

TIP PROJECT: B-4725

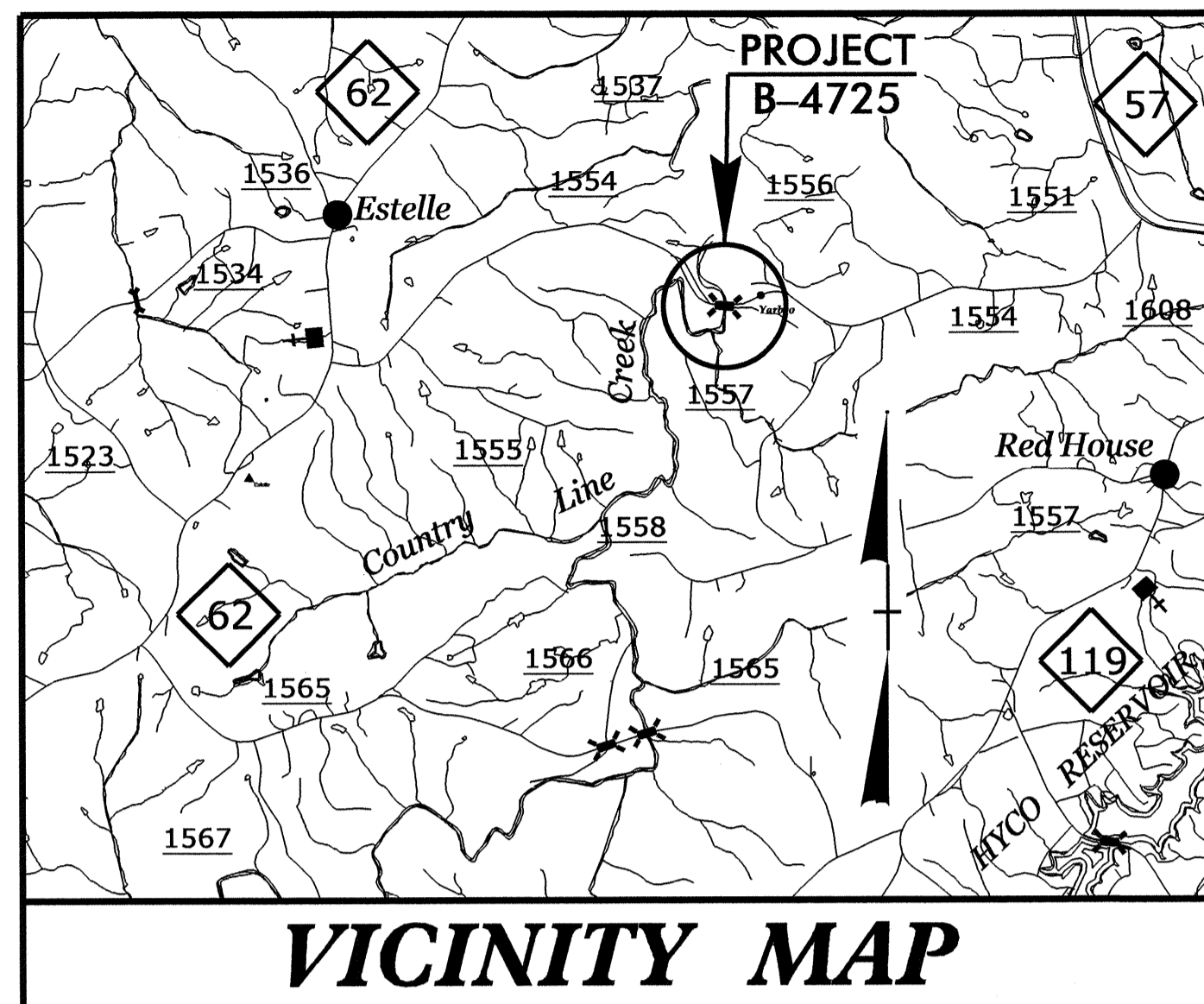
CONTRACT: C203079

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

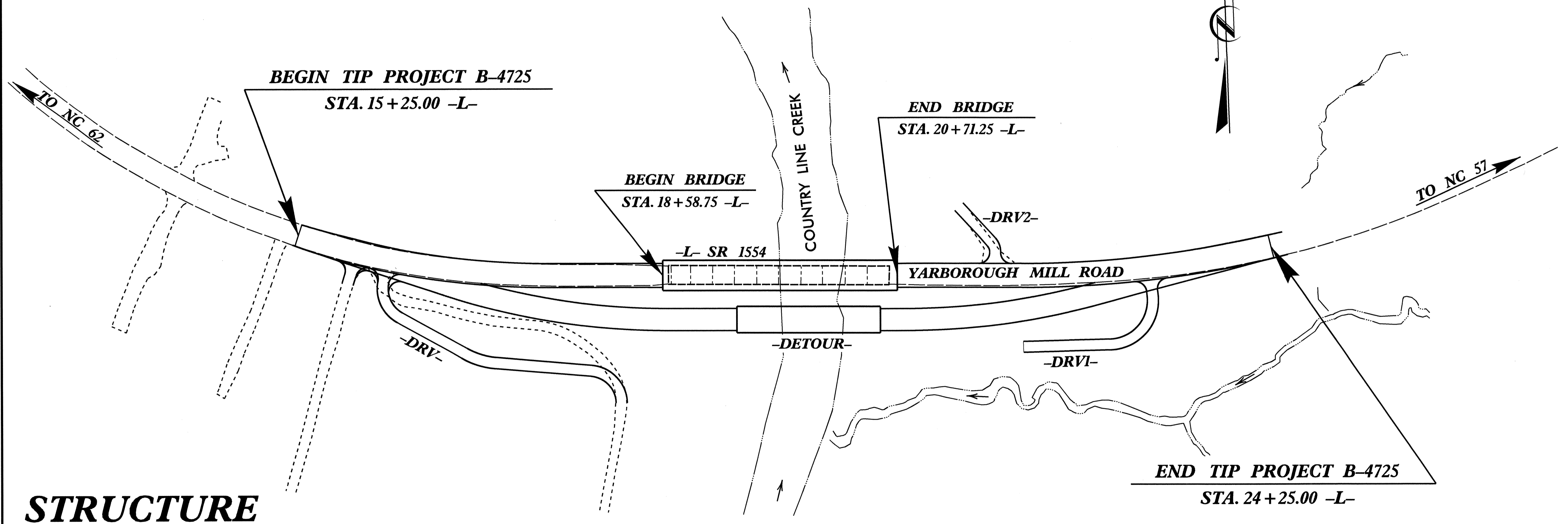
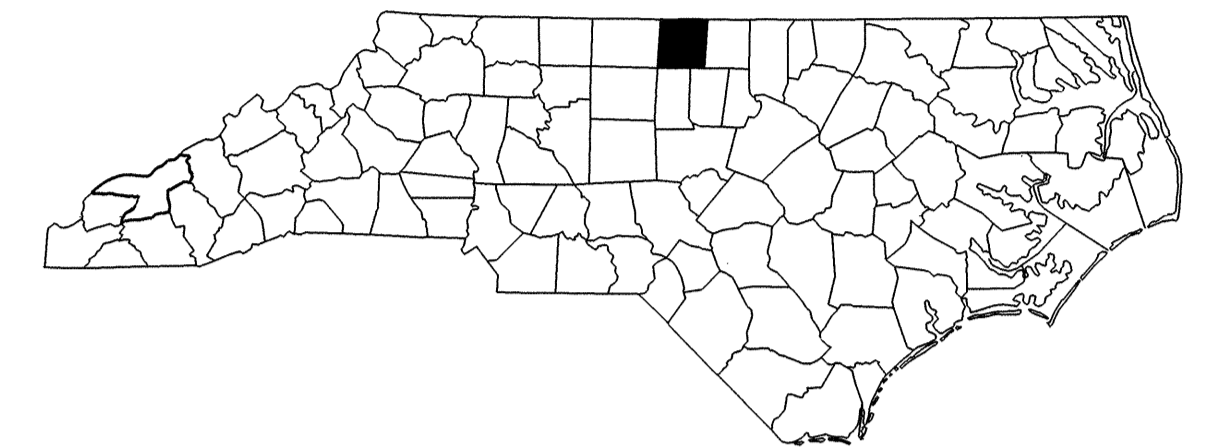
CASWELL COUNTY

LOCATION: BRIDGE NO.12 OVER COUNTRY LINE CREEK
ON SR 1554 (YARBOROUGH MILL ROAD)

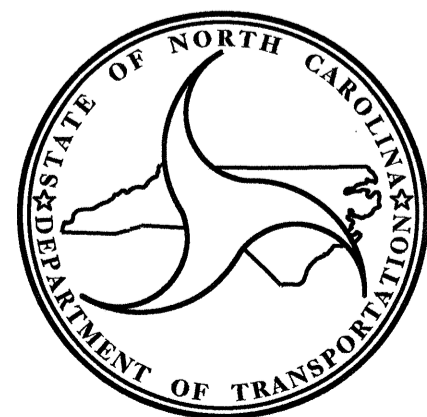
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4725		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38499.1.1	BRZ-1554(4)	PE	
38499.2.1	BRZ-1554(4)	RW & UTILITIES	
38499.3.1	BRZ-1554(4)	CONST.	



STRUCTURE



DESIGN DATA

ADT 2013 = 995
 ADT 2035 = 1500
 DHV = 10 %
 D = 55 %
 T = 3 % *
 V = 55 MPH
 * TTST=1% DUAL=2%
 FUNC. CLASS. =
 RURAL COLLECTOR
 SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4725 = 0.130 MILES
 LENGTH STRUCTURE TIP PROJECT B-4725 = 0.040 MILES
 TOTAL LENGTH OF TIP PROJECT B-4725 = 0.170 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
 1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE:
 JANUARY 15, 2013

J. M. BAILEY, PE
 PROJECT ENGINEER

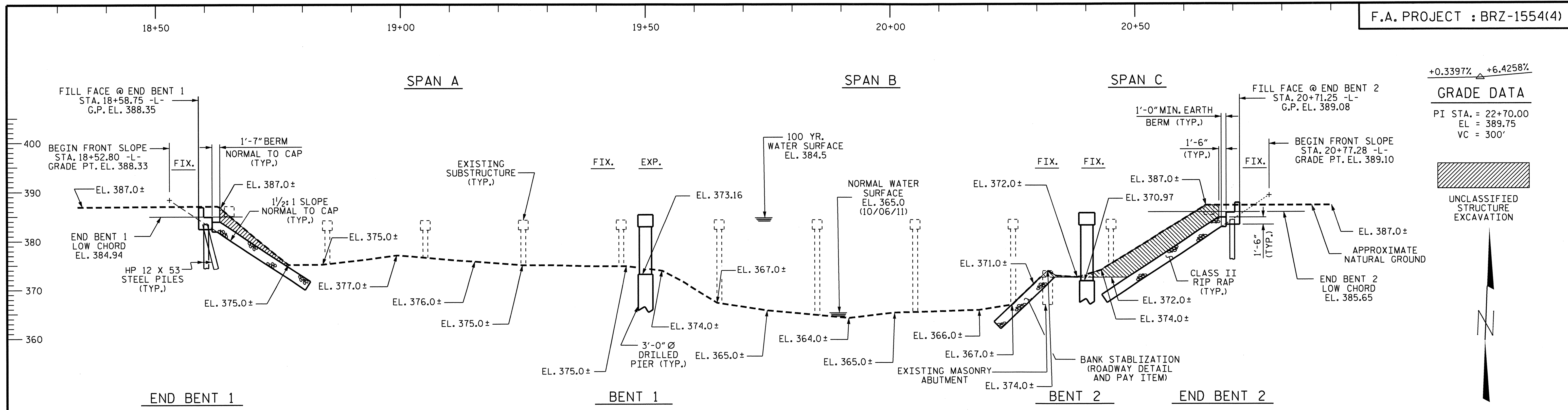
D. R. CALHOUN, PE
 PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT
 1000 Birch Ridge Dr.
 Raleigh NC, 27610

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

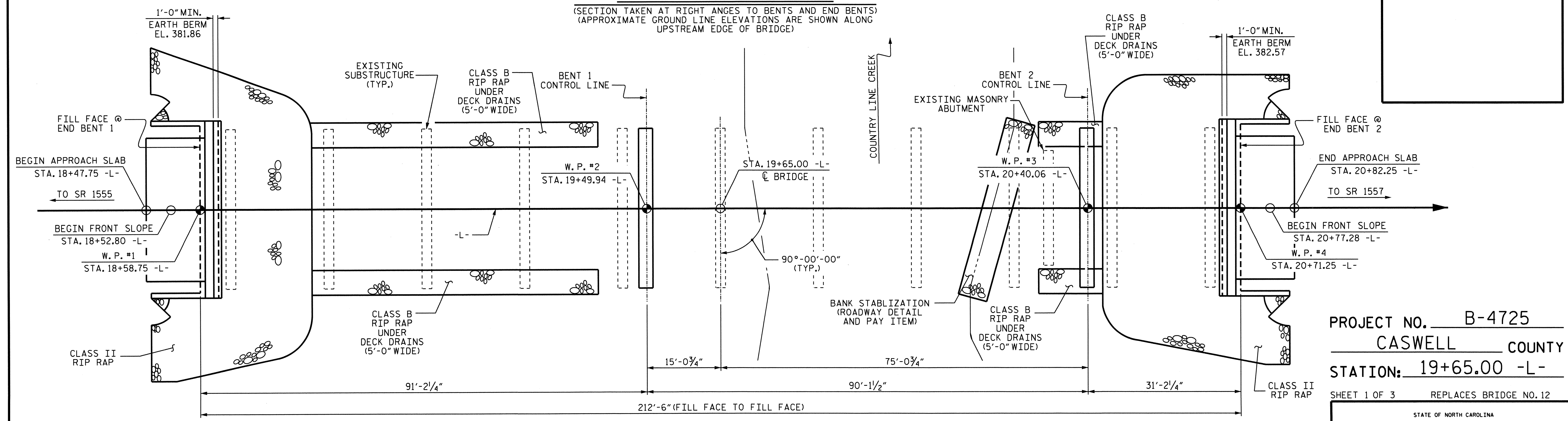
STATE DESIGN ENGINEER
 DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION

DIVISION ADMINISTRATOR DATE



SECTION ALONG -L-

(SECTION TAKEN AT RIGHT ANGLES TO BENTS AND END BENTS)
 (APPROXIMATE GROUND LINE ELEVATIONS ARE SHOWN ALONG
 UPSTREAM EDGE OF BRIDGE)



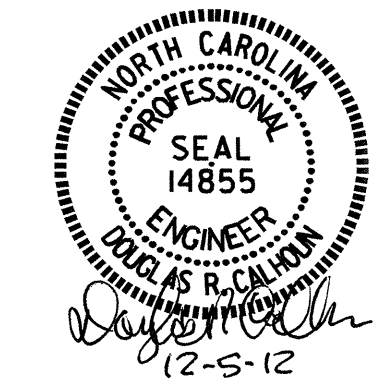
I HEREBY CERTIFY THESE PLANS
 ARE THE AS-BUILT PLANS

PLAN

PILES AND DRILLED PIERS NOT SHOWN FOR CLARITY

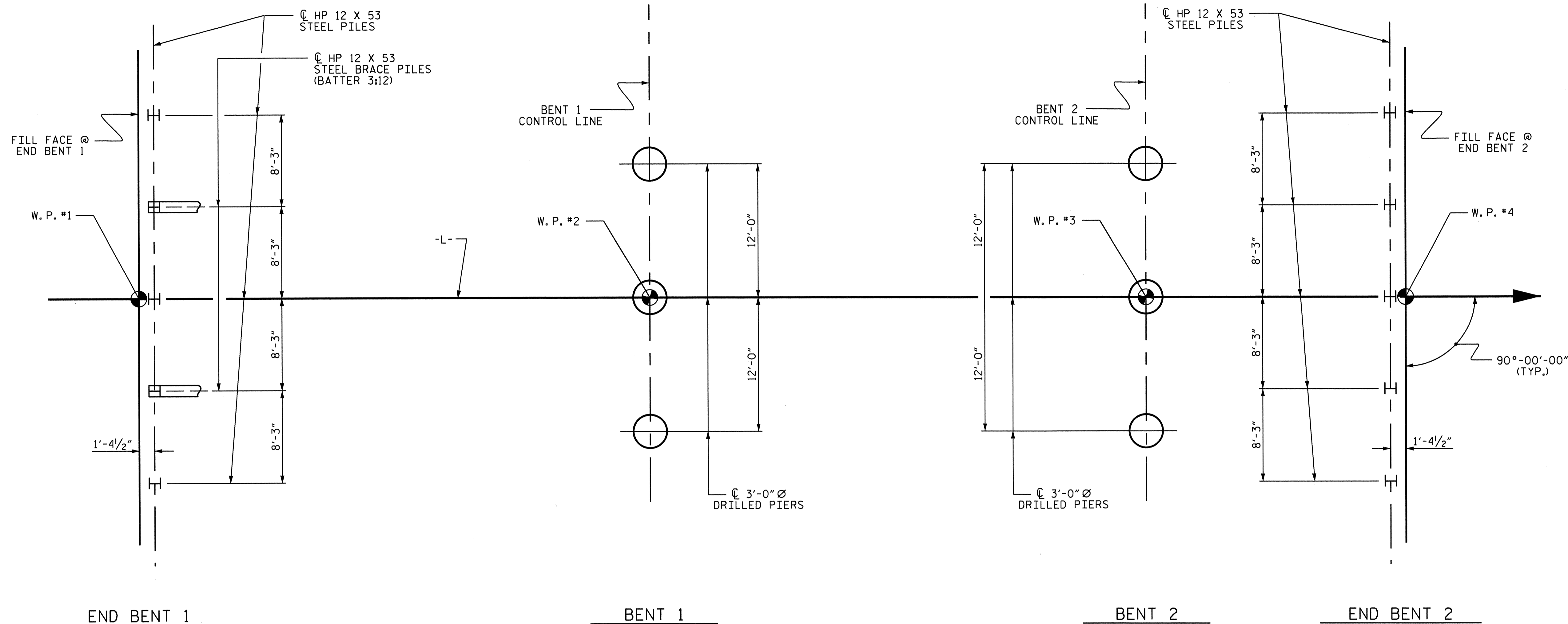
DRAWN BY : D.G. ELY DATE : 9/2012
 CHECKED BY : W.F. PARKER DATE : 10/2012

05-DEC-2012 12:00
 R:\Structures\Plans\B-4725_S0_G0.dgn
 dely



PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-
 SHEET 1 OF 3 REPLACES BRIDGE NO. 12

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING					
FOR BRIDGE ON SR 1554 (YARBOROUGH MILL RD) OVER COUNTRY LINE CREEK BETWEEN SR 1555 AND SR 1557					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-1
					TOTAL SHEETS 24



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE TO THE CENTERLINE AT BOTTOM OF CAP.

NOTES

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

DRILLED PIERS AT BENT NO.1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 430 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 90 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO.1 AND BENT NO.2. IF REQUIRED, DO NOT EXTEND CASING BELOW ELEVATION 367 (BENT 1) OR ELEVATION 368 (BENT 2) WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT STEEL CASING.

INSTALL DRILLED PIERS AT BENT NO.1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 344 FT. (LEFT), OR 339 FT. (CENTER AND RIGHT) AND WITH THE REQUIRED TIP RESISTANCE.

INSTALL DRILLED PIERS AT BENT NO.2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 345 FT. AND WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATIONS FOR BENT NO.1 AND BENT 2 IS ELEVATION 362 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS.

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

SPT MAY BE REQUIRED FOR DRILLED PIERS AT BENT NO.1. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT IS REQUIRED FOR DRILLED PIERS AT BENT NO.2. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR PILES SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

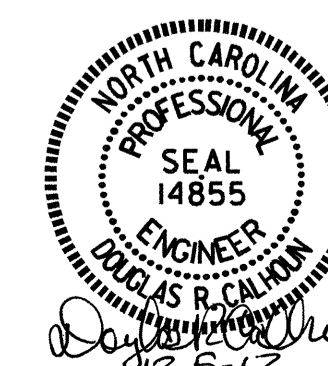
PREDRILLING FOR PILES IS REQUIRED AT END BENT NO.2. PREDRILL PILE LOCATIONS TO ELEVATION 375 FT. WITH EQUIPMENT THAT WILL RESULT IN A MAXIMUM PREDRILLING DIAMETER OF 24 INCHES. FOR PREDRILLING FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 1554
 (YARBOROUGH MILL RD)
 OVER COUNTRY LINE CREEK
 BETWEEN SR 1555 AND SR 1557



DRAWN BY: D. G. ELY DATE: 9/2012
 CHECKED BY: W. F. PARKER DATE: 10/2012

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

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY STRUCTURE	REMOVAL OF EXISTING STRUCTURE	3'-0" Ø DRILLED PIERS IN SOIL	3'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES	PREDRILLING FOR PILES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS B	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAMS		
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	TONS	SO. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE											LUMP SUM					420.0					LUMP SUM	30	2100.0
END BENT 1									LUMP SUM	15.7		2873		5	175			60	230	255			
BENT 1			78.5	19.0	18.5					17.9		11624	2135										
BENT 2			63.9	14.0	8.9		3			19.3		10987	1941										
END BENT 2									LUMP SUM	15.7		2873		5	100	30		15	320	355			
TOTAL	LUMP SUM	LUMP SUM	142.4	33.0	27.4	2	5	2	LUMP SUM	68.6	LUMP SUM	28357	4076	10	275	30	420.0	75	550	610	LUMP SUM	30	2100.0

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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+65.00 -L-."

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 25 FEET EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 2 (TL-2) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 19+65.00 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF 10 SPANS; 2 @ 20'-2", 1 @ 19'-9", 1 @ 20'-2", 1 @ 19'-9", 1 @ 20'-6", 1 @ 19'-3", 1 @ 20'-9", 1 @ 20'-1", 1 @ 20'-5" WITH A TIMBER DECK AND A STEEL GIRDER FLOOR SYSTEM WITH 4 1/2" AWS. CLEAR ROADWAY WIDTH OF 17.2' AND SUBSTRUCTURE CONSISTING OF TIMBER CAP AND PILES FOR END BENTS AND BENTS 2, 4, 6, AND 8 AND STEEL CAP AND PILE (CRUTCH) FOR BENTS 1, 3, 5, 7, AND 9 AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

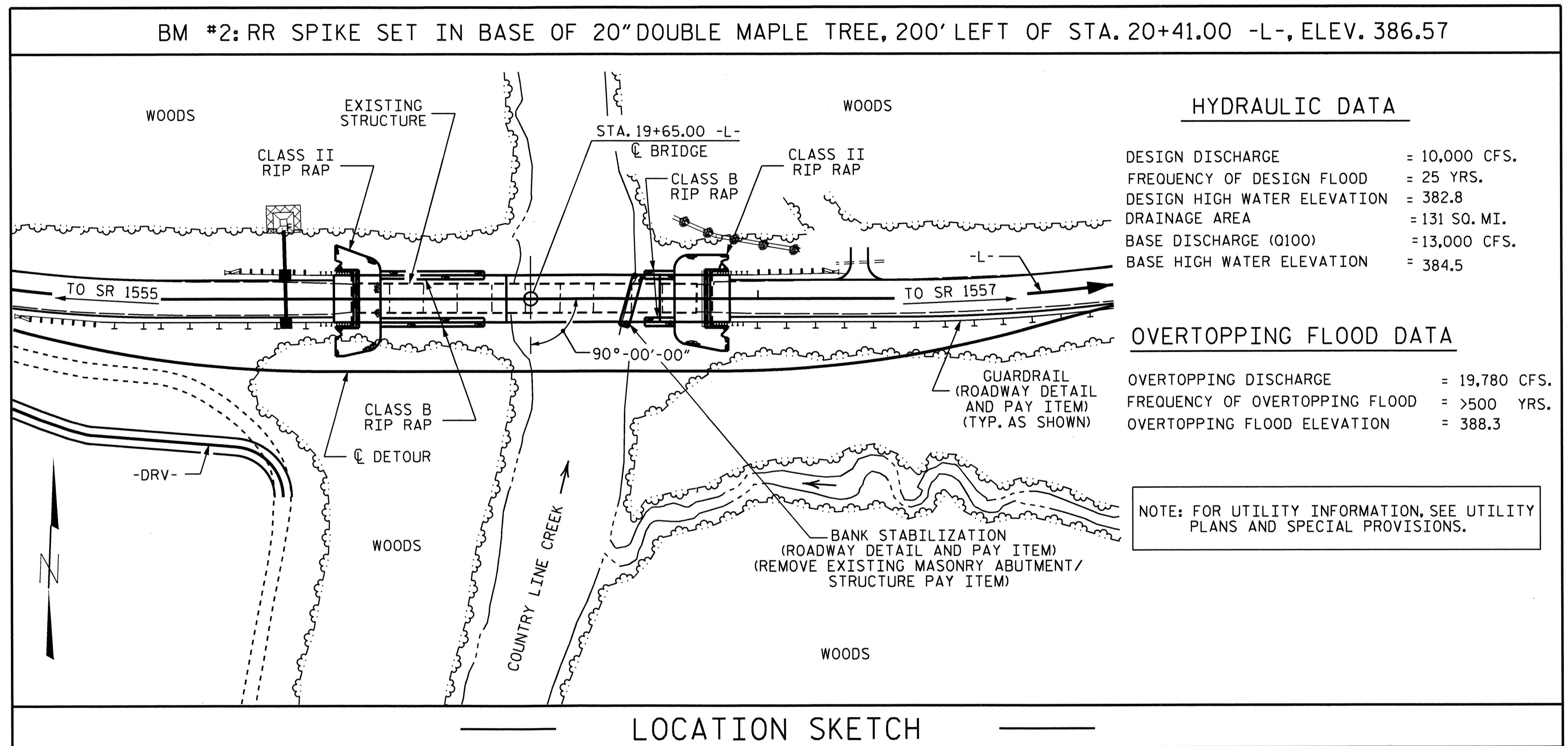
REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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

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

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

THE EXISTING MASONRY ABUTMENT ADJACENT TO PROPOSED BENT 2 SHALL BE REMOVED AS DIRECTED BY THE ENGINEER. THE COST SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 19+65.00 -L-."



HYDRAULIC DATA

DESIGN DISCHARGE	= 10,000 CFS.
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 382.8
DRAINAGE AREA	= 131 SQ. MI.
BASE DISCHARGE (0100)	= 13,000 CFS.
BASE HIGH WATER ELEVATION	= 384.5

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 19,780 CFS.
FREQUENCY OF OVERTOPPING FLOOD	= >500 YRS.
OVERTOPPING FLOOD ELEVATION	= 388.3

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

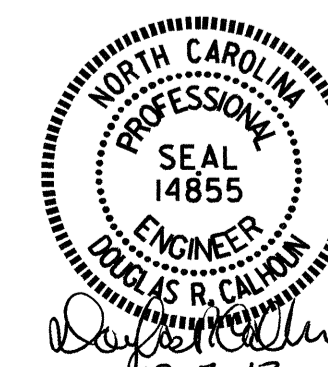
PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1554
 (YARBOROUGH MILL RD)
 OVER COUNTRY LINE CREEK
 BETWEEN SR 1555 AND SR 1557



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-3
1			3			TOTAL SHEETS 24
2			4			

DRAWN BY: D. G. ELY DATE: 9/2012
 CHECKED BY: W. F. PARKER DATE: 10/2012

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

LOAD FACTORS:

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

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								
						LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.109	--	1.75	0.272	1.47	90'	EL	44.25	0.493	1.26	90'	EL	4.425	0.80	0.272	1.11	90'	EL	44.25		
	HL-93(0pr)	N/A	--	1.633	--	1.35	0.272	1.9	90'	EL	44.25	0.493	1.63	90'	EL	4.425	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.507	54.255	1.75	0.272	1.99	90'	EL	44.25	0.493	1.65	90'	EL	4.425	0.80	0.272	1.51	90'	EL	44.25		
	HS-20(0pr)	36.000	--	2.14	77.039	1.35	0.272	2.59	90'	EL	44.25	0.493	2.14	90'	EL	4.425	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.519	47.501	1.4	0.272	5.82	90'	EL	44.25	0.493	5.05	90'	EL	4.425	0.80	0.272	3.52	90'	EL	44.25	
		SNGARBS2	20.000	--	2.572	51.43	1.4	0.272	4.25	90'	EL	44.25	0.493	3.55	90'	EL	4.425	0.80	0.272	2.57	90'	EL	44.25	
		SNAGRIS2	22.000	--	2.415	53.122	1.4	0.272	4	90'	EL	44.25	0.493	3.27	90'	EL	4.425	0.80	0.272	2.41	90'	EL	44.25	
		SNCOTTS3	27.250	--	1.749	47.674	1.4	0.272	2.89	90'	EL	44.25	0.493	2.52	90'	EL	4.425	0.80	0.272	1.75	90'	EL	44.25	
		SNAGGRS4	34.925	--	1.443	50.381	1.4	0.272	2.39	90'	EL	44.25	0.493	2.06	90'	EL	4.425	0.80	0.272	1.44	90'	EL	44.25	
		SNS5A	35.550	--	1.412	50.195	1.4	0.272	2.34	90'	EL	44.25	0.493	2.07	90'	EL	4.425	0.80	0.272	1.41	90'	EL	44.25	
		SNS6A	39.950	--	1.287	51.435	1.4	0.272	2.13	90'	EL	44.25	0.493	1.88	90'	EL	4.425	0.80	0.272	1.29	90'	EL	44.25	
	SNS7B	42.000	--	1.226	51.483	1.4	0.272	2.03	90'	EL	44.25	0.493	1.83	90'	EL	4.425	0.80	0.272	1.23	90'	EL	44.25		
	TTST	TNAGRIT3	33.000	--	1.568	51.733	1.4	0.272	2.59	90'	EL	44.25	0.493	2.24	90'	EL	4.425	0.80	0.272	1.57	90'	EL	44.25	
		TNT4A	33.075	--	1.572	52.007	1.4	0.272	2.6	90'	EL	44.25	0.493	2.2	90'	EL	4.425	0.80	0.272	1.57	90'	EL	44.25	
		TNT6A	41.600	--	1.278	53.17	1.4	0.272	2.11	90'	EL	44.25	0.493	1.92	90'	EL	4.425	0.80	0.272	1.28	90'	EL	44.25	
		TNT7A	42.000	--	1.281	53.782	1.4	0.272	2.12	90'	EL	44.25	0.493	1.89	90'	EL	4.425	0.80	0.272	1.28	90'	EL	44.25	
		TNT7B	42.000	--	1.315	55.229	1.4	0.272	2.18	90'	EL	44.25	0.493	1.79	90'	EL	4.425	0.80	0.272	1.31	90'	EL	44.25	
		TNAGRIT4	43.000	--	1.258	54.101	1.4	0.272	2.08	90'	EL	44.25	0.493	1.74	90'	EL	4.425	0.80	0.272	1.26	90'	EL	44.25	
TNAGT5A		45.000	--	1.19	53.537	1.4	0.272	1.97	90'	EL	44.25	0.493	1.71	90'	EL	4.425	0.80	0.272	1.19	90'	EL	44.25		
TNAGT5B	45.000	3	1.178	53.027	1.4	0.272	1.95	90'	EL	44.25	0.493	1.66	90'	EL	4.425	0.80	0.272	1.18	90'	EL	44.25			

NOTES:

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

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

COMMENTS:

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

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

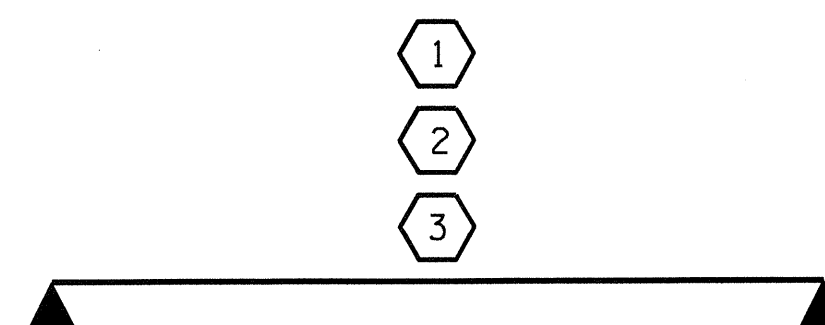
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

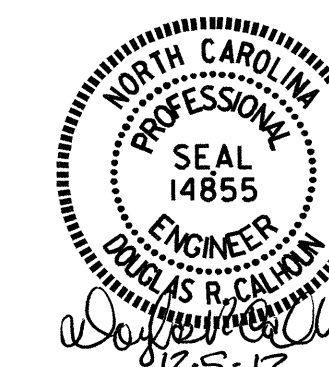
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY
(SPANS A & B)

PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
90' BOX BEAM UNIT
90° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-4
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012
DRAWN BY : TMG 11/11
CHECKED BY : AAC 11/11

LOAD FACTORS:

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	2.164	--	1.75	0.287	2.95	30'	EL	14.25	0.584	2.16	30'	EL	5.7	0.80	0.287	2.67	30'	EL	14.25		
	HL-93(0pr)	N/A	--	2.805	--	1.35	0.287	3.82	30'	EL	14.25	0.584	2.8	30'	EL	5.7	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	2.471	88.938	1.75	0.287	4.03	30'	EL	8.55	0.584	2.47	30'	EL	5.7	0.80	0.287	3.73	30'	EL	11.4		
	HS-20(0pr)	36.000	--	3.203	115.291	1.35	0.287	5.22	30'	EL	8.55	0.584	3.2	30'	EL	5.7	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	5.723	77.267	1.4	0.287	8.3	30'	EL	14.25	0.584	5.72	30'	EL	5.7	0.80	0.287	6.01	30'	EL	14.25	
		SNGARBS2	20.000	--	4.586	91.71	1.4	0.287	7.27	30'	EL	11.4	0.584	4.59	30'	EL	5.7	0.80	0.287	5.32	30'	EL	11.4	
		SNAGRIS2	22.000	--	4.492	98.82	1.4	0.287	7.32	30'	EL	8.55	0.584	4.49	30'	EL	5.7	0.80	0.287	5.42	30'	EL	11.4	
		SNCOTTS3	27.250	--	2.905	79.15	1.4	0.287	4.17	30'	EL	14.25	0.584	2.9	30'	EL	5.7	0.80	0.287	3.02	30'	EL	14.25	
		SNAGRS4	34.925	--	2.794	97.569	1.4	0.287	4.03	30'	EL	14.25	0.584	2.79	30'	EL	5.7	0.80	0.287	2.91	30'	EL	14.25	
		SNS5A	35.550	--	2.832	100.675	1.4	0.287	3.9	30'	EL	14.25	0.584	2.96	30'	EL	5.7	0.80	0.287	2.83	30'	EL	14.25	
		SNS6A	39.950	--	2.671	106.72	1.4	0.287	3.68	30'	EL	14.25	0.584	2.84	30'	EL	5.7	0.80	0.287	2.67	30'	EL	14.25	
	SNS7B	42.000	3	2.598	109.119	1.4	0.287	3.58	30'	EL	14.25	0.584	2.86	30'	EL	5.7	0.80	0.287	2.60	30'	EL	14.25		
	TTST	TNAGRIT3	33.000	--	3.429	113.142	1.4	0.287	4.8	30'	EL	14.25	0.584	3.43	30'	EL	5.7	0.80	0.287	3.48	30'	EL	14.25	
		TNT4A	33.075	--	3.118	103.143	1.4	0.287	4.52	30'	EL	14.25	0.584	3.12	30'	EL	5.7	0.80	0.287	3.28	30'	EL	14.25	
		TNT6A	41.600	--	2.932	121.961	1.4	0.287	4.12	30'	EL	14.25	0.584	2.93	30'	EL	5.7	0.80	0.287	2.99	30'	EL	14.25	
		TNT7A	42.000	--	2.936	123.333	1.4	0.287	4.26	30'	EL	14.25	0.584	2.94	30'	EL	5.7	0.80	0.287	3.09	30'	EL	14.25	
		TNT7B	42.000	--	2.816	118.283	1.4	0.287	4	30'	EL	14.25	0.584	2.82	30'	EL	5.7	0.80	0.287	2.90	30'	EL	14.25	
		TNAGRIT4	43.000	--	2.821	121.32	1.4	0.287	4.15	30'	EL	14.25	0.584	2.82	30'	EL	5.7	0.80	0.287	3.01	30'	EL	14.25	
TNAGT5A		45.000	--	2.867	129.015	1.4	0.287	4.04	30'	EL	14.25	0.584	2.87	30'	EL	5.7	0.80	0.287	2.94	30'	EL	14.25		
TNAGT5B	45.000	--	2.6	116.985	1.4	0.287	3.88	30'	EL	11.4	0.584	2.6	30'	EL	5.7	0.80	0.287	2.82	30'	EL	11.4			

NOTES:

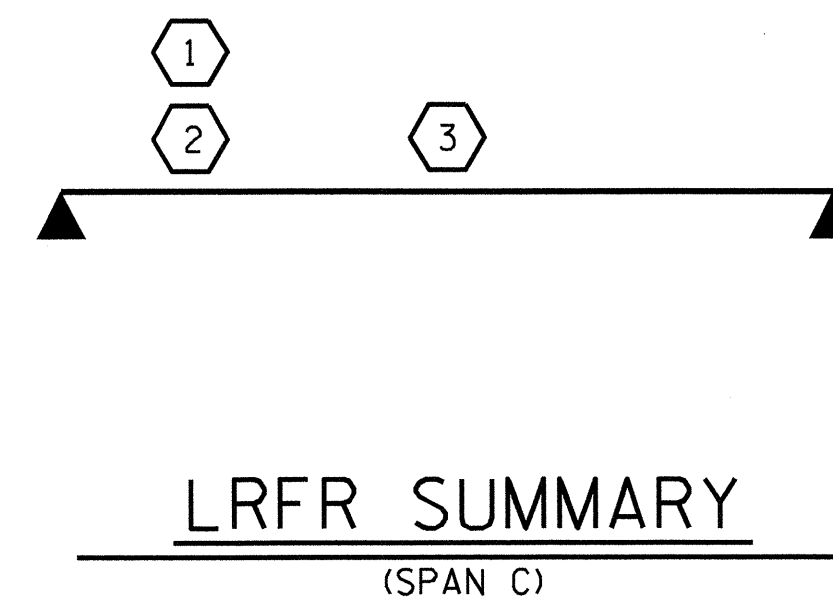
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

COMMENTS:

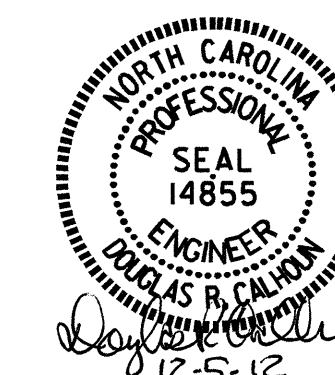
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#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER	
EL - EXTERIOR LEFT GIRDER	
ER - EXTERIOR RIGHT GIRDER	



PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD LRFR SUMMARY FOR 30' BOX BEAM UNIT 90° SKEW (NON-INTERSTATE TRAFFIC)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-5
					TOTAL SHEETS 24

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
 CHECKED BY : A. SORSENGINH DATE : 9/2012
 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 NON-SHRINK GROUT. THE 2 1/2" Ø 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 THE SL LOW MODULUS SILICONE SEALANT. THE BACKER RODS 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 FOR SPANS A AND B; 4000 PSI FOR SPAN C.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

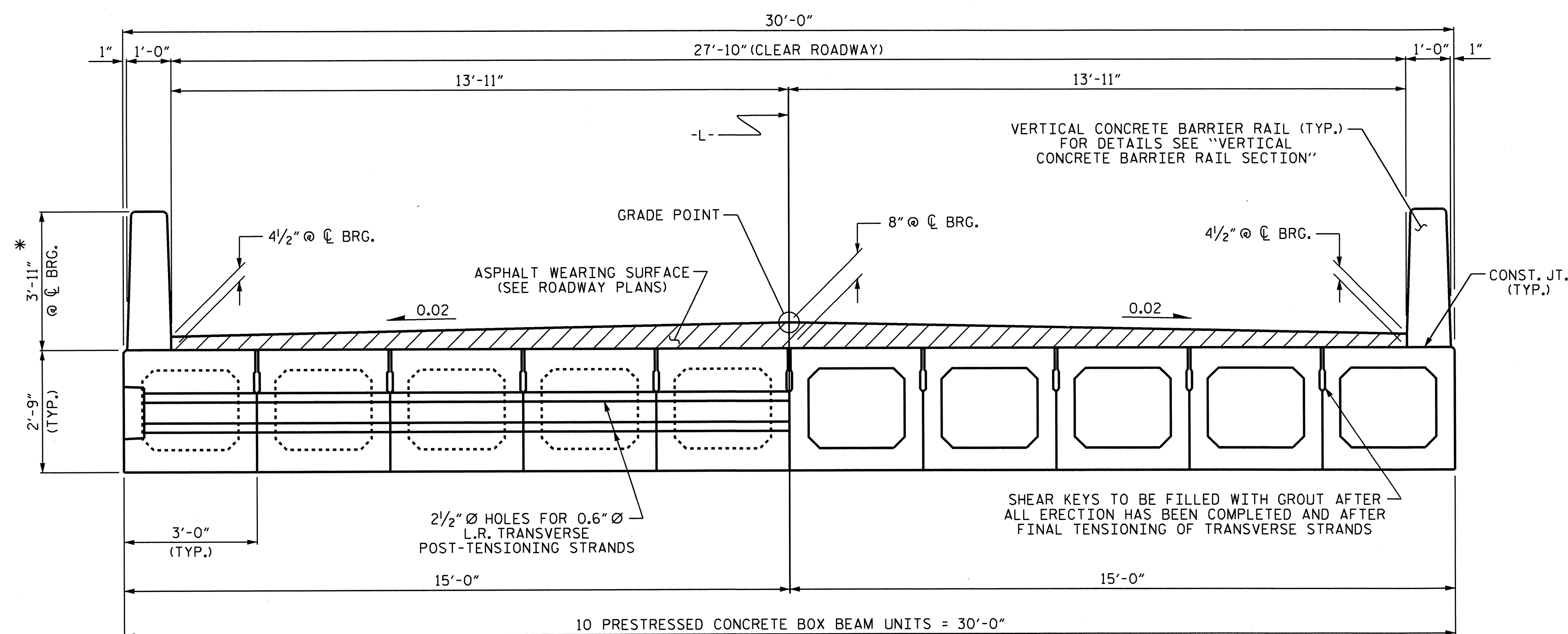
PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. 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 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 GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



