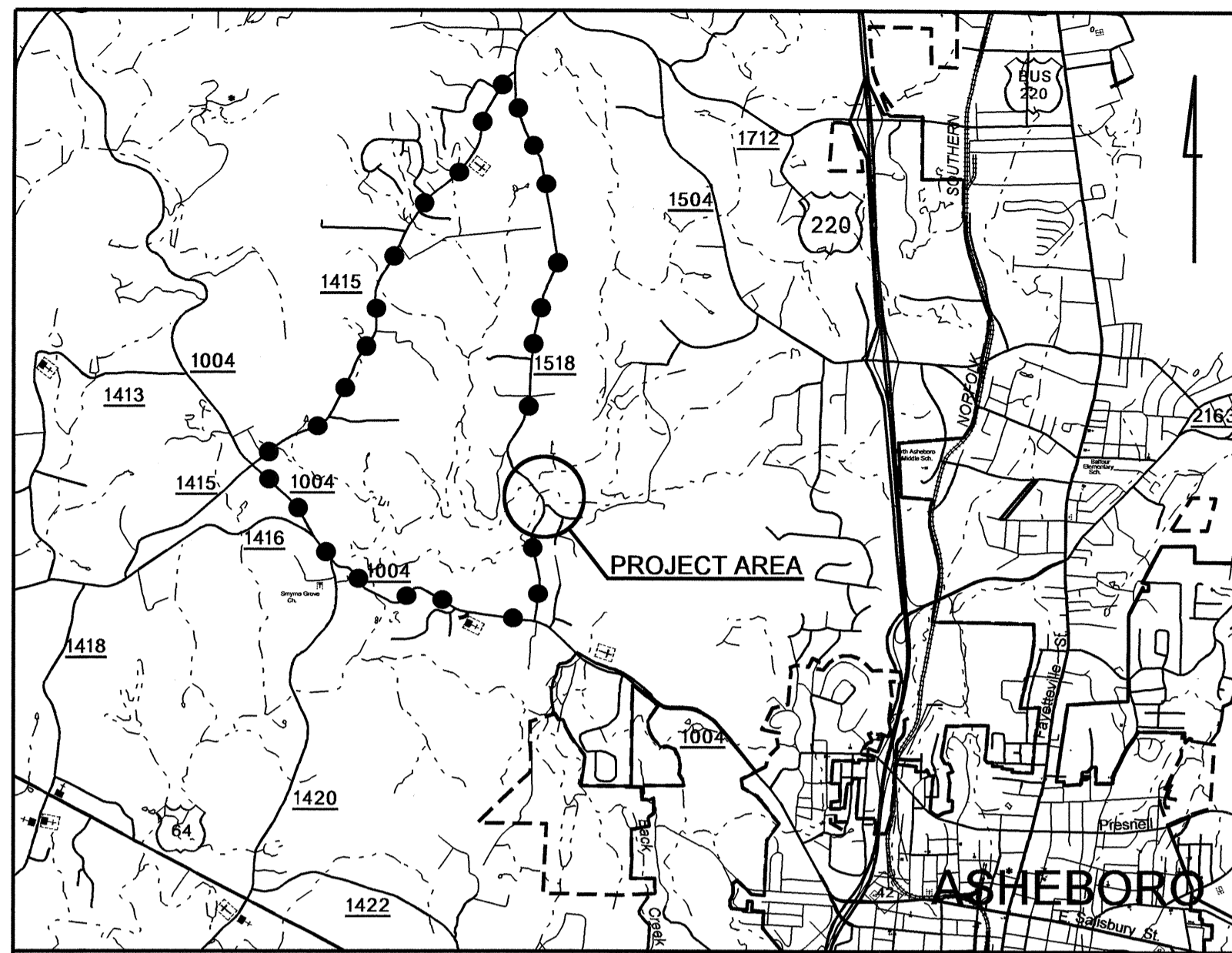


**CONTRACT: C202553 TIP PROJECT: B-4610**

**STRUCTURE**



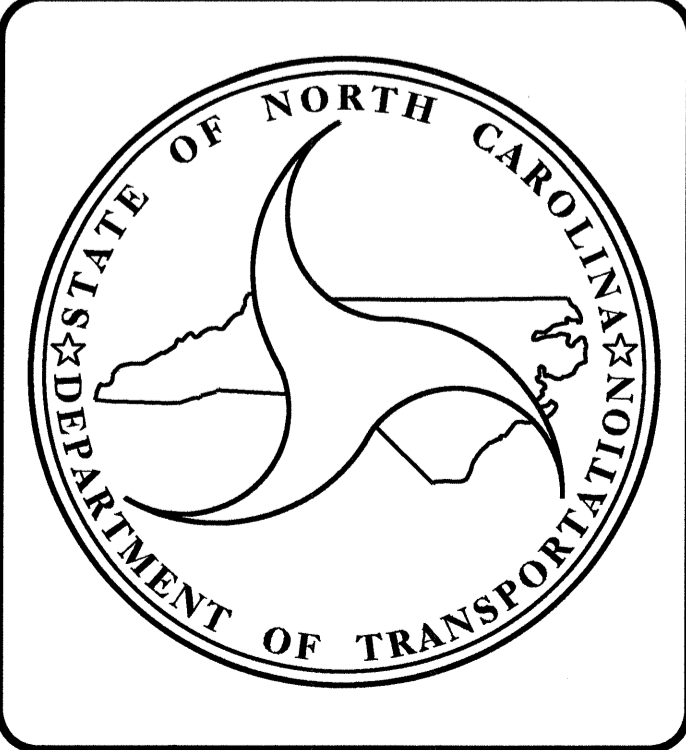
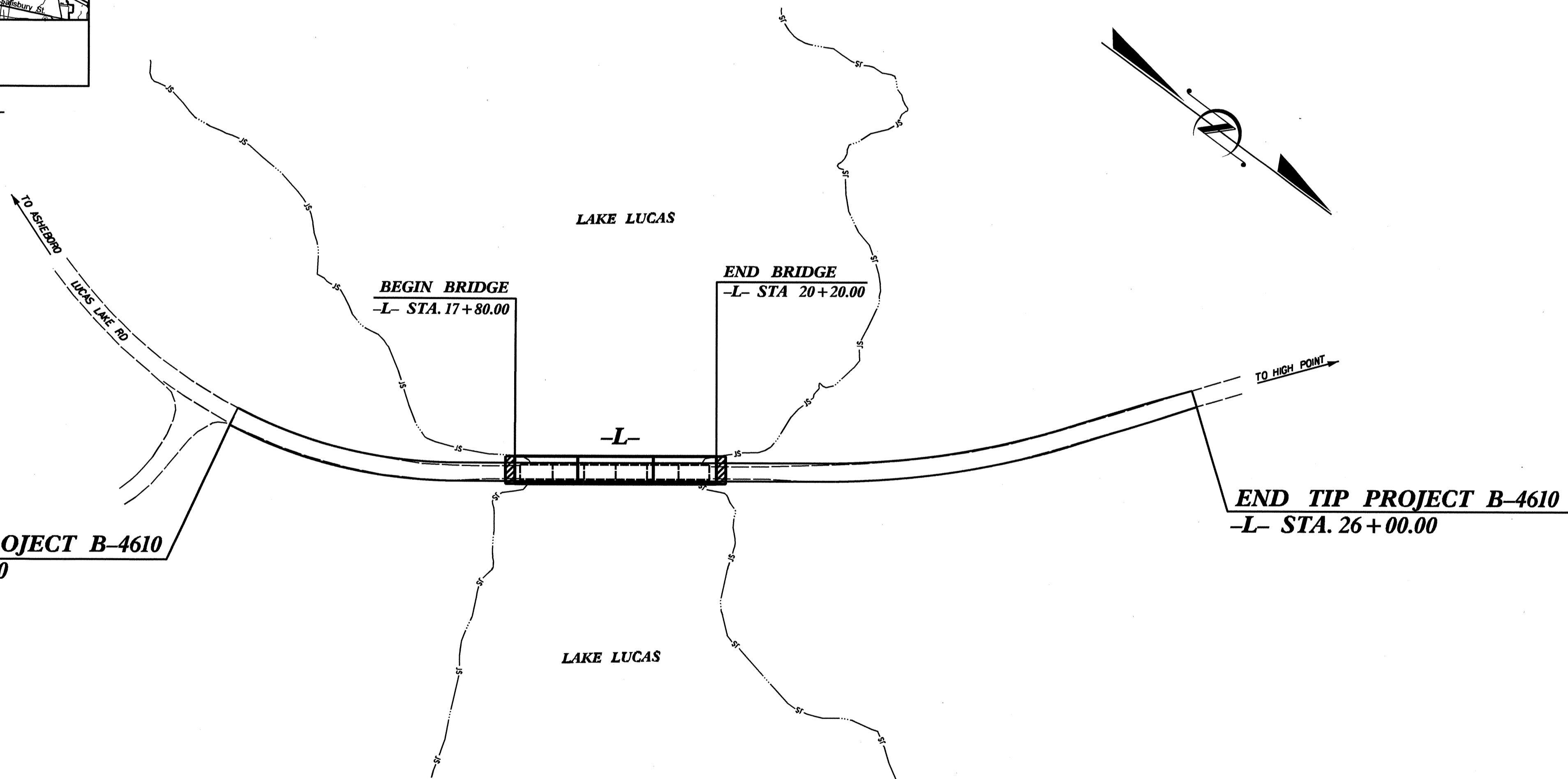
**VICINITY MAP**

OFFSITE DETOUR ROUTE

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**RANDOLPH COUNTY**

**LOCATION: BRIDGE NO. 73 OVER LAKE LUCAS ON SR 1518**  
**TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4610		
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
33794.1.1	BRZ-1518(2)	P.E.	
33794.2.1	BRZ-1518(2)	UTIL. & RAW	
33794.3.1	BRZ-1518(2)	CONST.	



**DESIGN DATA**

ADT 2010 =	1,200
ADT 2030 =	2000
DHV =	10 %
D =	60 %
T =	3 % *
V =	50 MPH
* TTST 1% DUAL 2%	
FUNC. CLASS. =	RURAL LOCAL

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4610 =	0.175 mi.
LENGTH STRUCTURE TIP PROJECT B-4610 =	0.046 mi.
TOTAL LENGTH TIP PROJECT B-4610 =	0.221 mi.

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**

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2006 STANDARD SPECIFICATIONS

<p>LETTING DATE :</p> <p style="text-align: center;">JUNE 15, 2010</p>	<p style="text-align: center;">J. C. FRYE, P.E. <small>PROJECT ENGINEER</small></p> <hr/> <p style="text-align: center;">T. H. FANG, P.E. <small>PROJECT DESIGN ENGINEER</small></p>
--	--

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

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

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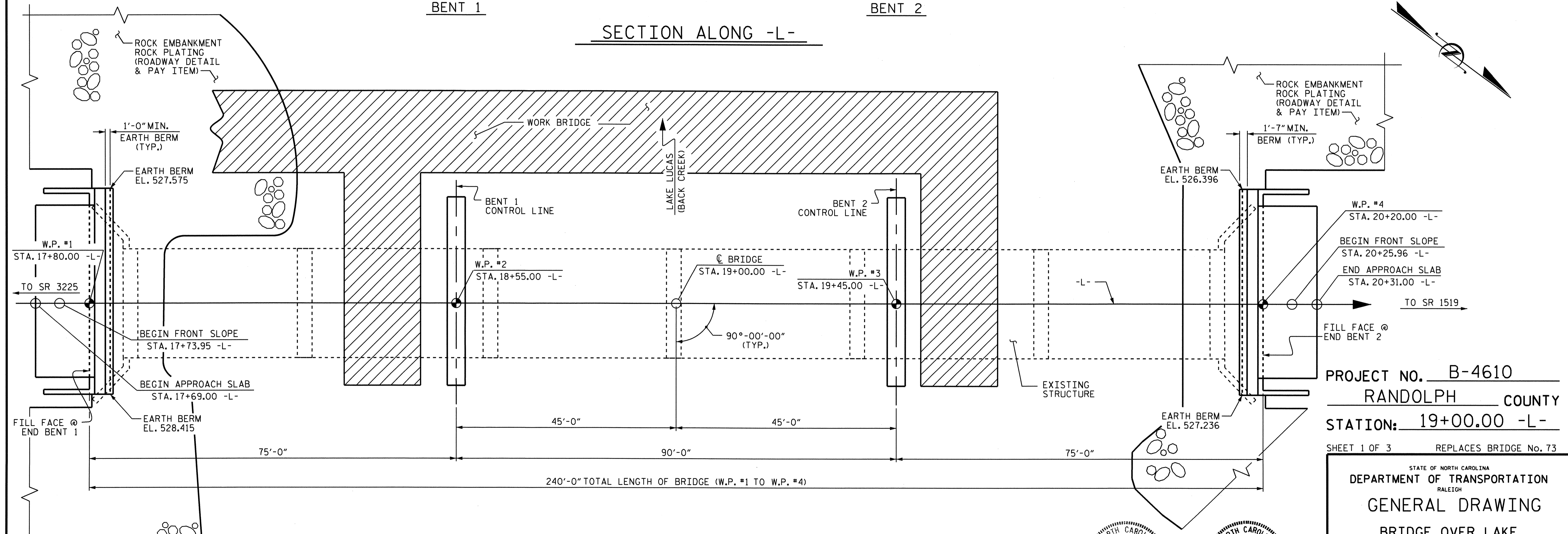
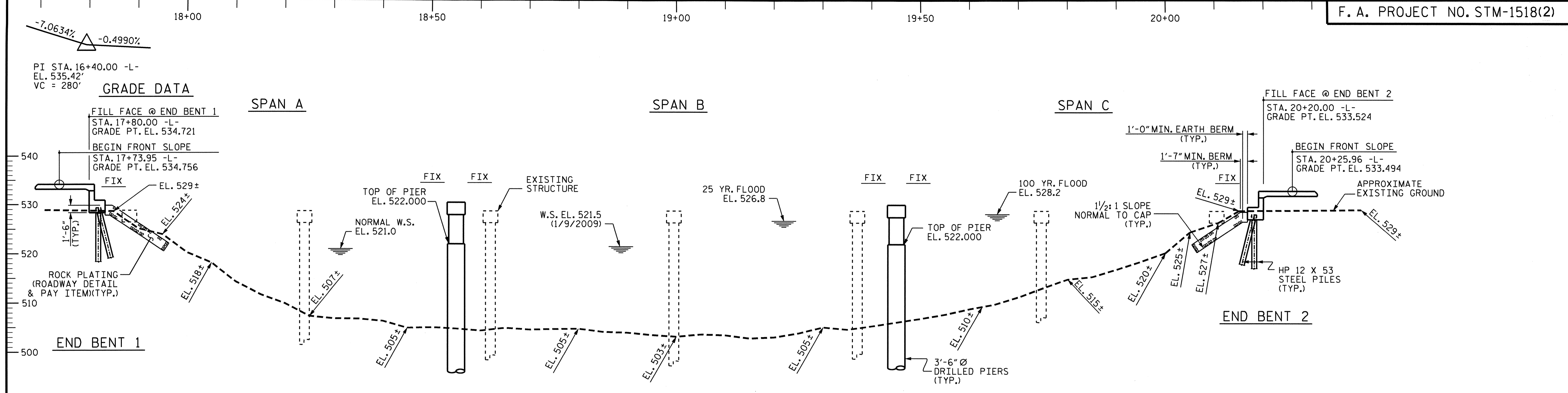
STATE DESIGN ENGINEER P.E.

**DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION**

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APPROVED

<small>DIVISION ADMINISTRATOR</small>	<small>DATE</small>
---------------------------------------	---------------------



PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 1 OF 3 REPLACES BRIDGE No. 73

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE OVER LAKE  
 LUCAS ON SR 1518 BETWEEN  
 SR 3225 AND SR 1519

REVISIONS

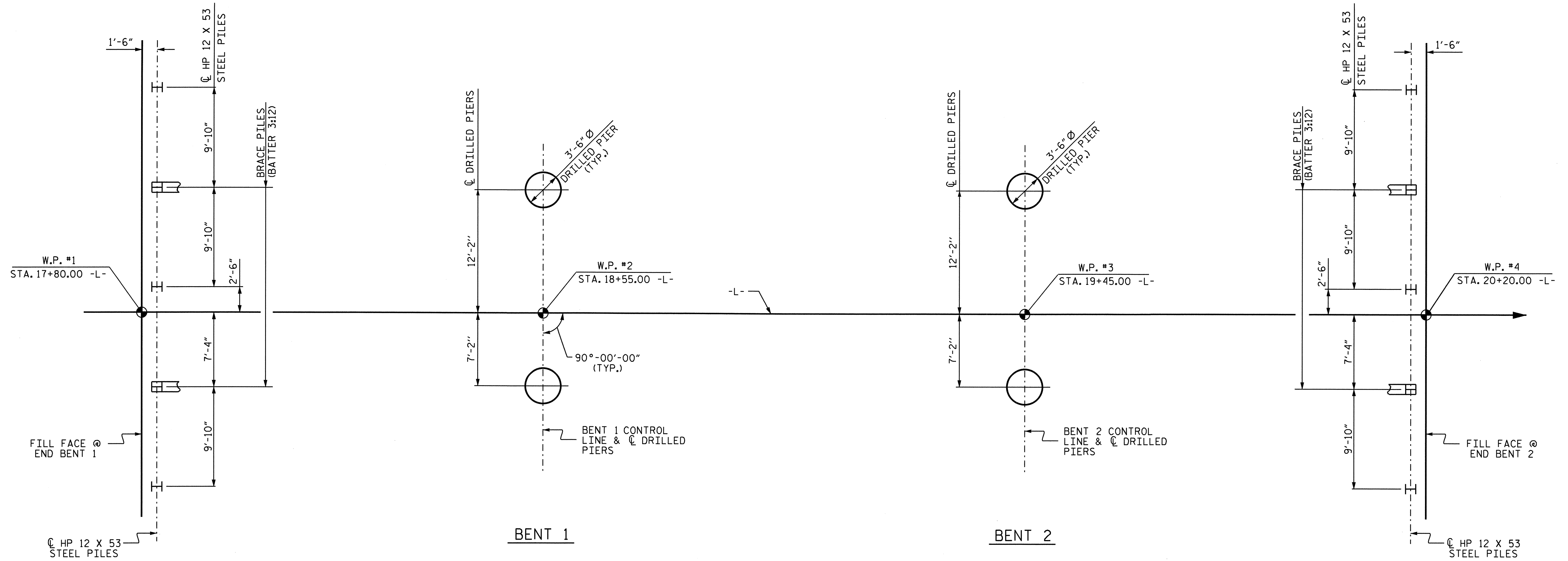
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-1  
 TOTAL SHEETS 25

DRAWN BY: Z. H. BROWN DATE: 6/26/09  
 CHECKED BY: W. A. DAVIS DATE: 7/17/09

NORTH CAROLINA PROFESSIONAL SEAL 11915  
 NORTH CAROLINA PROFESSIONAL SEAL 16301  
 3/1/10

01-MAR-2010 14:39  
 R:\Structures\Jayannaccone\Final Plans\b-4610.sd.gdn  
 Jayannaccone



**FOUNDATION LAYOUT**  
 DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES & DRILLED PIERS.

**NOTES**

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 565 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 100 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 565 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 135 TSF.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT 1. DO NOT EXTEND CASING BELOW ELEVATION 495 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT 2. DO NOT EXTEND CASING BELOW ELEVATION 497 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT 1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 476 FT. AND SATISFY THE REQUIRED TIP RESISTANCE.

INSTALL DRILLED PIERS AT BENT 2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 483 FT. AND SATISFY THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 495 FT. AND BENT 2 IS ELEVATION 497 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 CROSSHOLE SONIC LOGGING, SEE SPECIAL PROVISIONS.

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 130 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.

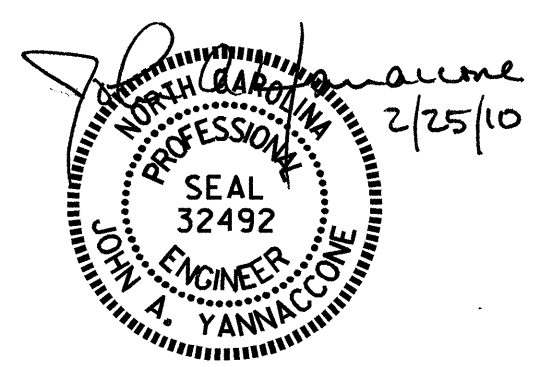
PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE OVER LAKE LUCAS  
 ON SR 1518 BETWEEN  
 SR 3225 AND SR 1519

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

S-2  
TOTAL SHEETS 22

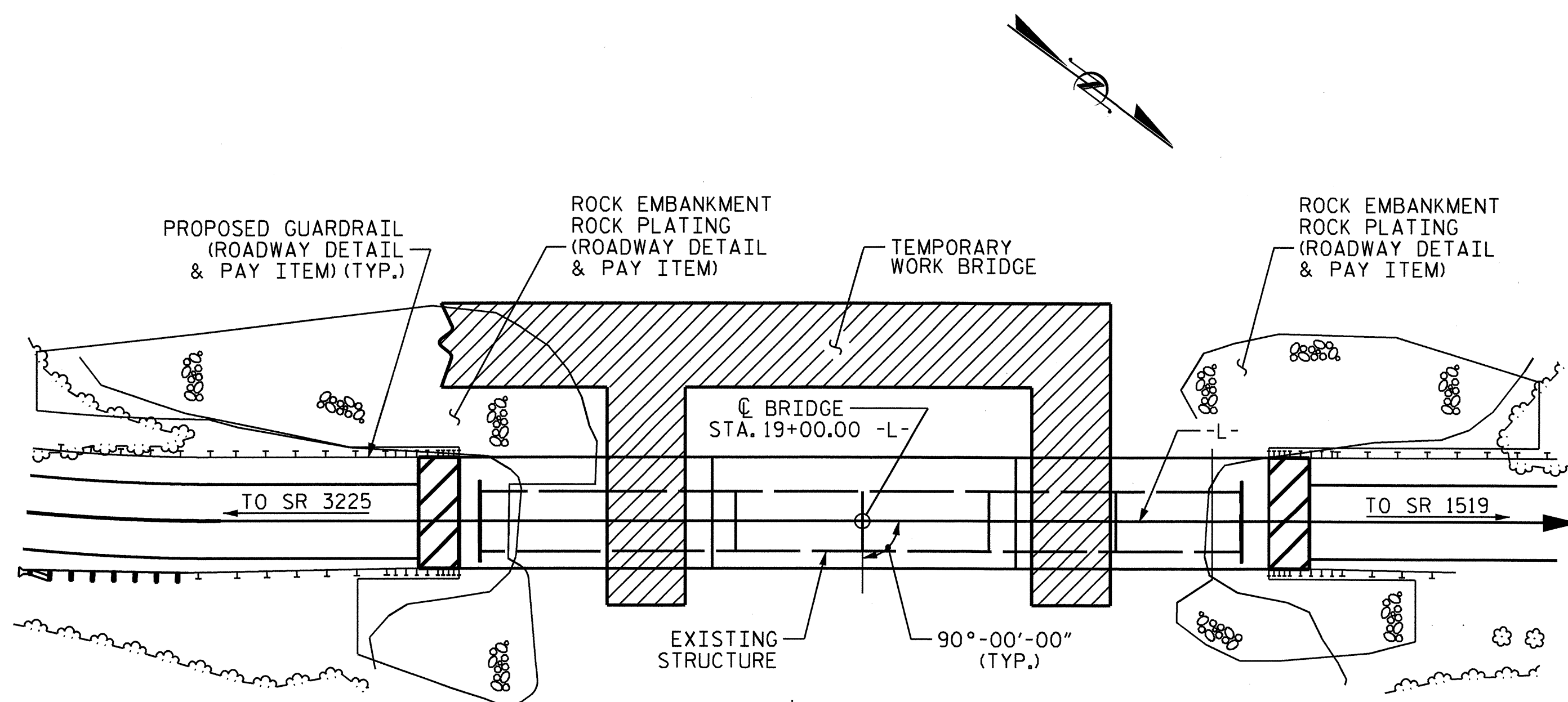


DRAWN BY : J. A. YANNACCONE DATE : 12/31/09  
 CHECKED BY : T. H. FANG DATE : 1/11/10

TOTAL BILL OF MATERIAL

	CONST. MAINT. & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	SID INSPECTION	CROSSHOLE SONIC LOGGING	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES	VERTICAL CONCRETE BARRIER RAIL	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS		
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE													475.5	LUMP SUM	36	2,850	
END BENT 1								19.3		3,084		5	175				
BENT 1			75.00	17.00	54.00			22.3		9,497	2,145						
BENT 2			61.00	17.00	50.00			22.0		8,727	1,836						
END BENT 2								19.3		3,078		5	165				
TOTAL	LUMP SUM	LUMP SUM	136.00	34.00	104.00	1	1	82.9	LUMP SUM	24,386	3,981	10	340	475.5	LUMP SUM	36	2,850

BM#1 : RR SPIKE IN BASE OF 15' PINE TREE, -L- STA. 14+05.95, 78.60 FT. LT., ELEV. 541.68'



HYDRAULIC DATA

DESIGN DISCHARGE = 2300 c.f.s.  
 FREQUENCY OF DESIGN FLOOD = 25 yr.  
 DESIGN HIGH WATER ELEVATION = 526.8  
 DRAINAGE AREA = 11.5 sq. mi.  
 BASIC DISCHARGE (Q 100) = 3400 c.f.s.  
 BASIC HIGH WATER ELEVATION = 528.2

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 14000 +/- c.f.s.  
 FREQUENCY OF OVERTOPPING FLOOD = 500+ yr.  
 OVERTOPPING FLOOD ELEVATION = 533.6

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

— LOCATION SKETCH —

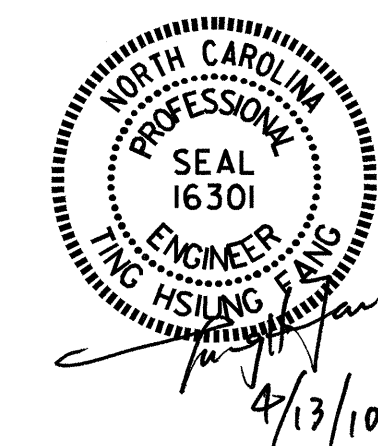
NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.  
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.  
 THE 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.  
 IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 19+00.00 -L-".  
 AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 6 SPANS: 1 @ 38'-0", 4 @ 37'-6" & 1 @ 38'-0" 15'-9" CLEAR ROADWAY WIDTH AND A TIMBER DECK ON STEEL FLOOR BEAM SYSTEM; SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE SPILL THROUGH ABUTMENTS, INTERIOR BENTS; RC POST & BEAM AND LOCATED ON THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.  
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF STANDARD SPECIFICATIONS.  
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED SHOWN ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.  
 FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 19+00.00 -L-, SEE SPECIAL PROVISIONS.  
 THE EXISTING PAVEMENT WITHIN THE AREA OF END BENT 1 PILES SHALL BE REMOVED AND THE ROADBED SCARIFIED TO A MINIMUM DEPTH OF 2'-0" AS DIRECTED BY THE ENGINEER.  
 FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 19+00.00 -L-, SEE SPECIAL PROVISIONS.  
 FOR VERTICAL CONCRETE BARRIER RAIL, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.  
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.  
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.  
 ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.  
 FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.  
 FOR ROCK EMBANKMENT AND ROCK PLATING IN AREAS OF END BENTS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 BRIDGE OVER LAKE  
 LUCAS ON SR 1518 BETWEEN  
 SR 3225 AND SR 1519



DRAWN BY : J. A. YANACCONO DATE : 12/22/09  
 CHECKED BY : T.H. FANG DATE : 1/11/10

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

TOTAL SHEETS 25

# LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE BOX BEAMS

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	1.119	--	1.75	0.271	1.57	B	EL	44.188	0.497	1.35	B	EL	4.419	0.80	0.274	1.12	A	EL	36.156		
	HL-93(0pr)	N/A	--	1.751	--	1.35	0.271	2.04	B	EL	44.188	0.497	1.75	B	EL	4.419	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.464	52.712	1.75	0.274	2.07	A	EL	36.156	0.497	1.77	B	EL	4.419	0.80	0.274	1.46	A	EL	36.156		
	HS-20(0pr)	36.000	--	2.294	82.589	1.35	0.274	2.68	A	EL	36.156	0.497	2.29	B	EL	4.419	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.301	44.569	1.40	0.274	5.82	A	EL	36.156	0.497	5.41	B	EL	4.419	0.80	0.274	3.30	A	EL	36.156	
		SNGARBS2	20.000	--	2.462	49.237	1.40	0.274	4.34	A	EL	36.156	0.497	3.80	B	EL	4.419	0.80	0.274	2.46	A	EL	36.156	
		SNAGRIS2	22.000	--	2.332	51.306	1.40	0.274	4.11	A	EL	36.156	0.497	3.51	B	EL	4.419	0.80	0.274	2.33	A	EL	36.156	
		SNCOTTS3	27.250	--	1.643	44.77	1.40	0.274	2.90	A	EL	36.156	0.497	2.70	B	EL	4.419	0.80	0.274	1.64	A	EL	36.156	
		SNAGGRS4	34.925	--	1.374	47.972	1.40	0.274	2.42	A	EL	36.156	0.497	2.21	B	EL	4.419	0.80	0.274	1.37	A	EL	36.156	
		SNS5A	35.550	--	1.343	47.75	1.40	0.274	2.37	A	EL	36.156	0.497	2.22	B	EL	4.419	0.80	0.274	1.34	A	EL	36.156	
		SNS6A	39.950	--	1.233	49.243	1.40	0.274	2.17	A	EL	36.156	0.497	2.01	B	EL	4.419	0.80	0.274	1.23	A	EL	36.156	
	SNS7B	42.000	--	1.174	49.301	1.40	0.274	2.07	A	EL	36.156	0.497	1.96	B	EL	4.419	0.80	0.274	1.17	A	EL	36.156		
	TTST	TNAGRIT3	33.000	--	1.503	49.605	1.40	0.274	2.65	A	EL	36.156	0.497	2.40	B	EL	4.419	0.80	0.274	1.50	A	EL	36.156	
		TNT4A	33.075	--	1.51	49.939	1.40	0.274	2.66	A	EL	36.156	0.497	2.36	B	EL	4.419	0.80	0.274	1.51	A	EL	36.156	
		TNT6A	41.600	--	1.235	51.365	1.40	0.274	2.18	A	EL	36.156	0.497	2.06	B	EL	4.419	0.80	0.274	1.23	A	EL	36.156	
		TNT7A	42.000	--	1.241	52.123	1.40	0.274	2.19	A	EL	36.156	0.497	2.02	B	EL	4.419	0.80	0.274	1.24	A	EL	36.156	
		TNT7B	42.000	--	1.284	53.935	1.40	0.274	2.27	A	EL	36.156	0.497	1.92	B	EL	4.419	0.80	0.274	1.28	A	EL	36.156	
		TNAGRIT4	43.000	--	1.221	52.521	1.40	0.274	2.15	A	EL	36.156	0.497	1.87	B	EL	4.419	0.80	0.274	1.22	A	EL	36.156	
TNAGT5A		45.000	--	1.152	51.82	1.40	0.274	2.03	A	EL	36.156	0.497	1.84	B	EL	4.419	0.80	0.274	1.15	A	EL	36.156		
TNAGT5B	45.000	3	1.138	51.189	1.40	0.274	2.01	A	EL	36.156	0.497	1.78	B	EL	4.419	0.80	0.274	1.14	A	EL	36.156			

### LOAD FACTORS:

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

	YEAR	ADTT
CURRENT	2010	22
FUTURE	2030	36

### 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. SPAN C RATING IS IDENTICAL TO SPAN A.
- 2.
- 3.
- 4.

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

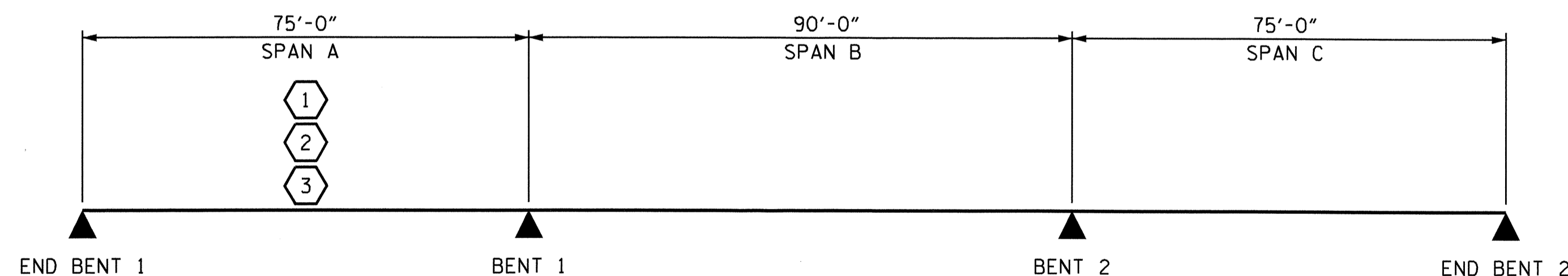
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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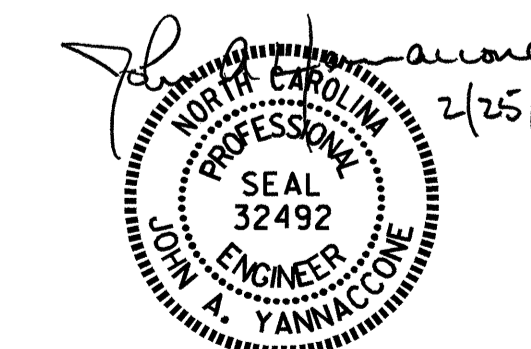
GIRDER LOCATION

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



### LRFR SUMMARY

PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-



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

ASSEMBLED BY : S. DOMBROWSKI	DATE : 1/7/10
CHECKED BY : J. YANNAKONE	DATE : 1/8/10
DRAWN BY : MAA 1/08	REV. 11/12/08R MAA/GM
CHECKED BY : GM/DI 2/08	

25-FEB-2010 11:36  
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 JYannaccone

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

STD. NO. LRFR1

**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 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 4800 PSI.

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

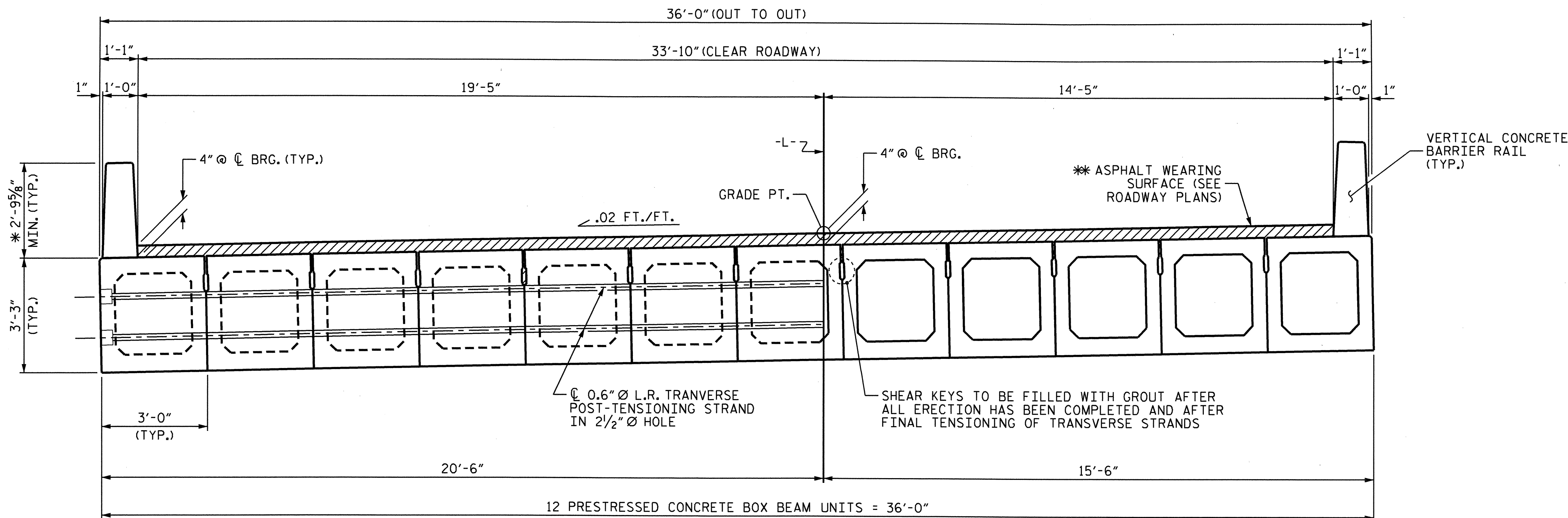
PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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 PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.



**TYPICAL SECTION**

THE MINIMUM HEIGHT OF THE RAIL IS SHOWN. THE HEIGHT OF THE RAIL VARIES WHILE THE TOP OF THE RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.

