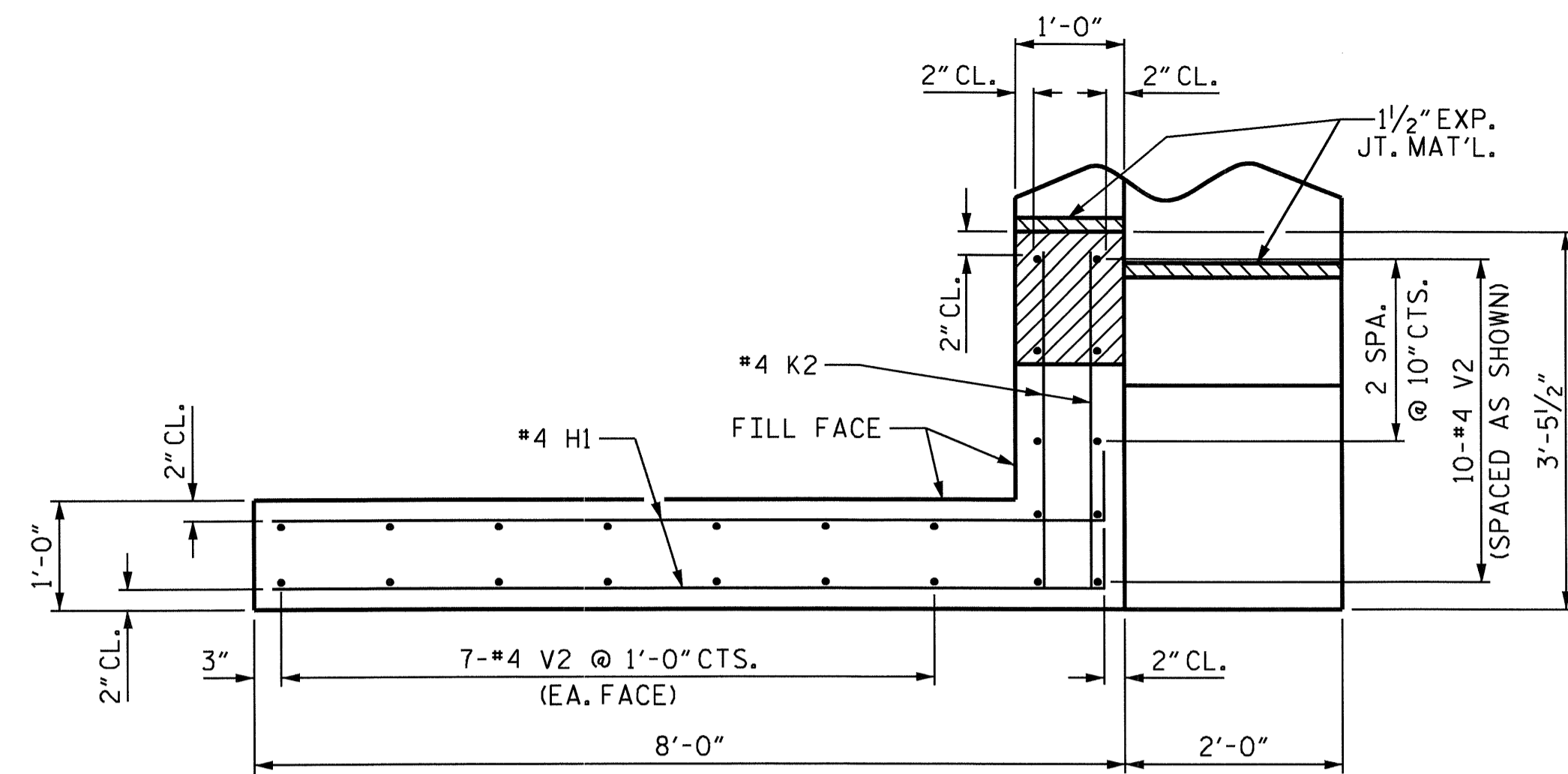


PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 1 OF 3

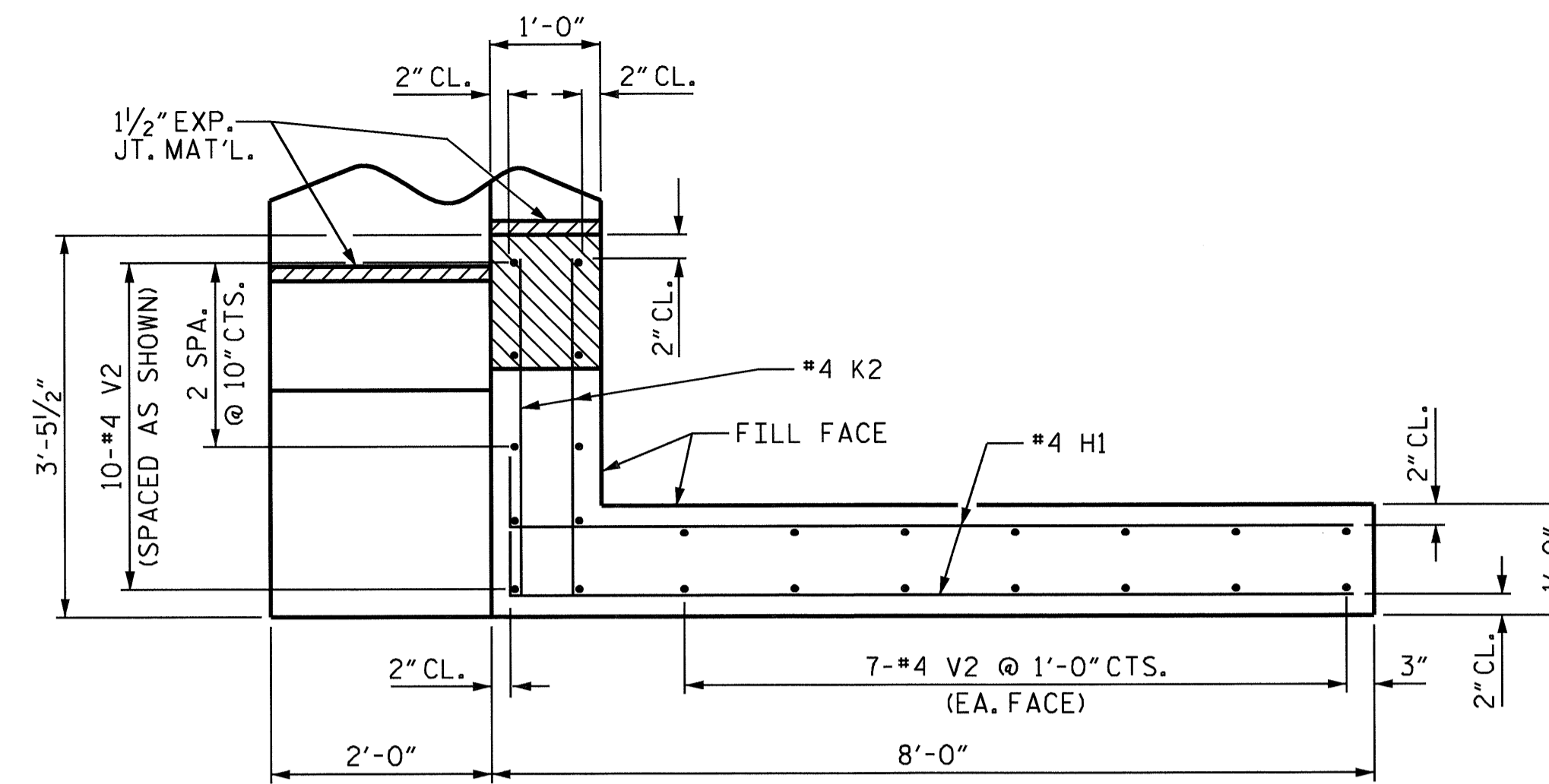
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SUBSTRUCTURE						TOTAL SHEETS 33
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REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
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DRAWN BY: RAMAN PATEL DATE: 2/23/10  
 CHECKED BY: Z.H. BROWN DATE: 5-21-10

