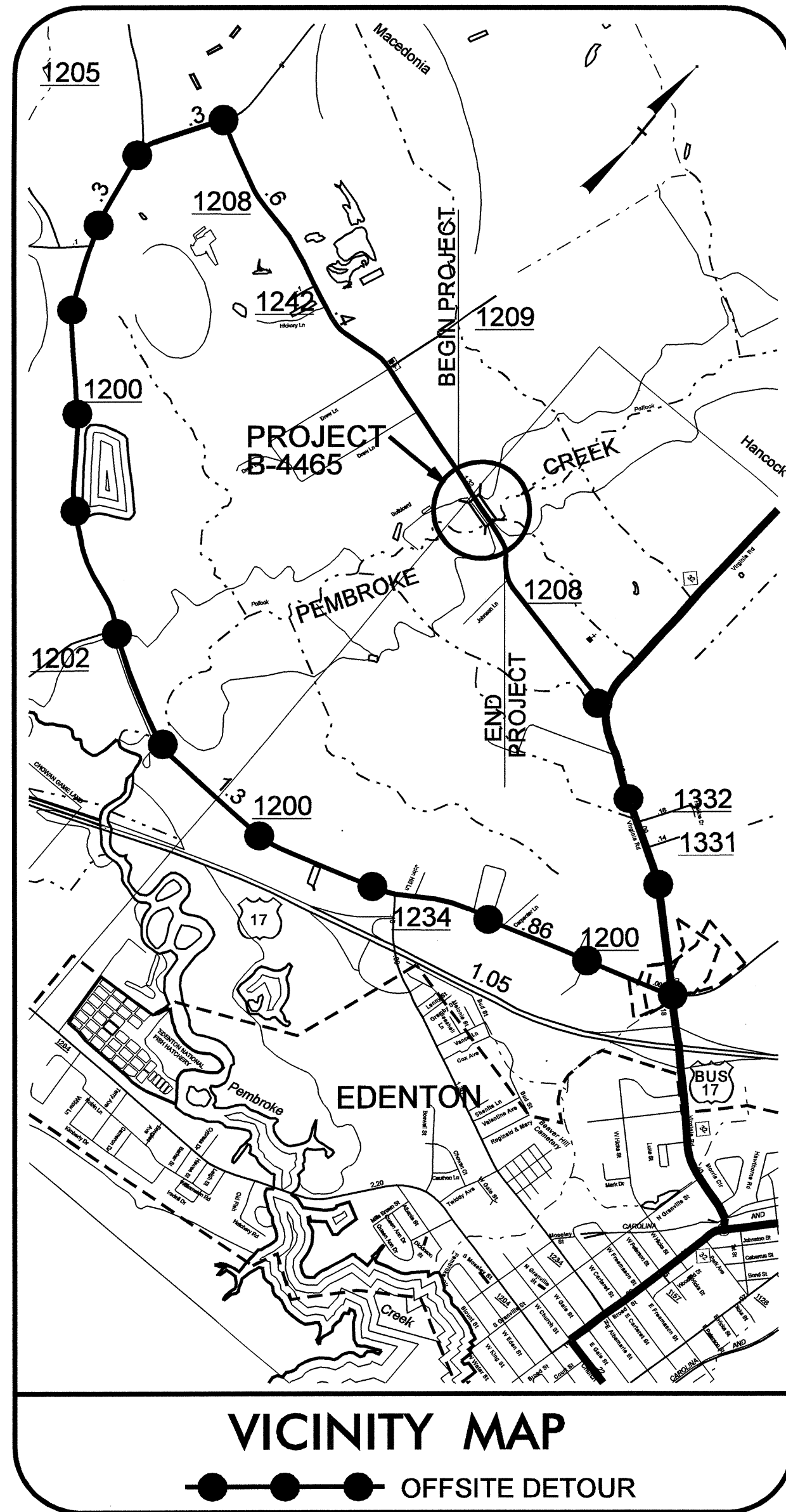


**CONTRACT: C202270 TIP PROJECT: B-4465**



NEAREST SHIPPING POINT: EDENTON ON NORFOLK SOUTHERN RR  
APPROX. 3.0 MILES FROM PROJECT

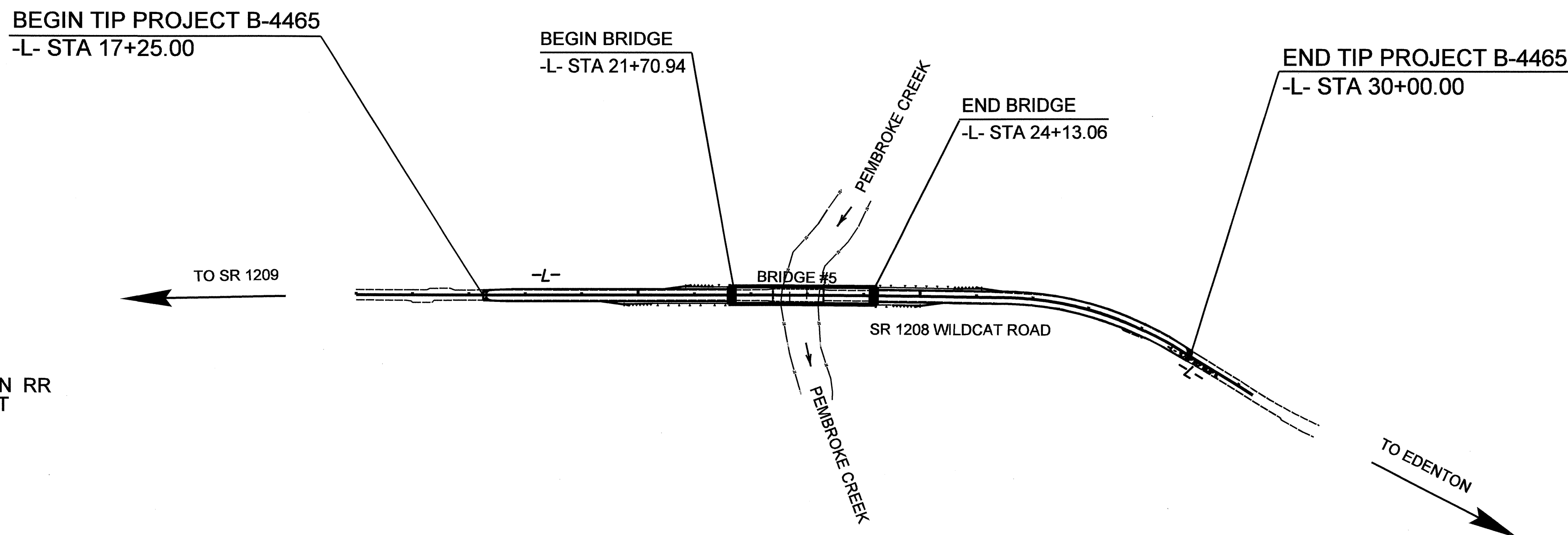
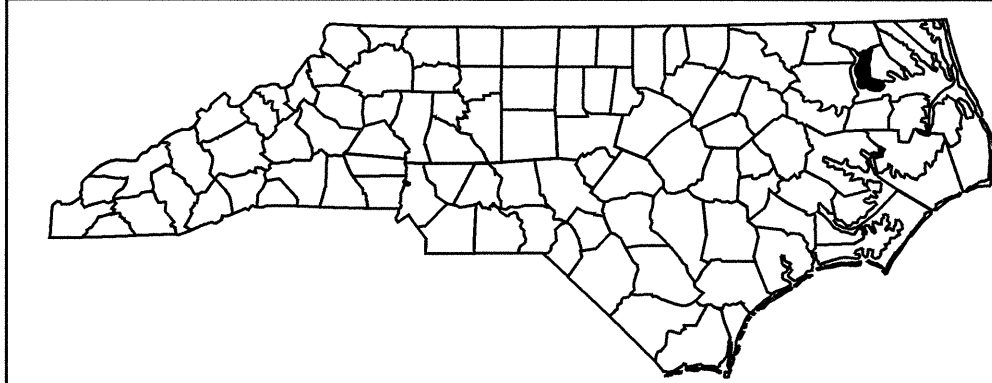
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CHOWAN COUNTY**

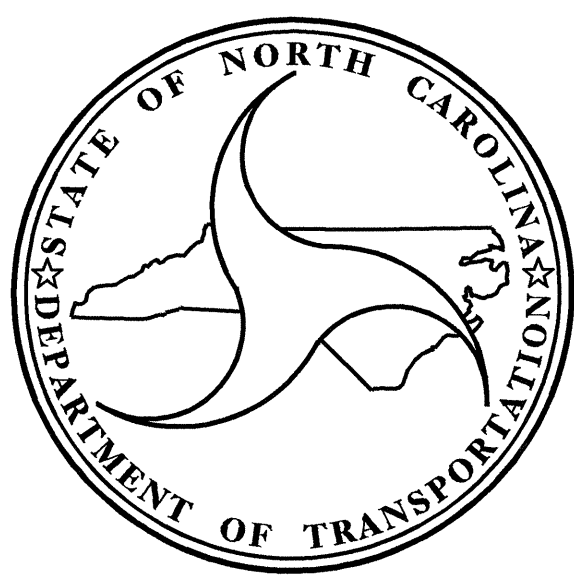
**LOCATION : BRIDGE NO.5 OVER PEMBROKE CREEK ON SR 1208**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4465		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33714.1.1	BRZ-1208 (I)	PE	
33714.2.1	BRZ-1208 (I)	RW & UTIL.	
33714.3.1	BRZ-1208 (I)	CONST.	



**STRUCTURE**



**DESIGN DATA**

ADT 2010 = 1,410  
 ADT 2030 = 2,110  
 DHV = 10 %  
 D = 60 %  
 T = 3 % \*  
 V = 50 MPH  
 \* TTST 1 % DUAL 2 %  
 FUNC CLASS = RURAL LOCAL

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT B-4465 = 0.195 MI.  
 LENGTH OF STRUCTURE TIP PROJECT B-4465 = 0.046 MI.  
 TOTAL LENGTH OF TIP PROJECT B-4465 = 0.241 MI.

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
 1000 BIRCH RIDGE DR. RALEIGH, NC 27610

2006 STANDARD SPECIFICATIONS

**LETTING DATE:**  
 JANUARY 19, 2010

**N. N. BULLOCK, PE**  
 PROJECT ENGINEER

**A. K. PASCHAL, PE**  
 PROJECT DESIGN ENGINEER

**STRUCTURE DESIGN UNIT**

DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION

APPROVED  
 DIVISION ADMINISTRATOR

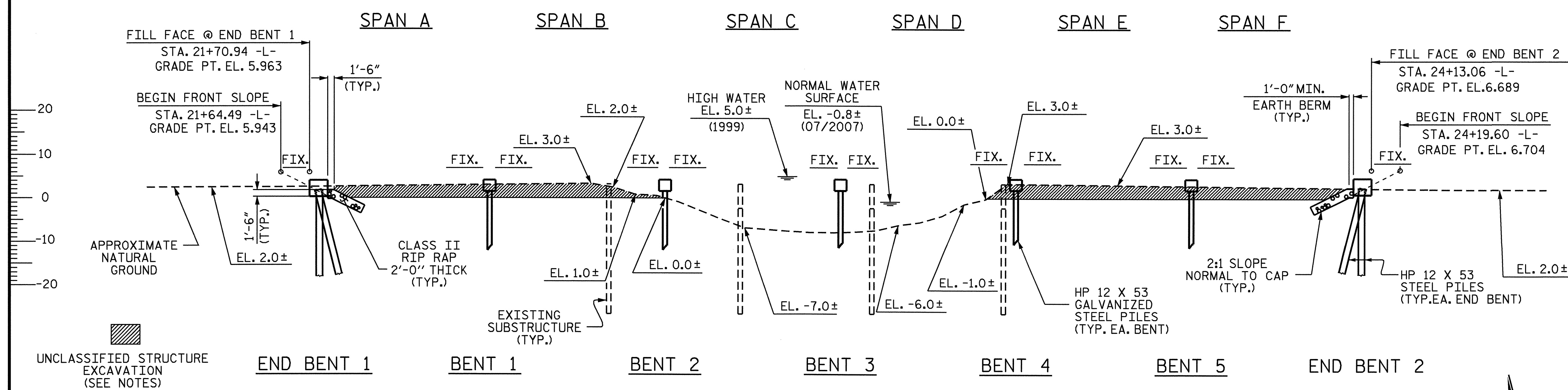
DATE

**GRADE DATA**

+1.3496% +0.3000%  
 PI STA. = 20+50.00 -L-  
 EL. = 5.60  
 VC = 150'

**NOTES:**

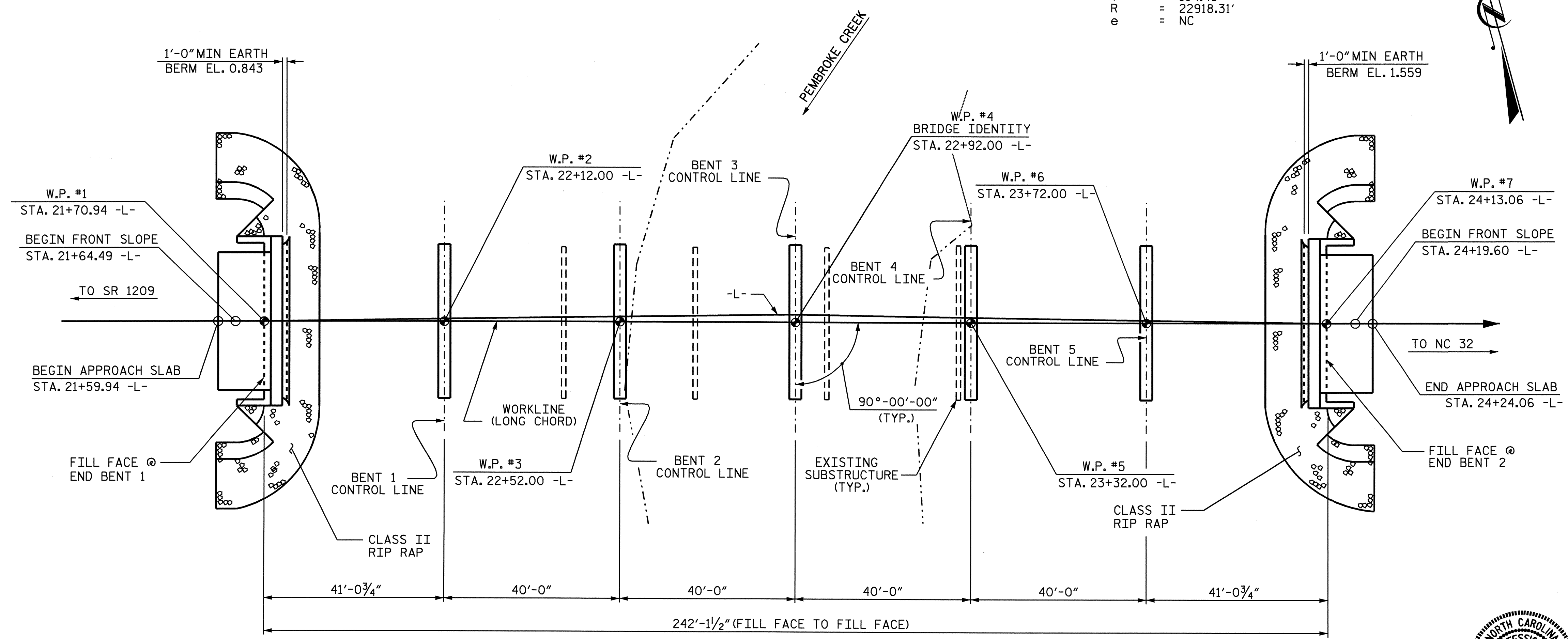
- ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THE EXISTING STRUCTURE CONSISTING OF THREE (3 @ 30'-0", TOTAL 90'-0") PRESTRESSED CONCRETE CHANNEL SPANS WITH A CLEAR ROADWAY WIDTH OF 24'-4" ON PRESTRESSED CONCRETE CAP WITH TOMBER PILE END BENTS AND BENTS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED.
- 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 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.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER CUBIC YARD FOR UNCLASSIFIED STRUCTURE EXCAVATION.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR SEISMIC DESIGN FOR SEISMIC PERFORMANCE ZONE 1.
- 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.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.
- ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
- 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.
- FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.
- FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.
- THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.



**HORIZONTAL CURVE DATA -L-**

PI	= 23+64.99 -L-
Δ	= 0°58'19.6" (RT.)
L	= 388.85'
T	= 194.43'
R	= 22918.31'
e	= NC

**SECTION ALONG -L-**

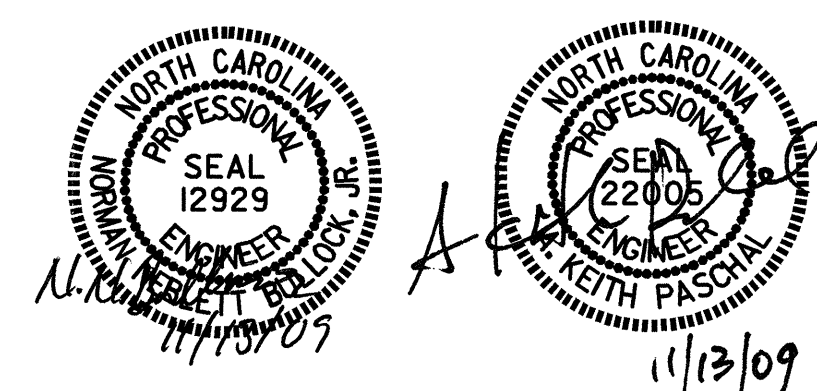


**PLAN**

(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)

DRAWN BY : M.FOWLER DATE : 8/3/09  
 CHECKED BY : J.G. KHARVA DATE : 8/24/09

12-OCT-2009 13:43  
 p:\structures\final plans\B4465.sd.GD.dgn  
 kpaschal

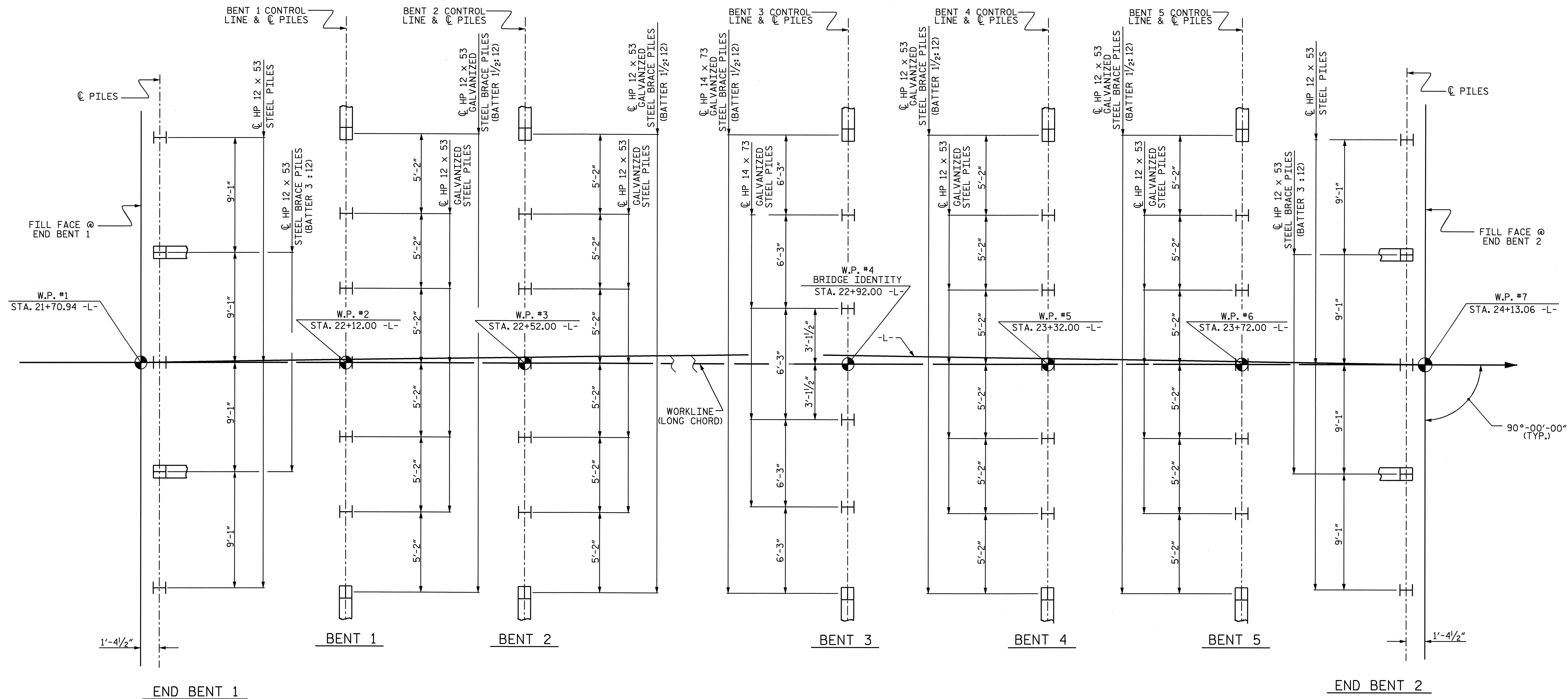


PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE #5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE OVER PEMBROKE  
 CREEK ON SR 1208 BETWEEN  
 SR 1209 AND NC 32

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



**FOUNDATION LAYOUT**

(DIMENSIONS LOCATING END BENT AND BENT PILES ARE SHOWN TO CENTERLINE PILES)

**NOTES :**

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 80 TONS PER PILE. DRIVE PILES TO A REQUIRED RESISTANCE OF 136 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 80 TONS PER PILE. DRIVE PILES TO A REQUIRED RESISTANCE OF 143 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

PILES AT BENT 1, BENT 2, BENT 4, AND BENT 5 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 180 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

PILES AT BENT 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

INSTALL PILES AT BENT 1 THROUGH 5 TO TIP ELEVATIONS NO HIGHER THAN -25 FT, -29 FT, -38 FT, -29 FT AND -25 FT, RESPECTIVELY.

THE SCOUR CRITICAL ELEVATIONS FOR BENT 1 THROUGH 5 ARE ELEVATIONS -7.0 FT, -13.0 FT, -20.0 FT, -13.0 FT AND -7.0 FT, RESPECTIVELY. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 25 TO 55 FT-KIP PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 55 TO 80 FT-KIP PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT 1 THRU 5. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT NO. 1, 2, 3, 4, OR 5.

SEE INTERIOR BENT SHEETS FOR MINIMUM GALVANIZED LENGTH OF STEEL PILES.

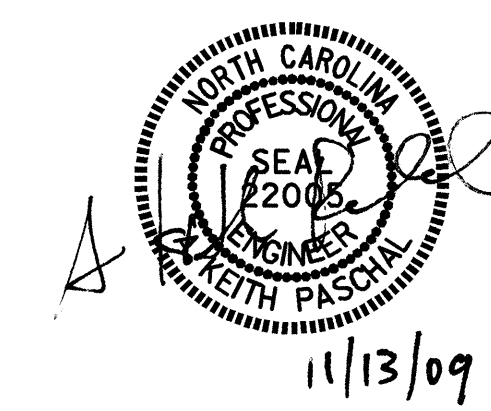
PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 BRIDGE OVER PEMBROKE CREEK  
 ON SR 1208 BETWEEN  
 SR 1209 AND NC 32

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



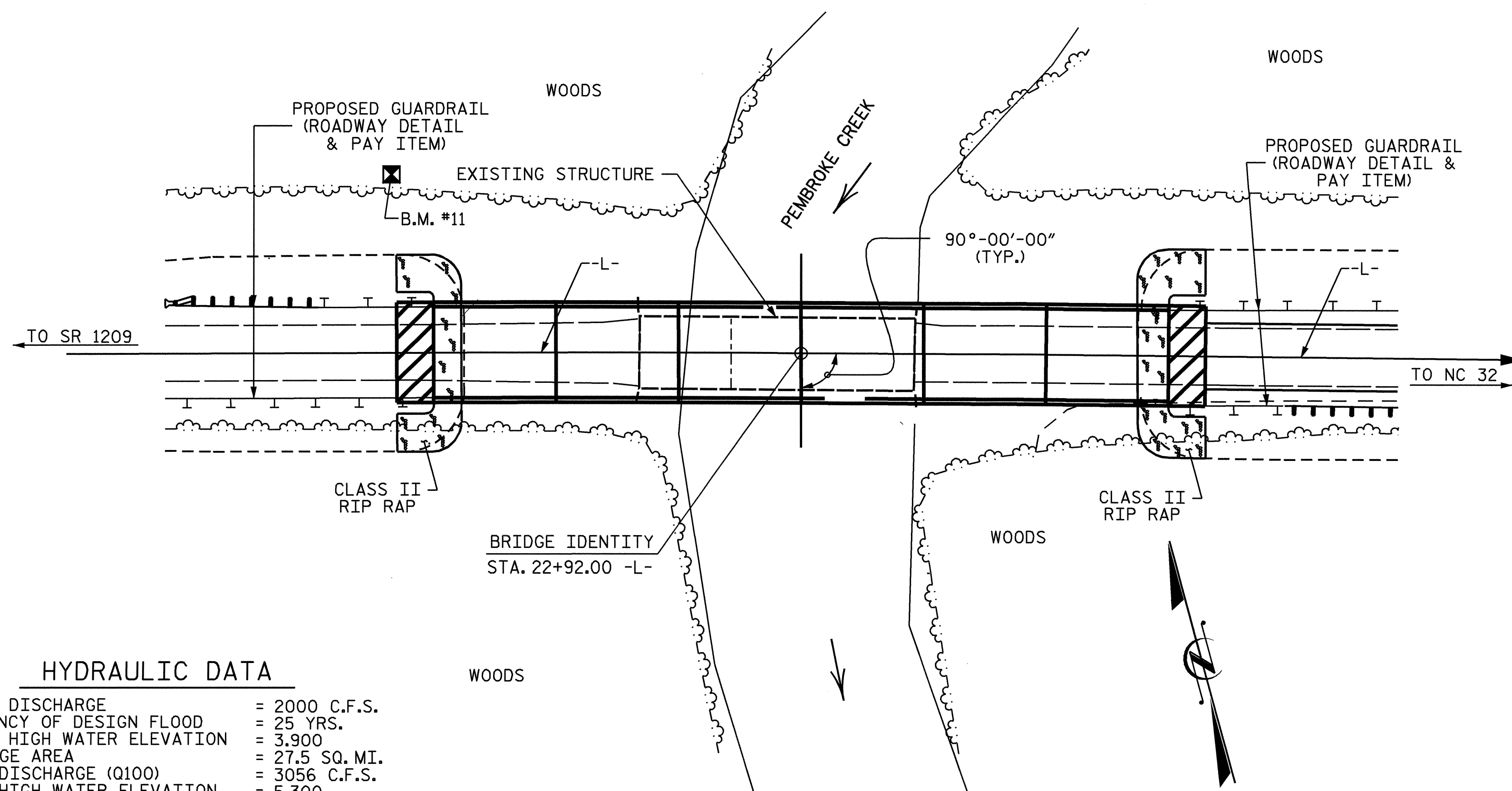
DRAWN BY : M. FOWLER DATE : 8/3/09  
 CHECKED BY : J.G. KHARVA DATE : 8/25/09

13-NOV-2009 15:04  
 o:\structures\final plans\b4465.sd.gdgn  
 kpaschal

**TOTAL BILL OF MATERIAL**

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		HP 12 X 53 GALVANIZED STEEL PILES		HP 14 X 73 GALVANIZED STEEL PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2" x 2'-7 1/2" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-6" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	CU. YDS.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE				LUMP SUM									459.42	479.75			LUMP SUM	66	2631.75
END BENT 1		289	13.8		1989	5	350					5			123	136			
BENT 1			11.9		1954			7	665			7							
BENT 2			11.9		1954			7	665			7							
BENT 3			11.9		1954					6	570	6							
BENT 4			11.9		1954			7	665			7							
BENT 5			11.9		1954			7	665			7							
END BENT 2		330	13.8		1989	5	375					5			130	145			
TOTAL	LUMP SUM	619	87.1	LUMP SUM	13748	10	725	28	2660	6	570	44	459.42	479.75	253	281	LUMP SUM	66	2631.75

B.M. #11: RR SPIKE SET IN 12" BLACK GUM 65' LT. STA. 21+35 -L- ELEV. 1.990



**HYDRAULIC DATA**

DESIGN DISCHARGE = 2000 C.F.S.  
 FREQUENCY OF DESIGN FLOOD = 25 YRS.  
 DESIGN HIGH WATER ELEVATION = 3.900  
 DRAINAGE AREA = 27.5 SQ. MI.  
 BASIC DISCHARGE (Q100) = 3056 C.F.S.  
 BASIC HIGH WATER ELEVATION = 5.300

**OVERTOPPING DATA**

OVERTOPPING DISCHARGE = 1600 C.F.S.  
 FREQUENCY OF OVERTOPPING FLOOD = 10 YRS.+  
 OVERTOPPING FLOOD ELEVATION = 3.600

**LOCATION SKETCH**

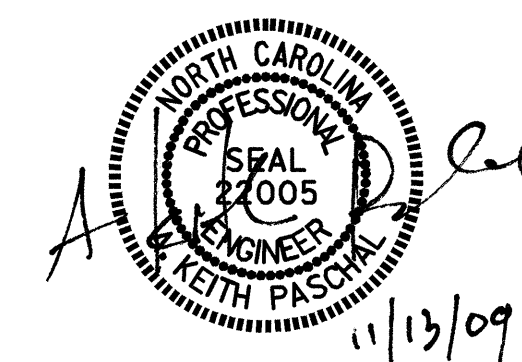
FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 BRIDGE OVER PEMBROKE CREEK  
 ON SR 1208 BETWEEN  
 SR 1209 AND NC 32



DRAWN BY : M.FOWLER DATE : 8/04/09  
 CHECKED BY : J.G.KHARVA DATE : 8/26/09

12-NOV-2009 14:16  
 F:\structures\final plans\b4465.sd\_gd.dgn  
 mFowler

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.28	--	1.75	0.277	1.39	A	ER	19.438	0.543	1.28	A	ER	1.944	0.80	0.277	1.41	A	ER	19.438	1	
	HL-93 (OPERATING)	N/A		1.65	--	1.35	0.277	1.80	A	ER	19.438	0.543	1.65	A	ER	1.944	N/A	----	----	--	--	----	1	
	HS-20 (INVENTORY)	36.000	②	1.41	52.202	1.80	0.277	1.69	A	ER	19.438	0.543	1.45	A	ER	1.944	1.00	0.277	1.41	A	ER	19.438	1	
	HS-20 (OPERATING)	36.000		1.93	69.602	1.35	0.277	2.26	A	ER	19.438	0.543	1.93	A	ER	1.944	N/A	----	----	--	--	----	1	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.61	41.954	1.40	0.277	3.13	A	ER	19.438	0.543	3.11	A	ER	1.944	0.80	0.277	2.61	A	ER	19.438	1
		SNGARBS2	20.000		2.16	46.240	1.40	0.277	2.58	A	ER	15.55	0.543	2.31	A	ER	1.944	0.80	0.277	2.16	A	ER	19.438	1
		SNAGRIS2	22.000		2.14	48.132	1.40	0.277	2.52	A	ER	15.55	0.543	2.19	A	ER	1.944	0.80	0.277	2.14	A	ER	15.55	1
		SNCOTTS3	27.250		1.30	42.550	1.40	0.277	1.56	A	ER	19.438	0.543	1.56	A	ER	1.944	0.80	0.277	1.30	A	ER	19.438	1
		SNAGGRS4	34.925		1.18	47.809	1.40	0.277	1.41	A	ER	19.438	0.543	1.37	A	ER	1.944	0.80	0.277	1.18	A	ER	19.438	1
		SNS5A	35.550		1.14	48.688	1.40	0.277	1.37	A	ER	19.438	0.543	1.43	A	ER	1.944	0.80	0.277	1.14	A	ER	19.438	1
		SNS6A	39.950		1.09	52.074	1.40	0.277	1.30	A	ER	19.438	0.543	1.34	A	ER	1.944	0.80	0.277	1.09	A	ER	19.438	1
		SNS7B	42.000	③	1.04	52.212	1.40	0.277	1.24	A	ER	19.438	0.543	1.36	A	ER	1.944	0.80	0.277	1.04	A	ER	19.438	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.34	51.579	1.40	0.277	1.60	A	ER	19.438	0.543	1.56	A	ER	1.944	0.80	0.277	1.34	A	ER	19.438	1
		TNT4A	33.075		1.35	49.221	1.40	0.277	1.62	A	ER	19.438	0.543	1.49	A	ER	1.944	0.80	0.277	1.35	A	ER	19.438	1
		TNT6A	41.600		1.15	57.344	1.40	0.277	1.38	A	ER	19.438	0.543	1.46	A	ER	1.944	0.80	0.277	1.15	A	ER	19.438	1
		TNT7A	42.000		1.18	56.476	1.40	0.277	1.41	A	ER	19.438	0.543	1.34	A	ER	1.944	0.80	0.277	1.18	A	ER	19.438	1
		TNT7B	42.000		1.20	54.344	1.40	0.277	1.44	A	ER	19.438	0.543	1.29	A	ER	1.944	0.80	0.277	1.20	A	ER	19.438	1
		TNAGRIT4	43.000		1.18	53.356	1.40	0.277	1.41	A	ER	19.438	0.543	1.24	A	ER	1.944	0.80	0.277	1.18	A	ER	19.438	1
TNAGT5A	45.000		1.09	57.940	1.40	0.277	1.30	A	ER	19.438	0.543	1.29	A	ER	1.944	0.80	0.277	1.09	A	ER	19.438	1		
TNAGT5B	45.000		1.05	52.840	1.40	0.277	1.26	A	ER	19.438	0.543	1.17	A	ER	1.944	0.80	0.277	1.05	A	ER	19.438	1		

### LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

	YEAR	ADTT
CURRENT	2010	25
FUTURE	2030	38

### 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. STIRRUP SPACING REDUCED FOR SHEAR.

- 2.
- 3.
- 4.

**# CONTROLLING LOAD RATING**

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

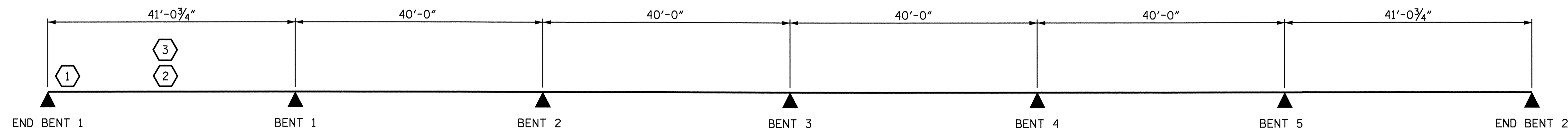
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

**GIRDER LOCATION**

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

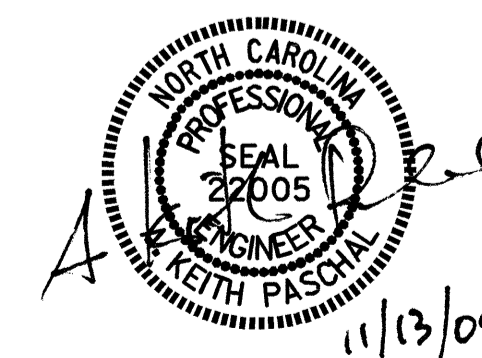


PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

## LRFR SUMMARY

ASSEMBLED BY : J.D. HAWK DATE : 8-8-09  
 CHECKED BY : J. E. LAZAROVICH DATE : 8-8-09  
 DRAWN BY : MAA 1/08 REV. 11/12/08RR MAA/GM  
 CHECKED BY : GM/DI 2/08

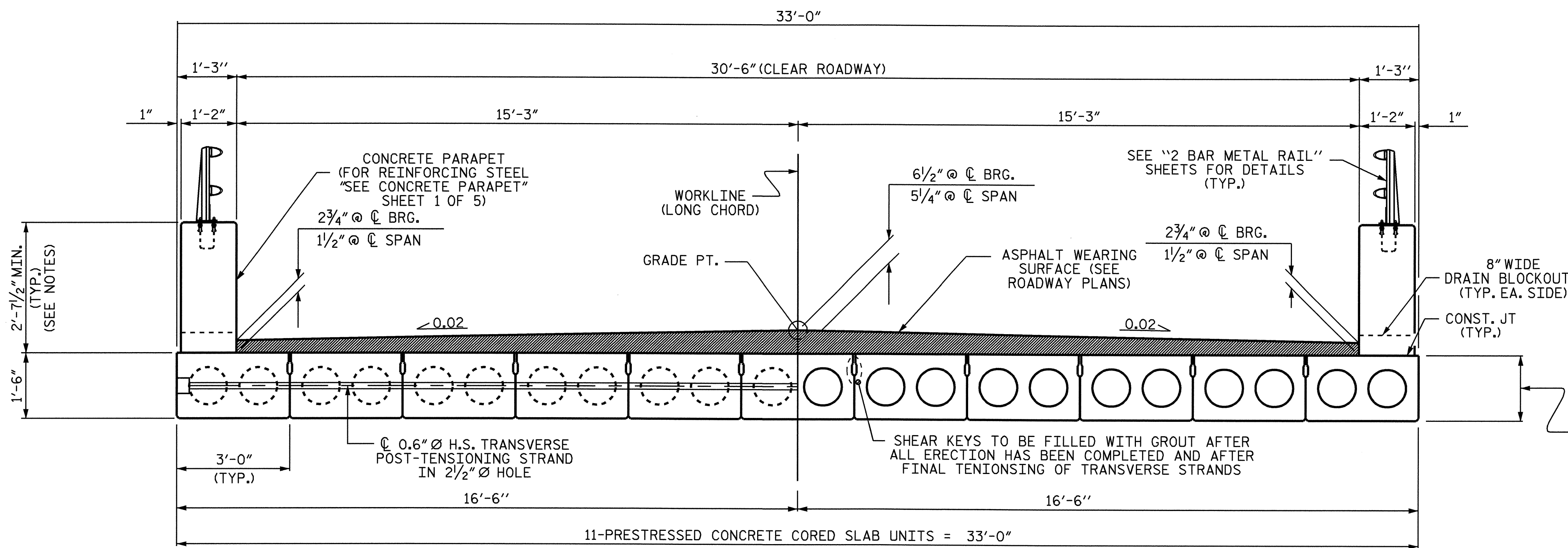
12-NOV-2009 14:24  
 F:\structures\Final plans\B-4465\fr1.dgn  
 mTowler



