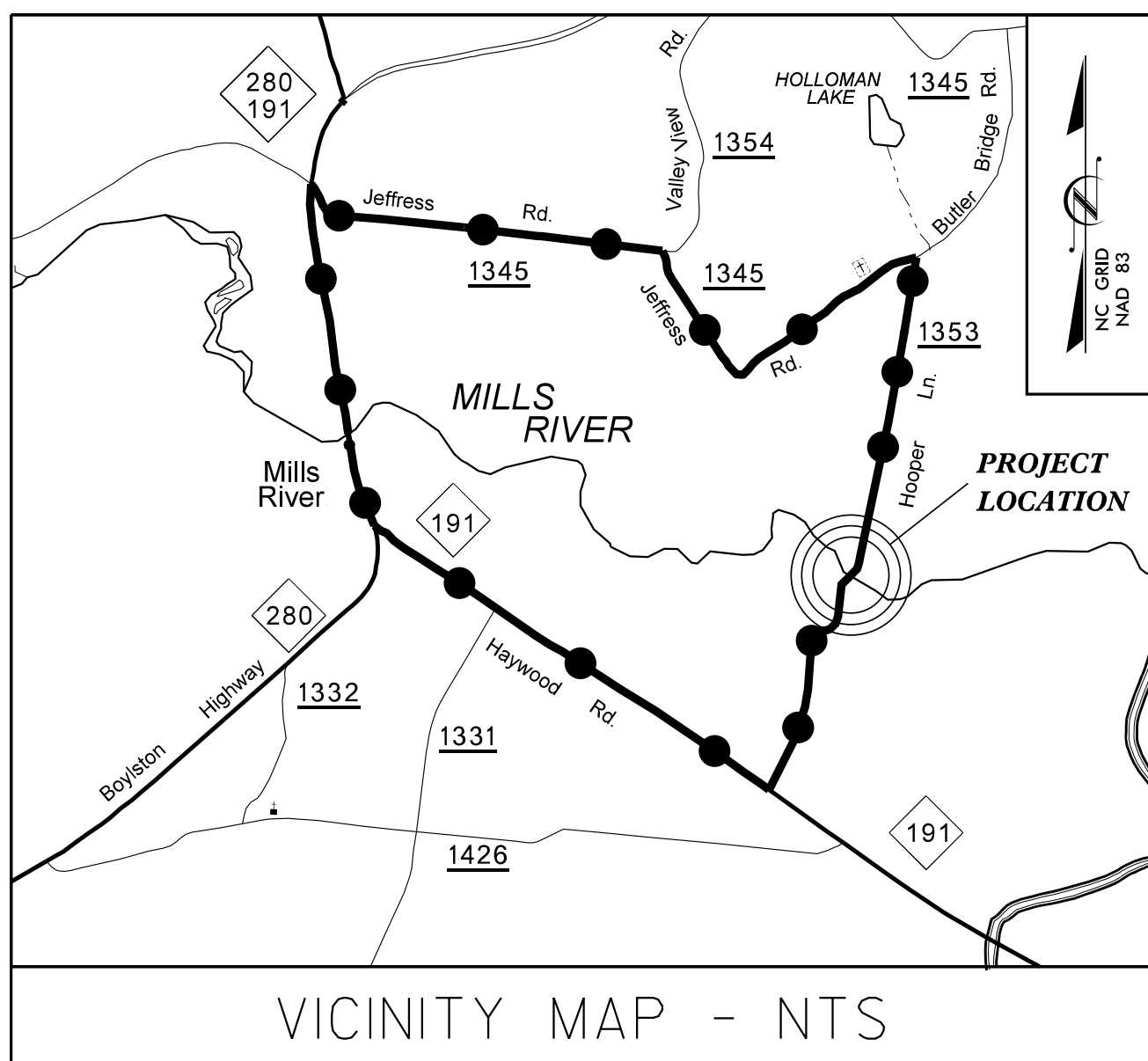


CONTRACT: DN00126 PROJECT: 14SP.20451.2



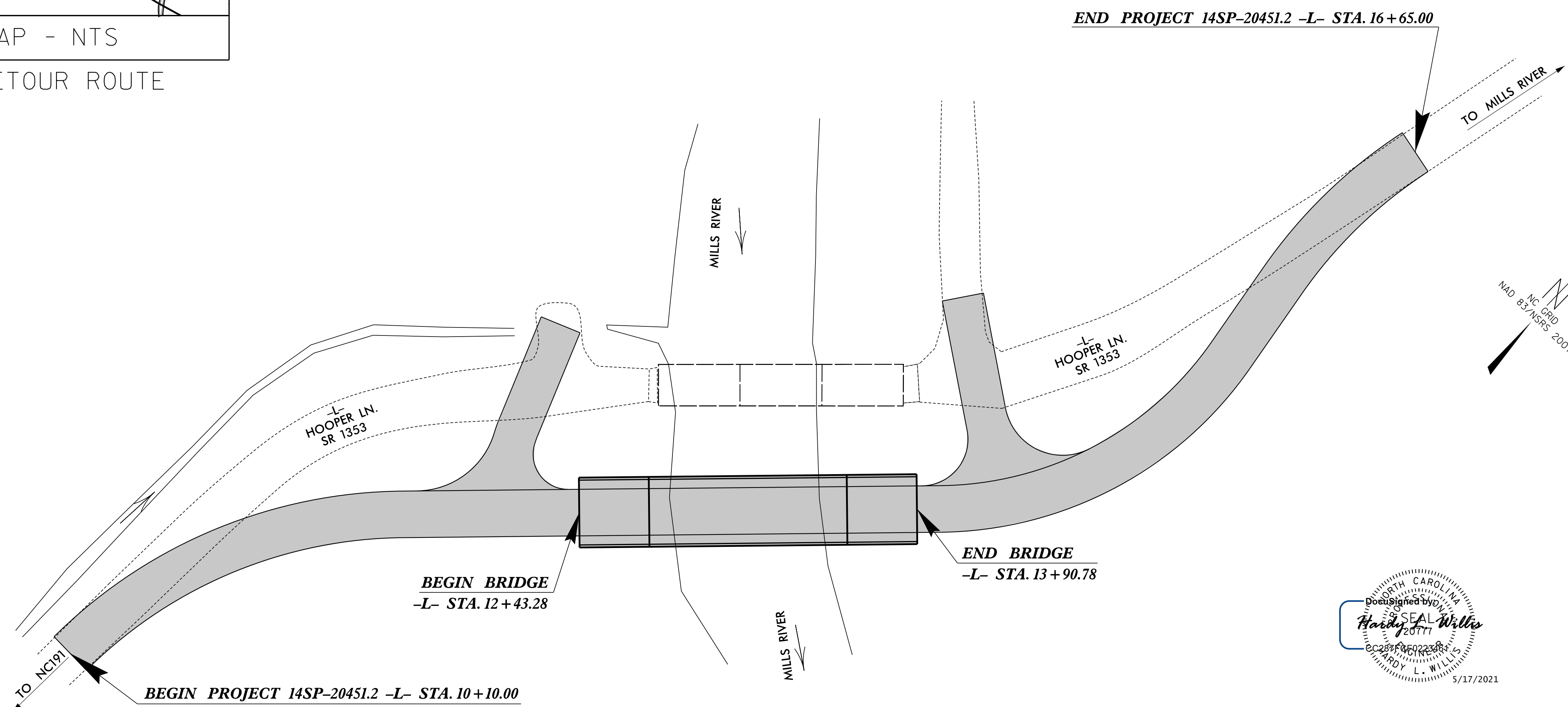
●-●-●-● DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

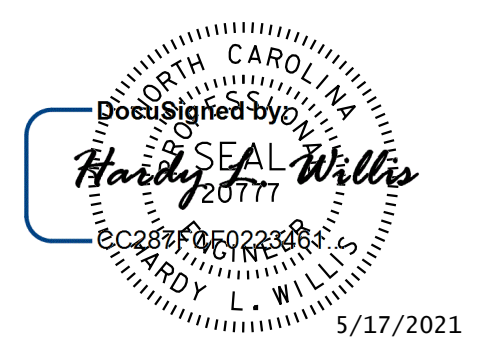
HENDERSON COUNTY

**BRIDGE NO. 147 OVER MILLS RIVER
ON SR 1353 (HOOPER LANE)**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	14SP.20451.2		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
14SP.20451.2		P.E.	
14SP.20451.2		RW & UTIL.	
14SP.20451.2		CONST.	



STRUCTURE



V&M
Vaughn & Melton
Consulting Engineers

Asheville, NC
828-253-2796

Charlotte, NC
704-397-0488

Tri-Cities, Tennessee
423-467-8400

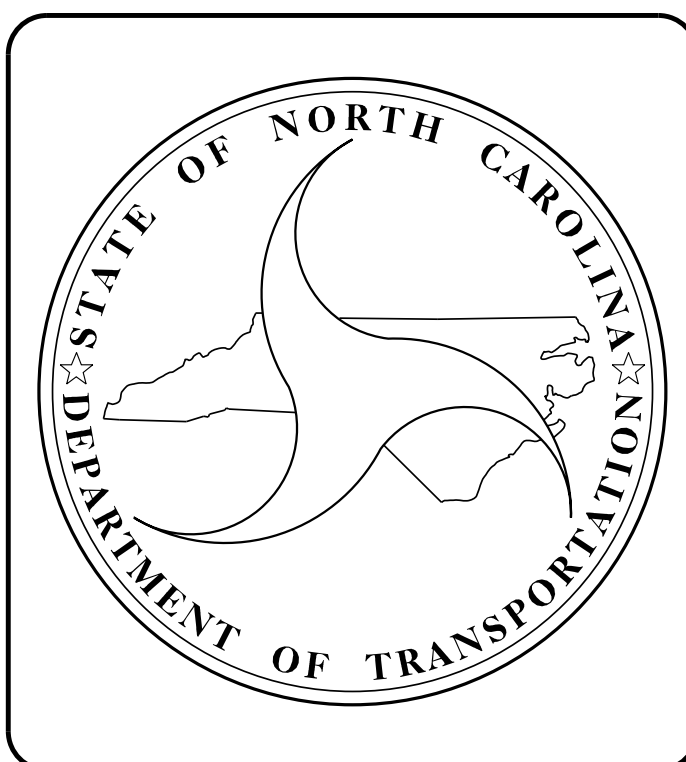
Knoxville, Tennessee
865-546-5800

Middlesboro, Kentucky
606-248-4600

Spangenberg, South Carolina
864-574-4775

Copyright © 2006 Vaughn & Melton, Inc. All rights reserved.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2012	=	280
ADT 2025	=	560
*T	=	6%
V	=	20 MPH
* TTST	=	3 DAUL = 3
FUNCT. CLASS	=	LOCAL SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT 14SP.20451.2	=	0.096 MI
LENGTH STRUCTURE TIP PROJECT 14SP.20451.2	=	0.028 MI
TOTAL LENGTH OF TIP PROJECT 14SP.20451.2	=	0.124 MI

Prepared in the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE, NC, 28806

FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2018 STANDARD SPECIFICATIONS

LETTING DATE :
JULY 13, 2021

HARDY WILLIS, PE
PROJECT ENGINEER

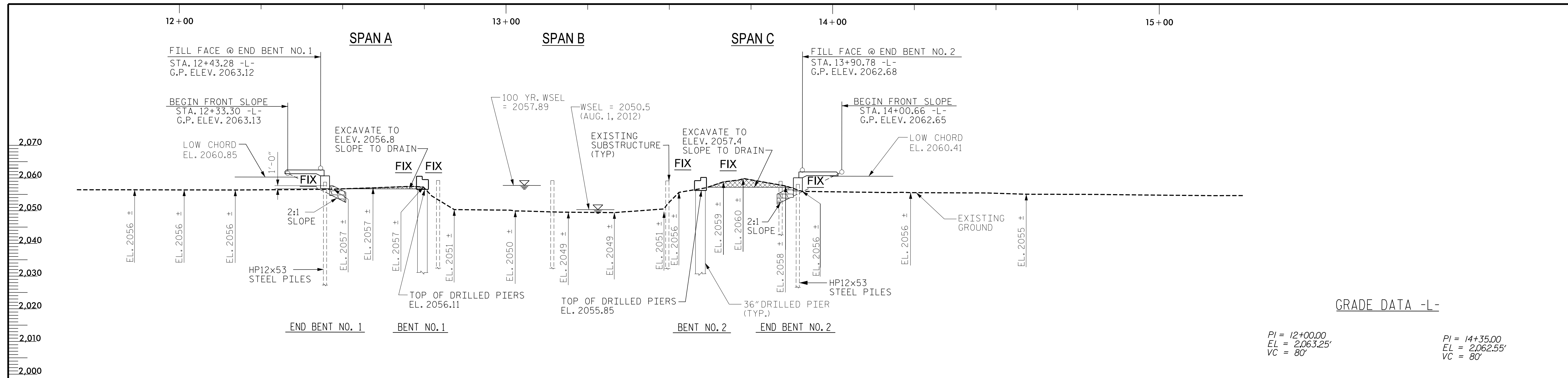
VAN TRAN, PE
PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

STATE DESIGN ENGINEER _____ P.E.
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED _____ DATE _____
DIVISION ADMINISTRATOR



GRADE DATA -L-

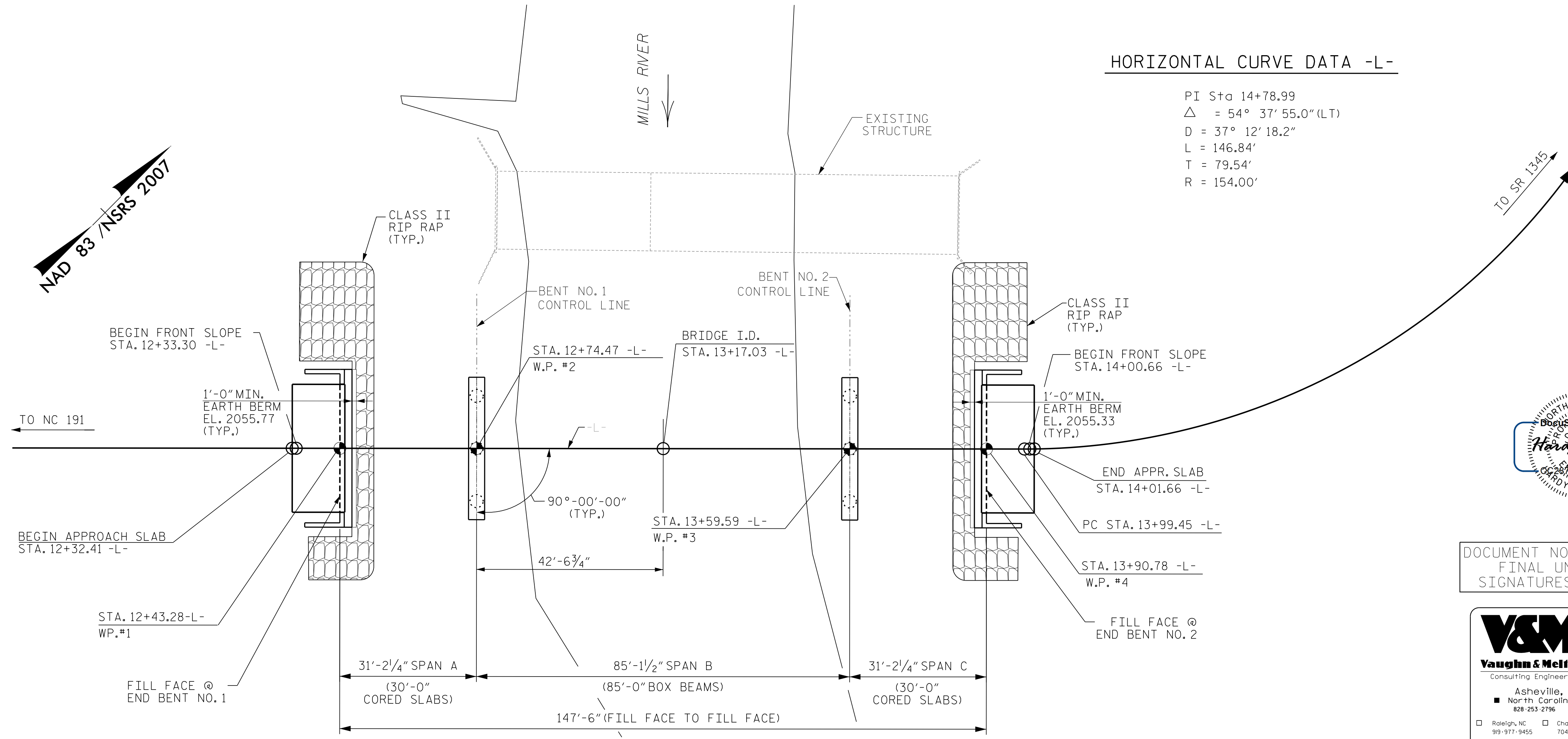
PI = 12+00.00
 EL = 2,063.25'
 VC = 80'
 PI = 14+35.00
 EL = 2,062.55'
 VC = 80'

UNCLASSIFIED STRUCTURE EXCAVATION

+5.3306% Δ -0.3000%
 -0.3000% Δ -4.2536%

HORIZONTAL CURVE DATA -L-

PI Sta 14+78.99
 Δ = 54° 37' 55.0" (LT)
 D = 37° 12' 18.2"
 L = 146.84'
 T = 79.54'
 R = 154.00'



I HEREBY CERTIFY THAT THESE PLANS ARE THE AS-BUILT PLANS.

Professional Engineer Seal for **SEAN WILLIS**, State of North Carolina, License No. 22486, dated 4/20/2021.

PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-
 SHEET 1 OF 2 REPLACES BRIDGE 147

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
 Consulting Engineers
 Asheville, North Carolina
 828-253-2796

Boone, NC 828-355-9933
 Tri-Cities, TN 423-467-8401
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4775
 Charleston, SC 843-974-5650
 Middlesboro, KY 606-248-6600
 Raleigh, NC 919-977-9455
 Charlotte, NC 704-357-0488
 Atlanta, GA 770-627-3509
 Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

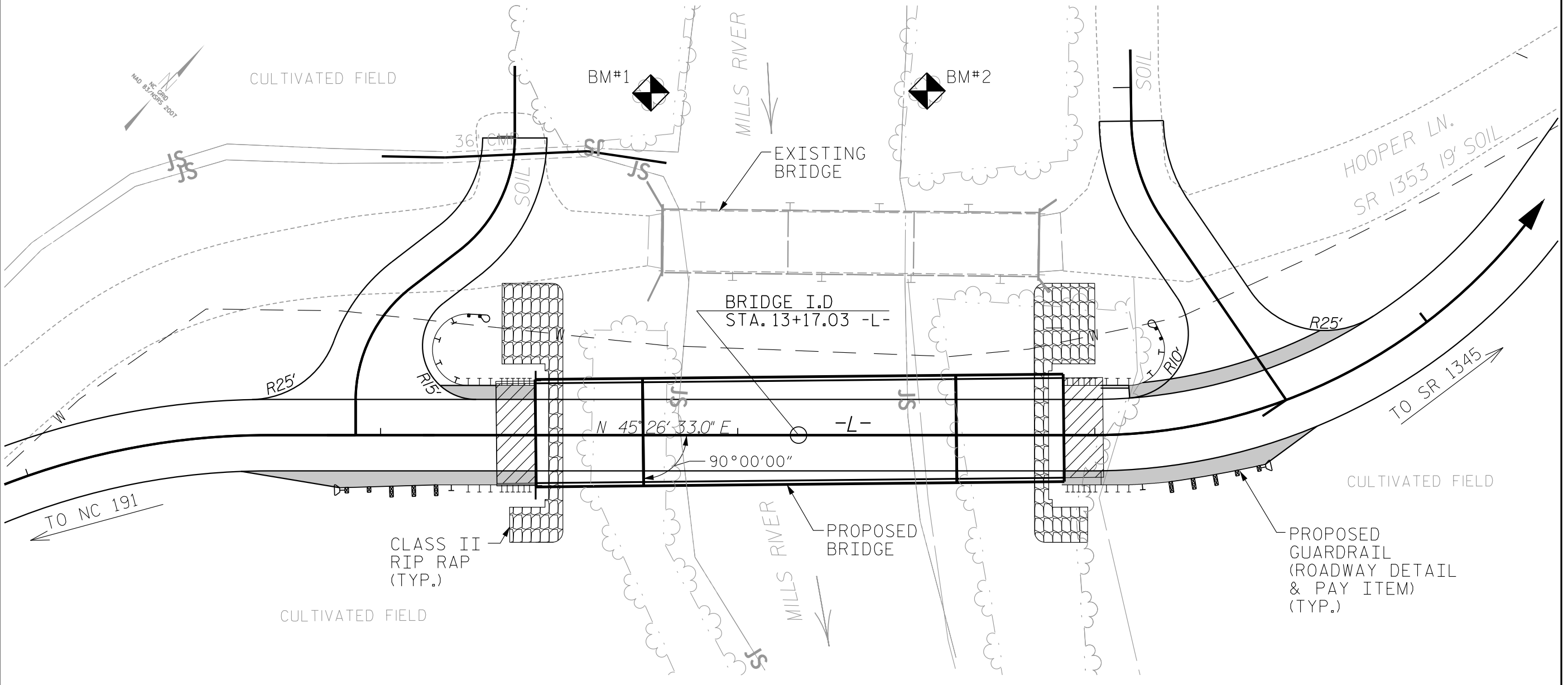
BRIDGE on SR 1353 over MILLS RIVER
 Between NC 191 & SR 1345

NOTES:
 END BENTS AND BENTS ARE PARALLEL.
 PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.
 CORED SLABS AND BOX BEAMS ARE PARALLEL TO C-C

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

DWN. BY: RWW DATE: 2/2016
 CHKD. BY: HLW DATE: 2/2016
 DES. EGR. OF RECORD: TVT DATE: 2/2016

BM#1 - RR SPIKE SET IN BASE OF 24" WILLOW TREE - N 614694, E 943287, STA 12+75.67, -L-, 95.8' LT., ELEV. 2060.79,



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.
LOCATION SKETCH

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF 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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THE EXISTING STRUCTURE, CONSISTING OF THREE SPANS, TOTALING 106-FOOT LONG (1 @ 35'-6", 1 @ 35'-0", 1 @ 35'-6") WITH TIMBER FLOOR ON I-BEAMS, 18 FEET CLEAR ROADWAY, ON CONCRETE ABUTMENTS AND INTERMEDIATE BENTS; TIMBER CAP / TIMBER PILES AT VARIOUS CENTERS AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES".
 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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 25 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
 ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOUNDATION NOTES:

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.
 PILES AT END BENT NO.1 & END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.
 DRIVE PILES AT END BENT NO.1 & END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 110 TONS PER PILE.
 STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 & END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
 TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED AT END BENT NO.1. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS. (AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION).
 FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.
 DRILLED PIERS AT BENT NO.1 & BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 295 TONS PER PIER.
 INSTALL DRILLED PIERS AT BENT NO.1 (LT) TO A TIP ELEVATION NO HIGHER THAN 2,010 FT AND WITH PENETRATION OF AT LEAST 14 FT INTO WEATHERED ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
 INSTALL DRILLED PIERS AT BENT NO.1 (CT & RT) TO A TIP ELEVATION NO HIGHER THAN 1,994 FT AND WITH PENETRATION OF AT LEAST 14 FT INTO WEATHERED ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
 INSTALL DRILLED PIERS AT BENT NO.2 (LT & CT) TO A TIP ELEVATION NO HIGHER THAN 1,993 FT AND WITH PENETRATION OF AT LEAST 10.0 FT INTO WEATHERED ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
 INSTALL DRILLED PIERS AT BENT NO.2 (RT) TO A TIP ELEVATION NO HIGHER THAN 2,008 FT AND WITH PENETRATION OF AT LEAST 10 FT INTO WEATHERED ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
 SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
 CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
 THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 AND NO.2 IS ELEVATION 2049.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	3'-0" Ø DRILLED PIERS IN SOIL	3'-0" Ø DRILLED PIERS NOT IN SOIL	PDA TESTING	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS	3'-0" x 2'-9" PRESTRESSED CONCRETE BOX BEAMS				
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	CU. YARDS	LUMP SUM	LBS.	LBS.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YARDS	LUMP SUM	NO.	LIN. FT.	NO.	LIN. FT.	
SUPERSTRUCTURE																									
END BENT 1								LUMP SUM	21.5		2,580		5	5	200	5		81	90						
BENT 1			105.75	65.0					17.4		14,089	2,831													
BENT 2			119.0	55.0					17.4		14,422	2,874													
END BENT 2								LUMP SUM	21.5		2,580		5	5	215	5		78	87						
TOTAL	LUMP SUM	LUMP SUM	224.75	120.0	1	1	1	LUMP SUM	77.8	LUMP SUM	33,671	5,705	10	10	415	10	290.50	159	177	LUMP SUM	20	600.00	10	850.00	

HYDRAULIC DATA
 DESIGN DISCHARGE = 2700 CFS
 DESIGN FREQUENCY = 2 YRS
 DESIGN HW ELEVATION = 2056.00 FT
 BASE DISCHARGE = 10460 CFS
 BASE FREQUENCY = 100 YRS
 BASE HW ELEVATION = 2057.89 FT

OVERTOPPING FLOOD DATA
 OVERTOPPING DISCHARGE = 2700 CFS
 OVERTOPPING FREQUENCY = 2 (+) YRS
 OVERTOPPING ELEVATION = 2056.00* FT

DRAINAGE AREA = 72.3 SQ MI

* ROADWAY OVERTOPS AT SAG LOCATED APPROX. 350 FT EAST FROM STREAM CROSSING

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
 STATION: 13+17.03 -L-
 SHEET 2 OF 2

DocuSign
 Healy, L. Willis
 2/20/2021

V&M
 Vaughn & Mellon
 Consulting Engineers
 Asheville, North Carolina
 828-253-2796

- Boone, NC 828-265-9933
- Tri-Cities, TN 423-467-8401
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middlesboro, KY 606-248-6600
- Raleigh, NC 919-977-9455
- Charlotte, NC 704-357-0488
- Atlanta, GA 770-627-3509

Copyright © 2006 Vaughn & Mellon, Inc. All Rights Reserved.

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 BRIDGE on SR 1353 over
 MILLS RIVER
 Between NC 191 & SR 1345

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

DWN. BY: RWW DATE: 2/2016
 CHKD. BY: HLW DATE: 2/2016
 DES. EGR. OF RECORD: TVT DATE: 2/2016

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.72	--	1.75	0.297	1.72	30'	EL	14.5	0.608	1.78	30'	EL	2.9	0.80	0.297	2.30	30'	EL	14.5		
	HL-93(Opr)	N/A	--	2.23	--	1.35	0.297	2.23	30'	EL	14.5	0.608	2.30	30'	EL	2.9	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	2.02	72.543	1.75	0.297	2.31	30'	EL	11.6	0.608	2.02	30'	EL	2.9	0.80	0.297	3.18	30'	EL	11.6		
	HS-20(Opr)	36.000	--	2.61	94.038	1.35	0.297	3.00	30'	EL	11.6	0.608	2.61	30'	EL	2.9	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.85	65.483	1.40	0.297	4.89	30'	EL	14.5	0.608	4.85	30'	EL	2.9	0.80	0.297	5.20	30'	EL	14.5	
		SNGARBS2	20.000	--	3.79	75.791	1.40	0.297	4.16	30'	EL	11.6	0.608	3.79	30'	EL	2.9	0.80	0.297	4.56	30'	EL	11.6	
		SNAGRIS2	22.000	--	3.66	80.495	1.40	0.297	4.22	30'	EL	11.6	0.608	3.66	30'	EL	2.9	0.80	0.297	4.63	30'	EL	11.6	
		SNCOTTS3	27.250	--	2.43	66.090	1.40	0.297	2.43	30'	EL	14.5	0.608	2.43	30'	EL	2.9	0.80	0.297	2.61	30'	EL	14.5	
		SNAGGRS4	34.930	--	2.26	79.057	1.40	0.297	2.35	30'	EL	14.5	0.608	2.26	30'	EL	2.9	0.80	0.297	2.51	30'	EL	14.5	
		SNS5A	35.550	--	2.26	80.515	1.40	0.297	2.26	30'	EL	14.5	0.608	2.39	30'	EL	2.9	0.80	0.297	2.43	30'	EL	14.5	
		SNS6A	39.950	--	2.15	86.051	1.40	0.297	2.15	30'	EL	14.5	0.608	2.26	30'	EL	2.9	0.80	0.297	2.31	30'	EL	14.5	
	TTST	SNS7B	42.000	--	2.08	87.410	1.40	0.297	2.08	30'	EL	14.5	0.608	2.30	30'	EL	2.9	0.80	0.297	2.23	30'	EL	14.5	
		TNAGRIT3	33.000	--	2.74	90.362	1.40	0.297	2.77	30'	EL	14.5	0.608	2.74	30'	EL	2.9	0.80	0.297	2.97	30'	EL	14.5	
		TNT4A	33.080	--	2.50	82.576	1.40	0.297	2.63	30'	EL	14.5	0.608	2.50	30'	EL	2.9	0.80	0.297	2.82	30'	EL	14.5	
		TNT6A	41.600	--	2.39	99.330	1.40	0.297	2.39	30'	EL	14.5	0.608	2.40	30'	EL	2.9	0.80	0.297	2.56	30'	EL	14.5	
		TNT7A	42.000	--	2.31	97.144	1.40	0.297	2.48	30'	EL	14.5	0.608	2.31	30'	EL	2.9	0.80	0.297	2.65	30'	EL	14.5	
		TNT7B	42.000	--	2.26	95.072	1.40	0.297	2.33	30'	EL	14.5	0.608	2.26	30'	EL	2.9	0.80	0.297	2.50	30'	EL	14.5	
		TNAGRIT4	43.000	--	2.19	94.317	1.40	0.297	2.41	30'	EL	14.5	0.608	2.19	30'	EL	2.9	0.80	0.297	2.58	30'	EL	14.5	
TNAGT5A	45.000	--	2.34	105.230	1.40	0.297	2.35	30'	EL	14.5	0.608	2.34	30'	EL	2.9	0.80	0.297	2.51	30'	EL	14.5			
TNAGT5B	45.000	3	2.07	92.941	1.40	0.297	2.20	30'	EL	11.6	0.608	2.07	30'	EL	2.9	0.80	0.297	2.42	30'	EL	11.6			

LOAD FACTORS:

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

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

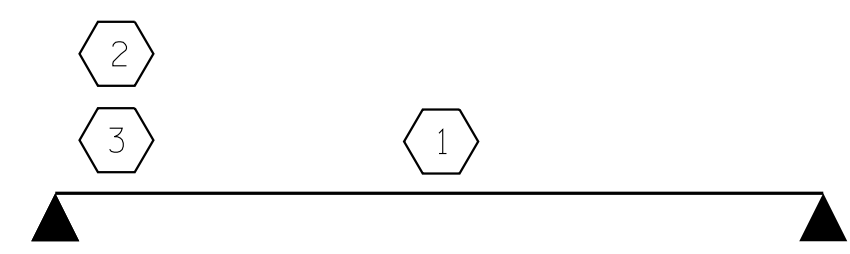
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

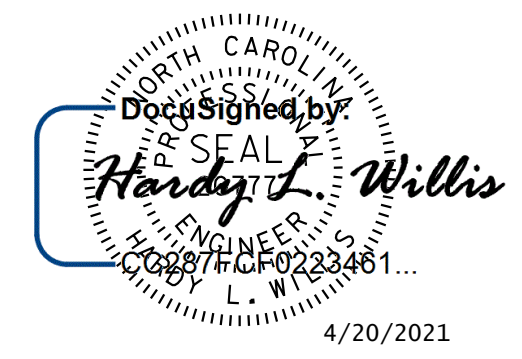
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
FOR SPAN 'A' & 'C'



PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+07.03 -L-

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

Boone, NC 828-255-9933
Tri-Cities, TN 423-667-9400
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4175
Charleston, SC 843-974-5650
Midwesters, KY 606-248-6600
Raleigh, NC 919-977-9455
Charlotte, NC 704-357-0488
Atlanta, GA 404-627-3500

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR
30' CORED SLAB UNIT
90° SKEW
(NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : RWW	DATE : 7/2016
CHECKED BY : HLW	DATE : 7/2016
ENGINEER OF RECORD: TWT	DATE : 7/2016
DRAWN BY : CVC 6/10	.
CHECKED BY : DNS 6/10	.

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

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER		
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION		DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.44	--	1.75	0.291	1.44	85'	EL	41.75	0.527	1.66	85'	EL	8.35	0.80	0.291	2.28	85'	EL	41.75		
	HL-93(0pr)	N/A	--	1.87	--	1.35	0.291	1.87	85'	EL	41.75	0.527	2.16	85'	EL	8.35	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.94	69.676	1.75	0.291	1.94	85'	EL	41.75	0.527	2.13	85'	EL	8.35	0.80	0.291	3.06	85'	EL	41.75		
	HS-20(0pr)	36.000	--	2.51	90.321	1.35	0.291	2.51	85'	EL	41.75	0.527	2.76	85'	EL	8.35	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	5.31	71.672	1.40	0.291	5.31	85'	EL	41.75	0.527	6.45	85'	EL	8.35	0.80	0.291	6.71	85'	EL	41.75	
		SNGARBS2	20.000	--	4.11	82.204	1.40	0.291	4.11	85'	EL	41.75	0.527	4.54	85'	EL	8.35	0.80	0.291	5.20	85'	EL	41.75	
		SNAGRIS2	22.000	--	3.87	85.231	1.40	0.291	3.87	85'	EL	41.75	0.527	4.20	85'	EL	8.35	0.80	0.291	4.90	85'	EL	41.75	
		SNCOTTS3	27.250	--	2.78	75.847	1.40	0.291	2.78	85'	EL	41.75	0.527	3.21	85'	EL	8.35	0.80	0.291	3.52	85'	EL	41.75	
		SNAGGRS4	34.930	--	2.30	80.422	1.40	0.291	2.30	85'	EL	41.75	0.527	2.64	85'	EL	8.35	0.80	0.291	2.92	85'	EL	41.75	
		SNS5A	35.550	--	2.25	80.092	1.40	0.291	2.25	85'	EL	41.75	0.527	2.66	85'	EL	8.35	0.80	0.291	2.85	85'	EL	41.75	
		SNS6A	39.950	--	2.07	82.844	1.40	0.291	2.07	85'	EL	41.75	0.527	2.44	85'	EL	8.35	0.80	0.291	2.63	85'	EL	41.75	
	TTST	SNS7B	42.000	--	1.96	82.331	1.40	0.291	1.96	85'	EL	41.75	0.527	2.37	85'	EL	8.35	0.80	0.291	2.48	85'	EL	41.75	
		TNAGRIT3	33.000	--	2.51	82.807	1.40	0.291	2.51	85'	EL	41.75	0.527	2.89	85'	EL	8.35	0.80	0.291	3.18	85'	EL	41.75	
		TNT4A	33.080	--	2.51	83.177	1.40	0.291	2.51	85'	EL	41.75	0.527	2.82	85'	EL	8.35	0.80	0.291	3.19	85'	EL	41.75	
		TNT6A	41.600	--	2.05	85.187	1.40	0.291	2.05	85'	EL	41.75	0.527	2.50	85'	EL	8.35	0.80	0.291	2.59	85'	EL	41.75	
		TNT7A	42.000	--	2.06	86.315	1.40	0.291	2.06	85'	EL	41.75	0.527	2.45	85'	EL	8.35	0.80	0.291	2.60	85'	EL	41.75	
		TNT7B	42.000	--	2.12	88.863	1.40	0.291	2.12	85'	EL	41.75	0.527	2.32	85'	EL	8.35	0.80	0.291	2.68	85'	EL	41.75	
		TNAGRIT4	43.000	--	2.02	86.814	1.40	0.291	2.02	85'	EL	41.75	0.527	2.25	85'	EL	8.35	0.80	0.291	2.56	85'	EL	41.75	
TNAGT5A	45.000	--	1.91	85.863	1.40	0.291	1.91	85'	EL	41.75	0.527	2.22	85'	EL	8.35	0.80	0.291	2.42	85'	EL	41.75			
TNAGT5B	45.000	3	1.89	85.014	1.40	0.291	1.89	85'	EL	41.75	0.527	2.14	85'	EL	8.35	0.80	0.291	2.39	85'	EL	41.75			

LOAD FACTORS:

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

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

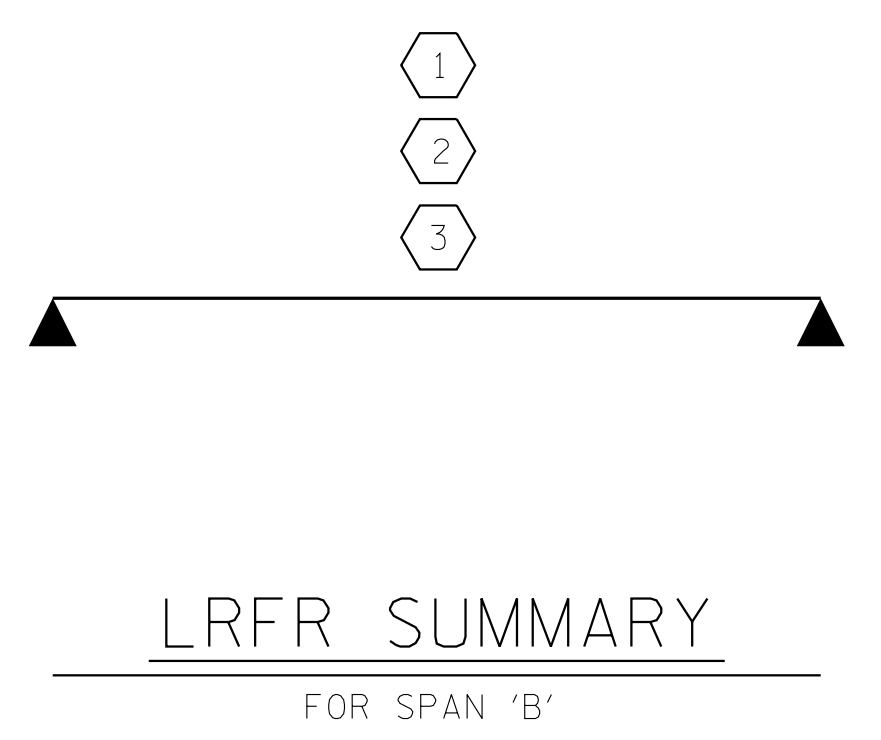
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

Boone, NC 828-255-9933
Tri-Cities, TN 423-467-8400
Knoxville, TN 865-546-9500
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
Madison, KY 606-248-6500
Raleigh, NC 919-877-9495
Charlotte, NC 334-357-0488
Atlanta, GA 770-627-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

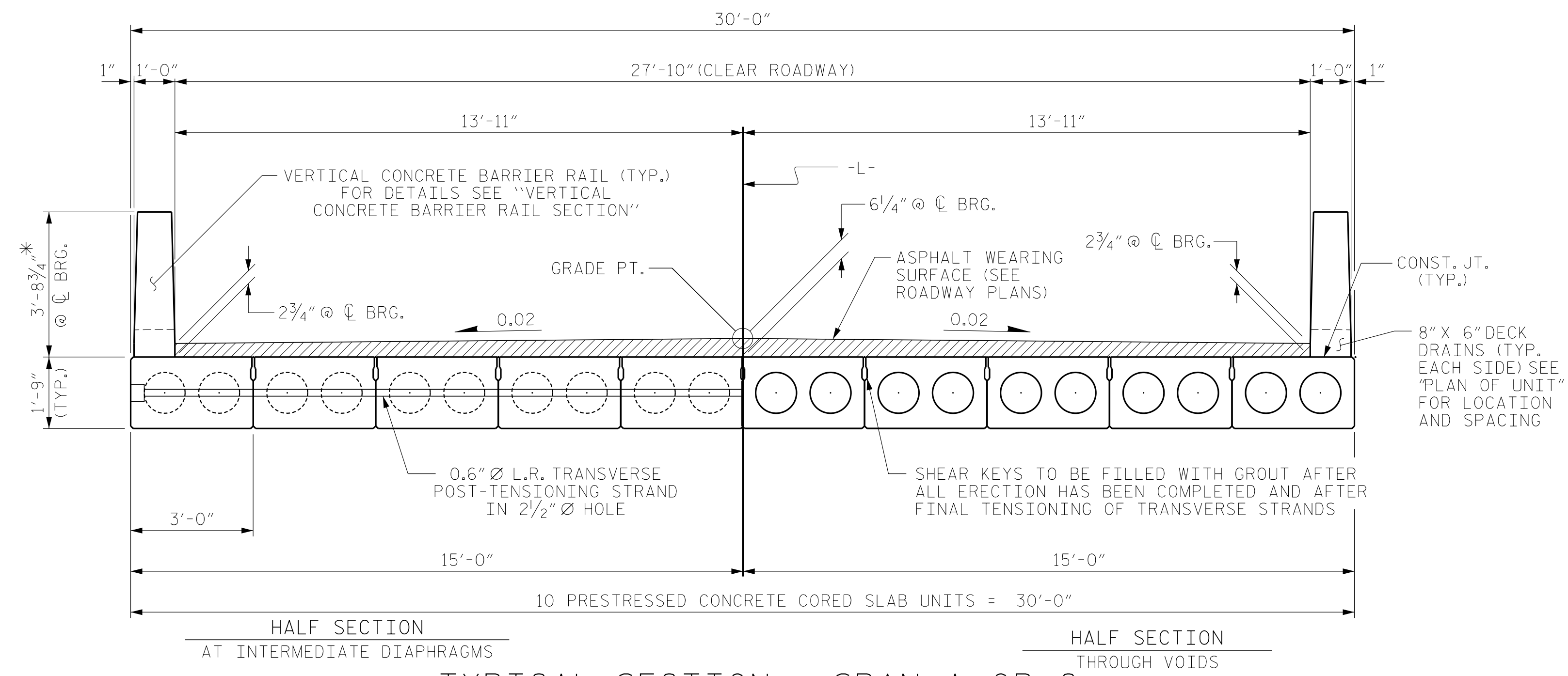
PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**LRFR SUMMARY FOR
85' BOX BEAM UNIT
90° SKEW
(NON-INTERSTATE TRAFFIC)**

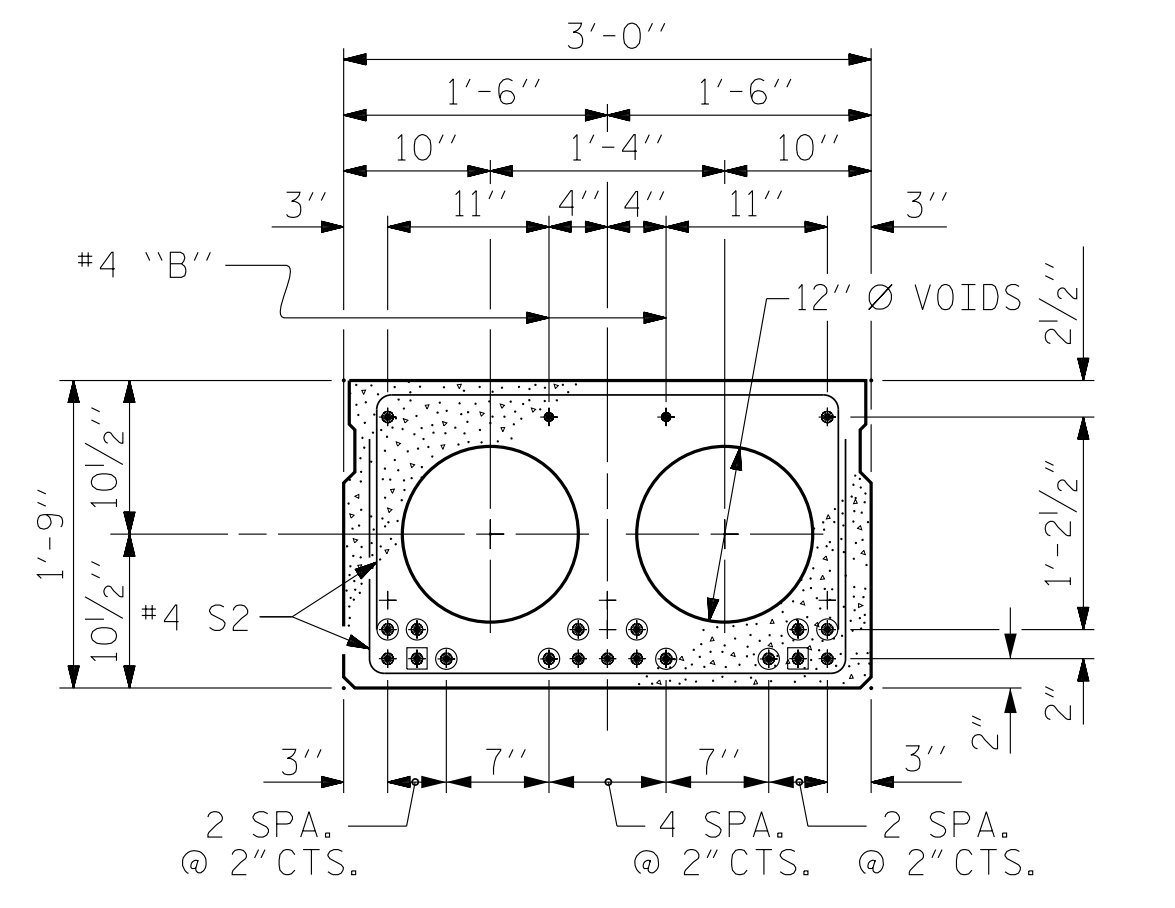
ASSEMBLED BY : RWW	DATE : 7/2016
CHECKED BY : HLW	DATE : 7/2016
ENGINEER OF RECORD: TVT	DATE : 7/2016
DRAWN BY : TMG II/II	.
CHECKED BY : AAC II/II	.

