

**CONTRACT: C202732 TIP NO: B-4542**

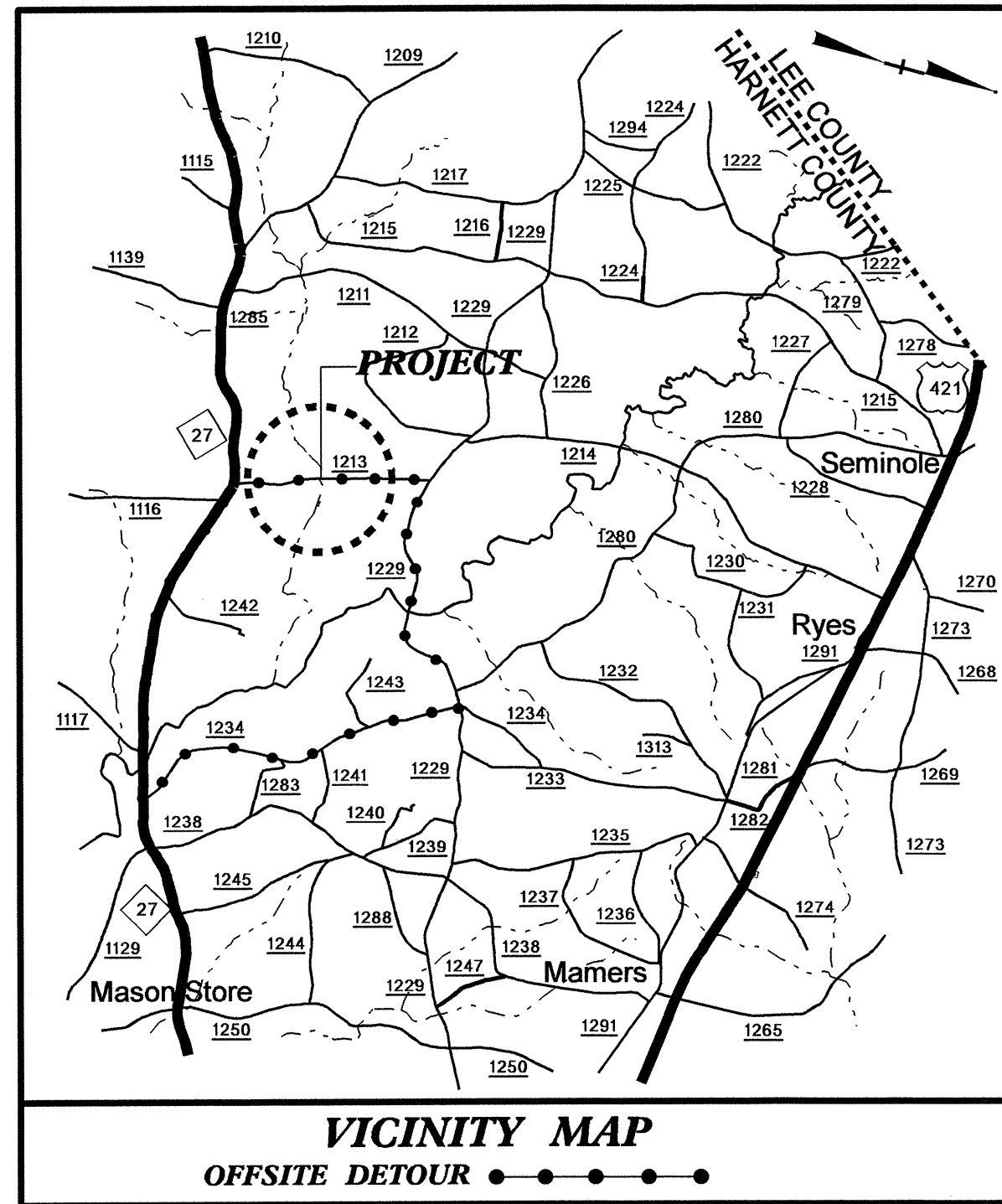
STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

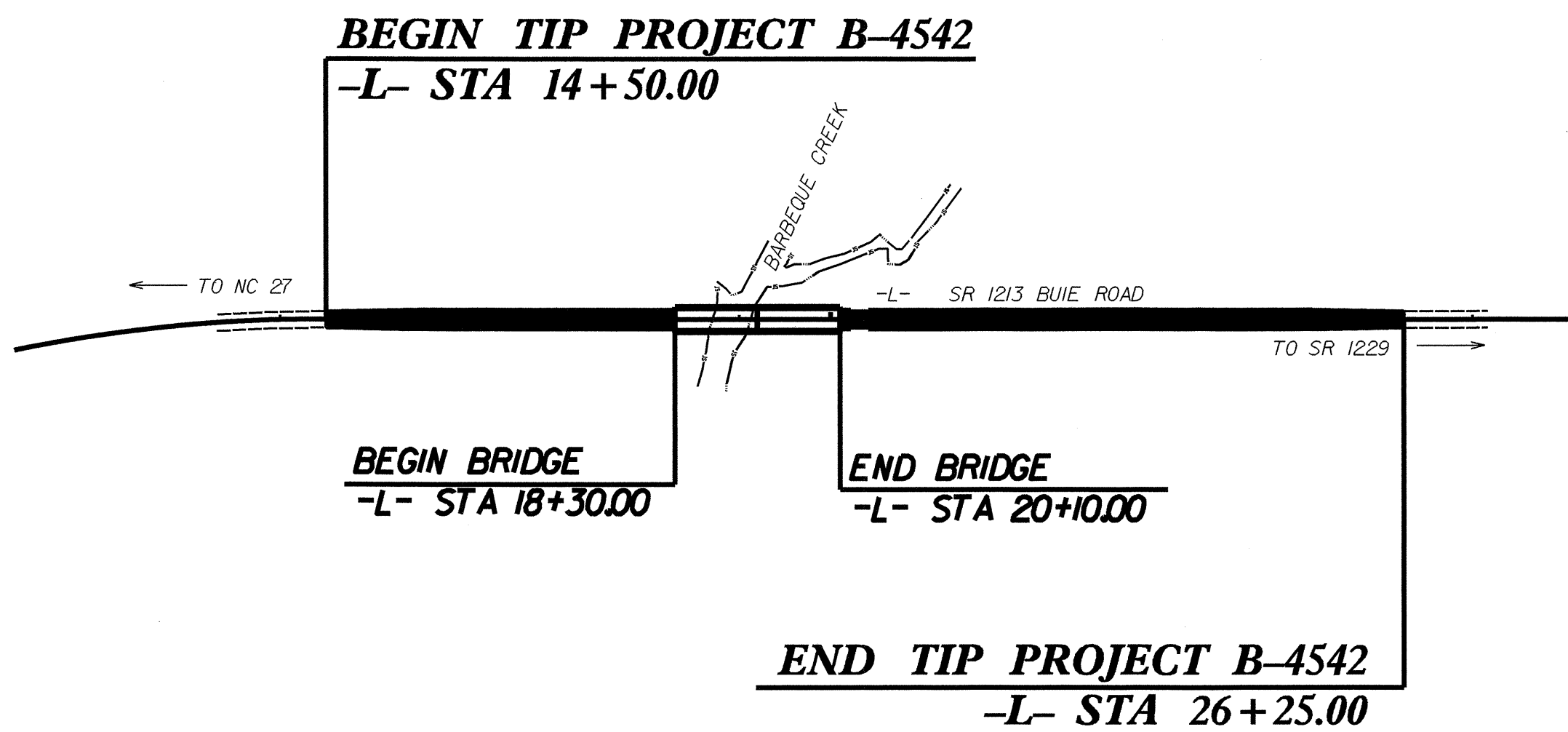
**HARNETT COUNTY**

**LOCATION: BRIDGE NO. 40 OVER BARBEQUE CREEK  
ON SR 1213 (BUIE ROAD)**

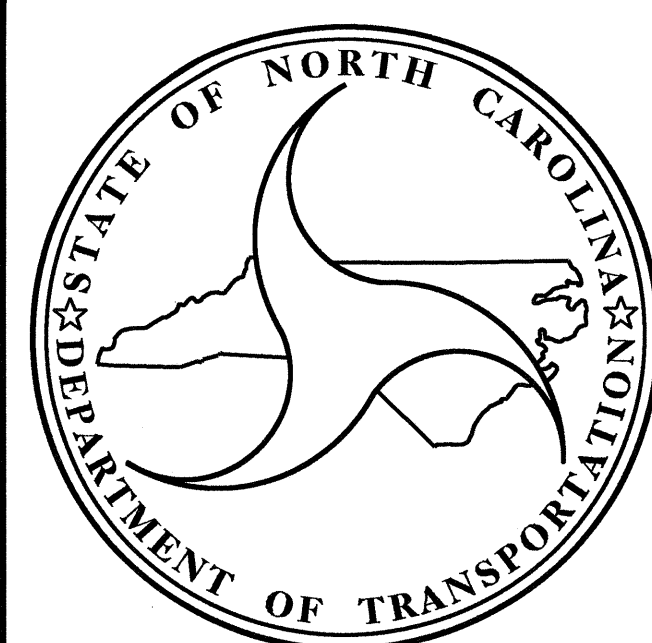
**TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4542		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33757.1.1	BRSTP-1213(7)	PE	
33757.2.1	BRSTP-1213(7)	RW	
33757.3.1	BRSTP-1213(7)	CONST.	



**STRUCTURE**



**DESIGN DATA**

ADT 2011	=	1037
ADT 2031	=	1630
DHV	=	10 %
D	=	60 %
T	=	3 % *
V	=	60 MPH
MINOR COLLECTOR		
* TTST	1% DUAL	2%
SUB-REGIONAL TIER		

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4542	=	0.189 MILES
LENGTH STRUCTURE TIP PROJECT B-4542	=	0.034 MILES
TOTAL LENGTH OF TIP PROJECT B-4542	=	0.223 MILES

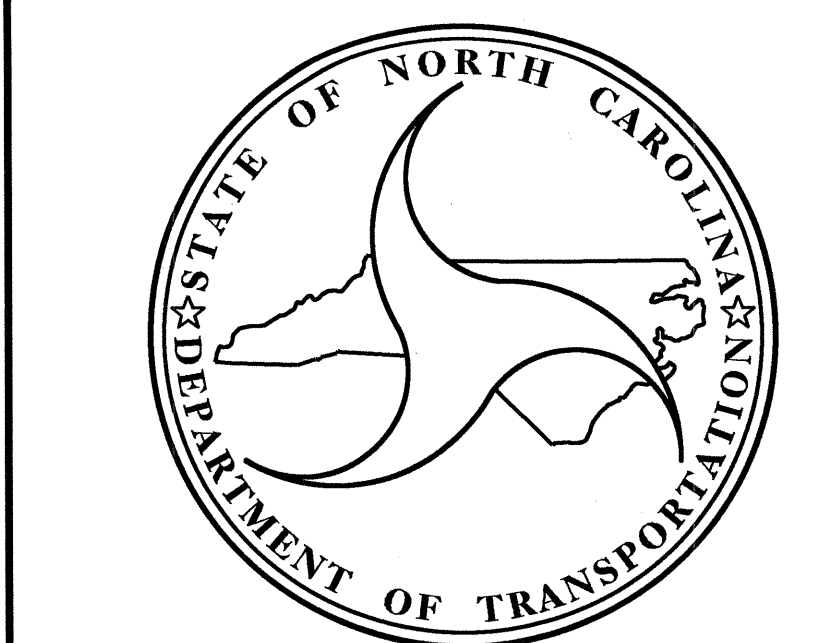
Prepared In the Office of:

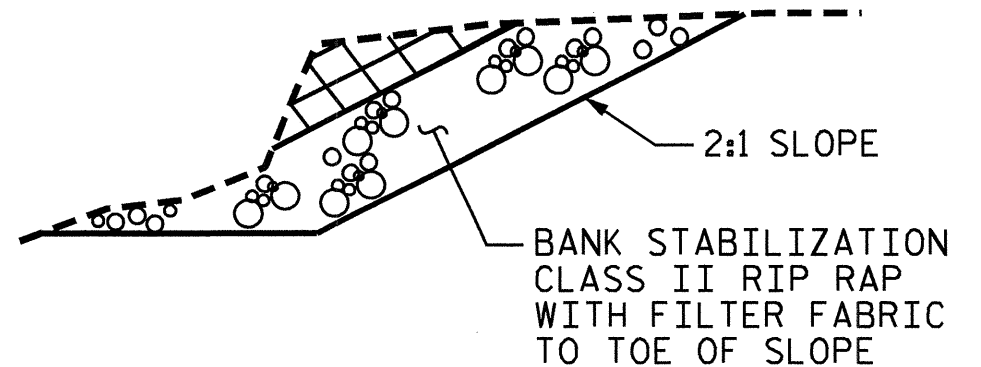
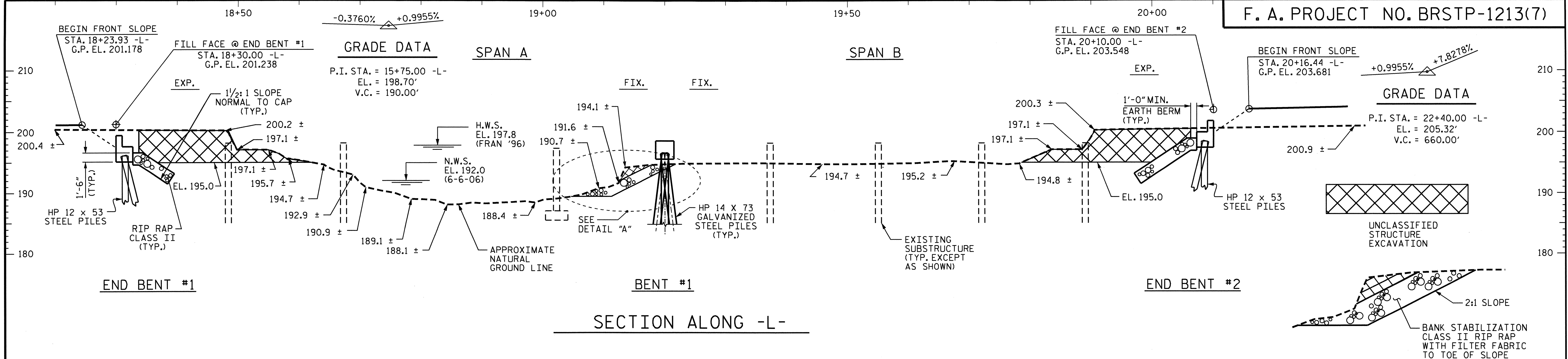
**DIVISION OF HIGHWAYS**

2006 STANDARD SPECIFICATIONS

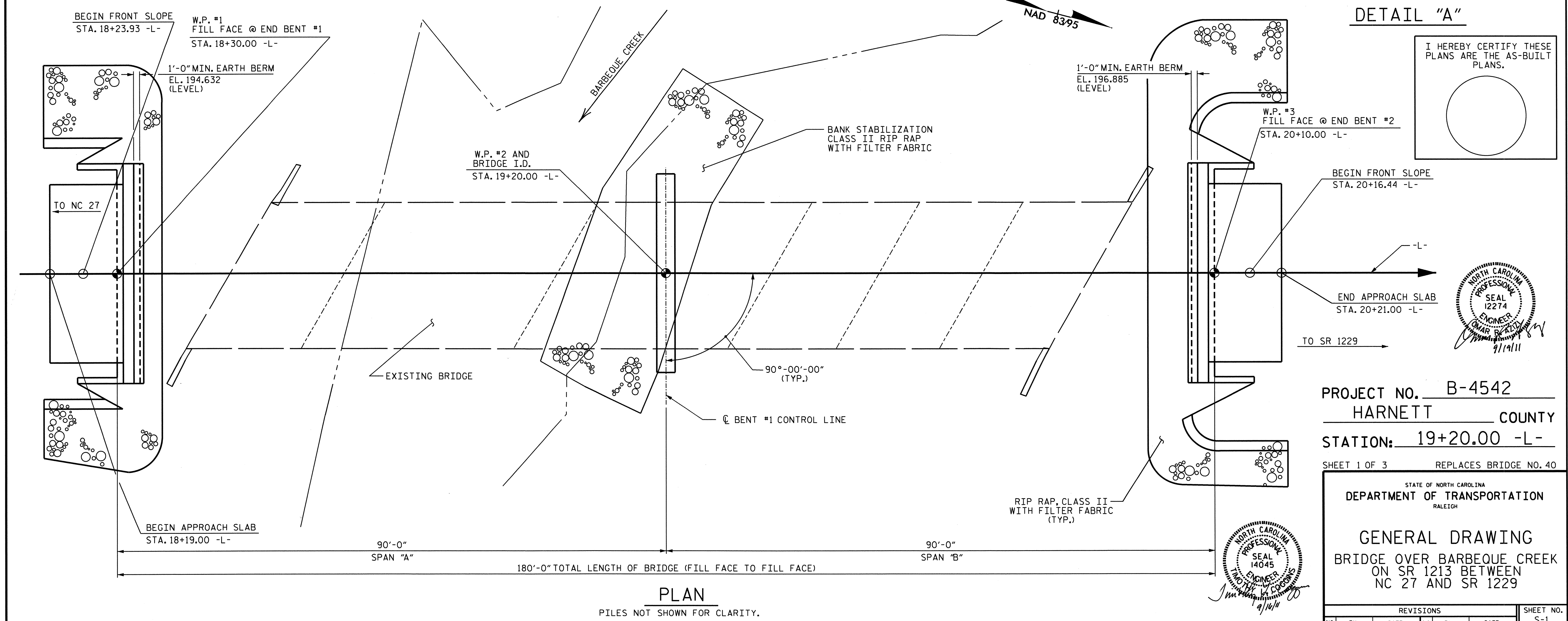
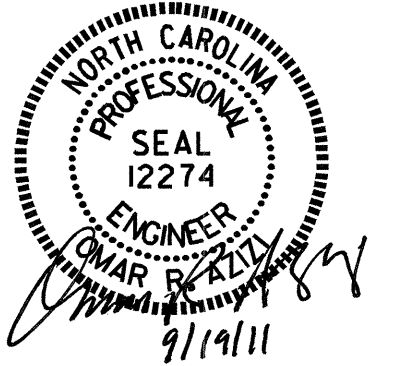
LETTING DATE :	OMAR R. AZIZI, PE PROJECT ENGINEER
MARCH 20, 2012	TIMOTHY L. COGGINS, PE PROJECT DESIGN ENGINEER

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





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



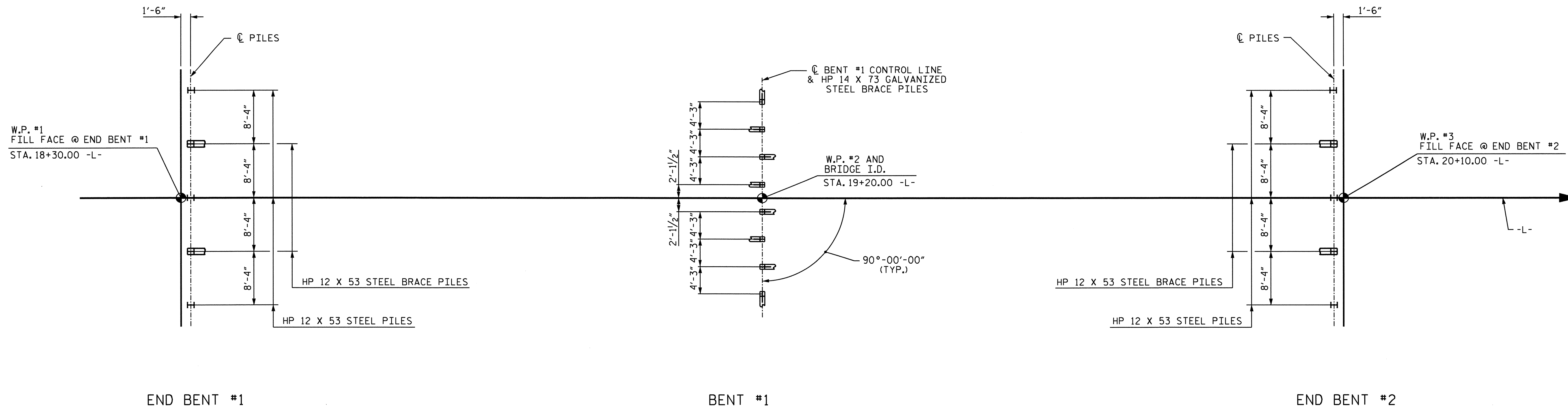
PROJECT NO. B-4542  
 HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 40  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 BRIDGE OVER BARBEQUE CREEK  
 ON SR 1213 BETWEEN  
 NC 27 AND SR 1229

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

DRAWN BY : PEGGY PARISI DATE : 5-7-09  
 CHECKED BY : JASON B. WILSON DATE : 3-8-11

15-JUL-2011 11:09  
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 tcoggins



### FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.  
 END BENT PILES ARE BATTERED AT 3:12  
 BENT BRACE PILES ARE BATTERED AT 1/2:12

### FOUNDATION NOTES:

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

PILES AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 165 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 285 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

STEEL H PILE POINTS ARE REQUIRED FOR STEEL H PILES AT BOTH END BENTS AND BENT NO.1. FOR STEEL PILE POINTS, SEE PILES PROVISION.

SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS ELEVATION 179 FT. SCOUR CRITICAL ELEVATION IS USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30-50 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO.1 AND END BENT NO.2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40-70 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT NO.1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

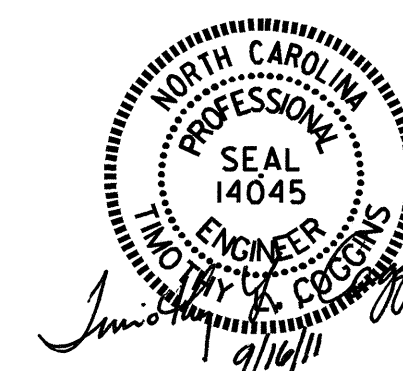
PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### GENERAL DRAWING

BRIDGE OVER BARBEQUE CREEK  
 ON SR 1213 BETWEEN  
 NC 27 AND SR 1229



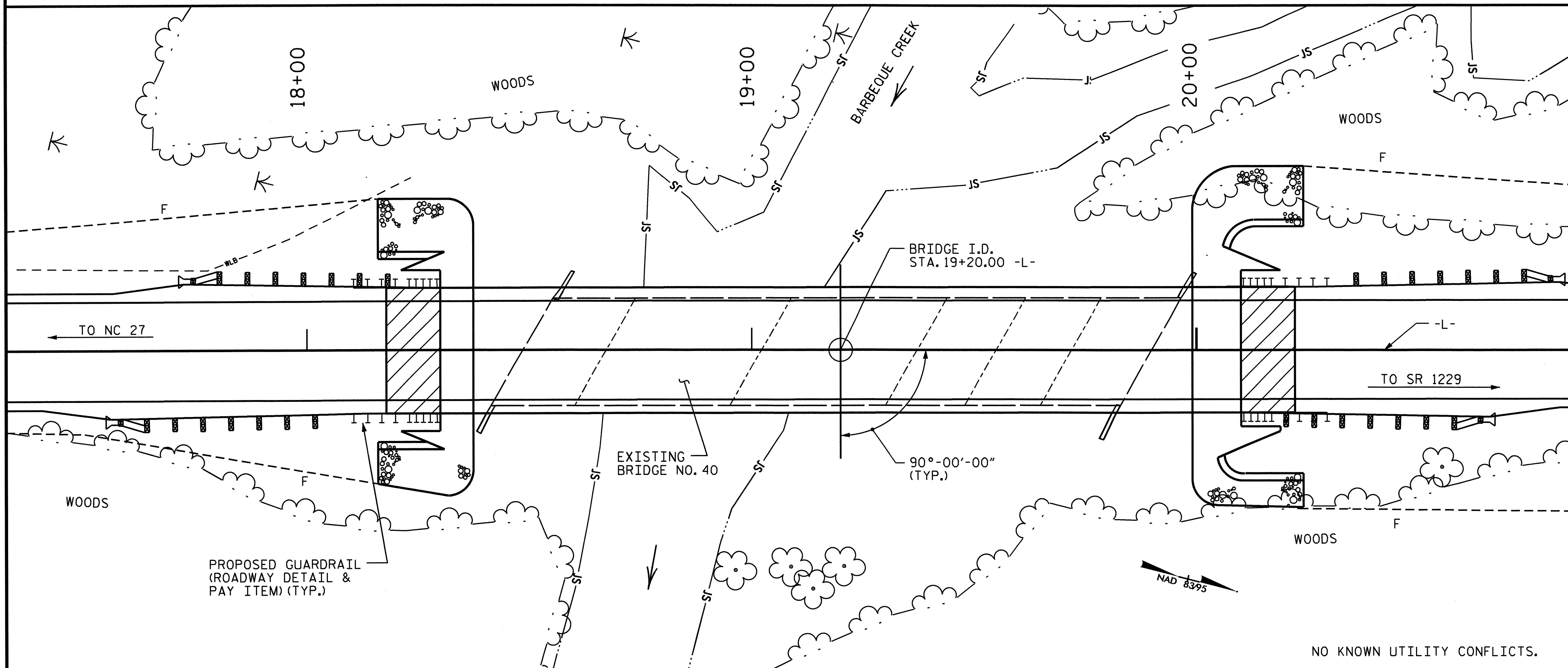
DRAWN BY : PEGGY PARISI DATE : 11-22-10  
 CHECKED BY : JASON B. WILSON DATE : 3-8-11

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



BM#2: RR SPIKE IN BASE OF 15" OAK, ELEV. 197.10', STA 17+74.62 -L-, 33.00' RT.



LOCATION SKETCH

**NOTES:**

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 18'-11", 1 SPAN @ 34'-11", 1 SPAN @ 35'-1", 1 SPAN @ 17'-8", 1 SPAN @ 17'-0" AND 1 SPAN @ 18'-3" FOR A TOTAL LENGTH OF 141'-10"; CLEAR ROADWAY WIDTH OF 24'-0" ON REINFORCED CONCRETE FLOOR ON TIMBER JOISTS AND I-BEAMS ON REINFORCED CONCRETE CAP WITH TIMBER PILES EXCEPT BT#2 OF REINFORCED CONCRETE POST & BEAM AND LOCATED AT PROPOSED STRUCTURE 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 THE STANDARD SPECIFICATIONS.  
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 39' RIGHT AND 35' LEFT OF CENTERLINE @ END BENT #1, 29' RIGHT AND 25' LEFT OF CENTERLINE @ END BENT #2 AND 27' RIGHT AND 24' LEFT OF CENTERLINE @ BENT #1 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.  
 THE 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.  
 ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.  
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, 'EVALUATING SCOUR AT BRIDGES', MAY, 2001.  
 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 SPICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.  
 INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR 'REMOVAL OF EXISTING STRUCTURE AT STATION 19+20.00 -L-.'  
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.  
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.  
 FOR VERTICAL CONCRETE BARRIER RAIL, SEE SPECIAL PROVISIONS.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.  
 THE CONTRACTOR SHALL USE A FLOATING TURBIDITY CURTAIN AND ATTEMPT TO REMOVE THE EXISTING FOOTINGS INTACT WITHOUT DE-WATERING. IF THE REMOVAL OF THE EXISTING FOOTINGS CANNOT BE COMPLETED WITH THIS METHOD, THE CONTRACTOR MUST THEN SUBMIT FOR APPROVAL ALTERNATE METHODS OF REMOVAL IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS. FOR FLOATING TURBIDITY CURTAIN PAY ITEM AND SPECIAL PROVISION, SEE PROJECT SPECIAL PROVISIONS IN THE CONTRACT.  
 FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.  
 FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

**TOTAL BILL OF MATERIAL**

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		HP 14 X 73 GALVANIZED STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS		
						NO.	LIN.FT.	NO.	LIN.FT.							EA.	EA.	LIN.FT.
	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.													
SUPERSTRUCTURE				LUMP SUM												LUMP SUM		
END BENT NO. 1		LUMP SUM	16.0		2723	5	200			5	3		84	93				
BENT NO. 1		LUMP SUM	10.8		1849			8	240	8	4		103	114				
END BENT NO. 2		LUMP SUM	16.1		2723	5	150			5			113	126				
TOTAL	LUMP SUM	LUMP SUM	42.9	LUMP SUM	7295	10	350	8	240	18	7	355.25	300	333	LUMP SUM	20	1776.25	

**HYDRAULIC DATA**

DESIGN DISCHARGE = 2,700 CFS  
 FREQUENCY OF DESIGN FLOOD = 25 YR.  
 DESIGN HIGH WATER ELEVATION = 199.5'  
 DRAINAGE AREA = 45.5 SQ. MI.  
 BASE DISCHARGE (Q100) = 4,144 CFS \*\*  
 BASE HIGH WATER ELEVATION = 200.7'

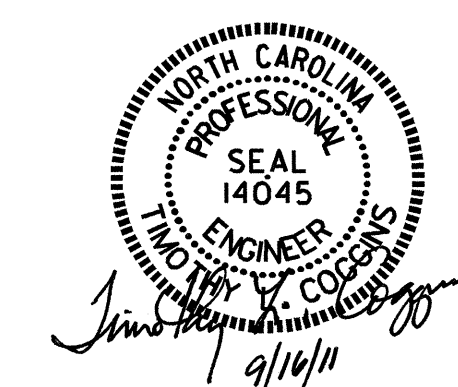
**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE = 4,000 CFS  
 FREQUENCY OF OVERTOPPING FLOOD = 100 YR. (-)  
 OVERTOPPING FLOOD ELEVATION = 198.96' \*

\* OVERTOPPING OCCURS @ SAG -L- STA. 15+32.09;  
 OVERTOPPING ELEV. REPRESENTS CROWN OF ROADWAY.  
 \*\* Q AT HEC-RAS RS 15264.5, LOCATED 24' UPSTREAM OF PROP. BRIDGE FACE.

DRAWN BY: PEGGY PARISI DATE: 5-7-09  
 CHECKED BY: JASON B. WILSON DATE: 3-8-11

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PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 3

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



# 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(Inv)	N/A	1	1.037	--	1.75	0.273	1.21	A	EL	43.656	0.494	1.10	A	EL	4.366	0.80	0.273	1.04	A	EL	43.656	1	
	HL-93(Opr)	N/A	--	1.426	--	1.35	0.273	1.57	A	EL	43.656	0.494	1.43	A	EL	4.366	N/A	--	--	--	--	--	1	
	HS-20(Inv)	36.000	2	1.405	50.585	1.75	0.273	1.65	A	EL	43.656	0.494	1.44	A	EL	4.366	0.80	0.273	1.41	A	EL	43.656	1	
	HS-20(Opr)	36.000	--	1.871	67.367	1.35	0.273	2.13	A	EL	43.656	0.494	1.87	A	EL	4.366	N/A	--	--	--	--	--	1	
LEGAL LOAD RATING	(SINGLE VEHICLE) SV	SNSH	13.500	--	3.274	44.197	1.4	0.273	4.79	A	EL	43.656	0.494	4.41	A	EL	4.366	0.80	0.273	3.27	A	EL	43.656	1
		SNGARBS2	20.000	--	2.396	47.910	1.4	0.273	3.51	A	EL	43.656	0.494	3.10	A	EL	4.366	0.80	0.273	2.40	A	EL	43.656	1
		SNAGRIS2	22.000	--	2.251	49.511	1.4	0.273	3.29	A	EL	43.656	0.494	2.86	A	EL	4.366	0.80	0.273	2.25	A	EL	43.656	1
		SNCOTTS3	27.250	--	1.628	44.360	1.4	0.273	2.38	A	EL	43.656	0.494	2.20	A	EL	4.366	0.80	0.273	1.63	A	EL	43.656	1
		SNAGGRS4	34.925	--	1.343	46.918	1.4	0.273	1.97	A	EL	43.656	0.494	1.80	A	EL	4.366	0.80	0.273	1.34	A	EL	43.656	1
		SNS5A	35.550	--	1.315	46.742	1.4	0.273	1.92	A	EL	43.656	0.494	1.81	A	EL	4.366	0.80	0.273	1.31	A	EL	43.656	1
		SNS6A	39.950	--	1.199	47.915	1.4	0.273	1.76	A	EL	43.656	0.494	1.64	A	EL	4.366	0.80	0.273	1.20	A	EL	43.656	1
	SNS7B	42.000	--	1.142	47.960	1.4	0.273	1.67	A	EL	43.656	0.494	1.60	A	EL	4.366	0.80	0.273	1.14	A	EL	43.656	1	
	(TRUCK TRACTOR SEMI-TRAILER) TTST	TNAGRIT3	33.000	--	1.461	48.197	1.4	0.273	2.14	A	EL	43.656	0.494	1.96	A	EL	4.366	0.80	0.273	1.46	A	EL	43.656	1
		TNT4A	33.075	--	1.465	48.456	1.4	0.273	2.14	A	EL	43.656	0.494	1.92	A	EL	4.366	0.80	0.273	1.47	A	EL	43.656	1
		TNT6A	41.600	--	1.191	49.557	1.4	0.273	1.74	A	EL	43.656	0.494	1.68	A	EL	4.366	0.80	0.273	1.19	A	EL	43.656	1
		TNT7A	42.000	--	1.194	50.137	1.4	0.273	1.75	A	EL	43.656	0.494	1.65	A	EL	4.366	0.80	0.273	1.19	A	EL	43.656	1
		TNT7B	42.000	--	1.226	51.509	1.4	0.273	1.80	A	EL	43.656	0.494	1.57	A	EL	4.366	0.80	0.273	1.23	A	EL	43.656	1
		TNAGRIT4	43.000	--	1.173	50.439	1.4	0.273	1.72	A	EL	43.656	0.494	1.52	A	EL	4.366	0.80	0.273	1.17	A	EL	43.656	1
TNAGT5A		45.000	--	1.109	49.905	1.4	0.273	1.62	A	EL	43.656	0.494	1.50	A	EL	4.366	0.80	0.273	1.11	A	EL	43.656	1	
TNAGT5B	45.000	3	1.098	49.422	1.4	0.273	1.61	A	EL	43.656	0.494	1.45	A	EL	4.366	0.80	0.273	1.10	A	EL	43.656	1		

### 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. SPANS A & B ARE IDENTICAL.
- 2.
- 3.
- 4.

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

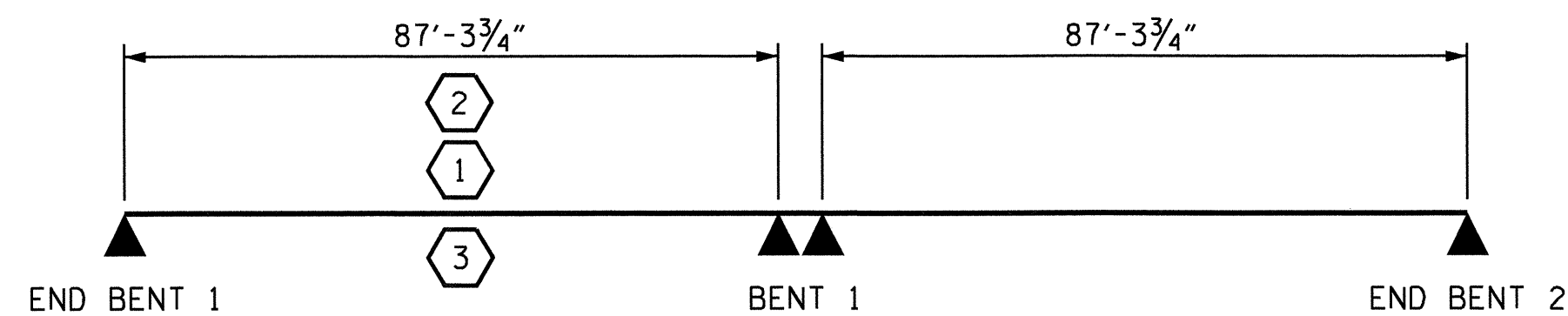
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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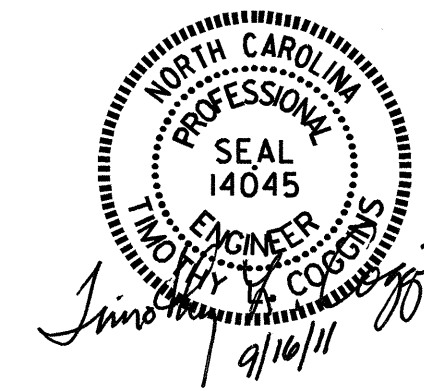
GIRDER LOCATION

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



## LRFR SUMMARY

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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

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

ASSEMBLED BY : A. M. LEE, PE      DATE : 7-23-2010  
 CHECKED BY : PEGGY PARISI      DATE : 4-5-2011  
 DRAWN BY : MAA 1/08      REV. 11/12/08R      MAA/GM  
 CHECKED BY : GM/DI 2/08

**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 GROUT. THE 2 1/2" Ø DOWEL HOLES AT EXPANSION ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH JOINT SEALER MATERIAL TO 1 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 6000 PSI.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS 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 OUTSIDE FACE OF EXTERIOR UNITS.