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

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

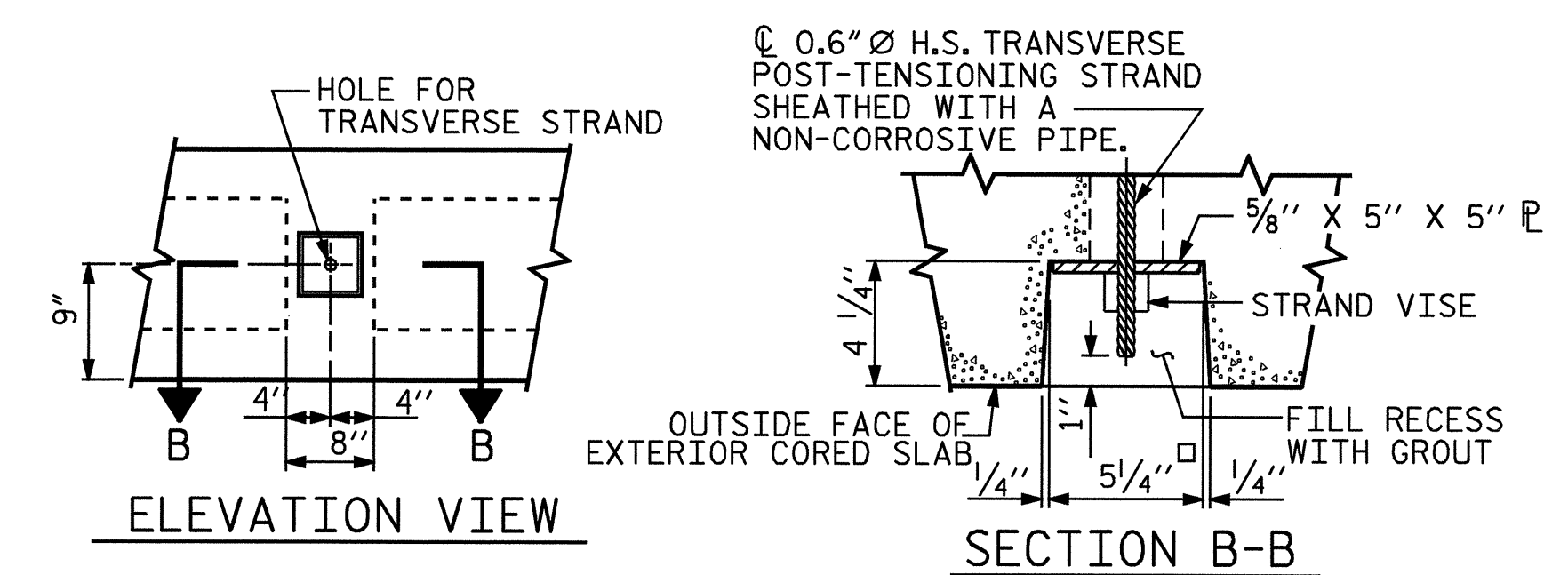
STD. NO. LRFR1



HALF SECTION @ DIAPHRAGMS

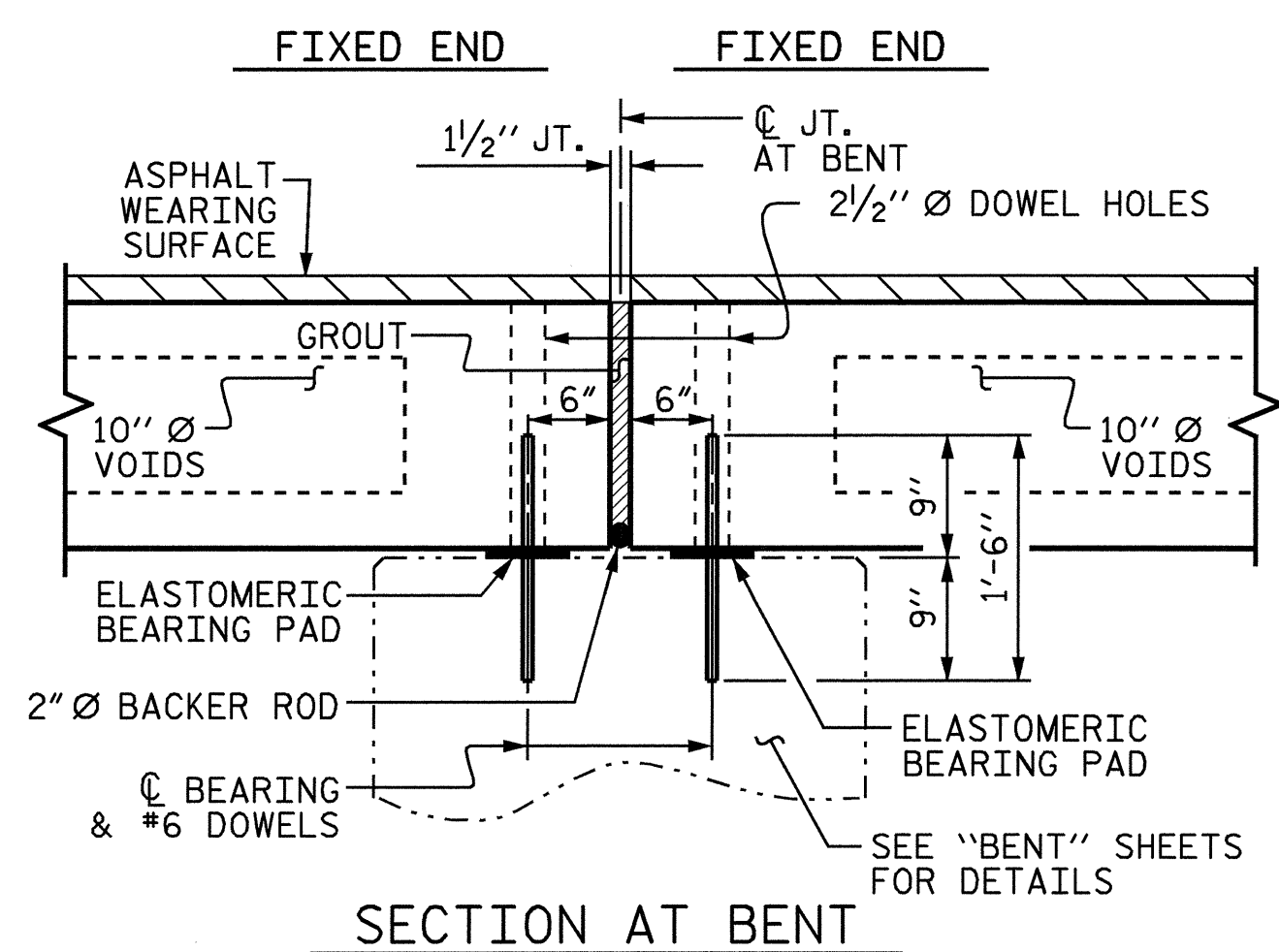
HALF SECTION @ VOIDS

TYPICAL SECTION

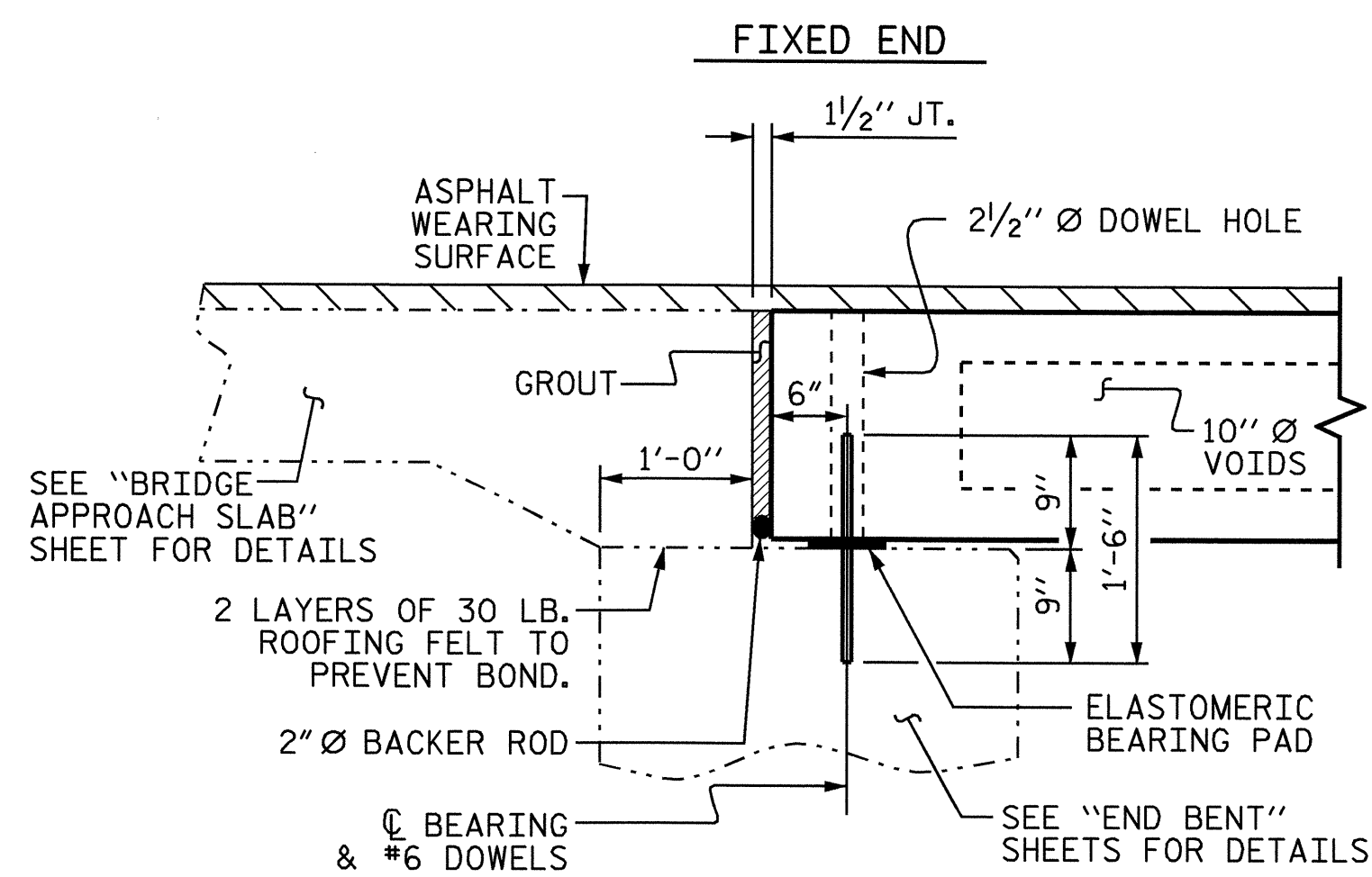


GRouted RECESS AT END OF POST-TENSIONED STRAND CORED SLABS

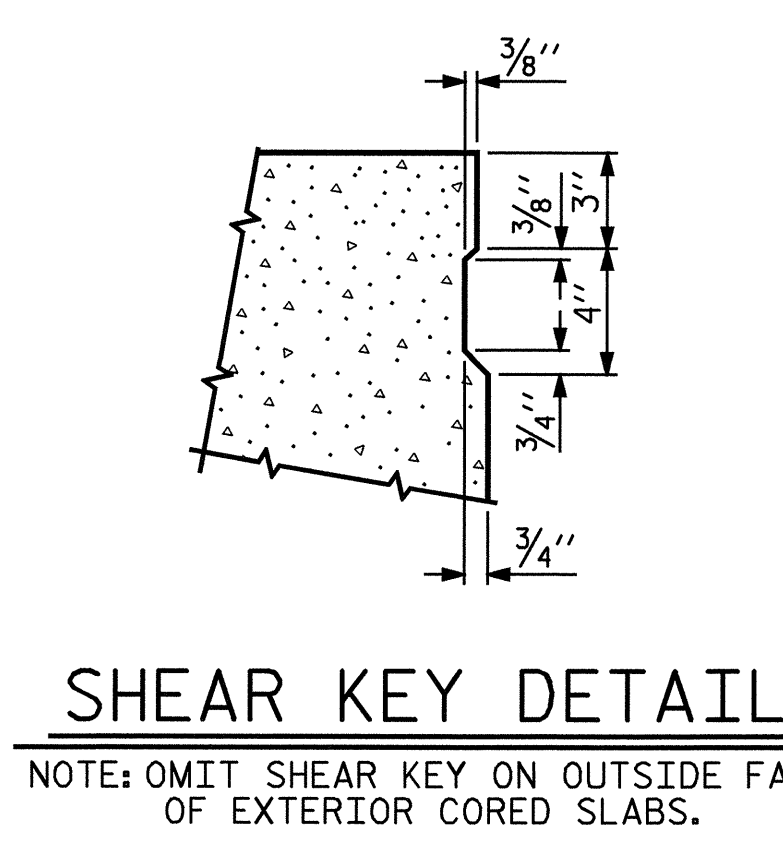
EPOXY PROTECTIVE COATING BENEATH DRAINS (TYP. EA. SIDE)



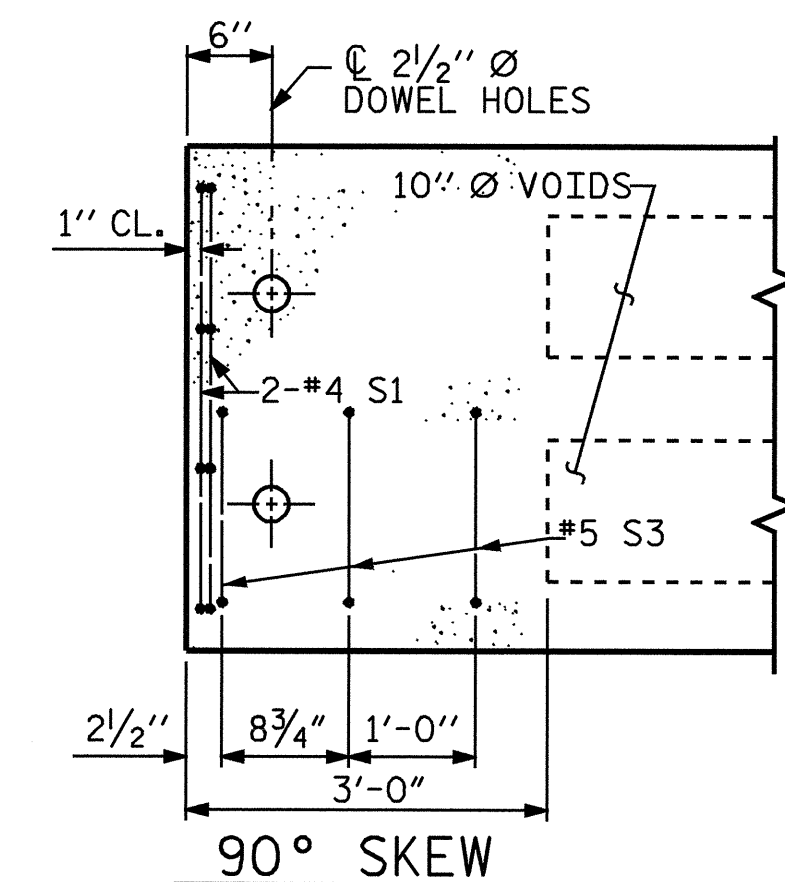
SECTION AT BENT



SECTION AT END BENT

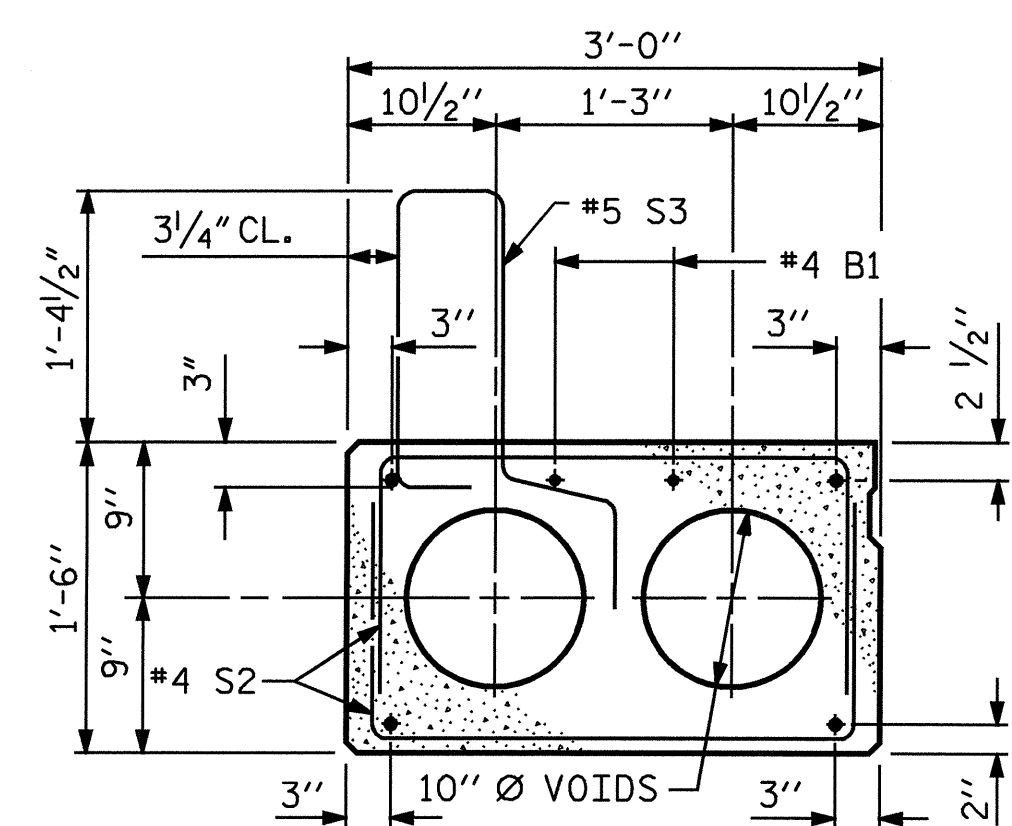


SHEAR KEY DETAIL



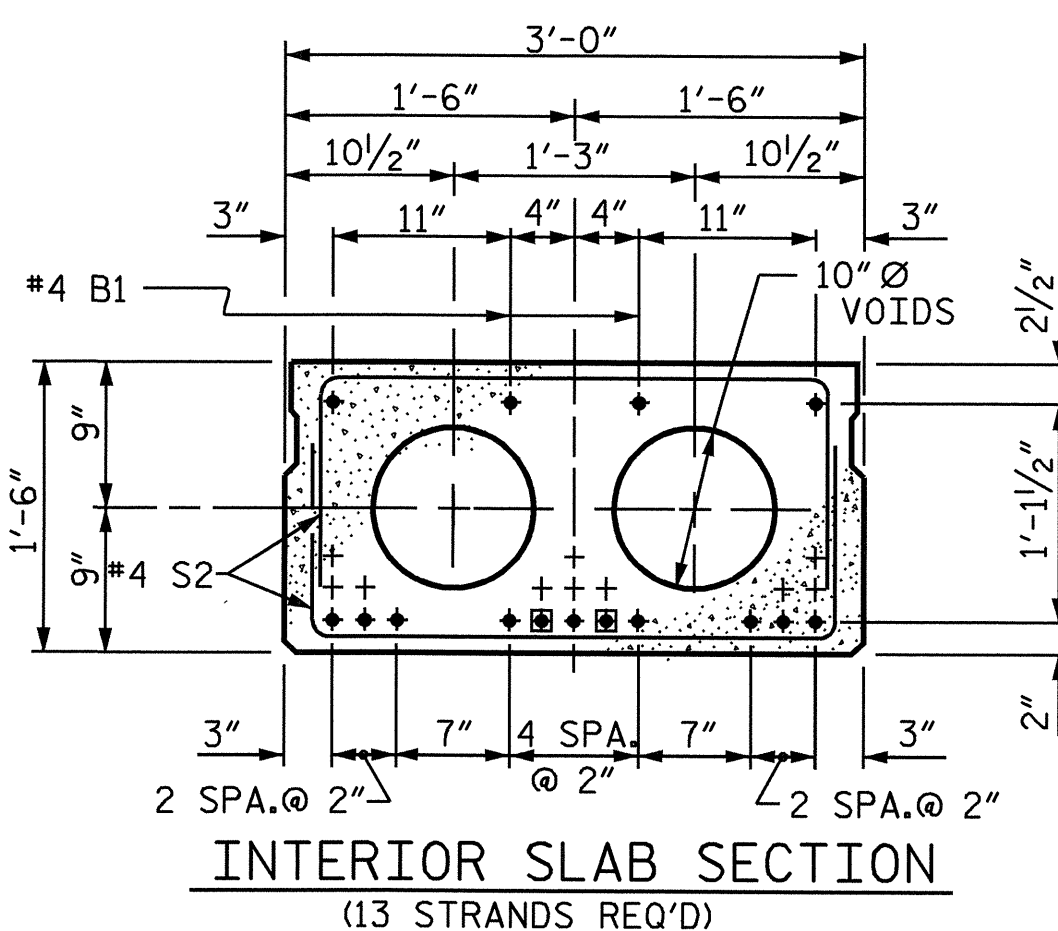
PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

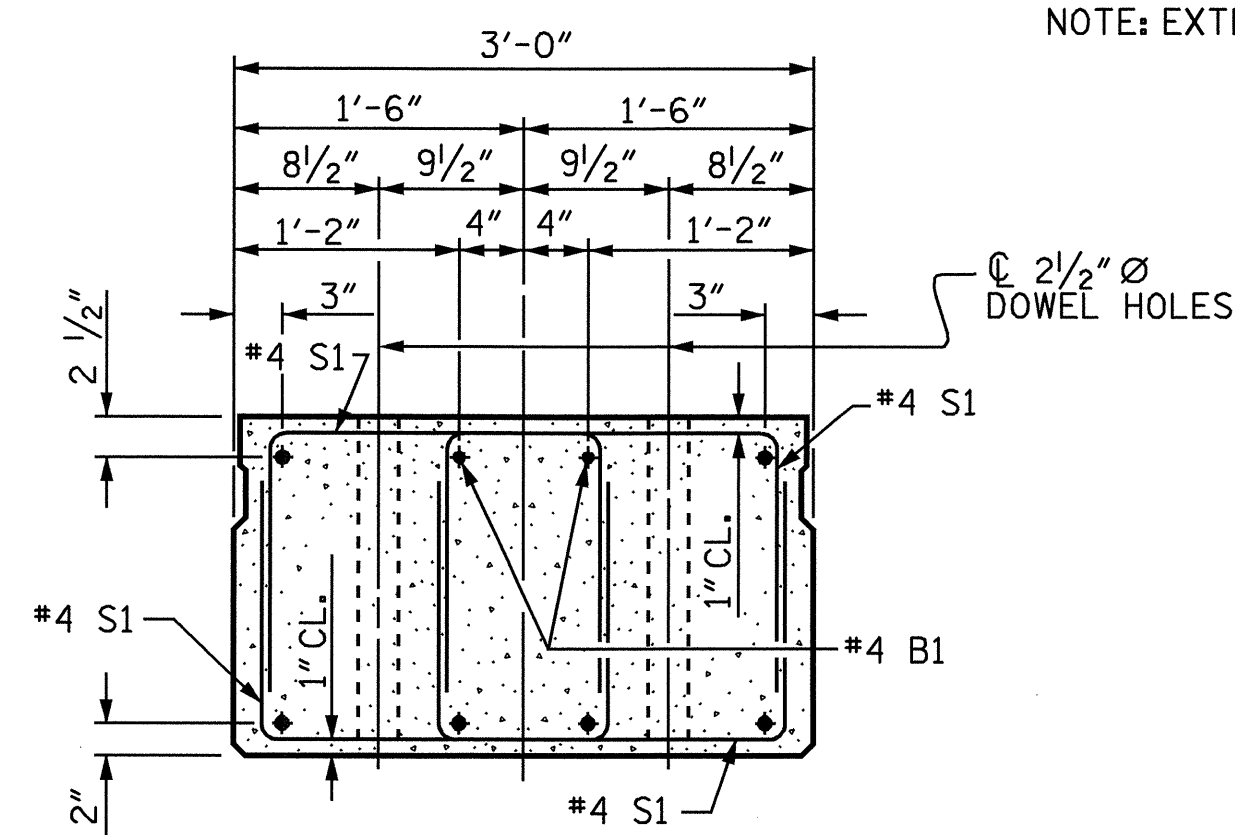


INTERIOR SLAB SECTION

(13 STRANDS REQ'D)

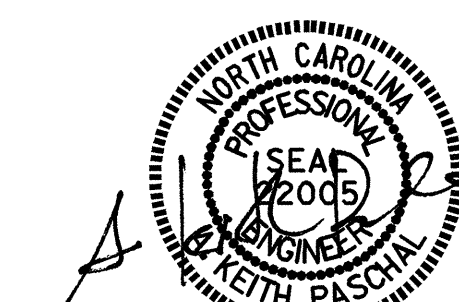
0.6" Ø LOW RELAXATION STRAND LAYOUT

BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM THE END OF THE CORED SLAB UNIT. SEE STANDARD SPECIFICATION ARTICLE 1078-7.



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.



PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-

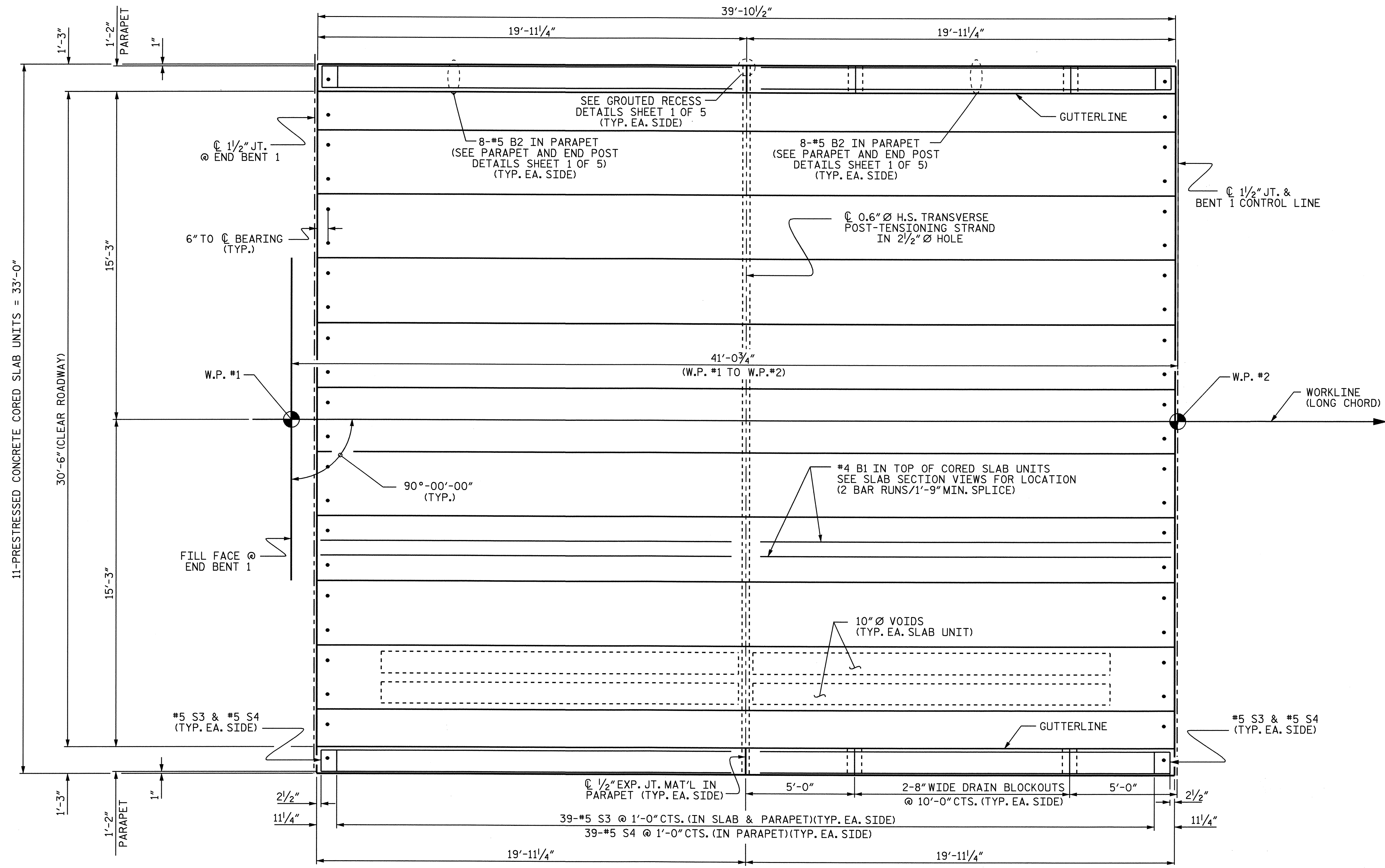
SHEET 1 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 1'-6"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT

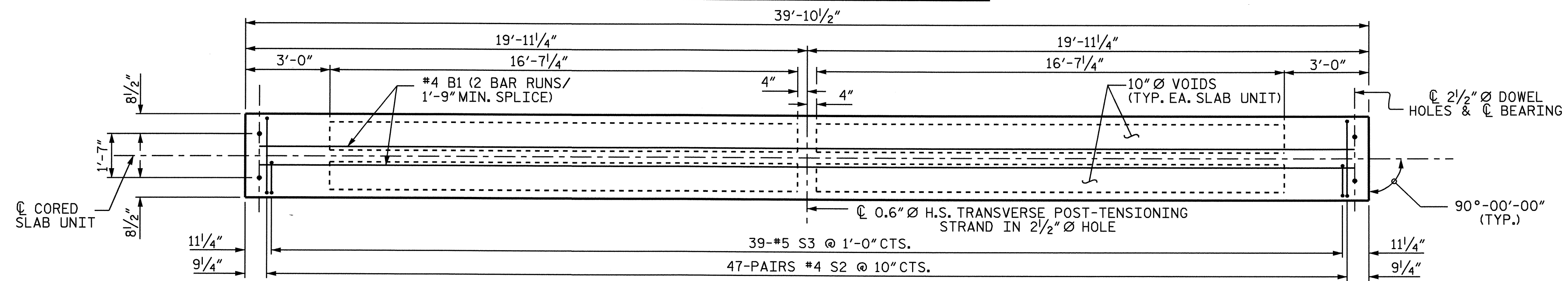
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			25

(SHT 1) STD. NO. PCS1

ASSEMBLED BY : M. FOWLER DATE : 10-24-08  
CHECKED BY : J. G. KHARVA DATE : 4-21-09  
DRAWN BY : WJH 4/89 REV. 10/17/00 RWW/LJS  
CHECKED BY : FCJ 5/89 REV. 7/10/01 RWW/LJS  
REV. 5/1/06 REV. 5/1/06 TLA/GM



PLAN OF SPAN A



PLAN OF CORED SLAB UNIT

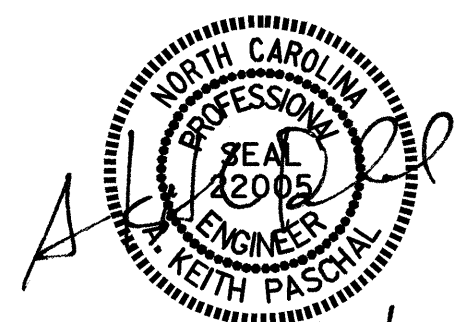
EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.  
 FOR LOCATION OF ADDITIONAL REINFORCING STEEL AT END OF SLAB UNIT,  
 SEE "PART-PLAN EXTERIOR SECTION" SHEET 1 OF 5.

NOTES:  
 DRAIN BLOCKOUTS SHALL BE SHIFTED  
 AS NECESSARY TO BE CENTERED  
 BETWEEN THE "S" BARS IN PARAPET.

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 2 OF 5

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

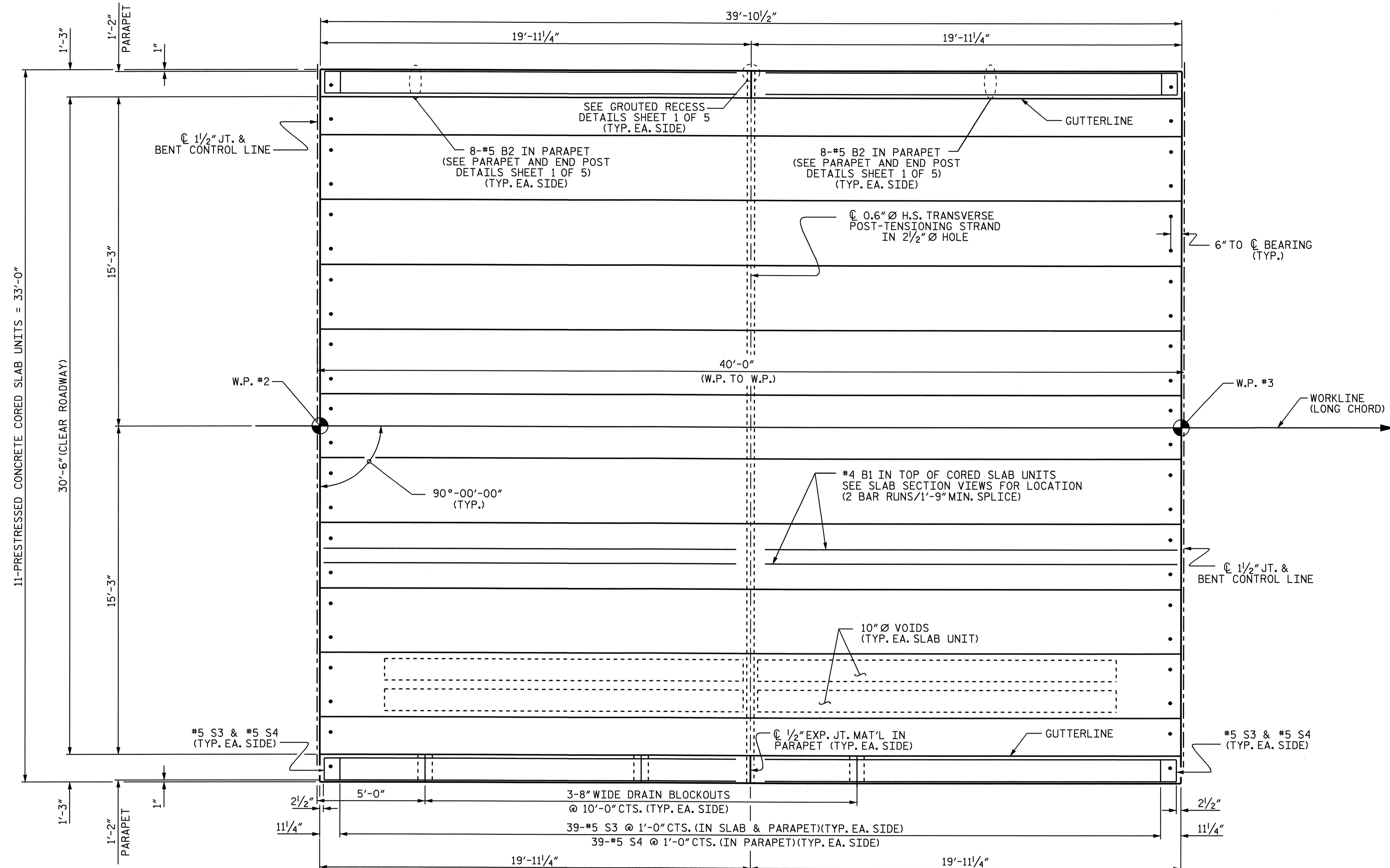


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			25

DRAWN BY : M.FOWLER DATE : 3/26/09  
 CHECKED BY : J.G. KHARVA DATE : 4/21/09

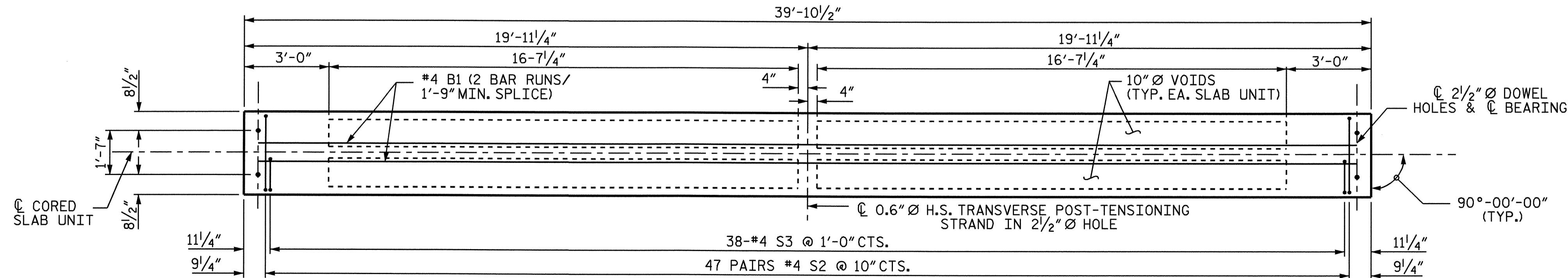
12-OCT-2009 13:42  
 c:\structures\final plans\B4465\_sd.cs.dgn  
 kpaschal

NC006



**PLAN OF SPAN B**

(SPAN C THRU E ARE SIMILAR)



**PLAN OF CORED SLAB UNIT**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.  
FOR LOCATION OF ADDITIONAL REINFORCING STEEL AT END OF SLAB UNIT,  
SEE "PART-PLAN EXTERIOR SECTION" SHEET 1 OF 5.

**NOTES:**

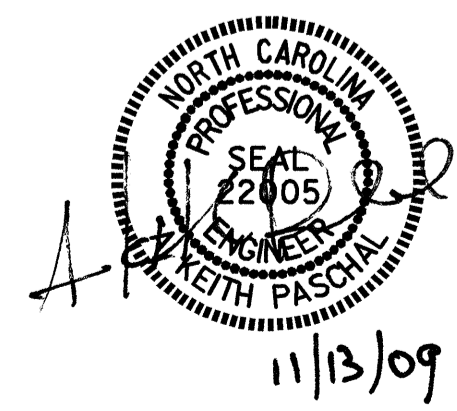
DECK DRAINS FOR SPAN E ARE SIMILAR TO SPAN B. (STA. 21+97.00 THRU STA. 22+37.00 & STA. 23+47.00 THRU STA. 23+87.00)  
ELIMINATE DRAINS IN SPAN C & D.  
DRAIN IN BLOCKOUT SHALL BE SHIFTED AS NECESSARY TO BE CENTERED BETWEEN THE "S" BARS IN PARAPET.

PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-  
SHEET 3 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

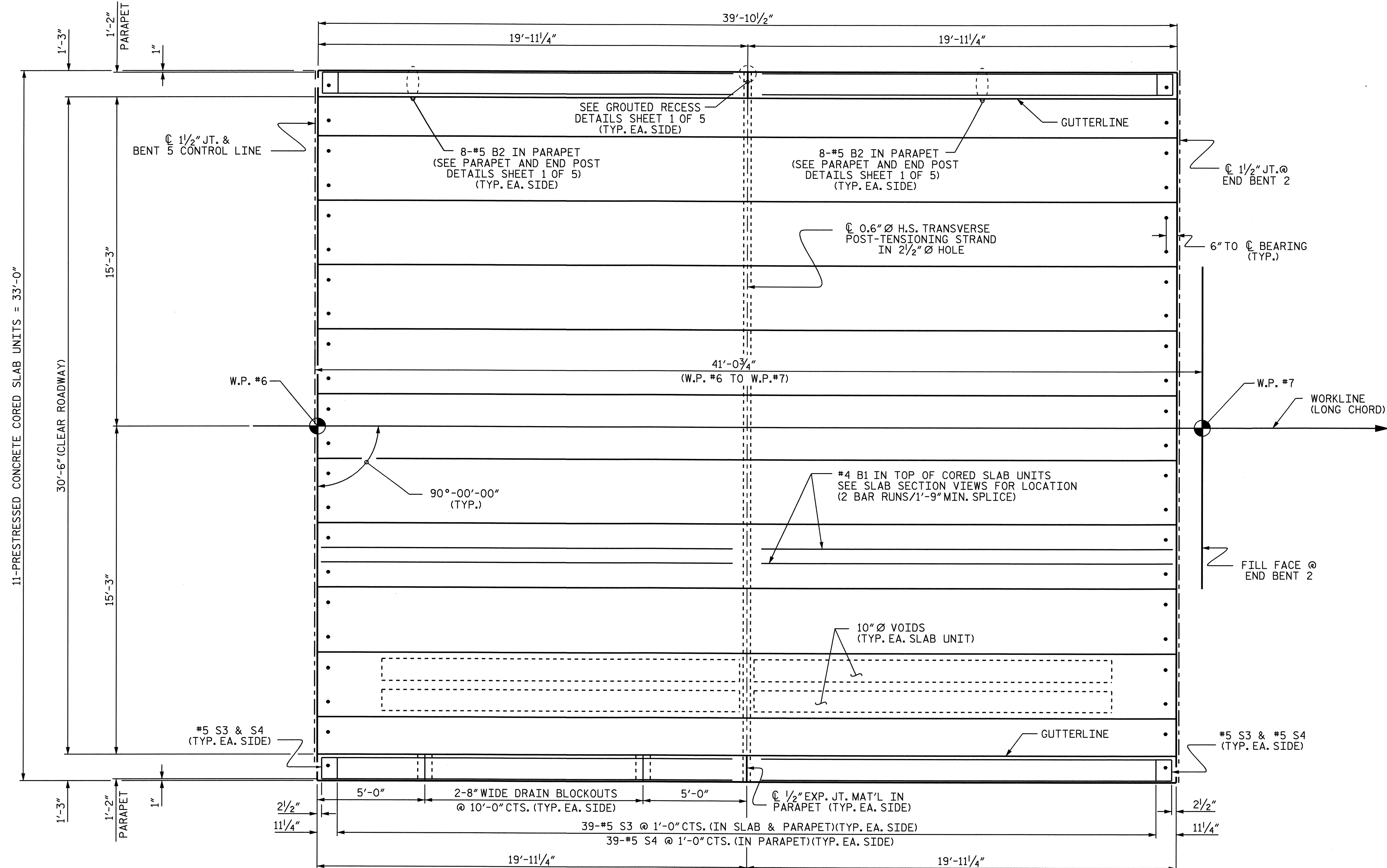
**SUPERSTRUCTURE  
PLAN OF SPAN B  
THRU SPAN E**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			25

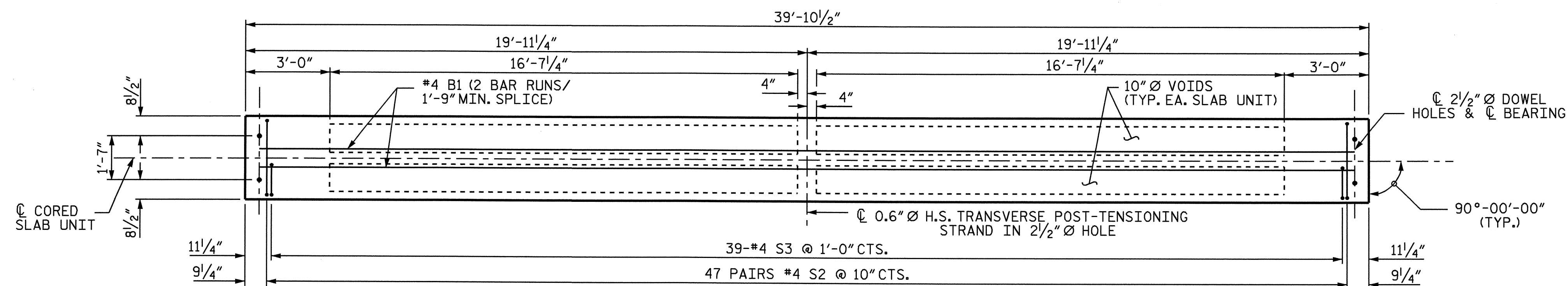


DRAWN BY: M.FOWLER DATE: 3/30/09  
CHECKED BY: J.G. KHARVA DATE: 4/21/09





PLAN OF SPAN F



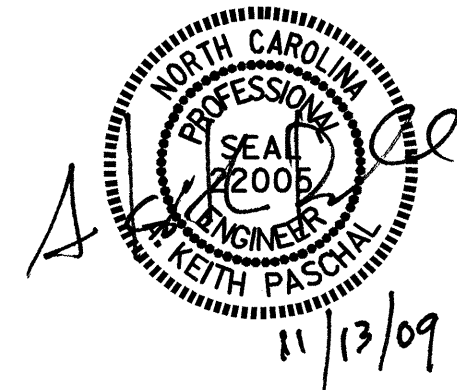
PLAN OF CORED SLAB UNIT

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.  
FOR LOCATION OF ADDITIONAL REINFORCING STEEL AT END OF SLAB UNIT,  
SEE "PART-PLAN EXTERIOR SECTION" SHEET 1 OF 5.

**NOTES:**  
DRAIN BLOCKOUTS SHALL BE SHIFTED AS NECESSARY TO BE CENTERED BETWEEN THE "S" BARS IN PARAPET.

PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-  
SHEET 4 OF 5

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



DRAWN BY: M.FOWLER DATE: 3/30/09  
CHECKED BY: J.G. KHARVA DATE: 4/21/09

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8	
1			3			TOTAL SHEETS	
2			4			25	

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 CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

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

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH. AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI.

ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

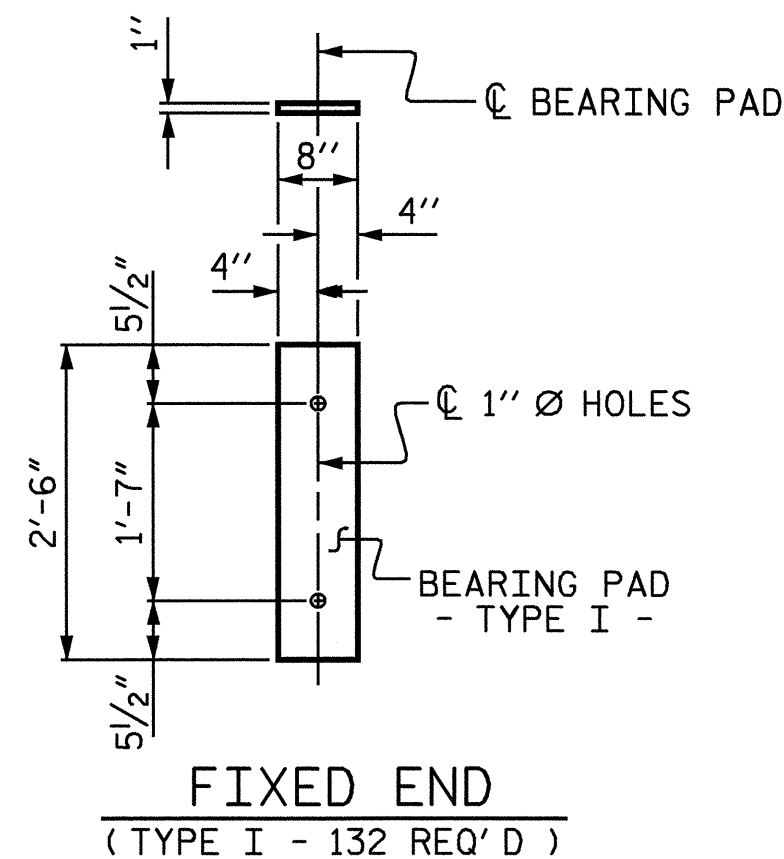
APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

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

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 1'-6"
	0.6" Ø L.R. STRAND
CAMBER ( SLAB ALONE IN PLACE ) ↓	1 1/16"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD** ↓	1/4"
FINAL CAMBER ↑	1 3/16"

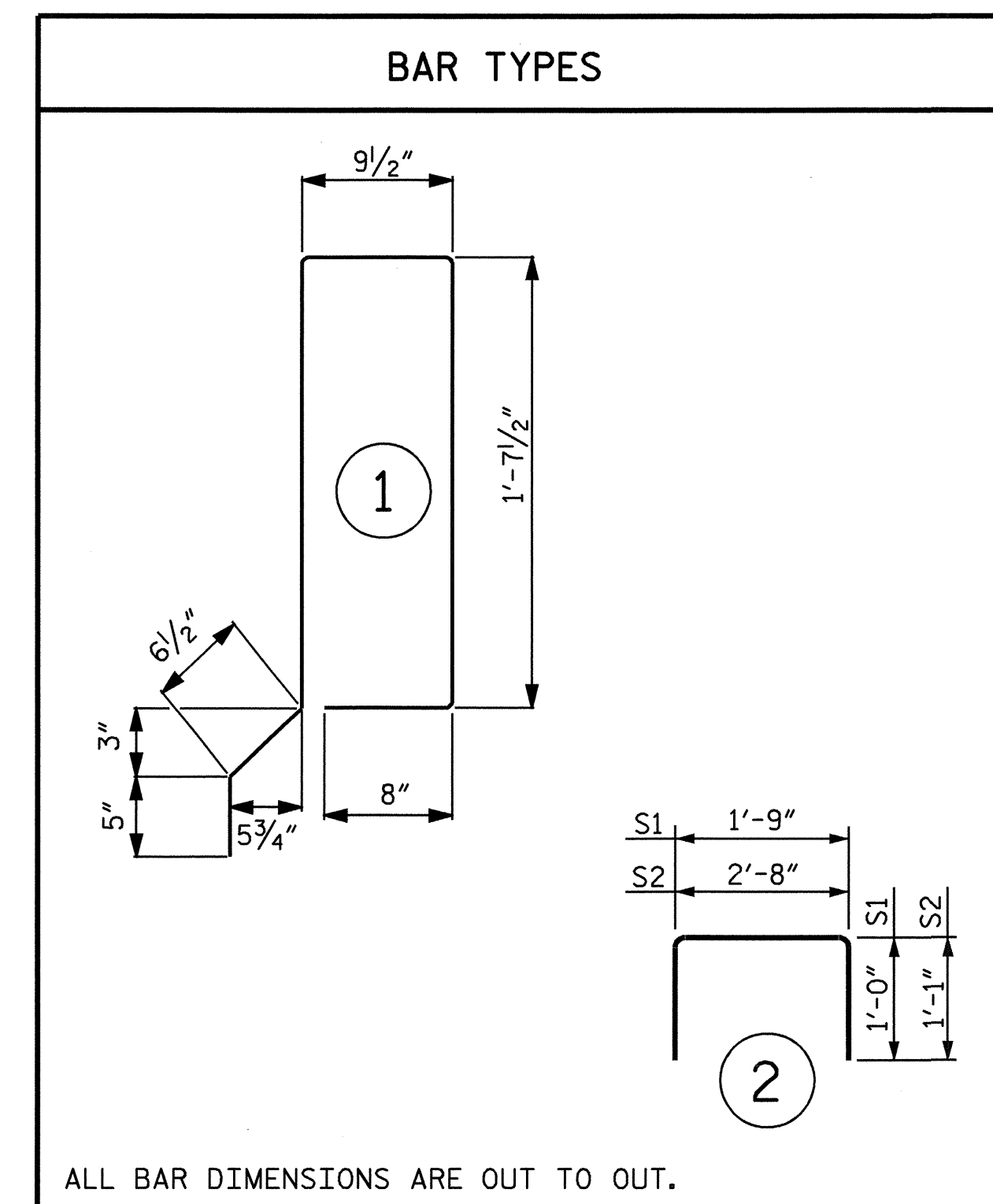
\*\* INCLUDES FUTURE WEARING SURFACE



ELASTOMERIC BEARING DETAILS

CORED SLABS REQUIRED								
	NUMBER PER SPAN	LENGTH						TOTAL LENGTH
		SPAN A	SPAN B	SPAN C	SPAN D	SPAN E	SPAN F	
EXTERIOR C.S.	2	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	478'-6"
INTERIOR C.S.	9	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	39'-10 1/2"	2153'-3"
TOTAL	11							2631'-9"

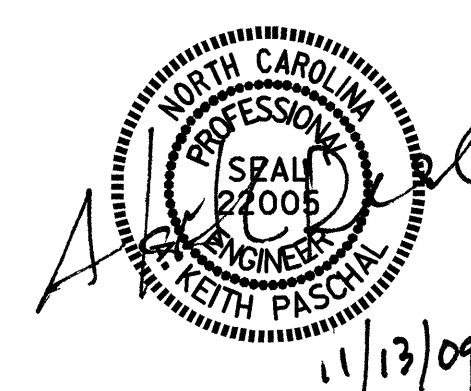
BILL OF MATERIAL FOR ONE CORED SLAB SECTION							
BAR	ALL SPANS			EXTERIOR UNIT		INTERIOR UNIT	
	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B1	4	# 4	STR	20'-8"	55	20'-8"	55
S1	8	# 4	2	3'-9"	20	3'-9"	20
S2	94	# 4	2	4'-10"	303	4'-10"	303
* S3	41	# 5	1	5'-8"	242		
REINFORCING STEEL				378 LBS.		378 LBS.	
* EPOXY COATED REINFORCING STEEL				242 LBS.			
5,500 P.S.I. CONCRETE				5.3 C.Y.		5.2 C.Y.	
0.6" Ø L.R. STRANDS No.				13		13	



PROJECT NO. B-4465  
 CHOWAN COUNTY  
 STATION: 22+92.00 -L-

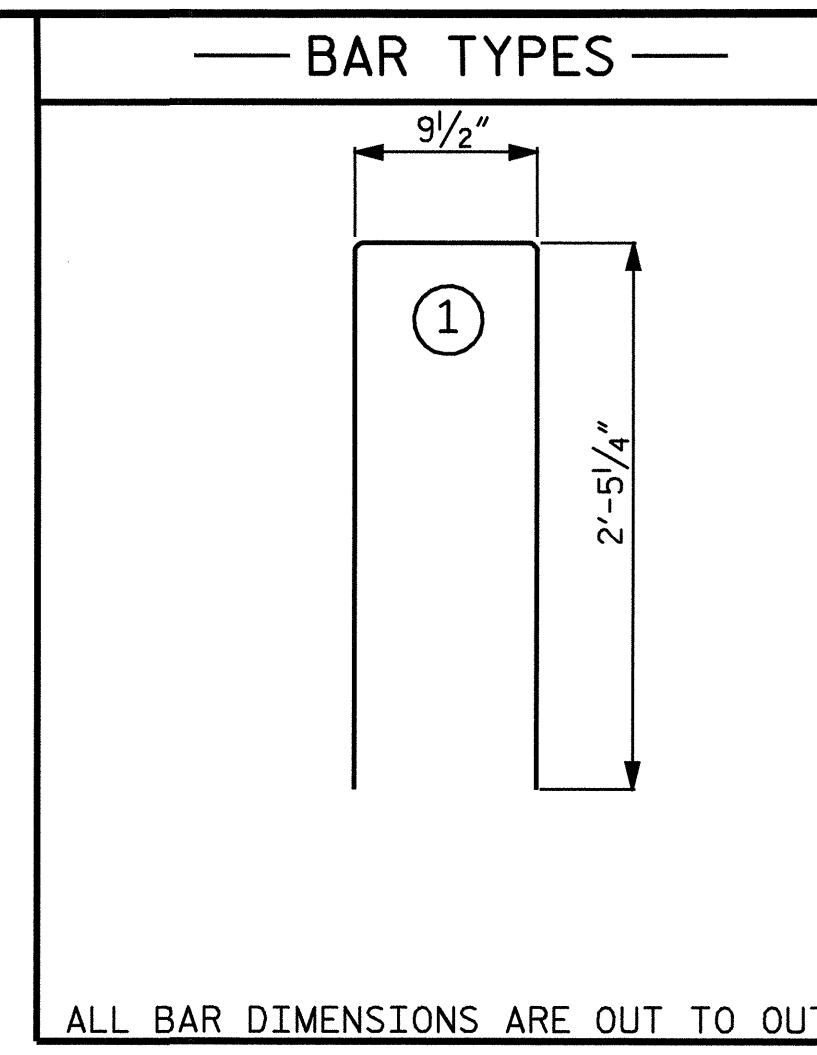
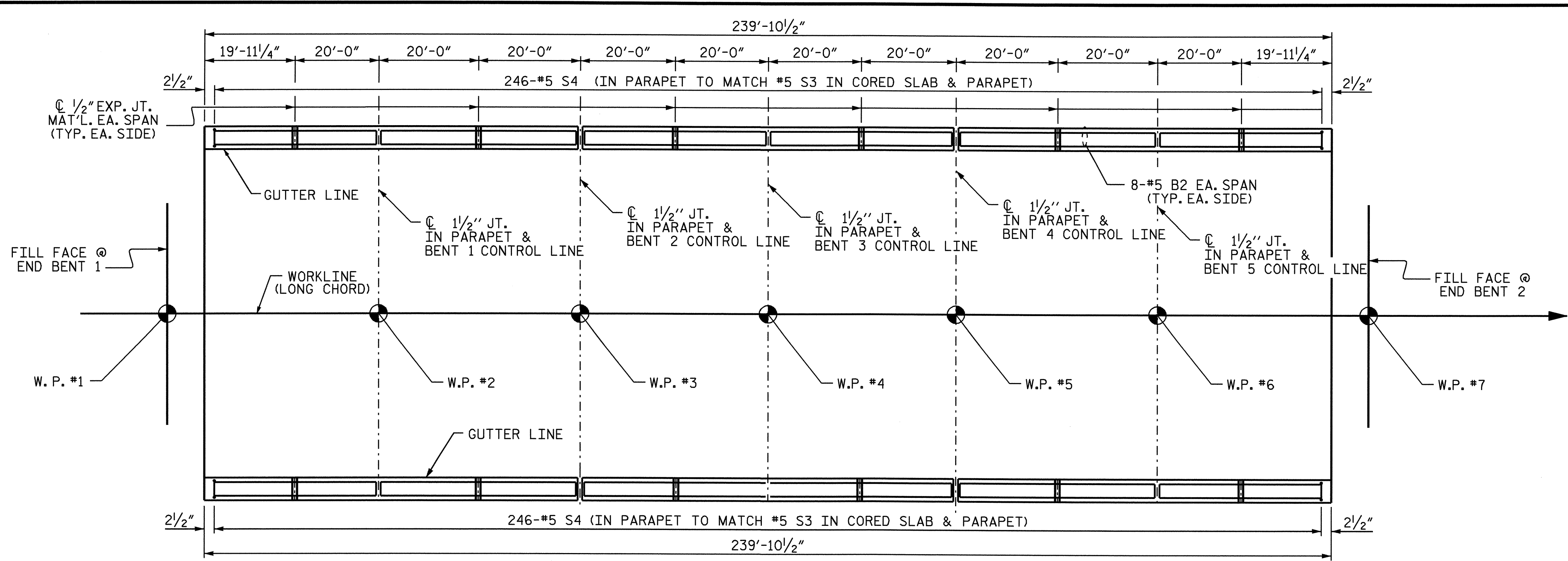
SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 1'-6"  
 PRESTRESSED  
 CONCRETE CORED  
 SLAB UNIT



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			25

ASSEMBLED BY : M.FOWELR	DATE : 10/31/08
CHECKED BY : J.G. KHARVA	DATE : 4/21/09
DRAWN BY : WJH 4/89	REV. 7/10/01 RWW/LES
CHECKED BY : FCJ 5/89	REV. 5/7/03RRR RWW/JTE
	REV. 5/1/06R TLA/GM

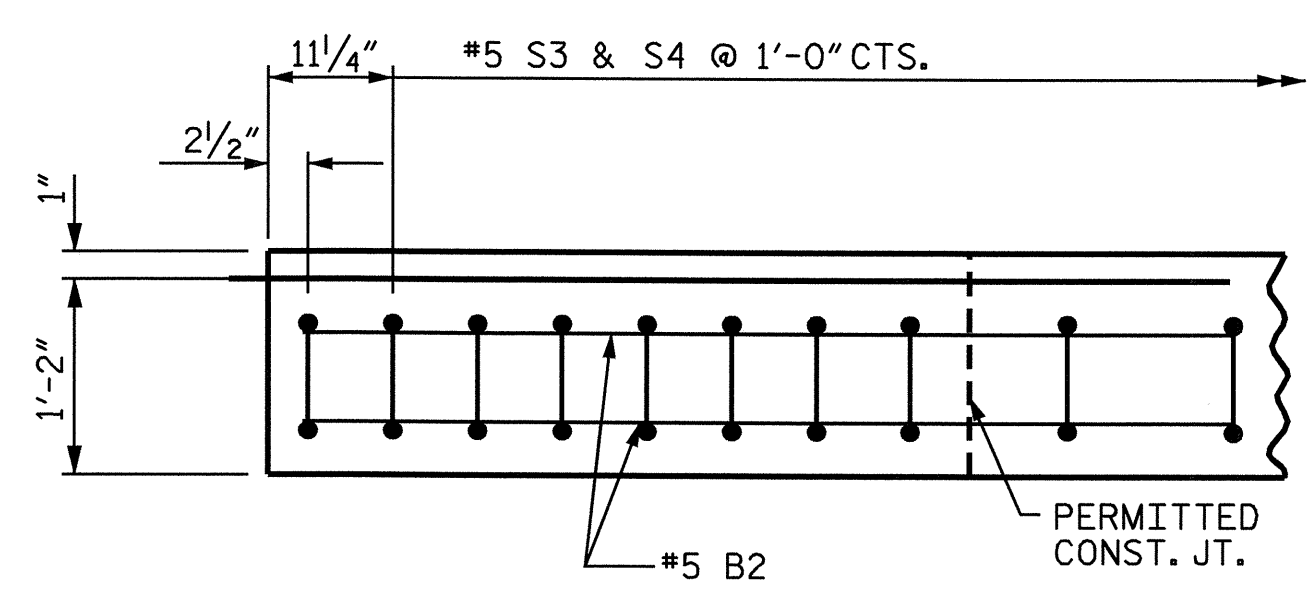
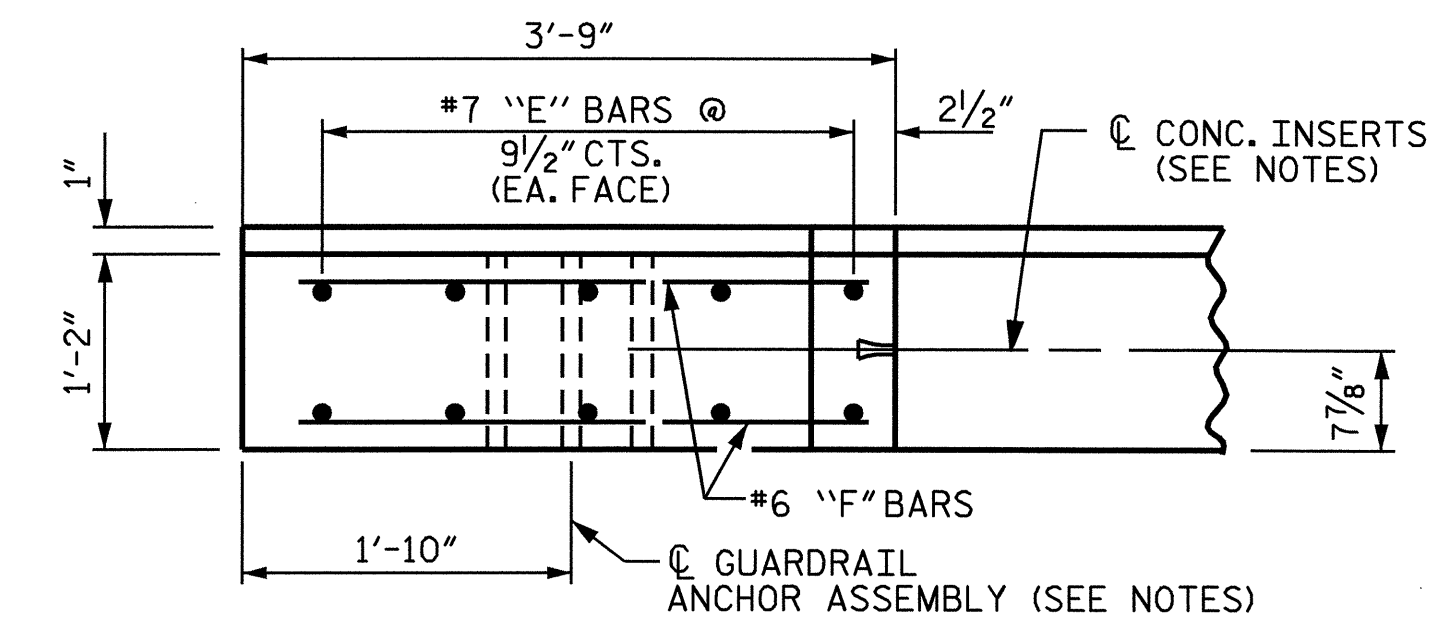


BILL OF MATERIAL PARAPETS AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B2	192	#5	STR	19'-7"	3922
*E1	8	#7	STR	2'-8"	44
*E2	8	#7	STR	3'-2"	52
*E3	8	#7	STR	3'-8"	60
*E4	8	#7	STR	4'-2"	68
*E5	8	#7	STR	4'-6"	74
*F1	8	#6	STR	1'-10"	22
*F2	8	#6	STR	3'-0"	36
*F3	8	#6	STR	3'-8"	44
*S4	492	#5	1	5'-8"	2908
* EPOXY COATED REINFORCING STEEL				LBS.	7230
CLASS AA CONCRETE				C.Y.	56.3
CONCRETE PARAPET				LIN. FT.	479.75

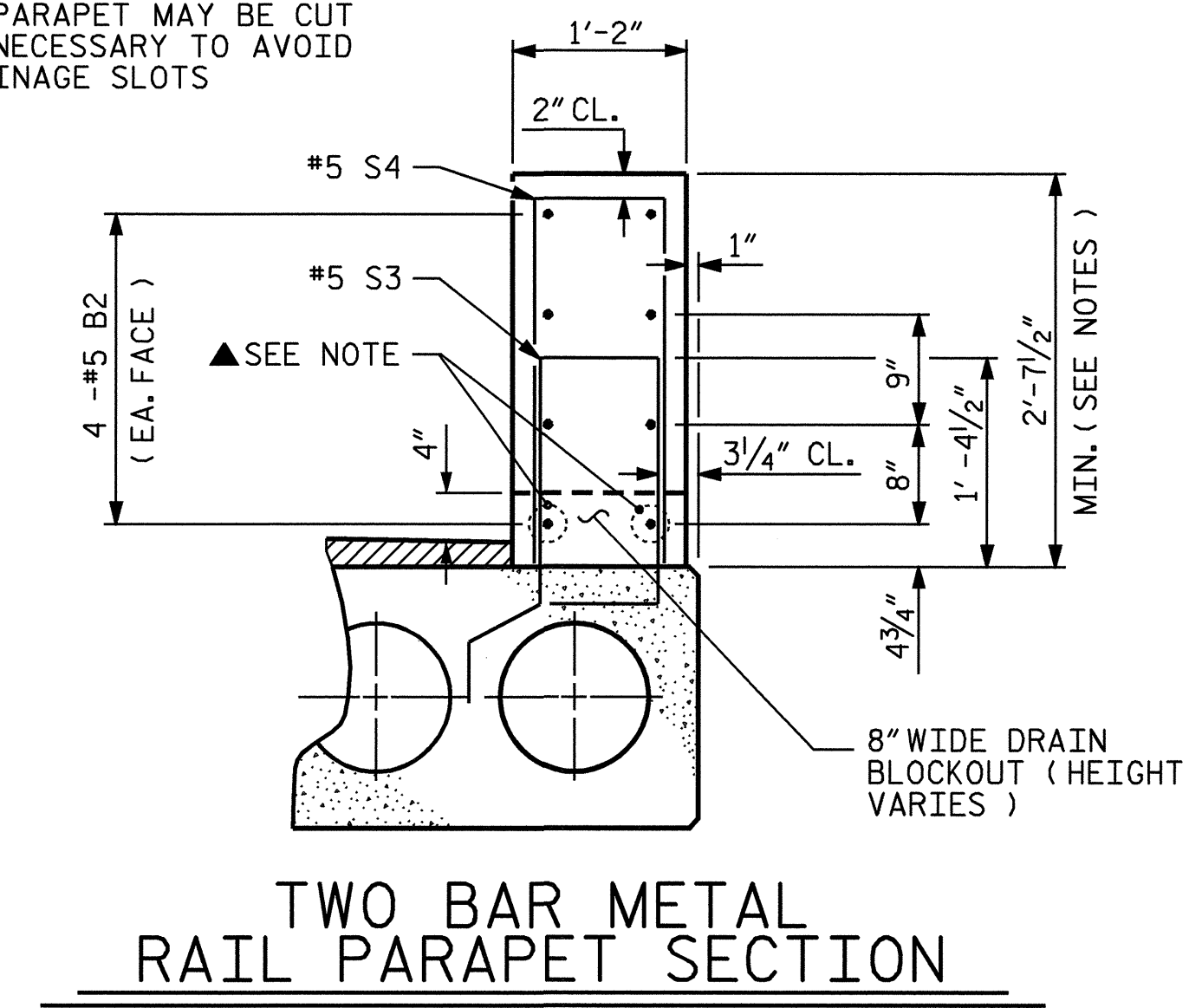
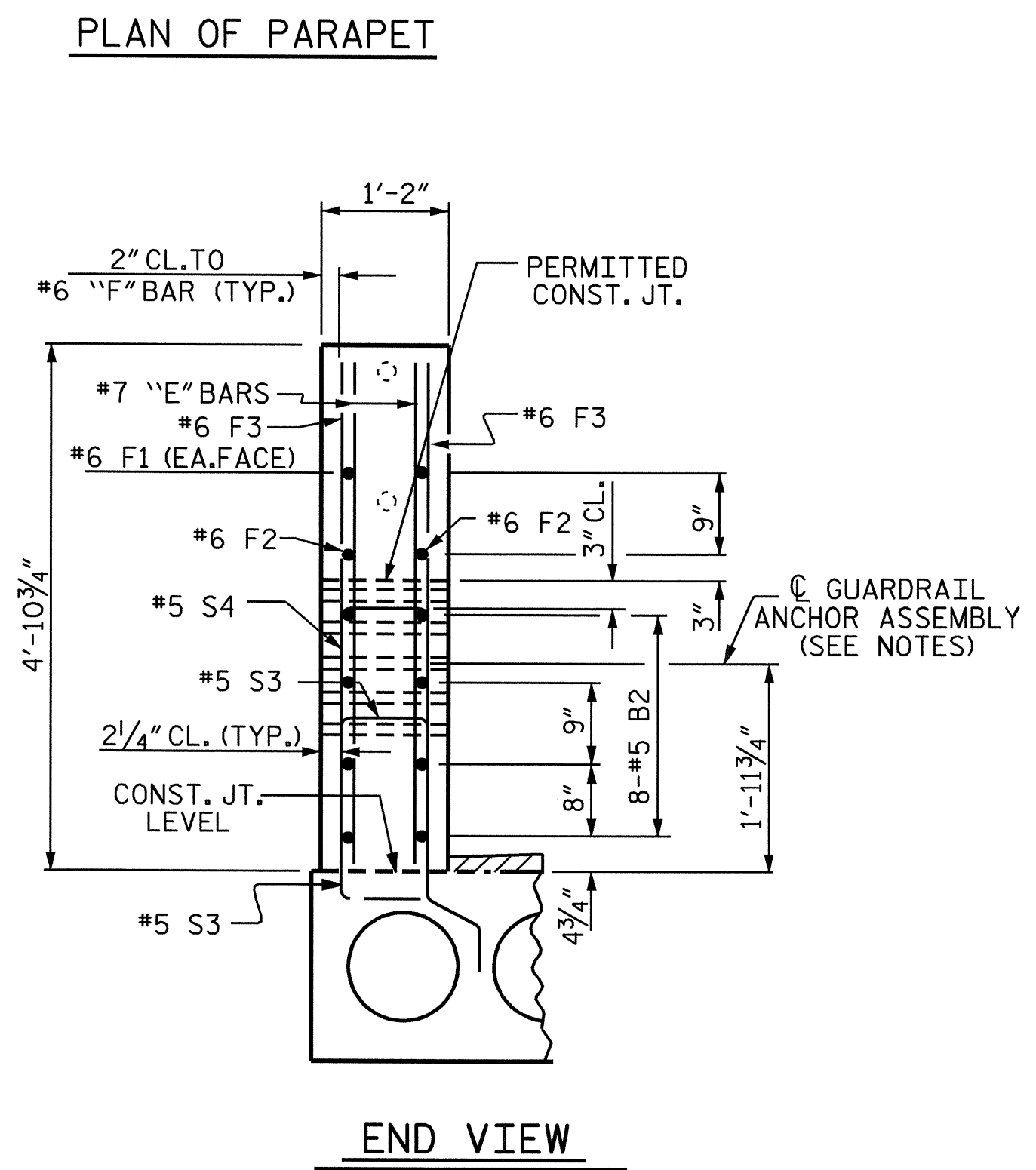
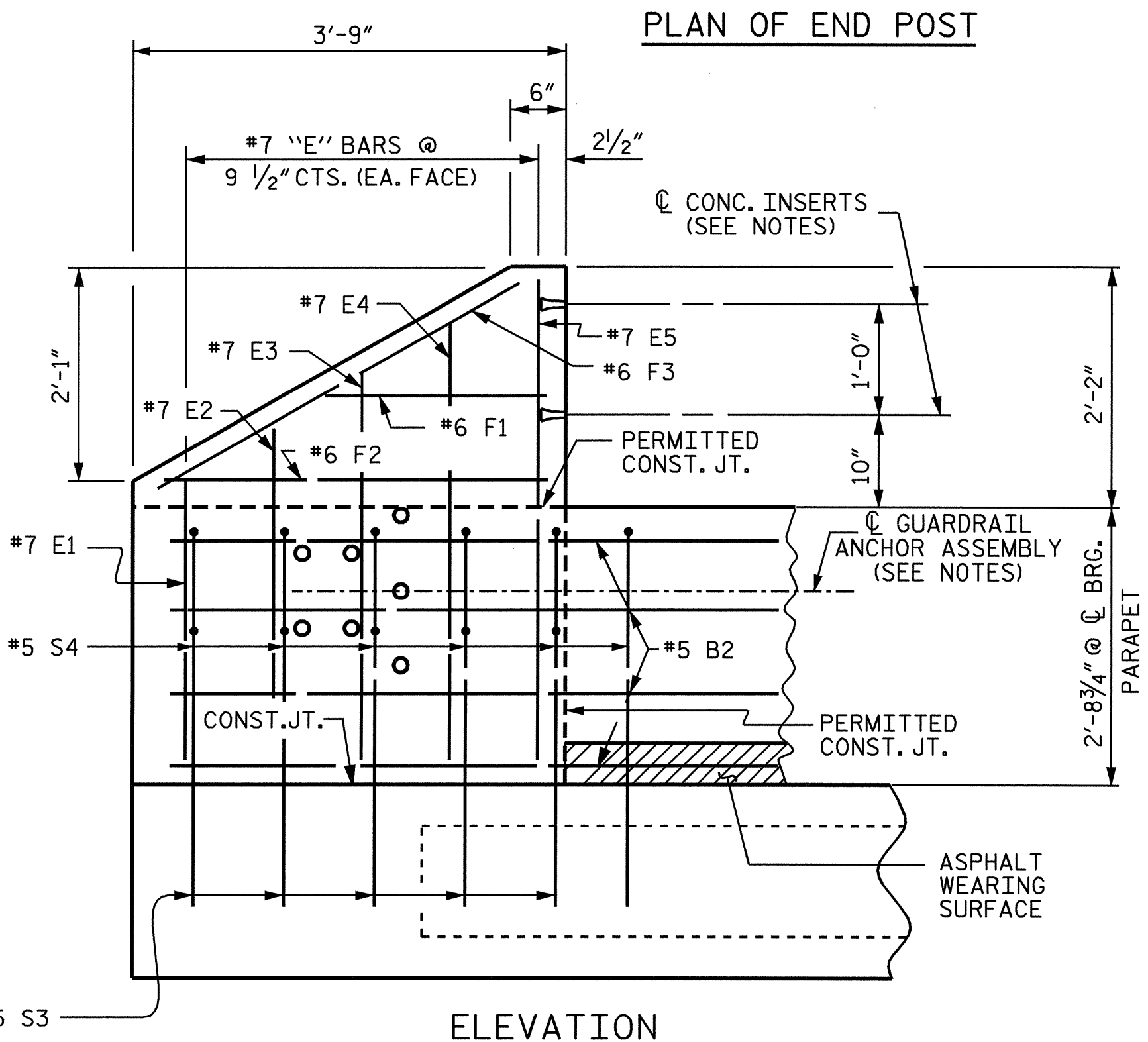
**PLAN OF PARAPET**

**NOTES**

ALL REINFORCING STEEL IN THE PARAPETS AND END POSTS SHALL BE EPOXY COATED.  
 FOR DETAILS OF CONCRETE INSERT AND GUARDRAIL ANCHOR ASSEMBLY, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET 3 OF 4.  
 #5 S3 BARS ARE INCLUDED IN THE BILL OF MATERIAL FOR CORED SLAB UNITS.  
 GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.  
 THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.



▲ BOTTOM ROW OF "B" BARS IN PARAPET MAY BE CUT AS NECESSARY TO AVOID DRAINAGE SLOTS



**PARAPET AND END POST FOR TWO-BAR RAIL**

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-  
 SHEET 1 OF 5

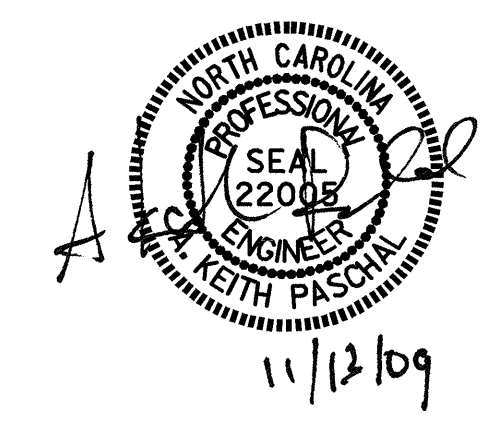
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 CONCRETE PARAPET AND  
 PARAPET END POST  
 DETAILS**  
 (FOR TWO BAR METAL RAIL)

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

SHEET NO. **S-10**  
 TOTAL SHEETS **25**

DRAWN BY: M.FOWLER DATE: 11/3/08  
 CHECKED BY: J.G. KHARVA DATE: 4/21/09



**NOTES**

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

**ALUMINUM RAILS**

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

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

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

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

**GENERAL NOTES**

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

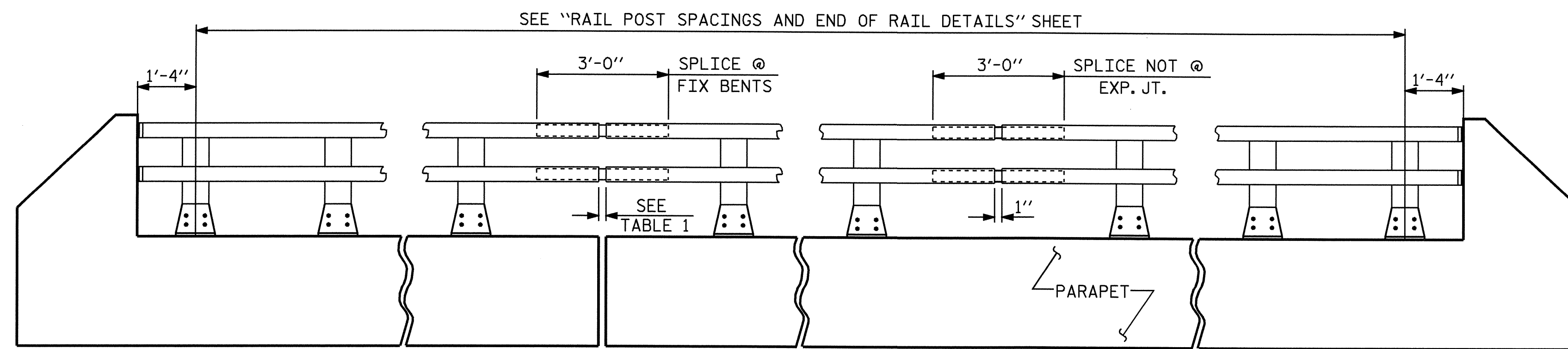
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

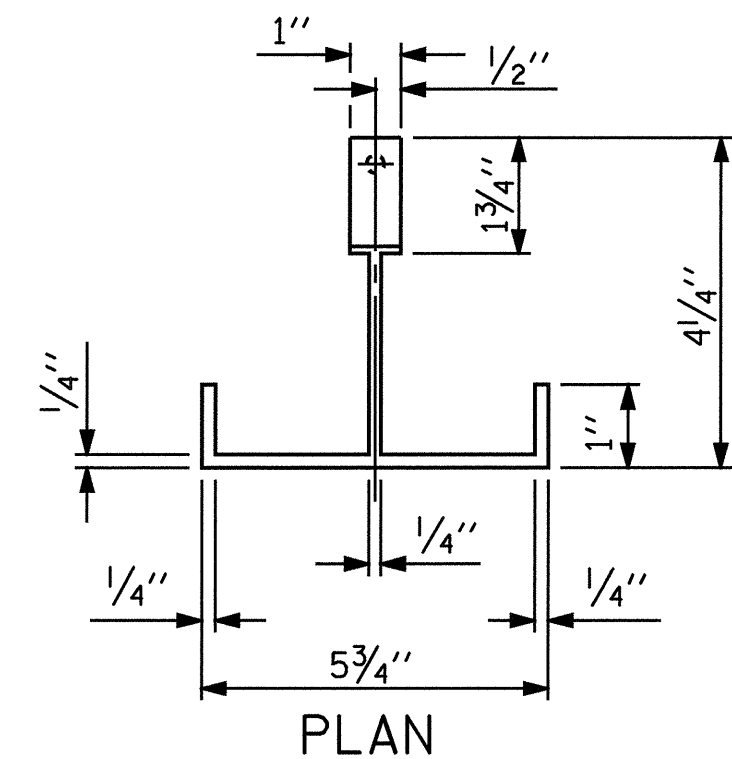
PAY LENGTH = 459.42 LIN. FT.



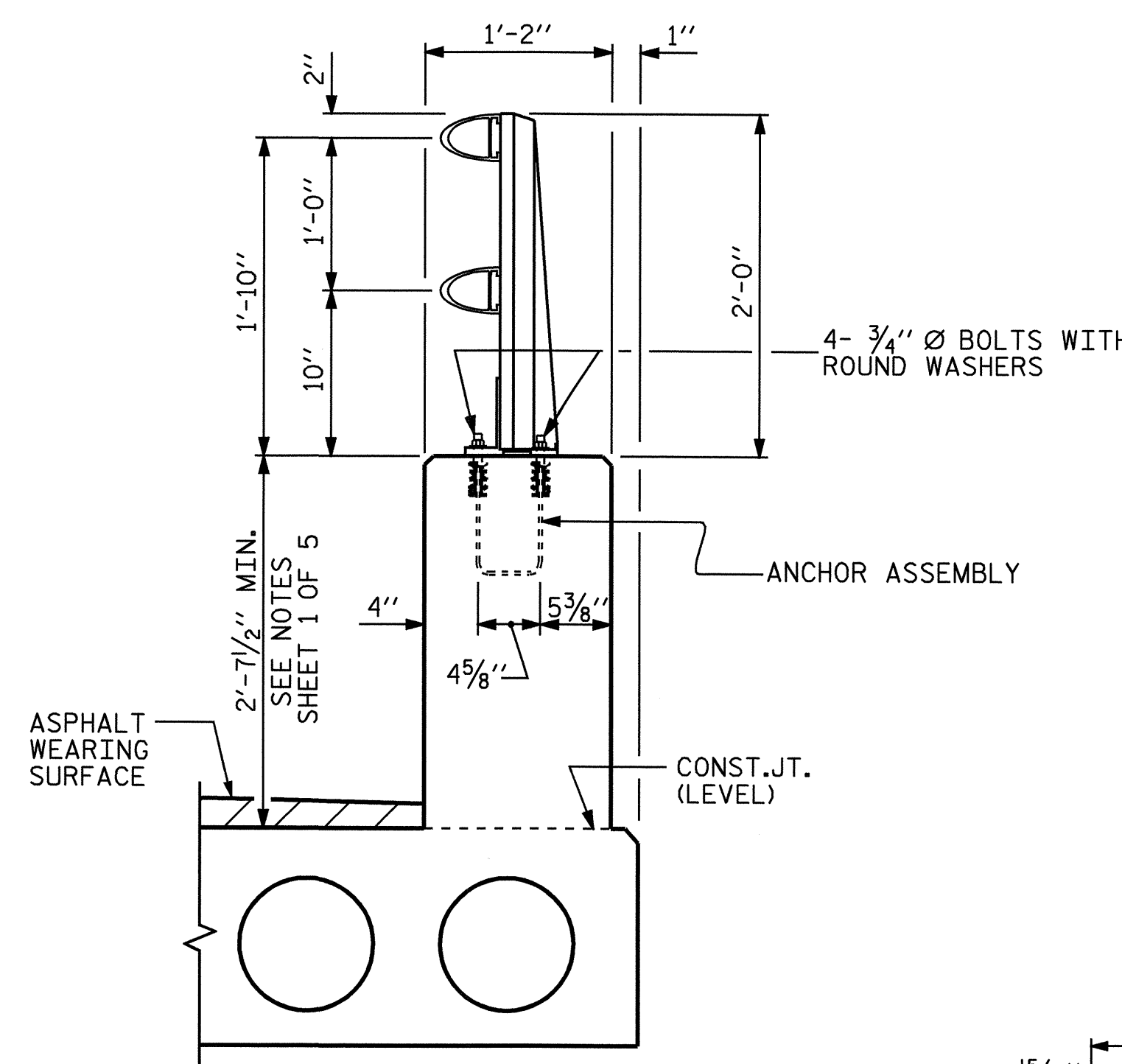
**ELEVATION**

NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.

