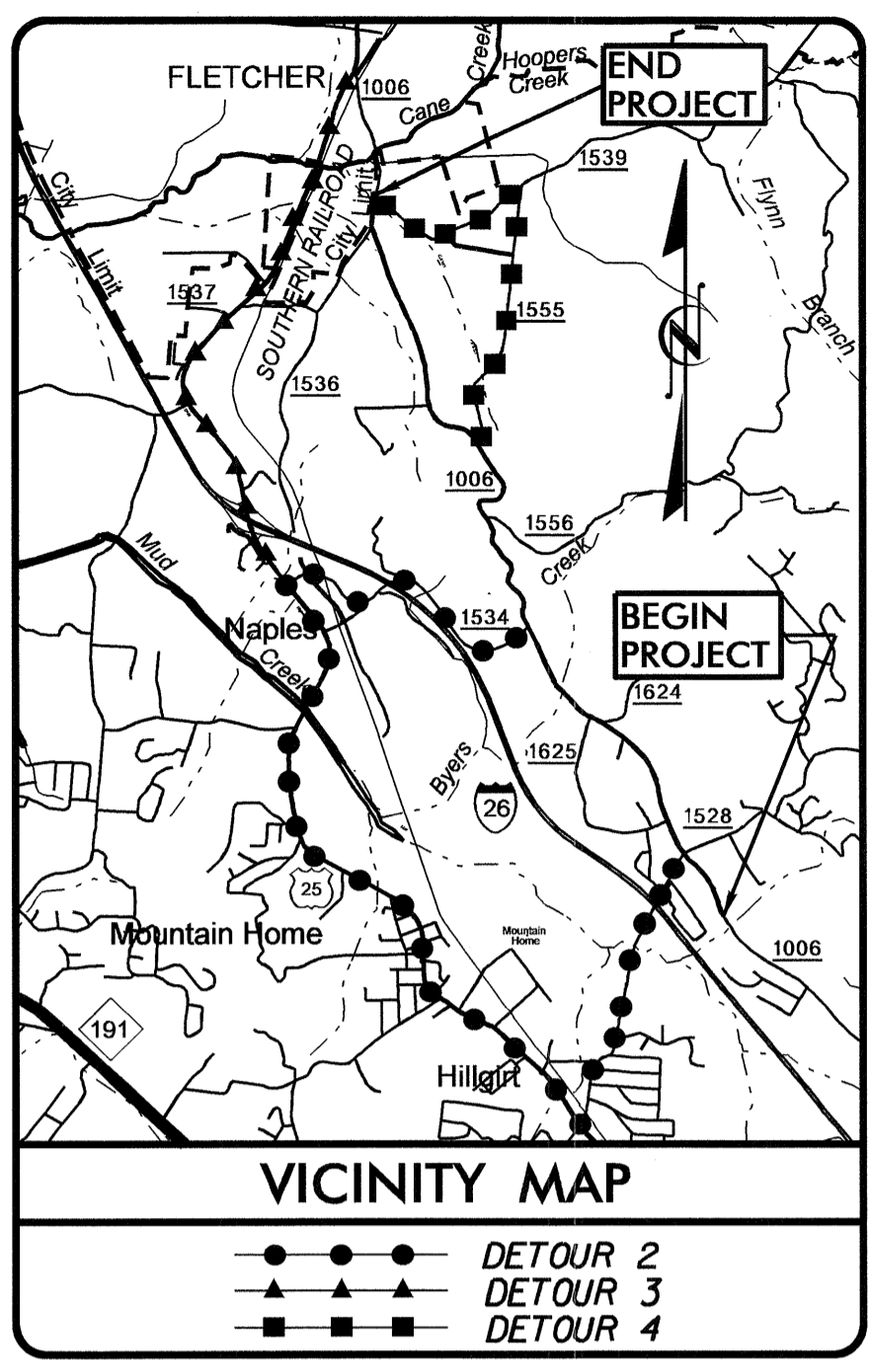


PROJECT: R-5207B

CONTRACT: C202743

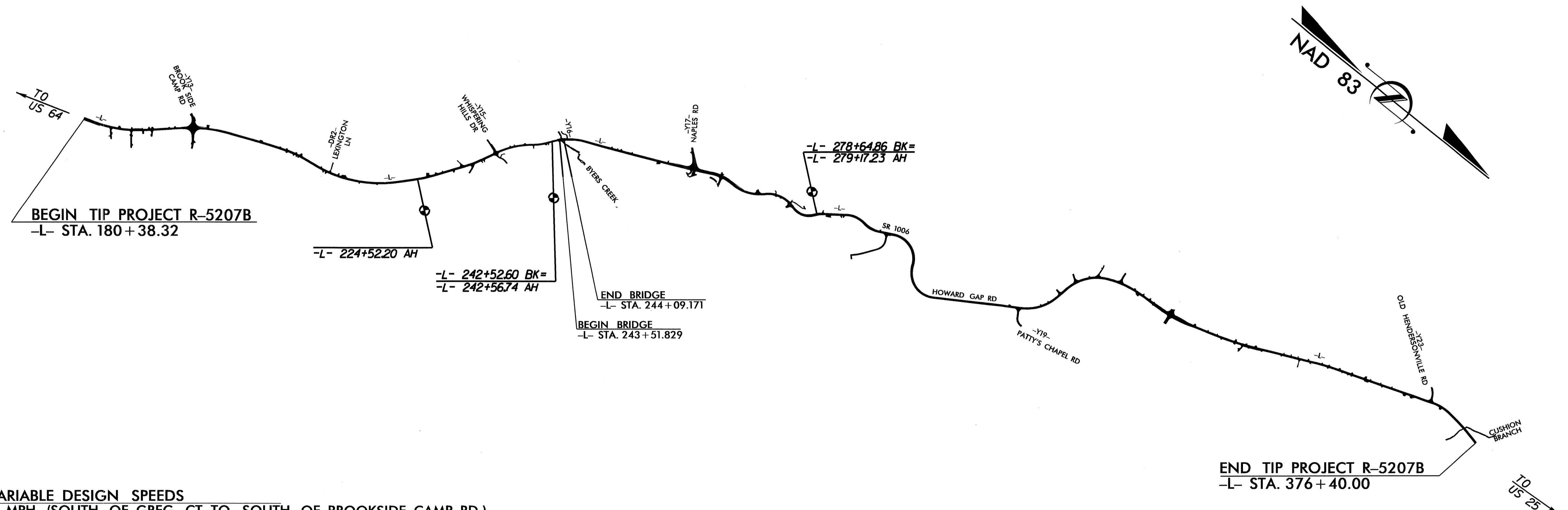
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
HENDERSON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5207B		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38629		PE	
45393.2.3		R/W, UTIL.	
45393.3.3		CONST.	



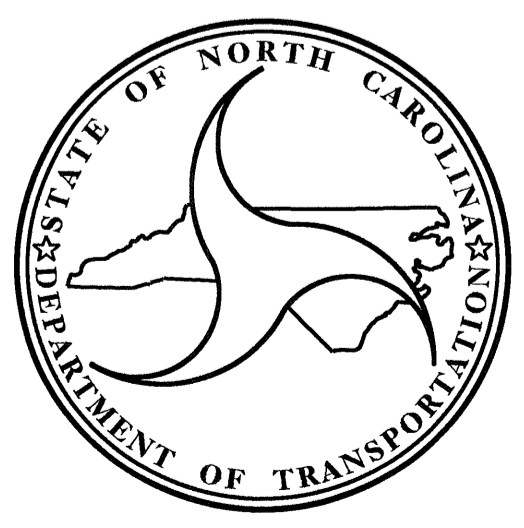
LOCATION: SR 1006 (HOWARD GAP RD.) FROM SOUTH OF SR 1528 (BROOKSIDE CAMP RD.) TO SR 1539 (JACKSON RD.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, UTILITIES, SIGNALS, AND SIGNING



VARIABLE DESIGN SPEEDS

- * Vd = 50 MPH (SOUTH OF GREG CT. TO SOUTH OF BROOKSIDE CAMP RD.)
- Vd = 40 MPH (NORTH OF BROOKSIDE CAMP RD. TO SOUTH OF NAPLES RD.)
- Vd = 30 MPH (NORTH OF NAPLES RD. TO SOUTH OF PATTY'S CHAPEL RD.)
- Vd = 40 MPH (NORTH OF PATTY'S CHAPEL RD. TO JACKSON RD.)



DESIGN DATA

ADT 2008 =	8,758
ADT 2028 =	13,218
DHV =	11 %
D =	60 %
T =	6 %
*Vd =	VARIES (SEE ABOVE)
TTST =	2% DUAL 4%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5207B =	3.691 MILES
LENGTH STRUCTURES TIP PROJECT R-5207B =	0.011 MILES
TOTAL LENGTH TIP PROJECT R-5207B =	3.702 MILES

PLANS PREPARED BY:

TGS ENGINEERS
 TGS ENGINEERS
 SUITE 141
 975 WALNUT STREET
 CARY, NC 27511
 PH (919) 319-8850

2006 STANDARD SPECIFICATIONS

LETTING DATE:
 JULY 17, 2012

PLANS PREPARED FOR:

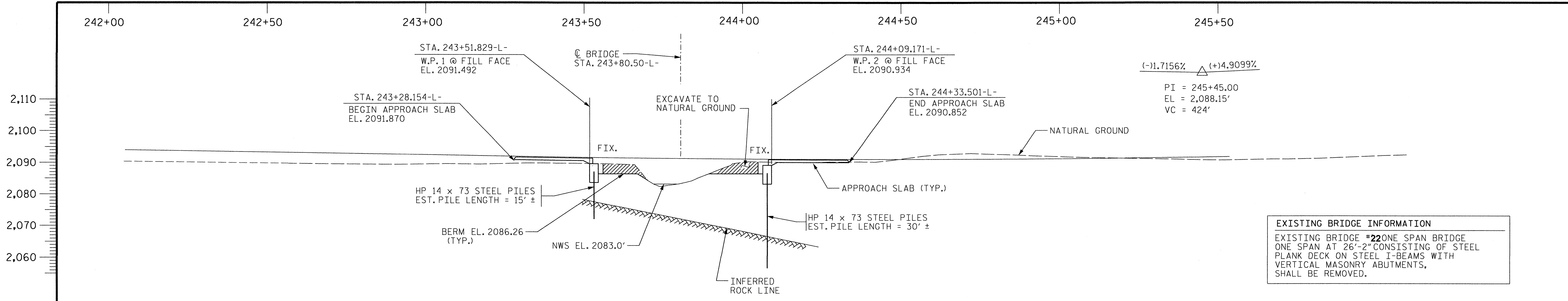
DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 1000 Birch Ridge Drive Raleigh, N.C. 27610

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

STRUCTURES

20-MAR-2012 11:54
 C:\p1\c202743\DRAWING\011.DWG



SECTION ALONG -L-
SECTIONS AT END BENTS ARE AT RIGHT ANGLES.

EXISTING BRIDGE INFORMATION
 EXISTING BRIDGE #22 ONE SPAN BRIDGE
 ONE SPAN AT 26'-2" CONSISTING OF STEEL
 PLANK DECK ON STEEL I-BEAMS WITH
 VERTICAL MASONRY ABUTMENTS,
 SHALL BE REMOVED.

⊙ GEO TECH BORE HOLES LOCATION.

-L- HORIZ. CURVE DATA

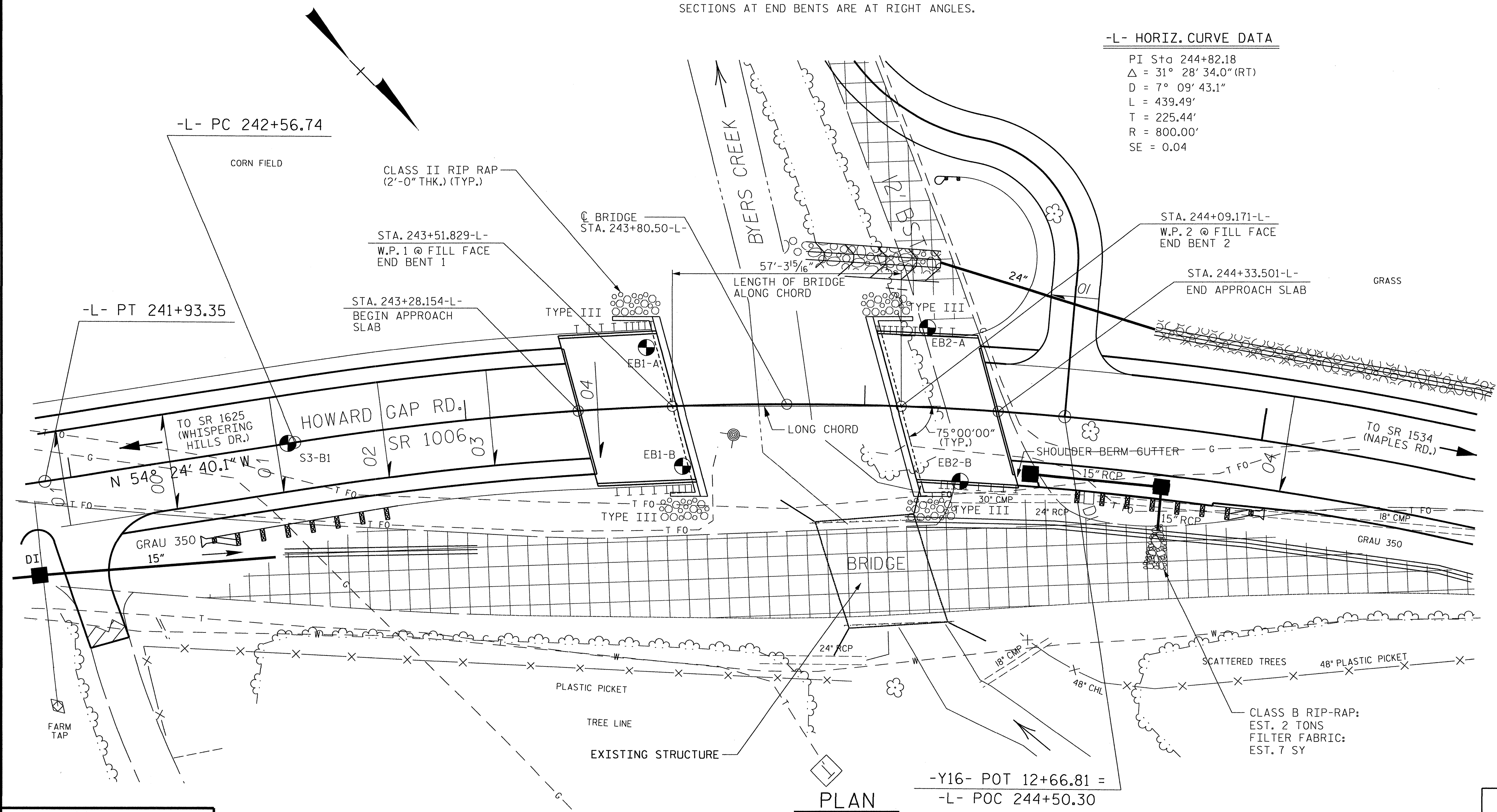
PI Sta 244+82.18
 $\Delta = 31^\circ 28' 34.0''$ (RT)
 $D = 7^\circ 09' 43.1''$
 $L = 439.49'$
 $T = 225.44'$
 $R = 800.00'$
 $SE = 0.04$

HYDROGRAPHIC DATA

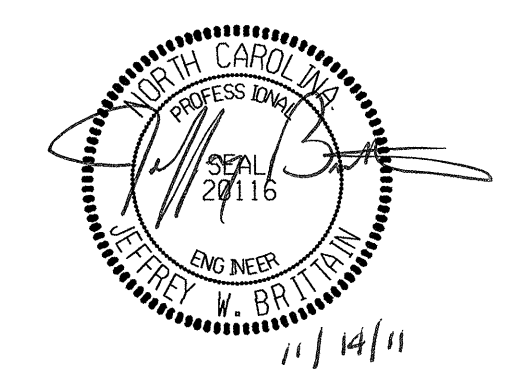
DESIGN DISCHARGE..... = 940 CFS
 FREQUENCY OF DESIGN FLOOD..... = 25 YRS.
 DESIGN HIGH WATER ELEVATION... = 2090.1'
 DRAINAGE AREA..... = 1.96 SQ. MI.
 BASIC DISCHARGE (Q100)..... = 1270 CFS
 BASIC HIGH WATER ELEVATION.... = 2091.2'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE..... = 1700 CFS
 FREQUENCY OF OVERTOPPING FLOOD..... = 200 YR.+
 OVERTOPPING FLOOD ELEVATION..... = 2091.4'



PLAN
 -Y16- POT 12+66.81 =
 -L- POC 244+50.30



PROJECT NO. R-5207B
 HENDERSON COUNTY
 STATION: 243+80.50-L-
 SHEET 1 OF 5 **REPLACES BRIDGE NO 22**

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**GENERAL DRAWING
 FOR BRIDGE #22
 ON HOWARD GAP RD. (SR 1006)
 OVER BYERS CREEK**

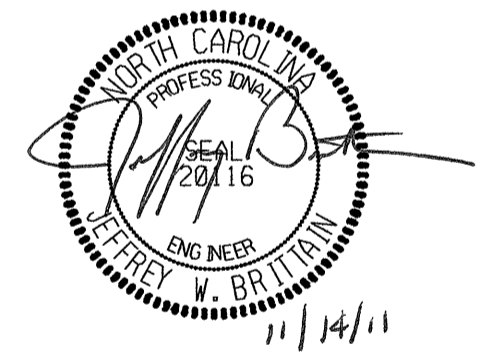
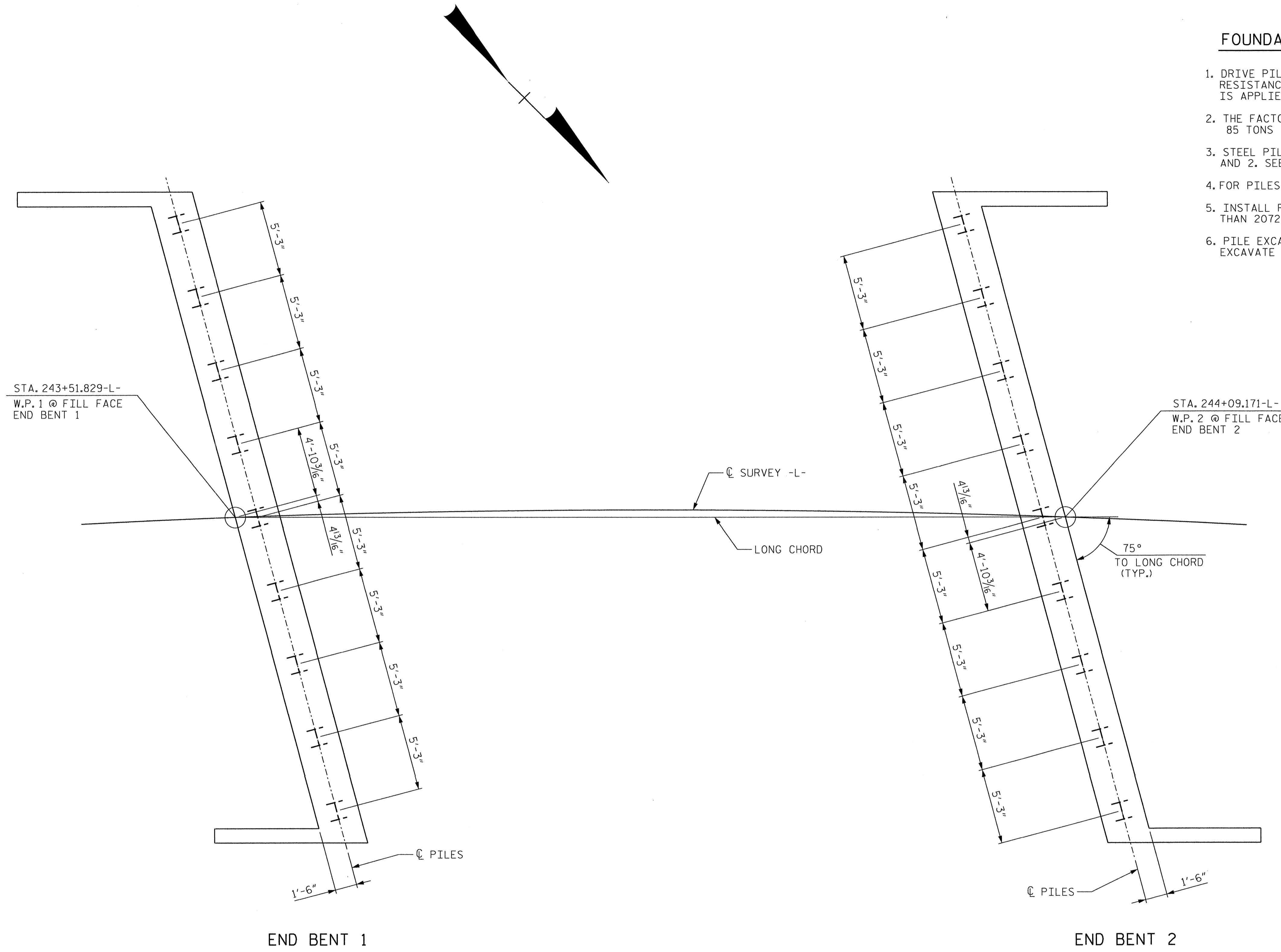
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			27
2			4			

DRAWN BY: RTJ DATE: 12/10
 CHECKED BY: NMW DATE: 12/10

PREPARED BY
 TGS ENGINEERS
 107-A WICA AVENUE
 MORGANTON, NC 28655

FOUNDATION NOTES:

1. DRIVE PILES AT END BENTS NO. 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 142 TONS PER PILE. A RESISTANCE FACTOR OF 0.6 IS APPLIED.
2. THE FACTORED RESISTANCE FOR PILES AT END BENTS 1 AND 2 IS 85 TONS PER PILE.
3. STEEL PILE POINTS ARE REQUIRED FOR H PILES AT END BENTS 1 AND 2. SEE PILE SPECIAL PROVISIONS.
4. FOR PILES, SEE SPECIAL PROVISIONS ATTACHED IN APPENDIX A.
5. INSTALL PILES AT END BENT 1 TO A TIP ELEVATION NO HIGHER THAN 2072 FEET, NAVD.
6. PILE EXCAVATION MAY BE REQUIRED TO INSTALL PILES AT END BENT 1. EXCAVATE HOLES TO ELEVATION 2072 FT. SEE PILE SPECIAL PROVISIONS.



FOUNDATION LAYOUT

ALL PILES ARE HP14x73 STEEL PILES.

NOTE:
DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF THE PILE.

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

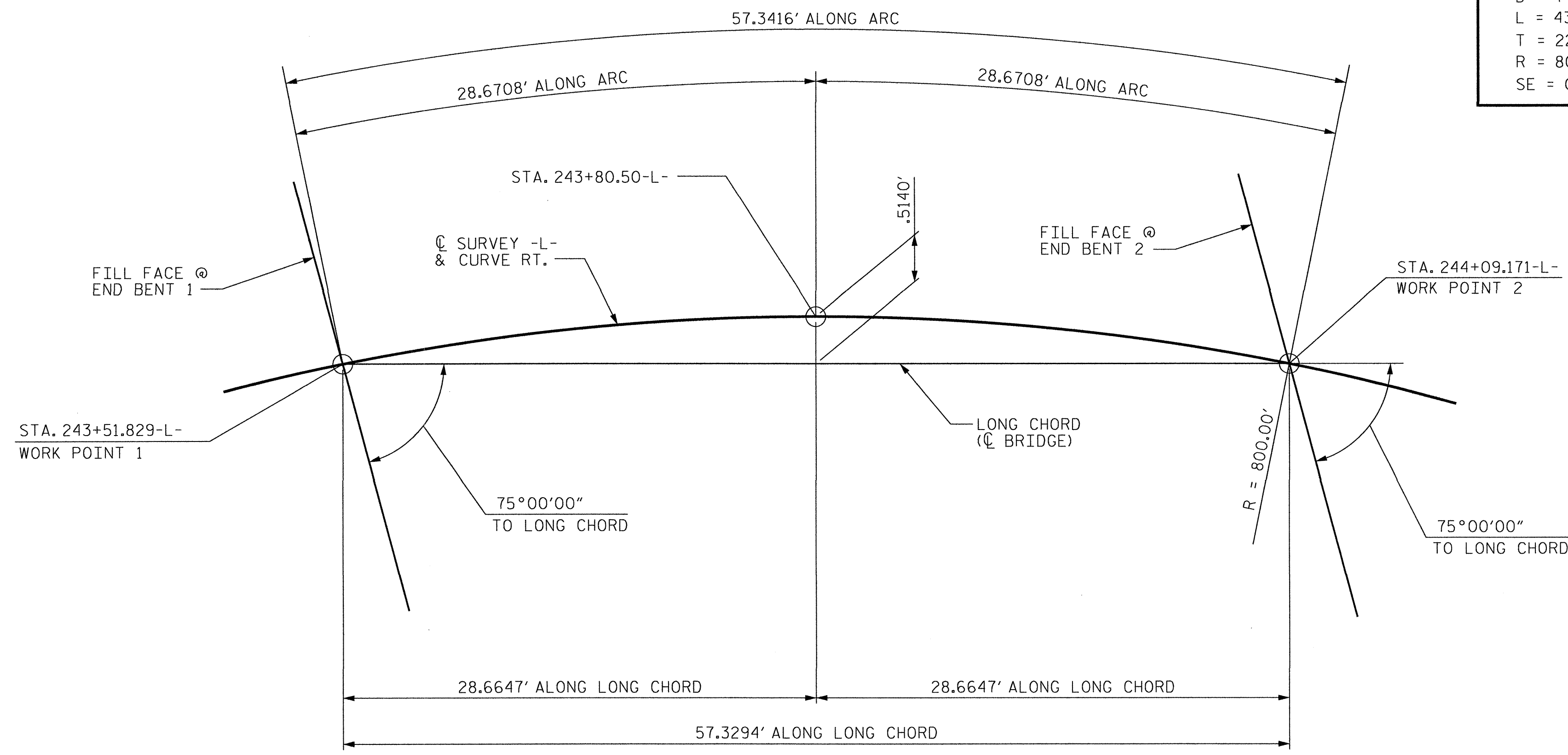
GENERAL DRAWING
 FOR BRIDGE ON
 HOWARD GAP RD. (SR 1006)
 OVER BYERS CREEK

DRAWN BY: RTJ DATE: 8/10
 CHECKED BY: NMW DATE: 5/11

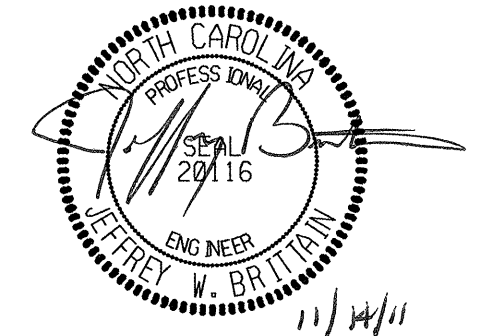
PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-2
1			3			TOTAL SHEETS
2			4			27

-L- HORIZ. CURVE DATA	
PI Sta	244+82.18
Δ	$31^{\circ} 28' 34.0''$ (RT)
D	$7^{\circ} 09' 43.1''$
L	439.49'
T	225.44'
R	800.00'
SE	0.04



LONG CHORD LAYOUT
NOTE: END BENTS ARE PARALLEL.



PROJECT NO. R-5207B
HENDERSON COUNTY
STATION: 243+80.50-L-

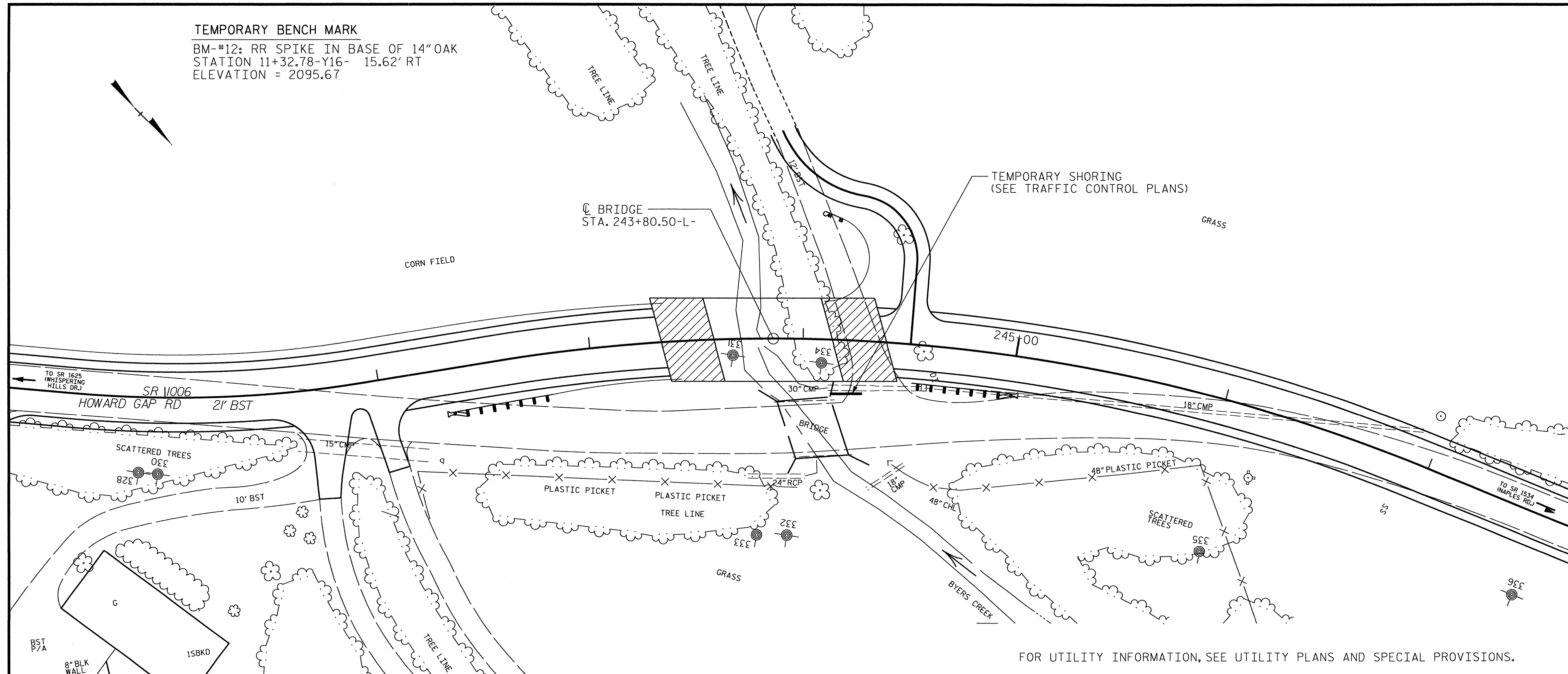
SHEET 3 OF 5
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE #22
ON HOWARD GAP RD. (SR 1006)
OVER BYERS CREEK

DRAWN BY: RTJ DATE: 05/11
CHECKED BY: NMW DATE: 06/11

PREPARED BY
TDS ENGINEERS
107-A MICA AVENUE
MORGANTON, NC 28655

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-3
1			3			TOTAL SHEETS
2			4			27

TEMPORARY BENCH MARK
 BM-#12: RR SPIKE IN BASE OF 14" OAK
 STATION 11+32.78-Y16- 15.62' RT
 ELEVATION = 2095.67



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

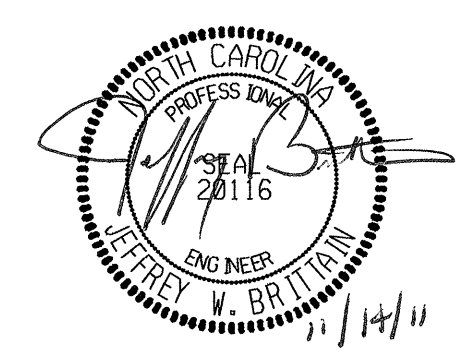
ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THE QUANTITY OF RIP RAP TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF TONS OF EACH CLASS OF RIP RAP WHICH HAS BEEN INCORPORATED INTO THE COMPLETED AND ACCEPTED WORK. THE RIP RAP WILL BE MEASURED BY BEING WEIGHED IN TRUCKS ON CERTIFIED PLATFORM SCALES OR OTHER CERTIFIED WEIGHING DEVICES. THE QUANTITY OF RIP RAP WILL BE PAID FOR AT THE CONTRACT UNIT PRICE.
 RIP RAP SHALL NOT BE PLACED UNDERNEATH THE BRIDGE.
 ADT 9430 FOR YEAR 2011.
 THE EXISTING STRUCTURE CONSISTING OF ONE 26'-2" SPAN, PLANK DECK ON STEEL I-BEAMS, SUPPORTED BY VERTICAL MASONRY ABUTMENTS AND LOCATED IN THE CROSS-HATCHED AREA AS SHOWN ON SHEET S-1, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR 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.
 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 CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR THE DISTANCE OF 30 FT. EACH SIDE OF THE LONG CHORD OF THE BRIDGE AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY 2001.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.
 FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

ITEM	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS "A" CONCRETE (BRIDGE)	BRIDGE APPROACH SLABS	REINFORCING STEEL (BRIDGE)			
	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	C.Y.	LUMP SUM	LBS.			
SUPERSTRUCTURE										
END BENT 1		45	59		38.9		3907			
END BENT 2					38.9		3908			
TOTALS	LUMP SUM	45	59	LUMP SUM	77.8	LUMP SUM	7815			

ITEM	HP14x73 STEEL PILES	STEEL PILE POINTS	TWO BAR METAL RAIL	1'-2" x 2'-9 3/4" CONCRETE PARAPET	RIP RAP, CLASS II (2'-0" THK.)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CORED SLABS		
	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	TON	S.Y.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE				94.4	110	--	--	LUMP SUM	13	715
END BENT 1	9	135	9			50	45			
END BENT 2	9	270	9			50	45			
TOTALS	18	405	18	94.4	110	100	90	LUMP SUM	13	715



PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOR BRIDGE #22
 ON HOWARD GAP RD. (SR 1006)
 OVER BYERS CREEK

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-4
1			3			TOTAL SHEETS
2			4			27

DRAWN BY: RTJ DATE: 05/11
 CHECKED BY: NMW DATE: 06/11

PREPARED BY
 TOS ENGINEERS
 107-A WICK AVE
 MORGANTON, NC 28655

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.065	--	1.75	0.27	1.25	55'	EL	26.982	0.616	1.12	55'	EL	5.396	0.80	0.27	1.07	55'	EL	26.982		
	HL-93(0pr)	N/A	--	1.452	--	1.35	0.27	1.61	55'	EL	26.982	0.616	1.45	55'	EL	5.396	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.335	48.043	1.75	0.27	1.56	55'	EL	26.982	0.616	1.34	55'	EL	5.396	0.80	0.27	1.33	55'	EL	26.982		
	HS-20(0pr)	36.000	--	1.734	62.425	1.35	0.27	2.02	55'	EL	26.982	0.616	1.73	55'	EL	5.396	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.802	37.83	1.4	0.27	4.09	55'	EL	26.982	0.616	3.81	55'	EL	5.396	0.80	0.27	2.80	55'	EL	26.982	
		SNGARBS2	20.000	--	2.175	43.506	1.4	0.27	3.18	55'	EL	26.982	0.616	2.76	55'	EL	5.396	0.80	0.27	2.18	55'	EL	26.982	
		SNAGRIS2	22.000	--	2.099	46.173	1.4	0.27	3.07	55'	EL	26.982	0.616	2.58	55'	EL	5.396	0.80	0.27	2.10	55'	EL	26.982	
		SNCOTTS3	27.250	--	1.397	38.065	1.4	0.27	2.04	55'	EL	26.982	0.616	1.91	55'	EL	5.396	0.80	0.27	1.40	55'	EL	26.982	
		SNAGGRS4	34.925	--	1.2	41.922	1.4	0.27	1.75	55'	EL	26.982	0.616	1.62	55'	EL	5.396	0.80	0.27	1.20	55'	EL	26.982	
		SNS5A	35.550	--	1.172	41.648	1.4	0.27	1.71	55'	EL	26.982	0.616	1.66	55'	EL	5.396	0.80	0.27	1.17	55'	EL	26.982	
		SNS6A	39.950	--	1.089	43.514	1.4	0.27	1.59	55'	EL	26.982	0.616	1.53	55'	EL	5.396	0.80	0.27	1.09	55'	EL	26.982	
	TTST	SNS7B	42.000	--	1.038	43.587	1.4	0.27	1.52	55'	EL	26.982	0.616	1.53	55'	EL	5.396	0.80	0.27	1.04	55'	EL	26.982	
		TNAGRIT3	33.000	--	1.333	43.973	1.4	0.27	1.95	55'	EL	26.982	0.616	1.81	55'	EL	5.396	0.80	0.27	1.33	55'	EL	26.982	
		TNT4A	33.075	--	1.342	44.4	1.4	0.27	1.96	55'	EL	26.982	0.616	1.75	55'	EL	5.396	0.80	0.27	1.34	55'	EL	26.982	
		TNT6A	41.600	--	1.112	46.252	1.4	0.27	1.62	55'	EL	26.982	0.616	1.67	55'	EL	5.396	0.80	0.27	1.11	55'	EL	26.982	
		TNT7A	42.000	--	1.125	47.255	1.4	0.27	1.64	55'	EL	26.982	0.616	1.56	55'	EL	5.396	0.80	0.27	1.13	55'	EL	26.982	
		TNT7B	42.000	--	1.174	49.318	1.4	0.27	1.72	55'	EL	26.982	0.616	1.47	55'	EL	5.396	0.80	0.27	1.17	55'	EL	26.982	
		TNAGRIT4	43.000	--	1.111	47.786	1.4	0.27	1.62	55'	EL	26.982	0.616	1.42	55'	EL	5.396	0.80	0.27	1.11	55'	EL	26.982	
TNAGT5A	45.000	--	1.041	46.851	1.4	0.27	1.52	55'	EL	26.982	0.616	1.44	55'	EL	5.396	0.80	0.27	1.04	55'	EL	26.982			
TNAGT5B	45.000	3	1.023	46.02	1.4	0.27	1.49	55'	EL	26.982	0.616	1.35	55'	EL	5.396	0.80	0.27	1.02	55'	EL	26.982			

LOAD FACTORS:

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

NOTES:

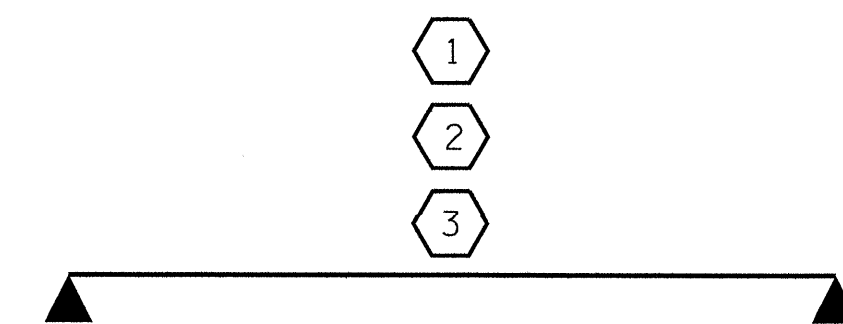
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

COMMENTS:

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

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



LRFR SUMMARY
FOR SPAN 'A'

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 5 OF 5



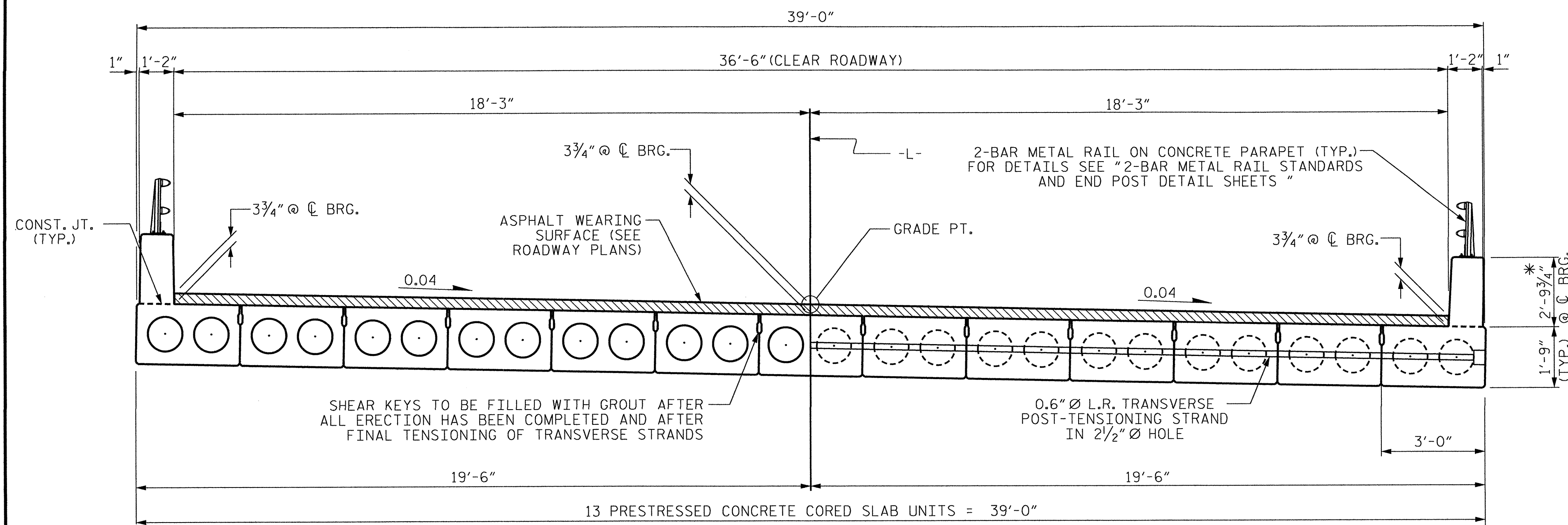
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 55' CORED SLAB UNIT
 75° SKEW & 105° SKEW
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : NMW	DATE : 5/11
CHECKED BY : RTJ	DATE : 6/11
DRAWN BY : CVC 6/10	
CHECKED BY : DNS 6/10	