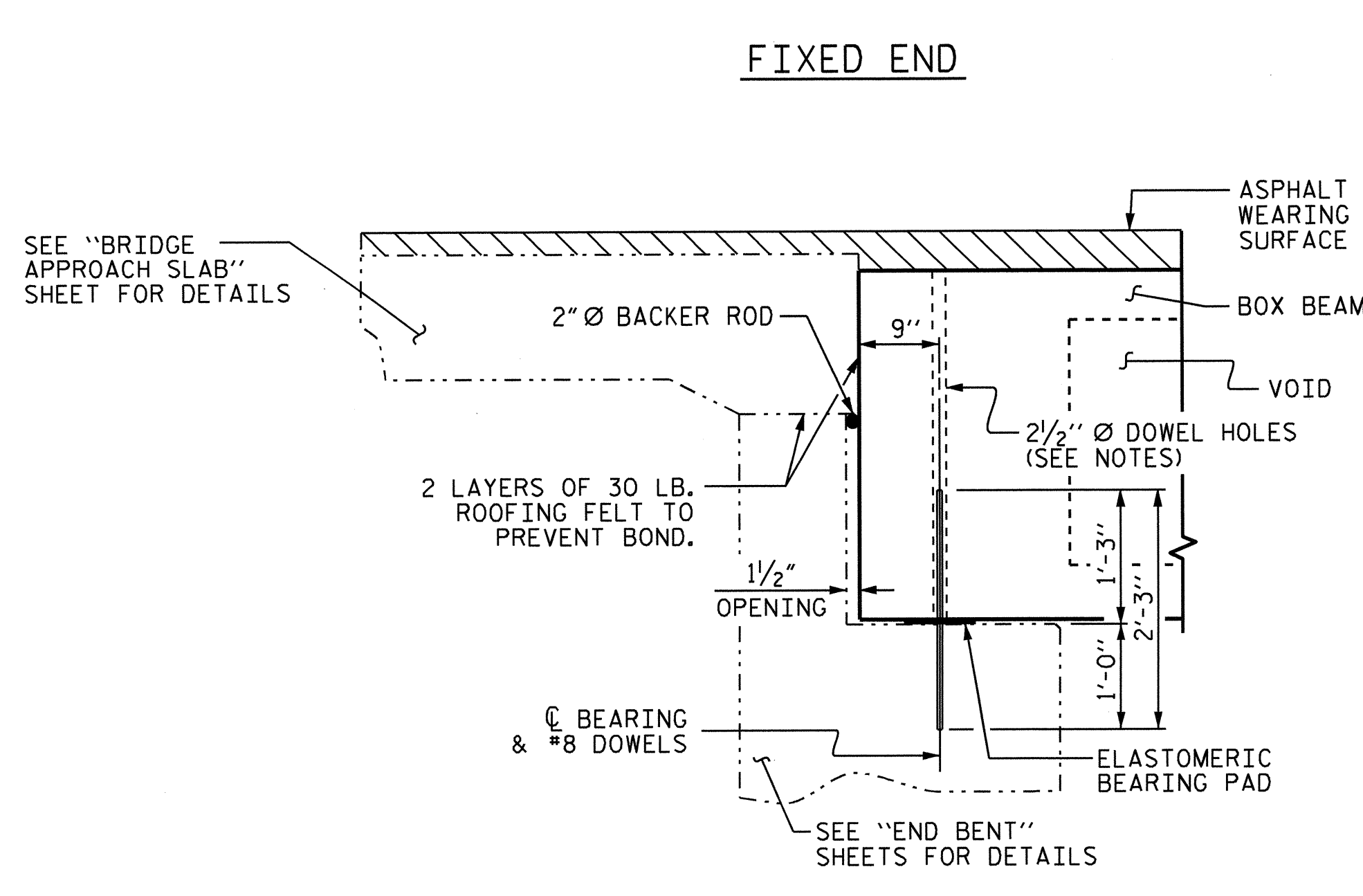
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

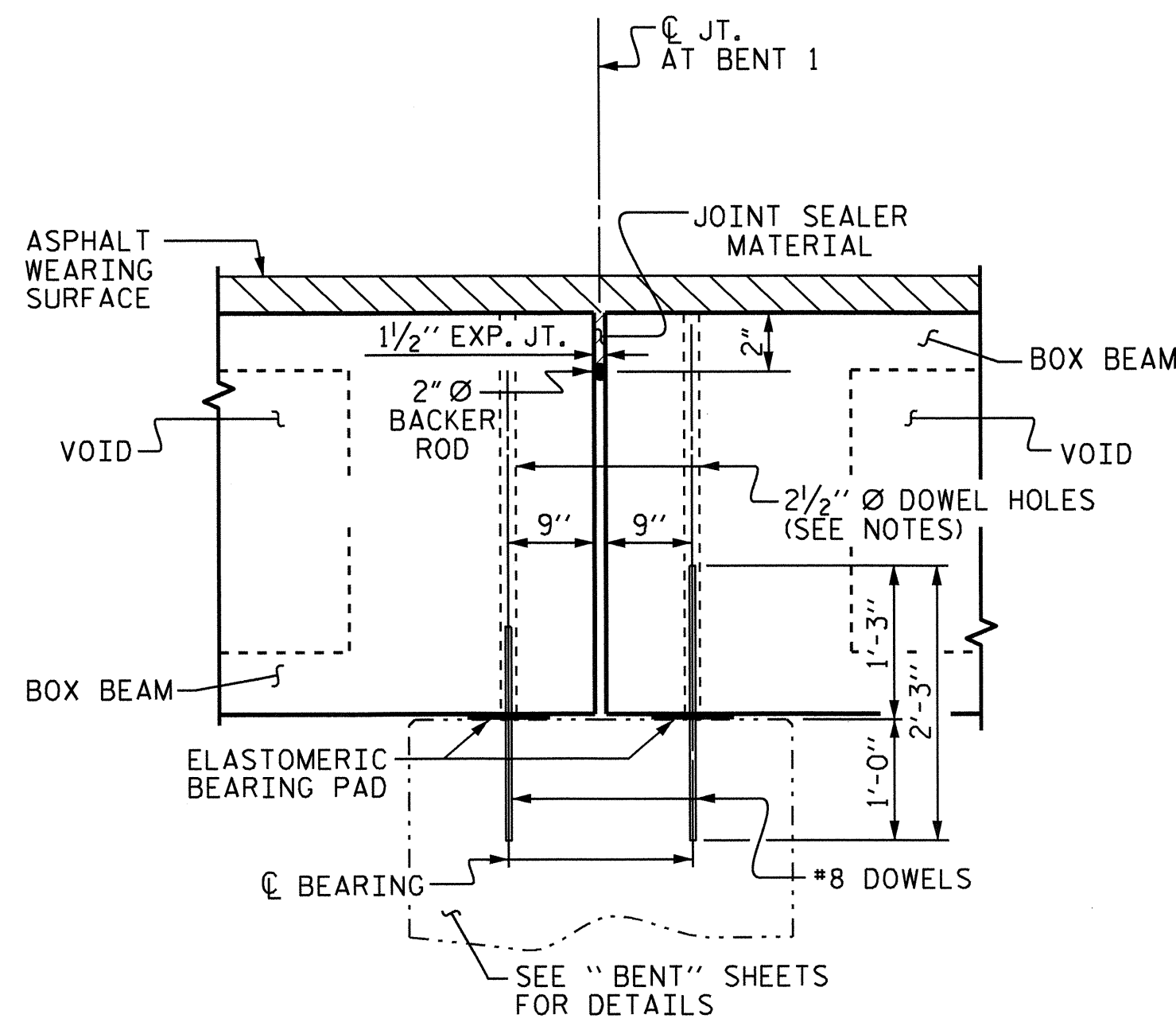
TYPICAL SECTION

*THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

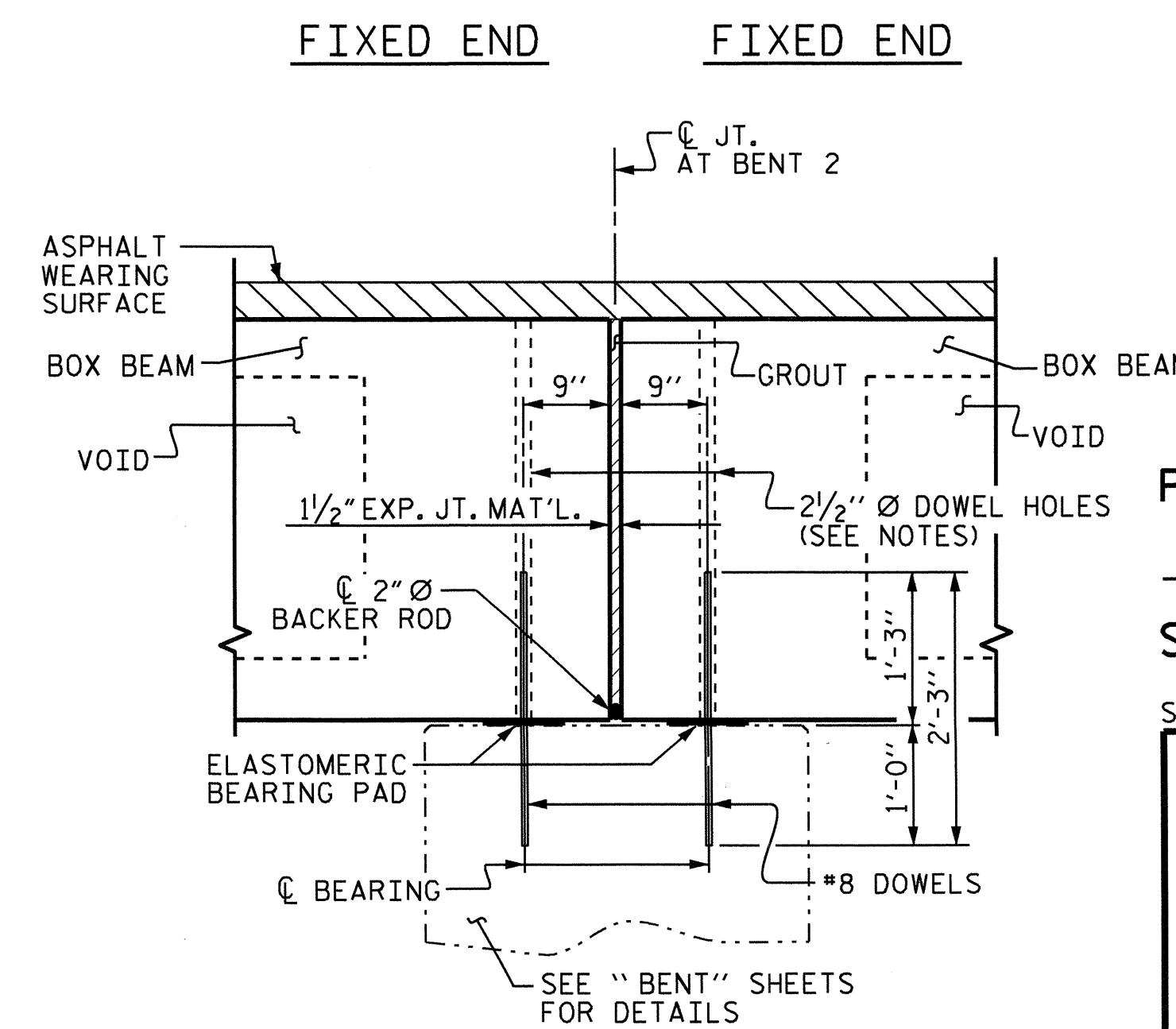
FIXED END EXPANSION END



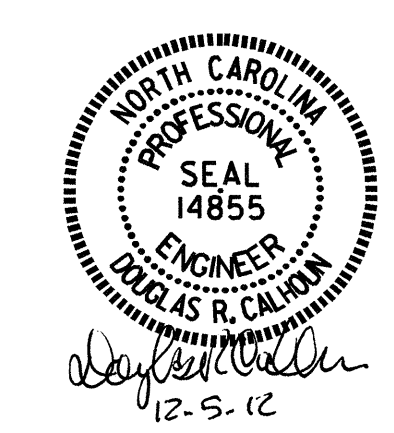
SECTION AT END BENT



SECTION AT BENT 1



SECTION AT BENT 2



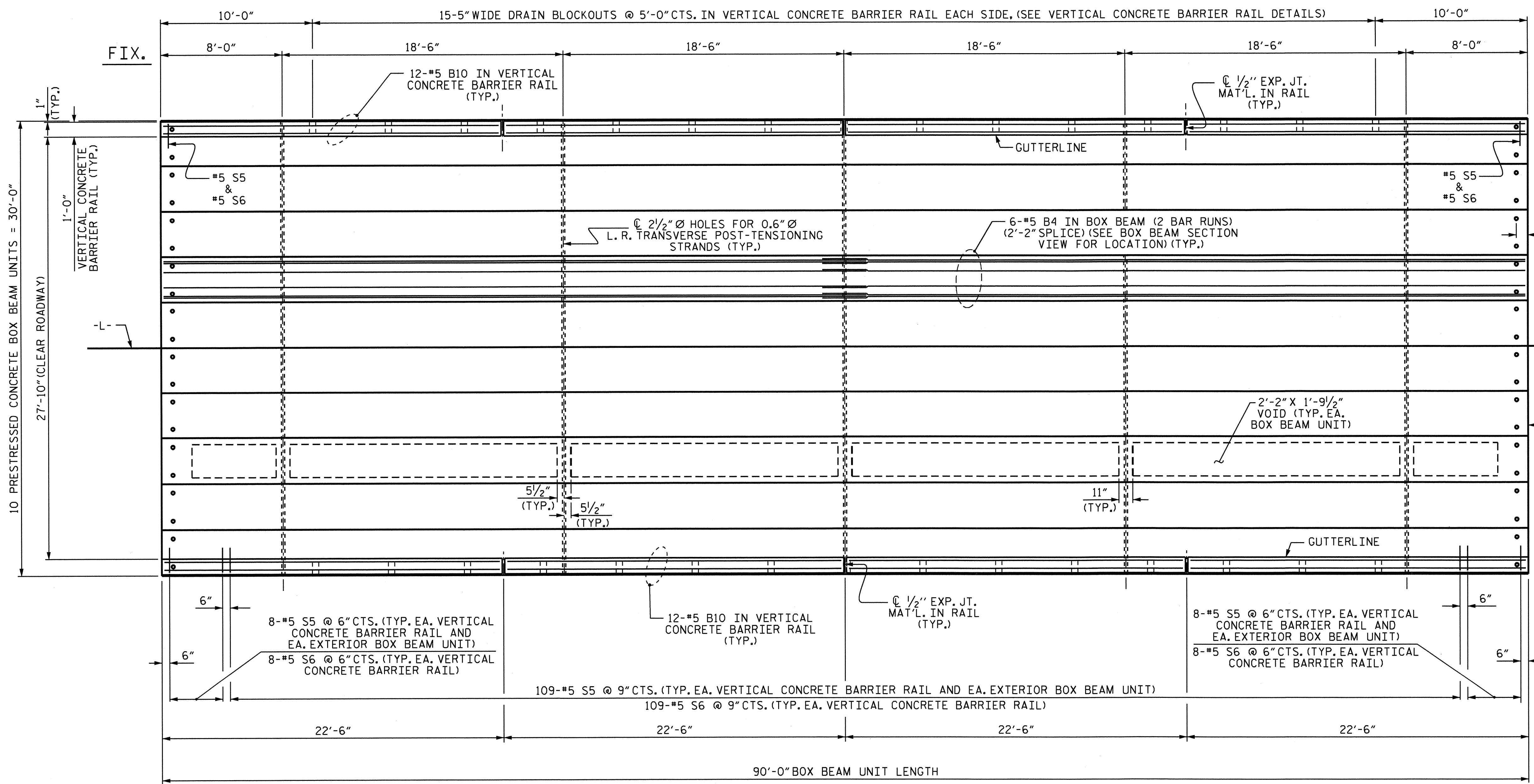
PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 1 OF 8

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

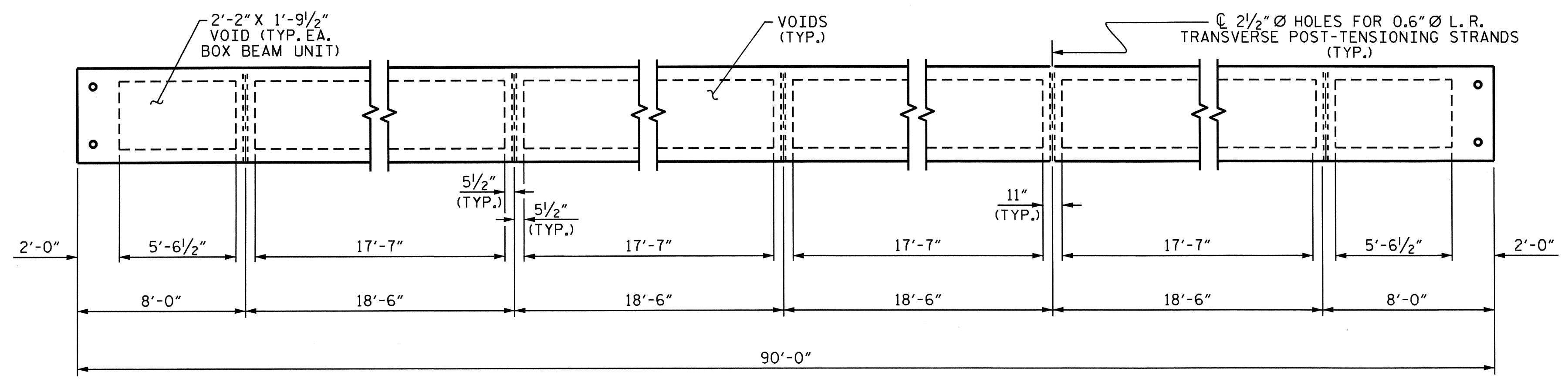
ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
 CHECKED BY : A. SORSENGINH DATE : 9/2012
 DRAWN BY : DCE 8/11
 CHECKED BY : TMG 11/11

REVISIONS						SHEET NO. 5-6 TOTAL SHEETS 24
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



NOTE:
SPACING OF DRAINS MAY BE ADJUSTED AS NECESSARY TO CENTER BETWEEN "S" BARS IN BARRIER RAIL.

PLAN OF SPAN A



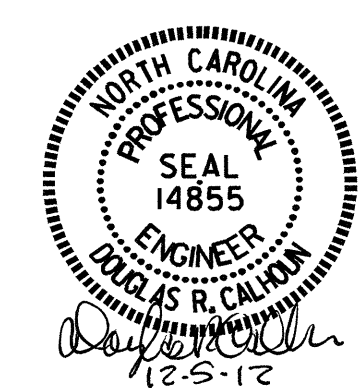
DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 2 OF 8

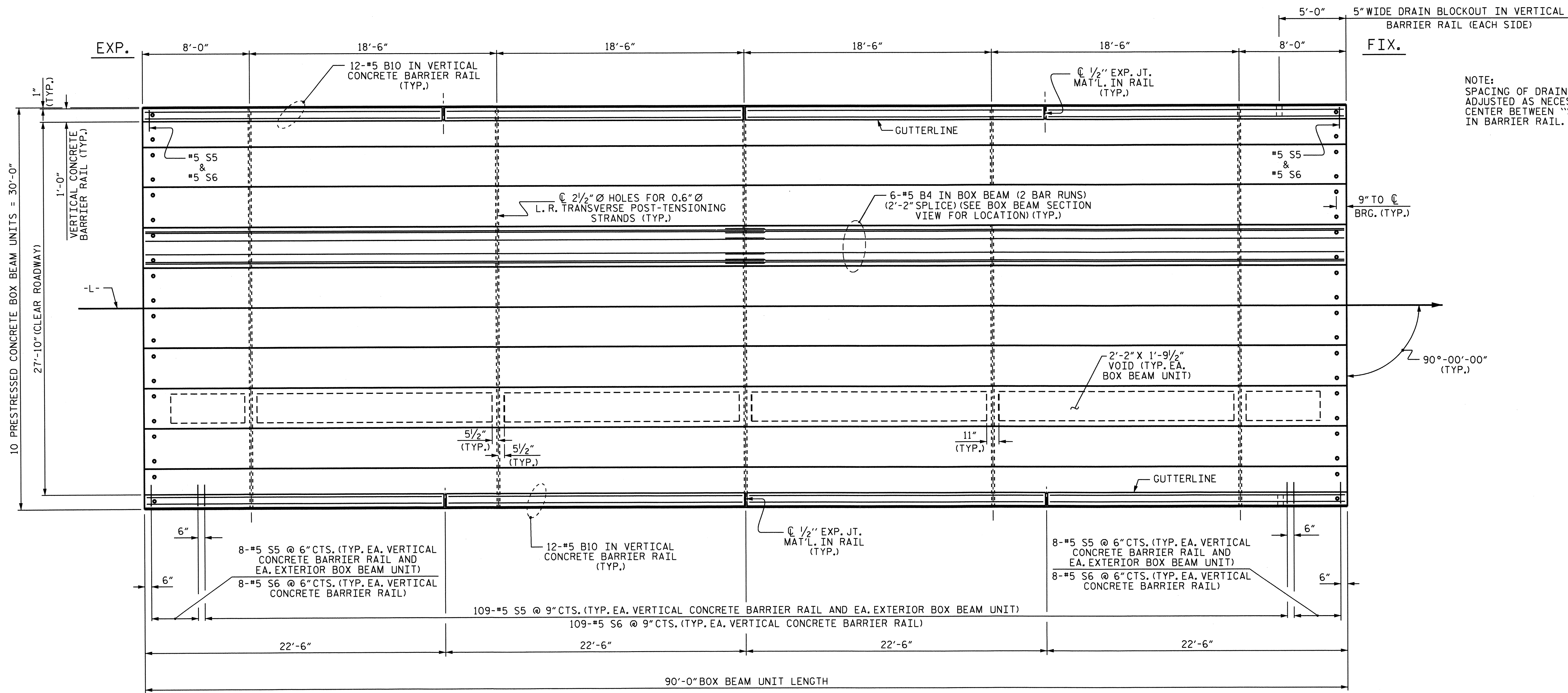
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 90' UNIT
27'-10" CLEAR ROADWAY
90° SKEW
SPAN A



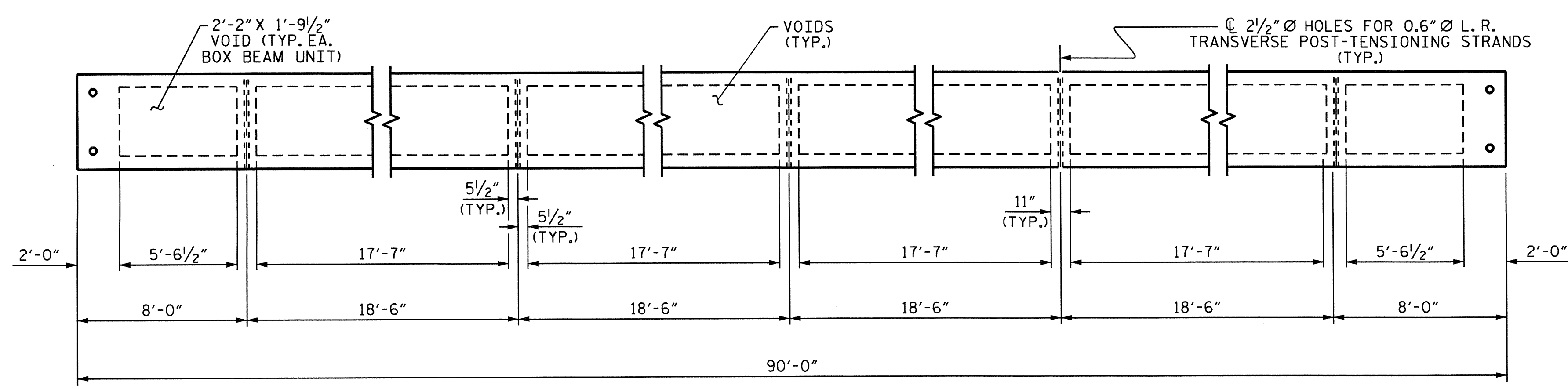
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012
DRAWN BY : DGE 8/10
CHECKED BY : TMG 11/11



NOTE:
SPACING OF DRAINS MAY BE
ADJUSTED AS NECESSARY TO
CENTER BETWEEN "S" BARS
IN BARRIER RAIL.

PLAN OF SPAN B



DIAPHRAGM AND VOID LAYOUT

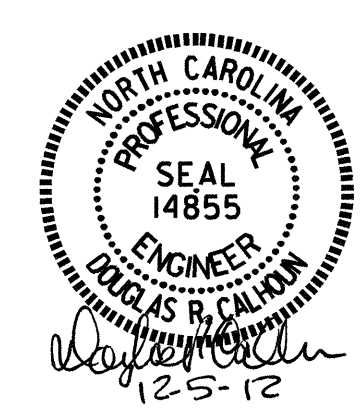
PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 3 OF 8

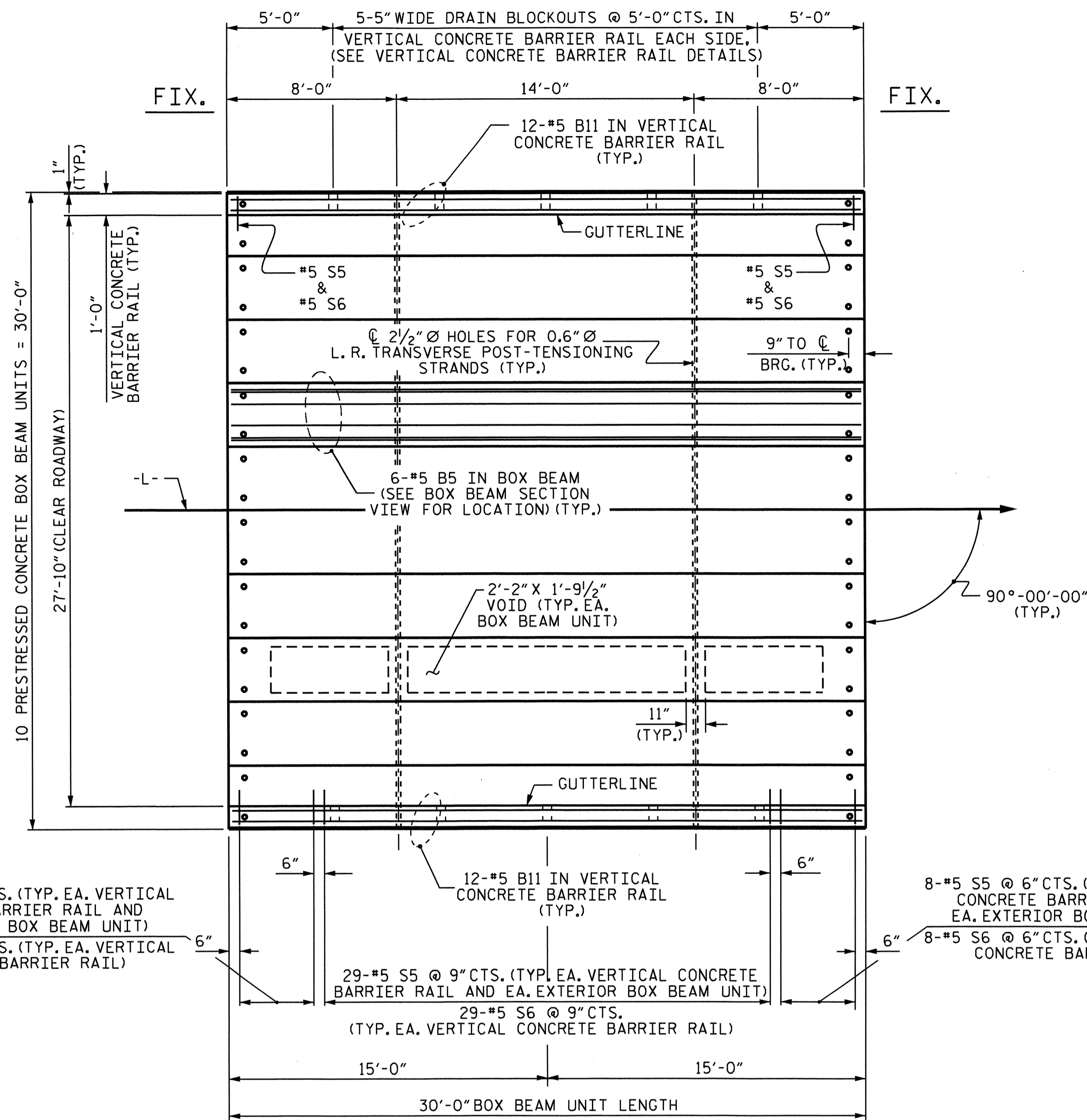
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 90' UNIT
27'-10" CLEAR ROADWAY
90° SKEW
SPAN B

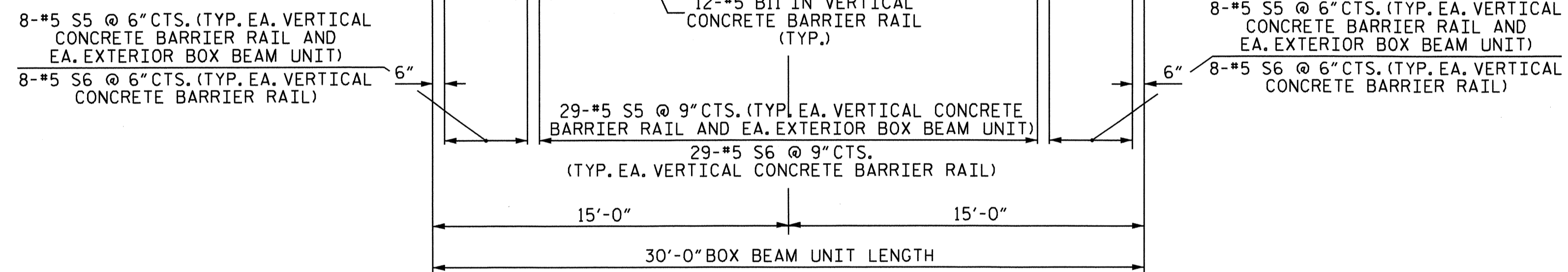
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			24
2			4			24



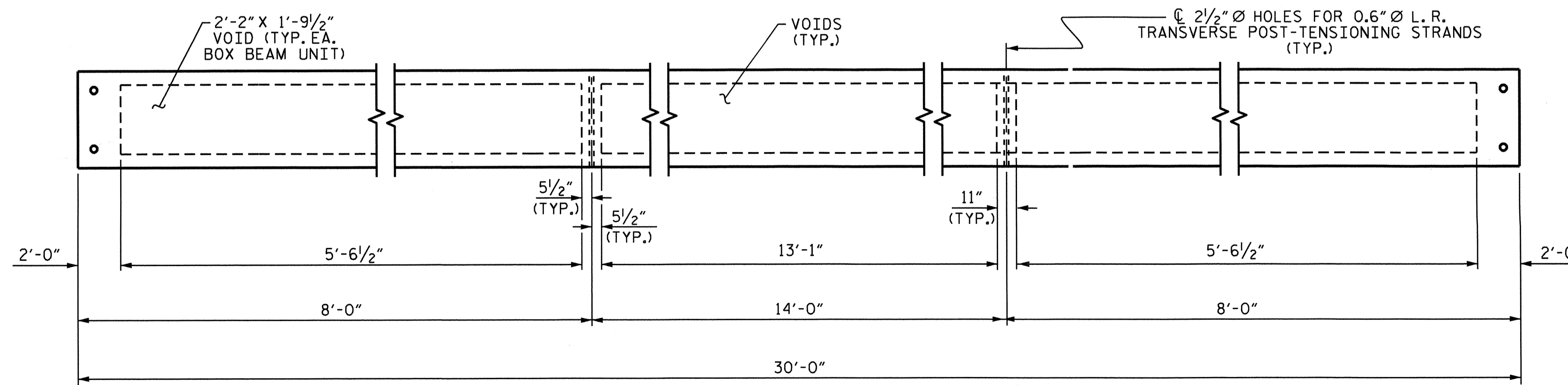
ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012
DRAWN BY : DGE 8/10
CHECKED BY : TMG 11/11



NOTE:
SPACING OF DRAINS MAY BE
ADJUSTED AS NECESSARY TO
CENTER BETWEEN "S" BARS
IN BARRIER RAIL.



PLAN OF SPAN C



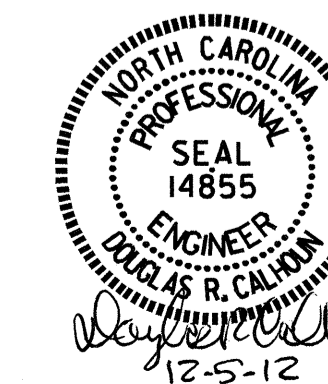
DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

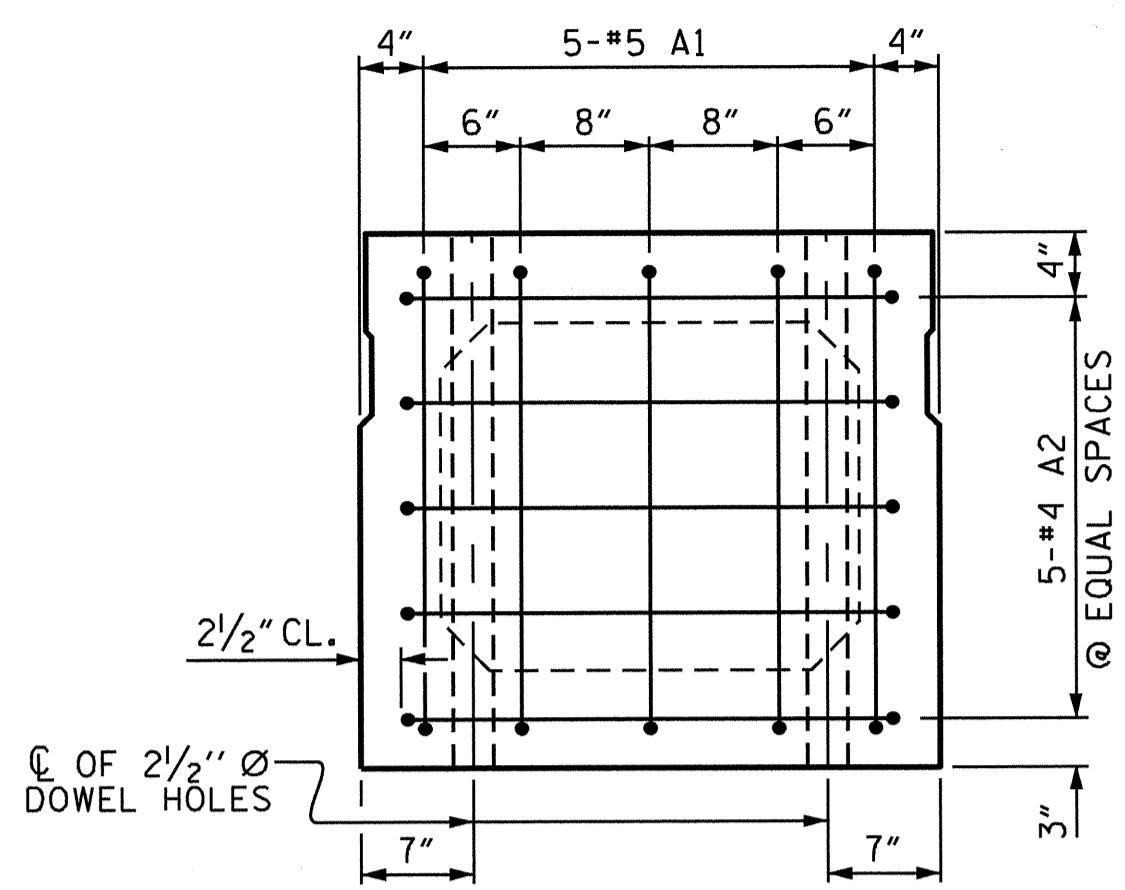
PLAN OF 30' UNIT
27'-10" CLEAR ROADWAY
90° SKEW
SPAN C



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			29

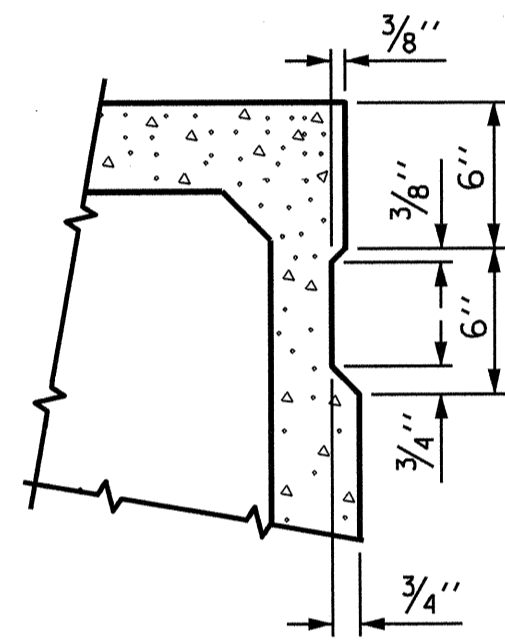
ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012

DRAWN BY : DGE 8/10
CHECKED BY : TMG 11/11



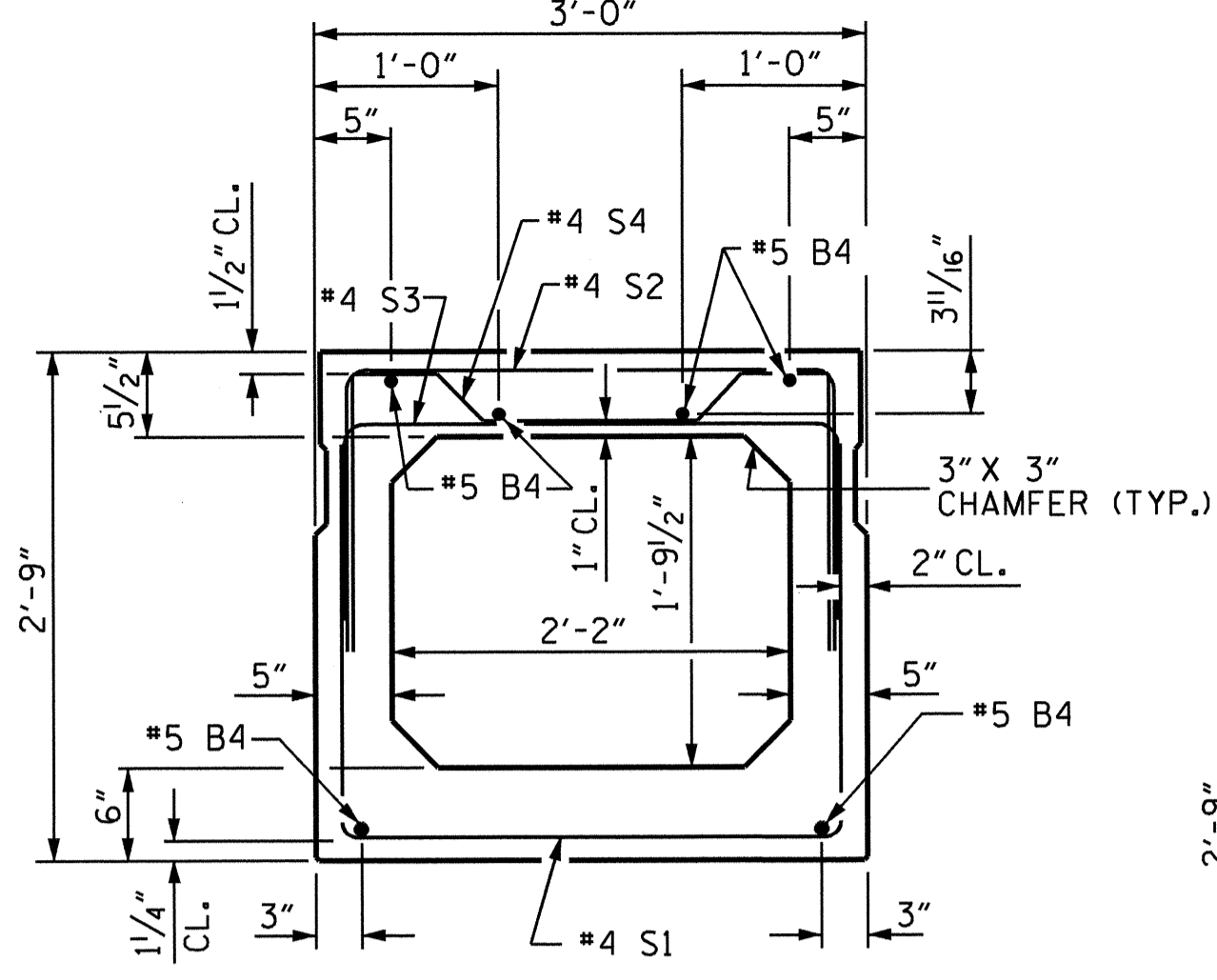
END ELEVATION

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.)