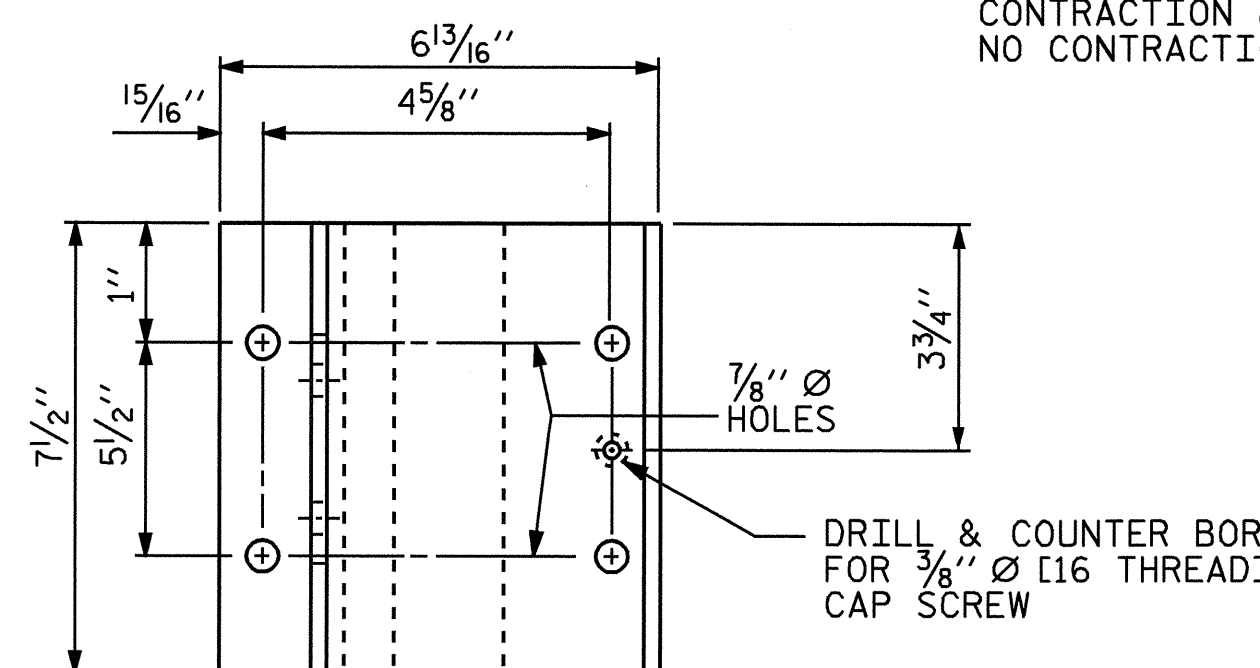
TABLE 1	
	RAIL OPENING
BENT 1	1 1/2"
BENT 2	1 1/2"
BENT 3	1 1/2"
BENT 4	1 1/2"
BENT 5	1 1/2"



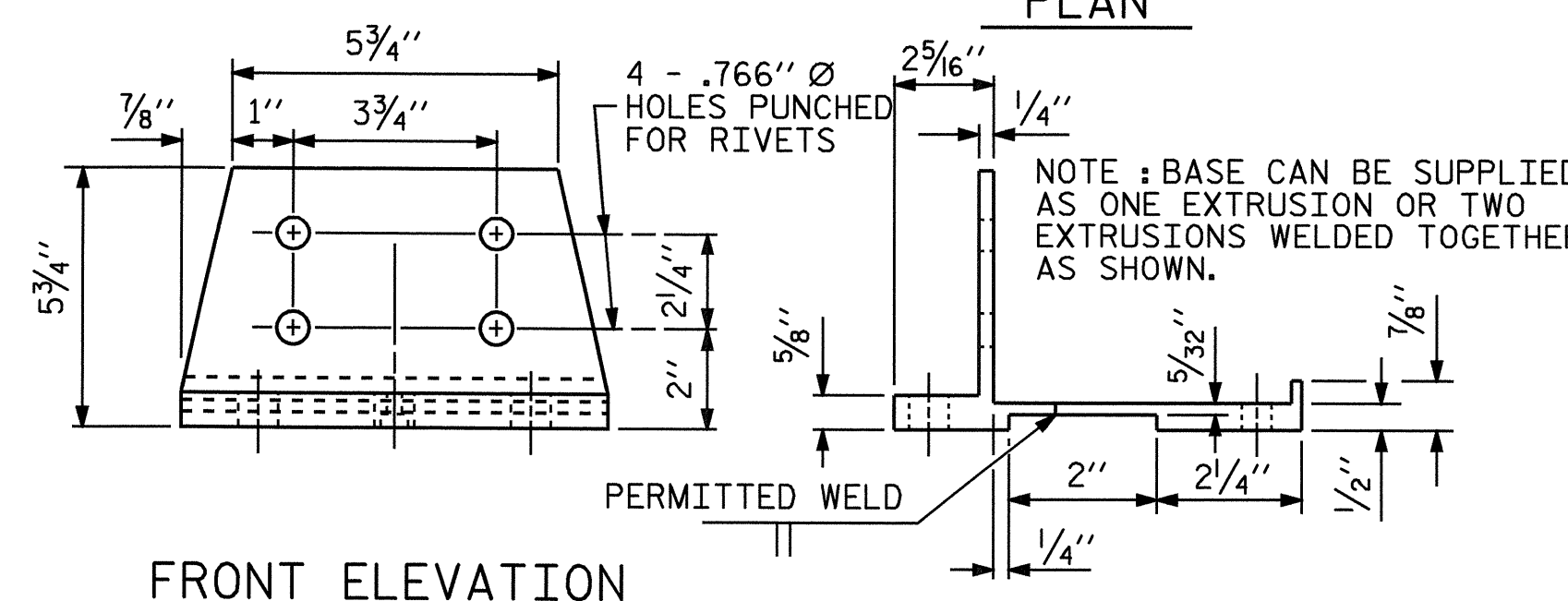
**PLAN**



**SECTION THRU PARAPET AND RAIL**



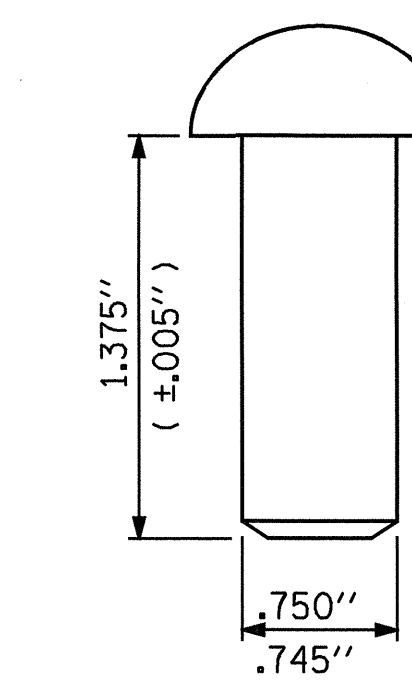
**PLAN**



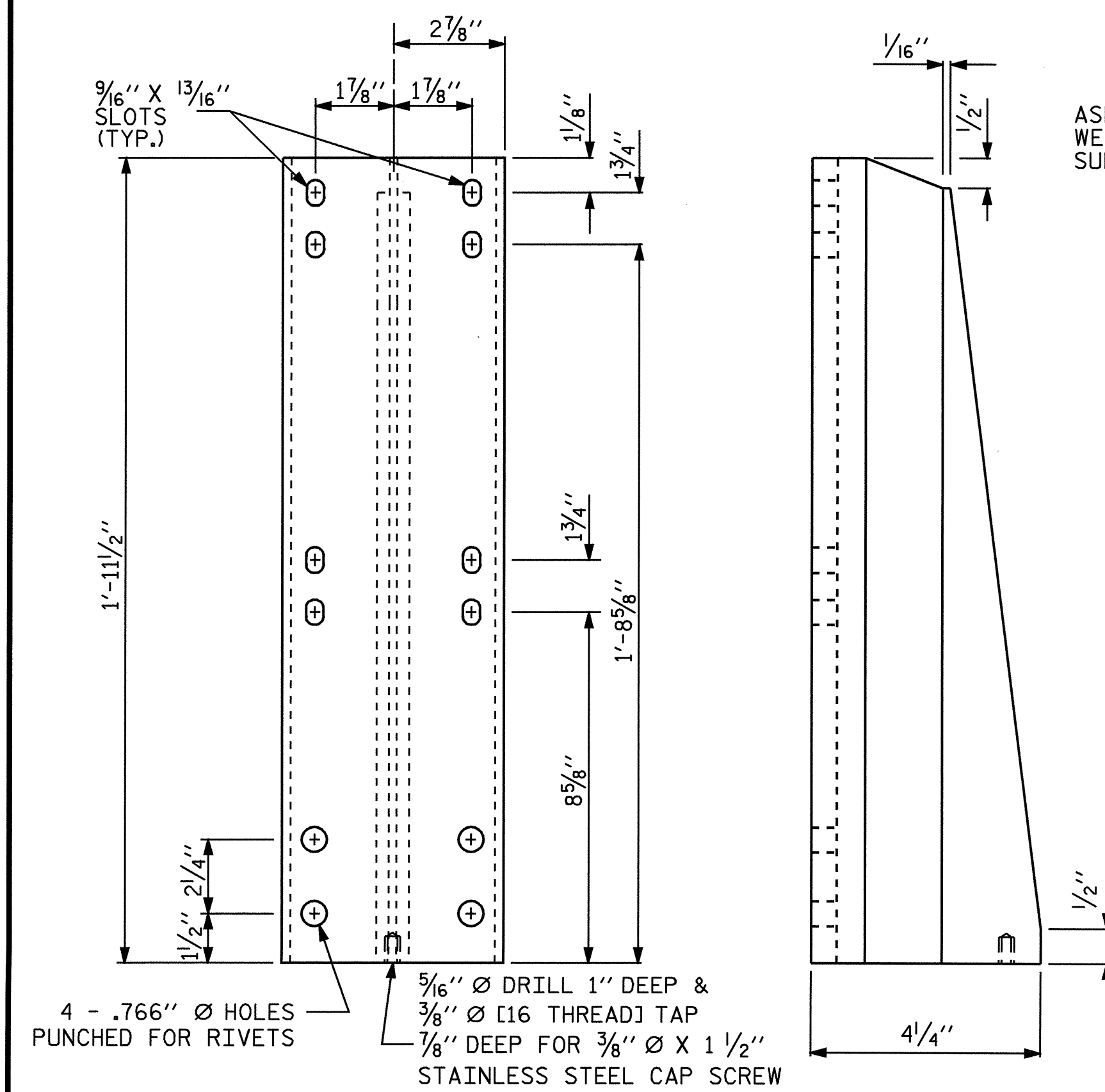
**FRONT ELEVATION**

**SIDE ELEVATION**

**POST BASE DETAILS**



**RIVET DETAIL**



**FRONT ELEVATION**

**SIDE ELEVATION**

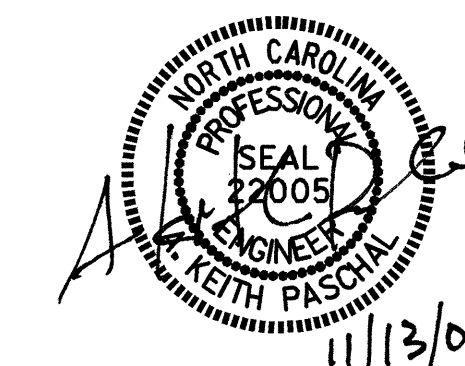
**DETAILS OF POST**

ASSEMBLED BY : M.FOLWER	DATE : 10/23/08
CHECKED BY : J.G. KHARVA	DATE : 3/25/09
DRAWN BY : EEM 6/94	REV. 10/17/00 LES/RDR
CHECKED BY : RGW 6/94	REV. 5/7/03R RWW/JTE
	REV. 5/1/06 TLA/GM

PROJECT NO. B-4465  
 CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD 2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-11
TOTAL SHEETS					25



NOTES

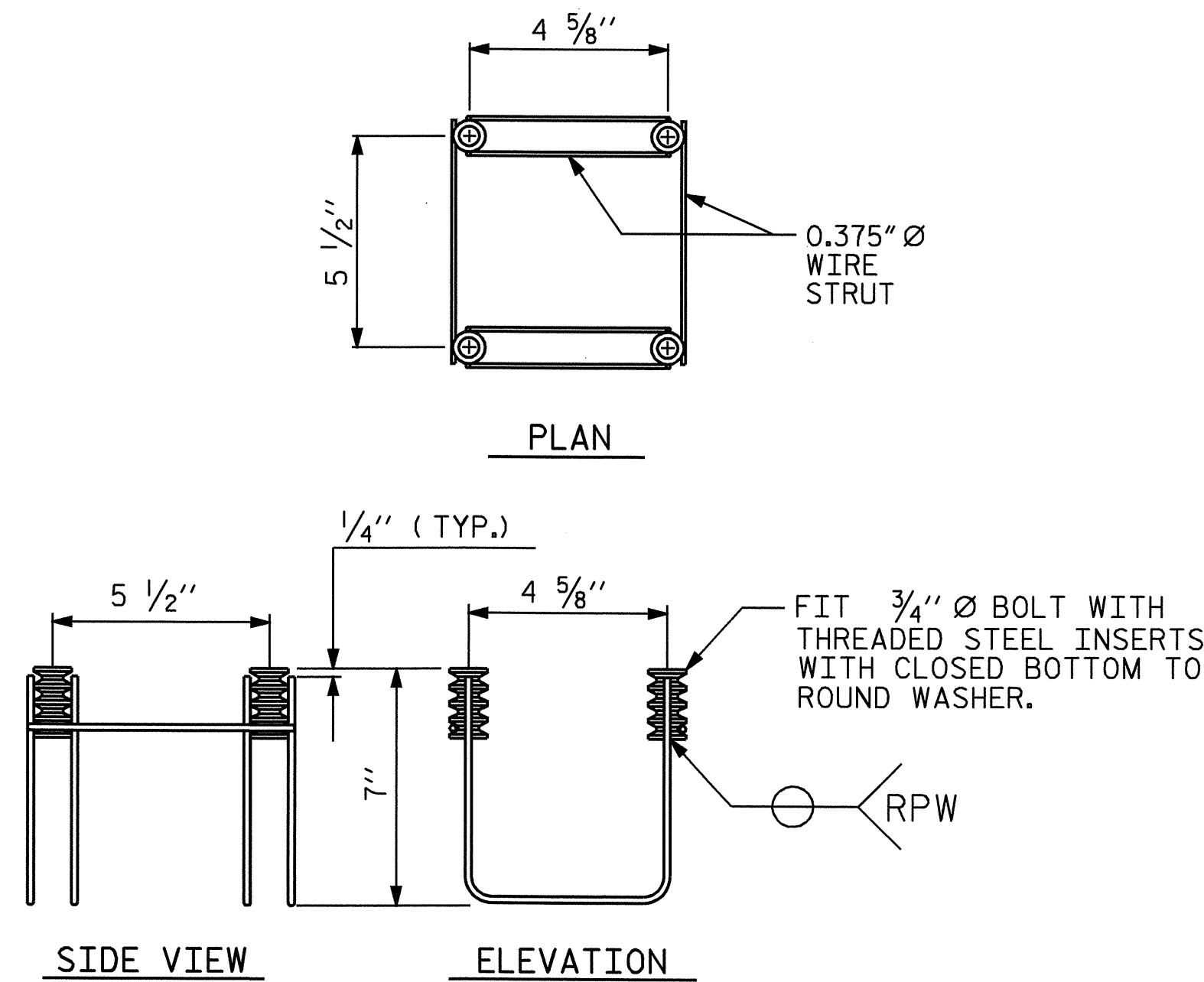
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

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

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

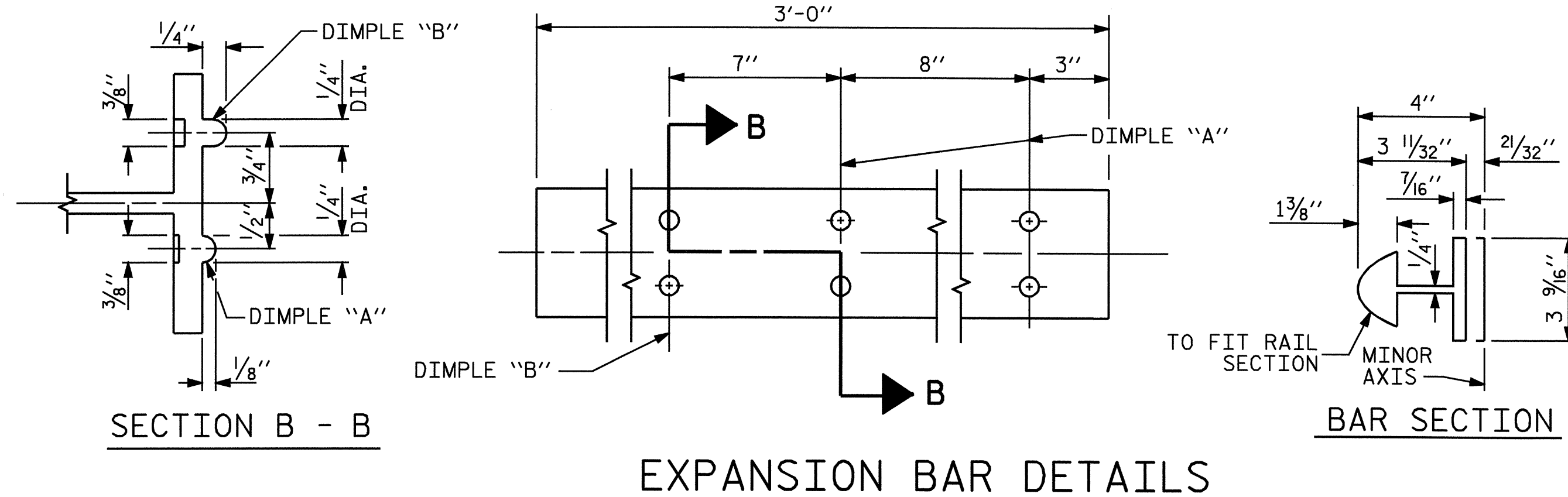
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



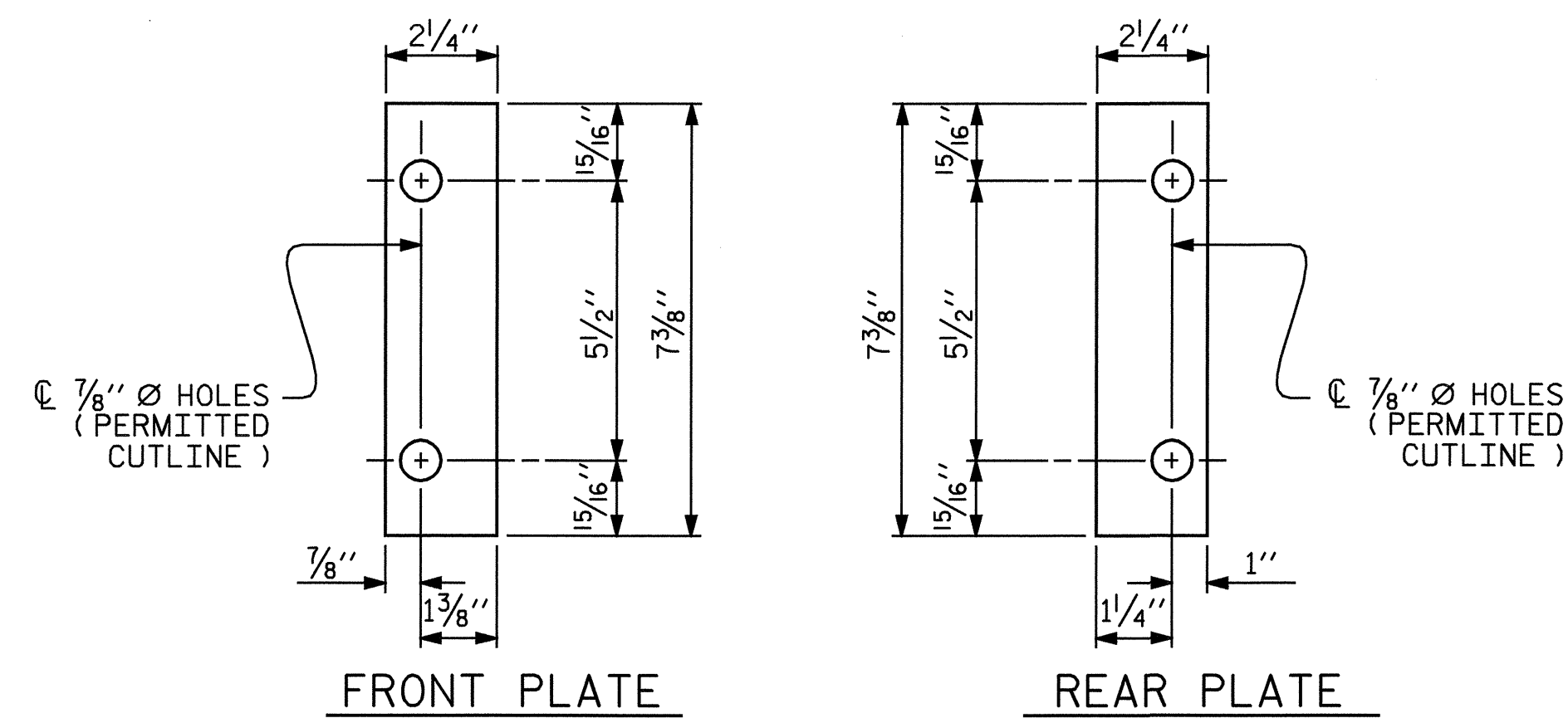
MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) : 1 3/4"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

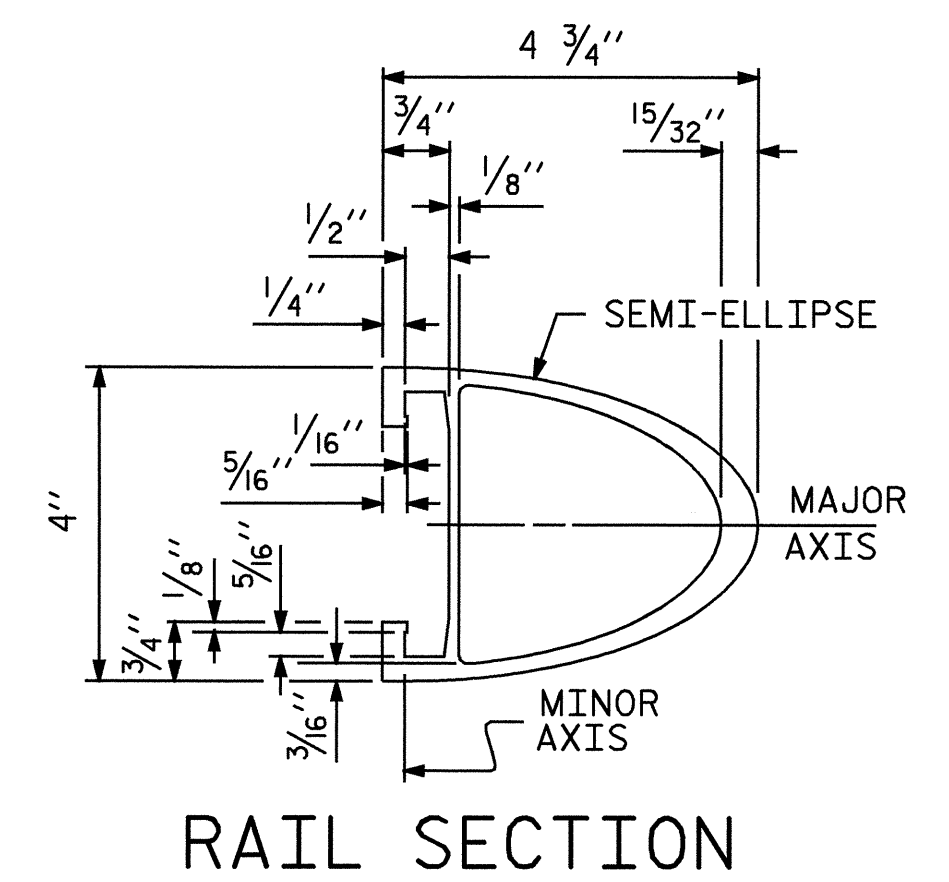
( 78 ASSEMBLIES REQUIRED )



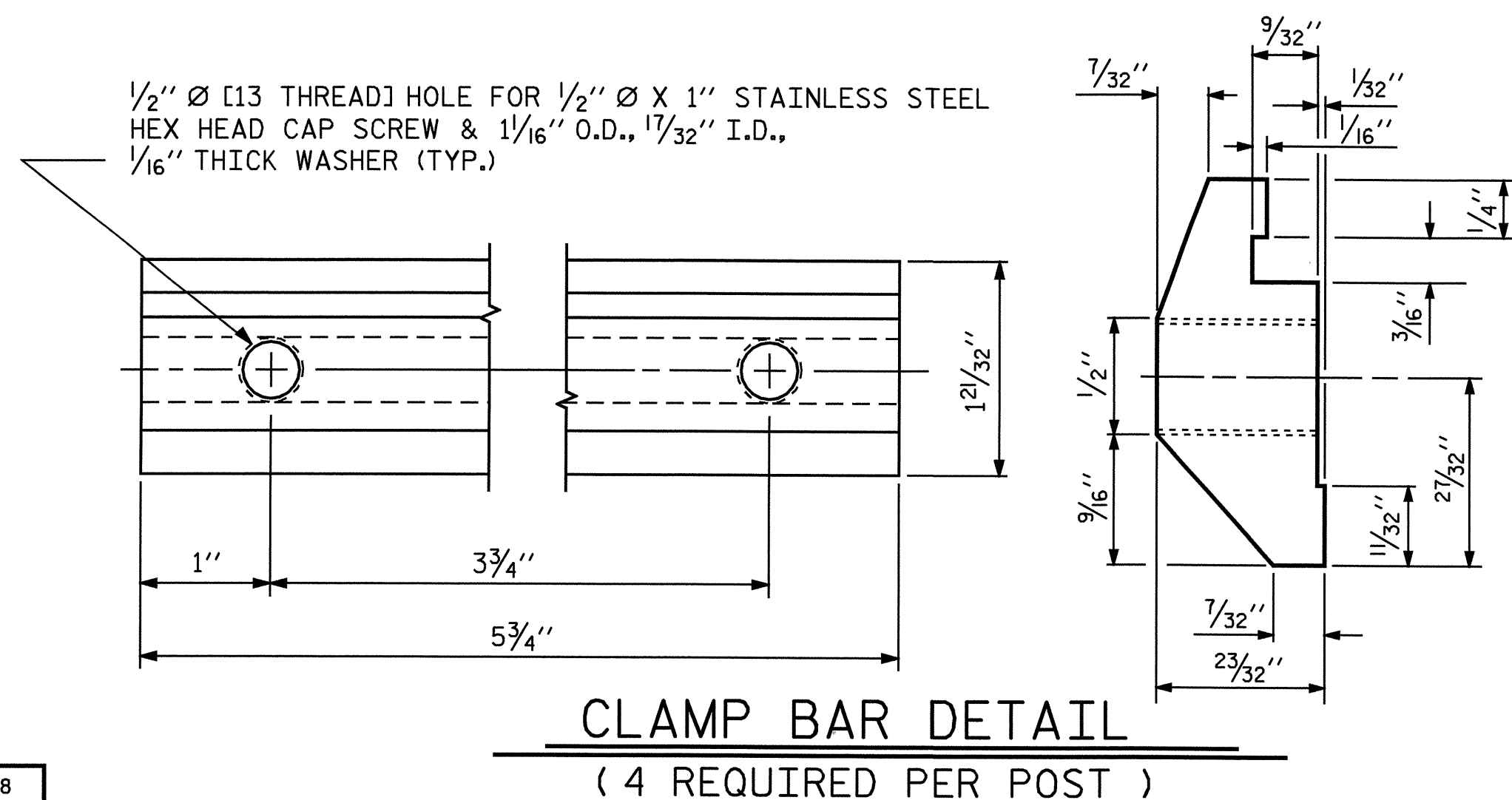
EXPANSION BAR DETAILS



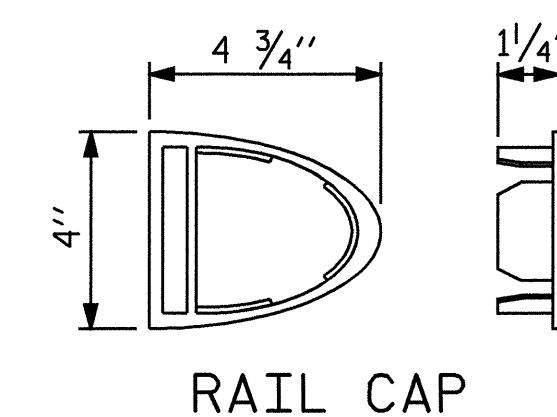
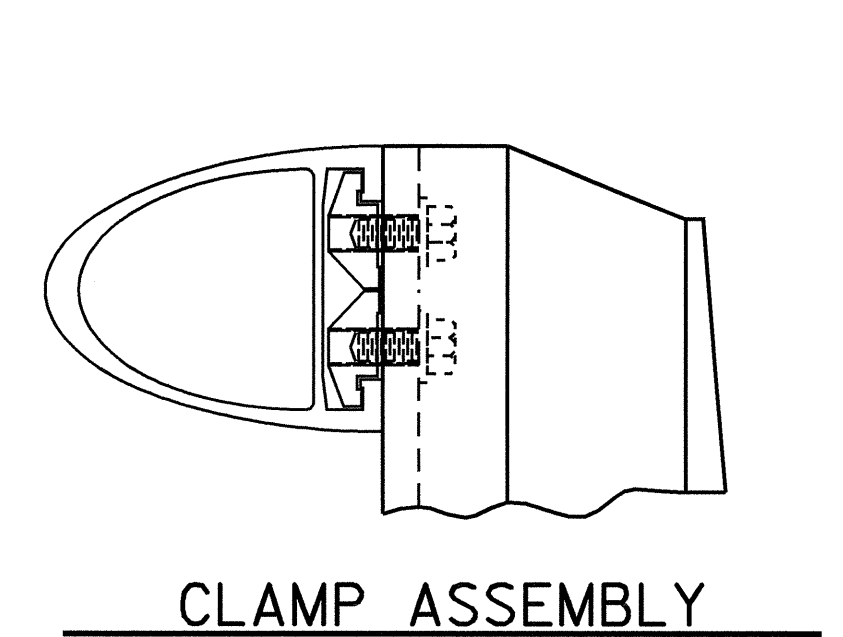
NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



RAIL SECTION



CLAMP BAR DETAIL  
( 4 REQUIRED PER POST )

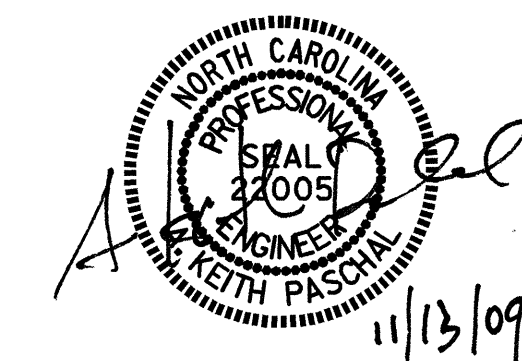


PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD

2 BAR METAL RAIL



ASSEMBLED BY : J.M.FOWLER	DATE : 10/23/08
CHECKED BY : J.G. KHARVA	DATE : 3/25/09
DRAWN BY : EEM 6/94	REV. 2/6/97 EEM/RGW
CHECKED BY : RGW 6/94	REV. 8/16/99 MAB/LES
	REV. 5/1/06R KMM/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			25

**NOTES**

**STRUCTURAL CONCRETE INSERT**

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
- B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 3/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

**NOTES**

**METAL RAIL TO END POST CONNECTION**

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

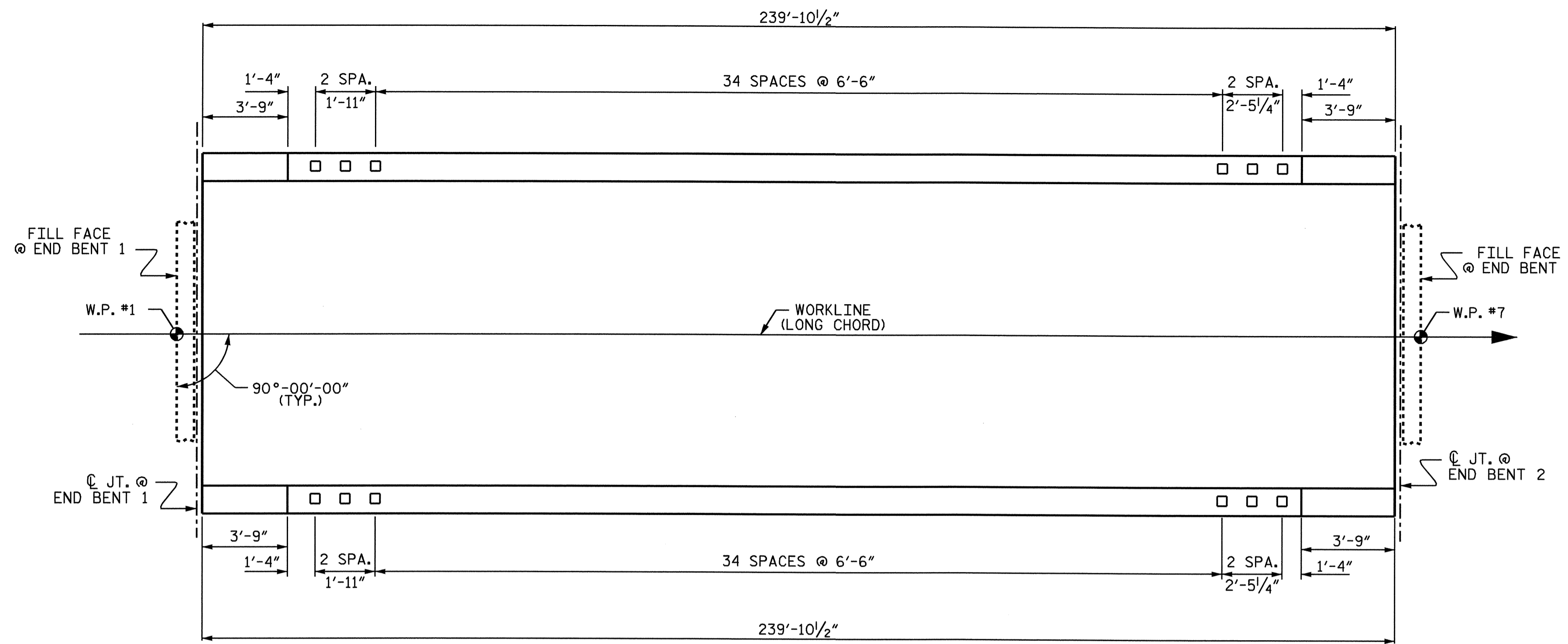
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
- C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
- D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
- E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

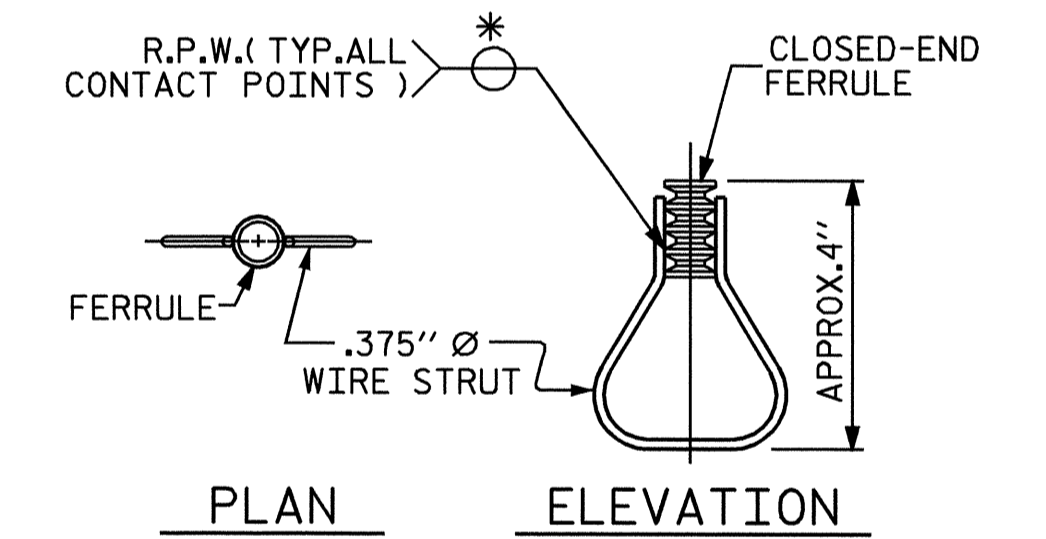
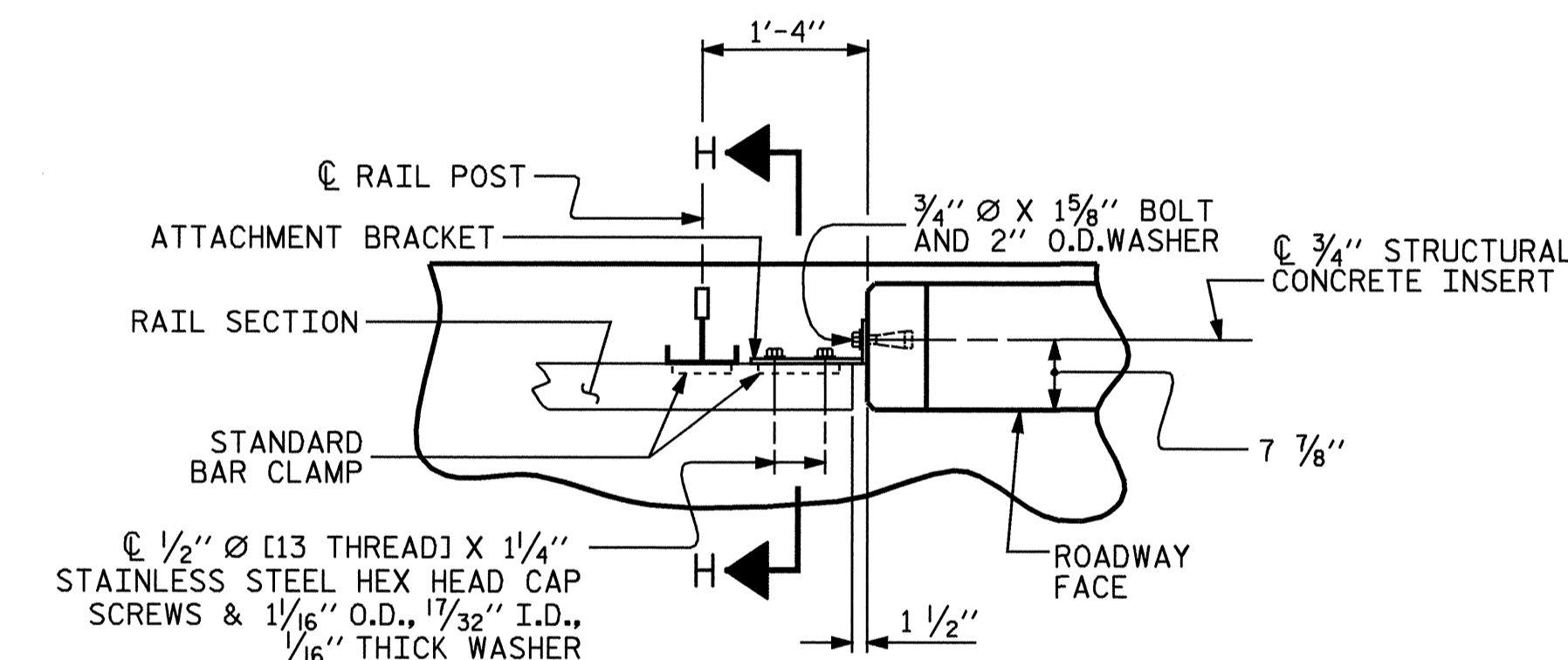
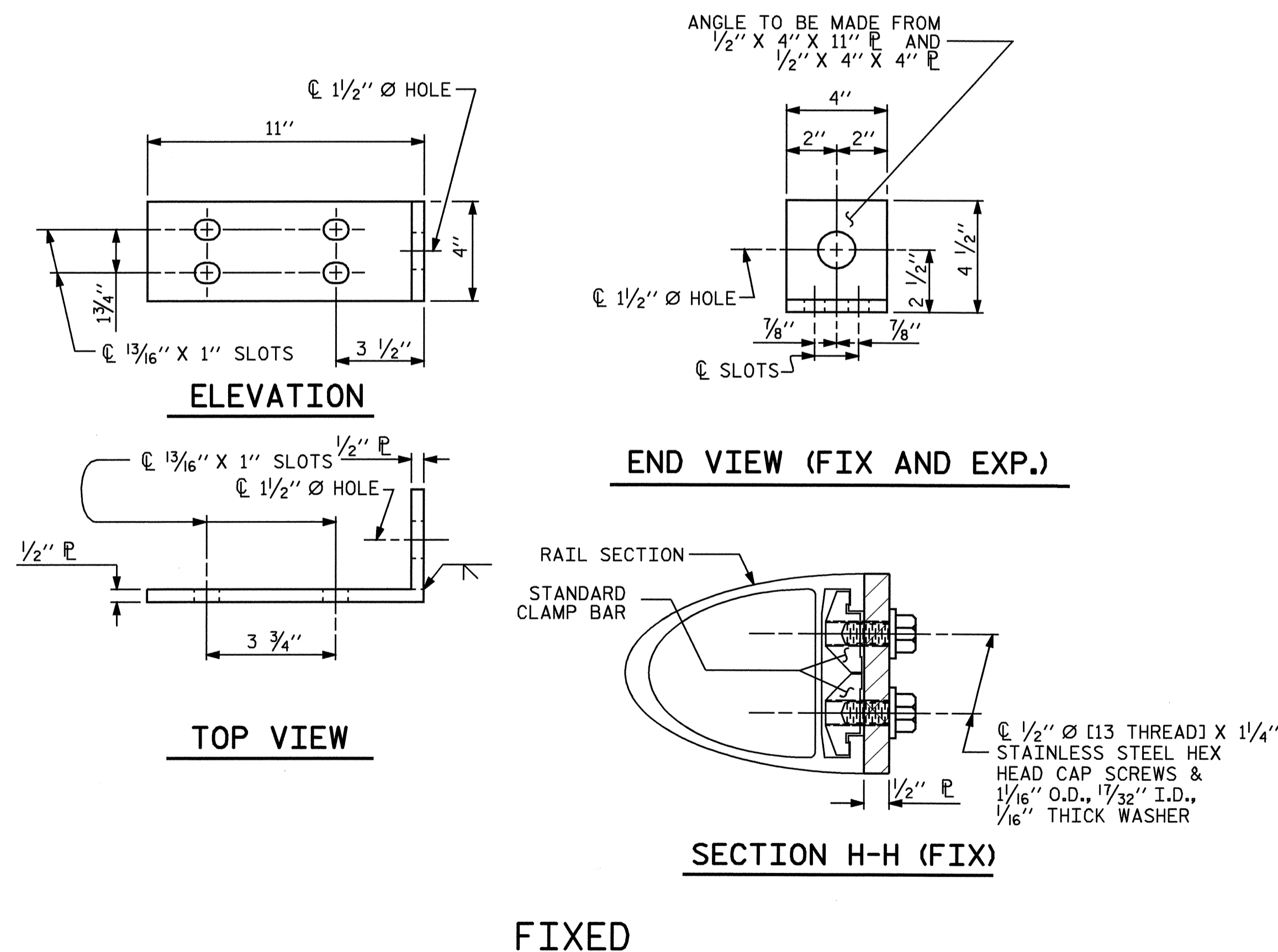
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



**PLAN OF RAIL POST SPACINGS**



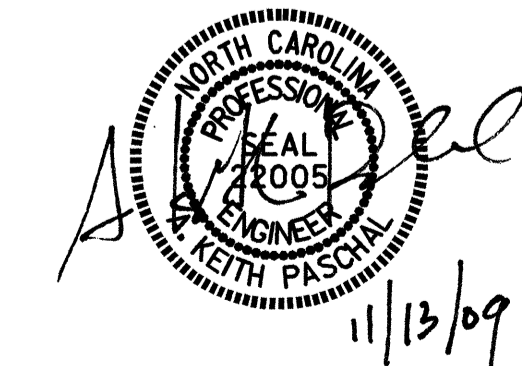
**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 4 OF 5

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



ASSEMBLED BY : M.FOWLER	DATE : 11/3/08
CHECKED BY : J.G. KHARVA	DATE : 3/25/09
DRAWN BY : FCJ 1/88	REV. 10/17/00 LES/RDR
CHECKED BY : CRK 3/89	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			25

NOTES

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

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

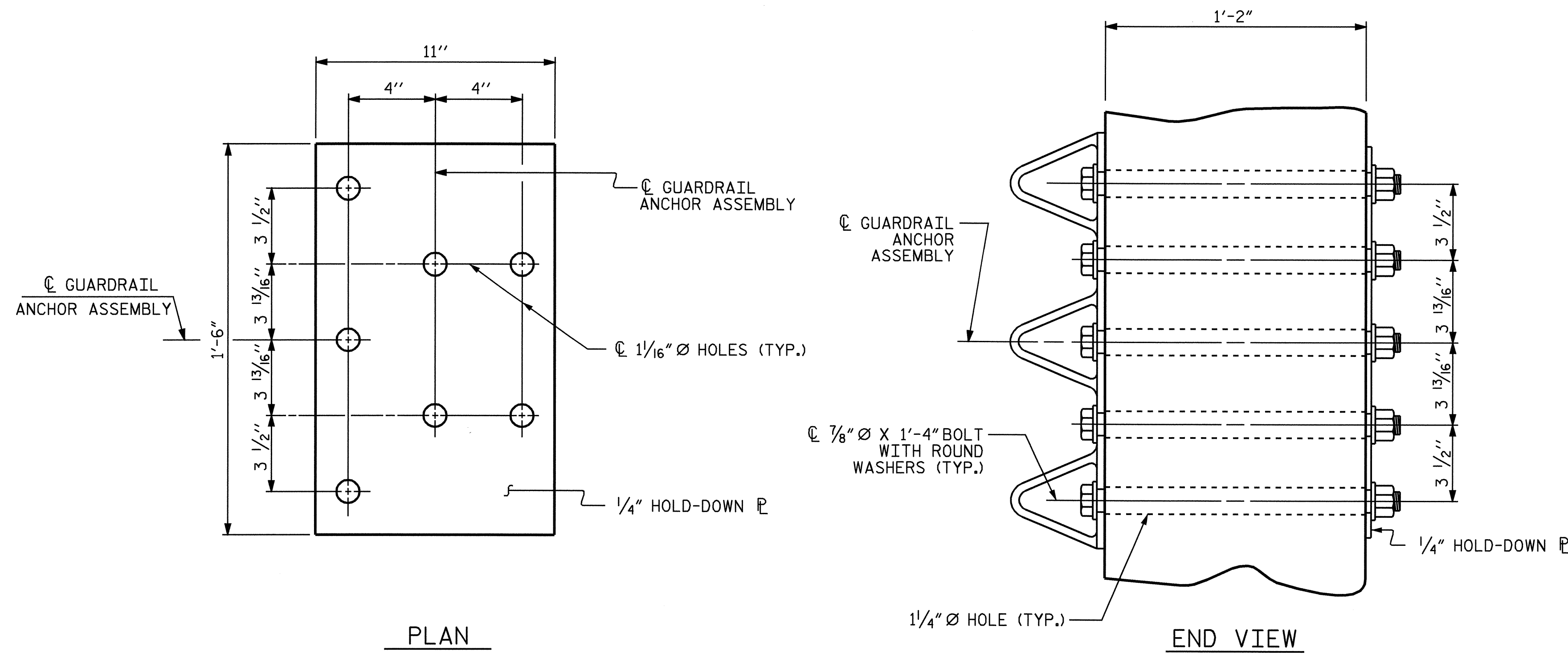
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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