PREPARED BY
 TGS ENGINEERS
 107-A WICA AVENUE
 MORGANTON, NC 28655

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	27
1			3			
2			4			

SHEET NO.
 S-5

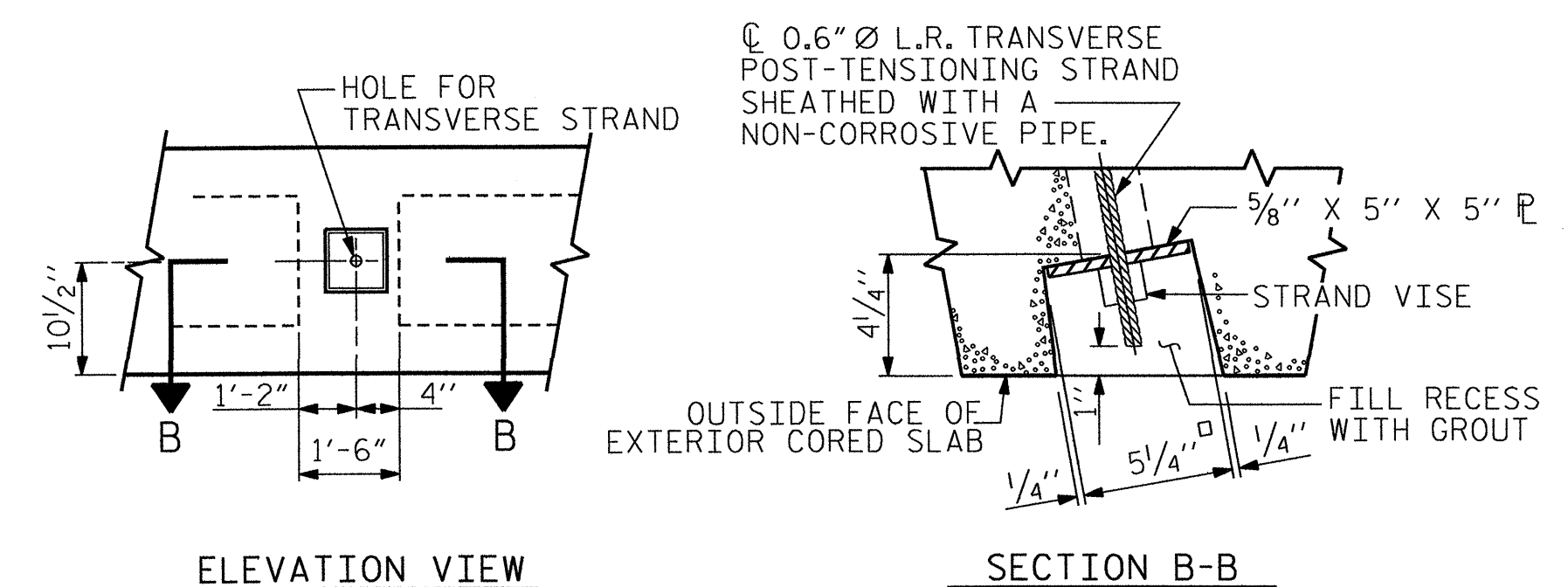


HALF SECTION THROUGH VOIDS

HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

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



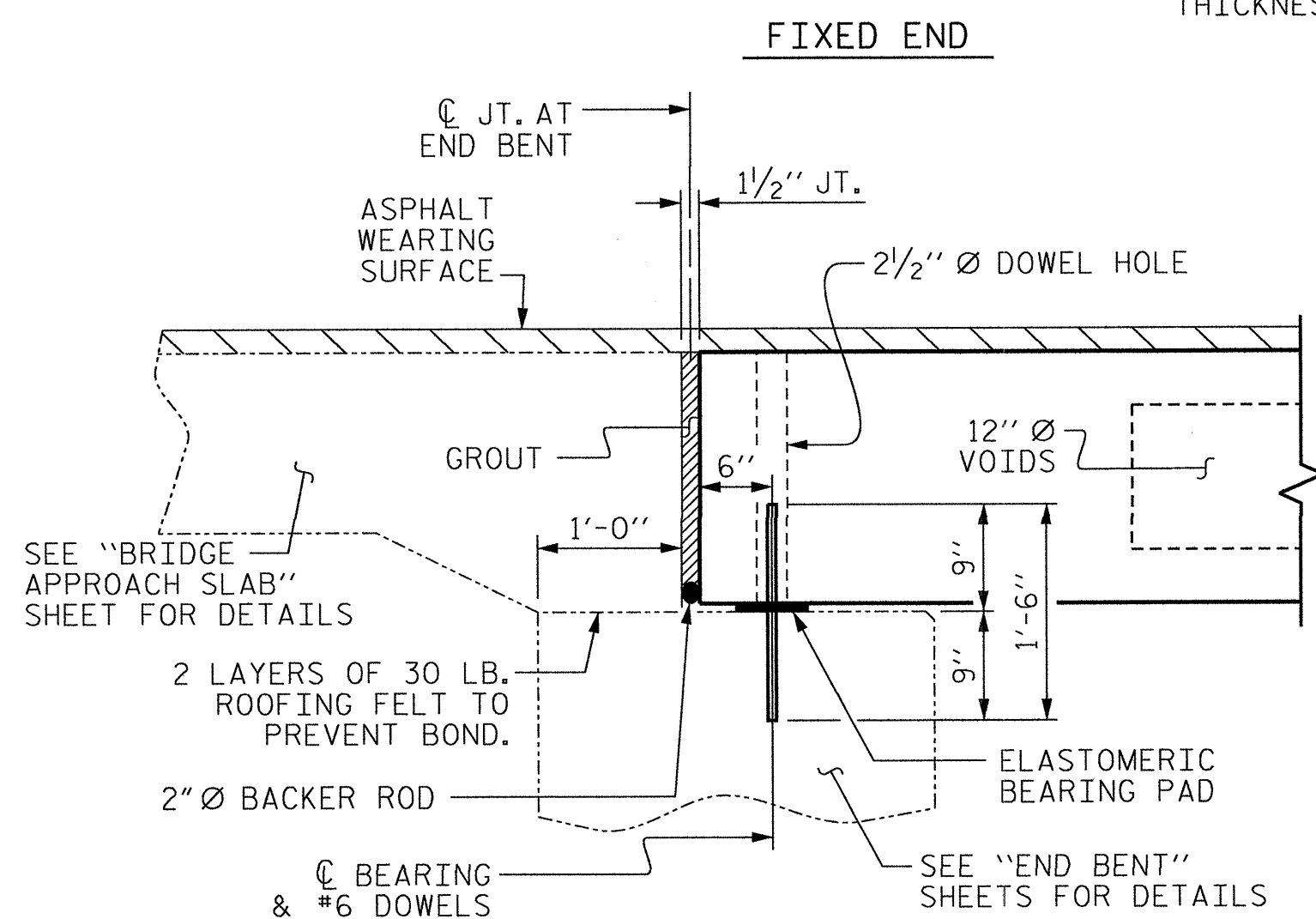
ELEVATION VIEW

SECTION B-B

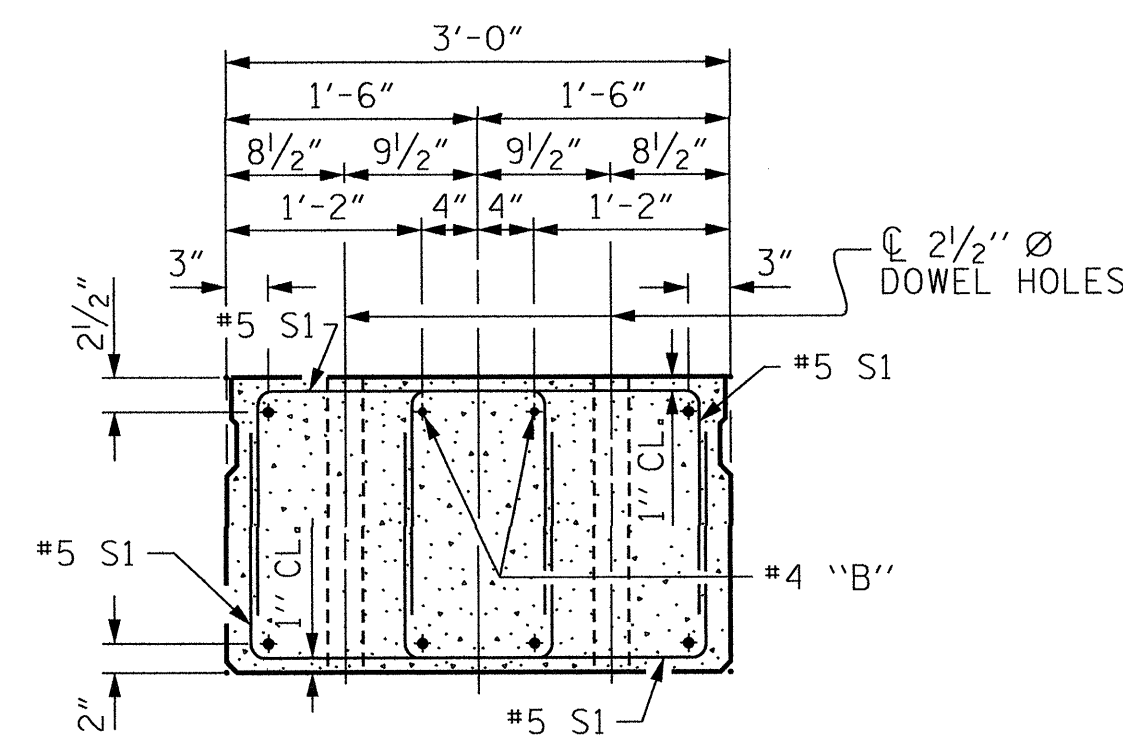
GRAUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

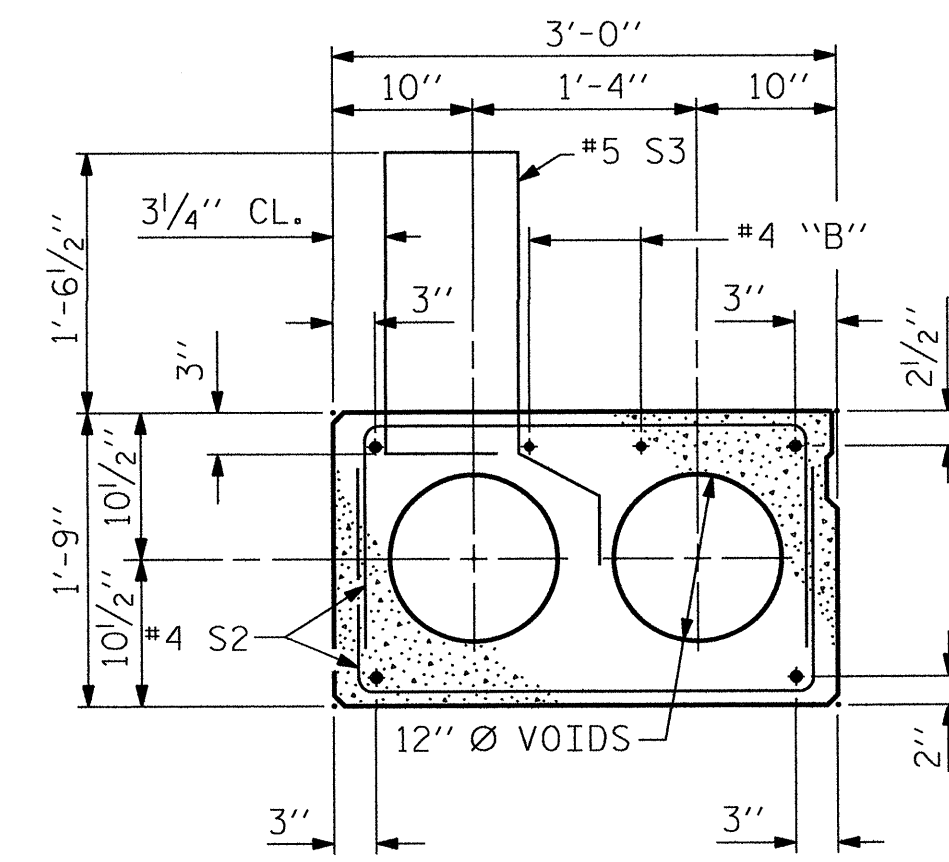


SECTION AT END BENT



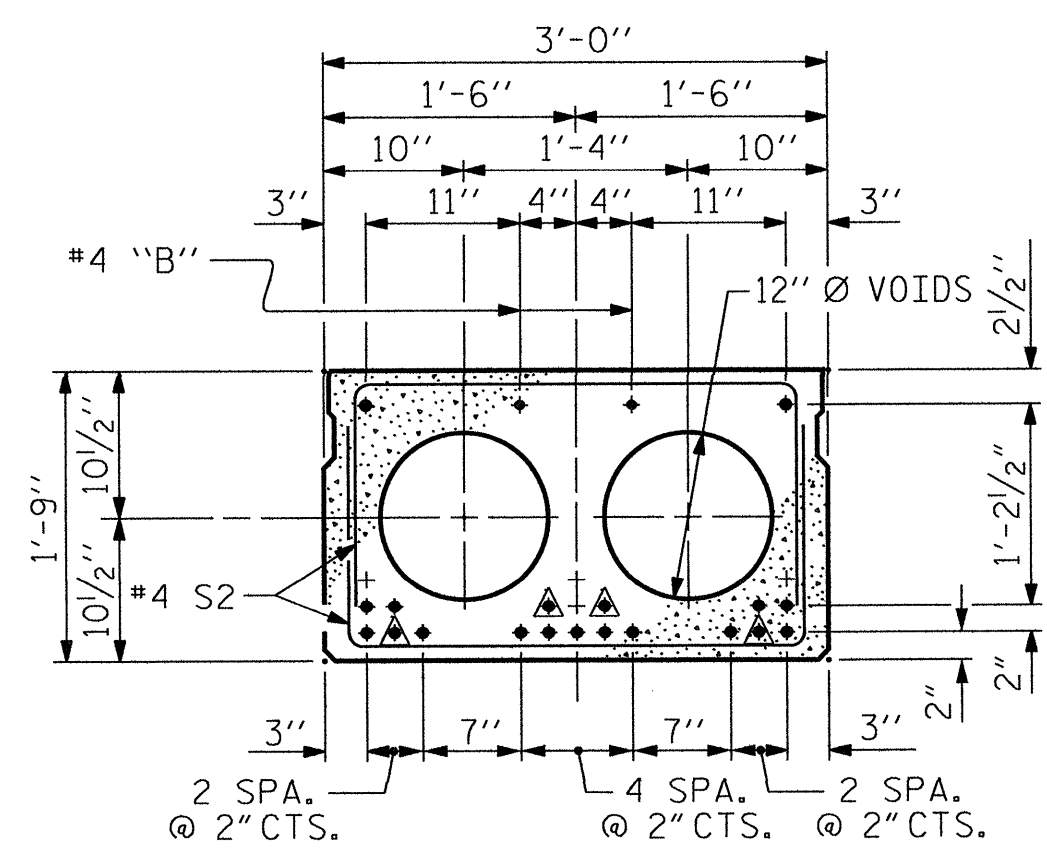
END ELEVATION

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



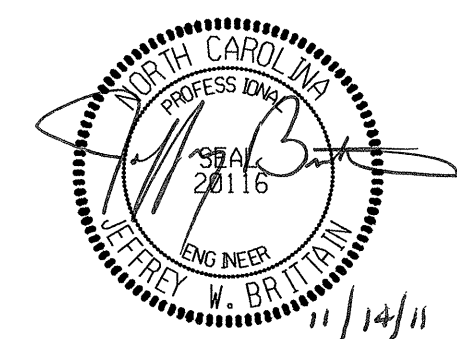
EXTERIOR SLAB SECTION

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



STRAND LAYOUT FOR 55' UNIT (19 STRANDS REQUIRED)

INTERIOR SLAB SECTION 0.6" Ø LOW RELAXATION



PROJECT NO. R-5207B
 HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 1 OF 2

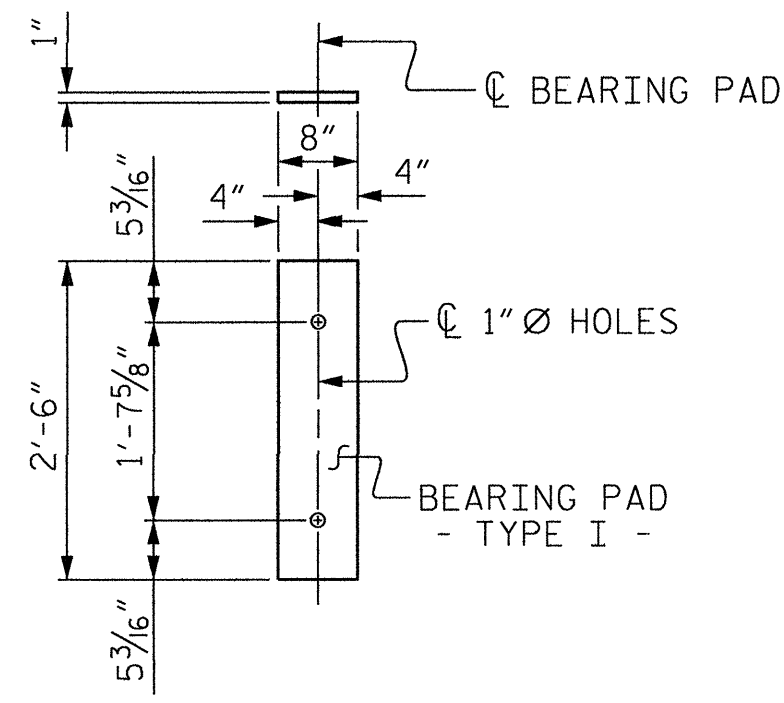
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 3'-0" X 1'-9"
 PRESTRESSED CONCRETE
 CORED SLAB UNIT
 75° SKEW

ASSEMBLED BY : NMW	DATE : 5/11
CHECKED BY : JLA	DATE : 5/11
DRAWN BY : DGE 6/09	
CHECKED BY : BCH 6/09	

PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

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

TOTAL SHEETS 27



FIXED END
(TYPE I - 26 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

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

CORED SLABS REQUIRED			
55' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	55'-0"	110'-0"
INTERIOR C.S.	11	55'-0"	605'-0"
TOTAL			715'-0"

DEAD LOAD DEFLECTION AND CAMBER EXTERIOR CORED SLAB SECTION

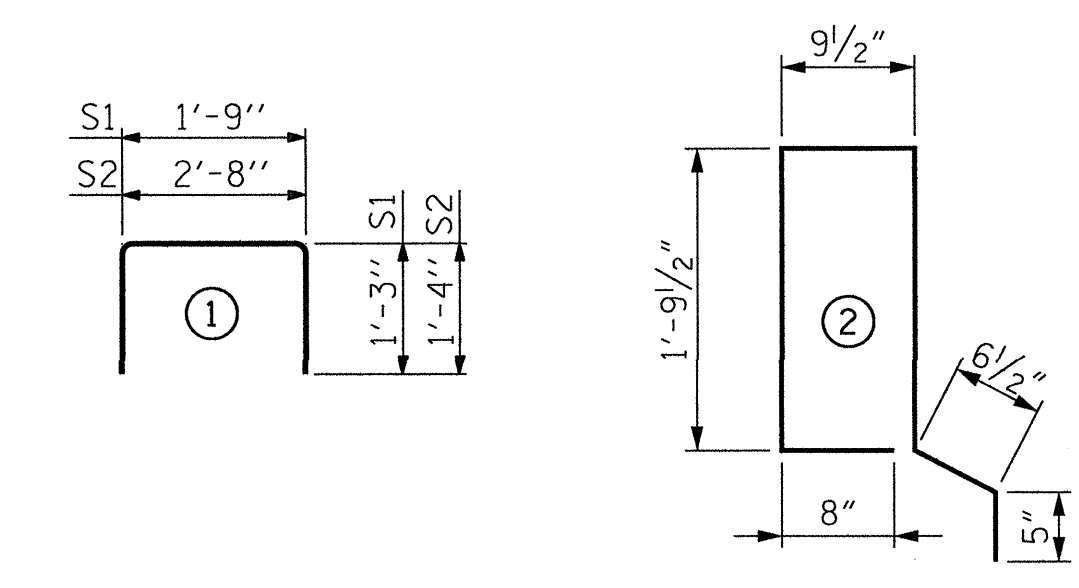
55' CORED SLAB UNIT	3'-0" x 1'-9" 0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2 7/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/2" ↓
FINAL CAMBER	2 3/8" ↑

DEAD LOAD DEFLECTION AND CAMBER INTERIOR CORED SLAB SECTION

55' CORED SLAB UNIT	3'-0" x 1'-9" 0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2 3/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/2" ↓
FINAL CAMBER	2 5/16" ↑

** INCLUDES FUTURE WEARING SURFACE

BAR TYPES



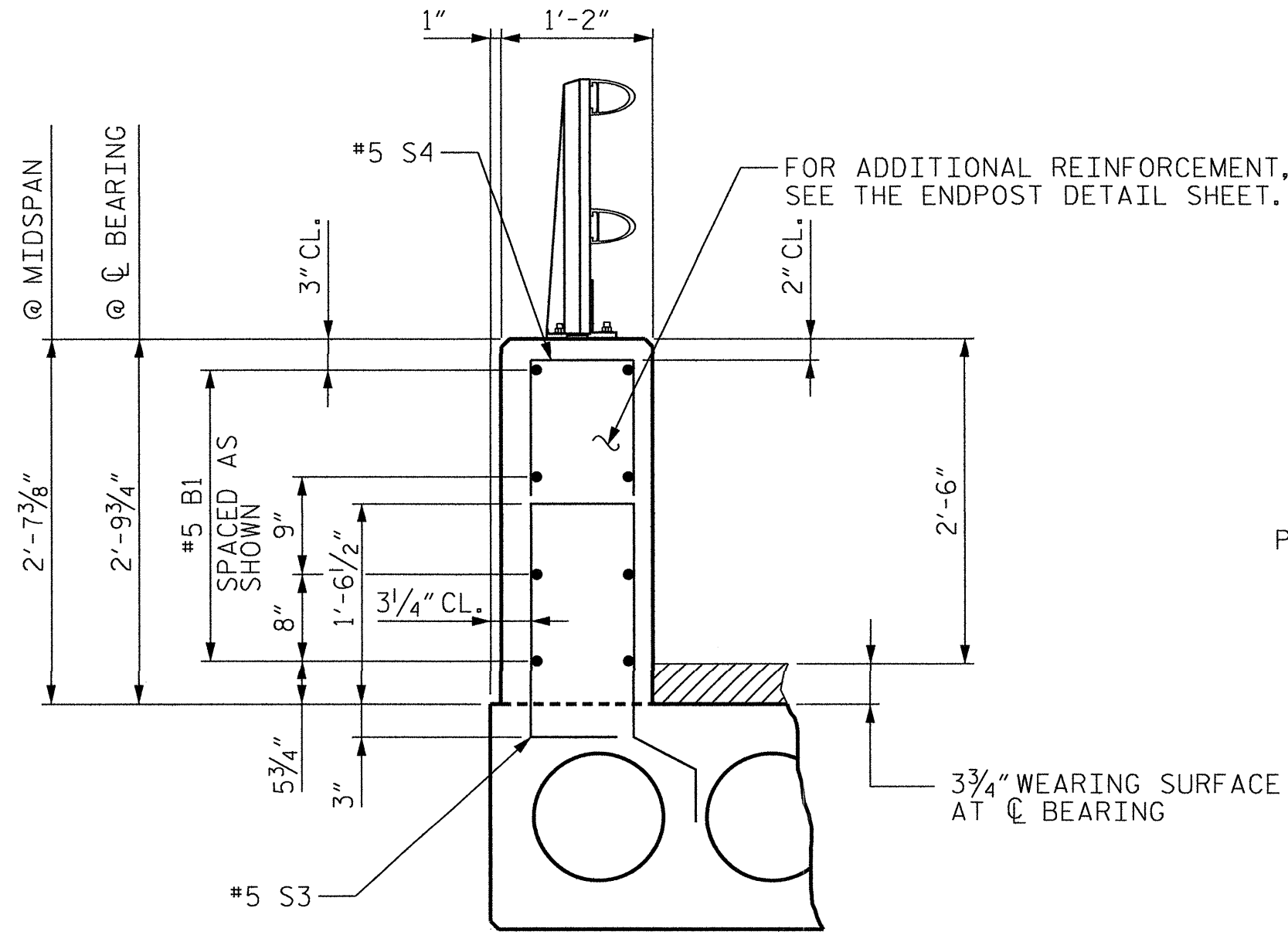
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	1	4'-3"	35	4'-3"	35
S2	128	#4	1	5'-4"	456	5'-4"	456
* S3	58	#5	2	6'-0"	363		
REINFORCING STEEL				LBS.	566		566
* EPOXY COATED REINFORCING STEEL				LBS.	363		
6500 P.S.I. CONCRETE				CU. YDS.	7.9		7.9
0.6" Ø L.R. STRANDS				No.	19		19

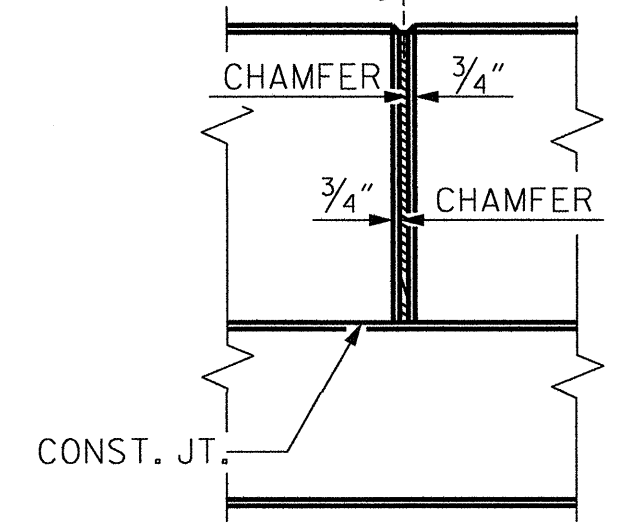
GUTTERLINE ASPHALT THICKNESS & PARAPET HEIGHT

36'-6" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS:	PARAPET HEIGHT
	@ MID-SPAN SUPERED SECTION	@ MID-SPAN
55' UNITS	1 3/8"	2'-7 3/8"



SECTION THRU PARAPET

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



ELEVATION AT EXPANSION JOINTS

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, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX 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.

ALL REINFORCING STEEL IN THE 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.

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

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE STRANDS SHALL BE 0.6" Ø AND TENSIONED TO 43,950 POUNDS.

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 THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

CONCRETE RELEASE STRENGTH

UNIT	PSI
55' UNITS	4900

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 2 OF 2



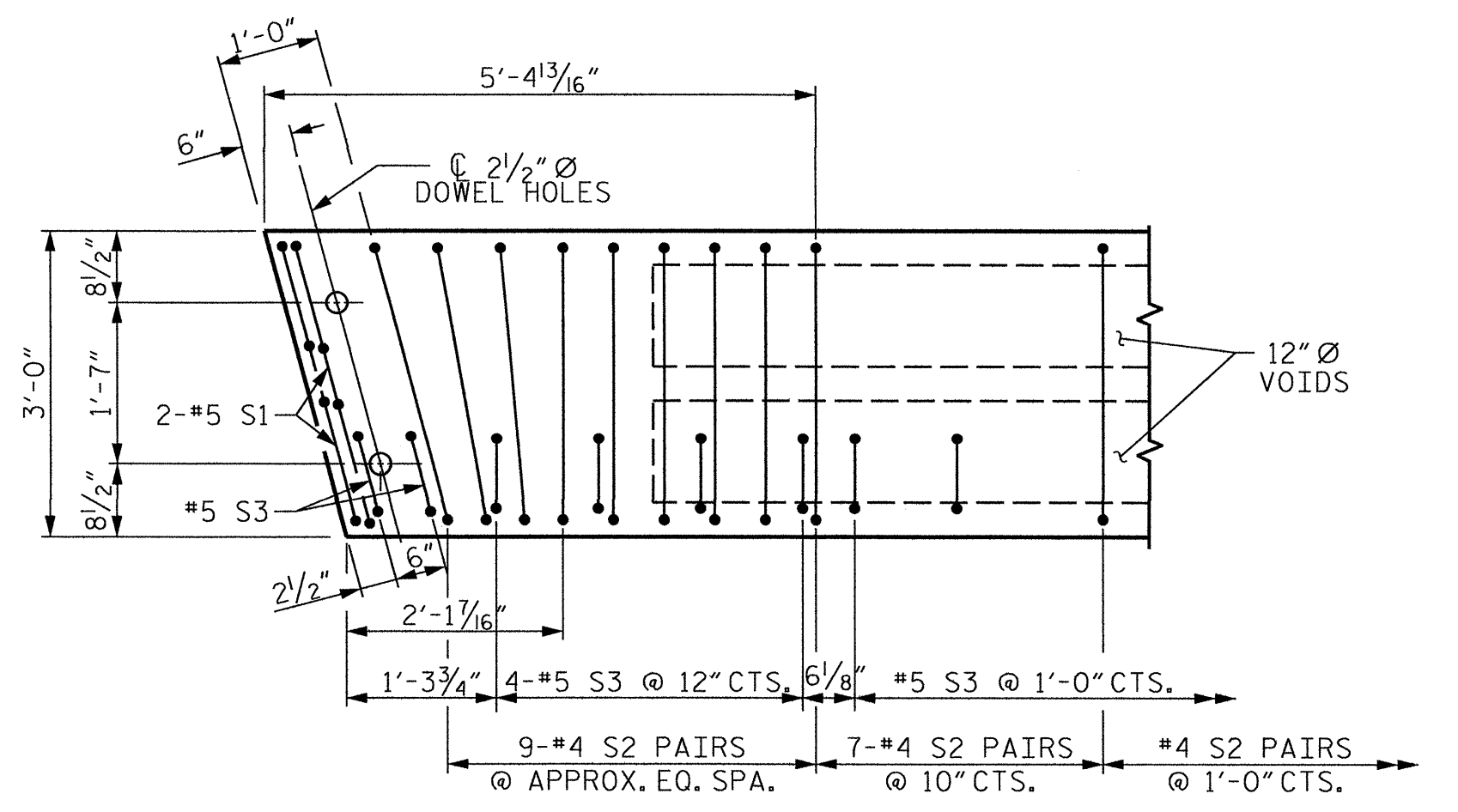
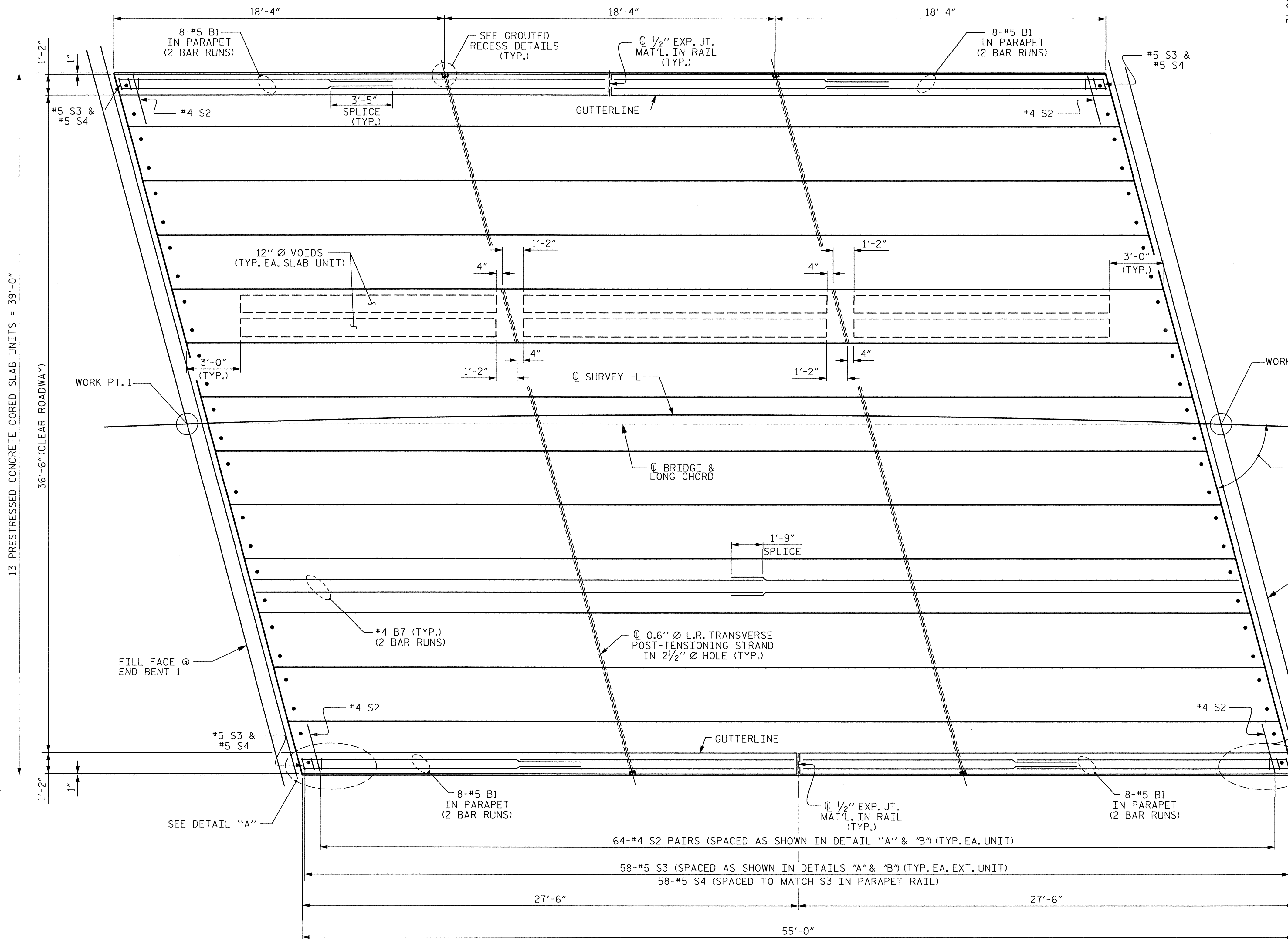
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 3'-0" X 1'-9"
 PRESTRESSED CONCRETE
 CORED SLAB UNIT
 75° SKEW

ASSEMBLED BY : NMW	DATE : 5/11
CHECKED BY : JLA	DATE : 5/11
DRAWN BY : DGE 5/09	
CHECKED BY : BCH 6/09	

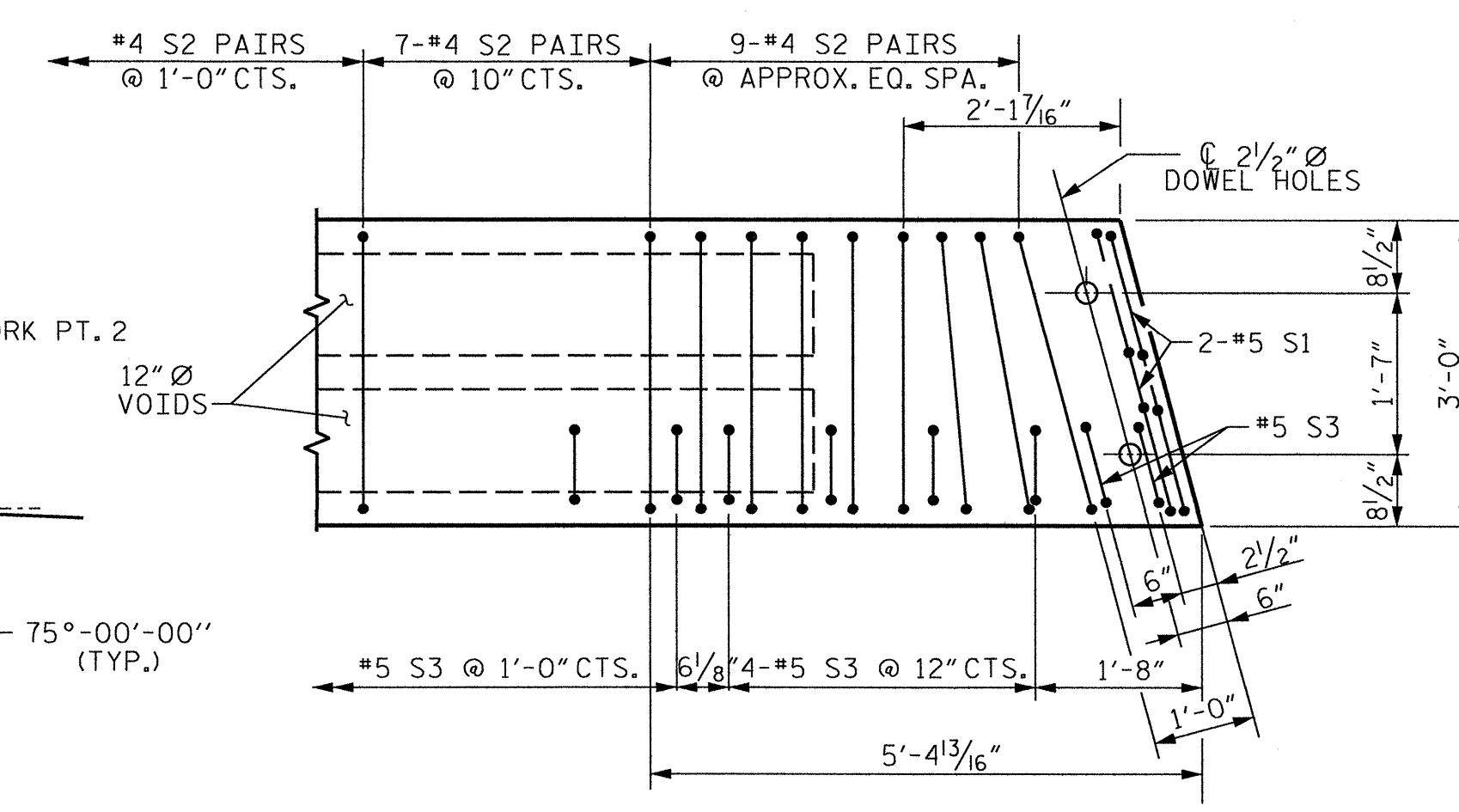
PREPARED BY
 TGS ENGINEERS
 107-A WICA AVENUE
 MORGANTON, NC 28655

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

TOTAL SHEETS: 27



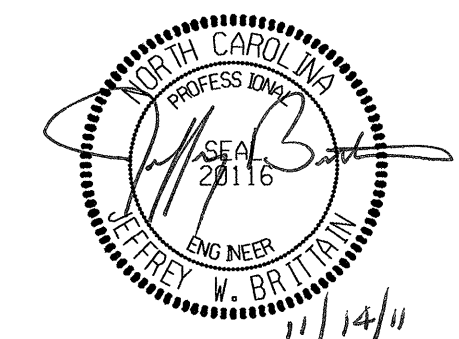
DETAIL "A"
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



DETAIL "B"
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PLAN OF UNIT

PROJECT NO. R-5207B
 HENDERSON COUNTY
 STATION: 243+80.50-L-

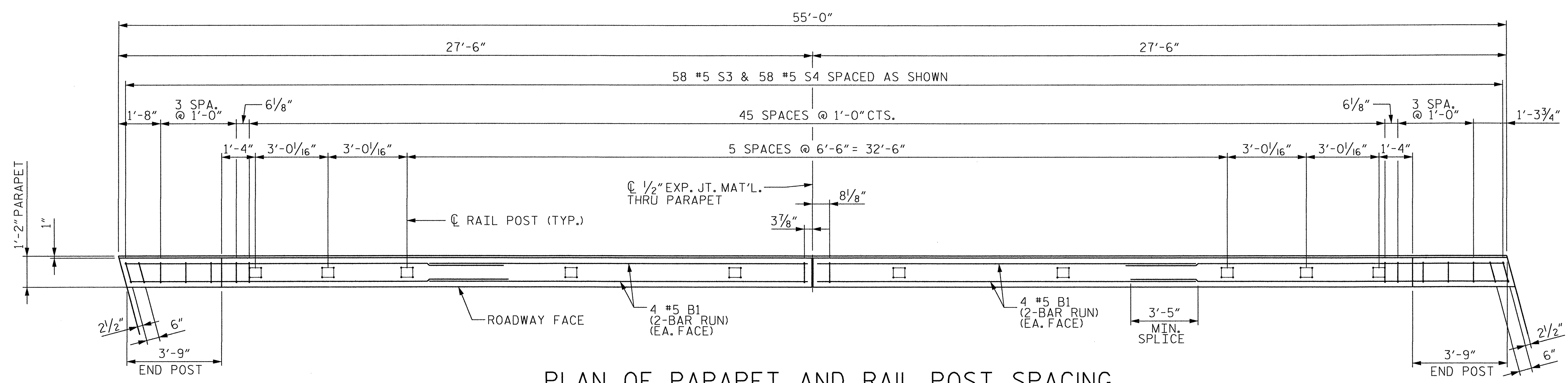


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 PLAN OF 55' UNIT
 36'-10" CLEAR ROADWAY
 75° SKEW

ASSEMBLED BY :	NMW	DATE :	5/11
CHECKED BY :	JLA	DATE :	5/11
DRAWN BY :	DGE 6/09		
CHECKED BY :	BCH 6/09		

PREPARED BY
 TGS ENGINEERS
 107-A WICK AVE
 MORGANTON, NC 28655

REVISIONS						SHEET NO. S-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 27
2			4			



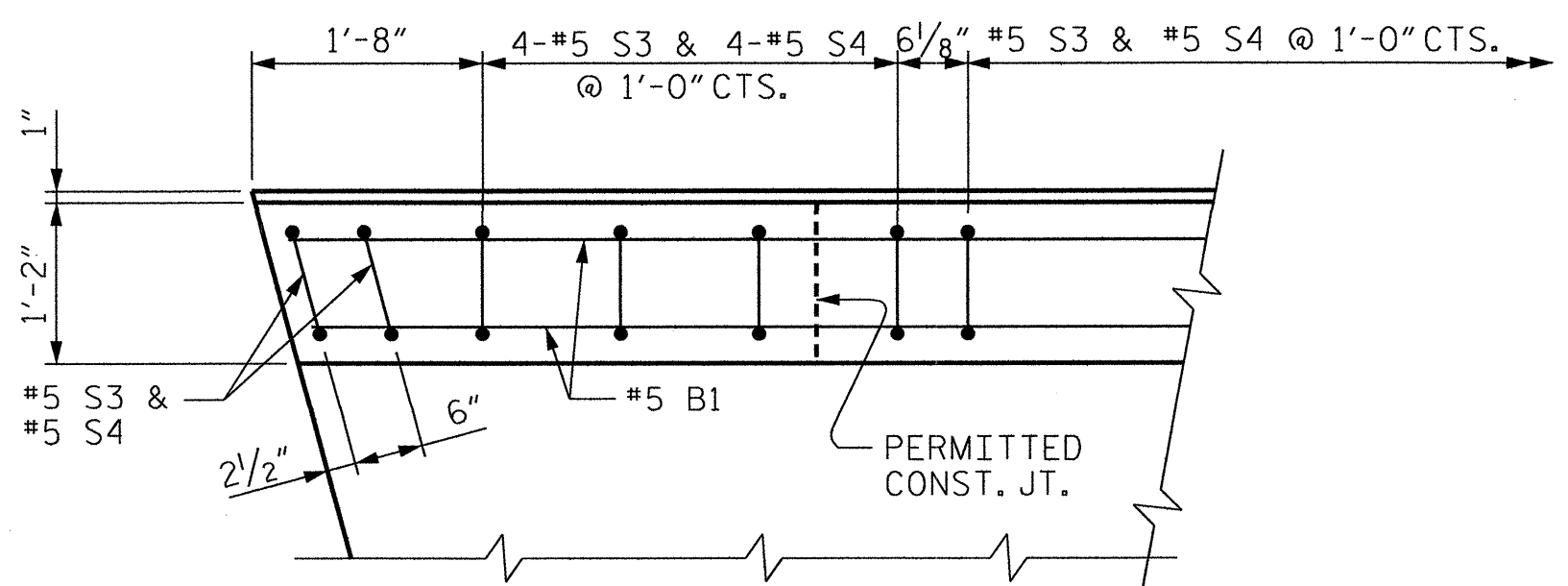
PLAN OF PARAPET AND RAIL POST SPACING

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR.