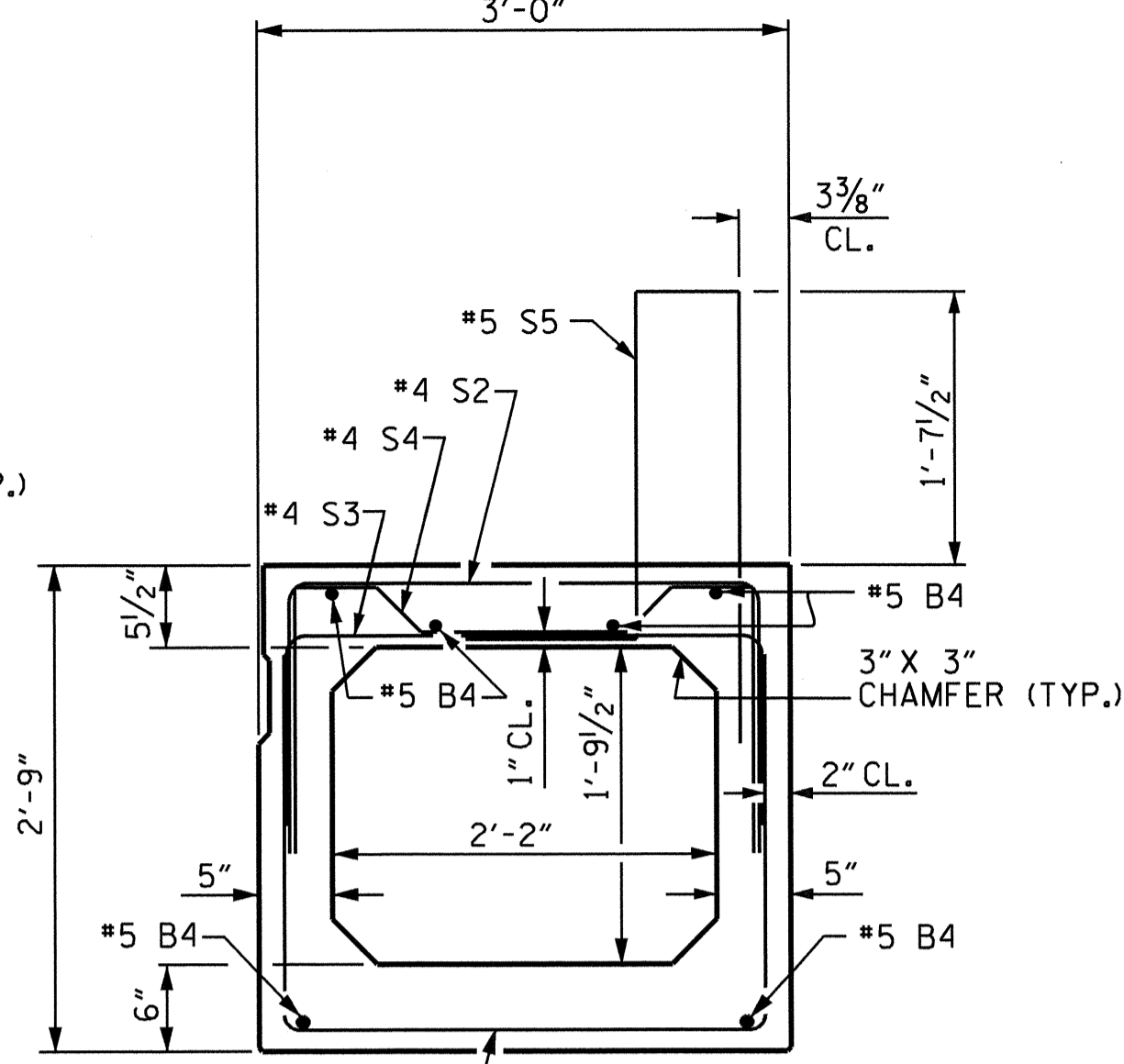
SHEAR KEY DETAIL

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



INTERIOR BOX BEAM SECTION

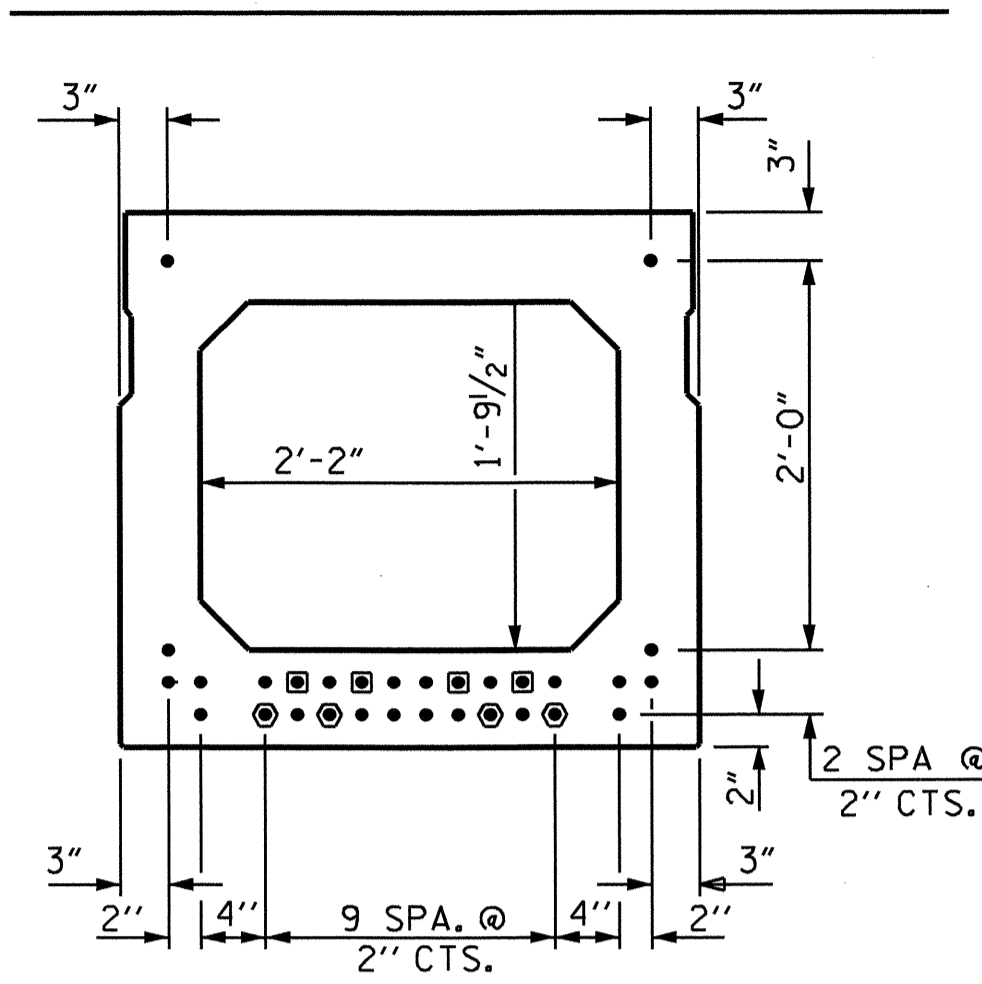
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

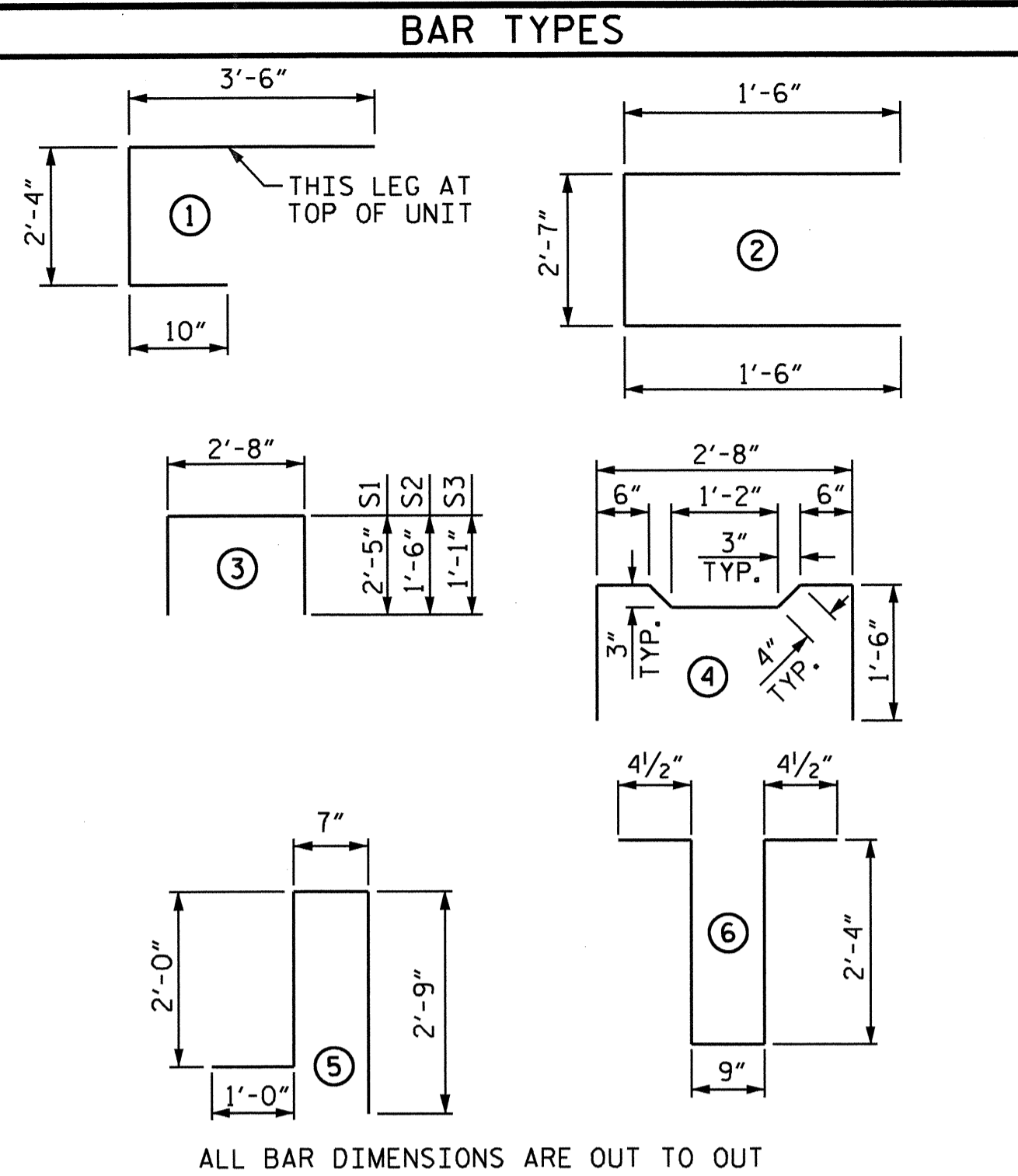
(30 STRANDS REQUIRED)

DEBONDING LEGEND

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

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

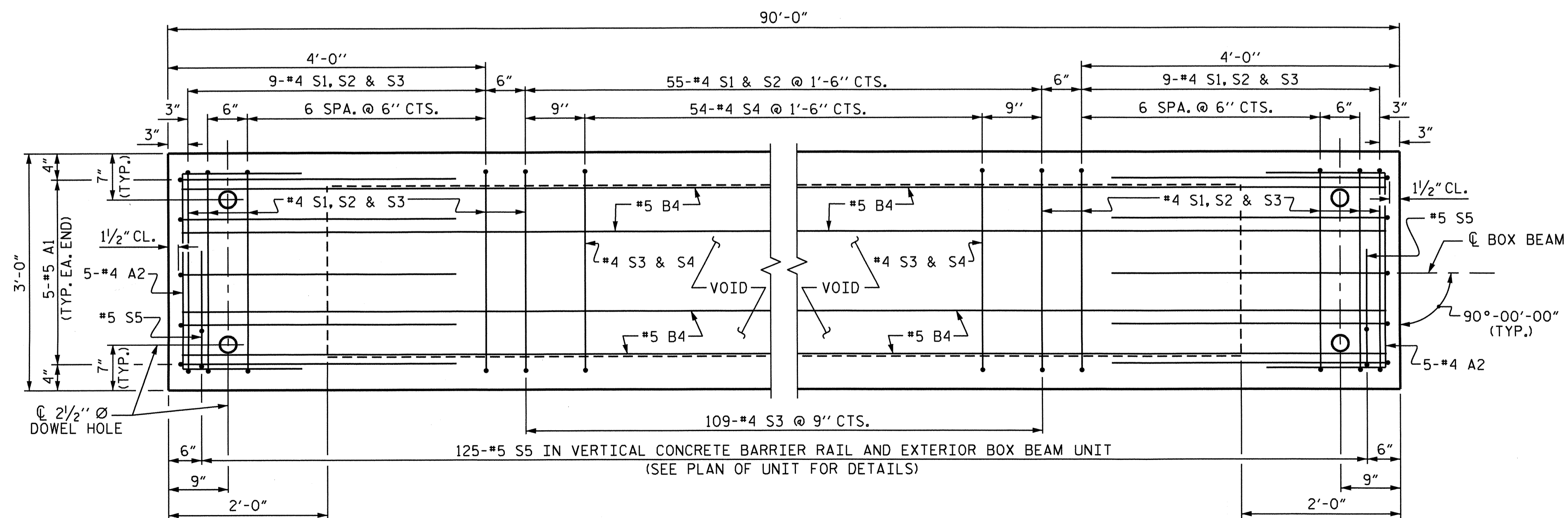
GRADE 270 STRANDS	
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950
	0.6" Ø L.R.



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	6'-8"	70	6'-8"	70
A2	40	#4	5'-7"	149	5'-7"	149
B4	12	#5	45'-11"	575	45'-11"	575
K1	15	#4	6'-2"	62	6'-2"	62
K2	10	#4	2'-7"	17	2'-7"	17
S1	73	#4	7'-6"	366	7'-6"	366
S2	73	#4	5'-8"	276	5'-8"	276
S3	127	#4	4'-10"	410	4'-10"	410
S4	54	#4	5'-10"	210	5'-10"	210
*S5	125	#5	6'-4"	826	--	--
REINFORCING STEEL			2135	LBS.	2135	LBS.
*EPOXY COATED REINF. STEEL			826	LBS.		
8000 P.S.I. CONCRETE			16.0	CU. YDS.	15.9	CU. YDS.
0.6" Ø L.R. STRANDS			No. 30		No. 30	

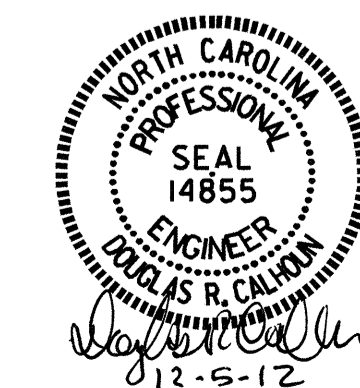


PLAN OF BOX BEAM

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

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012

DRAWN BY : DGE 10/11
CHECKED BY : TMG 11/11



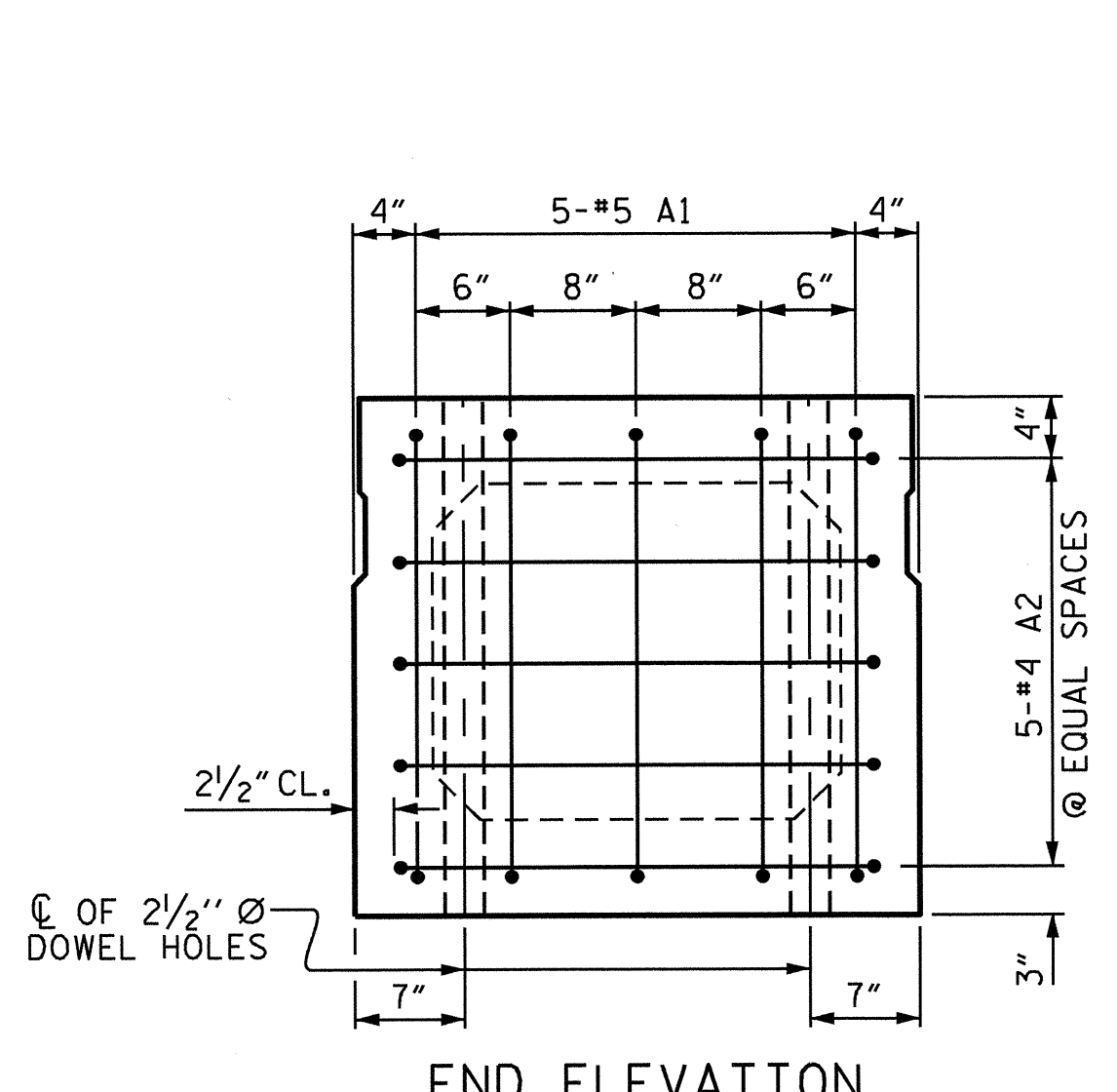
PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 5 OF 8

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

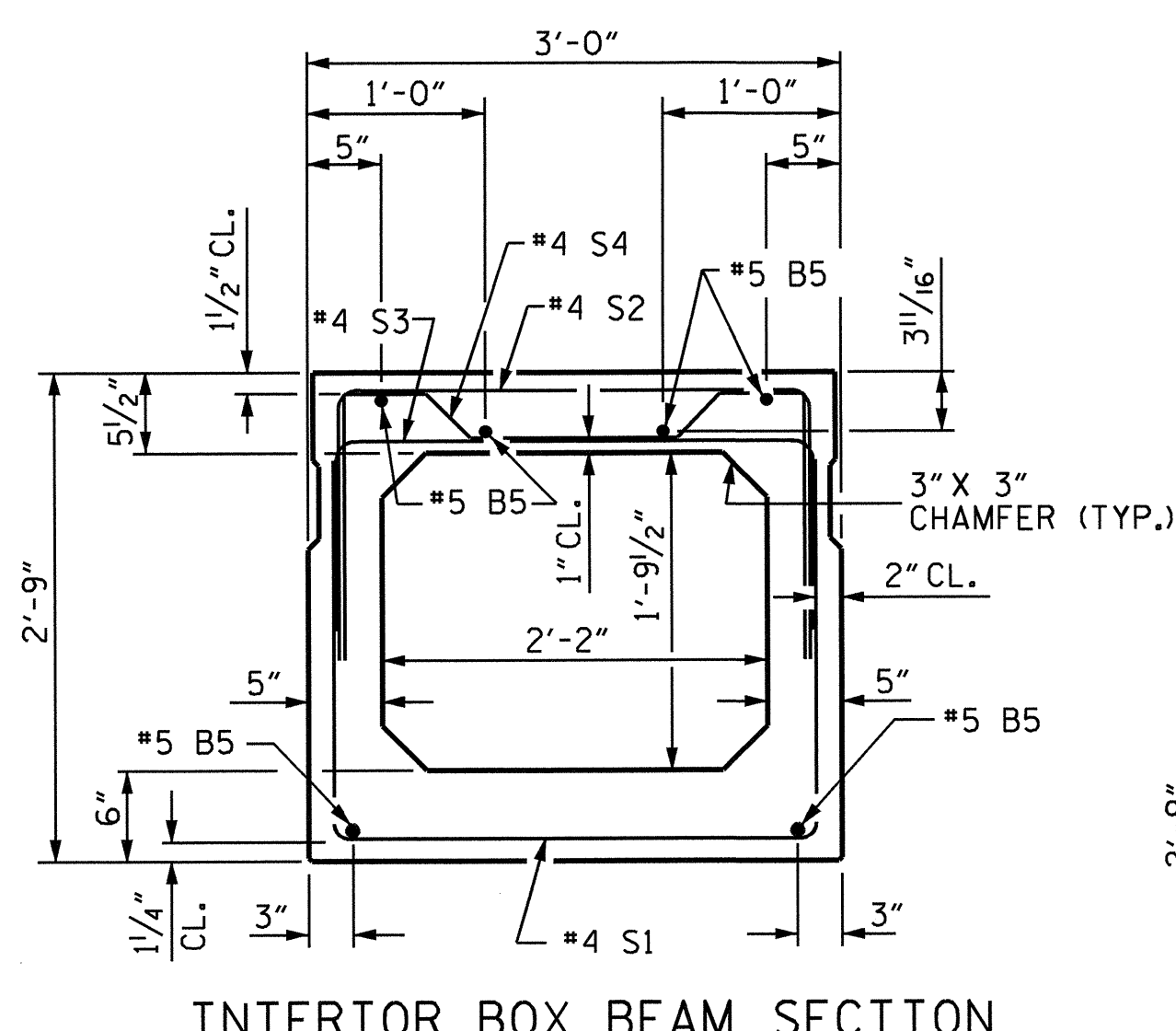
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			5-10
2			4			24

STD. NO. 33PCBB4.90S.90L



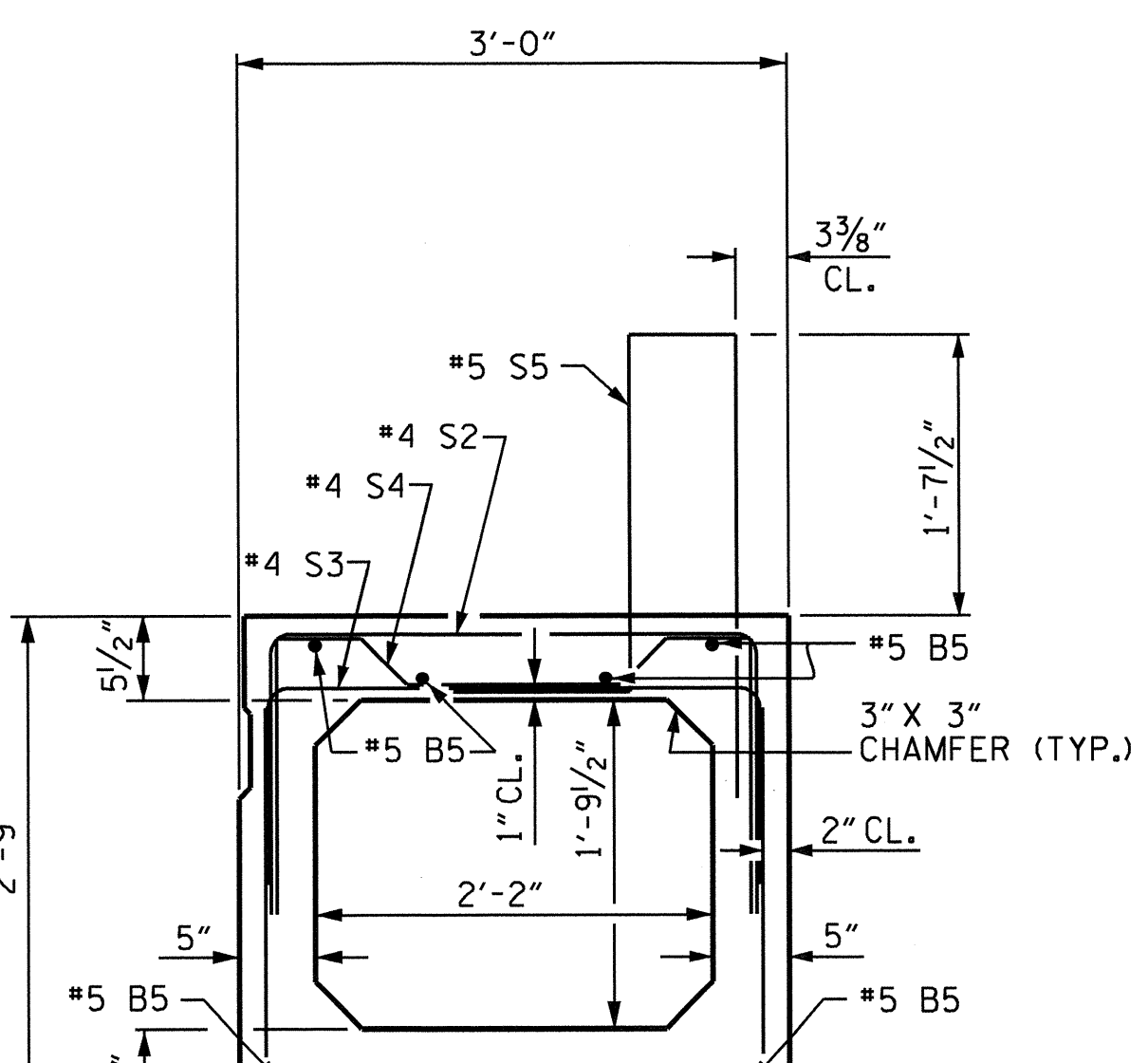
END ELEVATION

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

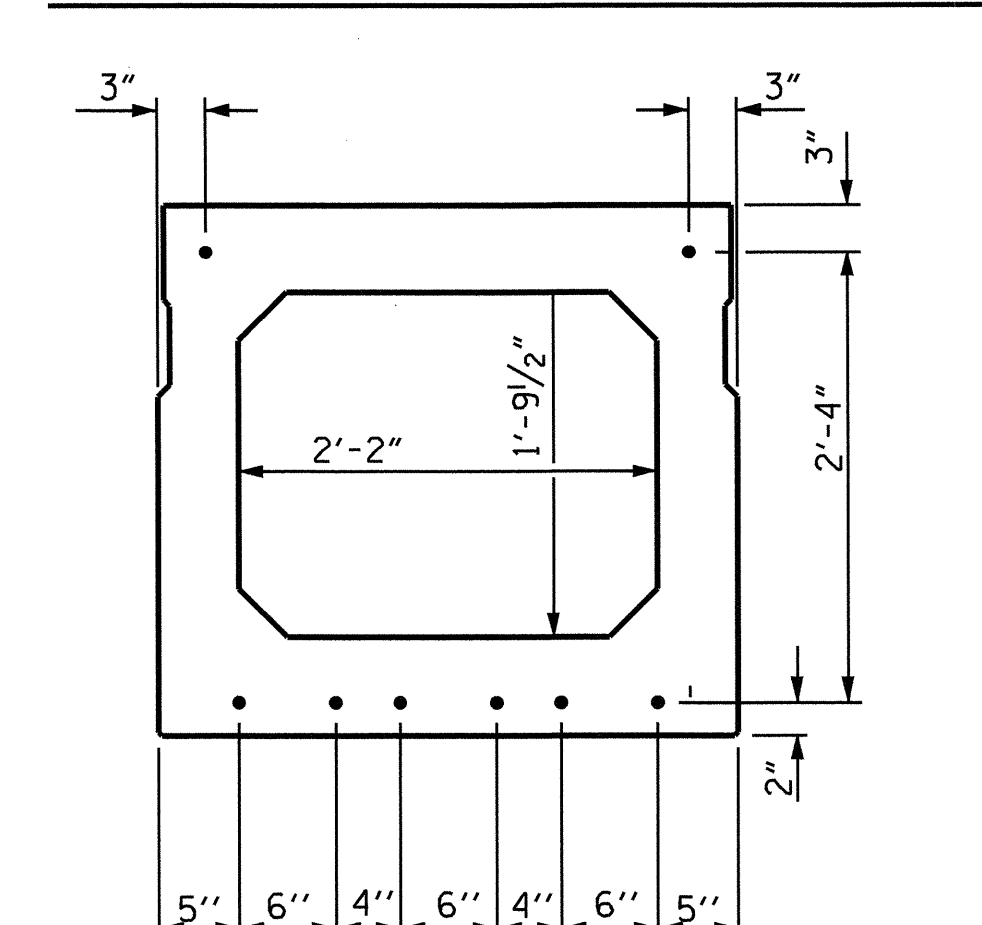
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

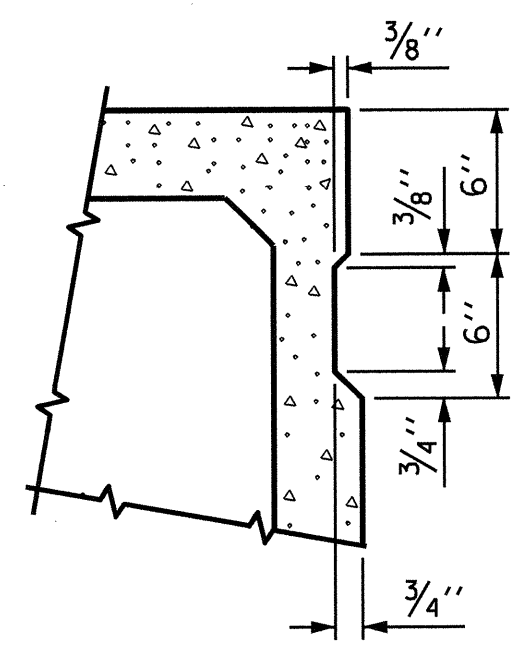
(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(8 STRANDS REQUIRED)

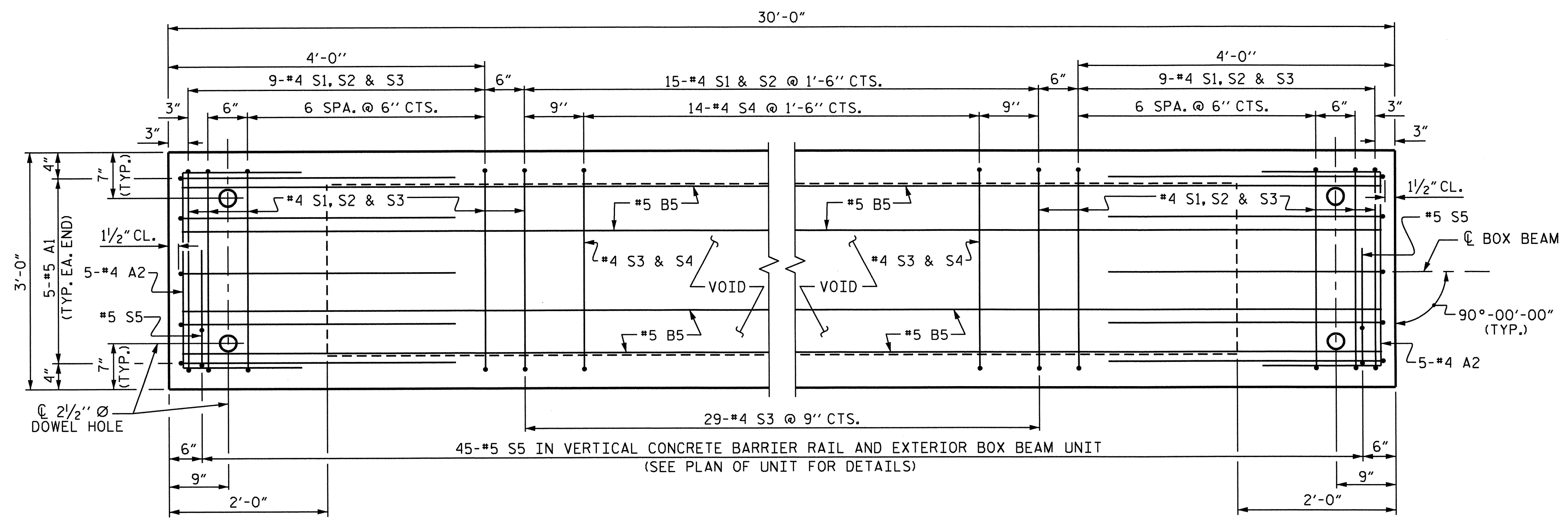


SHEAR KEY DETAIL

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

GRADE 270 STRANDS	
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	
A1	10	#5	1	LENGTH	WEIGHT	LENGTH	WEIGHT
A2	22	#4	2	5'-7"	82	5'-7"	82
B5	6	#5	STR	29'-8"	186	29'-8"	186
K1	6	#4	6	6'-2"	25	6'-2"	25
K2	4	#4	STR	2'-7"	7	2'-7"	7
S1	33	#4	3	7'-6"	165	7'-6"	165
S2	33	#4	3	5'-8"	125	5'-8"	125
S3	47	#4	3	4'-10"	152	4'-10"	152
S4	14	#4	4	5'-10"	55	5'-10"	55
* S5	45	#5	5	6'-4"	297	--	--
REINFORCING STEEL				867	LBS.	867	LBS.
* EPOXY COATED REINF. STEEL				297	LBS.		
5000 P.S.I. CONCRETE				5.8	CU. YDS.	5.7	CU. YDS.
0.6" Ø L.R. STRANDS				No. 8		No. 8	