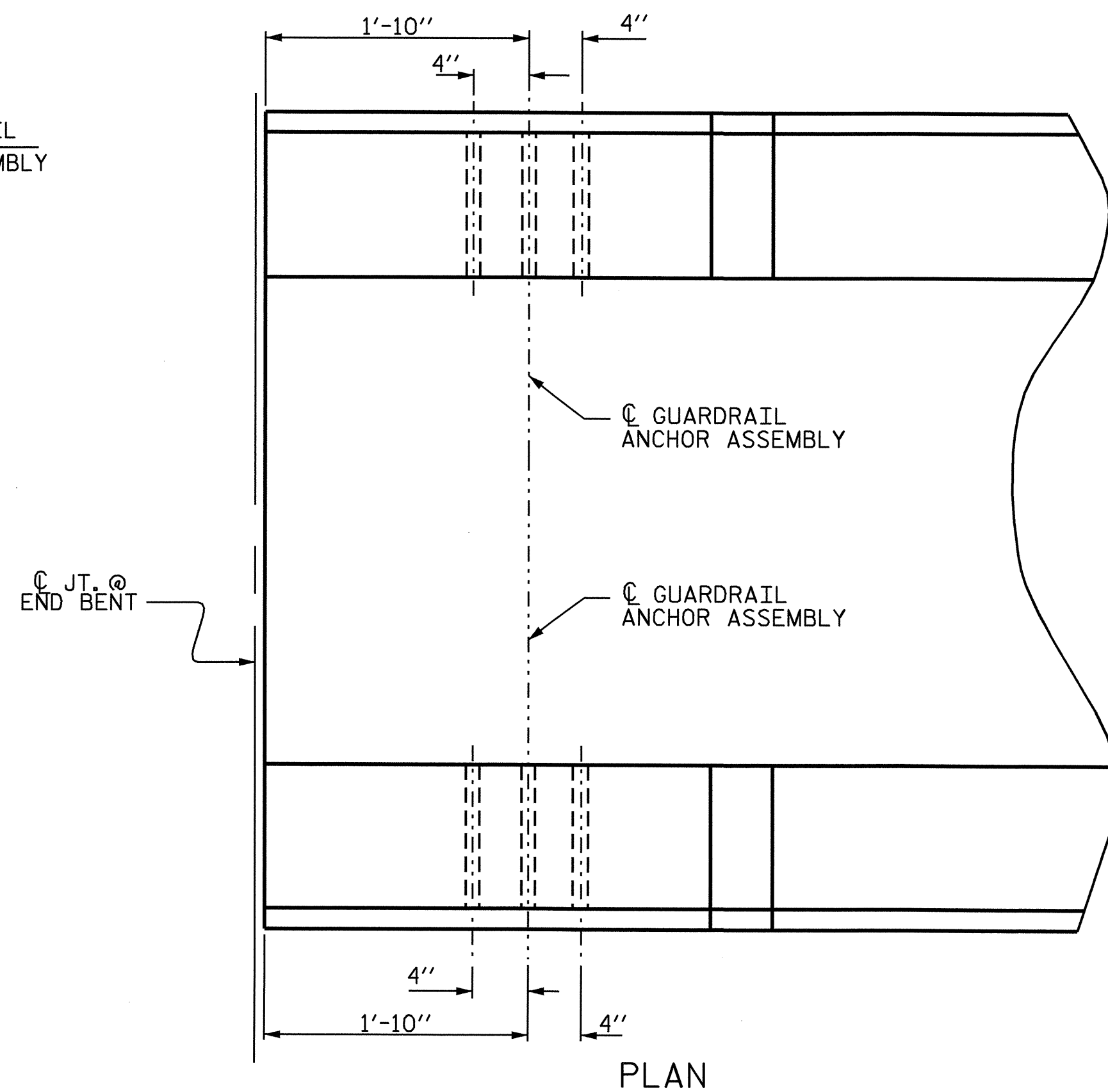
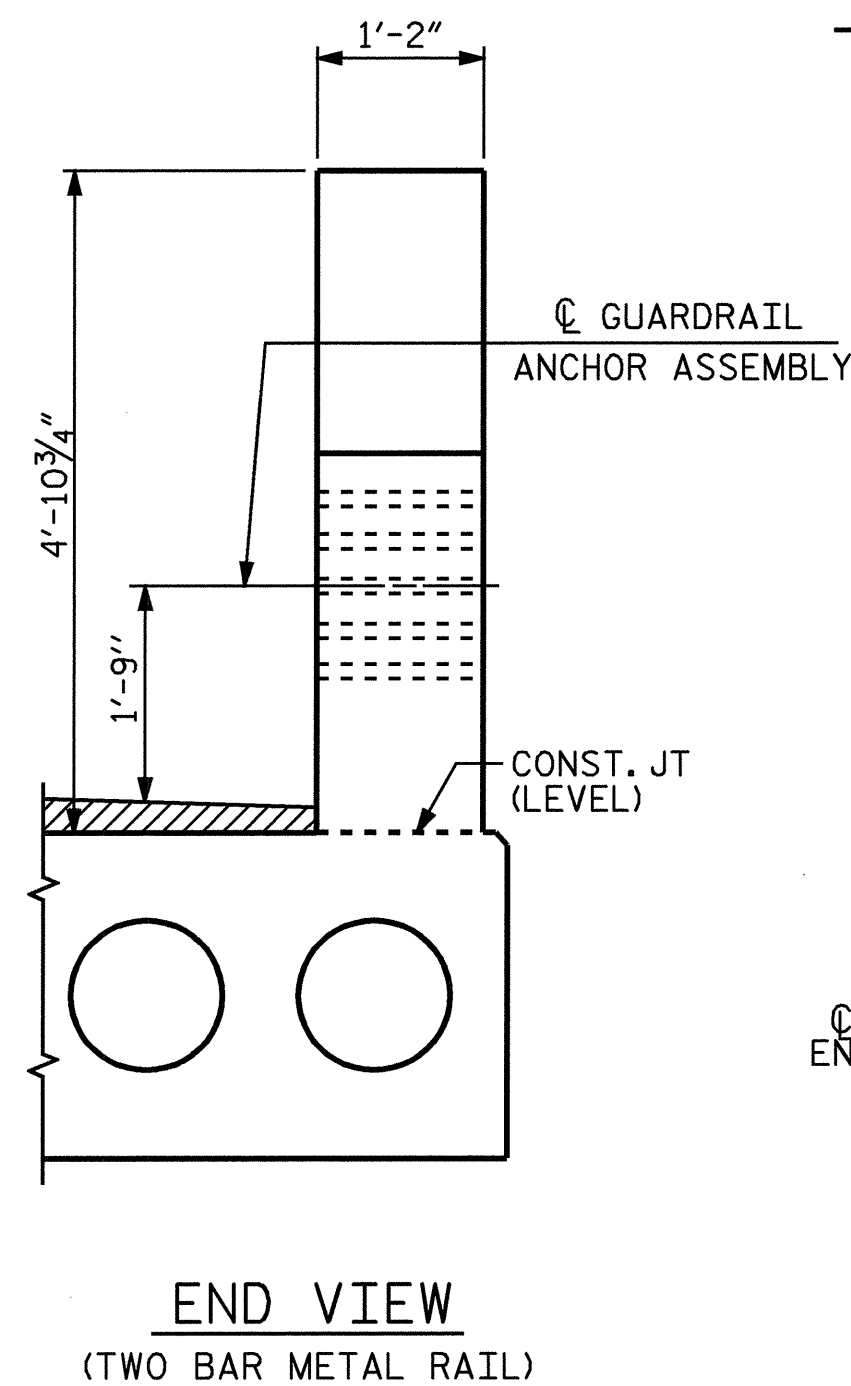
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

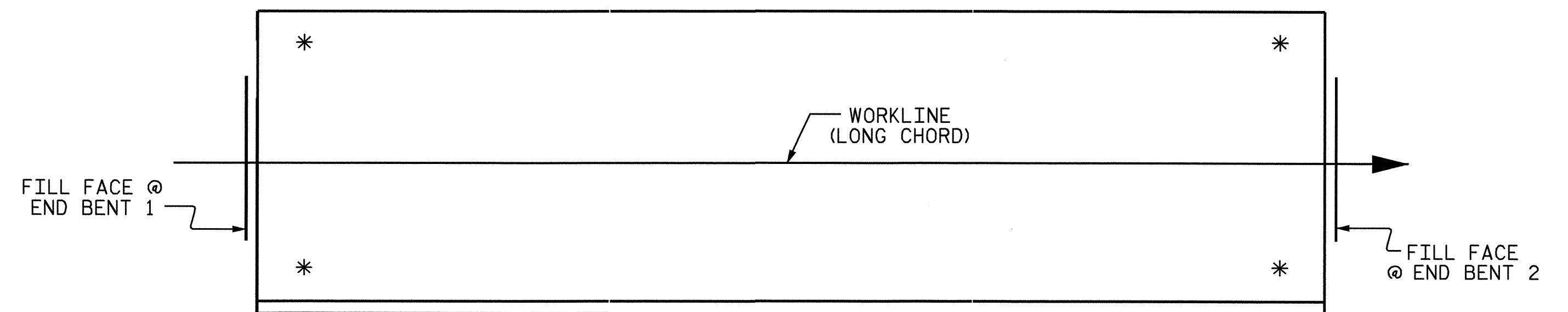


GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.



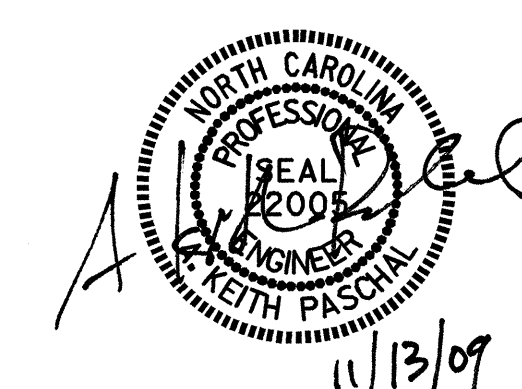
SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 5 OF 5

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

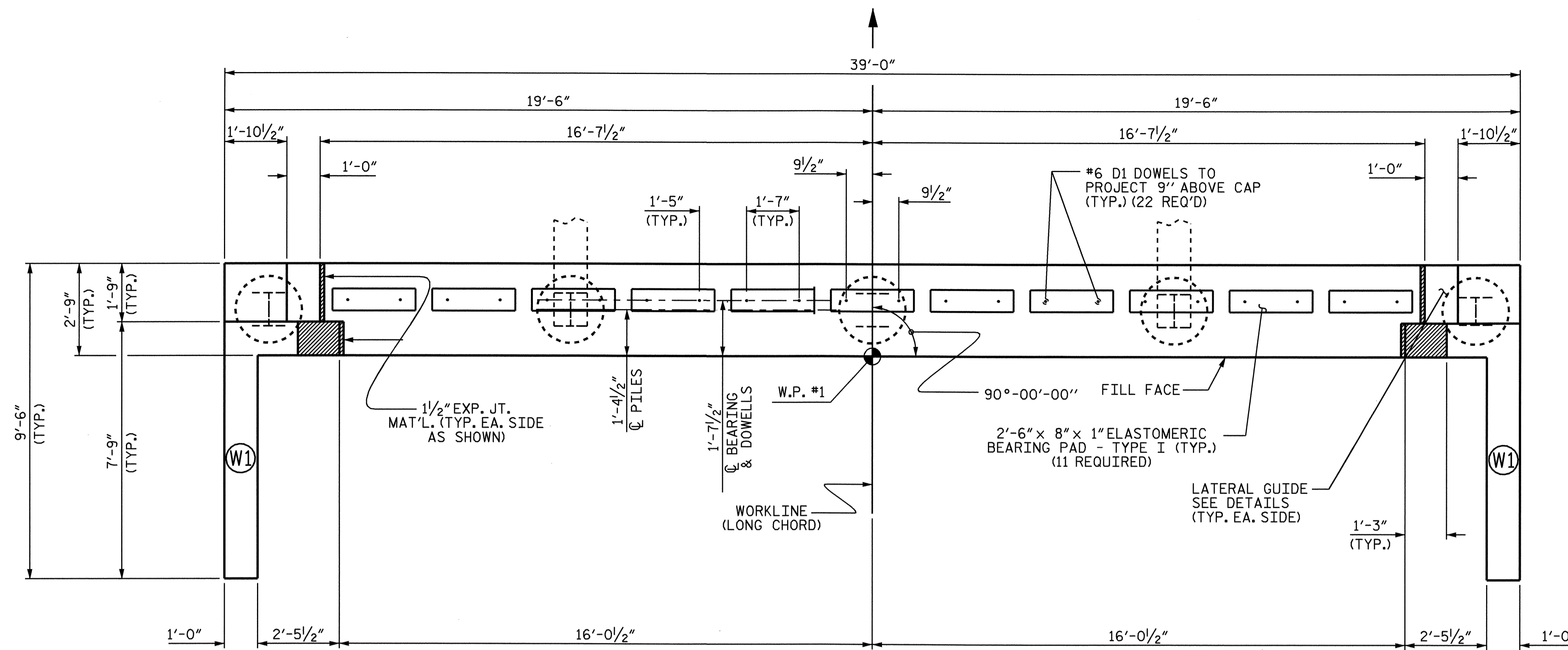


ASSEMBLED BY : M.FOWLER	DATE : 4/13/09
CHECKED BY : J.G. KHARVA	DATE : 4/21/09
DRAWN BY : EEM 6/94	REV. 10/17/00 RWW/LES
CHECKED BY : RGW 6/94	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

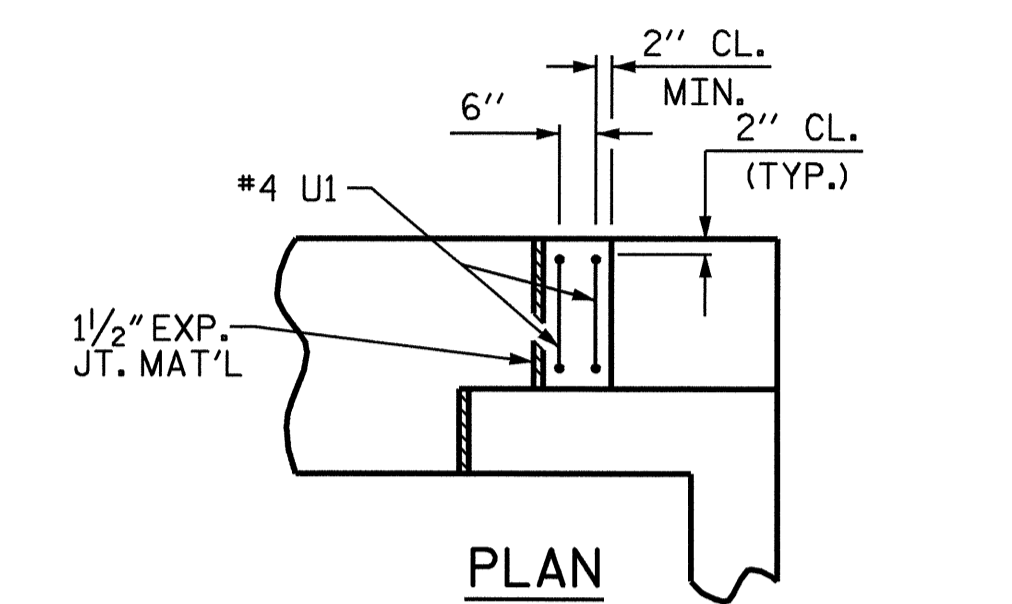
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			25

**NOTES**

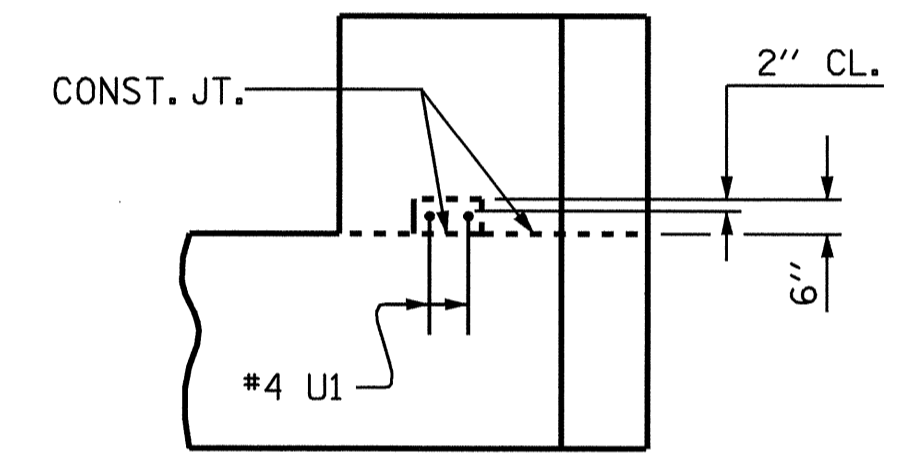
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE  
 POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED  
 AFTER THE PARAPET IS CAST IF SLIP FORMING  
 IS USED.



**PLAN**

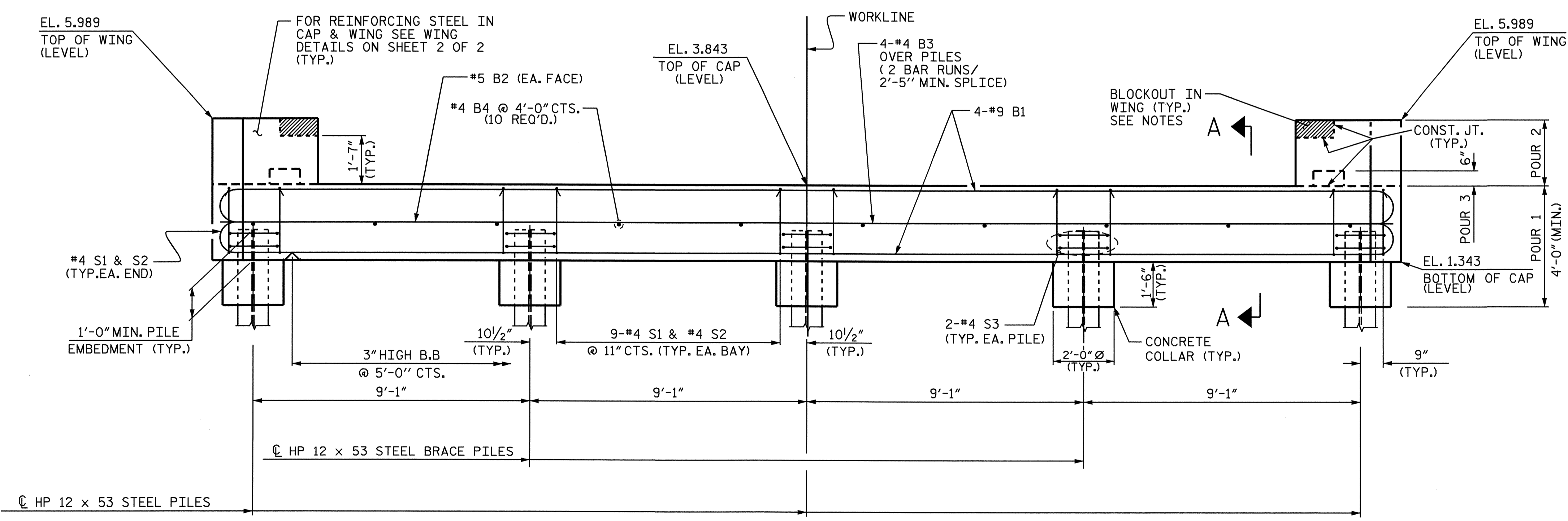


**PLAN**



**ELEVATION**

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

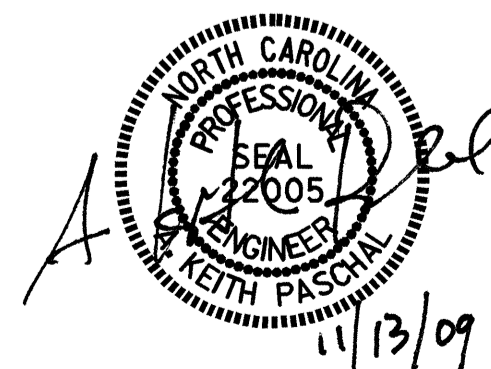


**ELEVATION**

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-  
 SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

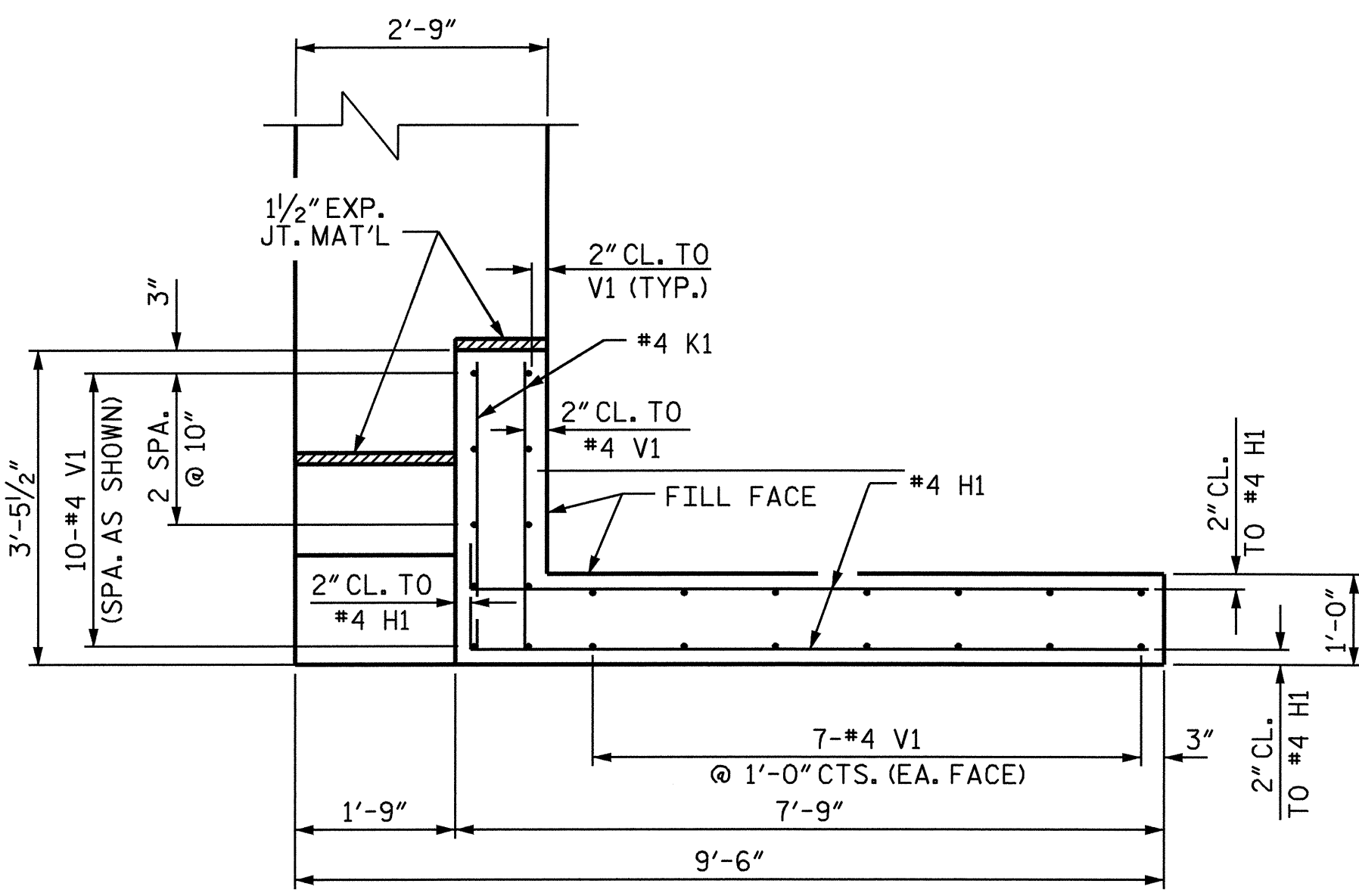
**SUBSTRUCTURE  
 END BENT 1**



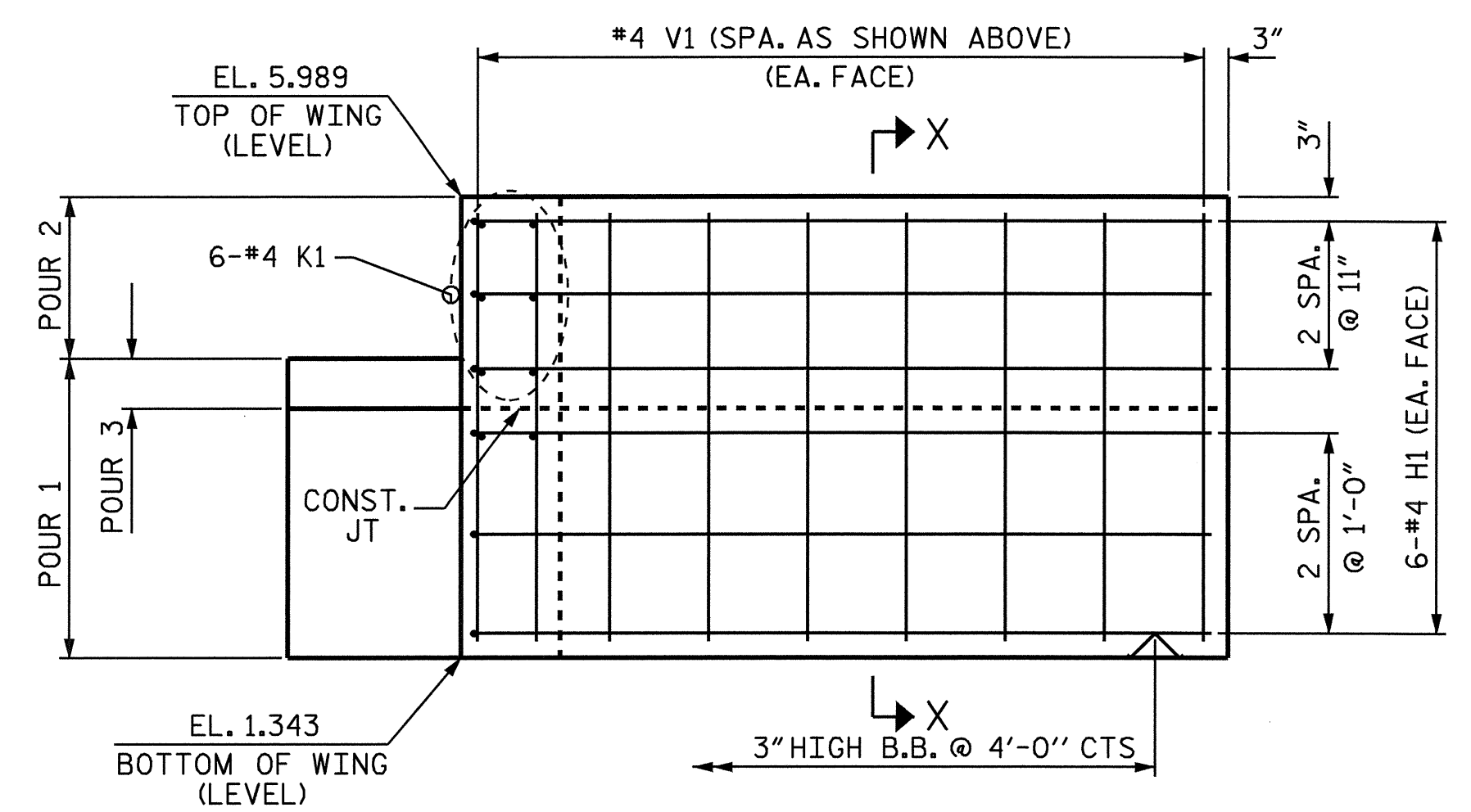
DRAWN BY: M.FOWLER DATE: 5/21/09  
 CHECKED BY: J.G.KHARVA DATE: 7/16/09

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

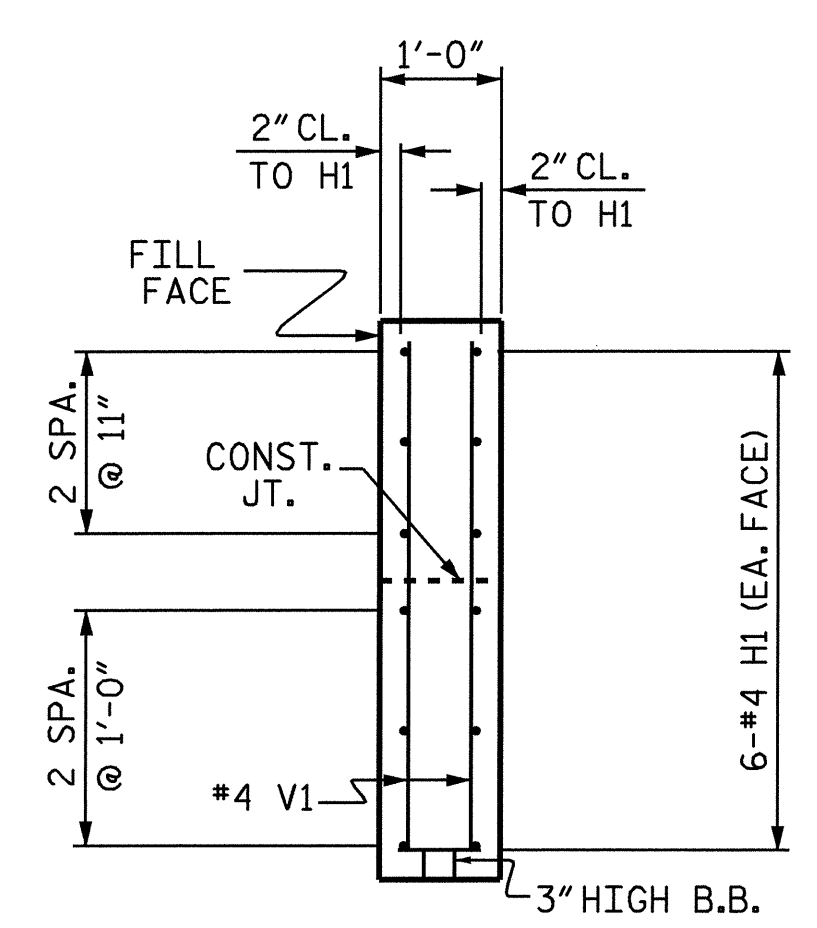




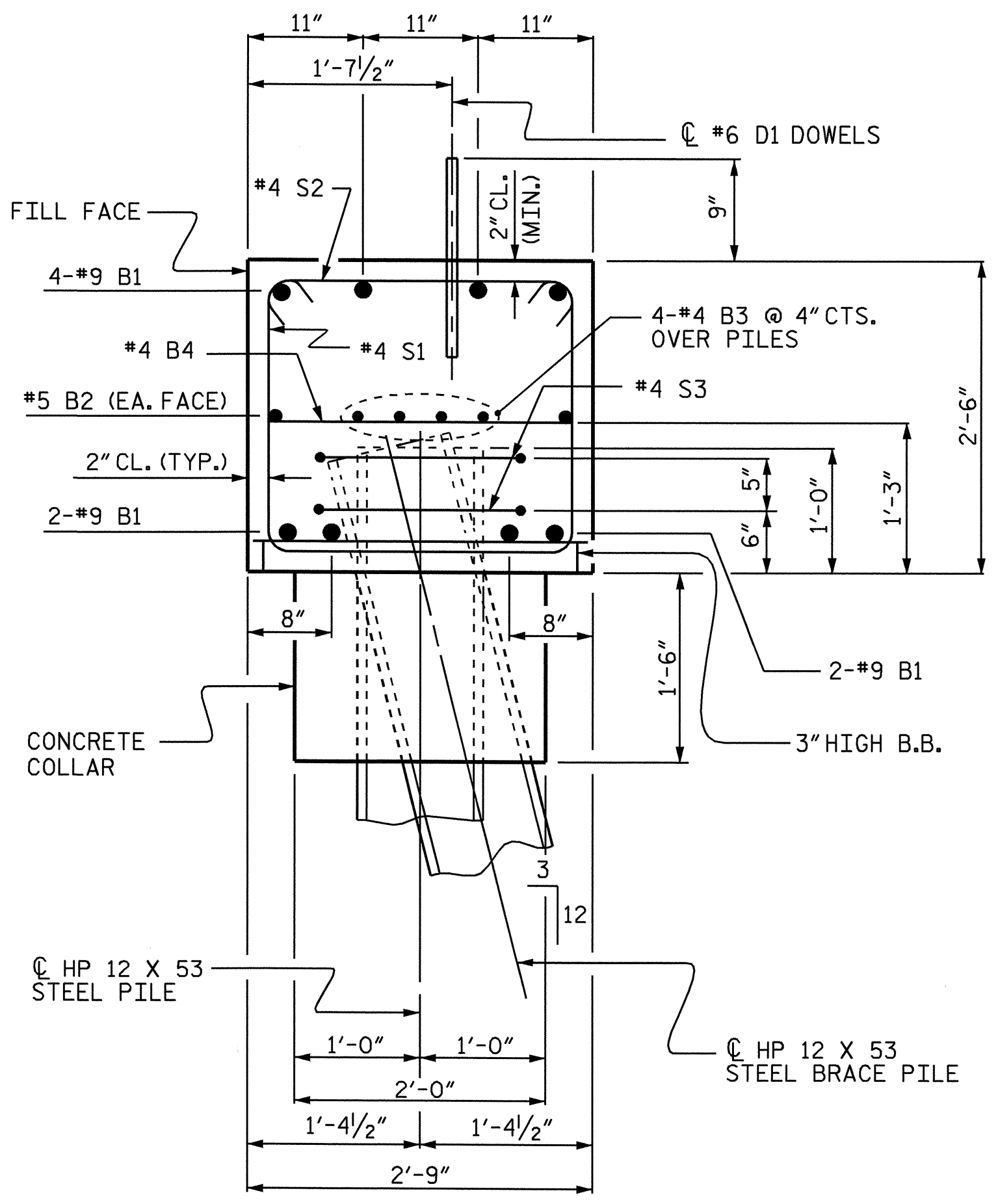
**PLAN OF WING (W1)**  
(LEFT WING SHOWN RIGHT WING SIMILAR)



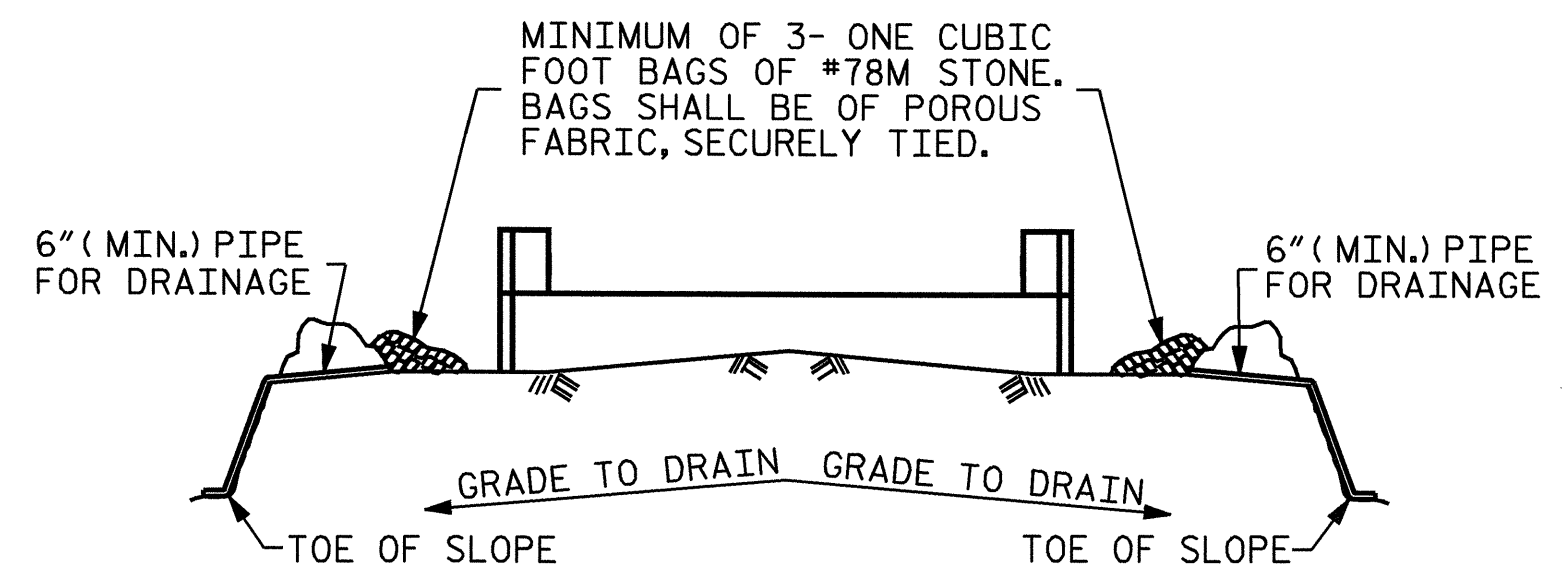
**ELEVATION OF WING (W1)**  
LEFT WING SHOWN RIGHT WING SIMILAR



**SECTION X-X**



**SECTION A-A**



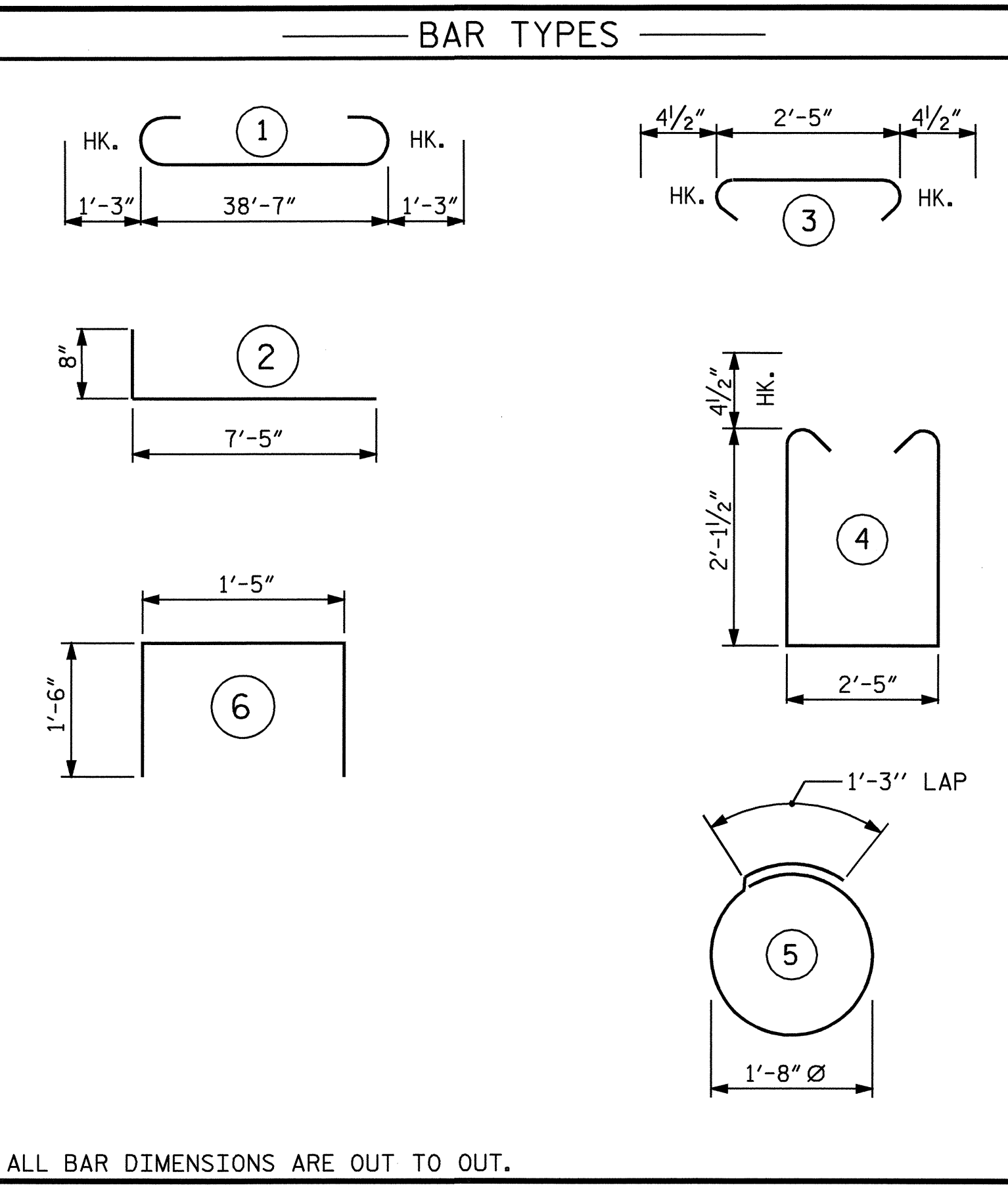
MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

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.

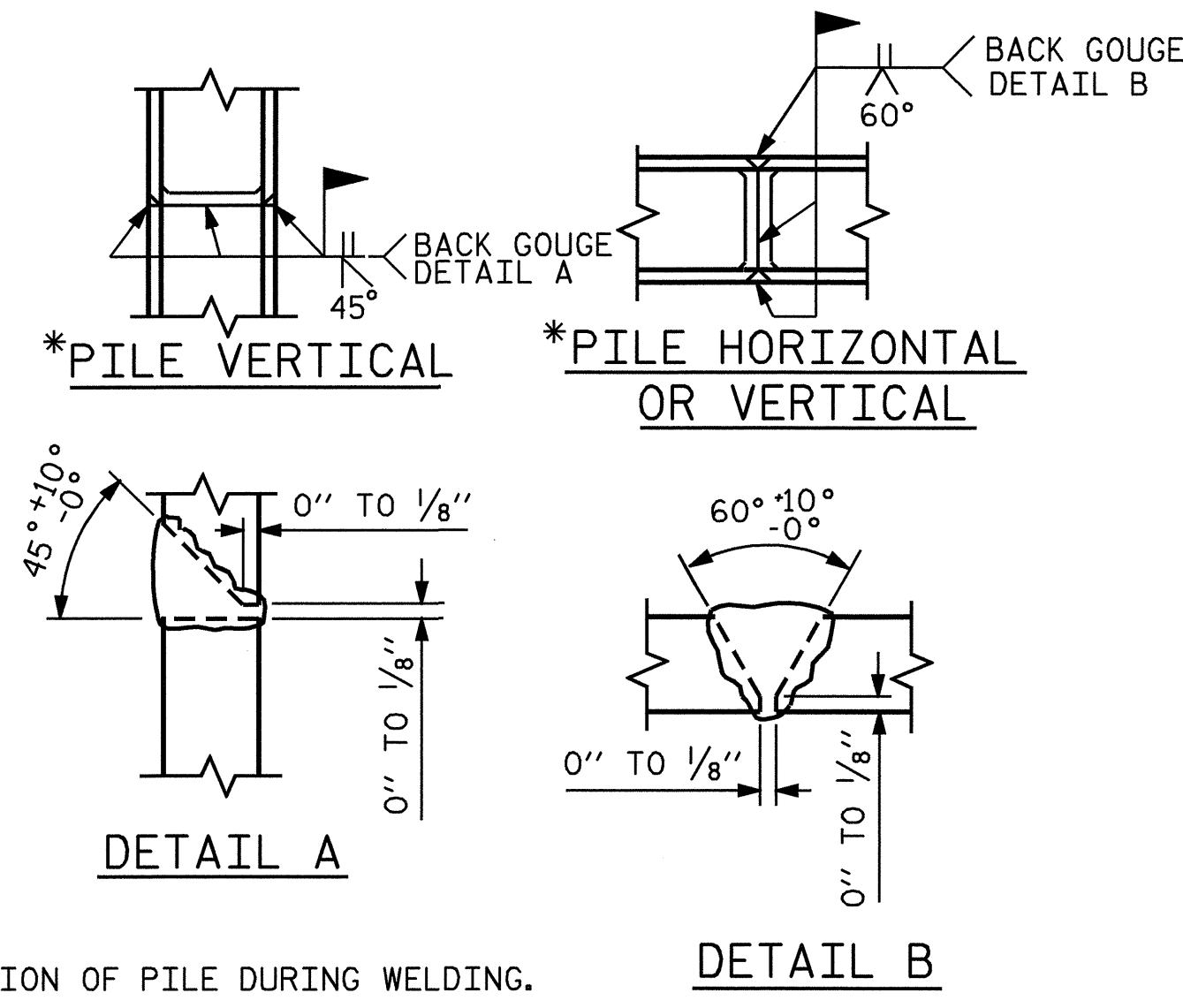
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



ALL BAR DIMENSIONS ARE OUT TO OUT.



