

**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

TIP PROJECT: B-4972

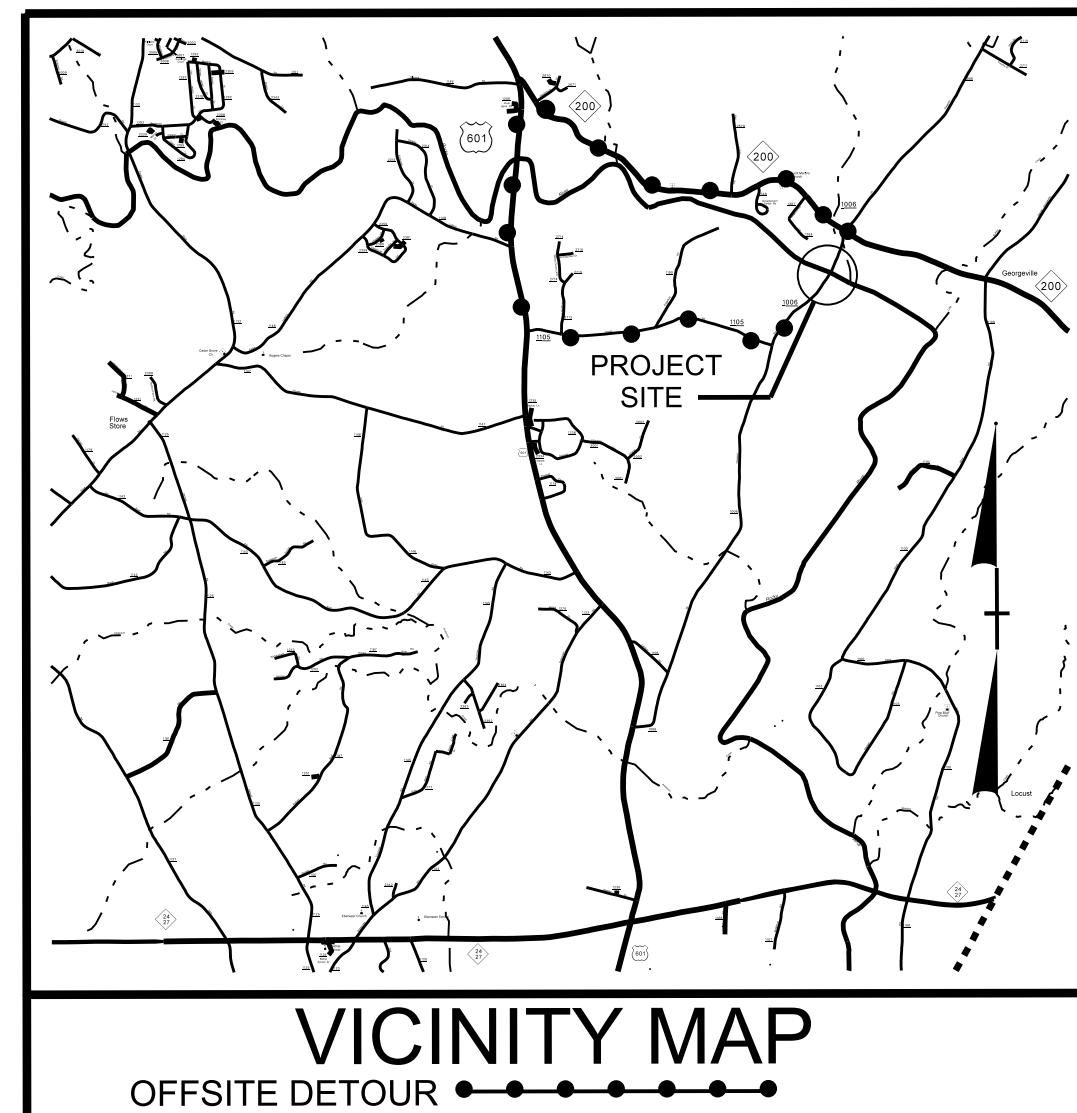
CONTRACT: C203588

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

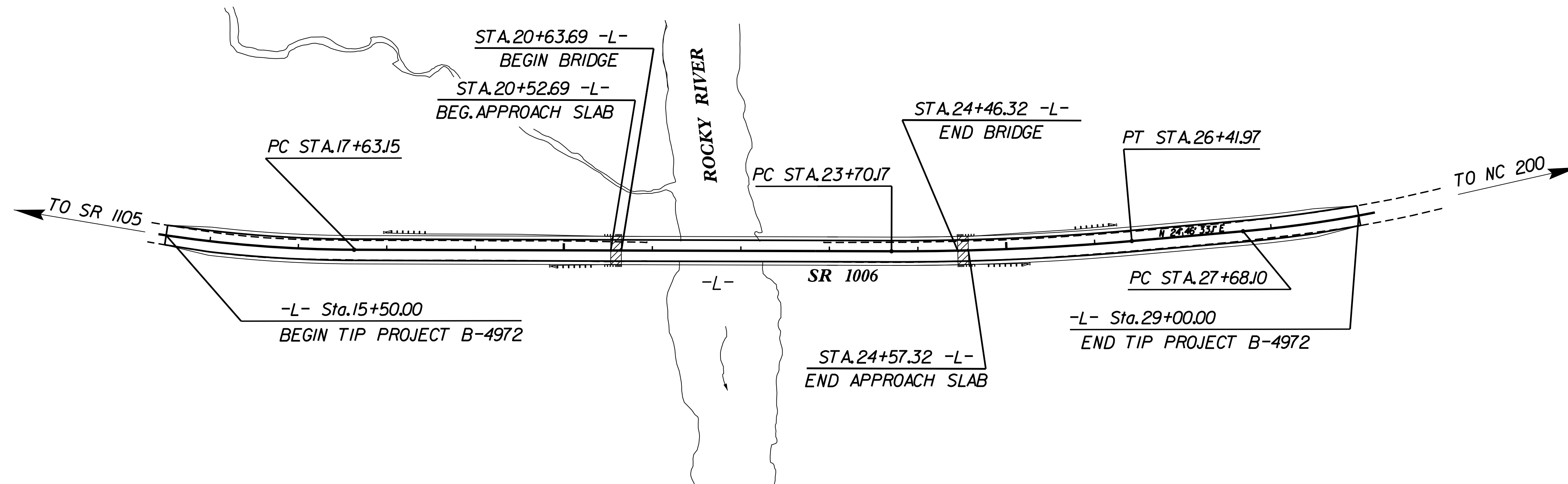
CABARRUS COUNTY

LOCATION: BRIDGE NO. 227 OVER ROCKY RIVER ON SR 1006

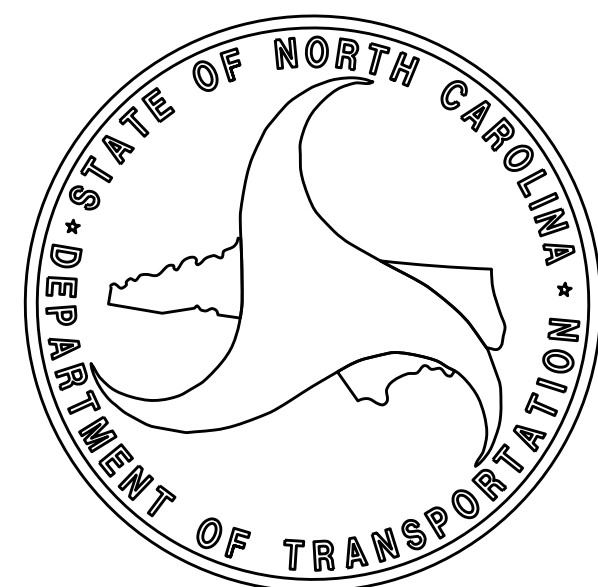
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4972		
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
40096.1.1	BRSTP-1006(32)	PE	
40096.2.FD1	BRSTP-1006(32)	RW, UTILITIES	
40096.3.FD1	BRSTP-1006(32)	CONSTR.	



STRUCTURE



DESIGN DATA
 ADT 2014 = 4,420
 ADT 2035 = 10,800
 K = 10 %
 D = 55 %
 *T = 13 %
 V = 55 MPH
 (RURAL LOCAL)
 SUB-REGIONAL TIER
 * TTST 3 % + DUAL 10%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4972 = 0.183 MI
 LENGTH OF STRUCTURE TIP PROJECT B-4972 = 0.073 MI
 TOTAL LENGTH OF TIP PROJECT B-4972 = 0.256 MI

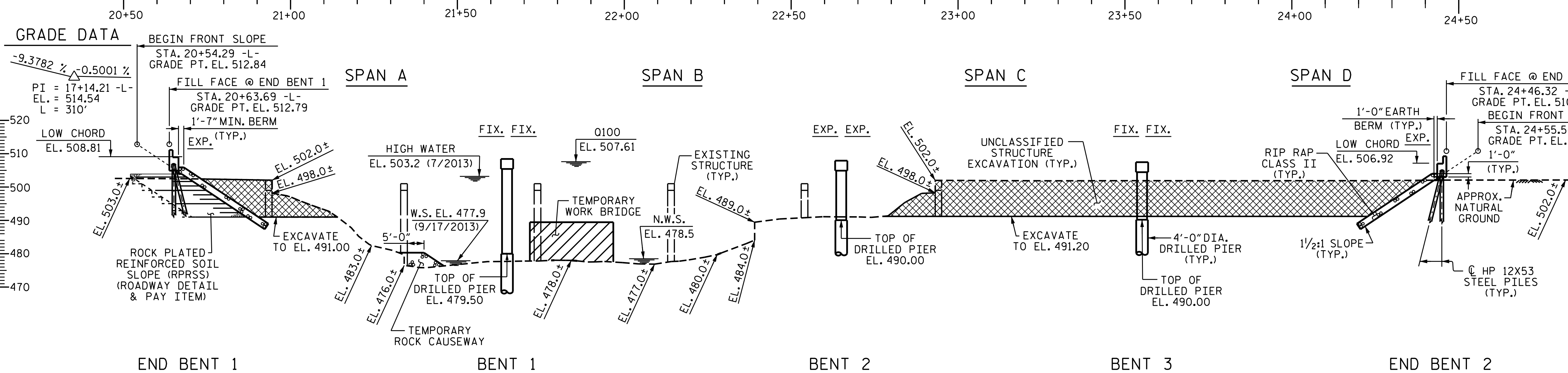
Prepared in the Office of:
DIVISION OF HIGHWAYS
 STRUCTURE MANAGEMENT UNIT
 1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

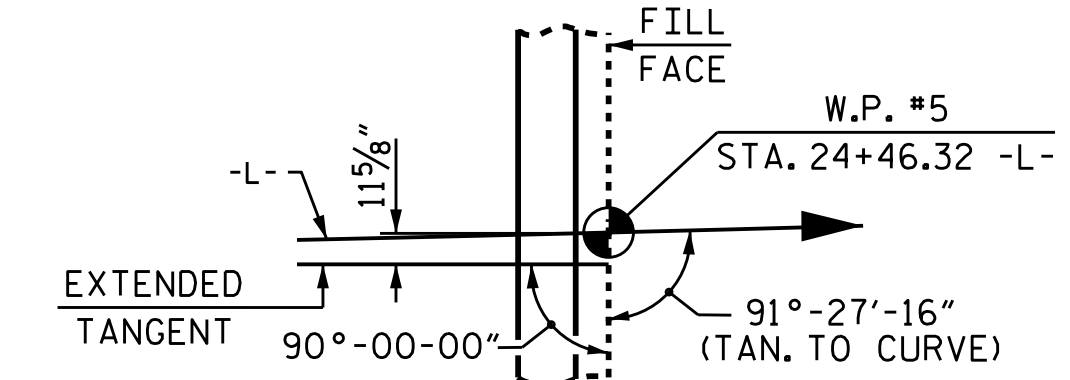
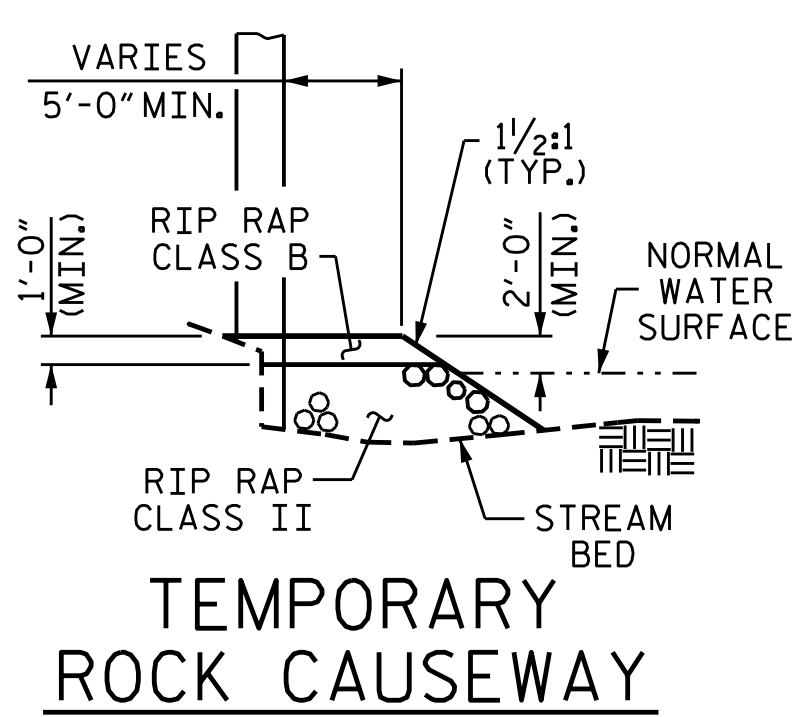
LETTING DATE:
 JUNE 16, 2015

L. E. SUTTON, PE
 PROJECT ENGINEER

V. A. PATEL, PE
 PROJECT DESIGN ENGINEER

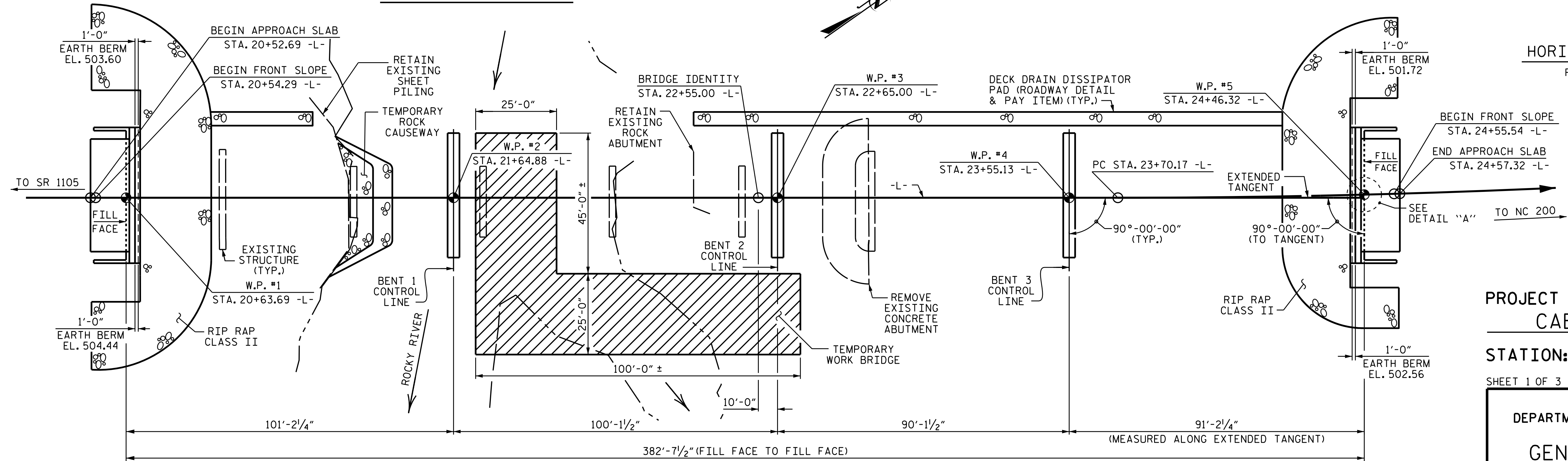


I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



HORIZONTAL CURVE DATA

P.I. STA. =	25+06.16 -L-
Δ =	5°-11'-27.5" (L.T.)
D =	1°-54'-35.5"
L =	271.80'
T =	135.99'
R =	3000.00'



PLAN
 (PILES, COLUMNS, & DRILLED PIERS NOT SHOWN FOR CLARITY)

PROJECT NO. B-4972
 CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 1 OF 3 REPLACES BRIDGE NO. 227

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE OVER ROCKY RIVER ON SR 1006 (MT. PLEASANT RD.) BETWEEN SR 1105 AND NC 200

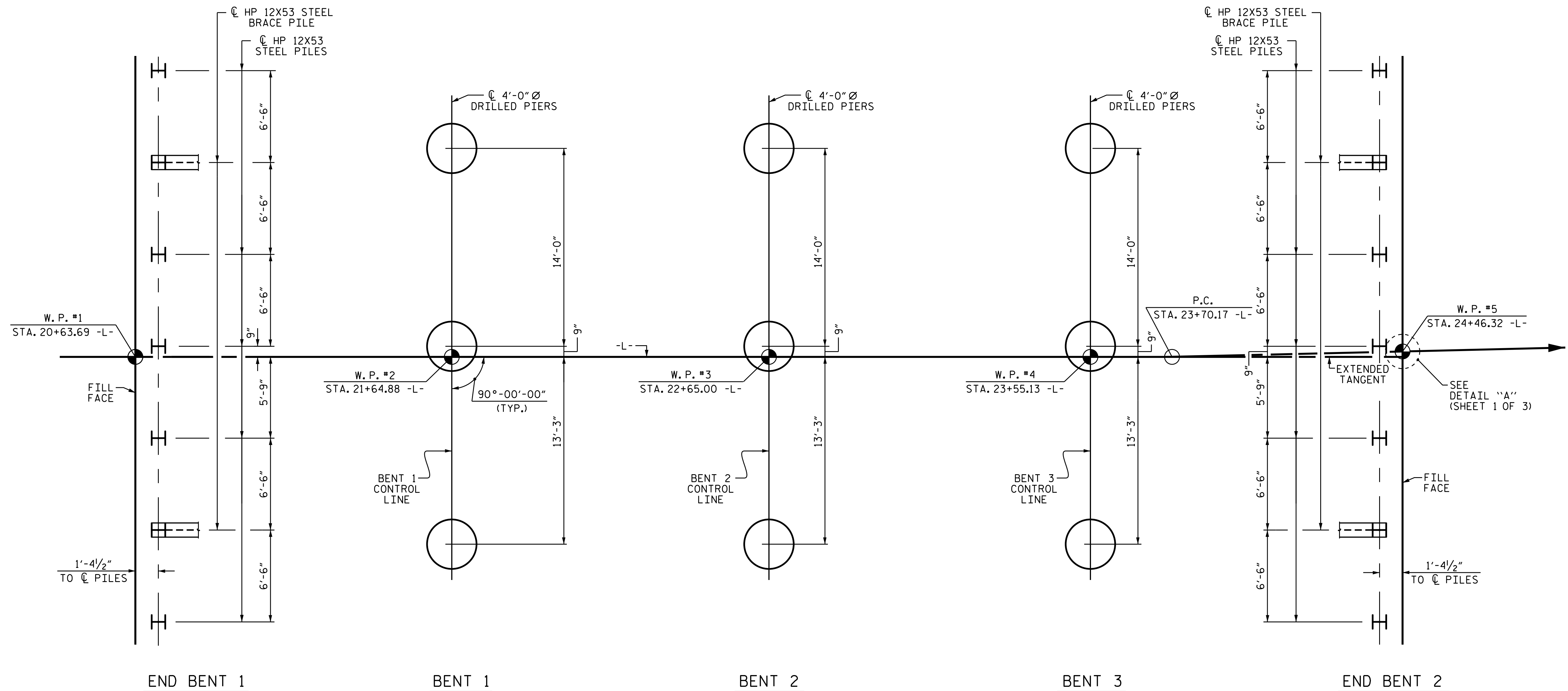
DRAWN BY : N.D.AIUTO DATE : 11/18/14
 CHECKED BY : T.H.CARROLL DATE : 12/19/14
 DESIGN ENGINEER OF RECORD : J.P.MCARTHA DATE : 12/19/14

PROFESSIONAL ENGINEER SEAL
 LURA E. SUTTON
 21638
 4/21/2015

PROFESSIONAL ENGINEER SEAL
 VIJAY A. PATEL
 23371
 4/22/2015

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

TOTAL SHEETS: 31



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO THE CENTERLINE.
BRACE PILES AT END BENTS ARE BATTERED 3:12

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

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

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 459.2 (LT.), 462.4 (CT.) & 465.5 (RT.) TO SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 10 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 457.6 (LT.), 458.8 (CT.) & 460.0 (RT.) TO SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 10 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

INSTALL DRILLED PIERS AT BENT 3 TO A TIP ELEVATION NO HIGHER THAN 461.7 (LT.), 462.8 (CT.) & 463.8 (RT.) TO SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 8 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 565 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 105 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 105 TSF.

DRILLED PIERS AT BENT 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 520 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 105 TSF.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT 1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 469.2 (LT.), 472.4 (CT.) & 475.5 (RT.) WITHOUT PRIOR APPROVAL FROM THE ENGINEER. INSTALL PERMANENT STEEL CASING AT BENT 1 BY VIBRATING, SCREWING, OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 471.0 (LT.), 473.8 (CT.), & 476.5 (RT.).

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 2. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 472.00 WITHOUT PRIOR APPROVAL FROM THE ENGINEER. INSTALL PERMANENT STEEL CASING AT BENT 2 BY VIBRATING, SCREWING, OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 484.0.

THE SCOUR CRITICAL ELEVATIONS FOR BENT 1 ARE 470.0 (LT.), 472.8 (CT.) & 475.5 (RT.). THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS 483.0. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR BENT 3 IS 484.0. THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

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

ROCK PLATED REINFORCED SOIL SLOPE IS REQUIRED BELOW CAP AT END BENT 1. SEE PROJECT SPECIAL PROVISIONS AND REINFORCED SOIL SLOPE DRAWINGS IN ROADWAY PLANS.

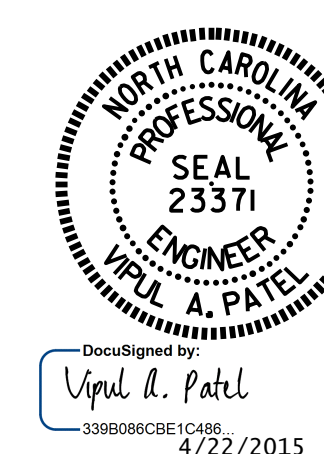
DRIVE PILES AT END BENT 1 AFTER REINFORCED SOIL SLOPE IS CONSTRUCTED. TOP LAYER OF GEOGRID WILL HAVE A MINIMUM COVER OF 2 FEET PRIOR TO DRIVING PILES.

PROJECT NO. B-4972
CABARRUS COUNTY
STATION: 22+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER ROCKY
RIVER ON SR 1006
(MT. PLEASANT RD.) BETWEEN
SR 1105 AND NC 200

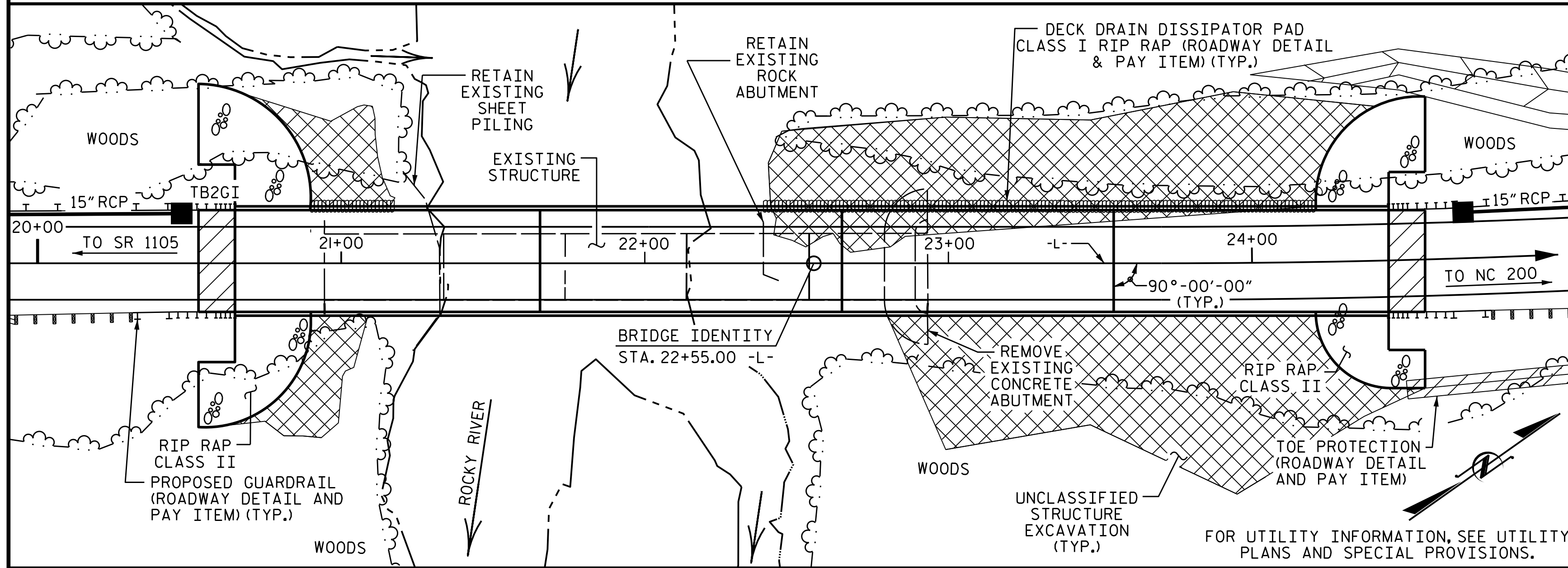


DRAWN BY : N.D. AIUTO DATE : 11/18/14
CHECKED BY : T.H. CARROLL DATE : 12/19/14
DESIGN ENGINEER OF RECORD : J.P. MCCARTHA DATE : 12/19/14

21-APR-2015 09:25
R:\Structures\Plans\B4972.SD.GD.01.dgn
lsutton

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			31

B.M. #2 : R.R. SPIKE IN A 10" TWIN BIRCH TREE, 60' RT. OF STA. 20+35 -L-, EL. 497.98



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES AREA TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
 ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.
 THE EXISTING PAVEMENT WITHIN THE AREA OF THE END BENT PILES SHALL BE REMOVED AND THE ROADBED SCARIFIED TO A MINIMUM DEPTH OF 2'-0".
 AT THE CONTRACTORS OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 22+55.00 -L-.
 INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE" AT STATION 22+55.00 -L-.
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 60 FT. (RT) AND 50 FT. (LT) OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.
 THE EXISTING STRUCTURE CONSISTS OF 5 SPANS (1 @ 40'-3", 3 @ 40'-0" AND 1 @ 40'-3") WITH A REINFORCED CONCRETE DECK ON I-BEAMS; WITH A CLEAR ROADWAY WIDTH OF 22'-0" ON REINFORCED CONCRETE CAP AND TIMBER PILES AT END BENTS AND BENT 4; REINFORCED CONCRETE POST AND BEAM AT BENTS 1 THROUGH 3 AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
 THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION AT BENTS 2 AND 3. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 26,130 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 505.9
DRAINAGE AREA	= 403 SQ. MI.
BASE DISCHARGE (Q100)	= 30,790 C.F.S.
BASE HIGH WATER ELEVATION	= 507.61

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 34,000 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 200± YRS.
OVERTOPPING FLOOD ELEVATION	= 508.8

TOTAL BILL OF MATERIAL

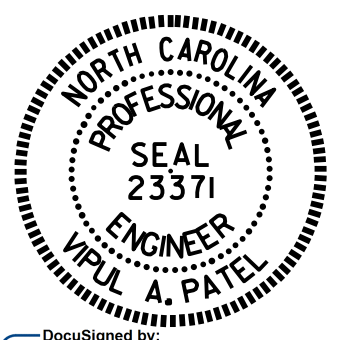
	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	4'-0" DIA. DRILLED PIERS IN SOIL	4'-0" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" DIA. DRILLED PIER	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CONCRETE WEARING SURFACE	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	
SUPERSTRUCTURE								12,677	12,176		LUMP SUM	
END BENT 1										28.4		
BENT 1			14.75	37.00	21.40					46.9		
BENT 2			69.75	24.00	57.60					35.1		
BENT 3			51.00	31.00						34.6		
END BENT 2										28.4		
TOTAL	LUMP SUM	LUMP SUM	135.50	92.00	79.00	1	LUMP SUM	12,677	12,176	173.4	LUMP SUM	
	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12X53 STEEL PILES	TWO BAR METAL RAIL	1'-2" X 2'-11" CONCRETE PARAPET	RIIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS		
	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE					745.25	761.00			LUMP SUM	LUMP SUM	48	4,560.00
END BENT 1	3,914		7	175			455	505				
BENT 1	16,494	3,366										
BENT 2	17,164	3,534										
BENT 3	16,190	3,207										
END BENT 2	3,914		7	175			400	445				
TOTAL	57,676	10,107	14	350	745.25	761.00	855	950	LUMP SUM	LUMP SUM	48	4,560.00

PROJECT NO. B-4972

CABARRUS COUNTY

STATION: 22+55.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOR BRIDGE OVER ROCKY RIVER ON SR 1006 (MT. PLEASANT RD.) BETWEEN SR 1105 AND NC 200

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS 31
2			4			

DRAWN BY : N.D. AIUTO DATE : 11/18/14
 CHECKED BY : T.H. CARROLL DATE : 12/19/14
 DESIGN ENGINEER OF RECORD : J.P. MCCARTHA DATE : 12/19/14

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR BOX BEAMS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	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 (INVENTORY)	N/A	①	1.09	--	1.75	0.268	1.10	A	EL	49.25	0.493	1.18	C	EL	4.425	0.80	0.268	1.09	A	EL	49.25		
	HL-93 (OPERATING)	N/A		1.43	--	1.35	0.268	1.43	A	EL	49.25	0.493	1.53	C	EL	4.425	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.50	54.72	1.75	0.268	1.53	A	EL	49.25	0.493	1.54	C	EL	4.425	0.80	0.269	1.50	C	EL	44.25		
	HS-20 (OPERATING)	36.000		1.98	71.37	1.35	0.268	1.98	A	EL	49.25	0.493	2.00	C	EL	4.425	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SN5H	13.500		3.49	48.64	1.40	0.268	4.53	A	EL	49.25	0.493	4.72	C	EL	4.425	0.80	0.269	3.49	C	EL	44.25	
		SNGARBS2	20.000		2.55	52.20	1.40	0.268	3.28	A	EL	49.25	0.493	3.32	C	EL	4.425	0.80	0.269	2.55	C	EL	44.25	
		SNAGRIS2	22.000		2.40	53.71	1.40	0.268	3.07	A	EL	49.25	0.493	3.06	C	EL	4.425	0.80	0.269	2.40	C	EL	44.25	
		SNCOTTS3	27.250		1.74	48.79	1.40	0.268	2.25	A	EL	49.25	0.493	2.35	C	EL	4.425	0.80	0.269	1.74	C	EL	44.25	
		SNAGGRS4	34.925		1.43	51.25	1.40	0.268	1.85	A	EL	49.25	0.493	1.92	C	EL	4.425	0.80	0.269	1.43	C	EL	44.25	
		SNS5A	35.550		1.40	51.08	1.40	0.268	1.81	A	EL	49.25	0.493	1.93	C	EL	4.425	0.80	0.269	1.40	C	EL	44.25	
		SNS6A	39.950		1.28	52.20	1.40	0.268	1.64	A	EL	49.25	0.493	1.75	C	EL	4.425	0.80	0.269	1.28	C	EL	44.25	
		SNS7B	42.000		1.22	52.24	1.40	0.268	1.56	A	EL	49.25	0.493	1.71	C	EL	4.425	0.80	0.269	1.22	C	EL	44.25	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.56	52.47	1.40	0.268	2.00	A	EL	49.25	0.493	2.10	C	EL	4.425	0.80	0.269	1.56	C	EL	44.25	
		TNT4A	33.075		1.56	52.71	1.40	0.268	2.00	A	EL	49.25	0.493	2.05	C	EL	4.425	0.80	0.269	1.56	C	EL	44.25	
		TNT6A	41.600		1.27	53.75	1.40	0.268	1.63	A	EL	49.25	0.493	1.79	C	EL	4.425	0.80	0.269	1.27	C	EL	44.25	
		TNT7A	42.000		1.27	54.30	1.40	0.268	1.63	A	EL	49.25	0.493	1.76	C	EL	4.425	0.80	0.269	1.27	C	EL	44.25	
		TNT7B	42.000		1.31	55.58	1.40	0.268	1.66	A	EL	49.25	0.493	1.68	C	EL	4.425	0.80	0.269	1.31	C	EL	44.25	
		TNAGRIT4	43.000		1.25	54.58	1.40	0.268	1.60	A	EL	49.25	0.493	1.63	C	EL	4.425	0.80	0.269	1.25	C	EL	44.25	
		TNAGT5A	45.000		1.18	54.08	1.40	0.268	1.51	A	EL	49.25	0.493	1.60	C	EL	4.425	0.80	0.269	1.18	C	EL	44.25	
TNAGT5B	45.000	③	1.17	53.62	1.40	0.268	1.50	A	EL	49.25	0.493	1.55	C	EL	4.425	0.80	0.269	1.17	C	EL	44.25			

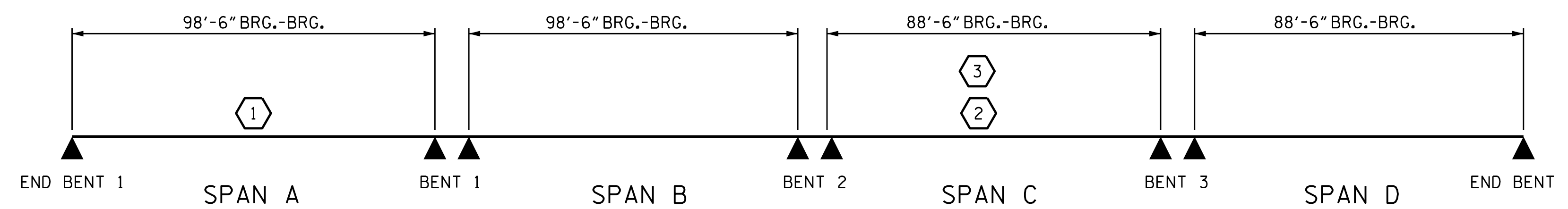
NOTES:

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

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

SPANS A AND B ARE IDENTICAL. SPANS C AND D ARE IDENTICAL.

#	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

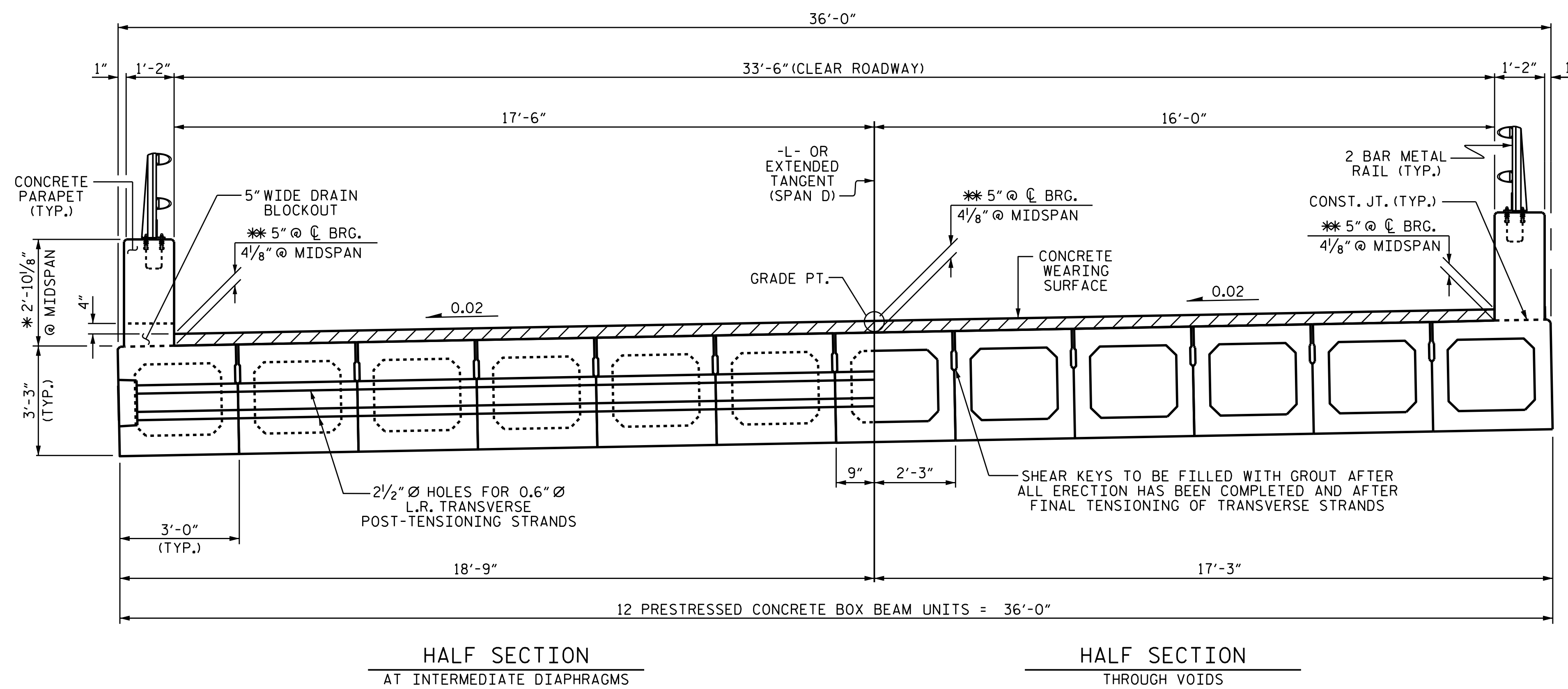
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-



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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			31

ASSEMBLED BY: H.A. LOCKLEAR DATE: 2-19-15
 CHECKED BY: T.R. PETERSON DATE: 2-19-15
 DRAWN BY: MAA 1/08 REV. 11/2/08RR MAA/GM DESIGN ENGINEER OF RECORD:
 CHECKED BY: GM/DI 2/08 REV. 10/1/11 MAA/GM H.A. LOCKLEAR DATE: 2-19-15



HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

* THE MINIMUM HEIGHT OF THE CONCRETE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

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

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

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

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT. THE 2 1/2" Ø DOWEL HOLES AT EXPANSION ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH JOINT SEALER MATERIAL TO 1 1/2" ABOVE THE TOP OF DOWELS AND THEN FILLED WITH GROUT.

THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE SL LOW MODULUS SILICONE SEALANT. THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5400 PSI FOR SPANS A AND B AND 4300 PSI FOR SPANS C AND D.

ALL REINFORCING STEEL IN CONCRETE PARAPETS AND CONCRETE WEARING SURFACE SHALL BE EPOXY COATED.

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

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

GROOVED CONTRACTION JOINTS, 1/4" IN DEPTH, SHALL BE TOOLED IN TOP OF WEARING SURFACE AT INTERIOR BENTS 1 & 3 WITH CONTINUOUS WEARING SURFACE, IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2" AT END BENTS 1 & 2 AND 2 1/2" AT BENT 2.

PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE CONCRETE RAIL. THE COST OF THE REINFORCING STEEL CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

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

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

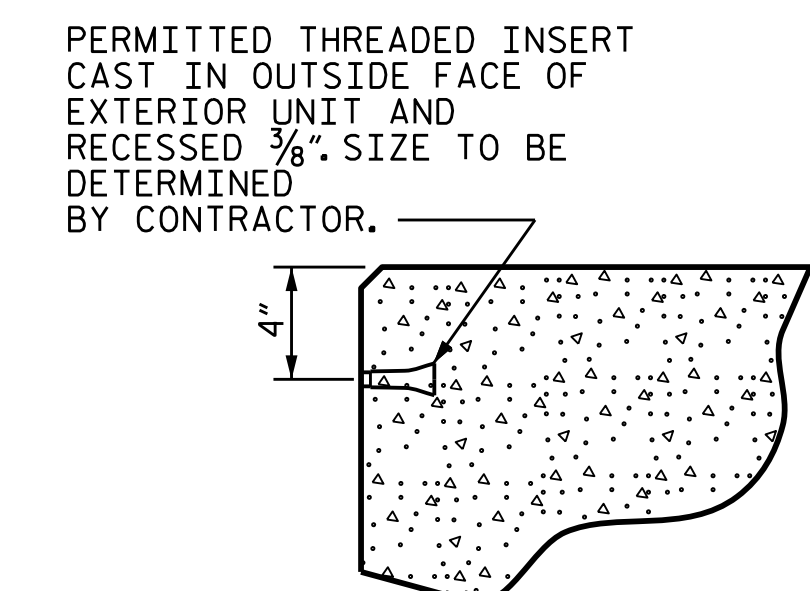
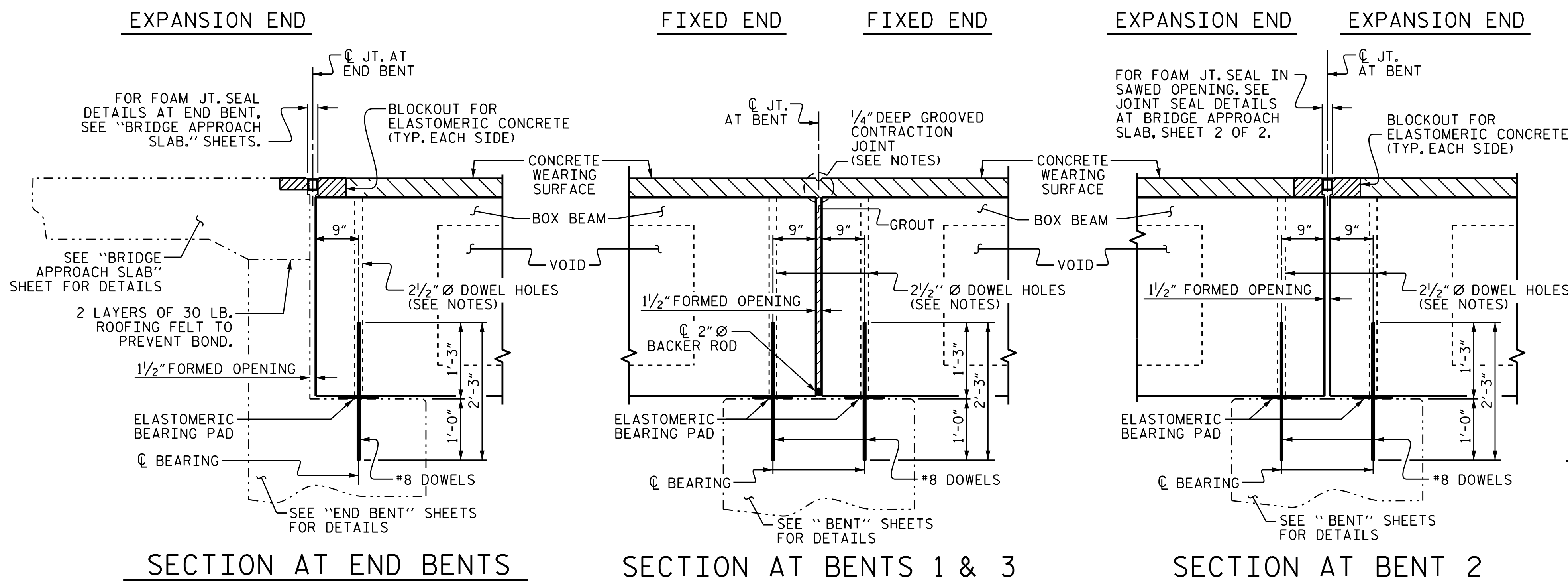
THE PERMITTED THREADED INSERTS SHALL BE GROUDED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR BOX BEAM UNITS THAT REQUIRE DRAINS IN THE CONCRETE PARAPET.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 5" X 4". THE HEIGHT OF THE BLOCKOUT IN THE CONCRETE PARAPET SHALL EXTEND FROM THE TOP OF THE BOX BEAM UNIT TO THE TOP OF THE DRAIN OPENING.

THE TOP OF THE BOX BEAM UNITS SHALL RECEIVE A RAKED FINISH IN ACCORDANCE WITH THE SECTION 1078-15 OF THE STANDARD SPECIFICATIONS.

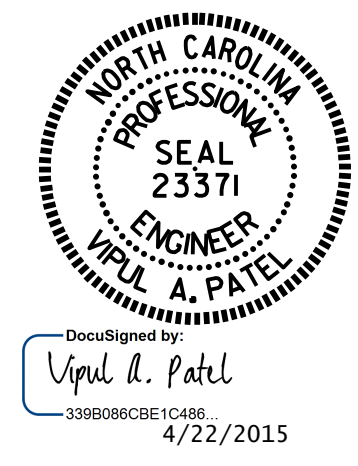


THREADED INSERT DETAIL

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

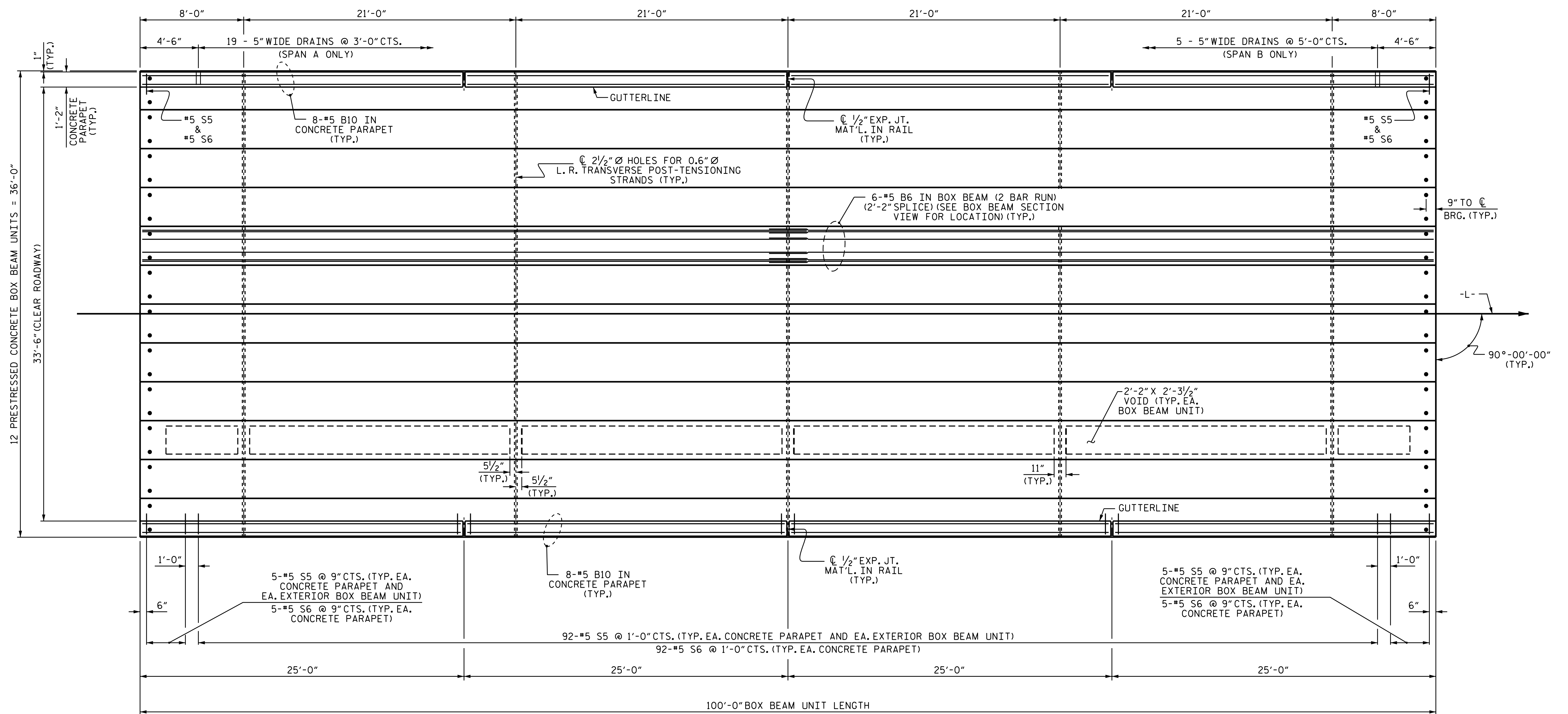
SHEET 1 OF 7

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

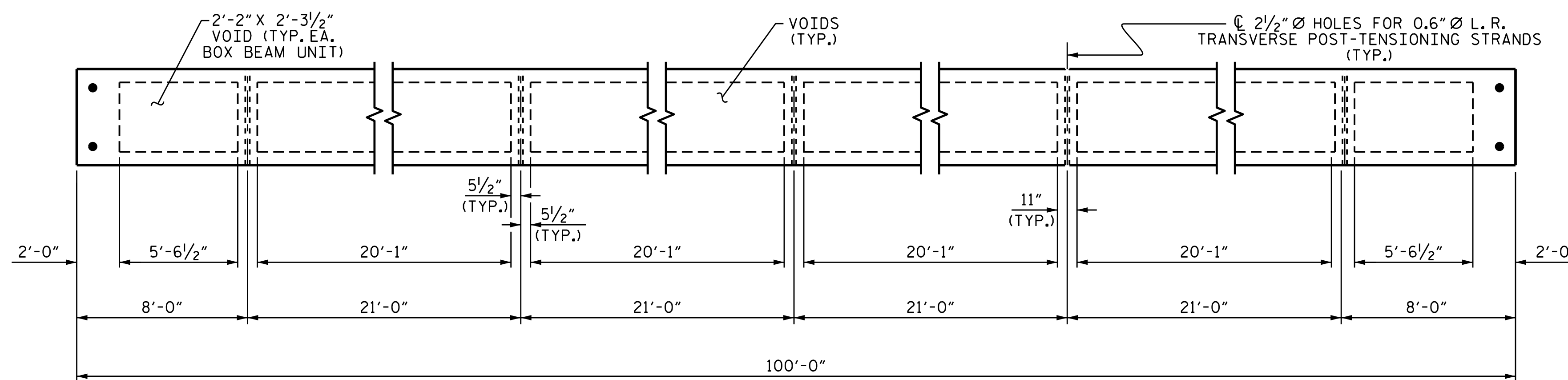


ASSEMBLED BY : J.P. MCCARTHA	DATE : 7-25-14	DESIGN ENGINEER OF RECORD:
CHECKED BY : M.E. GILES	DATE : 12-19-14	J.P. MCCARTHA
DRAWN BY : TLA	5/05	REV. 6/13
CHECKED BY : GM	6/05	REV. 8/14
		REV. 1/15
MAA/GM		
MAA/GM		
RWW/TMG		

REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 31
2			4			



PLAN OF UNIT



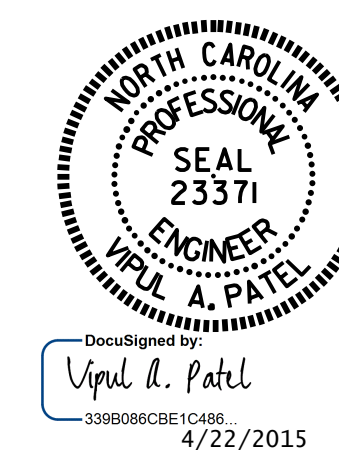
DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

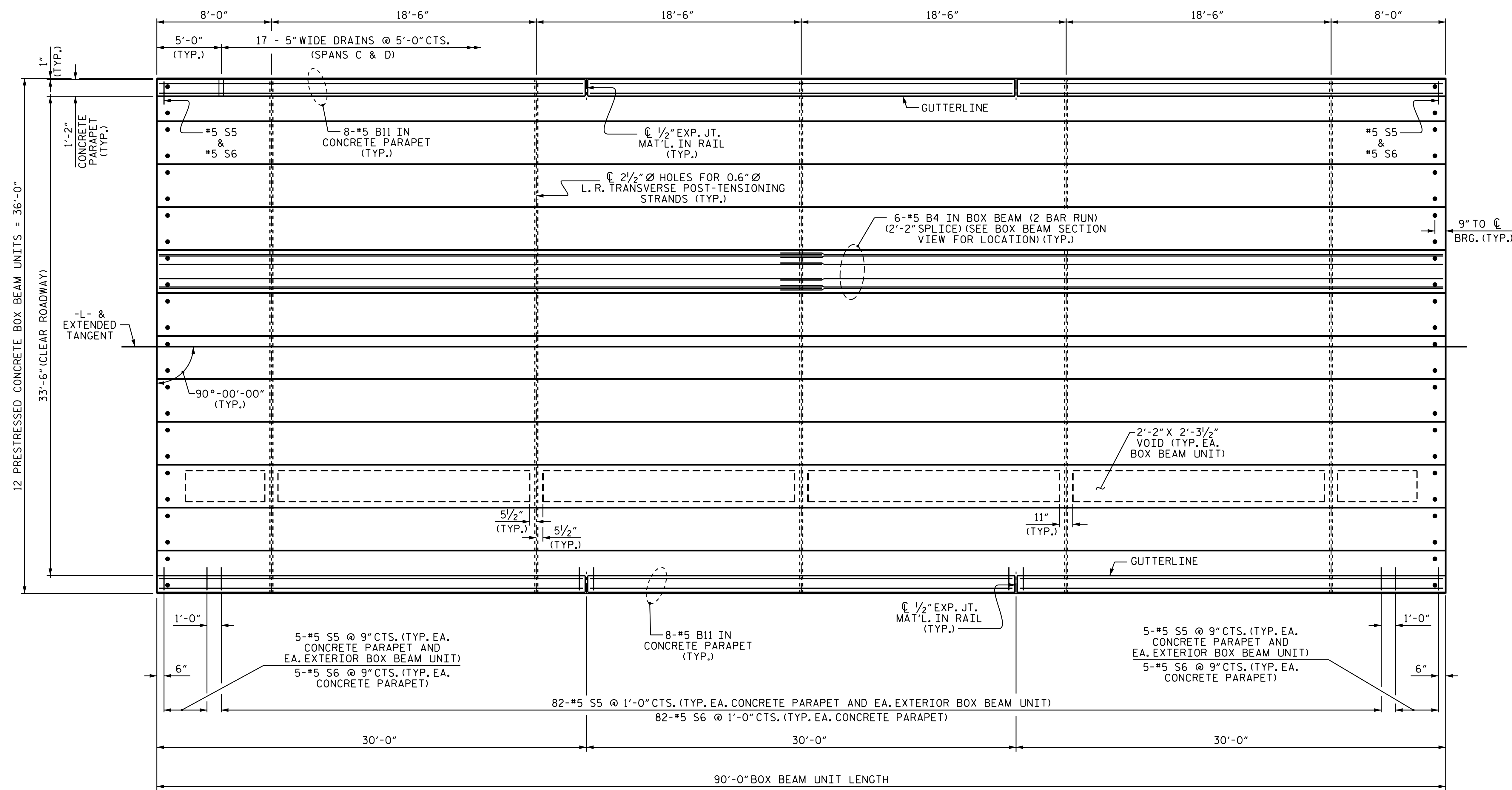
SHEET 2 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPANS
 33'-6" CLEAR ROADWAY
 (SPANS A & B)

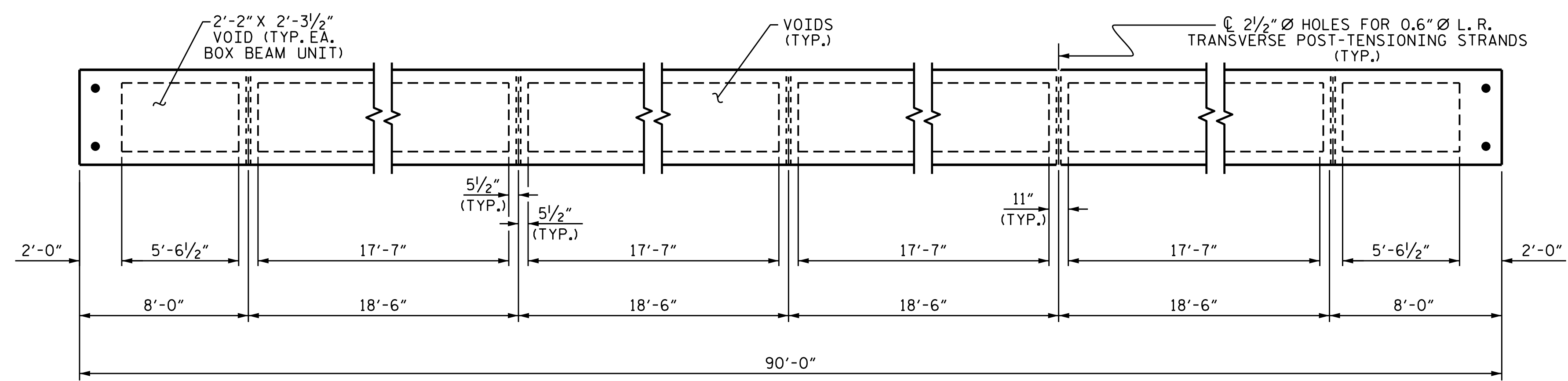
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			31
2			4			



ASSEMBLED BY : J.P. MCCARTHA DATE : 7-25-14
 CHECKED BY : M.E. GILES DATE : 12-17-14
 DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE : 12-17-14