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



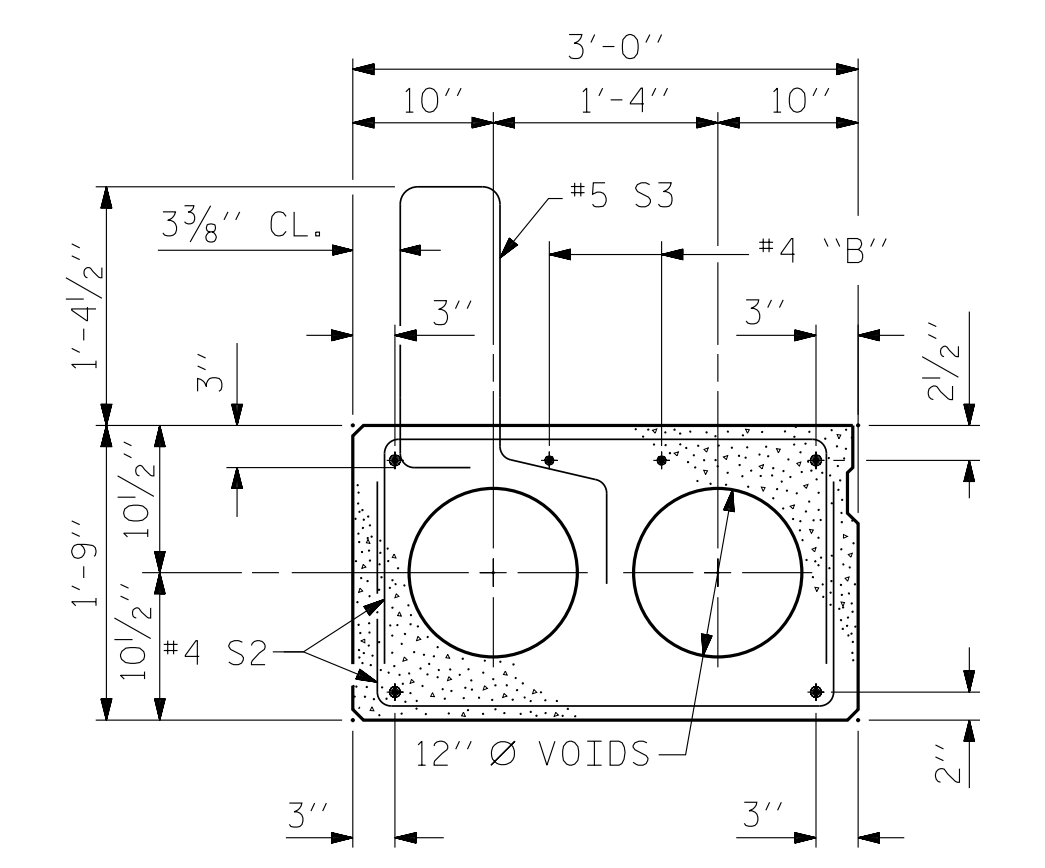
TYPICAL SECTION - SPAN A OR C

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



INTERIOR SLAB SECTION (30' UNIT) (9 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

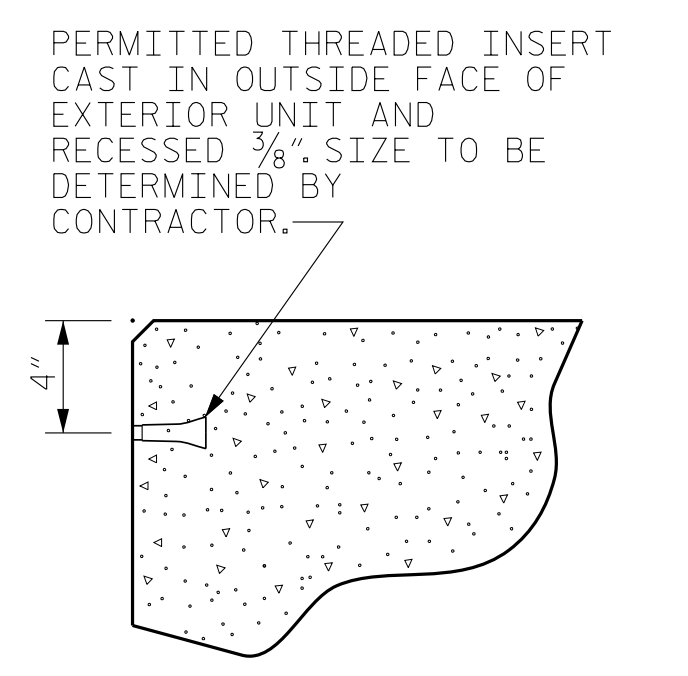


EXT. SLAB SECTION

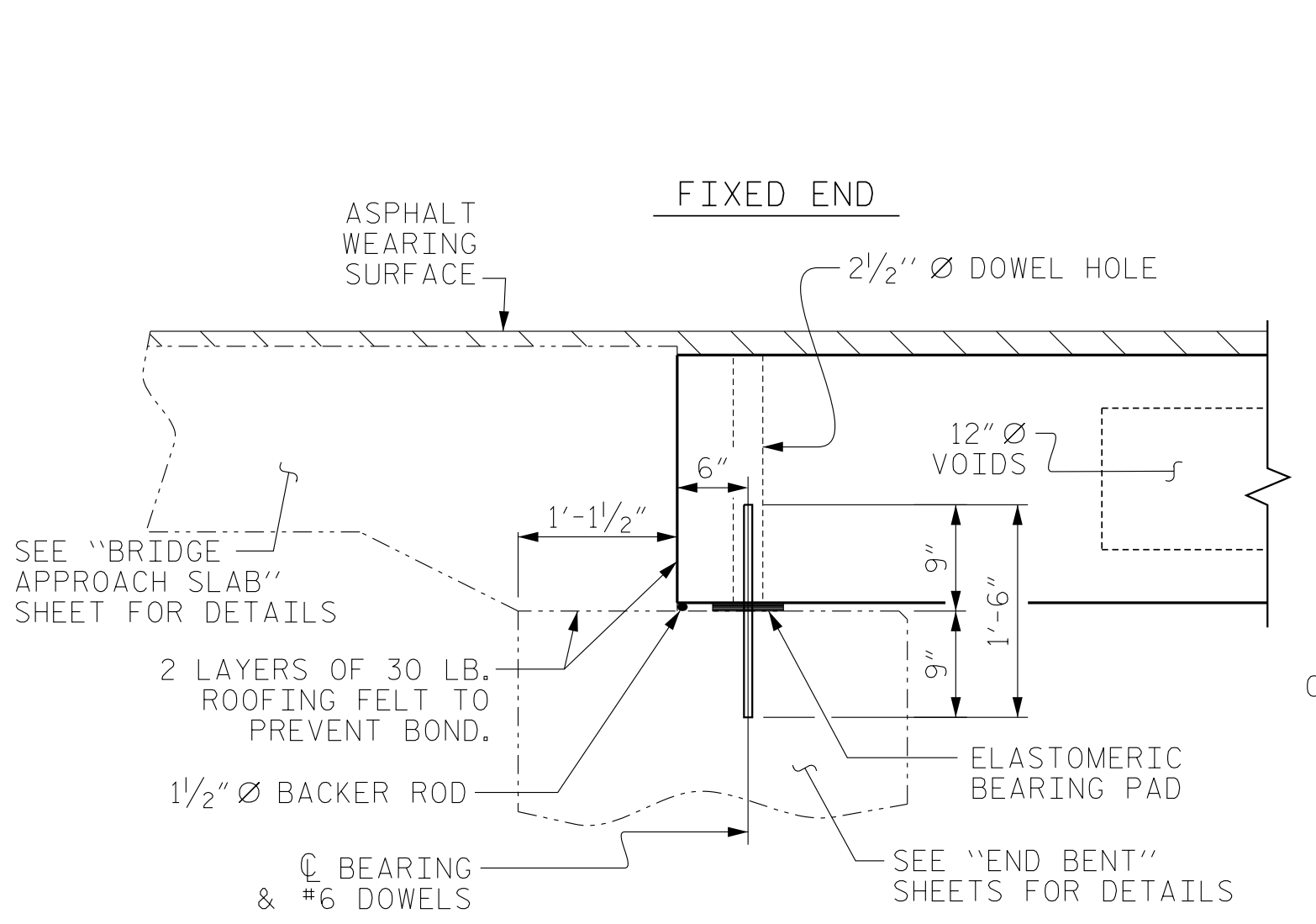
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

- BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
- OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

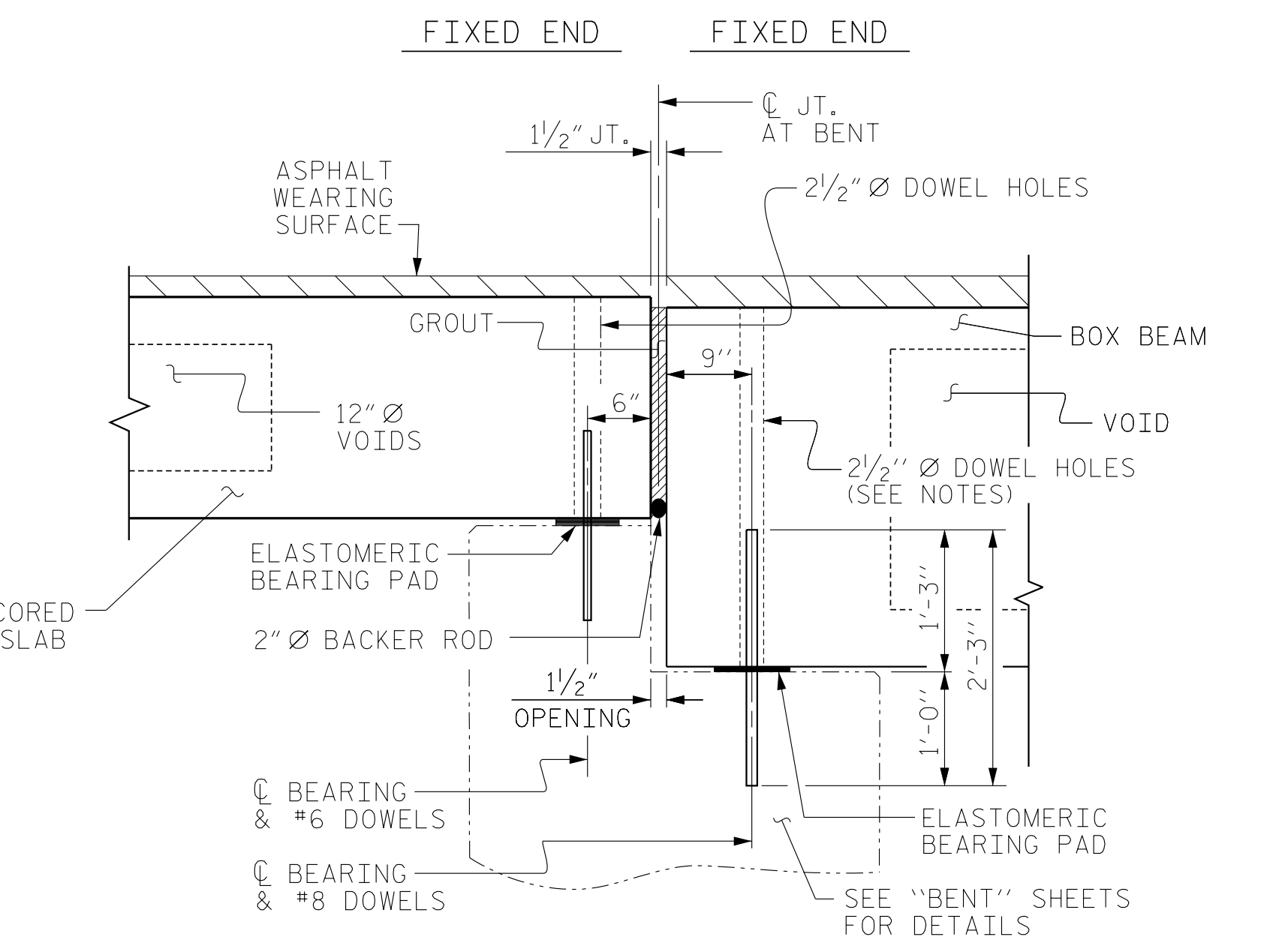
DEBONDING LEGEND



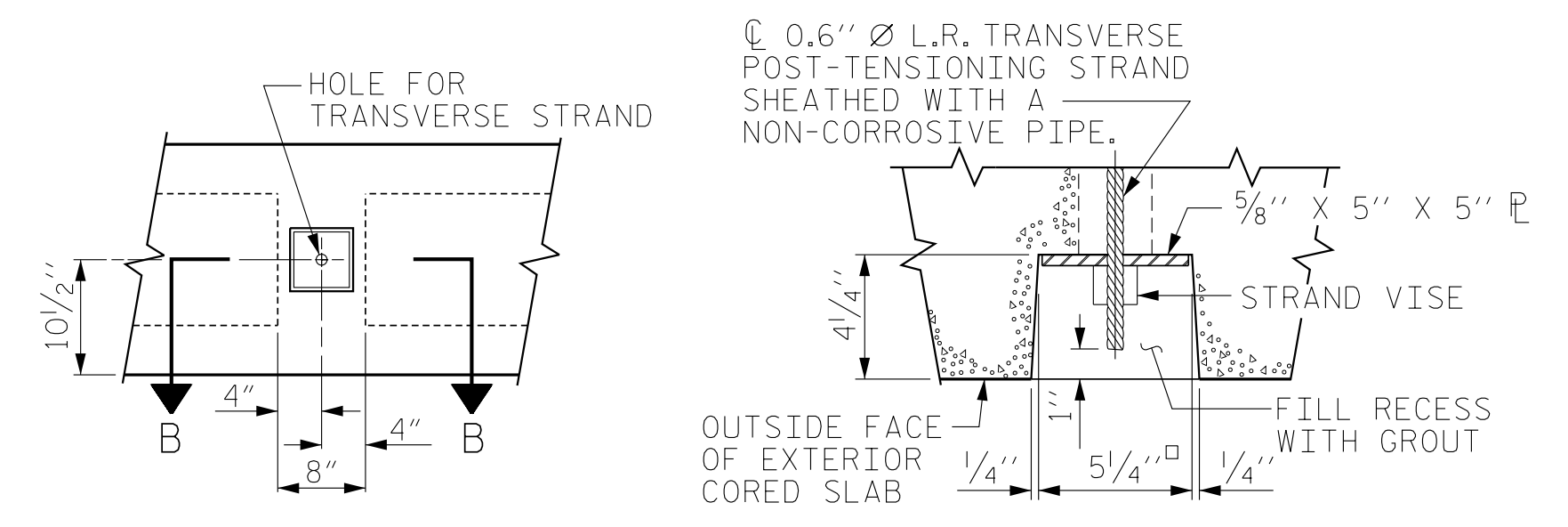
THREADED INSERT DETAIL



SECTION AT END BENT



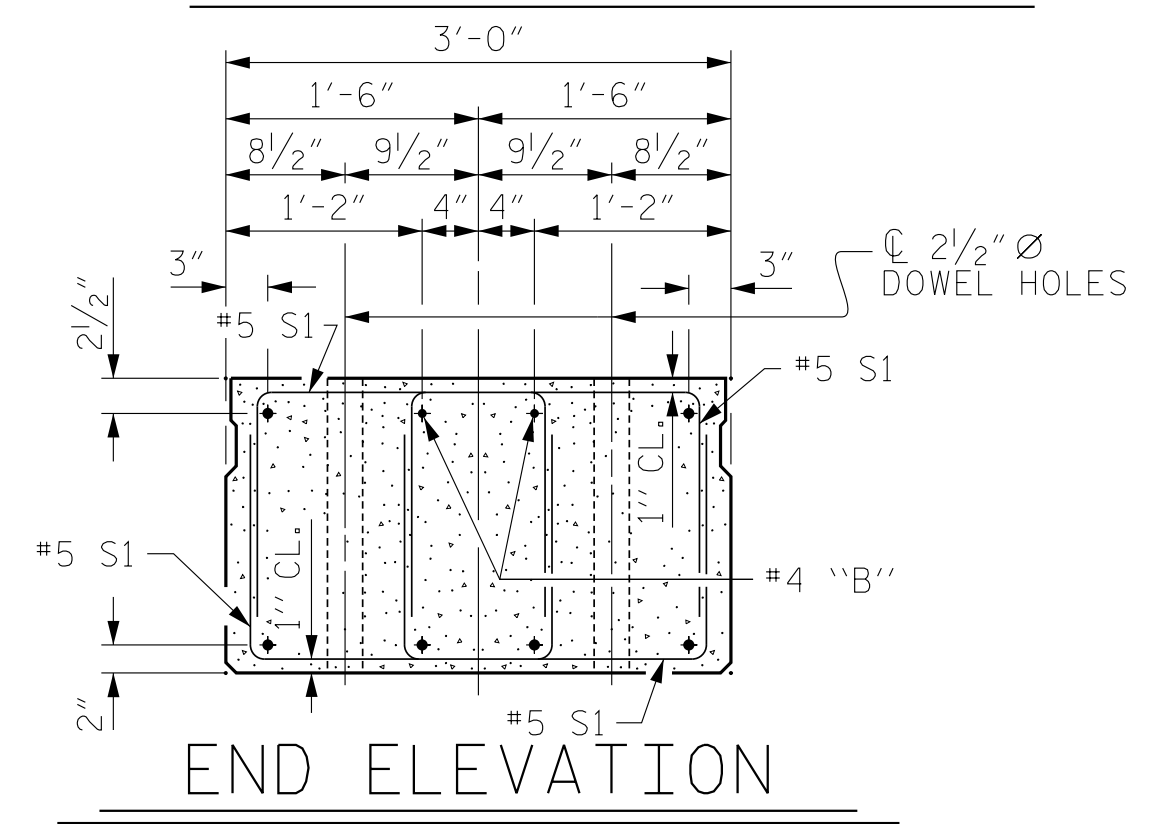
SECTION AT BENT



ELEVATION VIEW

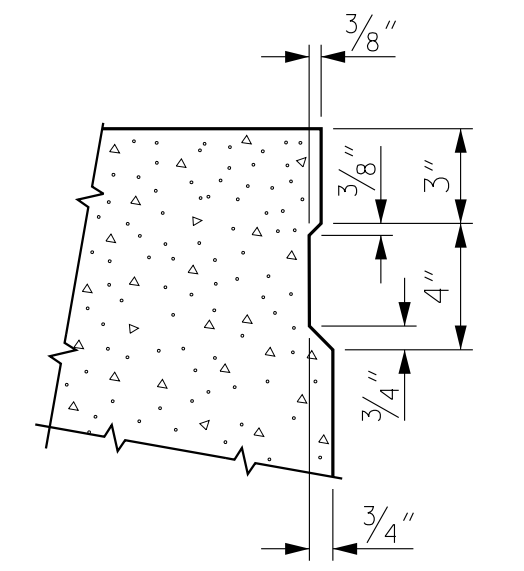
SECTION B-B

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



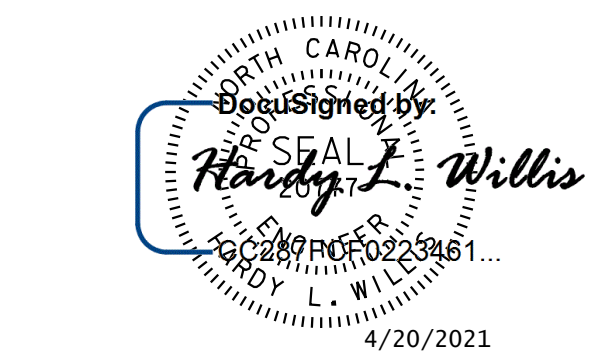
END ELEVATION

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



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughan & Melton
Consulting Engineers
Asheville, NC
919-977-9855

Boone, NC 828-355-9933
Tri-Cities, TN 423-461-8401
Knoxville, TN 865-546-9500
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-9550
Middleboro, KY 508-248-6500
Atlanta, GA 770-627-3509
Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

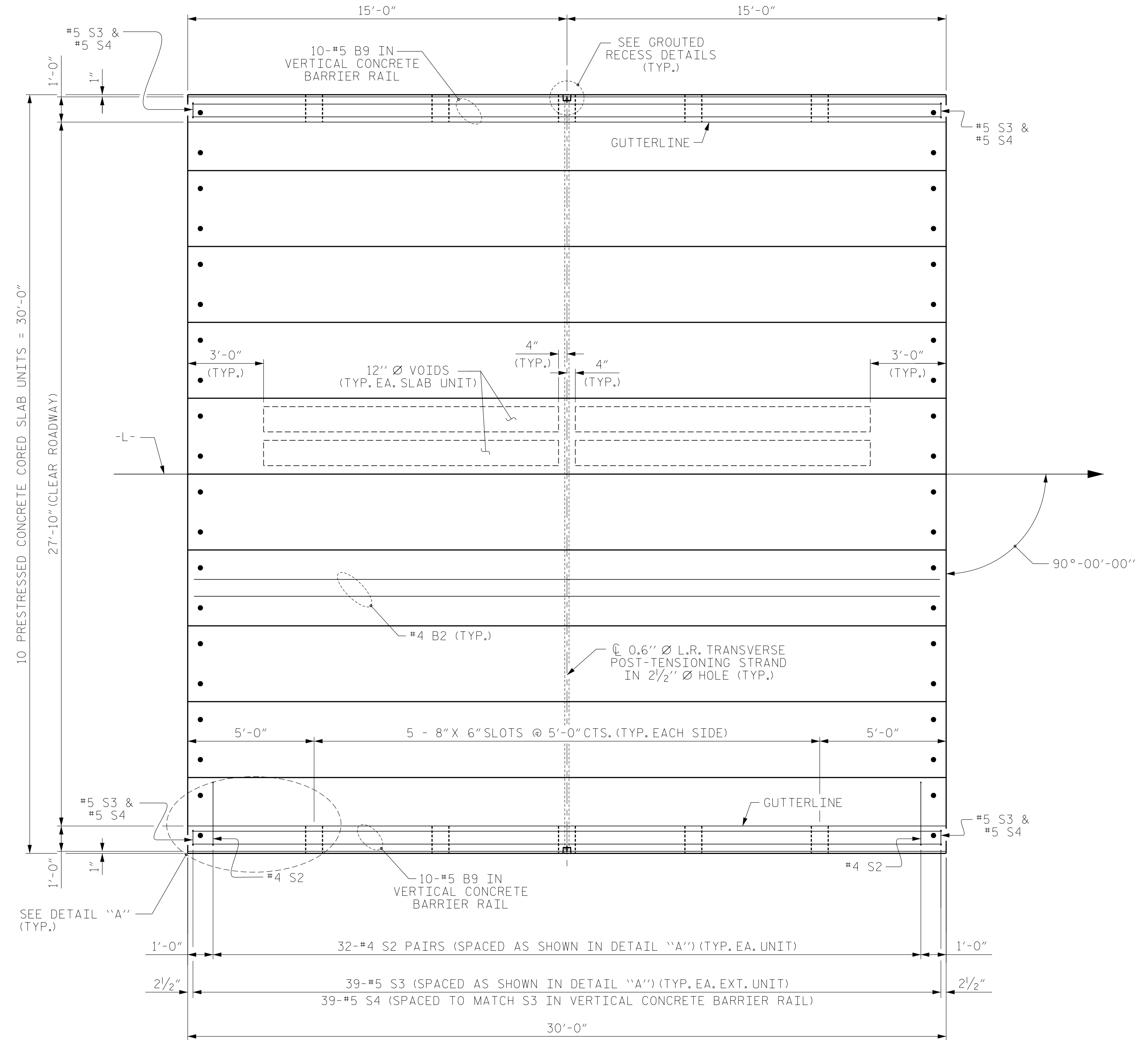
PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

SHEET 1 OF 3

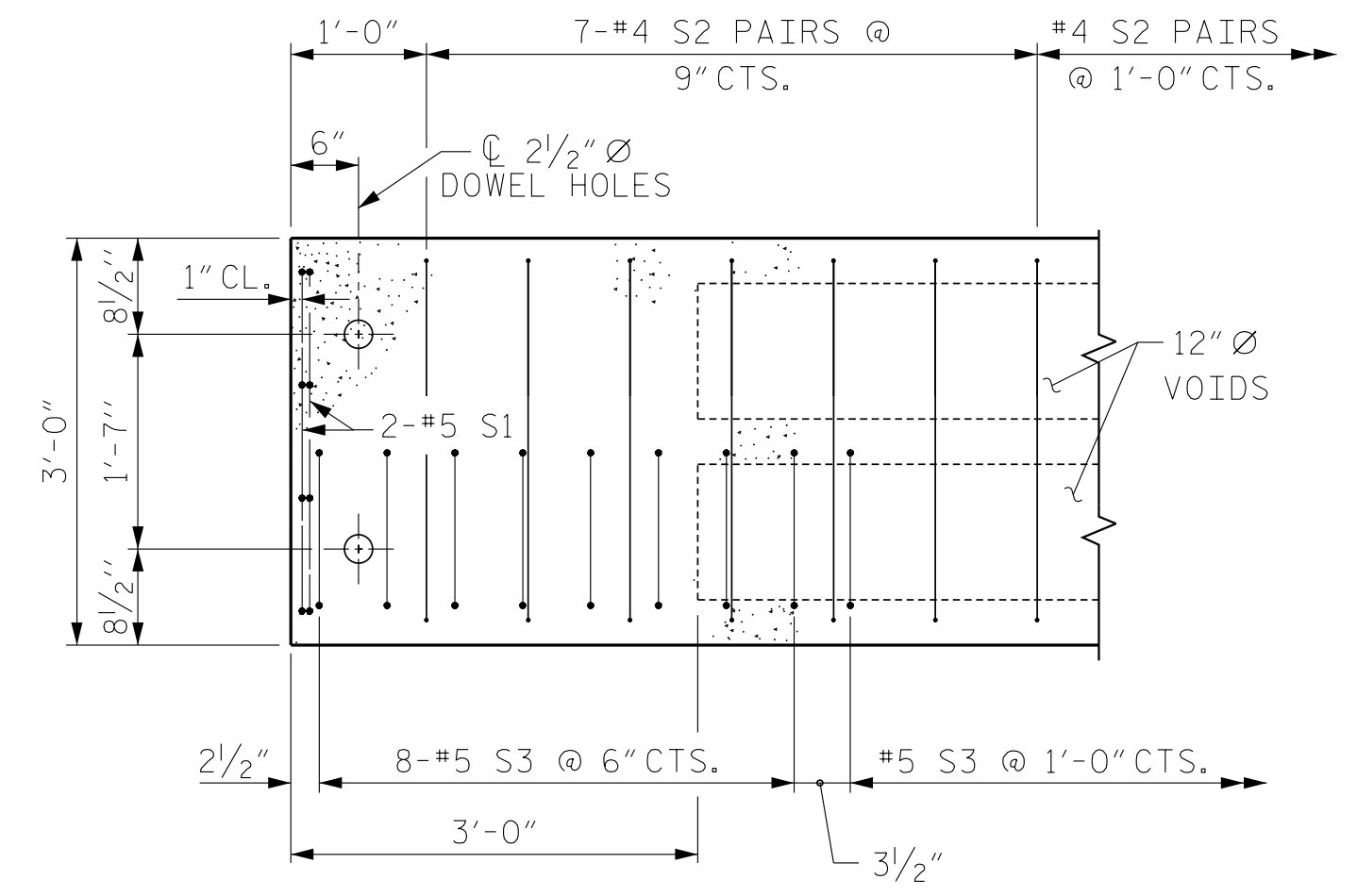
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

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

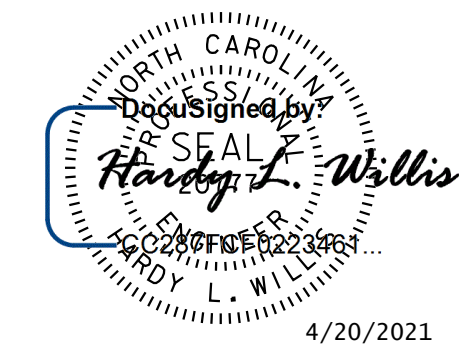
ASSEMBLED BY : RWW	DATE : 2/2016
CHECKED BY : HLW	DATE : 2/2016
ENGINEER OF RECORD : TVT	DATE : 2/2016
DRAWN BY : DGE 5/09	REV. 8/14
CHECKED BY : BCH 6/09	MAA/TMG



PLAN OF UNIT
(SPAN 'A' OR 'C')



DETAIL "A"
(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

SHEET 2 OF 3

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

ASSEMBLED BY : RWW	DATE : 2/2016
CHECKED BY : HLW	DATE : 2/2016
ENGINEER OF RECORD: TVT	DATE : 2/2016
DRAWN BY : DGE 3/09	REV. 12/5/11 MAA/AAC
CHECKED BY : BCH 3/09	REV. 8/14 MAA/TMG

V&M
Vaughn & Melton
 Consulting Engineers

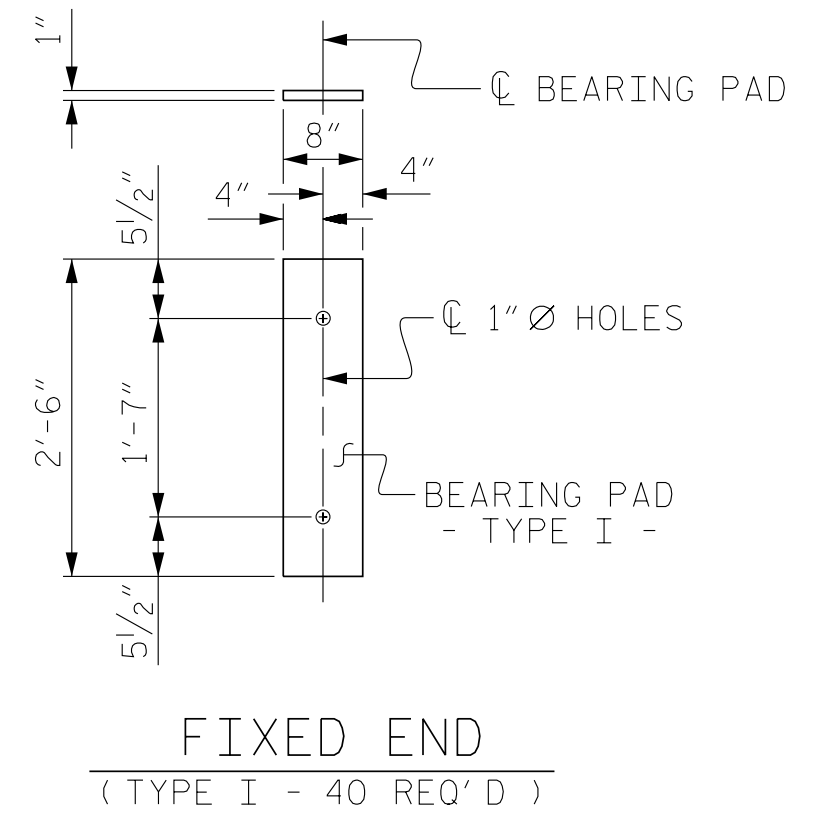
Asheville, North Carolina
 608-253-2786

Raleigh, NC 919-977-9455
 Charlotte, NC 704-357-0488
 Atlanta, GA 770-627-3509

Roanoke, NC 828-255-9933
 Tri-Cities, TN 423-467-9400
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4775
 Charleston, SC 843-974-5650
 Middleburg, FL 904-248-6600

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

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



ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
30' UNIT			
EXTERIOR C.S.	4	30'-0"	120'-0"
INTERIOR C.S.	16	30'-0"	480'-0"
TOTAL	20		600'-0"

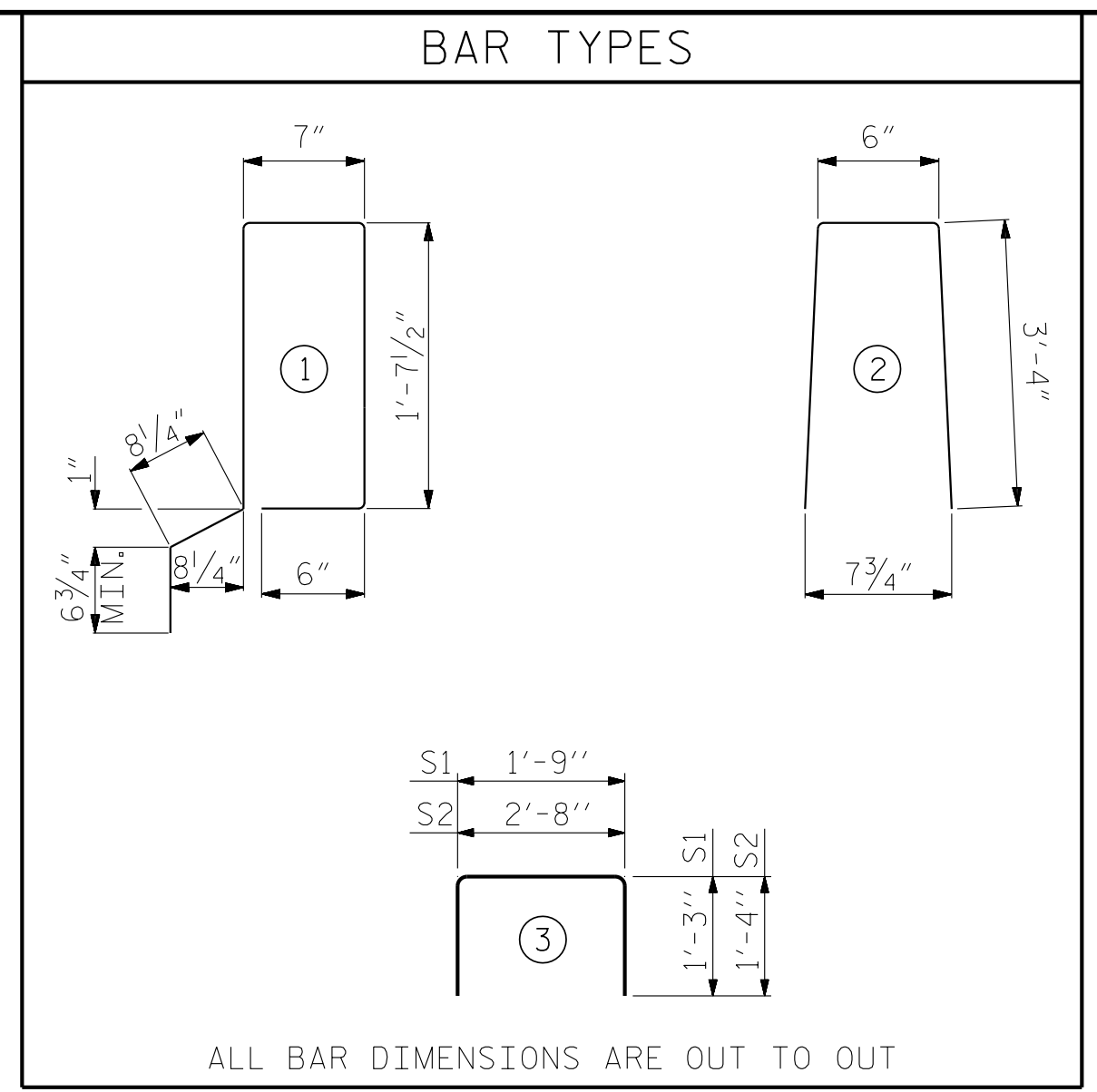
GRADE 270 STRANDS	
AREA (SQUARE INCHES)	0.6" Ø L.R.
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

CONCRETE RELEASE STRENGTH	
UNIT	PSI
30' UNITS	4000

BILL OF MATERIAL FOR ONE 30' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B2	2	#4	STR	29'-8"	40	29'-8"	40
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	64	#4	3	5'-4"	228	5'-4"	228
* S3	39	#5	1	5'-7"	227		
REINFORCING STEEL				LBS.	303	303	
* EPOXY COATED REINFORCING STEEL				LBS.	227		
5000 P.S.I. CONCRETE				CU. YDS.	4.4	4.4	
0.6" Ø L.R. STRANDS				No.	9	9	

DEAD LOAD DEFLECTION AND CAMBER	
30' CORED SLAB UNIT	3'-0" x 1'-9"
CAMBER (SLAB ALONE IN PLACE)	0.6" Ø L.R. STRAND
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↑
FINAL CAMBER	1/8" ↓
	1/8" ↑

** INCLUDES FUTURE WEARING SURFACE



NOTES

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

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

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

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

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER, SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