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

RAIL HEIGHT TABLE		
BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.		
SPAN	* AT C BEARINGS	* AT MID-SPAN
A	3'-0"	2'-11 1/8"
B	3'-0"	2'-9 5/8"
C	3'-0"	2'-11 1/8"

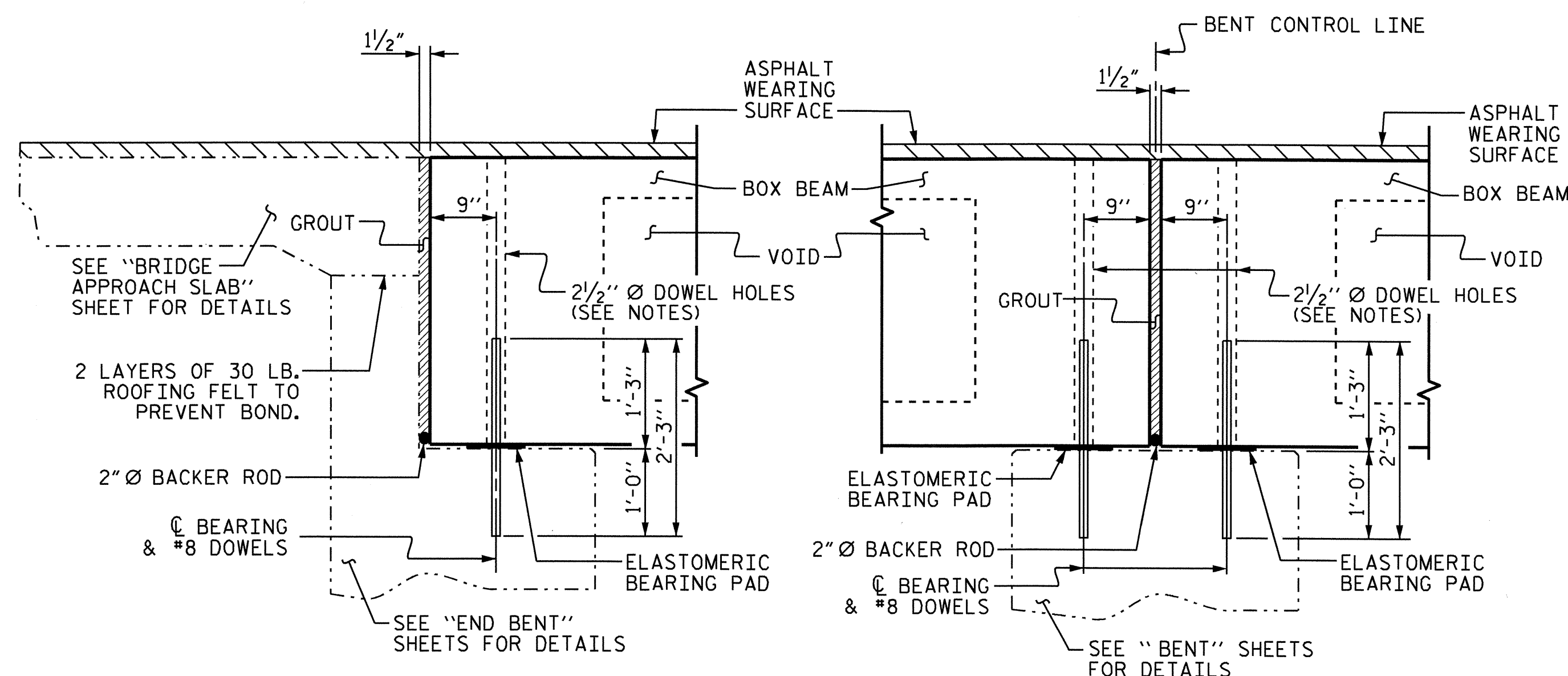
ASPHALT WEARING SURFACE THICKNESS TABLE				
BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.				
SPAN	* AT C BEARINGS		* AT MID-SPAN	
	GUTTERS	GRADE PT.	GUTTERS	GRADE PT.
A	4"	4"	3 3/8"	3 3/8"
B	4"	4"	1 5/8"	1 5/8"
C	4"	4"	3 3/8"	3 3/8"

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

**FIXED END**

**FIXED END**

**FIXED END**

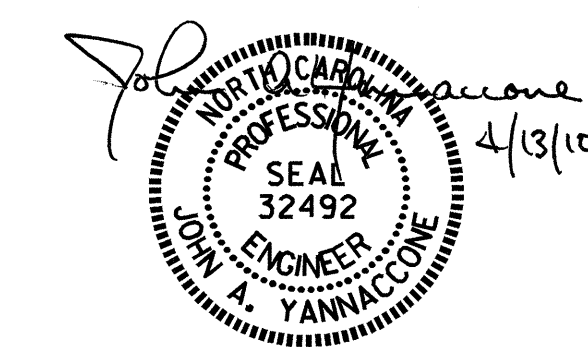


**SECTION AT END BENT**

**SECTION AT BENT**

PROJECT NO. B-4610  
RANDOLPH COUNTY  
STATION: 19+00.00 -L-

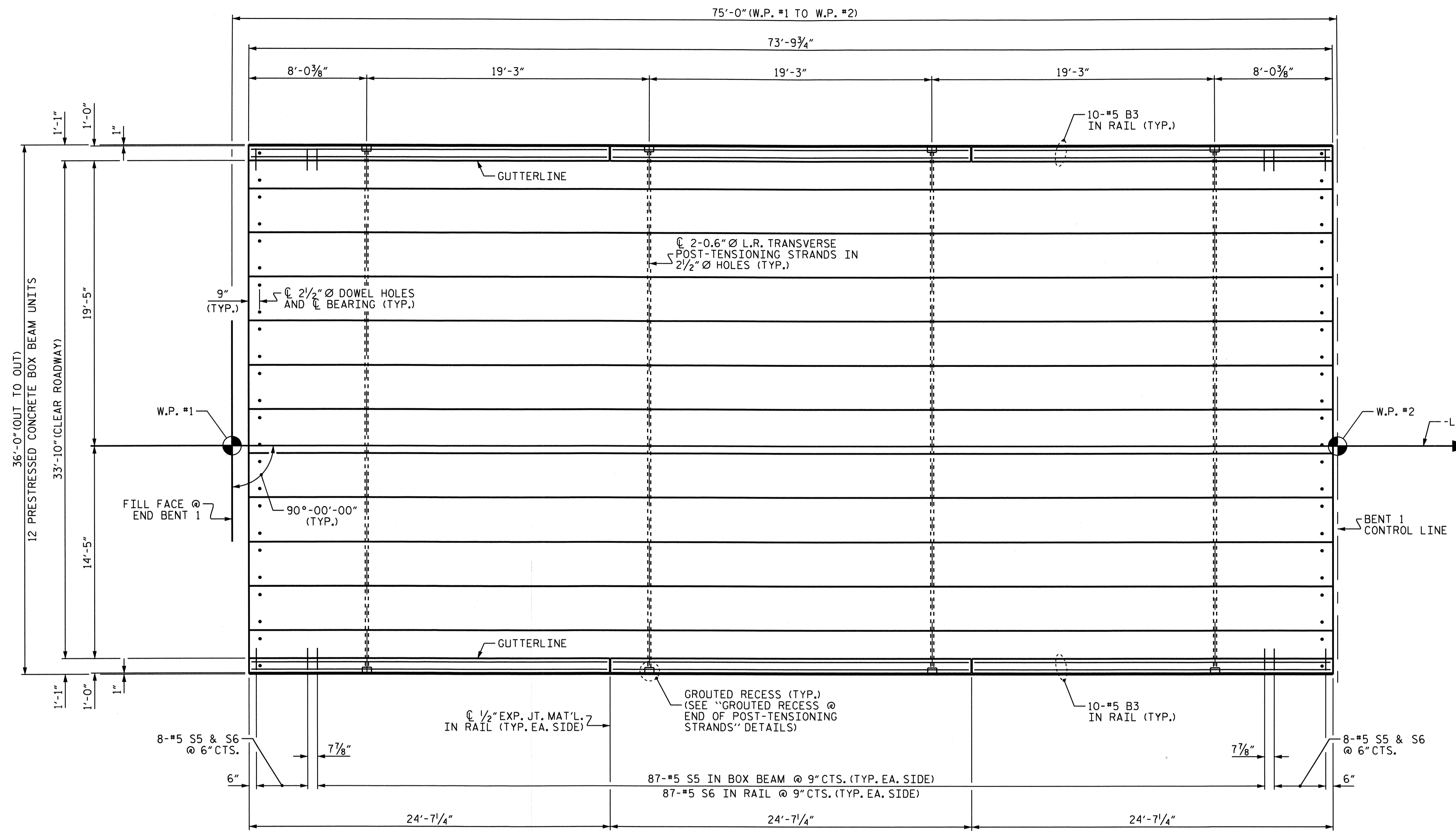
SHEET 1 OF 8



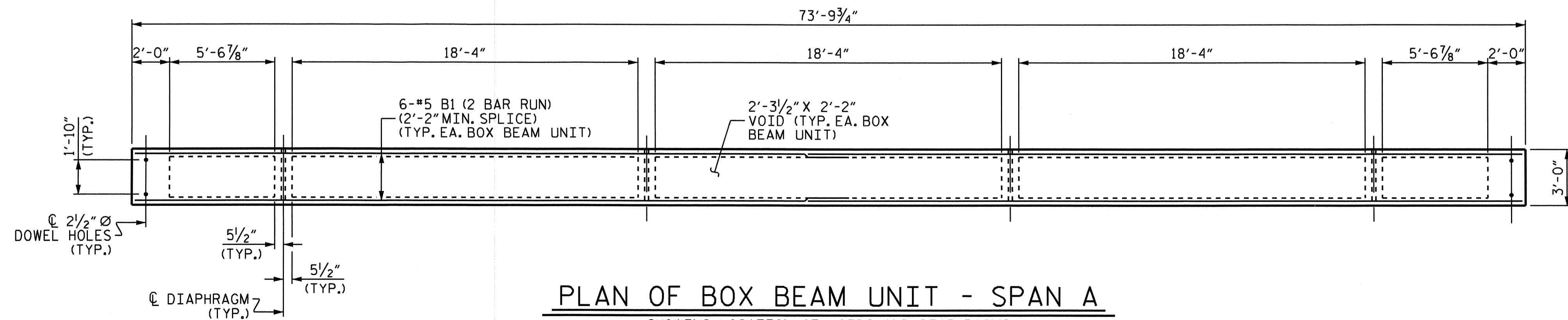
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-5
					TOTAL SHEETS 25

ASSEMBLED BY : E.C. LOCKLEAR DATE : 10-27-09  
CHECKED BY : J.A. YANNACCONE DATE : 12-23-09  
DRAWN BY : TLA 5/05  
CHECKED BY : GM 6/05

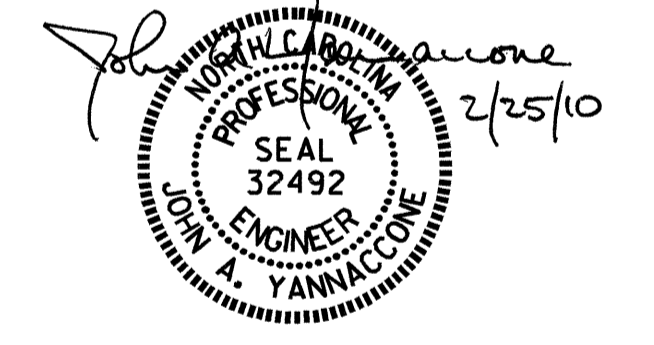
ADDED 7/11/05R  
REV. 5/1/06R KMM/GM



PLAN OF SPAN A



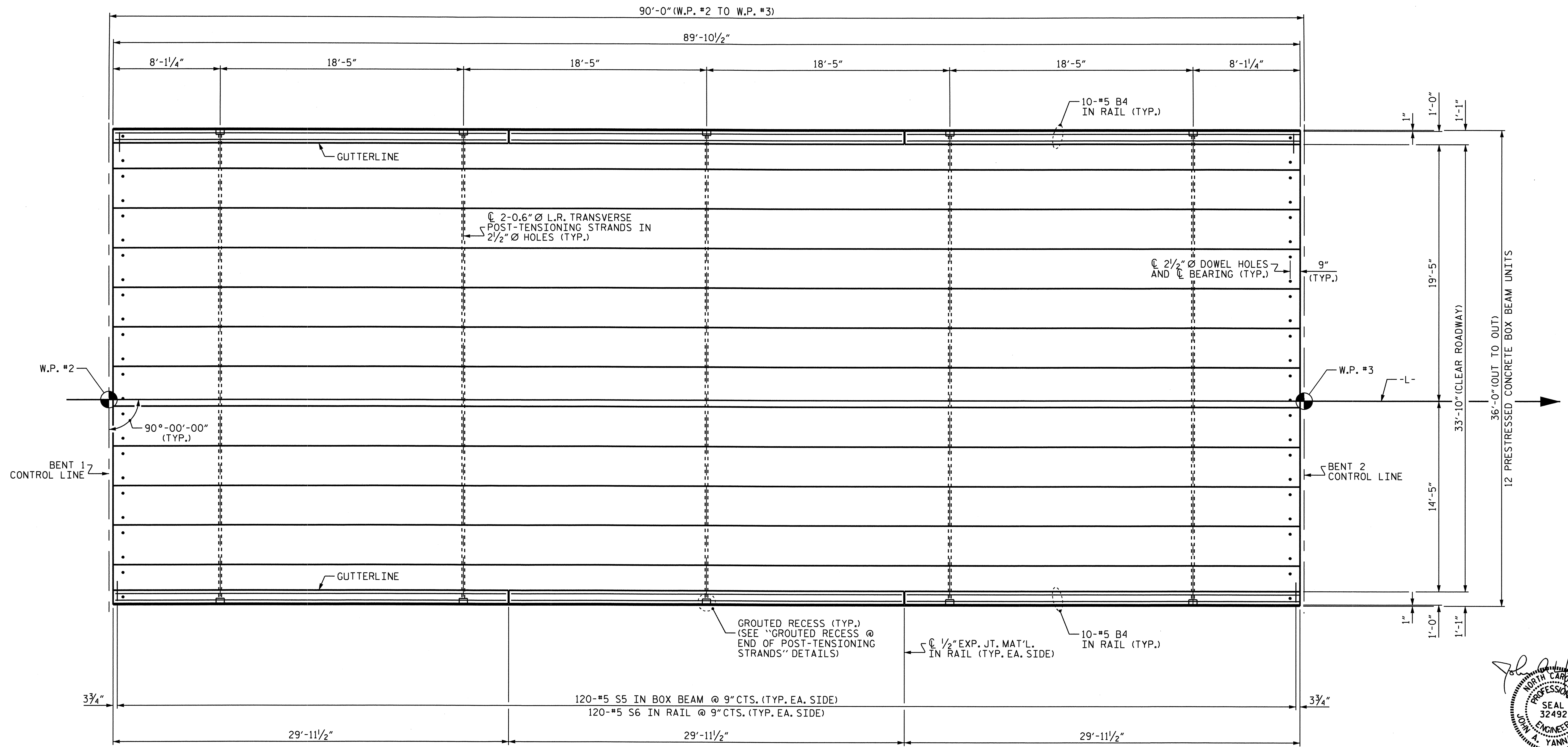
PLAN OF BOX BEAM UNIT - SPAN A  
SHOWING LOCATION OF VOIDS AND DIAPHRAGMS



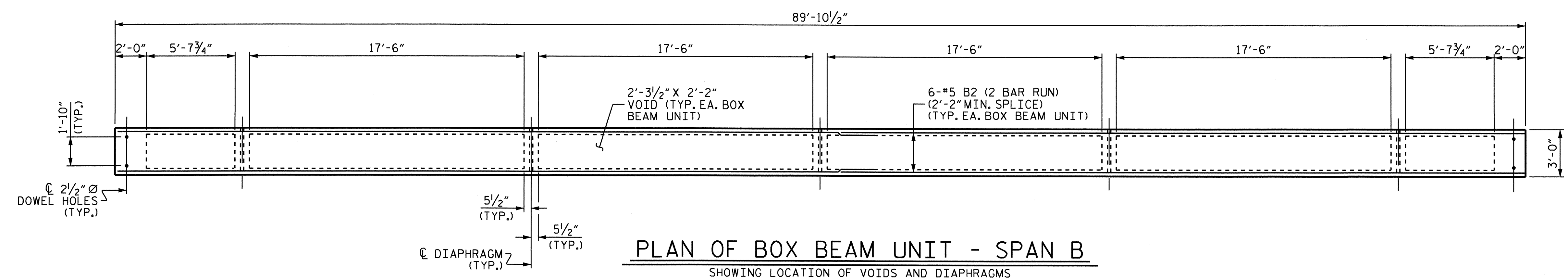
PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 2 OF 8

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
PLAN OF SPAN SPAN A					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					25
					S-6

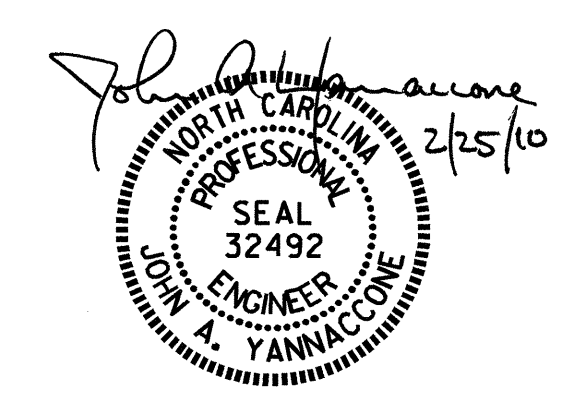
DRAWN BY: E.C. LOCKLEAR DATE: 10-26-09  
 CHECKED BY: J. YANNACCONE DATE: 12-30-09



PLAN OF SPAN B



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

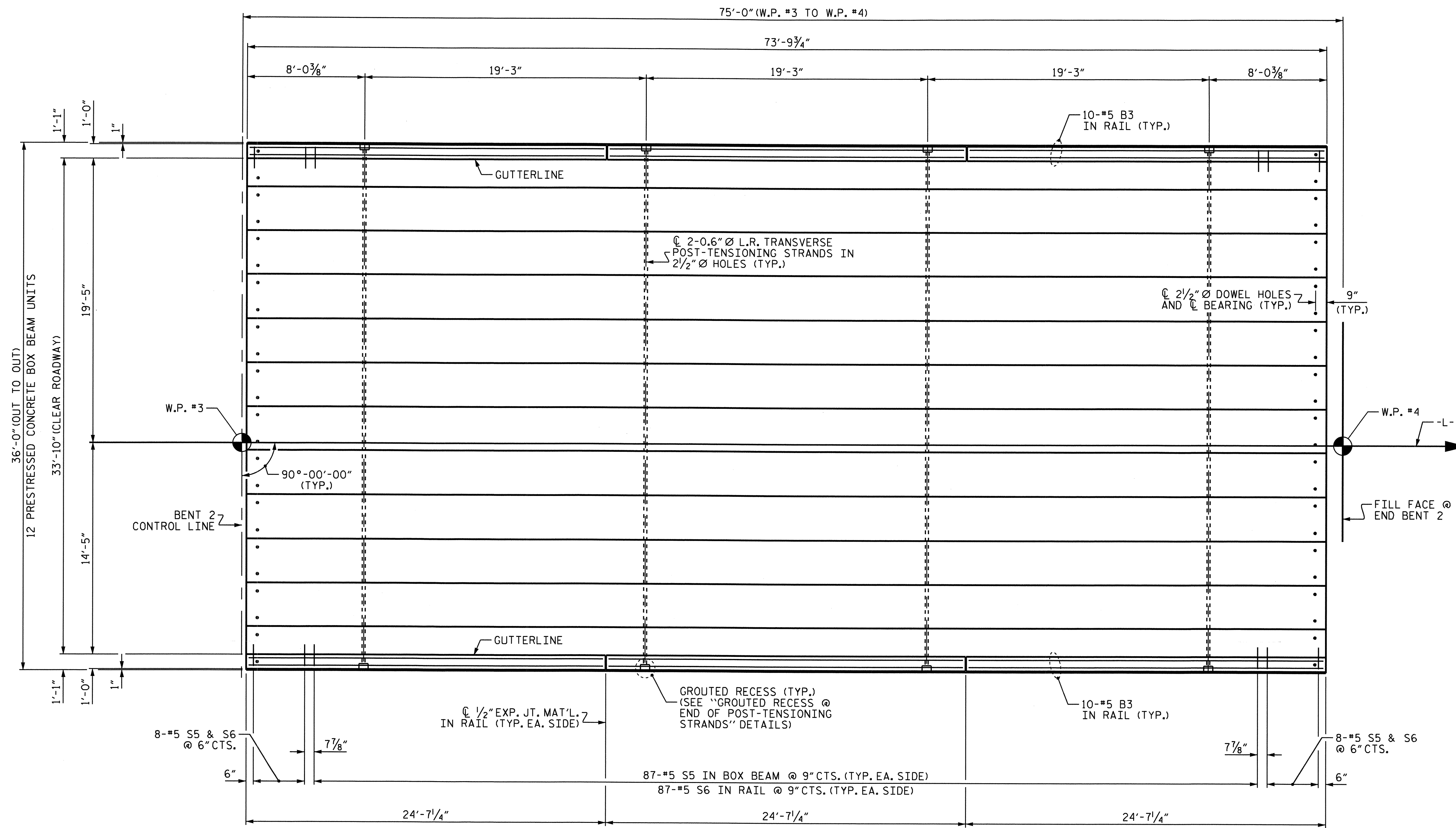


PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 3 OF 8

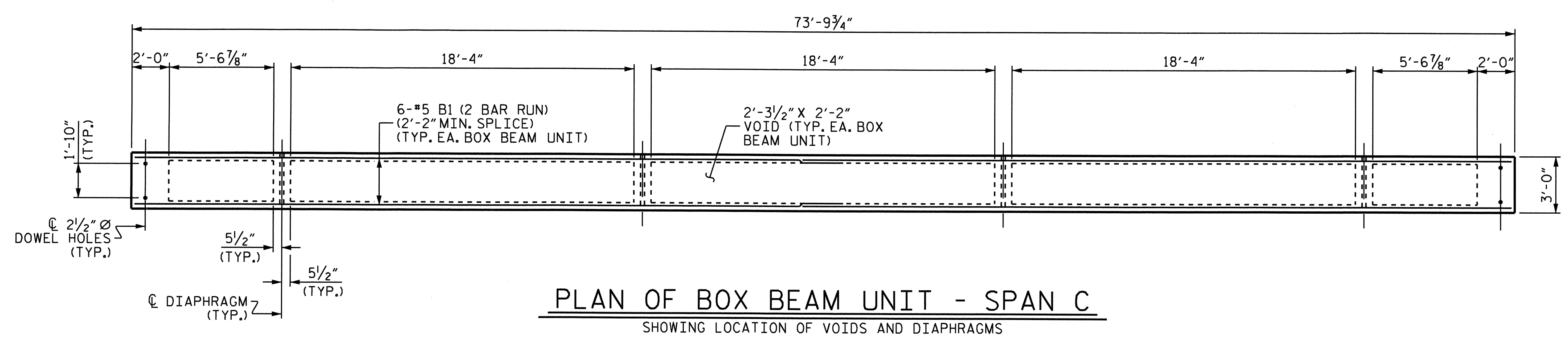
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE PLAN OF SPAN SPAN B					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-7					TOTAL SHEETS 25

DRAWN BY: E.C. LOCKLEAR DATE: 10-26-09  
 CHECKED BY: J. YANNAACONE DATE: 12-30-09

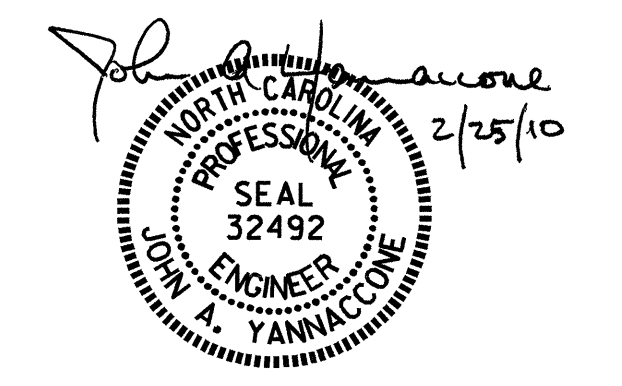




PLAN OF SPAN C



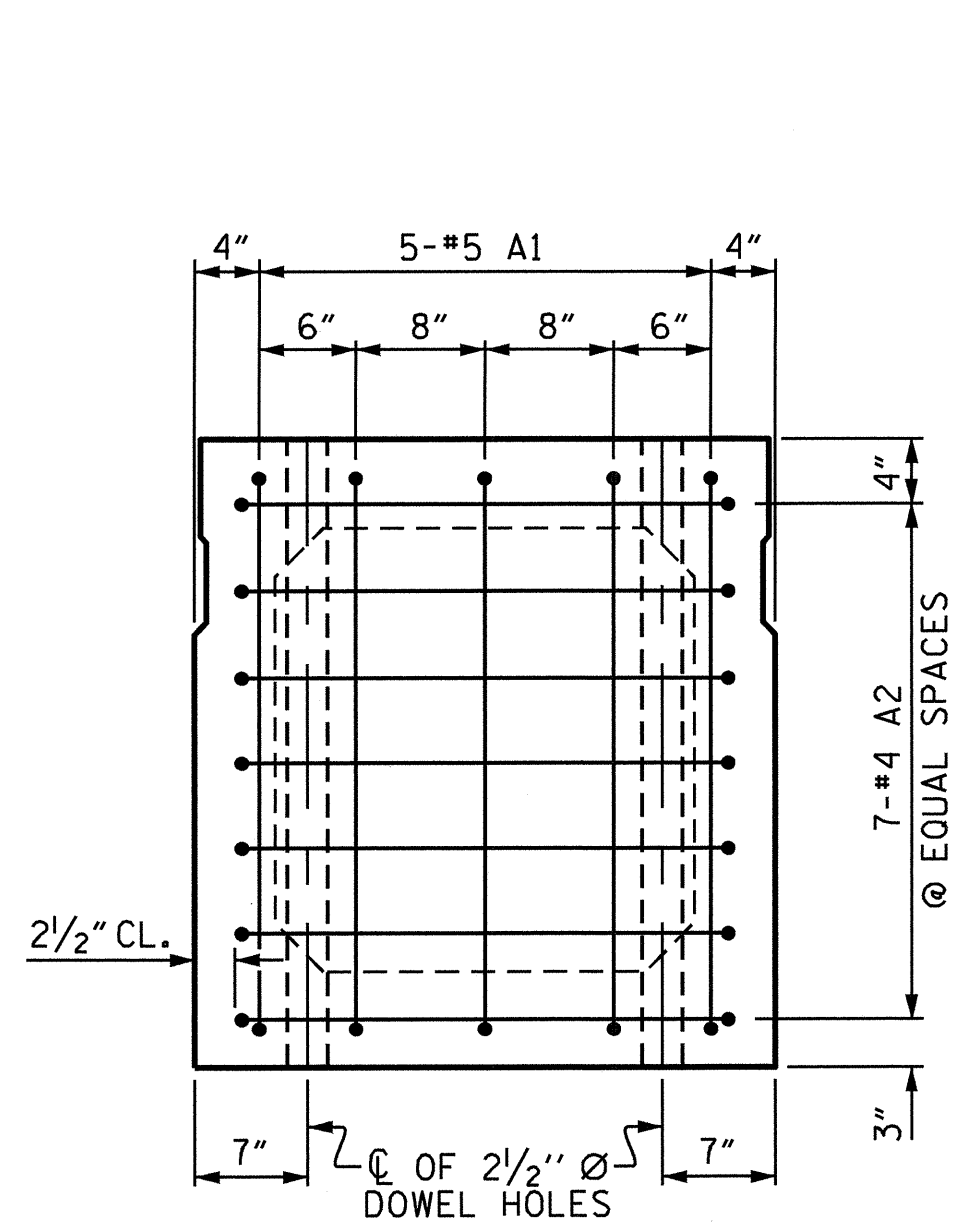
PLAN OF BOX BEAM UNIT - SPAN C  
SHOWING LOCATION OF VOIDS AND DIAPHRAGMS



PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 4 OF 8

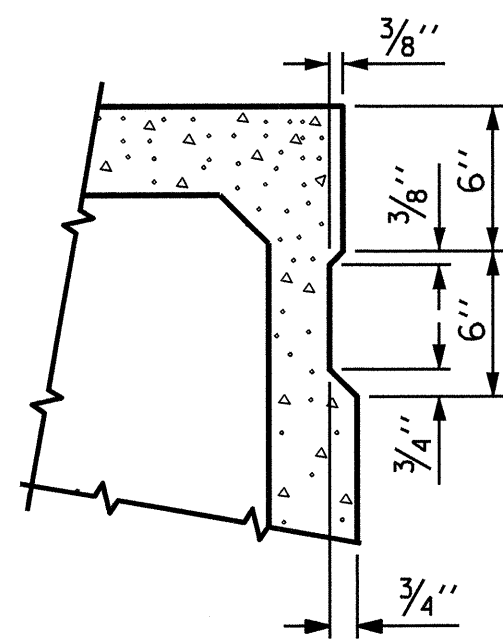
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
PLAN OF SPAN SPAN C					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-8
					TOTAL SHEETS 25

DRAWN BY : E.C. LOCKLEAR DATE : 10-26-09  
 CHECKED BY : J. YANNAKONE DATE : 12-30-09



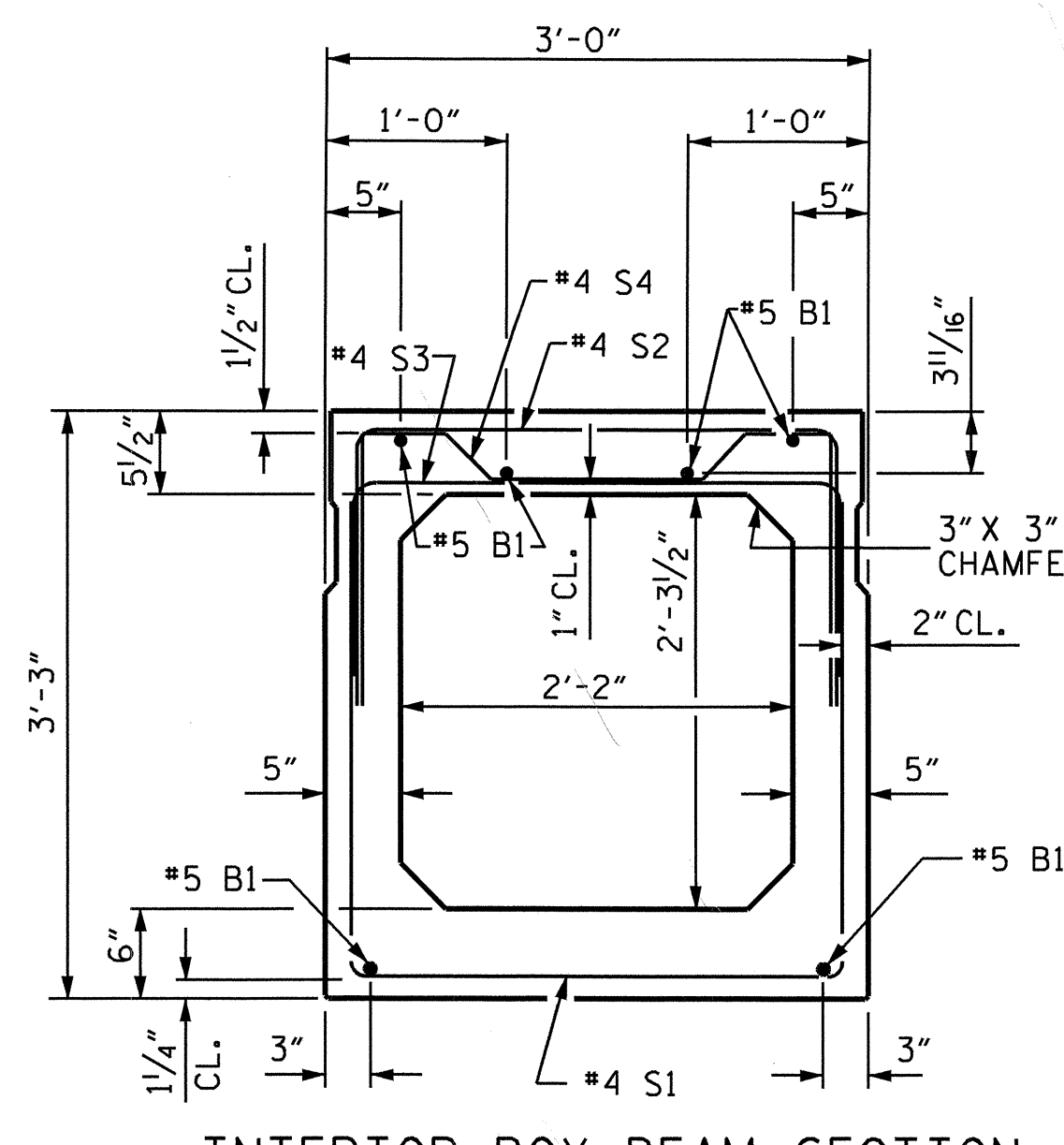
**END ELEVATION**

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.)

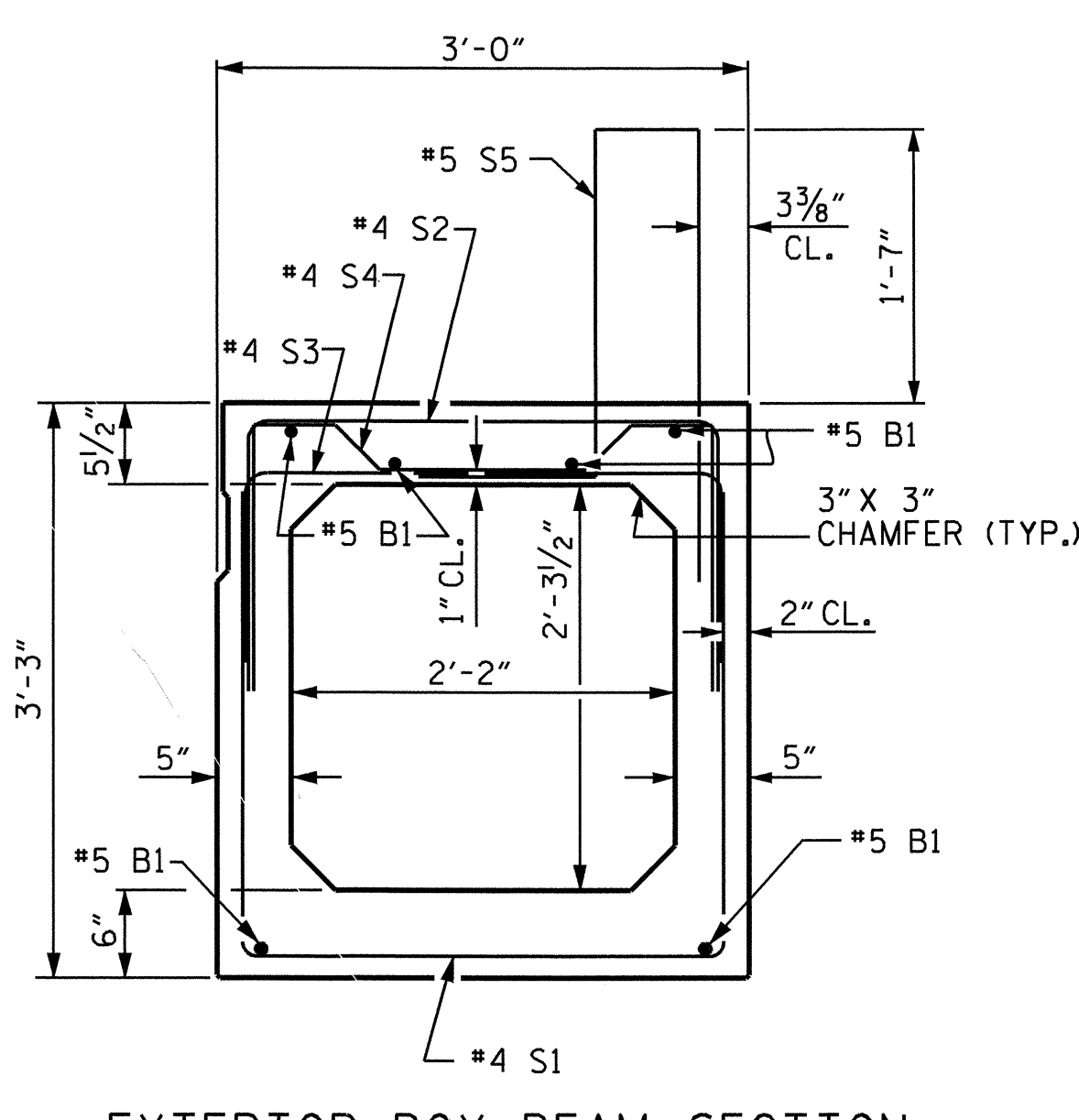


**SHEAR KEY DETAIL**

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

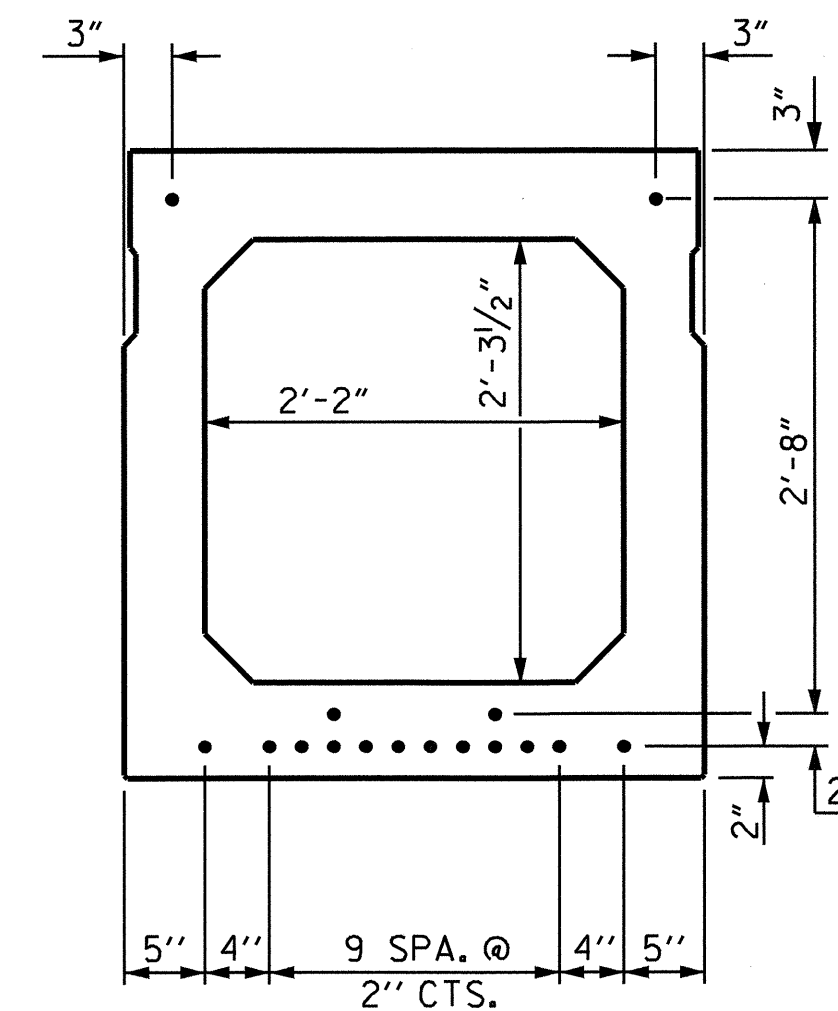


**INTERIOR BOX BEAM SECTION**  
(STRAND LAYOUT NOT SHOWN)



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

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



**TYPICAL STRAND LOCATION**

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

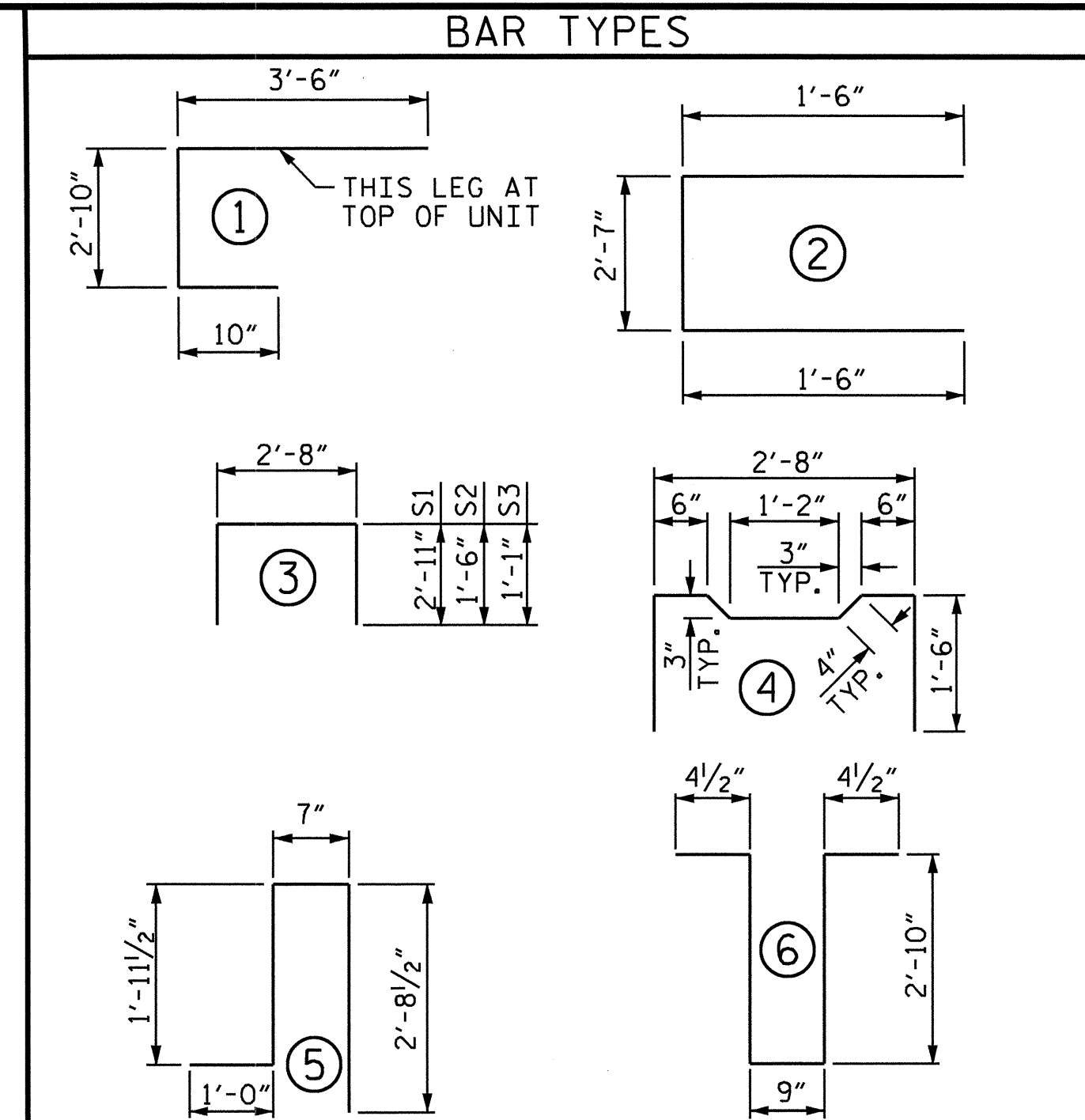
**BOX BEAM UNITS REQUIRED**

SPAN A			
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	73'-9 3/4"	147'-7 1/2"
INTERIOR	10	73'-9 3/4"	738'-1 1/2"
TOTAL	12		885'-9"
SPAN B			
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	89'-10 1/2"	179'-9"
INTERIOR	10	89'-10 1/2"	898'-9"
TOTAL	12		1078'-6"
SPAN C			
UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	73'-9 3/4"	147'-7 1/2"
INTERIOR	10	73'-9 3/4"	738'-1 1/2"
TOTAL	12		885'-9"
TOTAL BOX BEAM UNITS	No. 36		2850'-0" LIN. FT.