PLAN OF BOX BEAM

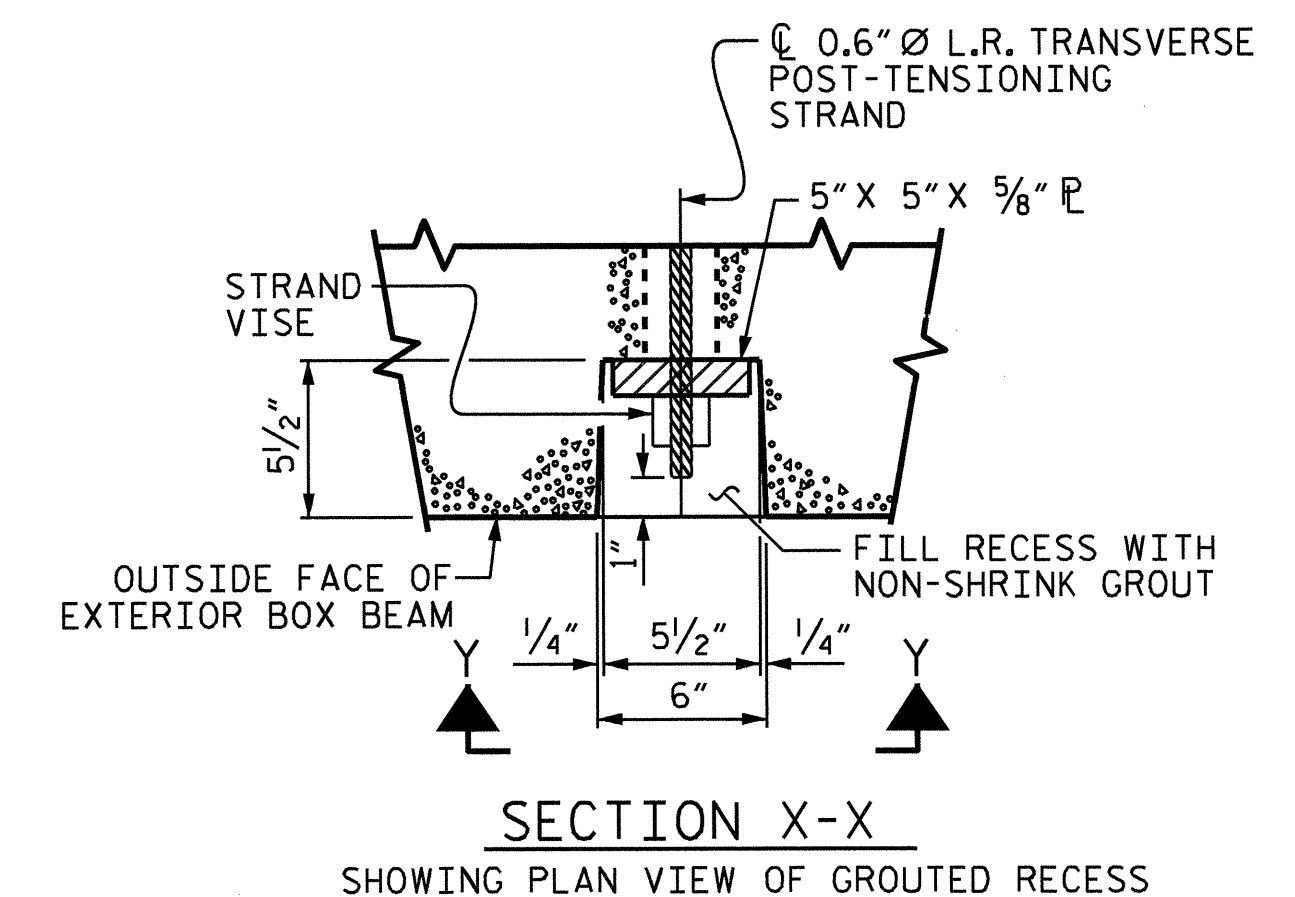
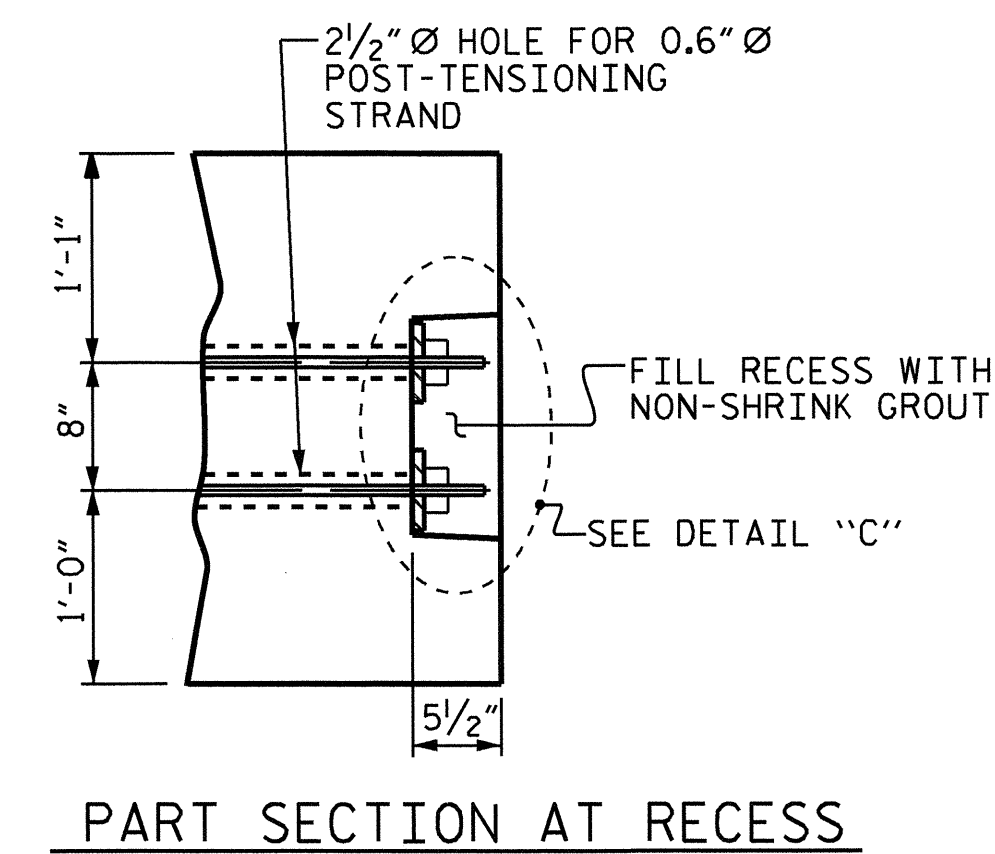
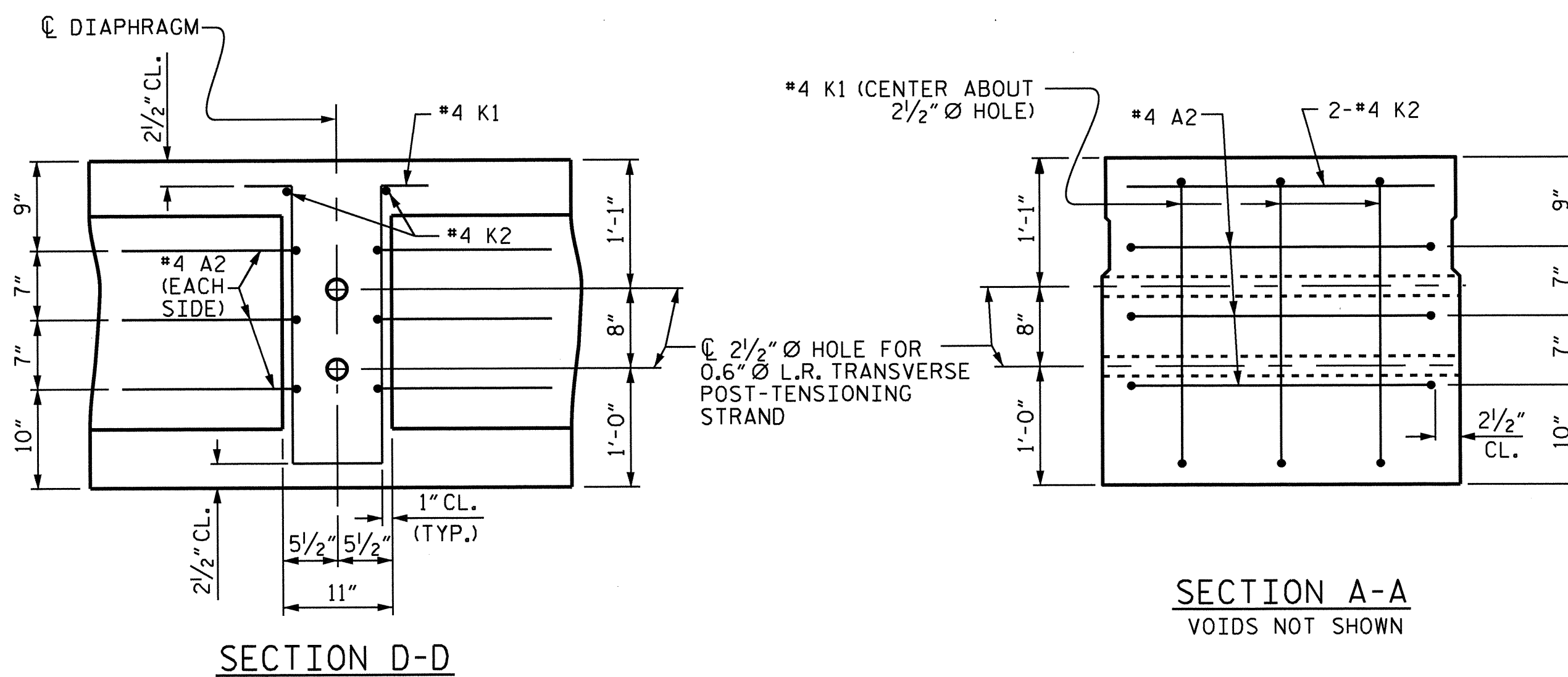
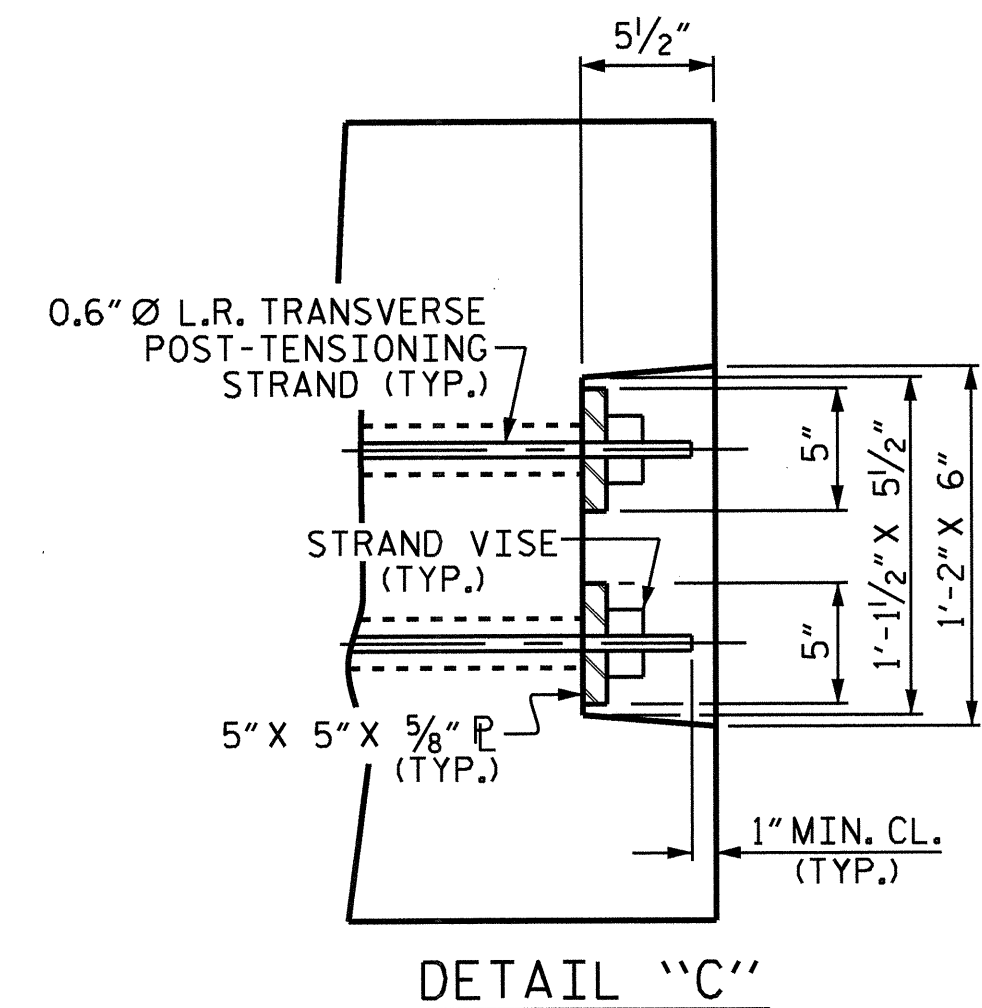
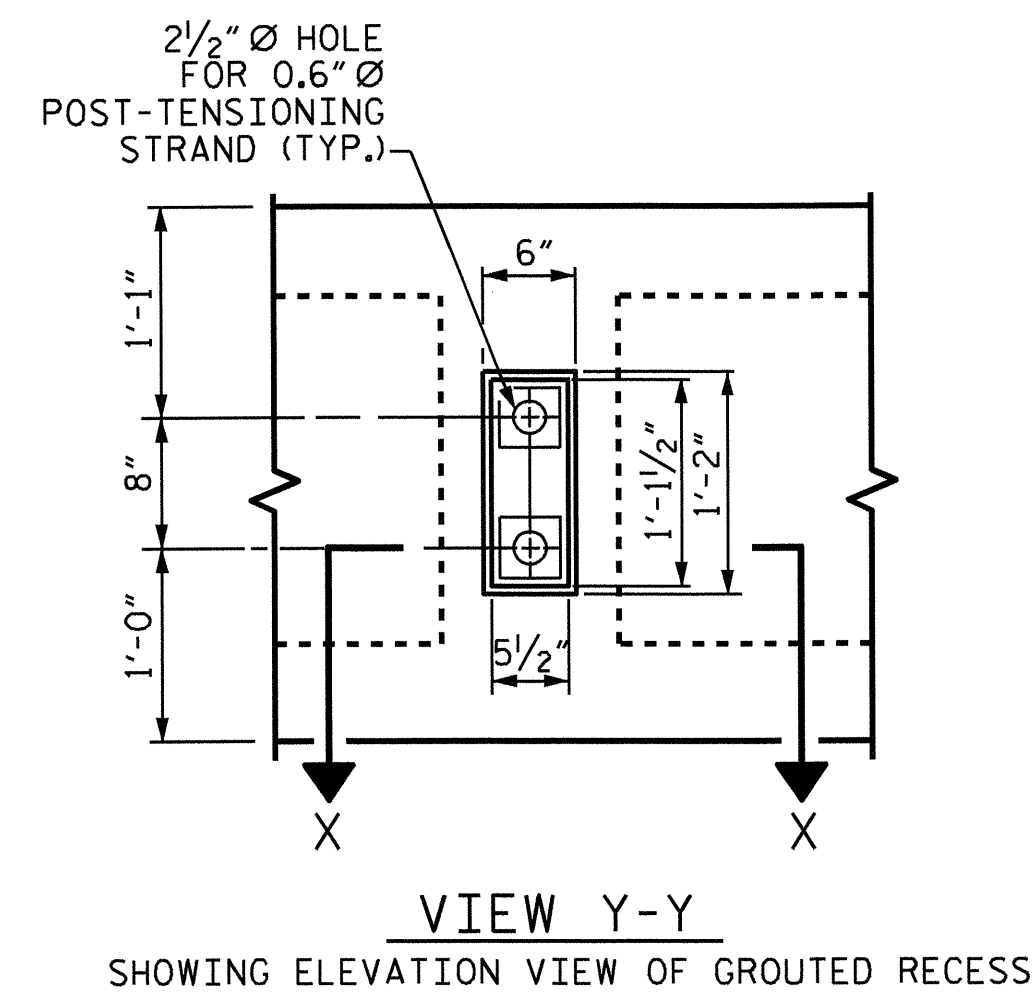
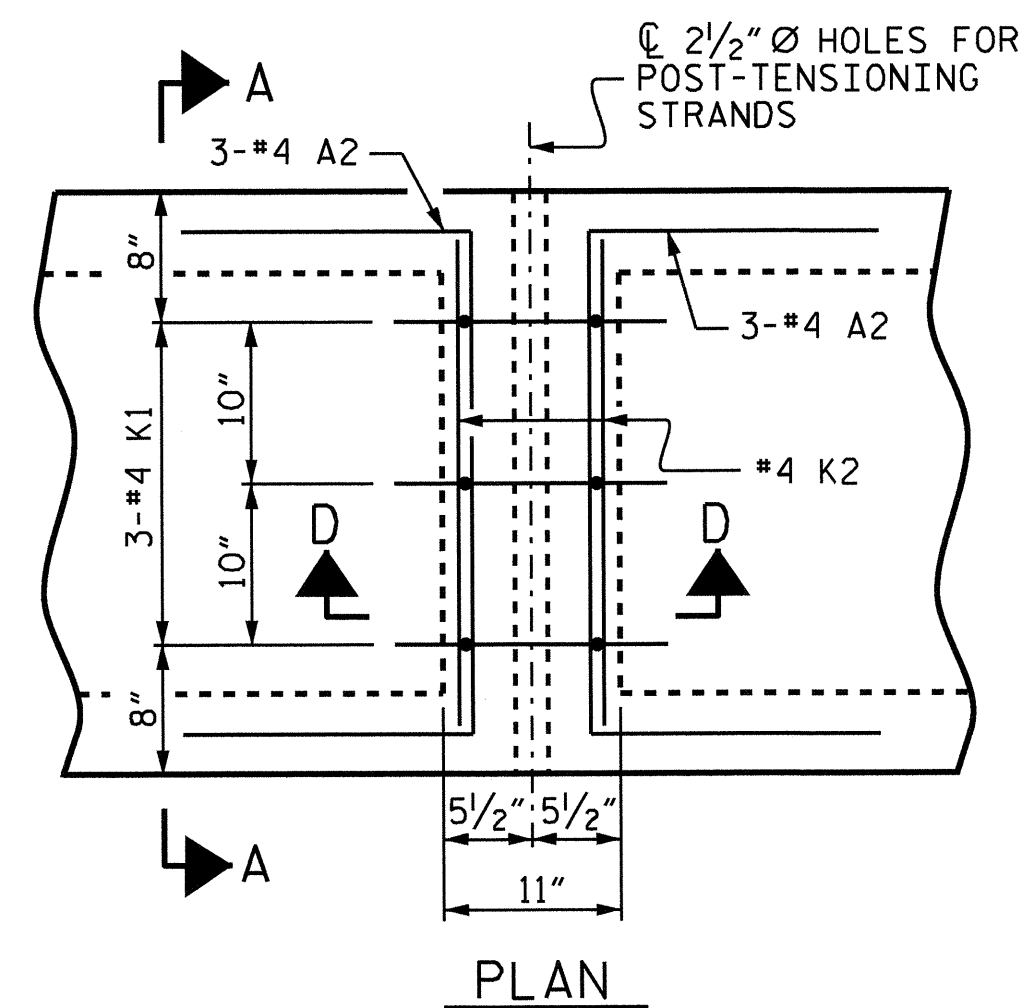
EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF UNIT. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
 CHECKED BY : A. SORSENGINH DATE : 9/2012
 DRAWN BY : DGE 10/11
 CHECKED BY : TMG 11/11

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-
 SHEET 6 OF 8



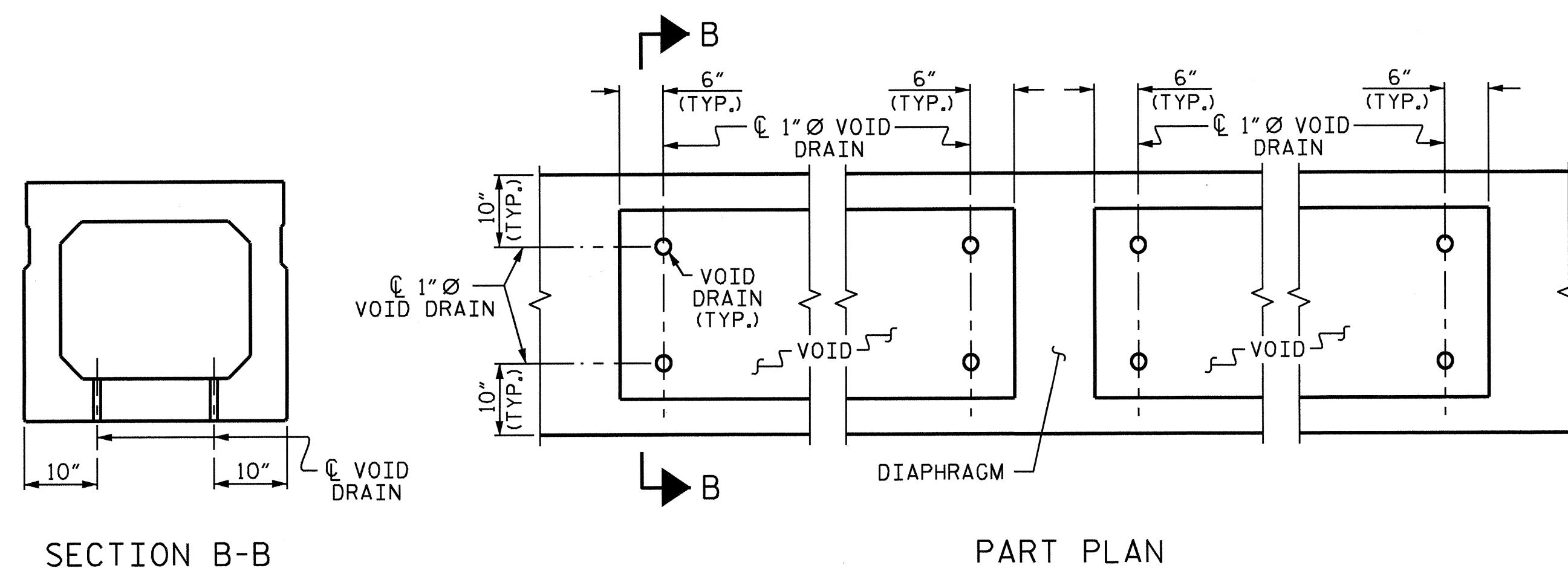
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD 3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT SPAN C					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 24



DOUBLE DIAPHRAGM DETAILS

*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

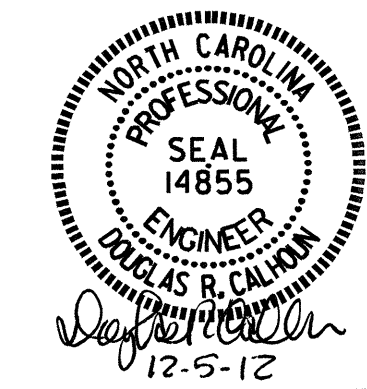
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
90' BOX BEAM UNIT (NC)	3'-0" x 2'-9"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3 3/4" ↑
FINAL CAMBER	3/4" ↓
** INCLUDES FUTURE WEARING SURFACE	

DEAD LOAD DEFLECTION AND CAMBER	
30' BOX BEAM UNIT (NC)	3'-0" x 2'-9"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/16" ↑
FINAL CAMBER	1/16" ↓
** INCLUDES FUTURE WEARING SURFACE	

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

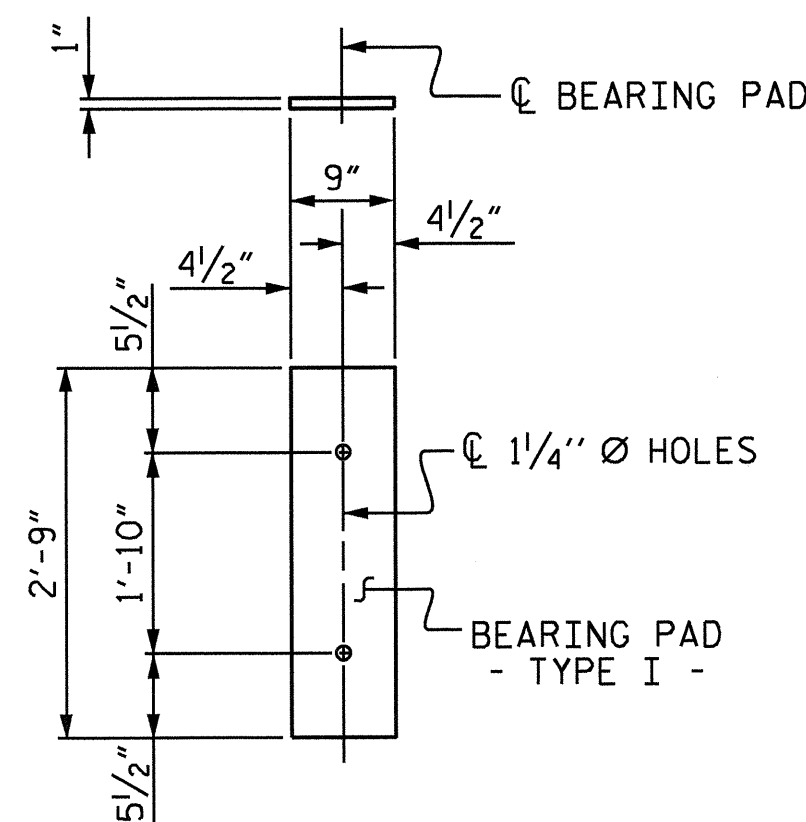
SHEET 7 OF 8



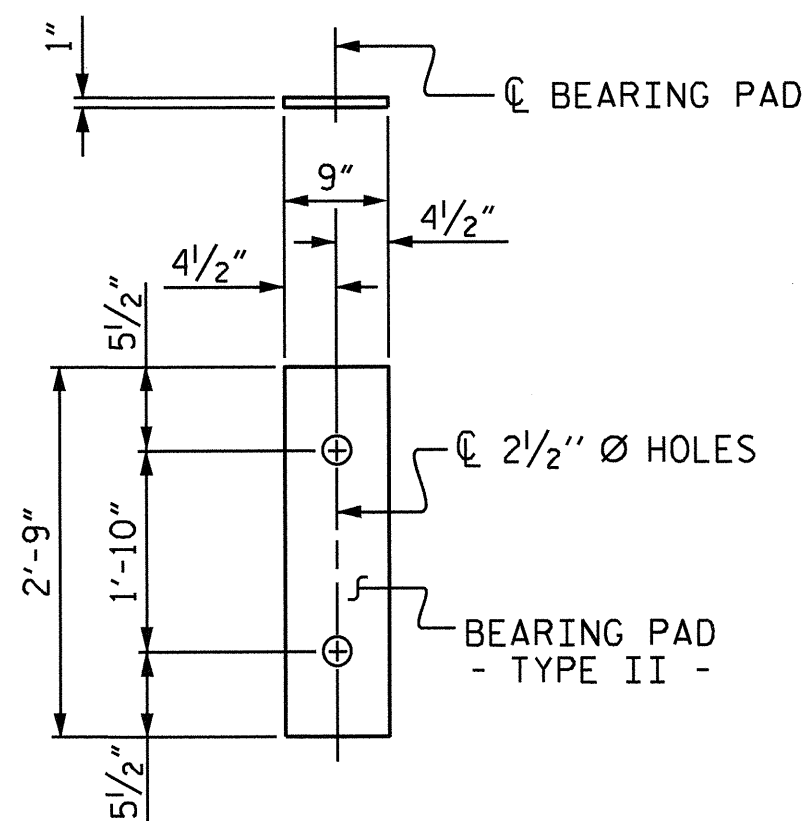
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-12
2			4			24

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
 CHECKED BY : A. SORSENINH DATE : 9/2012
 DRAWN BY : DGE 10/11
 CHECKED BY : TMG 11/11



FIXED END
(TYPE I - 50 REQ'D)



EXPANSION END
(TYPE II - 10 REQ'D)

ELASTOMERIC BEARING DETAILS

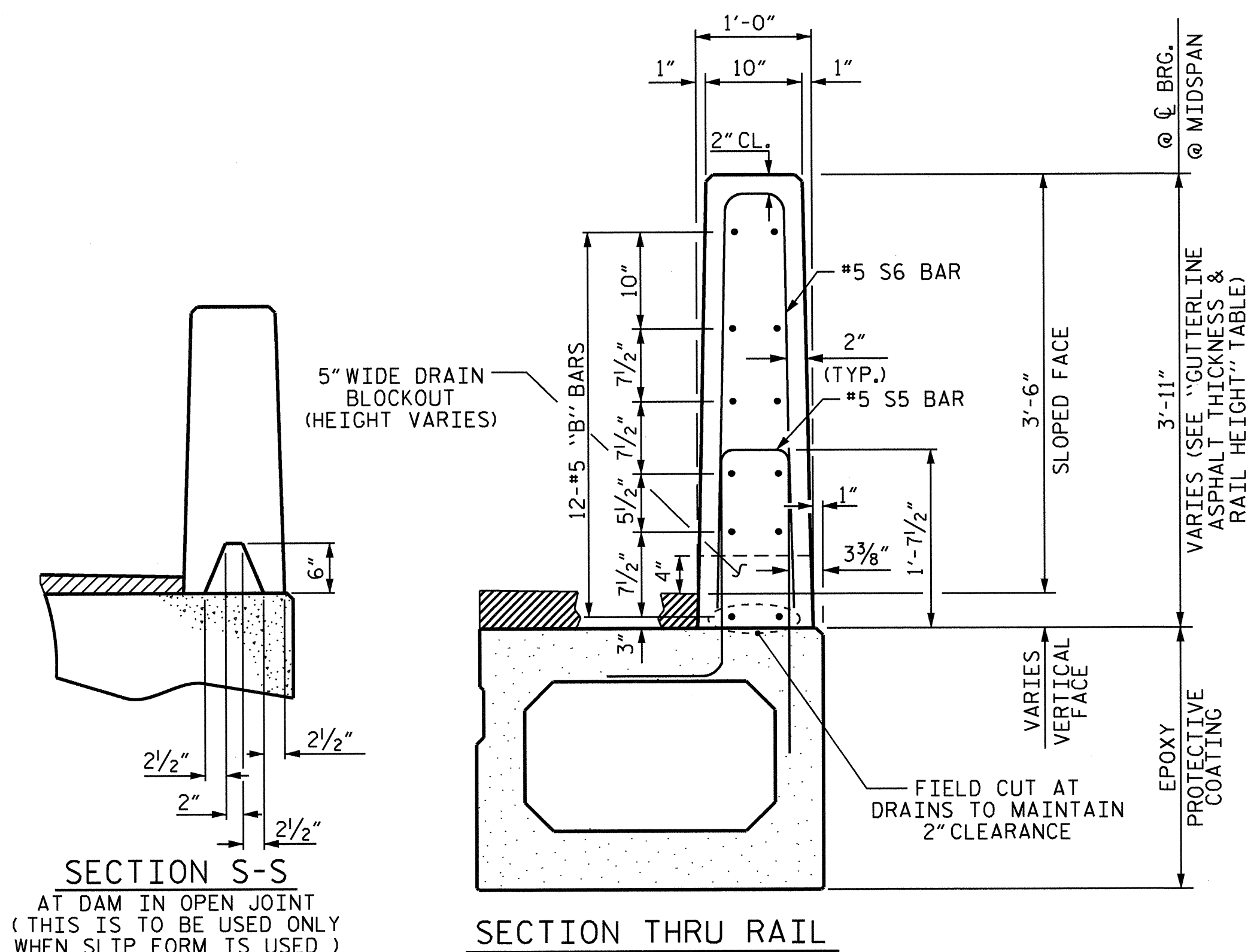
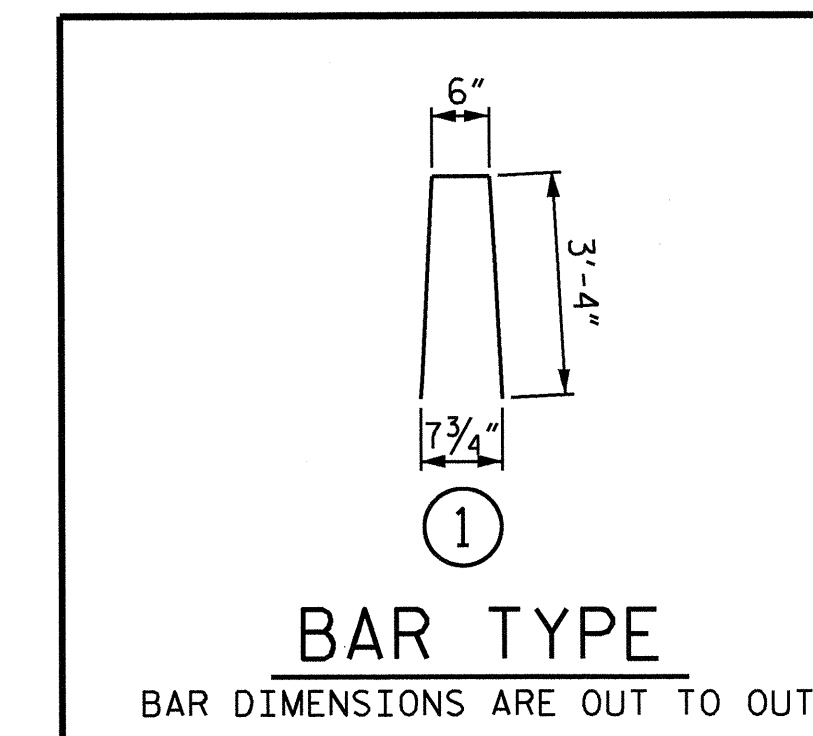
ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	4	90'-0"	360'-0"
INTERIOR B.B.	16	90'-0"	1440'-0"
TOTAL	20		1800'-0"

BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	30'-0"	60'-0"
INTERIOR B.B.	8	30'-0"	240'-0"
TOTAL	10		300'-0"



VERTICAL CONCRETE BARRIER RAIL DETAILS

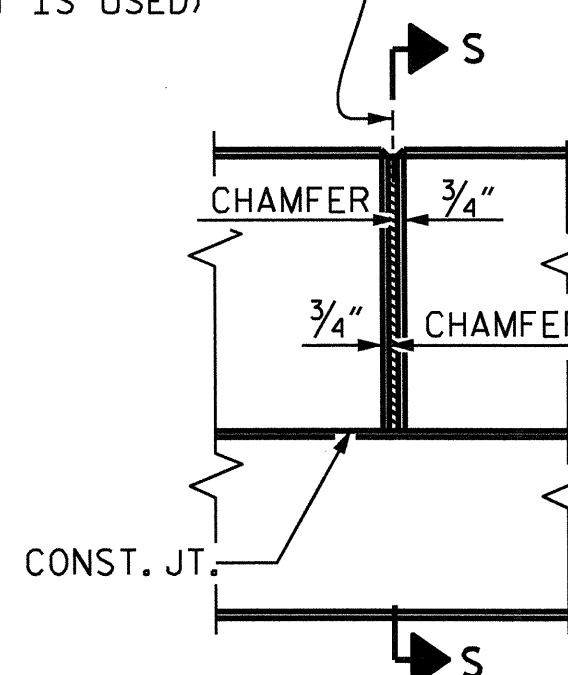
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
90' UNIT					
* B10	96	#5	STR	22'-1"	2211
* S6	250	#5	1	7'-2"	1869
* EPOXY COATED REINFORCING STEEL				LBS.	4080
CLASS AA CONCRETE				CU.YDS.	24.2
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	180.0

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
30' UNIT					
* B11	24	#5	STR	29'-8"	743
* S6	90	#5	1	7'-2"	673
* EPOXY COATED REINFORCING STEEL				LBS.	1416
CLASS AA CONCRETE				CU.YDS.	8.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	60.0

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



ELEVATION AT EXPANSION JOINTS

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
30' UNITS	4 3/8"	3'-10 1/8"
90' UNITS	1 1/2"	3'-8"

PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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



REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			24
2			4			

ASSEMBLED BY: A.C. OUTLAW DATE: 1/25/12
CHECKED BY: A. SORSENGINH DATE: 9/2012

DRAWN BY: DGE 10/11
CHECKED BY: TMG 11/11

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.)

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

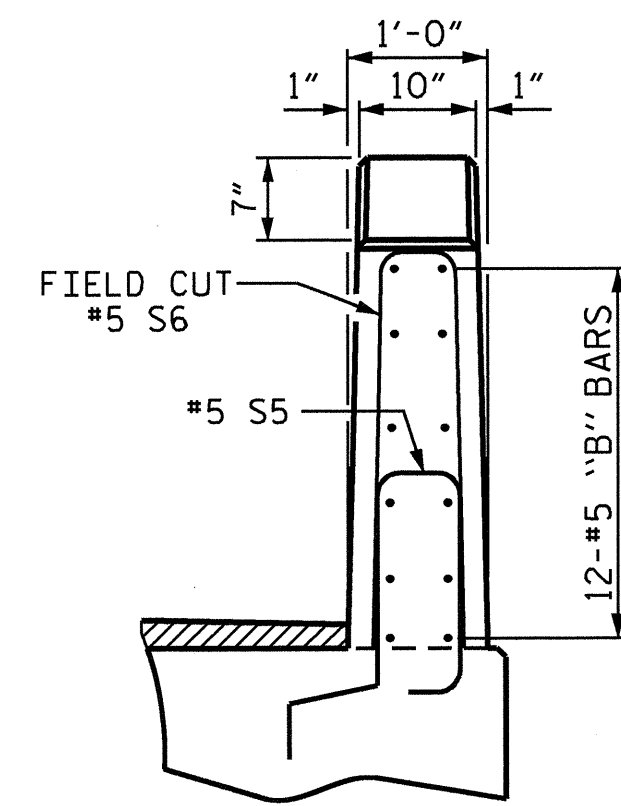
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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

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

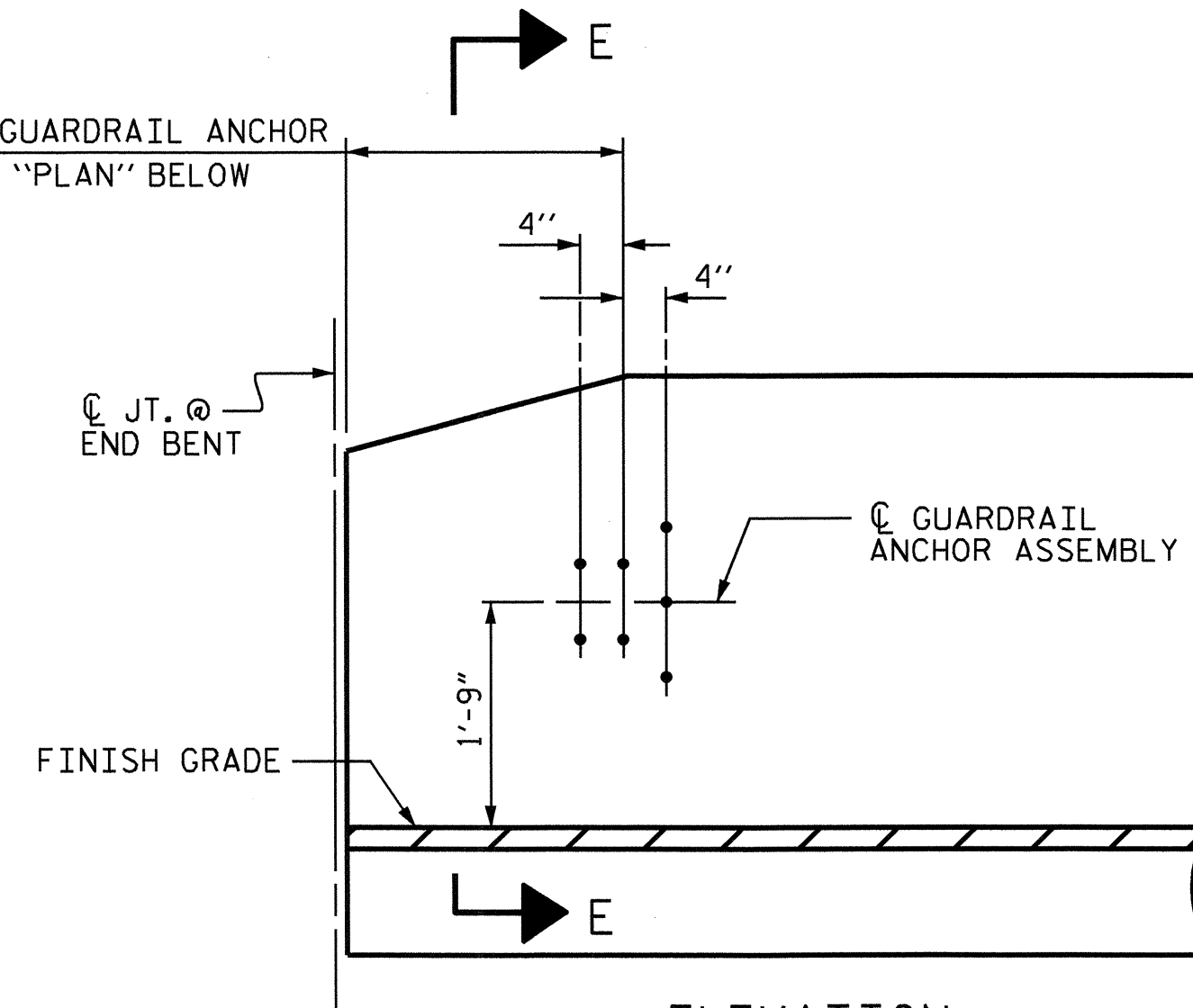
THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

S6 BARS AT END TRANSITION ON VERTICAL CONCRETE BARRIER RAIL MAY BE FIELD CUT AS NECESSARY.