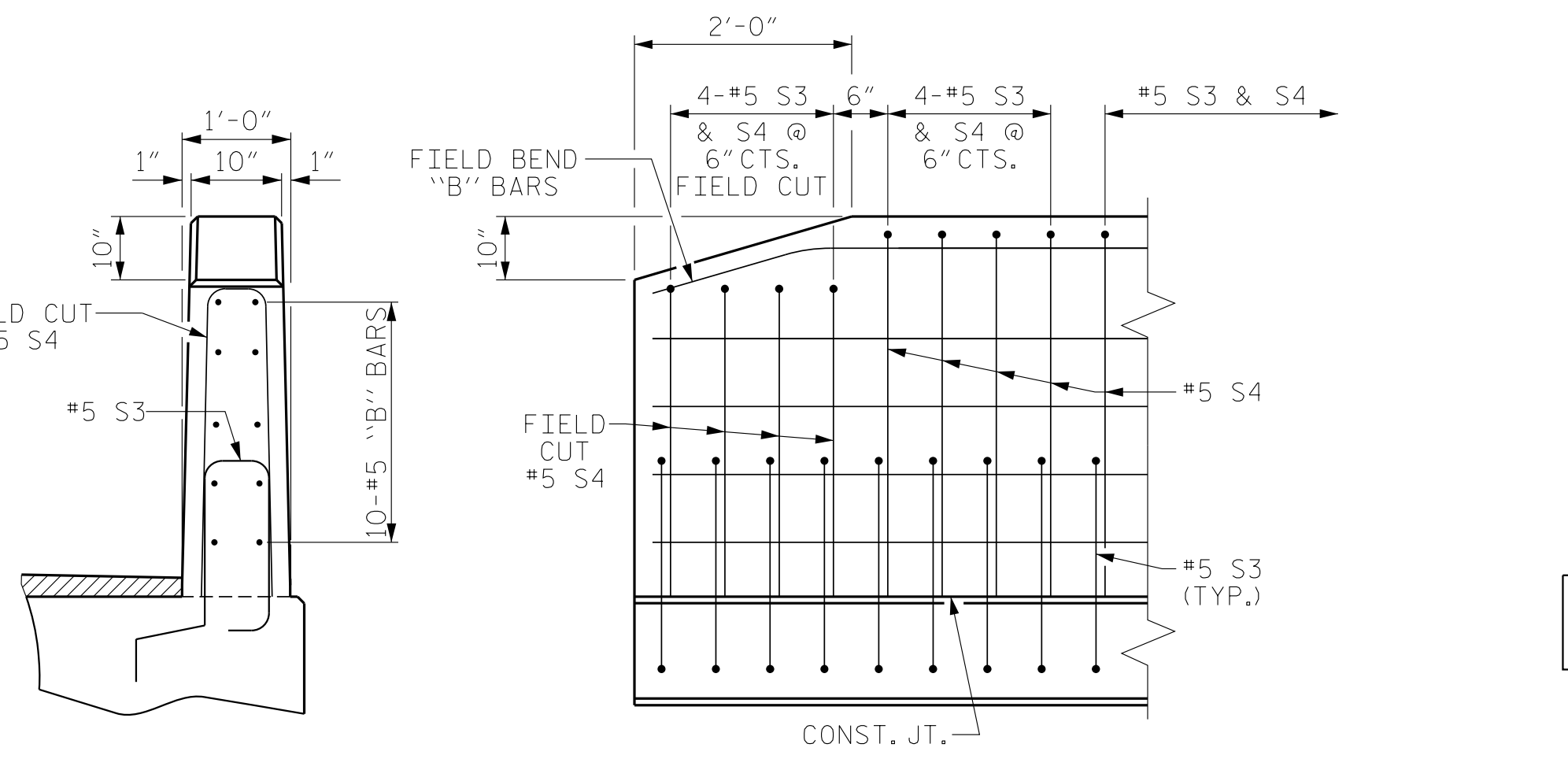
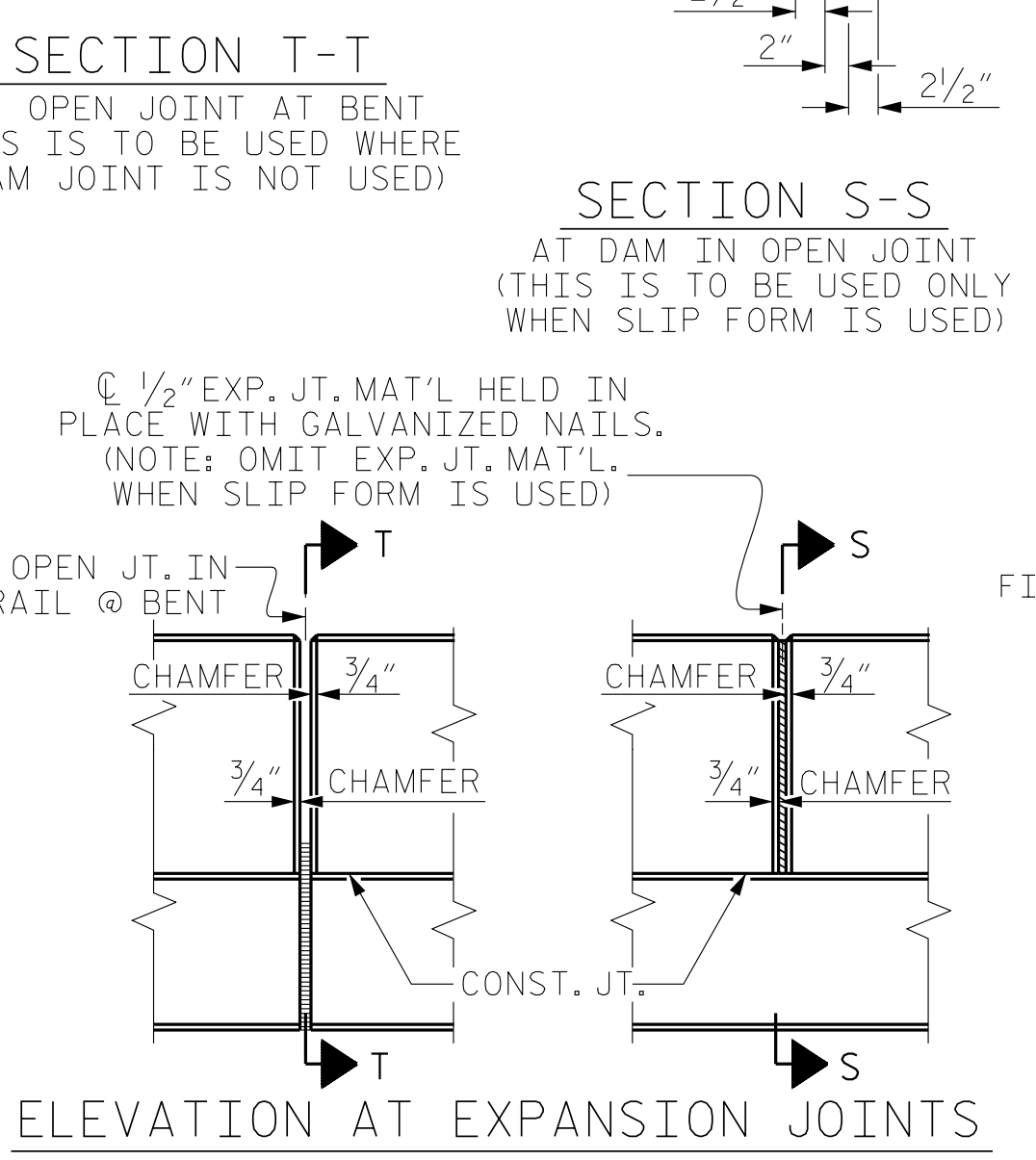
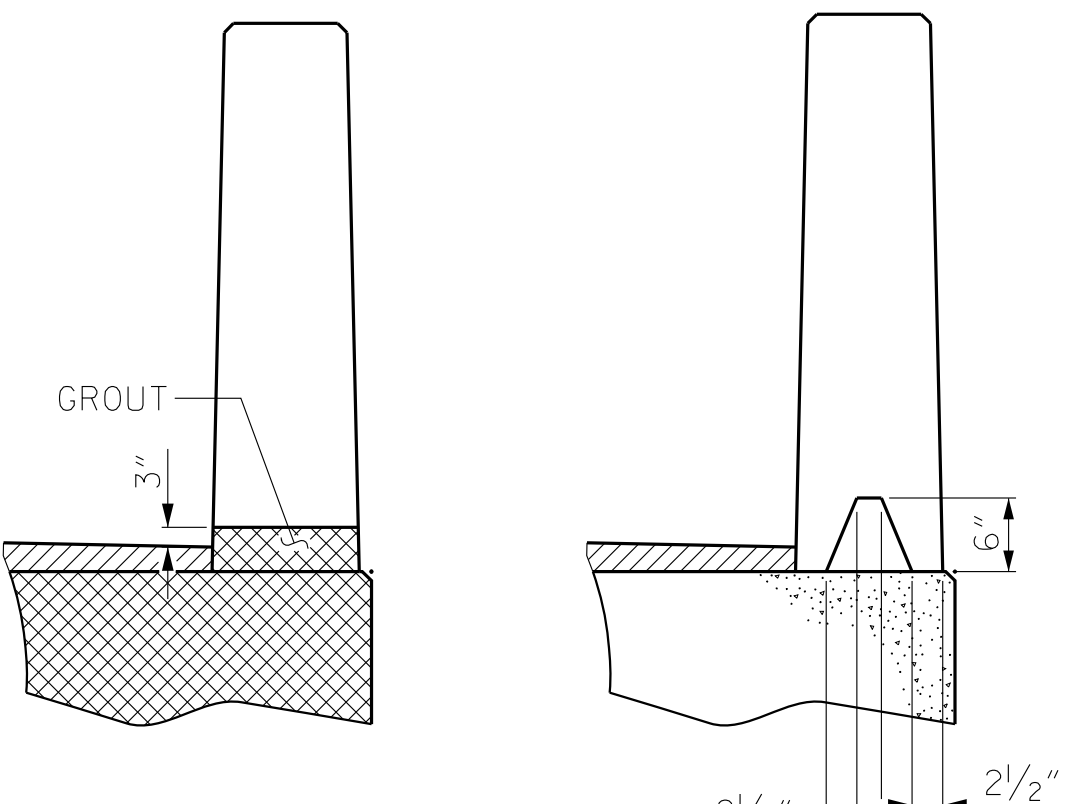
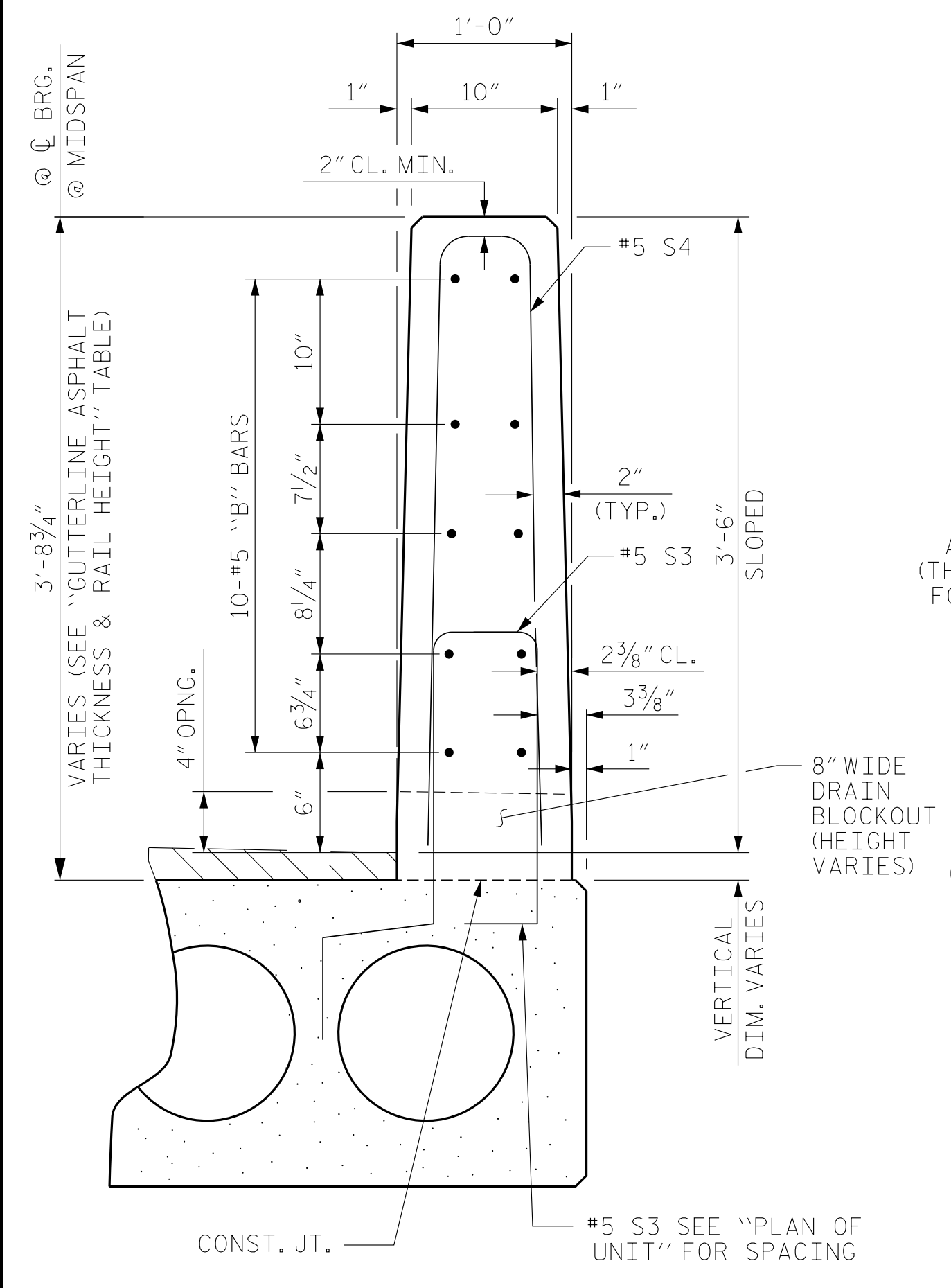
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED 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.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 8". THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

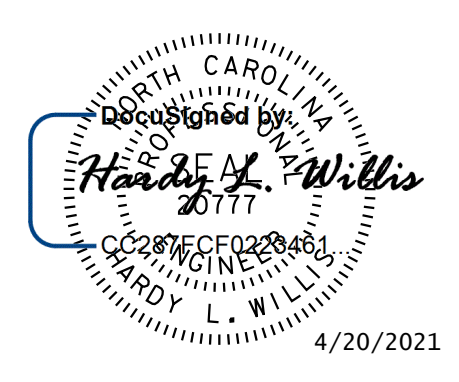
APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR CORED SLAB UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.



BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	30' UNIT					
* B9	20	40	#5	STR	29'-7"	1234
* S4	78	156	#5	2	7'-2"	1166
* EPOXY COATED REINFORCING STEEL				LBS.		2400
CLASS AA CONCRETE				CU. YDS.		15.4
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		120.50

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
30' UNITS	2 5/8"	3'-8 5/8"

ASSEMBLED BY : RWW	DATE : 2/2016
CHECKED BY : HLW	DATE : 2/2016
ENGINEER OF RECORD: TVT	DATE : 2/2016
DRAWN BY : DGE 5/09	REV. 5/18
CHECKED BY : BCH 6/09	MAA/TMG



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughan & Melton
Consulting Engineers
Asheville, North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-8400
Knoxville, TN 865-546-9800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-9550
Midlothian, KY 806-249-6600
Raleigh, NC 919-971-9655
Charlotte, NC 704-351-0468
Atlanta, GA 770-627-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

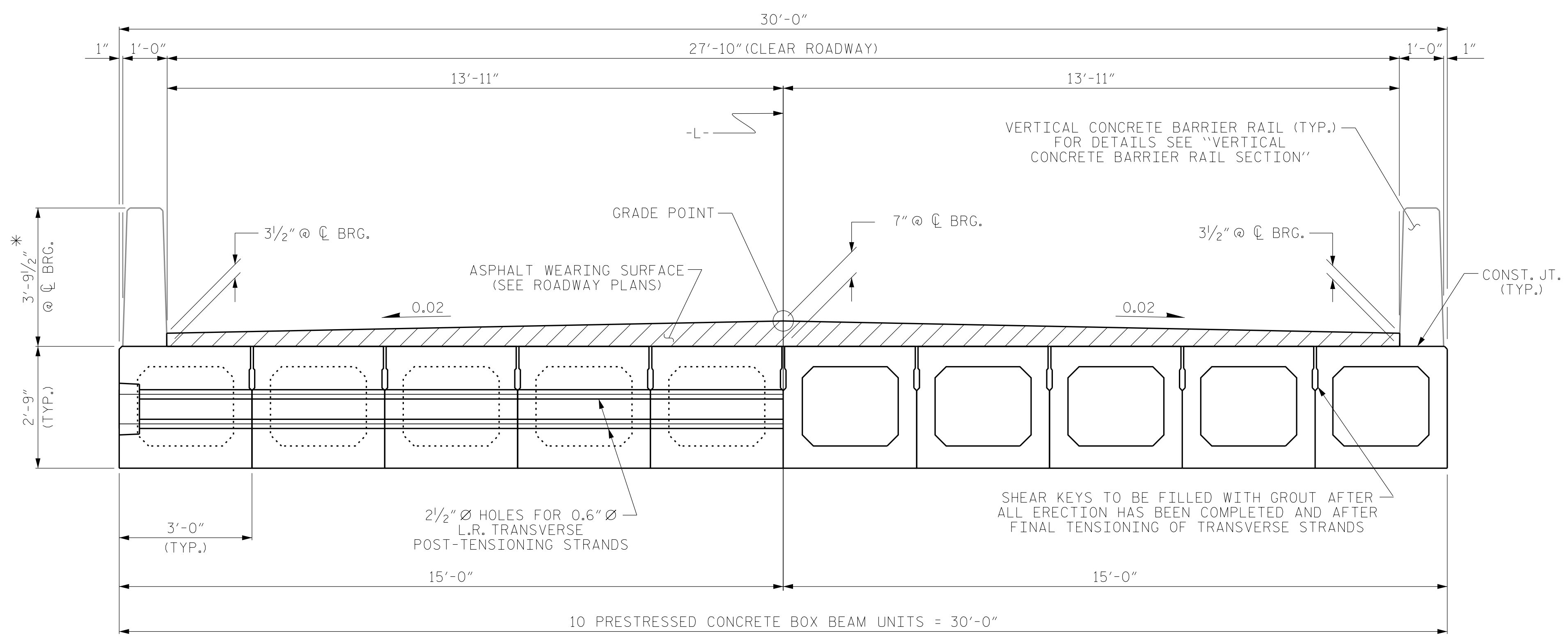
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

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

NOTES

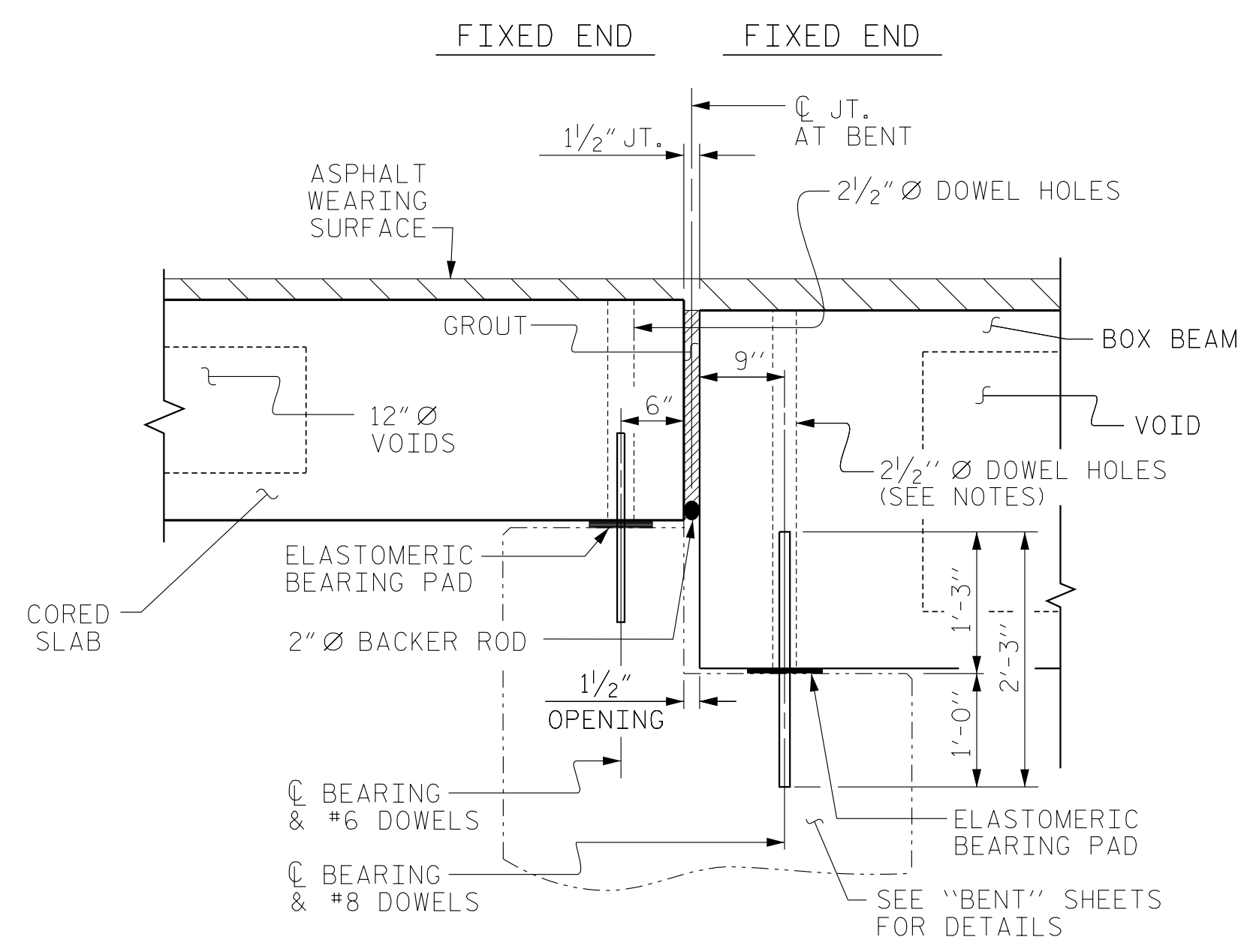
- ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED 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 GROUTED AFTER THE TENSIONING OF THE STRANDS.
- THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.
- THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.
- THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.
- ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.
- PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.
- APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.
- VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.
- THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- 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 GROUTED 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.



HALF SECTION AT INTERMEDIATE DIAPHRAGMS HALF SECTION THROUGH VOIDS

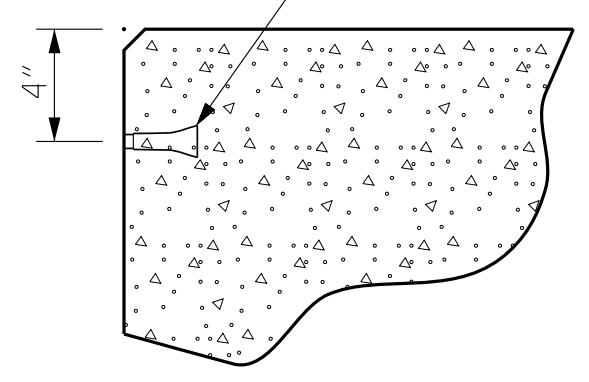
TYPICAL SECTION - SPAN B

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

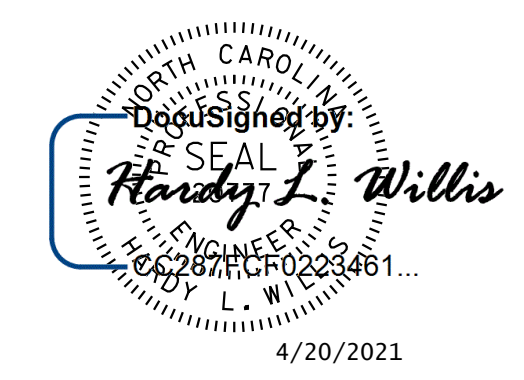


SECTION AT BENT

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



THREADED INSERT DETAIL



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughan & Melton
Consulting Engineers

Asheville, NC 828-263-2796
Norfolk, VA 757-441-1455

Boone, NC 828-263-9555
Tri-Cities, TN 423-467-8400
Knoxville, TN 865-594-9500
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
Madisonville, KY 502-348-6500
Charlotte, NC 704-527-0488
Atlanta, GA 770-627-3509

Copyright © 2006 Vaughan & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

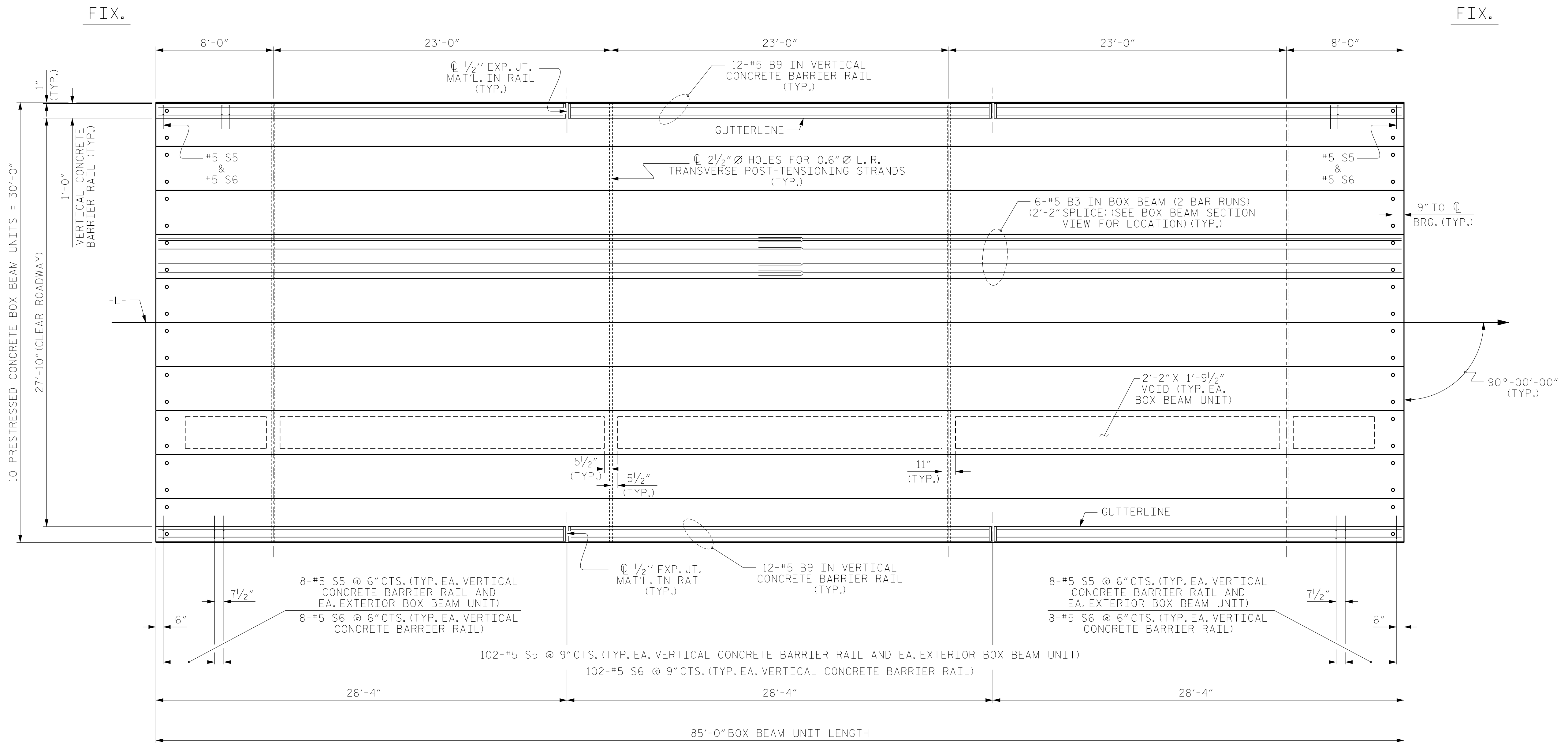
SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

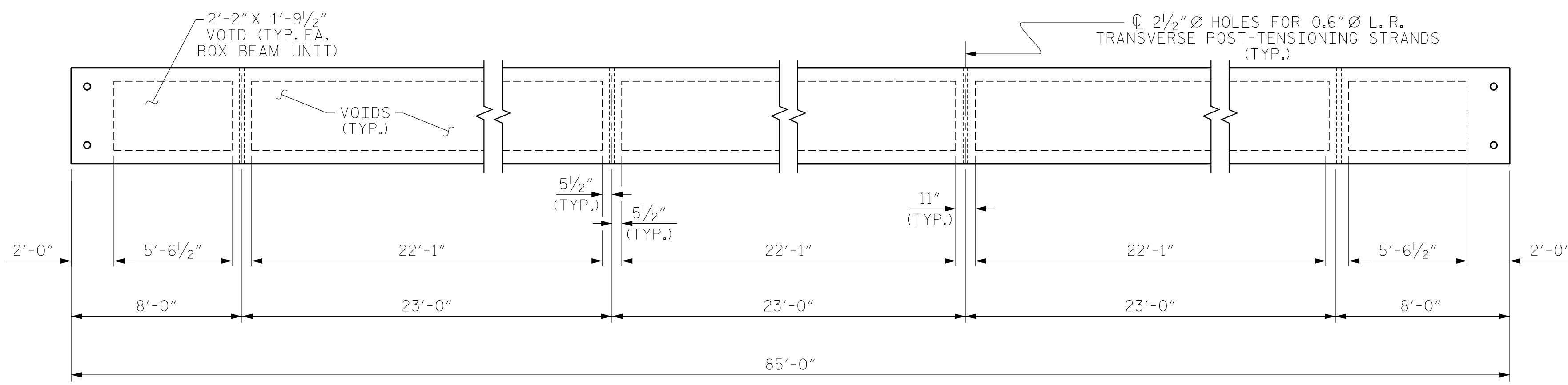
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD:	TVT	DATE :	2/2016
DRAWN BY :	DCE 8/11	REV.	8/14 MAA/TMG
CHECKED BY :	TMG 11/11		

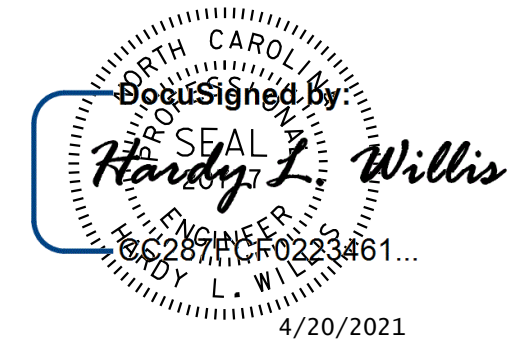


PLAN OF UNIT

(SPAN 'B')



DIAPHRAGM AND VOID LAYOUT



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
438-253-2786

Boone, NC 828-260-9933
Tri-Cities, TN 423-467-8400
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
Milledgeville, KY 606-248-6600
Atlanta, GA 770-427-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

SHEET 2 OF 5

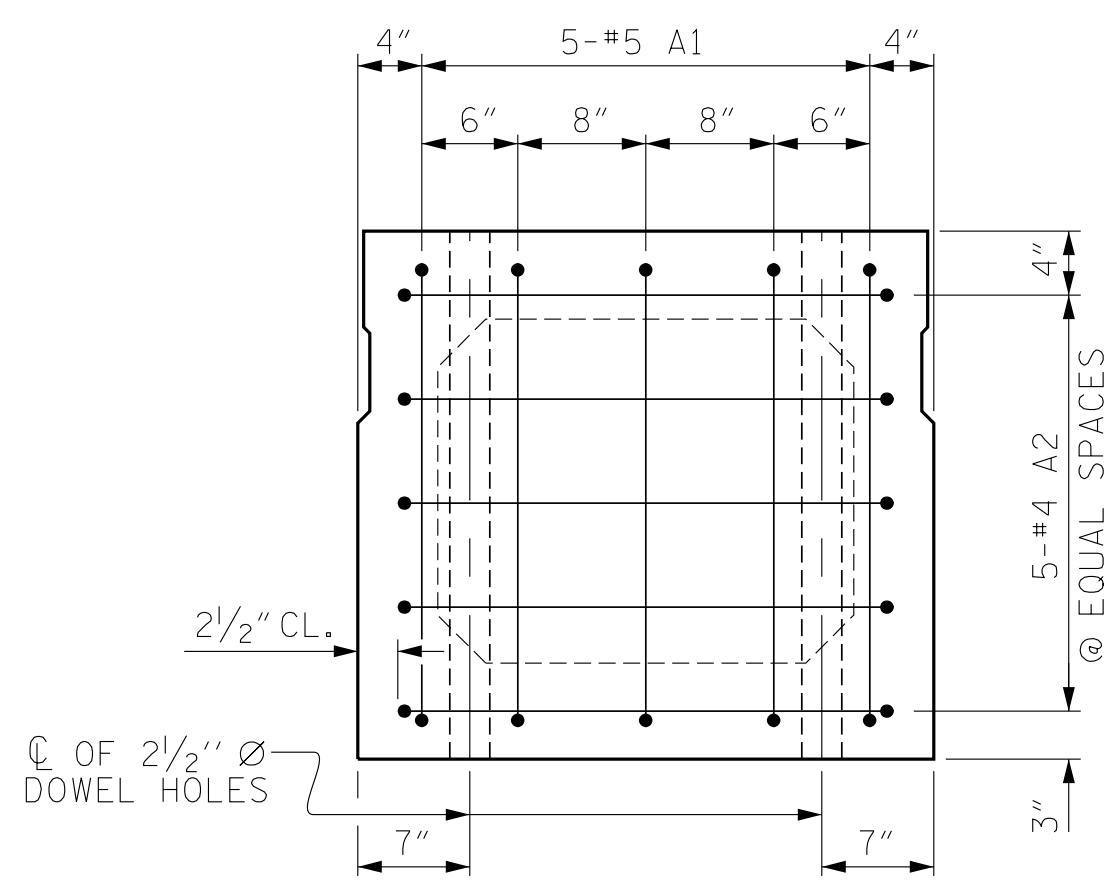
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 85' UNIT
27'-10" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			24

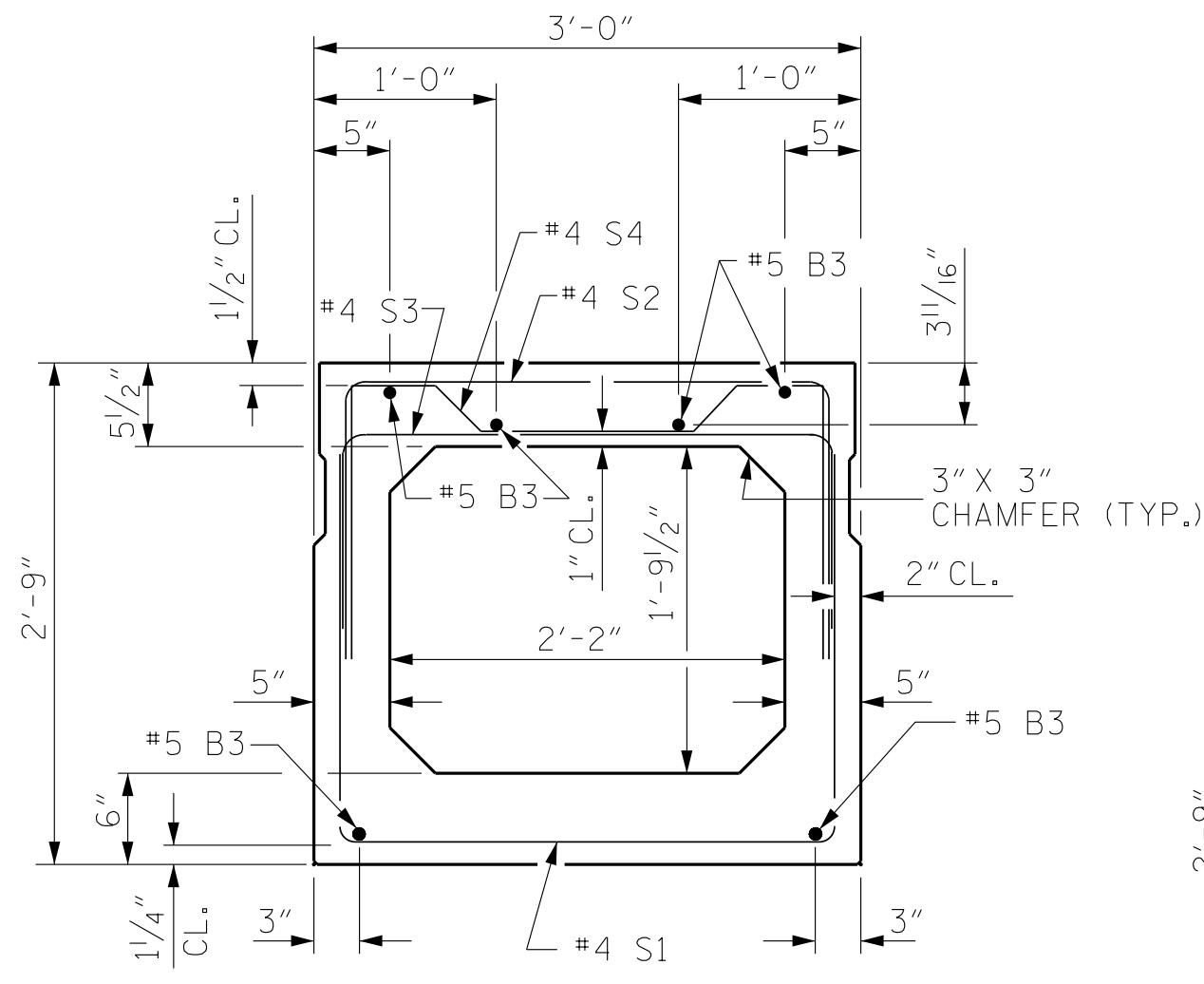
STD.NO.33PCBB_30_90S_85L

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD:	TVT	DATE :	2/2016
DRAWN BY :	DGE 8/II	REV. 8/14	MAA/TMG
CHECKED BY :	TMG II/II		



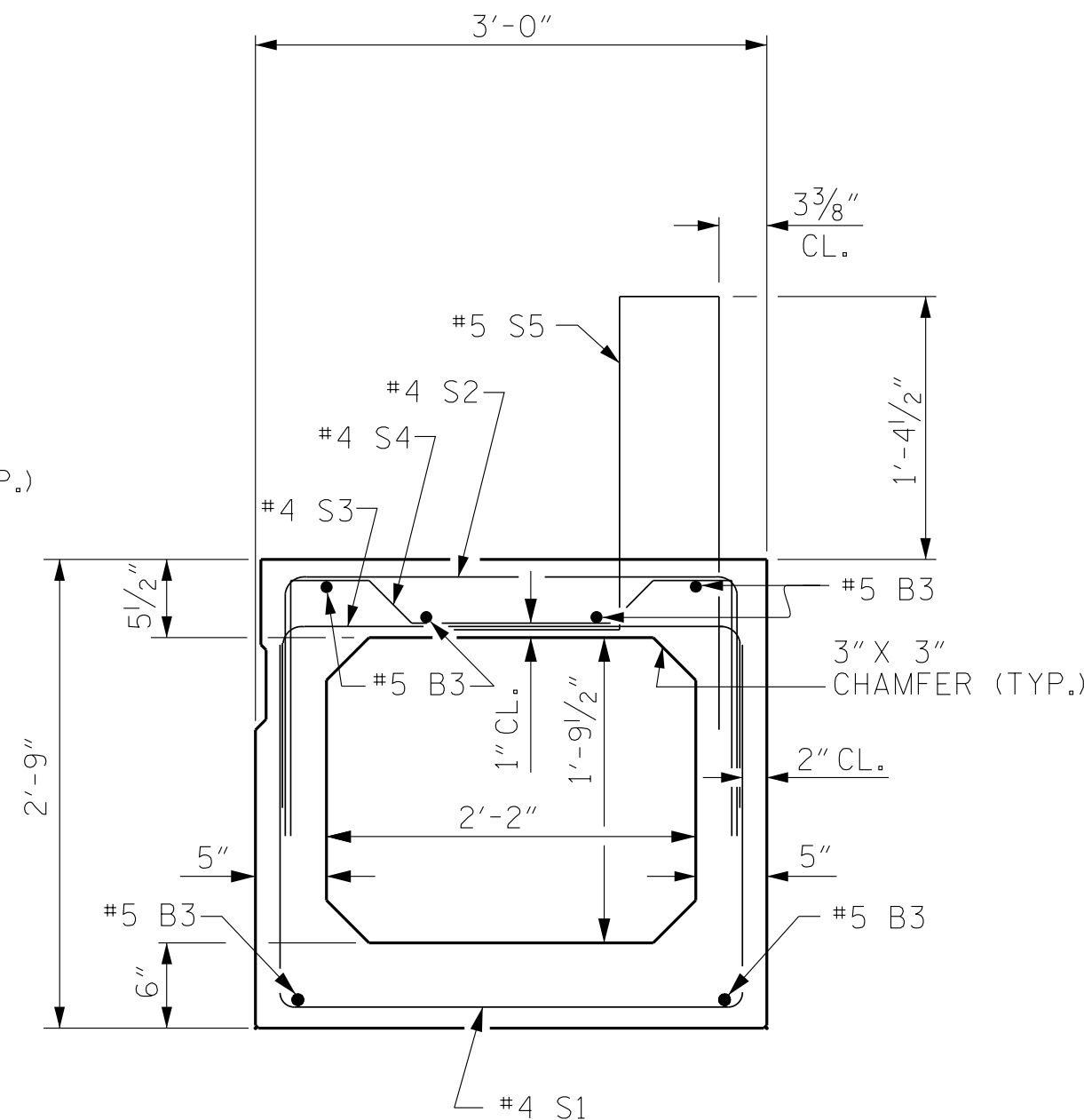
END ELEVATION

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



INTERIOR BOX BEAM SECTION

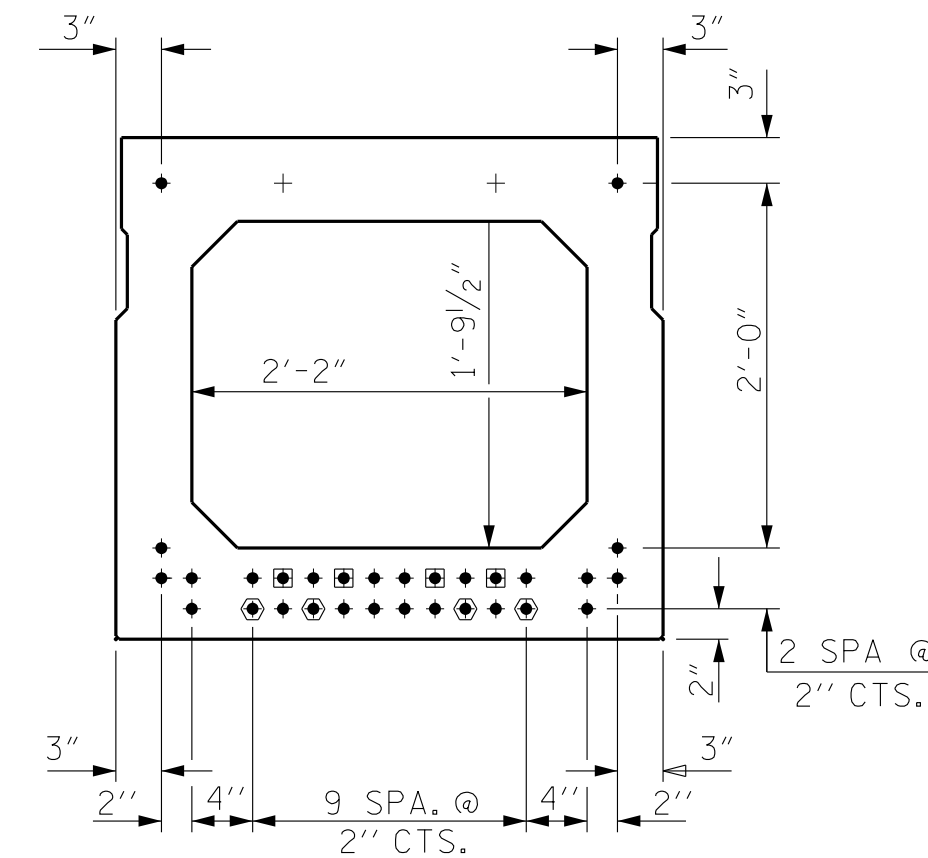
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

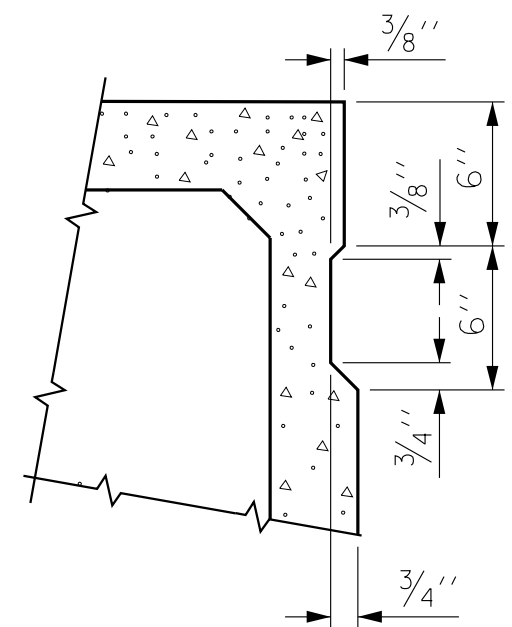
(30 STRANDS REQUIRED)

DEBONDING LEGEND

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

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

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



SHEAR KEY DETAIL

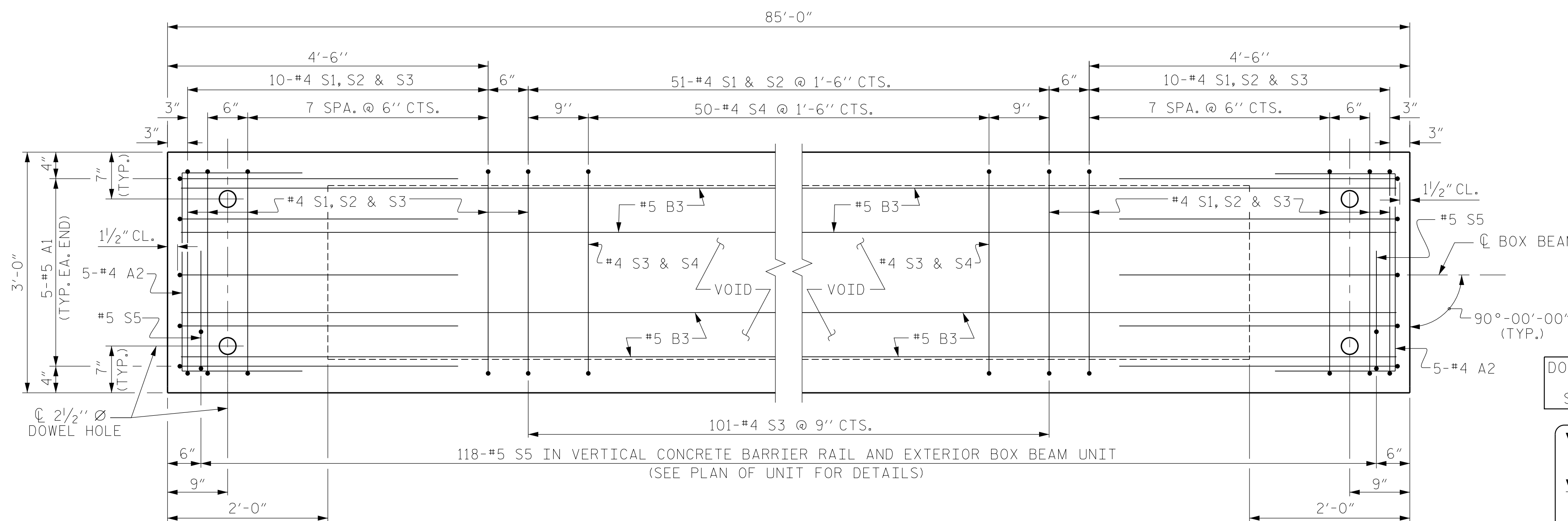
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