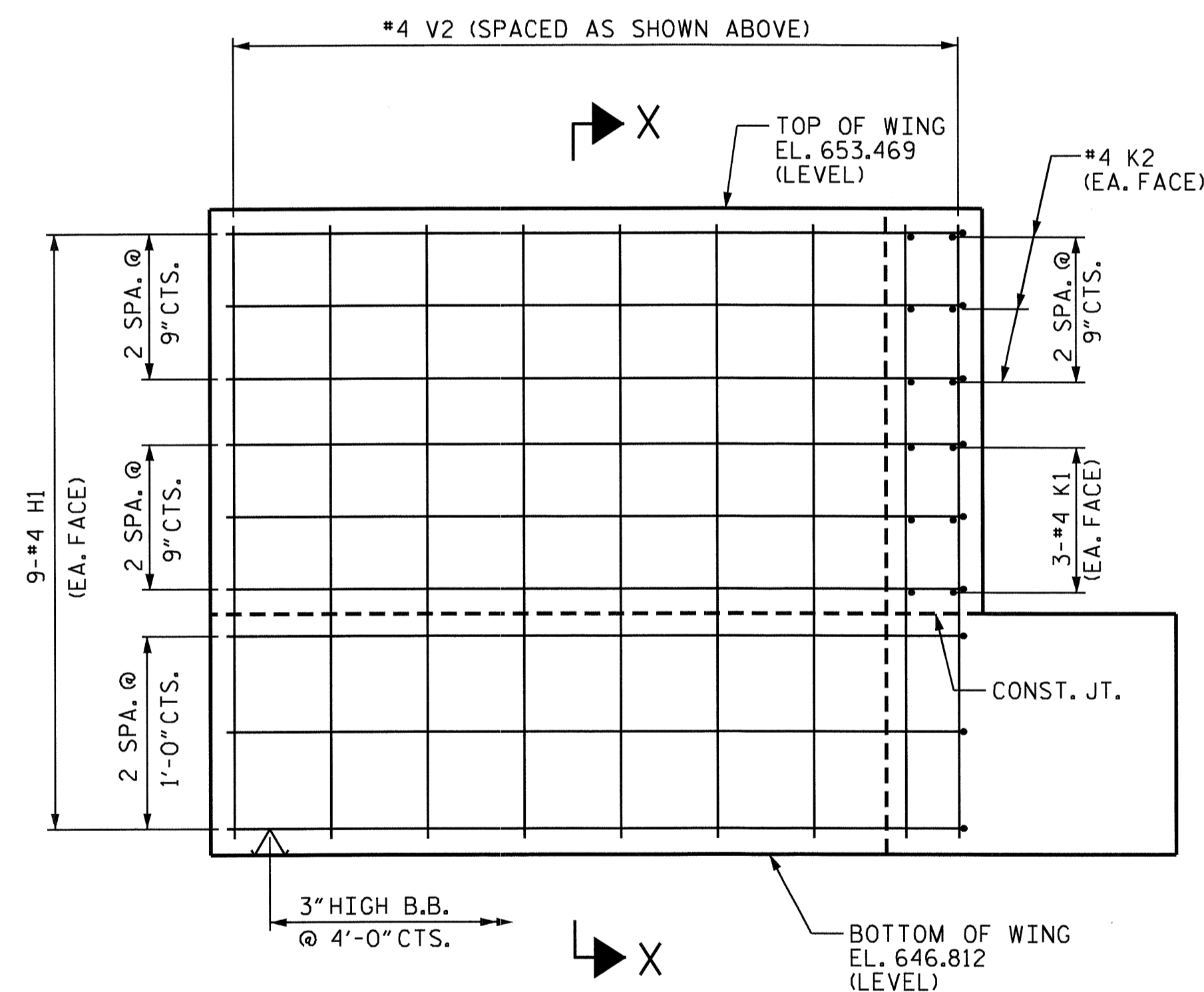
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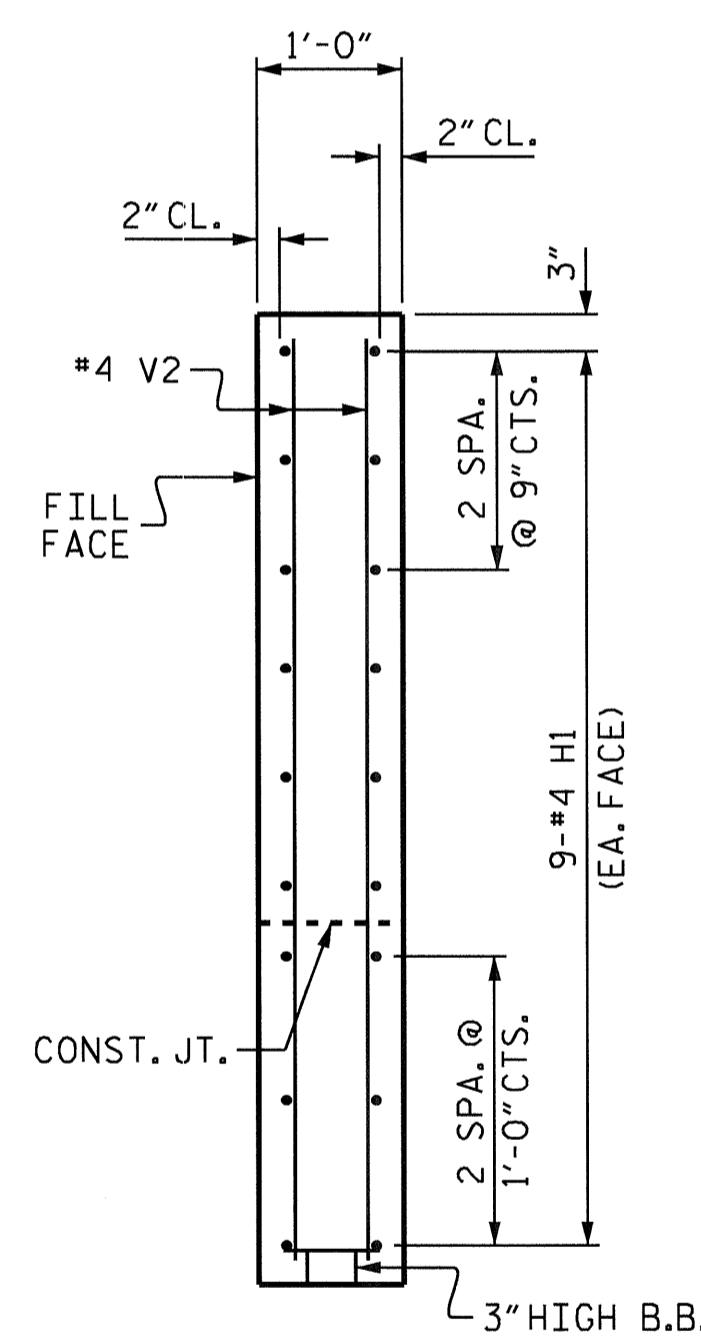
PLAN OF WING W1