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 3'-3"
	0.6" Ø L.R. STRAND
	SPANS A & C
CAMBER (BEAM ALONE IN PLACE)	↑ 1/4"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD	↓ 5/16"
FINAL CAMBER	↑ 15/16"

**GRADE 270 STRANDS**

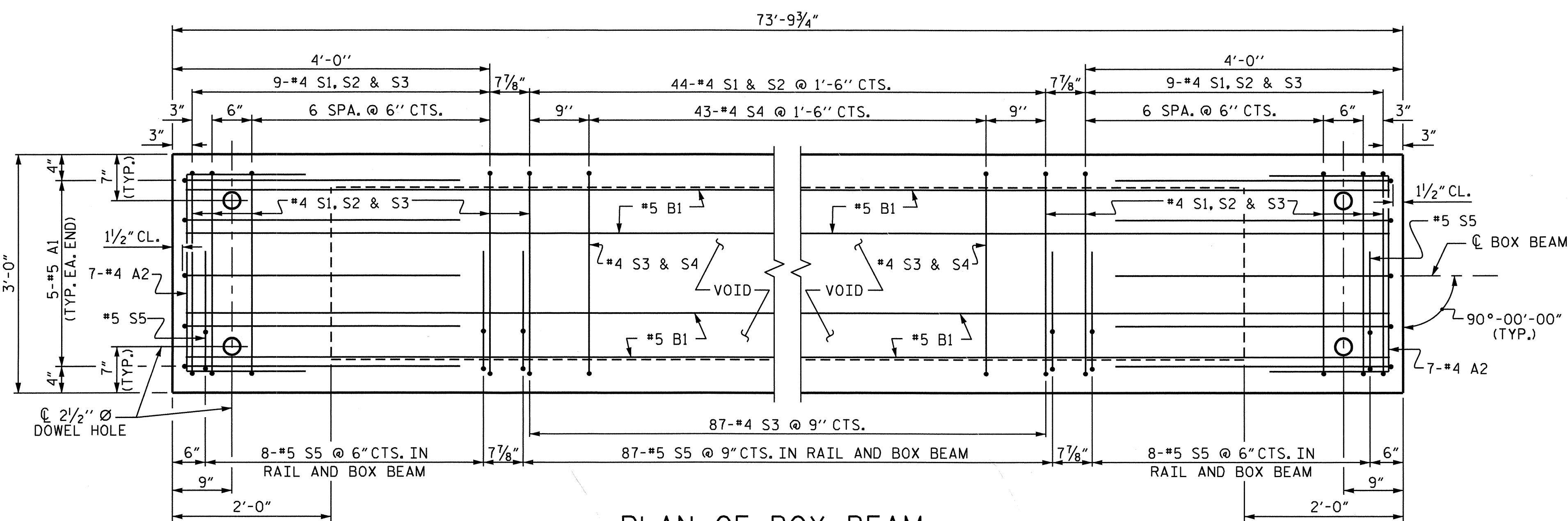
AREA ( SQUARE INCHES )	0.217
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950



ALL BAR DIMENSIONS ARE OUT TO OUT

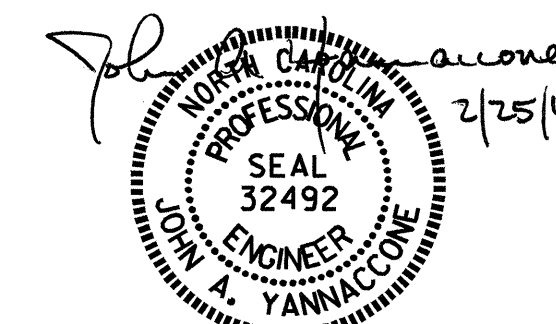
**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	38	#4	2	5'-7"	142	5'-7"	142
B1	12	#5	STR	37'-11"	475	37'-11"	475
K1	12	#4	6	7'-2"	57	7'-2"	57
K2	8	#4	STR	2'-7"	14	2'-7"	14
S1	62	#4	3	8'-6"	352	8'-6"	352
S2	62	#4	3	5'-8"	235	5'-8"	235
S3	105	#4	3	4'-10"	339	4'-10"	339
S4	43	#4	4	5'-10"	168	5'-10"	168
* S5	103	#5	5	6'-3"	671	--	--
REINFORCING STEEL					1857 LBS.		1857 LBS.
* EPOXY COATED REINF. STEEL					671 LBS.		
6000 P.S.I. CONCRETE					14.6 CU. YDS.		14.6 CU. YDS.
0.6" Ø L.R. STRANDS					No. 16		No. 16



**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-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 5 OF 8

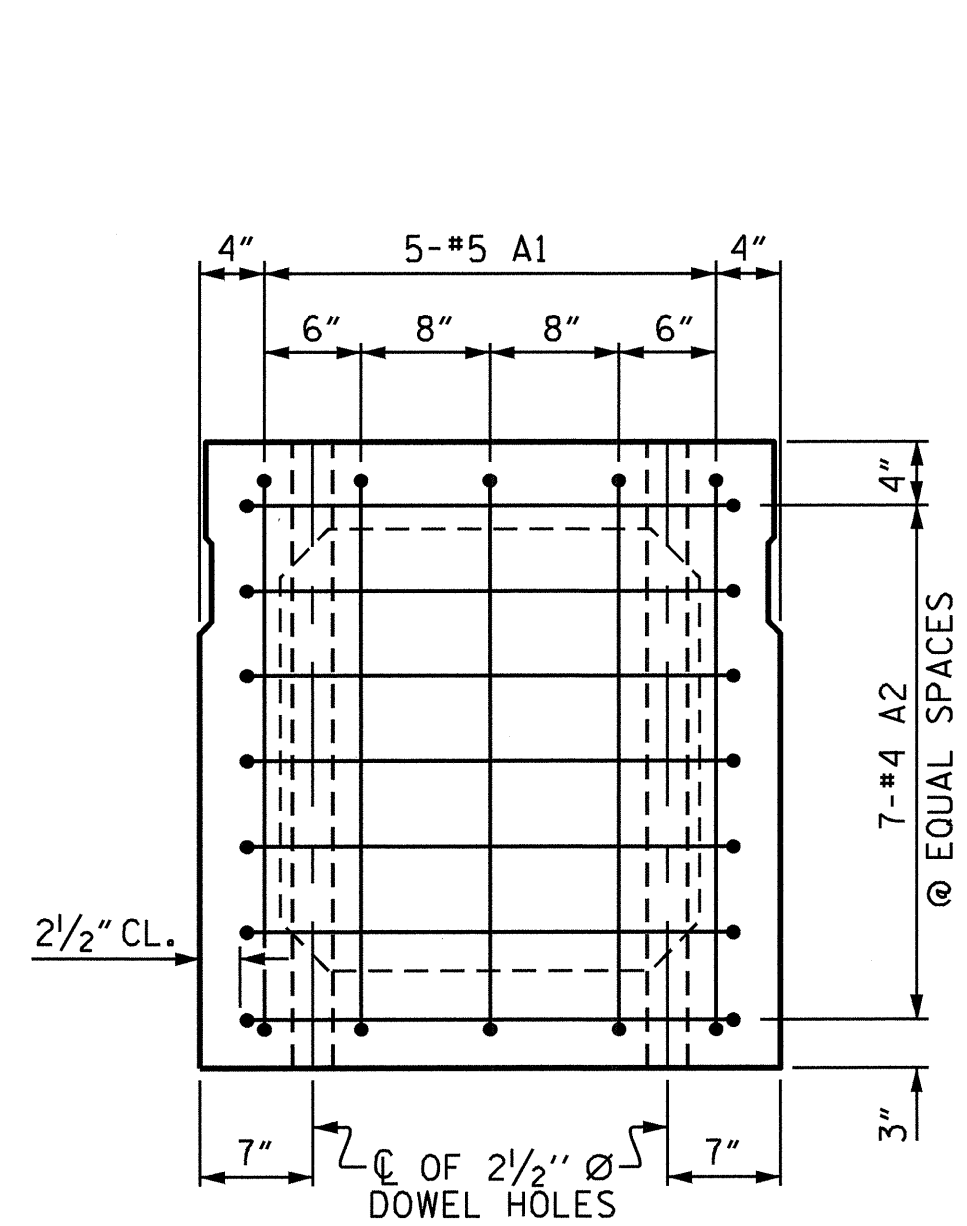
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 3'-3"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 SPANS A & C

ASSEMBLED BY : E.C. LOCKLEAR DATE : 10-28-09  
 CHECKED BY : J. YANNACCONE DATE : 12-30-09  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05  
 ADDED 7/11/05  
 REV. 5/1/06 TLA/GM

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

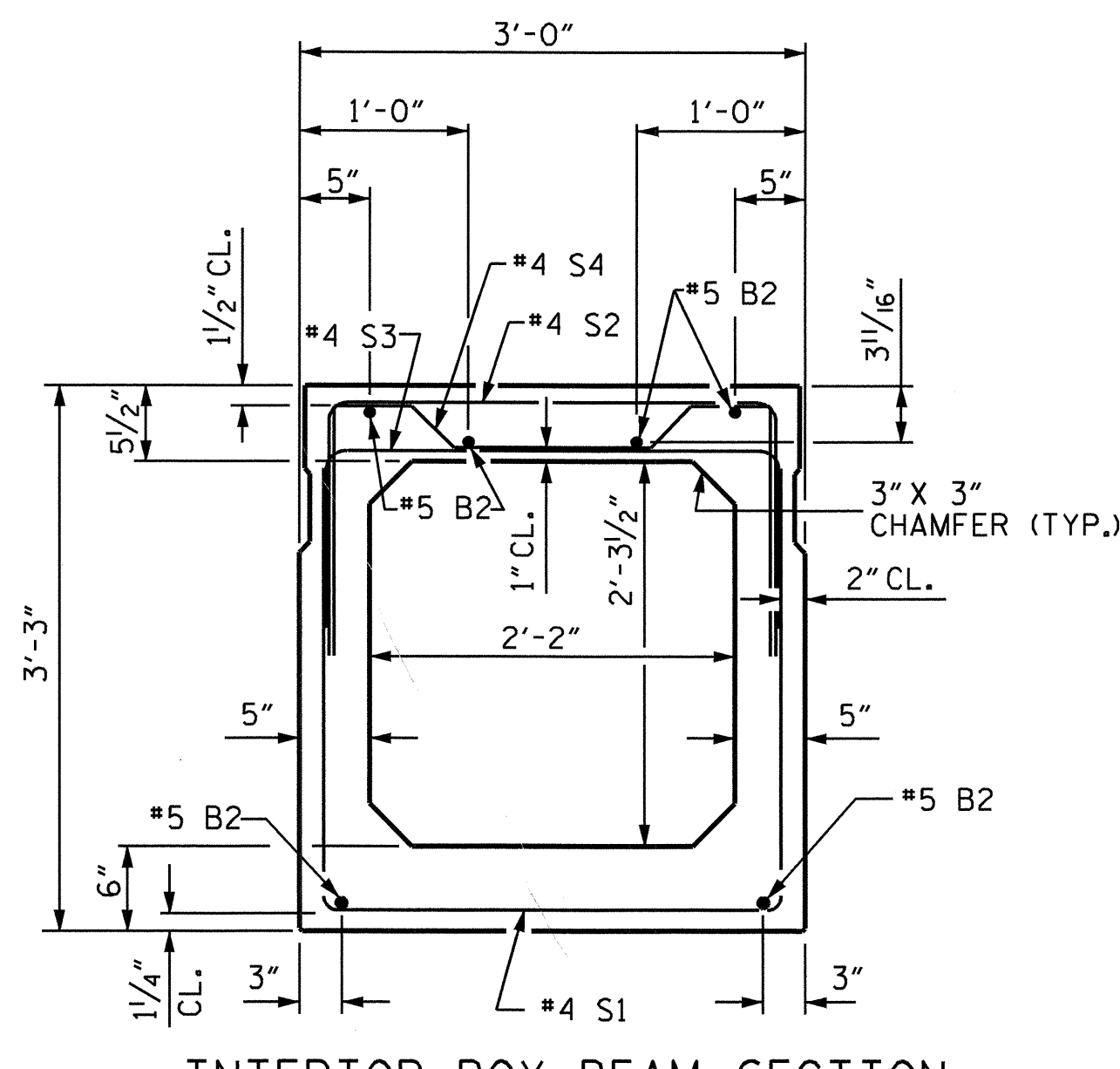
STD. NO. PCBB6

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 jayannaccone

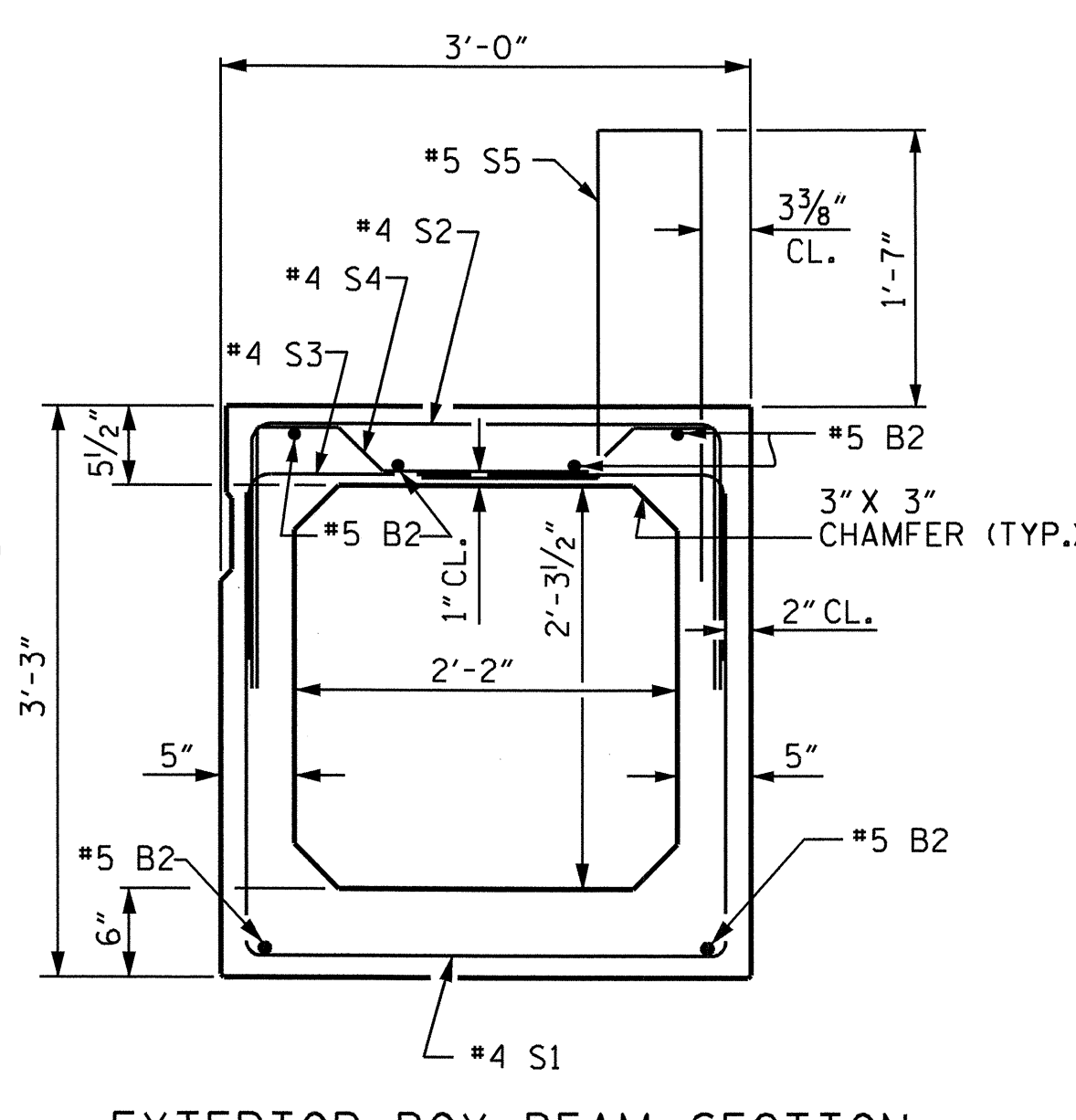


**END ELEVATION**

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.)

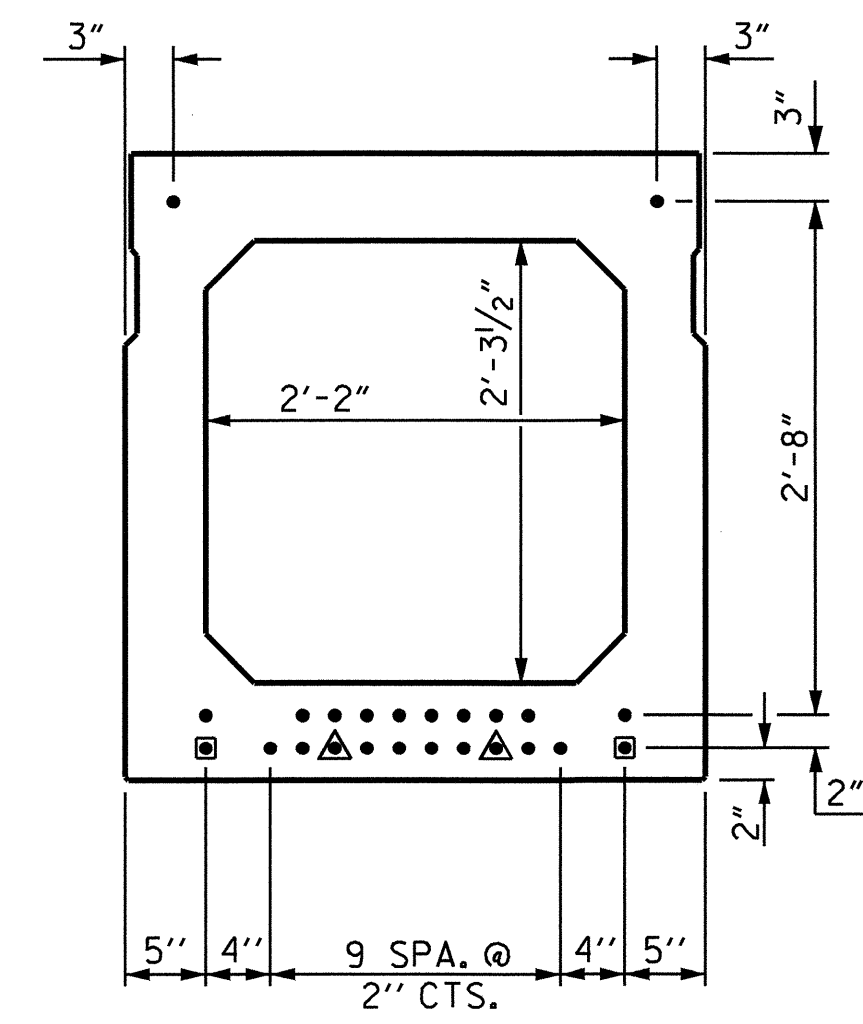


**INTERIOR BOX BEAM SECTION**  
(STRAND LAYOUT NOT SHOWN)



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

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



**TYPICAL STRAND LOCATION**

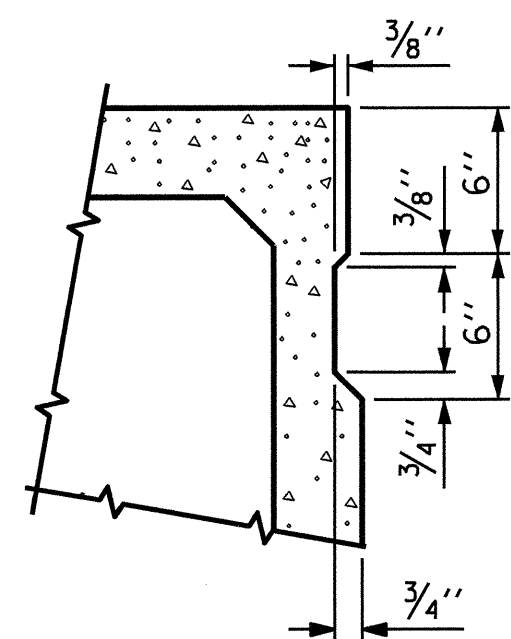
(24 STRANDS REQUIRED)  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

- ◼ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◻ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER

**GRADE 270 STRANDS**

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

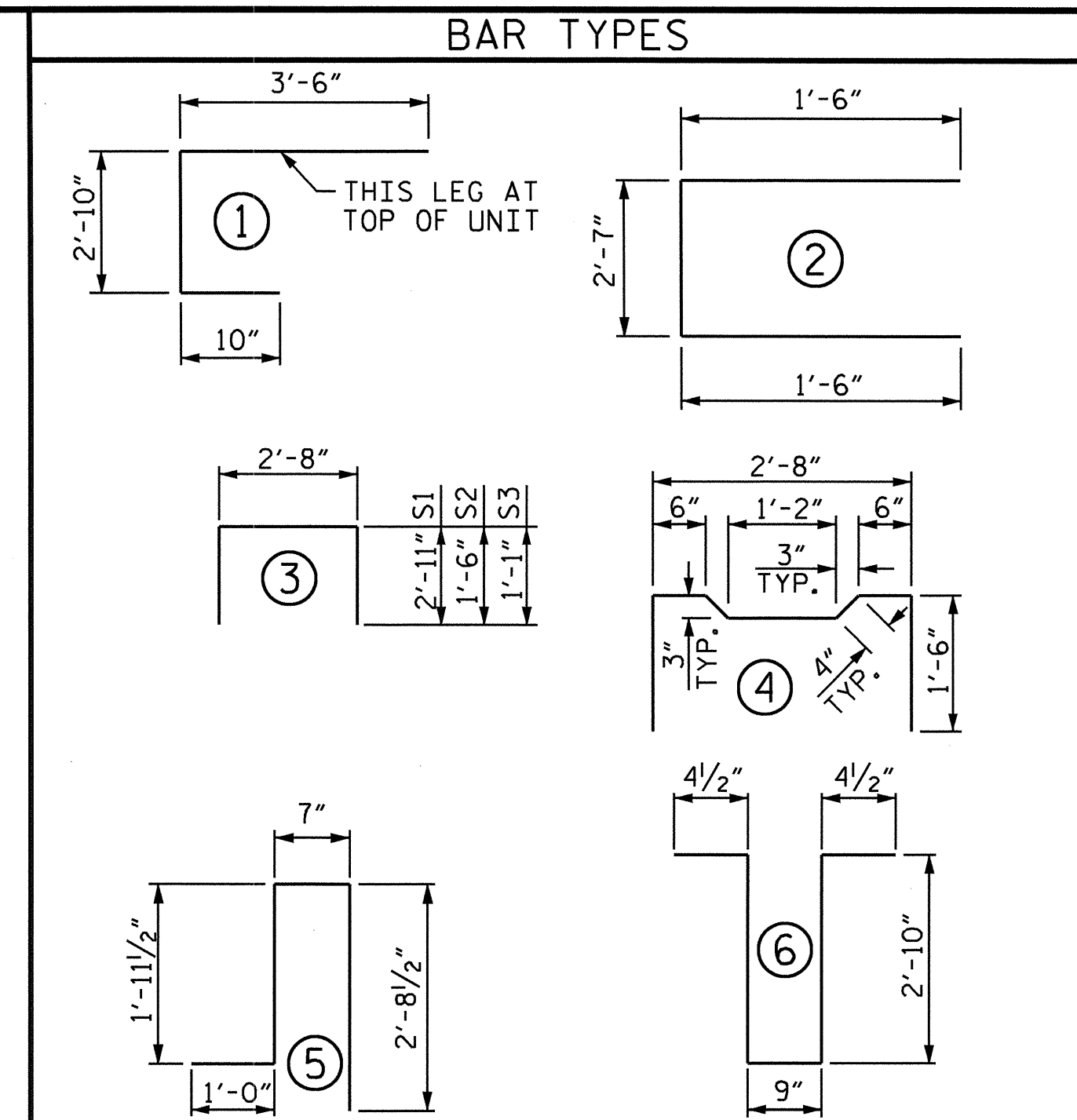


**SHEAR KEY DETAIL**

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

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

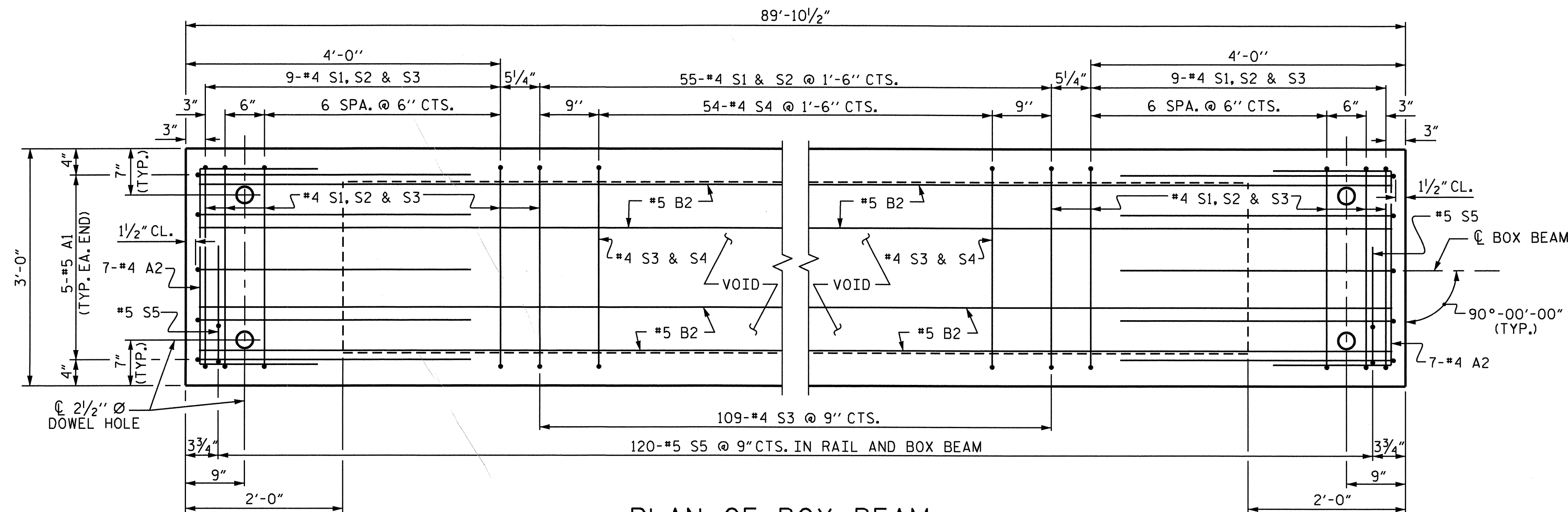
FOR NUMBER AND LENGTHS OF BOX BEAM UNITS REQUIRED FOR SPAN B, SEE SHEET 5 OF 8.



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	7'-2"	75	7'-2"	75	
A2	44	#4	5'-7"	164	5'-7"	164	
B2	12	#5	STR	45'-11"	575	45'-11"	575
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	73	#4	3	8'-6"	414	8'-6"	414
S2	73	#4	3	5'-8"	276	5'-8"	276
S3	127	#4	3	4'-10"	410	4'-10"	410
S4	54	#4	4	5'-10"	210	5'-10"	210
*S5	120	#5	5	6'-3"	782	--	--
REINFORCING STEEL			2213 LBS.		2213 LBS.		
*EPOXY COATED REINF. STEEL			782 LBS.		782 LBS.		
6000 P.S.I. CONCRETE			17.6 CU. YDS.		17.6 CU. YDS.		
0.6" Ø L.R. STRANDS			No. 24		No. 24		

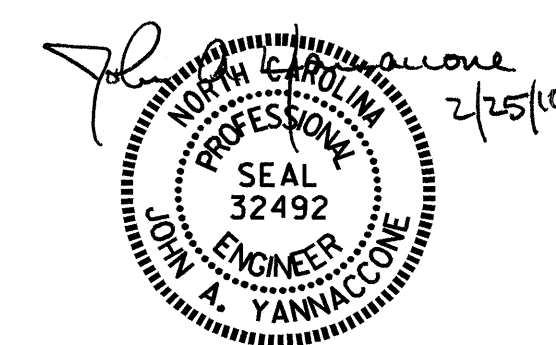


**PLAN OF BOX BEAM**

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.

ASSEMBLED BY : E.C. LOCKLEAR	DATE : 10-28-09
CHECKED BY : J. YANACCONO	DATE : 12-30-09
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/11/06

25-FEB-2010 11:36 R:\Structure\JYanaccone\Final Plans\B4610.sd.bx.dgn jyanaccone



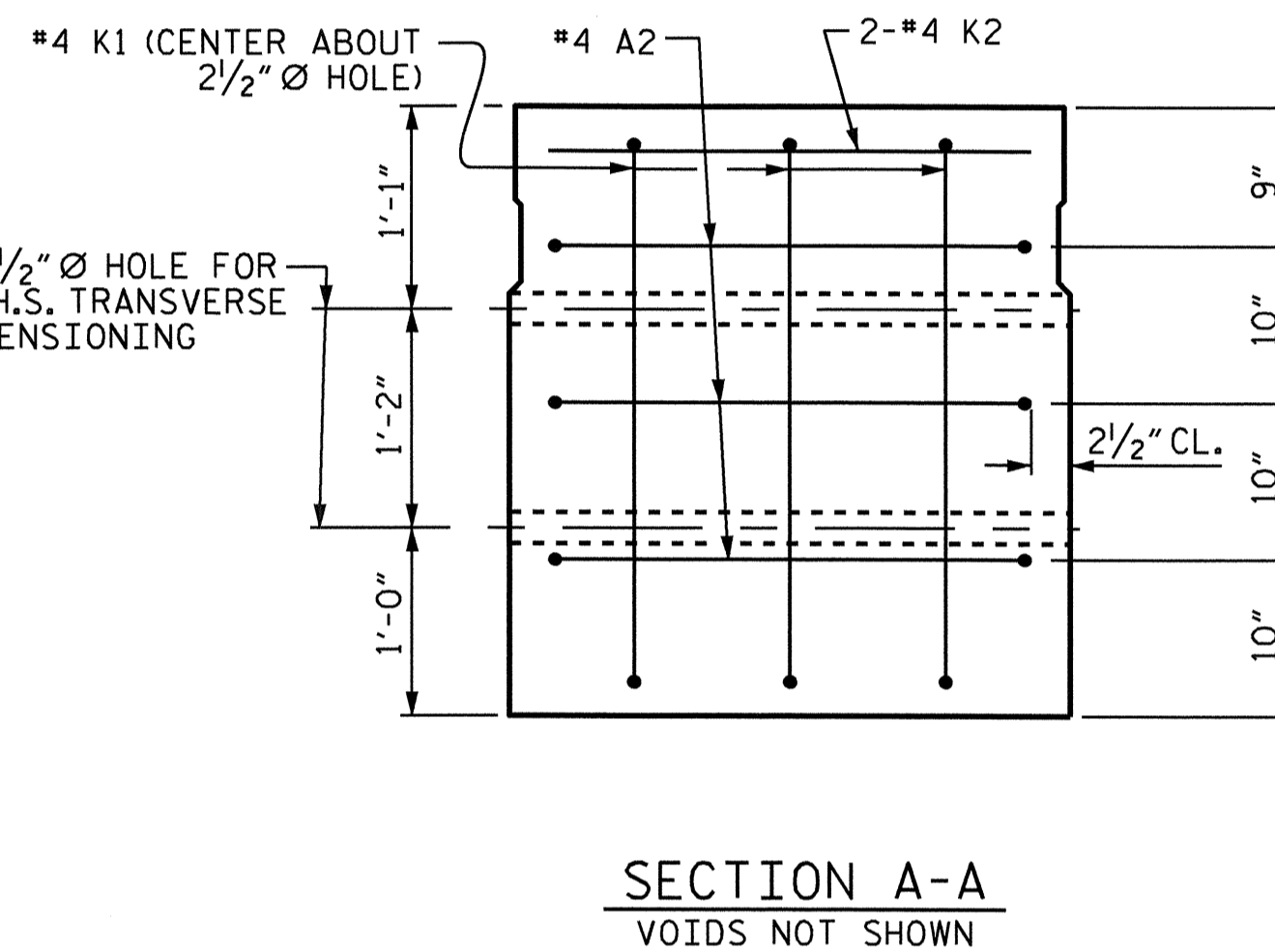
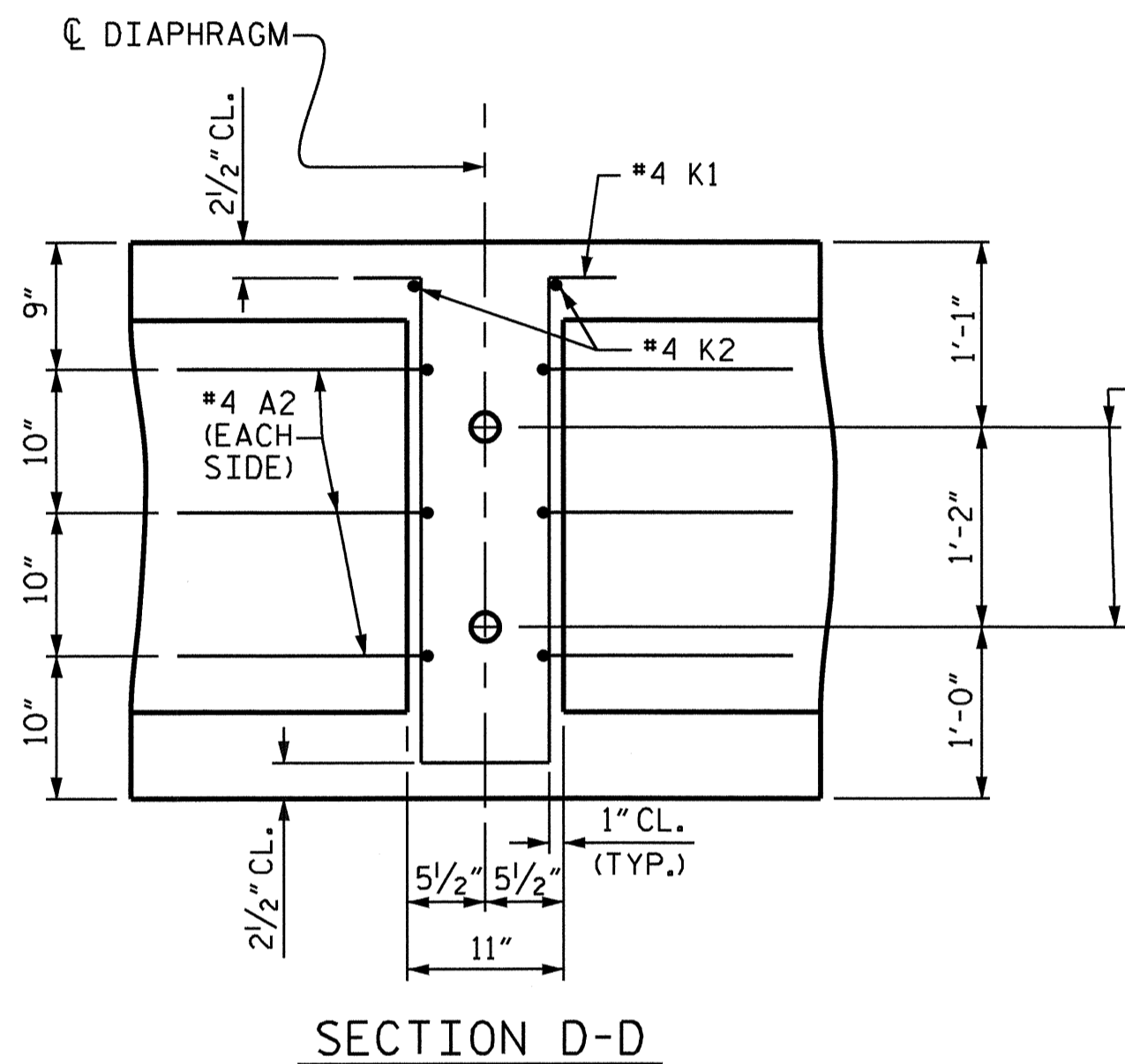
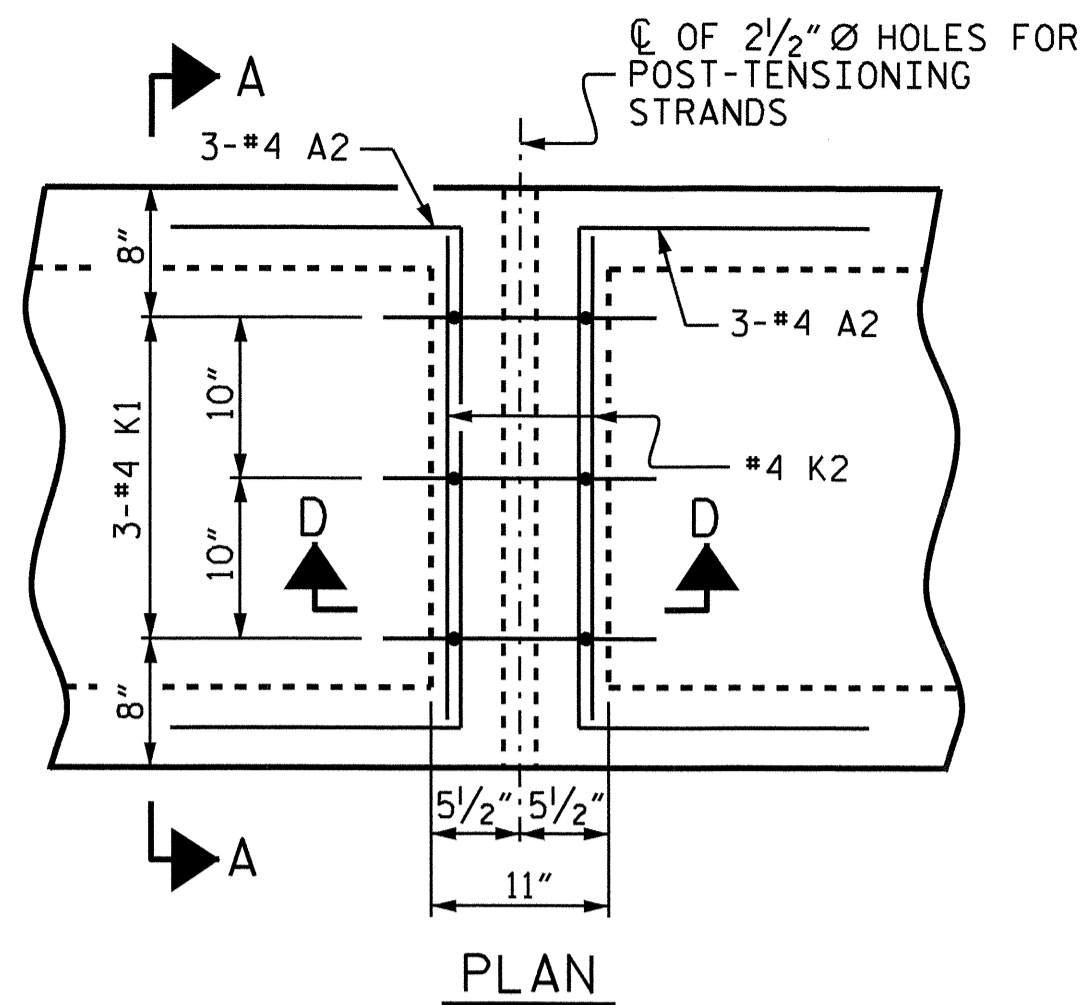
PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 6 OF 8

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

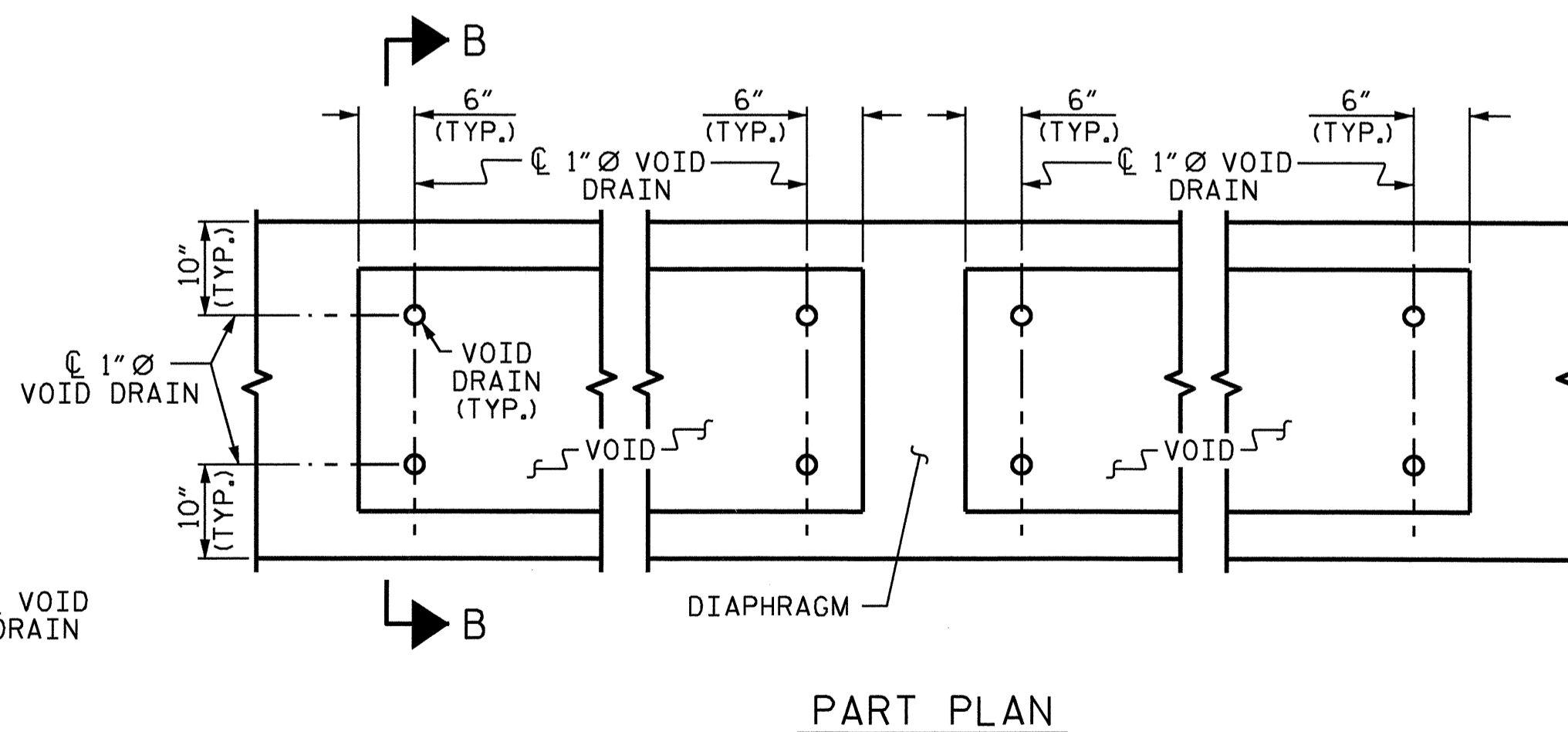
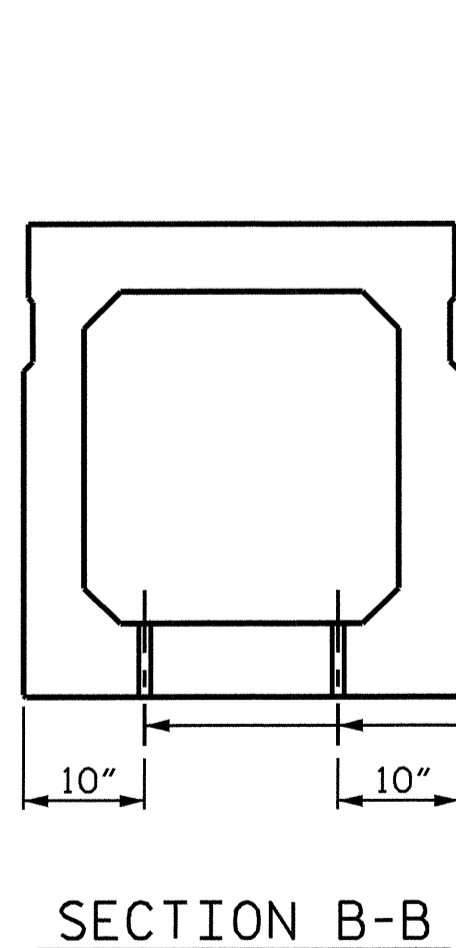
REVISIONS						SHEET NO. S-10
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 25
2			4			