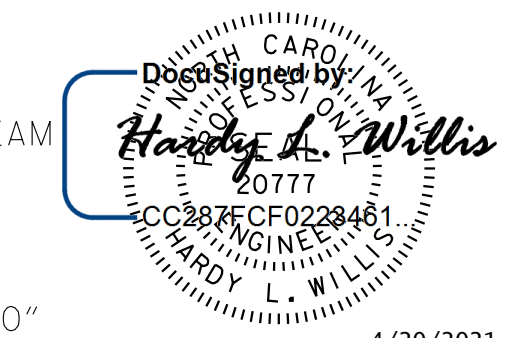
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	34	#4	2	5'-7"	127	5'-7"	127
B3	12	#5	STR	43'-5"	543	43'-5"	543
K1	12	#4	6	6'-2"	49	6'-2"	49
K2	8	#4	STR	2'-7"	14	2'-7"	14
S1	71	#4	3	7'-6"	356	7'-6"	356
S2	71	#4	3	5'-8"	269	5'-8"	269
S3	121	#4	3	4'-10"	391	4'-10"	391
S4	50	#4	4	5'-10"	195	5'-10"	195
* S5	118	#5	5	5'-10"	718	--	--
REINFORCING STEEL				2014	LBS.	2014	LBS.
* EPOXY COATED REINF. STEEL				718	LBS.		
8000 P.S.I. CONCRETE				15.1	CU. YDS.	15.0	CU. YDS.
0.6" Ø L.R. STRANDS				No. 30		No. 30	



PLAN OF BOX BEAM

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

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	DCE IO/II	REV. 9/14	MAA/TMG
CHECKED BY :	TMG II/II		



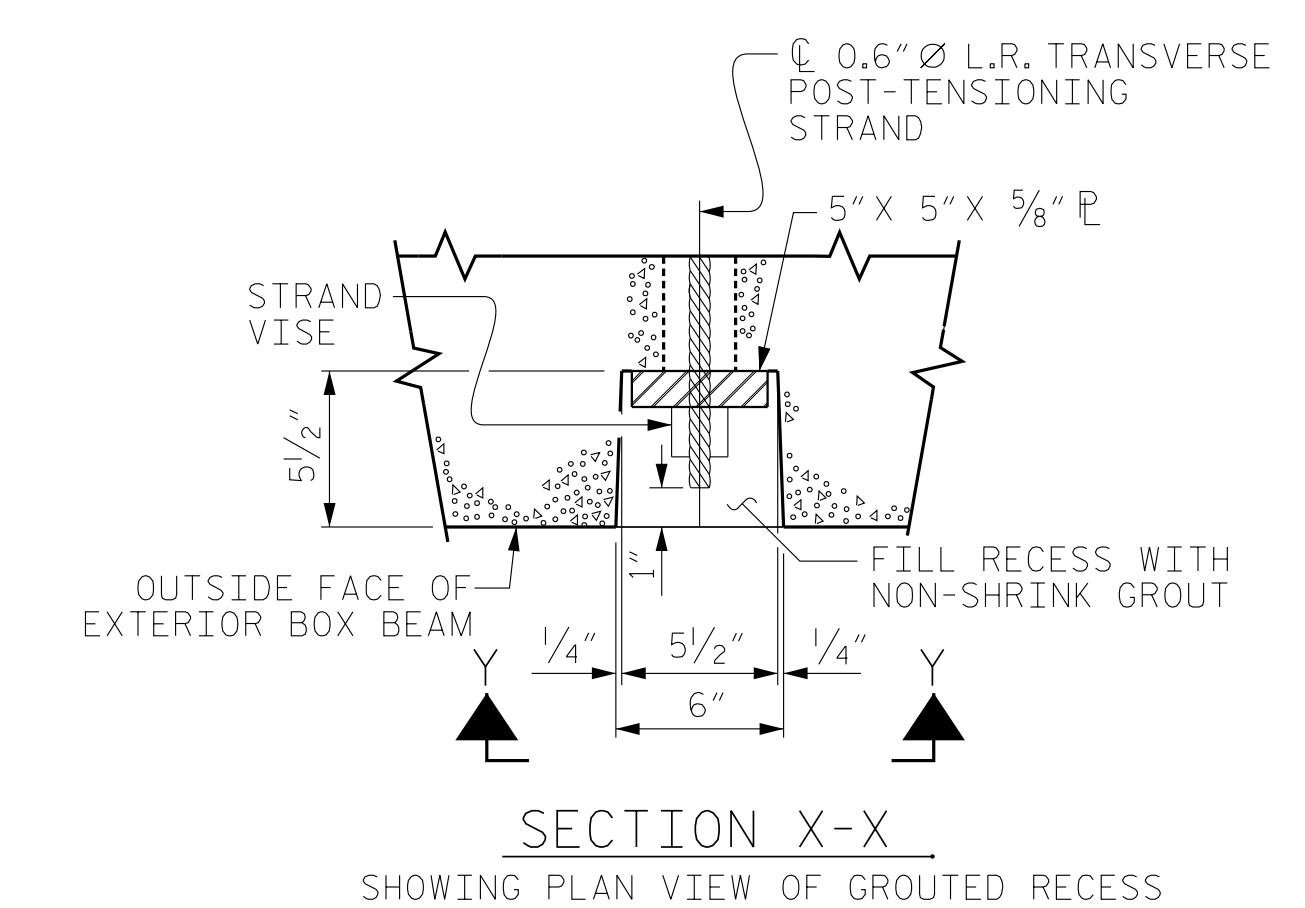
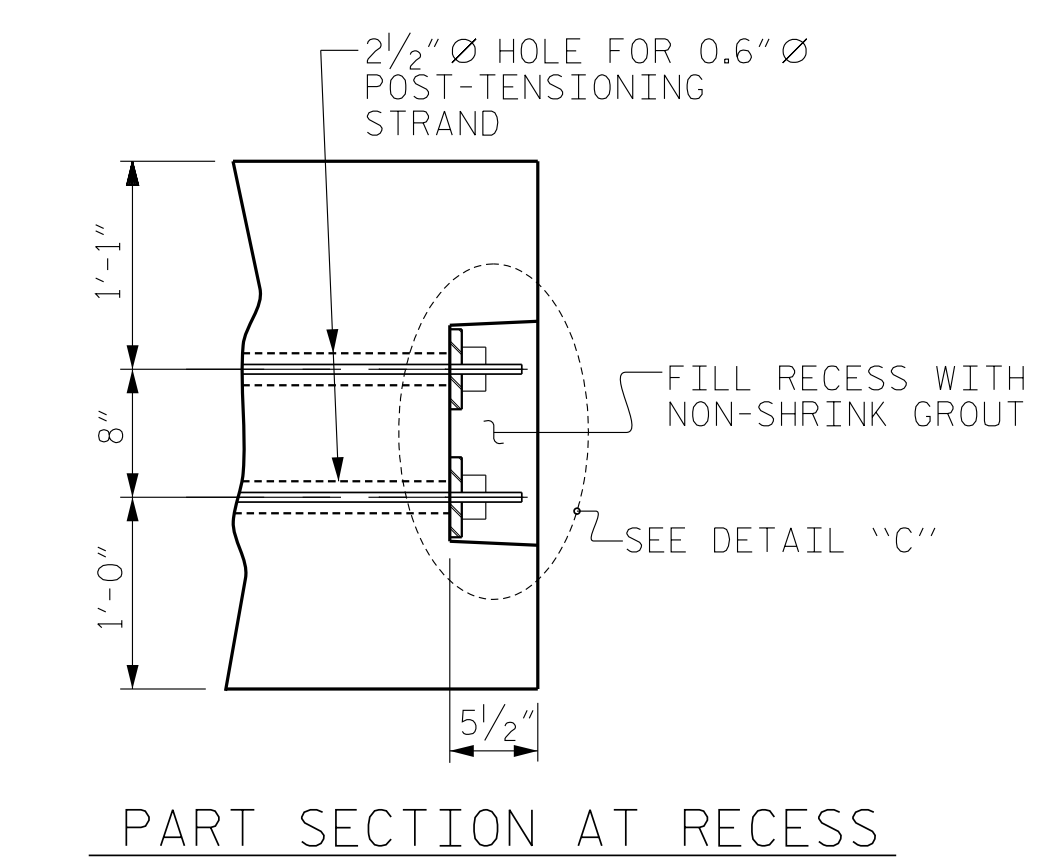
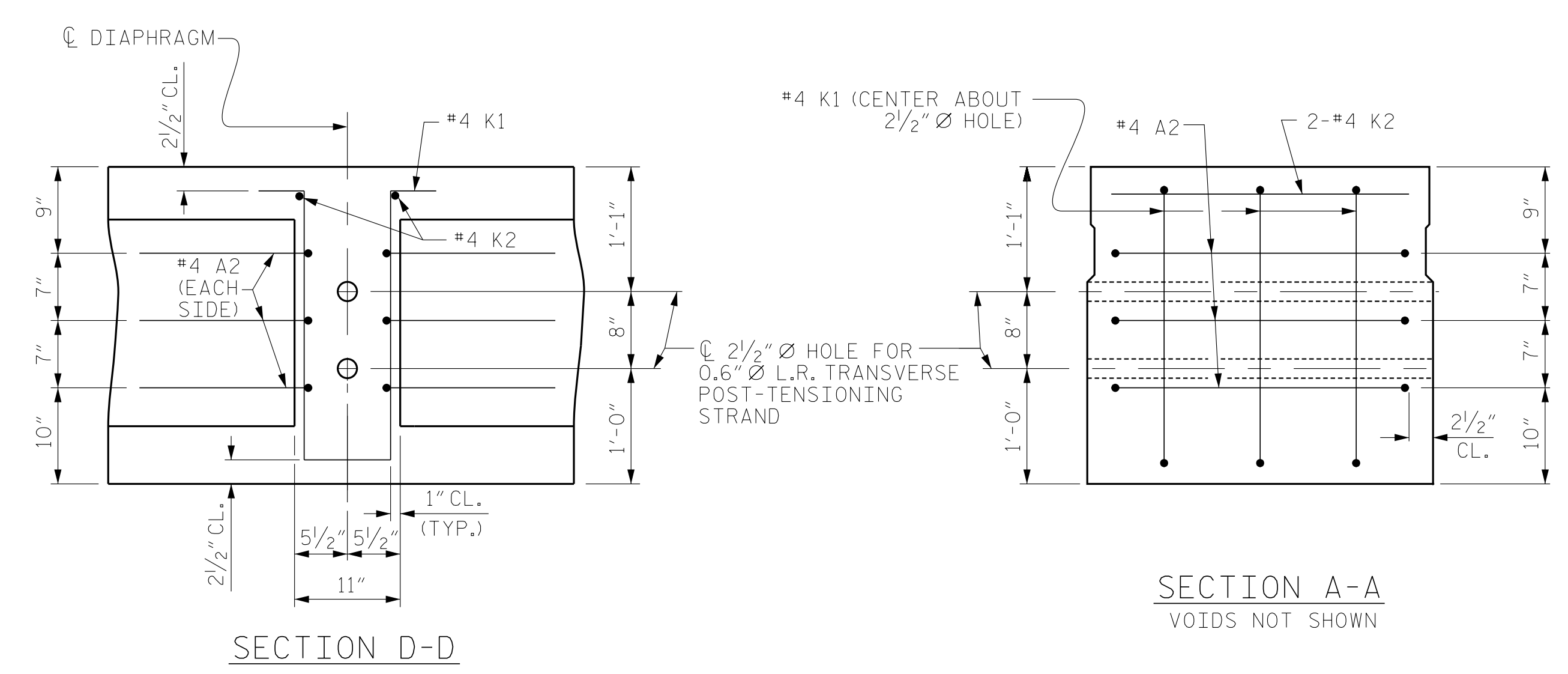
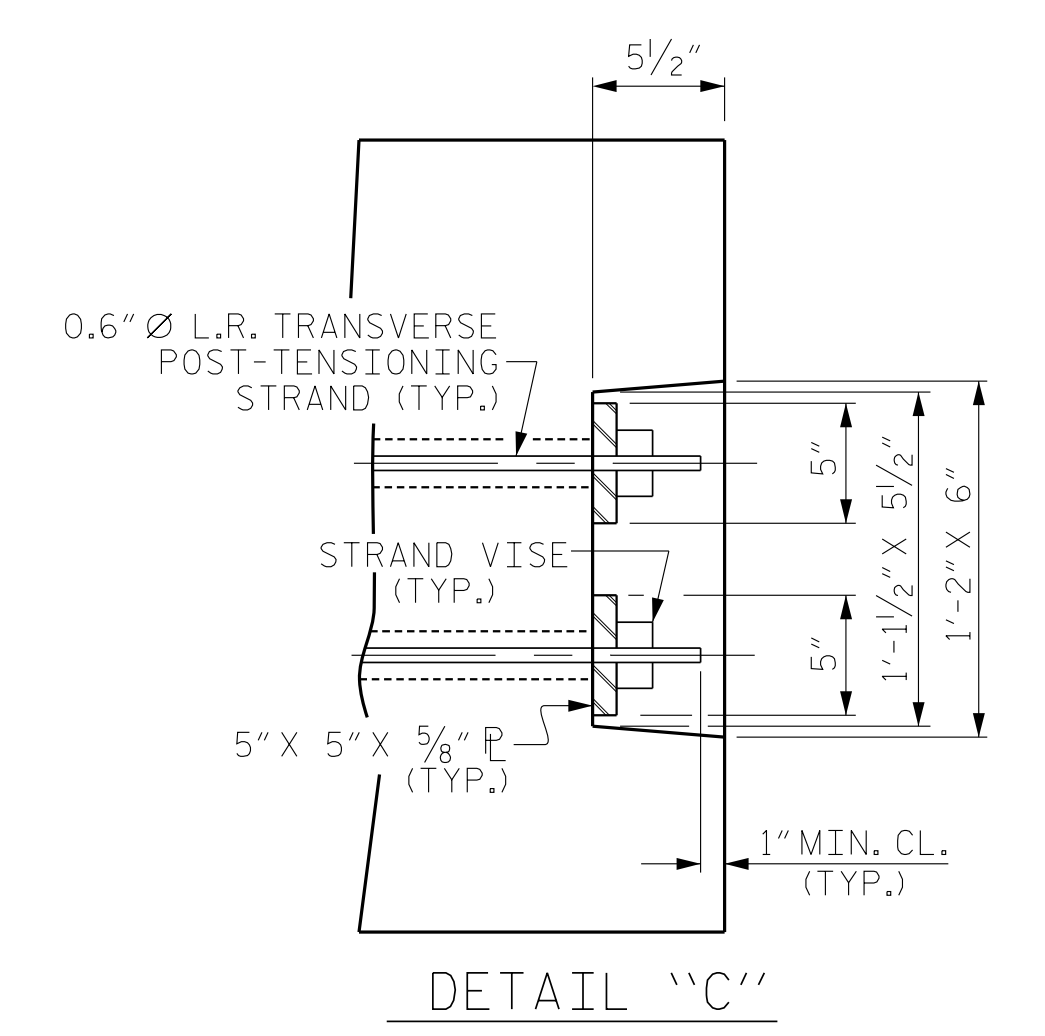
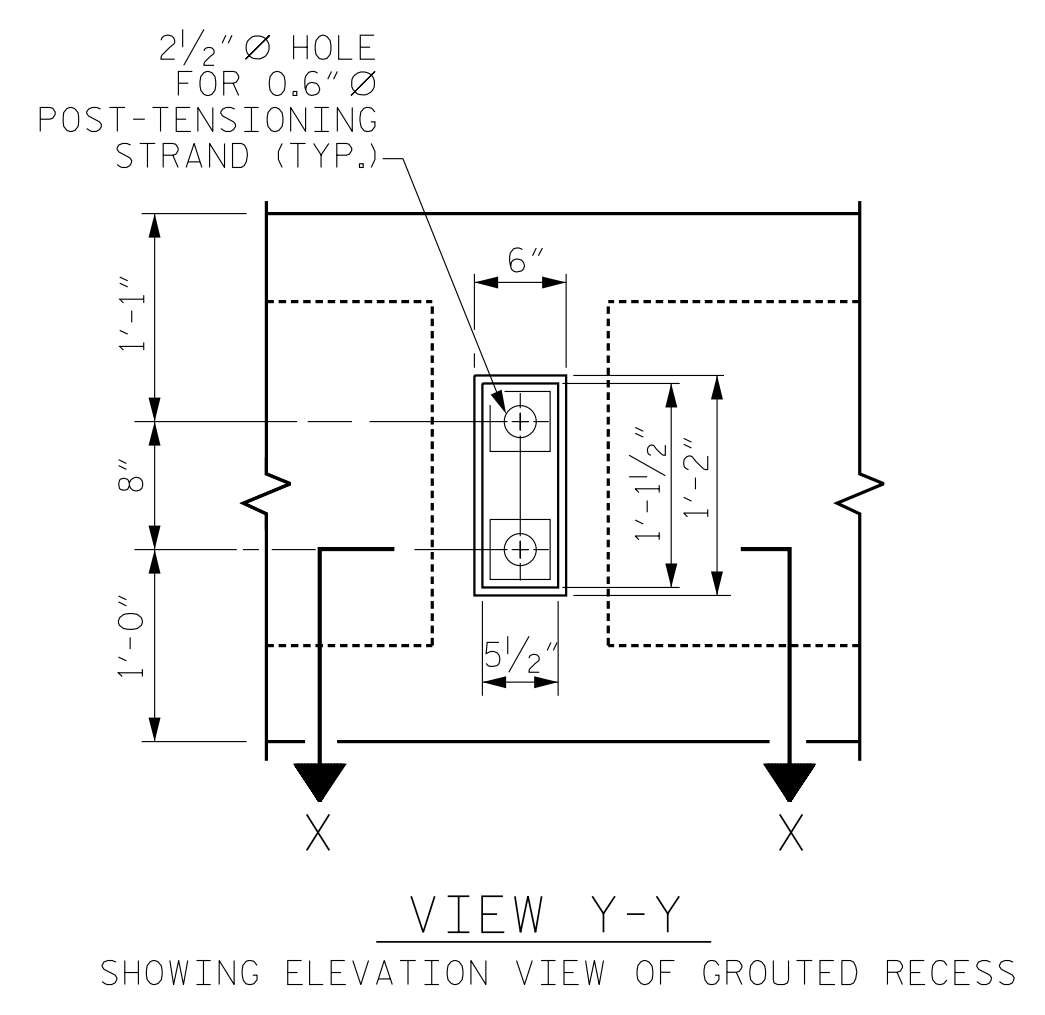
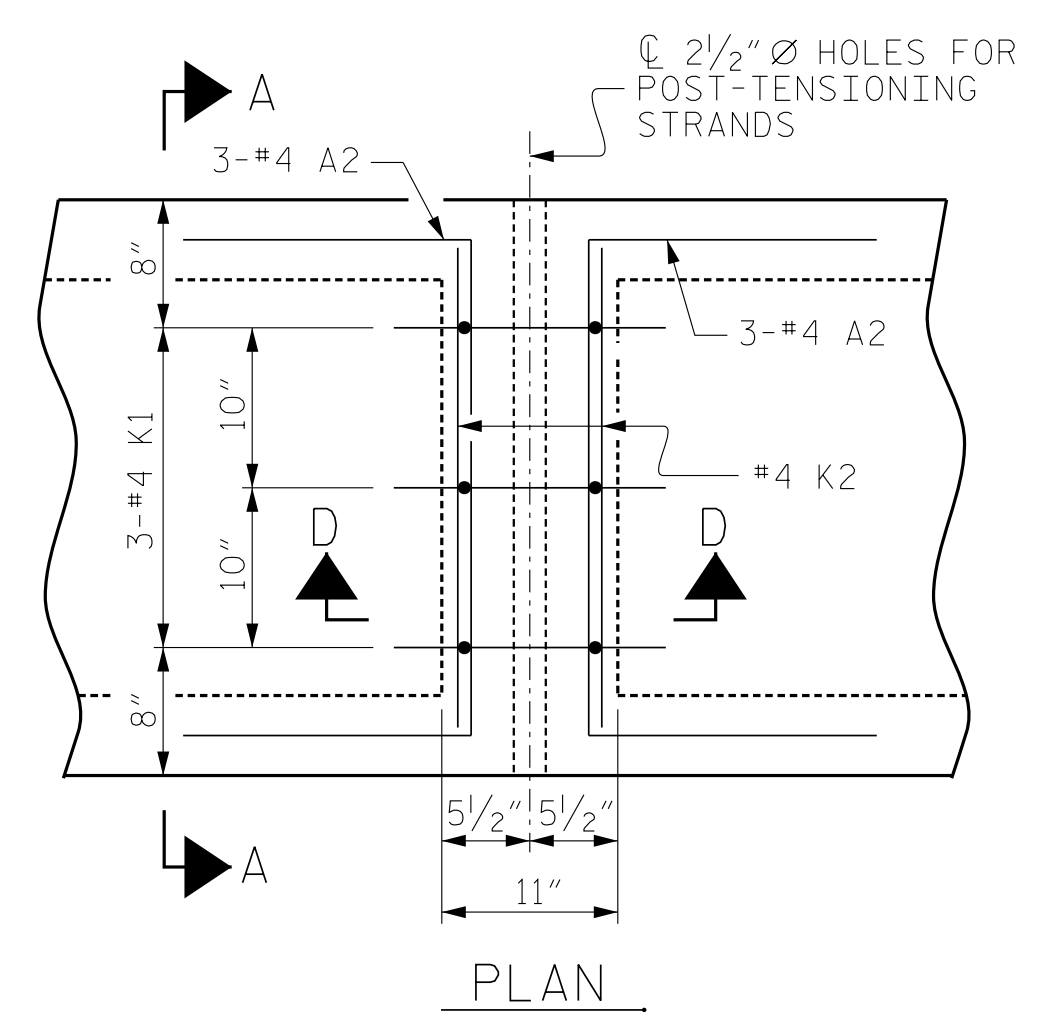
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

SHEET 3 OF 5
 STANDARD
 3'-0" X 2'-9"
 PRESTRESSED CONCRETE
 BOX BEAM UNIT

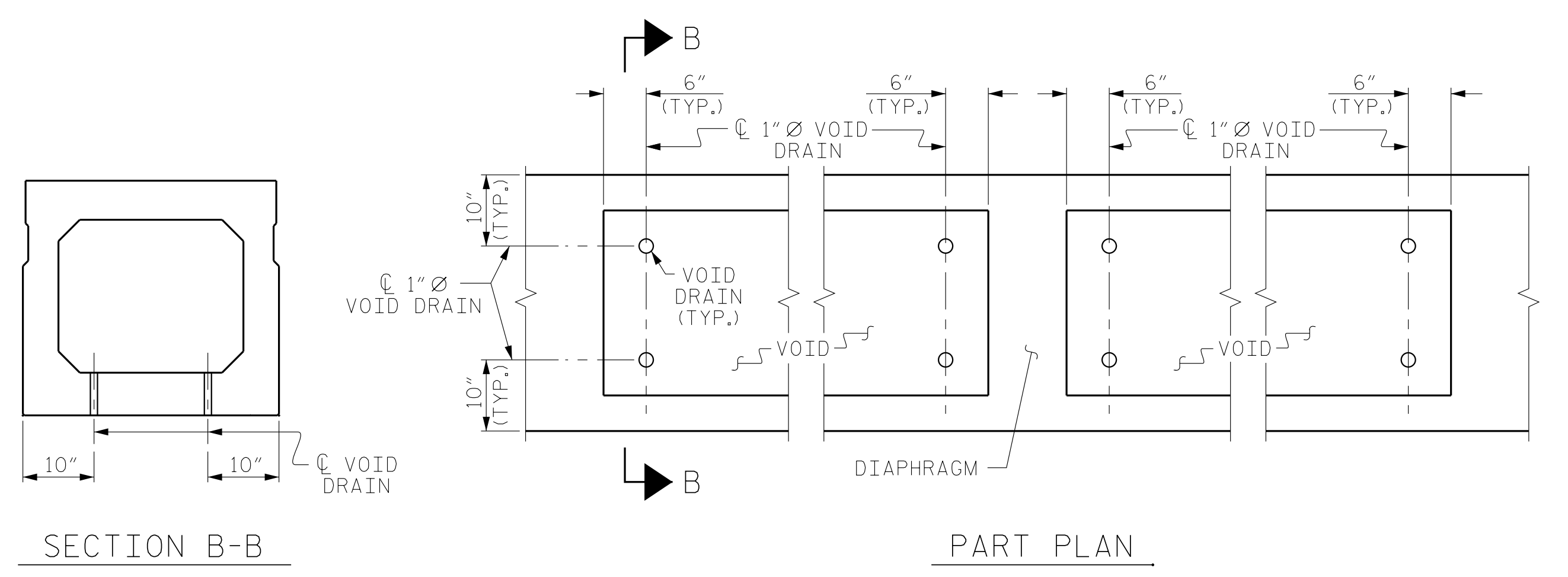
REVISIONS						SHEET NO. S-10
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 24
2			4			



DOUBLE DIAPHRAGM DETAILS

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

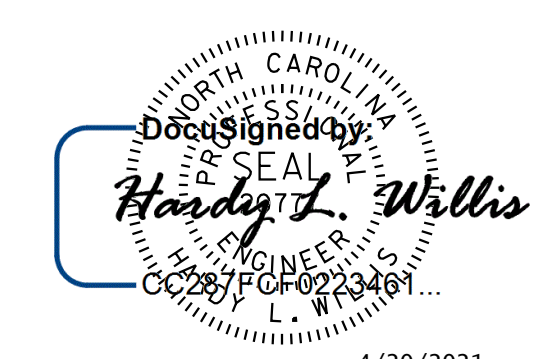
GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM



VOID DRAIN DETAILS
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

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

** INCLUDES FUTURE WEARING SURFACE



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, NC
North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-800
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 803-974-9650
Milledgeville, GA 606-248-6600
Raleigh, NC 919-977-9455
Charlotte, NC 704-357-0488
Atlanta, GA 770-627-3909

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

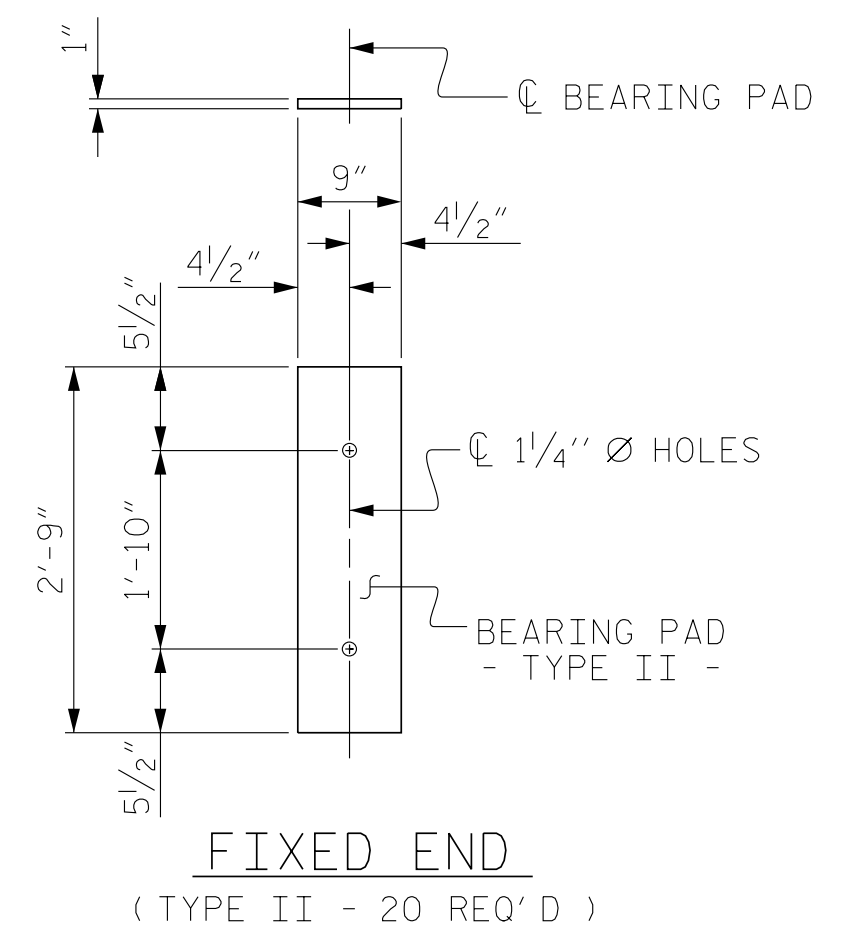
SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

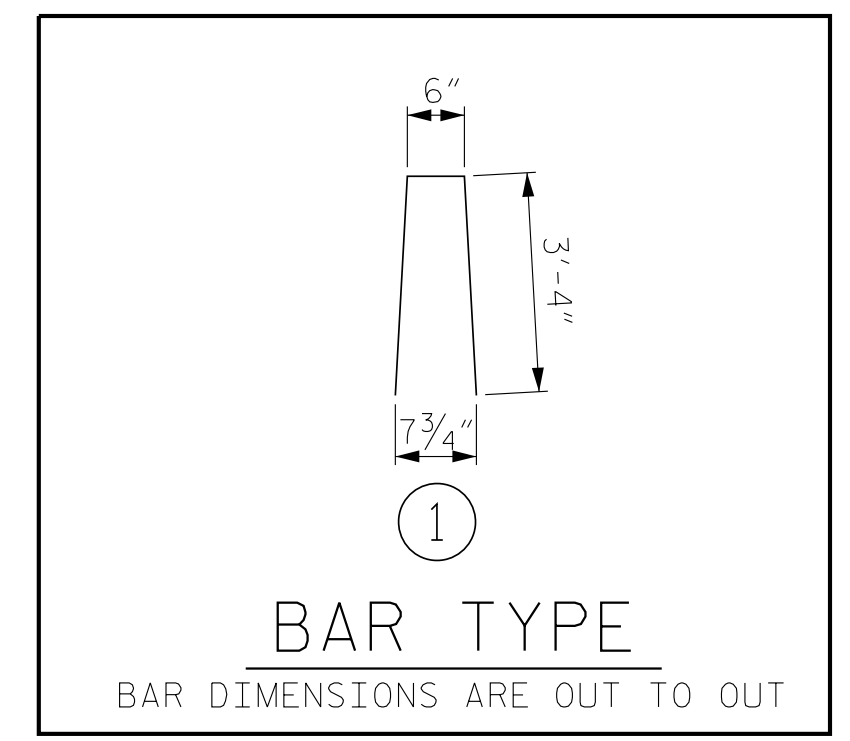
STANDARD
3'-0" X 2'-9"
PRESTRESSED CONCRETE
BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			24

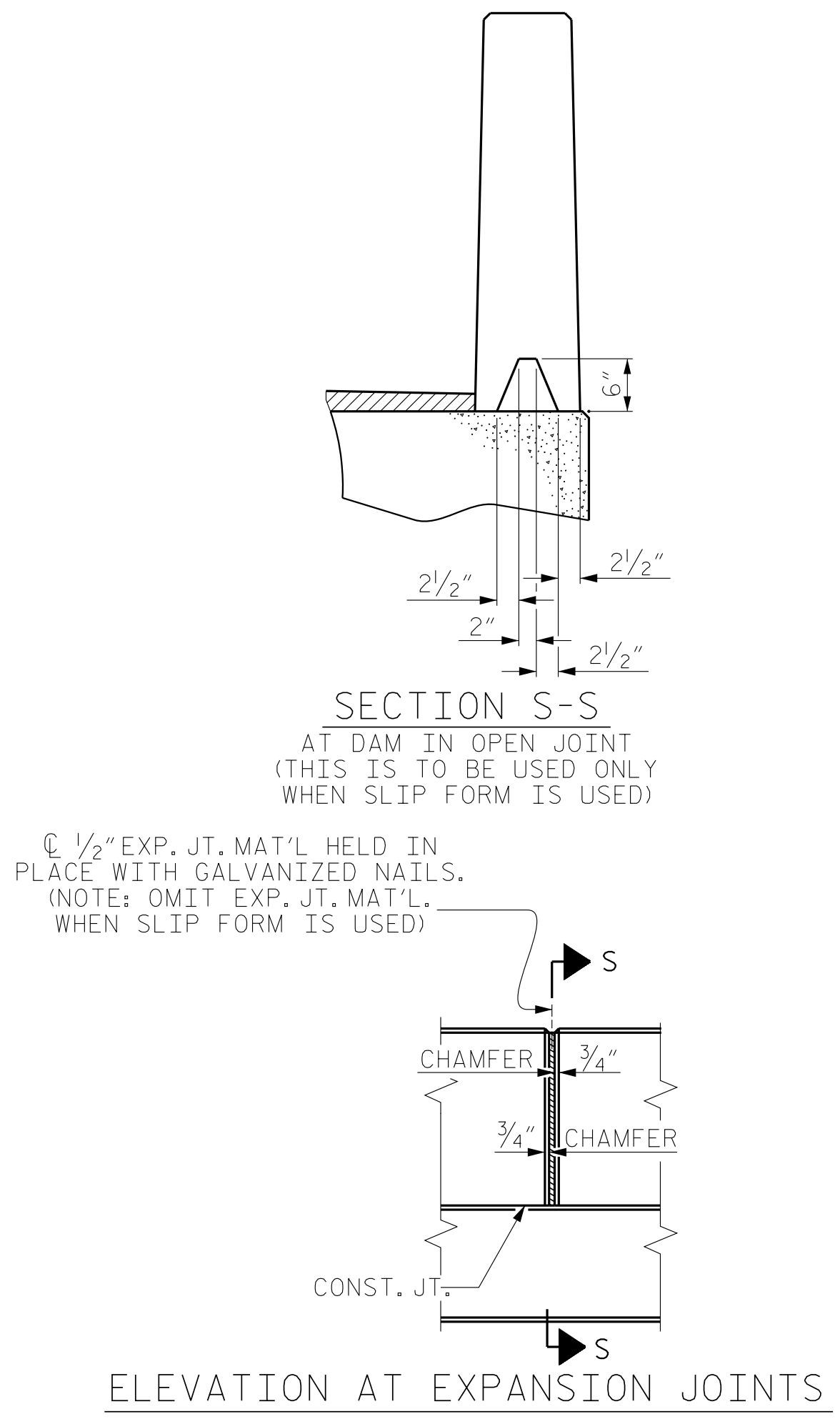
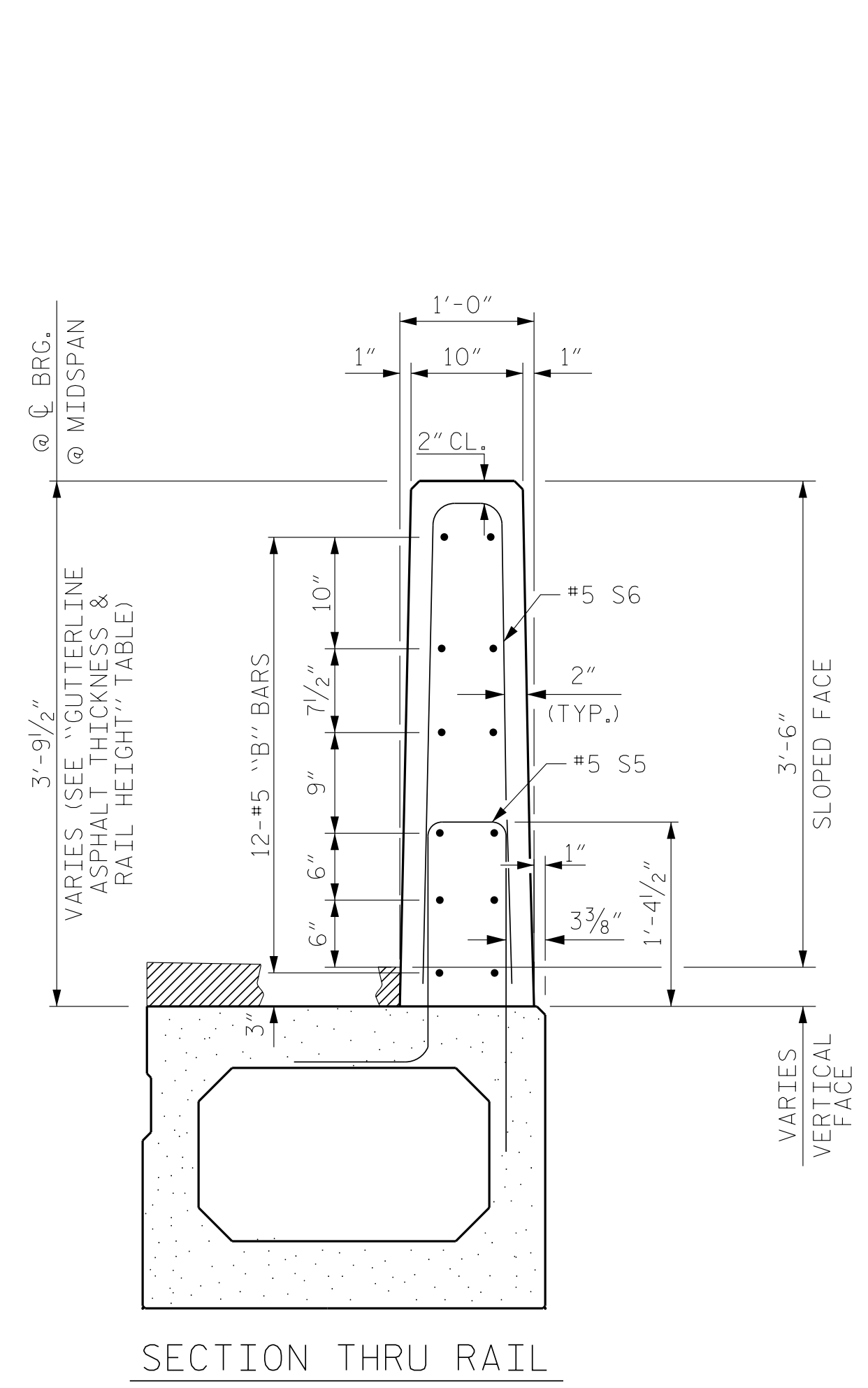
ASSEMBLED BY : RWW	DATE : 2/2016
CHECKED BY : HLW	DATE : 2/2016
ENGINEER OF RECORD: TVT	DATE : 2/2016
DRAWN BY : DCE IO/II	REV. 8/14
CHECKED BY : TMG II/II	MAA/TMG



BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	85'-0"	170'-0"
INTERIOR B.B.	8	85'-0"	680'-0"
TOTAL	10		850'-0"



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



BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	85' UNIT				
* B9	72	#5	STR	27'-11"	2096
* S6	236	#5	1	7'-2"	1764
* EPOXY COATED REINFORCING STEEL				LBS.	3860
CLASS AA CONCRETE				CU.YDS.	22.0
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.	170.0

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
85' UNITS	1 1/2"	3'-7 1/2"

VERTICAL CONCRETE BARRIER RAIL DETAILS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina 608-253-2786

99-977-9455 Raleigh, NC
704-357-0488 Charlotte, NC
410-621-3509 Atlanta, GA

800-351-9933 Tri-Cities, TN
423-467-8401 Knoxville, TN
865-546-5800 Spartanburg, SC
864-574-0775 Charleston, SC
843-974-5660 Midlands, NY
606-248-6600

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

ASSEMBLED BY : RWW	DATE : 2/2016
CHECKED BY : HLW	DATE : 2/2016
ENGINEER OF RECORD: TVT	DATE : 2/2016
DRAWN BY : DCE IO/II	REV. 5/18
CHECKED BY : TMG II/II	MAA/TMG

NOTES

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

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

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

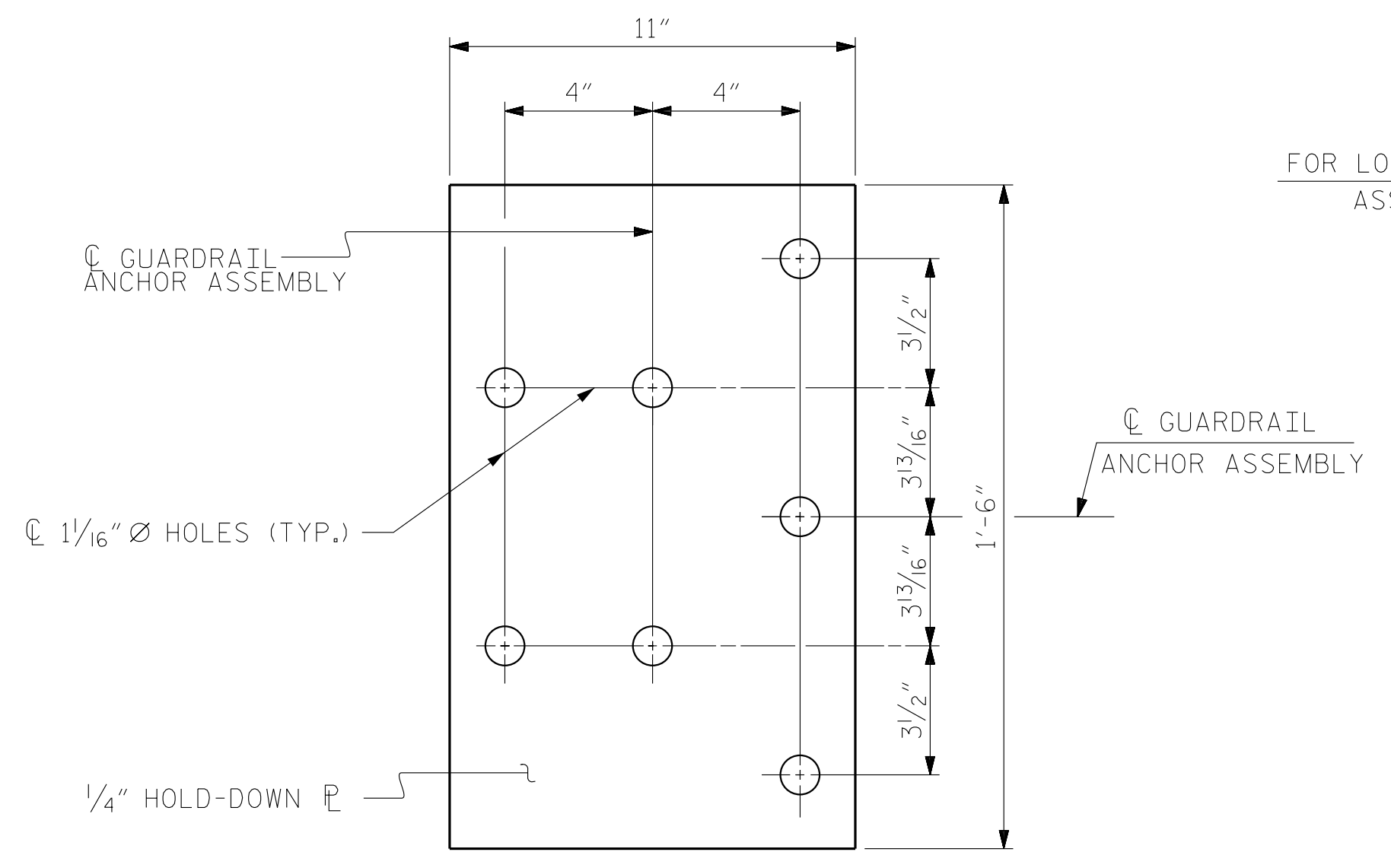
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

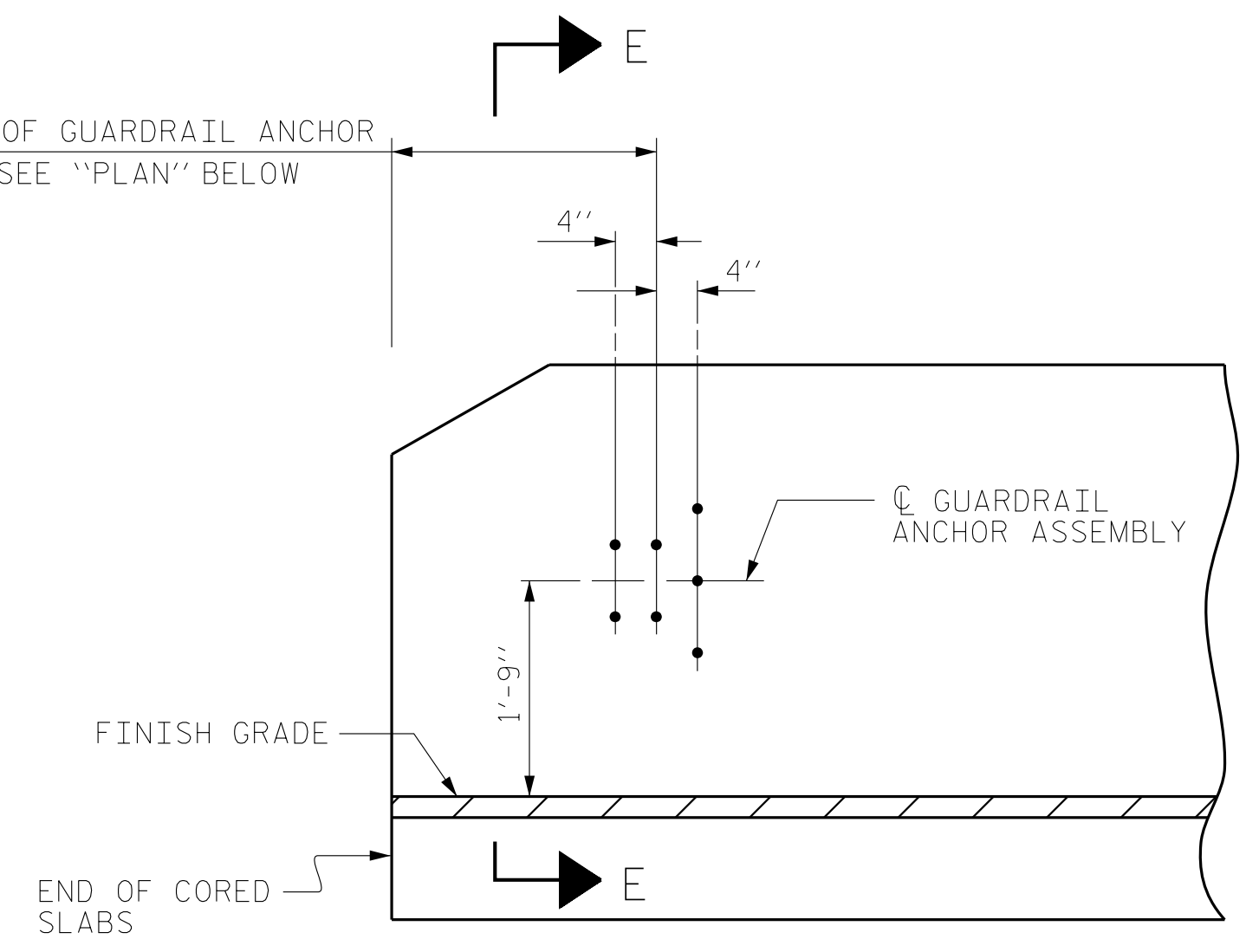
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

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

THE 1 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.

