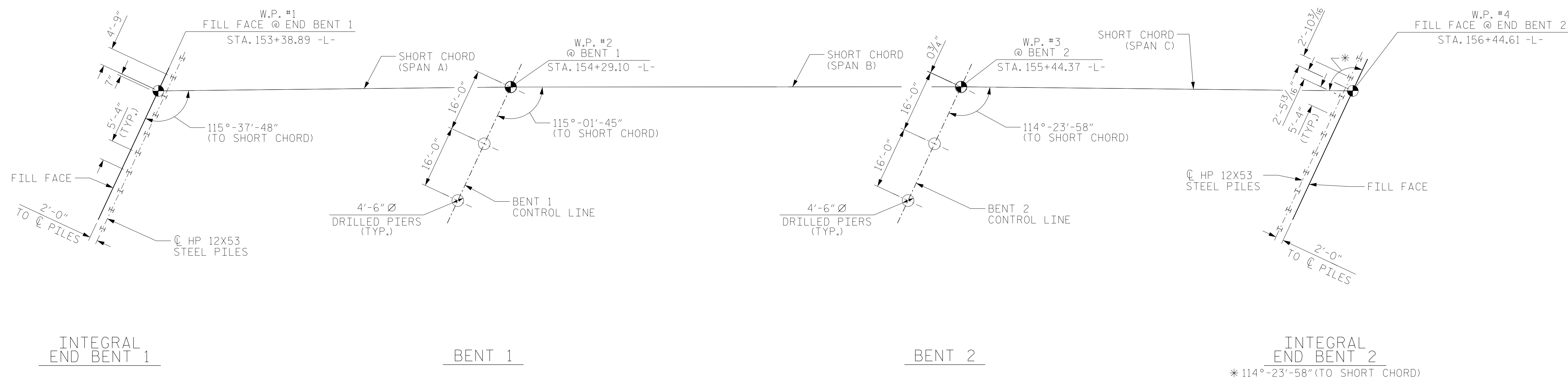


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### FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO PILE AND DRILLED PIER CENTERLINE.

### NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- DRILLED PIERS AT BENT NO.1 AND BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 510 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 90 TSF.
- INSTALL DRILLED PIERS AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN 696 FT (LEFT), 694 FT (CENTER) AND 692 FT (RIGHT) WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 9 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- INSTALL DRILLED PIERS AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN 702 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 9 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- THE SCOUR CRITICAL ELEVATIONS FOR BENT NO.1 AND BENT NO.2 ARE ELEVATION 709 FT AND 712 FT, RESPECTIVELY. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- DO NOT USE SLURRY CONSTRUCTION FOR DRILLED PIERS AT BENT NO.1 AND BENT NO.2.
- SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 2 OF 4

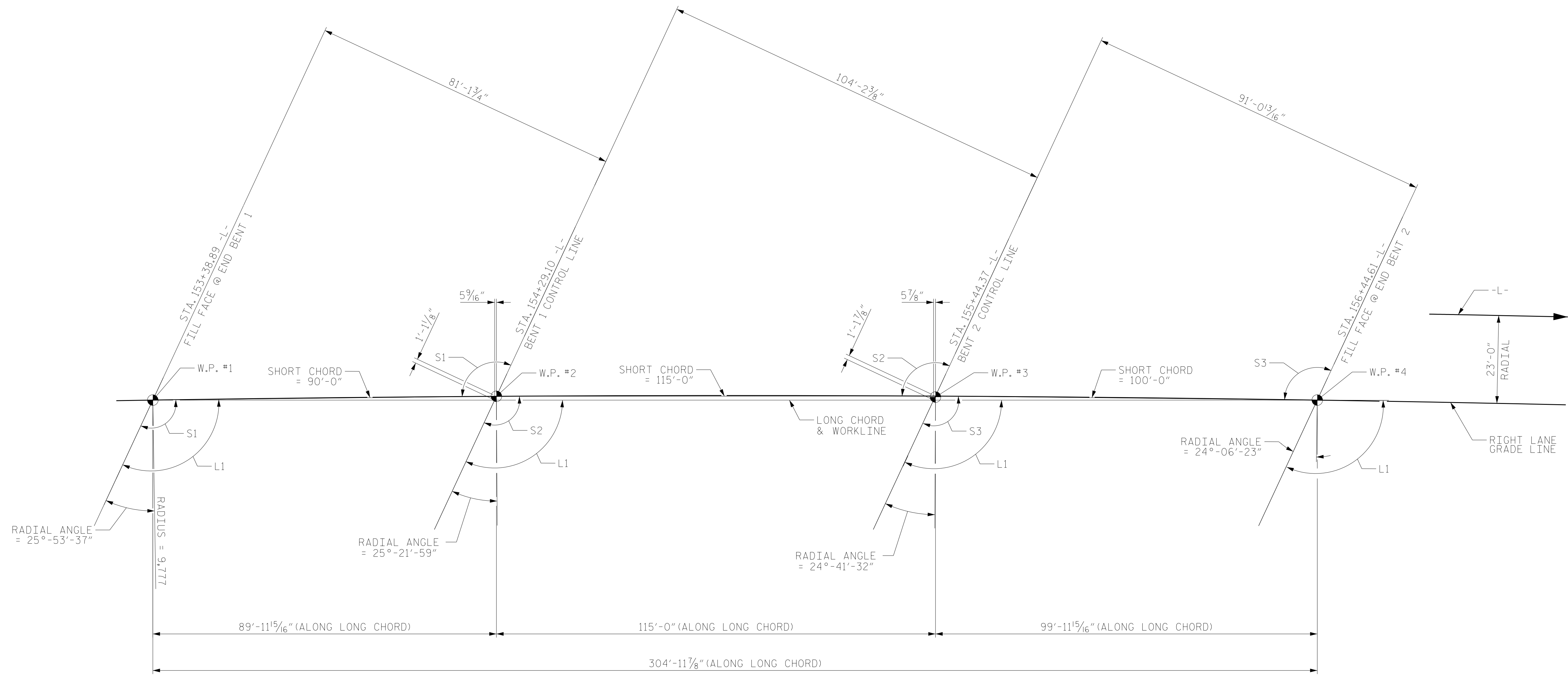


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 RIGHT LANE BRIDGE OVER BULL  
 RUN CREEK ON SR 4121  
 BETWEEN SR 1352 AND SR 1355

DRAWN BY : TWL DATE : 12/2017  
 CHECKED BY : TLC DATE : 12/2017  
 DESIGN ENGINEER OF RECORD: MAL DATE : 12/2017

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-2
1			3			TOTAL SHEETS
2			4			37



**LONG CHORD LAYOUT**

NOTE: ALL END BENTS & BENTS ARE PARALLEL

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 3 OF 4

ANGLES	
LONG CHORD	SHORT CHORD
L1 = 115°-00'-00"	S1 = 115°-37'-48"
	S2 = 115°-01'-45"
	S3 = 114°-23'-58"

**HORIZONTAL CURVE DATA -L-**

P.I. STA. = 149+31.07  
 Δ = 15°-31'-57.9" (RT.)  
 D = 0°-35'-04.7"  
 L = 2,656.76'  
 T = 1336.57'  
 R = 9,800.00'  
 S.E. = 0.03



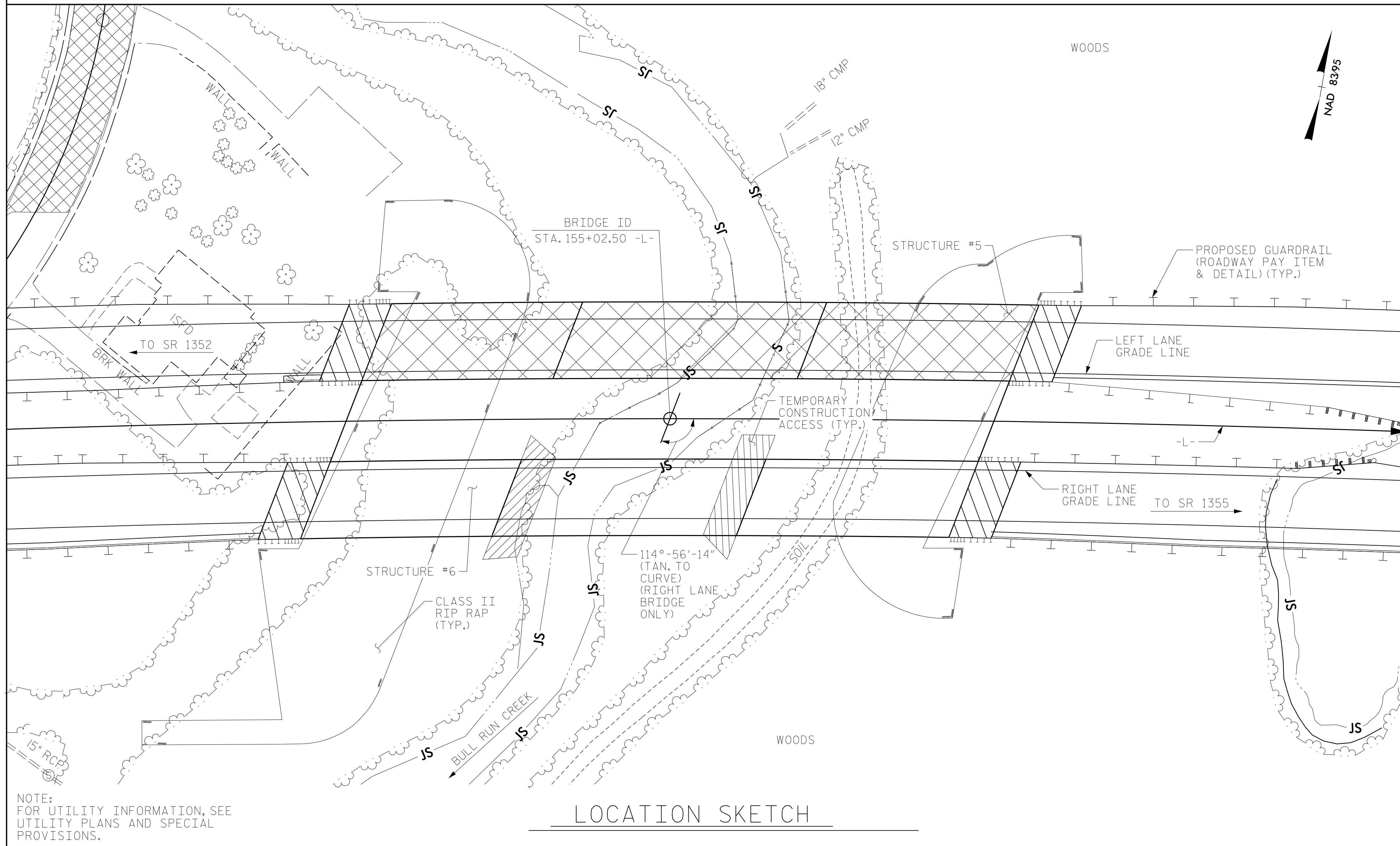
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 RIGHT LANE BRIDGE OVER BULL  
 RUN CREEK ON SR 4121  
 BETWEEN SR 1352 AND SR 1355

DRAWN BY : MAL DATE : 10/2017  
 CHECKED BY : TLC DATE : 10/2017  
 DESIGN ENGINEER OF RECORD: MAL DATE : 10/2017

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-3
1			3			TOTAL SHEETS
2			4			37

BENCH MARK #11: RAILROAD SPIKE IN 16" RED OAK 339.60' RIGHT OF STA. 153+77.17 -L-, EL. 729.91'



NOTE:  
FOR UTILITY INFORMATION, SEE  
UTILITY PLANS AND SPECIAL  
PROVISIONS.