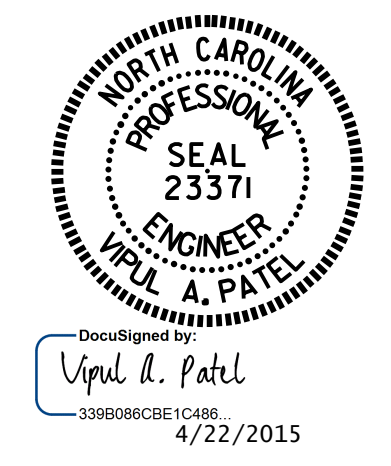
PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

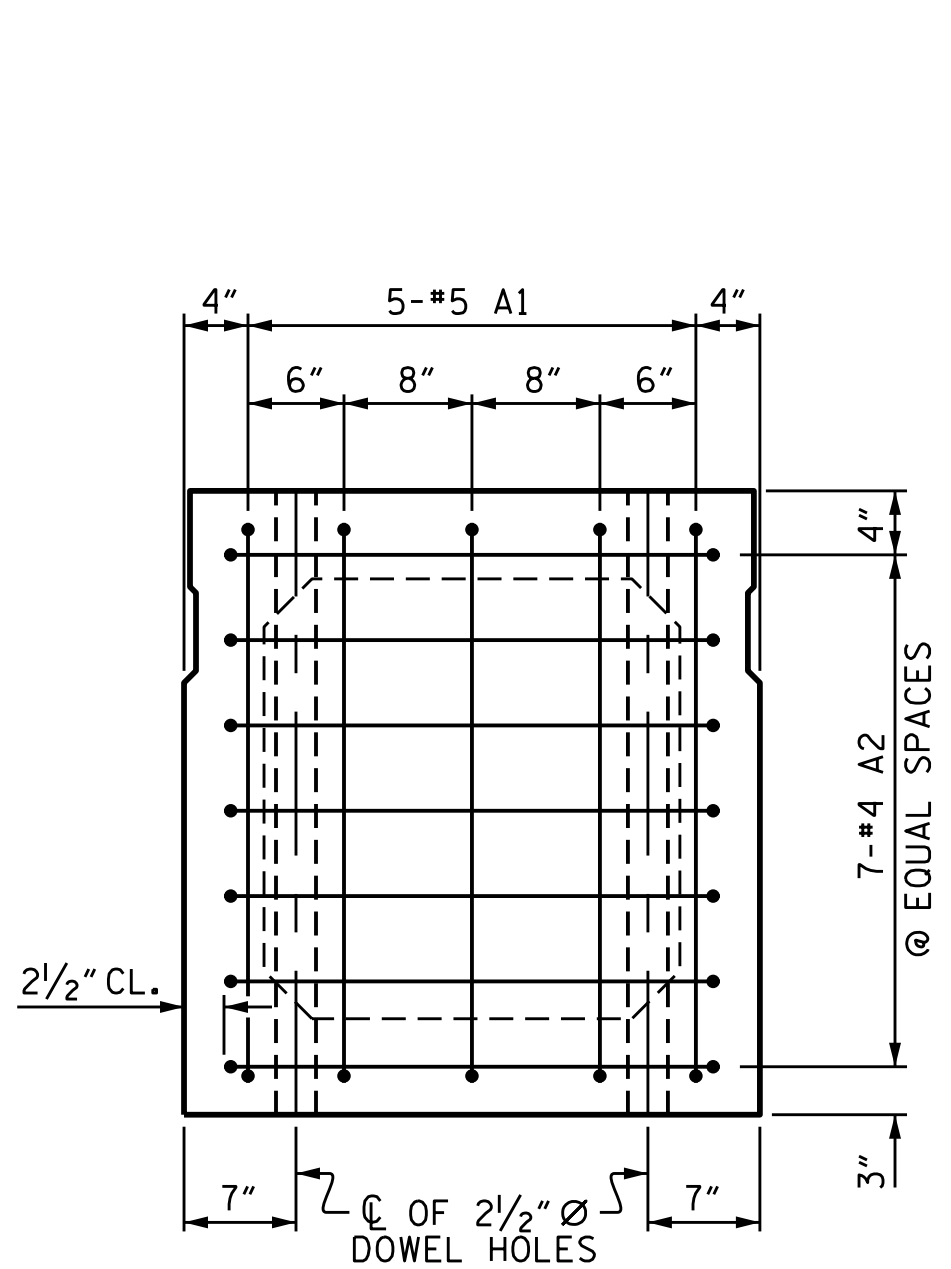
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 3 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPANS
 33'-6" CLEAR ROADWAY
 (SPANS C & D)



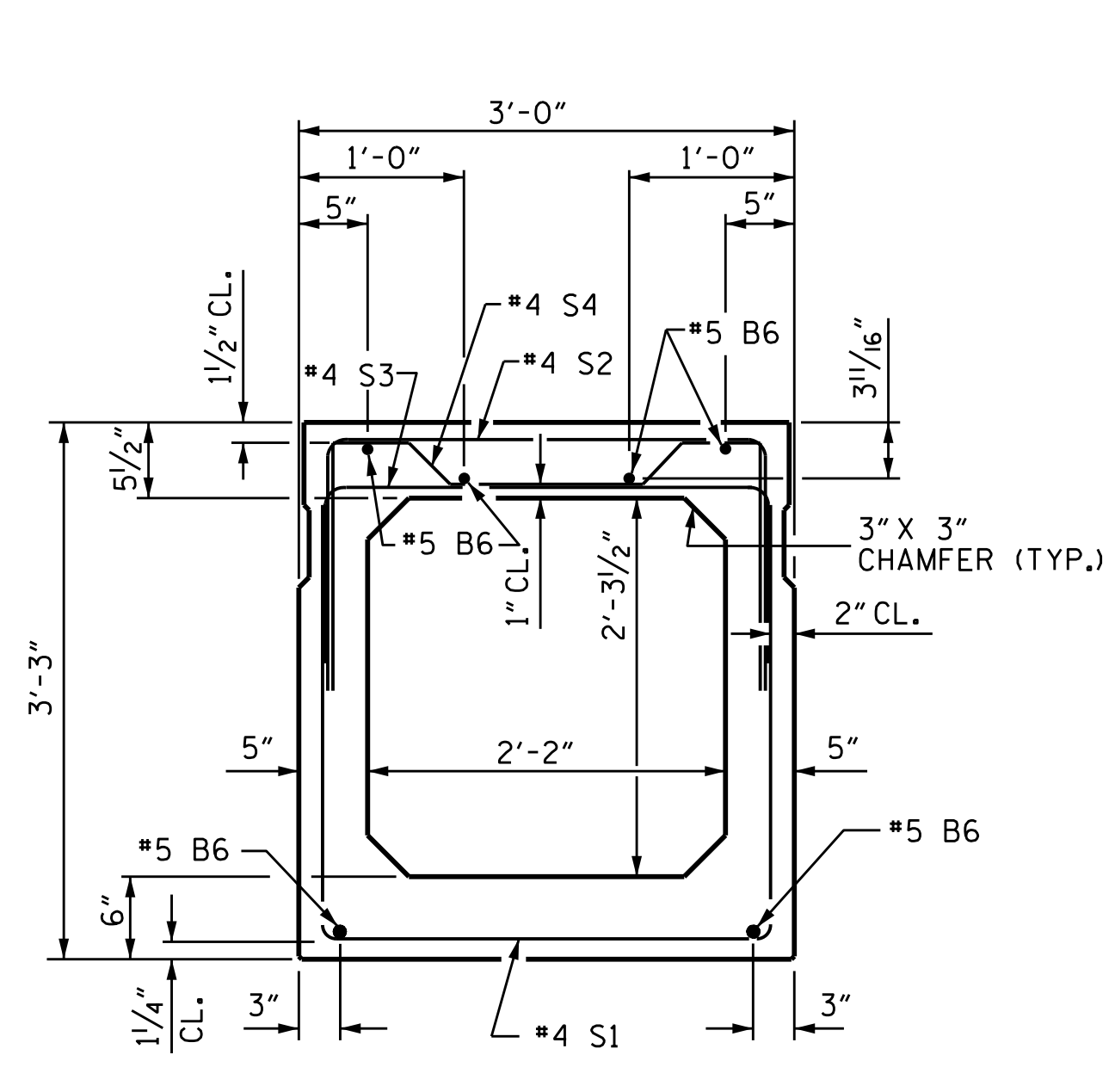
ASSEMBLED BY: J.P. MCCARTHA DATE: 7-25-14
 CHECKED BY: M.E. GILES DATE: 12-17-14
 DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12-17-14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			31



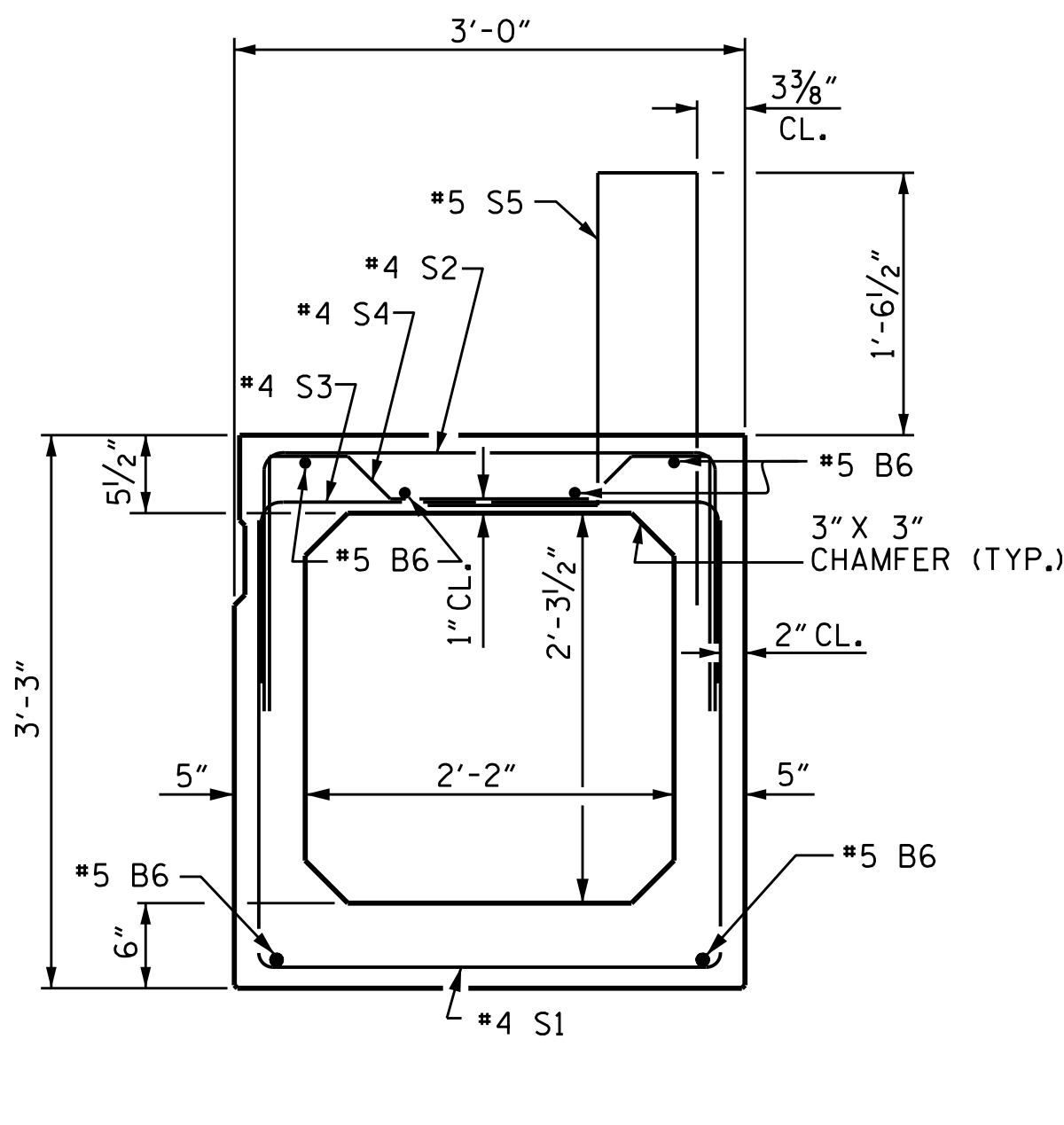
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



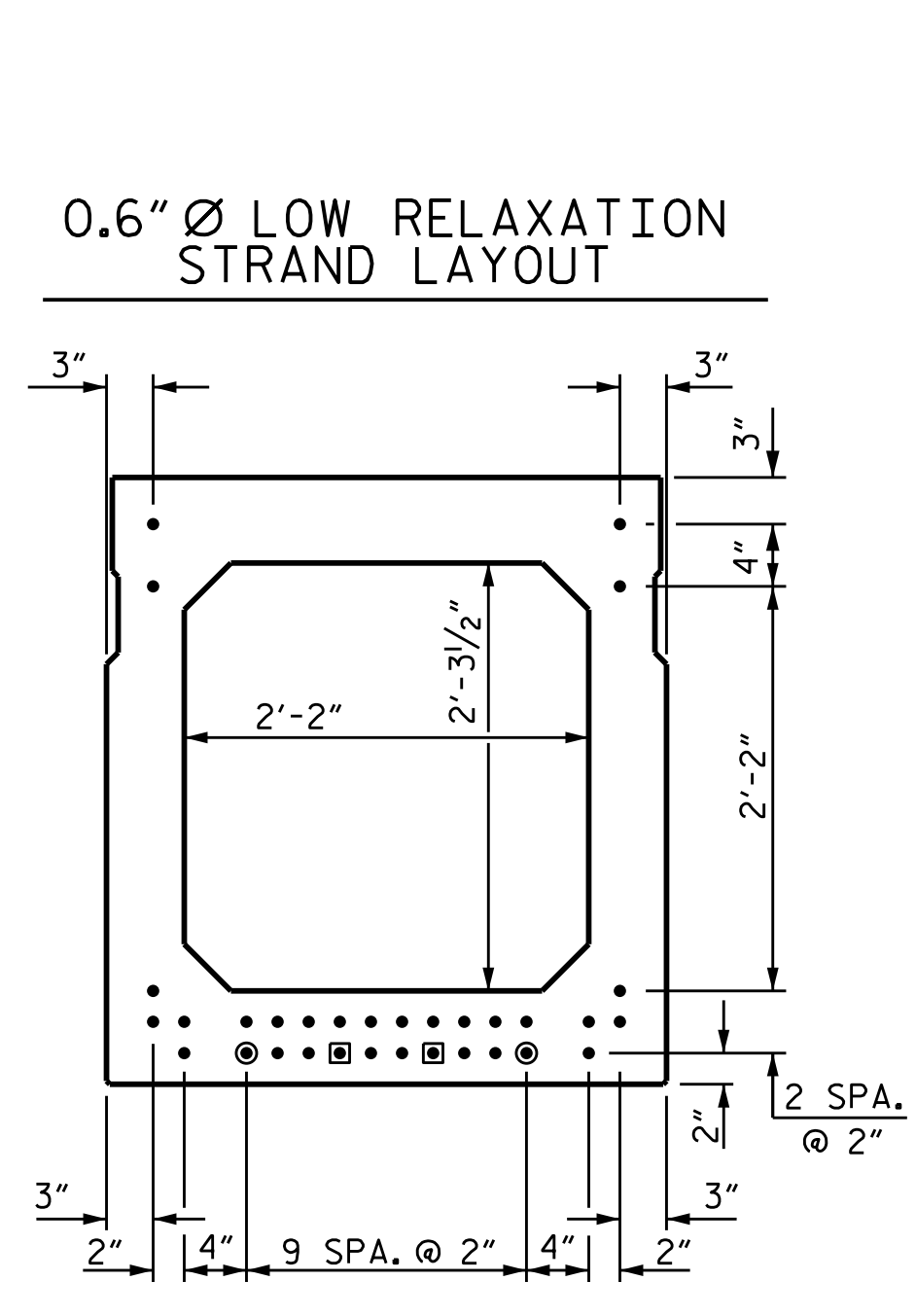
INTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)



TYPICAL STRAND LOCATION

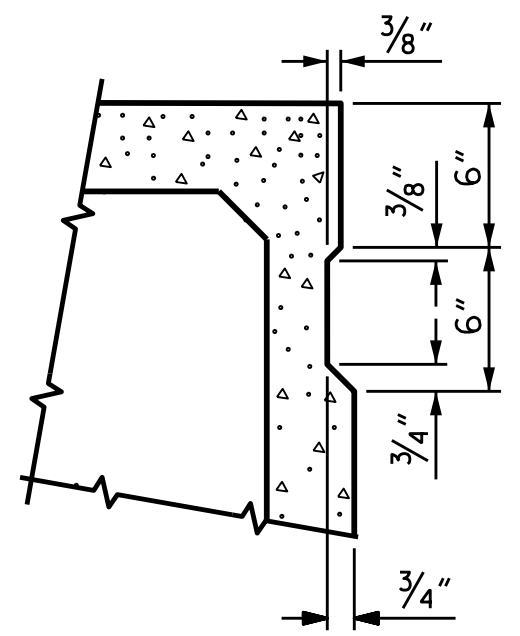
(32 STRANDS REQUIRED)

DEBONDING LEGEND

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

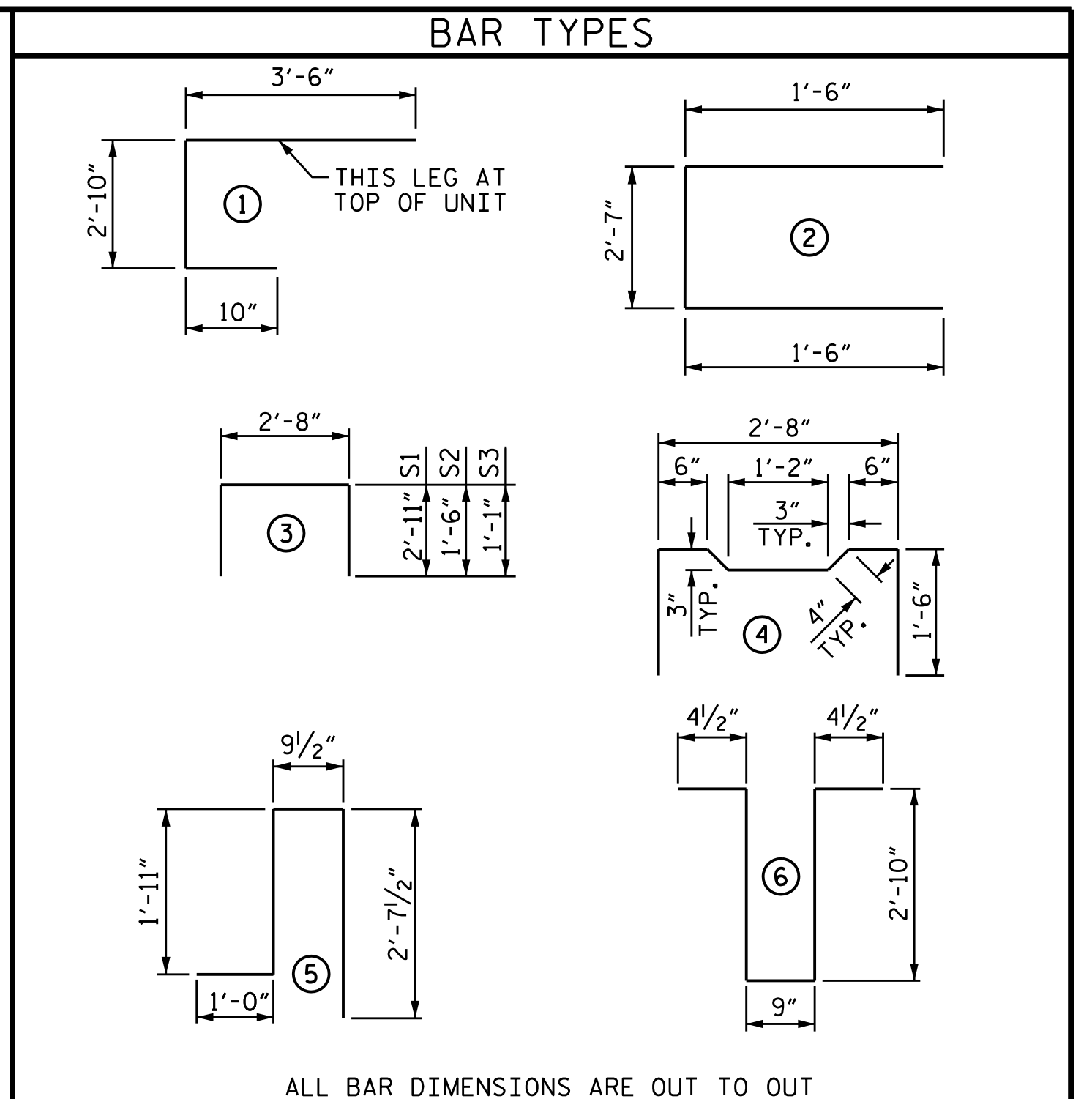
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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



SHEAR KEY DETAIL

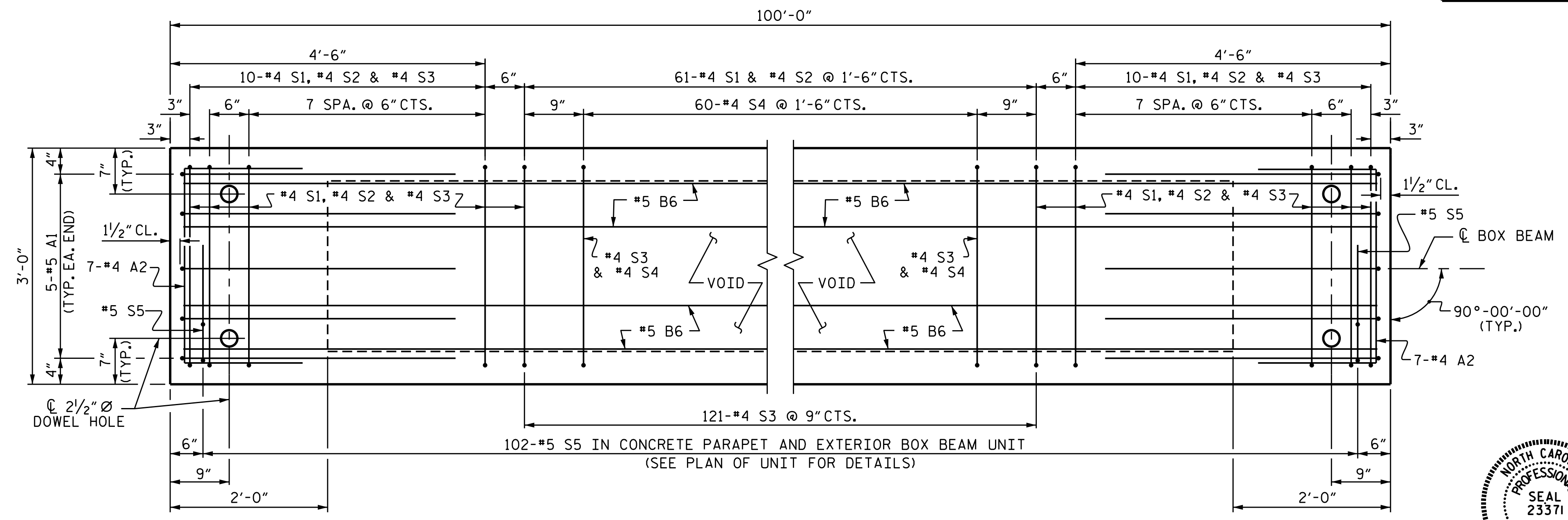
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

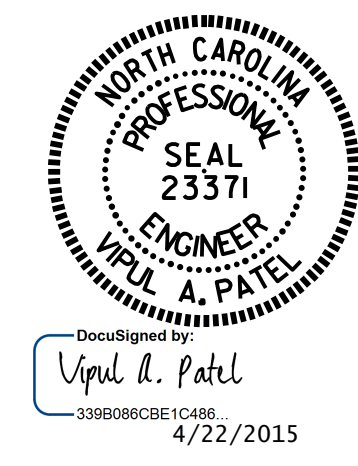
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-7"	164	5'-7"	164
B6	12	#5	STR	50'-11"	637	50'-11"	637
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	81	#4	3	8'-6"	460	8'-6"	460
S2	81	#4	3	5'-8"	307	5'-8"	307
S3	141	#4	3	4'-10"	455	4'-10"	455
S4	60	#4	4	5'-10"	234	5'-10"	234
*S5	102	#5	5	6'-4"	674	--	--
REINFORCING STEEL				LBS.	2,421	LBS.	2,421
* EPOXY COATED REINFORCING STEEL				LBS.	674		
7000 P.S.I. CONCRETE				CU. YDS.	19.6	CU. YDS.	19.4
0.6" Ø L.R. STRANDS				No.	32	No.	32



PLAN OF BOX BEAM

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

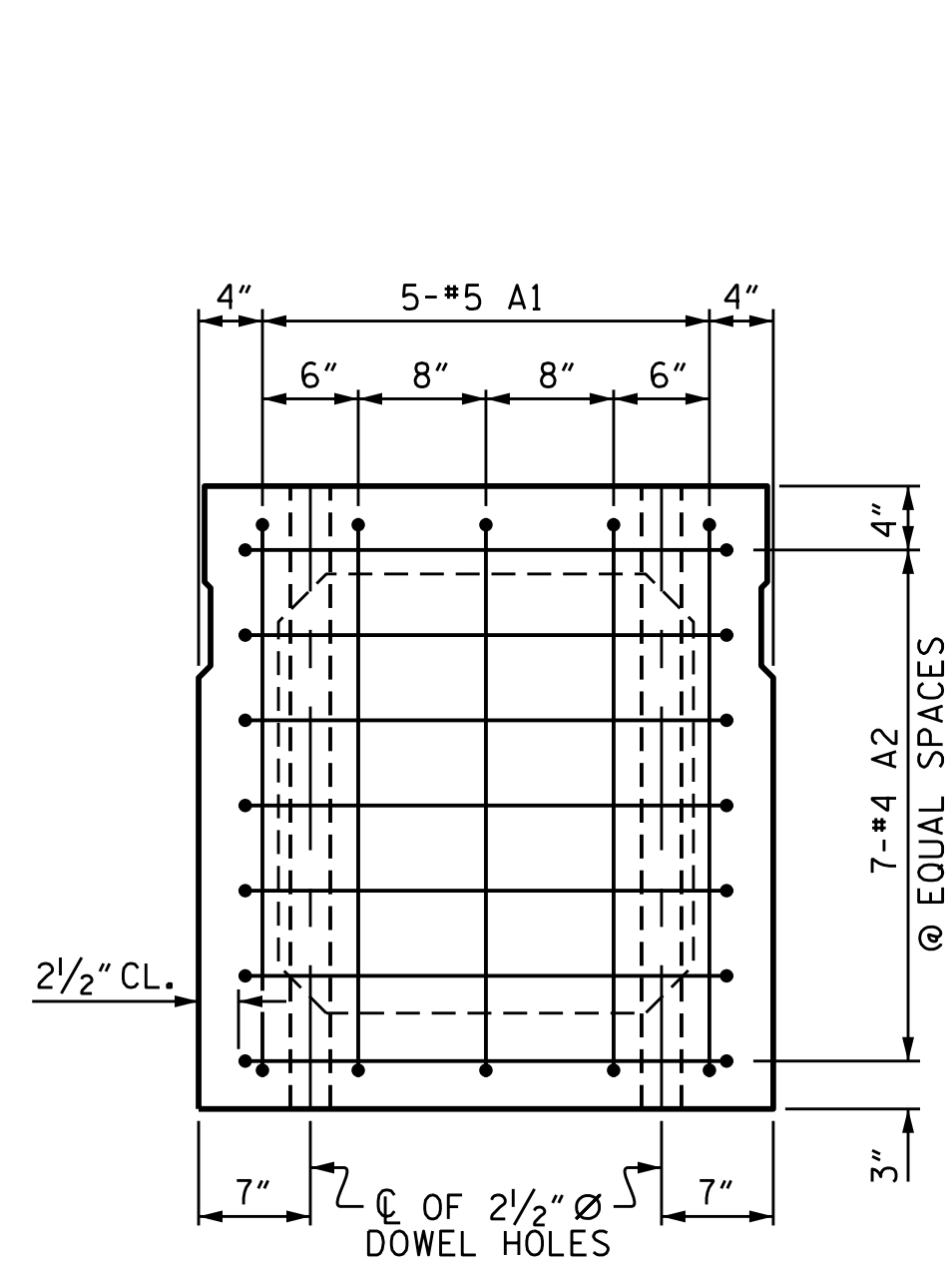
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 4 OF 7



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

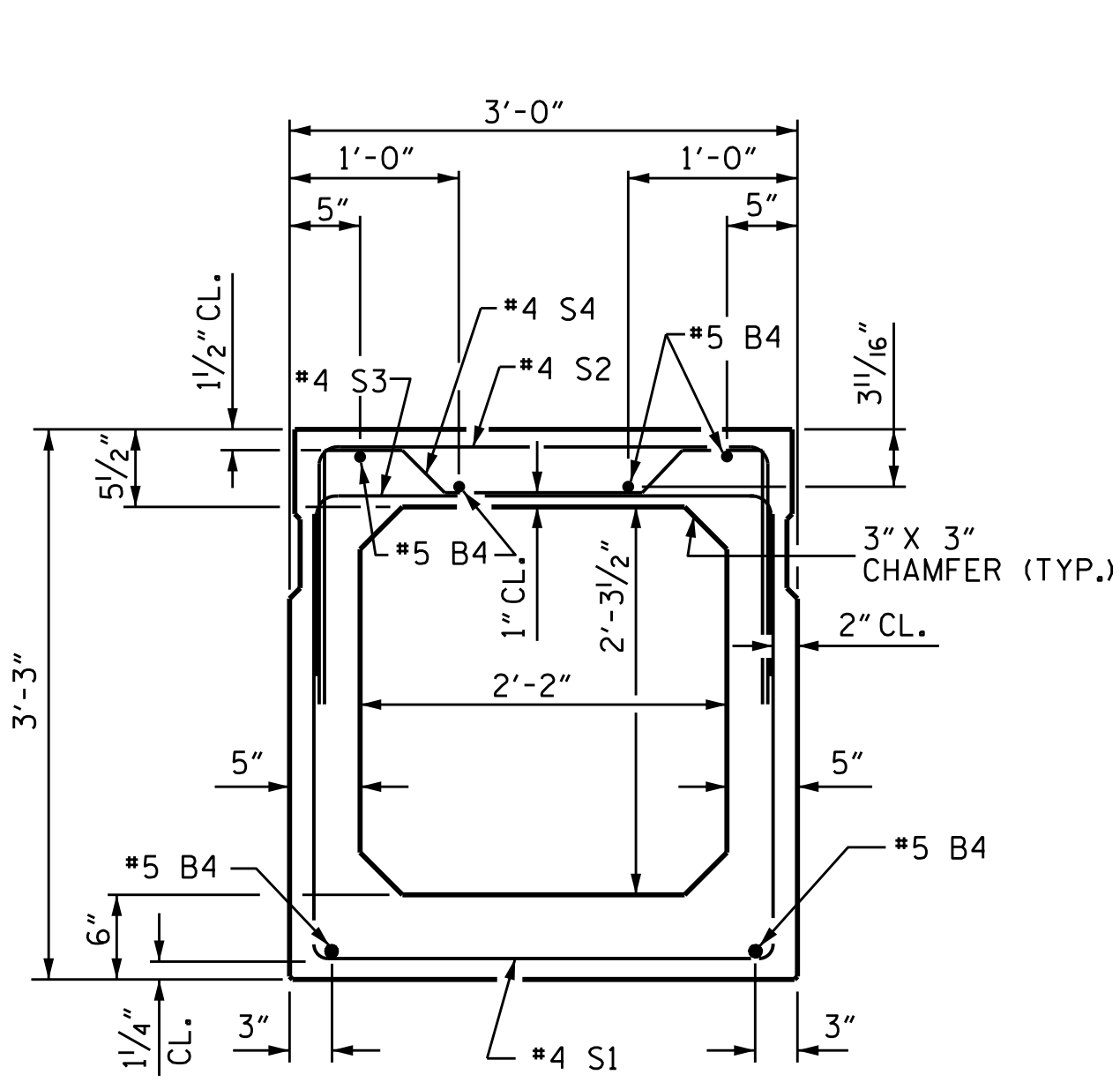
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY: J.P. MCCARTHA	DATE: 7-28-14		
CHECKED BY: M.E. GILES	DATE: 12-17-14		
DRAWN BY: TLA 5/05	REV. 5/1/06	TLA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY: GM 6/05	REV. 10/1/11	MAA/GM	J.P. MCCARTHA
	REV. 1/15	RWW/TMG	DATE: 12-17-14

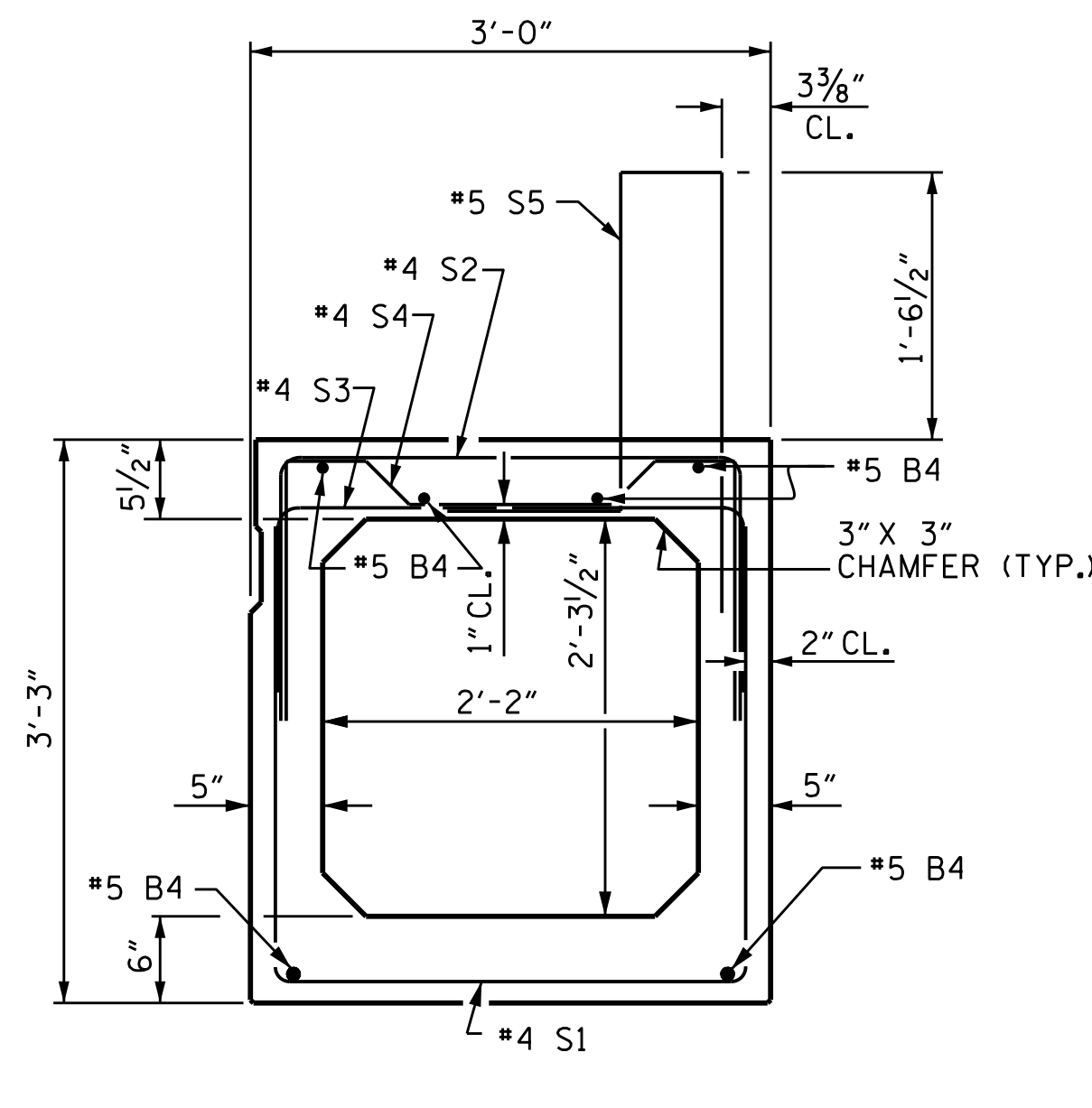


END ELEVATION

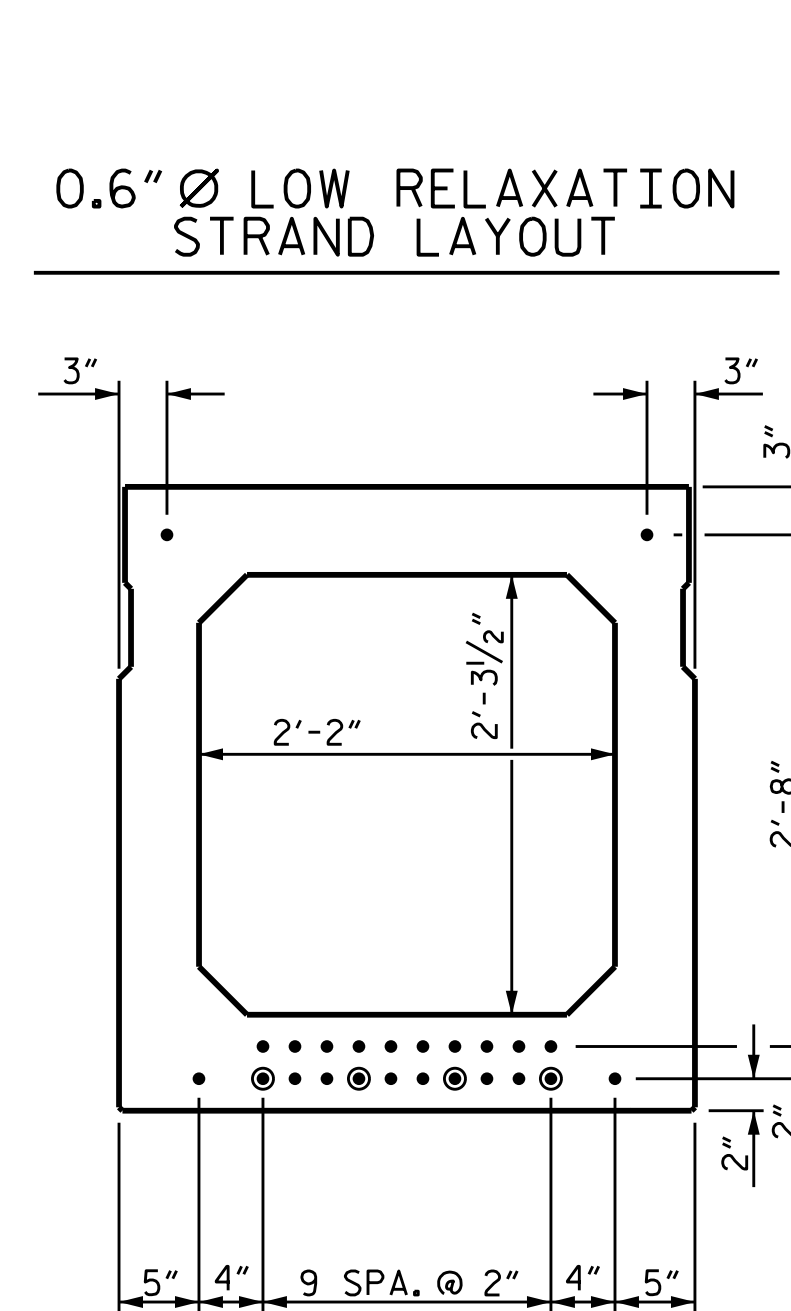
SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



INTERIOR BOX BEAM SECTION (STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION (STRAND LAYOUT NOT SHOWN)



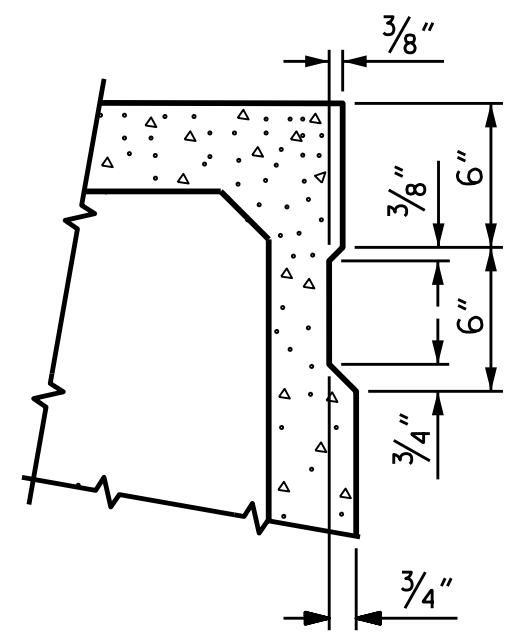
TYPICAL STRAND LOCATION (24 STRANDS REQUIRED)

DEBONDING LEGEND

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

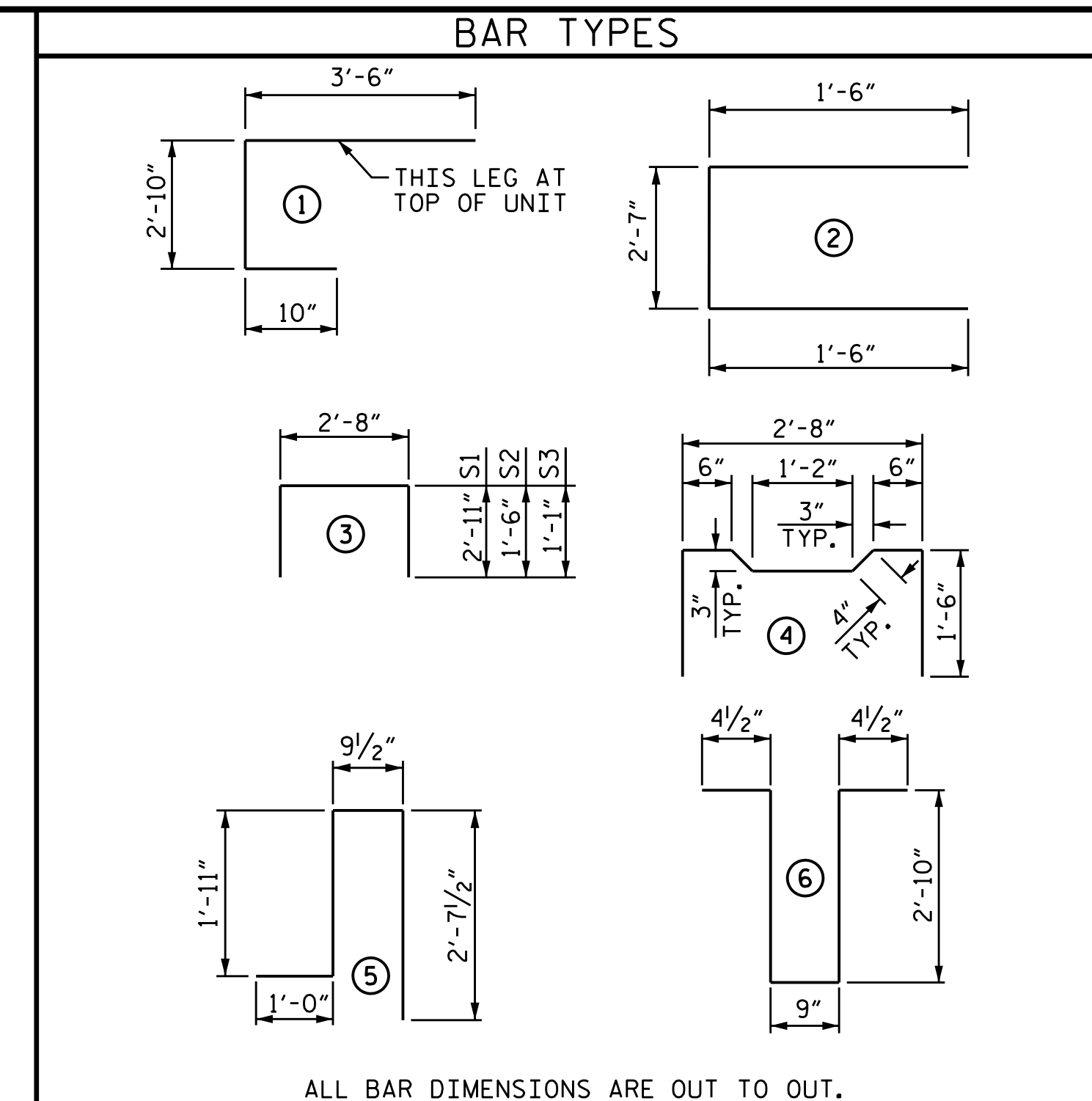
BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

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



SHEAR KEY DETAIL

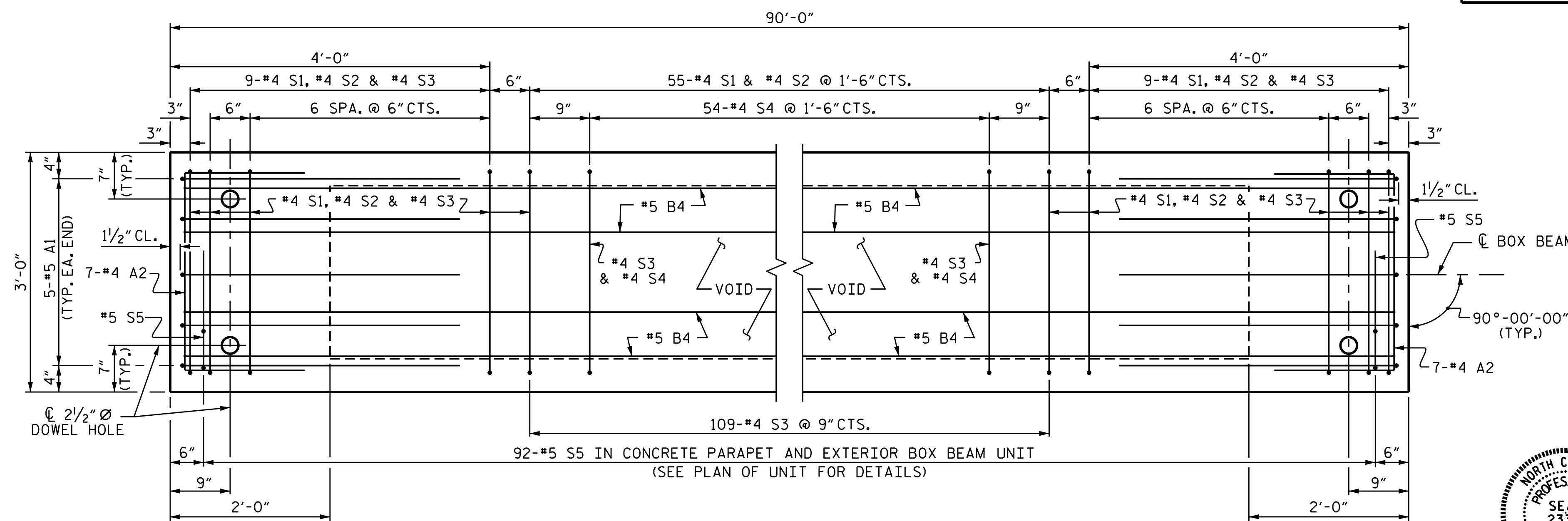
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-7"	164	5'-7"	164
B4	12	#5	STR	45'-11"	575	45'-11"	575
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	73	#4	3	8'-6"	414	8'-6"	414
S2	73	#4	3	5'-8"	276	5'-8"	276
S3	127	#4	3	4'-10"	410	4'-10"	410
S4	54	#4	4	5'-10"	210	5'-10"	210
*S5	92	#5	5	6'-4"	608	--	--
REINFORCING STEEL				LBS.	2,213	LBS.	2,213
*EPOXY COATED REINF. STEEL				LBS.	608		
5500 P.S.I. CONCRETE				CU. YDS.	17.8	CU. YDS.	17.6
0.6" Ø L.R. STRANDS				No.	24	No.	24