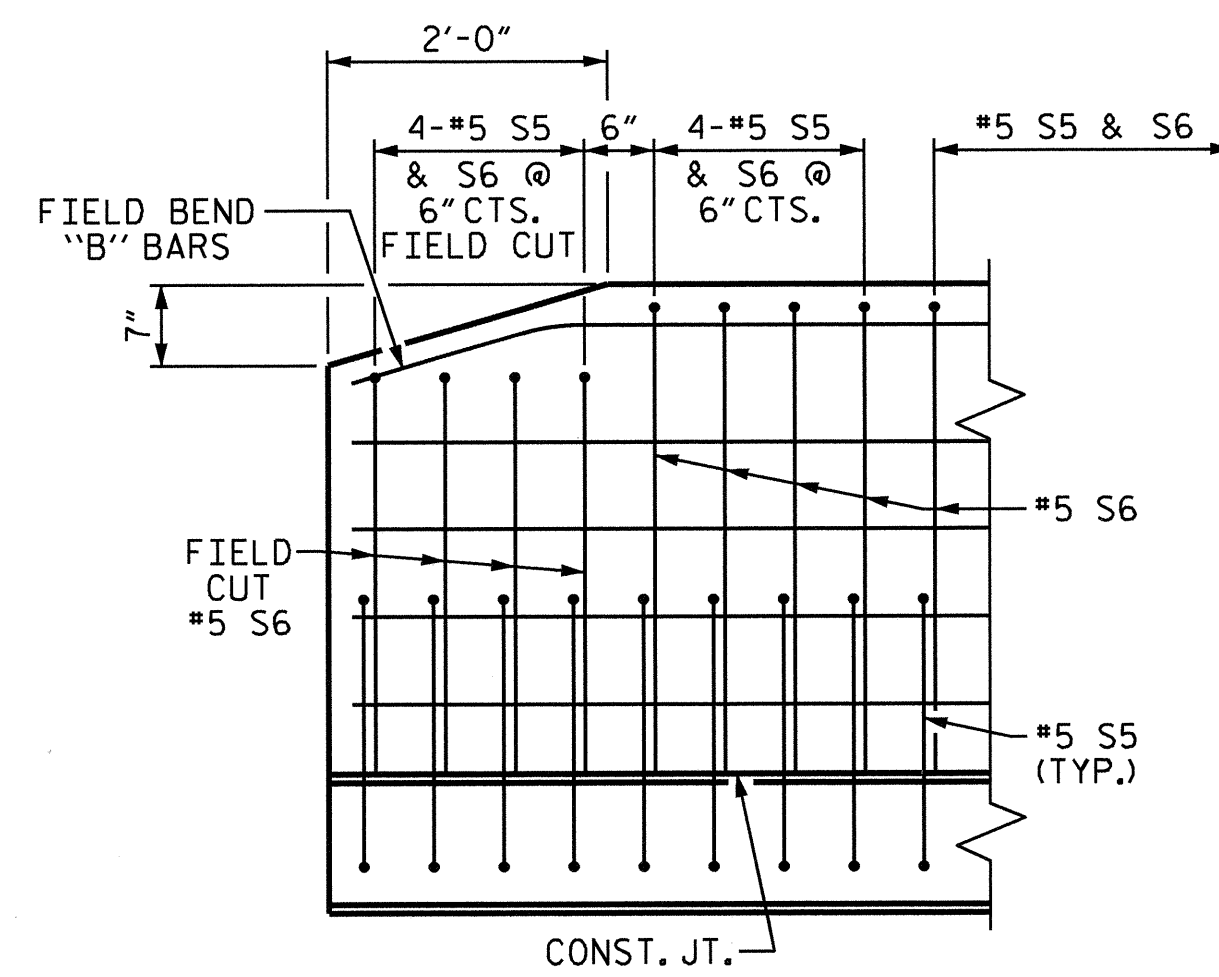


END VIEW

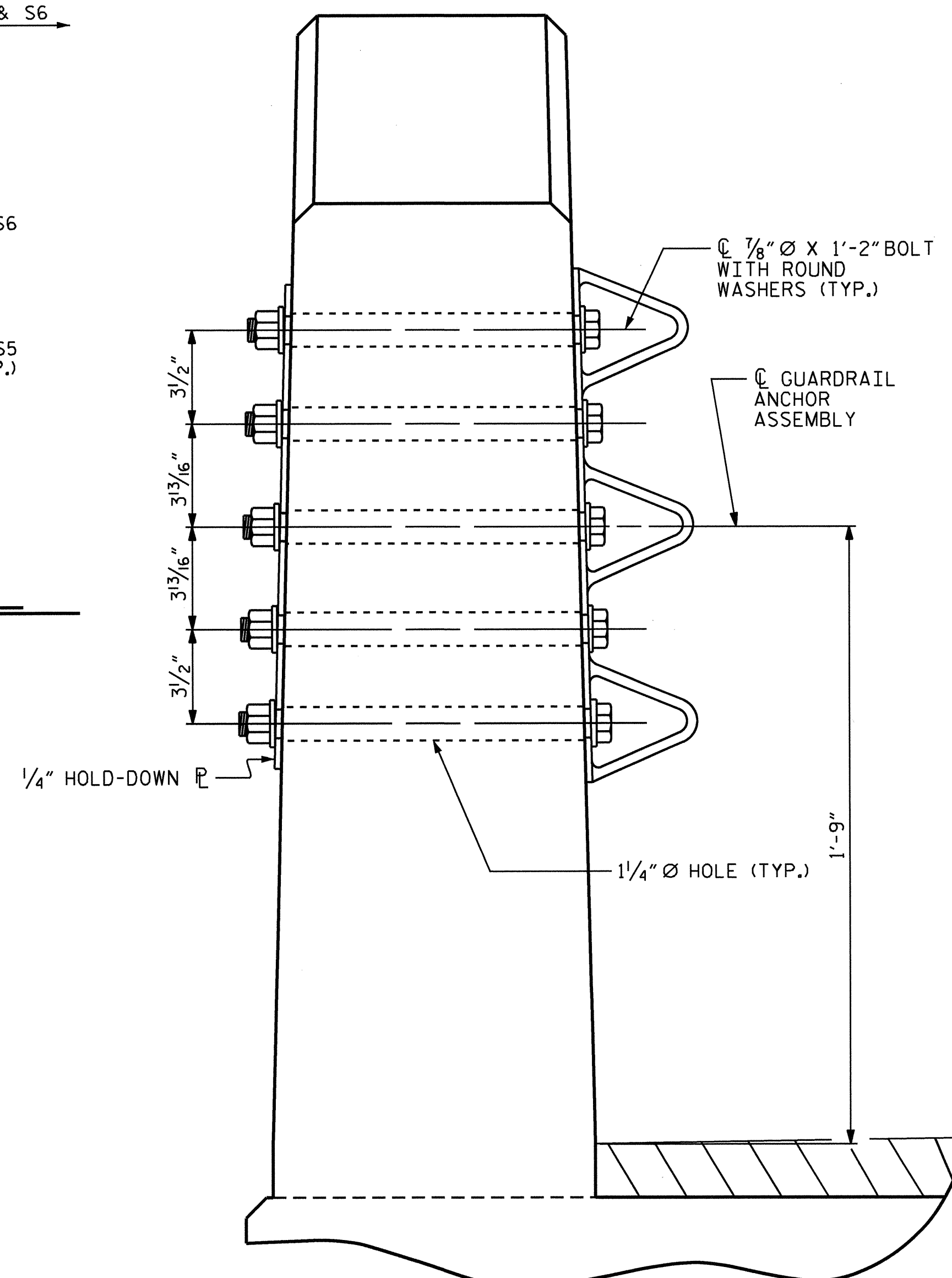
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



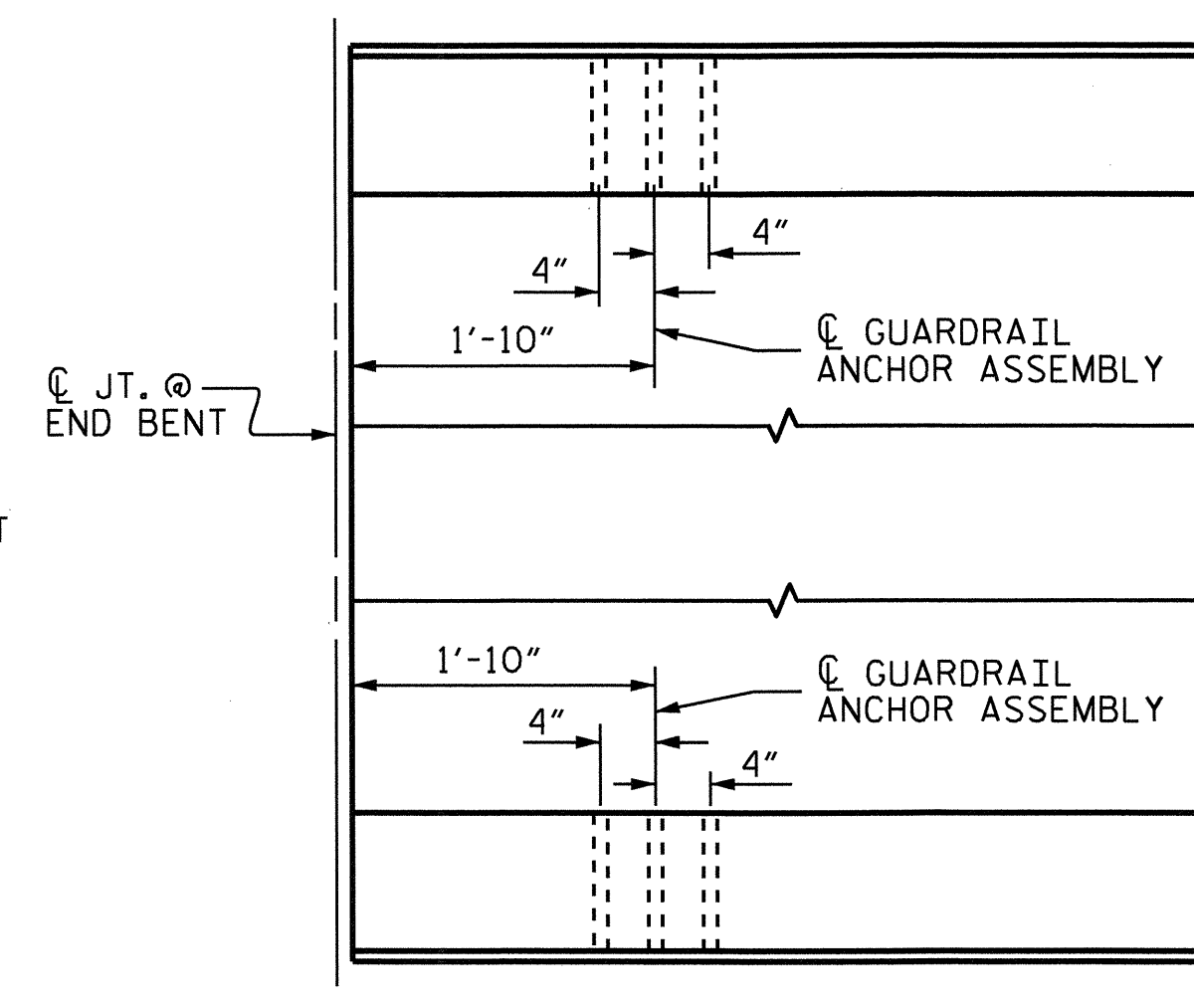
ELEVATION



SIDE VIEW
END OF RAIL DETAILS

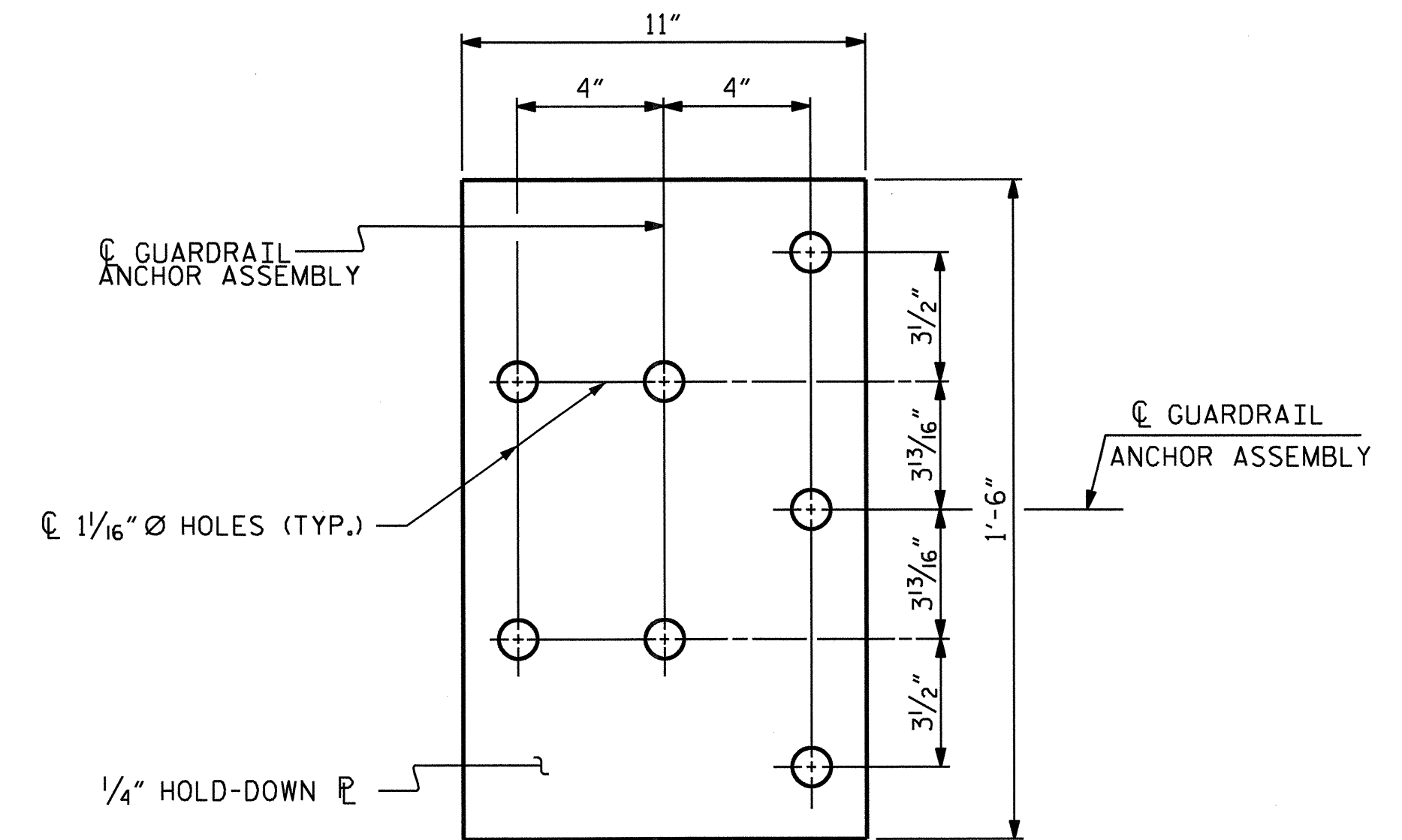


SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS

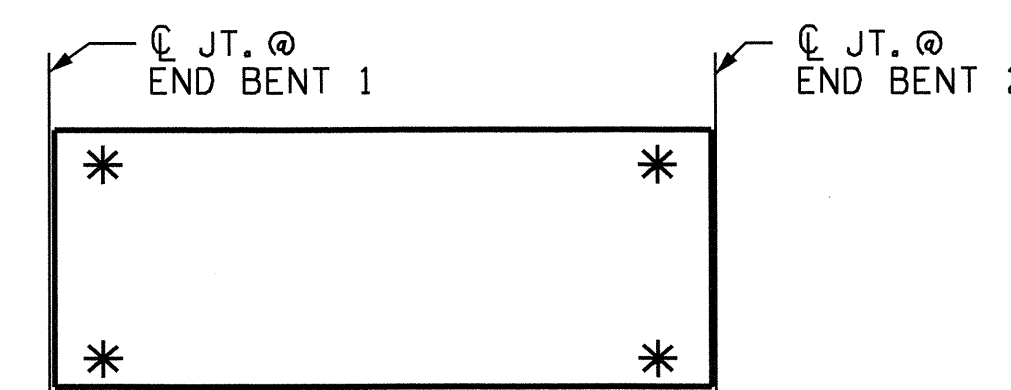


PLAN
LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.



PLAN

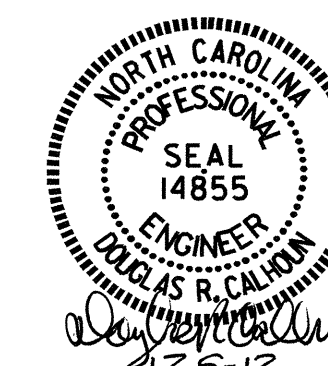


SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

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



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-14
2			4			TOTAL SHEETS 24

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
 CHECKED BY : A. SORSENGINH DATE : 9/2012
 DRAWN BY : MAA 5/10
 CHECKED BY : GM 5/10
 ADDED 5/6/10
 REV. 10/1/11 MAA/GM
 REV. 12/5/11 MAA/GM

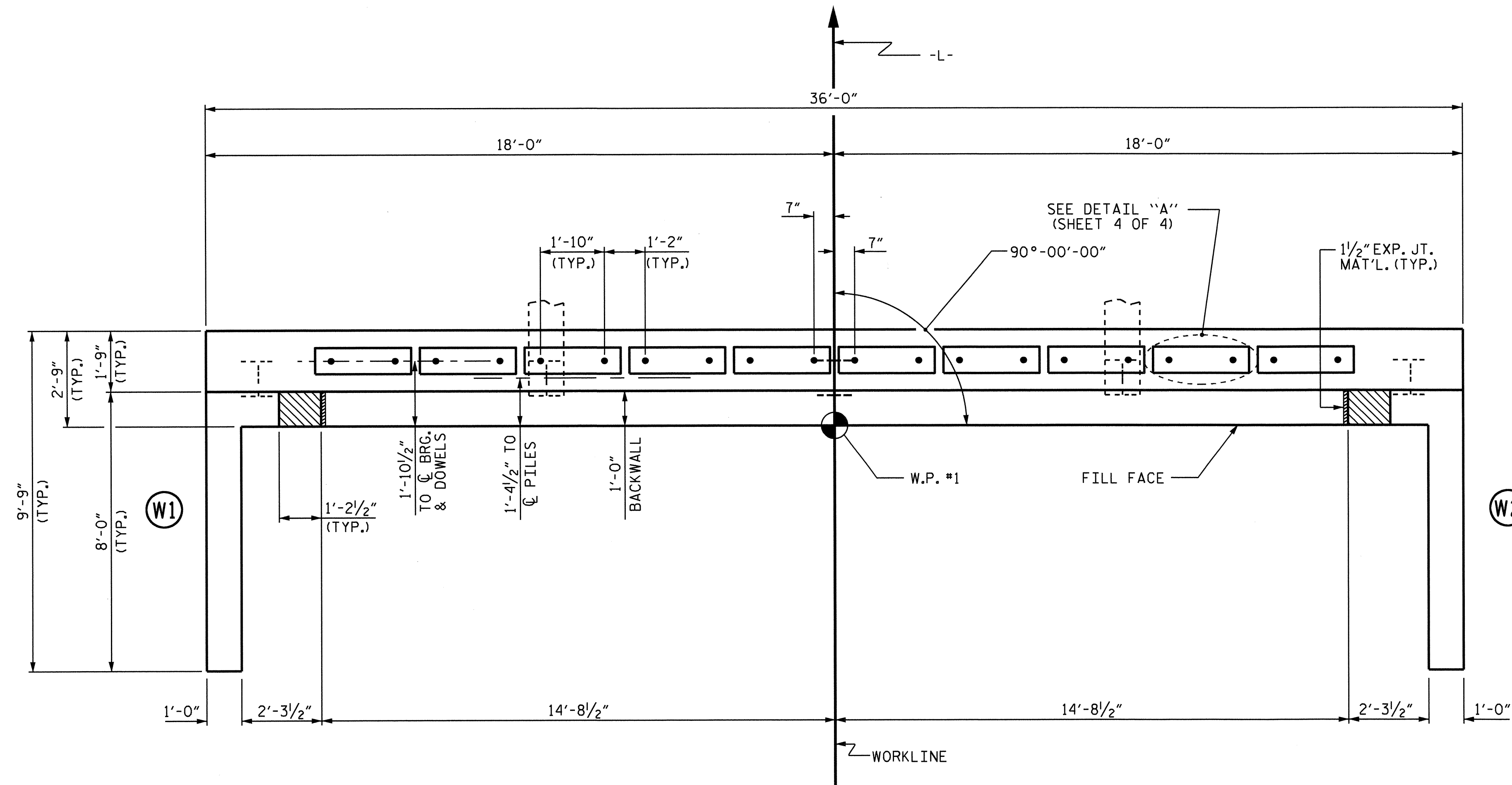
NOTES

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

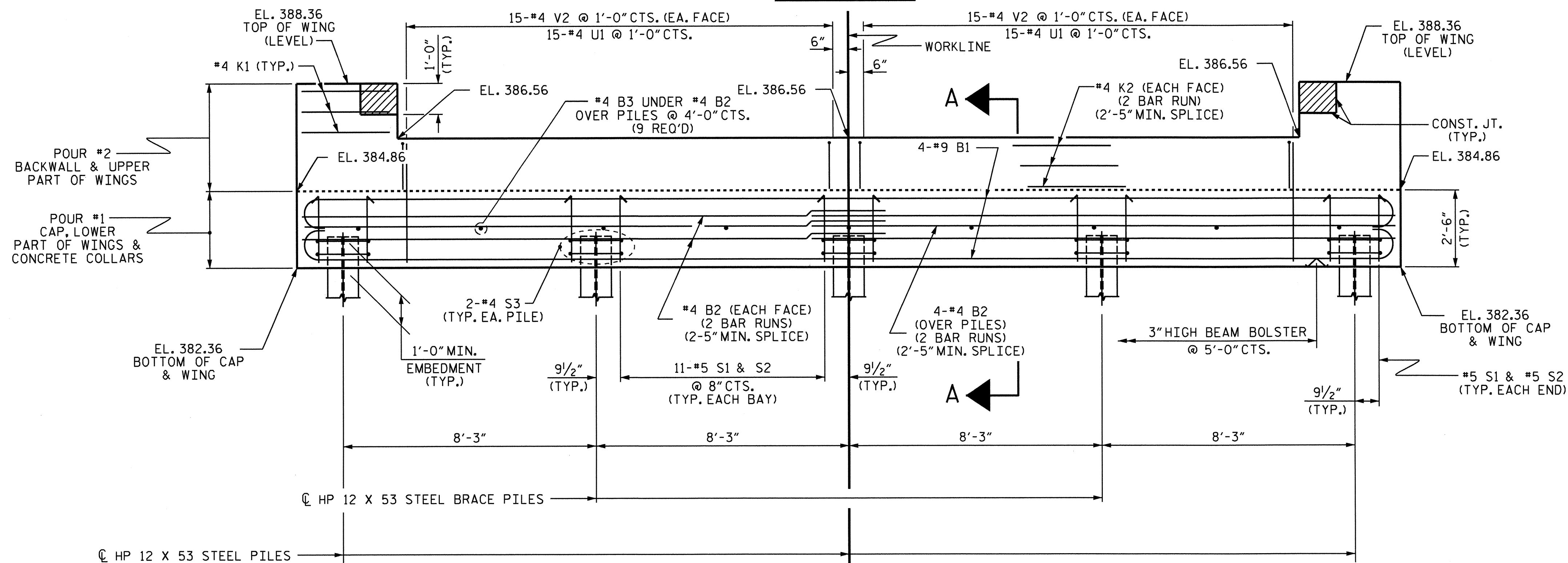
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

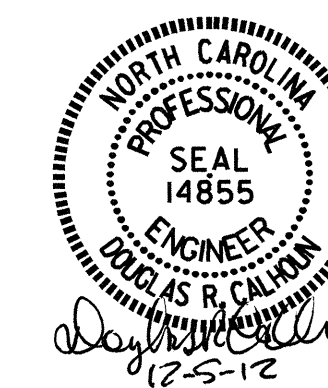
WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012
DRAWN BY : DGE 02/10
CHECKED BY : MKT 02/10

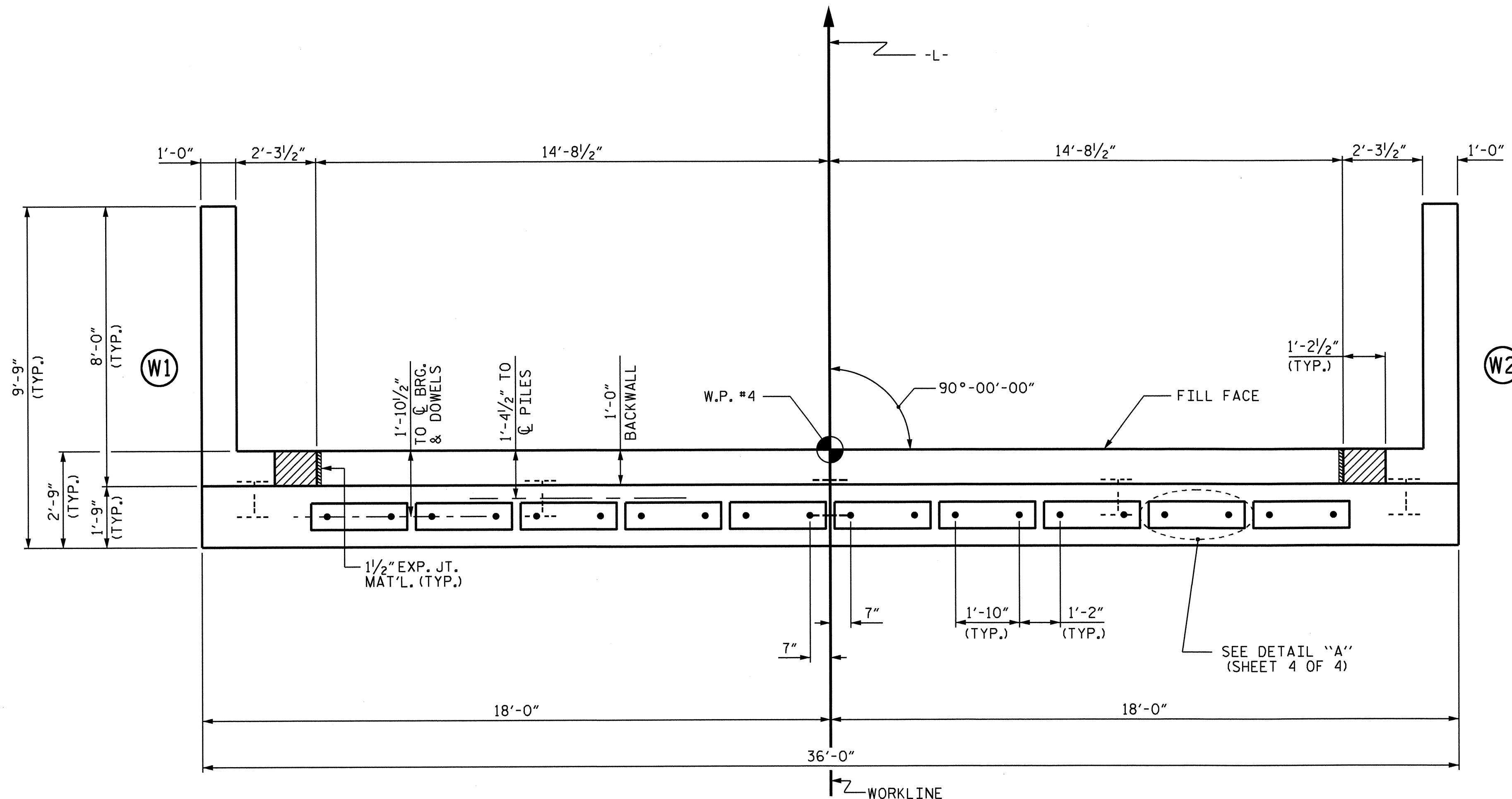
NOTES

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

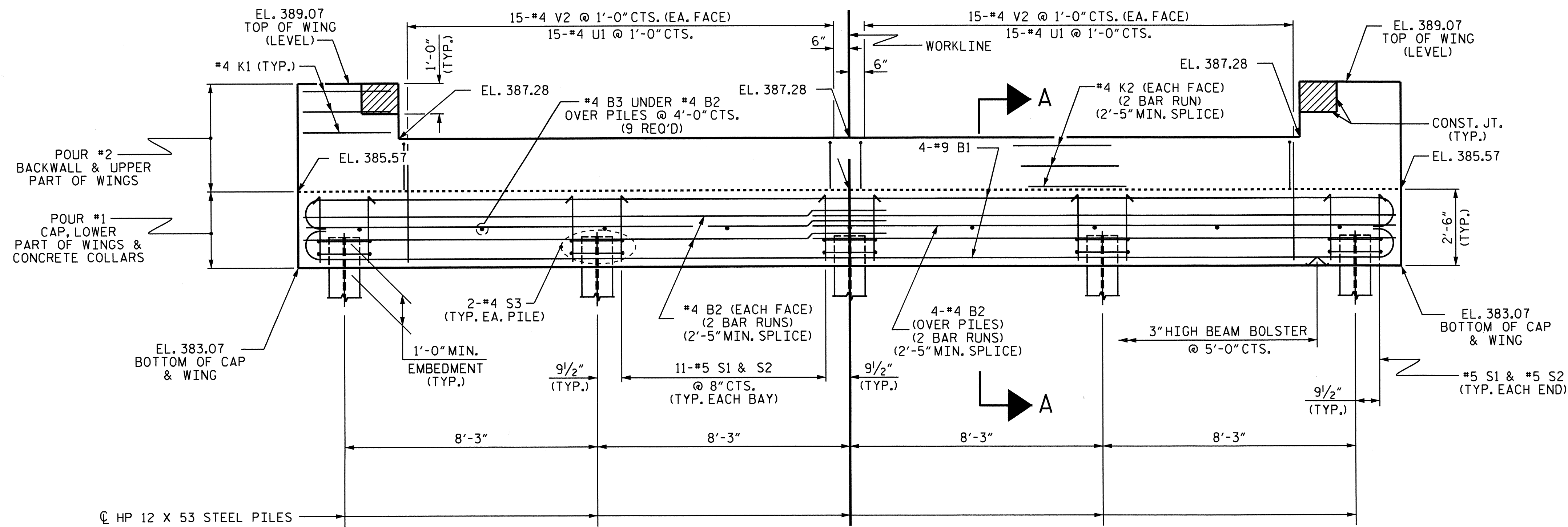
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN



ELEVATION

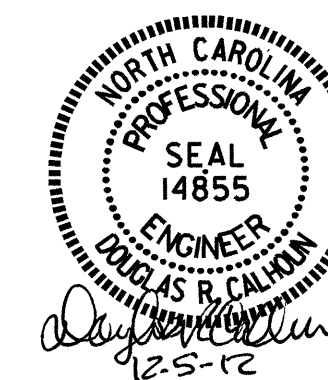
WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. B-4725
CASWELL COUNTY
STATION: 19+65.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

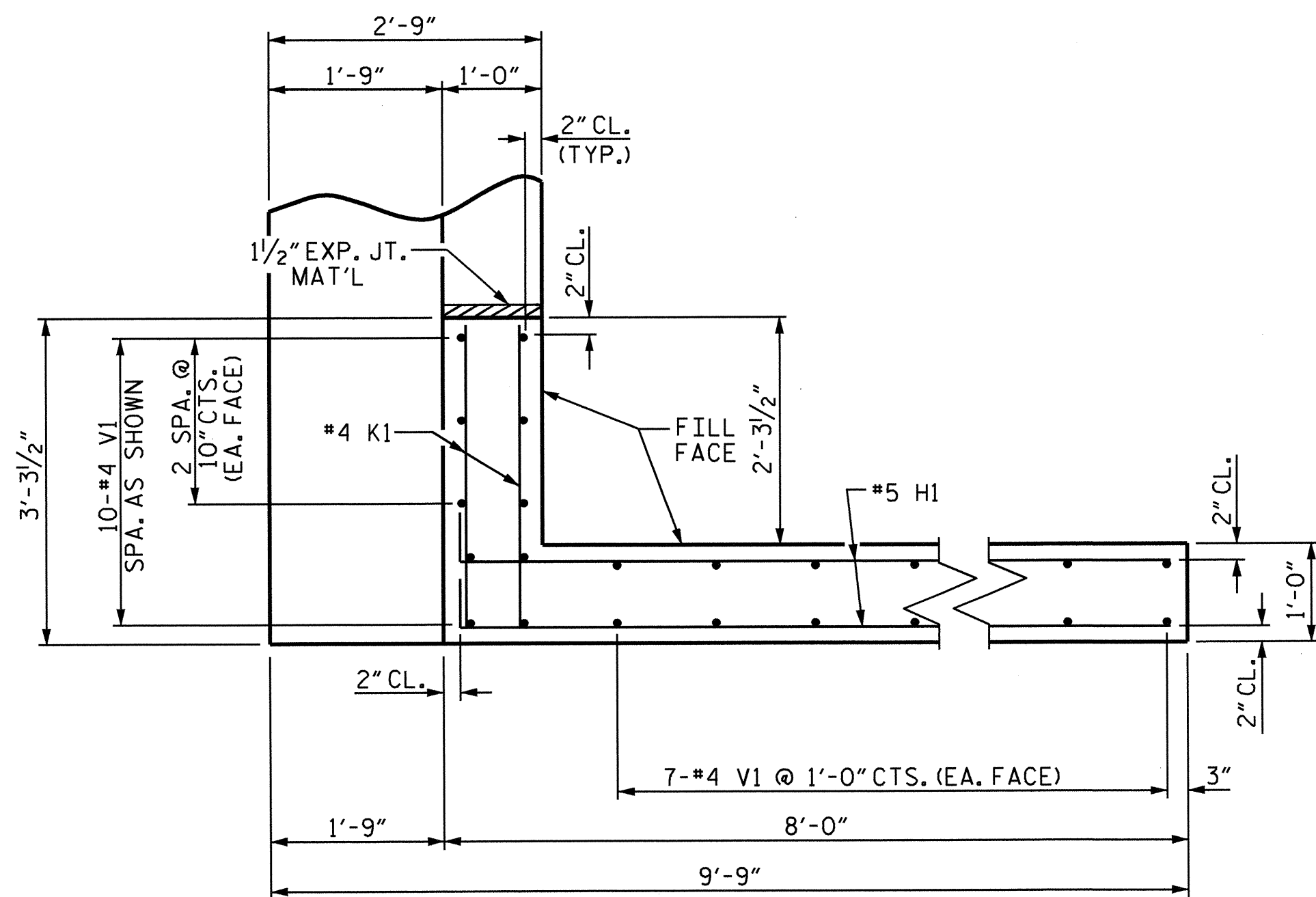
SUBSTRUCTURE
END BENT 2



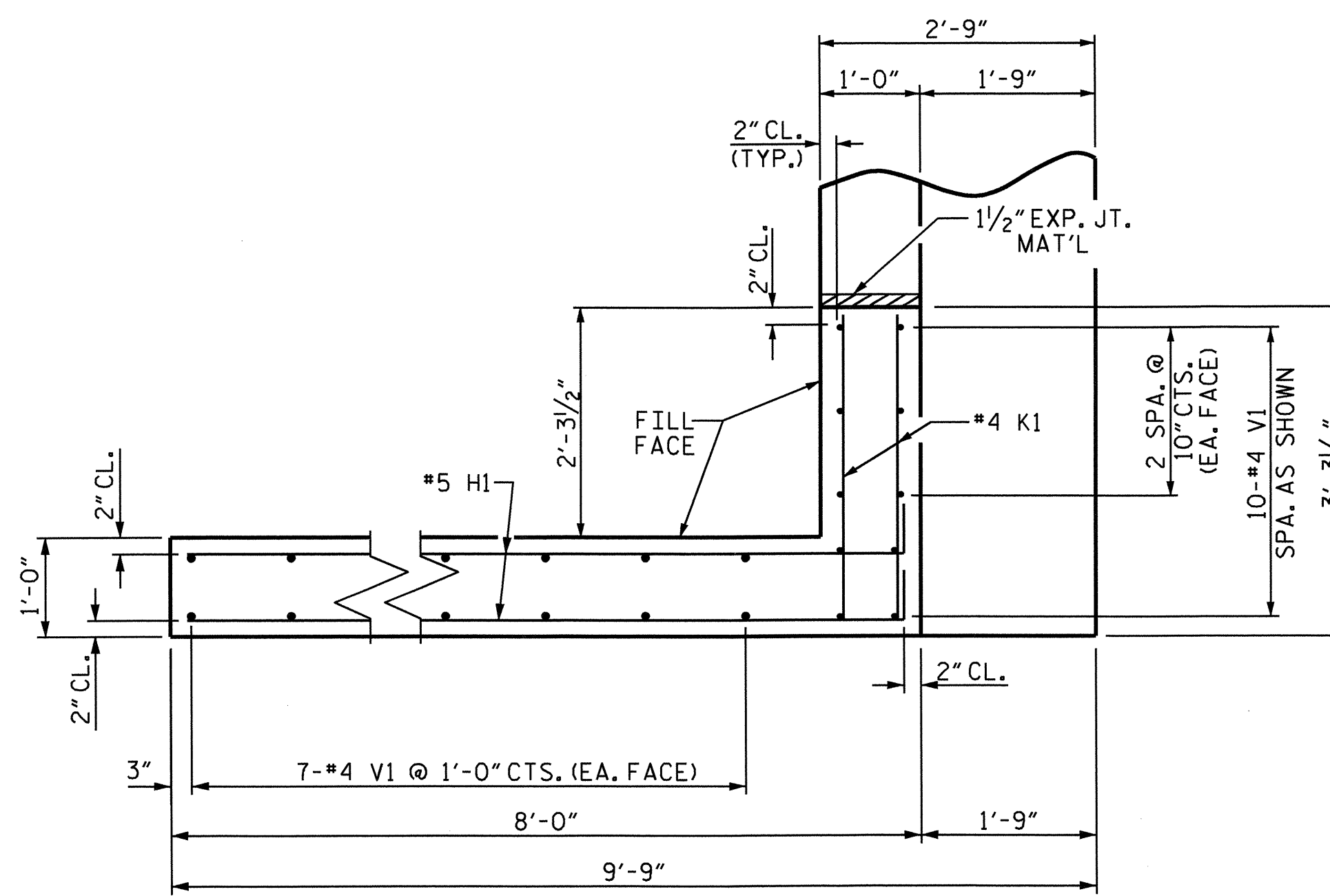
ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
CHECKED BY : A. SORSENGINH DATE : 9/2012

DRAWN BY : DGE 02/10
CHECKED BY : MKT 02/10

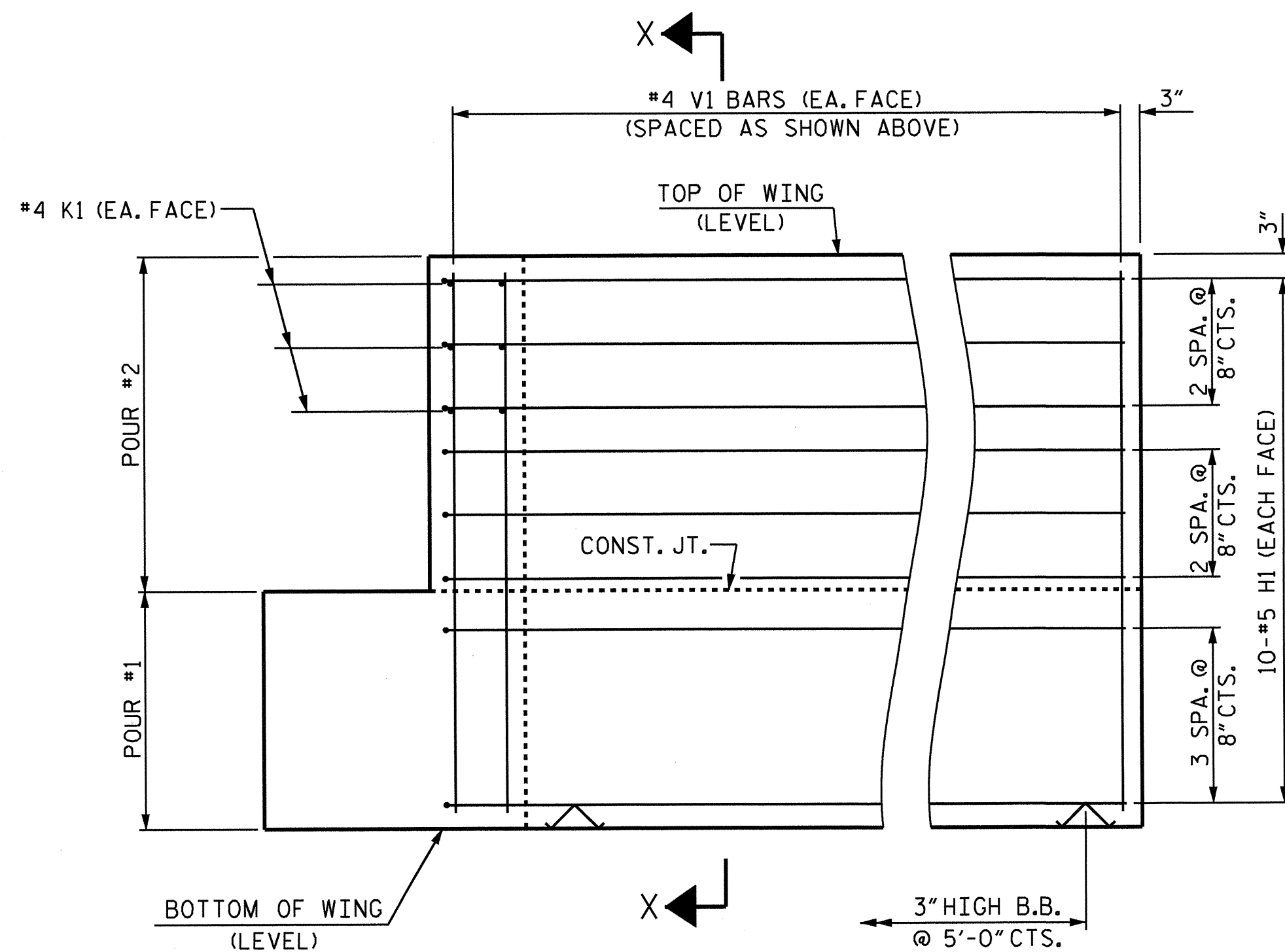
REVISIONS						SHEET NO. 5-16 TOTAL SHEETS 29
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



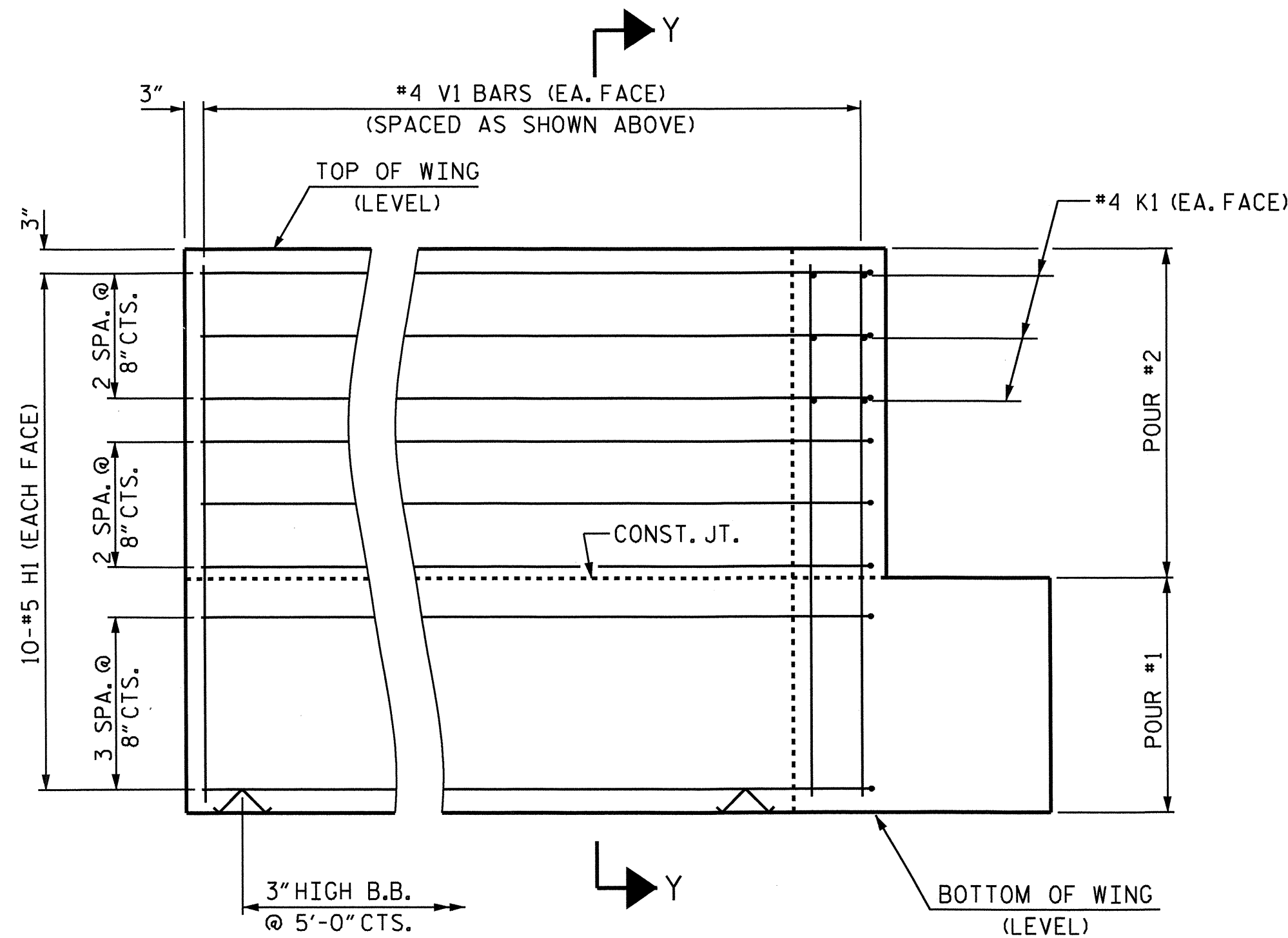
PLAN OF WING (W1)



PLAN OF WING (W2)