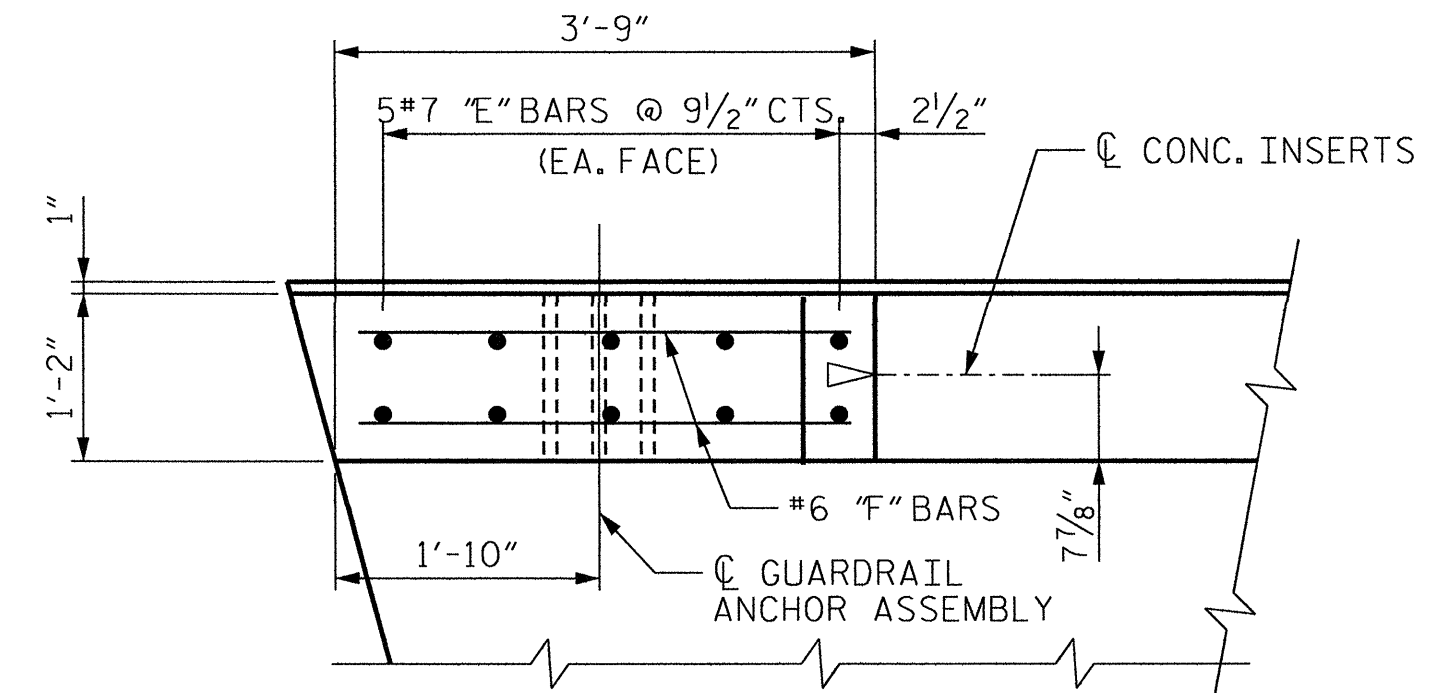
NOTES:

QUANTITIES FOR THE #5 S3 BARS ARE SHOWN IN THE CORED SLAB BILL OF MATERIAL.

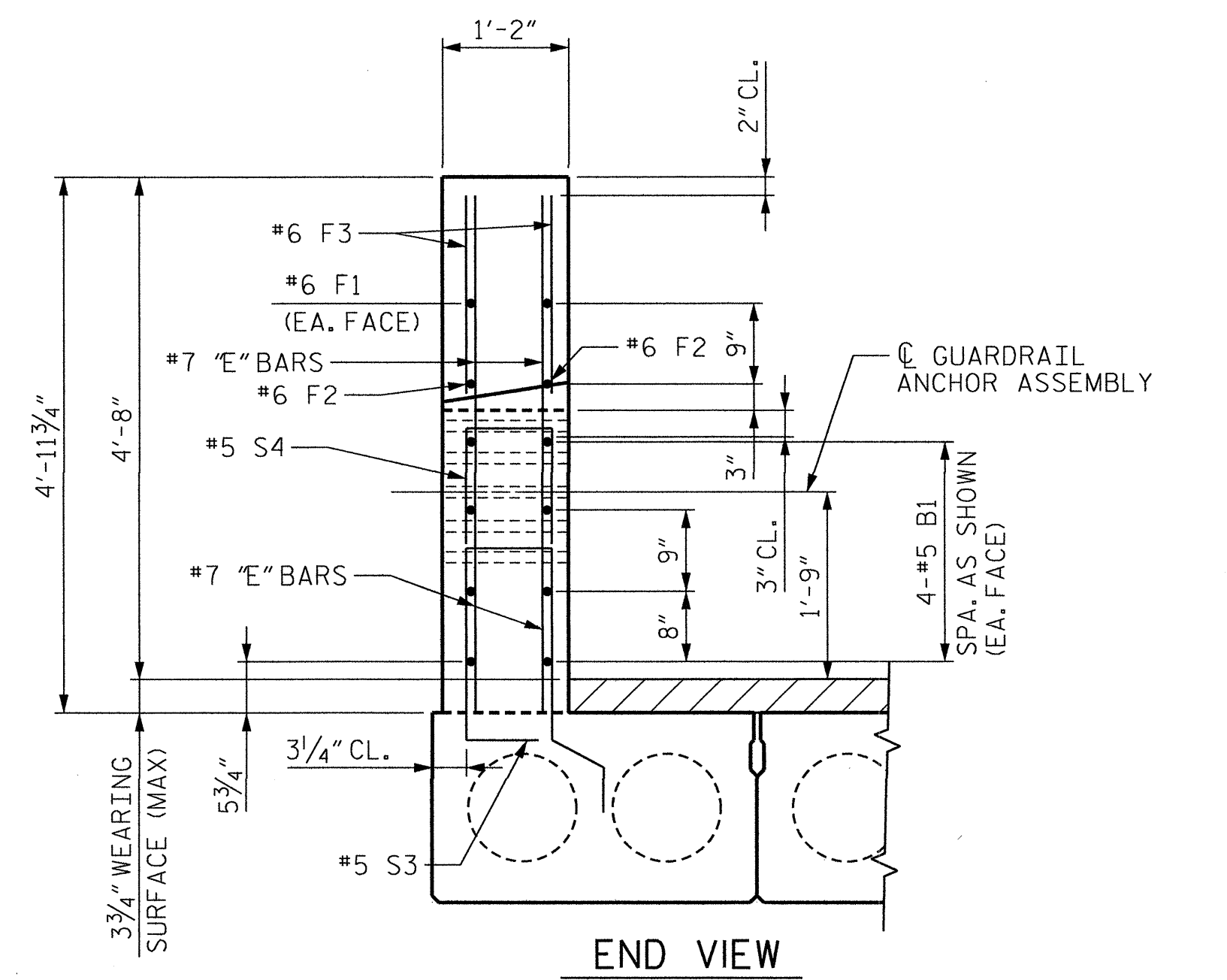
ALL REINFORCING STEEL IN PARAPETS AND END POSTS SHALL BE EPOXY COATED.



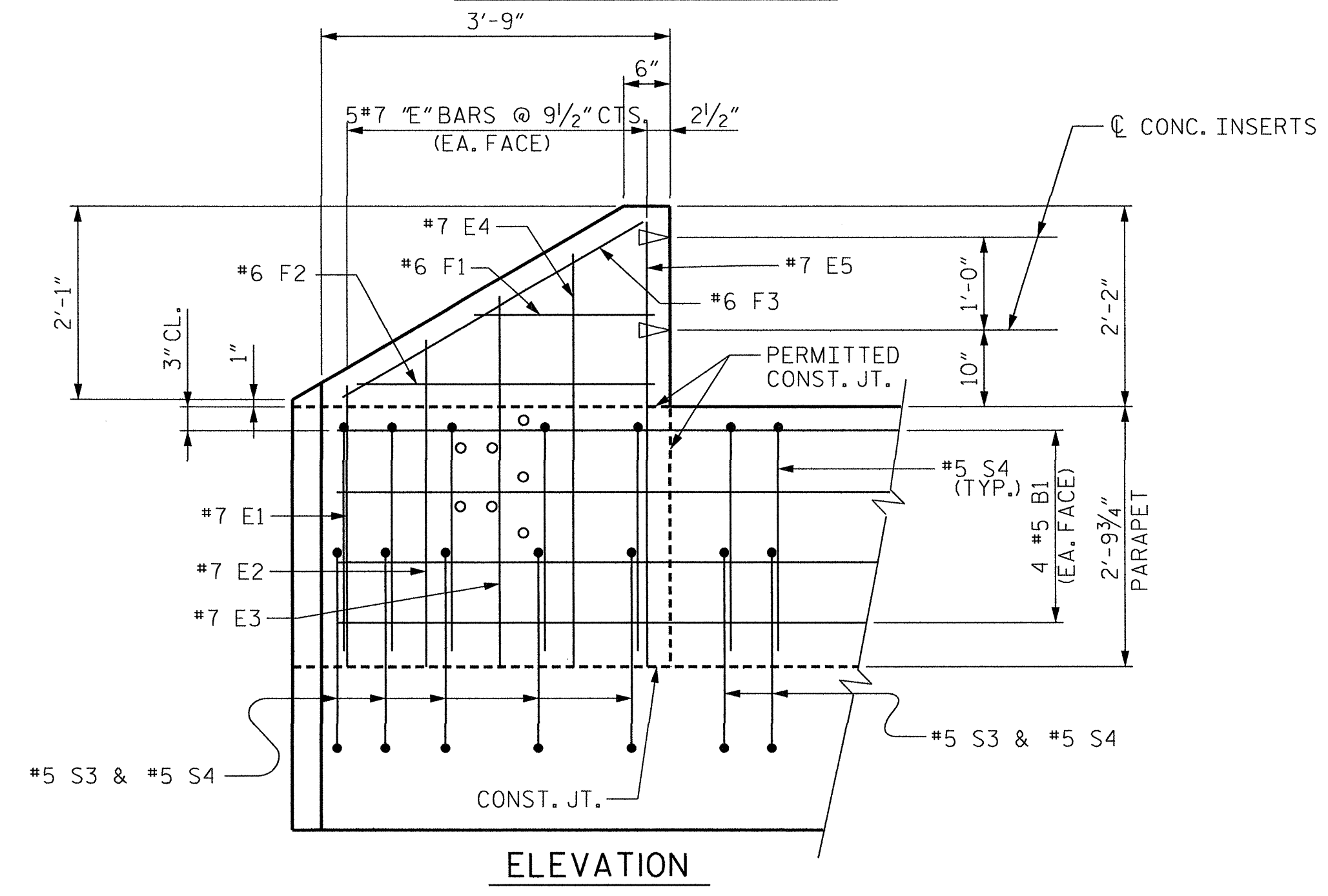
PLAN OF PARAPET



PLAN OF END POST



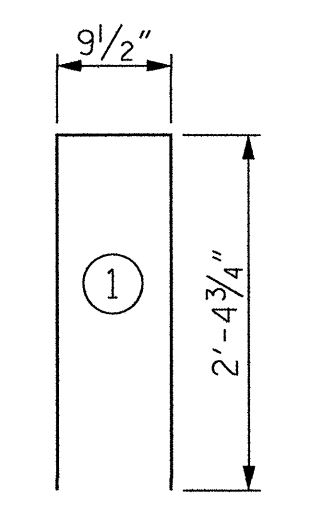
END VIEW



ELEVATION

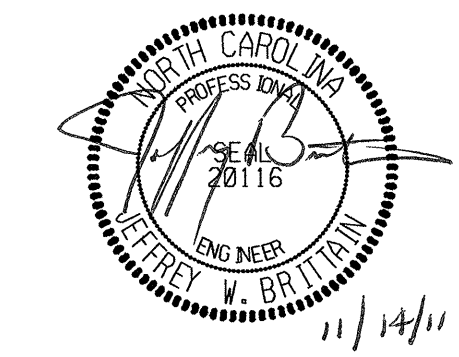
TWO BAR METAL RAIL					
BILL OF MATERIAL FOR 2 PARAPET AND 4 END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	64	#5	STR.	15'-5"	1029
* E1	4	#7	STR.	3'-0"	49
* E2	4	#7	STR.	3'-6"	57
* E3	4	#7	STR.	4'-0"	65
* E4	4	#7	STR.	4'-5"	72
* E5	4	#7	STR.	4'-9"	78
* F1	4	#6	STR.	1'-11"	23
* F2	4	#6	STR.	3'-2"	38
* F3	4	#6	STR.	3'-9"	45
* S4	58	#5	1	5'-7"	676
* EPOXY COATED REINFORCING STEEL					2132 LBS.
CLASS "AA" CONCRETE					14.3 C.Y.
1'-2" x 2'-9 3/4" CONCRETE PARAPET					110.0 L.F.

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-5207B
 HENDERSON COUNTY
 STATION: 243+80.50-L-



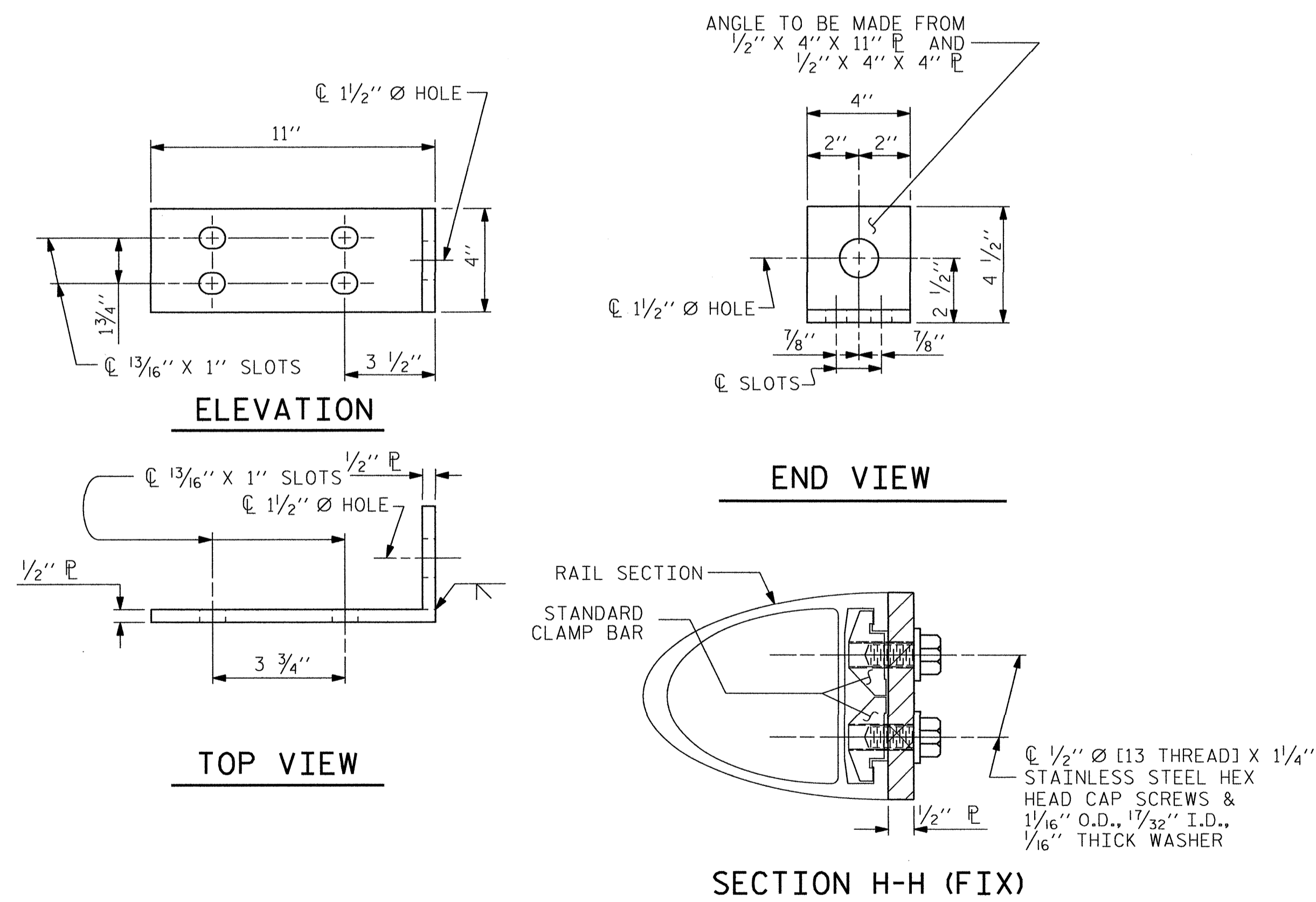
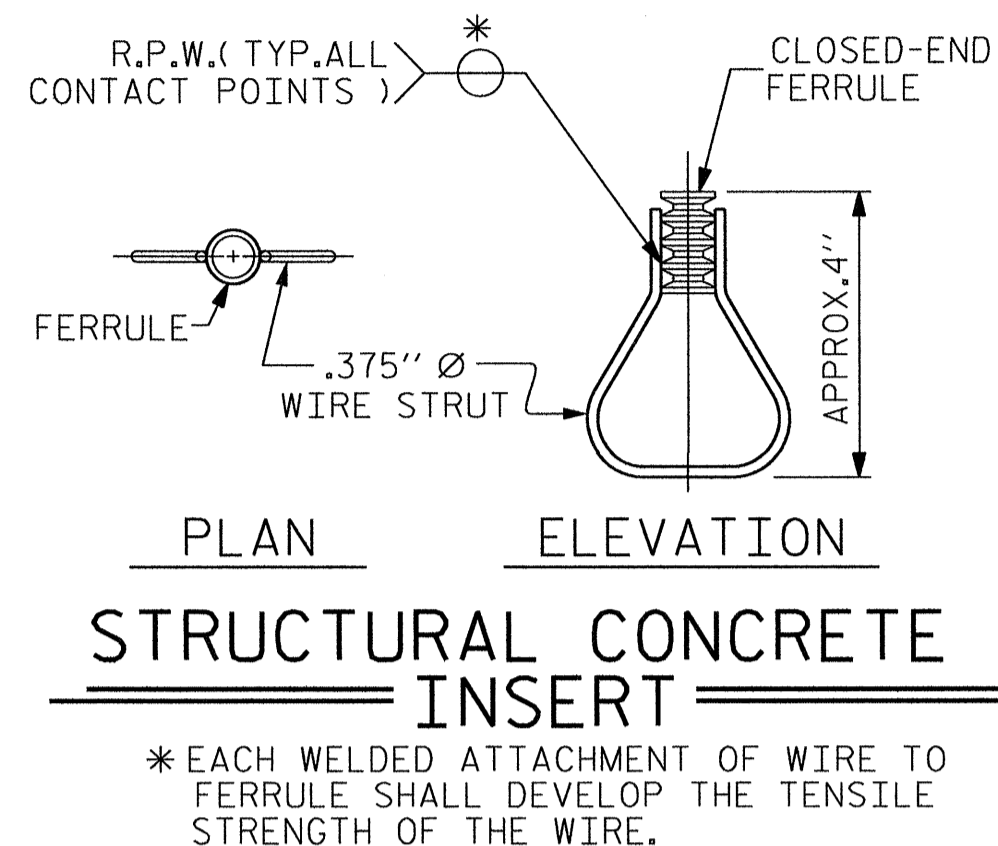
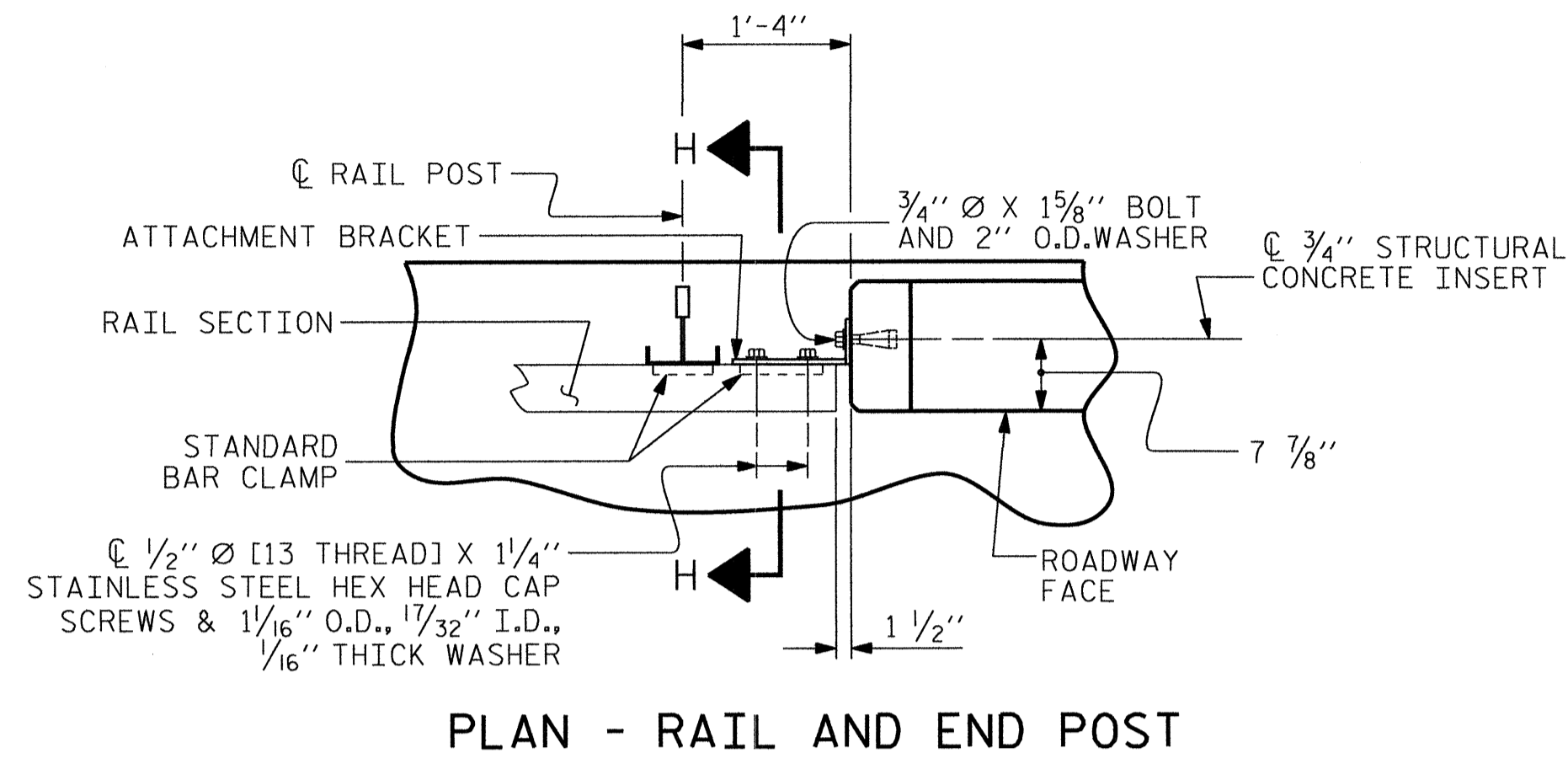
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END POST DETAILS
 PARAPET DETAILS
 RAIL POST SPACING

DRAWN BY: RTJ/JLA DATE: 2/11
 CHECKED BY: NMW DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A WICA AVENUE
 MORGANTON, NC 28655

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-9
1			3			TOTAL SHEETS
2			4			27



DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES
STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 - 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.)
 - 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:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - 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.
 - 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°.
 - STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

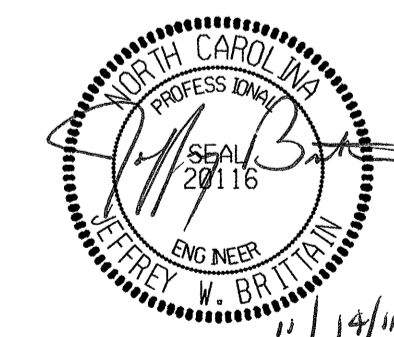
THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

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.



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HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 1 OF 3

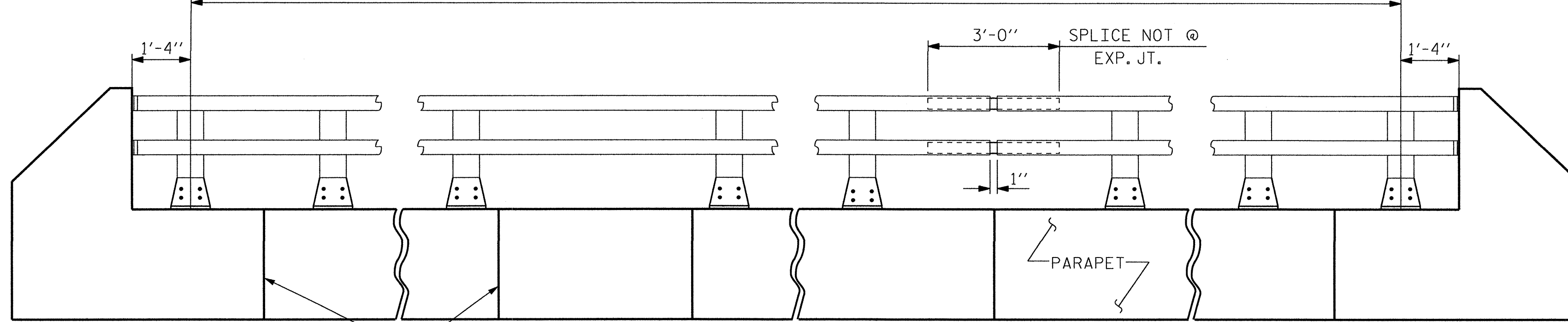
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 END OF RAIL DETAILS
 FOR ONE OR TWO BAR METAL RAILS

DRAWN BY: RTJ DATE: 5/11
 CHECKED BY: NMW DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A WICA AVENUE
 MORGANTON, NC 28655

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			27
2			4			

SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET



TOOLED CONTRACTION JT.
(SEE NOTES)

ELEVATION

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

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.

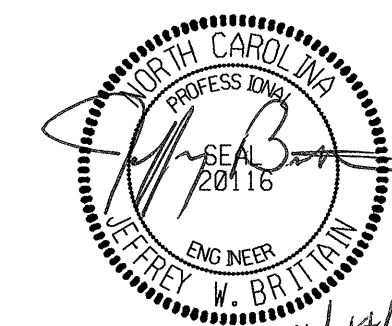
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 94.375 LIN. FT.

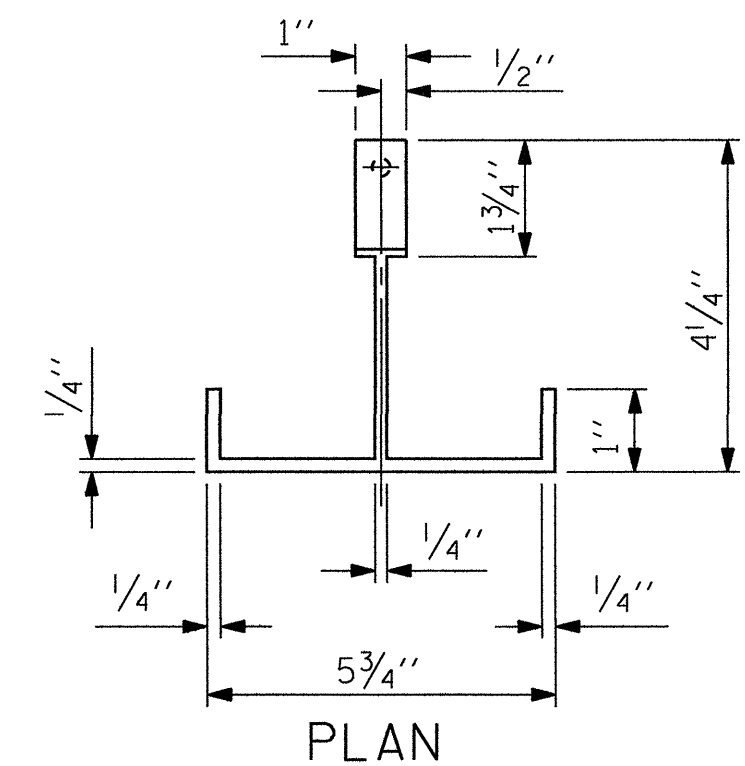


PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

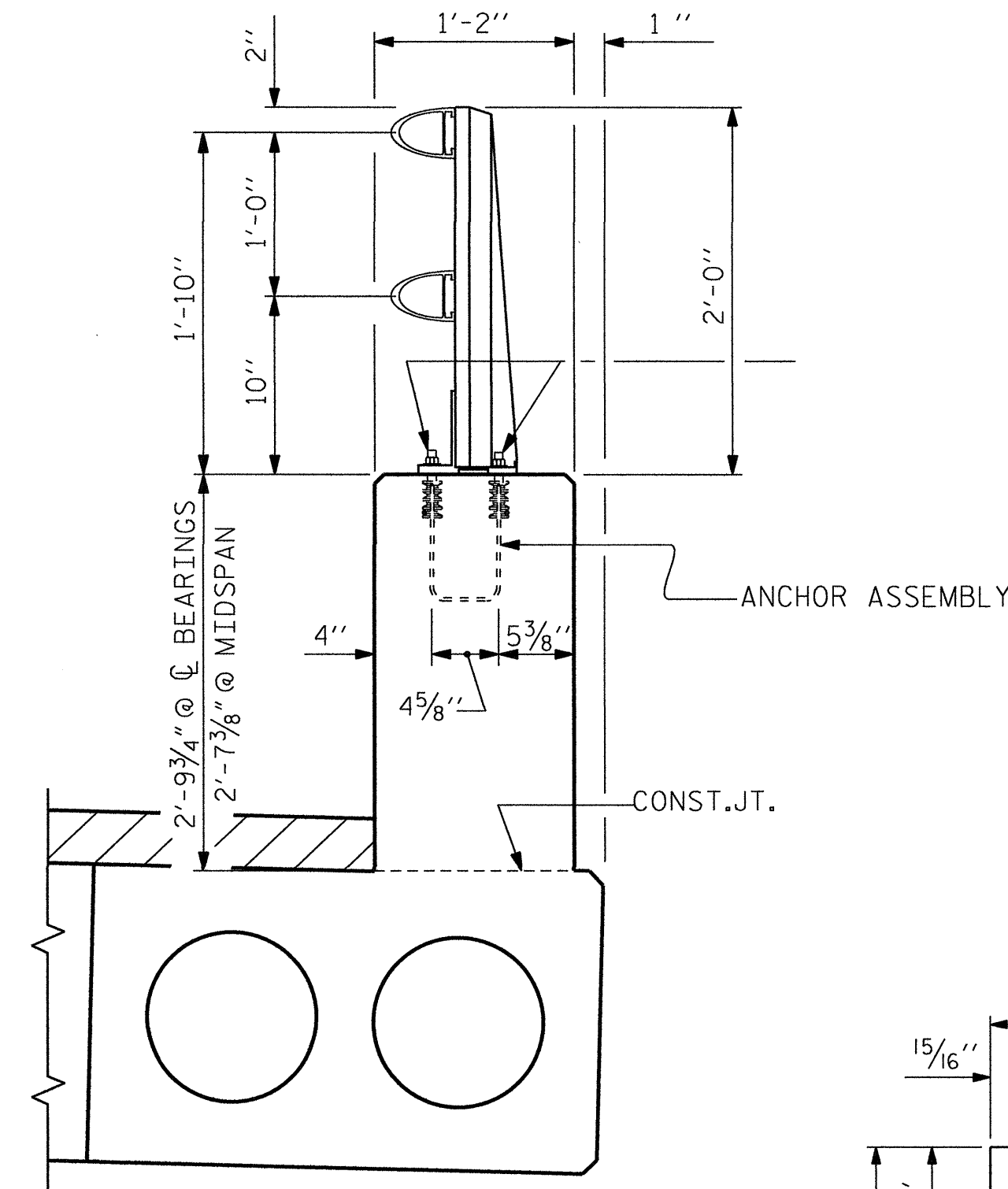
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 2 BAR METAL RAIL

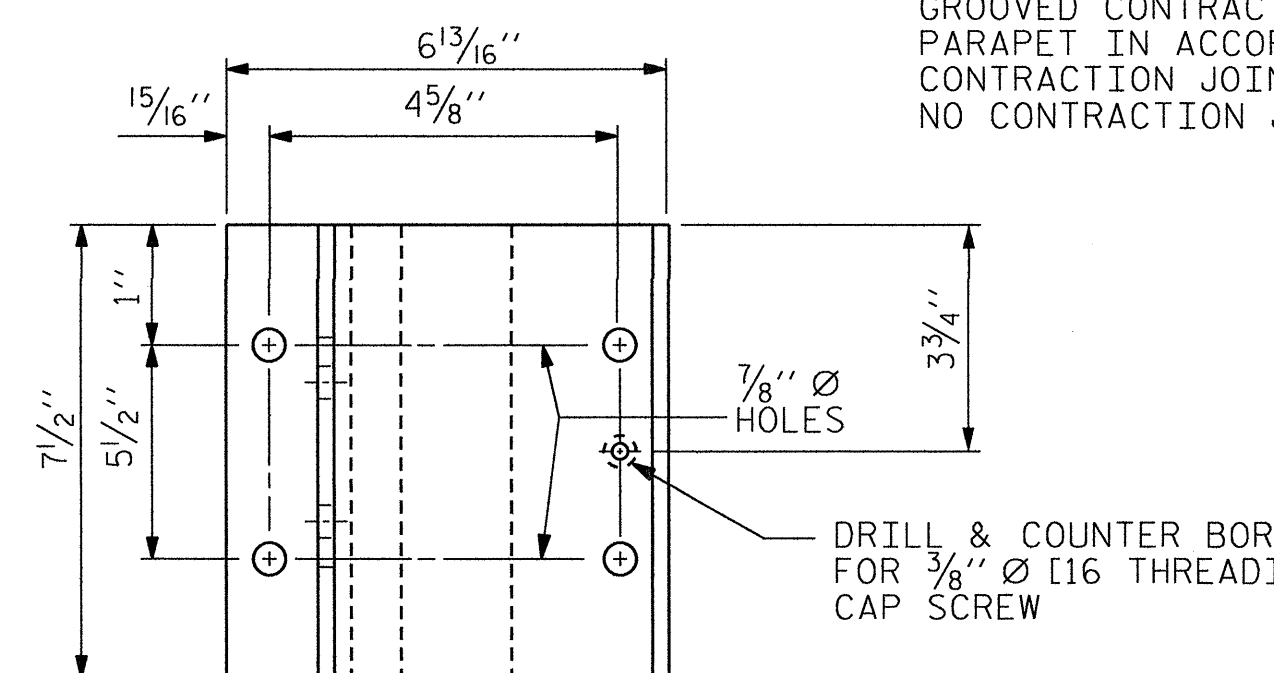
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			27
2			4			



PLAN

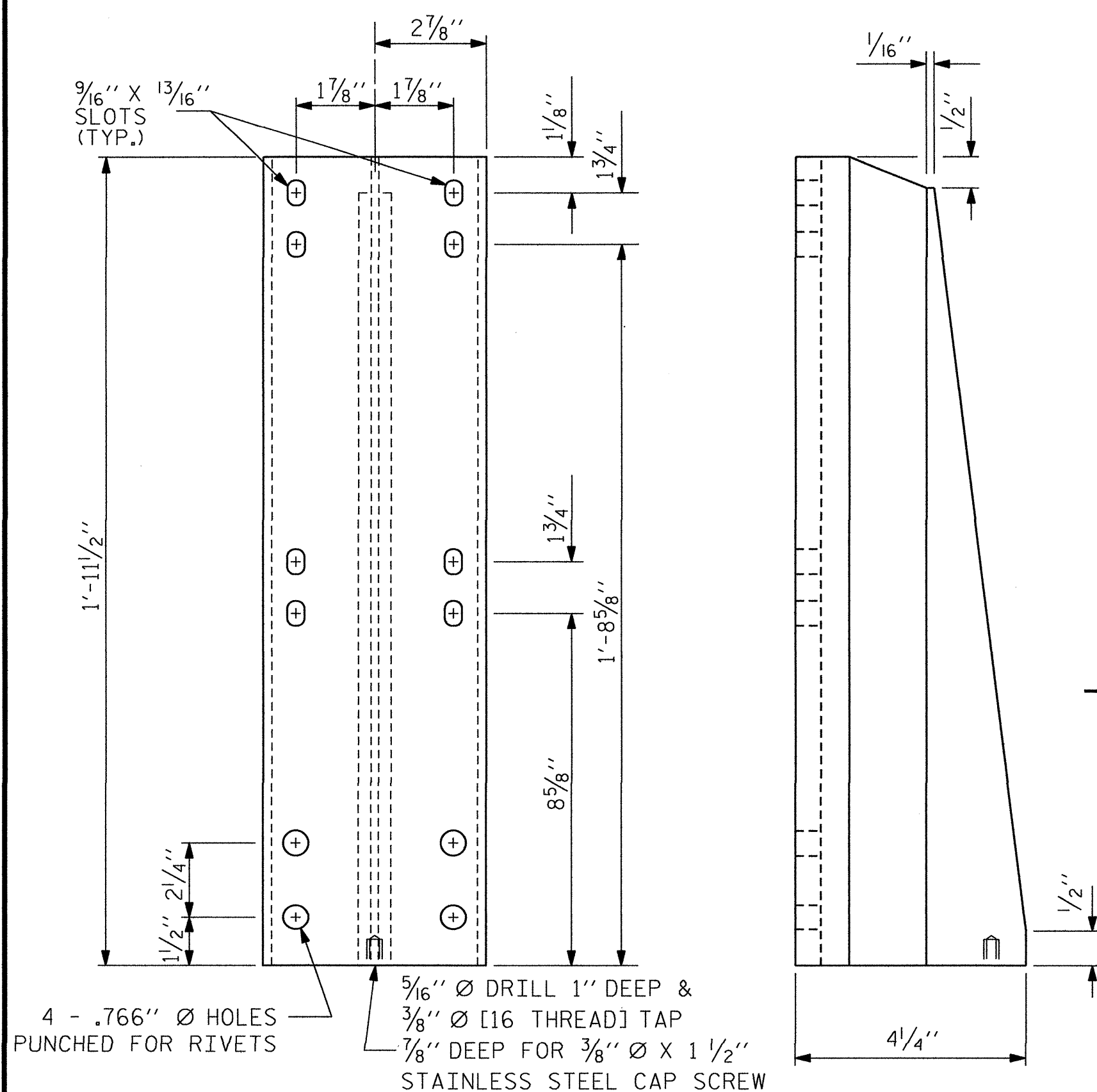


SECTION THRU PARAPET AND RAIL



PLAN

DRILL & COUNTER BORE FOR 3/8" Ø [16 THREAD] CAP SCREW

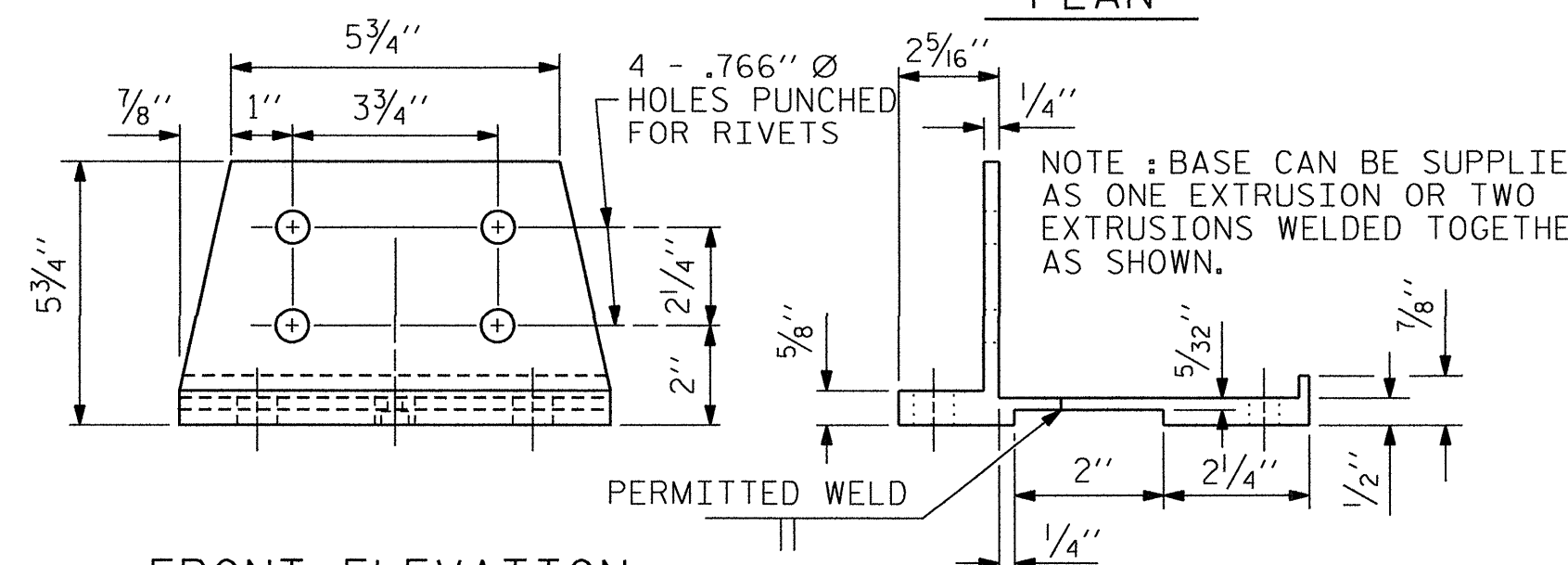


FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST

4 - .766" Ø HOLES PUNCHED FOR RIVETS
 3/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP 5/8" DEEP FOR 3/8" Ø X 1 1/2" STAINLESS STEEL CAP SCREW



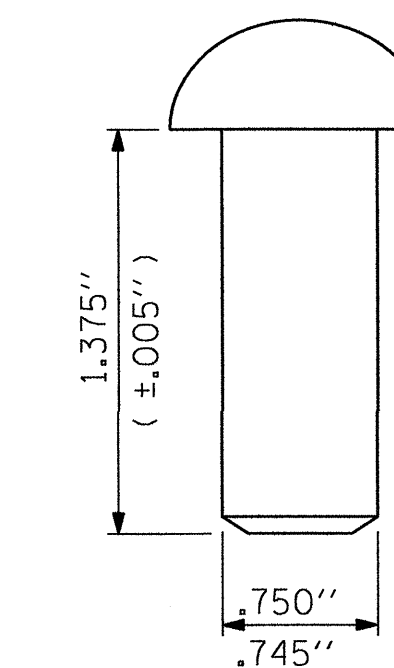
FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS

NOTE : BASE CAN BE SUPPLIED AS ONE EXTRUSION OR TWO EXTRUSIONS WELDED TOGETHER AS SHOWN.