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 FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE THE TEMPORARY ACCESS AT STATION 155+02.50 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE.
- FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS (360,000 KG) OF REINFORCING STEEL, ONE 30 INCH (760 MM) SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS (360,000 KG) OF REINFORCING STEEL, TWO 30 INCH (760 MM) SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 3,660 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS
DESIGN HIGH WATER ELEVATION	= 721.9
DRAINAGE AREA	= 7.7 SQ. MI.
BASE DISCHARGE (Q100)	= 4,000 CFS
BASE HIGH WATER ELEVATION	= 722.3

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 4,930+ CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500 YRS
OVERTOPPING FLOOD ELEVATION	= 763.5 *
* AT STATION 149+75 -L-	

LOCATION SKETCH

TOTAL BILL OF MATERIALS

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMP. ACCESS AT STA. 155+02.50 -L-	4'-6" Ø DRILLED PIER IN SOIL	4'-6" Ø DRILLED PIER NOT IN SOIL	SID INSPECTION	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	72" MODIFIED PRESTRESSED CONCRETE GIRDERS
	LUMP SUM	LIN. FT.	LIN. FT.	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO. LIN. FT.
SUPERSTRUCTURE						12,353	12,145		LUMP SUM			12 1,201.33
END BENT No. 1								44.5		9,248		
BENT No. 1		30.0	36.0					84.9		25,538	5,457	
BENT No. 2		12.0	30.0					85.5		23,606	4,805	
END BENT No. 2								44.2		9,265		
TOTAL	LUMP SUM	42.0	66.0	1	1	12,353	12,145	259.1	LUMP SUM	67,657	10,262	12 1,201.33

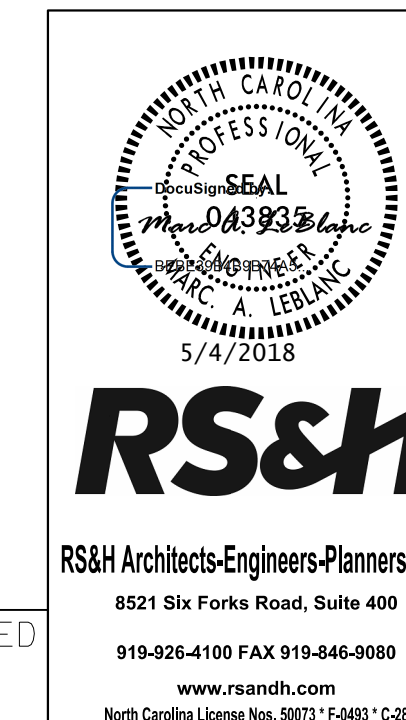
  

	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ELECTRICAL CONDUIT SYSTEM FOR SIGNALS	OVERSIZED JUNCTION BOX	
	EACH	NO. LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	EACH	
SUPERSTRUCTURE					606.3		LUMP SUM	LUMP SUM		
END BENT No. 1		10	10	525	1,245	1,385				
BENT No. 1										
BENT No. 2										
END BENT No. 2		10	10	125	1,075	1,195				
TOTAL		20	10	650	10	606.3	2,320	2,580	LUMP SUM LUMP SUM	2

DRAWN BY : MAL DATE : 10/2017  
 CHECKED BY : TLC DATE : 01/2018  
 DESIGN ENGINEER OF RECORD: MAL DATE : 01/2018

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH	
GENERAL DRAWING RIGHT LANE BRIDGE OVER BULL RUN CREEK ON SR 4121 BETWEEN SR 1352 AND SR 1355	
REVISIONS	
NO.	BY: DATE:
1	3
2	4
SHEET NO. S6-4 TOTAL SHEETS 37	

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## 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 (FF)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FF)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	Ⓛ	1.23	--	1.75	0.93	1.31	B	EL	56.36	1.08	1.55	B	I	10.71	0.80	0.93	1.23	B	EL	56.36		
	HL-93 (OPERATING)	N/A		1.70	--	1.35	0.93	1.70	B	EL	56.36	1.08	2.01	B	I	10.71	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	Ⓜ	1.77	63.720	1.75	0.93	1.89	B	EL	56.36	1.08	2.08	A	I	16.82	0.80	0.93	1.77	B	EL	56.36		
	HS-20 (OPERATING)	36.000		2.45	88.200	1.35	0.93	2.45	B	EL	56.36	1.08	2.70	A	I	16.82	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		4.28	57.780	1.40	0.93	5.70	B	EL	56.36	1.08	6.09	B	I	67.78	0.80	0.93	4.28	B	EL	56.36		
		SNGARBS2	20.000	3.06	61.200	1.40	0.93	4.09	B	EL	56.36	1.08	4.42	A	I	16.82	0.80	0.93	3.06	B	EL	56.36		
		SNAGRIS2	22.000	2.85	62.700	1.40	0.93	3.80	B	EL	56.36	1.08	4.10	A	I	16.82	0.80	0.93	2.85	B	EL	56.36		
		SNCOTTS3	27.250	2.12	57.770	1.40	0.93	2.83	B	EL	56.36	1.08	3.11	A	I	16.82	0.80	0.93	2.12	B	EL	56.36		
		SNAGGRS4	34.925	1.73	60.420	1.40	0.93	2.30	B	EL	56.36	1.08	2.56	B	I	44.95	0.80	0.93	1.73	B	EL	56.36		
		SNS5A	35.550	1.69	60.080	1.40	0.93	2.26	B	EL	56.36	1.08	2.53	B	I	44.95	0.80	0.93	1.69	B	EL	56.36		
		SNS6A	39.950	1.53	61.124	1.40	0.93	2.05	B	EL	56.36	1.08	2.37	A	I	16.82	0.80	0.93	1.53	B	EL	56.36		
	SNS7B	42.000	1.46	61.320	1.40	0.93	1.95	B	EL	56.36	1.08	2.32	A	I	16.82	0.80	0.93	1.46	B	EL	56.36			
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.86	61.380	1.40	0.93	2.49	B	EL	56.36	1.08	2.75	B	I	44.95	0.80	0.93	1.86	B	EL	56.36	
		TNT4A	33.075		1.87	61.850	1.40	0.93	2.49	B	EL	56.36	1.08	2.63	B	I	44.95	0.80	0.93	1.87	B	EL	56.36	
		TNT6A	41.600		1.51	62.816	1.40	0.93	2.01	B	EL	56.36	1.08	2.42	B	I	44.95	0.80	0.93	1.51	B	EL	56.36	
		TNT7A	42.000		1.51	63.420	1.40	0.93	2.01	B	EL	56.36	1.08	2.32	B	I	44.95	0.80	0.93	1.51	B	EL	56.36	
		TNT7B	42.000		1.55	65.100	1.40	0.93	2.07	B	EL	56.36	1.08	2.21	B	I	44.95	0.80	0.93	1.55	B	EL	56.36	
		TNAGRIT4	43.000		1.48	63.640	1.40	0.93	1.97	B	EL	56.36	1.08	2.14	B	I	44.95	0.80	0.93	1.48	B	EL	56.36	
TNAGT5A		45.000		1.40	63.000	1.40	0.93	1.87	B	EL	56.36	1.08	2.13	B	I	44.95	0.80	0.93	1.40	B	EL	56.36		
TNAGT5B	45.000	Ⓝ	1.39	62.550	1.40	0.93	1.86	B	EL	56.36	1.08	2.09	A	I	16.82	0.80	0.93	1.39	B	EL	56.36			

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:**

1. TRANSFORMING ALL PRESTRESSING TENDONS.
- 2.
- 3.
- 4.

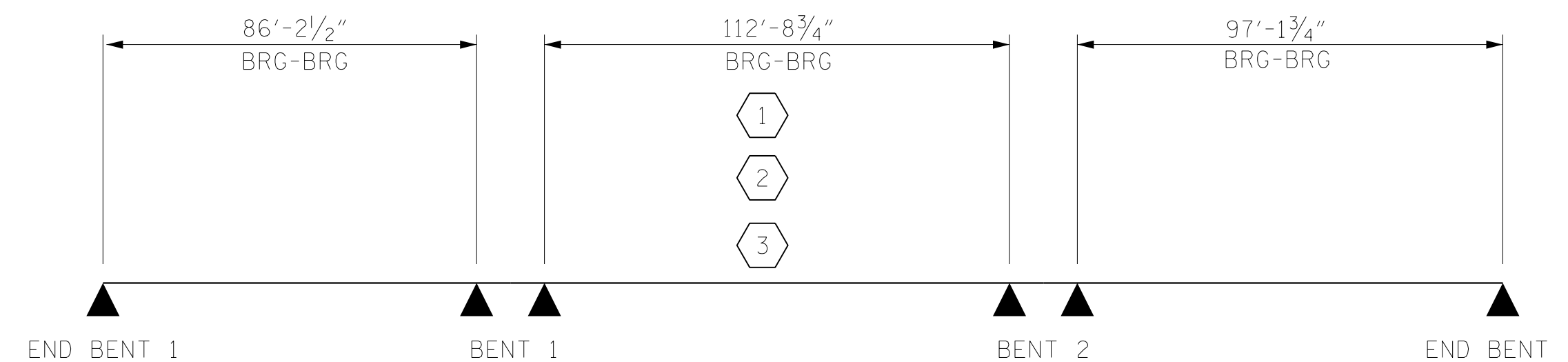
Ⓝ CONTROLLING LOAD RATING
Ⓛ DESIGN LOAD RATING (HL-93)
Ⓜ DESIGN LOAD RATING (HS-20)
Ⓝ LEGAL LOAD RATING ** ** SEE CHART FOR VEHICLE TYPE
GIRDER LOCATION
I - INTERIOR GIRDER EL - EXTERIOR LEFT GIRDER ER - EXTERIOR RIGHT GIRDER

SECTION PROPERTIES SPANS A, B, & C - INTERIOR			
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	72	80.50
AREA	IN <sup>2</sup>	833.1	1617.1
I <sub>xx</sub>	IN <sup>4</sup>	570260	1203885
Y <sub>cg</sub>	IN	36.79	55.92
SELF WT.	PLF	868.0	2010.0
EFF. WIDTH	IN	-	129.0

SECTION PROPERTIES PROVIDED AT MIDSPAN

SECTION PROPERTIES SPAN B - EXTERIOR			
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	72	80.50
AREA	IN <sup>2</sup>	833.1	1535.0
I <sub>xx</sub>	IN <sup>4</sup>	570260	1167672
Y <sub>cg</sub>	IN	36.79	54.83
SELF WT.	PLF	868.0	1890.5
EFF. WIDTH	IN	-	115.5

SECTION PROPERTIES PROVIDED AT MIDSPAN



LRFR SUMMARY

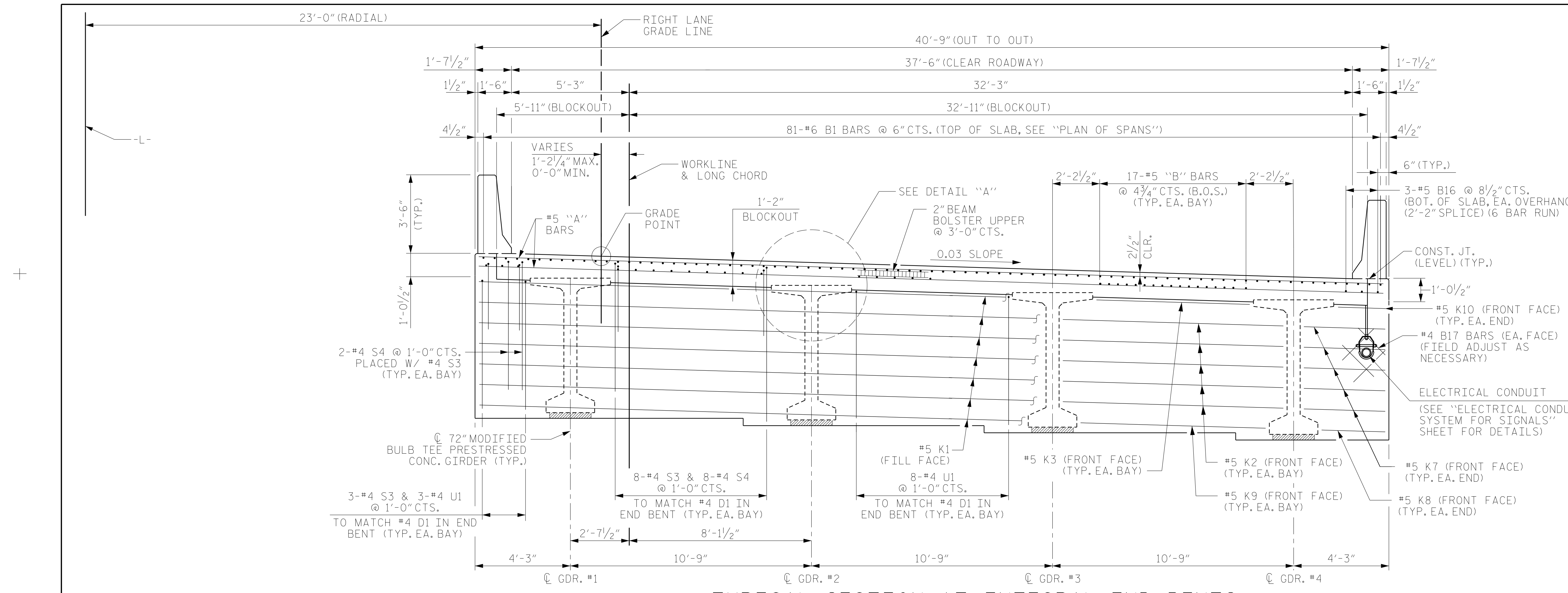
PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-