PLAN OF BOX BEAM

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

PROJECT NO. B-4972
 CABARRUS COUNTY
 STATION: 22+55.00 -L-

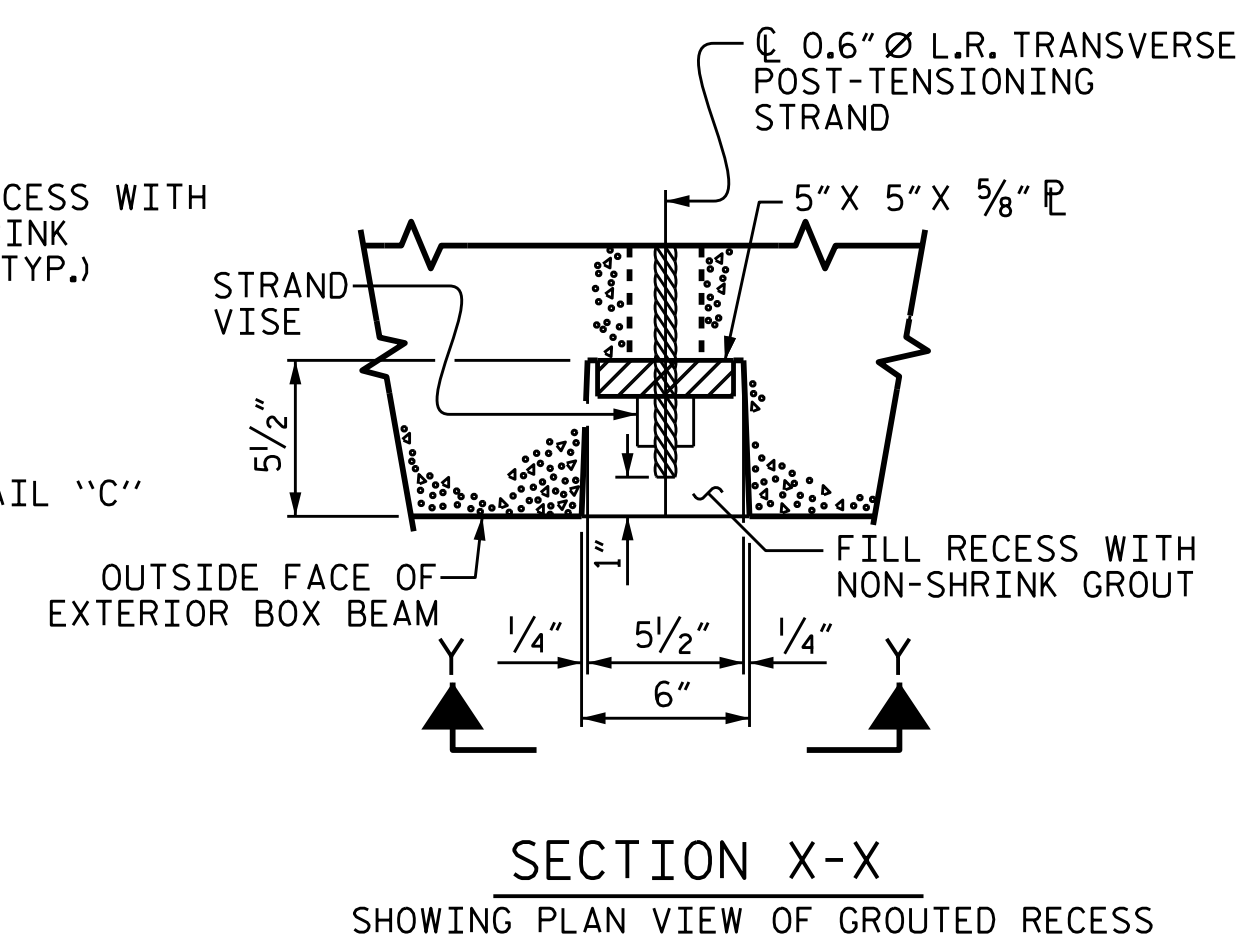
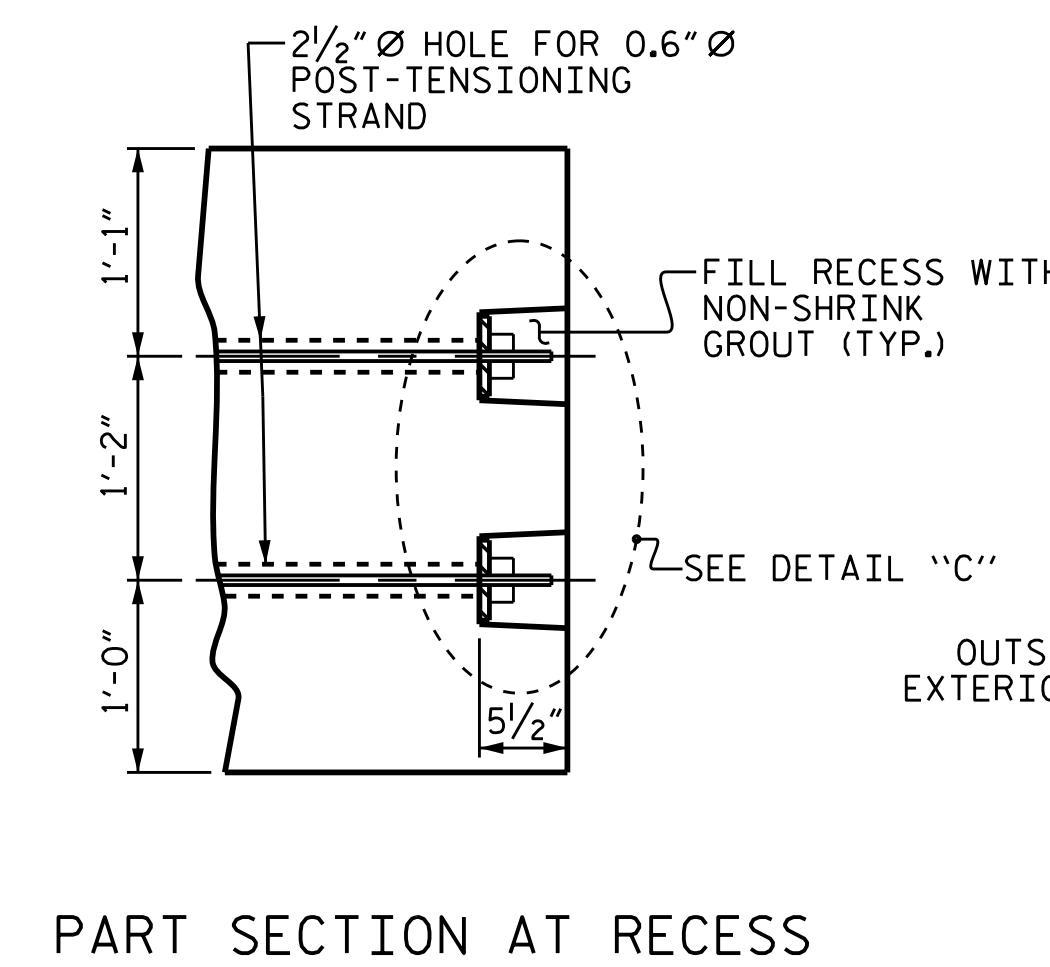
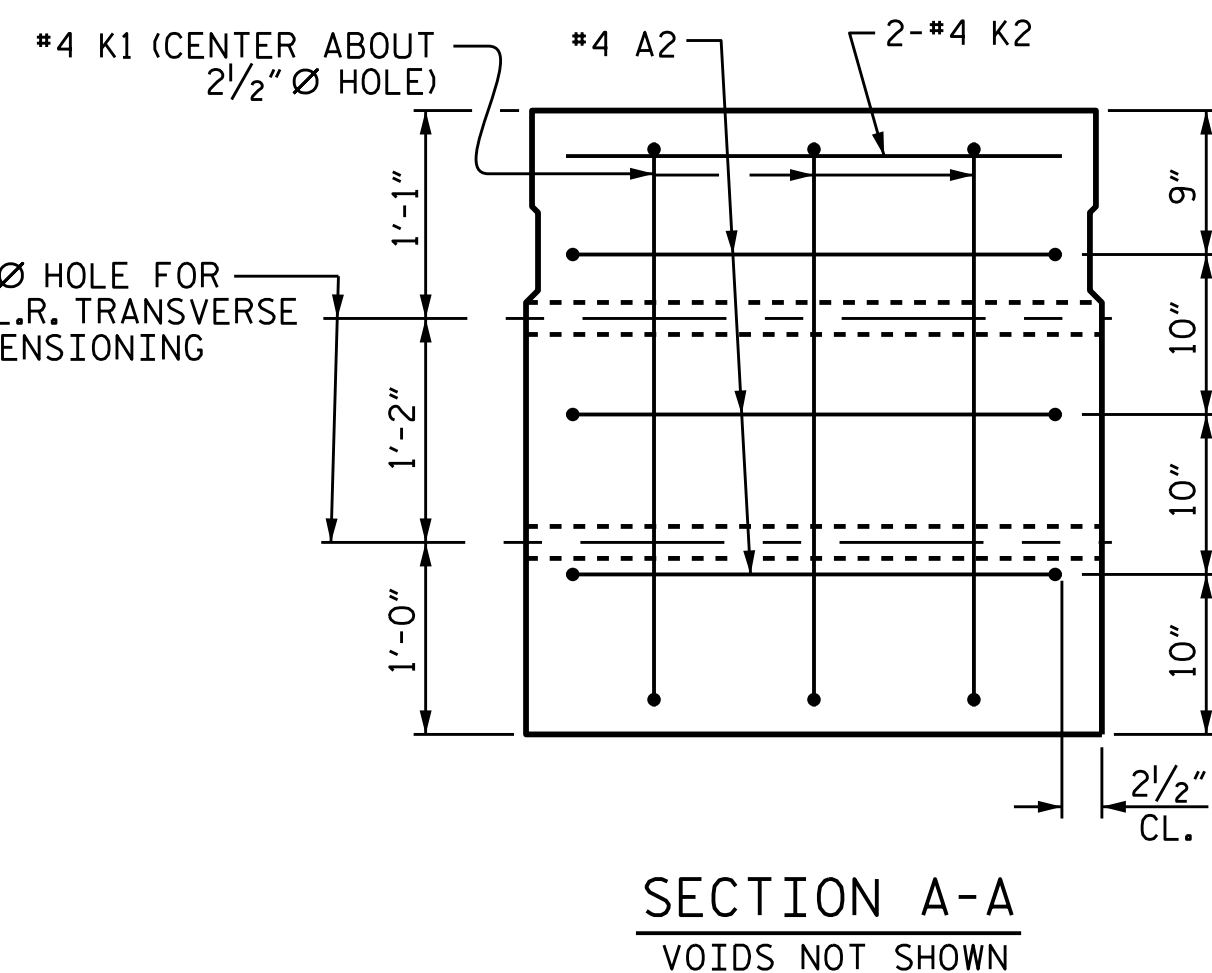
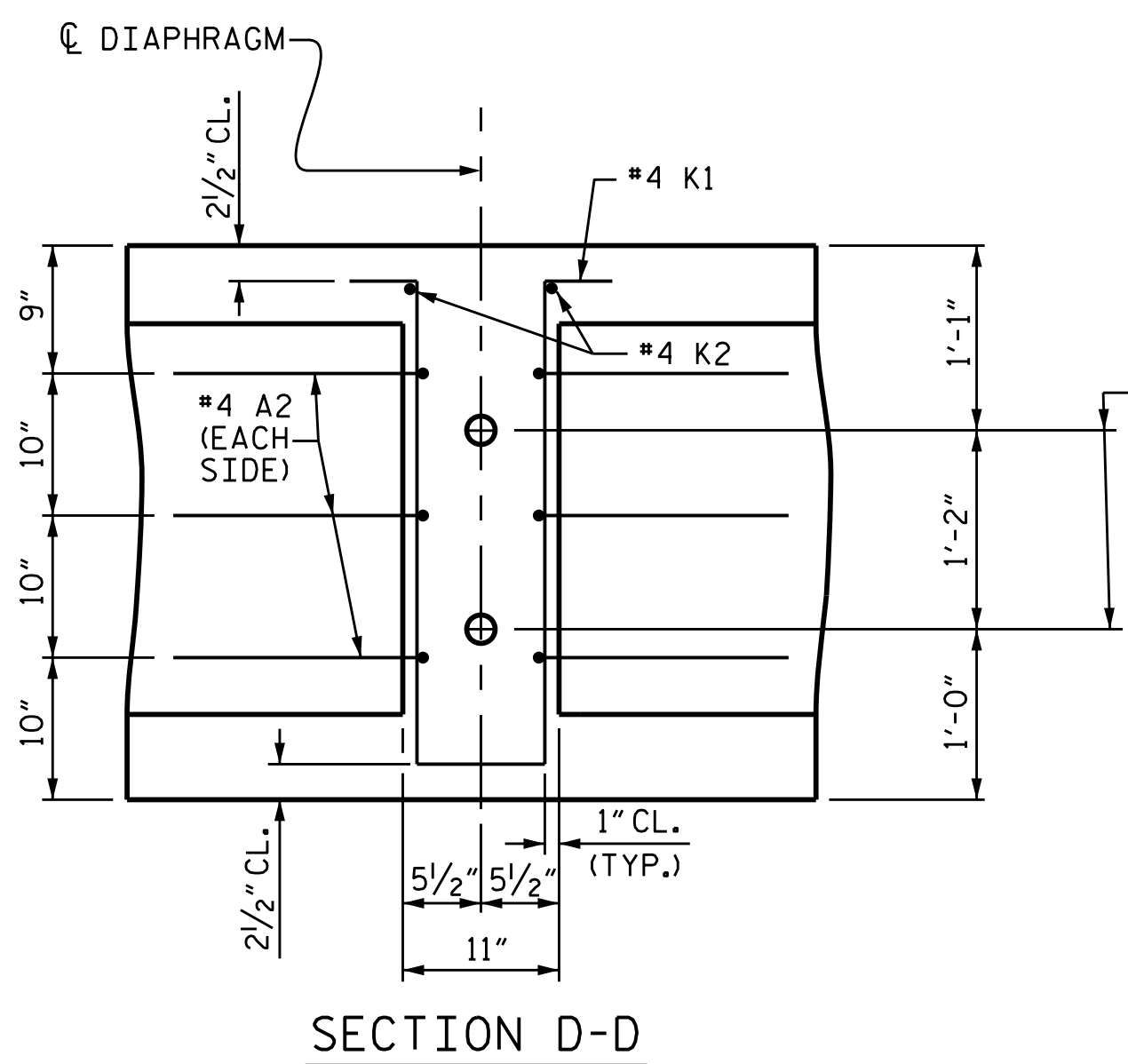
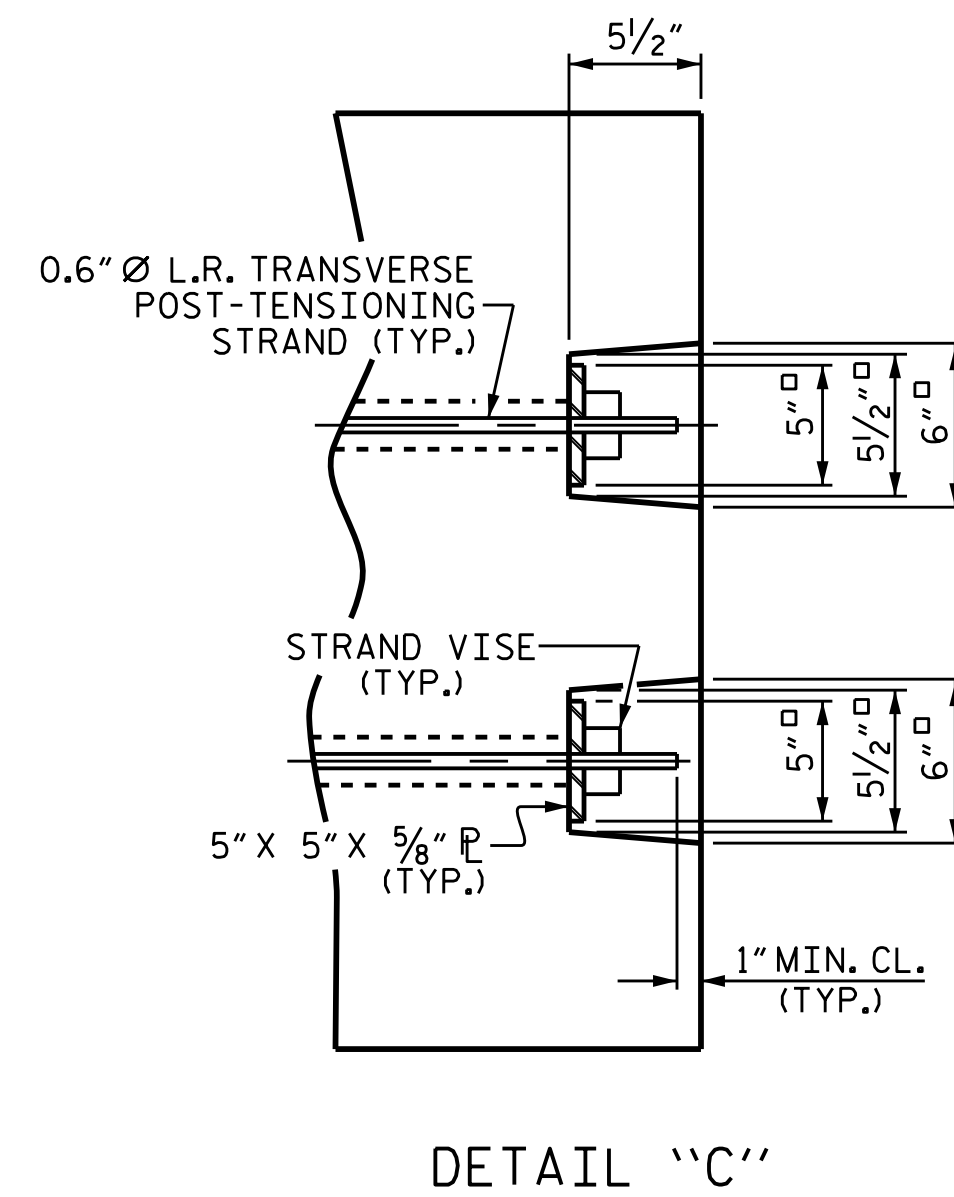
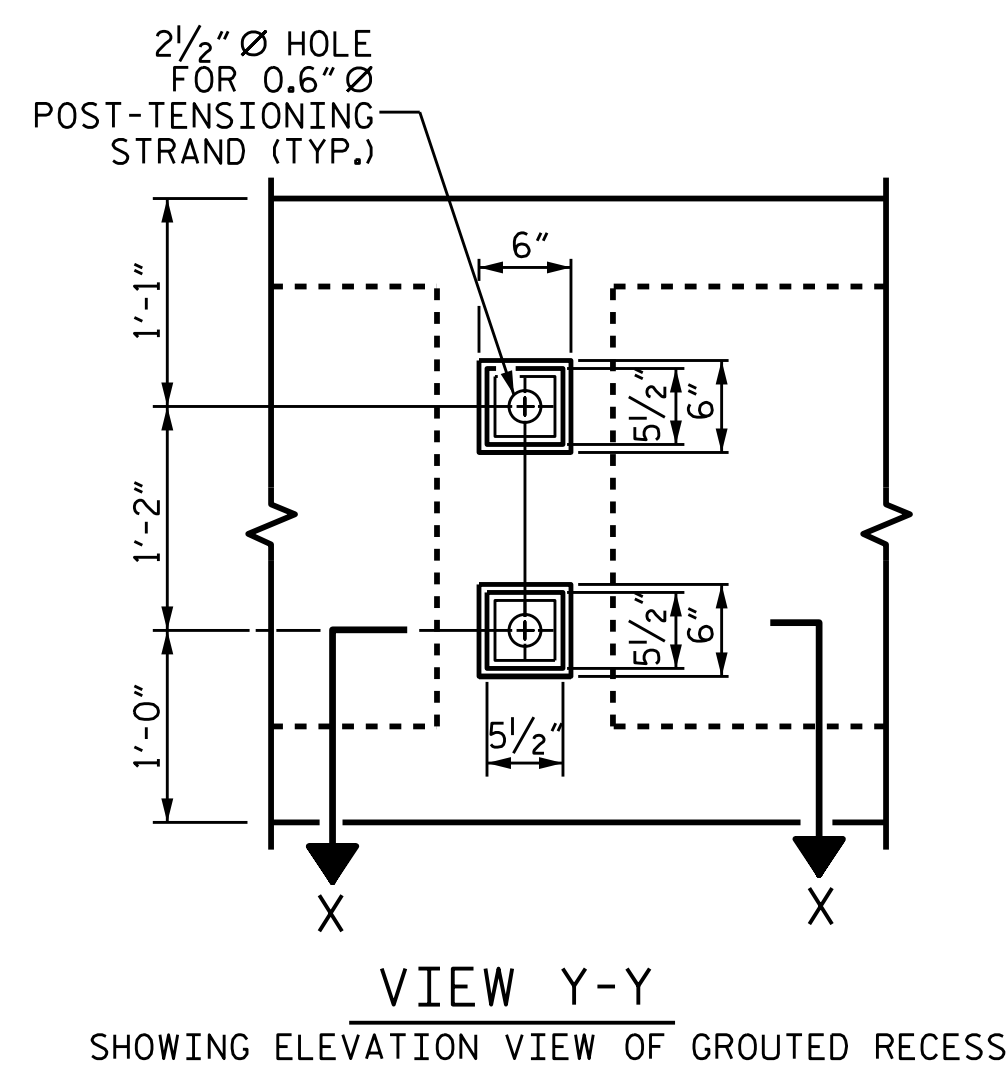
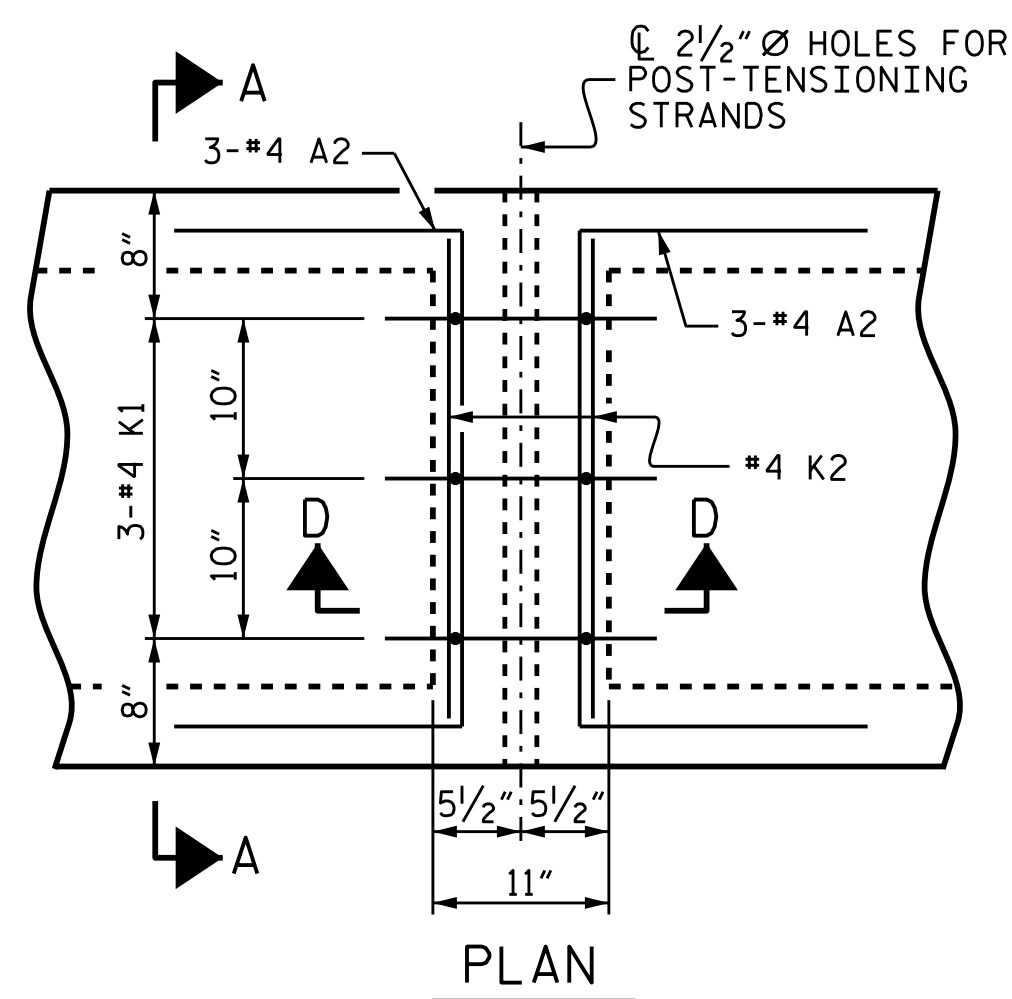
SHEET 5 OF 7



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

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

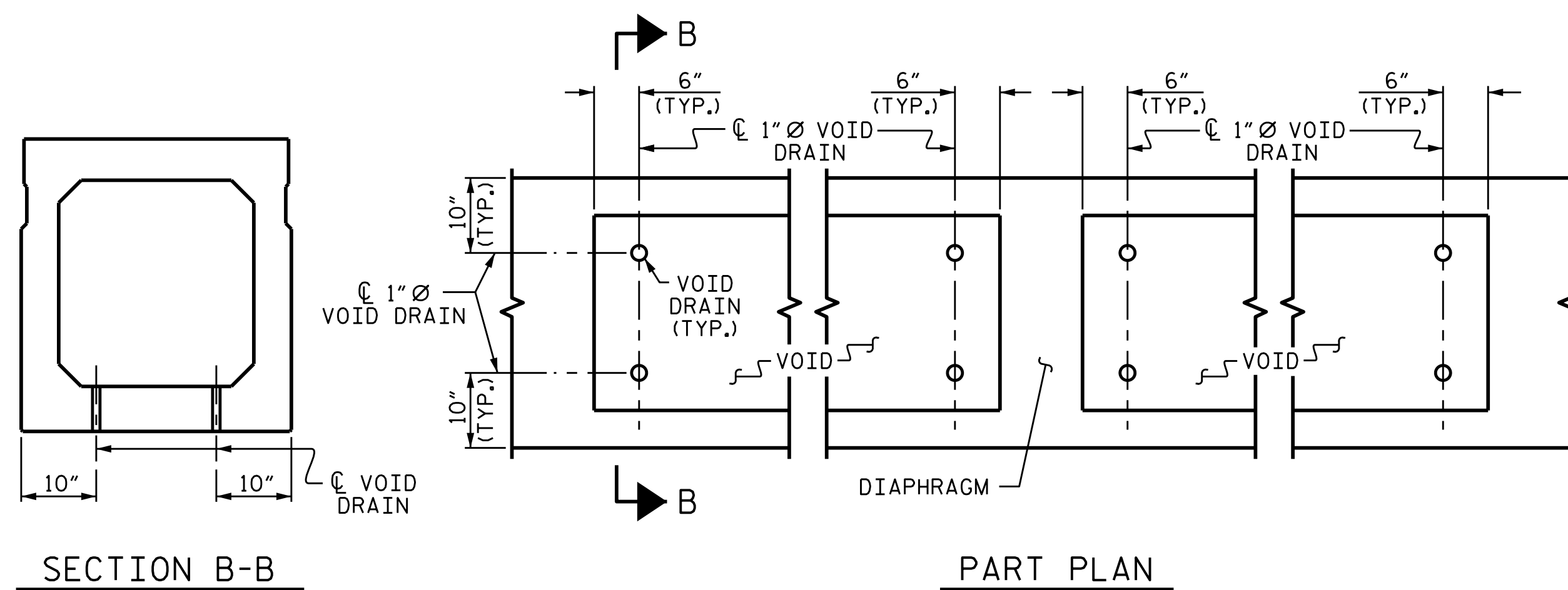
ASSEMBLED BY: J.P. MCCARTHA	DATE: 7-28-14	DESIGN ENGINEER OF RECORD:	J.P. MCCARTHA	DATE: 12-17-14
CHECKED BY: M.E. GILES	DATE: 12-17-14			
DRAWN BY: TLA 5/05	REV. 5/1/06	TLA/GM		
CHECKED BY: GM 6/05	REV. 10/1/11	MAA/GM		
	REV. 1/15	RWW/TMG		



DOUBLE DIAPHRAGM DETAILS

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

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



VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

BOX BEAM UNITS REQUIRED

SPANS A & B	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	4	100'-0"	400'-0"
INTERIOR B.B.	20	100'-0"	2000'-0"
SPANS C & D	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	4	90'-0"	360'-0"
INTERIOR B.B.	20	90'-0"	1800'-0"
TOTAL	48		4560'-0"

DEAD LOAD DEFLECTION AND CAMBER

SPANS A & B	3'-0" x 3'-3"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND
DEFLECTION DUE TO PARAPET & FUTURE WEARING SURFACE	1 1/16" ↓
DEFLECTION DUE TO CONCRETE WEARING SURFACE	1/2" ↓
FINAL CAMBER	7/8" ↑

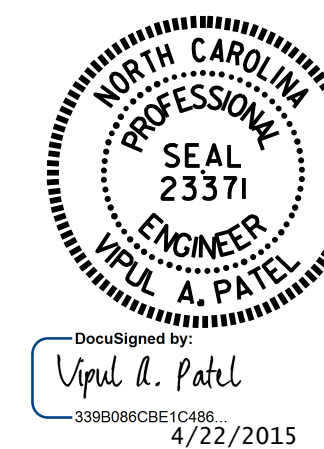
DEAD LOAD DEFLECTION AND CAMBER

SPANS C & D	3'-0" x 3'-3"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND
DEFLECTION DUE TO PARAPET & FUTURE WEARING SURFACE	1 1/16" ↓
DEFLECTION DUE TO CONCRETE WEARING SURFACE	3/8" ↓
FINAL CAMBER	7/8" ↑

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

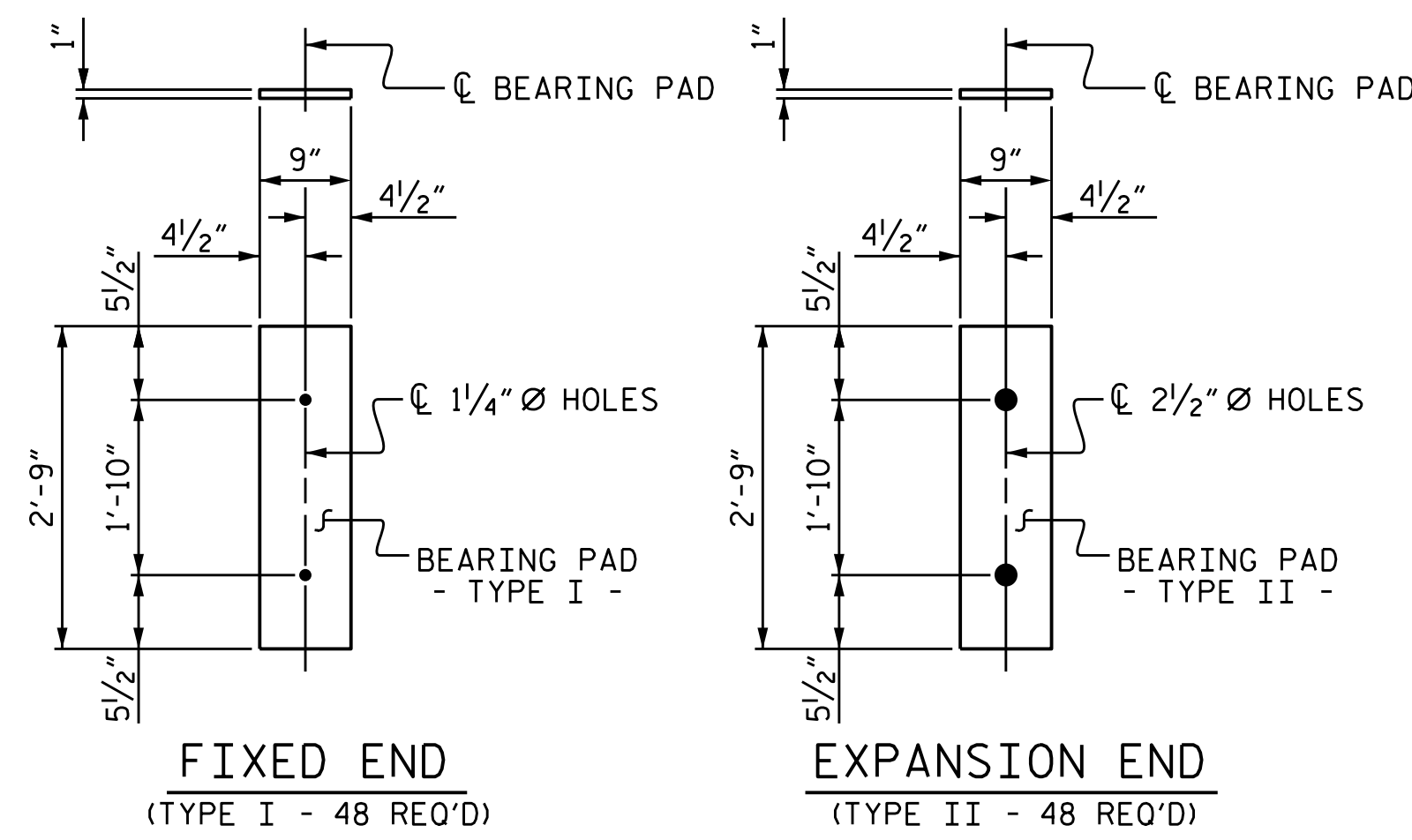
SHEET 6 OF 7

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



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

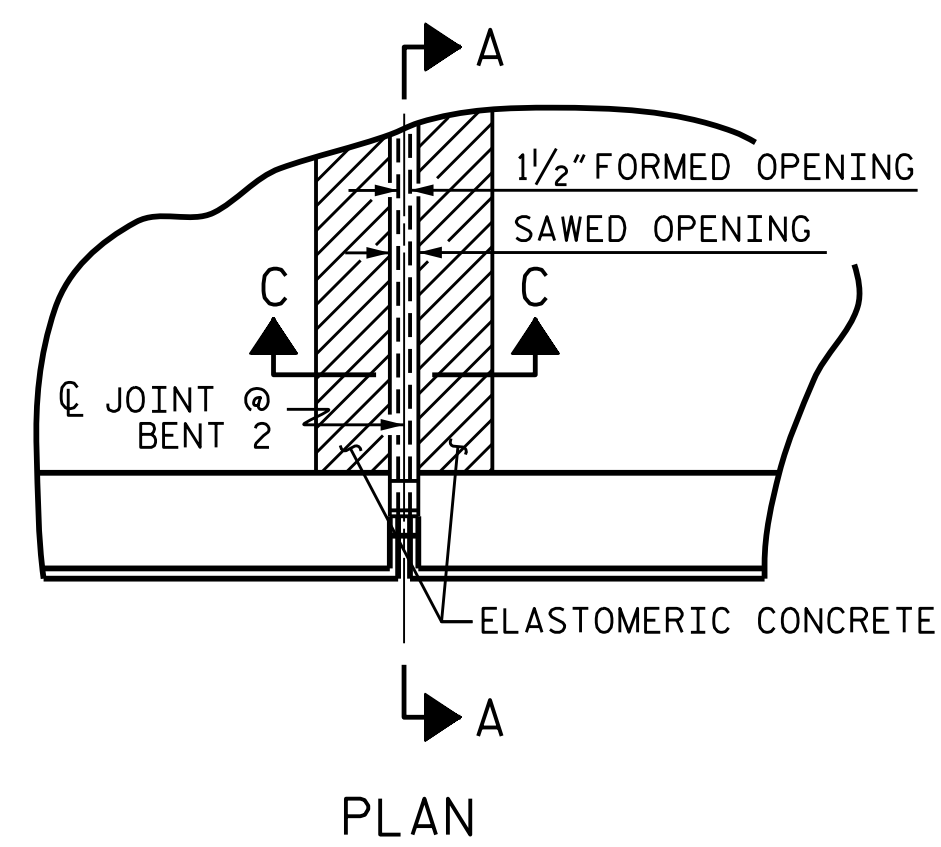
ASSEMBLED BY : J.P. MCCARTHA	DATE : 7-25-14	DESIGN ENGINEER OF RECORD:	
CHECKED BY : M.E. GILES	DATE : 12-17-14	J.P. MCCARTHA	DATE : 12-17-14
DRAWN BY : TLA	5/05	ADDED	7/11/05
CHECKED BY : GM	6/05	REV.	5/1/06
		REV.	10/1/11
		TLA/GM	MAA/GM



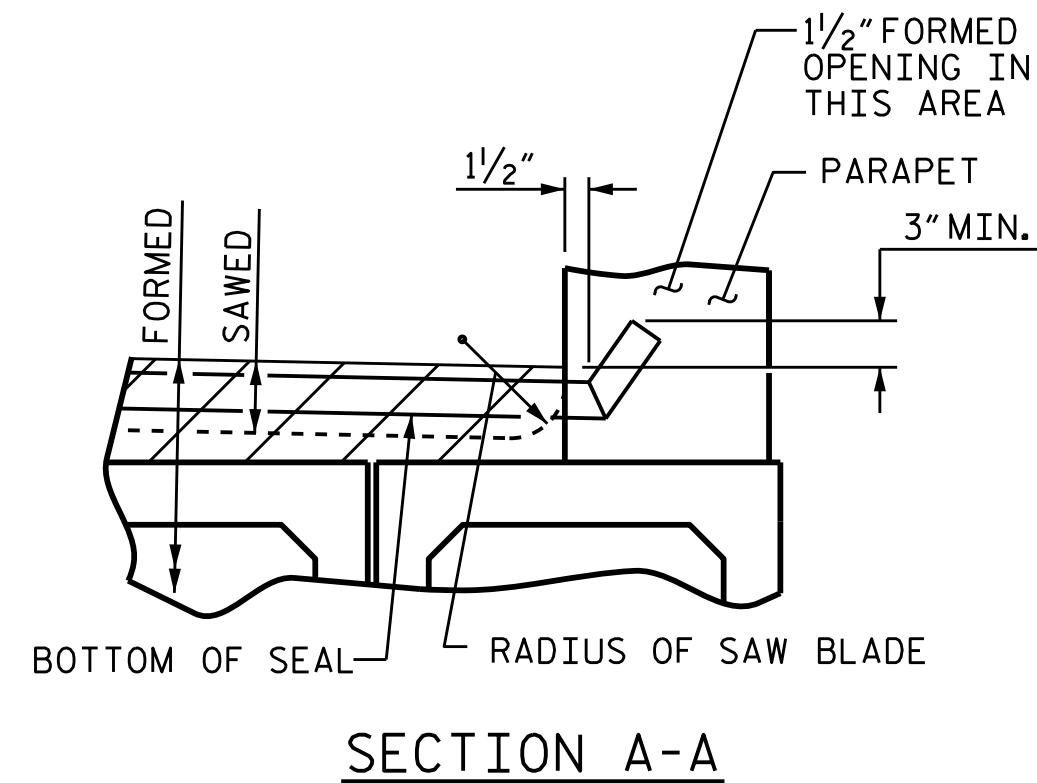
ELASTOMERIC BEARING DETAILS
ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

ELASTOMERIC CONCRETE	
	ELASTOMERIC CONCRETE (CU. FT.) ▲
BENT 2	12.8
TOTAL	12.8

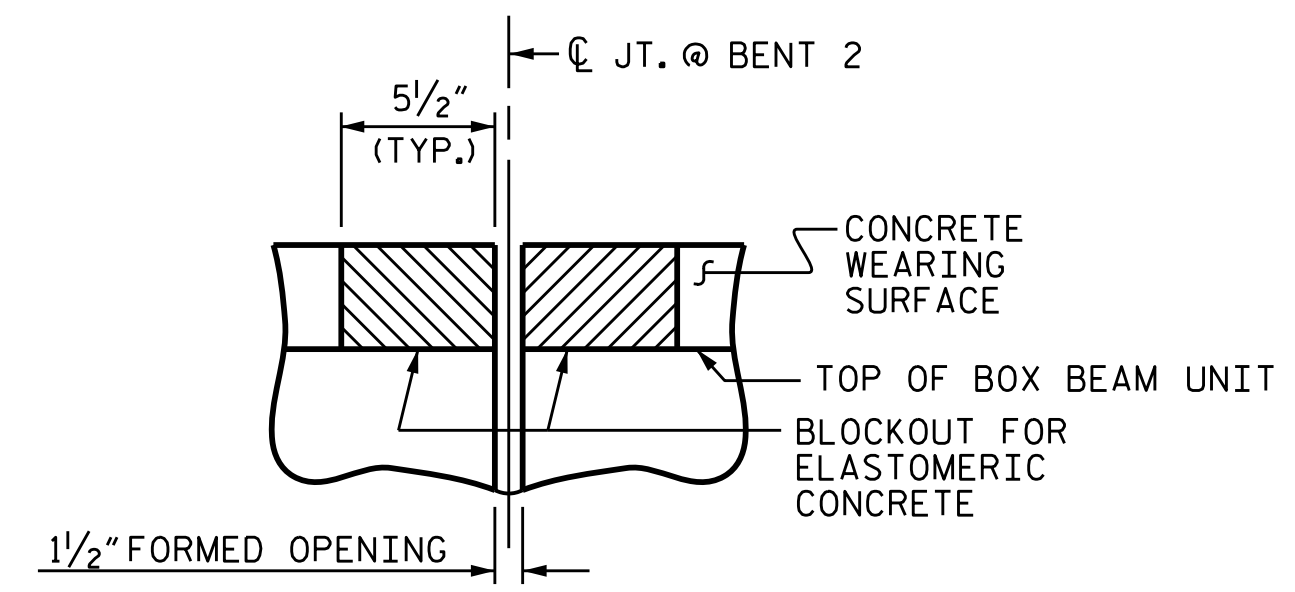
▲ BASED ON THE MINIMUM BLOCKOUT SHOWN.



PLAN

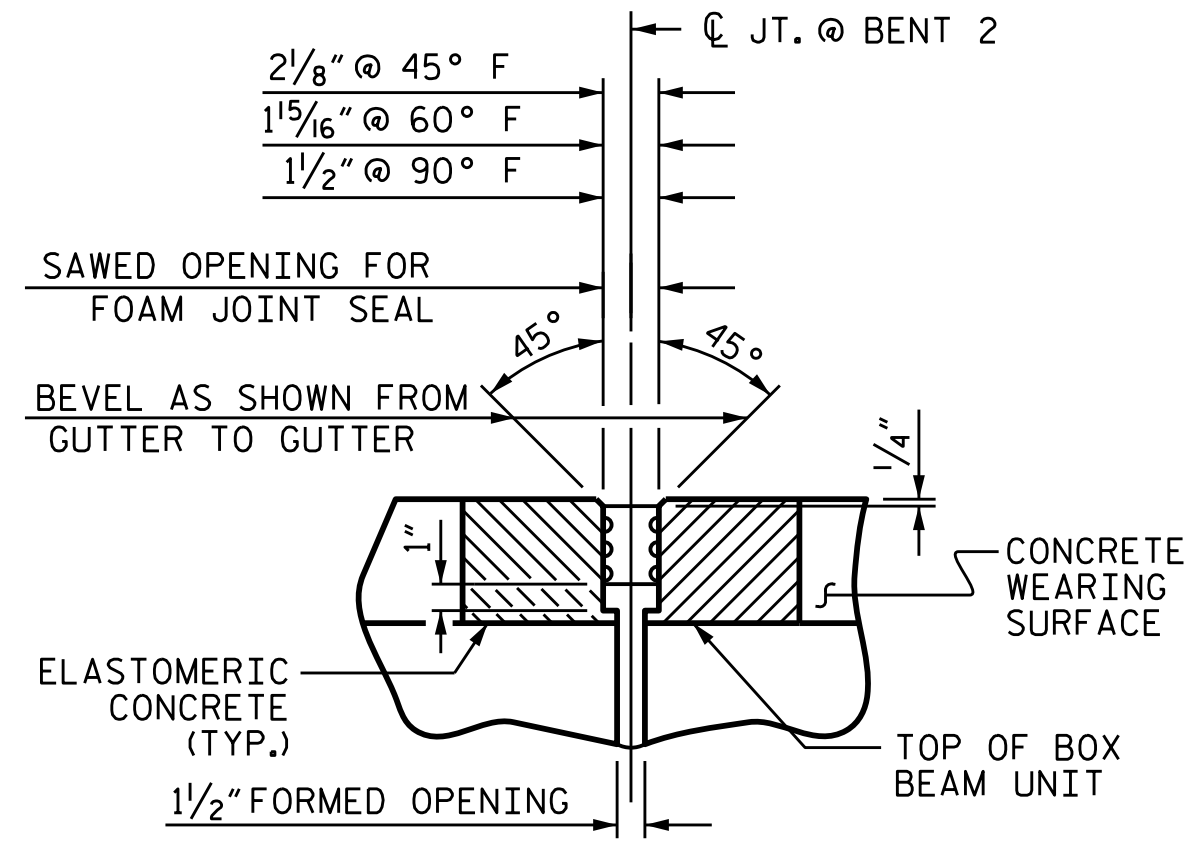


SECTION A-A



SECTION C-C

FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

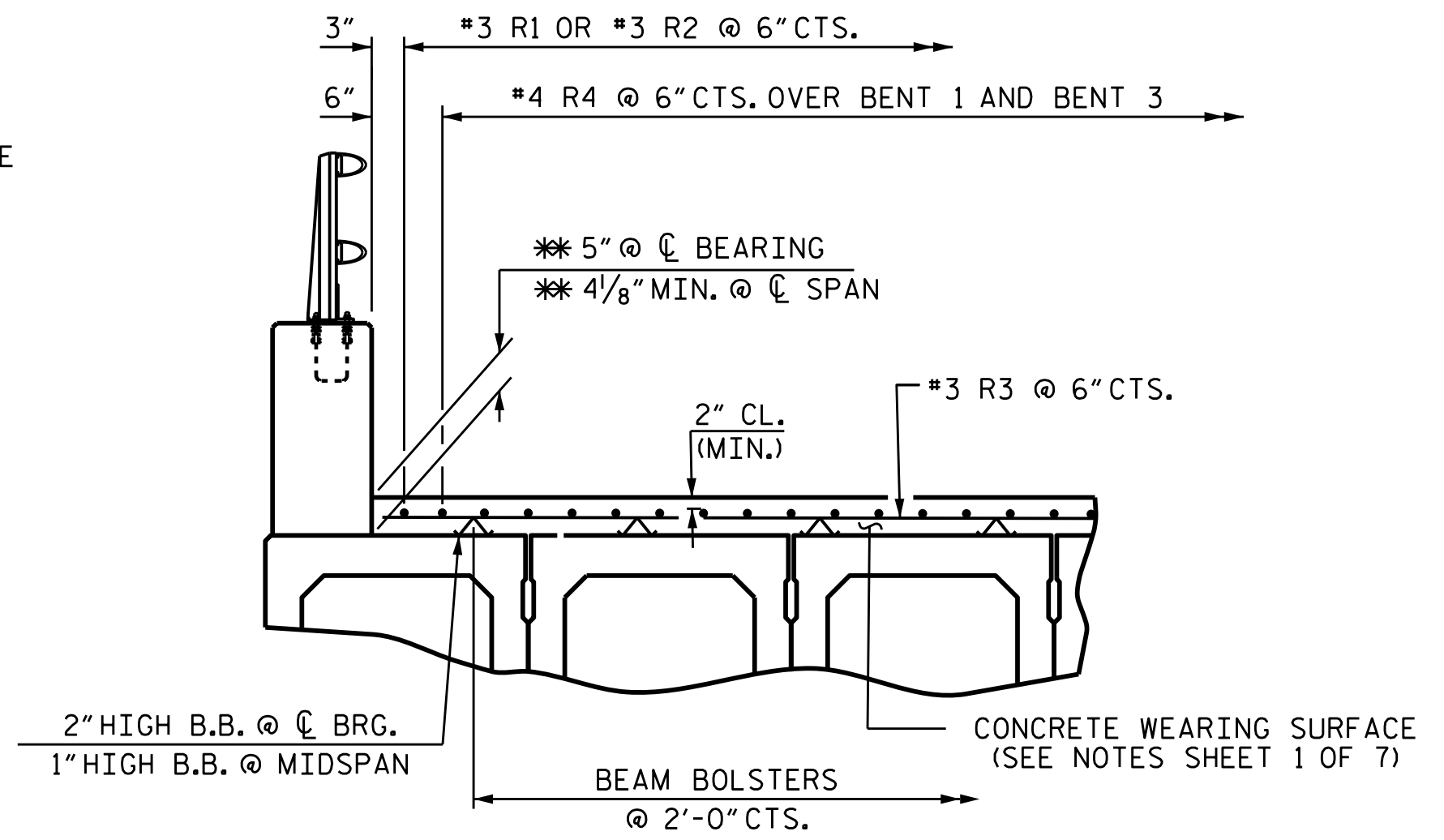


SECTION C-C

FOAM JOINT SEAL FOR BENT 2 (EXPANSION)

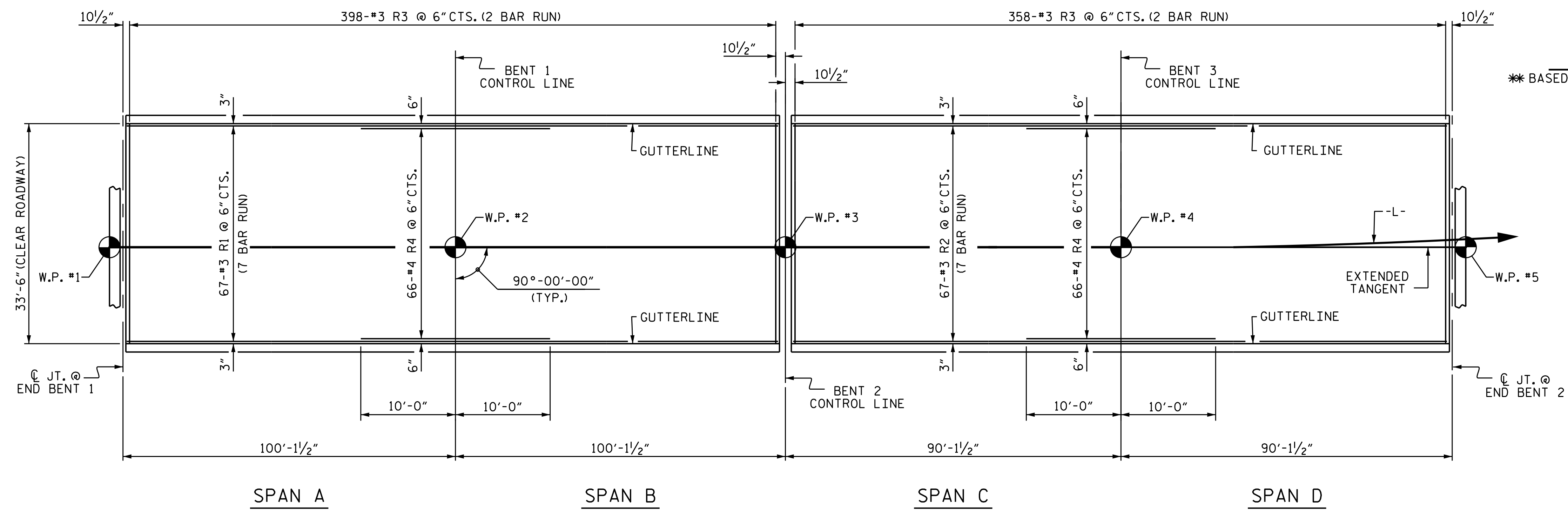
JOINT SEAL DETAILS @ BENT 2

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP AS SHOWN.



REINFORCING FOR CONCRETE WEARING SURFACE

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



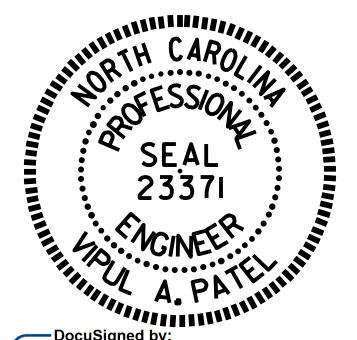
PLAN VIEW

BILL OF MATERIAL FOR CONCRETE WEARING SURFACE						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*R1	469	#3	STR	29'-6"	5202	
*R2	469	#3	STR	26'-8"	4703	
*R3	1512	#3	STR	17'-3"	9806	
*R4	132	#4	STR	20'-0"	1764	
* EPOXY COATED REINFORCING STEEL					LBS.	21,476
CONCRETE WEARING SURFACE					SO. FT.	12,677

GROOVING BRIDGE FLOORS	
APPROACH SLABS	654 SQ. FT.
BRIDGE DECK	11,522 SQ. FT.
TOTAL	12,176 SQ. FT.

SPLICE LENGTH CHART	
BAR SIZE	EPOXY COATED
#3	1'-3"

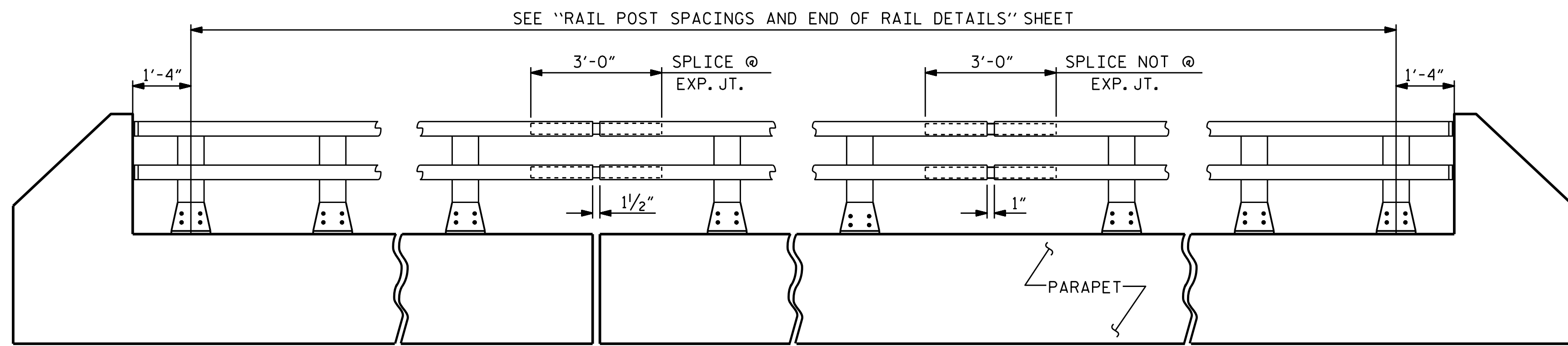
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 7 OF 7



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

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

ASSEMBLED BY : T. H. CARROLL	DATE : 3/6/15	MAA/GM	DESIGN ENGINEER OF RECORD:
CHECKED BY : V. A. PATEL	DATE : 3/9/15	MAA/GM	V. A. PATEL
DRAWN BY : TLA 5/05	REV. 10/12	RWW/TMG	DATE : 3/9/15
CHECKED BY : GM 6/05	REV. 6/13		
	REV. 1/15		



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.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

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 ENSURE 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.

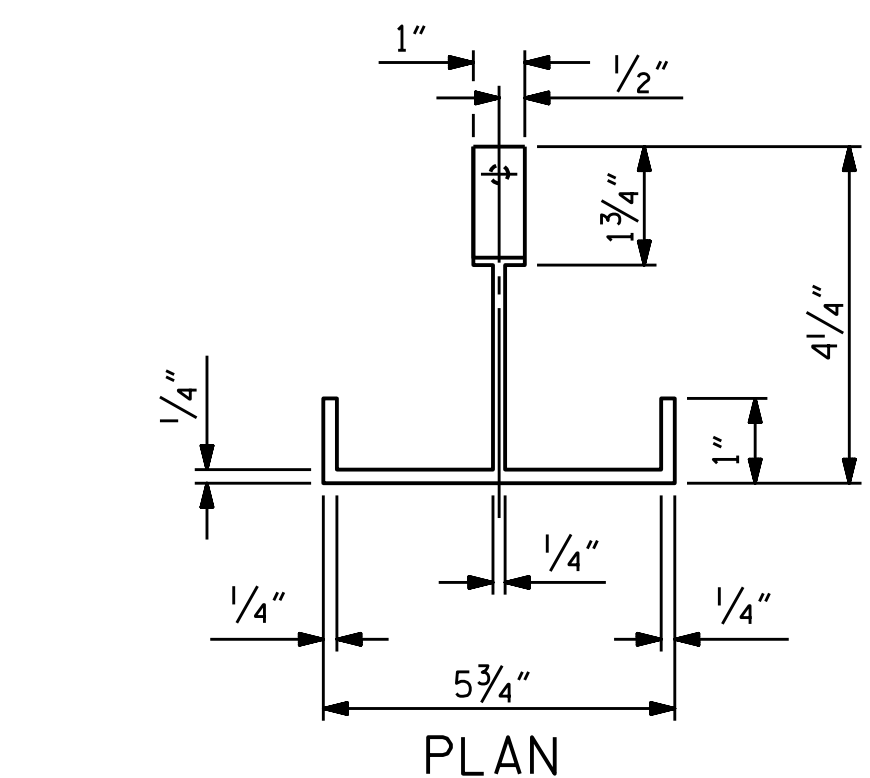
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

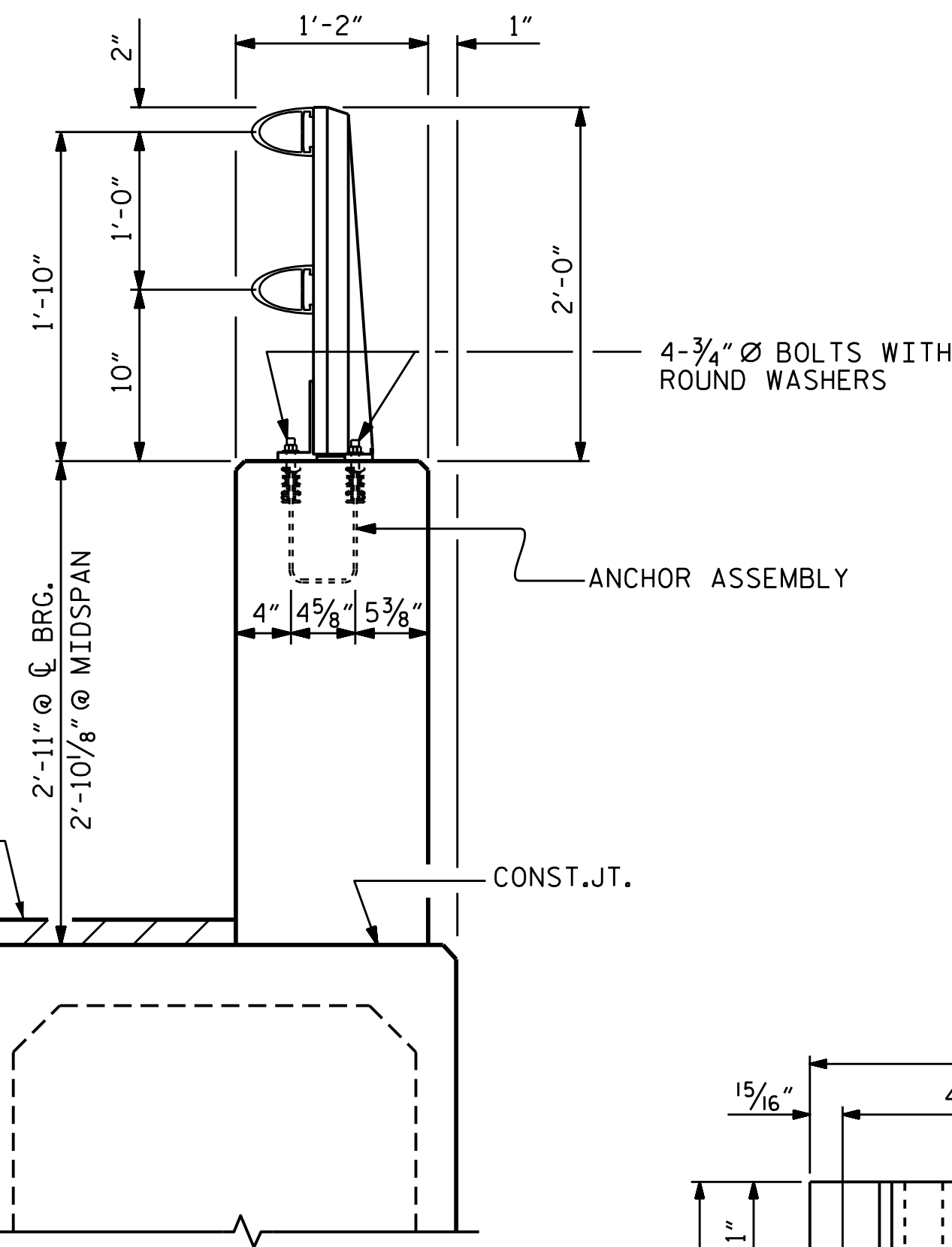
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET 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.

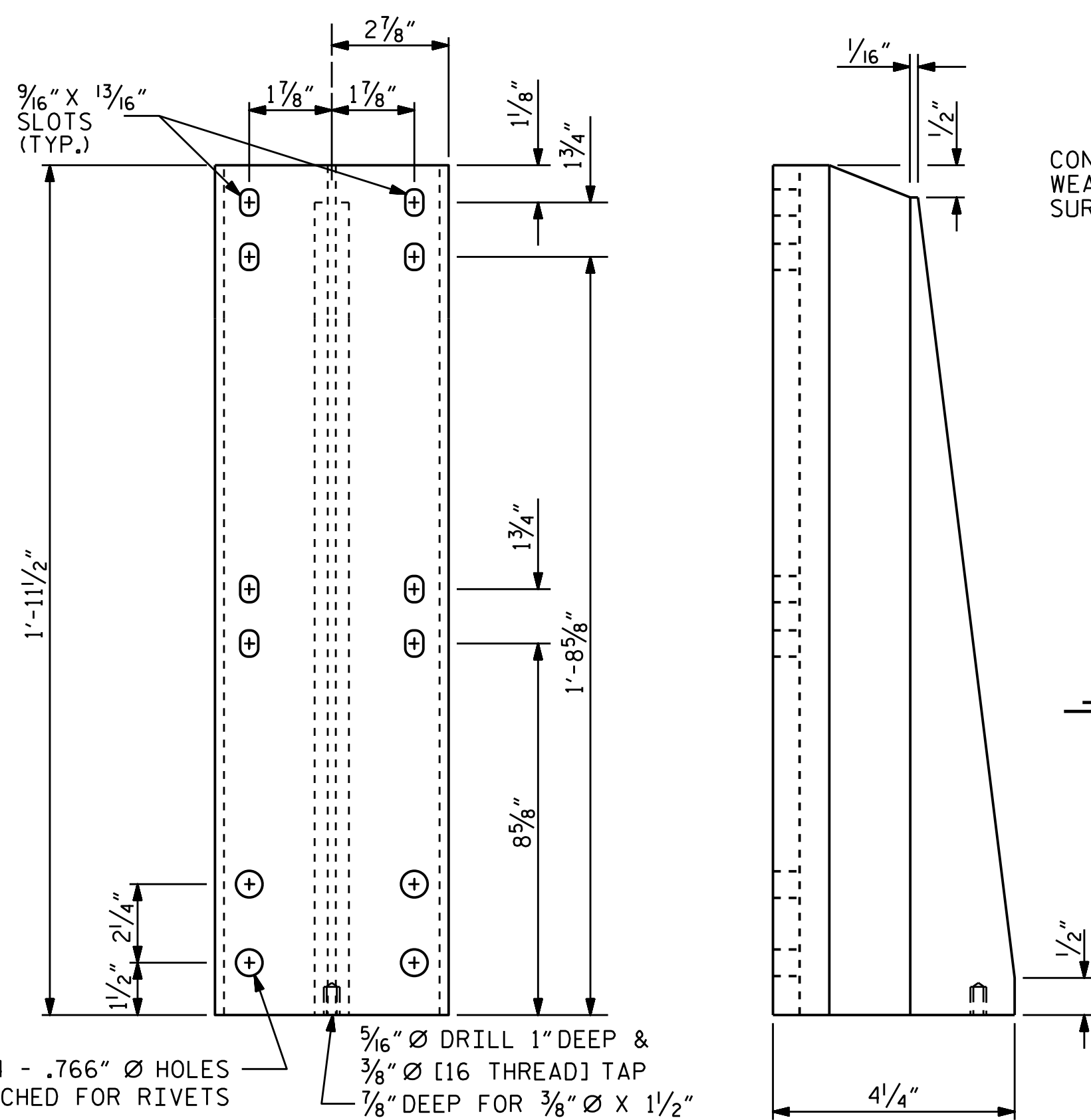
PAY LENGTH = 745.25 LIN. FT.