PERMITTED WELD



RIVET DETAIL

DRAWN BY: RTJ DATE: 3/11
 CHECKED BY: NMW DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A WICK AVE
 MORGANTON, NC 28655

NOTES

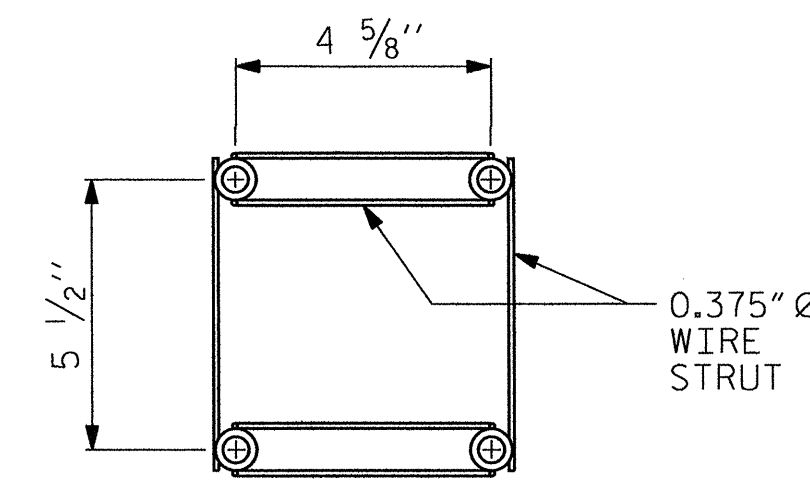
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

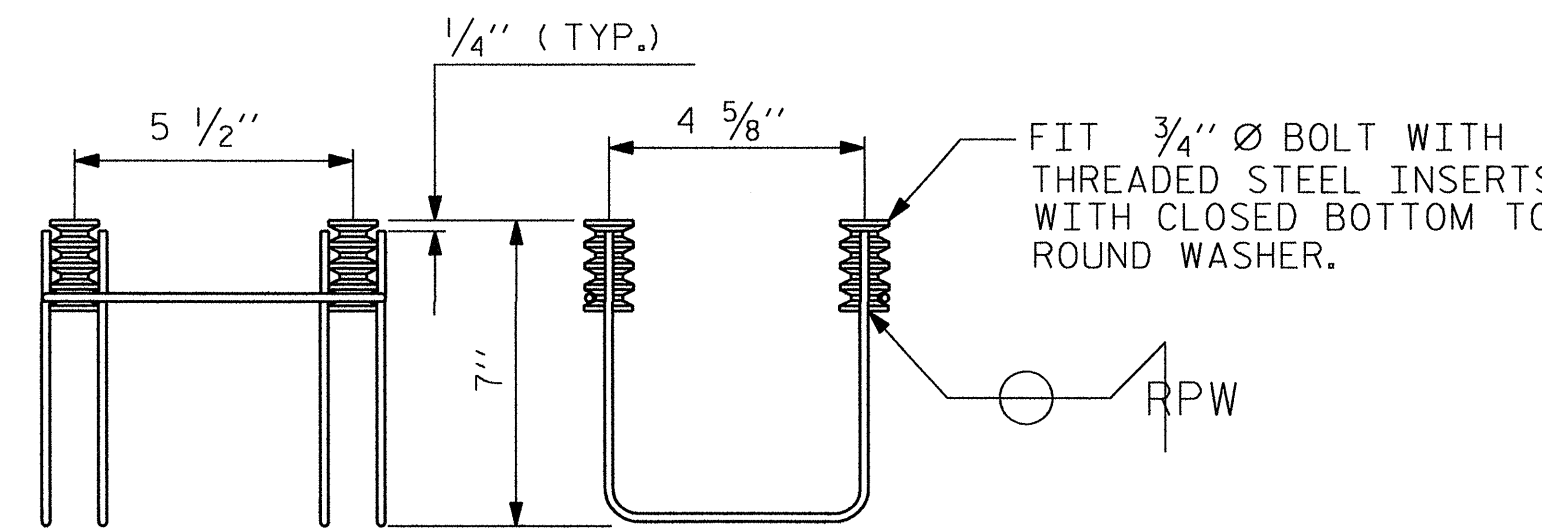
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT 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 1/6" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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



PLAN



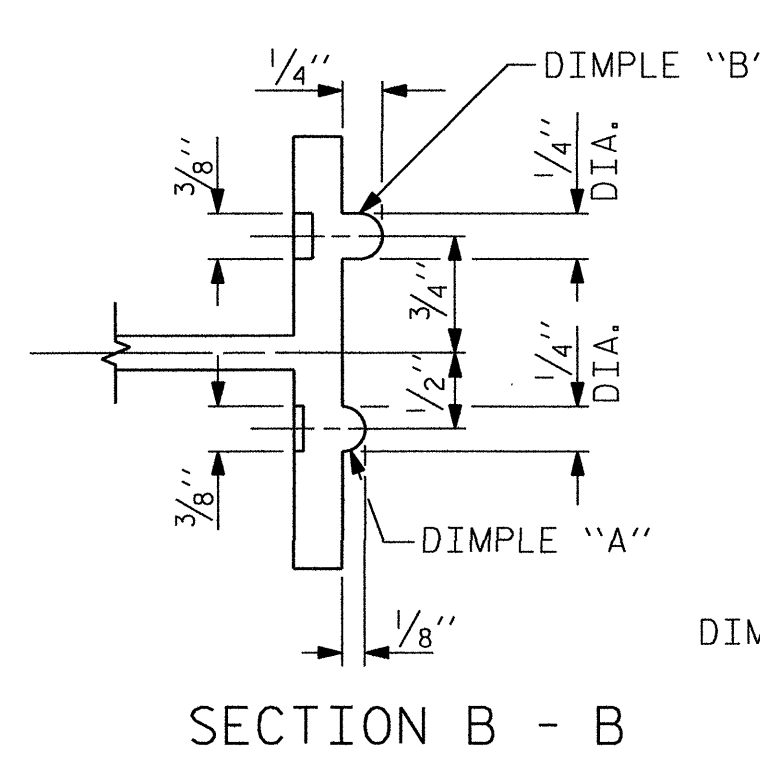
SIDE VIEW

ELEVATION

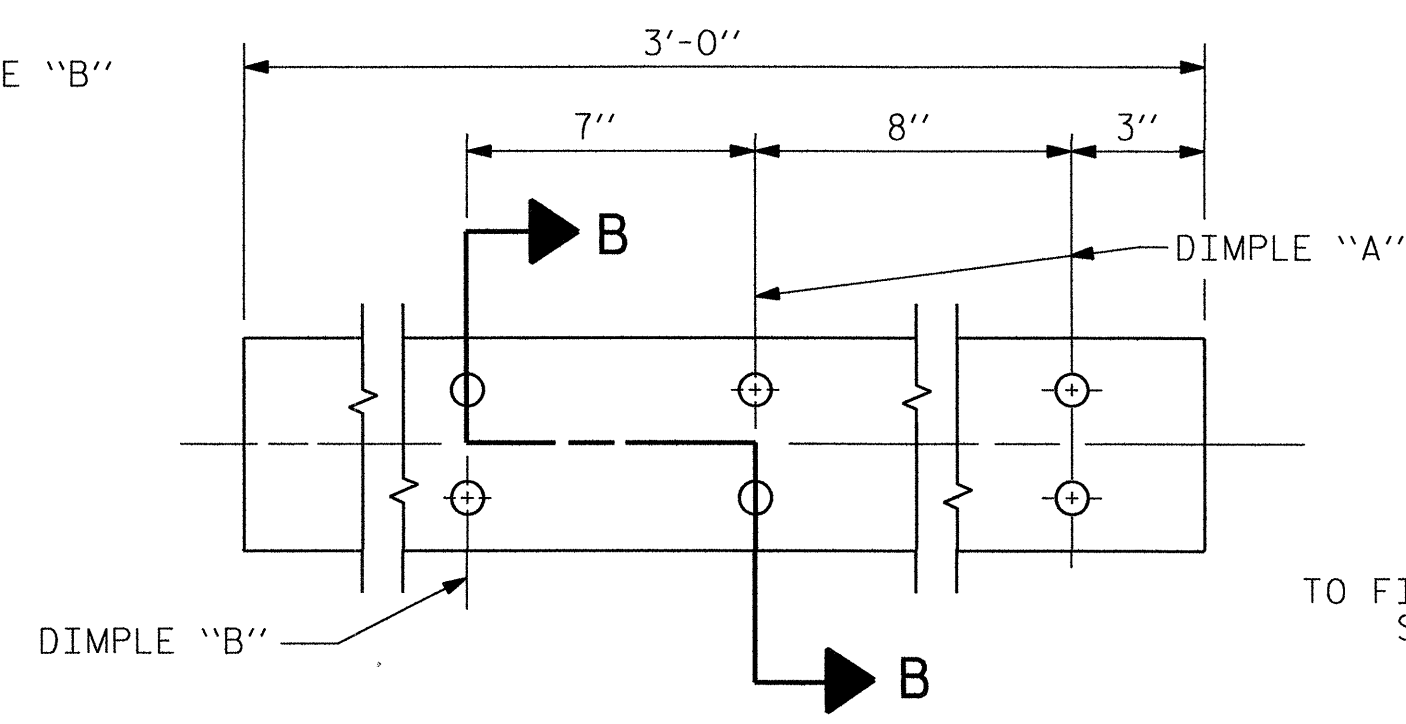
MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) : 1 3/4"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

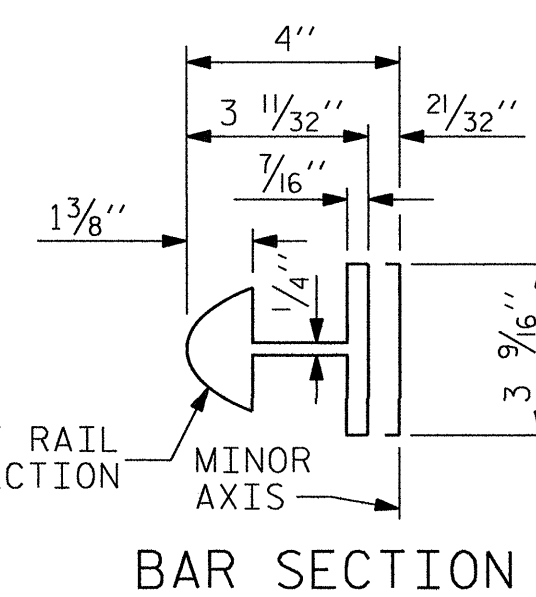
(20 ASSEMBLIES REQUIRED)



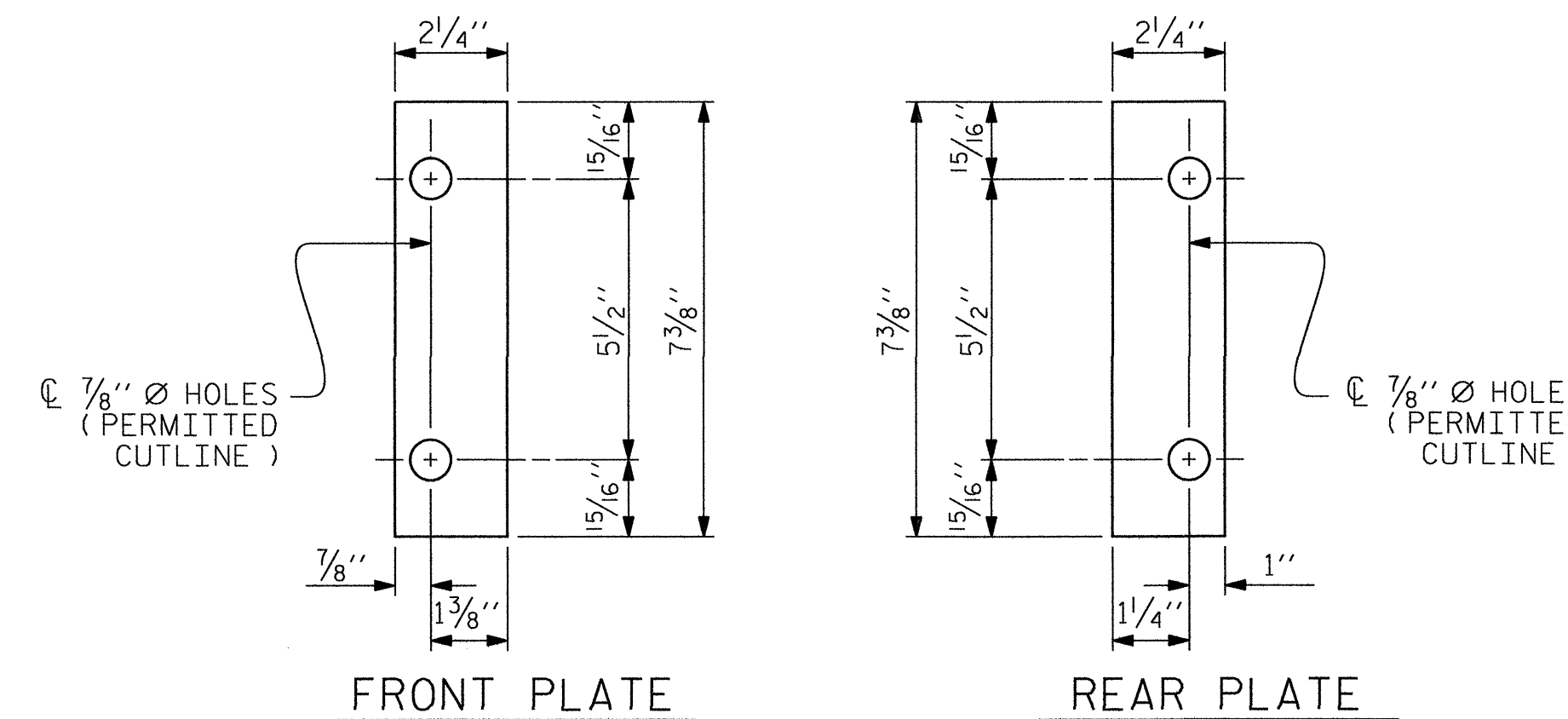
SECTION B - B



EXPANSION BAR DETAILS



BAR SECTION

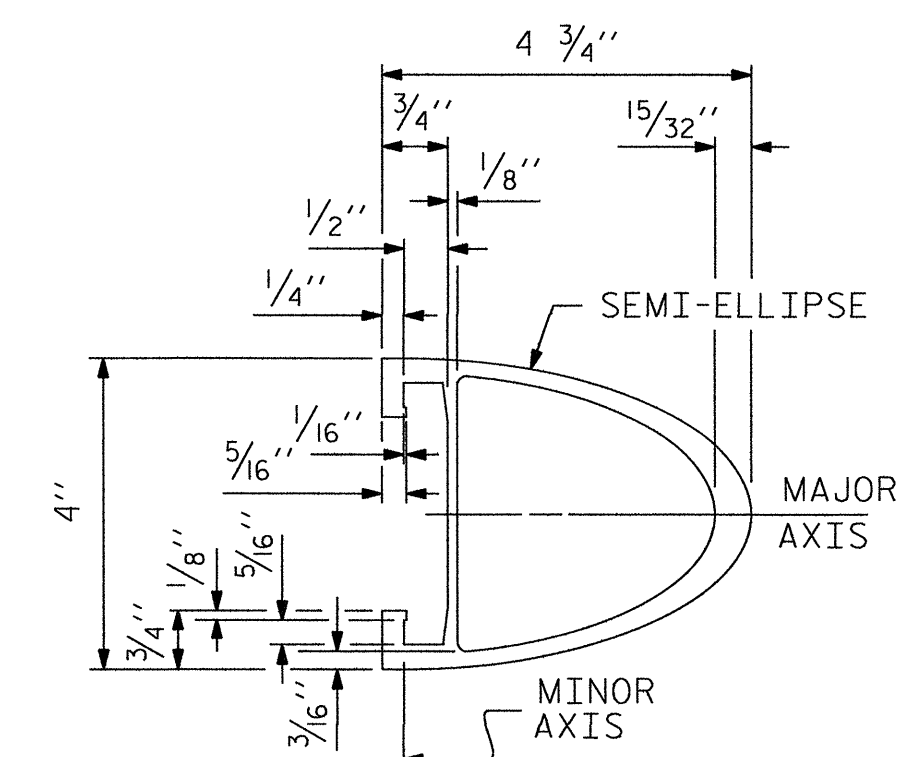


FRONT PLATE

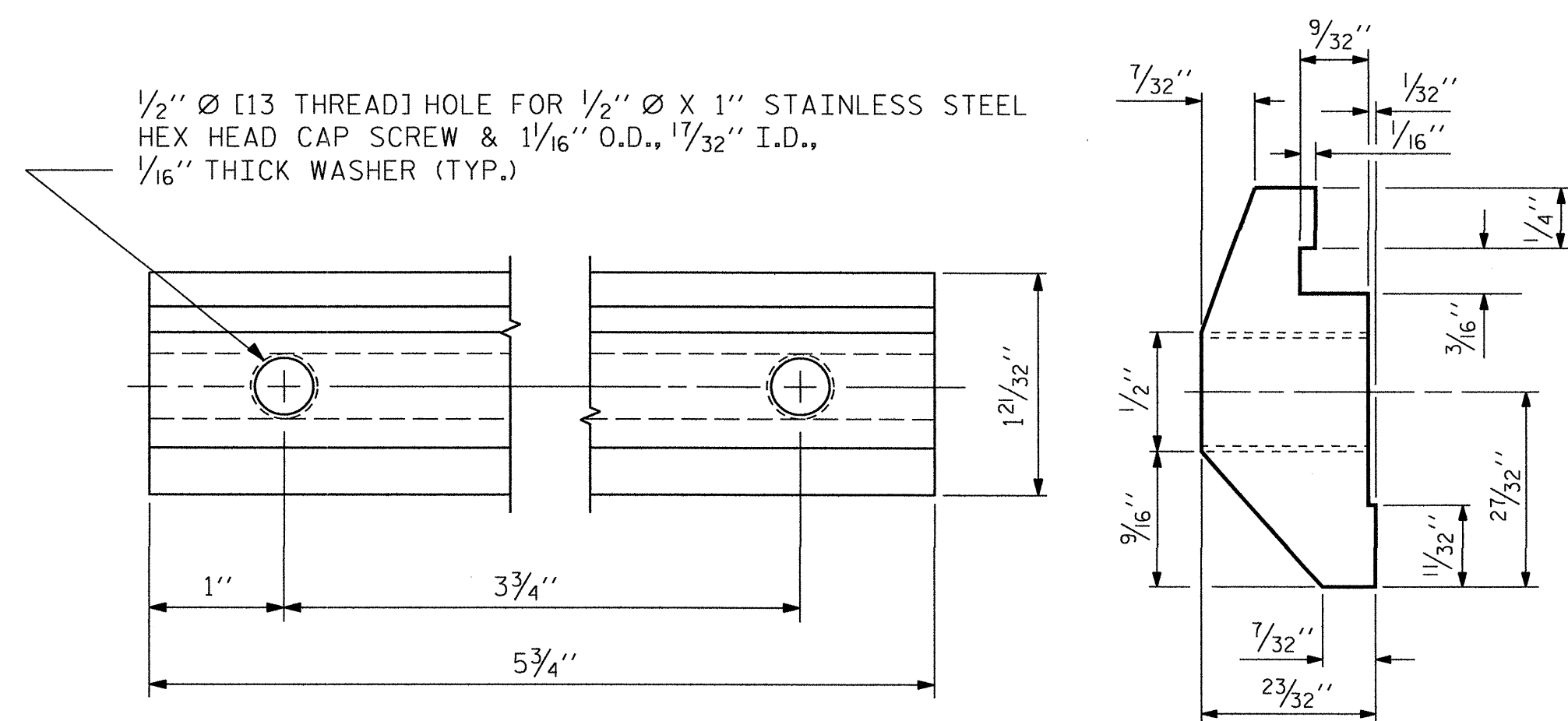
REAR PLATE

SHIM DETAILS

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

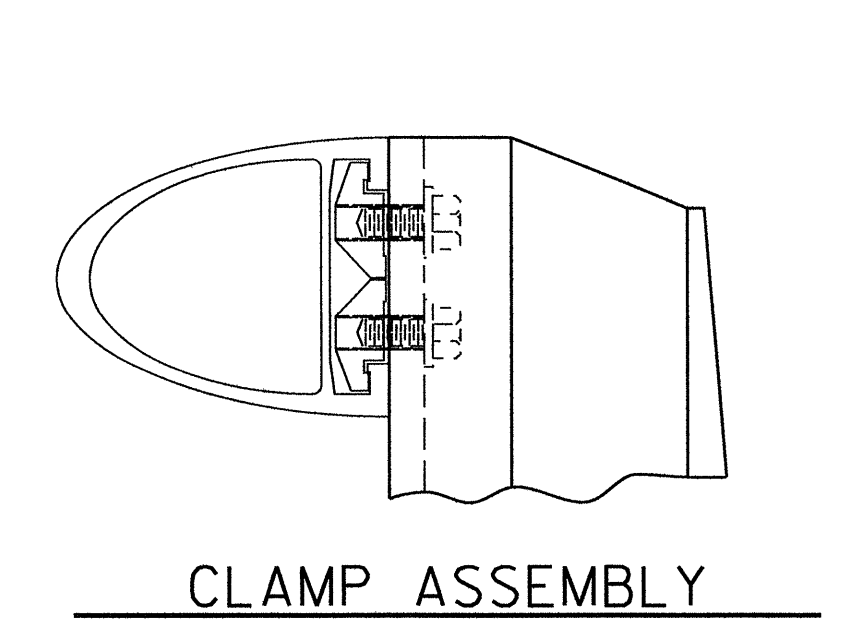


RAIL SECTION

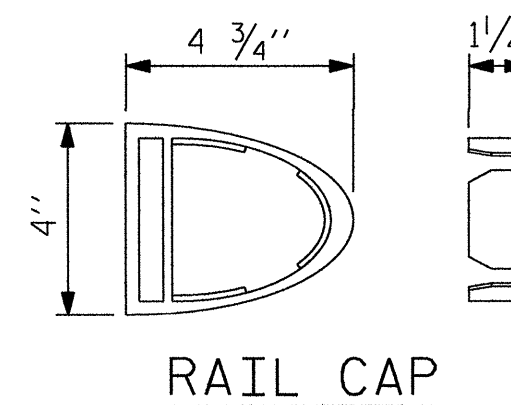


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

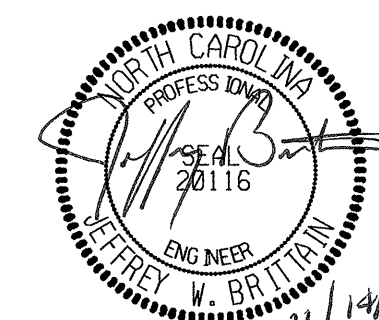
SHEET 3 OF 3

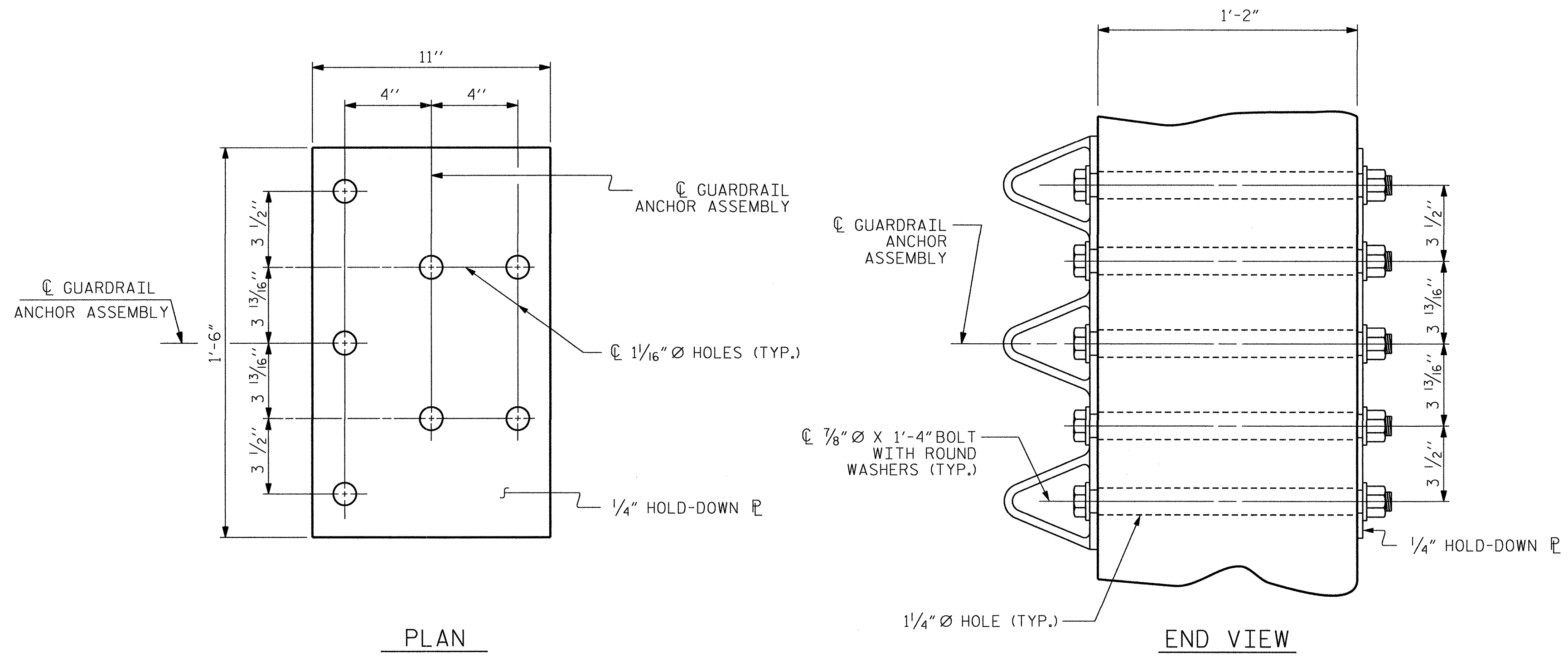
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			27
2			4			

DRAWN BY: RTJ DATE: 3/11
 CHECKED BY: NMW DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A WICK AVENUE
 MORGANTON, NC 28655





GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES (FOR METAL RAILS)

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

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

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

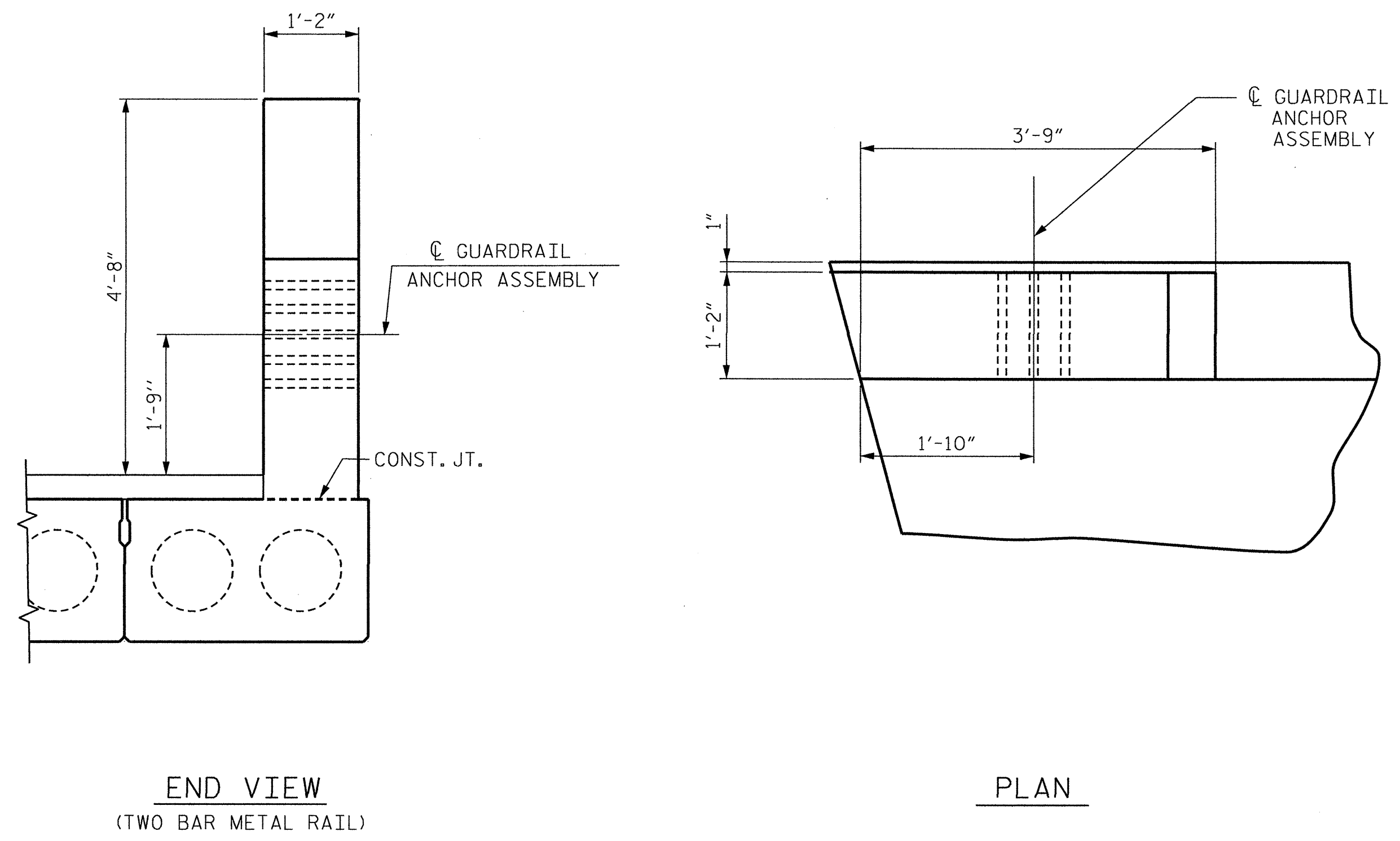
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

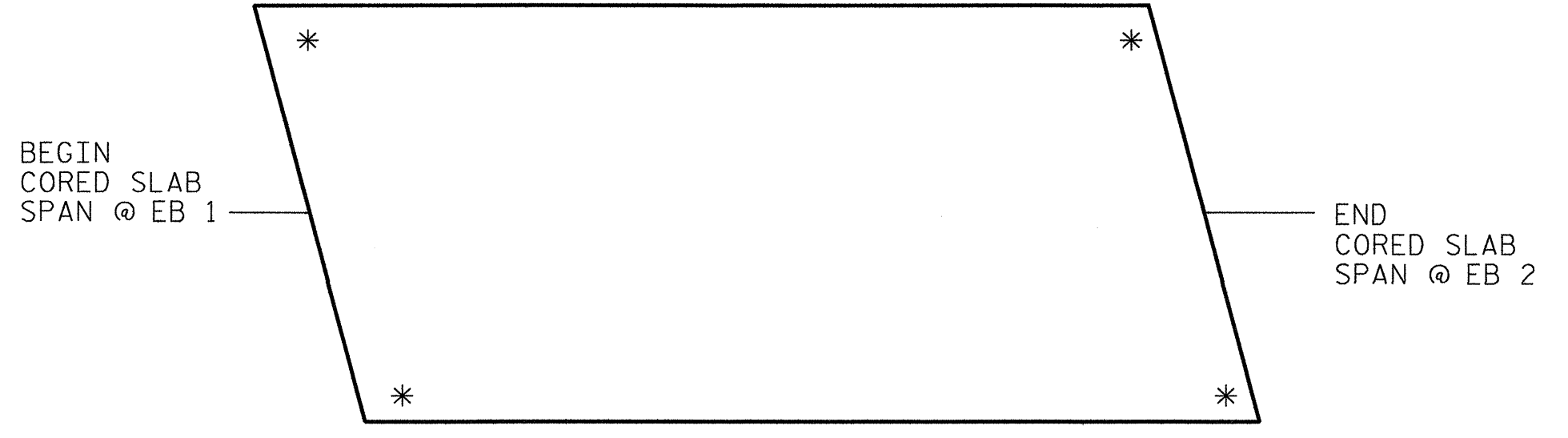
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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



LOCATION OF GUARDRAIL ANCHOR AT END POST



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-



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

DRAWN BY: RTJ DATE: 2/11
 CHECKED BY: JLA DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A WICK AVE
 MORGANTON, NC 28655

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			27
2			4			

NOTES

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

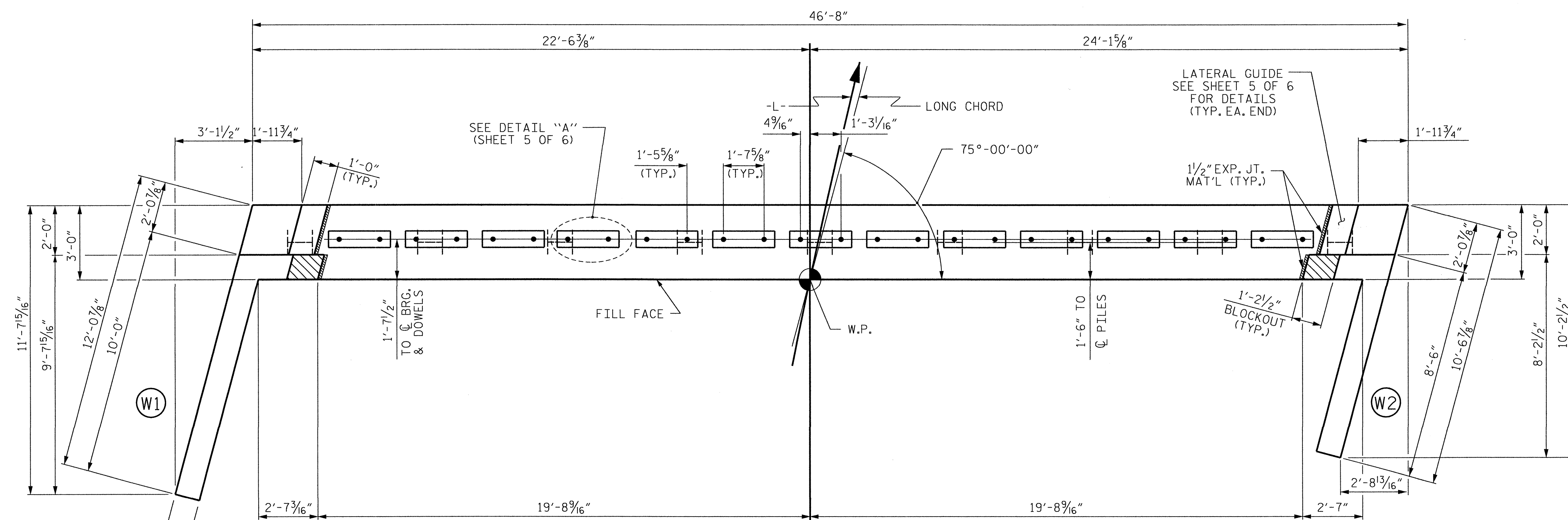
THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

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

FOR PILE SPlice DETAILS, SEE SHEET 6 OF 6.

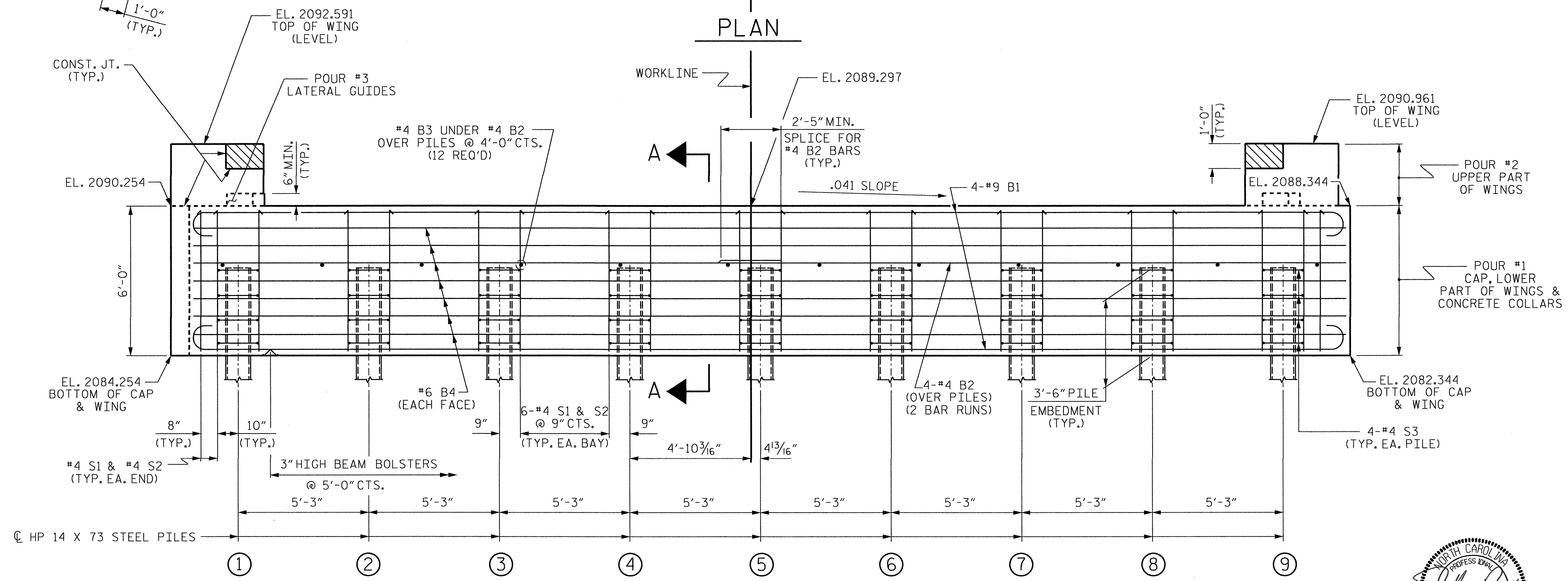
FOR WING DETAILS, SEE SHEET 3 OF 6.

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



PLAN

TOP OF PILE ELEVATIONS	
①	2087.642
②	2087.426
③	2087.211
④	2086.996
⑤	2086.781
⑥	2086.565
⑦	2086.350
⑧	2086.135
⑨	2085.920



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 5 OF 6.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 5 OF 6.

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 1



ASSEMBLED BY : RTJ DATE : 05/11
 CHECKED BY : JLA DATE : 06/11
 DRAWN BY : DGE 03/10
 CHECKED BY : MKT 03/10

PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

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

TOTAL SHEETS: 27

NOTES

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

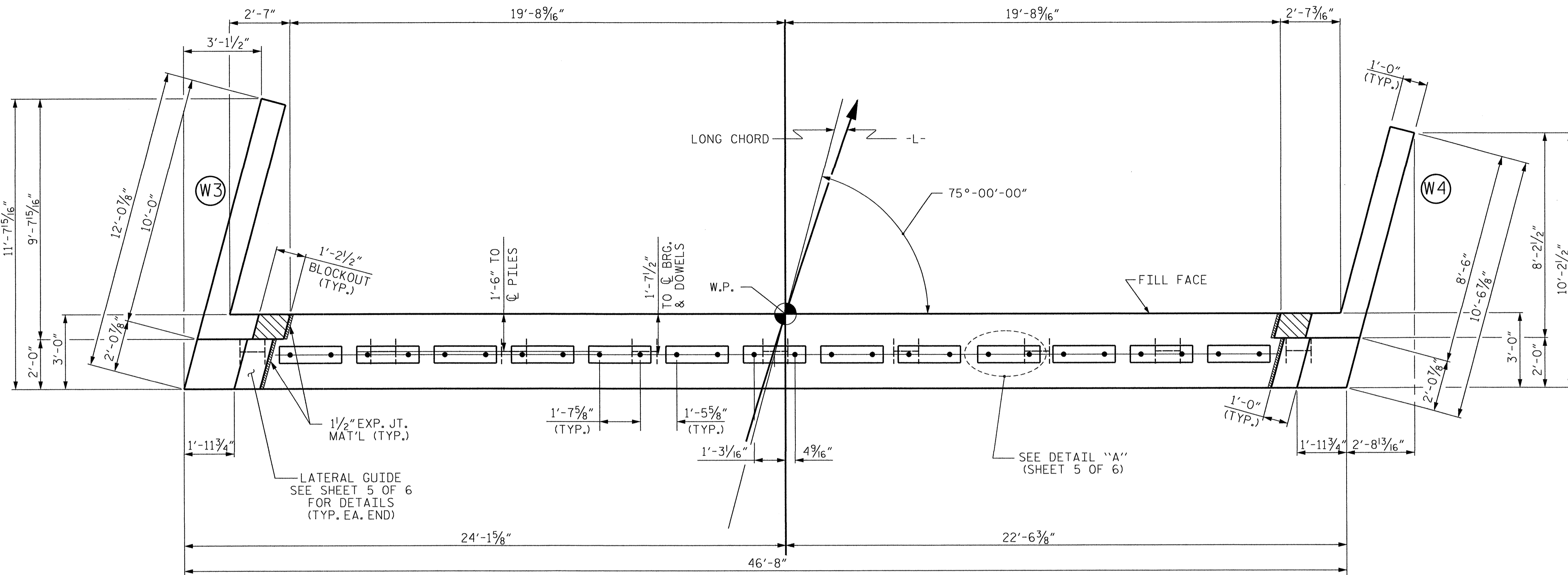
THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

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

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

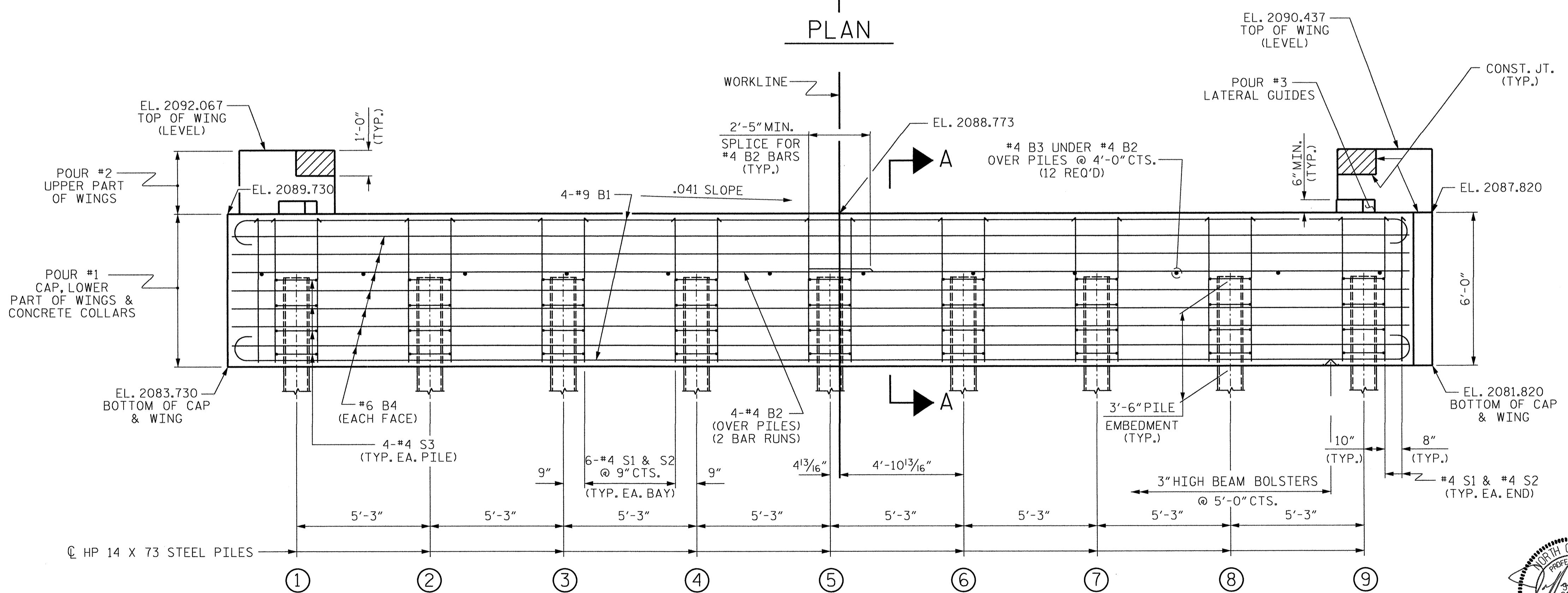
FOR WING DETAILS, SEE SHEET 4 OF 6.