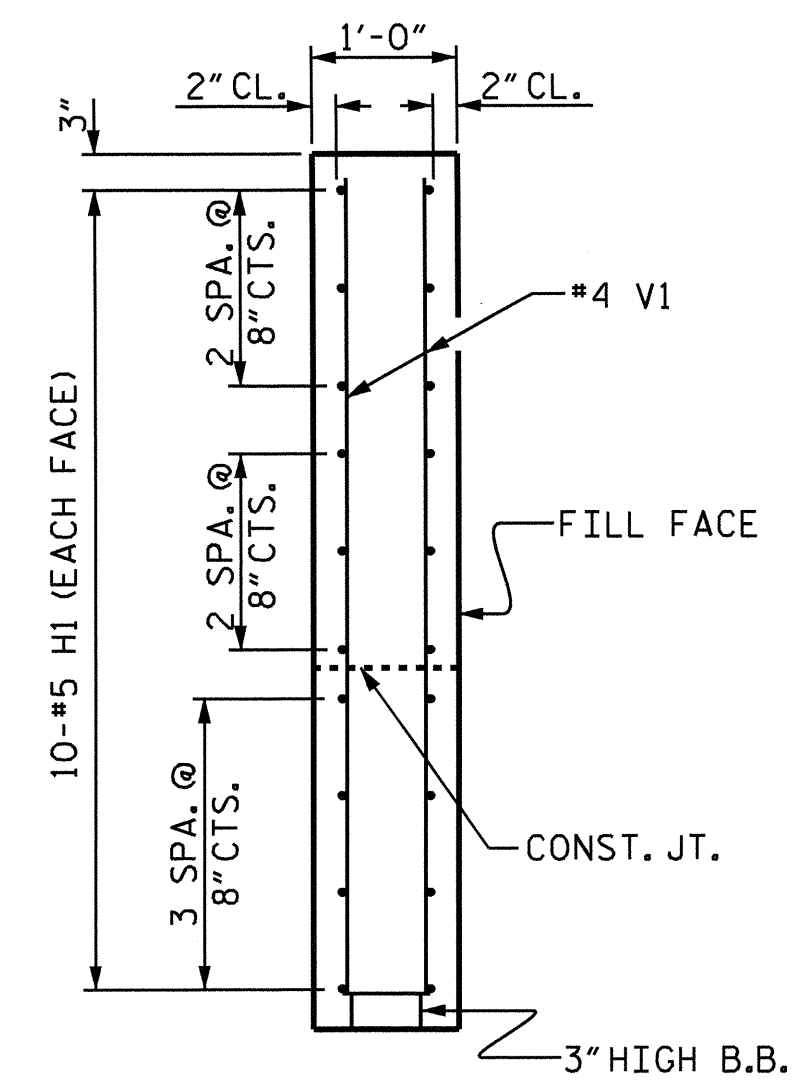


ELEVATION OF WING (W1)

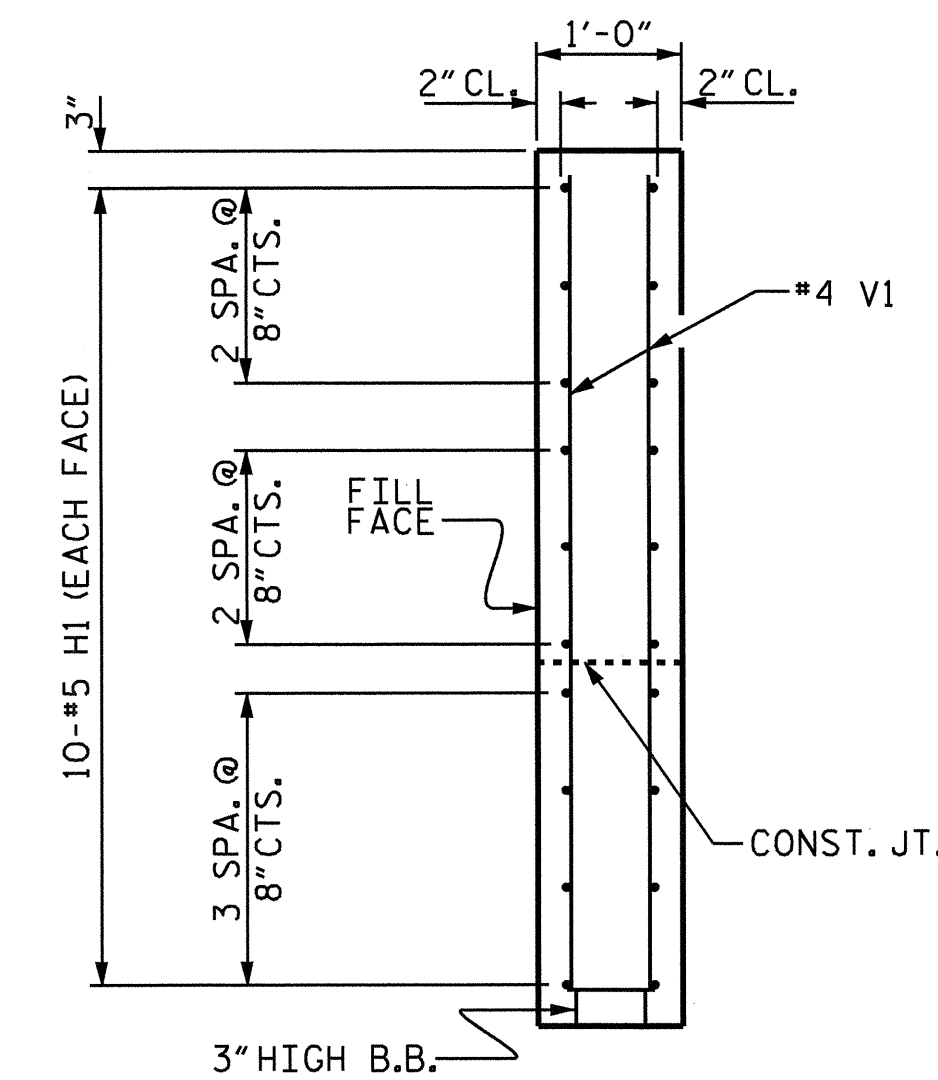


ELEVATION OF WING (W2)

WING DETAILS



SECTION X-X



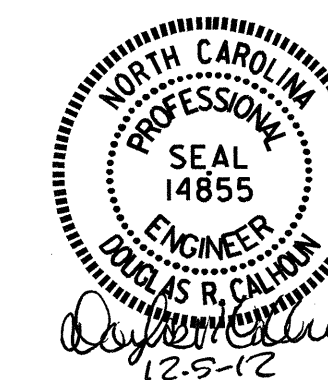
SECTION Y-Y

PROJECT NO. B-4725
 CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT
 WING DETAILS

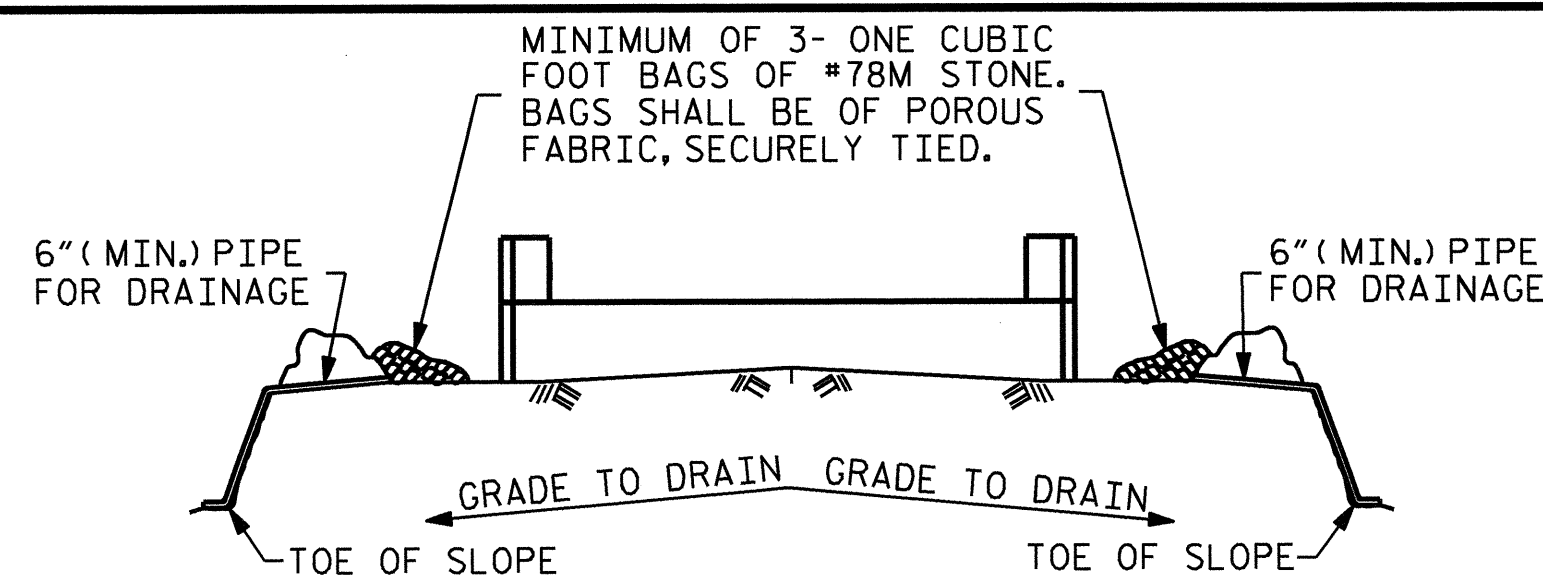


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17	
1			3			TOTAL SHEETS	24
2			4				

DRAWN BY: A.C. OUTLAW DATE: 1/25/12
 CHECKED BY: A. SORSENGINH DATE: 9/2012

09-DCT-2012 1641
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STD. NO. EB_30_90S4_33BB

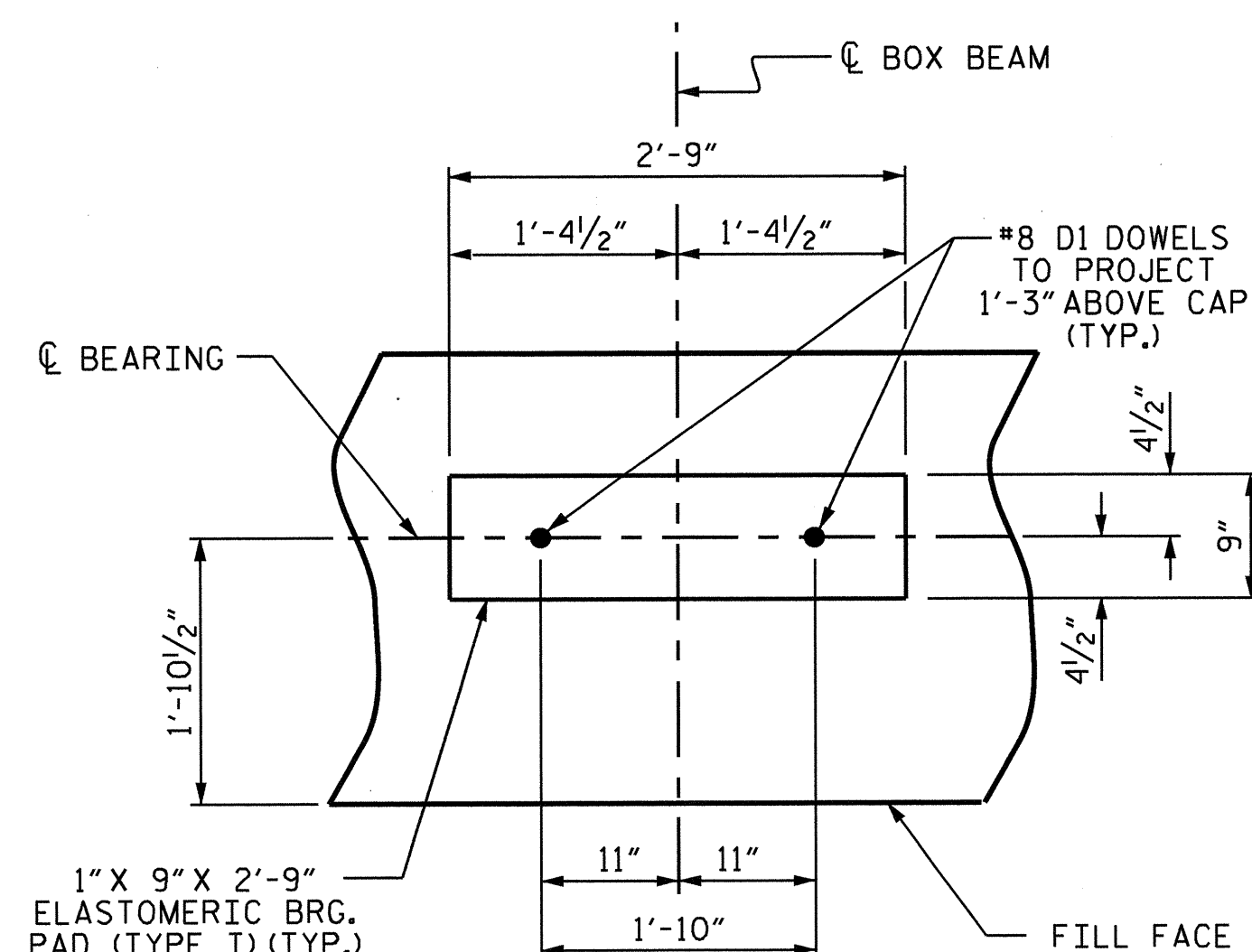


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

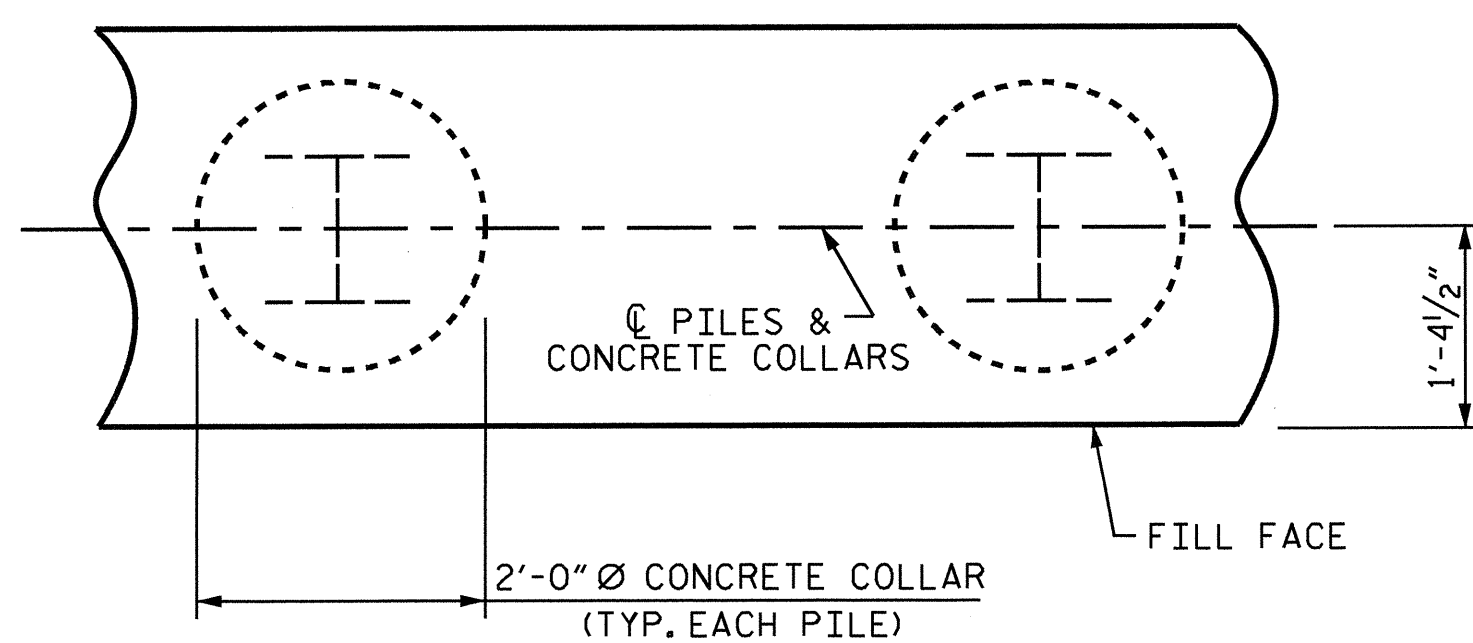
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



DETAIL "A"

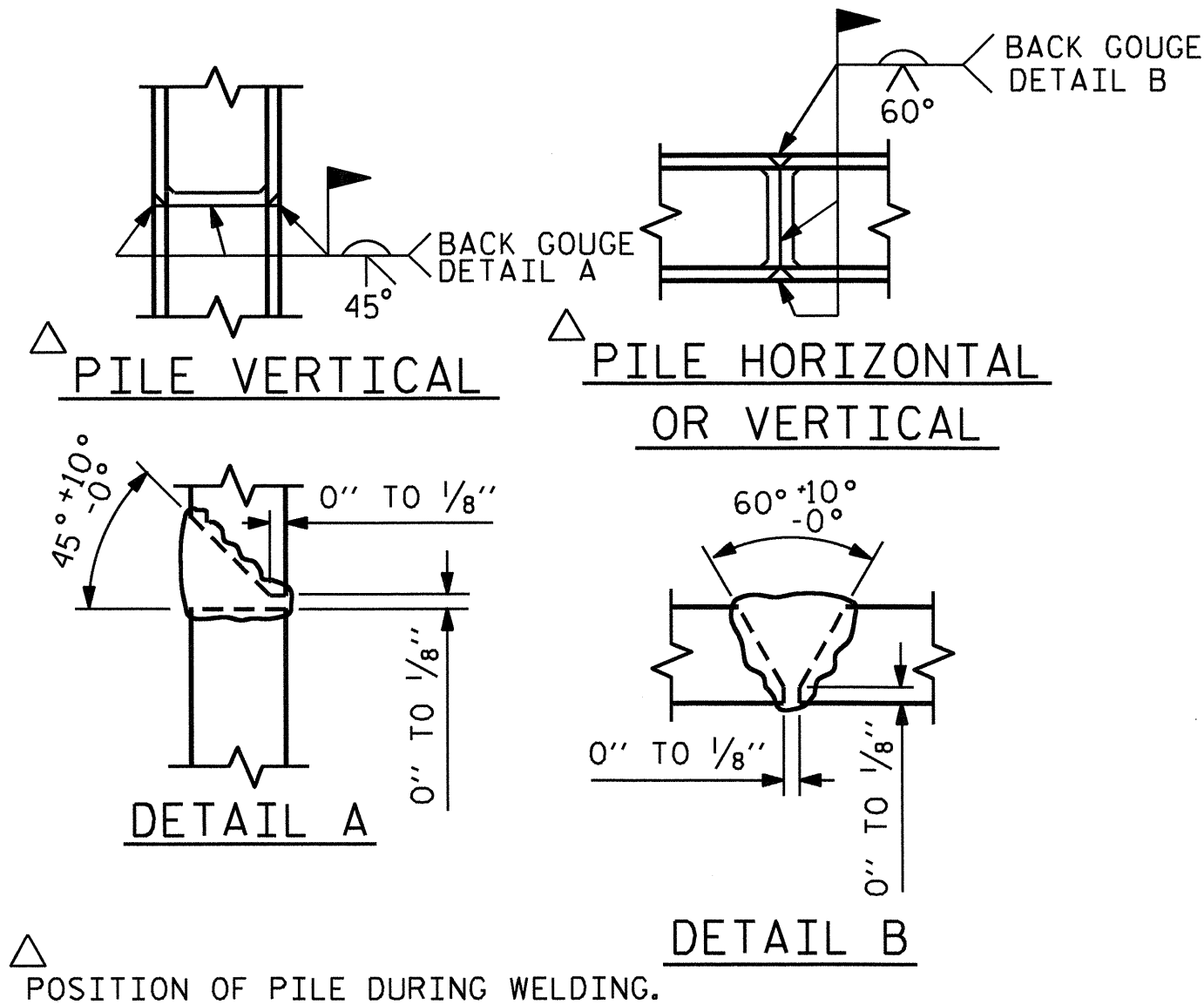
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

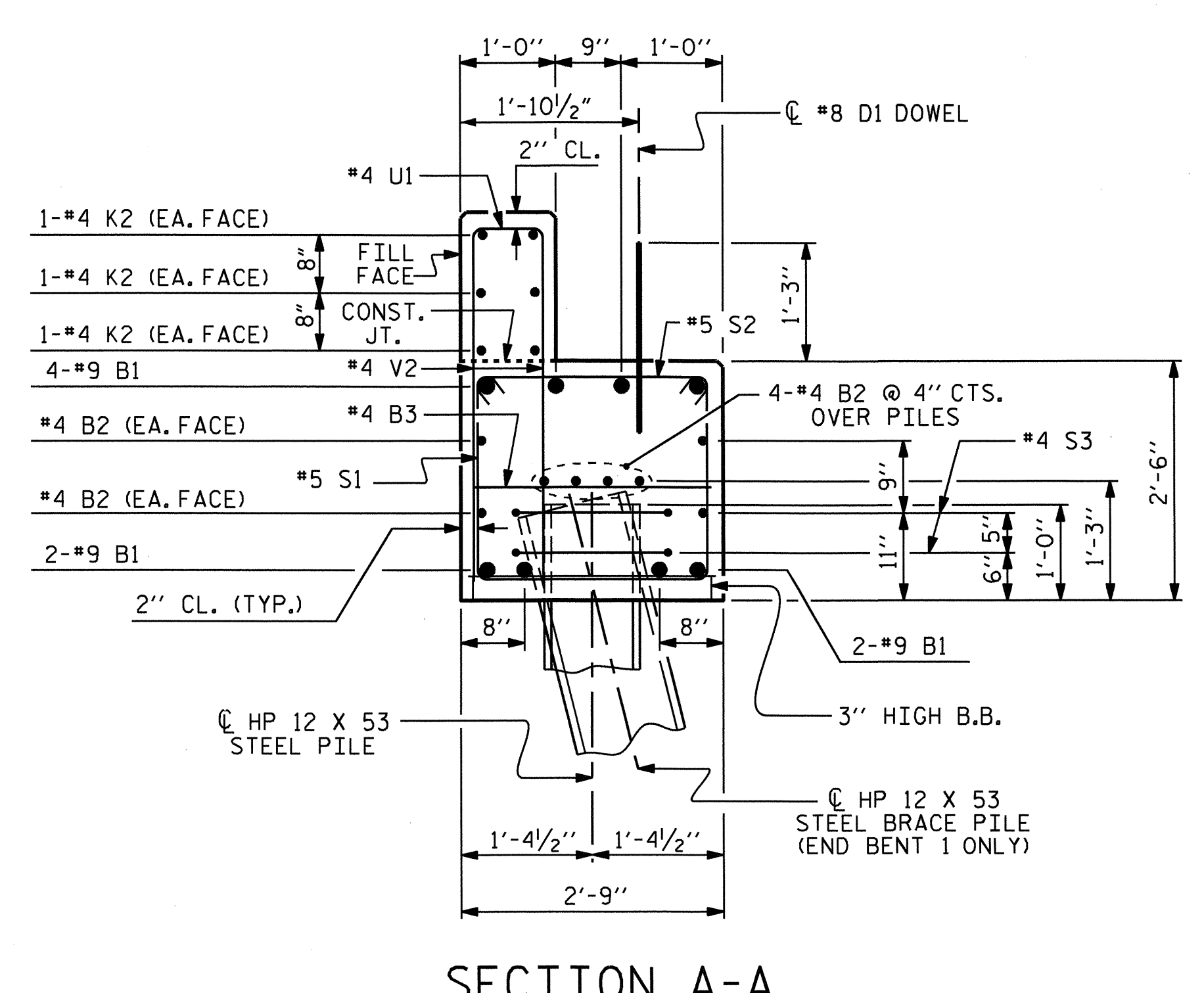
(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



PILE SPLICE DETAILS

BAR TYPES	
ALL BAR DIMENSIONS ARE OUT TO OUT.	
END BENT 1 HP 12 X 53 STEEL PILES NO: 5 LIN. FT. = 175	END BENT 2 HP 12 X 53 STEEL PILES NO: 5 LIN. FT. = 100
PREDRILLING FOR PILES NO: 5 LIN. FT. = 30	

BILL OF MATERIAL FOR ONE END BENT					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	38'-0"	1034
B2	16	#4	STR	19'-1"	204
B3	9	#4	STR	2'-5"	15
D1	20	#8	STR	2'-3"	120
H1	40	#5	2	8'-4"	348
K1	12	#4	STR	2'-11"	23
K2	12	#4	STR	19'-1"	153
S1	46	#5	3	7'-7"	364
S2	46	#5	4	3'-4"	160
S3	10	#4	5	6'-6"	43
U1	30	#4	6	3'-8"	73
V1	48	#4	STR	5'-8"	182
V2	60	#4	STR	3'-10"	154
REINFORCING STEEL (FOR ONE END BENT)					2873 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					11.3 C.Y.
POUR #2 BACKWALL & UPPER PART OF WINGS					4.4 C.Y.
TOTAL CLASS A CONCRETE					15.7 C.Y.



SECTION A-A

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

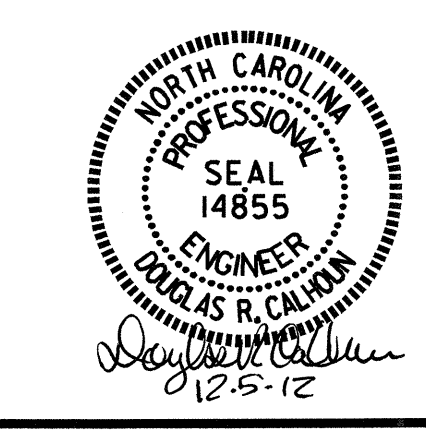
PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-
 SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1 & 2
 DETAILS

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

SHEET NO. S-18
 TOTAL SHEETS 24



ASSEMBLED BY: A.C. OUTLAW DATE: 1/25/12
 CHECKED BY: A. SORSENGINH DATE: 9/2012
 DRAWN BY: DGE 02/10
 CHECKED BY: MKT 02/10

09-OCT-2012 16:11
 R:\Structures\Plans\B4725.SD.E*.01.dgn
 dely

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.

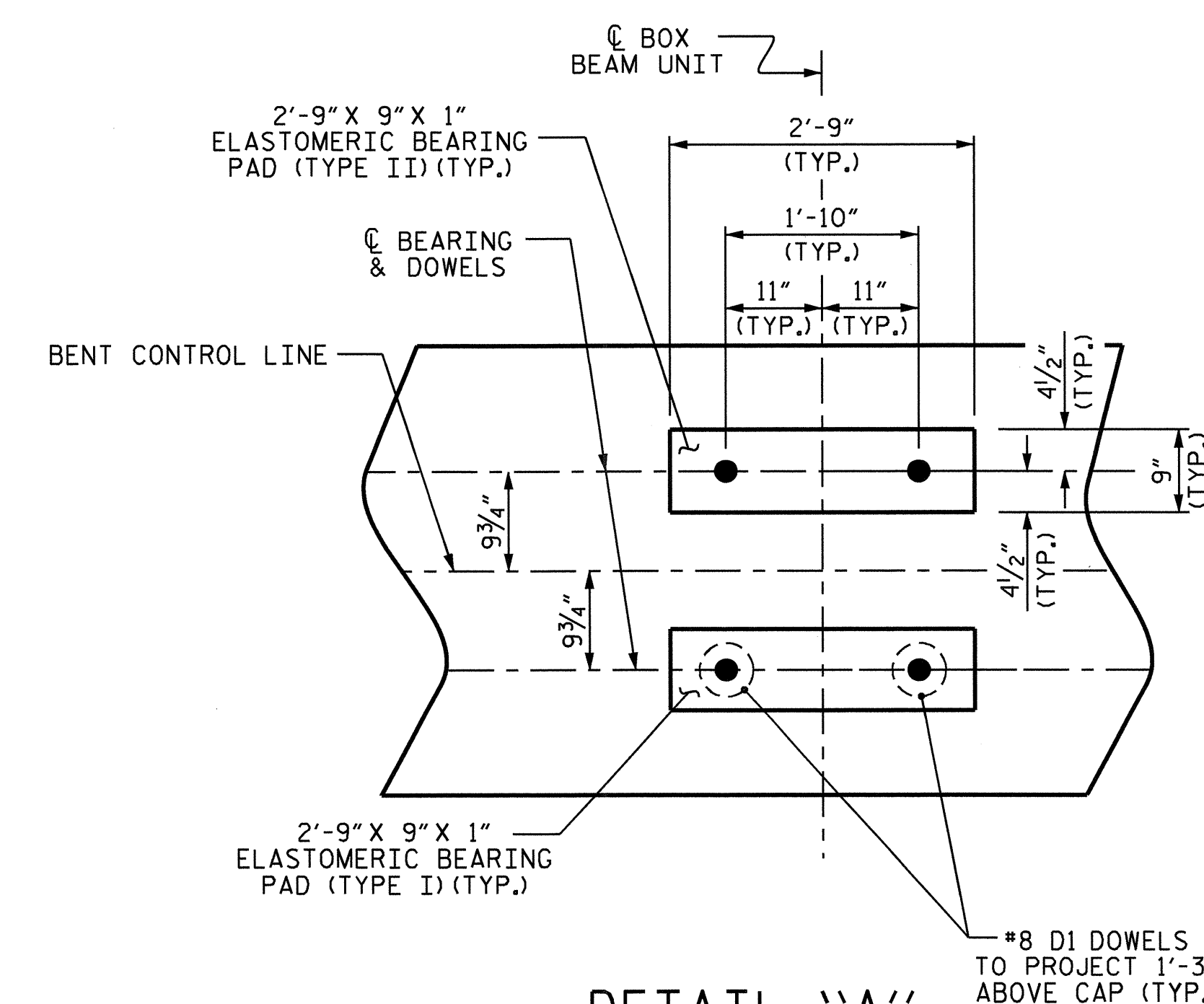
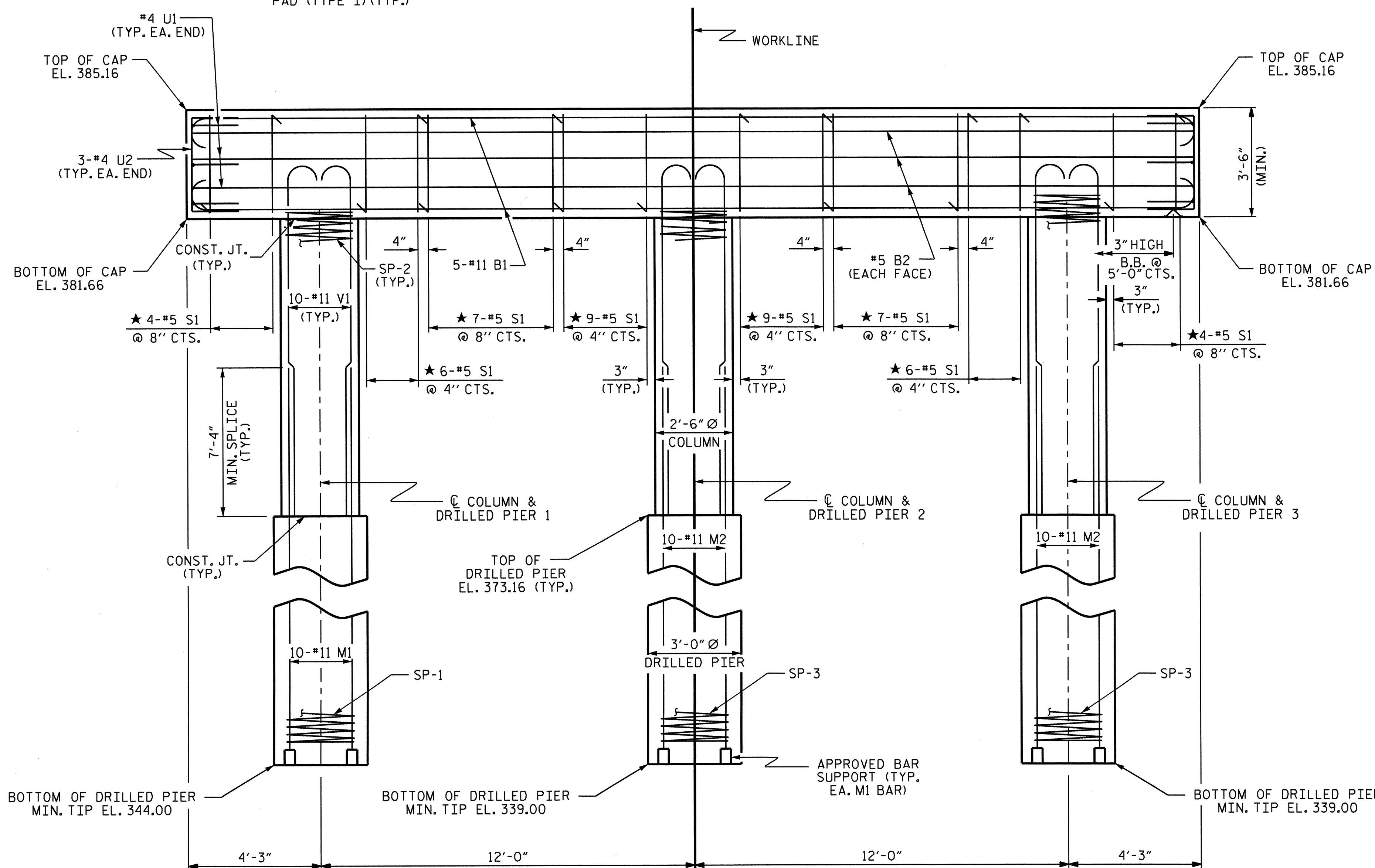
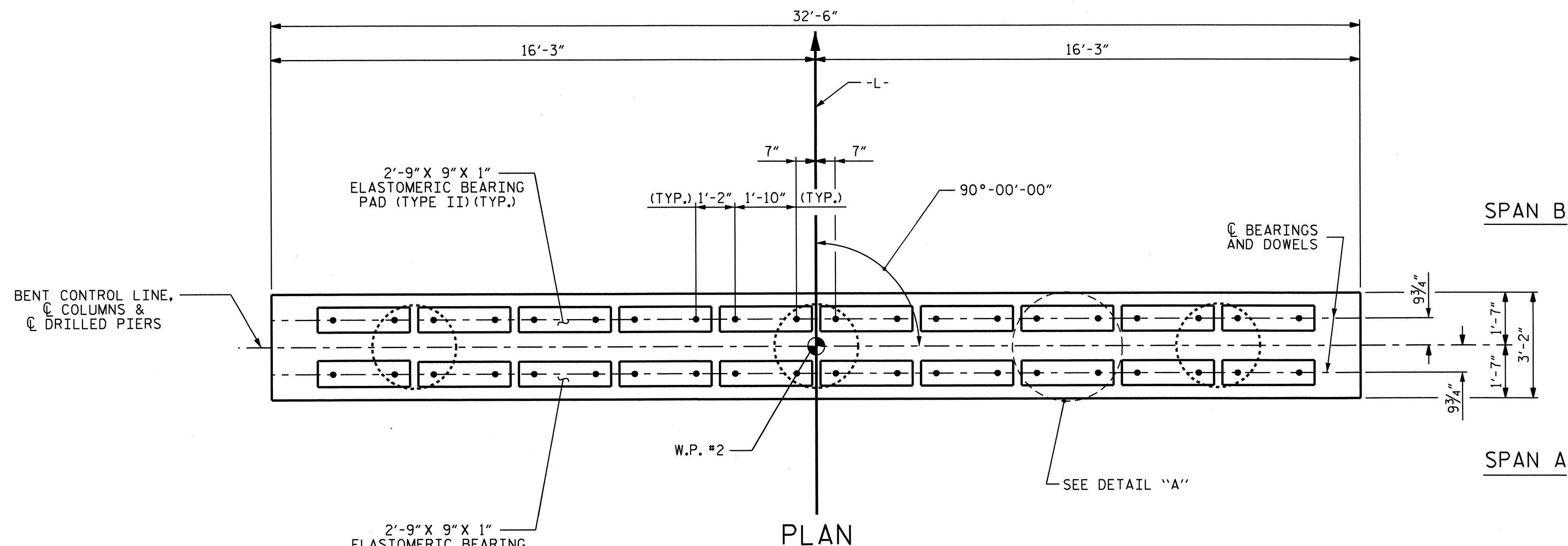
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

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 ONE FOOT BELOW THE GROUND LINE.