PLAN



SECTION THROUGH PARAPET AND RAIL



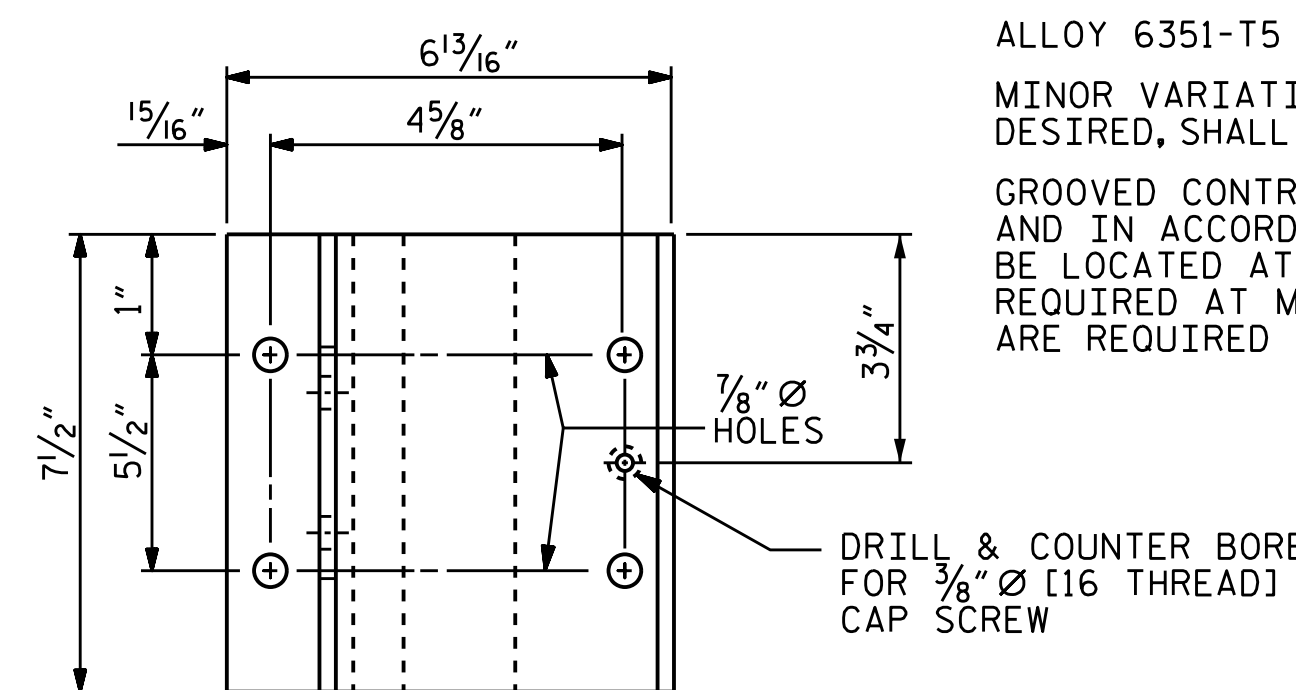
FRONT ELEVATION

SIDE ELEVATION

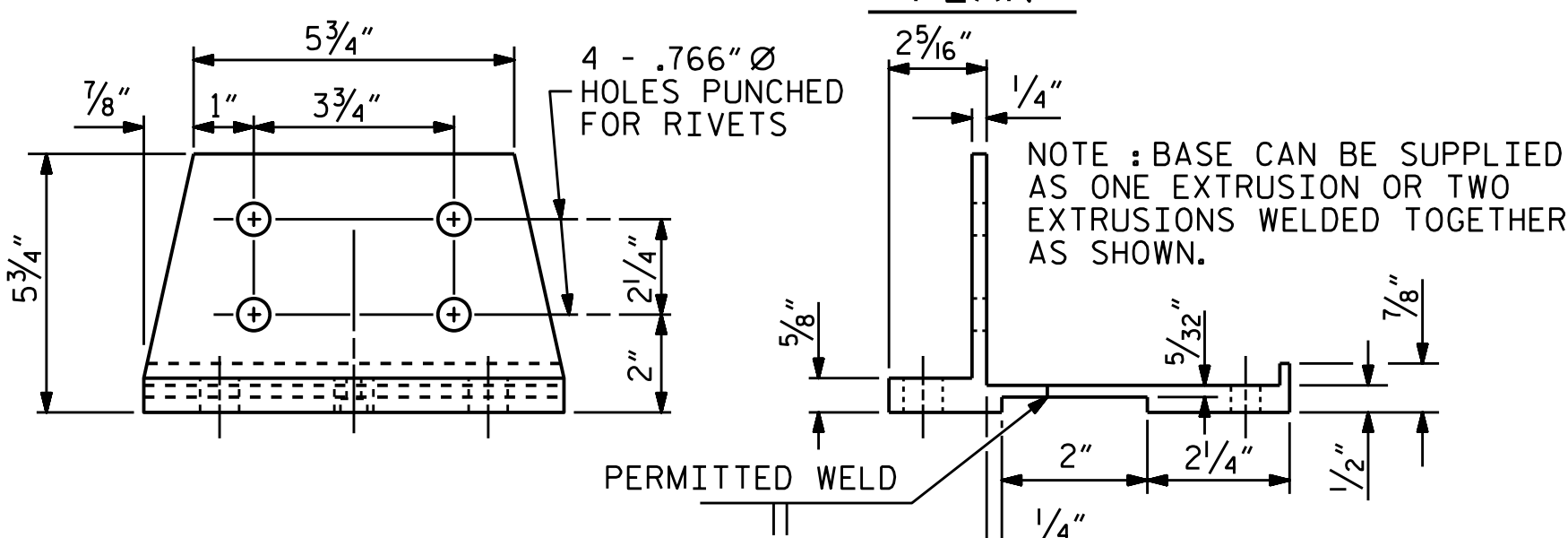
DETAILS OF POST

ASSEMBLED BY: J.P. MCCARTHA DATE: 7-29-14
 CHECKED BY: M.E. GILES DATE: 12-17-14
 DRAWN BY: EEM 6/94 REV. 5/1/06 TLA/GM
 CHECKED BY: RCW 6/94 REV. 10/1/11 MAA/GM
 REV. 6/13 MAA/GM

21-APR-2015 09:25
 R:\Structures\Plans\B4972-SD_2MR_01.dgn
 Isutton



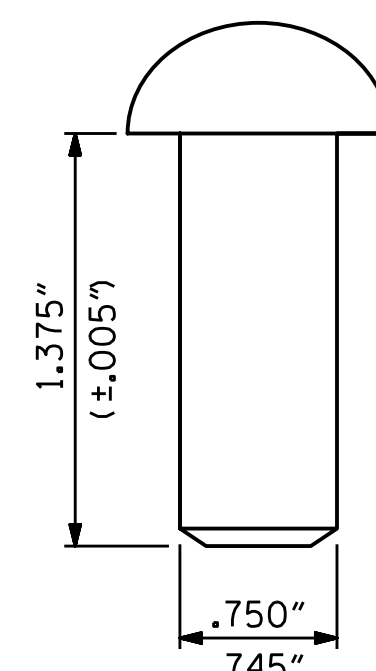
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

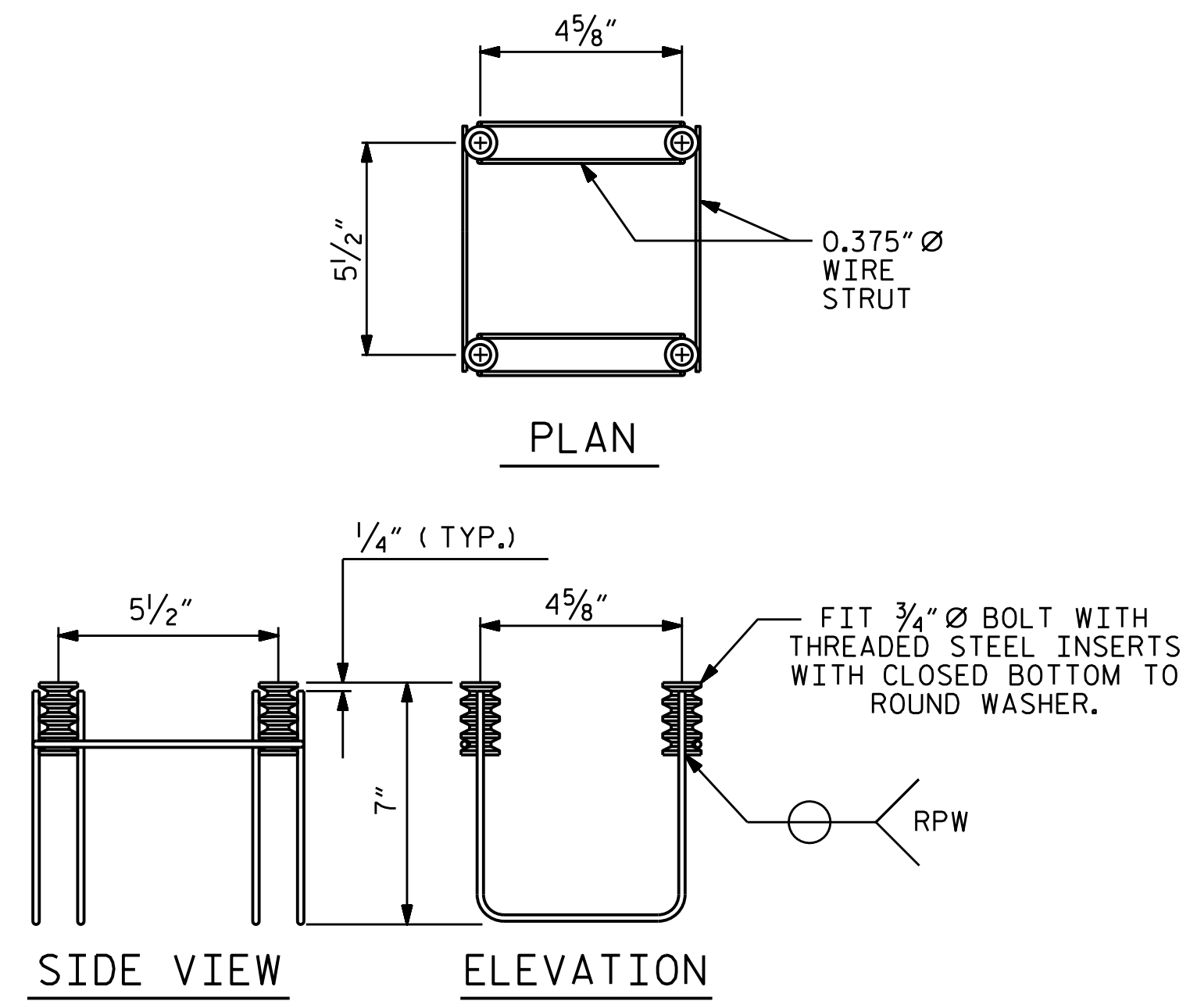
SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-12
STANDARD 2 BAR METAL RAIL						
REVISIONS						TOTAL SHEETS 31
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



Designed by
 Vipul A. Patel
 338080810000
 4/22/2015

STD. NO. BMR3



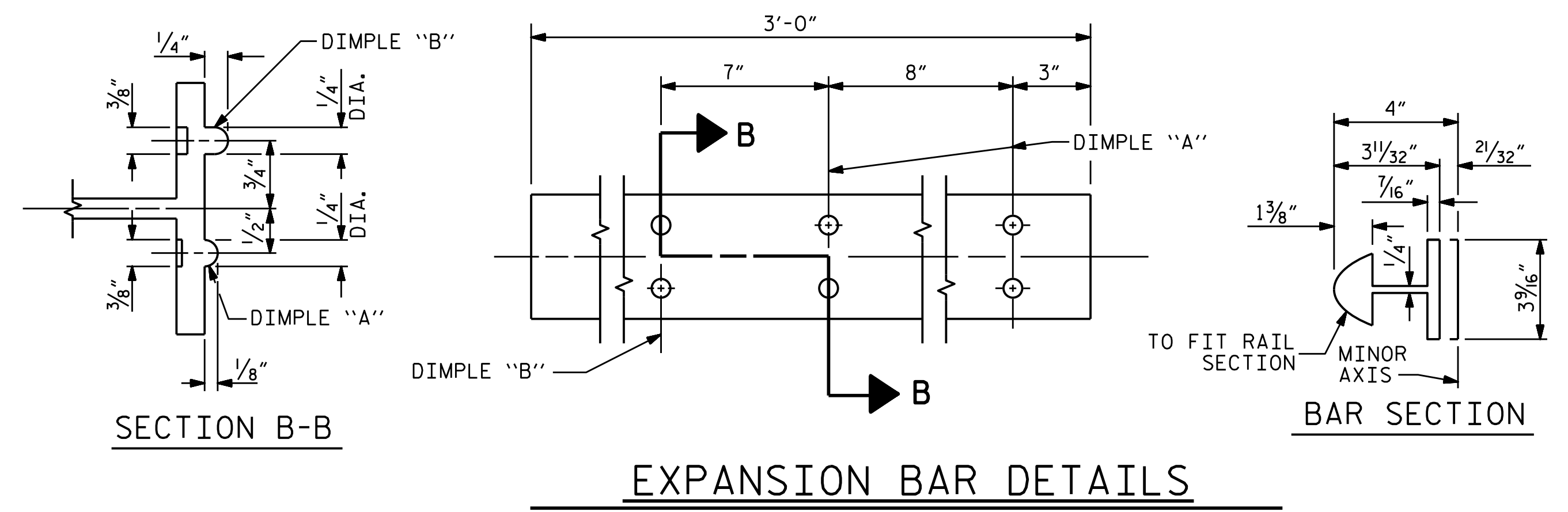
4-BOLT METAL RAIL ANCHOR ASSEMBLY
(128 ASSEMBLIES REQUIRED)

NOTES

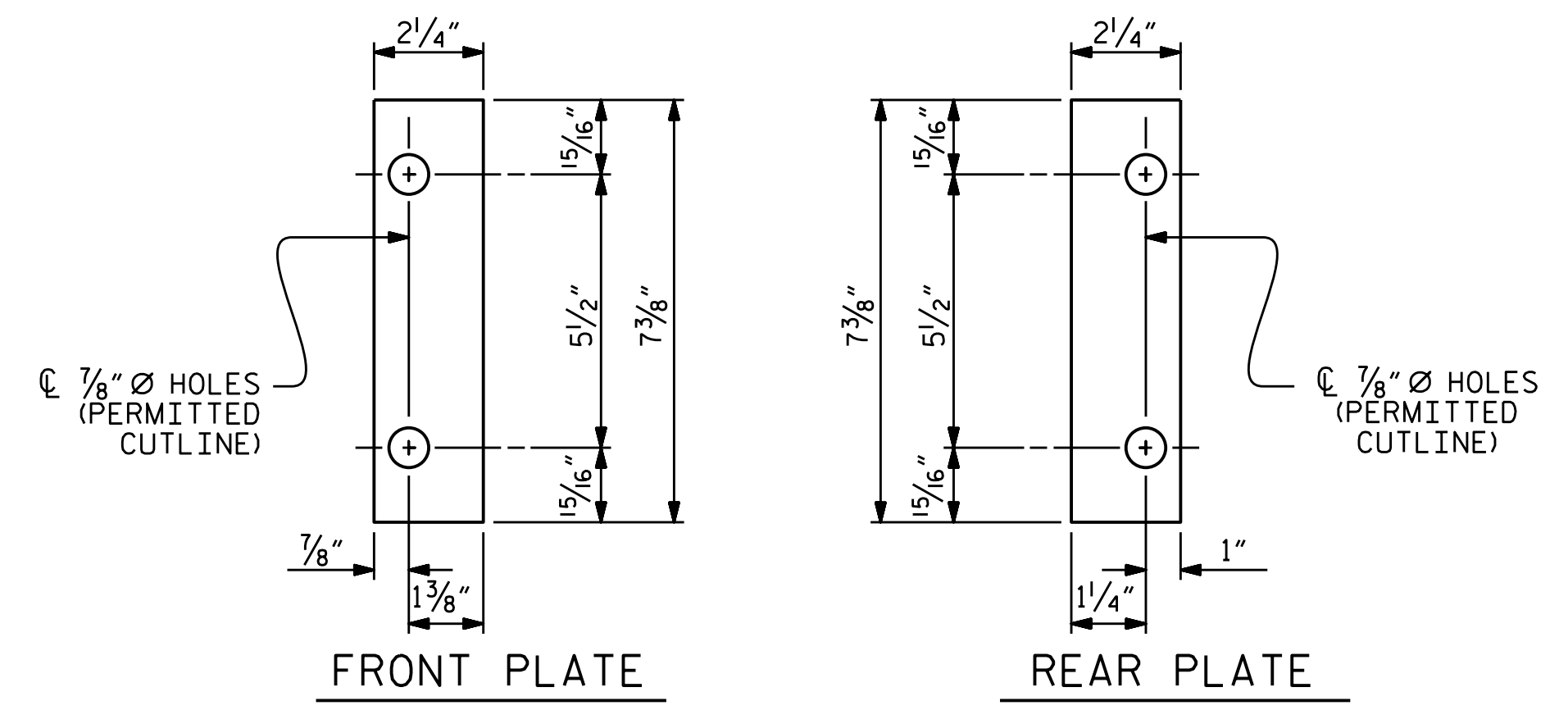
- THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
 - B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL 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 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
 - D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
 - E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
 - F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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.

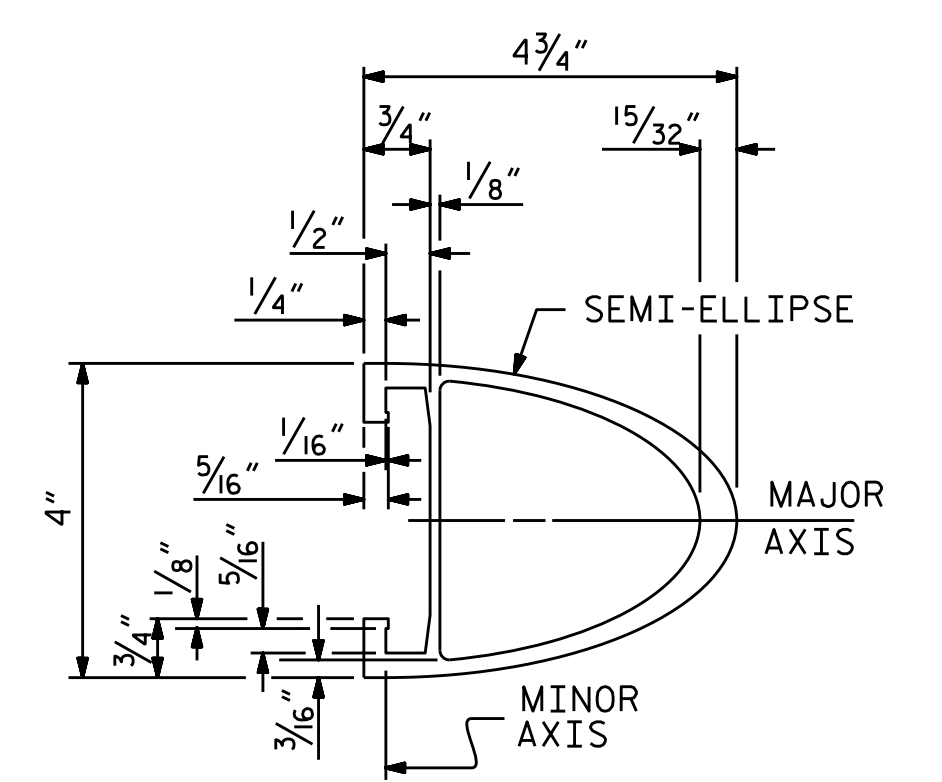


EXPANSION BAR DETAILS

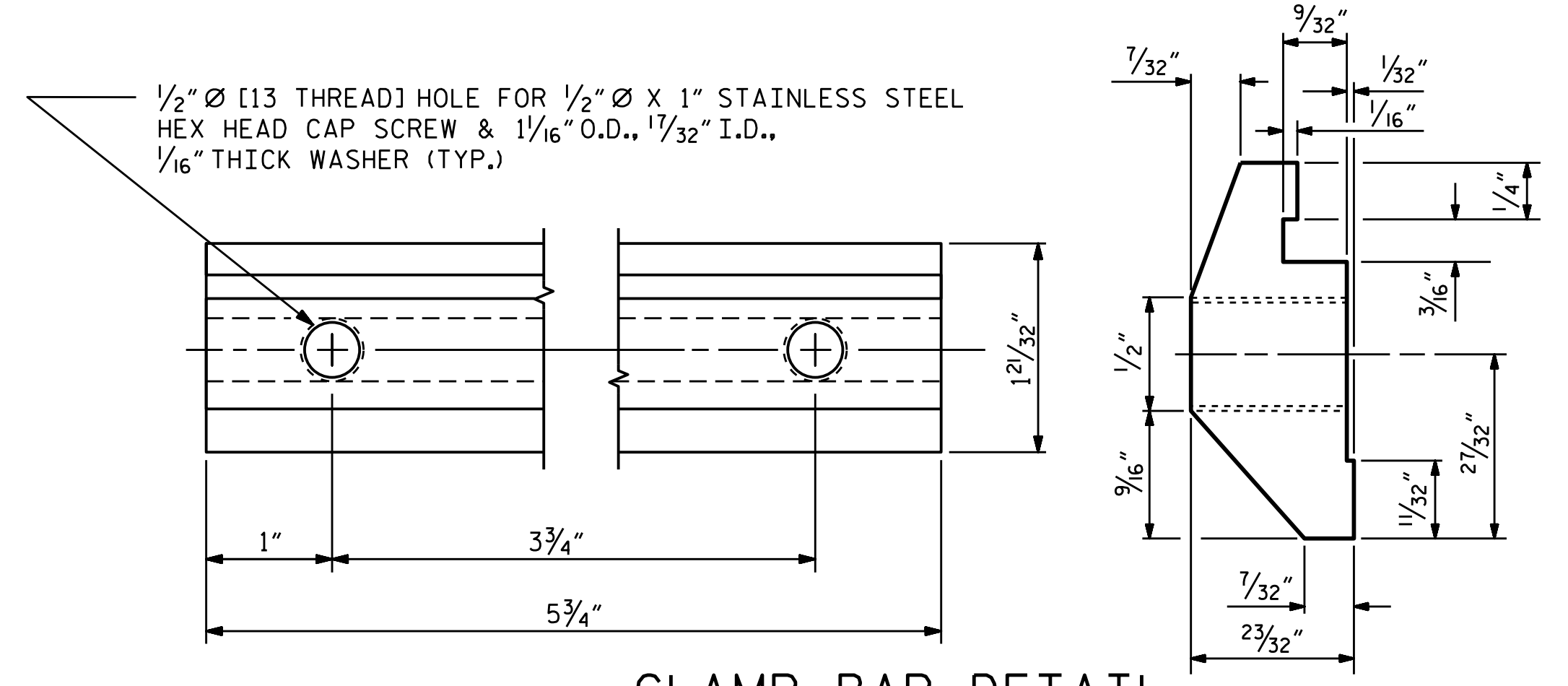


SHIM DETAILS

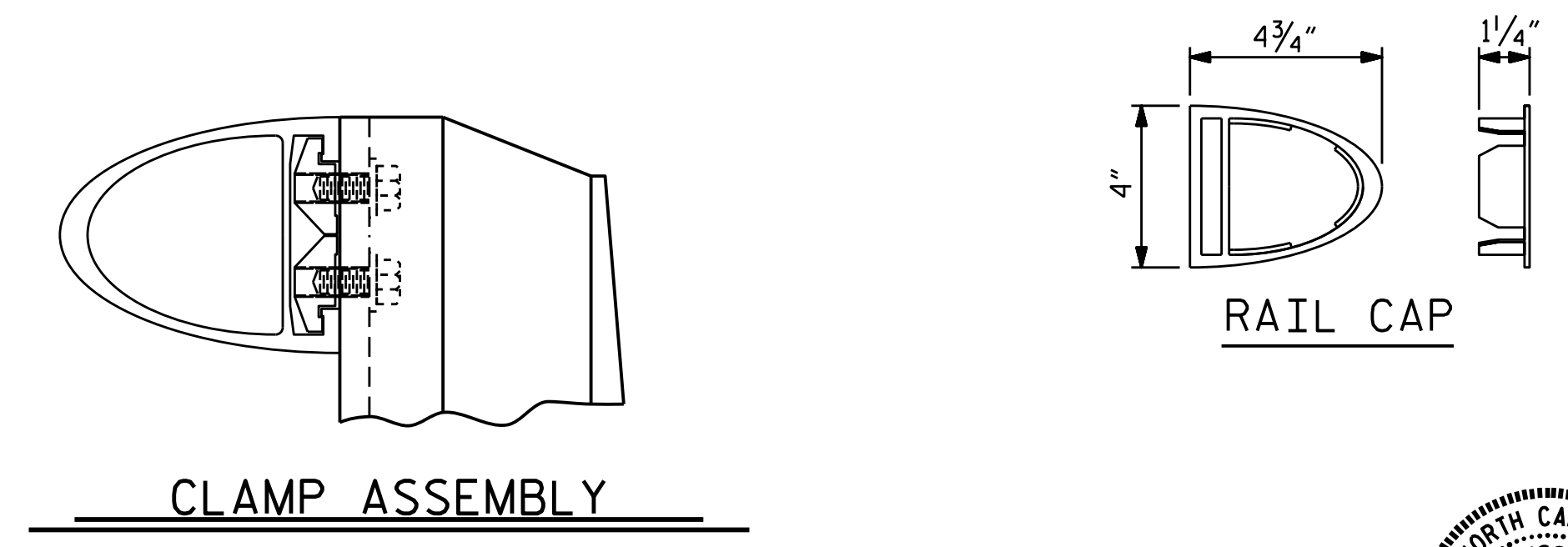
NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



RAIL SECTION



CLAMP BAR DETAIL
(4 REQUIRED PER POST)

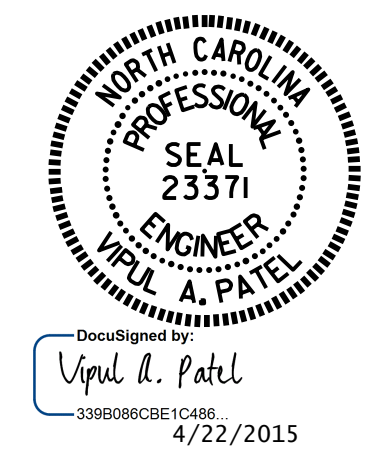


CLAMP ASSEMBLY

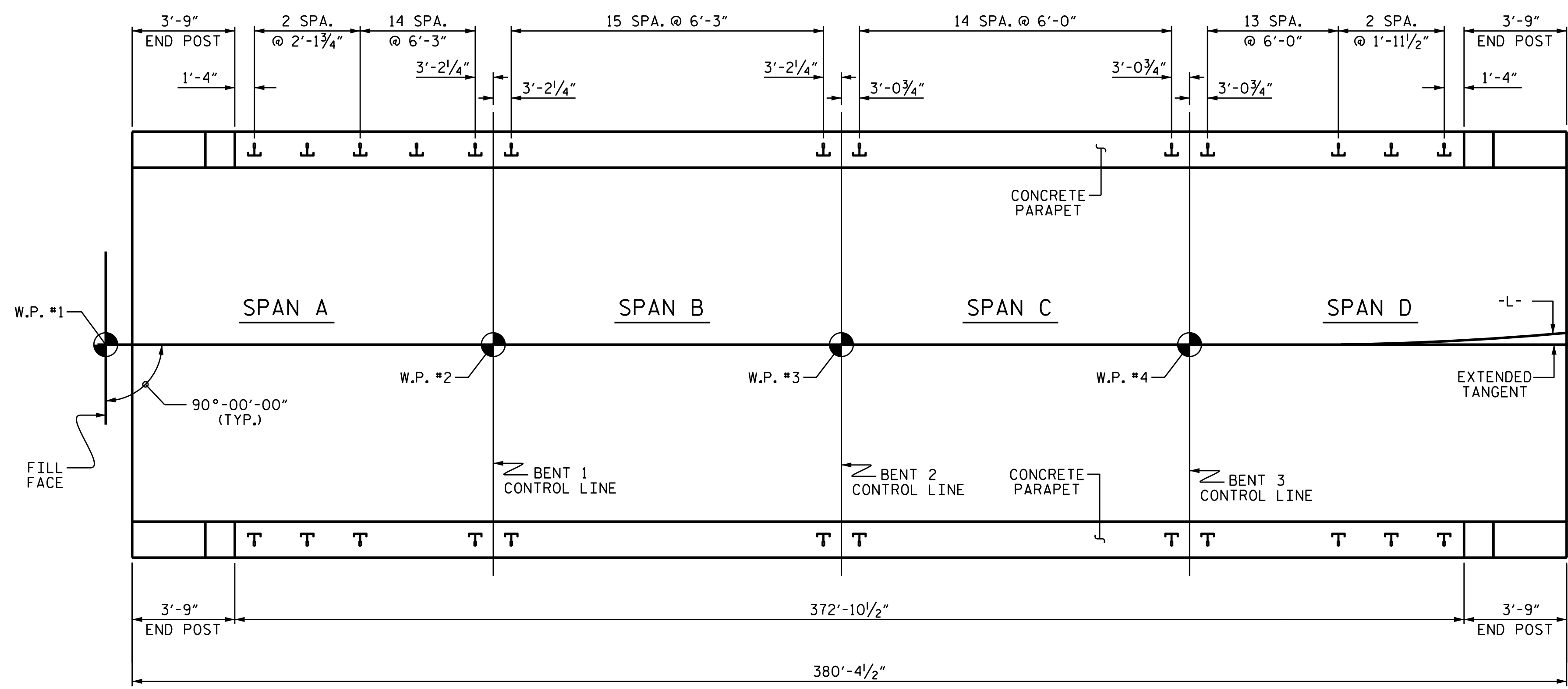
RAIL CAP

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-13
STANDARD						TOTAL SHEETS 31
2 BAR METAL RAIL						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



ASSEMBLED BY : J.P. MCCARTHA	DATE : 7-29-14
CHECKED BY : M.E.GILES	DATE : 12-17-14
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RCW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM



PLAN OF RAIL POST SPACINGS
DIMENSIONS ARE TYPICAL FOR EACH SIDE OF BRIDGE

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 7/16" 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:

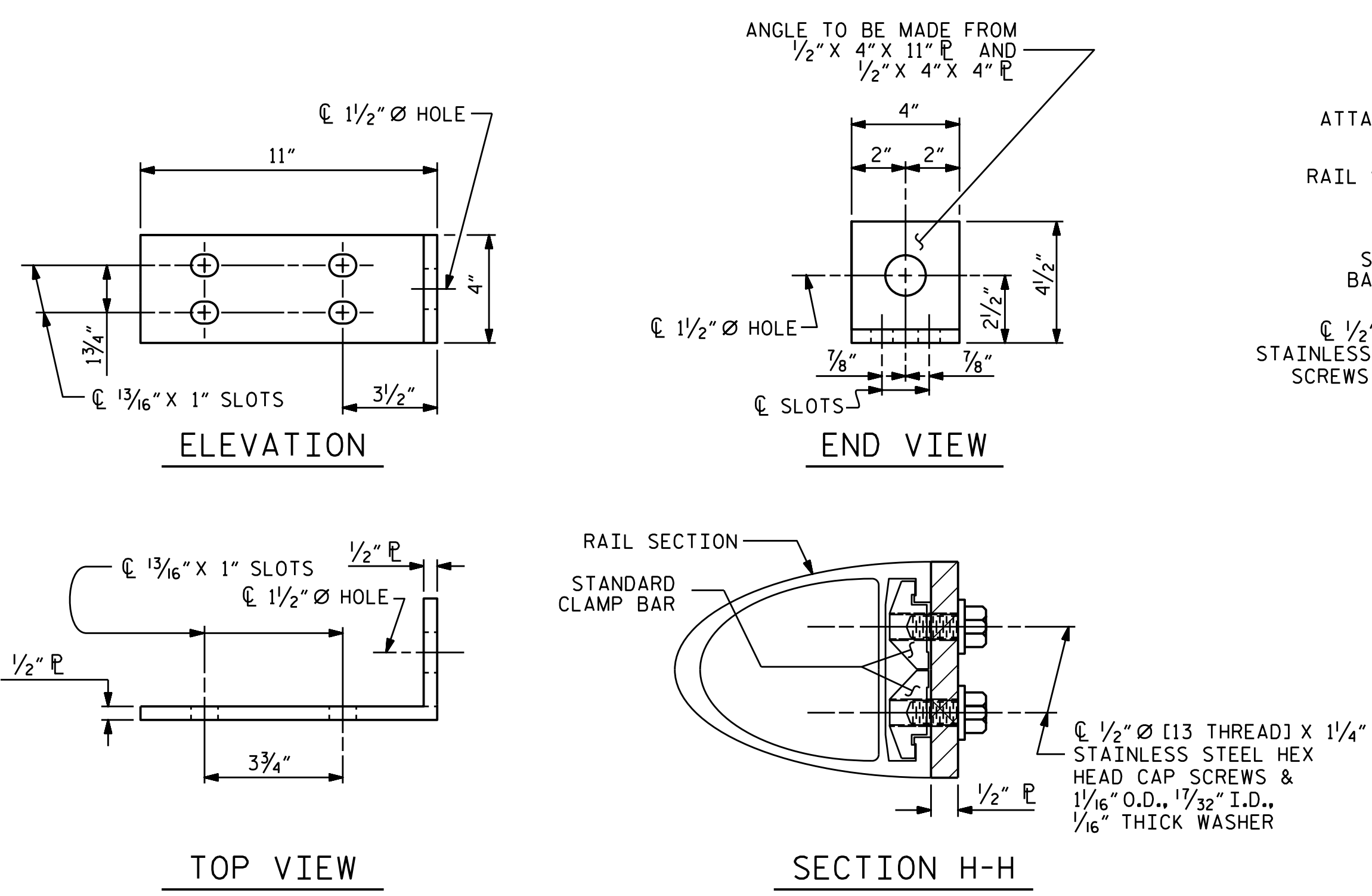
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. 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°F.
- 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.

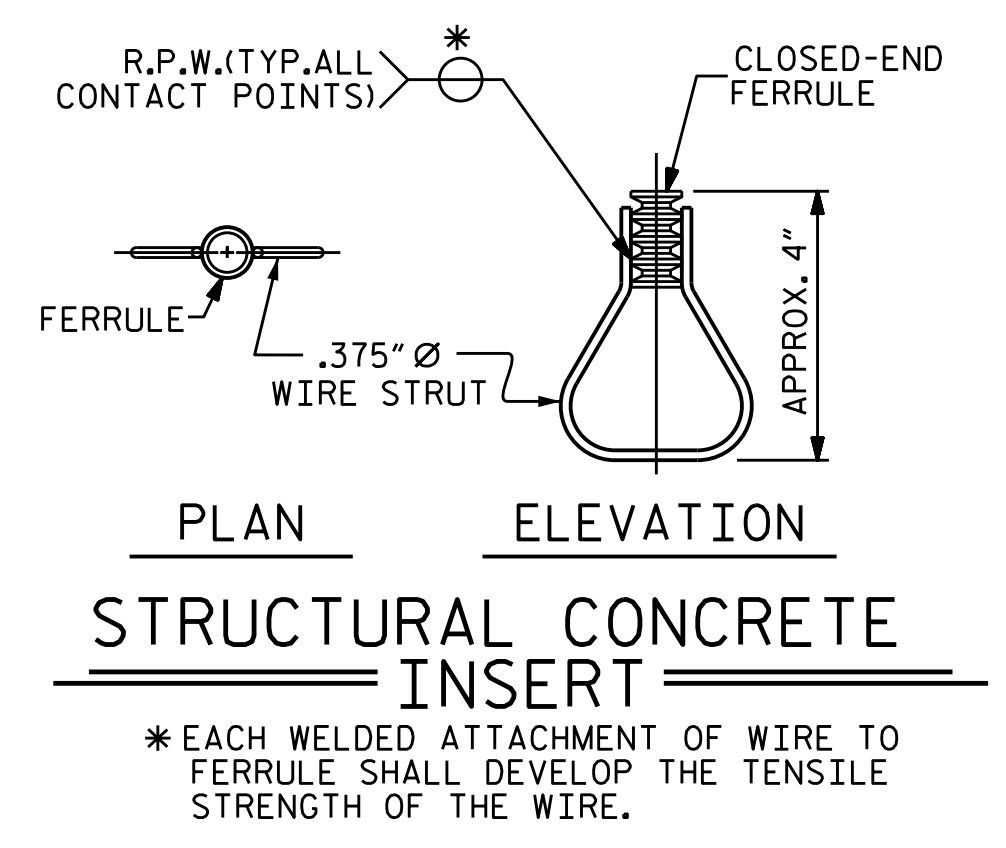
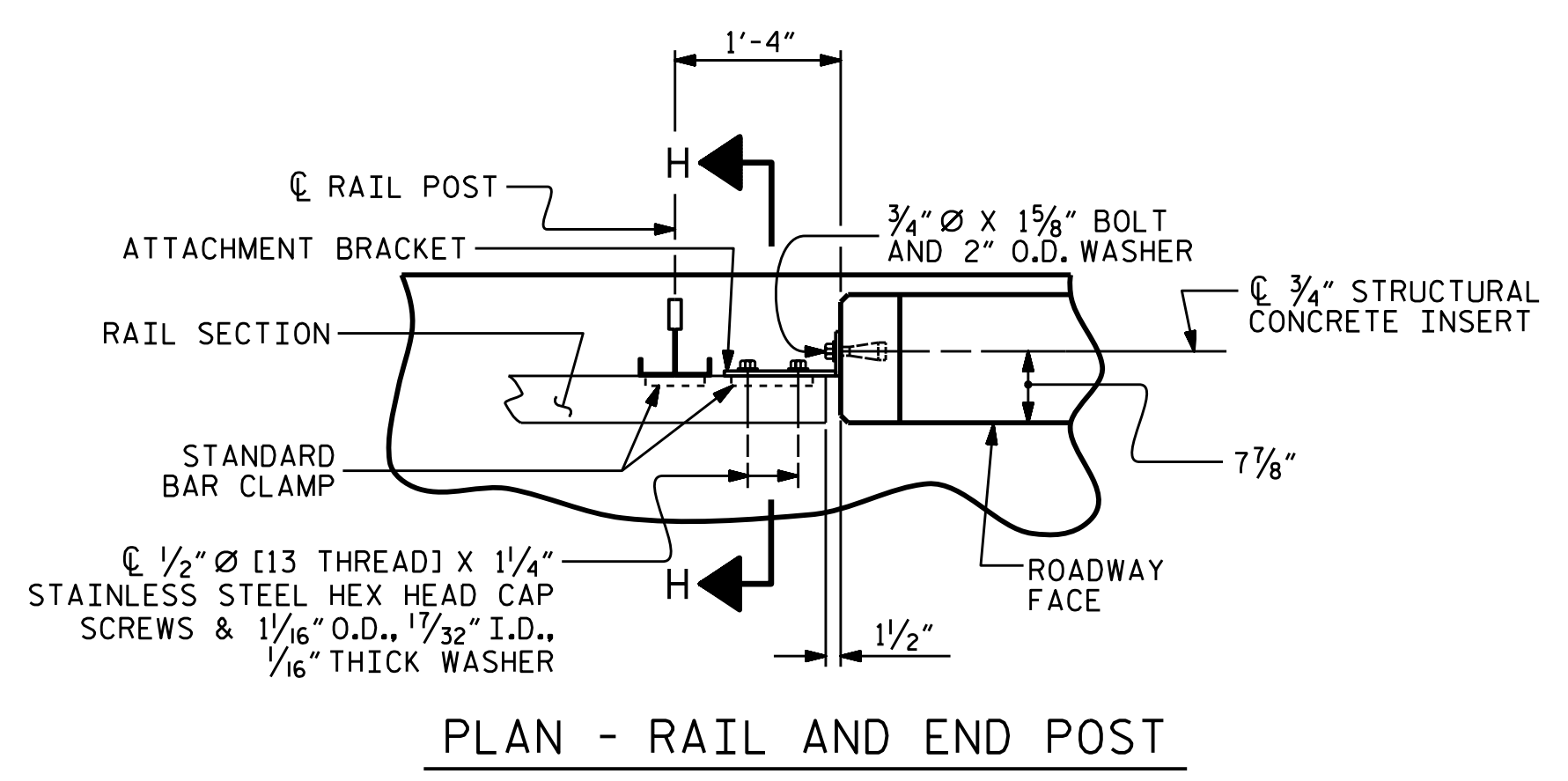
THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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.



DETAILS FOR ATTACHING METAL RAIL TO END POST



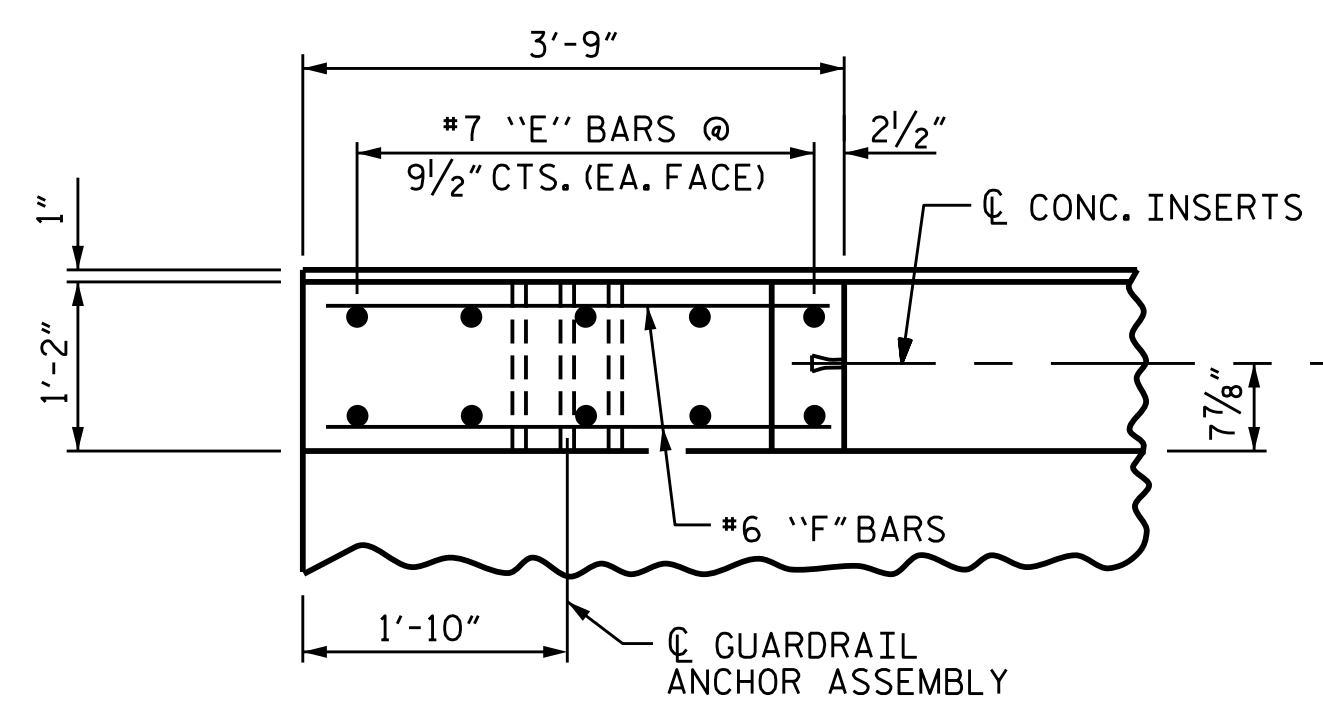
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

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

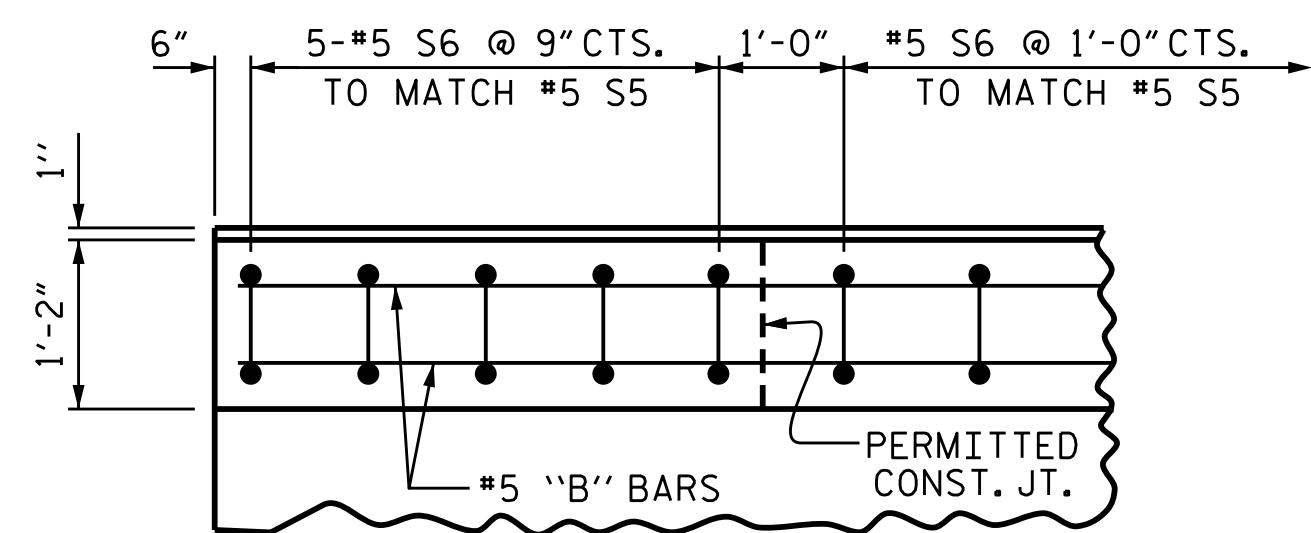


ASSEMBLED BY : N.D.AIUTO	DATE : 7-29-14
CHECKED BY : M.E.GILES	DATE : 12-17-14
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

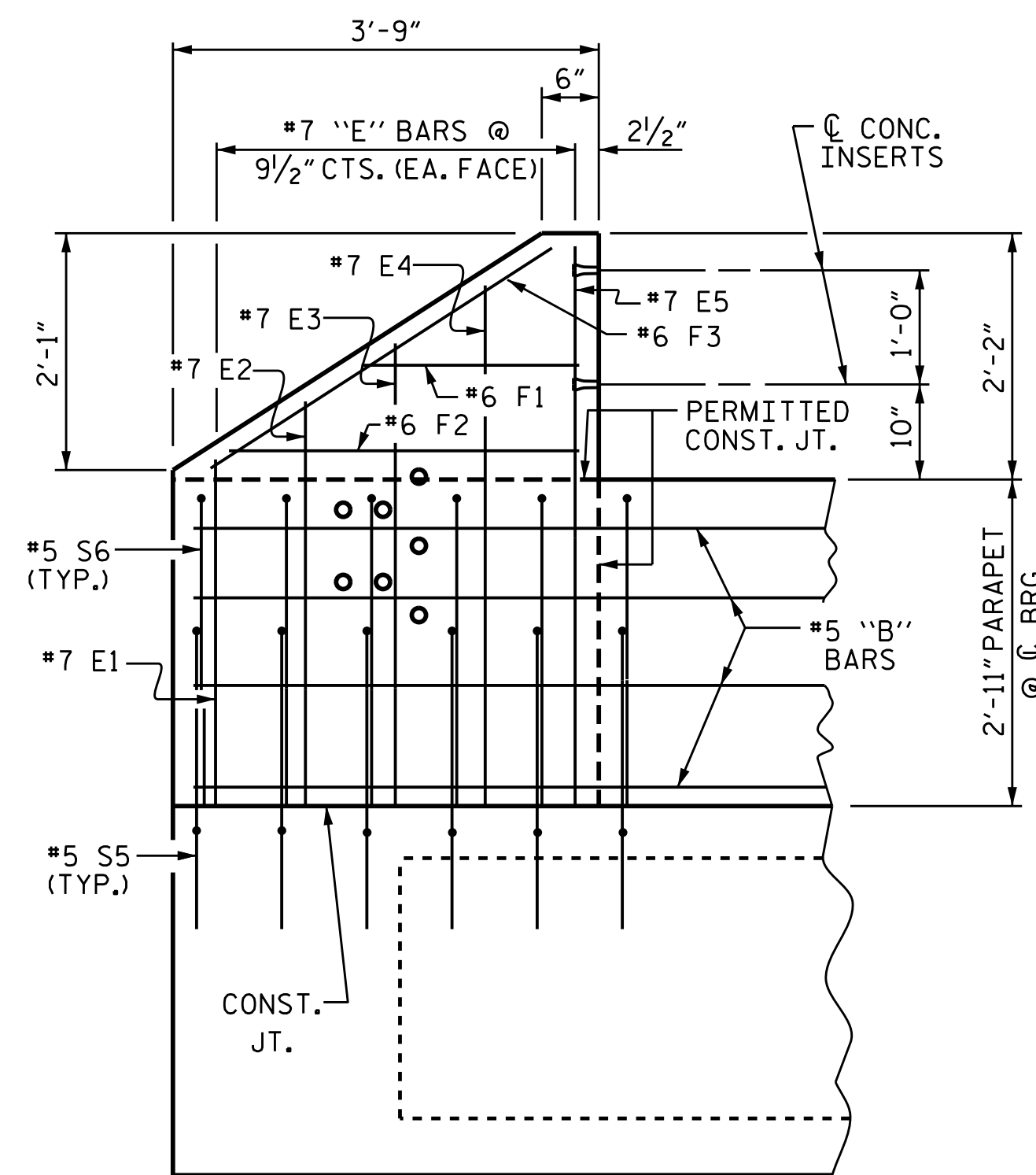
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			31



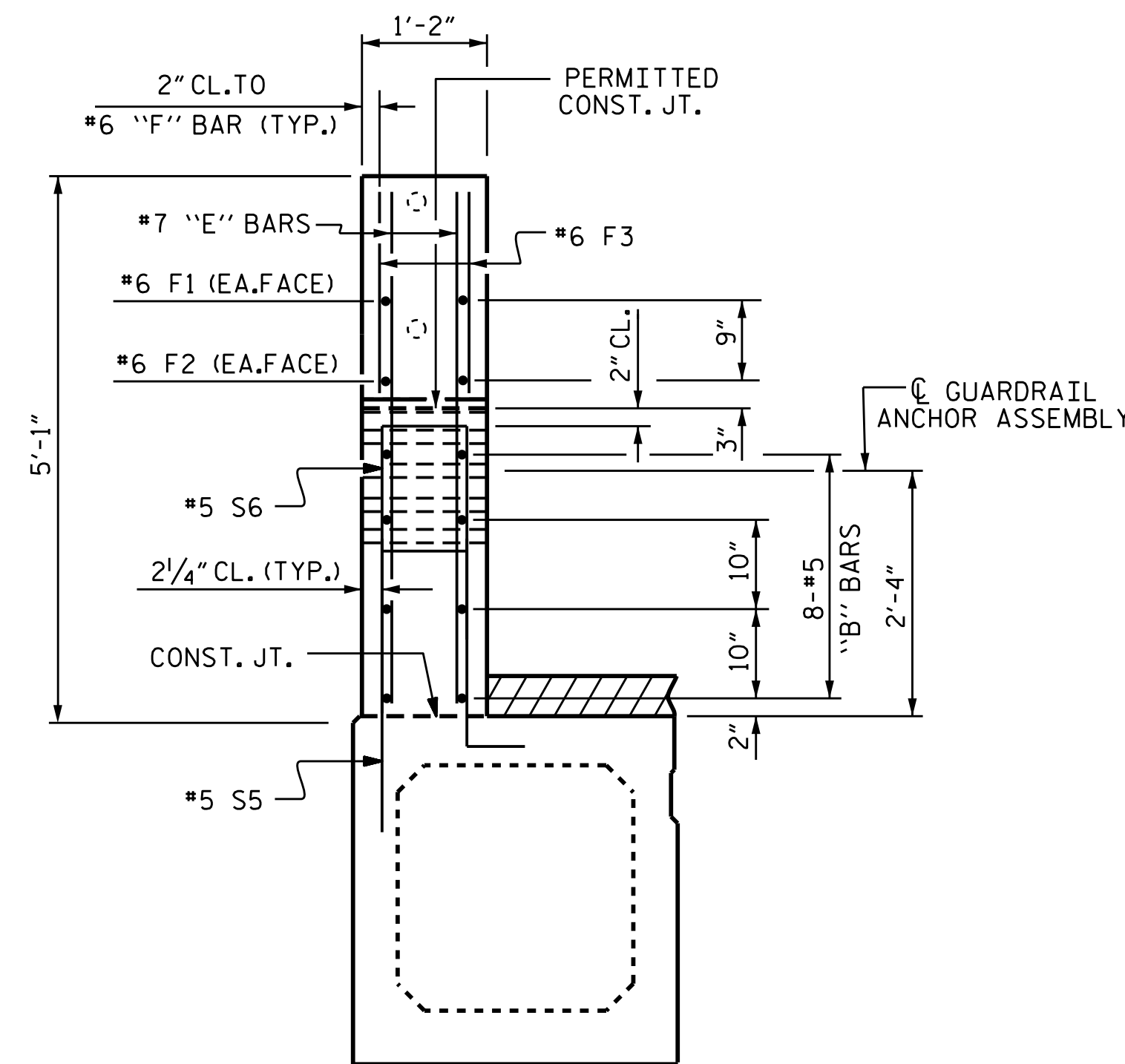
PLAN OF END POST



PLAN OF PARAPET

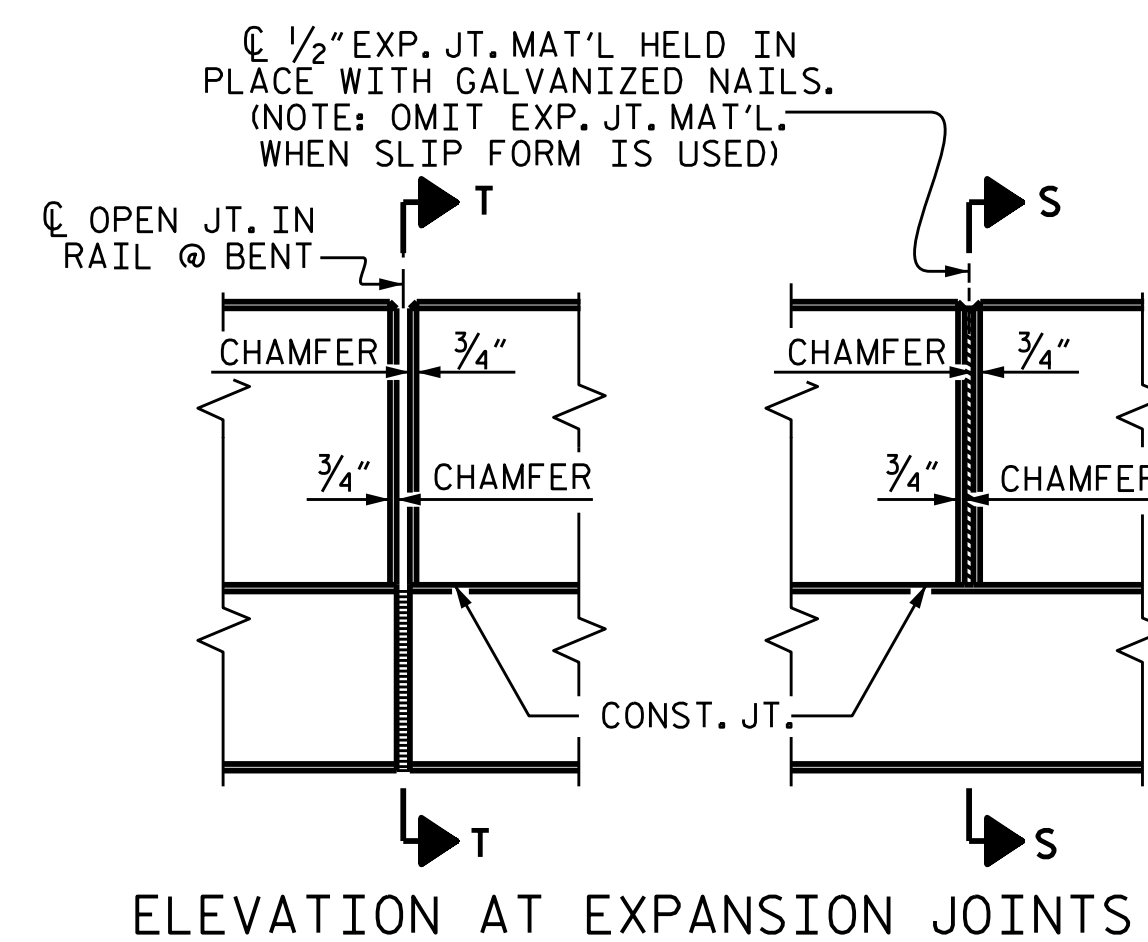


ELEVATION

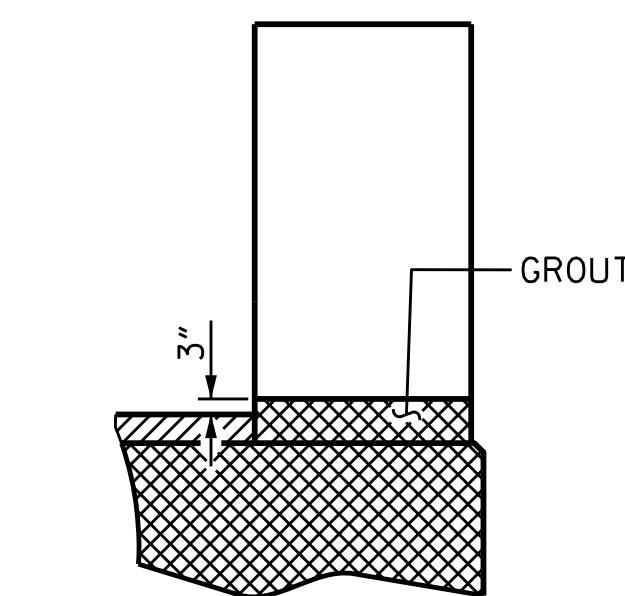


END VIEW

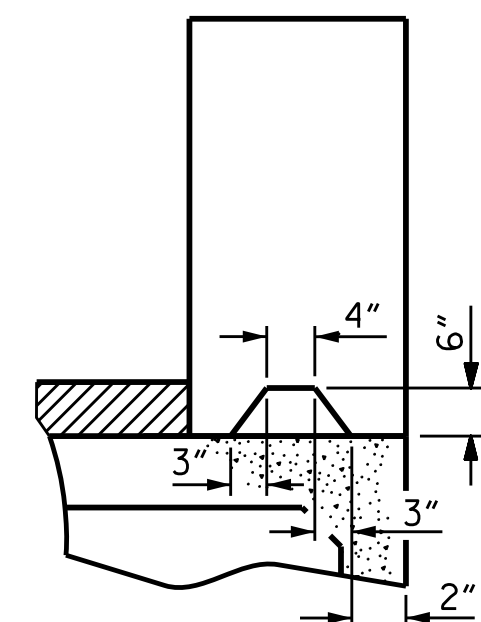
PARAPET AND END POST FOR TWO-BAR RAIL



ELEVATION AT EXPANSION JOINTS

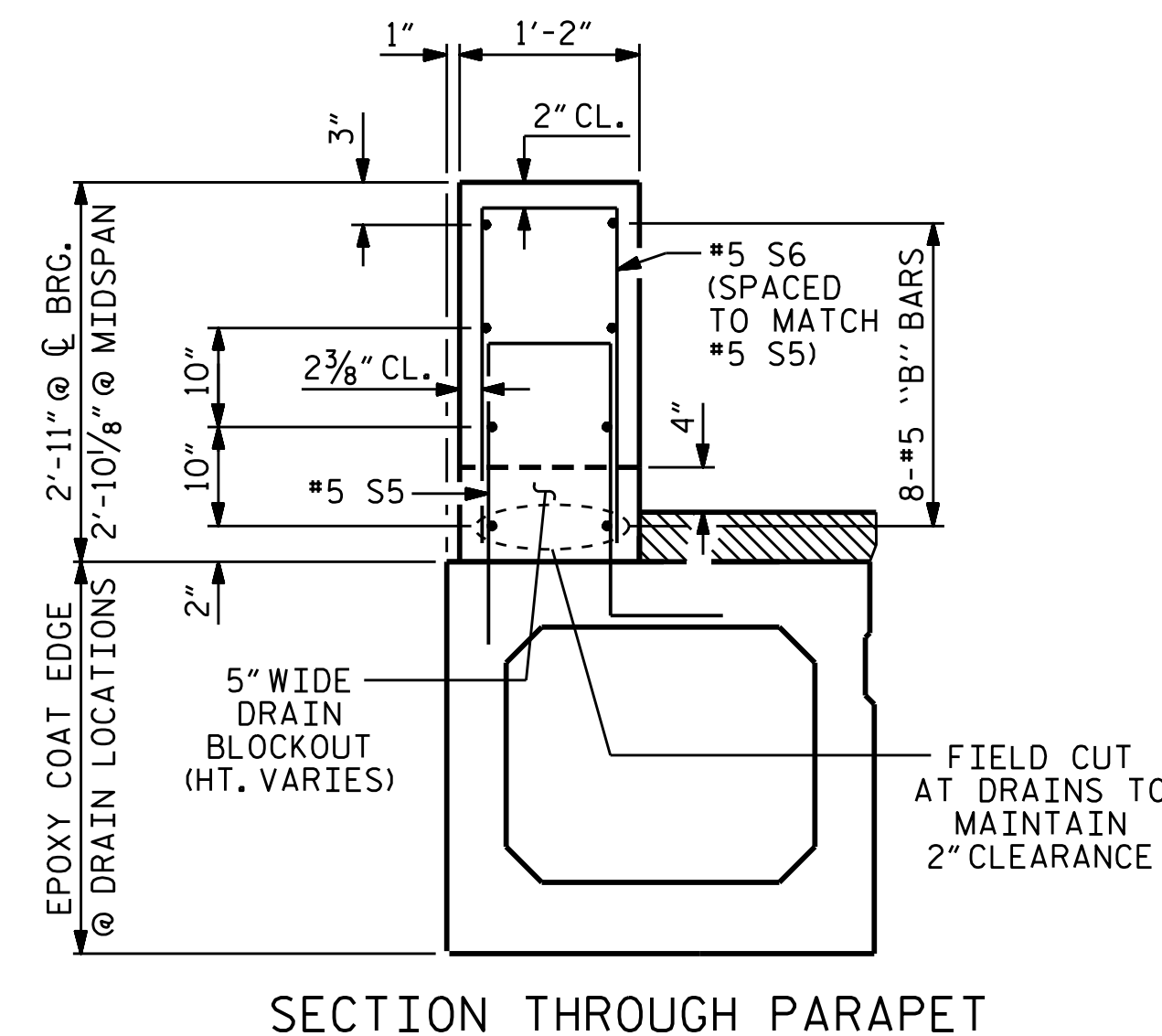


SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE
FOAM JOINT IS NOT USED)



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

PARAPET DETAILS



SECTION THROUGH PARAPET

NOTES

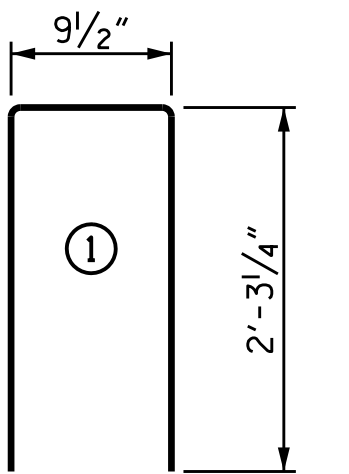
ALL REINFORCING STEEL IN THE CONCRETE PARAPETS AND END POSTS SHALL BE EPOXY COATED.