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

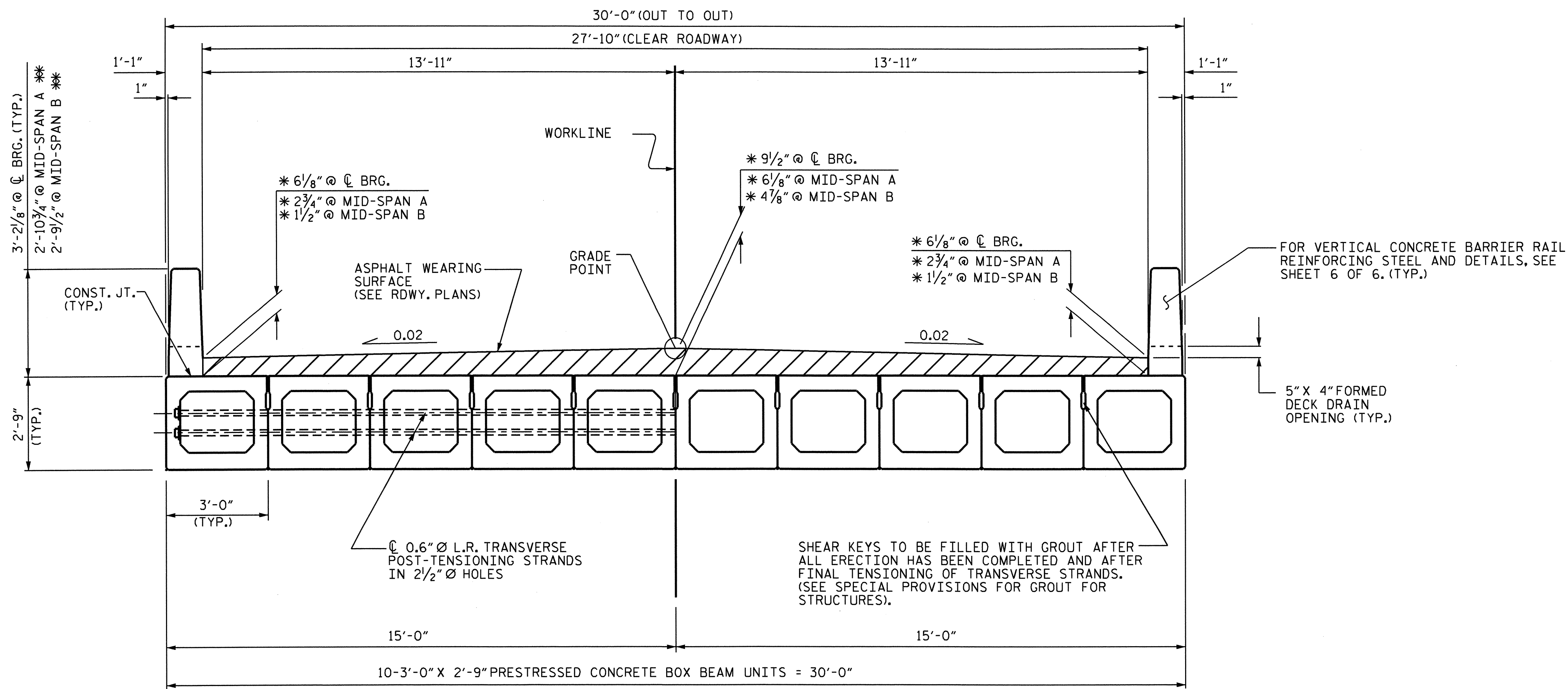
THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

\* THE MINIMUM HEIGHT OF THE RAIL FOR EACH SPAN IS SHOWN. THE HEIGHT OF THE RAIL VARIES WHILE THE TOP OF THE RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

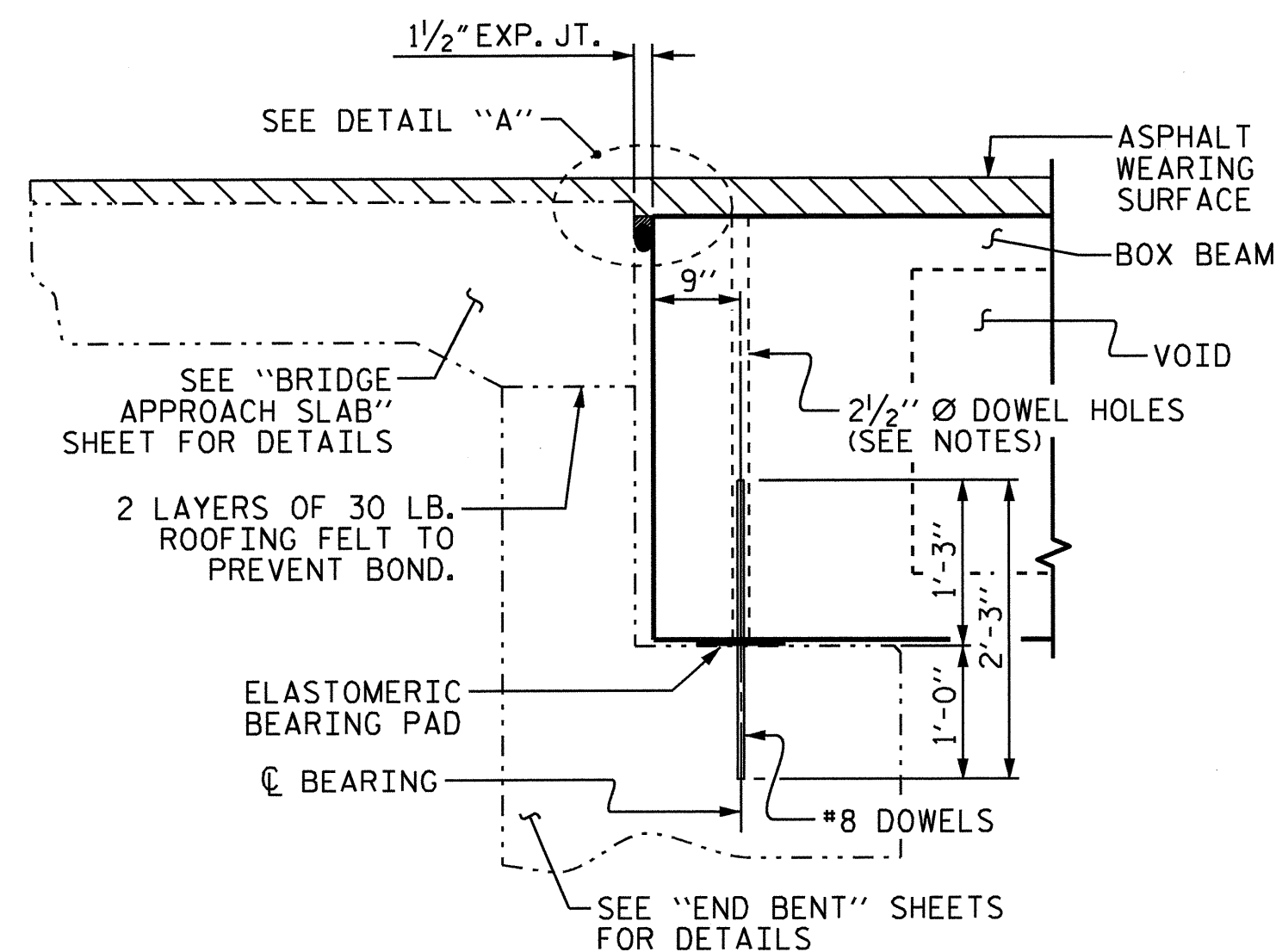
FOR VERTICAL CONCRETE BARRIER RAIL, SEE SPECIAL PROVISIONS.



**TYPICAL SECTION**

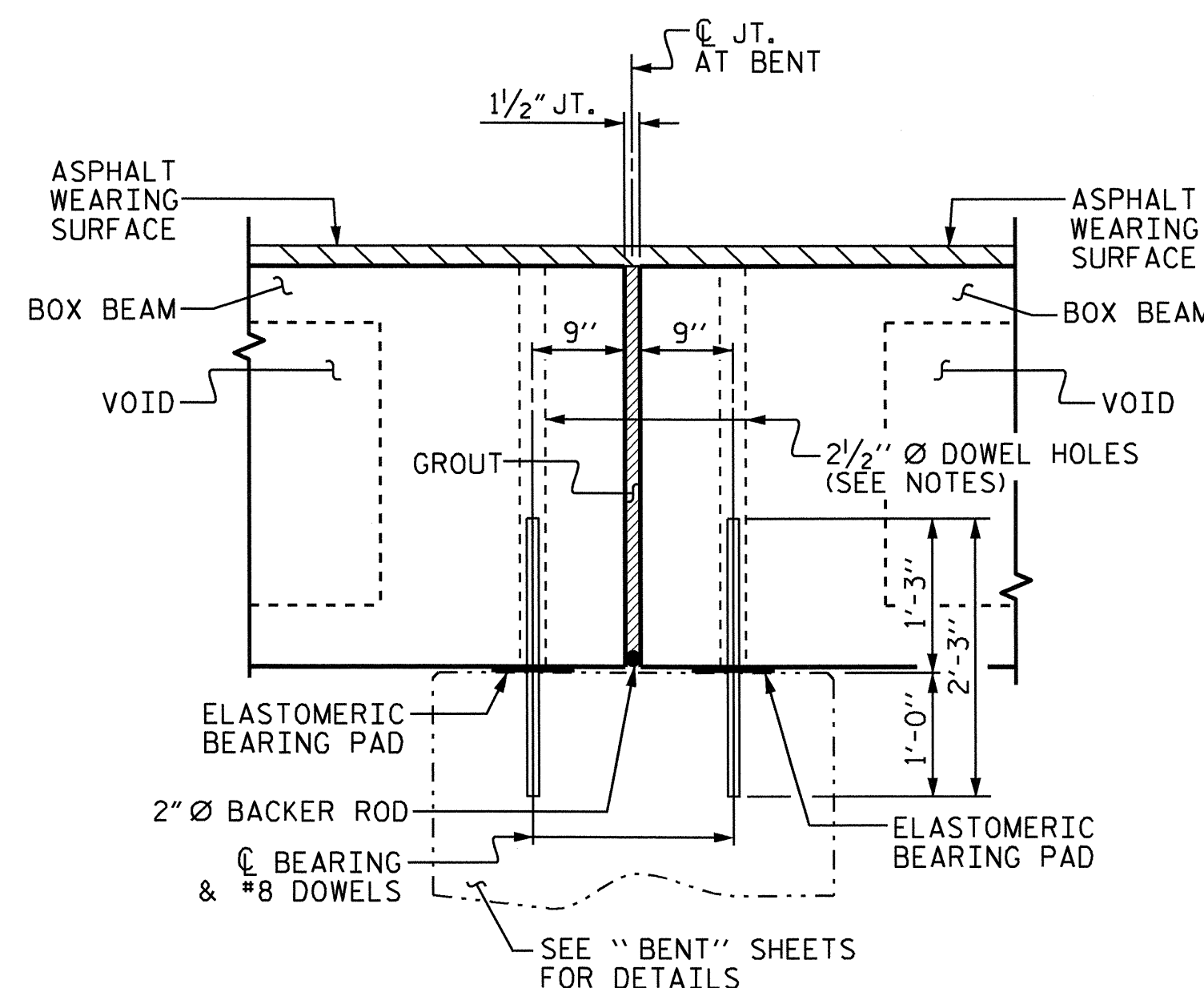
\* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

**EXPANSION END**

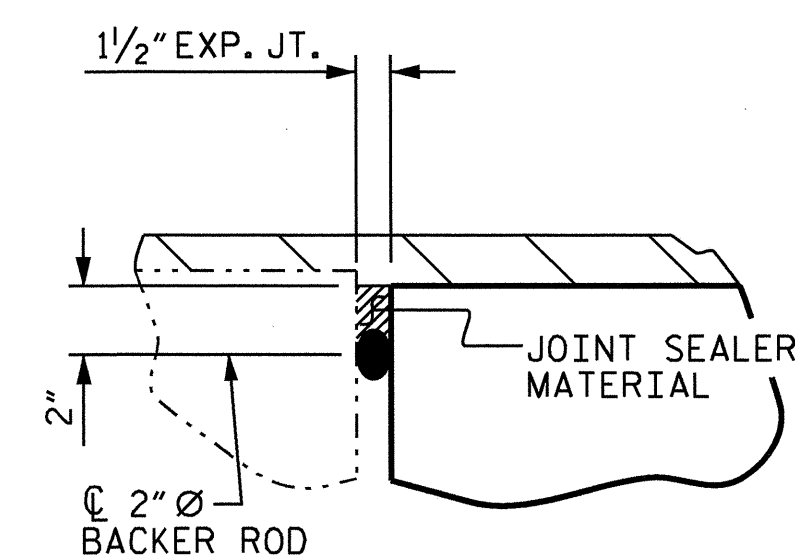


**SECTION AT END BENT**

**FIXED END FIXED END**



**SECTION AT BENT**

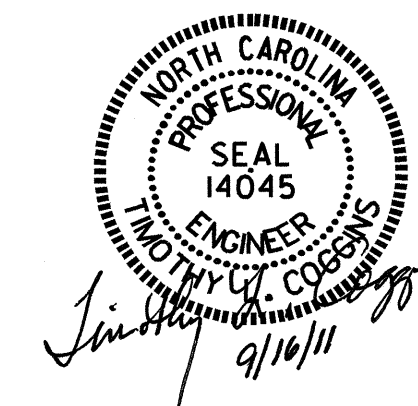


**DETAIL "A"**

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

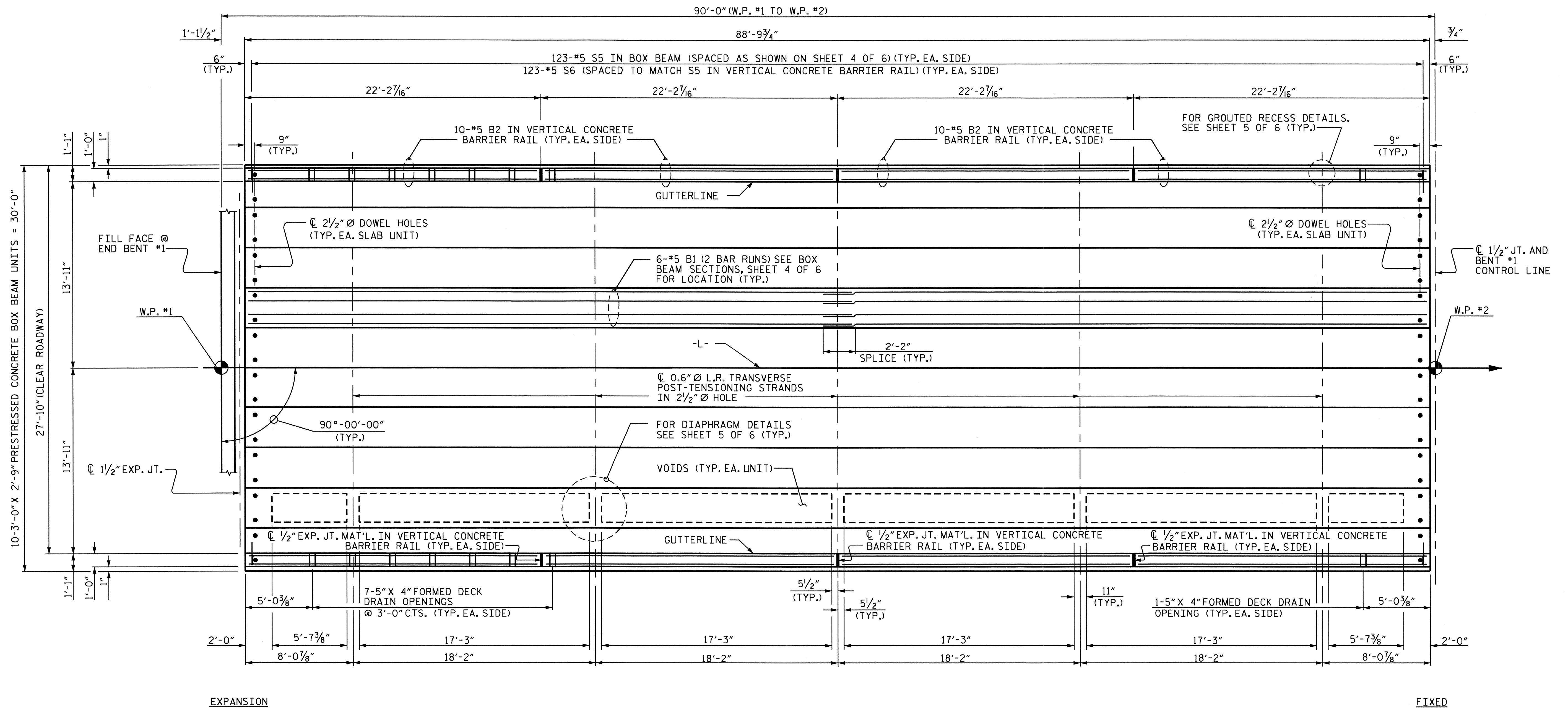
SHEET 1 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
STANDARD						S-5
3'-0" X 2'-9"						TOTAL SHEETS
PRESTRESSED CONCRETE BOX BEAM UNIT						22
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



ASSEMBLED BY : M.D.PISO DATE : 09-13-10  
 CHECKED BY : B.N.BARODAWALA DATE : 10-05-10  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05



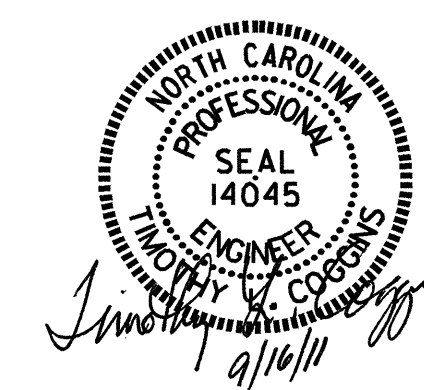


**PLAN OF BOX BEAM UNIT - SPAN "A"**

(SEE SHEETS 4 & 5 OF 6 FOR REINFORCING STEEL IN CONCRETE BOX BEAM UNITS FOR SPAN A)

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

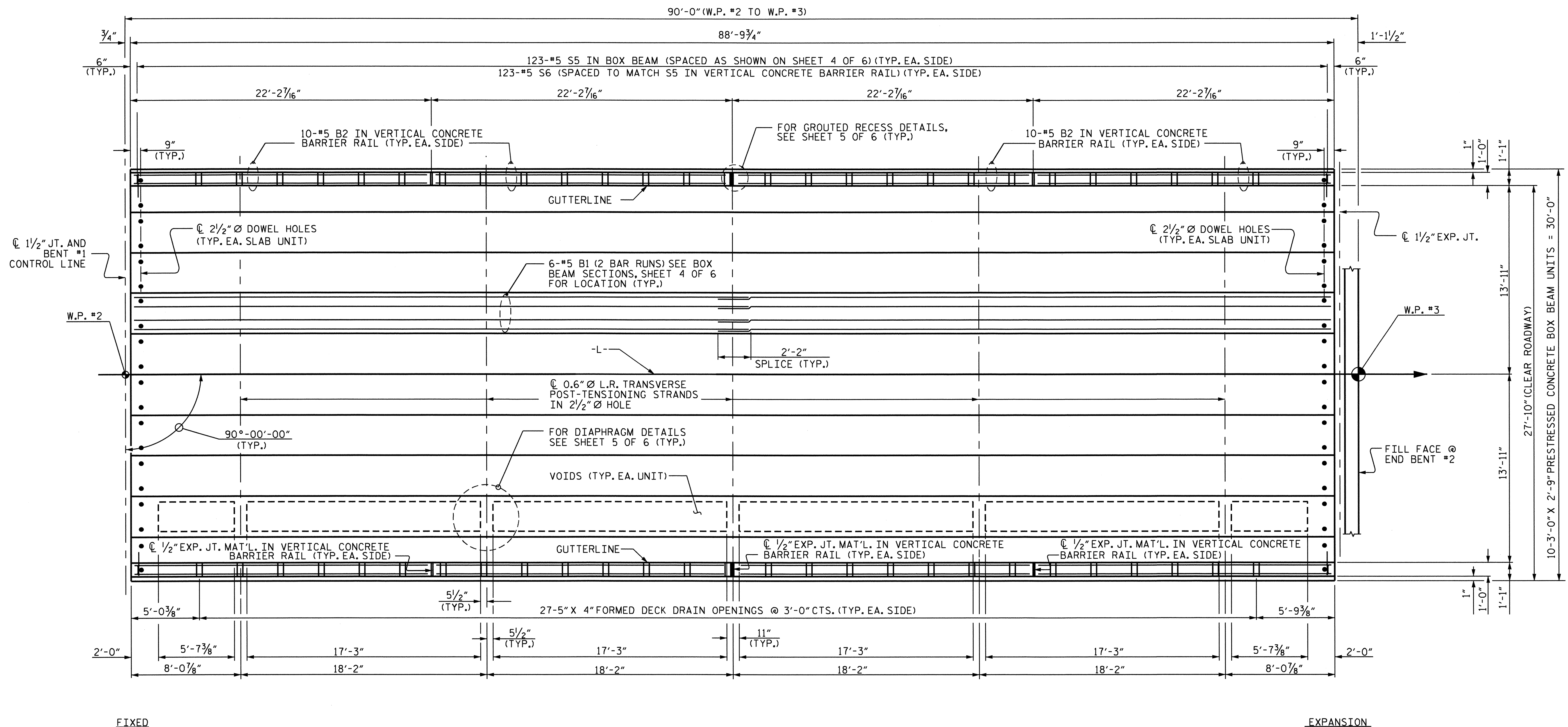
SHEET 2 OF 6



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN A  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : M.D.PISO DATE : 09-13-10  
 CHECKED BY : B.N.BARODAWALA DATE : 10-06-10



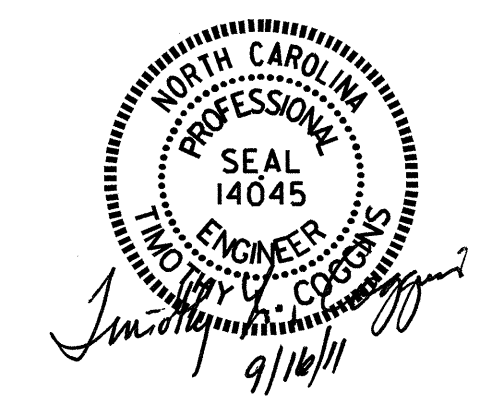
**PLAN OF BOX BEAM UNIT - SPAN "B"**  
 (SEE SHEETS 4 & 5 OF 6 FOR REINFORCING STEEL IN CONCRETE BOX BEAM UNITS FOR SPAN B)

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE

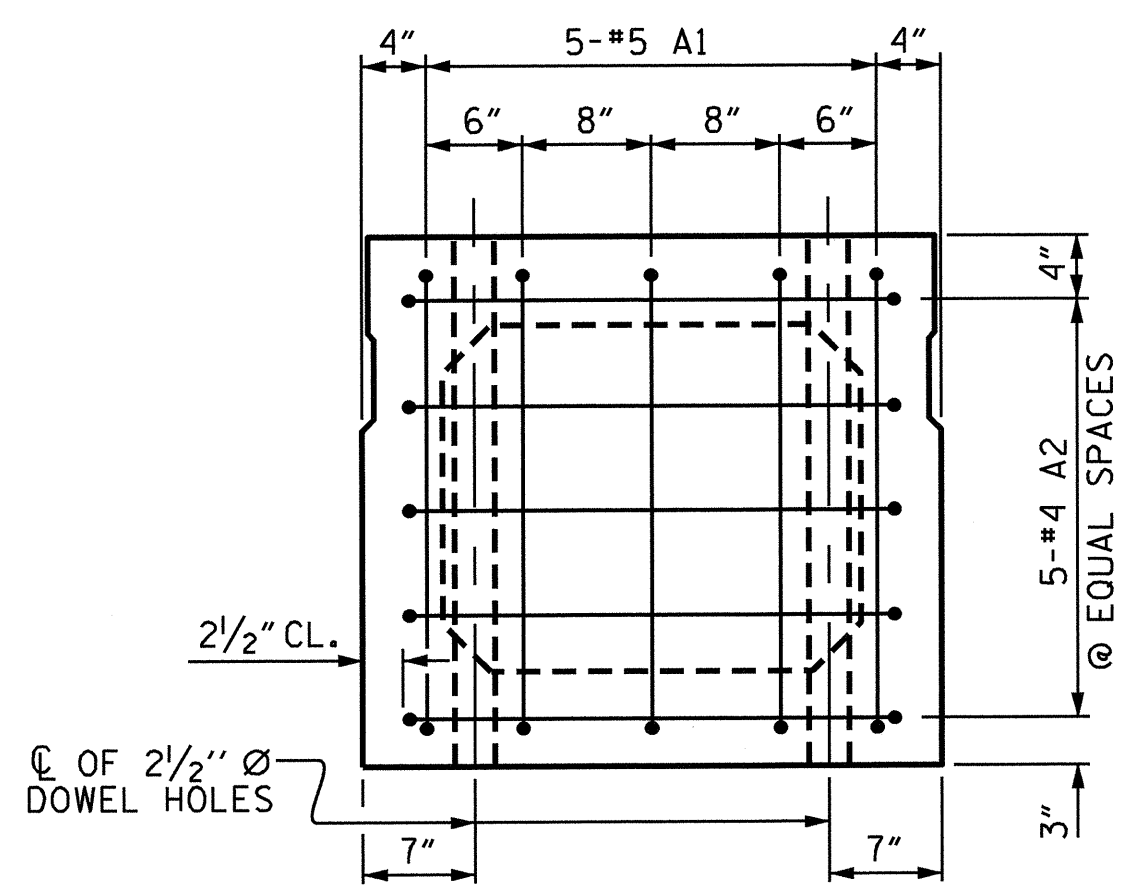
**PLAN OF SPAN B**  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM



DRAWN BY : M.D.PISO DATE : 09-13-10  
 CHECKED BY : B.N.BARODAWALA DATE : 10-06-10

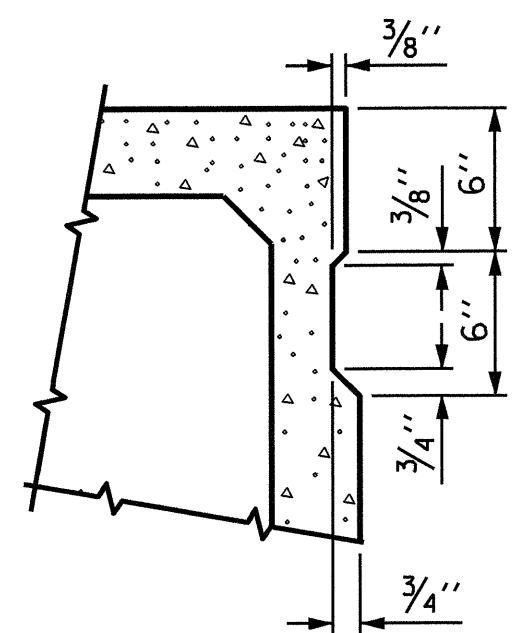
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			22





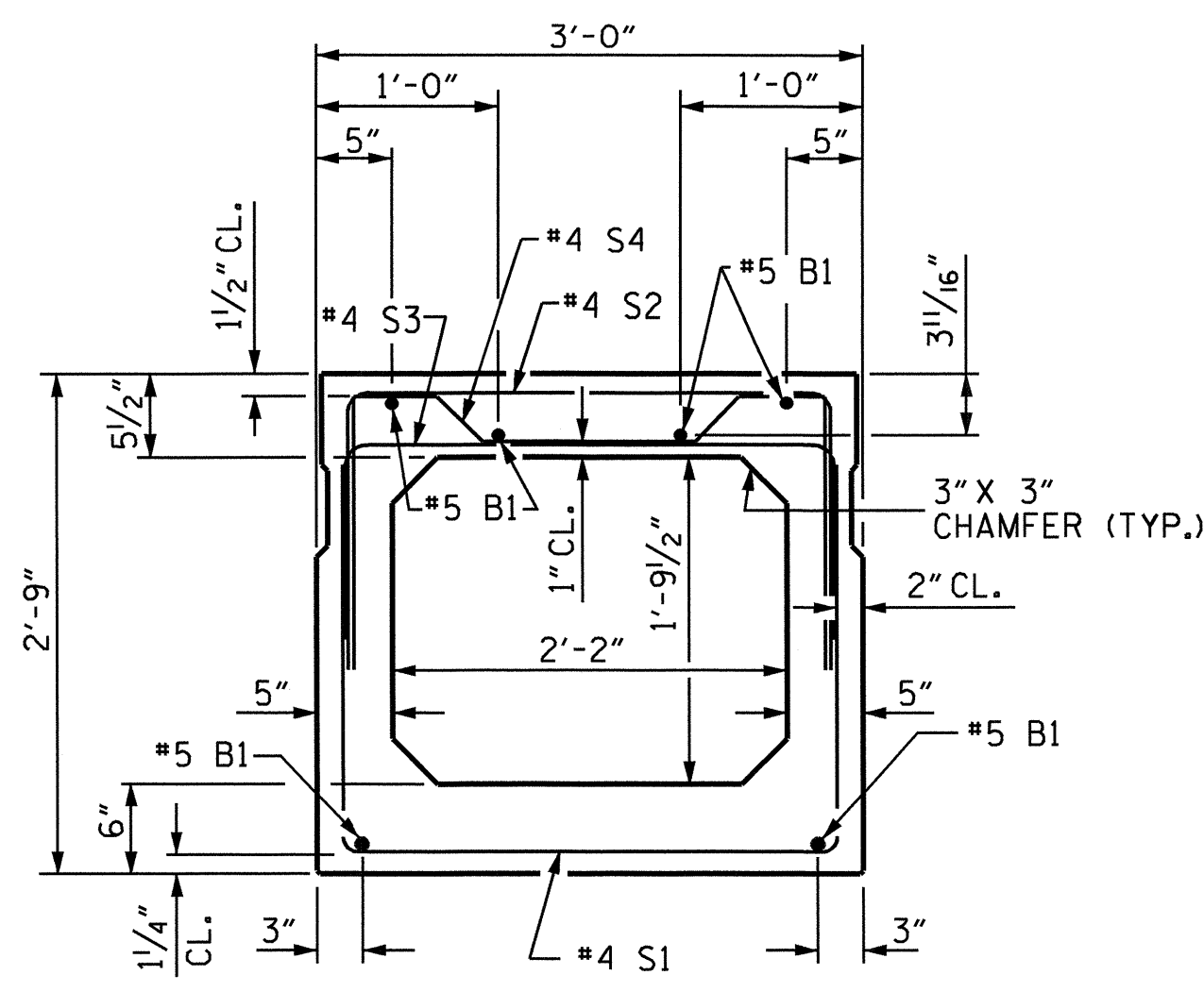
END ELEVATION

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.)