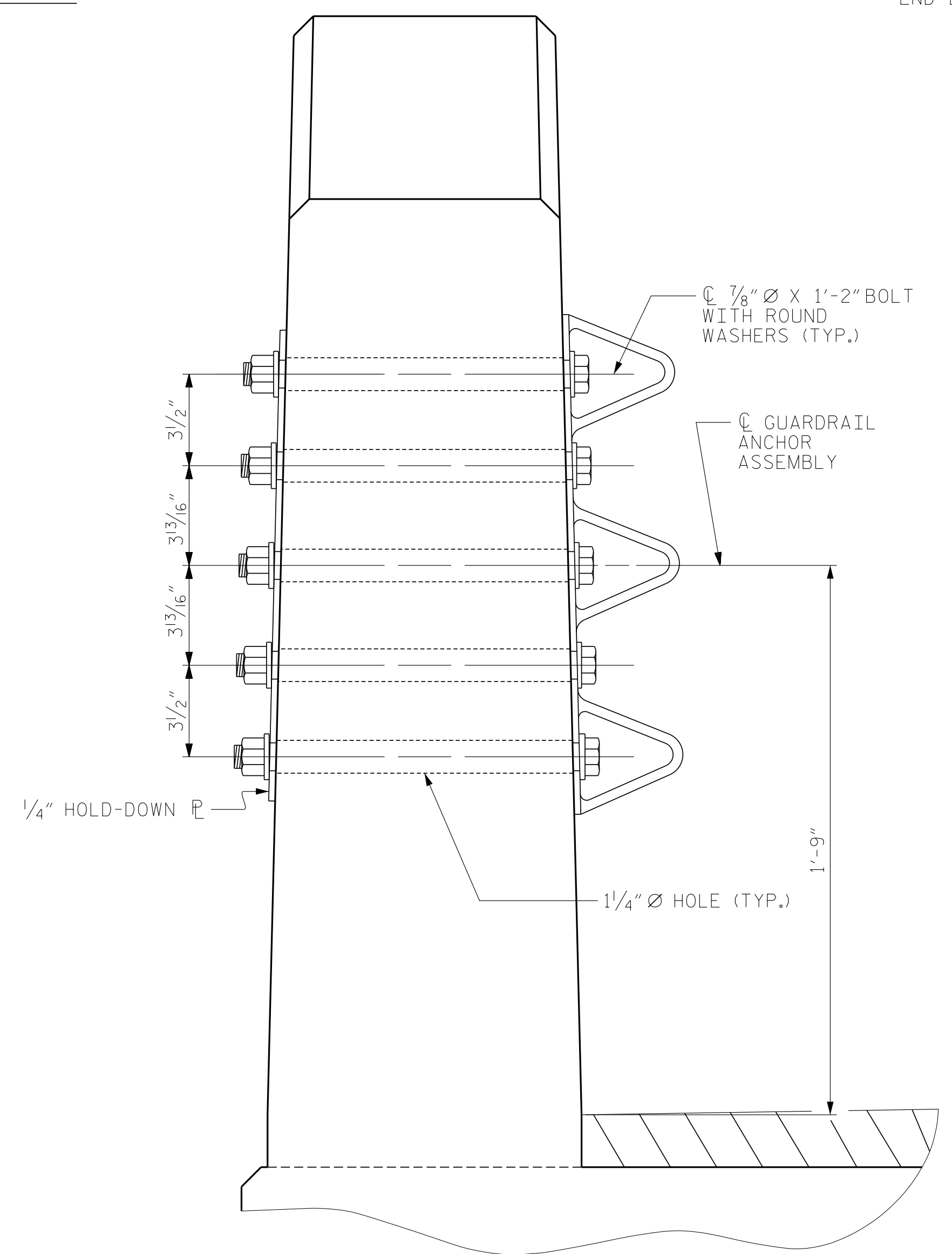


PLAN

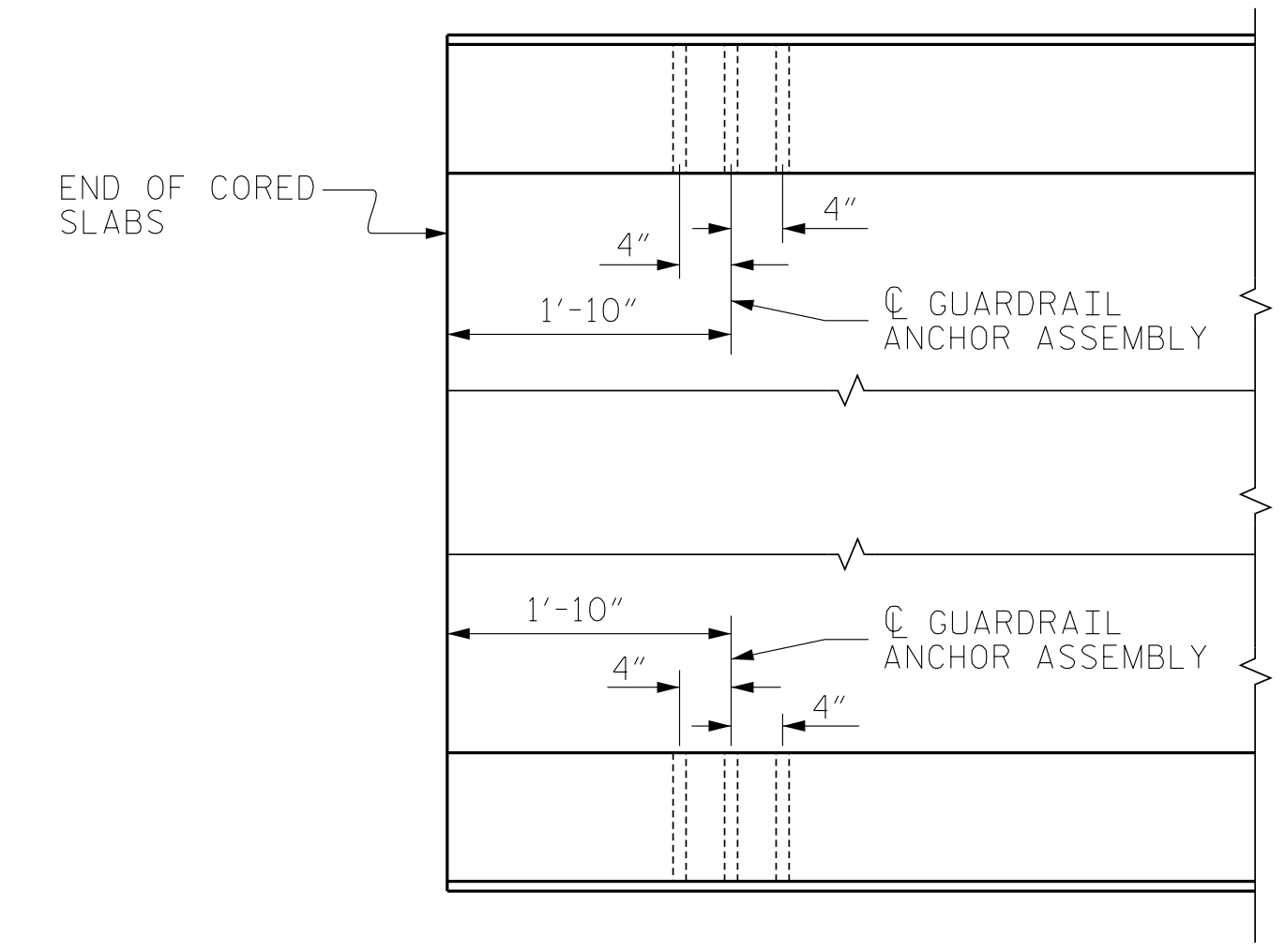


ELEVATION

END BENT #1 SHOWN, END BENT #2 SIMILAR.



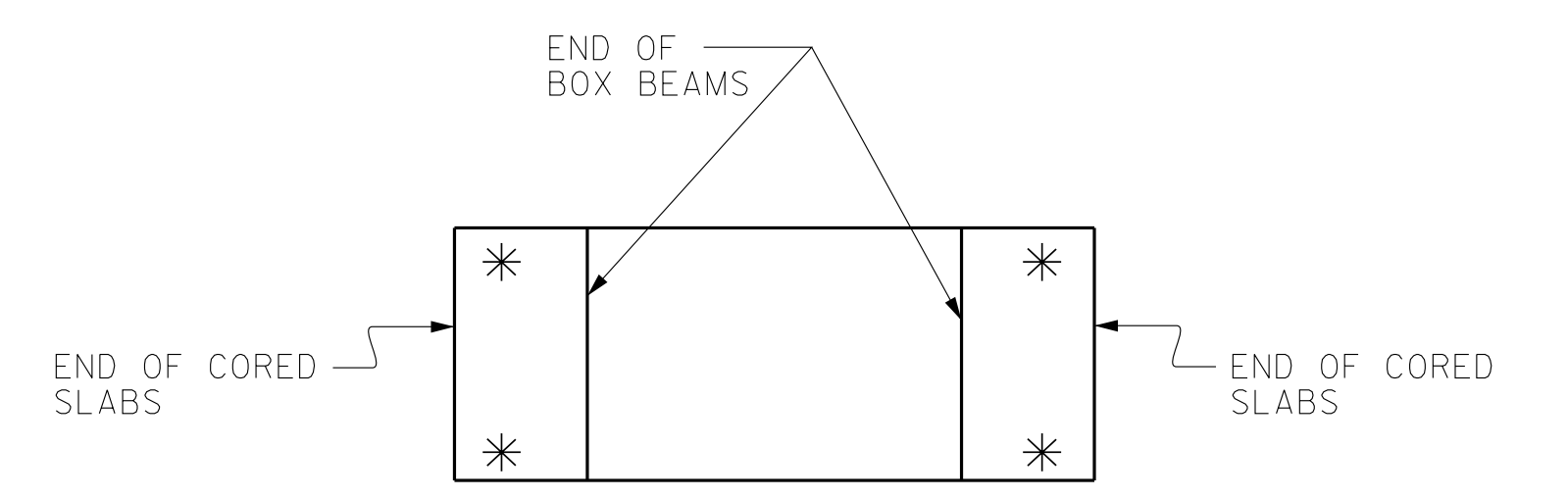
SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

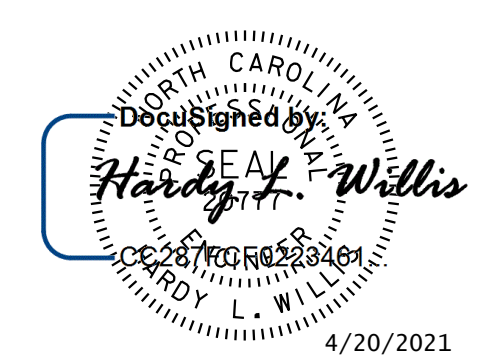
LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina 828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 823-467-8400
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4175
Charleston, SC 843-974-5650
Middleboro, KY 606-248-6600
Atlanta, GA 770-627-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE
FOR VERTICAL CONCRETE
BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	MAA 5/10	REV. 12/5/11	MAA/GM
CHECKED BY :	GM 5/10	REV. 6/13	MAA/GM
		REV. 5/18	MAA/TMG

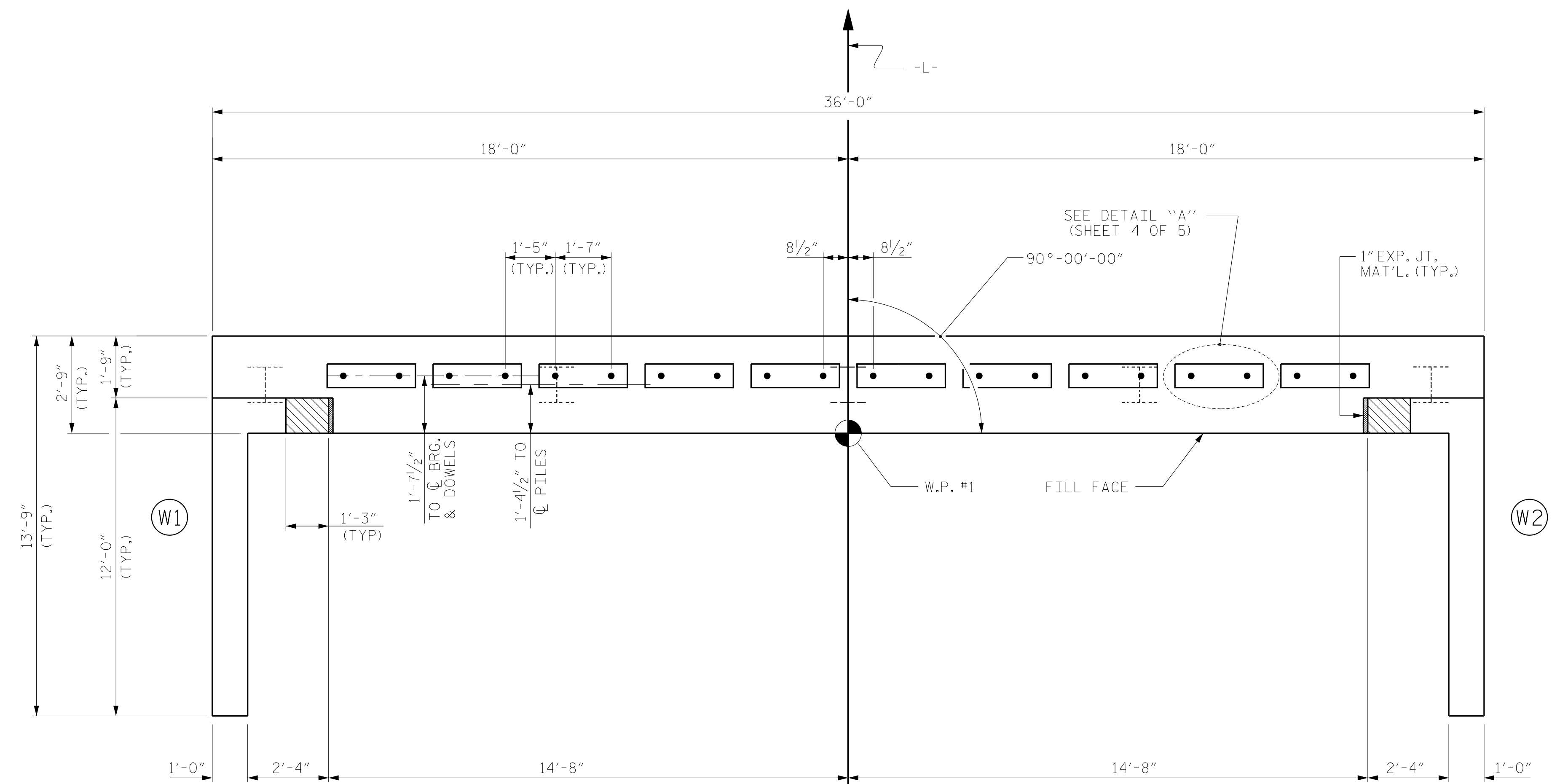
NOTES

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

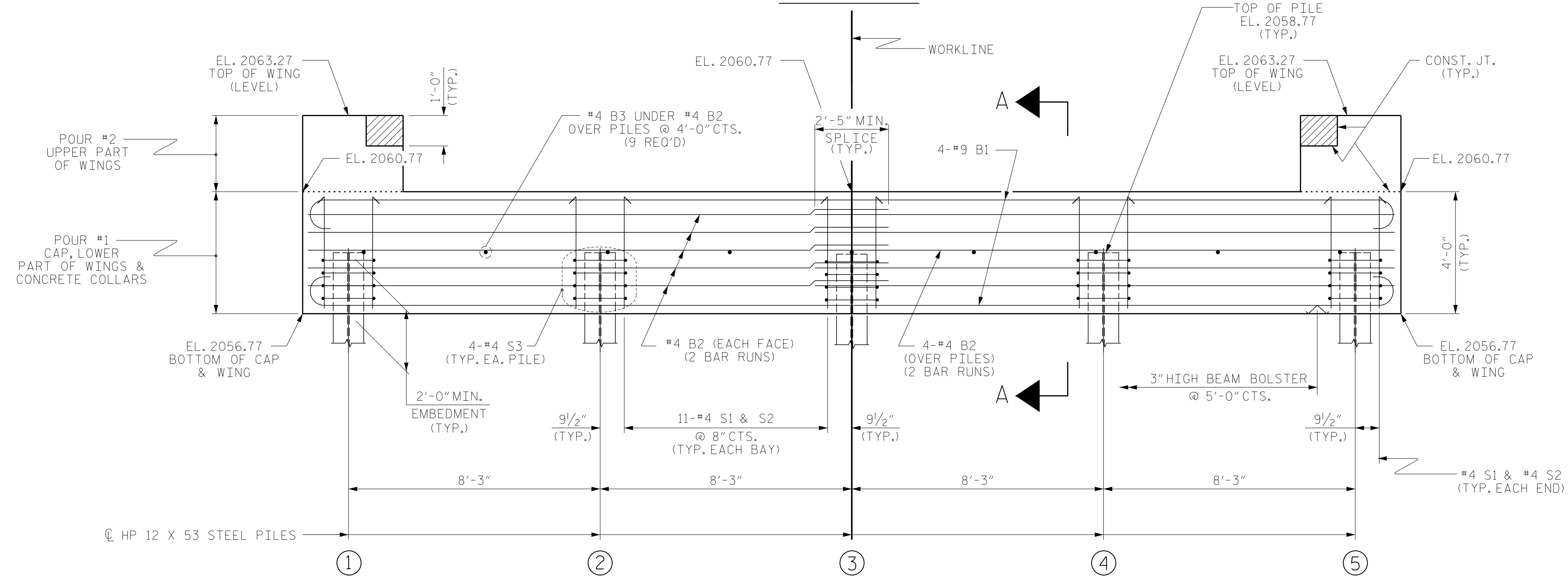
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 5.

FOR WING DETAILS, SEE SHEETS 3 OF 5 AND 4 OF 5.



PLAN



ELEVATION

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/20/2021

V&M
Vaughan & Melton
Consulting Engineers

Asheville, North Carolina 828-253-2796

- Boone, NC 828-900-9935
- Tri-Cities, TN 423-467-8400
- Knockville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
- Middlesboro, KY 606-248-6600
- Atlanta, GA 770-627-3559

Copyright © 2006 Vaughan & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1

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

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	WJH 12/II	REV.	4/15
CHECKED BY :	AAC 12/II		MAA/TMG

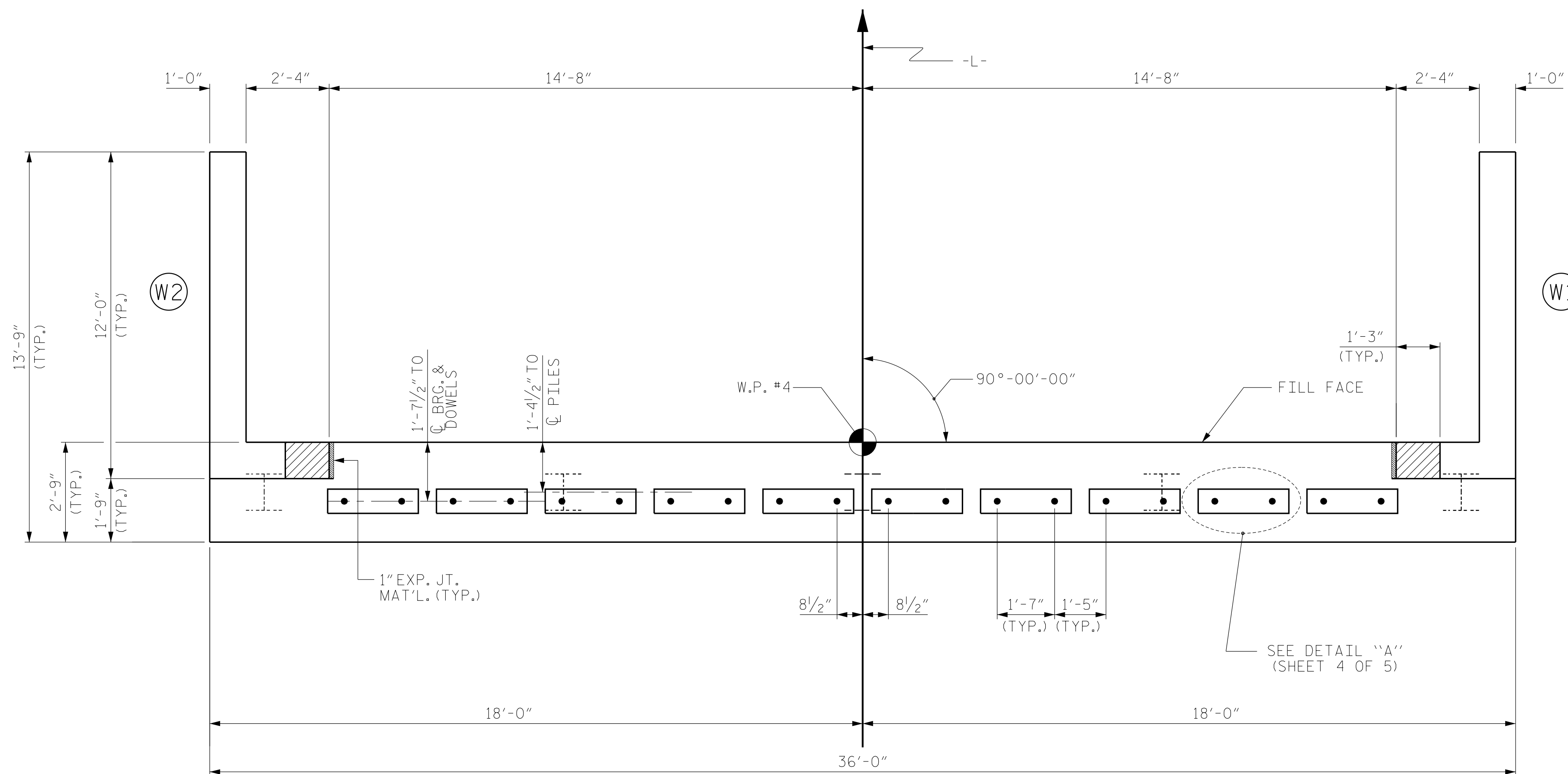
NOTES

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

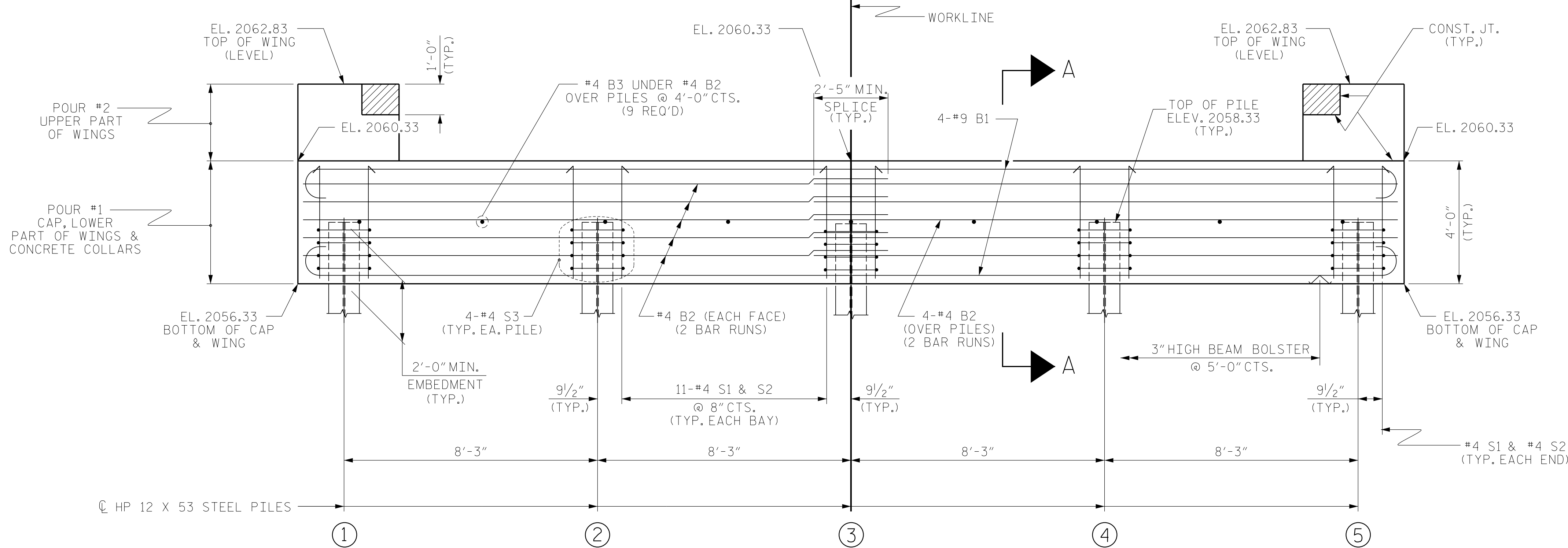
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 5.

FOR WING DETAILS, SEE SHEETS 3 OF 5 AND 4 OF 5.

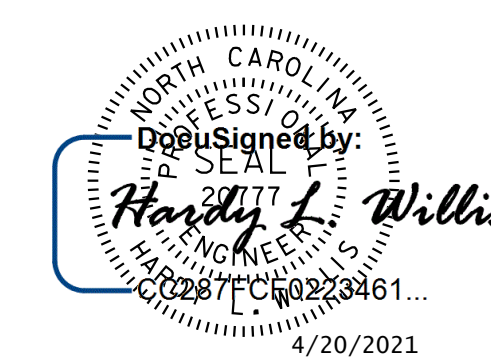


PLAN



ELEVATION

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
 Vaughn & Melton
 Consulting Engineers
 Asheville, North Carolina
 828-253-2796

Boone, NC 828-355-9933
 Tri-Cities, TN 628-627-9420
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4775
 Charleston, SC 843-974-5650
 Mississippi, MS 606-248-6600
 Raleigh, NC 919-977-9455
 Charlotte, NC 704-357-0488
 Atlanta, GA 770-627-3509

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

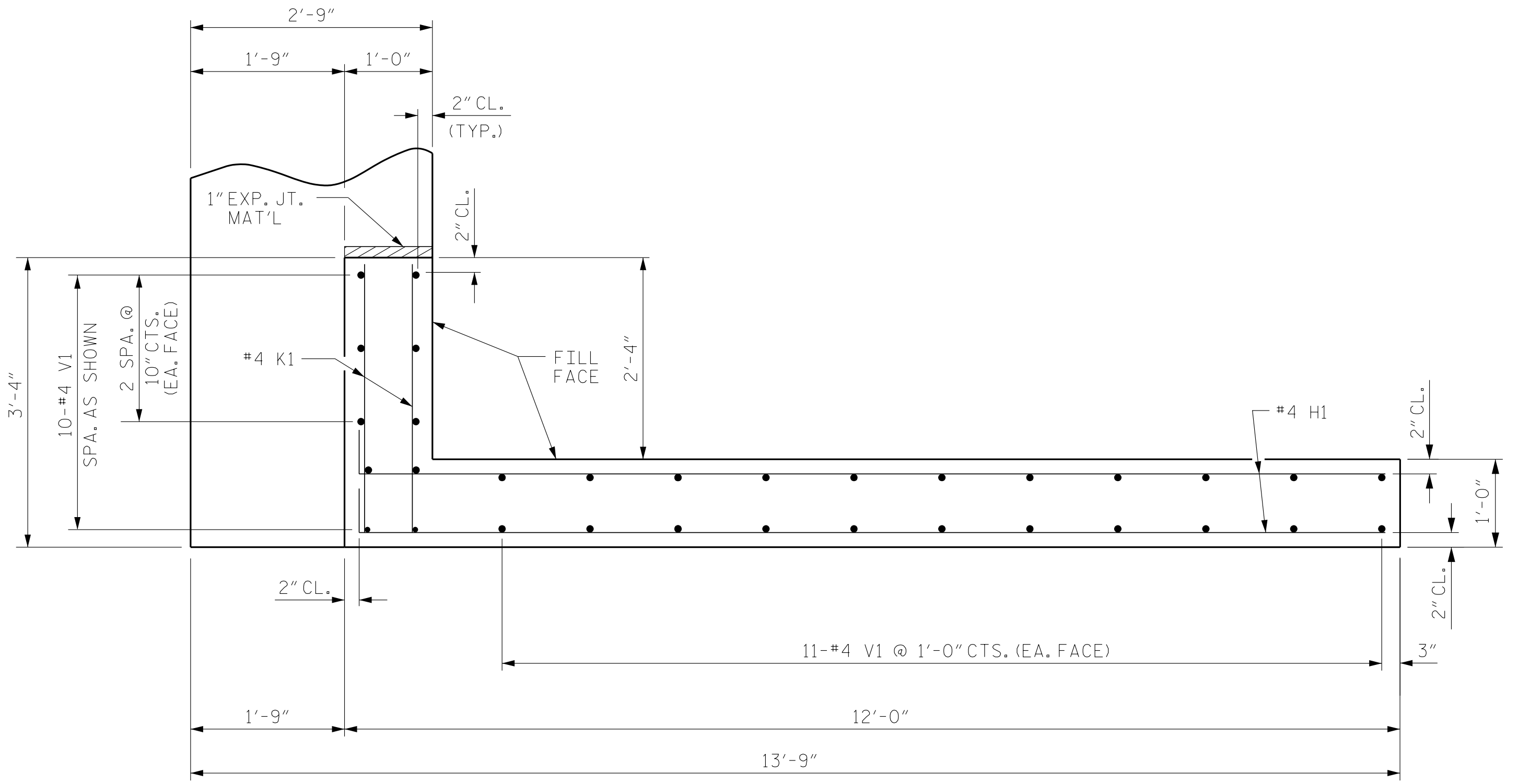
SHEET 2 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

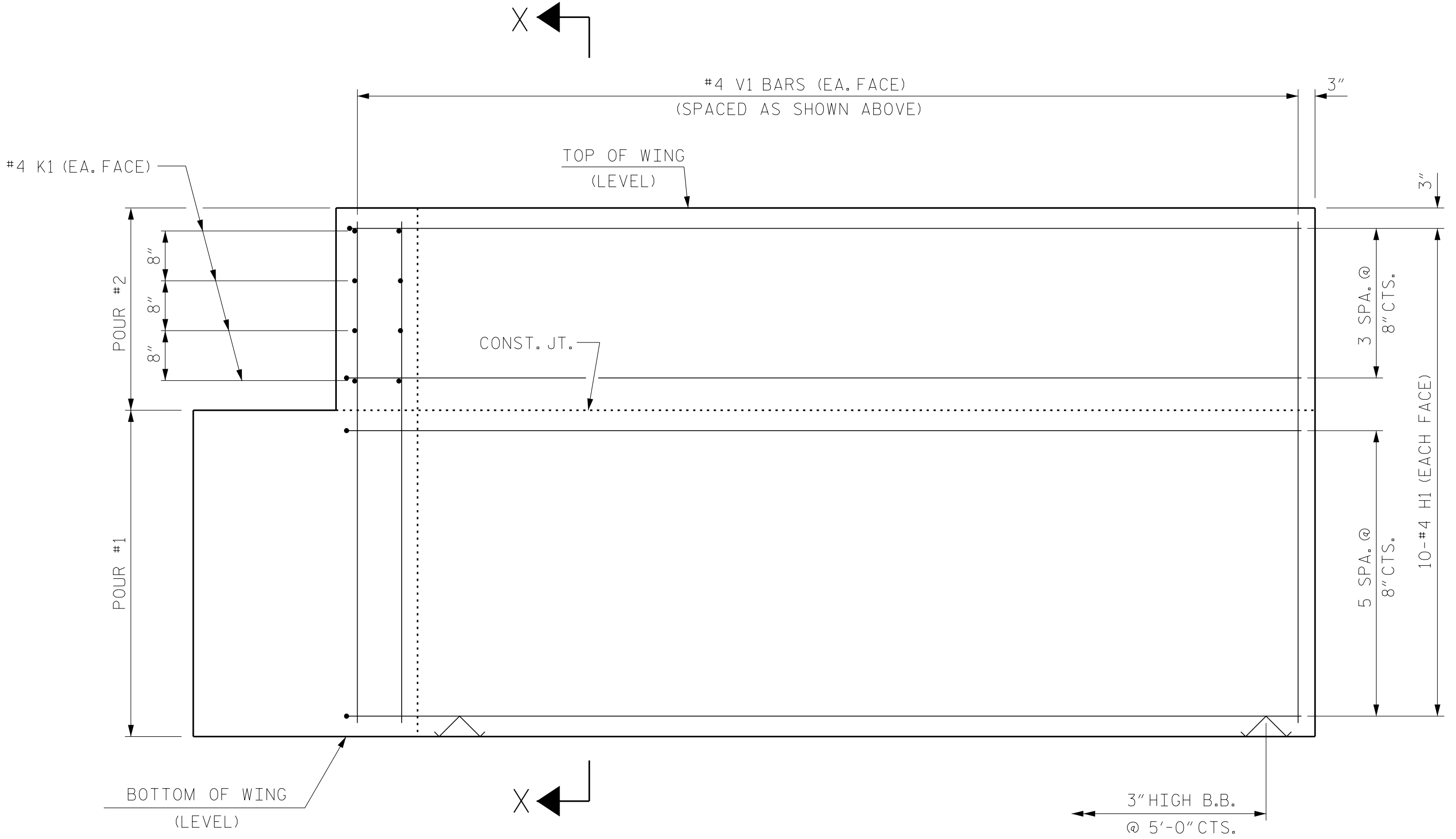
SUBSTRUCTURE
 END BENT No. 2

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

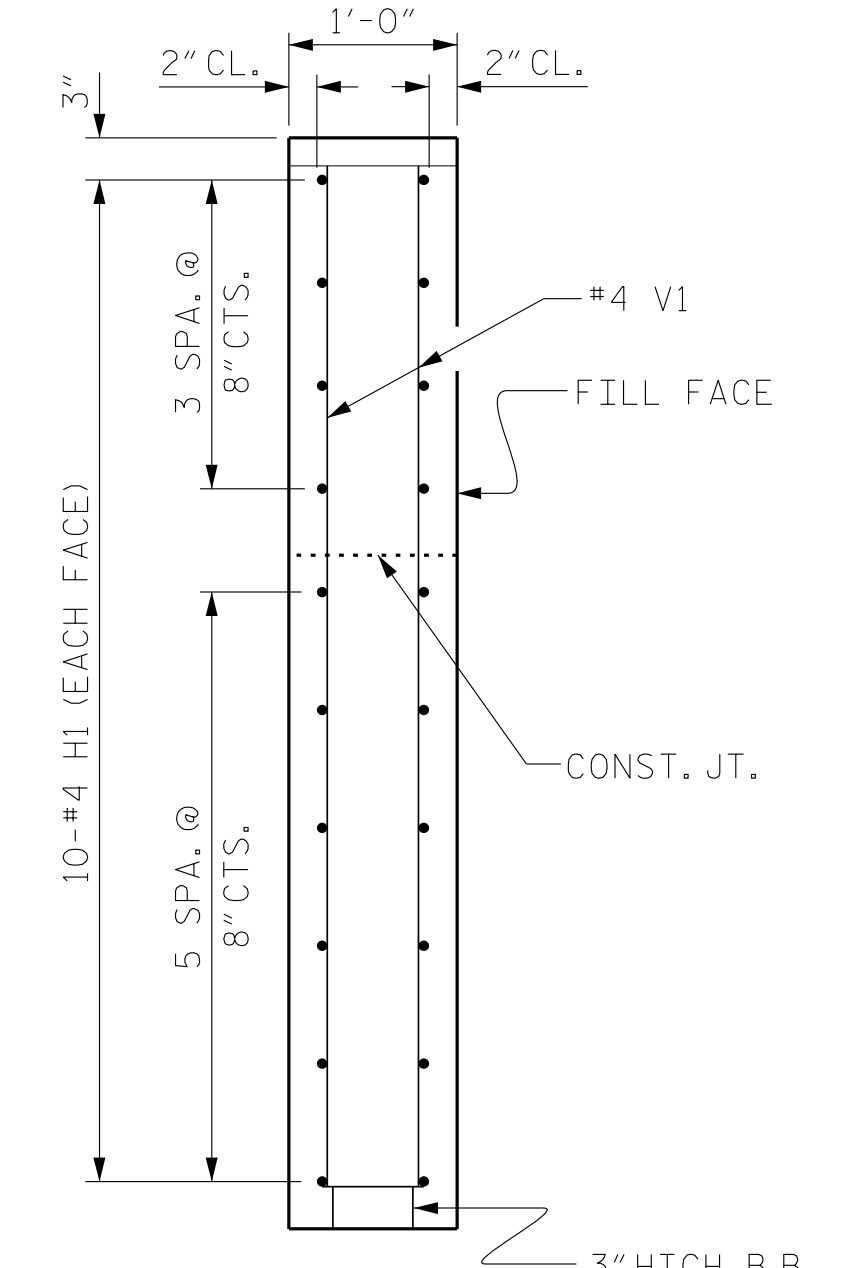
ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	WJH 12/11	REV.	4/15
CHECKED BY :	AAC 12/11		MAA/TMG



PLAN OF WING (W1)



ELEVATION OF WING (W1)

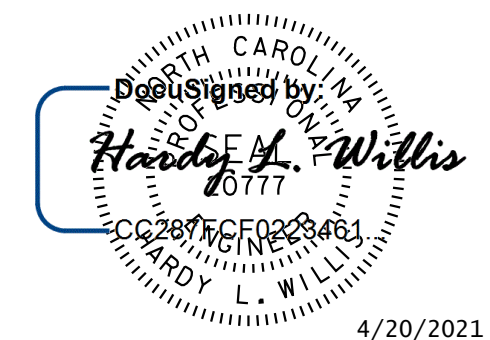


SECTION X-X

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	WJH 12/11	REV.	4/15
CHECKED BY :	AAC 12/11	MAA/TMG	

4/11/2021 4:02:42 PM
 ...\\16-145P-20451.2-SD-EB1.16.dgn
 User:ncwarren

WING DETAILS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
 Vaughn & Melton
 Consulting Engineers
 Asheville, North Carolina
 828-255-7796