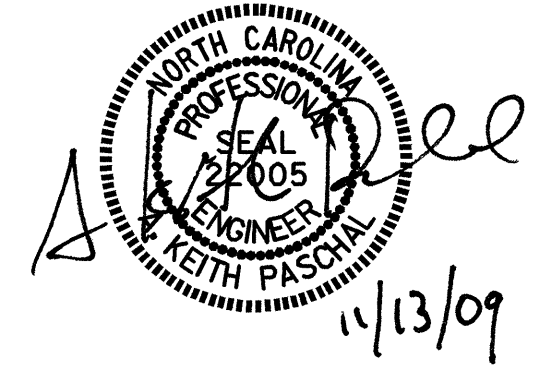
**PILE SPLICE DETAILS**

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-1"	1118
B2	2	#5	STR	38'-8"	81
B3	8	#4	STR	20'-7"	110
B4	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	24	#4	2	8'-1"	130
K1	12	#4	STR	3'-1"	25
S1	38	#4	4	7'-5"	188
S2	38	#4	3	3'-2"	80
S3	10	#4	5	6'-6"	43
U1	4	#4	6	4'-5"	12
V1	48	#4	STR	4'-3"	136
TOTAL REINFORCING STEEL				=	1989 LBS
CLASS A CONCRETE BREAKDOWN					
POUR 1 (CAP, COLLARS & LOWER PART OF WINGS)					12.1 C.Y.
POUR 2 (UPPER PART OF WINGS)					1.6 C.Y.
POUR 3 (LATERAL GUIDES)					0.1 C.Y.
TOTAL CLASS A CONCRETE					13.8 C.Y.
HP 12 X 53 STEEL PILES					350 LIN. FT.
NO. : 5					
PILE REDRIVES					NO. : 5

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1



DRAWN BY : M.FOWLER DATE : 5/27/09  
 CHECKED BY : J.G. KHARVA DATE : 7/16/09

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

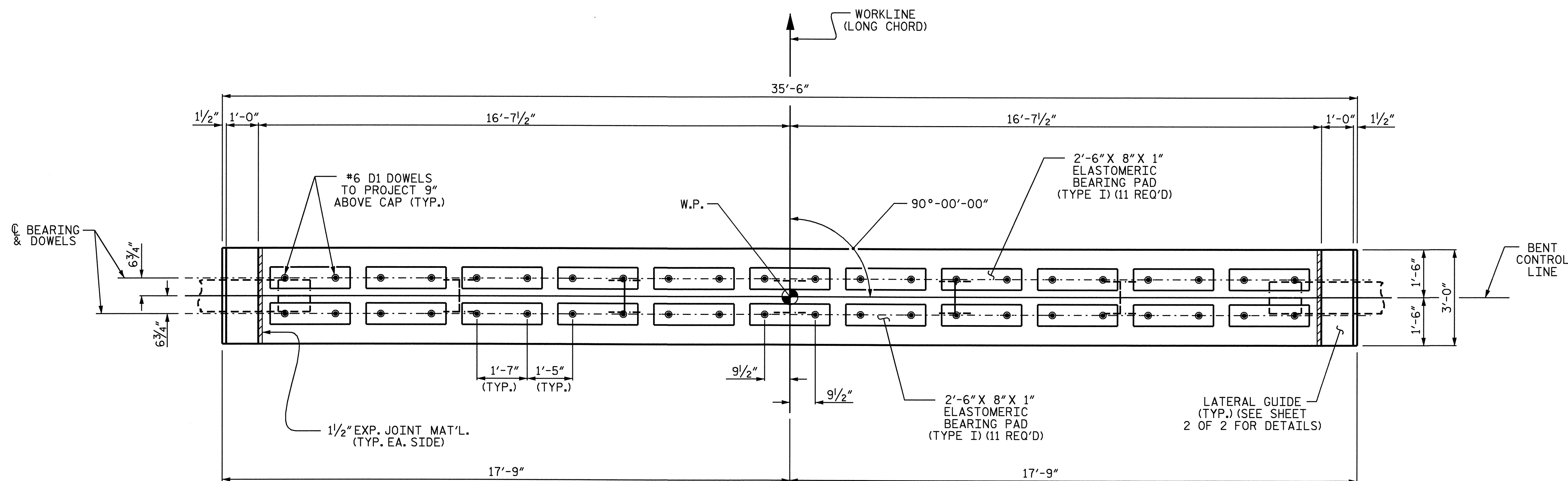
SHEET NO.  
**S-16**  
 TOTAL SHEETS  
**25**

**NOTES**

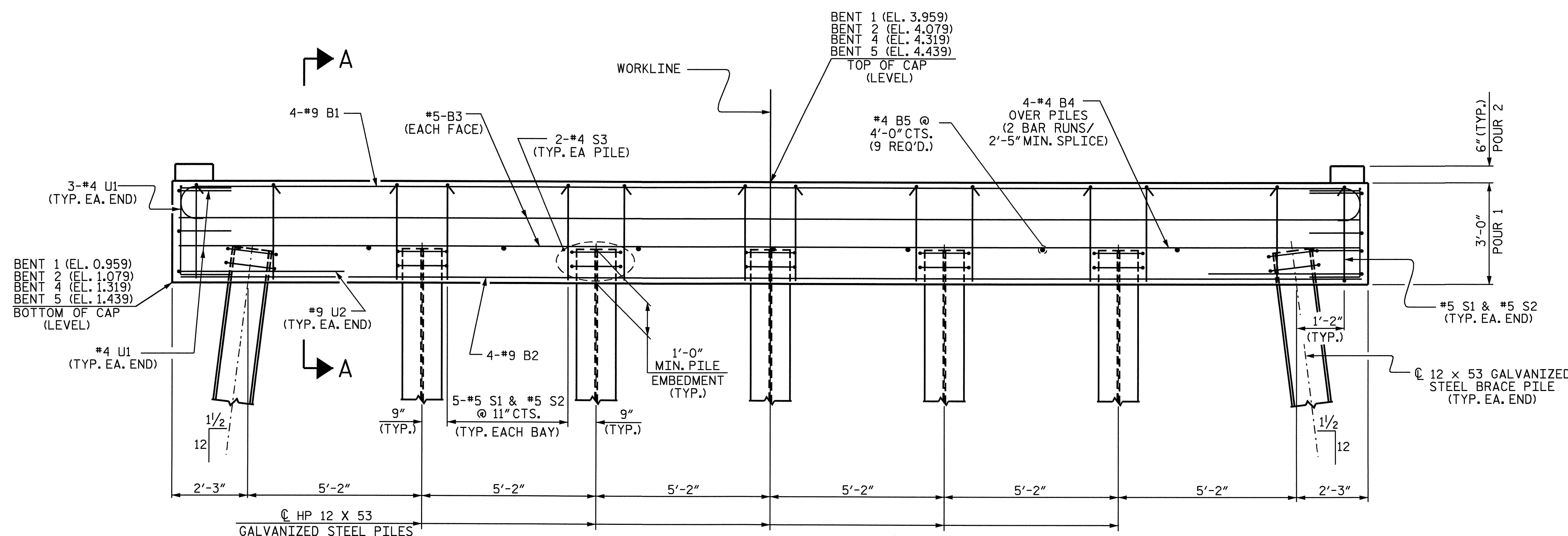
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDE AT EACH END OF THE CORED SLAB IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

A MINIMUM OF 22'-0" OF THE TOP OF EACH PILE SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



**PLAN**



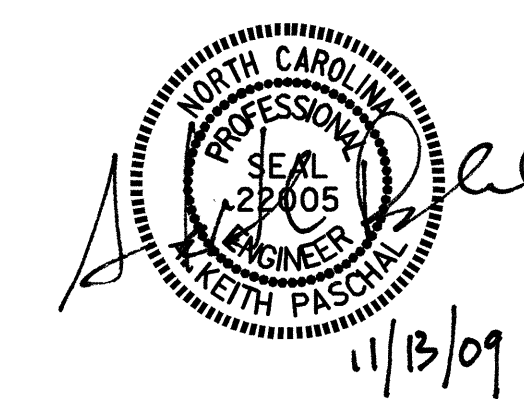
**ELEVATION**

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

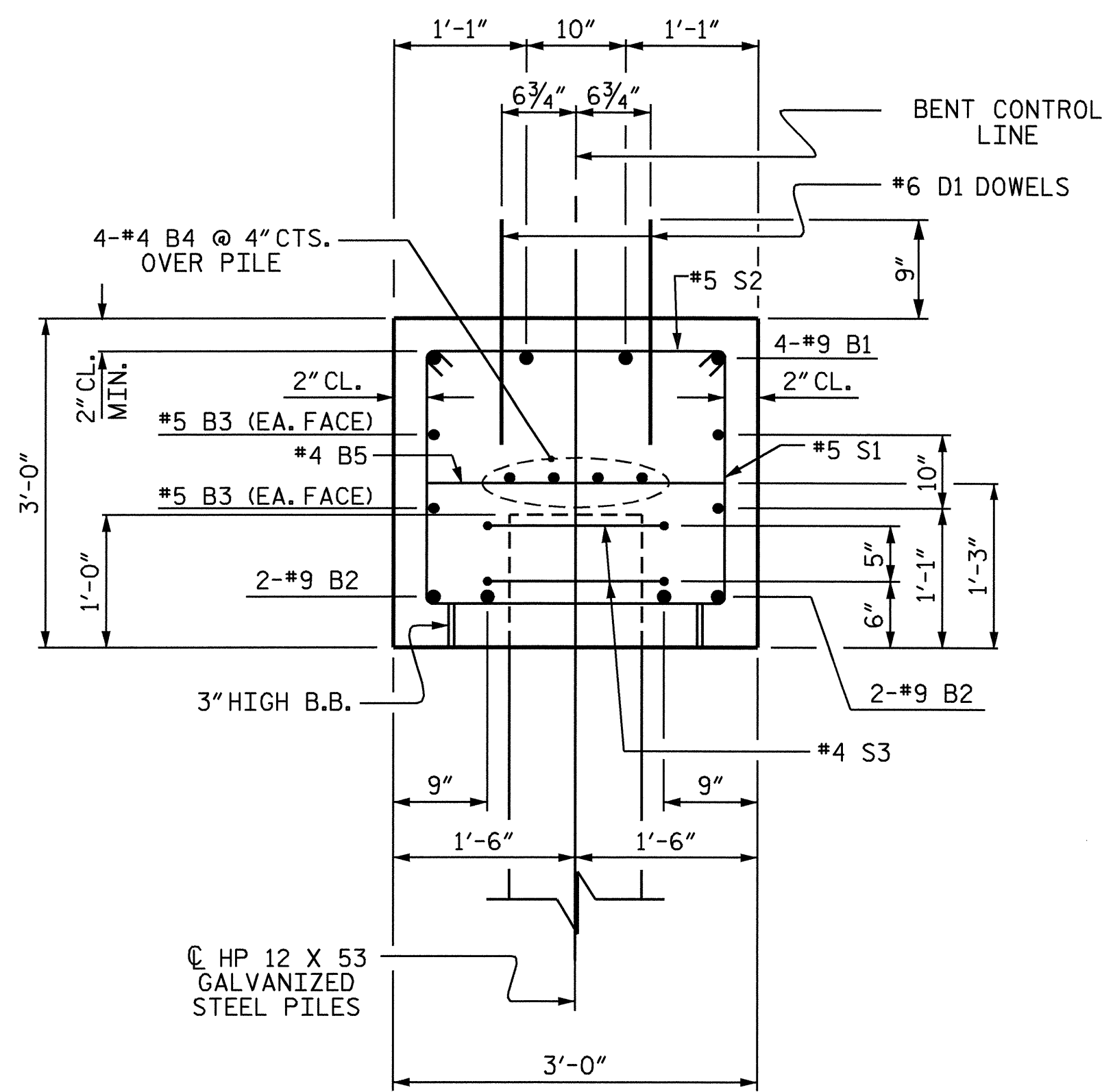
SUBSTRUCTURE  
 BENT 1,2,4 & 5



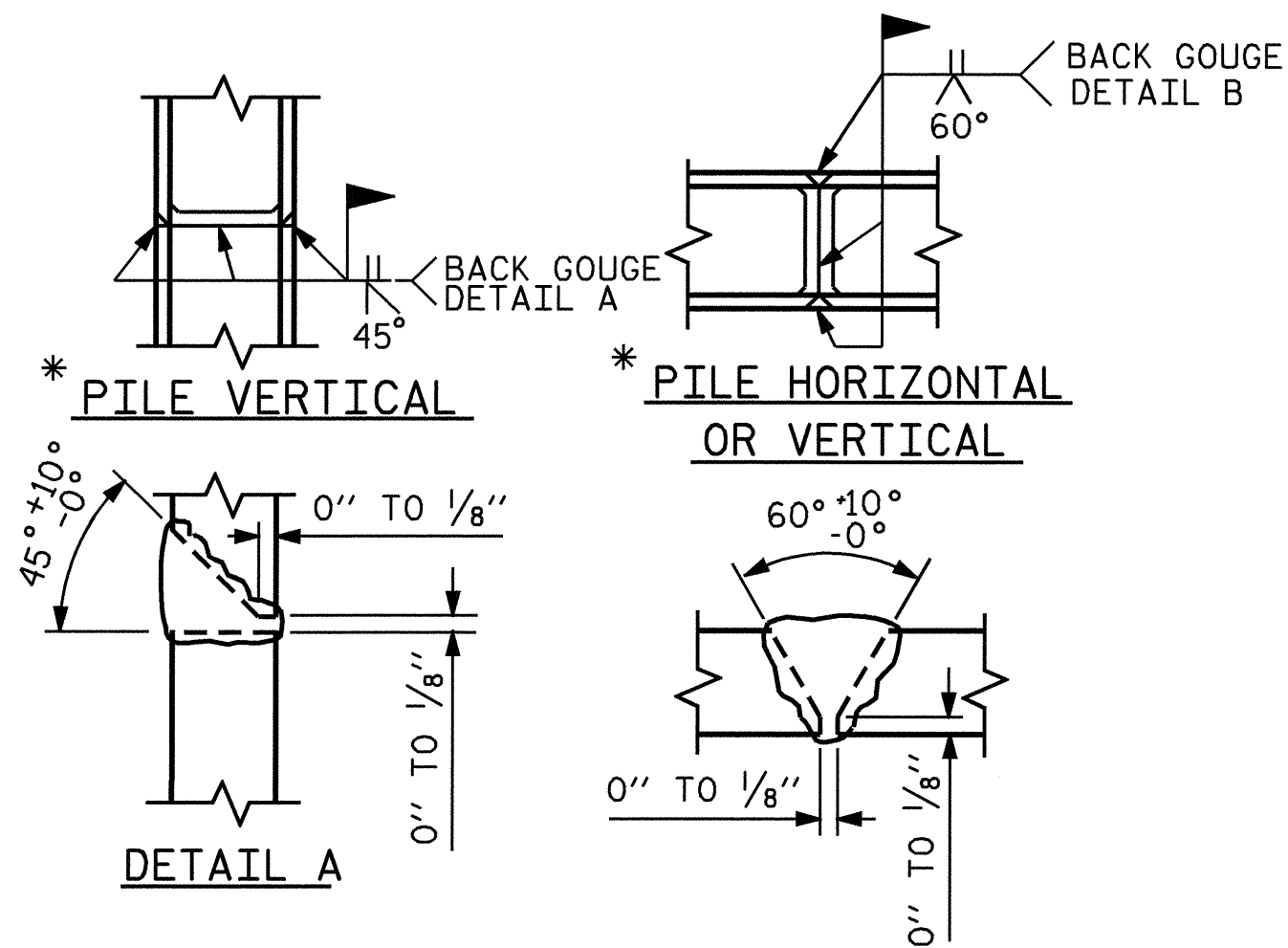
DRAWN BY: J. G. KHARVA DATE: 7/22/09  
 CHECKED BY: J. D. HAWK DATE: 7/30/09

12-NOV-2009 12:52  
 r:\structures\final plans\b-4465.sd.b\*\_1,2,4,5.dgn  
 mFowler

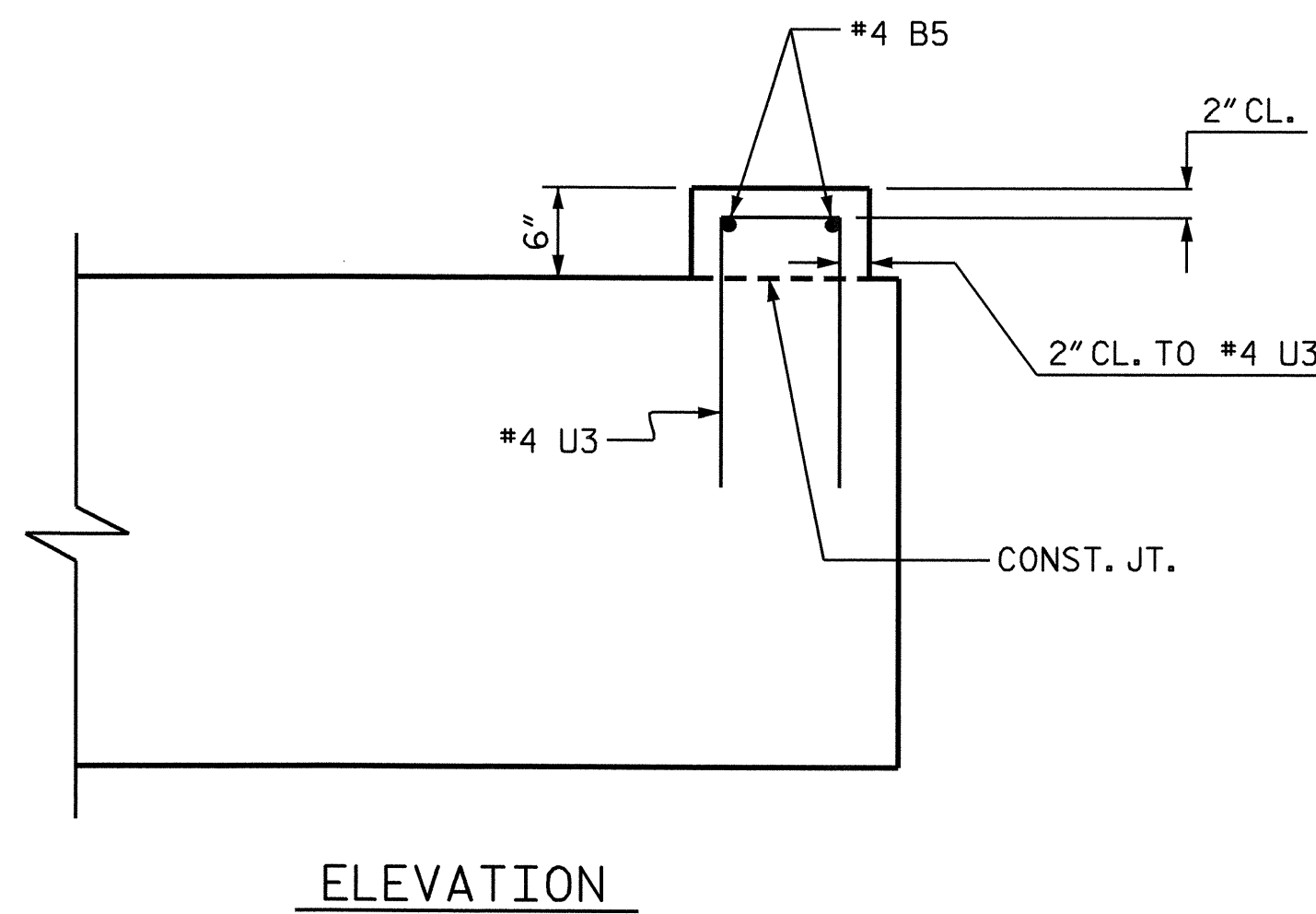
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17	
1			3			TOTAL SHEETS	
2			4			25	



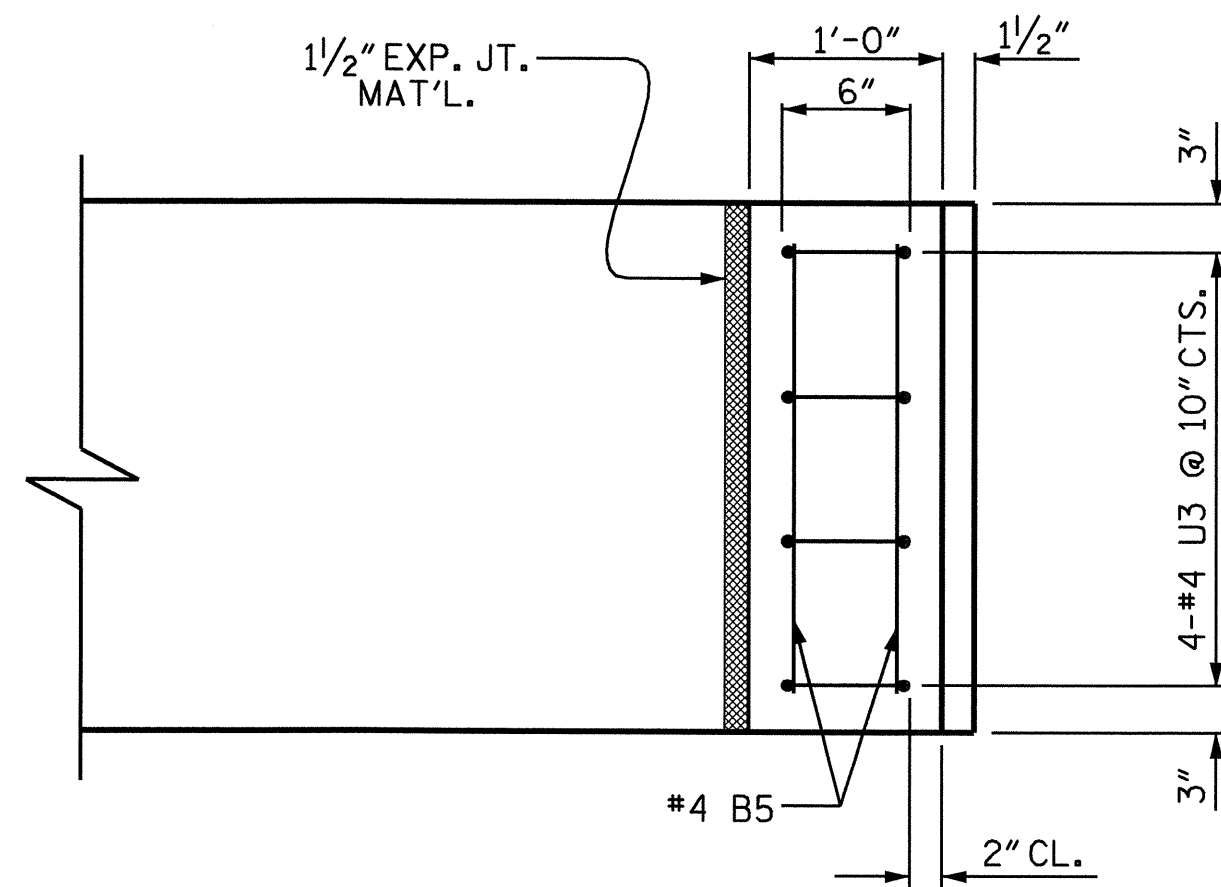
SECTION A-A



PILE SPLICE DETAILS



ELEVATION

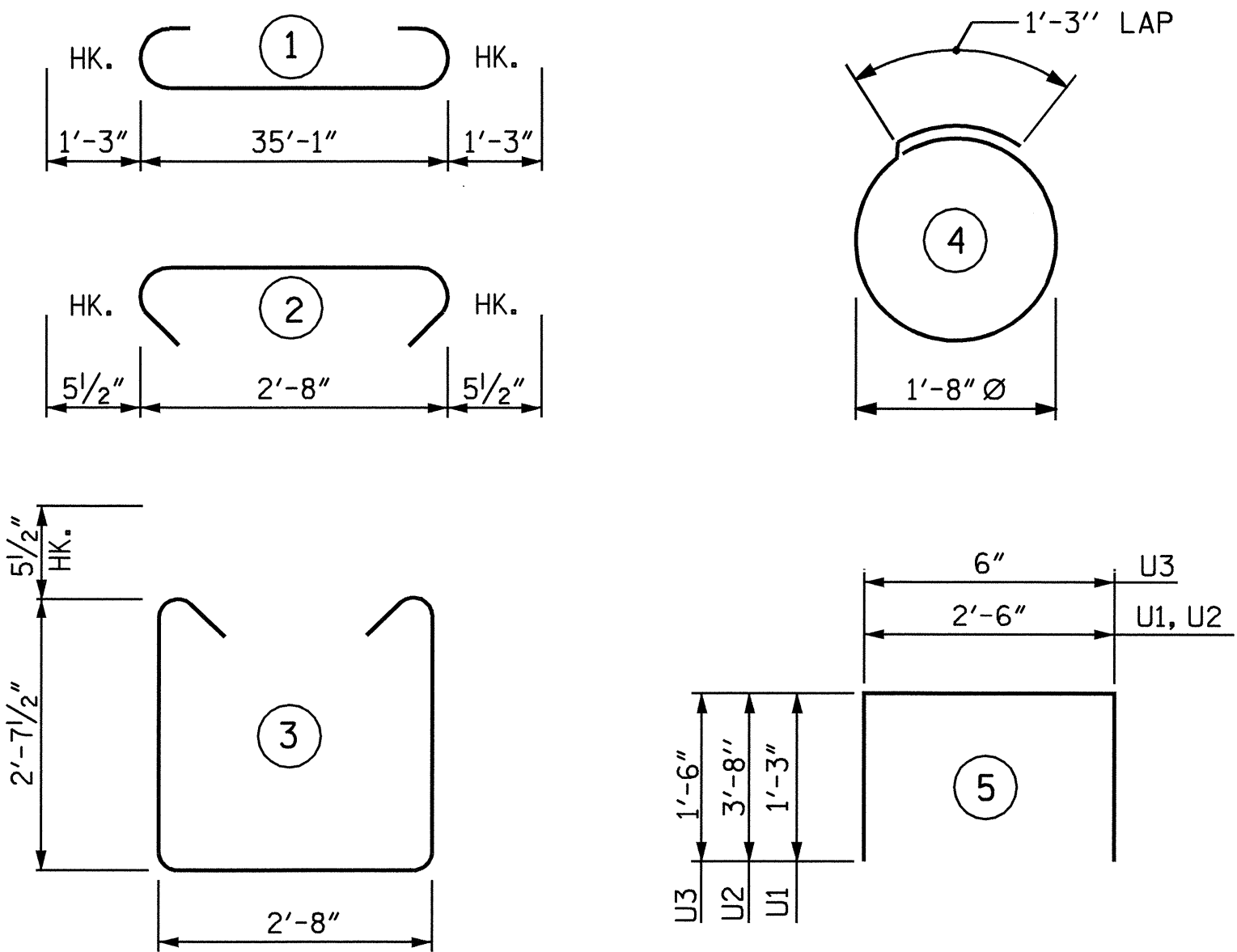


PLAN

LATERAL GUIDE DETAIL

(EACH END SIMILAR)

BAR TYPES



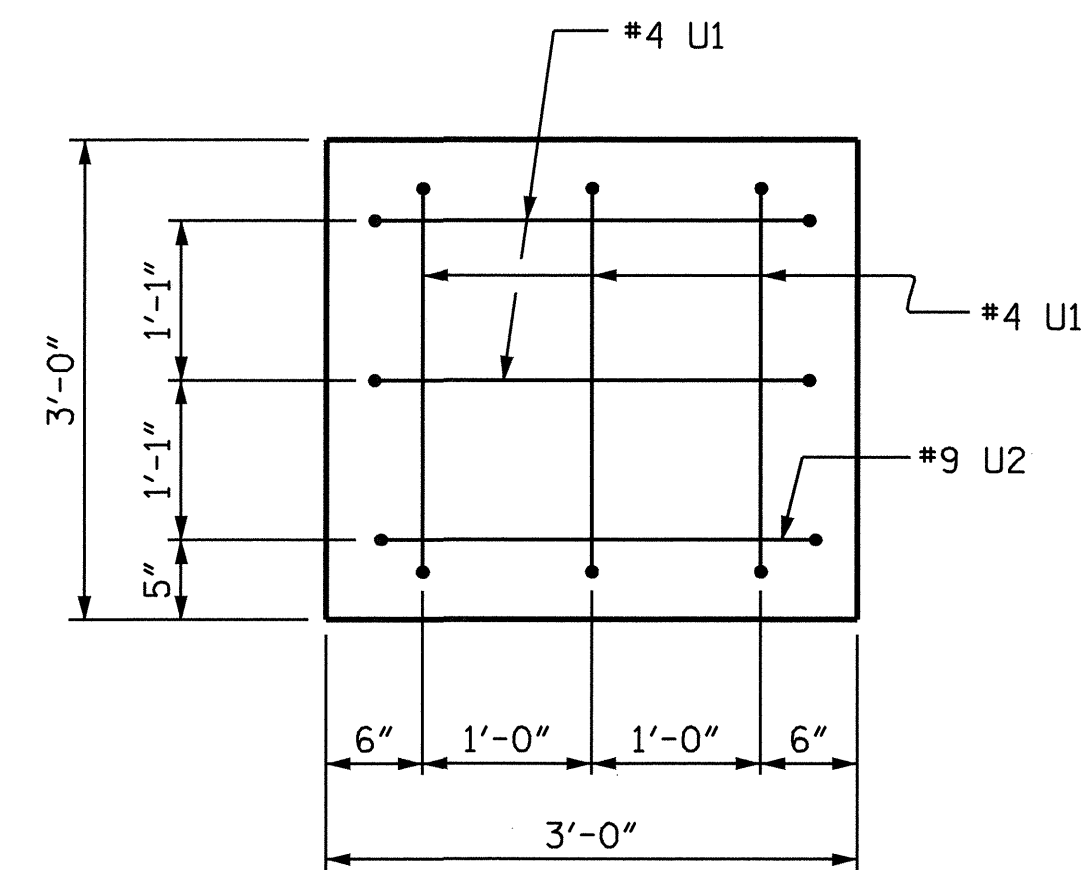
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1,2,4 & 5

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#9	1	37'-7"	511
B2	4	#9	STR	35'-2"	478
B3	4	#5	STR	35'-2"	147
B4	8	#4	STR	18'-10"	101
B5	13	#4	STR	2'-8"	23
D1	44	#6	STR	1'-6"	99
S1	32	#5	3	8'-10"	295
S2	32	#5	2	3'-7"	120
S3	14	#4	4	6'-6"	61
U1	10	#4	5	5'-0"	33
U2	2	#9	5	9'-10"	67
U3	8	#4	5	3'-6"	19

REINFORCING STEEL	1954 LBS.
CLASS A CONCRETE	
POUR 1 (CAP)	C.Y. 11.8
POUR 2 (LATERAL GUIDES)	C.Y. 0.1
TOTAL	C.Y. 11.9
HP 12 x 53 GALVANIZED STEEL PILES	
NO. : 7	LIN. FT. 665.0
PILE REDRIVES	NO. : 7



END VIEW

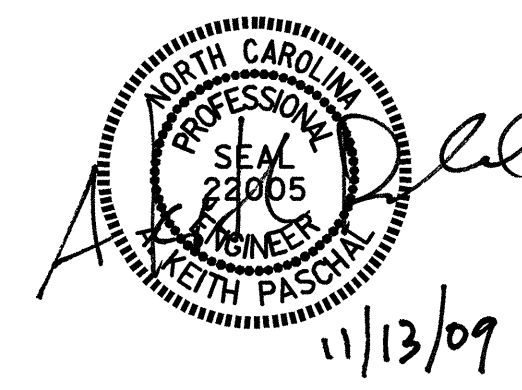
(TYP. EA. END)

PROJECT NO. B-4465  
 CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 1,2,4 & 5



DRAWN BY : J.G. KHARVA DATE : 7/18/09  
 CHECKED BY : J.D. HAWK DATE : 7/30/09

12-NOV-2009 12:01  
 R:\structures\final plans\b-4465.sd.b\*-1,2,4,5.dgn  
 mFowler

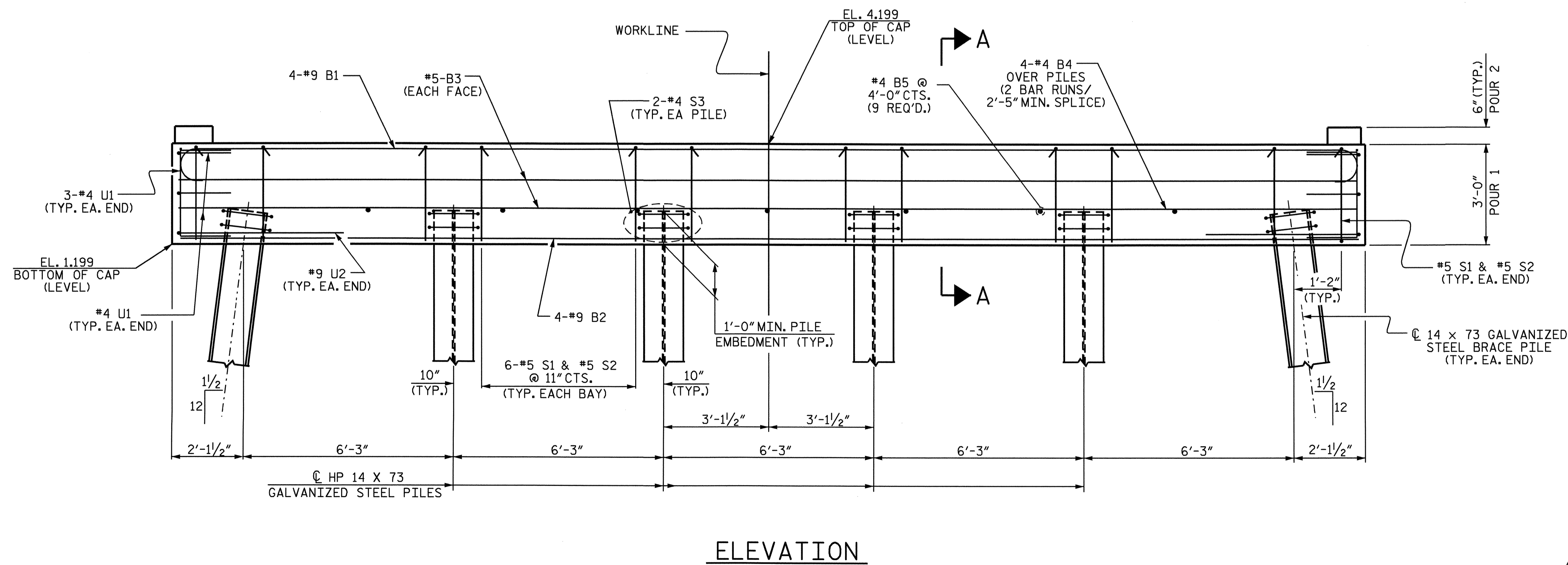
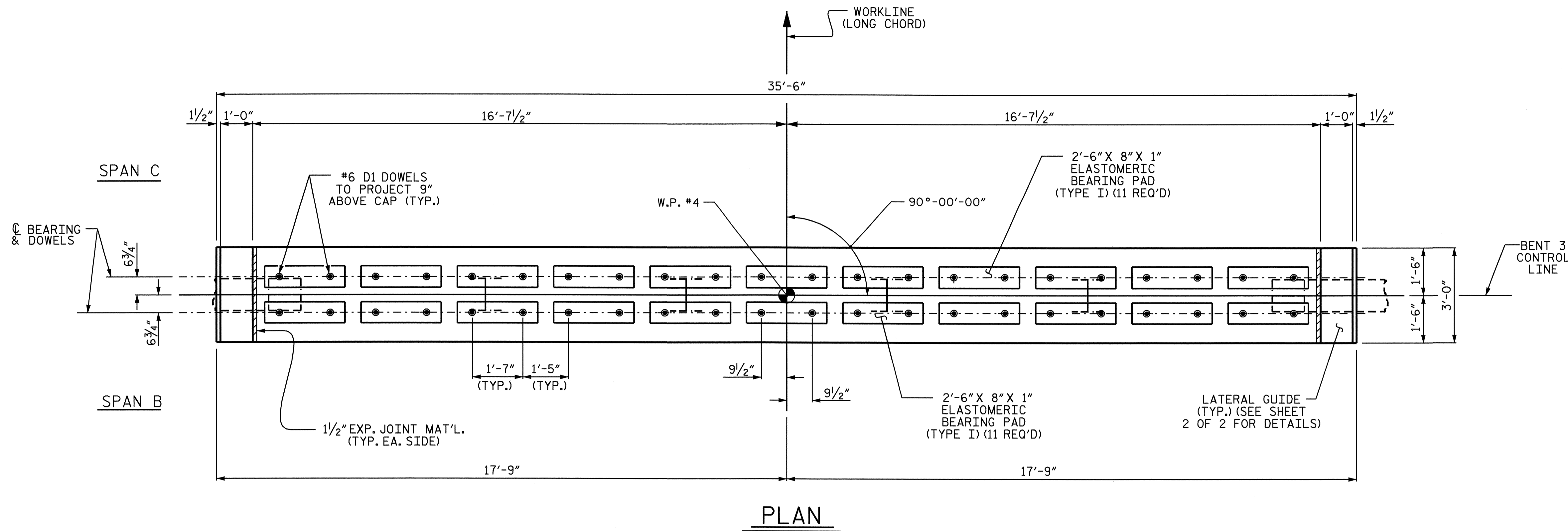
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			25
2			4			

**NOTES**

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

THE LATERAL GUIDE AT EACH END OF THE CORED SLAB IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

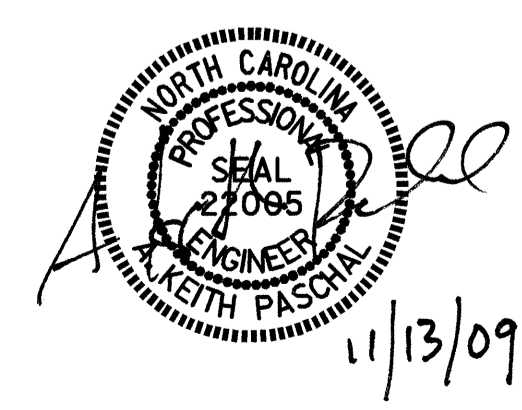
A MINIMUM OF 30'-0" OF THE TOP OF EACH PILE SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-  
 SHEET 1 OF 2

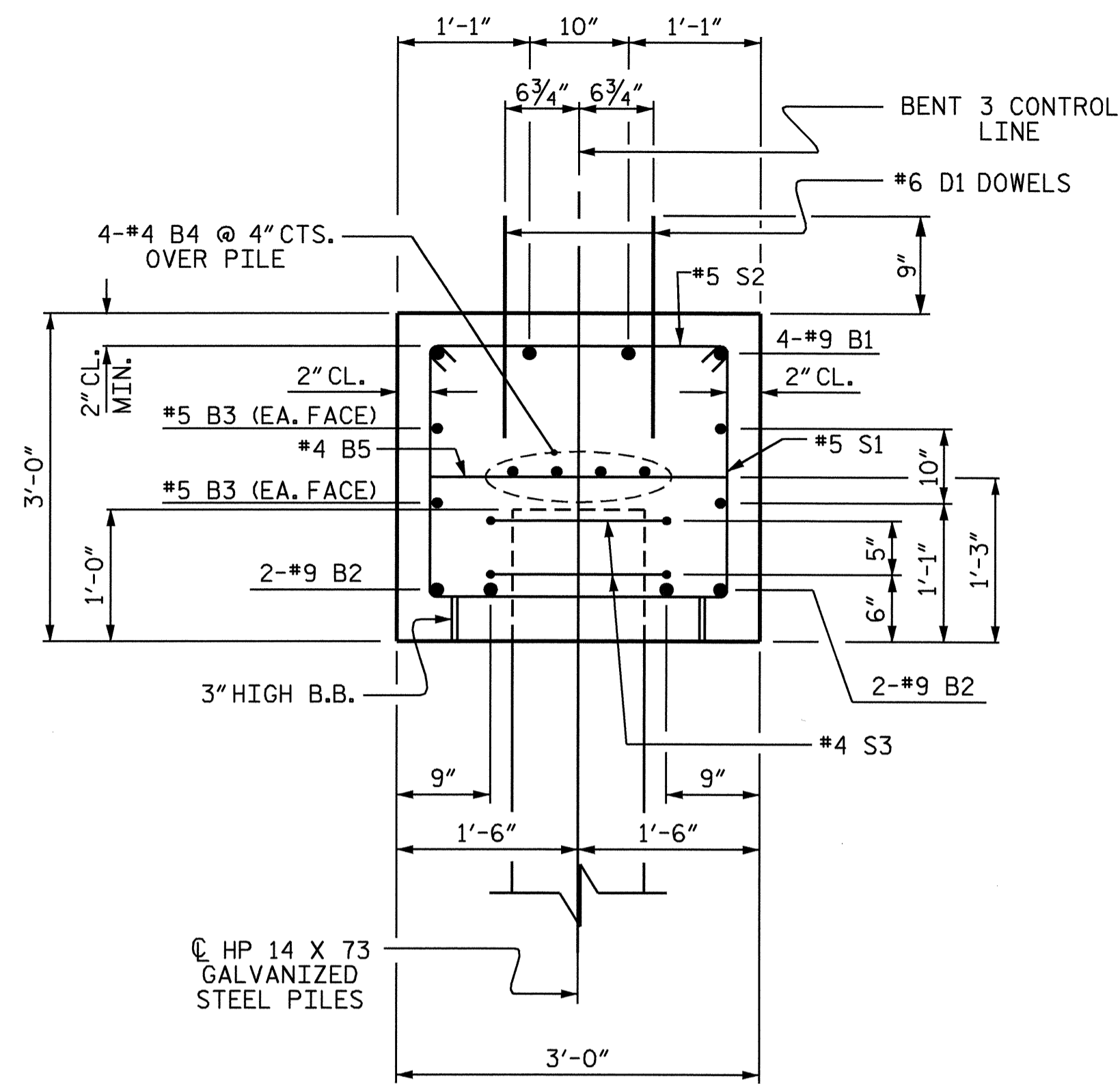
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE BENT 3**