STD. NO. PCBB6



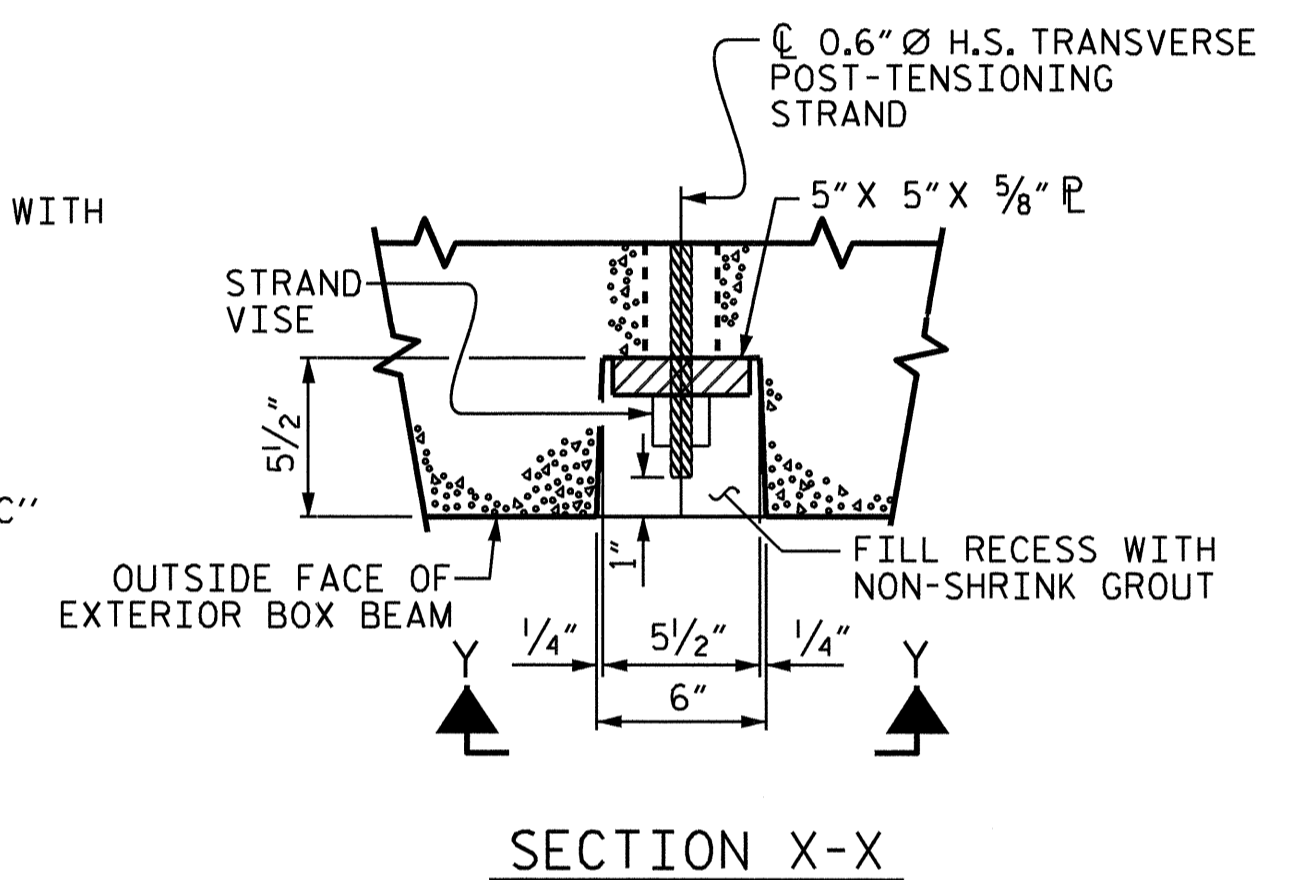
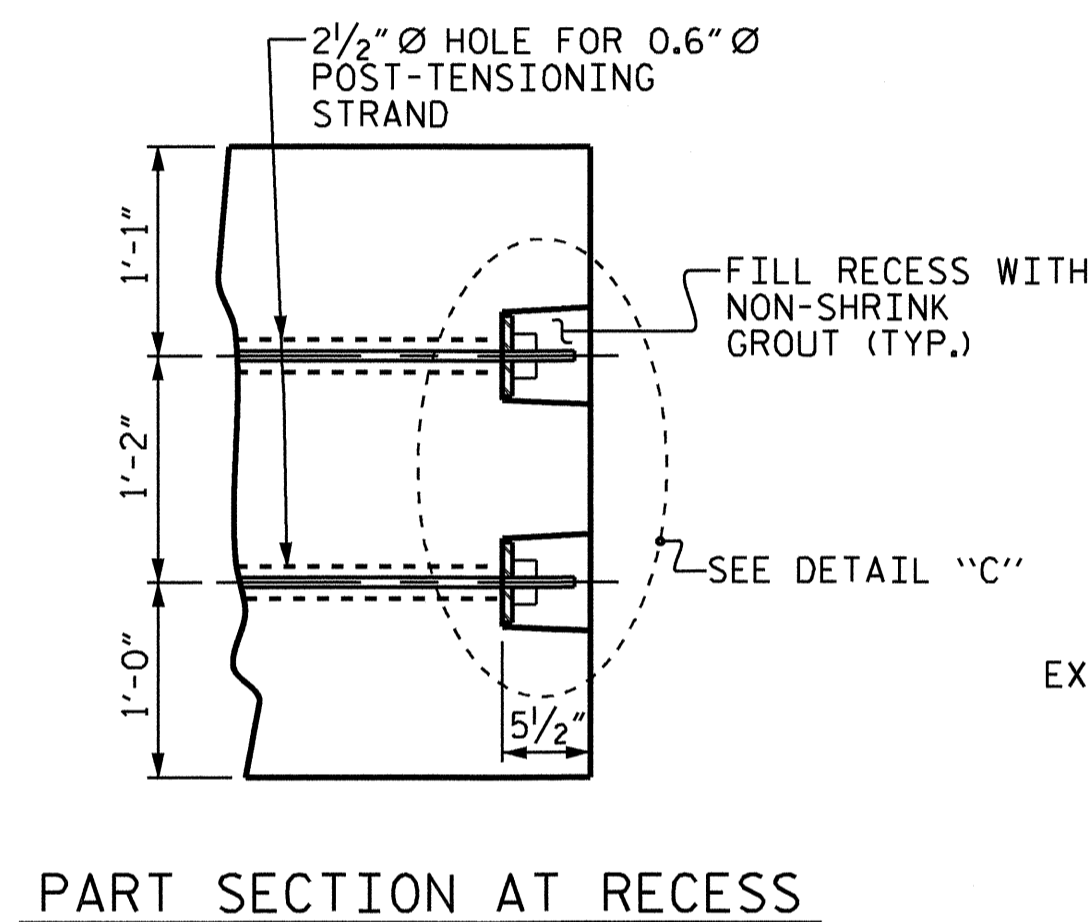
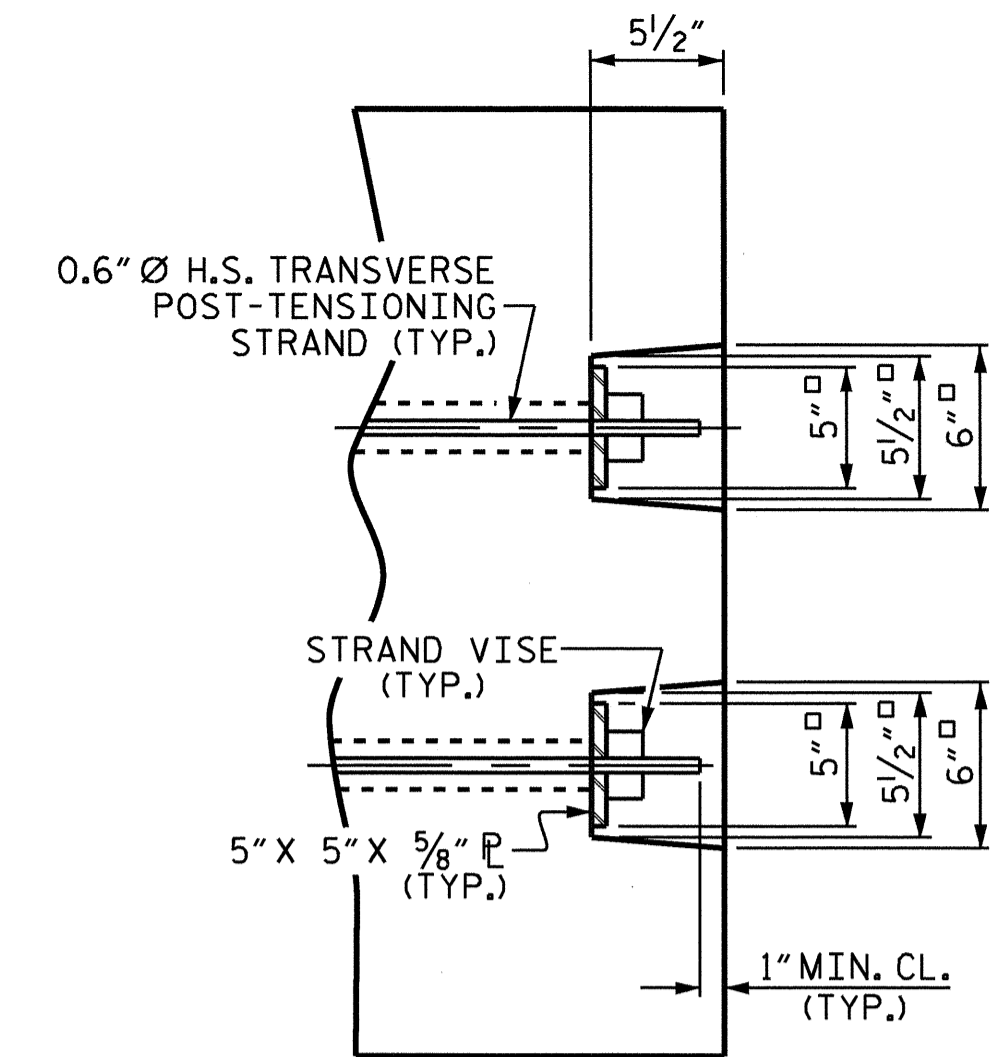
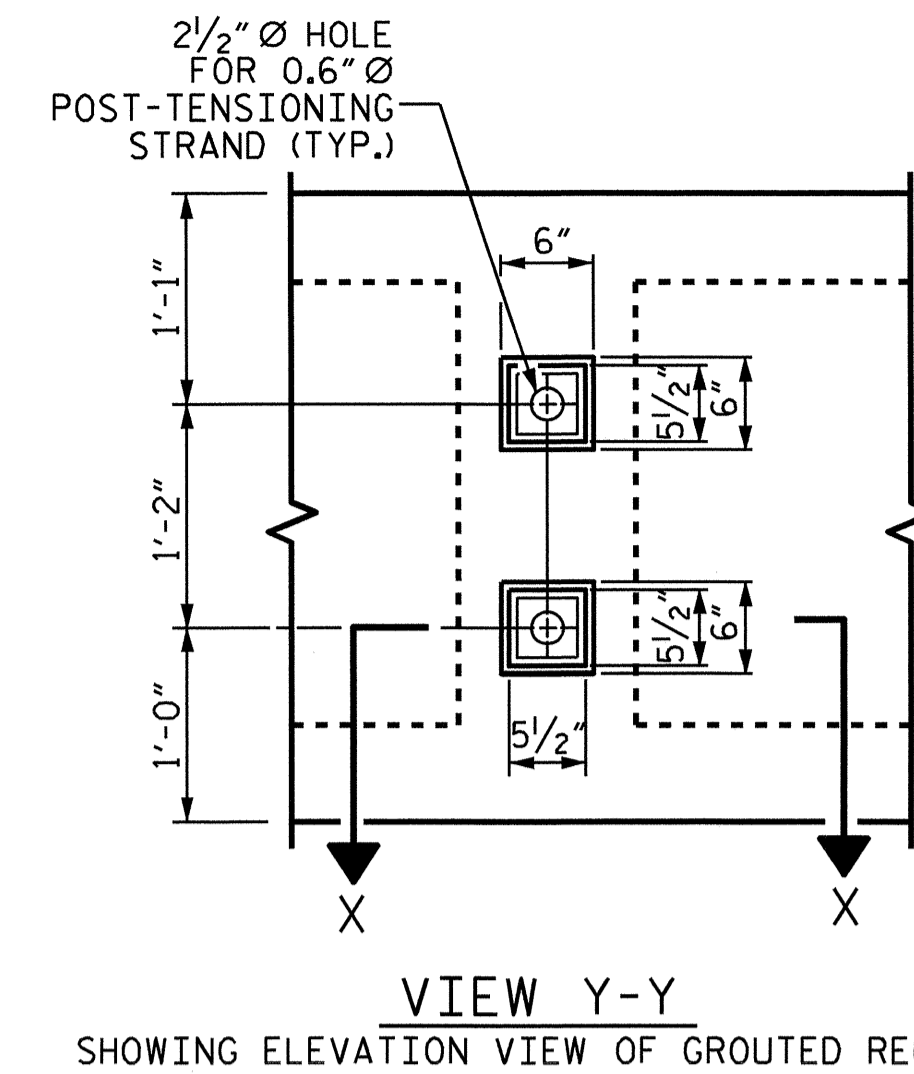
**DOUBLE DIAPHRAGM DETAILS**

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

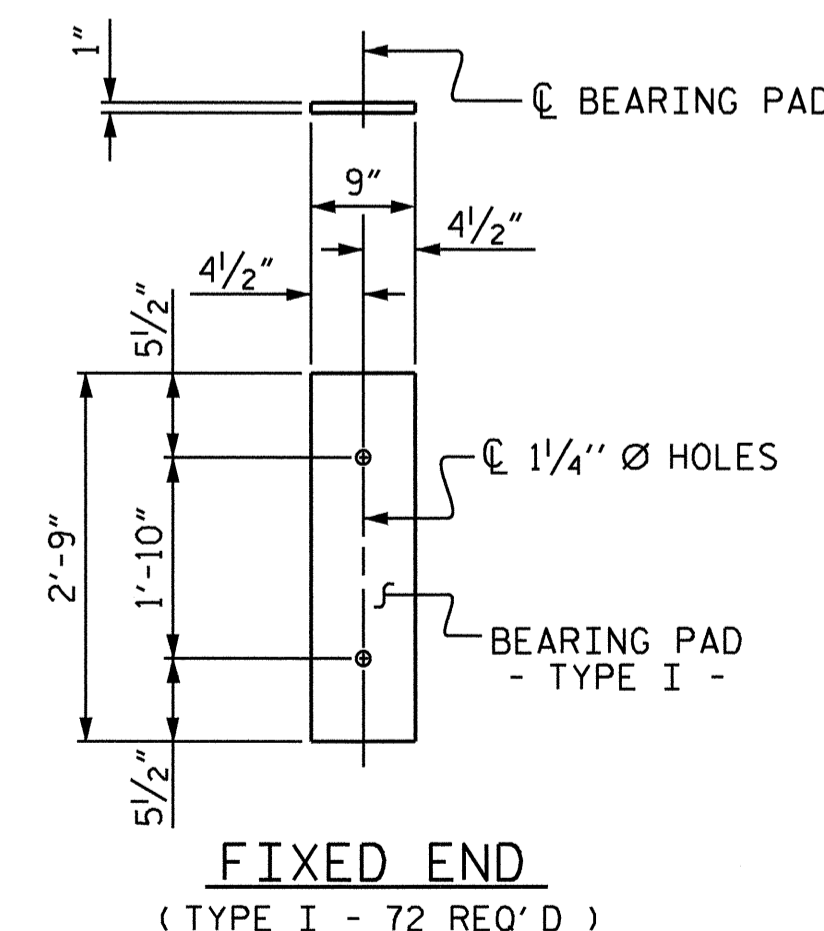


**VOID DRAIN DETAILS**

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

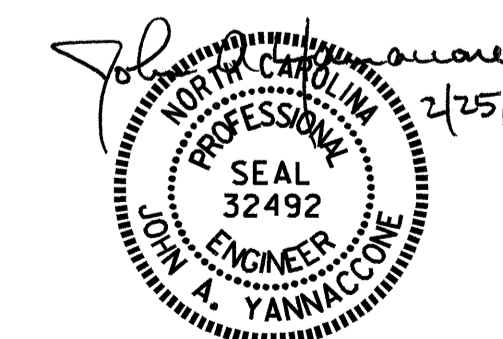


**GROUDED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM**



**ELASTOMERIC BEARING DETAILS**

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 7 OF 8

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

ASSEMBLED BY : E.C. LOCKLEAR	DATE : 10-28-09
CHECKED BY : J. YANNAKONE	DATE : 12-30-09
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			25

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 1/8" 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 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

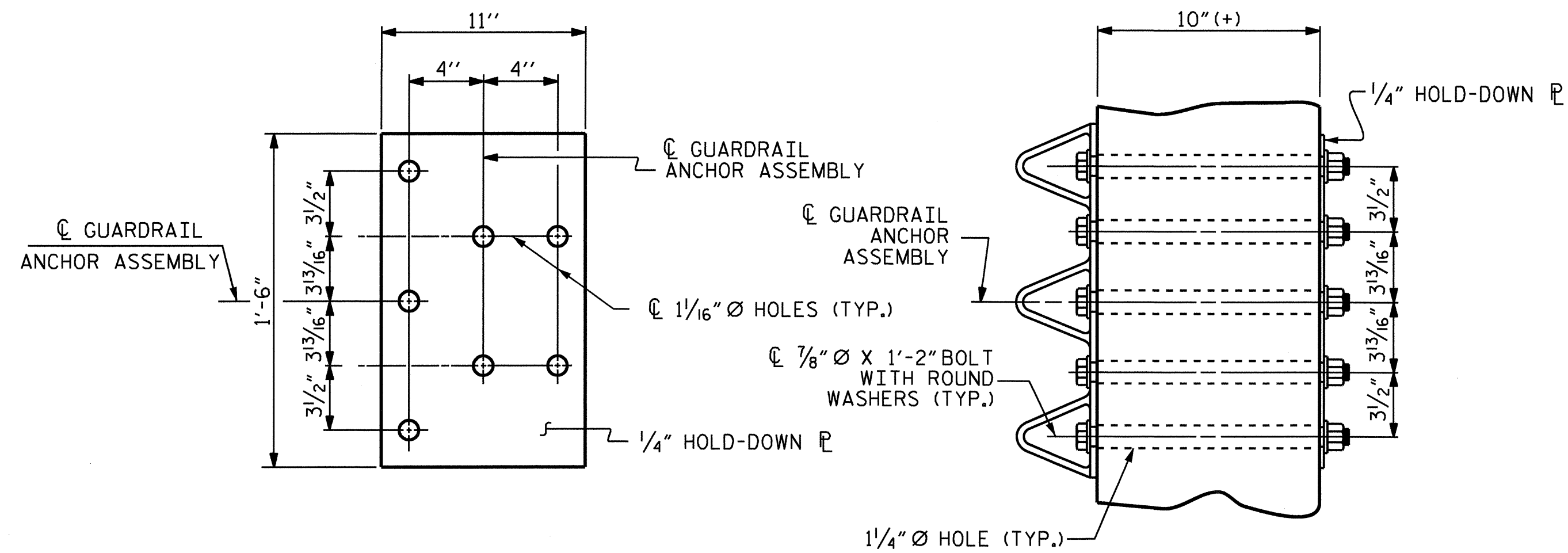
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE 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.

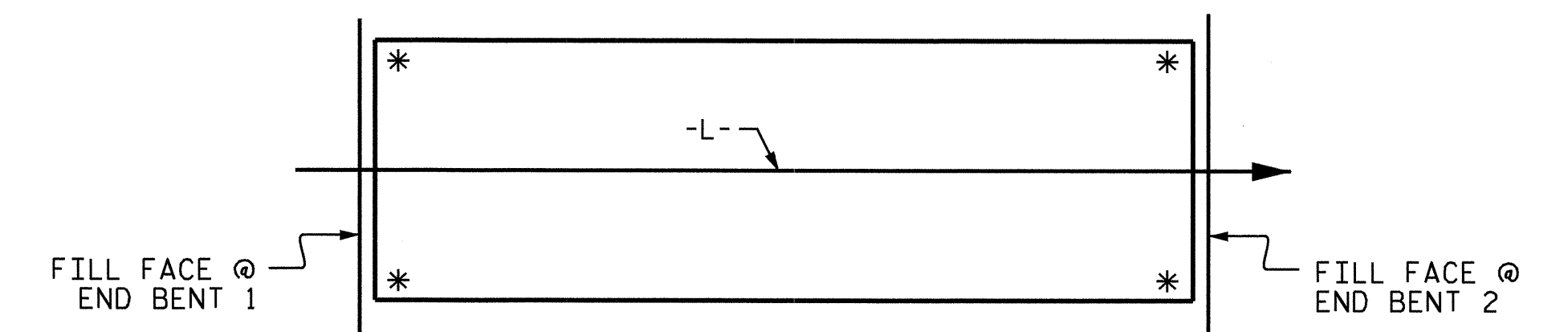
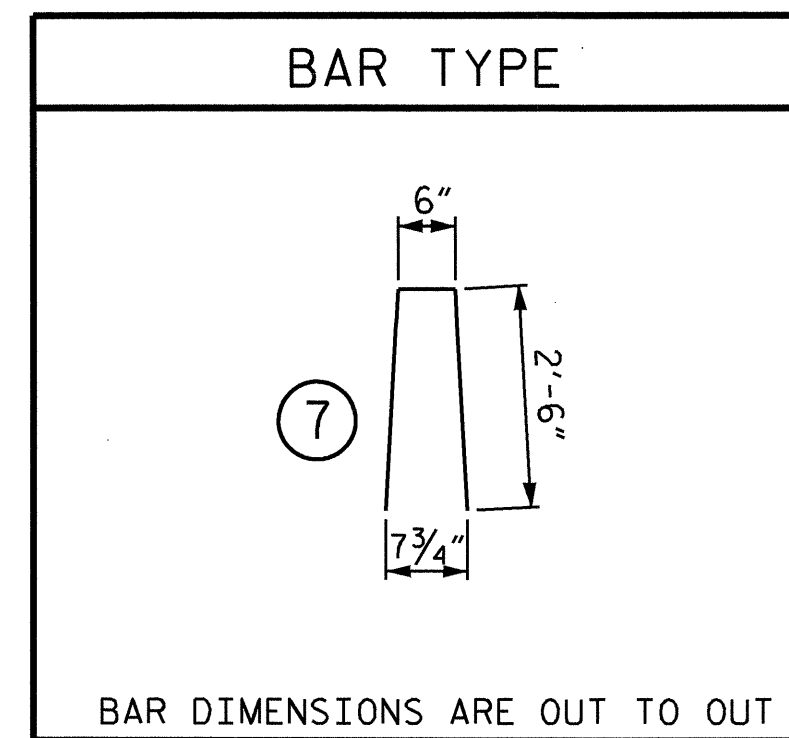
FOR VERTICAL CONCRETE BARRIER RAIL, SEE SPECIAL PROVISIONS.



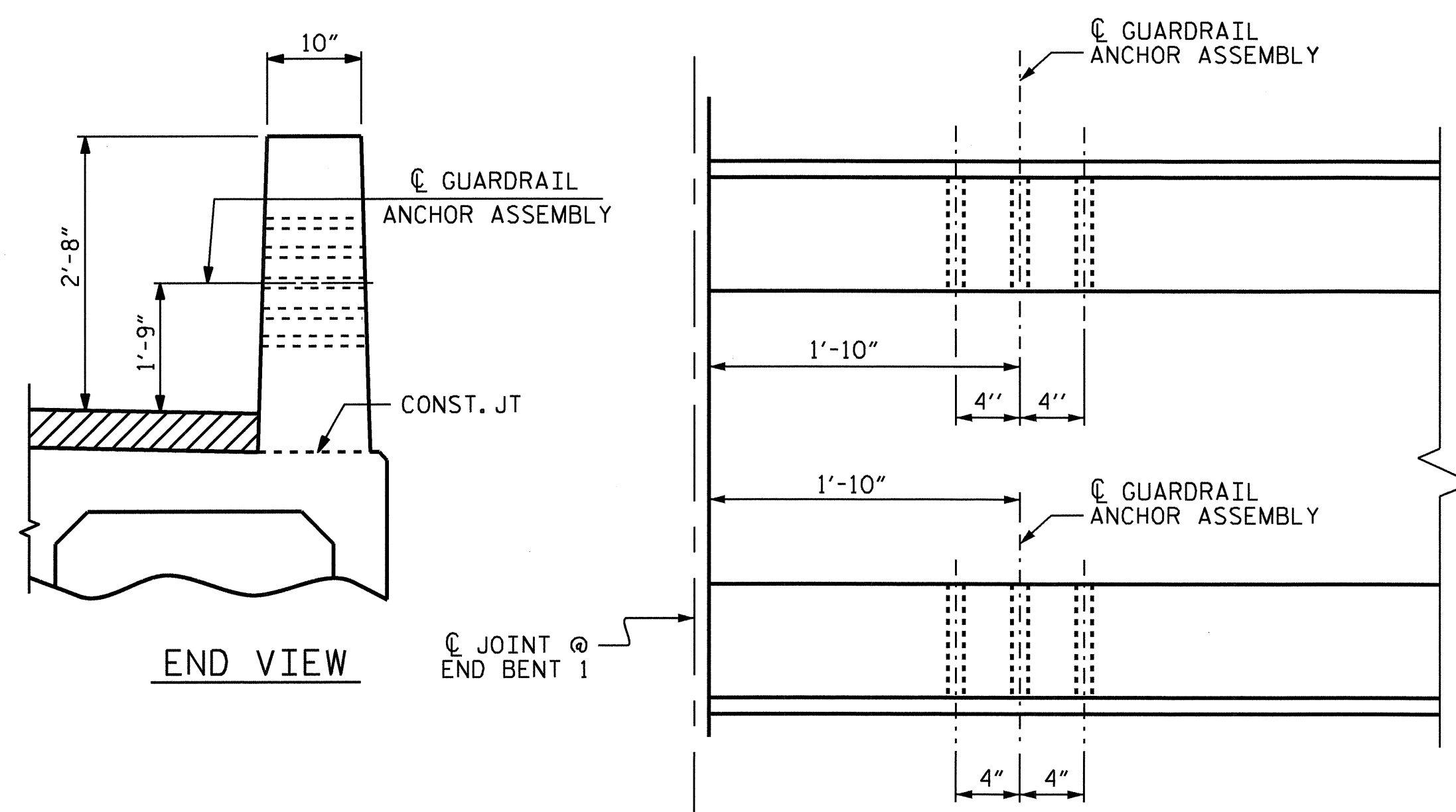
PLAN END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

BAR	BARS PER SPAN			TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	SPAN A	SPAN B	SPAN C					
*B3	60	60	60	120	#5	STR	24'-3"	3035
*B4		60		60	#5	STR	29'-7"	1851
*S6	206	240	206	652	#5	7	5'-6"	3740
* EPOXY COATED REINFORCING STEEL								8626 LBS.
CLASS AA CONCRETE								48.4 CU. YDS.
TOTAL LIN. FT. OF VERTICAL CONCRETE BARRIER RAIL								475.5 LIN. FT.

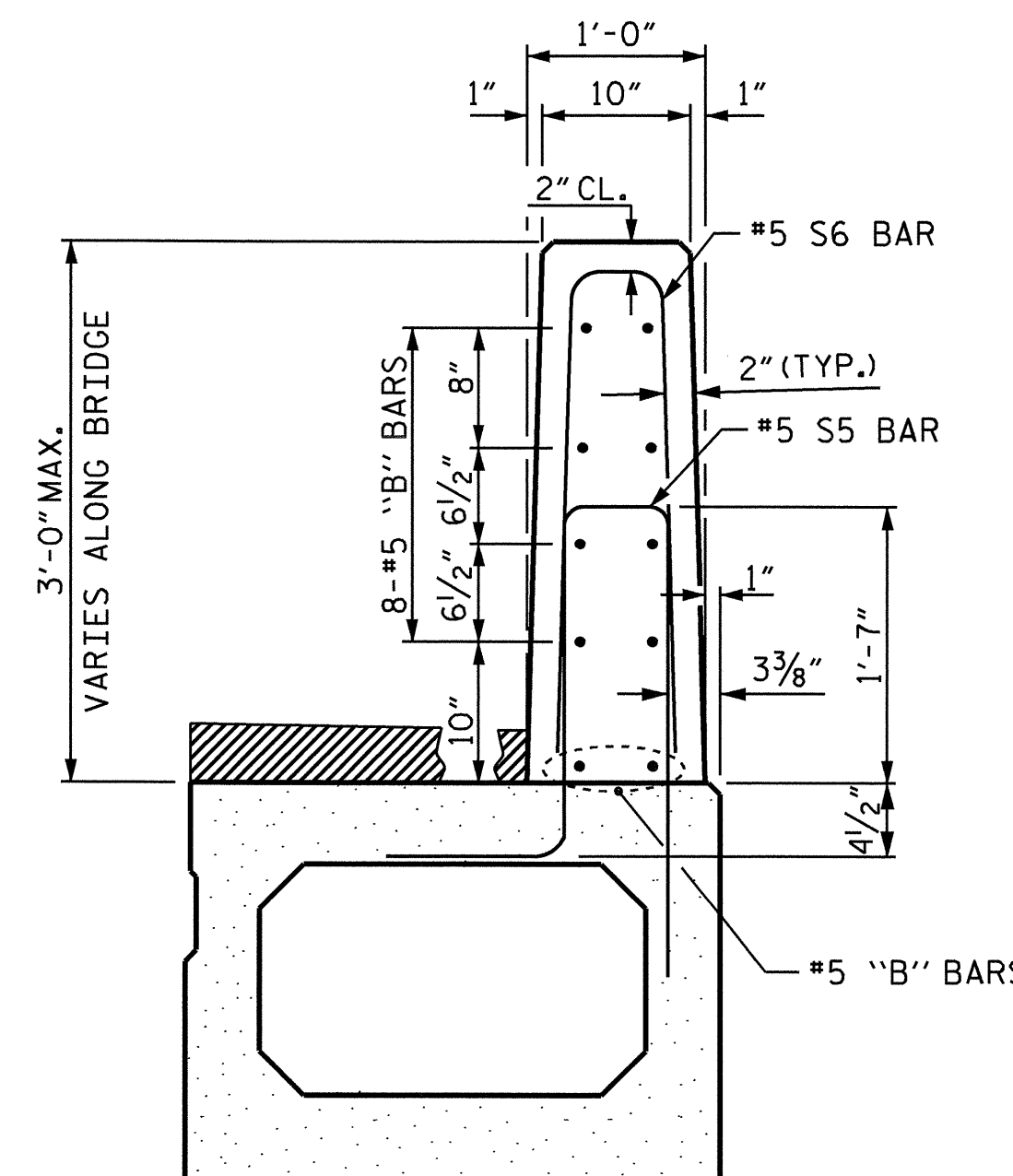


SKETCH SHOWING POINTS OF ATTACHMENT



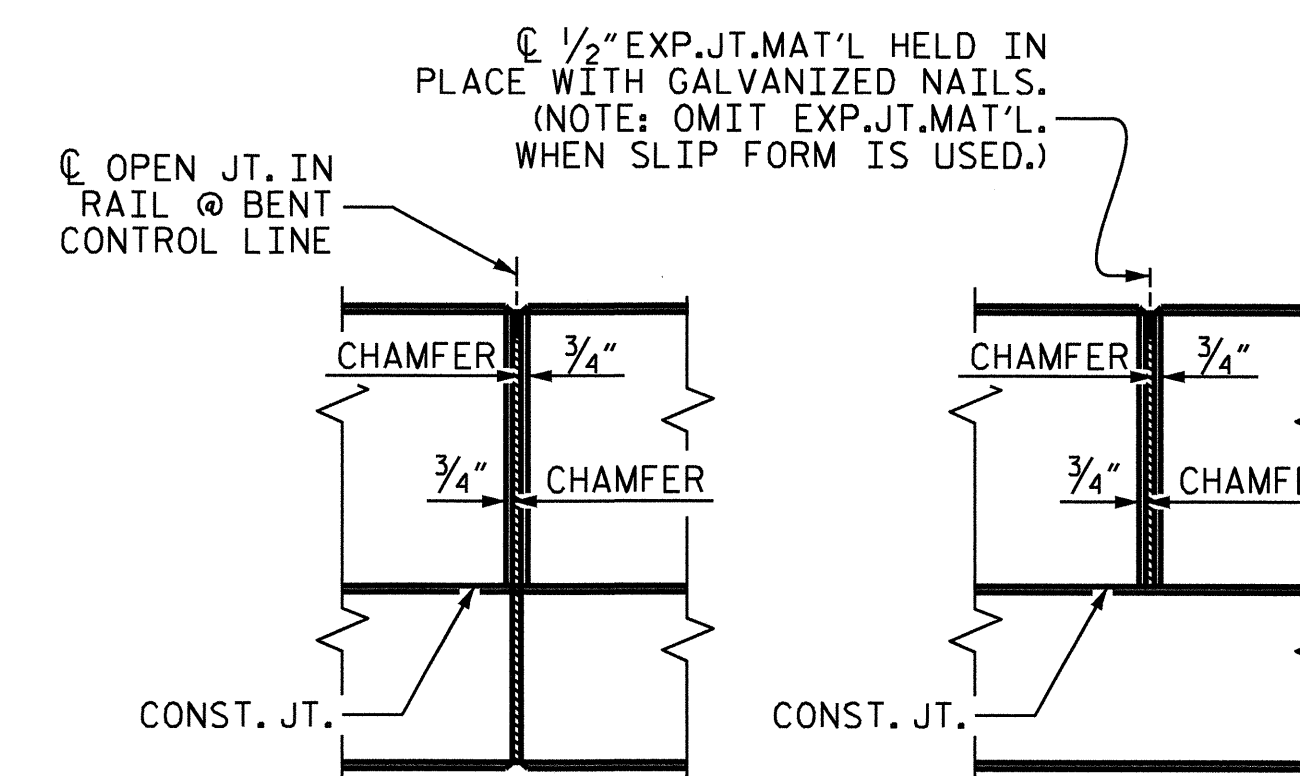
LOCATION OF GUARDRAIL ANCHOR

END BENT 1 SHOWN, END BENT 2 SIMILAR.

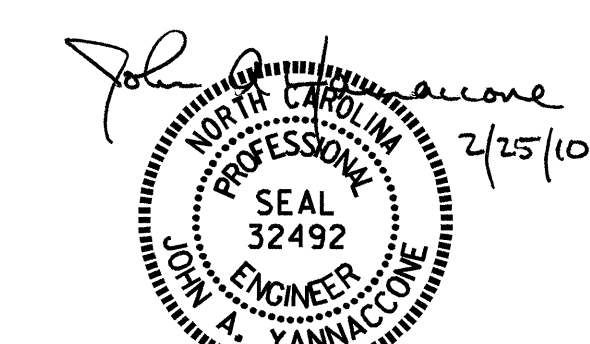


SECTION THRU RAIL

SHOWN AT CENTER BEARING



ELEVATION AT EXPANSION JOINTS



PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 8 OF 8

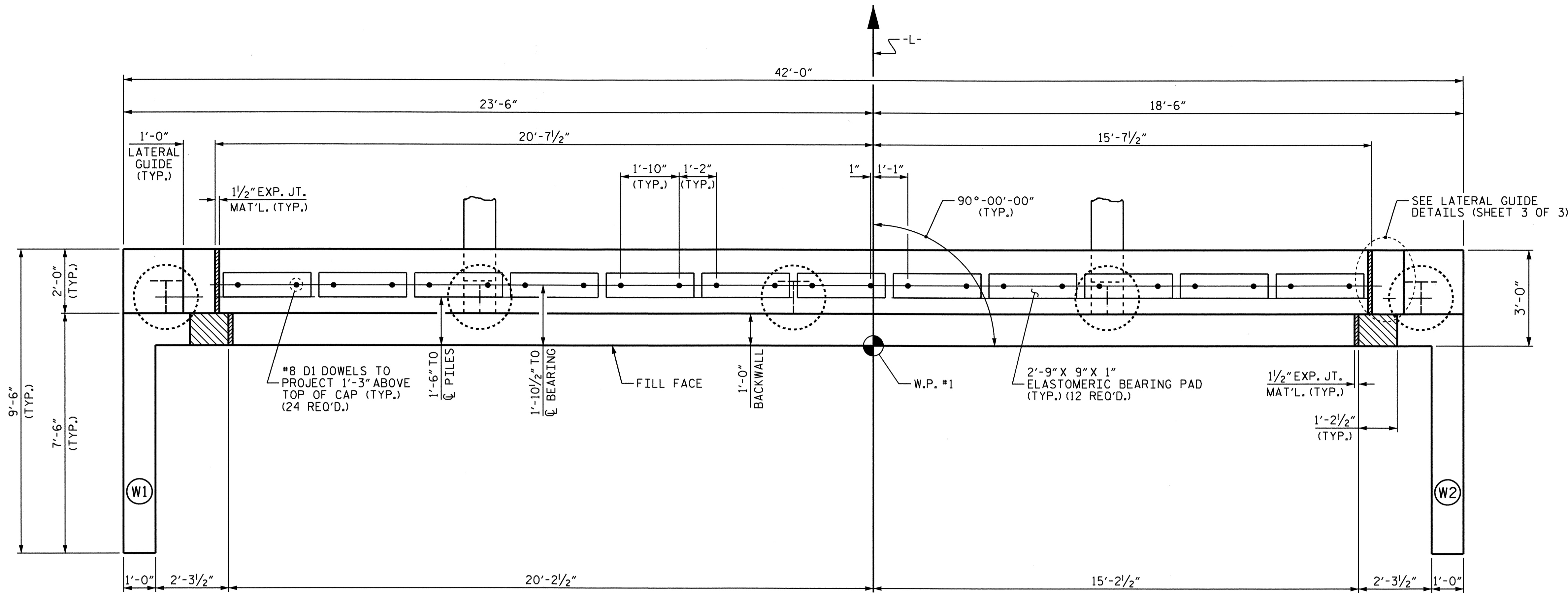
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 VERTICAL CONCRETE  
 BARRIER RAIL  
 AND  
 GUARDRAIL ANCHORAGE  
 DETAILS

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

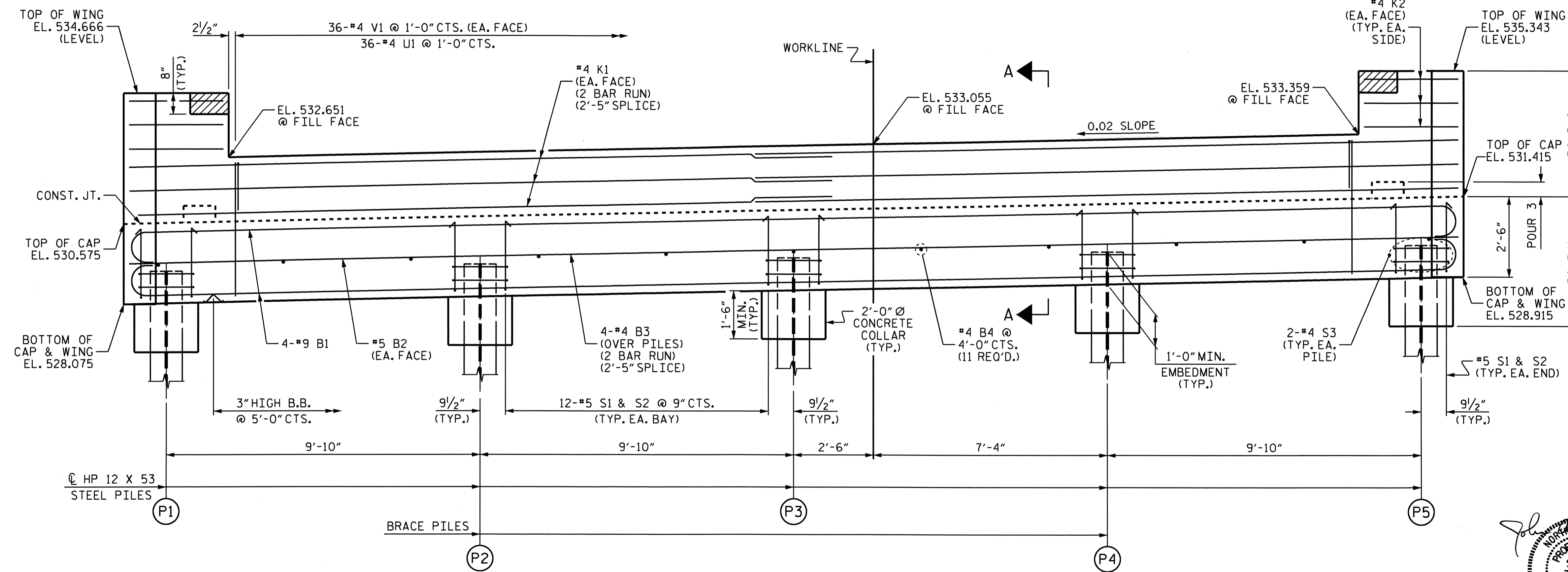
TOTAL SHEETS: 25

ASSEMBLED BY: E.C. LOCKLEAR DATE: 10-28-09  
 CHECKED BY: J. YANNAACONE DATE: 12-30-09  
 DRAWN BY: TLA 5/05  
 CHECKED BY: GM 6/05

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



PLAN



ELEVATION

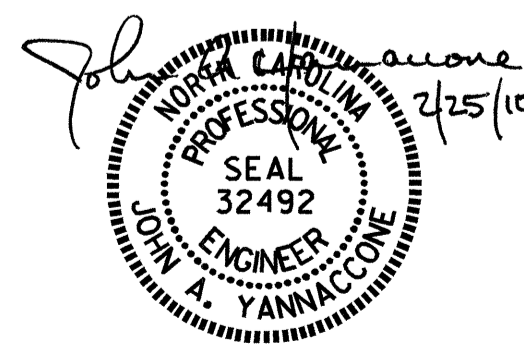
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #8 D1 DOWELS.  
 THE LATERAL GUIDE AT EACH END OF CAP IS NOT TO BE POURED UNTIL AFTER BOX BEAM UNITS ARE IN PLACE.  
 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.