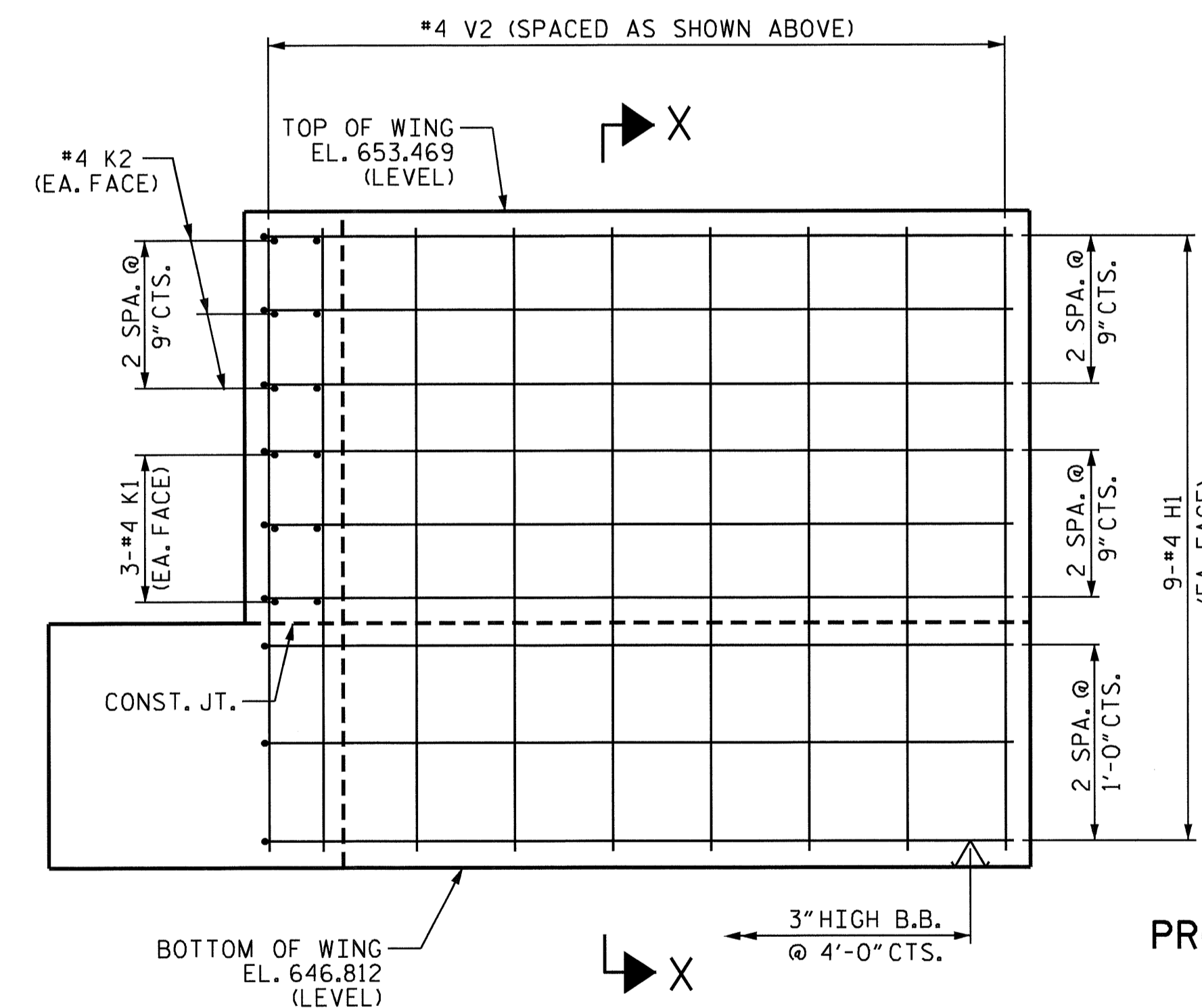
PLAN OF WING W2



ELEVATION OF WING W1



SECTION X-X

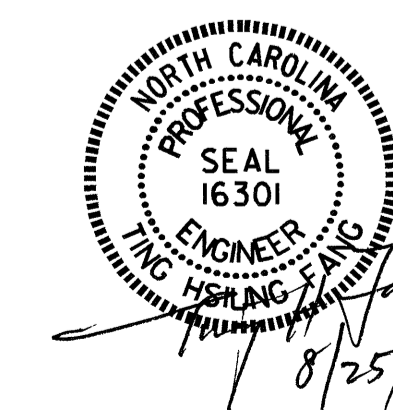


ELEVATION OF WING W2

PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 2 OF 3

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

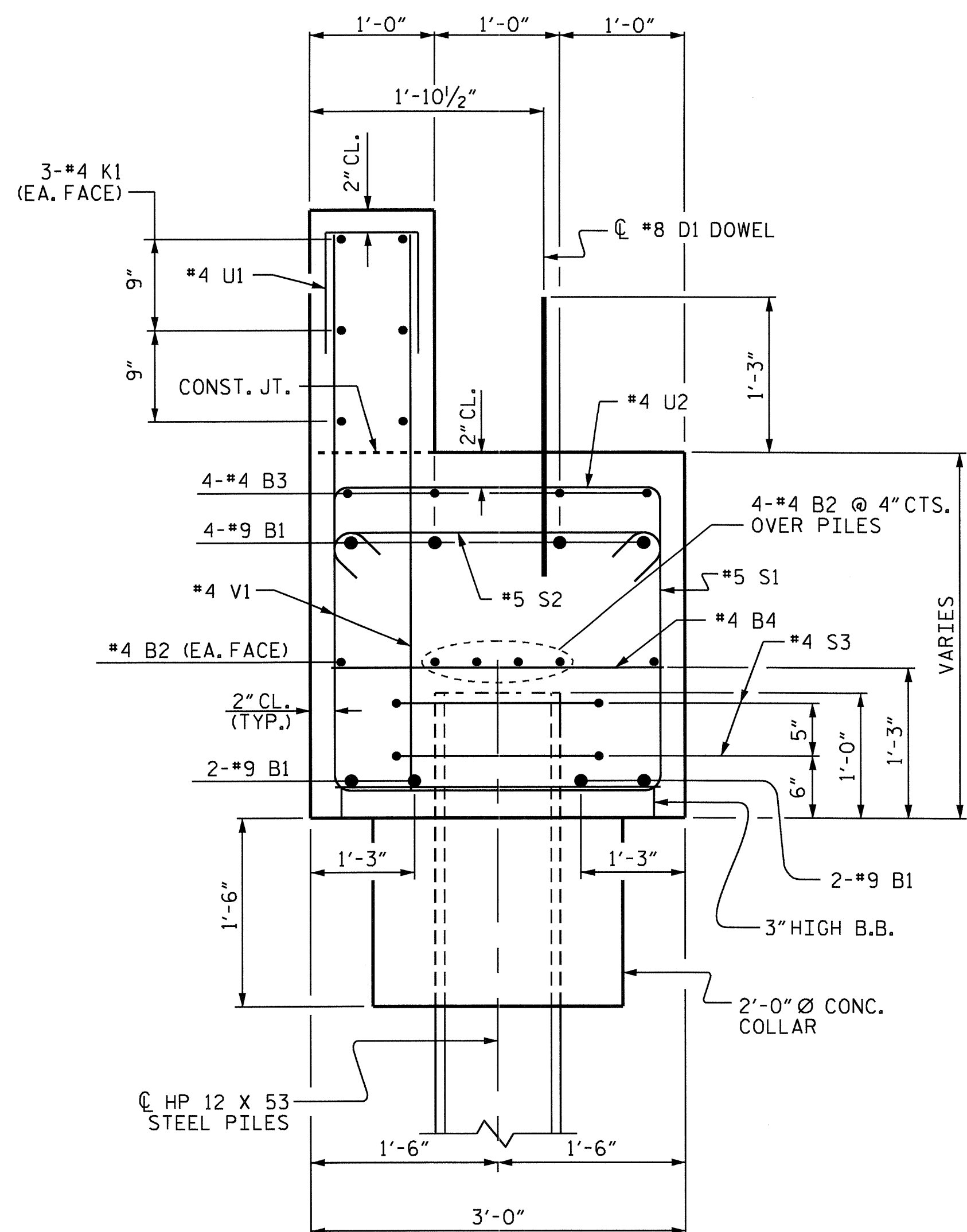


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 CHECKED BY : Z.H. BROWN DATE : 5-21-10

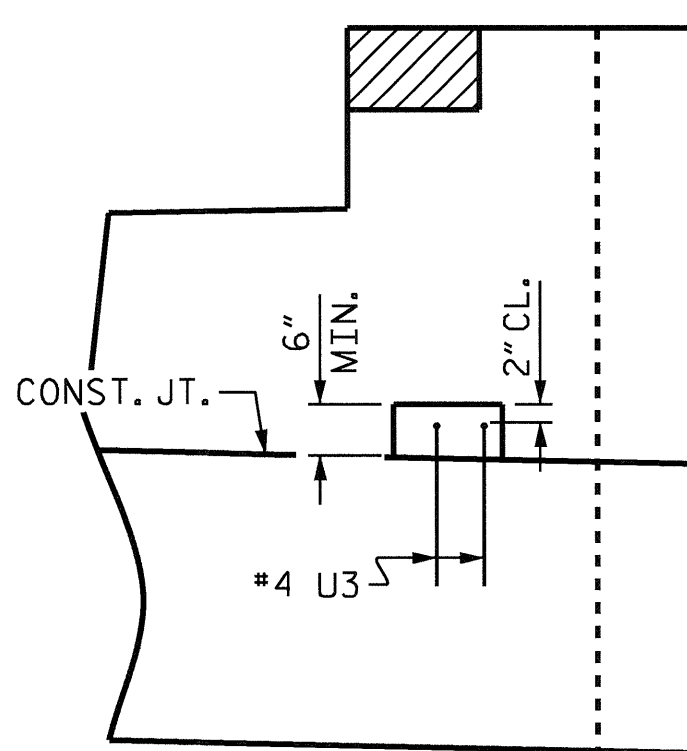
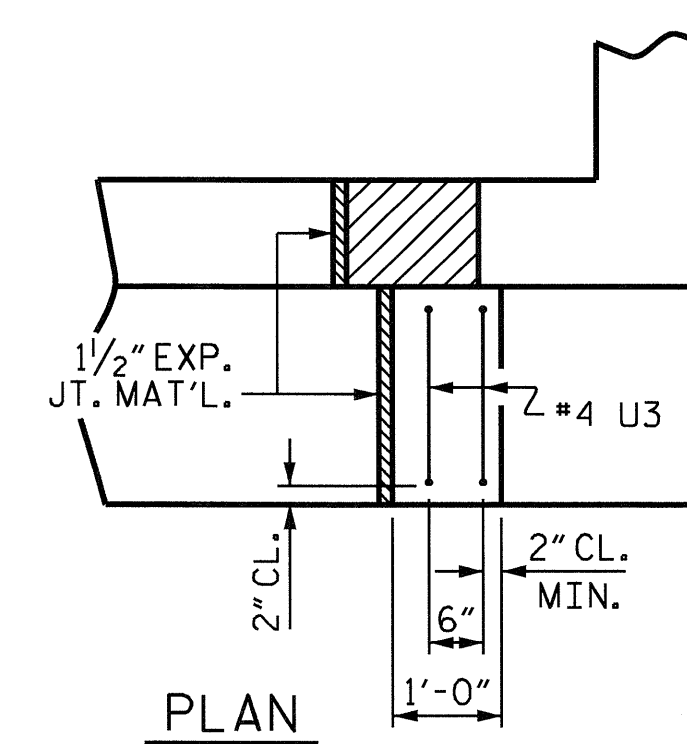
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 qinguyen

REVISIONS						SHEET NO.	
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1			3			TOTAL SHEETS	
2			4			33	