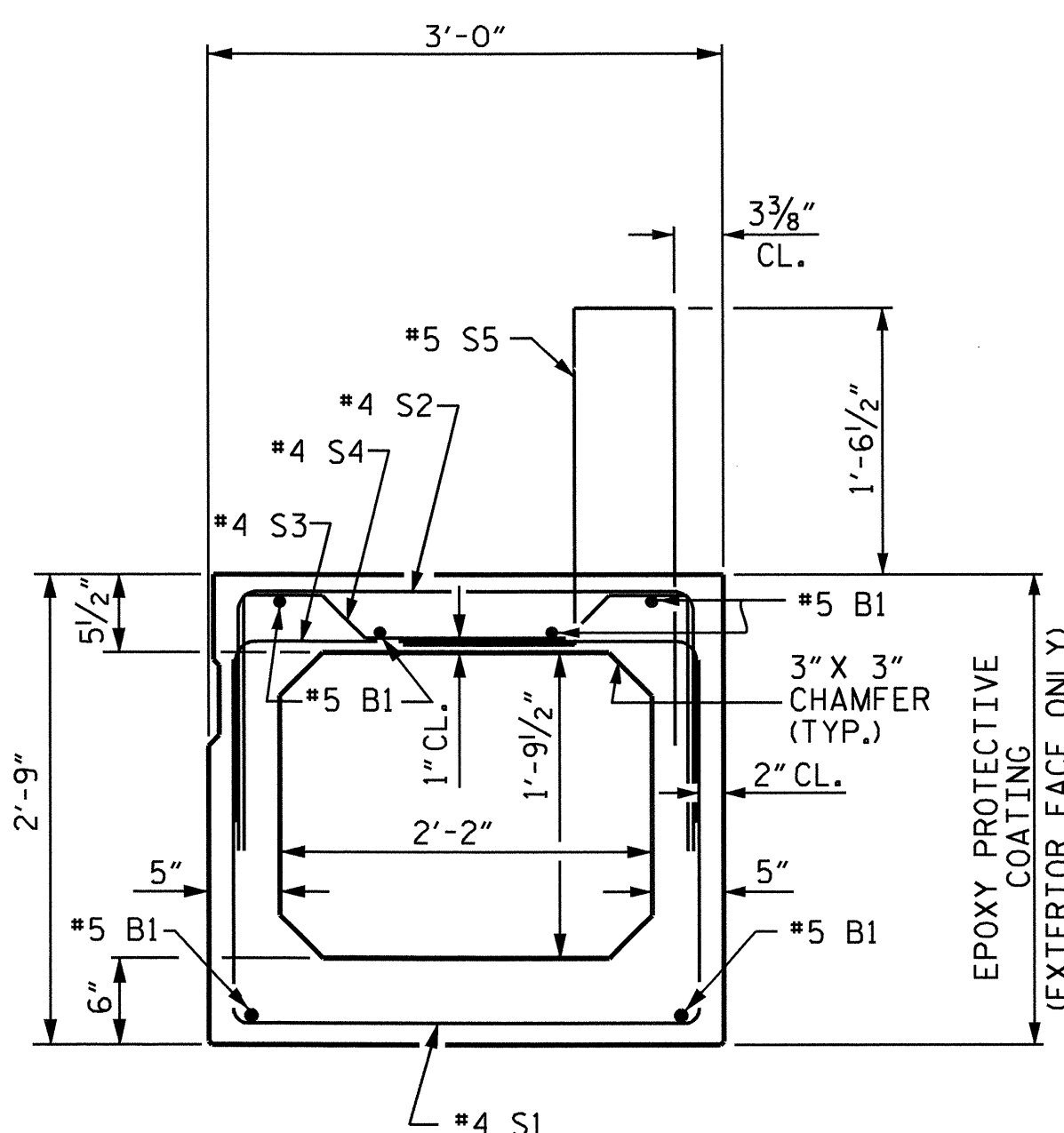
SHEAR KEY DETAIL

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



INTERIOR BOX BEAM SECTION

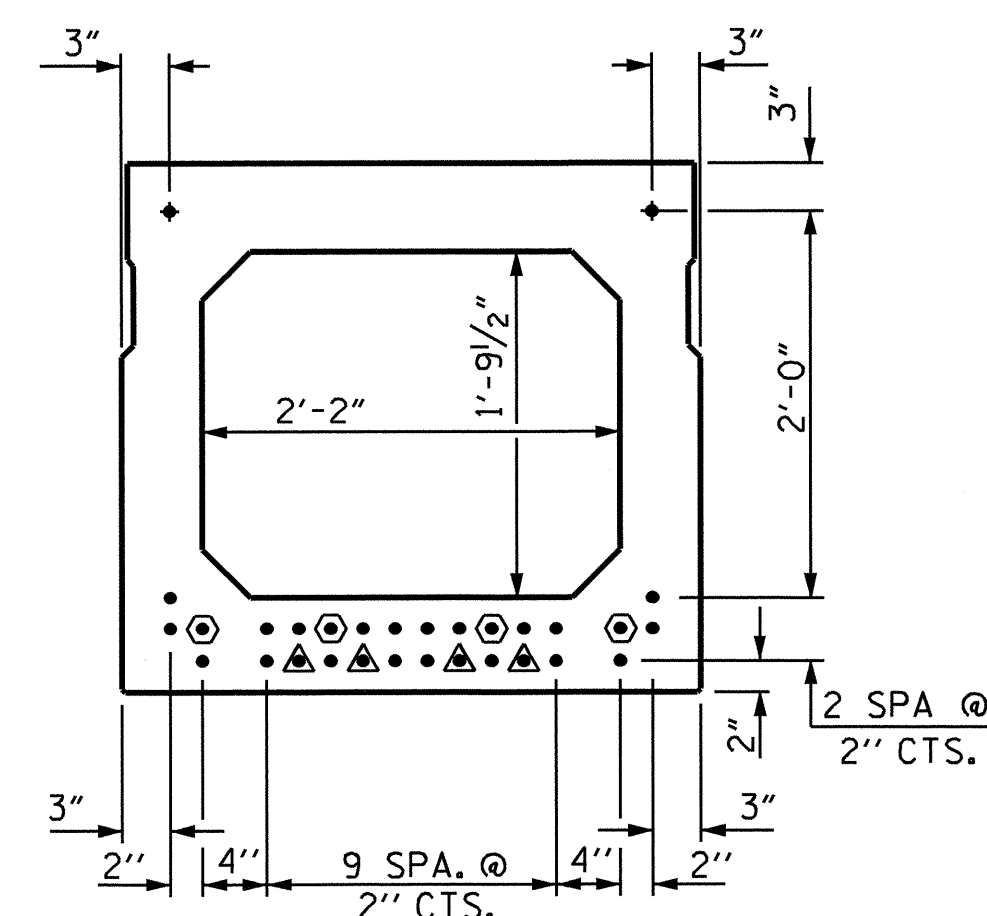
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

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

DEBONDING LEGEND

- FULLY BONDED STRANDS
- ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER

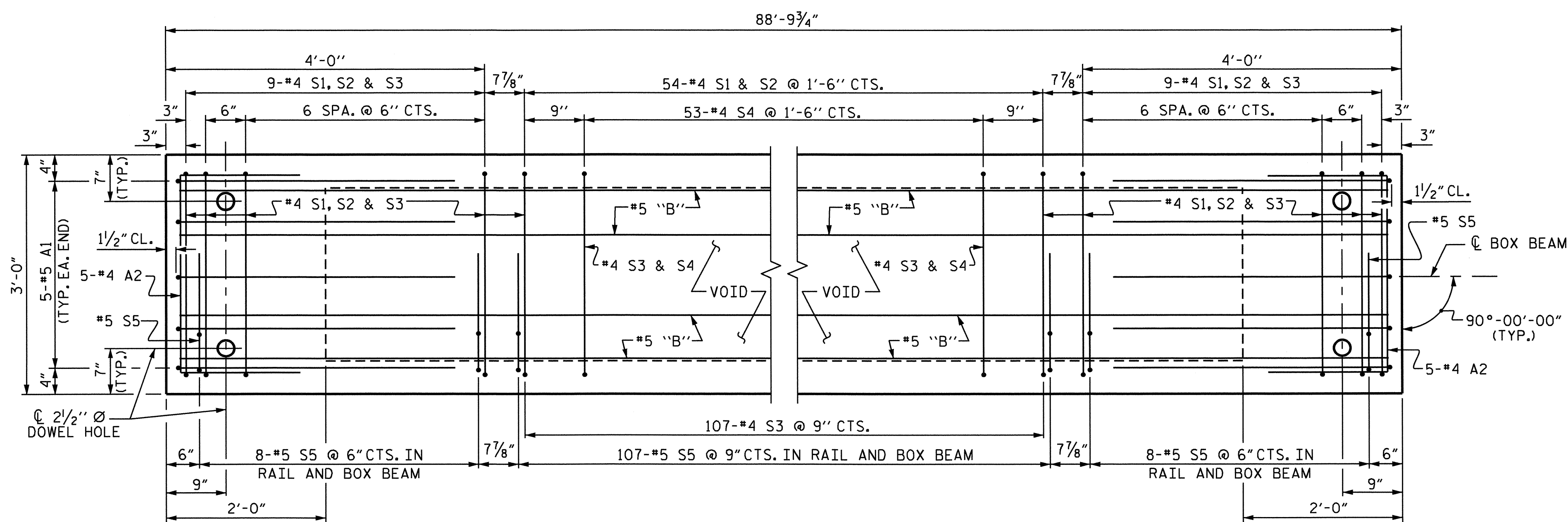
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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

**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	6'-8"	70	6'-8"	70
A2	40	#4	2	5'-7"	149	5'-7"	149
B1	12	#5	STR	45'-4"	567	45'-4"	567
K1	15	#4	6	6'-2"	62	6'-2"	62
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	72	#4	3	7'-6"	361	7'-6"	361
S2	72	#4	3	5'-8"	273	5'-8"	273
S3	125	#4	3	4'-10"	404	4'-10"	404
S4	53	#4	4	5'-10"	207	5'-10"	207
* S5	123	#5	5	6'-2"	791	--	--
REINFORCING STEEL				2110 LBS.		2110 LBS.	
* EPOXY COATED REINF. STEEL				791 LBS.			
7500 P.S.I. CONCRETE				15.7 CU. YDS.		15.7 CU. YDS.	
0.6" Ø L.R. STRANDS				No. 30		No. 30	



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.

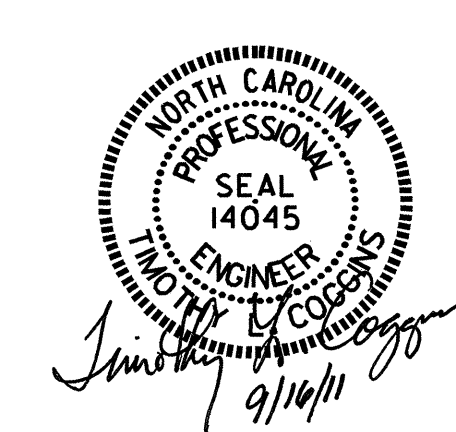
PROJECT NO. B-4542

HARNETT COUNTY

STATION: 19+20.00 -L-

SHEET 4 OF 6

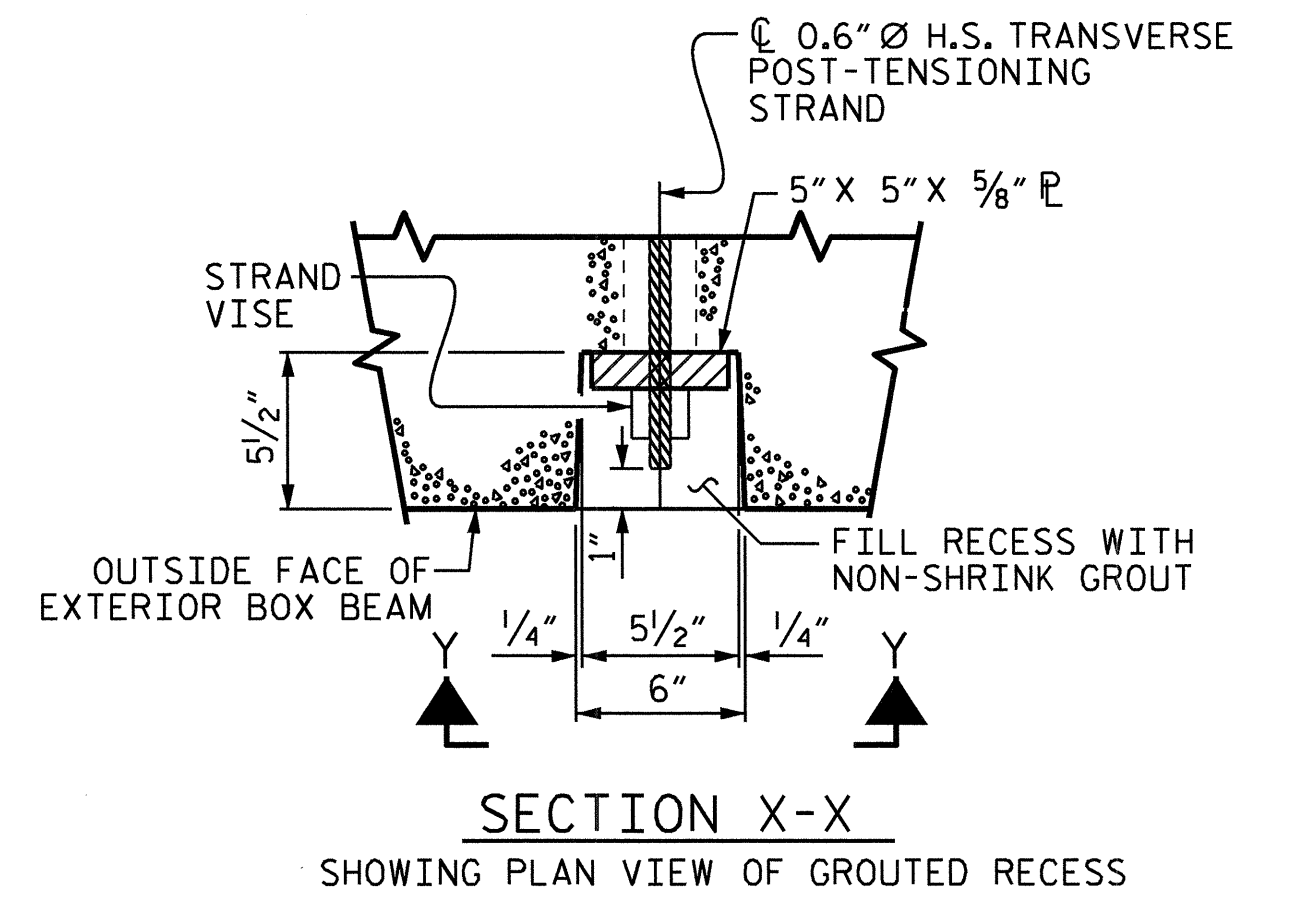
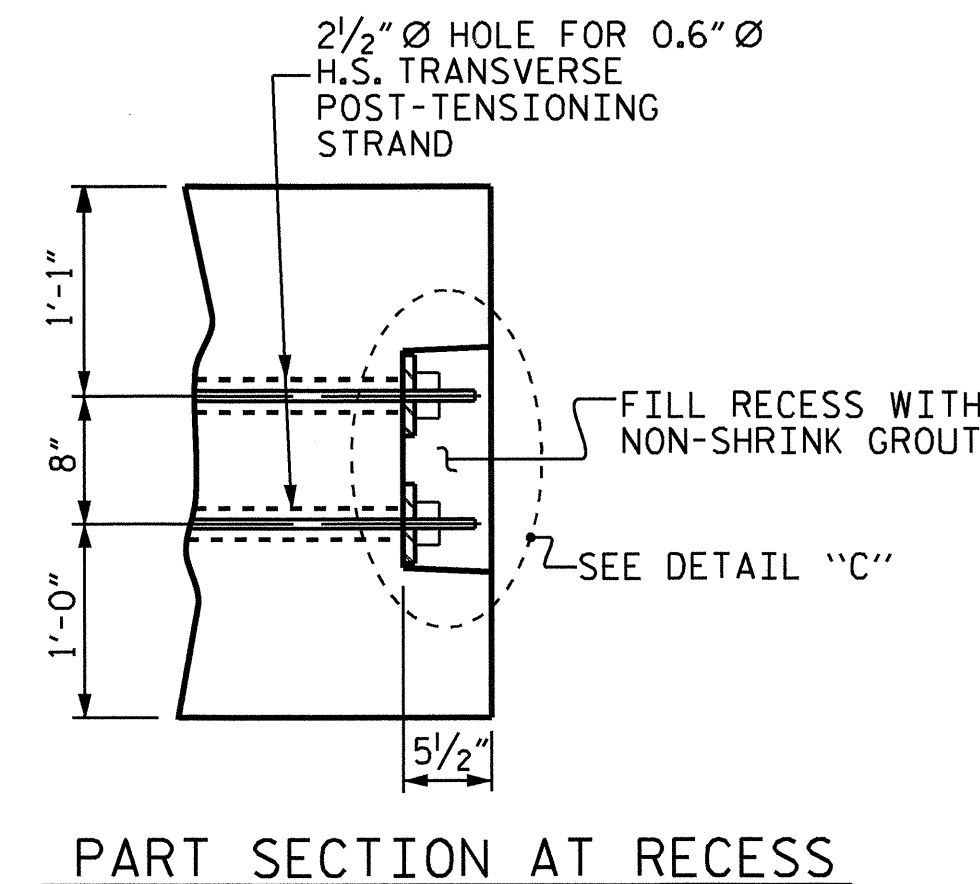
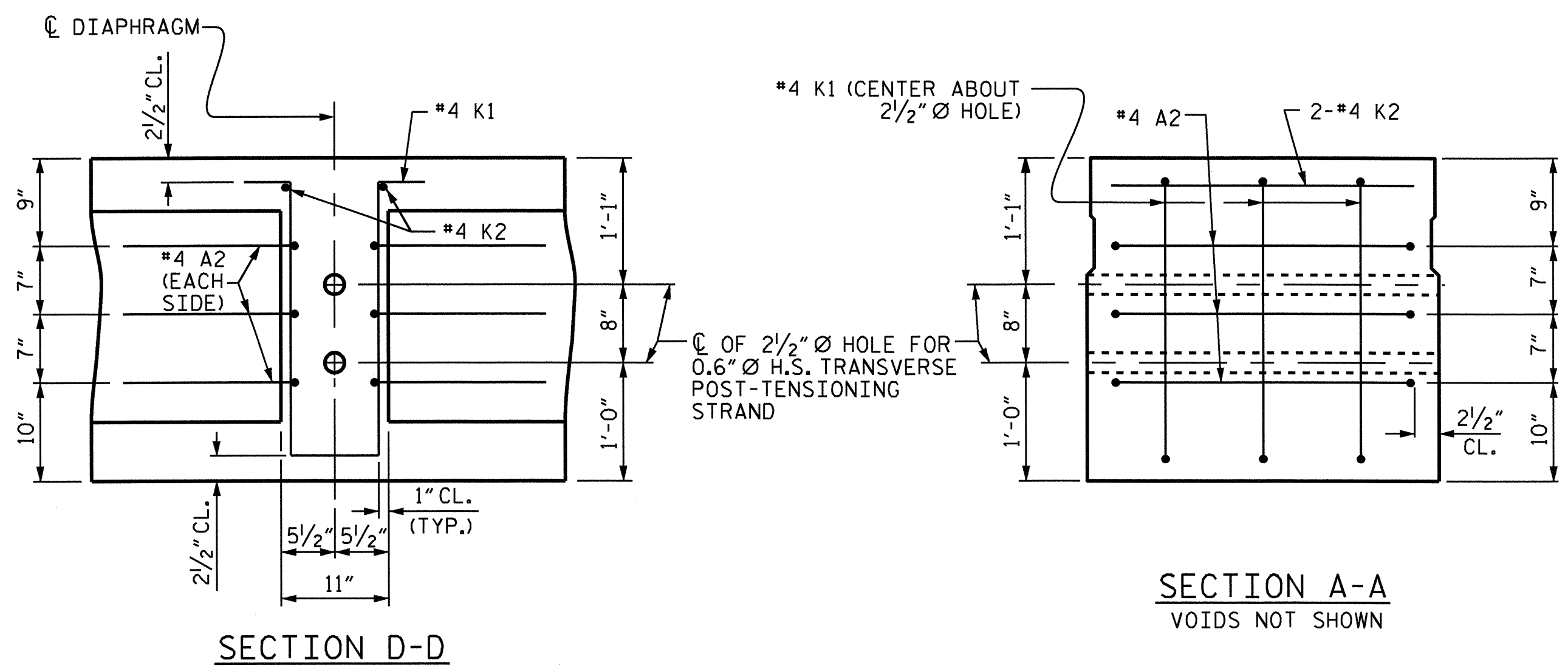
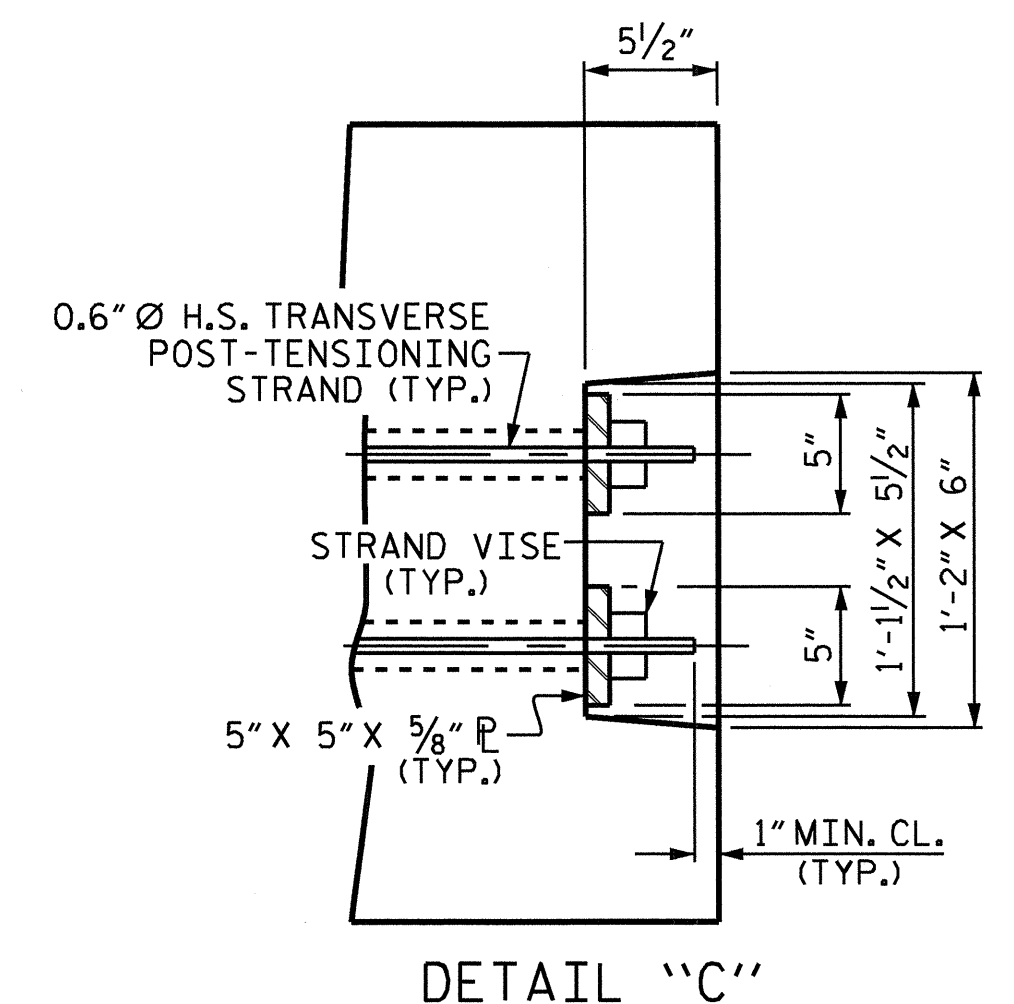
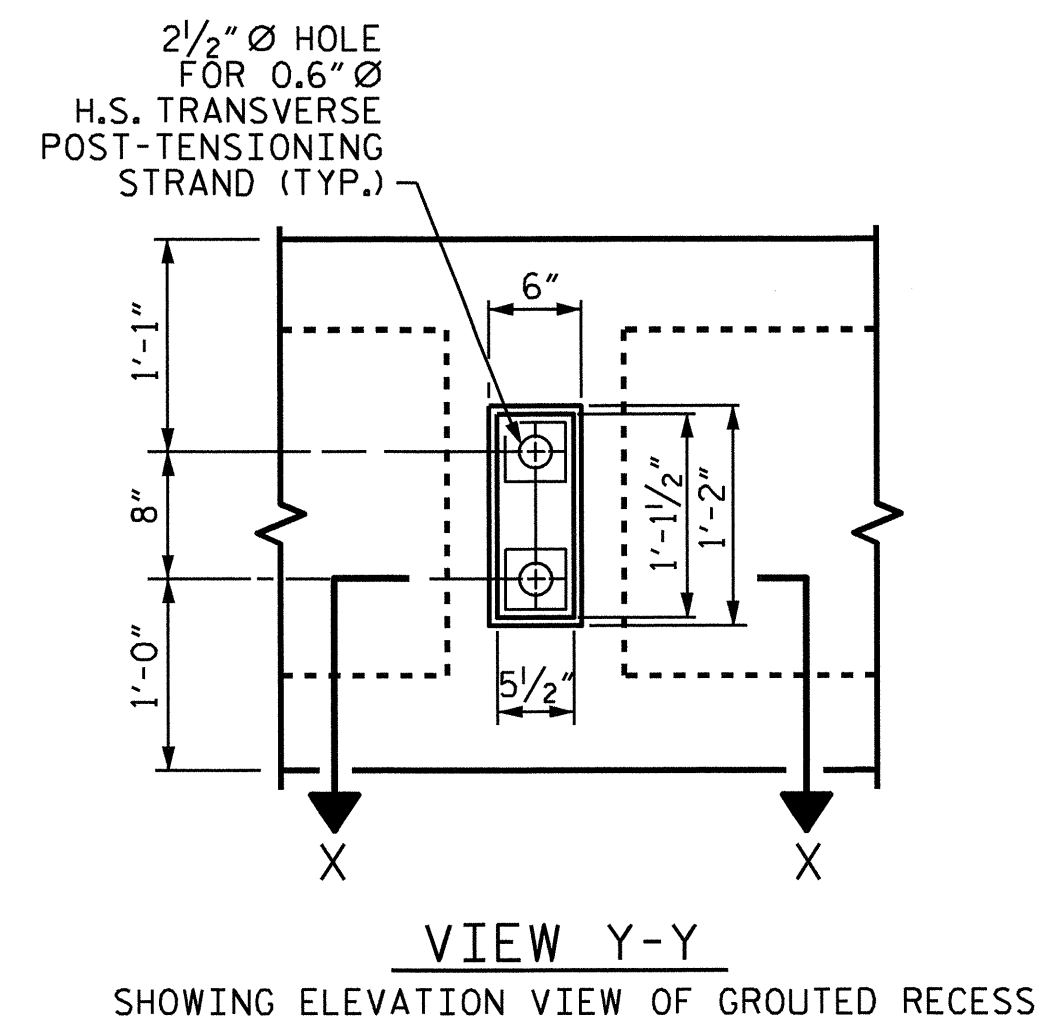
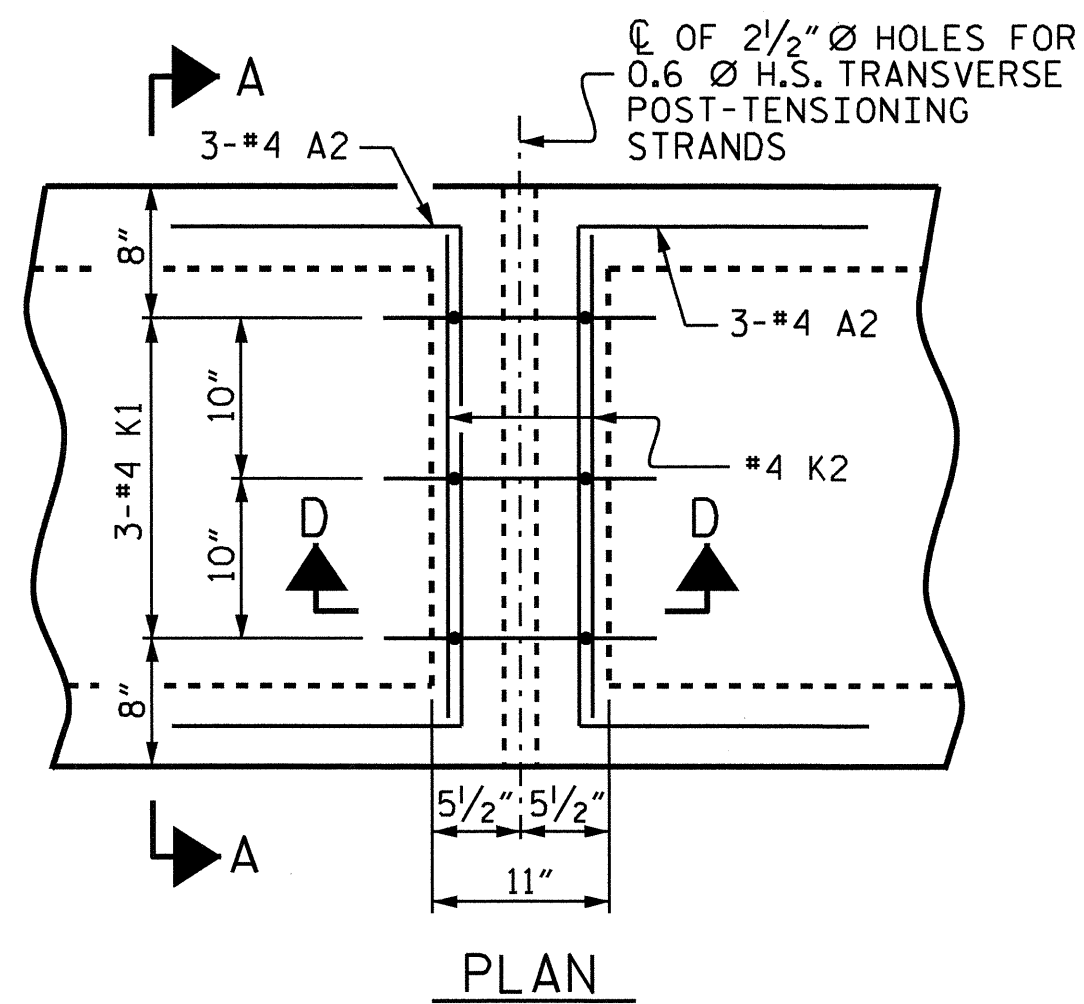
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 2'-9"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT  
SPANS A & B



ASSEMBLED BY : M.D.PISO	DATE :09-13-10
CHECKED BY : B.N.BARODAWALA	DATE :10-06-10
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO. S-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 22
2			4			

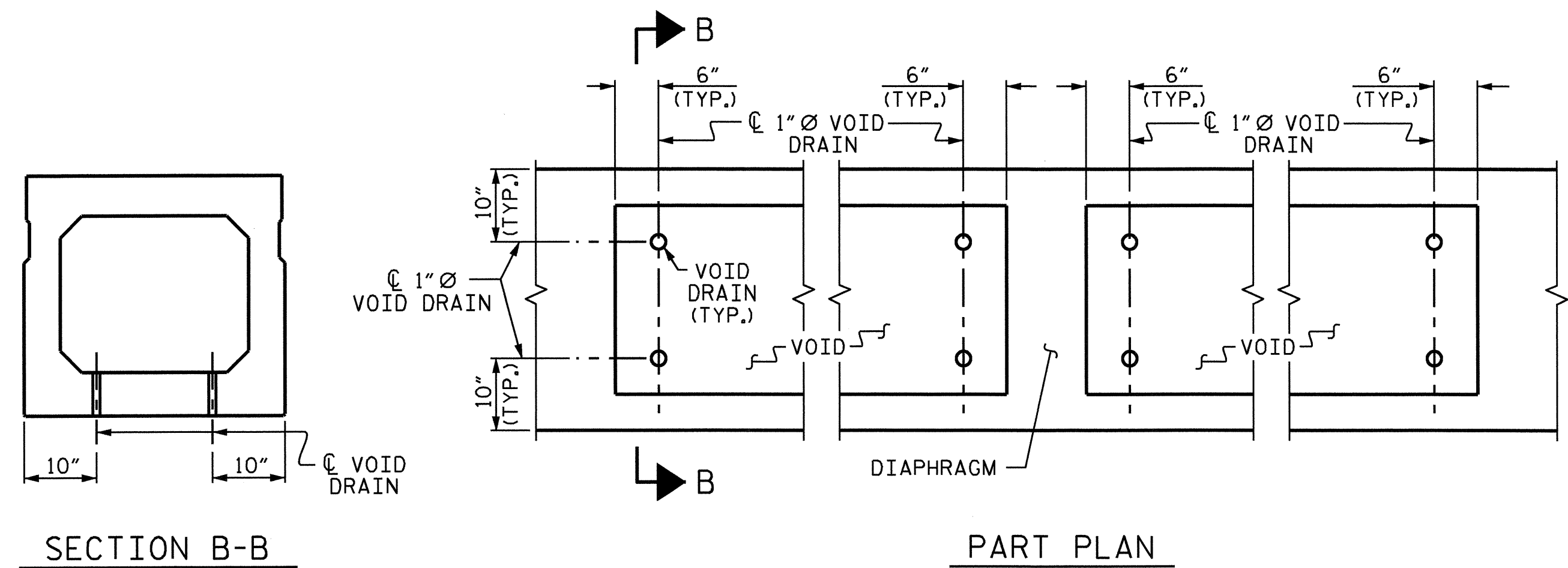
(SHT 1C) STD. NO. PCBB4



**DOUBLE DIAPHRAGM DETAILS - SPANS A & B**

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

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



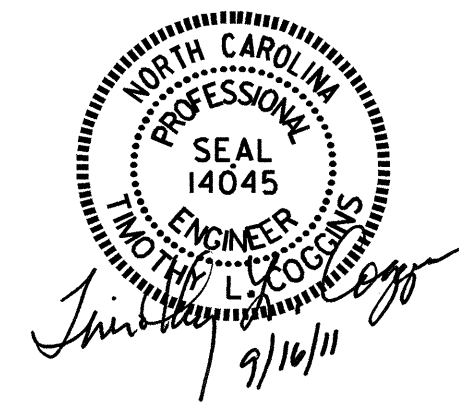
**VOID DRAIN DETAILS**  
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER		
	3'-0" x 2'-9"	
	0.6" Ø L.R. STRAND	
	SPAN "A"	SPAN "B"
CAMBER (BEAM ALONE IN PLACE)	↑ 4 5/8"	↑ 4 5/8"
DEFLECTION DUE TO SUPERIMPOSED DEADLOAD **	↓ 1 1/4"	↓ 1 1/4"
FINAL CAMBER	↑ 3 3/8"	↑ 3 3/8"

\*\* INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 5 OF 6

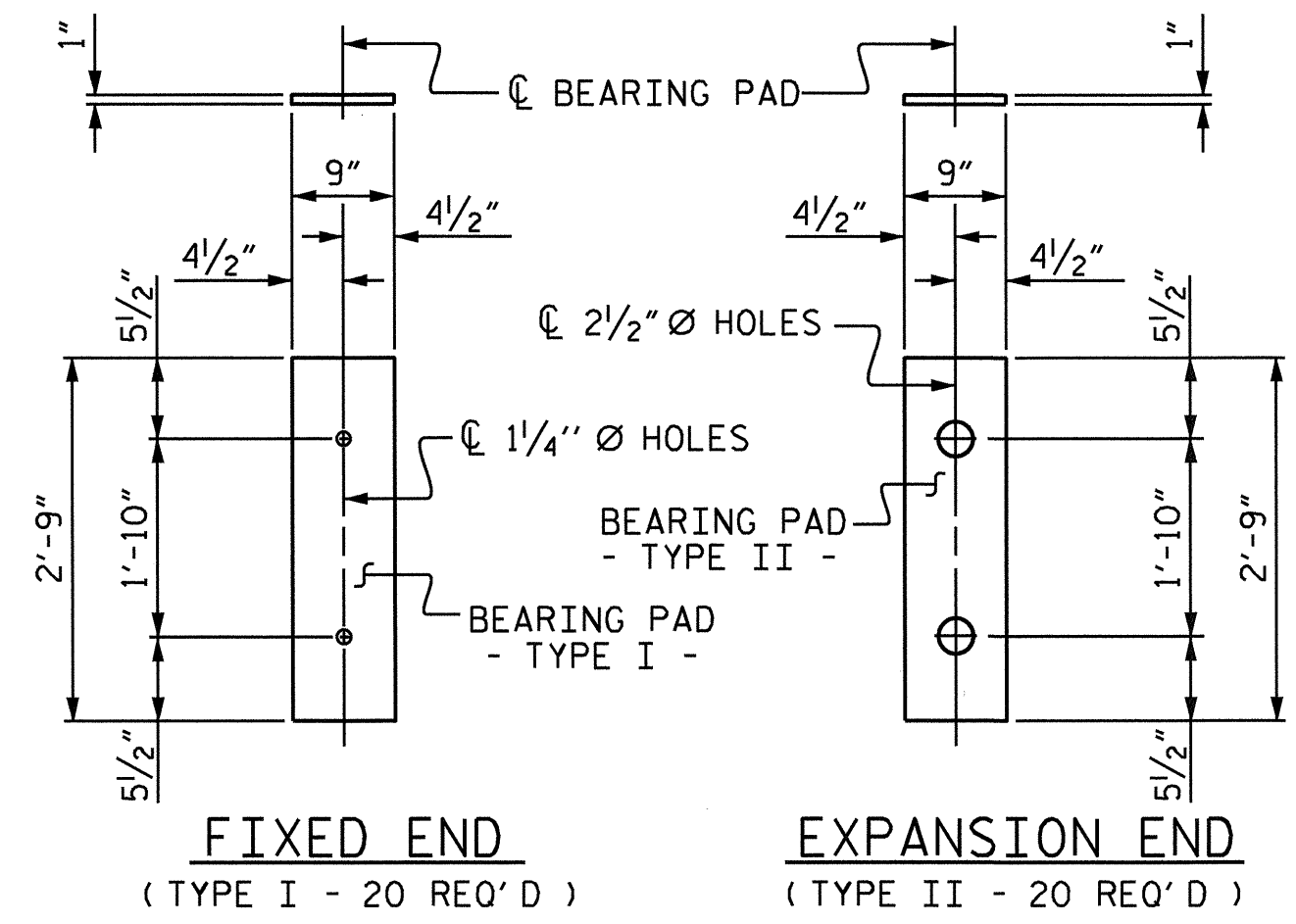
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 SPANS A & B



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9	
1			3			TOTAL SHEETS	22
2			4				

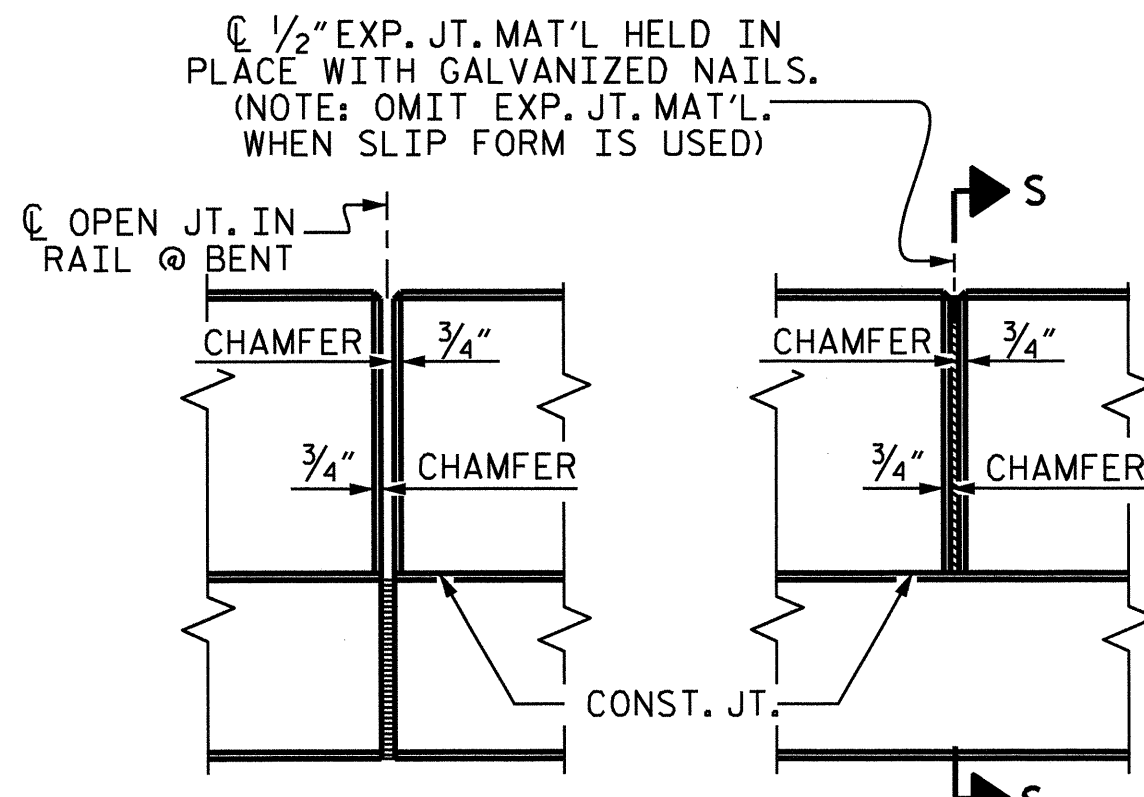
ASSEMBLED BY : M.D.PISO DATE : 09-13-10  
 CHECKED BY : B.N.BARODAWALA DATE : 10-05-10  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05  
 ADDED 7/11/05  
 REV. 5/1/06 TLA/GM