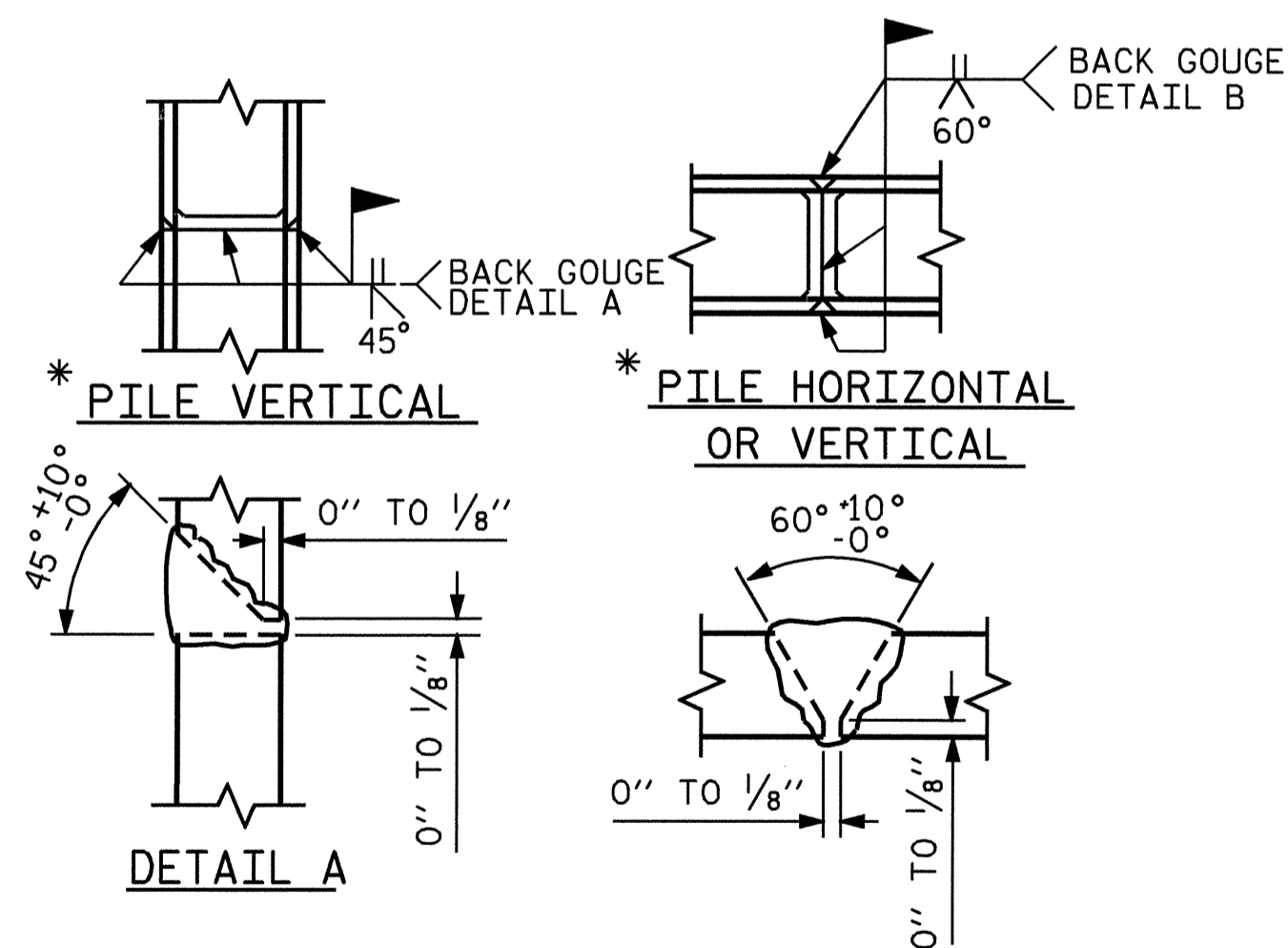


DRAWN BY : J.G. KHARVA DATE : 7/17/09  
 CHECKED BY : J.D. HAWK DATE : 7/30/09

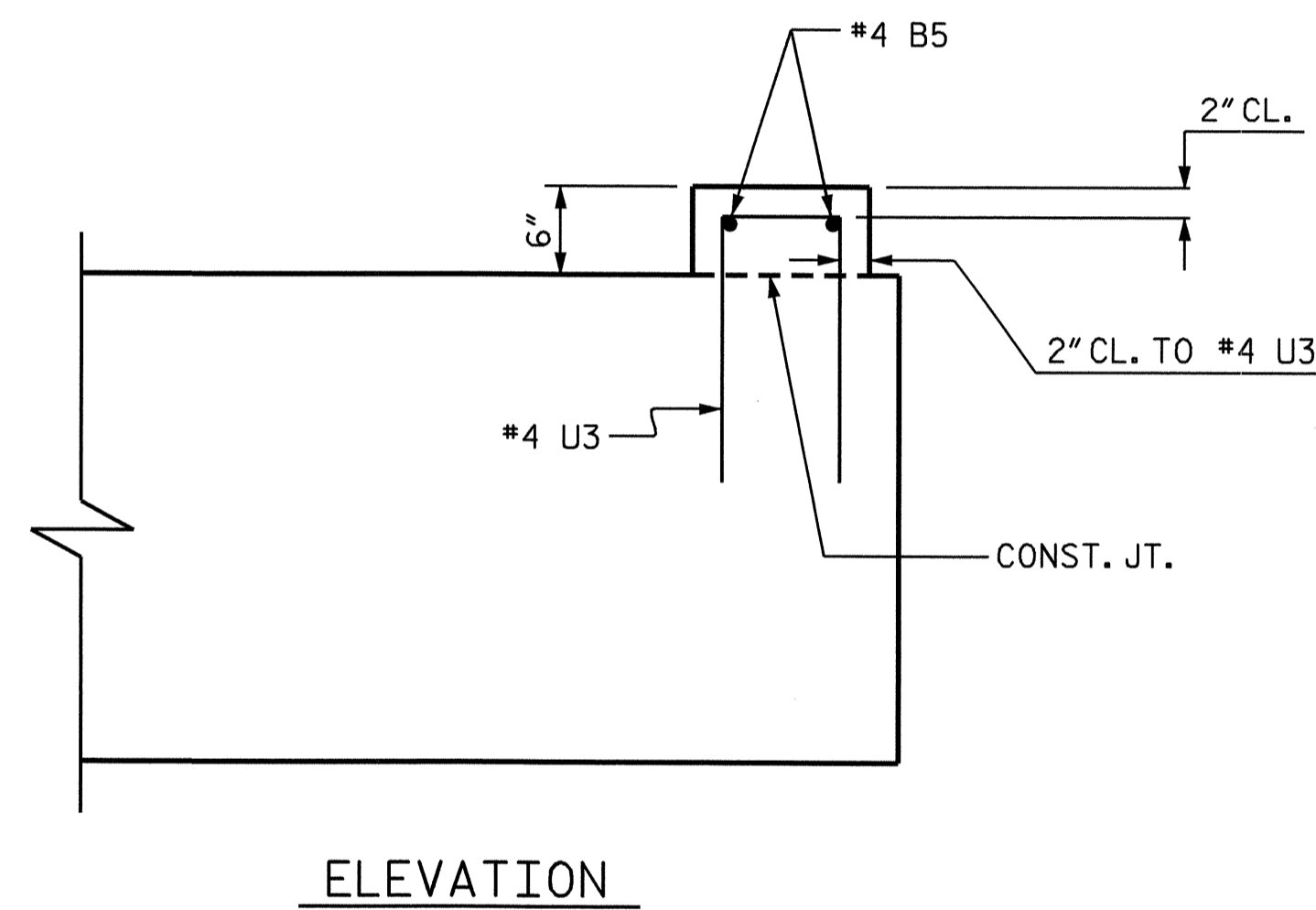
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19	
1			3			TOTAL SHEETS	
2			4			25	



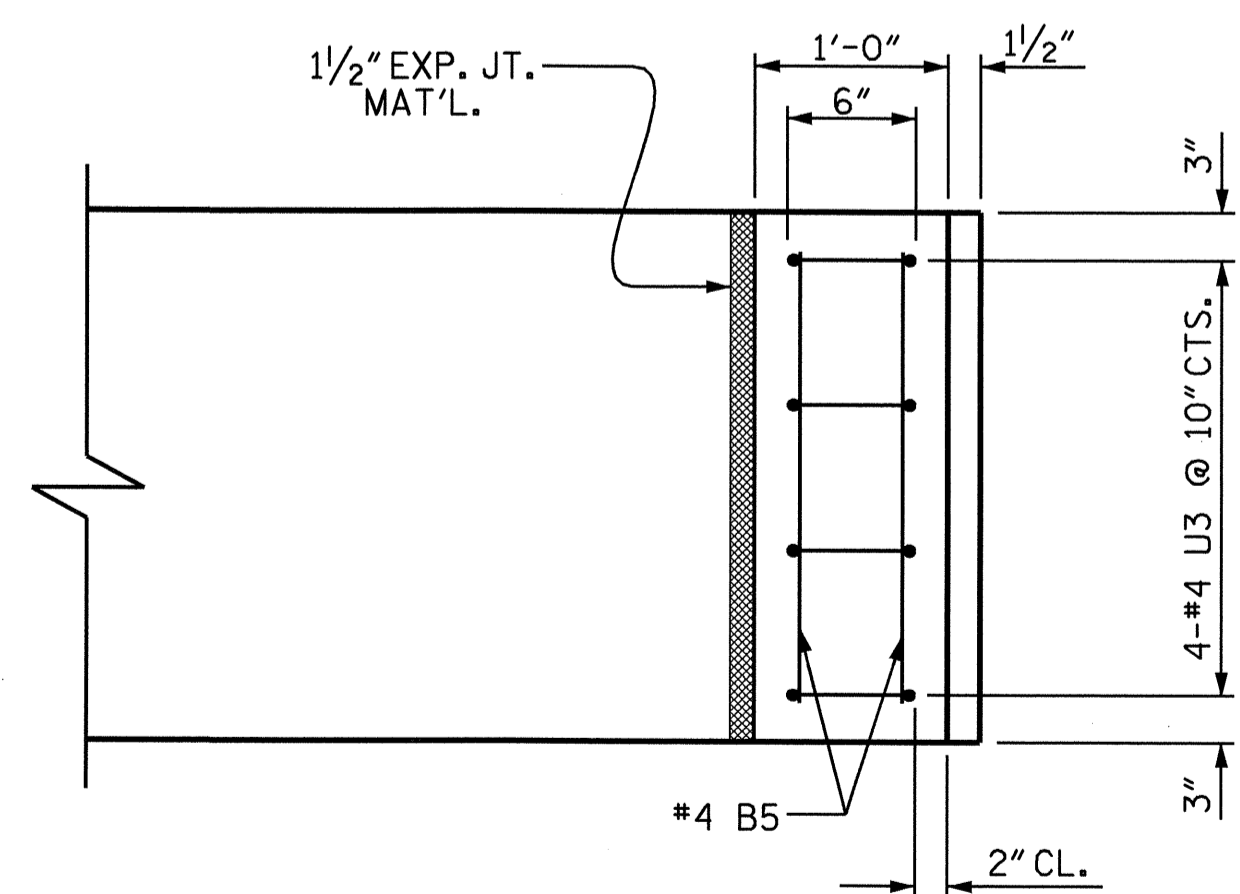
SECTION A-A



PILE SPLICE DETAILS

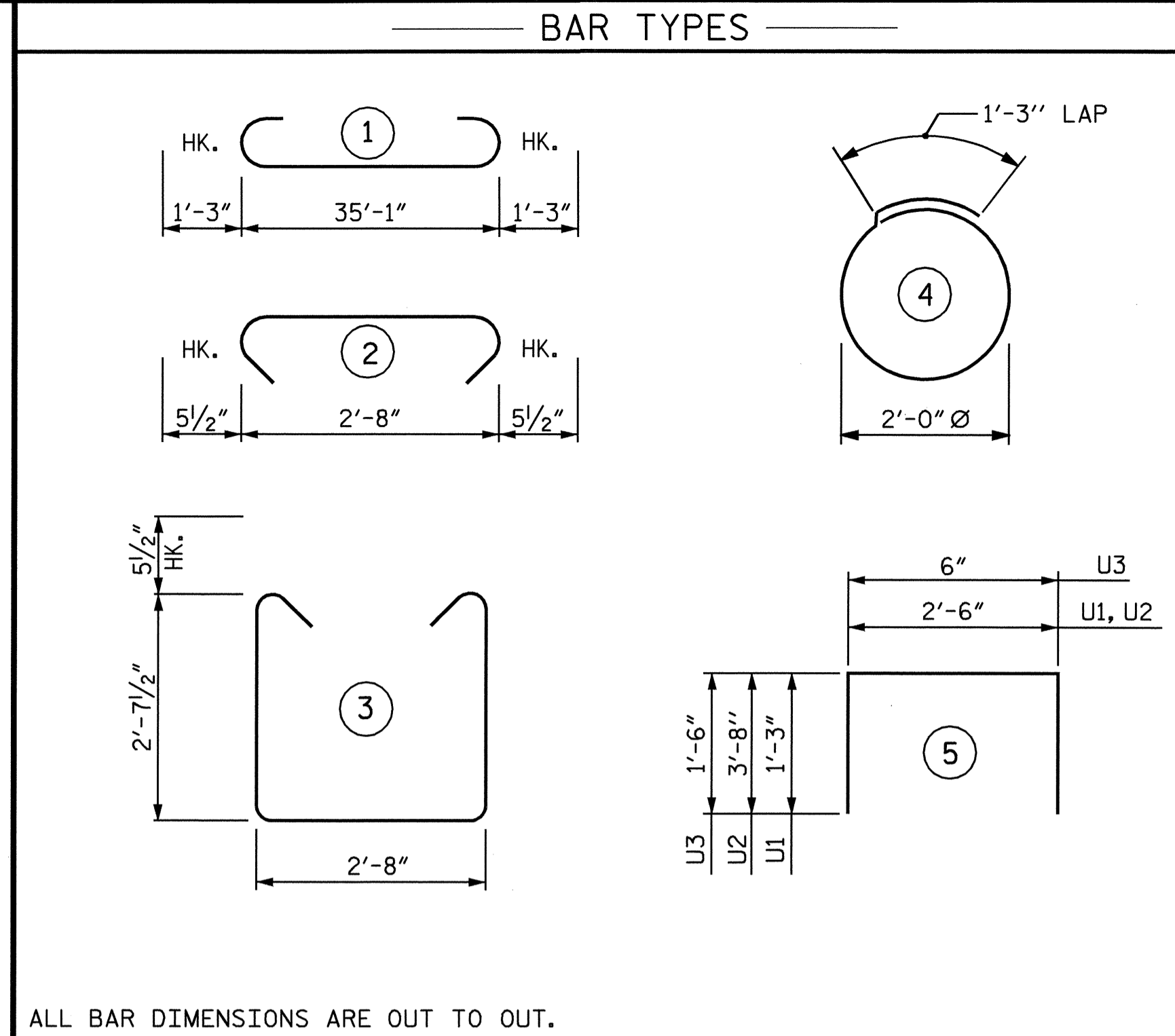


ELEVATION



PLAN

LATERAL GUIDE DETAIL  
(EACH END SIMILAR)



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 3

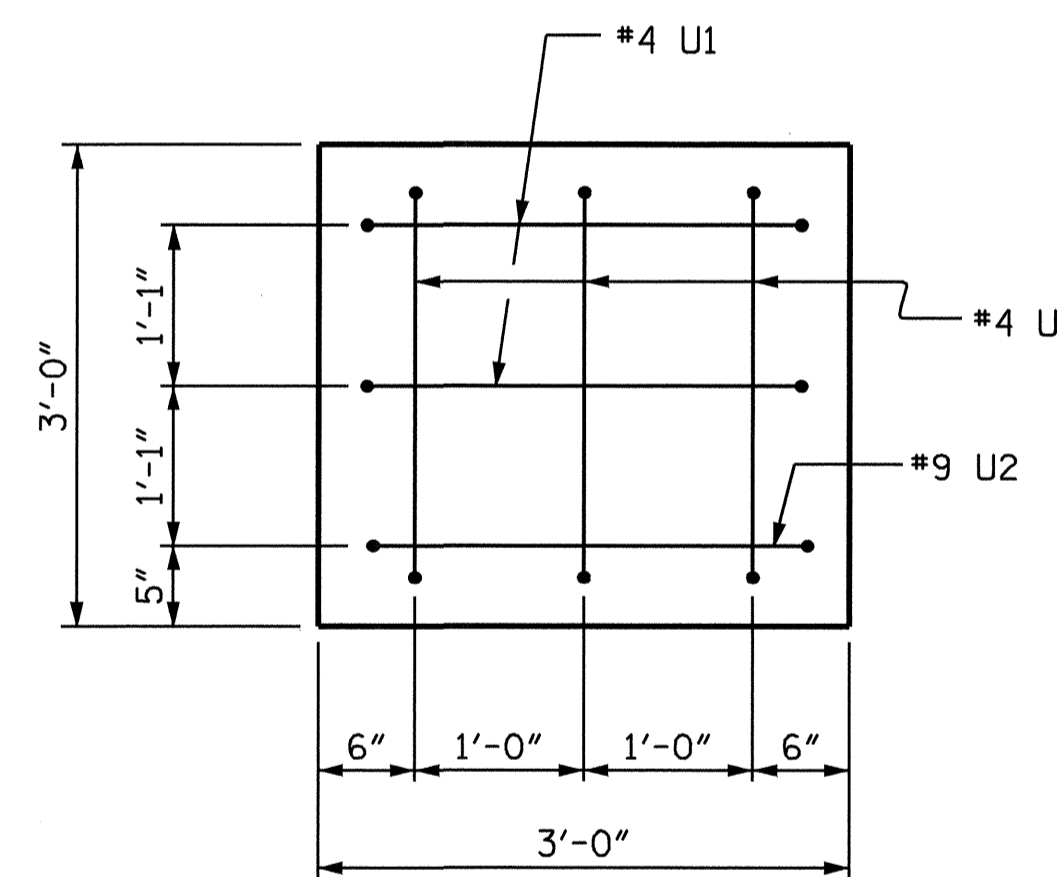
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#9	1	37'-7"	511
B2	4	#9	STR	35'-2"	478
B3	4	#5	STR	35'-2"	147
B4	8	#4	STR	18'-10"	101
B5	13	#4	STR	2'-8"	23
D1	44	#6	STR	1'-6"	99
S1	32	#5	3	8'-10"	295
S2	32	#5	2	3'-7"	120
S3	12	#4	4	7'-7"	61
U1	10	#4	5	5'-0"	33
U2	2	#9	5	9'-10"	67
U3	8	#4	5	3'-6"	19

REINFORCING STEEL 1954 LBS.

CLASS A CONCRETE  
POUR 1 (CAP) C.Y. 11.8  
POUR 2 (LATERAL GUIDE) C.Y. 0.1  
TOTAL C.Y. 11.9

HP 14 x 73 GALVANIZED STEEL PILES  
NO. : 6 LIN. FT. 570.0

PILE REDRIVES NO. : 6



END VIEW  
(TYP. EA. END)

PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT 3



REVISIONS

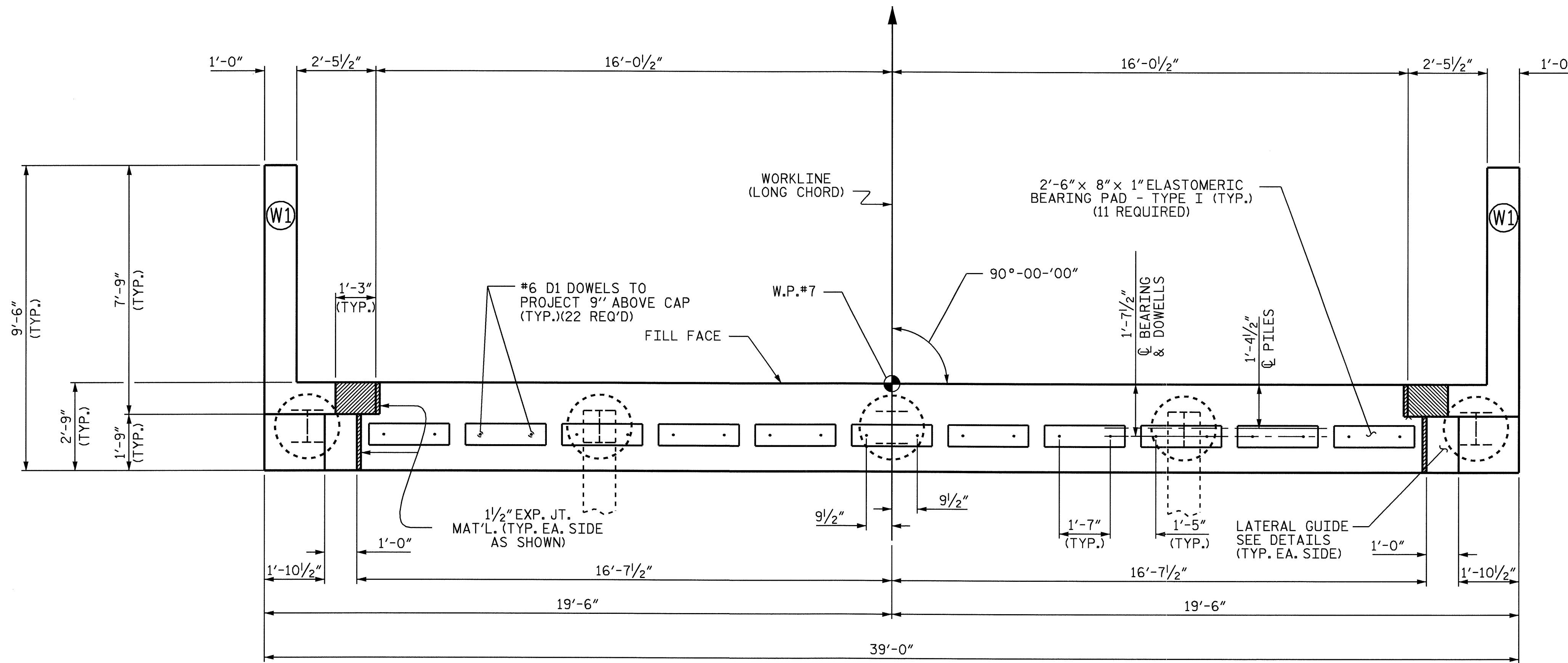
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
S-20  
TOTAL SHEETS  
25

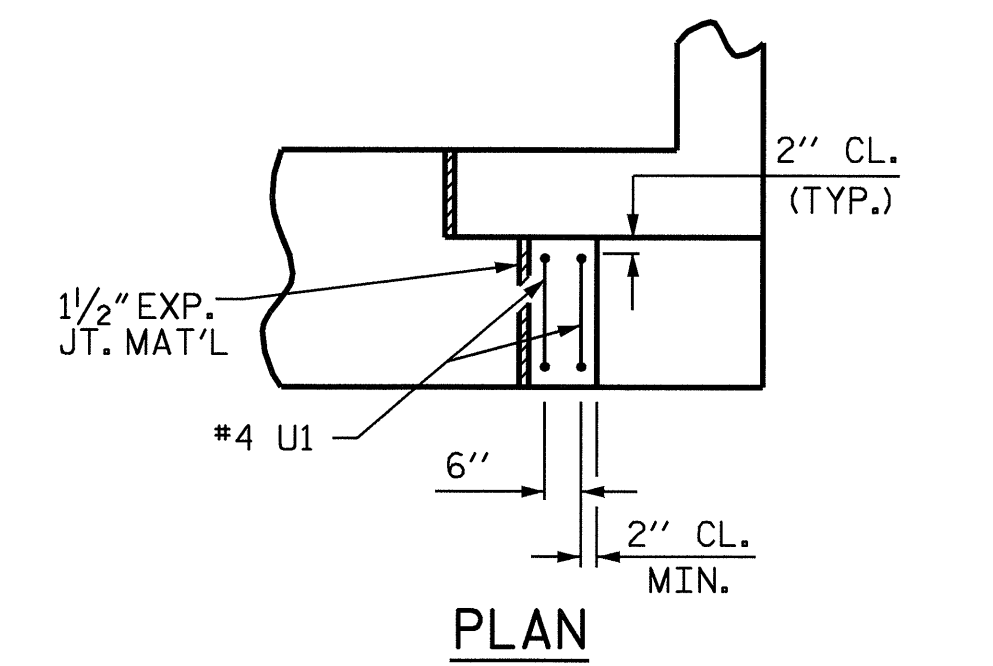
DRAWN BY : J.G. KHARVA DATE : 7/17/09  
CHECKED BY : J.D. HAWK DATE : 7/30/09

**NOTES**

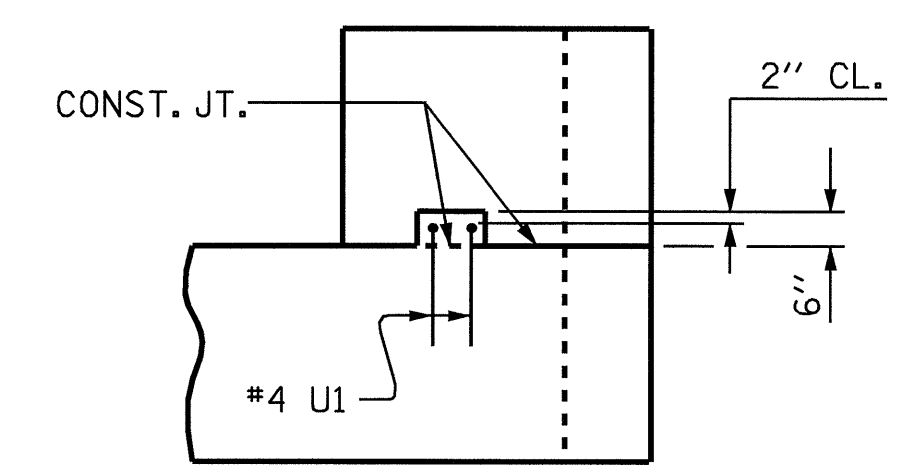
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE  
 POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED  
 AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.



**PLAN**

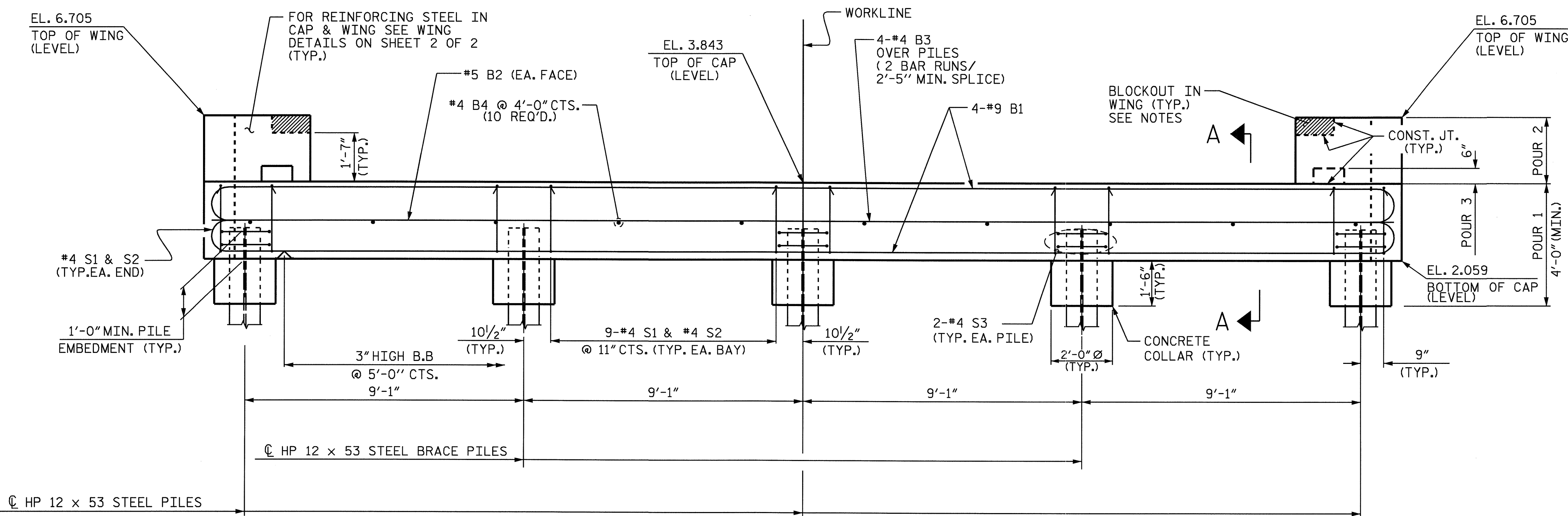


**PLAN**



**ELEVATION**

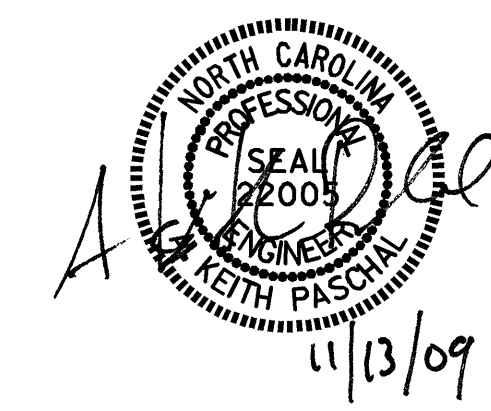
**LATERAL GUIDE DETAILS**  
(EACH END SIMILAR)



**ELEVATION**

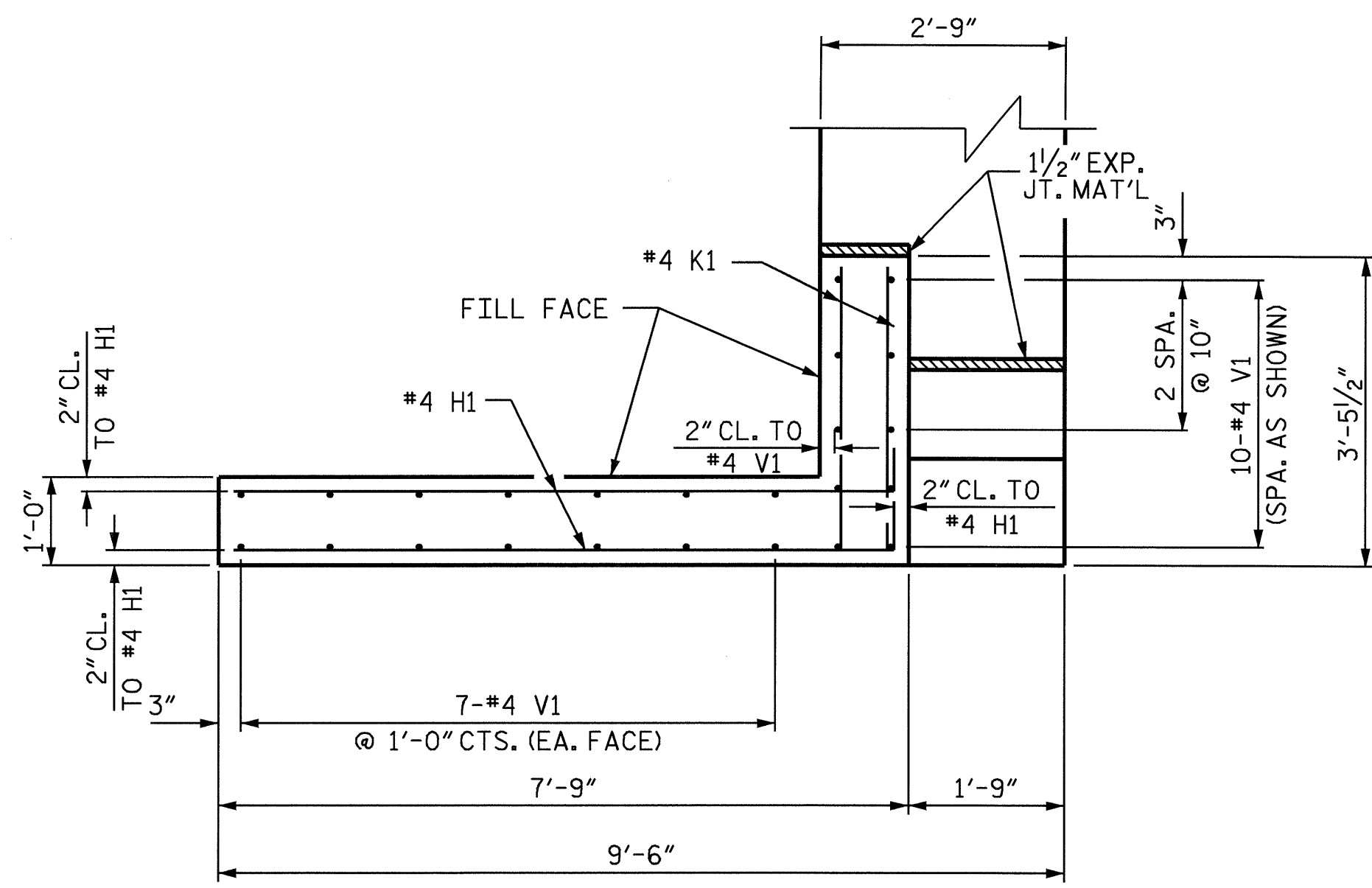
DRAWN BY: M.FOWLER DATE: 5/21/09  
 CHECKED BY: J.G.KHARVA DATE: 7/16/09

13-NOV-2009 10:36  
 o:\structures\final plans\b4465.sd.e\*.dgn  
 Kpaschal

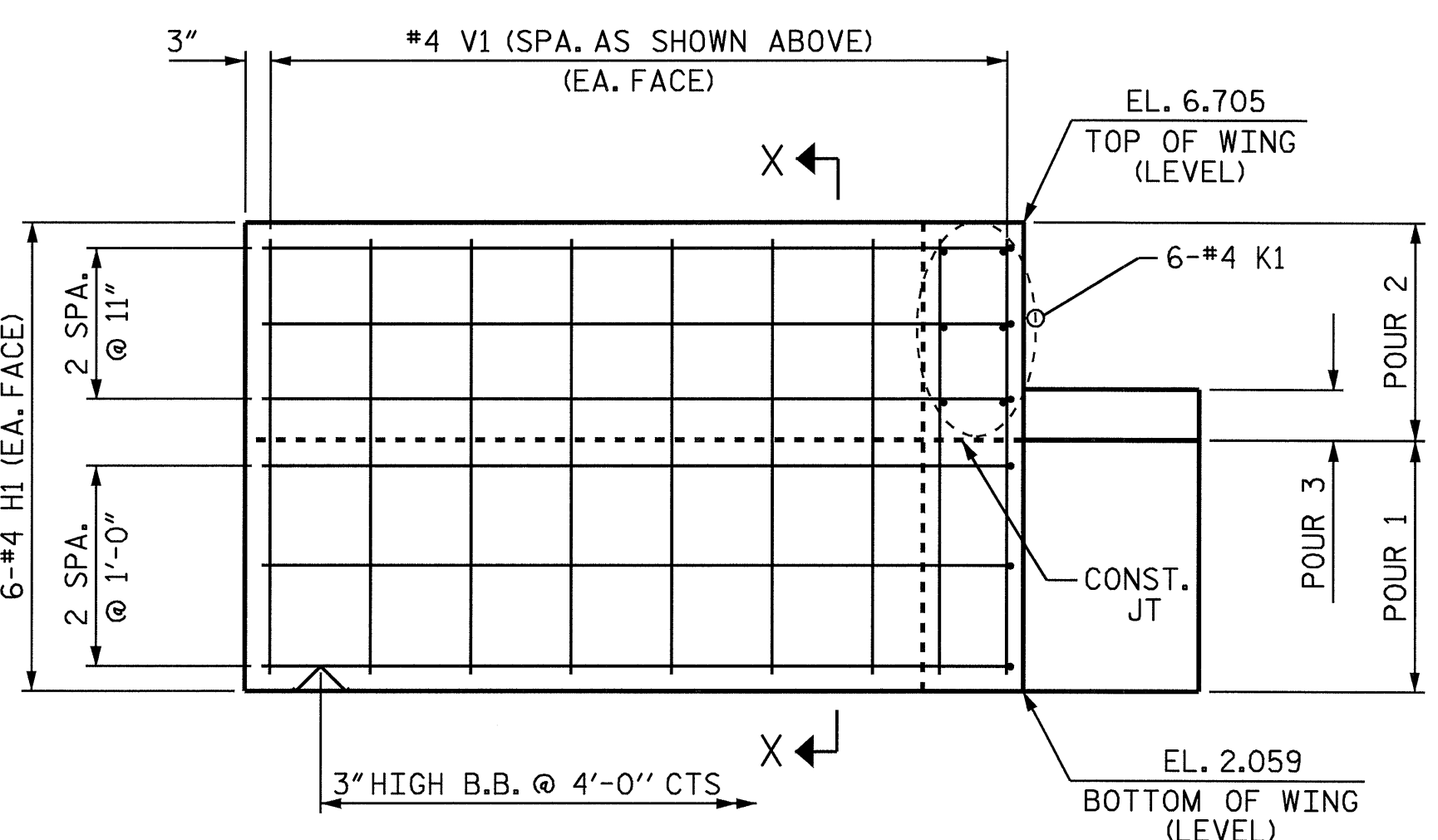


PROJECT NO. B-4465  
 CHOWAN COUNTY  
 STATION: 22+92.00 -L-  
 SHEET 1 OF 2

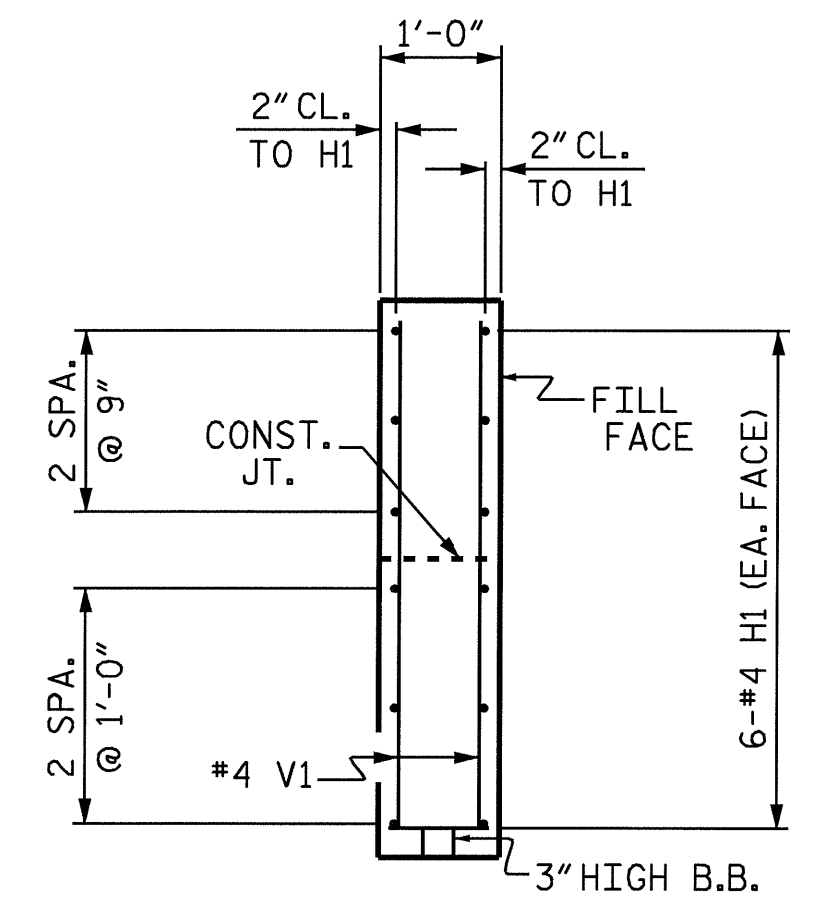
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-21
					TOTAL SHEETS 25