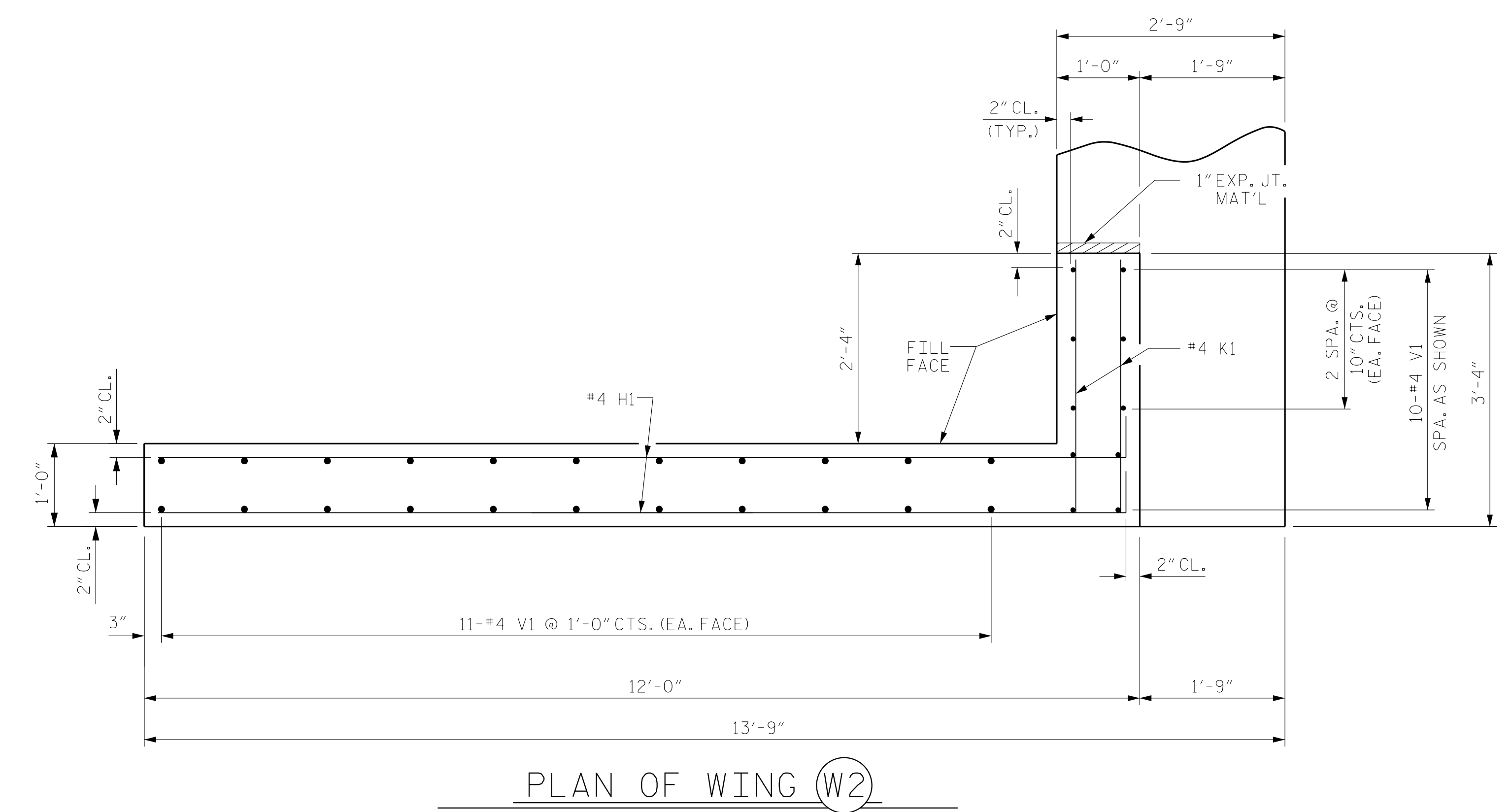
Boone, NC 828-265-9933
 Tri-Cities, TN 423-467-9400
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4175
 Charleston, SC 843-974-5650
 Mississippi, KY 606-248-6600
 Raleigh, NC 919-977-9455
 Charlotte, NC 704-357-0488
 Atlanta, GA 478-427-3528
 Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

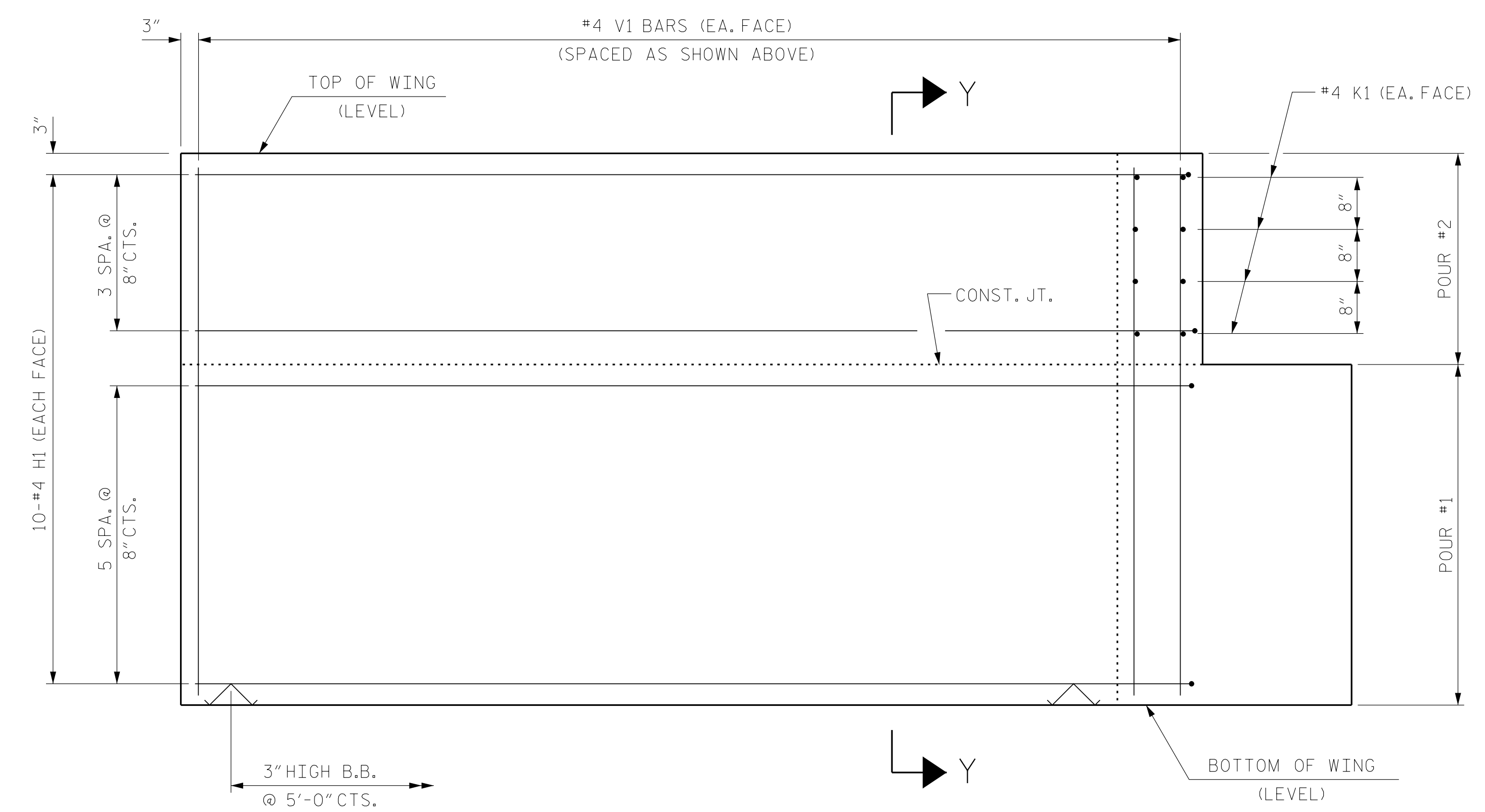
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 1 & No. 2
 WING DETAILS

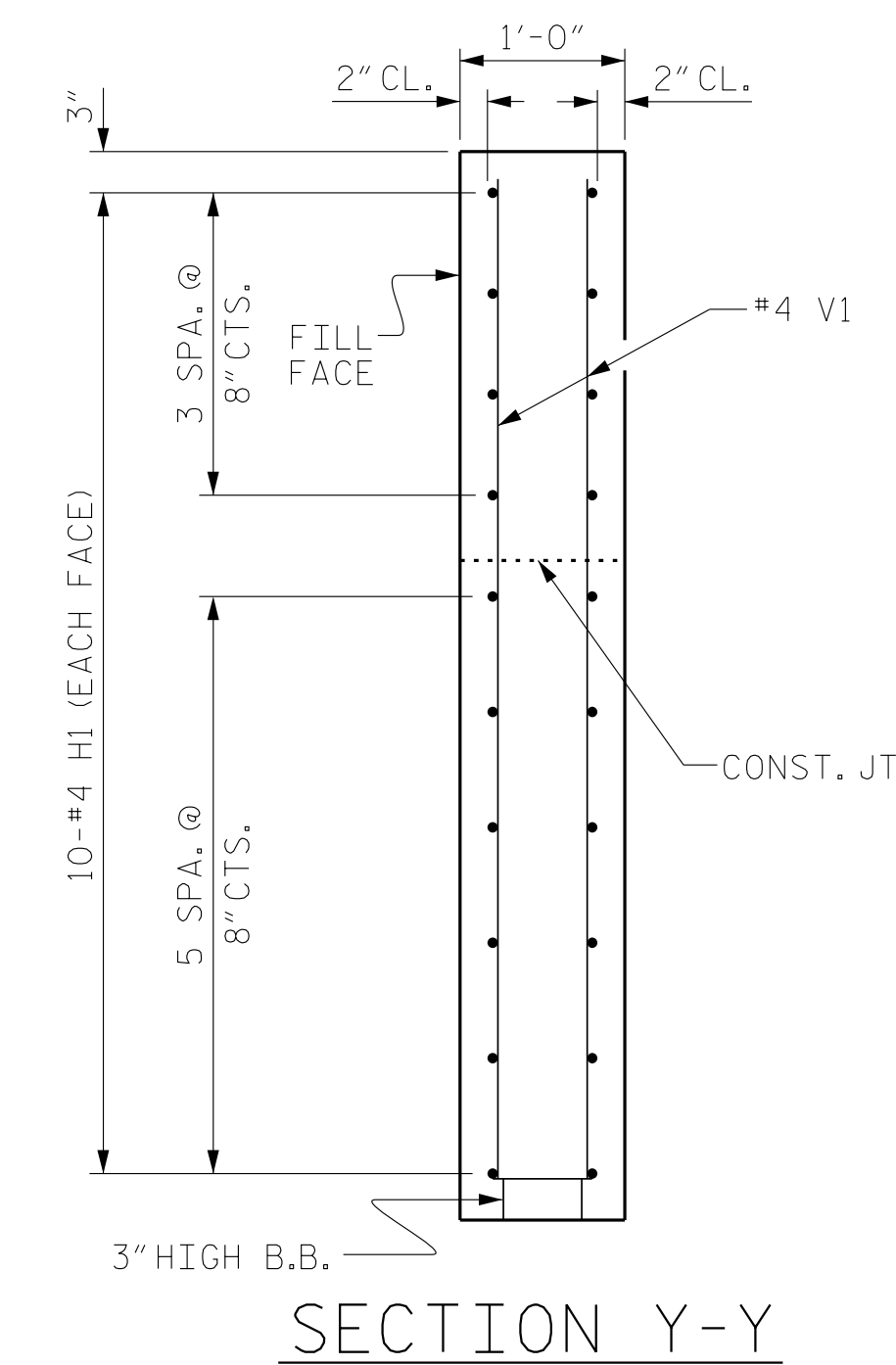
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			24



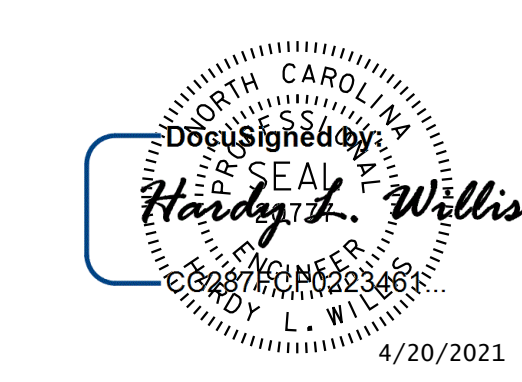
PLAN OF WING (W2)



ELEVATION OF WING (W2)
WING DETAILS



SECTION Y-Y



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, NC 828-253-2796
North Carolina 843-914-5650

Blaine, NC 828-355-9933
Tri-Cities, TN 423-481-8450
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-914-5650
Wadesboro, NC 606-248-6600
Atlanta, GA 770-621-2909

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

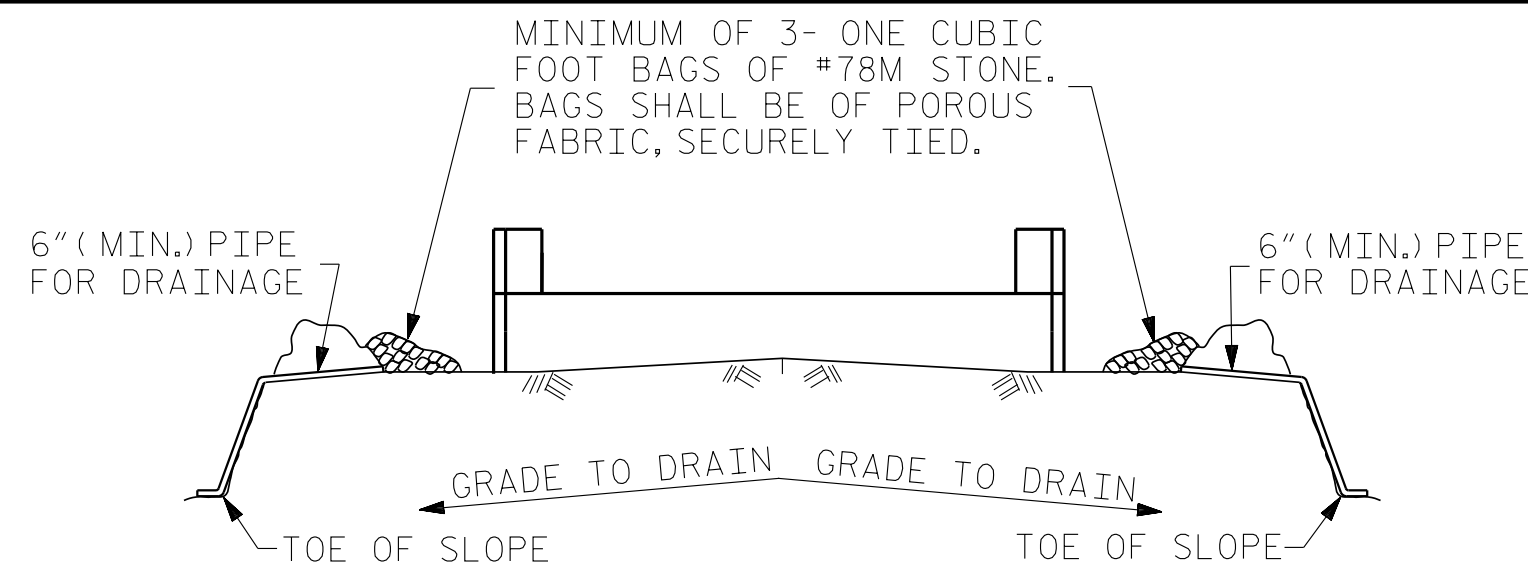
PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-
SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1 & No. 2
WING DETAILS

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

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	WJH 12/II	REV.	4/15
CHECKED BY :	AAC 12/II	MAA/TMG	

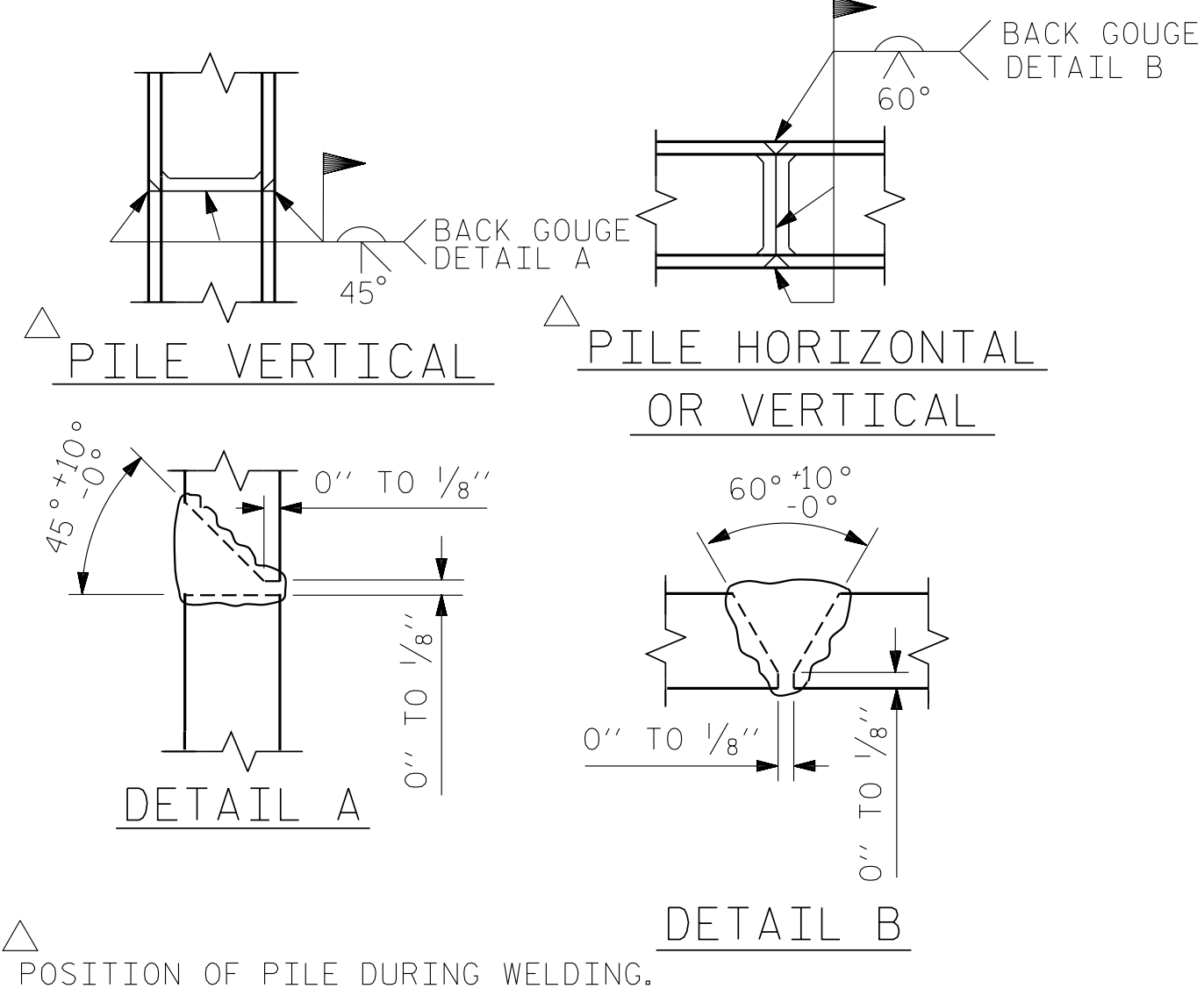


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

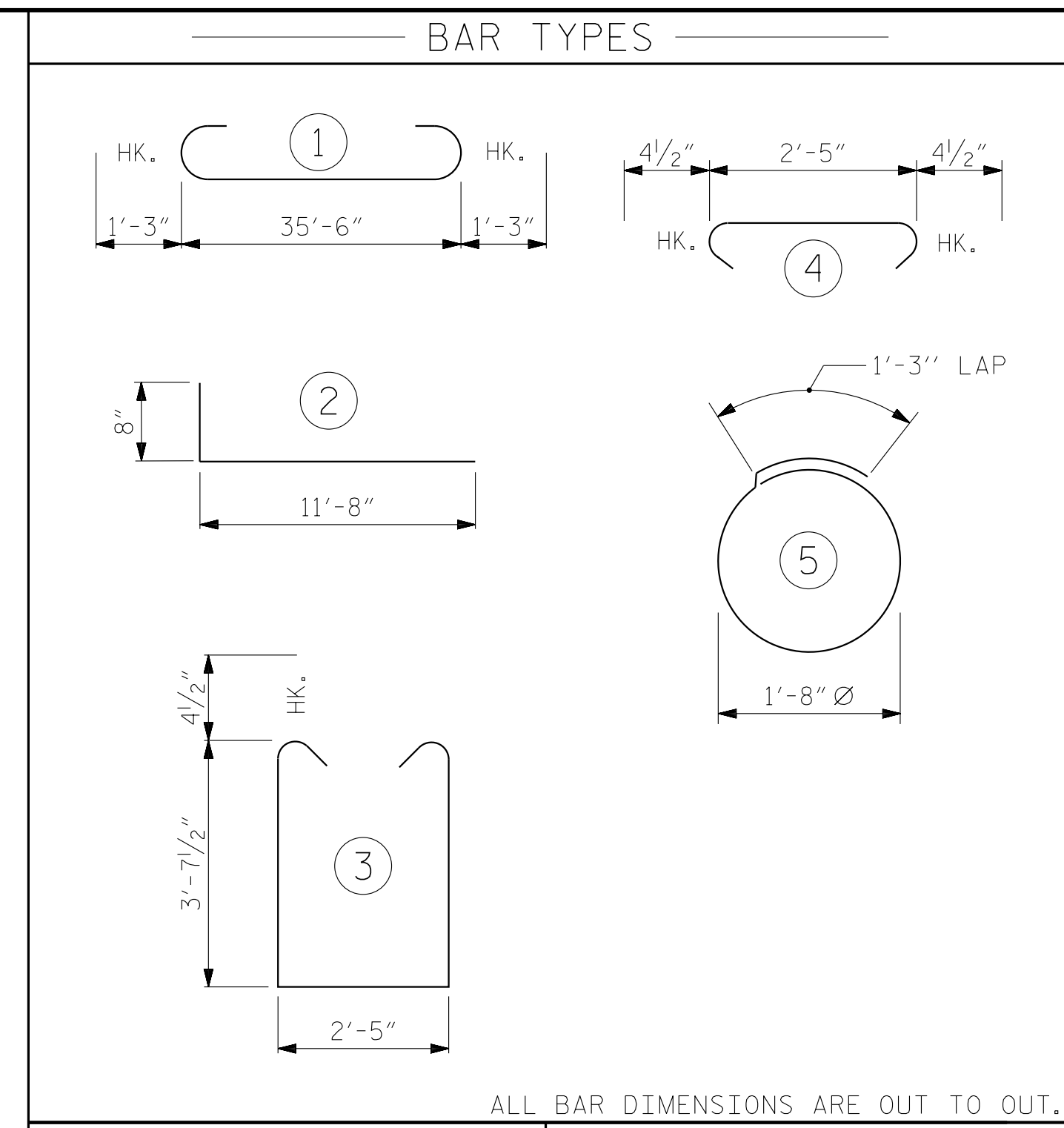
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

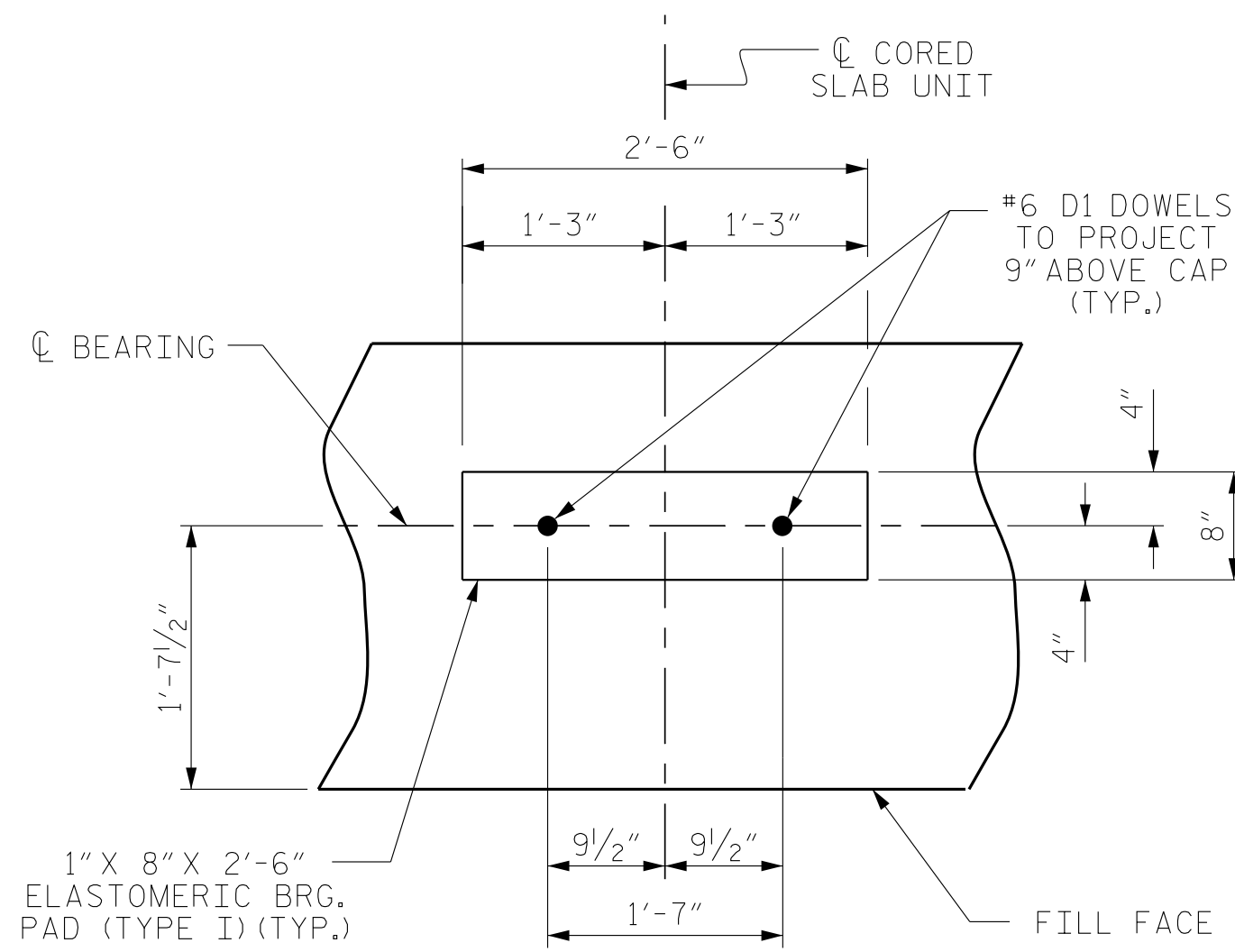


PILE SPLICE DETAILS



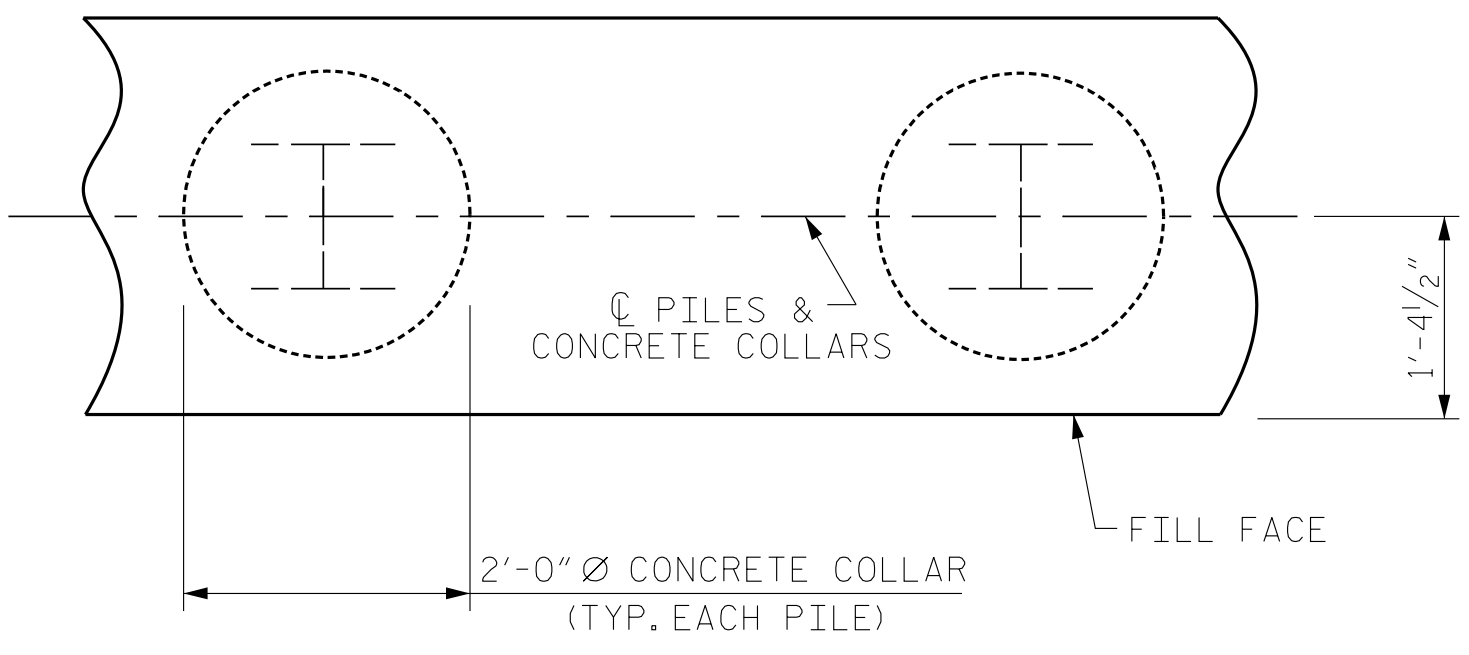
BILL OF MATERIAL FOR ONE END BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9		38'-0"	1034
B2	28	#4	STR	19'-1"	357
B3	9	#4	STR	2'-5"	15
D1	20	#6	STR	1'-6"	45
H1	40	#4		12'-4"	330
K1	16	#4	STR	2'-11"	31
S1	46	#4		10'-5"	320
S2	46	#4		3'-2"	97
S3	20	#4		6'-6"	87
V1	64	#4	STR	6'-2"	264
REINFORCING STEEL (FOR ONE END BENT)					2580 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1	CAP, LOWER PART OF WINGS & COLLARS				18.8 C.Y.
POUR #2	UPPER PART OF WINGS				2.7 C.Y.
TOTAL CLASS A CONCRETE					21.5 C.Y.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO.: 5 LIN. FT.= 200	NO.: 5 LIN. FT.= 215
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES
NO.: 5	NO.: 5
STEEL PILES POINTS	STEEL PILES POINTS
NO.: 5	NO.: 5



DETAIL "A"

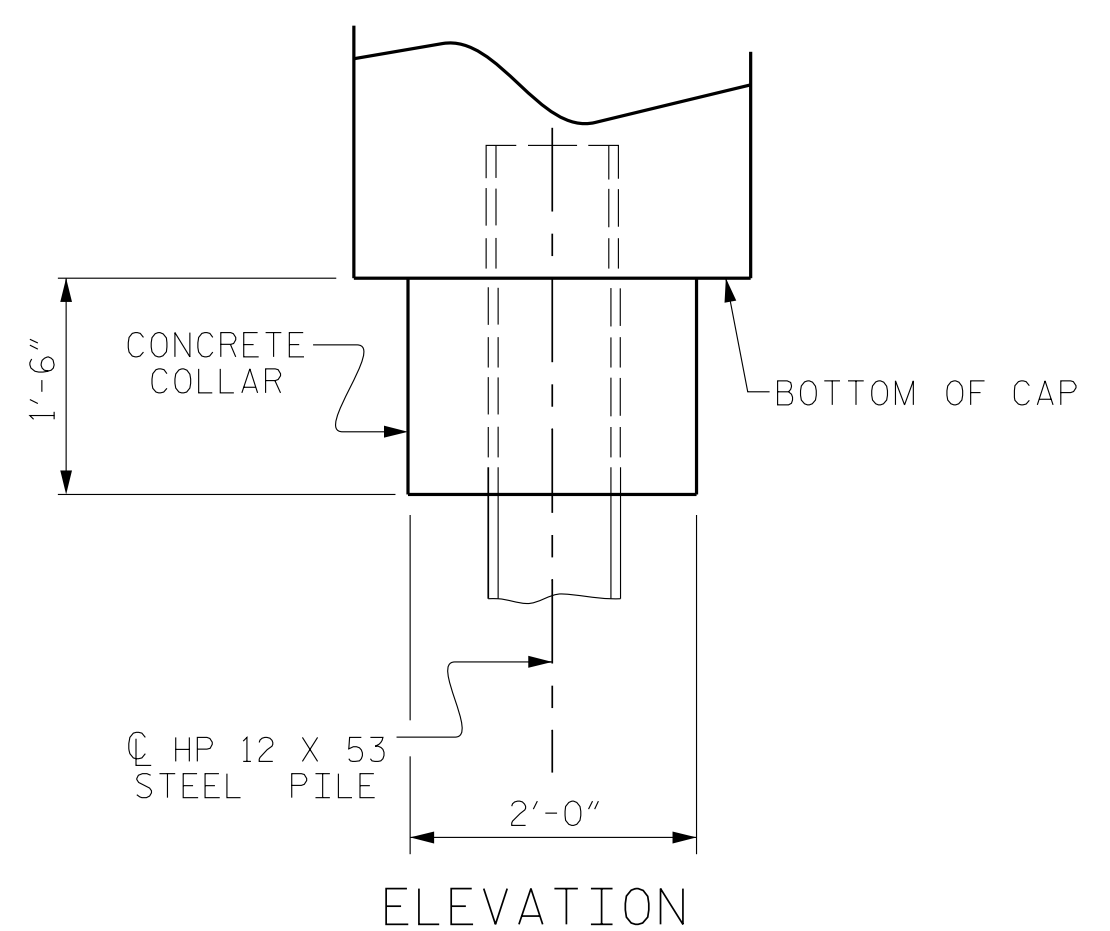
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



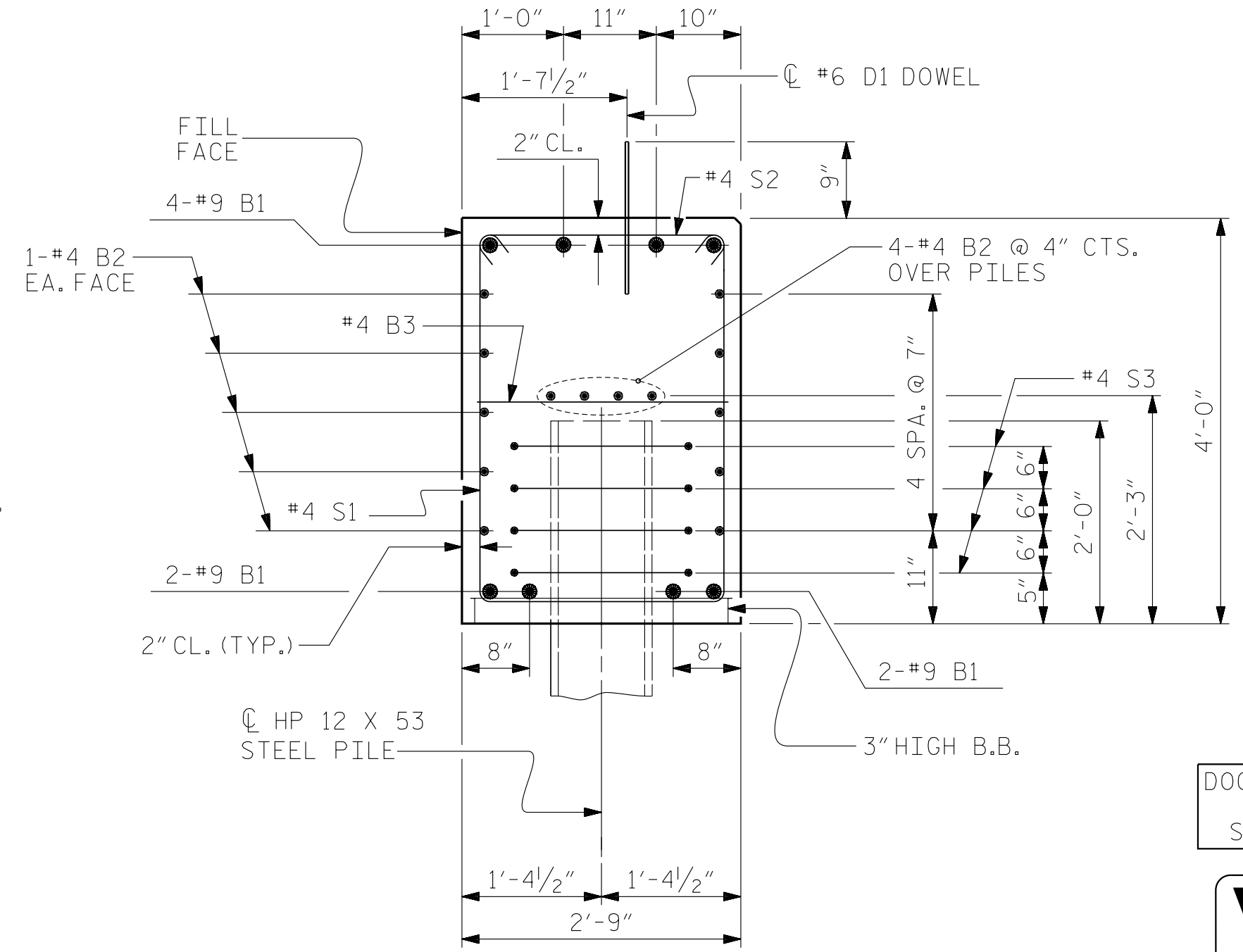
PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

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

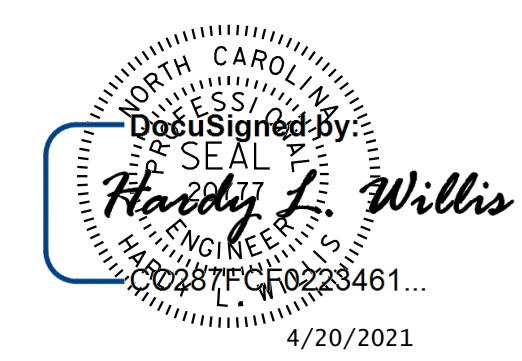


ELEVATION



SECTION A-A

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina
828-253-2796

99-977-9455 Raleigh, NC
704-357-0488 Charlotte, NC
770-621-3509 Atlanta, GA

828-255-9933 Boone, NC
423-461-9400 Tri-Cities, TN
865-546-5800 Knoxville, TN
864-524-4715 Spartanburg, SC
843-974-5650 Wadesboro, NC
606-248-6600 Charleston, SC

Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

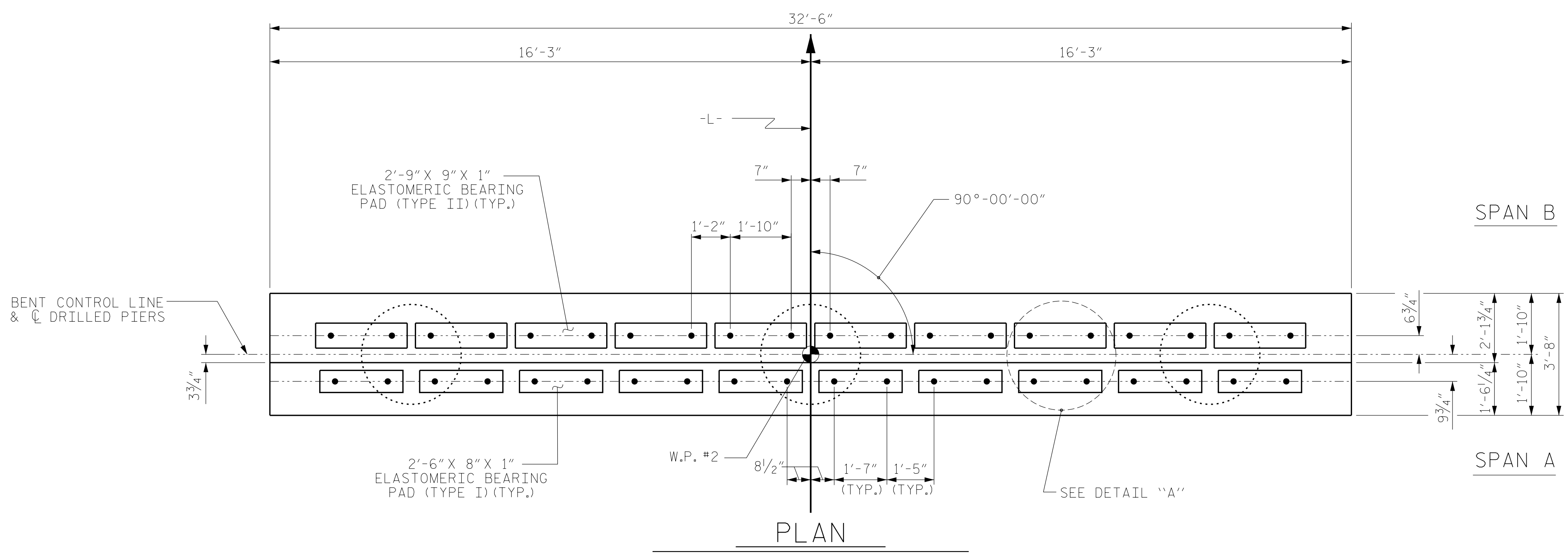
SUBSTRUCTURE
END BENT No. 1 & No. 2
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			24

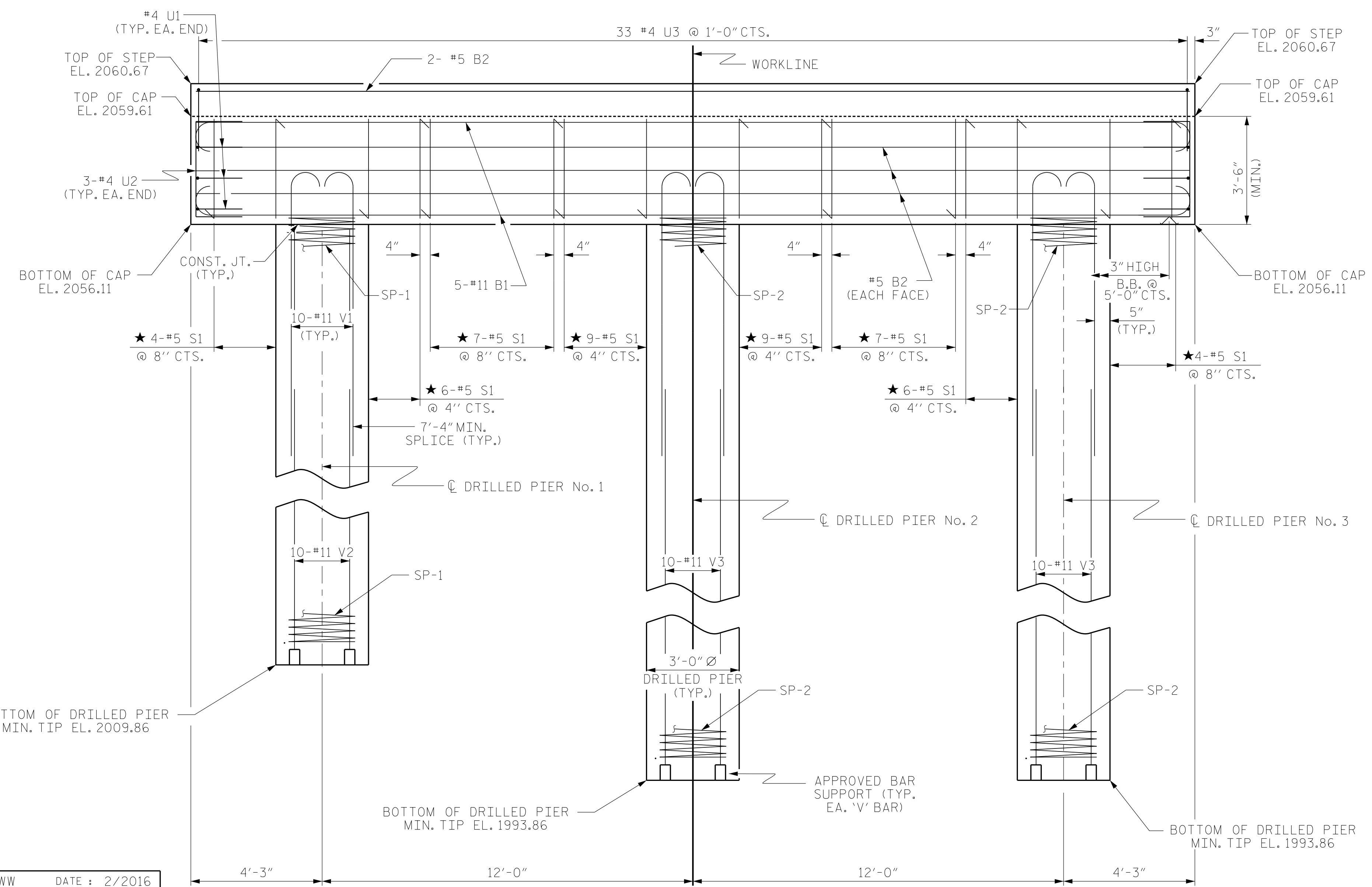
ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	WJH 12/11	REV. 4/17	MAA/THC
CHECKED BY :	AAC 12/11		

NOTES

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
- ★ INVERT ALTERNATE STIRRUPS.
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE CENTERLINE JOINT IN DECK SLAB (CONTROL LINE) IS OFFSET FROM THE CENTERLINE BENT.

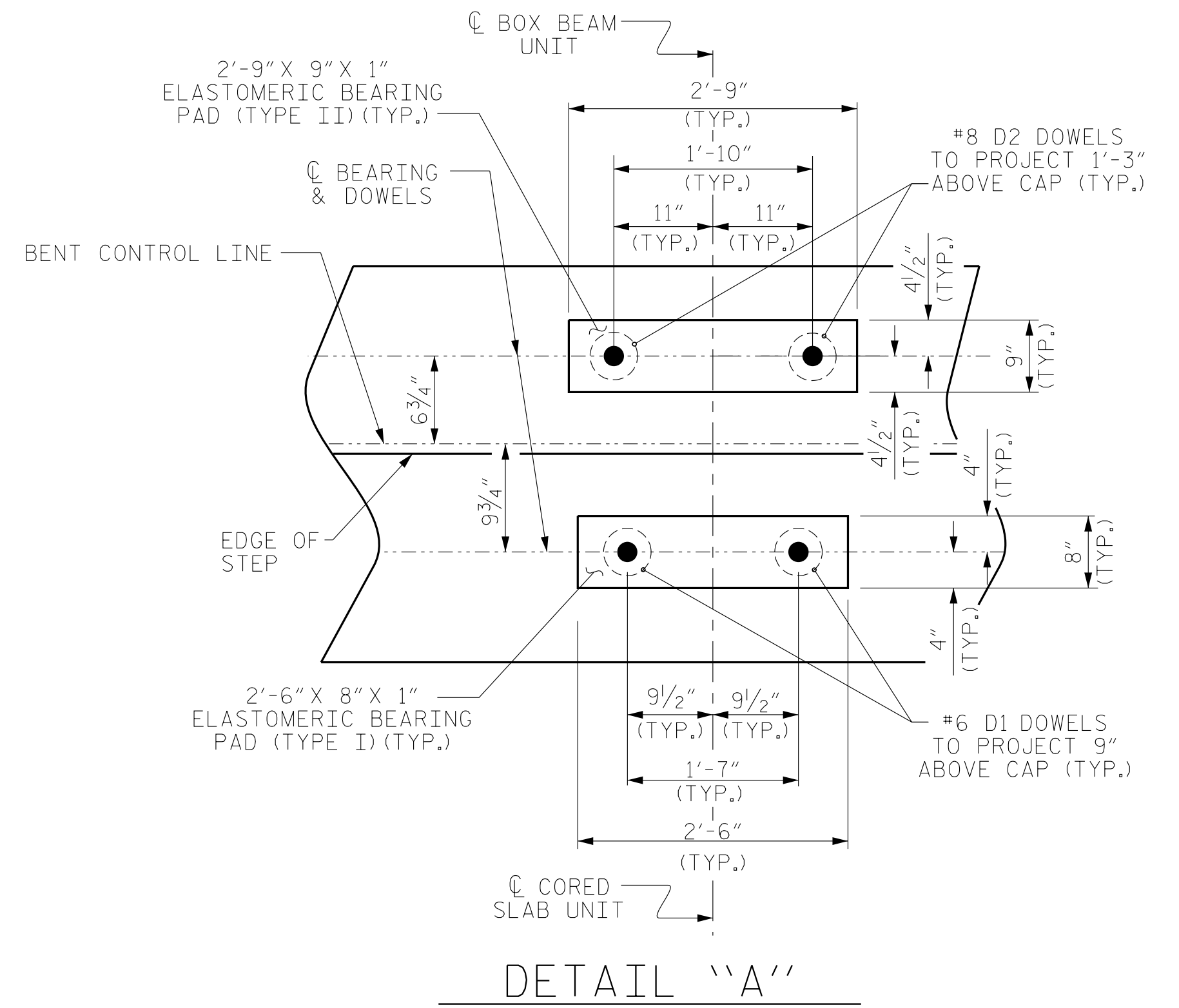


PLAN



ELEVATION

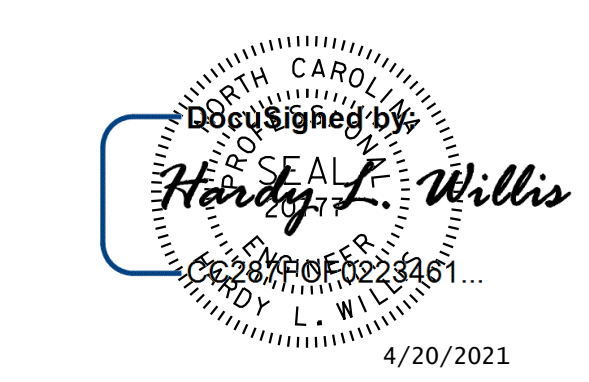
DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH DRILLED PIER UNLESS OTHERWISE NOTED.



DETAIL "A"

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	DGE 4/10	REV.	11/14
CHECKED BY :	MKT 4/10	MAA/TMG	

4/11/2021 5:19:19 PM
 ...19_14SP.20451.2_SD.B1.19.dgn
 User:ncwarren



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
 Vaughn & Melton
 Consulting Engineers

Asheville, North Carolina
 99-911-9455

Boone, NC 828-255-9933
 Tri-Cities, TN 423-467-8440
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4175
 Charleston, SC 843-374-5650
 Middleboro, NY 608-248-8600
 Charlotte, NC 704-357-0488
 Atlanta, GA 478-827-3509

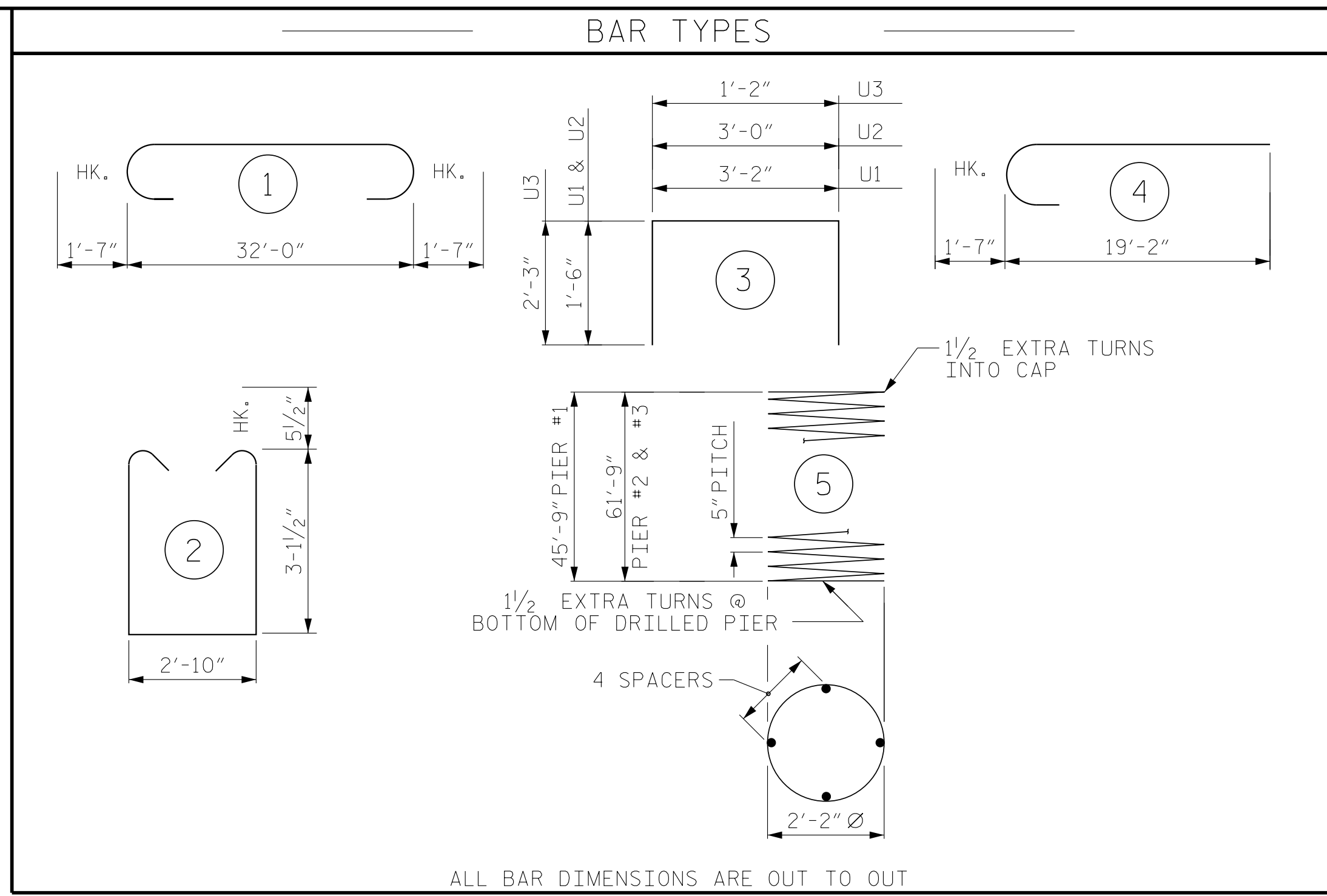
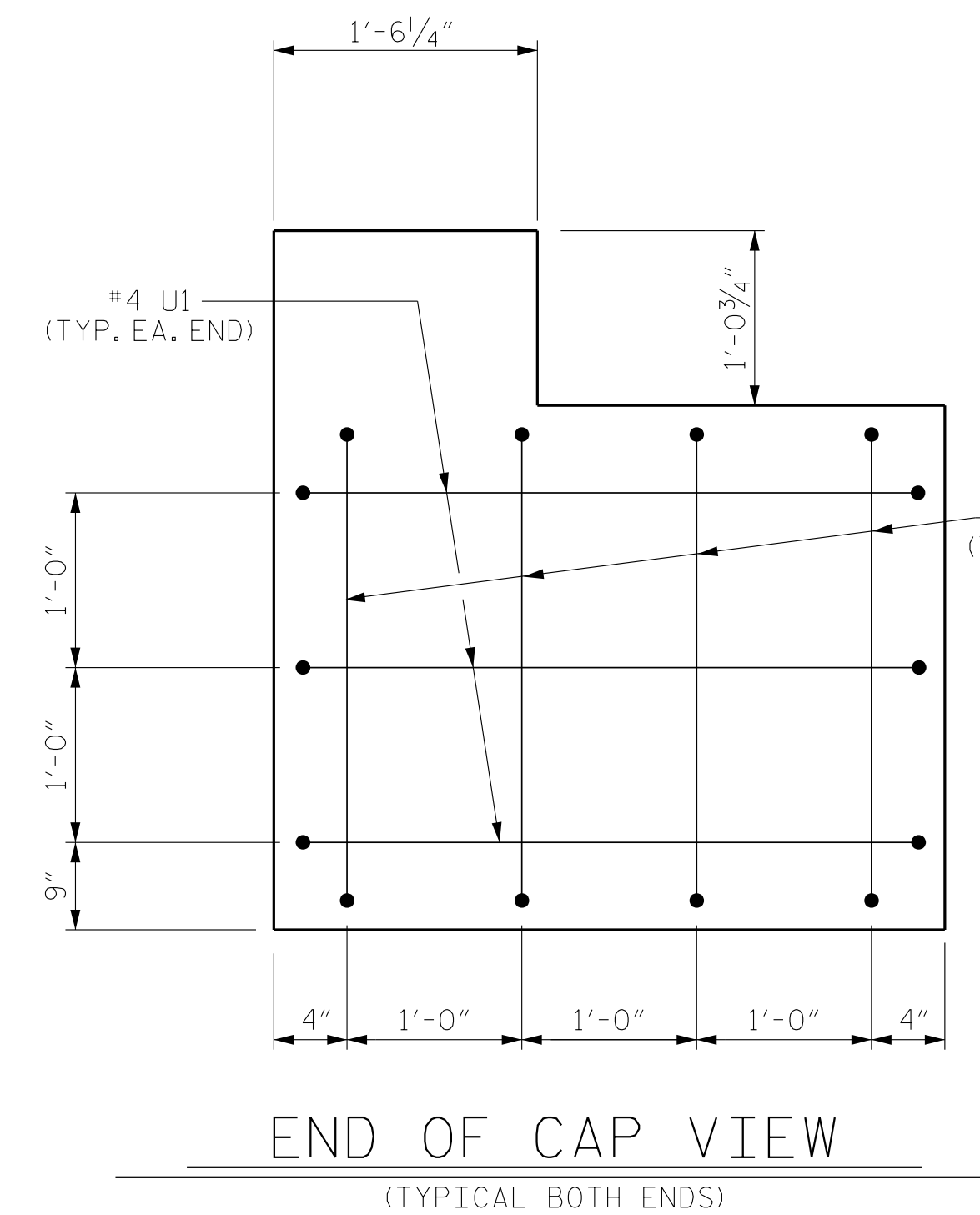
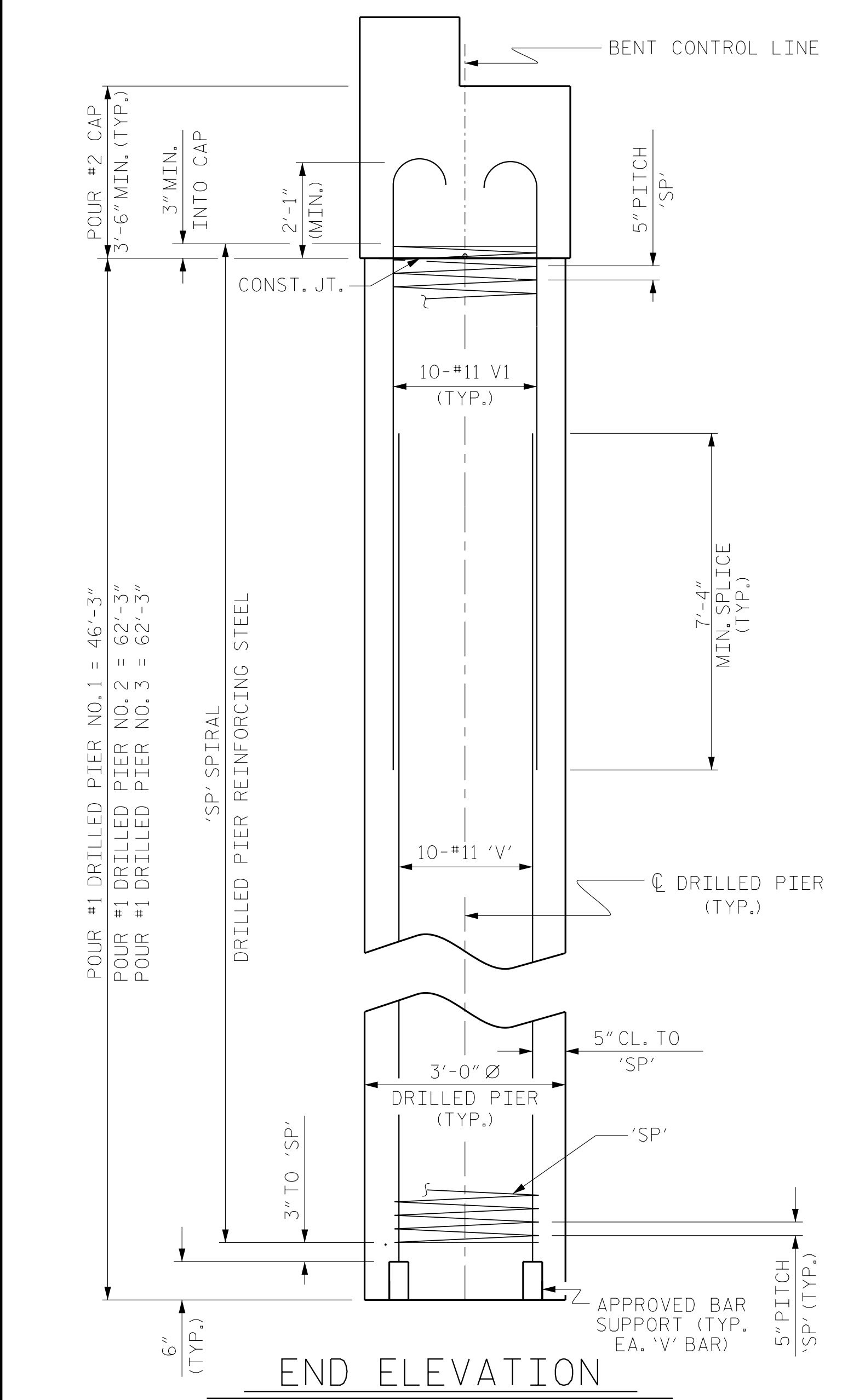
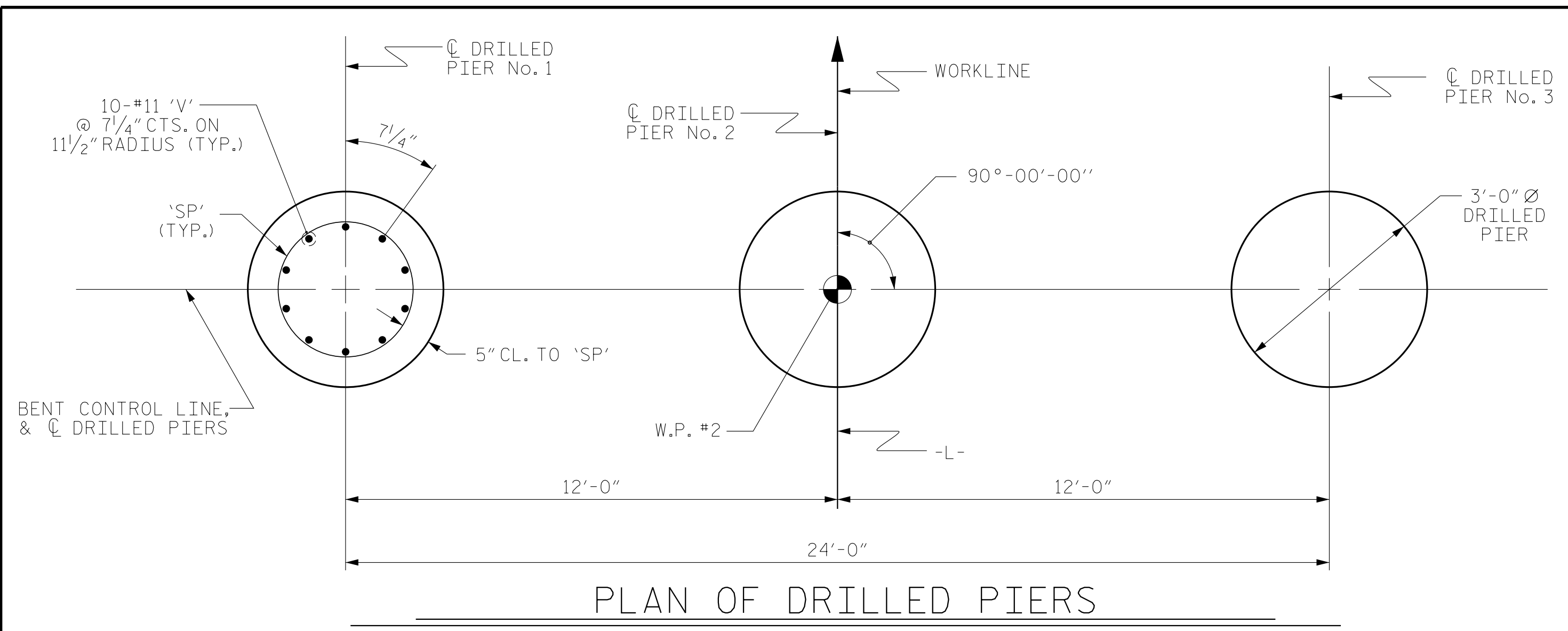
Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

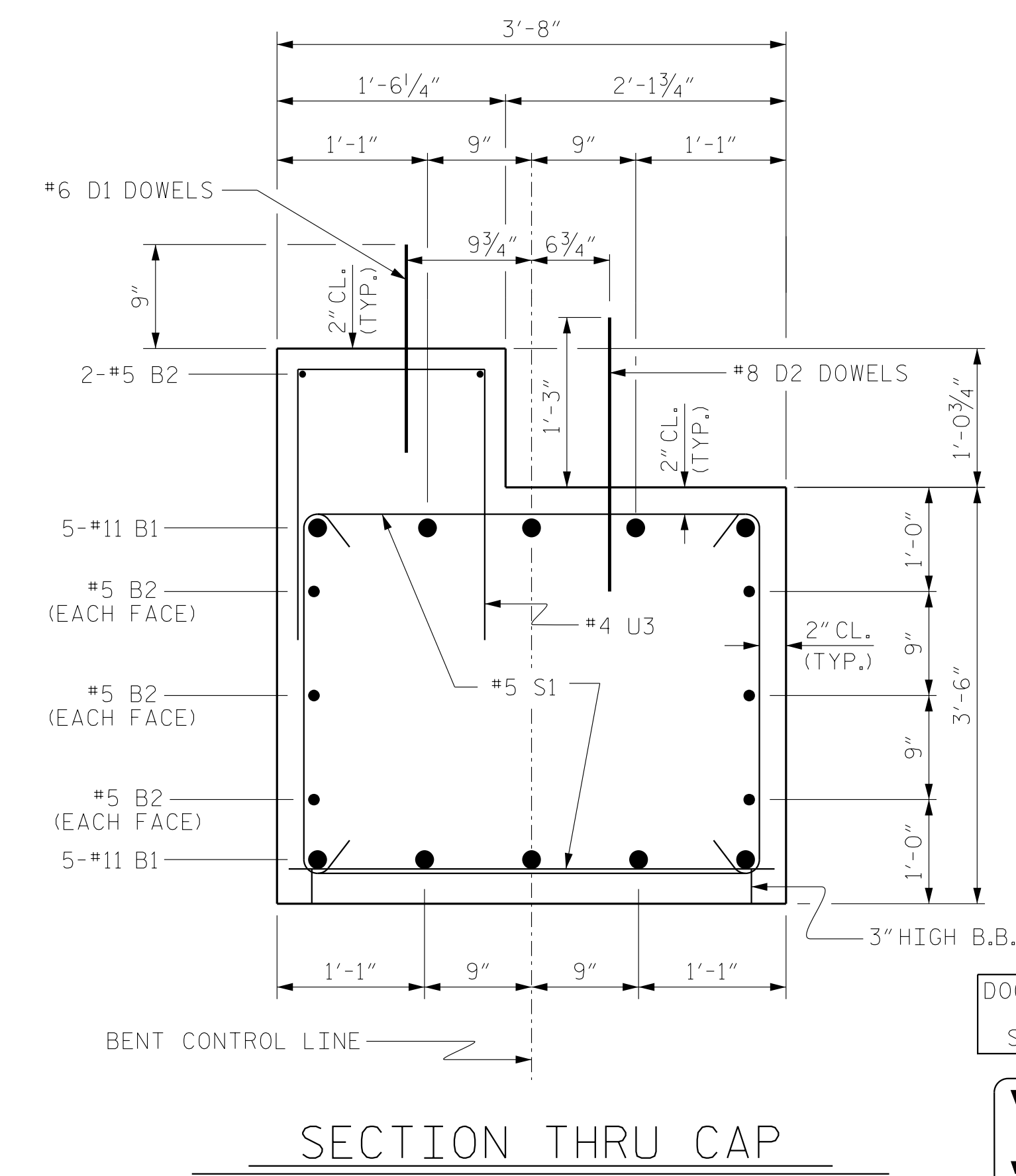
SHEET 1 OF 2

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

SHEET NO. S-19
 TOTAL SHEETS 24



BILL OF MATERIAL FOR BENT NO. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	35'-2"	1868
B2	8	#5	STR	32'-2"	268
D1	20	#6	STR	1'-6"	45
D2	20	#8	STR	2'-3"	120
S1	52	#5	2	10'-0"	542
U1	6	#4	3	6'-2"	25
U2	8	#4	3	6'-0"	32
U3	33	#4	3	5'-8"	125
V1	30	#11	4	20'-9"	3307
V2	10	#11	STR	39'-0"	2071
V3	20	#11	STR	55'-0"	5844
REINFORCING STEEL (FOR ONE BENT)					14,089 LBS.
SP-1	1	*	5	750'-10"	783
SP-2	2	*	5	981'-10"	2048
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					2831 LBS.
* THE SP-1 AND SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (CAP)					17.4 C.Y.
TOTAL CLASS A CONCRETE					17.4 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE					44.7 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL					65.0 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL					106.0 LIN. FT.
CSL TUBES					701.0 LIN. FT.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville, North Carolina 828-293-2796

Boone, NC 828-255-9933
Tri-Cities, TN 423-467-8401
Knoxville, TN 865-546-1800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650

Raleigh, NC 919-877-9465
Charlotte, NC 704-251-0488
Atlanta, GA 770-627-3509

Copyright © 2008 Vaughn & Melton, Inc. All Rights Reserved.

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-
SHEET 2 OF 2

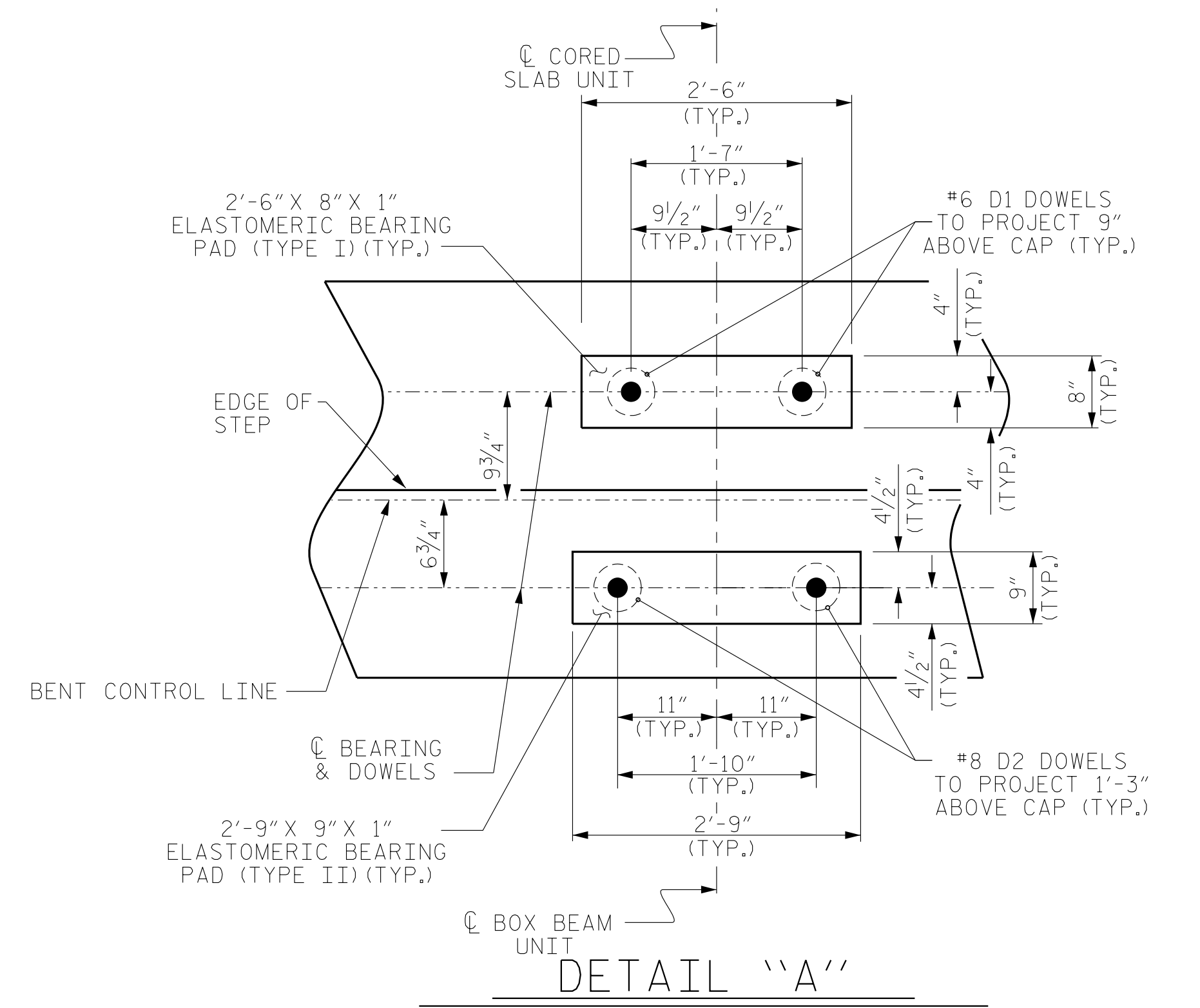
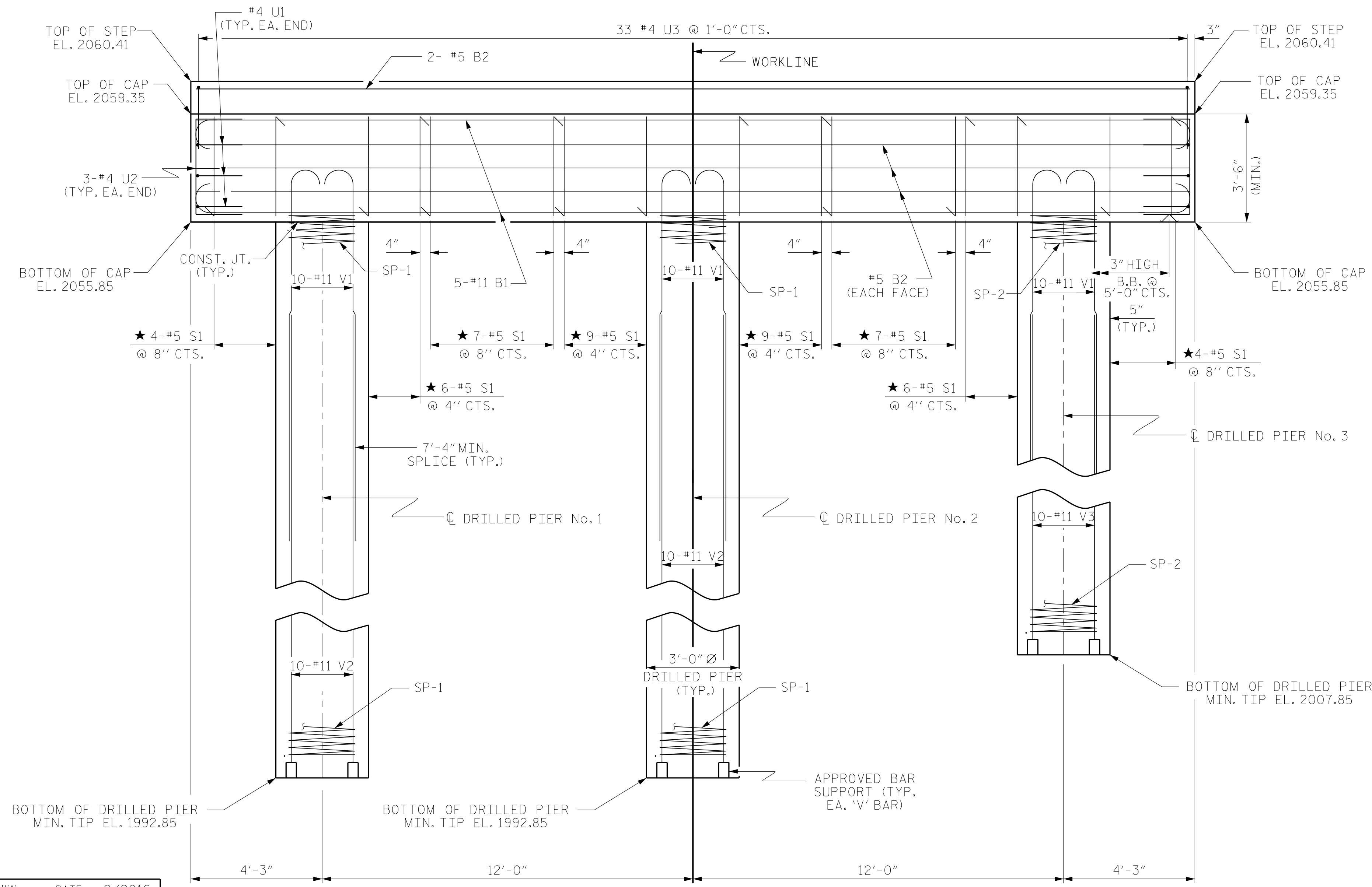
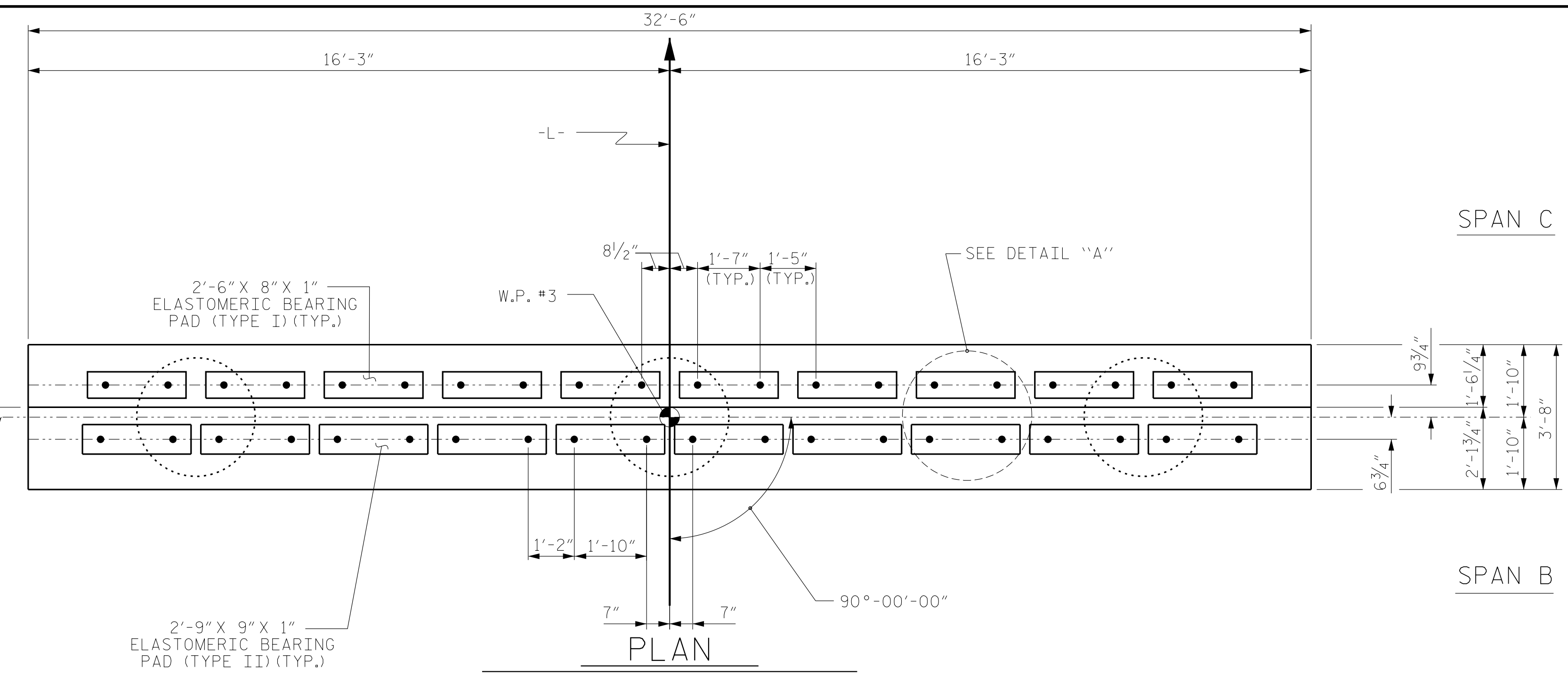
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-20				
TOTAL SHEETS 24				

ASSEMBLED BY : RWW	DATE : 2/2016
CHECKED BY : HLW	DATE : 2/2016
ENGINEER OF RECORD : TVT	DATE : 2/2016
DRAWN BY : DGE 3/10	REV. 11/14 MAA/TMG
CHECKED BY : MKT 3/10	

NOTES

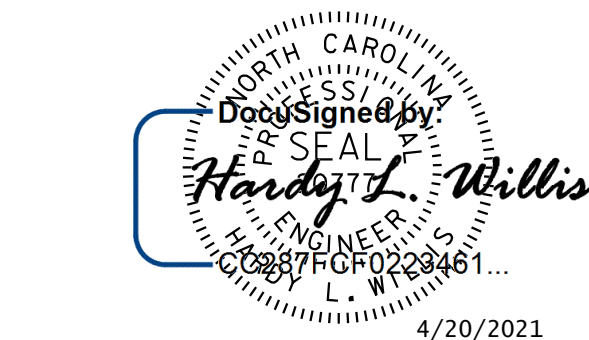
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
- ★ INVERT ALTERNATE STIRRUPS.
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE CENTERLINE JOINT IN DECK SLAB (CONTROL LINE) IS OFFSET FROM THE CENTERLINE BENT.



ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	DGE	4/10	
CHECKED BY :	MKT	4/10	
REV.	II/14	MAA/TMG	

4/11/2021 5:24:12 PM
 ...21.14SP.20451.2_SD.B2.21.dgn
 User:ncwarren

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



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
 Vaughn & Melton
 Consulting Engineers
 Asheville, NC
 99-917-9455

Boone, NC 828-355-9933
 Tryon, NC 828-681-8408
 Knoxville, TN 865-546-5600
 Spartanburg, SC 864-574-4775
 Charleston, SC 803-574-6500
 Middleboro, KY 606-248-6600
 Atlanta, GA 770-627-3509

Copyright © 2008 Vaughn & Melton, Inc. All Rights Reserved

PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

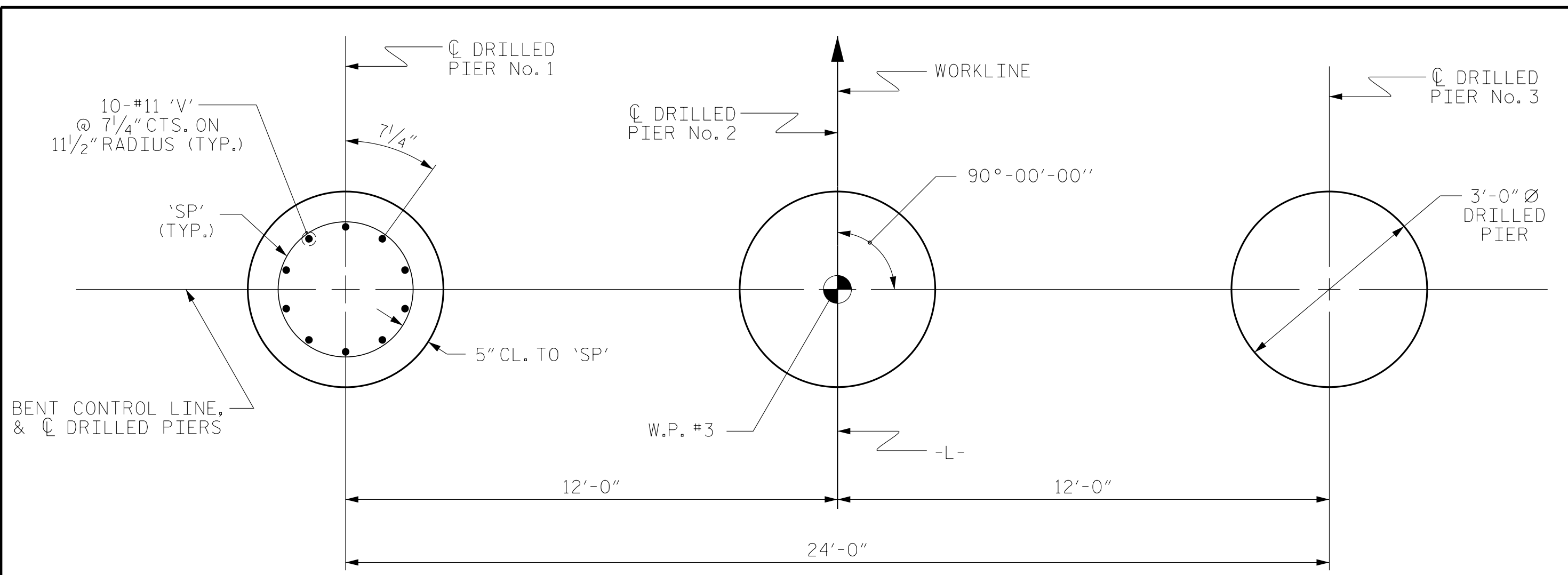
SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

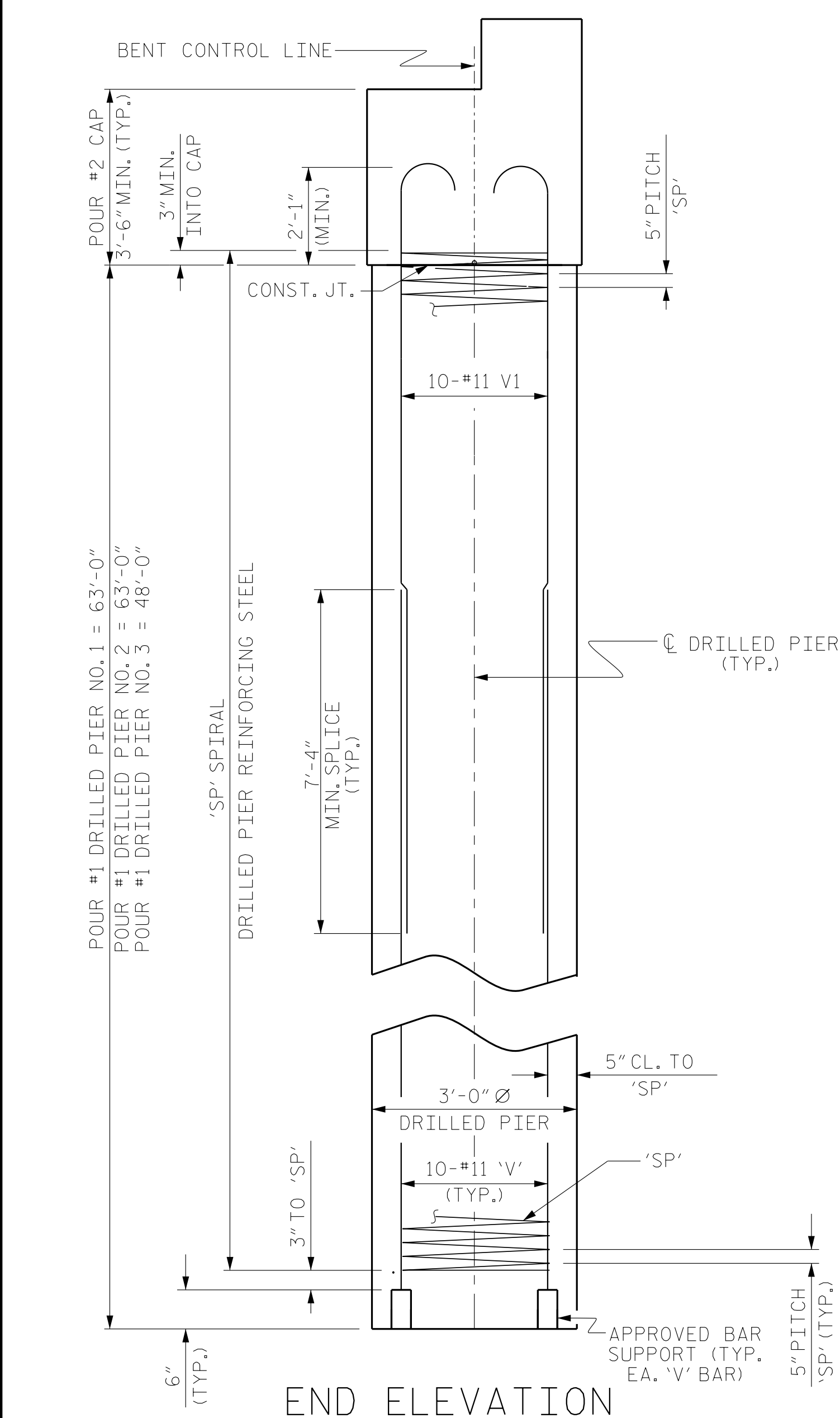
SUBSTRUCTURE BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS 24
2			4			

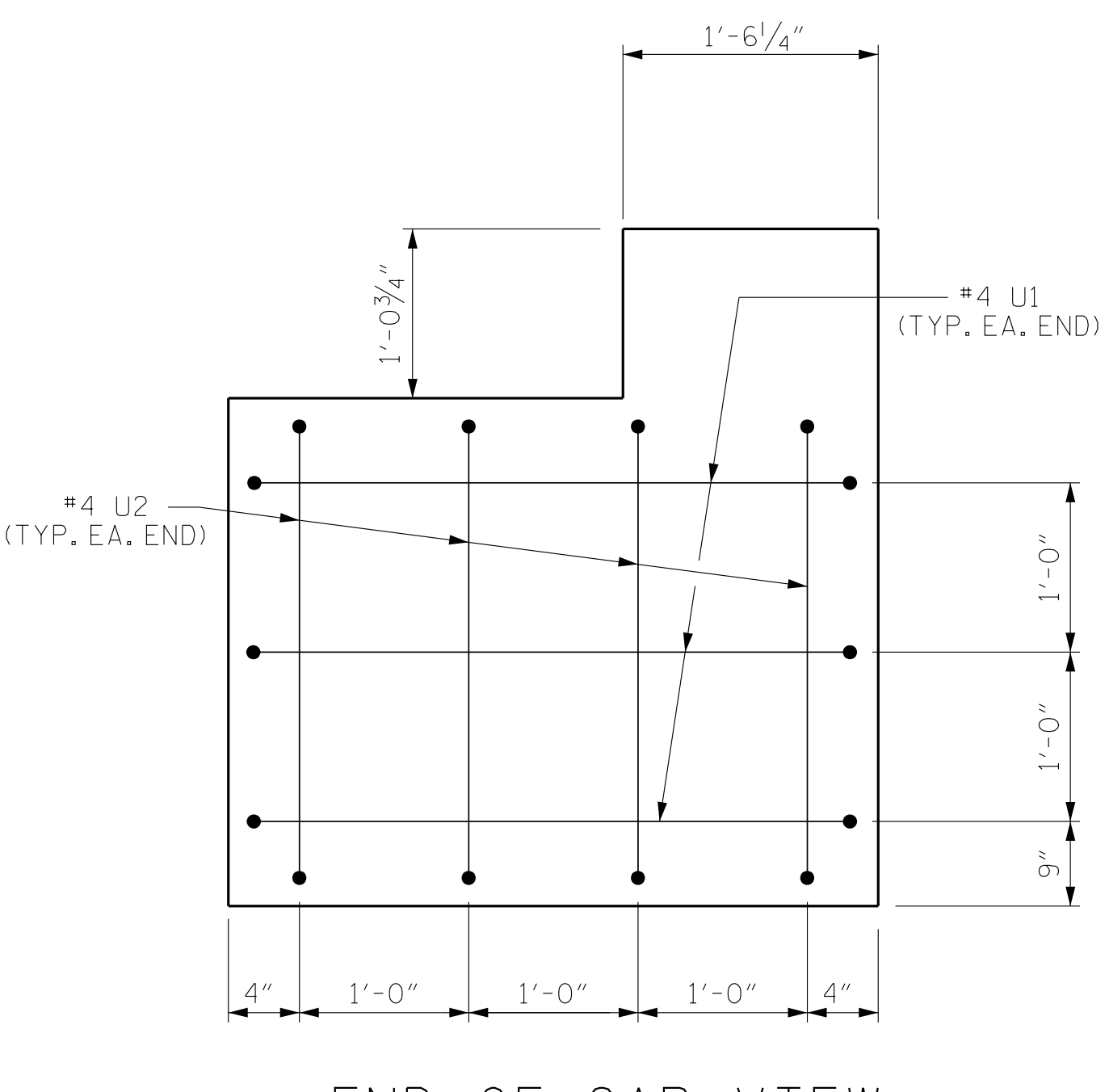
STD. NO. DP_BT_30_90S_<50'



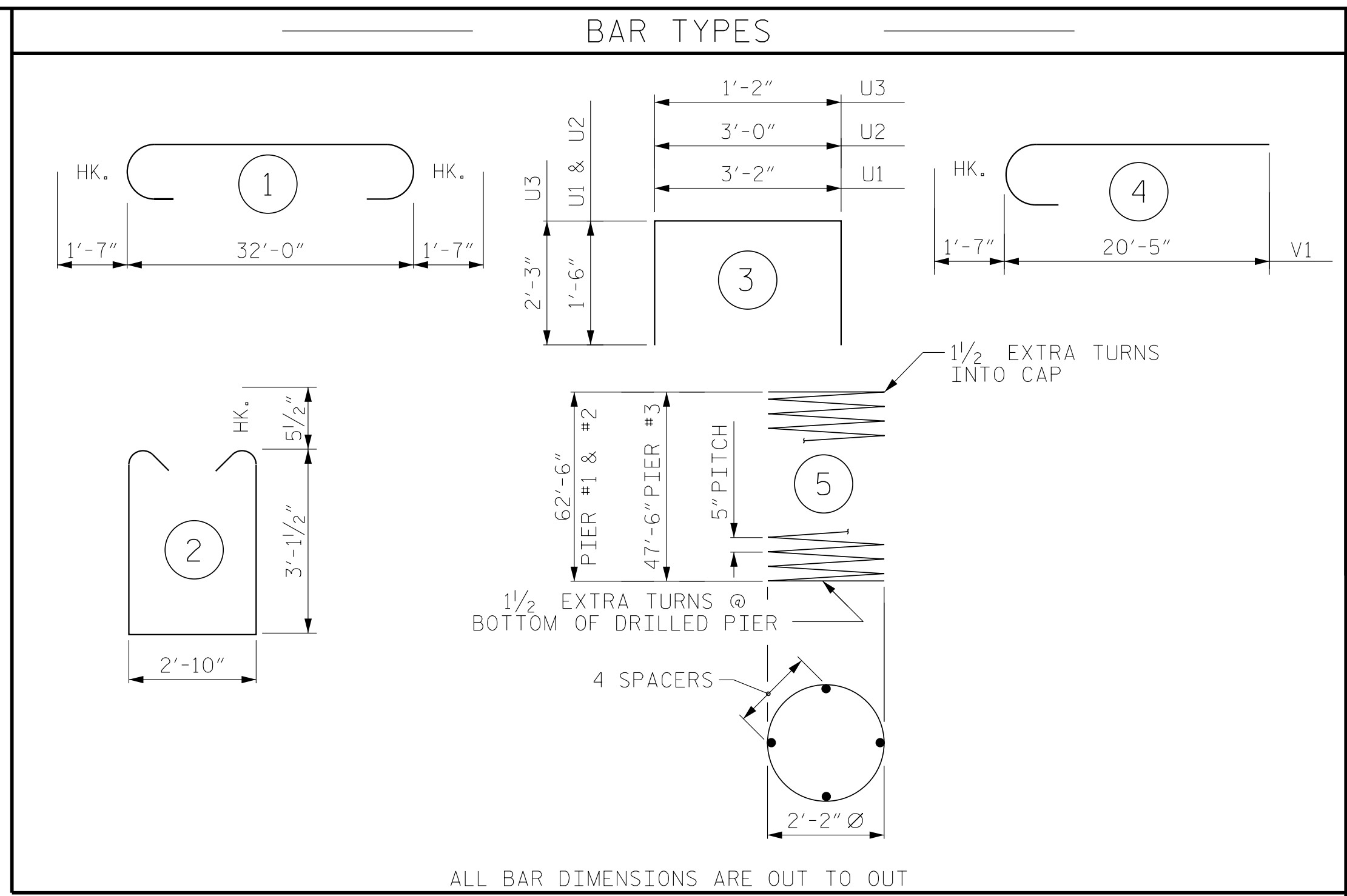
PLAN OF DRILLED PIERS



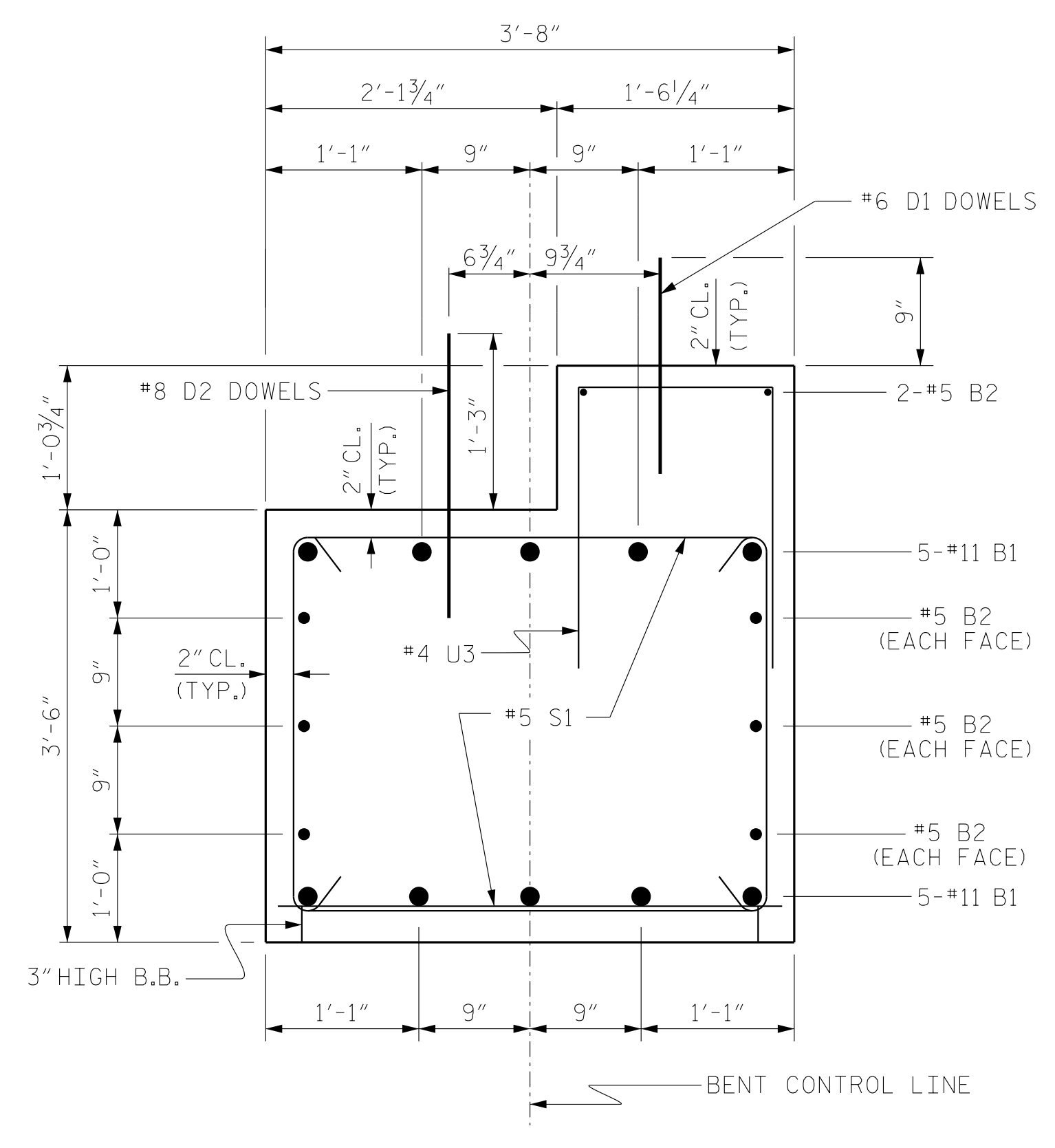
END ELEVATION



END OF CAP VIEW
(TYPICAL BOTH ENDS)



ALL BAR DIMENSIONS ARE OUT TO OUT



SECTION THRU CAP

BILL OF MATERIAL FOR BENT NO. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	35'-2"	1868
B2	8	#5	STR	32'-2"	268
D1	20	#6	STR	1'-6"	45
D2	20	#8	STR	2'-3"	120
S1	52	#5	2	10'-0"	542
U1	6	#4	3	6'-2"	25
U2	6	#4	3	6'-0"	32
U3	33	#4	3	5'-8"	125
V1	30	#11	4	22'-0"	3507
V2	20	#11	STR	54'-6"	5791
V3	10	#11	STR	39'-6"	2099
REINFORCING STEEL (FOR ONE BENT)					14,422 LBS.
SP-1	2	*	5	993'-7"	2073
SP-2	1	*	5	767'-6"	801
SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT)					2874
* THE SP-1 AND SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #2 (CAP)					17.4 C.Y.
TOTAL CLASS A CONCRETE					17.4 C.Y.
DRILLED PIERS: (FOR ONE BENT)					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)					45.6 C.Y.
3'-0" DRILLED PIER NOT IN SOIL					55.0 LIN. FT.
3'-0" DRILLED PIER IN SOIL					119.0 LIN. FT.
CSL TUBES					714.0 LIN. FT.

ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	DGE 3/10	REV. 11/14	MAA/TMG
CHECKED BY :	MKT 3/10		

3/23/2021 11:46:33 AM
...\\2214SP.20451.2.SD.B2.22.dgn
User:ncwarren



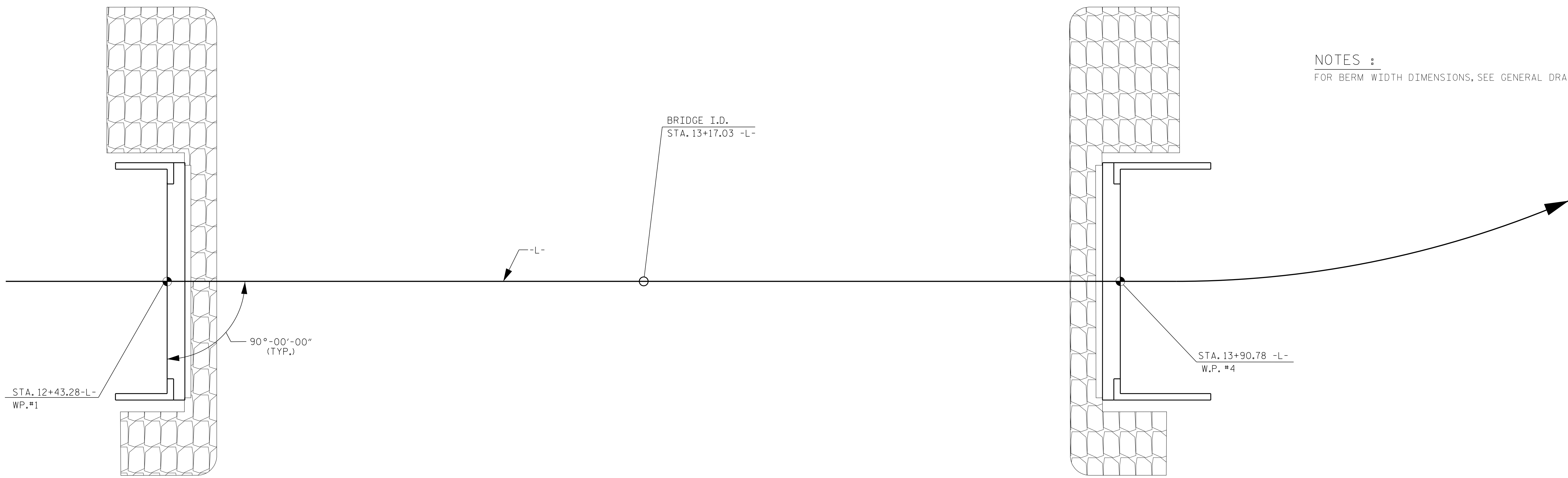
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M Vaughn & Melton Consulting Engineers	<input type="checkbox"/> Boone, NC <input type="checkbox"/> Charlotte, NC <input type="checkbox"/> Charlotte, TN <input type="checkbox"/> Knoxville, TN <input type="checkbox"/> Memphis, TN <input type="checkbox"/> Spartanburg, SC <input type="checkbox"/> Asheville, NC <input type="checkbox"/> Charleston, SC <input type="checkbox"/> Greenville, SC <input type="checkbox"/> Raleigh, NC <input type="checkbox"/> Winston-Salem, NC <input type="checkbox"/> York, NC
---	---

PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-22					TOTAL SHEETS 24

STD. NO. DP_BT_30_90S_<50'

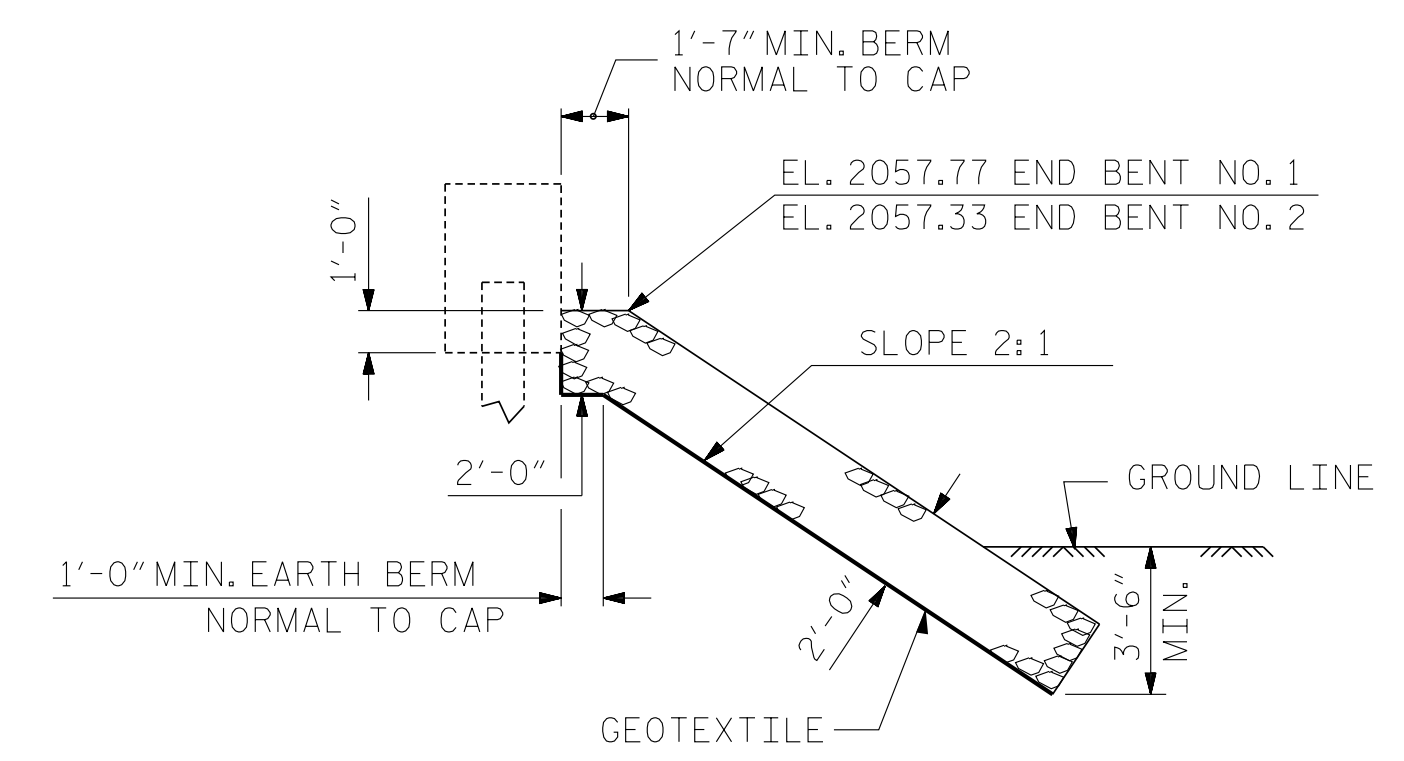


NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

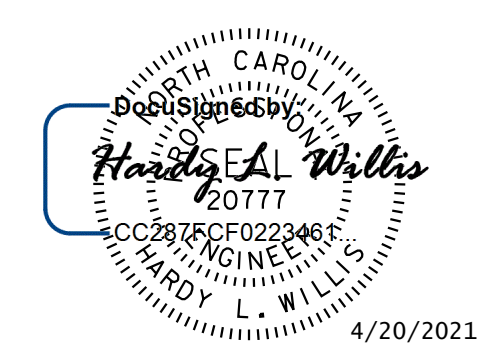
END BENT NO. 1

END BENT NO. 2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+17.03	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	81	90
END BENT 2	78	87



SECTION
BERM RIP RAPPED



PROJECT NO. 14SP.20451.2
HENDERSON COUNTY
STATION: 13+17.03 -L-

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

V&M
Vaughn & Melton
Consulting Engineers

Asheville,
North Carolina
828-253-2796

Boone, NC 828-355-9933
Tri-Cities, TN 423-467-9400
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-974-5650
Milledgeville, KY 606-248-6600
Atlanta, GA 770-627-3509

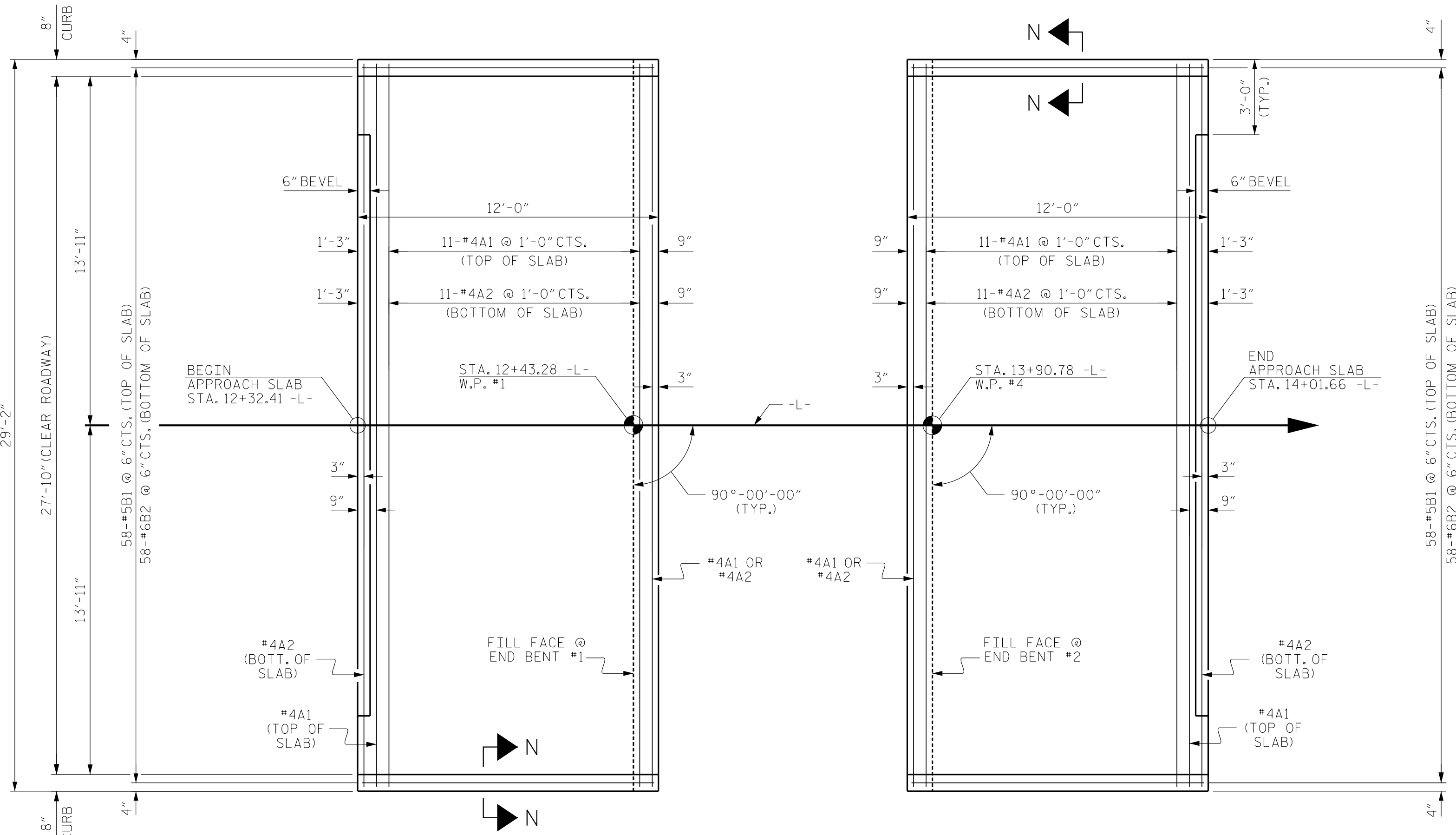
Copyright © 2006 Vaughn & Melton, Inc. All Rights Reserved.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

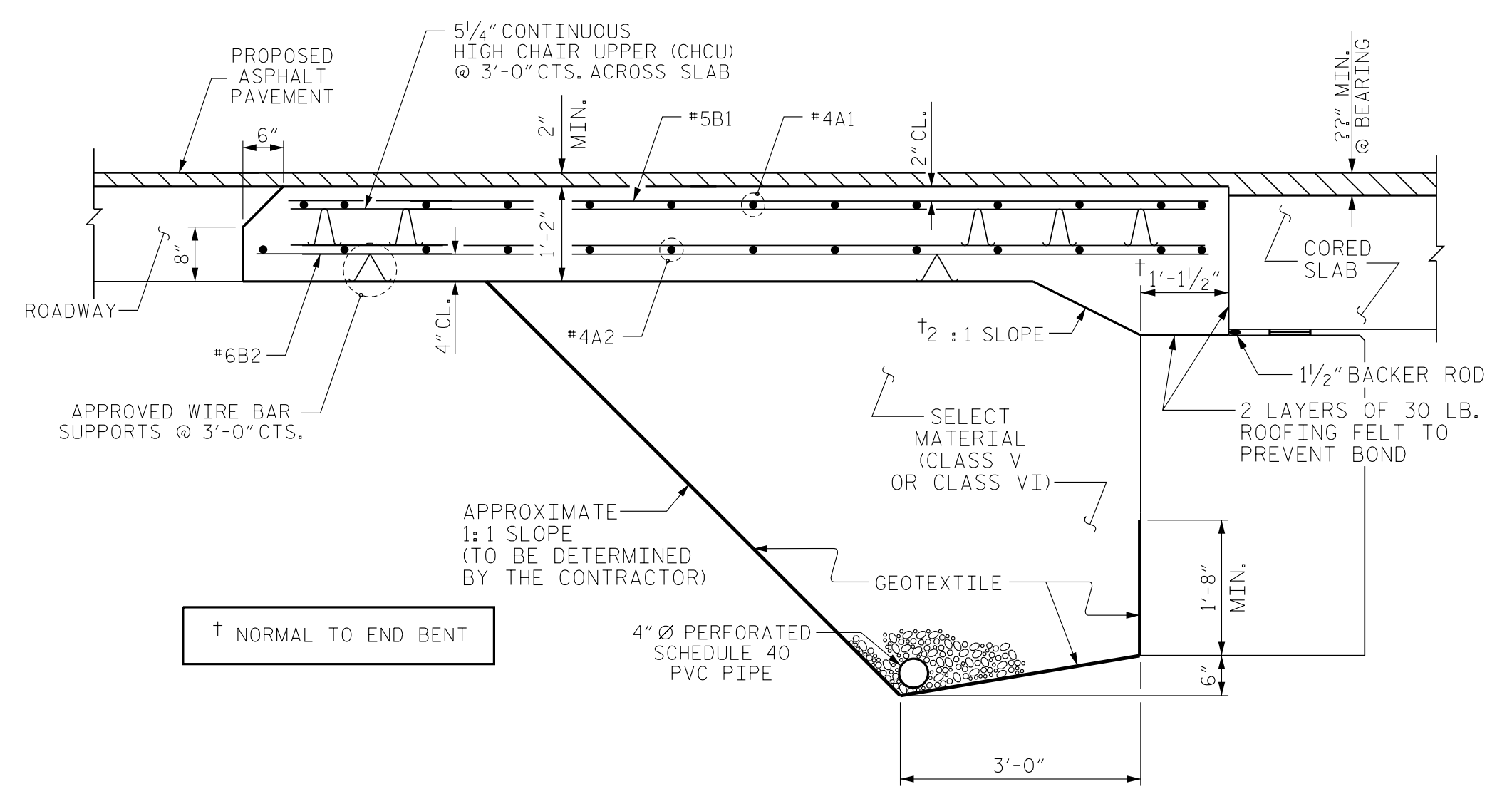
STANDARD
= RIP RAP DETAILS =

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			24

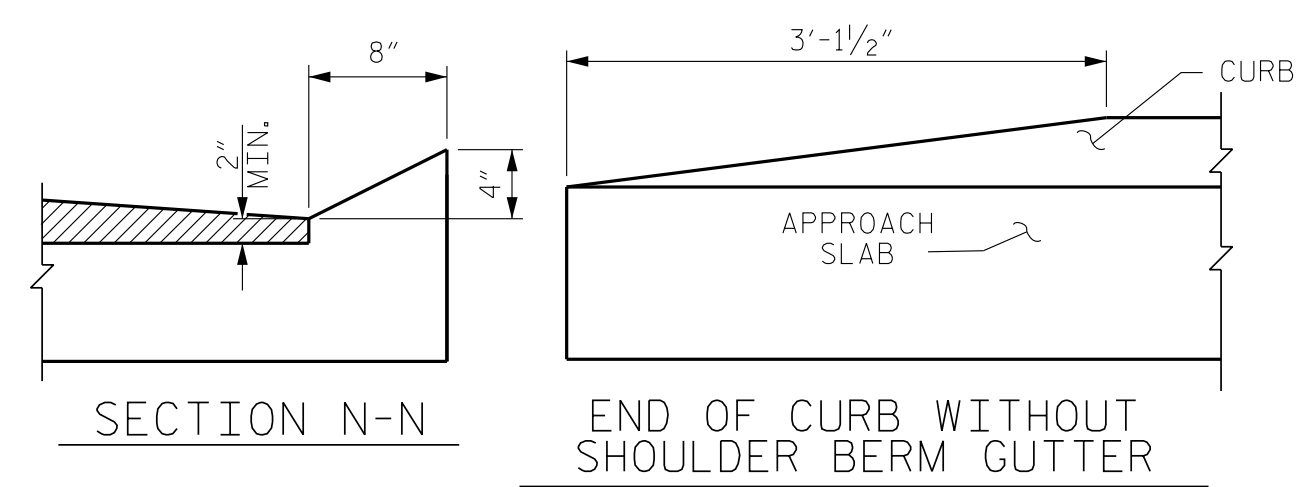
ASSEMBLED BY :	RWW	DATE :	2/2016
CHECKED BY :	HLW	DATE :	2/2016
ENGINEER OF RECORD :	TVT	DATE :	2/2016
DRAWN BY :	REK 1/84	REV. 5/1/06R	TLA/GM
CHECKED BY :	RDU 1/84	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/GM



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



SECTION THRU SLAB
(TYPE II - MODIFIED APPROACH FILL)



CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

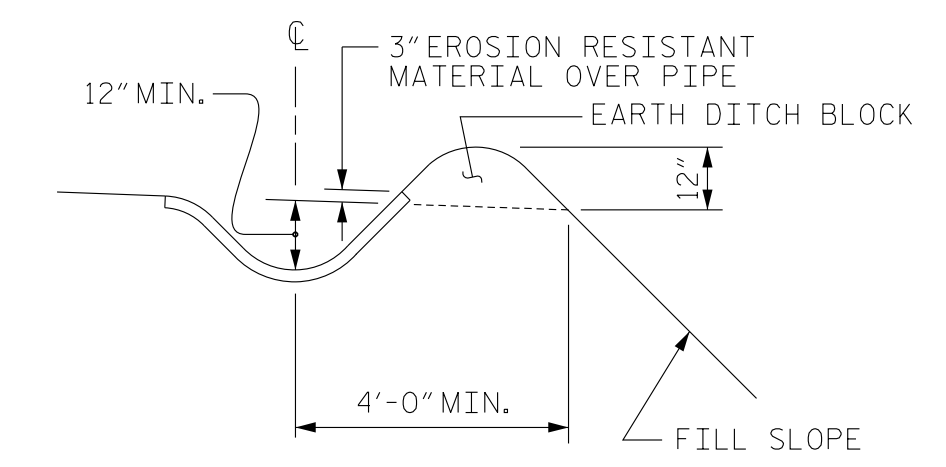
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKFILL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

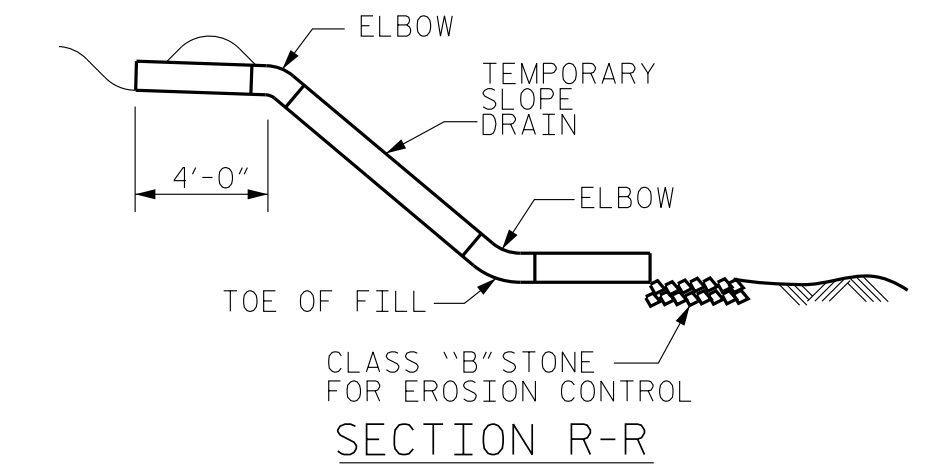
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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

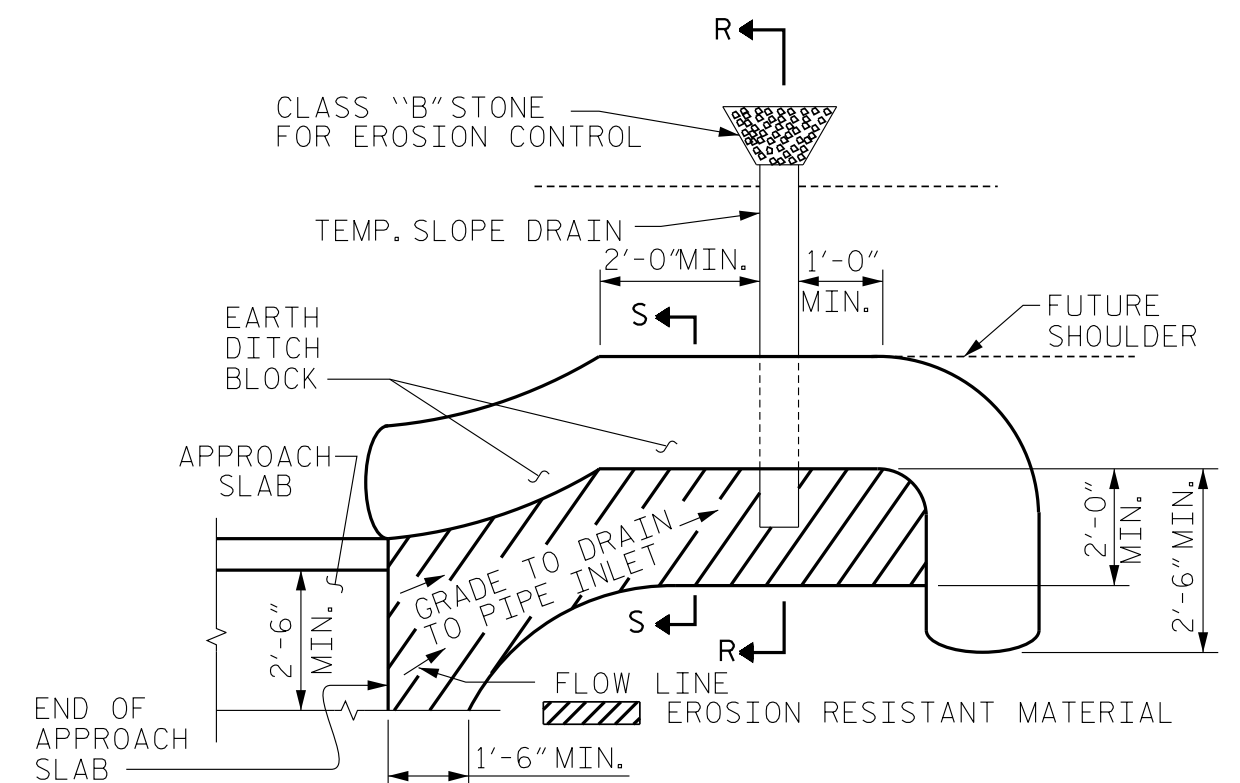
APPROACH SLAB GROOVING IS NOT REQUIRED.



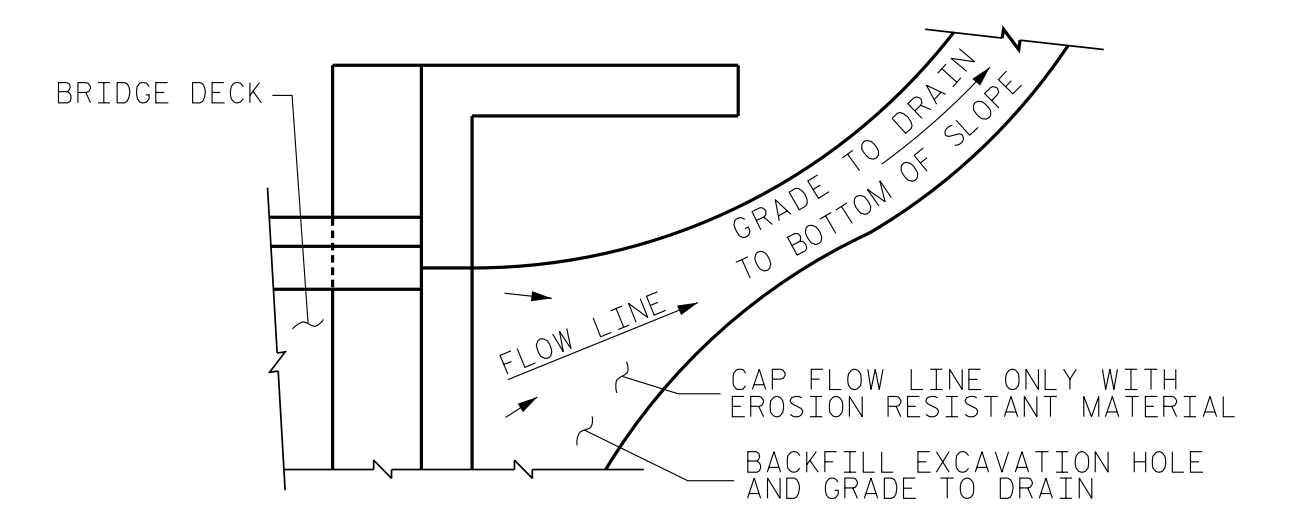
SECTION S-S



SECTION R-R



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



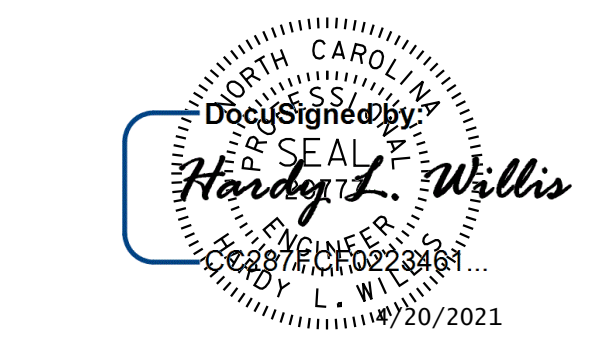
TEMPORARY DRAINAGE DETAIL

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.

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.

BILL OF MATERIAL						
APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	13	#4	STR	28'-10"	250	
A2	13	#4	STR	28'-10"	250	
* B1	58	#5	STR	11'-2"	676	
B2	58	#6	STR	11'-8"	1016	
REINFORCING STEEL					LBS.	1266
* EPOXY COATED REINFORCING STEEL					LBS.	926
CLASS AA CONCRETE					C. Y.	16.7
APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	13	#4	STR	28'-10"	250	
A2	13	#4	STR	28'-10"	250	
* B1	58	#5	STR	11'-2"	676	
B2	58	#6	STR	11'-8"	1016	
REINFORCING STEEL					LBS.	1266
* EPOXY COATED REINFORCING STEEL					LBS.	926
CLASS AA CONCRETE					C. Y.	16.7

ASSEMBLED BY : RWW DATE : 2/2016
 CHECKED BY : HLW DATE : 2/2016
 ENGINEER OF RECORD: TVT DATE : 2/2016
 DRAWN BY : SHS/MAA 5-09 REV. 12-17 MAA/THC
 CHECKED BY : BCH 5-09 REV. 08-19 BNB/THC



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

V&M
Vaughan & Melton
Consulting Engineers
Asheville, North Carolina
919-253-2196
Charlotte, NC 919-377-9455
Cherohoke, NC 704-357-0488
Atlanta, GA 770-627-3509
Boone, NC 828-355-9333
Tri-Cities, TN 423-461-8401
Greenville, TN 865-546-5800
Spartanburg, SC 803-574-4775
Cherokee, SC 843-974-5650
Middleboro, KY 606-248-6600

PROJECT NO. 14SP.20451.2
 HENDERSON COUNTY
 STATION: 13+17.03 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

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

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "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 $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " 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 $\frac{1}{4}$ " 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 $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset 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 $\frac{3}{16}$ " 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 $\frac{1}{16}$ " 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. FINS 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