TOP OF PILE ELEVATIONS	
(P1)	529.112
(P2)	529.309
(P3)	529.505
(P4)	529.702
(P5)	529.899

PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 1 OF 3

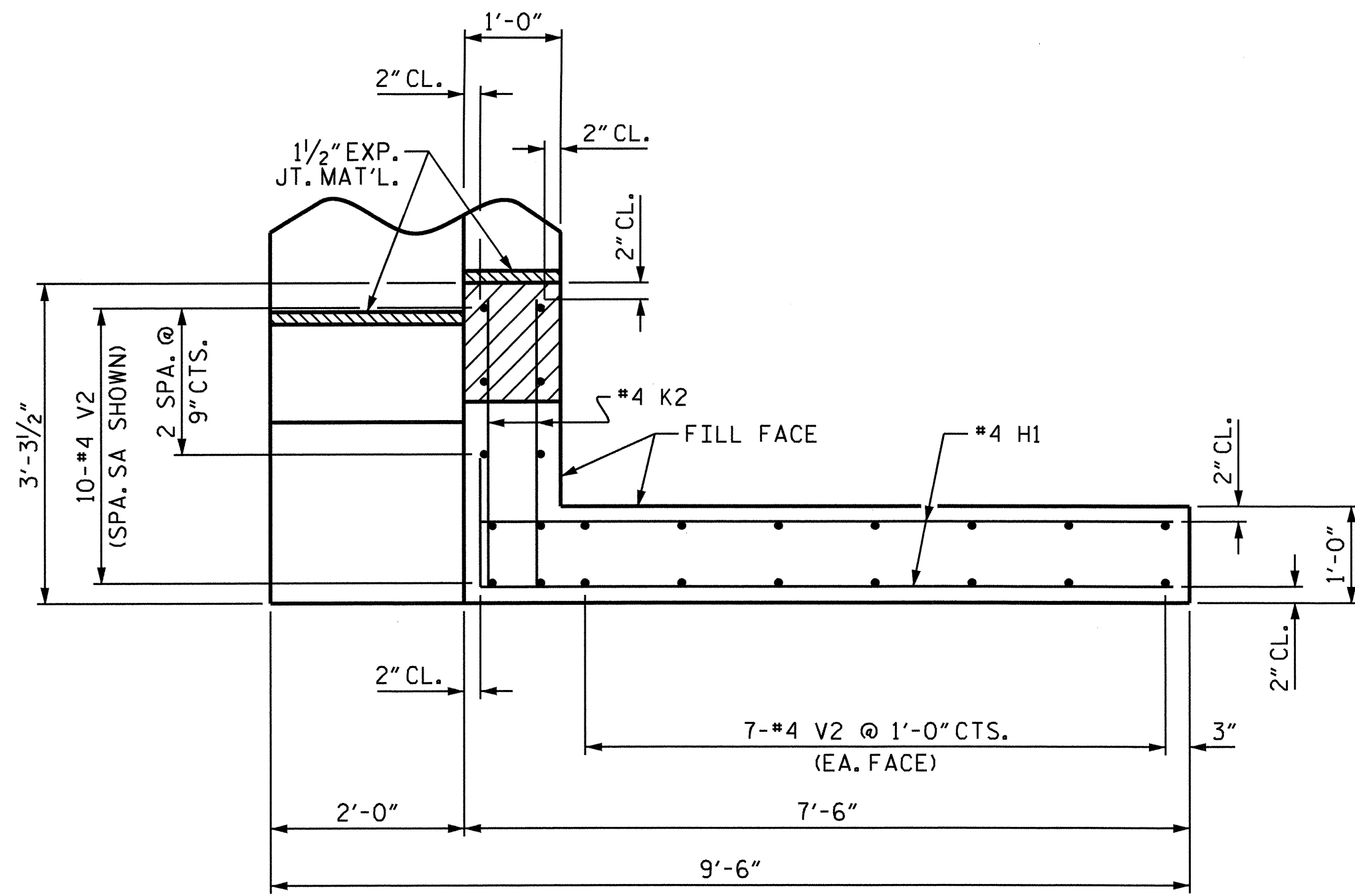
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1



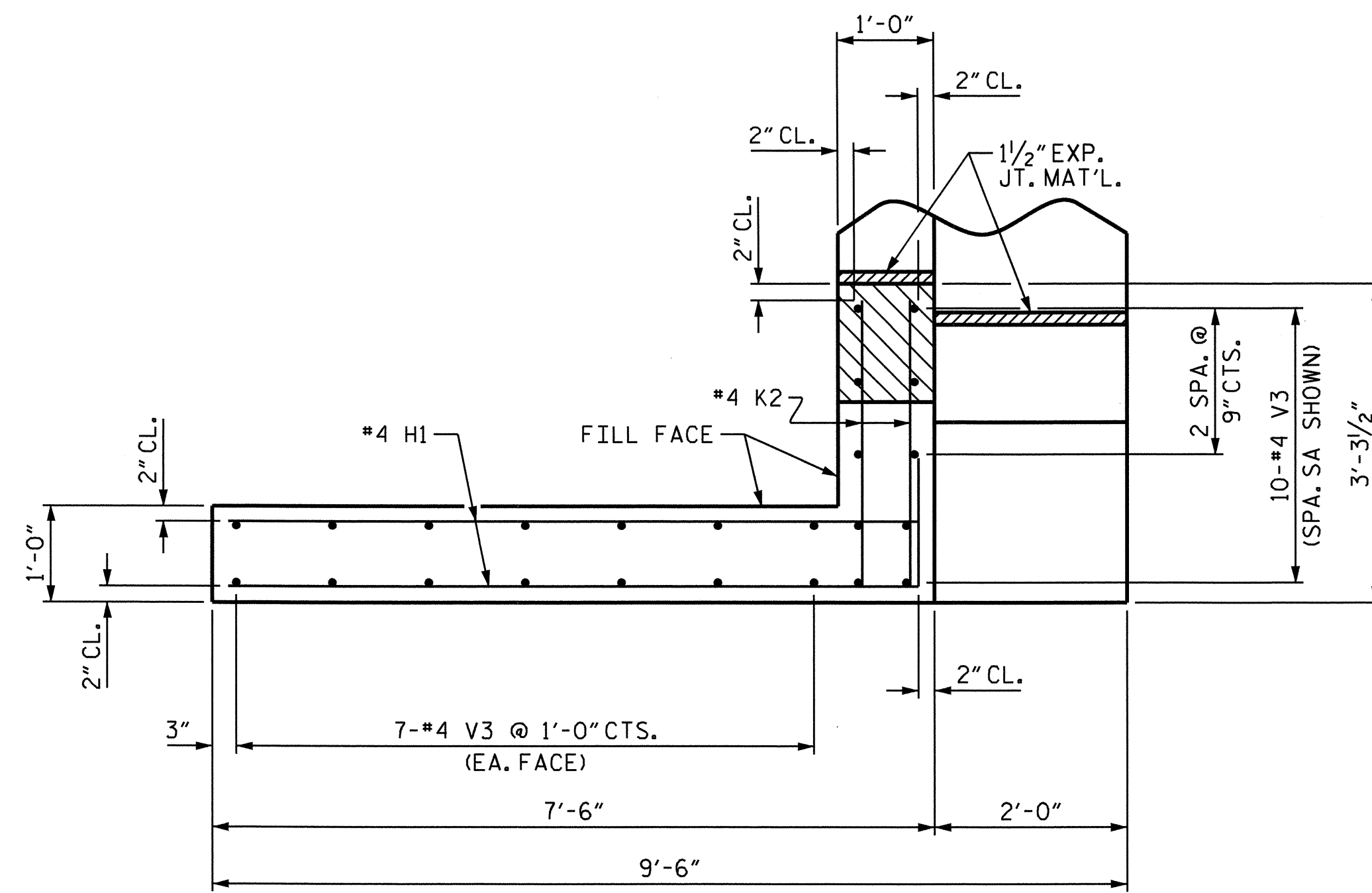
DRAWN BY: E.C. LOCKLEAR DATE: 11-5-09  
 CHECKED BY: J. YANNACCONE DATE: 12-28-09

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
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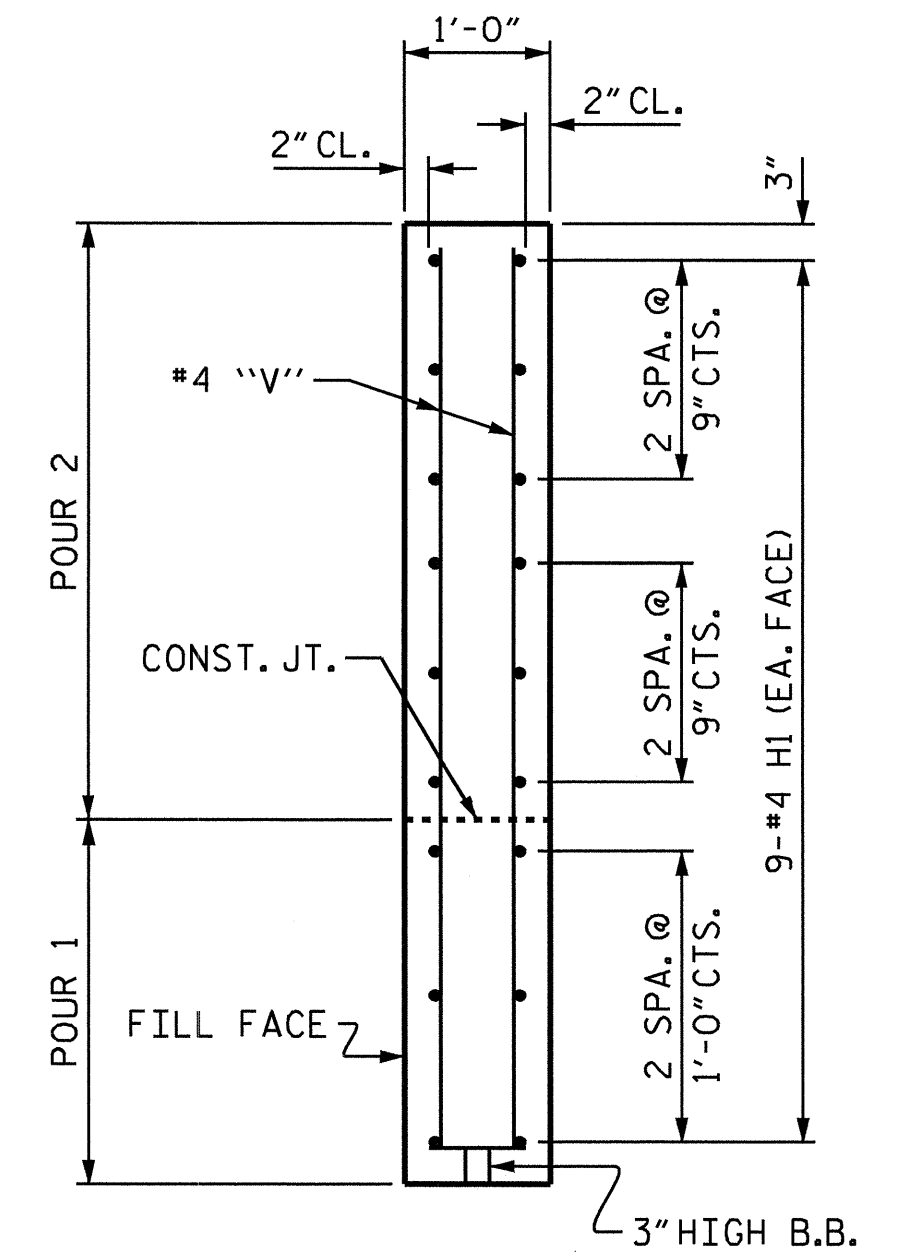
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 JYannaccone



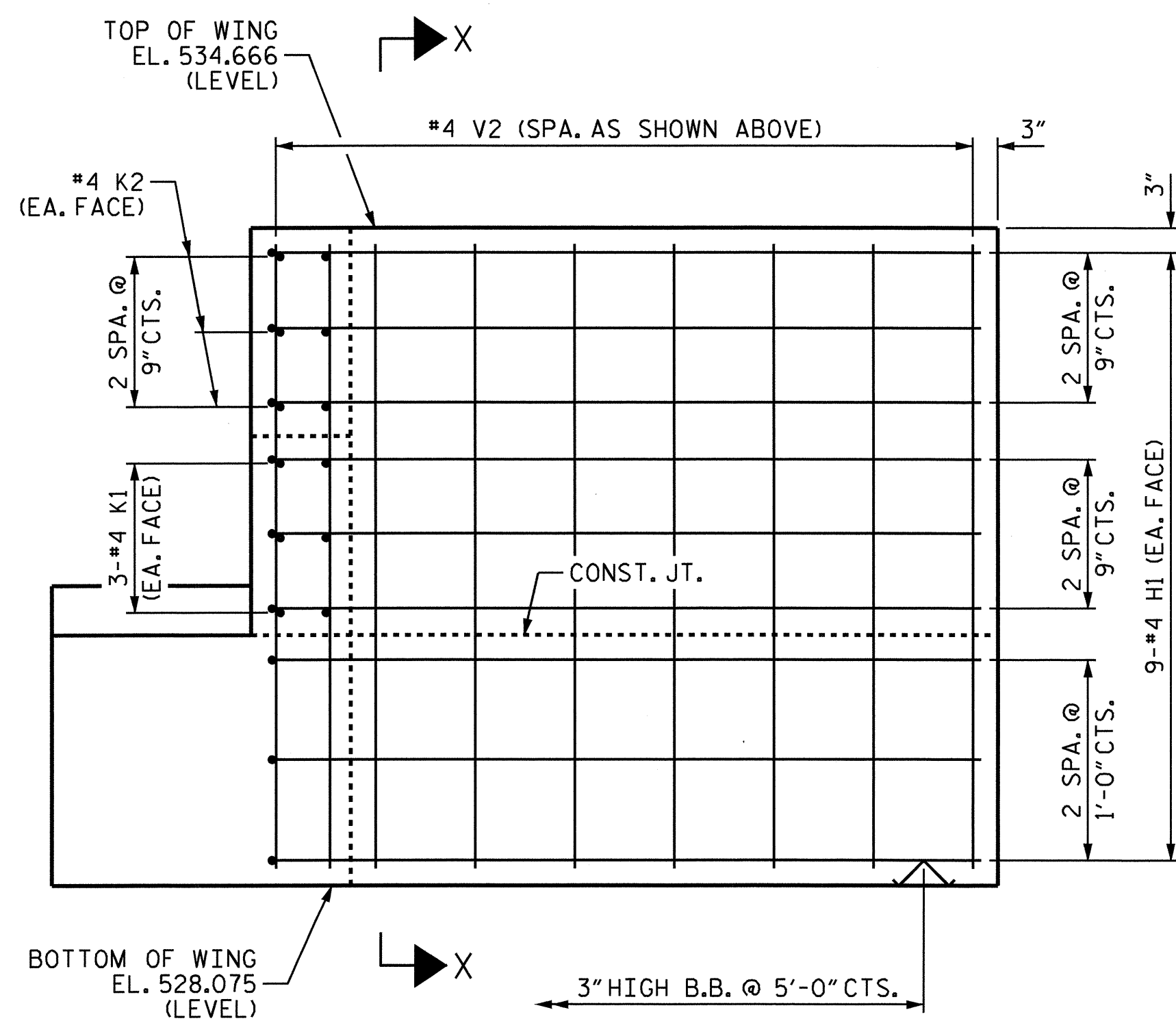
PLAN OF WING (W1)



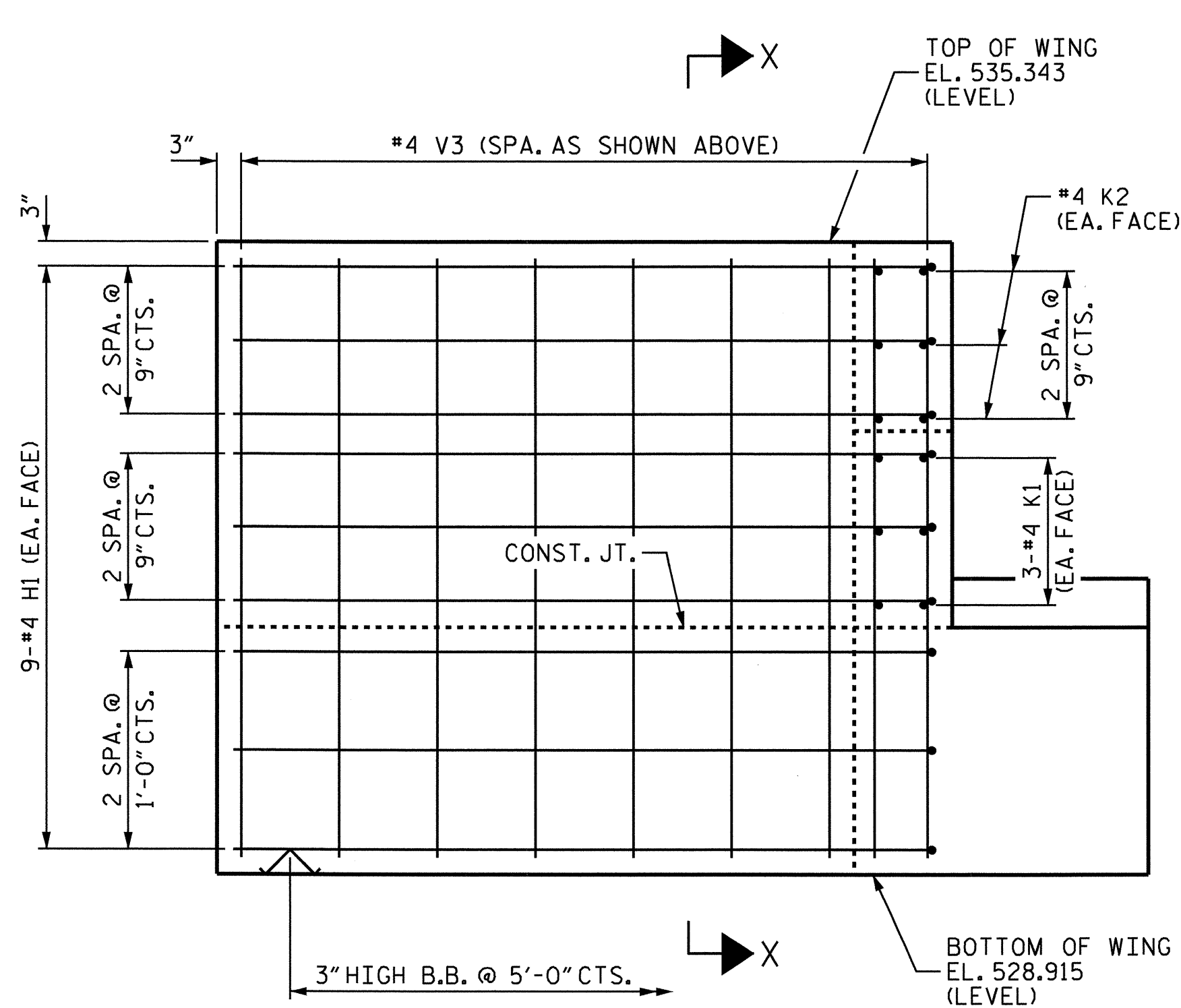
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)

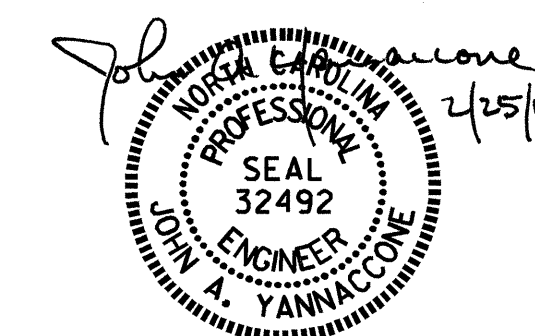


ELEVATION OF WING (W2)

PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 2 OF 3

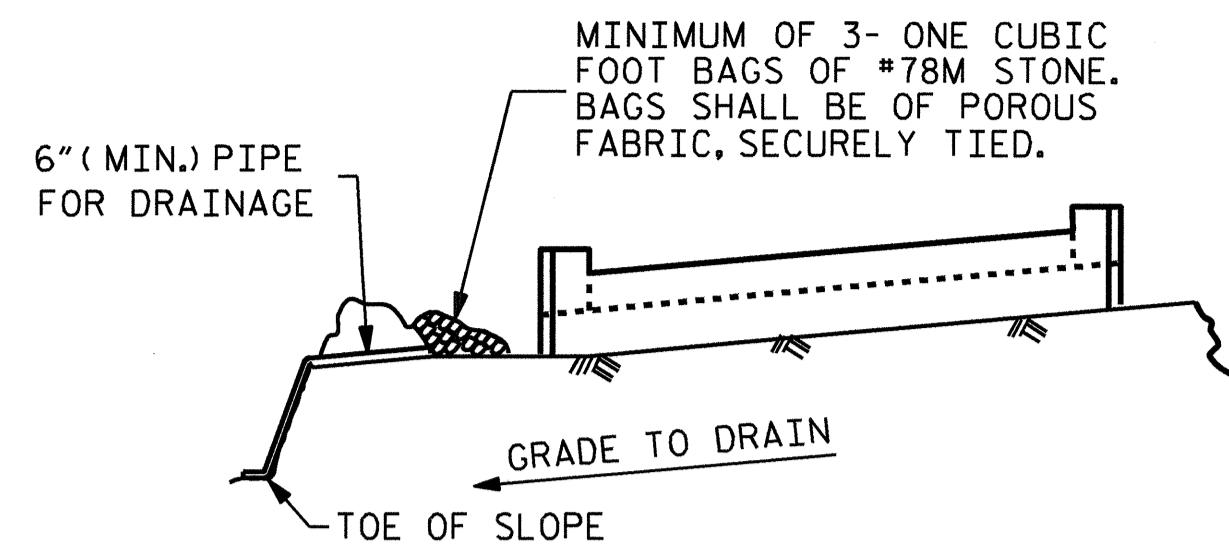
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1



DRAWN BY: E.C. LOCKLEAR DATE: 11-6-09  
 CHECKED BY: J. YANNACCONE DATE: 12-28-09

25-FEB-2010 11:35  
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 JYannaccone

REVISIONS						SHEET NO.	
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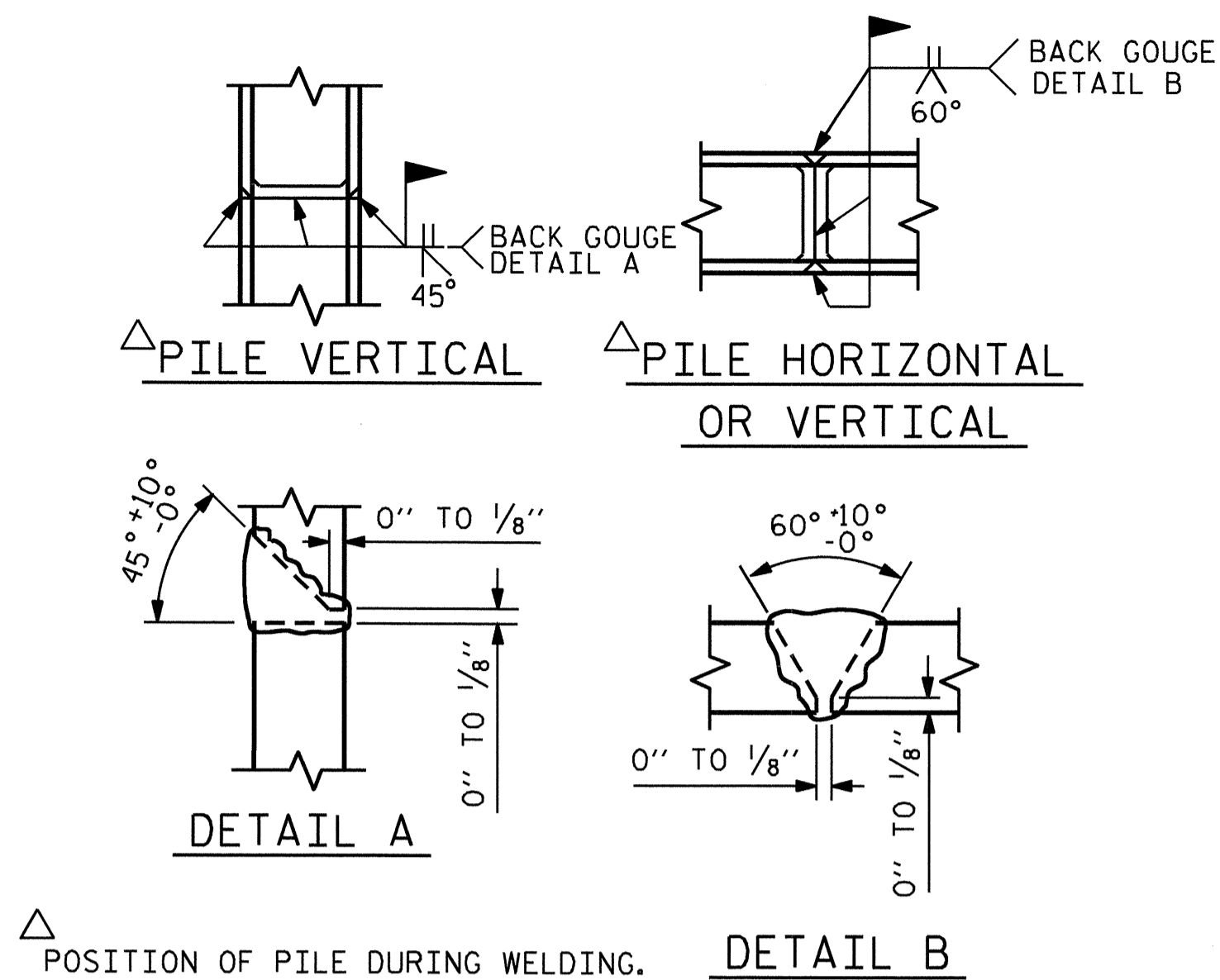
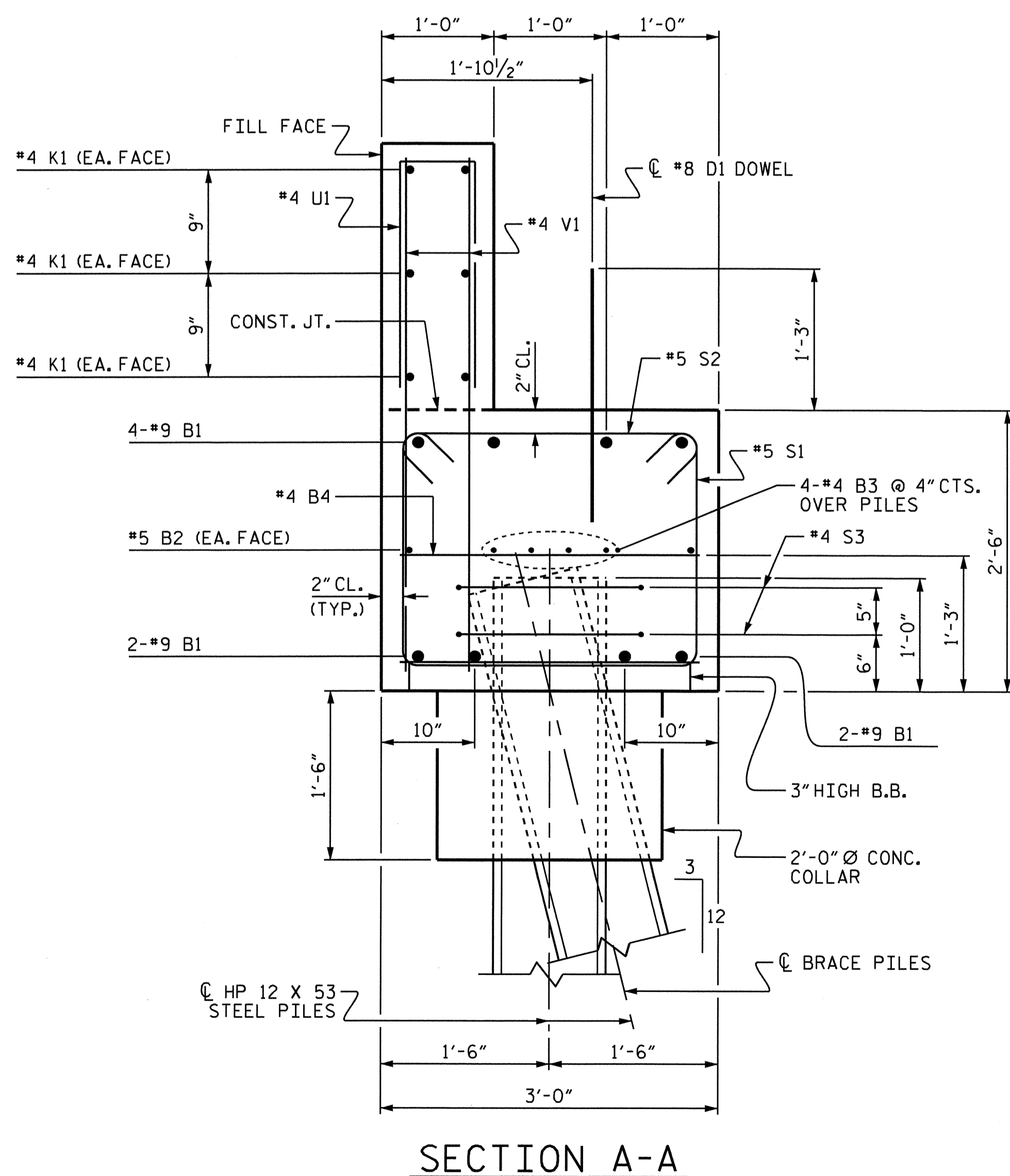


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

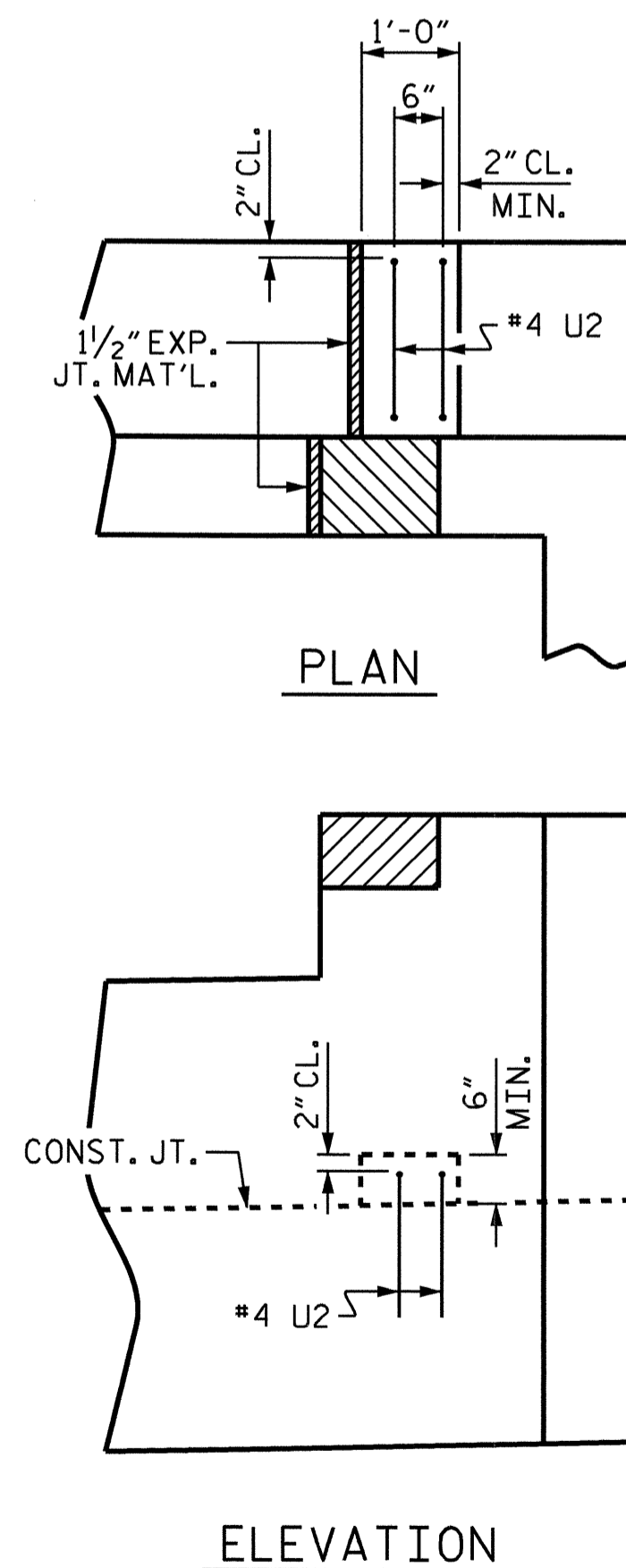
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

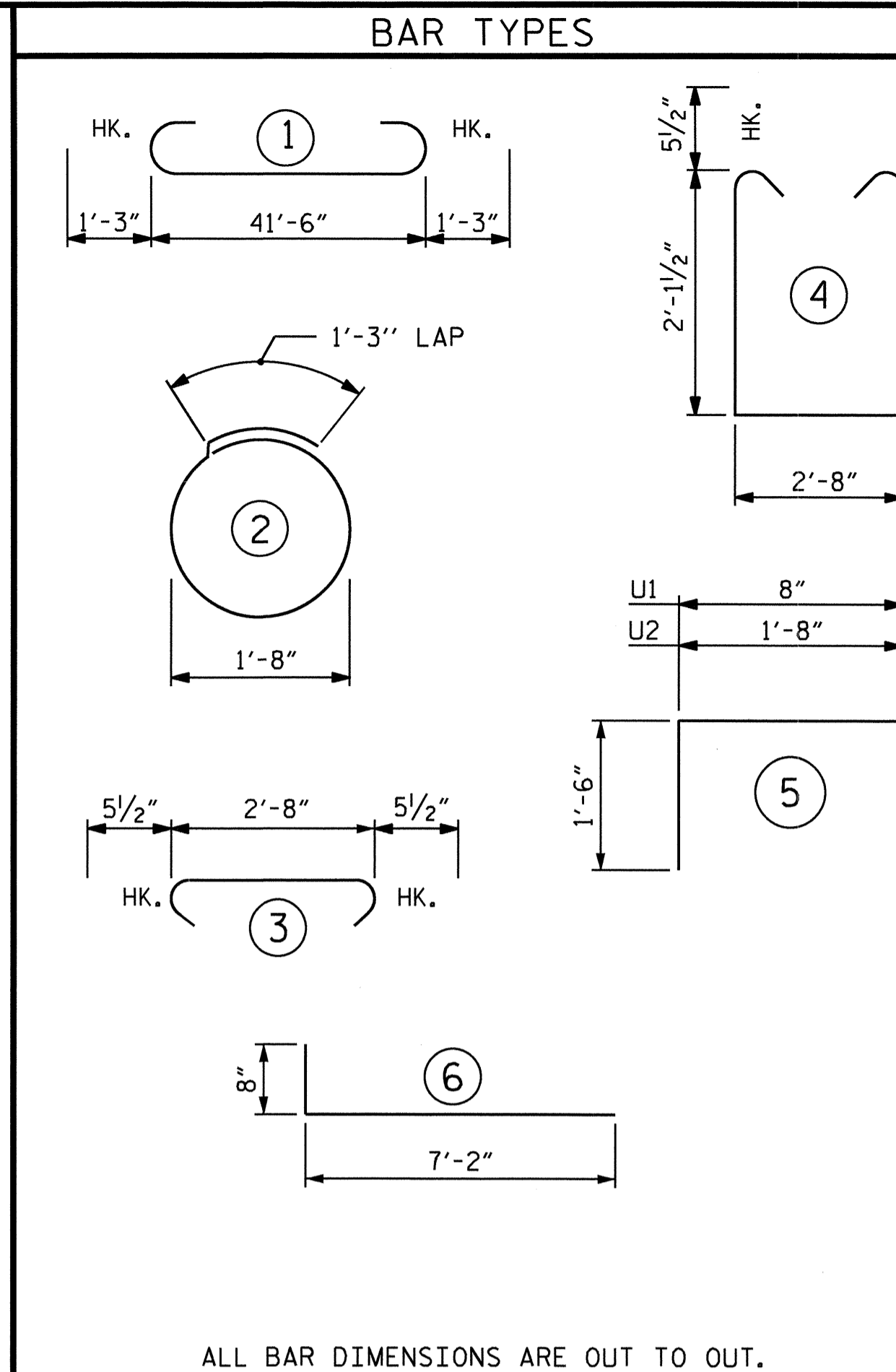
### TEMPORARY DRAINAGE AT END BENT



### PILE SPLICE DETAILS



### LATERAL GUIDE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		44'-0"	1197
B2	2	#5	STR	41'-8"	87
B3	8	#4	STR	22'-1"	118
B4	11	#4	STR	2'-8"	20
D1	24	#8	STR	2'-3"	144
H1	36	#4	6	7'-10"	188
K1	12	#4	STR	22'-1"	177
K2	12	#4	STR	2'-11"	23
S1	50	#5	4	7'-10"	409
S2	50	#5	3	3'-7"	187
S3	10	#4	2	6'-6"	43
U1	36	#4	5	3'-8"	88
U2	4	#4	5	4'-8"	12
V1	72	#4	STR	4'-1"	196
V2	24	#4	STR	6'-2"	99
V3	24	#4	STR	6'-0"	96

REINFORCING STEEL LBS. 3084

#### CLASS A CONC. BREAKDOWN

POUR 1 CONCRETE COLLARS, CAP & LOWER WINGS	C.Y.	13.7
POUR 2 UPPER WINGS & BACKWALL	C.Y.	5.5
POUR 3 LATERAL GUIDES	C.Y.	0.1
TOTAL	C.Y.	19.3

HP 12 X 53 STEEL PILES No. 5 LIN. FT. = 175

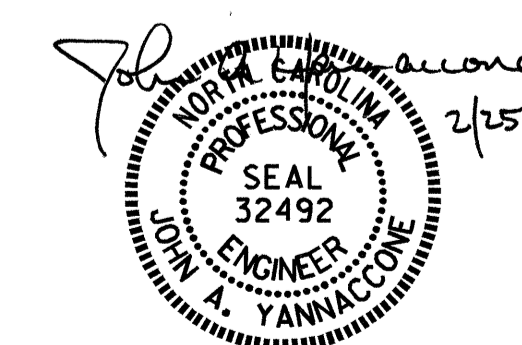
PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

END BENT 1

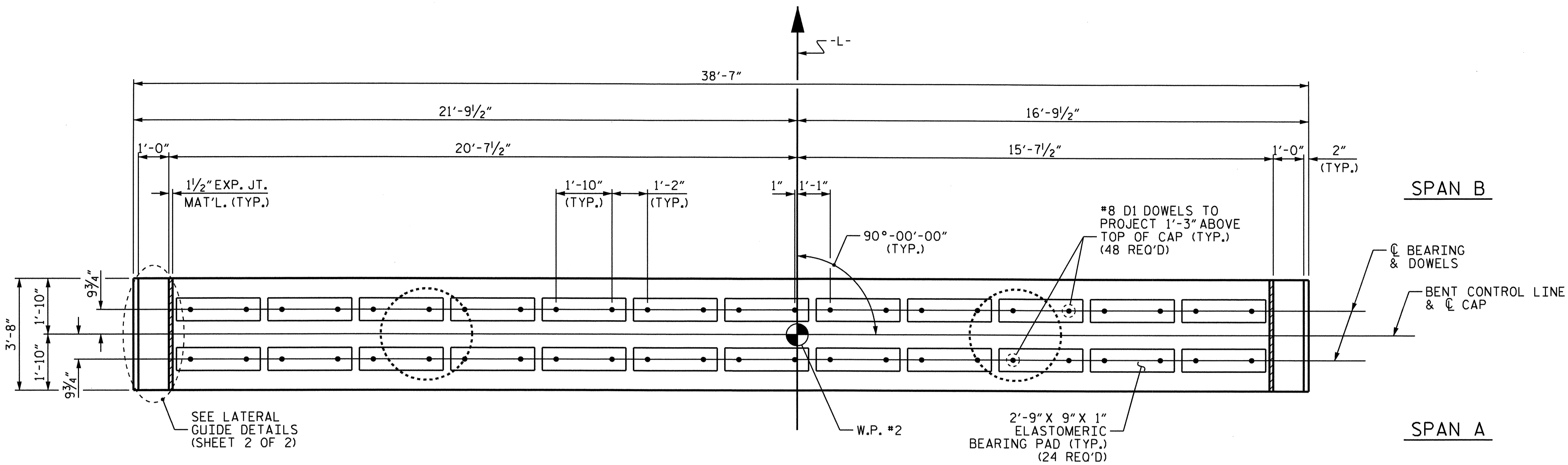


#### REVISIONS

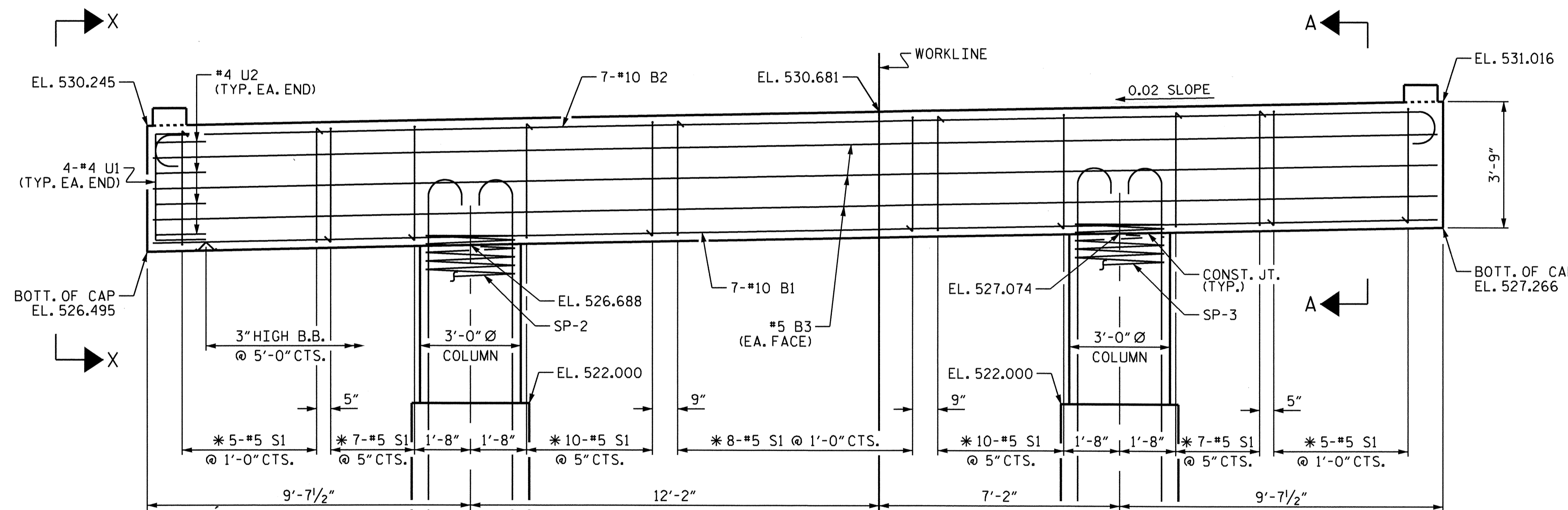
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-15
2			4			TOTAL SHEETS 25

DRAWN BY: E.C. LOCKLEAR DATE: 11-6-09  
 CHECKED BY: J. YANNAACONE DATE: 12-28-09

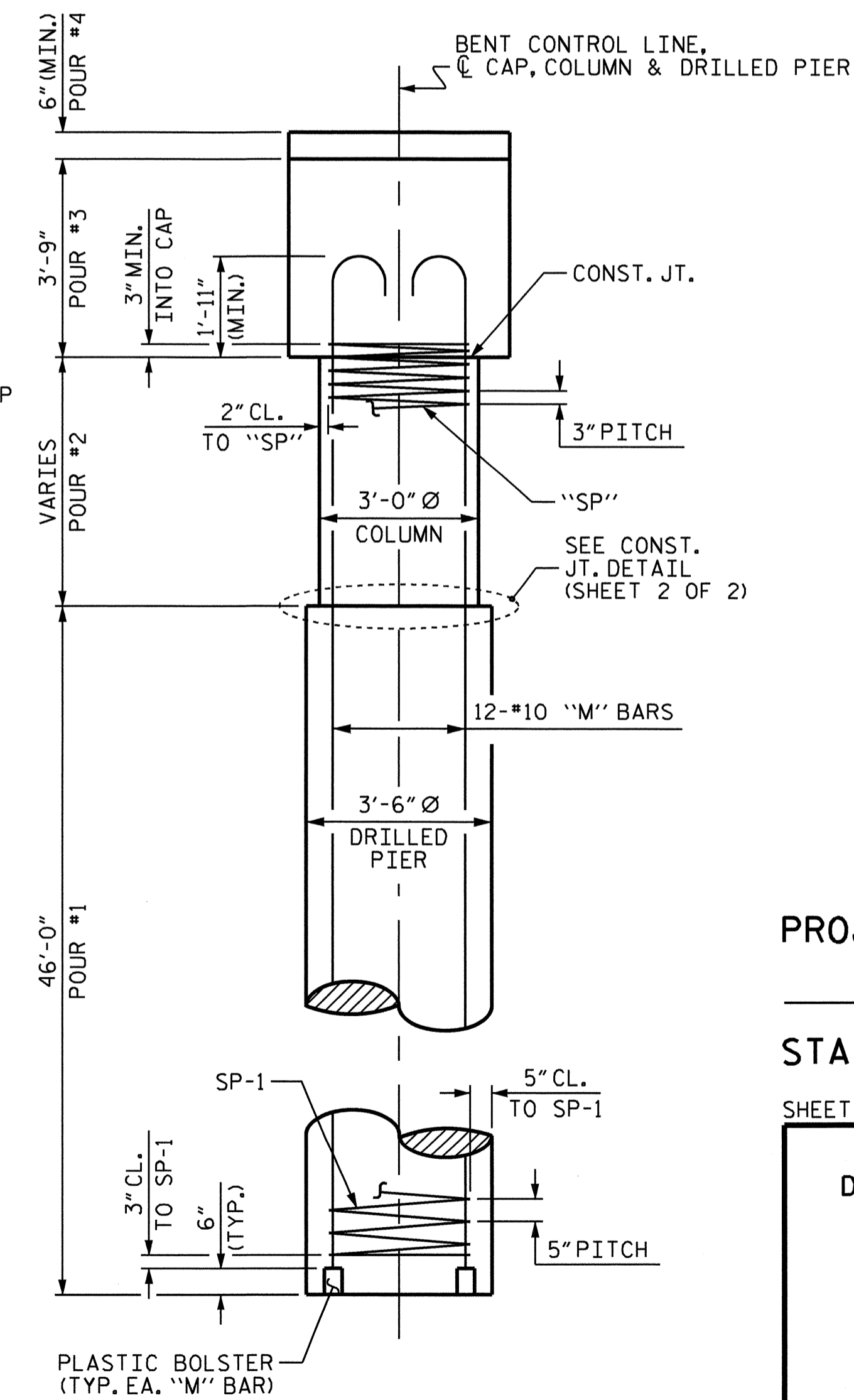




PLAN



ELEVATION



END ELEVATION

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #8 DOWELS.  
HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

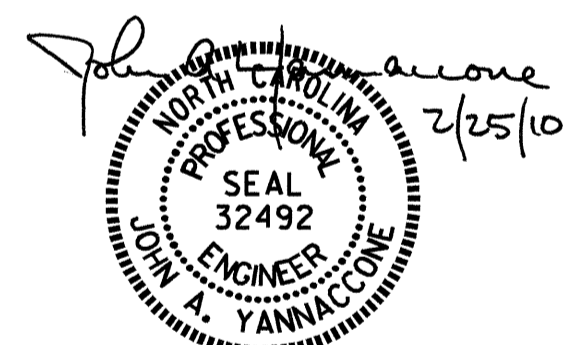
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

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

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

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.