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 DESIGN ENGINEER OF RECORD: MAL DATE : 12/2017

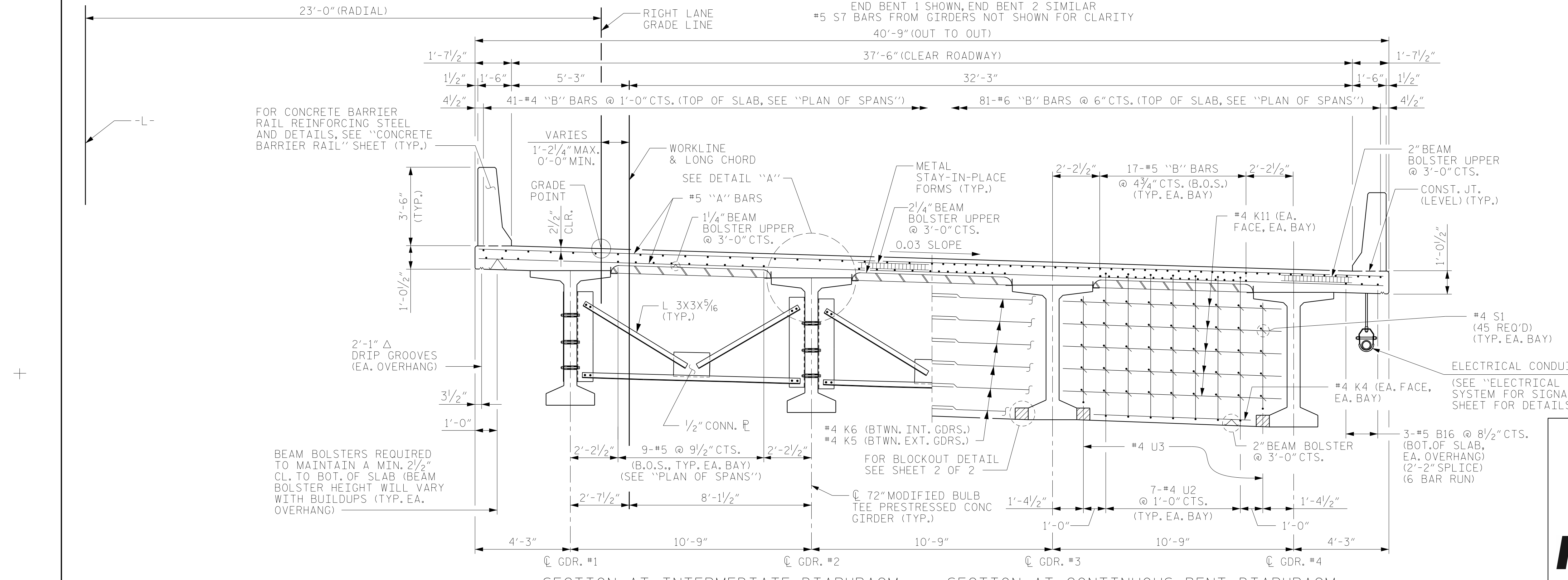
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.	
SUPERSTRUCTURE LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC) RIGHT LANE						S6-5	
REVISIONS						TOTAL SHEETS	
NO.	BY:	DATE:	NO.	BY:	DATE:	37	
1			3				
2			4				



TYPICAL SECTION AT INTEGRAL END BENTS



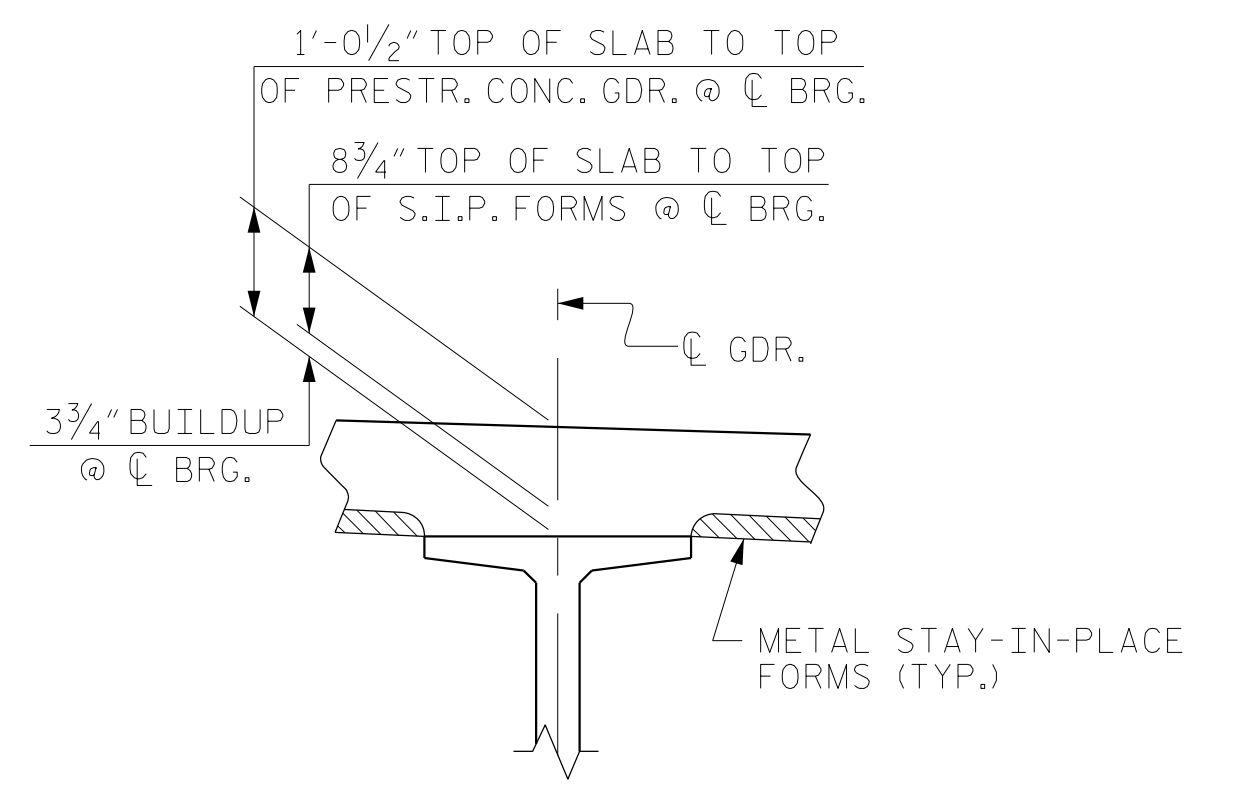
SECTION AT INTERMEDIATE DIAPHRAGM SECTION AT CONTINUOUS BENT DIAPHRAGM

TYPICAL SECTION

NOTES

- PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER @ 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 @ 4'-0" CTS. WITH A HEIGHT TO PROVIDE 2 1/2" CLEAR DISTANCE ABOVE THE FORMS.
- LONGITUDINAL REINFORCING STEEL ("B" BARS) 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.
- CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL DECK SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

B.O.S. = BOTTOM OF SLAB  
K1 AND K7 BARS IN INTEGRAL END BENT DIAPHRAGM MAY BE ADJUSTED AS NECESSARY TO CLEAR ELECTRICAL CONDUIT.



DETAIL "A"

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-  
SHEET 1 OF 2

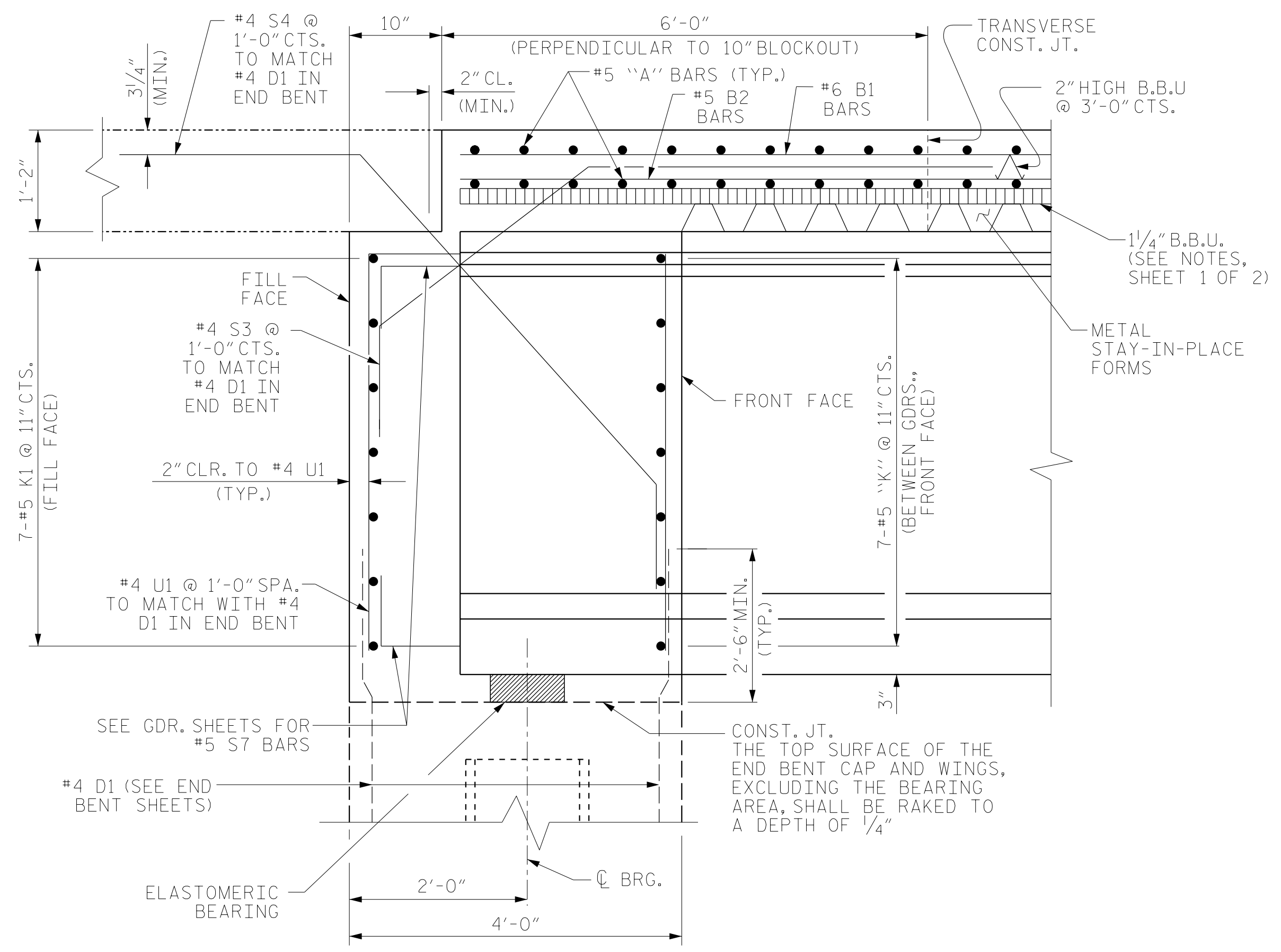


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
TYPICAL SECTION  
RIGHT LANE