NC005



**SECTION A-A**

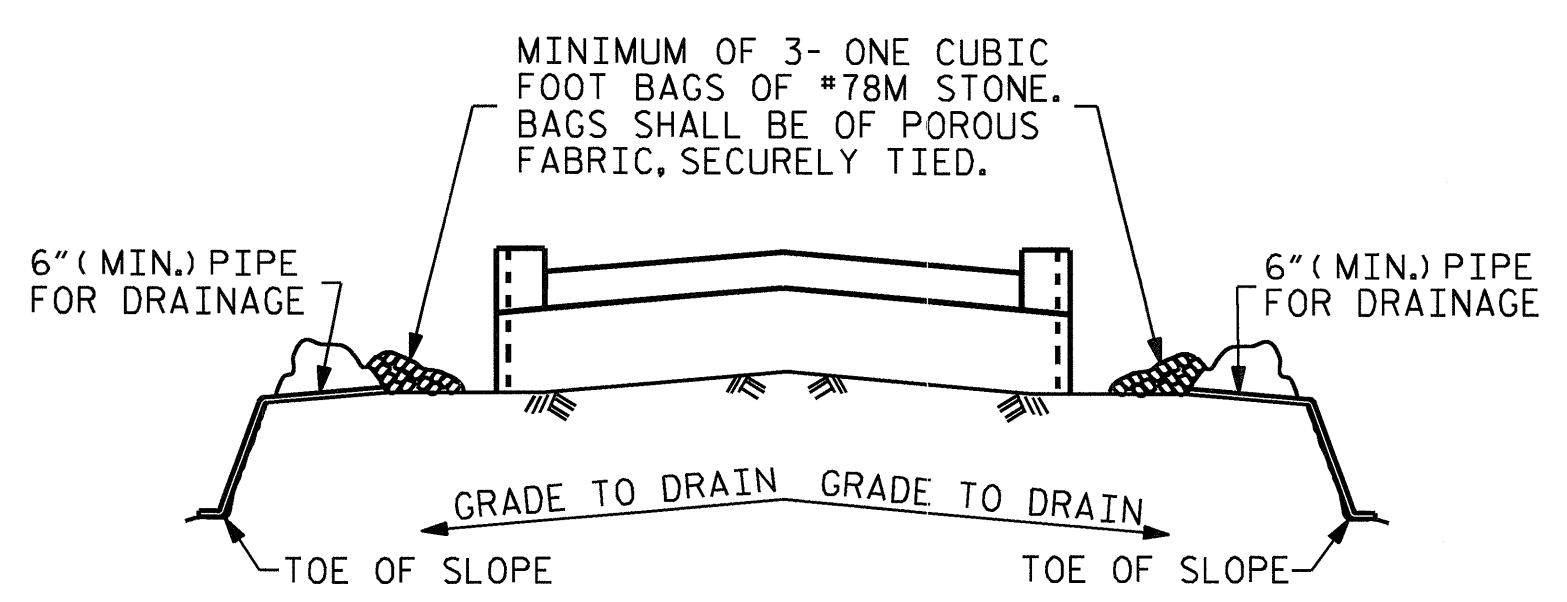


**ELEVATION**

**LATERAL GUIDE DETAILS**  
(EACH END SIMILAR)

BAR TYPES		BILL OF MATERIAL				
END BENT 2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	#9	1	44'-0"	1197	
B2	12	#4	STR	22'-1"	177	
B3	4	#4	STR	18'-6"	49	
B4	11	#4	STR	2'-8"	20	
D1	24	#8	STR	2'-3"	144	
H1	36	#4	6	8'-4"	200	
K1	12	#4	STR	22'-1"	177	
K2	12	#4	STR	3'-1"	25	
S1	44	#5	4	7'-10"	359	
S2	44	#5	3	3'-7"	164	
S3	12	#4	2	6'-6"	52	
U1	35	#4	5	3'-8"	86	
U2	13	#4	5	5'-8"	49	
U3	4	#4	5	4'-8"	12	
V1	70	#4	STR	4'-3"	199	
V2	48	#4	STR	6'-4"	203	
REINFORCING STEEL				LBS.	3113	
CLASS A CONC. BREAKDOWN						
POUR 1 CONCRETE COLLARS, CAP & LOWER WINGS				C.Y.	15.0	
POUR 2 UPPER WINGS & BACKWALL				C.Y.	5.9	
POUR 3 LATERAL GUIDES				C.Y.	0.1	
TOTAL				C.Y.	21.0	
HP 12 X 53 STEEL PILES						
No. 6				LIN. FT. =	240	

ALL BAR DIMENSIONS ARE OUT TO OUT.

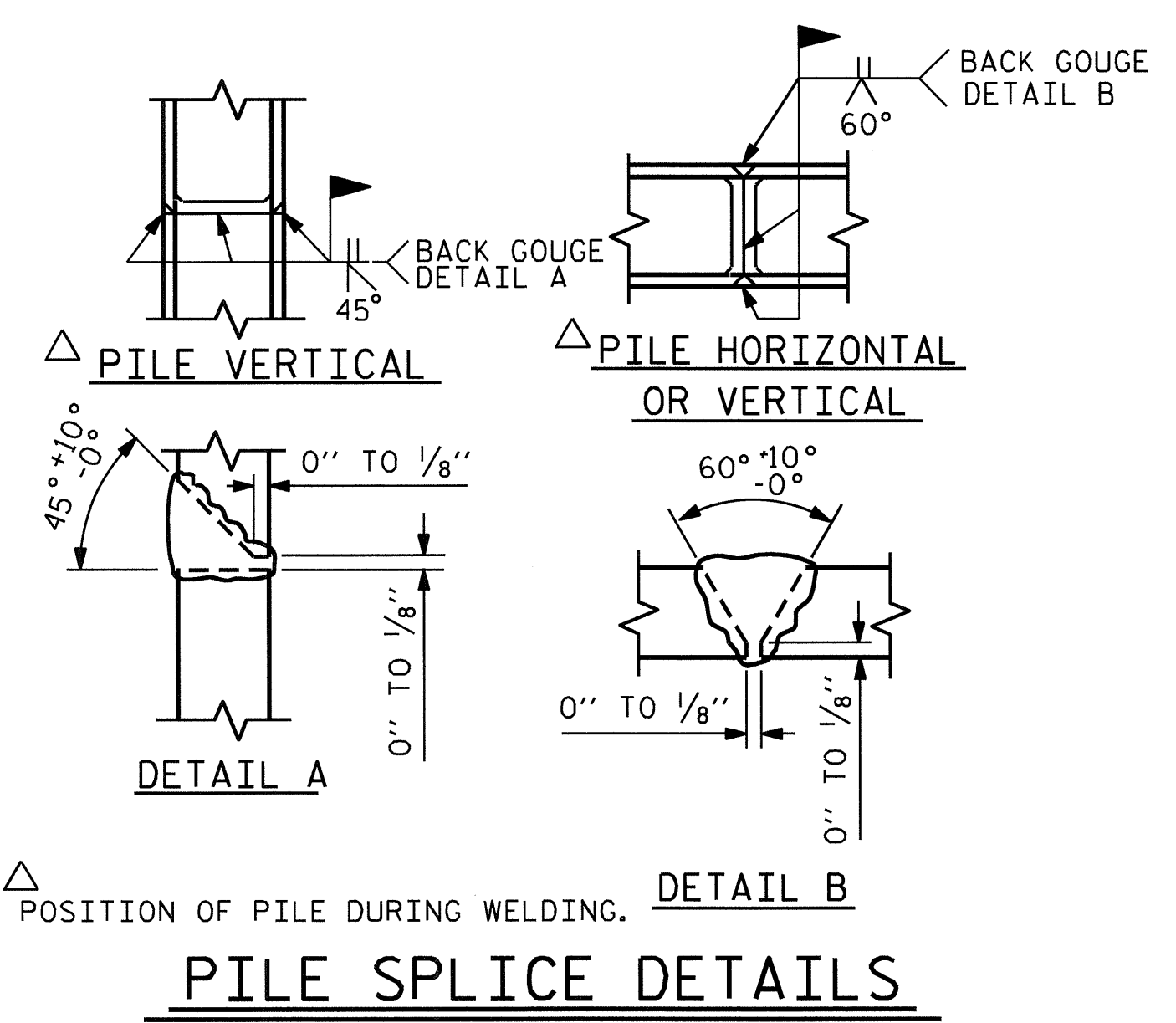


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

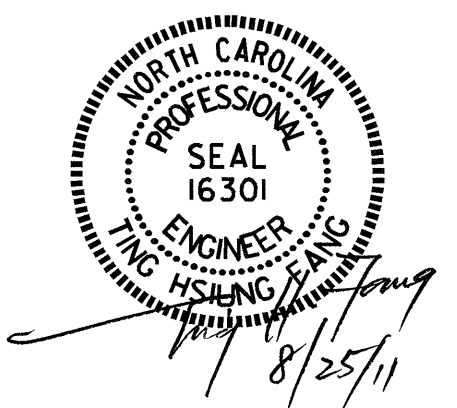
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