PROJECT NO. B-4610  
RANDOLPH COUNTY  
STATION: 19+00.00 -L-

SHEET 1 OF 2

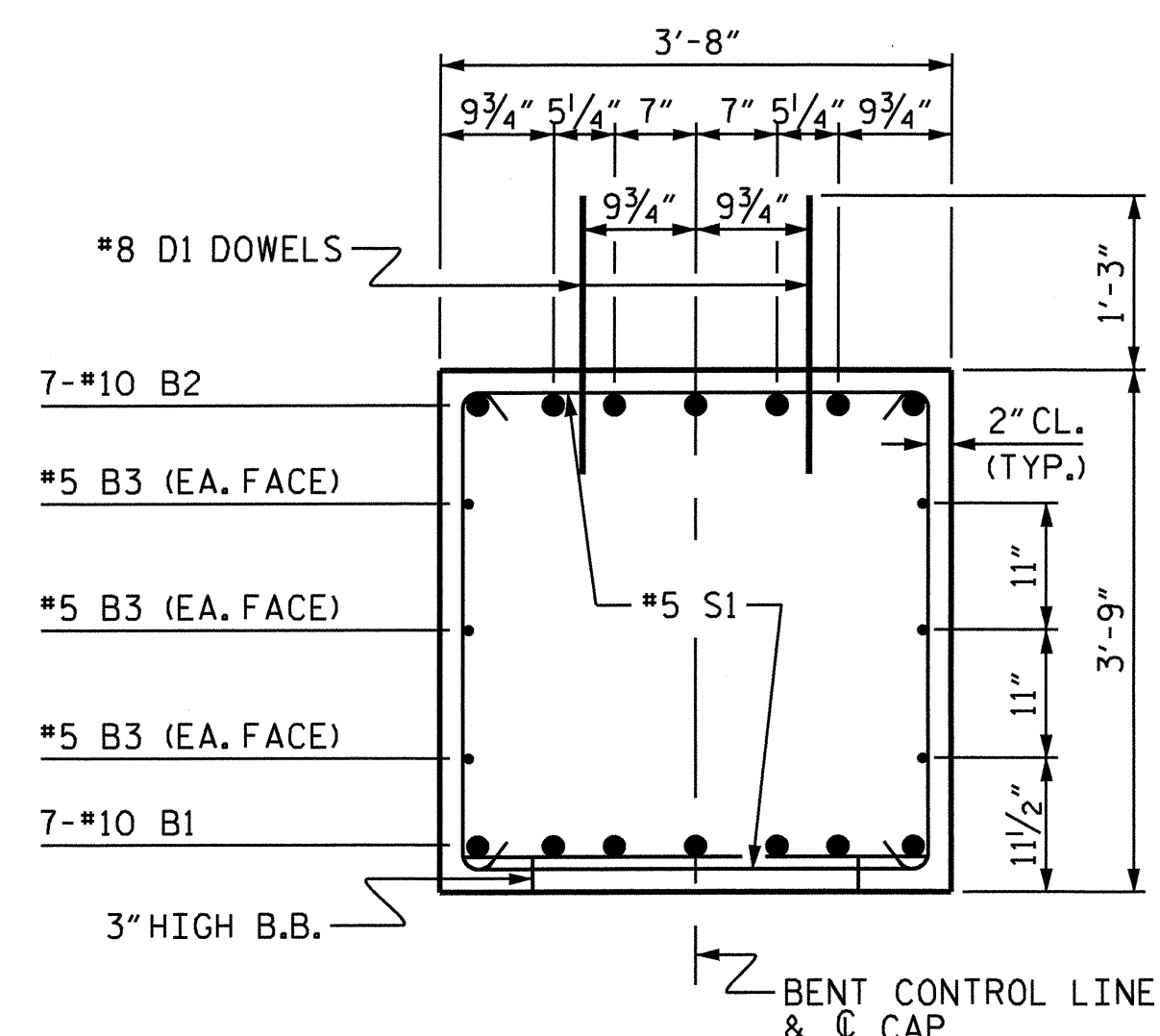
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE

BENT 1

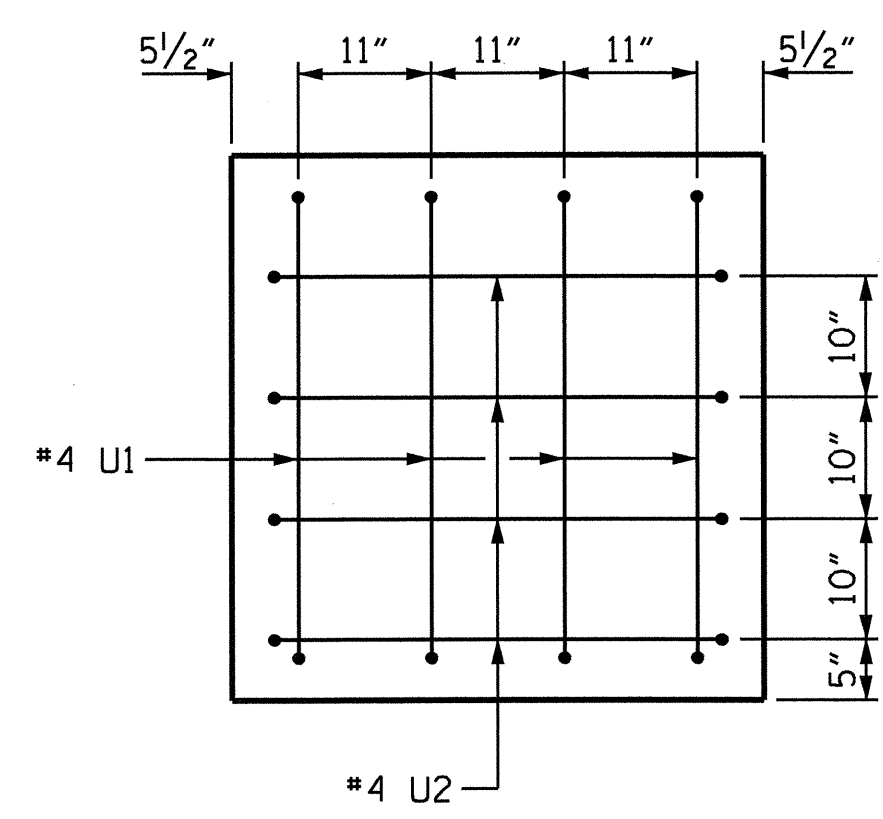
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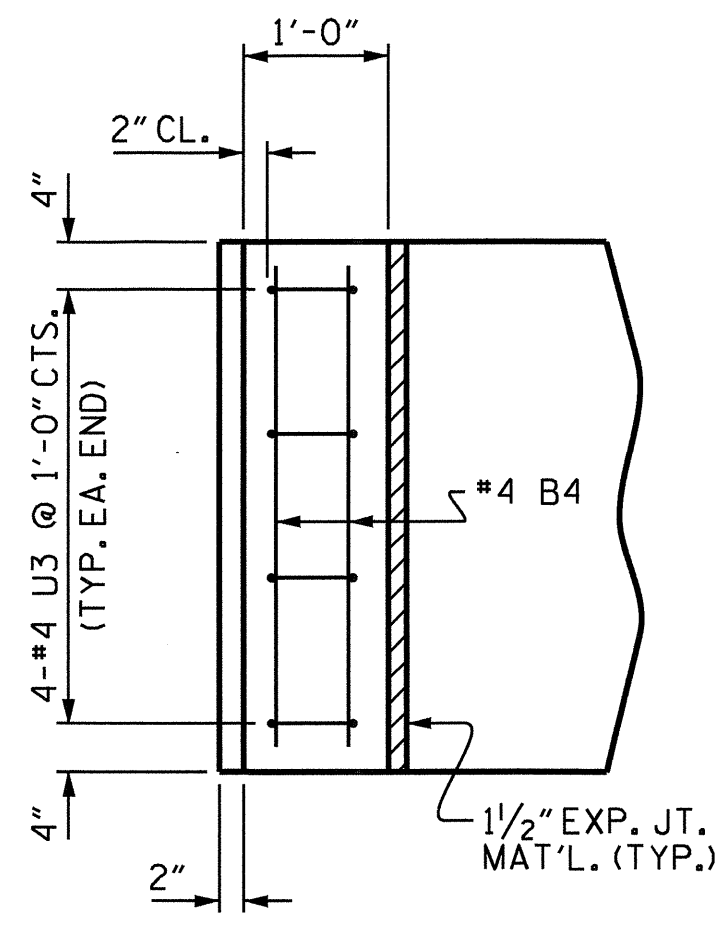
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			25



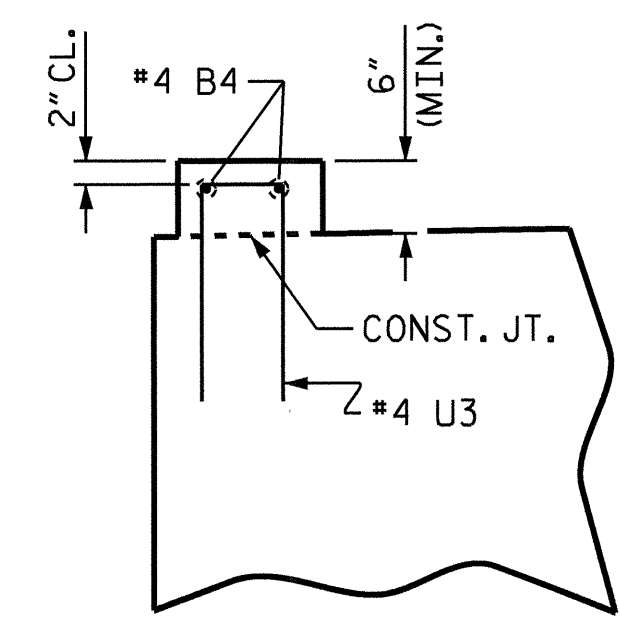
**SECTION A-A**



**SECTION X-X**

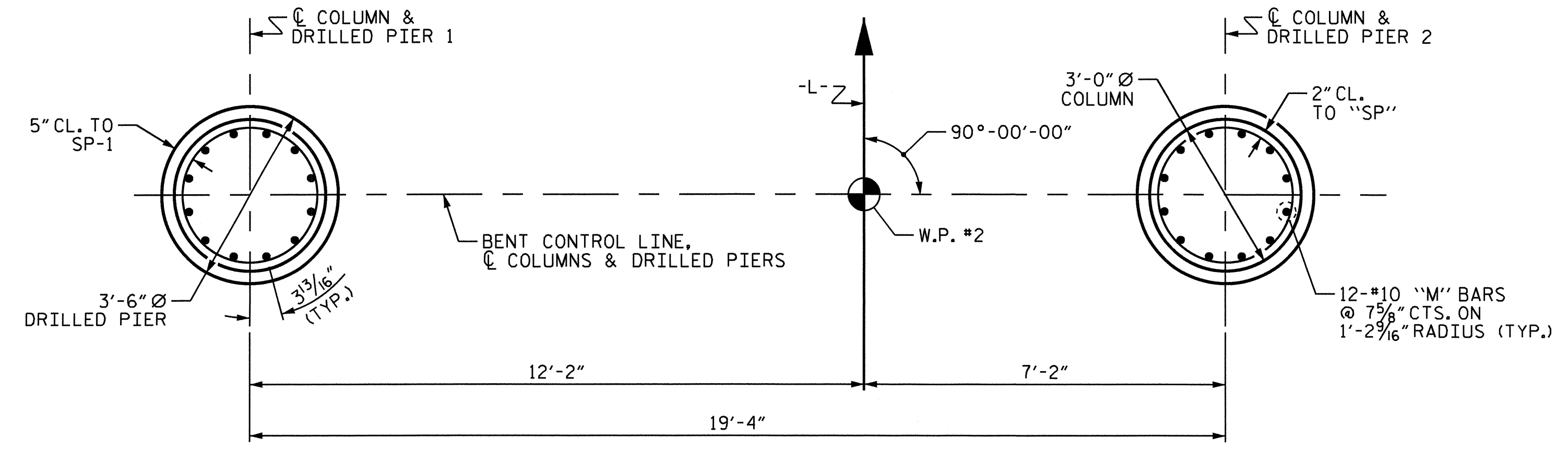


**PLAN**



**ELEVATION**

**LATERAL GUIDE DETAILS**

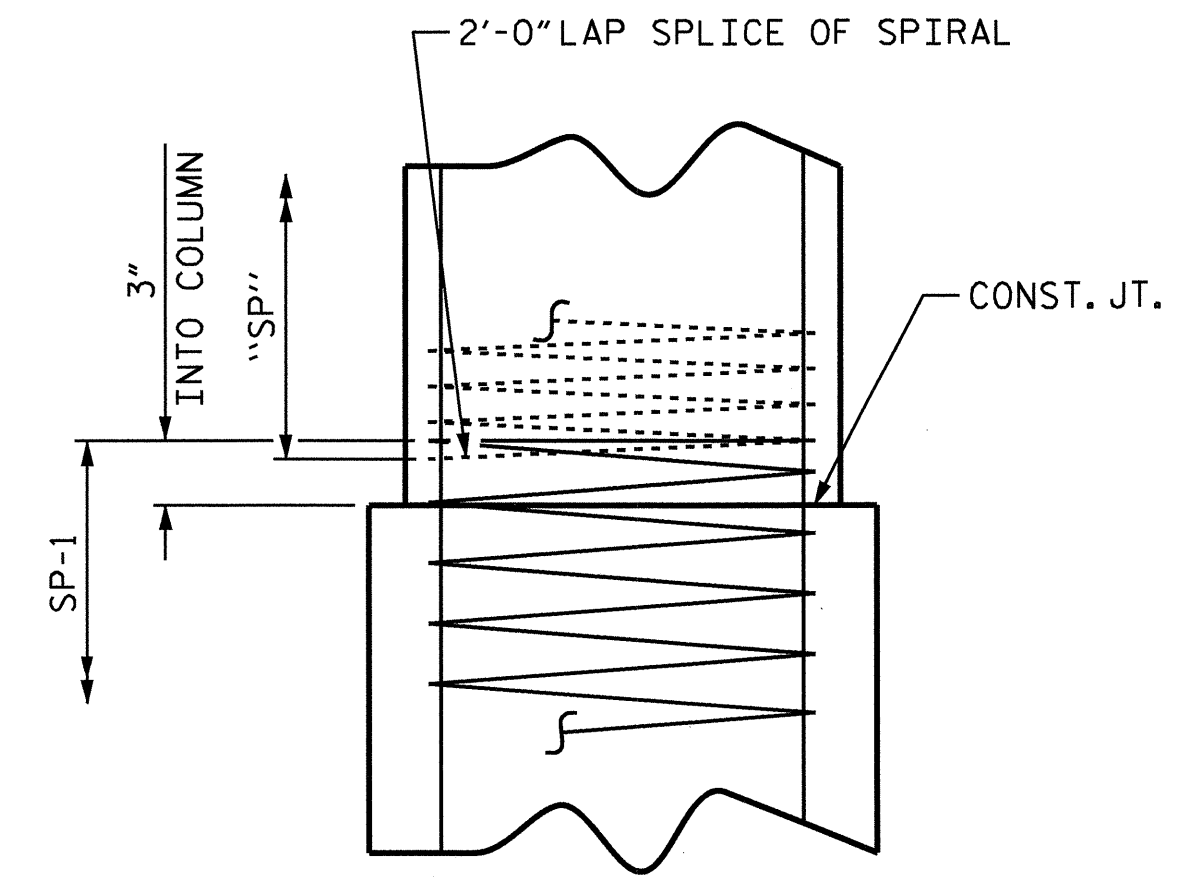


**PLAN OF DRILLED PIERS**  
(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER AND COLUMN)

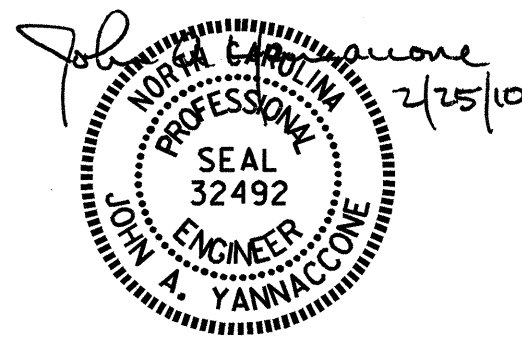
BAR TYPES						BILL OF MATERIAL																																																																																																																																																																																																																																												
						<p align="center"><b>BENT 1</b></p> <table border="1"> <thead> <tr> <th>BAR</th> <th>NO.</th> <th>SIZE</th> <th>TYPE</th> <th>LENGTH</th> <th>WEIGHT</th> </tr> </thead> <tbody> <tr><td>B1</td><td>7</td><td>#10</td><td>STR</td><td>38'-3"</td><td>1152</td></tr> <tr><td>B2</td><td>7</td><td>#10</td><td>STR</td><td>40'-11"</td><td>1232</td></tr> <tr><td>B3</td><td>6</td><td>#5</td><td>STR</td><td>38'-3"</td><td>239</td></tr> <tr><td>B4</td><td>4</td><td>#4</td><td>STR</td><td>3'-4"</td><td>9</td></tr> <tr><td colspan="6"> </td></tr> <tr><td>D1</td><td>48</td><td>#8</td><td>STR</td><td>2'-3"</td><td>288</td></tr> <tr><td colspan="6"> </td></tr> <tr><td>M1</td><td>12</td><td>#10</td><td>2</td><td>56'-11"</td><td>2939</td></tr> <tr><td>M2</td><td>12</td><td>#10</td><td>2</td><td>57'-3"</td><td>2956</td></tr> <tr><td colspan="6"> </td></tr> <tr><td>S1</td><td>52</td><td>#5</td><td>3</td><td>11'-0"</td><td>597</td></tr> <tr><td colspan="6"> </td></tr> <tr><td>U1</td><td>8</td><td>#4</td><td>4</td><td>6'-3"</td><td>33</td></tr> <tr><td>U2</td><td>8</td><td>#4</td><td>4</td><td>6'-2"</td><td>33</td></tr> <tr><td>U3</td><td>8</td><td>#4</td><td>4</td><td>3'-6"</td><td>19</td></tr> <tr><td colspan="6"> </td></tr> <tr><td colspan="5">REINFORCING STEEL</td><td>LBS.</td><td>9497</td></tr> <tr><td>SP-1</td><td>2</td><td>*</td><td>5</td><td>913'-0"</td><td>1905</td></tr> <tr><td>SP-2</td><td>1</td><td>**</td><td>6</td><td>175'-4"</td><td>117</td></tr> <tr><td>SP-3</td><td>1</td><td>**</td><td>6</td><td>183'-7"</td><td>123</td></tr> <tr><td colspan="6"> </td></tr> <tr><td colspan="5">SPIRAL COLUMN REINFORCING STEEL</td><td>LBS.</td><td>2145</td></tr> <tr><td colspan="6">CLASS A CONCRETE</td></tr> <tr><td colspan="4">POUR #2 - COLUMNS</td><td>CU. YDS.</td><td>2.6</td></tr> <tr><td colspan="4">POUR #3 - CAP</td><td>CU. YDS.</td><td>19.6</td></tr> <tr><td colspan="4">POUR #4 - LATERAL GUIDE</td><td>CU. YDS.</td><td>0.1</td></tr> <tr><td colspan="4">TOTAL</td><td>CU. YDS.</td><td>22.3</td></tr> <tr><td colspan="6">DRILLED PIER QUANTITIES:</td></tr> <tr><td colspan="5">DRILLED PIER CONCRETE</td><td></td><td></td></tr> <tr><td colspan="4">POUR #1 - DRILLED PIERS</td><td>CU. YDS.</td><td>32.8</td></tr> <tr><td colspan="4">3'-6" Ø DRILLED PIERS</td><td></td><td></td></tr> <tr><td colspan="4">IN SOIL</td><td>LIN. FT.</td><td>75.00</td></tr> <tr><td colspan="4">3'-6" Ø DRILLED PIERS</td><td></td><td></td></tr> <tr><td colspan="4">NOT IN SOIL</td><td>LIN. FT.</td><td>17.00</td></tr> <tr><td colspan="4">PERMANENT STEEL CASING</td><td></td><td></td></tr> <tr><td colspan="4">FOR 3'-6" Ø DRILLED PIERS</td><td>LIN. FT.</td><td>54.00</td></tr> <tr><td colspan="4">CSL TUBES</td><td>LIN. FT.</td><td>388.00</td></tr> </tbody> </table>						BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	B1	7	#10	STR	38'-3"	1152	B2	7	#10	STR	40'-11"	1232	B3	6	#5	STR	38'-3"	239	B4	4	#4	STR	3'-4"	9							D1	48	#8	STR	2'-3"	288							M1	12	#10	2	56'-11"	2939	M2	12	#10	2	57'-3"	2956							S1	52	#5	3	11'-0"	597							U1	8	#4	4	6'-3"	33	U2	8	#4	4	6'-2"	33	U3	8	#4	4	3'-6"	19							REINFORCING STEEL					LBS.	9497	SP-1	2	*	5	913'-0"	1905	SP-2	1	**	6	175'-4"	117	SP-3	1	**	6	183'-7"	123							SPIRAL COLUMN REINFORCING STEEL					LBS.	2145	CLASS A CONCRETE						POUR #2 - COLUMNS				CU. YDS.	2.6	POUR #3 - CAP				CU. YDS.	19.6	POUR #4 - LATERAL GUIDE				CU. YDS.	0.1	TOTAL				CU. YDS.	22.3	DRILLED PIER QUANTITIES:						DRILLED PIER CONCRETE							POUR #1 - DRILLED PIERS				CU. YDS.	32.8	3'-6" Ø DRILLED PIERS						IN SOIL				LIN. FT.	75.00	3'-6" Ø DRILLED PIERS						NOT IN SOIL				LIN. FT.	17.00	PERMANENT STEEL CASING						FOR 3'-6" Ø DRILLED PIERS				LIN. FT.	54.00	CSL TUBES				LIN. FT.	388.00
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT																																																																																																																																																																																																																																													
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U3	8	#4	4	3'-6"	19																																																																																																																																																																																																																																													
REINFORCING STEEL					LBS.	9497																																																																																																																																																																																																																																												
SP-1	2	*	5	913'-0"	1905																																																																																																																																																																																																																																													
SP-2	1	**	6	175'-4"	117																																																																																																																																																																																																																																													
SP-3	1	**	6	183'-7"	123																																																																																																																																																																																																																																													
SPIRAL COLUMN REINFORCING STEEL					LBS.	2145																																																																																																																																																																																																																																												
CLASS A CONCRETE																																																																																																																																																																																																																																																		
POUR #2 - COLUMNS				CU. YDS.	2.6																																																																																																																																																																																																																																													
POUR #3 - CAP				CU. YDS.	19.6																																																																																																																																																																																																																																													
POUR #4 - LATERAL GUIDE				CU. YDS.	0.1																																																																																																																																																																																																																																													
TOTAL				CU. YDS.	22.3																																																																																																																																																																																																																																													
DRILLED PIER QUANTITIES:																																																																																																																																																																																																																																																		
DRILLED PIER CONCRETE																																																																																																																																																																																																																																																		
POUR #1 - DRILLED PIERS				CU. YDS.	32.8																																																																																																																																																																																																																																													
3'-6" Ø DRILLED PIERS																																																																																																																																																																																																																																																		
IN SOIL				LIN. FT.	75.00																																																																																																																																																																																																																																													
3'-6" Ø DRILLED PIERS																																																																																																																																																																																																																																																		
NOT IN SOIL				LIN. FT.	17.00																																																																																																																																																																																																																																													
PERMANENT STEEL CASING																																																																																																																																																																																																																																																		
FOR 3'-6" Ø DRILLED PIERS				LIN. FT.	54.00																																																																																																																																																																																																																																													
CSL TUBES				LIN. FT.	388.00																																																																																																																																																																																																																																													

ALL BAR DIMENSIONS ARE OUT TO OUT.

\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
\* THE SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



**CONSTRUCTION JOINT DETAIL**

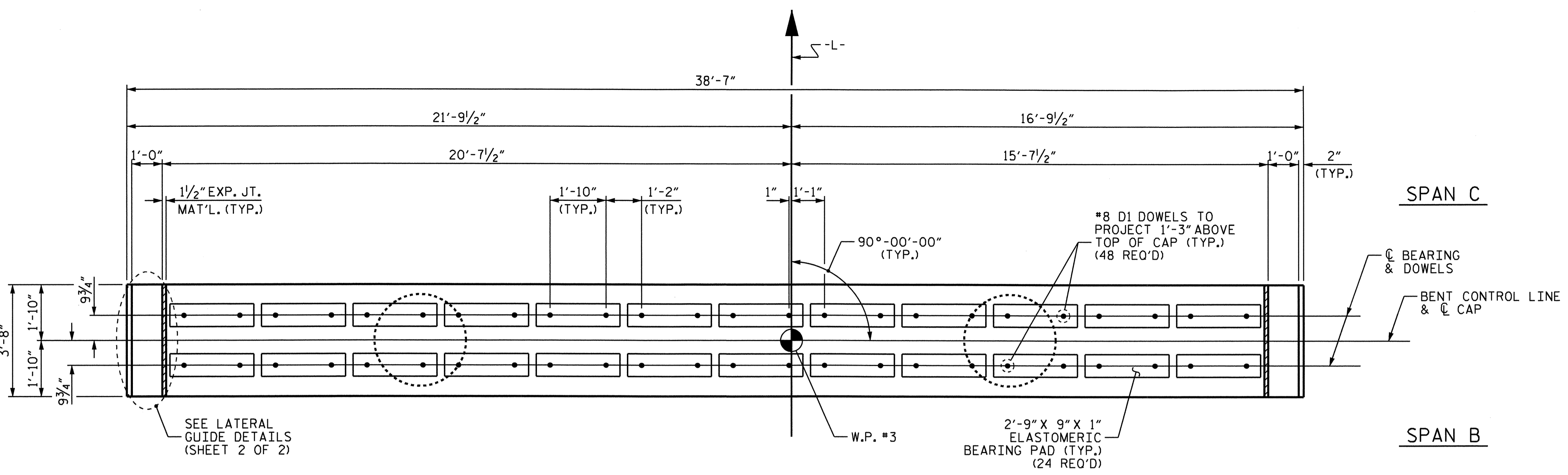


PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 2 OF 2

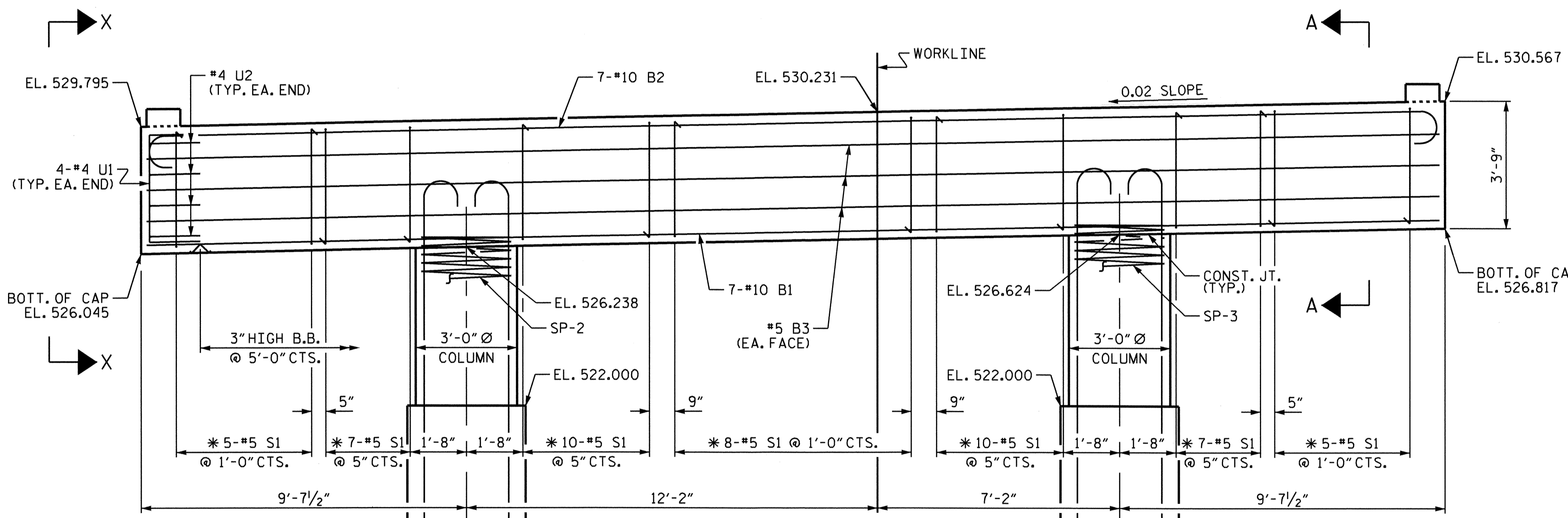
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
BENT 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DRAWN BY: E.C. LOCKLEAR DATE: 12-15-09  
 CHECKED BY: J. YANNACCONE DATE: 12-30-09

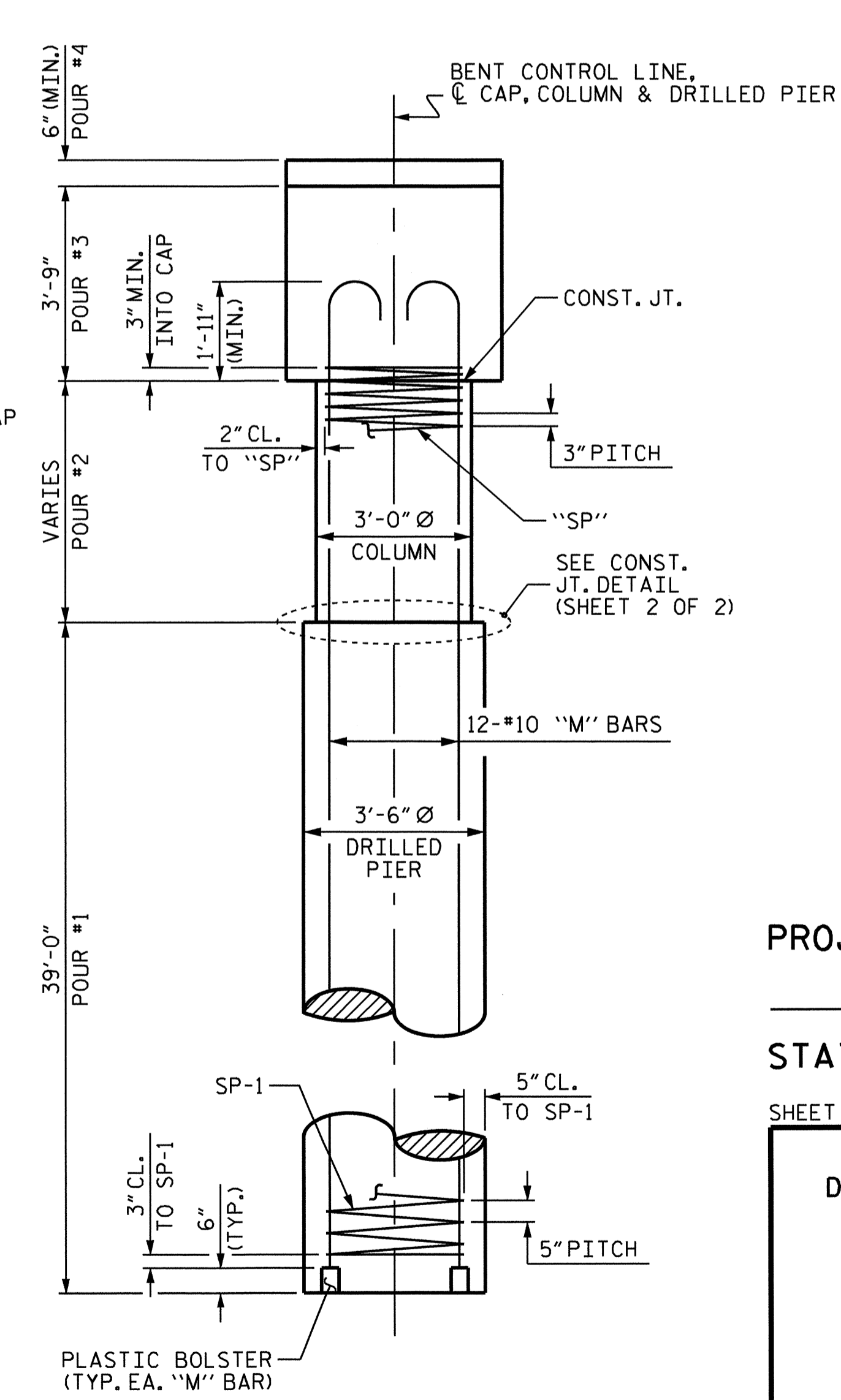
SHEET NO.  
S-17  
 TOTAL SHEETS  
25



**PLAN**



**ELEVATION**



**END ELEVATION**

**NOTES**

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

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

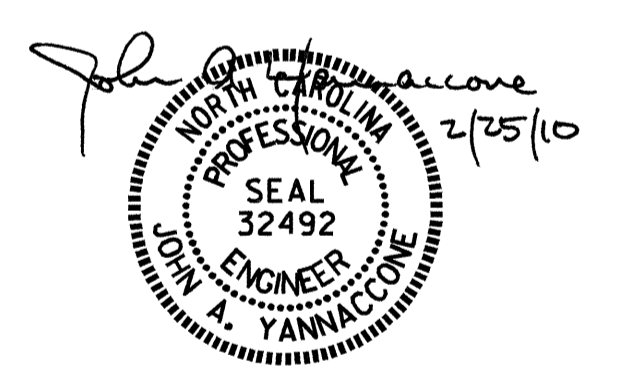
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

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

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

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

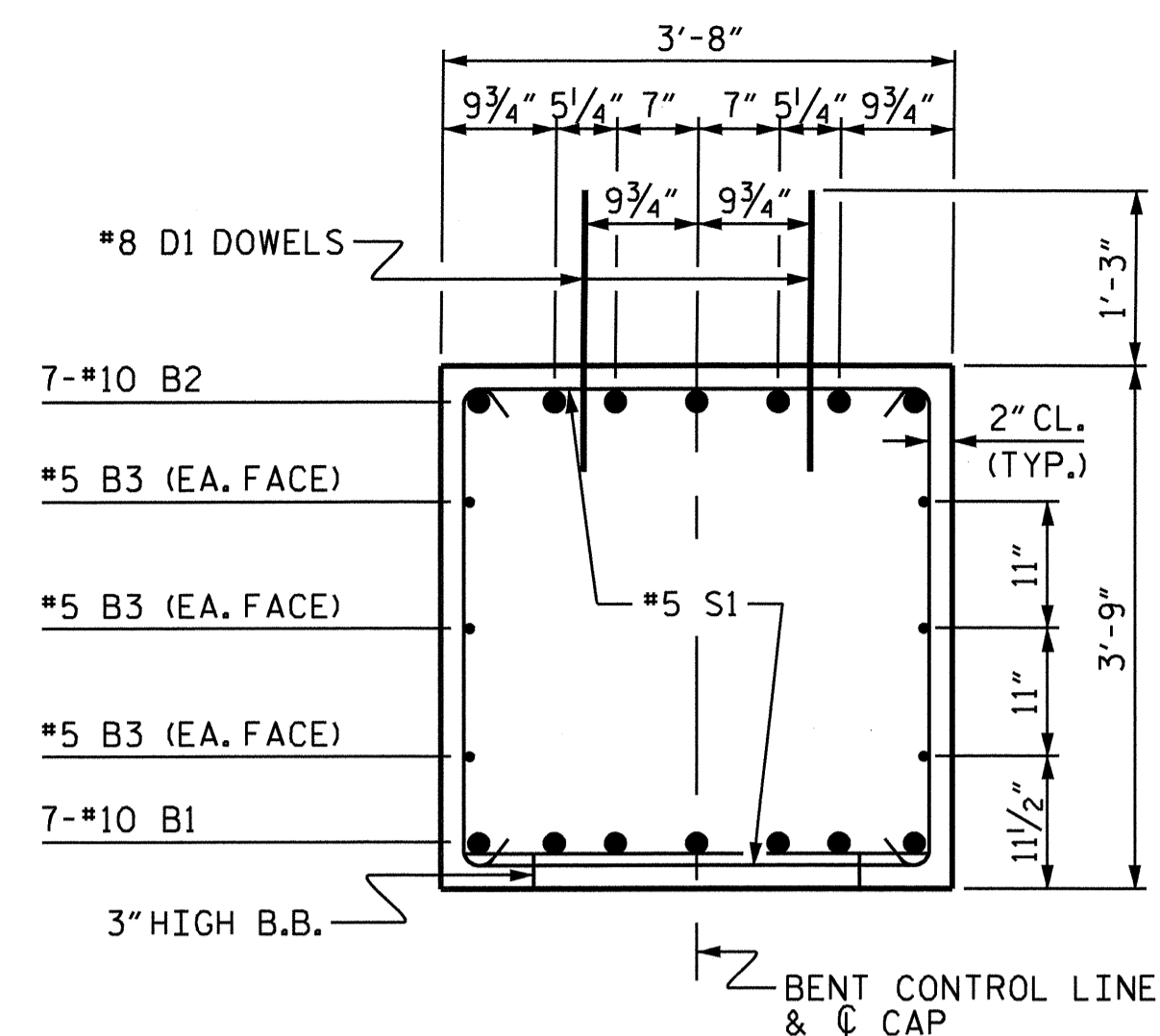


PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 1 OF 2

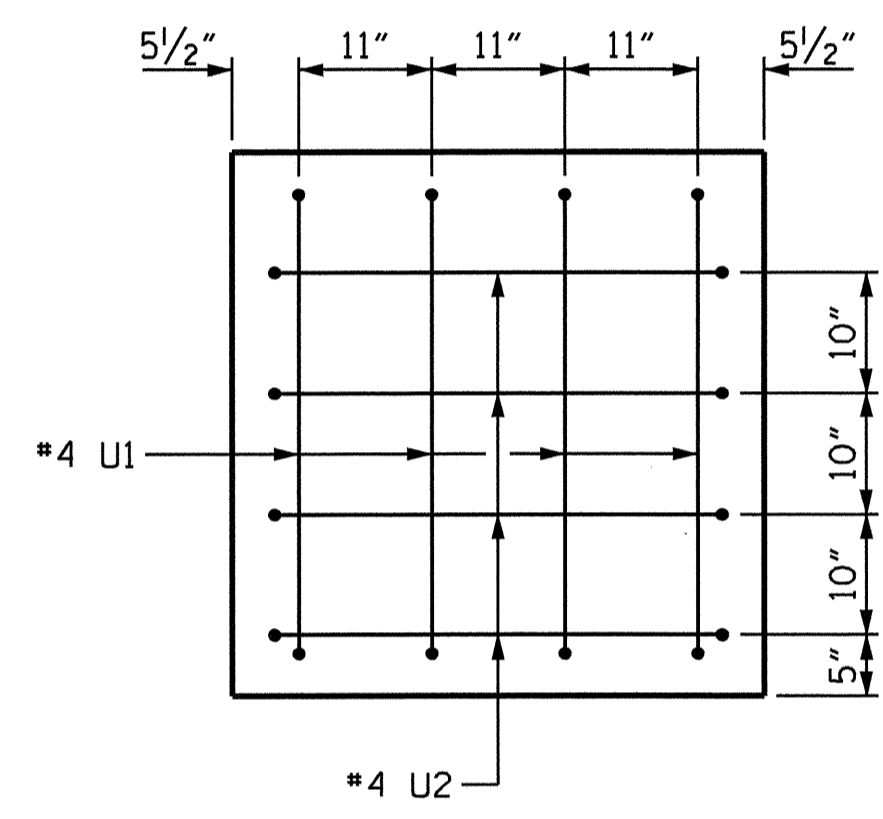
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**BENT 2**

REVISIONS						SHEET NO.	
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2			4				