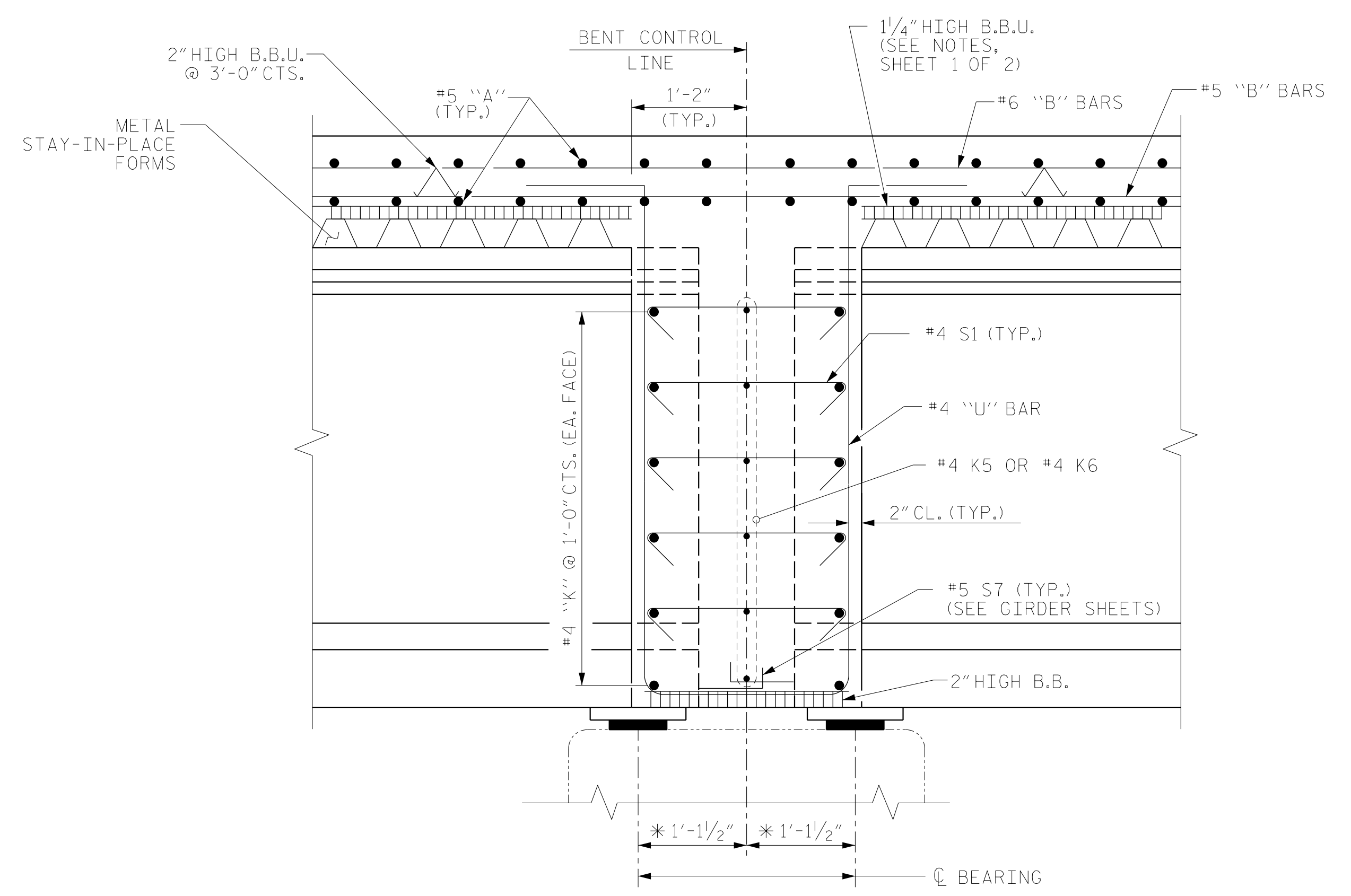
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			56-6
2			4			TOTAL SHEETS 37

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DESIGN ENGINEER OF RECORD: MAL DATE : 12/2017

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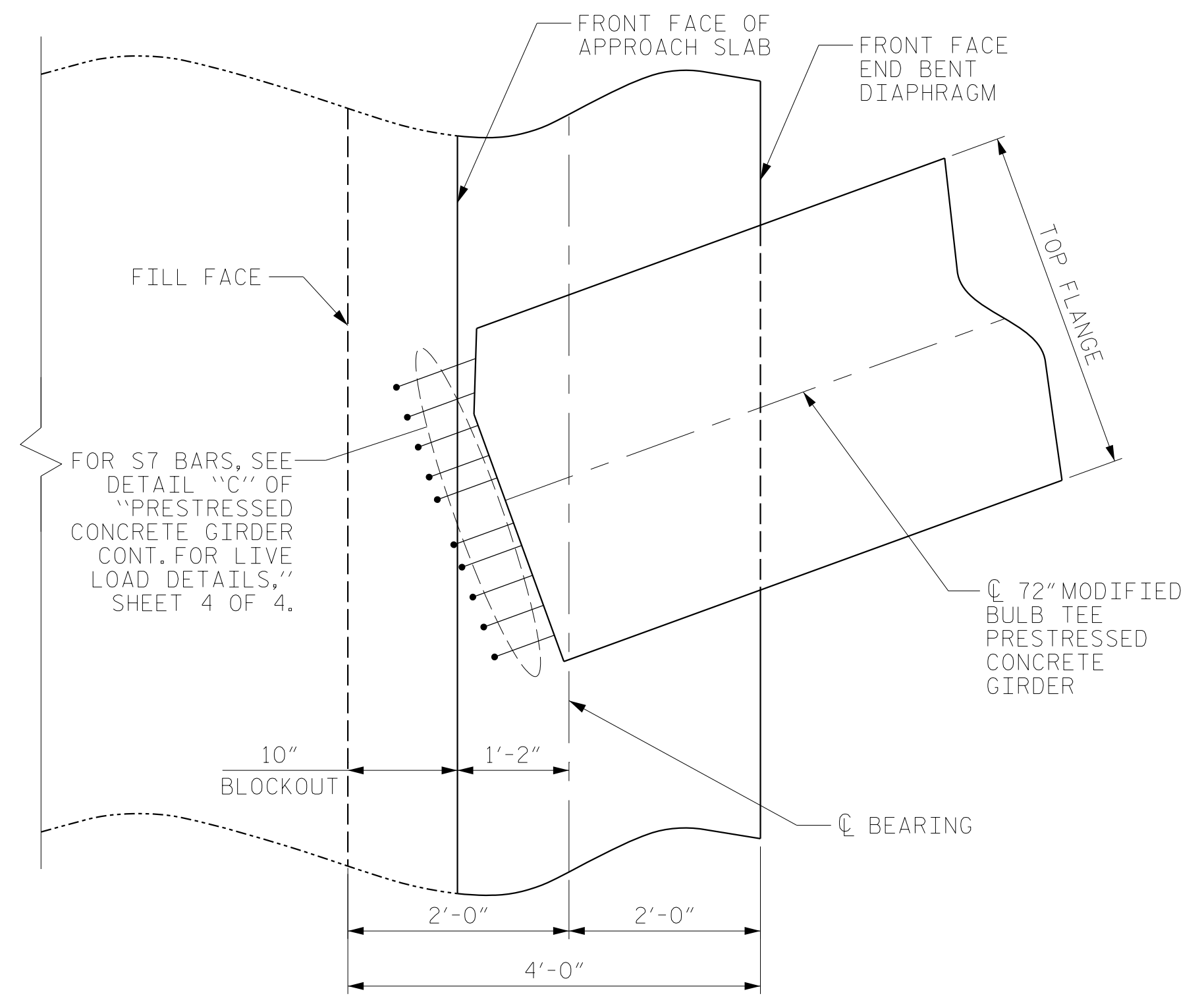