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



PLAN

TOP OF PILE ELEVATIONS	
①	2087.148
②	2086.933
③	2086.718
④	2086.503
⑤	2086.287
⑥	2086.072
⑦	2085.857
⑧	2086.642
⑨	2085.426



ELEVATION

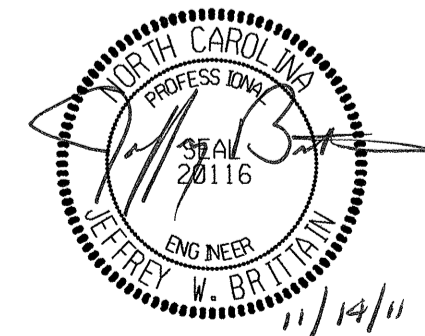
WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 5 OF 6.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 5 OF 6.

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 2

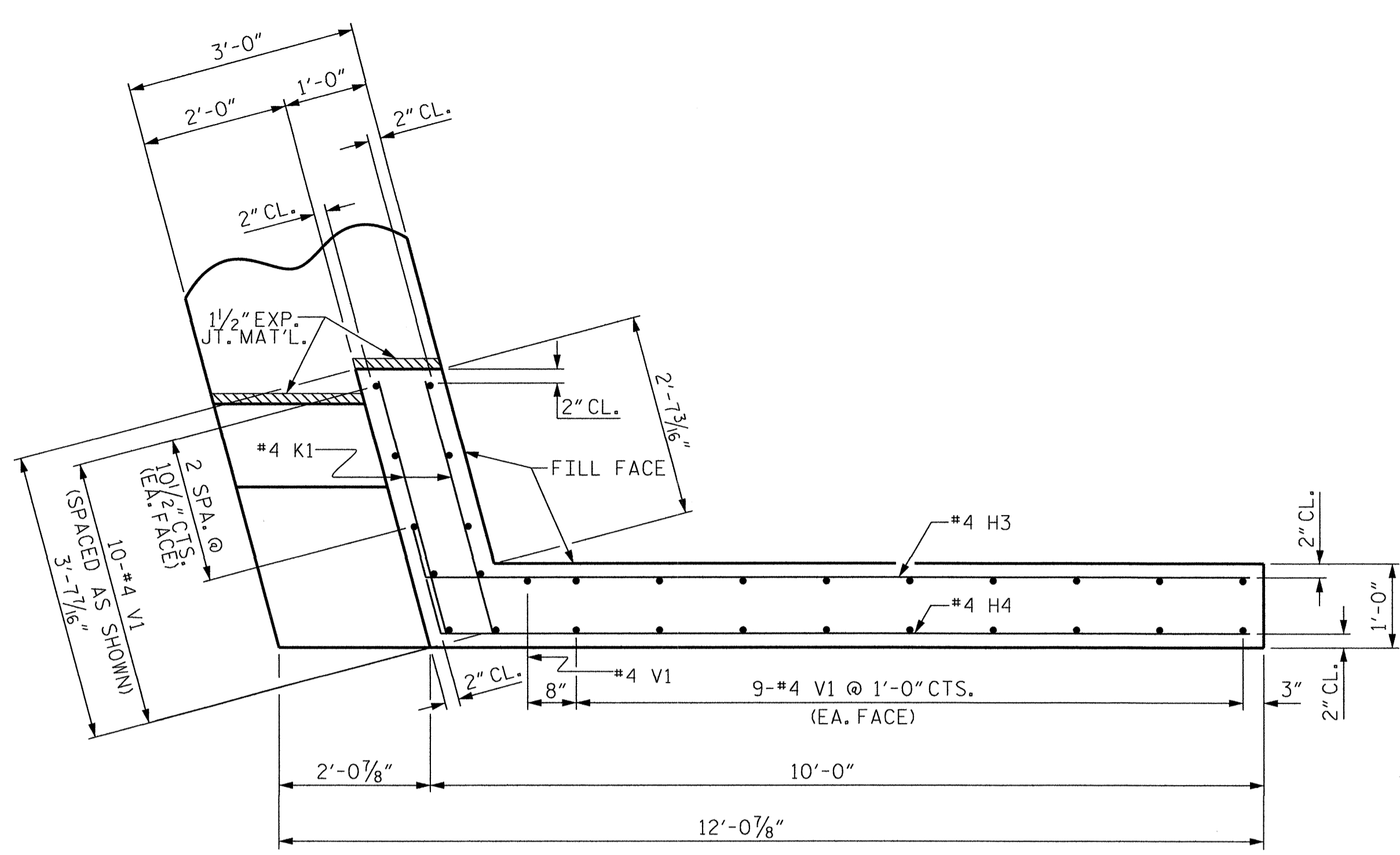


ASSEMBLED BY : RTJ	DATE : 05/11
CHECKED BY : JLA	DATE : 06/11
DRAWN BY : DGE 03/10	
CHECKED BY : MKT 03/10	

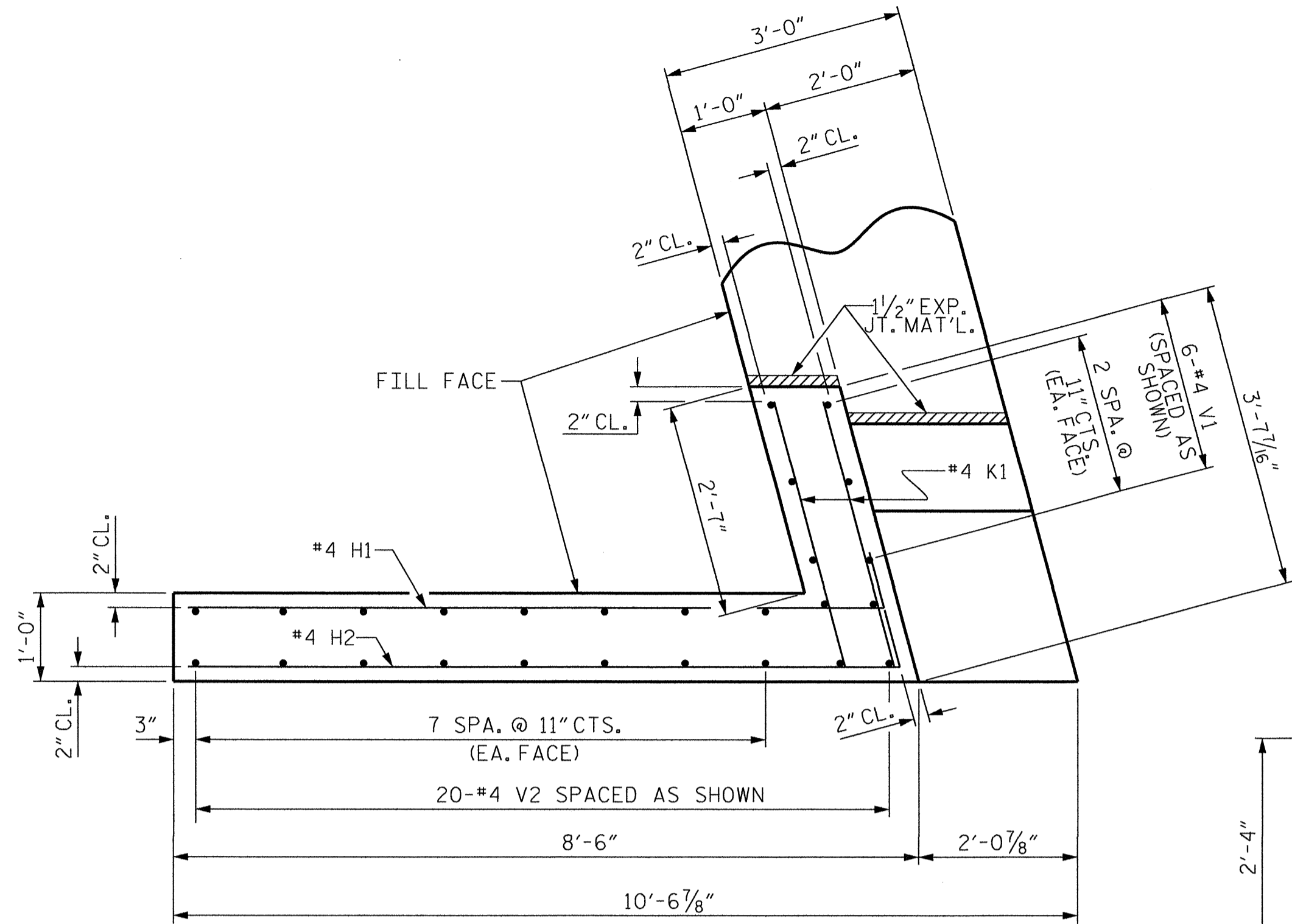
PREPARED BY
 TGS ENGINEERS
 107-A WICA AVENUE
 MORGANTON, NC 28655

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

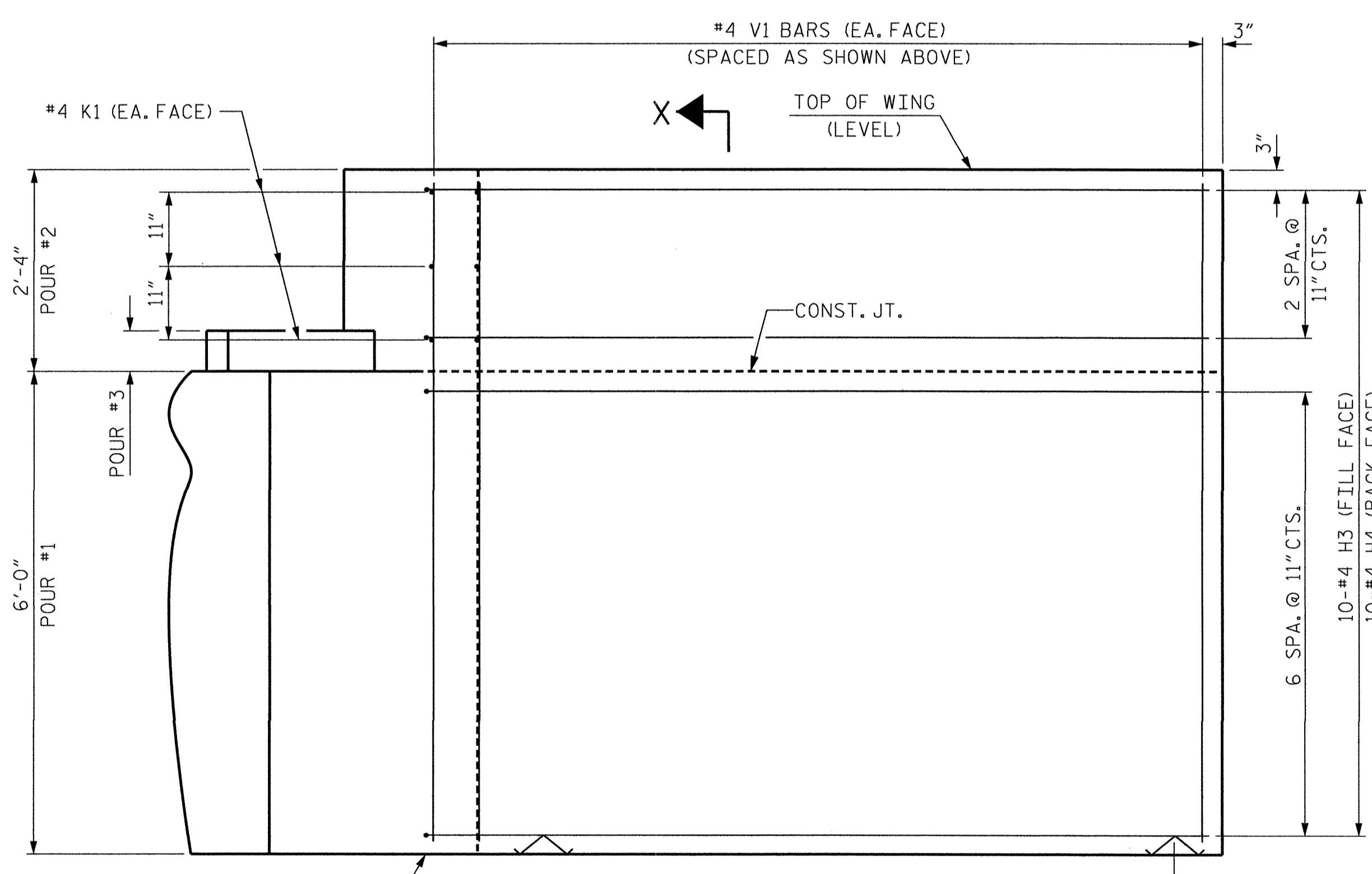
TOTAL SHEETS 27



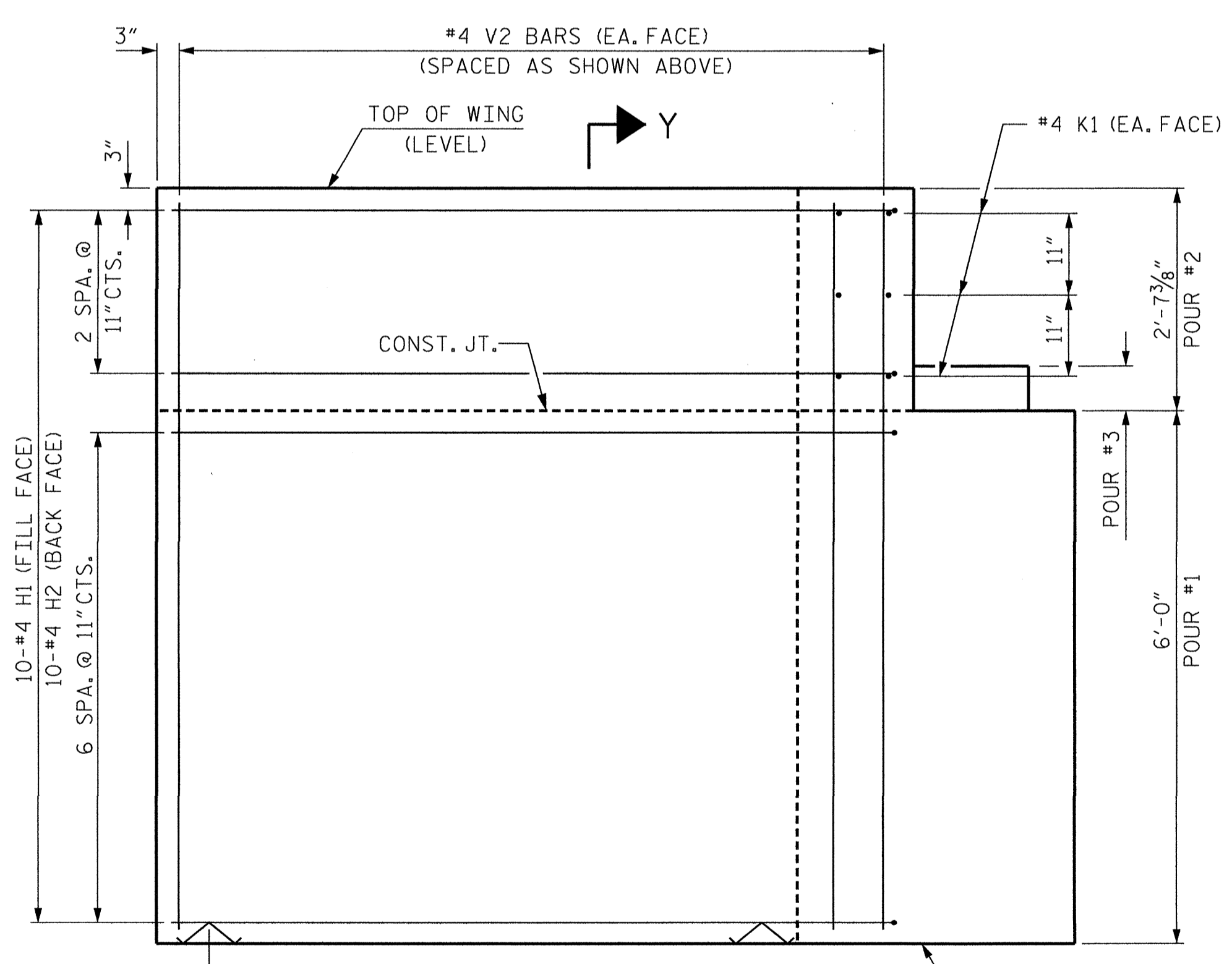
PLAN OF WING (W1)



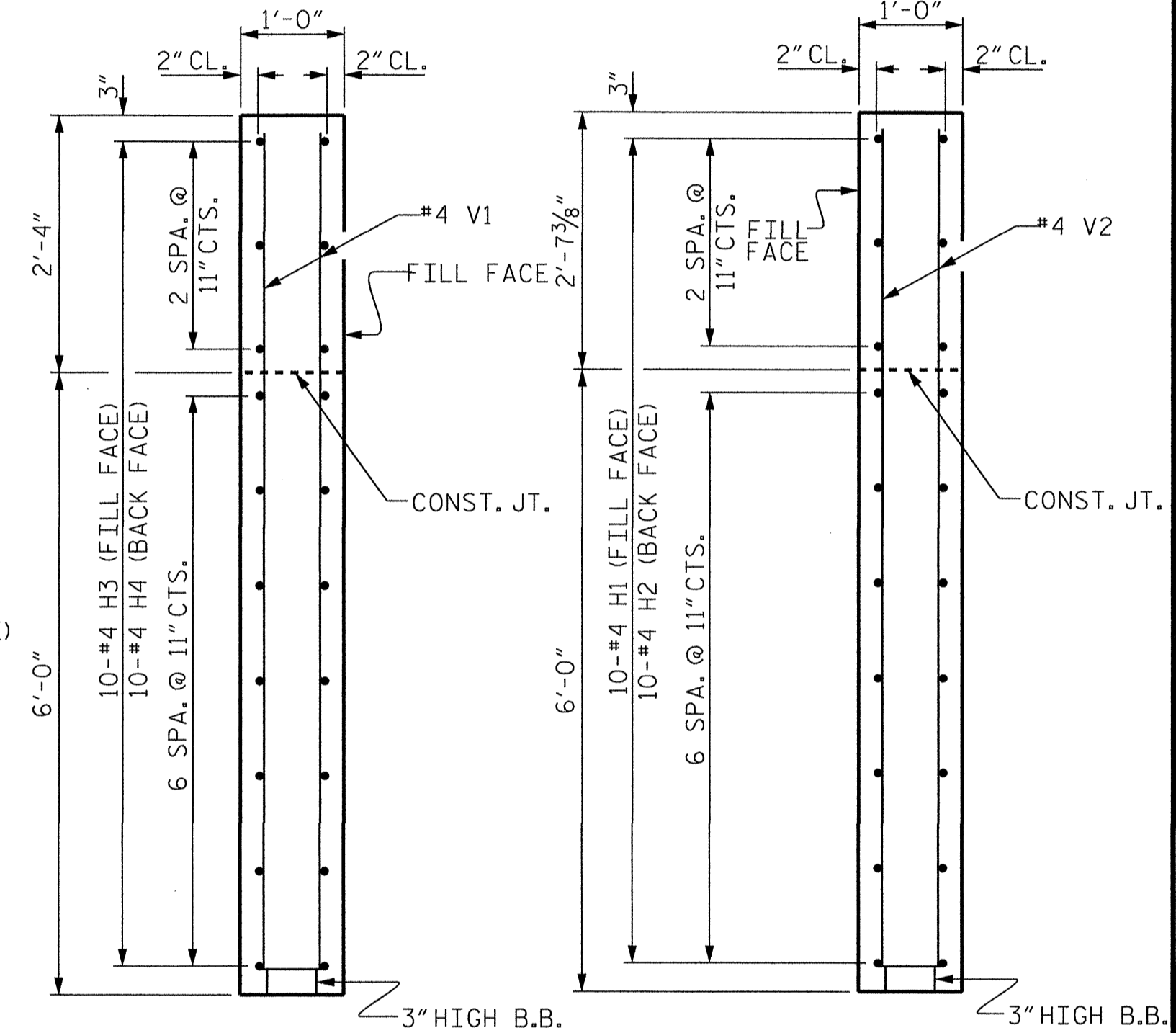
PLAN OF WING (W2)



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X

SECTION Y-Y

WING DETAILS

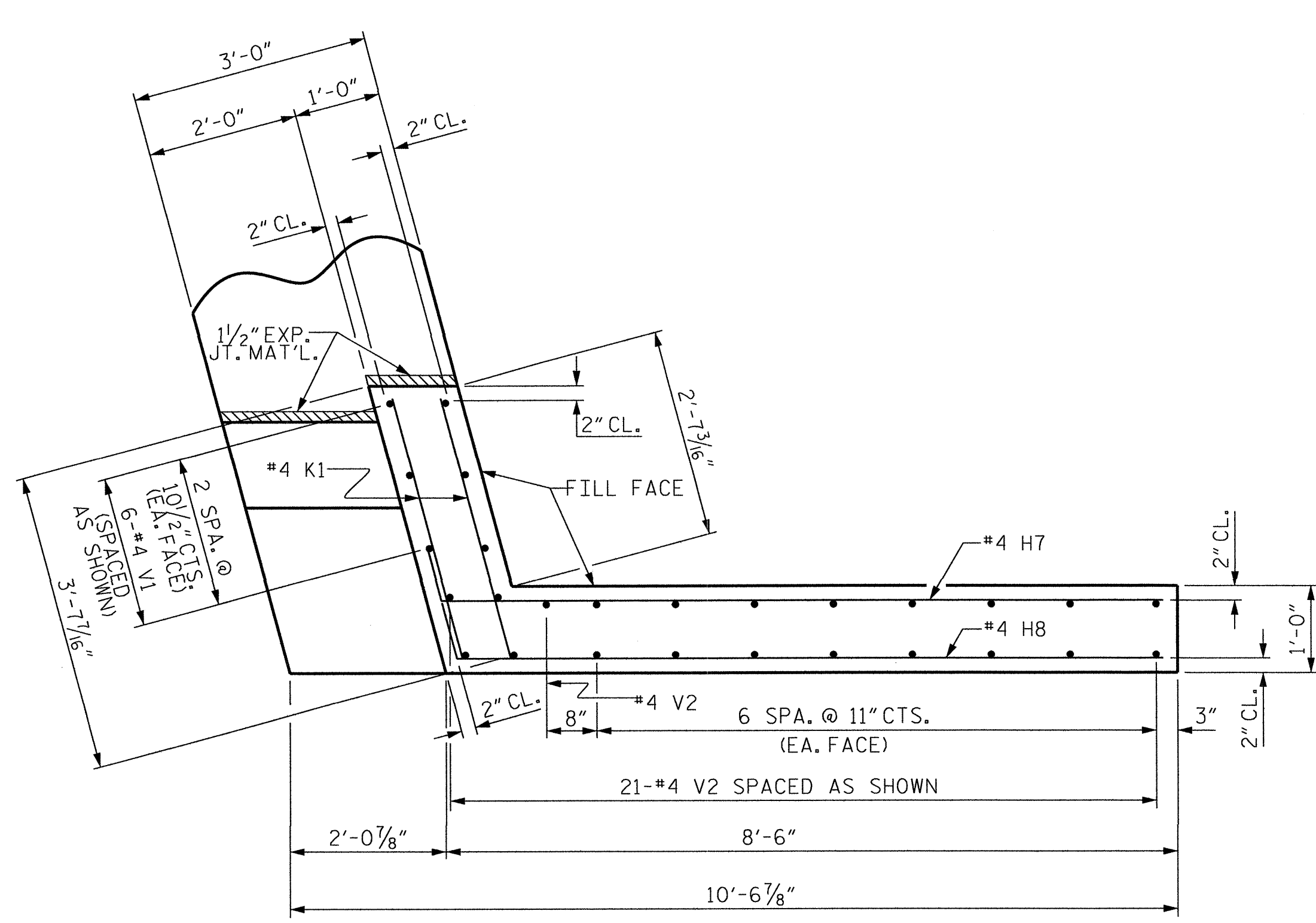
ASSEMBLED BY :	RTJ	DATE :	05/11
CHECKED BY :	JLA	DATE :	06/11
DRAWN BY :	DGE 3/10		
CHECKED BY :	MKT 3/10		

PREPARED BY
TGS ENGINEERS
107-A MICA AVENUE
MORGANTON, NC 28655

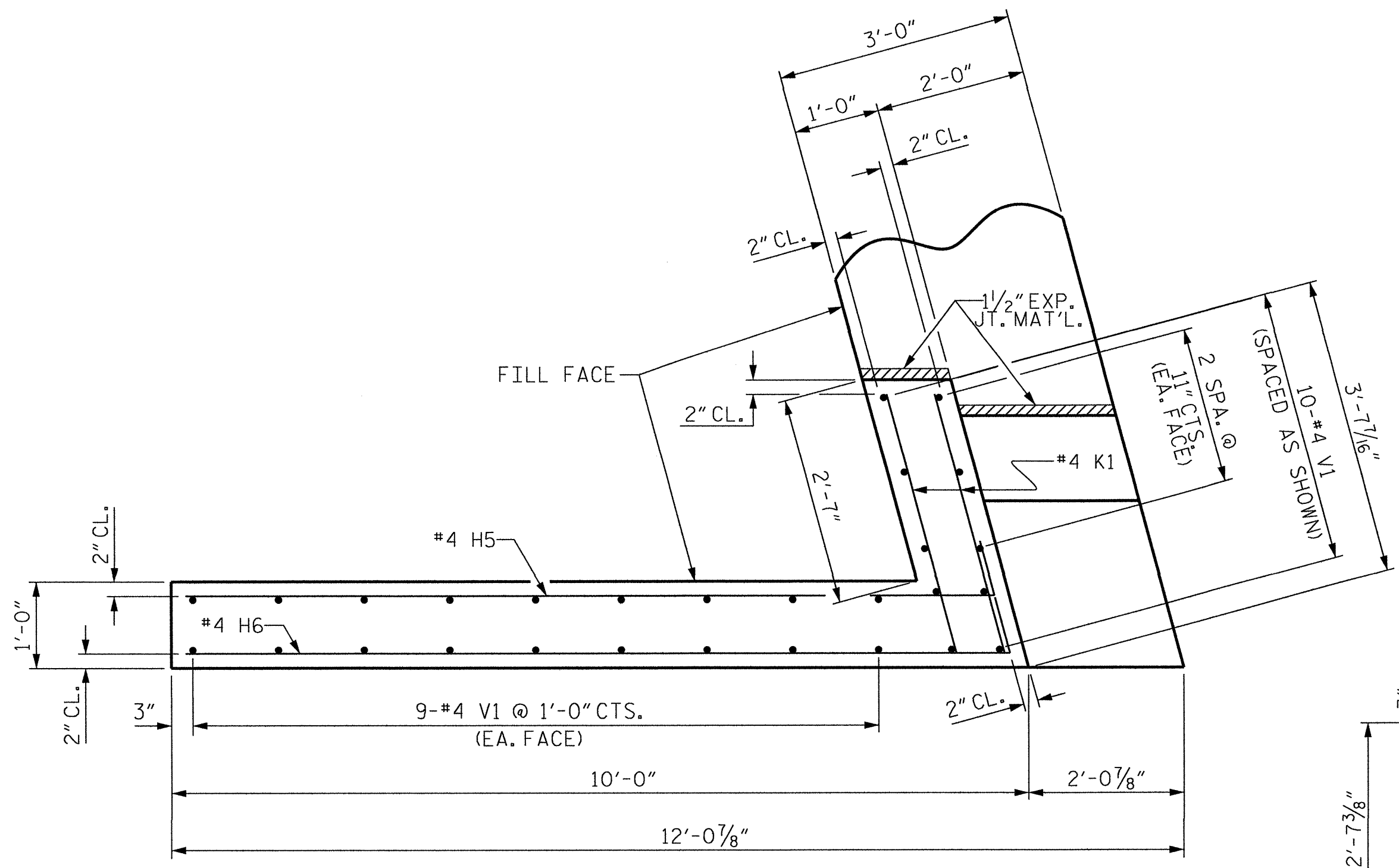


PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-
 SHEET 3 OF 6

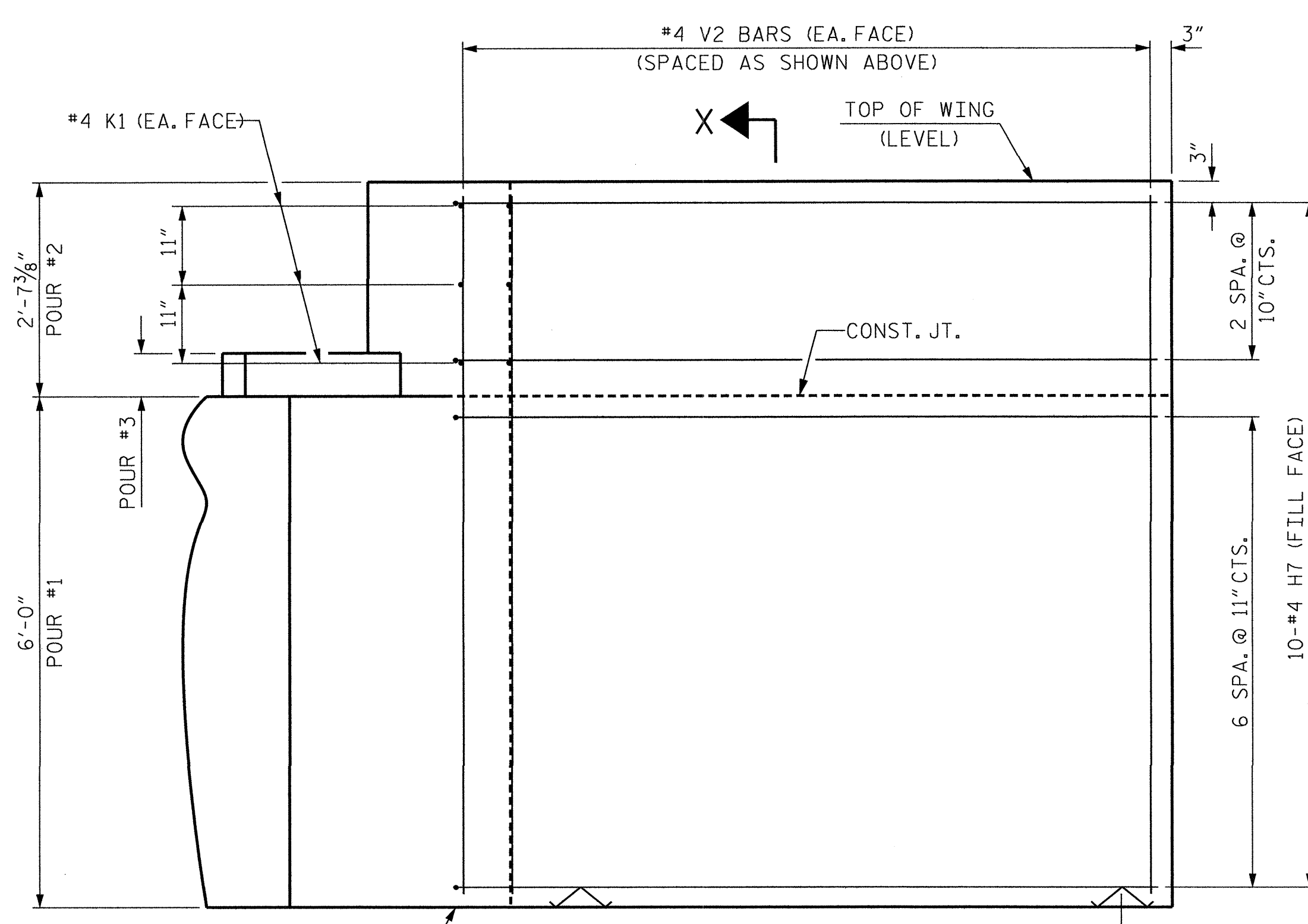
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 1 WING DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-16
					TOTAL SHEETS 27



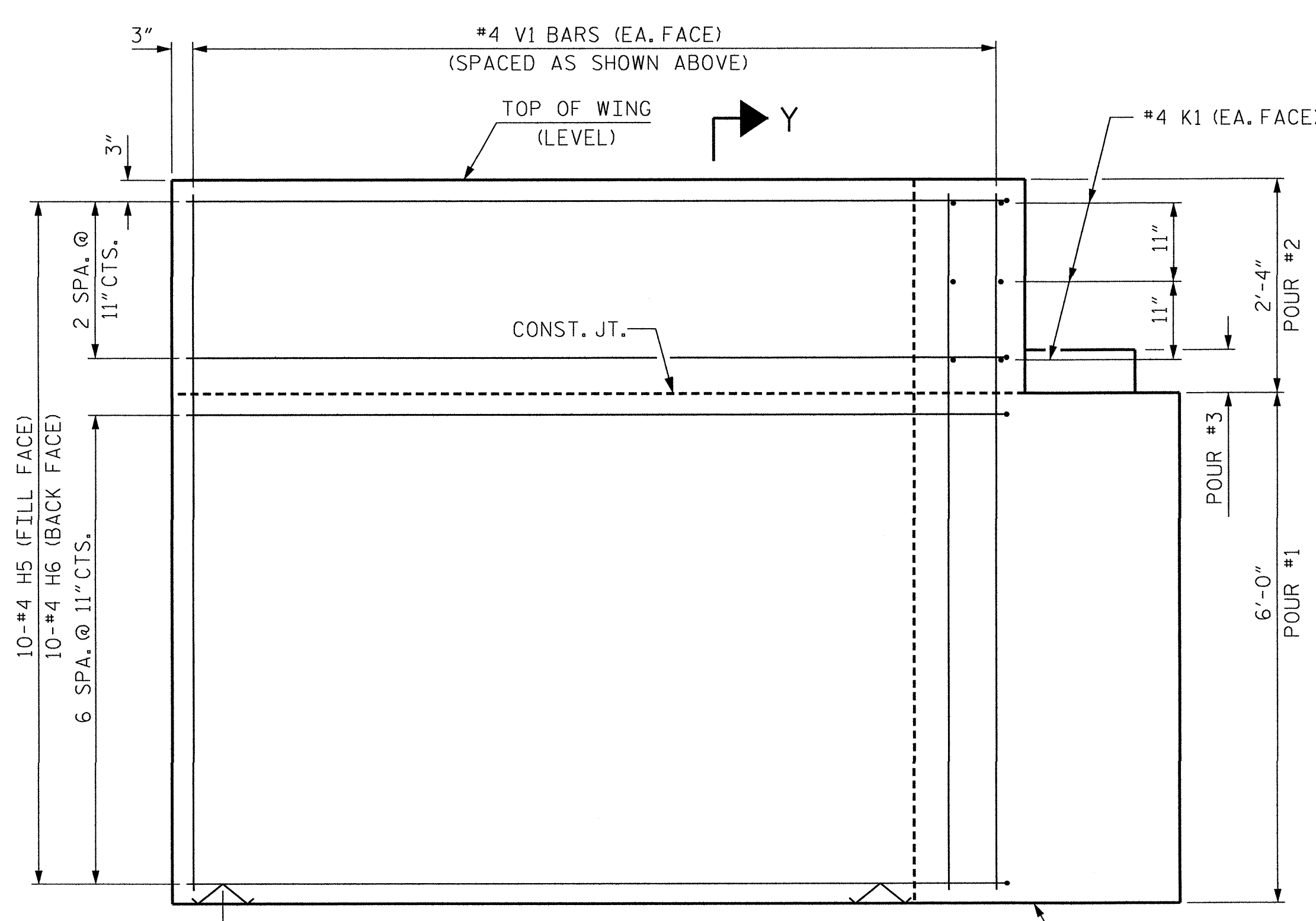
PLAN OF WING (W4)



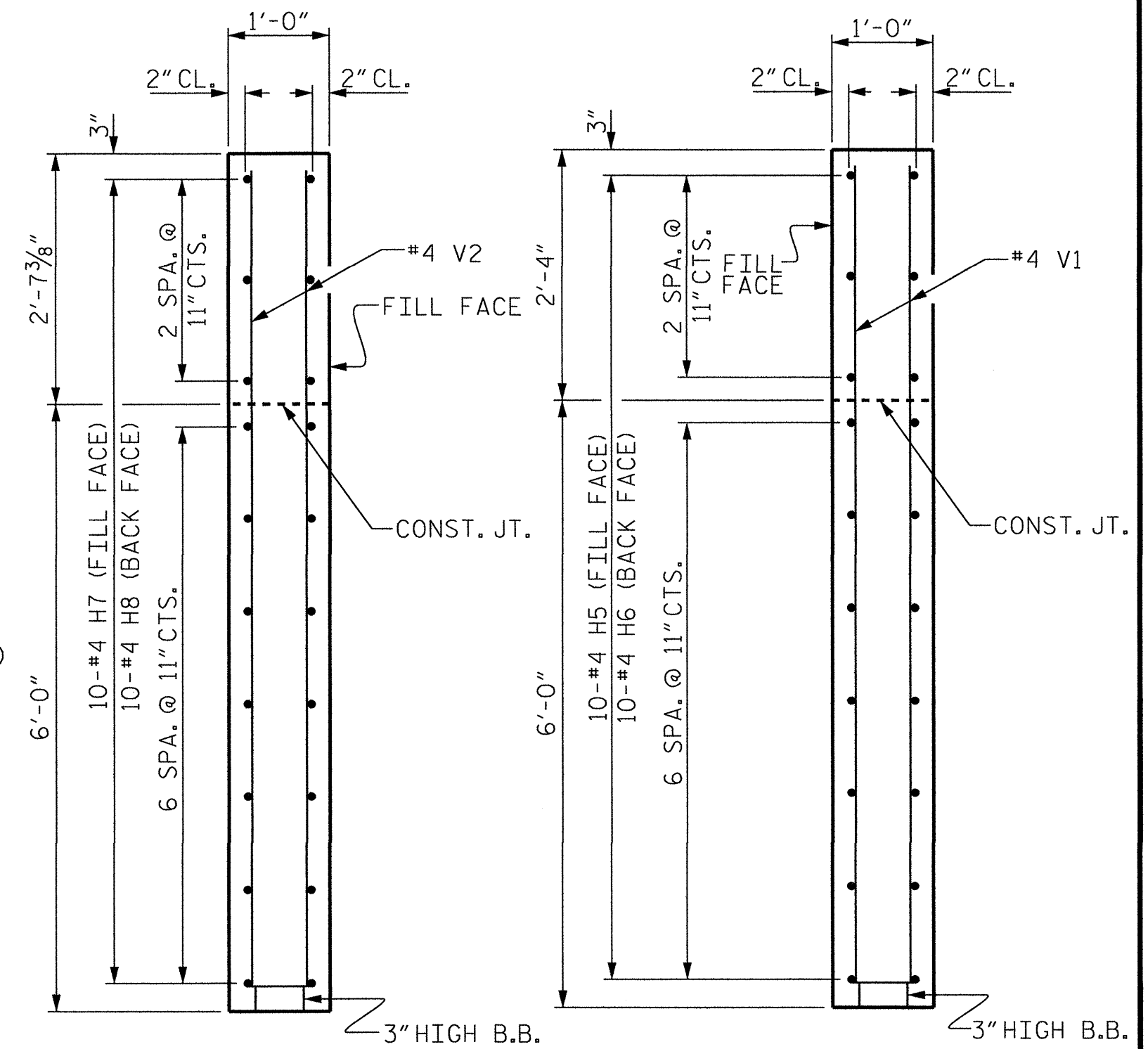
PLAN OF WING (W3)



ELEVATION OF WING (W4)



ELEVATION OF WING (W3)



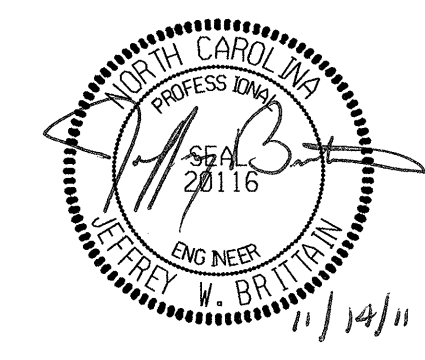
SECTION X-X

SECTION Y-Y

WING DETAILS

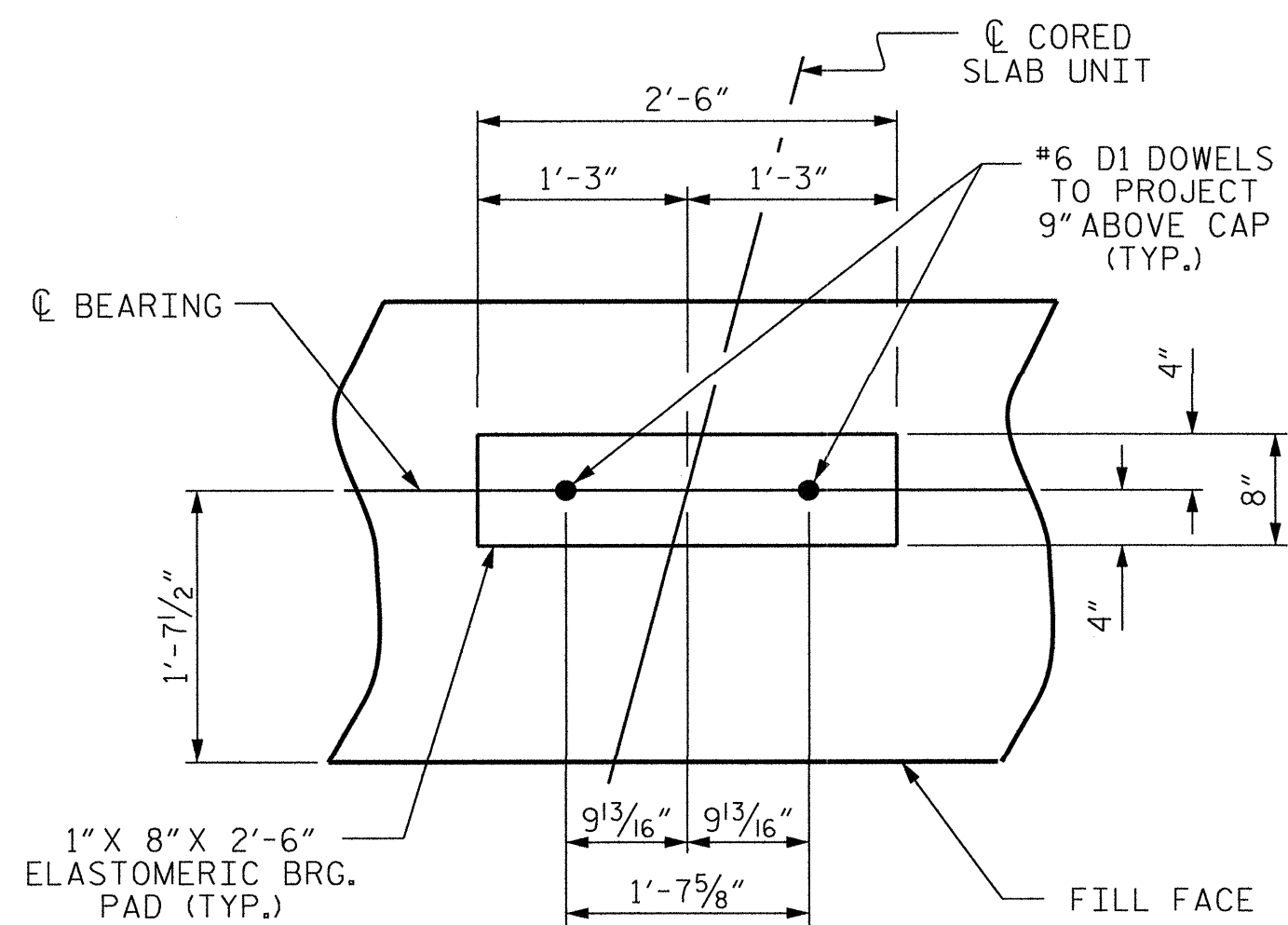
ASSEMBLED BY :	RTJ	DATE :	05/11
CHECKED BY :	JLA	DATE :	06/11
DRAWN BY :	DGE 3/10		
CHECKED BY :	MKT 3/10		