VERTICAL 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.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 5" X 4". THE HEIGHT OF THE BLOCKOUT IN THE CONCRETE PARAPET SHALL EXTEND FROM THE TOP OF THE BOX BEAM UNIT TO THE TOP OF THE DRAIN OPENING.

APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR BOX BEAM UNITS THAT REQUIRE DRAINS IN THE CONCRETE PARAPET.

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

PARAPETS AND END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B10	128	#5	STR	24'-7"	3282
* B11	96	#5	STR	29'-7"	2962
* E1	8	#7	STR	2'-11"	48
* E2	8	#7	STR	3'-5"	56
* E3	8	#7	STR	3'-11"	64
* E4	8	#7	STR	4'-5"	72
* E5	8	#7	STR	4'-10"	79
* F1	8	#6	STR	1'-10"	22
* F2	8	#6	STR	3'-0"	36
* F3	8	#6	STR	3'-8"	44
* S6	776	#5	1	5'-7"	4519
* EPOXY COATED REINFORCING STEEL				LBS.	11,182
CLASS AA CONCRETE				CU.YDS.	96.7
1'-2" X 2'-11" CONCRETE PARAPET				LIN. FT.	761.00

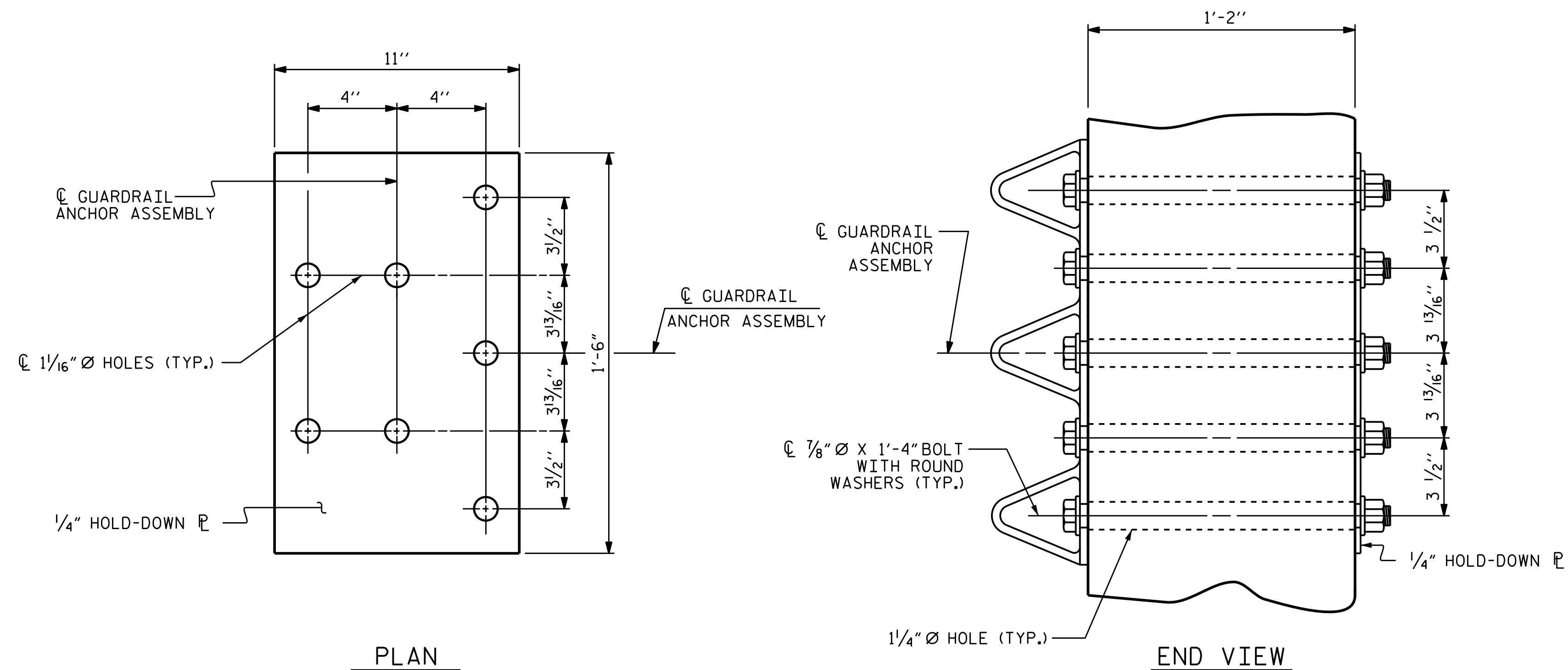
PROJECT NO. B-4972
CABARRUS COUNTY
STATION: 22+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PARAPET
&
END POST DETAILS

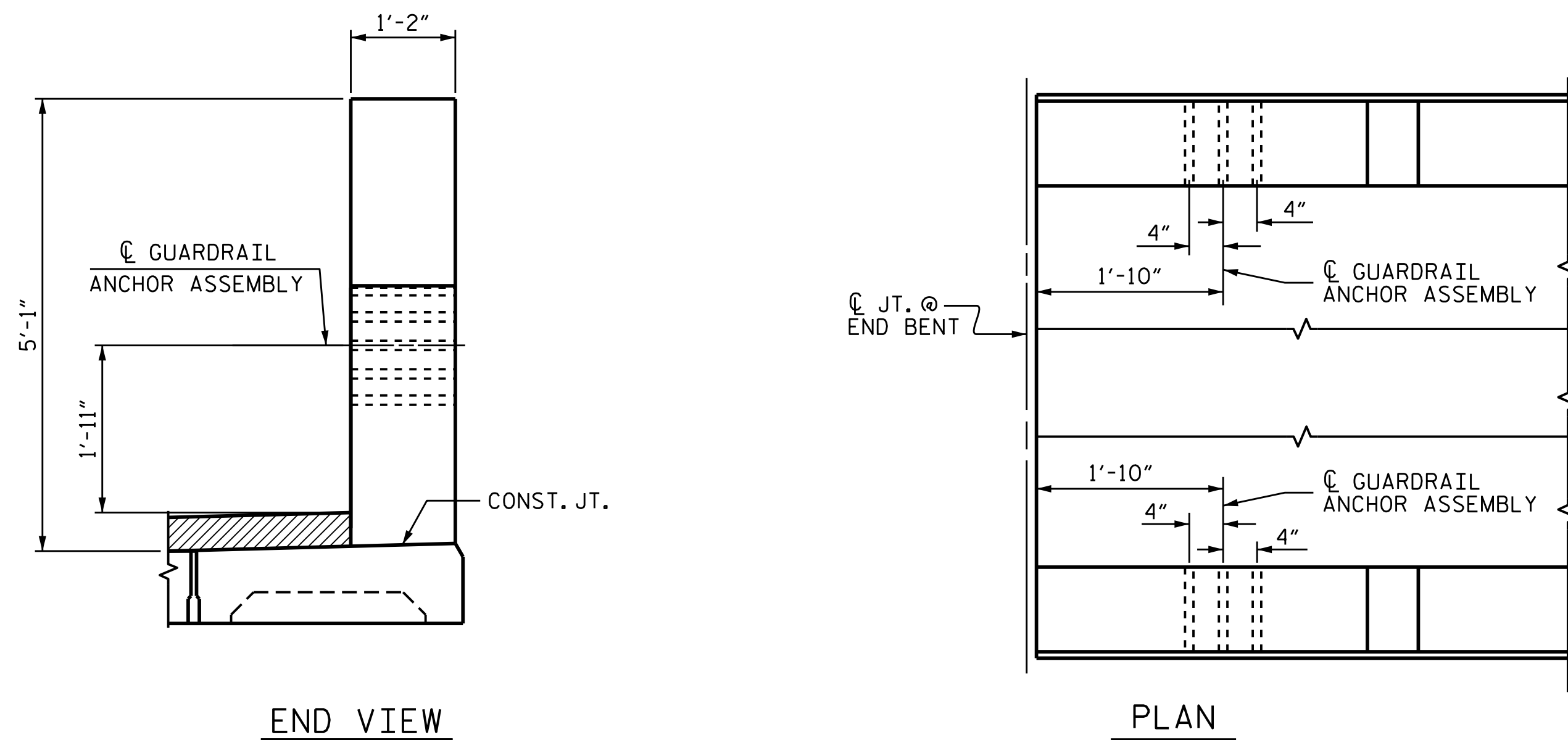


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			31
2			4			

DRAWN BY: J.P. MCCARTHA DATE: 7-29-14
CHECKED BY: M.E. GILES DATE: 12-17-14



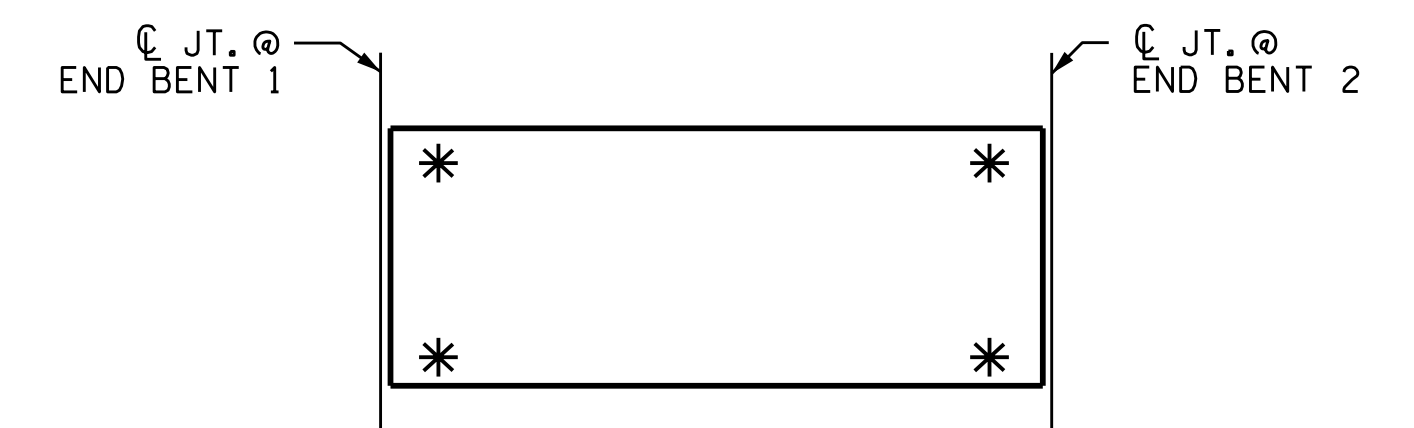
GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST

NOTES

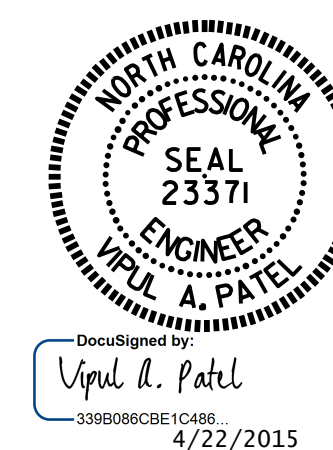
- THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.
- THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.
- BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF 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.



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-16
STANDARD GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS						
REVISIONS						TOTAL SHEETS 31
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY :	N. D'AIUTO	DATE :	2-6-15
CHECKED BY :	V.A. PATEL	DATE :	2-6-15
DRAWN BY :	MAA 5/10	REV. I2/5/11	MAA/GM
CHECKED BY :	GM 5/10	REV. 6/13	MAA/GM
		REV. 1/15	MAA/GM

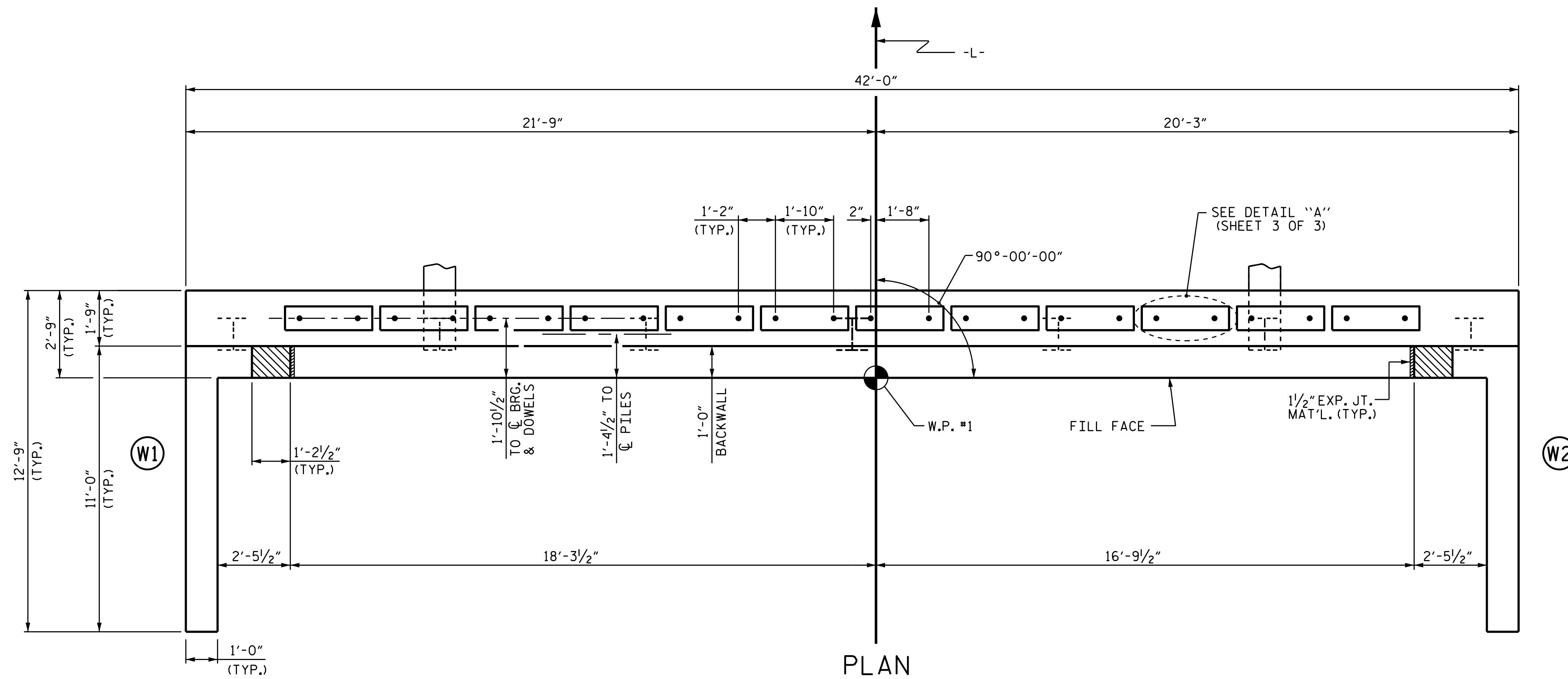
NOTES

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET AND END POST IS CAST IF SLIP FORMING IS USED.

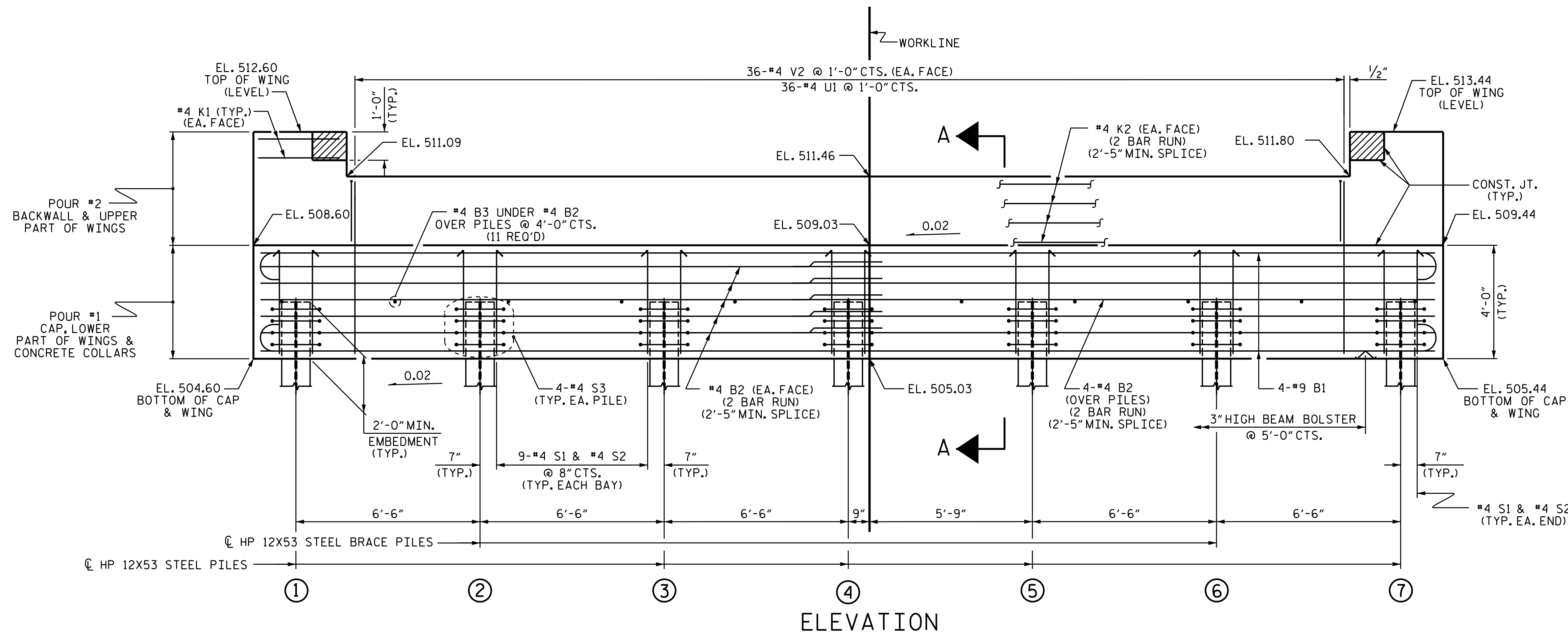
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.



PLAN

TOP OF PILE ELEVATIONS	
①	506.64
②	506.77
③	506.90
④	507.03
⑤	507.16
⑥	507.29
⑦	507.42



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 3 OF 3.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

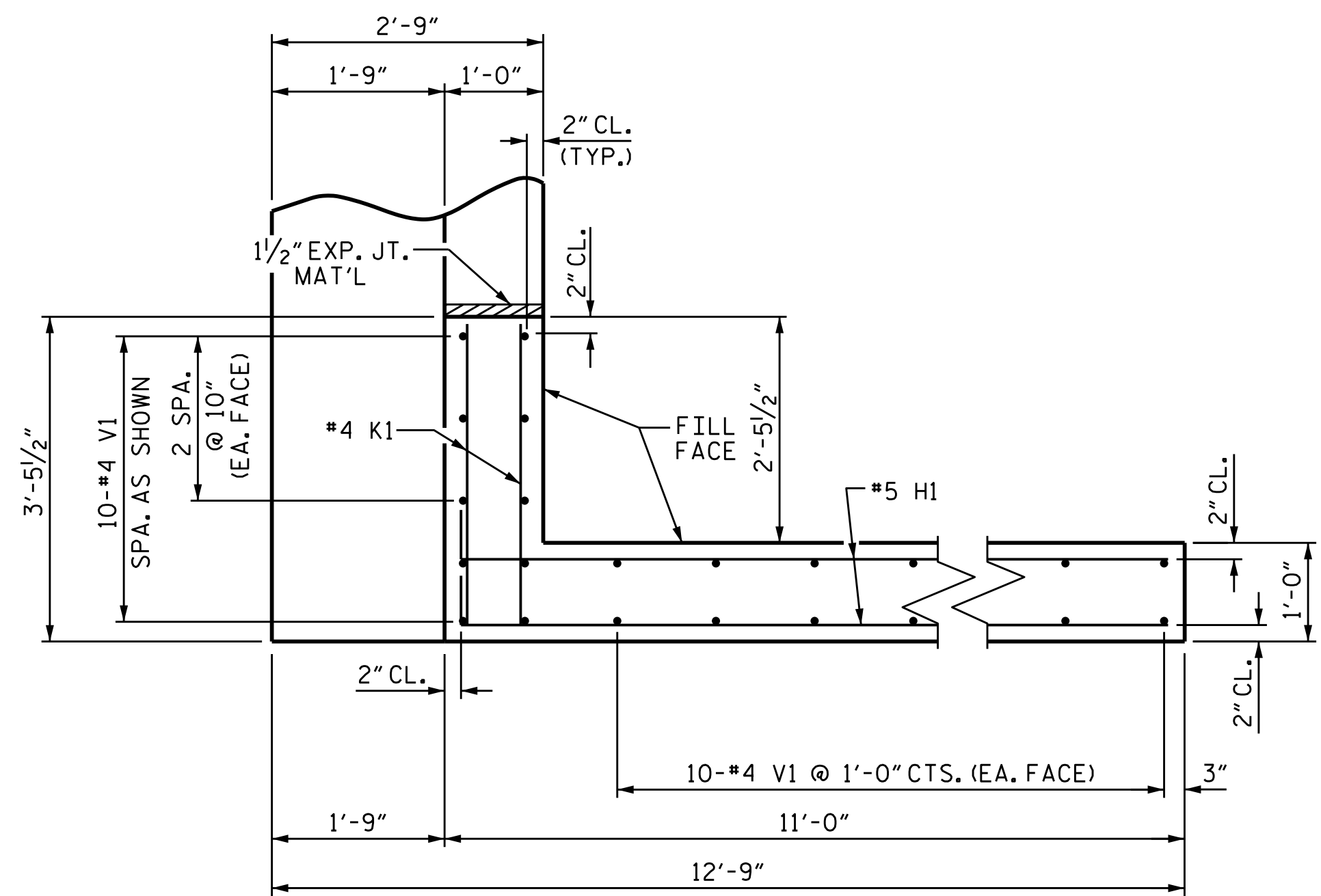
SUBSTRUCTURE
 END BENT 1



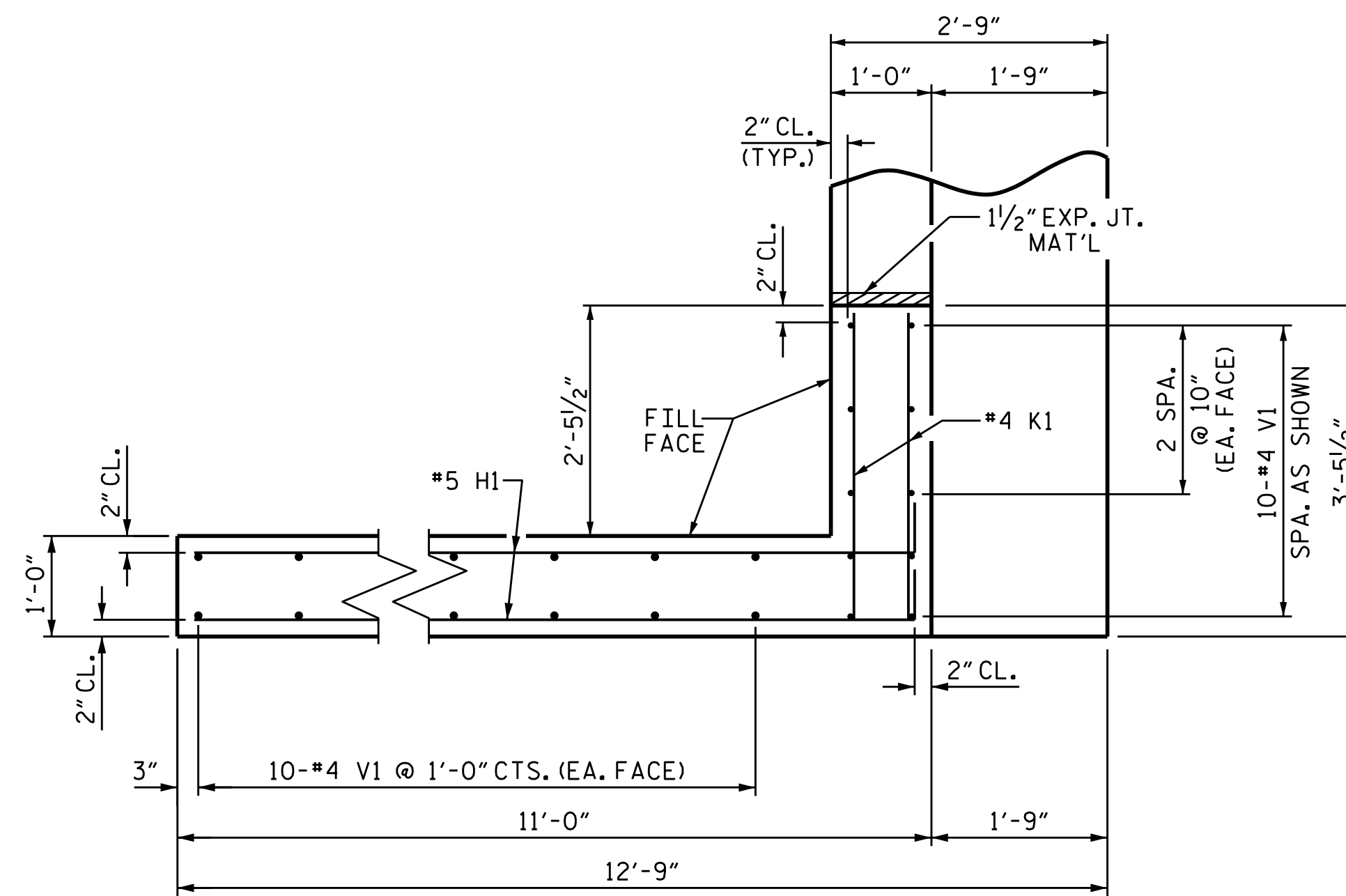
ASSEMBLED BY: N.D. AIUTO DATE: 10/6/14
 CHECKED BY: M.E. GILES DATE: 12/17/14
 DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12/17/14

21-APR-2015 09:25
 R:\Structures\Plans\B4972.SD.E1.01.dgn
 Isuttion

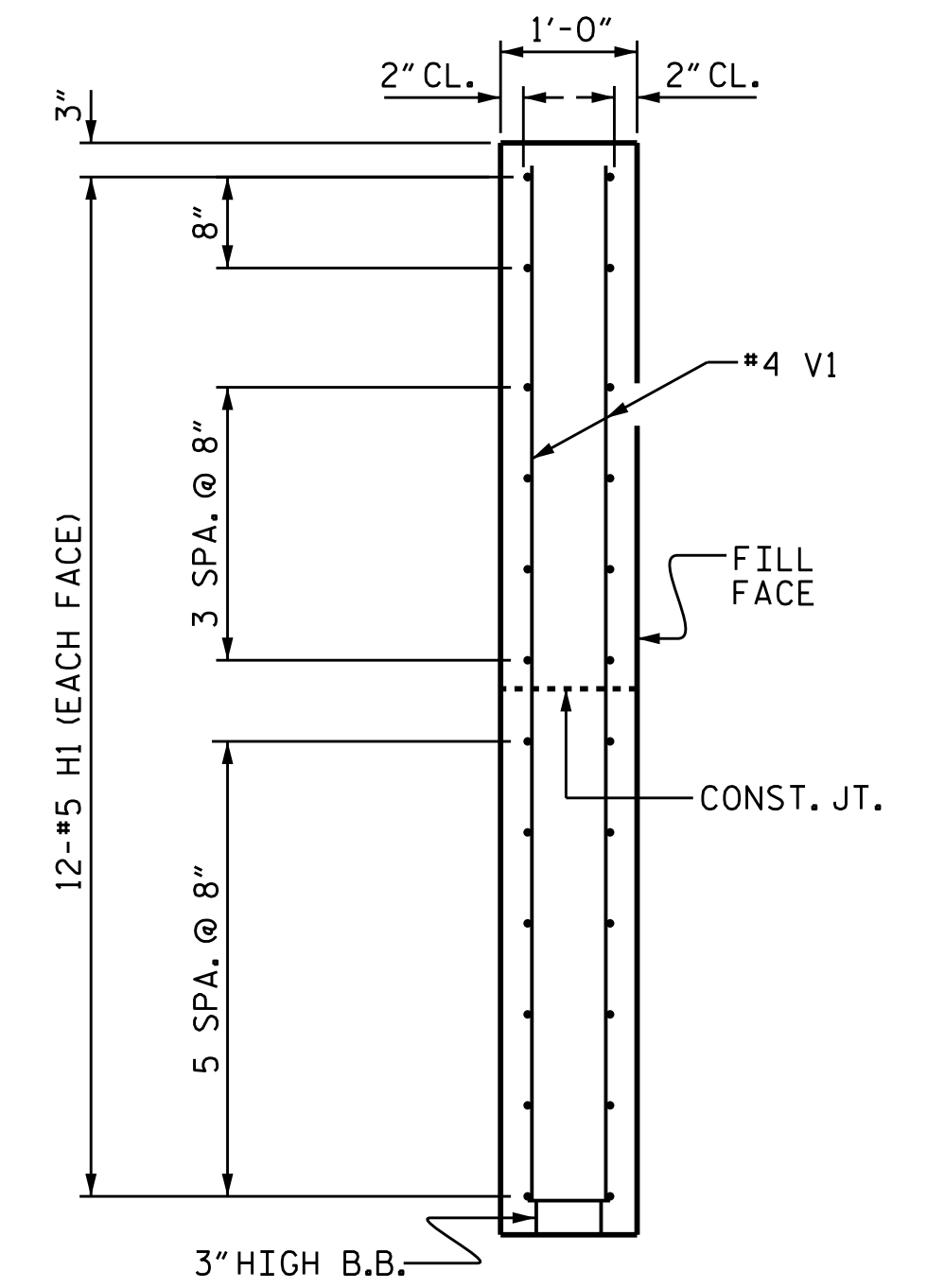
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			31



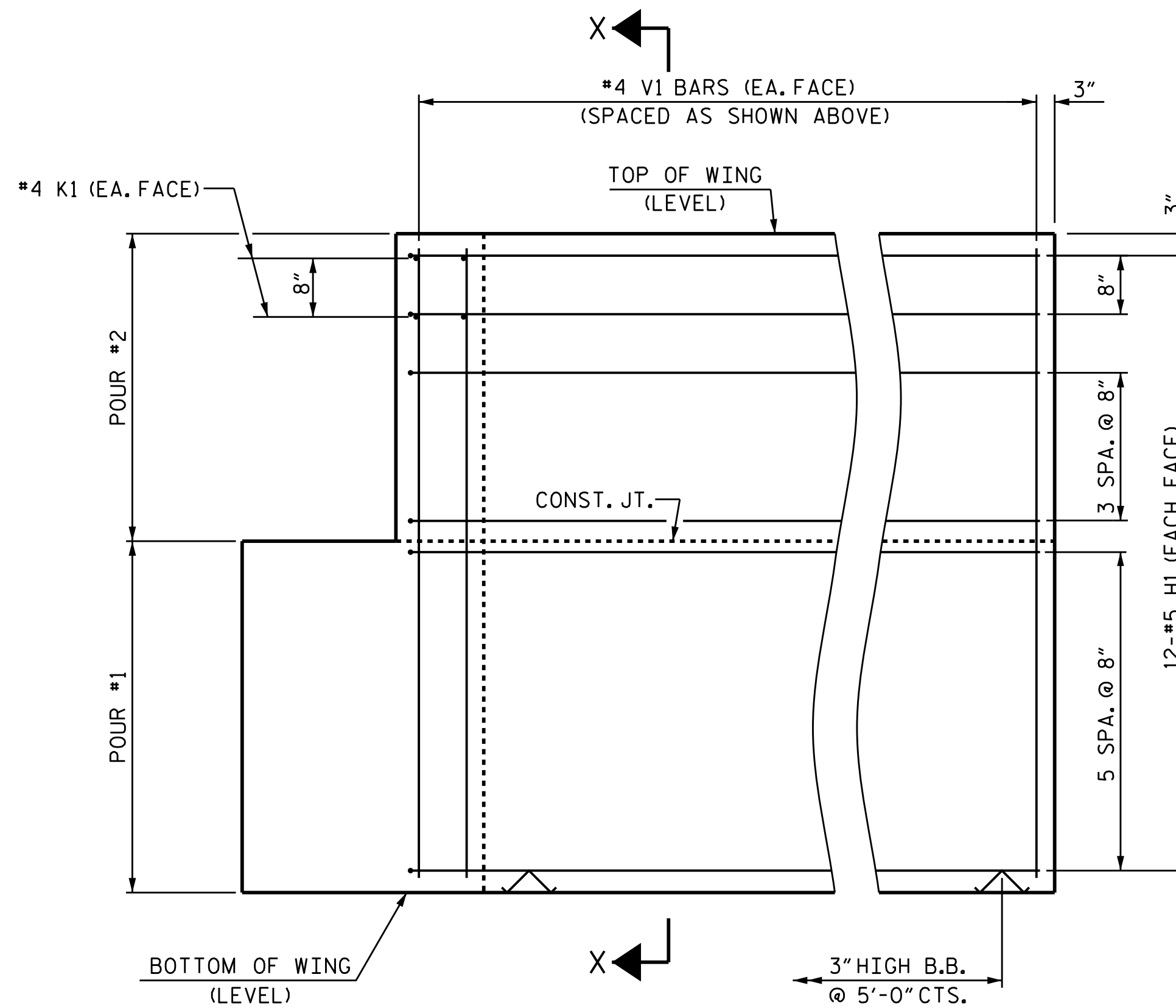
PLAN OF WING (W1)



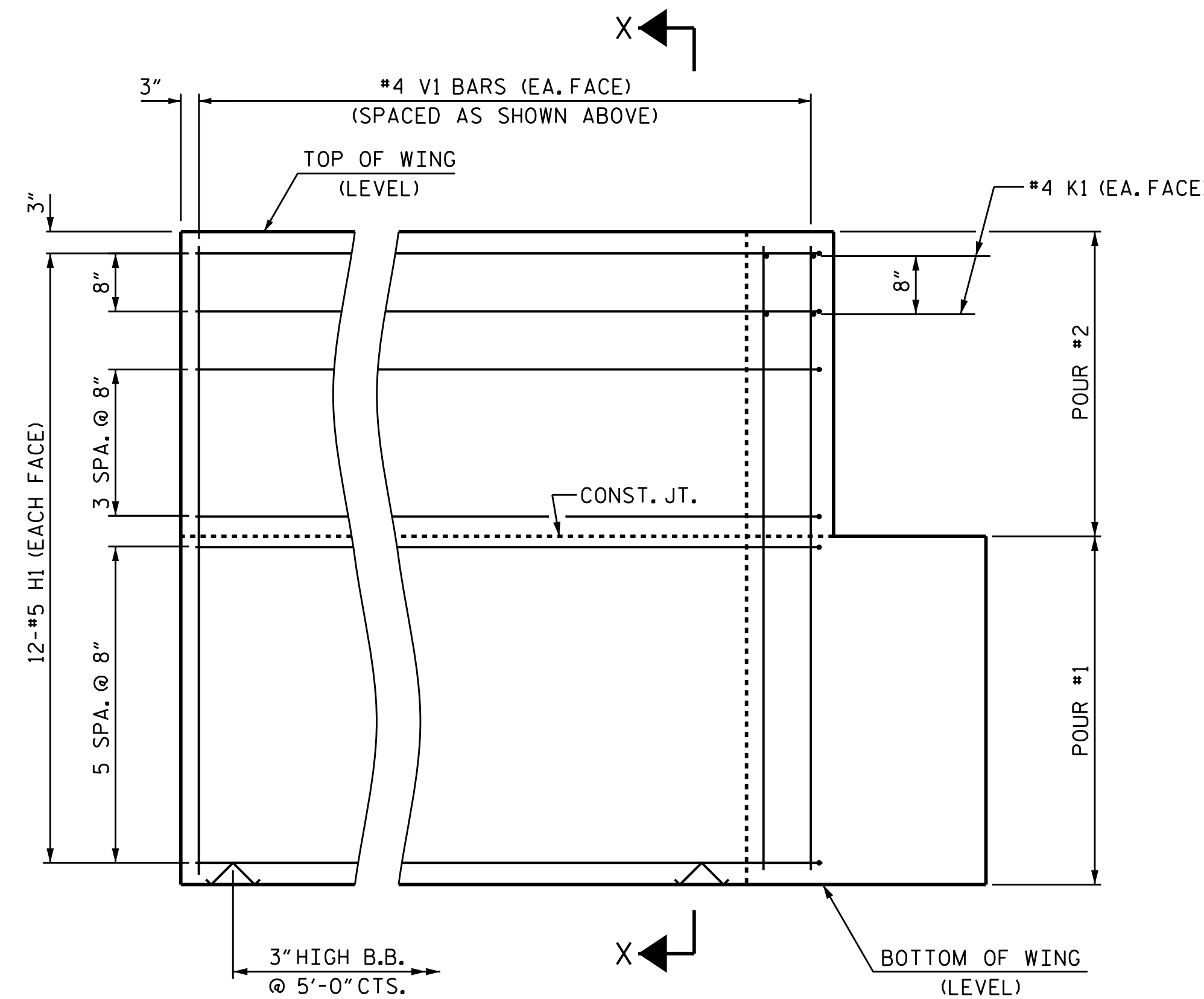
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)



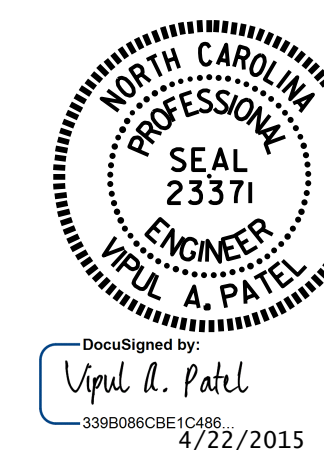
ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-4972
 CABARRUS COUNTY
 STATION: 22+55.00 -L-

SHEET 2 OF 3

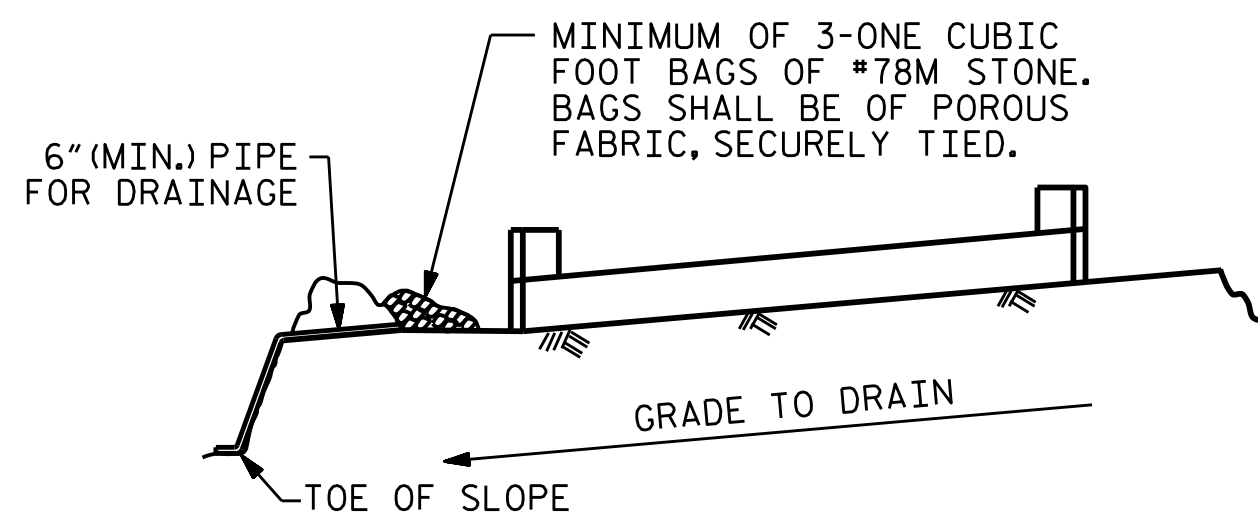
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1



ASSEMBLED BY: N.D. AIUTO DATE: 10/6/14
 CHECKED BY: M.E. GILES DATE: 12/17/14
 DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12/17/14

21-APR-2015 09:25
 R:\Structures\Plans\B4972.SD.E1.01.dgn
 Isutton

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			31

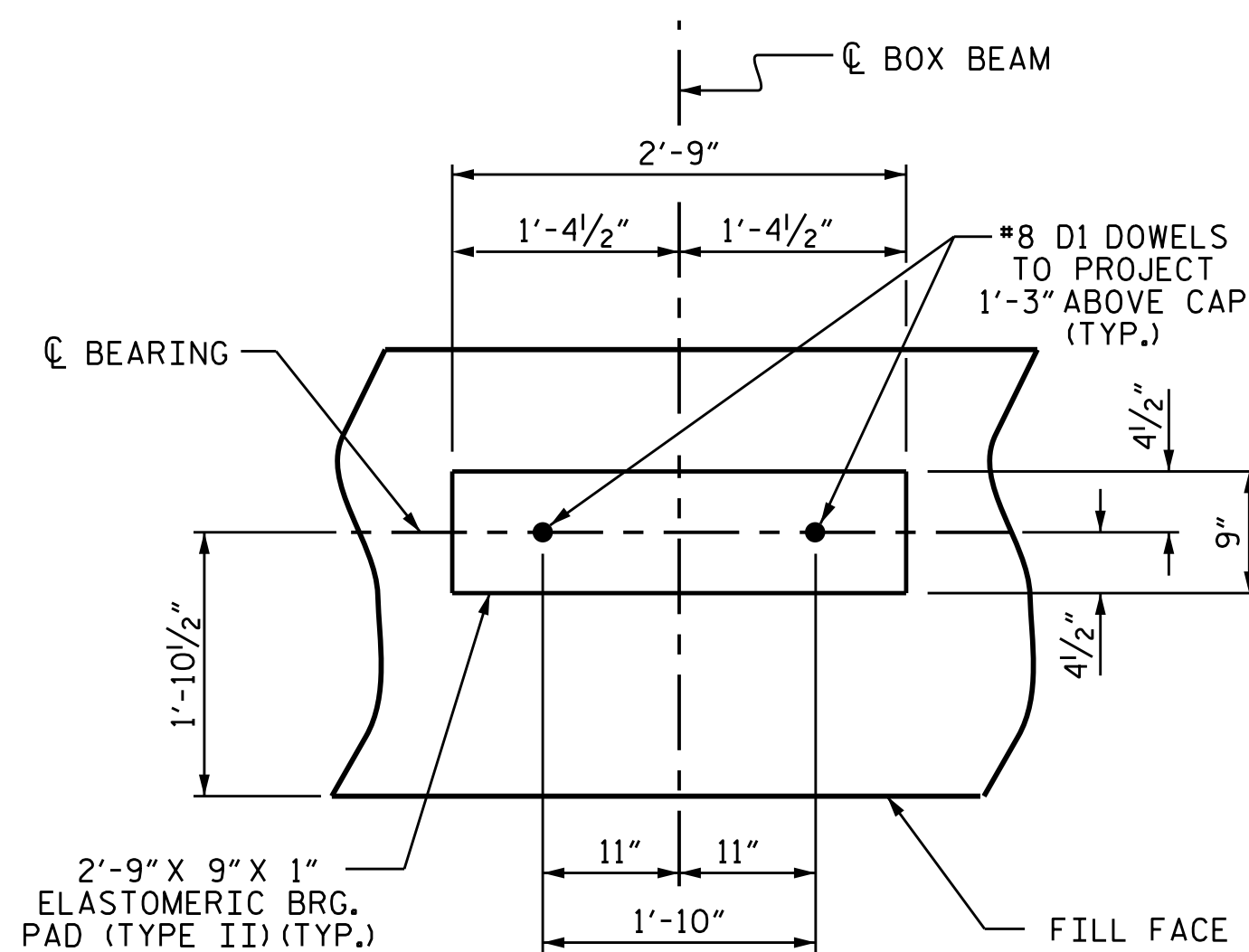


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

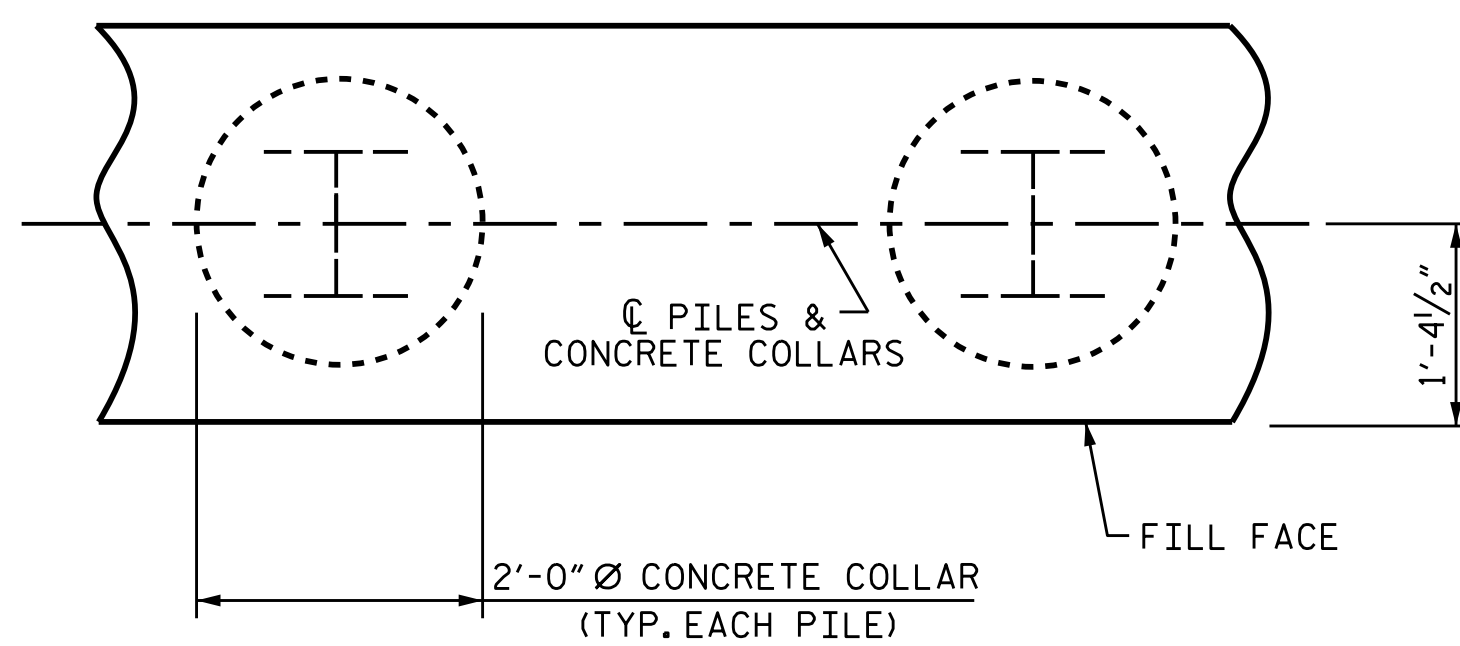
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

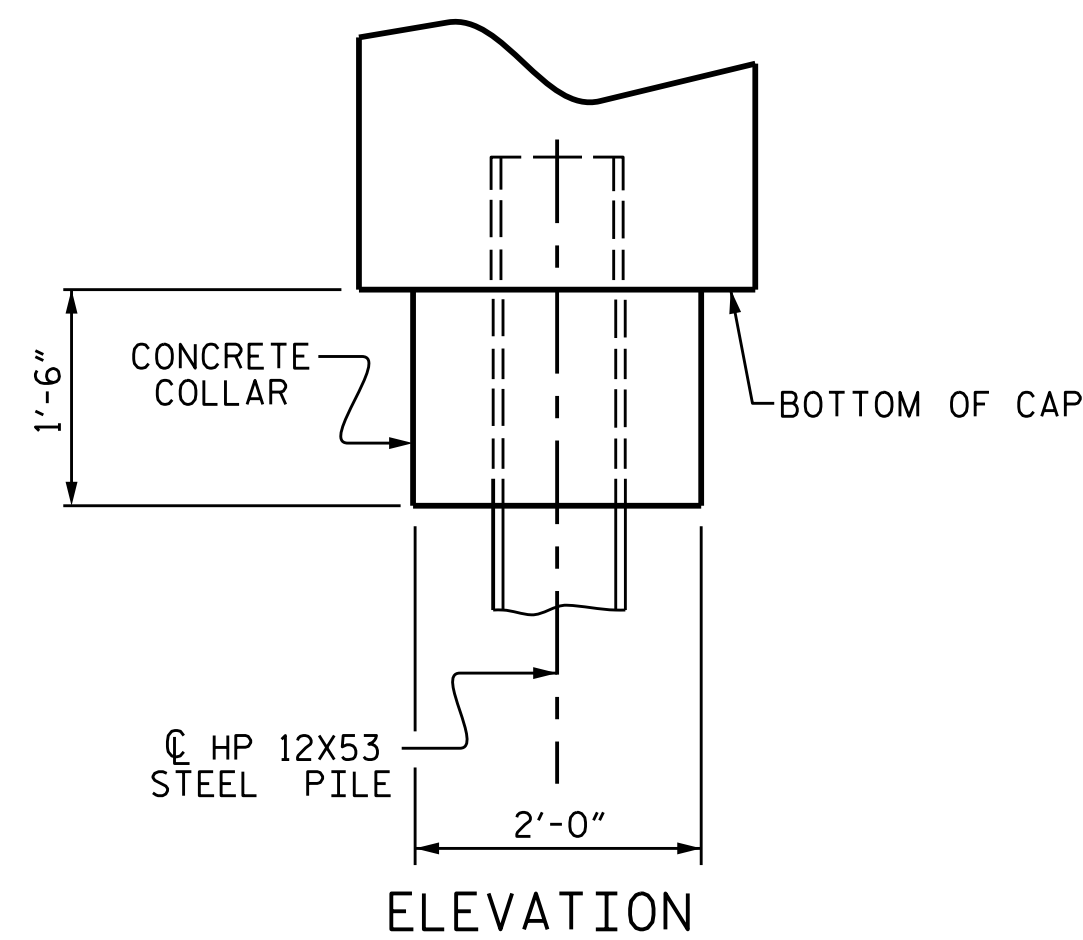


DETAIL "A"