SECTION THRU INTEGRAL END BENT

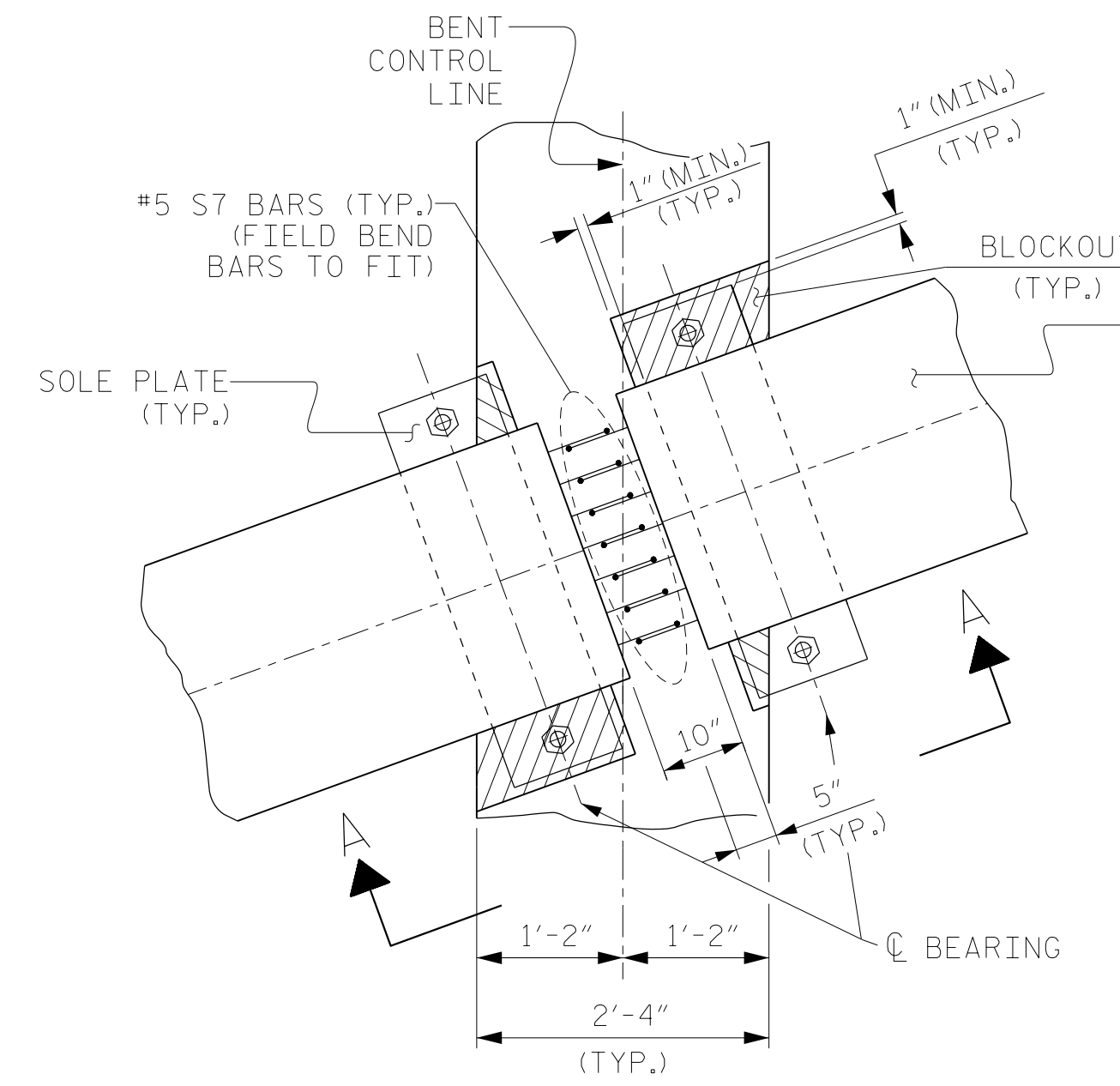


SECTION THRU CONTINUOUS BENT DIAPHRAGM

\* MEASURED ALONG C OF GIRDER

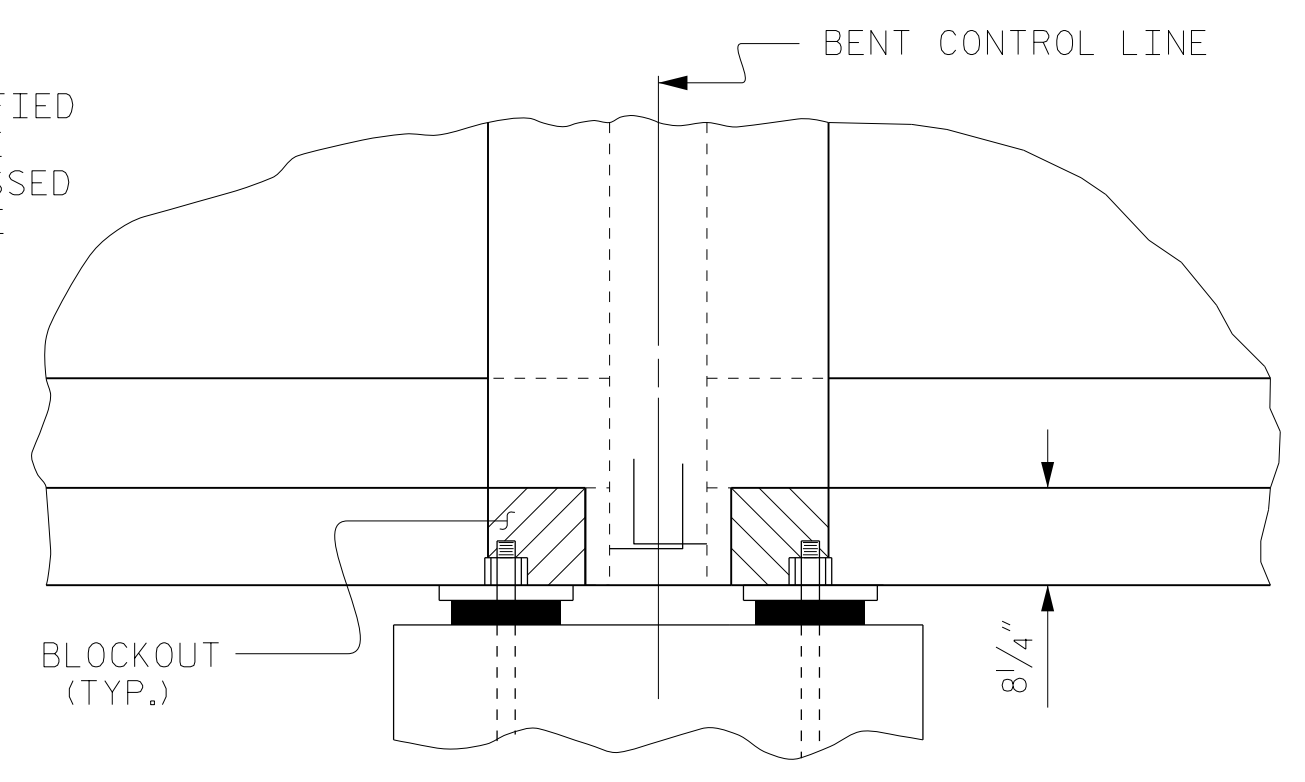


PLAN OF GIRDER @ INTEGRAL END BENT



PLAN VIEW

BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION A-A

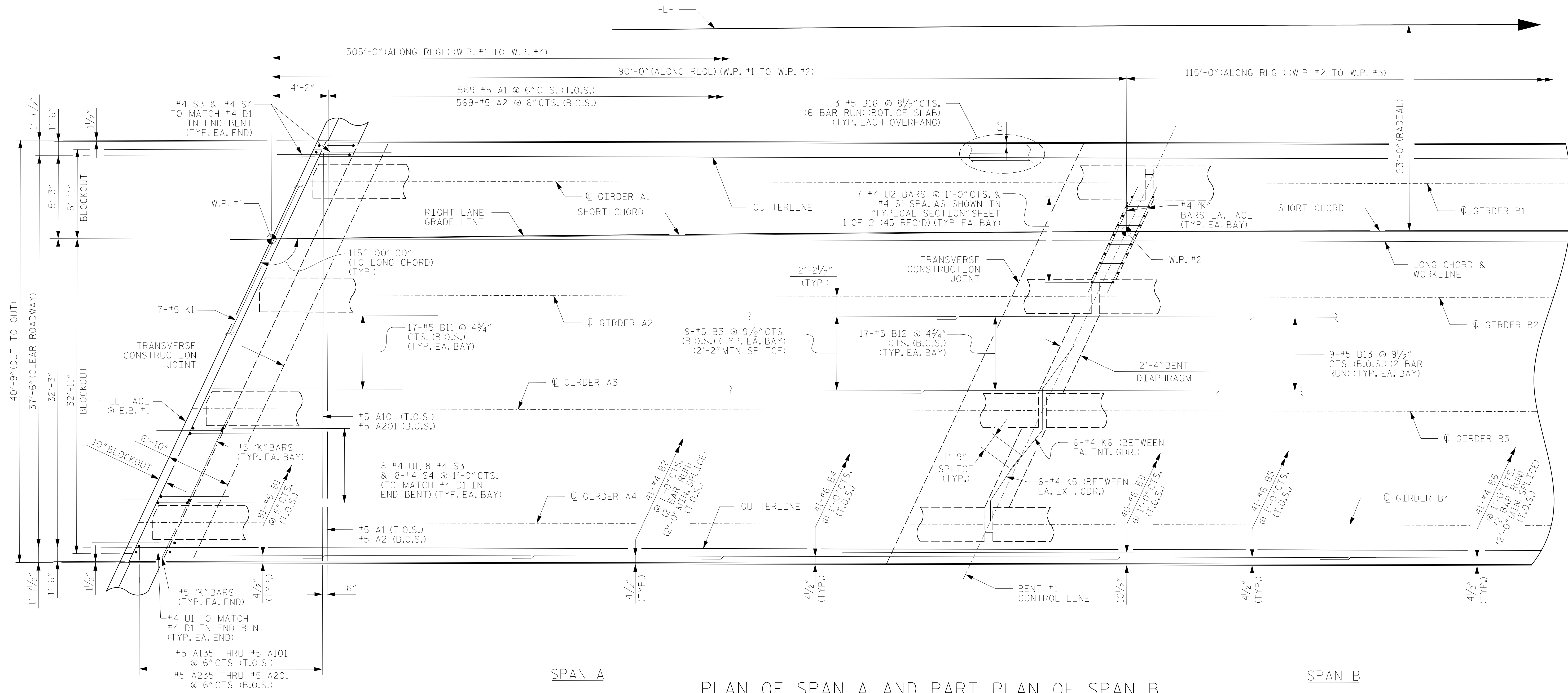
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 SHEET 2 OF 2

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 www.rsandh.com  
 North Carolina License No. 00737-0403-C&E

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION DETAILS RIGHT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S6-7
TOTAL SHEETS					37

DRAWN BY :	TWL	DATE :	12/2017
CHECKED BY :	TLC	DATE :	01/2018
DESIGN ENGINEER OF RECORD:	MAL	DATE :	01/2018

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PLAN OF SPAN A AND PART PLAN OF SPAN B

BRIDGE DECK AND ALL GIRDERS ARE ALONG LONG CHORD.

NOTES

FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 1 OF 2.

FOR END BENT DIAPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE "TYPICAL SECTION DETAILS" SHEET 2 OF 2.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEET.

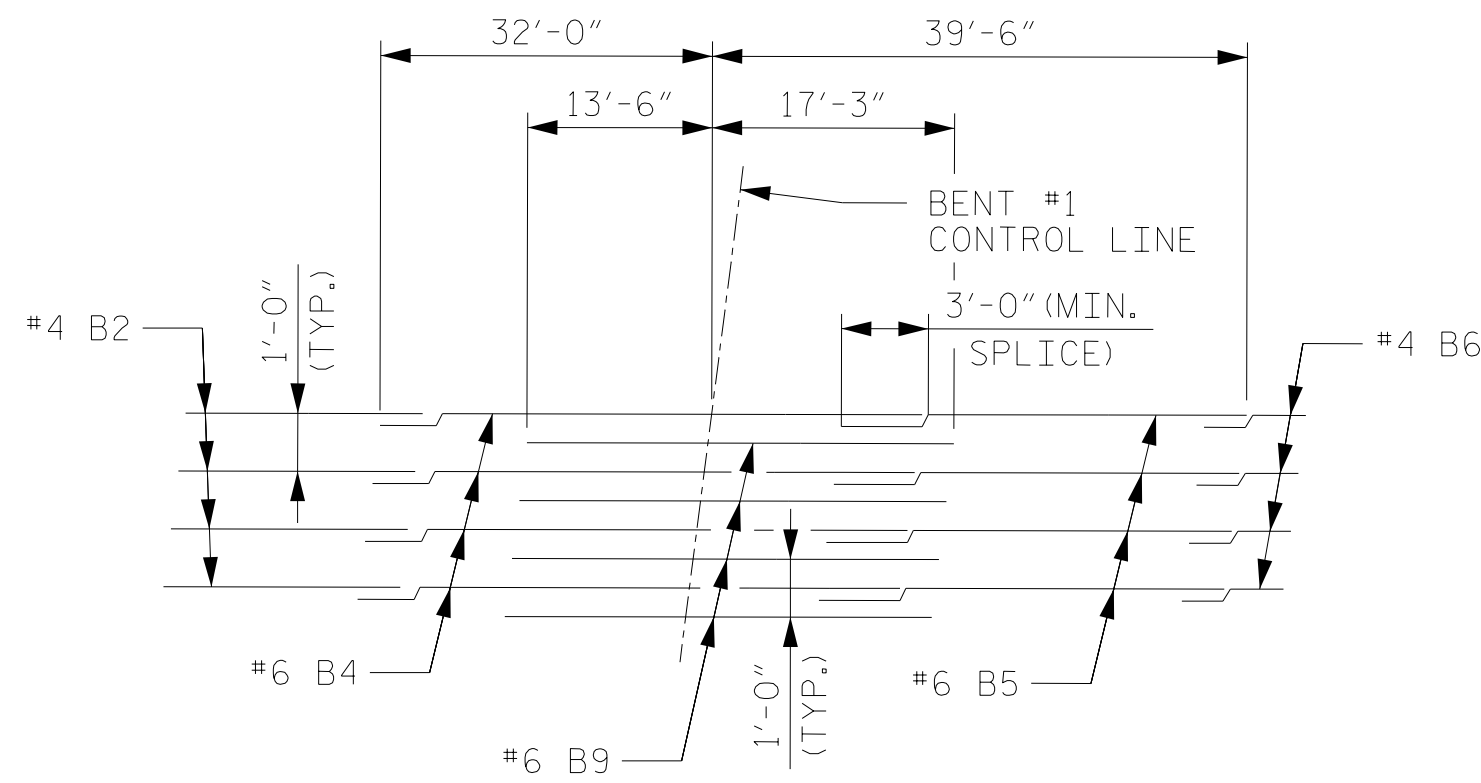
FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 2 OF 2.

FOR BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

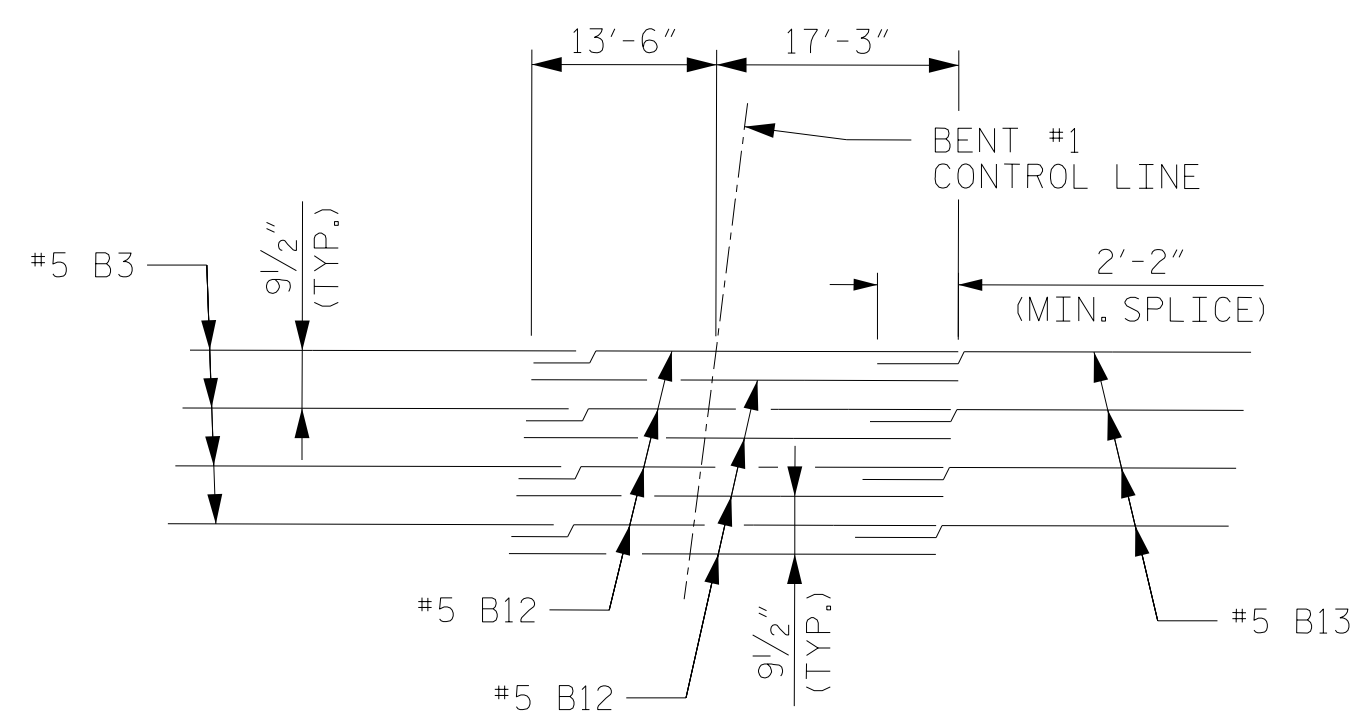
#5 "A" BARS ARE SPACED PERPENDICULAR TO LONG CHORD.