PREPARED BY
TCS ENGINEERS
107-A MICA AVENUE
MORGANTON, NC 28655



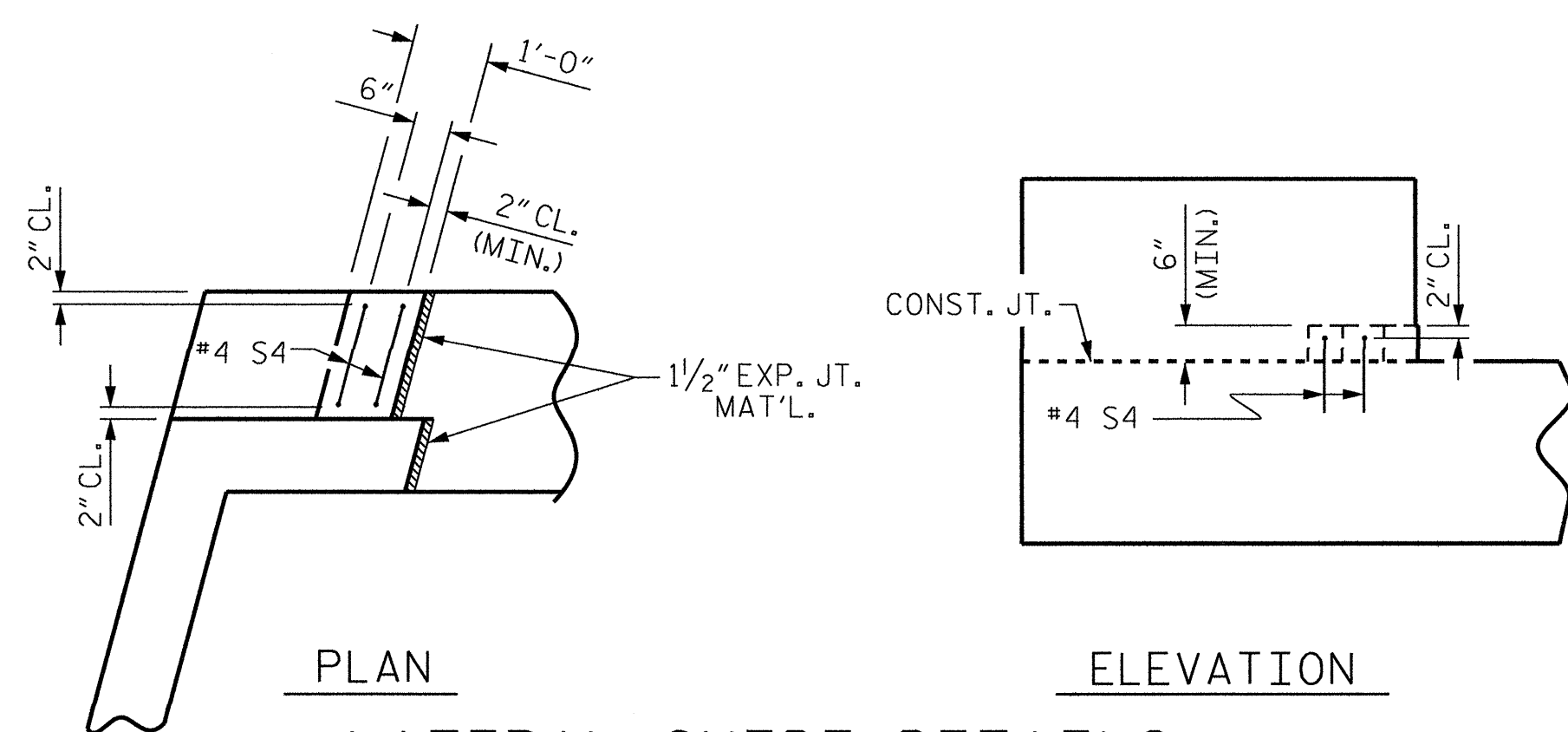
PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-
 SHEET 4 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2 WING DETAILS					
SHEET NO. S-17					
TOTAL SHEETS 27					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		



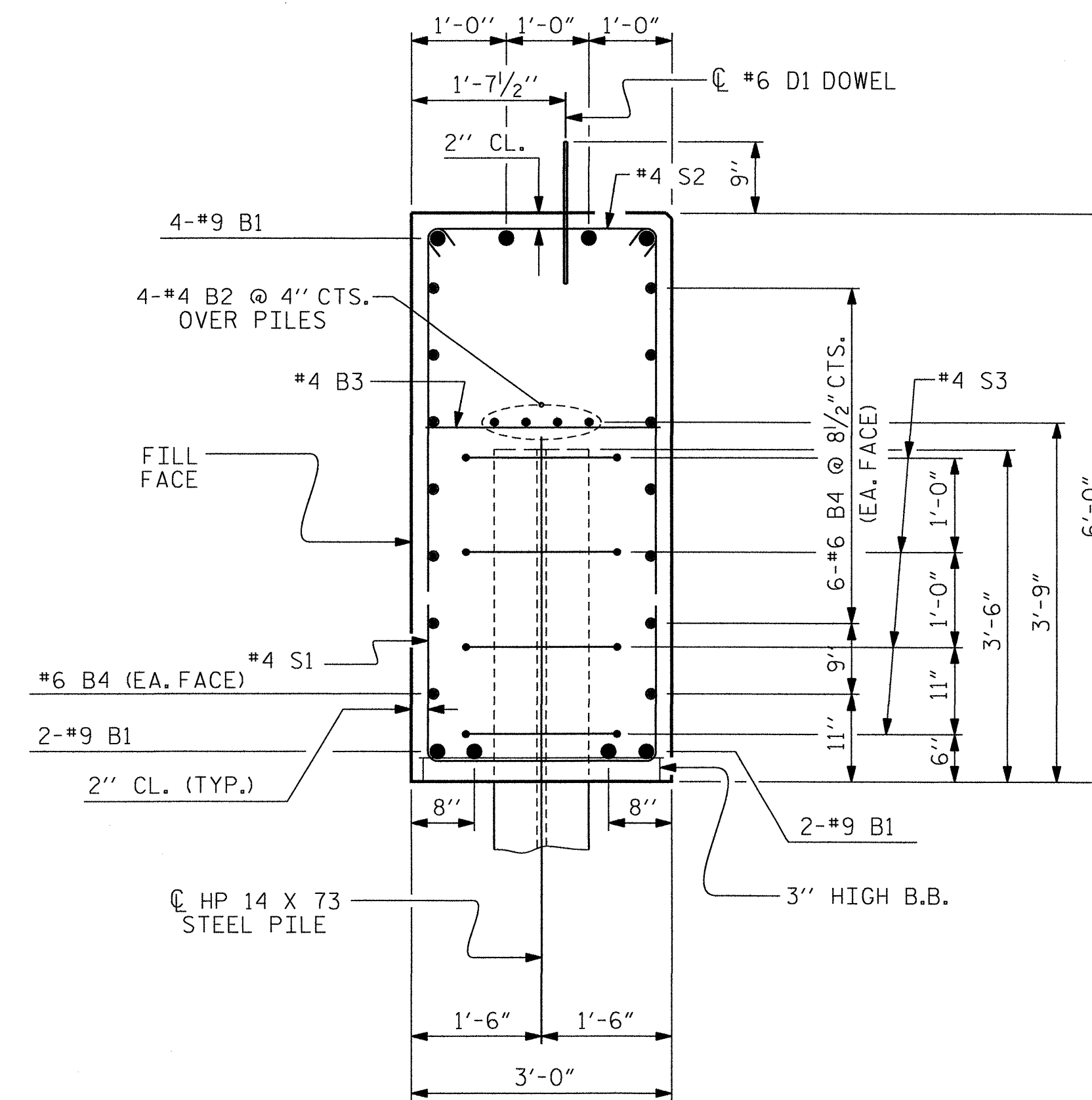
DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



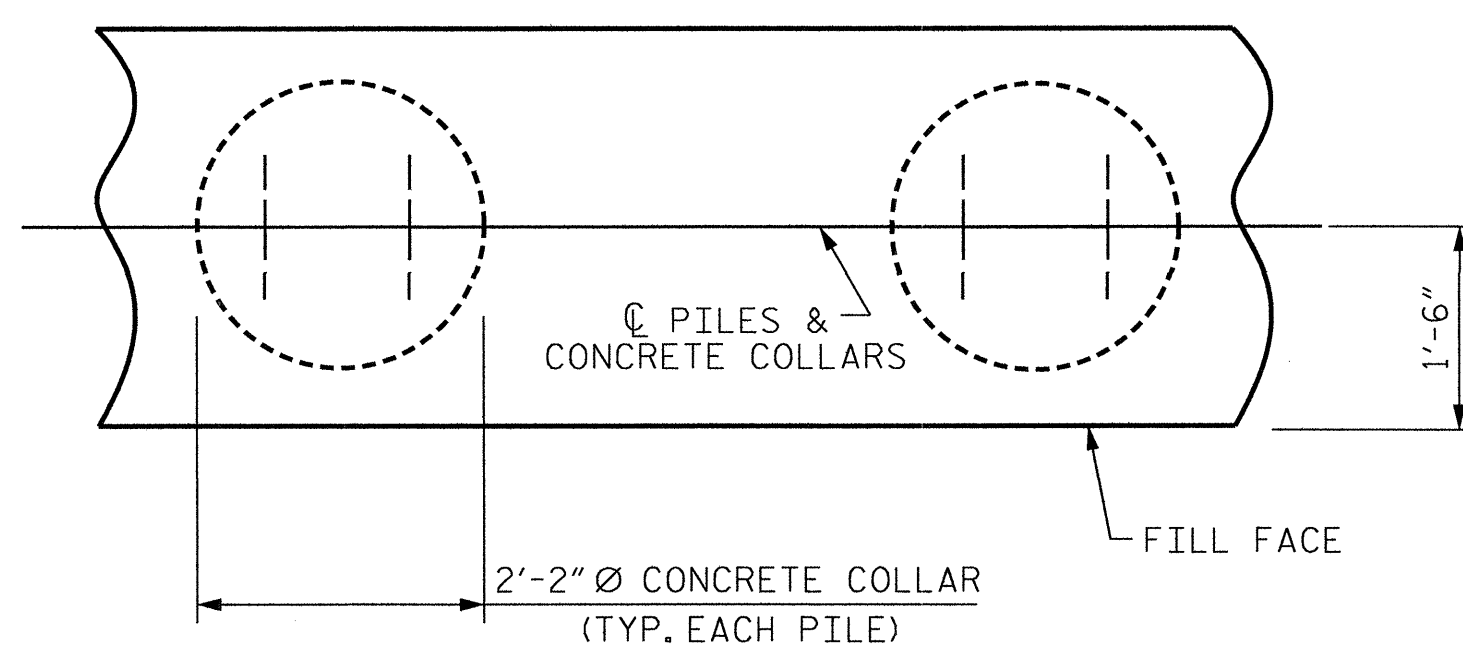
LATERAL GUIDE DETAILS

(END BENT No. 1, LEFT LATERAL GUIDE SHOWN, RIGHT END SIMILAR)
(END BENT No. 2 SIMILAR BY ROTATION)

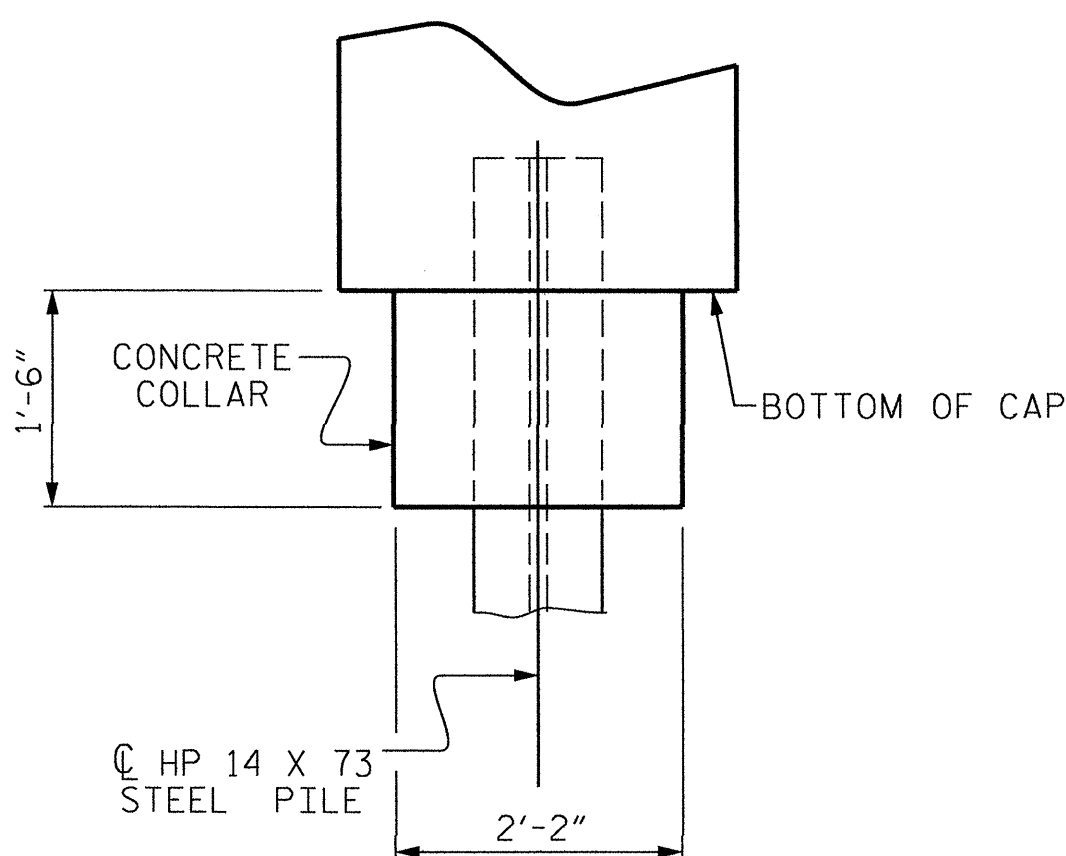


SECTION A-A

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



PLAN



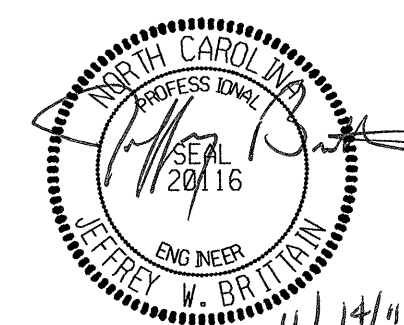
ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 5 OF 6

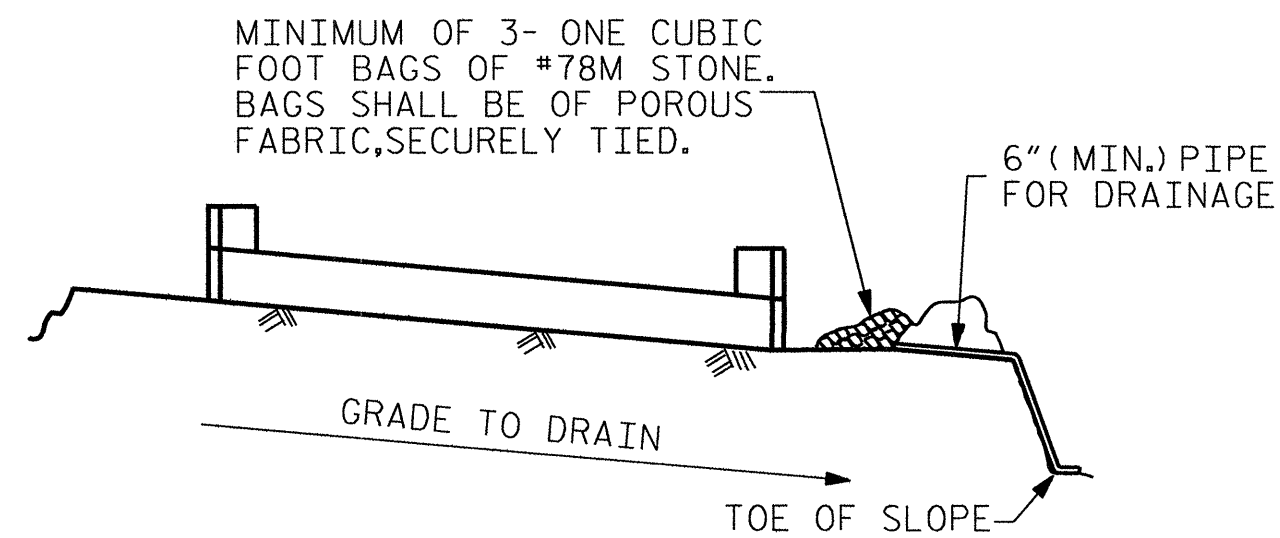


PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT No. 1 & 2
 DETAILS

ASSEMBLED BY : RTJ	DATE : 05/11
CHECKED BY : JLA	DATE : 06/11
DRAWN BY : DGE 3/10	
CHECKED BY : MKT 3/10	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			27



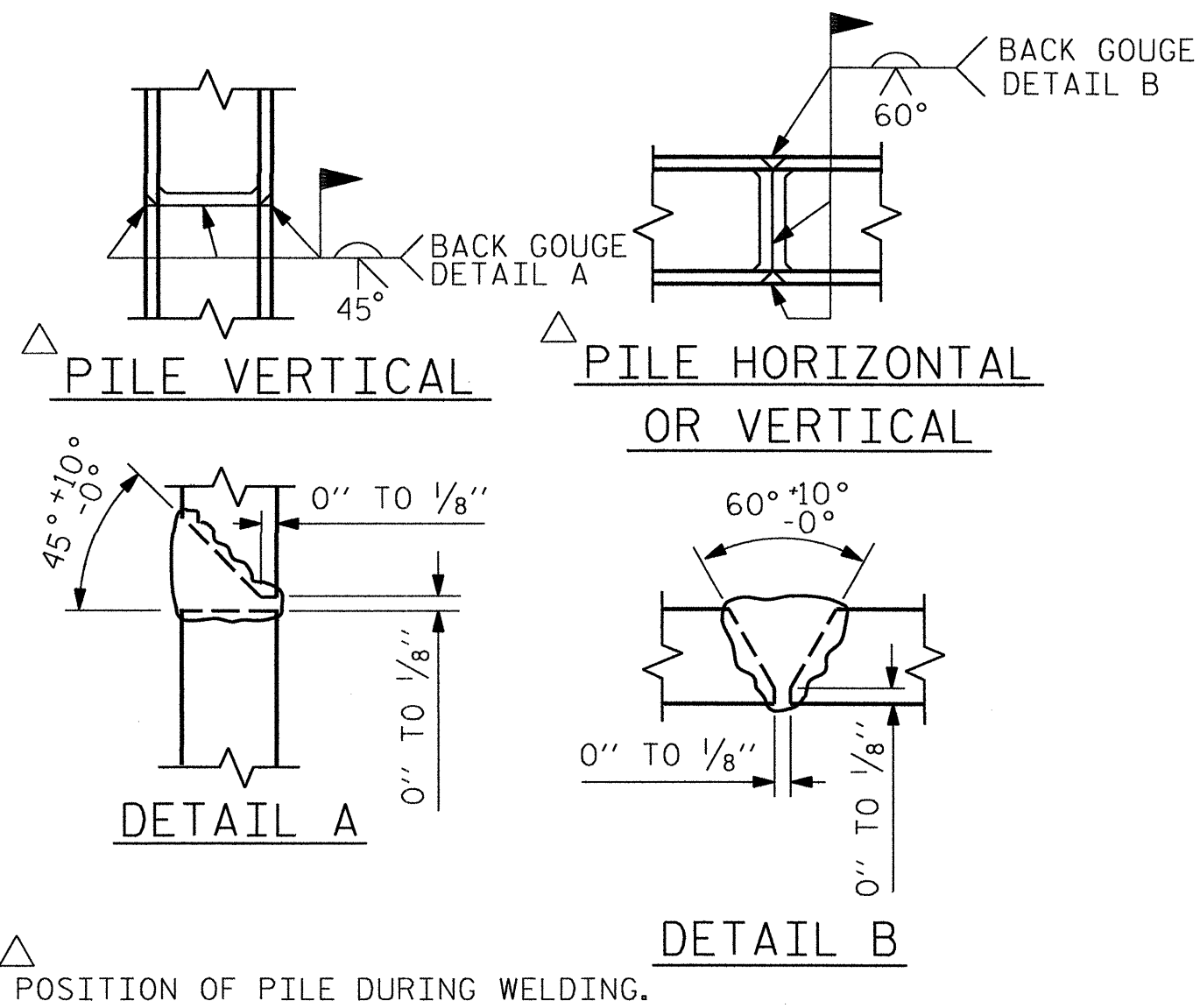
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES						BILL OF MATERIAL FOR END BENT 1					BILL OF MATERIAL FOR END BENT 2						
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	#8		48'-8"	1324		B1	#8		48'-8"	1324	B1	#8		48'-8"	1324		
B2	#8	STR	24'-5"	130		B2	#8	STR	24'-5"	130	B2	#8	STR	24'-5"	130		
B3	#4	STR	2'-8"	21		B3	#4	STR	2'-8"	21	B3	#4	STR	2'-8"	21		
B4	#6	STR	46'-4"	974		B4	#6	STR	46'-4"	974	B4	#6	STR	46'-4"	974		
D1	#6	STR	1'-6"	59		D1	#6	STR	1'-6"	59	D1	#6	STR	1'-6"	59		
H1	#4	2	8'-7"	57		H5	#4	2	10'-1"	67	H5	#4	2	10'-1"	67		
H2	#4	2	8'-9"	58		H6	#4	2	10'-3"	68	H6	#4	2	10'-3"	68		
H3	#4	3	10'-6"	70		H7	#4	3	9'-0"	60	H7	#4	3	9'-0"	60		
H4	#4	3	10'-4"	69		H8	#4	3	8'-10"	59	H8	#4	3	8'-10"	59		
K1	#4	STR	3'-3"	26		K1	#4	STR	3'-3"	26	K1	#4	STR	3'-3"	26		
S1	52	#4	4	14'-8"	509	S1	52	#4	4	14'-8"	509	S1	52	#4	4	14'-8"	509
S2	52	#4	5	3'-5"	119	S2	52	#4	5	3'-5"	119	S2	52	#4	5	3'-5"	119
S3	36	#4	6	7'-7"	182	S3	36	#4	6	7'-7"	182	S3	36	#4	6	7'-7"	182
S4	4	#4	7	4'-7"	12	S4	4	#4	7	4'-7"	12	S4	4	#4	7	4'-7"	12
V1	35	#4	STR	8'-0"	187	V1	34	#4	STR	8'-0"	187	V1	34	#4	STR	8'-0"	187
V2	20	#4	STR	8'-3"	110	V2	21	#4	STR	8'-3"	110	V2	21	#4	STR	8'-3"	110
REINFORCING STEEL					3,907 LBS.	REINFORCING STEEL					3,908 LBS.						
CLASS A CONCRETE BREAKDOWN (FOR END BENT 1)						CLASS A CONCRETE BREAKDOWN (FOR END BENT 2)											
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					36.6 C.Y.	POUR #1 CAP, LOWER PART OF WINGS & COLLARS					36.6 C.Y.						
POUR #2 UPPER PART OF WINGS					2.2 C.Y.	POUR #2 UPPER PART OF WINGS					2.2 C.Y.						
POUR #3 LATERAL GUIDES					0.1 C.Y.	POUR #3 LATERAL GUIDES					0.1 C.Y.						
TOTAL CLASS A CONCRETE					38.9 C.Y.	TOTAL CLASS A CONCRETE					38.9 C.Y.						
END BENT No. 1 HP 14 X 73 STEEL PILES NO: 9 LIN. FT.= 135 STEEL PILE POINTS NO: 9						END BENT No. 2 HP 14 X 73 STEEL PILES NO: 9 LIN. FT.= 270 STEEL PILE POINTS NO: 9											



PILE SPLICE DETAILS

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 6 OF 6



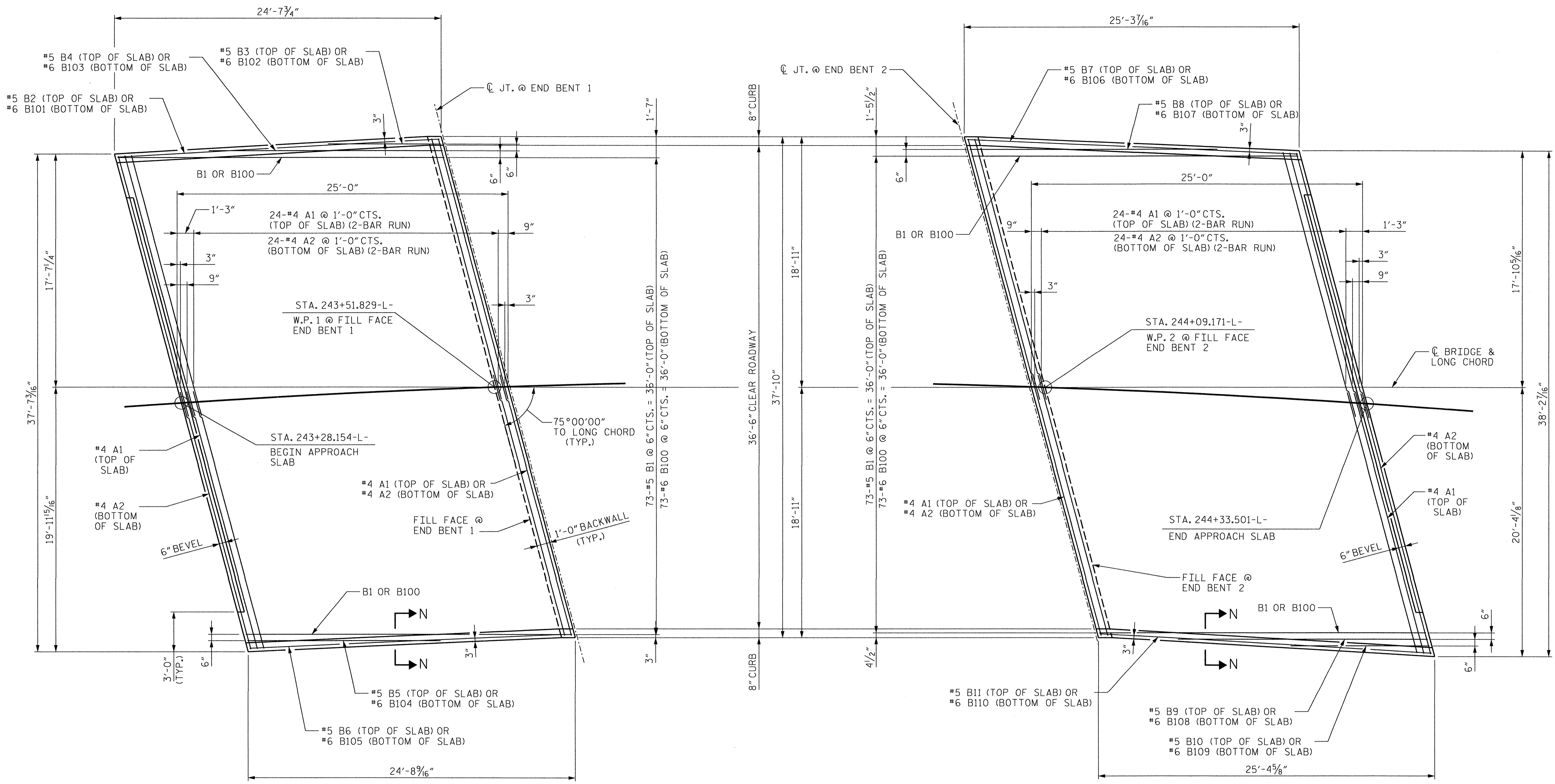
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT No. 1 & 2
 DETAILS

ASSEMBLED BY : RTJ DATE : 05/11
 CHECKED BY : JLA DATE : 06/11
 DRAWN BY : DGE 3/10
 CHECKED BY : MKT 3/10

PREPARED BY
 TOS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

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

TOTAL SHEETS: 27



PLAN @ END BENT 1

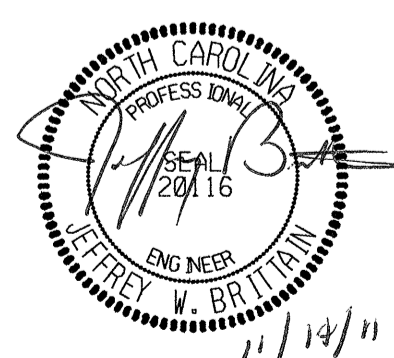
PLAN @ END BENT 2

PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT



PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

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

TOTAL SHEETS
27

DRAWN BY: RTJ DATE: 2/11
 CHECKED BY: JLA DATE: 5/11

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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.

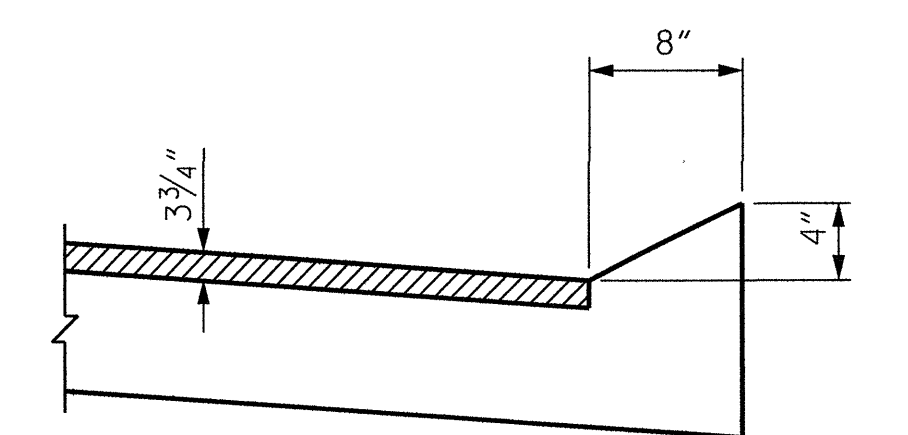
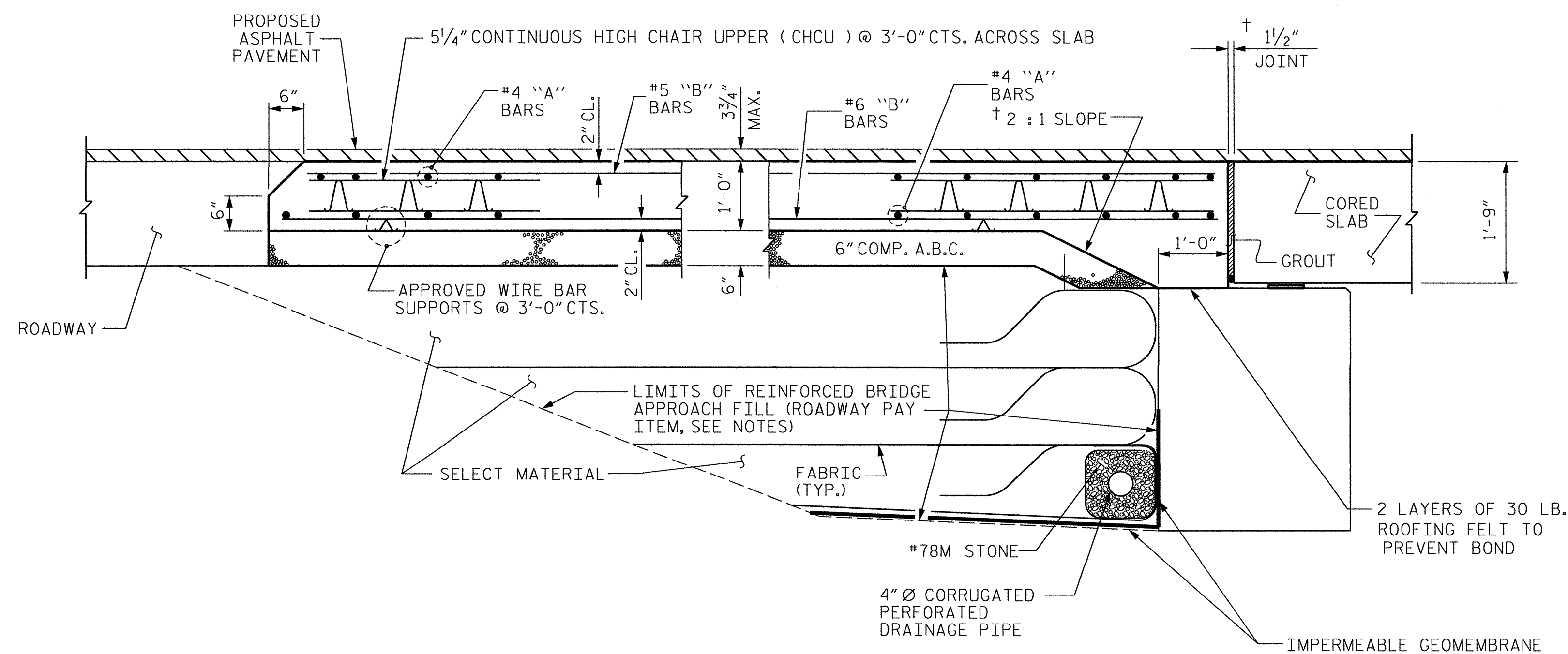
FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE CORED SLAB UNIT" SHEETS.

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

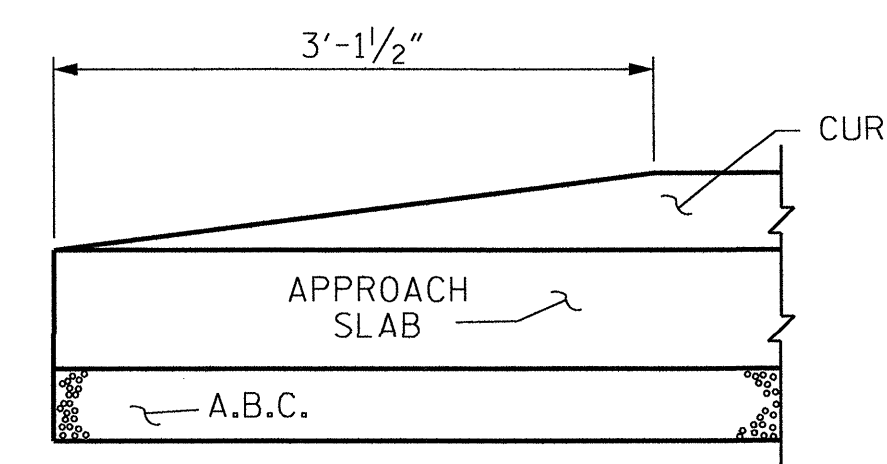
APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL

APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	20'-7"	715
A2	52	#4	STR	20'-6"	712
*B1	73	#5	STR	24'-2"	1,840
*B2	1	#5	STR	24'-4"	25
*B3	1	#5	STR	8'-6"	9
*B4	1	#5	STR	17'-7"	18
*B5	1	#5	STR	14'-6"	15
*B6	1	#5	STR	23'-6"	25
B100	73	#6	STR	24'-7"	2,695
B101	1	#6	STR	24'-4"	37
B102	1	#6	STR	8'-6"	13
B103	1	#6	STR	17'-7"	26
B104	1	#6	STR	14'-6"	22
B105	1	#6	STR	23'-6"	35
				REINFORCING STEEL	LBS. 3,540
				*EPOXY COATED REINFORCING STEEL	LBS. 2,647
				CLASS AA CONCRETE	C. Y. 36.3
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	20'-7"	715
A2	52	#4	STR	20'-6"	712
*B1	73	#5	STR	24'-2"	1,840
*B7	1	#5	STR	24'-11"	26
*B8	1	#5	STR	18'-8"	19
*B9	1	#5	STR	18'-10"	20
*B10	1	#5	STR	10'-5"	11
*B11	1	#5	STR	25'-1"	26
B100	73	#6	STR	24'-7"	2,695
B106	1	#6	STR	24'-11"	37
B107	1	#6	STR	18'-8"	28
B108	1	#6	STR	18'-10"	28
B109	1	#6	STR	10'-5"	16
B110	1	#6	STR	25'-1"	38
				REINFORCING STEEL	LBS. 3,554
				*EPOXY COATED REINFORCING STEEL	LBS. 2,657
				CLASS AA CONCRETE	C. Y. 37.3

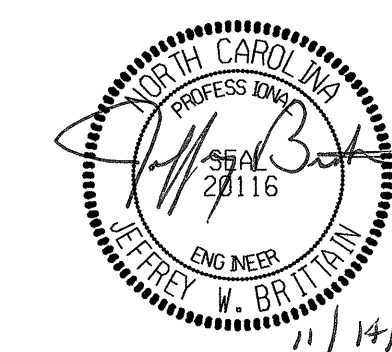


SECTION N-N



END OF CURB WITHOUT
SHOULDER BERM GUTTER

CURB DETAILS



PROJECT NO. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

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

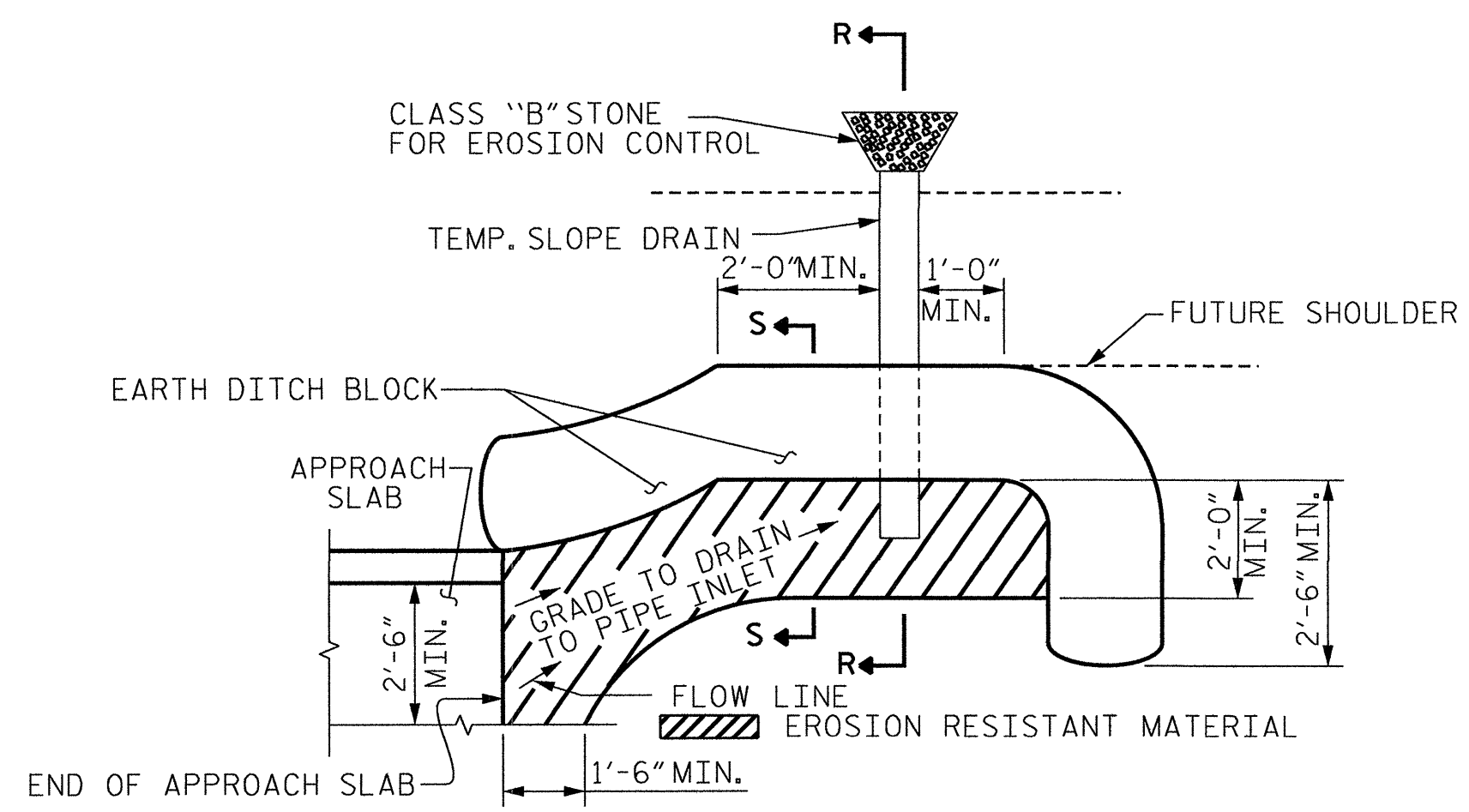
TOTAL SHEETS
27

† NORMAL TO END BENT

SECTION THRU SLAB

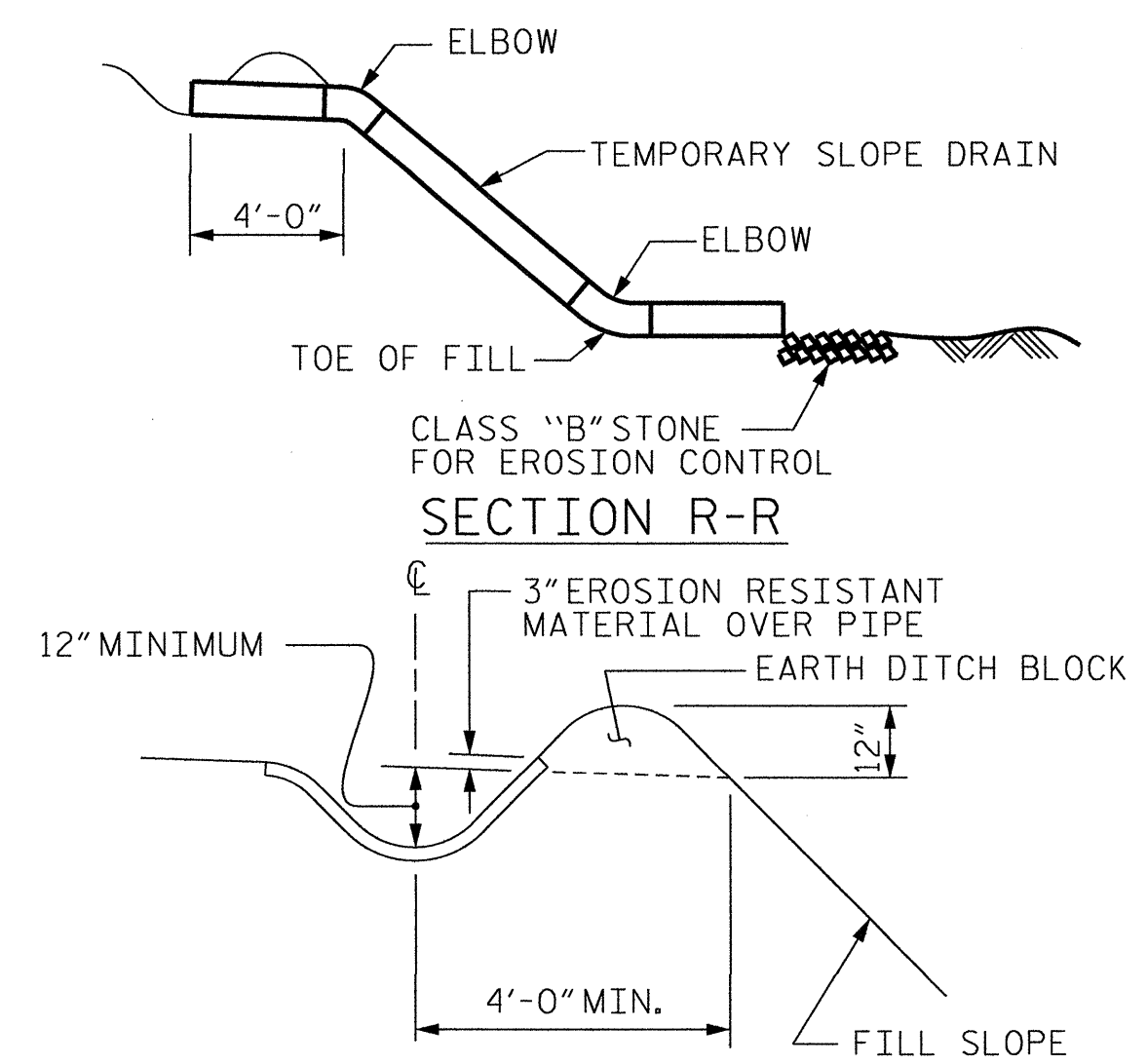
DRAWN BY: RTJ DATE: 2/11
 CHECKED BY: JLA DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655