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



DETAIL "A"

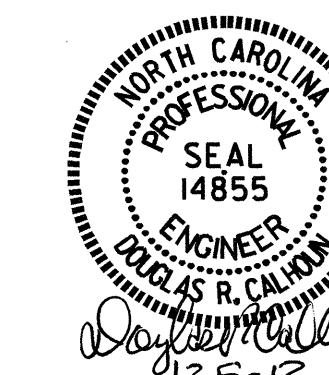
(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. B-4725
 CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1



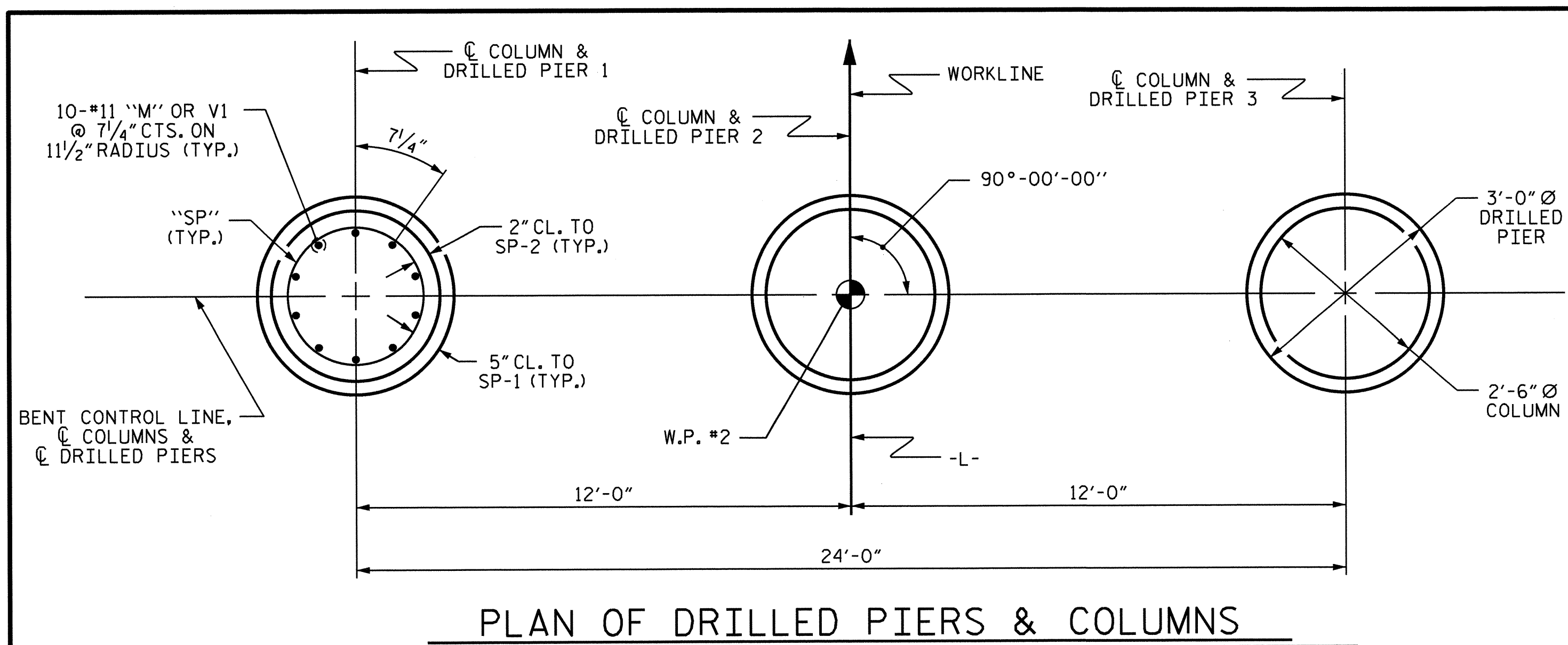
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-19
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : A.C. OUTLAW DATE : 9/28/12
 CHECKED BY : A. SORSENGINH DATE : 10/2012

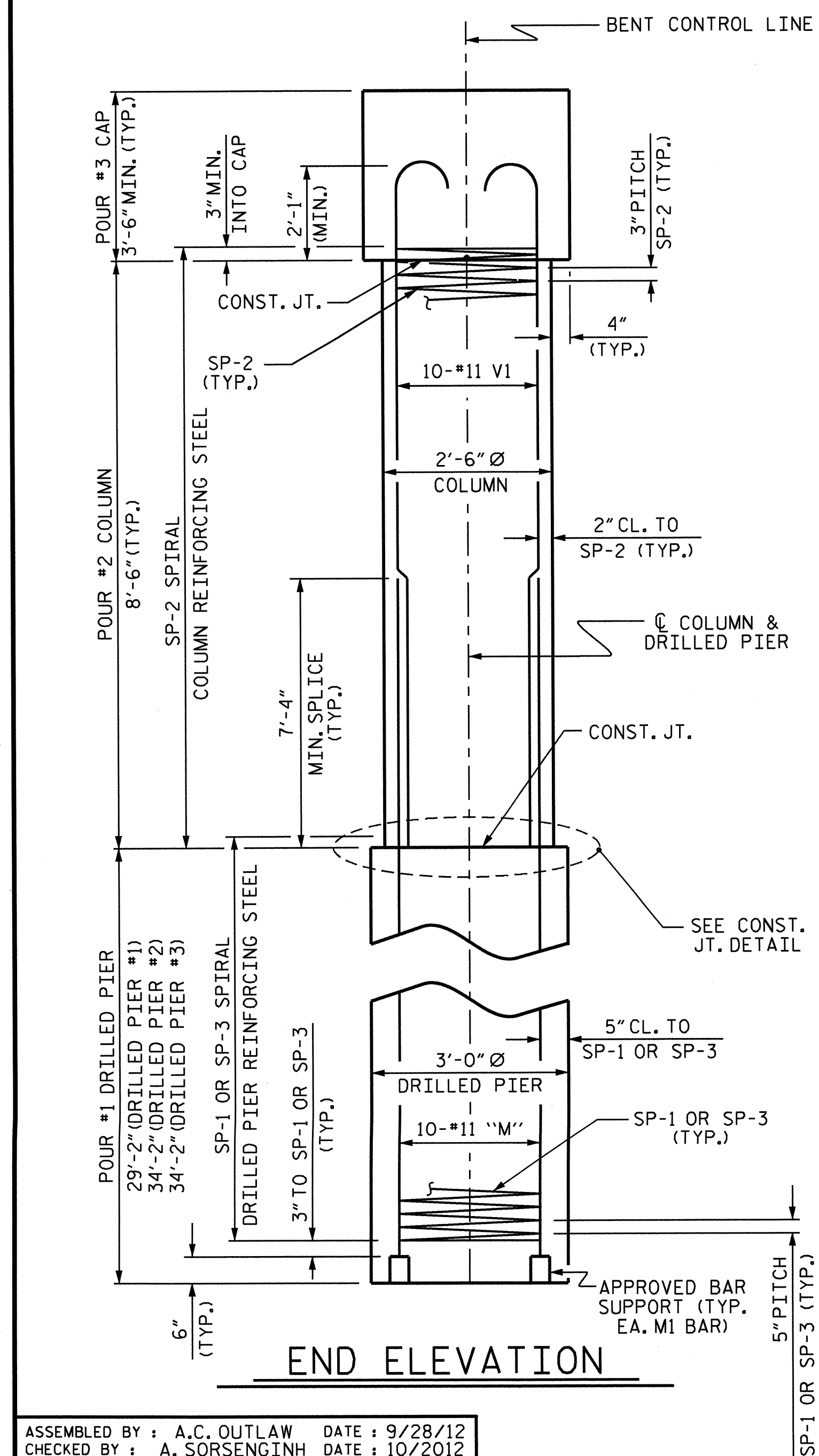
DRAWN BY : DGE 03/10
 CHECKED BY : MKT 03/10

ELEVATION

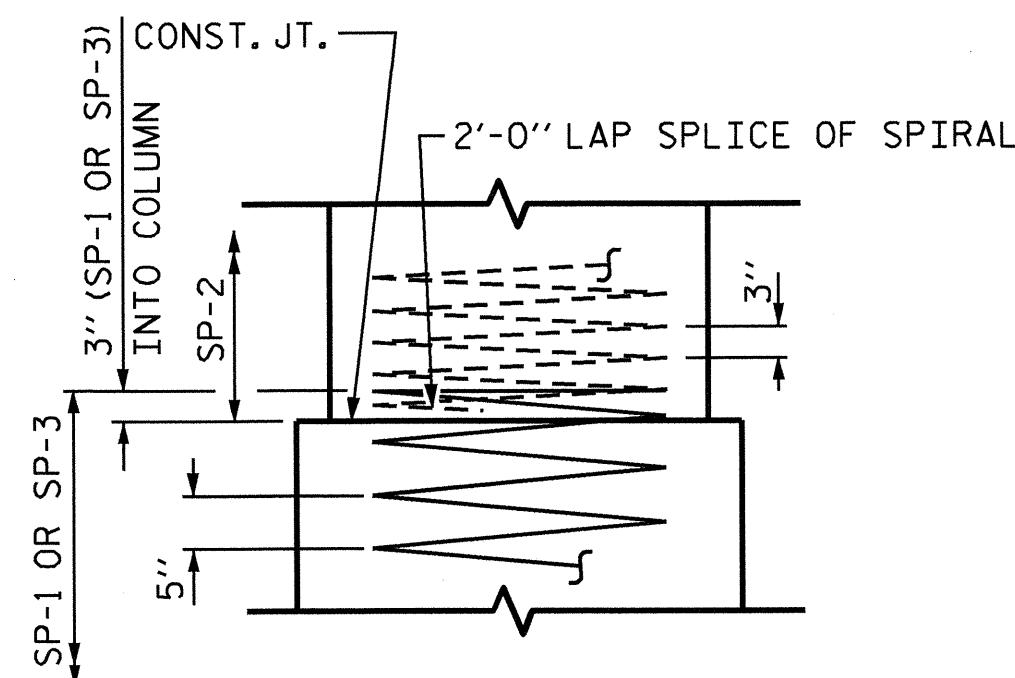
DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.



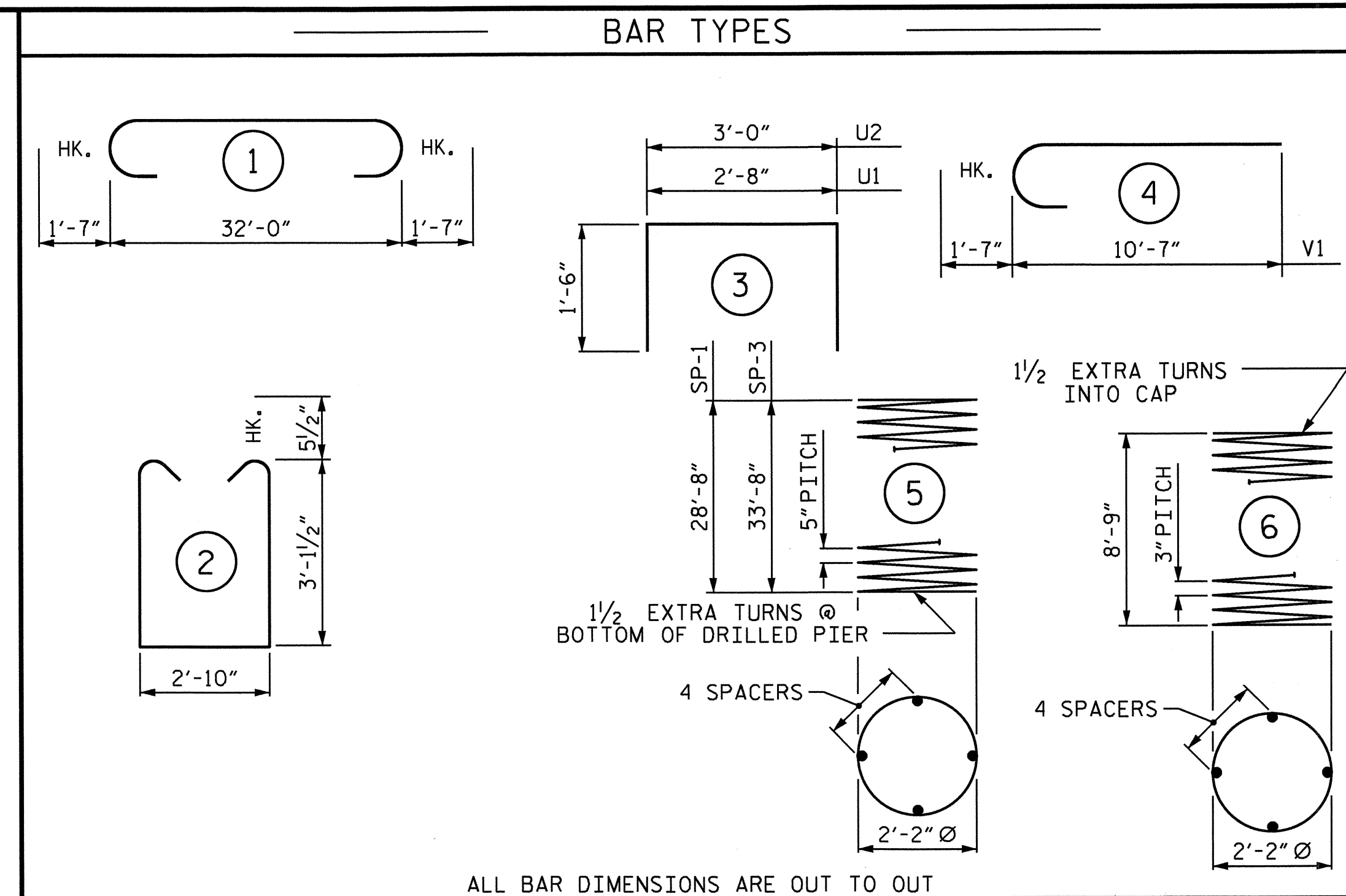
PLAN OF DRILLED PIERS & COLUMNS



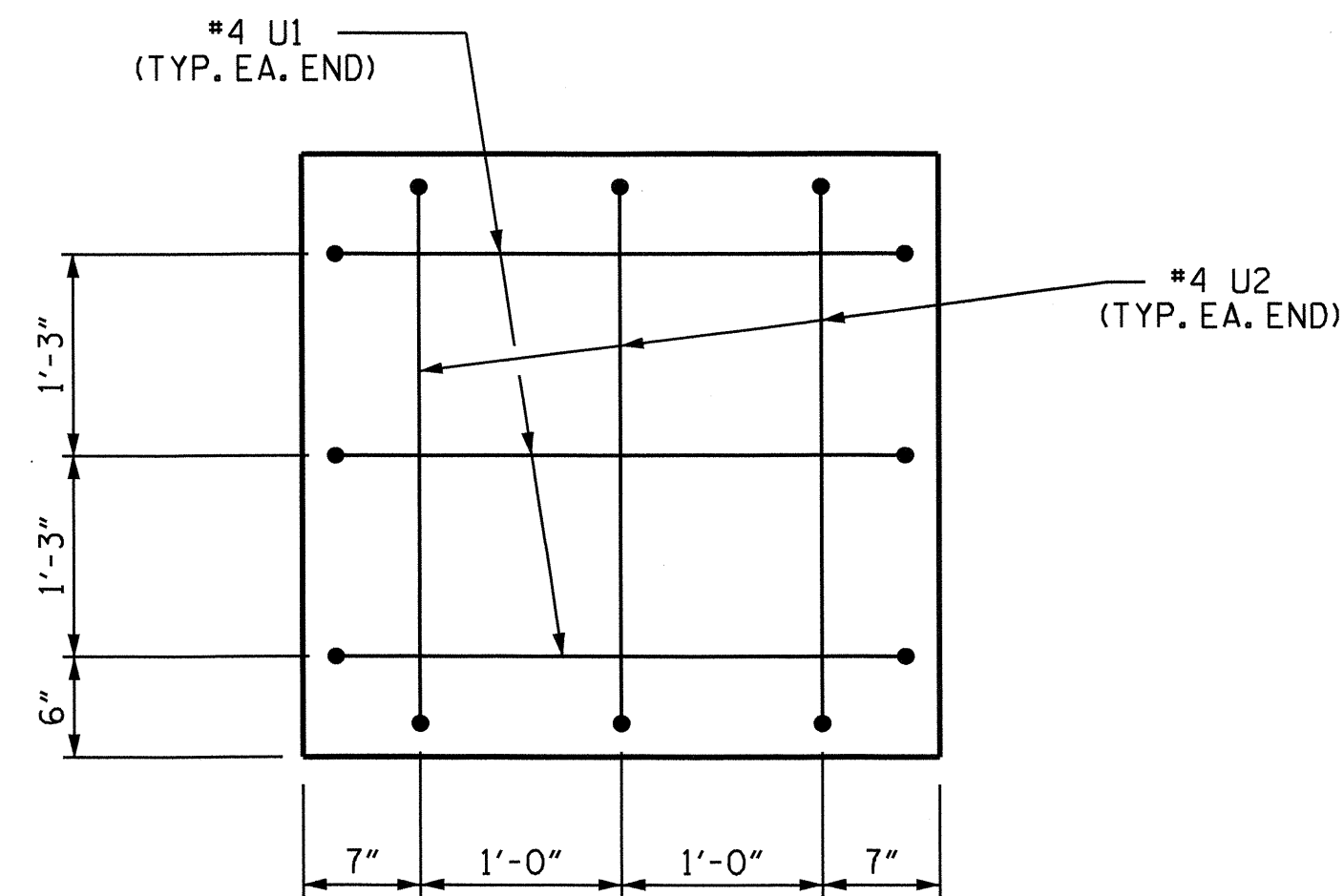
END ELEVATION



CONSTRUCTION JOINT DETAIL

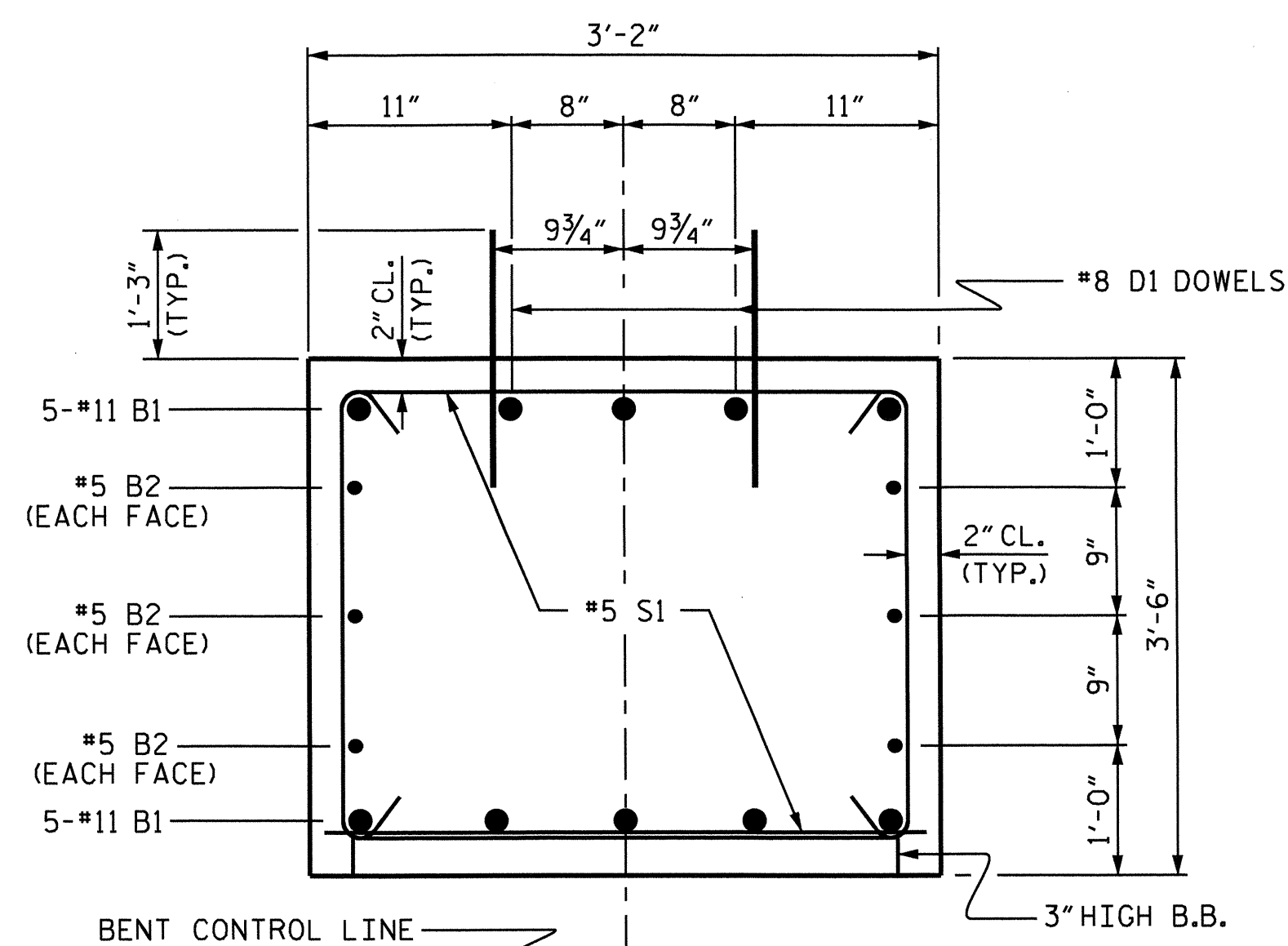


ALL BAR DIMENSIONS ARE OUT TO OUT



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	35'-2"	1868
B2	6	#5	STR	32'-2"	201
D1	40	#8	STR	2'-3"	240
M1	10	#11	STR	39'-3"	2085
M2	20	#11	STR	44'-3"	4702
S1	52	#5	2	10'-0"	542
U1	6	#4	3	5'-8"	23
U2	6	#4	3	6'-0"	24
V1	30	#11	4	12'-2"	1939

REINFORCING STEEL 11624 LBS.

SP-1	1	*	5	472'-7"	493
SP-2	3	**	6	243'-10"	489
SP-3	2	*	5	552'-6"	1153
SPIRAL COLUMN REINFORCING STEEL					2135

* 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

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	4.6 C.Y.
POUR #3 (CAP)	13.3 C.Y.
TOTAL CLASS A CONCRETE	17.9 C.Y.

DRILLED PIERS:

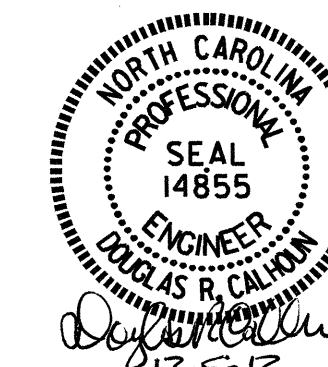
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	25.5 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL	19.0 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL	78.5 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	18.5 LIN. FT.
▲ CSL TUBES	408 LIN. FT.

▲ NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

PROJECT NO. B-4725
 CASWELL COUNTY
 STATION: 19+65.00 -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		
					S-20
					TOTAL SHEETS 29



ASSEMBLED BY: A.C. OUTLAW DATE: 9/28/12
 CHECKED BY: A. SORSENGINH DATE: 10/2012
 DRAWN BY: DCE 03/10
 CHECKED BY: MKT 03/10

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.

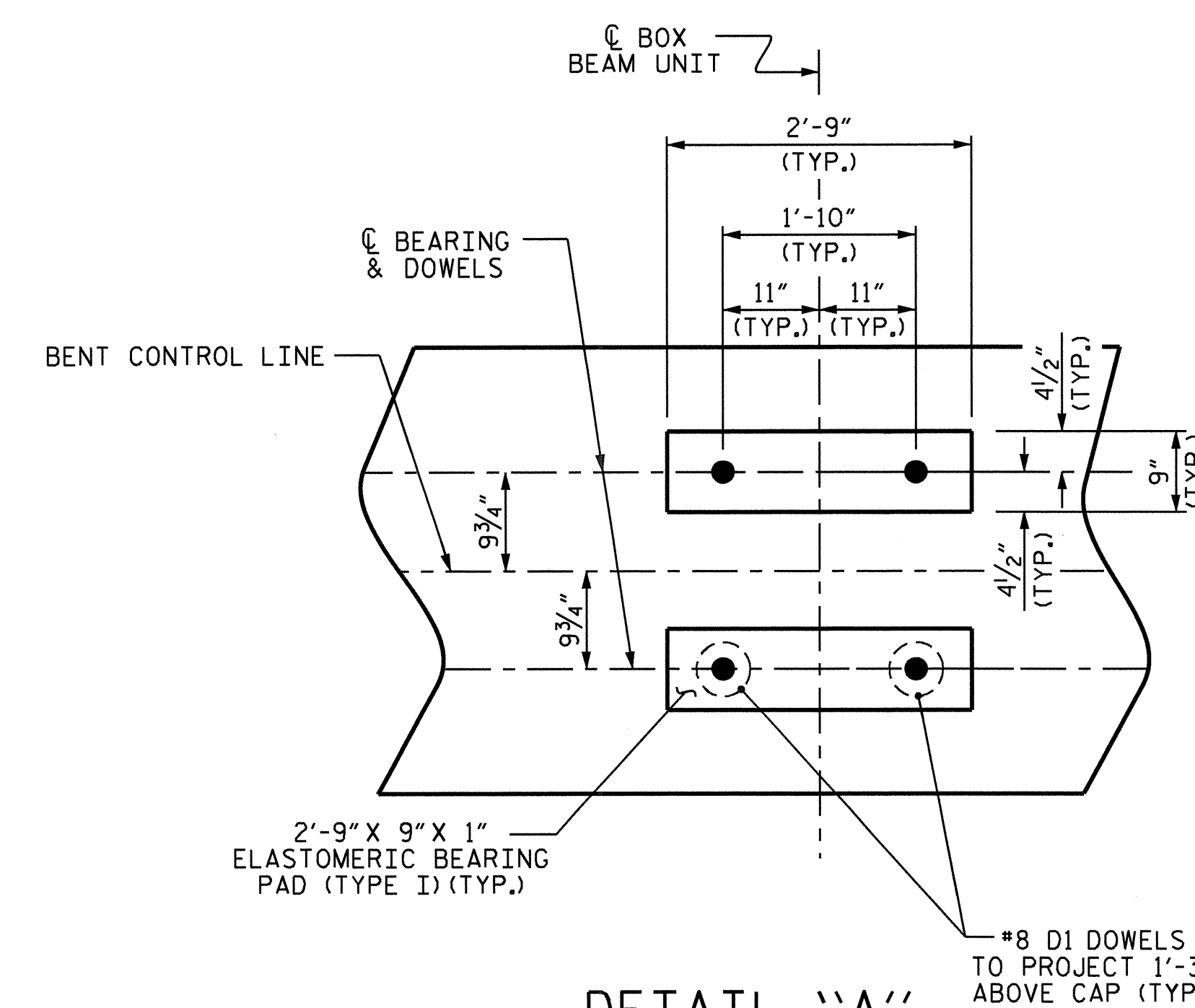
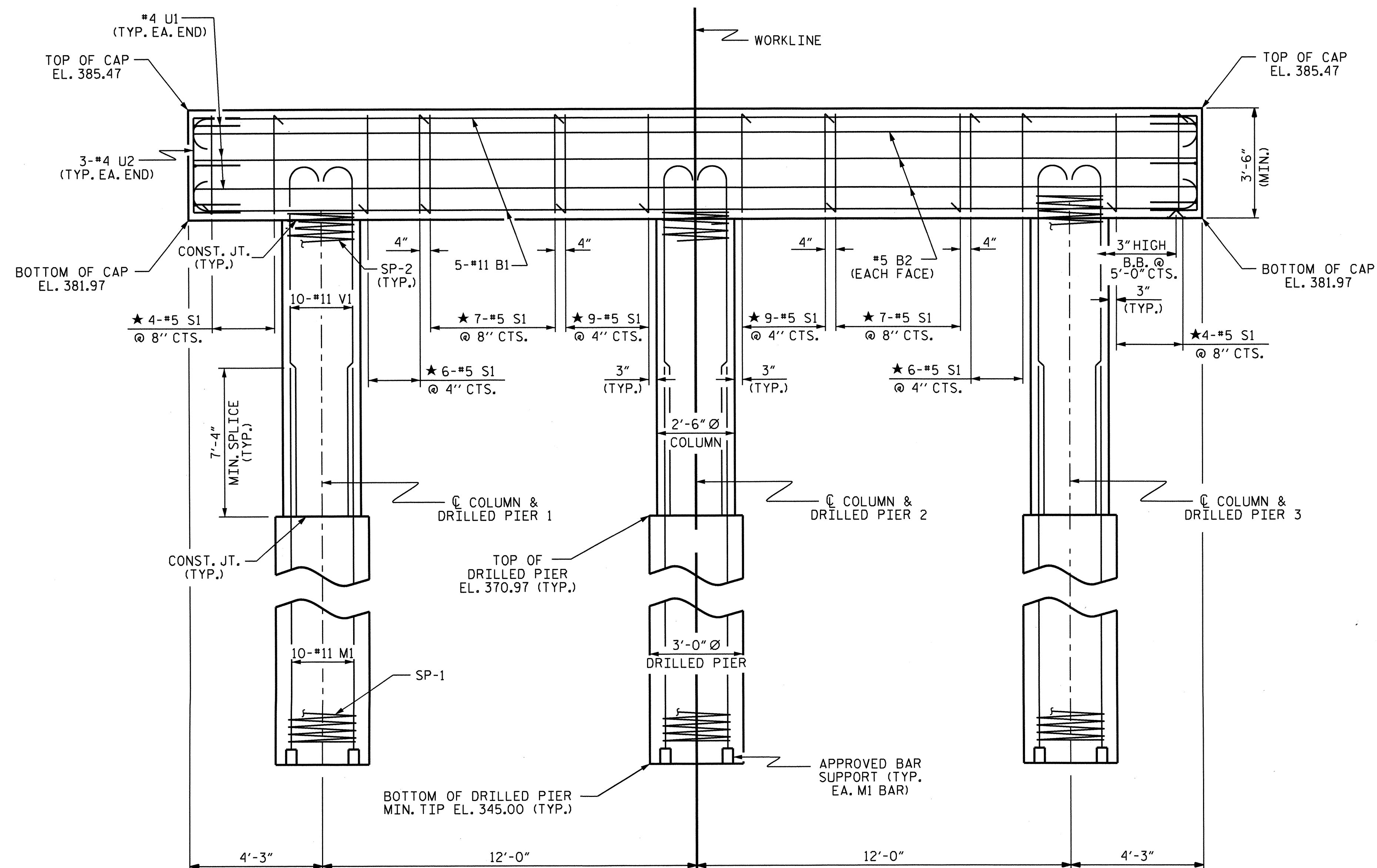
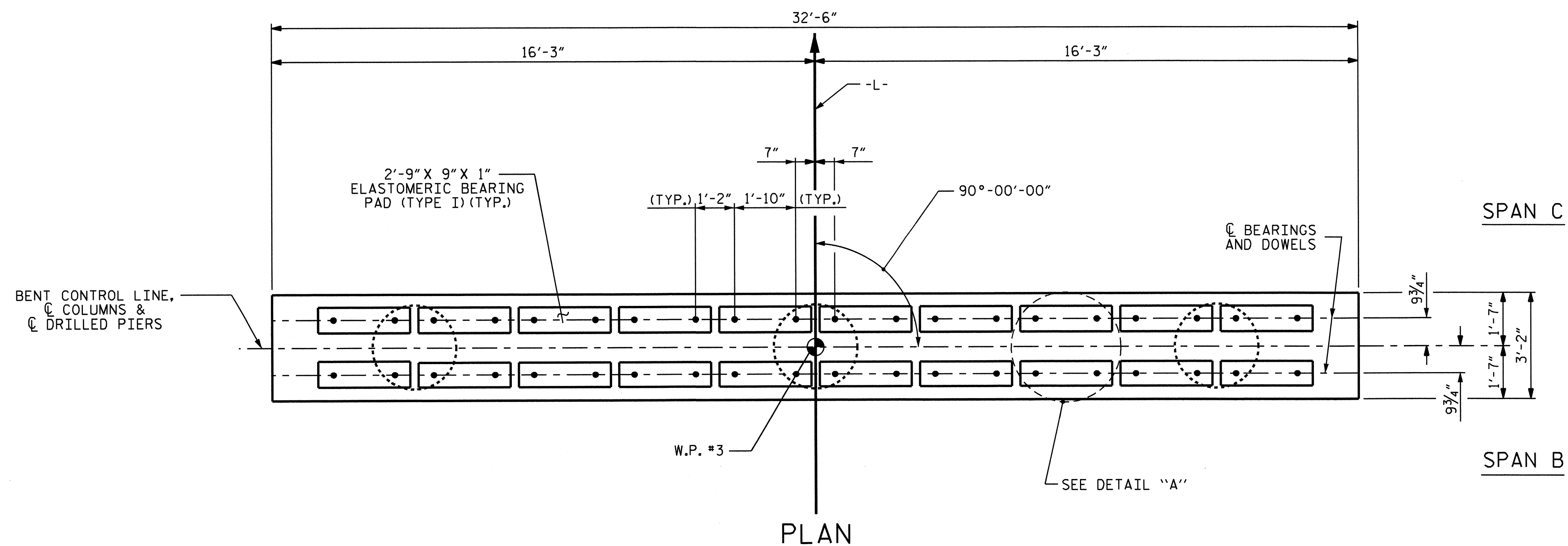
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

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 ONE FOOT BELOW THE GROUND LINE.

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



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. **B-4725**

CASWELL COUNTY

STATION: **19+65.00 -L-**

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2



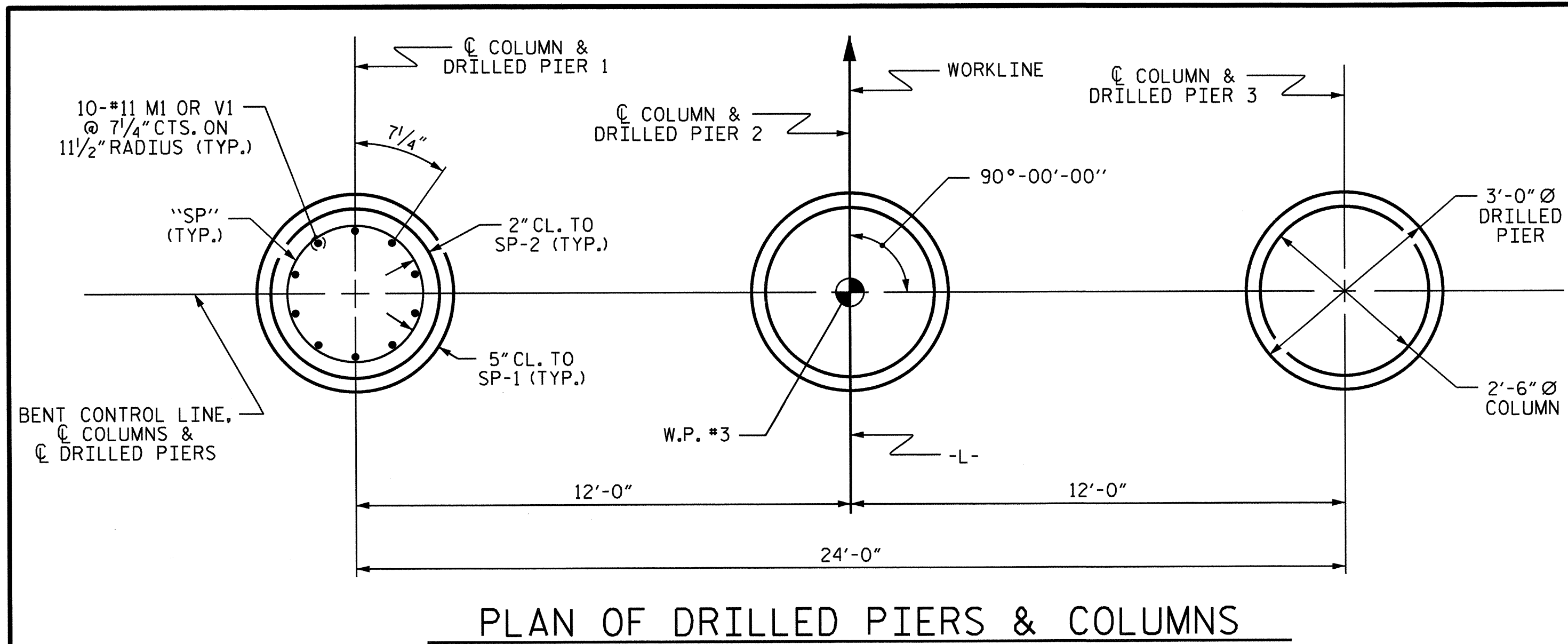
REVISIONS			SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 24

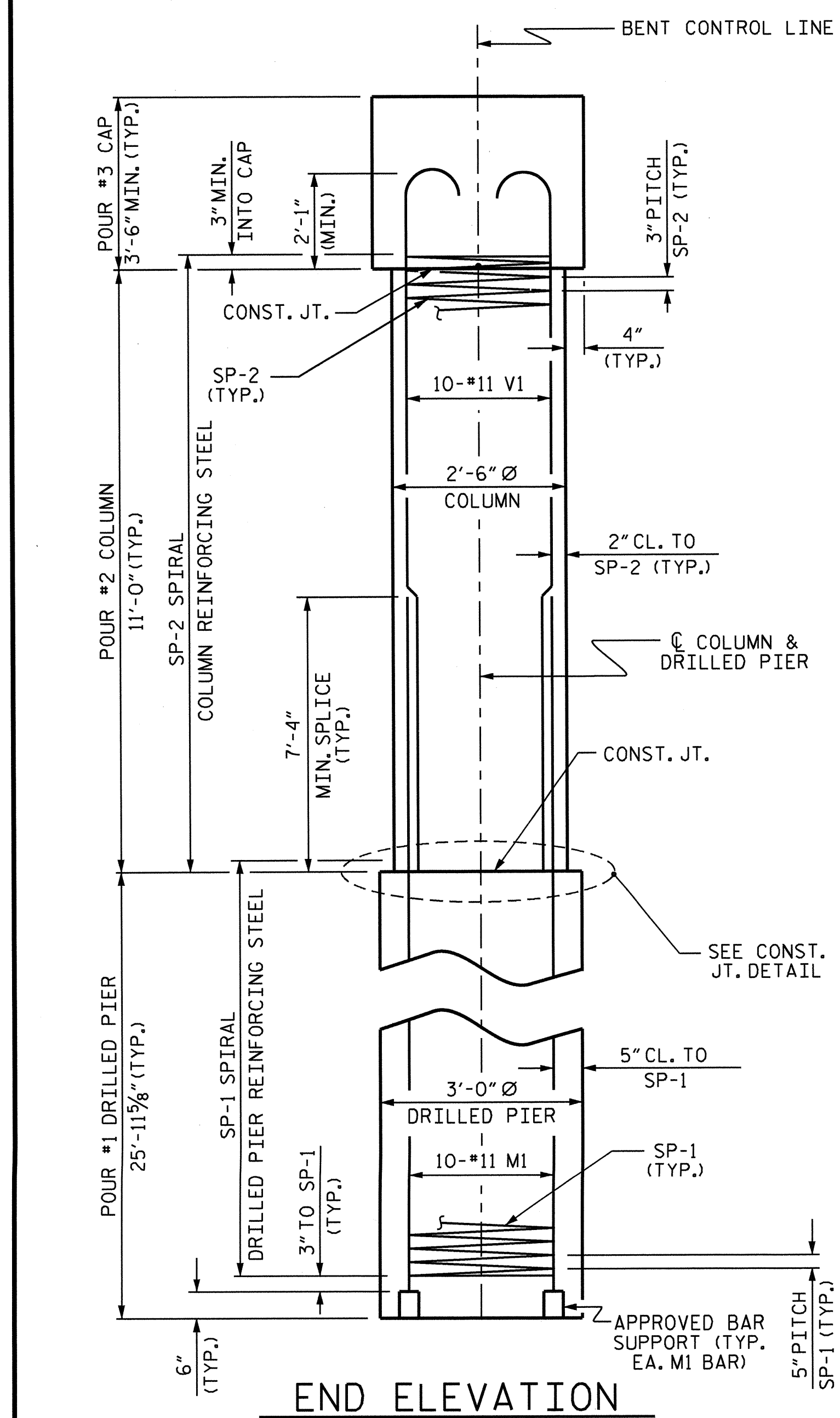
ASSEMBLED BY : A.C. OUTLAW DATE : 9/28/12
CHECKED BY : A. SORSENGINH DATE : 10/2012

DRAWN BY : DGE 03/10
CHECKED BY : MKT 03/10

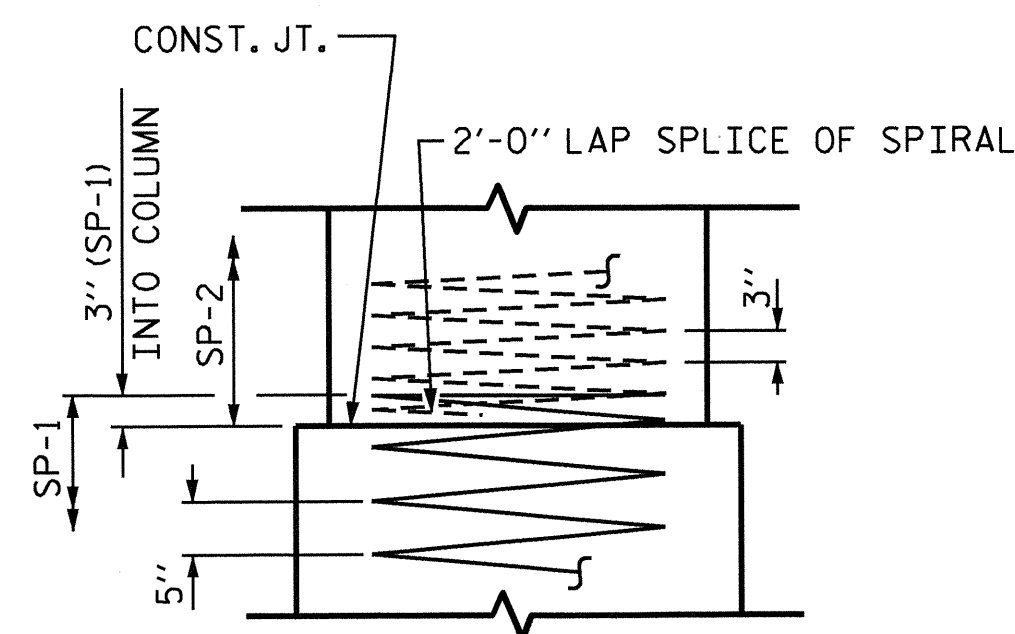
DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.