T.O.S. = TOP OF SLAB

B.O.S. = BOT. OF SLAB



TOP OF SLAB REINFORCING STEEL LAYOUT



BOTTOM OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPAN A  
 PART PLAN OF SPAN B  
 RIGHT LANE

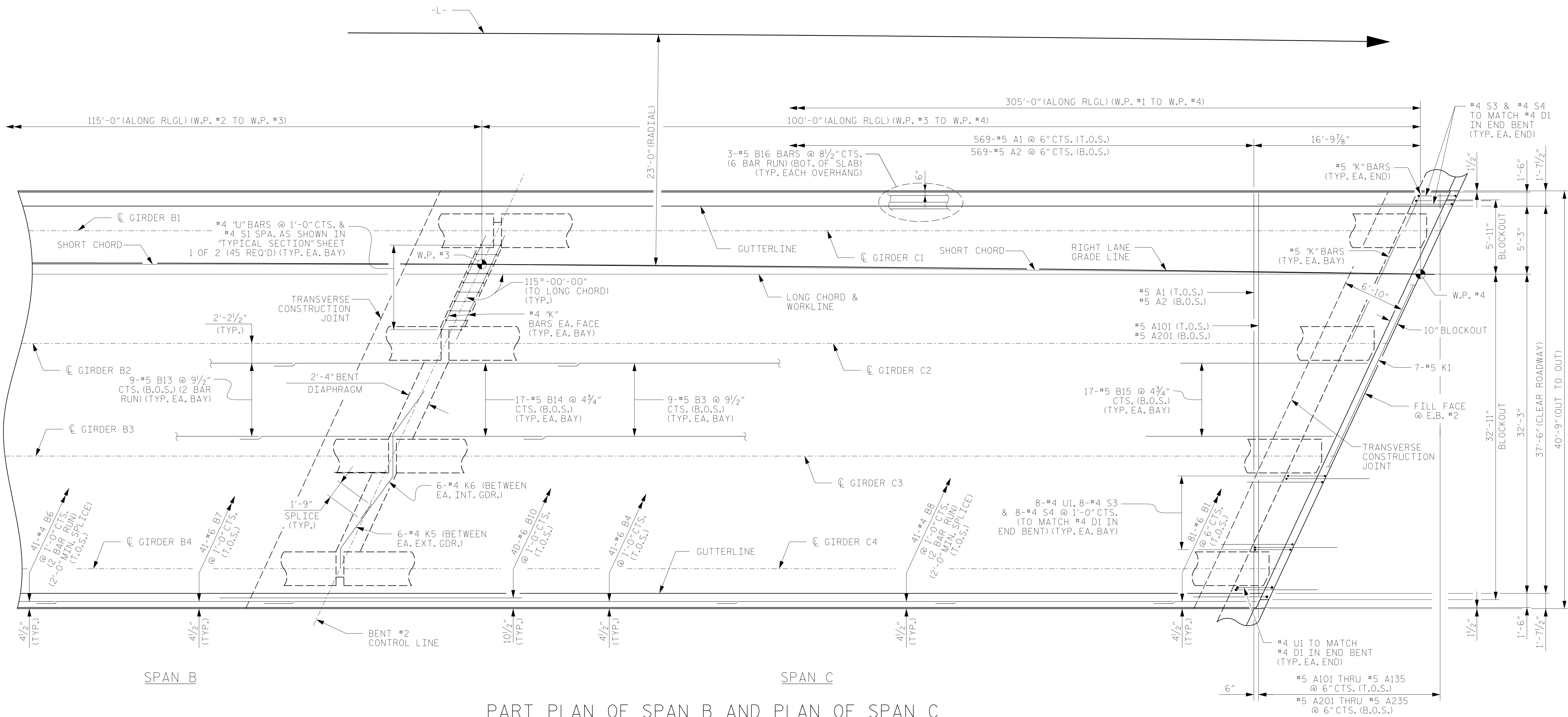
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CHECKED BY :	TLC	DATE :	01/2018
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1			3			37
2			4			



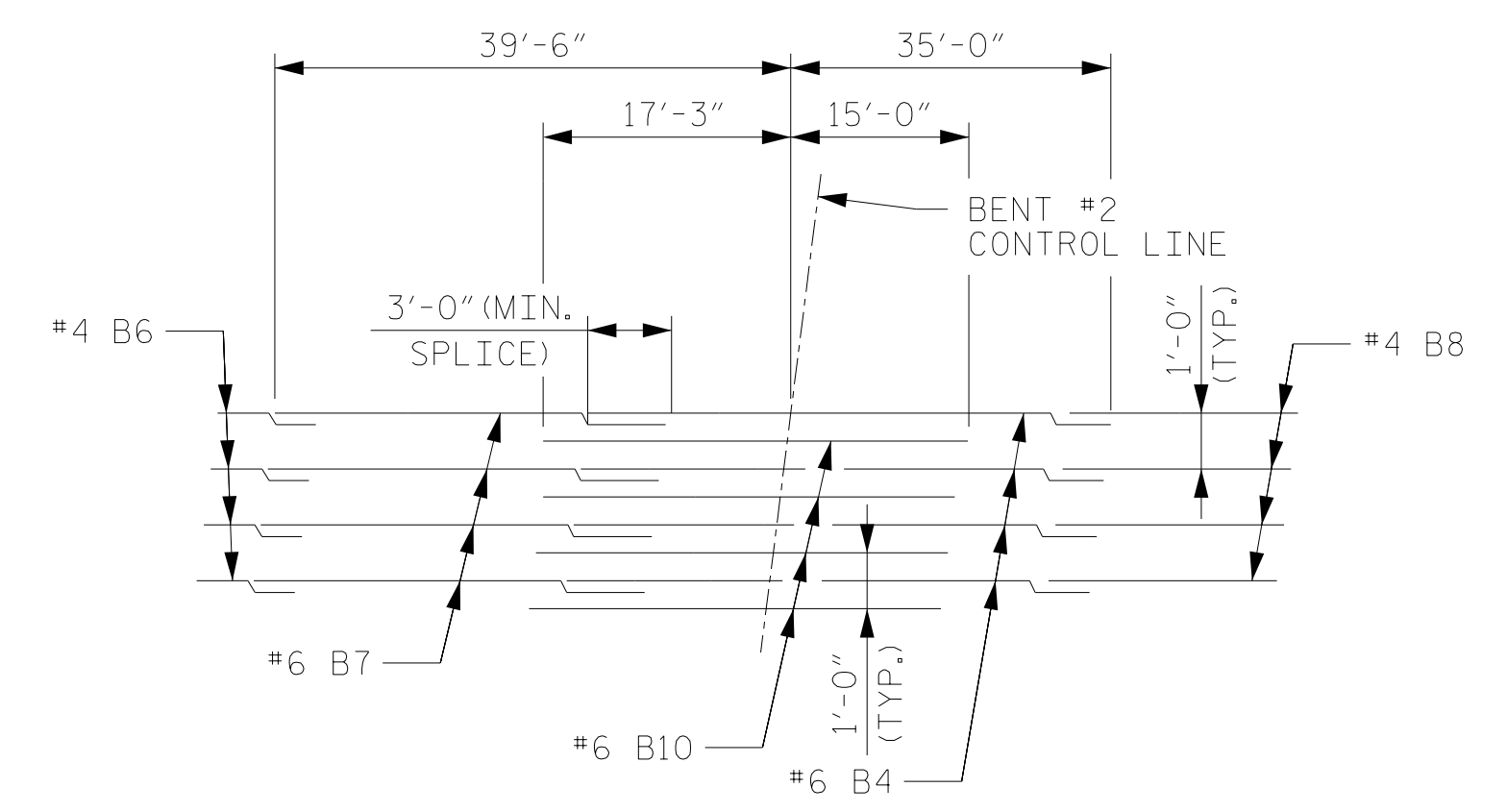


PART PLAN OF SPAN B AND PLAN OF SPAN C

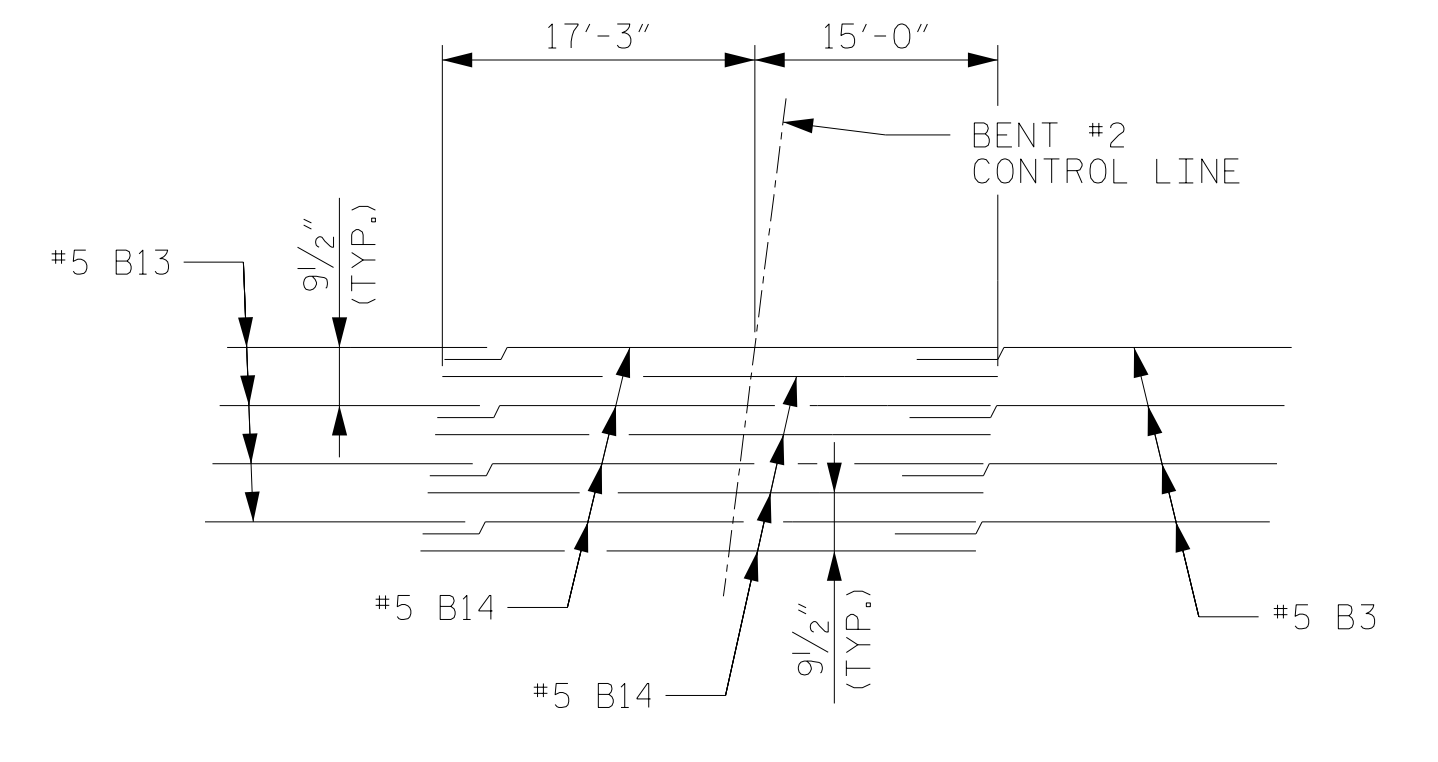
BRIDGE DECK AND ALL GIRDERS ARE ALONG LONG CHORD.