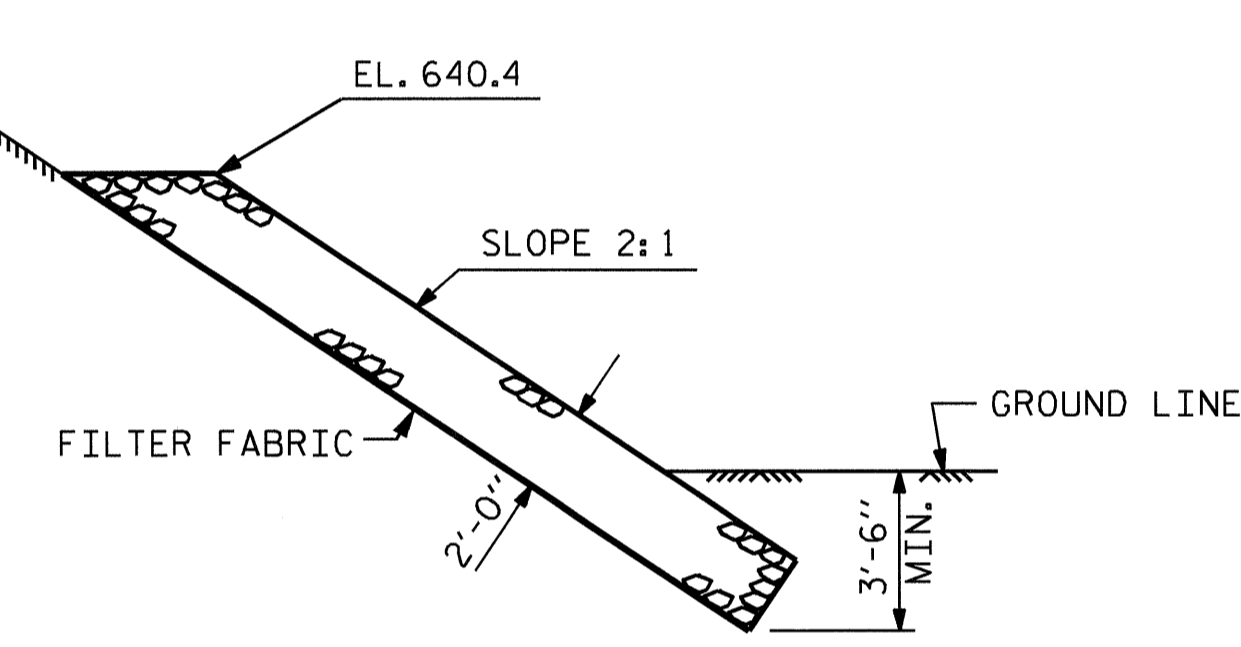
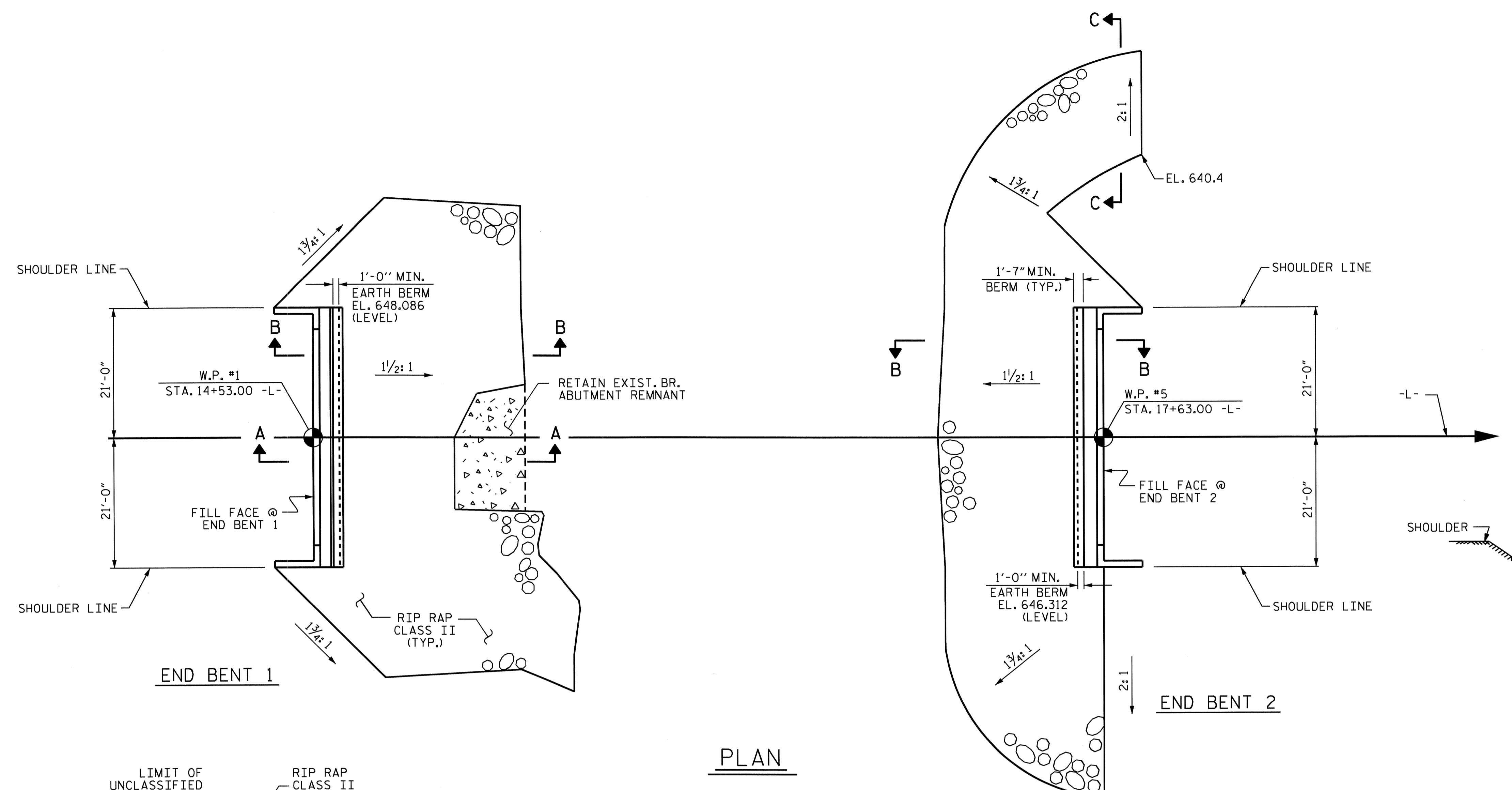


PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT 2					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 33

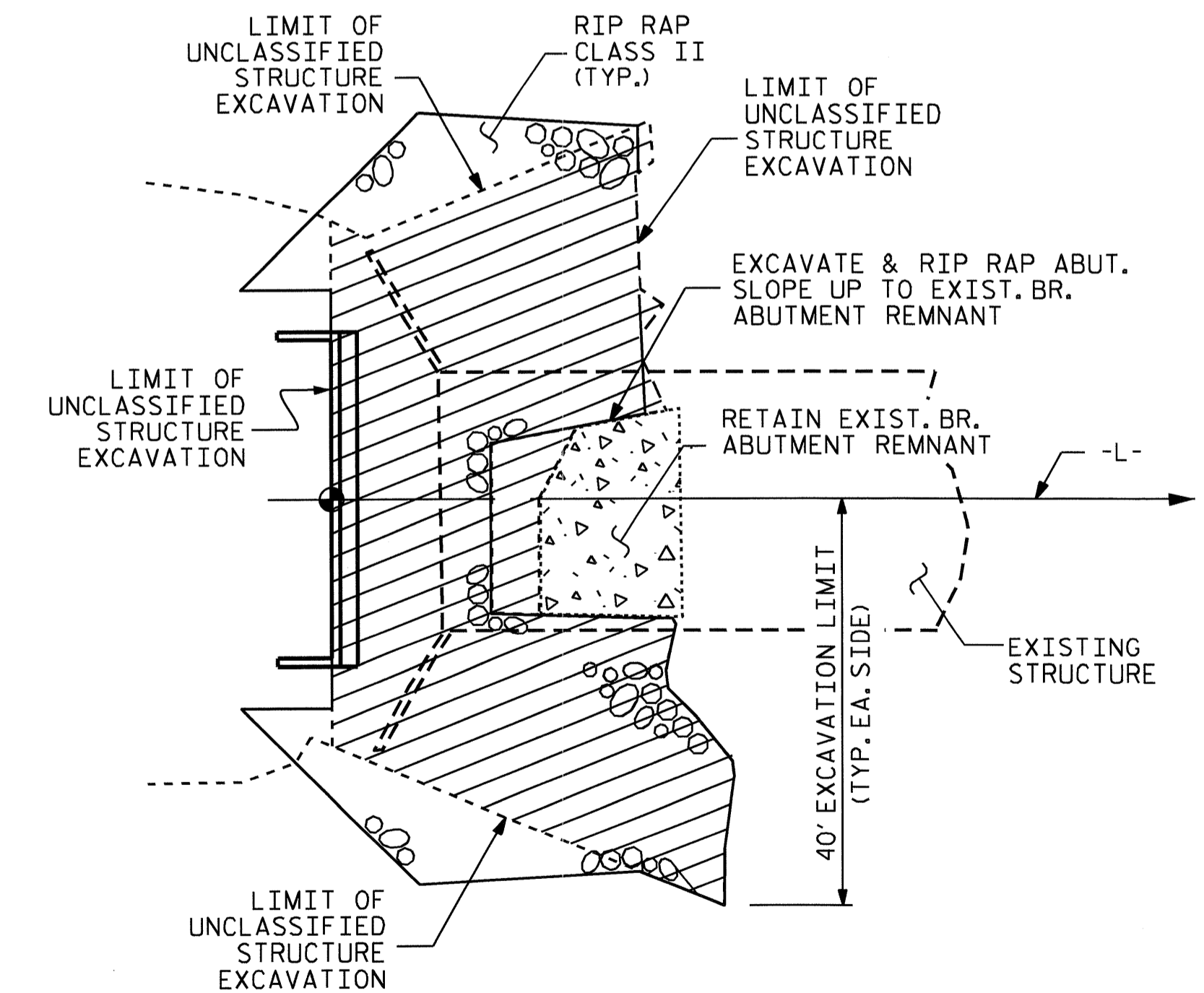
DRAWN BY : RAMAN PATEL DATE : 2/24/10  
 CHECKED BY : Z.H. BROWN DATE : 5-21-10

ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+08.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	280	400
END BENT 2	250	360