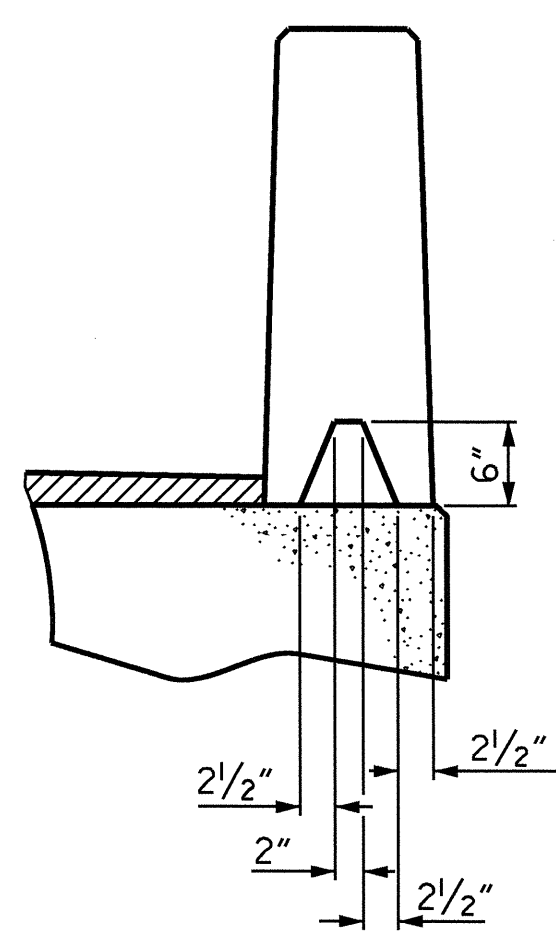


**ELASTOMERIC BEARING DETAILS**

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



**ELEVATION AT EXPANSION JOINTS**

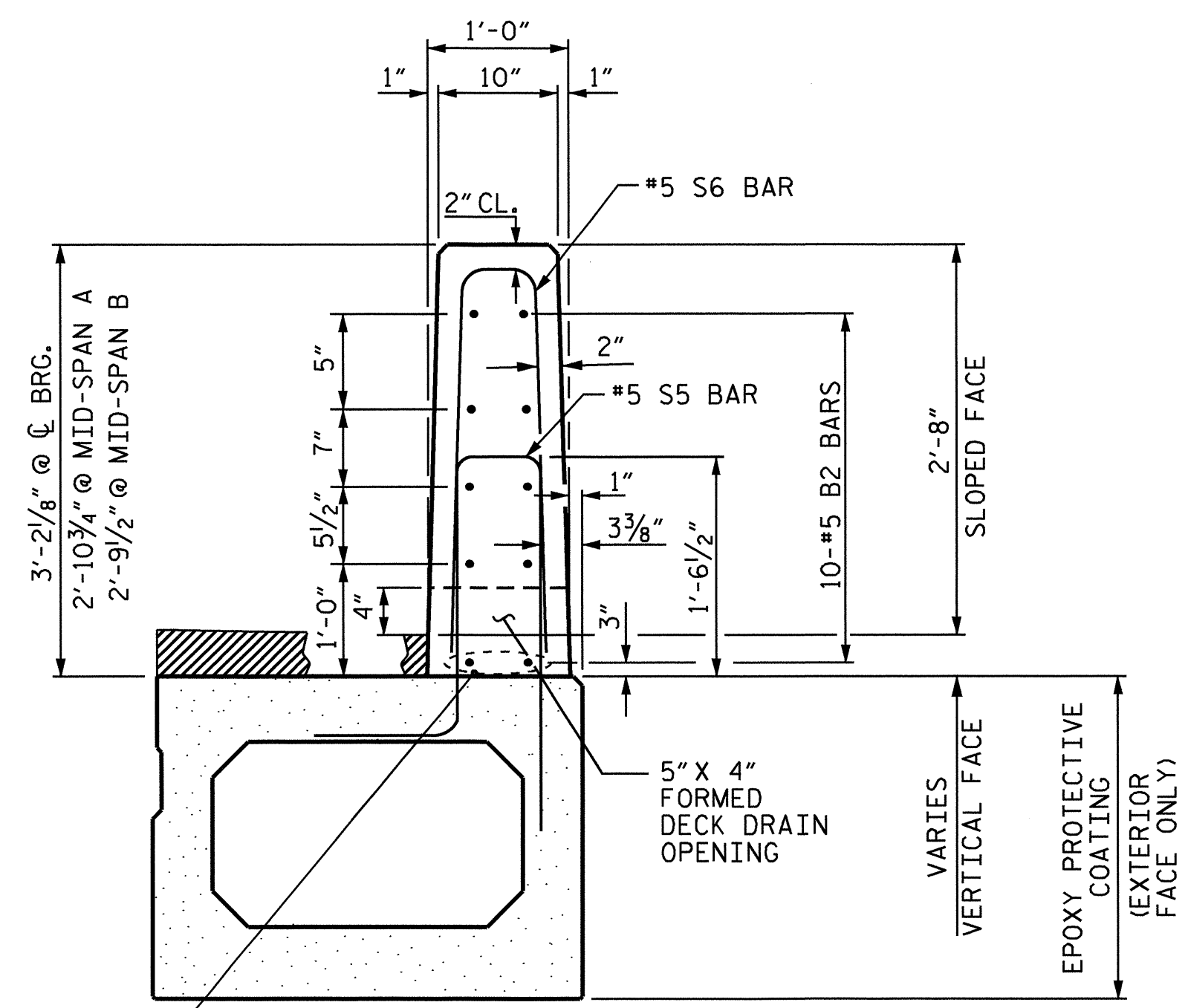
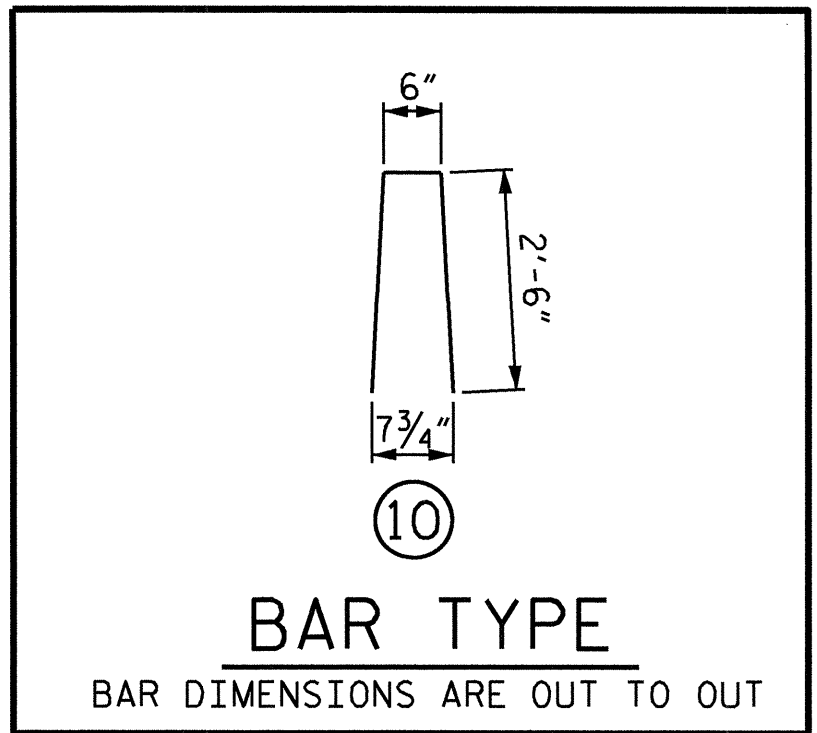


**SECTION S-S AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)**

**VERTICAL CONCRETE BARRIER RAIL DETAILS**

BAR	BARS PER SPAN	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
* B2	80	80	#5	STR	21'-10"	3644
* S6	246	246	#5	10	5'-6"	2822
* EPOXY COATED REINFORCING STEEL 6466LBS.						
CLASS AA CONCRETE 36.7 CU.YDS.						
TOTAL LIN. FT. OF VERTICAL CONCRETE BARRIER RAIL 355.25						

3'-0" X 2'-9"	NUMBER	LENGTH	TOTAL LENGTH
SPAN A INT.	8	88'-9 3/4"	710'-6"
EXT.	2	88'-9 3/4"	177'-7 1/2"
SPAN B INT.	8	88'-9 3/4"	710'-6"
EXT.	2	88'-9 3/4"	177'-7 1/2"
TOTAL	20		1776'-3"



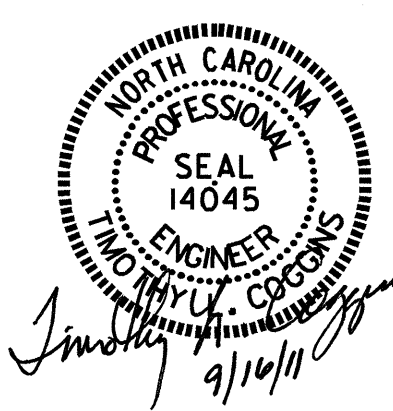
**SECTION THRU RAIL**

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 3'-0" X 2'-9"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT DETAILS



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS 22
2			4			

ASSEMBLED BY : M.D.PISO	DATE : 09-13-10
CHECKED BY : B.N.BARODAWALA	DATE : 10-06-10
DRAWN BY : TLA 5/05	ADDED 7/11/05R
CHECKED BY : GM 6/05	REV. 5/1/06RR TLA/GM

15-SEP-2011 14:26  
 R:\TIP\Projects-B\B4542\Structures\Final Plans\B4542.sd.bx.01.dgn  
 taverette

NOTES

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

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

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

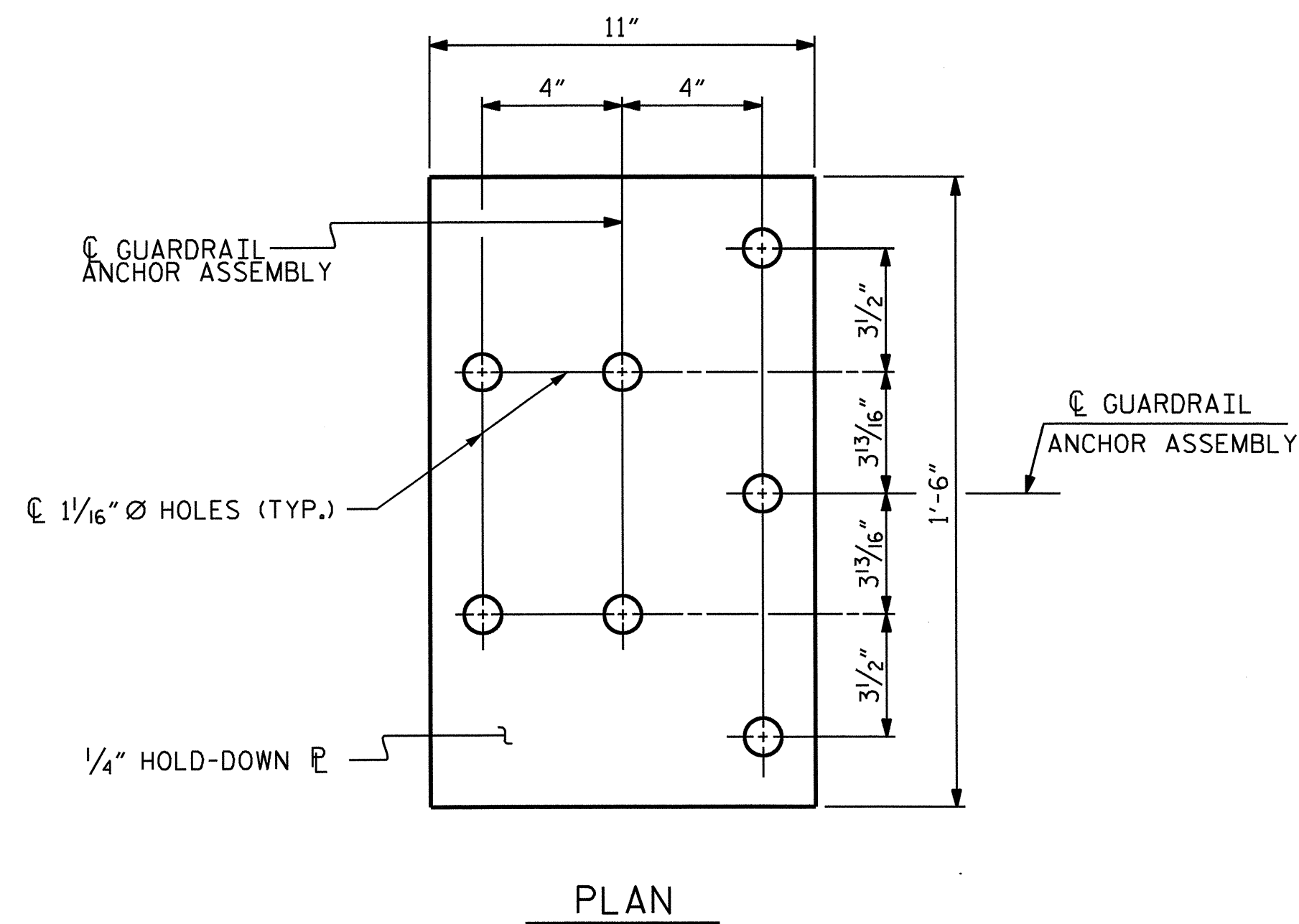
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF VERTICAL CONCRETE BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

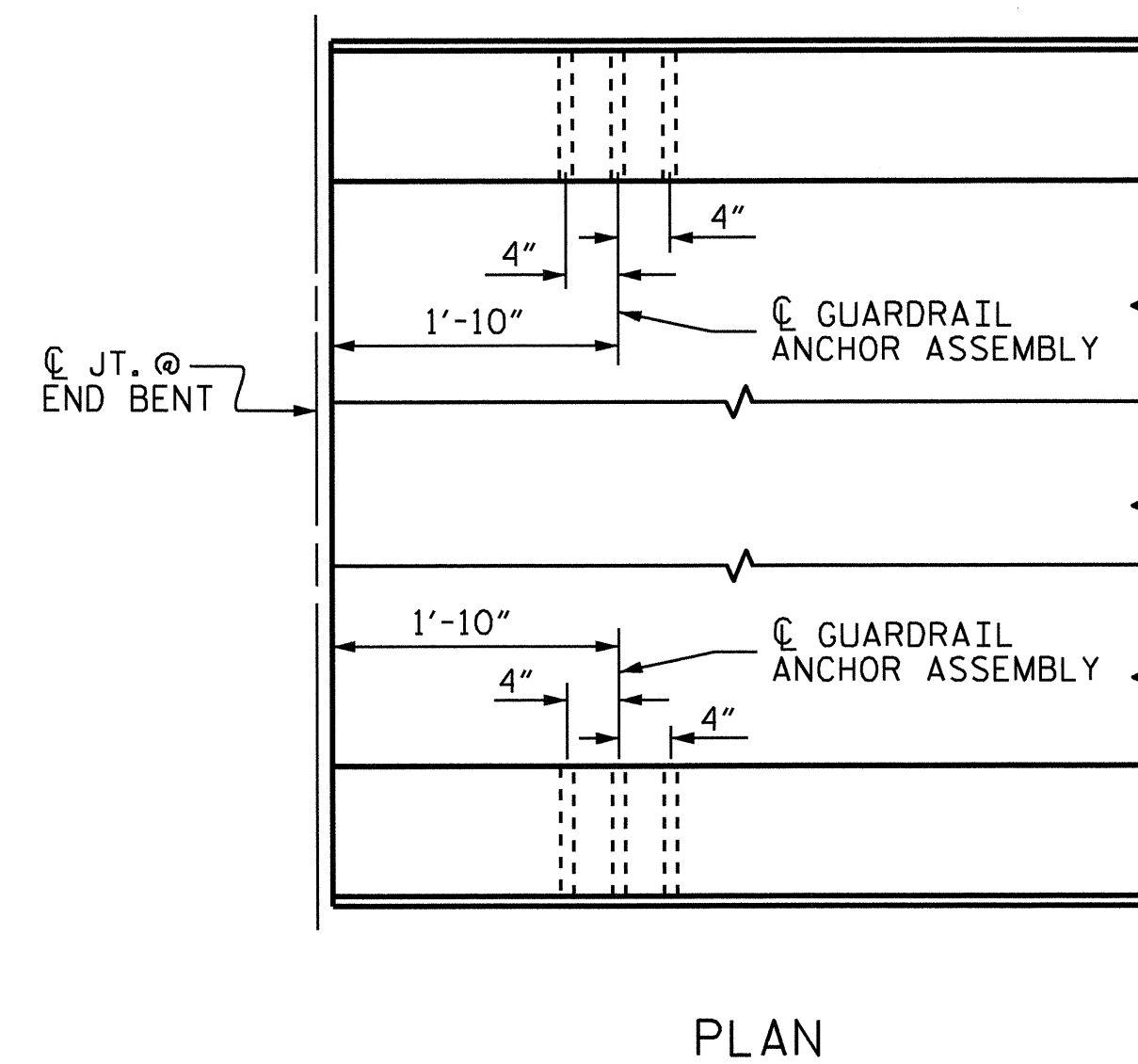
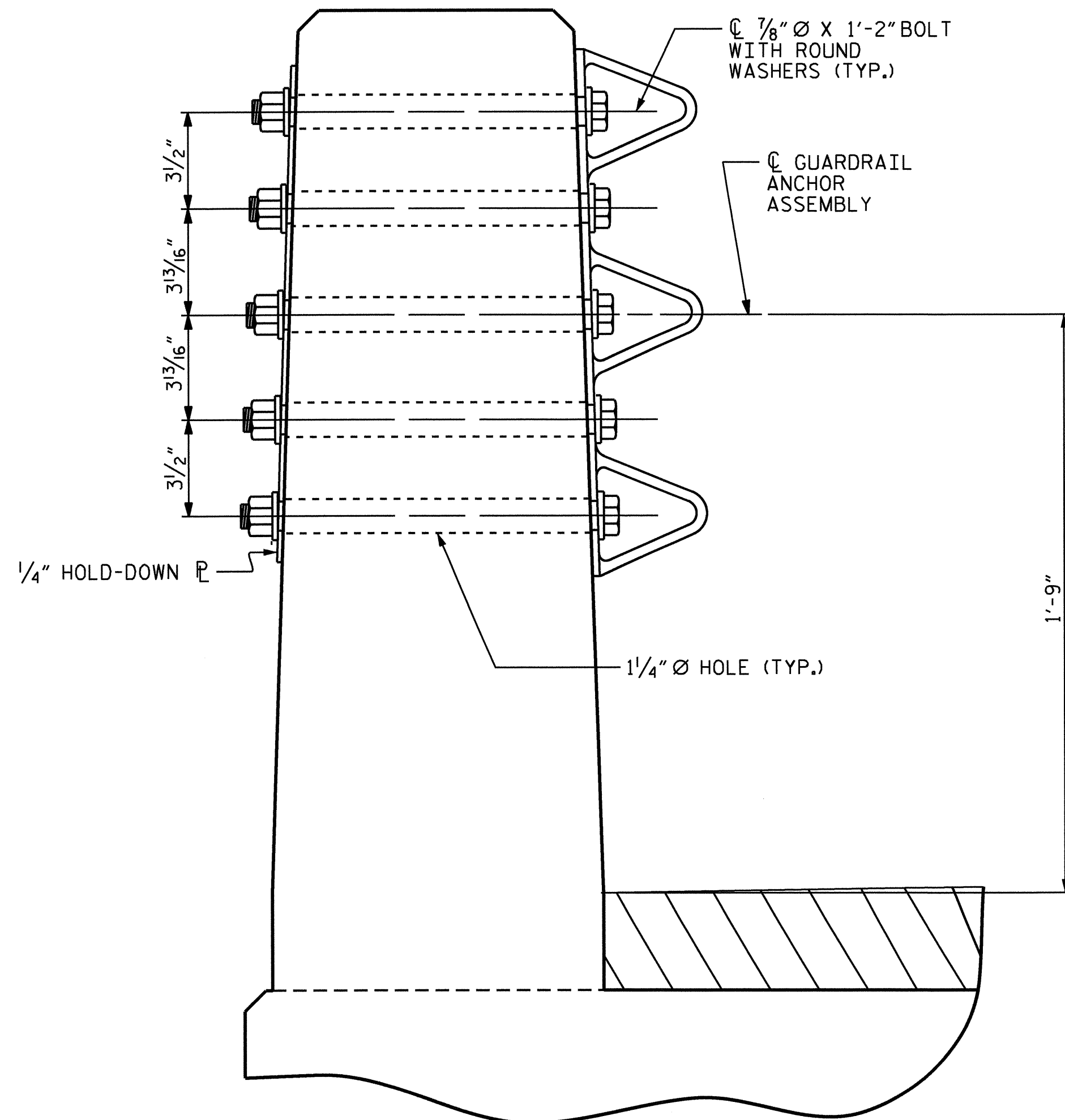
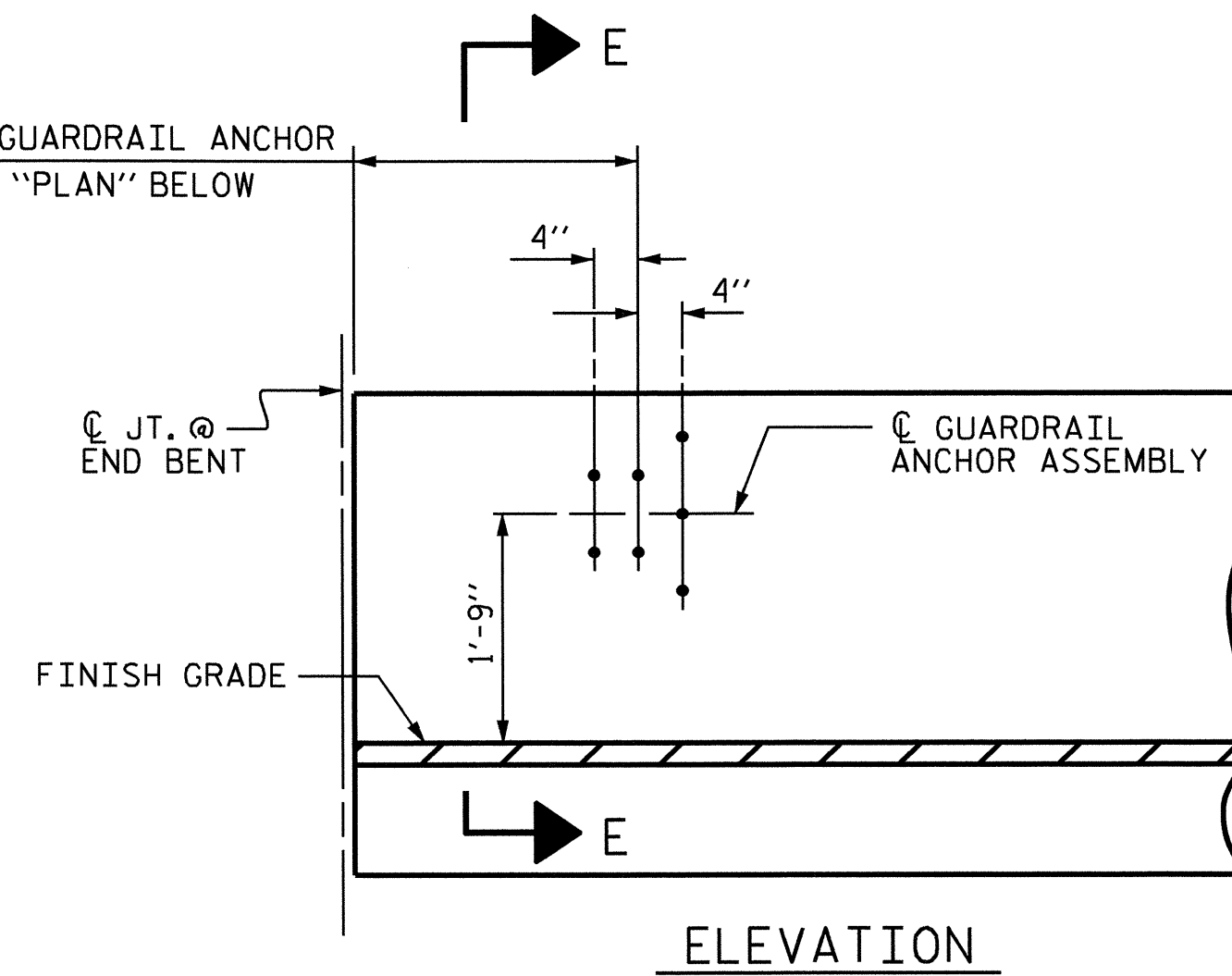
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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

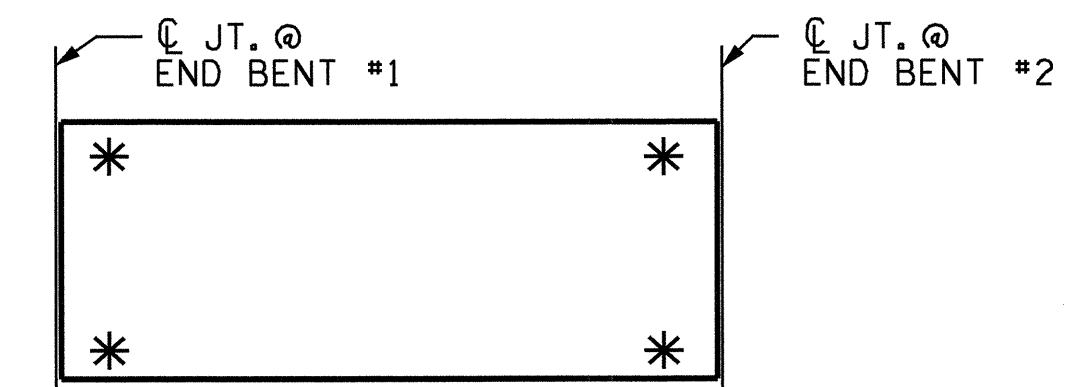


FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



LOCATION OF ANCHORS FOR GUARDRAIL

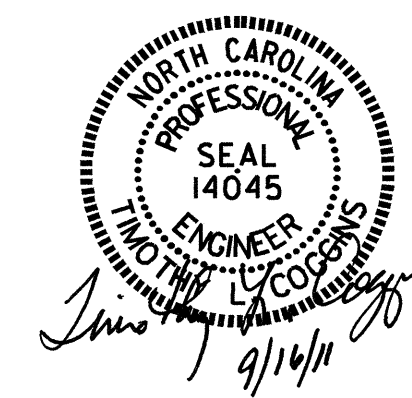
END BENT #1 SHOWN, END BENT #2 SIMILAR.



\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

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



ASSEMBLED BY : M.D.PISO DATE :09-13-10  
 CHECKED BY : B.N.BARODAWALA DATE :10-06-10  
 DRAWN BY : MAA 5/10  
 CHECKED BY : GM 5/10

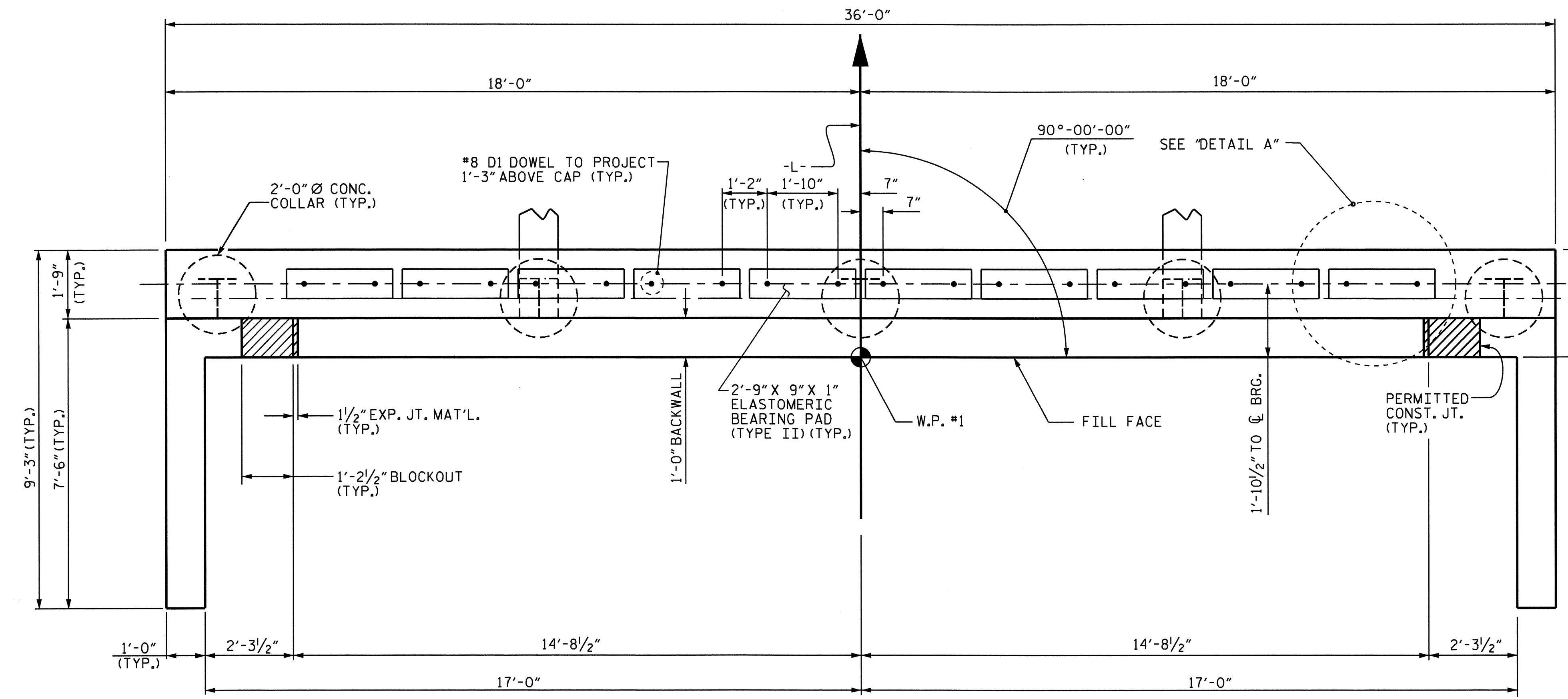
ADDED 5/6/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			22

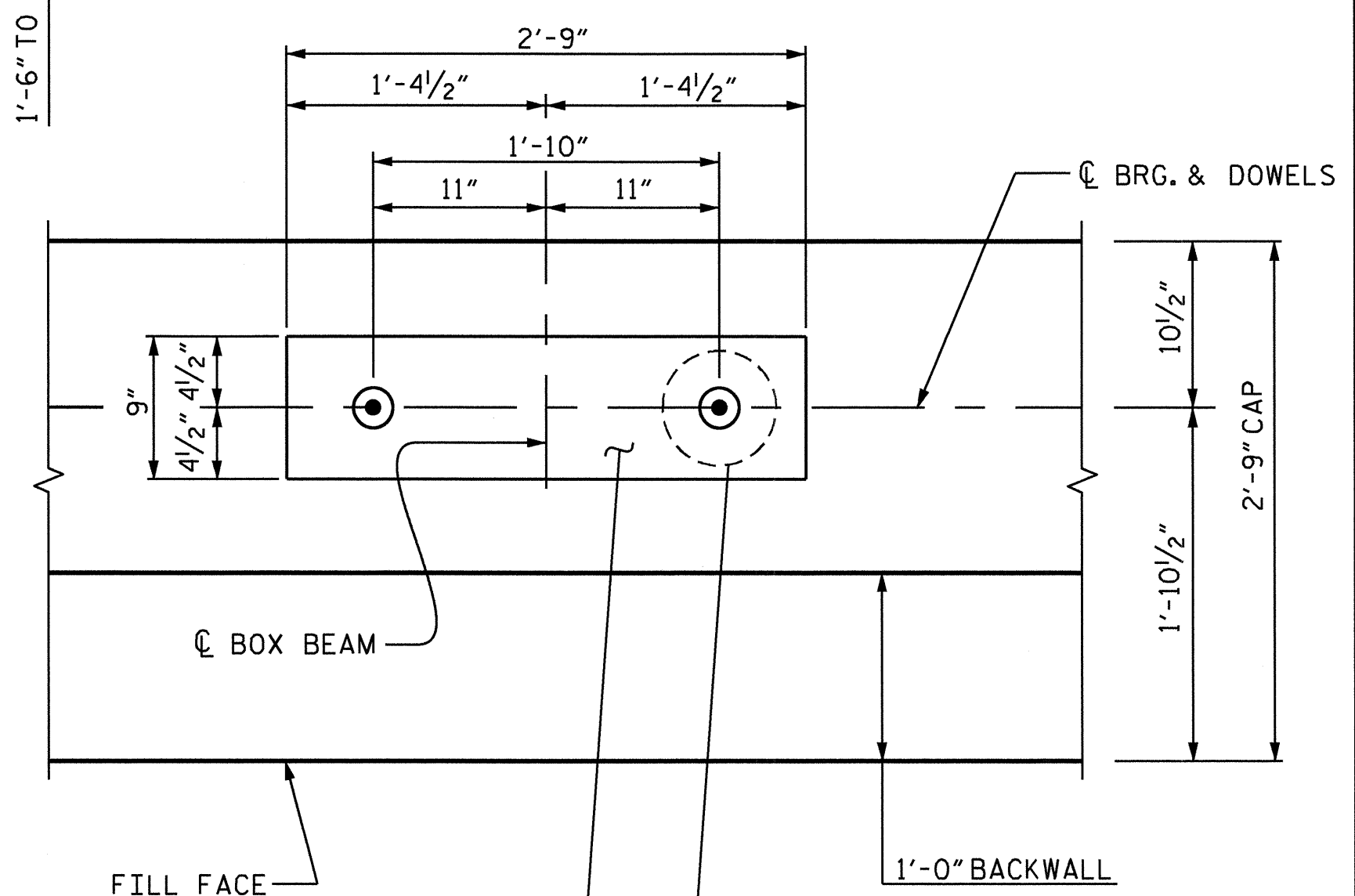


**NOTES:**

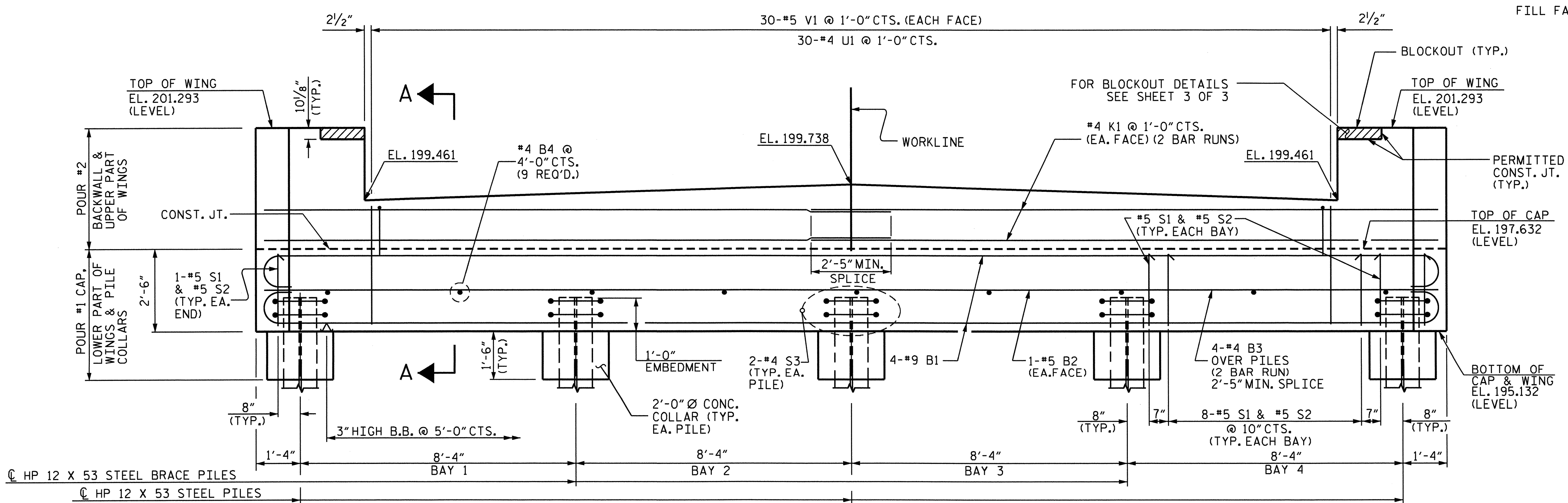
STIRRUPS MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 THE CONCRETE IN THE SHADED AREA OF THE WING WALL SHALL BE  
 POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.  
 THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER  
 DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED  
 BRIDGE APPROACH FILLS. SEE ROADWAY PLANS. REINFORCING STEEL IN  
 THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