NOTES

- FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 1 OF 2.
- FOR END BENT DIAPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE "TYPICAL SECTION DETAILS" SHEET 2 OF 2.
- STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY, FOR LOCATIONS, SEE "FRAMING PLAN" SHEET.
- FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 2 OF 2.
- FOR BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.
- #5 "A" BARS ARE SPACED PERPENDICULAR TO LONG CHORD.
- T.O.S. = TOP OF SLAB
- B.O.S. = BOT. OF SLAB



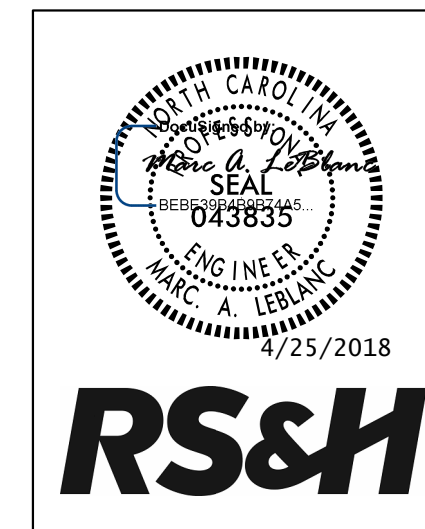
TOP OF SLAB REINFORCING STEEL LAYOUT



BOTTOM OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 2 OF 2



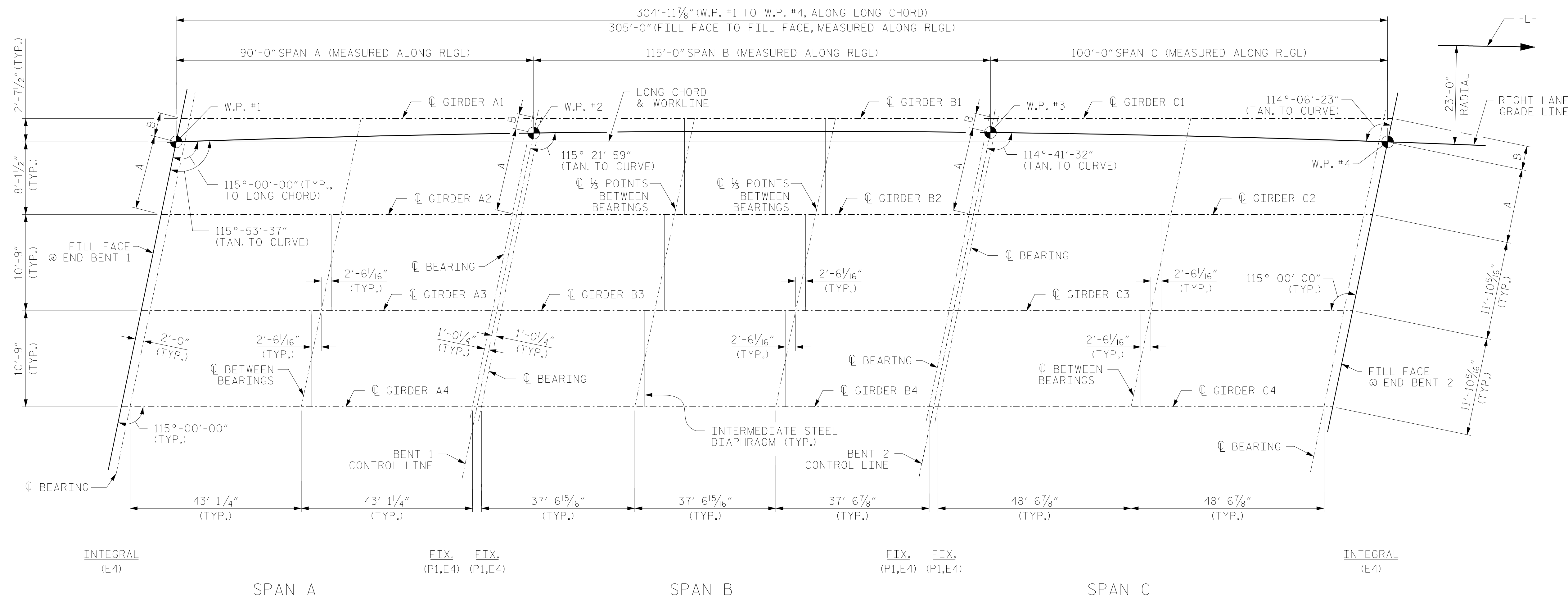
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PART PLAN OF SPAN B  
 PLAN OF SPAN C  
 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			56-9
2			4			TOTAL SHEETS 37

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 DESIGN ENGINEER OF RECORD: MAL DATE : 01/2018



FRAMING PLAN

NOTES:

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.  
 RLGL = RIGHT LANE GRADE LINE

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

LOCATION	A	B
END BENT 1	8'-11 9/16"	2'-10 3/4"
BENT 1	10'-0 11/16"	1'-9 5/8"
BENT 2	10'-1 1/16"	1'-8 7/8"
END BENT 2	8'-11 9/16"	2'-10 3/4"

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 CHECKED BY : JMR      DATE : 03/2018  
 DESIGN ENGINEER OF RECORD: MAL      DATE : 01/2018

4/24/2018  
 X:\P103109003 U-2412A Sites 2 & 3 DualBridges\Site 3\Design\Structures\Working DGN\406\_019\_U2412A\_SMU\_FRA\_S6-10.dgn  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

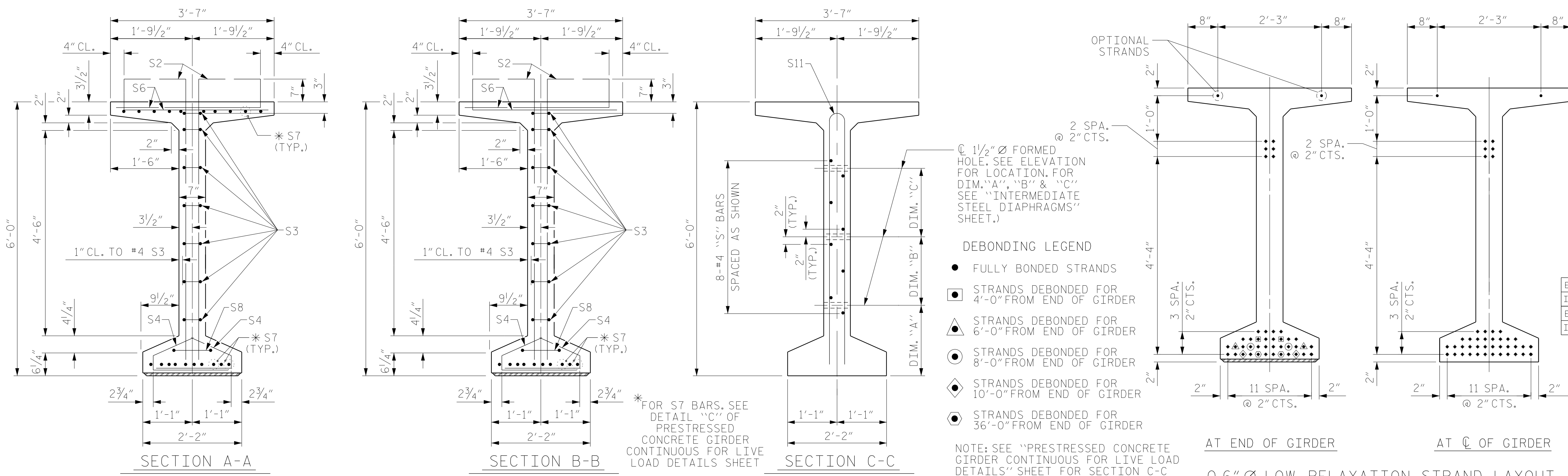
SUPERSTRUCTURE  
 FRAMING PLAN

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			56-10
2			4			TOTAL SHEETS 37