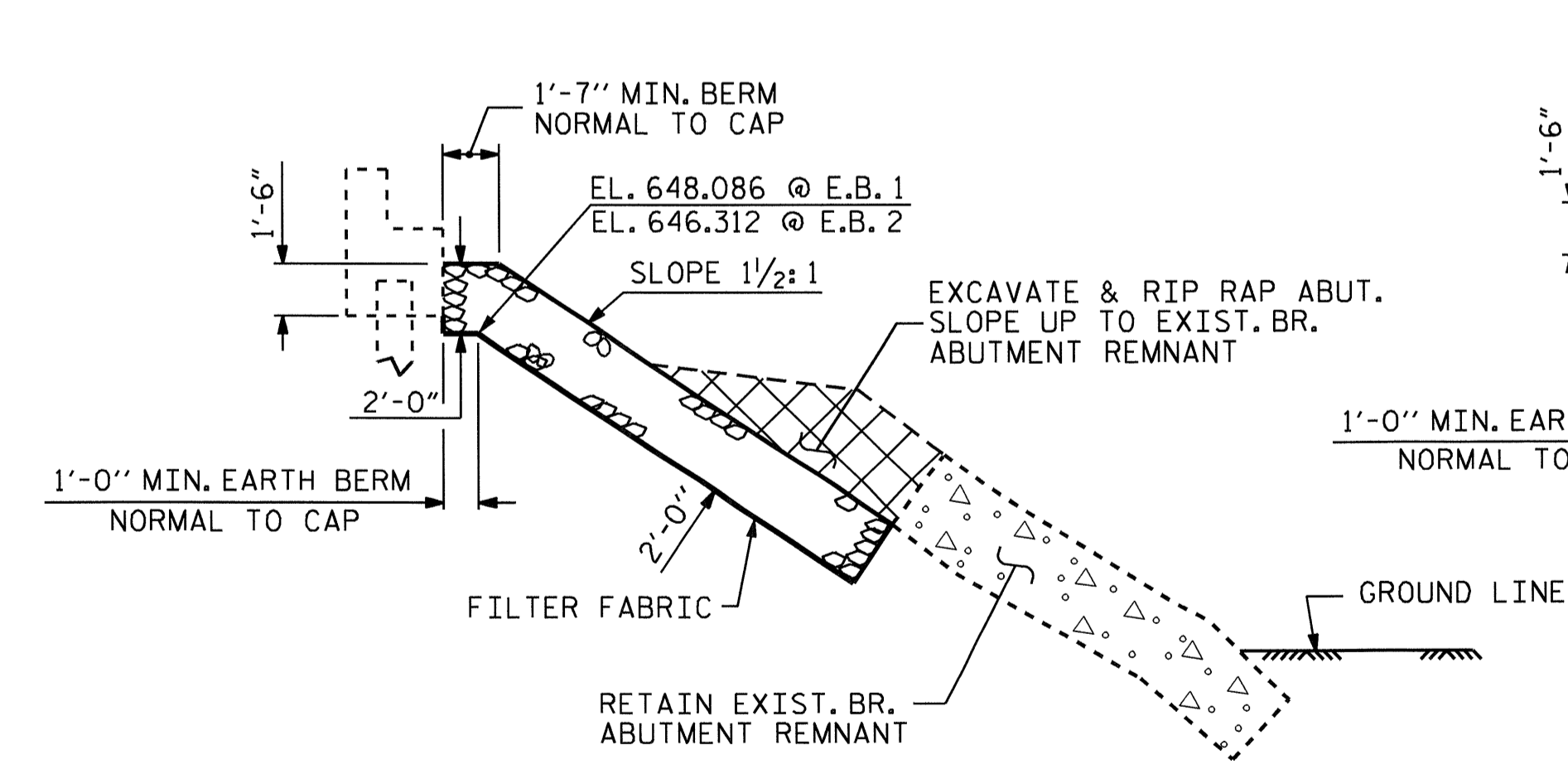


PLAN

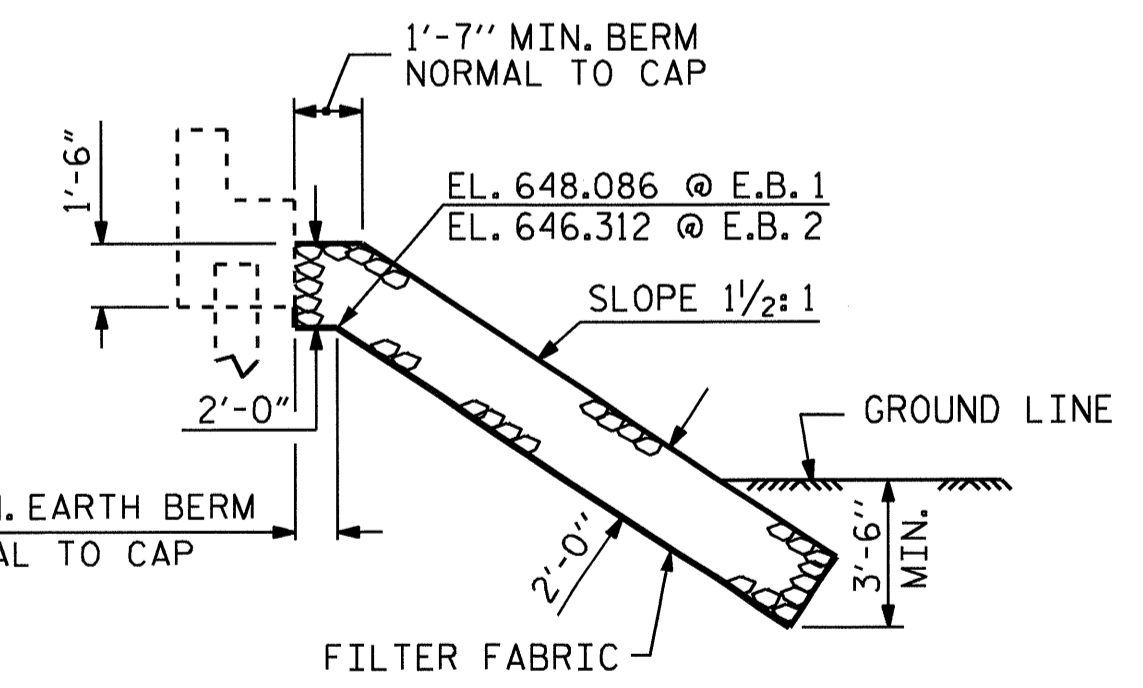
SECTION C-C



EXCAVATION DETAIL AT END BENT 1



SECTION A-A



SECTION B-B

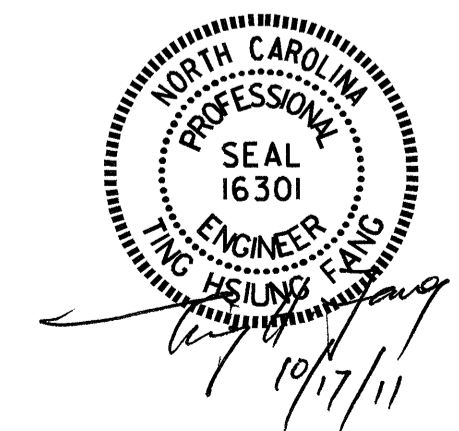
PROJECT NO. B-4498  
 DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 RIP RAP DETAILS