**PLAN**



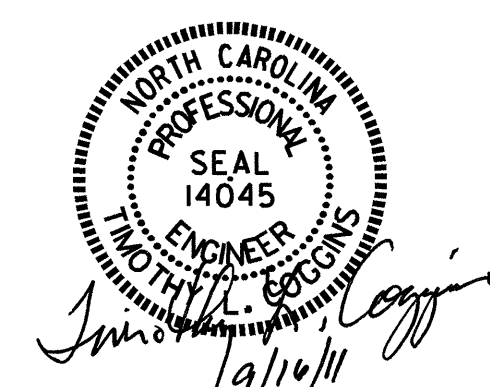
**DETAIL "A"**  
(TYP. EA. UNIT)



**ELEVATION**

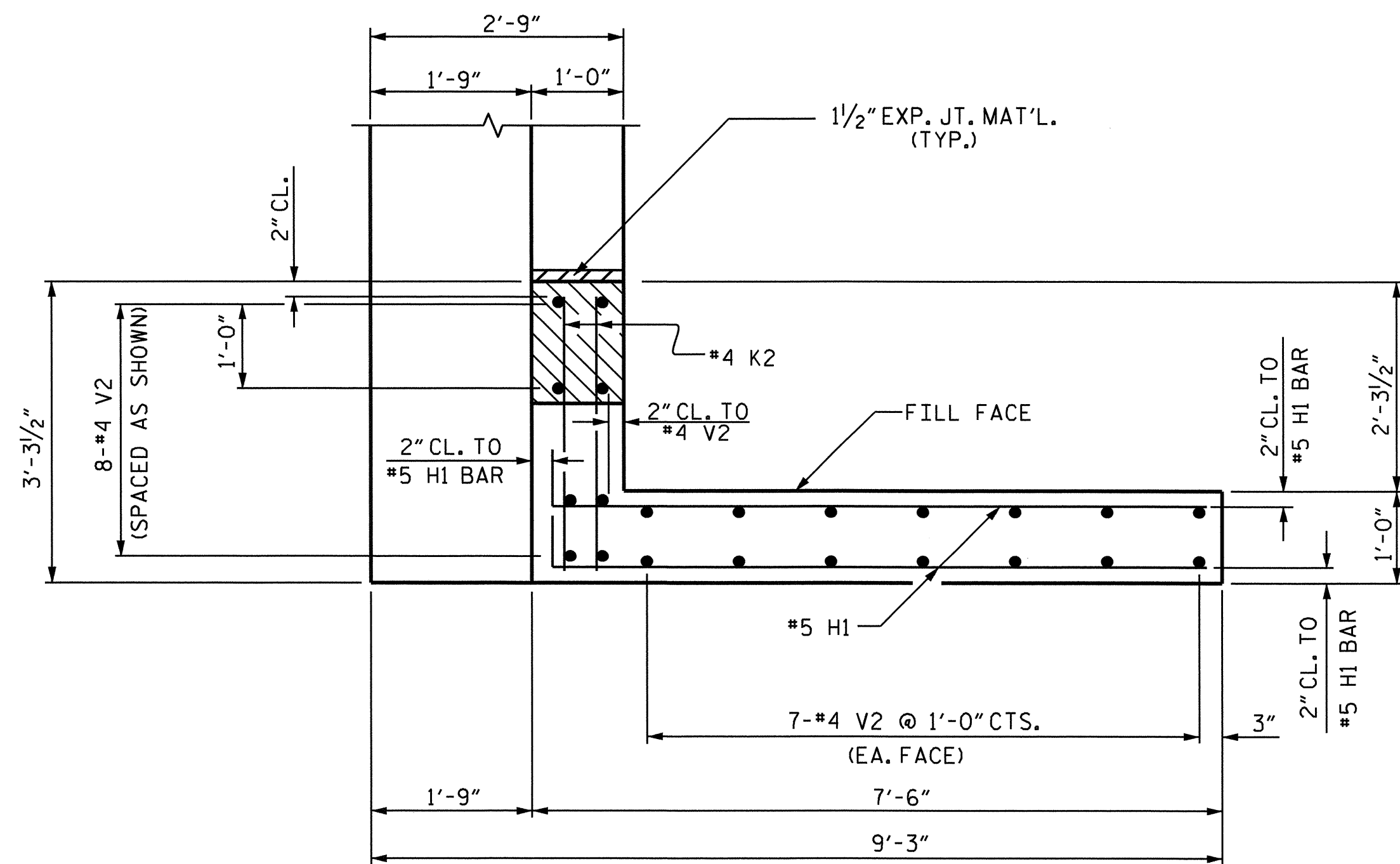
PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 3

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



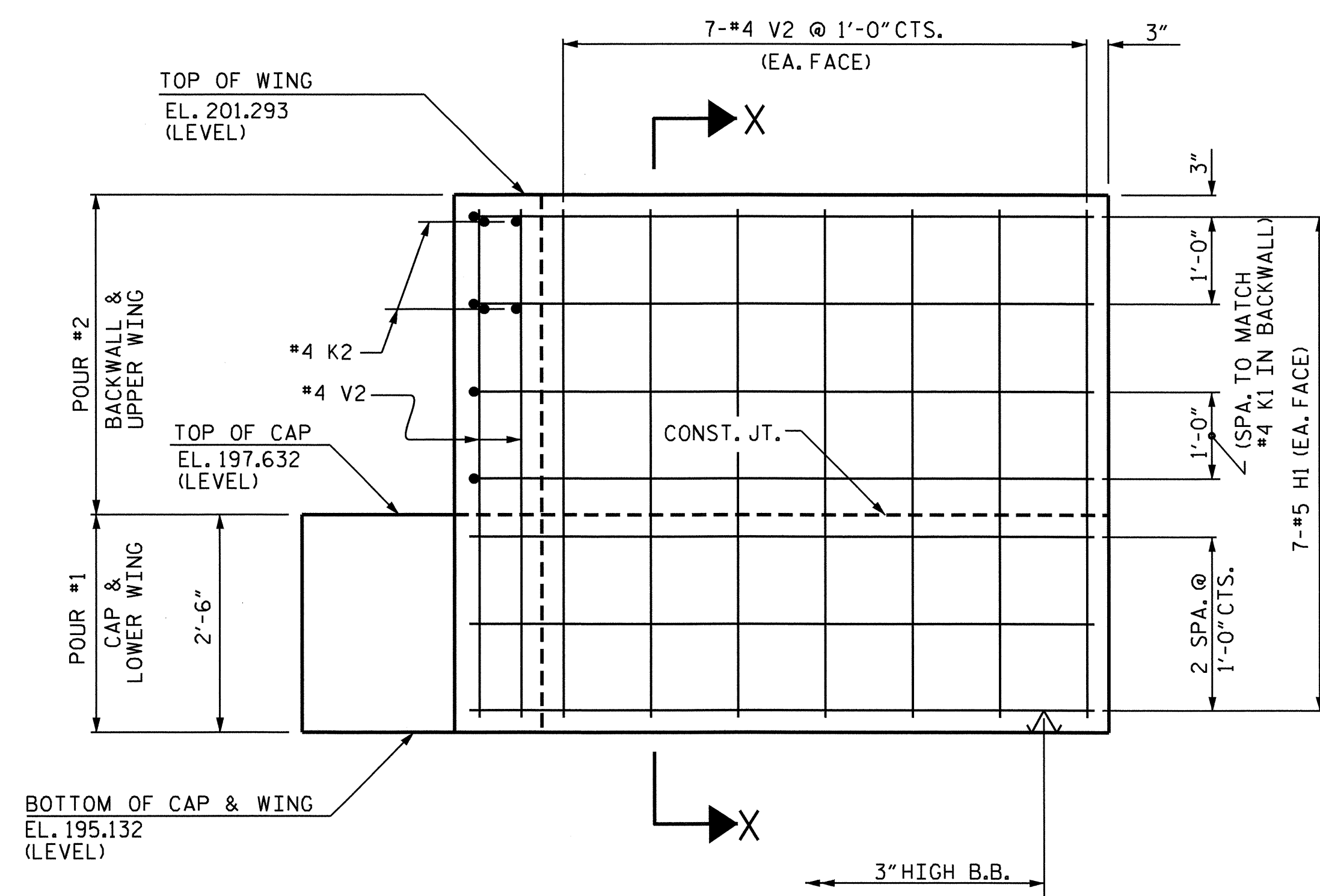
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 CHECKED BY: J.B. WILSON DATE: 1-24-11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			22



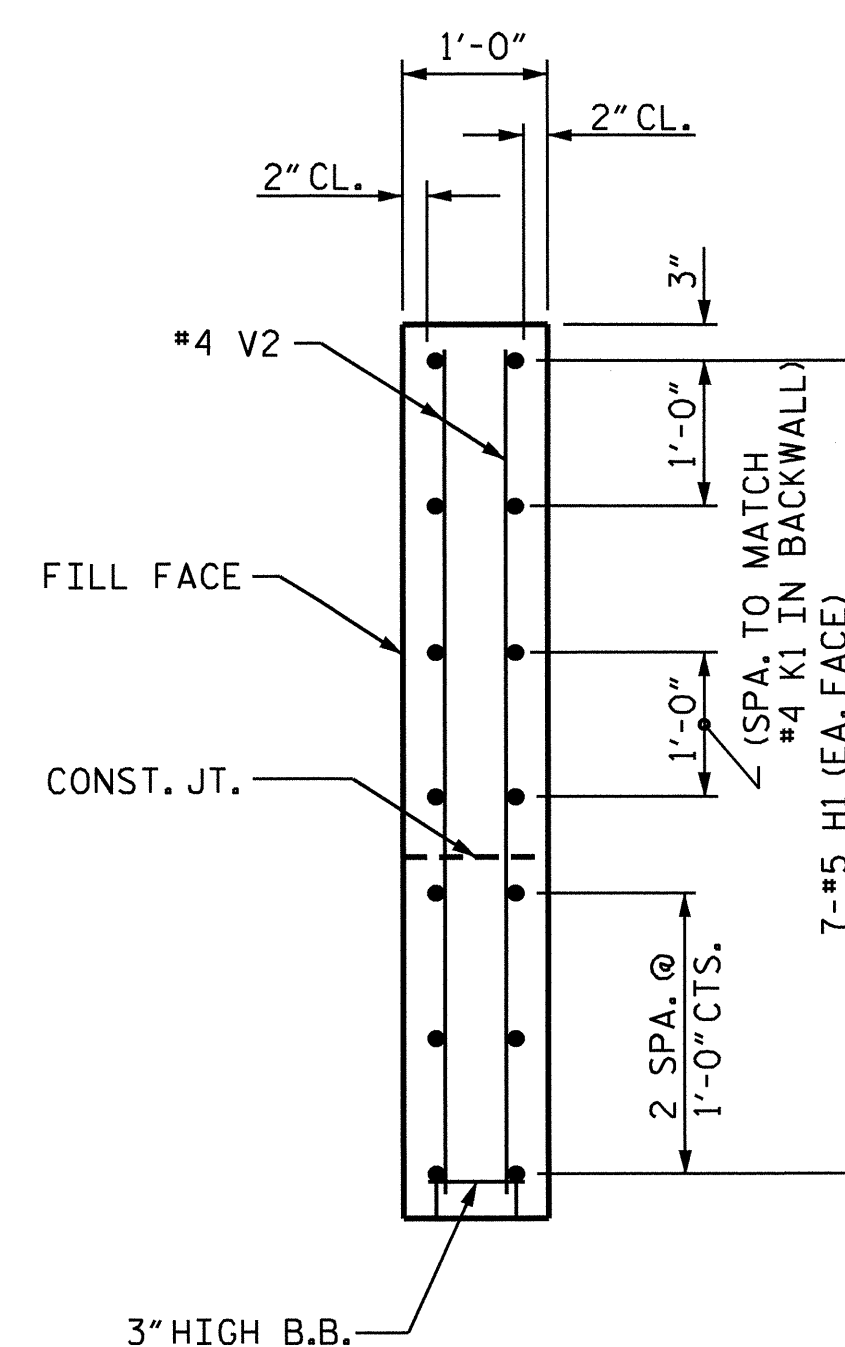
**PLAN OF LEFT WING**

RIGHT WING SIMILAR



**ELEVATION OF LEFT WING**

RIGHT WING SIMILAR



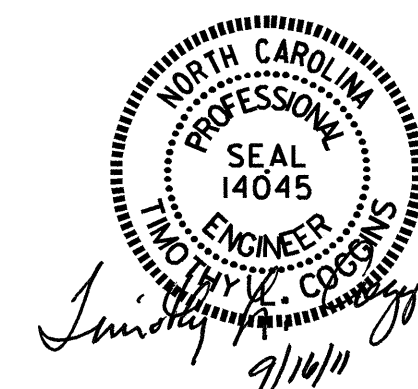
**SECTION X-X**

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT #1

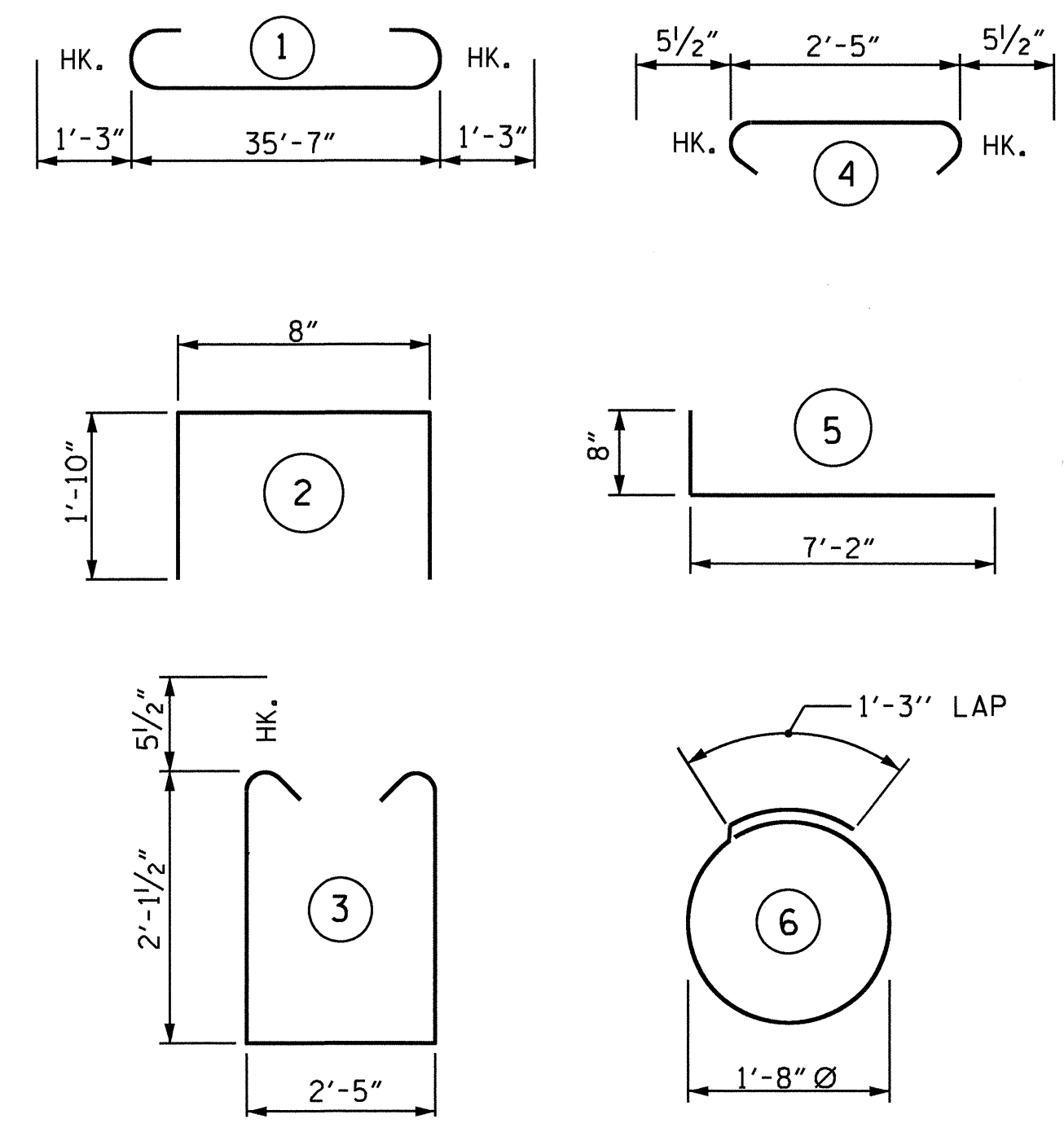


DRAWN BY : M.D.PISO DATE : 11-18-10  
 CHECKED BY : J.B.WILSON DATE : 1-24-11

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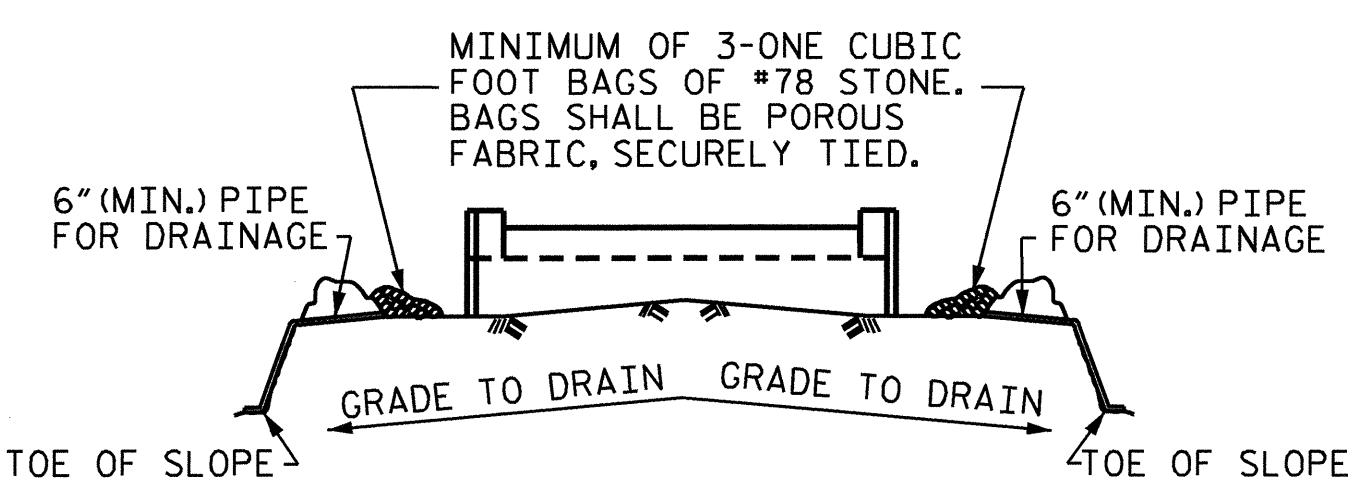
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			22

BAR TYPES



BILL OF MATERIAL					
END BENT #1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9		38'-1"	1036
B2	2	5	STR.	35'-8"	74
B3	8	4	STR.	19'-1"	102
B4	9	4	STR.	2'-5"	15
D1	20	8	STR.	2'-3"	120
H1	28	5	5	7'-10"	229
K1	8	4	STR.	19'-1"	102
K2	8	4	STR.	2'-11"	16
S1	42	5	3	7'-7"	332
S2	42	5	4	3'-4"	146
S3	10	4	6	6'-6"	43
U1	30	4	2	4'-4"	87
V1	60	5	STR.	4'-0"	250
V2	44	4	STR.	5'-10"	171
REINFORCING STEEL					2723 LBS.
POUR #1 CAP, LOWER PART OF WINGS AND PIPE COLLARS					11.2 C.Y.
POUR#2 BACKWALL AND UPPER PART OF WINGS					4.8 C.Y.
CLASS "A" CONCRETE TOTAL					16.0 C.Y.
HP 12 X 53 STEEL PILES NO. 5					200 LIN. FT.
PILE REDRIVES					3 EA.
STEEL PILE POINTS					5 EA.

ALL BAR DIMENSIONS ARE OUT TO OUT.

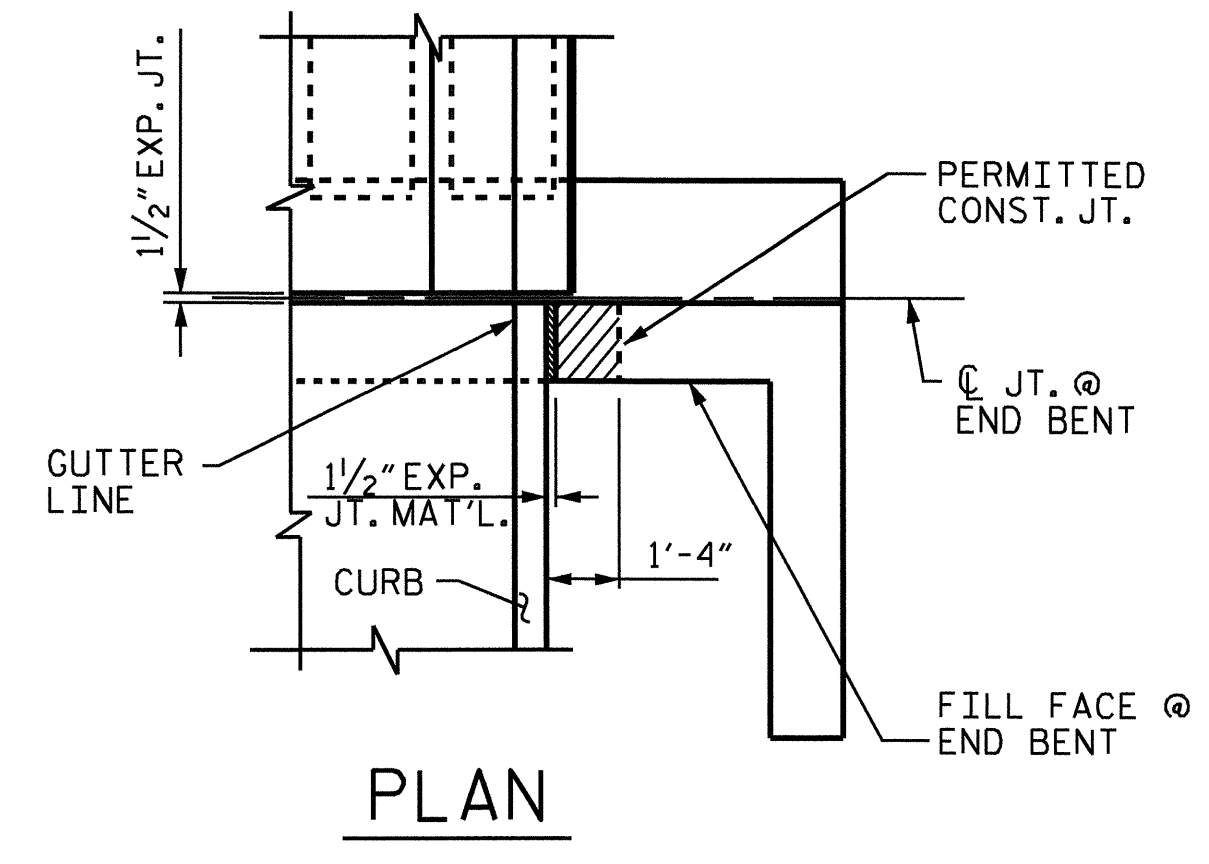


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

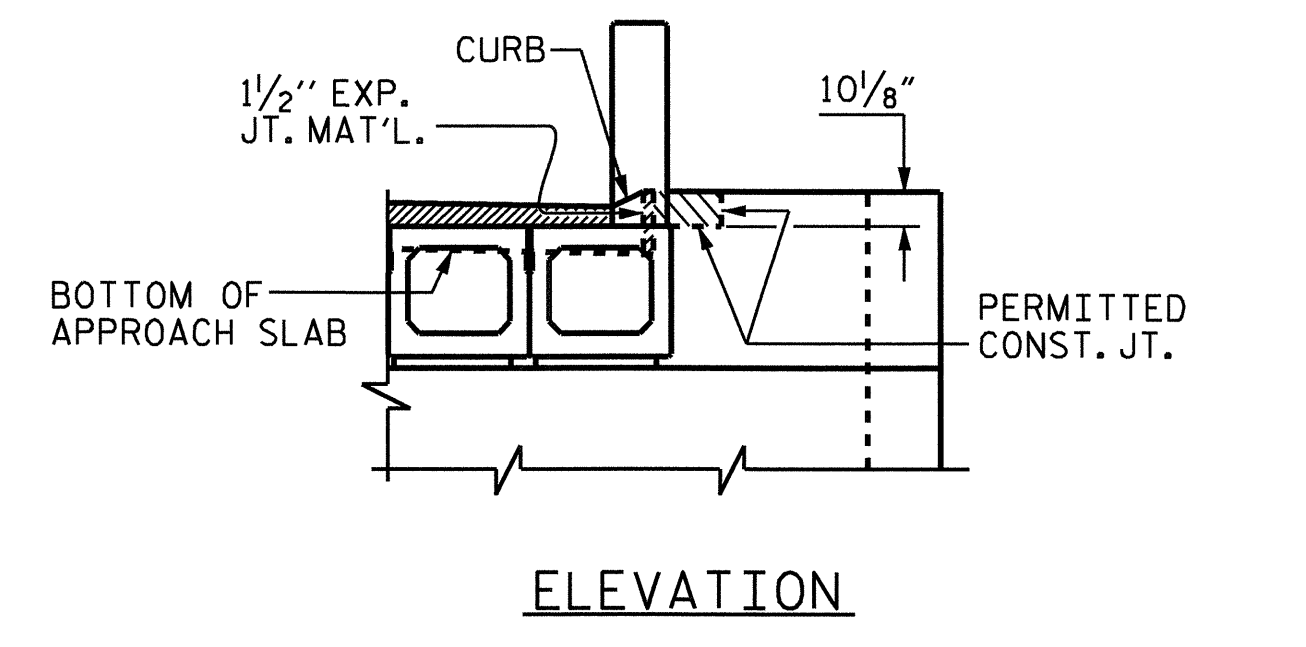
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

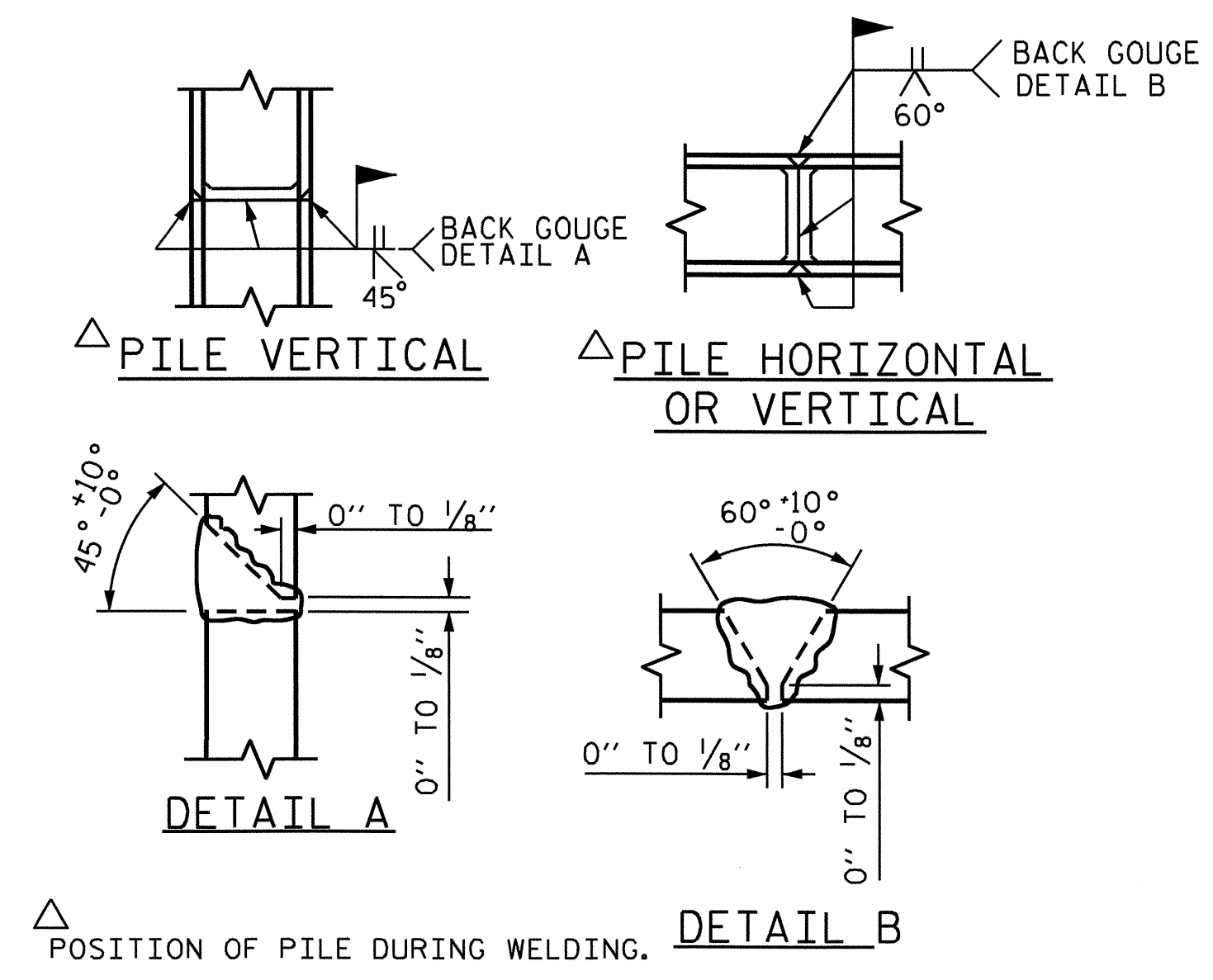
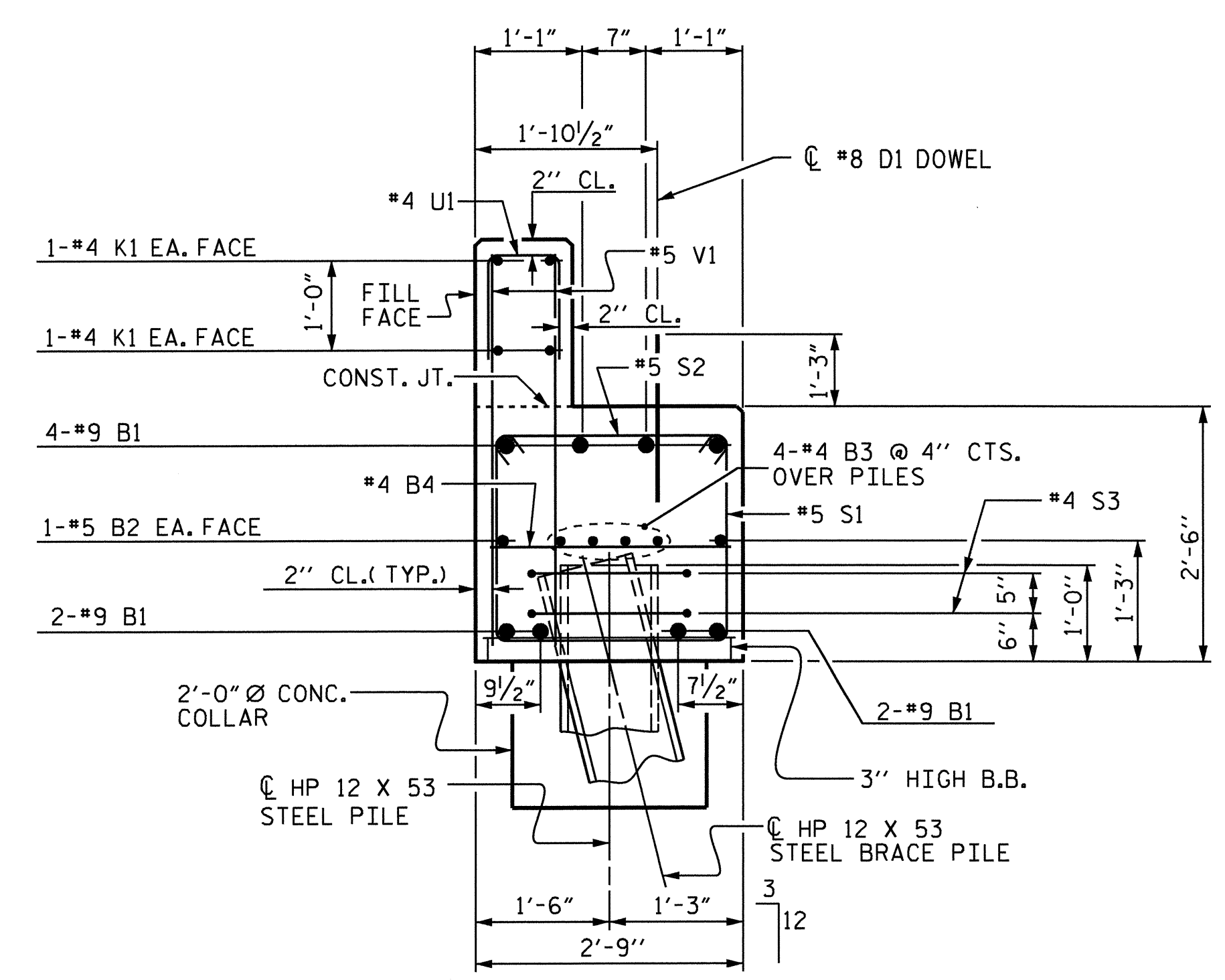
TEMPORARY DRAINAGE AT END BENT



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



BLOCKOUT IN WING WALL FOR BOX BEAM

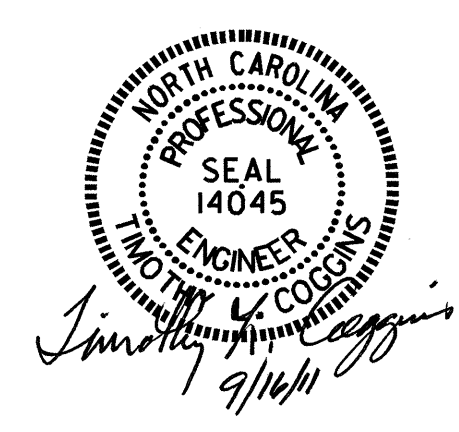


PILE SPLICE DETAILS

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -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-14	
1			3			TOTAL SHEETS	22
2			4				