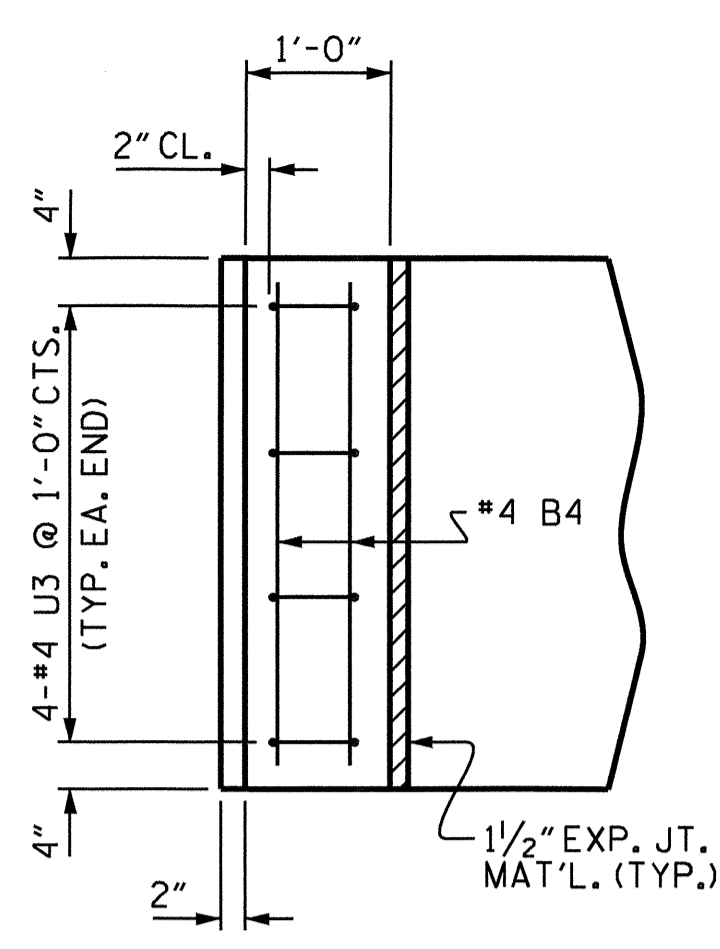
DRAWN BY: E.C. LOCKLEAR DATE: 12-15-09  
 CHECKED BY: J. YANNACCONE DATE: 12-30-09



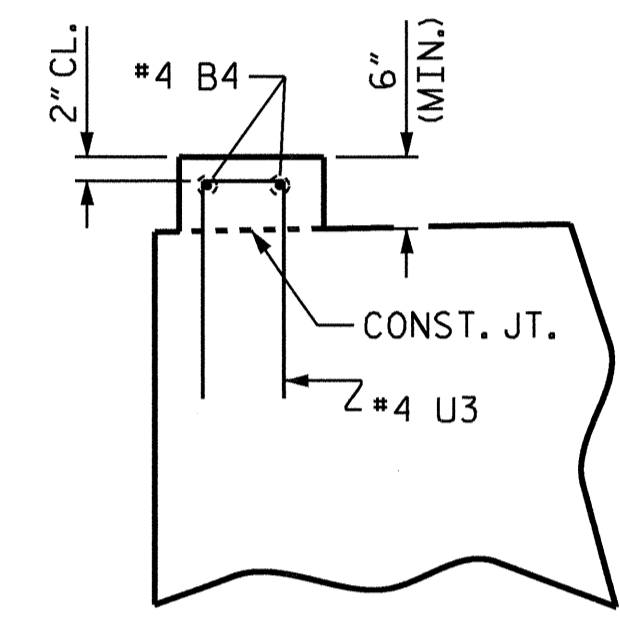
**SECTION A-A**



**SECTION X-X**

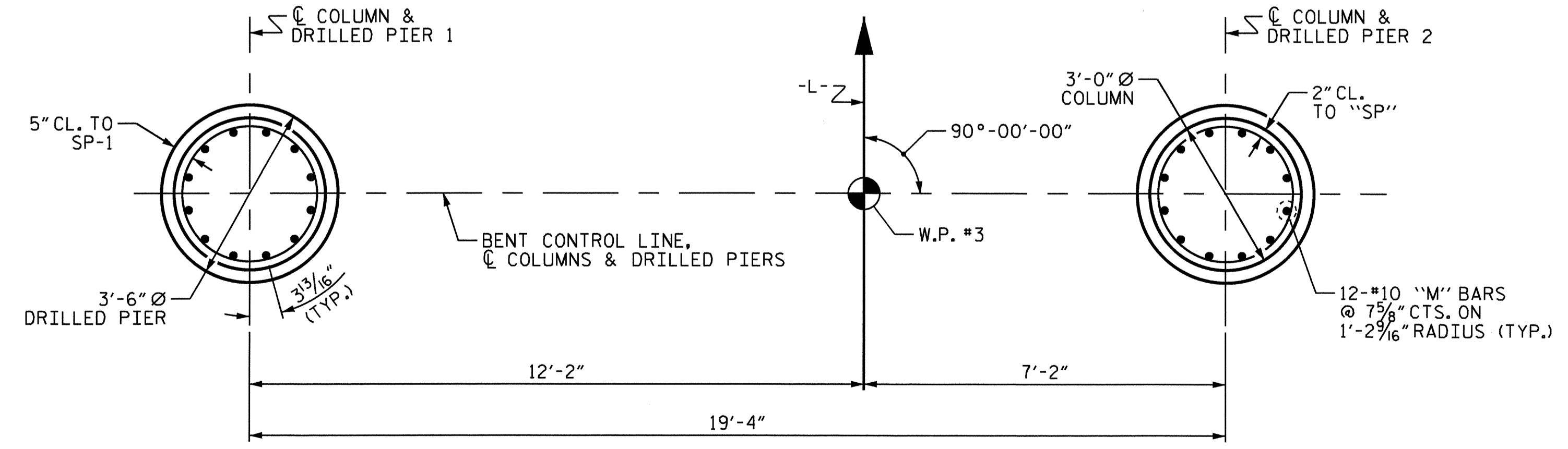


**PLAN**

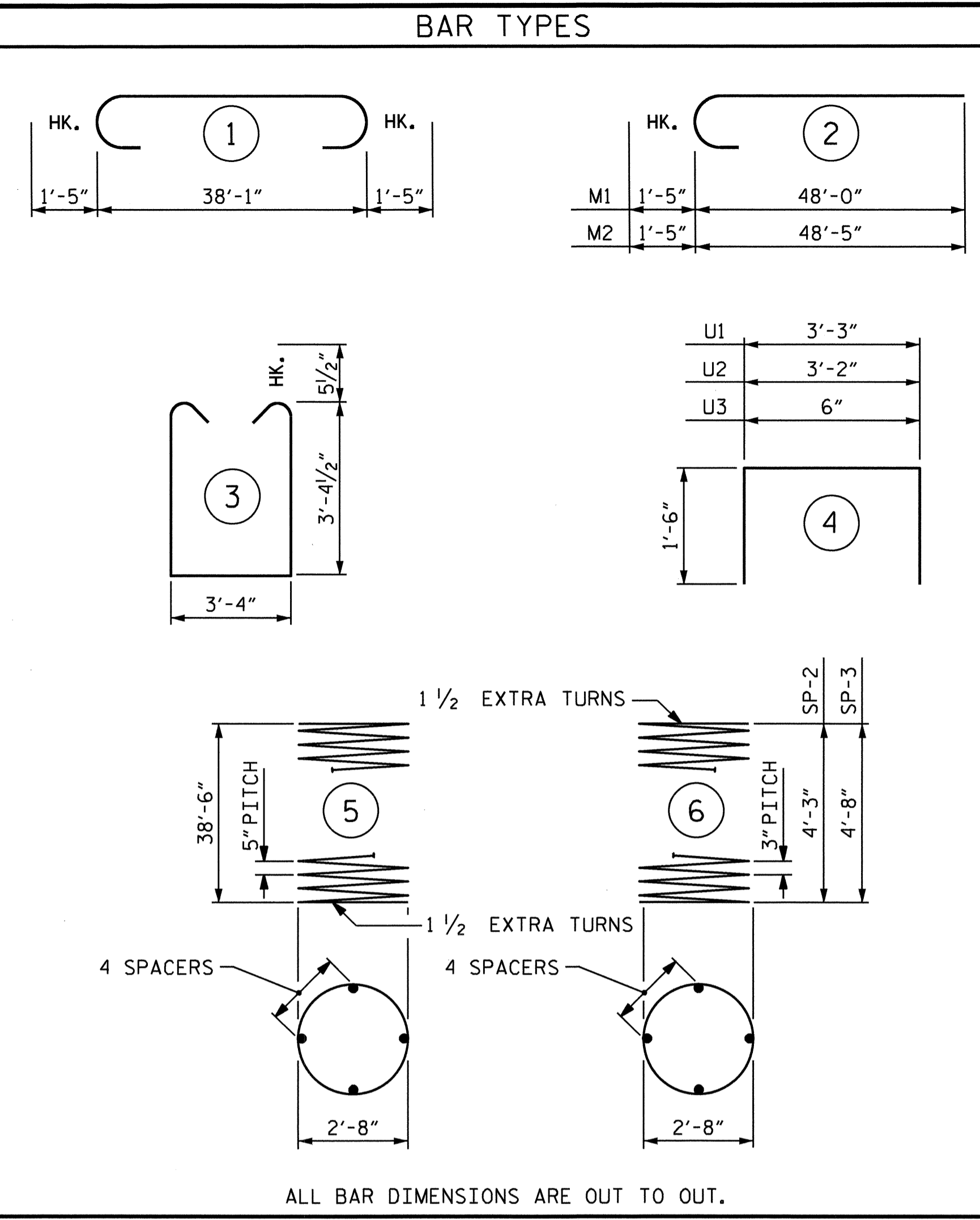


**ELEVATION**

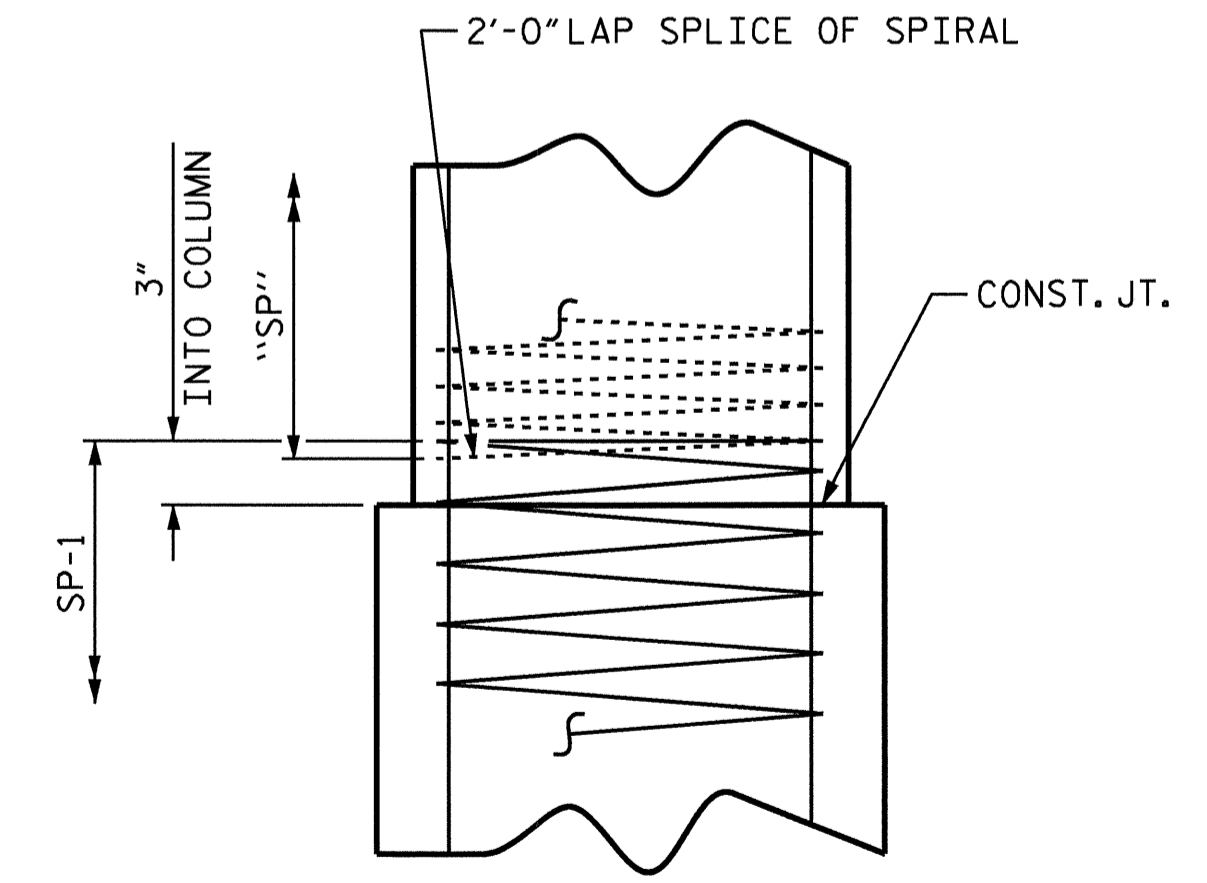
**LATERAL GUIDE DETAILS**



**PLAN OF DRILLED PIERS**  
(REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER AND COLUMN)



ALL BAR DIMENSIONS ARE OUT TO OUT.

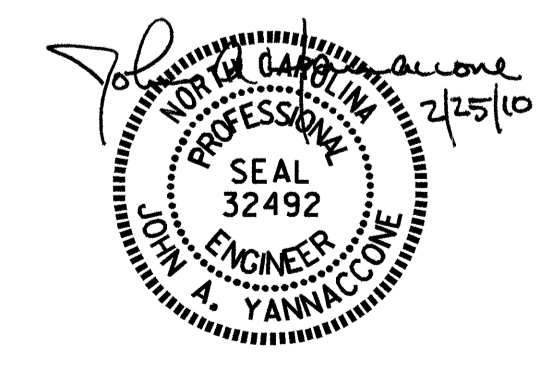


**CONSTRUCTION JOINT DETAIL**

BILL OF MATERIAL					
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#10	STR	38'-3"	1152
B2	7	#10	1	40'-11"	1232
B3	6	#5	STR	38'-3"	239
B4	4	#4	STR	3'-4"	9
D1	48	#8	STR	2'-3"	288
M1	12	#10	2	49'-5"	2552
M2	12	#10	2	49'-10"	2573
S1	52	#5	3	11'-0"	597
U1	8	#4	4	6'-3"	33
U2	8	#4	4	6'-2"	33
U3	8	#4	4	3'-6"	19
REINFORCING STEEL				LBS.	8727
SP-1	2	*	5	773'-2"	1613
SP-2	1	**	6	158'-10"	106
SP-3	1	**	6	175'-4"	117
SPIRAL COLUMN REINFORCING STEEL				LBS.	1836
CLASS A CONCRETE					
POUR #2 - COLUMNS				CU. YDS.	2.3
POUR #3 - CAP				CU. YDS.	19.6
POUR #4 - LATERAL GUIDE				CU. YDS.	0.1
TOTAL				CU. YDS.	22.0
DRILLED PIER QUANTITIES:					
DRILLED PIER CONCRETE					
POUR #1 - DRILLED PIERS				CU. YDS.	27.8
3'-6" Ø DRILLED PIERS IN SOIL				LIN. FT.	61.00
3'-6" Ø DRILLED PIERS NOT IN SOIL				LIN. FT.	17.00
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS				LIN. FT.	50.00
CSL TUBES				LIN. FT.	332.00

\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.  
 \*\* THE SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

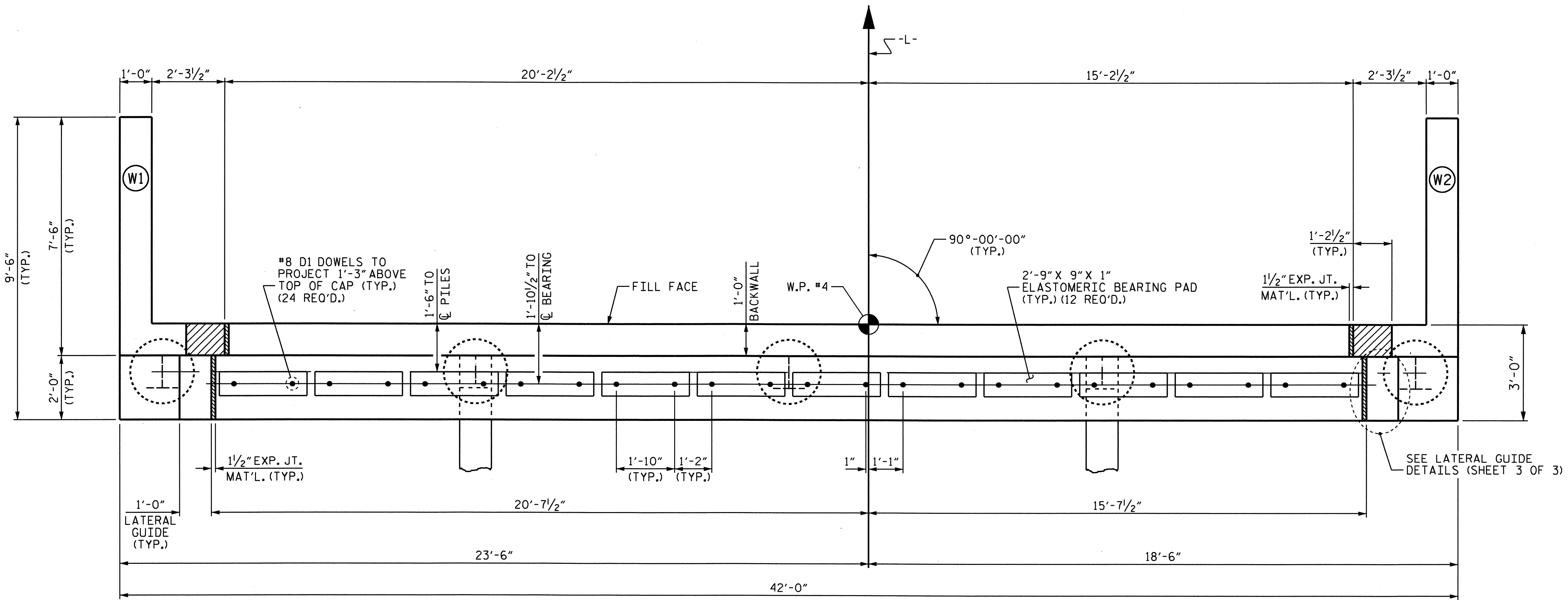
PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 2 OF 2



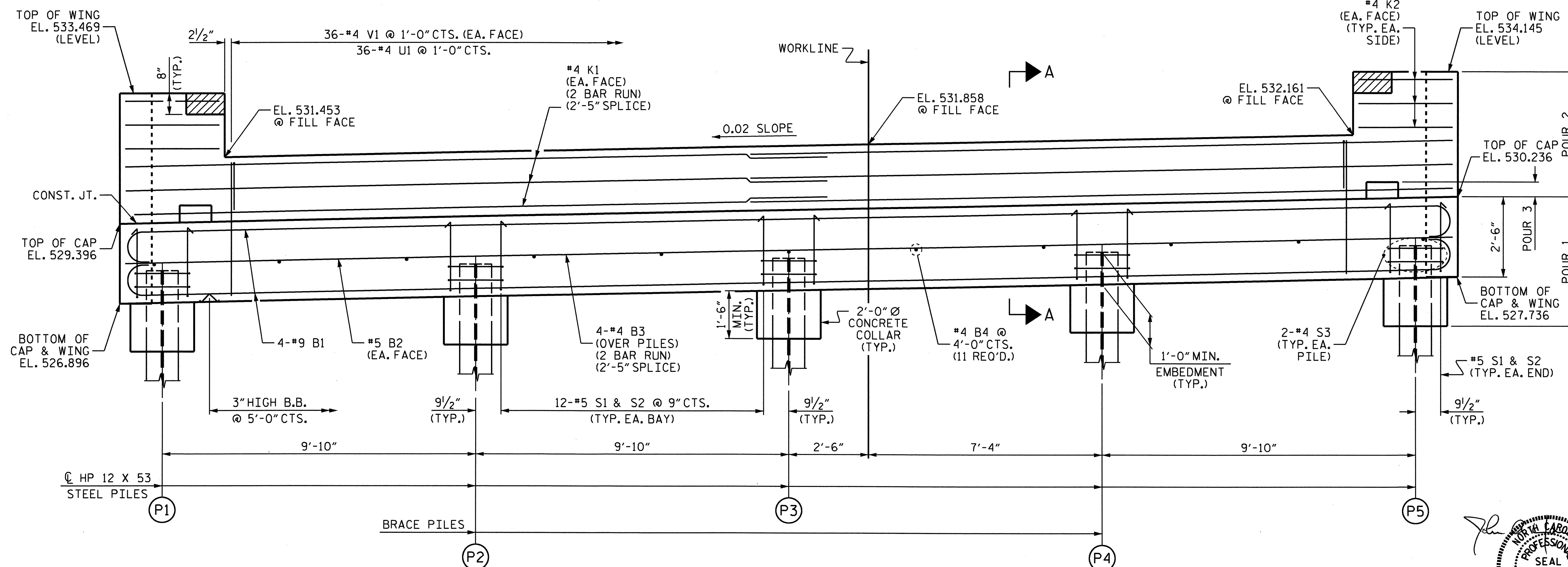
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			25

DRAWN BY: E.C. LOCKLEAR DATE: 12-15-09  
 CHECKED BY: J. YANNACCONE DATE: 12-30-09



PLAN



ELEVATION

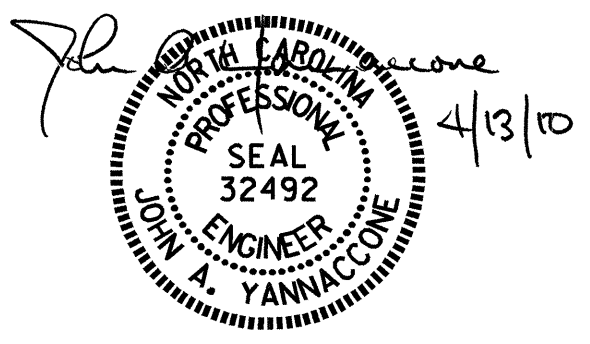
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #8 D1 DOWELS.  
 THE LATERAL GUIDE AT EACH END OF CAP IS NOT TO BE POURED UNTIL AFTER BOX BEAM UNITS ARE IN PLACE.  
 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.

TOP OF PILE ELEVATIONS	
(P1)	527.933
(P2)	528.130
(P3)	528.326
(P4)	528.523
(P5)	528.720

PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-  
 SHEET 1 OF 3

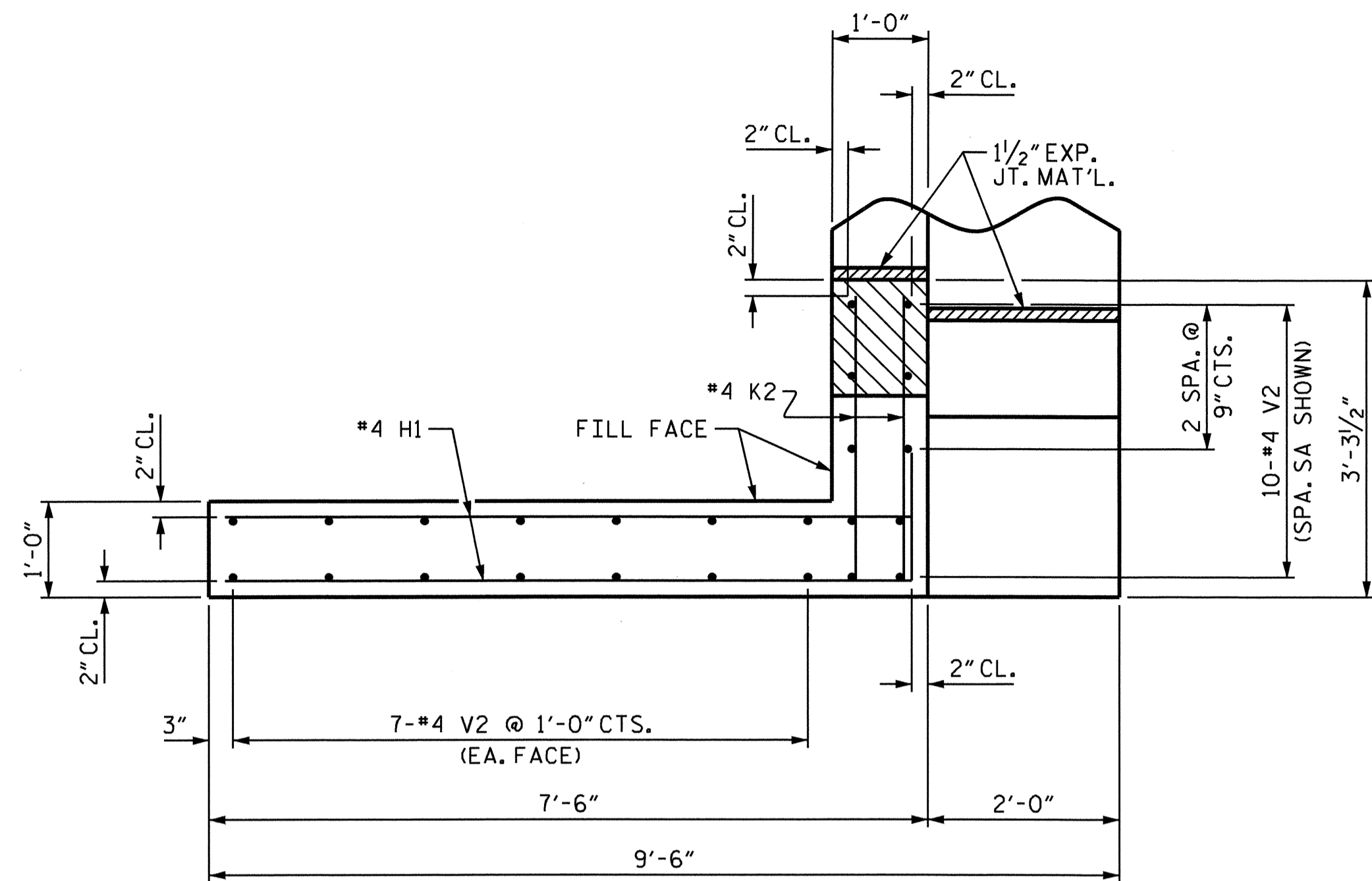
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2



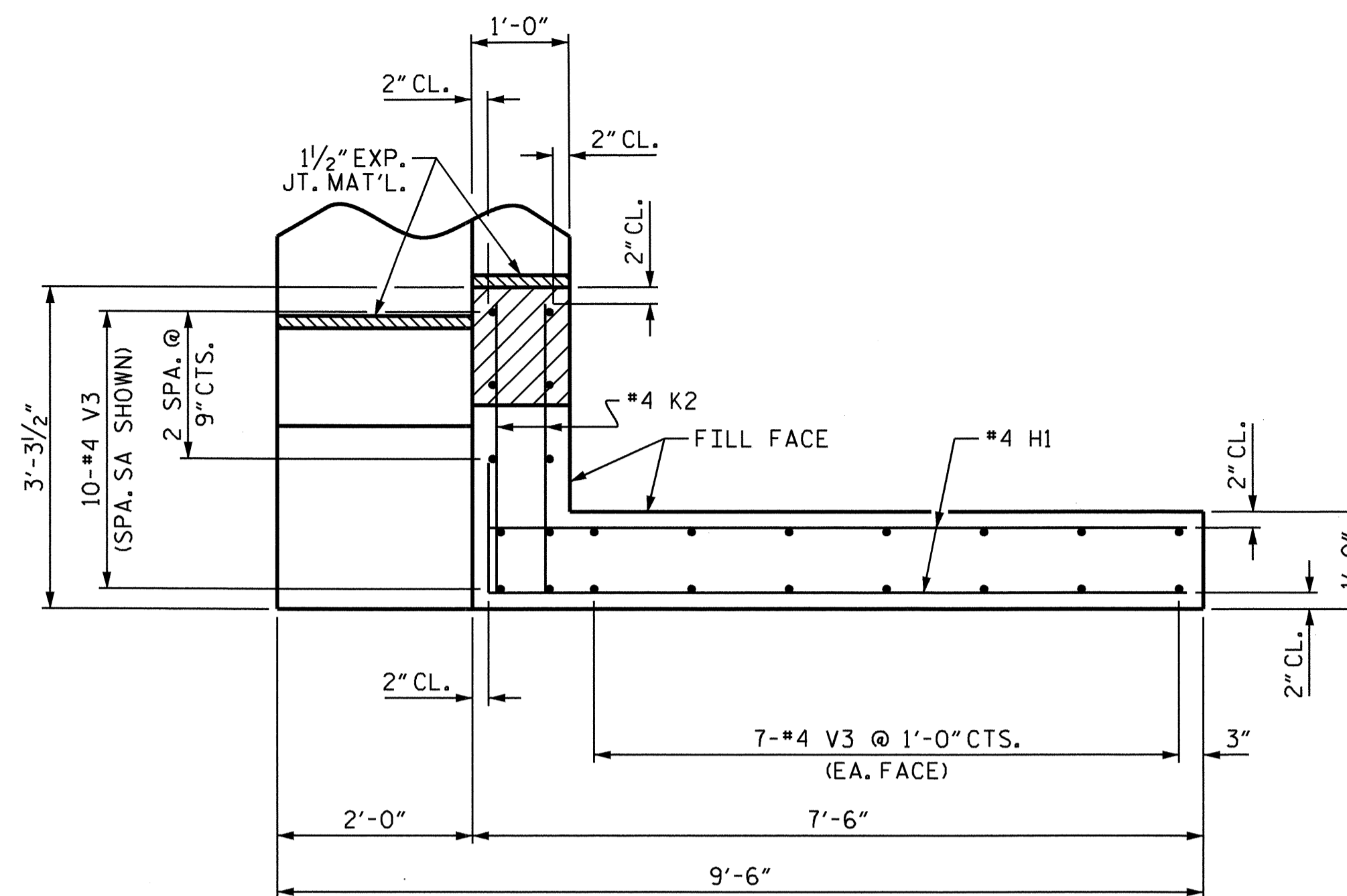
DRAWN BY: E.C. LOCKLEAR DATE: 11-5-09  
 CHECKED BY: J. YANNACCONE DATE: 12-28-09

13-APR-2010 12:00  
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 JYannaccone

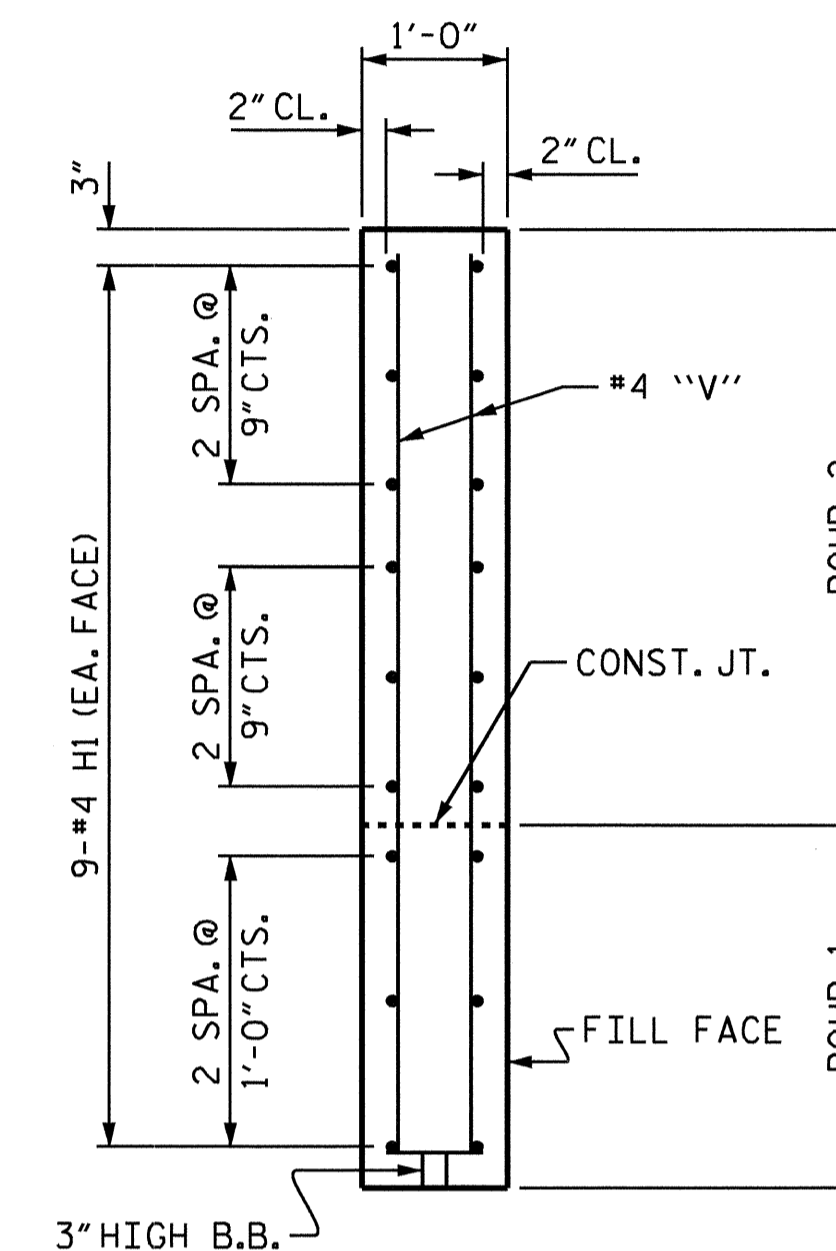
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
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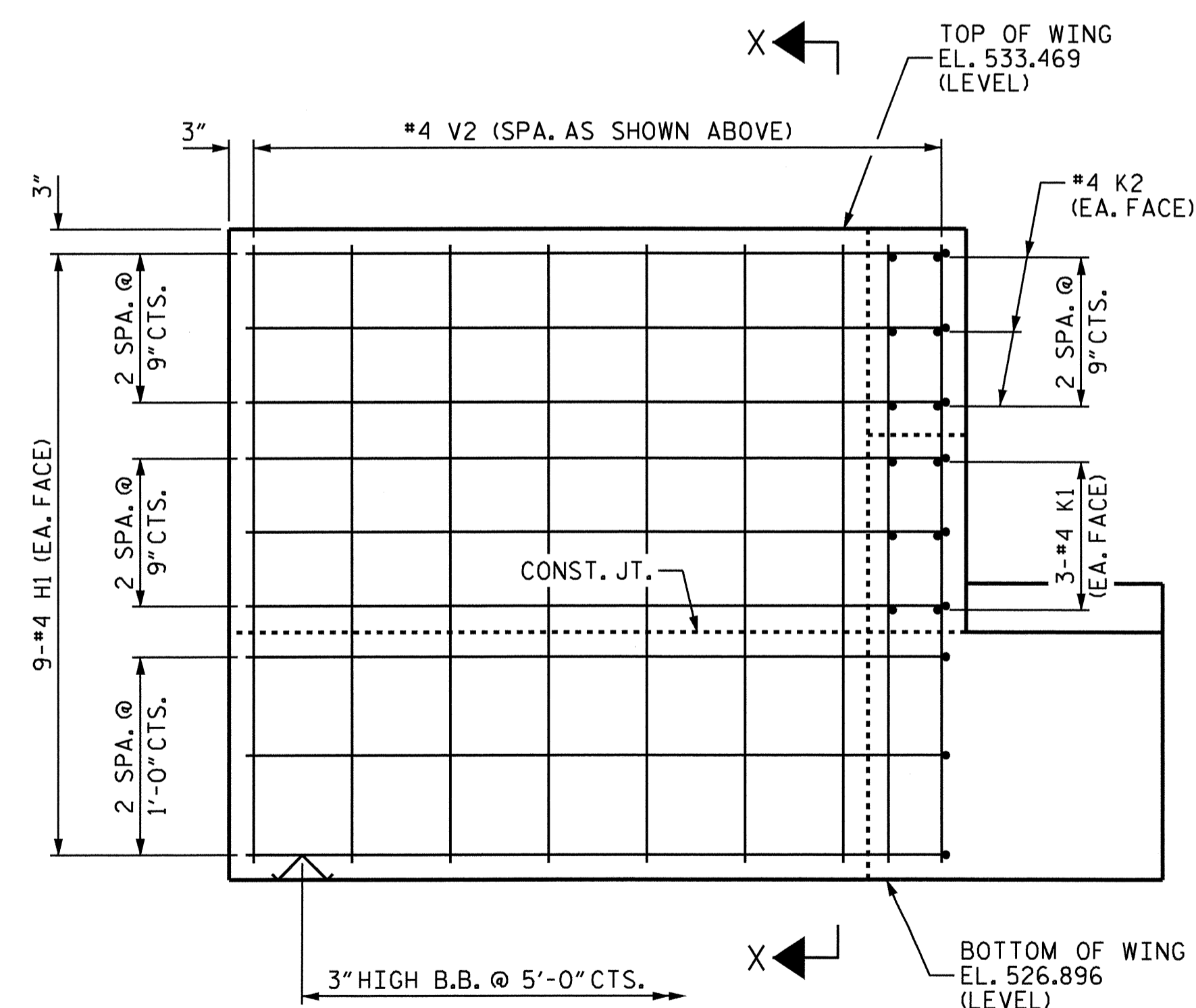
PLAN OF WING (W1)



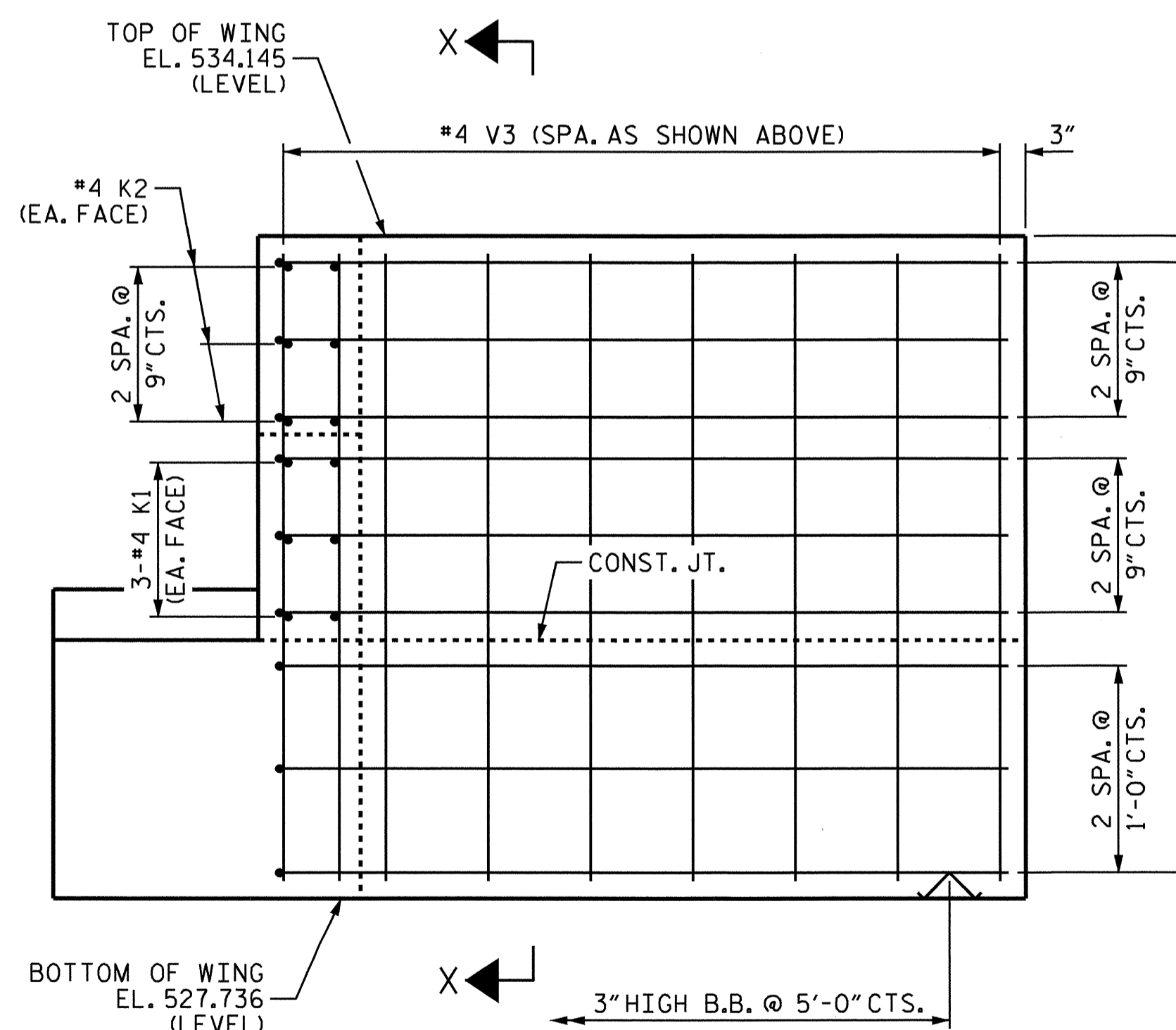
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)

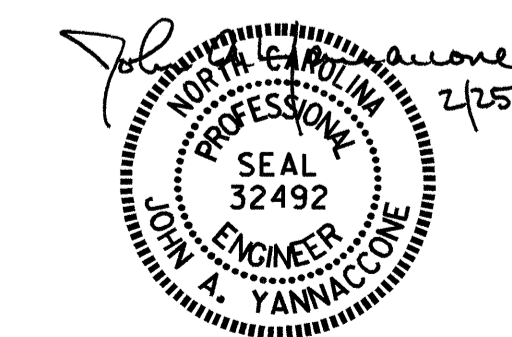


ELEVATION OF WING (W2)

PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 2 OF 3

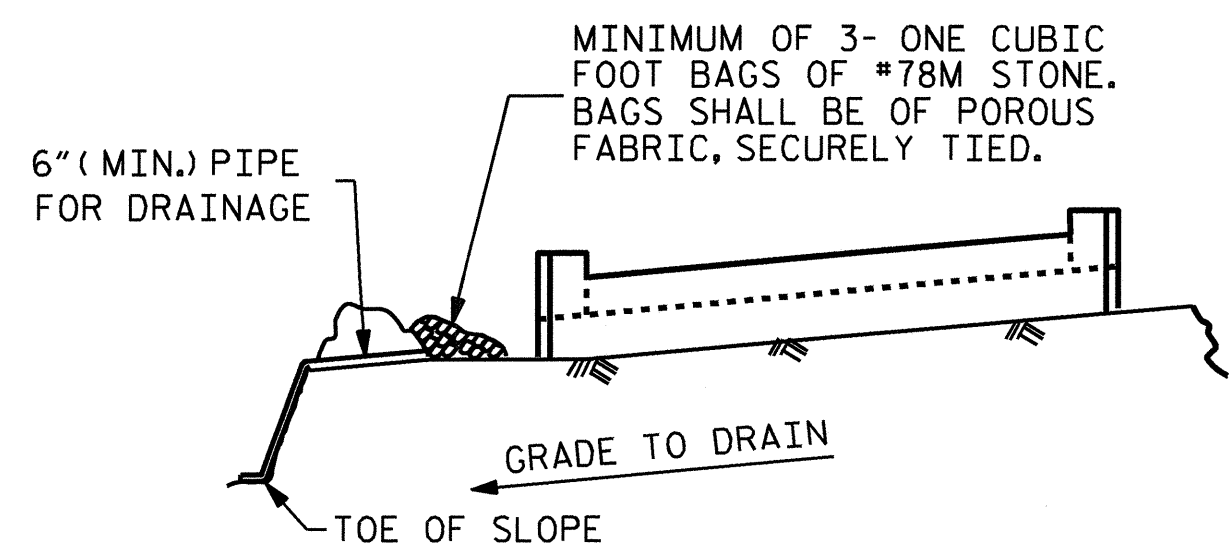
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2