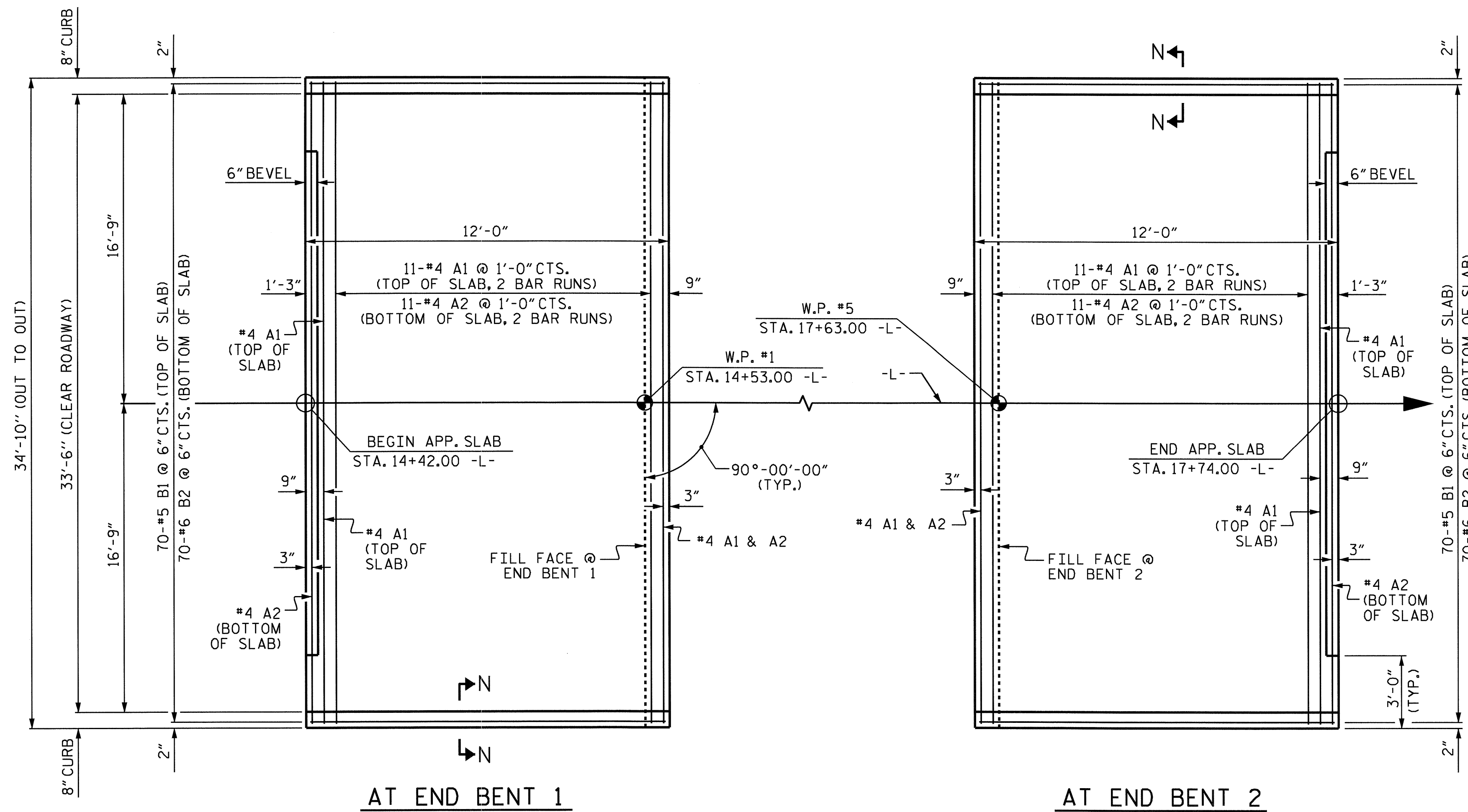
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	33
1			3			33
2			4			

SHEET NO. S-31



ASSEMBLED BY : Z. H. BROWN DATE : 8/13/09  
 CHECKED BY : HARISH SHAH DATE : 1/20/10  
 DRAWN BY : FCJ 2/88 REV. 8/16/99 RWW/LES  
 CHECKED BY : ARB 8/88 REV. 10/17/00 RWW/LES  
 REV. 5/1/06 TLA/GM

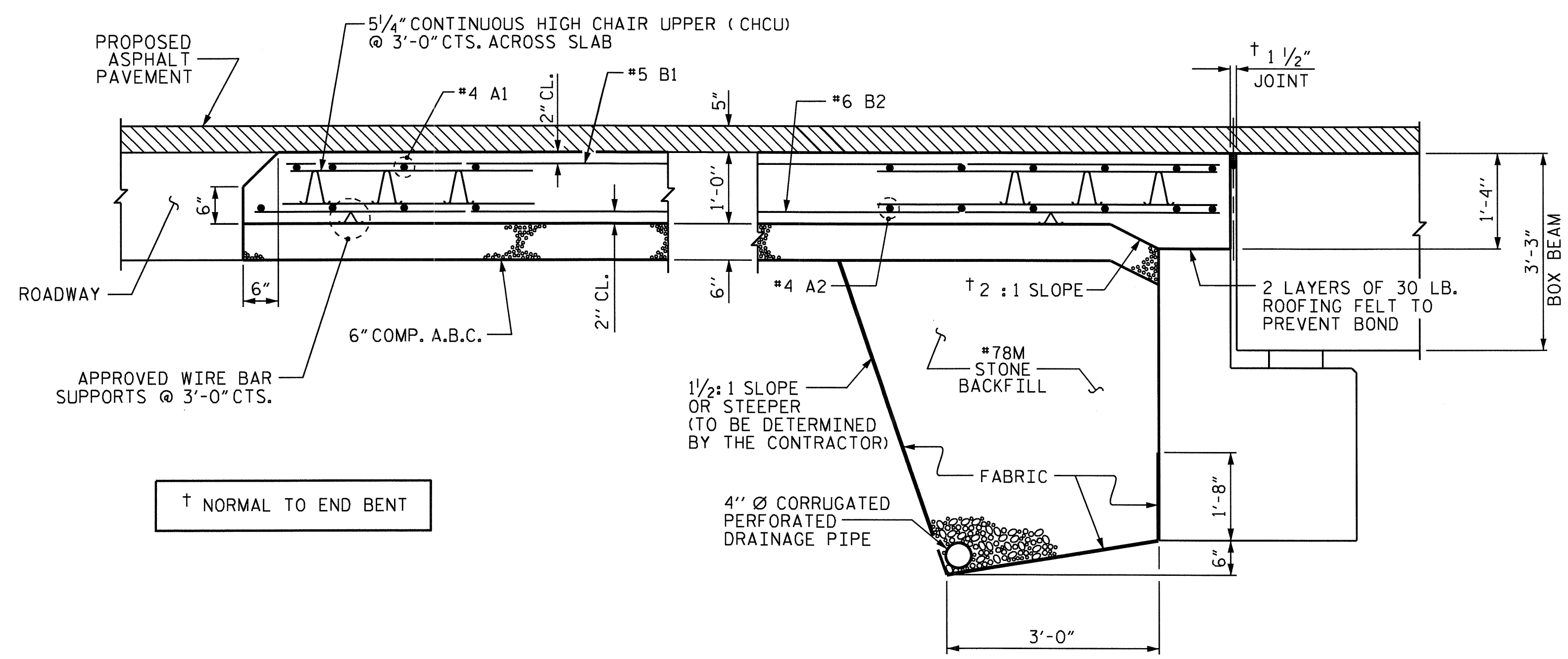




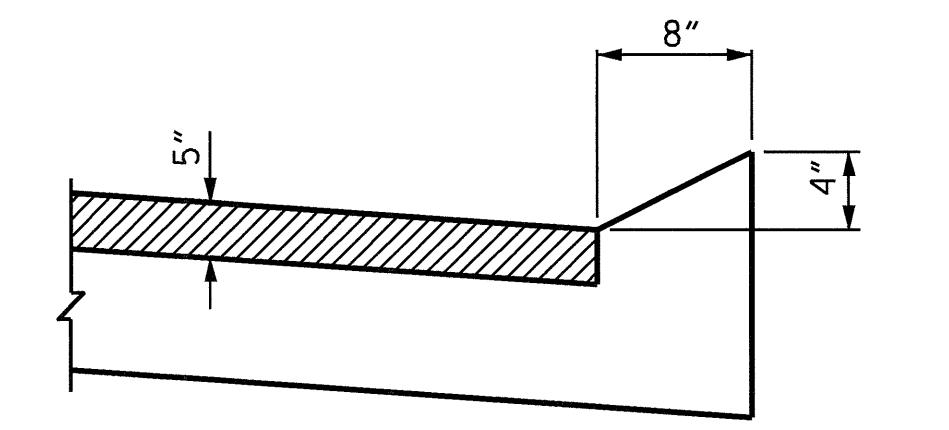
AT END BENT 1 AT END BENT 2

**PLAN**

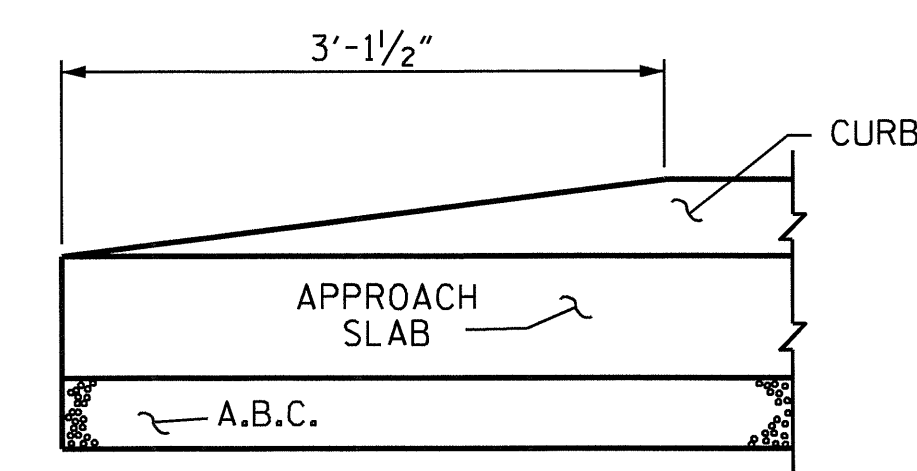
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



**SECTION THRU SLAB**



**SECTION N-N**



**END OF CURB WITHOUT SHOULDER BERM GUTTER**

**CURB DETAILS**

**NOTES**

FOR BRIDGE APPROACH FILL INCLUDING FABRIC, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

APPROACH SLABS SHALL NOT BE CONSTRUCTED UNTIL AFTER BOX BEAM UNITS ARE IN PLACE.