DRAWN BY: M.D.PISO DATE: 11-18-10  
 CHECKED BY: JASON B. WILSON DATE: 1-24-11



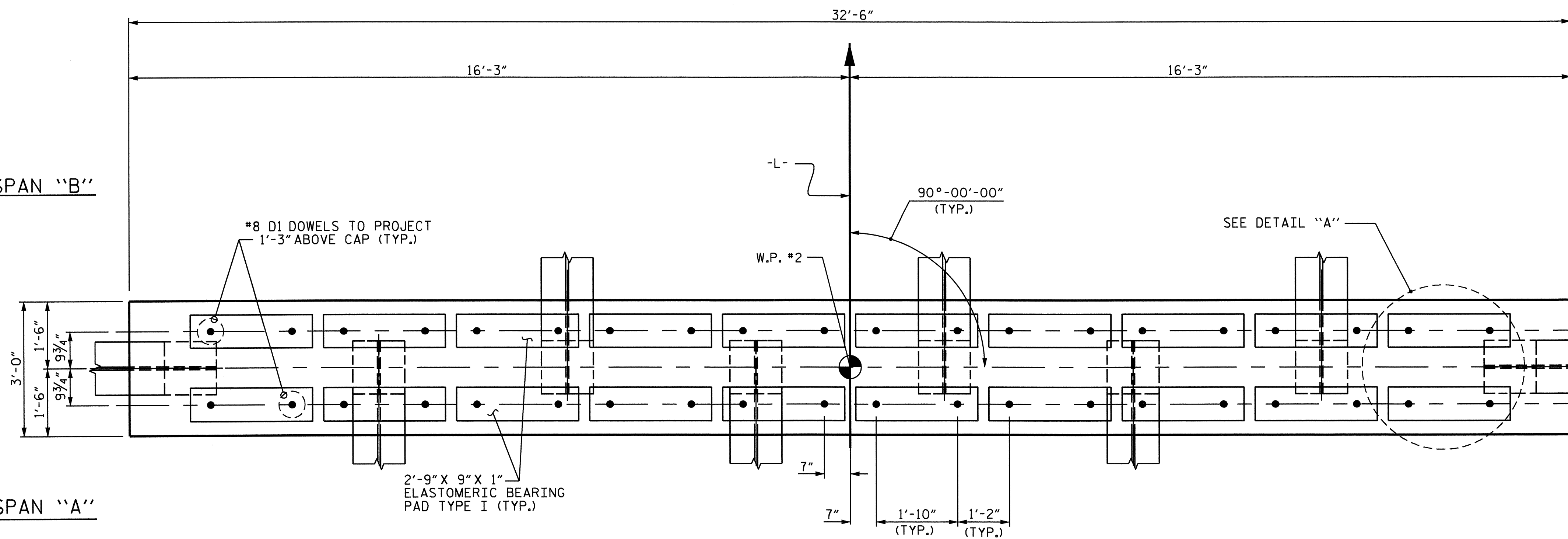
**NOTES:**

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

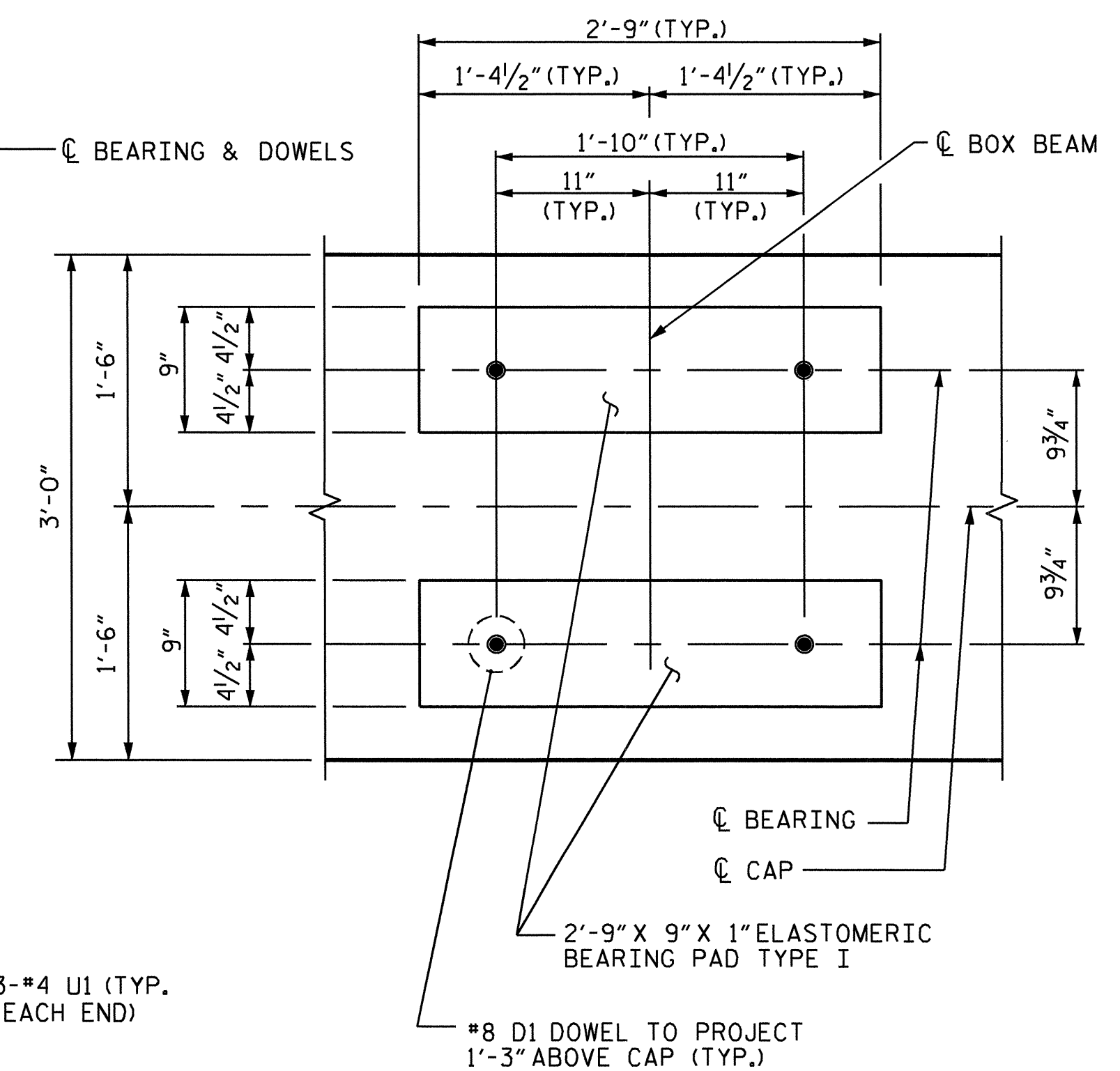
GALVANIZE THE FULL LENGTH OF EACH INTERIOR BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

SPAN "B"

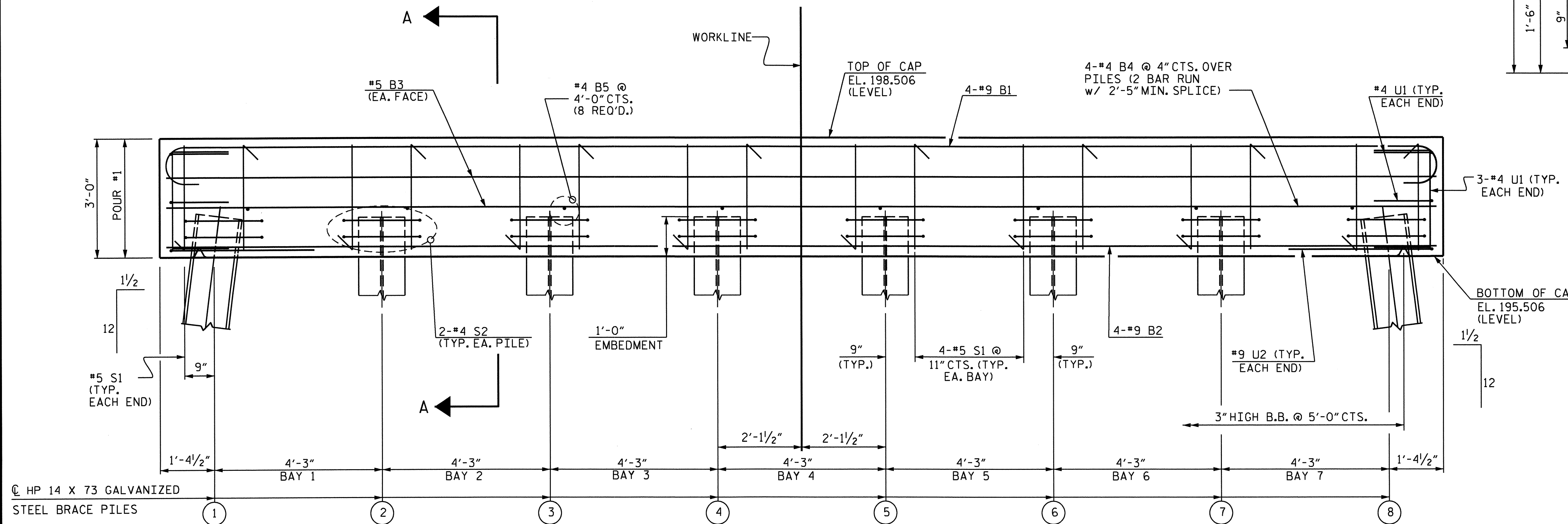
SPAN "A"



**PLAN**



**DETAIL A**  
(TYP. EA. UNIT)



**ELEVATION**

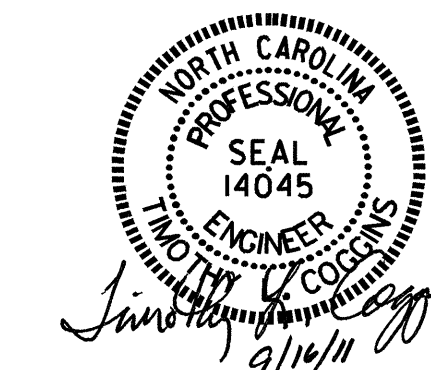
NOTES: PILE NOS. 2-7 ARE ALTERNATELY BRACED. INVERT ALTERNATE STIRRUPS.

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT #1



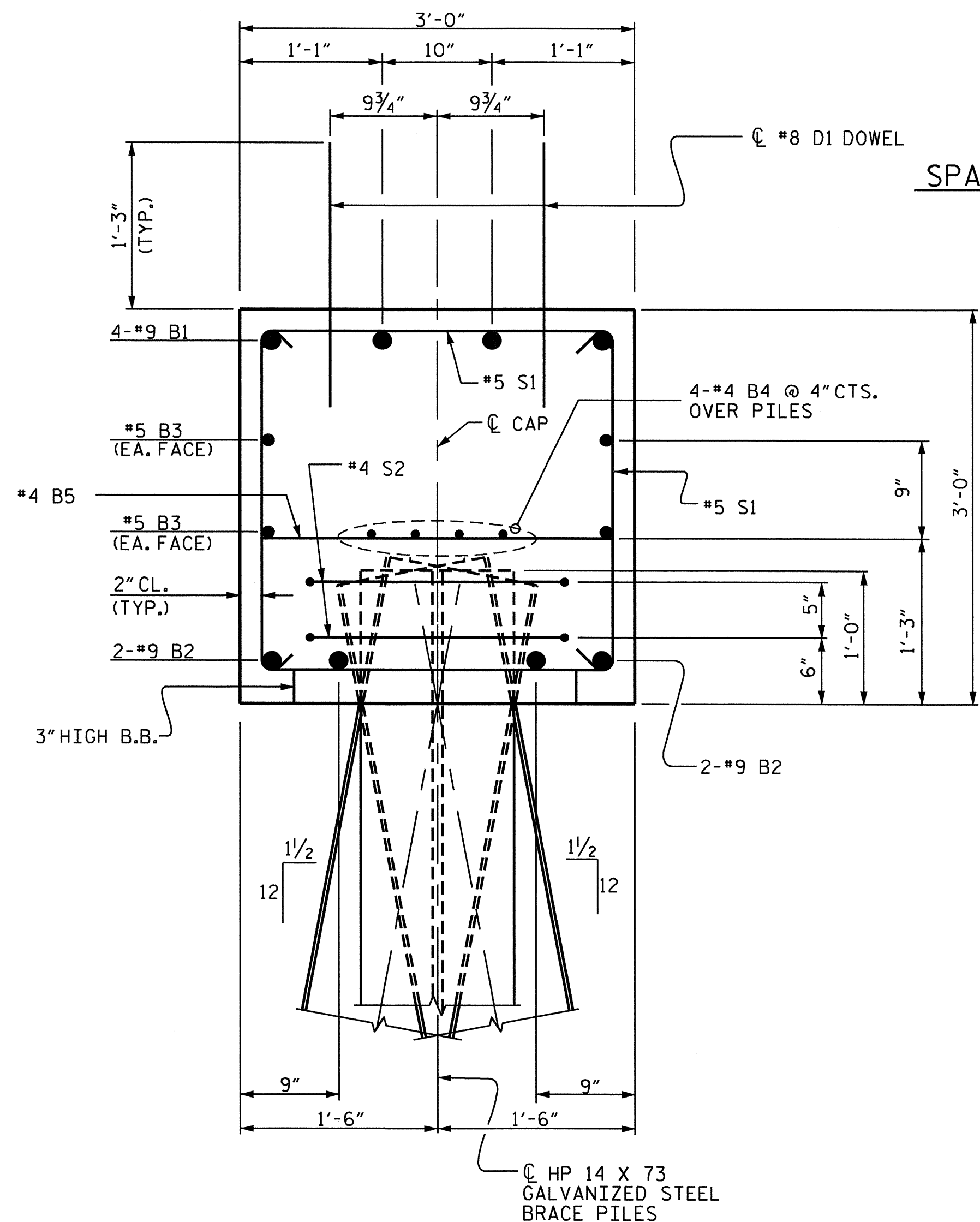
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 CHECKED BY: J.B. WILSON DATE: 1-26-11

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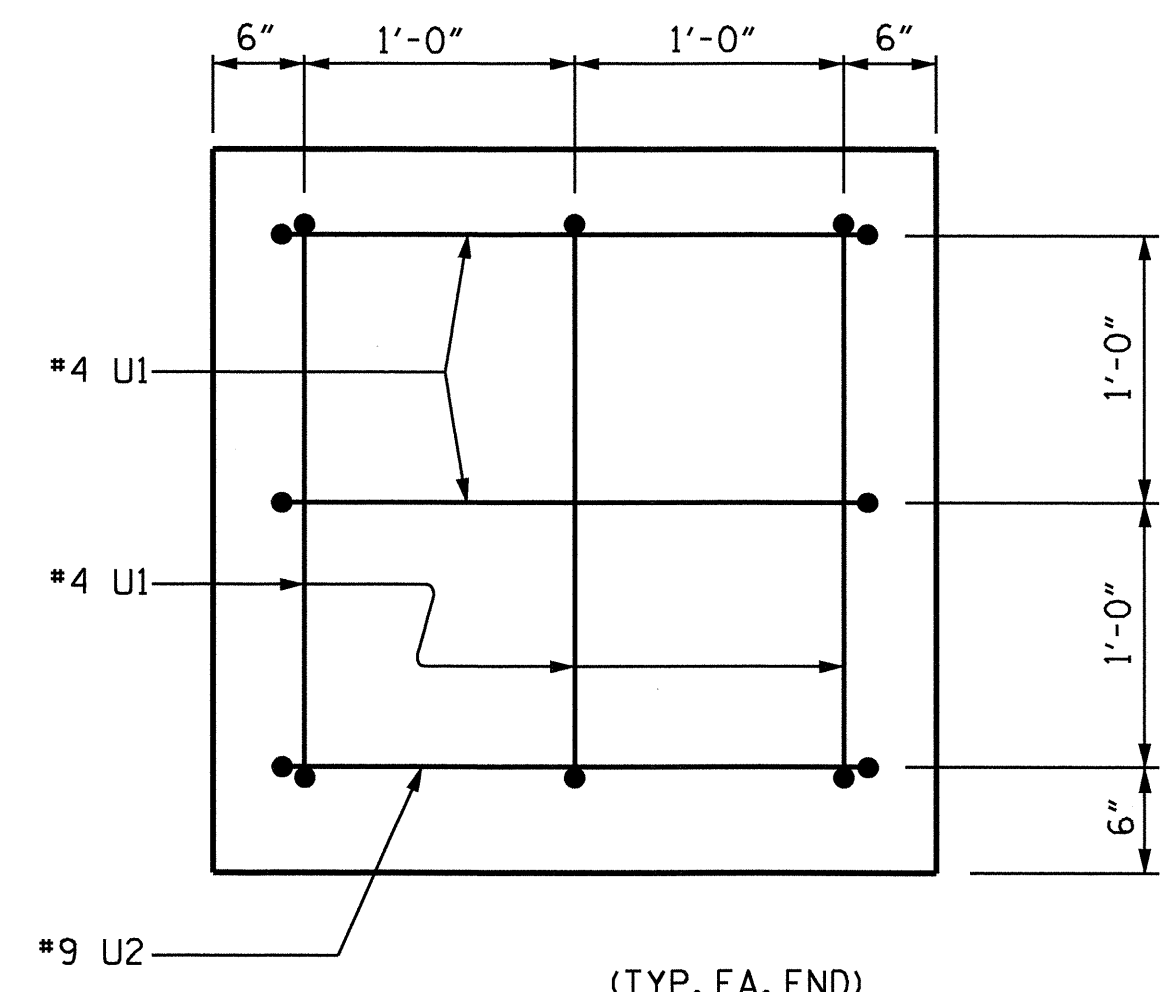
REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			22

SPAN "A"

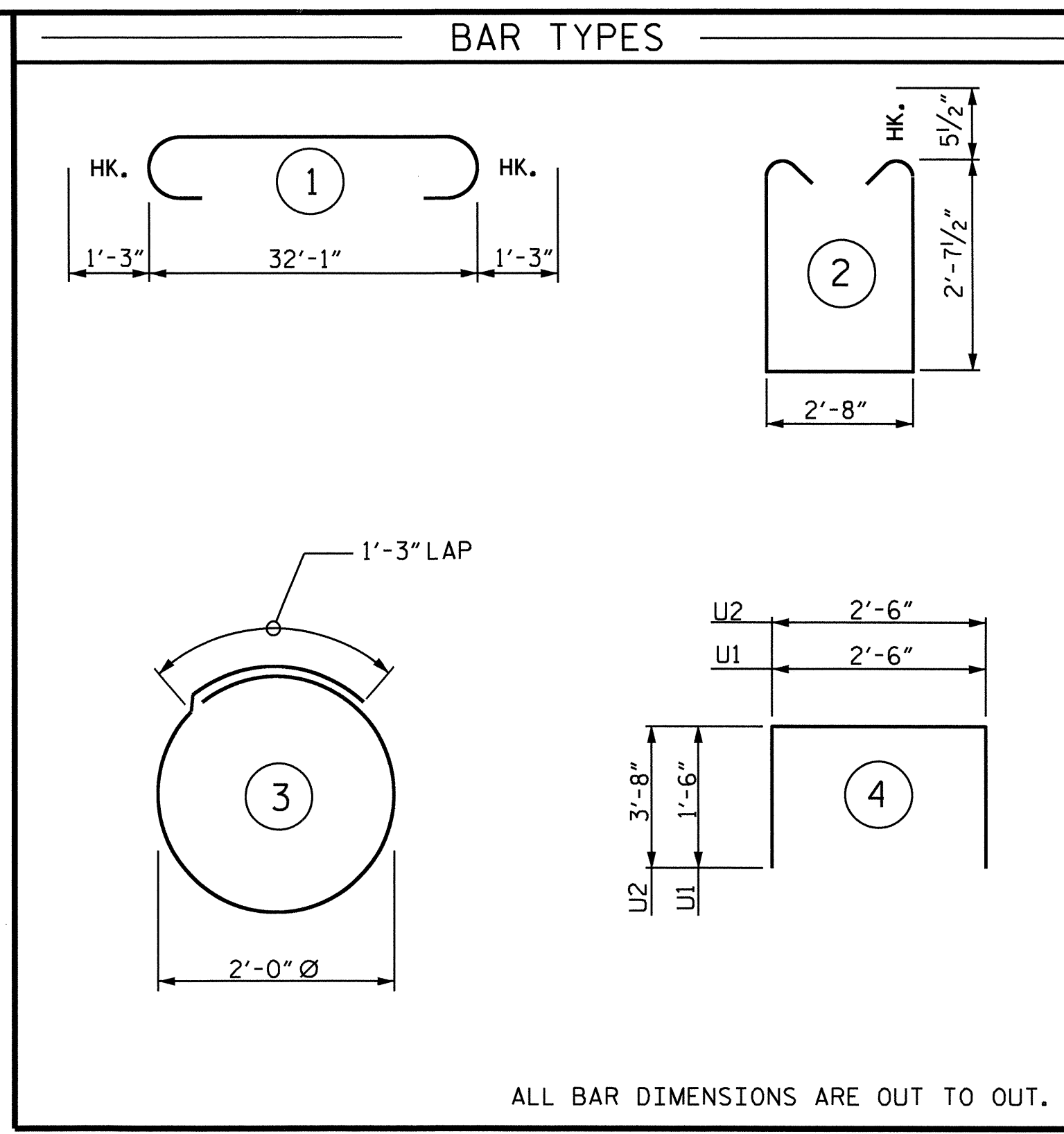
SPAN "B"



SECTION A-A

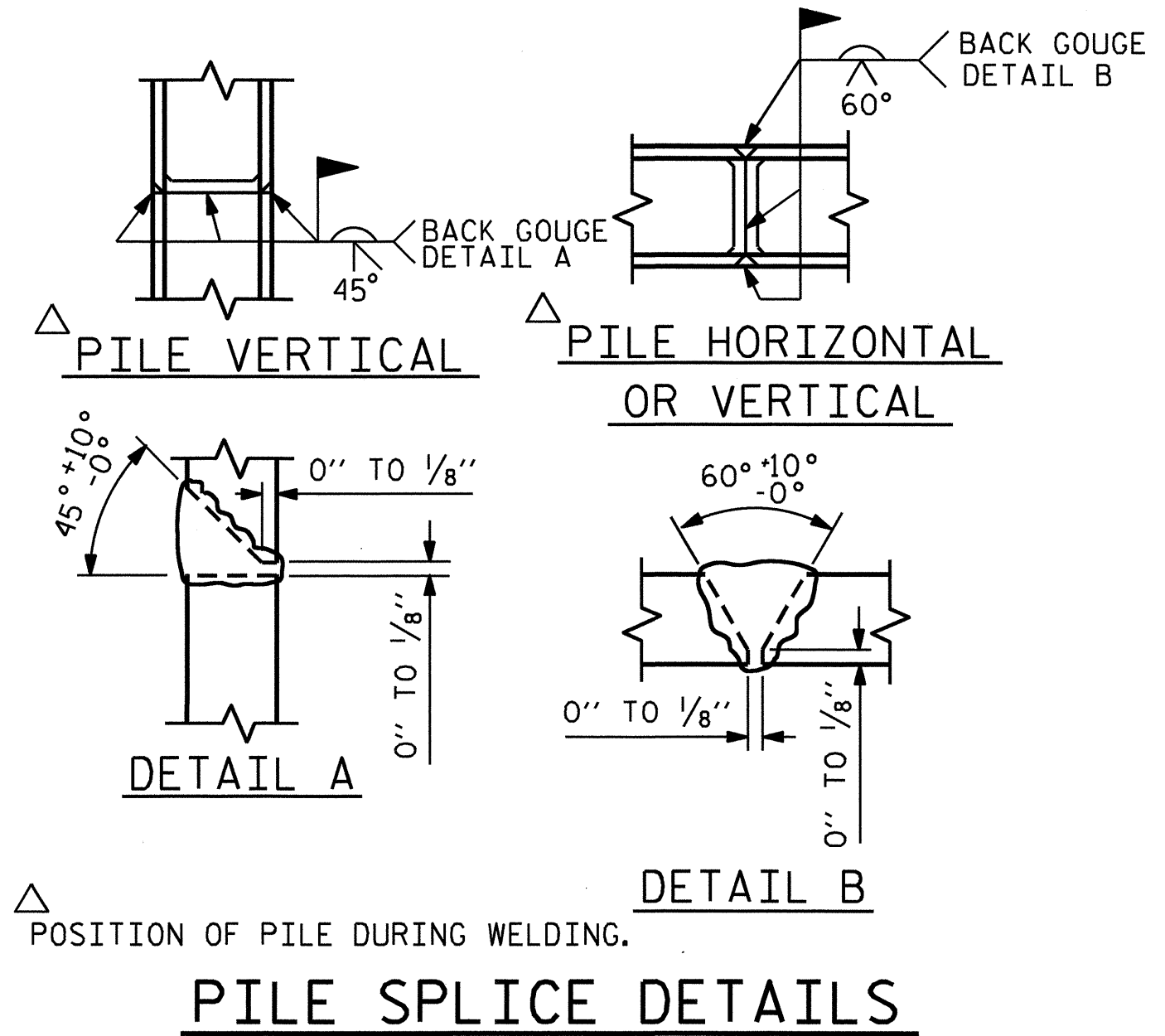


END VIEW



BILL OF MATERIAL BENT #1

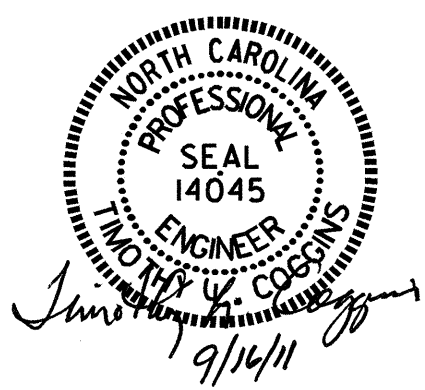
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#9	1	34'-7"	470
B2	4	#9	STR.	32'-2"	437
B3	4	#5	STR.	32'-2"	134
B4	8	#4	STR.	17'-4"	93
B5	8	#4	STR.	2'-8"	14
D1	40	#8	STR.	2'-3"	240
S1	30	#5	2	8'-10"	276
S2	16	#4	3	7'-7"	81
U1	10	#4	4	5'-6"	37
U2	2	#9	4	9'-10"	67
REINFORCING STEEL					1849 LBS.
CLASS "A" CONCRETE POUR #1 (CAP)					10.8 C.Y.
TOTAL CONCRETE					10.8 C.Y.
HP 14 X 73 GALVANIZED STEEL PILES NO. 8					240 LIN. FT.
PILE REDRIVES					EACH 4
STEEL PILE POINTS					EACH 8



PROJECT NO. B-4542  
 HARNETT COUNTY  
 STATION: 19+20.00 -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:	5-16
1			3			TOTAL SHEETS
2			4			22



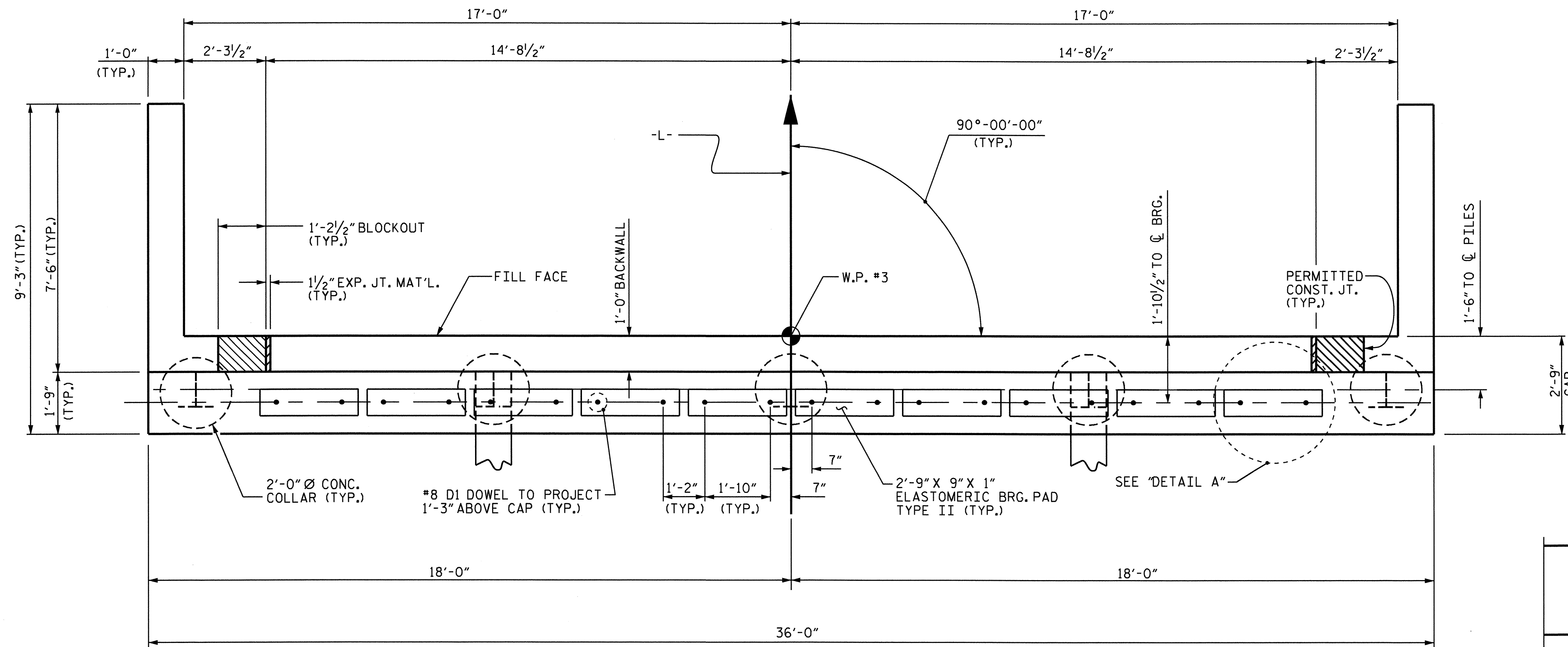
DRAWN BY: M.D.PISO DATE: 10-21-10  
 CHECKED BY: J.B. WILSON DATE: 1-26-11

**NOTES:**

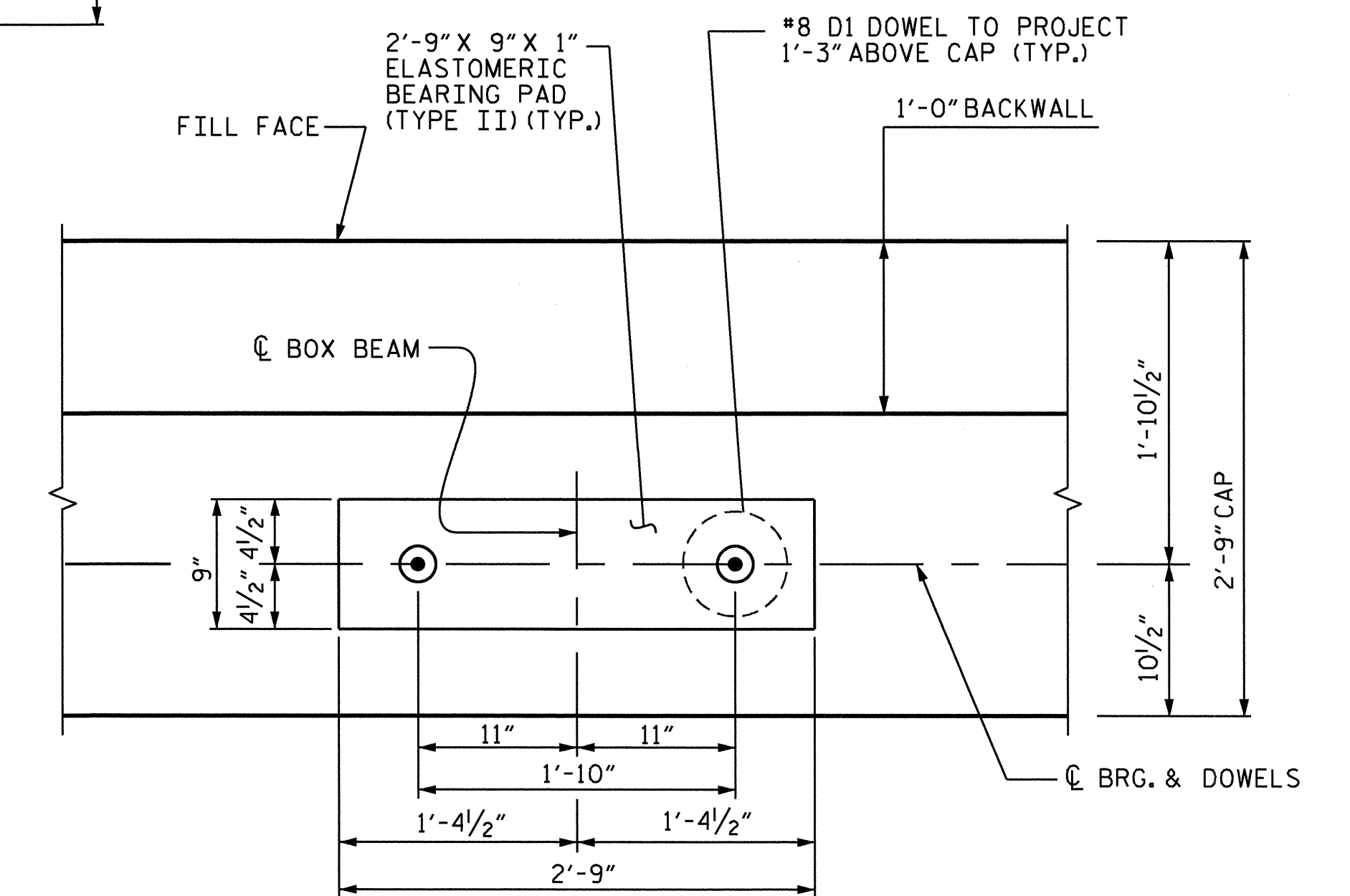
STIRRUPS MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

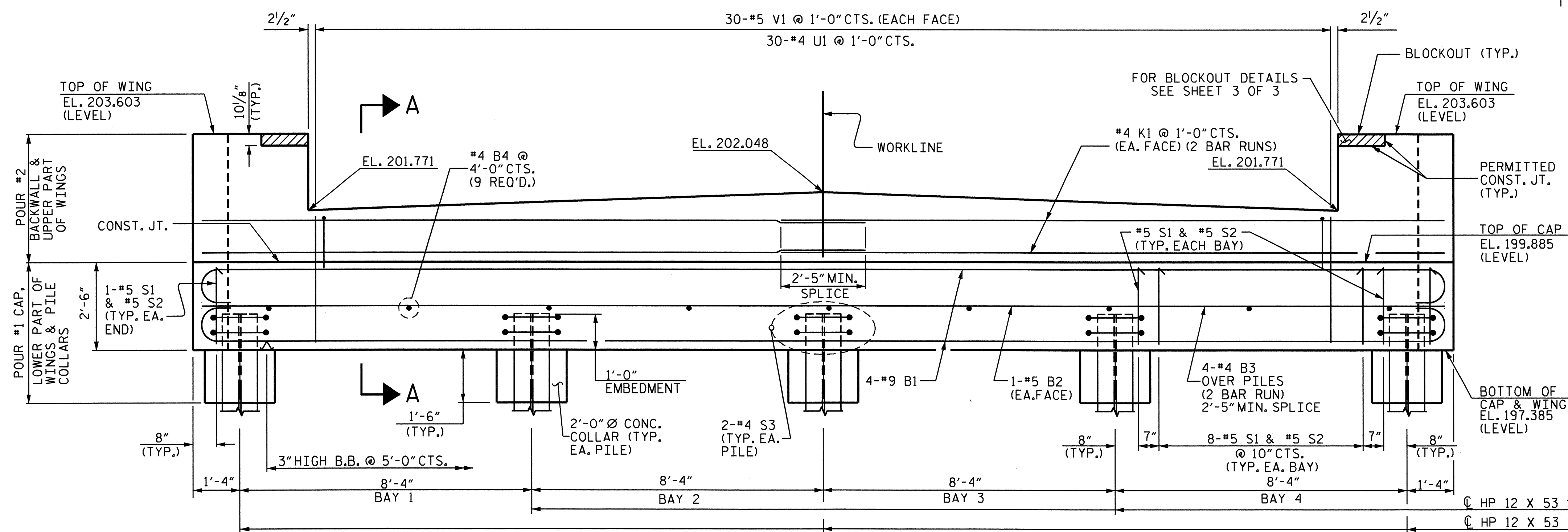
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