DRAWN BY: E.C. LOCKLEAR DATE: 11-6-09  
 CHECKED BY: J. YANNACCONE DATE: 12-28-09

25-FEB-2010 11:35  
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 JYannaccone

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	
2			4			25	

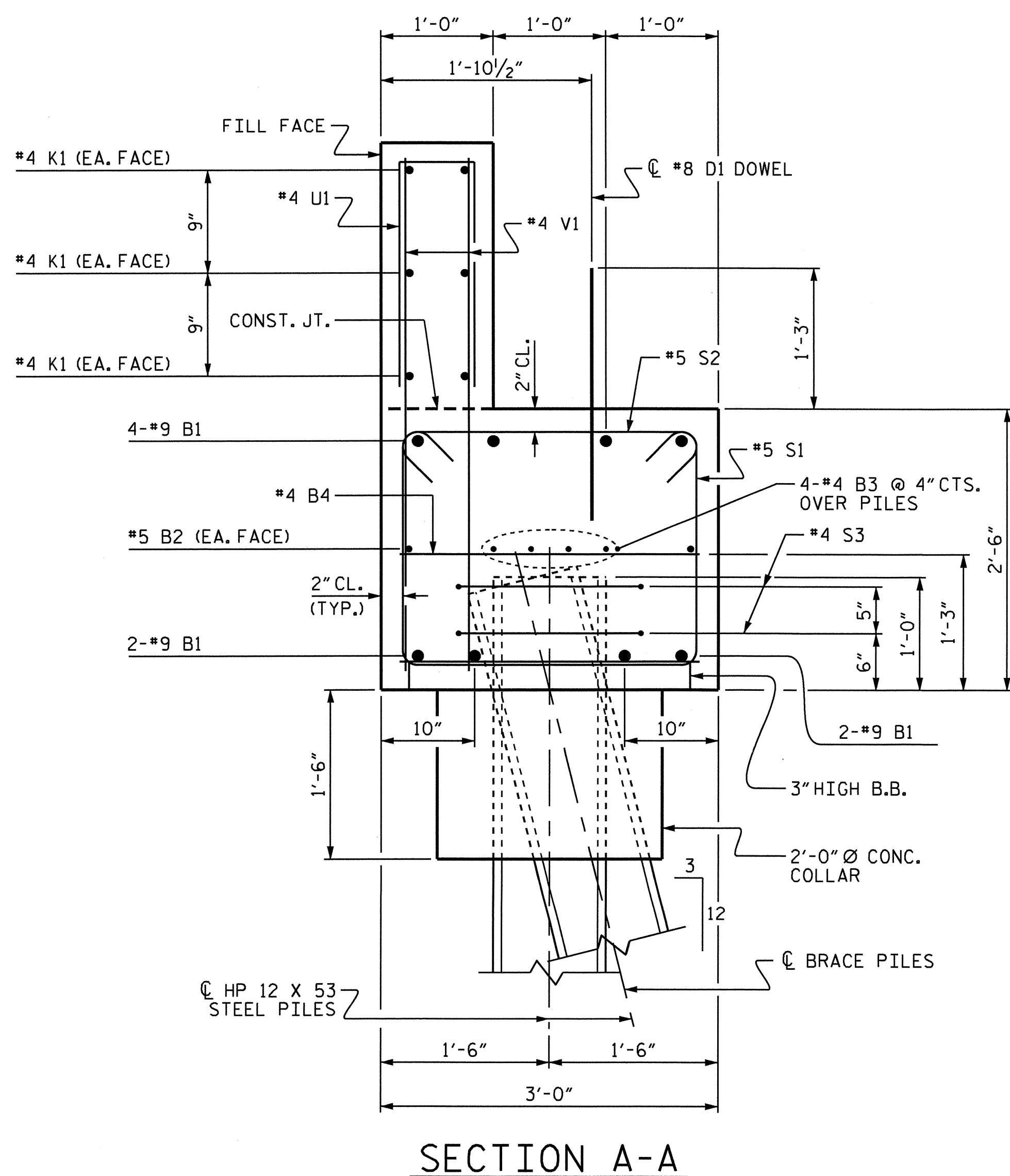


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

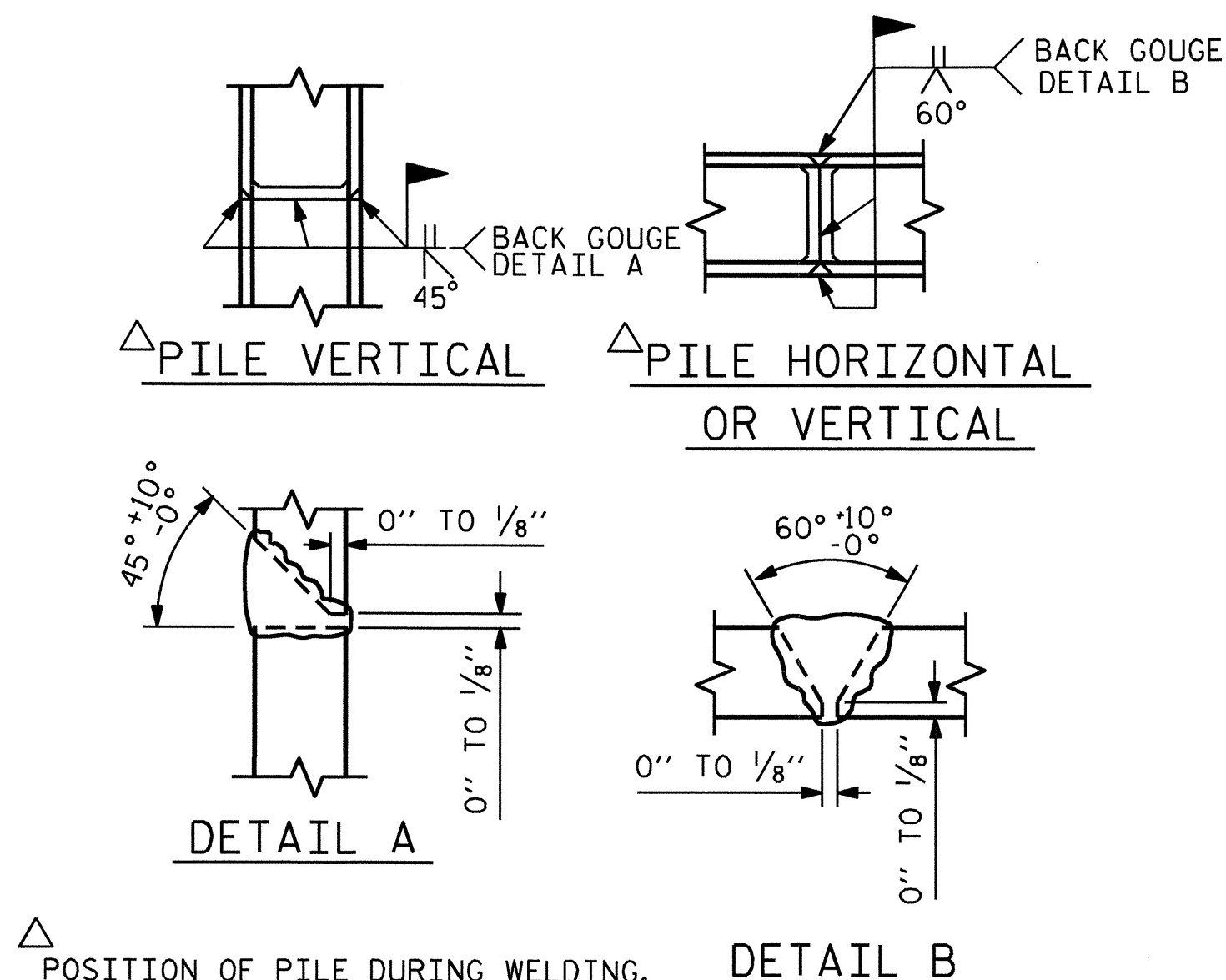
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

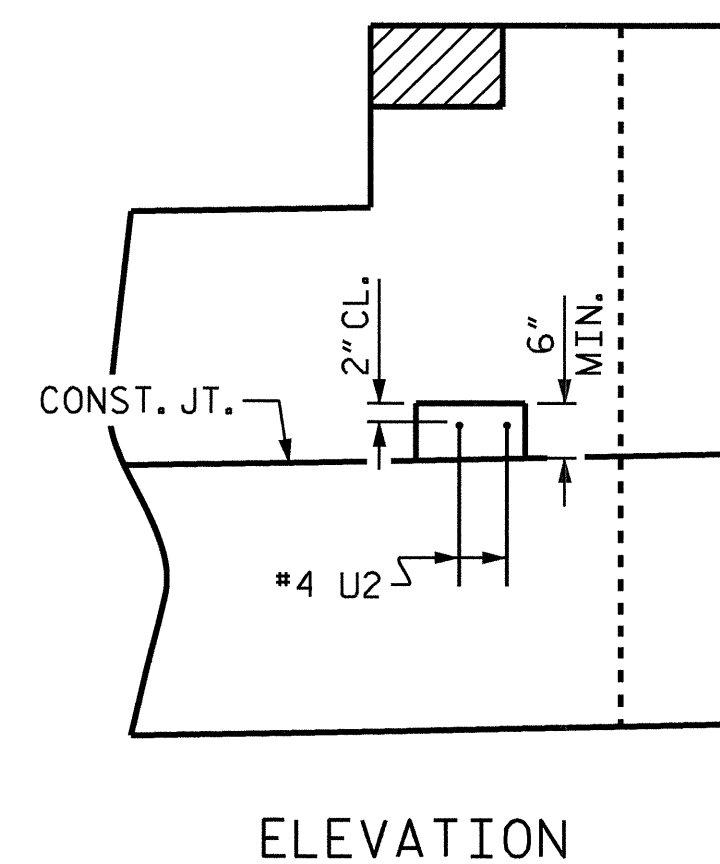
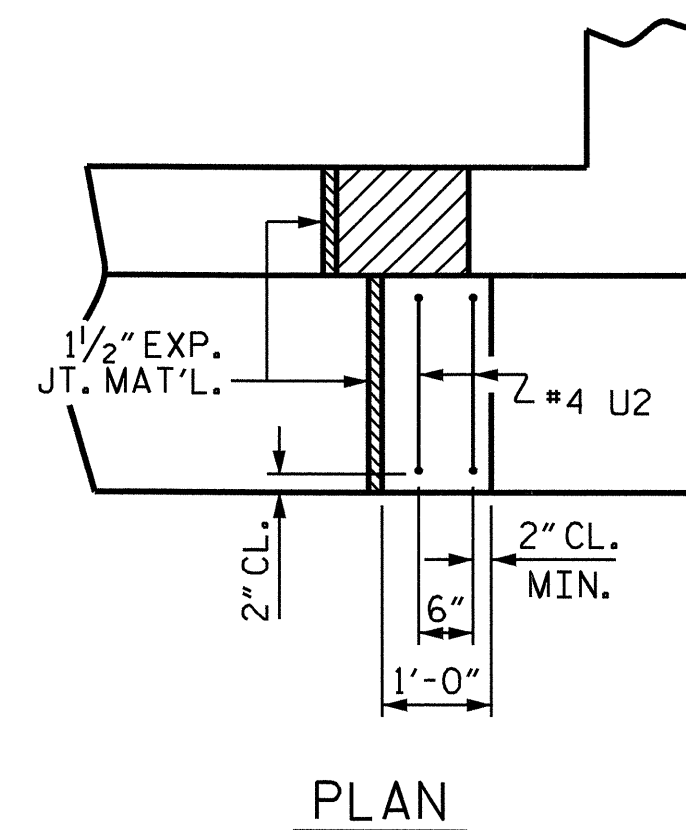
### TEMPORARY DRAINAGE AT END BENT



SECTION A-A



### PILE SPLICE DETAILS



### LATERAL GUIDE DETAILS

(EACH END SIMILAR)

BAR TYPES					
HK.	①	HK.	5/2"	HK.	5/2"
1'-3"	41'-6"	1'-3"	2'-1 1/2"	2'-8"	④
1'-3"	1'-3" LAP	1'-8"	8"	1'-8"	⑤
5/2"	2'-8"	5/2"	1'-6"	7'-2"	⑥
HK.	③	HK.			

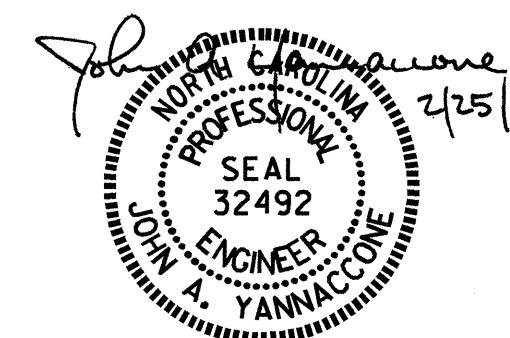
BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-0"	1197
B2	2	#5	STR	41'-8"	87
B3	8	#4	STR	22'-1"	118
B4	11	#4	STR	2'-8"	20
D1	24	#8	STR	2'-3"	144
H1	36	#4	6	7'-10"	188
K1	12	#4	STR	22'-1"	177
K2	12	#4	STR	2'-11"	23
S1	50	#5	4	7'-10"	409
S2	50	#5	3	3'-7"	187
S3	10	#4	2	6'-6"	43
U1	36	#4	5	3'-8"	88
U2	4	#4	5	4'-8"	12
V1	72	#4	STR	4'-0"	192
V2	24	#4	STR	6'-1"	98
V3	24	#4	STR	5'-11"	95
REINFORCING STEEL				LBS.	3078
CLASS A CONC. BREAKDOWN					
POUR 1 CONCRETE COLLARS, CAP & LOWER WINGS				C.Y.	13.7
POUR 2 UPPER WINGS & BACKWALL				C.Y.	5.5
POUR 3 LATERAL GUIDES				C.Y.	0.1
TOTAL				C.Y.	19.3
HP 12 X 53 STEEL PILES				LIN. FT.	= 165

ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-4610  
 RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 3 OF 3

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

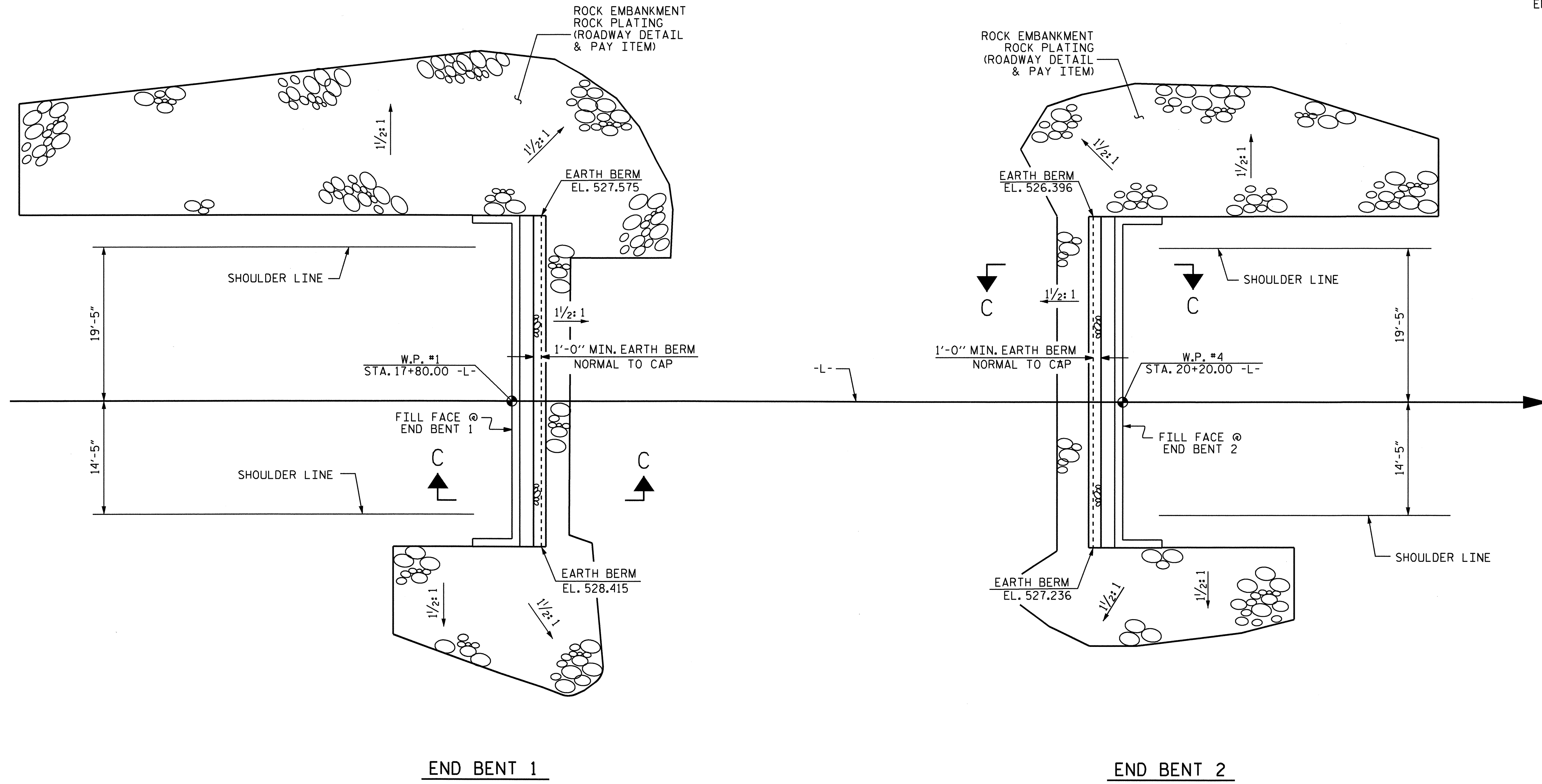


DRAWN BY: E.C. LOCKLEAR DATE: 11-6-09  
 CHECKED BY: J. YANNACCONE DATE: 12-28-09

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			25

NOTES

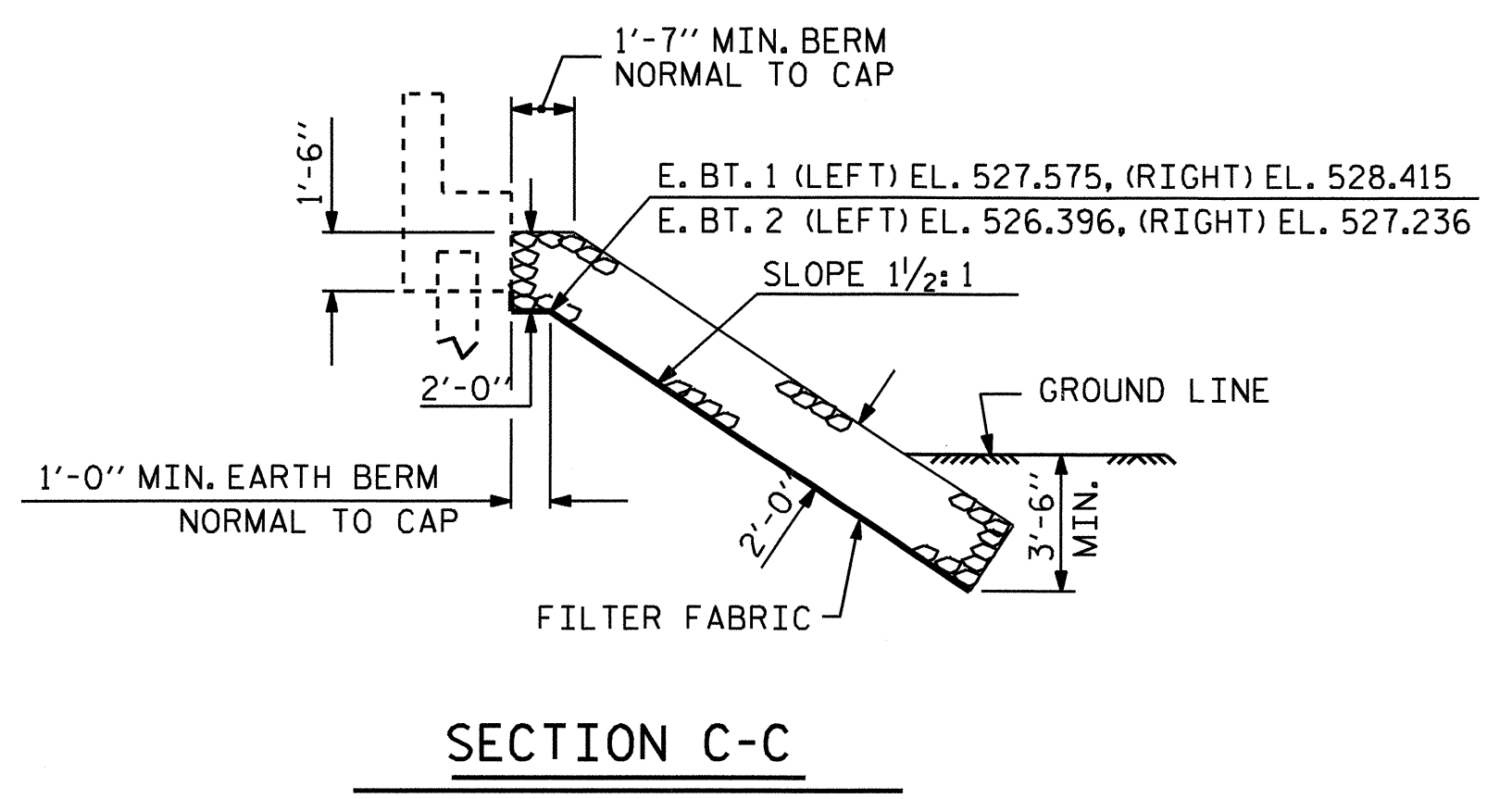
FOR ROCK EMBANKMENT AND ROCK PLATING IN AREAS OF END BENTS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.



END BENT 1

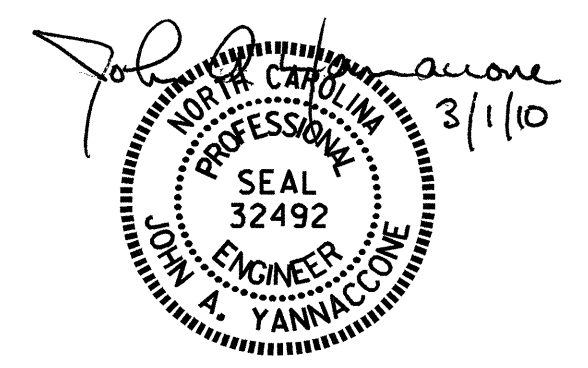
END BENT 2

PLAN



SECTION C-C

PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

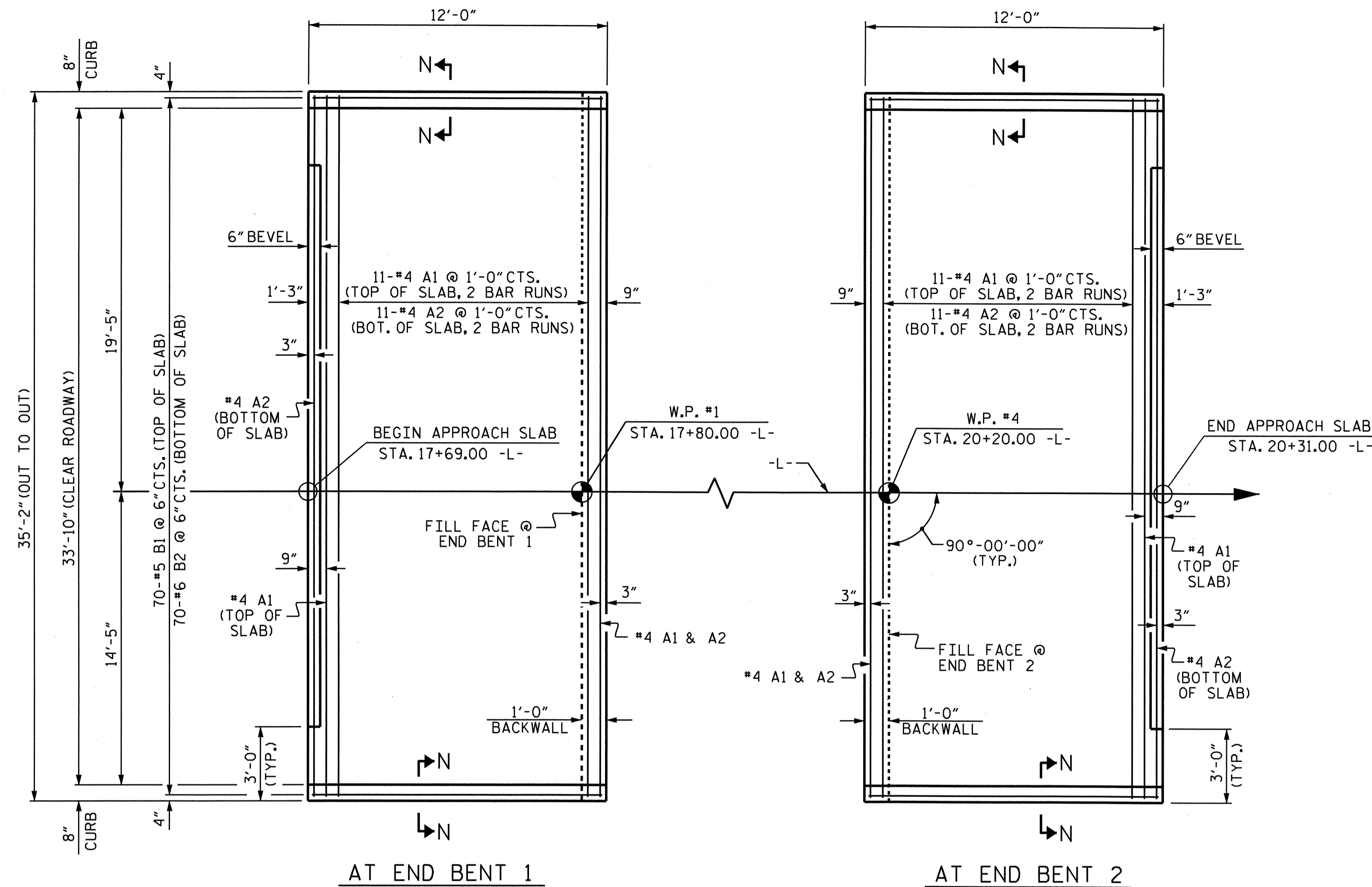
**ROCK EMBANKMENT  
 ROCK PLATING  
 DETAILS**

ASSEMBLED BY : HARISH SHAH	DATE : 10/03/09
CHECKED BY : J. A. YANNAKONE	DATE : 1/06/10
DRAWN BY : FCJ 2/88	REV. 8/16/99 RWW/LES
CHECKED BY : ARB 8/88	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			25

01-MAR-2010 14:34  
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 Jayannaccone





AT END BENT 1

AT END BENT 2

PLAN

DIMENSIONS & REINFORCING STEEL SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.

NOTES

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

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

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

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

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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

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

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

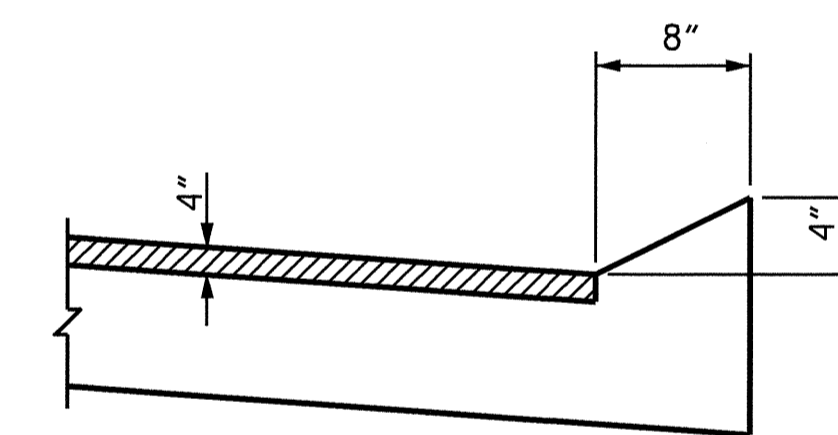
THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

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

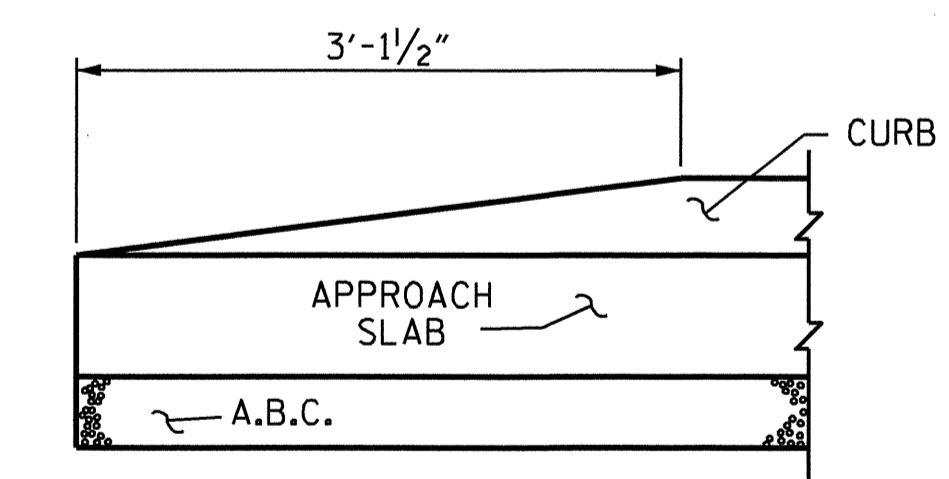
FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE CORED SLAB UNIT" SHEETS.

THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

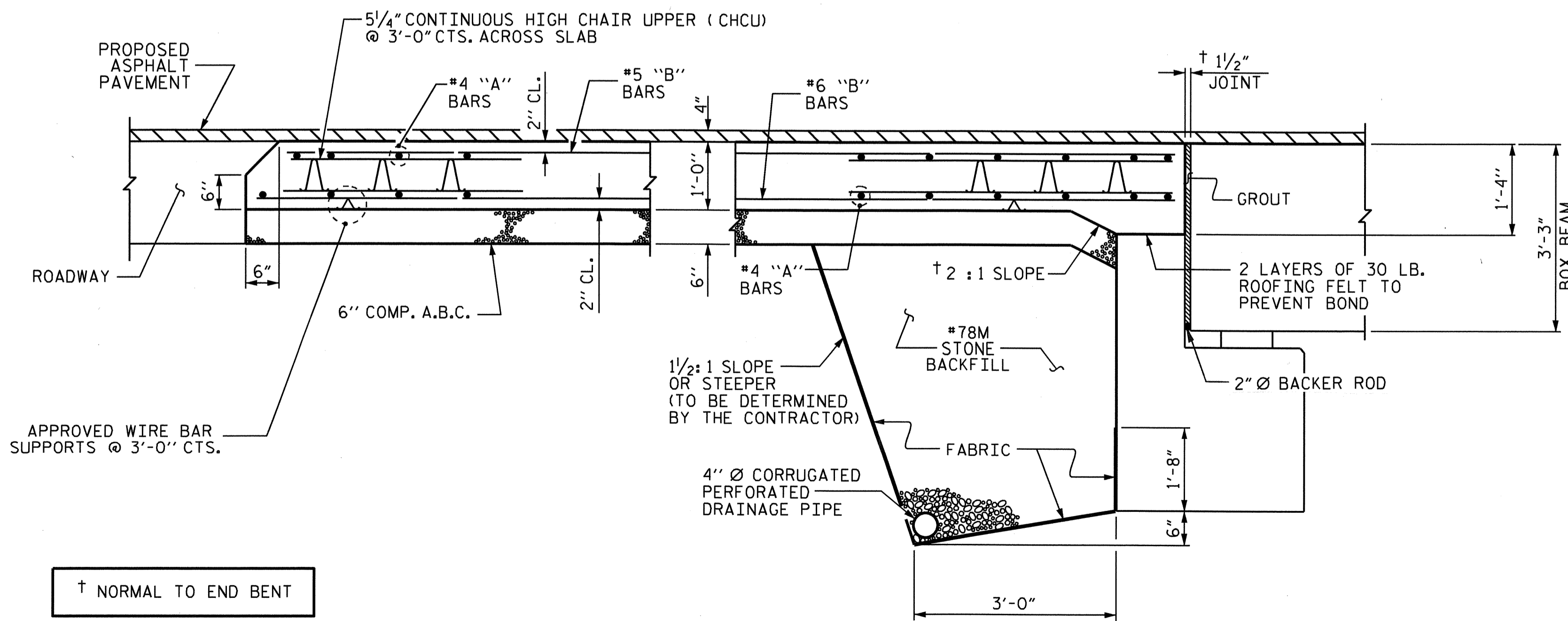


SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS



SECTION THRU SLAB

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	18'-5"	320
A2	26	#4	STR	18'-4"	318
*B1	70	#5	STR	11'-2"	815
B2	70	#6	STR	11'-8"	1227
REINFORCING STEEL				LBS.	1545
*EPOXY COATED REINFORCING STEEL				LBS.	1135
CLASS AA CONCRETE				C. Y.	16.4

SPLICE CHART

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

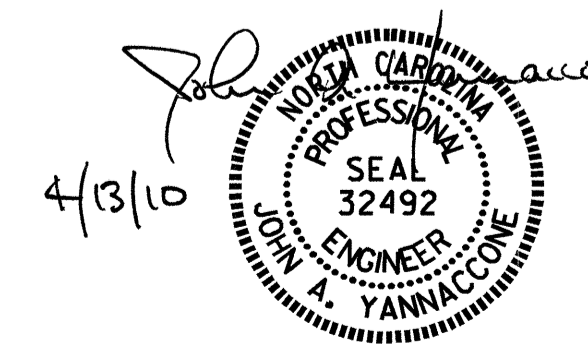
PROJECT NO. B-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

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:
1			3		
2			4		

TOTAL SHEETS: 25

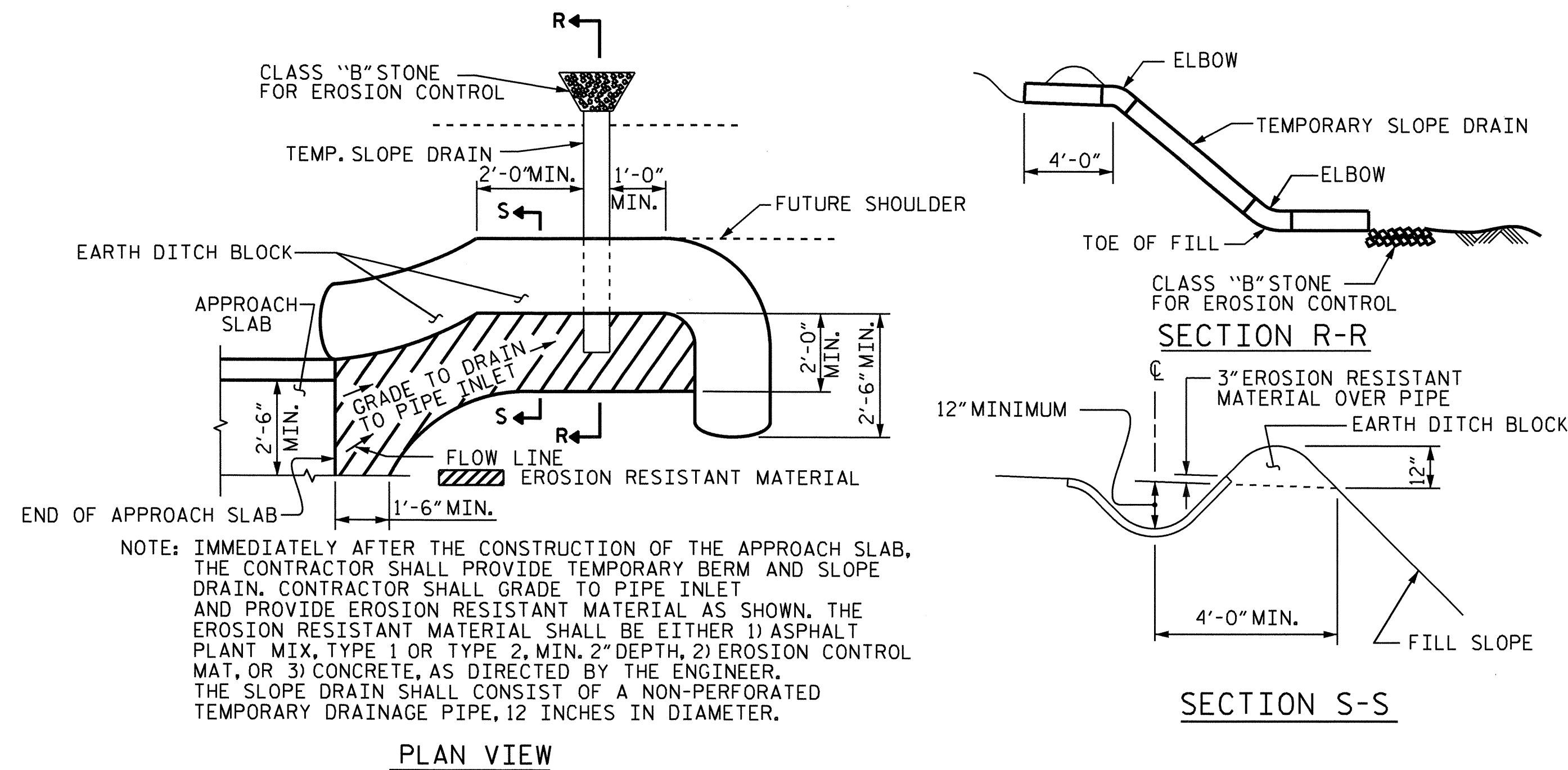


ASSEMBLED BY: HARISH SHAH DATE: 10/4/09  
 CHECKED BY: J.A. YANNAKONE DATE: 12/21/09  
 DRAWN BY: KMM 3-08  
 CHECKED BY: GM 3-08

13-APR-2010 12:38  
 R:\Structures\JYannaccone\Final Plans\b-4610.sd.os.dgn  
 JYannaccone

(SHT 3a)

STD. NO. BAS13

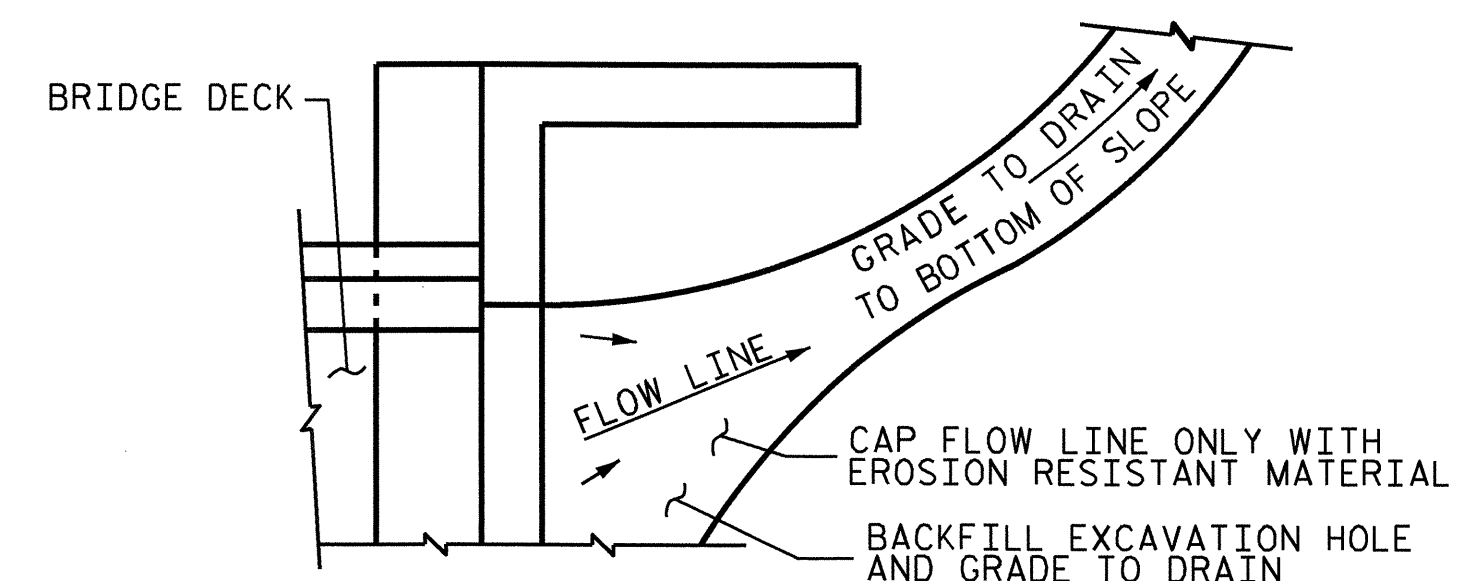


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW

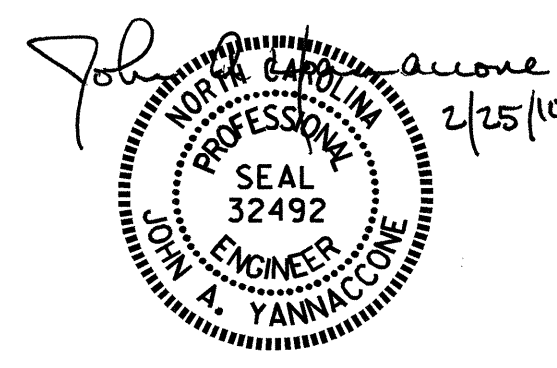
**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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-4610  
RANDOLPH COUNTY  
 STATION: 19+00.00 -L-

SHEET 2 OF 2

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

ASSEMBLED BY : HARISH SHAH	DATE : 11/5/09
CHECKED BY : J. A. YANNAKONE	DATE : 12/21/09
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

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

STD. NO. BAS10

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

### HANDRAILS AND POSTS:

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