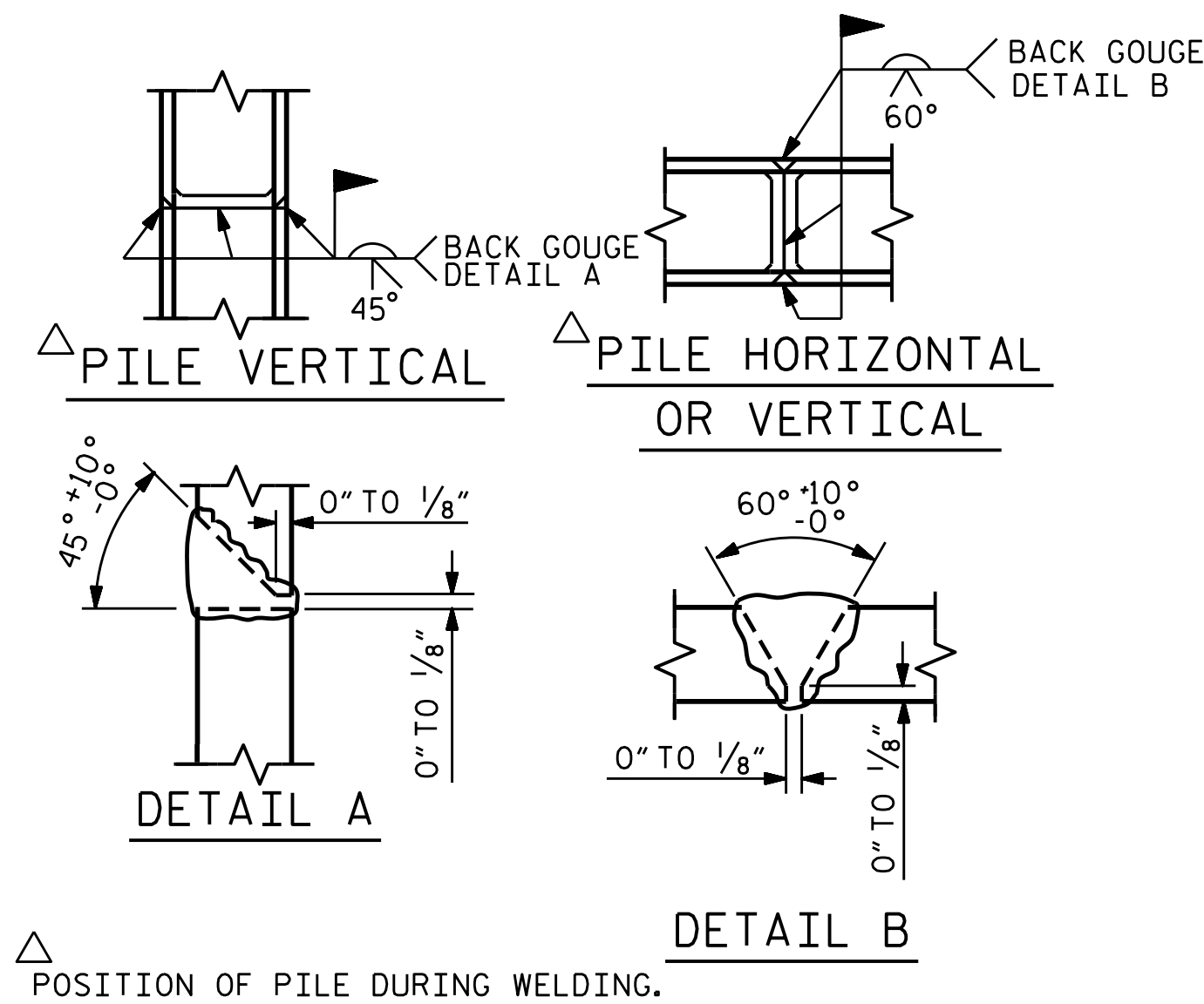


PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

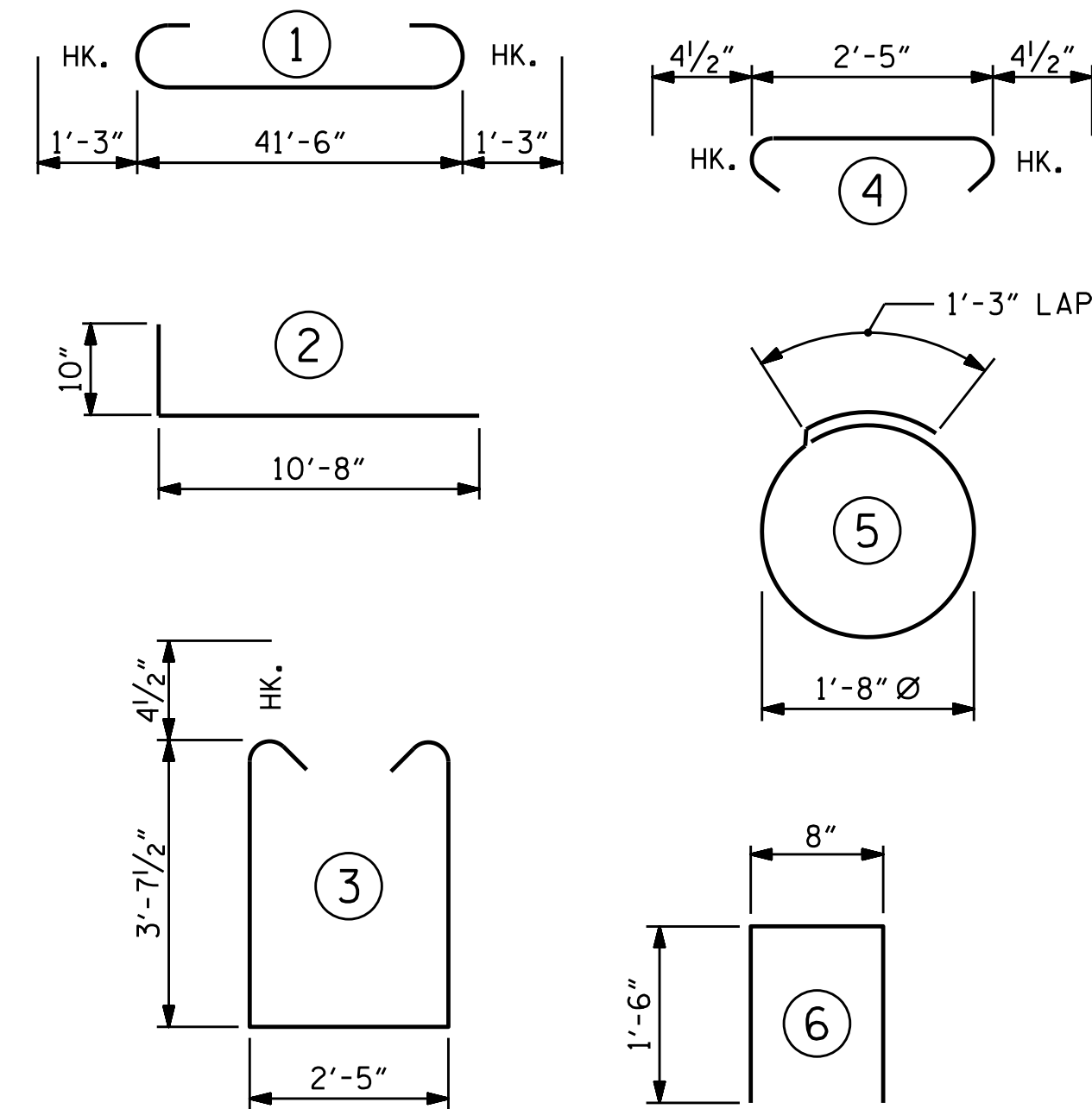


ELEVATION



PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

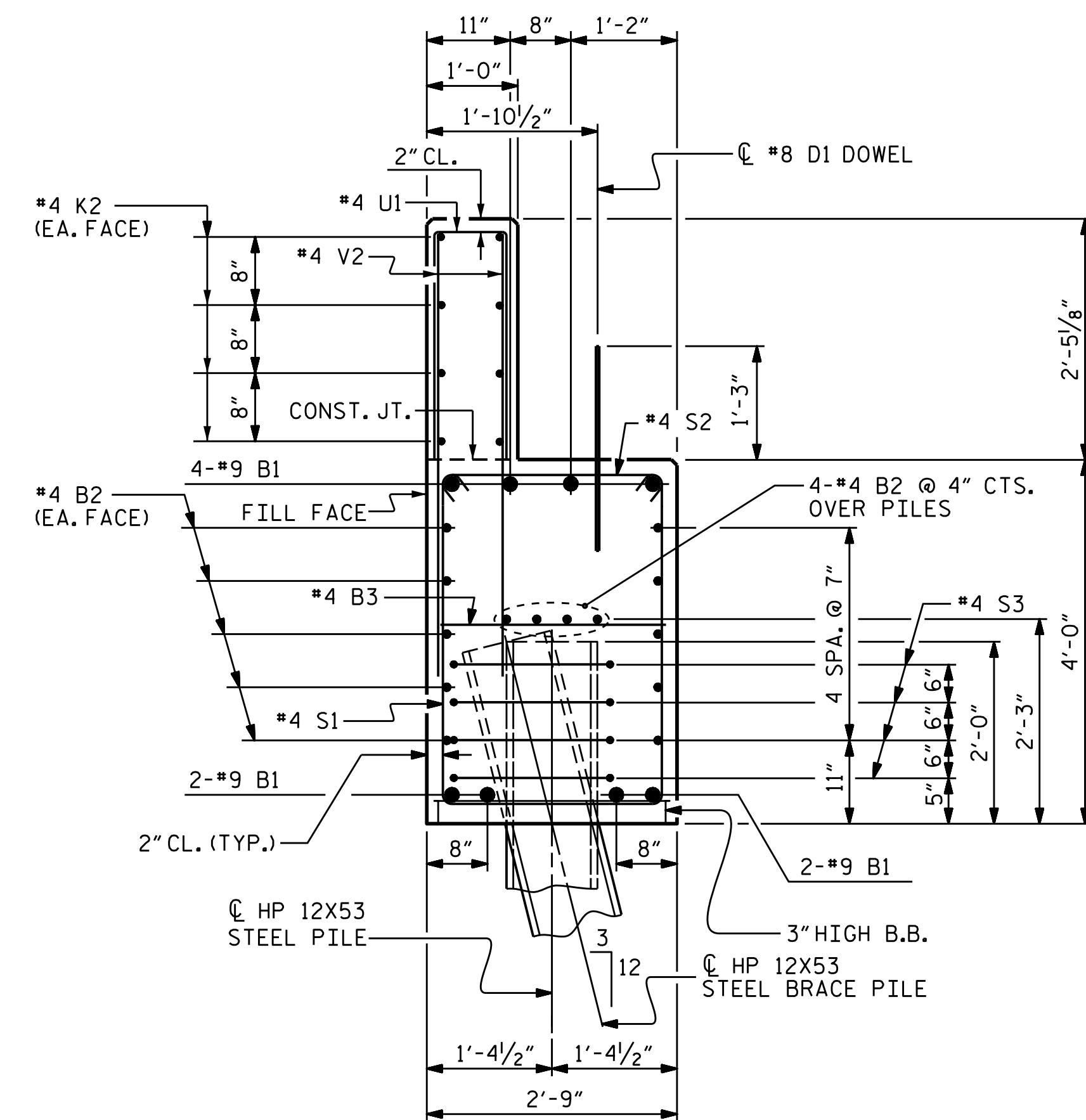
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-0"	1197
B2	28	#4	STR	22'-1"	413
B3	11	#4	STR	2'-5"	18
D1	24	#8	STR	2'-3"	144
H1	48	#5	2	11'-6"	576
K1	8	#4	STR	3'-1"	16
K2	16	#4	STR	22'-1"	236
S1	56	#4	3	10'-5"	390
S2	56	#4	4	3'-2"	118
S3	28	#4	5	6'-6"	122
U1	36	#4	6	3'-8"	88
V1	60	#4	STR	7'-8"	307
V2	72	#4	STR	6'-0"	289

REINFORCING STEEL LBS. 3,914

CLASS A CONCRETE BREAKDOWN

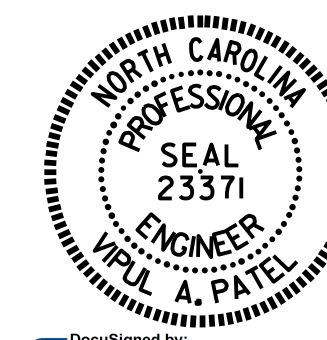
POUR #1	CAP, LOWER PART OF WINGS & COLLARS	C.Y.	21.3
POUR #2	BACKWALL & UPPER PART OF WINGS	C.Y.	7.1
TOTAL CLASS A CONCRETE		C.Y.	28.4

HP 12X53 STEEL PILES
NO: 7 LIN. FT. 175



SECTION A-A

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



PROJECT NO. B-4972
CABARRUS COUNTY
STATION: 22+55.00 -L-

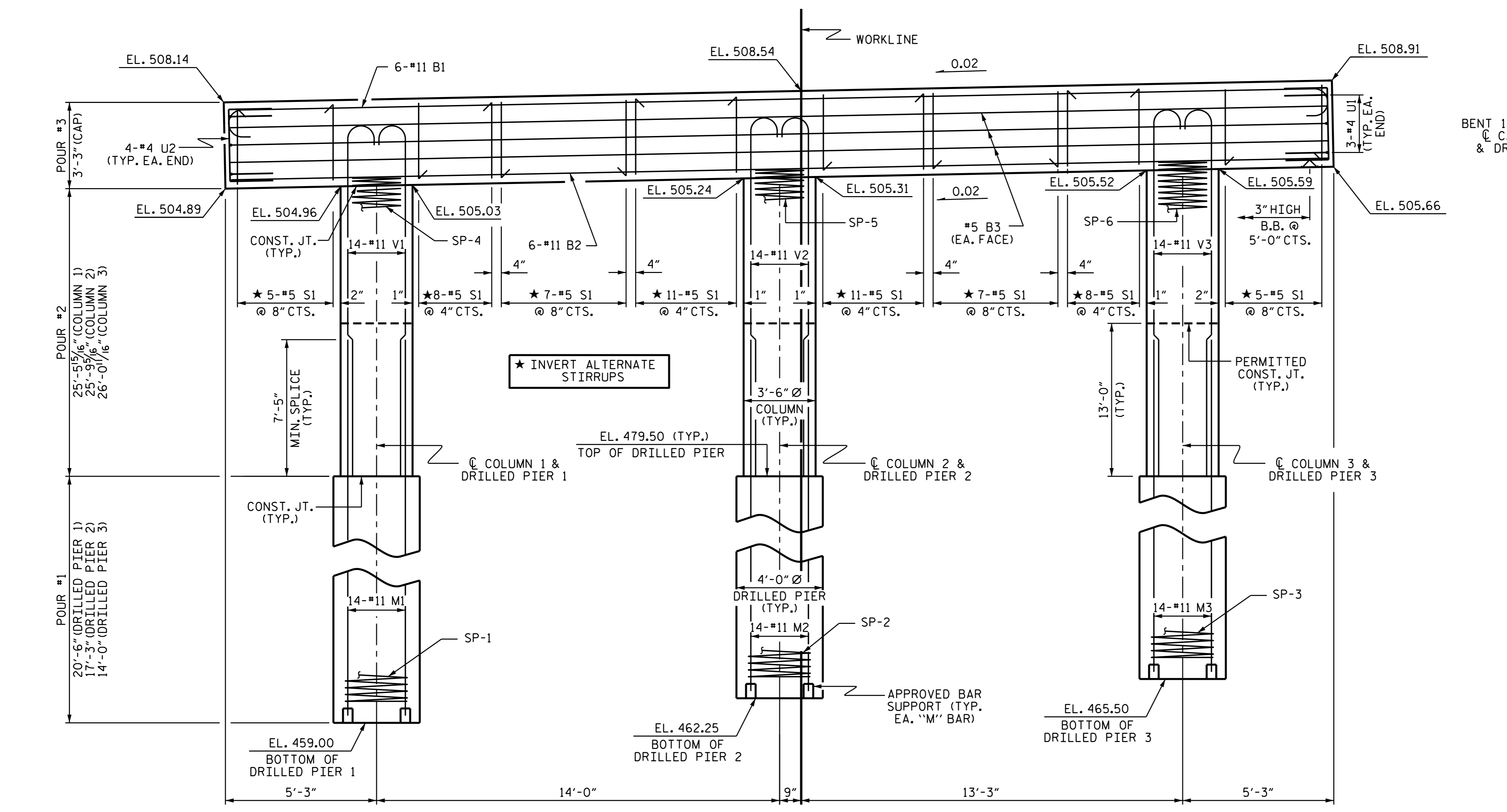
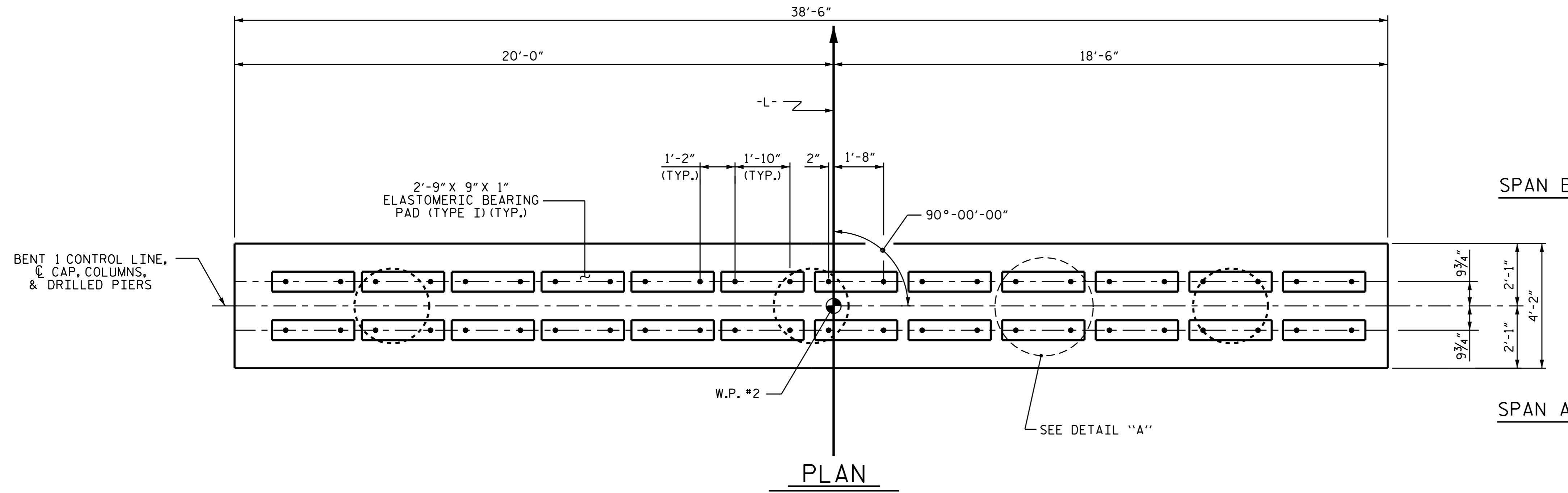
SHEET 3 OF 3

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

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

TOTAL SHEETS 31

ASSEMBLED BY: N.D. AIUTO DATE: 10/6/14
CHECKED BY: M.E. GILES DATE: 12/17/14
DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12/17/14



NOTES

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

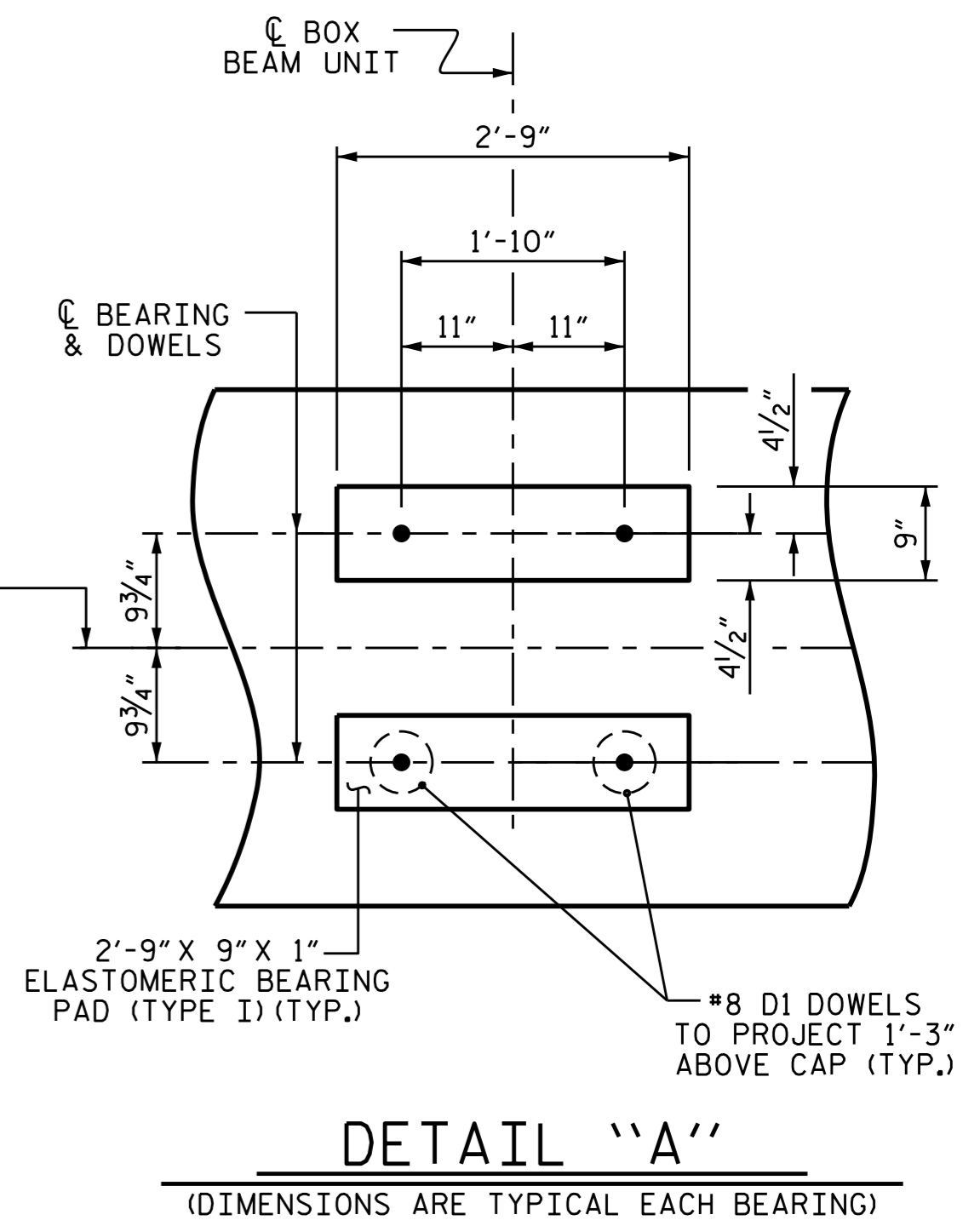
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

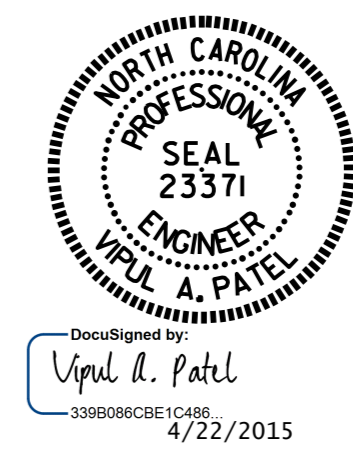
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



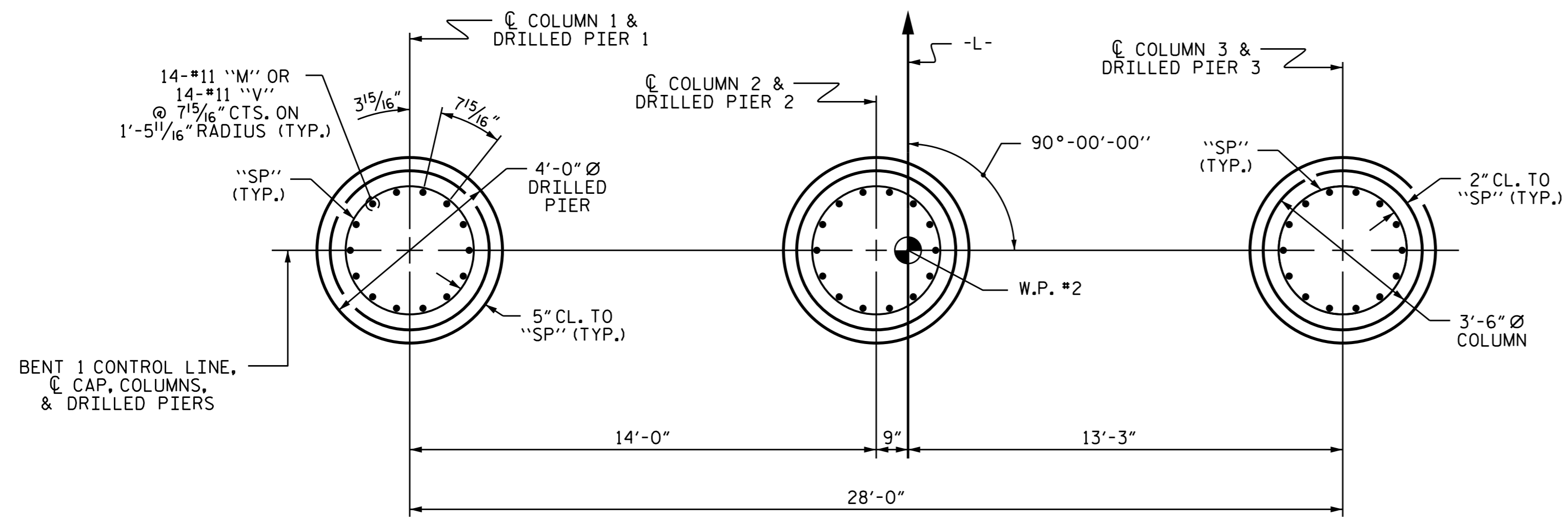
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

SHEET 1 OF 2

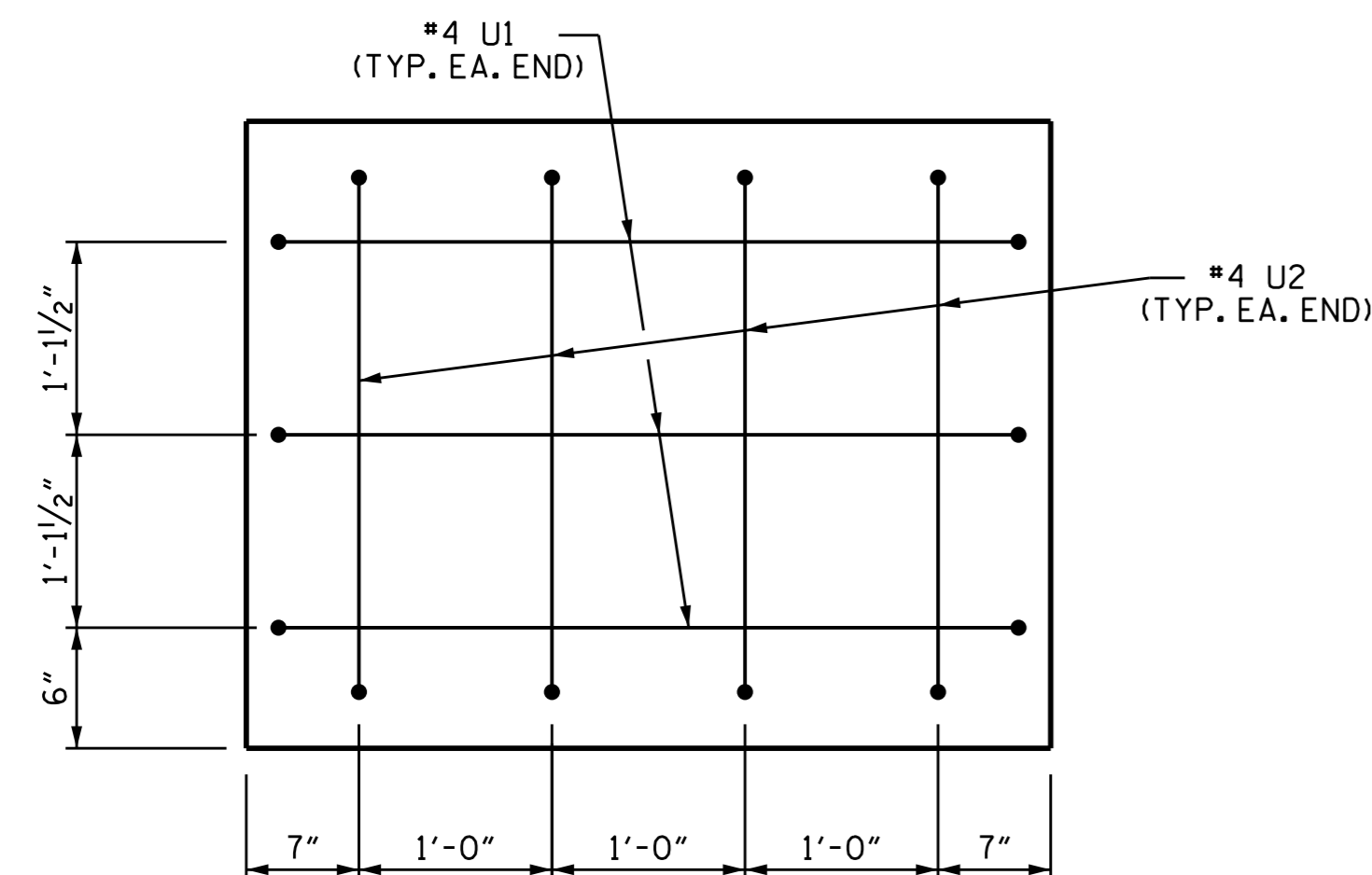
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH			
SUBSTRUCTURE BENT 1			
REVISIONS			
NO.	BY:	DATE:	NO.
1			3
2			4
SHEET NO. S-20			TOTAL SHEETS 31



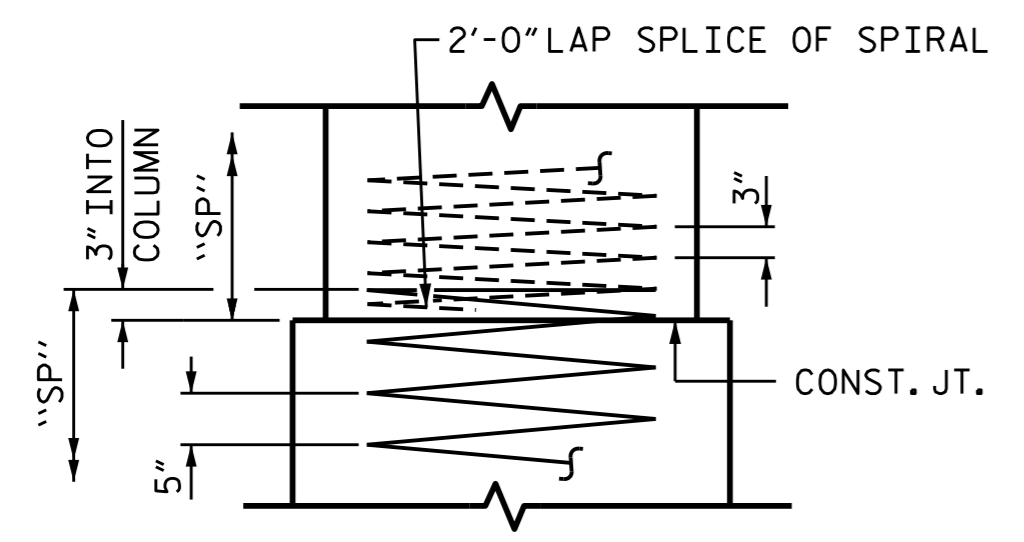
ASSEMBLED BY: N.D'AIUTO DATE: 11/7/14
 CHECKED BY: T.H.CARROLL DATE: 12/17/14
 DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE: 12/17/14



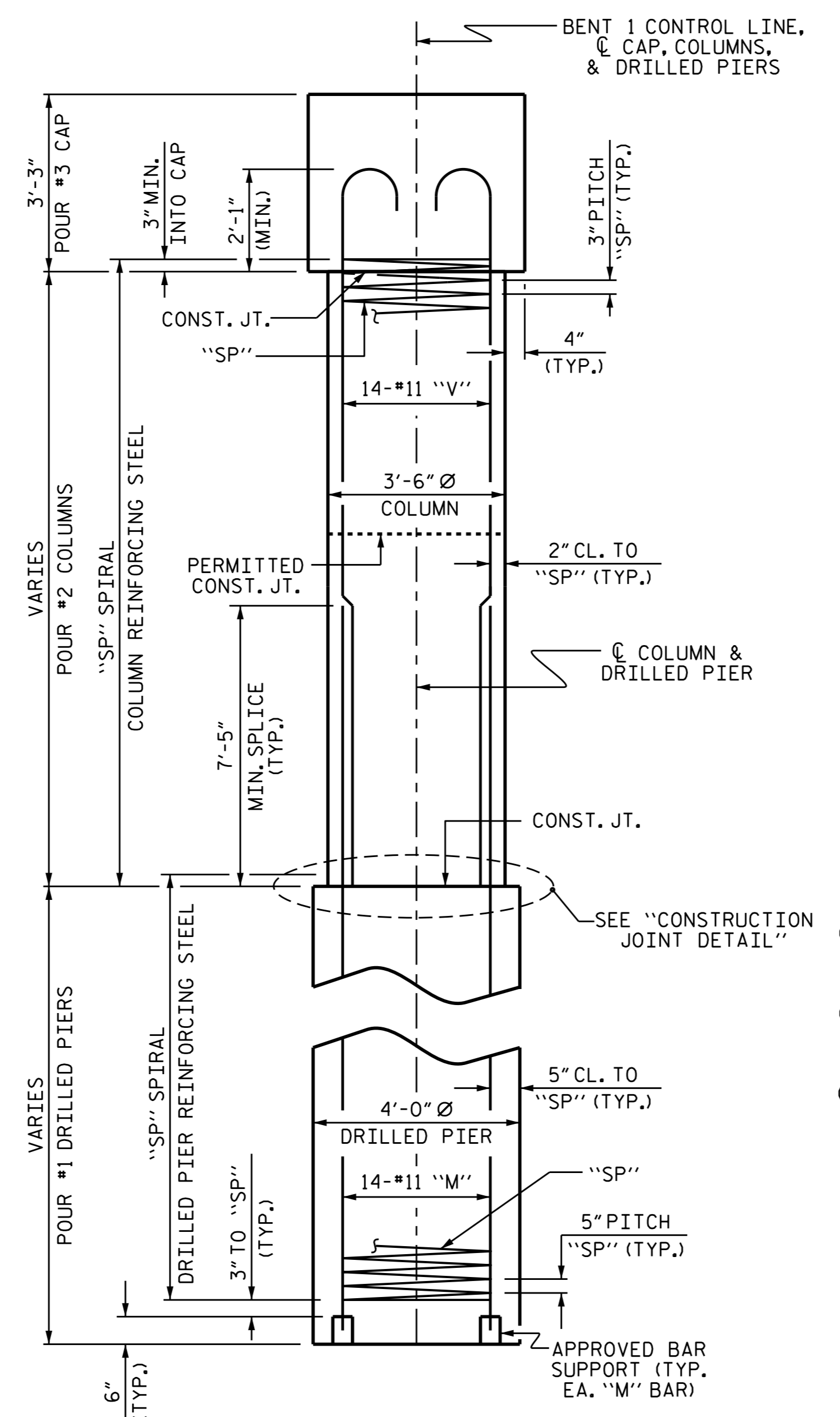
PLAN OF DRILLED PIERS & COLUMNS



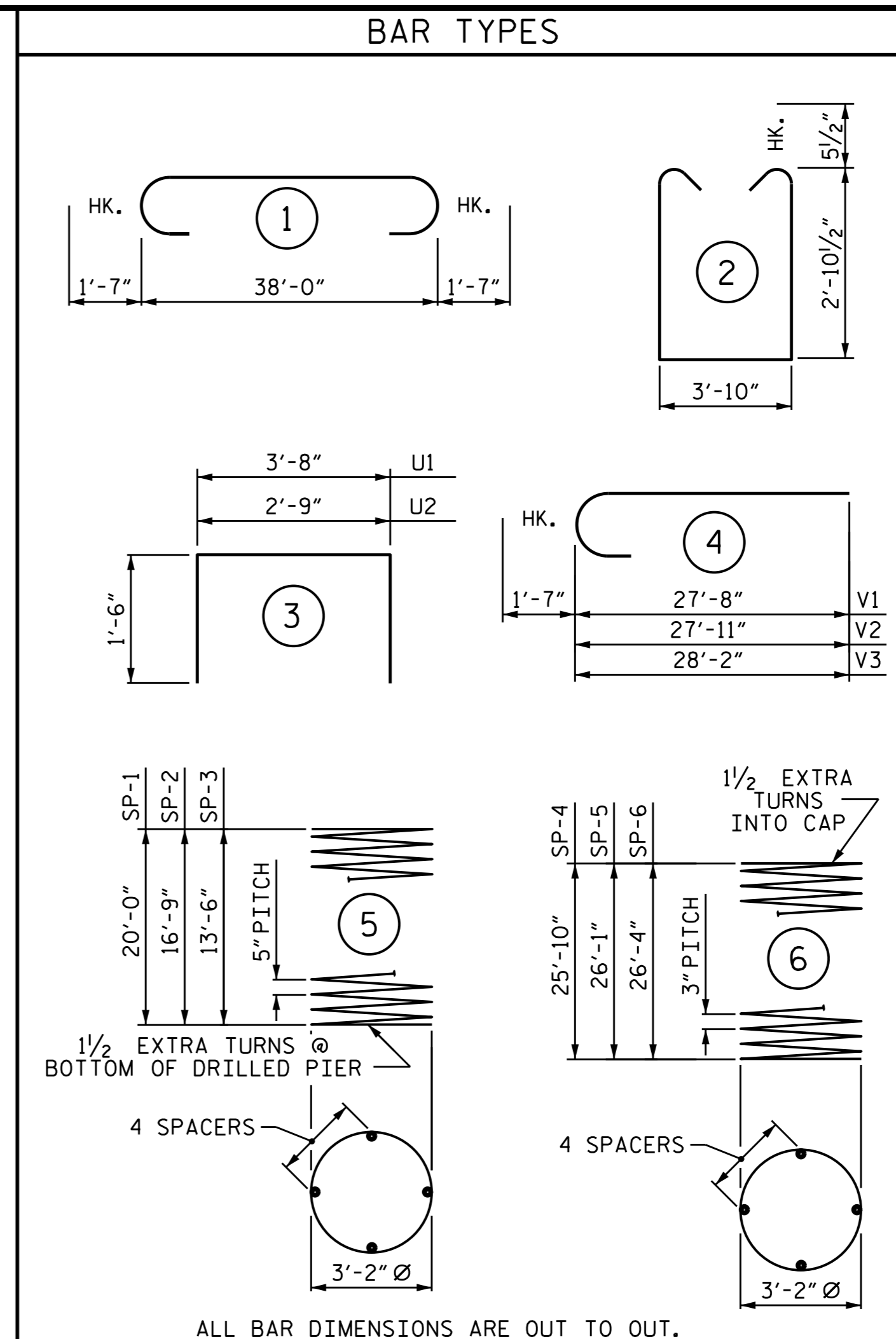
END VIEW
(TYP. EA. END)



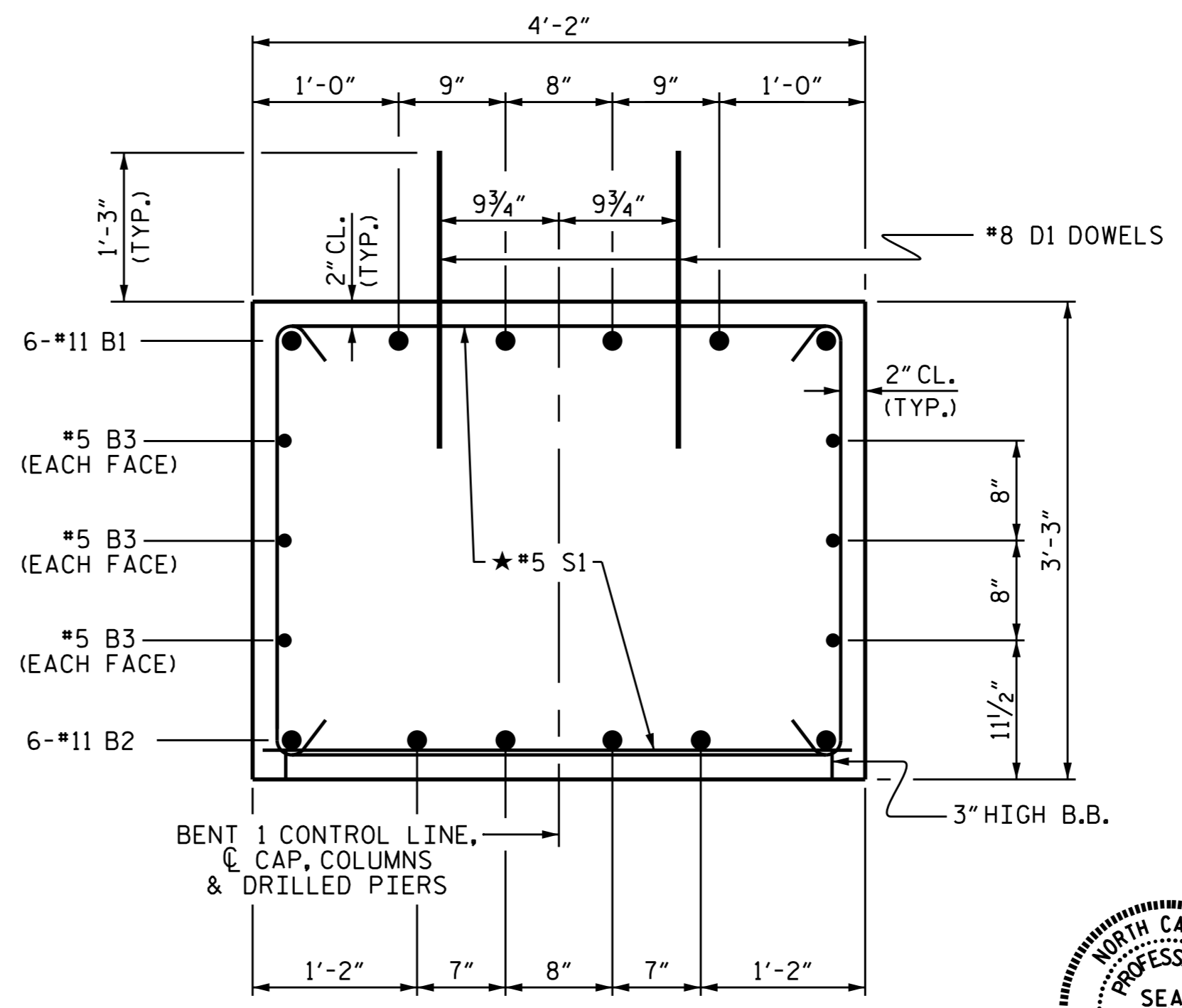
CONSTRUCTION JOINT DETAIL



END ELEVATION



ALL BAR DIMENSIONS ARE OUT TO OUT.



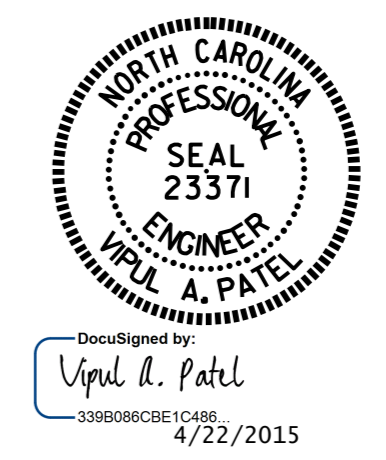
SECTION THROUGH CAP

* INVERT ALTERNATE STIRRUPS

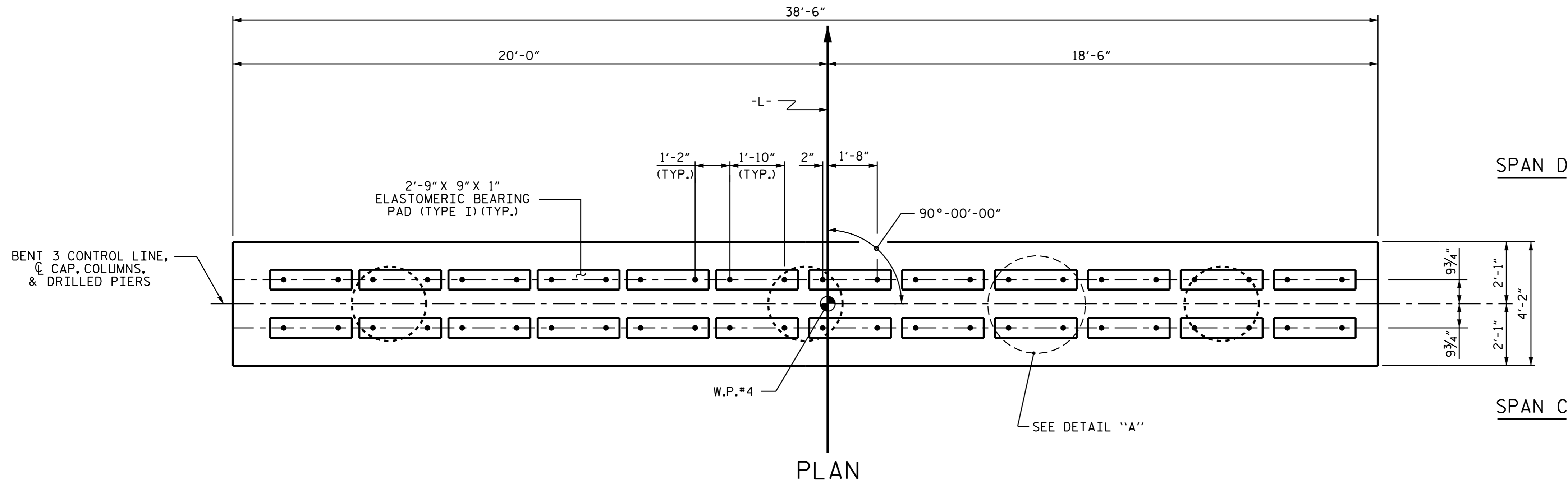
BILL OF MATERIAL					
BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	6	#11	1	41'-2"	1312
B2	6	#11	STR	38'-2"	1217
B3	6	#5	STR	38'-2"	239
D1	48	#8	STR	2'-3"	288
M1	14	#11	STR	30'-8"	2281
M2	14	#11	STR	27'-5"	2039
M3	14	#11	STR	24'-2"	1798
S1	62	#5	2	10'-6"	679
U1	6	#4	3	6'-8"	27
U2	8	#4	3	5'-9"	31
V1	14	#11	4	29'-3"	2176
V2	14	#11	4	29'-6"	2194
V3	14	#11	4	29'-9"	2213
REINFORCING STEEL				LBS.	16,494
SP-1	1	*	5	484'-10"	506
SP-2	1	*	5	408'-11"	427
SP-3	1	*	5	333'-0"	347
SP-4	1	**	6	1031'-3"	689
SP-5	1	**	6	1041'-0"	695
SP-6	1	**	6	1050'-10"	702
SPIRAL COLUMN REINFORCING STEEL				LBS.	3,366
* THE SP-1, SP-2, SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-4, SP-5, SP-6 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)				C.Y.	27.6
POUR #3 (CAP)				C.Y.	19.3
TOTAL CLASS A CONCRETE				C.Y.	46.9
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				C.Y.	24.1
4'-0" Ø DRILLED PIER IN SOIL				LIN. FT.	14.75
4'-0" Ø DRILLED PIER NOT IN SOIL				LIN. FT.	37.00
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER				LIN. FT.	21.40
CSL TUBES				LIN. FT.	225.00

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 31



ASSEMBLED BY : N.D'AIUTO DATE : 11/7/14
 CHECKED BY : T.H.CARROLL DATE : 12/17/14
 DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/17/14



NOTES

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

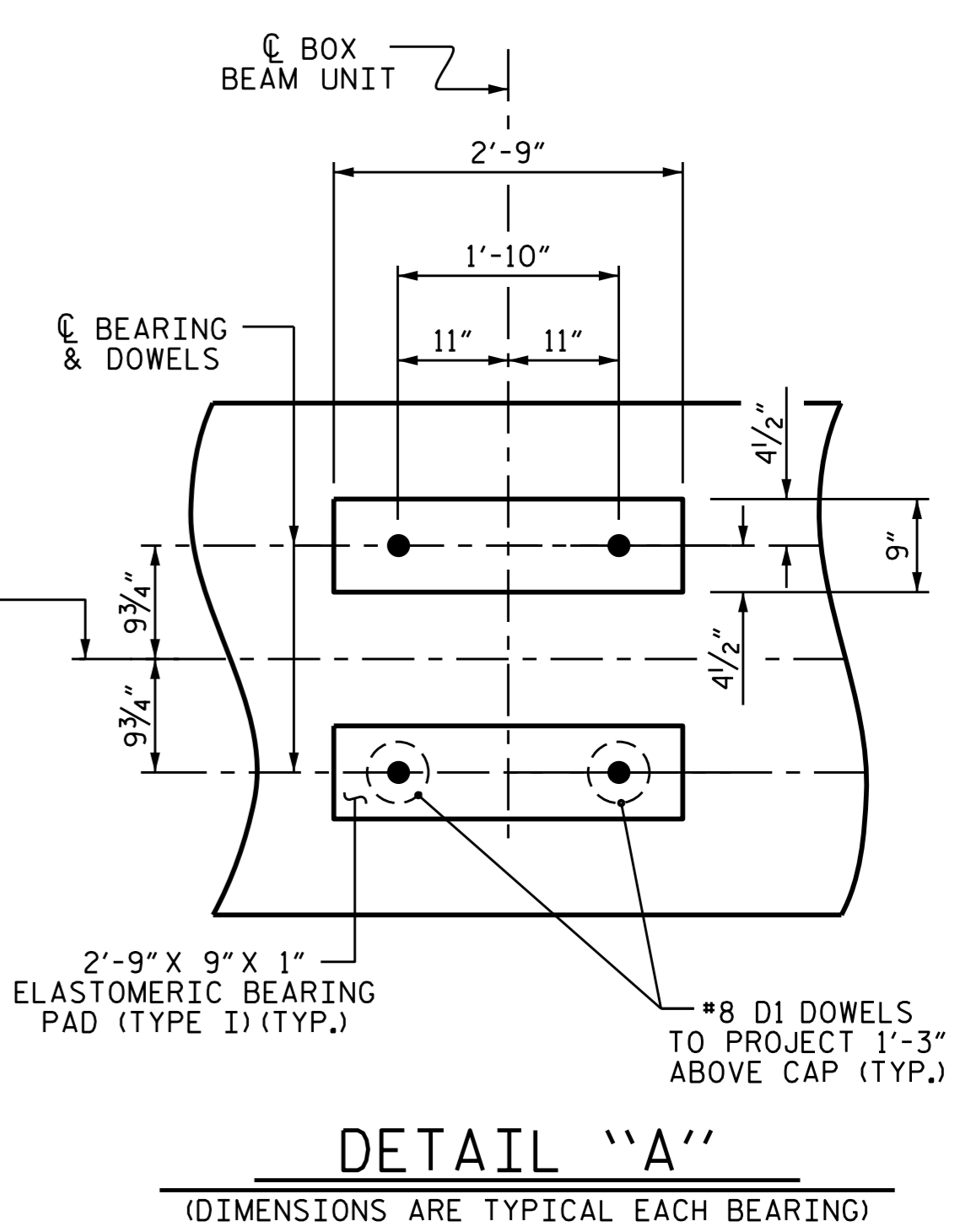
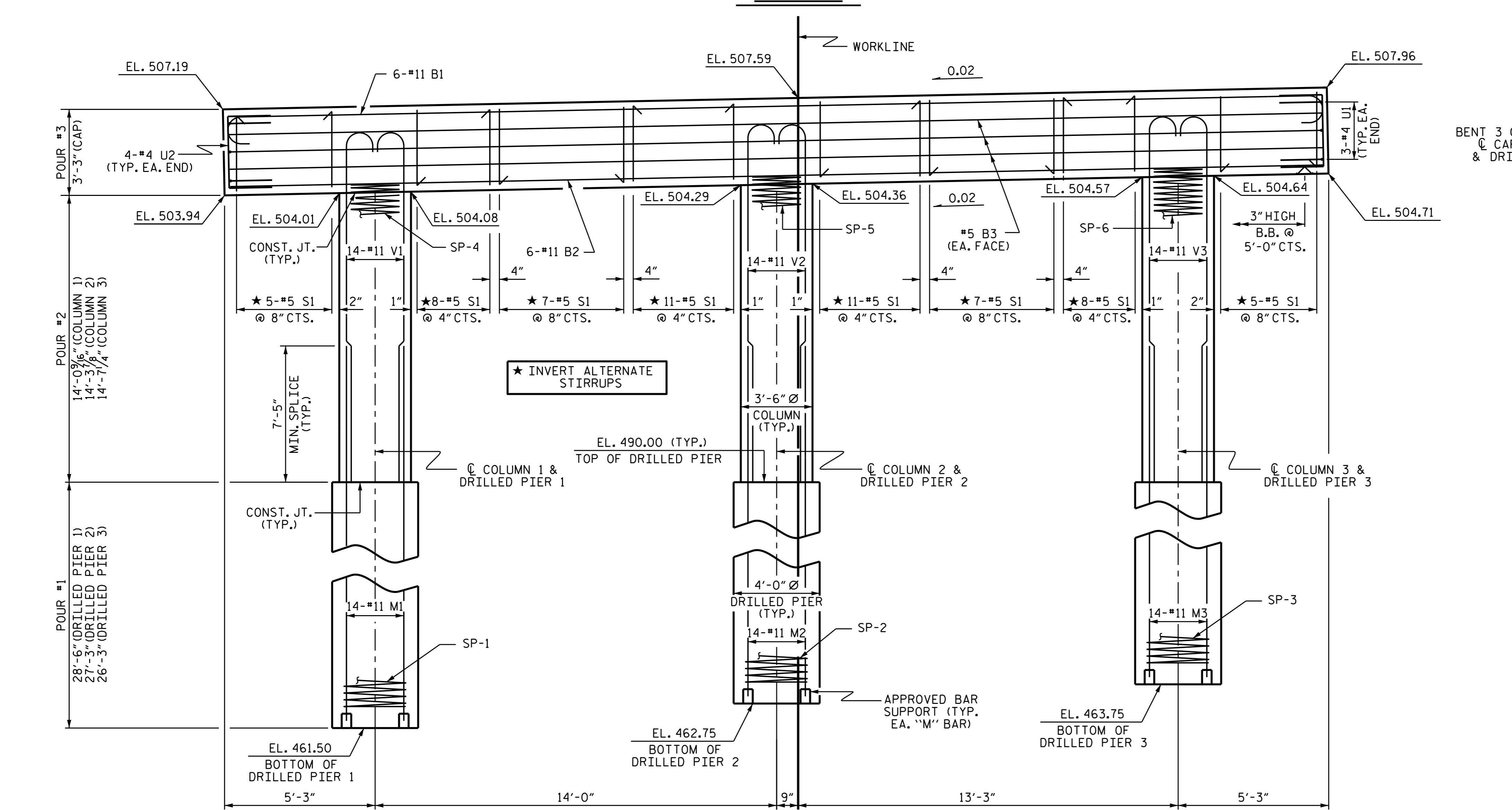
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

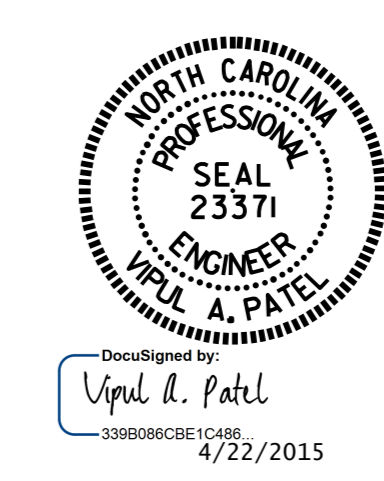
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

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



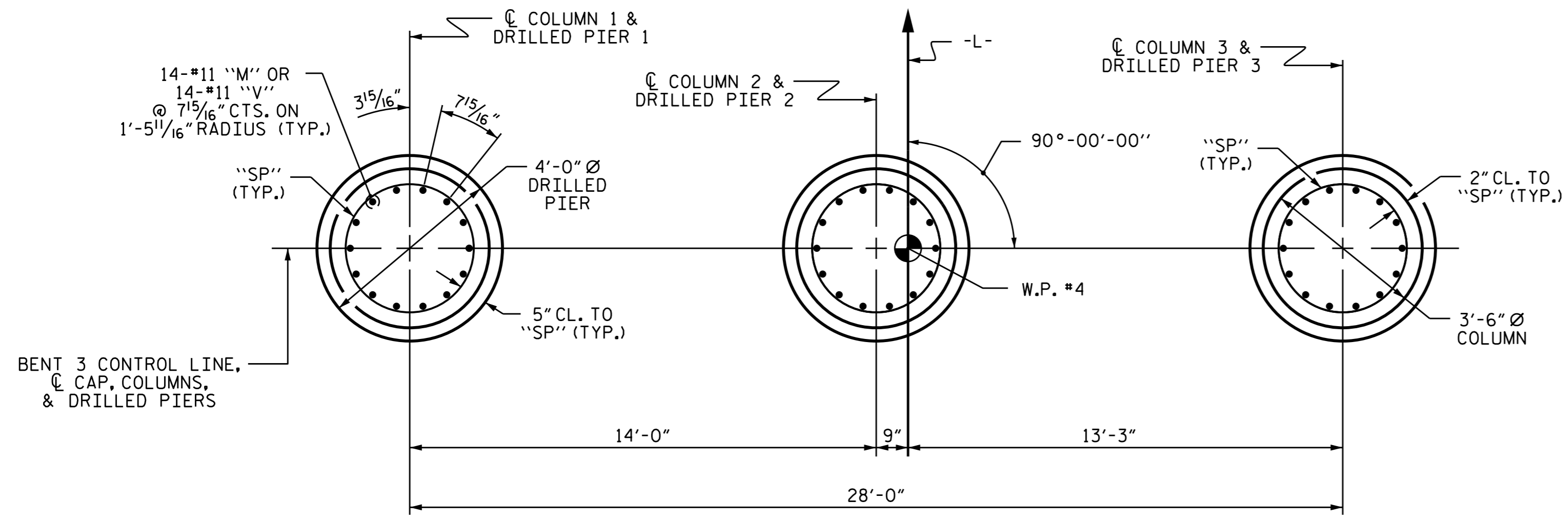
ASSEMBLED BY : N.D'AIUTO DATE : 11/7/14
 CHECKED BY : T.H.CARROLL DATE : 12/17/14
 DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/17/14