**PLAN**



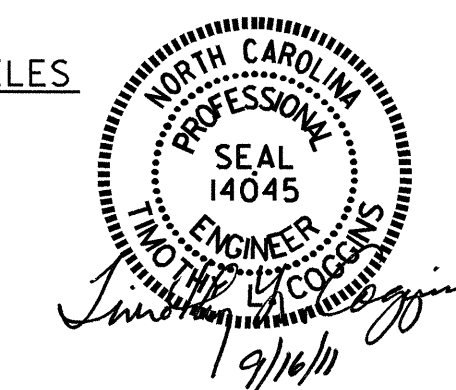
**DETAIL 'A'**  
(TYP. EA. UNIT)



**ELEVATION**

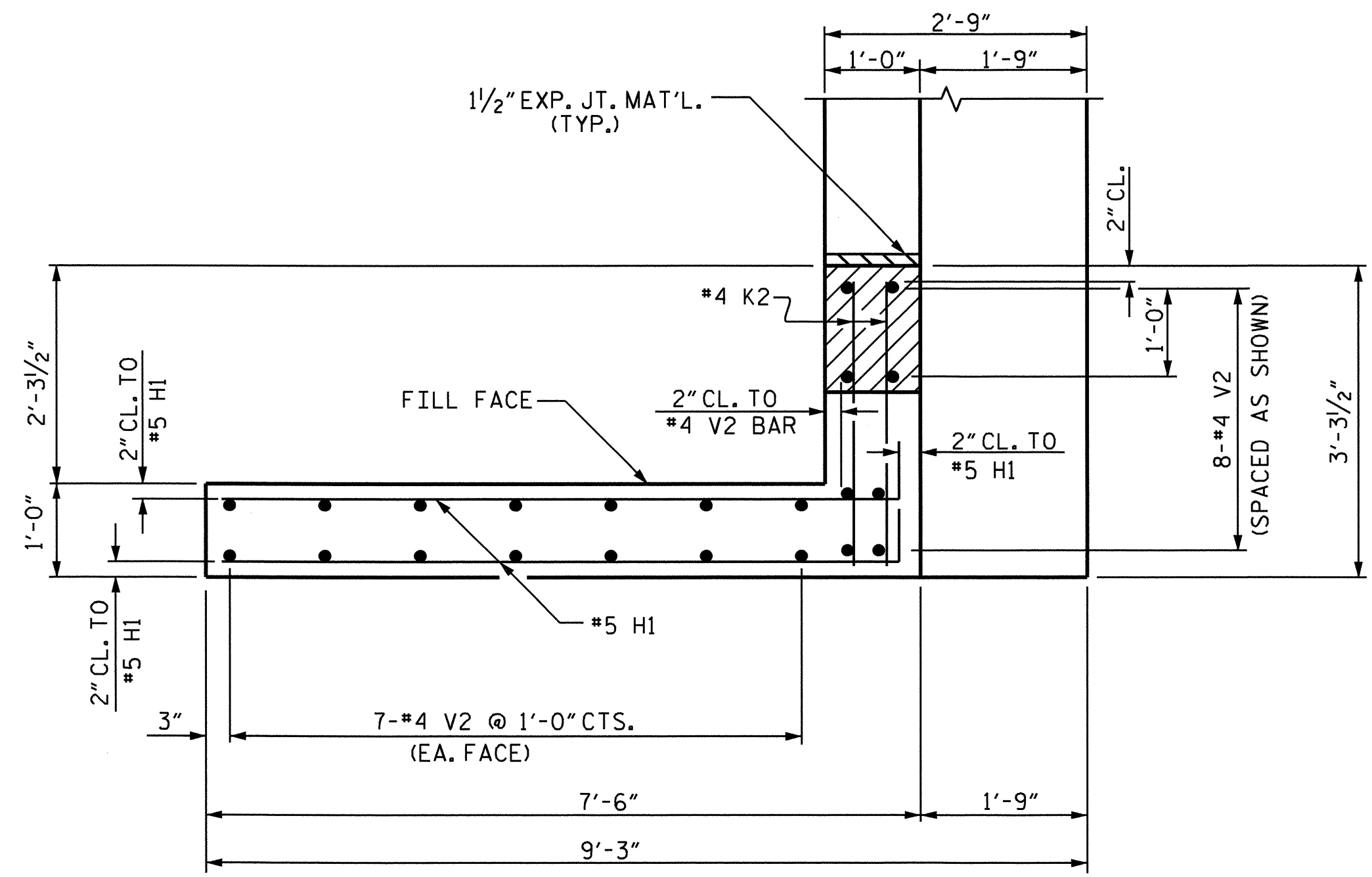
PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT #2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-17
					TOTAL SHEETS 22

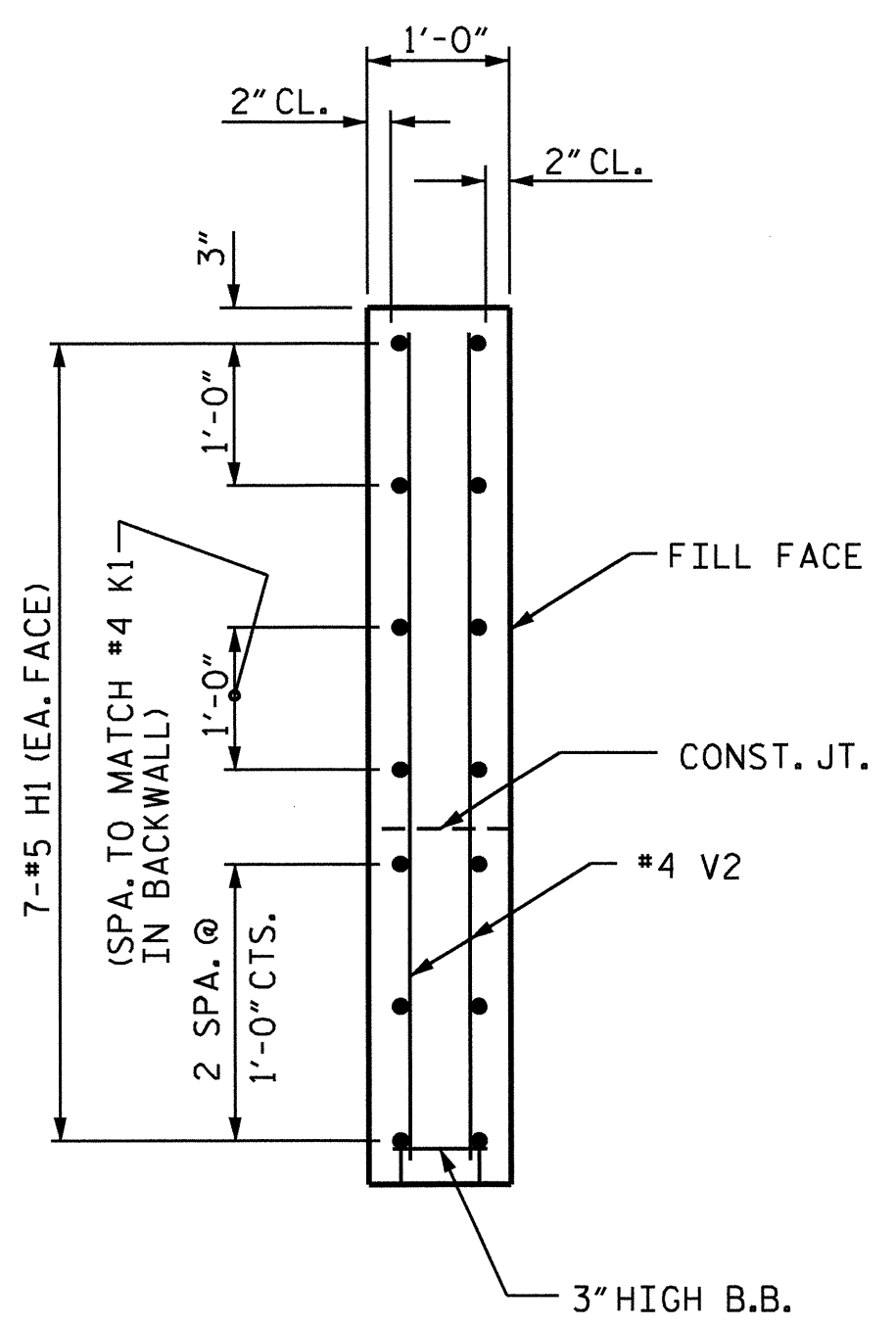


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 CHECKED BY: J.B. WILSON DATE: 1/24/11

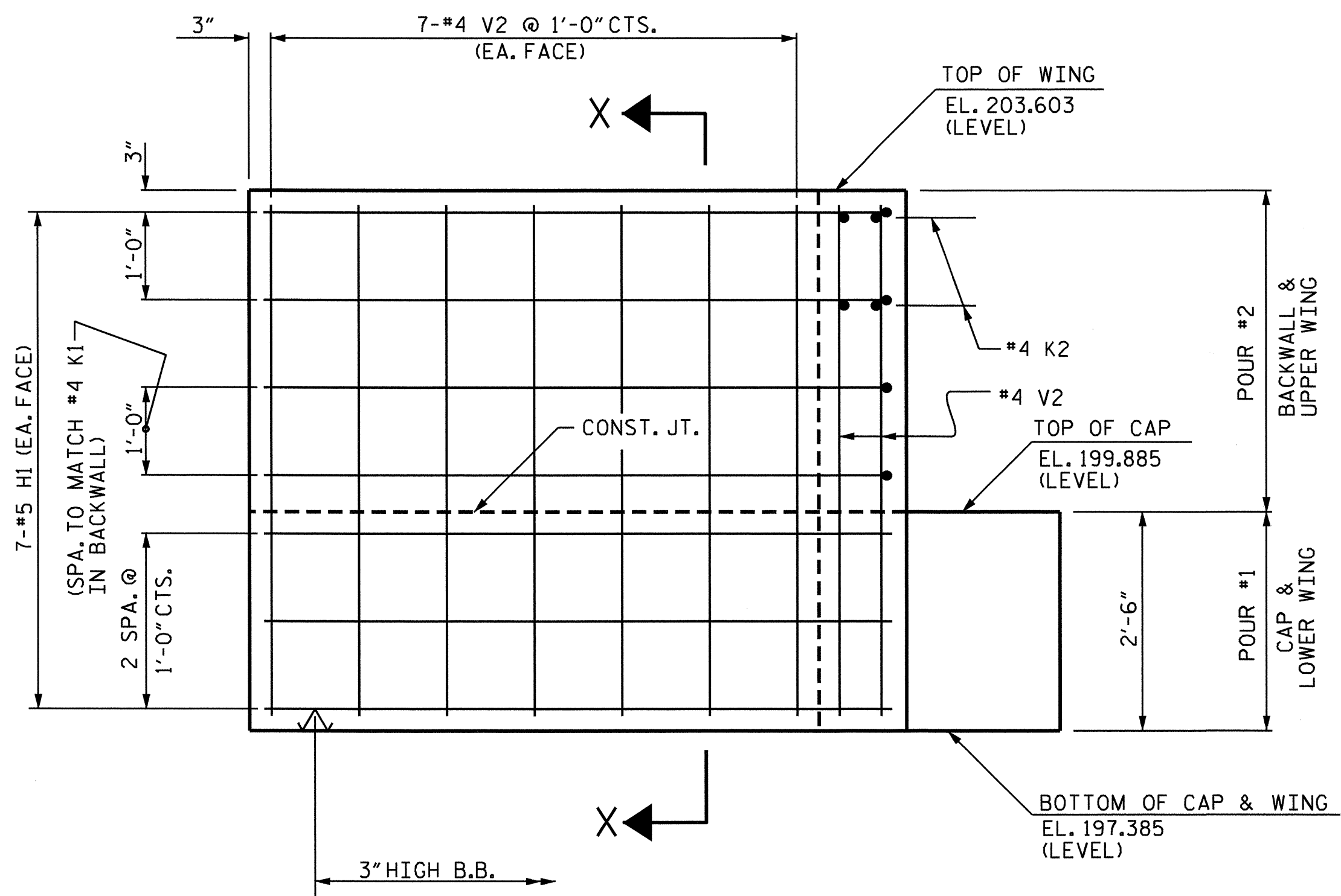




**PLAN OF LEFT WING**  
RIGHT WING SIMILAR



**SECTION X-X**

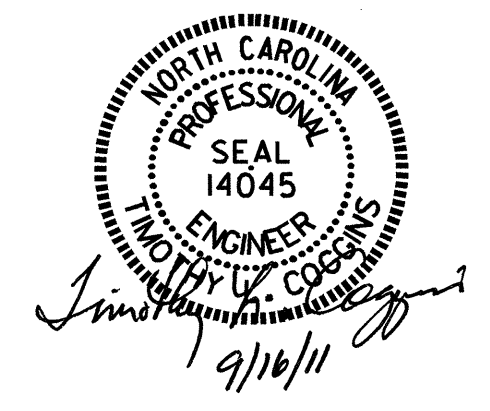


**ELEVATION OF LEFT WING**  
RIGHT WING SIMILAR

PROJECT NO. B-4542  
HARNETT COUNTY  
STATION: 19+20.00 -L-

SHEET 2 OF 3

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

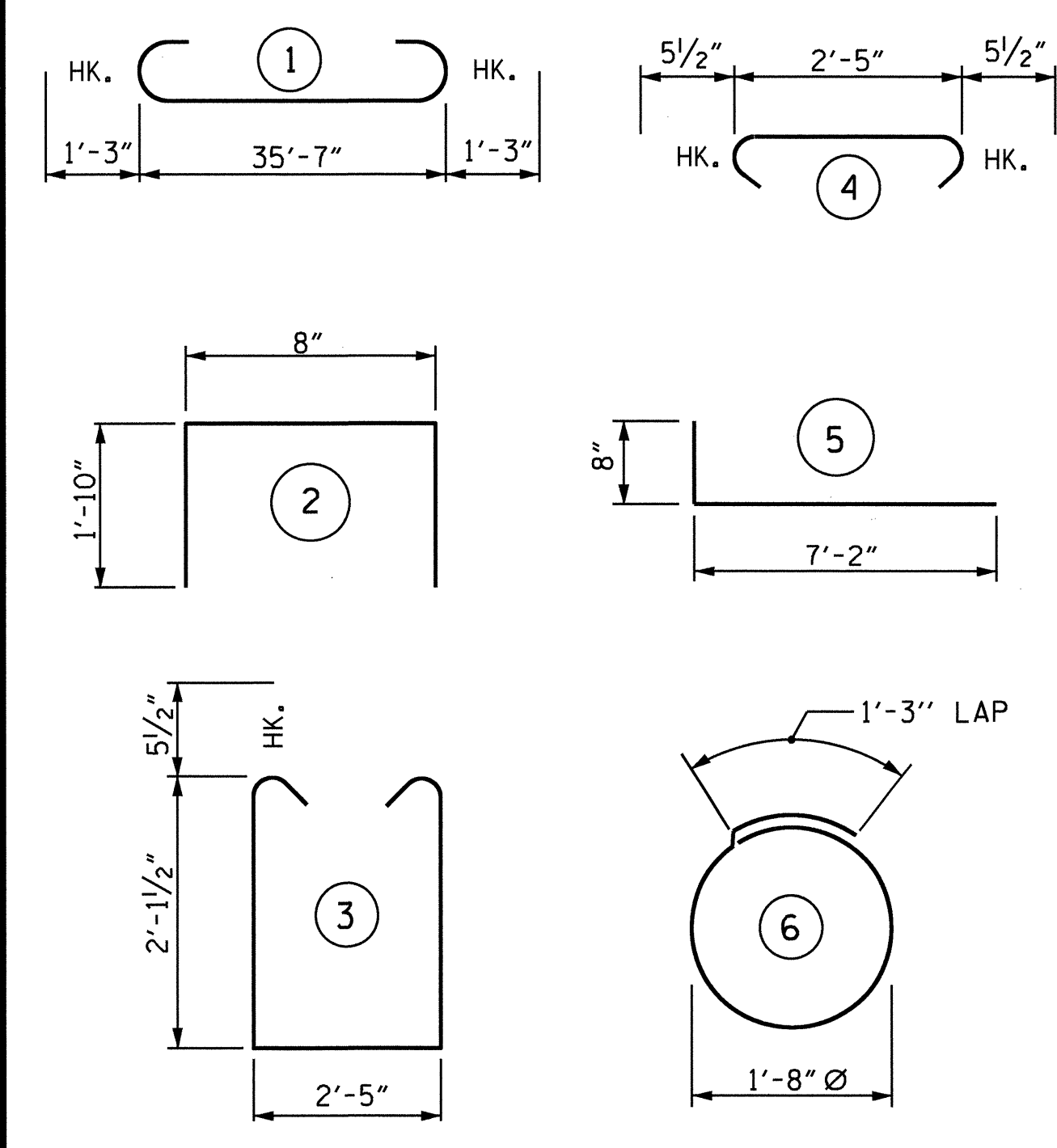


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CHECKED BY : J.B. WILSON DATE : 1-24-11

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			22

BAR TYPES

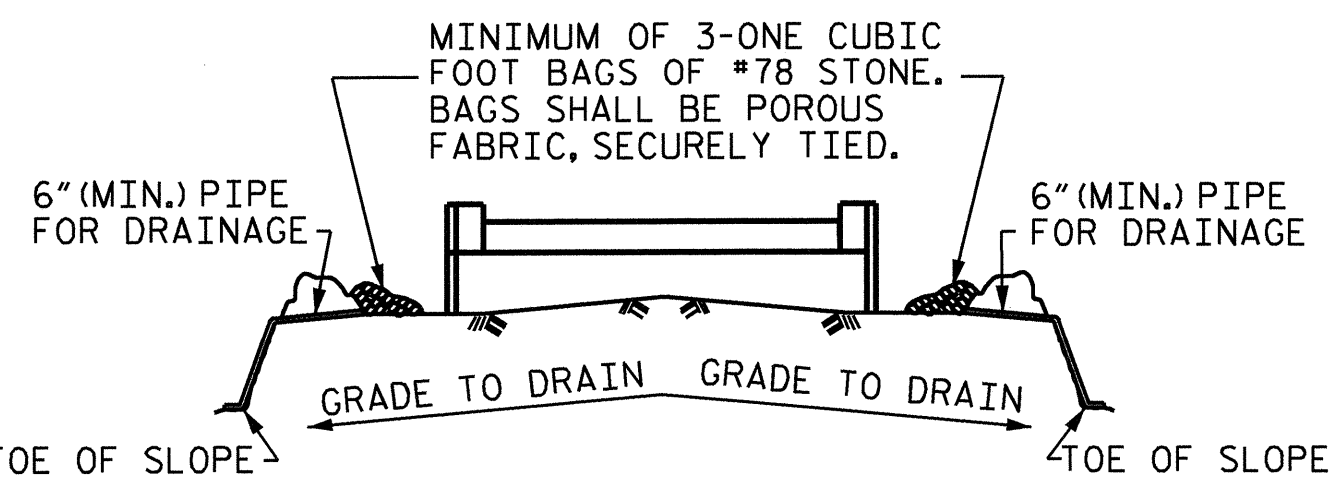


BILL OF MATERIAL  
END BENT #2

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	38'-1"	1036
B2	2	5	STR.	35'-8"	74
B3	8	4	STR.	19'-1"	102
B4	9	4	STR.	2'-5"	15
D1	20	8	STR.	2'-3"	120
H1	28	5	5	7'-10"	229
K1	8	4	STR.	19'-1"	102
K2	8	4	STR.	2'-11"	16
S1	42	5	3	7'-7"	332
S2	42	5	4	3'-4"	146
S3	10	4	6	6'-6"	43
U1	30	4	2	4'-4"	87
V1	60	5	STR.	4'-0"	250
V2	44	4	STR.	5'-10"	171

REINFORCING STEEL	2723	LBS.
POUR #1 CAP, LOWER PART OF WINGS AND PILE COLLARS	11.2	C.Y.
POUR #2 BACKWALL AND UPPER PART OF WINGS	4.9	C.Y.
CLASS "A" CONCRETE TOTAL	16.1	C.Y.
STEEL PILE POINTS	5	EA.
HP 12 X 53 STEEL PILES NO. 5	150	LIN. FT.

ALL BAR DIMENSIONS ARE OUT TO OUT.

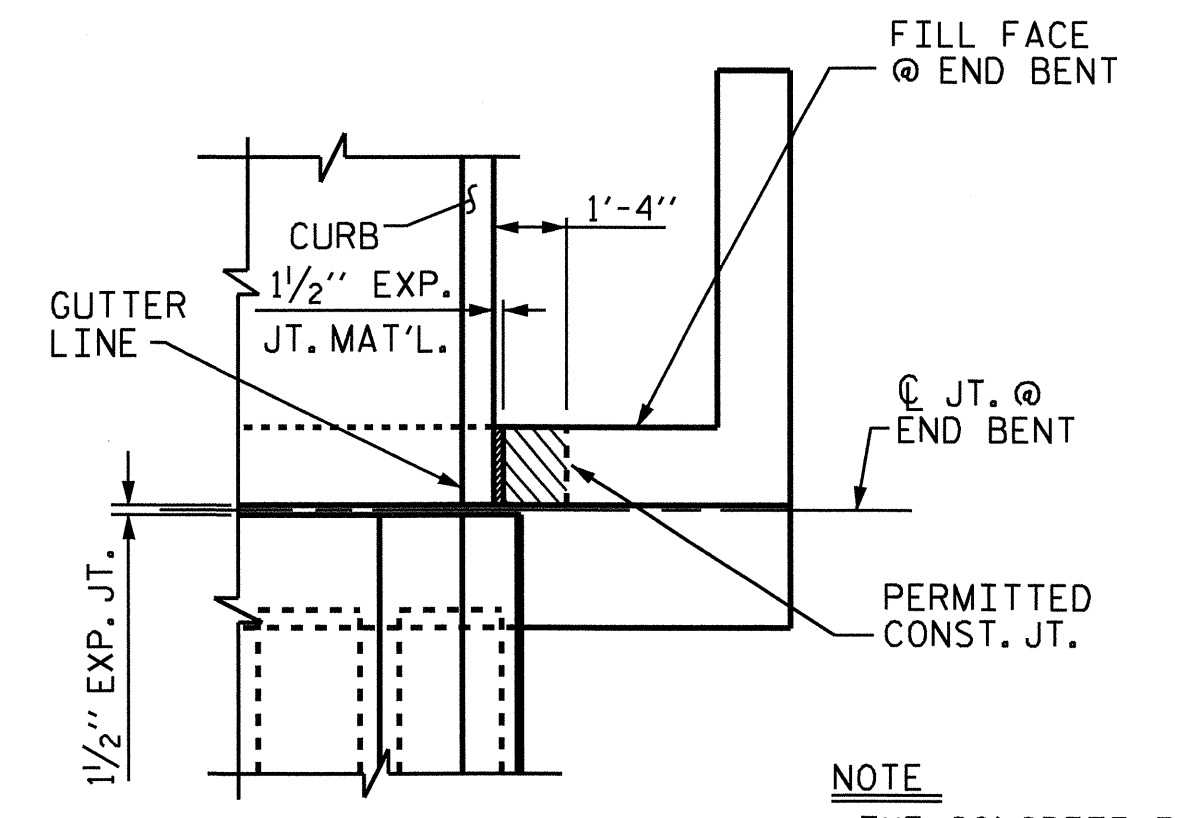


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

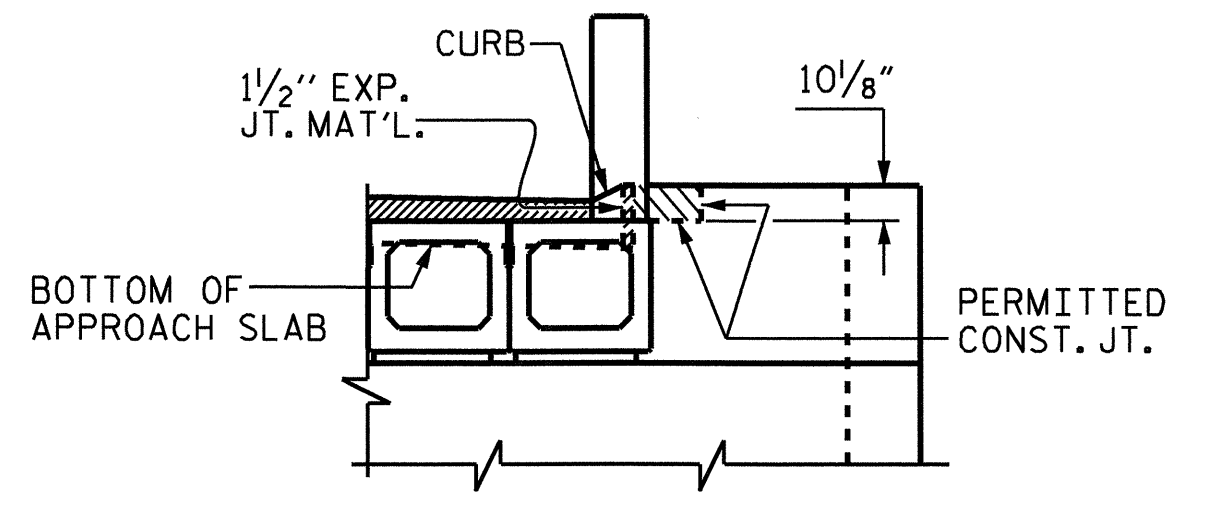
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