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

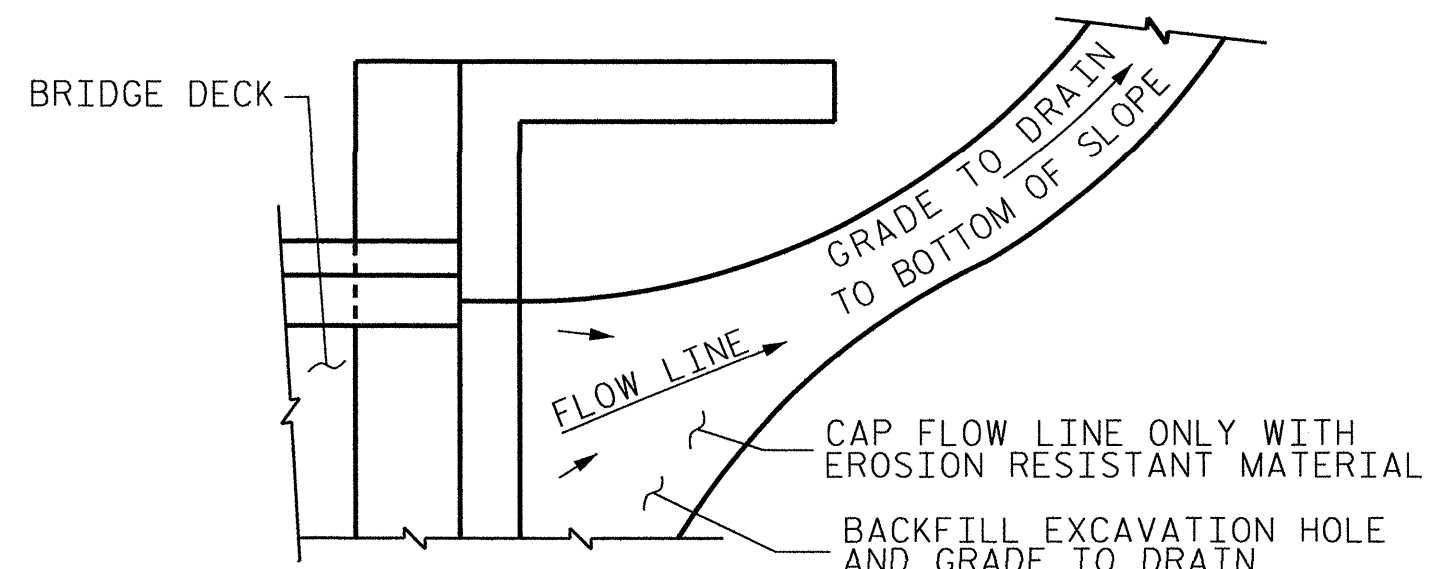
PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

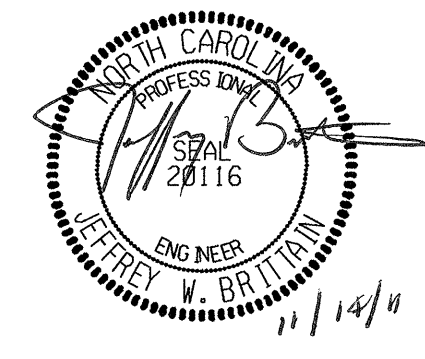
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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. R-5207B
HENDERSON COUNTY
 STATION: 243+80.50-L-
 SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-22
1			3			TOTAL SHEETS
2			4			27

DRAWN BY: RTJ DATE: 08/10
 CHECKED BY: JLA DATE: 5/11

PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

BM #17 ELEV. 2101.48'
RAILROAD SPIKE IN BASE OF 18" PINE
92.78' RT OF -L- STA. 361+67.75

NOTE: THIS SITE IS LOCATED IN A FLOOD HAZARD ZONE. NO FLOOD STUDY FOR THIS STREAM.

HYDROGRAPHIC DATA

DESIGN DISCHARGE..... = 380 CFS
FREQUENCY OF DESIGN FLOOD..... = 25 YRS.
DESIGN HIGH WATER ELEVATION... = 2072.72'
DRAINAGE AREA..... = 480 ACRES
BASIC DISCHARGE (Q100)..... = 600 CFS
BASIC HIGH WATER ELEVATION.... = 2077.00'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE..... = 405 CFS
FREQUENCY OF OVERTOPPING FLOOD..... = 25 YR.-
OVERTOPPING FLOOD ELEVATION..... = 2073.26'

EXISTING CULVERT INFORMATION

1 @ 5' x 5' +/- RCBC

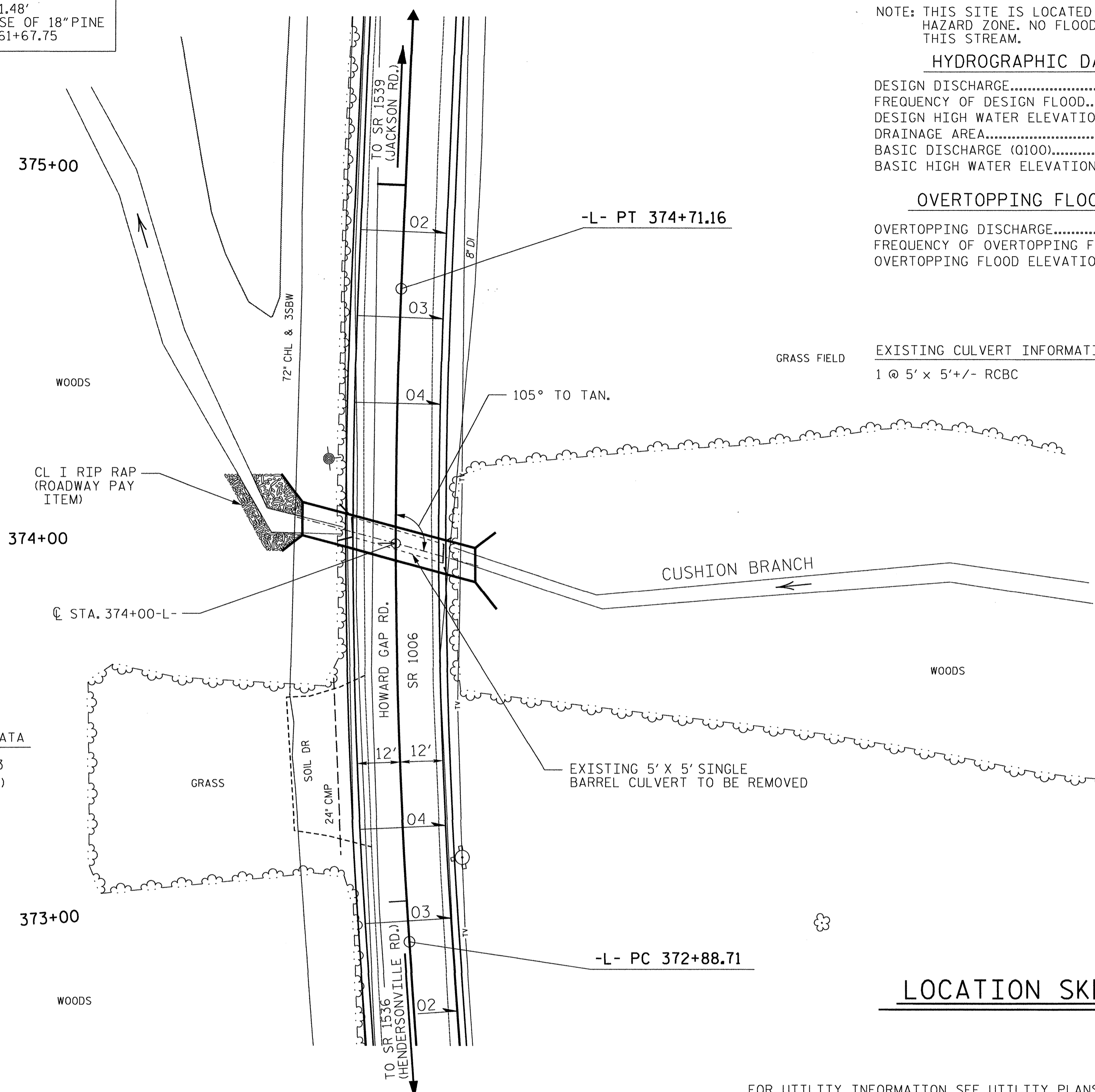
NOTES

ASSUMED LIVE LOAD ----- HL93 OR ALTERNATE LOADING.
DESIGN FILL----- 3.1'
FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

REMOVAL OF THE EXISTING CULVERT SHALL BE INCLUDED IN THE LUMP SUM PAY ITEM FOR CULVERT EXCAVATION.



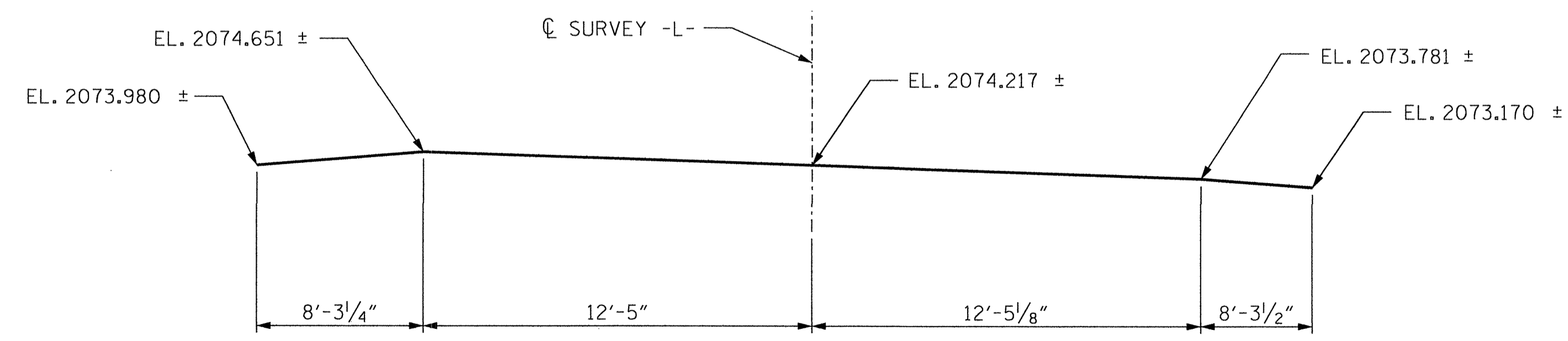
LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

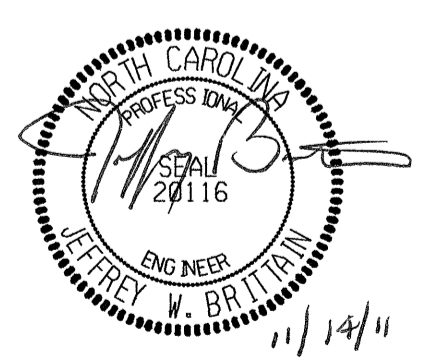
-L- HORIZ. CURVE DATA

PI Sta 373+80.03
Δ = 6°20'08.4" (RT)
D = 3°28'20.9"
L = 182.45'
T = 91.32'
R = 1,650.00'
SE = 0.04

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
BARREL @ 0.952 CY/FT	47.6	C.Y.
WING ETC.	13.3	C.Y.
TOTAL	60.9	C.Y.
REINFORCING STEEL		
BARREL	5,551	LBS.
WINGS ETC.	744	LBS.
TOTAL	6,295	LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MATERIAL	75	TONS



PROFILE ALONG CULVERT



PROJECT NO. R-5207B
COUNTY: HENDERSON
STATION: 374+00-L-
SHEET 1 OF 4

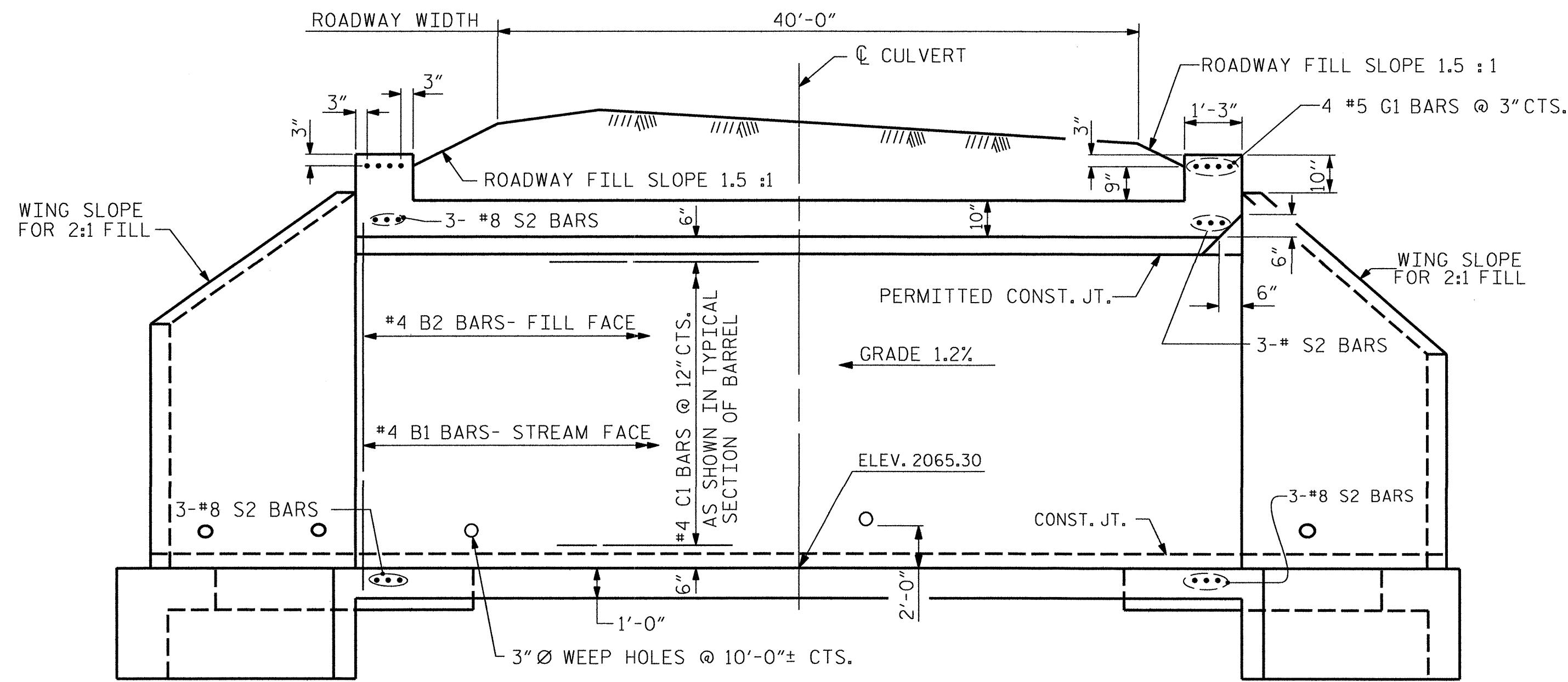
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. x 5 FT.
CONCRETE BOX CULVERT
105° SKEW

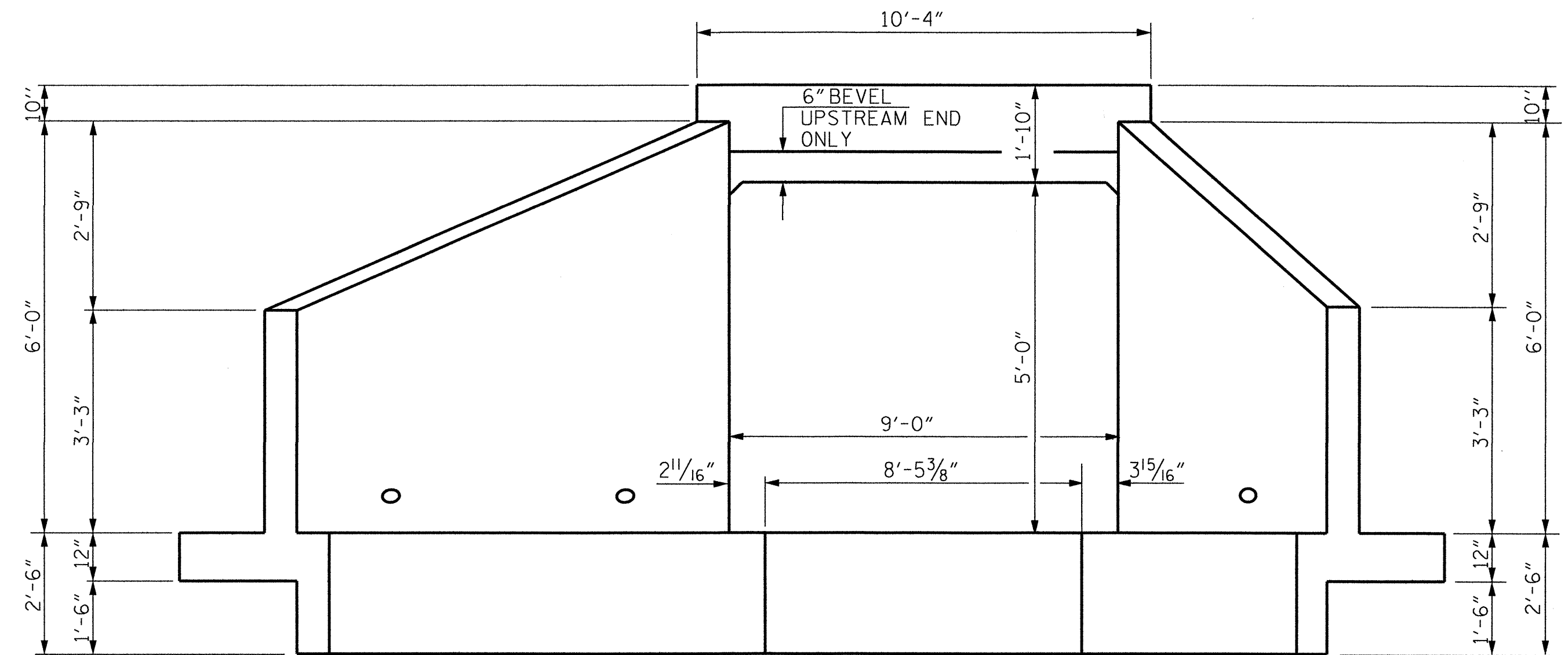
DRAWN BY: RTJ DATE: 9/06
CHECKED BY: NMW DATE: 04/11

PREPARED BY
TGS ENGINEERS
107-A MICA AVENUE
MORGANTON, NC 28655

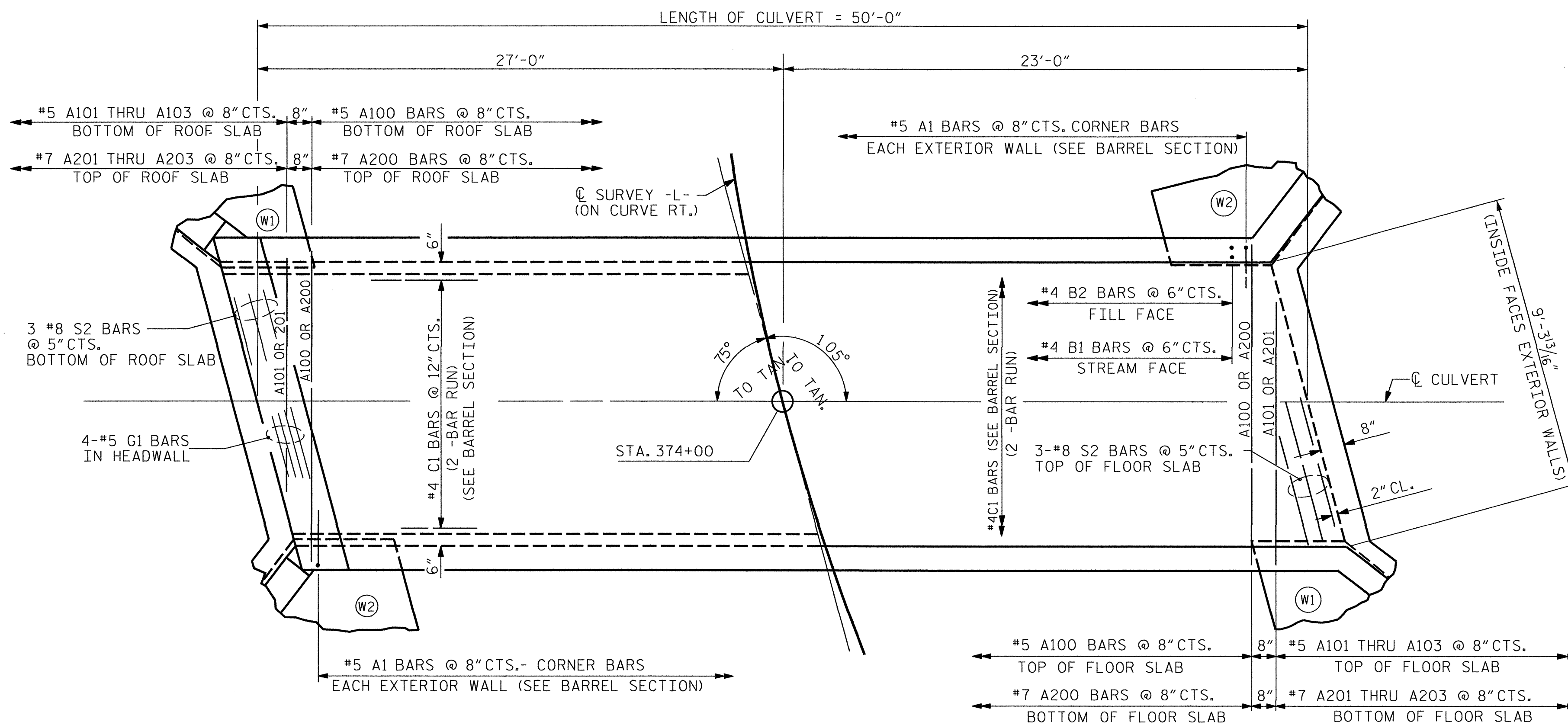
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-23
1			3			TOTAL SHEETS
2			4			27



CULVERT SECTION NORMAL TO ROADWAY

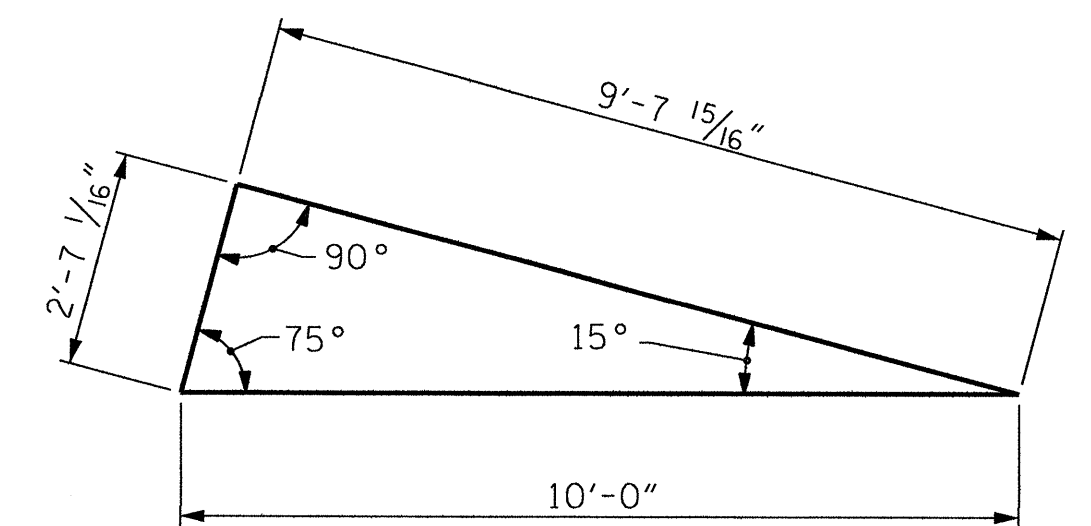


END ELEVATION NORMAL TO SKEW

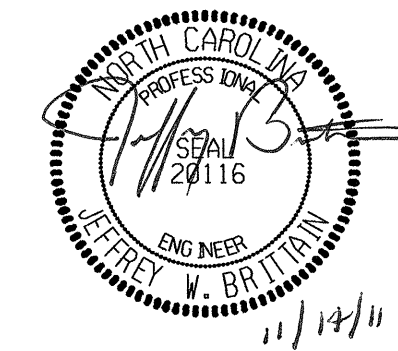


PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB



SKEW TRIANGLE



PROJECT NO. R-5207B
 COUNTY: HENDERSON
 STATION: 374+00-L
 SHEET 2 OF 4

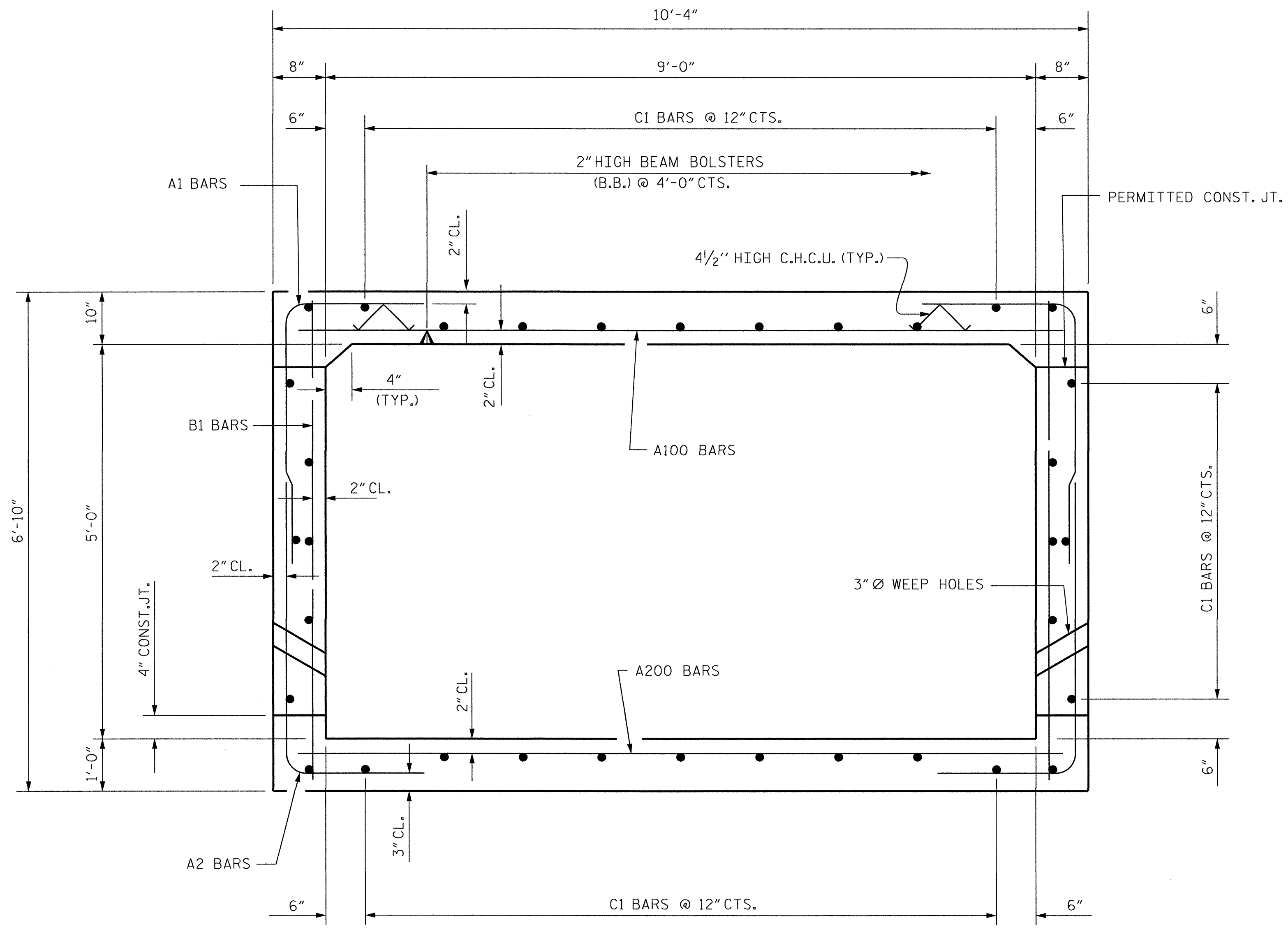
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 9 FT. x 5 FT.
 CONCRETE BOX CULVERT
 105° SKEW

DRAWN BY: JLA DATE: 09/06
 CHECKED BY: MNW DATE: 04/11

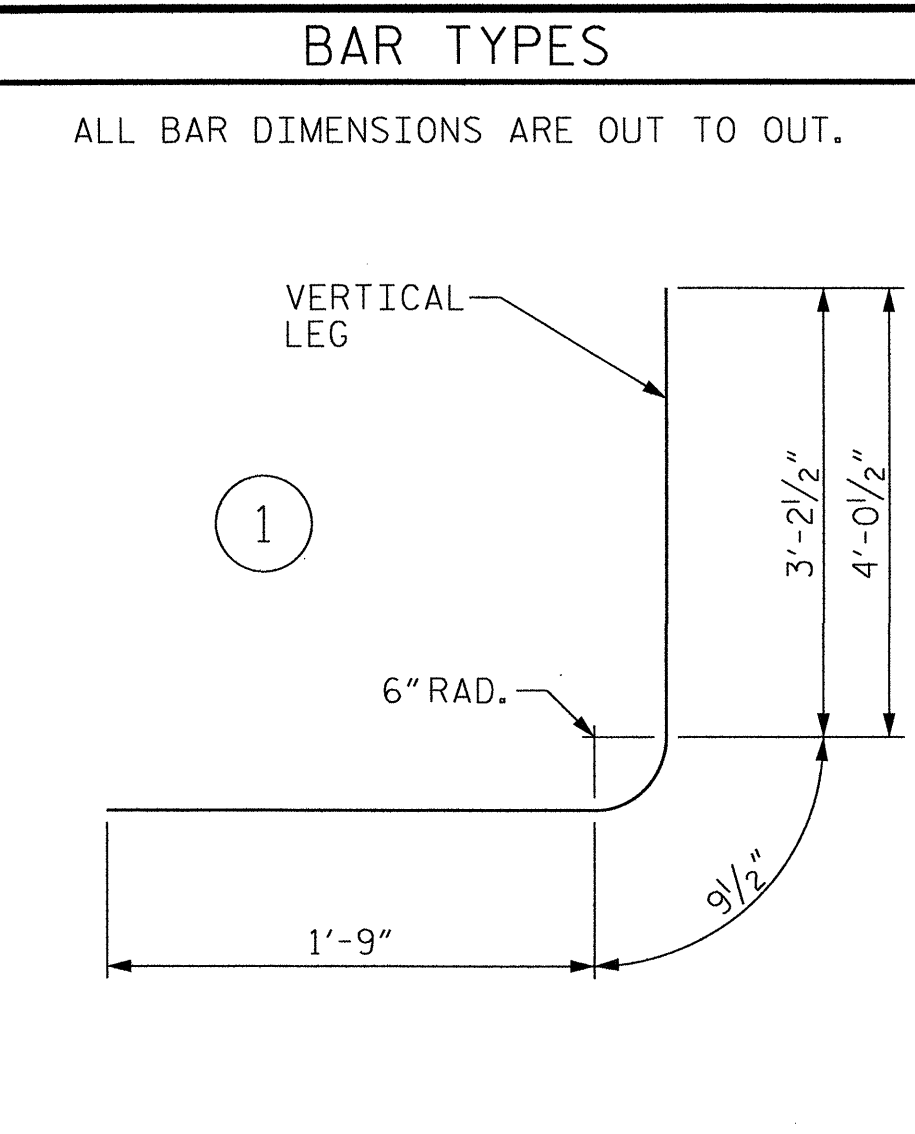
PREPARED BY
 TGS ENGINEERS
 107-A NICA AVENUE
 MORGANTON, NC 28655

REVISIONS						SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS	
1			3			27	
2			4				



RIGHT ANGLE SECTION OF BARREL

THERE ARE 34 "C" BARS IN SECTION OF BARREL
 SINGLE 9' X 5' BOX CULVERT BARREL SECTION
 FOR FILLS LESS THAN 15 FEET



BILL OF MATERIAL
CULVERT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	154	#5	1	5'-9"	924
A2	154	#5	1	6'-7"	1057
A100	142	#5	STR	10'-0"	1481
A101	4	#5	STR	8'-1"	34
A102	4	#5	STR	5'-7"	23
A103	4	#5	STR	3'-1"	13
B1	100	#4	STR	6'-5"	429
C1	68	#4	STR	25'-10"	1173
G1	8	#5	STR	10'-4"	86
S2	12	#8	STR	10'-4"	331
REINFORCING STEEL					5551 LBS

MIN. SLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
C1	#4	1'-11"



PROJECT NO. R-5207B
COUNTY: HENDERSON
STATION: 374 + 00-L-
 SHEET 3 OF 4

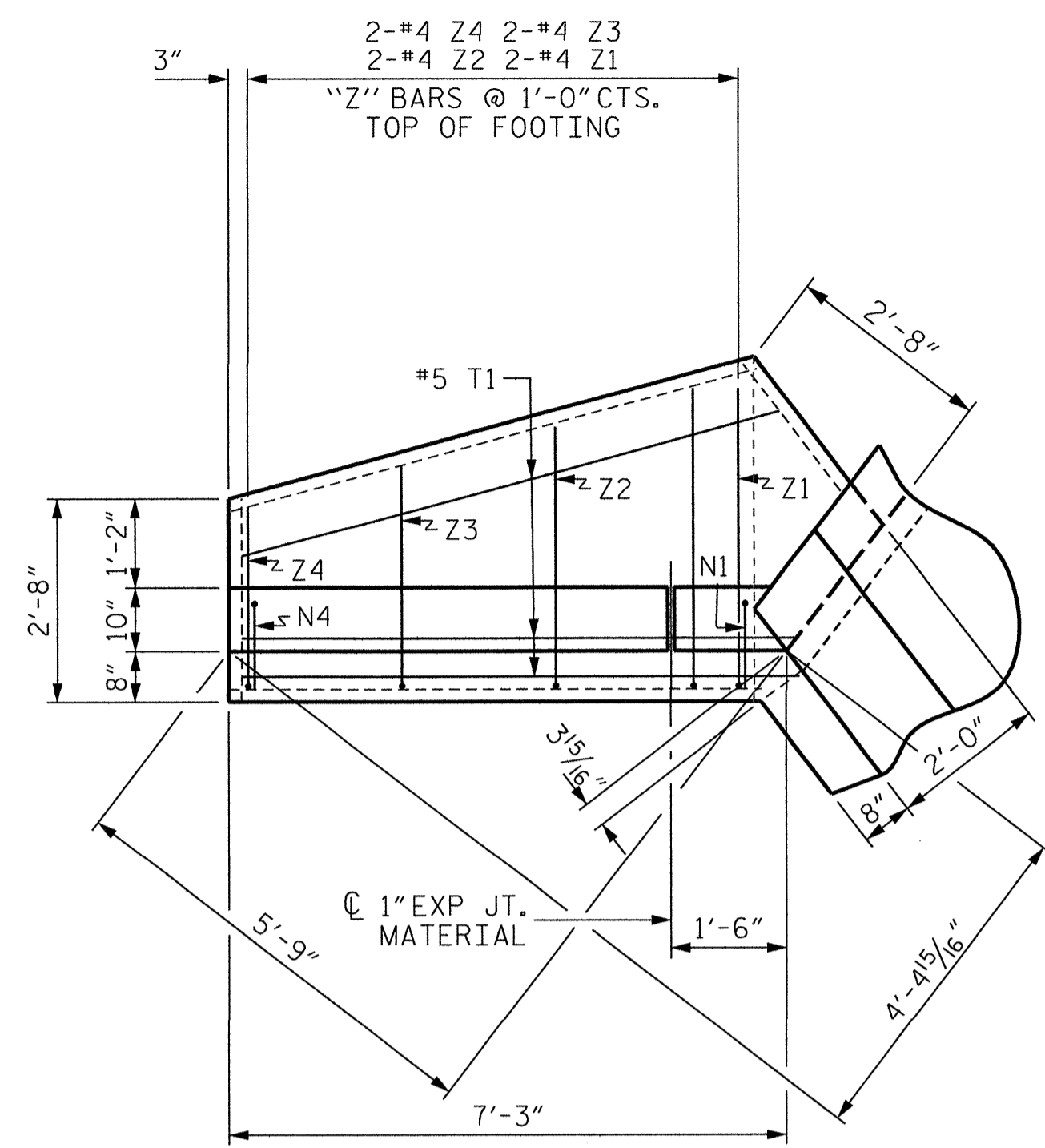
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SINGLE 9 FT. x 5 FT.
 CONCRETE BOX CULVERT
 105° SKEW**

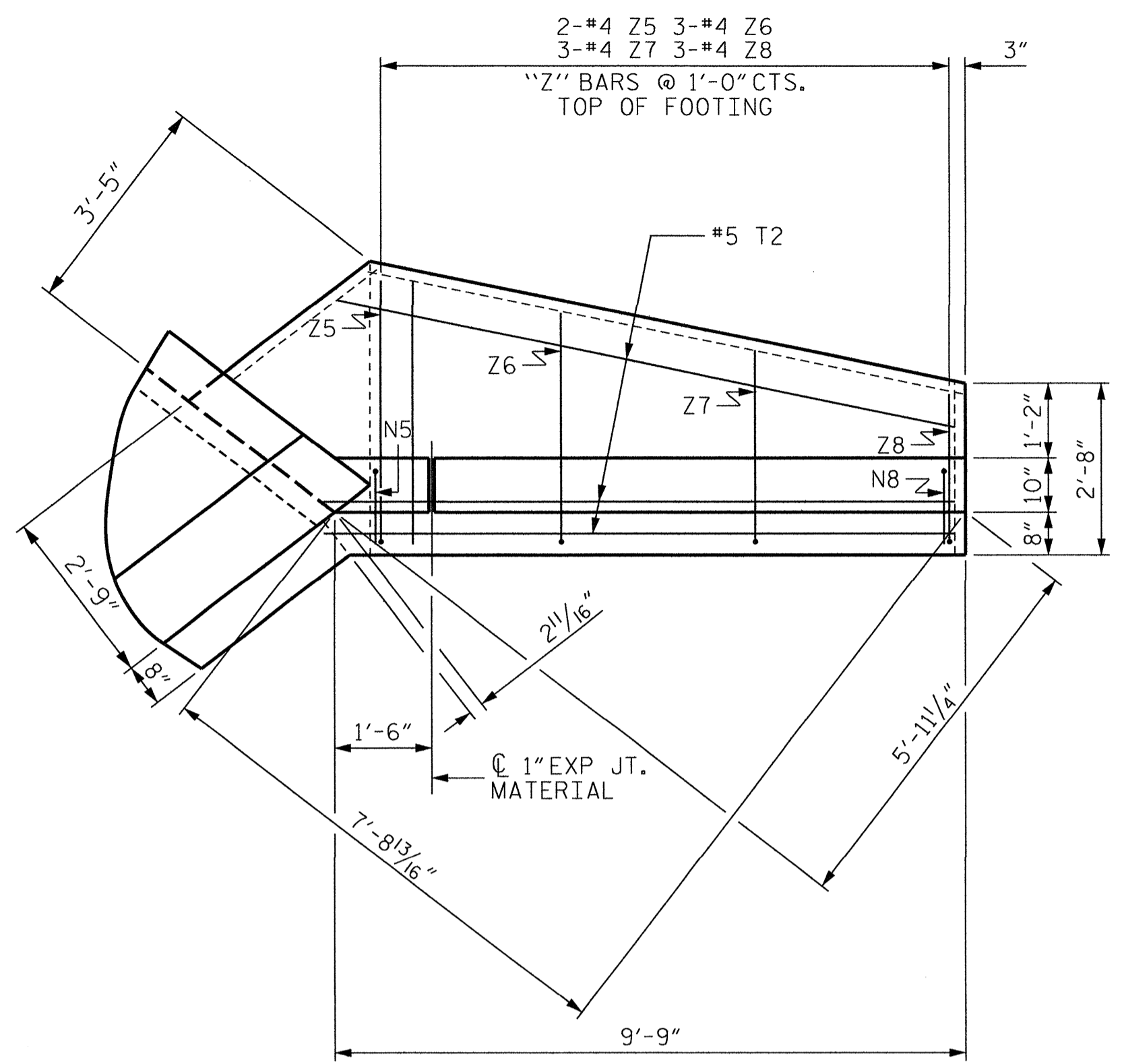
DRAWN BY: JLA **DATE:** 09/06
CHECKED BY: NMW **DATE:** 04/11