21-APR-2015 09:33
 R:\Structures\Plans\B4972.SD.B3.01.dgn
 Isuttton

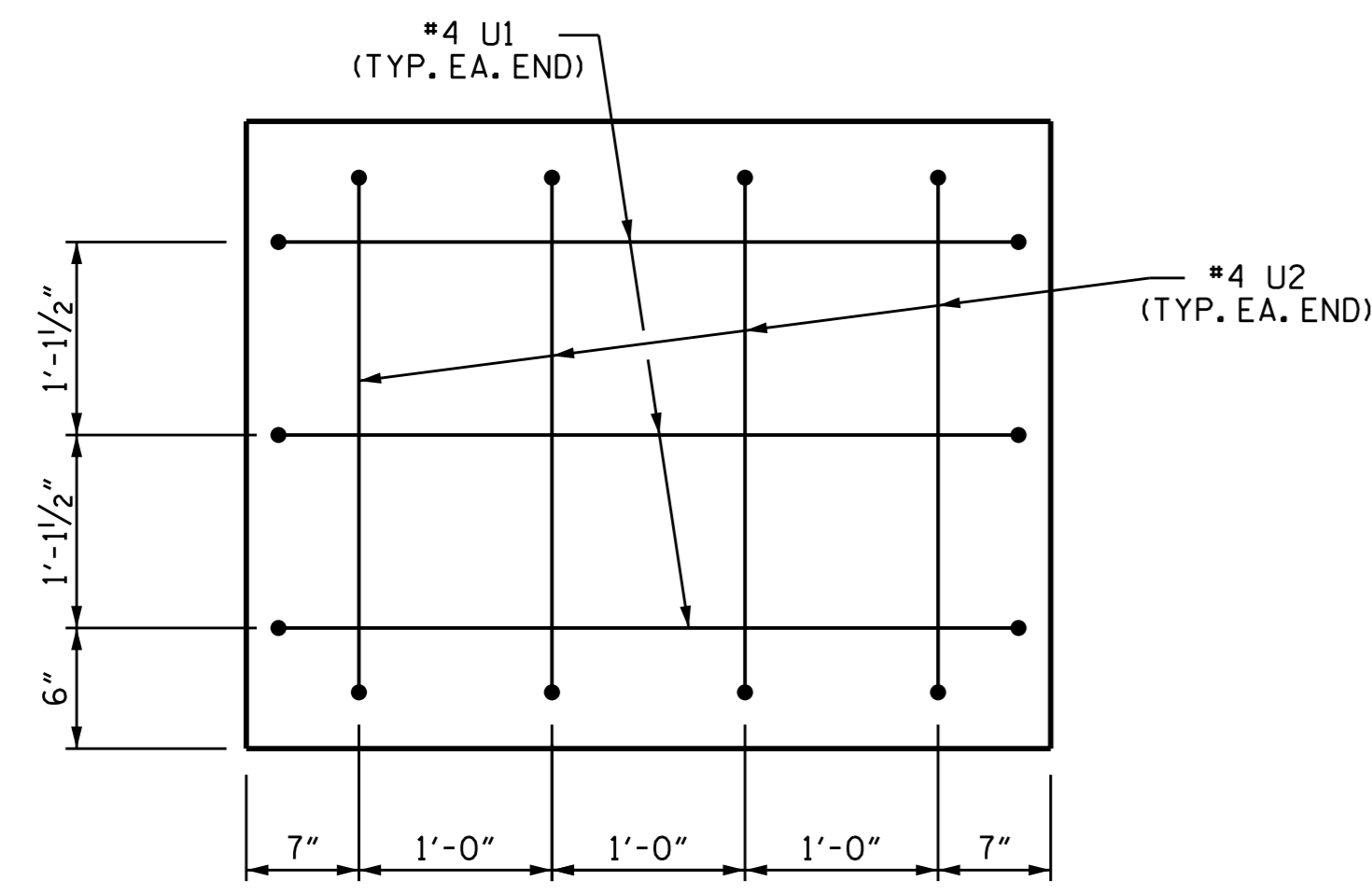


PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 1 OF 2

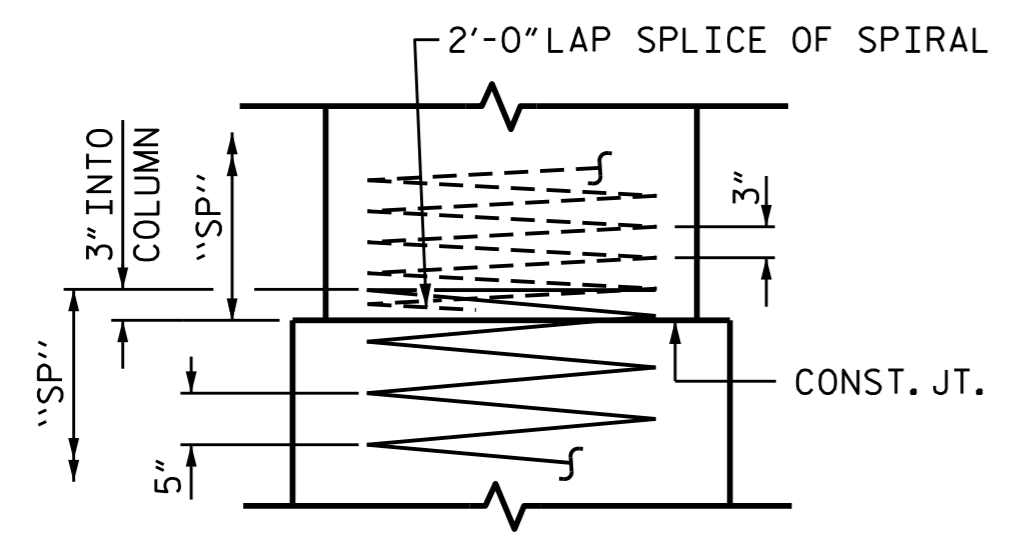
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 3					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 31



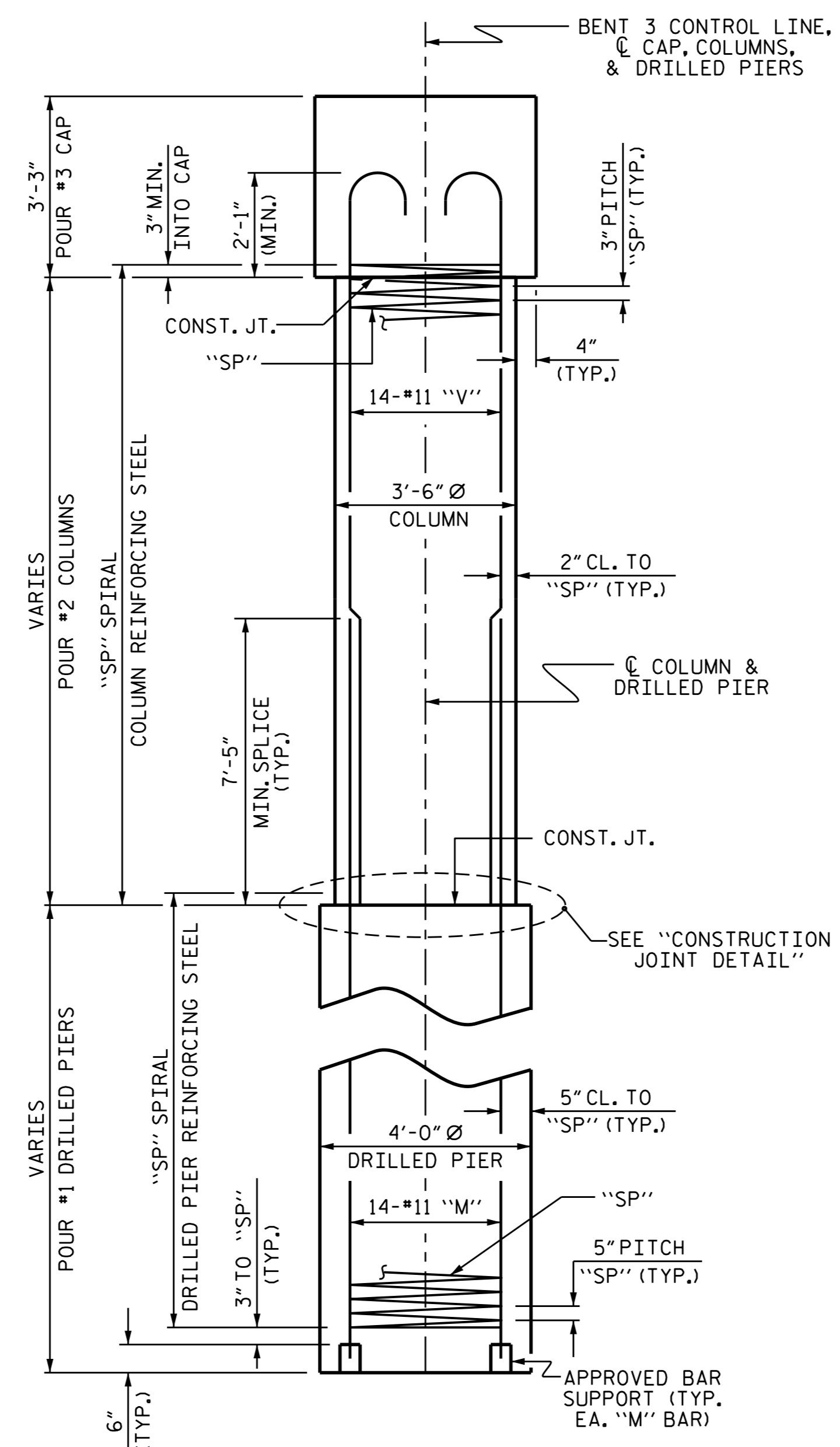
PLAN OF DRILLED PIERS & COLUMNS



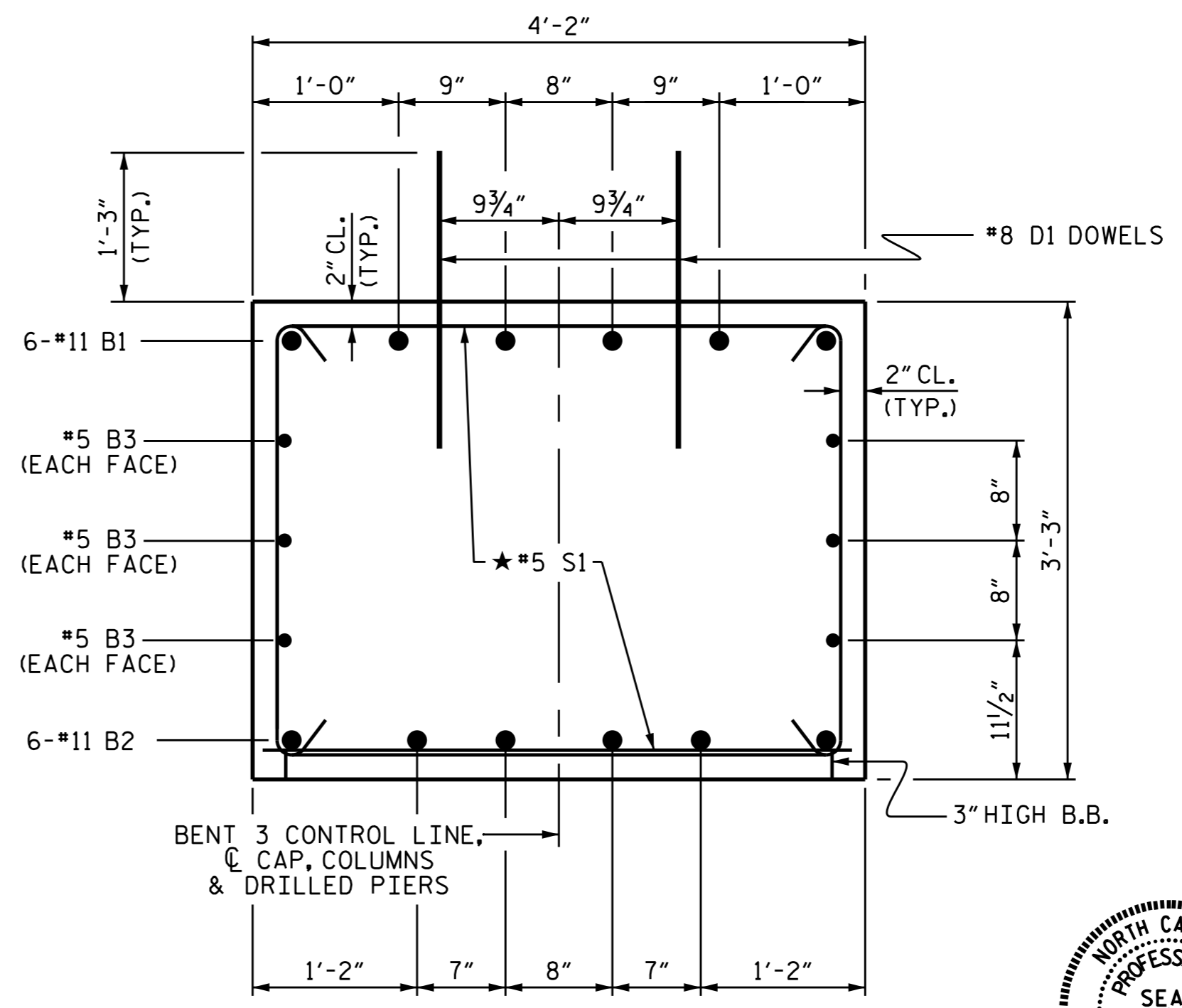
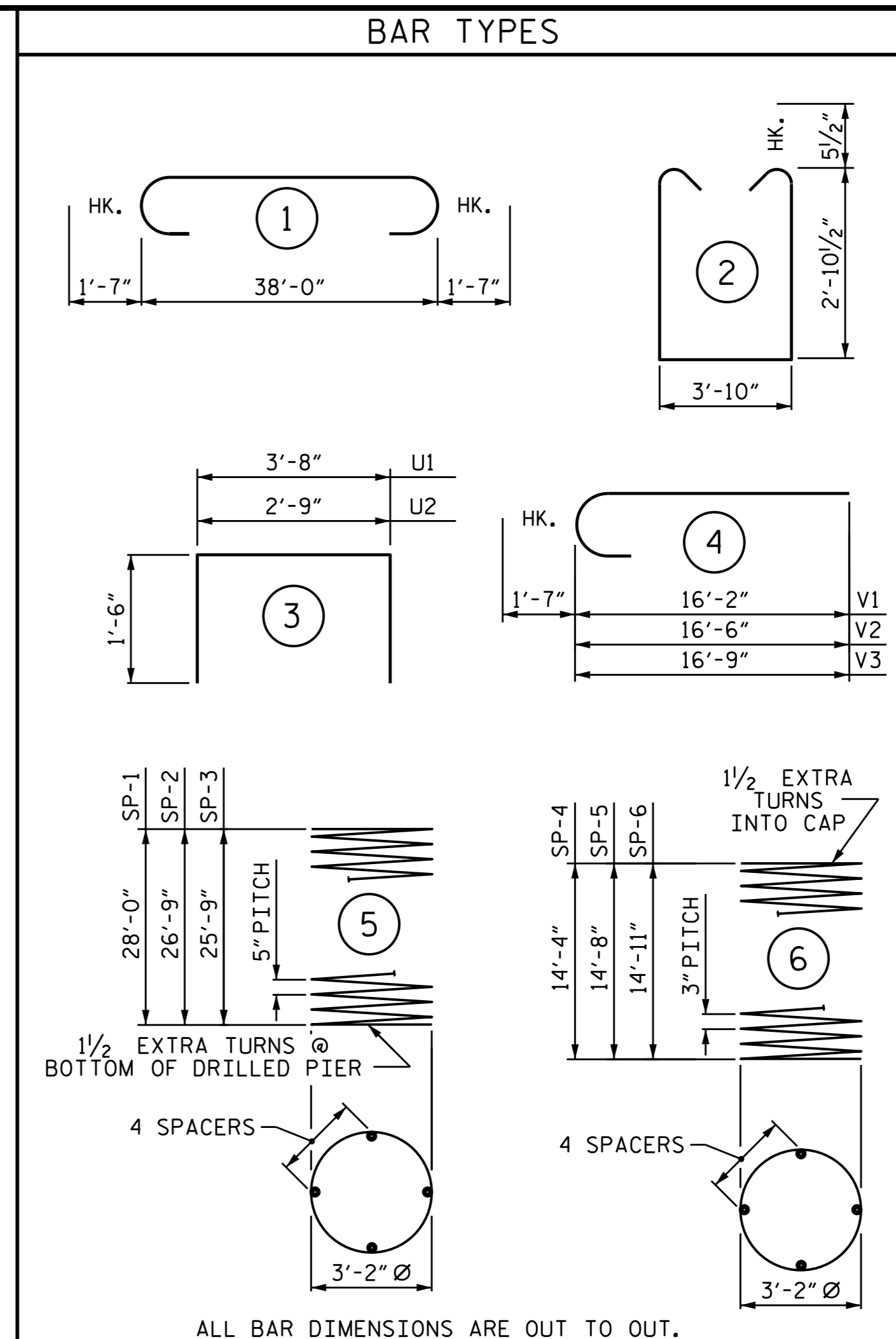
END VIEW
(TYP. EA. END)



CONSTRUCTION JOINT DETAIL



END ELEVATION

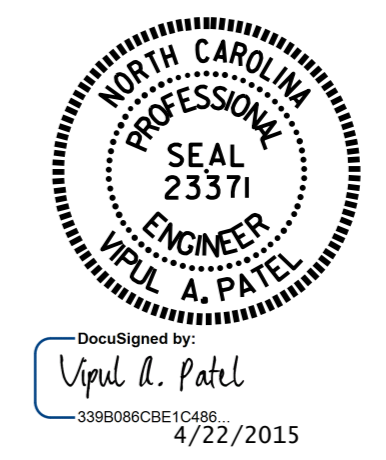


SECTION THROUGH CAP

BILL OF MATERIAL					
BENT 3					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#11	1	41'-2"	1312	
B2	#11	STR	38'-2"	1217	
B3	#5	STR	38'-2"	239	
D1	#8	STR	2'-3"	288	
M1	#11	STR	38'-8"	2876	
M2	#11	STR	37'-5"	2783	
M3	#11	STR	36'-5"	2709	
S1	#5	2	10'-6"	679	
U1	#4	3	6'-8"	27	
U2	#4	3	5'-9"	31	
V1	#11	4	17'-9"	1320	
V2	#11	4	18'-1"	1345	
V3	#11	4	18'-4"	1364	
REINFORCING STEEL					LBS. 16,190
SP-1	#5	*	5	673'-4"	702
SP-2	#5	*	5	644'-0"	672
SP-3	#5	*	5	621'-11"	649
SP-4	#6	**	6	579'-6"	387
SP-5	#6	**	6	591'-9"	395
SP-6	#6	**	6	601'-7"	402
SPIRAL COLUMN REINFORCING STEEL					LBS. 3,207
* THE SP-1, SP-2, SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
** THE SP-4, SP-5, SP-6 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)			C.Y.	15.3	
POUR #3 (CAP)			C.Y.	19.3	
TOTAL CLASS A CONCRETE				C.Y.	34.6
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)			C.Y.	38.2	
4'-0" Ø DRILLED PIER IN SOIL			LIN. FT.	51.00	
4'-0" Ø DRILLED PIER NOT IN SOIL			LIN. FT.	31.00	
CSL TUBES			LIN. FT.	360.40	

PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 3					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 31



ASSEMBLED BY : N.D'AIUTO DATE : 11/7/14
 CHECKED BY : T.H.CARROLL DATE : 12/17/14
 DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/17/14

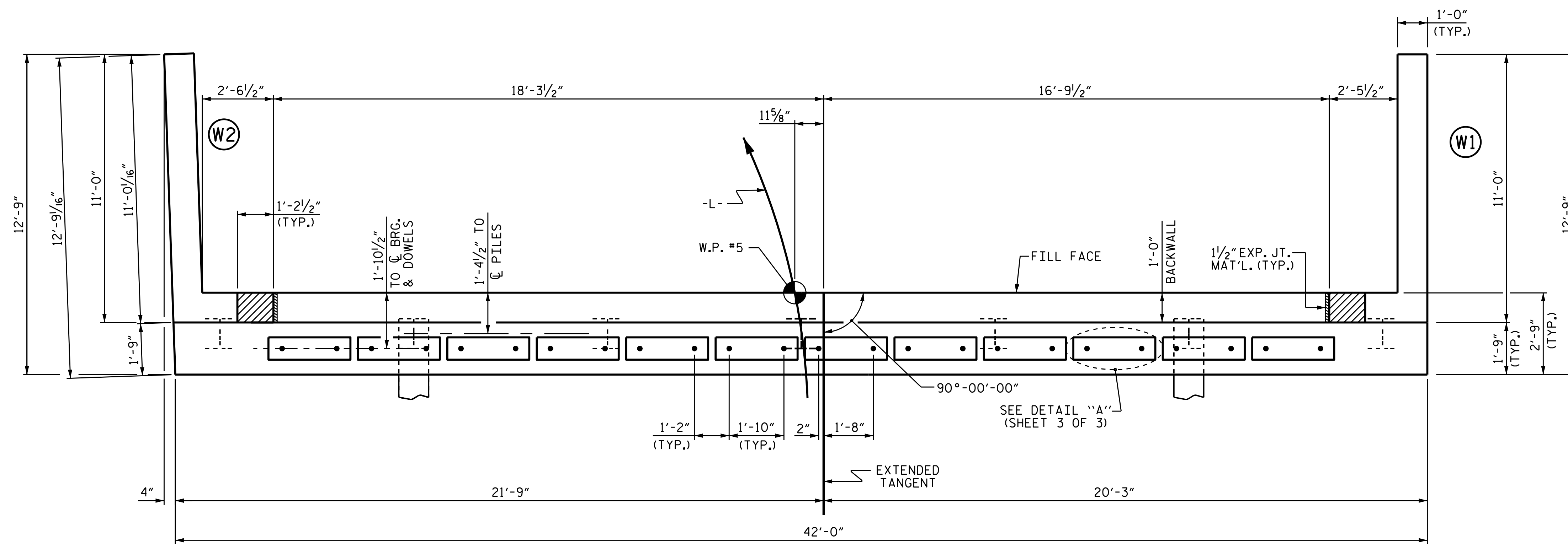
NOTES

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET AND END POST IS CAST IF SLIP FORMING IS USED.

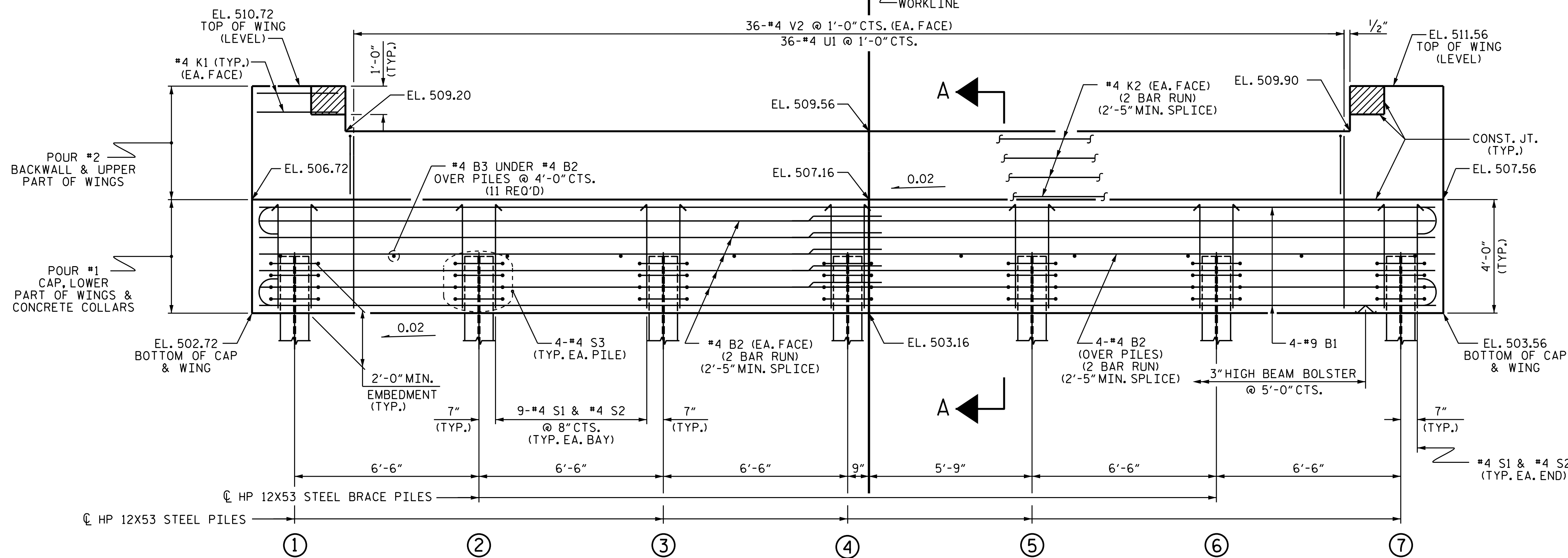
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.



PLAN

TOP OF PILE ELEVATIONS	
①	504.76
②	504.89
③	505.02
④	505.15
⑤	505.28
⑥	505.41
⑦	505.54



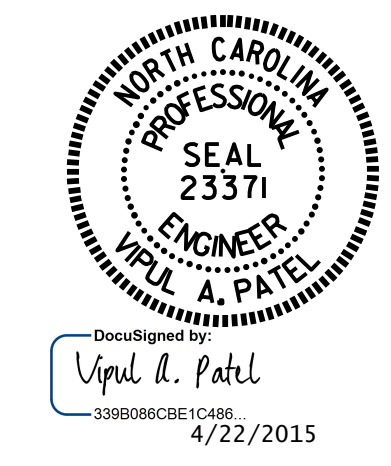
ELEVATION

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 3 OF 3.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

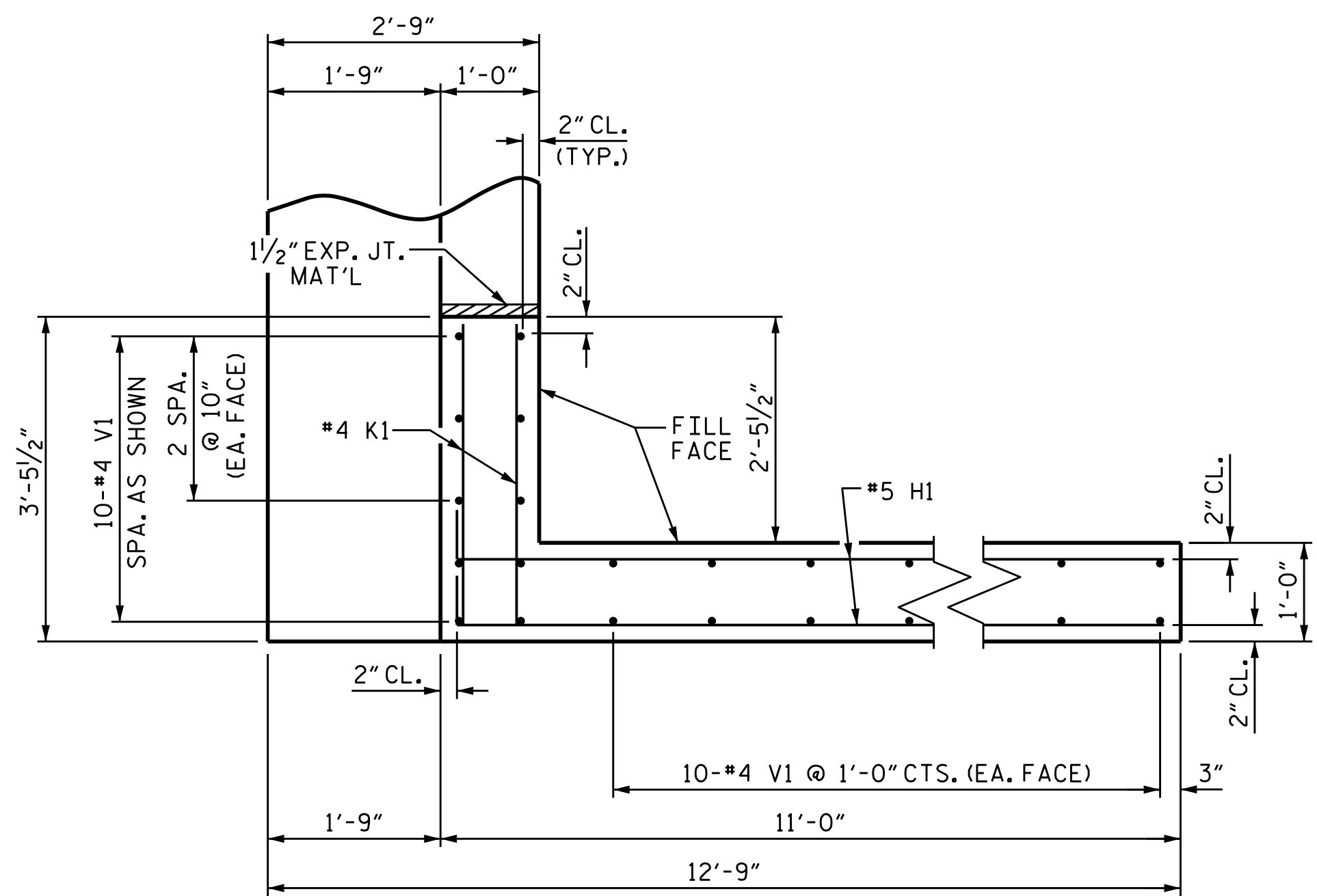
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-

SHEET 1 OF 3

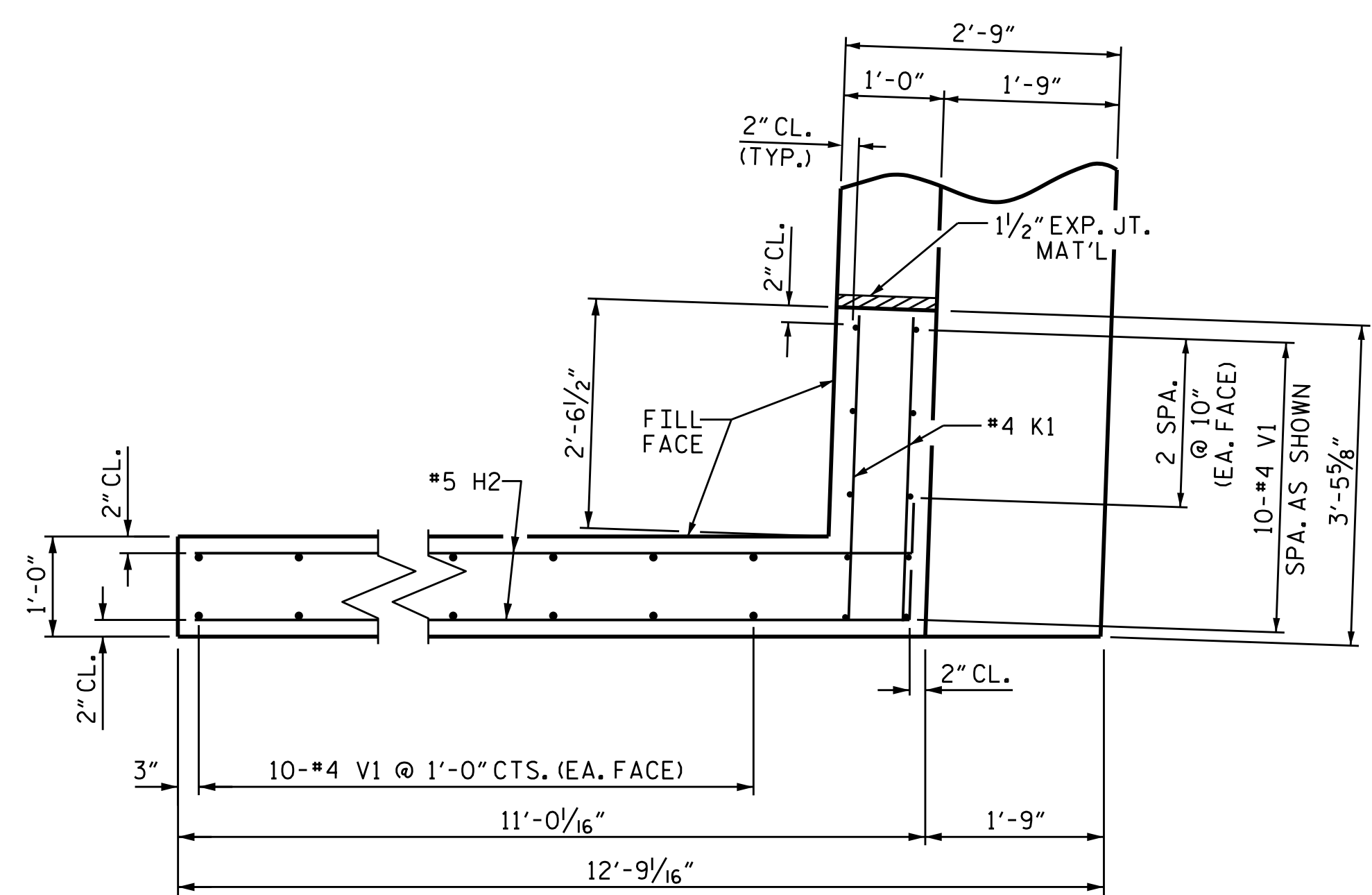
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-26
					TOTAL SHEETS 31



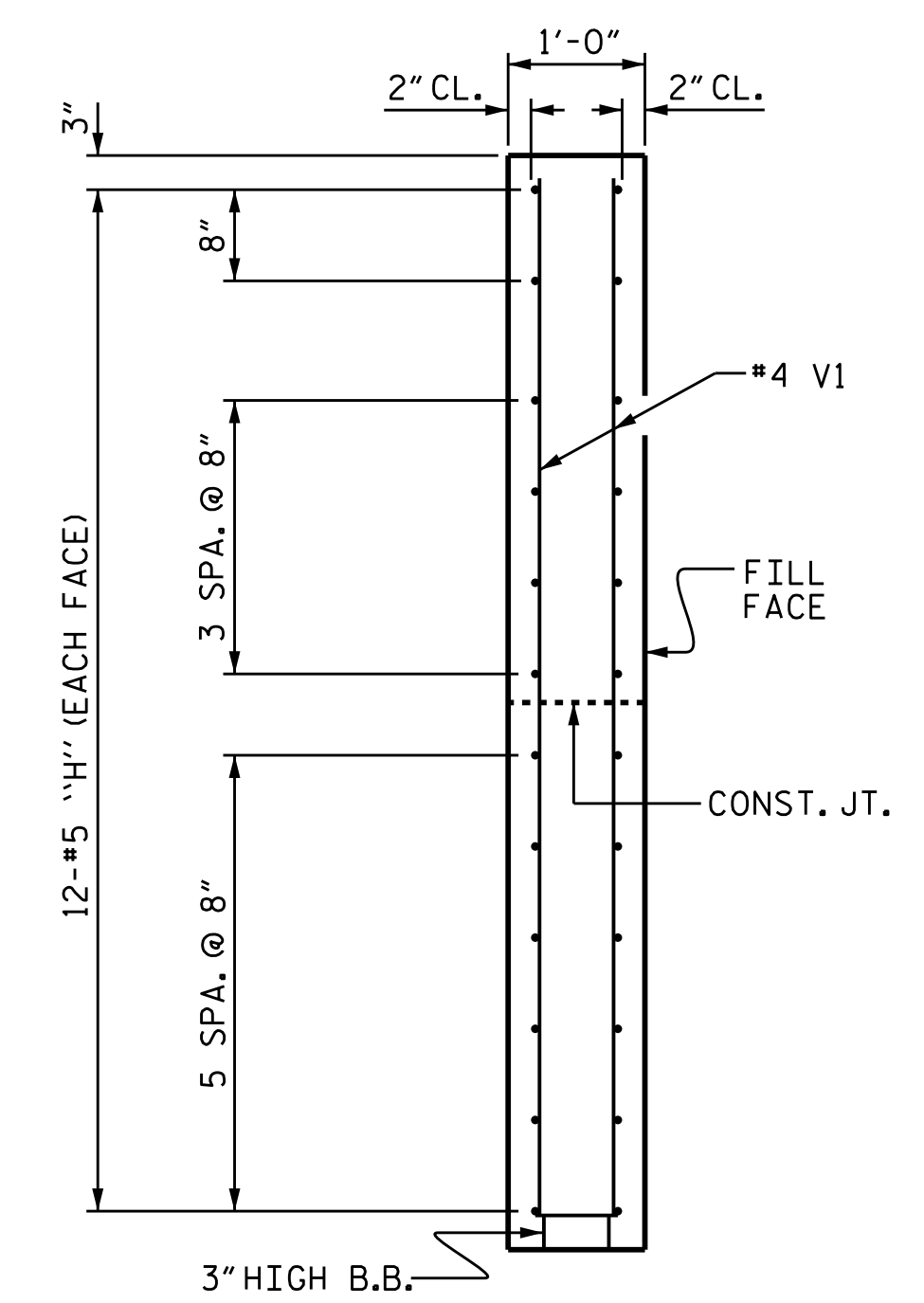
ASSEMBLED BY: N.D. AIUTO DATE: 10/6/14
 CHECKED BY: M.E. GILES DATE: 12/17/14
 DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12/17/14



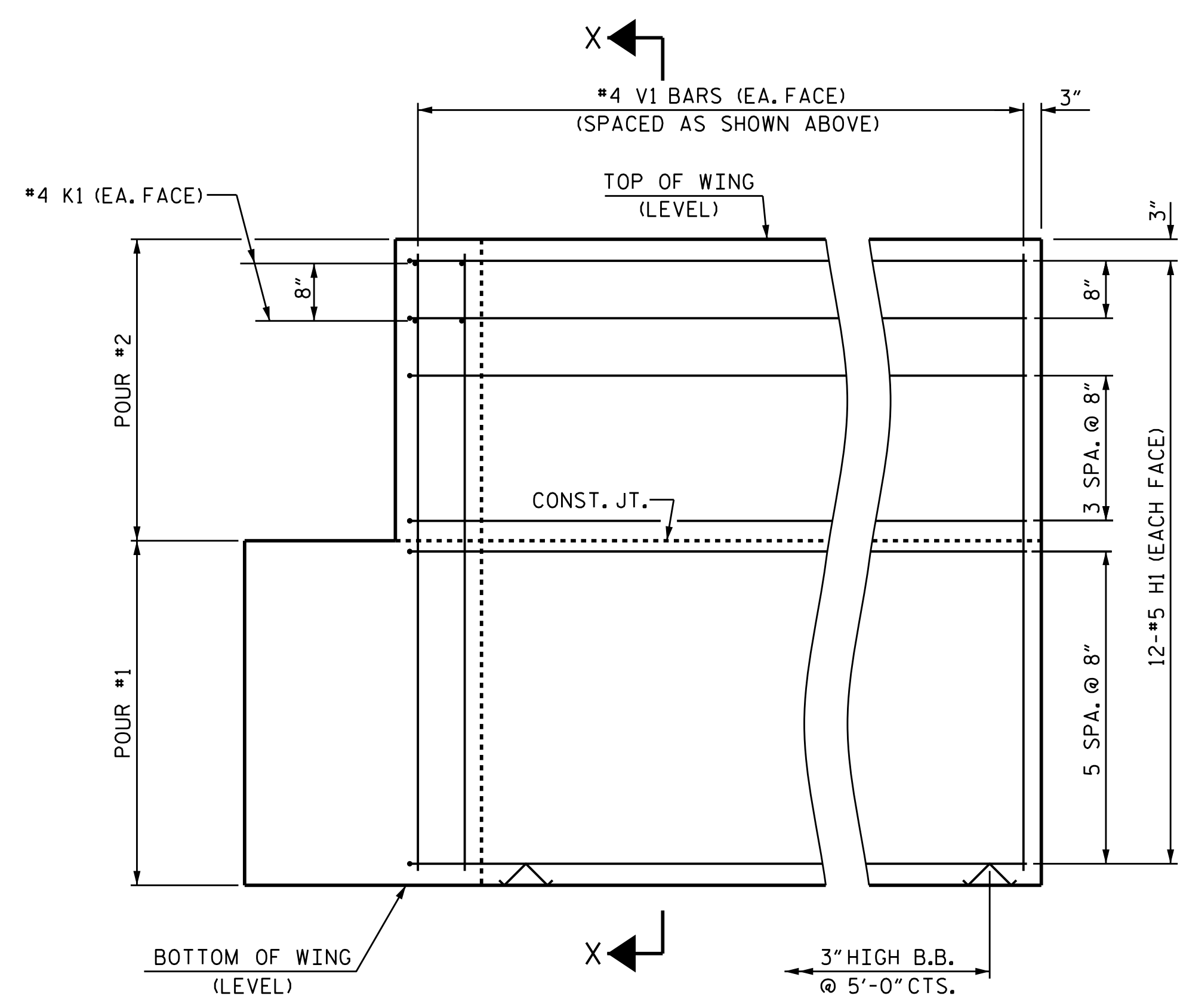
PLAN OF WING (W1)



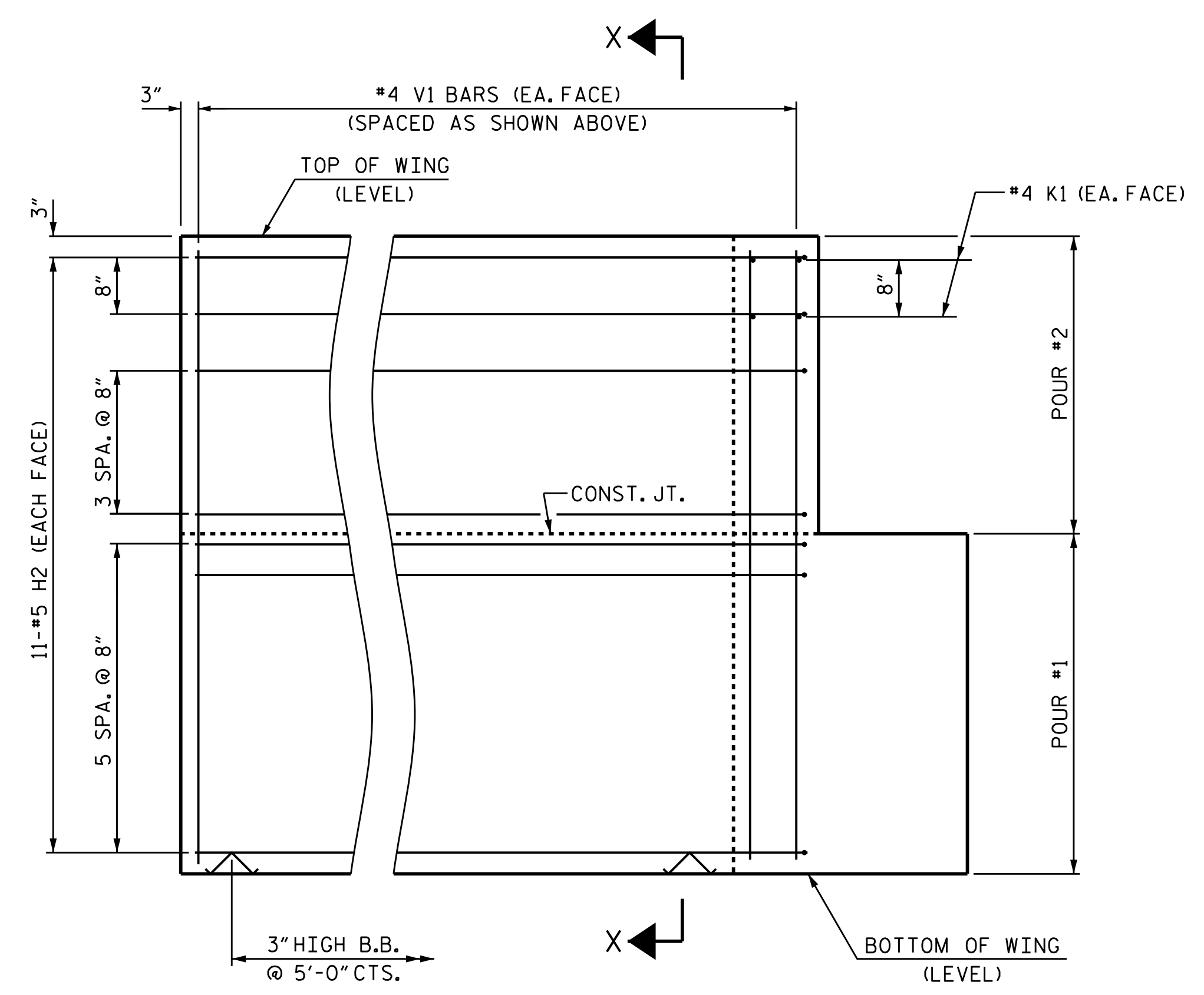
PLAN OF WING (W2)



SECTION X-X



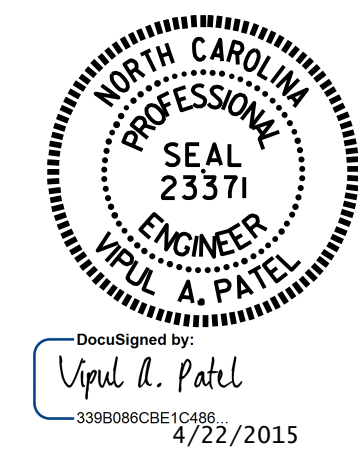
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

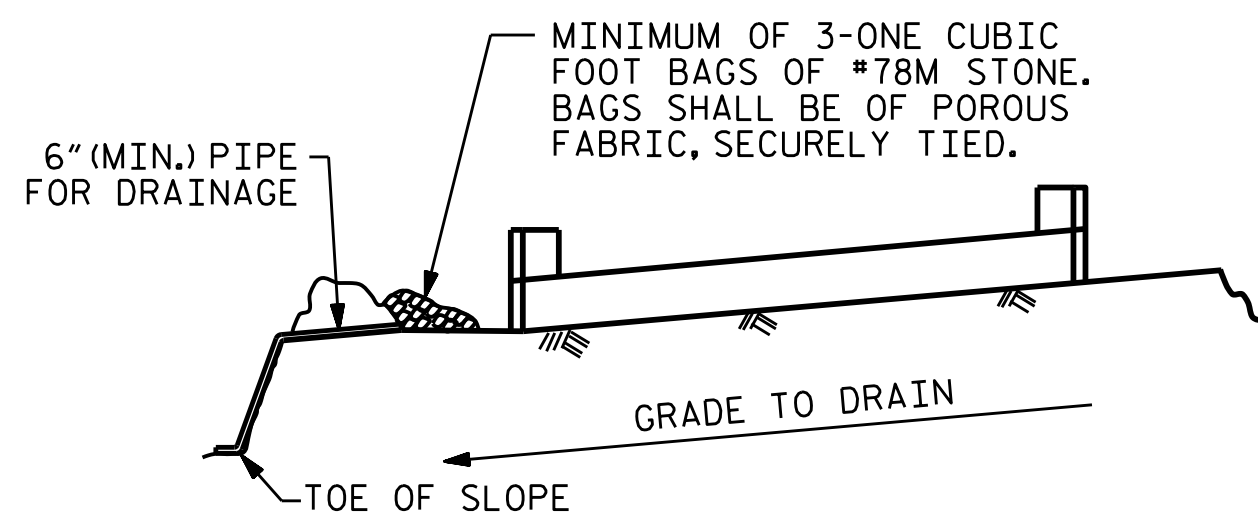
PROJECT NO. B-4972
 CABARRUS COUNTY
 STATION: 22+55.00 -L-
 SHEET 2 OF 3



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

ASSEMBLED BY: N.D. AIUTO DATE: 10/6/14
 CHECKED BY: M.E. GILES DATE: 12/17/14
 DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12/17/14

SHEET NO.
S-27
TOTAL SHEETS
31

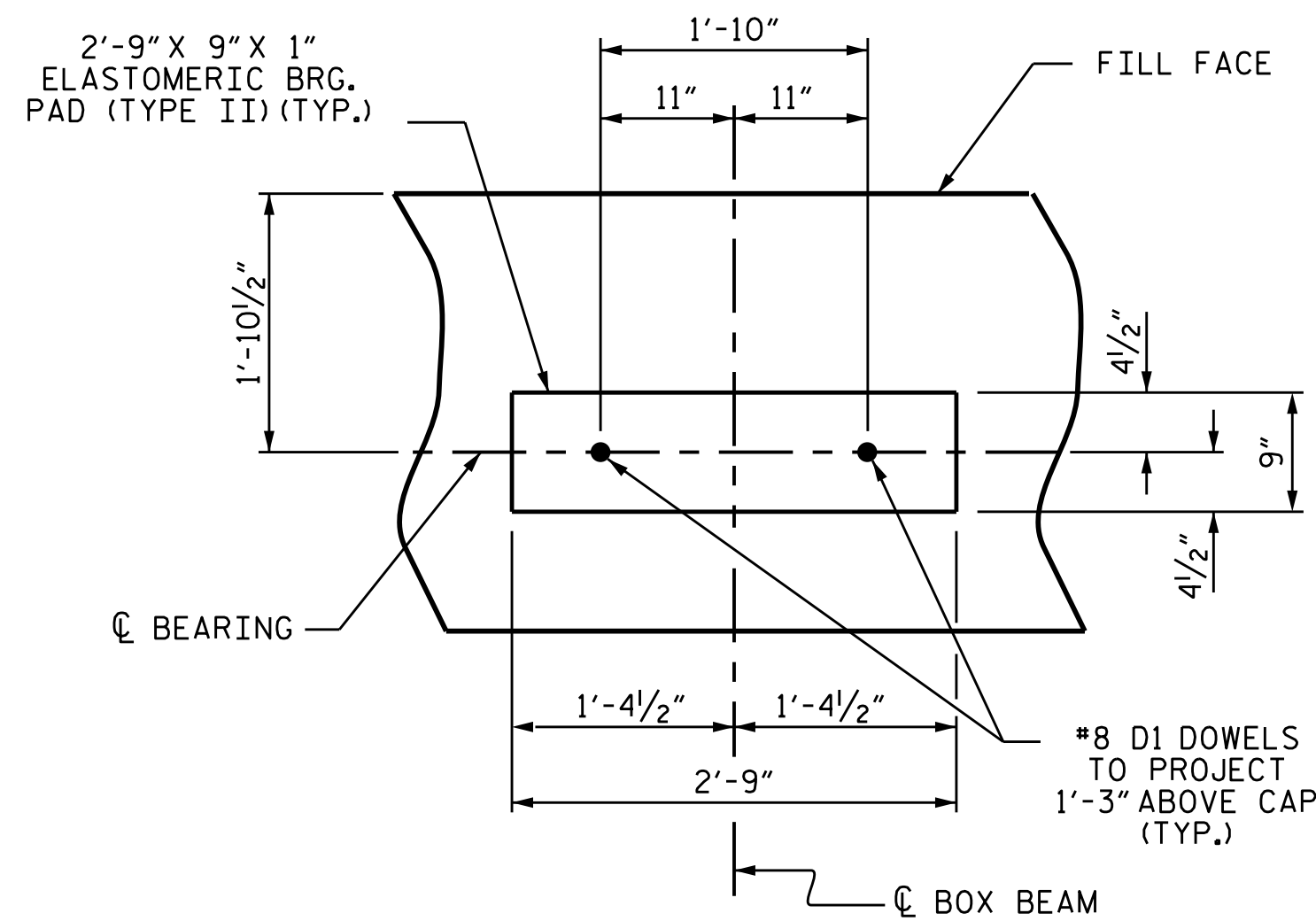


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

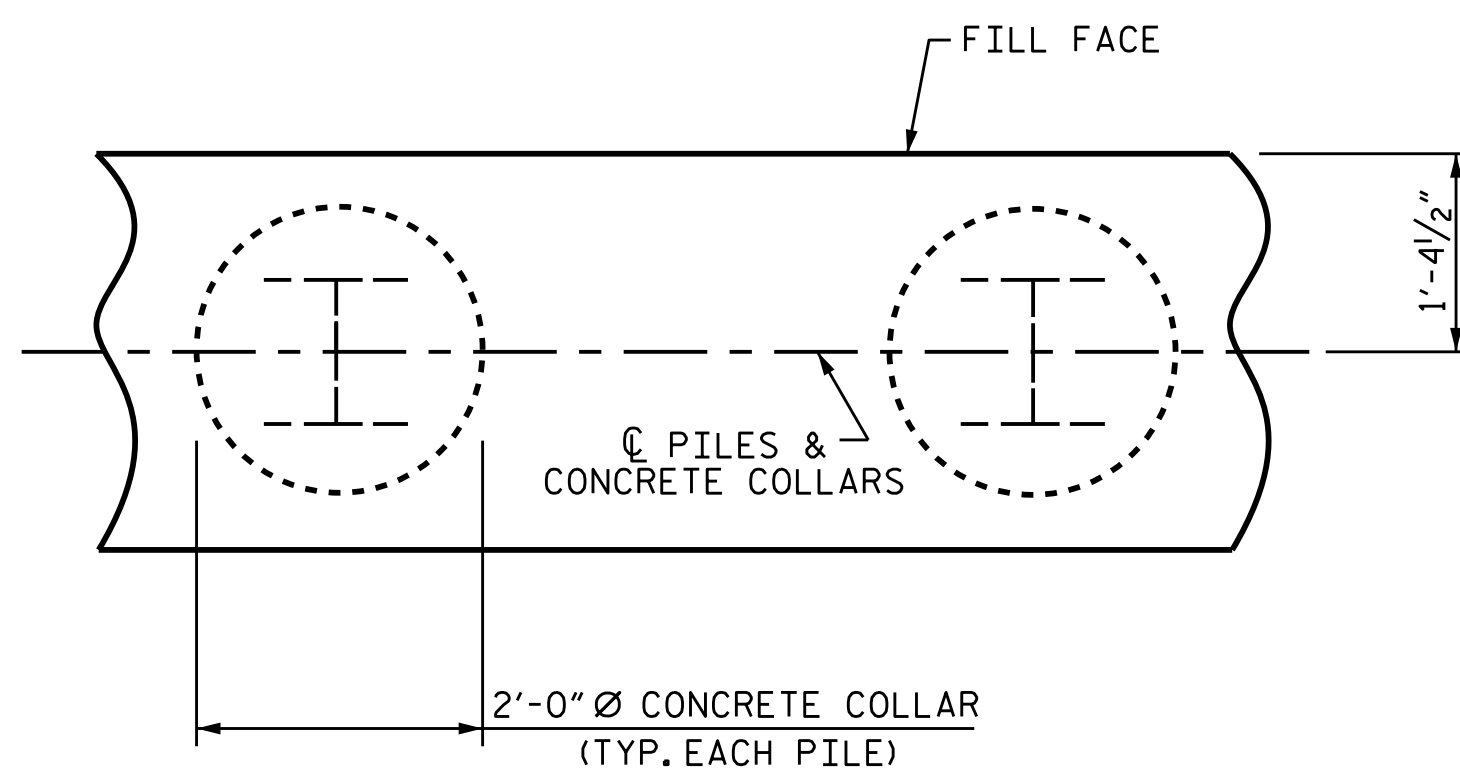
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

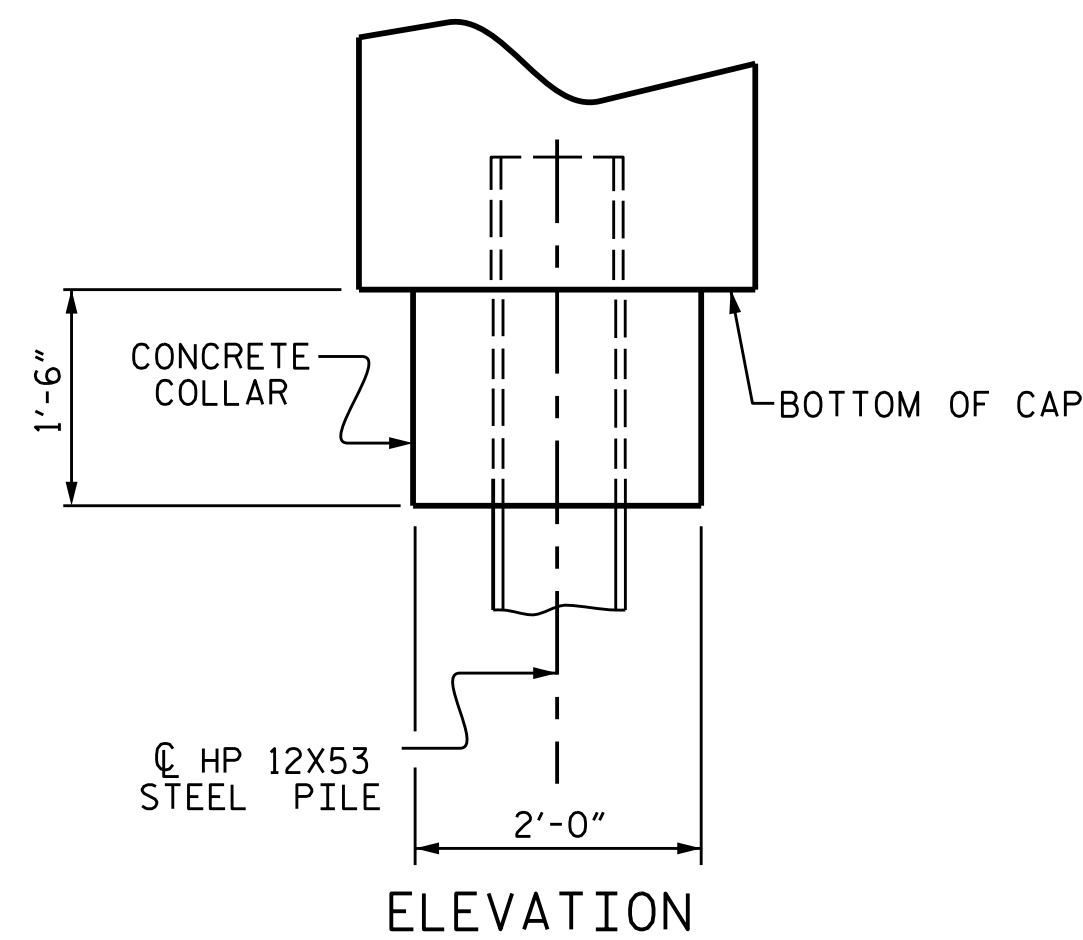


DETAIL "A"