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

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE 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.

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25,0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

**BILL OF MATERIAL**  
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	26	#4	STR	18'-3"	317
A2	26	#4	STR	18'-2"	316
* B1	70	#5	STR	11'-2"	819
B2	70	#6	STR	12'-8"	1232
REINFORCING STEEL				LBS.	1548
* EPOXY COATED REINFORCING STEEL				LBS.	1136
CLASS AA CONCRETE				C. Y.	16.3

**SPLICE CHART**

#4 A1	2'-0"
#4 A2	1'-9"

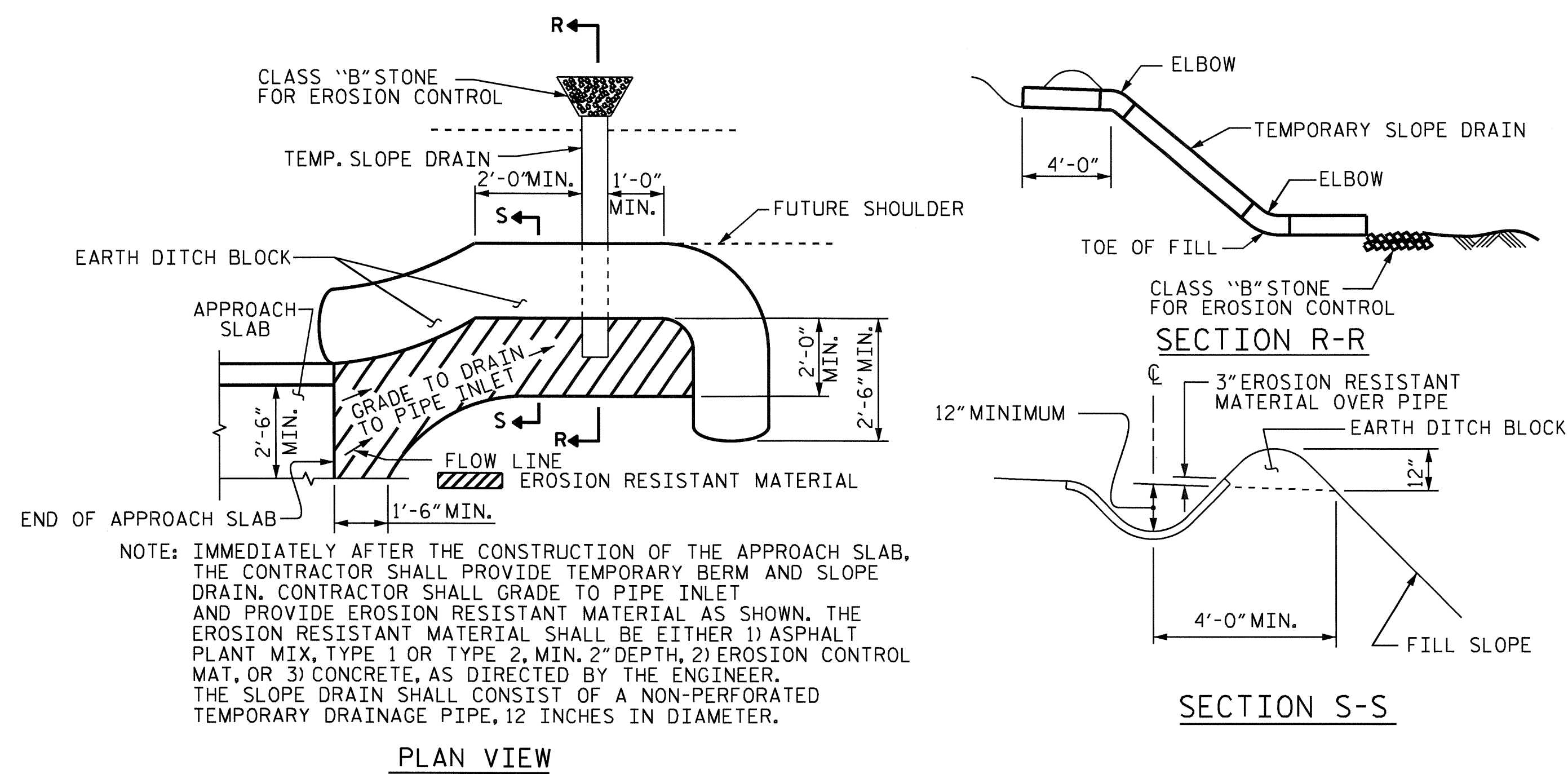
ASSEMBLED BY : Z. H. BROWN DATE : 8/12/09  
 CHECKED BY : HARISH SHAH DATE : 1/20/10  
 DRAWN BY : FCJ 6/87 REV. 7/10/01 LES/RDR  
 CHECKED BY : EGA 6/87 REV. 5/7/03R RWW/JTE  
 REV. 5/1/06R KMM/GM

PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 BOX BEAM

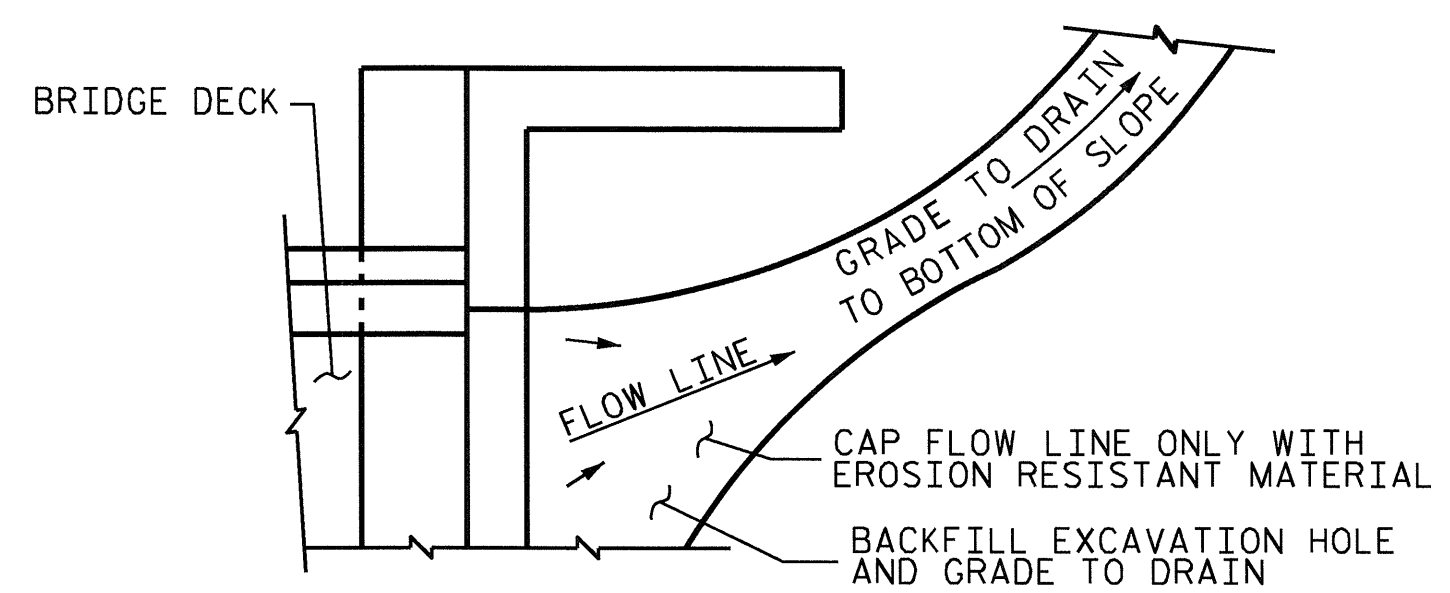
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			33



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.

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

**TEMPORARY DRAINAGE DETAIL**

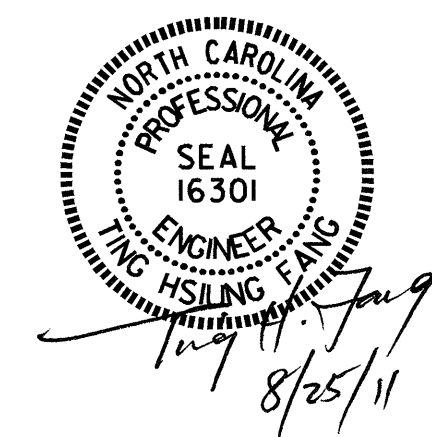
PROJECT NO. B-4498  
DAVIDSON COUNTY  
 STATION: 16+08.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 BRIDGE APPROACH  
 SLAB DETAILS

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



ASSEMBLED BY : Z. H. BROWN	DATE : 8/12/09
CHECKED BY : HARISH SHAH	DATE : 1/20/10
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R MAA/KMM

## 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 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER. DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS. WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0". EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED. WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES 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