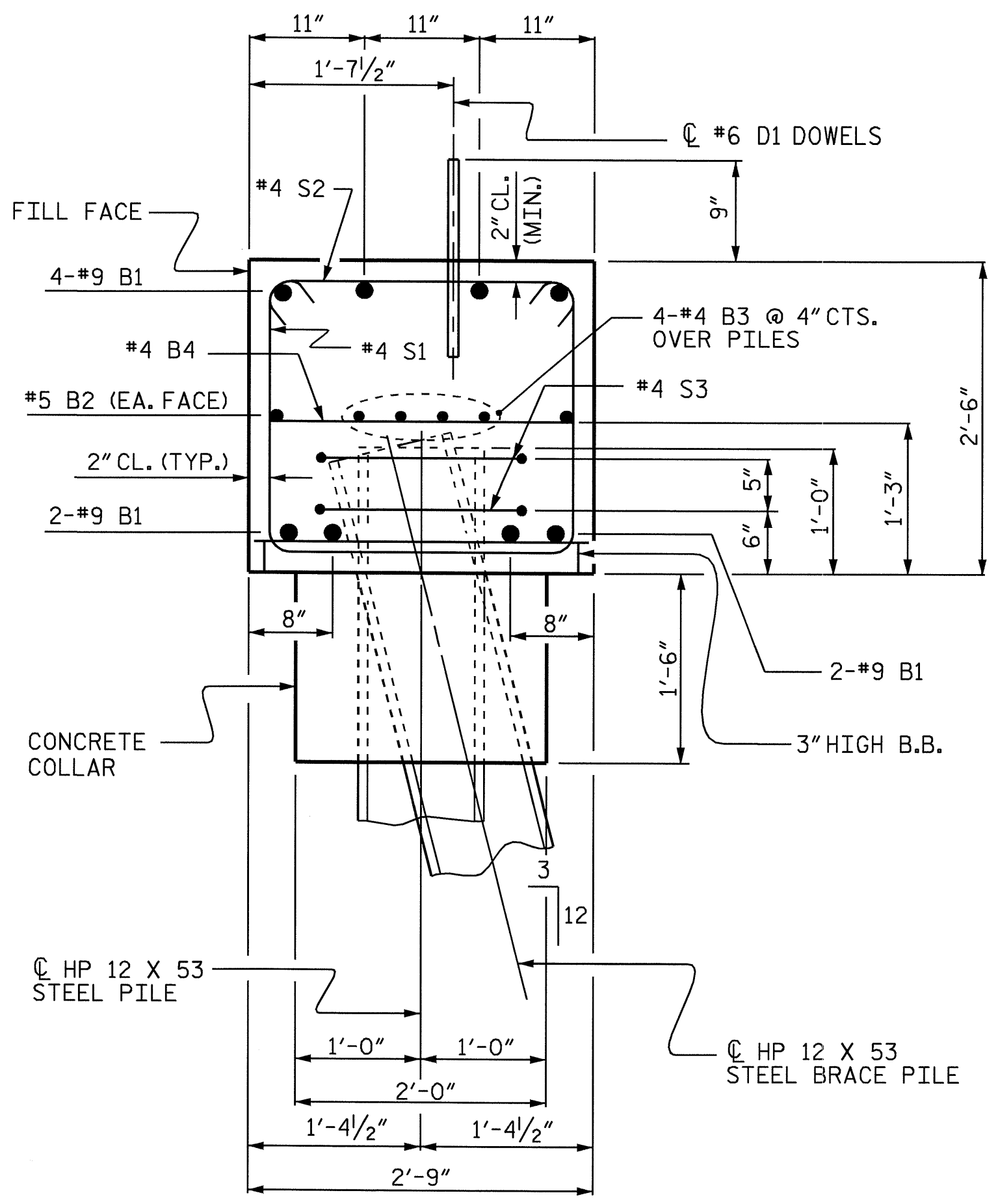
**PLAN OF WING (W1)**  
LEFT WING SHOWN RIGHT WING SIMILAR



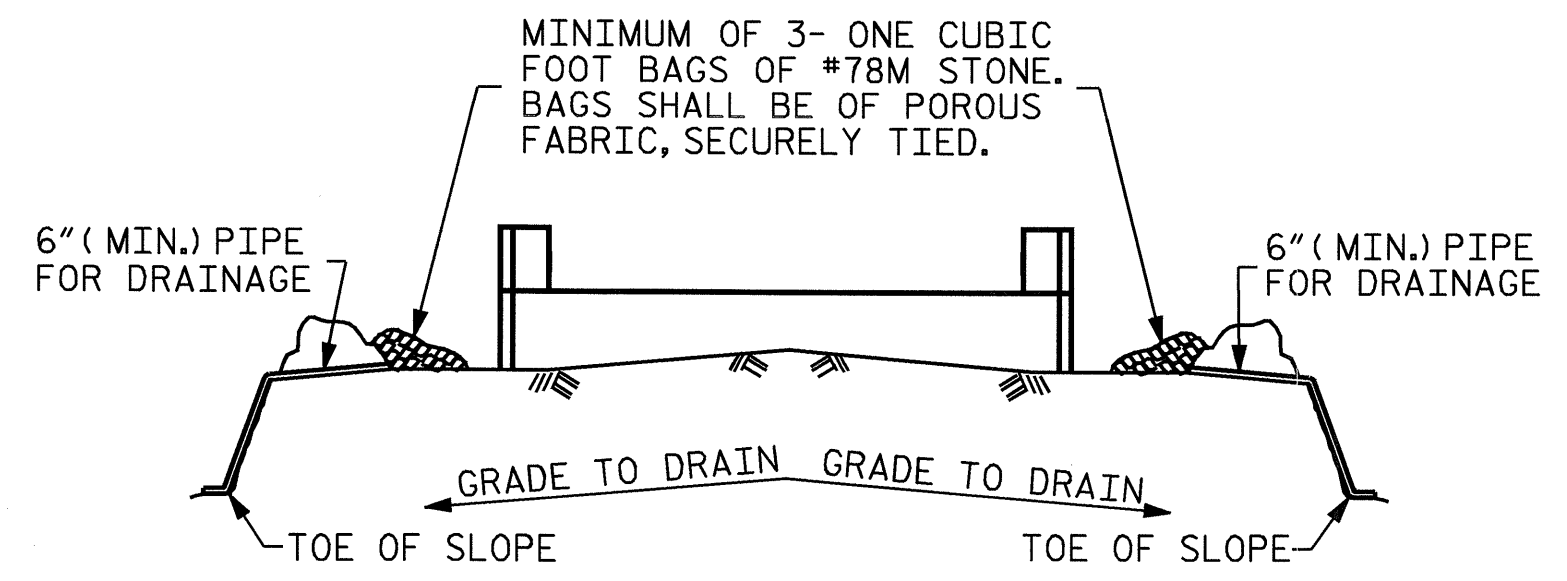
**ELEVATION OF WING (W1)**  
LEFT WING SHOWN RIGHT WING SIMILAR



**SECTION X-X**



**SECTION A-A**

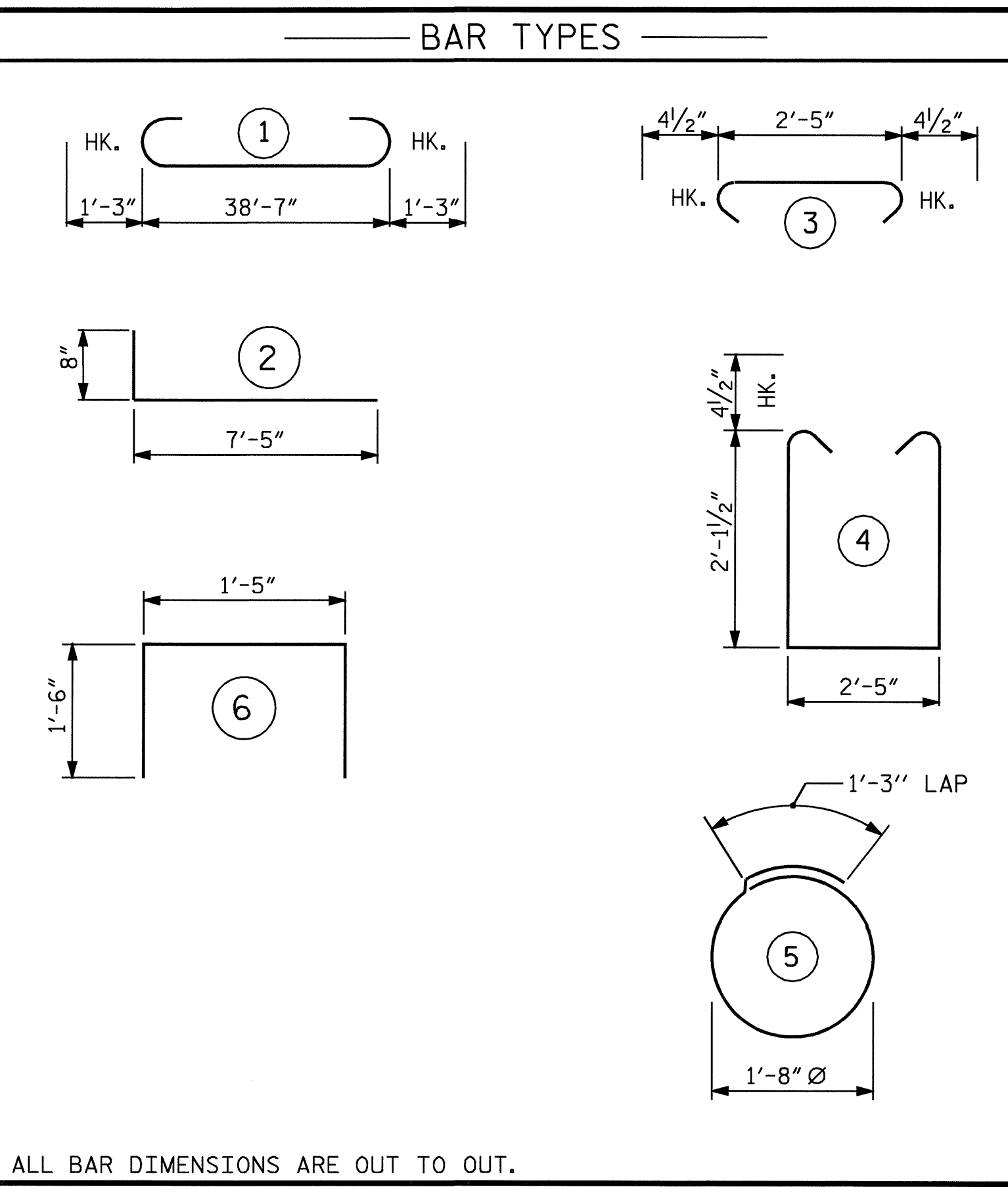


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

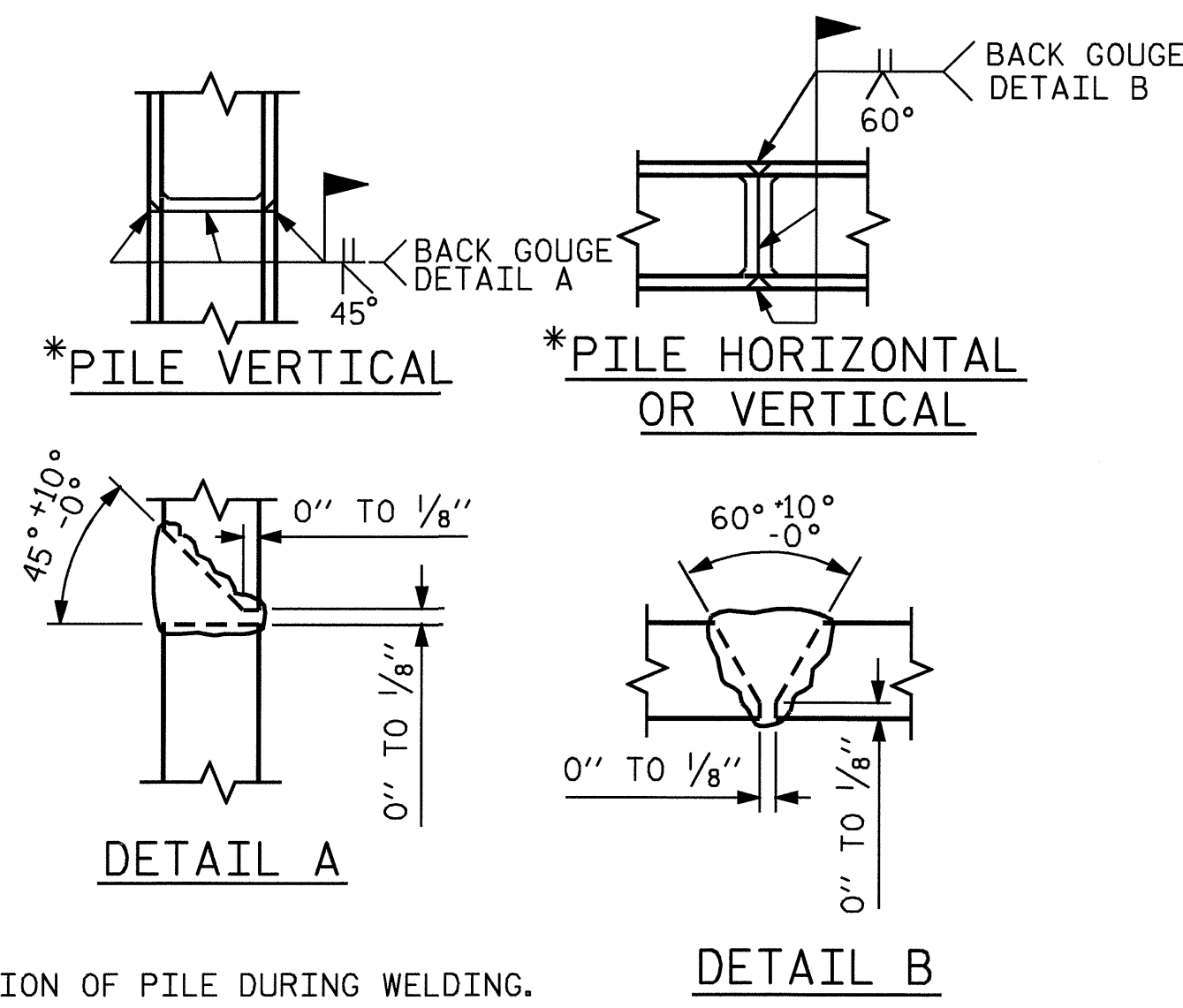
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



ALL BAR DIMENSIONS ARE OUT TO OUT.



\*POSITION OF PILE DURING WELDING.

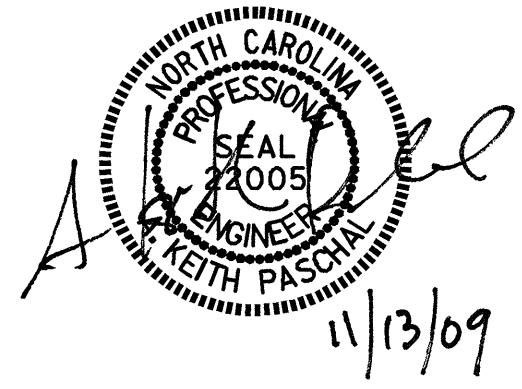
**PILE SPLICE DETAILS**

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		41'-1"	1118
B2	2	#5	STR	38'-8"	81
B3	8	#4	STR	20'-7"	110
B4	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	24	#4	2	8'-1"	130
K1	12	#4	STR	3'-1"	25
S1	38	#4	4	7'-5"	188
S2	38	#4	3	3'-2"	80
S3	10	#4	5	6'-6"	43
U1	4	#4	6	4'-5"	12
V1	48	#4	STR	4'-3"	136
TOTAL REINFORCING STEEL				=	1989 LBS
CLASS A CONCRETE BREAKDOWN					
POUR 1 (CAP, COLLARS & LOWER PART OF WINGS)					12.1 C.Y.
POUR 2 (UPPER PART OF WINGS)					1.6 C.Y.
POUR 3 (LATERAL GUIDES)					0.1 C.Y.
TOTAL CLASS A CONCRETE					13.8 C.Y.
HP 12 X 53 STEEL PILES					375
NO. : 5					
PILE REDRIVES					NO. : 5

PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-  
SHEET 2 OF 2

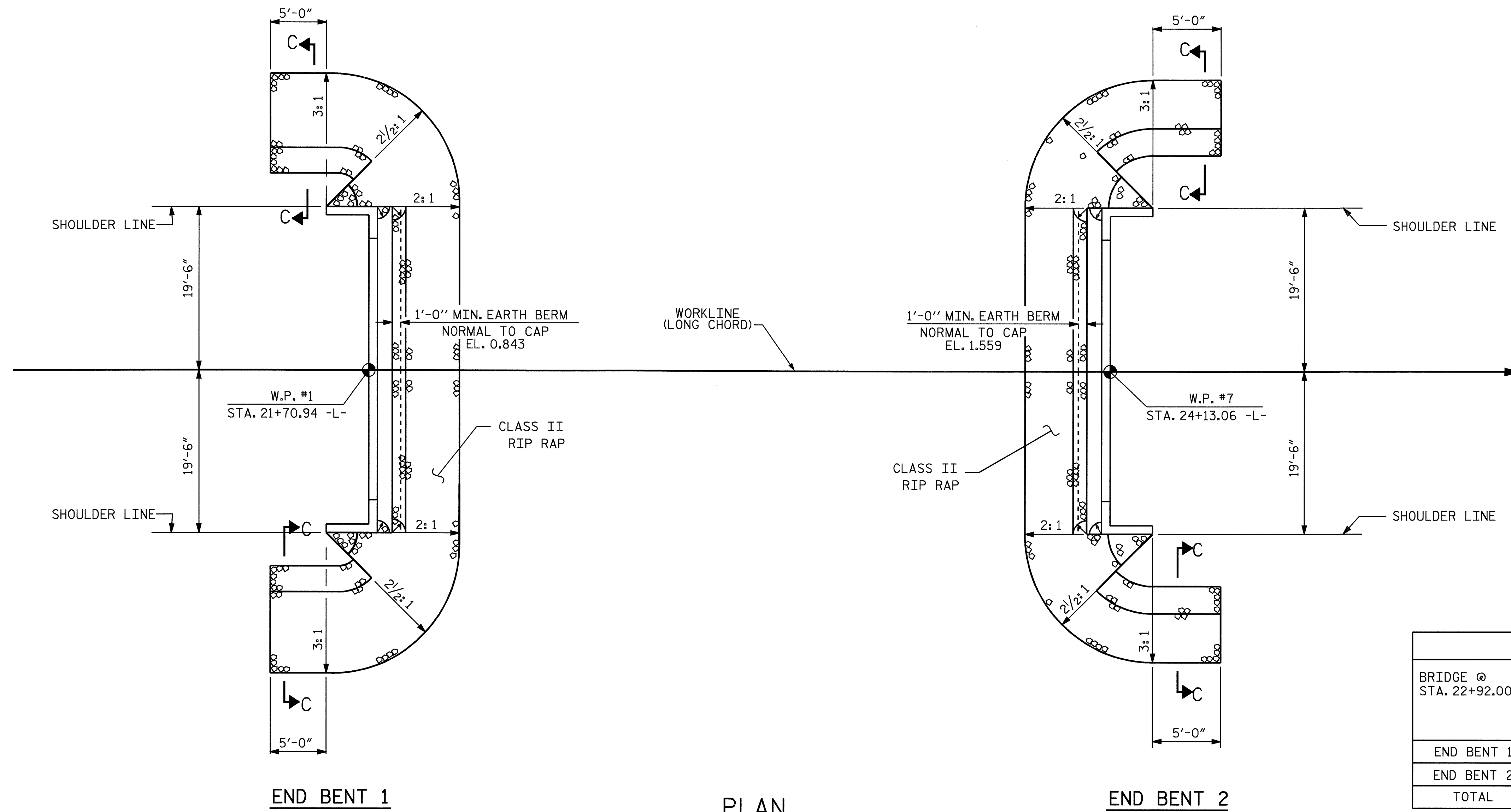
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 2



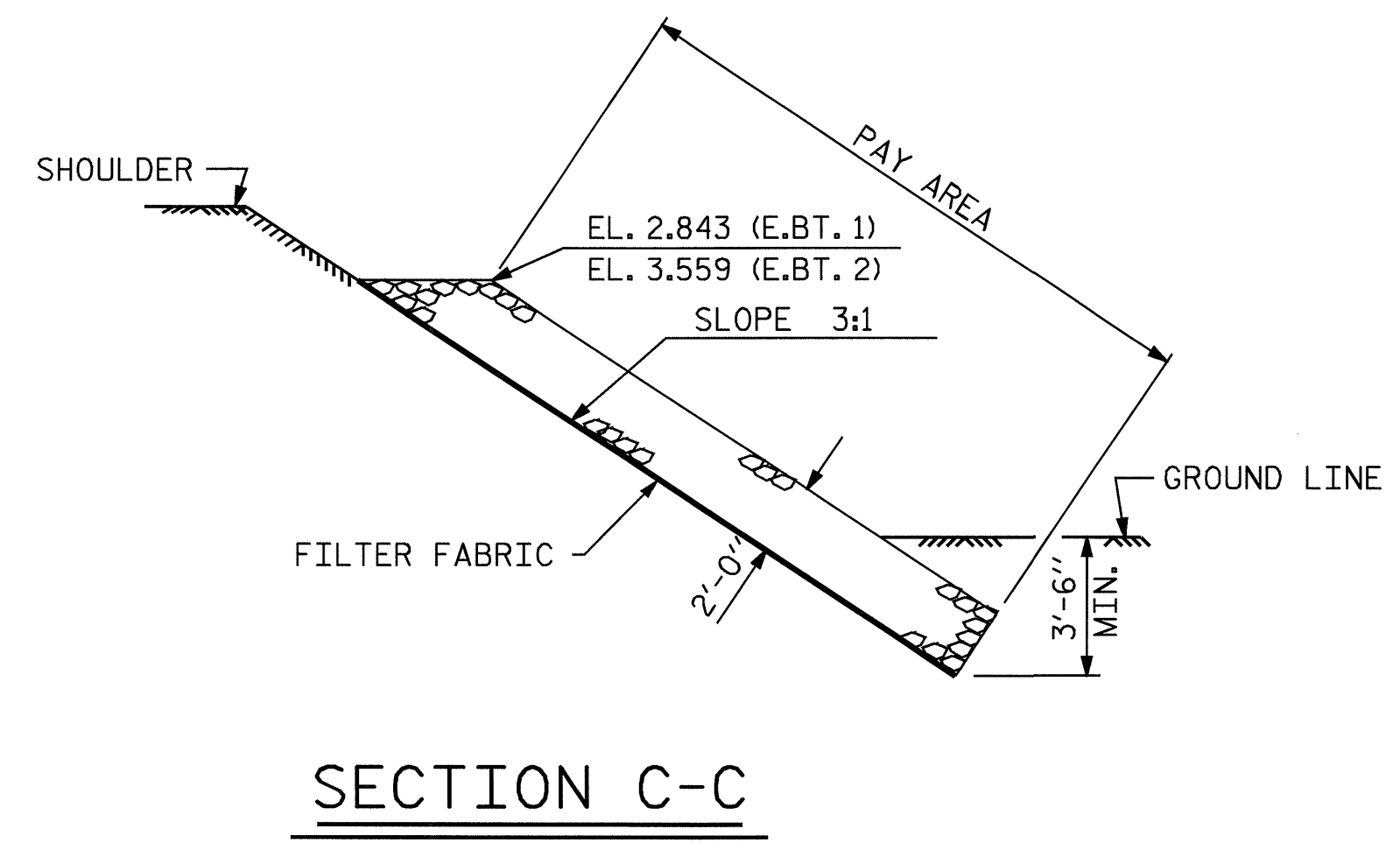
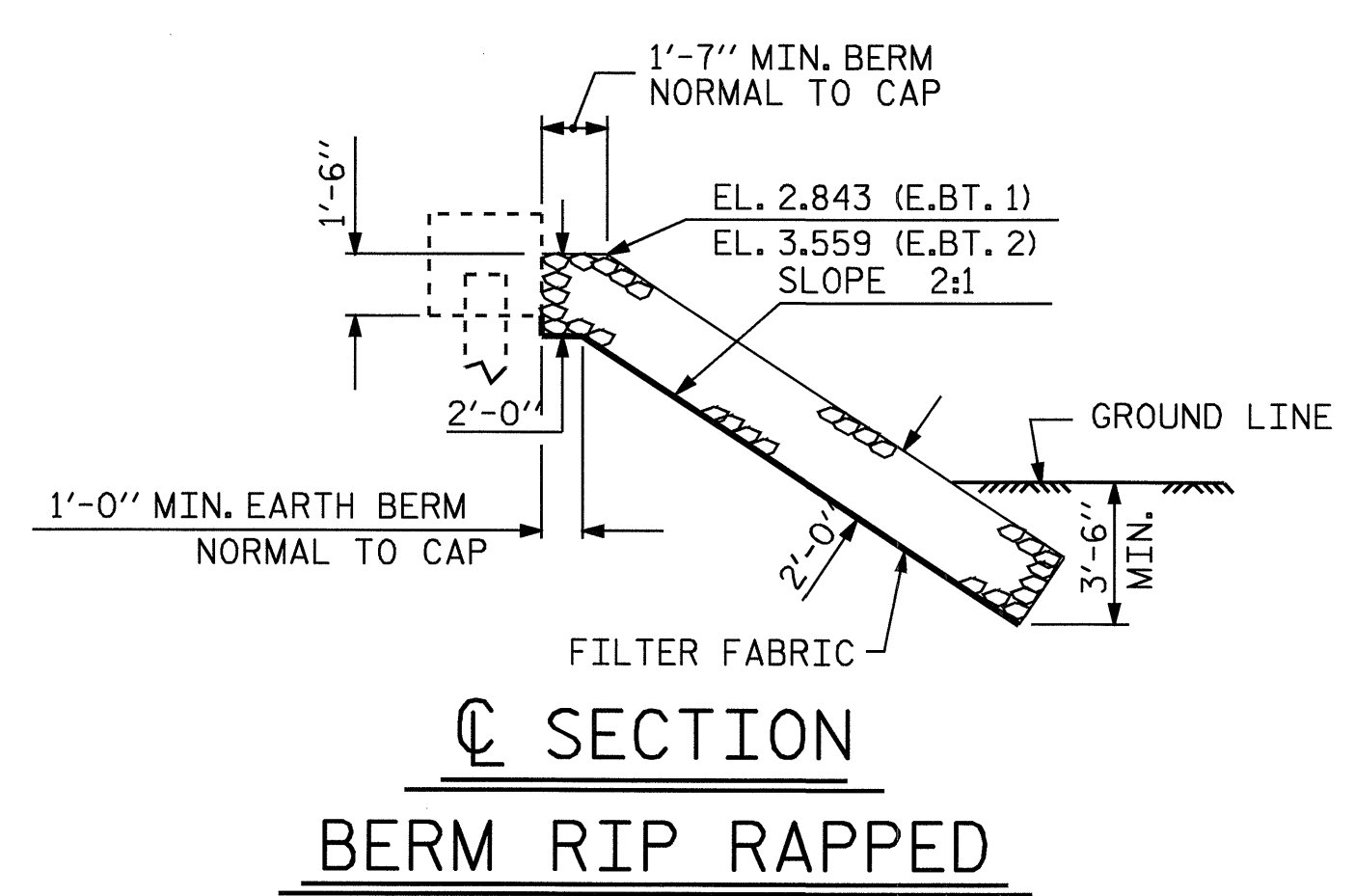
DRAWN BY: M.FOWLER DATE: 5/27/09  
CHECKED BY: J.G. KHARVA DATE: 7/16/09

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



ESTIMATED QUANTITIES		
BRIDGE @ STA. 22+92.00 -L-	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	123	136
END BENT 2	130	145
TOTAL	253	281

END BENT 1 PLAN END BENT 2

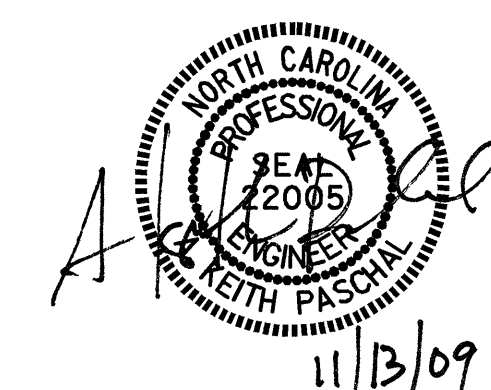


SECTION C-C  
BERM RIP RAPPED

SECTION C-C

PROJECT NO. B-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

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



ASSEMBLED BY : M.FOWLER DATE : 8/10/09  
 CHECKED BY : J.G. KHARVA DATE : 8/25/09  
 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

12-NOV-2009 11:21  
 F:\structures\final plans\b4465.ed.r.r.dgn  
 mFowler

SKEW 90° STD. NO. RR2



NOTES

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

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

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.

BILL OF MATERIAL

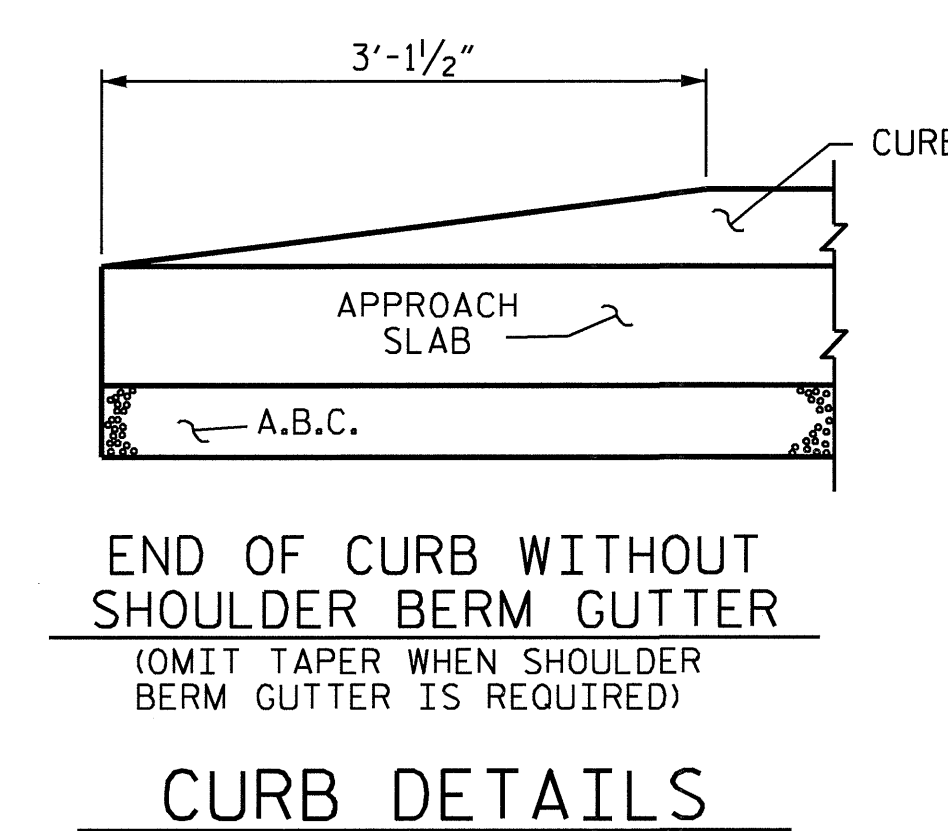
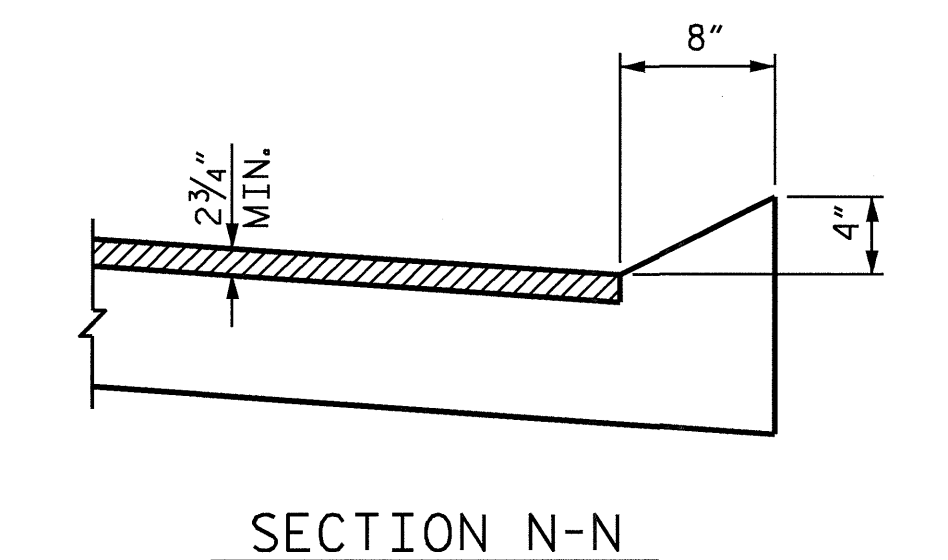
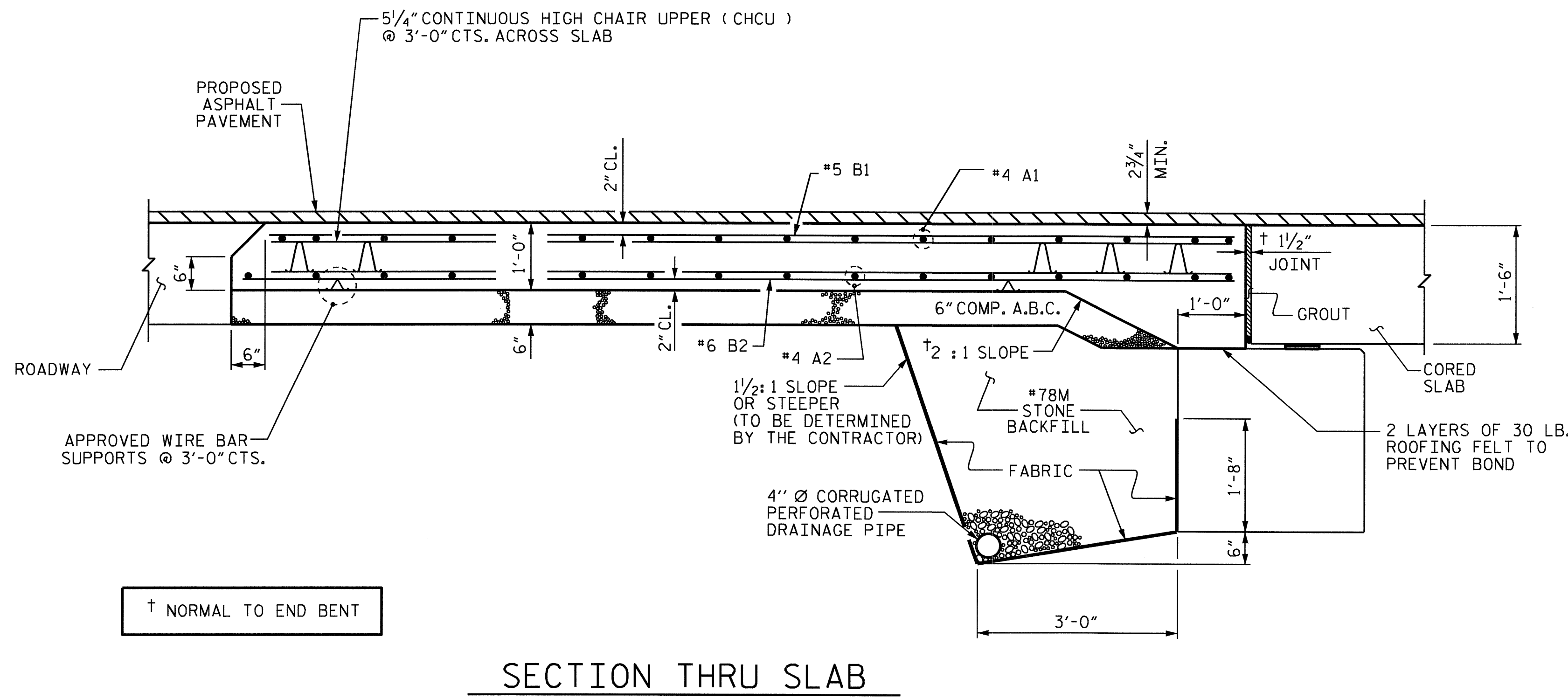
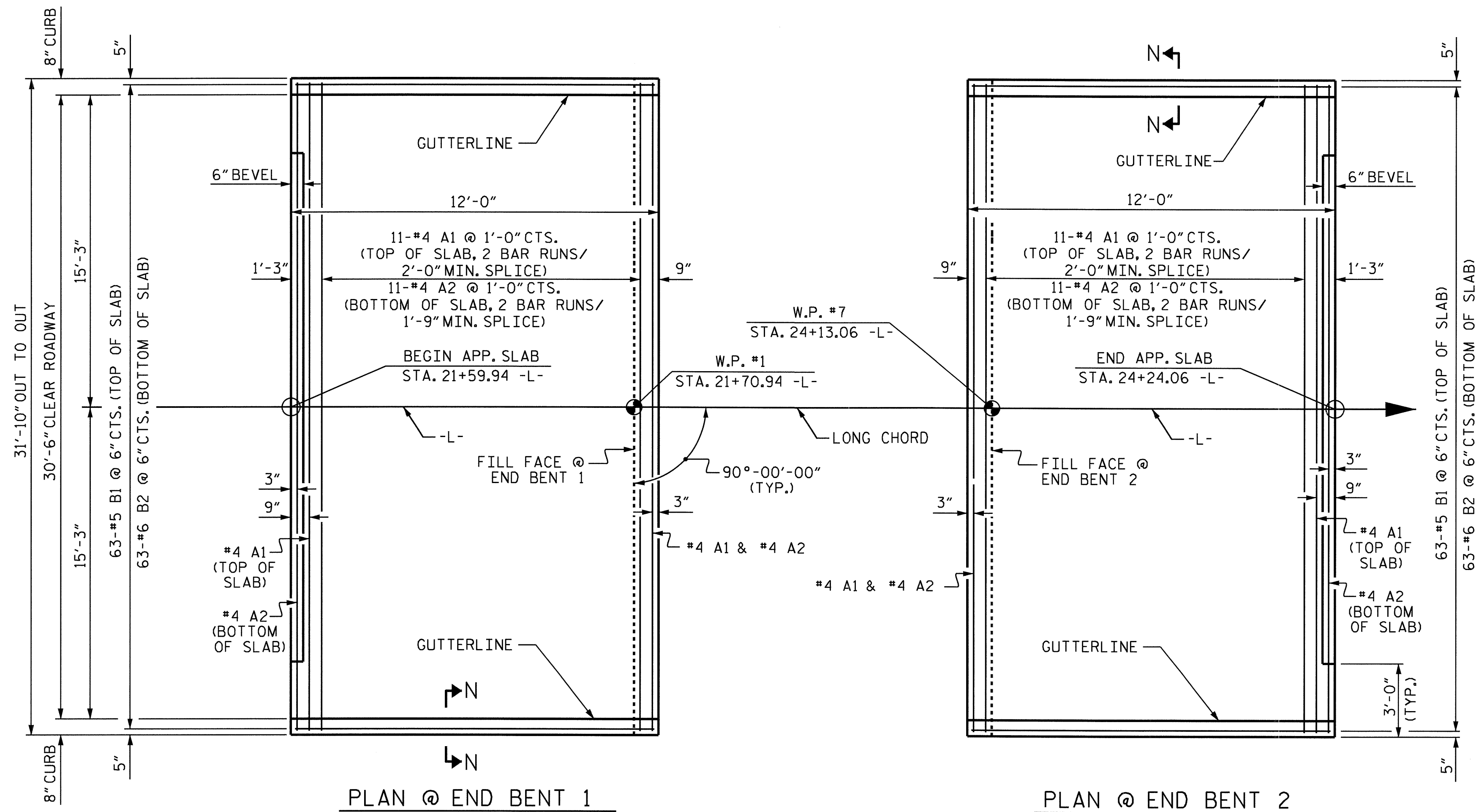
FOR ONE APPROACH SLAB  
(2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	16'-9"	291
A2	26	#4	STR	16'-8"	289
*B1	63	#5	STR	11'-3"	739
B2	63	#6	STR	11'-8"	1104

REINFORCING STEEL LBS. 1393

\*EPOXY COATED REINFORCING STEEL LBS. 1027

CLASS AA CONCRETE C. Y. 15.4

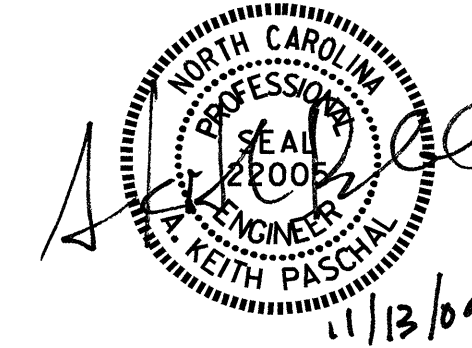


PROJECT NO. B-4465  
CHOWAN COUNTY  
STATION: 22+92.00 -L-

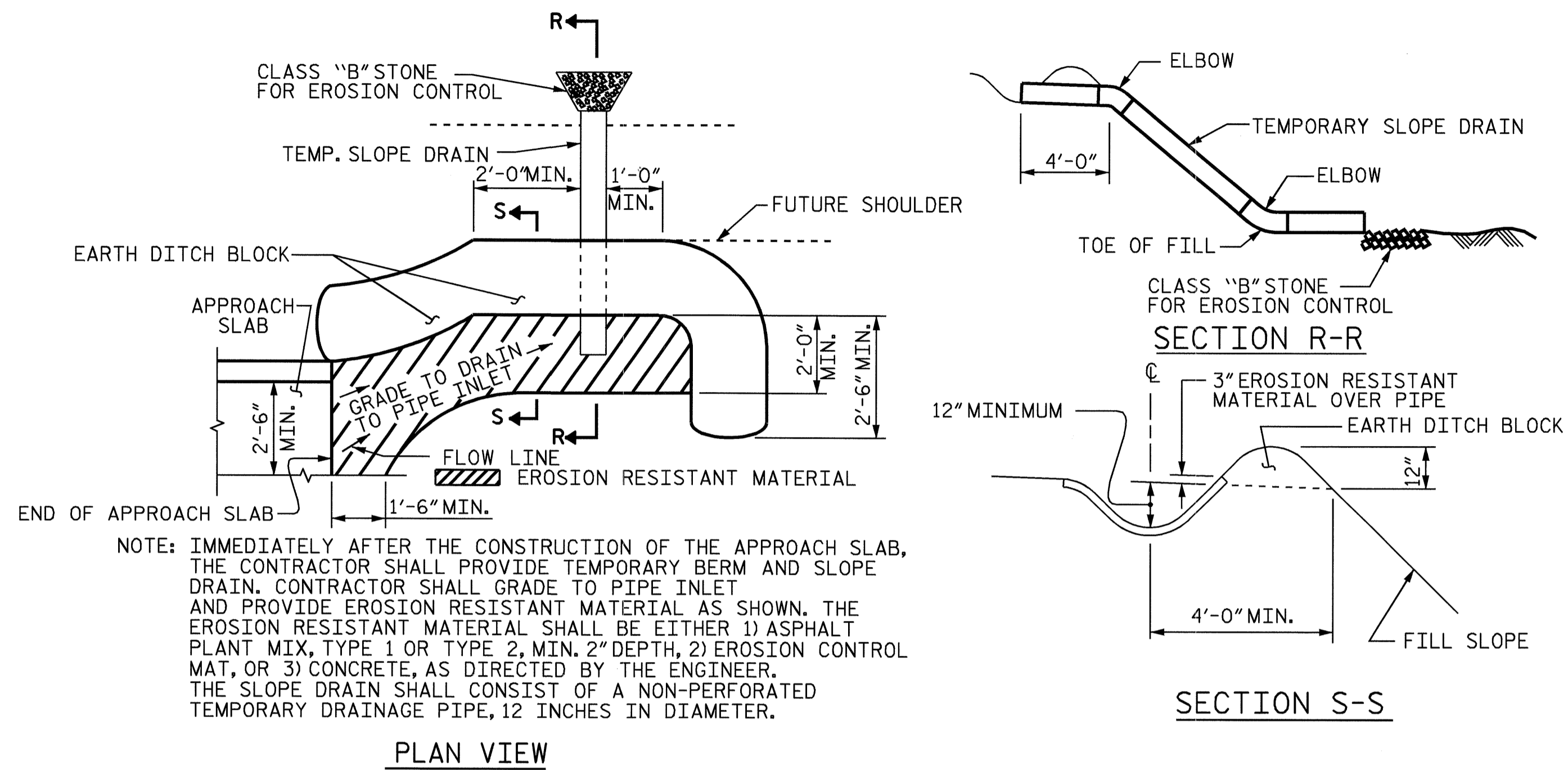
SHEET 1 OF 2

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

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24	
1			3			TOTAL SHEETS	
2			4			25	

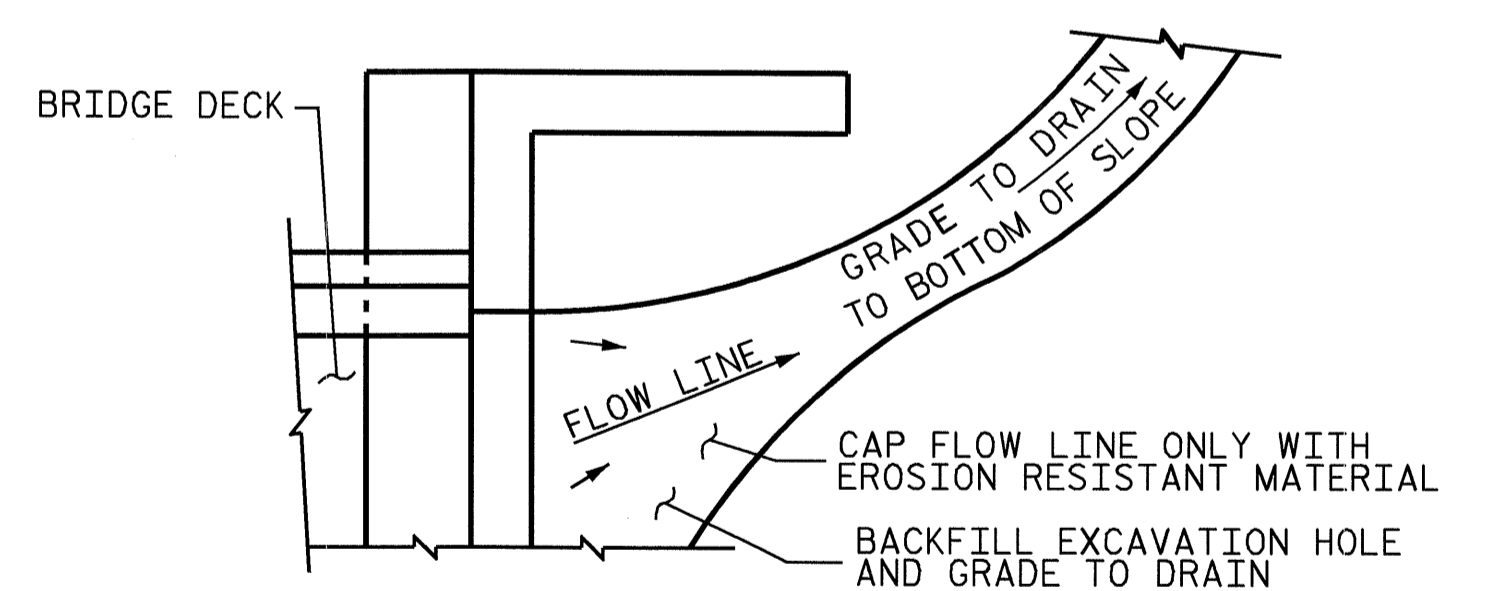


ASSEMBLED BY : M.FOWLER	DATE : 7/13/09
CHECKED BY : J.G. KHARVA	DATE : 7/23/09
DRAWN BY : FCJ 6/87	REV. 7/10/01 LES/RDR
CHECKED BY : EGA 6/87	REV. 5/7/03R RWW/JTE
	REV. 5/1/06R KMM/GM



**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



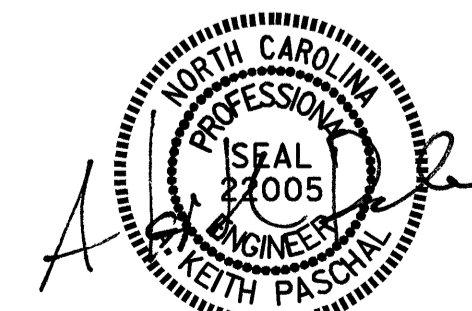
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT 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-4465  
CHOWAN COUNTY  
 STATION: 22+92.00 -L-

SHEET 2 OF 2

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



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

ASSEMBLED BY : M.FOWLER	DATE : 3/10/09
CHECKED BY : J.G. KHARVA	DATE : 7/23/09
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

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

### SPECIAL NOTES:

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

# ENGLISH

JANUARY, 1990

STD. NO. SN