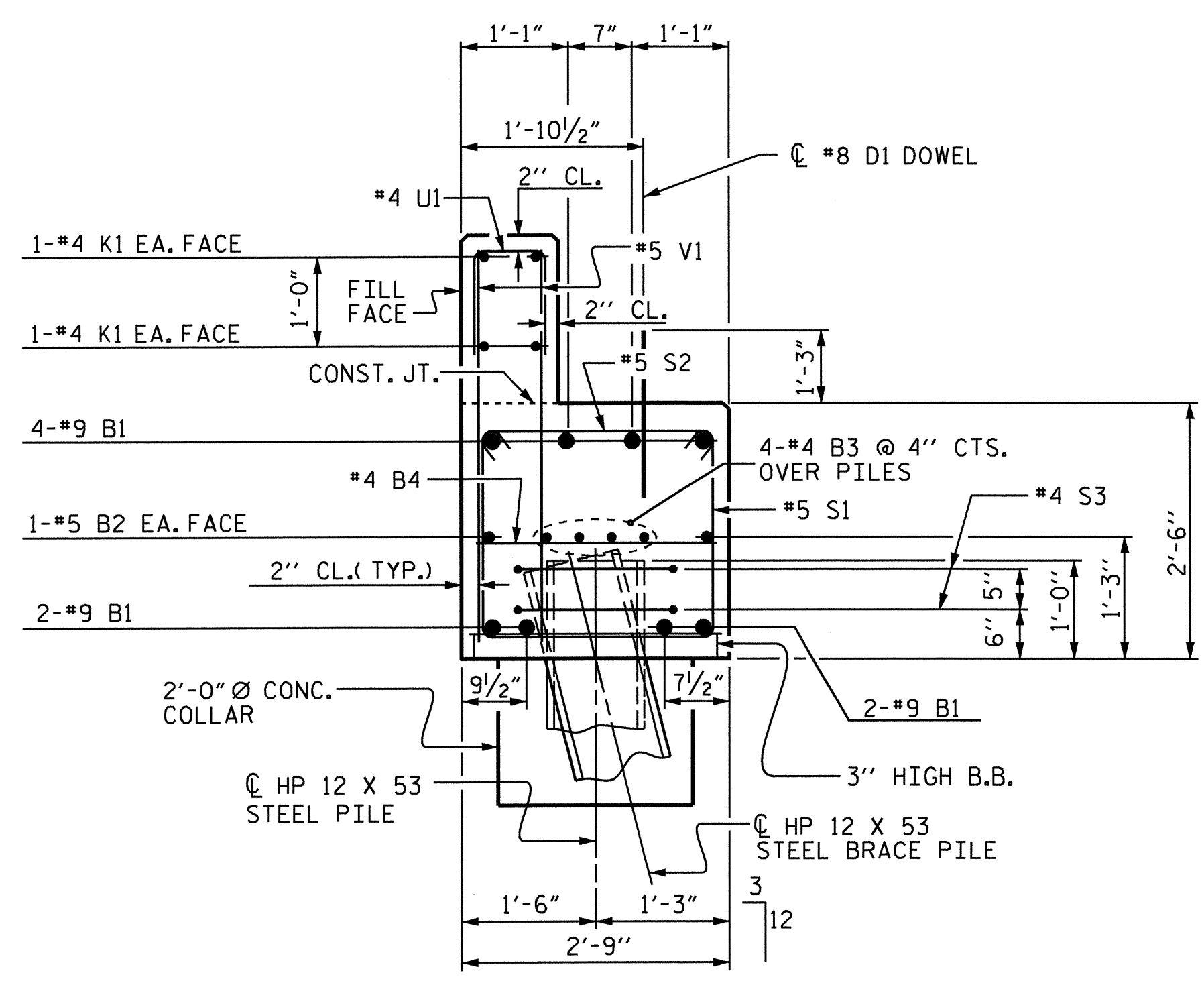
PLAN

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

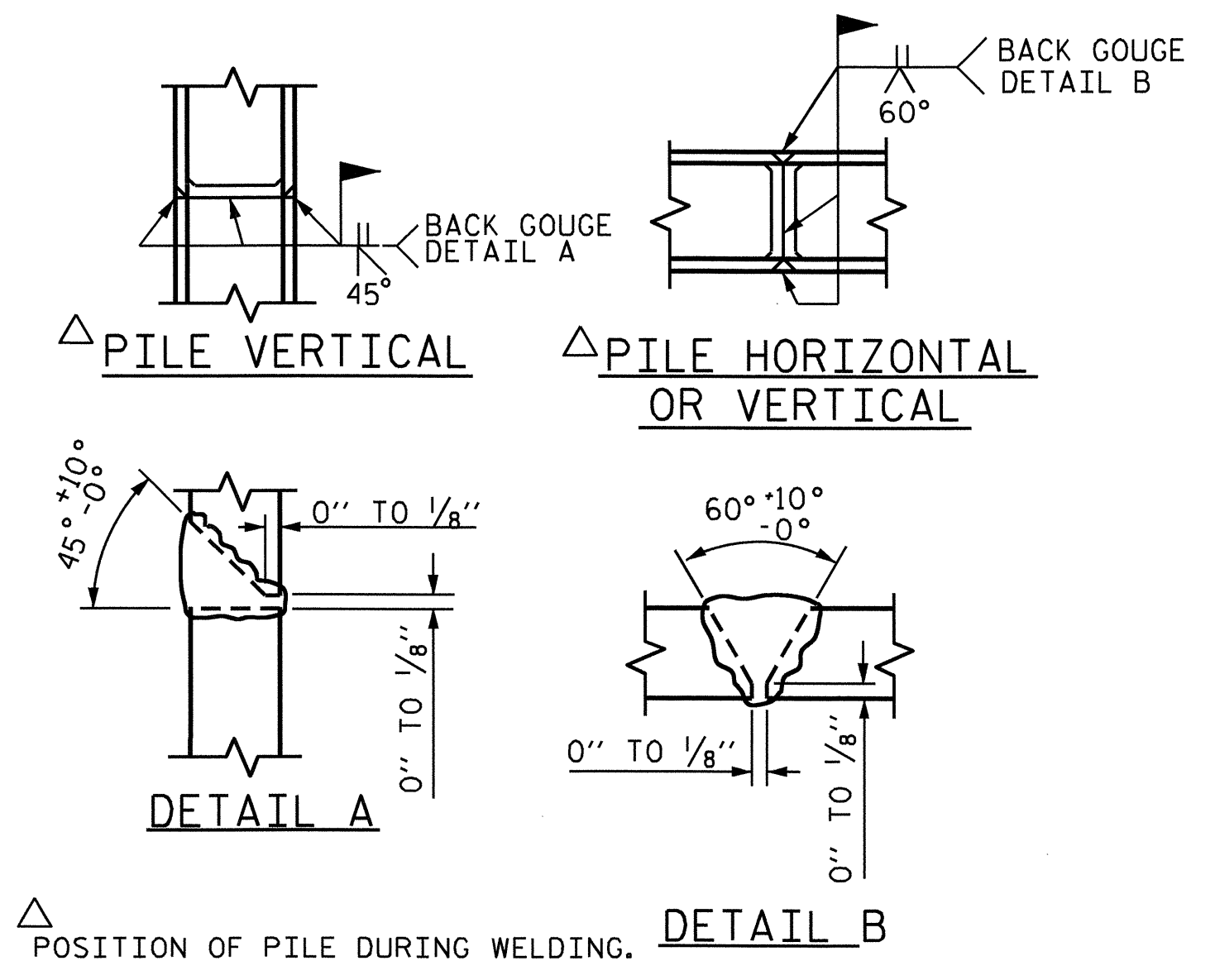


ELEVATION

BLOCKOUT IN WING WALL FOR BOX BEAM



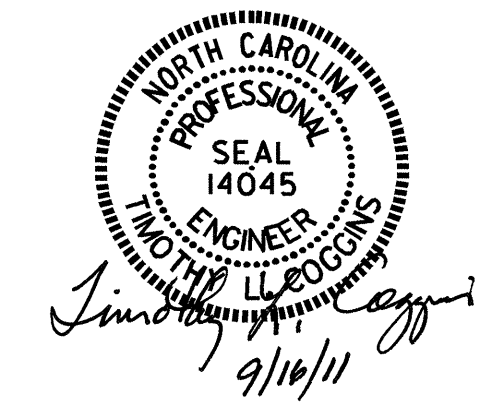
SECTION A-A



PILE SPLICE DETAILS

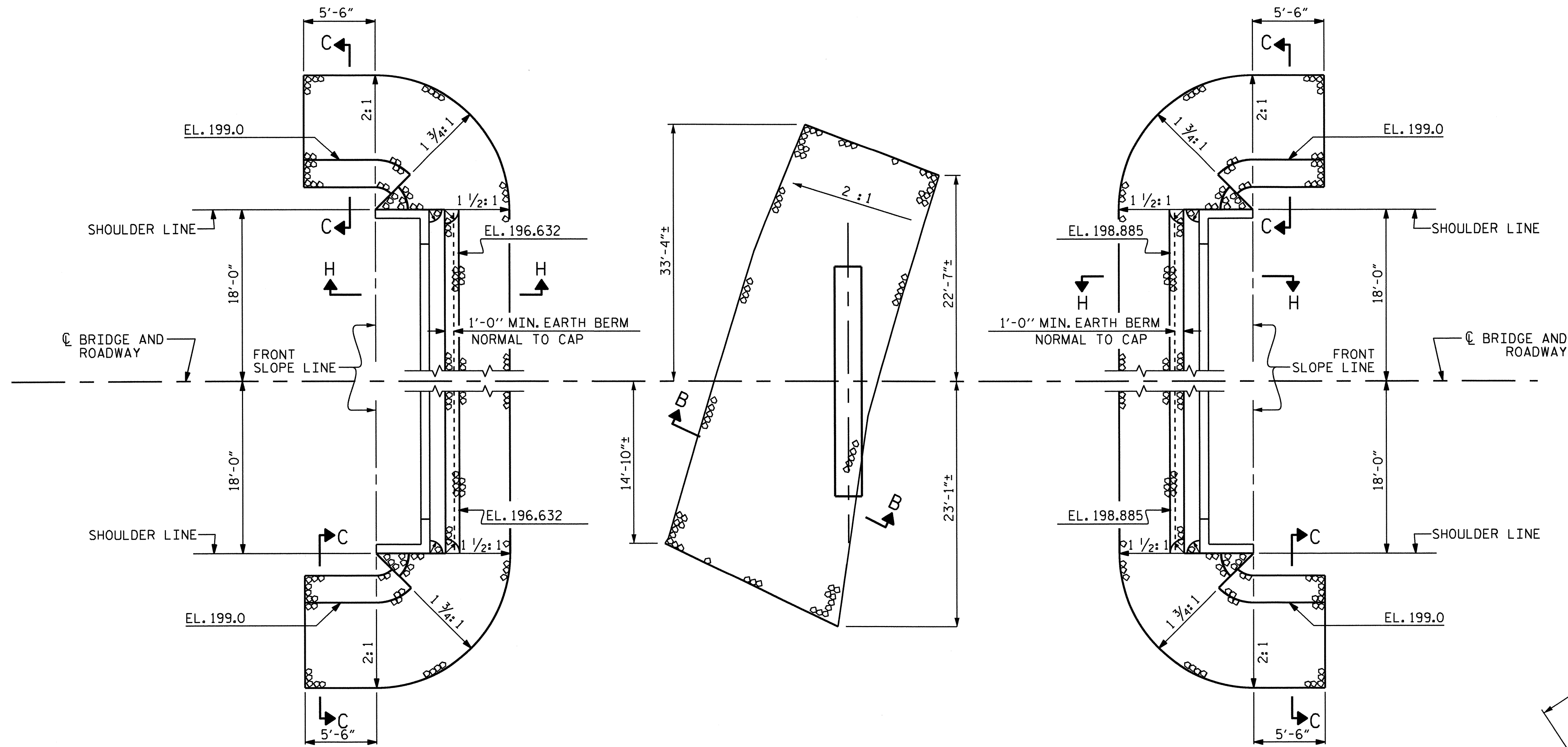
PROJECT NO. B-4542  
HARNETT COUNTY  
STATION: 19+20.00 -L-  
SHEET 3 OF 3

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

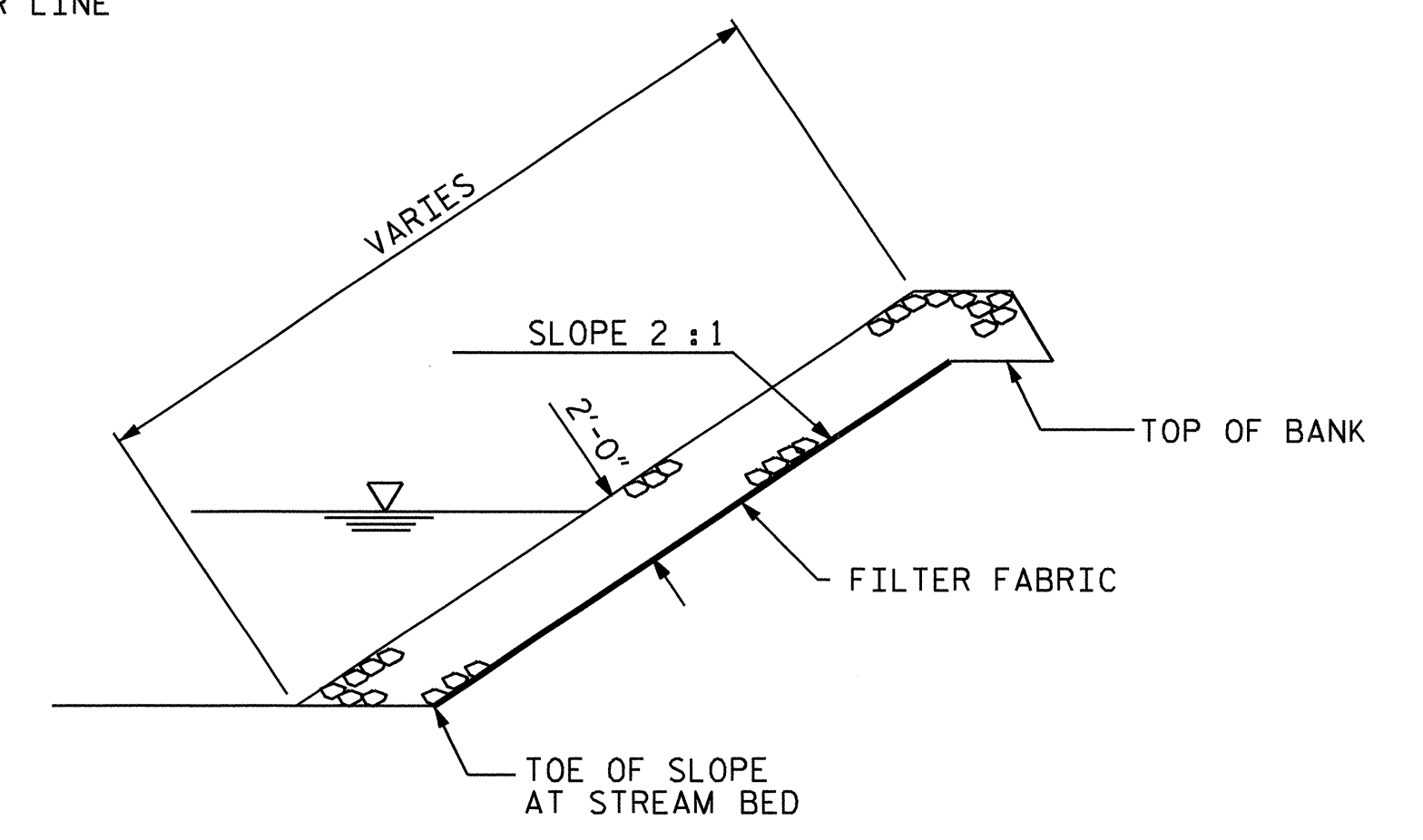


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			22

DRAWN BY: M.D. PISO DATE: 11-18-10  
CHECKED BY: JASON B. WILSON DATE: 1-24-11

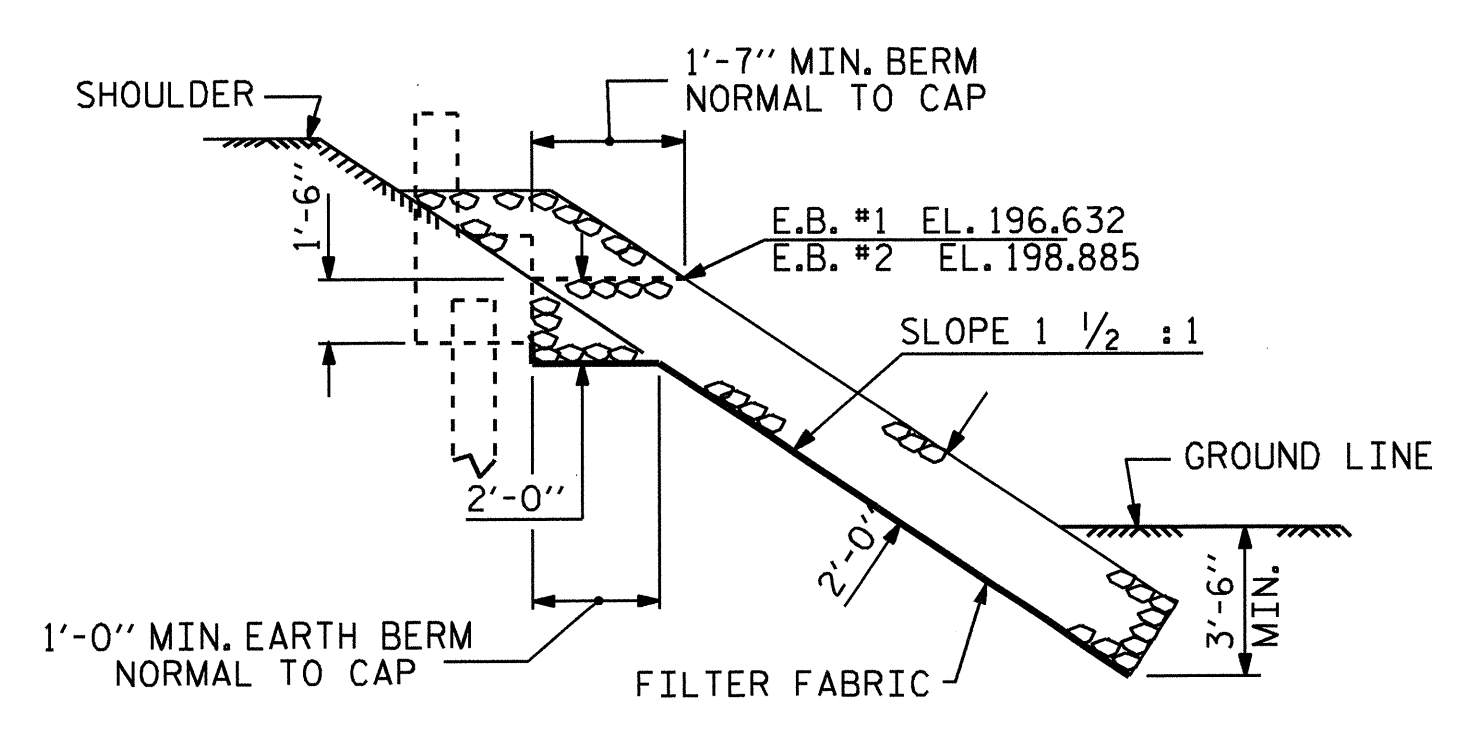


ESTIMATED QUANTITIES		
BRIDGE @ STA. 19+20.00 -L-	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	84	93
BENT 1	103	114
END BENT 2	113	126

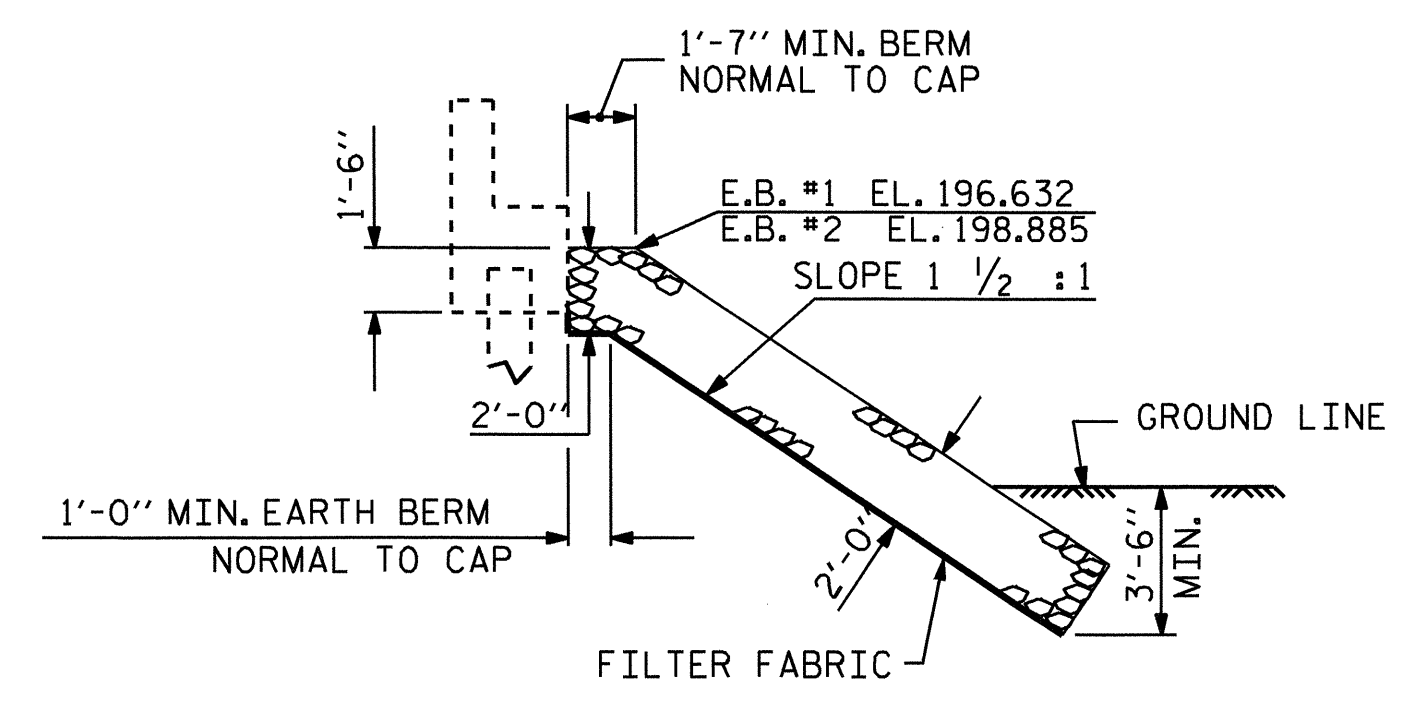


SECTION B-B

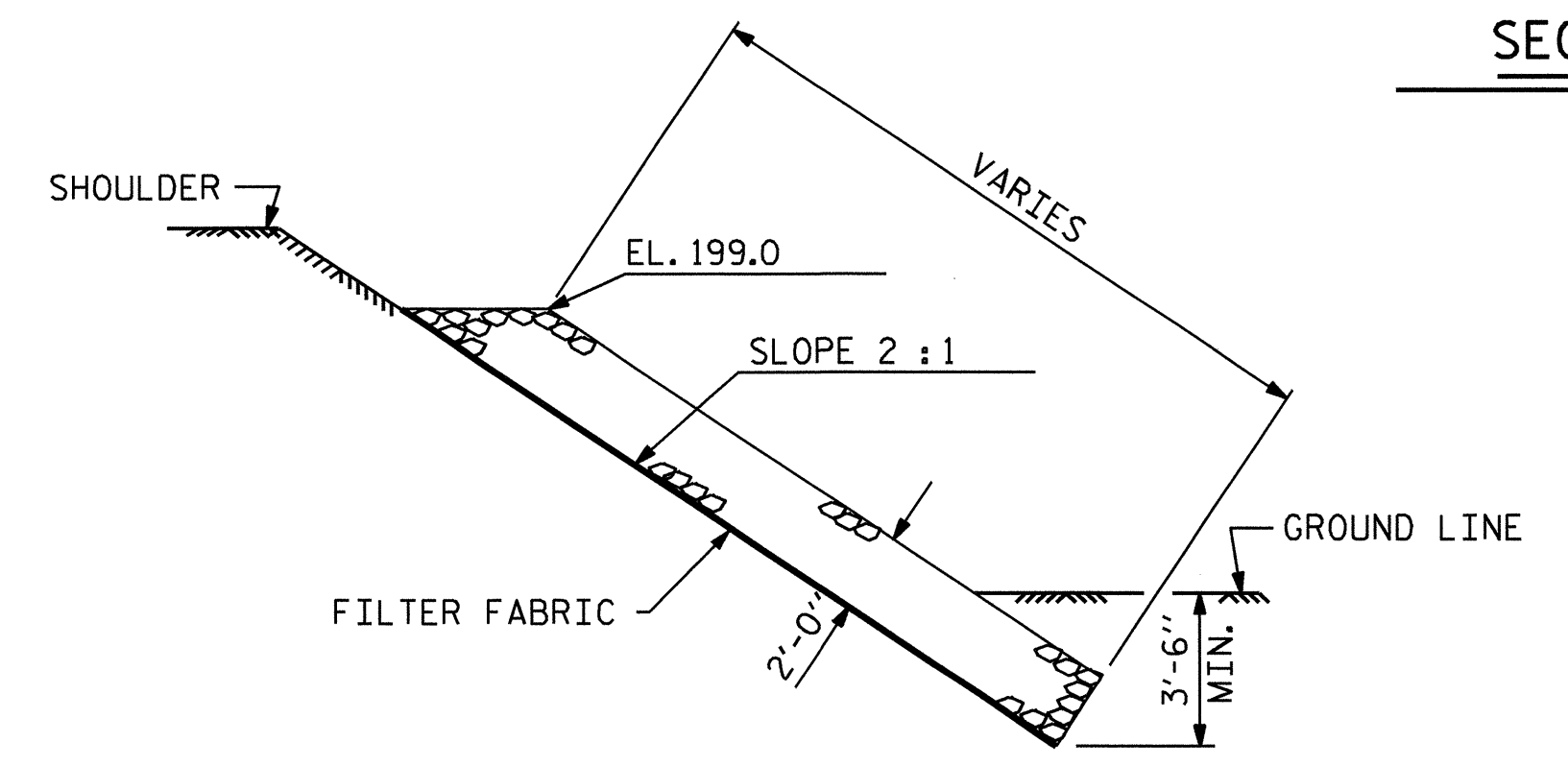
SHOULDER RIP RAP IS HIGHER THAN BERM RIP RAP



SECTION H-H



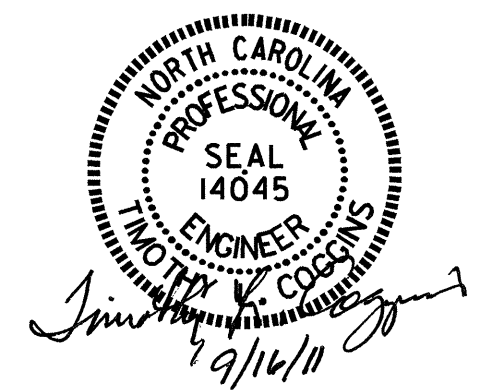
SECTION C-C  
BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -L-

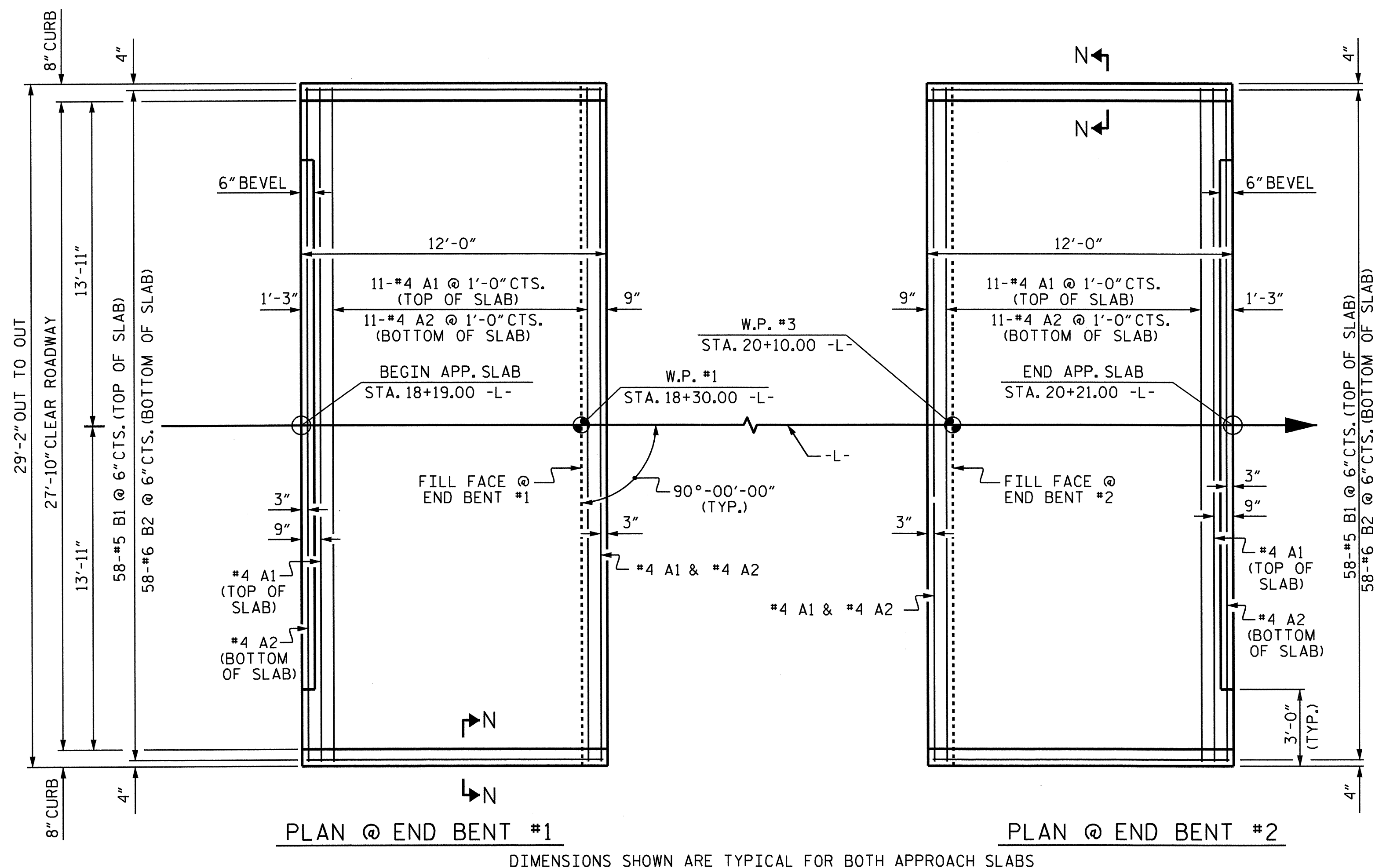
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 RIP RAP DETAILS



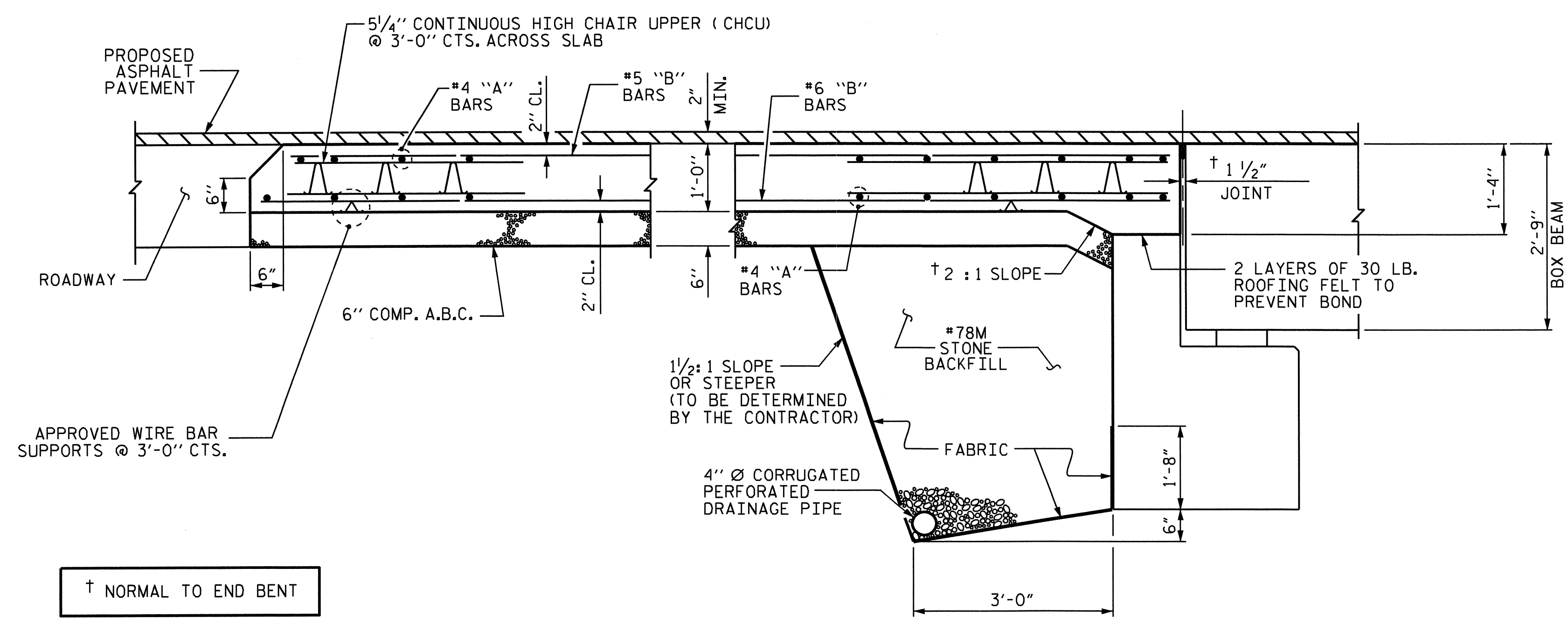
ASSEMBLED BY : J.B. WILSON DATE : 9/15/10  
 CHECKED BY : PEGGY PARISI DATE : 10/26/10  
 DRAWN BY : FCJ 2/88 REV. 8/16/99 RWW/LES  
 CHECKED BY : ARB 8/88 REV. 10/17/00 RWW/LES  
 REV. 5/1/06R TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS 22
2			4			

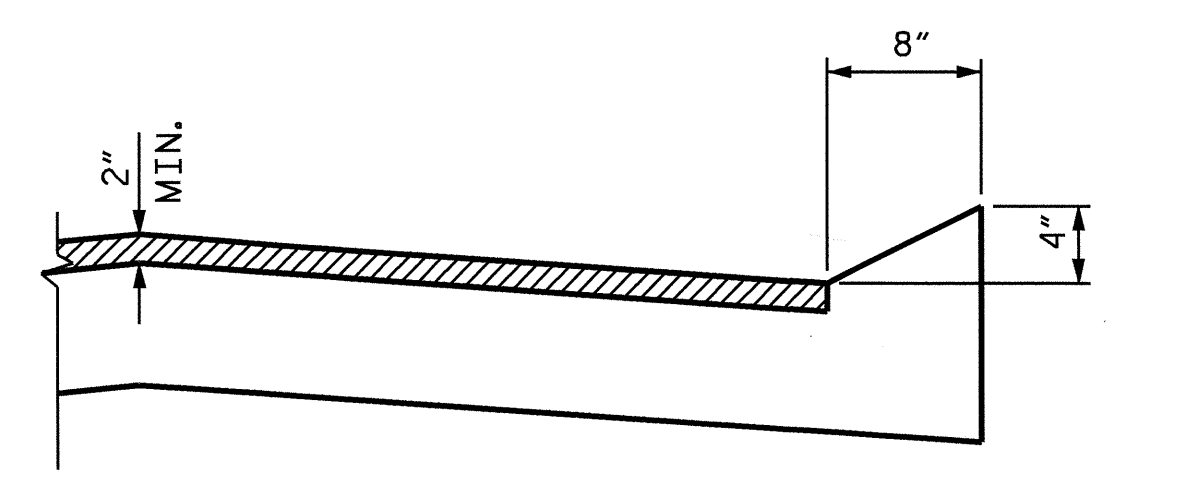




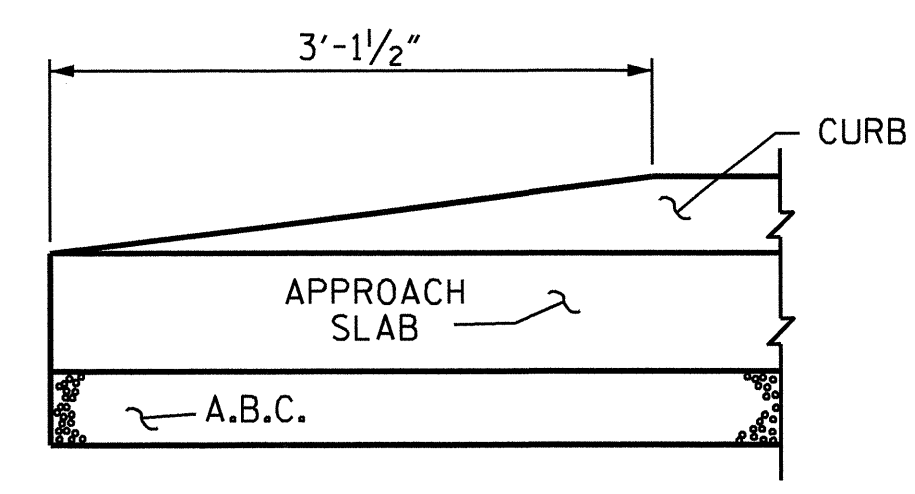
PLAN @ END BENT #1  
 PLAN @ END BENT #2  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



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.

FABRIC SHALL BE TYPE I 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.

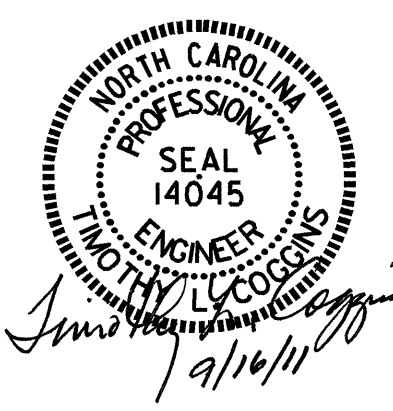
APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL

APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
*B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL					1266 LBS.
*EPOXY COATED REINFORCING STEEL					926 LBS.
CLASS AA CONCRETE					13.5 C. Y.
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
*B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL					1266 LBS.
*EPOXY COATED REINFORCING STEEL					926 LBS.
CLASS AA CONCRETE					13.5 C. Y.

ASSEMBLED BY : J.B. WILSON DATE : 4/30/10  
 CHECKED BY : M.D. PISO DATE : 5/12/10  
 DRAWN BY : KMM 3-08  
 CHECKED BY : GM 3-08

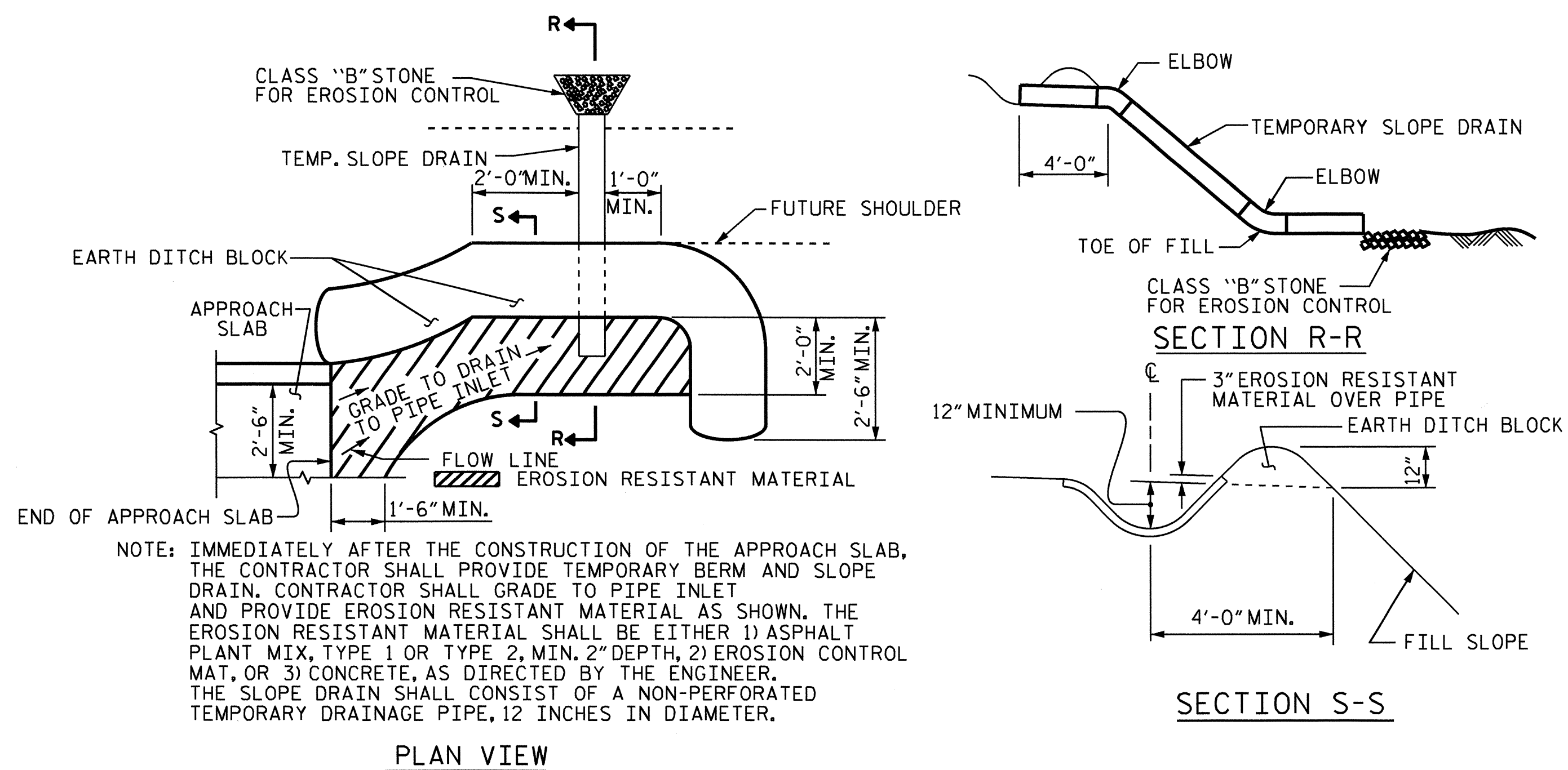
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PROJECT NO. B-4542  
 HARNETT COUNTY  
 STATION: 19+20.00 -L-  
 SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 (SUB-REGIONAL TIER)

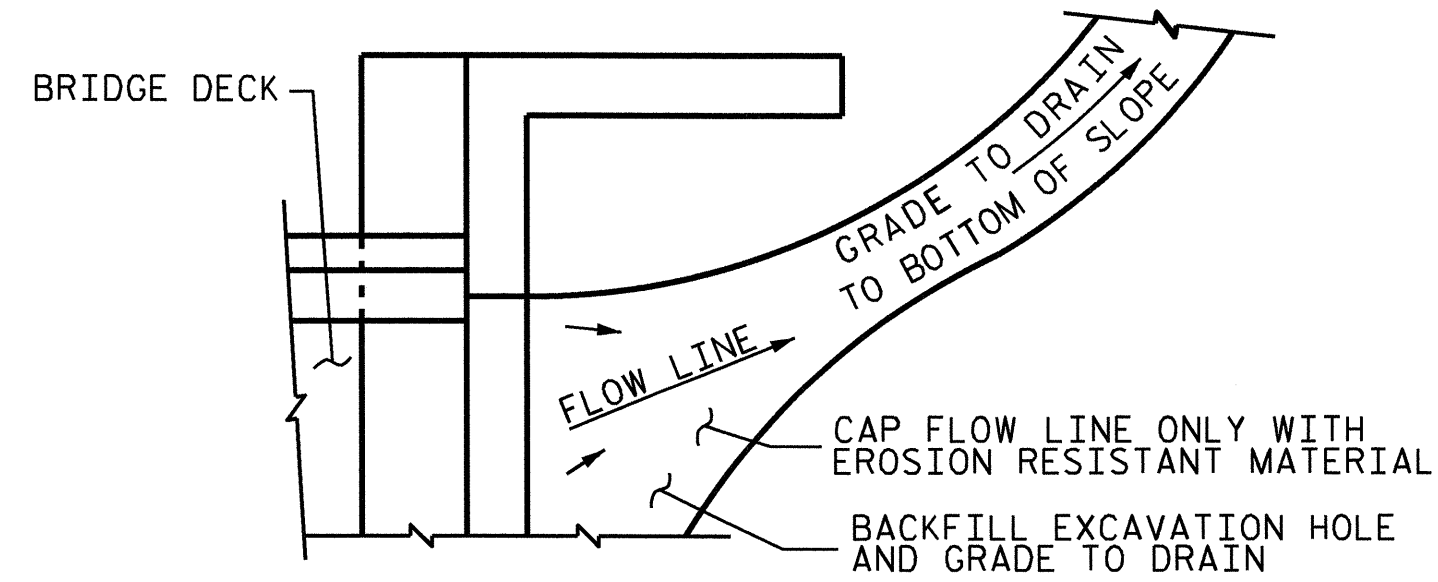
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS 22	
2			4				



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.

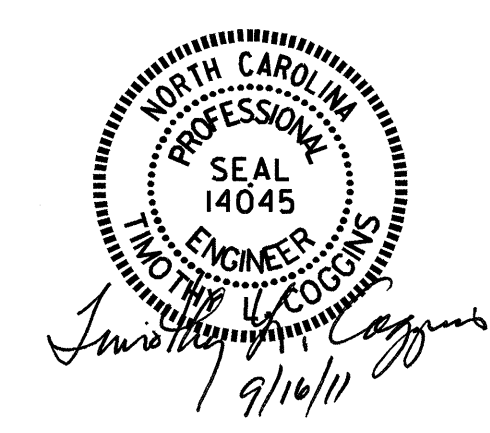
**TEMPORARY DRAINAGE DETAIL**

PROJECT NO. B-4542  
HARNETT COUNTY  
 STATION: 19+20.00 -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-22
1			3			TOTAL SHEETS
2			4			22



ASSEMBLED BY : J.B. WILSON	DATE : 4/30/10
CHECKED BY : M.D. PISO	DATE : 5/12/10
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	-----	375 LBS. PER SQ. IN.
OF TIMBER	-----	
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 ORDNATE, 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 ORDNATE, AND ACTUAL BEAM CAMBER.

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

### HANDRAILS AND POSTS:

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

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

### SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN