

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

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

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

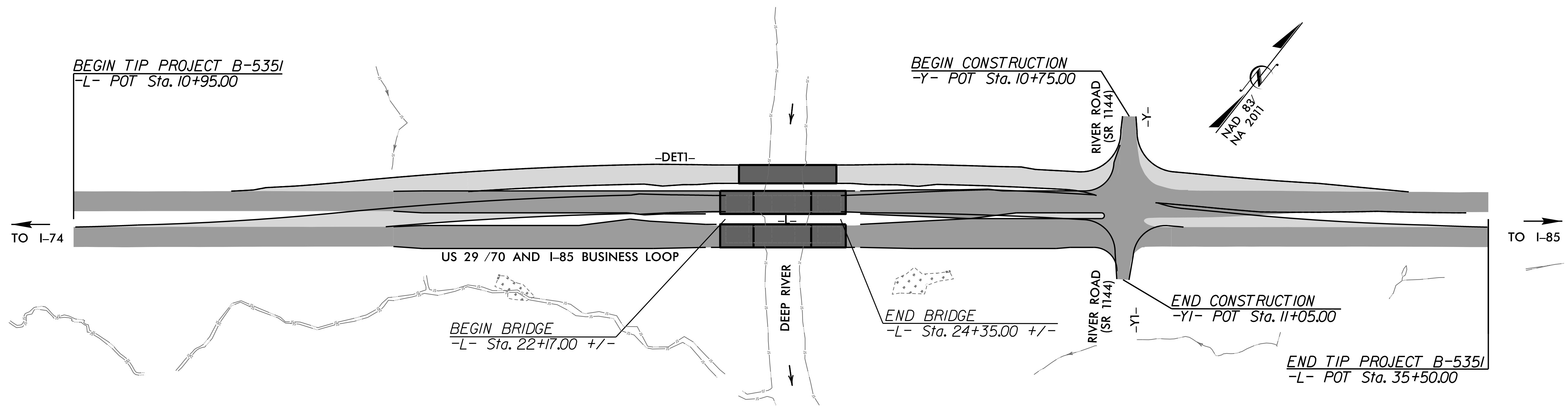
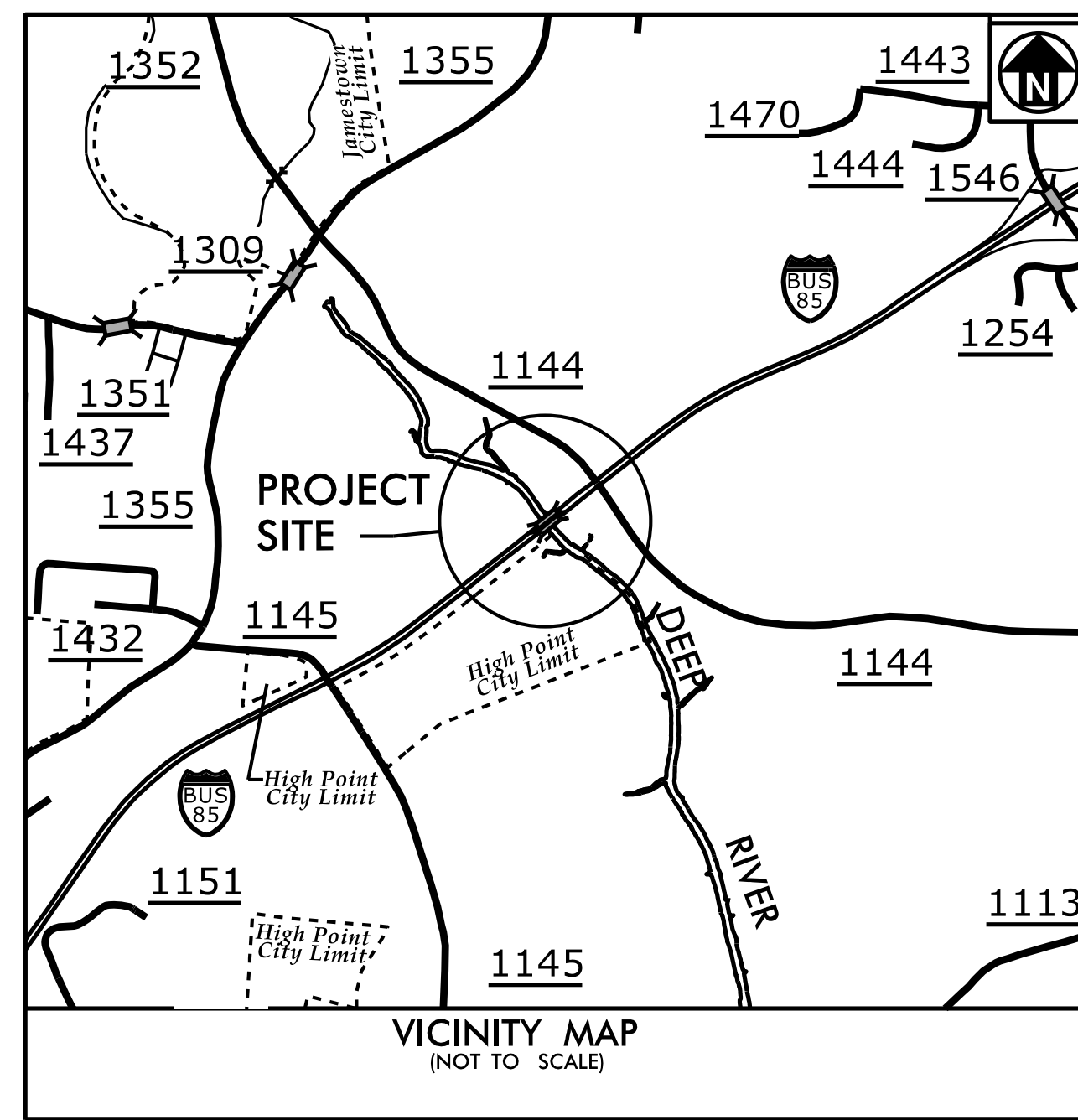
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5351	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46065.1.1		PE	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# GUILFORD COUNTY

**LOCATION: REPLACE BRIDGE NO. 242 AND BRIDGE NO. 237 OVER DEEP RIVER  
IN HIGH POINT ON US 29 /70 /I-85 BUSINESS**

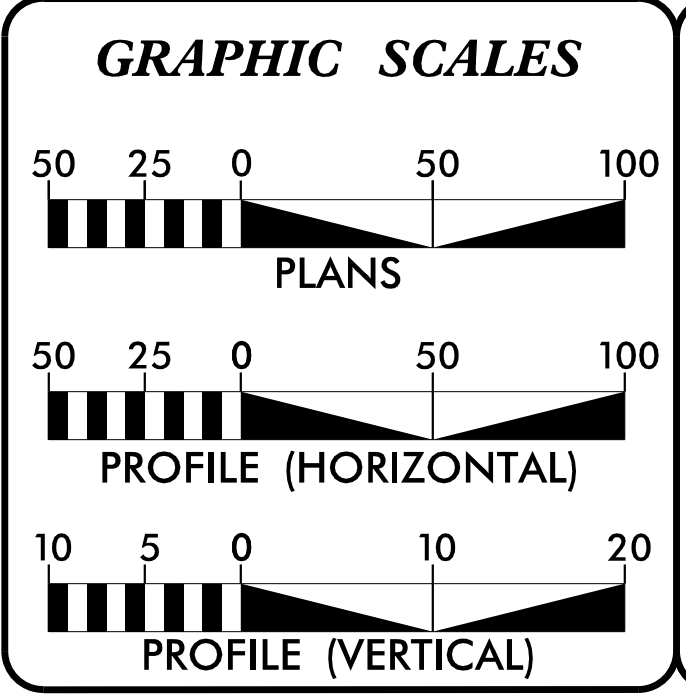
**TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE**



## STRUCTURES

**TIP PROJECT: B-5351**

**CONTRACT: C204100**



**DESIGN DATA**

ADT 2018	=	34,500
ADT 2038	=	42,900
K	=	10 %
D	=	55 %
T	=	8 % *
V	=	60 MPH
* (TTST = 3% + DUAL 5%)		
FUNC CLASS = MAJOR ARTERIAL REGIONAL TIER		

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-5351	=	0.424 MILES
LENGTH STRUCTURE TIP PROJECT B-5351	=	0.041 MILES
TOTAL LENGTH OF TIP PROJECT B-5351	=	0.465 MILES

PLANS PREPARED FOR THE NCDOT BY:  
MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER : P-0671

2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
OCTOBER 20, 2017

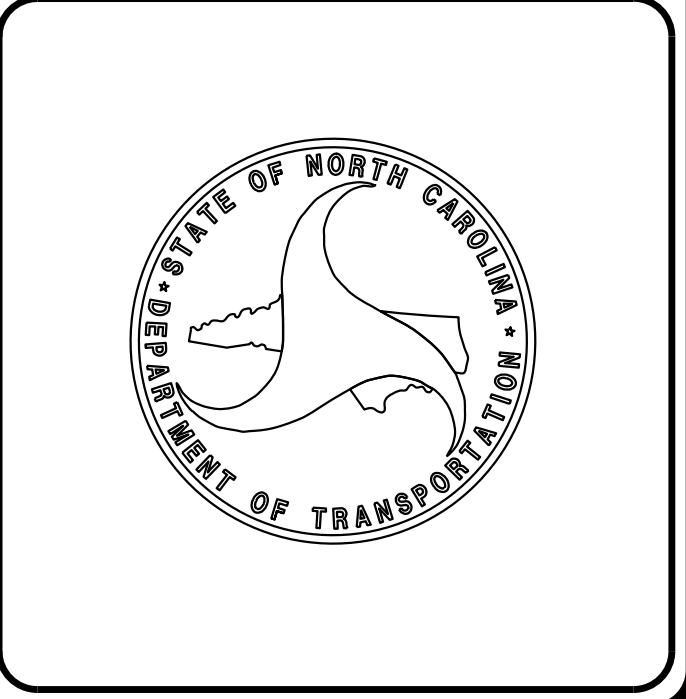
**LETTING DATE:**  
JUNE 19, 2018

**MORRIS ISRAELNAIM, PE**  
PROJECT ENGINEER  
PE# ENGINEER

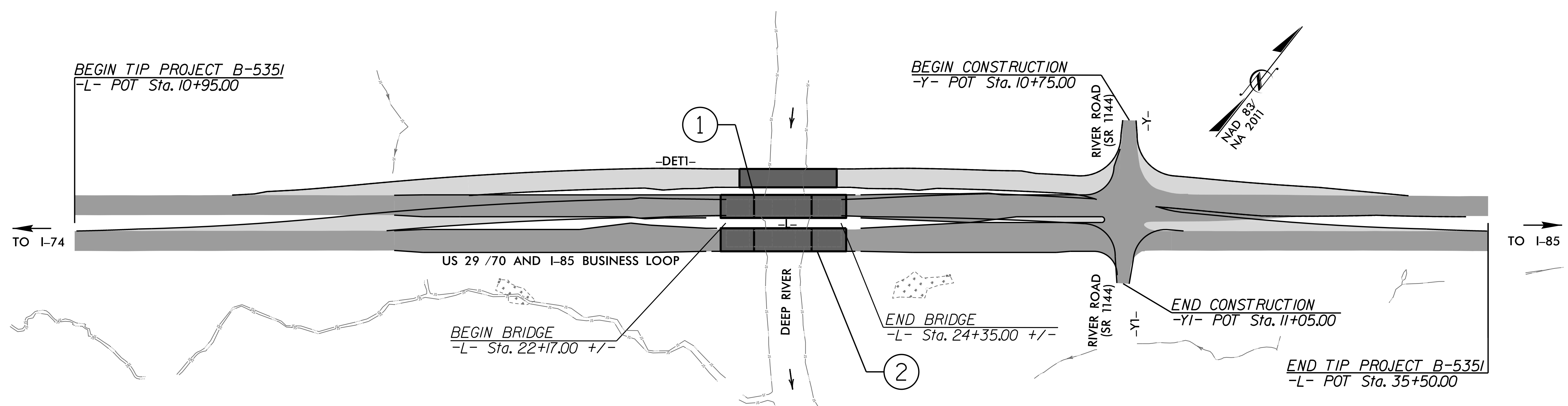
**ALLYSON K. ORR, PE**  
PROJECT DESIGN ENGINEER  
PE# ENGINEER

**DAVID STUTTS, PE**  
NCDOT CONTACT

3/14/2018

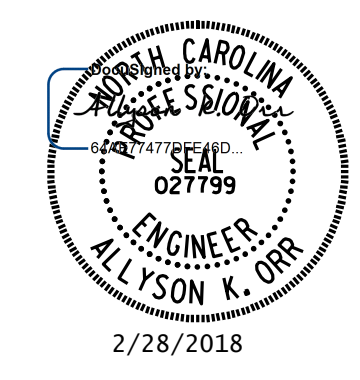


09/05/19  
 3/14/2018 8:14:29 AM  
 Planning  
 Filename: P:\NC\_Bridges\M16001.35 - B-5351 Guilford Co\B-5351\Structures\499-001-B5351-SMU-TSH.dgn



STRUCTURE INDEX			
STR.	STATION	DESCRIPTION	SHEETS
1	23+26.00 -L-	BRIDGE ON US 29 / 70 / I-85 BUISNESS OVER DEEP RIVER (WBL)	S1-1 THRU S1-35
2	23+26.00 -L-	BRIDGE ON US 29 / 70 / I-85 BUISNESS OVER DEEP RIVER (EBL)	S2-1 THRU S2-35

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: \_\_\_\_\_



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

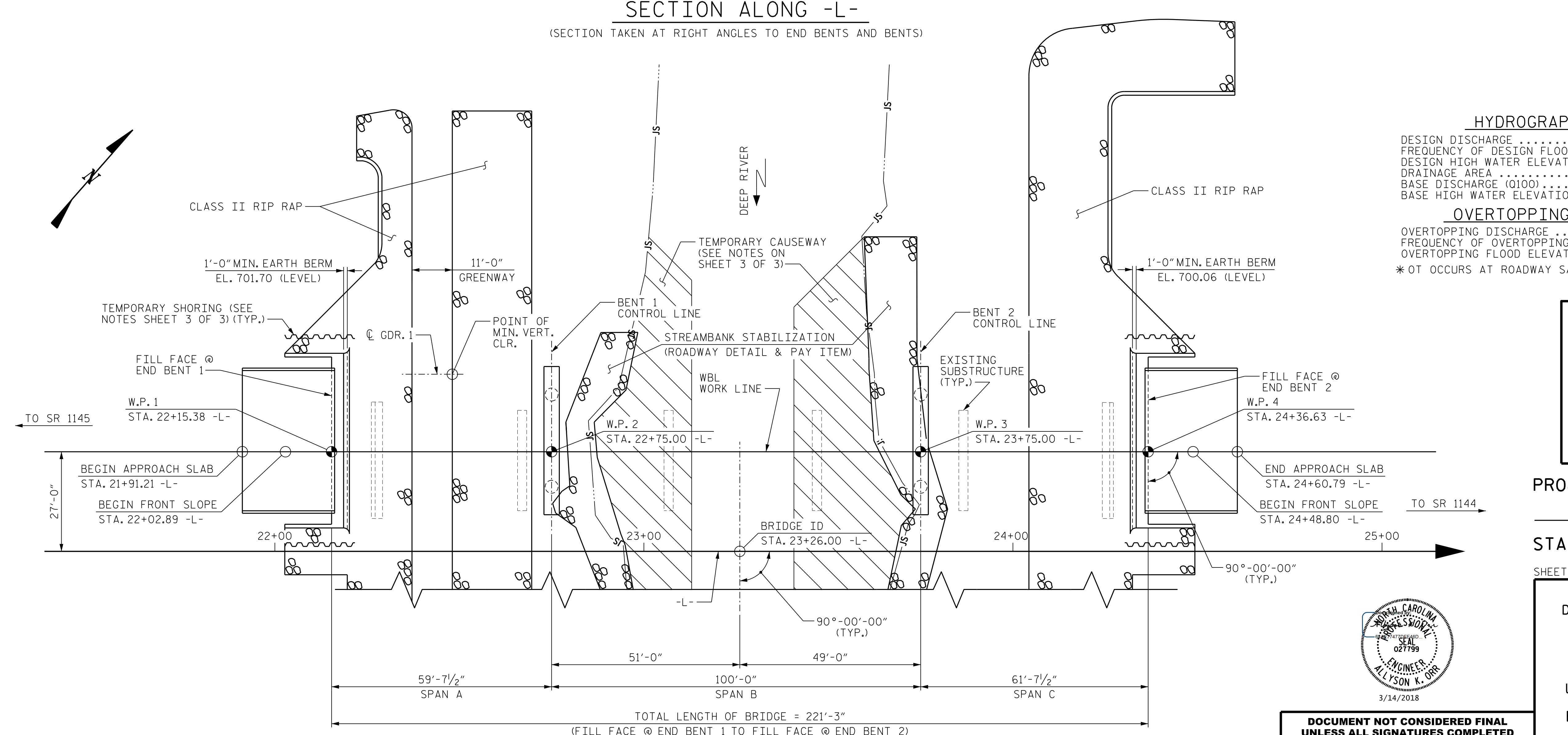
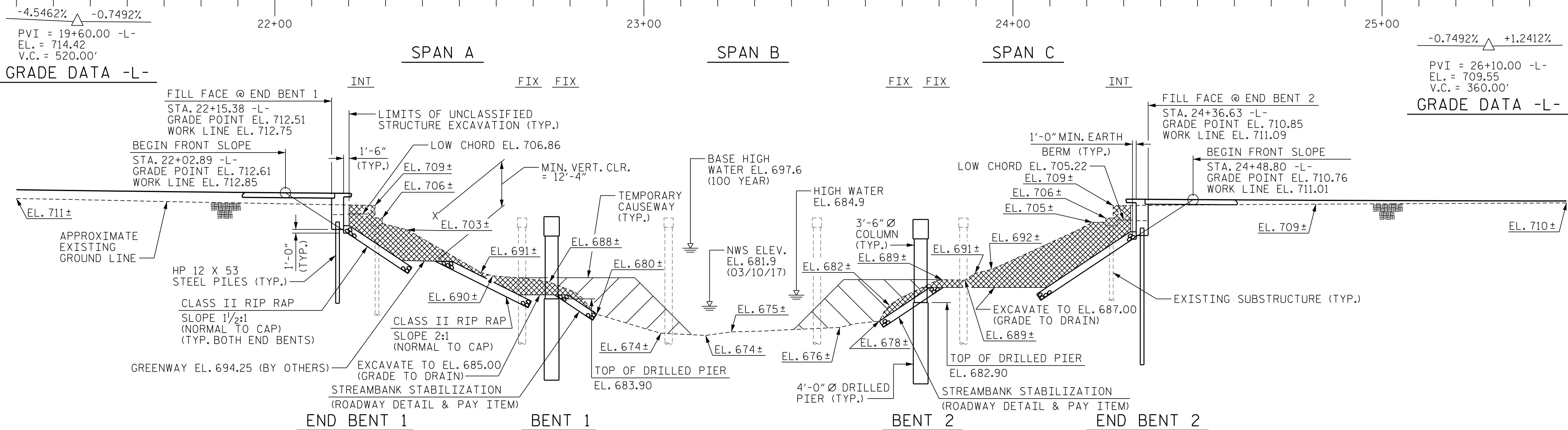
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

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

DRAWN BY : B.E. LANNING DATE : 02/18  
 CHECKED BY : A.K. ORR DATE : 02/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

2/8/2018 1:39:53 PM blanning  
 File name: P:\NC\_Bridges\MI600135 - B-5351 Guilford Co.\B-5351 Structures\499\_003\_B5351\_SML\_INDEX.dgn





**HYDROGRAPHIC DATA**

DESIGN DISCHARGE ..... = 11,122 CFS  
 FREQUENCY OF DESIGN FLOOD ..... = 50 YRS.  
 DESIGN HIGH WATER ELEVATION ..... = 696.6  
 DRAINAGE AREA ..... = 75.4 SQ. MI.  
 BASE DISCHARGE (Q100) ..... = 12,390 CFS  
 BASE HIGH WATER ELEVATION ..... = 697.6

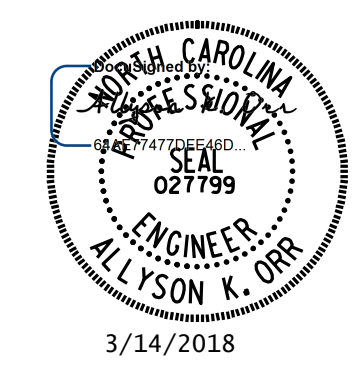
**OVERTOPPING FLOOD DATA**

OVERTOPPING DISCHARGE ..... = 38,000 CFS  
 FREQUENCY OF OVERTOPPING FLOOD ..... = 500+ YRS.  
 OVERTOPPING FLOOD ELEVATION ..... = 710.6 \*

\* OT OCCURS AT ROADWAY SAG STA. 25+65.50 -L- AT ROADWAY CROWN.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. **B-5351**  
 GUILFORD COUNTY  
 STATION: **23+26.00 -L-**  
 SHEET 1 OF 3 REPLACES BRIDGE NO. 242



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**

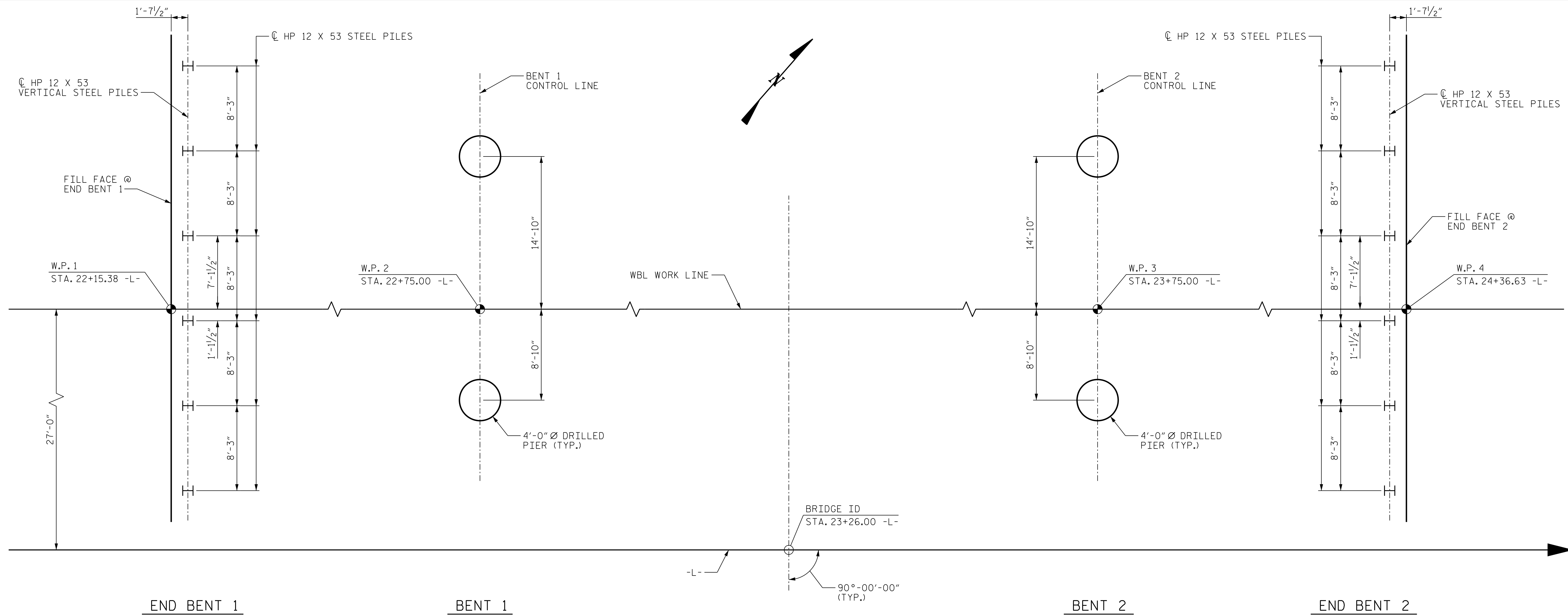
FOR BRIDGE ON  
 US 29 / 70 / I-85 BUSINESS  
 OVER DEEP RIVER  
 BETWEEN SR 1145 AND SR 1144  
 (WBL)

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

TOTAL SHEETS: **35**  
 SHEET NO. **S1-1**

DRAWN BY: **B.E. LANNING**      DATE: **12/17**  
 CHECKED BY: **A.K. ORR**      DATE: **01/18**  
 DESIGN ENGINEER OF RECORD: **A.K. ORR**      DATE: **02/18**

3/14/2018 8:24:11 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Structures\LEFT LANE (WBL)\401.001.B5351.SMU.GDI\_400242.dgn



### FOUNDATION LAYOUT

DIMENSIONS LOCATING END BENT PILES AT BENT DRILLED PIERS ARE SHOWN TO CENTERLINE PILES AND DRILLED PIERS.

### NOTES

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

DRILLED PIERS AT BENT 1 AND BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 805 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 65 TSF.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT 1 AND BENT 2, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 670 FT. (BENT 1) AND ELEVATION 668 FT. (BENT 2) WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT 1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 662 FT. WITH THE REQUIRED TIP RESISTANCE.

INSTALL DRILLED PIERS AT BENT 2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 661 FT. WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATIONS FOR BENT 1 IS ELEVATION 669 FT. THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 667 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. 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 CROSSHOLE SONIC LOGGING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

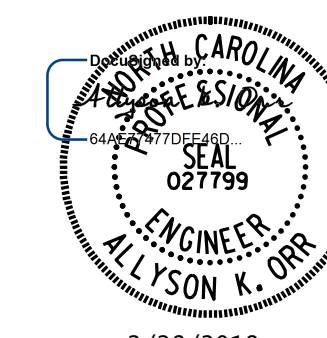
PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1 AND END BENT 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 3



2/28/2018

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON  
 US 29 / 70 / I-85 BUSINESS  
 OVER DEEP RIVER  
 BETWEEN SR 1145 AND SR 1144  
 (WBL)

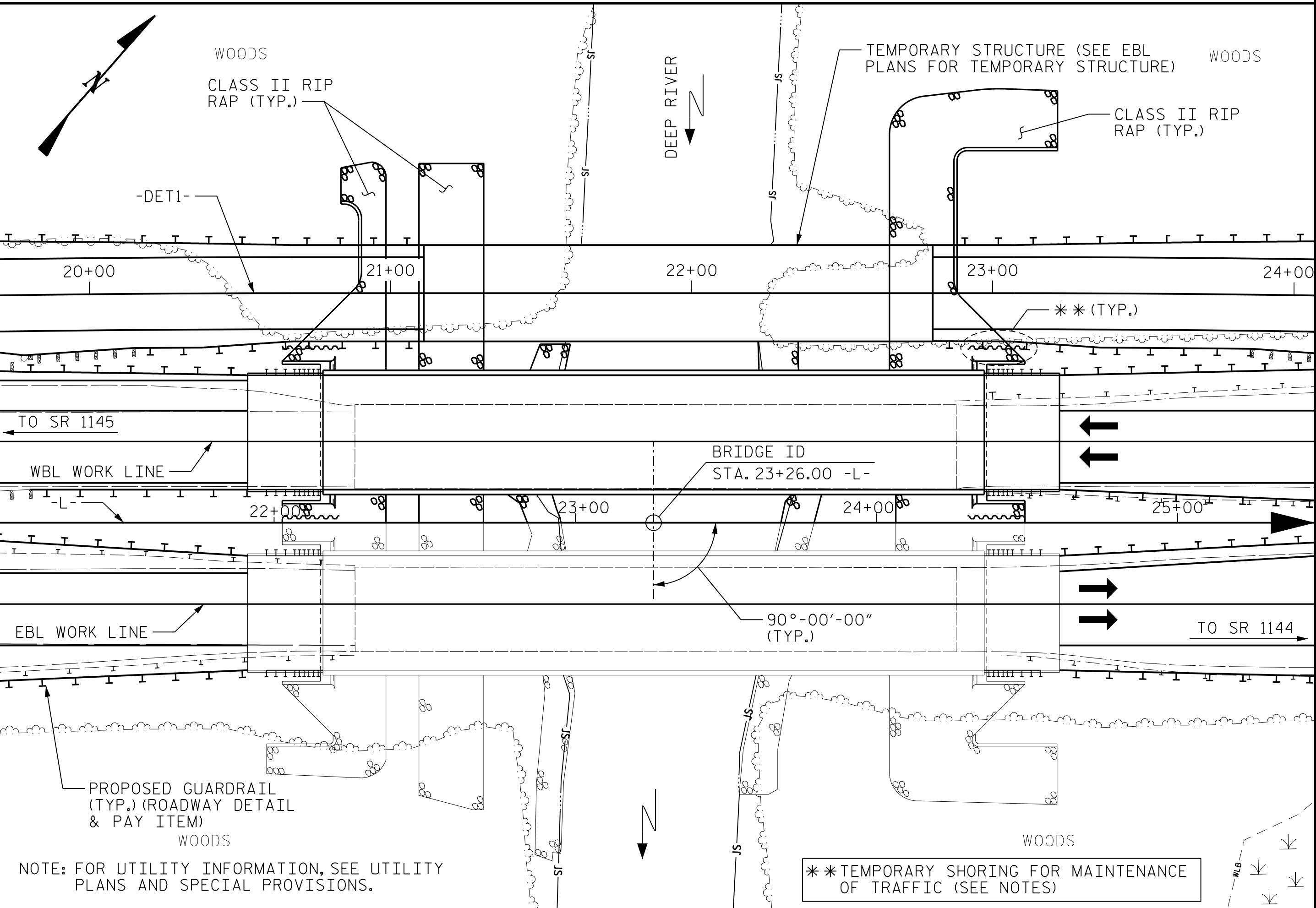
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			35

DRAWN BY : B.E. LANNING	DATE : 01/18
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

2/8/2018 10:43:09 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Bridges\Structures\LEFT LANE (WBL)\401\_003\_B5351\_SML\_GD2\_400242.dgn



B.M. #1: RR SPIKE IN 12" SYCAMORE; 205' RIGHT OF STA. 24+41.00 -L-, EL. 692.52.



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.  
FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.  
THE EXISTING STRUCTURE CONSISTING OF FIVE SPANS @ 40'-0", WITH A REINFORCED CONCRETE FLOOR ON REINFORCED CONCRETE DECK GIRDERS, AND A CLEAR ROADWAY WIDTH OF 28'-0" ON REINFORCED CONCRETE CAP WITH TIMBER PILE END BENTS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.  
REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS TO NOT ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.  
THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 115 FT. TO THE LEFT OF THE SURVEY LINE 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.  
THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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 THE DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.  
PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF THE METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.  
REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.  
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.  
FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.  
NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.  
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.  
THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.  
AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 23+26.00 -L-.  
THE CONTRACTOR'S ATTENTION SHALL BE DRAWN TO THE FACT THAT ONLY 50% OF THE CHANNEL WILL BE ALLOWED TO BE BLOCKED AT ANY TIME.  
TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN VIEW.  
FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

TOTAL BILL OF MATERIAL

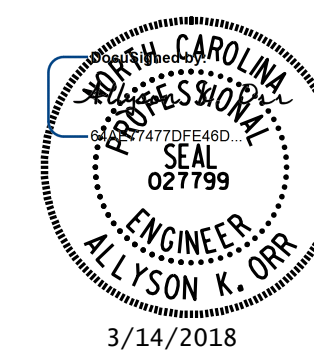
	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY ACCESS AT STA. 23+26.00 -L-	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" Ø DRILLED PIERS IN SOIL	4'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.
SUPERSTRUCTURE										9,127	9,390
END BENT 1									LUMP SUM		
BENT 1				28.0	16.0	30.0					
BENT 2				30.0	14.0	32.0					
END BENT 2									LUMP SUM		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	58.0	30.0	62.0	2	2	LUMP SUM	9,127	9,390

TOTAL BILL OF MATERIAL

	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	
	CU. YDS.	LUMP SUM	LBS.	LBS.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TON	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE					1088.75				439.17				LUMP SUM
END BENT 1	35.6	LUMP SUM	4,981			6	6	117	6		570	635	
BENT 1	44.3		11,195	2,020									
BENT 2	44.5		11,221	2,033									
END BENT 2	35.6	LUMP SUM	4,981			6	6	222	6		530	590	
TOTAL	160.0	LUMP SUM	32,378	4,053	1088.75	12	12	339	12	439.17	1,100	1,225	LUMP SUM

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 3 OF 3



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**

FOR BRIDGE ON  
 US 29 / 70 / I-85 BUSINESS  
 OVER DEEP RIVER  
 BETWEEN SR 1145 AND SR 1144  
 (WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S1-3
2			4			TOTAL SHEETS 35

DRAWN BY: B.E. LANNING DATE: 12/17  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

3/14/2018 8:23:46 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_005\_B5351\_SML\_G03\_400242.dgn



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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.17	--	1.75	0.806	1.50	C	I	29.44	0.896	<b>1.17</b>	B	I	92.95	0.80	0.806	1.60	C	I	29.4		
	HL-93 (OPERATING)	N/A		1.30	--	1.35	0.806	1.94	C	I	29.44	0.896	1.30	B	I	92.95	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.92	69.12	1.75	0.806	<b>1.92</b>	C	I	29.44	0.896	2.38	A	I	45.50	0.80	0.806	2.06	C	I	29.4		
	HS-20 (OPERATING)	36.000		2.49	89.64	1.35	0.806	2.49	C	I	29.44	0.896	3.10	A	I	45.50	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.52	47.52	1.40	0.806	5.15	C	I	29.44	0.896	7.27	C	I	11.78	0.80	0.806	3.52	C	I	29.4	
		SNGARBS2	20.000		2.69	53.80	1.40	0.806	3.93	C	I	29.44	0.896	5.25	C	I	11.78	0.80	0.806	2.69	C	I	29.4	
		SNAGRIS2	22.000		2.58	56.76	1.40	0.806	3.76	C	I	29.44	0.896	4.90	C	I	11.78	0.80	0.806	2.58	C	I	29.4	
		SNCOTTS3	27.250		1.74	47.42	1.40	0.806	2.55	C	I	29.44	0.896	3.44	C	I	11.78	0.80	0.806	1.74	C	I	29.4	
		SNAGGRS4	34.925		1.49	52.04	1.40	0.806	2.18	C	I	29.44	0.896	2.83	C	I	11.78	0.80	0.806	1.49	C	I	29.4	
		SNS5A	35.550		1.47	52.26	1.40	0.806	2.14	C	I	29.44	0.896	2.97	C	I	11.78	0.80	0.806	1.47	C	I	29.4	
		SNS6A	39.950		1.36	54.33	1.40	0.806	1.98	C	I	29.44	0.896	2.73	B	I	19.55	0.80	0.806	1.36	C	I	29.4	
	SNS7B	42.000		1.29	54.18	1.40	0.806	1.89	C	I	29.44	0.896	2.62	B	I	19.55	0.80	0.806	1.29	C	I	29.4		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.68	55.44	1.40	0.806	2.45	C	I	29.44	0.896	3.21	B	I	19.55	0.80	0.806	1.68	C	I	29.4	
		TNT4A	33.075		1.67	55.24	1.40	0.806	2.44	C	I	29.44	0.896	3.14	C	I	11.78	0.80	0.806	1.67	C	I	29.4	
		TNT6A	41.600		1.38	57.41	1.40	0.806	2.01	C	I	29.44	0.896	2.84	B	I	19.55	0.80	0.806	1.38	C	I	29.4	
		TNT7A	42.000		1.40	58.80	1.40	0.806	2.04	C	I	29.44	0.896	2.73	C	I	11.78	0.80	0.806	1.40	C	I	29.4	
		TNT7B	42.000		1.45	60.90	1.40	0.806	2.10	C	I	35.33	0.896	2.61	B	I	19.55	0.80	0.806	1.45	C	I	29.4	
		TNAGRIT4	43.000		1.38	59.34	1.40	0.806	2.01	C	I	29.44	0.896	2.53	C	I	11.78	0.80	0.806	1.38	C	I	29.4	
TNAGT5A		45.000		1.29	58.05	1.40	0.806	1.89	C	I	29.44	0.896	2.46	B	I	19.55	0.80	0.806	1.29	C	I	29.4		
TNAGT5B	45.000	③	1.27	57.15	1.40	0.806	1.85	C	I	29.44	0.896	2.34	C	I	11.78	0.80	0.806	<b>1.27</b>	C	I	29.4			

LOAD FACTORS:

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

NOTES:

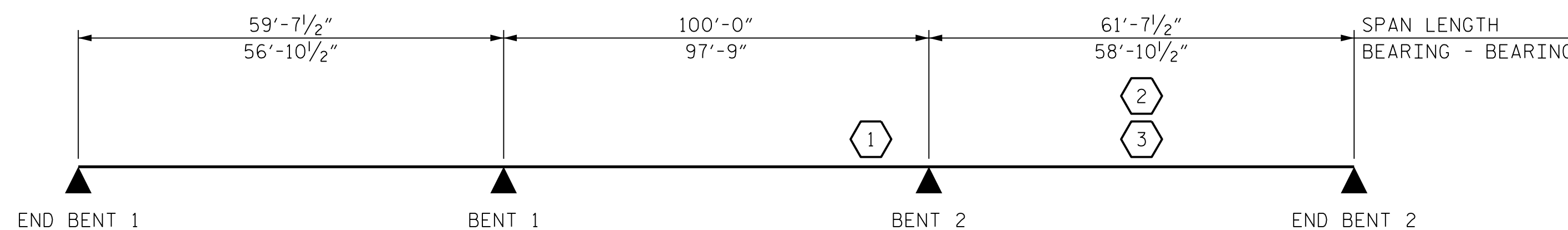
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

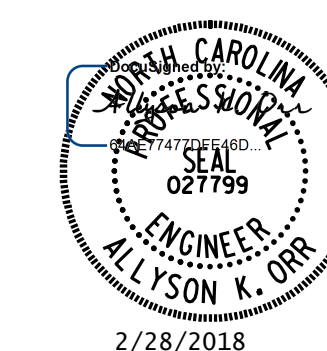
COMMENTS:

- GIRDERS ARE CONSIDERED TO BE CONTINUOUS FOR LIVE LOAD.
- 
- 
- 

#	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 E - EXTERIOR GIRDER	



PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC) (WBL)					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					35

2/8/2018 10:43:14 AM User: blanning  
 File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\LEFT LANE (WBL)\X401\_007\_B5351\_SML\_LRFR\_400242.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

**NOTES**

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

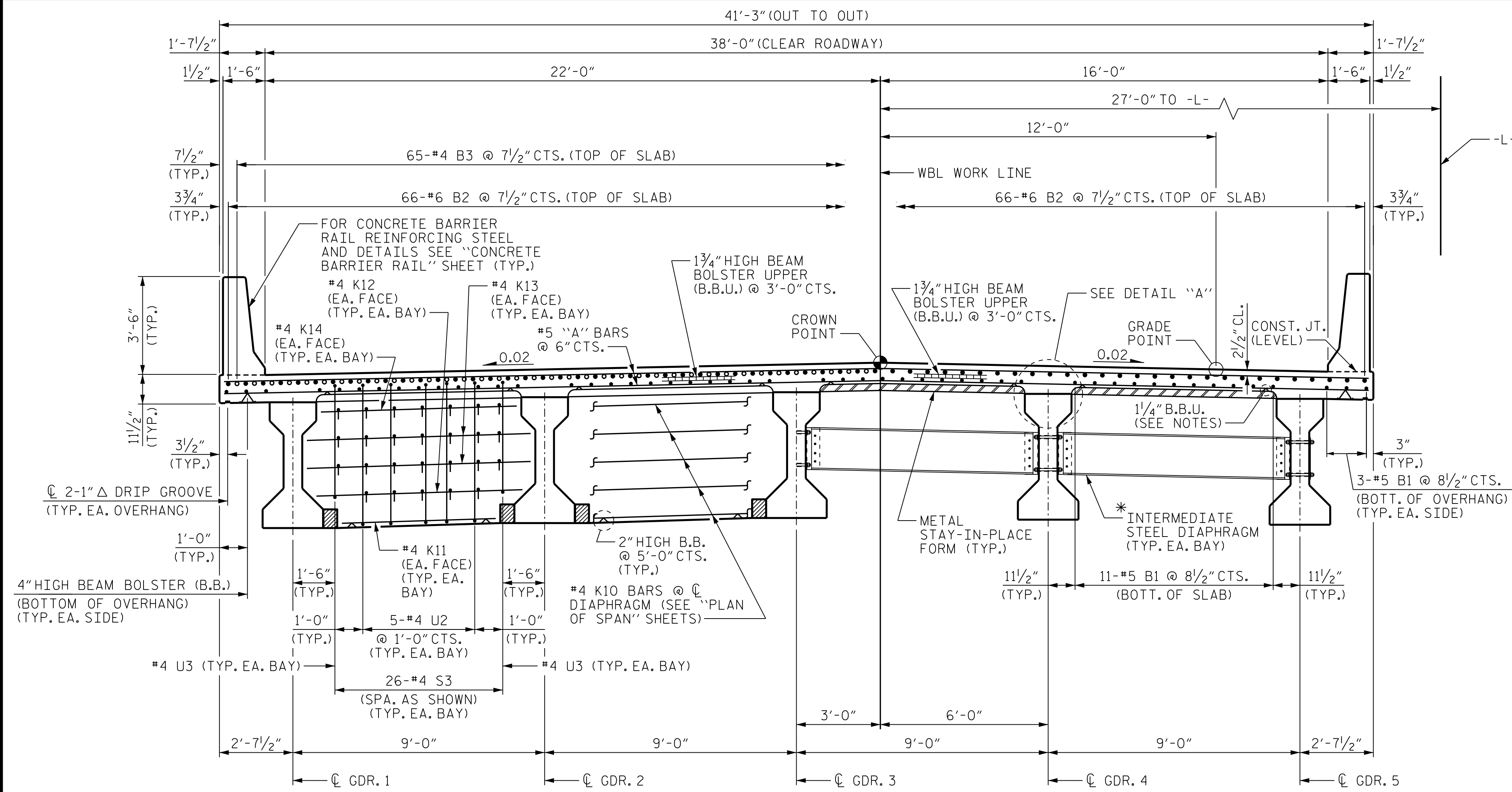
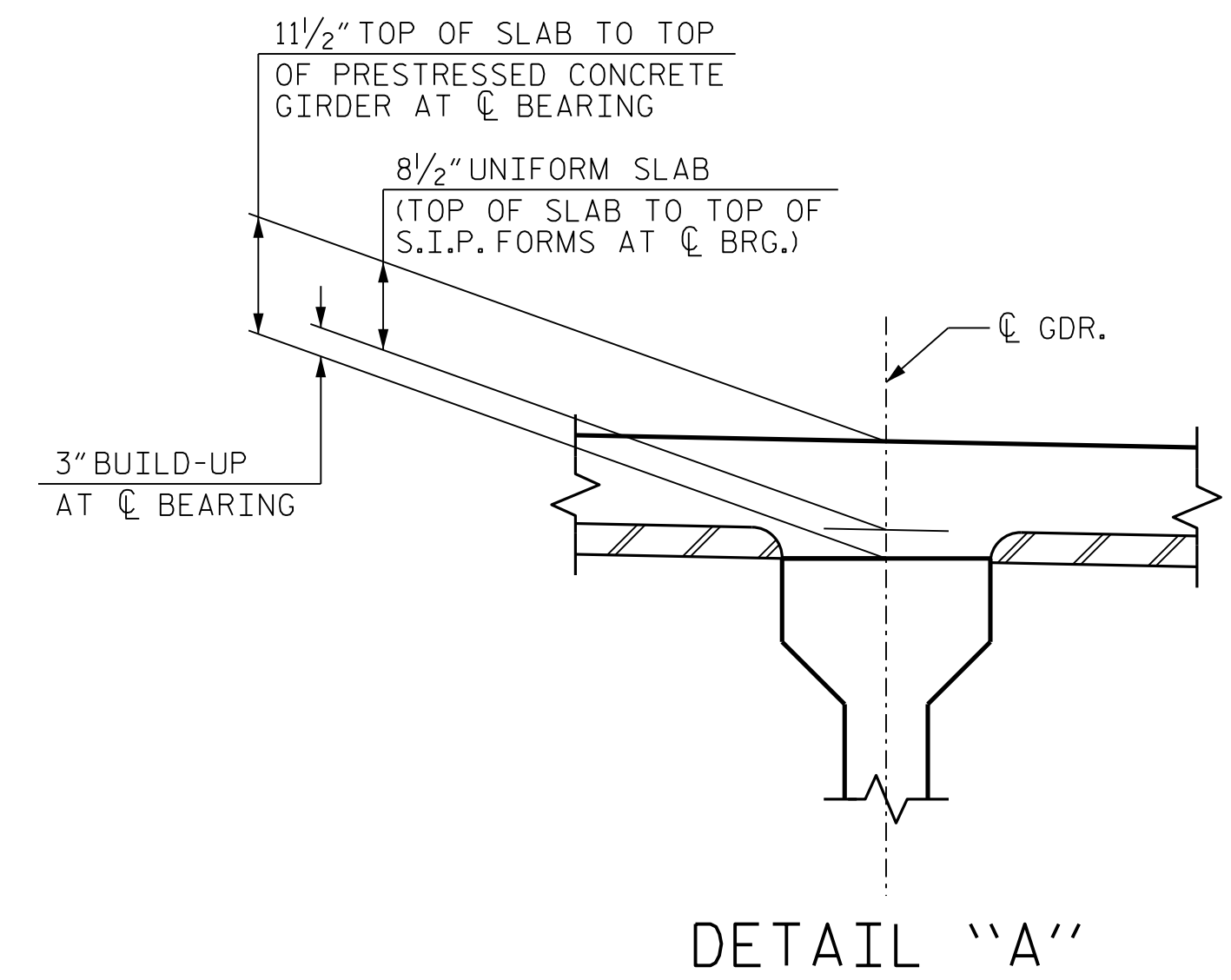
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

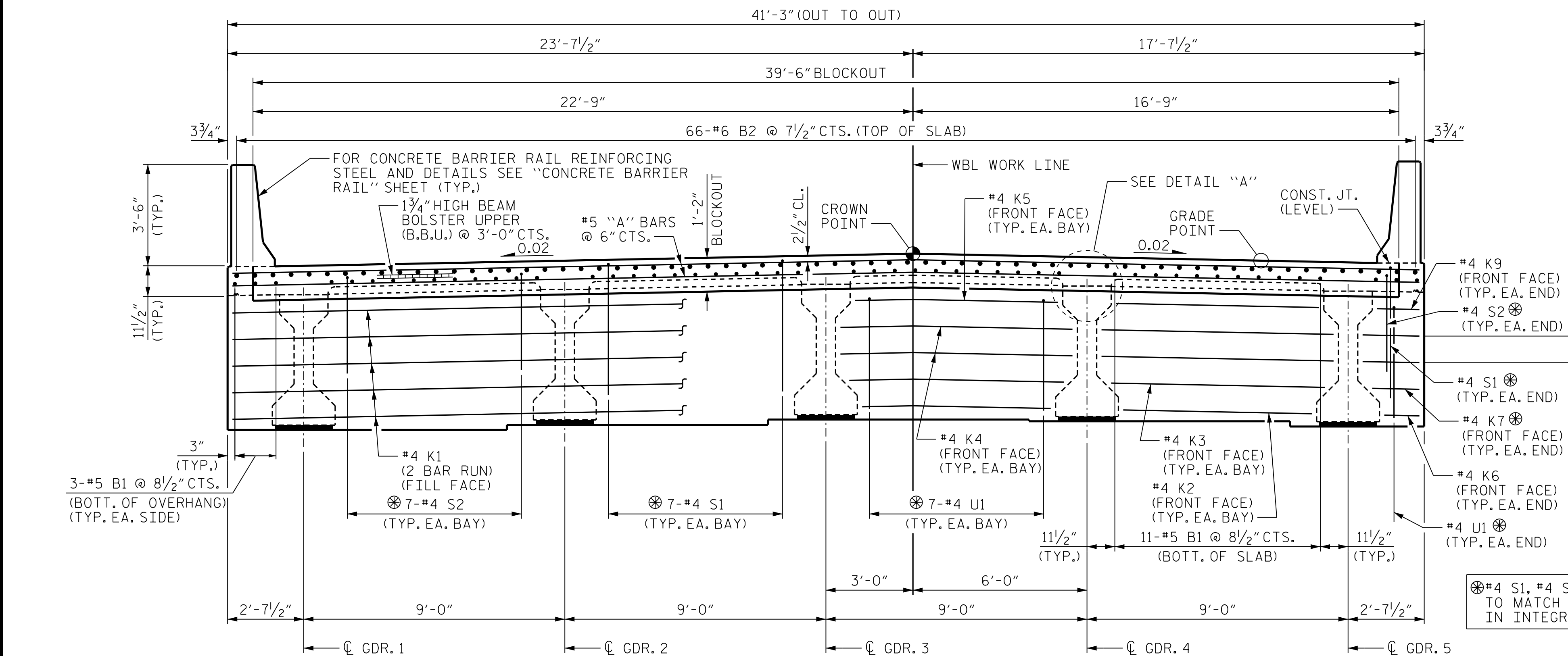
ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.

\* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



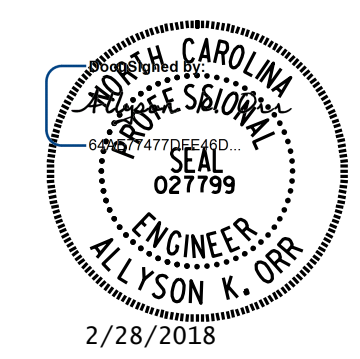
**TYPICAL SECTION**  
(SHOWING BENT DIAPHRAGM)

**TYPICAL SECTION**  
(SHOWING INTERMEDIATE DIAPHRAGM AT SPANS A & C ONLY)



**TYPICAL SECTION AT INTEGRAL END BENT**  
(FOR ADDITIONAL DIMENSIONS, SEE TYPICAL SECTION ABOVE)

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE**  
**TYPICAL SECTION**  
**AND DETAILS**

<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>						<b>(WBL)</b>						
MI ENGINEERING 1011 SCHAUH DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER: P-0671						REVISIONS						SHEET NO. <b>S1-5</b>
NO.	BY:	DATE:	NO.	BY:	DATE:							
1			3							TOTAL SHEETS <b>35</b>		
2			4									

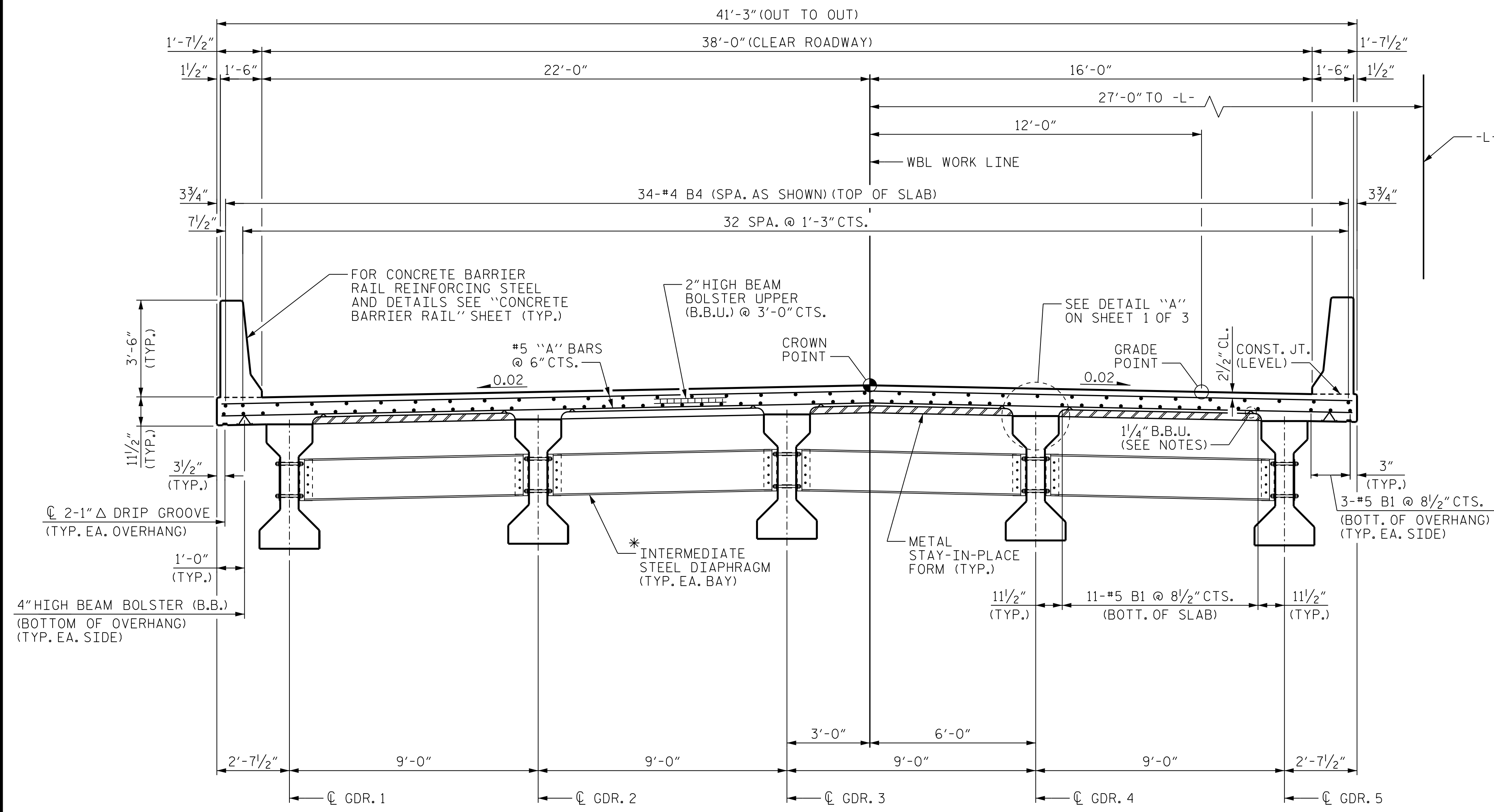
2/8/2018 10:43:16 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Structures\LEFT LANE (WBL)\401\_009\_B5351\_SMUL\_TSI\_400242.dgn

DRAWN BY: B.E. LANNING DATE: 12/17  
 CHECKED BY: A.K. ORR DATE: 12/17  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

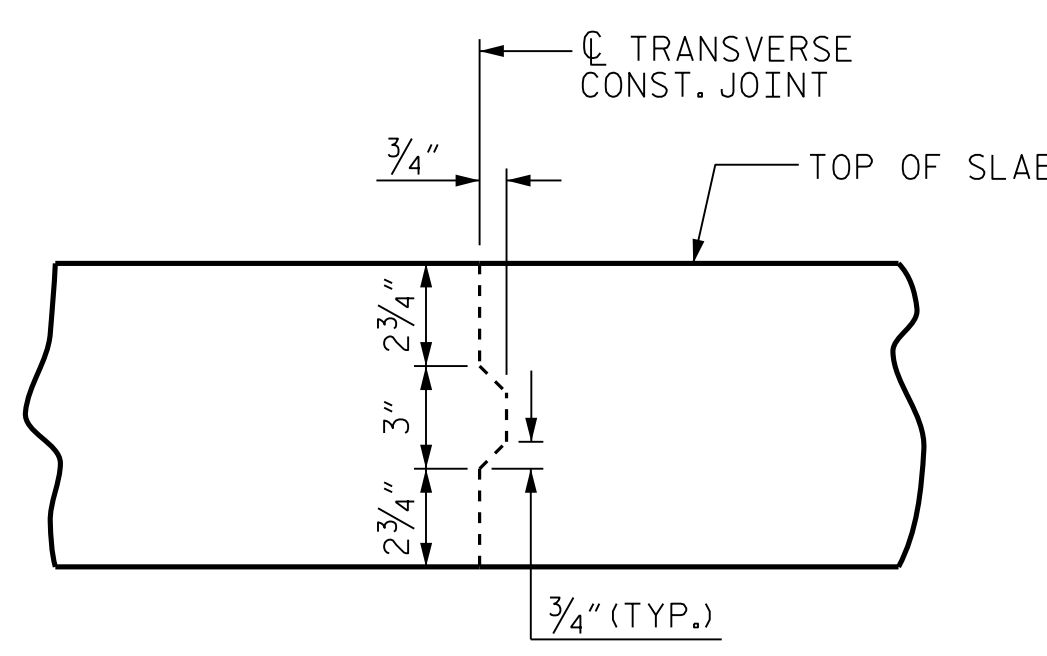


NOTES

FOR ADDITIONAL DETAILS AND NOTES, SEE SHEET 1 OF 3.  
 \* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



**TYPICAL SECTION**  
 (SHOWING INTERMEDIATE DIAPHRAGM AT SPAN B ONLY)

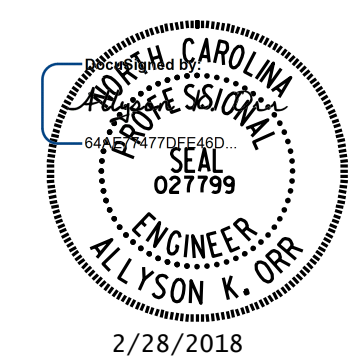


**TRANSVERSE CONSTRUCTION JOINT DETAIL**

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN.  
 LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 AND DETAILS

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S1-6
2			4			TOTAL SHEETS 35

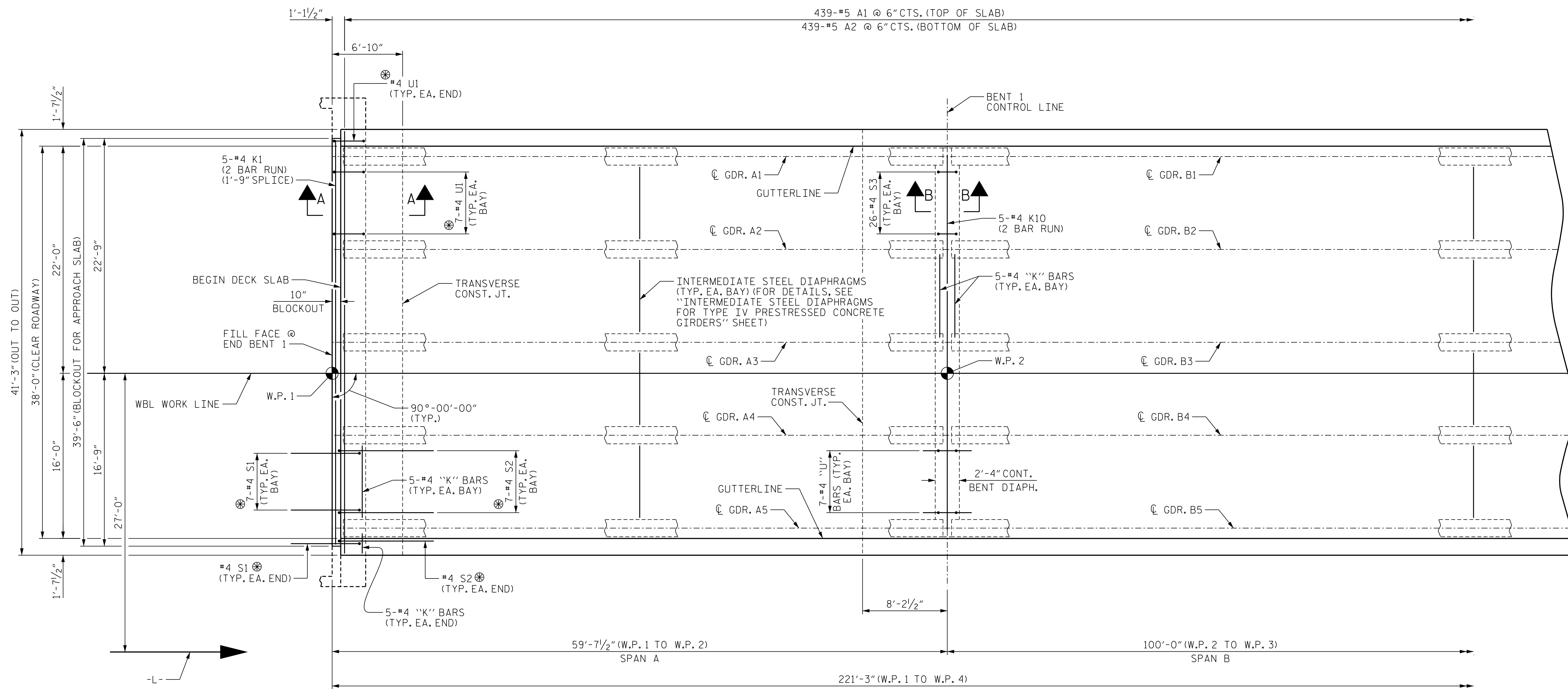
DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 12/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

2/8/2018 10:43:18 AM User: blanning  
 Filenamer: P:\NC Bridges\MI6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_011\_B5351.SMU.IS2\_400242.dgn





2/8/2018 10:43:23 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\LEFT LANE (WBL)\401.015.B5351.SMU.PSI\_400242.dgn



SPAN A

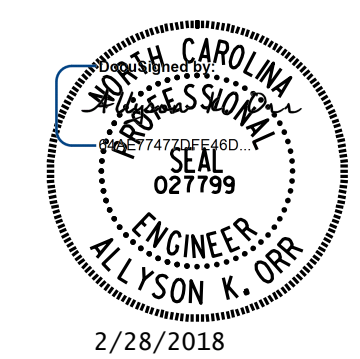
SPAN B

### PLAN OF SPAN A AND PART OF SPAN B

- NOTES:**
- FOR REINFORCING STEEL IN BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEETS.
  - FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEETS.
  - FOR LOCATION OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.
  - FOR TOP AND BOTTOM "B" BARS NOT SHOWN, SEE SHEET 3 OF 3.
  - ⊗ #4 S1, #4 S2 & #4 U1 TO MATCH WITH #4 "V" BARS IN INTEGRAL END BENT CAP.
  - FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEET 2 OF 3.
  - FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 3



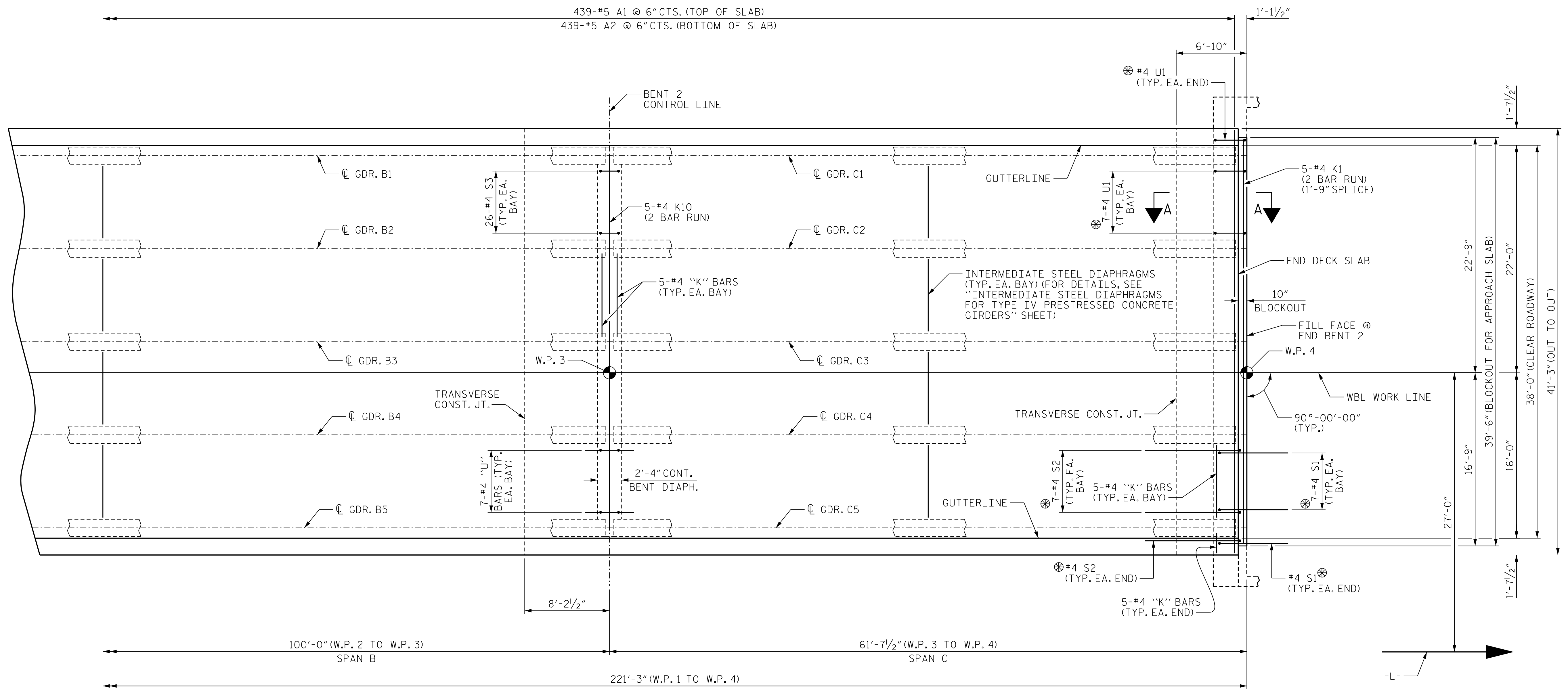
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE**  
**PLAN OF SPANS**  
**SPAN A AND PART**  
**OF SPAN B**  
 (WBL)

**DOCUMENT NOT CONSIDERED FINAL**  
**UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-8
1			3			TOTAL SHEETS
2			4			35

DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 12/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18



SPAN B

SPAN C

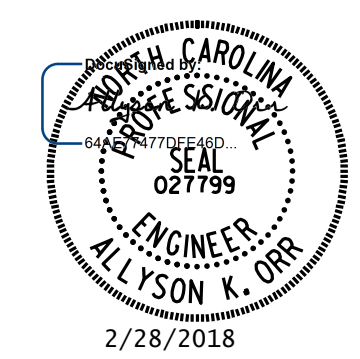
**PART PLAN OF SPAN B AND PLAN OF SPAN C**

**NOTES:**

- FOR REINFORCING STEEL IN BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEETS.
- FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEETS.
- FOR LOCATION OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.
- FOR TOP AND BOTTOM "B" BARS NOT SHOWN, SEE SHEET 3 OF 3.
- ⊗ #4 S1, #4 S2 & #4 U1 TO MATCH WITH #4 "V" BARS IN INTEGRAL END BENT CAP.
- FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEET 2 OF 3.
- FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 3



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 PLAN OF SPANS  
 PART OF SPAN B  
 AND SPAN C  
 (WBL)**

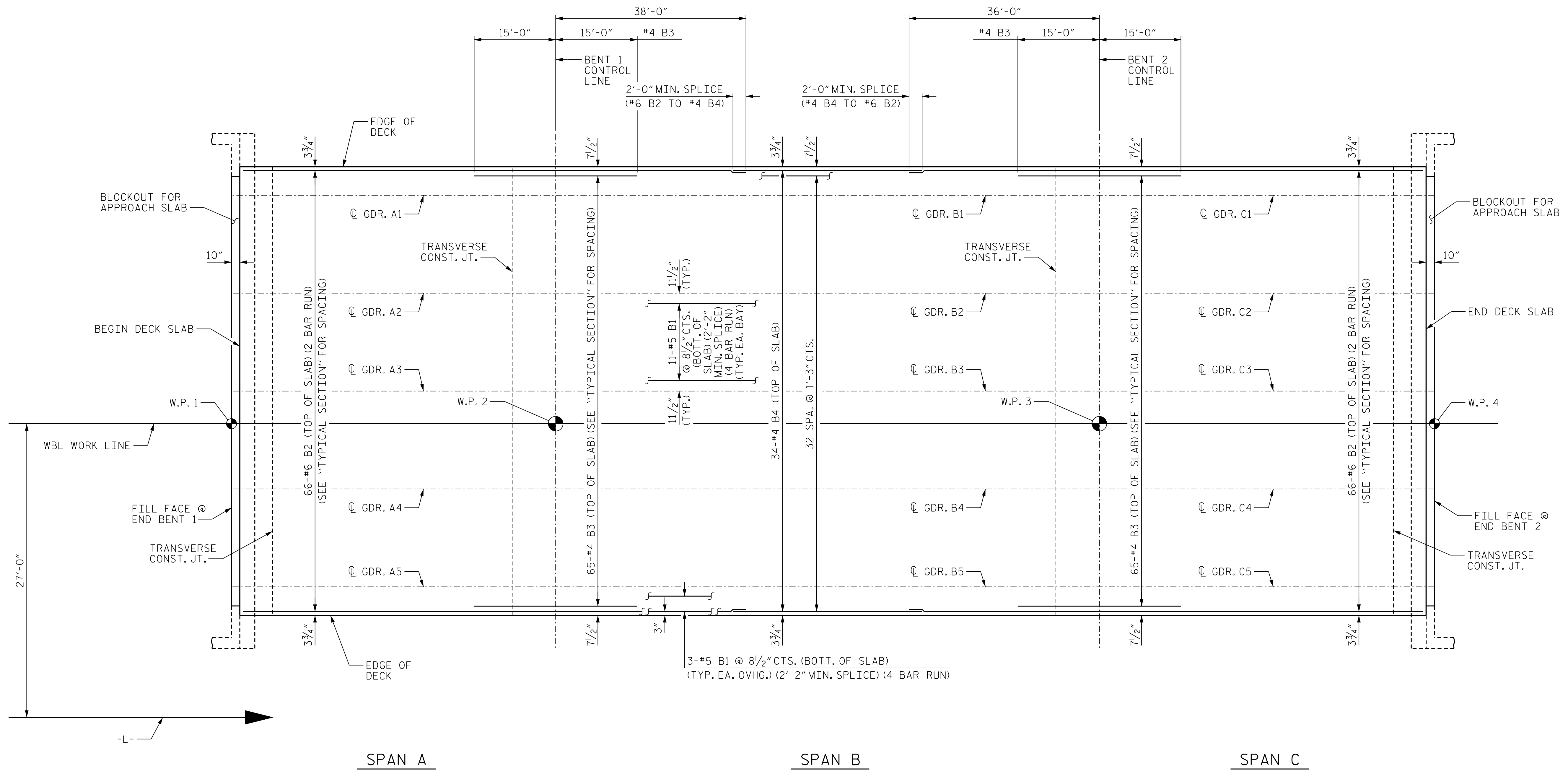
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-9
1			3			TOTAL SHEETS
2			4			35

DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 12/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

2/8/2018 10:43:25 AM User: blanning  
 Filenamer: P:\NC Bridges\MI6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_017\_B5351\_SMU\_PS2\_400242.dgn



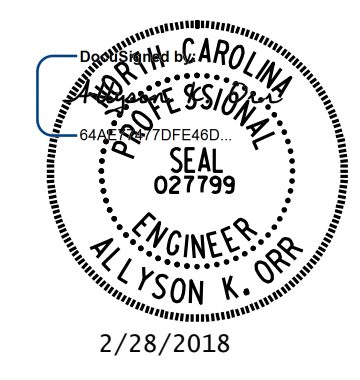
2/8/2018 10:43:27 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_019\_B5351\_SML\_P53\_400242.dgn



**PLAN - "B" BAR LAYOUT**

**NOTES**  
 SEE "TYPICAL SECTION AND DETAILS" SHEETS FOR TRANSVERSE BAR SPACING.  
 GUTTERLINE NOT SHOWN FOR CLARITY.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 3 OF 3



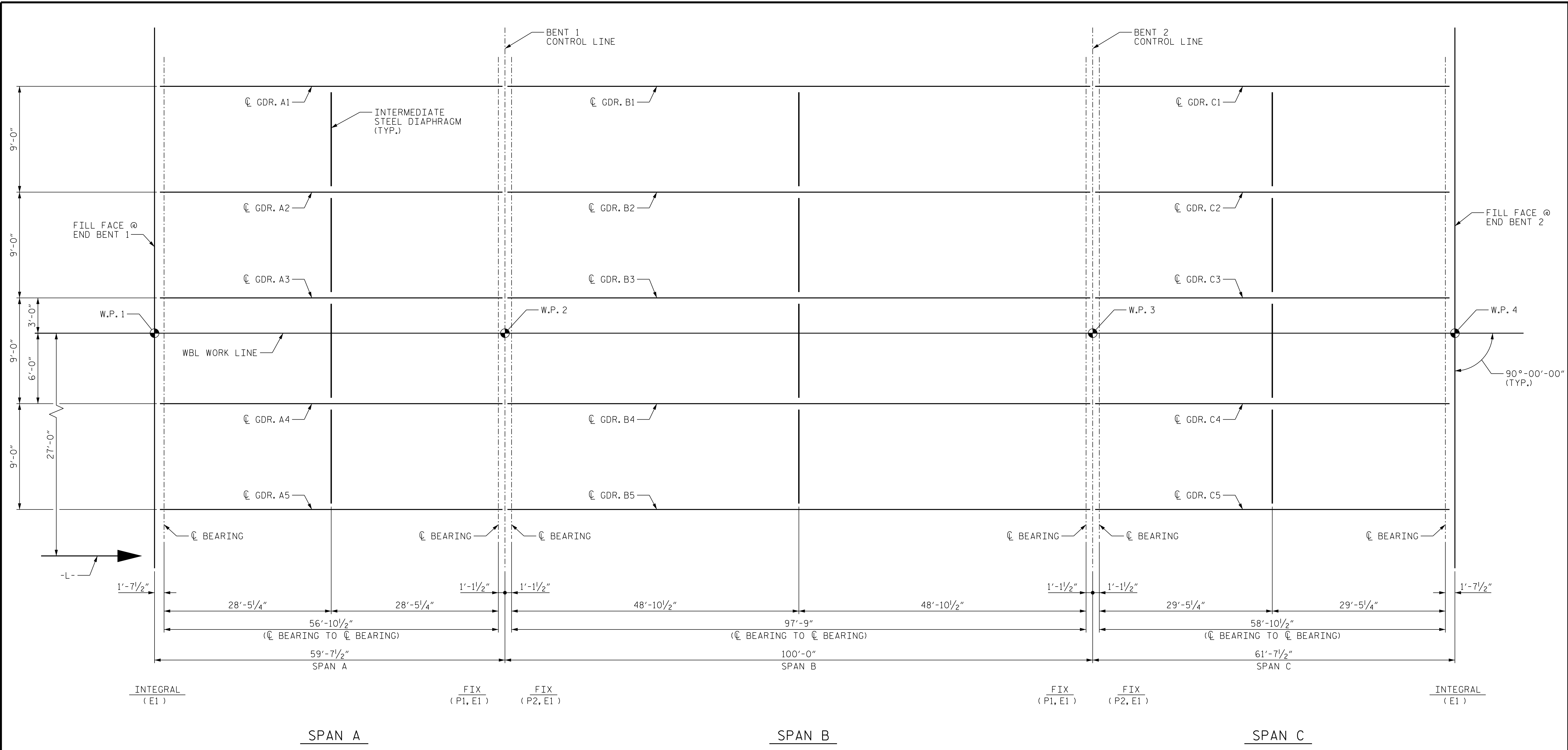
**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

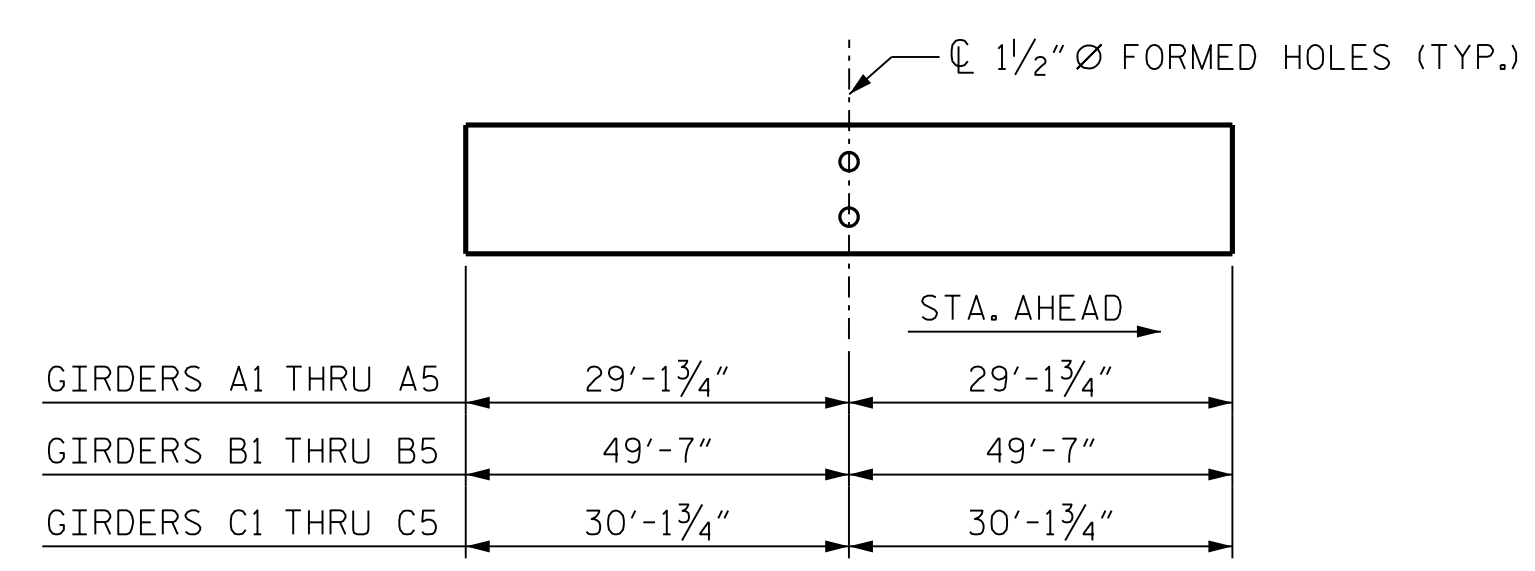
STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
SUPERSTRUCTURE					
PLAN OF SPANS					
"B" BAR LAYOUT					
(WBL)					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					35
					<b>S1-10</b>

DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 12/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

2/8/2018 10:43:29 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A01\_021.B5351.SMU.FP1\_400242.dgn

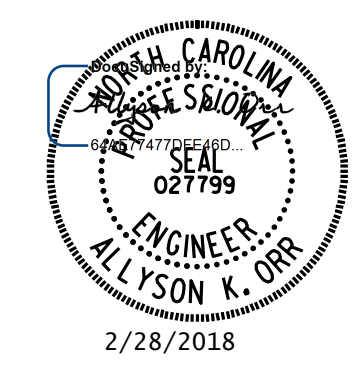


### FRAMING PLAN



**GIRDER ELEVATION**  
MEASUREMENTS GIVEN ALONG BOTTOM OF GIRDER

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 FRAMING PLAN**

DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 12/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

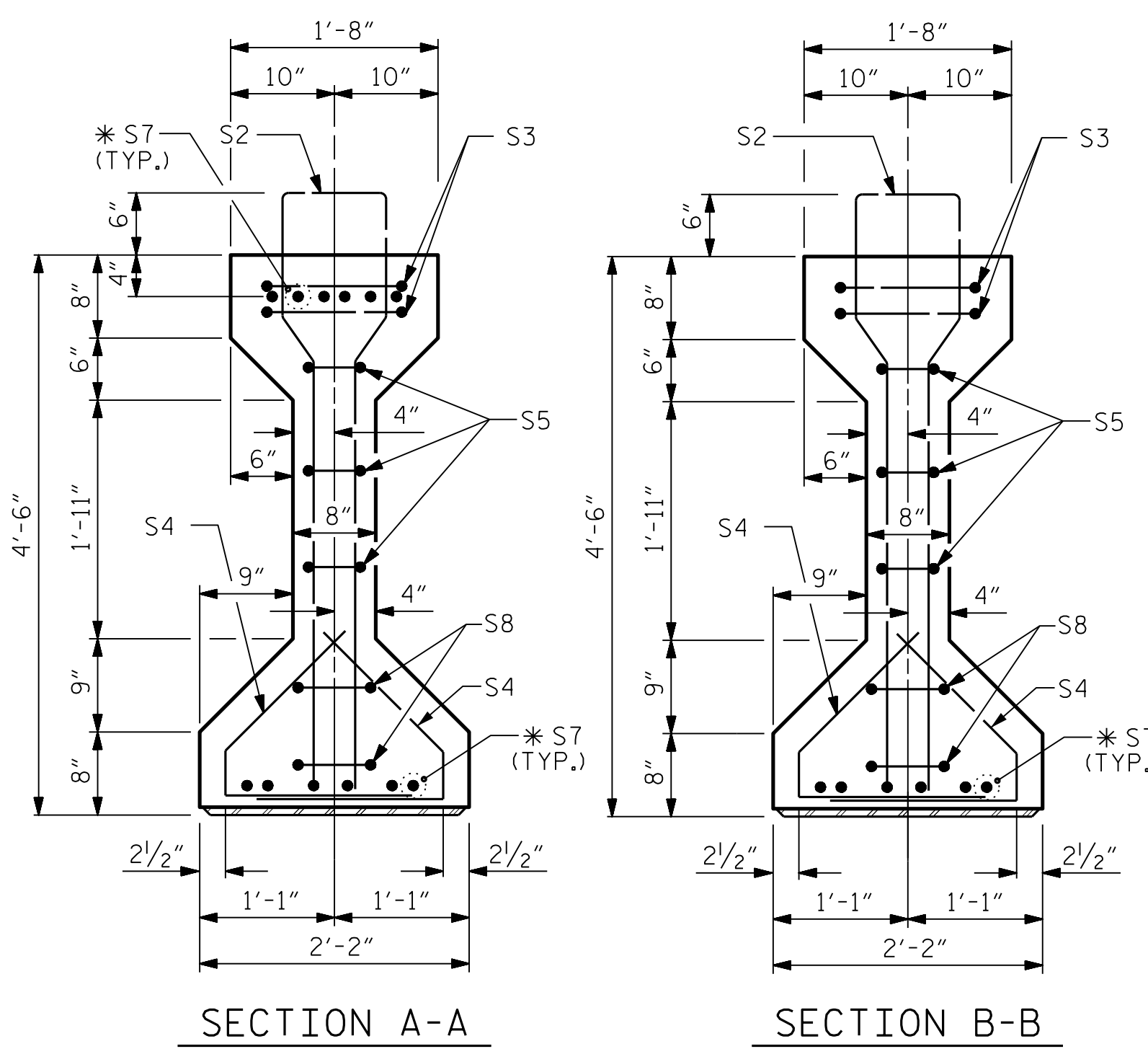
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			



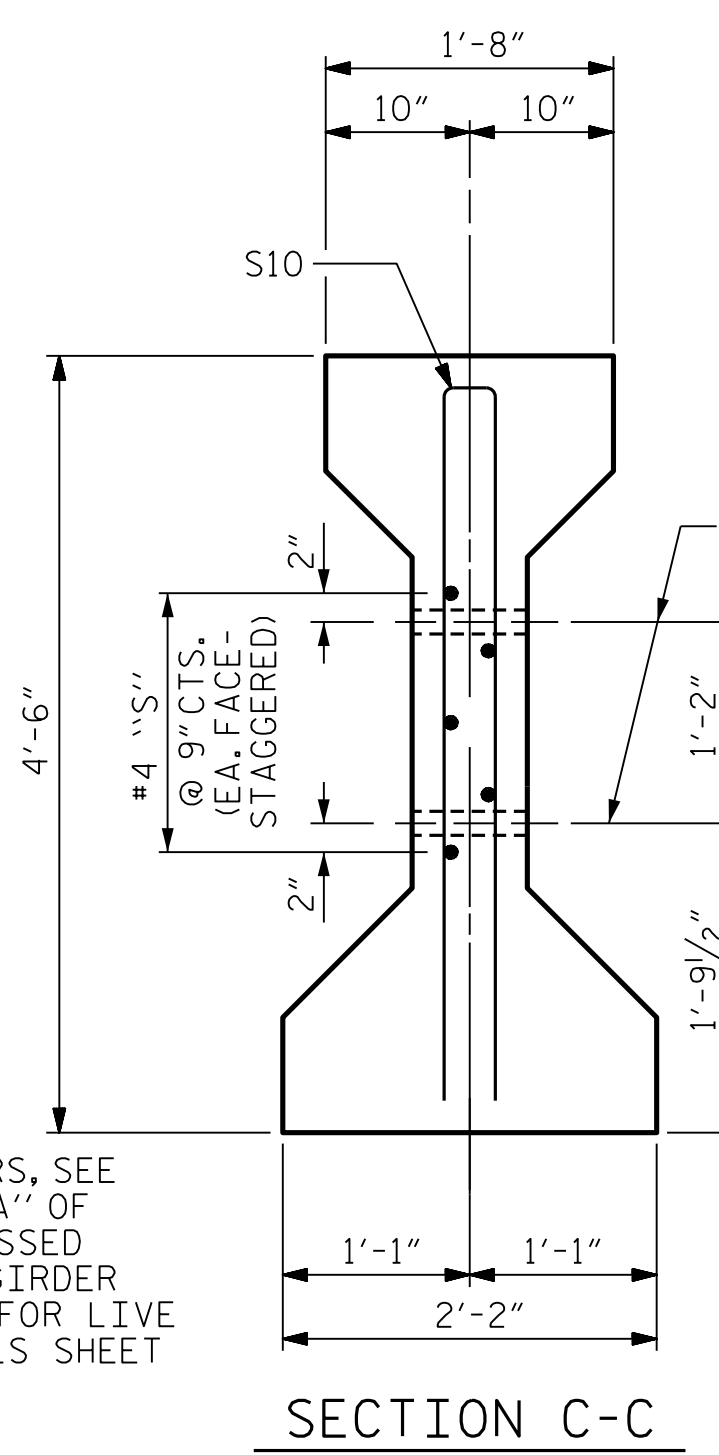




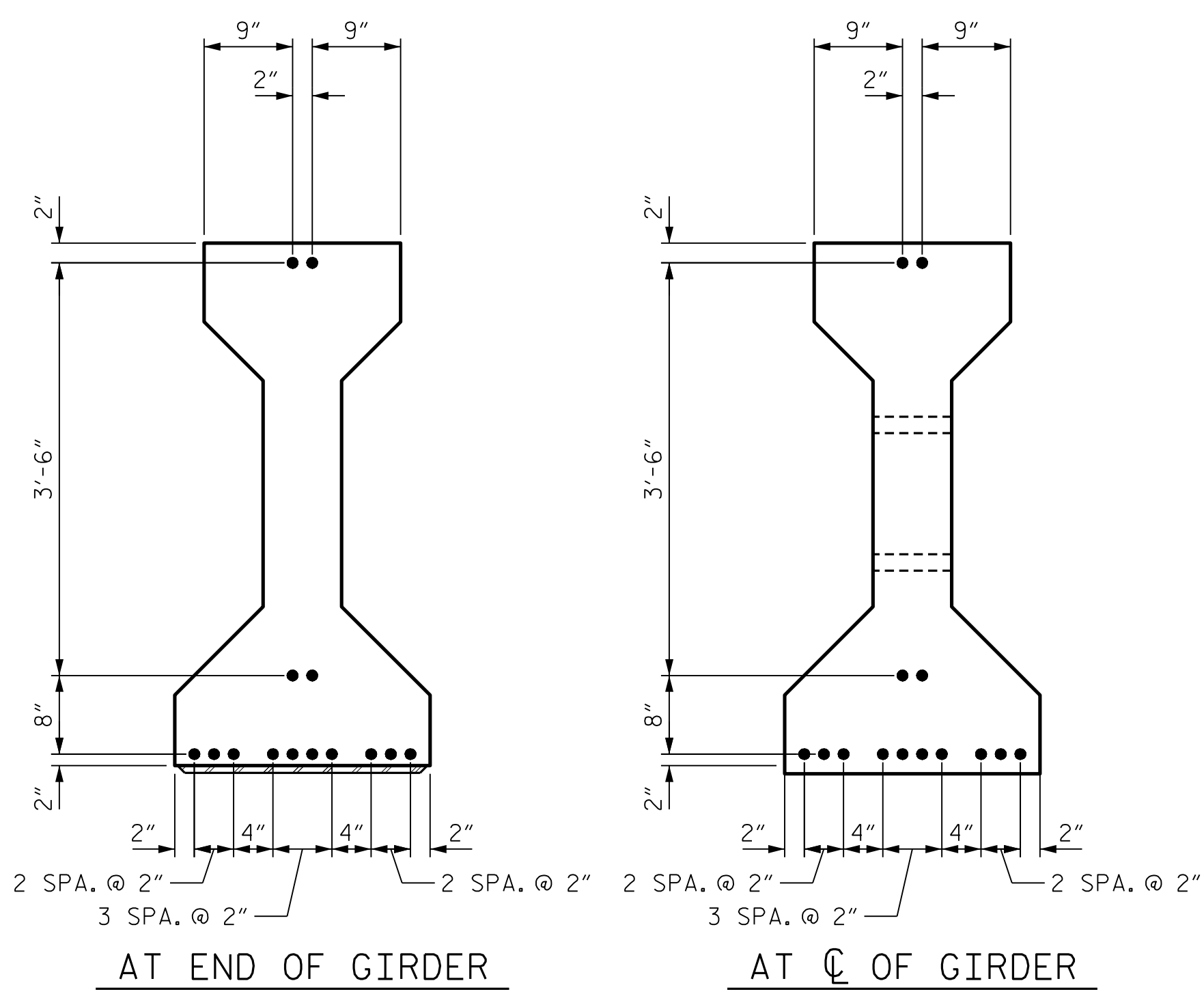




\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



1/2" Ø FORMED HOLE  
(SEE FRAMING PLAN  
FOR LOCATION)



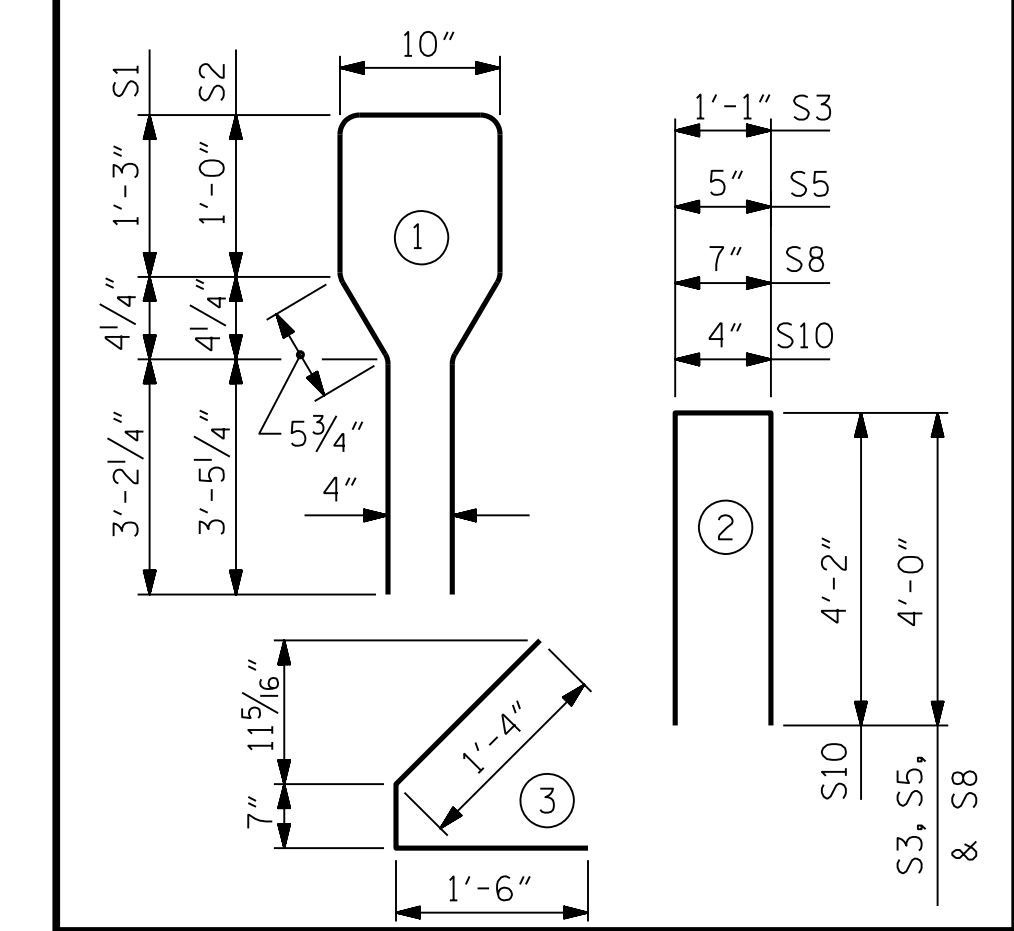
AT END OF GIRDER  
AT C of GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

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

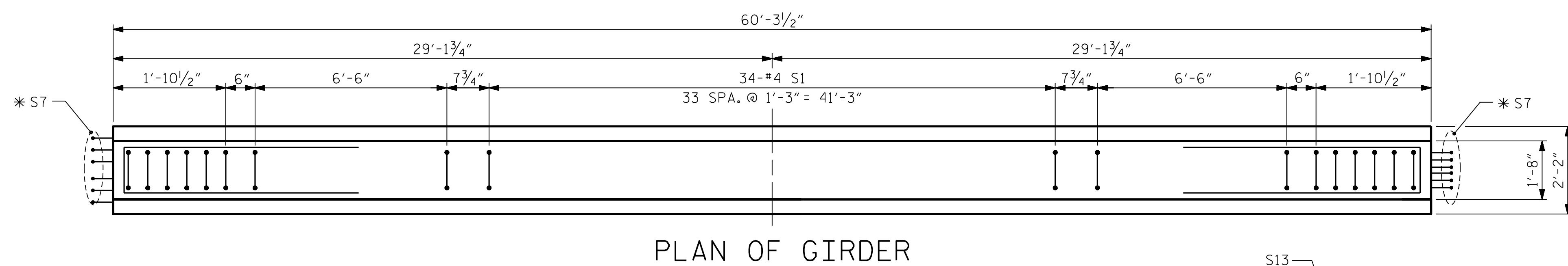
REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	62	#4	1	10'-8"	442
S2	12	#5	1	10'-8"	134
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

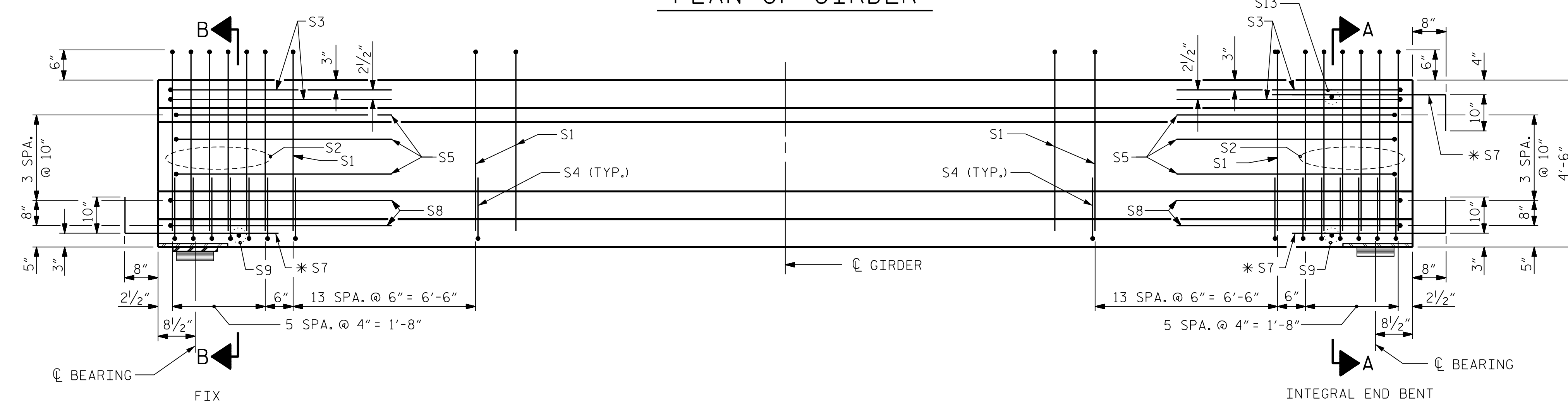
BAR TYPES  
ALL BAR DIMENSIONS ARE OUT-TO-OUT.



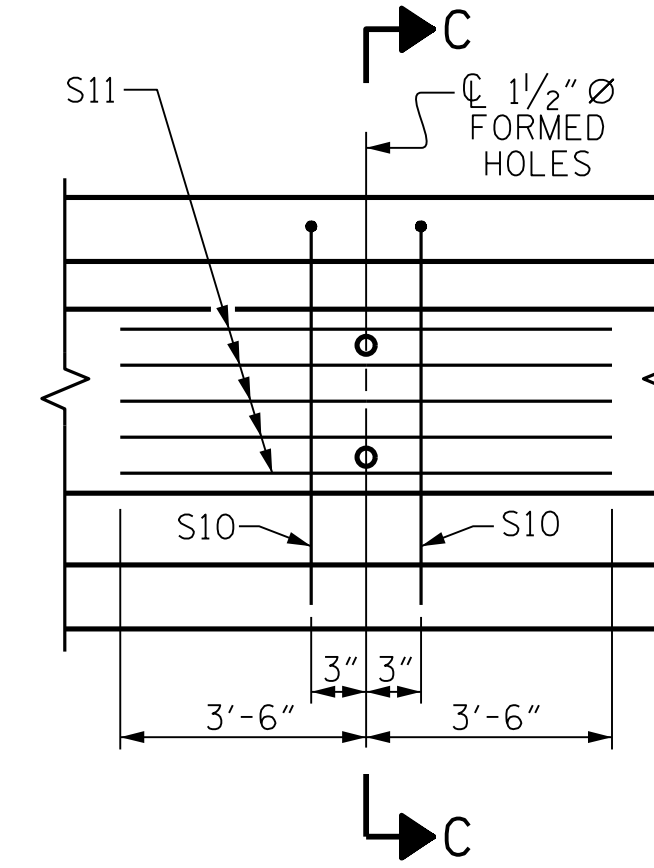
DEBONDING LEGEND  
• FULLY BONDED STRAND



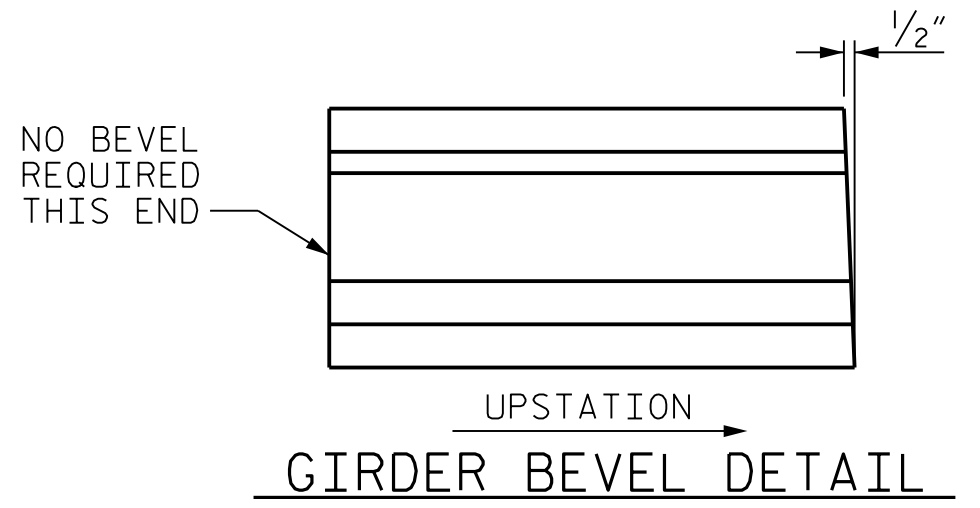
PLAN OF GIRDER



ELEVATION OF GIRDER  
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL



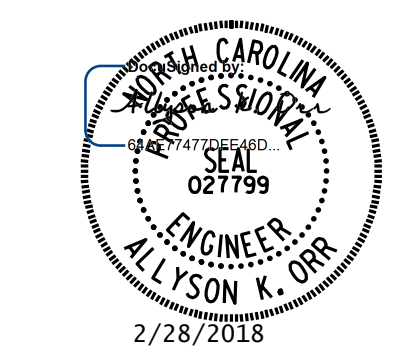
GIRDER BEVEL DETAIL

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	5000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
ALL	952	12.2	14

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	60.29 FT.	301.45 FT.

PROJECT NO. B-5351  
GUILFORD COUNTY  
STATION: 23+26.00 -L-  
SHEET 3 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN C  
(WBL)



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

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

SHEET NO.  
**S1-14**  
TOTAL SHEETS  
**35**

STD. NO. PCG6 (Sht. 2)

2/8/2018 10:43:36 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401\_027\_B5351\_SMU\_PCC3\_400242.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY: GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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 SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

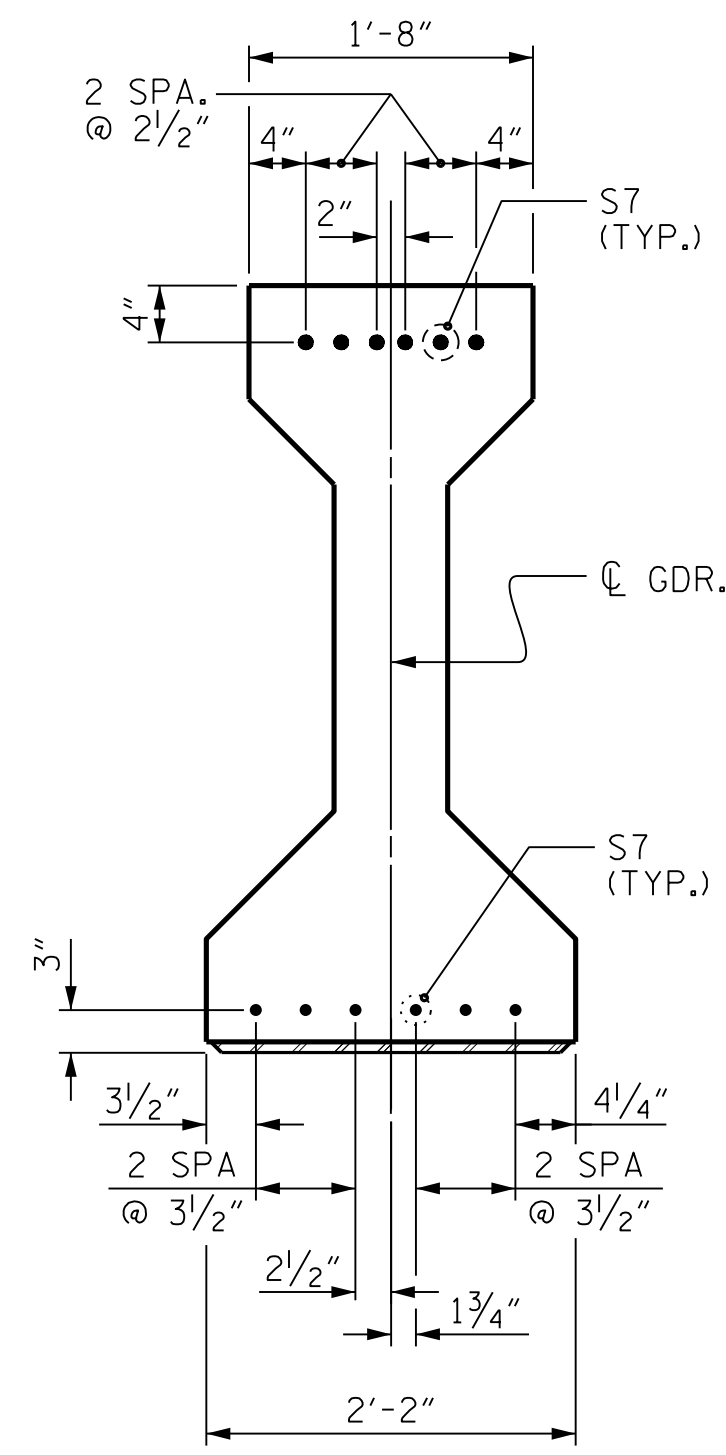
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI AT SPANS A AND C, AND 6000 PSI AT SPAN B.

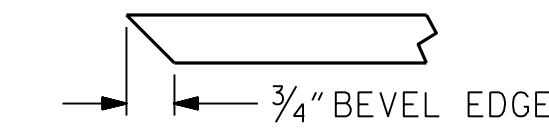
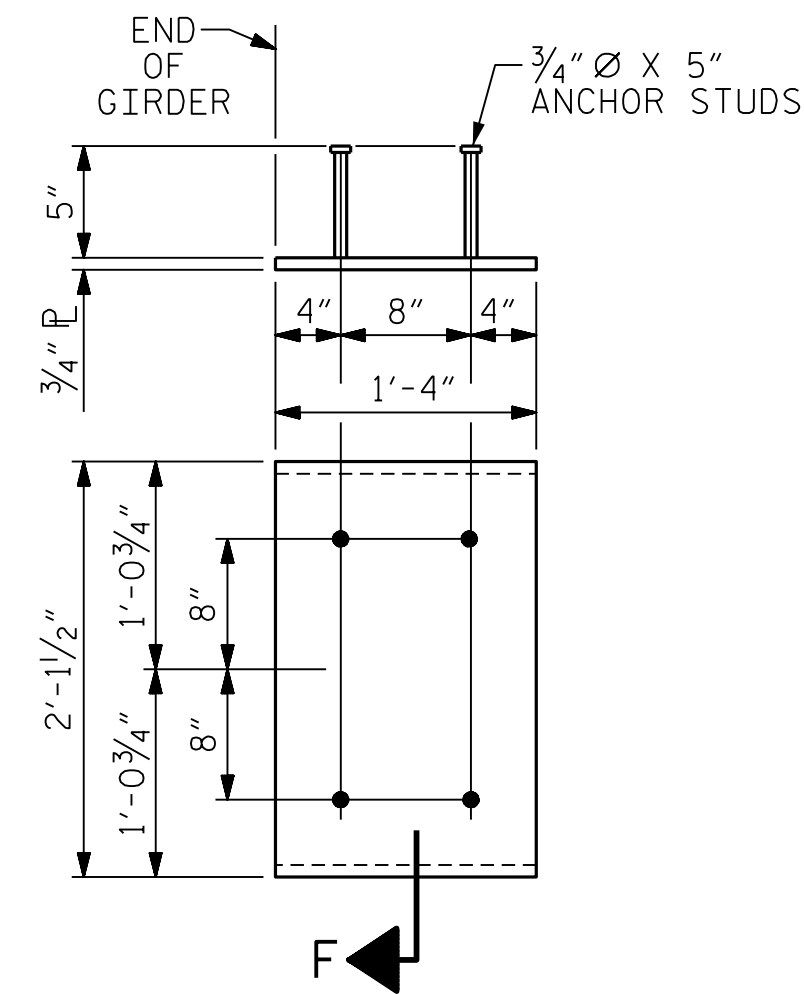
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



DETAIL "A"



SECTION "F"

(SEE NOTES)

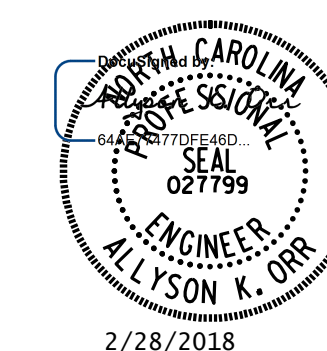
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D. PER GIRDER)

2/8/2018 10:43:38 AM User: blanning  
 File: P:\NC Bridges\W16001.35 - B-5351 Guilford Co.\B-5351 Structures\LEFT LANE (WBL)\401\_029\_B5351\_SMU\_PCC4\_400242.dgn

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 4 OF 6



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 DETAILS

(WBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY: GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC



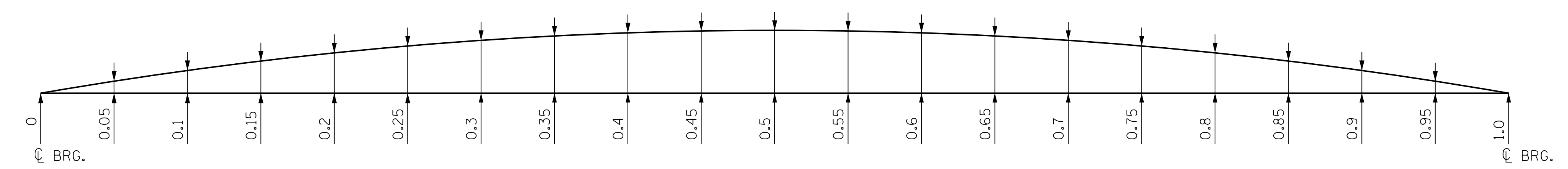
DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS

GIRDER	SPAN A																				SPAN B																						
	TWENTIETH POINTS																				TWENTIETH POINTS																						
1 & 5	CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.007	0.014	0.020	0.026	0.032	0.036	0.040	0.042	0.044	0.044	0.042	0.040	0.036	0.032	0.026	0.020	0.014	0.007	0	0	0.030	0.058	0.086	0.111	0.133	0.151	0.166	0.177	0.184	0.186	0.184	0.177	0.166	0.151	0.133	0.111	0.086	0.058	0.030	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.003	0.005	0.008	0.010	0.012	0.013	0.015	0.016	0.016	0.016	0.015	0.014	0.013	0.011	0.009	0.007	0.004	0.002	0	0	0.019	0.037	0.055	0.073	0.087	0.101	0.111	0.120	0.123	0.126	0.123	0.120	0.111	0.101	0.087	0.073	0.055	0.037	0.019	0
	FINAL CAMBER	↑	0	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	1/8"	1/16"	0	0	1/8"	1/4"	3/8"	7/16"	9/16"	5/8"	11/16"	11/16"	3/4"	3/4"	3/4"	11/16"	11/16"	5/8"	9/16"	7/16"	3/8"	1/4"	1/8"	0
2, 3 & 4	CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.007	0.014	0.020	0.026	0.032	0.036	0.040	0.042	0.044	0.044	0.042	0.040	0.036	0.032	0.026	0.020	0.014	0.007	0	0	0.030	0.058	0.086	0.111	0.133	0.151	0.166	0.177	0.184	0.186	0.184	0.177	0.166	0.151	0.133	0.111	0.086	0.058	0.030	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.003	0.006	0.009	0.012	0.014	0.016	0.018	0.019	0.020	0.020	0.019	0.018	0.016	0.014	0.011	0.008	0.005	0.003	0	0	0.022	0.044	0.065	0.086	0.103	0.120	0.131	0.142	0.146	0.149	0.146	0.142	0.131	0.120	0.103	0.086	0.065	0.044	0.022	0
	FINAL CAMBER	↑	0	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0	0	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS

GIRDER	SPAN C																						
	TWENTIETH POINTS																						
1 & 5	CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.007	0.014	0.021	0.027	0.032	0.036	0.040	0.043	0.044	0.045	0.044	0.043	0.040	0.036	0.032	0.027	0.021	0.014	0.007	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.003	0.005	0.008	0.010	0.013	0.015	0.017	0.018	0.019	0.019	0.019	0.018	0.017	0.015	0.013	0.011	0.009	0.006	0.003	0
	FINAL CAMBER	↑	0	1/16"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0	
2, 3 & 4	CAMBER (GIRDER ALONE IN PLACE)	↑	0	0.007	0.014	0.021	0.027	0.032	0.036	0.040	0.043	0.044	0.045	0.044	0.043	0.040	0.036	0.032	0.027	0.021	0.014	0.007	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0	0.003	0.006	0.010	0.013	0.016	0.018	0.020	0.022	0.023	0.023	0.023	0.022	0.021	0.019	0.016	0.013	0.010	0.007	0.004	0
	FINAL CAMBER	↑	0	1/16"	1/8"	1/8"	3/16"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	3/16"	3/16"	1/8"	1/16"	1/16"	0

\*\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.  
 ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS SHOWN IN INCHES (FRACTION FORM).



SCHMATIC CAMBER ORDINATES AT GIRDER TWENTIETH POINTS

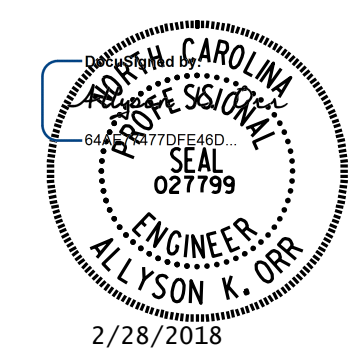
PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 DEAD LOAD DEFLECTION  
 AND CAMBER TABLES

(WBL)



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S1-16
2			4			

TOTAL SHEETS: 35

DRAWN BY : B.E. LANNING	DATE : 01/18
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

2/8/2018 10:43:40 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_031\_B5351.SMU\_PCC5\_400242.dgn

**STRUCTURAL STEEL NOTES**

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

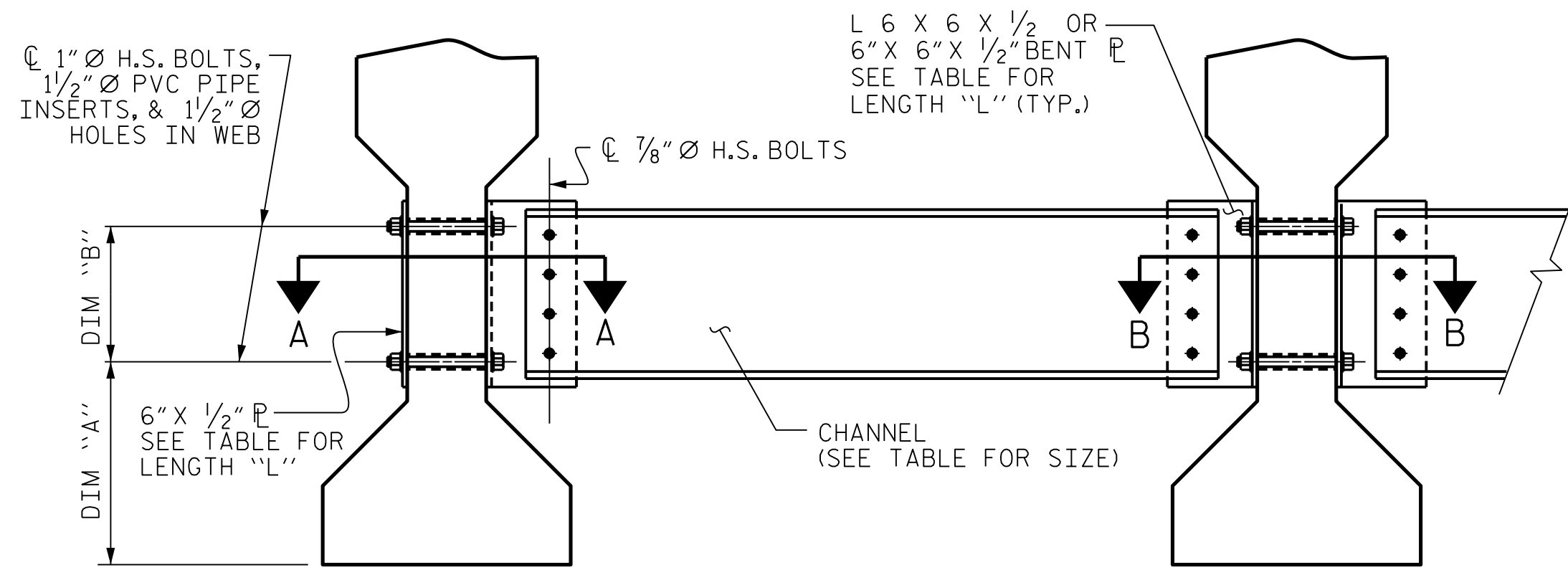
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

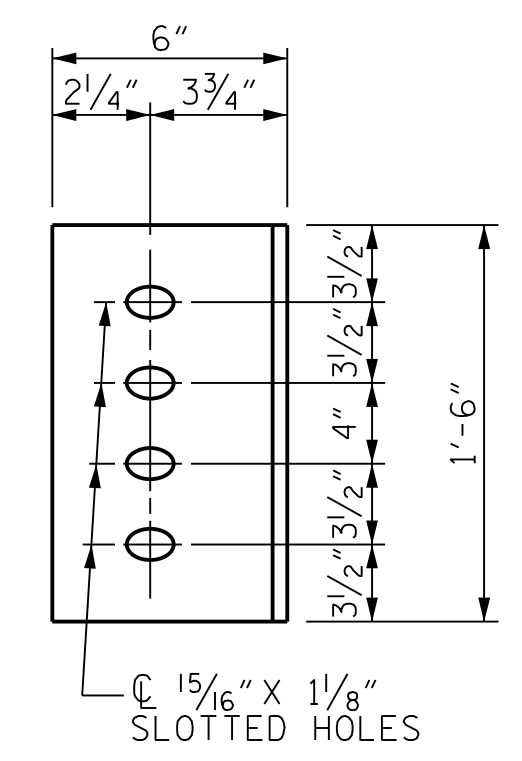
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

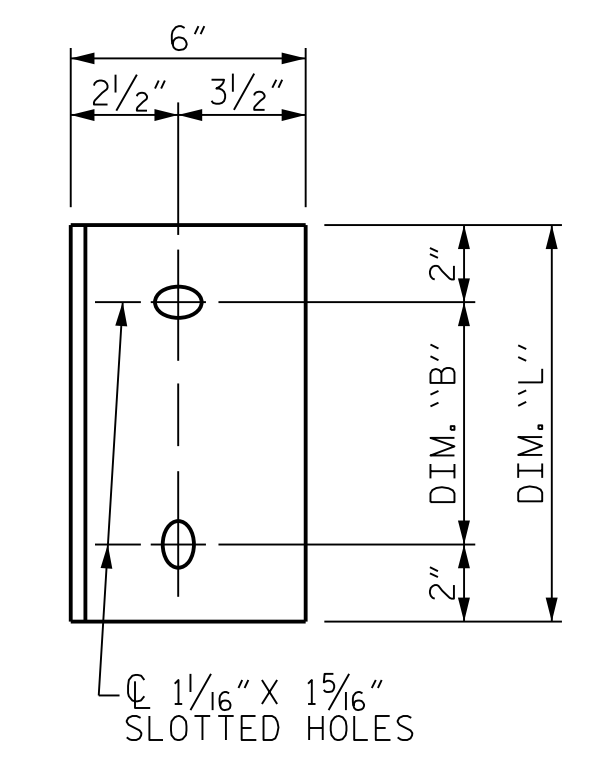


EXTERIOR GIRDER INTERIOR GIRDER

**PART SECTION AT INTERMEDIATE DIAPHRAGM**



DIAPHRAGM FACE



WEB FACE

**CONNECTOR PLATE DETAILS**

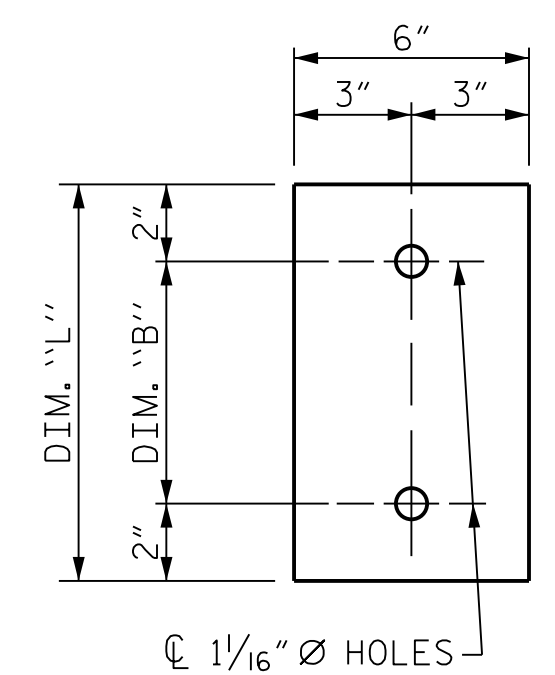
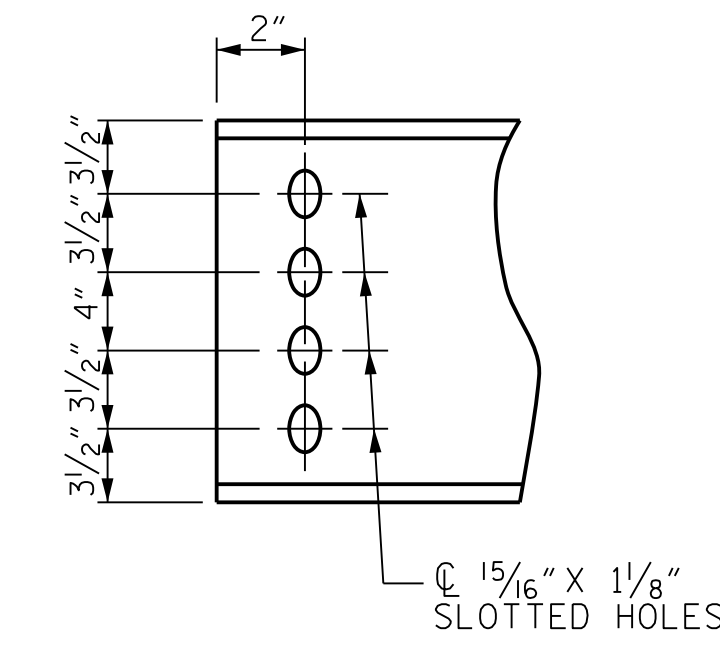
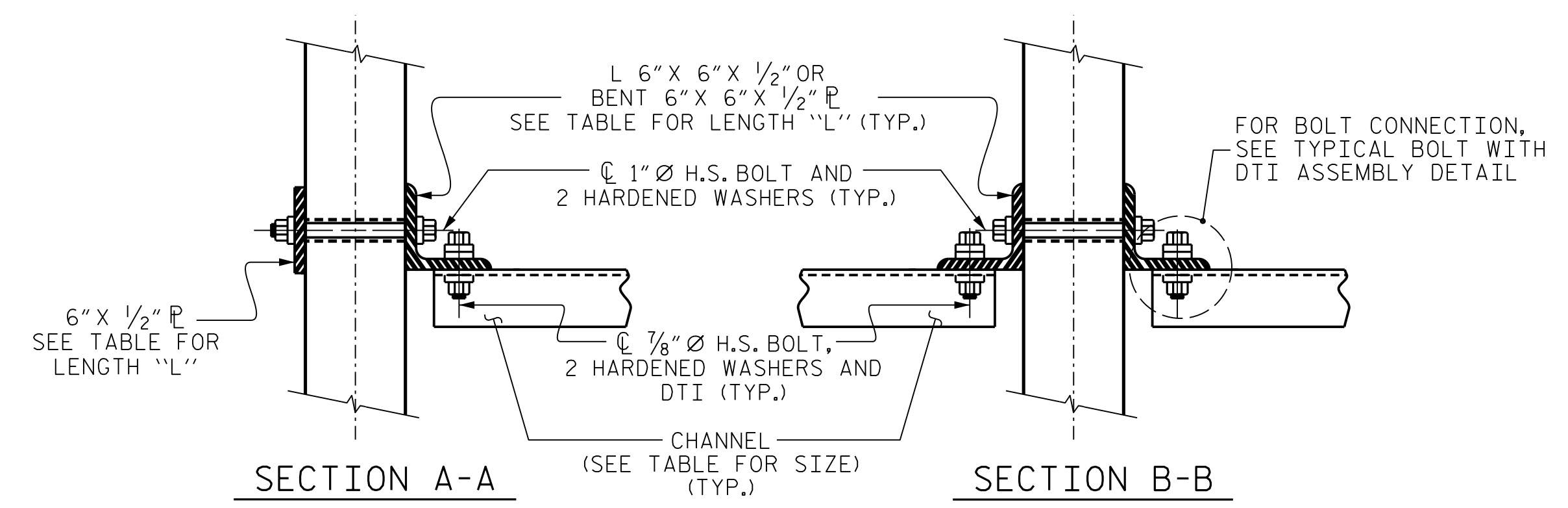


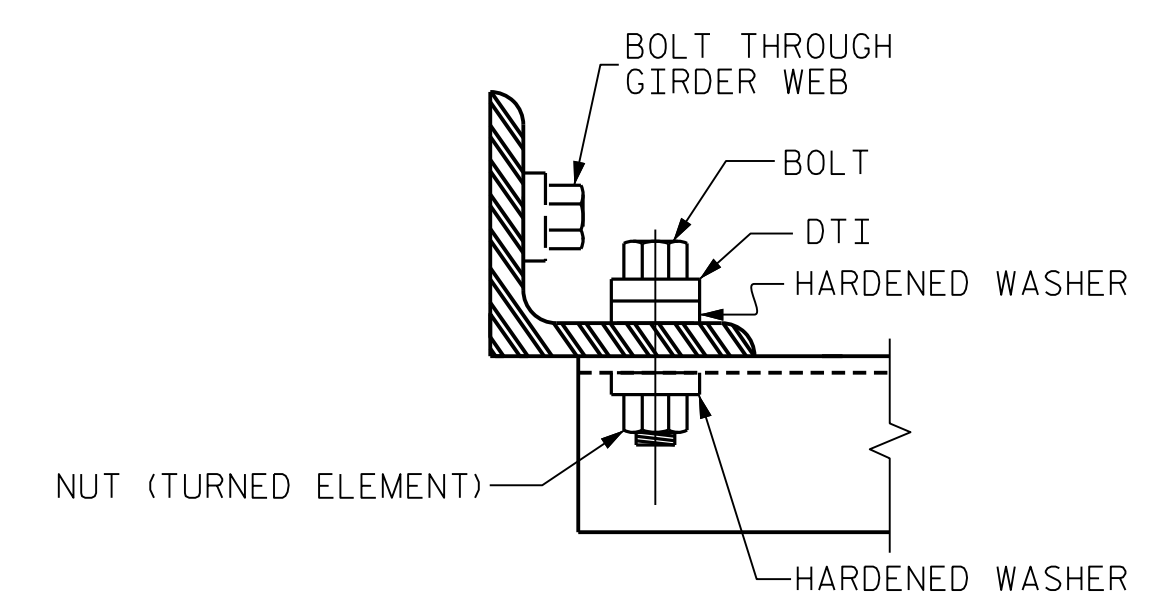
PLATE DETAILS



CHANNEL END



**CONNECTION DETAILS**



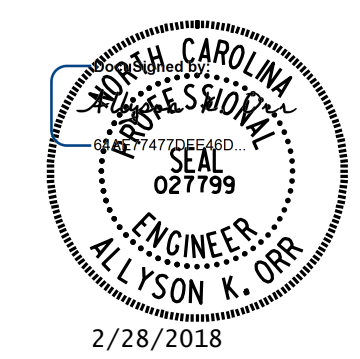
BOLT WITH DTI ASSEMBLY DETAIL

**TABLE**

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. **B-5351**  
**GUILFORD** COUNTY  
 STATION: **23+26.00 -L-**

SHEET 6 OF 6



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 INTERMEDIATE  
 STEEL DIAPHRAGMS  
 FOR TYPE IV PRESTRESSED  
 CONCRETE GIRDERS  
 (WBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

2/8/2018 10:43:42 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_033\_B5351\_SMU\_PCC6\_400242.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY: VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC



**NOTES**

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1#2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

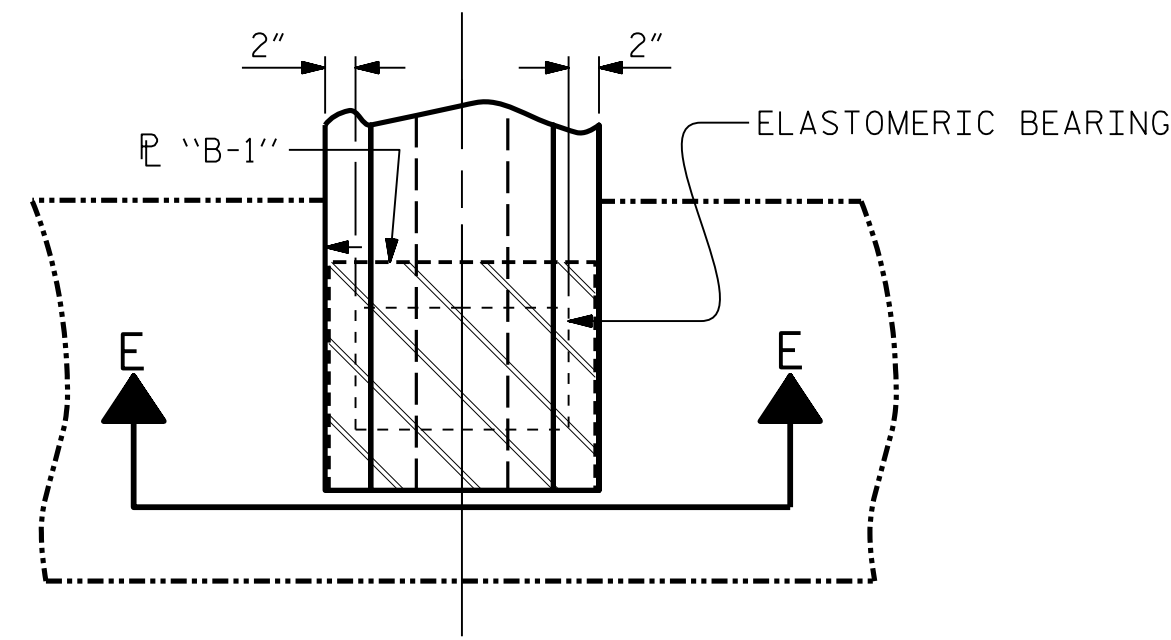
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

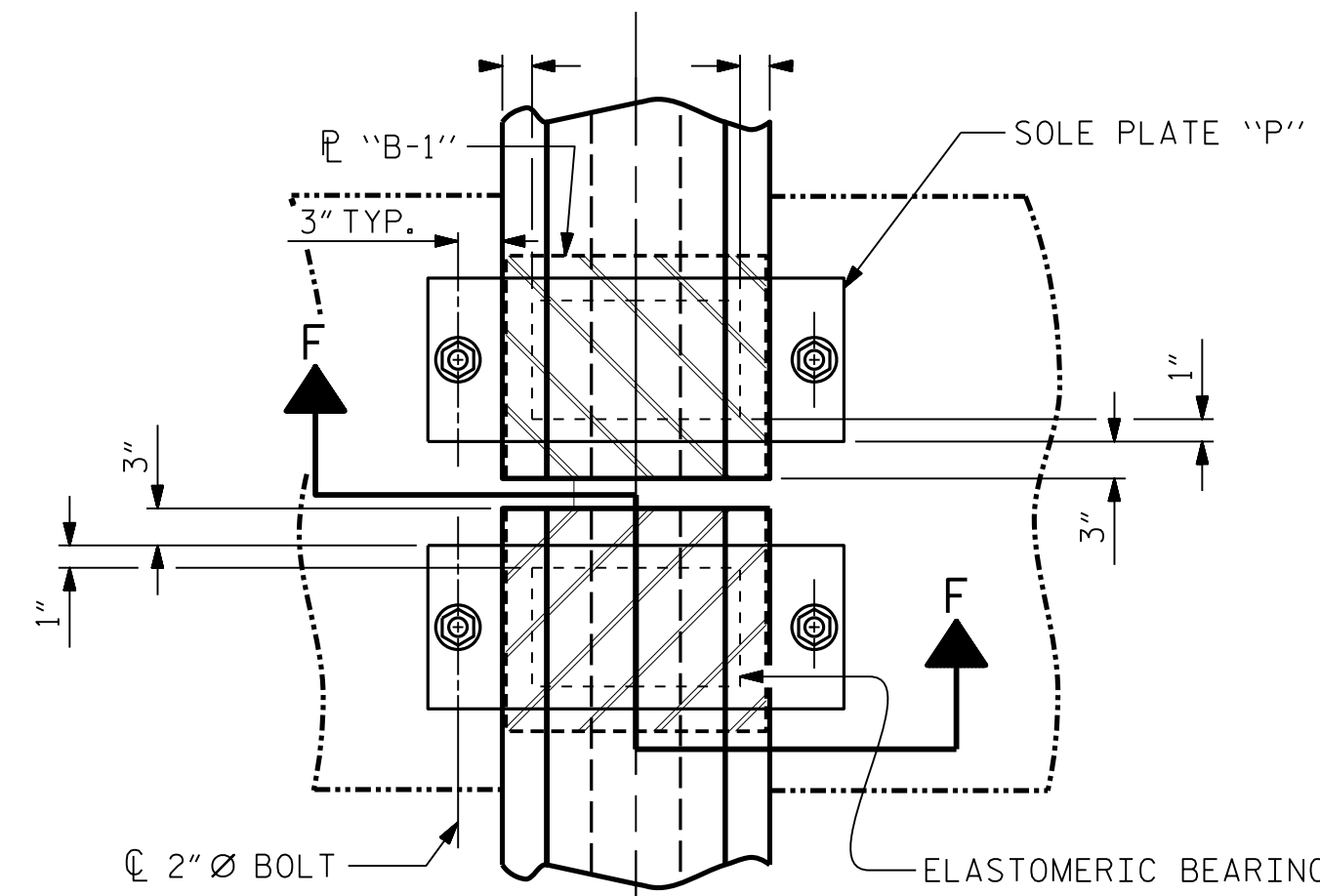
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

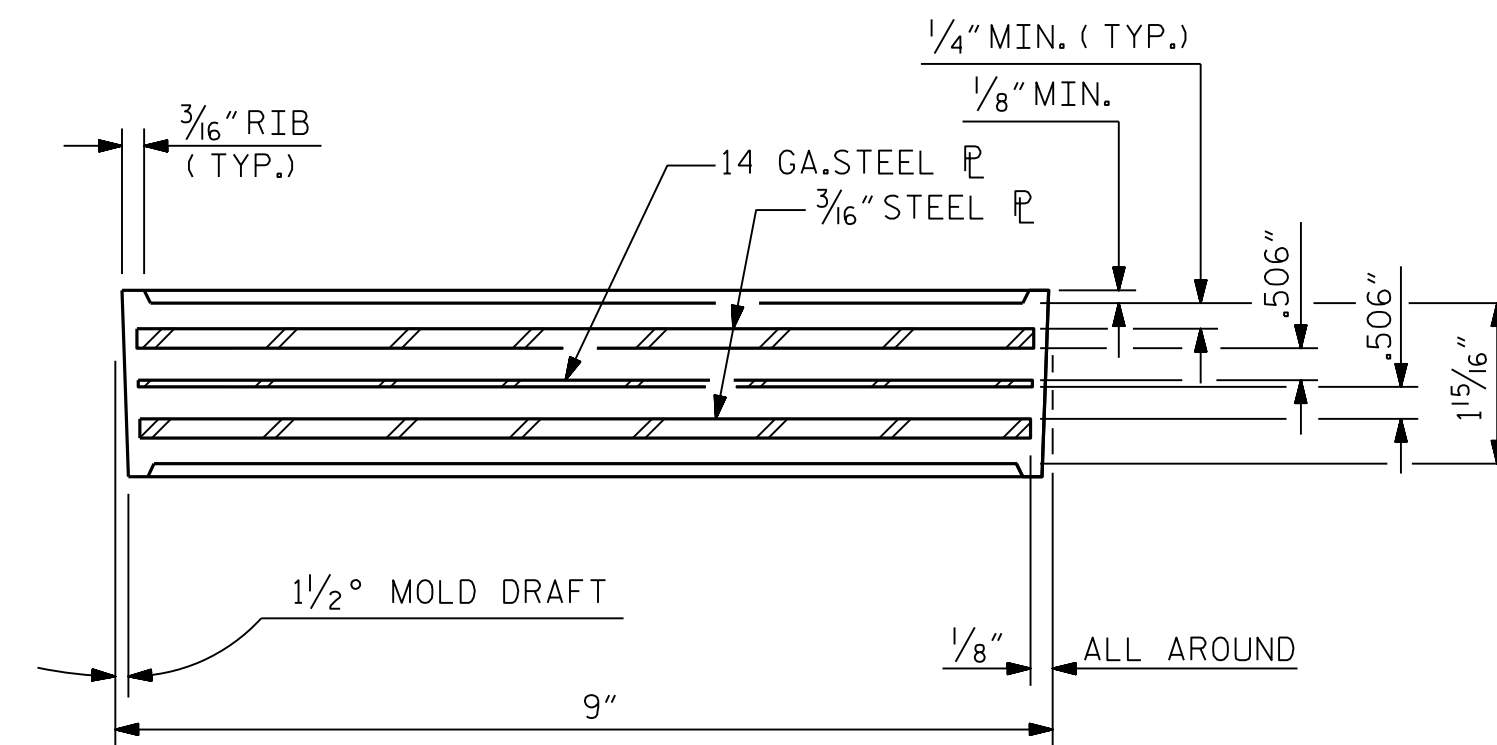
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



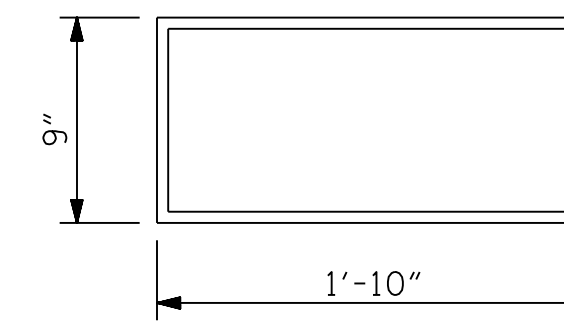
**PLAN VIEW**  
(SHOWING INTEGRAL END BENT)



**PLAN VIEW**  
(SHOWING INTERIOR BENT)



**TYPICAL SECTION OF ELASTOMERIC BEARINGS**

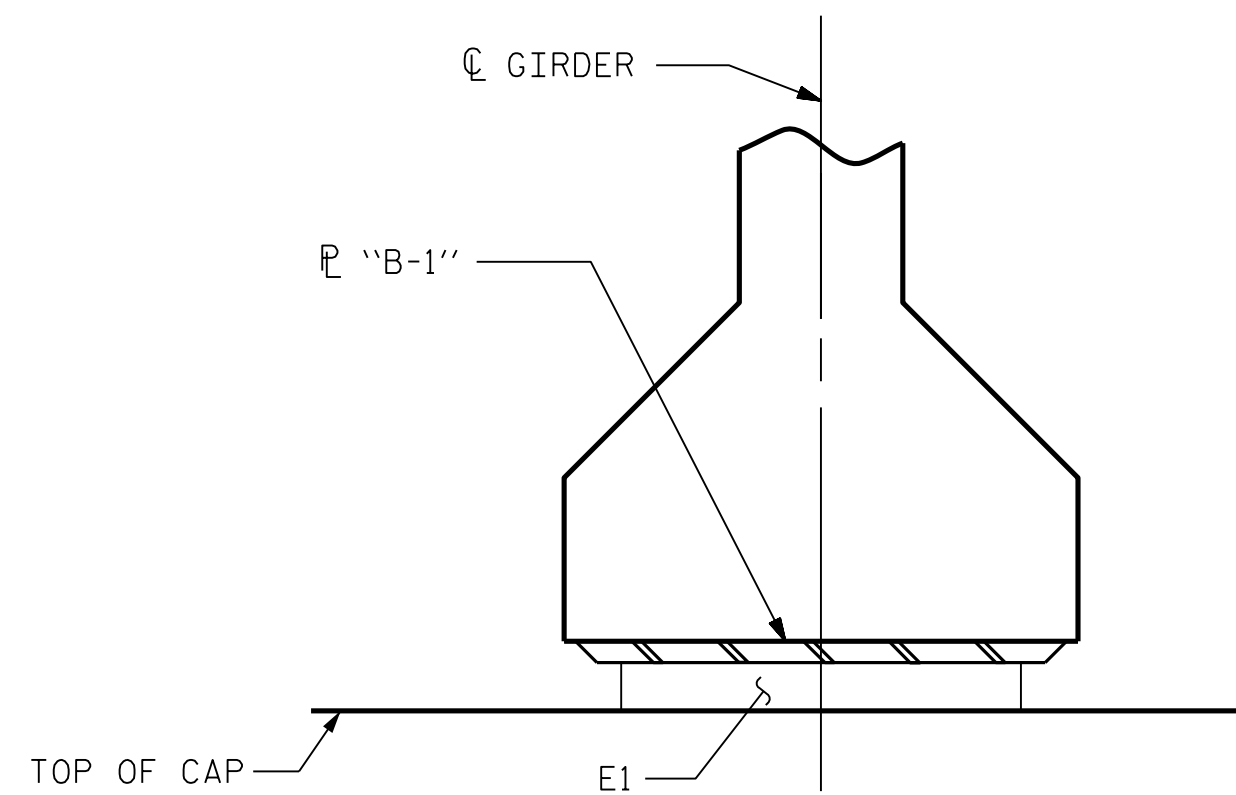


E1 (30 REQ'D.)

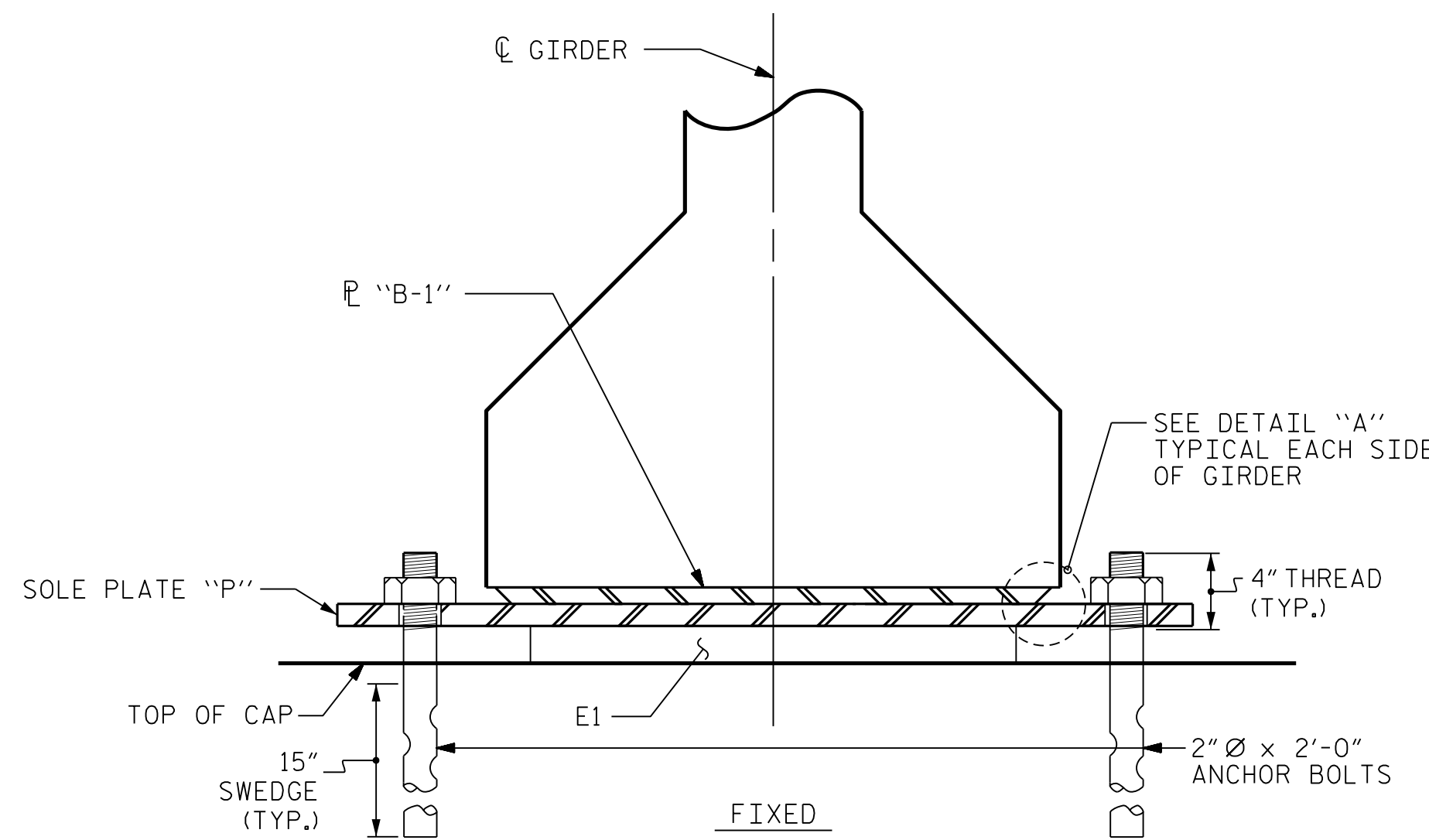
**PLAN VIEW OF ELASTOMERIC BEARING**

**TYPE IV**

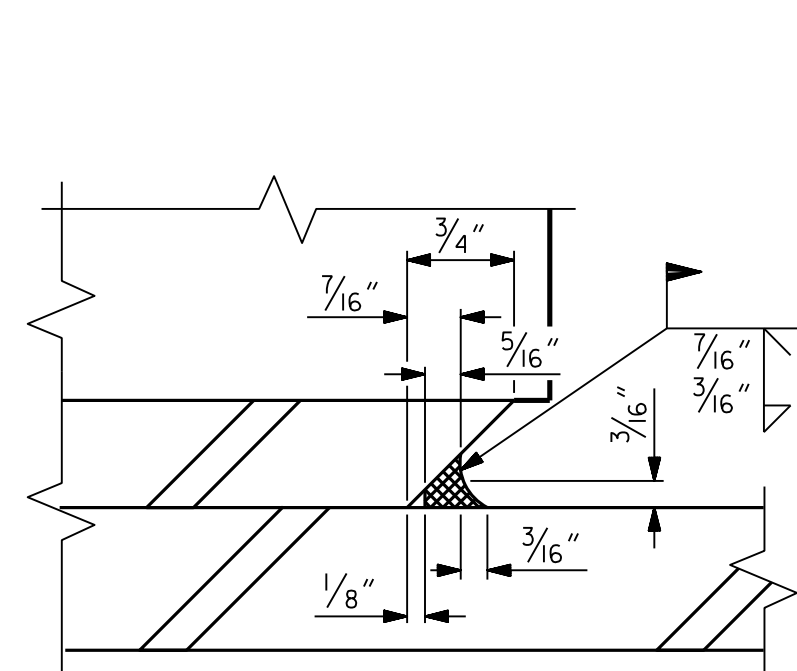
<b>MAXIMUM ALLOWABLE SERVICE LOADS</b>	
<b>D.L.+L.L. (NO IMPACT)</b>	
<b>TYPE IV</b>	<b>225 k</b>



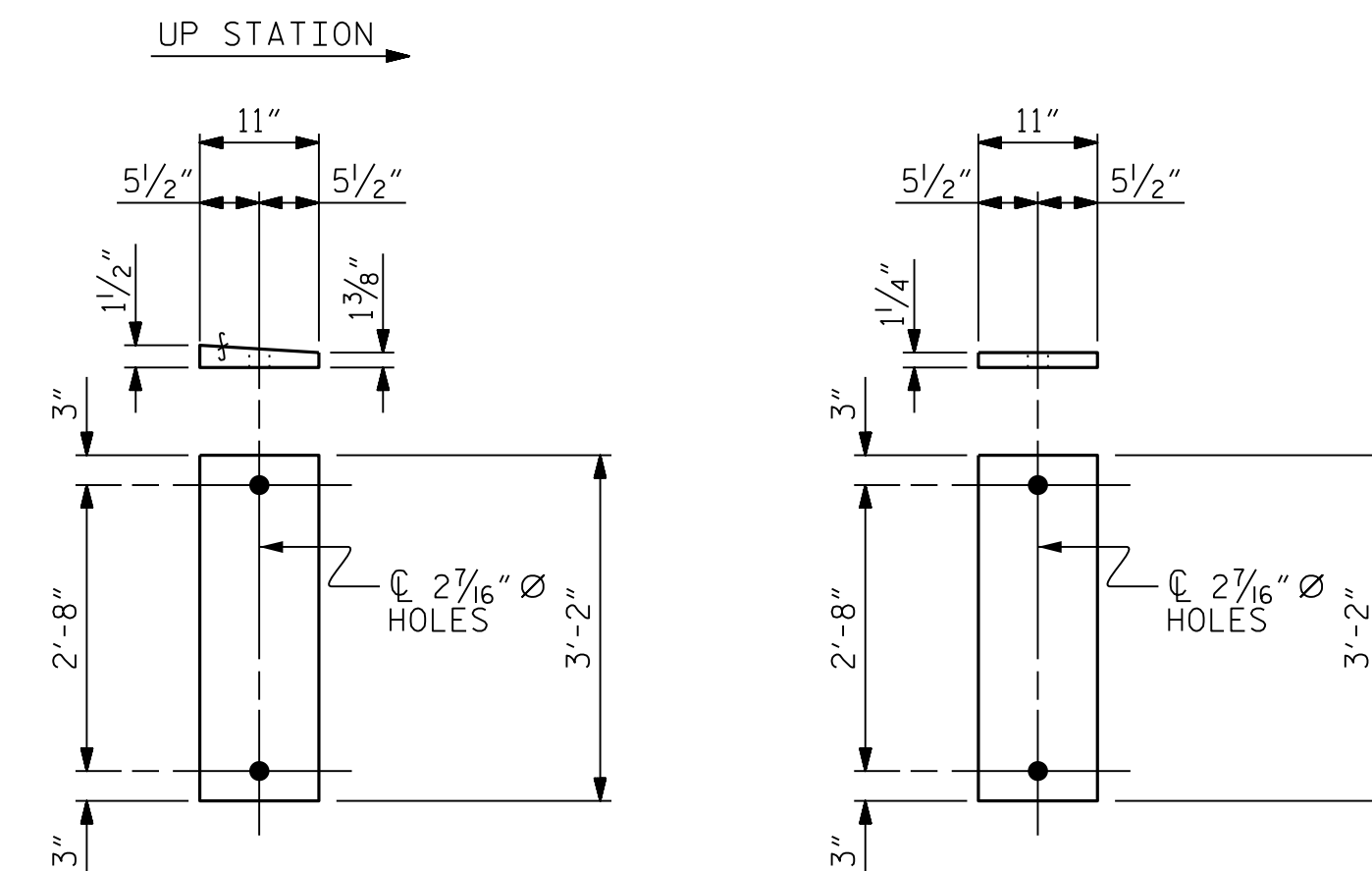
**SECTION E-E**  
(SHOWING INTEGRAL END BENT)



**SECTION F-F**  
(SHOWING INTERIOR BENT)



**DETAIL "A"**

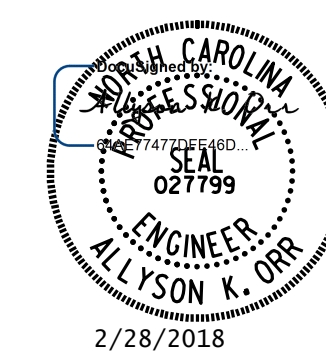


**P-1 (FIXED)**  
(10 REQ'D.)

**P-2 (FIXED)**  
(10 REQ'D.)

**SOLE PLATE DETAILS ("P")**

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD ELASTOMERIC BEARING DETAILS**  
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (WBL)

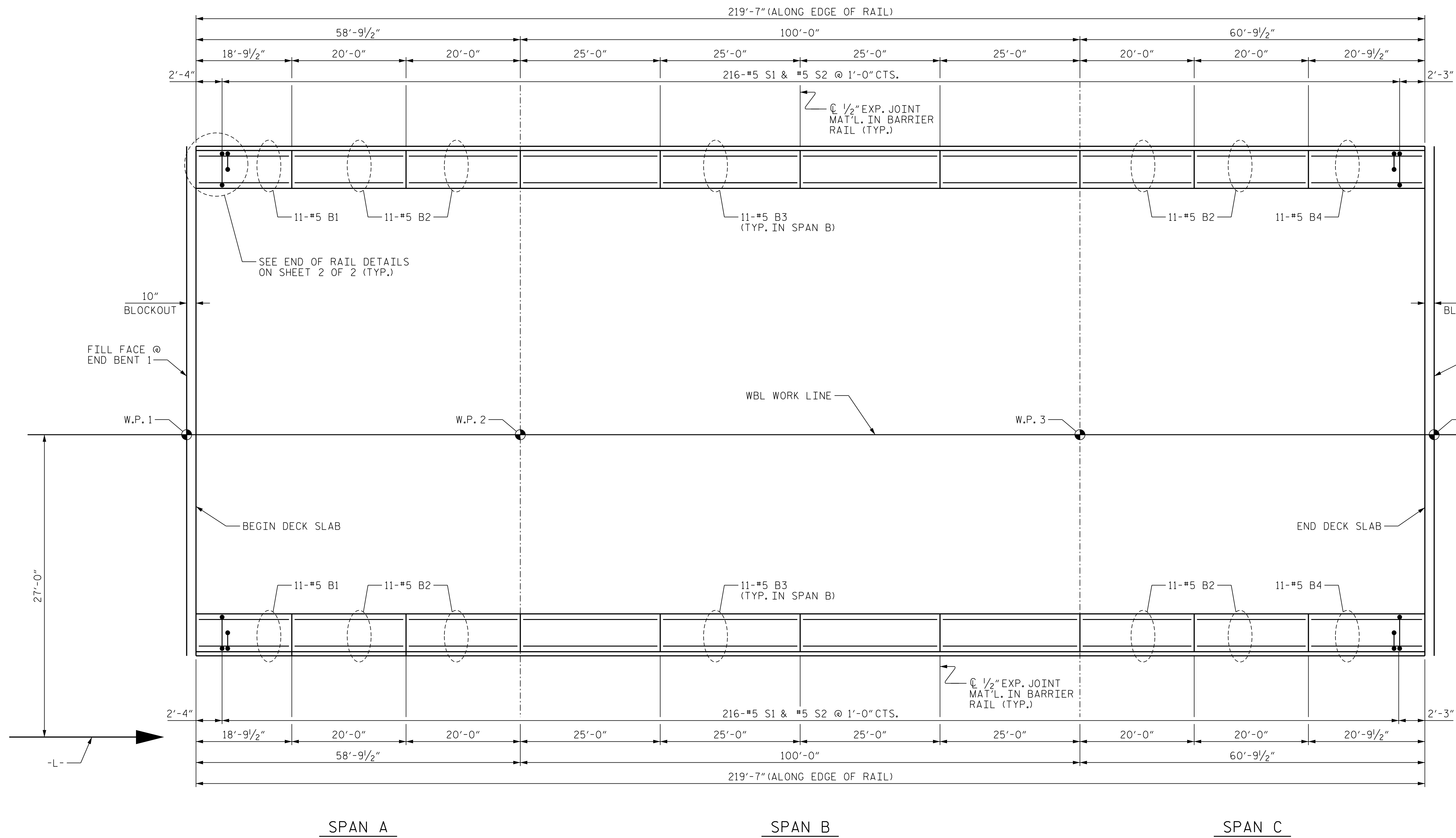
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			
2			4			

STD. NO. EB3

2/8/2018 10:43:44 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_035\_B5351\_SMU\_BGL\_400242.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY: VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

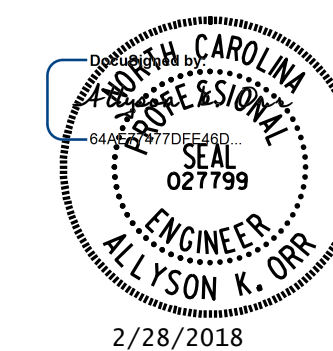
2/8/2018 10:43:47 AM User: blanning  
 Filenamer: P:\NC Bridges\MI600135 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_037\_B5351\_SMU\_CBRL\_40242.dgn



**PLAN OF BARRIER RAIL**

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**CONCRETE BARRIER RAIL**

(WBL)

DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 12/17
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING					
1011 SCHAUB DRIVE, SUITE 100					
RALEIGH, NC 27606					
(919) 851-6606					
FIRM PE NUMBER : P-0671					

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			



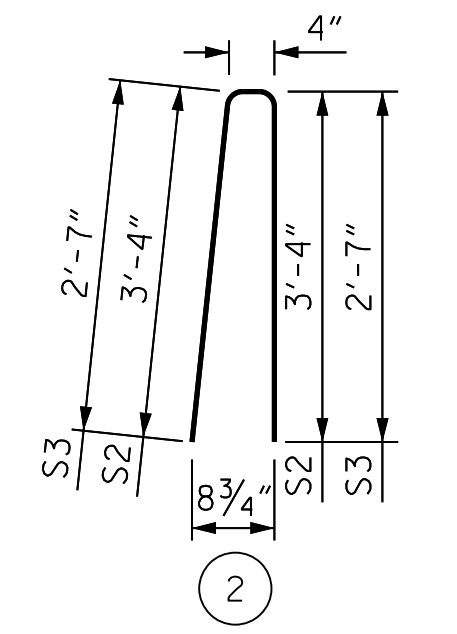
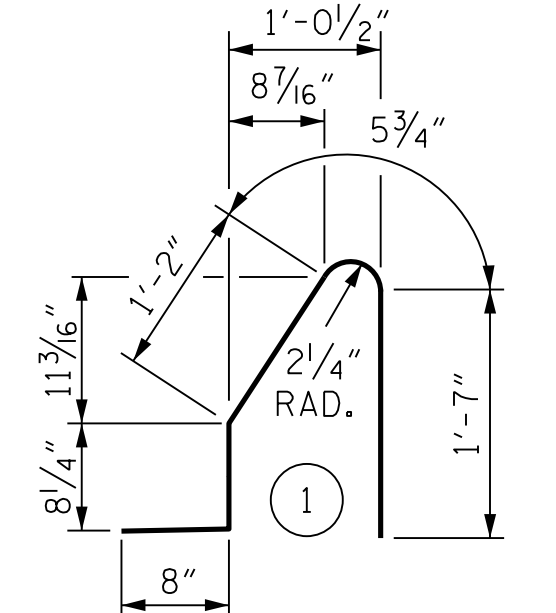
**NOTES**

THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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. THE 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.

**BAR TYPES**

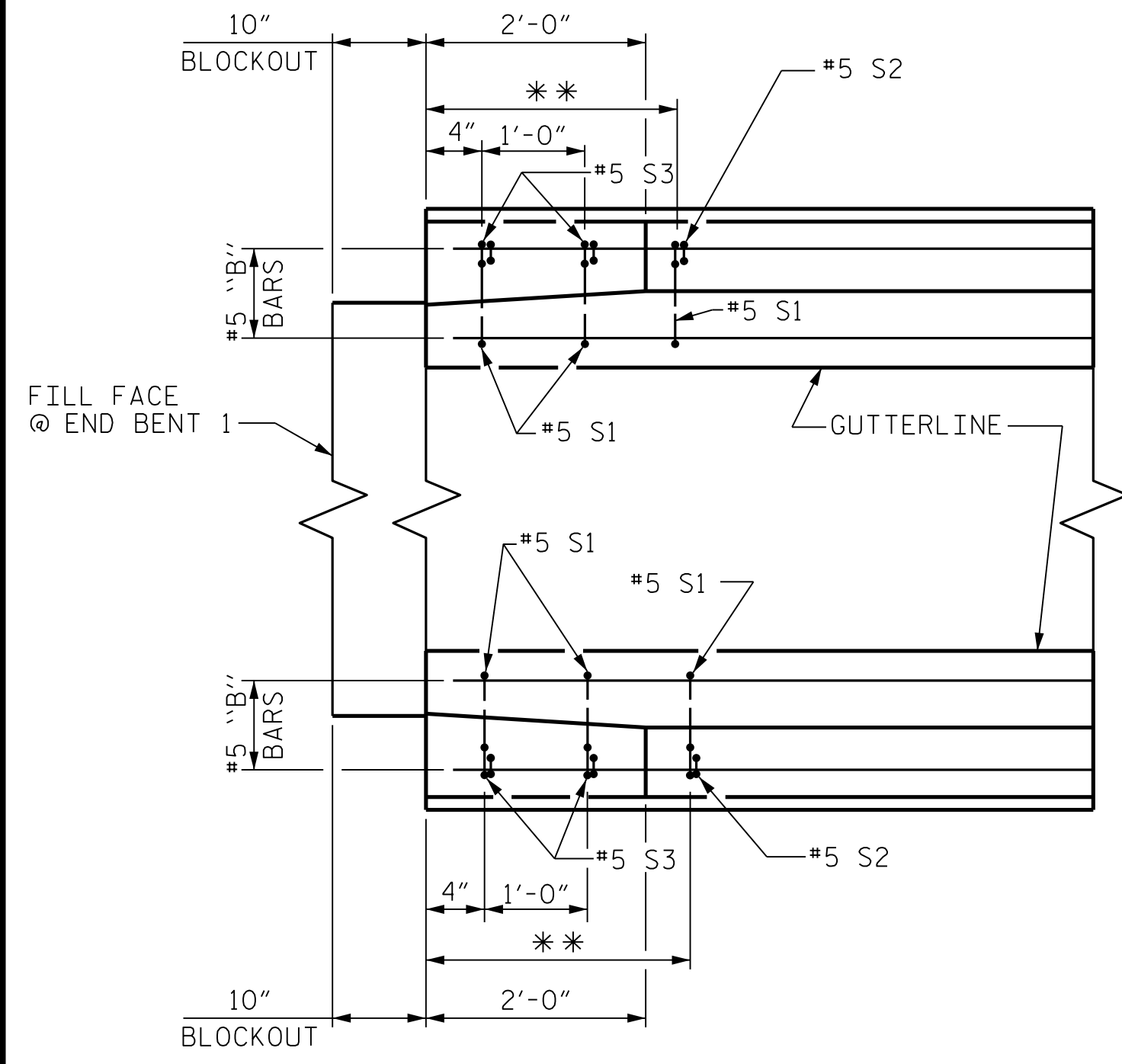


ALL BAR DIMENSIONS ARE OUT TO OUT.

**BILL OF MATERIAL**

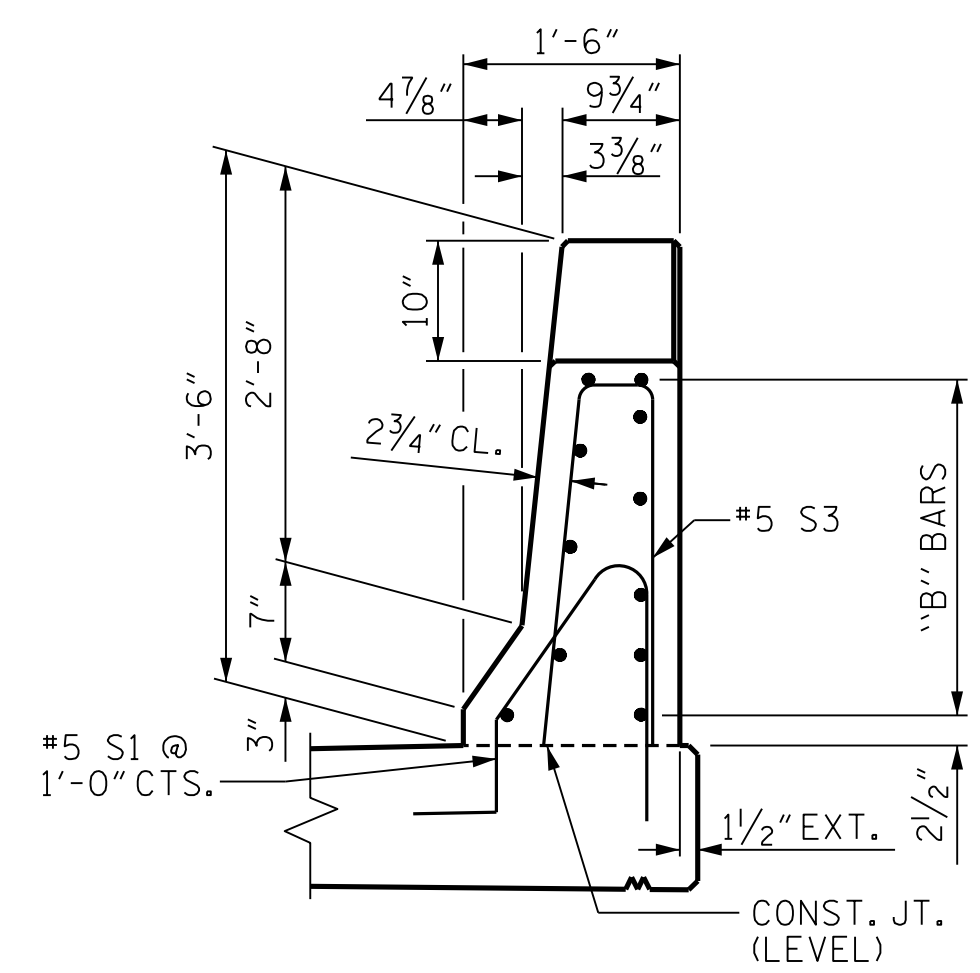
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR.	18'-5"	422
* B2	88	#5	STR.	19'-7"	1797
* B3	88	#5	STR.	24'-7"	2256
* B4	22	#5	STR.	20'-5"	468
* S1	440	#5	1	4'-7"	2103
* S2	432	#5	2	7'-0"	3154
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL					10,247 LBS.
CLASS AA CONCRETE					59.7 CU. YDS.
CONCRETE BARRIER RAIL					439.17 LIN. FT.



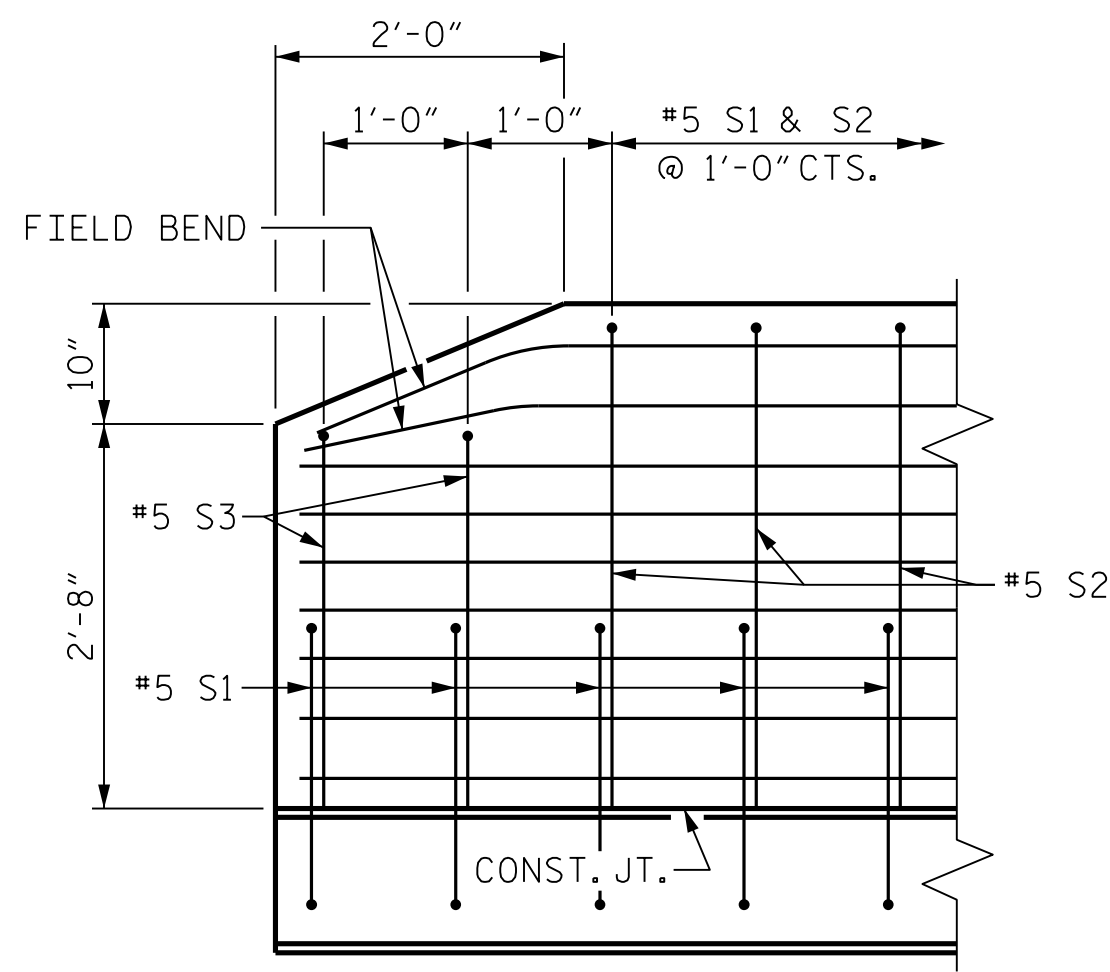
**PLAN**

\*\* 2'-4" (END BENT 1)  
2'-3" (END BENT 2)

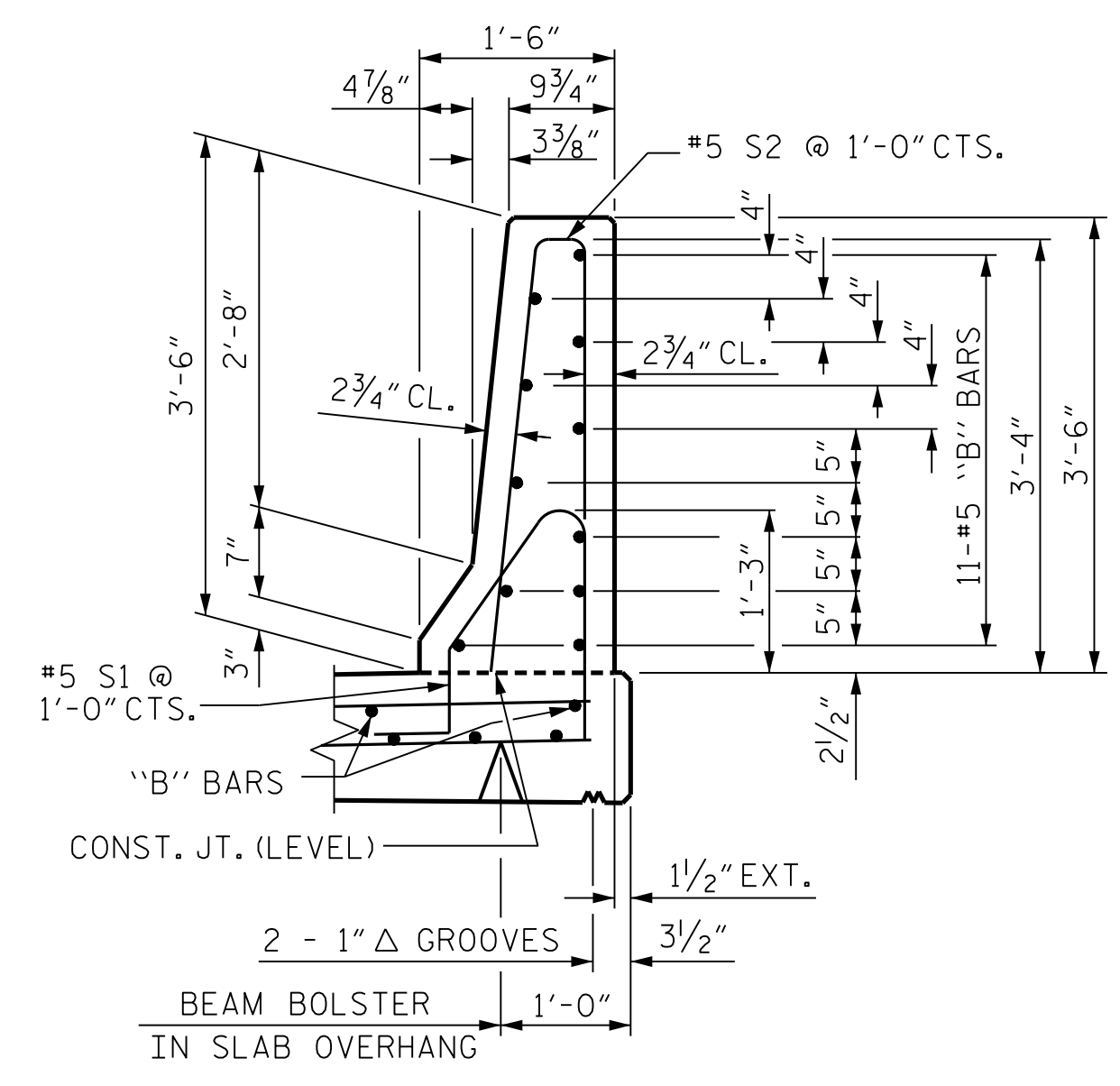


**END VIEW**

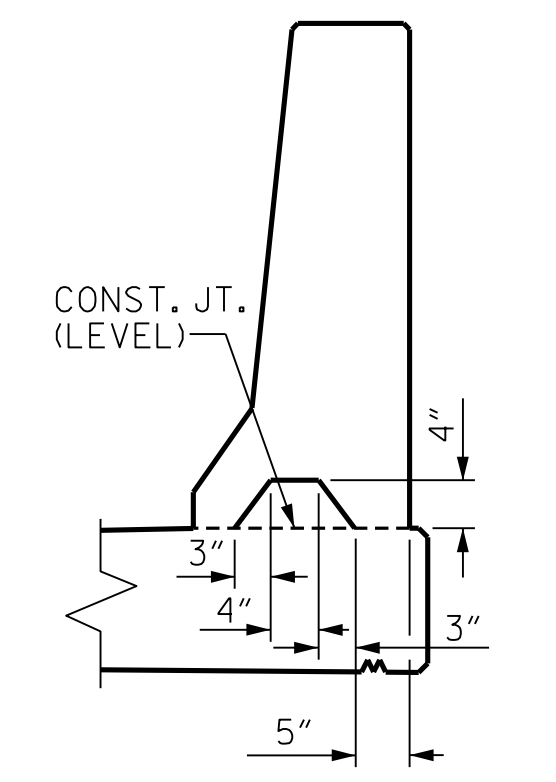
**END OF RAIL DETAILS**



**SIDE VIEW**



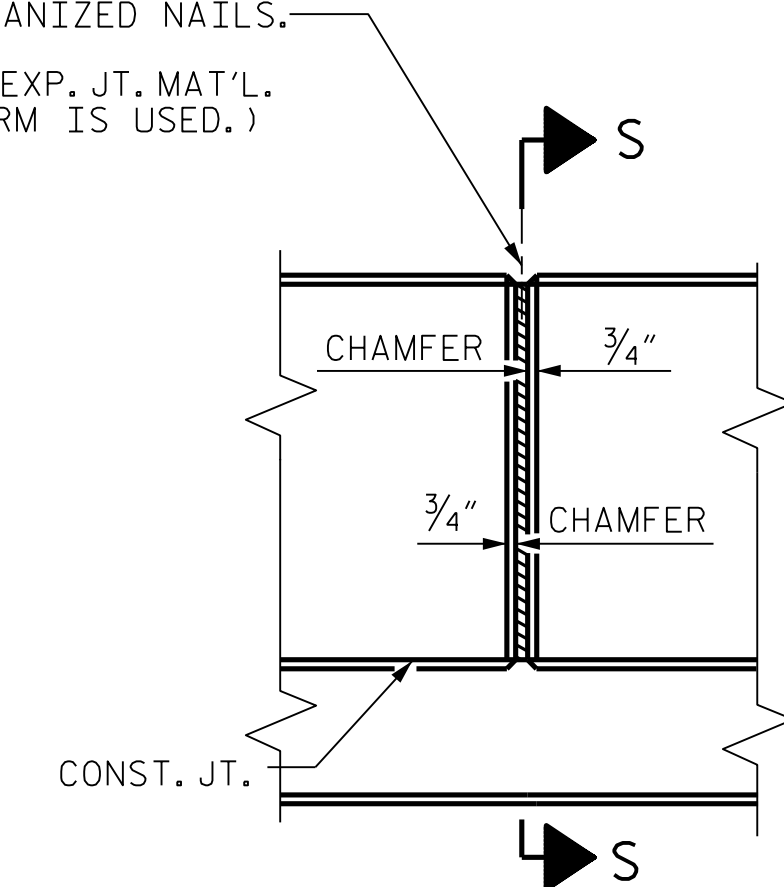
**SECTION THRU RAIL**



**SECTION S-S**

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

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

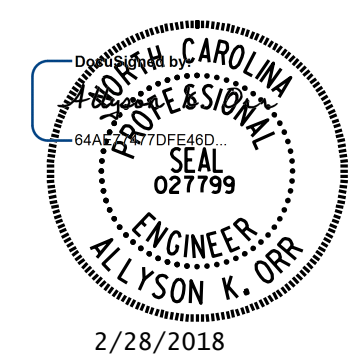


**ELEVATION AT EXPANSION JOINTS**

**BARRIER RAIL DETAILS**

PROJECT NO. B-5351  
GUILFORD COUNTY  
STATION: 23+26.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**STANDARD  
CONCRETE  
BARRIER RAIL**

(WBL)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER : P-0671

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

STD. NO. CBRI (SHT 1)

2/8/2018 10:43:49 AM User: blanning File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_039\_B5351\_SMU\_CBR2\_400242.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY: SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

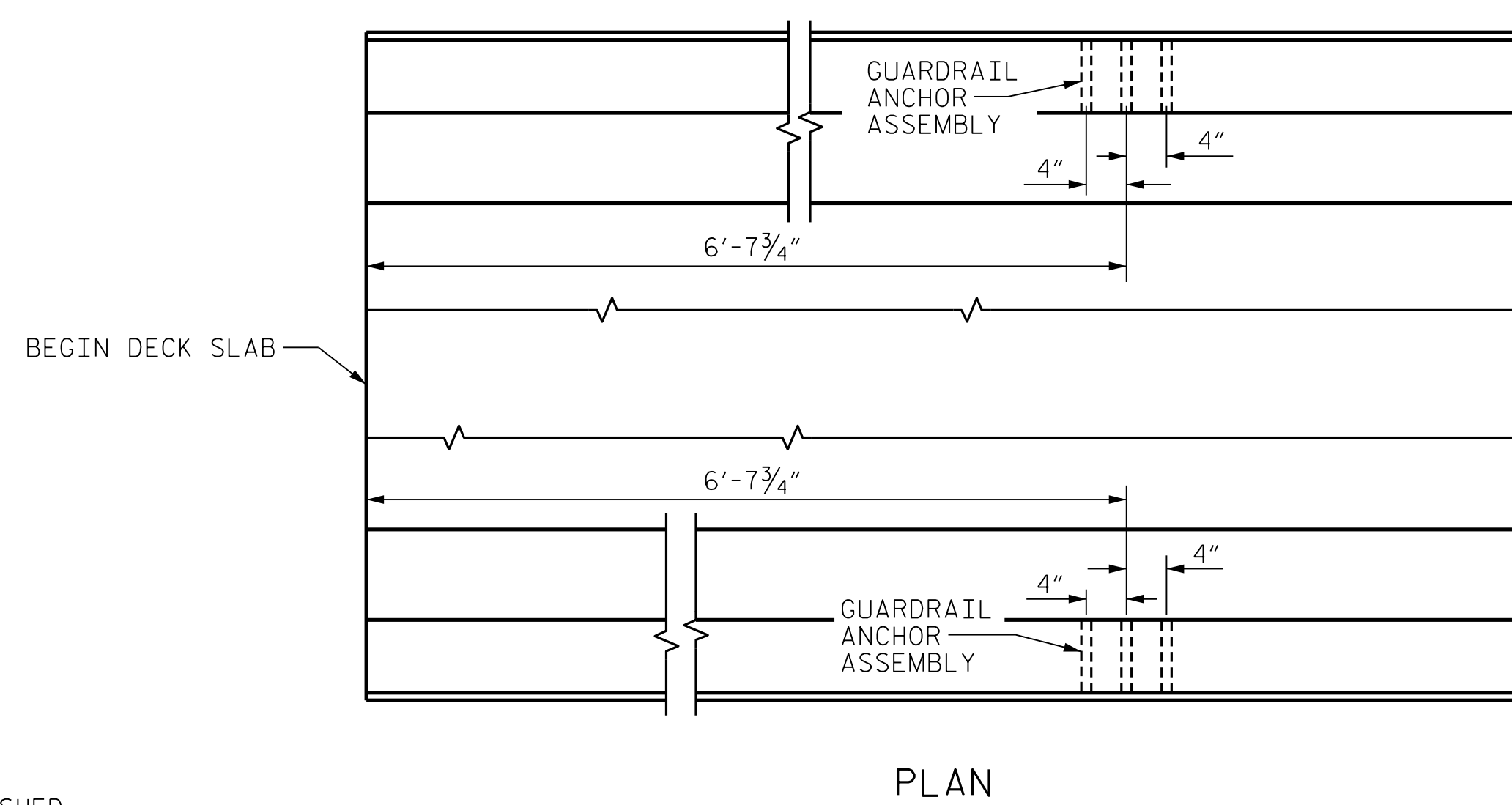
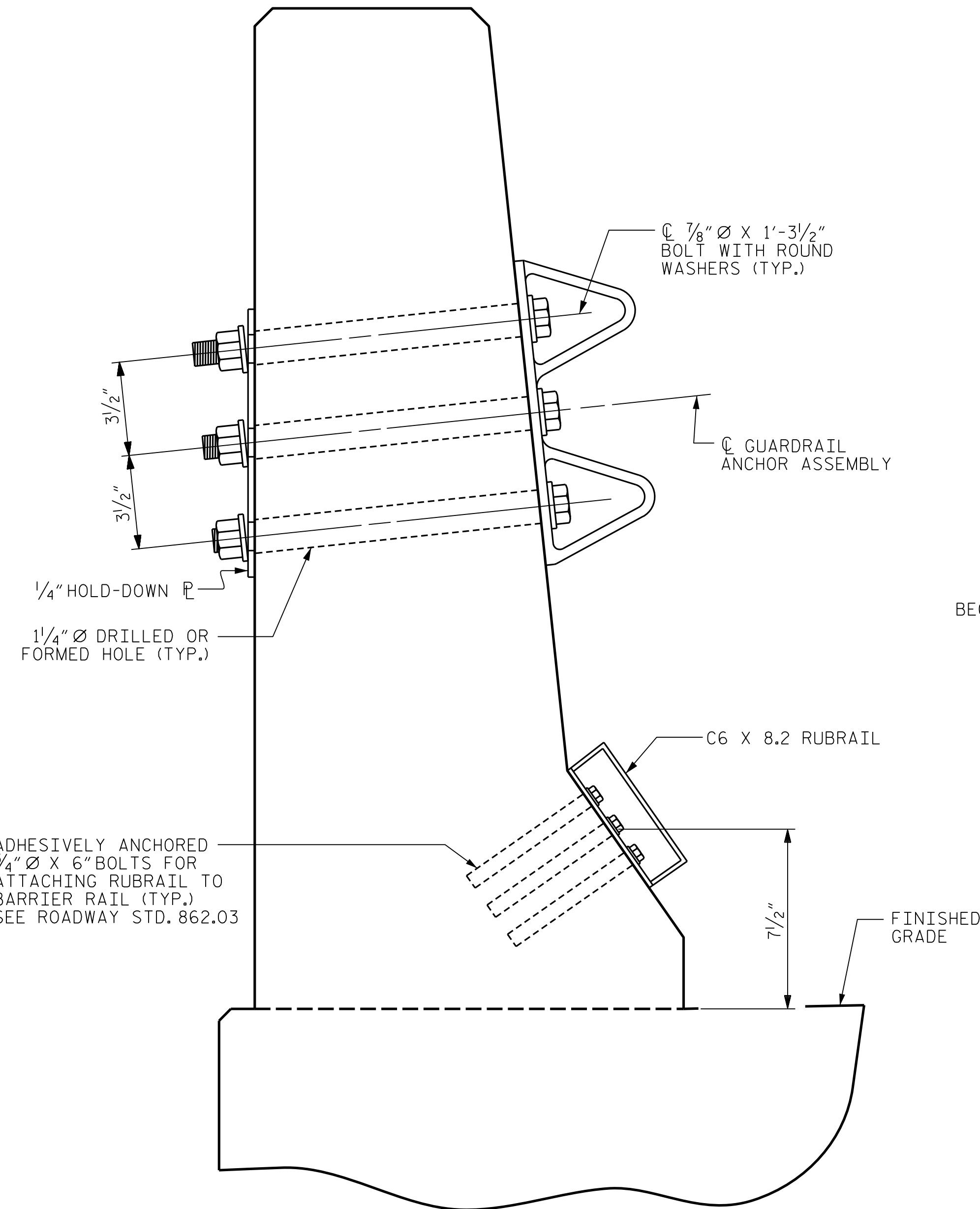
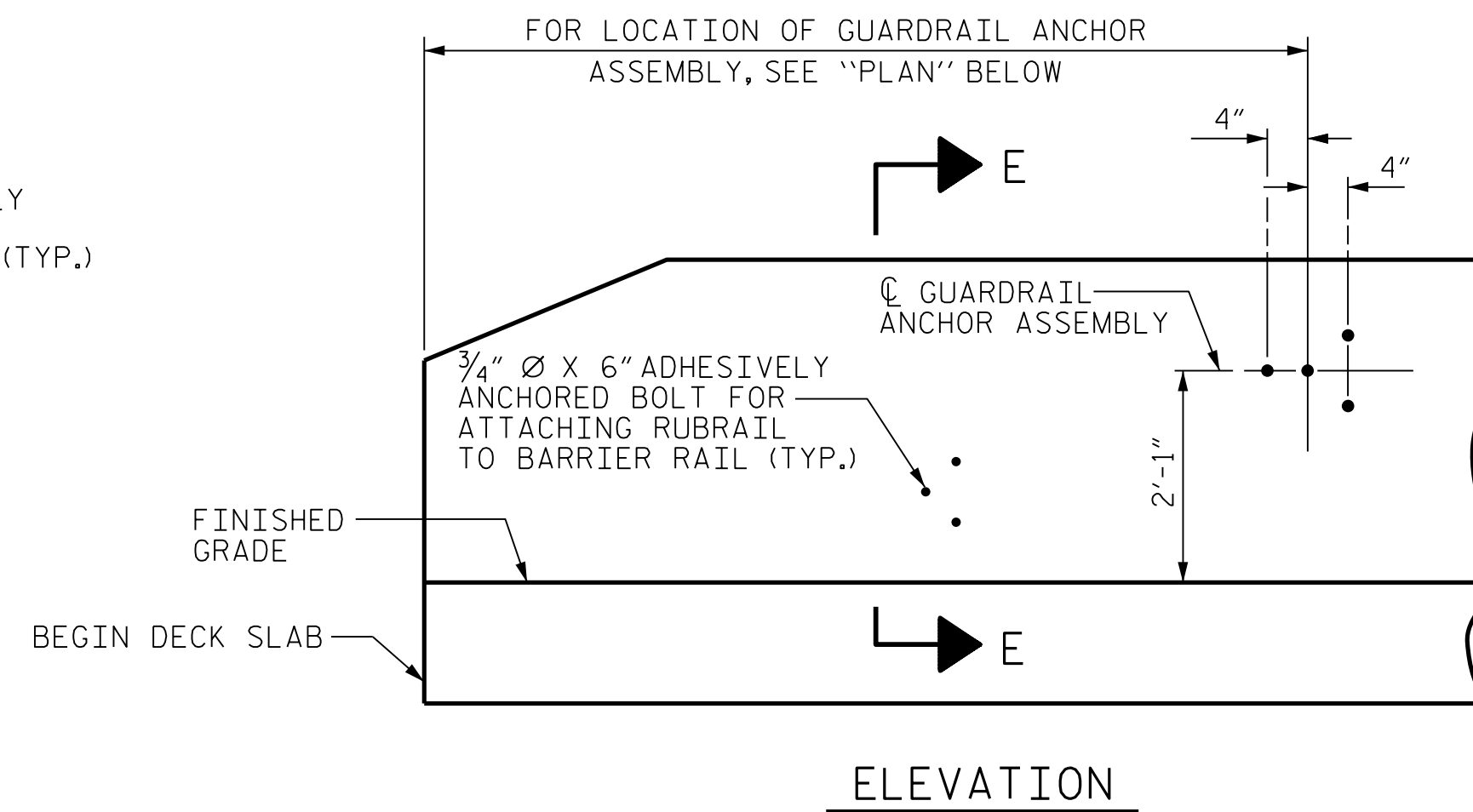
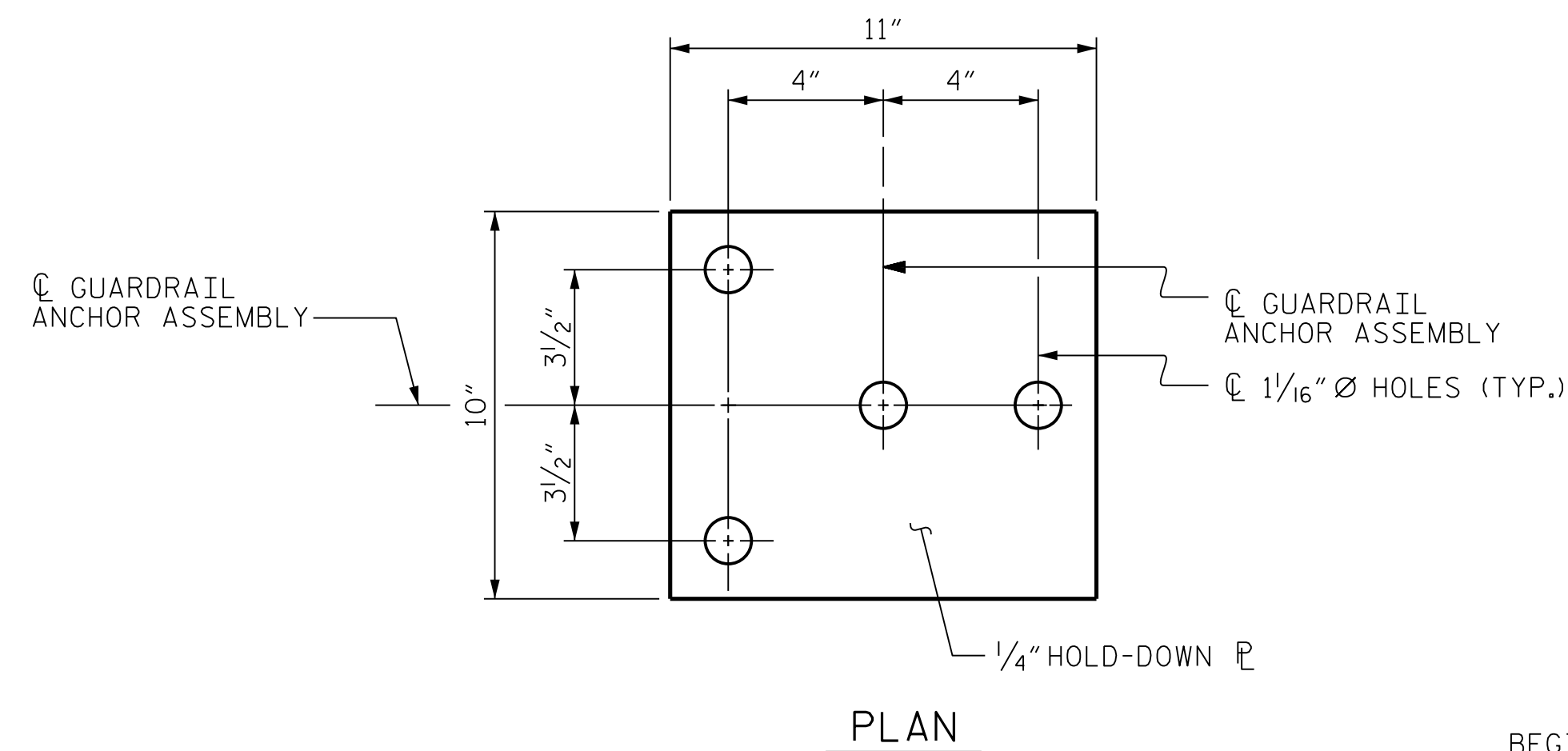
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 CONCRETE BARRIER RAIL.

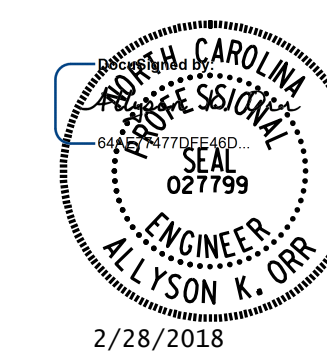
THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS  
\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

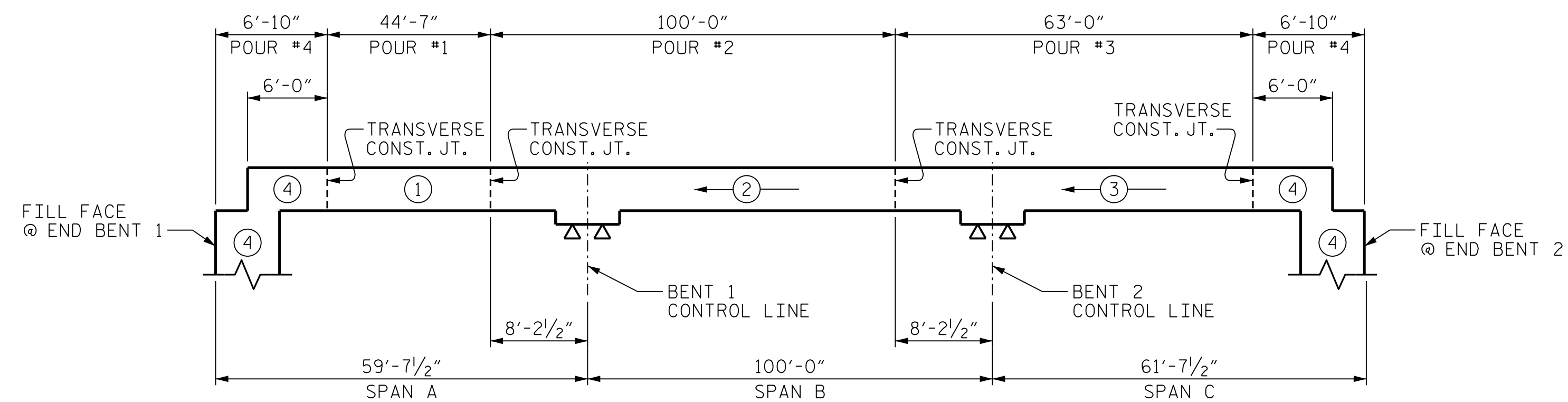
(SHT 1) STD. NO. GRA2

2/8/2018 10:43:51 AM User: blanning  
 File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_041.B5351.SMU\_GRA1\_400242.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

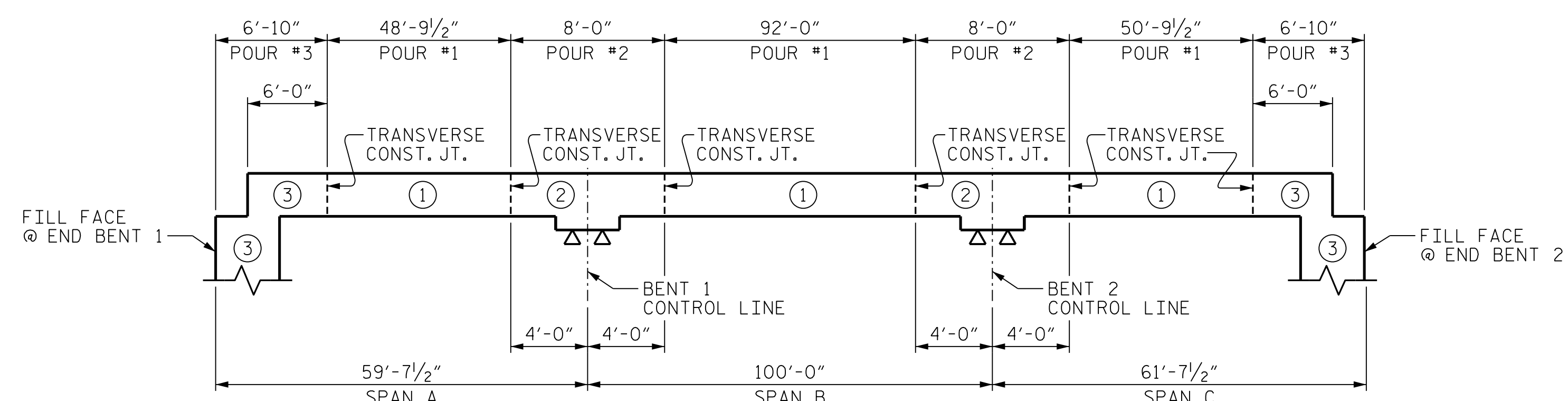


2/8/2018 10:43:53 AM User: blanning  
 Filenamer: P:\NC Bridges\W600135 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401\_043\_B5351\_SML\_BOM1\_400242.dgn



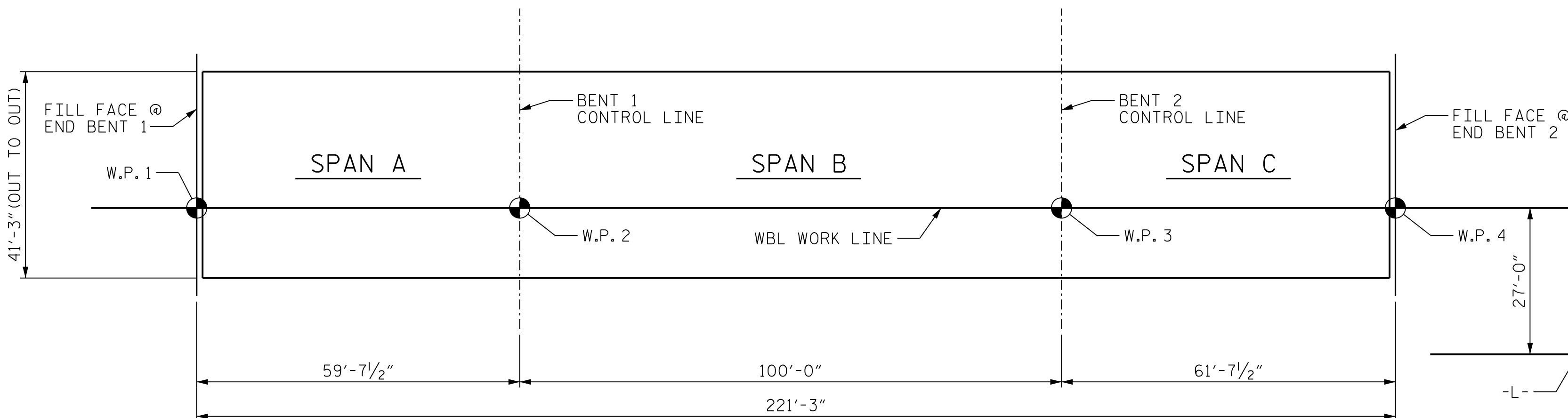
**POURING SEQUENCE**

⊕ INDICATES POUR NUMBER AND DIRECTION OF POUR



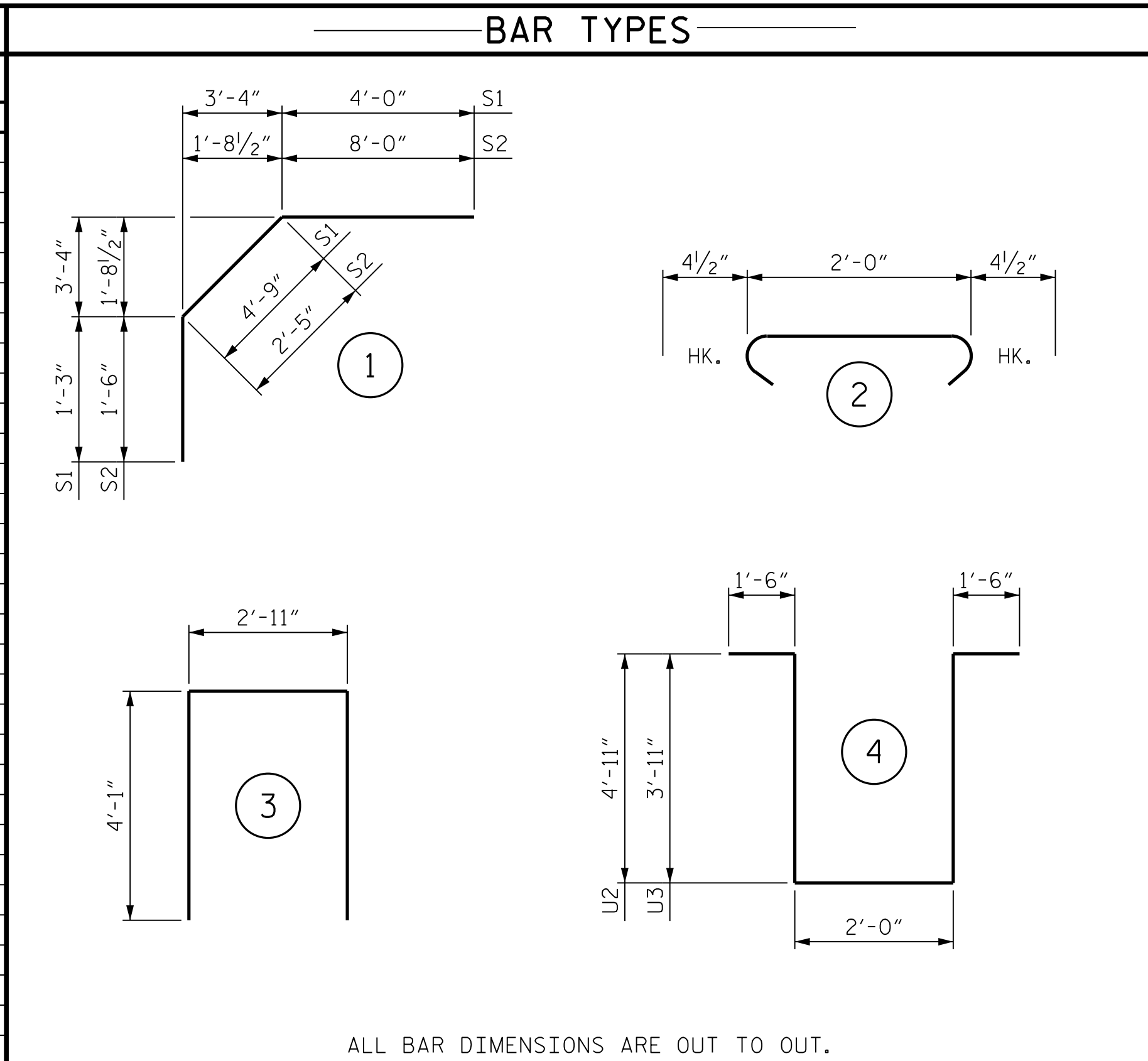
**OPTIONAL POURING SEQUENCE**

POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3,000 PSI.



**LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB**  
(SQ. FT. = 9,127)

REINFORCING BAR SCHEDULE					
SPANS A, B & C					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	439	#5	STR	40'-11"	18735
A2	439	#5	STR	40'-11"	18735
B1	200	#5	STR	56'-6"	11786
*B2	264	#6	STR	49'-10"	19760
*B3	130	#4	STR	30'-0"	2605
*B4	34	#4	STR	30'-0"	681
K1	20	#4	STR	21'-4"	285
K2	8	#4	STR	6'-6"	35
K3	8	#4	STR	7'-6"	40
K4	16	#4	STR	8'-0"	86
K5	8	#4	STR	7'-0"	37
K6	4	#4	STR	1'-2"	3
K7	4	#4	STR	1'-8"	4
K8	8	#4	STR	1'-11"	10
K9	4	#4	STR	1'-5"	4
K10	20	#4	STR	19'-1"	255
K11	16	#4	STR	5'-4"	57
K12	16	#4	STR	7'-6"	80
K13	32	#4	STR	8'-0"	171
K14	16	#4	STR	7'-0"	75
*S1	60	#4	1	10'-0"	401
*S2	60	#4	1	11'-11"	478
S3	208	#4	2	2'-9"	382
U1	60	#4	3	11'-1"	444
U2	40	#4	4	14'-10"	396
U3	16	#4	4	12'-10"	137



**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

**—SUPERSTRUCTURE BILL OF MATERIAL—**

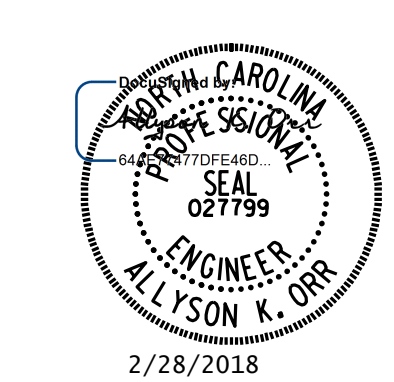
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	*EPOXY COATED REINFORCING STEEL (LBS.)
POUR #1	57.2	-	-
POUR #2	141.6	-	-
POUR #3	94.1	-	-
POUR #4	57.4	-	-
<b>TOTALS**</b>	<b>350.3</b>	<b>33,022</b>	<b>42,660</b>

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

**GROOVING BRIDGE FLOORS**

APPROACH SLABS	1704 SO.FT.
BRIDGE DECK	7686 SO.FT.
<b>TOTAL</b>	<b>9390 SO.FT.</b>

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-



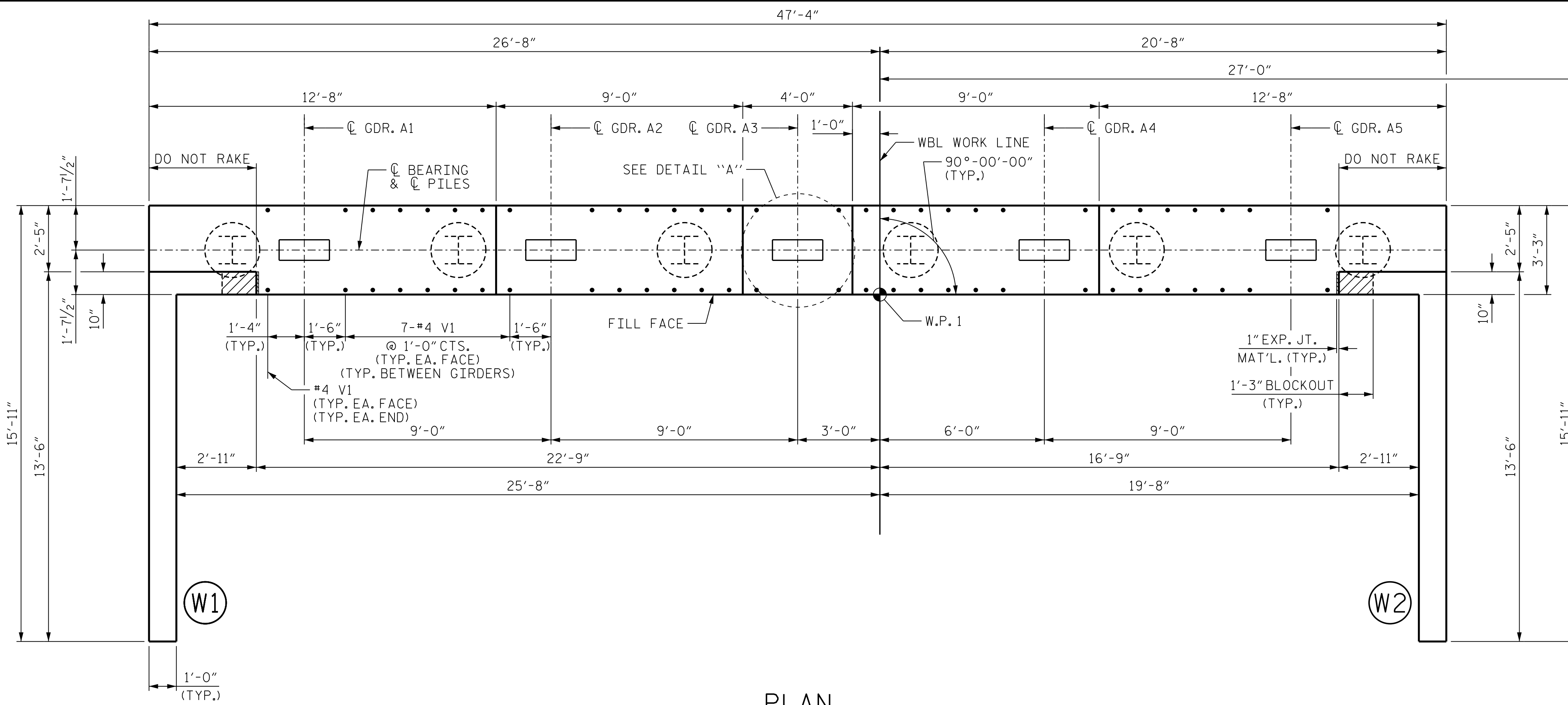
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SUPERSTRUCTURE  
 BILL OF MATERIAL  
 (WBL)

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

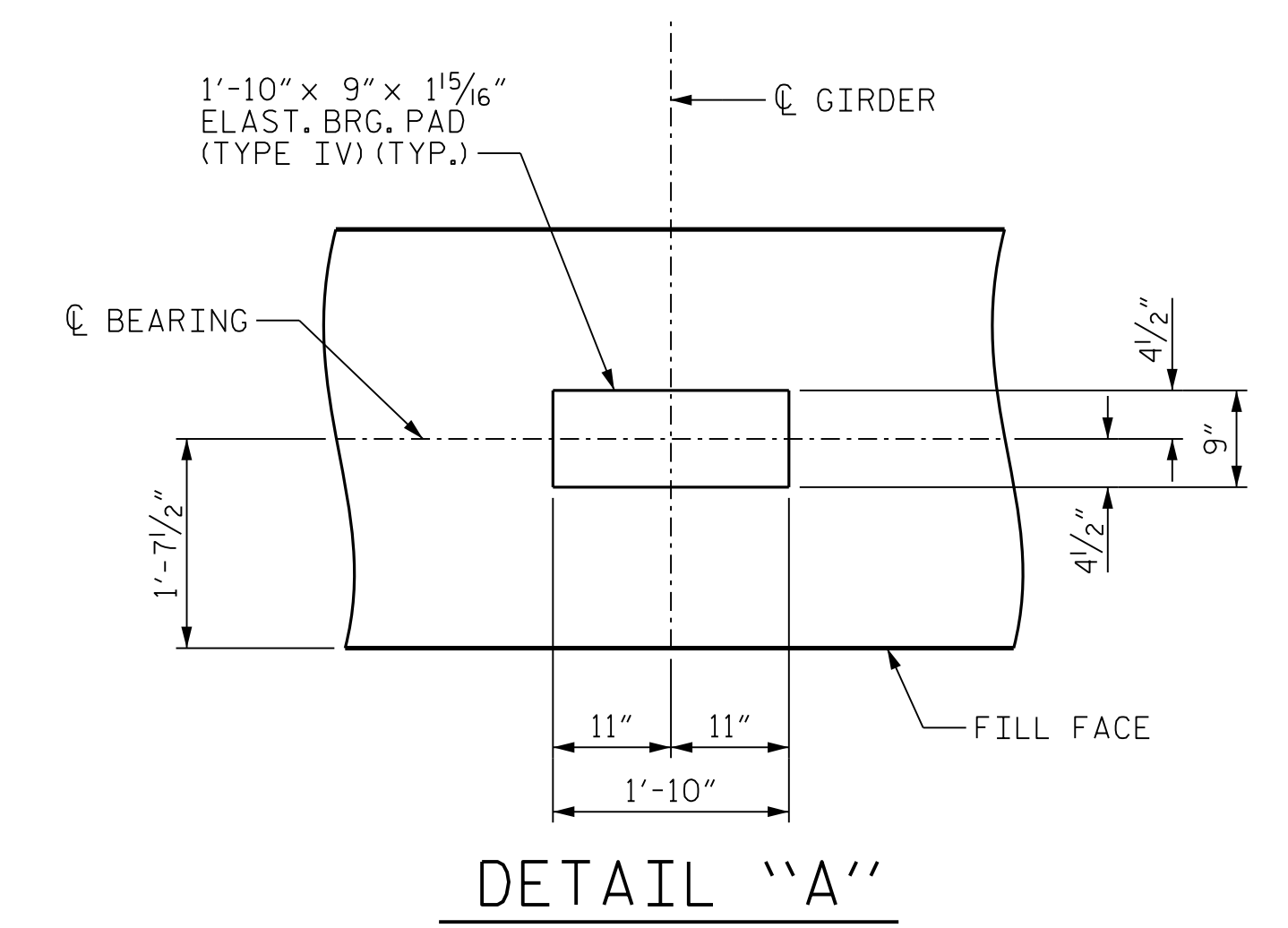
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S1-22
2			4			TOTAL SHEETS 35

ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: JMB 5/87	REV. 5/1/06 TLA/GM
CHECKED BY: SJD 9/87	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

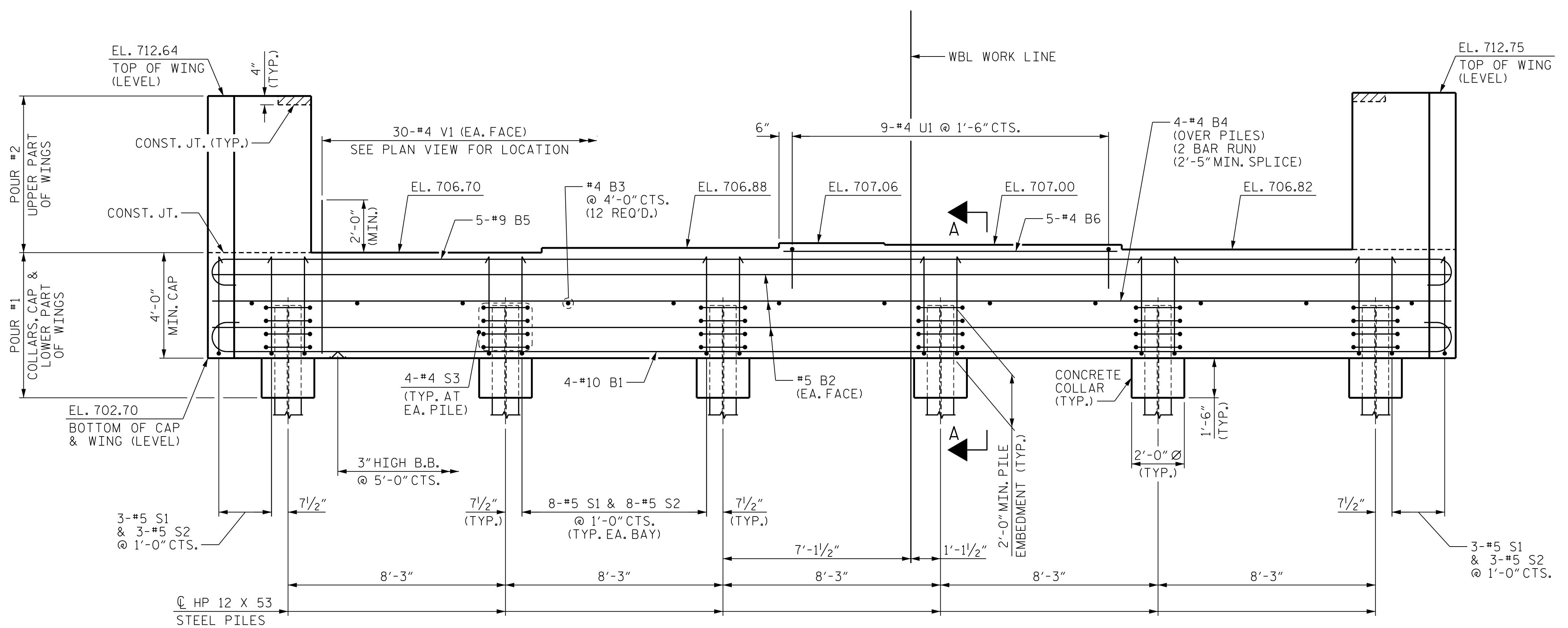


PLAN

**NOTES**  
 THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE END AS INDICATED, SHALL BE RAKED TO A DEPTH OF 1/4".  
 -L- FOR SECTION A-A, SEE SHEET 3 OF 3.  
 FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

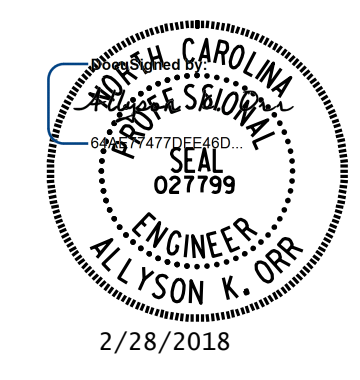


DETAIL "A"



ELEVATION

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 PLAN AND ELEVATION

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

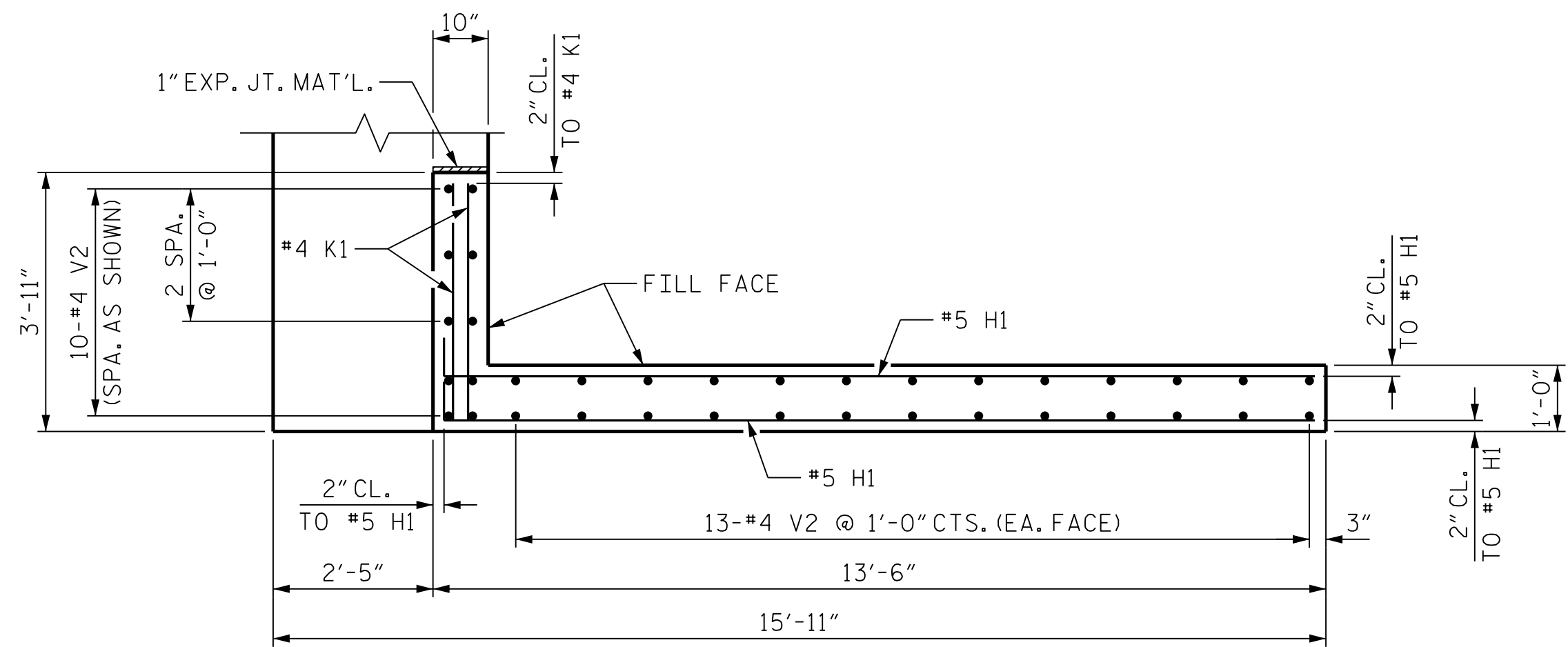
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO. <b>S1-23</b>
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS <b>35</b>
2			4			

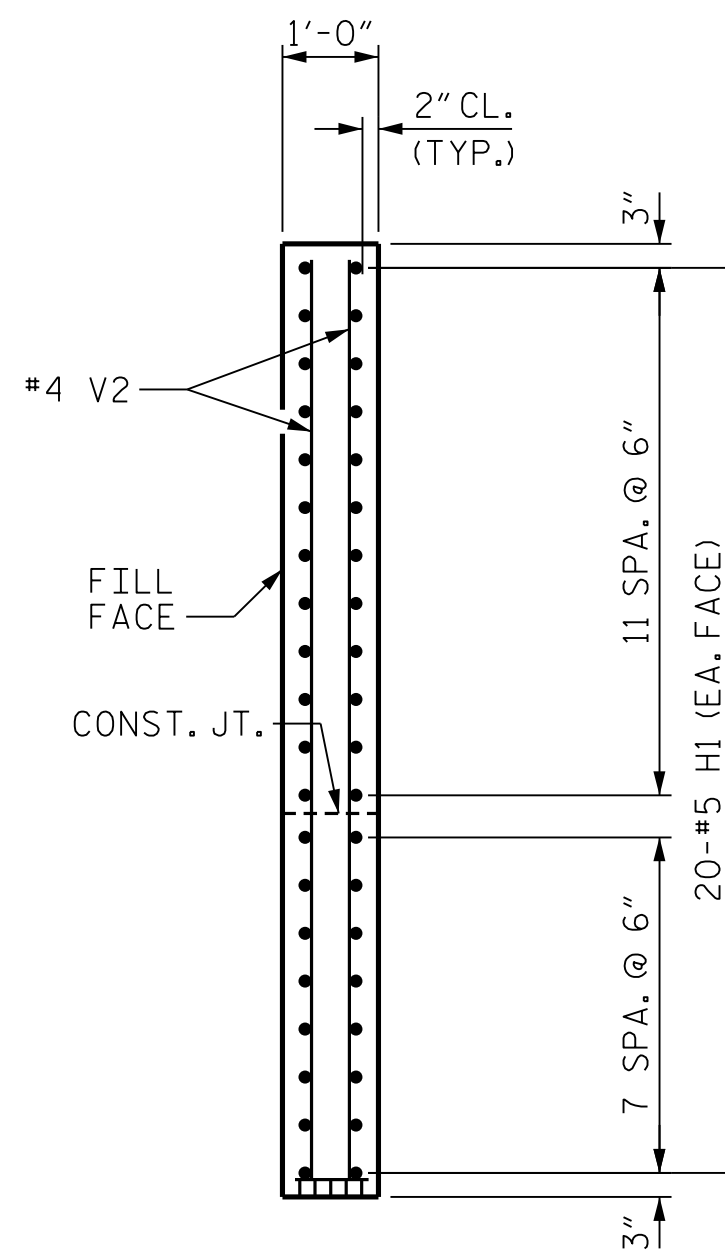
2/8/2018 10:43:55 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A01\_045\_B5351\_SMU.EIA\_400242.dgn

DRAWN BY : B.E. LANNING DATE : 12/17  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

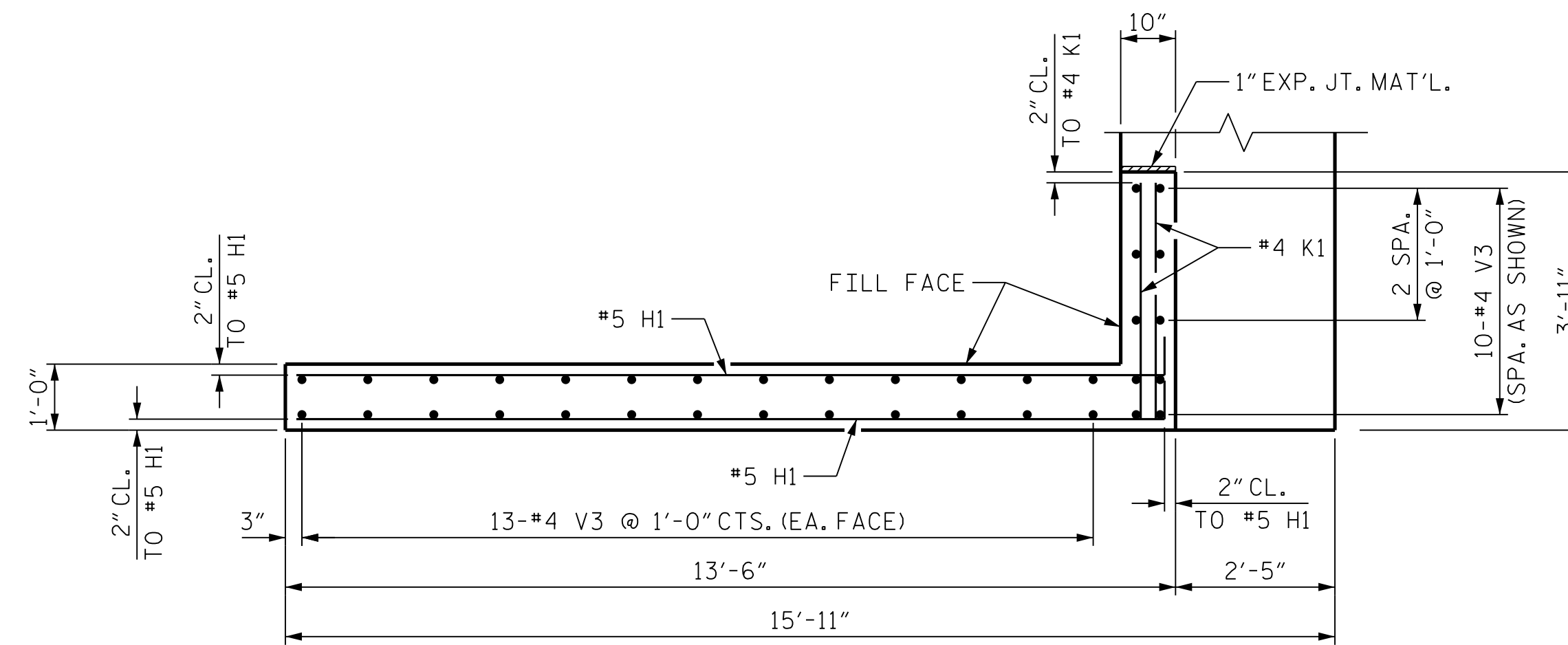




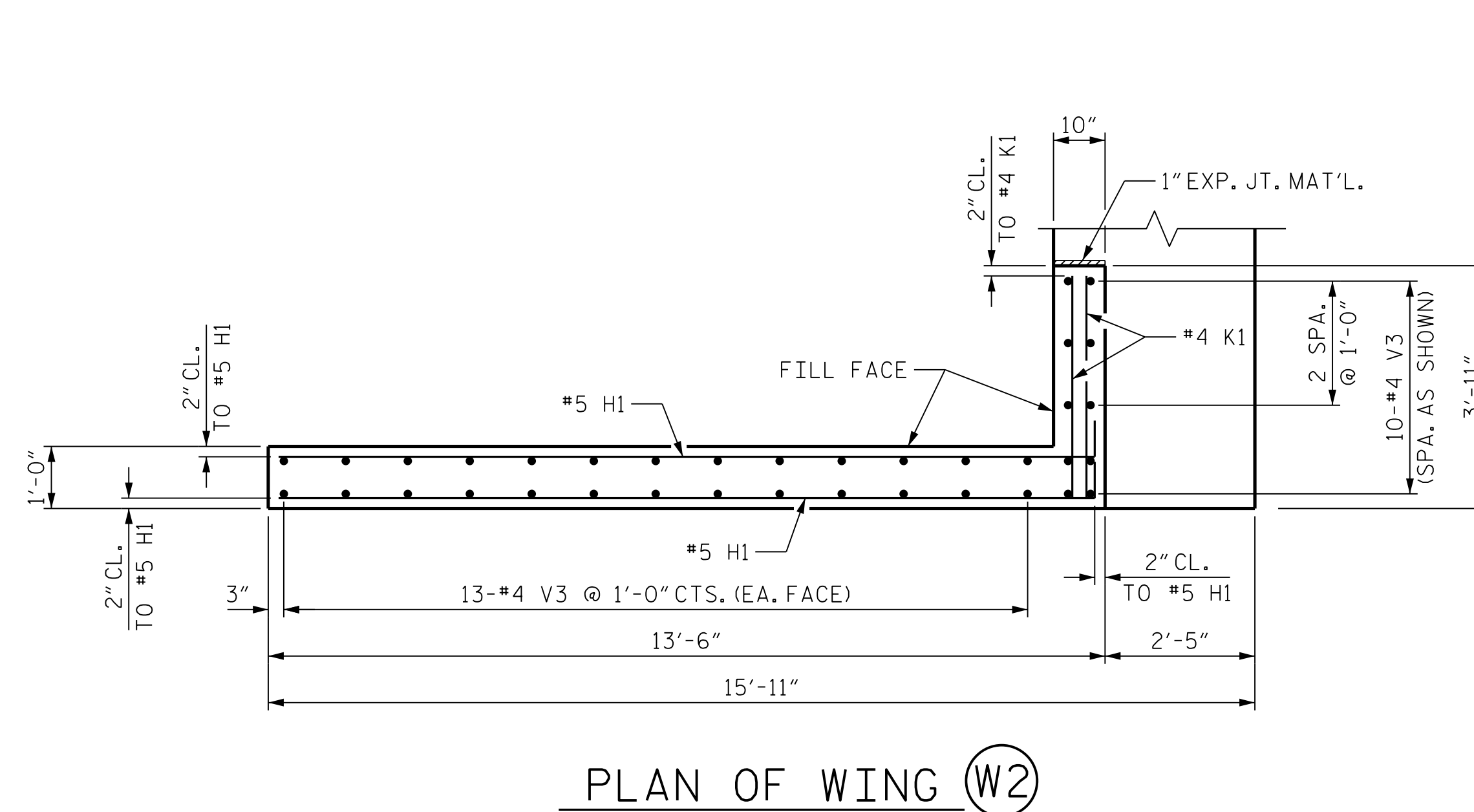
PLAN OF WING (W1)



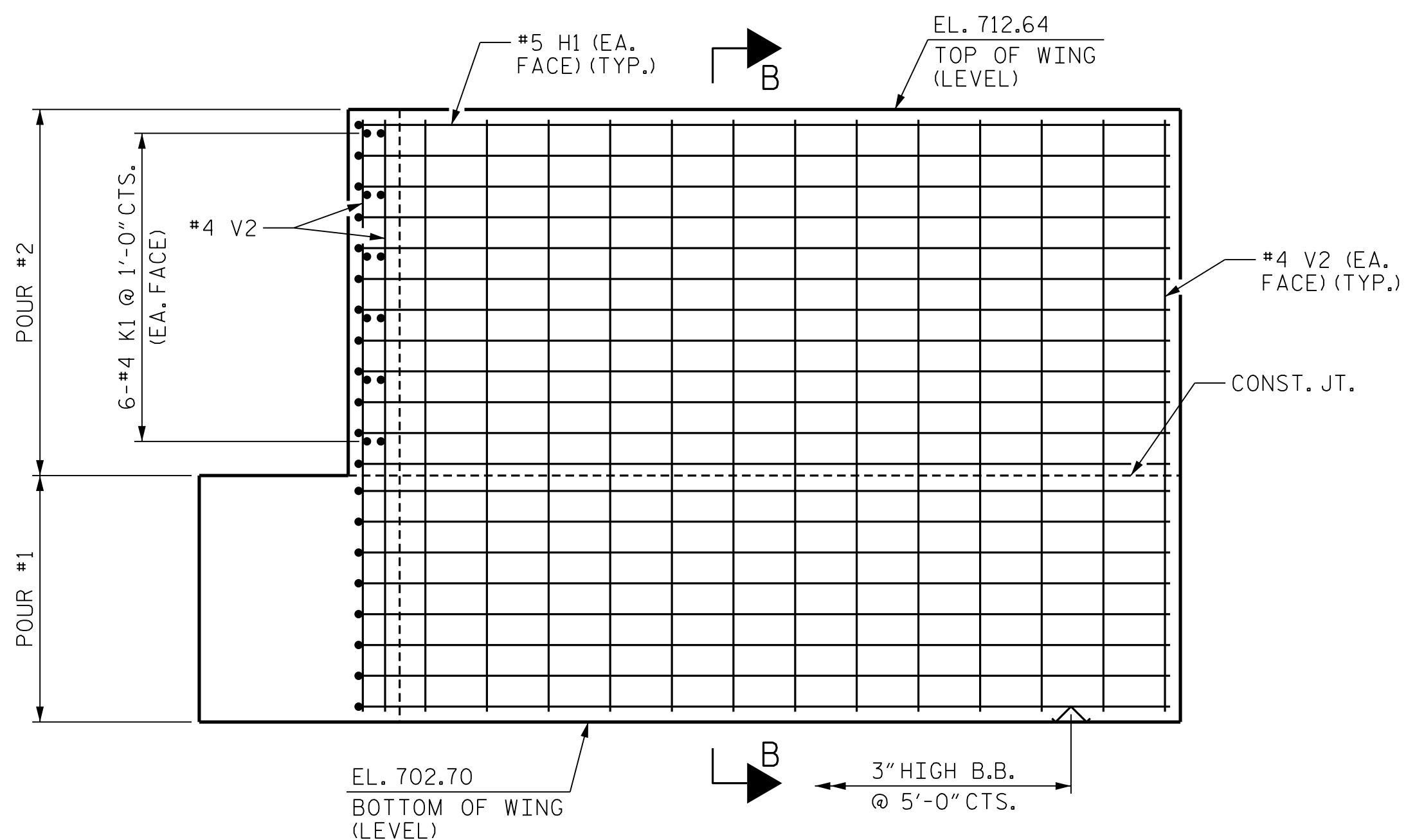
SECTION B-B



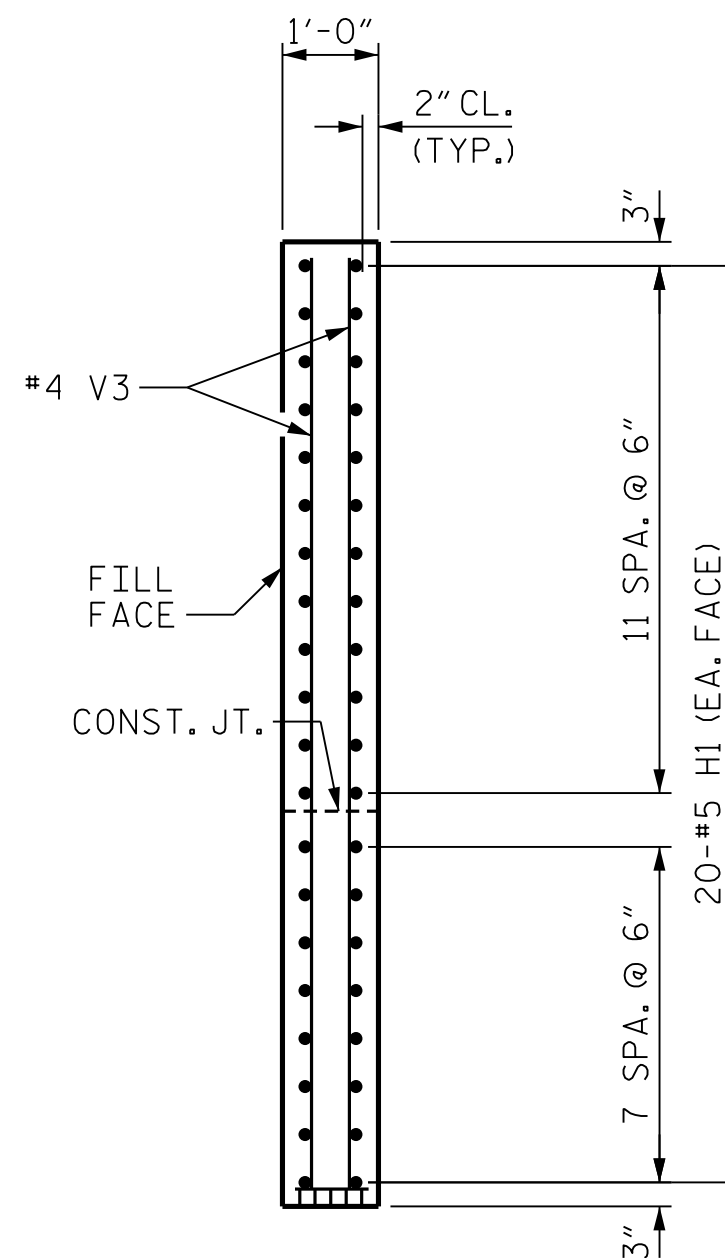
PLAN OF WING (W2)



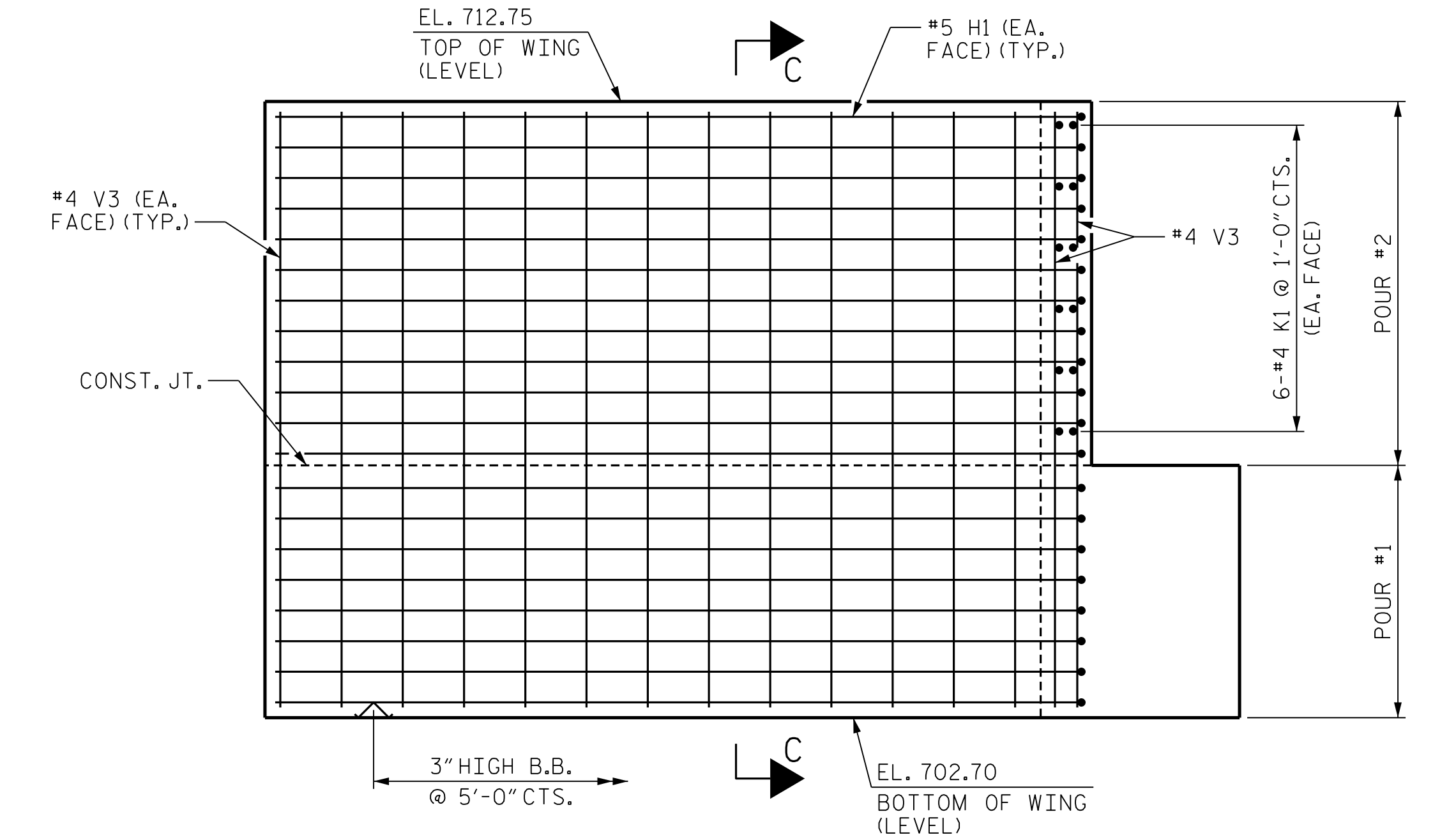
SECTION B-B



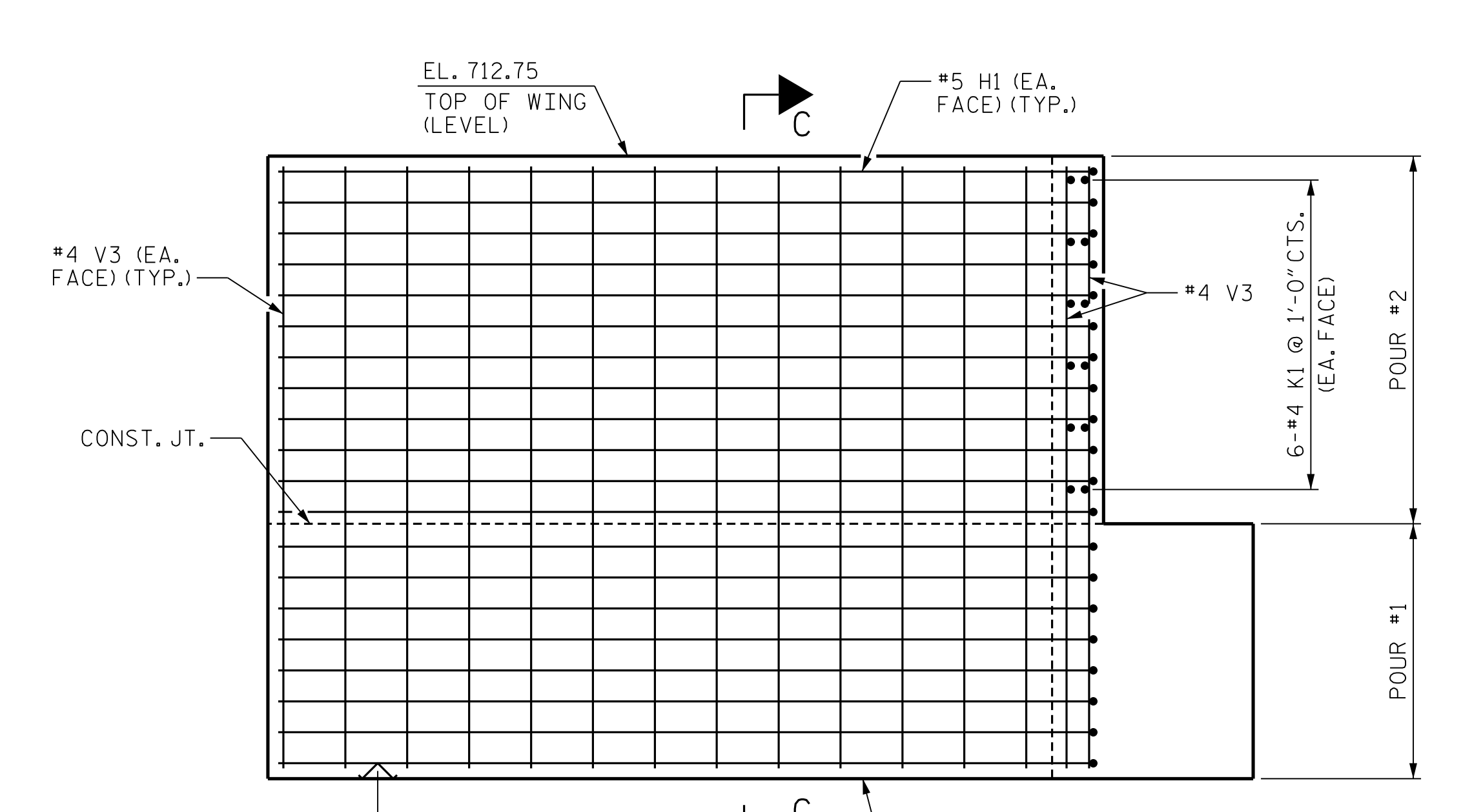
ELEVATION OF WING (W1)



SECTION C-C



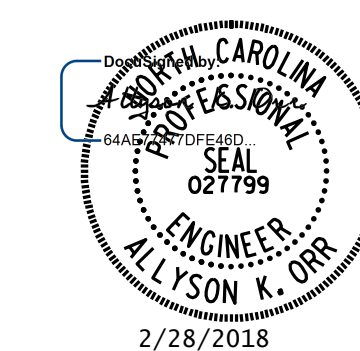
ELEVATION OF WING (W2)



SECTION C-C

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 3



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

(WBL)

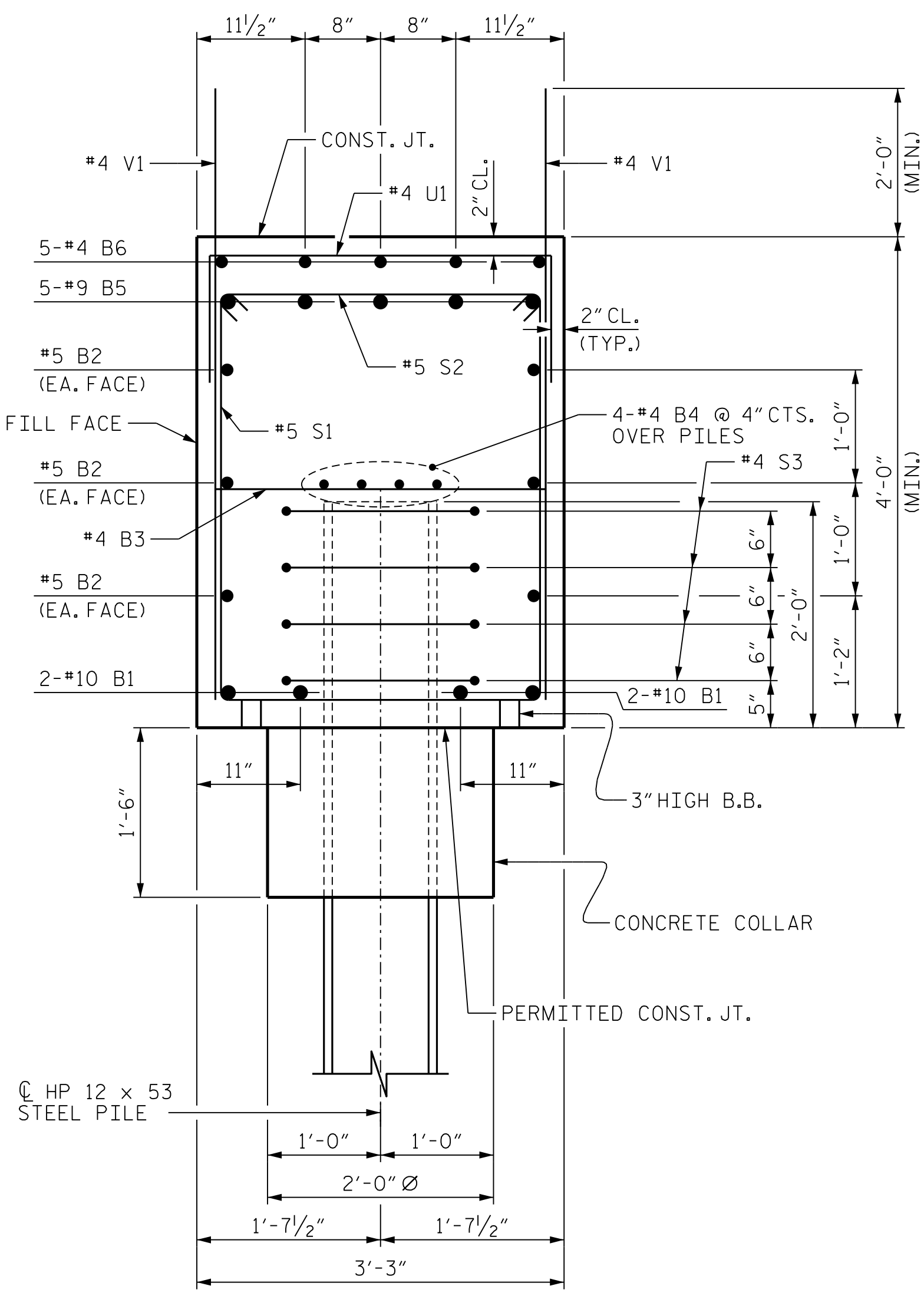
**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

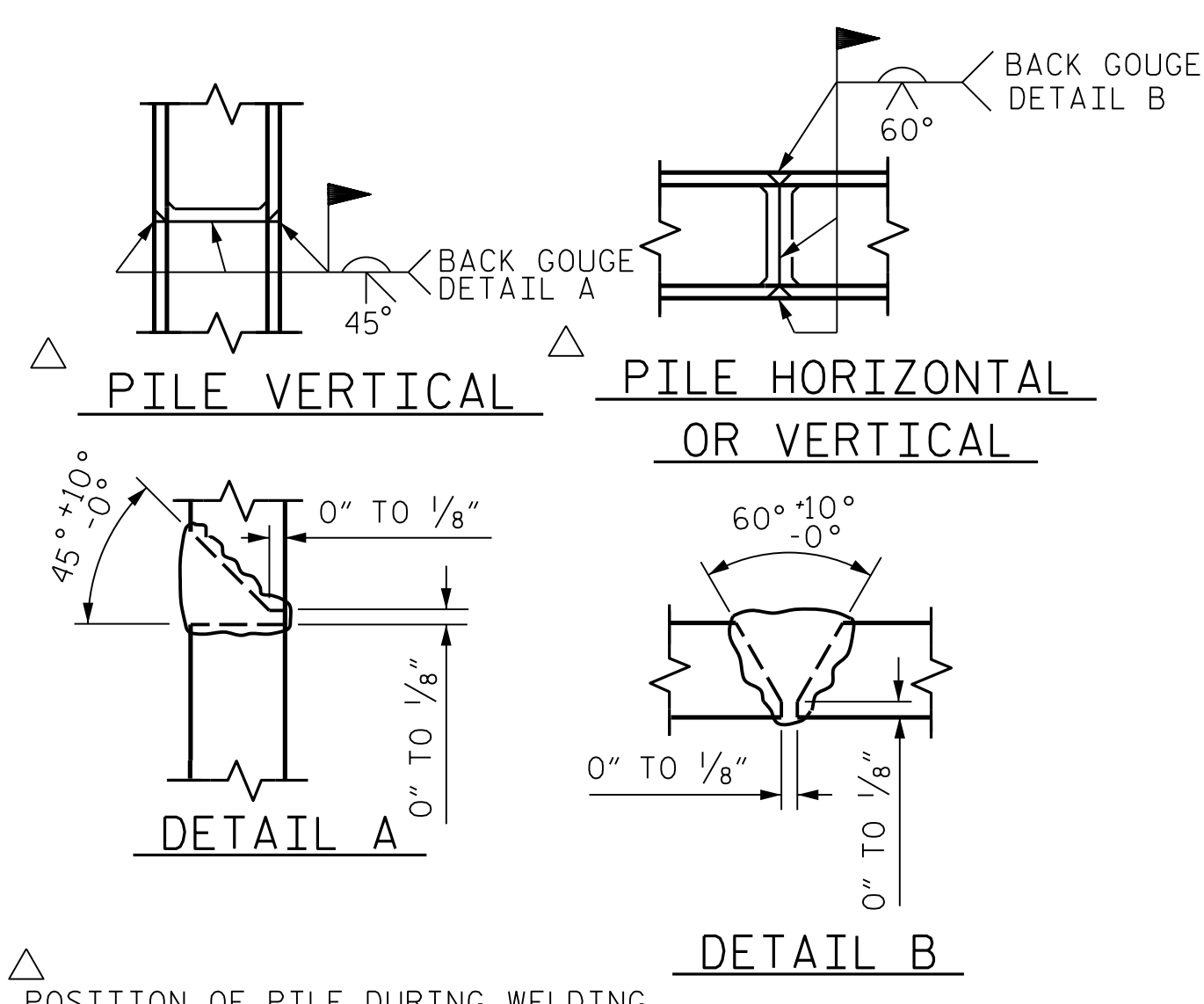
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S1-24
2			4			

DRAWN BY : B.E. LANNING	DATE : 12/17
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

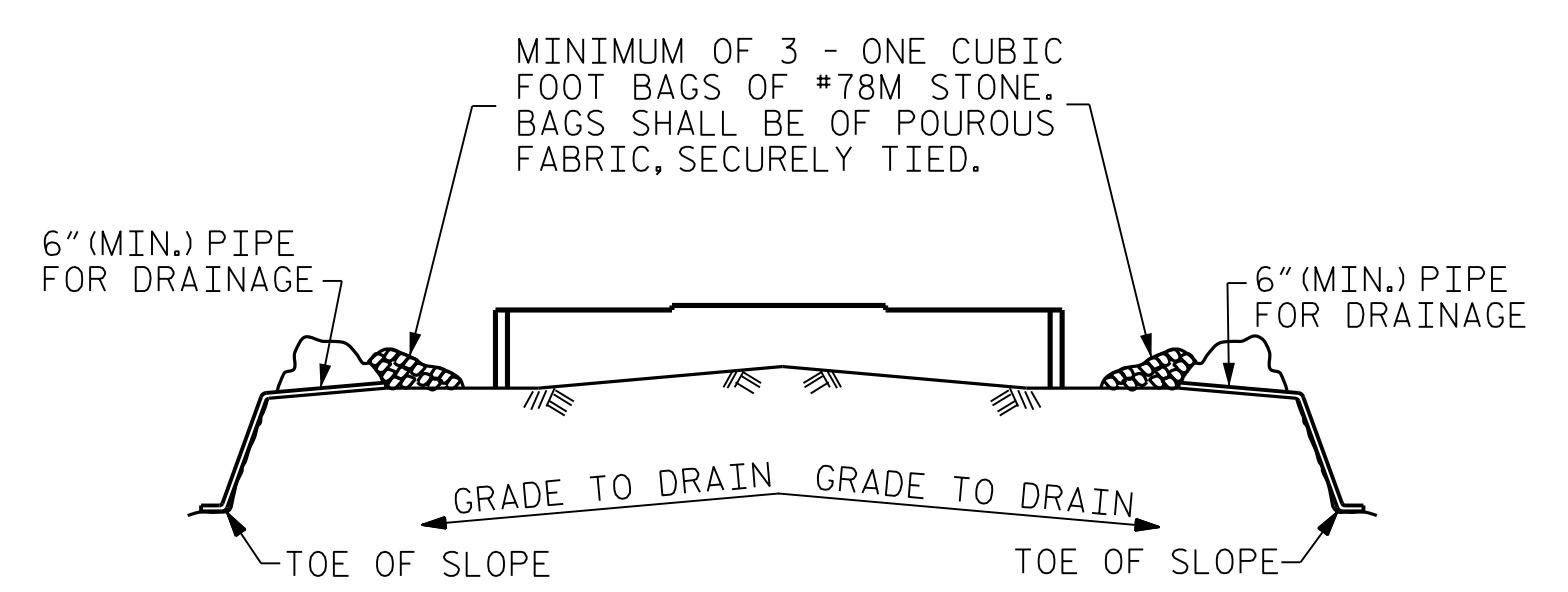
2/8/2018 10:43:57 AM User: blanning  
 Filenamer: P:\NC Bridges\W16001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401\_047\_B5351\_SMU\_EIB\_400242.dgn



SECTION A-A



PILE SPLICE DETAILS

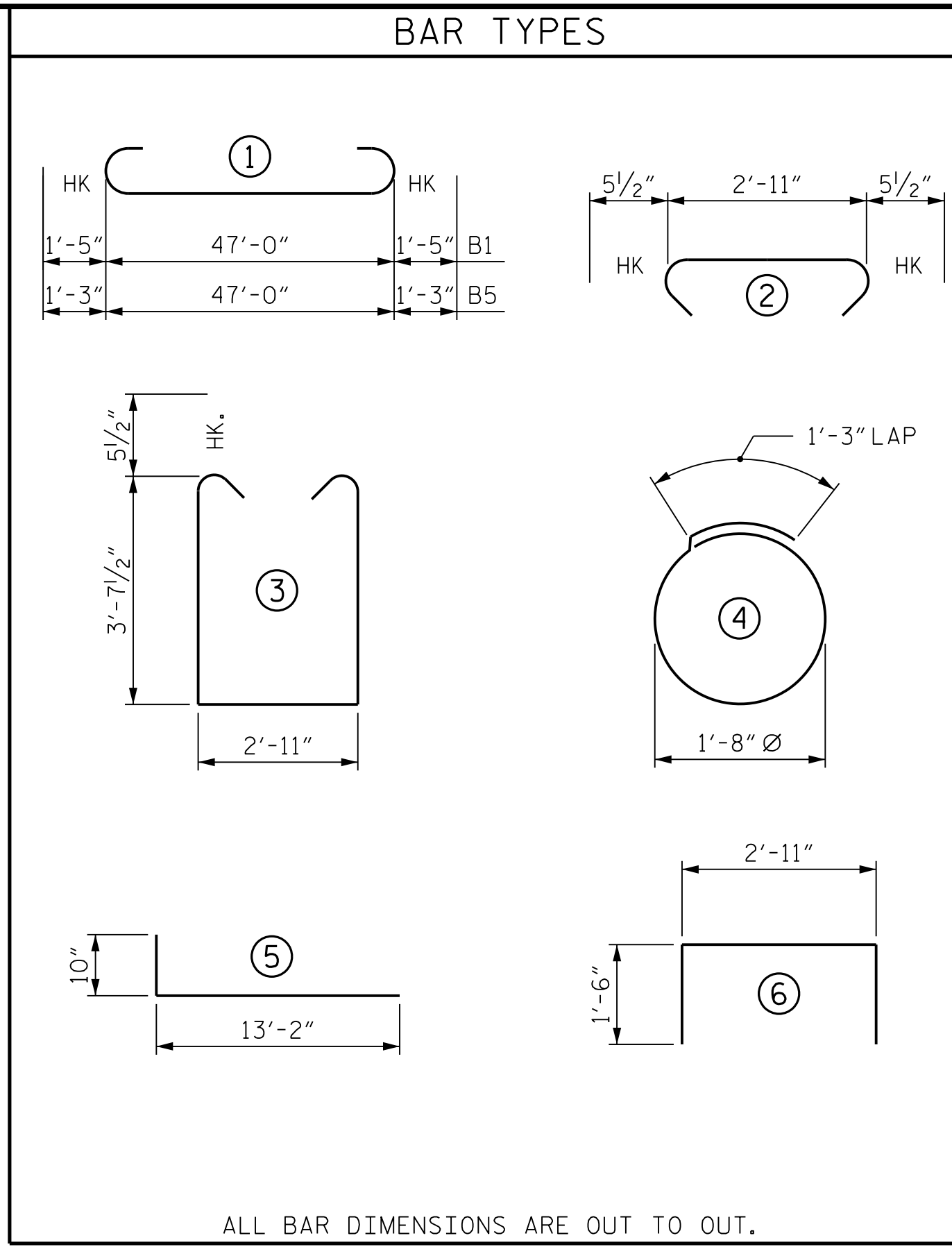


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

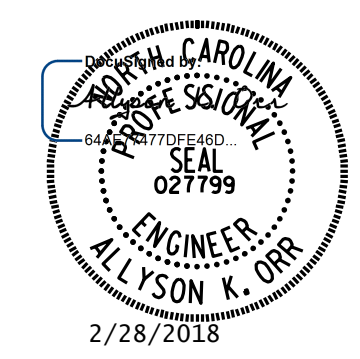


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	49'-10"	858
B2	6	#5	STR	47'-0"	294
B3	12	#4	STR	2'-11"	23
B4	8	#4	STR	24'-9"	132
B5	5	#9	1	49'-6"	842
B6	5	#4	STR	12'-8"	42
H1	80	#5	5	14'-0"	1168
K1	24	#4	STR	3'-7"	57
S1	46	#5	3	11'-1"	532
S2	46	#5	2	3'-10"	184
S3	24	#4	4	6'-6"	104
U1	9	#4	6	5'-11"	36
V1	60	#4	STR	6'-2"	247
V2	36	#4	STR	9'-7"	230
V3	36	#4	STR	9'-8"	232
REINFORCING STEEL					4,981 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (COLLARS, CAP & LOWER PART OF WINGS)					28.6 C.Y.
POUR #2 (UPPER PART OF WINGS)					7.0 C.Y.
TOTAL					35.6 C.Y.
HP 12 X 53 STEEL PILES					NO. : 6 117.0 LIN. FT.
STEEL PILE POINTS					6
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					EA. : 6

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 DETAILS AND  
 BILL OF MATERIAL  
 (WBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

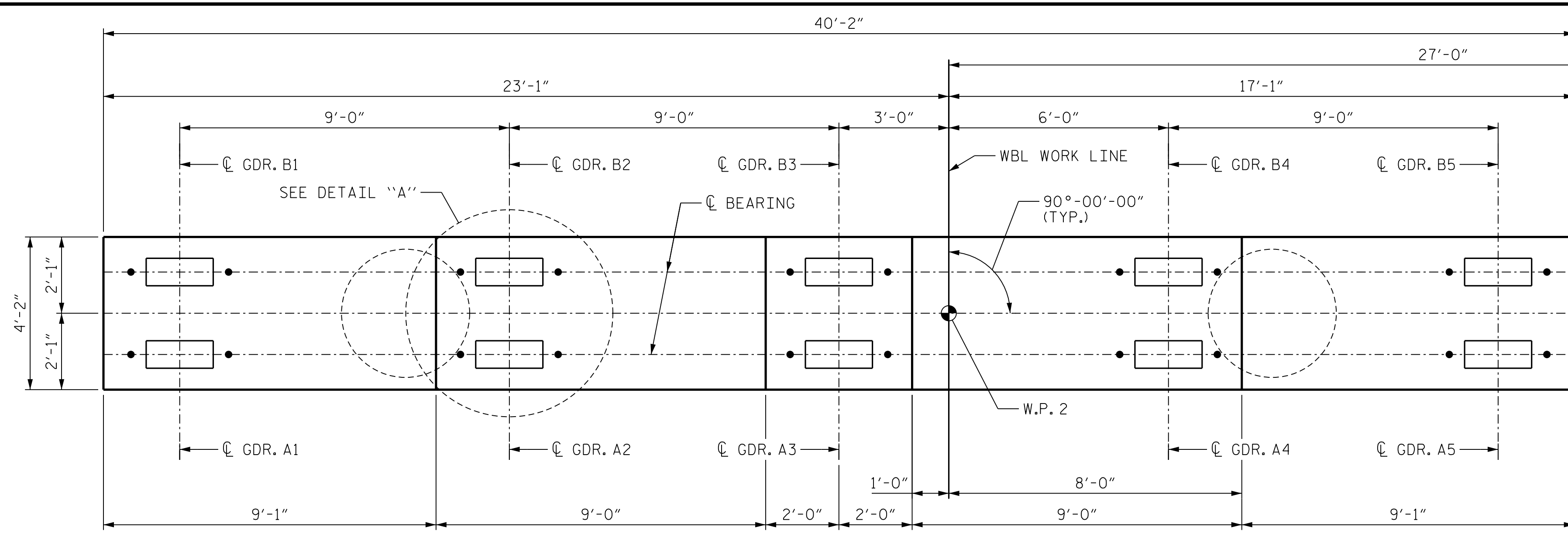
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

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

2/8/2018 10:44:00 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401\_049\_B5351\_SMU.EIC\_400242.dgn

DRAWN BY : B.E. LANNING DATE : 12/17  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18





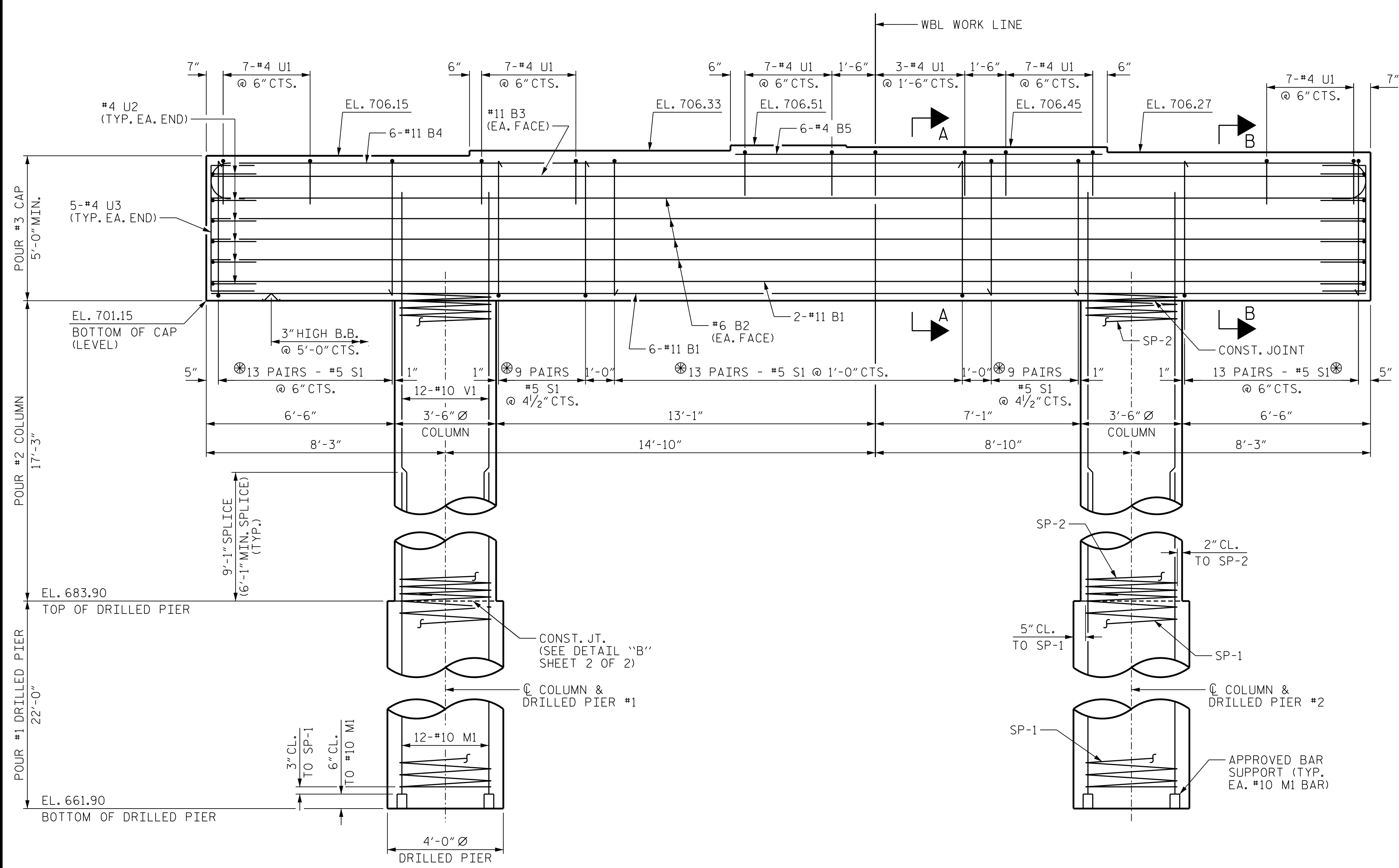
PLAN

SPAN B

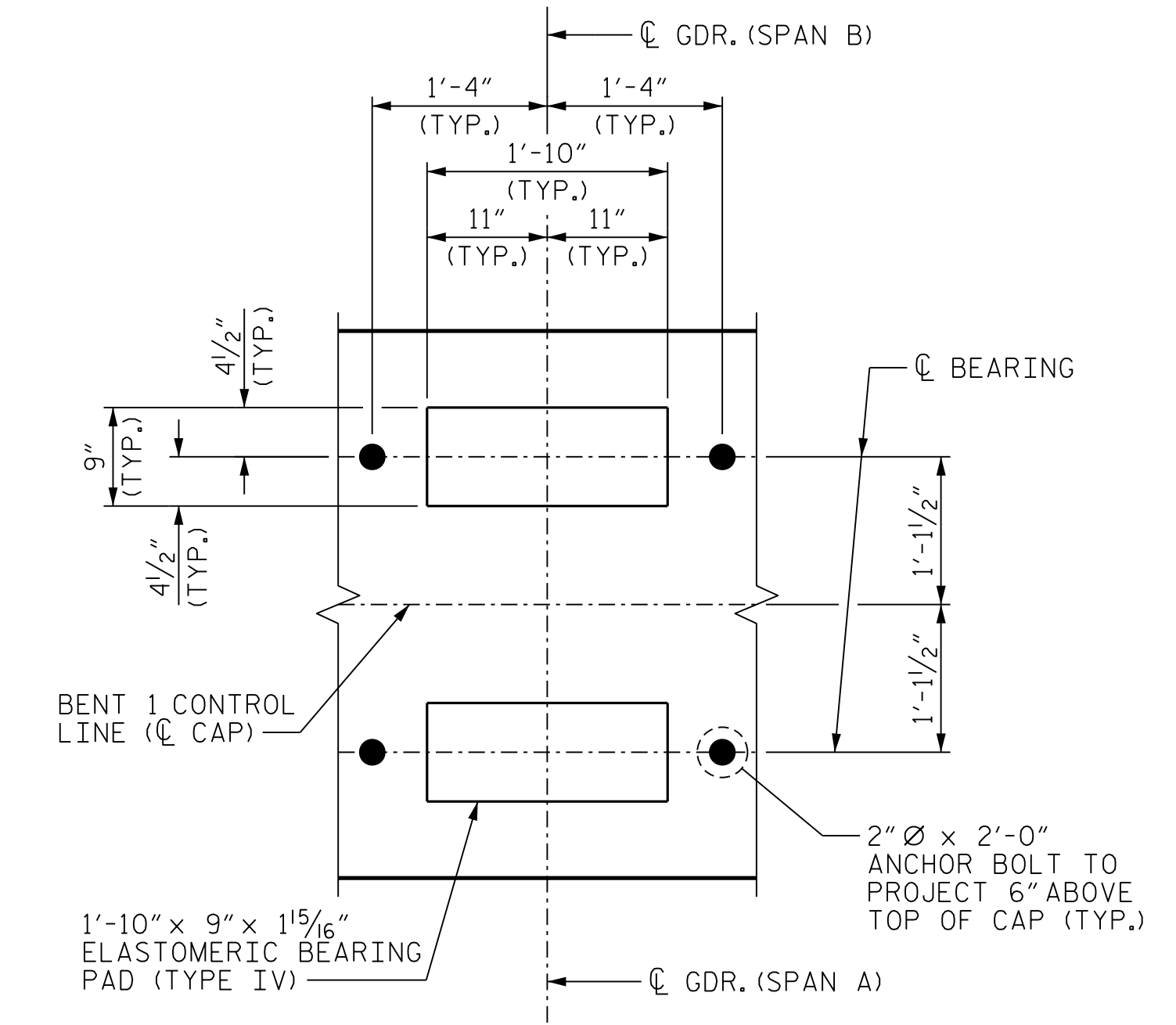
SPAN A

NOTES

- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- ALL STEEL IN THE DRILLED PIER IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIER IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- FOR DRILLED PIER & PERMANENT STEEL CASING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- FOR SECTION A-A, SECTION B-B, END OF CAP VIEW AND END ELEVATION, SEE SHEET 2 OF 2.
- ⊗ INVERT ALTERNATE PAIRS OF STIRRUPS.



ELEVATION

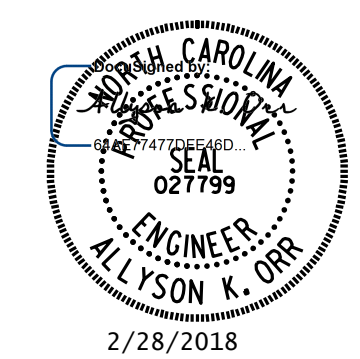


DETAIL "A"

(DIMENSIONS ARE TYPICAL AT EACH BEARING)

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 1  
 PLAN AND ELEVATION

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

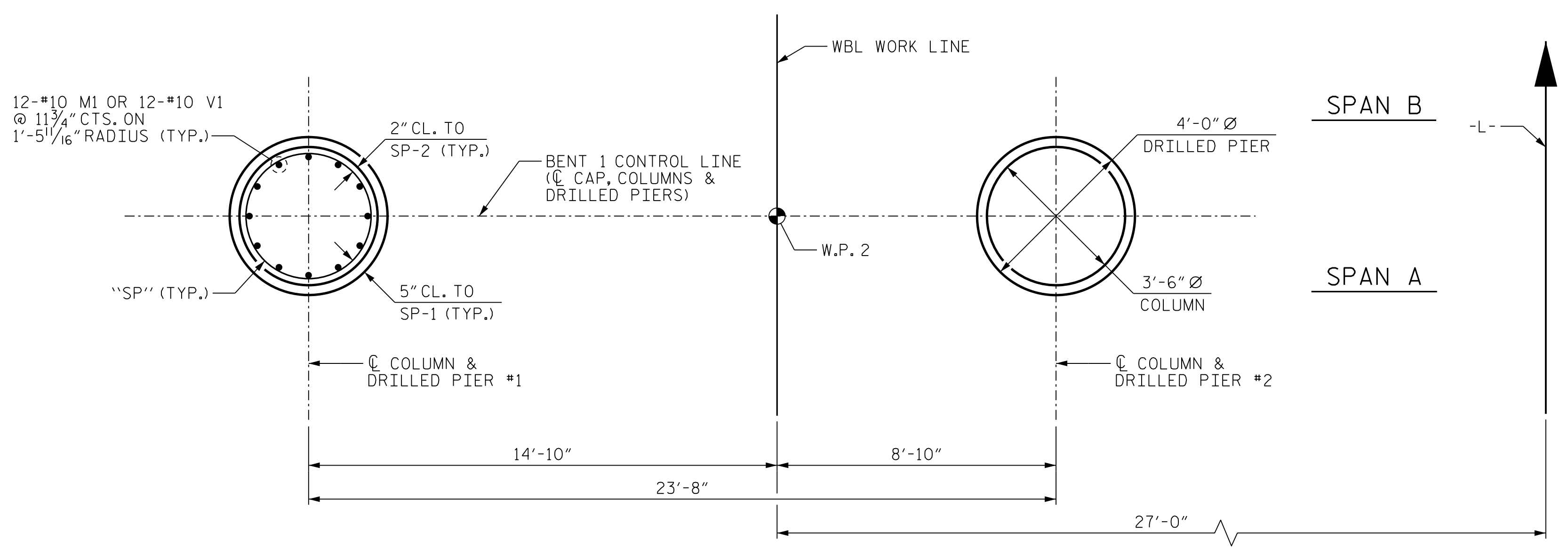
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26	
1			3			TOTAL SHEETS	
2			4			35	

DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

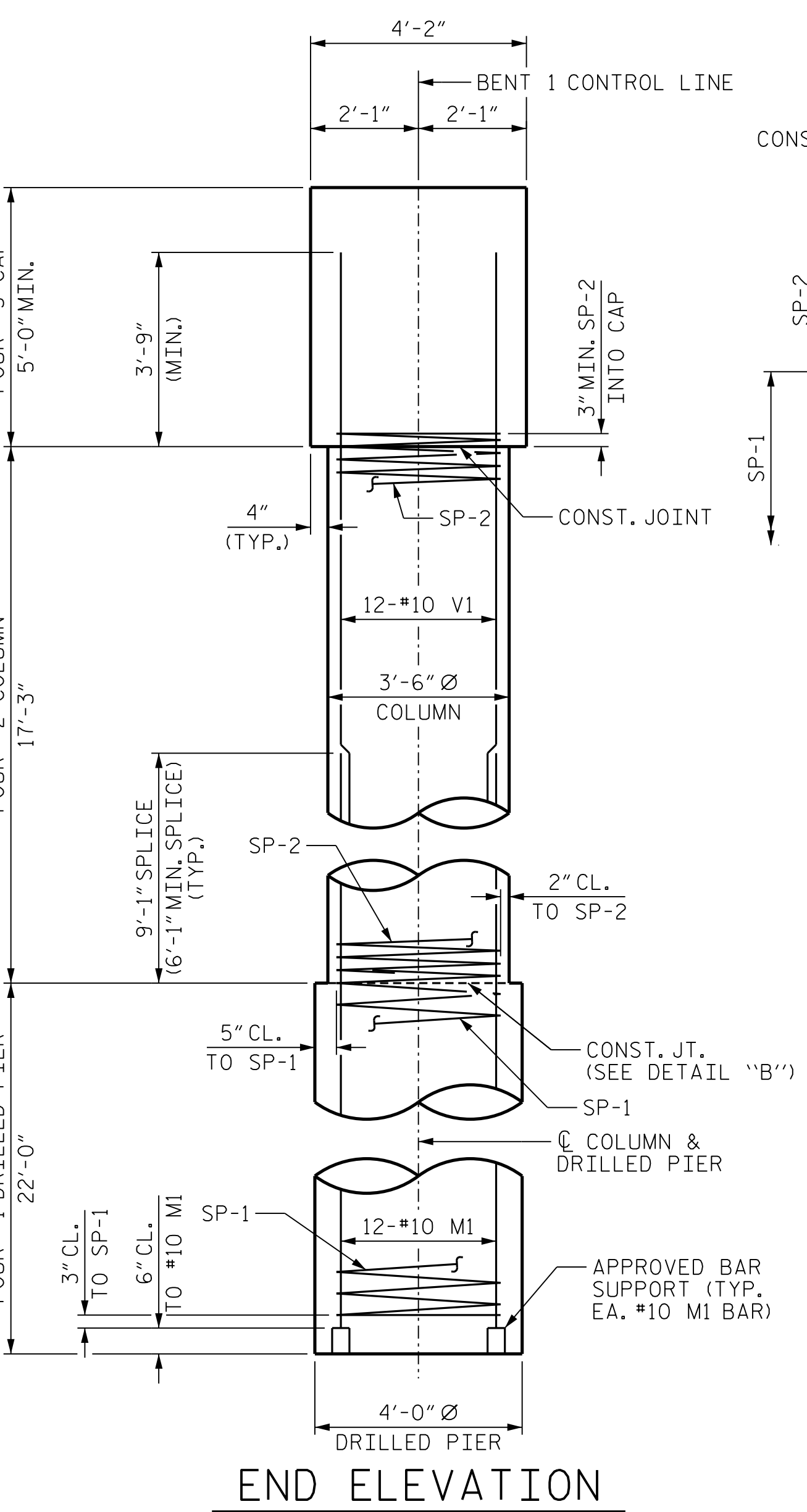
(DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED)

2/8/2018 10:44:02 AM User: blanning  
 File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401.051.B5351.SMU.BIA\_400242.dgn

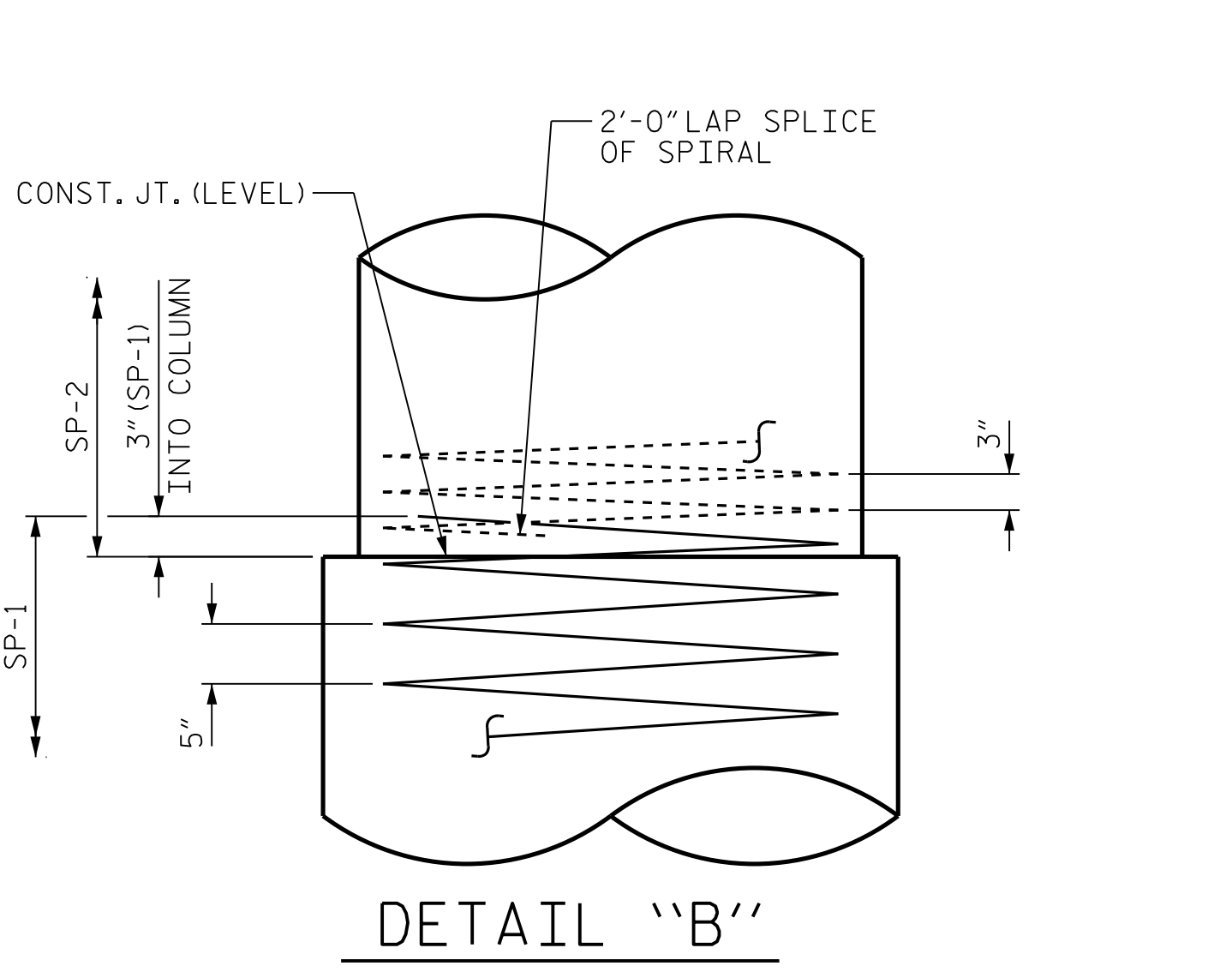
2/8/2018 10:44:04 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401.053.B5351.SMU.BIB\_400242.dgn



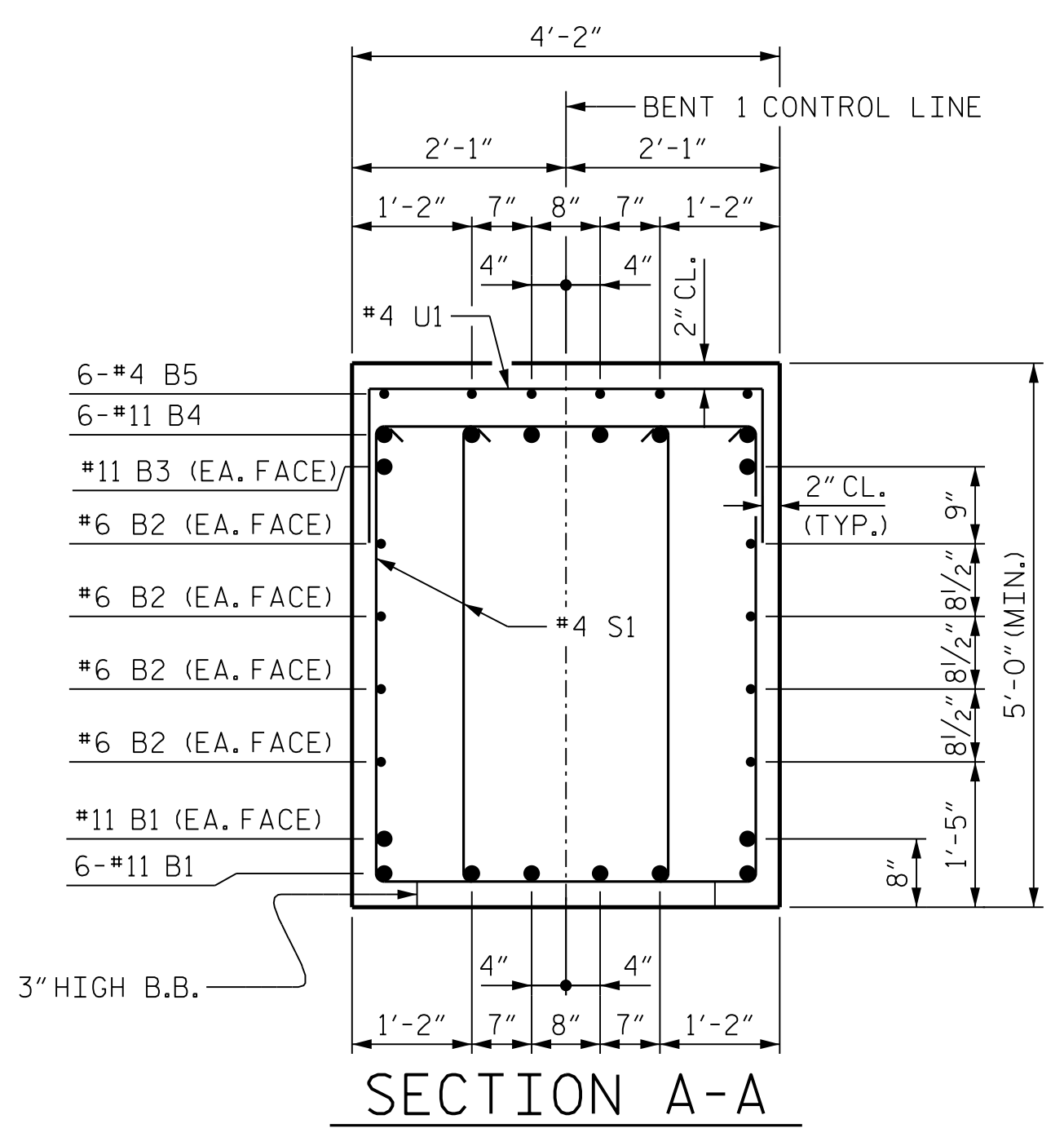
PLAN OF DRILLED PIERS AND COLUMNS



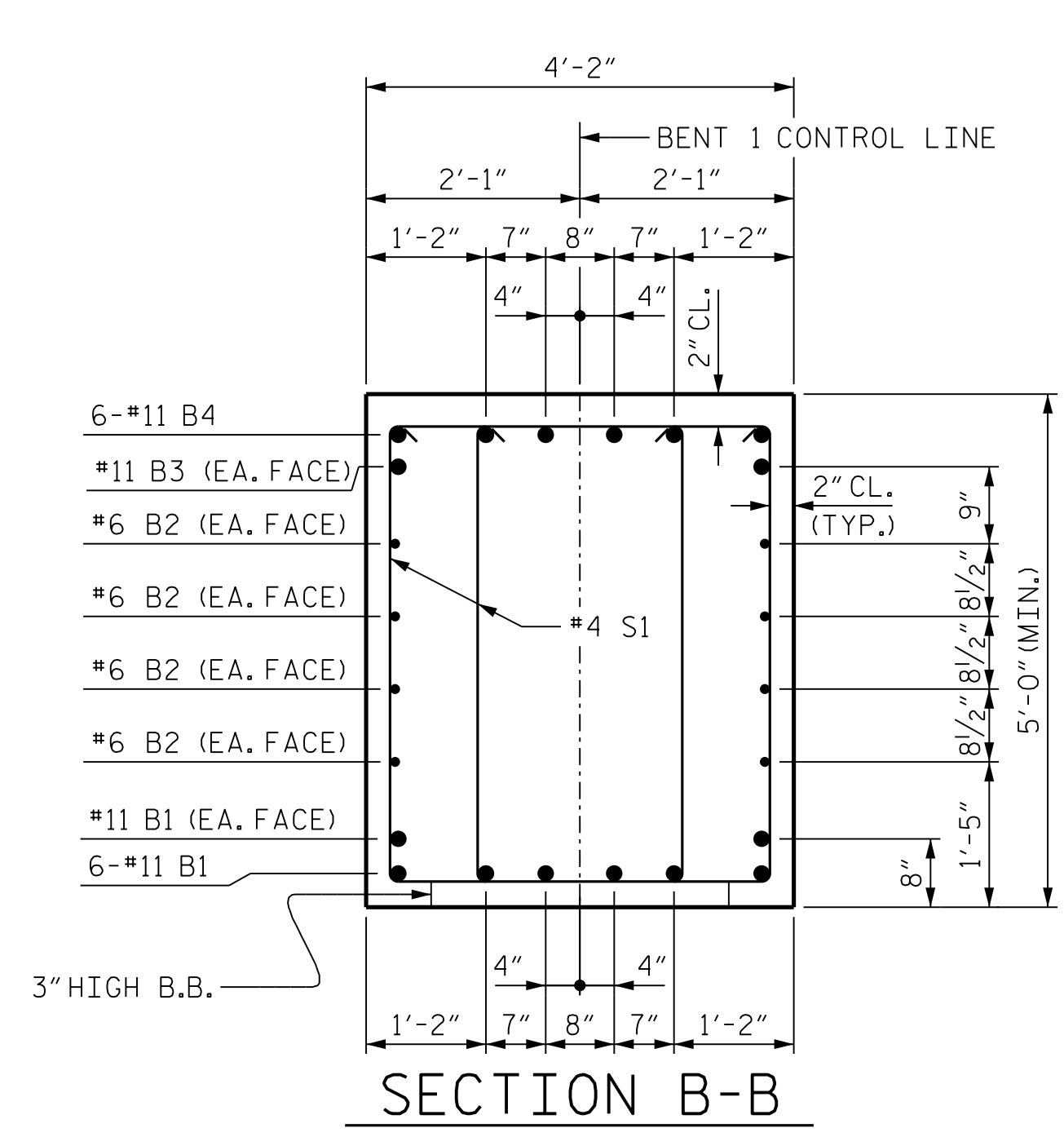
END ELEVATION



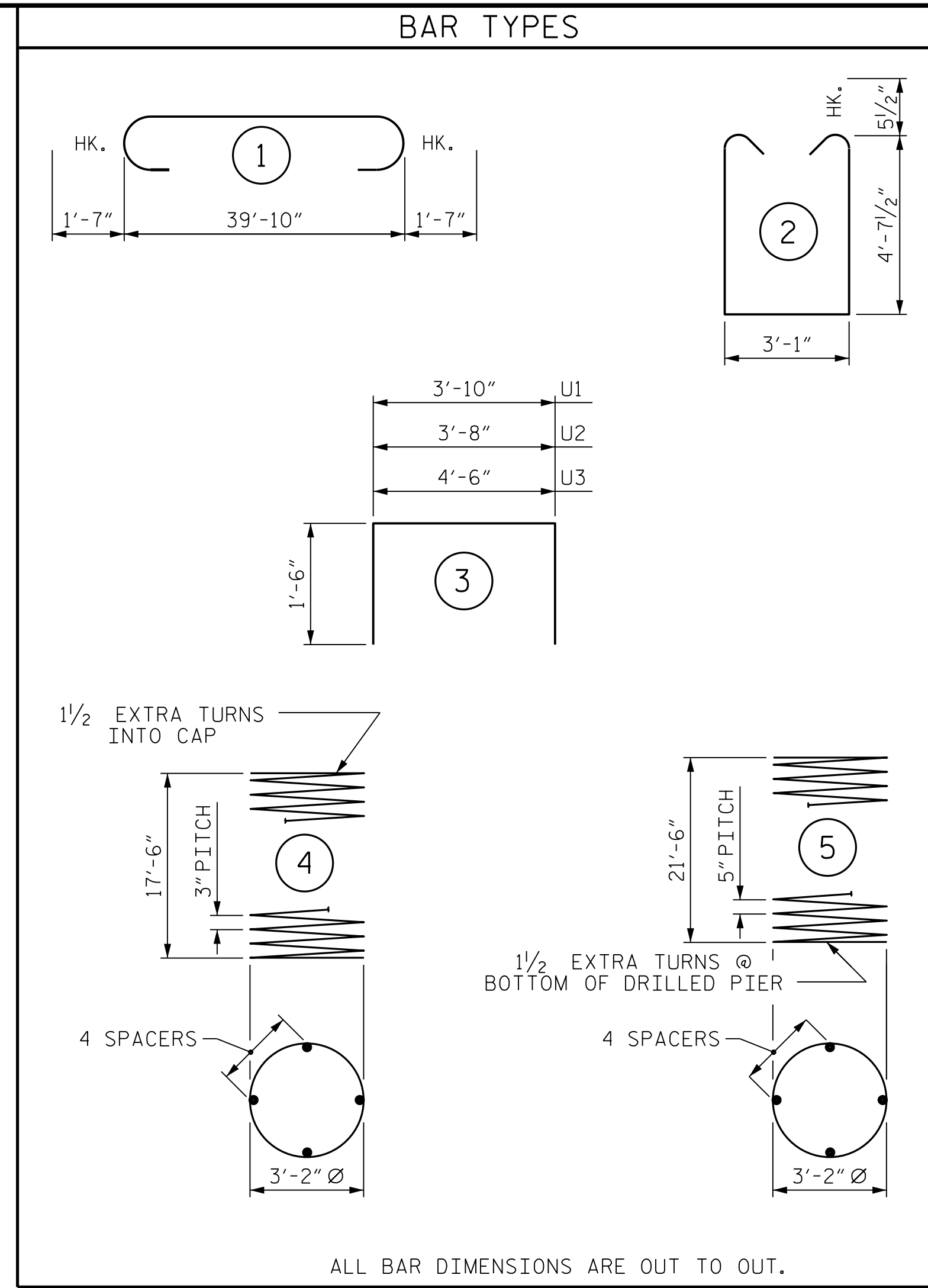
DETAIL "B"



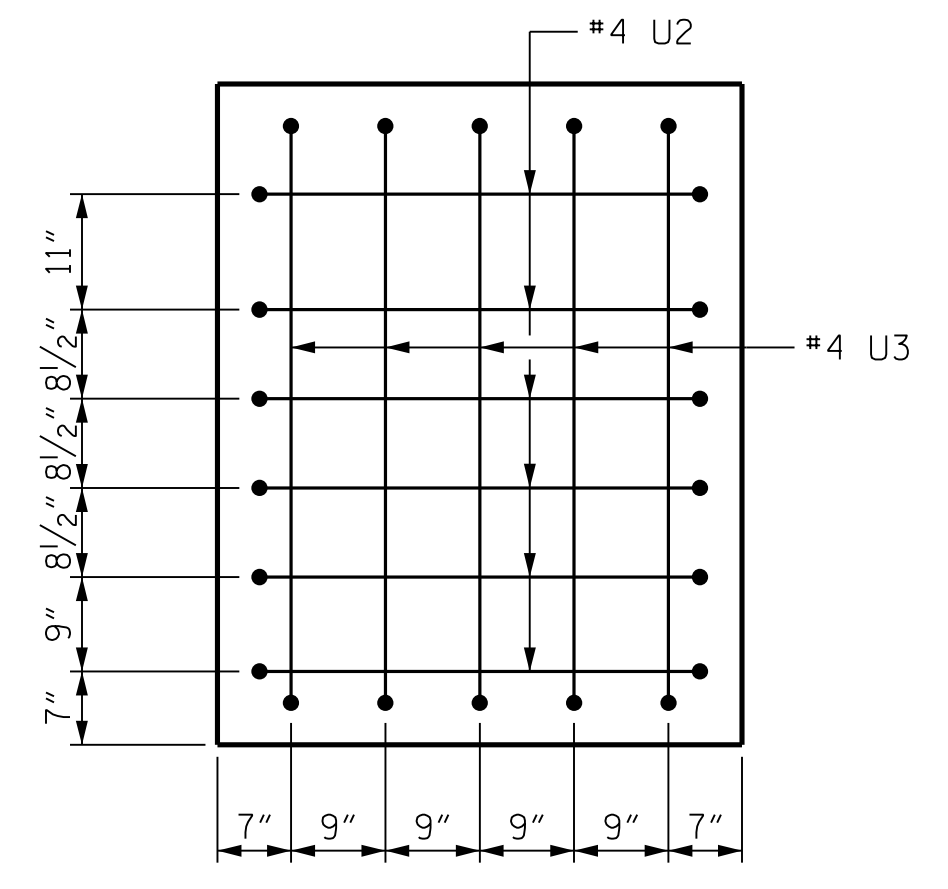
SECTION A-A



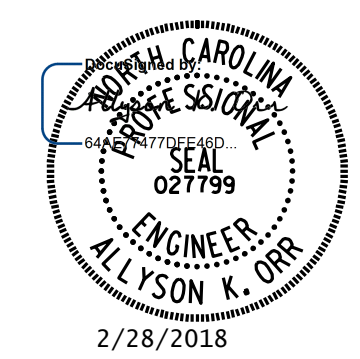
SECTION B-B



ALL BAR DIMENSIONS ARE OUT TO OUT.



END OF CAP VIEW  
(TYPICAL BOTH ENDS)



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

BILL OF MATERIAL					
BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#8	STR	39'-10"	1693	
B2	#6	STR	39'-10"	479	
B3	#11	STR	39'-10"	423	
B4	#11	1	43'-0"	1371	
B5	#4	STR	12'-8"	51	
M1	#10	STR	30'-7"	3158	
S1	#5	2	13'-3"	1575	
U1	#4	3	6'-10"	173	
U2	#4	3	6'-8"	53	
U3	#4	3	7'-6"	50	
V1	#10	STR	21'-0"	2169	
REINFORCING STEEL				11,195	LBS.
SPIRAL COLUMN REINFORCING STEEL 2,020 LBS.					
SP-1	2	**	5	519'-2"	1083
SP-2	2	*	4	701'-0"	937
CLASS A CONCRETE BREAKDOWN					
POUR #3 (CAP)				32.0	C.Y.
POUR #2 (COLUMN)				12.3	C.Y.
TOTAL				44.3	C.Y.
DRILLED PIERS					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				20.5	C.Y.
4'-0" Ø DRILLED PIER IN SOIL				28.0	LIN. FT.
4'-0" Ø DRILLED PIER NOT IN SOIL				16.0	LIN. FT.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER				30.0	LIN. FT.
CSL TUBES				188.0	LIN. FT.

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1 DETAILS AND BILL OF MATERIAL (WBL)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

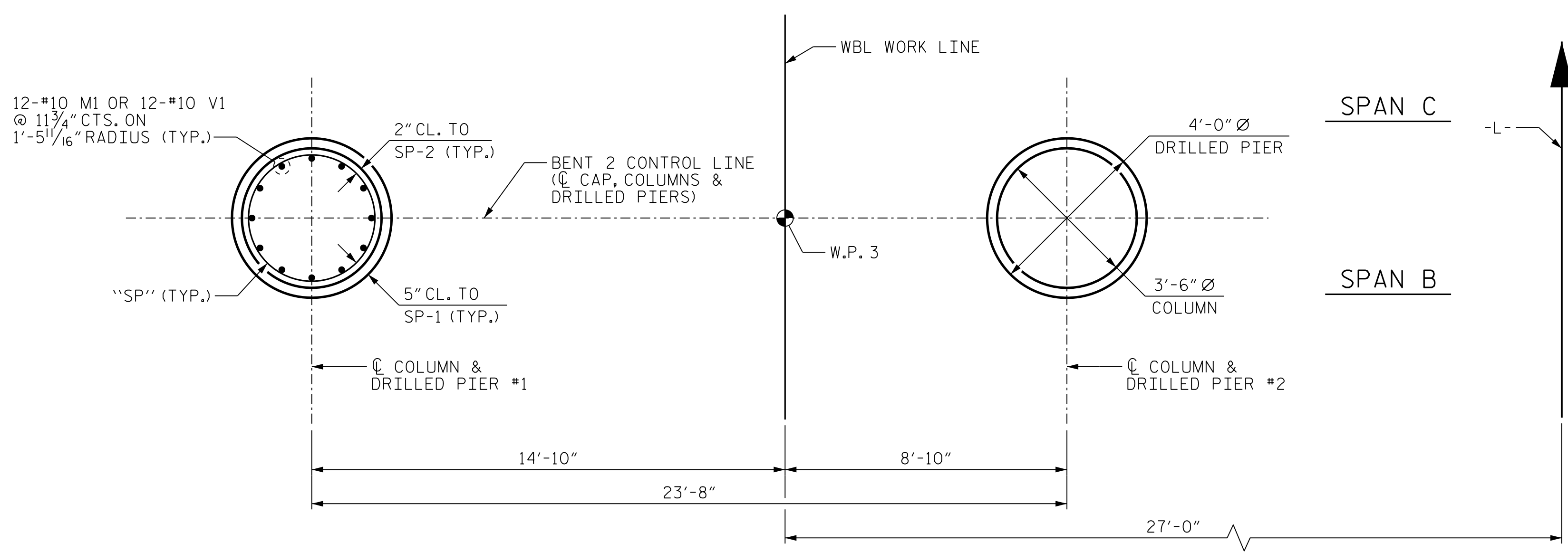
DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

SHEET NO.  
**S1-27**  
 TOTAL SHEETS  
**35**

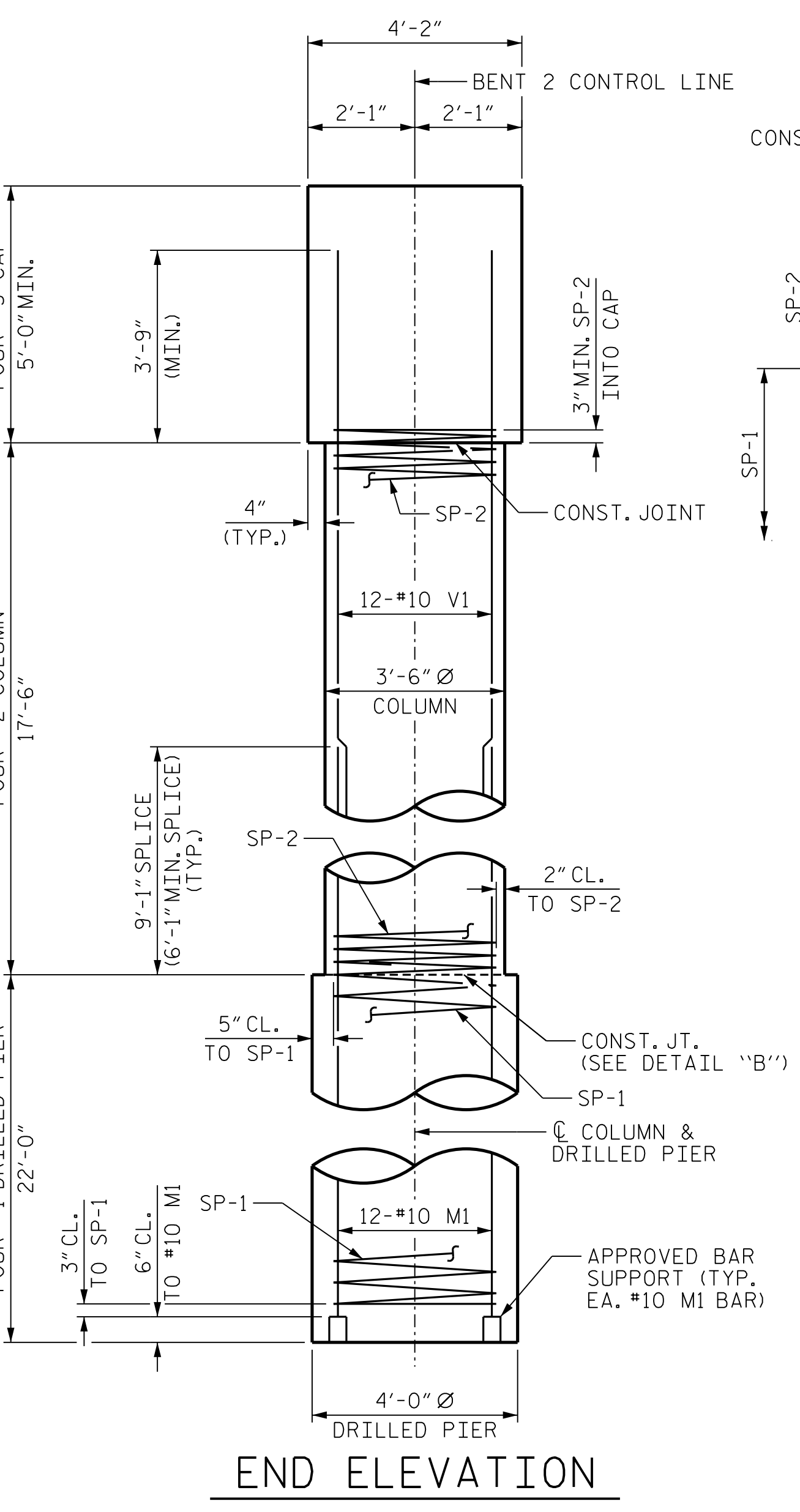




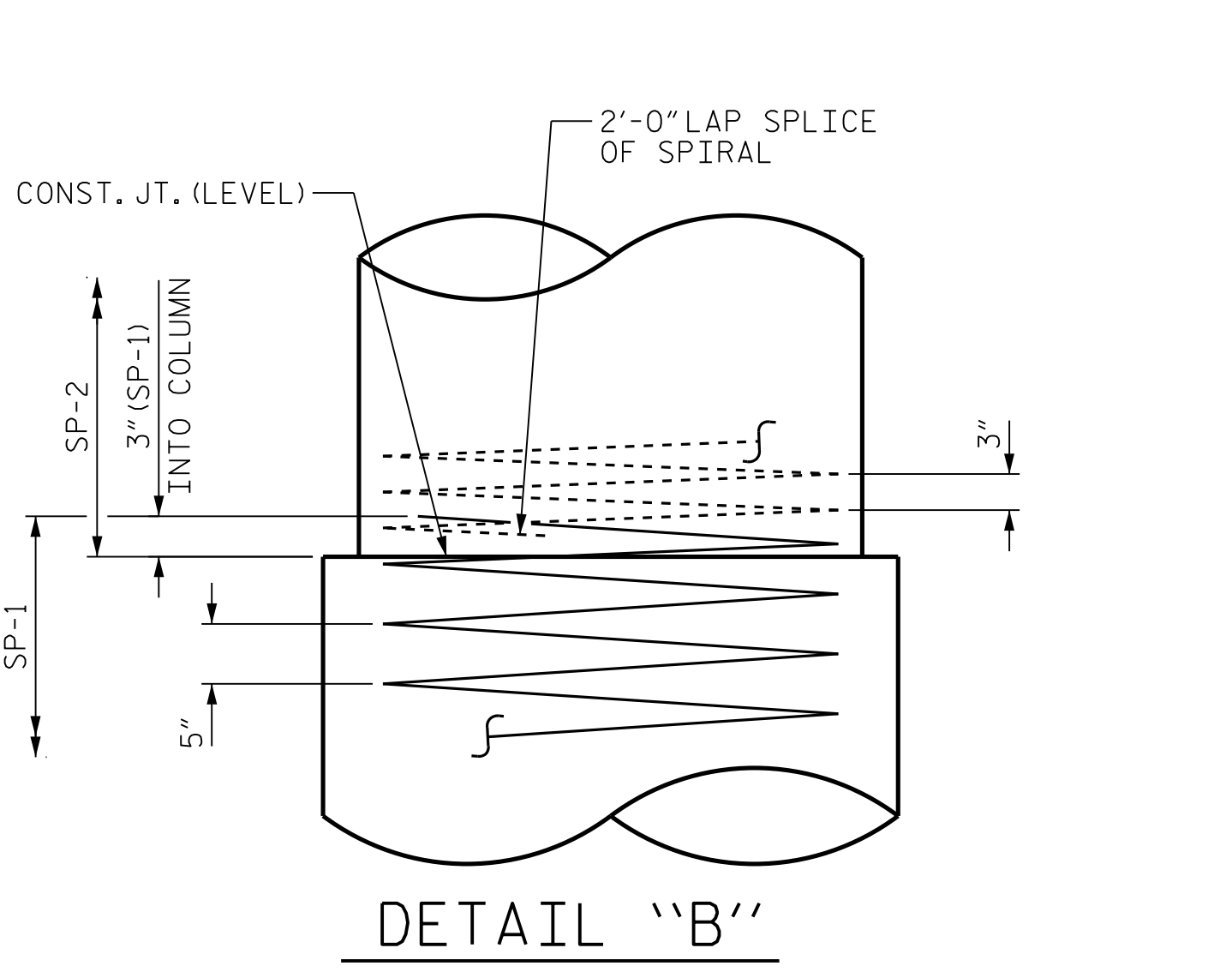
2/8/2018 10:44:08 AM  
 User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\LEFT LANE (WBL)\A401\_057\_B5351\_SMU\_B2B\_400242.dgn



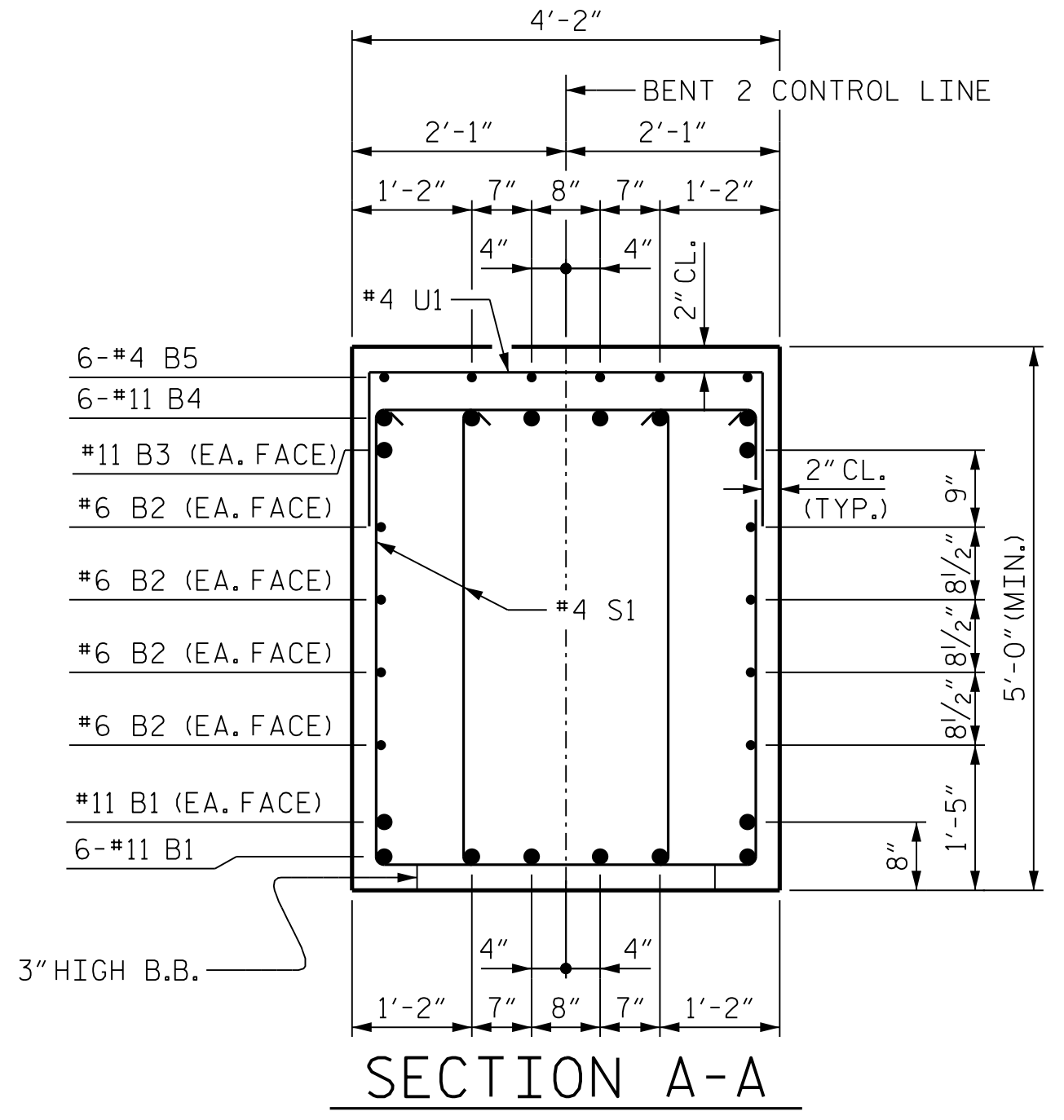
PLAN OF DRILLED PIERS AND COLUMNS



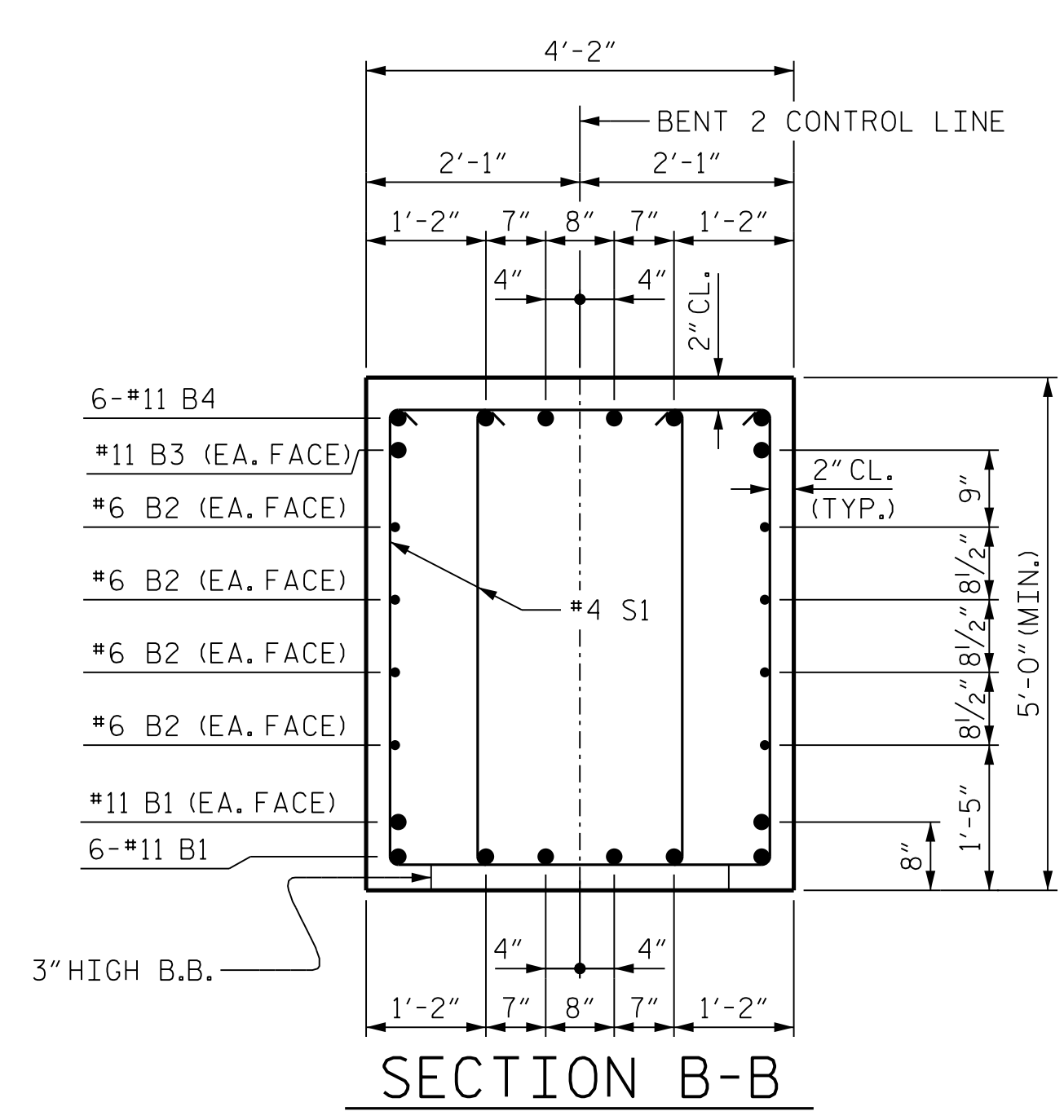
END ELEVATION



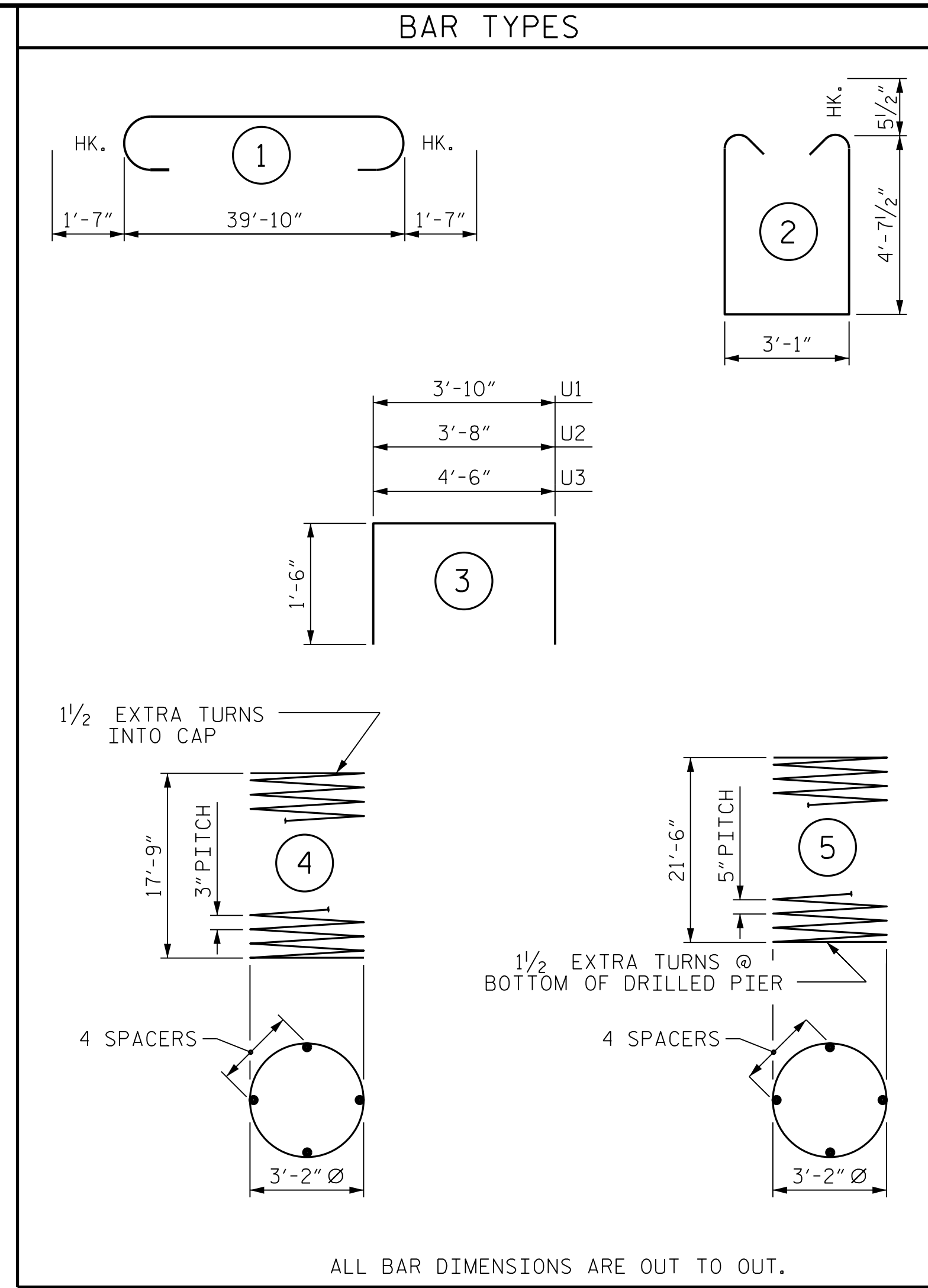
DETAIL "B"



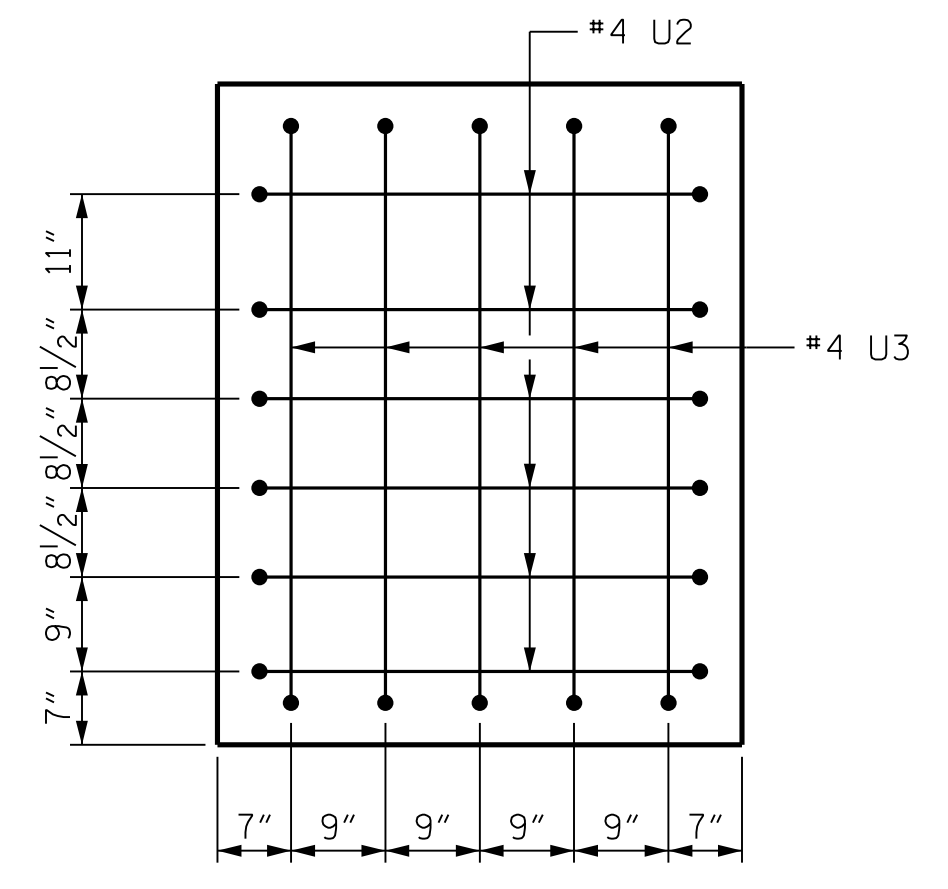
SECTION A-A



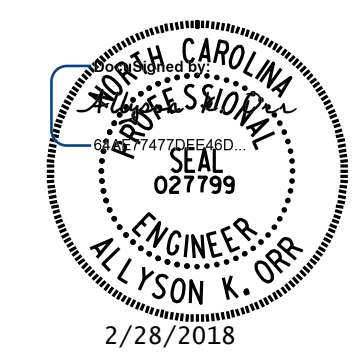
SECTION B-B



ALL BAR DIMENSIONS ARE OUT TO OUT.



END OF CAP VIEW  
(TYPICAL BOTH ENDS)



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

BILL OF MATERIAL					
BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#8	#11 STR	39'-10"	1693	
B2	#8	#6 STR	39'-10"	479	
B3	2	#11 STR	39'-10"	423	
B4	6	#11	43'-0"	1371	
B5	6	#4 STR	12'-8"	51	
M1	24	#10 STR	30'-7"	3158	
S1	114	#5	2	13'-3"	1575
U1	38	#4	3	6'-10"	173
U2	12	#4	3	6'-8"	53
U3	10	#4	3	7'-6"	50
V1	24	#10 STR	21'-3"	21695	
REINFORCING STEEL				11,221 LBS.	
SPIRAL COLUMN REINFORCING STEEL 2,033 LBS.					
SP-1	2	**	5	519'-2"	1083
SP-2	2	*	4	701'-9"	950
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE BREAKDOWN					
POUR #3 (CAP)				32.0 C.Y.	
POUR #2 (COLUMN)				12.5 C.Y.	
TOTAL				44.5 C.Y.	
DRILLED PIERS					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				20.5 C.Y.	
4'-0" Ø DRILLED PIER IN SOIL				30.0 LIN. FT.	
4'-0" Ø DRILLED PIER NOT IN SOIL				14.0 LIN. FT.	
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER				32.0 LIN. FT.	
CSL TUBES				188.0 LIN. FT.	

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**BENT 2**  
 DETAILS AND  
 BILL OF MATERIAL  
 (WBL)

DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

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

SHEET NO.  
**S1-29**  
 TOTAL SHEETS  
**35**



**NOTES**

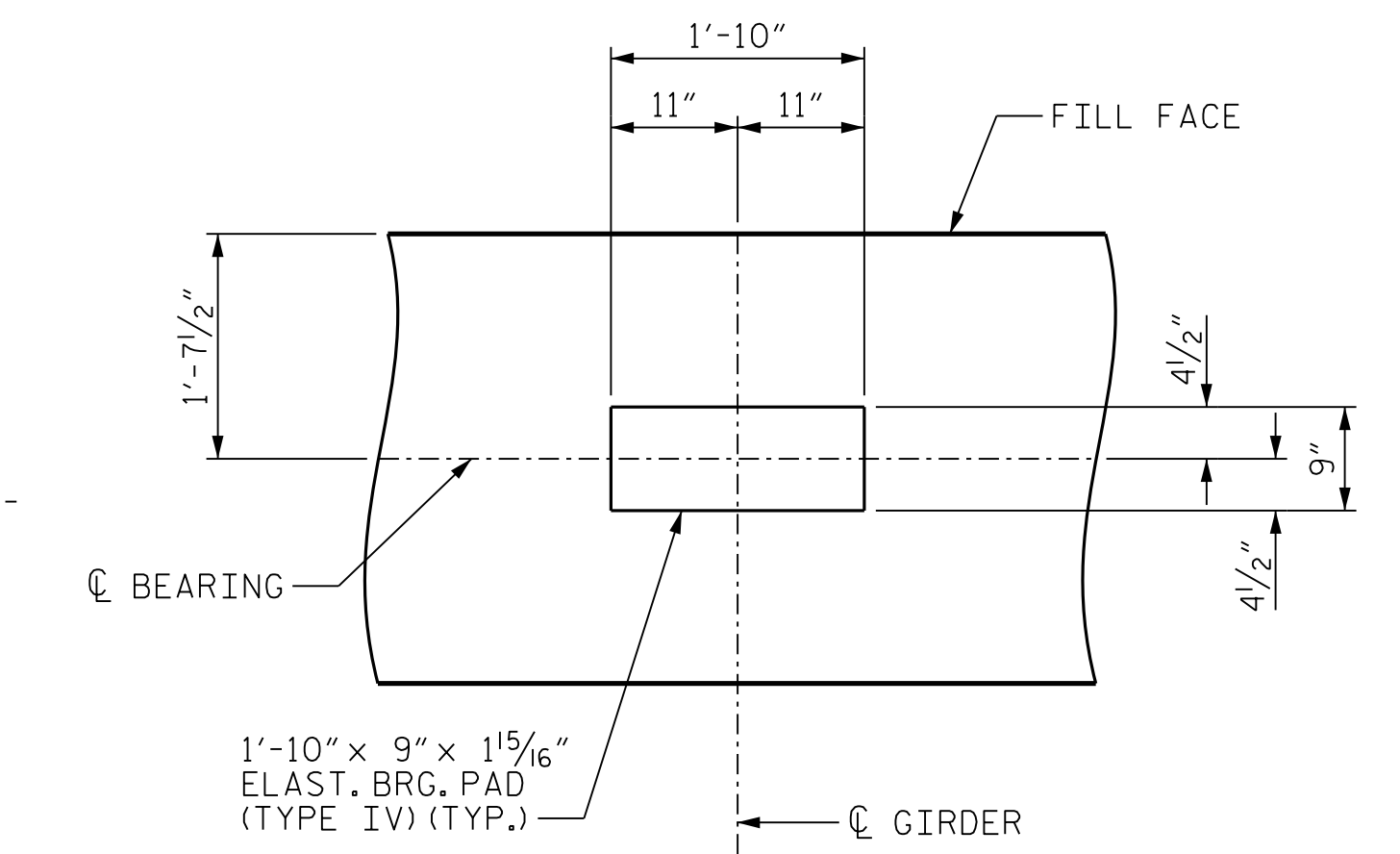
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE END AS INDICATED, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTION A-A, SEE SHEET 3 OF 3.

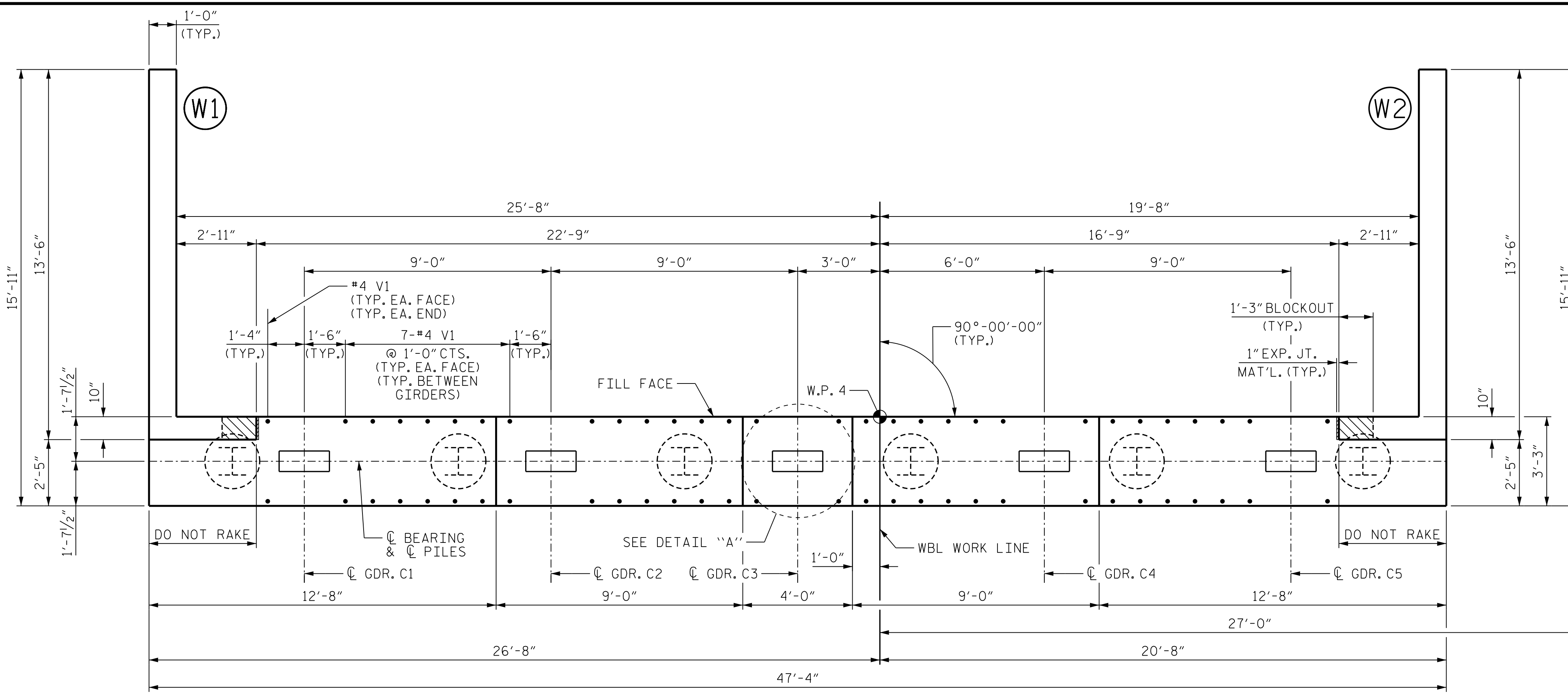
FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

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

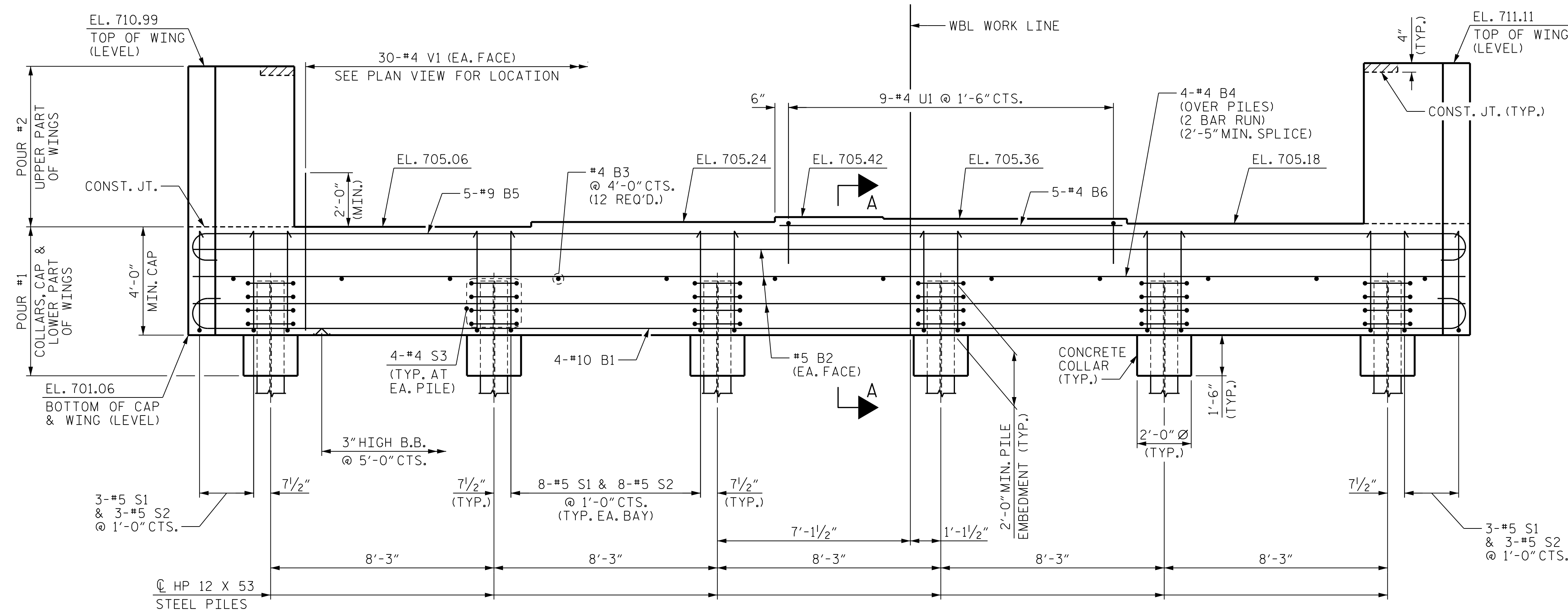
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.



**DETAIL "A"**



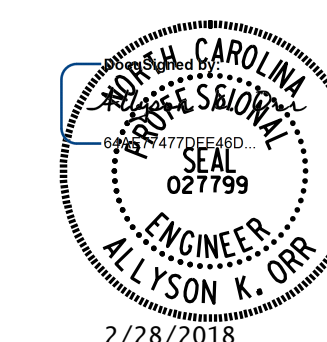
**PLAN**



**ELEVATION**

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 PLAN AND ELEVATION

(WBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

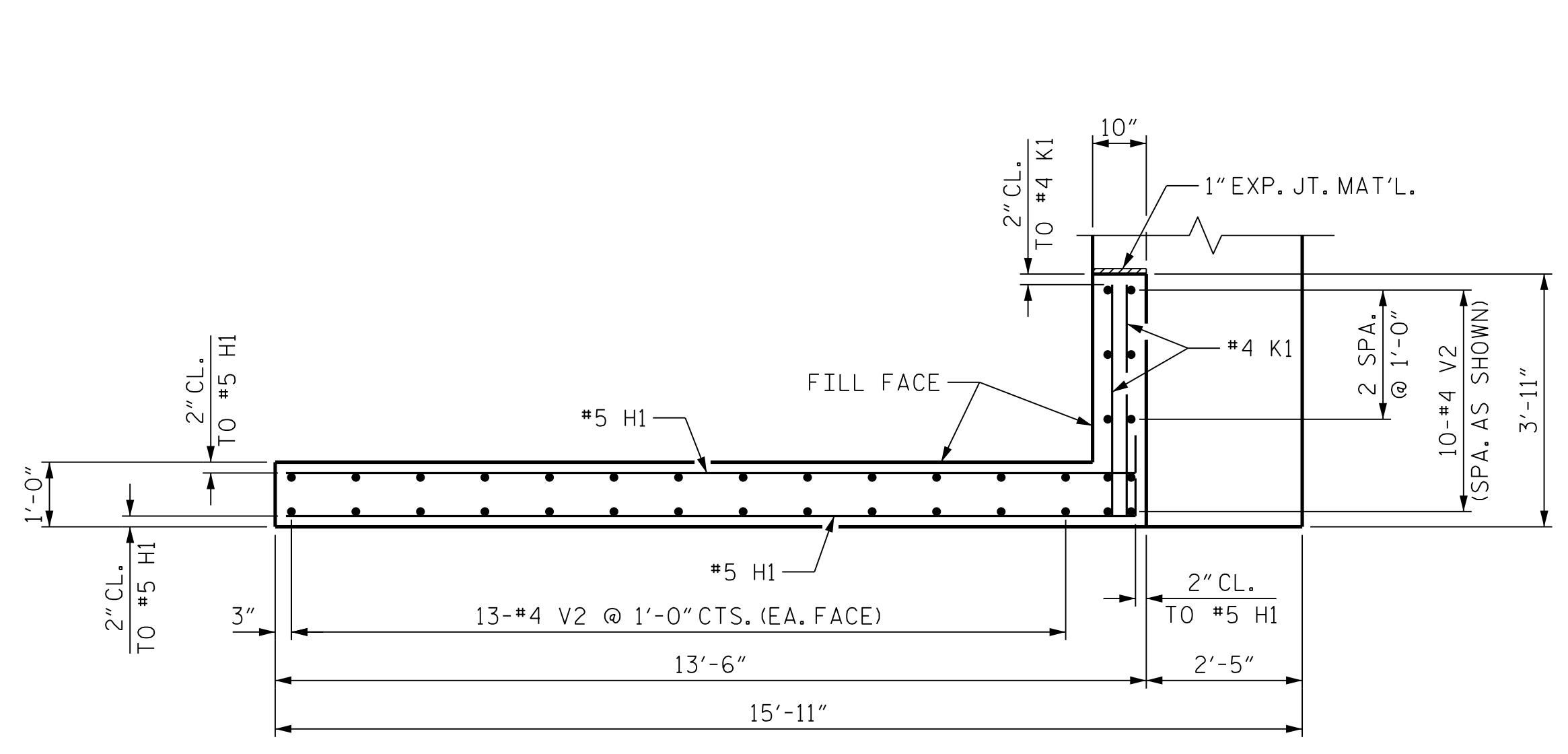
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

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

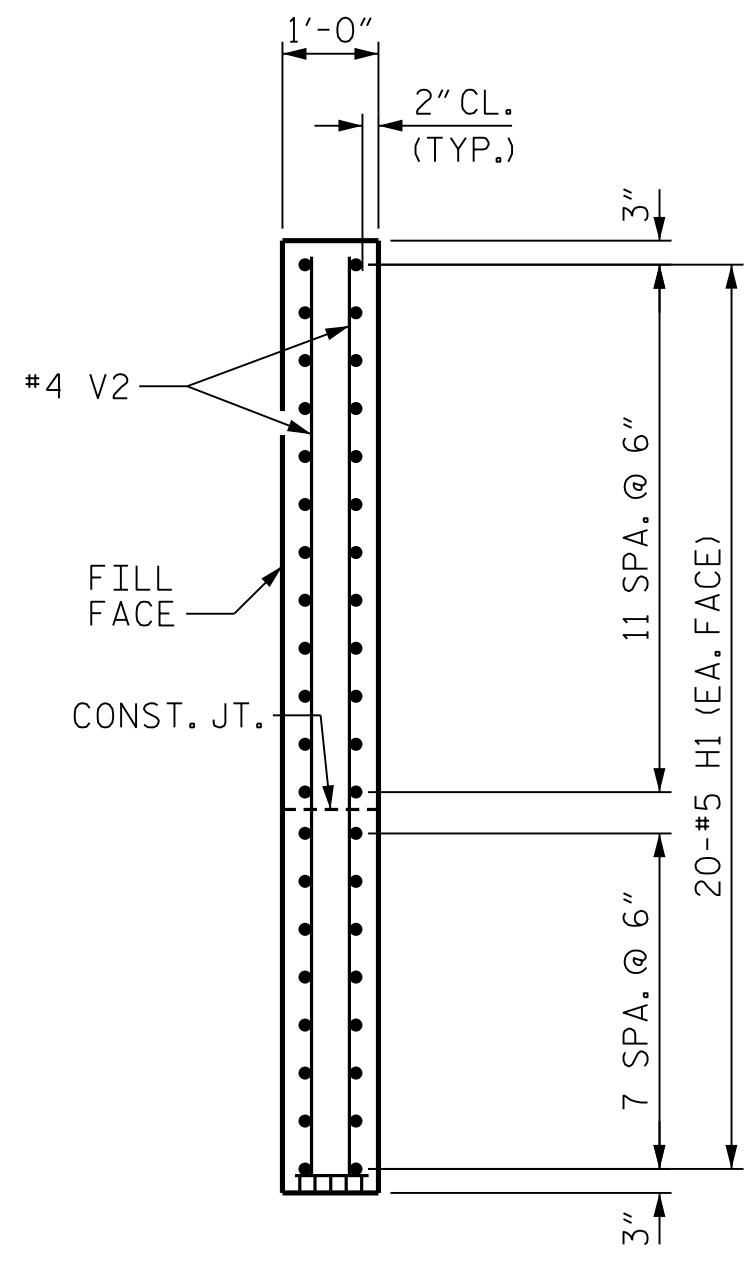
DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

2/8/2018 10:44:11 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\A401.059.B5351.SMU.E2A\_400242.dgn

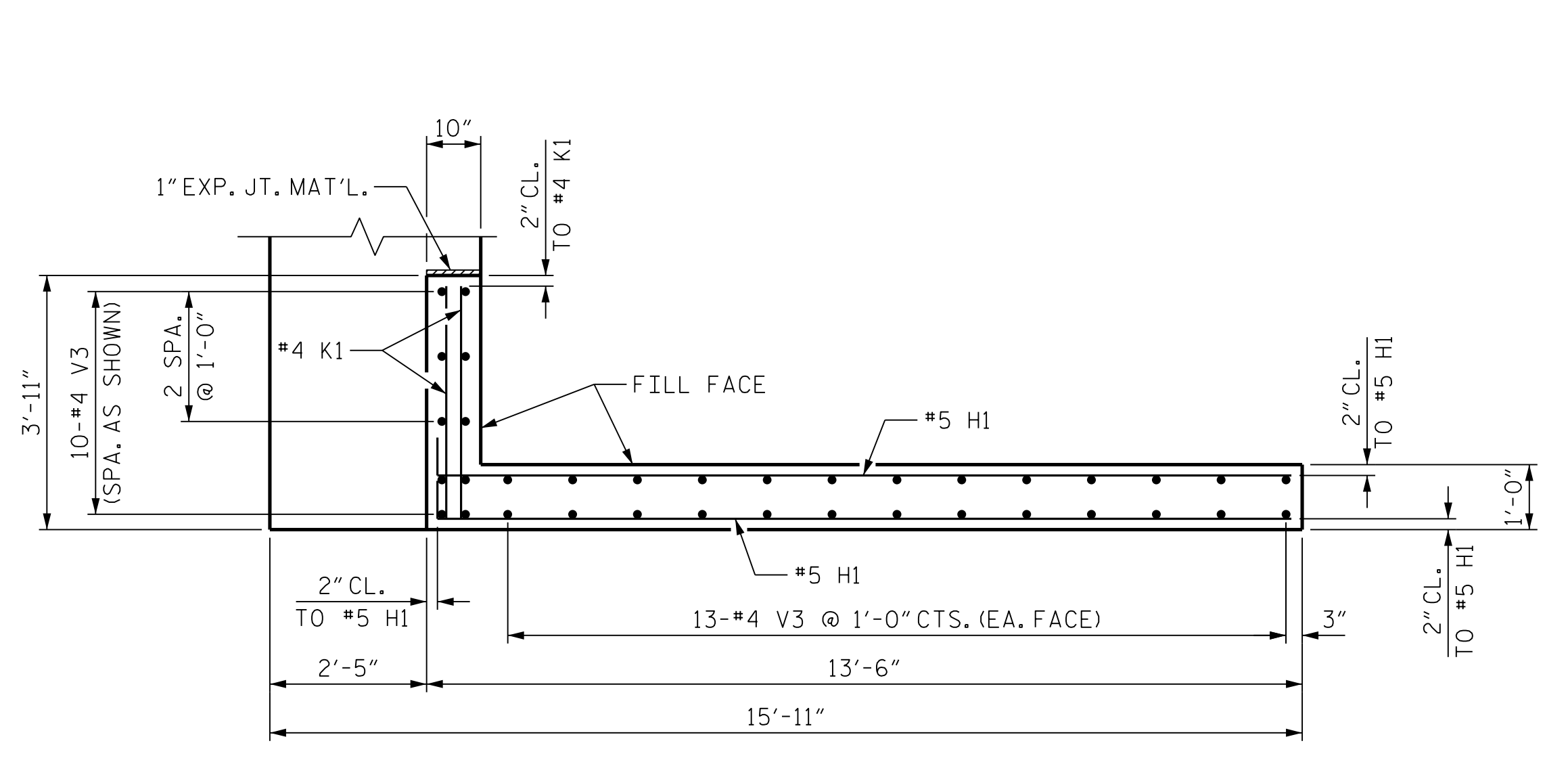
2/8/2018 10:44:13 AM User: blanning  
 Filenamer: P:\NC Bridges\W16001.35 - B-5351 Guilford Co\B-5351\Structures\LEFT LANE (WBL)\401\_061.B5351.SWU.E2B\_400242.dgn



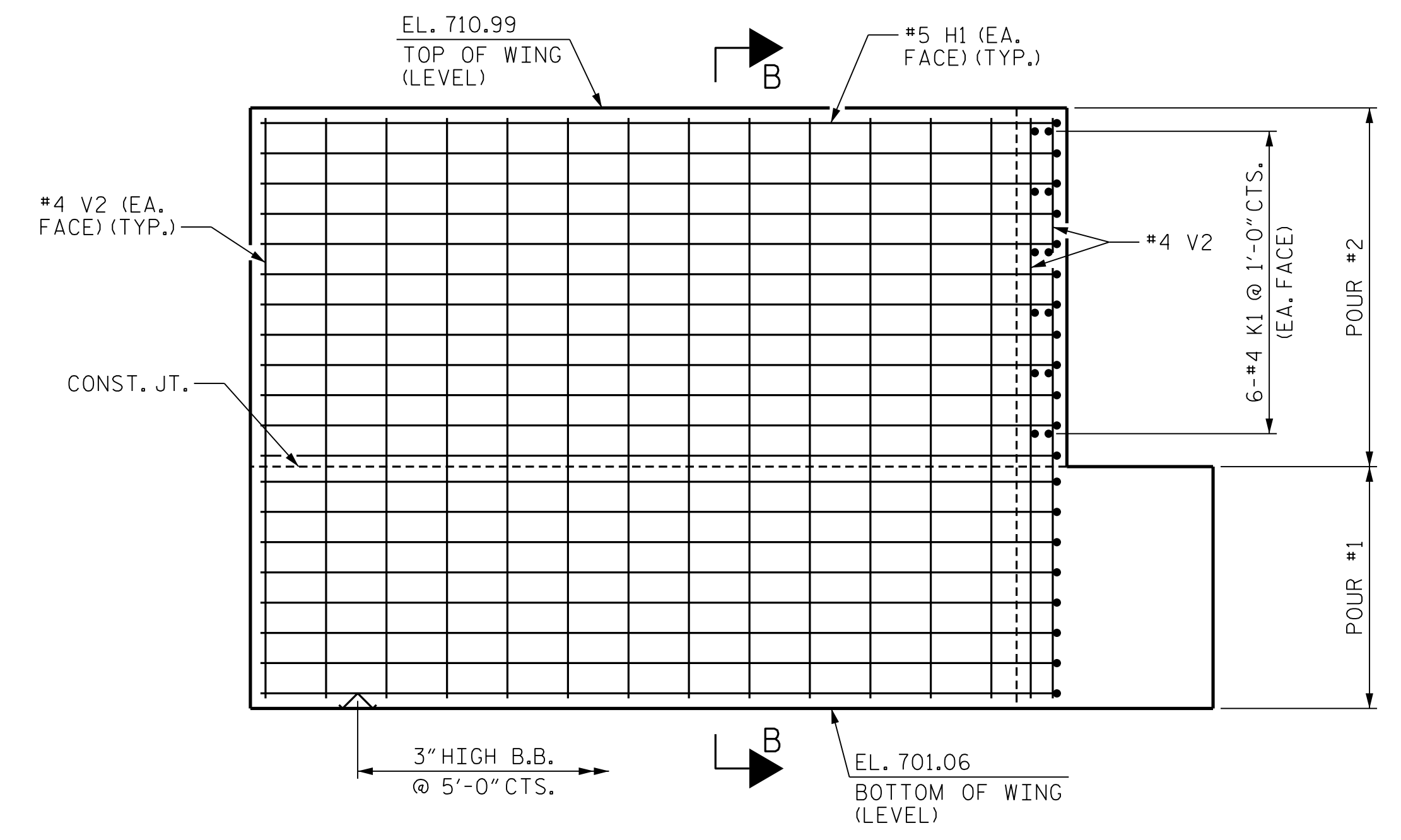
PLAN OF WING (W1)



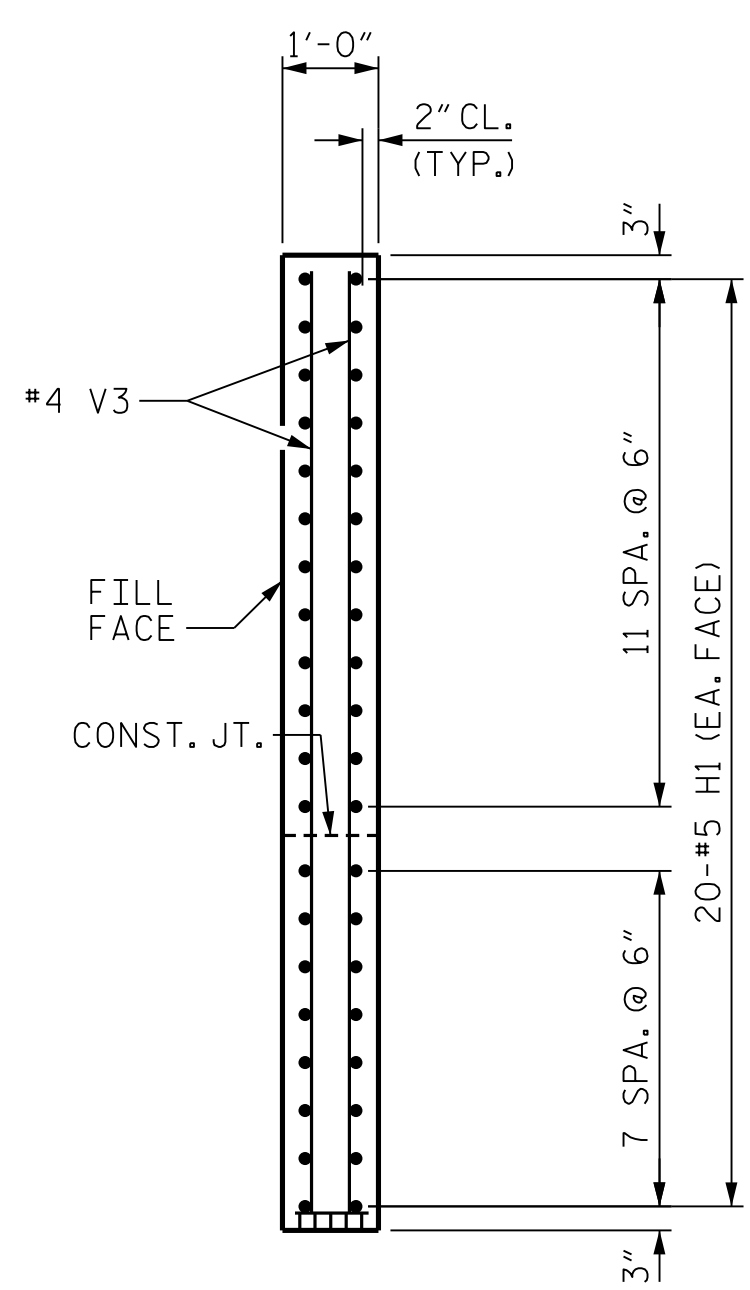
SECTION B-B



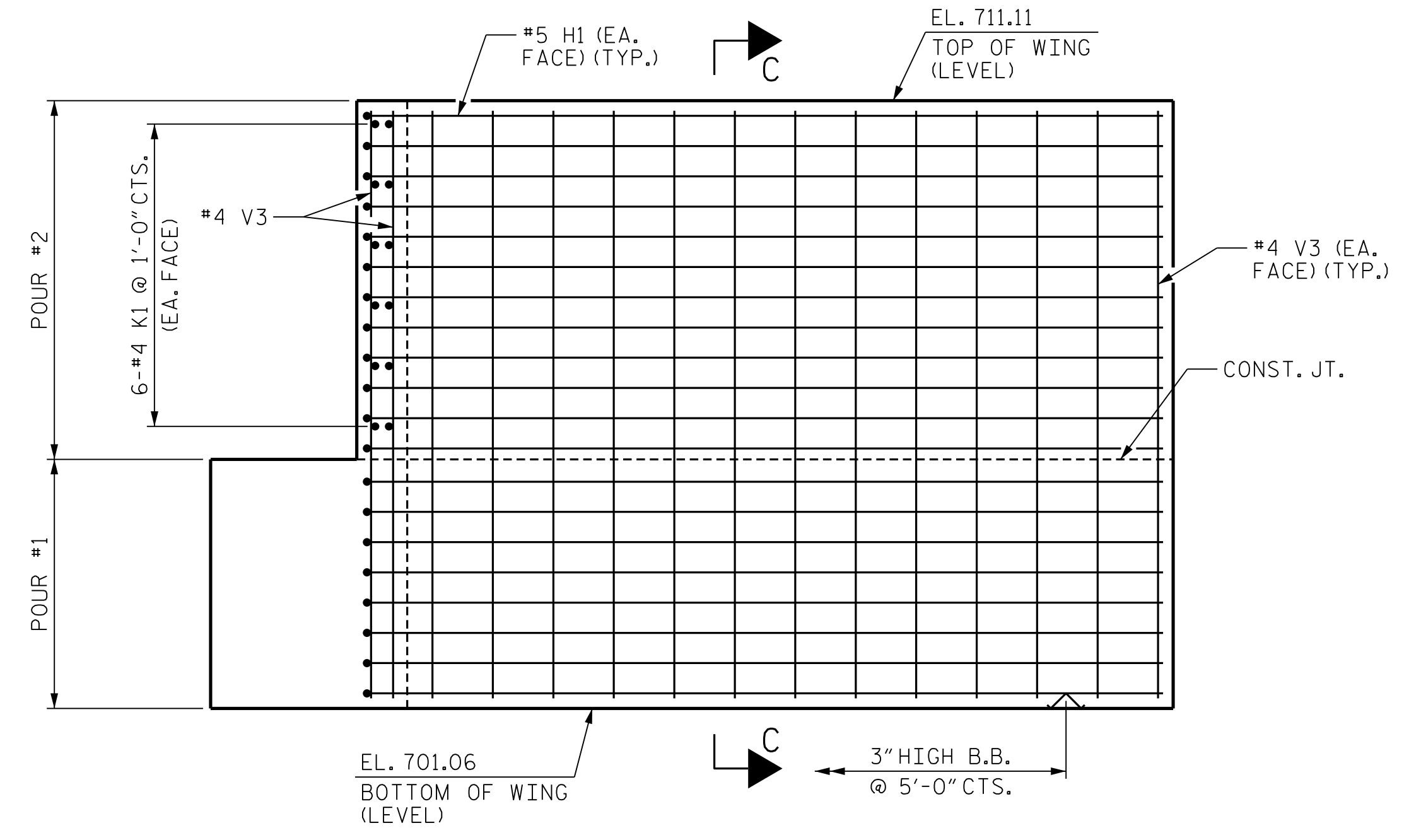
PLAN OF WING (W2)



ELEVATION OF WING (W1)



SECTION C-C



ELEVATION OF WING (W2)

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 3



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 WING DETAILS  
 (WBL)

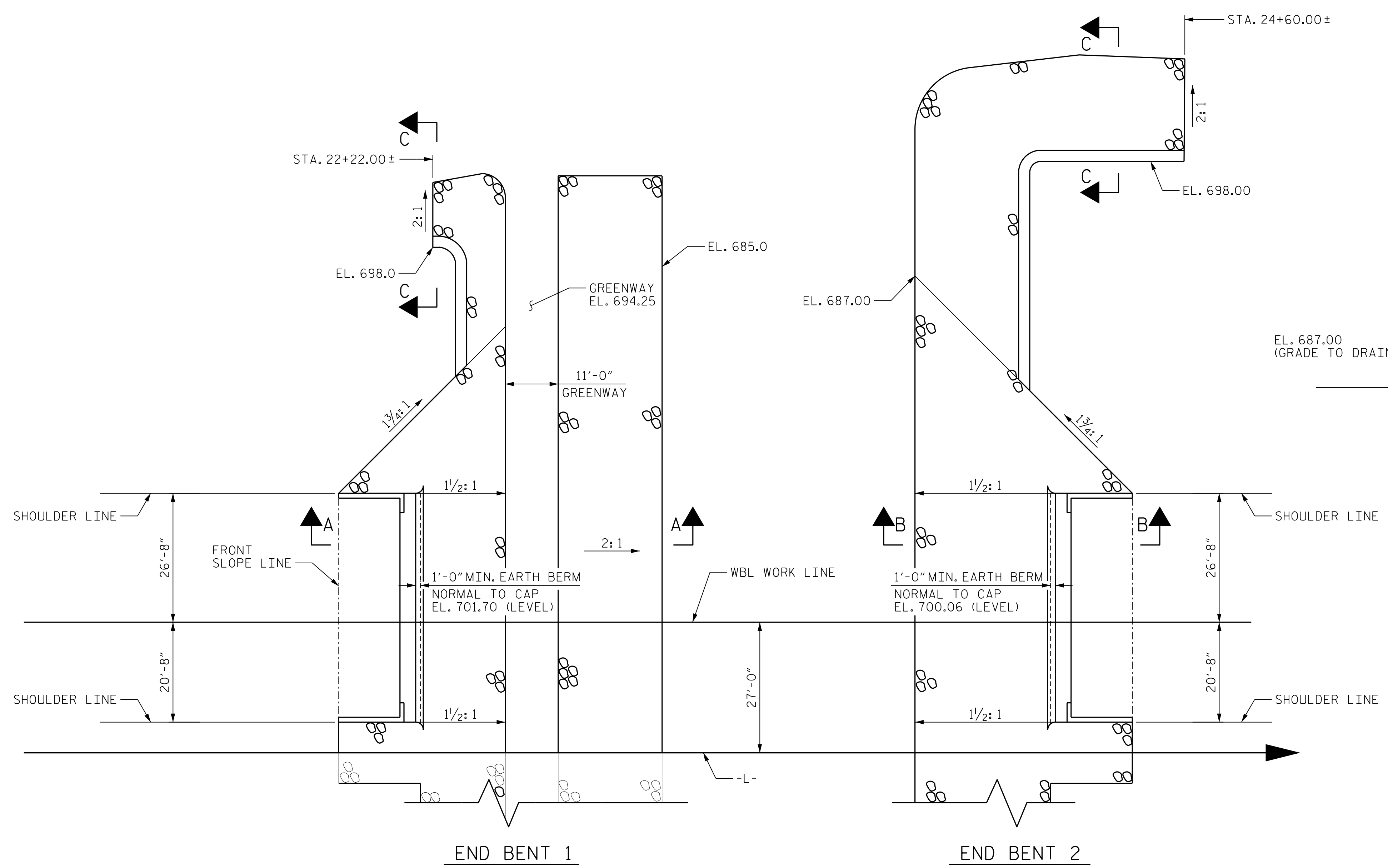
REVISIONS						SHEET NO. <b>SI-31</b>
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS <b>35</b>
2			4			

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

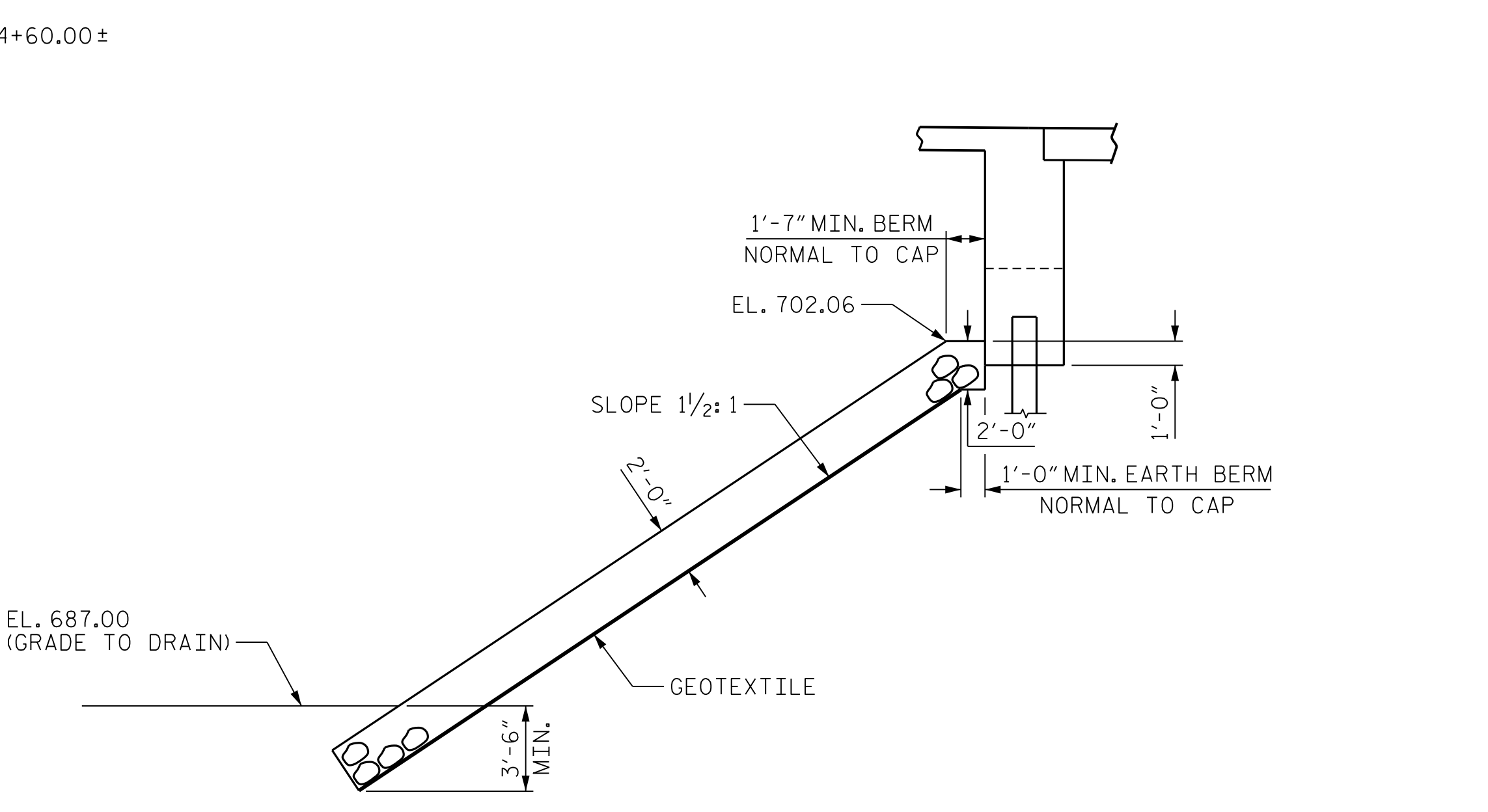




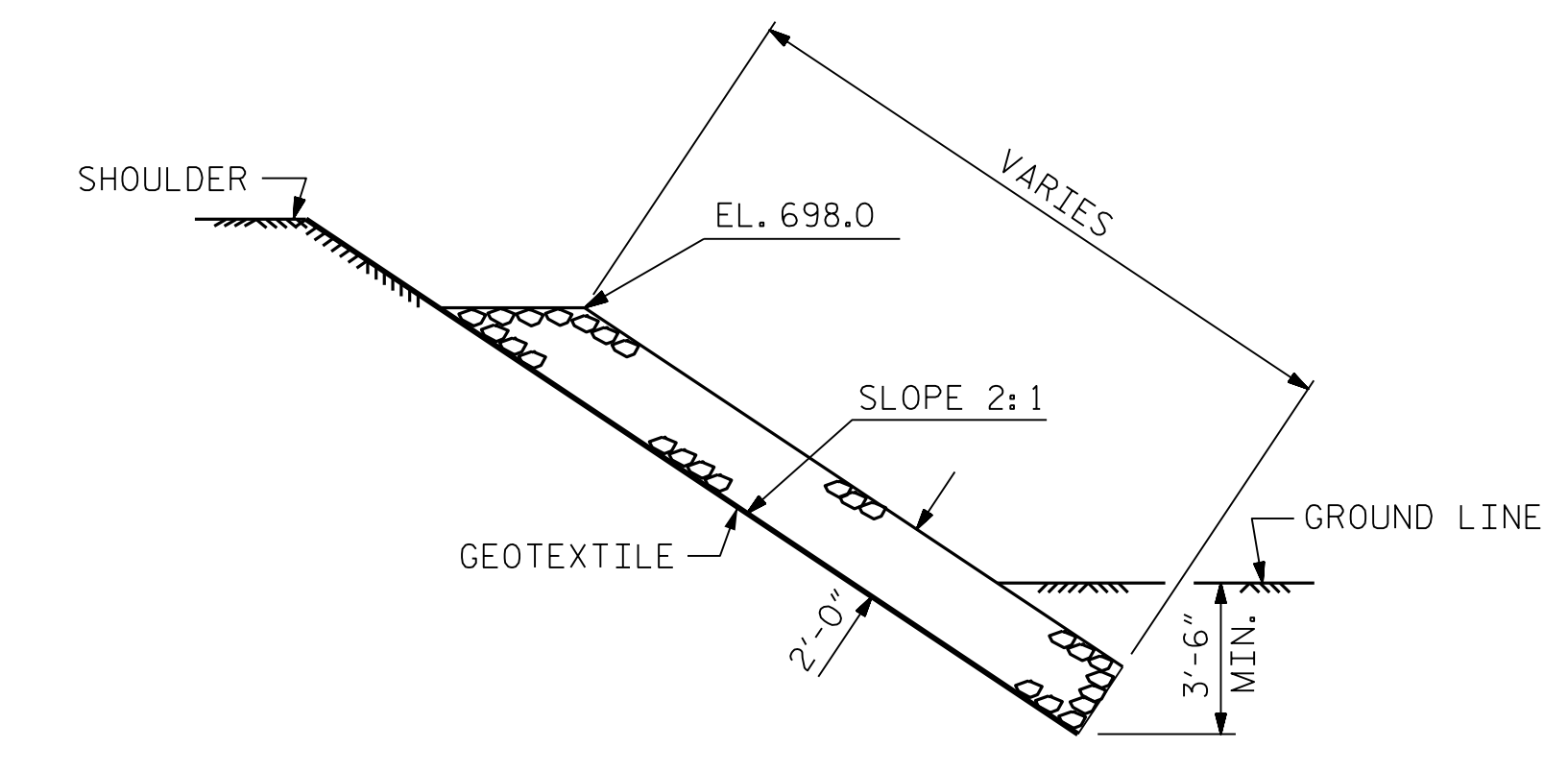
2/8/2018 10:44:17 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\LEFT LANE (WBL)\401\_065\_B5351\_SMU\_RRL\_400242.dgn



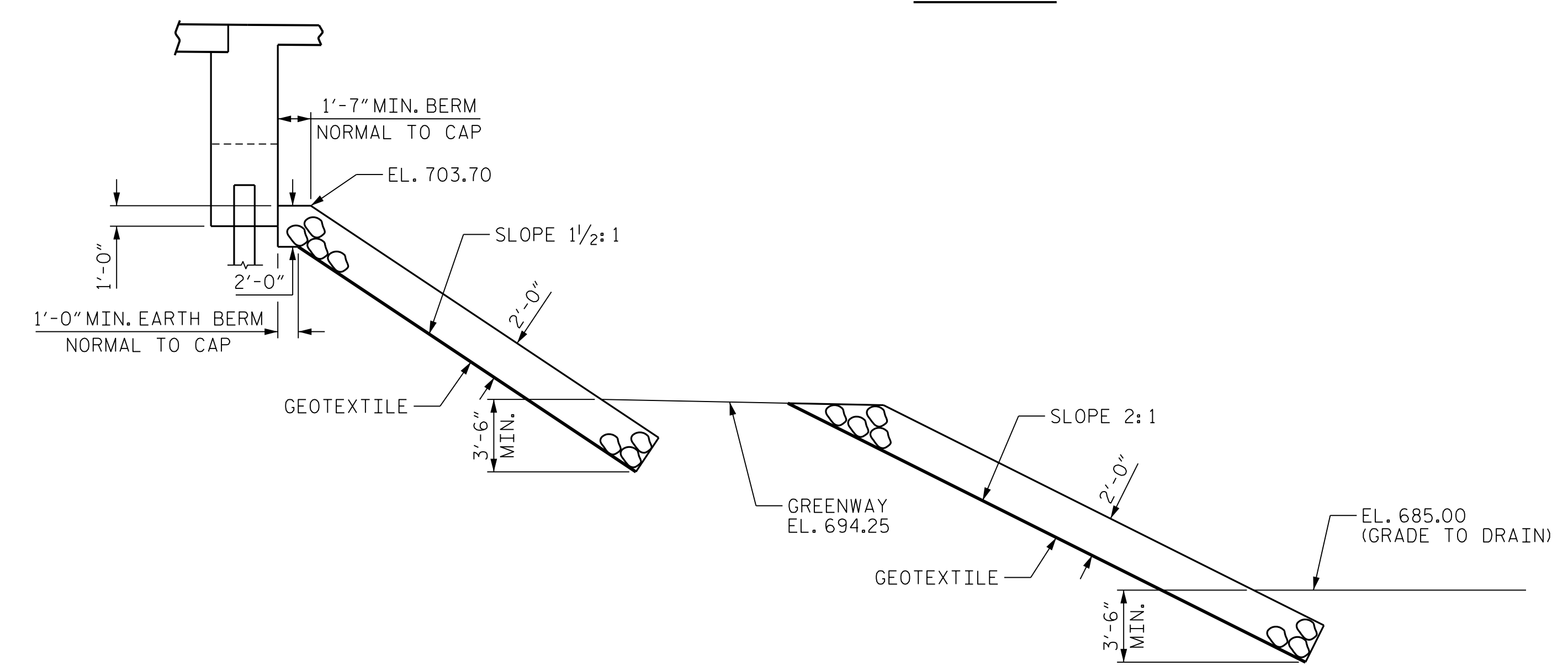
PLAN



SECTION B-B



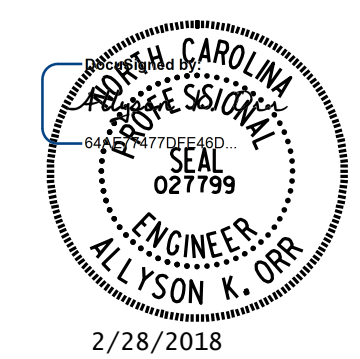
SECTION C-C



SECTION A-A

ESTIMATED QUANTITIES		
WBL BRIDGE @ STA. 23+26.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	570	635
END BENT 2	530	590

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

RIP RAP DETAILS

(WBL)

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S1-33
2			4			

TOTAL SHEETS 35



**NOTES**

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 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 BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

**BILL OF MATERIAL**

**FOR ONE APPROACH SLAB (2 REQ'D.)**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	20'-6"	712
A2	52	#4	STR	20'-5"	709
* B1	78	#5	STR	24'-2"	1966
B2	78	#6	STR	24'-8"	2890

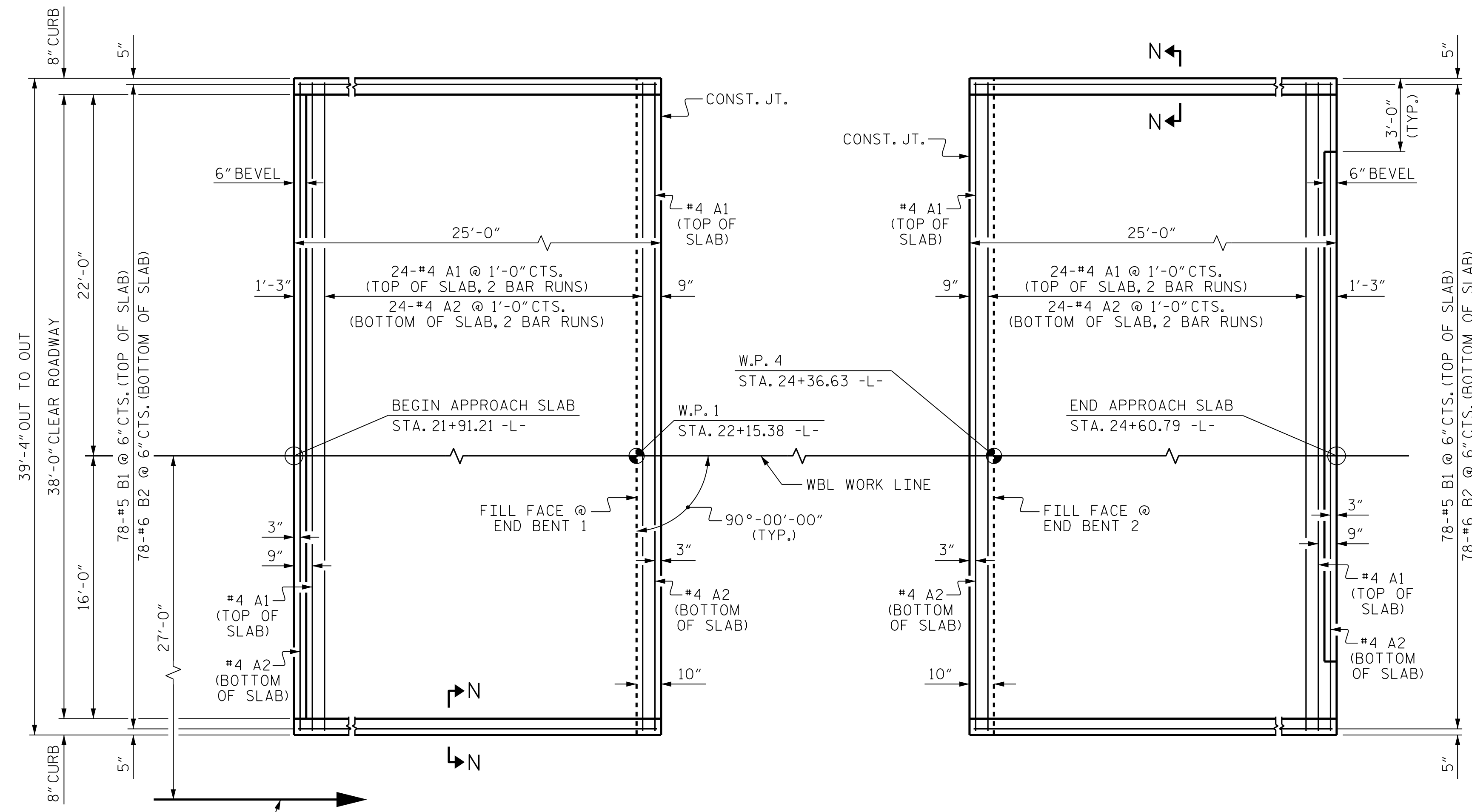
REINFORCING STEEL LBS. 3599

\* EPOXY COATED REINFORCING STEEL LBS. 2678

CLASS AA CONCRETE C.Y. 42.6

**SPLICE LENGTHS**

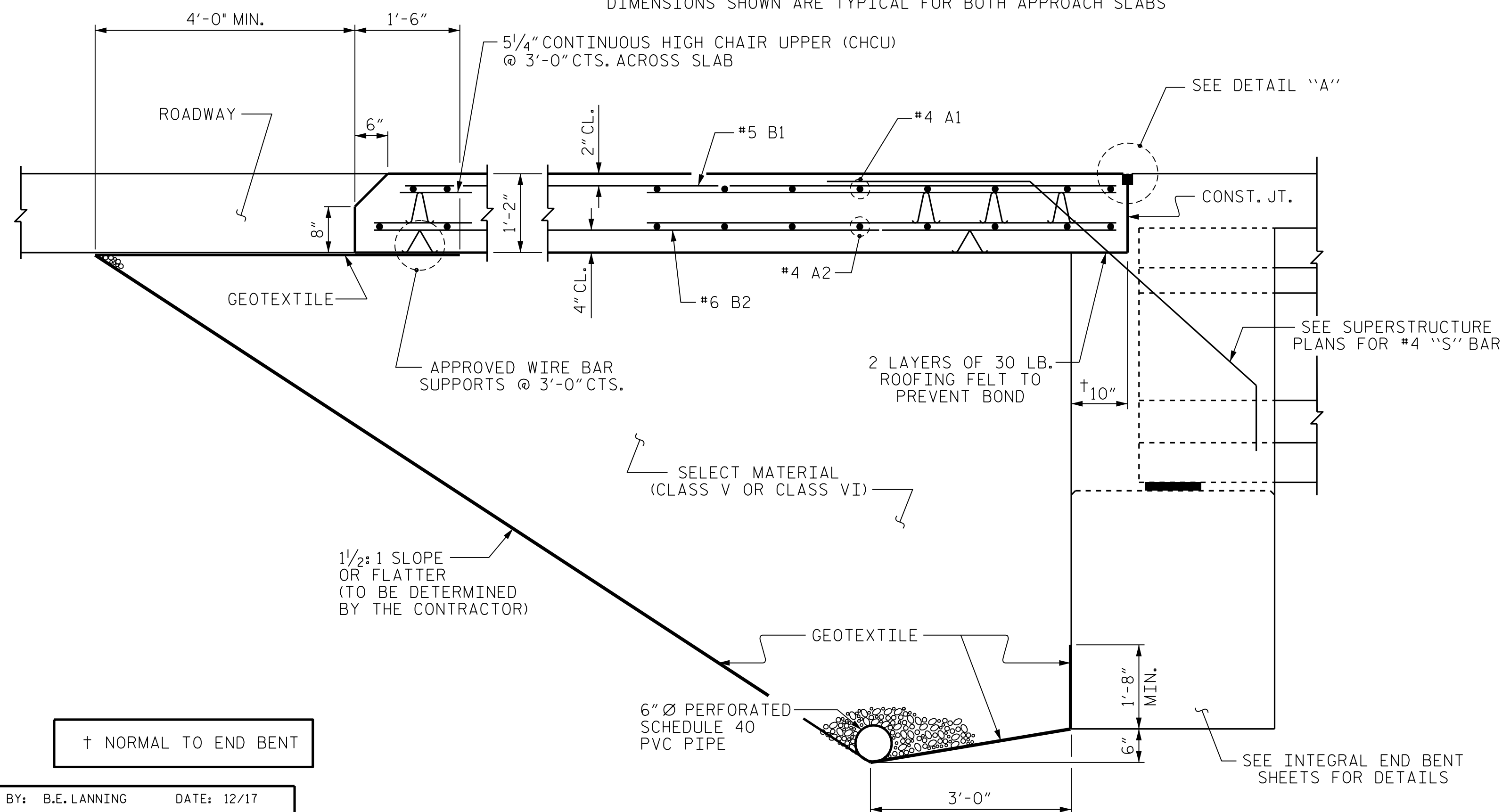
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



PLAN @ END BENT 1

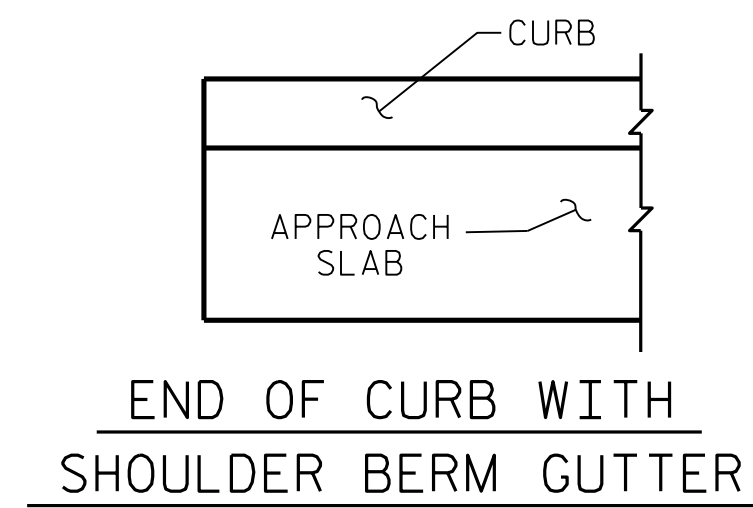
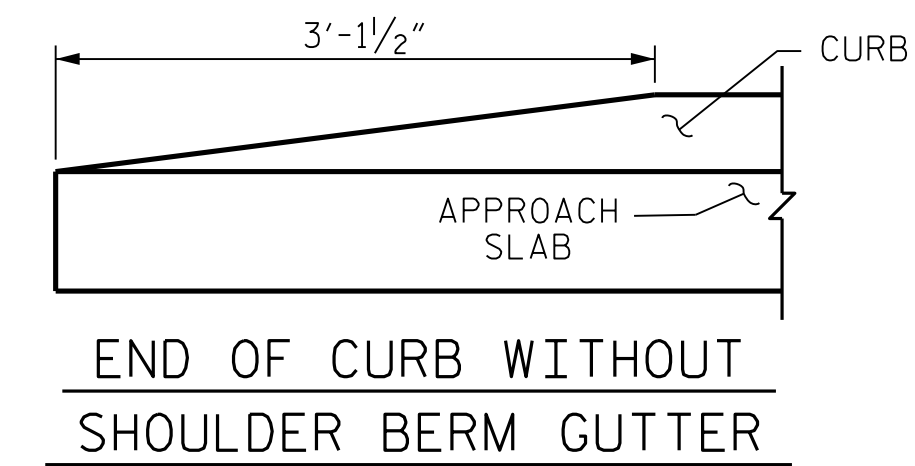
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

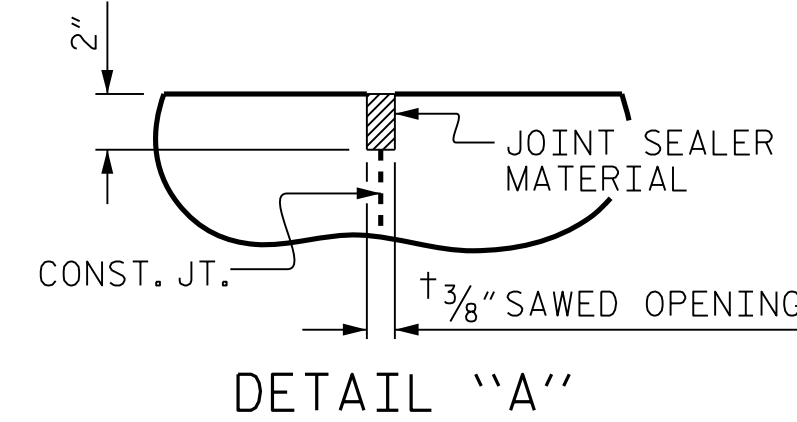
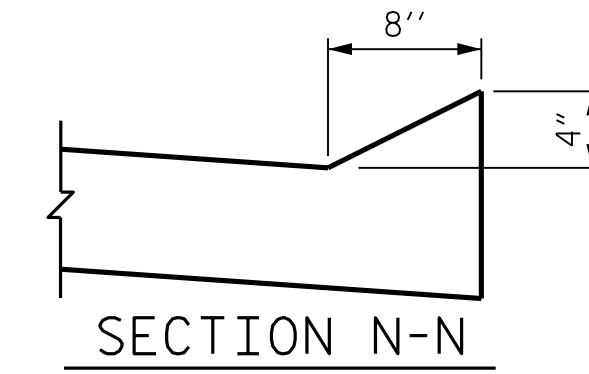


SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



CURB DETAILS

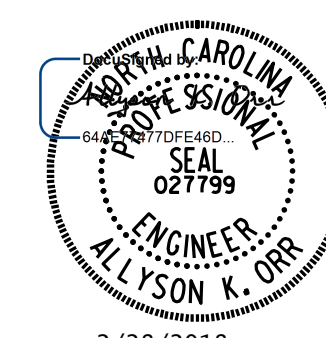


DETAIL "A"

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT  
 WITH FLEXIBLE PAVEMENT  
 (WBL)



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

STD. NO. BAS5 (SHT 1)

2/8/2018 10:44:19 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\LEFT LANE (WBL)\401.067.B5351.SML.BAS1.400242.dgn

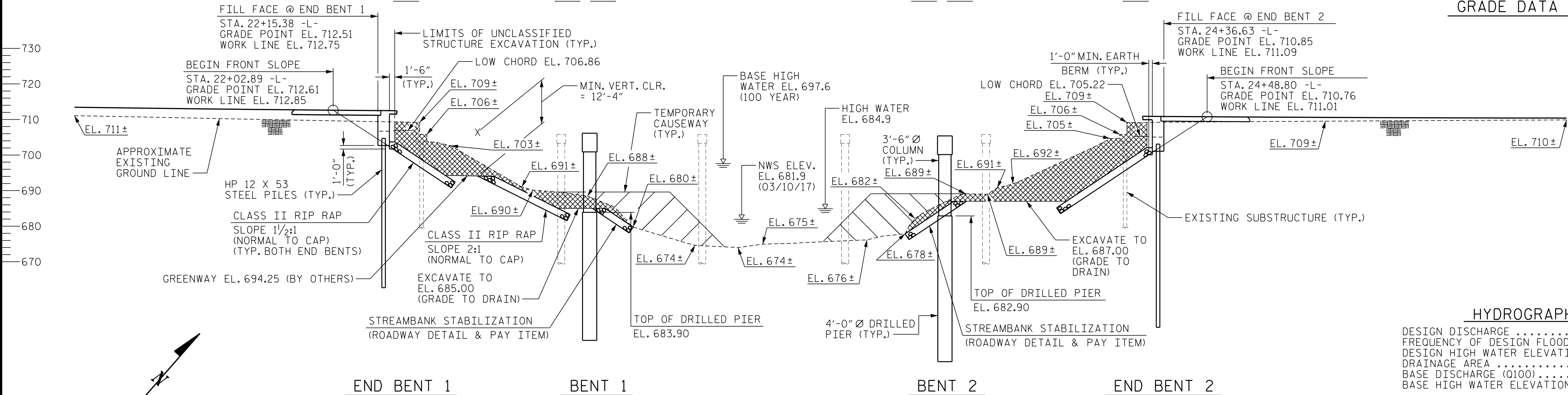
ASSEMBLED BY: B.E. LANNING	DATE: 12/17
CHECKED BY: A.K. ORR	DATE: 12/17
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC





-4.4808% -0.7492%  
 PVI = 19+60.00 -L-  
 EL. = 714.42  
 V.C. = 520.00'  
**GRADE DATA -L-**

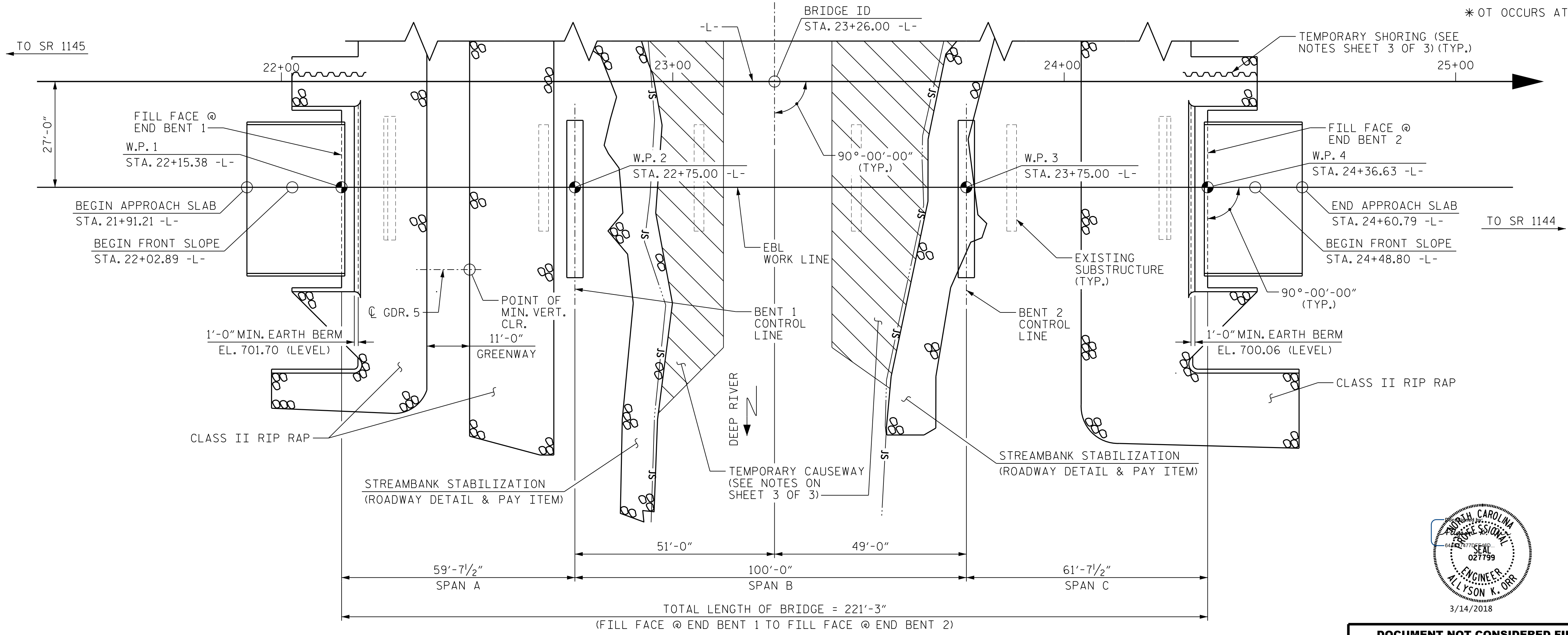
-0.7492% +1.1441%  
 PVI = 26+10.00 -L-  
 EL. = 709.55  
 V.C. = 340.00'  
**GRADE DATA -L-**



**HYDROGRAPHIC DATA**  
 DESIGN DISCHARGE ..... = 11,122 CFS  
 FREQUENCY OF DESIGN FLOOD ..... = 50 YRS.  
 DESIGN HIGH WATER ELEVATION ..... = 696.6  
 DRAINAGE AREA ..... = 75.4 SQ. MI.  
 BASE DISCHARGE (Q100) ..... = 12,390 CFS  
 BASE HIGH WATER ELEVATION ..... = 697.6

**OVERTOPPING FLOOD DATA**  
 OVERTOPPING DISCHARGE ..... = 38,000 CFS  
 FREQUENCY OF OVERTOPPING FLOOD ..... = 500+ YRS.  
 OVERTOPPING FLOOD ELEVATION ..... = 710.6 \*  
 \* OT OCCURS AT ROADWAY SAG STA. 25+65.50 -L- AT ROADWAY CROWN.

**SECTION ALONG -L-**  
 (SECTION TAKEN AT RIGHT ANGLES TO END BENTS AND BENTS)



I HEREBY CERTIFY THESE PLANS  
 ARE THE AS-BUILT PLANS

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 237

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON  
 US 29 / 70 / I-85 BUSINESS  
 OVER DEEP RIVER  
 BETWEEN SR 1145 AND SR 1144  
 (EBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-1 TOTAL SHEETS 35
2			4			

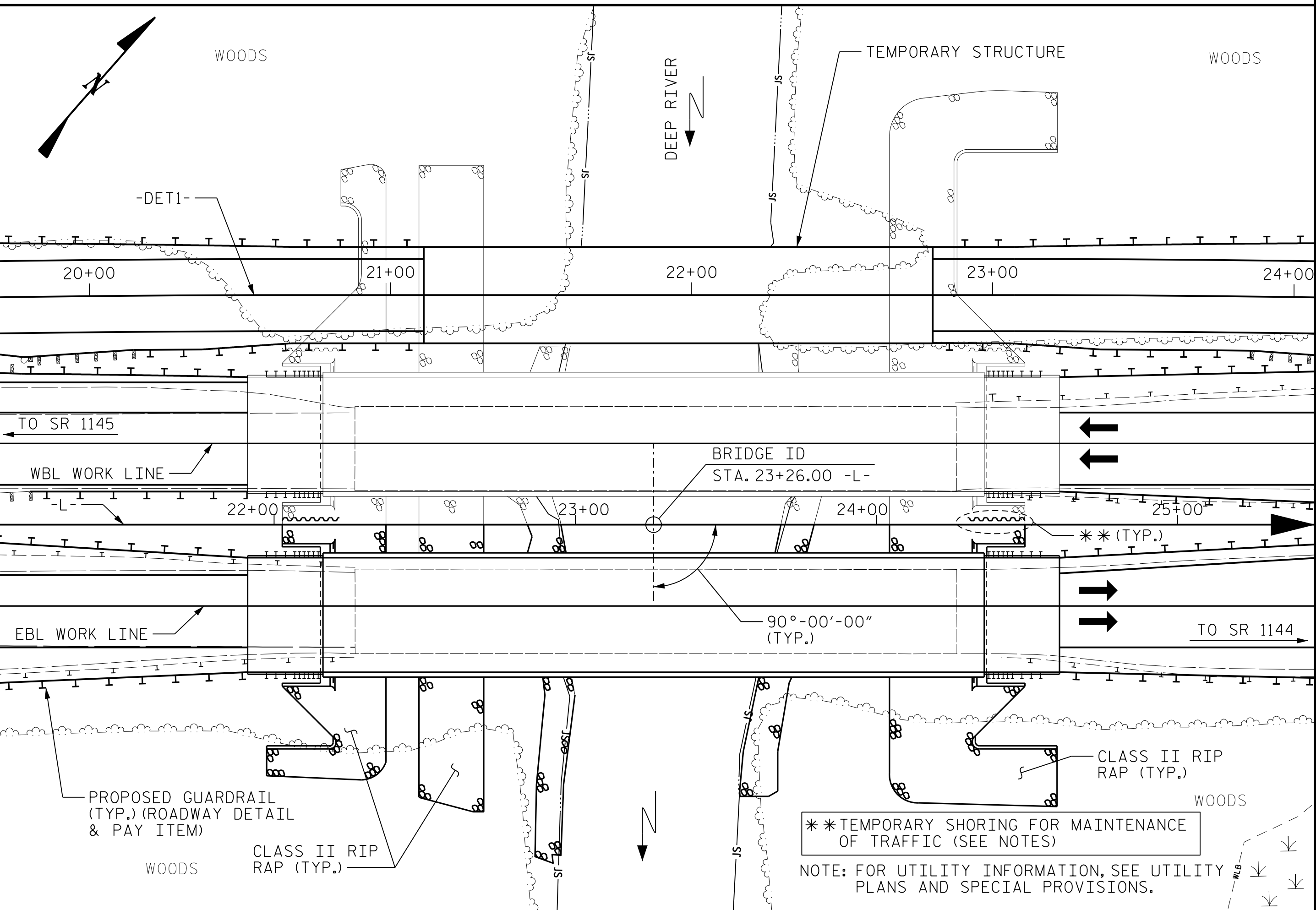
DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

3/14/2018 8:25:36 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.001.B5351.SMU.GDL\_400237.dgn





B.M. #1: RR SPIKE IN 12" SYCAMORE; 205' RIGHT OF STA. 24+41.00 -L-, EL. 692.52.



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.  
 THE EXISTING STRUCTURE CONSISTING OF FIVE SPANS @ 40'-0" WITH A REINFORCED CONCRETE FLOOR ON REINFORCED CONCRETE DECK GIRDERS, AND A CLEAR ROADWAY WIDTH OF 28'-0" ON REINFORCED CONCRETE CAP WITH TIMBER PILE END BENTS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.  
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS TO NOT ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.  
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 100 FT. TO THE RIGHT OF THE SURVEY LINE 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.  
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. 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 THE DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.  
 PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF THE METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.  
 REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.  
 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.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.  
 NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.  
 THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.  
 THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.  
 AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 23+26.00 -L-.  
 TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN VIEW.  
 THE CONTRACTOR'S ATTENTION SHALL BE DRAWN TO THE FACT THAT ONLY 50% OF THE CHANNEL WILL BE ALLOWED TO BE BLOCKED AT ANY TIME.  
 FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.  
 THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 21+95.50 -DET1- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.  
 THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

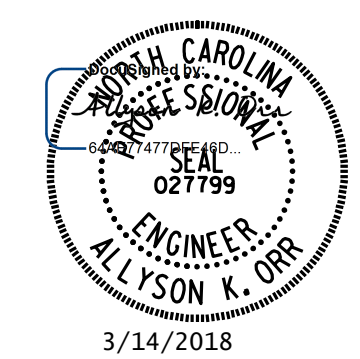
	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY STRUCTURE AT STA. 21+95.50 -DET1-	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY ACCESS AT STA. 23+26.00 -L-	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" Ø DRILLED PIERS IN SOIL	4'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	LUMP SUM	SQ. FT.
SUPERSTRUCTURE											9,127
END BENT 1										LUMP SUM	
BENT 1					56.0	16.0	34.0				
BENT 2					61.0	21.0	28.0				
END BENT 2										LUMP SUM	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	117.0	37.0	62.0	2	2	LUMP SUM	9,127

TOTAL BILL OF MATERIAL

	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	
	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	TON	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	9,390					1088.75				439.17			LUMP SUM	
END BENT 1		35.6	LUMP SUM	4,981			6	6	252	6		540	600	
BENT 1		44.3		12,641	2,705									
BENT 2		44.5		13,184	2,963									
END BENT 2		35.6	LUMP SUM	4,981			6	6	297	6		400	445	
TOTAL	9,390	160.0	LUMP SUM	35,787	5,668	1088.75	12	12	549	12	439.17	940	1,045	LUMP SUM

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON  
 US 29 / 70 / I-85 BUSINESS  
 OVER DEEP RIVER  
 BETWEEN SR 1145 AND SR 1144  
 (EBL)

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-3
2			4			TOTAL SHEETS 35

DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

3/14/2018 8:27:41 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.005.BE5351.SMU.GD3\_400237.dgn



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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.17	--	1.75	0.806	1.50	C	I	29.44	0.896	<b>1.17</b>	B	I	92.95	0.80	0.806	1.60	C	I	29.4		
	HL-93 (OPERATING)	N/A		1.30	--	1.35	0.806	1.94	C	I	29.44	0.896	1.30	B	I	92.95	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.92	69.12	1.75	0.806	<b>1.92</b>	C	I	29.44	0.896	2.38	A	I	45.50	0.80	0.806	2.06	C	I	29.4		
	HS-20 (OPERATING)	36.000		2.49	89.64	1.35	0.806	2.49	C	I	29.44	0.896	3.10	A	I	45.50	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.52	47.52	1.40	0.806	5.15	C	I	29.44	0.896	7.27	C	I	11.78	0.80	0.806	3.52	C	I	29.4	
		SNGARBS2	20.000		2.69	53.80	1.40	0.806	3.93	C	I	29.44	0.896	5.25	C	I	11.78	0.80	0.806	2.69	C	I	29.4	
		SNAGRIS2	22.000		2.58	56.76	1.40	0.806	3.76	C	I	29.44	0.896	4.90	C	I	11.78	0.80	0.806	2.58	C	I	29.4	
		SNCOTTS3	27.250		1.74	47.42	1.40	0.806	2.55	C	I	29.44	0.896	3.44	C	I	11.78	0.80	0.806	1.74	C	I	29.4	
		SNAGGRS4	34.925		1.49	52.04	1.40	0.806	2.18	C	I	29.44	0.896	2.83	C	I	11.78	0.80	0.806	1.49	C	I	29.4	
		SNS5A	35.550		1.47	52.26	1.40	0.806	2.14	C	I	29.44	0.896	2.97	C	I	11.78	0.80	0.806	1.47	C	I	29.4	
		SNS6A	39.950		1.36	54.33	1.40	0.806	1.98	C	I	29.44	0.896	2.73	B	I	19.55	0.80	0.806	1.36	C	I	29.4	
	SNS7B	42.000		1.29	54.18	1.40	0.806	1.89	C	I	29.44	0.896	2.62	B	I	19.55	0.80	0.806	1.29	C	I	29.4		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.68	55.44	1.40	0.806	2.45	C	I	29.44	0.896	3.21	B	I	19.55	0.80	0.806	1.68	C	I	29.4	
		TNT4A	33.075		1.67	55.24	1.40	0.806	2.44	C	I	29.44	0.896	3.14	C	I	11.78	0.80	0.806	1.67	C	I	29.4	
		TNT6A	41.600		1.38	57.41	1.40	0.806	2.01	C	I	29.44	0.896	2.84	B	I	19.55	0.80	0.806	1.38	C	I	29.4	
		TNT7A	42.000		1.40	58.80	1.40	0.806	2.04	C	I	29.44	0.896	2.73	C	I	11.78	0.80	0.806	1.40	C	I	29.4	
		TNT7B	42.000		1.45	60.90	1.40	0.806	2.10	C	I	35.33	0.896	2.61	B	I	19.55	0.80	0.806	1.45	C	I	29.4	
		TNAGRIT4	43.000		1.38	59.34	1.40	0.806	2.01	C	I	29.44	0.896	2.53	C	I	11.78	0.80	0.806	1.38	C	I	29.4	
TNACT5A		45.000		1.29	58.05	1.40	0.806	1.89	C	I	29.44	0.896	2.46	B	I	19.55	0.80	0.806	1.29	C	I	29.4		
TNACT5B	45.000	③	1.27	57.15	1.40	0.806	1.85	C	I	29.44	0.896	2.34	C	I	11.78	0.80	0.806	<b>1.27</b>	C	I	29.4			

LOAD FACTORS:

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

NOTES:

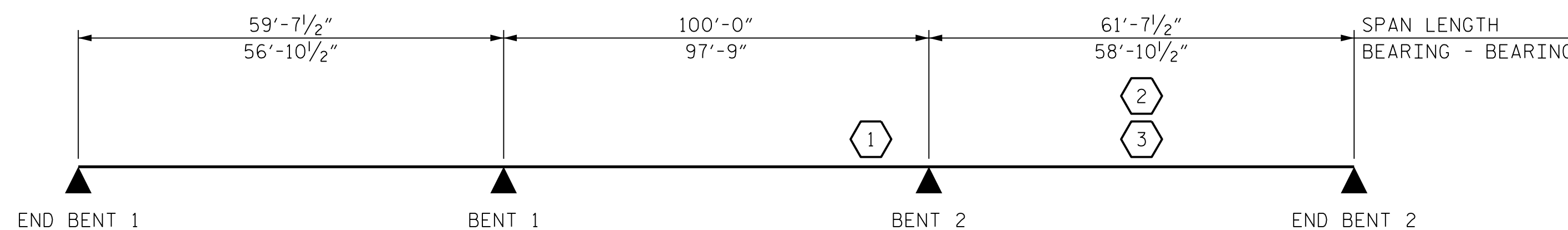
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

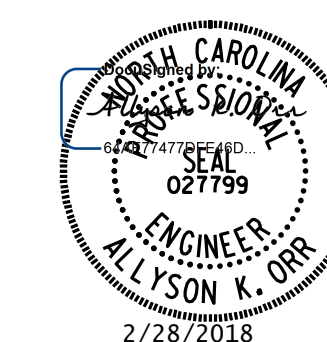
COMMENTS:

- GIRDERS ARE CONSIDERED TO BE CONTINUOUS FOR LIVE LOAD.
- 
- 
- 

#	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 E - EXTERIOR GIRDER	



PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



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

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

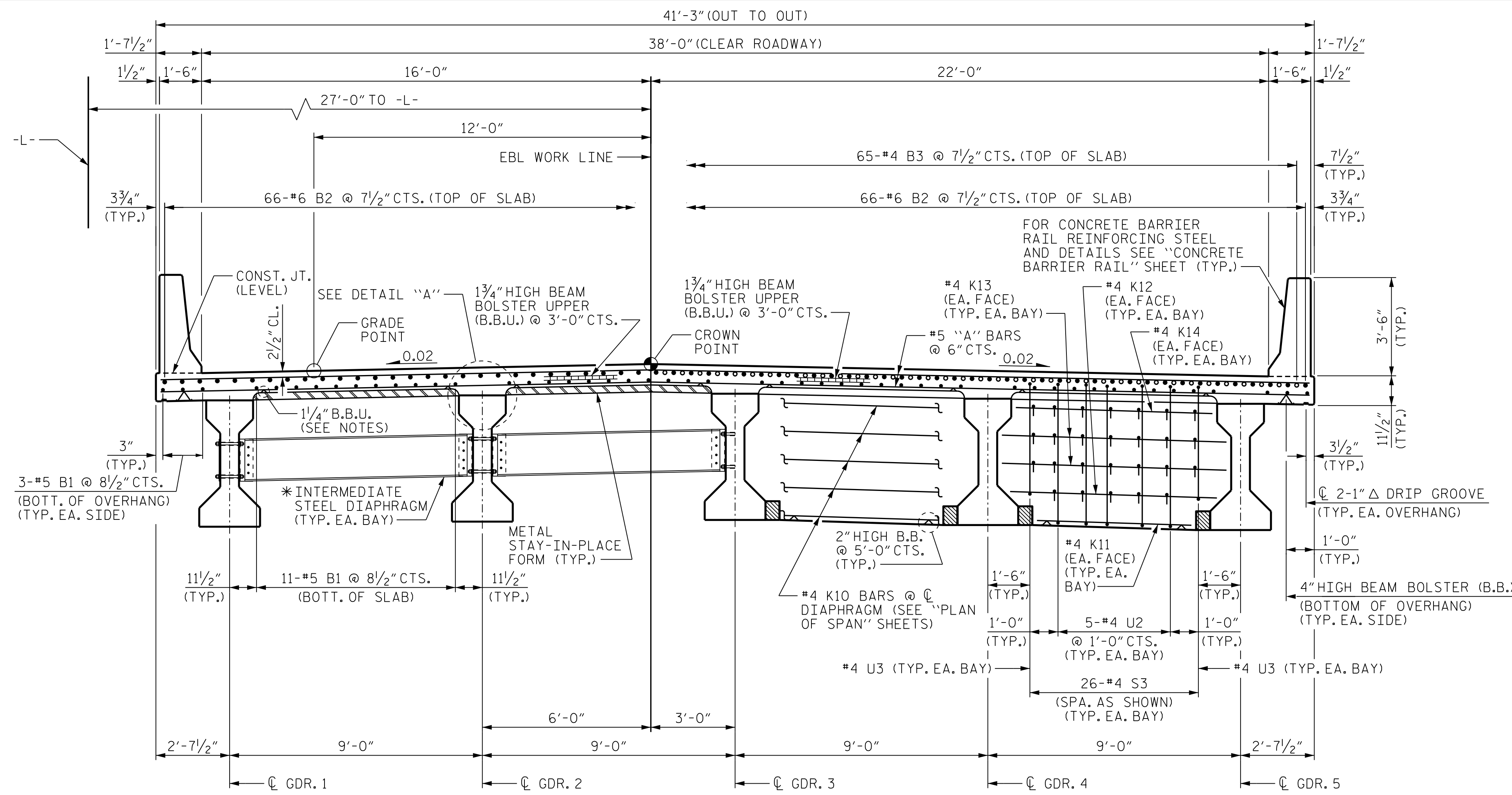
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

STD. NO. LRFR2

2/8/2018 11:28:34 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.007.BE5351.SMU.LRFR.400237.dgn

ASSEMBLED BY : B.E. LANNING	DATE: 01/18
CHECKED BY : A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC





**TYPICAL SECTION**  
(SHOWING INTERMEDIATE DIAPHRAGM AT SPANS A & C ONLY)

**TYPICAL SECTION**  
(SHOWING BENT DIAPHRAGM)

**NOTES**

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

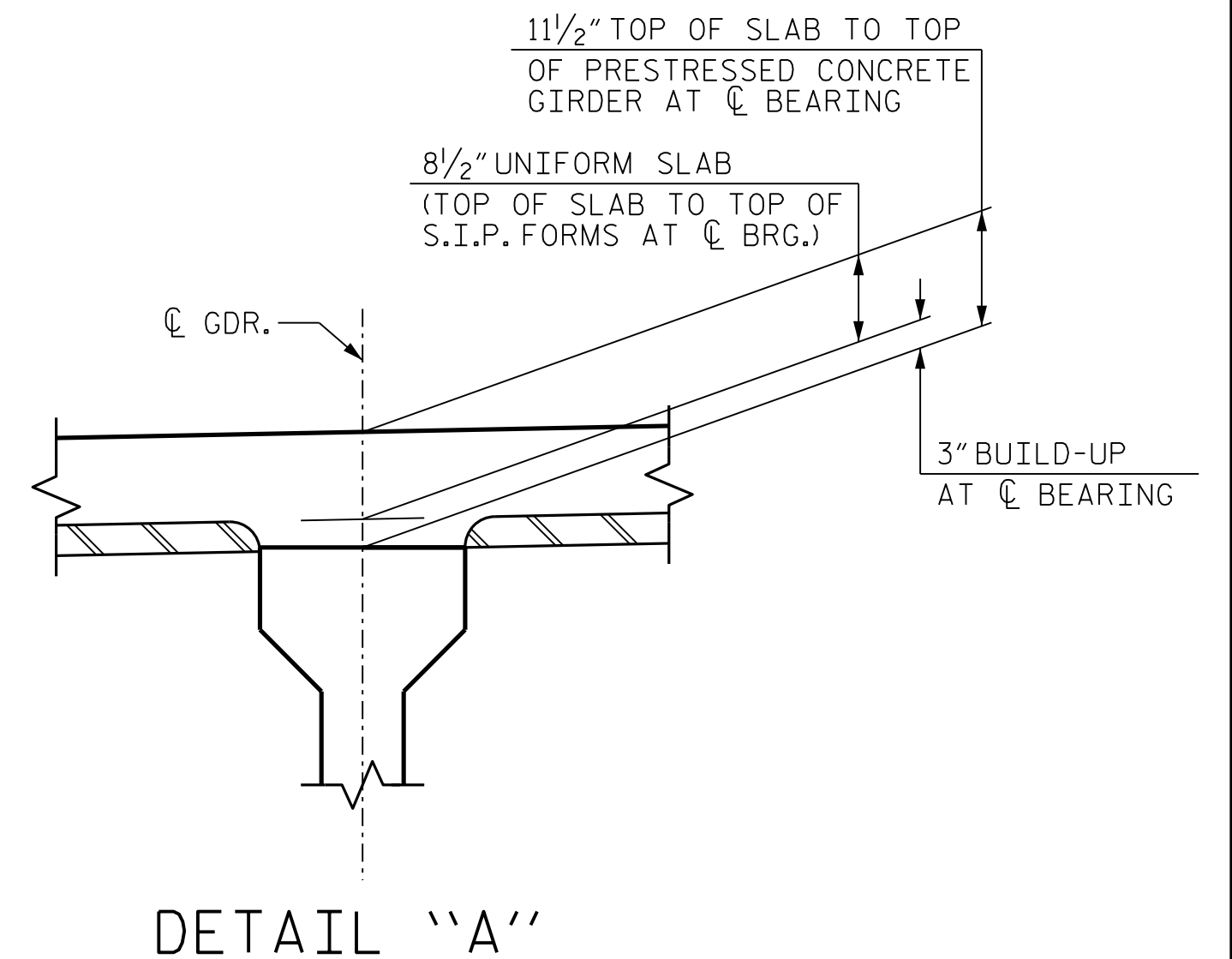
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

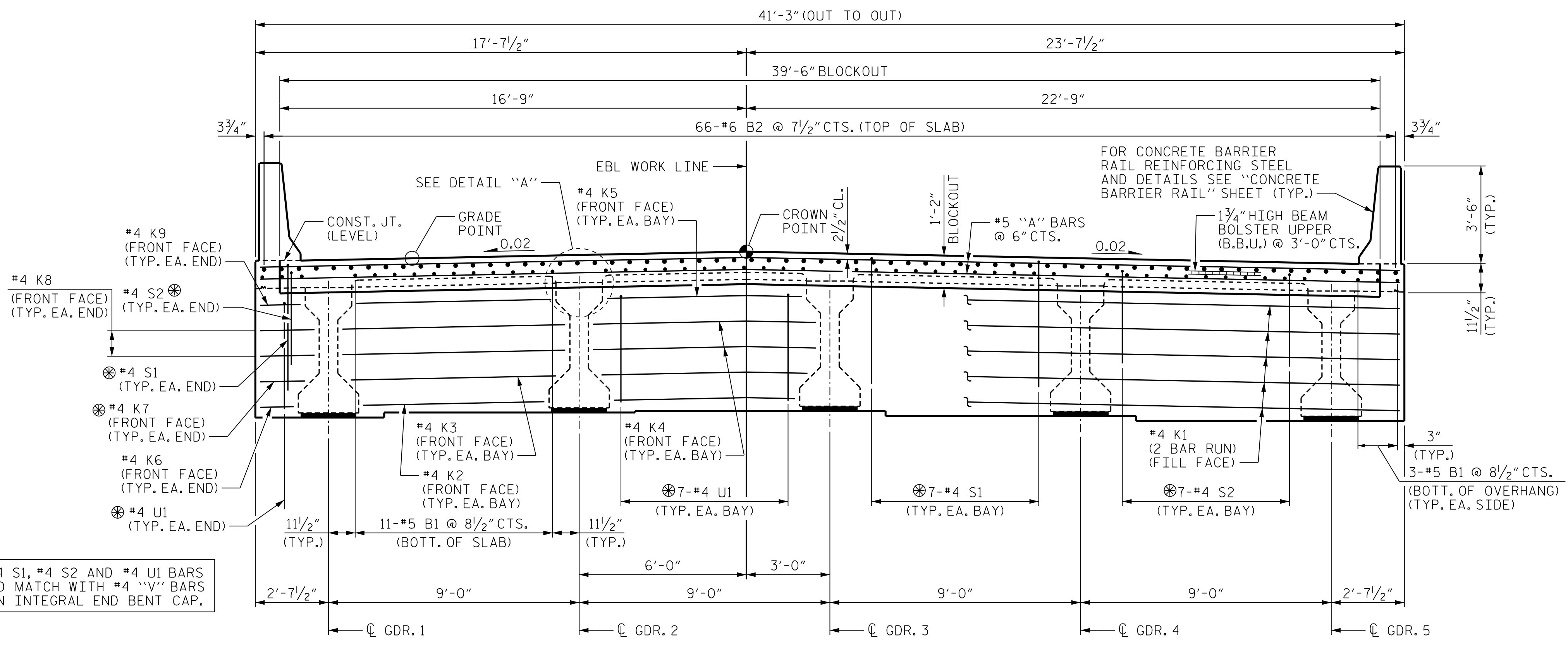
BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.

\* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

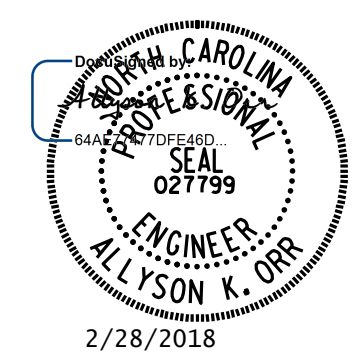


**DETAIL "A"**



**TYPICAL SECTION AT INTEGRAL END BENT**  
(FOR ADDITIONAL DIMENSIONS, SEE TYPICAL SECTION ABOVE)

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 TYPICAL SECTION  
 AND DETAILS**  
 (EBL)

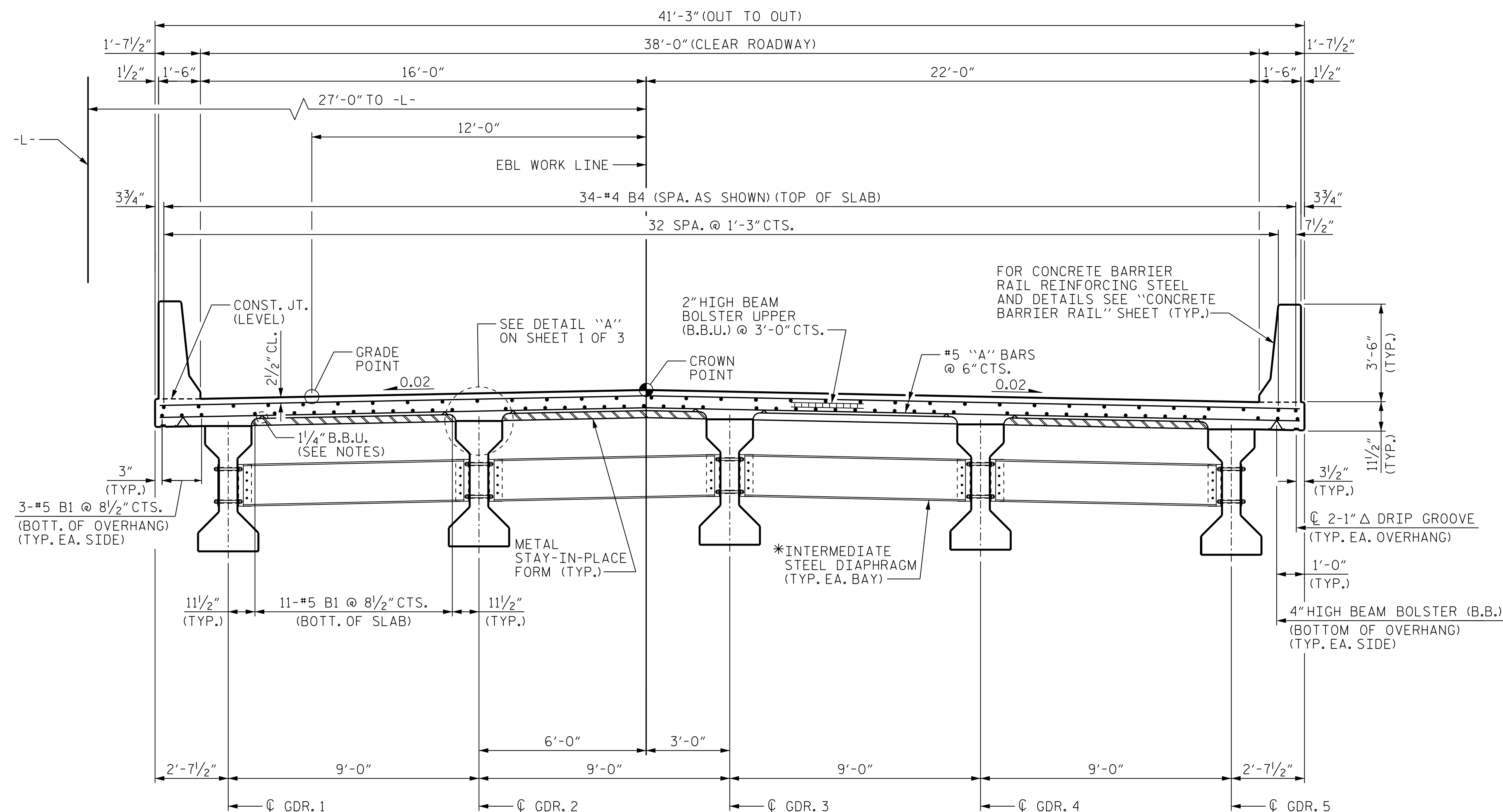
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>					
MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER: P-0671					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. <b>S2-5</b>					TOTAL SHEETS <b>35</b>

2/8/2018 11:28:36 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Structures\RIGHT LANE (EBL)\402.009-B5351-SMU-TS1-400237.dgn

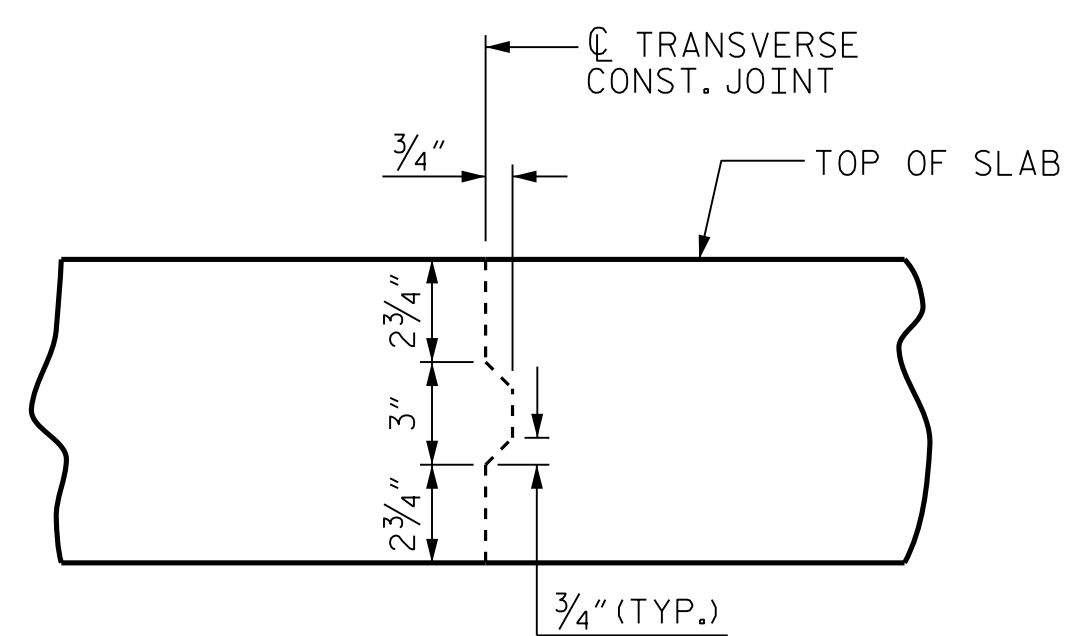
DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

NOTES

FOR ADDITIONAL DETAILS AND NOTES, SEE SHEET 1 OF 3.  
 \* FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



TYPICAL SECTION  
 (SHOWING INTERMEDIATE DIAPHRAGM AT SPAN B ONLY)

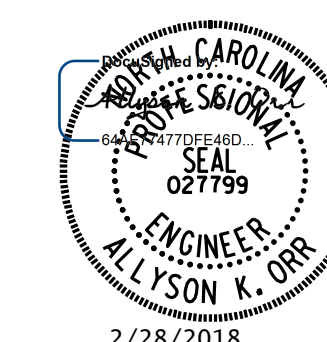


TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN.  
 LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 TYPICAL SECTION  
 AND DETAILS

(EBL)

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

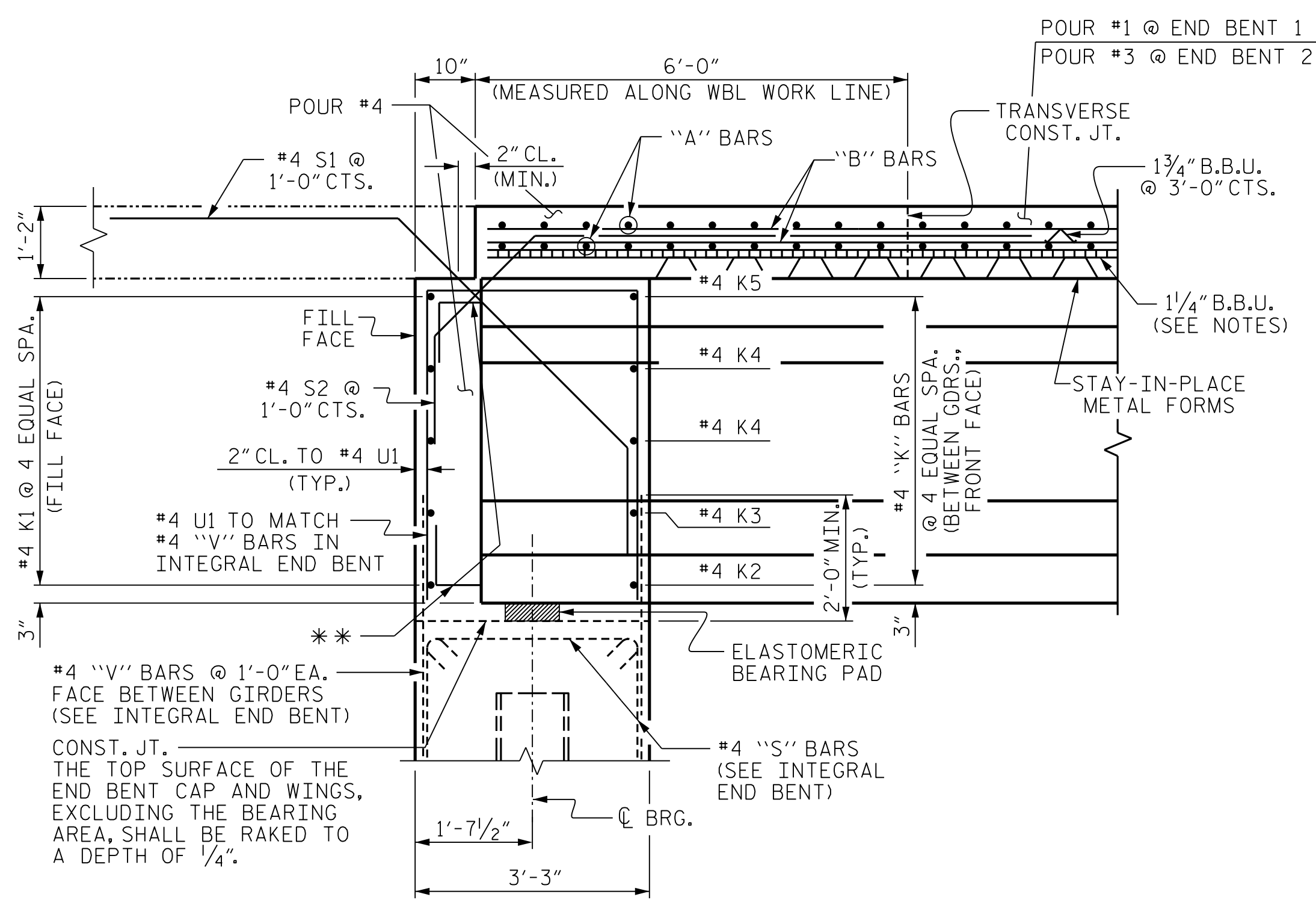
MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER: P-0671		REVISIONS		SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 35

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

2/8/2018 11:28:38 AM User: blanning  
 Filenamer: P:\NC Bridges\MI600135 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.011.B5351.SMJ.TS2.40237.dgn

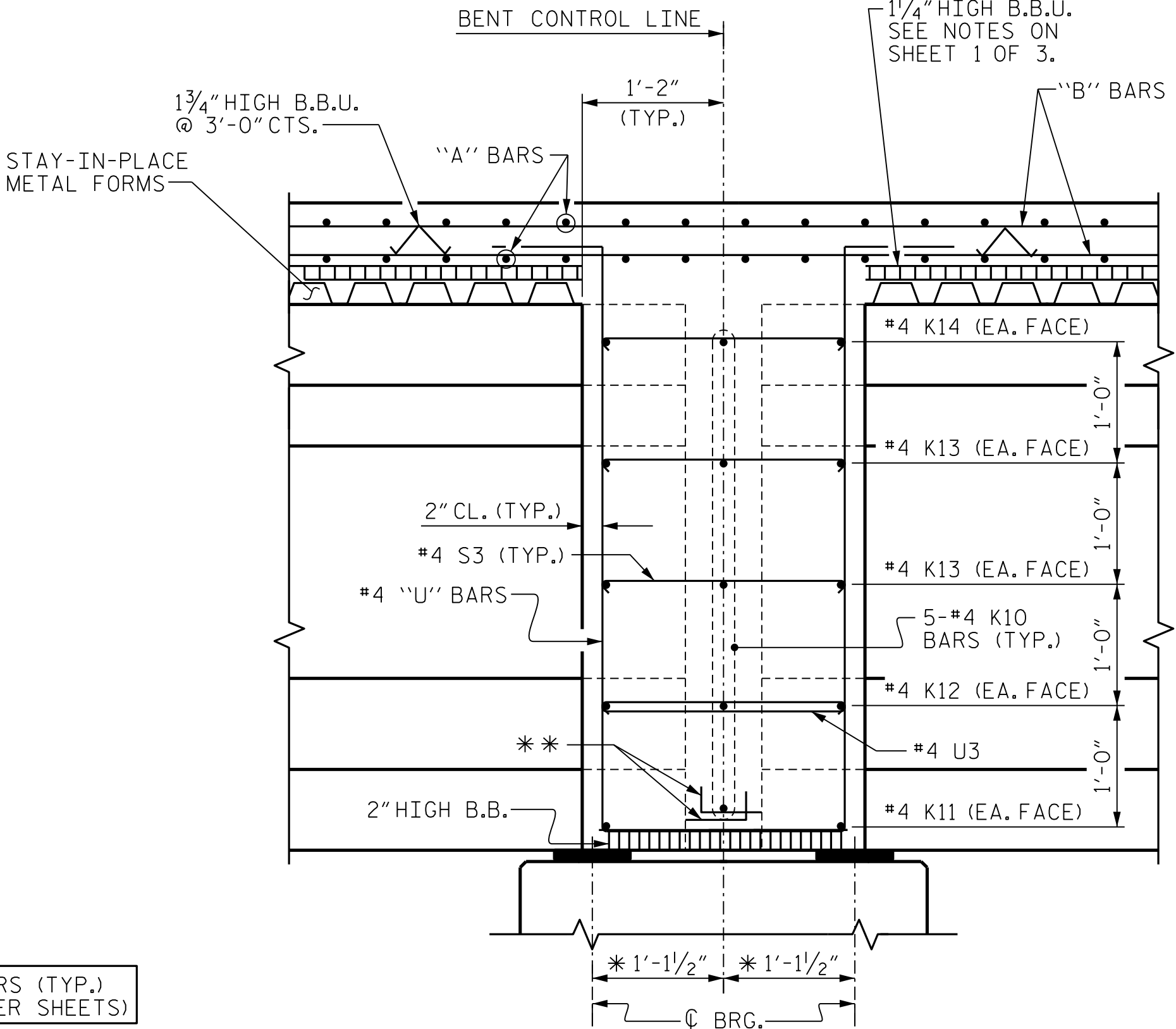


2/8/2018 11:28:40 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.013.B5351.SMU.TS3.400237.dgn



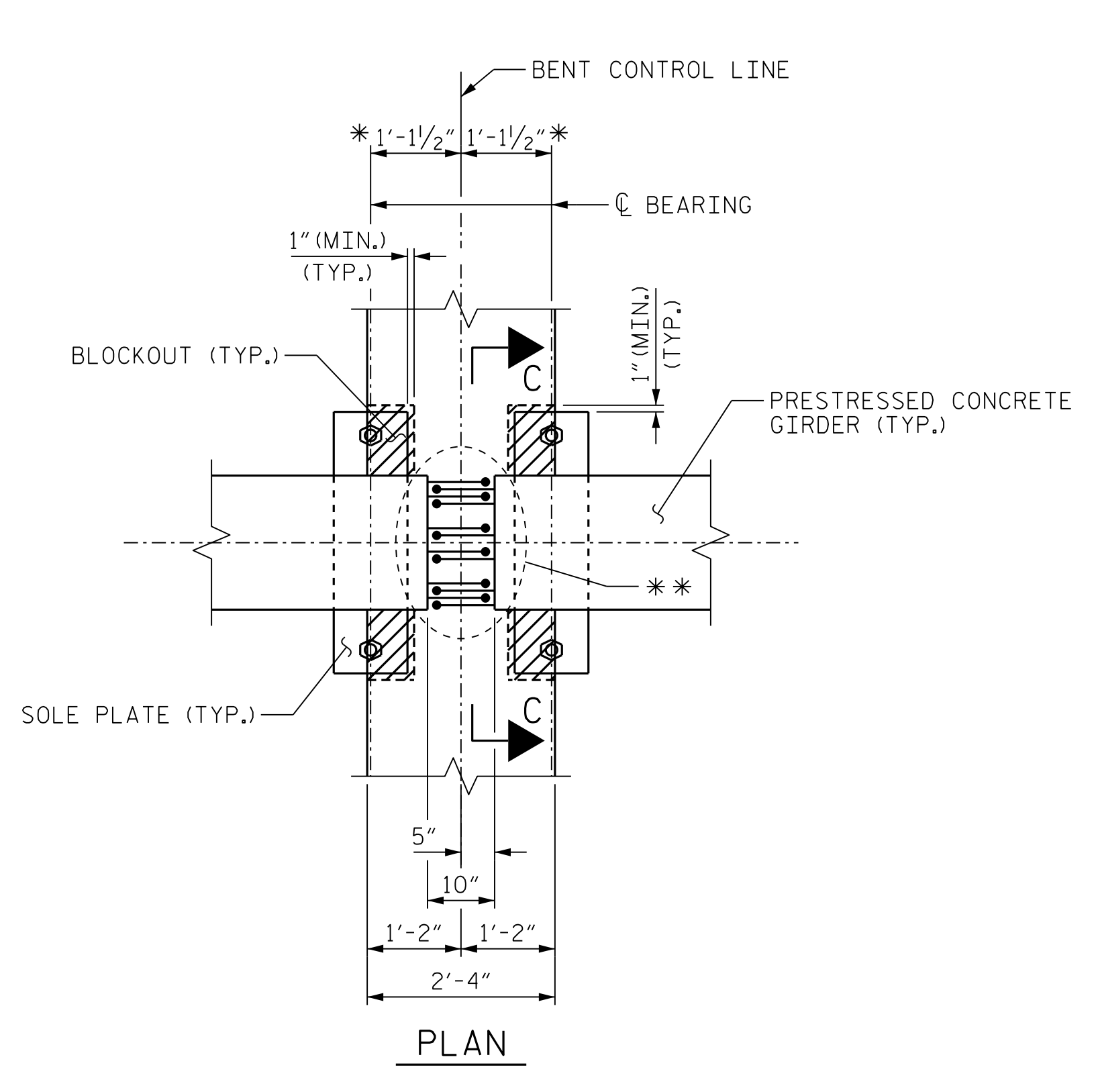
SECTION A-A

\*\* #5 "S" BARS (TYP.)  
(SEE GIRDER SHEETS)

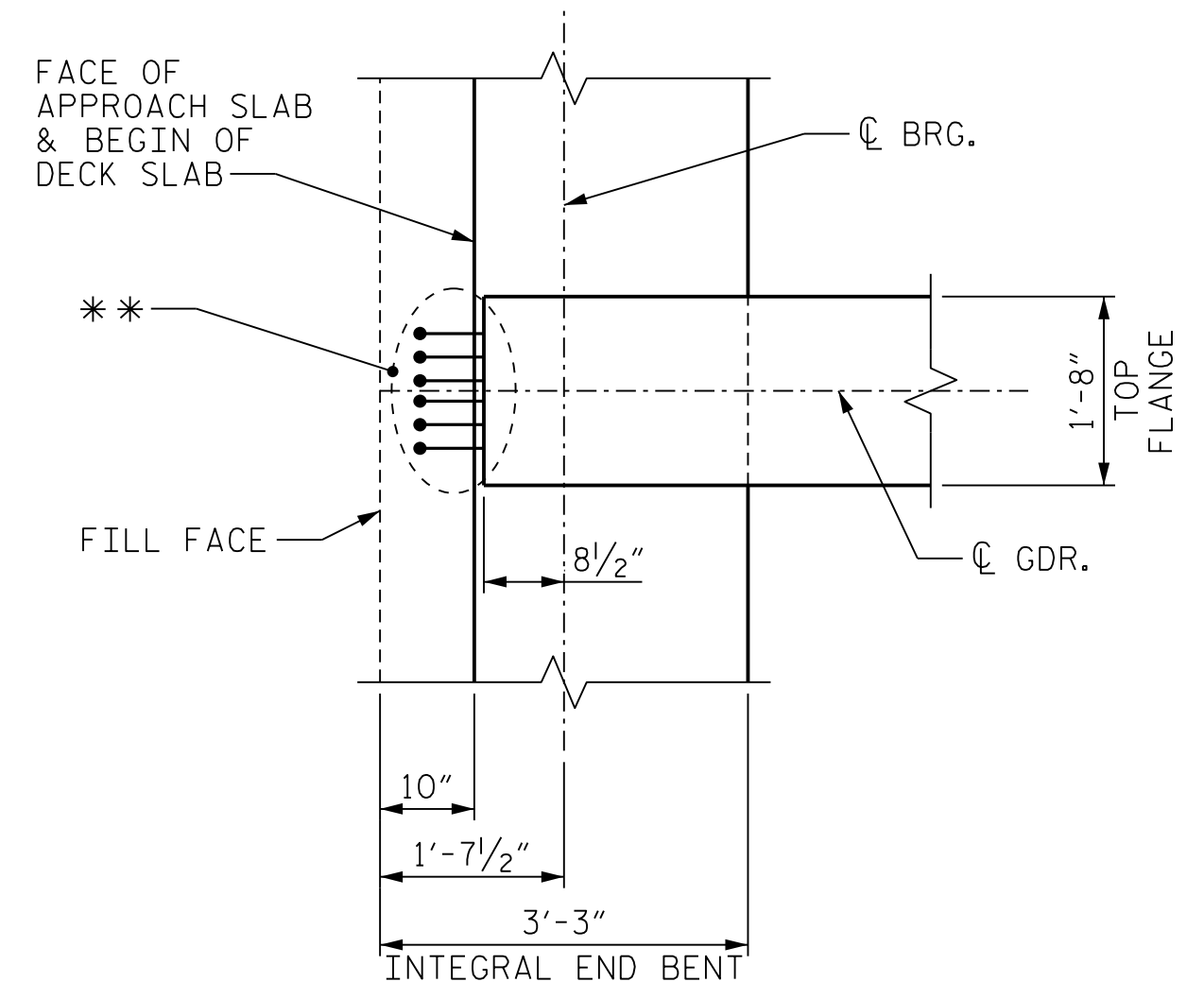


SECTION B-B

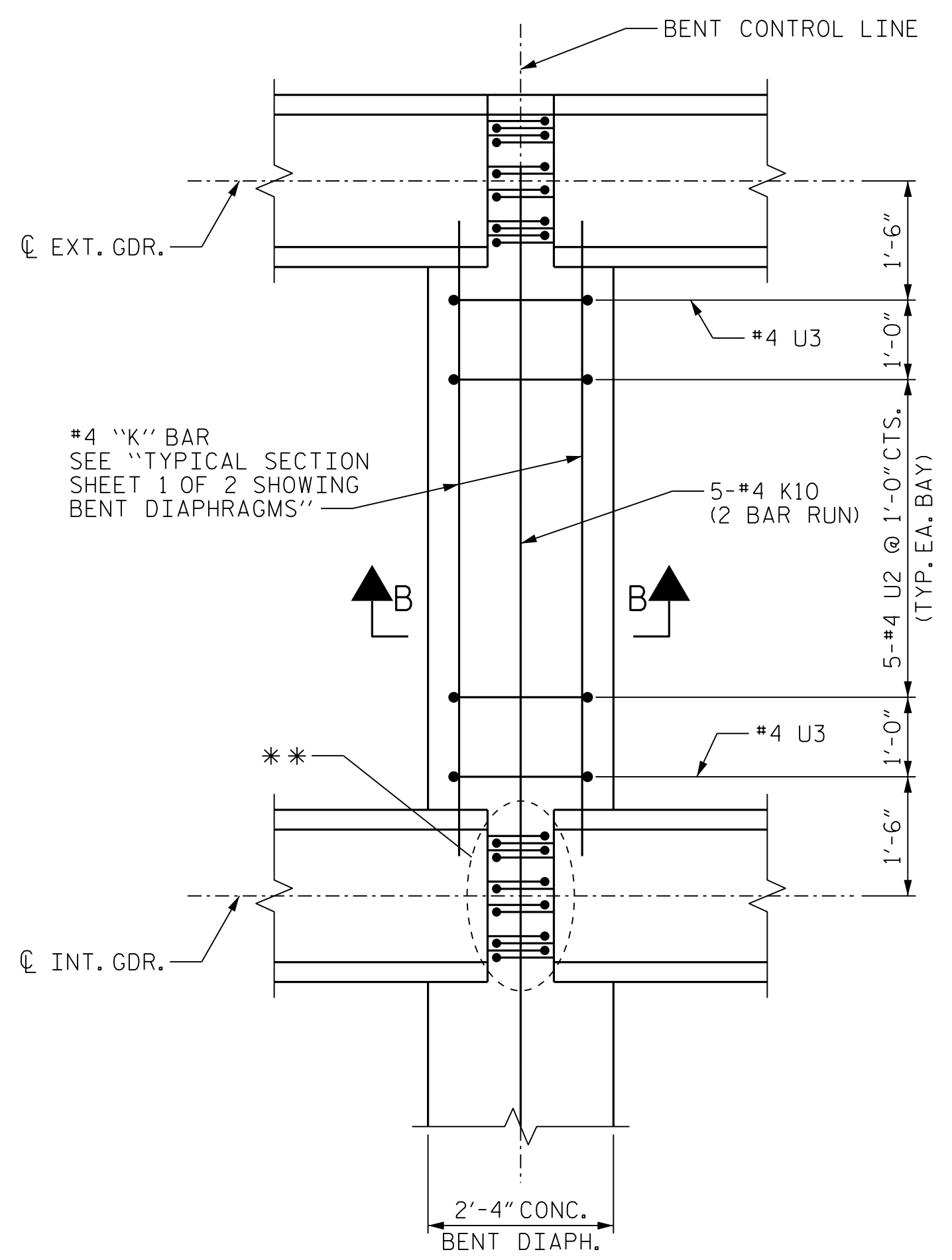
\* MEASURED ALONG CL GIRDER



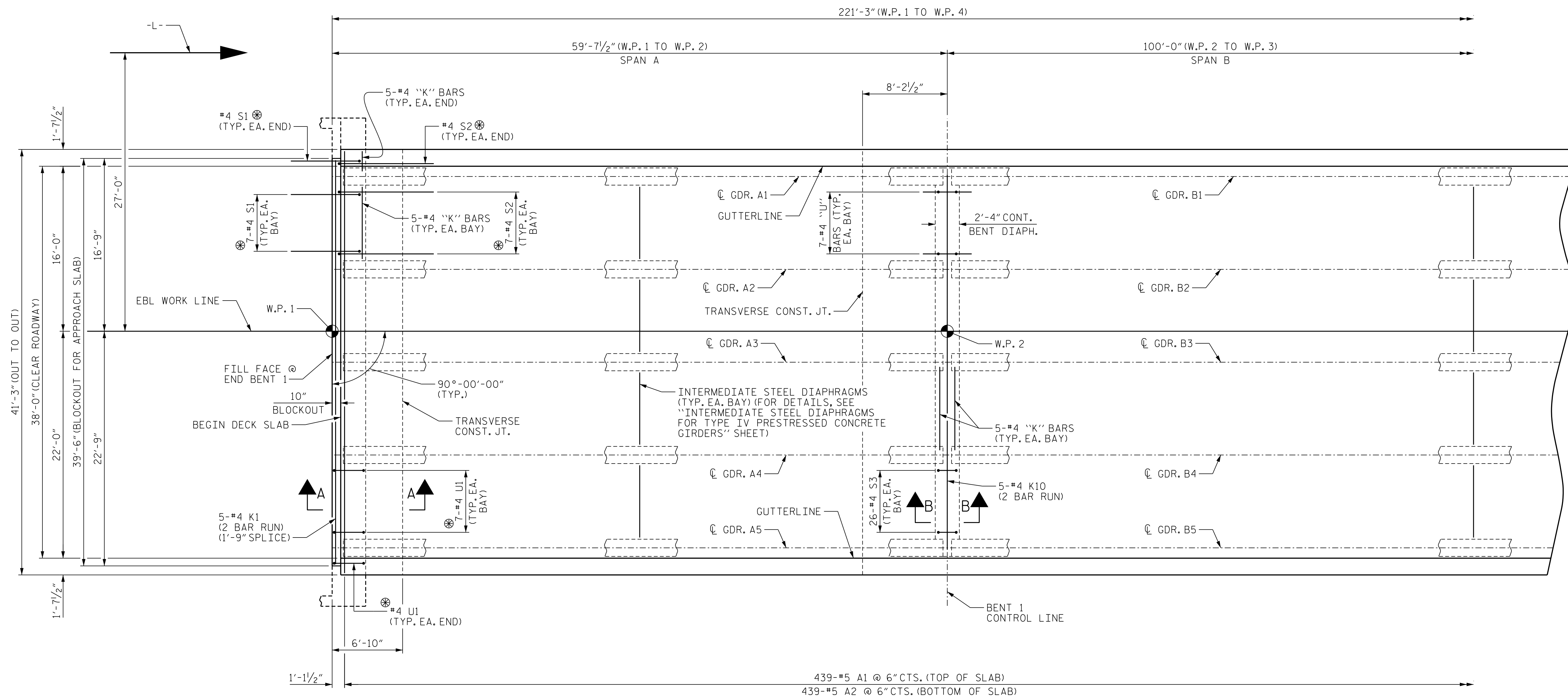
PLAN



PLAN OF GIRDER AT INTEGRAL END BENT  
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



2/8/2018 11:28:43 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.015.B5351.SMU.PS1\_40237.dgn

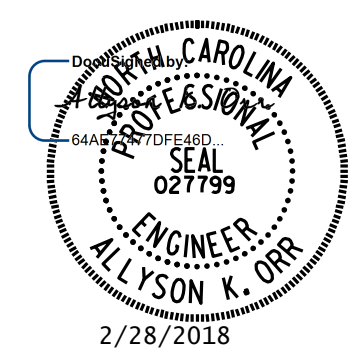


SPAN A SPAN B

### PLAN OF SPAN A AND PART OF SPAN B

- NOTES:**
- FOR REINFORCING STEEL IN BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEETS.
  - FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEETS.
  - FOR LOCATION OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.
  - FOR TOP AND BOTTOM "B" BARS NOT SHOWN, SEE SHEET 3 OF 3.
  - ⊛ #4 S1, #4 S2 & #4 U1 TO MATCH WITH #4 "V" BARS IN INTEGRAL END BENT CAP.
  - FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEET 2 OF 3.
  - FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 1 OF 3



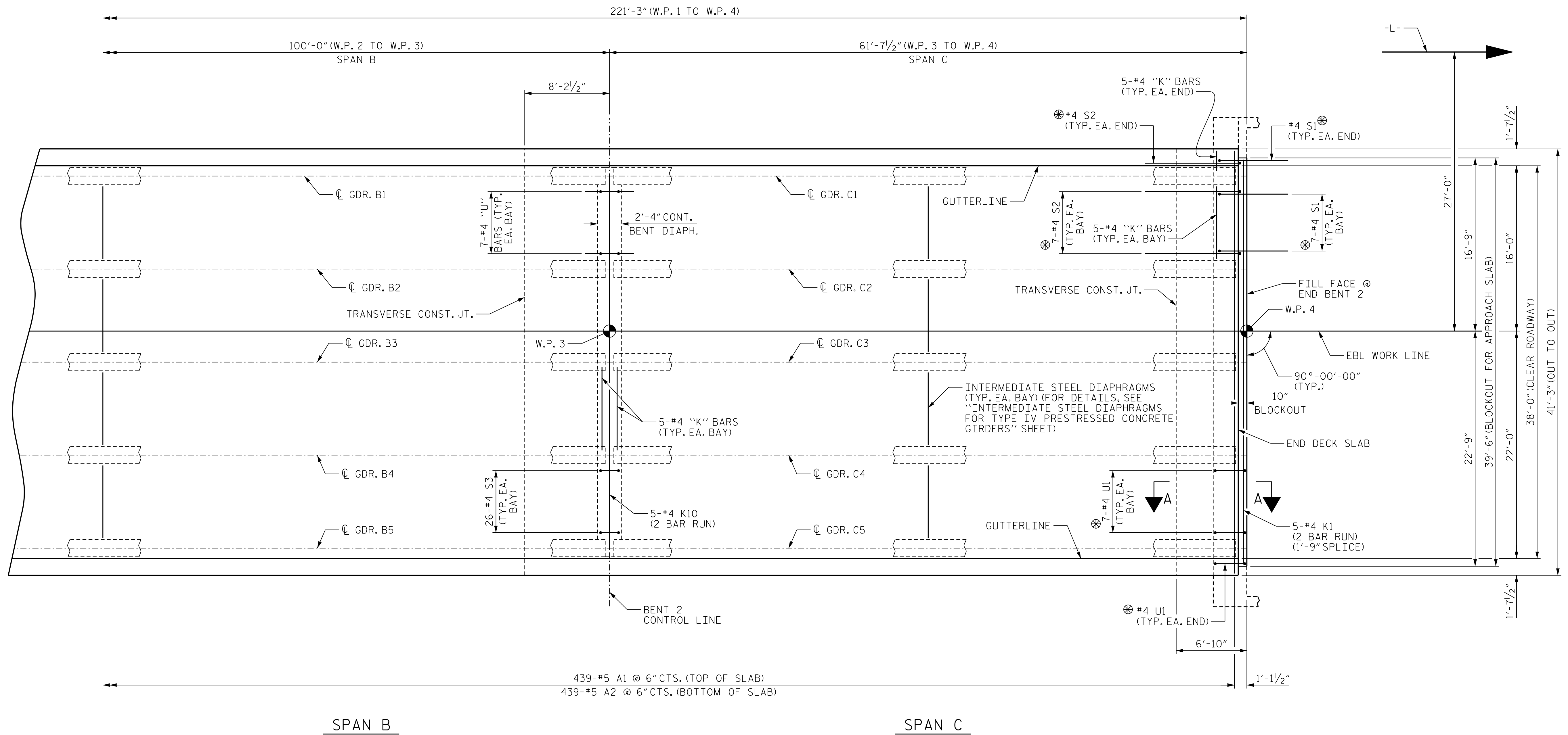
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
SUPERSTRUCTURE					
PLAN OF SPANS					
SPAN A AND PART					
OF SPAN B					
(EBL)					
NO.		BY:		DATE:	
1		3		4	
2		4		4	
SHEET NO.					S2-8
TOTAL SHEETS					35

DRAWN BY : B.E. LANNING	DATE : 01/18
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

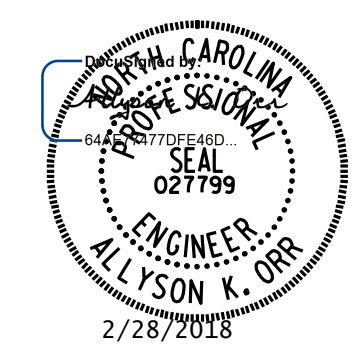




**PART PLAN OF SPAN B AND PLAN OF SPAN C**

- NOTES:**
- FOR REINFORCING STEEL IN BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEETS.
  - FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEETS.
  - FOR LOCATION OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.
  - FOR TOP AND BOTTOM "B" BARS NOT SHOWN, SEE SHEET 3 OF 3.
  - #4 S1, #4 S2 & #4 U1 TO MATCH WITH #4 "V" BARS IN INTEGRAL END BENT CAP.
  - FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "SUPERSTRUCTURE TYPICAL SECTION AND DETAILS" SHEET 2 OF 3.
  - FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 3



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

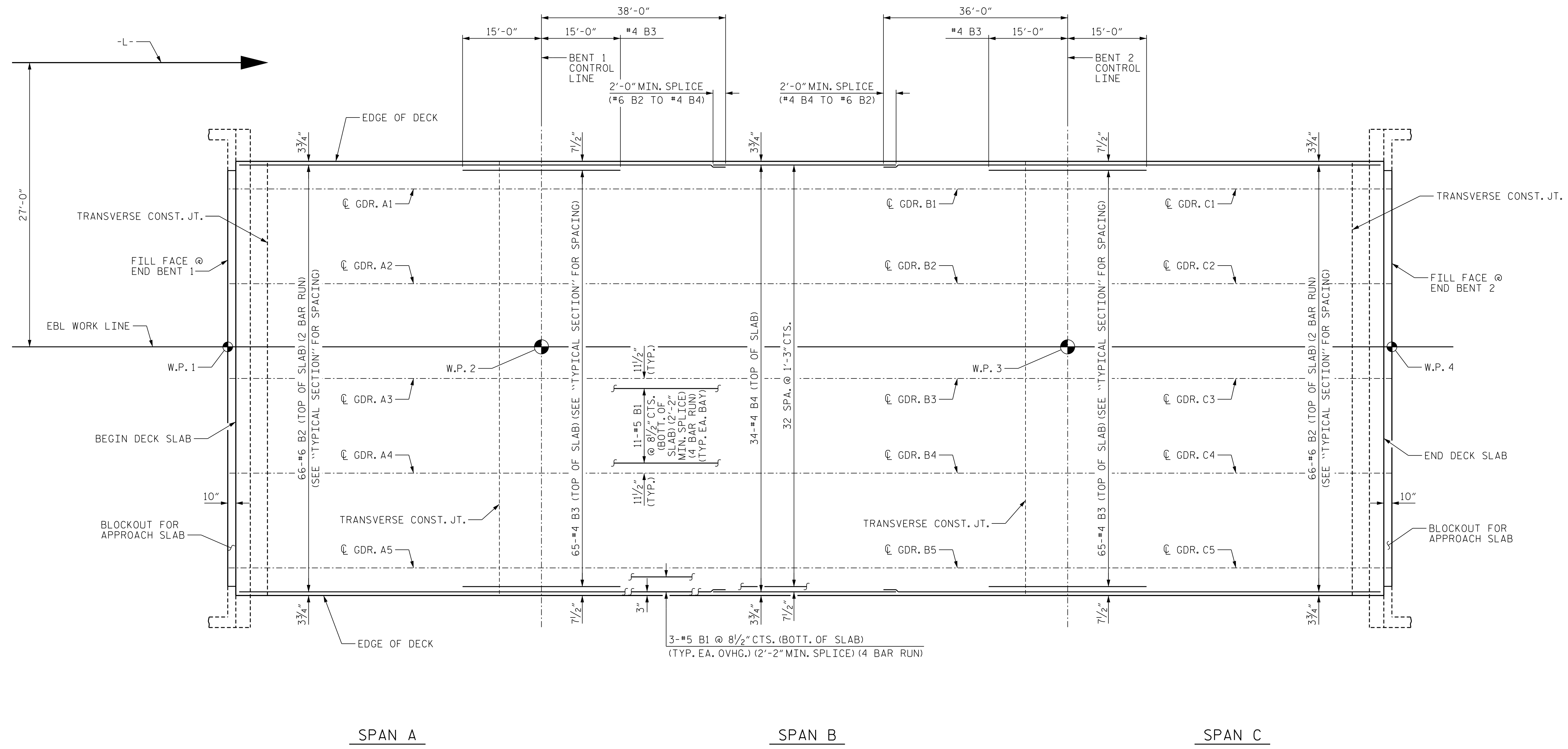
**SUPERSTRUCTURE  
 PLAN OF SPANS  
 PART OF SPAN B  
 AND SPAN C  
 (EBL)**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-9 TOTAL SHEETS 35
2			4			

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

2/8/2018 11:28:45 AM User: blanning  
 Filenamer: P:\NC Bridges\MI600135 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.017.B5351.SMU.PS2.400237.dgn

2/8/2018 11:28:47 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.019.B5351.SMU.PS3.400237.dgn



**PLAN - "B" BAR LAYOUT**

**NOTES**  
 SEE "TYPICAL SECTION AND DETAILS" SHEETS FOR TRANSVERSE BAR SPACING.  
 GUTTERLINE NOT SHOWN FOR CLARITY.

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 3 OF 3



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

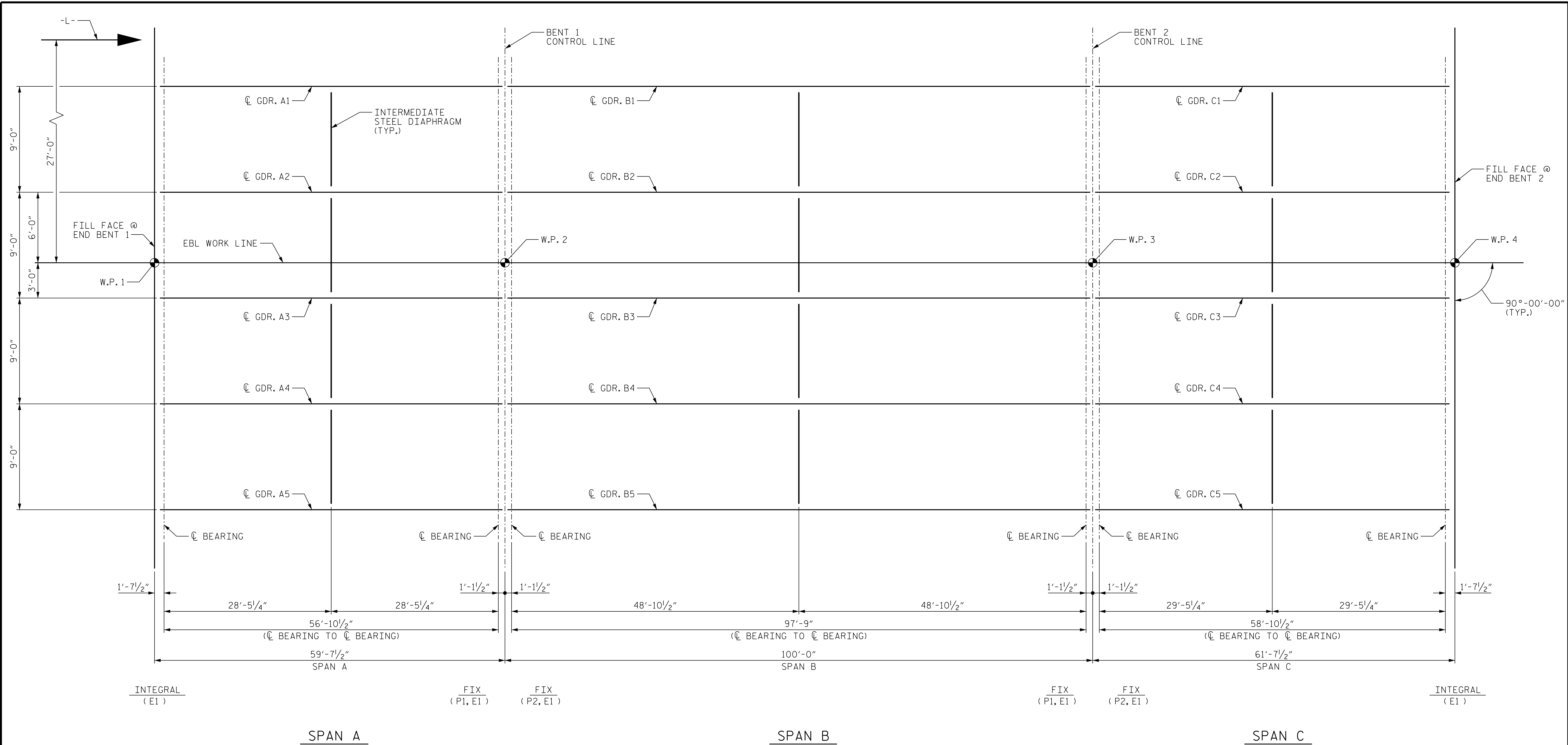
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS  
 "B" BAR LAYOUT  
 (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

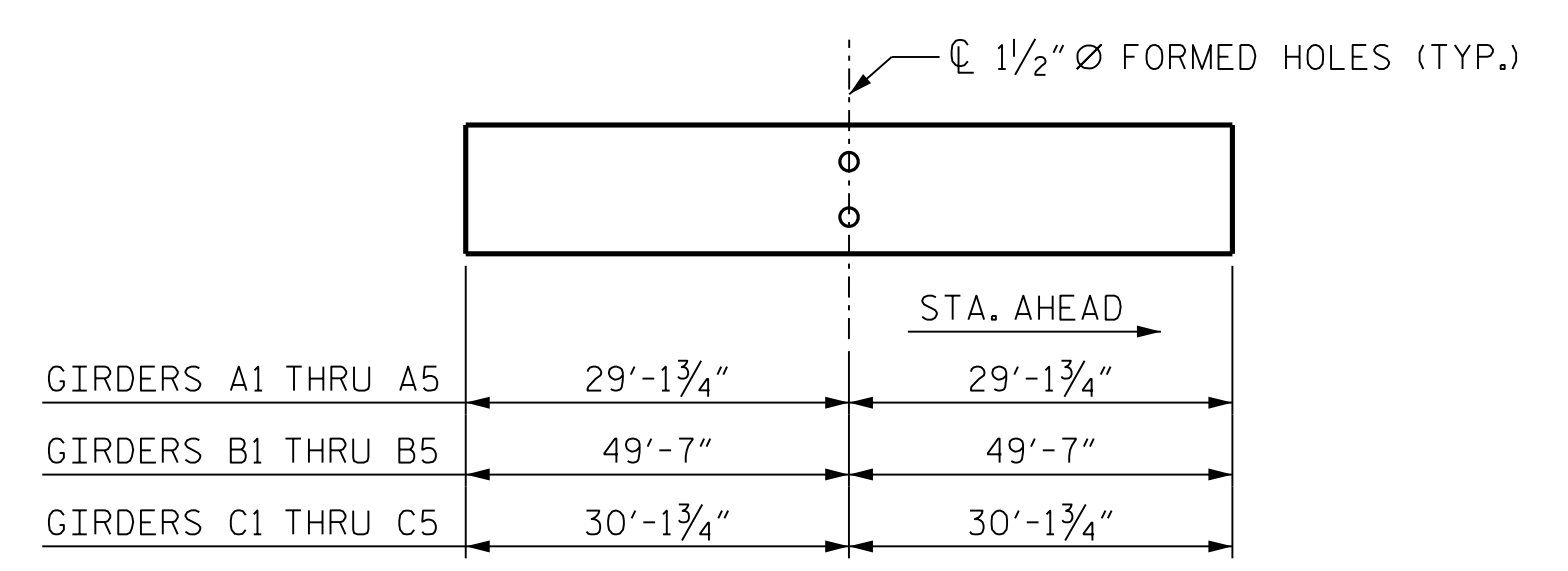
DRAWN BY : B.E. LANNING	DATE : 01/18
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18



2/8/2018 11:28:49 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.021.B5351.SMU.FPI.40237.dgn

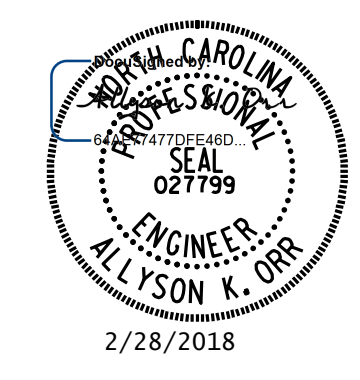


**FRAMING PLAN**



**GIRDER ELEVATION**  
MEASUREMENTS GIVEN ALONG BOTTOM OF GIRDER

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



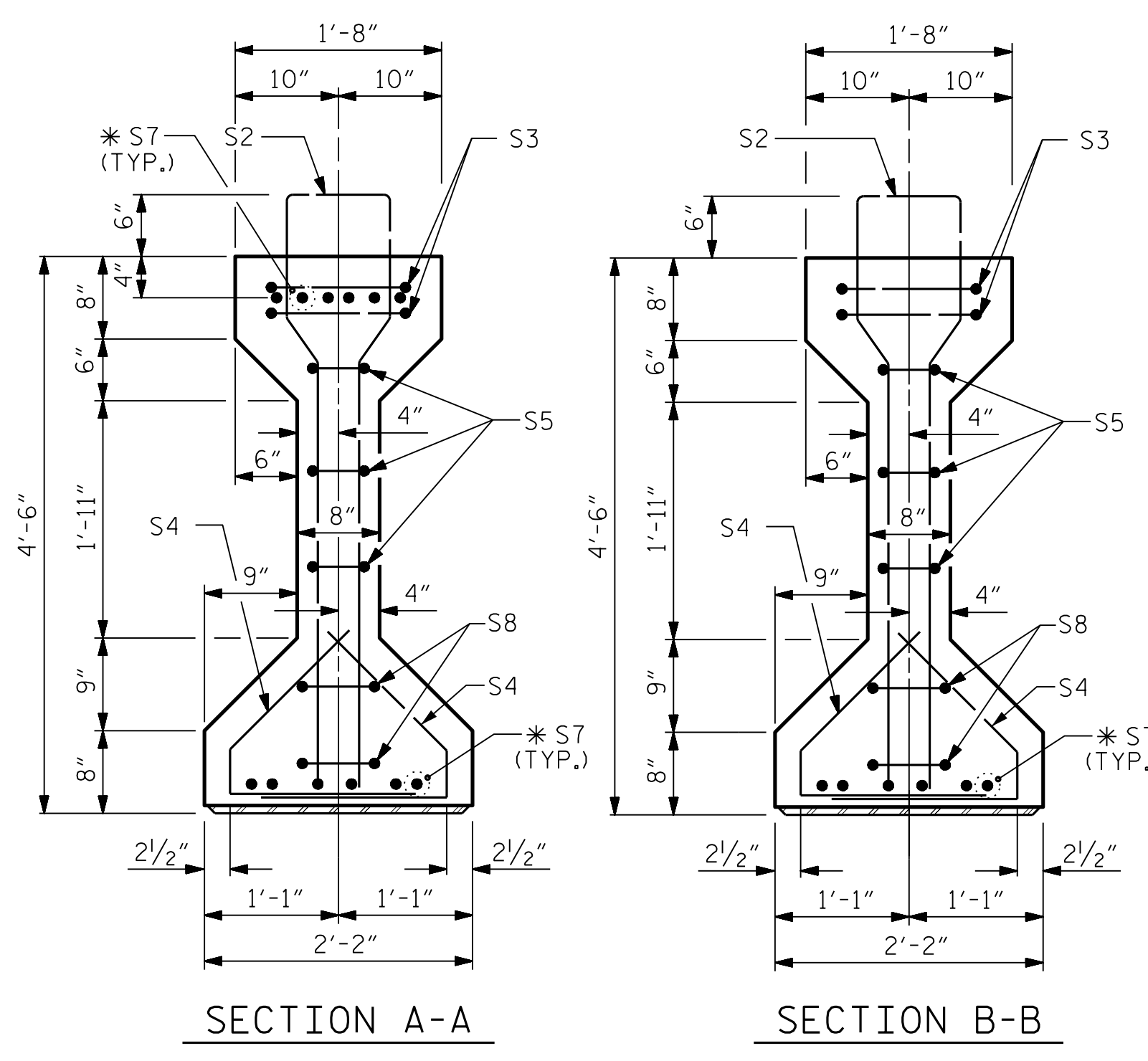
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SUPERSTRUCTURE  
 FRAMING PLAN**

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

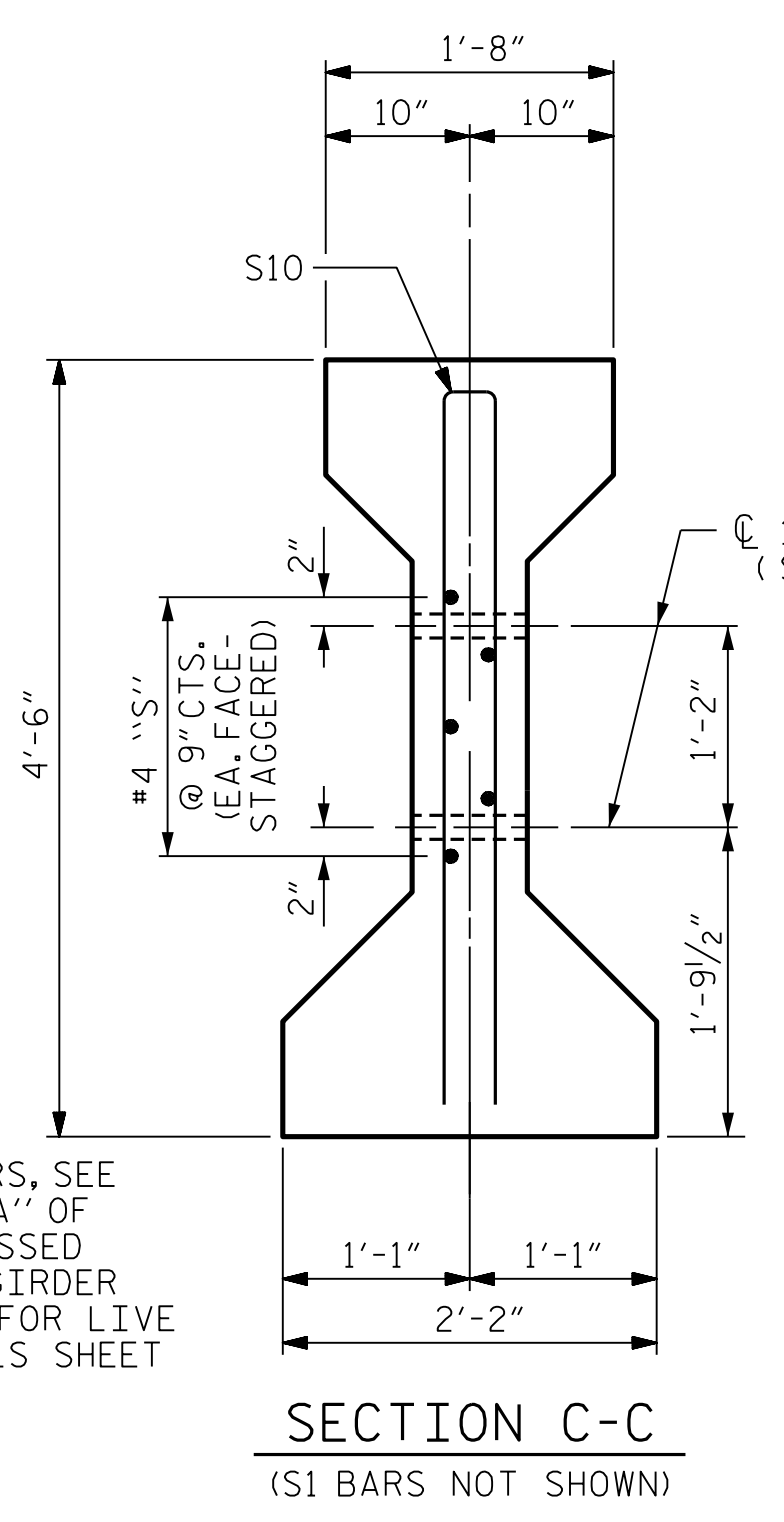
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

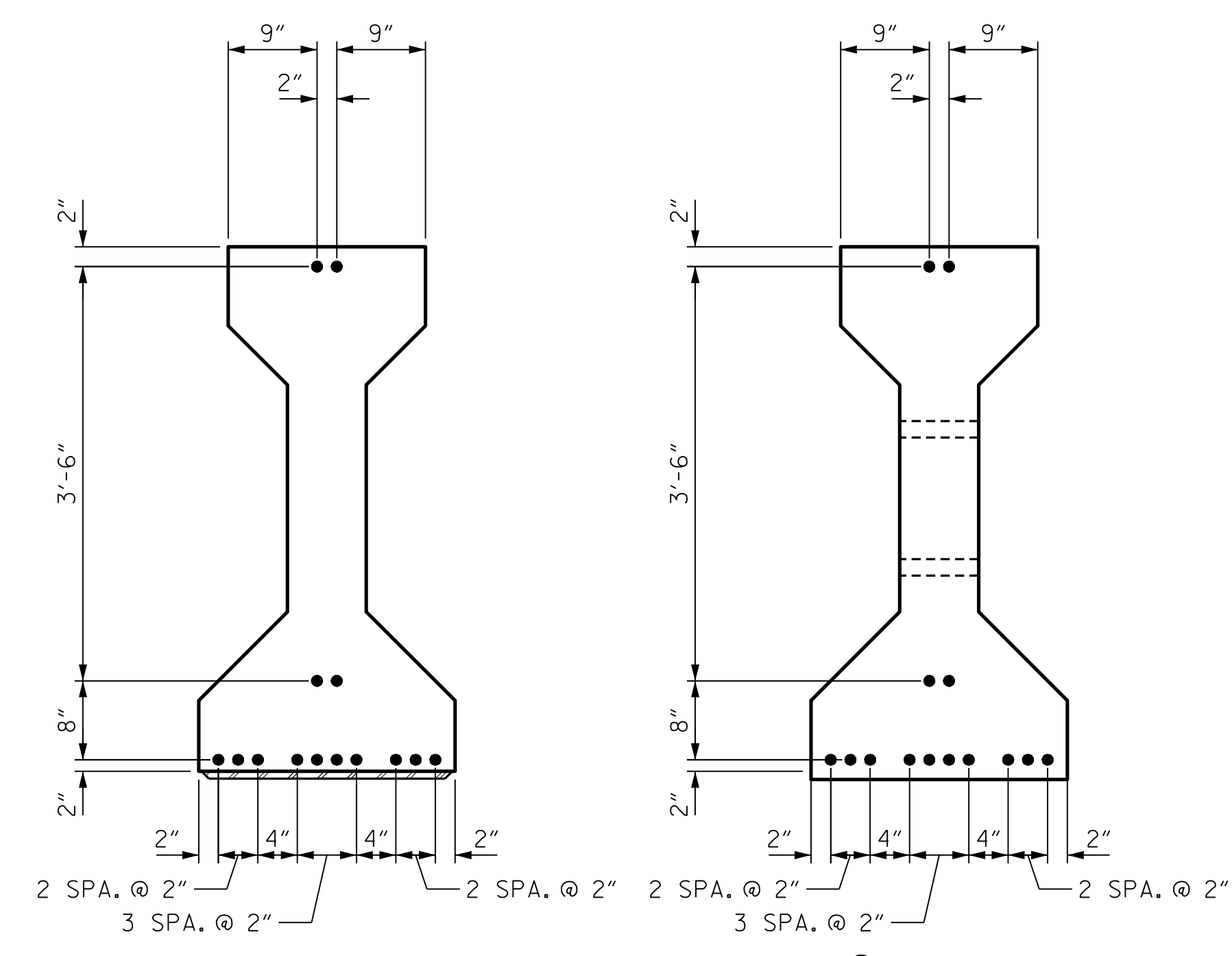
DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18



\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



1/2" Ø FORMED HOLE  
(SEE FRAMING PLAN  
FOR LOCATION)



AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

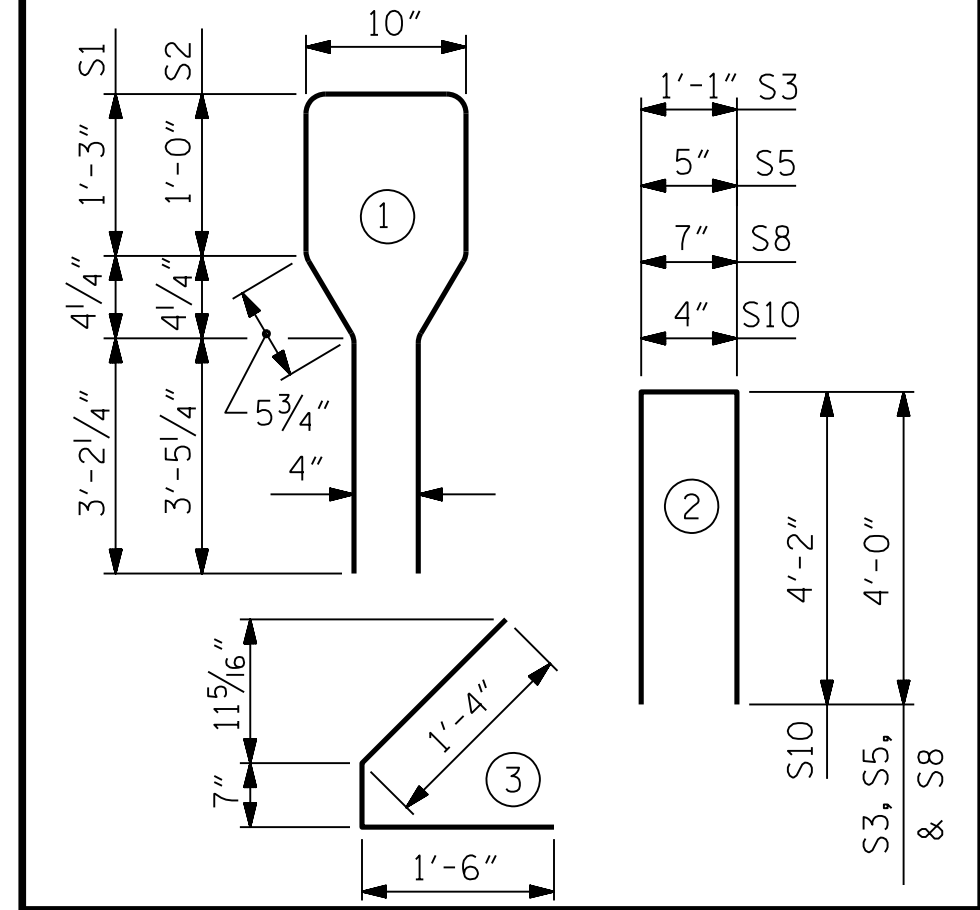
DEBONDING LEGEND  
• FULLY BONDED STRAND

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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	60	#4	1	10'-8"	428
S2	12	#5	1	10'-8"	134
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

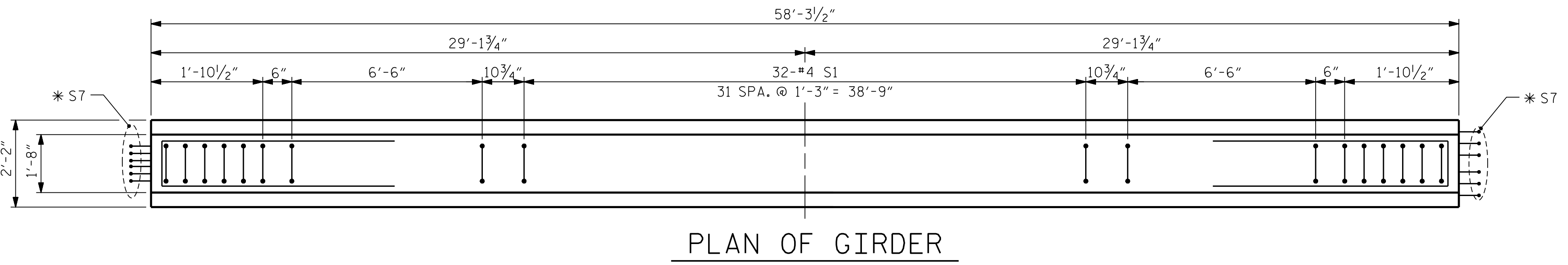
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES  
ALL BAR DIMENSIONS ARE OUT-TO-OUT.

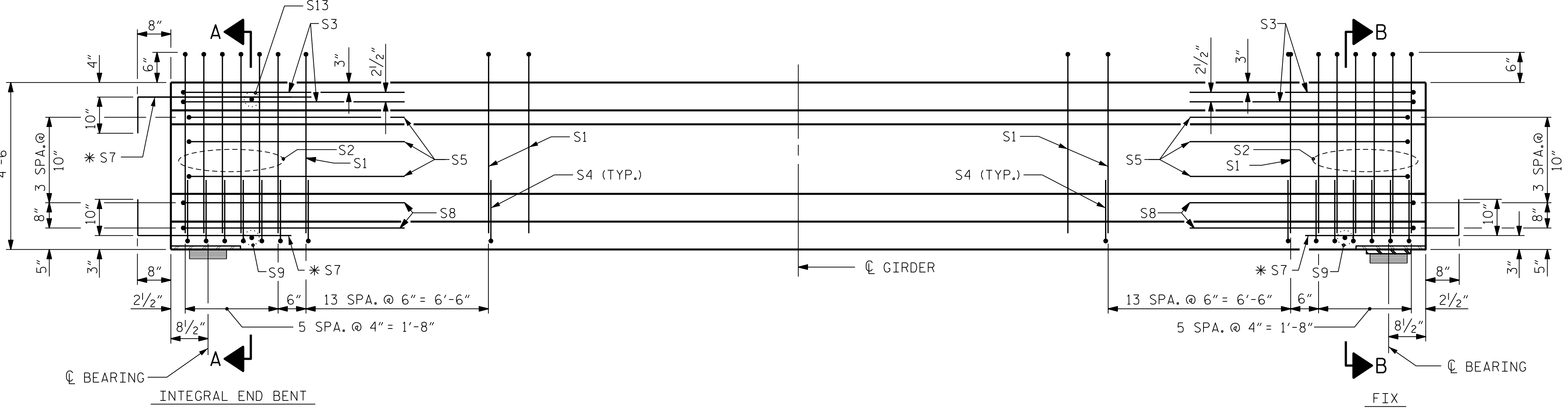


QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	5000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
ALL	938	11.8	14

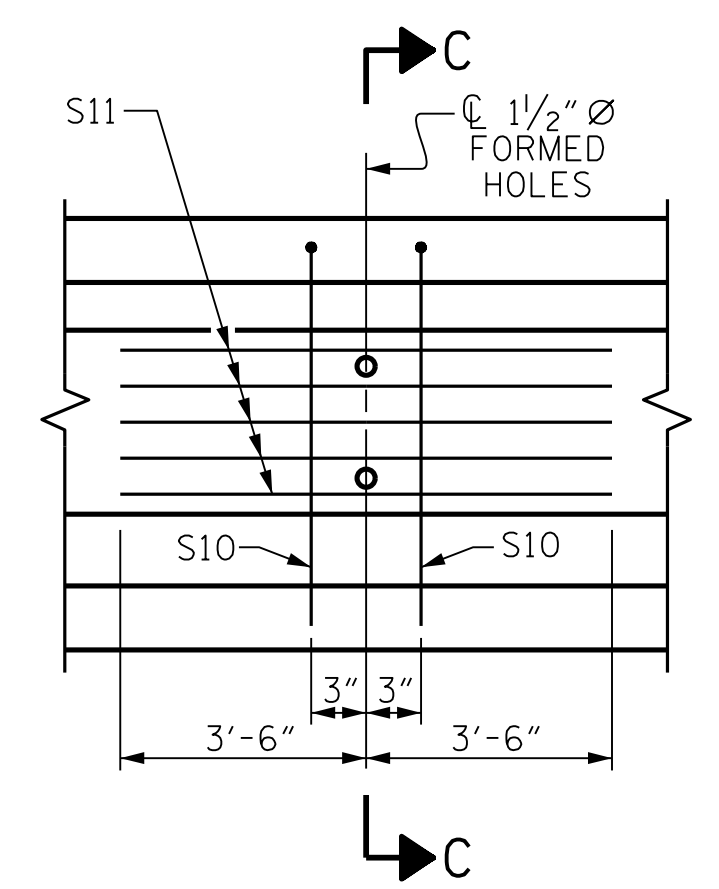
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	58.29 FT.	291.46 FT.



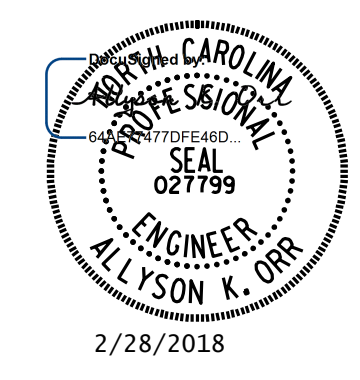
PLAN OF GIRDER



ELEVATION OF GIRDER  
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

PROJECT NO. B-5351  
GUILFORD COUNTY  
STATION: 23+26.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN A  
(EBL)

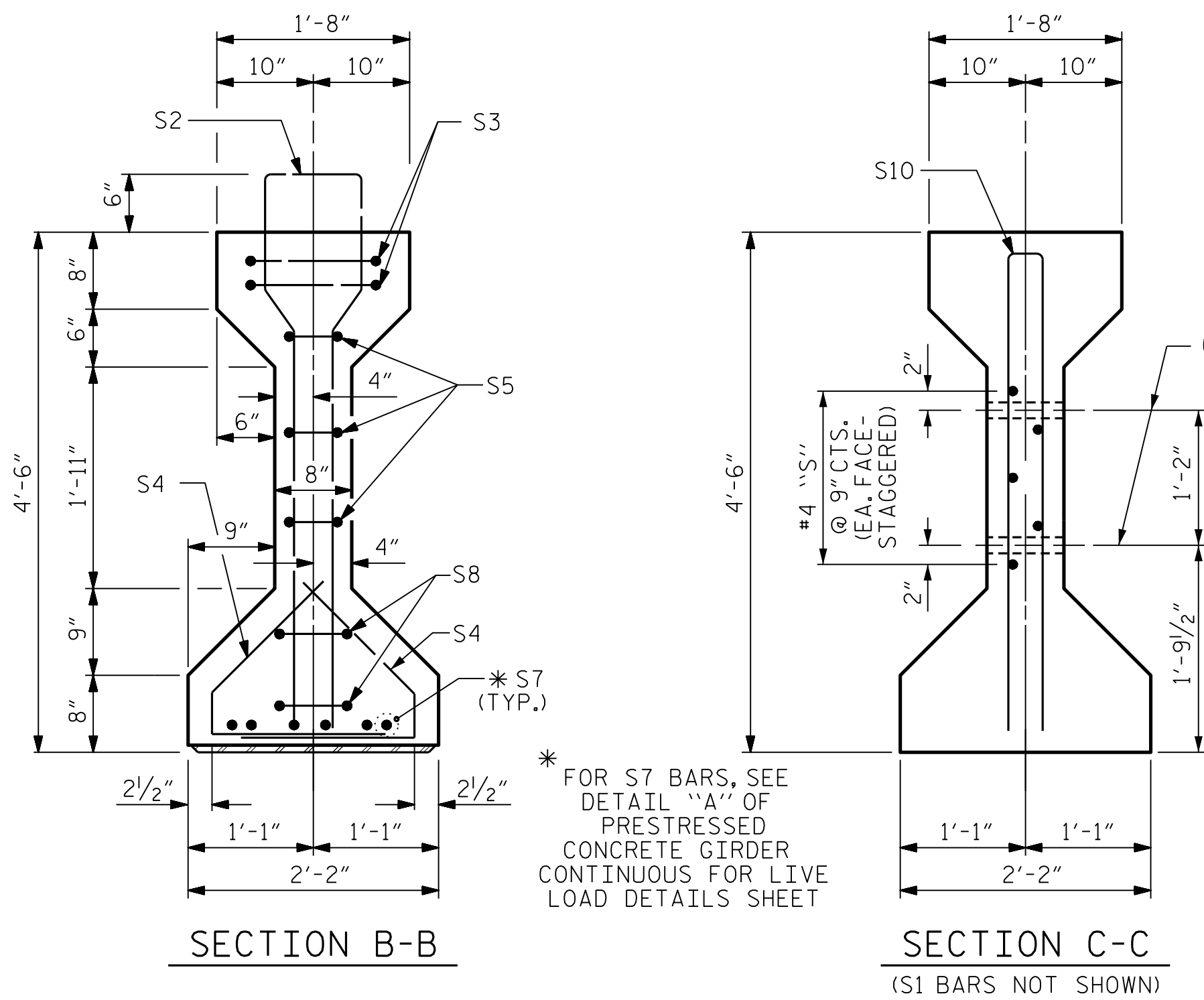
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS 35
2			4			

STD. NO. PCG6 (Sht. 2)

2/8/2018 11:28:51 AM  
 User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.023-B5351-SMU-PCG1-400237.dgn

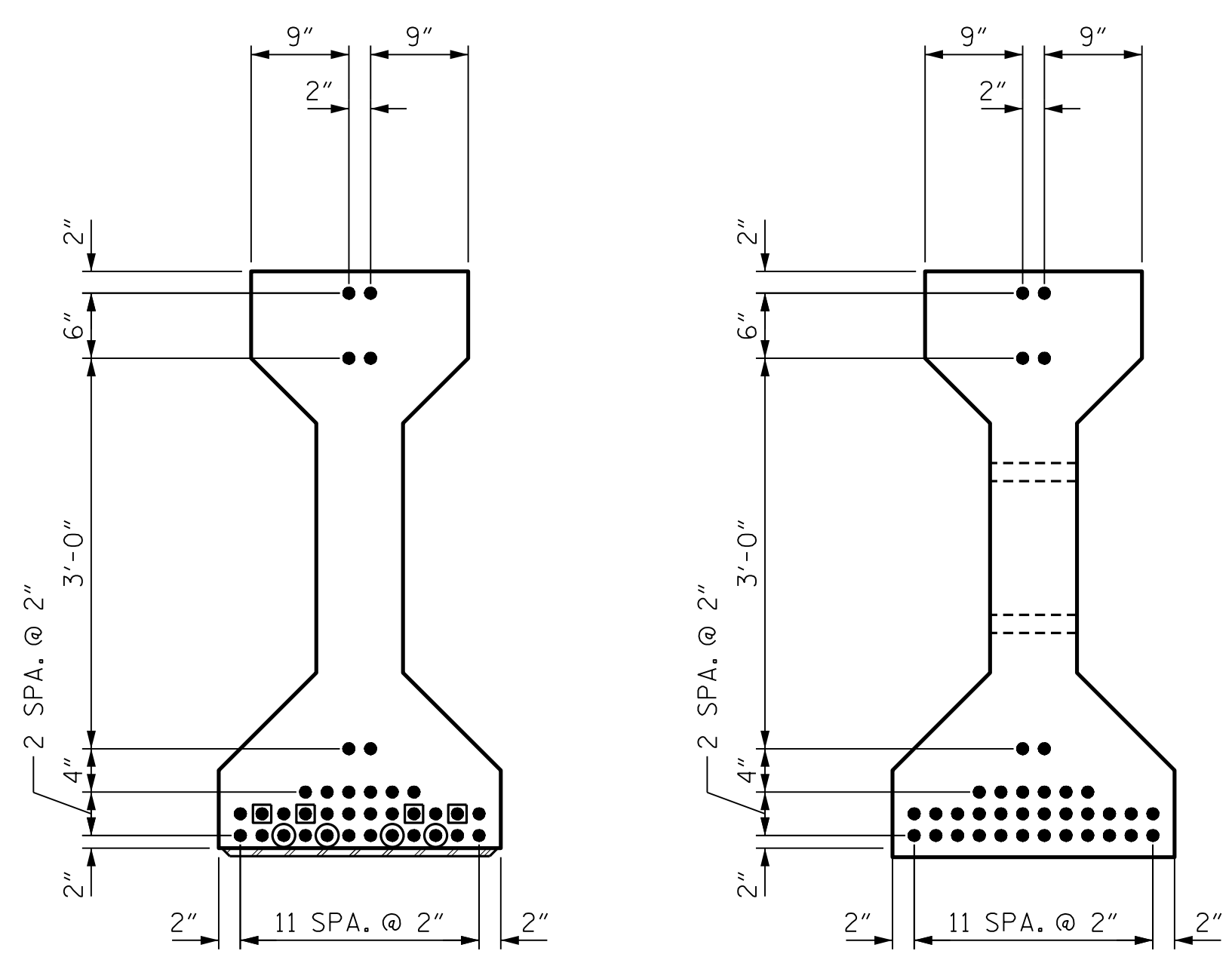
ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY: GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC





\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET

1/2" Ø FORMED HOLE  
(SEE FRAMING PLAN  
FOR LOCATION)



AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

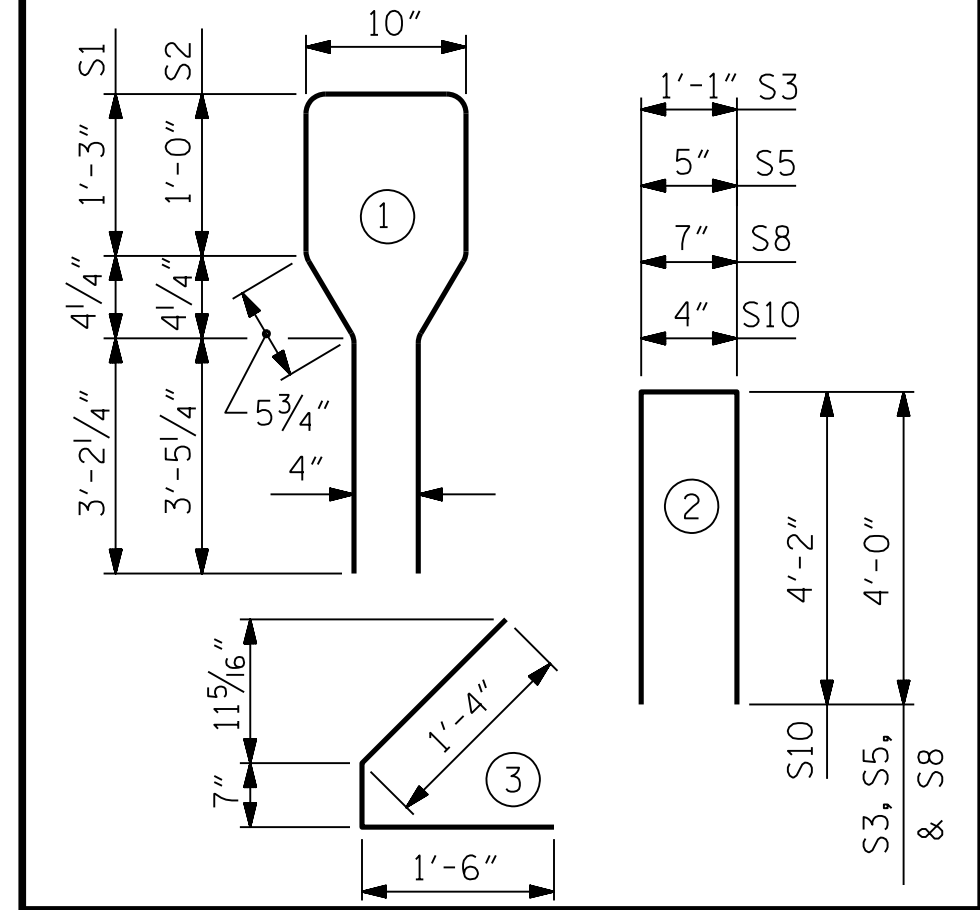
- DEBONDING LEGEND**
- FULLY BONDED STRAND
  - STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
  - STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	94	#4	1	10'-8"	670
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
S5	6	#4	2	8'-5"	34
* S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

**BAR TYPES**  
ALL BAR DIMENSIONS ARE OUT-TO-OUT.

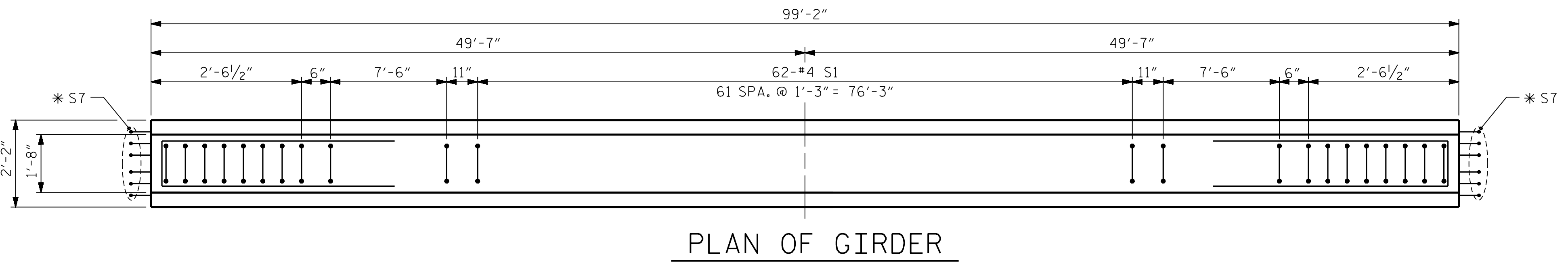


**QUANTITIES FOR ONE GIRDER**

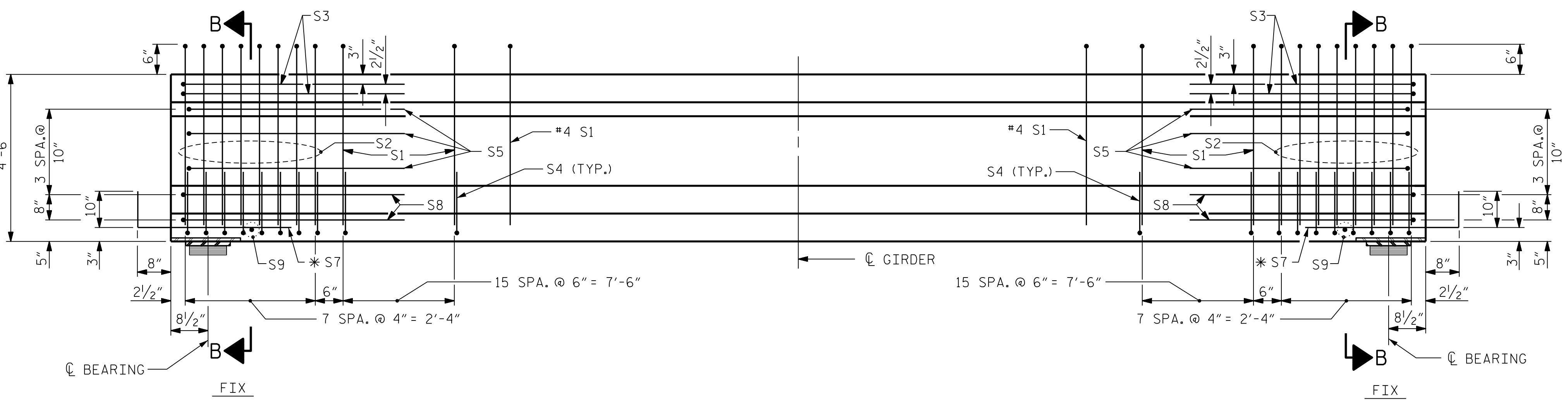
	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
ALL	1314	20.1	36

**GIRDERS REQUIRED**

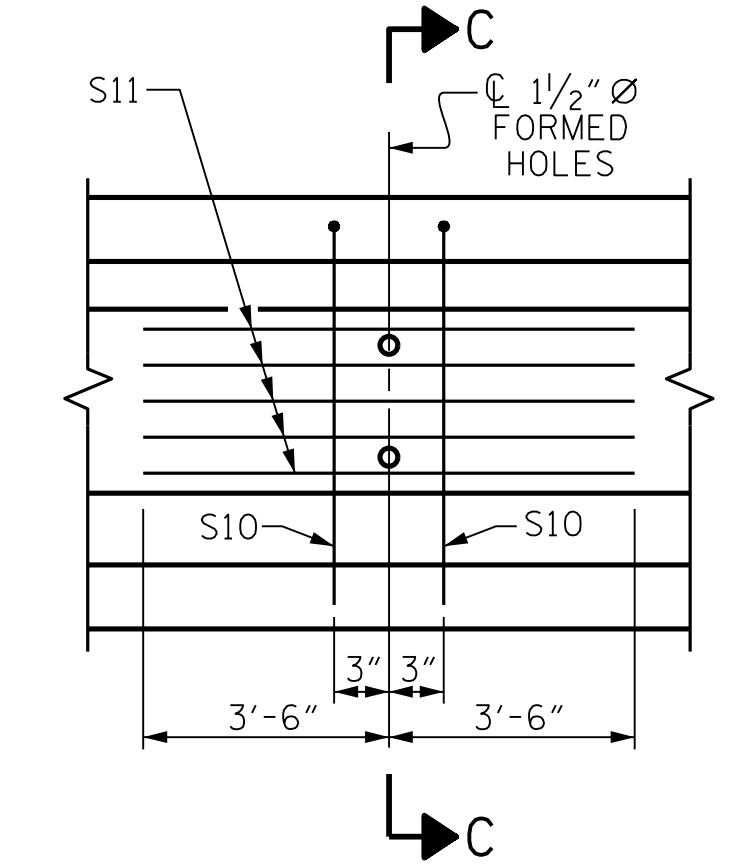
NUMBER	LENGTH	TOTAL LENGTH
5	99.17 FT.	495.83 FT.



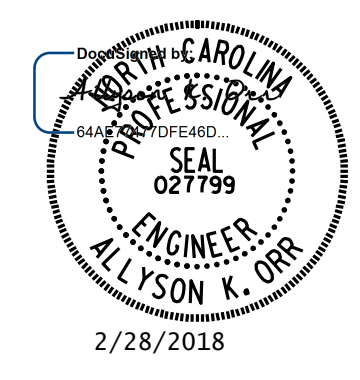
PLAN OF GIRDER



ELEVATION OF GIRDER  
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER : P-0671

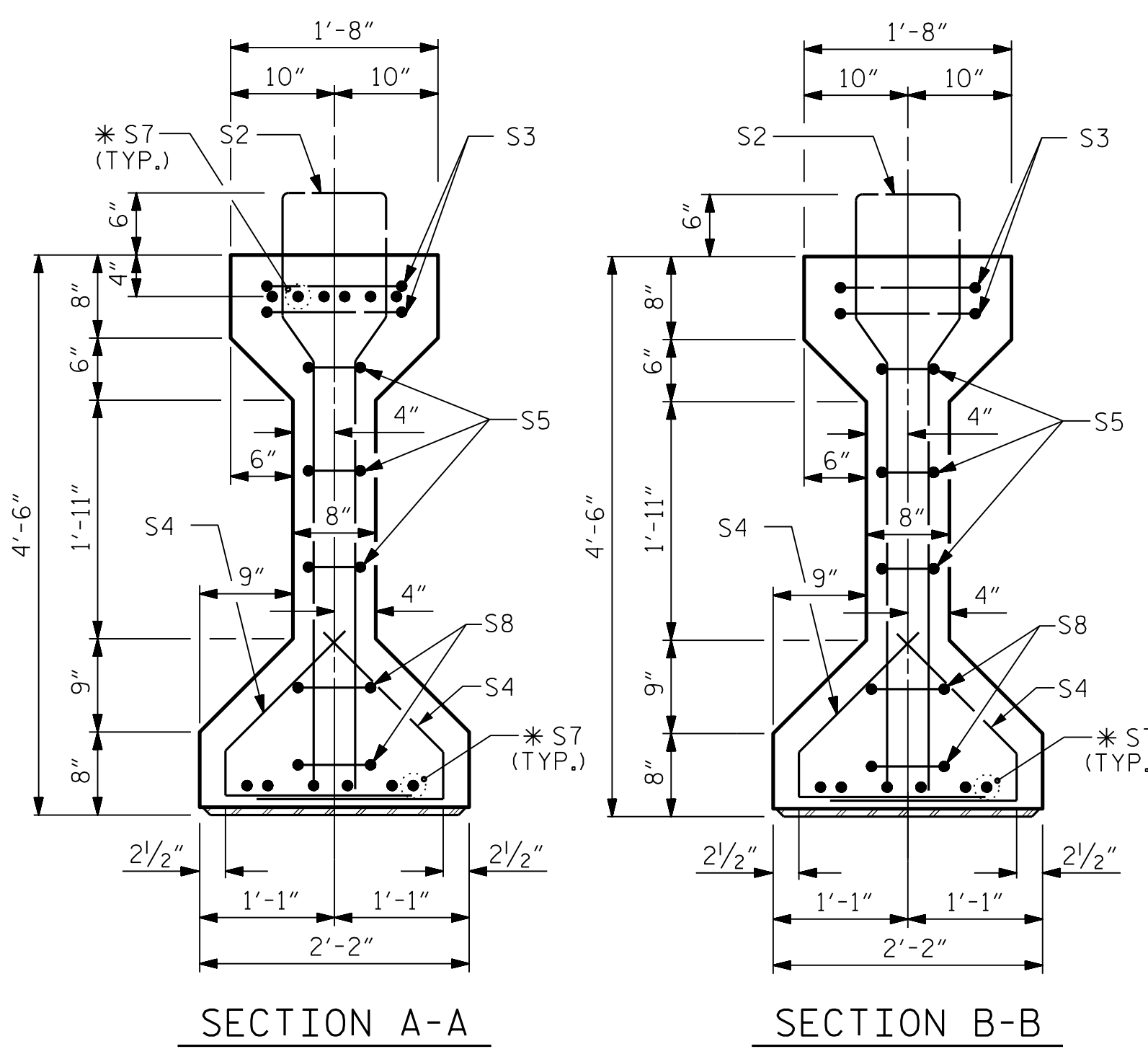
PROJECT NO. B-5351  
GUILFORD COUNTY  
STATION: 23+26.00 -L-  
SHEET 2 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN B (EBL)

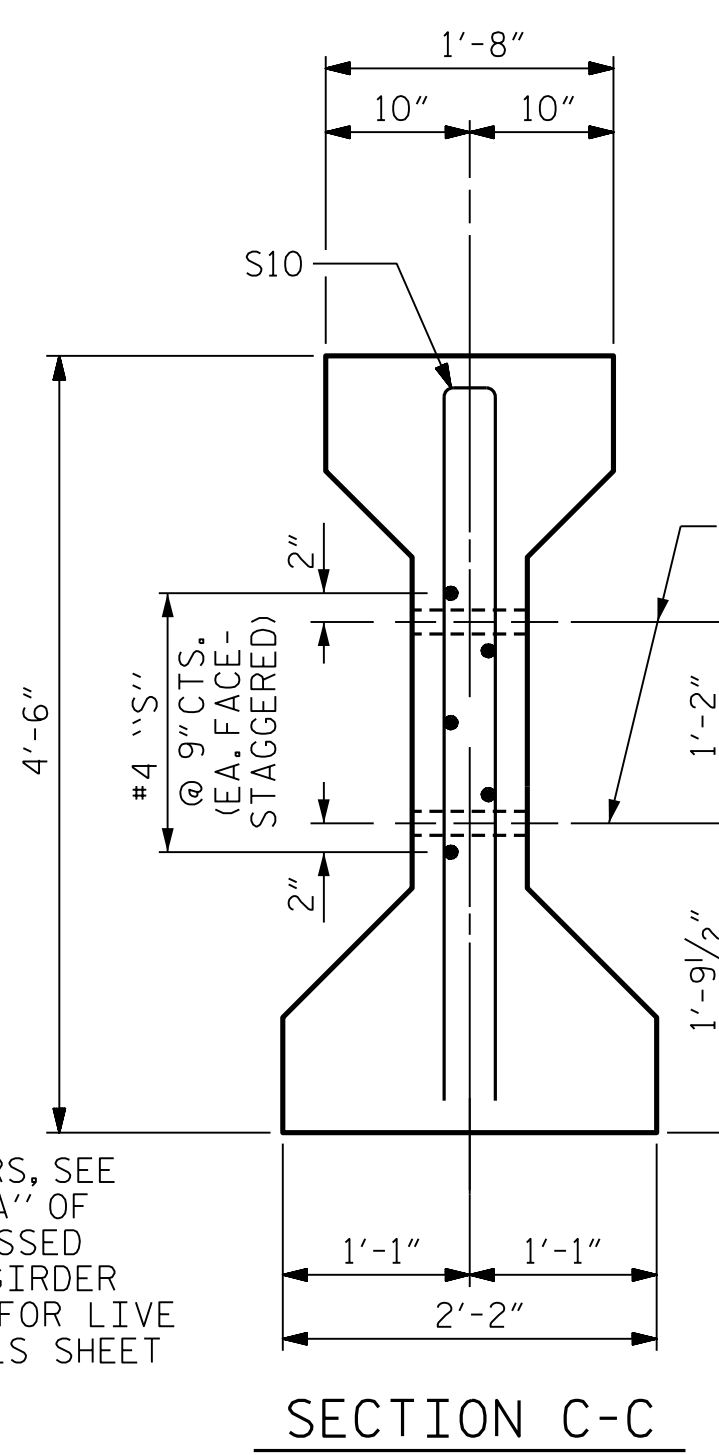
REVISIONS						SHEET NO. <b>S2-13</b>
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS <b>35</b>
2			4			

2/8/2018 11:28:53 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co-B-5351\Structures\RIGHT LANE (EBL)\402.025-B5351-SMU-PCG2-400237.dgn

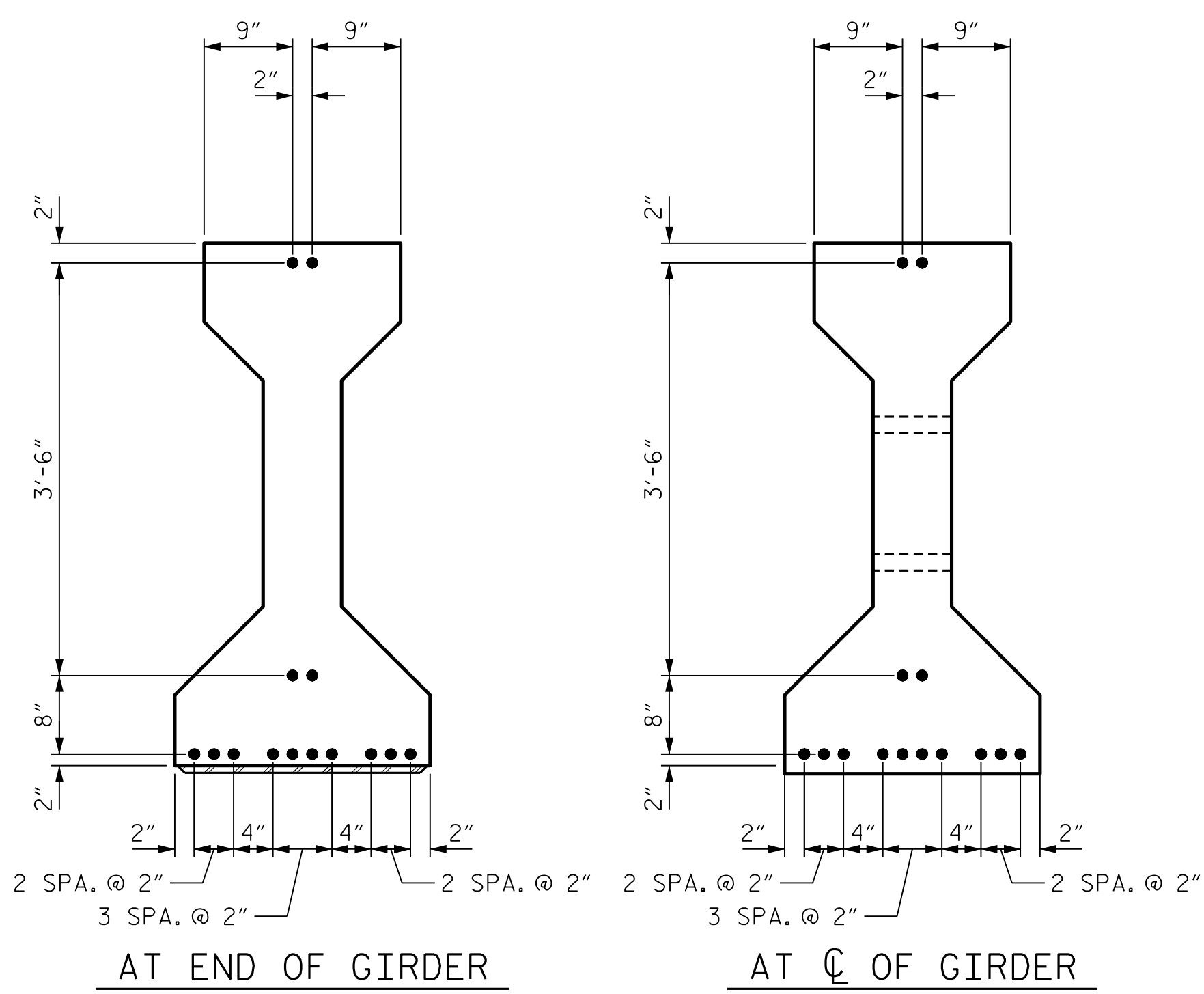
ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY: GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC



\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



1/2" Ø FORMED HOLE  
(SEE FRAMING PLAN  
FOR LOCATION)



AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

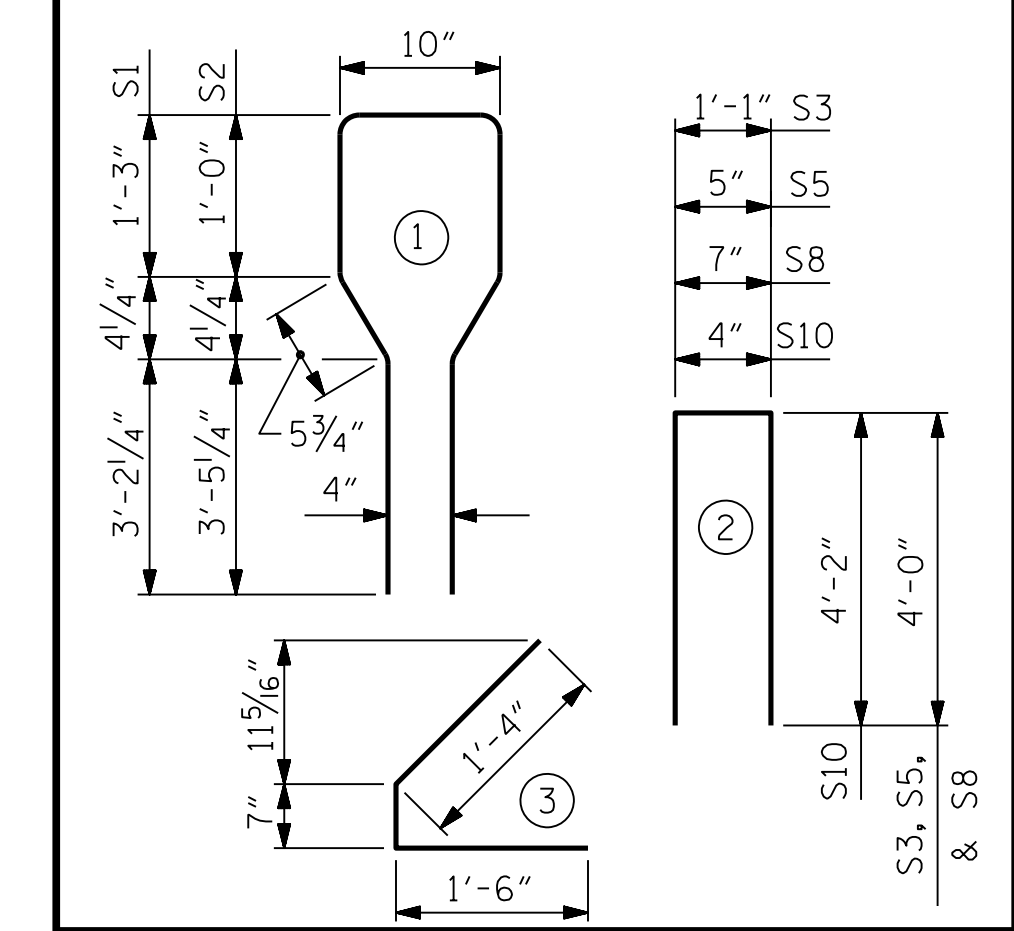
DEBONDING LEGEND  
• FULLY BONDED STRAND

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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	62	#4	1	10'-8"	442
S2	12	#5	1	10'-8"	134
S3	4	#4	2	9'-1"	24
S4	80	#4	3	3'-5"	183
S5	6	#4	2	8'-5"	34
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES  
ALL BAR DIMENSIONS ARE OUT-TO-OUT.

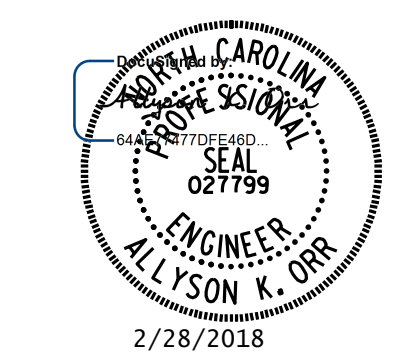


QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	5000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
ALL	952	12.2	14

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	60.29 FT.	301.45 FT.

PROJECT NO. B-5351  
GUILFORD COUNTY  
STATION: 23+26.00 -L-  
SHEET 3 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN C (EBL)



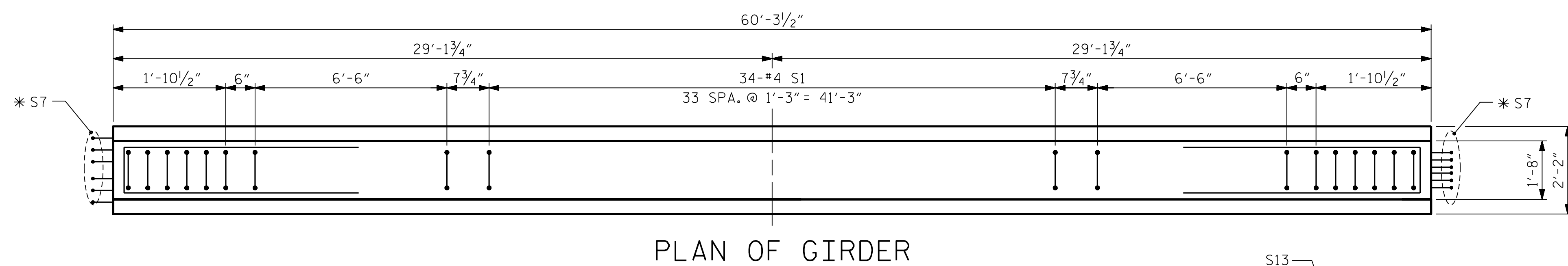
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

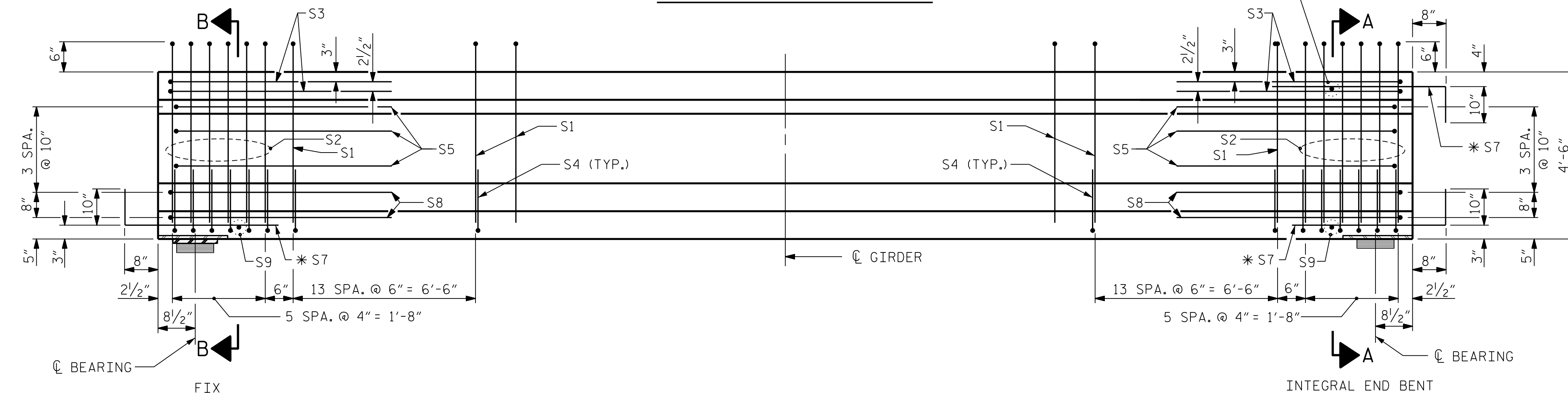
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
**S2-14**  
TOTAL SHEETS  
**35**

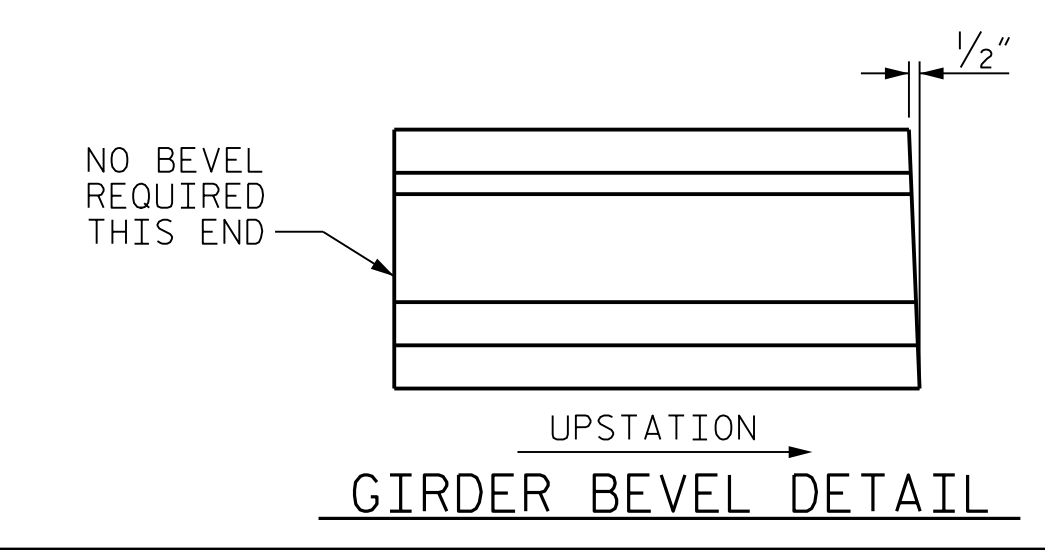
STD. NO. PCG6 (Sht. 2)



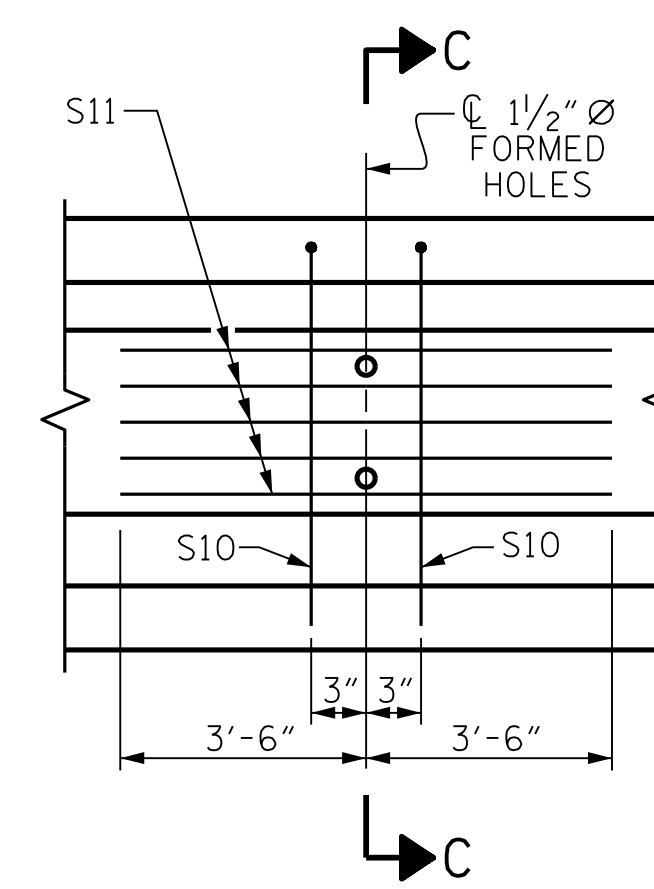
PLAN OF GIRDER



ELEVATION OF GIRDER  
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



GIRDER BEVEL DETAIL



PARTIAL ELEVATION  
SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL

2/8/2018 11:28:56 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.027-B5351-SMU-PCG3-400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY: GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC



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 SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

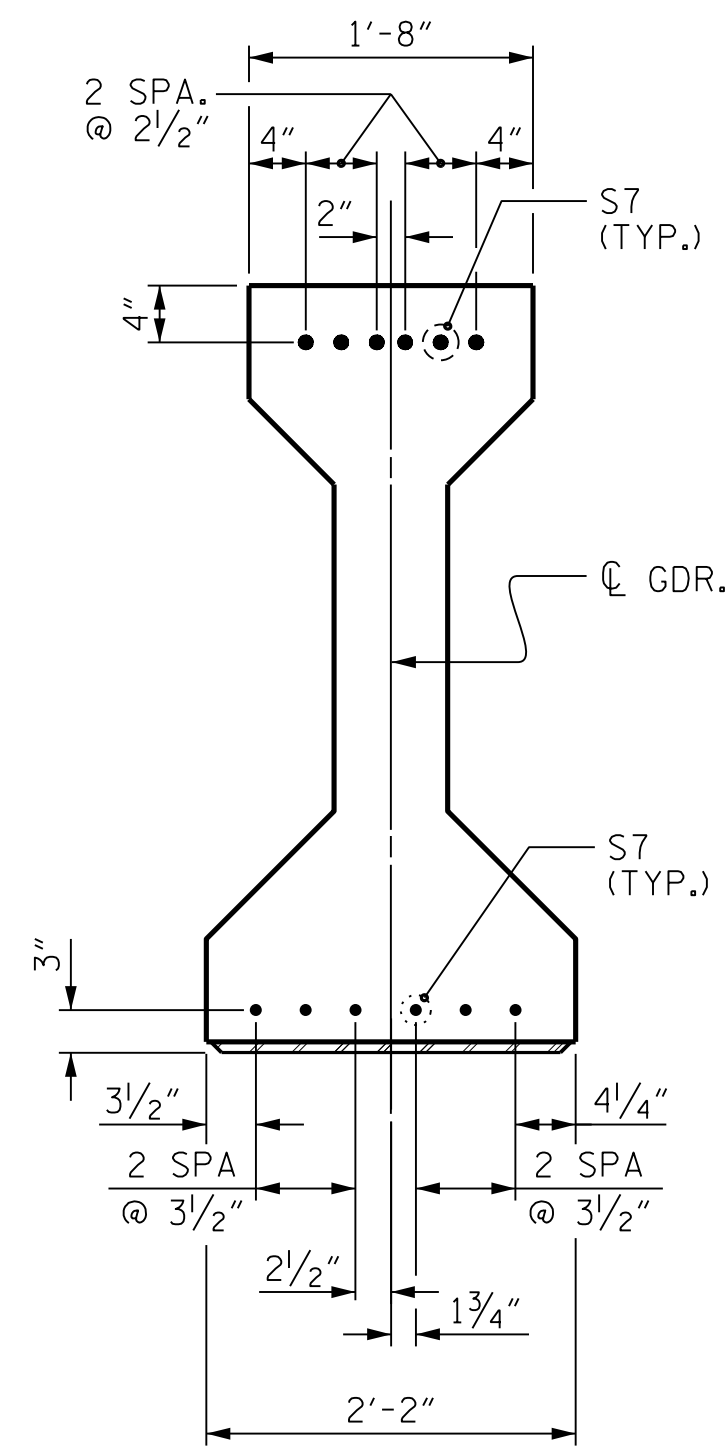
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI AT SPANS A AND C, AND 6000 PSI AT SPAN B.

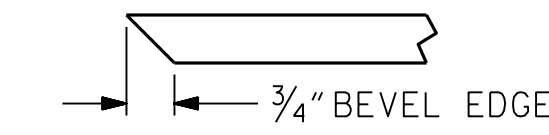
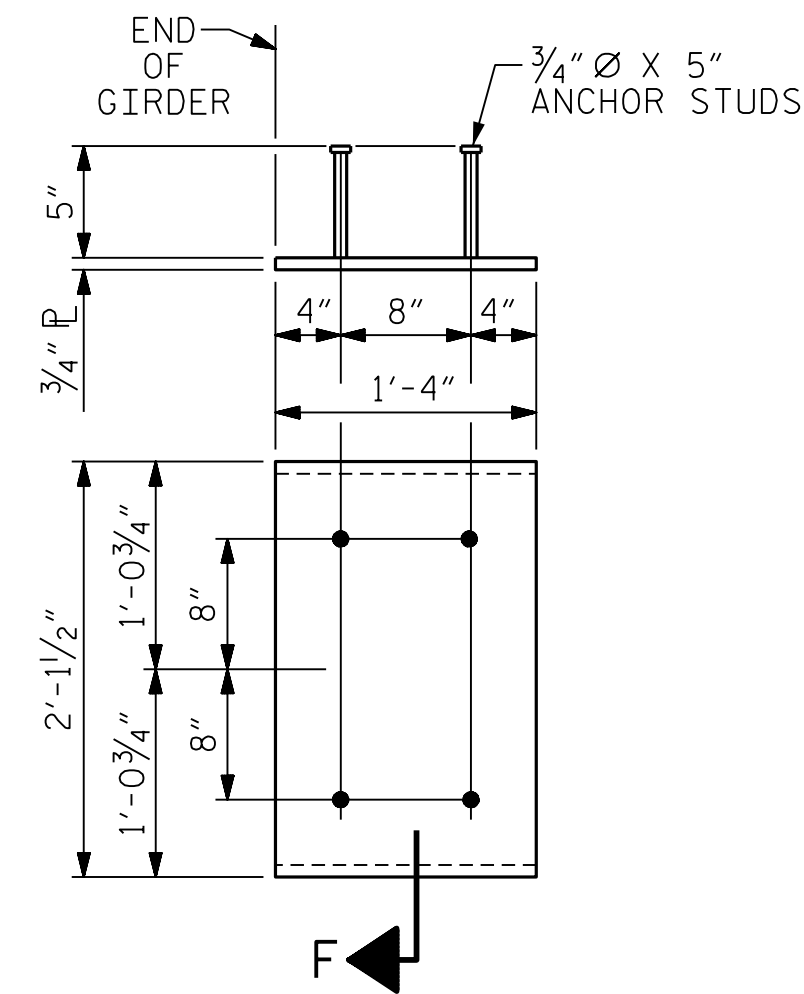
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



DETAIL "A"



SECTION "F"

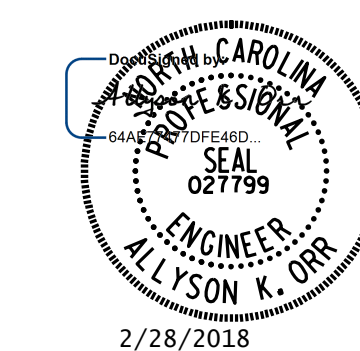
(SEE NOTES)

EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D. PER GIRDER)

2/8/2018 11:28:58 AM User: blanning  
 File: P:\NC Bridges\W16001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.029.B5351.SMU.PCC4\_400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY: GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 DETAILS  
 (EBL)

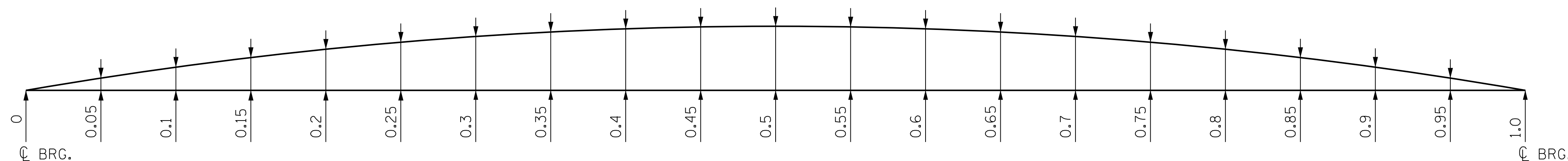
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

### DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS

GIRDER	TWENTIETH POINTS	SPAN A																			SPAN B																						
		0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0	0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
1 & 5	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.007	0.014	0.020	0.026	0.032	0.036	0.040	0.042	0.044	0.044	0.044	0.042	0.040	0.036	0.032	0.026	0.020	0.014	0.007	0	0	0.030	0.058	0.086	0.111	0.133	0.151	0.166	0.177	0.184	0.186	0.184	0.177	0.166	0.151	0.133	0.111	0.086	0.058	0.030	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.003	0.005	0.008	0.010	0.012	0.013	0.015	0.016	0.016	0.016	0.015	0.014	0.013	0.011	0.009	0.007	0.004	0.002	0	0	0	0.019	0.037	0.055	0.073	0.087	0.101	0.111	0.120	0.123	0.126	0.123	0.120	0.111	0.101	0.087	0.073	0.055	0.037	0.019	0
	FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	1/8"	1/16"	0	0	0	1/8"	1/4"	3/8"	7/16"	9/16"	5/8"	11/16"	11/16"	3/4"	3/4"	3/4"	11/16"	11/16"	5/8"	9/16"	7/16"	3/8"	1/4"	1/8"	0
2, 3 & 4	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.007	0.014	0.020	0.026	0.032	0.036	0.040	0.042	0.044	0.044	0.044	0.042	0.040	0.036	0.032	0.026	0.020	0.014	0.007	0	0	0.030	0.058	0.086	0.111	0.133	0.151	0.166	0.177	0.184	0.186	0.184	0.177	0.166	0.151	0.133	0.111	0.086	0.058	0.030	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.003	0.006	0.009	0.012	0.014	0.016	0.018	0.019	0.020	0.020	0.020	0.019	0.018	0.016	0.014	0.011	0.008	0.005	0.003	0	0	0.022	0.044	0.065	0.086	0.103	0.120	0.131	0.142	0.146	0.149	0.146	0.142	0.131	0.120	0.103	0.086	0.065	0.044	0.022	0
	FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0	0	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	0	

GIRDER	TWENTIETH POINTS	SPAN C																				
		0	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1.0
1 & 5	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.007	0.014	0.021	0.027	0.032	0.036	0.040	0.043	0.044	0.045	0.044	0.043	0.040	0.036	0.032	0.027	0.021	0.014	0.007	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.003	0.005	0.008	0.010	0.013	0.015	0.017	0.018	0.019	0.019	0.019	0.018	0.017	0.015	0.013	0.011	0.009	0.006	0.003	0
	FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	0	
2, 3 & 4	CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.007	0.014	0.021	0.027	0.032	0.036	0.040	0.043	0.044	0.045	0.044	0.043	0.040	0.036	0.032	0.027	0.021	0.014	0.007	0
	** DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.003	0.006	0.010	0.013	0.016	0.018	0.020	0.022	0.023	0.023	0.023	0.022	0.021	0.019	0.016	0.013	0.010	0.007	0.004	0
	FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	3/16"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	3/16"	3/16"	1/8"	1/16"	1/16"	0

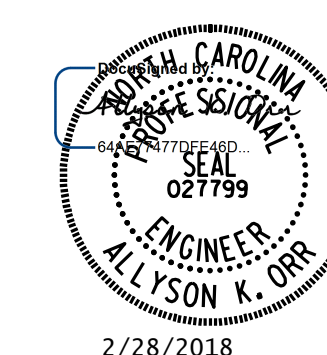
\*\* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.  
 ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM),  
 EXCEPT "FINAL CAMBER", WHICH IS SHOWN IN INCHES (FRACTION FORM).



SCHEMATIC CAMBER ORDINATES AT GIRDER TWENTIETH POINTS

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 5 OF 6



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 DEAD LOAD DEFLECTION  
 AND CAMBER TABLES**

(EBL)

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

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

2/8/2018 11:29:00 AM User: blanning  
 Filenamer: P:\NC Bridges\MI600135 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.031.B5351.SMU.PC65\_400237.dgn



**STRUCTURAL STEEL NOTES**

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

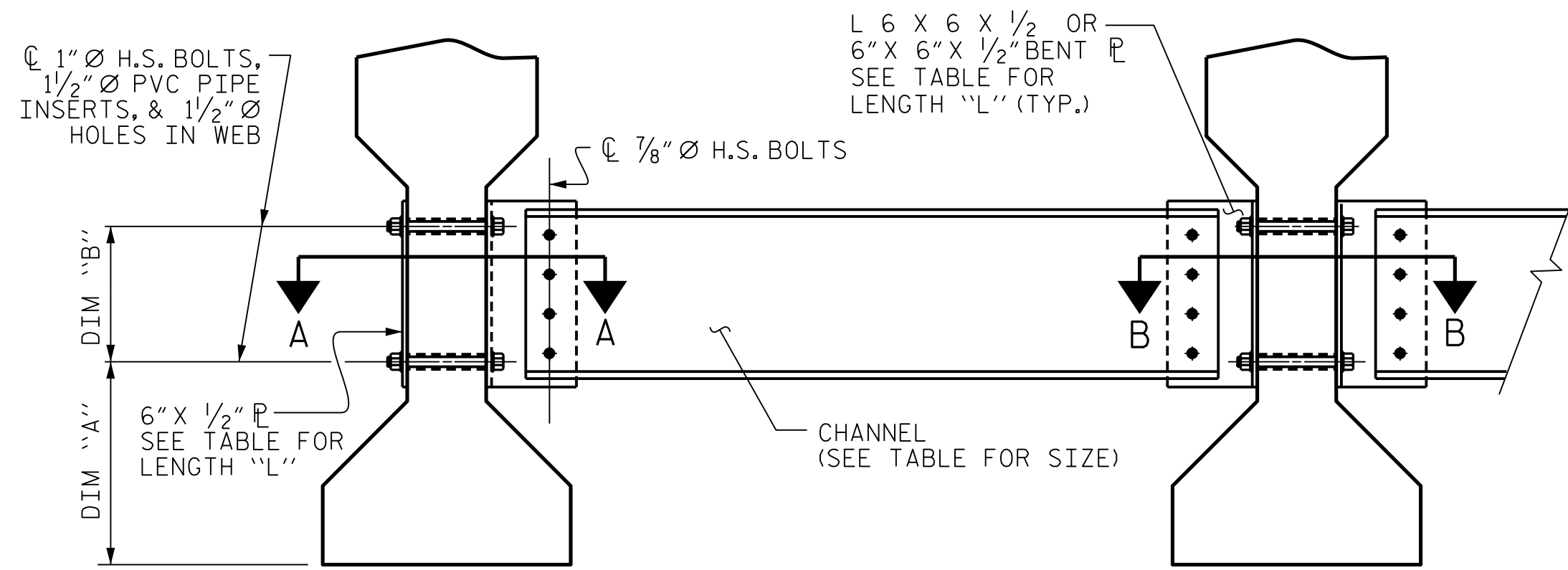
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

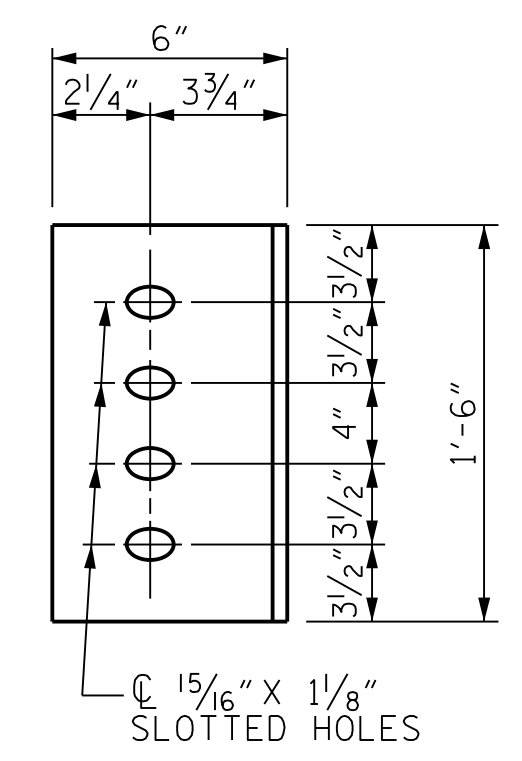
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

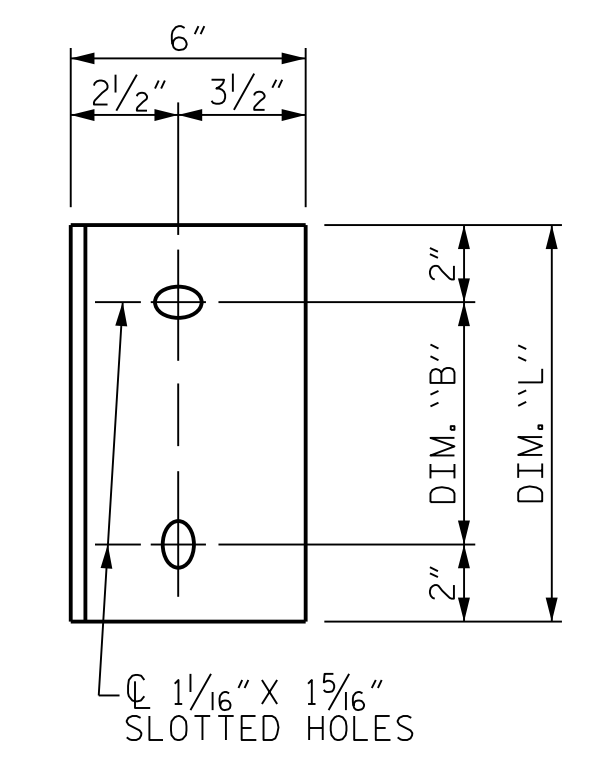


EXTERIOR GIRDER INTERIOR GIRDER

**PART SECTION AT INTERMEDIATE DIAPHRAGM**



DIAPHRAGM FACE



WEB FACE

**CONNECTOR PLATE DETAILS**

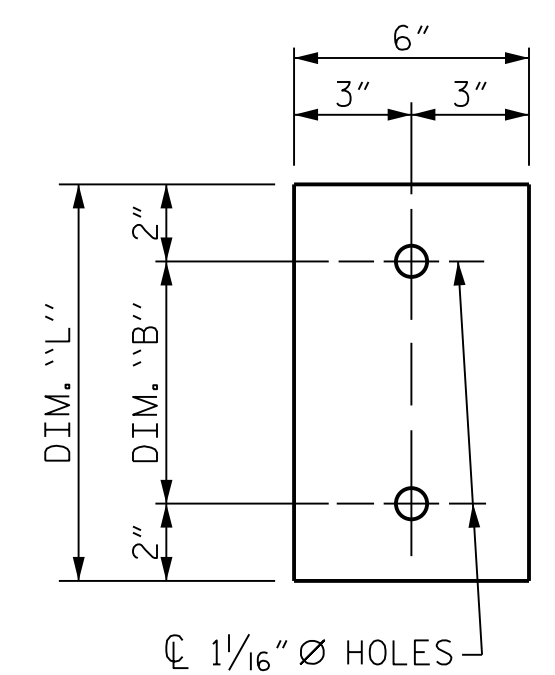
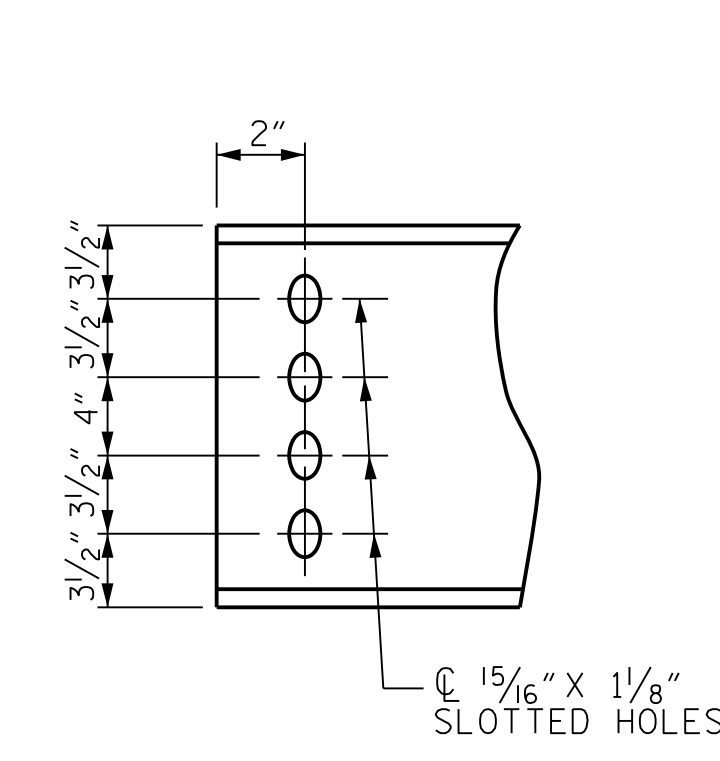
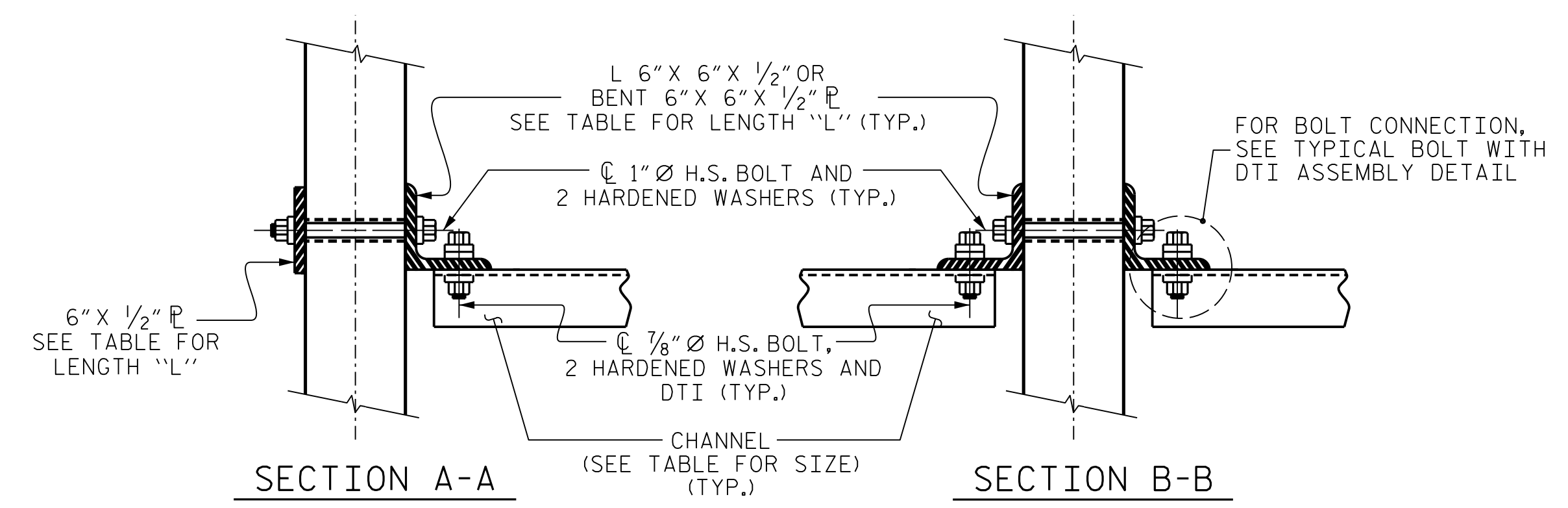


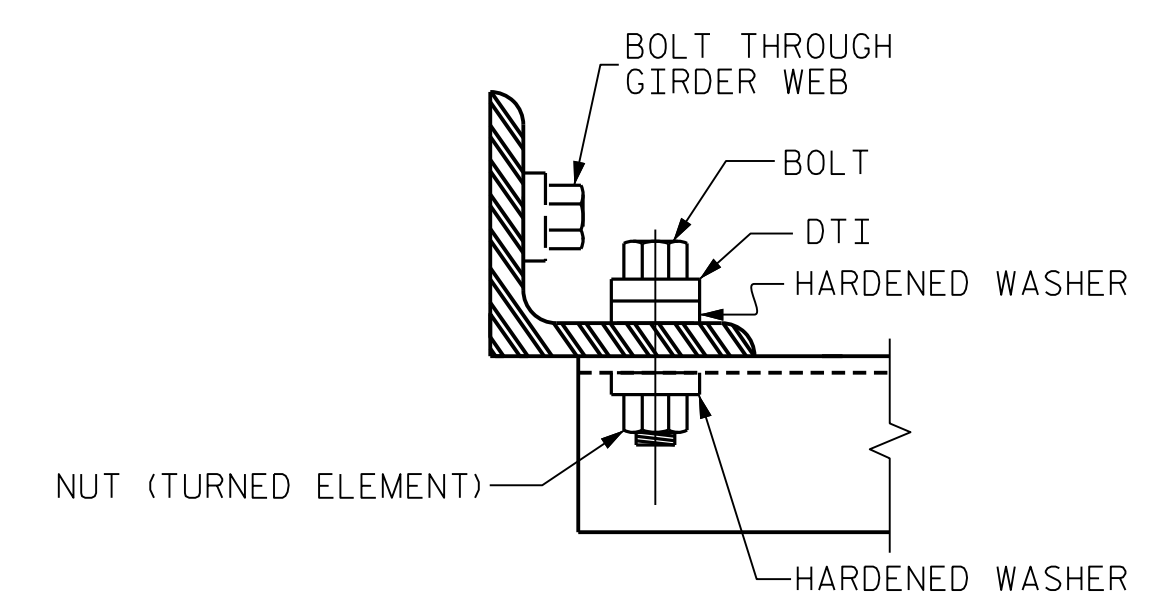
PLATE DETAILS



CHANNEL END



**CONNECTION DETAILS**



BOLT WITH DTI ASSEMBLY DETAIL

**TABLE**

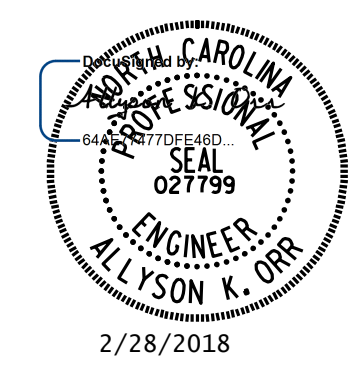
GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. **B-5351**

**GUILFORD** COUNTY

STATION: **23+26.00 -L-**

SHEET 6 OF 6



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR TYPE IV PRESTRESSED  
CONCRETE GIRDERS  
(EBL)

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

2/8/2018 11:29:02 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.033.B5351.SMU.PCC6-400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY: VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

**NOTES**

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1#2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

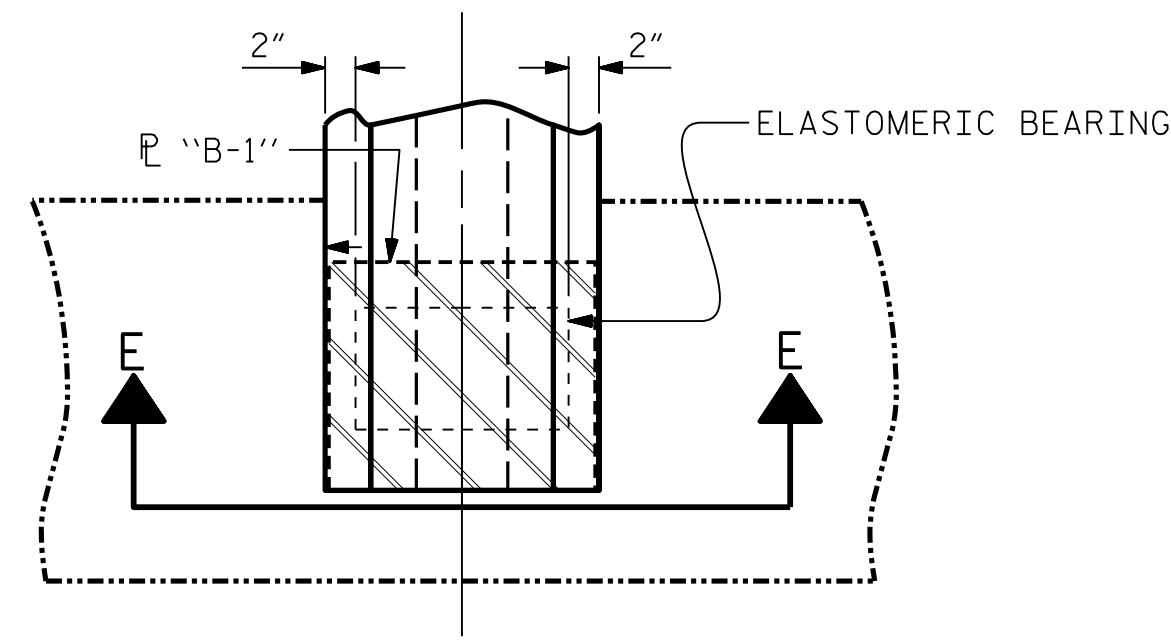
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

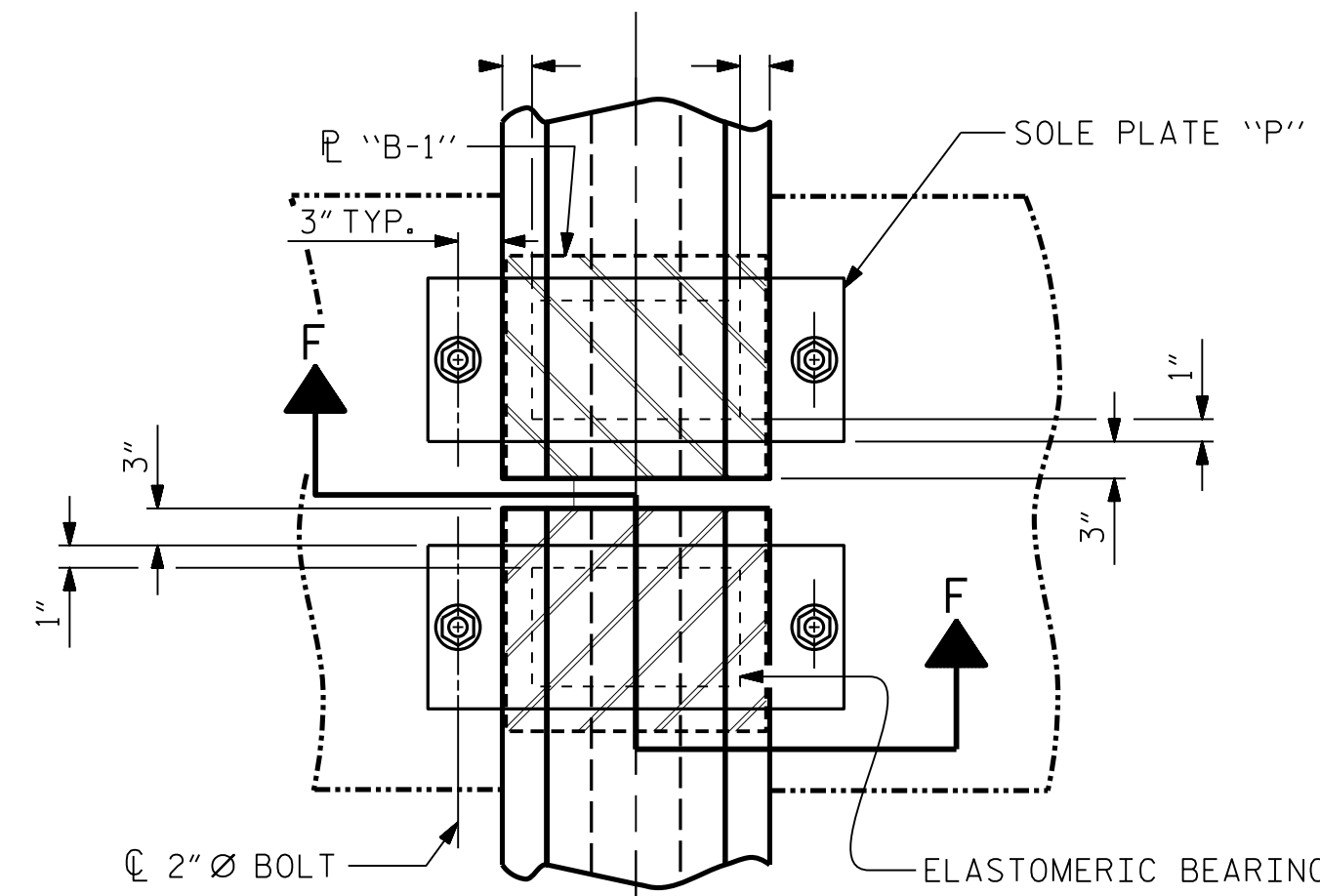
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

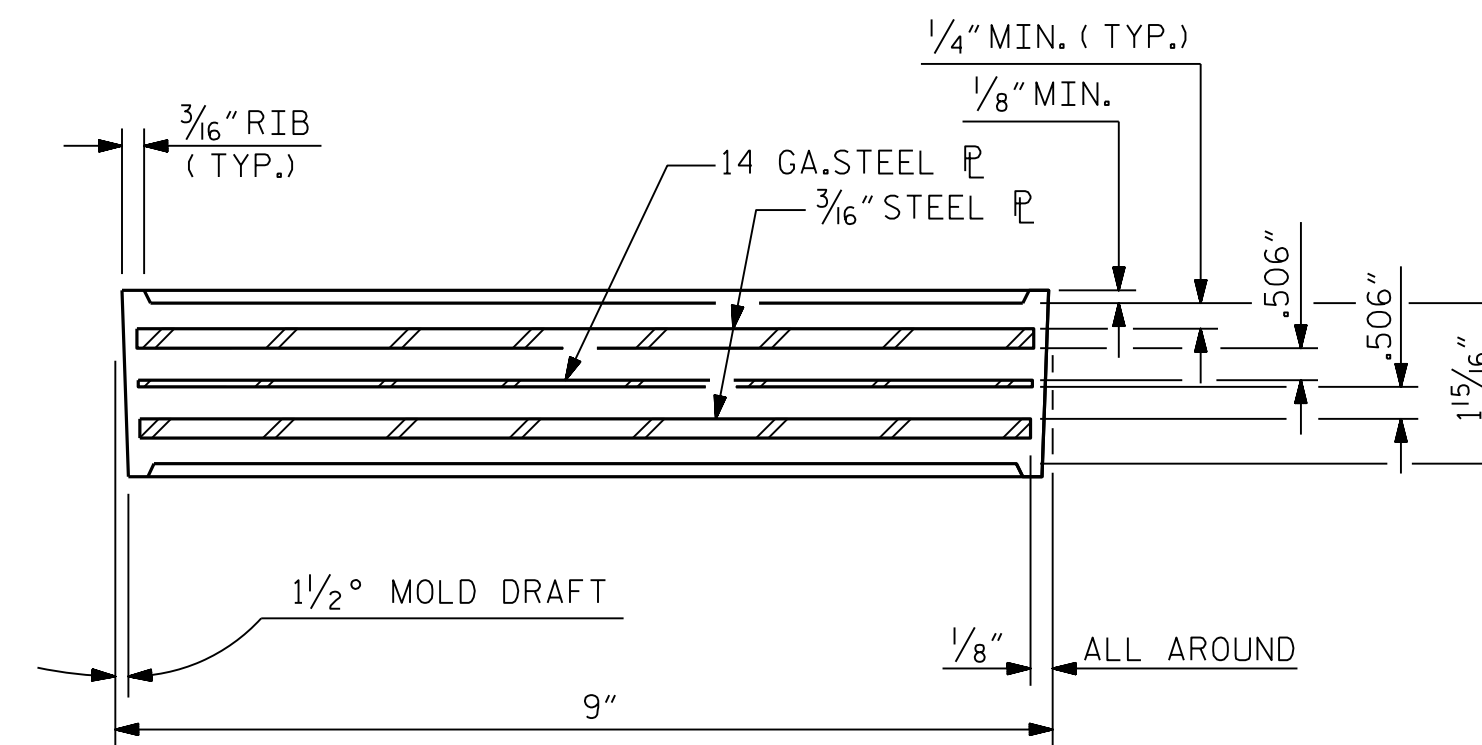
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



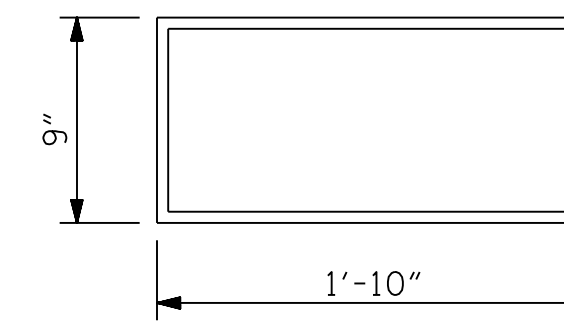
**PLAN VIEW**  
(SHOWING INTEGRAL END BENT)



**PLAN VIEW**  
(SHOWING INTERIOR BENT)



**TYPICAL SECTION OF ELASTOMERIC BEARINGS**

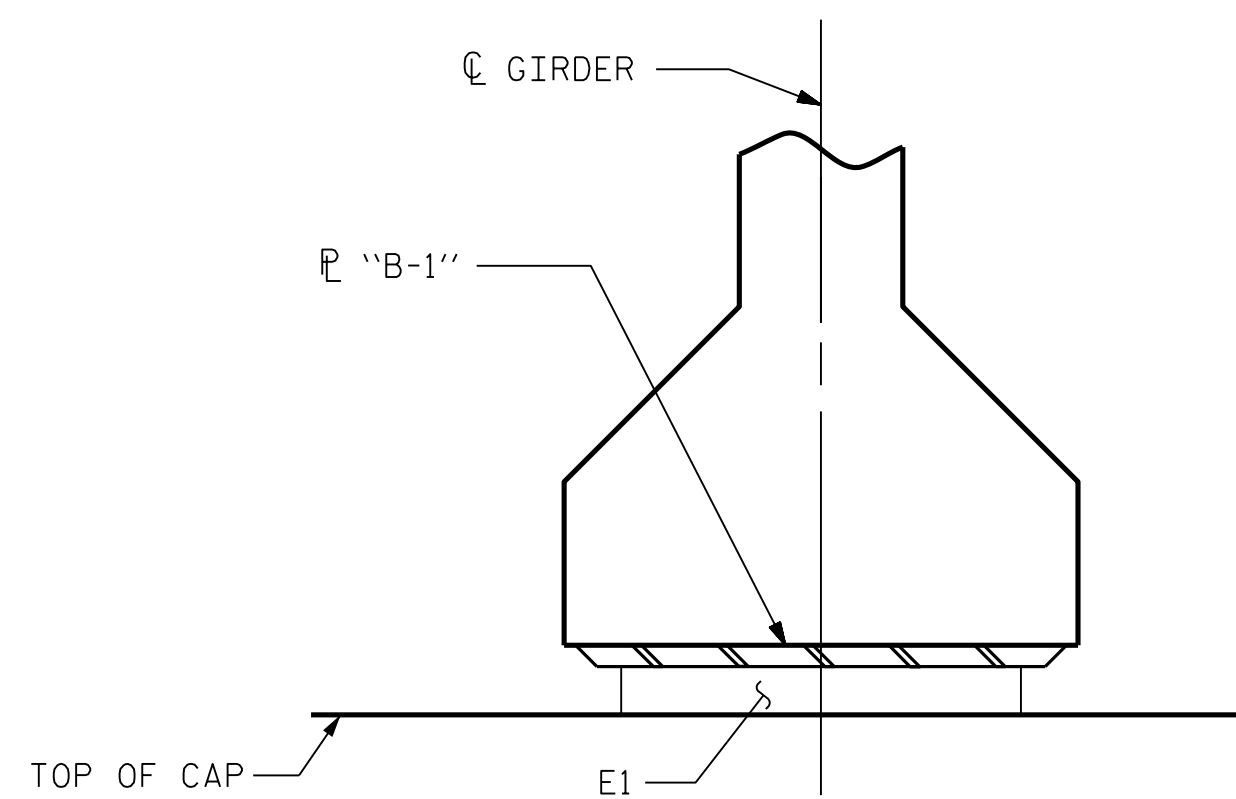


E1 (30 REQ'D.)

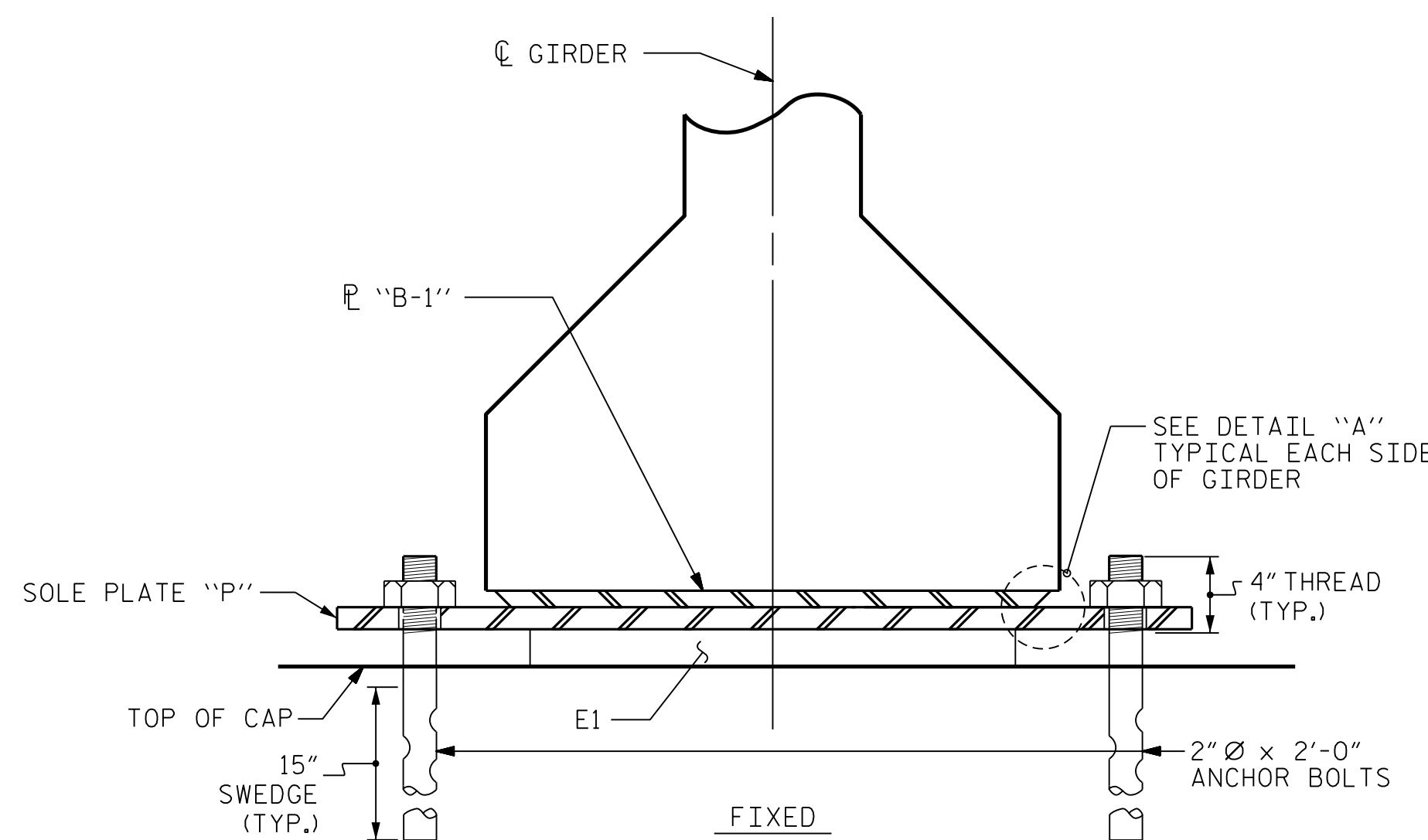
**PLAN VIEW OF ELASTOMERIC BEARING**

**TYPE IV**

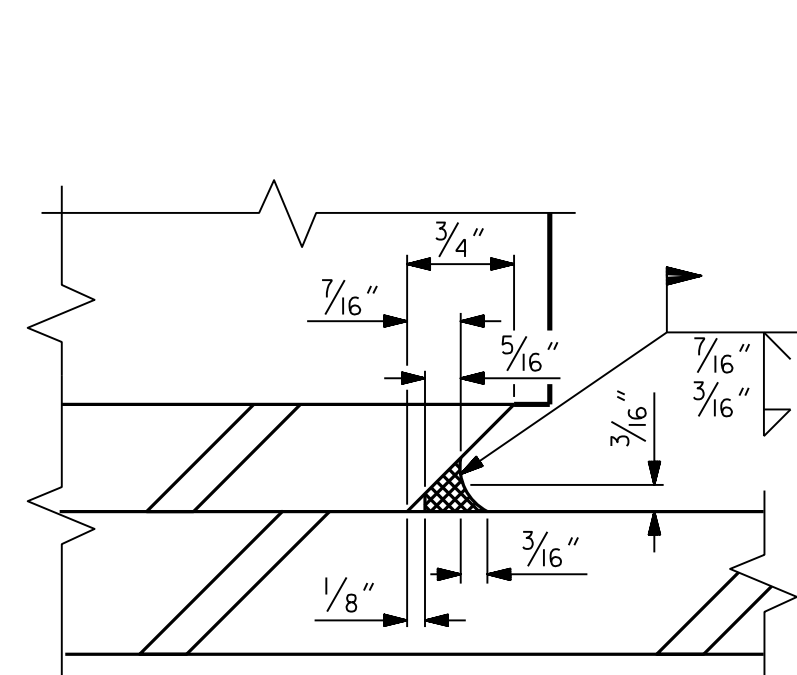
<b>MAXIMUM ALLOWABLE SERVICE LOADS</b>	
<b>D.L.+L.L. (NO IMPACT)</b>	
<b>TYPE IV</b>	<b>225 k</b>



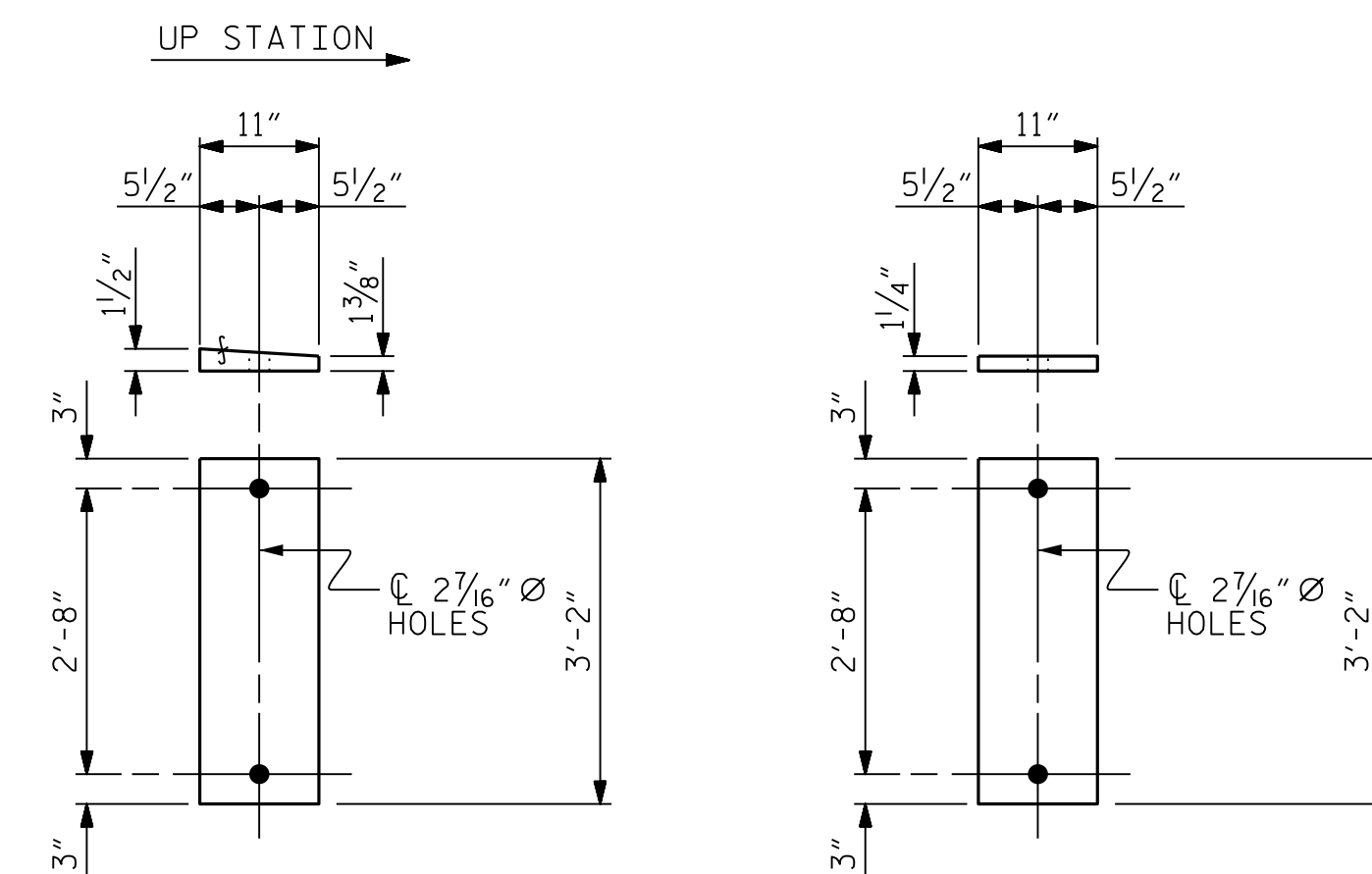
**SECTION E-E**  
(SHOWING INTEGRAL END BENT)



**SECTION F-F**  
(SHOWING INTERIOR BENT)



**DETAIL "A"**

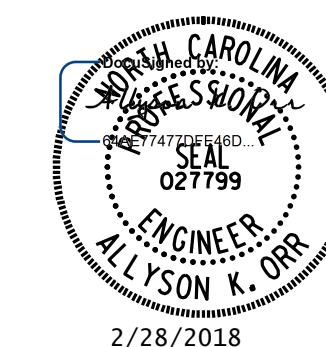


**P-1 (FIXED)**  
(10 REQ'D.)

**P-2 (FIXED)**  
(10 REQ'D.)

**SOLE PLATE DETAILS ("P")**

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**STANDARD ELASTOMERIC BEARING DETAILS**  
 PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

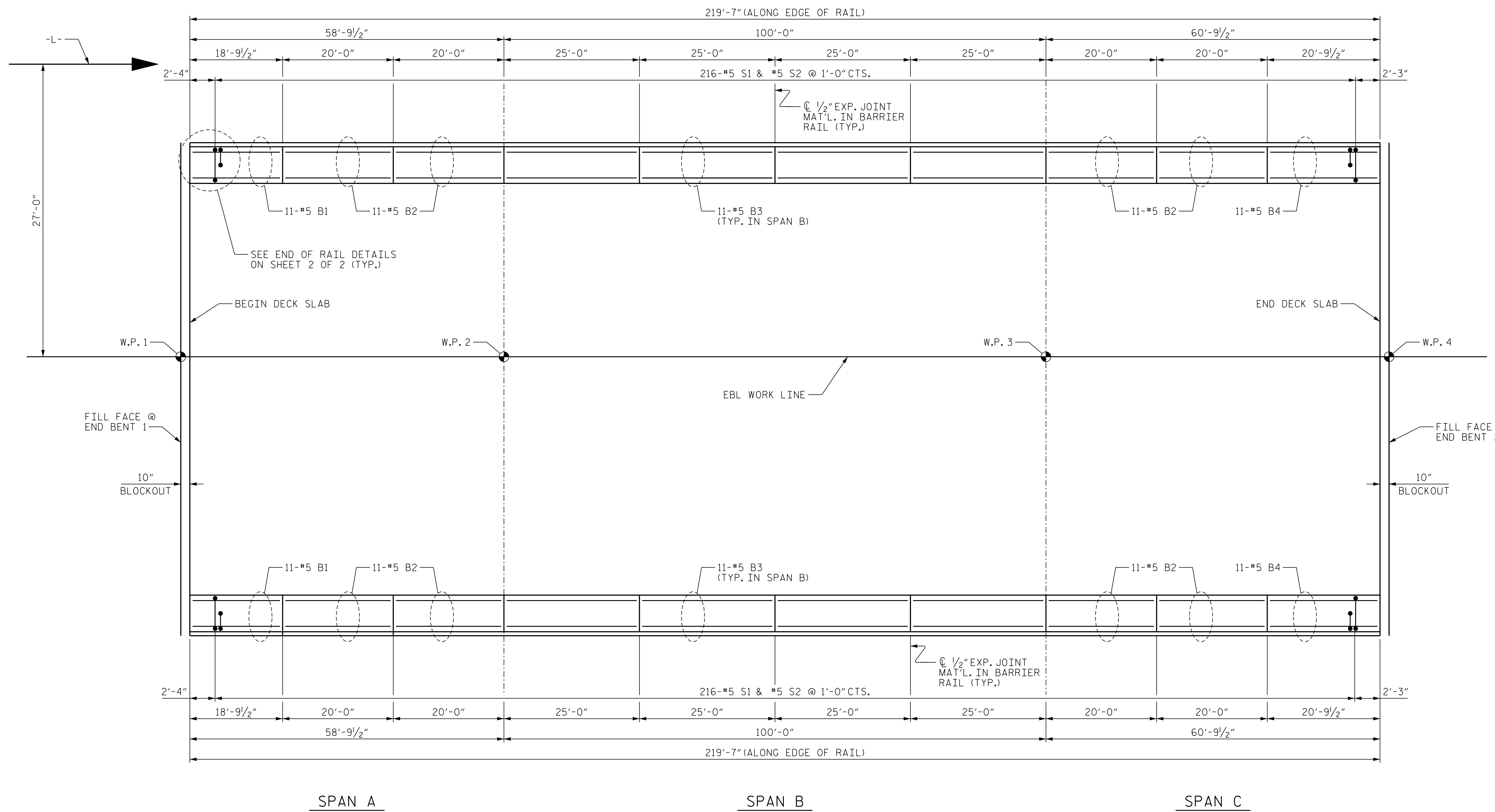
STD. NO. EB3

2/8/2018 11:29:04 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.035-B5351-SMU-BCL-400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY: VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC



2/8/2018 11:29:06 AM User: blanning  
 Filenamer: P:\NC Bridges\MI600135 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.037-B5351-SMU-CBRL-400237.dgn



**PLAN OF BARRIER RAIL**

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 2  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
**CONCRETE BARRIER RAIL**  
 (EBL)



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

**MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

DRAWN BY : <u>B.E. LANNING</u>	DATE : <u>01/18</u>
CHECKED BY : <u>A.K. ORR</u>	DATE : <u>01/18</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>02/18</u>

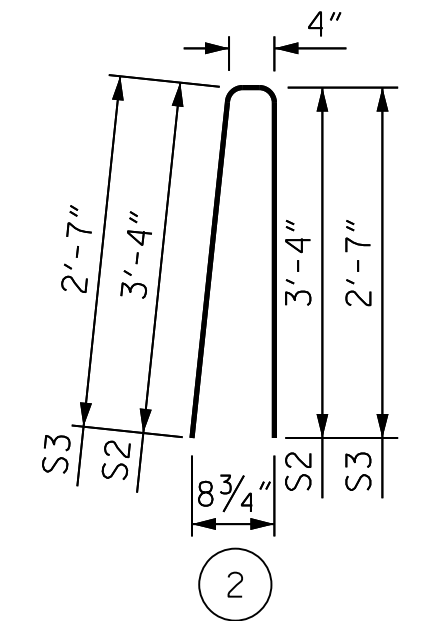
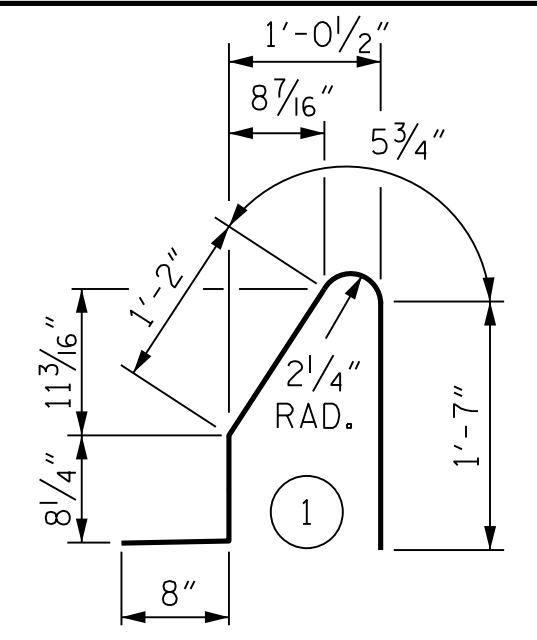
NOTES

THE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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. THE 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.

BAR TYPES



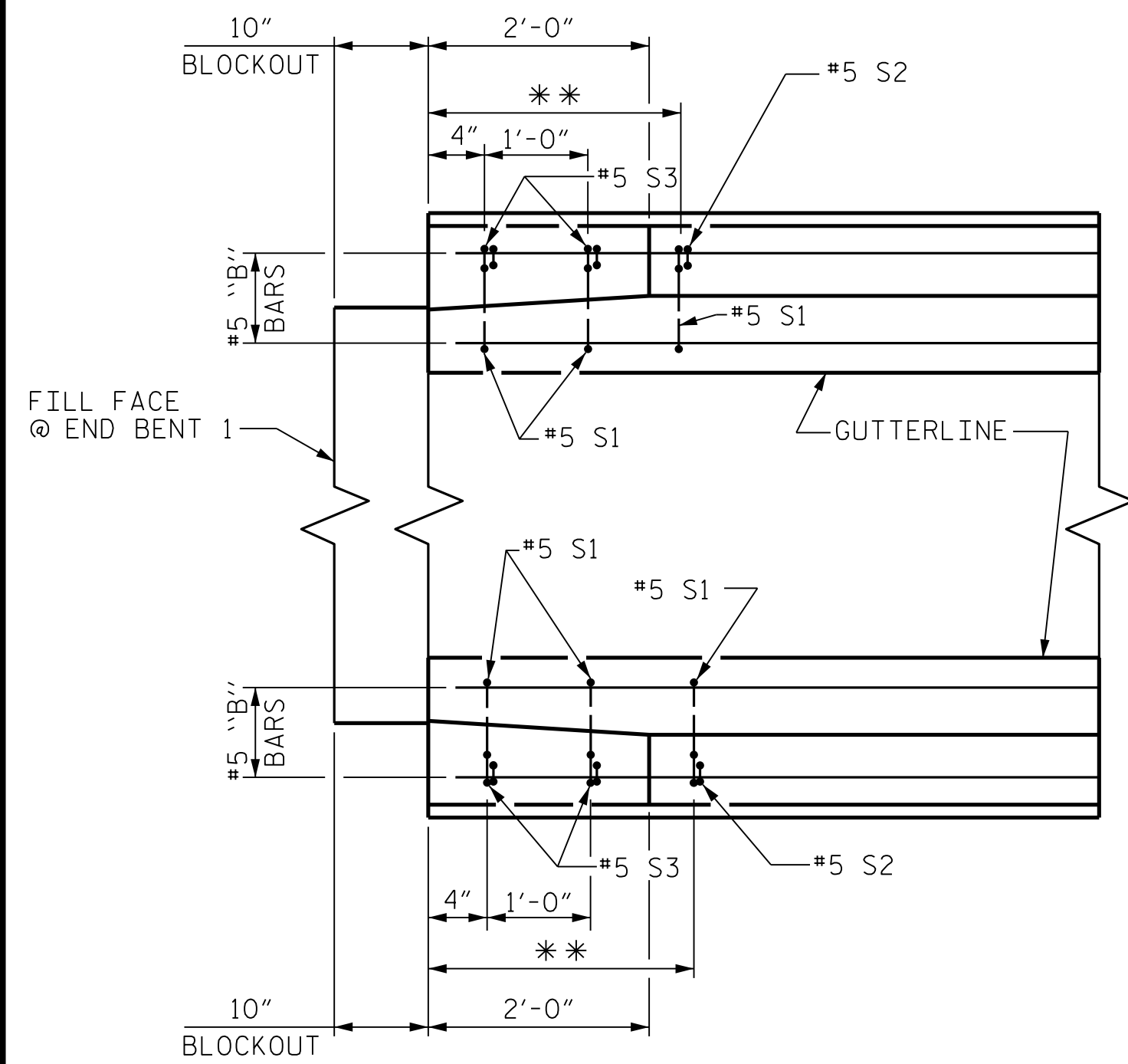
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

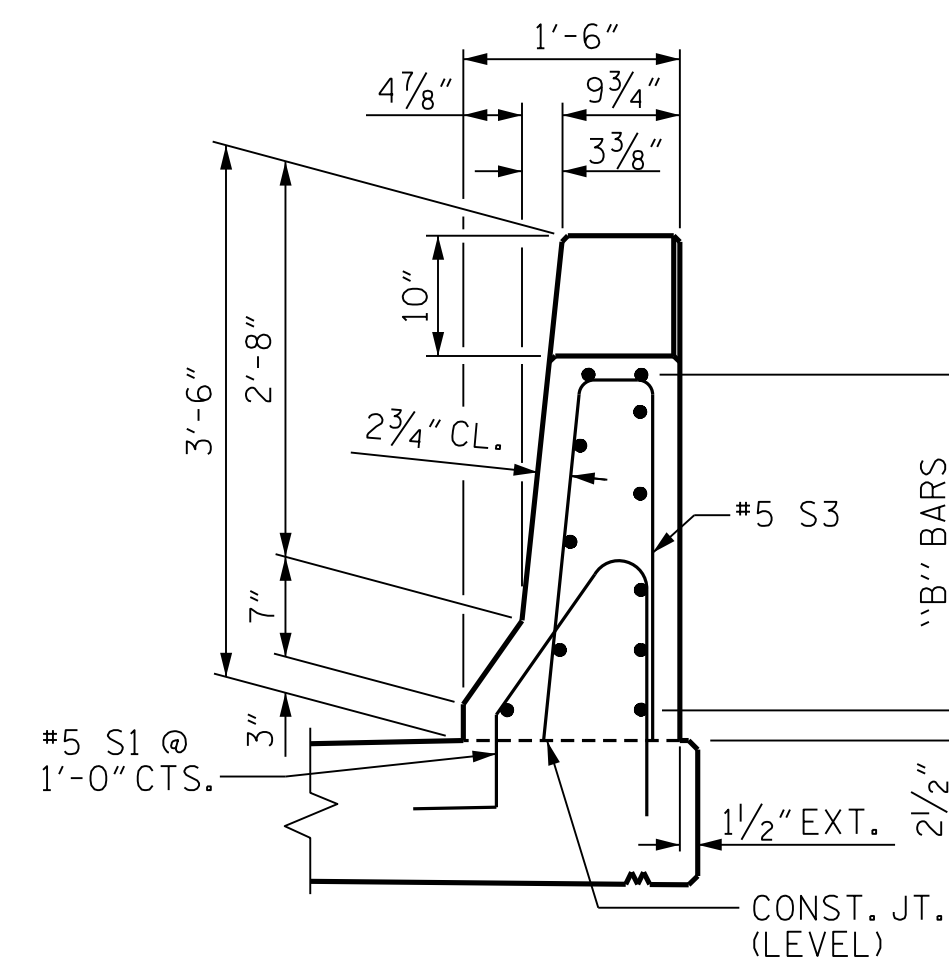
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR.	18'-5"	422
* B2	88	#5	STR.	19'-7"	1797
* B3	88	#5	STR.	24'-7"	2256
* B4	22	#5	STR.	20'-5"	468
* S1	440	#5	1	4'-7"	2103
* S2	432	#5	2	7'-0"	3154
* S3	8	#5	2	5'-6"	46

* EPOXY COATED REINFORCING STEEL	10,247 LBS.
CLASS AA CONCRETE	59.7 CU. YDS.
CONCRETE BARRIER RAIL	439.17 LIN. FT.



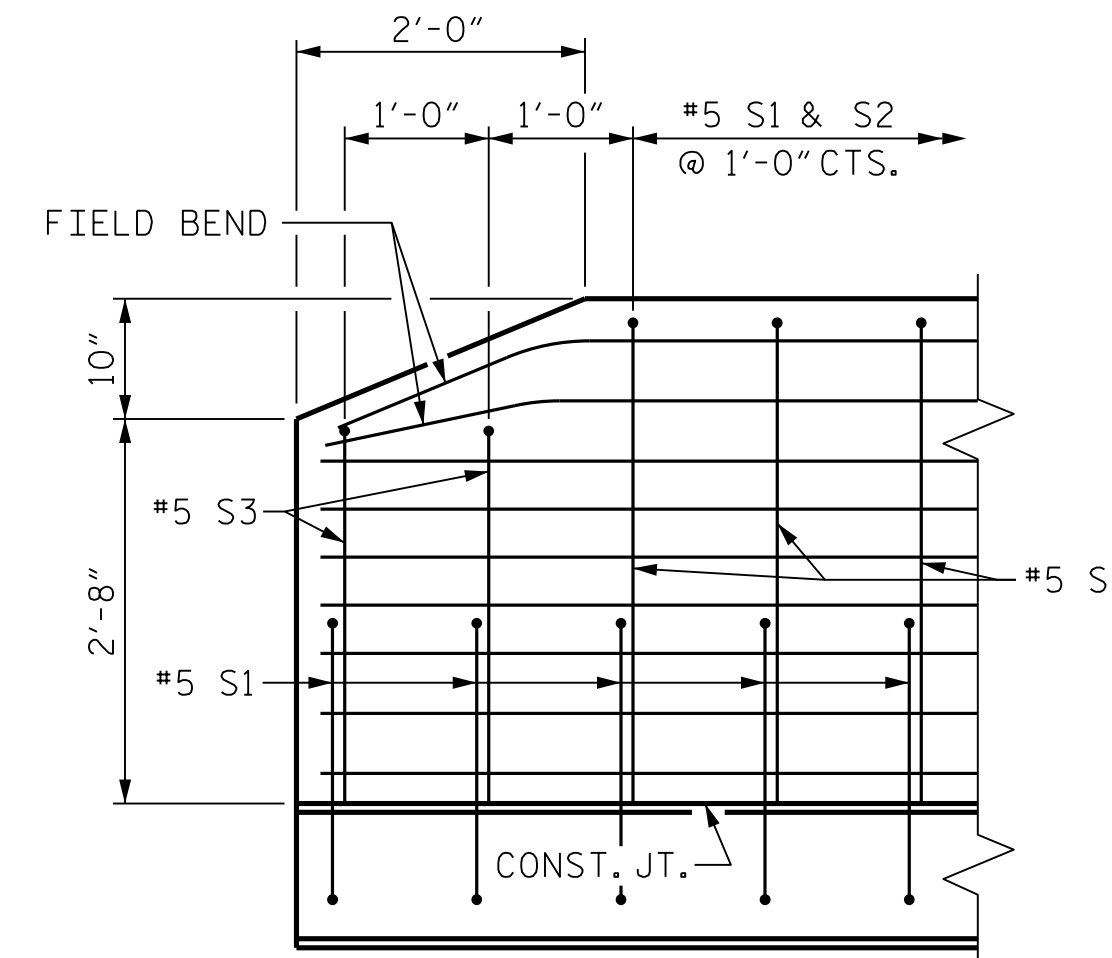
PLAN

\*\* 2'-4" (END BENT 1)  
2'-3" (END BENT 2)

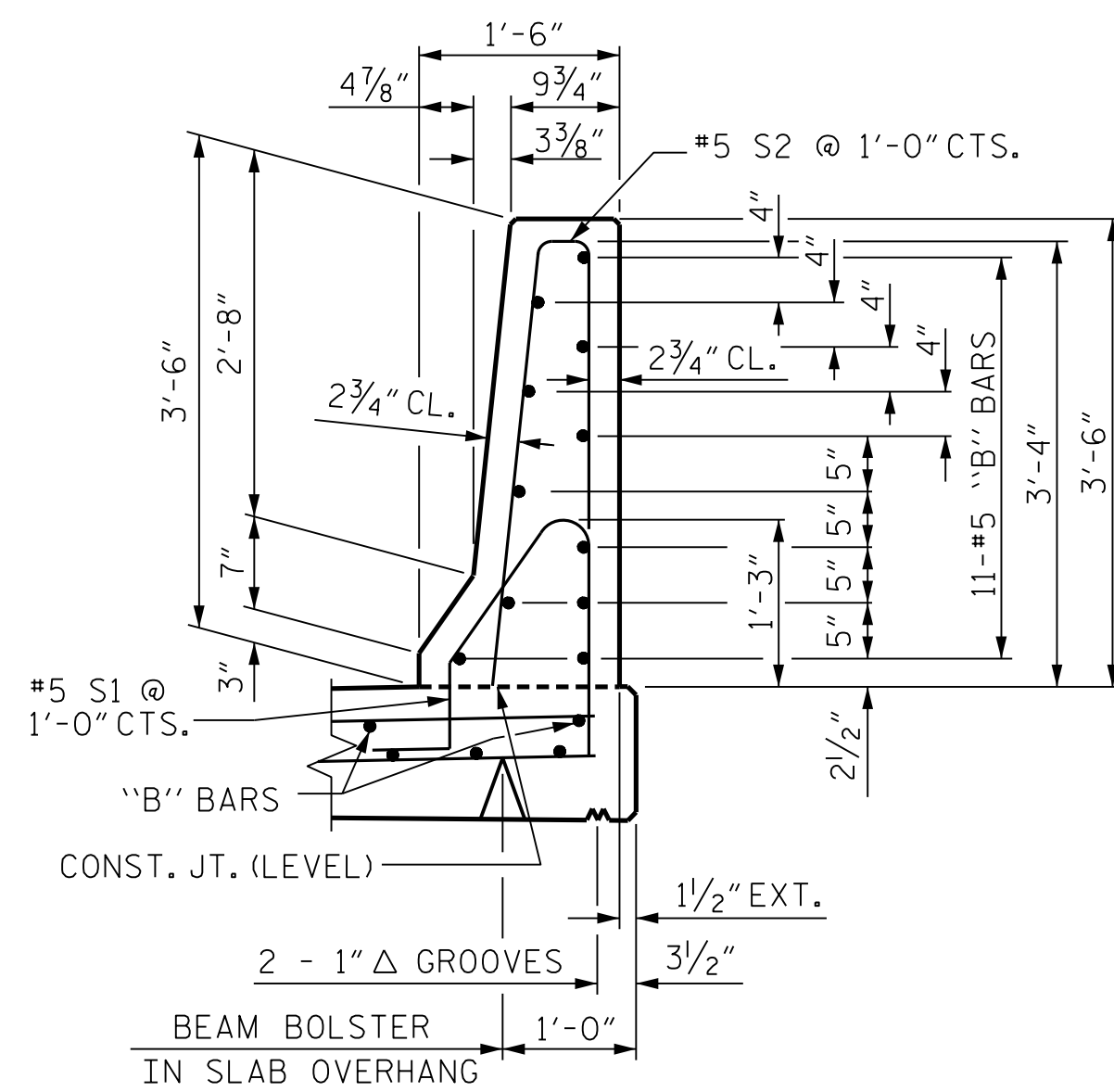


END VIEW

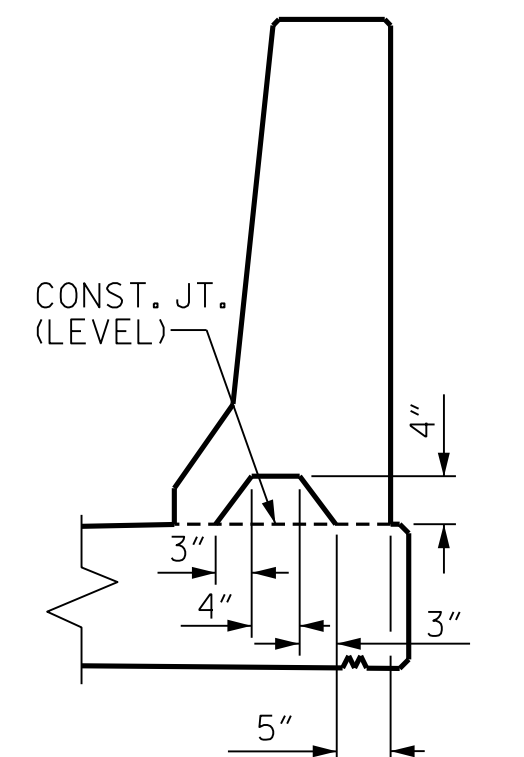
END OF RAIL DETAILS



SIDE VIEW



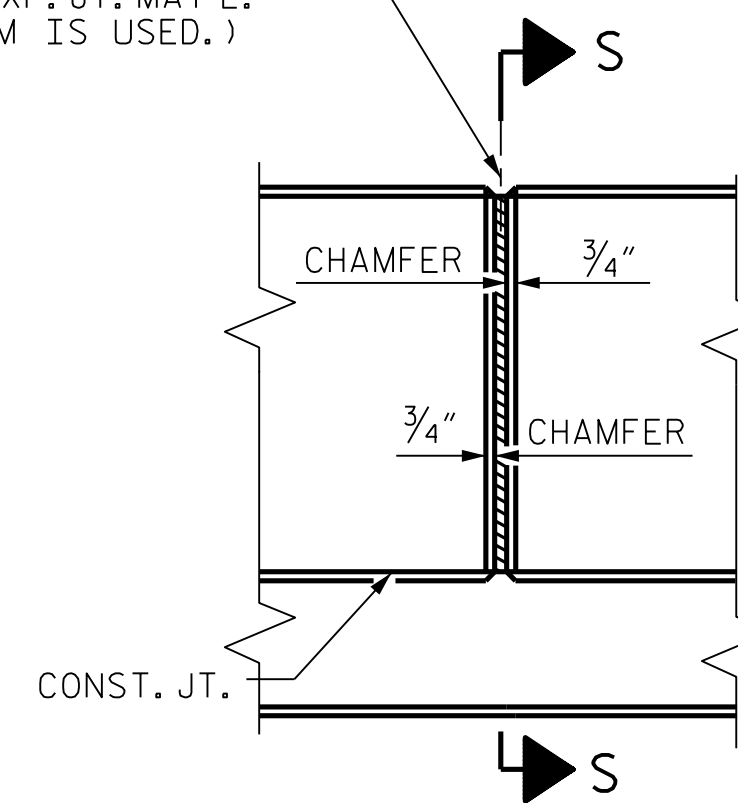
SECTION THRU RAIL



SECTION S-S

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

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

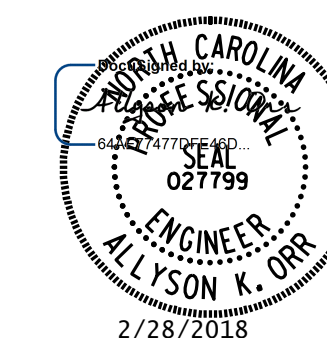


ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. B-5351  
GUILFORD COUNTY  
STATION: 23+26.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
CONCRETE  
BARRIER RAIL

(EBL)

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-20 TOTAL SHEETS 35
2			4			

STD. NO. CBR1 (SHT 1)

2/8/2018 11:29:09 AM User: blanning  
 Filenamer: P:\NC Bridges\MI6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.039.BE5351.SMU.CBR2.400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY: SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC



NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

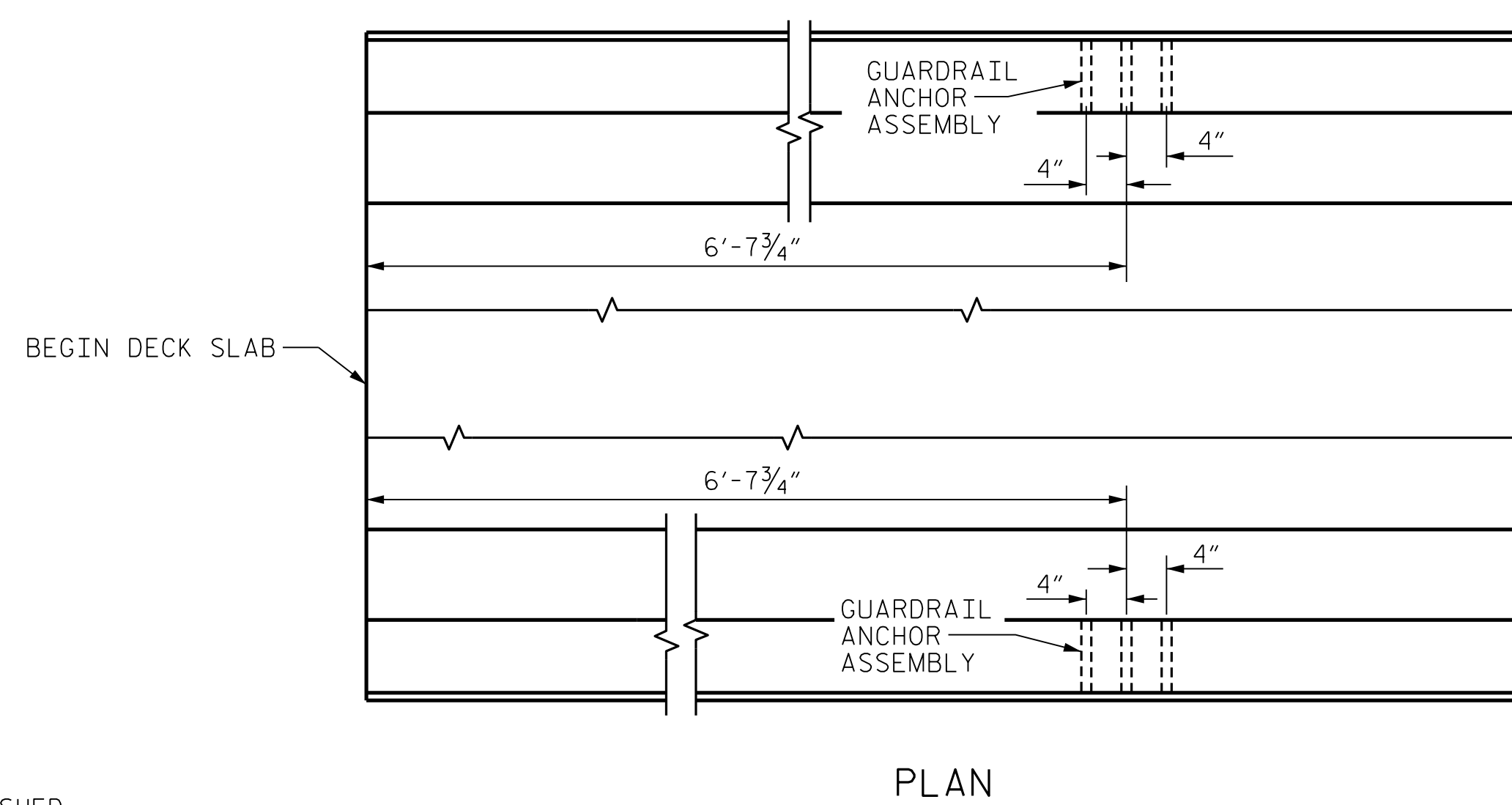
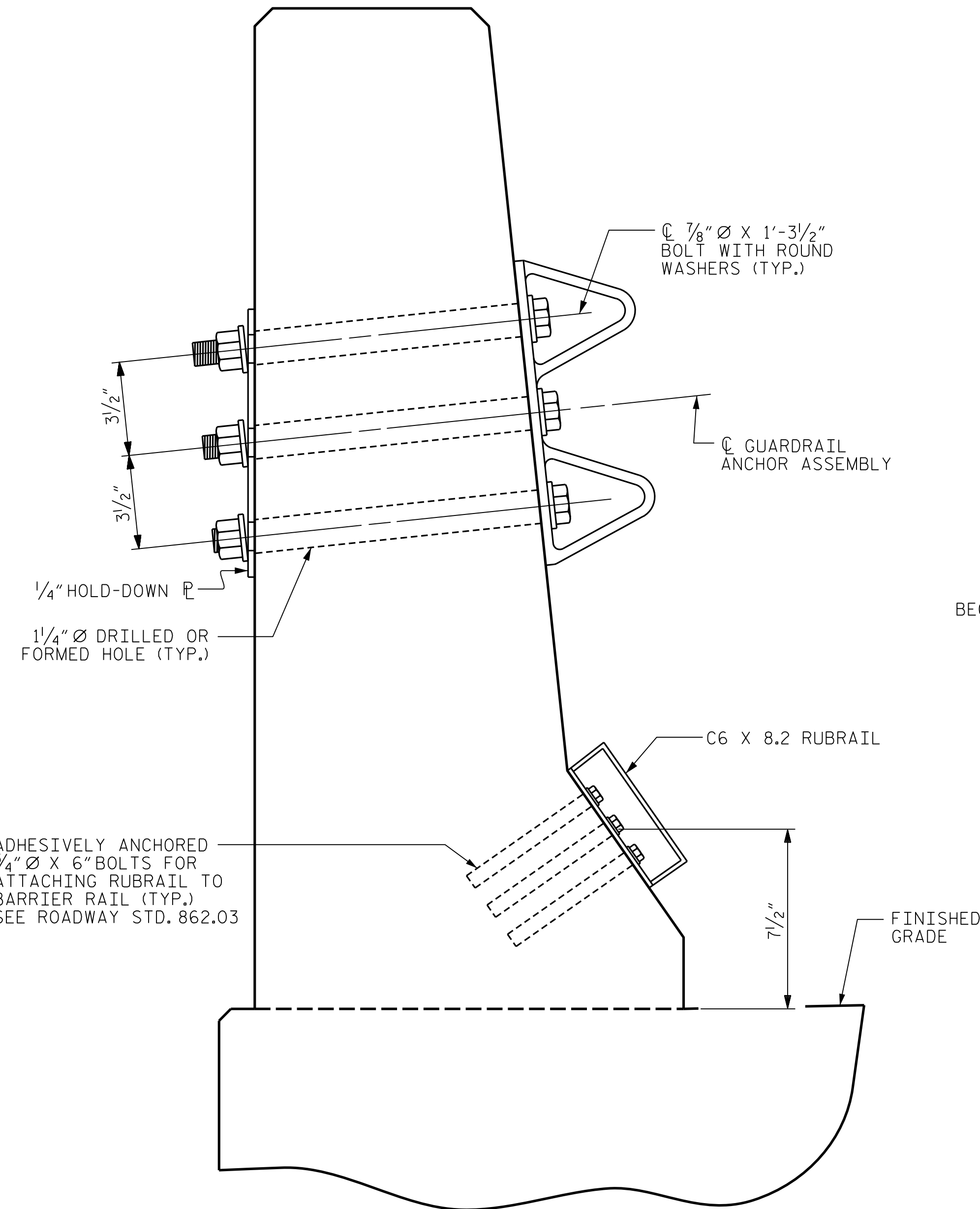
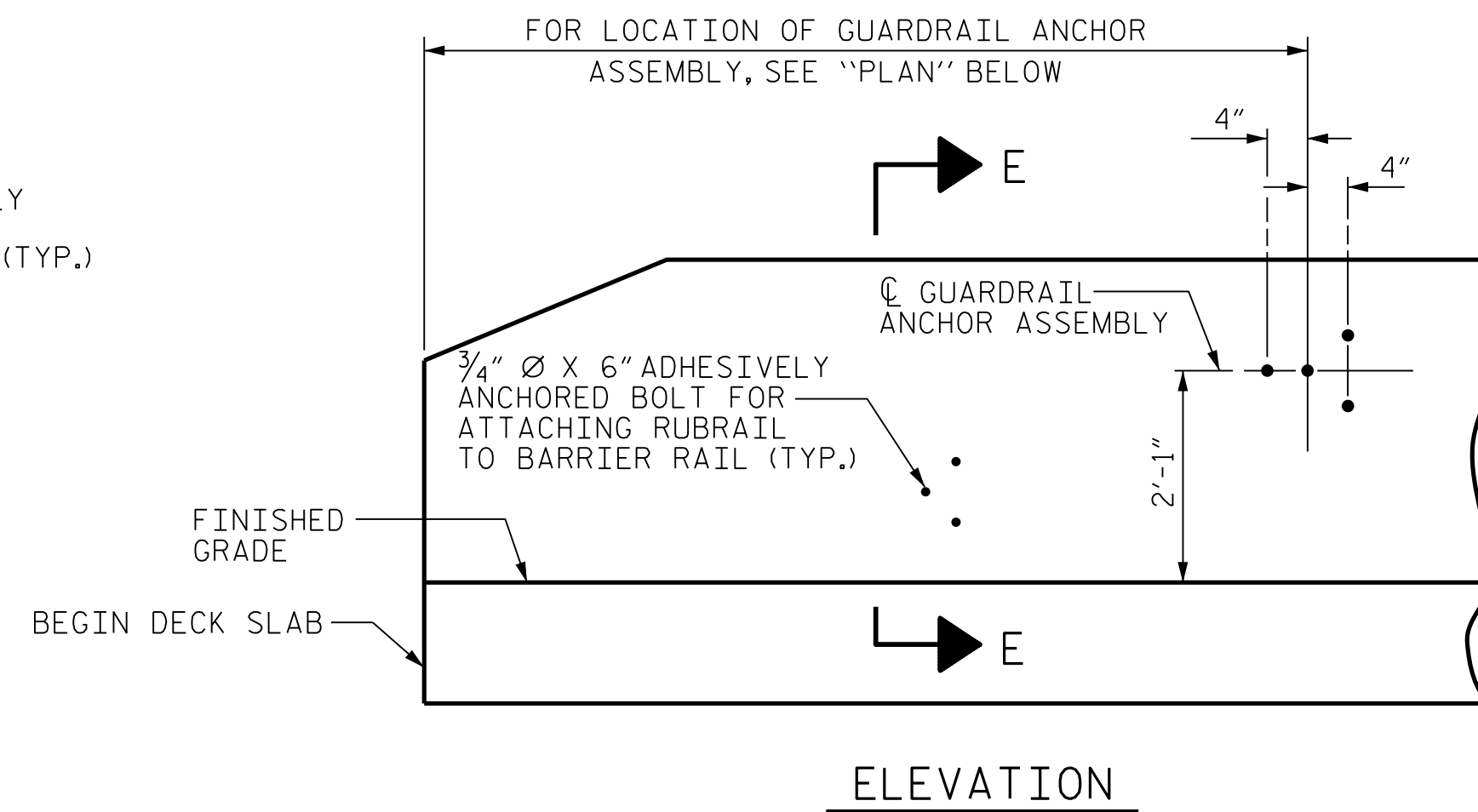
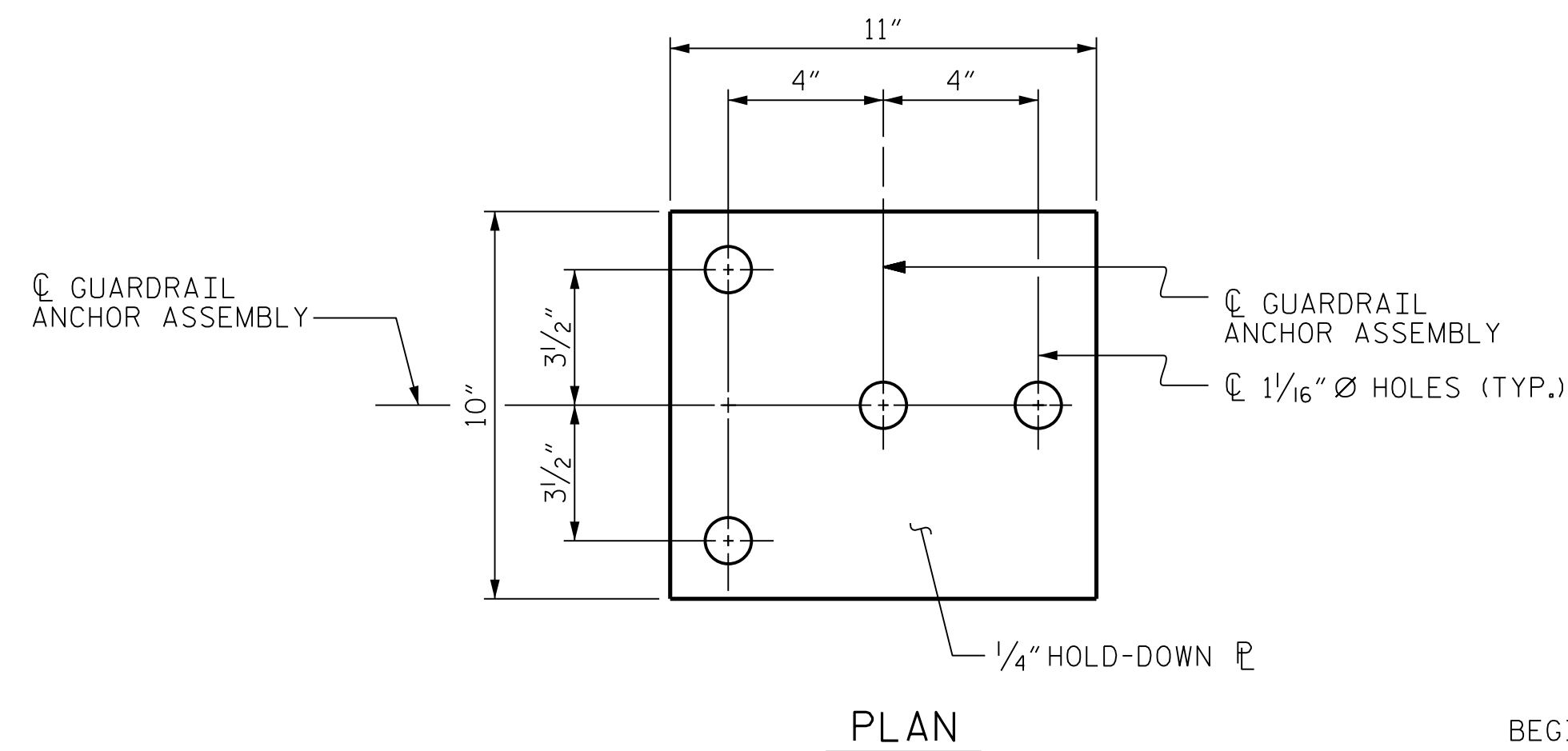
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 CONCRETE BARRIER RAIL.

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.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

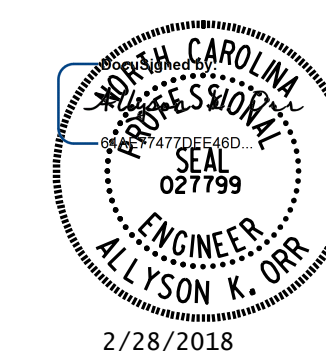


LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS  
\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

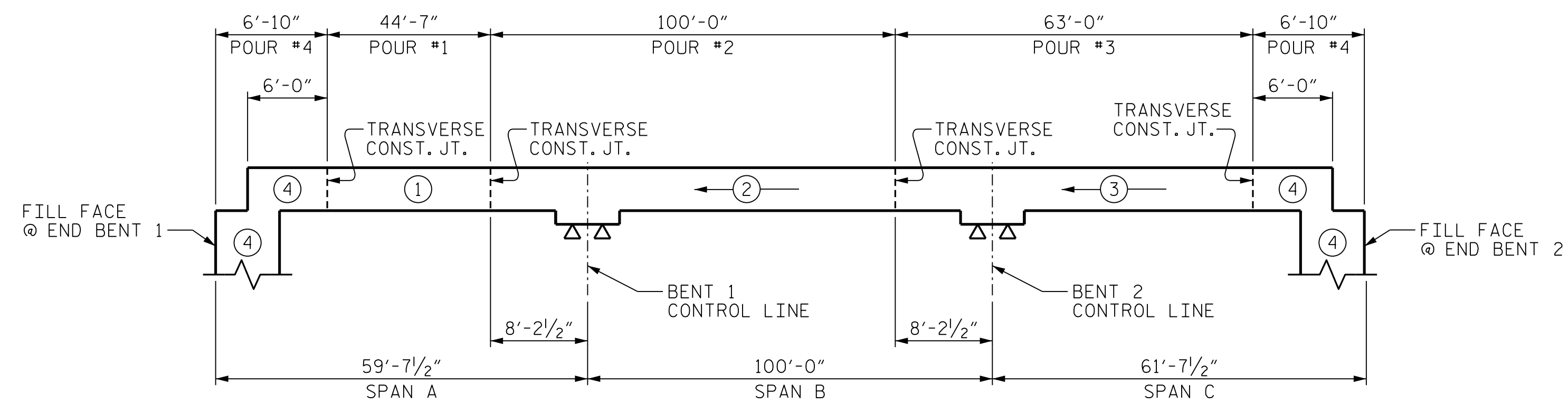
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

(SHT 1) STD. NO. GRA2

2/8/2018 11:29:11 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.041.B5351.SMU.GRA1\_400237.dgn

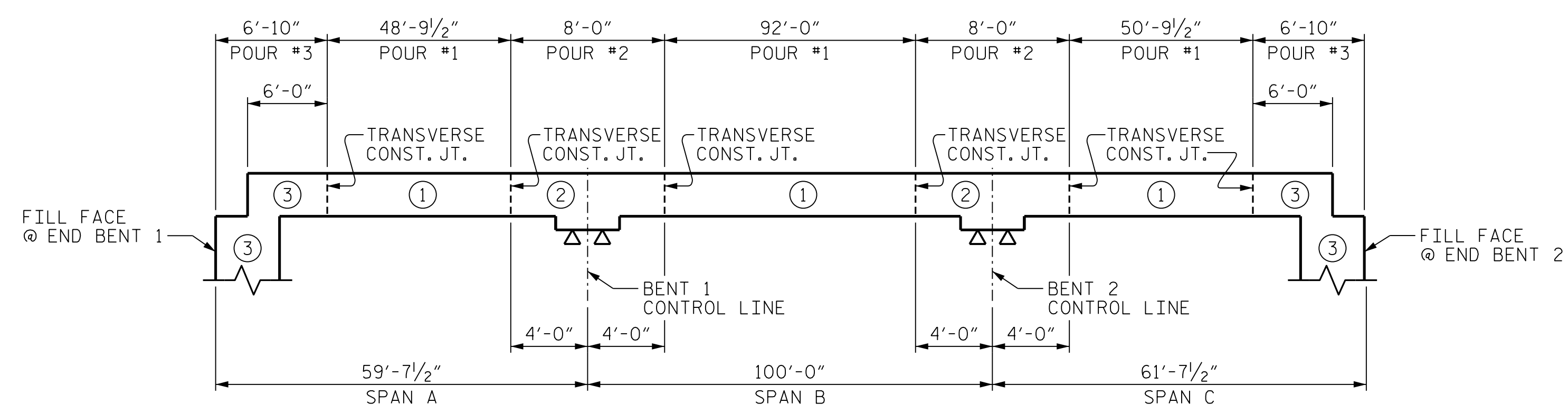
ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

2/8/2018 11:29:13 AM User: blanning  
 File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.043.B5351.SMU.BOM1\_400237.dgn



**POURING SEQUENCE**

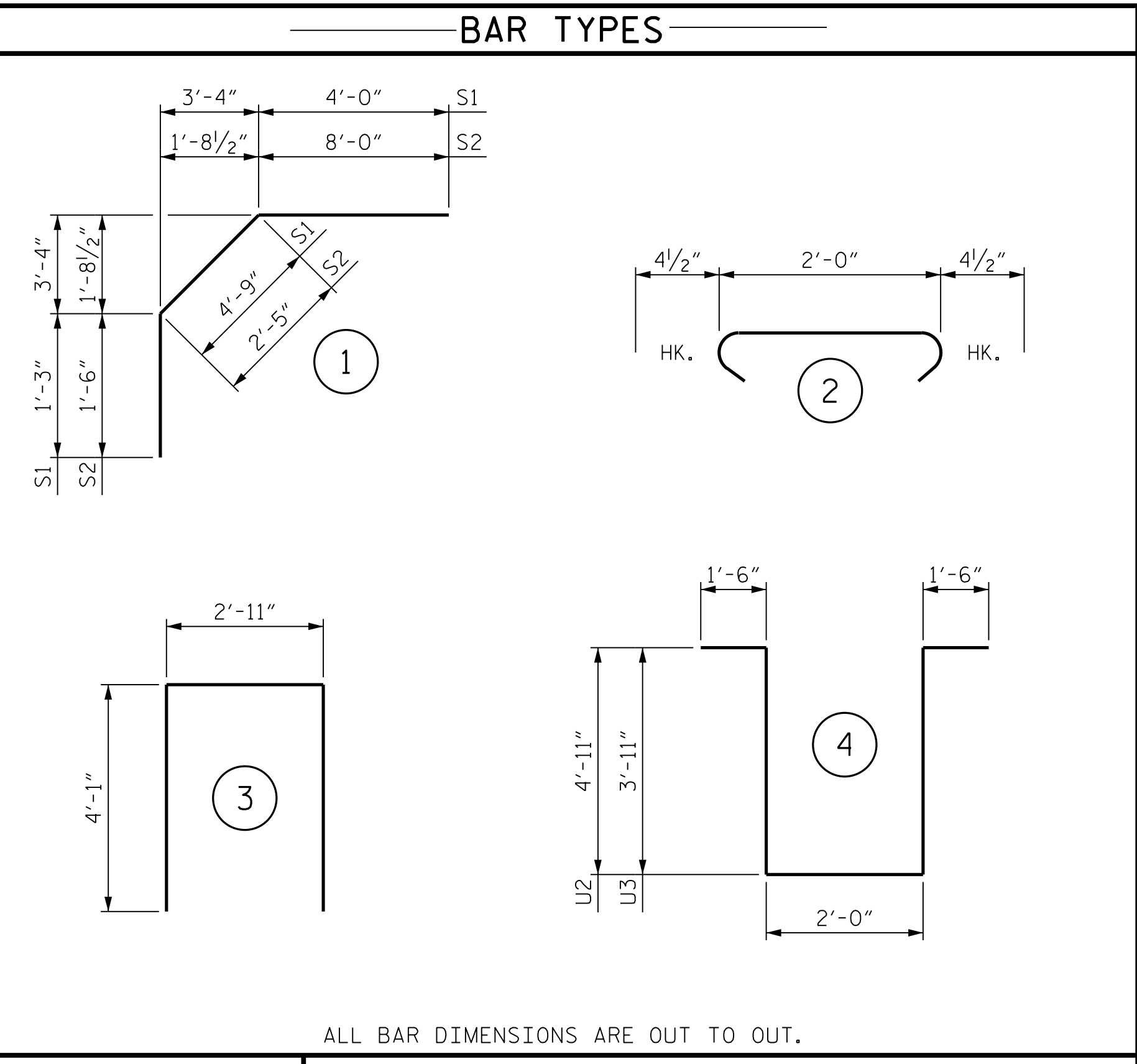
INDICATES POUR NUMBER AND DIRECTION OF POUR



**OPTIONAL POURING SEQUENCE**

POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3,000 PSI.

REINFORCING BAR SCHEDULE					
SPANS A, B & C					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	439	#5	STR	40'-11"	18735
A2	439	#5	STR	40'-11"	18735
B1	200	#5	STR	56'-6"	11786
*B2	264	#6	STR	49'-10"	19760
*B3	130	#4	STR	30'-0"	2605
*B4	34	#4	STR	30'-0"	681
K1	20	#4	STR	21'-4"	285
K2	8	#4	STR	6'-6"	35
K3	8	#4	STR	7'-6"	40
K4	16	#4	STR	8'-0"	86
K5	8	#4	STR	7'-0"	37
K6	4	#4	STR	1'-2"	3
K7	4	#4	STR	1'-8"	4
K8	8	#4	STR	1'-11"	10
K9	4	#4	STR	1'-5"	4
K10	20	#4	STR	19'-1"	255
K11	16	#4	STR	5'-4"	57
K12	16	#4	STR	7'-6"	80
K13	32	#4	STR	8'-0"	171
K14	16	#4	STR	7'-0"	75
*S1	60	#4	1	10'-0"	401
*S2	60	#4	1	11'-11"	478
S3	208	#4	2	2'-9"	382
U1	60	#4	3	11'-1"	444
U2	40	#4	4	14'-10"	396
U3	16	#4	4	12'-10"	137



ALL BAR DIMENSIONS ARE OUT TO OUT.

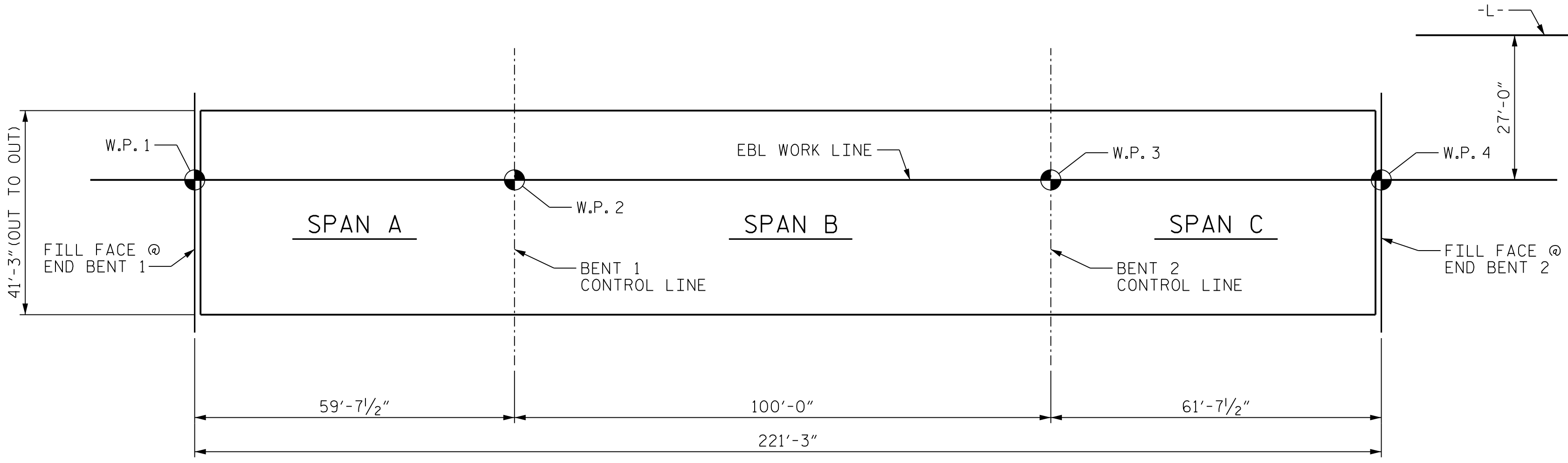
**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	*EPOXY COATED REINFORCING STEEL (LBS.)
POUR #1	57.2	-	-
POUR #2	141.6	-	-
POUR #3	94.1	-	-
POUR #4	57.4	-	-
TOTALS**	350.3	33,022	42,660

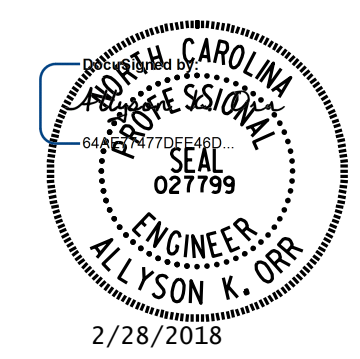
\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9,127)

GROOVING BRIDGE FLOORS	
APPROACH SLABS	1704 SO.FT.
BRIDGE DECK	7686 SO.FT.
TOTAL	9390 SO.FT.

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-



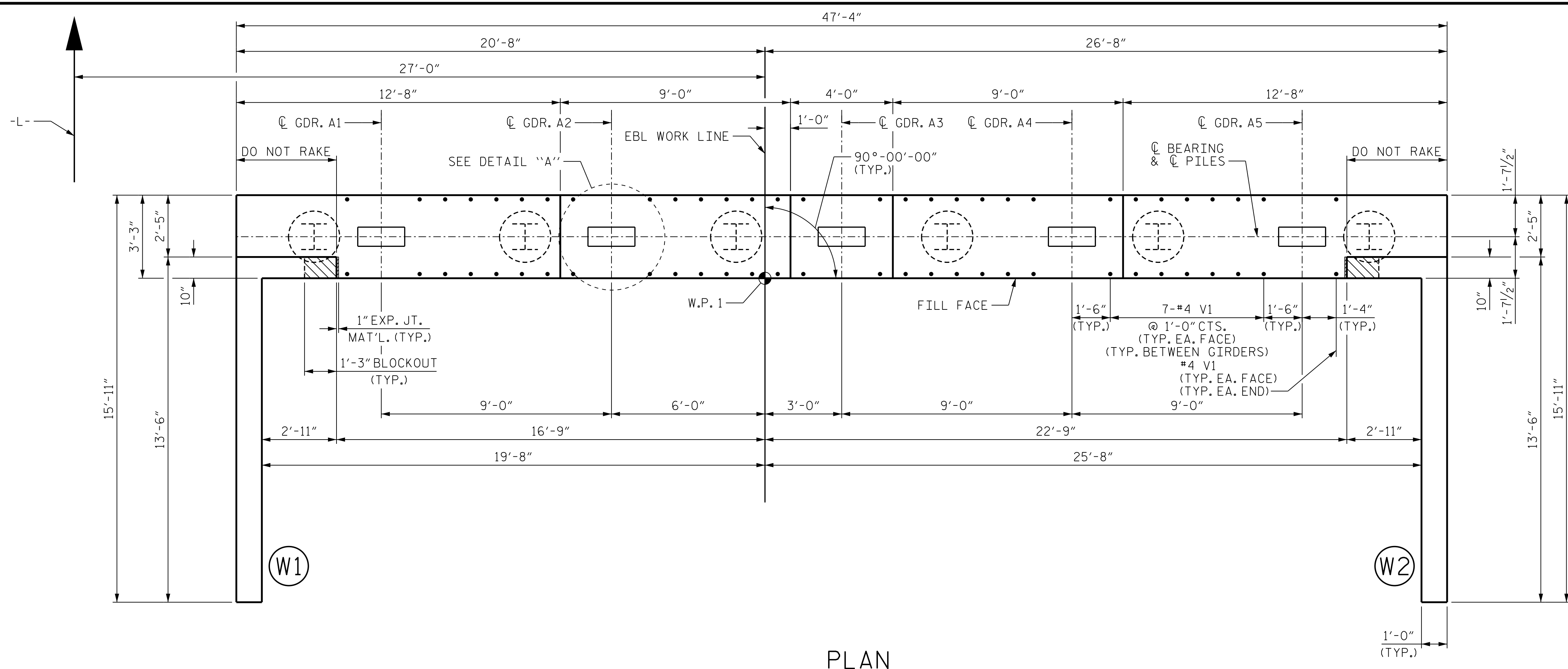
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD SUPERSTRUCTURE BILL OF MATERIAL (EBL)

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUH DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-22
2			4			TOTAL SHEETS 35

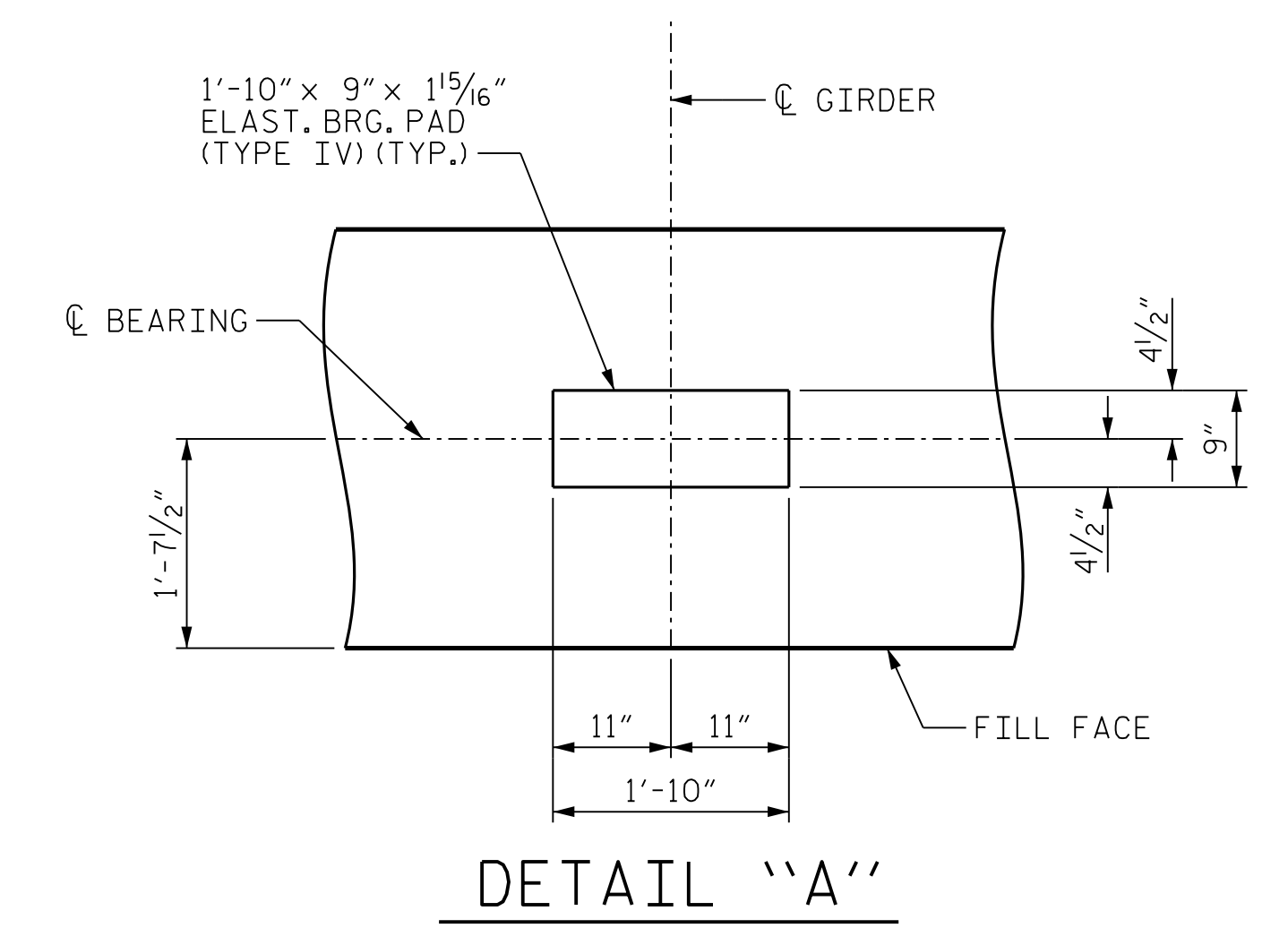
STD. NO. BOM2



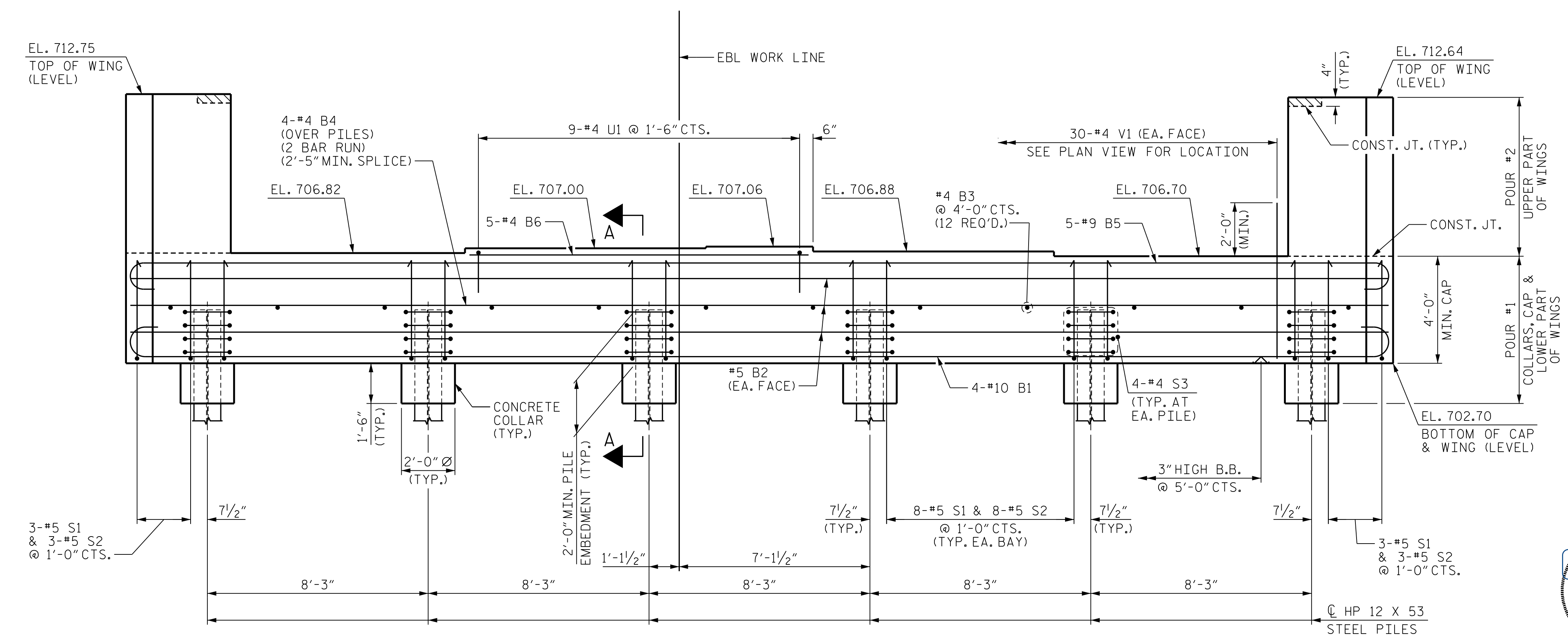


PLAN

**NOTES**  
 THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE END AS INDICATED, SHALL BE RAKED TO A DEPTH OF 1/4".  
 FOR SECTION A-A, SEE SHEET 3 OF 3.  
 FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

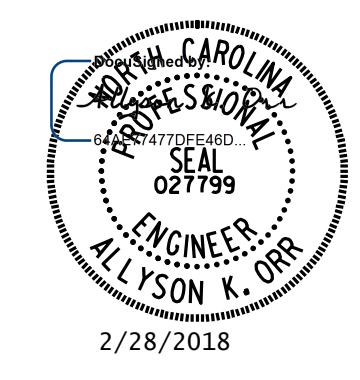


DETAIL "A"



ELEVATION

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 PLAN AND ELEVATION  
 (EBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

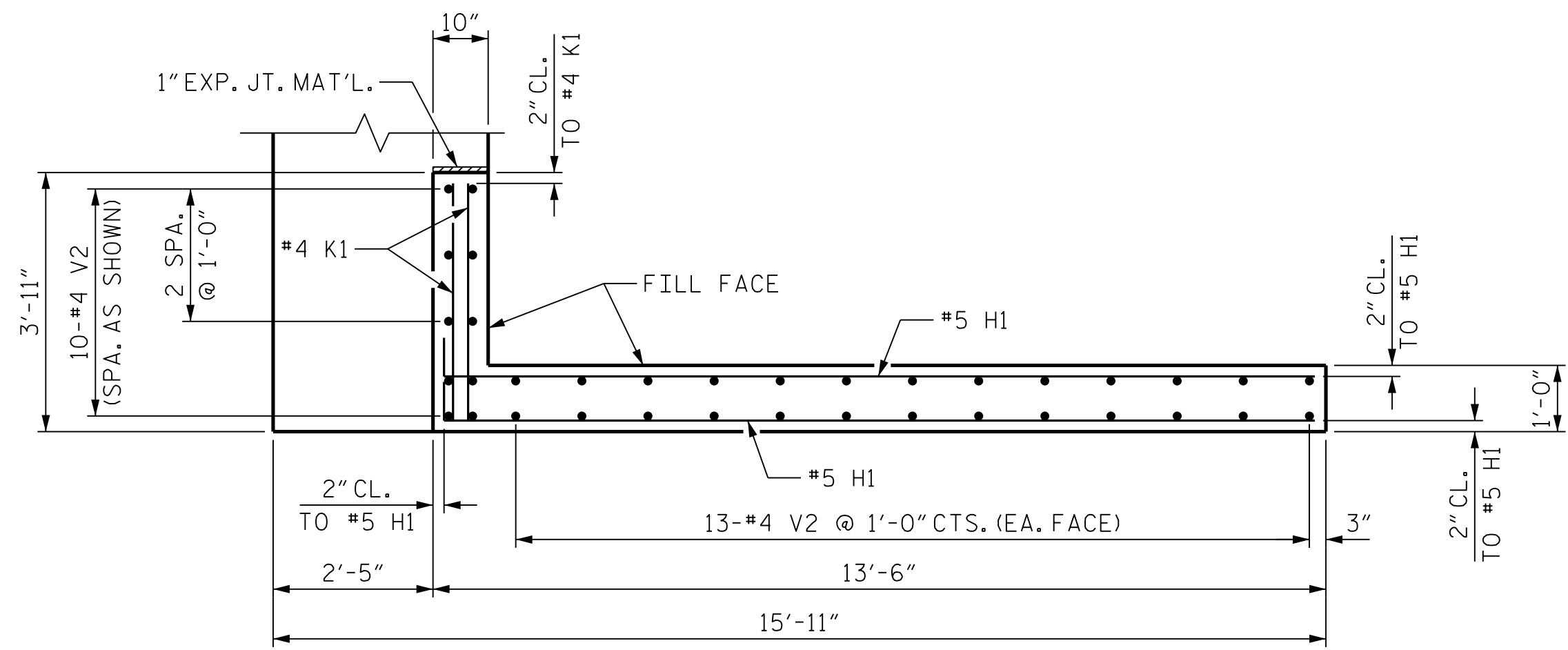
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-23 TOTAL SHEETS 35
2			4			

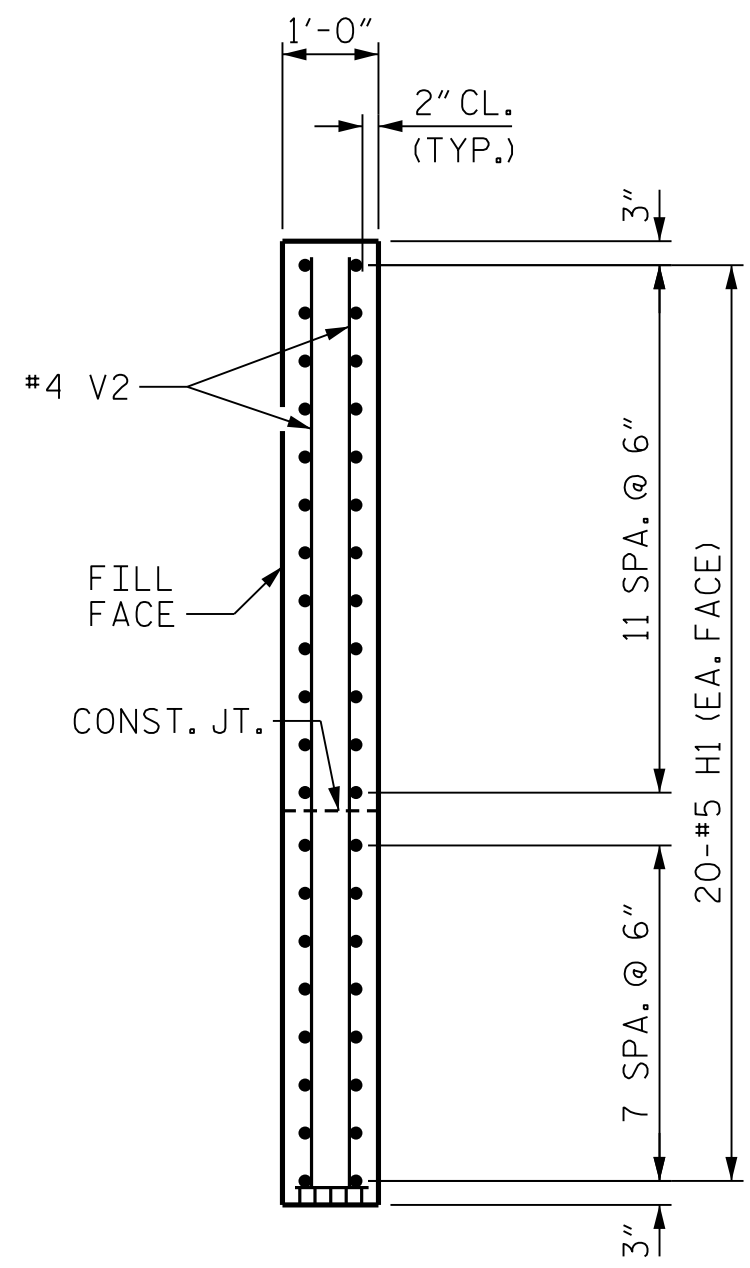
DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

2/8/2018 11:29:15 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.045.B5351.SMU.EIA.400237.dgn

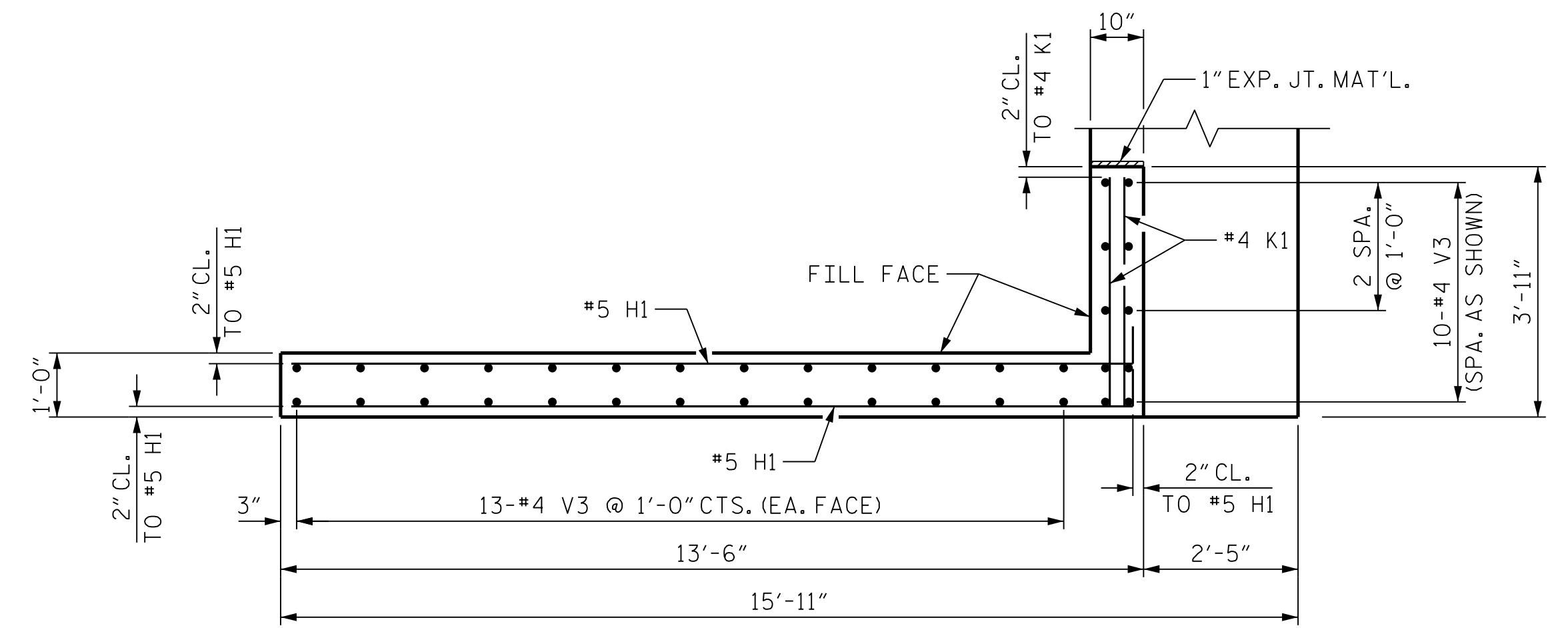
2/8/2018 11:29:17 AM User: blanning  
 Filenamer: P:\NC Bridges\MI600135 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.047.B5351.SMU.EIB-400237.dgn



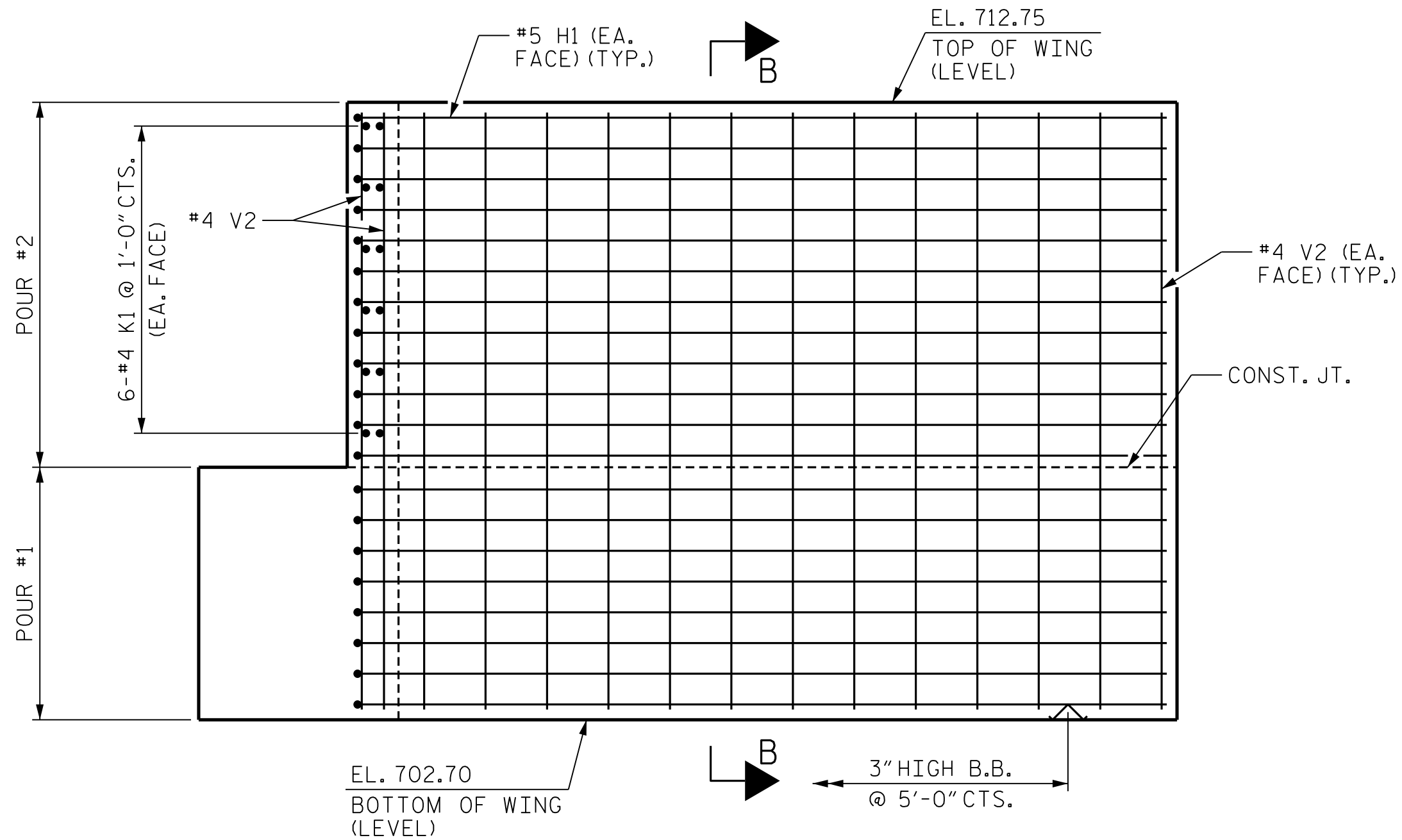
PLAN OF WING (W1)



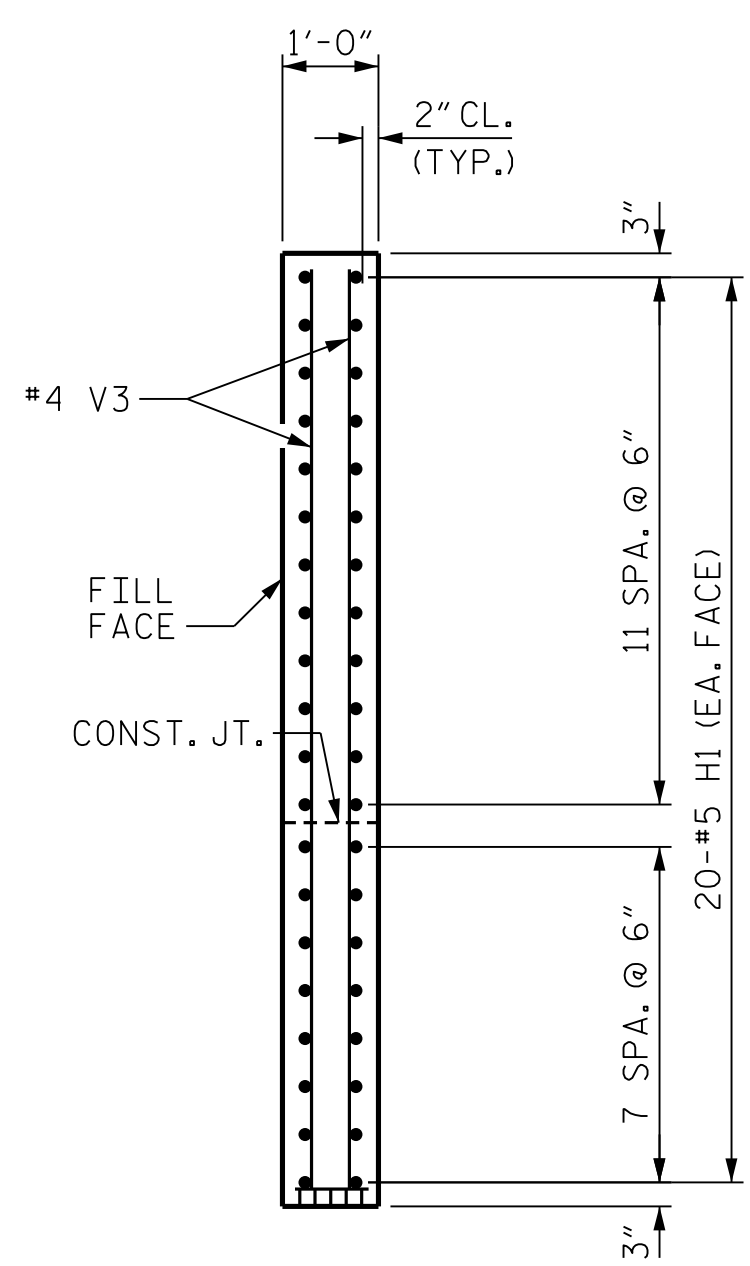
SECTION B-B



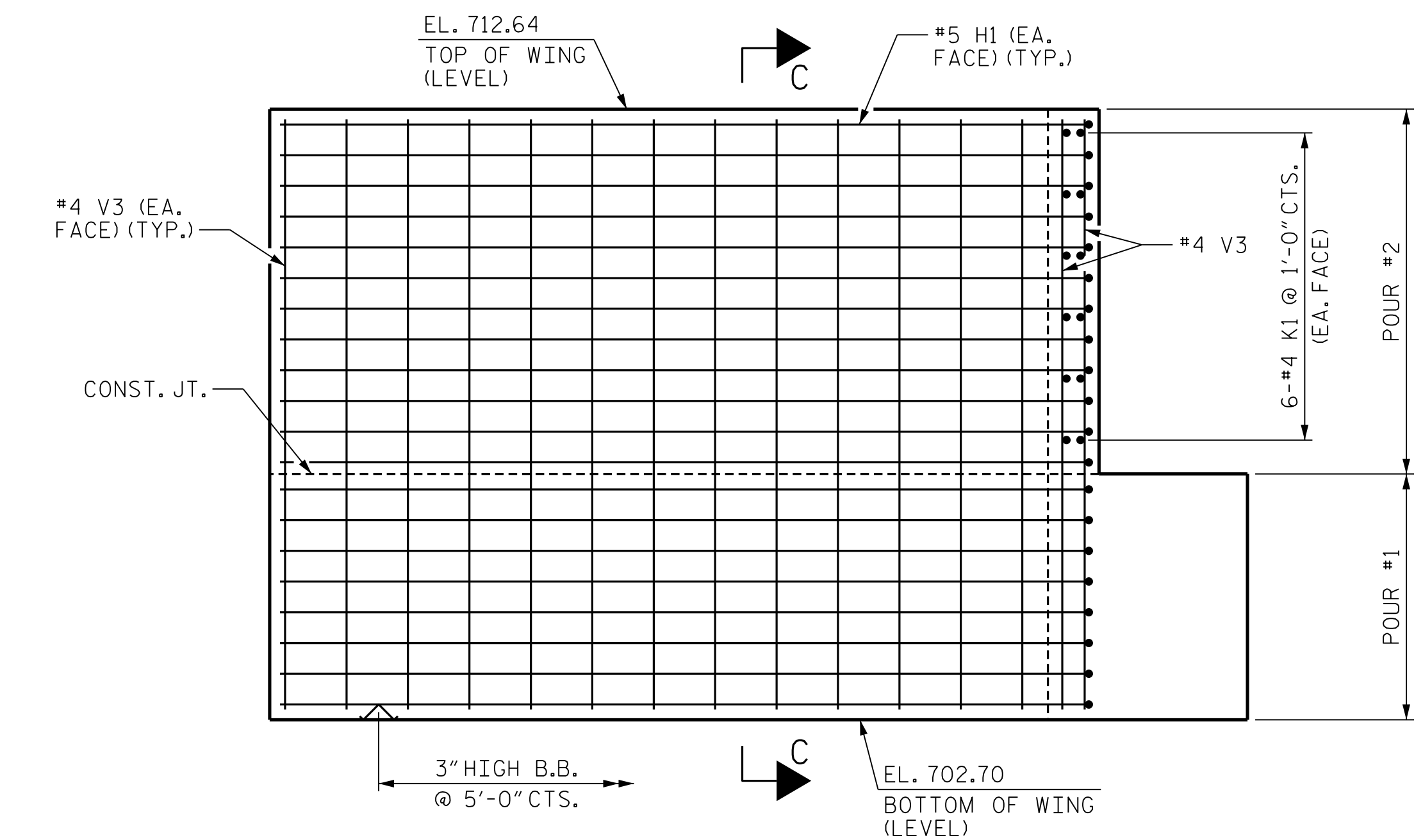
PLAN OF WING (W2)



ELEVATION OF WING (W1)



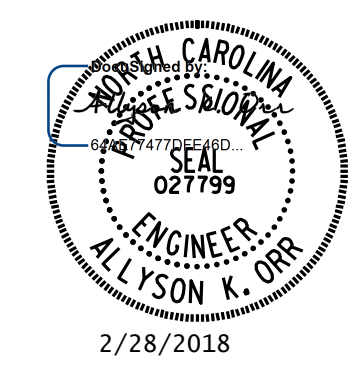
SECTION C-C



ELEVATION OF WING (W2)

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 WING DETAILS

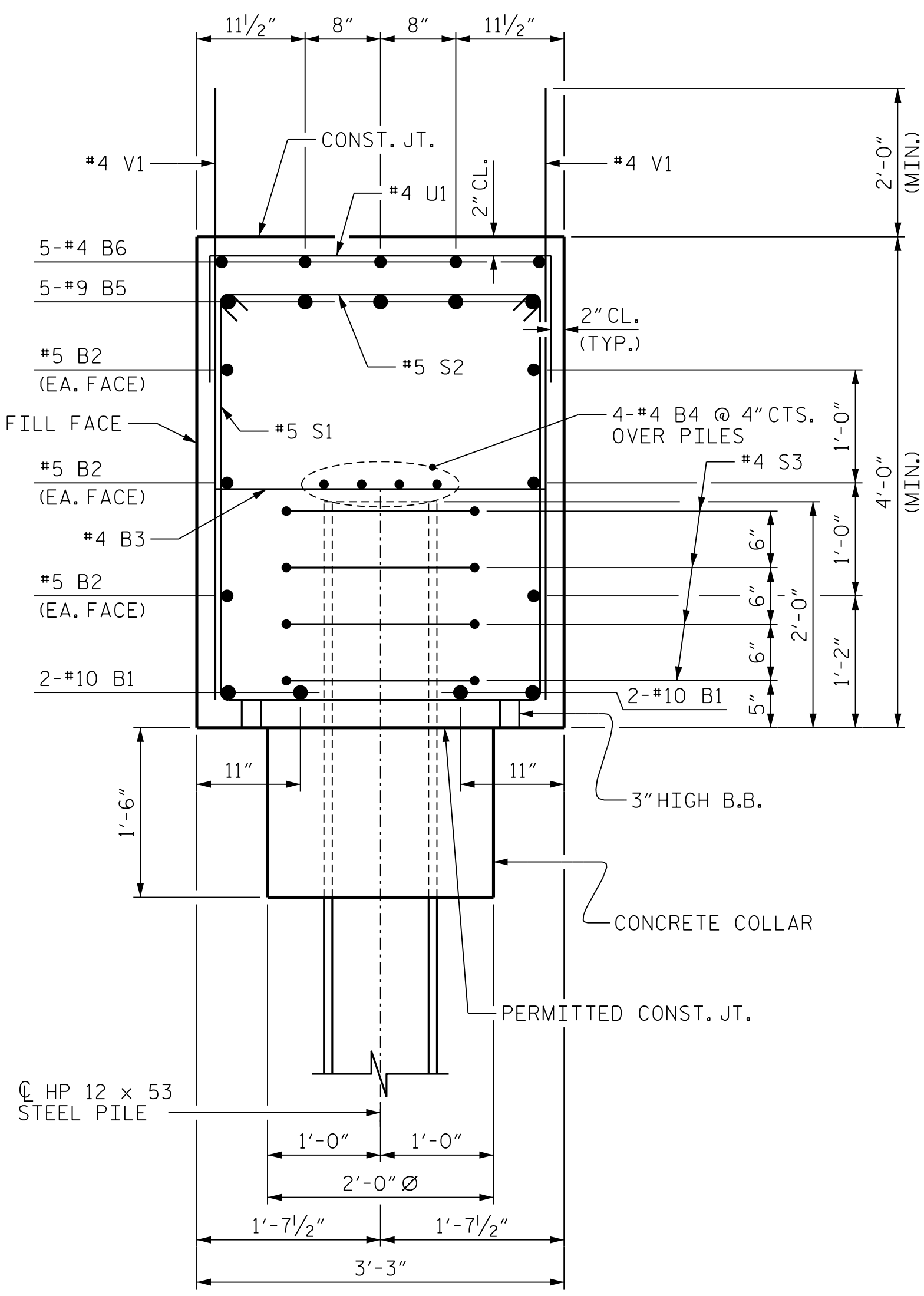


**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

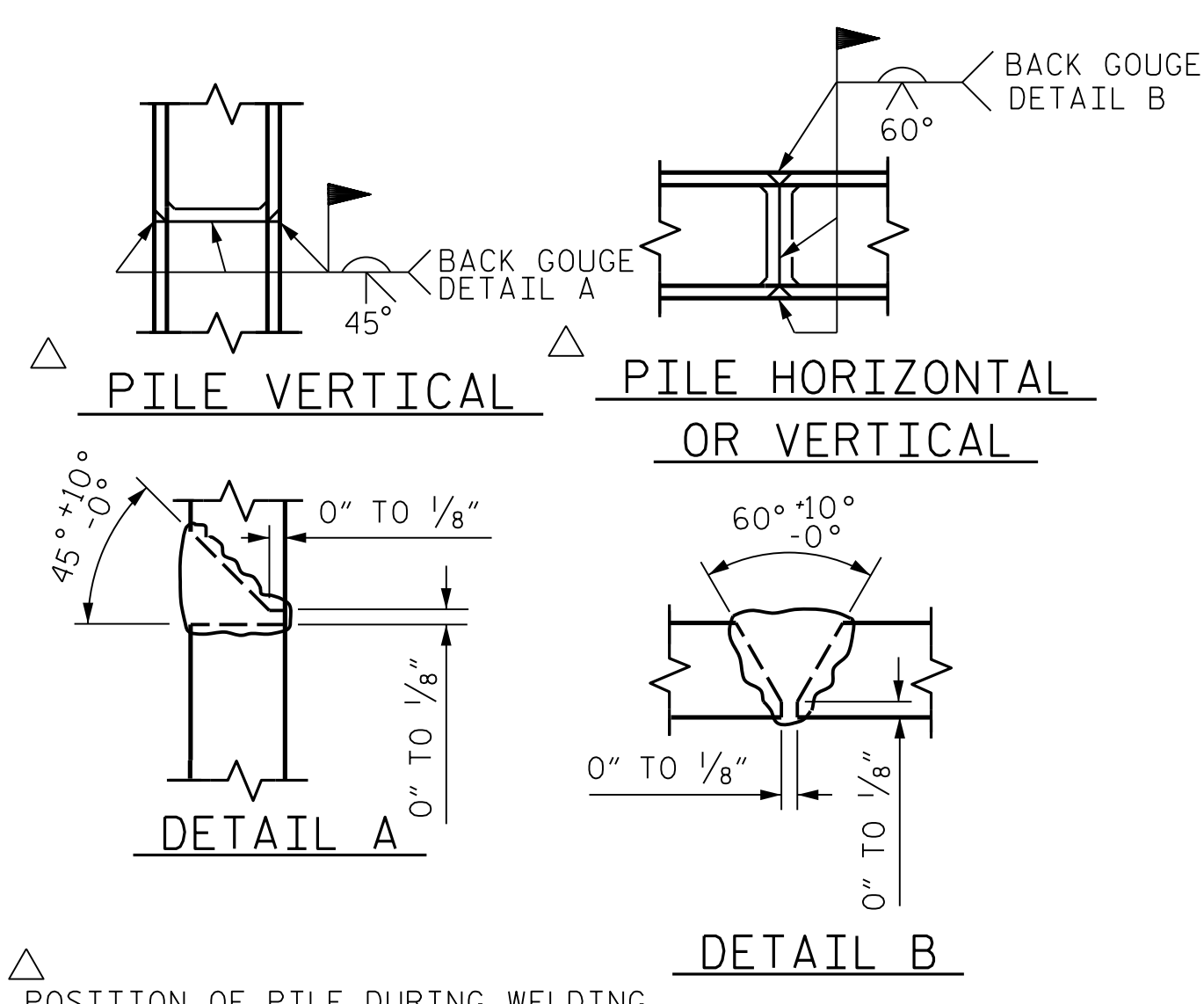
REVISIONS						SHEET NO. <b>S2-24</b>
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS <b>35</b>
2			4			

DRAWN BY : <u>B.E. LANNING</u>	DATE : <u>01/18</u>
CHECKED BY : <u>A.K. ORR</u>	DATE : <u>01/18</u>
DESIGN ENGINEER OF RECORD : <u>A.K. ORR</u>	DATE : <u>02/18</u>

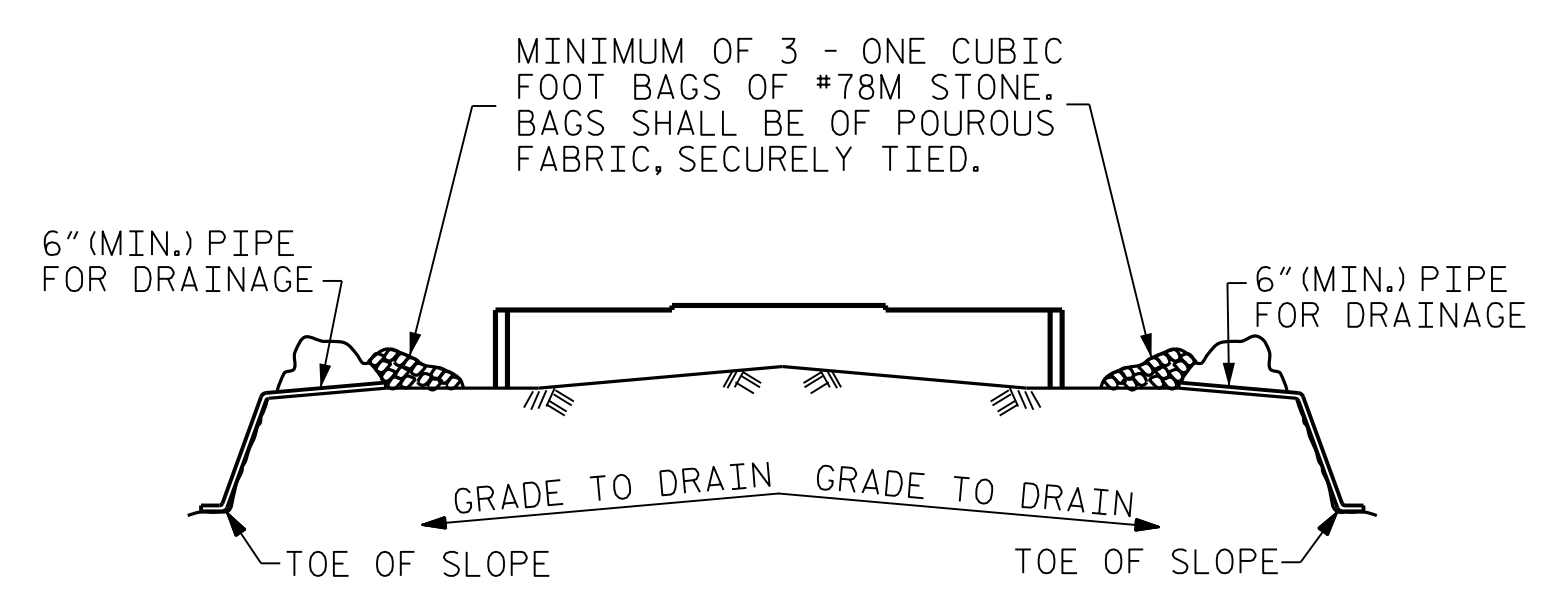




SECTION A-A



PILE SPLICE DETAILS

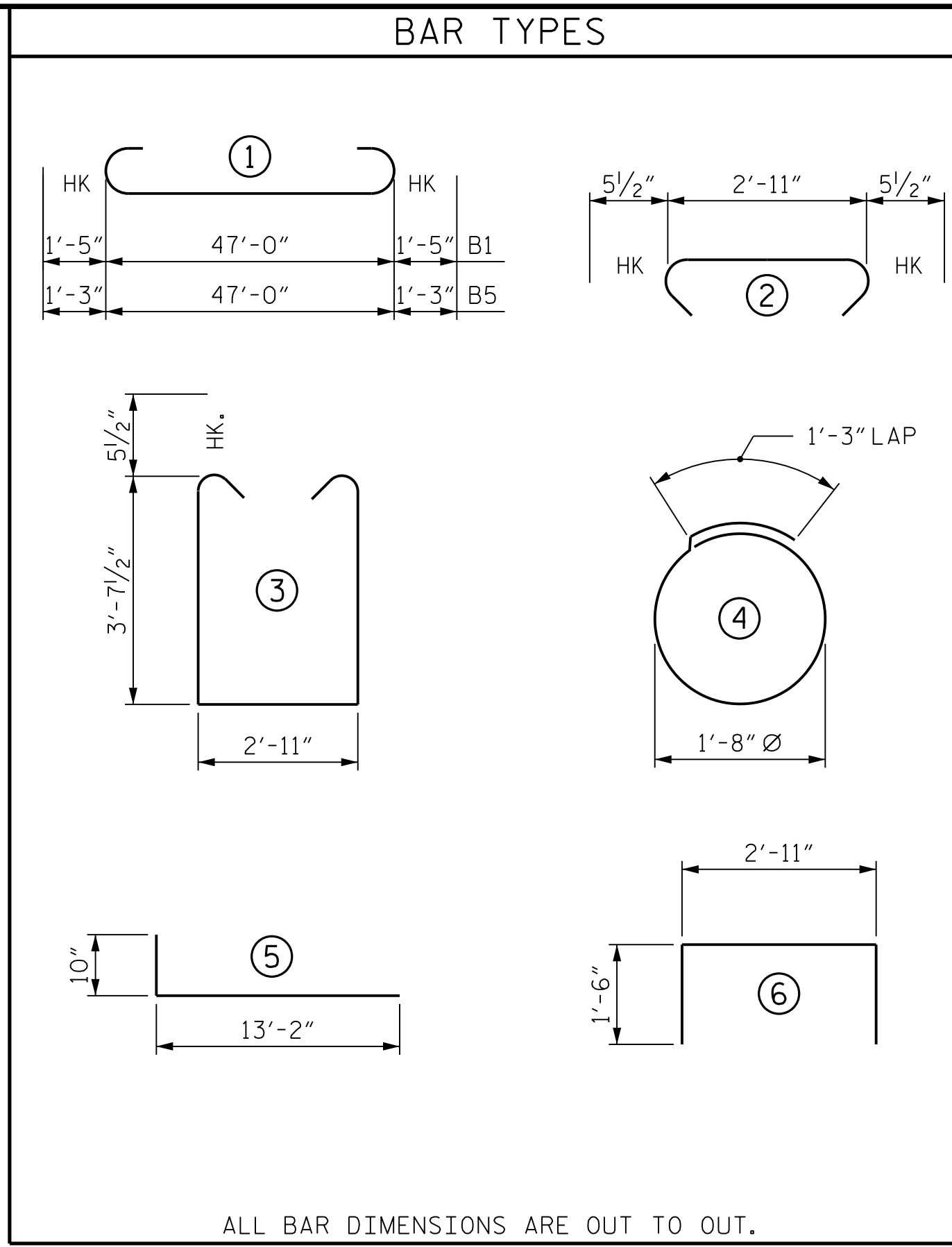


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

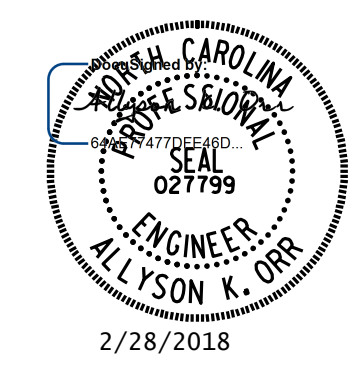


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	49'-10"	858
B2	6	#5	STR	47'-0"	294
B3	12	#4	STR	2'-11"	23
B4	8	#4	STR	24'-9"	132
B5	5	#9	1	49'-6"	842
B6	5	#4	STR	12'-8"	42
H1	80	#5	5	14'-0"	1168
K1	24	#4	STR	3'-7"	57
S1	46	#5	3	11'-1"	532
S2	46	#5	2	3'-10"	184
S3	24	#4	4	6'-6"	104
U1	9	#4	6	5'-11"	36
V1	60	#4	STR	6'-2"	247
V2	36	#4	STR	9'-7"	230
V3	36	#4	STR	9'-8"	232
REINFORCING STEEL					4,981 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (COLLARS, CAP & LOWER PART OF WINGS)					28.6 C.Y.
POUR #2 (UPPER PART OF WINGS)					7.0 C.Y.
TOTAL					35.6 C.Y.
HP 12 X 53 STEEL PILES					NO. : 6 252.0 LIN. FT.
STEEL PILE POINTS					6
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					EA. : 6

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1  
 DETAILS AND  
 BILL OF MATERIAL  
 (EBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

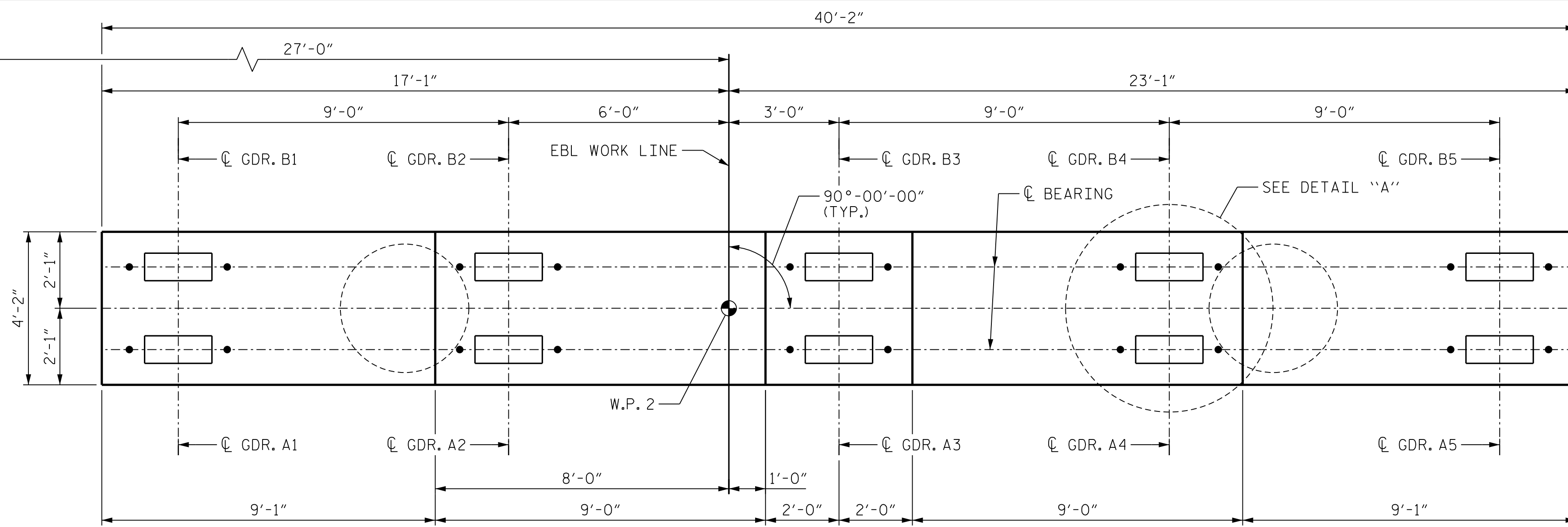
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

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

SHEET NO.  
**S2-25**  
 TOTAL SHEETS  
**35**

2/8/2018 11:29:19 AM User: blanning File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.049.B5351.SMU.EIC.400237.dgn

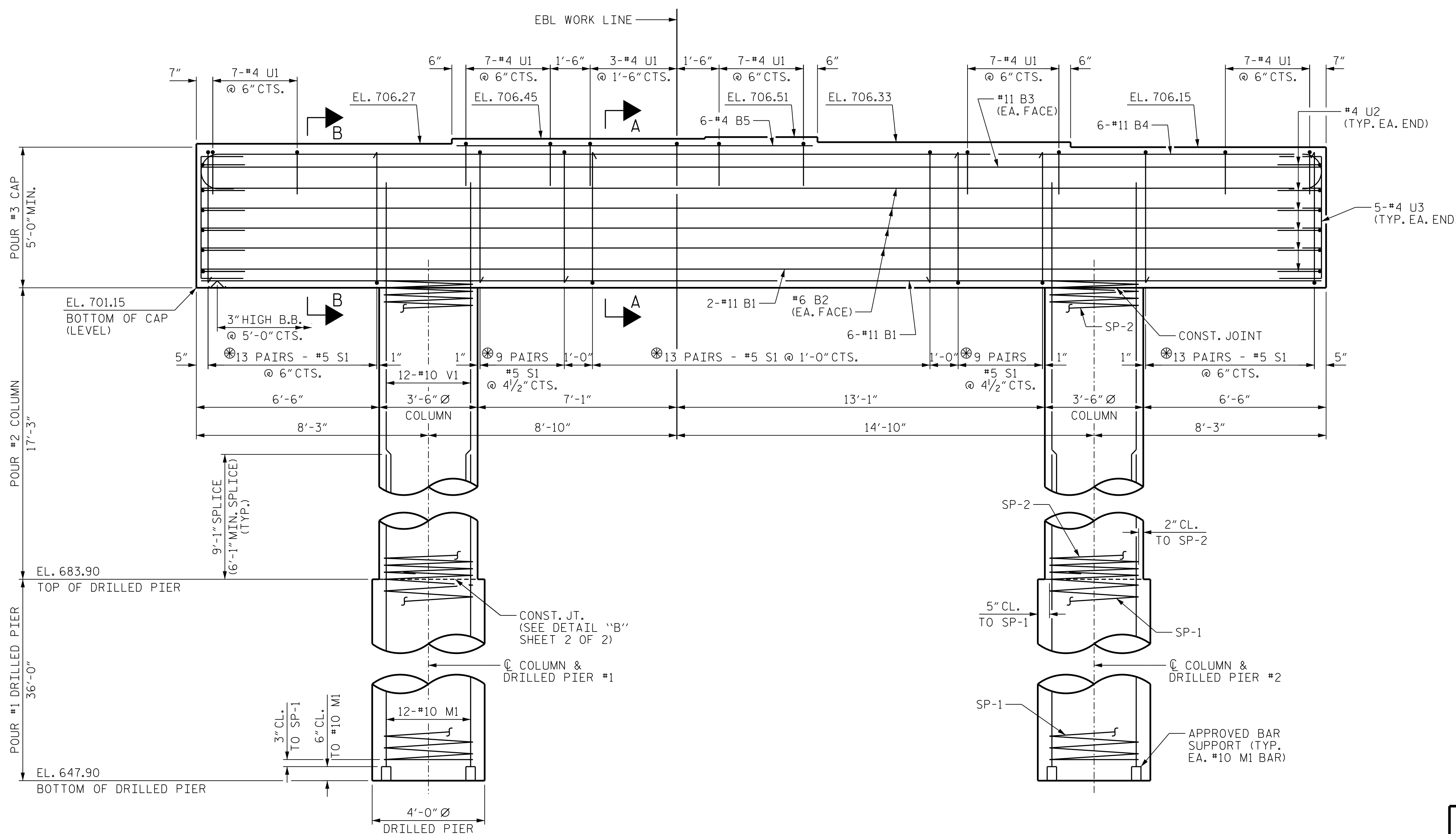
DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18



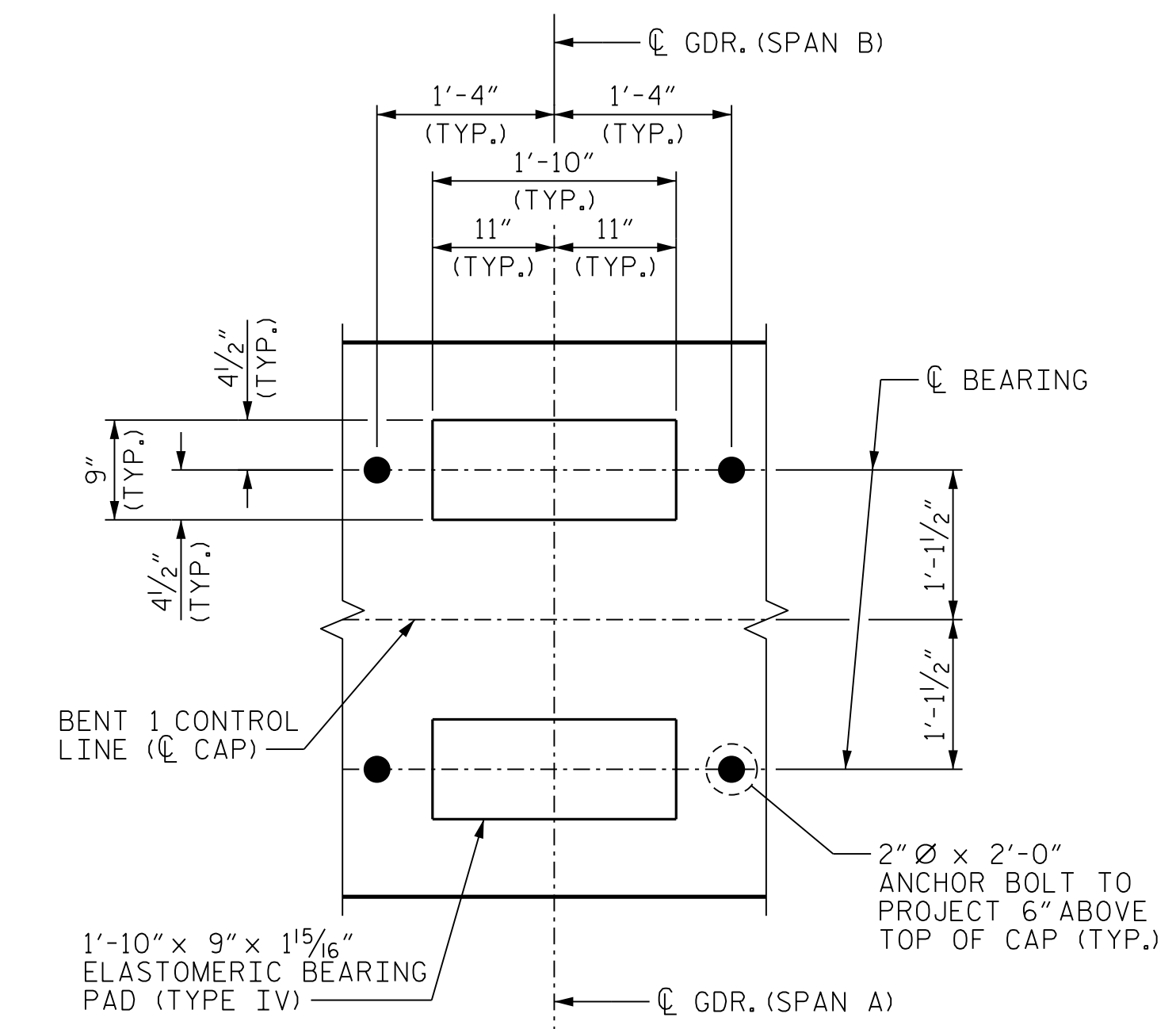
PLAN

NOTES

- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- ALL STEEL IN THE DRILLED PIER IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIER IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- FOR DRILLED PIER & PERMANENT STEEL CASING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- FOR SECTION A-A, SECTION B-B, END OF CAP VIEW AND END ELEVATION, SEE SHEET 2 OF 2.
- ⊗ INVERT ALTERNATE PAIRS OF STIRRUPS.



ELEVATION

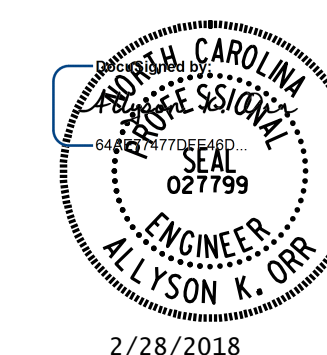


DETAIL "A"

(DIMENSIONS ARE TYPICAL AT EACH BEARING)

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 2



DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED



MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1 PLAN AND ELEVATION					
(EBL)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S2-26
TOTAL SHEETS					35

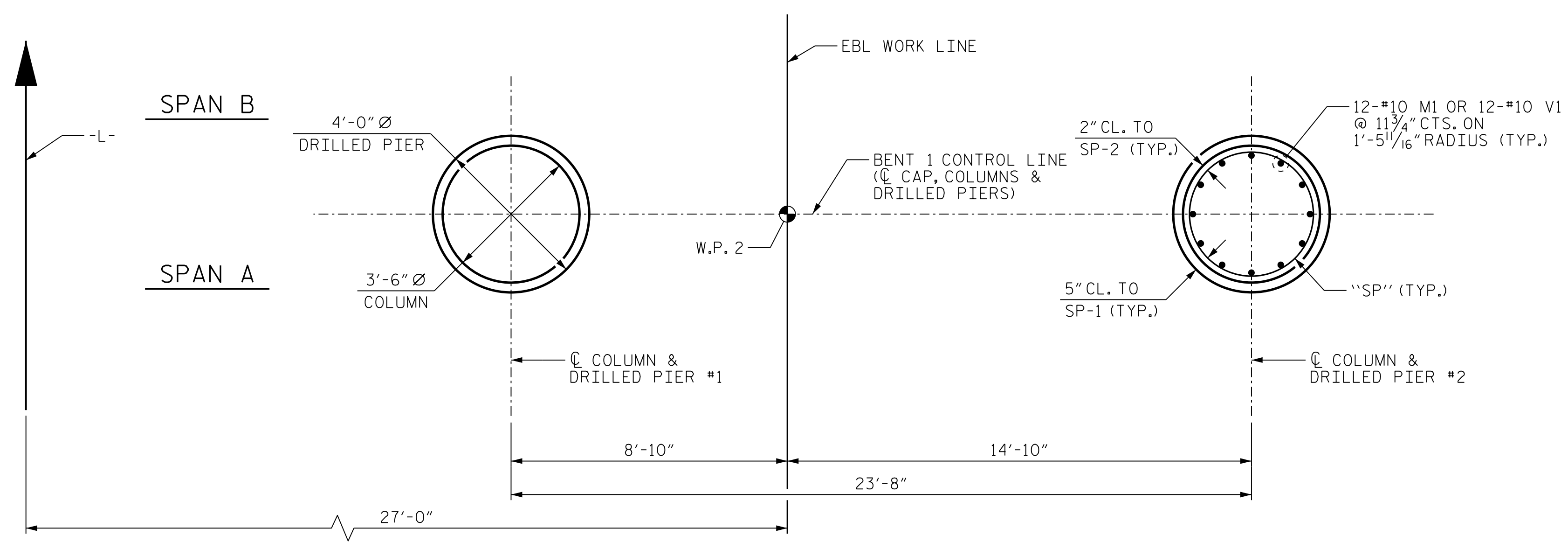
DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

(DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED)

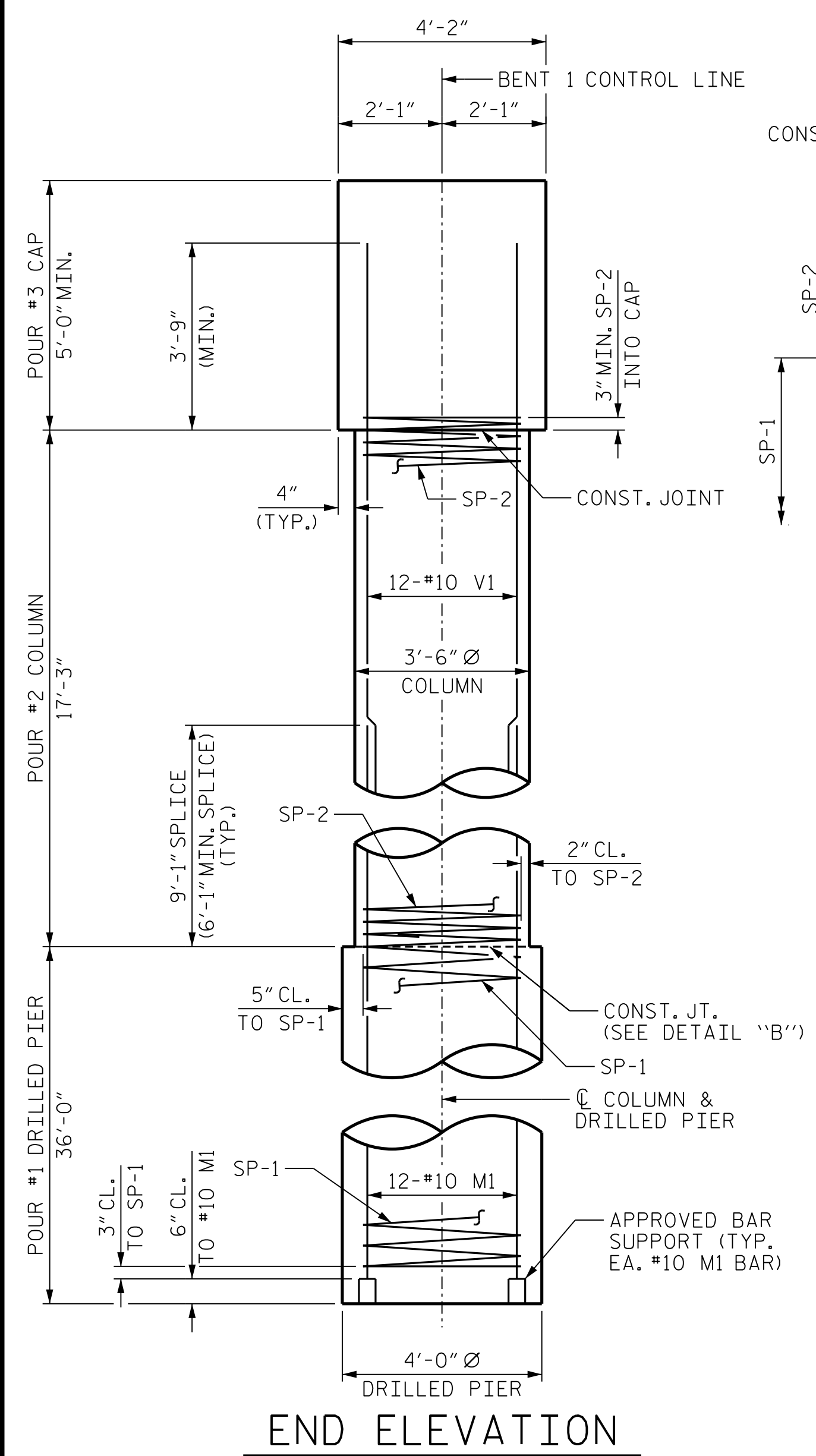
2/8/2018 11:29:22 AM User: blanning  
 Filenamer: P:\NC Bridges\W600135 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.051.B5351.SMU.BIA\_400237.dgn



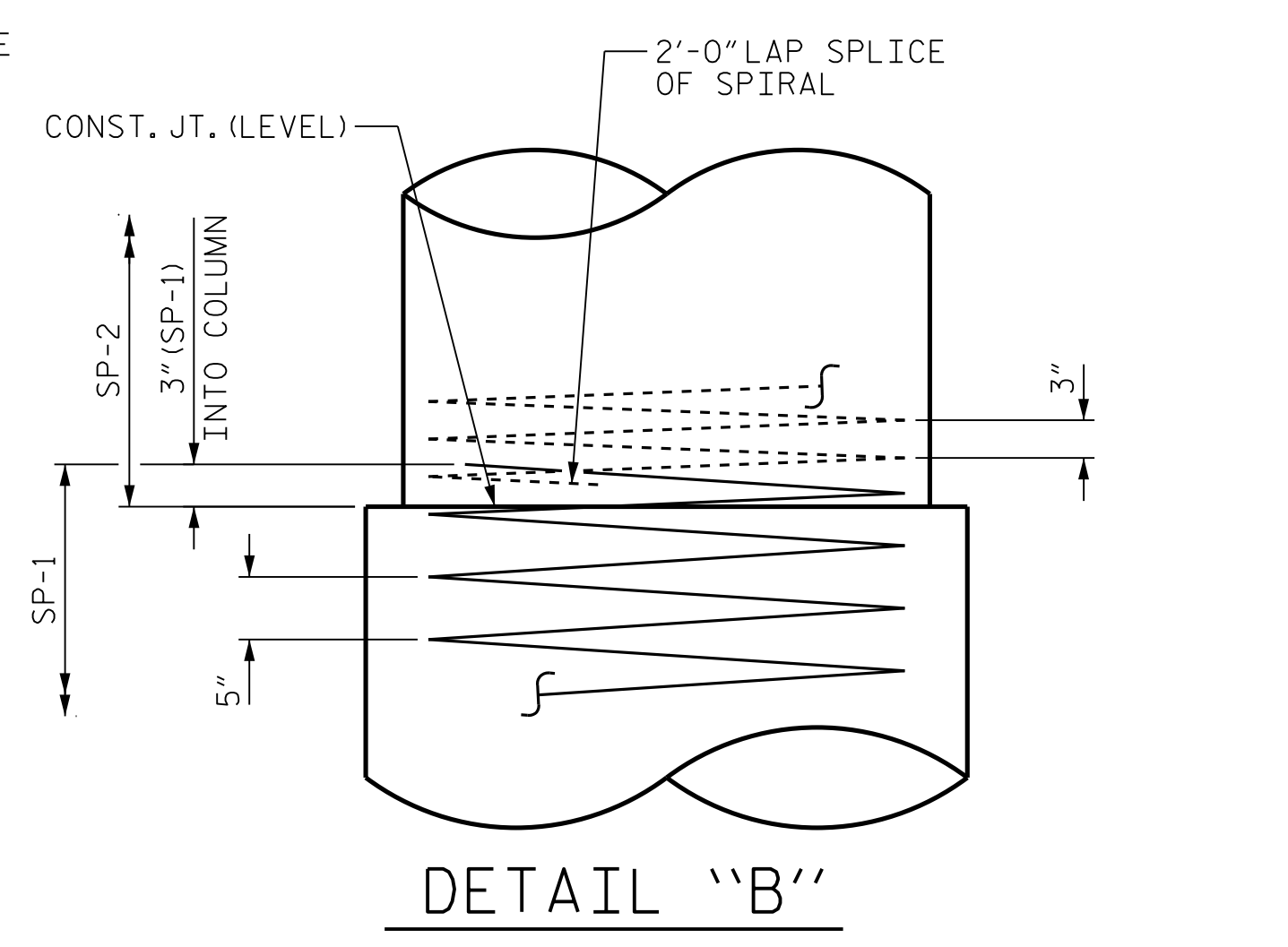
2/8/2018 11:29:24 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.053.B5351.SMU.BIB\_400237.dgn



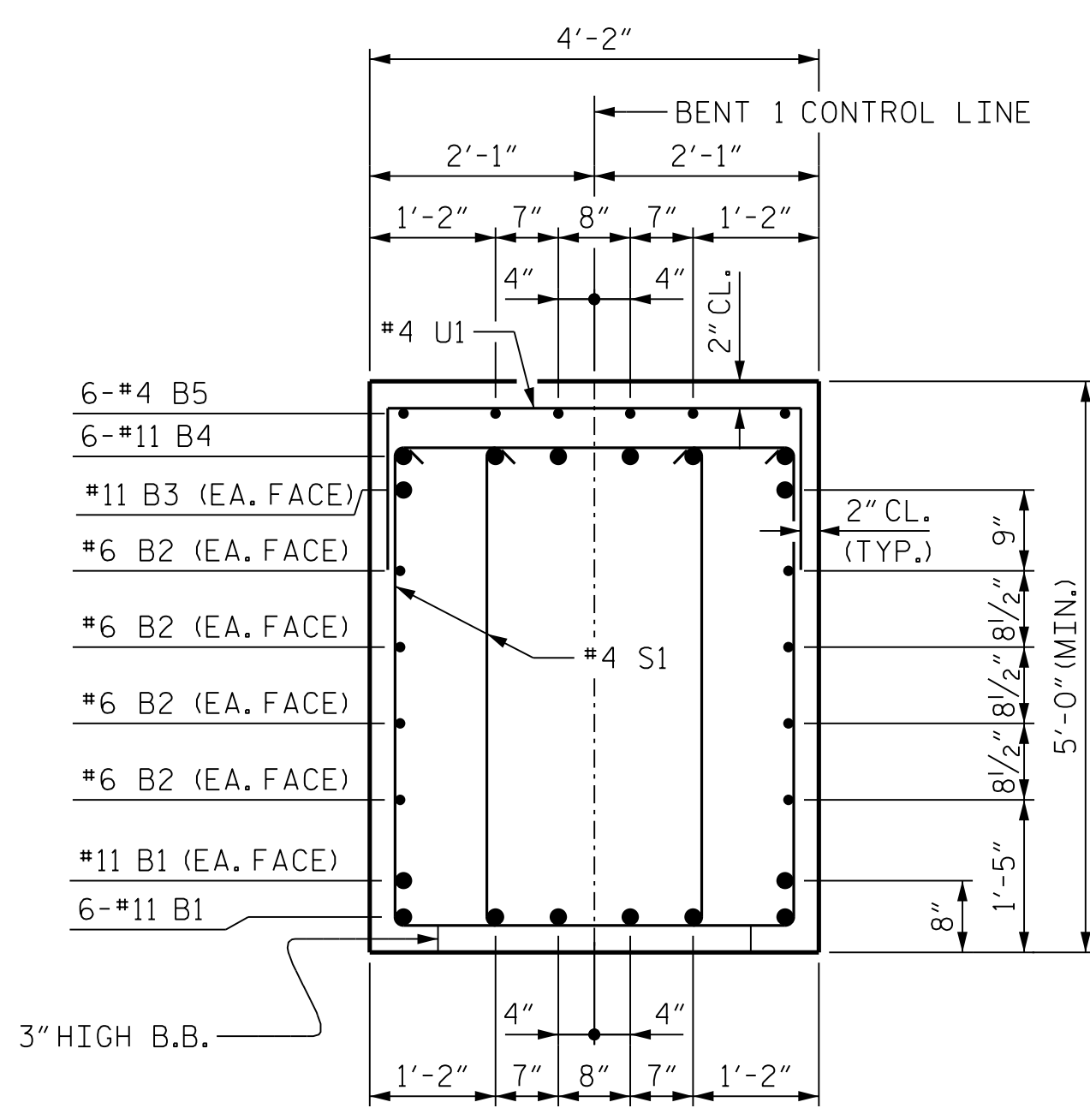
PLAN OF DRILLED PIERS AND COLUMNS



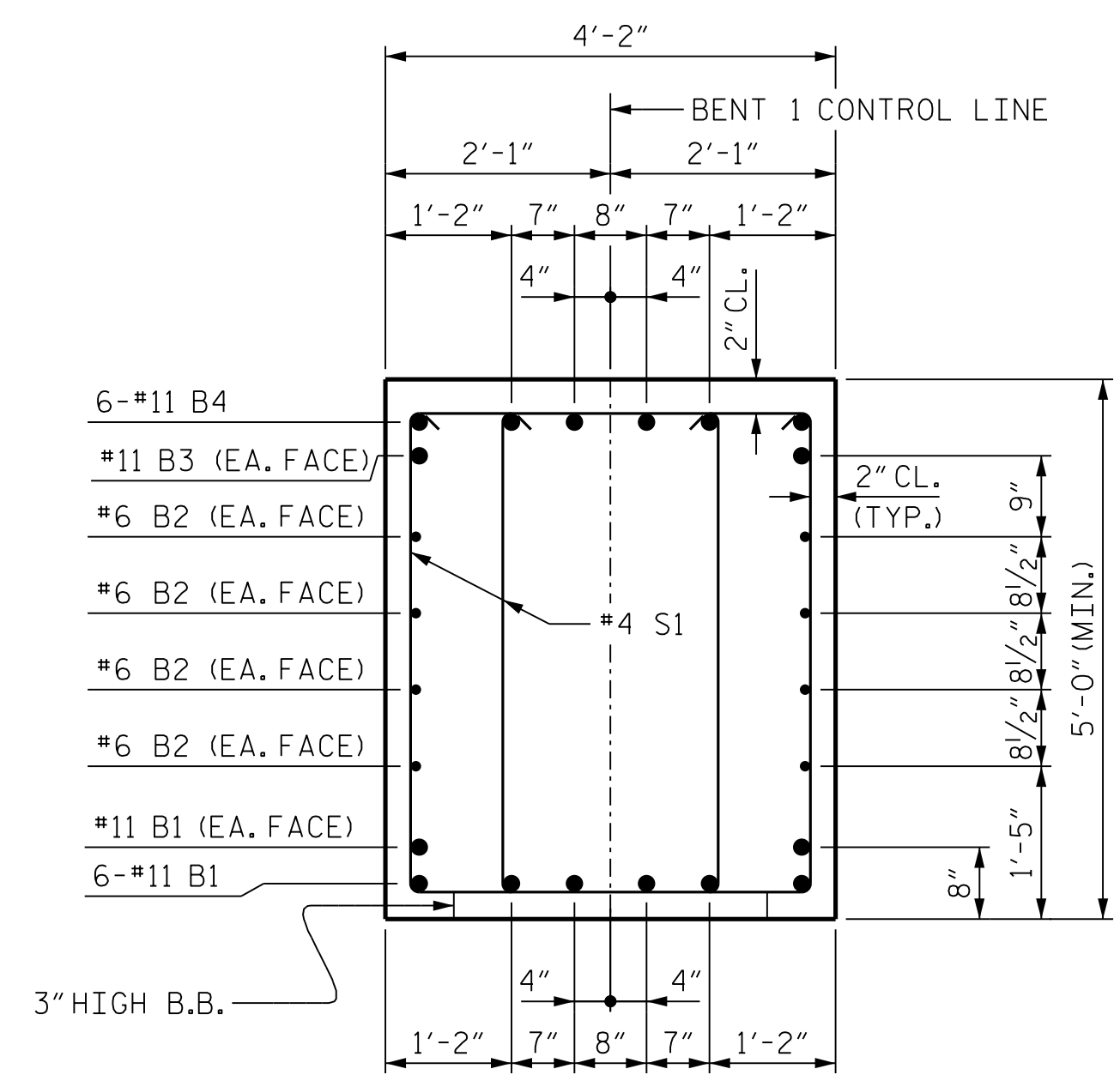
END ELEVATION



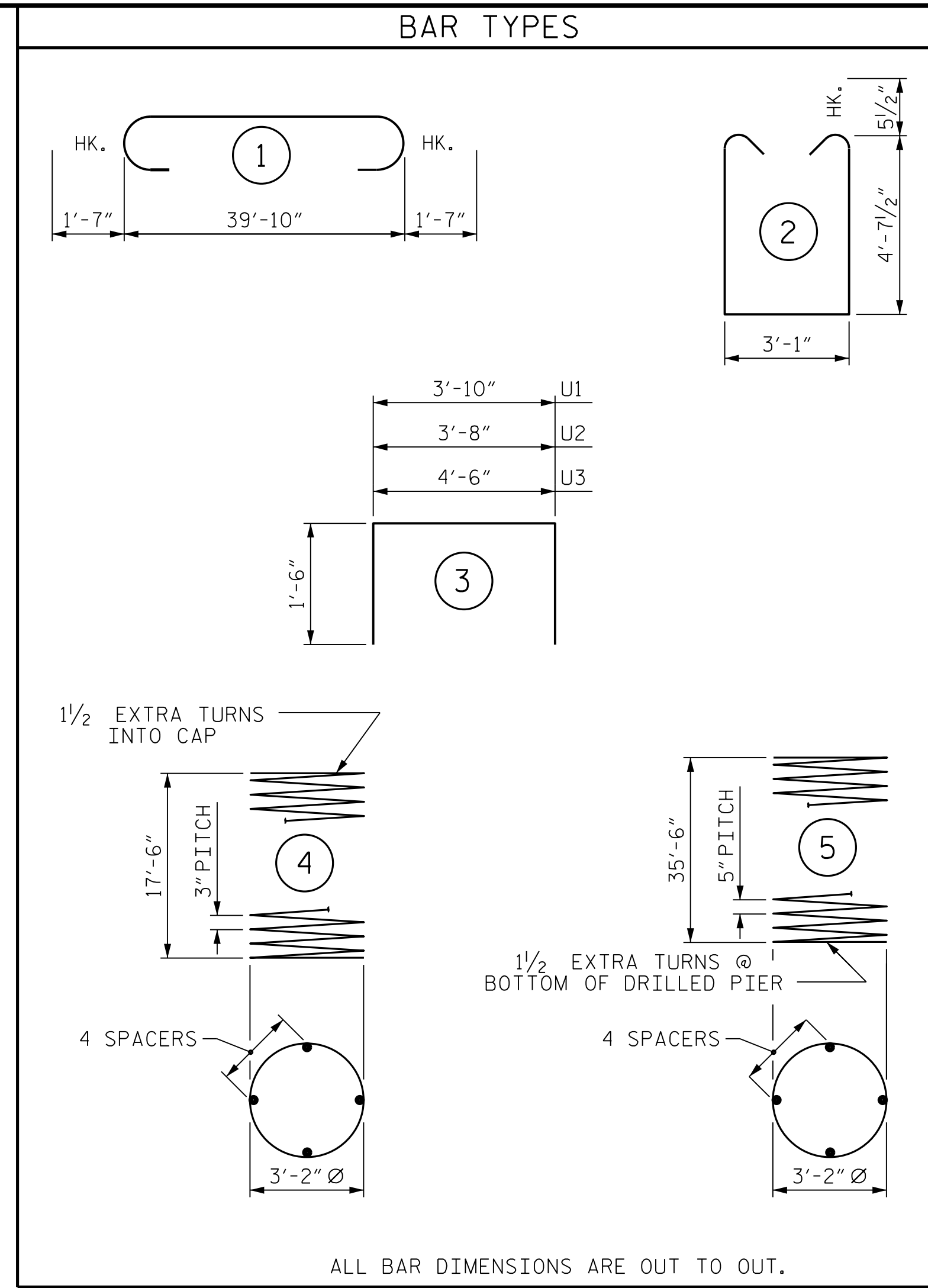
DETAIL "B"



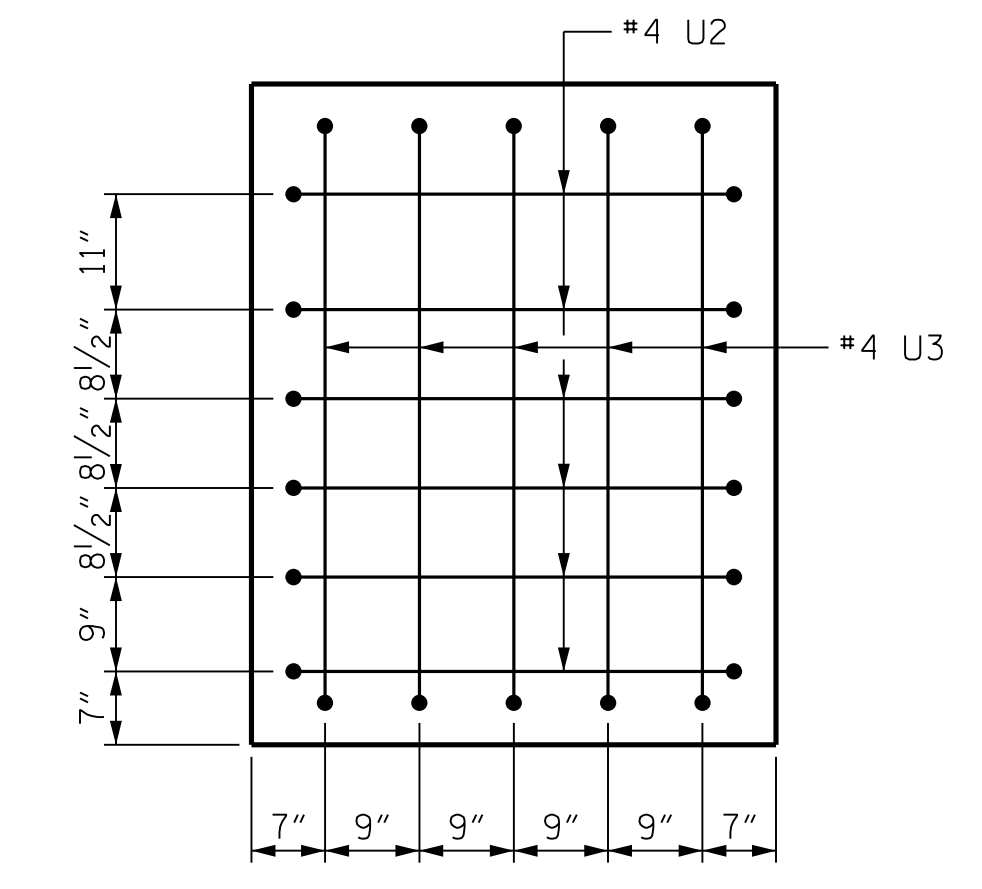
SECTION A-A



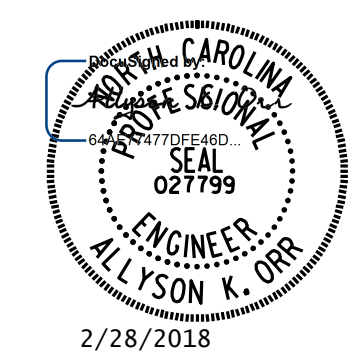
SECTION B-B



ALL BAR DIMENSIONS ARE OUT TO OUT.



END OF CAP VIEW  
(TYPICAL BOTH ENDS)



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27606  
(919) 851-6606  
FIRM PE NUMBER: P-0671

BILL OF MATERIAL					
BENT 1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	#11	STR	39'-10"	1693
B2	8	#6	STR	39'-10"	479
B3	2	#11	STR	39'-10"	423
B4	6	#11	1	43'-0"	1371
B5	6	#4	STR	12'-8"	51
M1	24	#10	STR	44'-7"	4604
S1	114	#5	2	13'-3"	1575
U1	38	#4	3	6'-10"	173
U2	12	#4	3	6'-8"	53
U3	10	#4	3	7'-6"	50
V1	24	#10	STR	21'-0"	2169
REINFORCING STEEL					12,641 LBS.
REINFORCING STEEL					
SP-1	2	**	5	847'-8"	1768
SP-2	2	*	4	701'-0"	937
SPIRAL COLUMN REINFORCING STEEL					2,705 LBS.
* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE BREAKDOWN					
POUR #3 (CAP)				32.0	C.Y.
POUR #2 (COLUMN)				12.3	C.Y.
TOTAL				44.3	C.Y.
DRILLED PIERS					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				33.6	C.Y.
4'-0" Ø DRILLED PIER IN SOIL				56.0	LIN. FT.
4'-0" Ø DRILLED PIER NOT IN SOIL				16.0	LIN. FT.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER				34.0	LIN. FT.
CSL TUBES				300.0	LIN. FT.

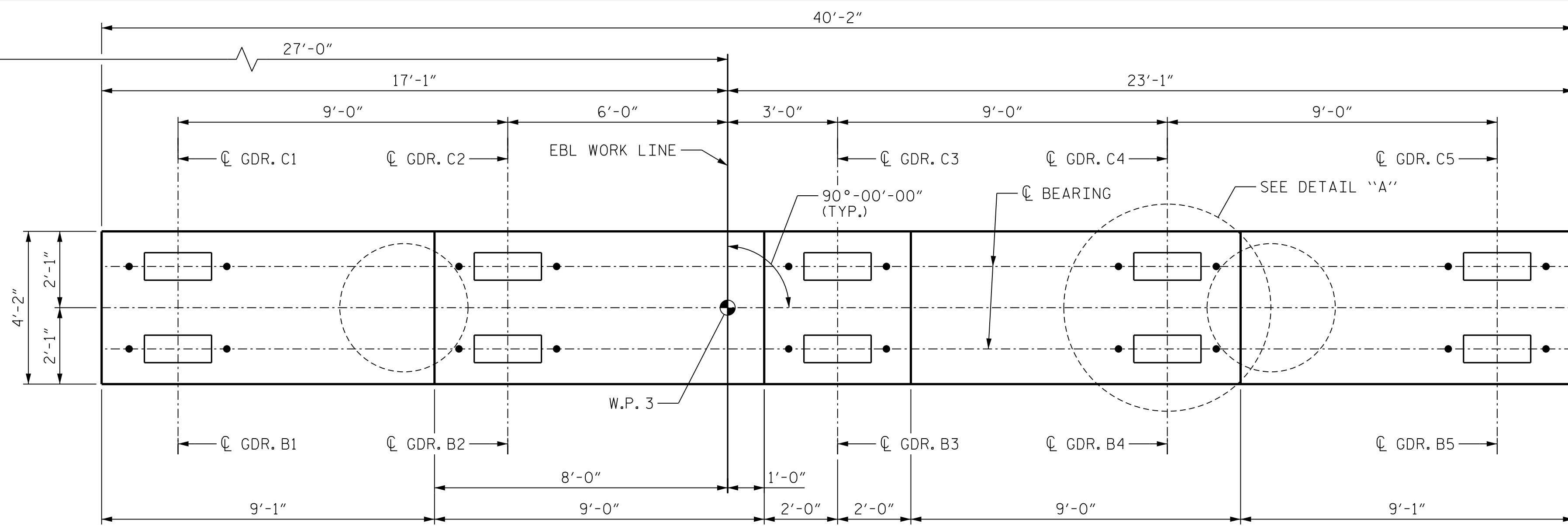
PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 1  
 DETAILS AND  
 BILL OF MATERIAL  
 (EBL)

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

DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

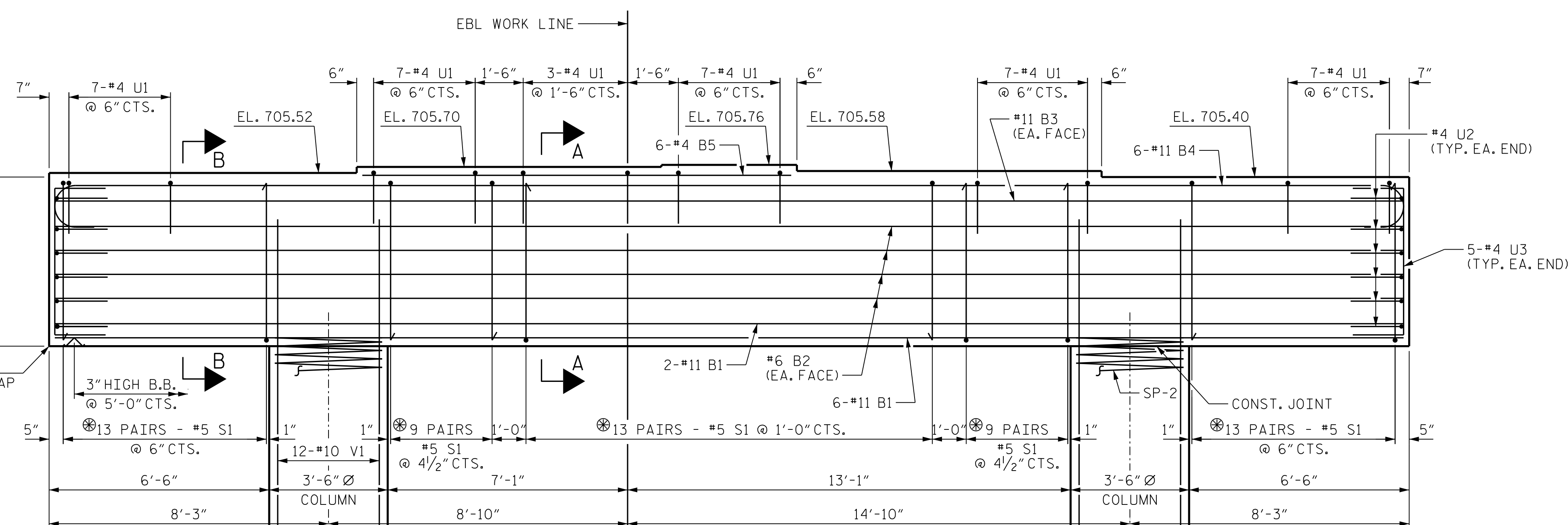
SHEET NO.  
**S2-27**  
 TOTAL SHEETS  
**35**



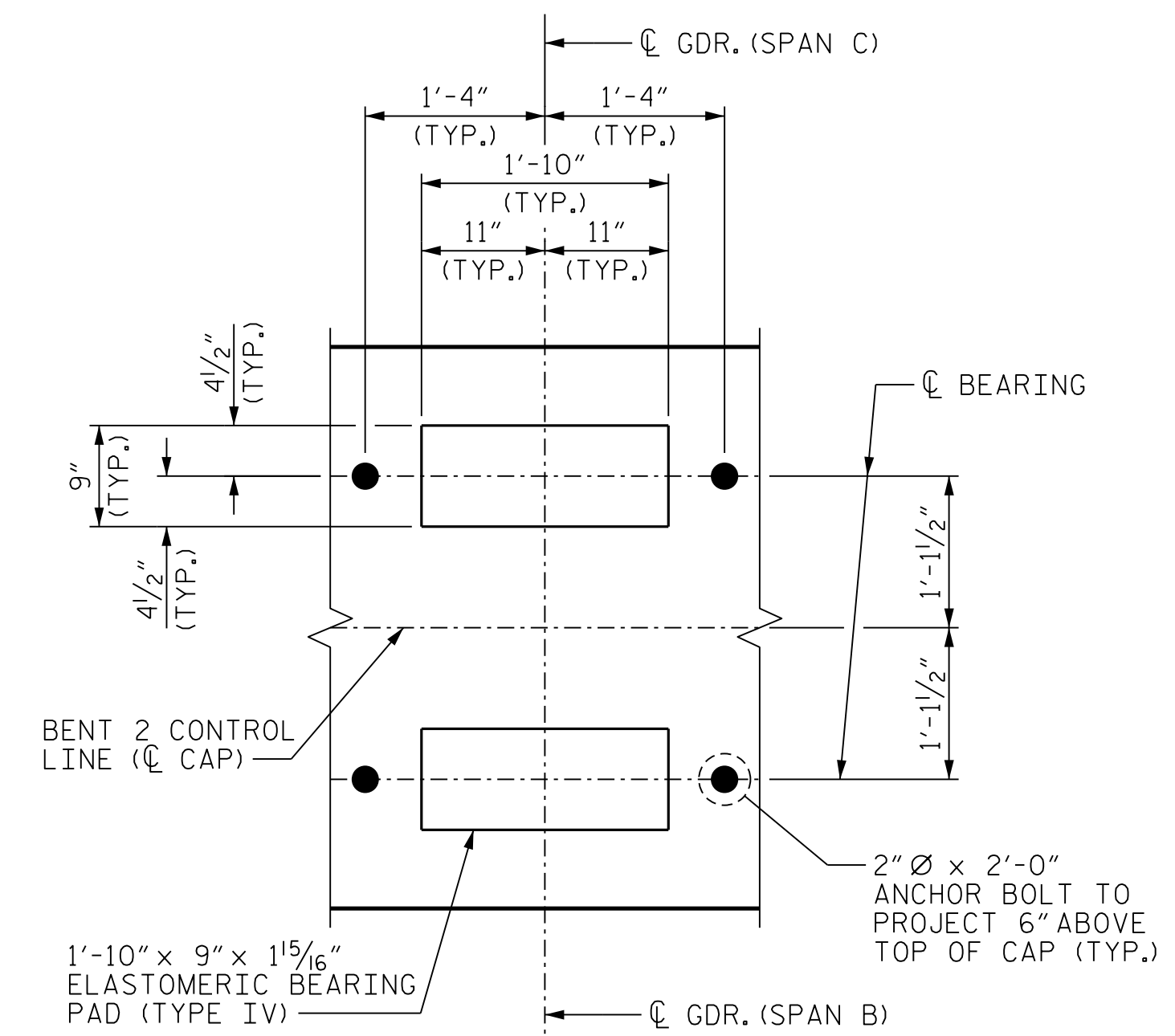
PLAN

NOTES

- STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- ALL STEEL IN THE DRILLED PIER IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIER IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- FOR DRILLED PIER & PERMANENT STEEL CASING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- FOR SECTION A-A, SECTION B-B, END OF CAP VIEW AND END ELEVATION, SEE SHEET 2 OF 2.
- ⊗ INVERT ALTERNATE PAIRS OF STIRRUPS.



ELEVATION

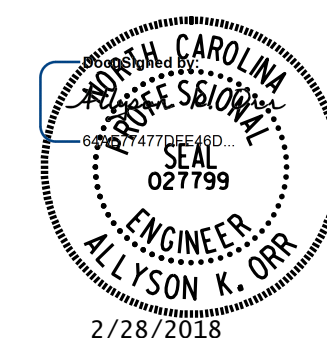


DETAIL "A"

(DIMENSIONS ARE TYPICAL AT EACH BEARING)

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT 2  
 PLAN AND ELEVATION

(EBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S2-28
2			4			

TOTAL SHEETS: 35

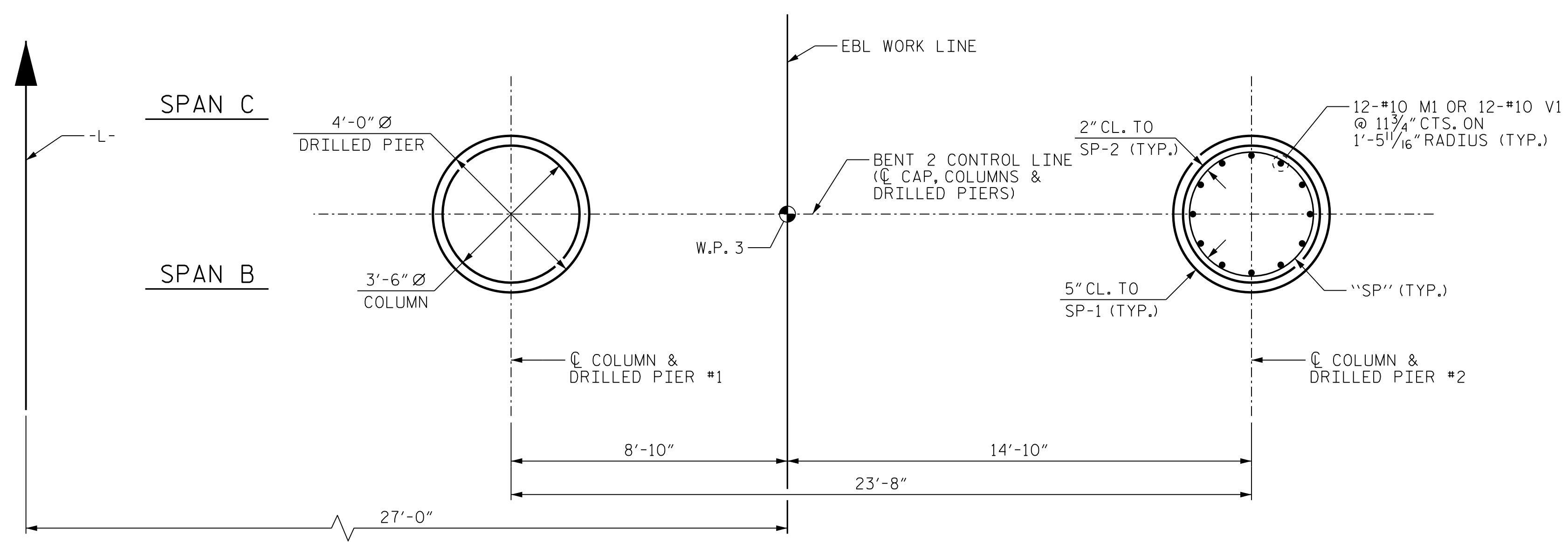
DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

(DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED)

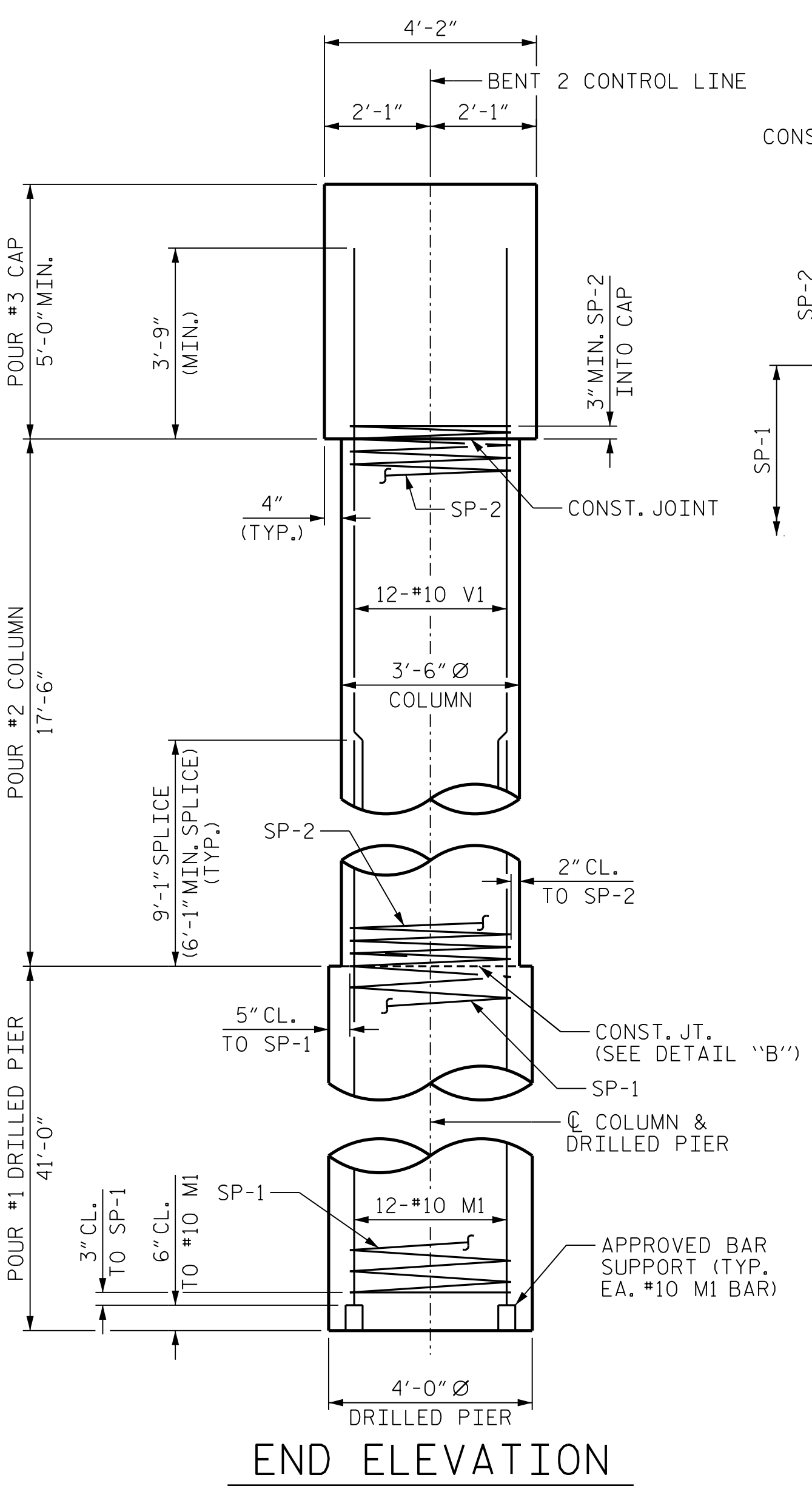
2/8/2018 11:29:26 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.055.B5351.SMU.B2A-400237.dgn



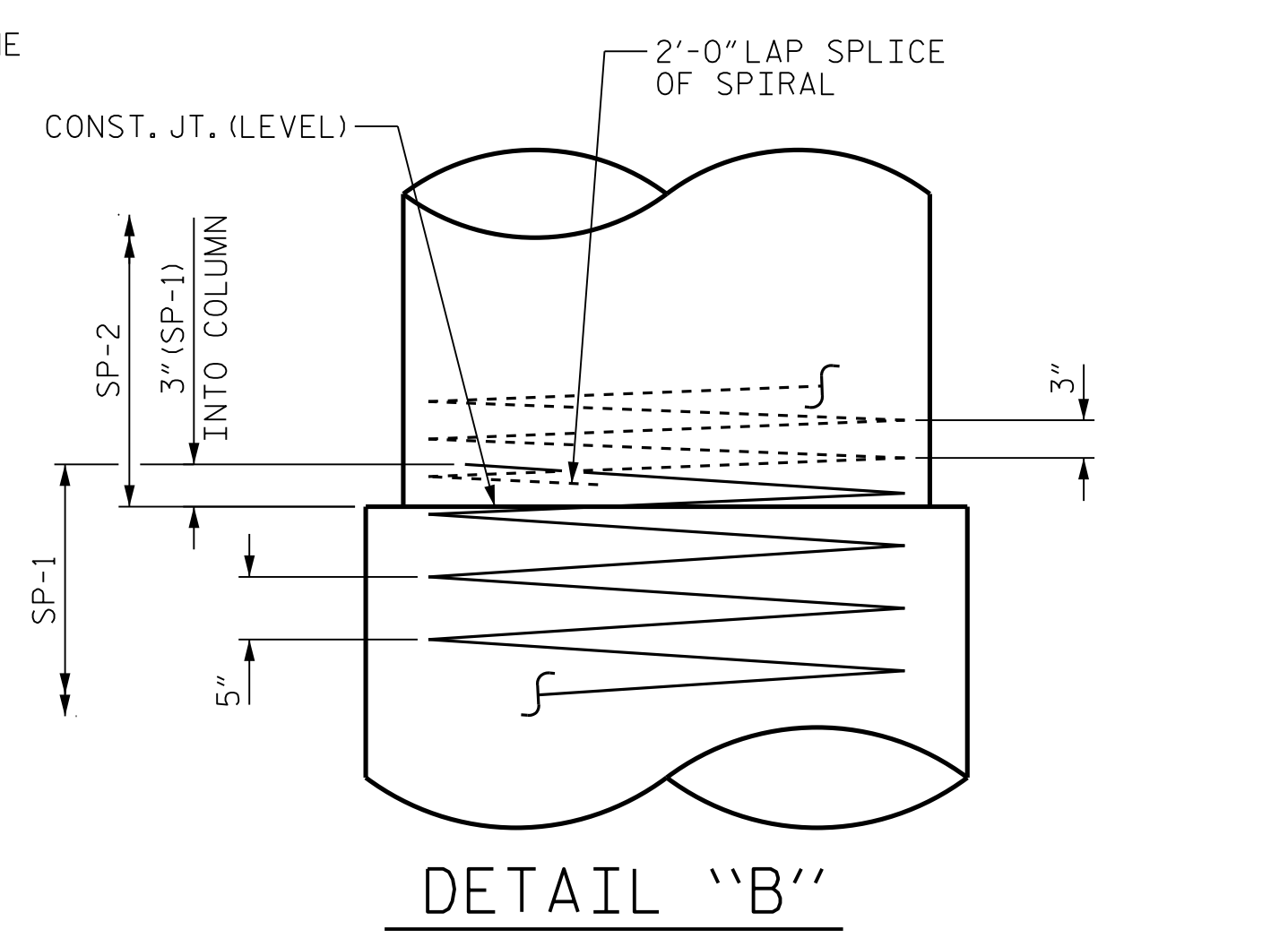
2/8/2018 11:29:28 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.057-B5351-SMU-B2B-400237.dgn



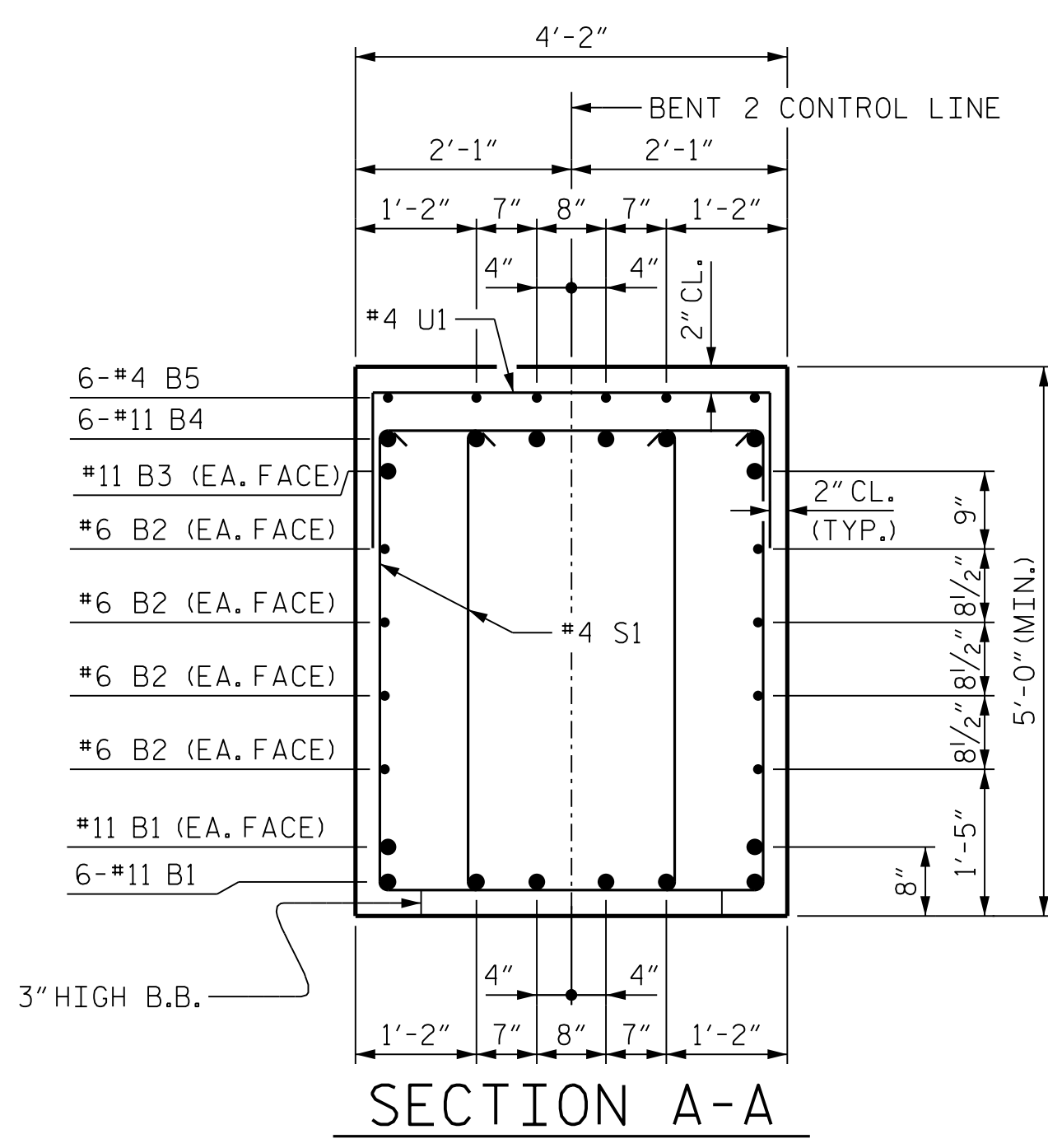
PLAN OF DRILLED PIERS AND COLUMNS



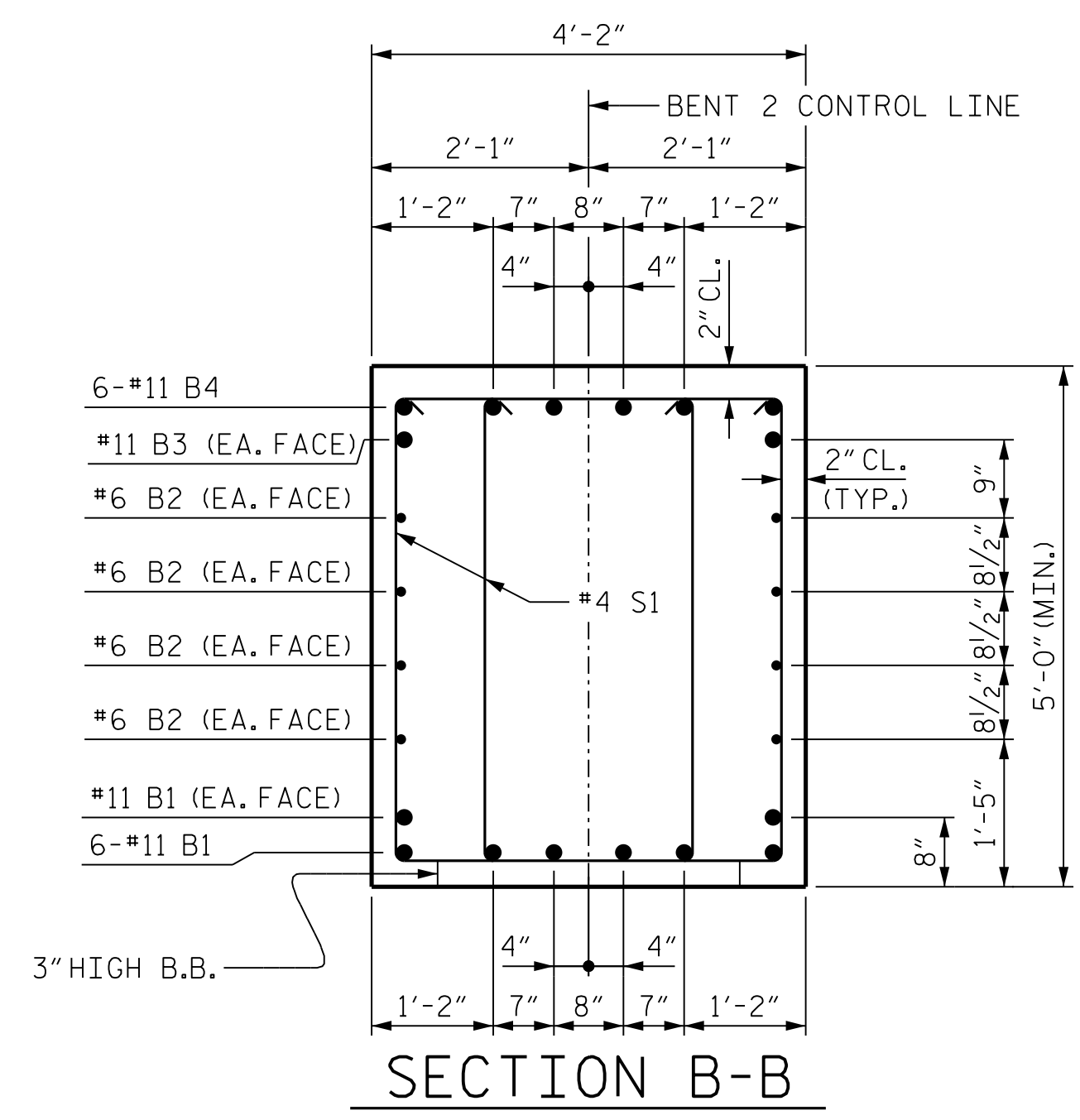
END ELEVATION



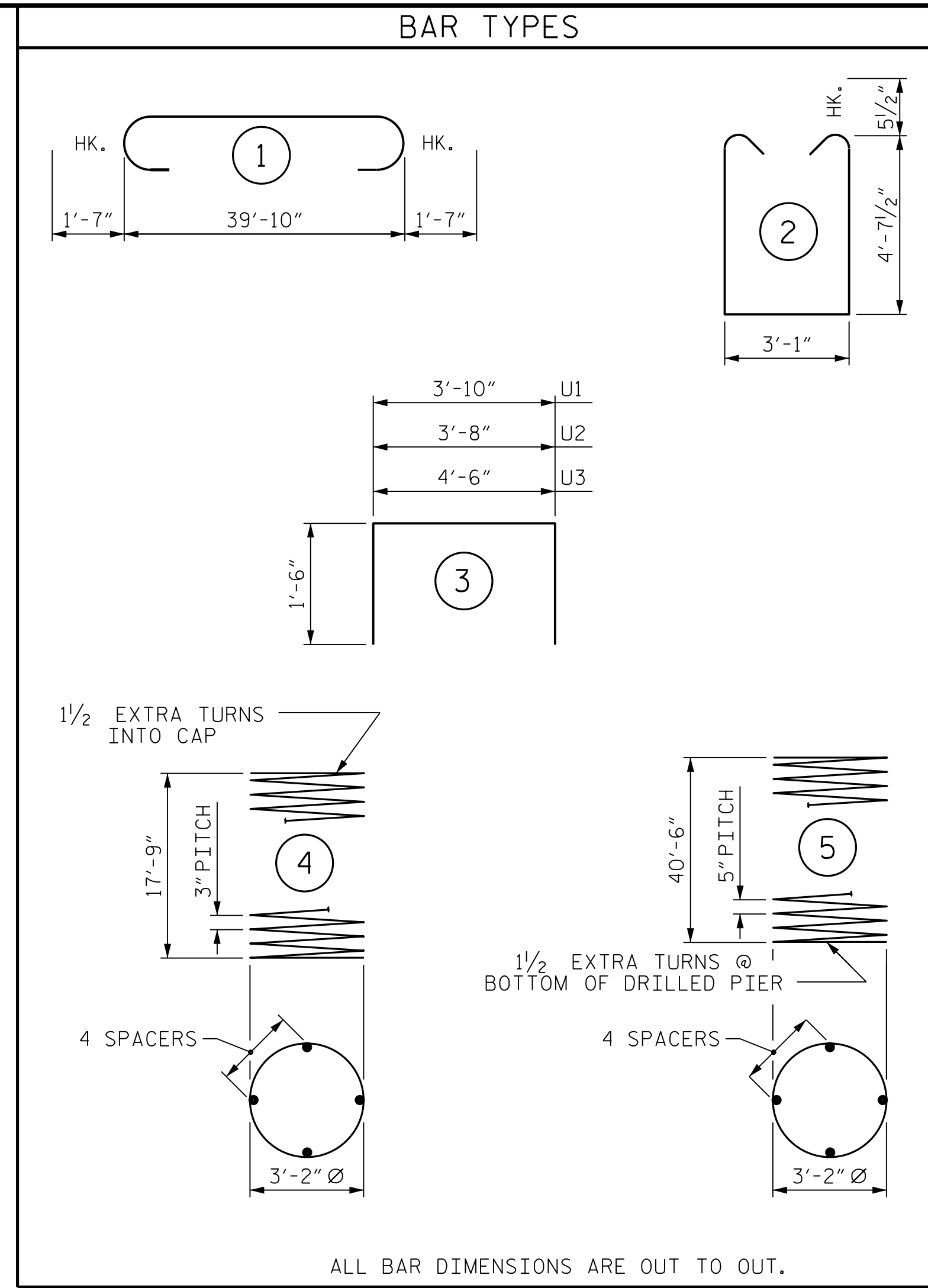
DETAIL "B"



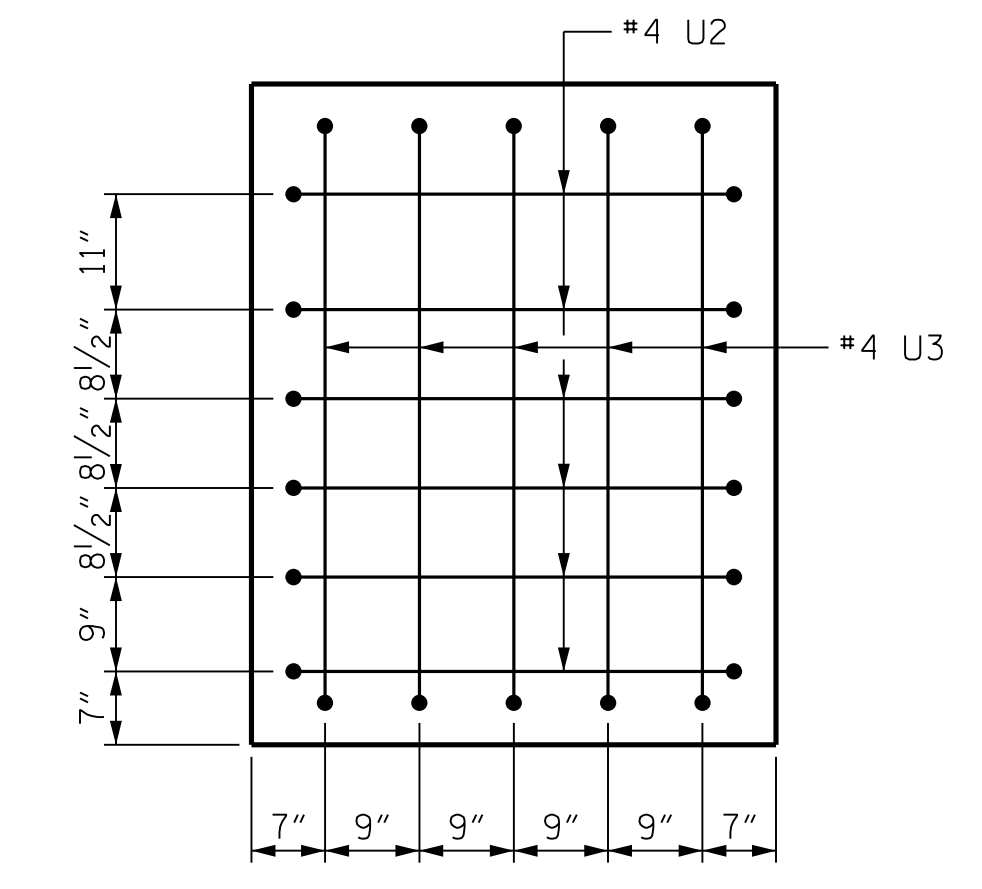
SECTION A-A



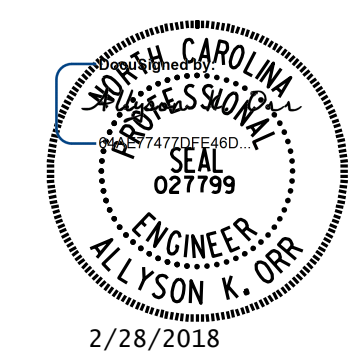
SECTION B-B



ALL BAR DIMENSIONS ARE OUT TO OUT.



END OF CAP VIEW  
(TYPICAL BOTH ENDS)



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

BILL OF MATERIAL					
BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	#8	#11 STR	39'-10"	1693	
B2	#8	#6 STR	39'-10"	479	
B3	#8	#11 STR	39'-10"	423	
B4	#6	#11	43'-0"	1371	
B5	#6	#4 STR	12'-8"	51	
M1	#10	STR	49'-7"	5121	
S1	#5	2	13'-3"	1575	
U1	#4	3	6'-10"	173	
U2	#4	3	6'-8"	53	
U3	#4	3	7'-6"	50	
V1	#10	STR	21'-3"	2195	
REINFORCING STEEL				13,184 LBS.	
REINFORCING STEEL					
SP-1	2	**	5	965'-0"	2013
SP-2	2	*	4	710'-9"	950
SPIRAL COLUMN REINFORCING STEEL				2,963 LBS.	
* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE BREAKDOWN					
POUR #3 (CAP)				32.0 C.Y.	
POUR #2 (COLUMN)				12.5 C.Y.	
TOTAL				44.5 C.Y.	
DRILLED PIERS					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				38.2 C.Y.	
4'-0" Ø DRILLED PIER IN SOIL				61.0 LIN. FT.	
4'-0" Ø DRILLED PIER NOT IN SOIL				21.0 LIN. FT.	
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER				28.0 LIN. FT.	
CSL TUBES				340.0 LIN. FT.	

PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
**BENT 2**  
 DETAILS AND  
 BILL OF MATERIAL  
 (EBL)

DRAWN BY: B.E. LANNING DATE: 01/18  
 CHECKED BY: A.K. ORR DATE: 01/18  
 DESIGN ENGINEER OF RECORD: A.K. ORR DATE: 02/18

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

SHEET NO.  
**S2-29**  
 TOTAL SHEETS  
**35**

**NOTES**

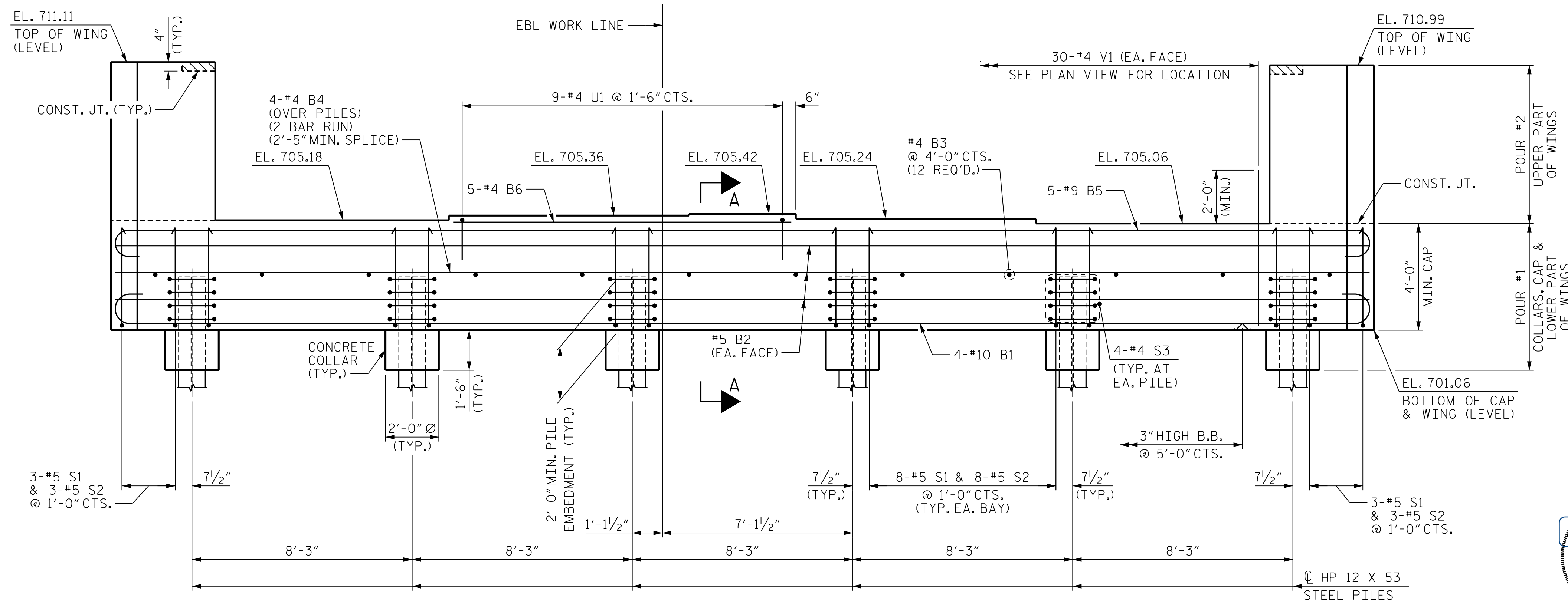
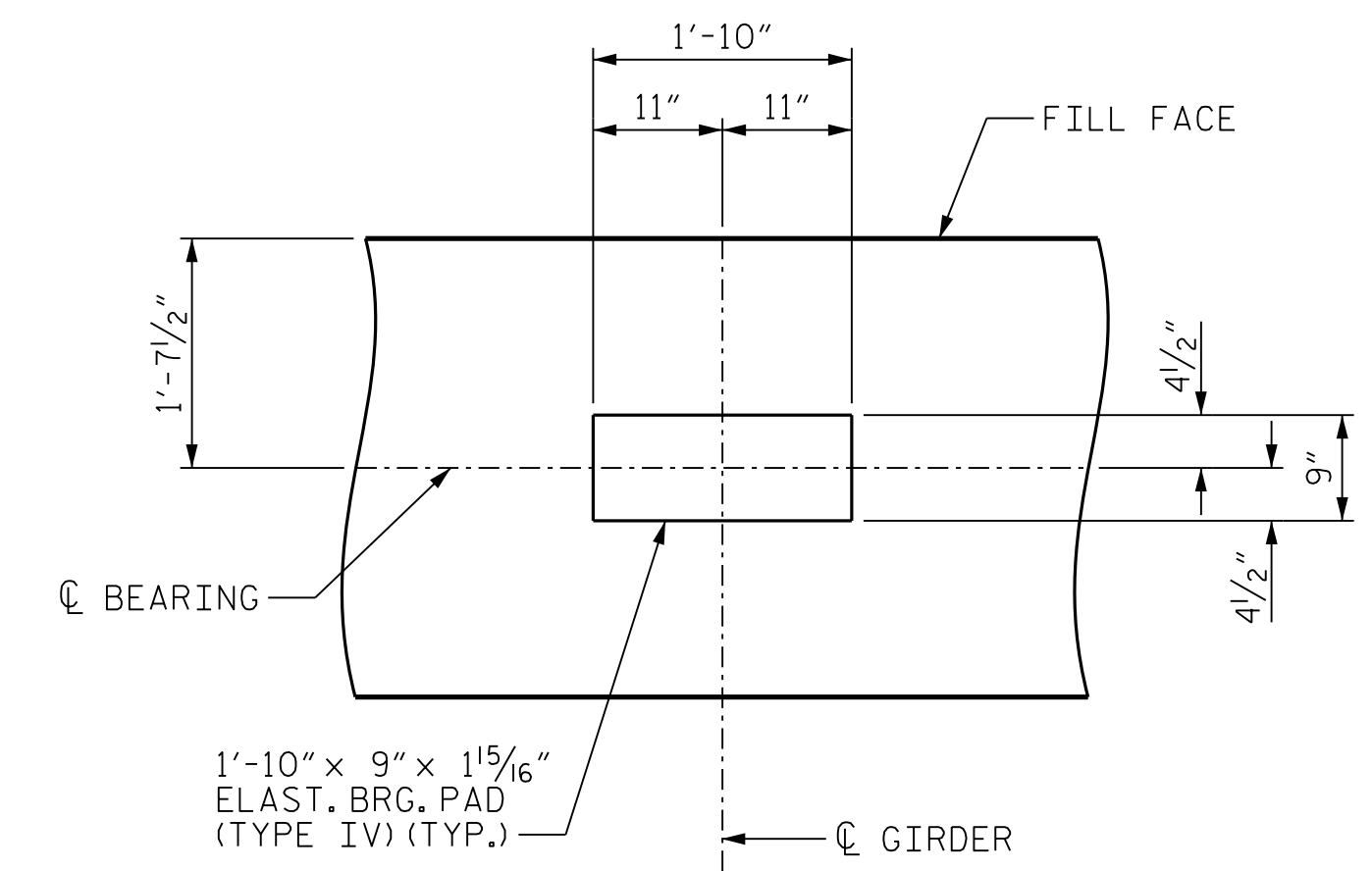
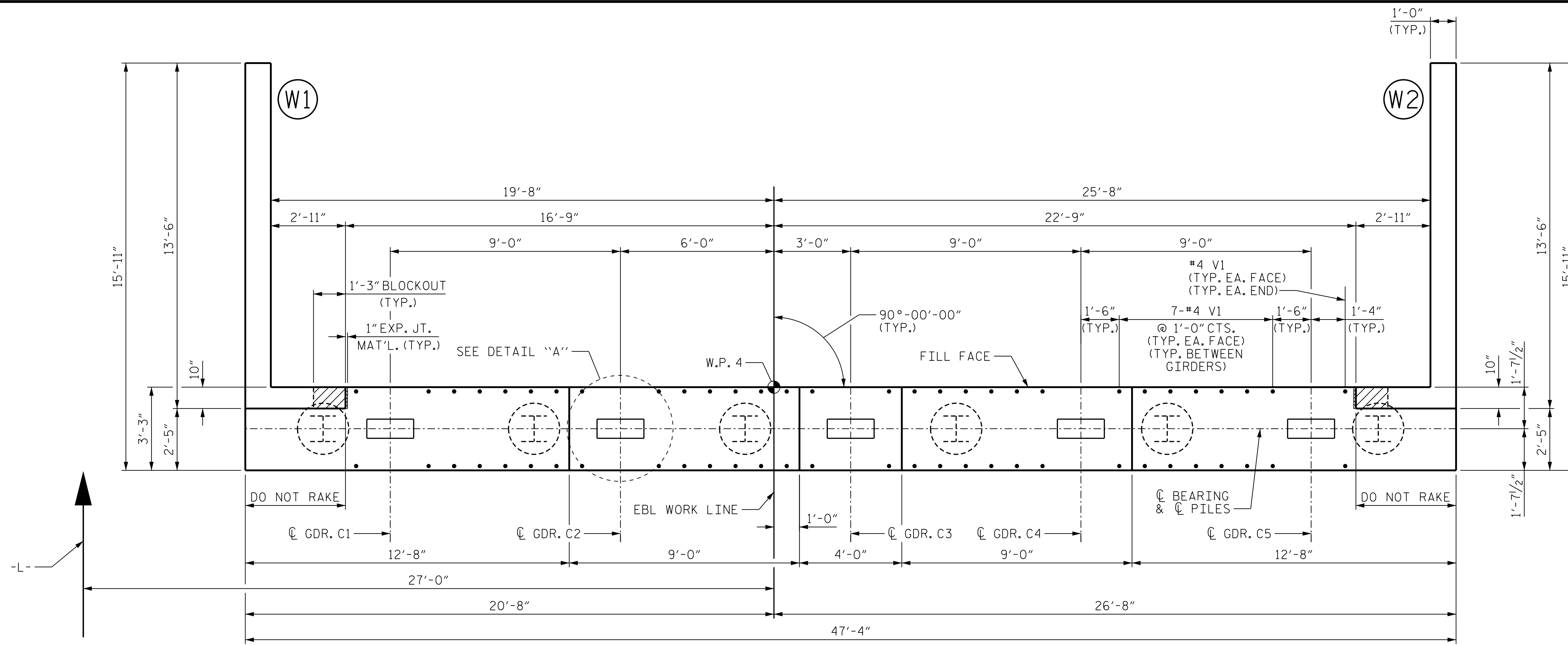
THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE END AS INDICATED, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTION A-A, SEE SHEET 3 OF 3.

FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

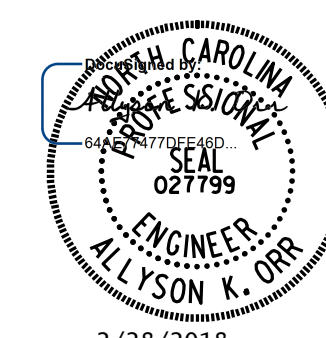
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.



PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 PLAN AND ELEVATION

(EBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

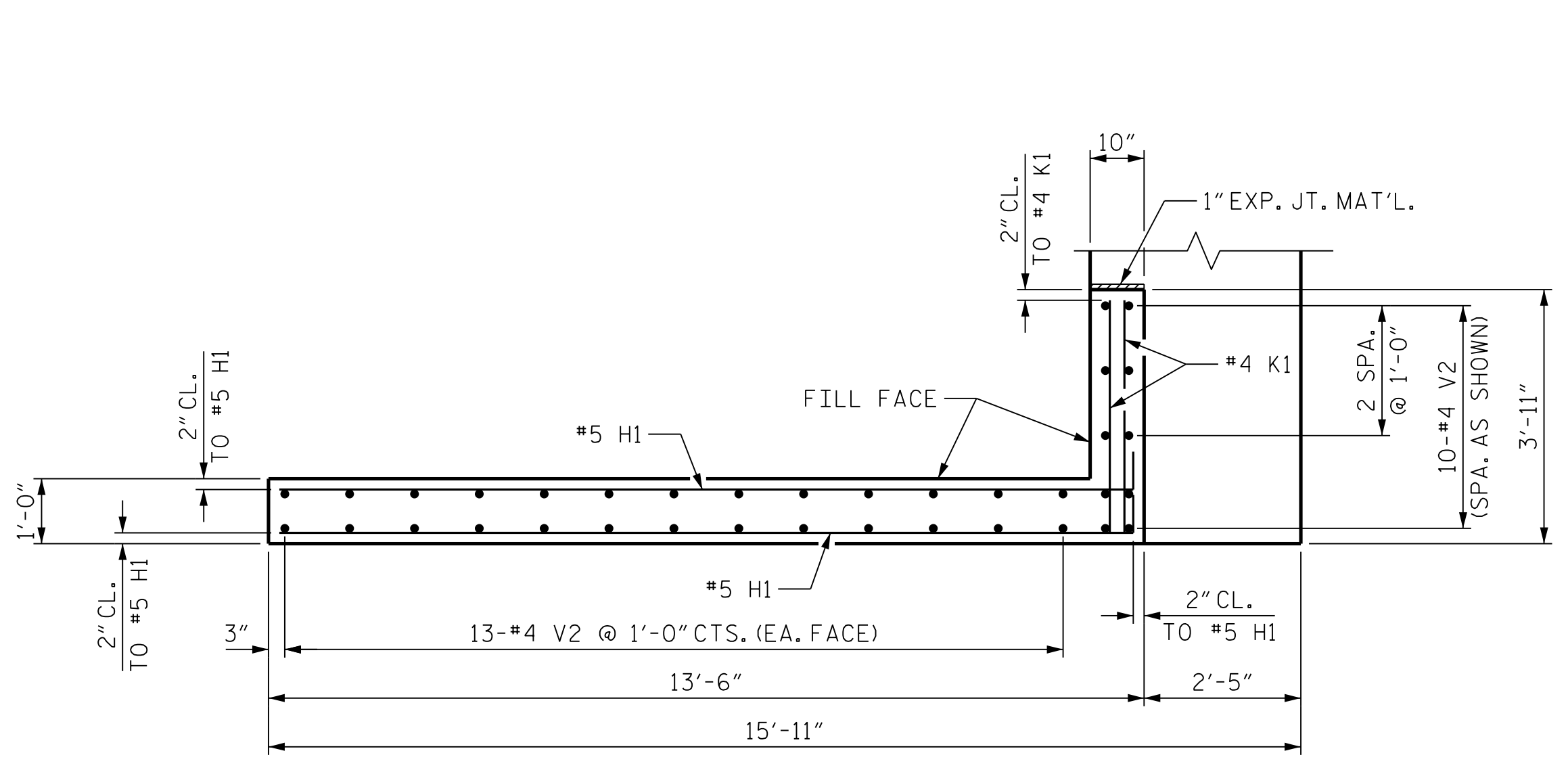
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

DRAWN BY : B.E. LANNING	DATE : 01/18
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18

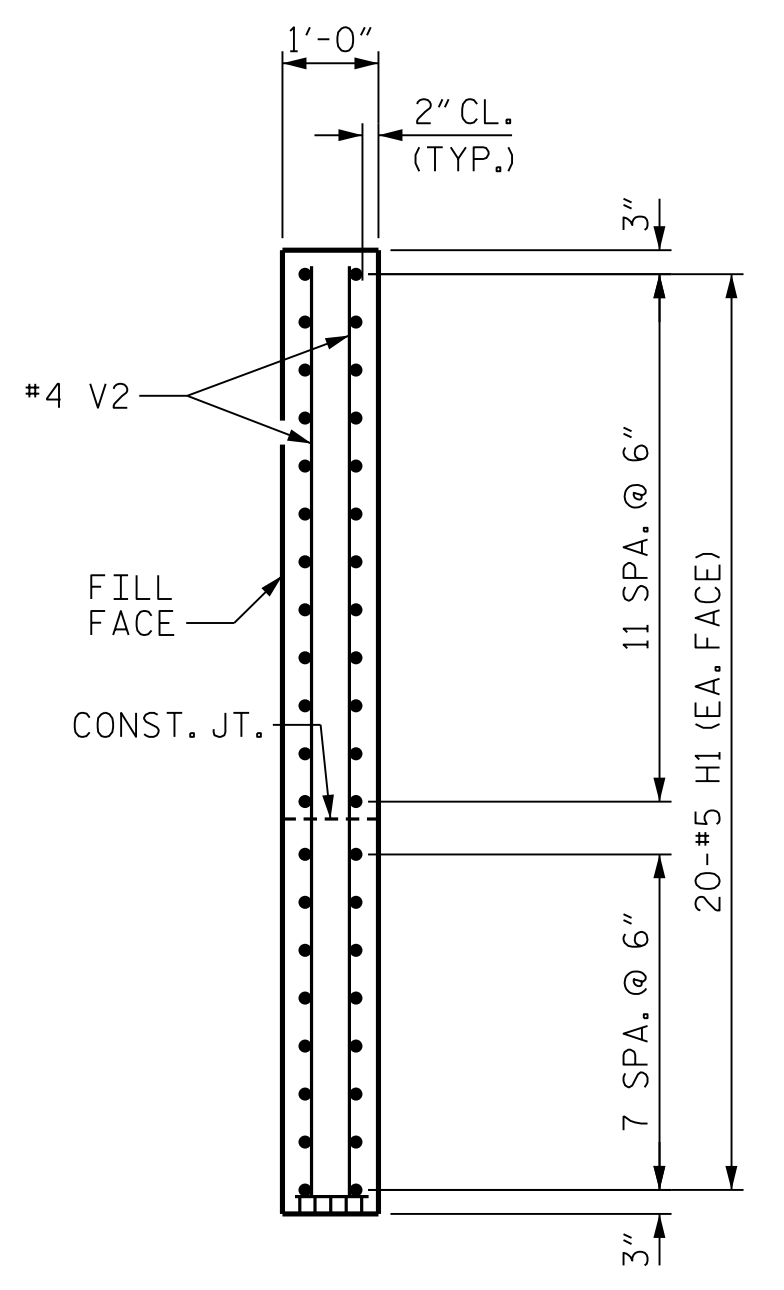
2/8/2018 11:29:31 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.059.B5351.SMU.E2A-400237.dgn



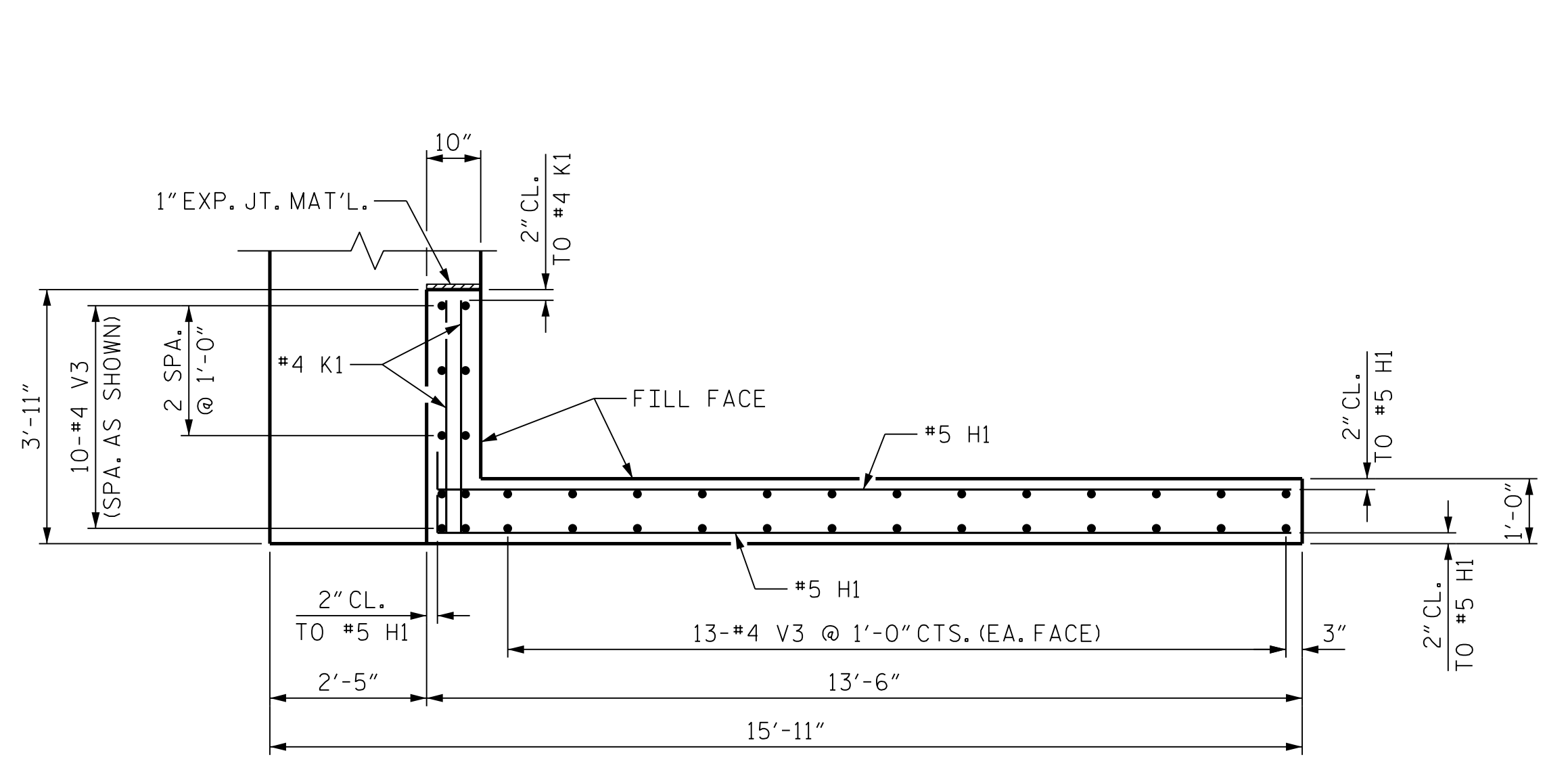
2/8/2018 11:29:39 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.061.B5351.SMU.E2B-400237.dgn



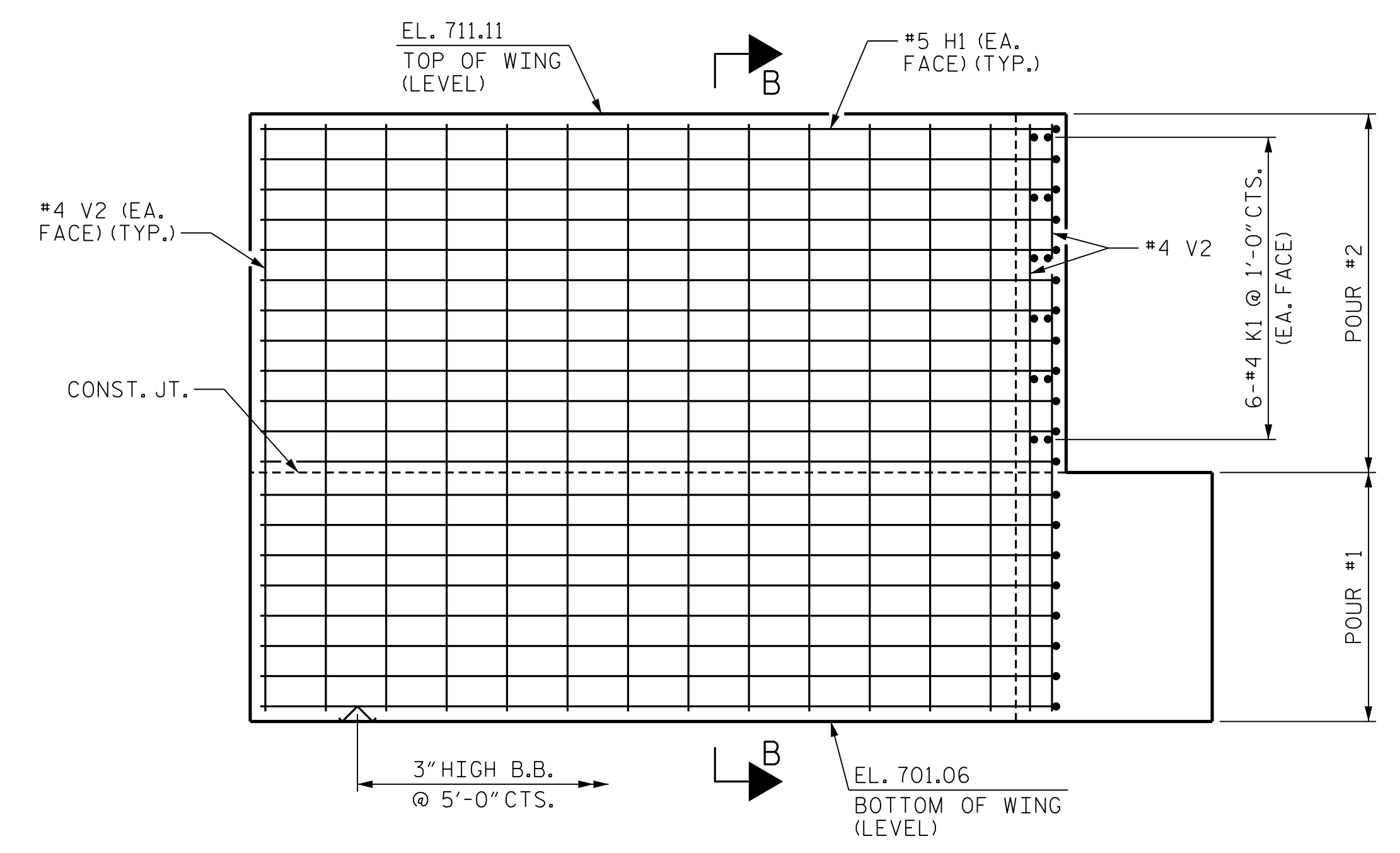
PLAN OF WING (W1)



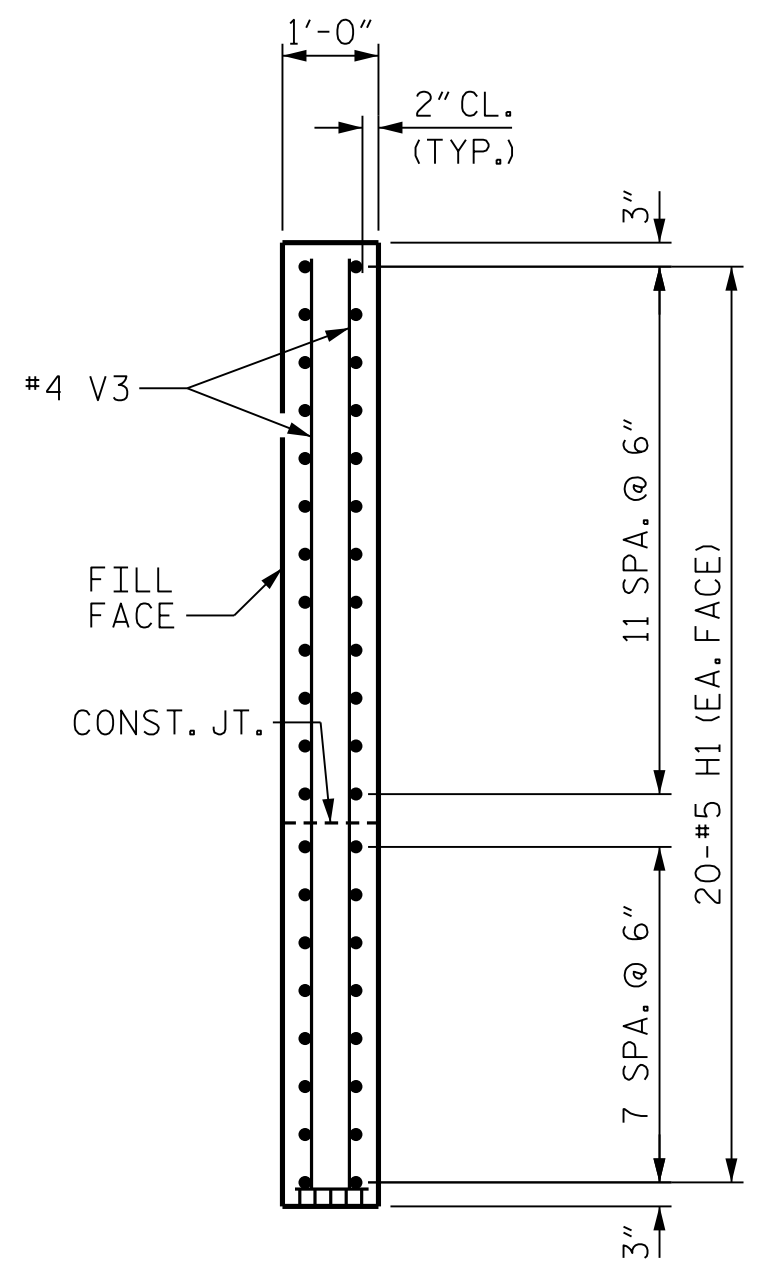
SECTION B-B



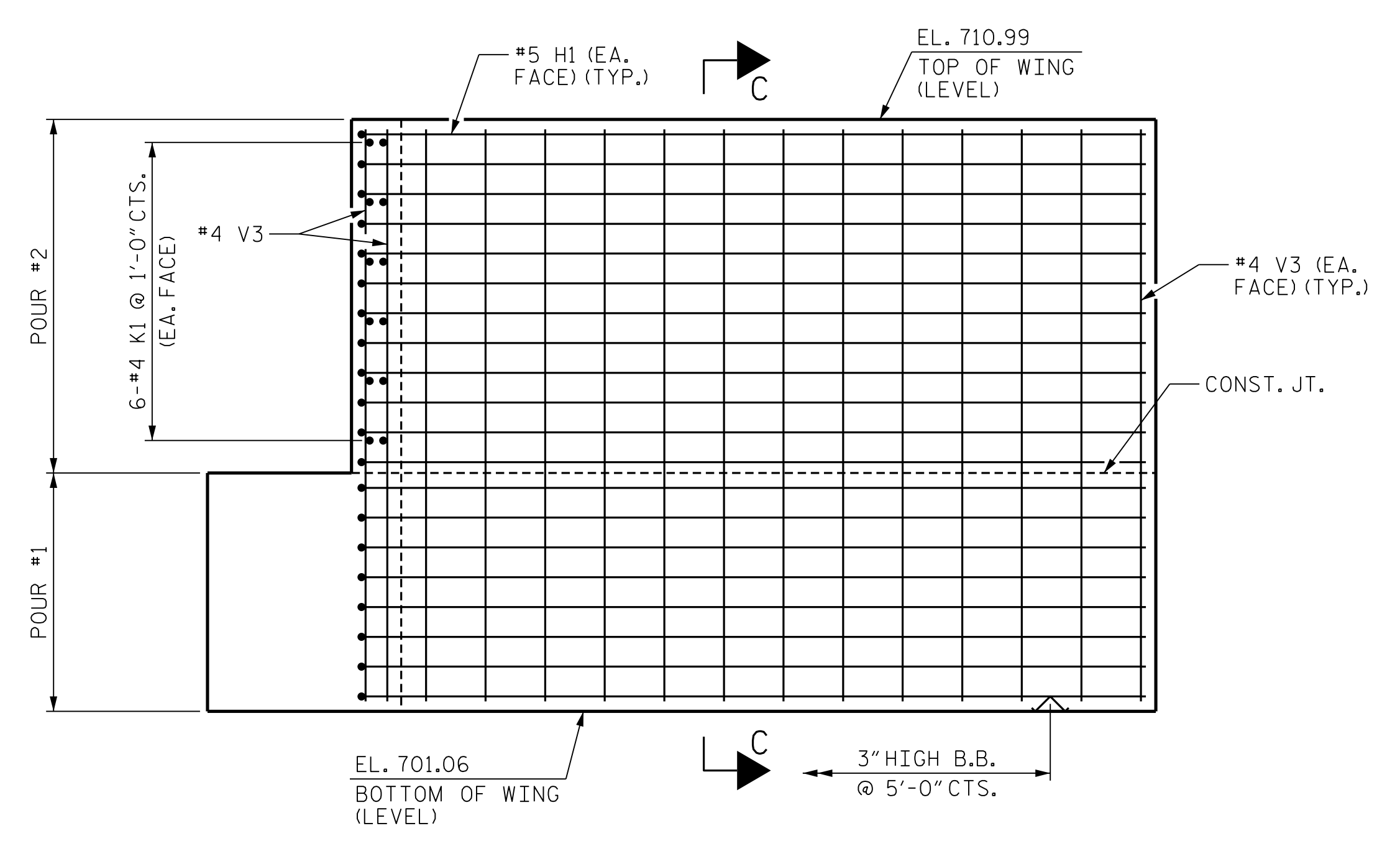
PLAN OF WING (W2)



ELEVATION OF WING (W1)

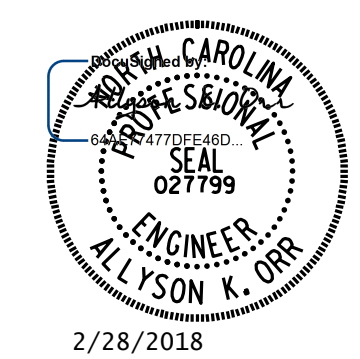


SECTION C-C



ELEVATION OF WING (W2)

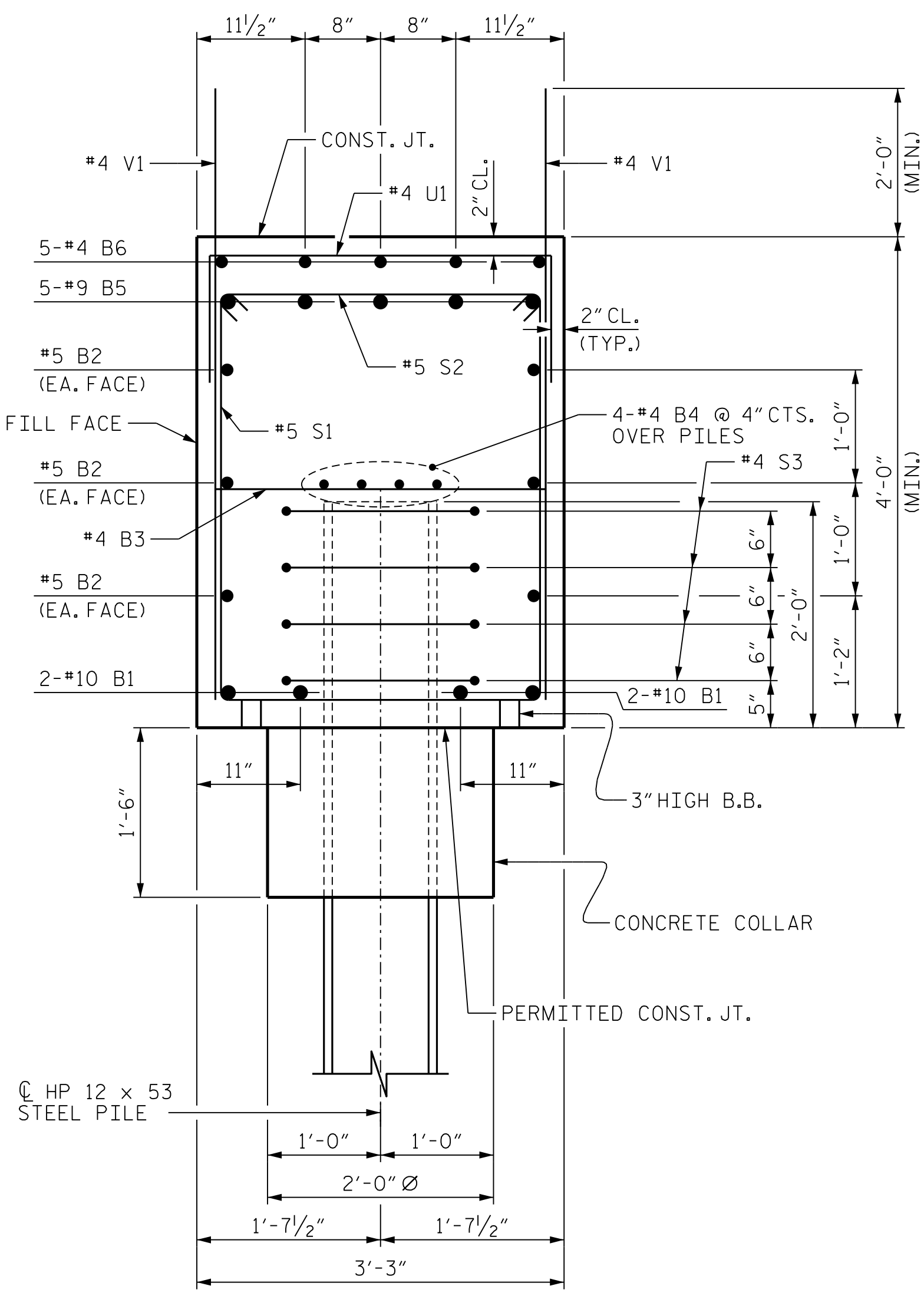
PROJECT NO. B-5351  
 GUILFORD COUNTY  
 STATION: 23+26.00 -L-  
 SHEET 2 OF 3



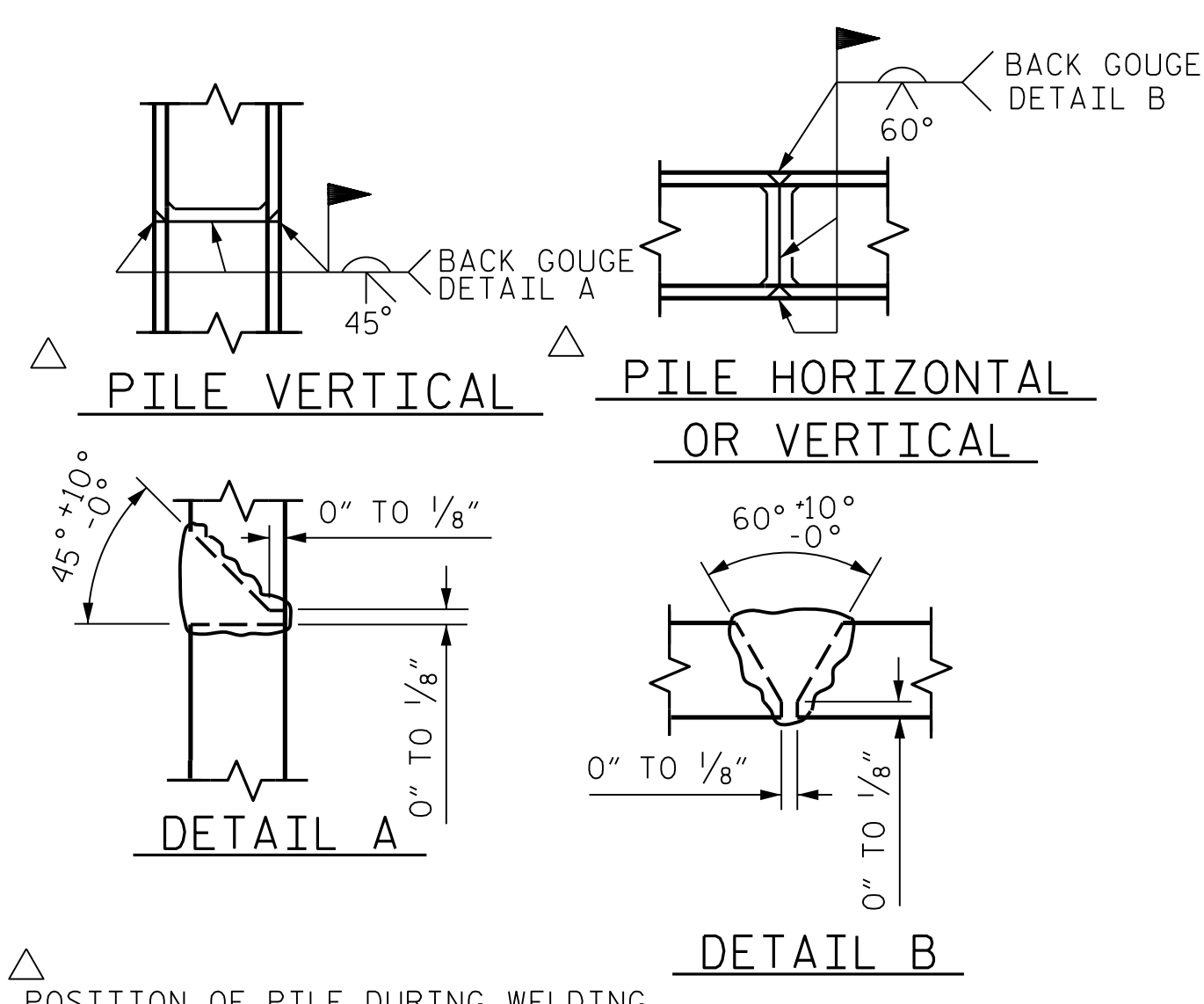
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2 WING DETAILS					
(EBL)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. <b>S2-31</b>					TOTAL SHEETS <b>35</b>

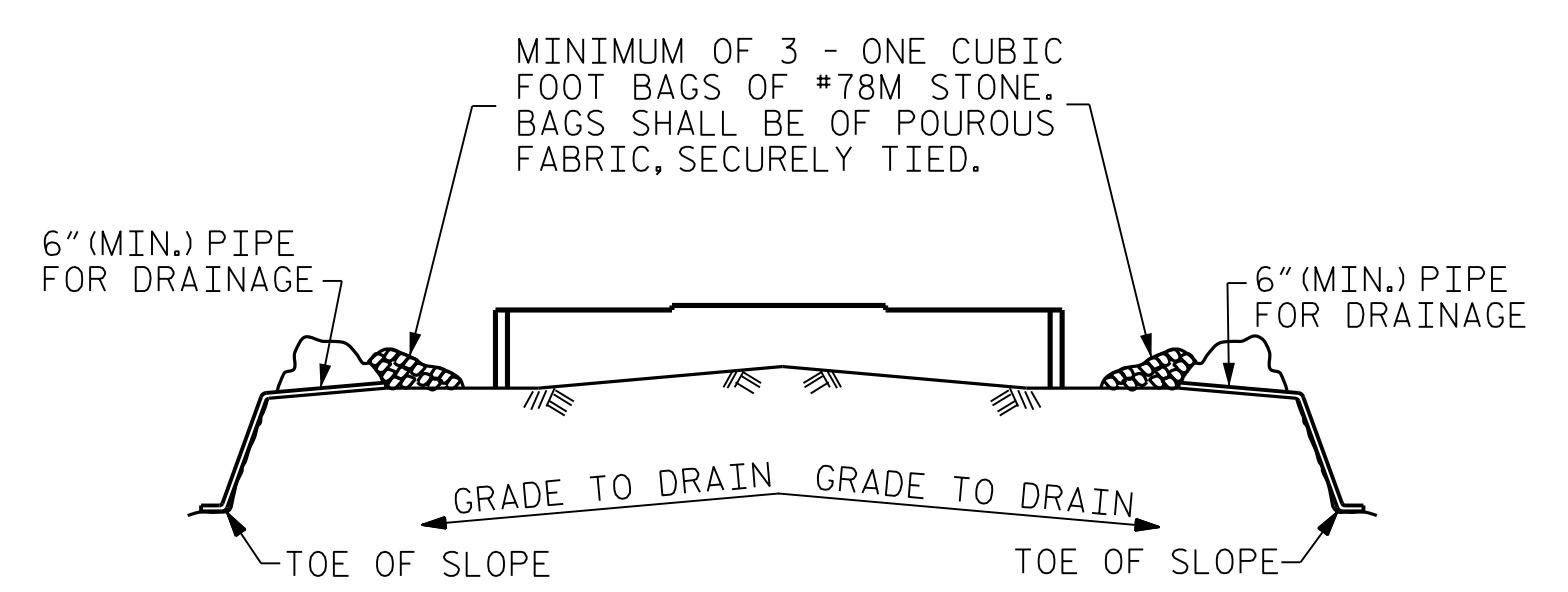
DRAWN BY : B.E. LANNING	DATE : 01/18
CHECKED BY : A.K. ORR	DATE : 01/18
DESIGN ENGINEER OF RECORD : A.K. ORR	DATE : 02/18



SECTION A-A



PILE SPLICE DETAILS

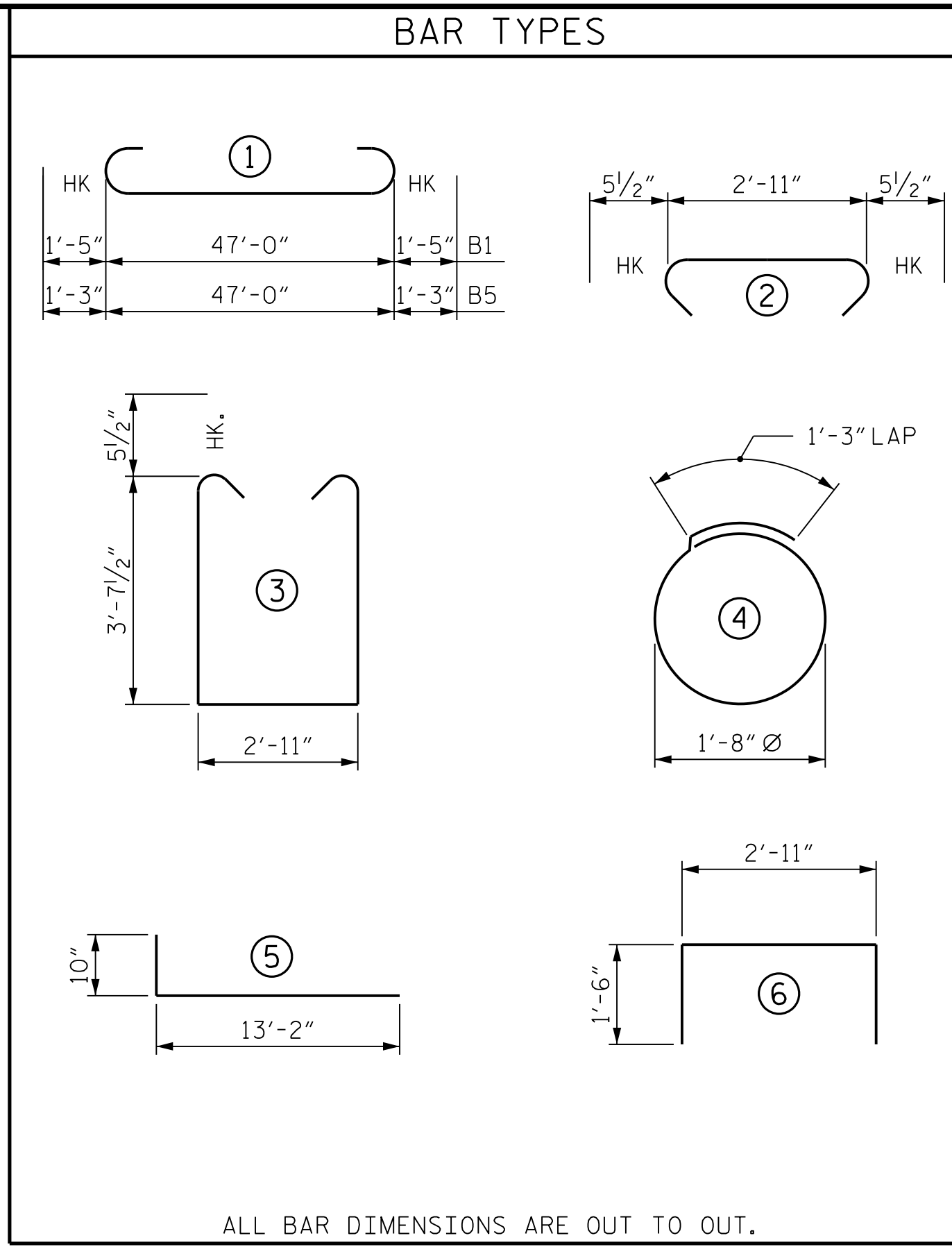


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT



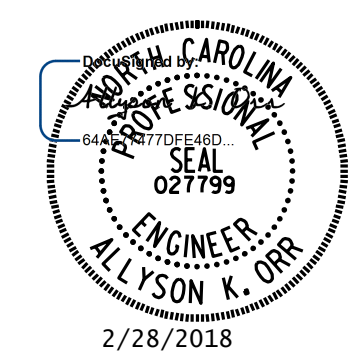
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	49'-10"	858
B2	6	#5	STR	47'-0"	294
B3	12	#4	STR	2'-11"	23
B4	8	#4	STR	24'-9"	132
B5	5	#9	1	49'-6"	842
B6	5	#4	STR	12'-8"	42
H1	80	#5	5	14'-0"	1168
K1	24	#4	STR	3'-7"	57
S1	46	#5	3	11'-1"	532
S2	46	#5	2	3'-10"	184
S3	24	#4	4	6'-6"	104
U1	9	#4	6	5'-11"	36
V1	60	#4	STR	6'-2"	247
V2	36	#4	STR	9'-7"	230
V3	36	#4	STR	9'-8"	232
REINFORCING STEEL					4,981 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 (COLLARS, CAP & LOWER PART OF WINGS)					28.6 C.Y.
POUR #2 (UPPER PART OF WINGS)					7.0 C.Y.
TOTAL					35.6 C.Y.
HP 12 X 53 STEEL PILES					NO. : 6 297.0 LIN. FT.
STEEL PILE POINTS					6
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					EA. : 6

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2  
 DETAILS AND  
 BILL OF MATERIAL  
 (EBL)

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671

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

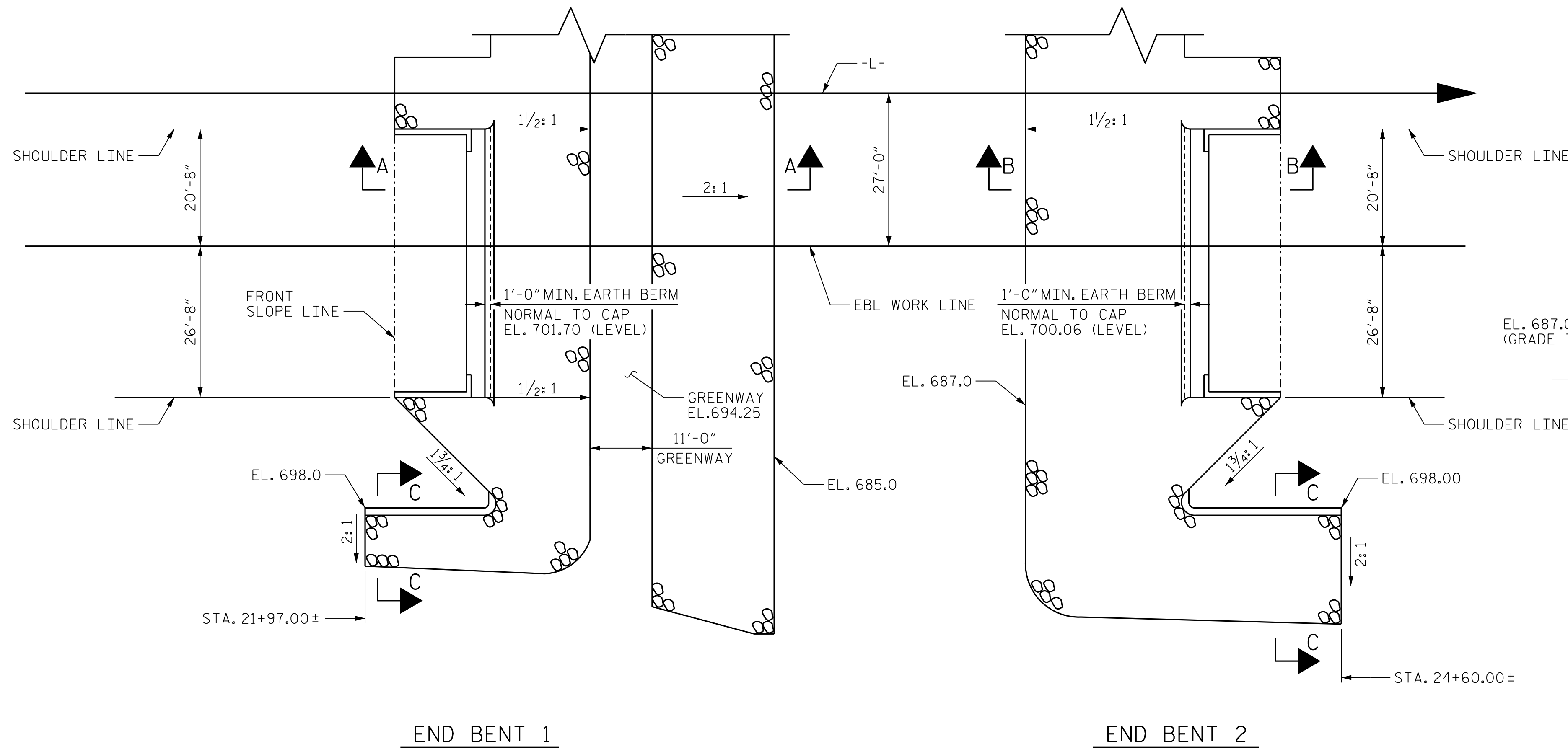
SHEET NO.  
**S2-32**  
 TOTAL SHEETS  
**35**

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

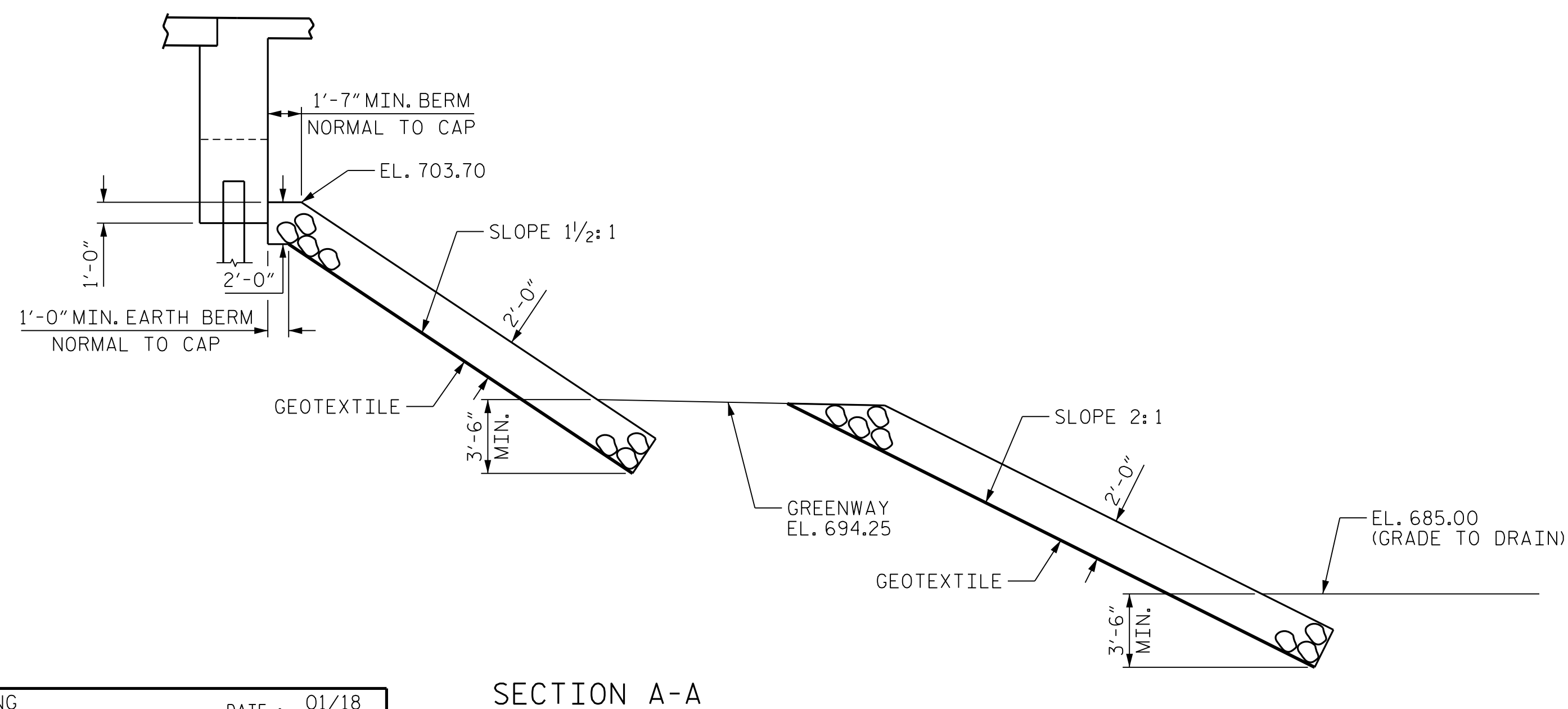
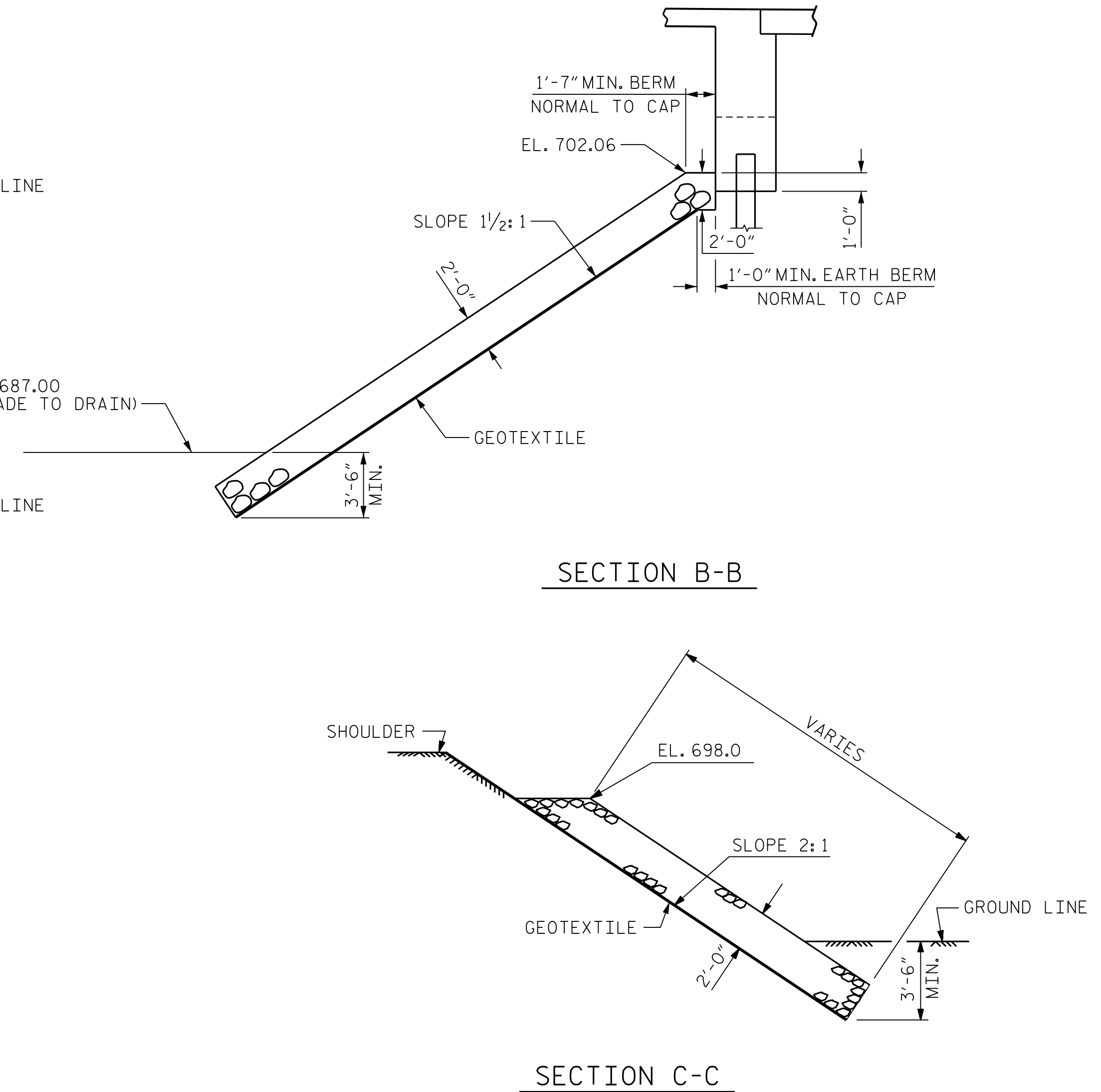
2/8/2018 11:29:41 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351\Structures\RIGHT LANE (EBL)\402.063.B5351.SMU.E2C-400237.dgn



2/8/2018 11:29:43 AM User: blanning  
 Filenamer: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.065.B5351.SMU.RRI.400237.dgn



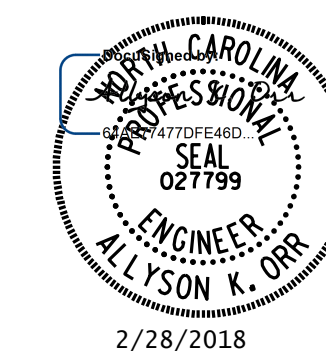
PLAN



SECTION A-A

ESTIMATED QUANTITIES		
EBL BRIDGE @ STA. 23+26.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	540	600
END BENT 2	400	445

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-



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

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**  
 MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

DRAWN BY : B.E. LANNING DATE : 01/18  
 CHECKED BY : A.K. ORR DATE : 01/18  
 DESIGN ENGINEER OF RECORD : A.K. ORR DATE : 02/18

**NOTES**

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

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6"Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 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 BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 6"Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

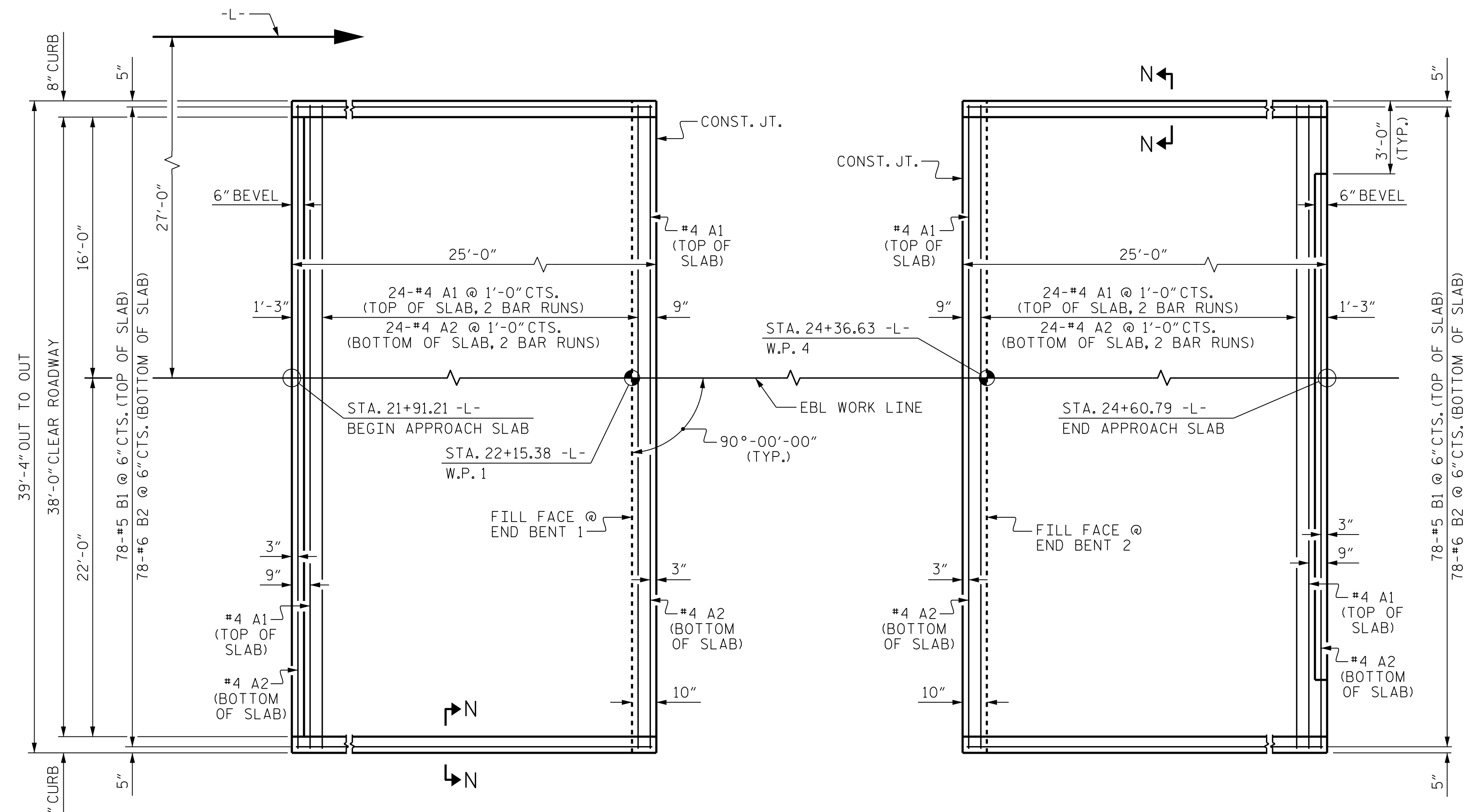
**BILL OF MATERIAL**

**FOR ONE APPROACH SLAB (2 REQ'D.)**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	20'-6"	712
A2	52	#4	STR	20'-5"	709
* B1	78	#5	STR	24'-2"	1966
B2	78	#6	STR	24'-8"	2890
REINFORCING STEEL				LBS.	3599
* EPOXY COATED REINFORCING STEEL				LBS.	2678
CLASS AA CONCRETE				C.Y.	42.6

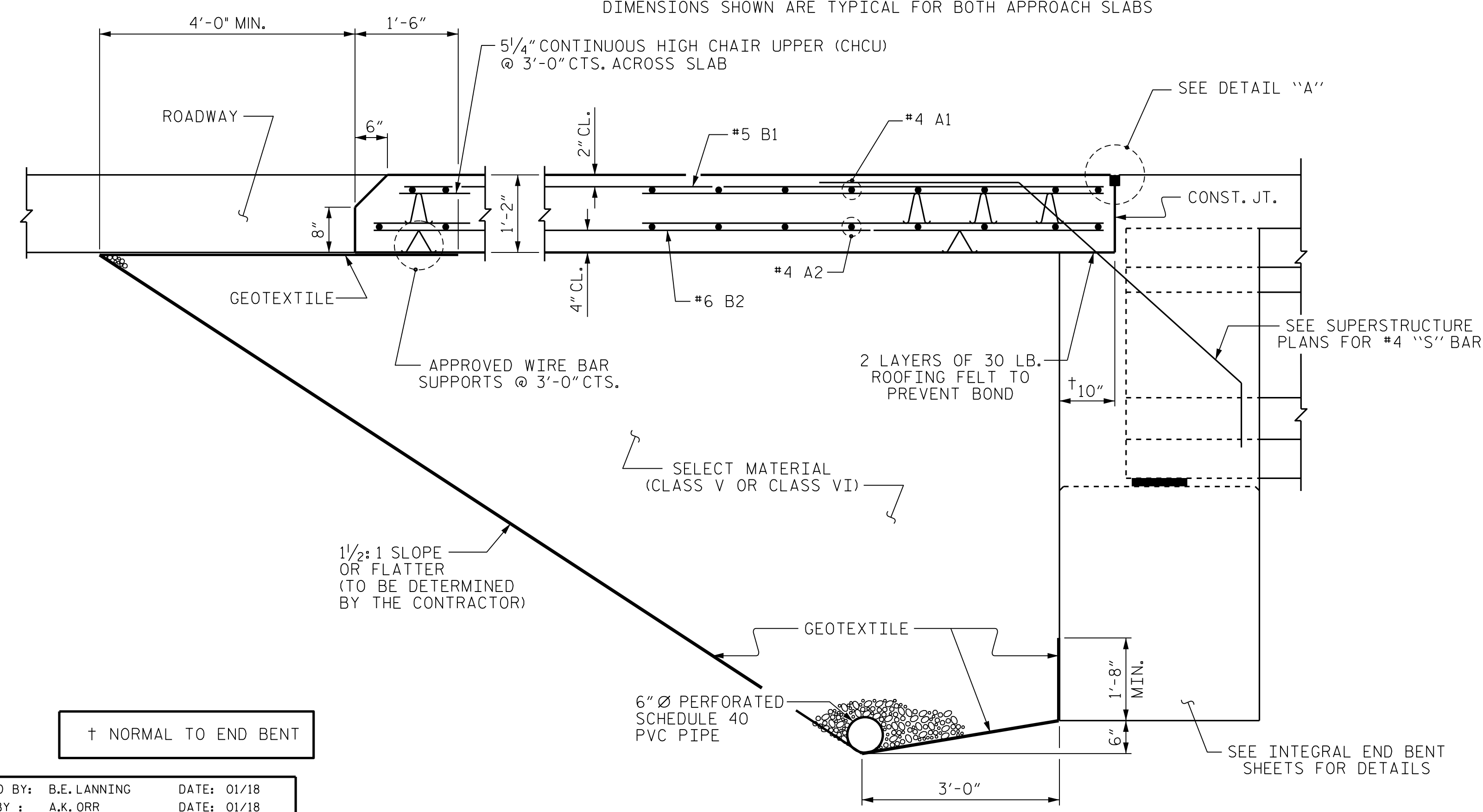
**SPLICE LENGTHS**

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

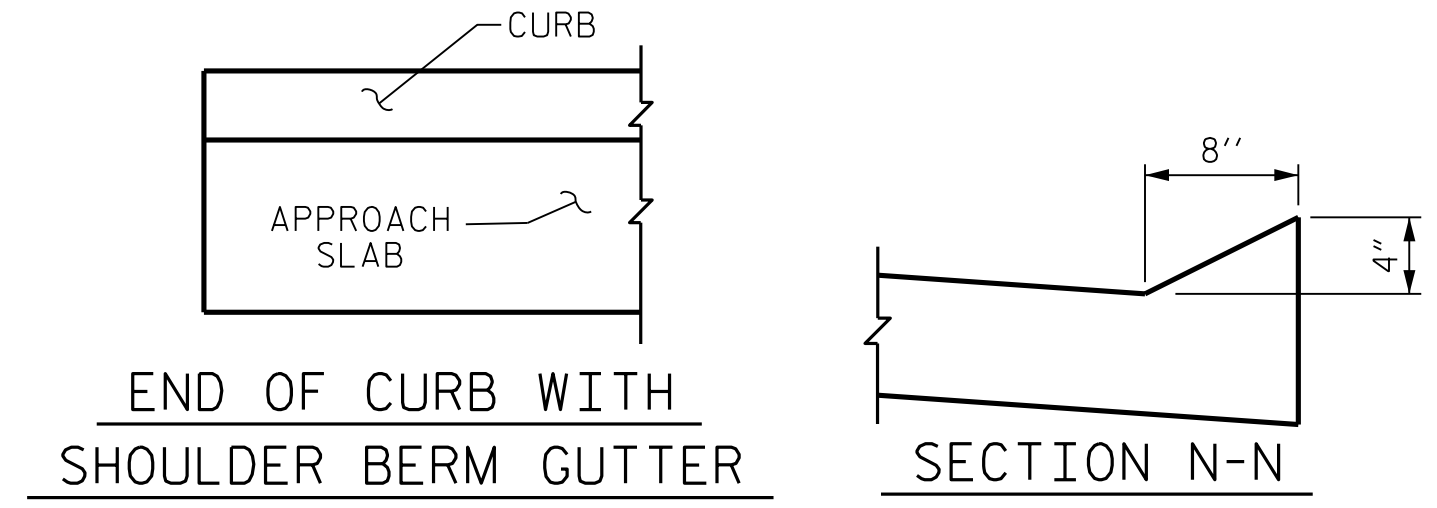
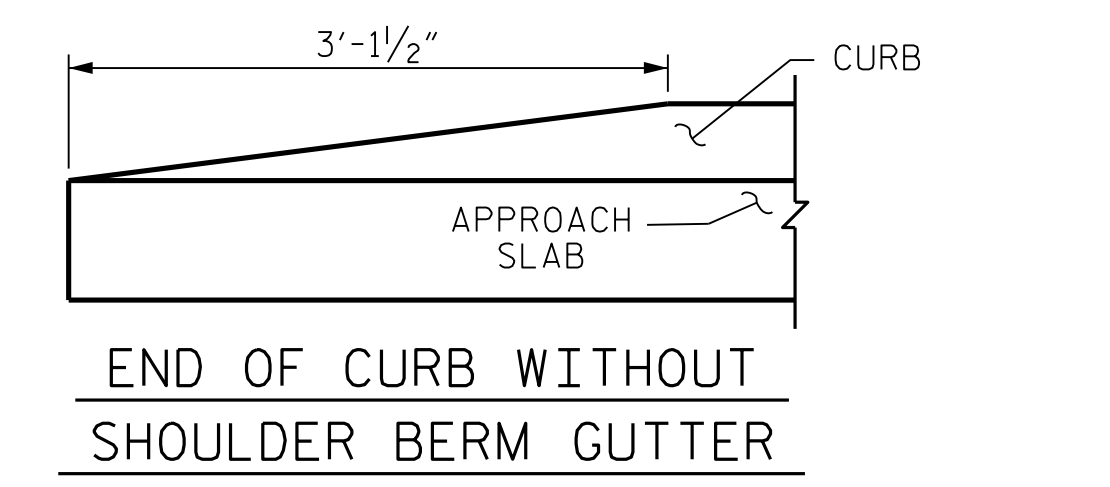


**PLAN @ END BENT 1**      **PLAN @ END BENT 2**

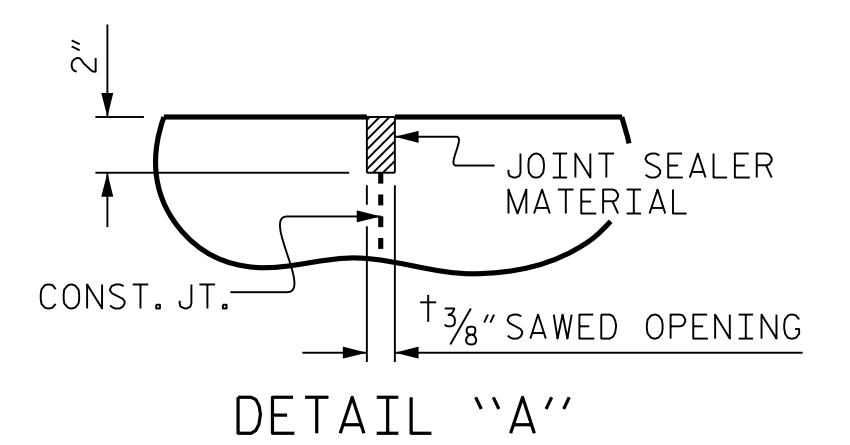
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



**SECTION THRU SLAB**  
(TYPE I - STANDARD APPROACH FILL)



**CURB DETAILS**

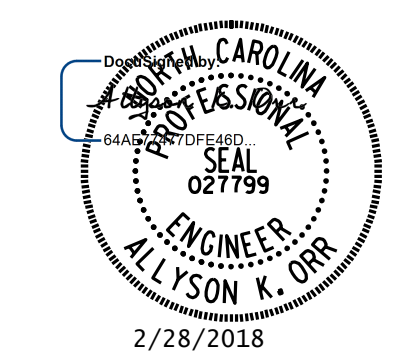


**DETAIL "A"**

PROJECT NO. **B-5351**  
**GUILFORD** COUNTY  
 STATION: **23+26.00 -L-**

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT  
 WITH FLEXIBLE PAVEMENT  
 (EBL)



**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

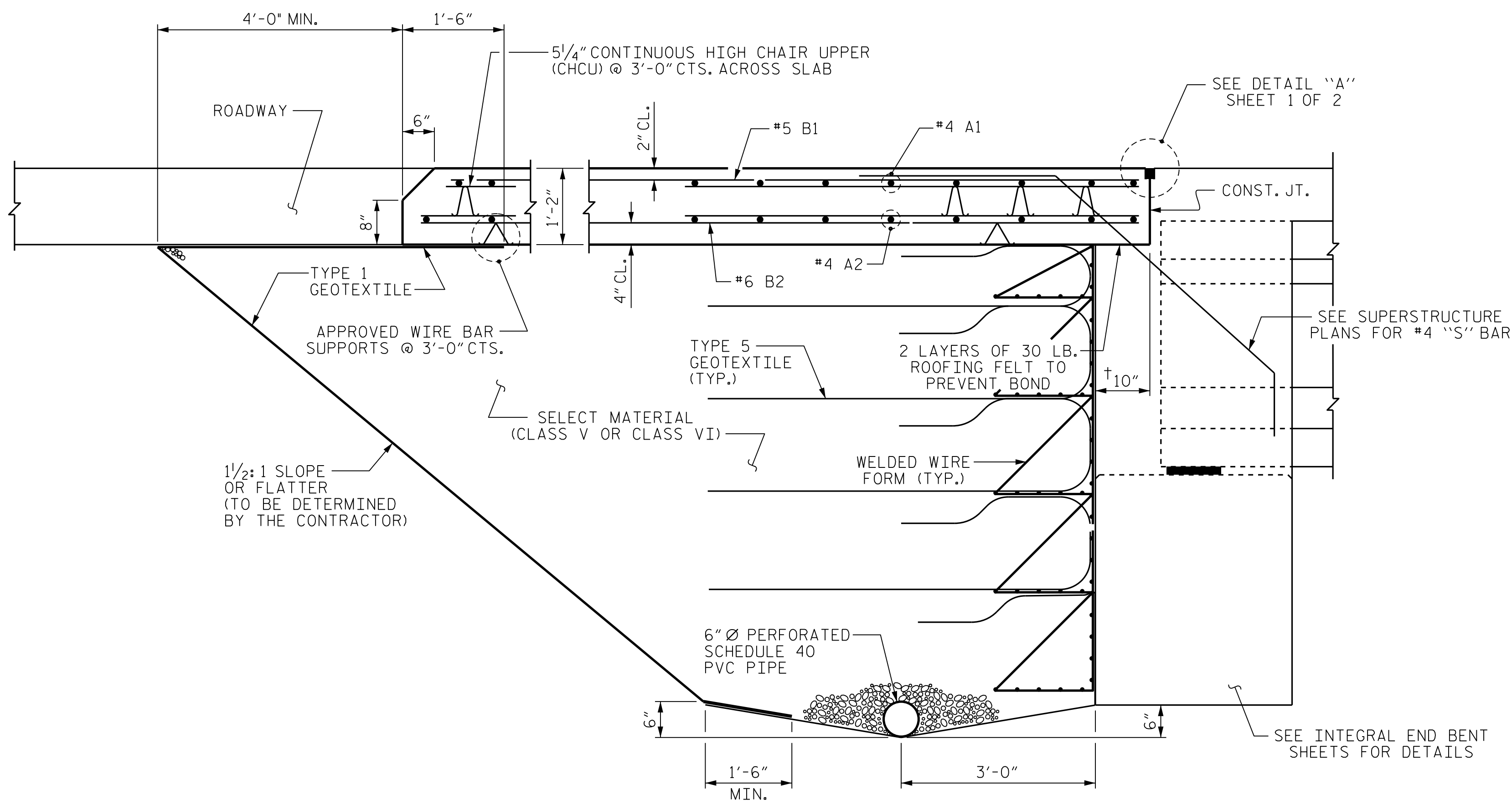
MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			35
2			4			

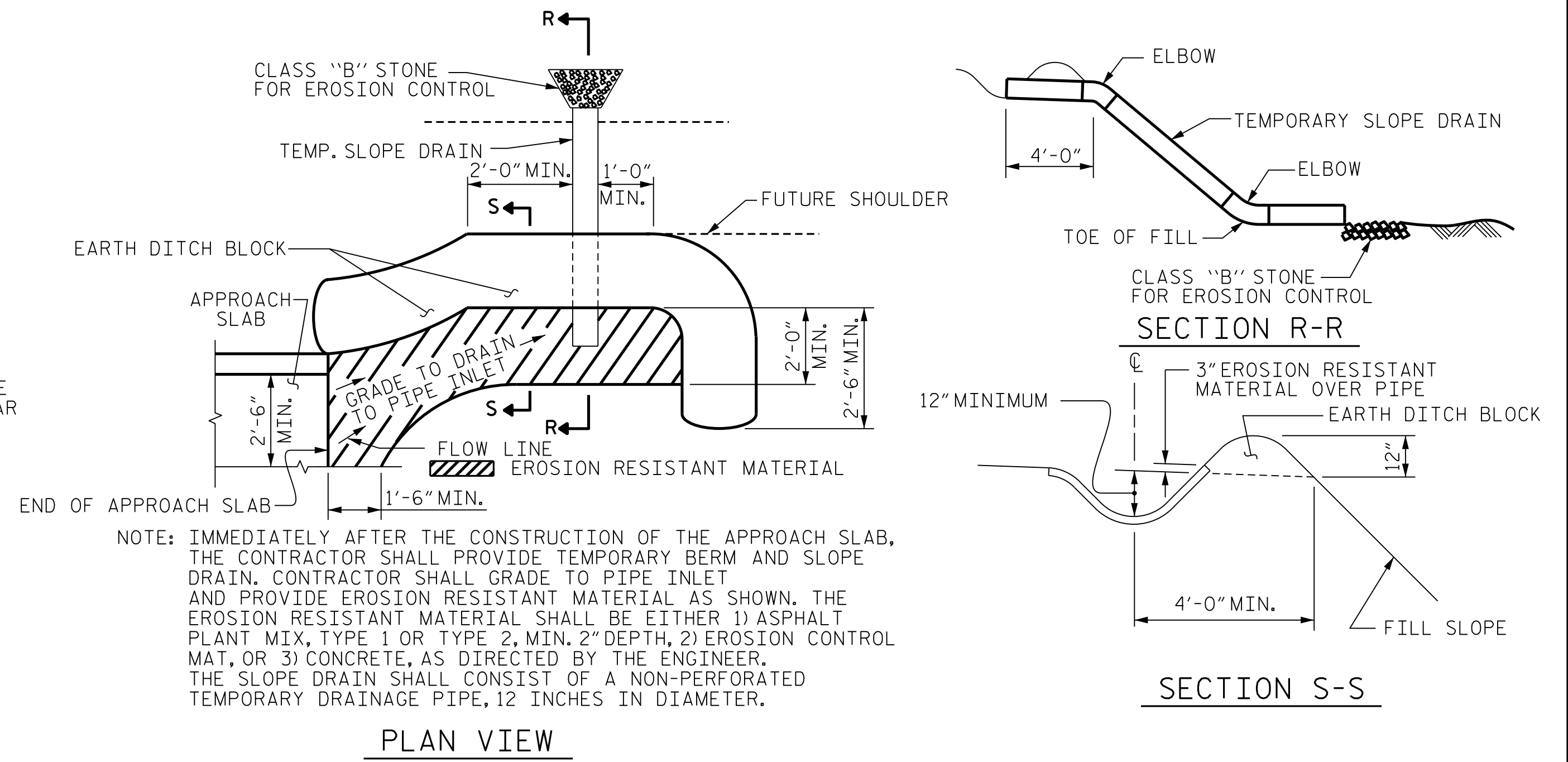
2/8/2018 11:29:45 AM User: blanning  
 File: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.067.B5351.SMU.BAS1\_400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

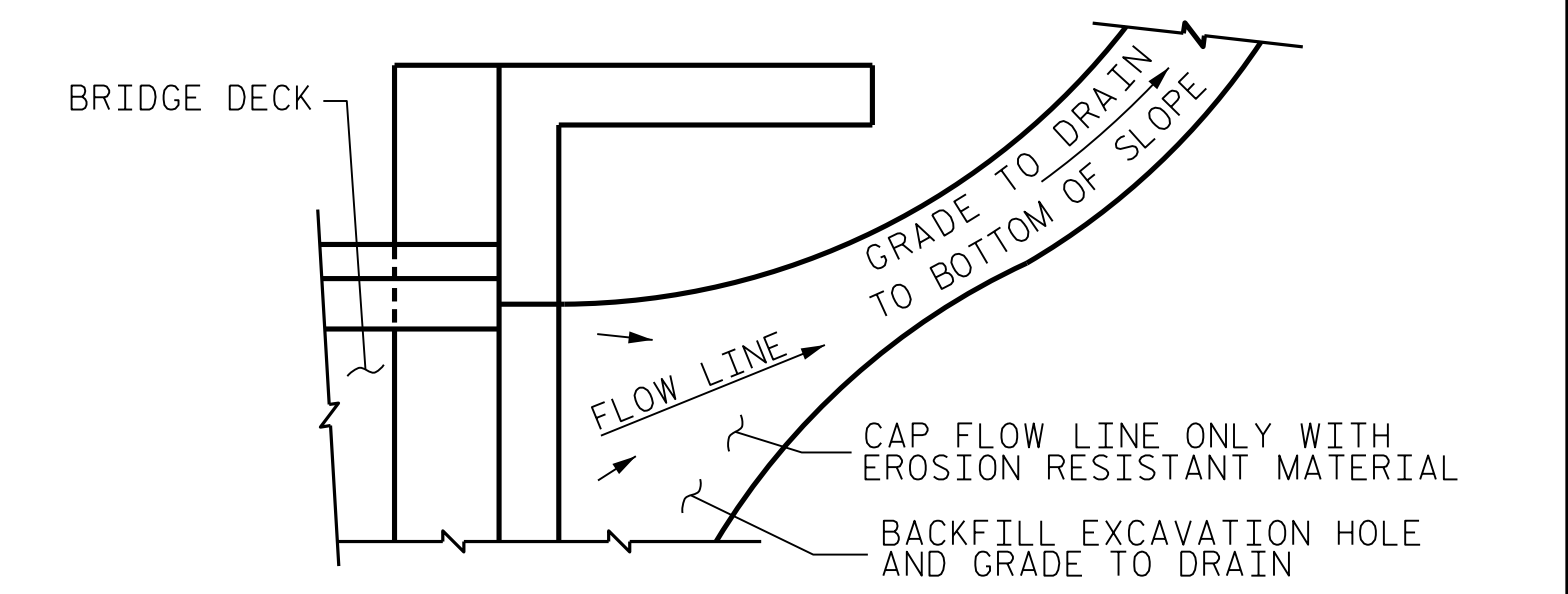




SECTION THRU SLAB  
(TYPE A - ALTERNATE APPROACH FILL)



TEMPORARY BERM AND SLOPE DRAIN DETAILS

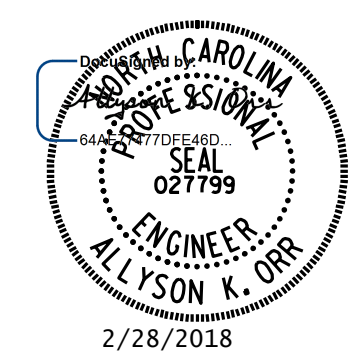


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. B-5351  
GUILFORD COUNTY  
 STATION: 23+26.00 -L-

SHEET 2 OF 2



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

MI ENGINEERING  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27606  
 (919) 851-6606  
 FIRM PE NUMBER: P-0671

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB DETAILS					
(EBL)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S2-35					TOTAL SHEETS 35

STD. NO. BAS5 (SHT 2)

2/8/2018 11:29:47 AM User: blanning  
 Filename: P:\NC Bridges\W6001.35 - B-5351 Guilford Co\B-5351 Structures\RIGHT LANE (EBL)\402.069.B5351.SMU.BAS2.400237.dgn

ASSEMBLED BY: B.E. LANNING	DATE: 01/18
CHECKED BY: A.K. ORR	DATE: 01/18
DESIGN ENGINEER OF RECORD: A.K. ORR	DATE: 02/18
DRAWN BY: TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY: GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