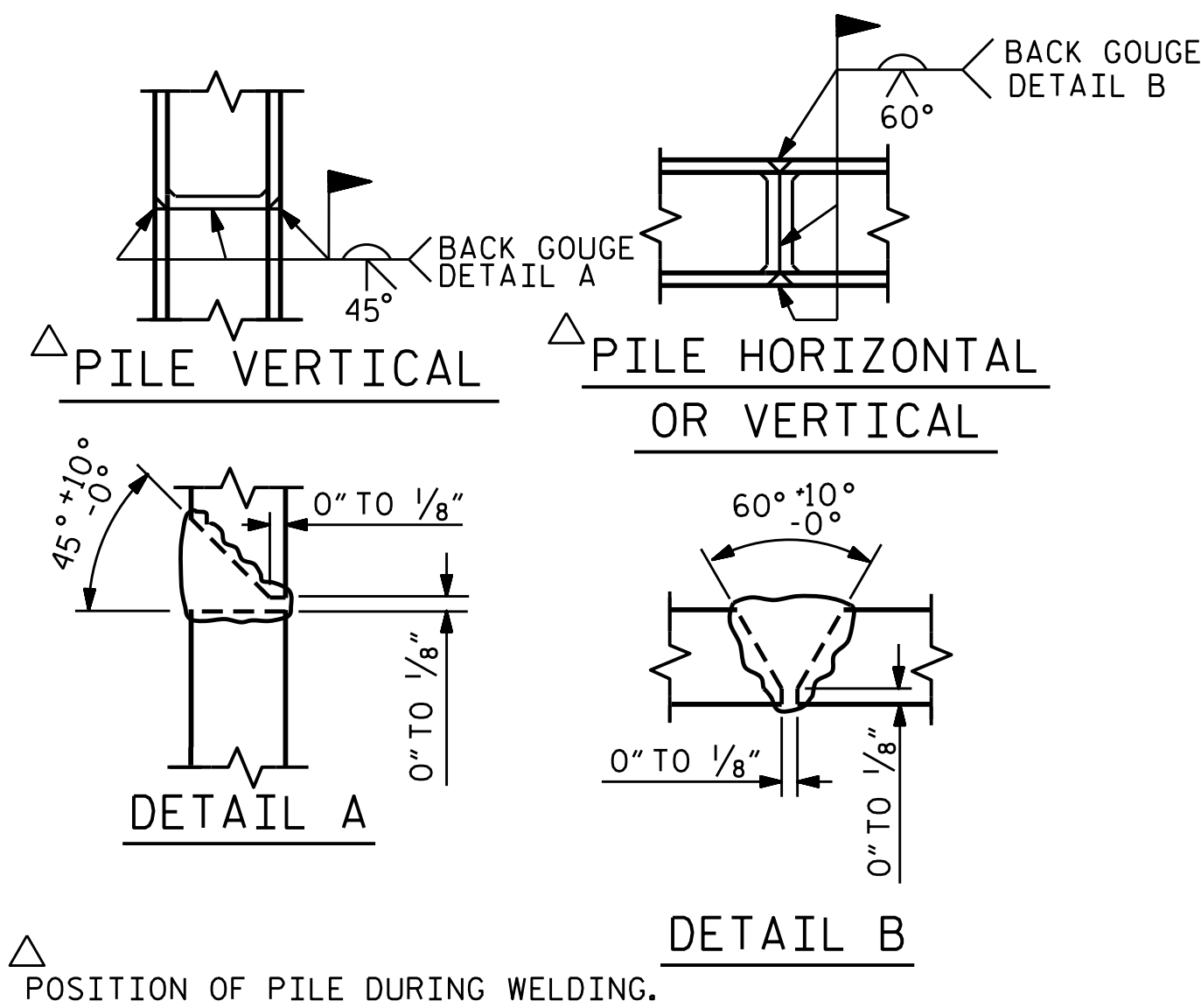


PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

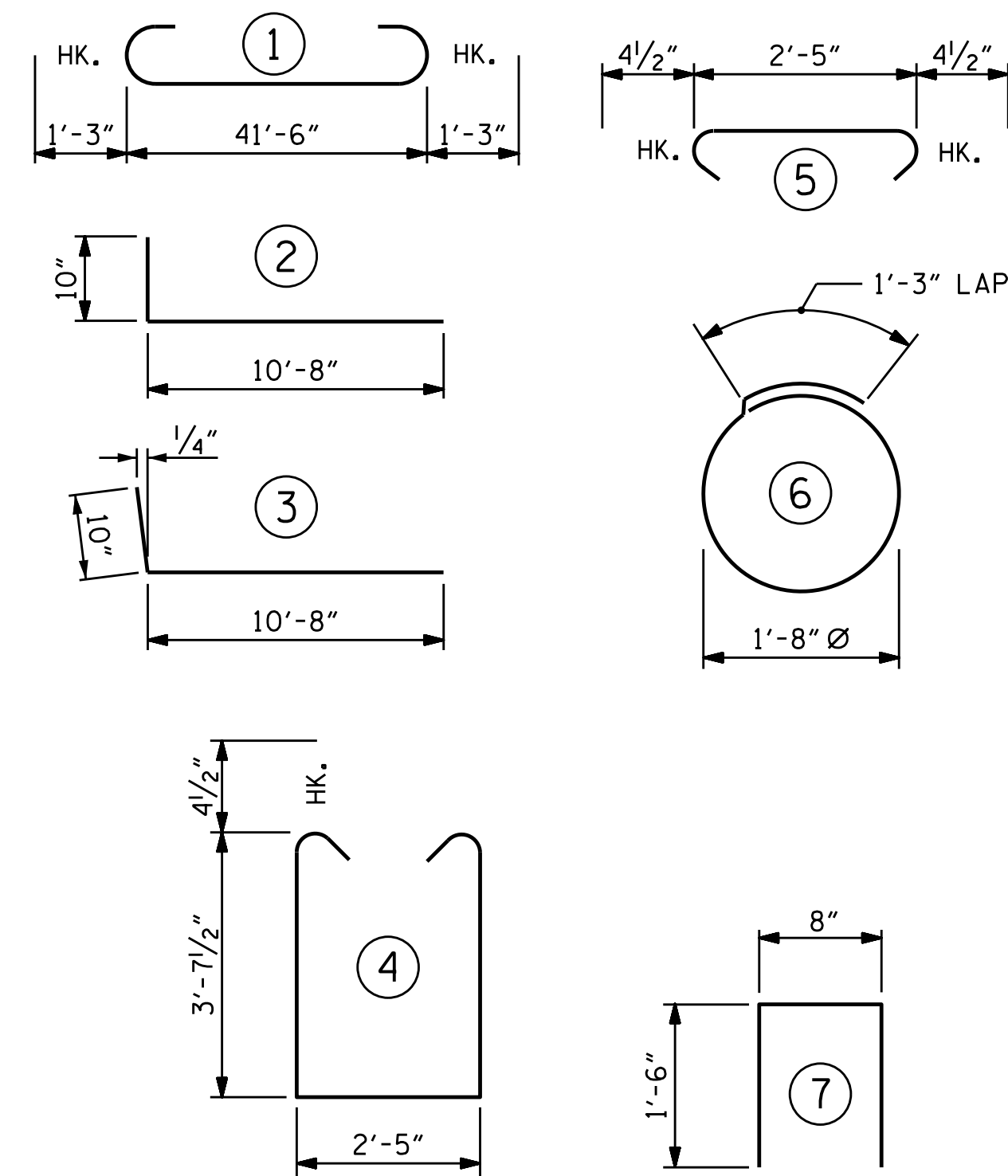


ELEVATION



PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

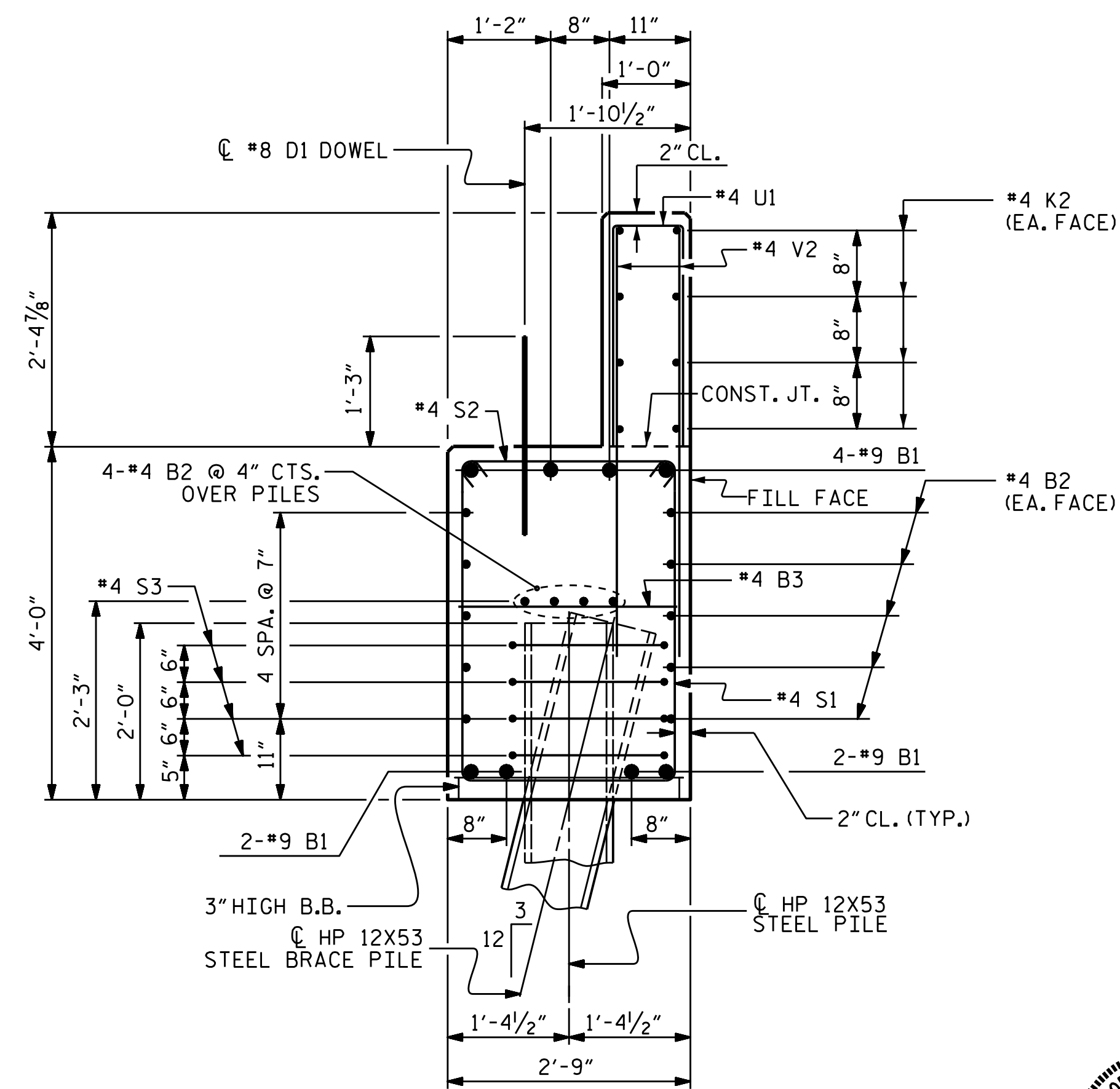
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#8	#9	1	44'-0"	1197
B2	#4	STR	22'-1"	413	
B3	#4	STR	2'-5"	18	
D1	#8	STR	2'-3"	144	
H1	#5	2	11'-6"	288	
H2	#5	3	11'-6"	288	
K1	#4	STR	3'-1"	16	
K2	#4	STR	22'-1"	236	
S1	#4	4	10'-5"	390	
S2	#4	5	3'-2"	118	
S3	#4	6	6'-6"	122	
U1	#4	7	3'-8"	88	
V1	#4	STR	7'-8"	307	
V2	#4	STR	6'-0"	289	

REINFORCING STEEL LBS. 3,914

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER PART OF WINGS & COLLARS	C.Y.	21.3
POUR #2	BACKWALL & UPPER PART OF WINGS	C.Y.	7.1
TOTAL CLASS A CONCRETE		C.Y.	28.4

HP 12X53 STEEL PILES
NO: 7
LIN. FT. 175



SECTION A-A

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



PROJECT NO. B-4972
CABARRUS COUNTY
STATION: 22+55.00 -L-

SHEET 3 OF 3

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

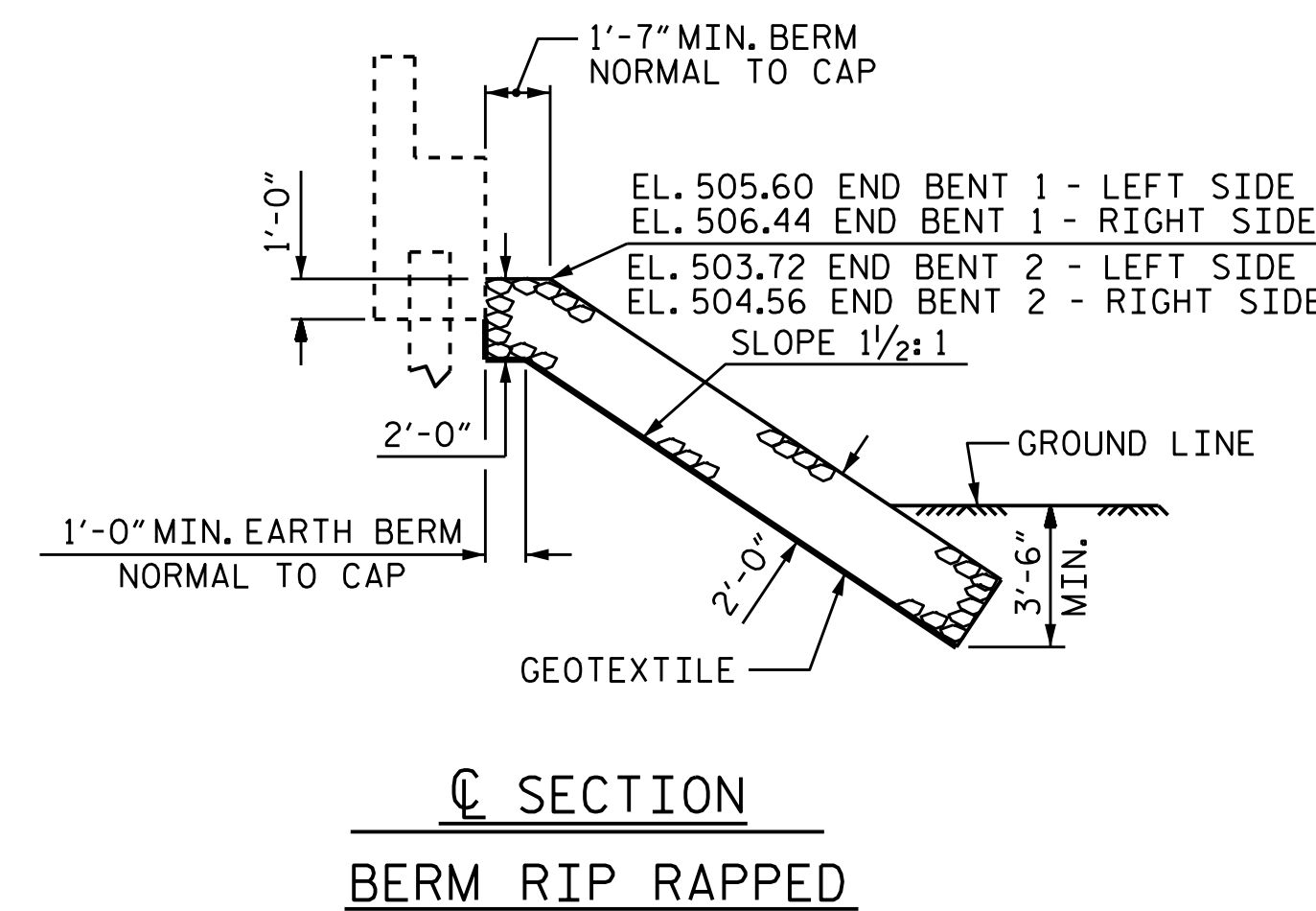
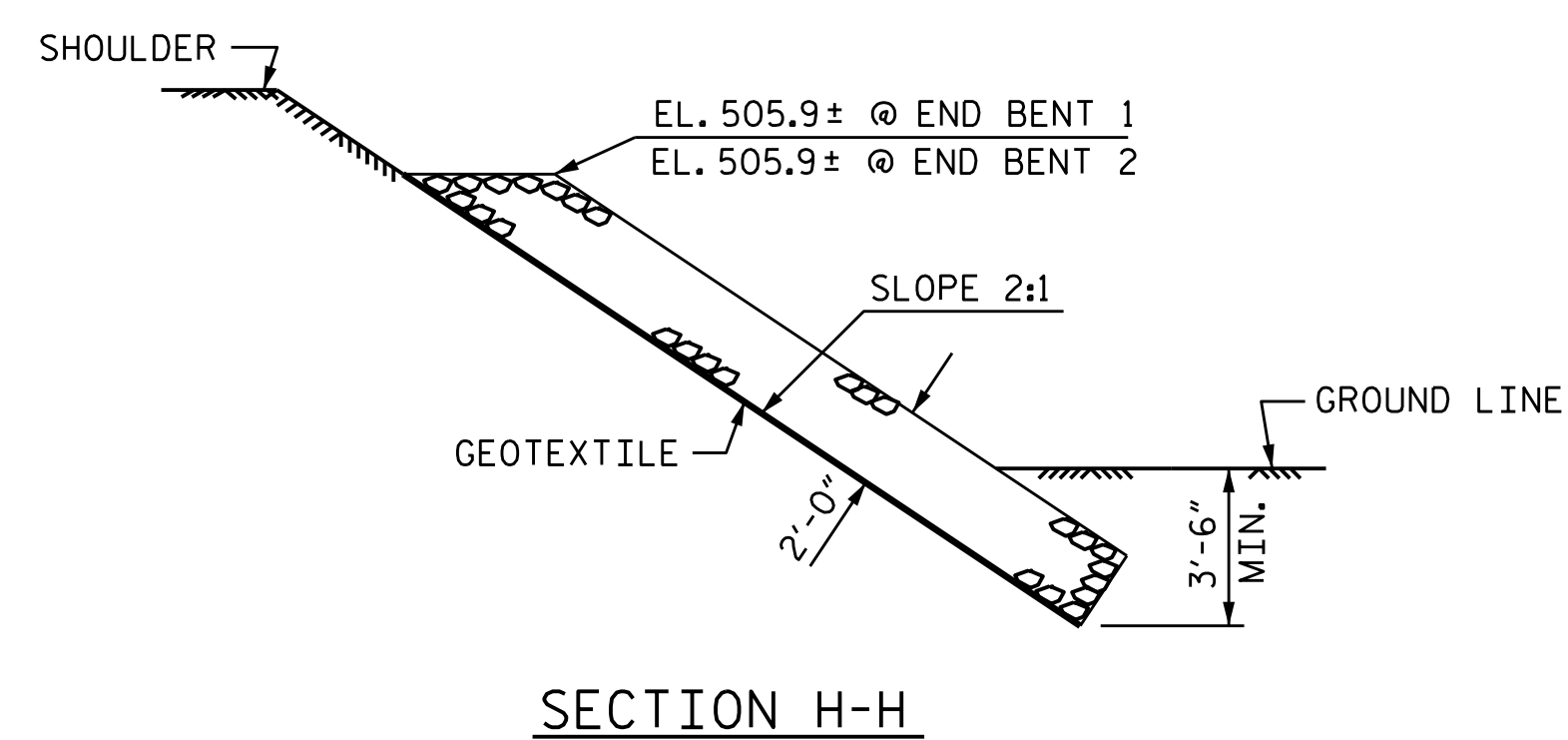
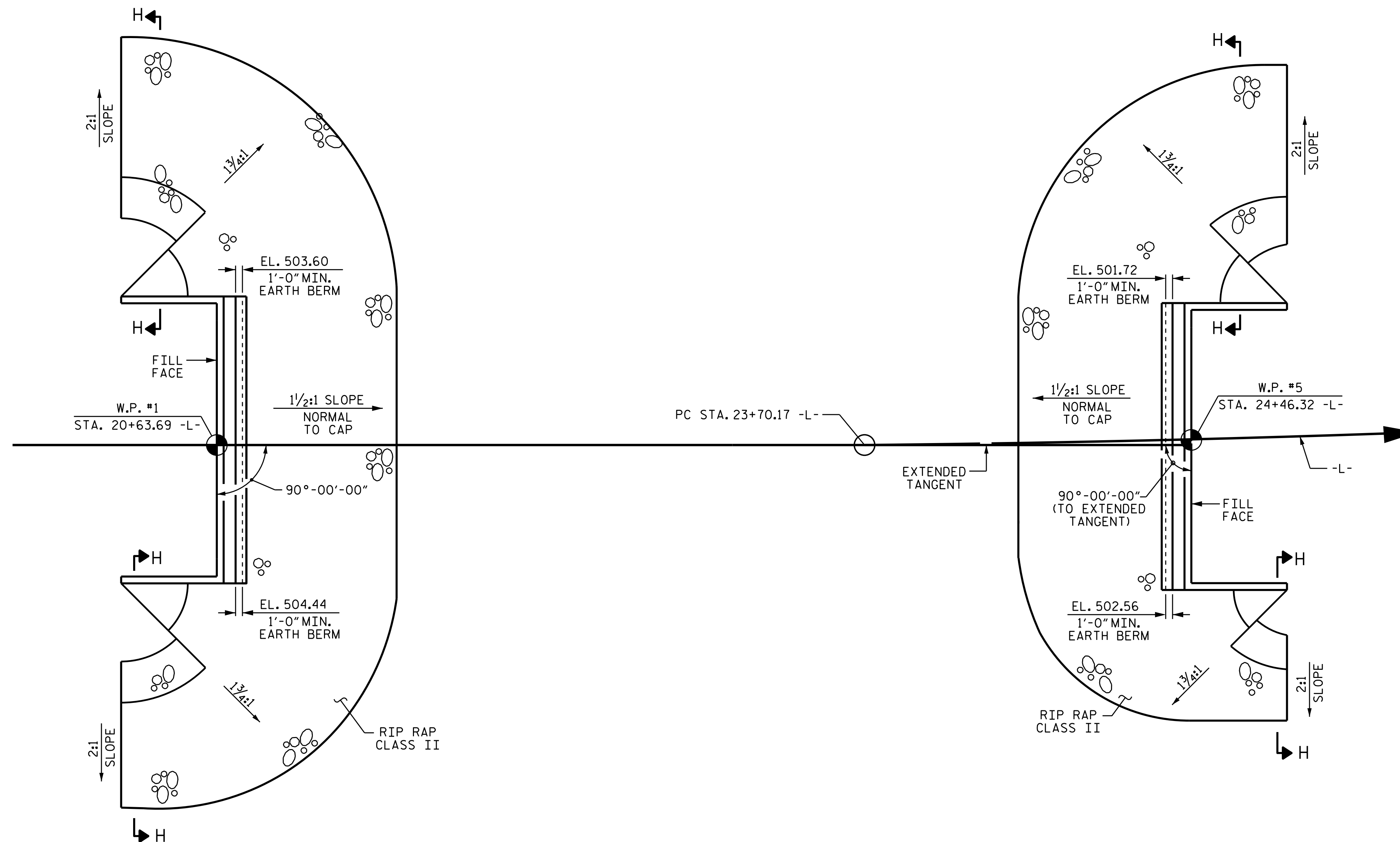
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS 31

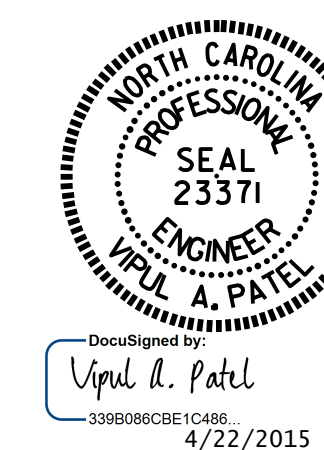
ASSEMBLED BY: N.D. AIUTO DATE: 10/6/14
CHECKED BY: M.E. GILES DATE: 12/17/14
DESIGN ENGINEER OF RECORD: J.P. MCCARTHA DATE: 12/17/14

ESTIMATED QUANTITIES

BRIDGE @ STA. 22+55.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	455	505
END BENT 2	400	445
TOTAL	855	950



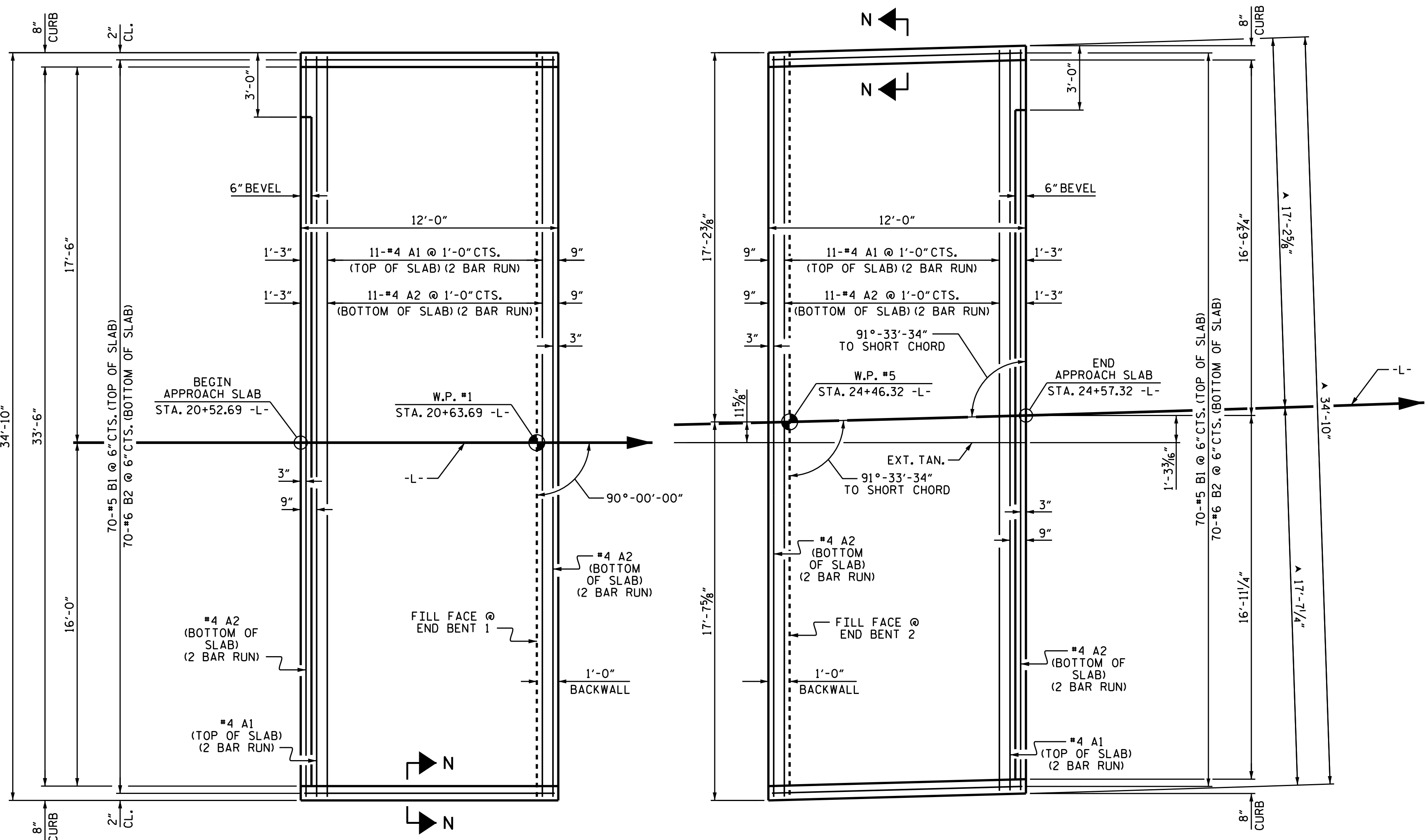
PROJECT NO. B-4972
CABARRUS COUNTY
 STATION: 22+55.00 -L-



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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			31

ASSEMBLED BY : N.D. AIUTO DATE : 7/10/14
 CHECKED BY : M.E. GILES DATE : 1/7/15
 DRAWN BY : FCJ 2/88 REV. 8/16/99 RWW/LES
 CHECKED BY : ARB 8/88 REV. 10/17/00 RWW/LES
 REV. 5/1/06R TLA/GM



PLAN @ END BENT 1
PLAN @ END BENT 2

▲ RADIAL DIMENSIONS

NOTES

APPROACH SLABS SHALL BE POURED AFTER CONCRETE WEARING SURFACE IS POURED.

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 JOINT SHALL BE SAWED AFTER THE CASTING OF THE BARRIER RAIL.

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

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

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

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

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

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

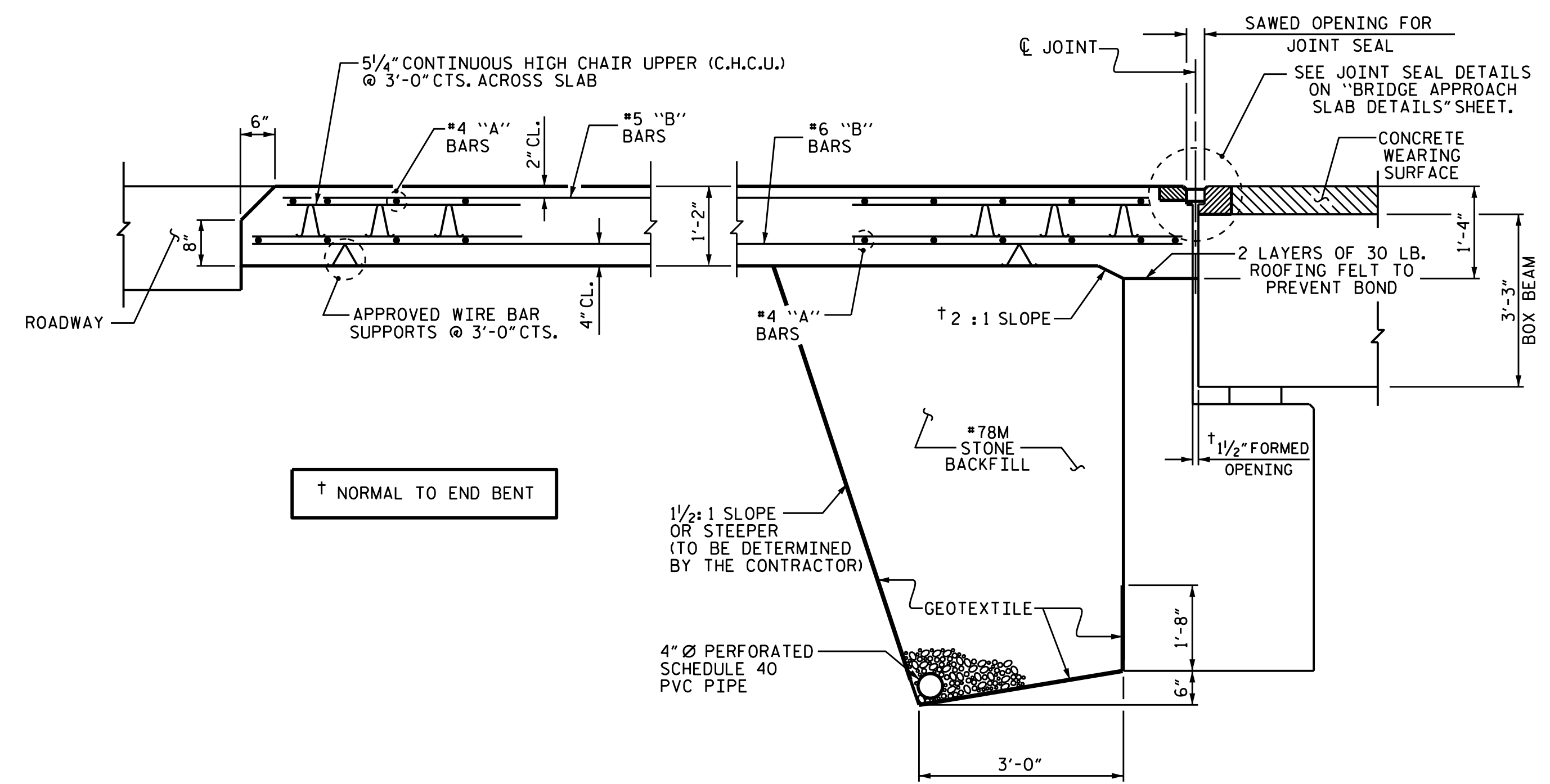
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2" @ END BENT 1 AND @ END BENT 2 AND 2 1/2" @ BENT 2.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

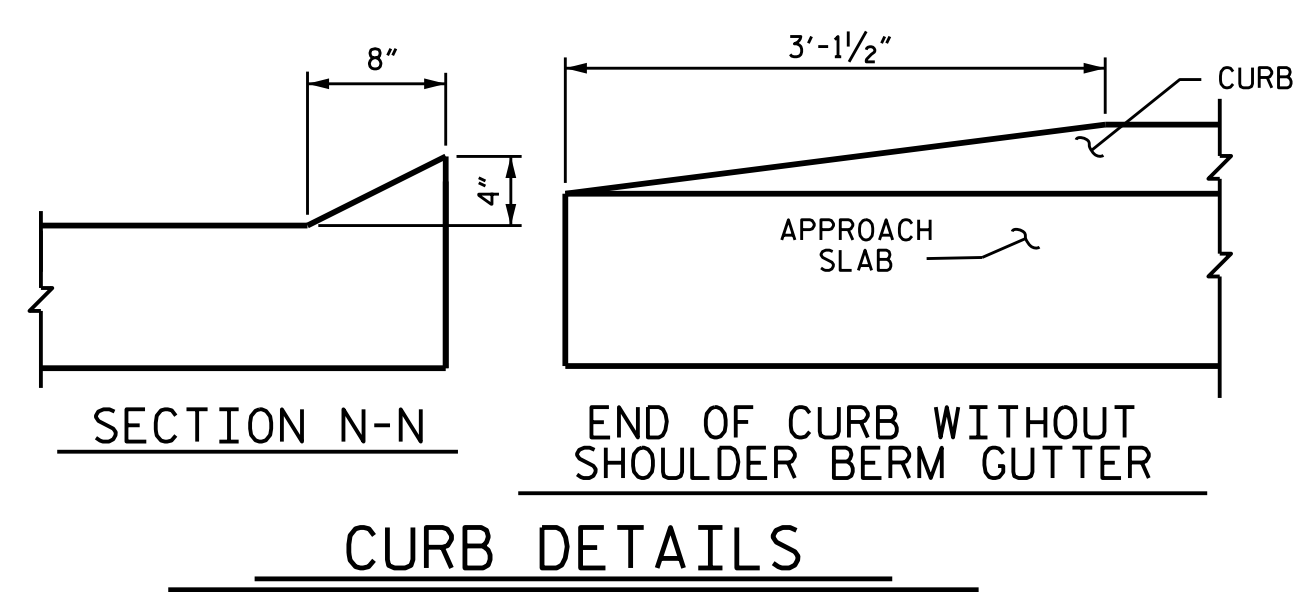
ARC OFFSETS ARE NEGLIGIBLE AND NOT SHOWN AT END BENT 2.

BILL OF MATERIAL					
APPROACH SLAB AT EB 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	24	#4	STR	18'-3"	293
A2	26	#4	STR	18'-2"	316
* B1	70	#5	STR	10'-10"	791
B2	70	#6	STR	11'-8"	1227
REINFORCING STEEL				LBS.	1543
* EPOXY COATED REINFORCING STEEL				LBS.	1084
CLASS AA CONCRETE				C. Y.	18.2
APPROACH SLAB AT EB 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	24	#4	STR	18'-3"	293
A2	26	#4	STR	18'-2"	316
* B1	70	#5	STR	10'-10"	791
B2	70	#6	STR	11'-8"	1227
REINFORCING STEEL				LBS.	1543
* EPOXY COATED REINFORCING STEEL				LBS.	1084
CLASS AA CONCRETE				C. Y.	18.2

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"



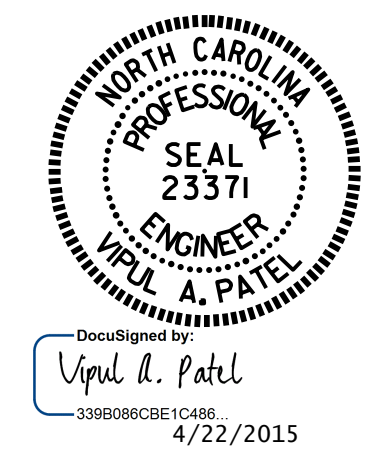
† NORMAL TO END BENT



SECTION THROUGH SLAB

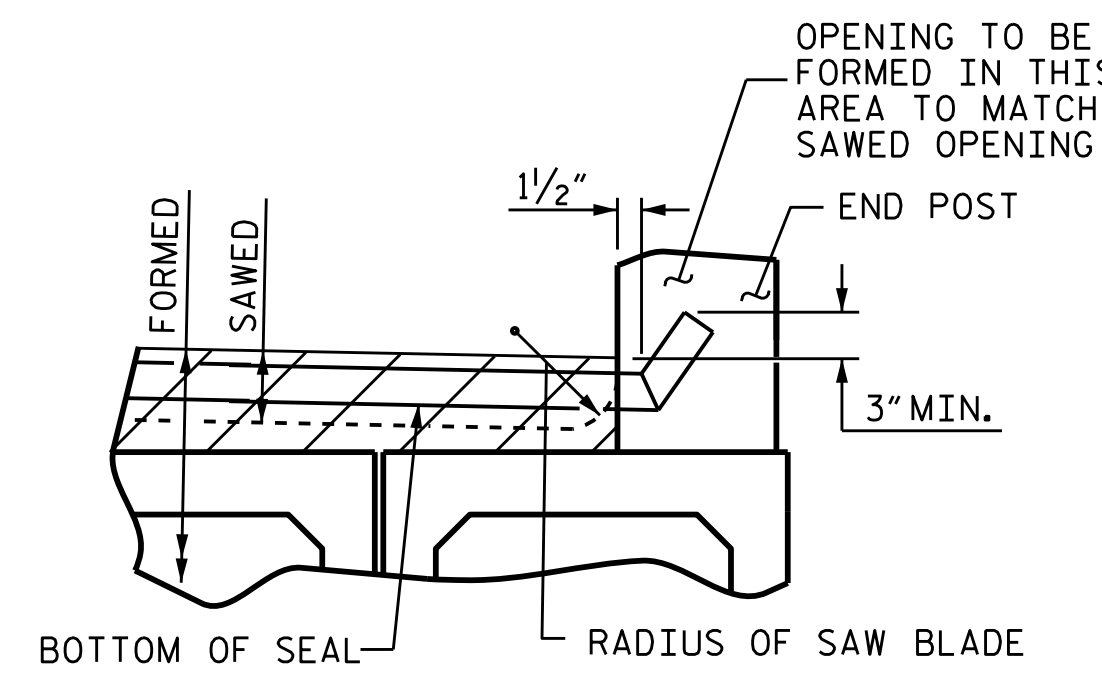
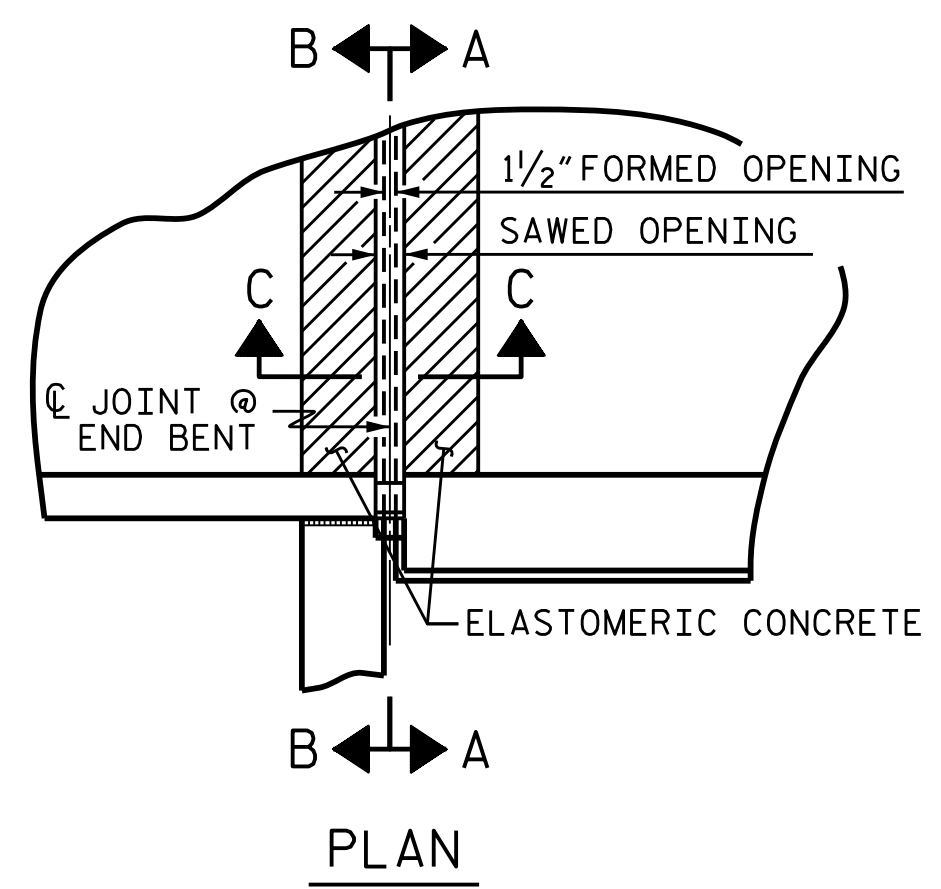
ROCK PLATED REINFORCED SOIL SLOPE IS REQUIRED BELOW CAP AT END BENT 1. SEE PROJECT SPECIAL PROVISIONS AND REINFORCED SOIL SLOPE DRAWINGS IN ROADWAY PLANS.

ASSEMBLED BY : N.D. AIUTO	DATE : 7-3-14
CHECKED BY : P.S. ADKINS	DATE : 7-10-14
DRAWN BY : KMM 3-08	REV. 10/1/11 MAA/GM
CHECKED BY : GM 3-08	REV. 12/21/11 MAA/GM
	REV. 6/13 MAA/GM

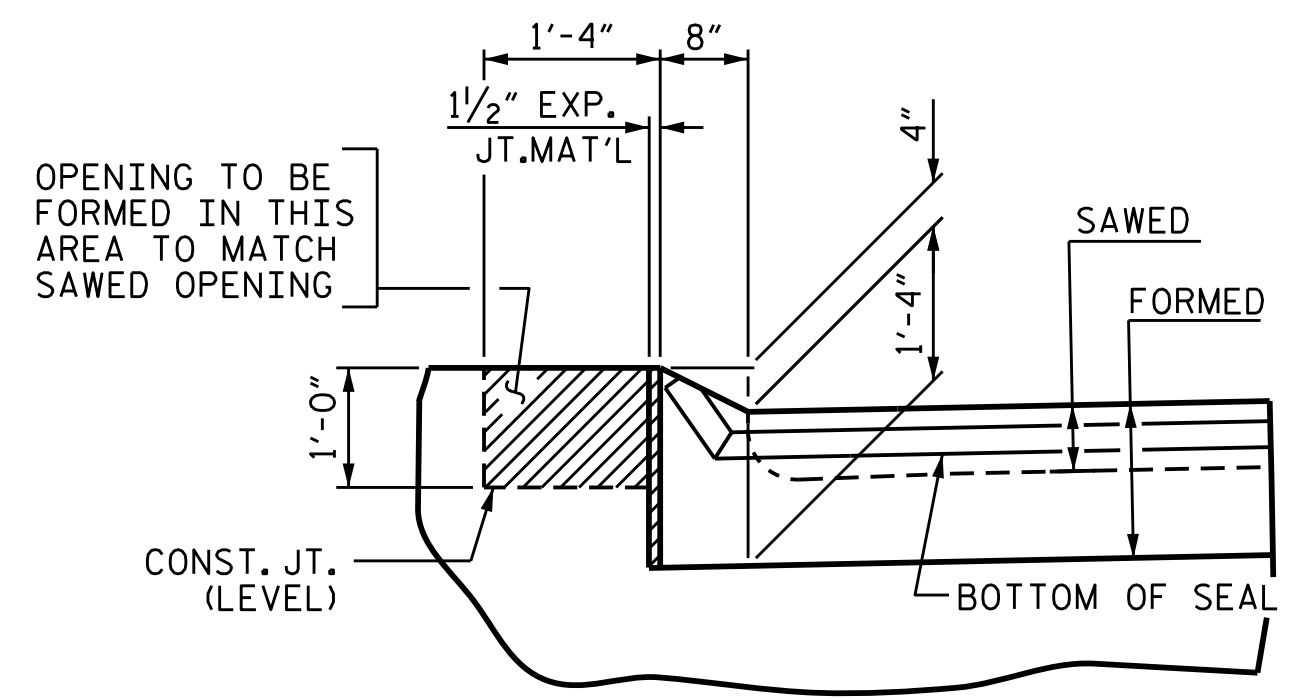


PROJECT NO. B-4972
CABARRUS COUNTY
STATION: 22+55.00 -L-

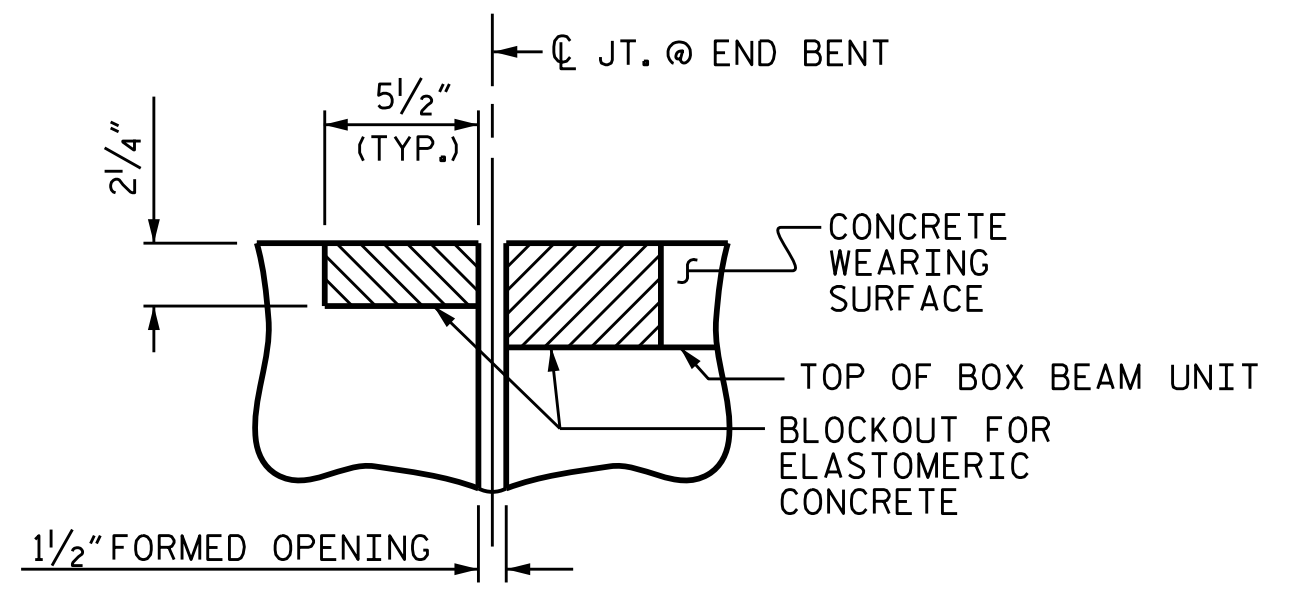
STATE OF NORTH CAROLINA				SHEET NO.	
DEPARTMENT OF TRANSPORTATION				S-30	
RALEIGH				TOTAL SHEETS	
STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT (SUB-REGIONAL TIER)				31	
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		



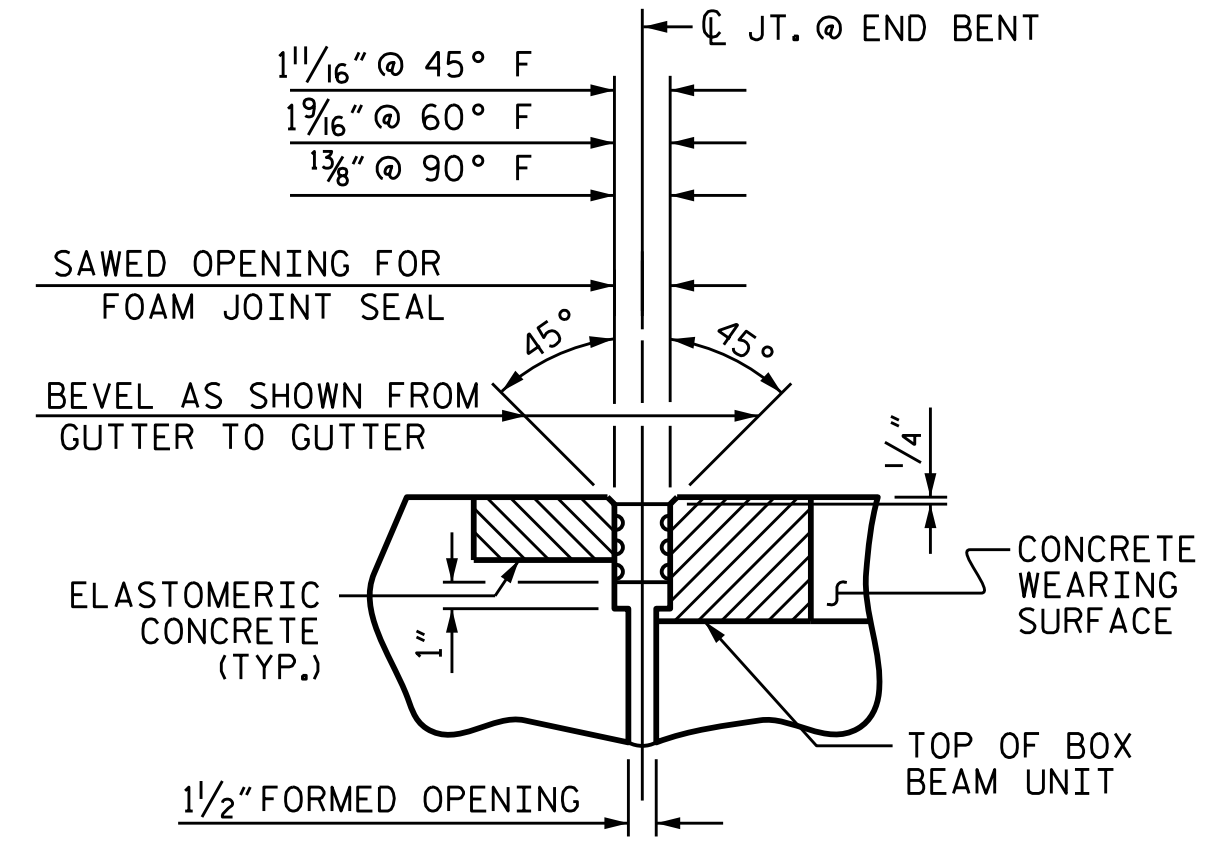
SECTION A-A



SECTION B-B



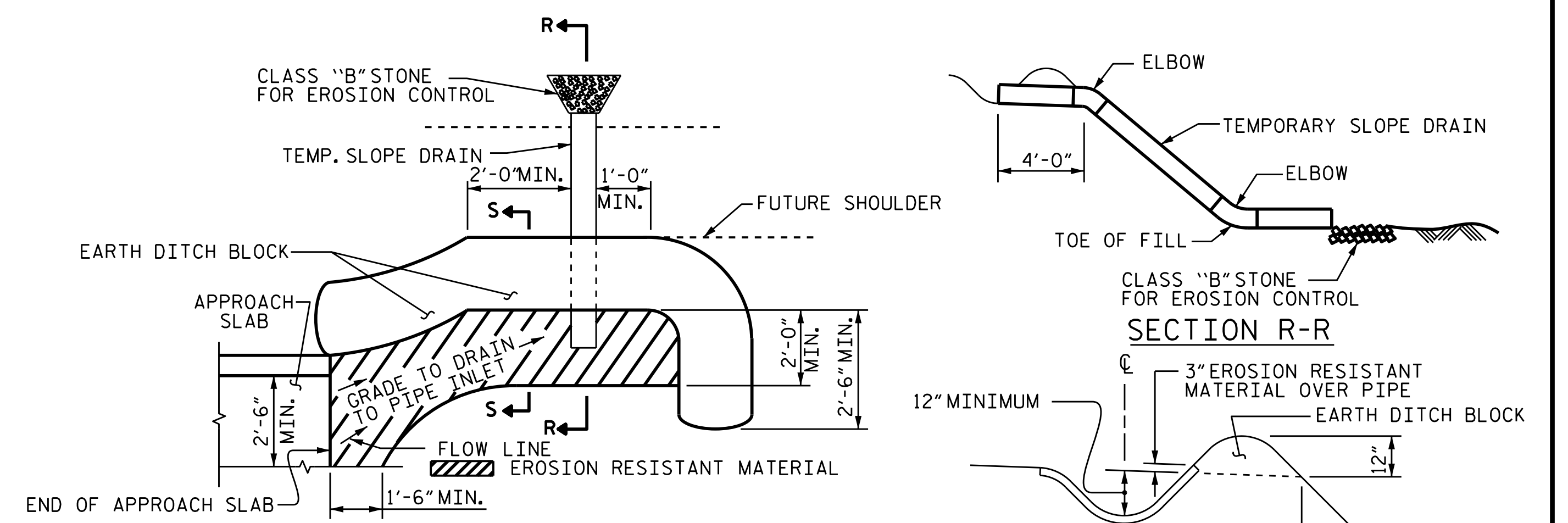
SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)

JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP AS SHOWN.
THE JOINT SHALL BE SAWED PRIOR TO CASTING OF PARAPETS
AND END POSTS.

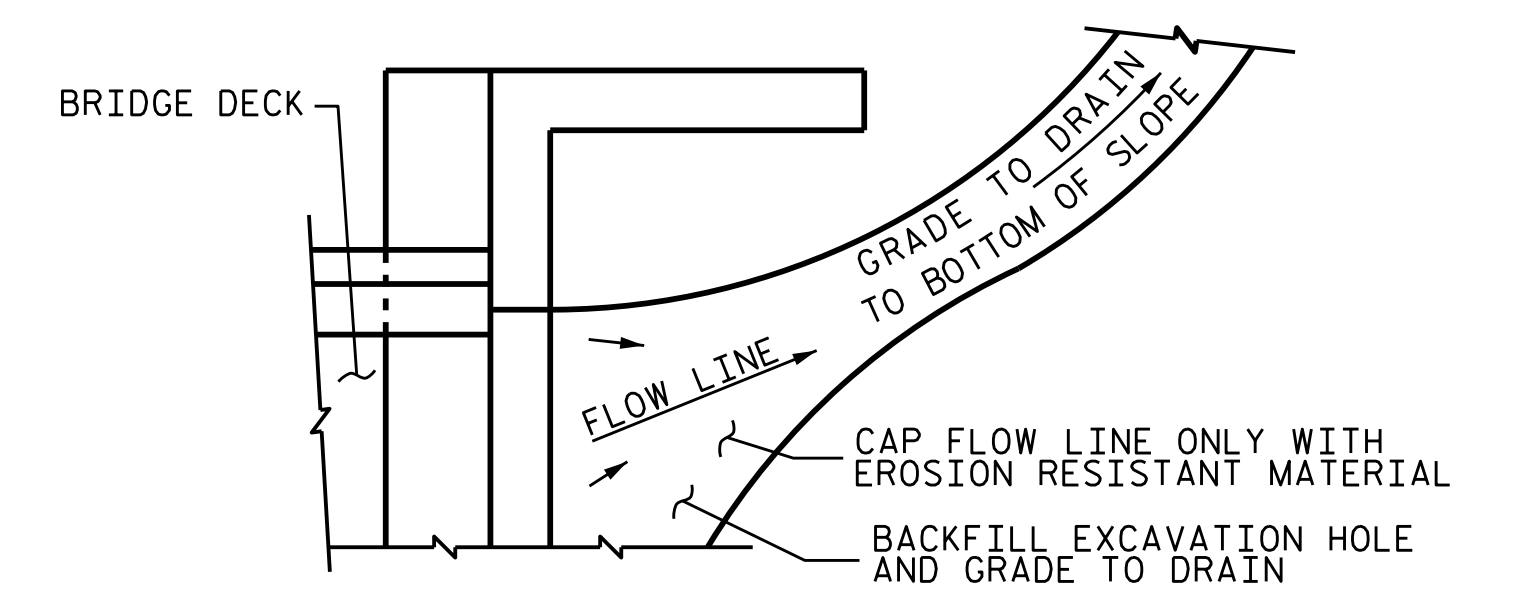


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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

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

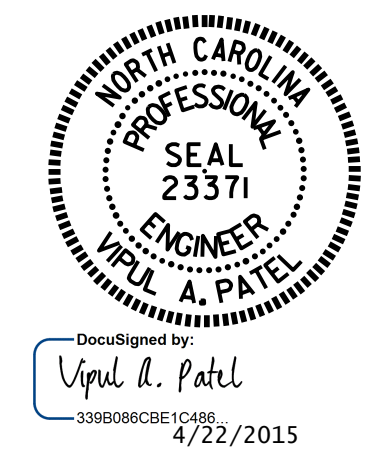
ELASTOMERIC CONCRETE	
	ELASTOMERIC CONCRETE (CU. FT.) ▲
END BENT 1	9.3
END BENT 2	9.3
TOTAL	18.6

▲ BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. B-4972
CABARRUS COUNTY
STATION: 22+55.00 -L-

SHEET 2 OF 2

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



REVISIONS						SHEET NO. S-31
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 31
2			4			

ASSEMBLED BY :	N.D. AIUTO	DATE :	7-7-14
CHECKED BY :	P.S. ADKINS	DATE :	7-10-14
DRAWN BY :	FCJ 11/88	REV. 10/11/11	MAA/GM
CHECKED BY :	ARB 11/88	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN, WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER, WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER. DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS. WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0". EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED. WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

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

ENGLISH

JANUARY, 1990

STD. NO. SN