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 107-A WICKA AVENUE
 MORGANTON, NC 28655

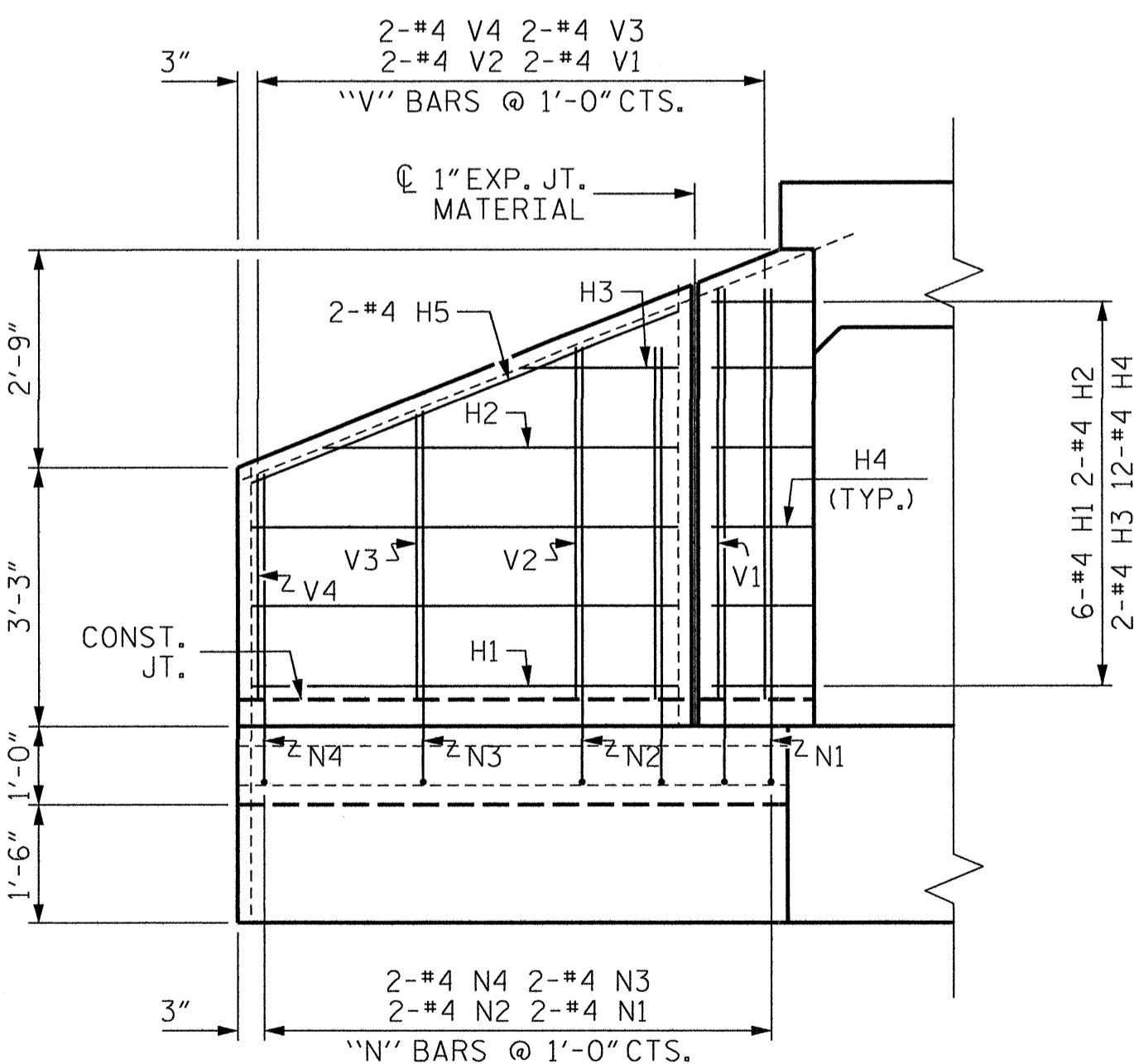
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			S-25
2			4			S-27



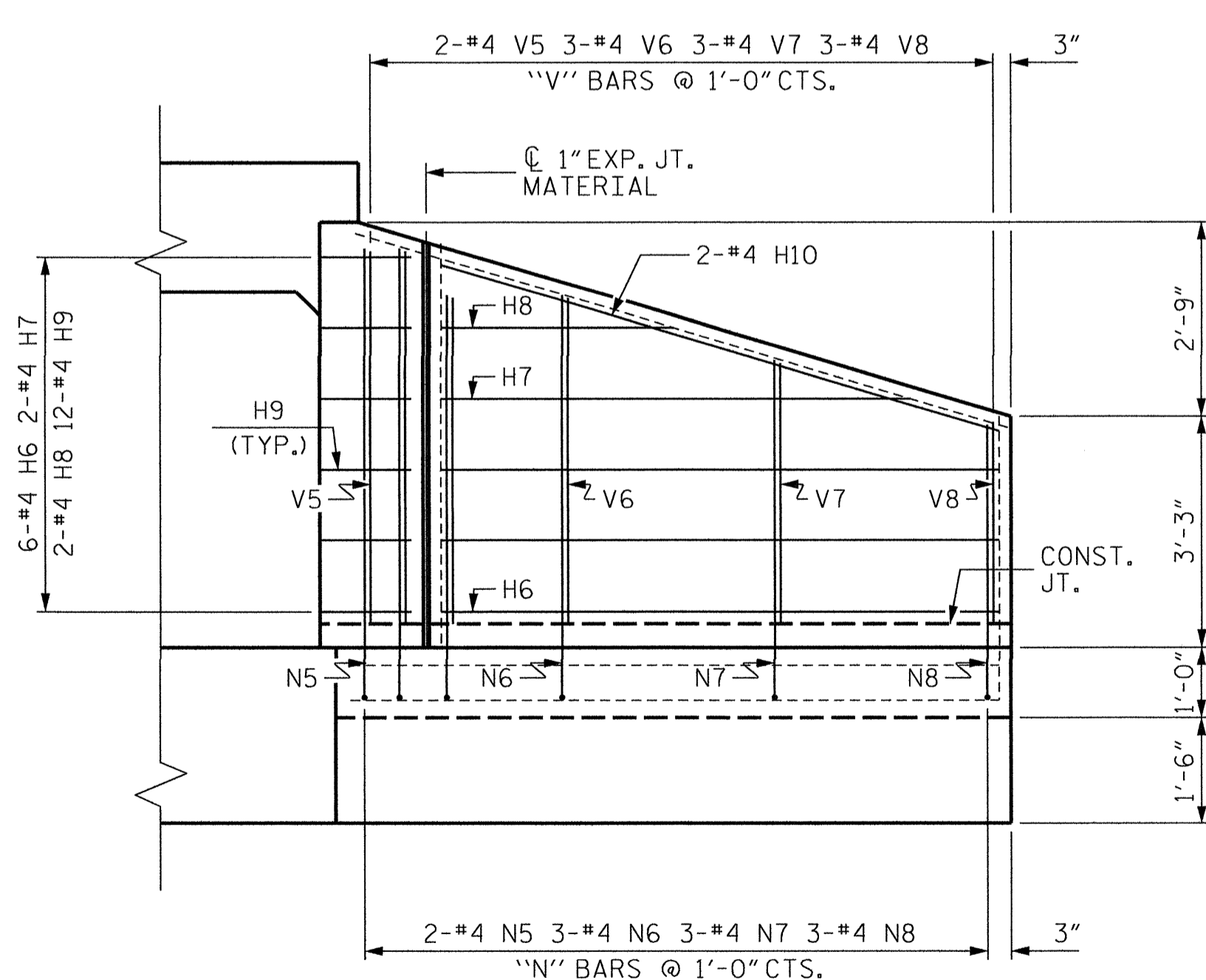
PLAN W2



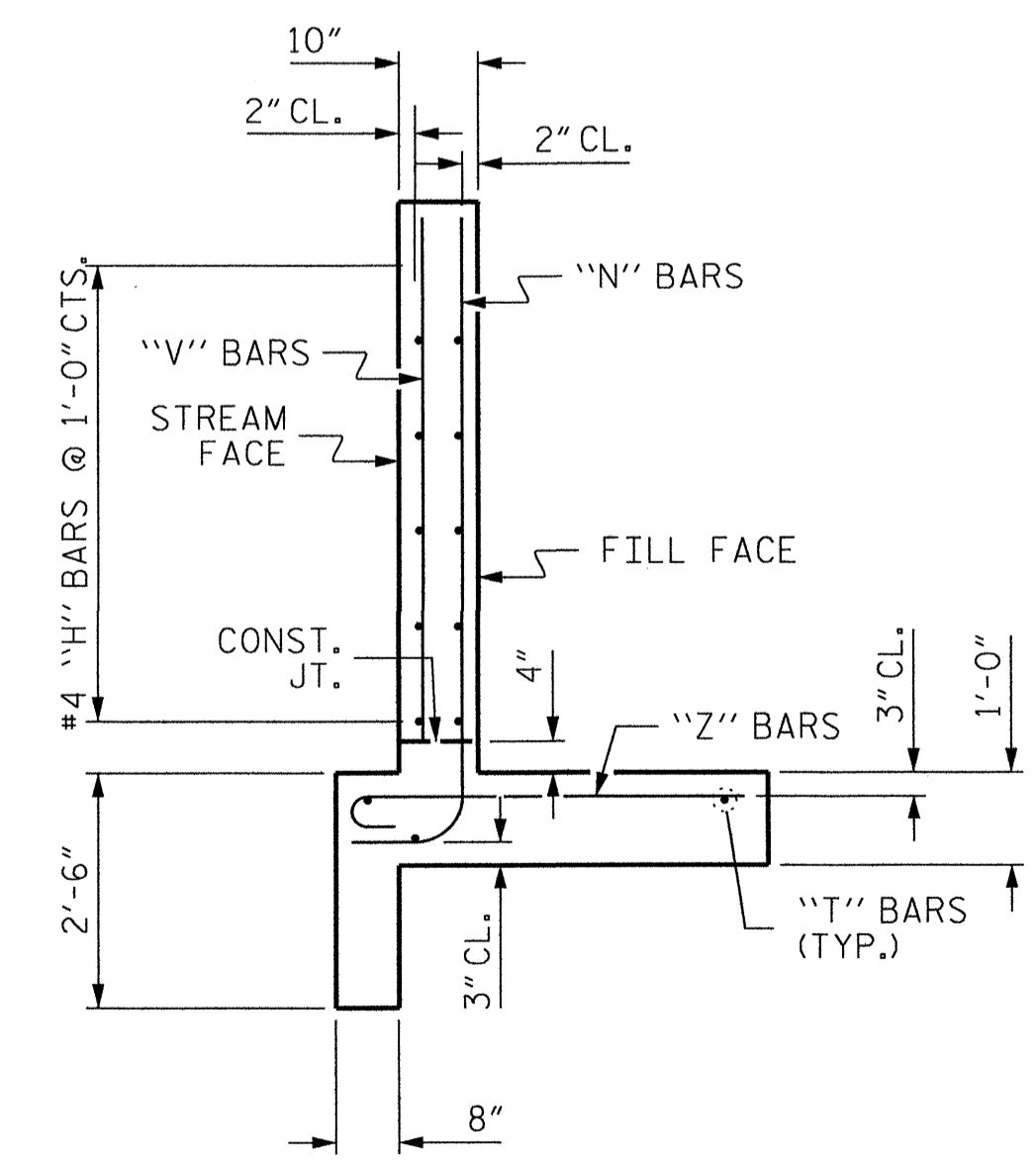
PLAN W1



ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

①

②

③

④

Z1	3'-11"	6"
Z2	3'-5"	6"
Z3	2'-11"	6"
Z4	2'-4"	6"
Z5	4'-1"	6"
Z6	3'-7"	6"
Z7	3'-0"	6"
Z8	2'-4"	6"

BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	5'-4"	43
H2	4	#4	STR	4'-5"	12
H3	4	#4	STR	2'-0"	5
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	5'-9"	15
H6	12	#4	STR	7'-10"	63
H7	4	#4	STR	6'-7"	18
H8	4	#4	STR	3'-3"	9
H9	24	#4	2	3'-3"	52
H10	4	#4	STR	8'-2"	22
N1	4	#4	3	7'-2"	19
N2	4	#4	3	6'-5"	17
N3	4	#4	3	5'-8"	15
N4	4	#4	3	4'-10"	13
N5	4	#4	3	7'-4"	20
N6	6	#4	3	6'-8"	27
N7	6	#4	3	5'-9"	23
N8	6	#4	3	4'-10"	19
T1	6	#5	STR	7'-3"	45
T2	6	#5	STR	9'-9"	61
V1	4	#4	STR	5'-2"	14
V2	4	#4	STR	4'-5"	12
V3	4	#4	STR	3'-7"	10
V4	4	#4	STR	2'-10"	8
V5	4	#4	STR	5'-3"	14
V6	6	#4	STR	4'-7"	18
V7	6	#4	STR	3'-8"	15
V8	6	#4	STR	2'-10"	11
Z1	4	#4	4	4'-5"	12
Z2	4	#4	4	3'-11"	10
Z3	4	#4	4	3'-5"	9
Z4	4	#4	4	2'-10"	8
Z5	4	#4	4	4'-7"	12
Z6	6	#4	4	4'-1"	16
Z7	6	#4	4	3'-6"	14
Z8	6	#4	4	2'-10"	11
REINFORCING STEEL				744	LBS
FOR 4 WINGS					
CLASS A CONCRETE					
4 WINGS				11.2	CY
2 HEADWALLS				1.0	CY
2 END CURTAIN WALLS				1.1	CY
TOTAL				13.3	CY



PROJECT NO. R-5207B
 COUNTY: HENDERSON
 STATION: 374 + 00-L-
 SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS FOR
 CONCRETE BOX CULVERT
 H = 5'-0" SLOPE = 2:1
 105° SKEW

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-26
1			3			TOTAL SHEETS
2			4			27

DRAWN BY: JLA DATE: 09/06
 CHECKED BY: MNW DATE: 04/11

PREPARED BY
 TGS ENGINEERS
 107-A MICA AVENUE
 MORGANTON, NC 28655

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.

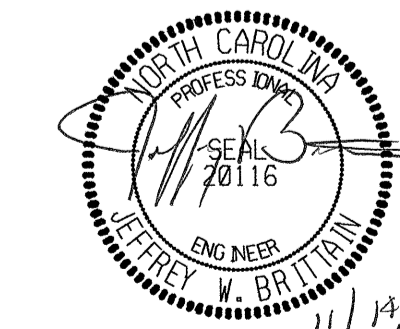
METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL 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.

DRAWN BY: JLA DATE: 10/11
CHECKED BY: RTJ DATE: 10/11

PREPARED BY
TGS ENGINEERS
107-A MICA AVENUE
MORGANTON, NC 28655



PROJECT NO. R-5207B
COUNTY: HENDERSON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

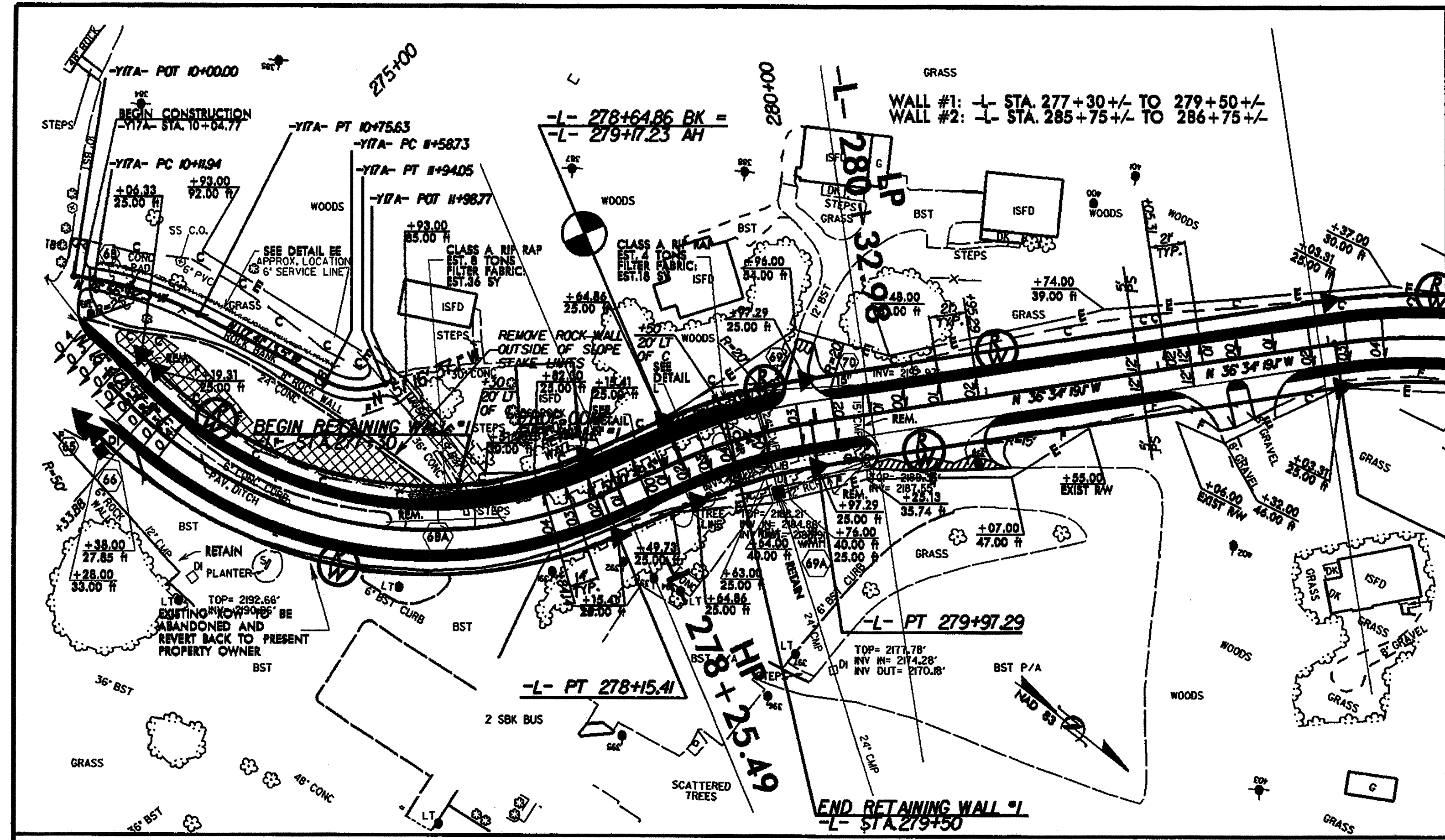
STANDARD NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-27
1			3			TOTAL SHEETS
2			4			27

GEOTECHNICAL ENGINEER
ENGINEER

SEAL 29869
STATE ENGINEER
STATE OF NORTH CAROLINA

4/20/12
SIGNATURE DATE



RETAINING WALL ELEVATIONS

-L- STA	OFFSET FROM C (LEFT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
277+30.00	20.00	2195.90	2195.90	0.00	0.00
277+50.00	20.00	2200.00	2196.30	3.70	3.20
278+00.00	20.00	2205.67	2197.19	8.48	7.88
278+50.00	20.00	2203.37	2197.92	5.45	4.95
278+64.86	20.00	2201.95	2198.09	3.86	3.36
279+17.23	20.00	2199.16	2197.88	1.28	.78
279+50.00	20.00	2197.41	2197.41	0.00	0.00

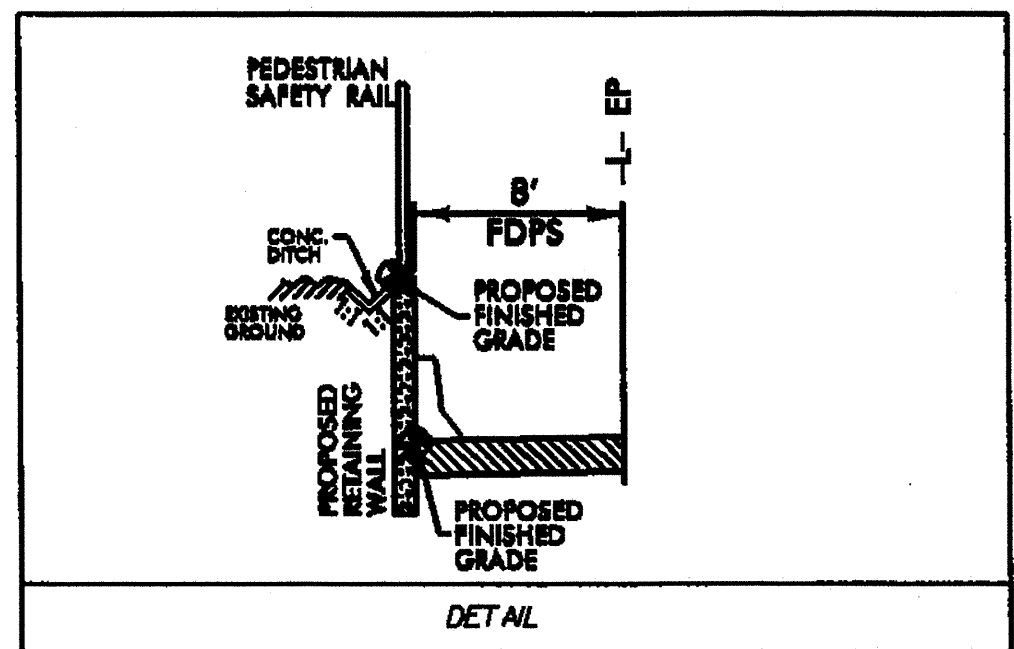
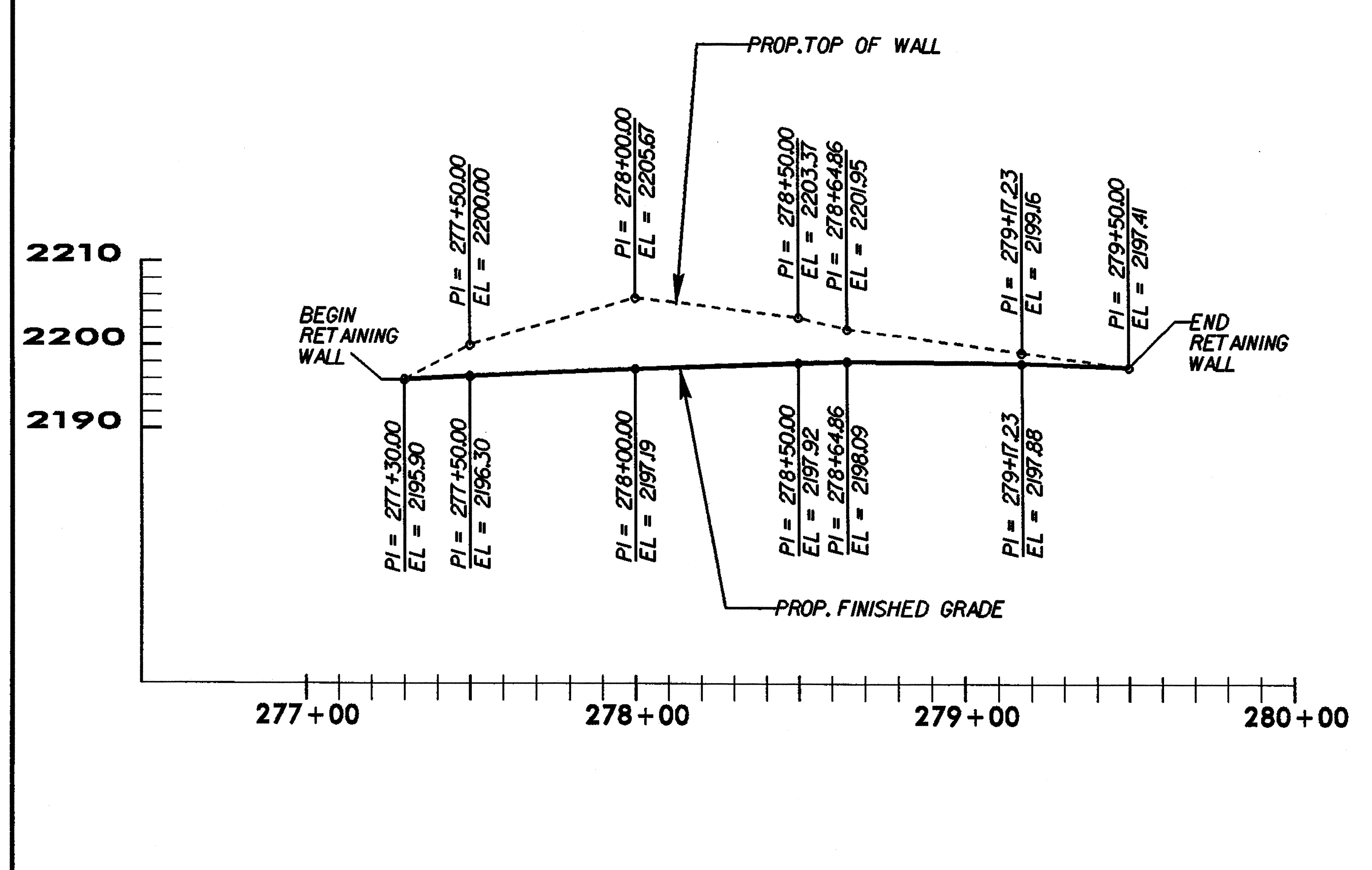
* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH

** FOR DESIGN WALL HEIGHT "H" AND ADDITIONAL CONSTRUCTION DETAILS, SEE SHEET 2 OF 2

TOTAL STRUCTURE QUANTITIES

SOLDIER PILE RETAINING WALLS	920	SQ. FT.
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LOCATION SKETCH



PROJECT NO.: R-5207B
 HENDERSON COUNTY
 STATION: 277+30.00 to 279+50.00 -L-
 SHEET 1 OF 3

GEOTECHNICAL ENGINEERING UNIT


EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

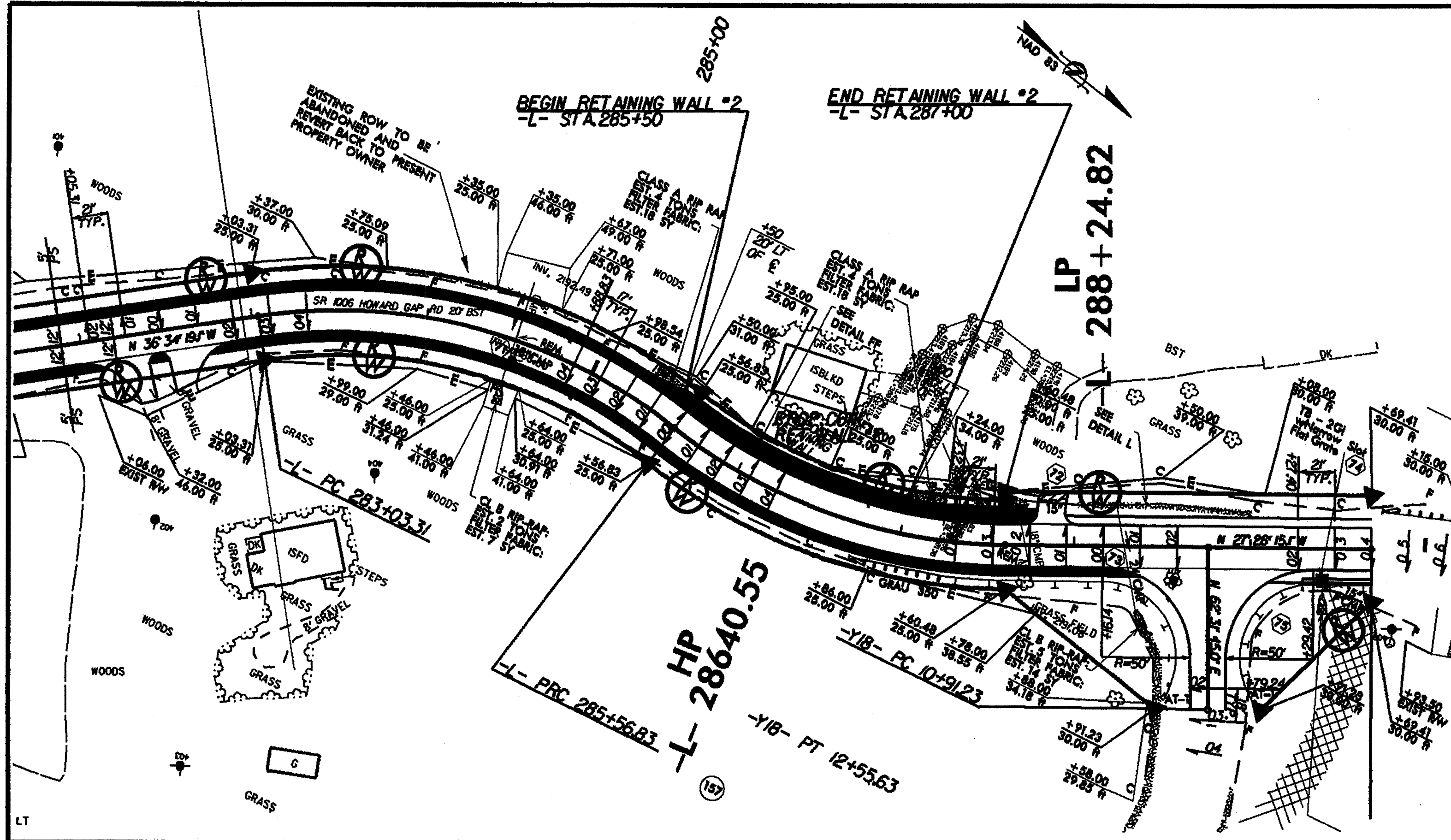
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SOLDIER PILE RETAINING WALL #1

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

PREPARED BY: J.T.W. DATE: 4.11.12
 REVIEWED BY: S.C.C. DATE: 4.11.12

GEOTECHNICAL ENGINEER  SIGNATURE: <i>C. Clark</i> DATE: 4/12/12	ENGINEER SIGNATURE: _____ DATE: _____
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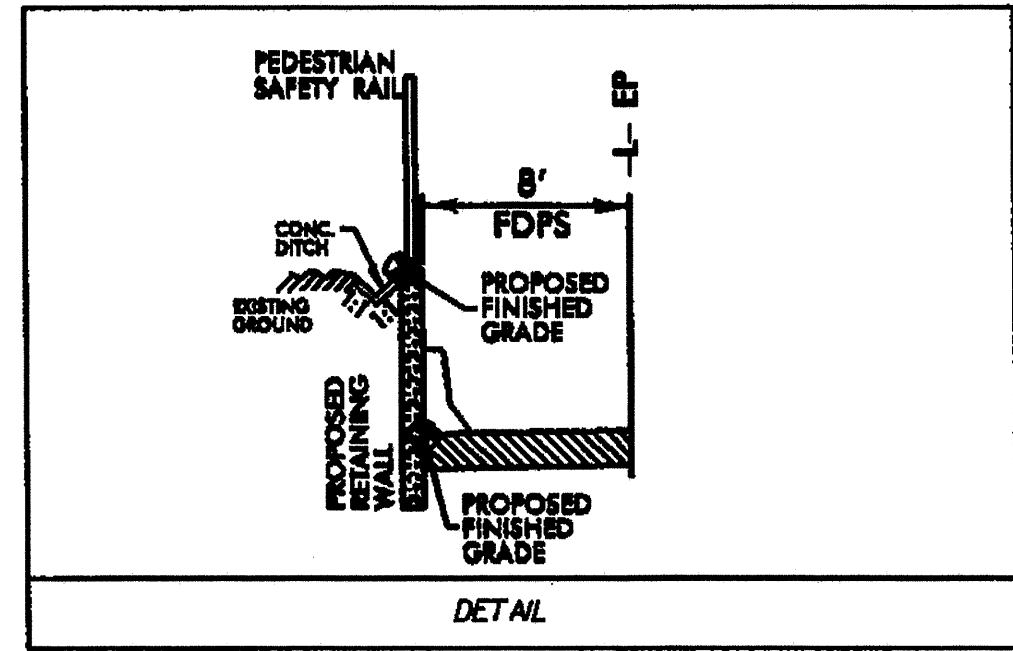
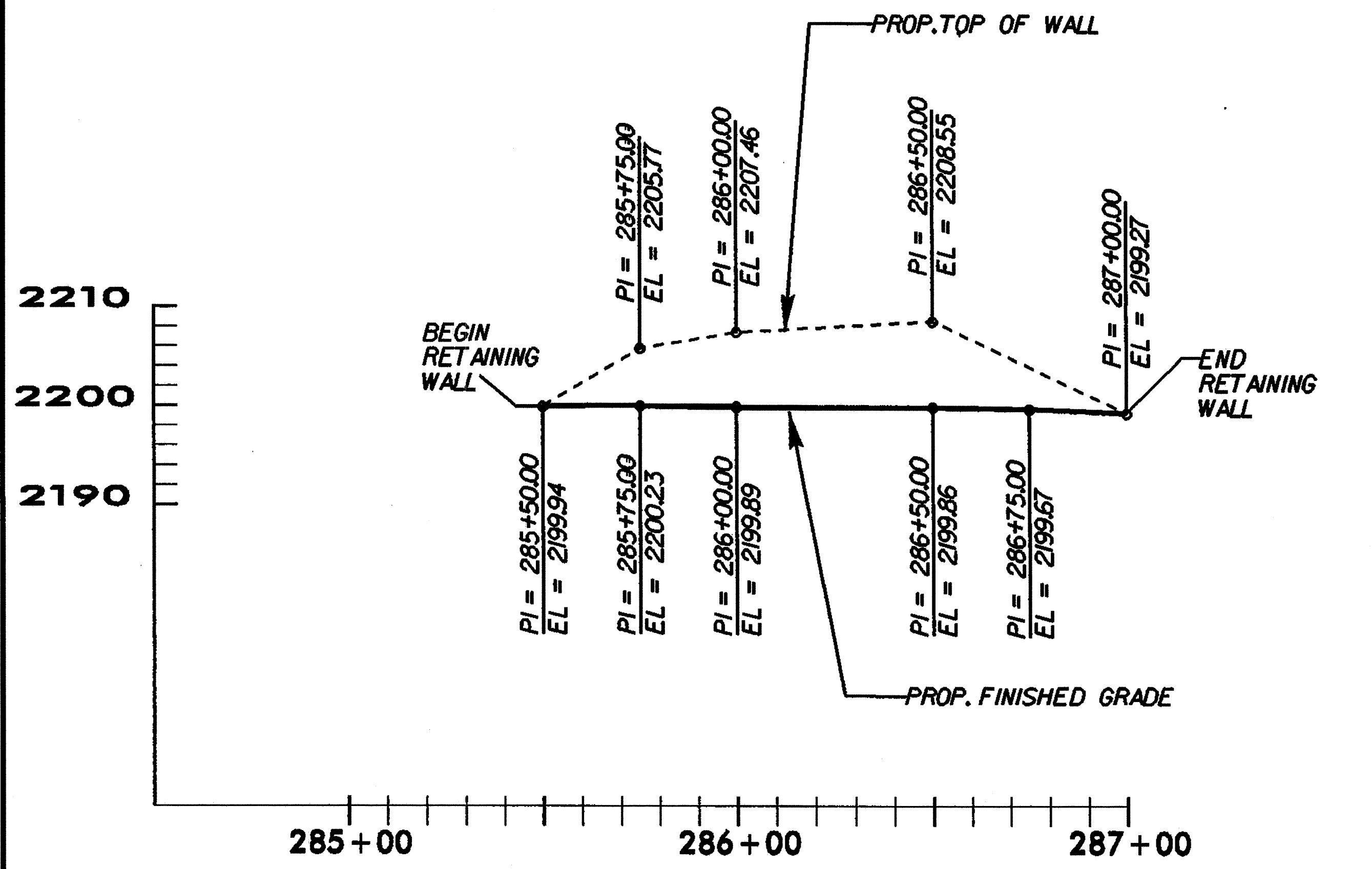


-L- STA	OFFSET FROM CL (LEFT)	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
285+50.00	20.00	2199.94	2199.94	0.00	0.00
285+75.00	20.00	2205.77	2200.23	5.54	5.04
286+00.00	20.00	2207.46	2199.89	7.57	7.07
286+50.00	20.00	2208.55	2199.86	8.69	8.19
286+75.00	20.00	2205.72	2199.67	6.05	5.55
287+00.00	20.00	2199.27	2199.27	0.00	0.00

* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH
 ** FOR DESIGN WALL HEIGHT "H" AND ADDITIONAL CONSTRUCTION DETAILS, SEE SHEET 2 OF 2

LOCATION SKETCH

SOLDIER PILE RETAINING WALLS	860	SQ. FT.
------------------------------	-----	---------



PROJECT NO.: R-5207B
 HENDERSON COUNTY
 STATION: 285+50.00 to 287+00.00 -L-
 SHEET 2 OF 3

GEOTECHNICAL ENGINEERING UNIT
 EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SOLDIER PILE RETAINING WALL #2					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. W-2 TOTAL SHEETS 3

PREPARED BY: J.T.W. DATE: 4.11.12
 REVIEWED BY: S.C.C. DATE: 4.11.12

NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NOS. 1 & 2. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

AT THE CONTRACTOR'S OPTION, USE DRIVEN H-PILES FOR RETAINING WALL

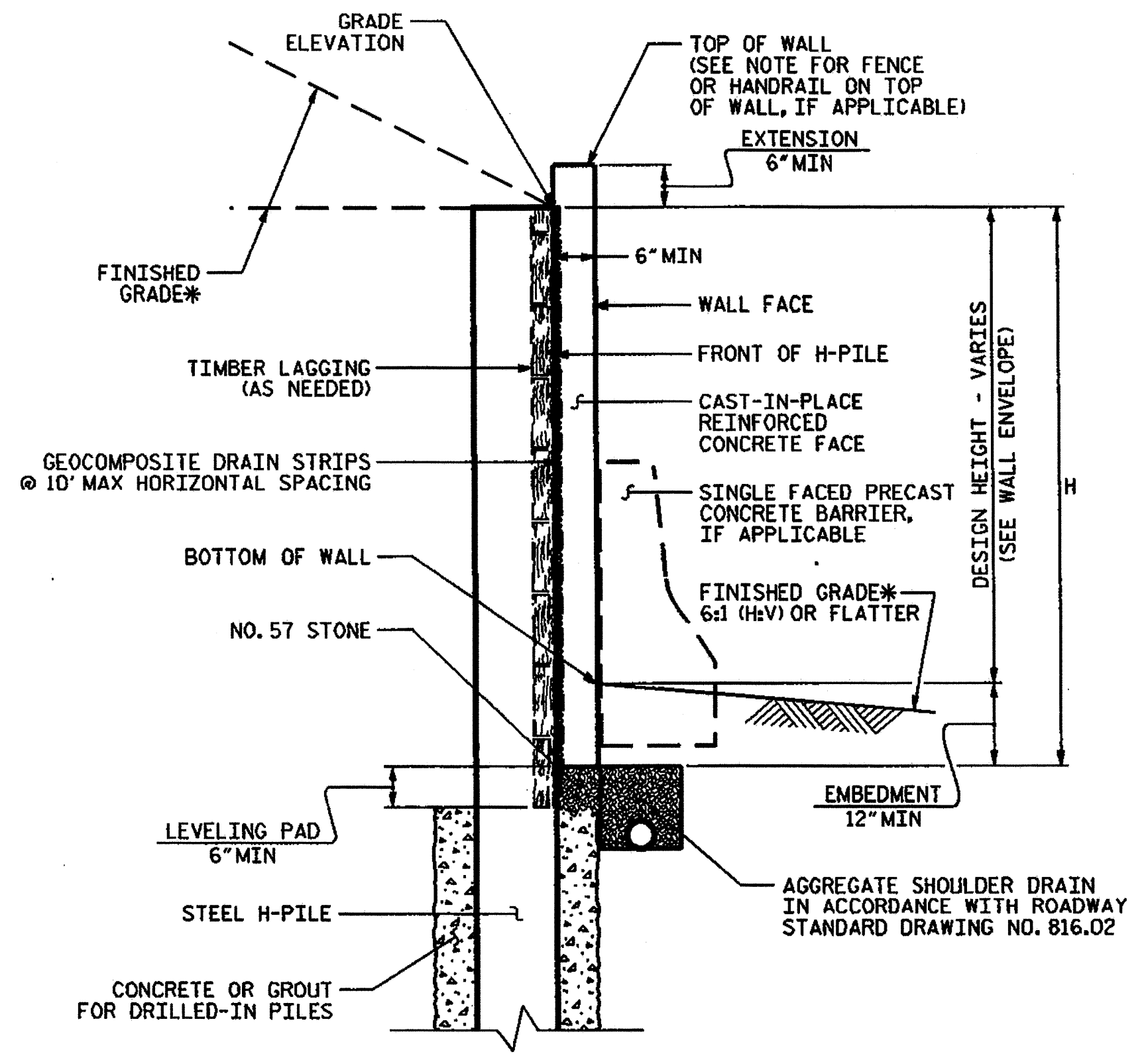
USE A SOLDIER PILE RETAINING WALL WITH A CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NOS. 1 & 2.

A SIMULATED STONE FINISH THAT MEETS ARTICLE 1000-4 OF THE STANDARD SPECIFICATIONS IS REQUIRED FOR THE CAST IN PLACE FACING FOR RETAINING NOS. 1 & 2. SEE SIMULATED STONE FORMLINER FINISH SPECIAL PROVISION.

SUBMIT FORMLINER SAMPLES FOR APPROVAL BEFORE BEGINNING SOLDIER PILE WALL CONSTRUCTION.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NOS. 1 & 2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

- DESIGN RETAINING WALL NOS. 1 & 2. FOR THE FOLLOWING:
- 1) H = DESIGN HEIGHT + EMBEDMENT
 - 2) DESIGN LIFE = 75 YEARS
 - 3) MINIMUM EMBEDMENT ELEVATION = 2 FT
 - 4) IN-SITU ASSUMED MATERIAL PARAMETERS ABOVE 2180 FT:
 UNIT WEIGHT, $\gamma = 120$ LB/CF
 FRICTION ANGLE, $\phi = 30$ DEGREES
 COHESION, $c = 0$ LB/SF
 - 5) IN-SITU ASSUMED MATERIAL PARAMETERS BELOW 2180 FT:
 UNIT WEIGHT, $\gamma = 120$ LB/CF
 FRICTION ANGLE, $\phi = 30$ DEGREES
 COHESION, $c = 0$ LB/SF



**SOLDIER PILE WALL WITH
CAST-IN-PLACE FACE - TYPICAL SECTION**

*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.

PROJECT NO.: R-5207B
HENDERSON COUNTY
STATION: WALL #1 277+30.00 to 279+50.00
WALL #2 285+50.00 to 287+00.00
 SHEET 3 OF 3

PREPARED BY: J.T.W. DATE: 4.11.12
 REVIEWED BY: S.C.C. DATE: 4.11.12

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

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