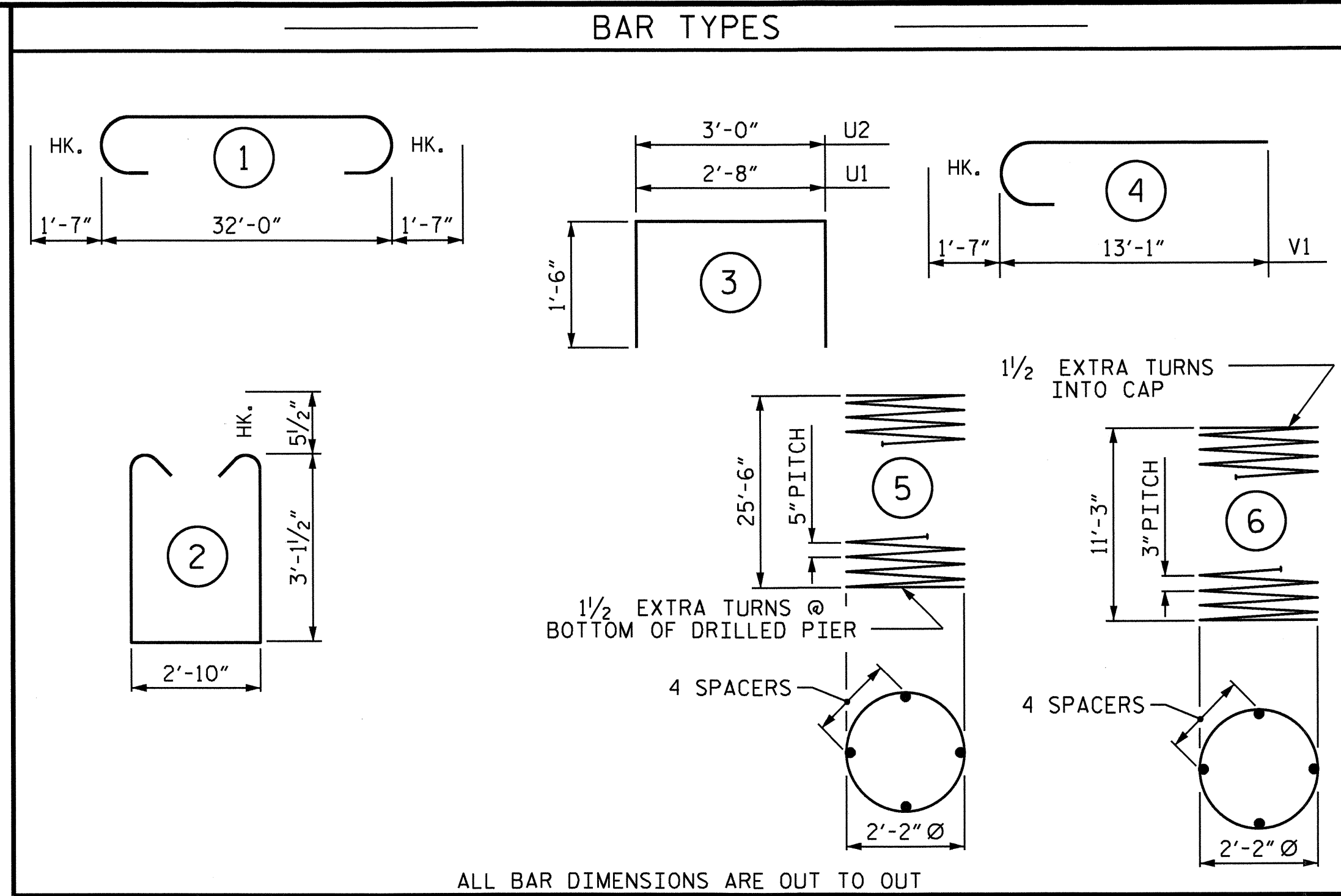
PLAN OF DRILLED PIERS & COLUMNS



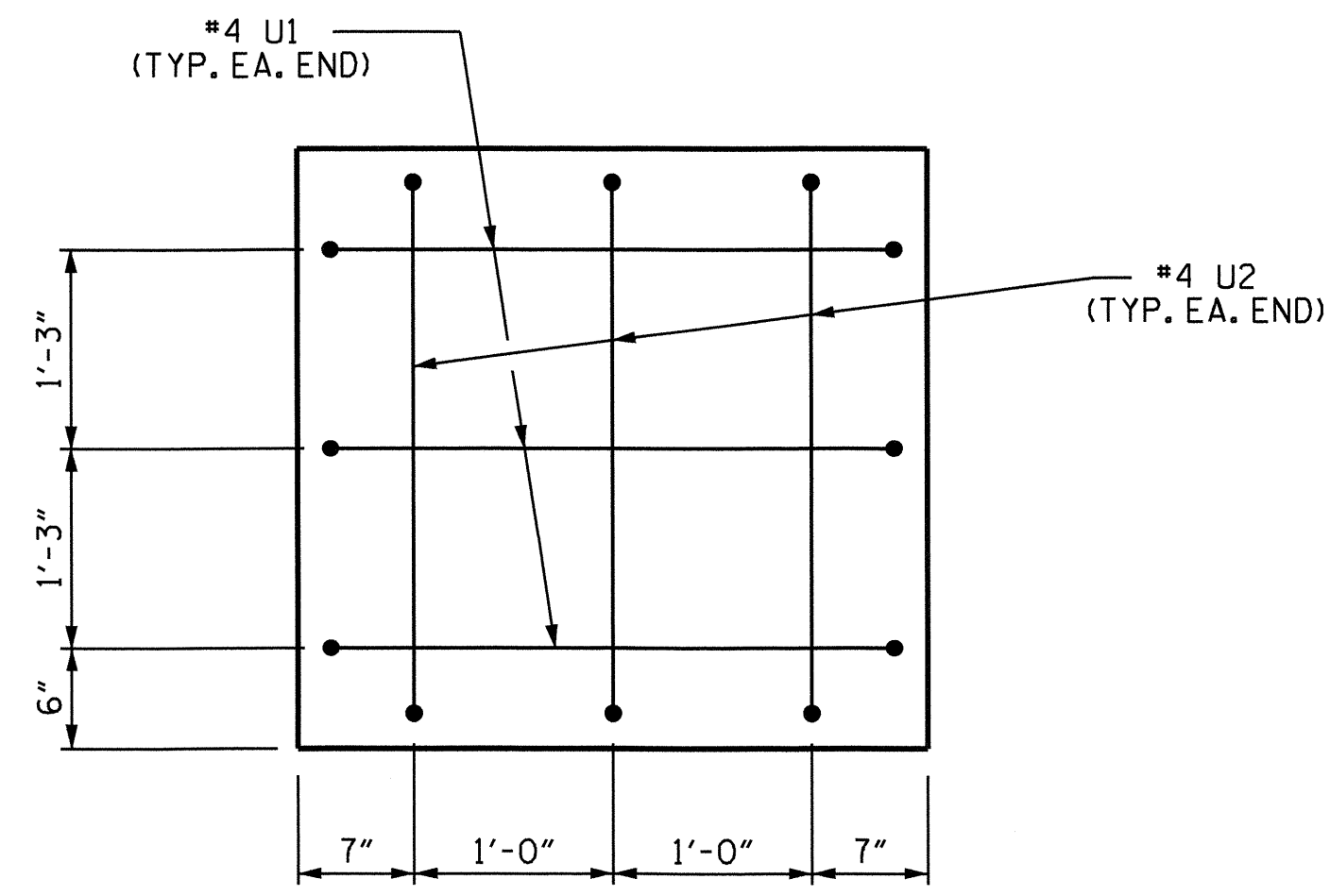
END ELEVATION



CONSTRUCTION JOINT DETAIL

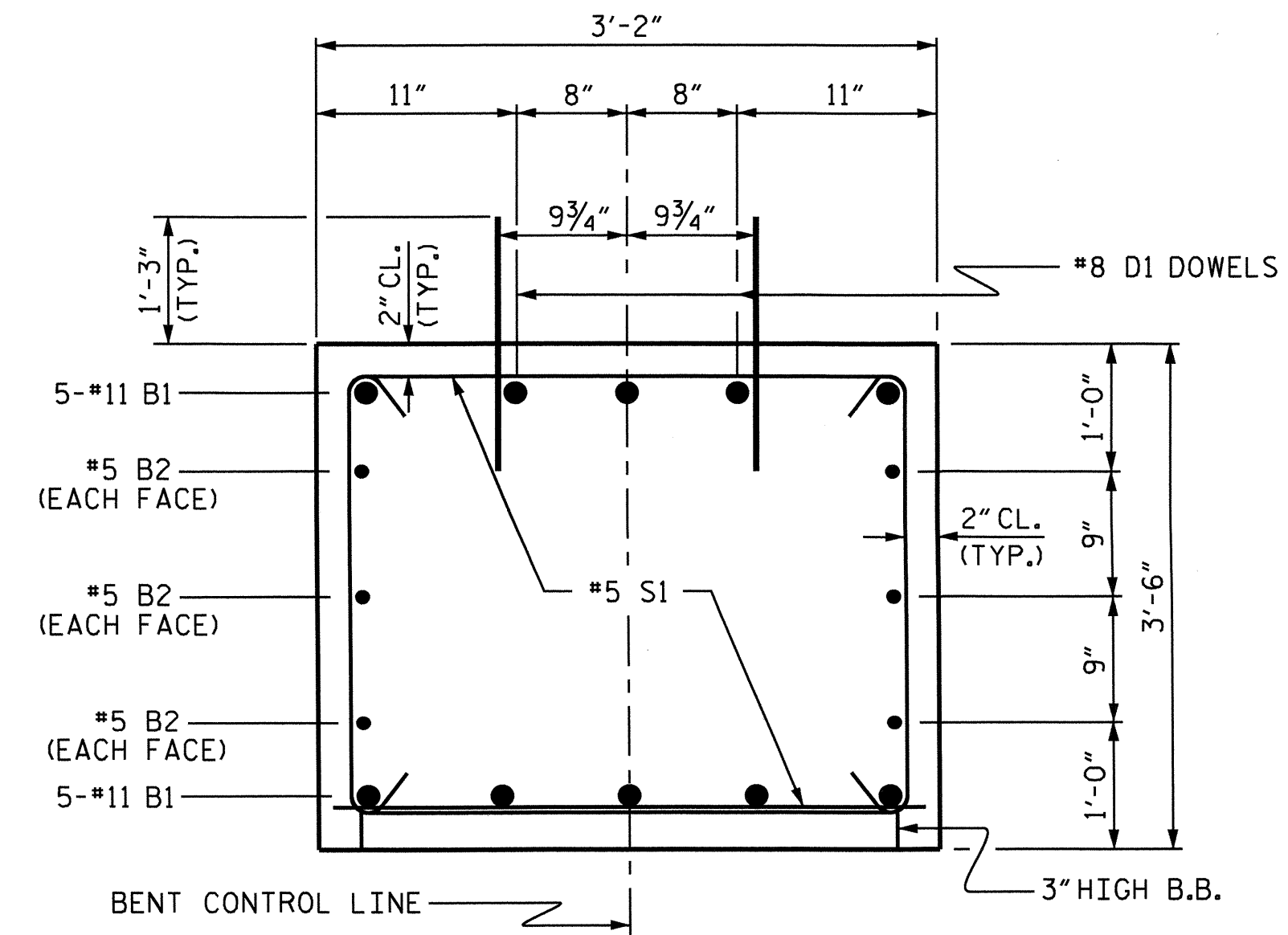


ALL BAR DIMENSIONS ARE OUT TO OUT



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BILL OF MATERIAL					
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	35'-2"	1868
B2	6	#5	STR	32'-2"	201
D1	40	#8	STR	2'-3"	240
M1	30	#11	STR	36'-1"	5751
S1	52	#5	2	10'-0"	542
U1	6	#4	3	5'-8"	23
U2	6	#4	3	6'-0"	24
V1	30	#11	4	14'-8"	2338
REINFORCING STEEL					10987 LBS.
SP-1	3	*	5	419'-4"	1312
SP-2	3	**	6	314'-0"	629
SPIRAL COLUMN REINFORCING STEEL					1941
* 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					
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					6.0 C.Y.
POUR #3 (CAP)					13.3 C.Y.
TOTAL CLASS A CONCRETE					19.3 C.Y.
DRILLED PIERS:					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					20.4 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL					14.0 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL					63.9 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER					8.9 LIN. FT.
▲ CSL TUBES					330 LIN. FT.
SPT TESTING					3 EACH

▲ NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

SHEET 2 OF 2

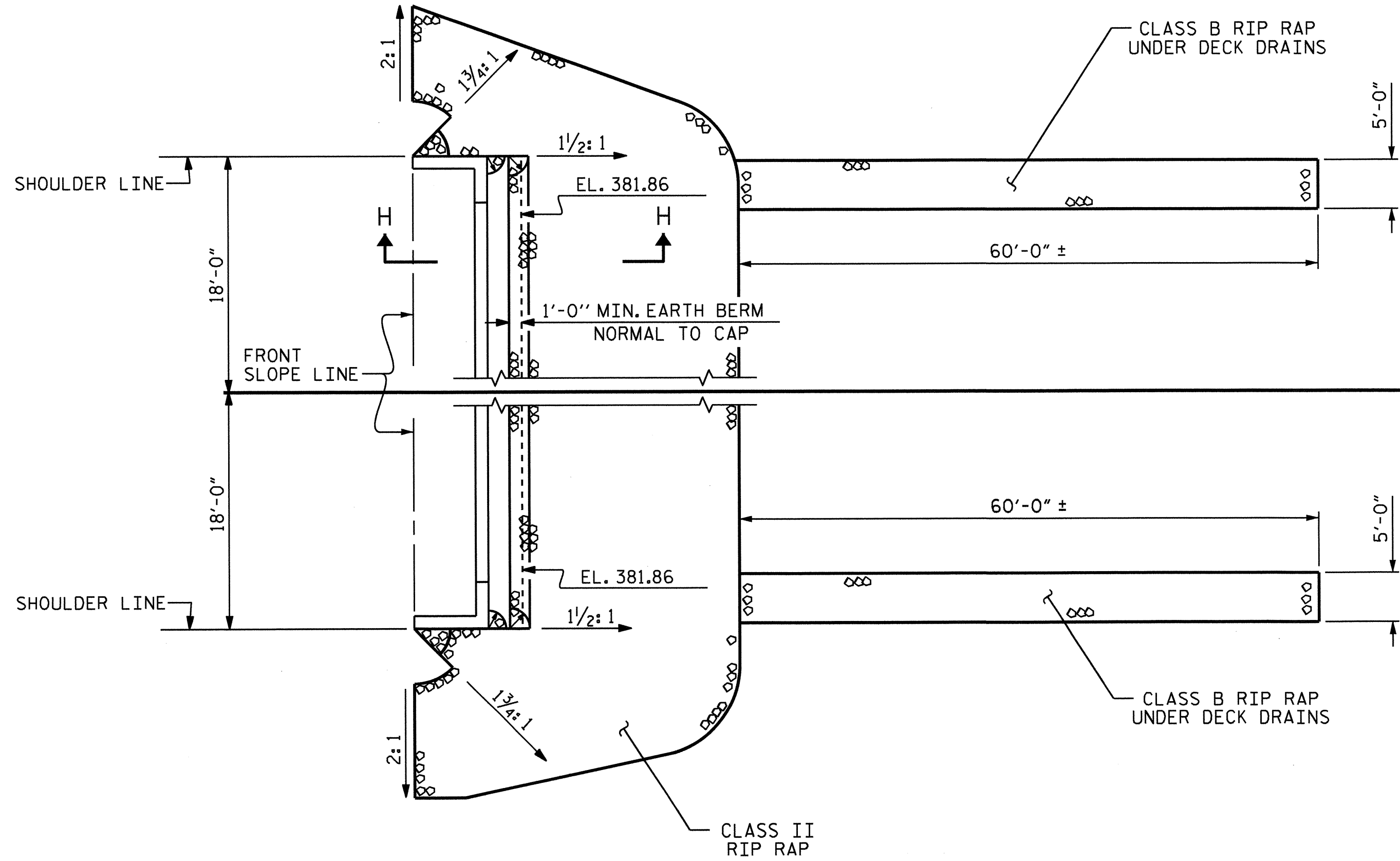
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 2



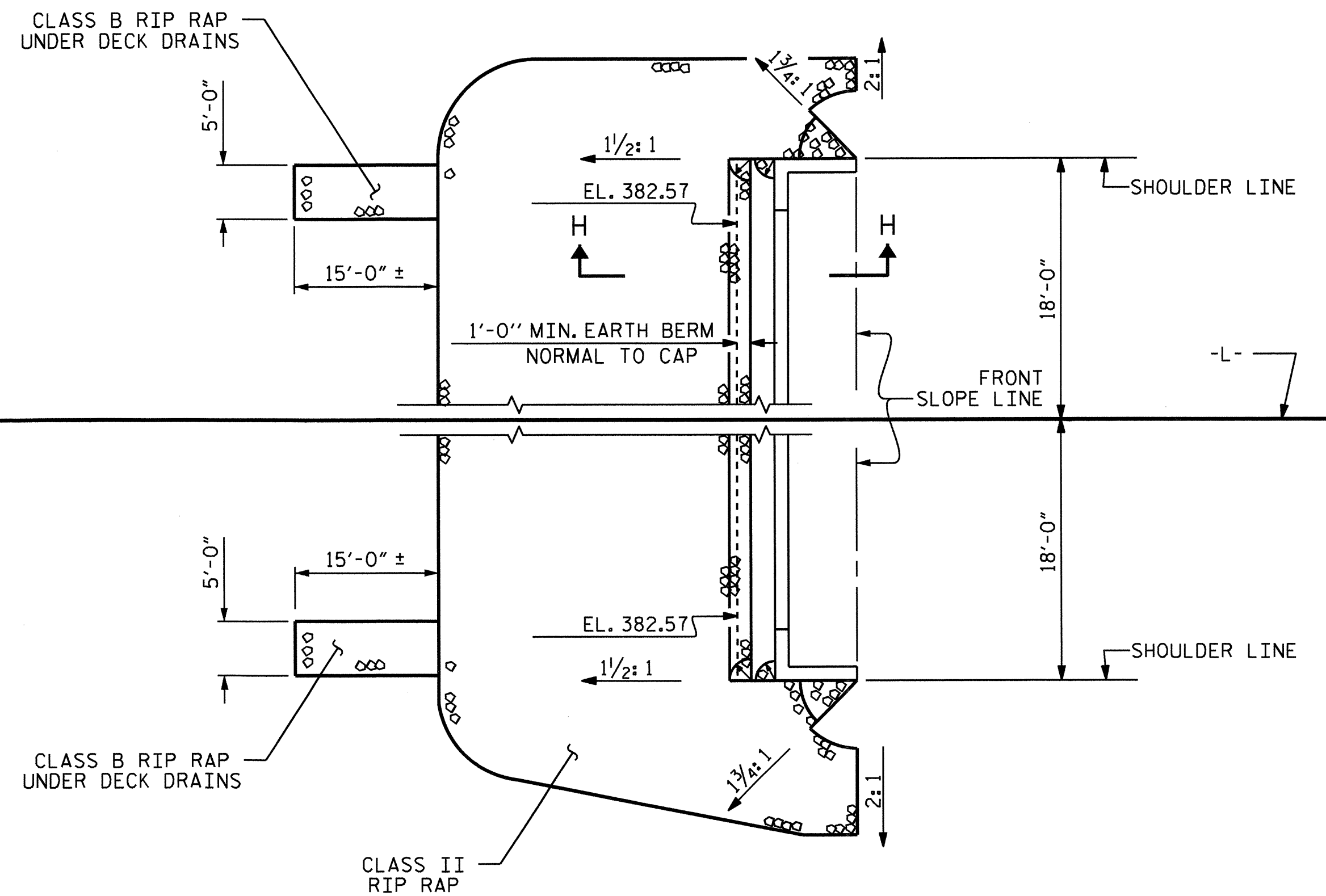
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
S-22	TOTAL SHEETS 24

ASSEMBLED BY: A.C. OUTLAW DATE: 9/28/12
 CHECKED BY: A. SORSENGINH DATE: 10/20/12
 DRAWN BY: DGE 03/10
 CHECKED BY: MKT 03/10

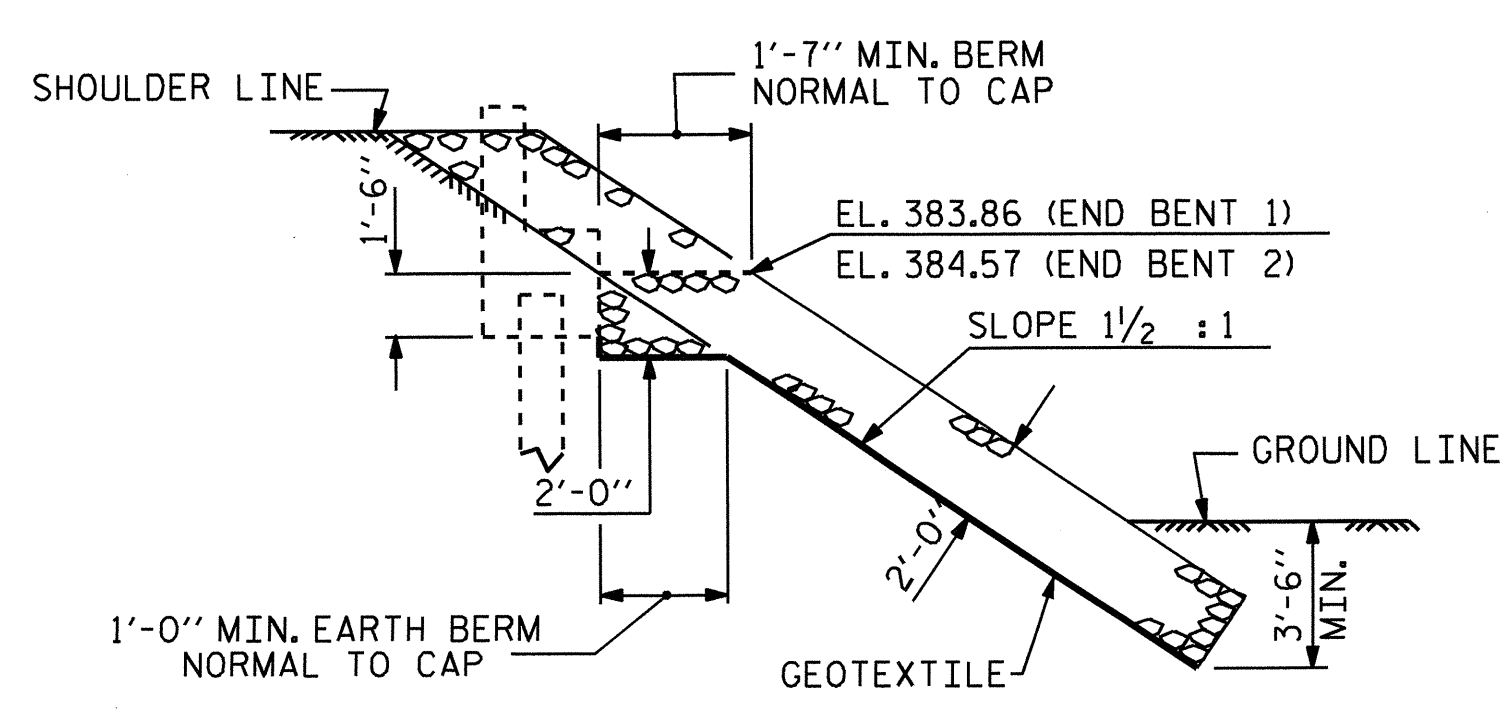


END BENT 1

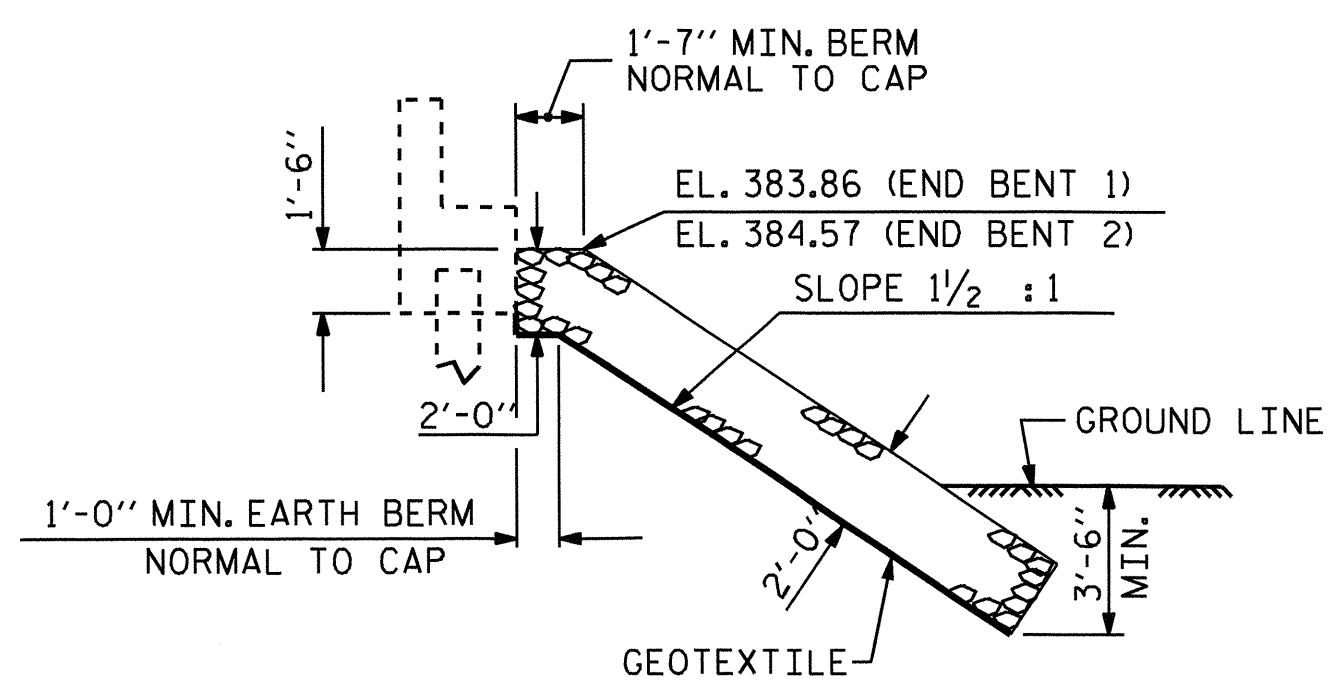


END BENT 2

ESTIMATED QUANTITIES			
BRIDGE @ STA. 19+65.00 -L-	RIP RAP CLASS B (UNDER DECK DRAINS)	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	TONS	SQUARE YARDS
END BENT 1	60	230	255
END BENT 2	15	320	355



SECTION H-H



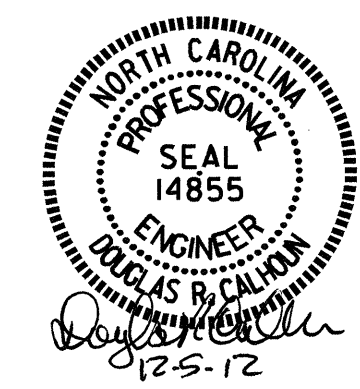
**C SECTION
BERM RIP RAPPED**

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

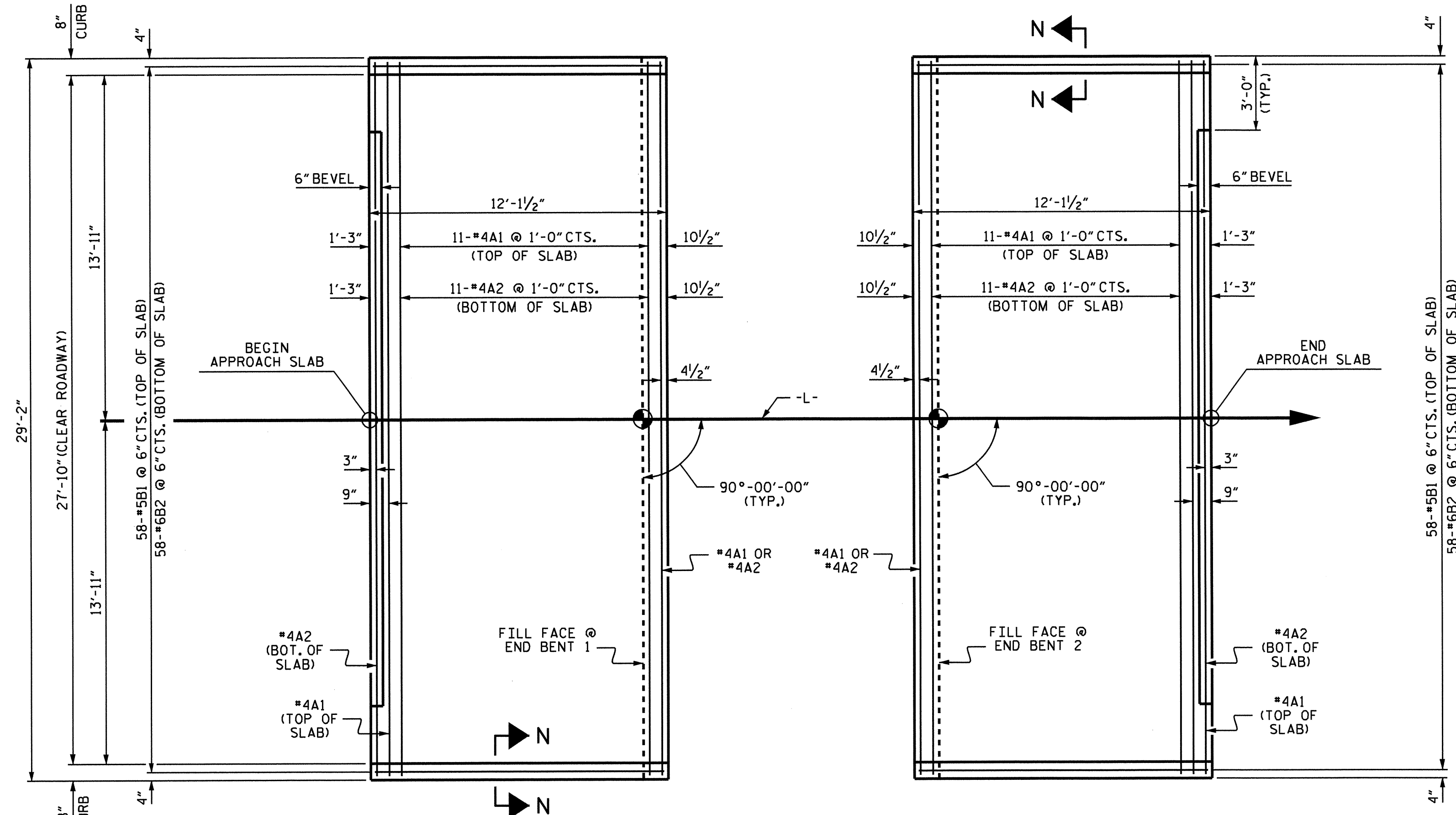
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 RIP RAP DETAILS

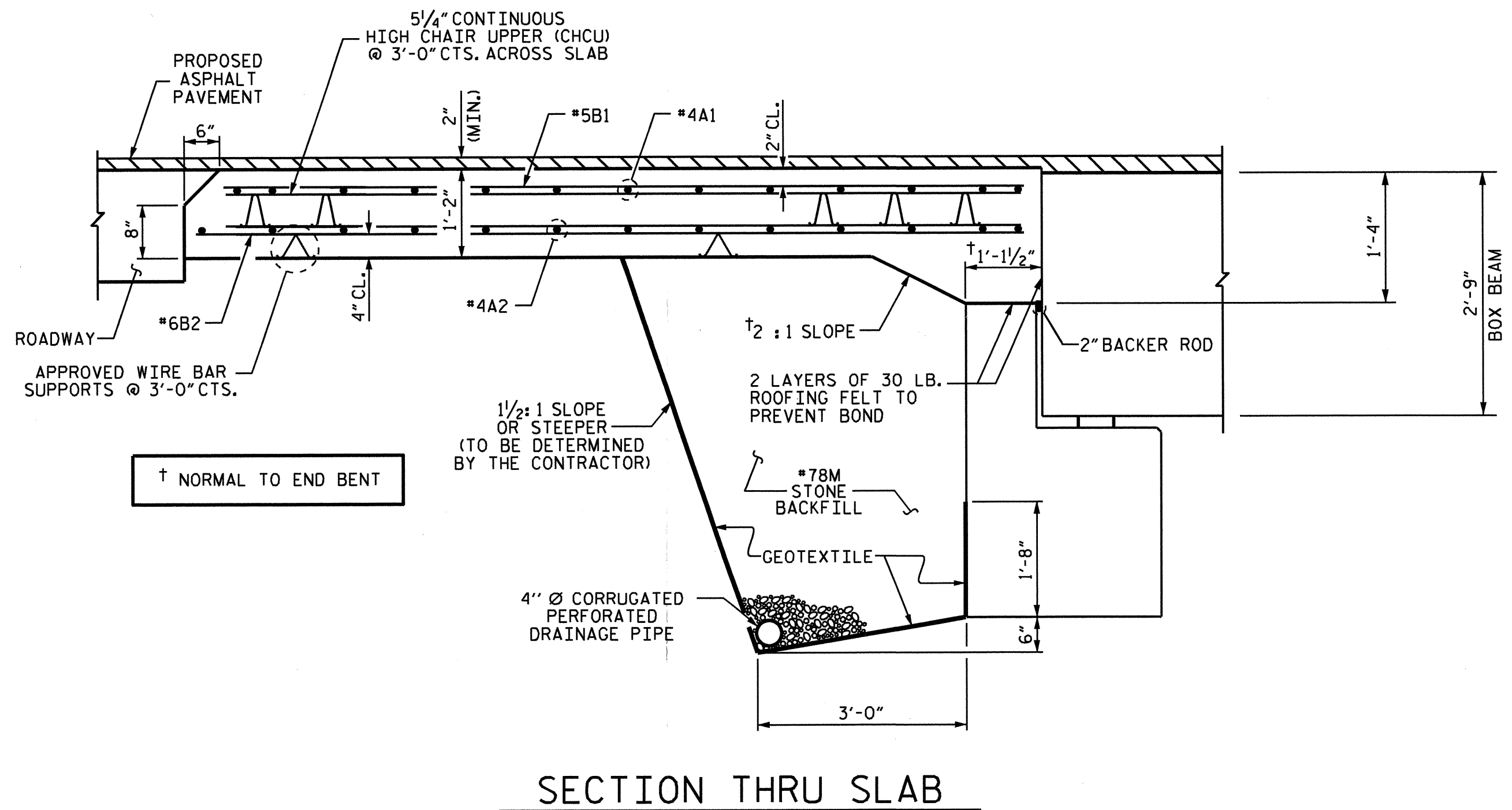
REVISIONS						SHEET NO. 5-23
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			21



ASSEMBLED BY : D. G. ELY DATE : 10/2012
 CHECKED BY : W. F. PARKER DATE : 10/2012
 DRAWN BY : FCJ 2/88 REV. 5/1/06R TLA/GM
 CHECKED BY : ARB 8/88 REV. 10/1/11 MAA/GM
 REV. 12/2/11 MAA/GM



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



SECTION THRU SLAB

NOTES

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

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

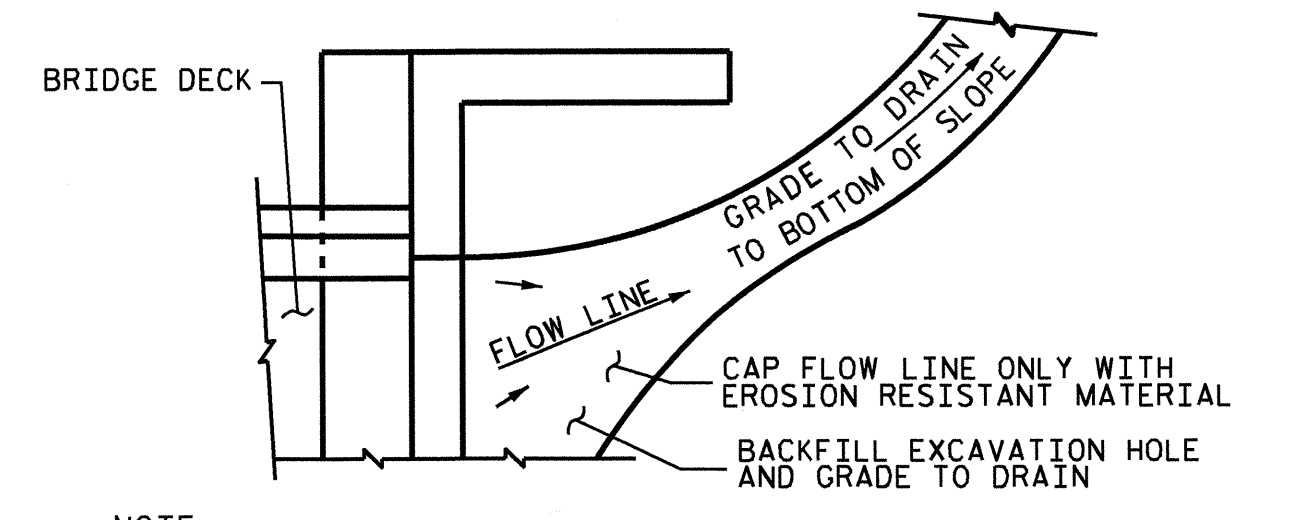
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#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.

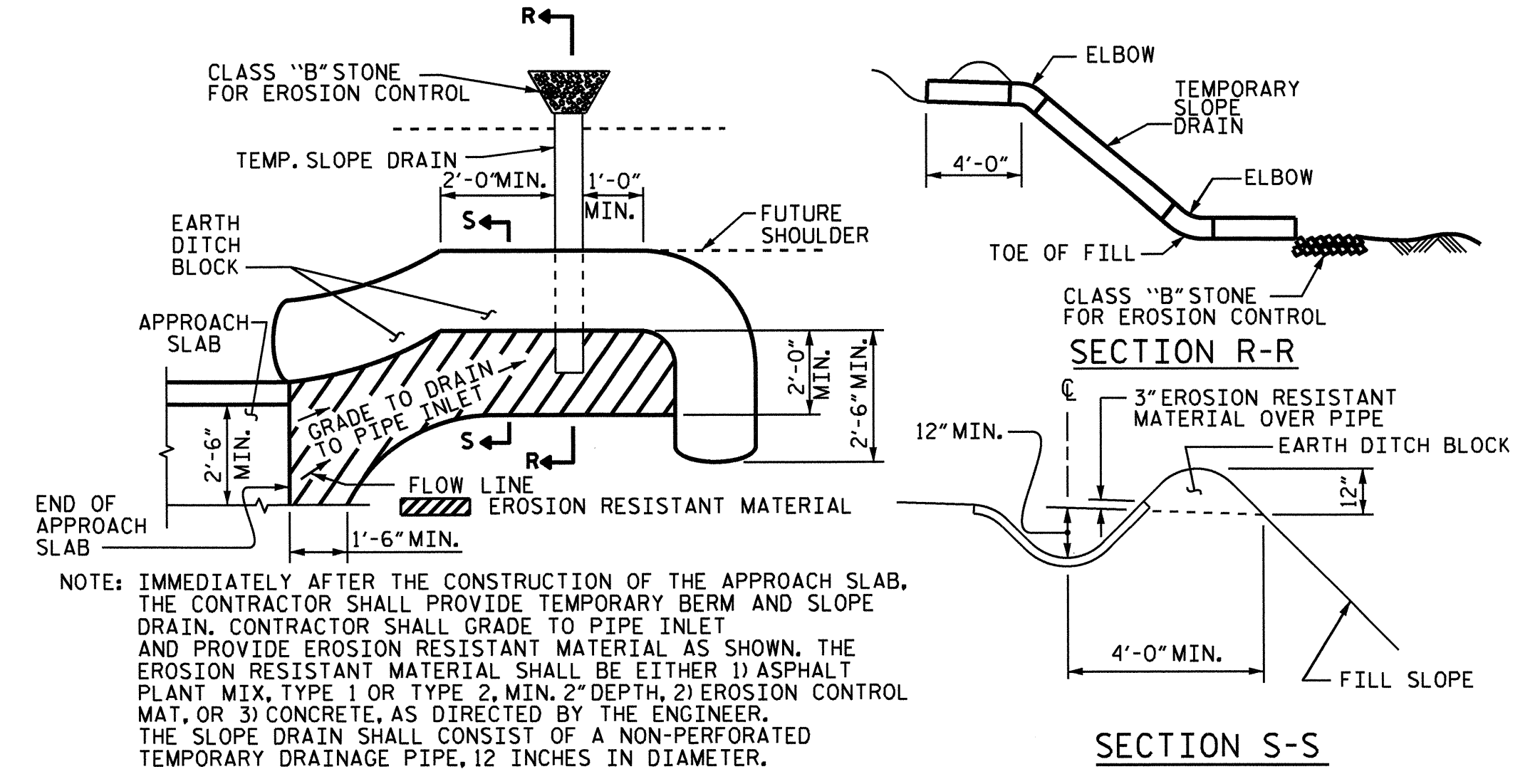
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

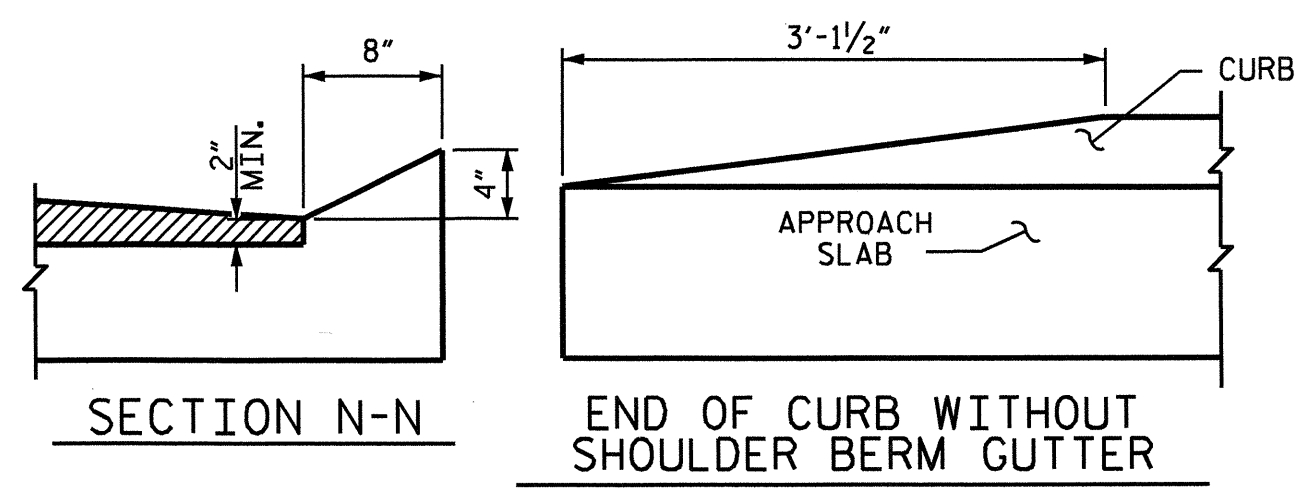


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

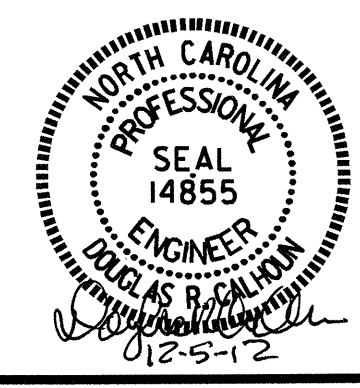


PLAN VIEW
TEMPORARY BERM AND SLOPE DRAIN DETAILS
 (TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



CURB DETAILS

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



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					LBS. 1266
*EPOXY COATED REINFORCING STEEL					LBS. 926
CLASS AA CONCRETE					C. Y. 15.6
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					LBS. 1266
*EPOXY COATED REINFORCING STEEL					LBS. 926
CLASS AA CONCRETE					C. Y. 15.6

ASSEMBLED BY : A.C. OUTLAW DATE : 1/25/12
 CHECKED BY : A. SORSENGINH DATE : 9/2012
 DRAWN BY : MAA 11/11
 CHECKED BY : AAC 11/11

PROJECT NO. B-4725
CASWELL COUNTY
 STATION: 19+65.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB BOX BEAM UNIT (SUB-REGIONAL TIER) 90° SKEW					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 24

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

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