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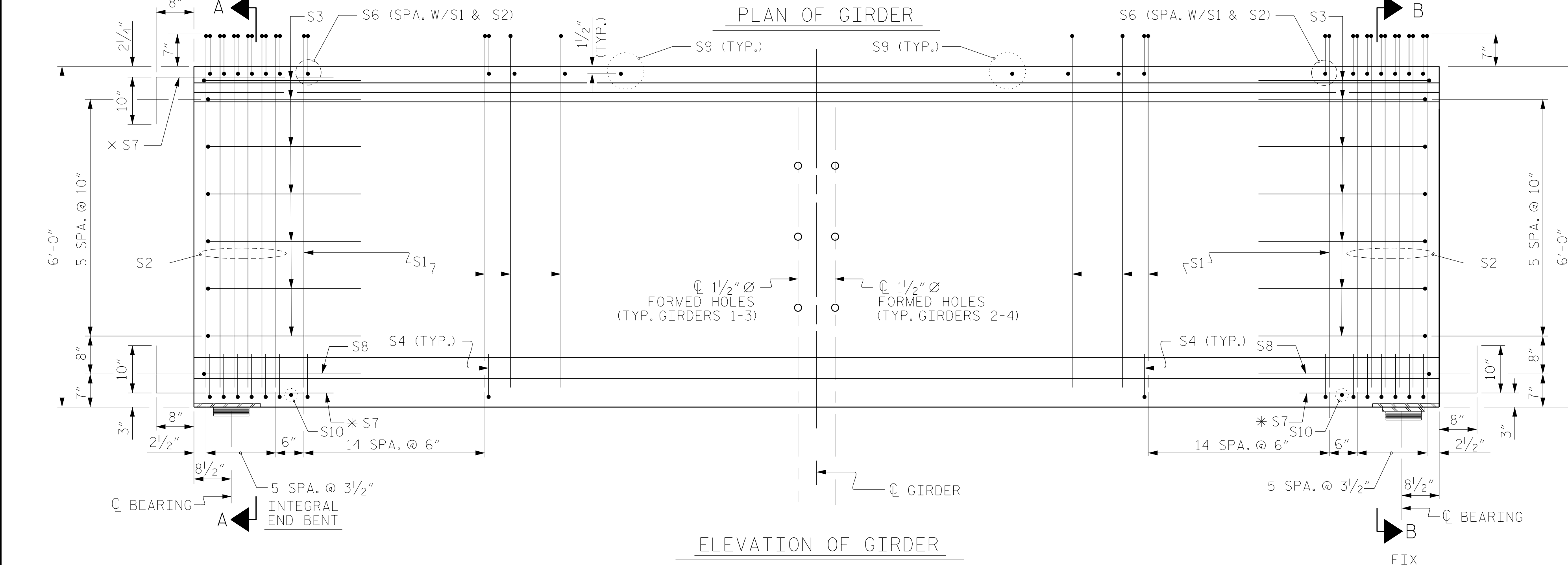
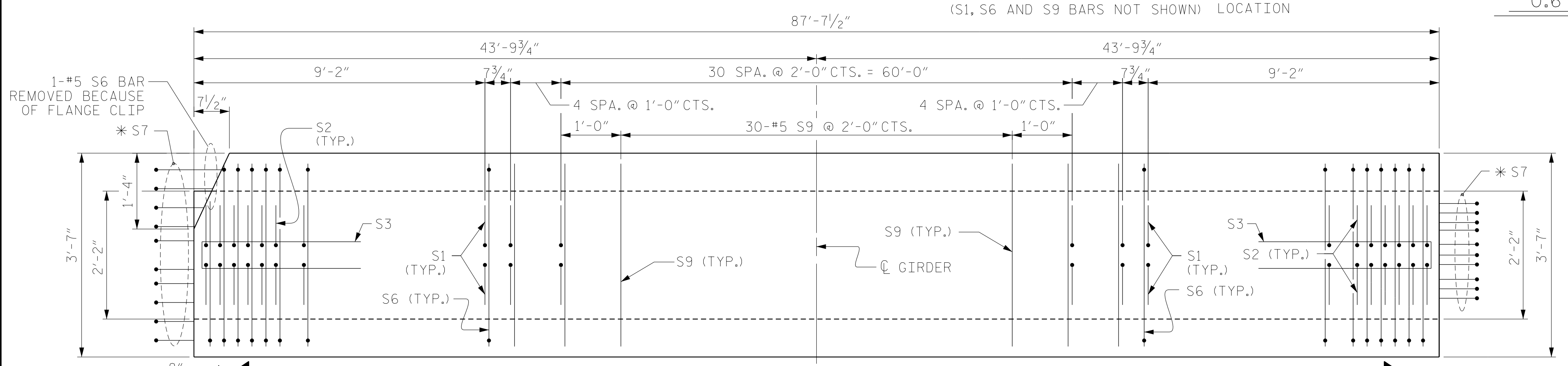
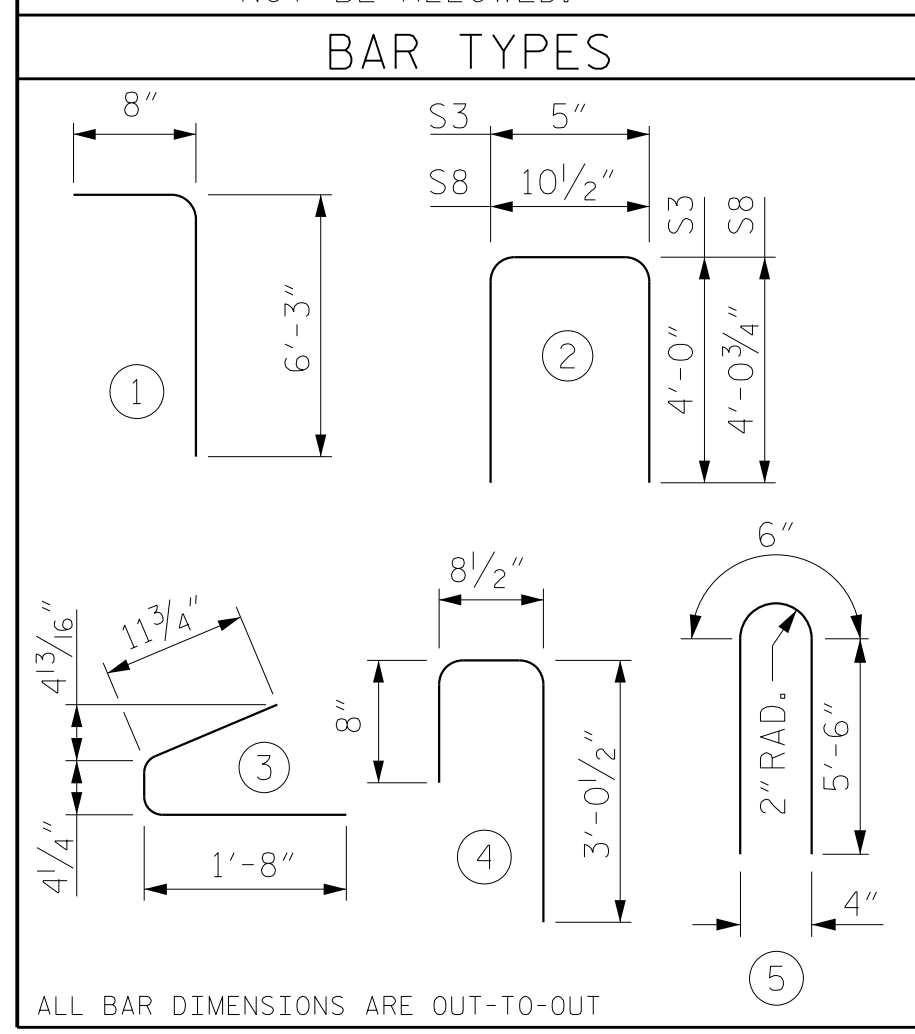


0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	138	#4	1	6'-11"	638
S2	24	#5	1	6'-11"	173
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S6	83	#5	4	4'-5"	382
*S7	30	#5	STR	3'-8"	115
S8	2	#5	2	9'-0"	19
S9	40	#5	STR	3'-3"	136
S10	2	#3	STR	1'-10"	1
S11	4	#5	5	11'-6"	48
S11	8	#5	5	11'-6"	96
S12	8	#4	STR	8'-0"	43
S13	8	#4	STR	13'-8"	73
TOTAL					1971

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



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1802	18.8	42
INTERIOR GIRDER	1880	18.8	42

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	87'-7 1/2"	350.50'

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 1 OF 4

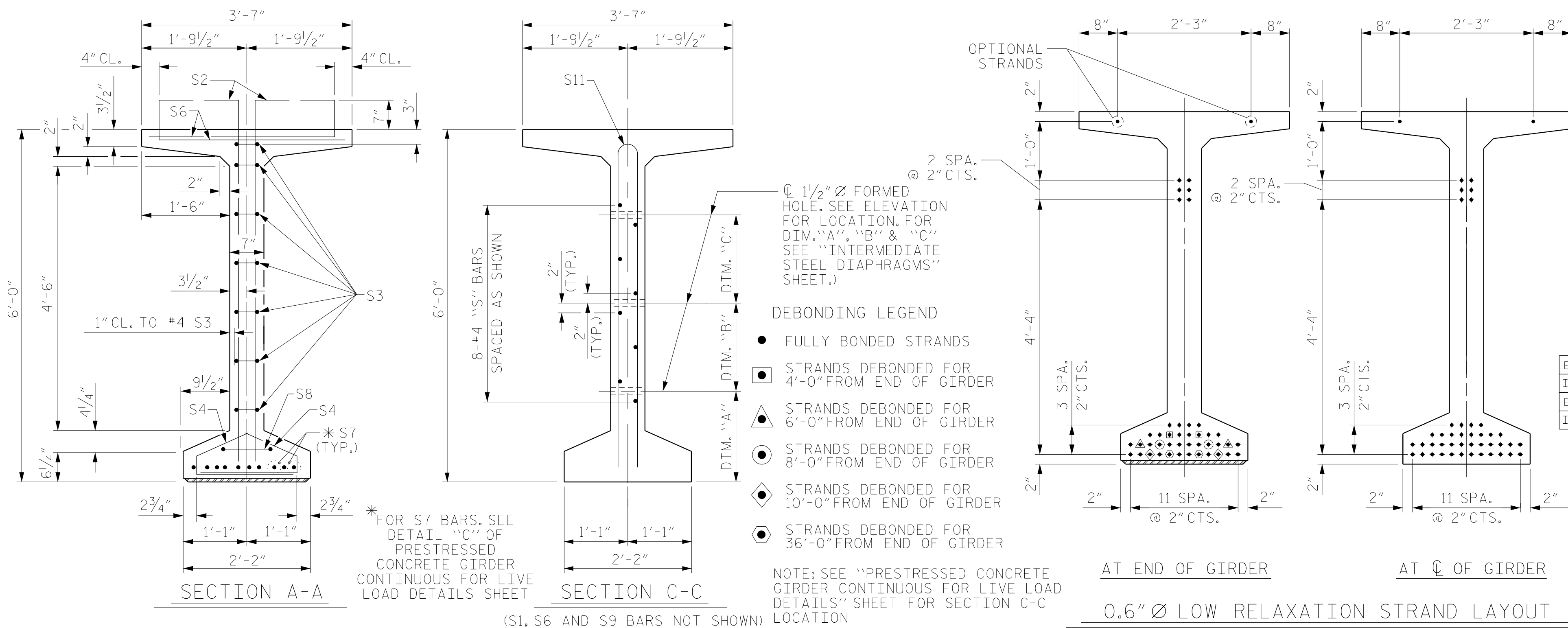


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 72" PRESTRESSED CONCRETE  
 MODIFIED BULB TEE  
 CONTINUOUS FOR LIVE LOAD  
 SPAN A  
 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-11
2			4			TOTAL SHEETS 37

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- DEBONDING LEGEND**
- FULLY BONDED STRANDS
  - ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
  - ◼ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
  - ◽ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
  - ◾ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
  - ◿ STRANDS DEBONDED FOR 36'-0" FROM END OF GIRDER

NOTE: SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET FOR SECTION C-C LOCATION

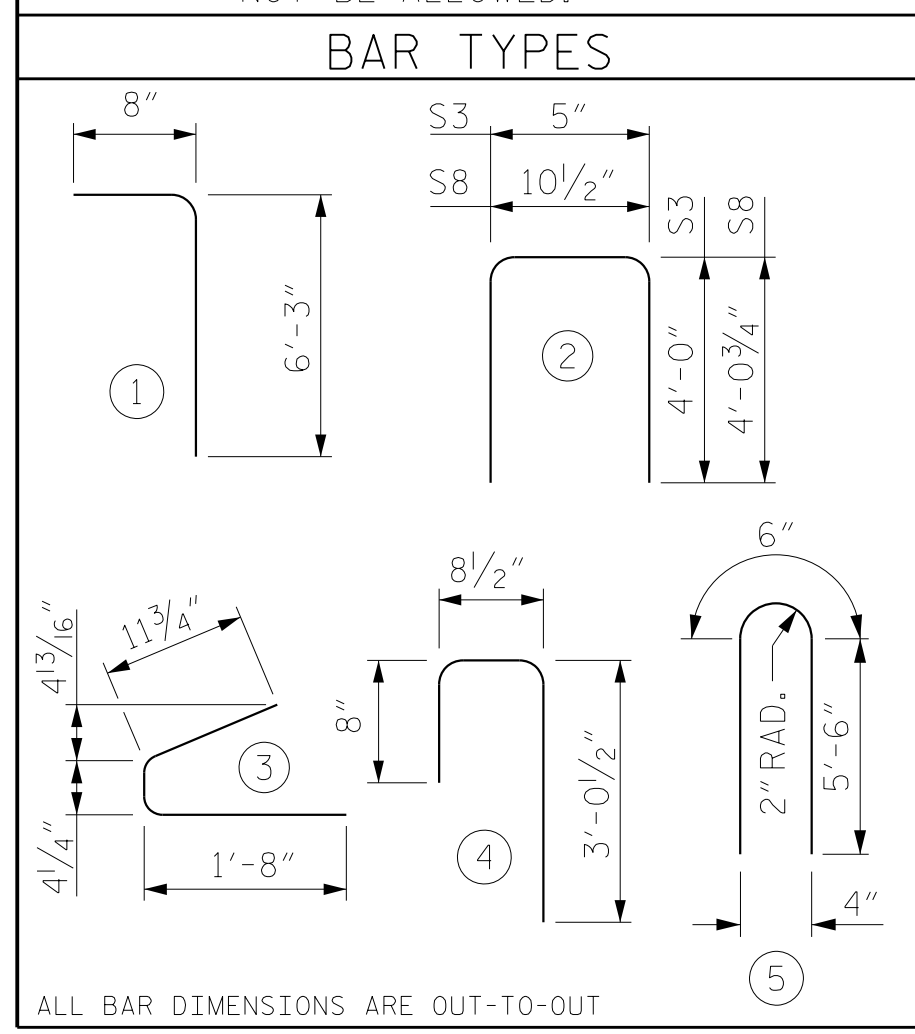
AT END OF GIRDER AT  $\phi$  OF GIRDER  
 0.6"  $\phi$  LOW RELAXATION STRAND LAYOUT  
 (ALL STRANDS STRAIGHT)

0.6" $\phi$ 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 GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	222	#4	1	6'-11"	1026
S2	24	#5	1	6'-11"	173
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S6	84	#5	4	4'-5"	387
*S7	20	#5	STR	3'-8"	76
S8	2	#5	2	9'-0"	19
S9	82	#5	STR	3'-3"	278
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	11'-6"	96
EXTERIOR GDR. S11	16	#5	5	11'-6"	192
EXTERIOR GDR. S12	16	#4	STR	8'-0"	86
INTERIOR GDR. S13	16	#4	STR	13'-8"	146
TOTAL					2727

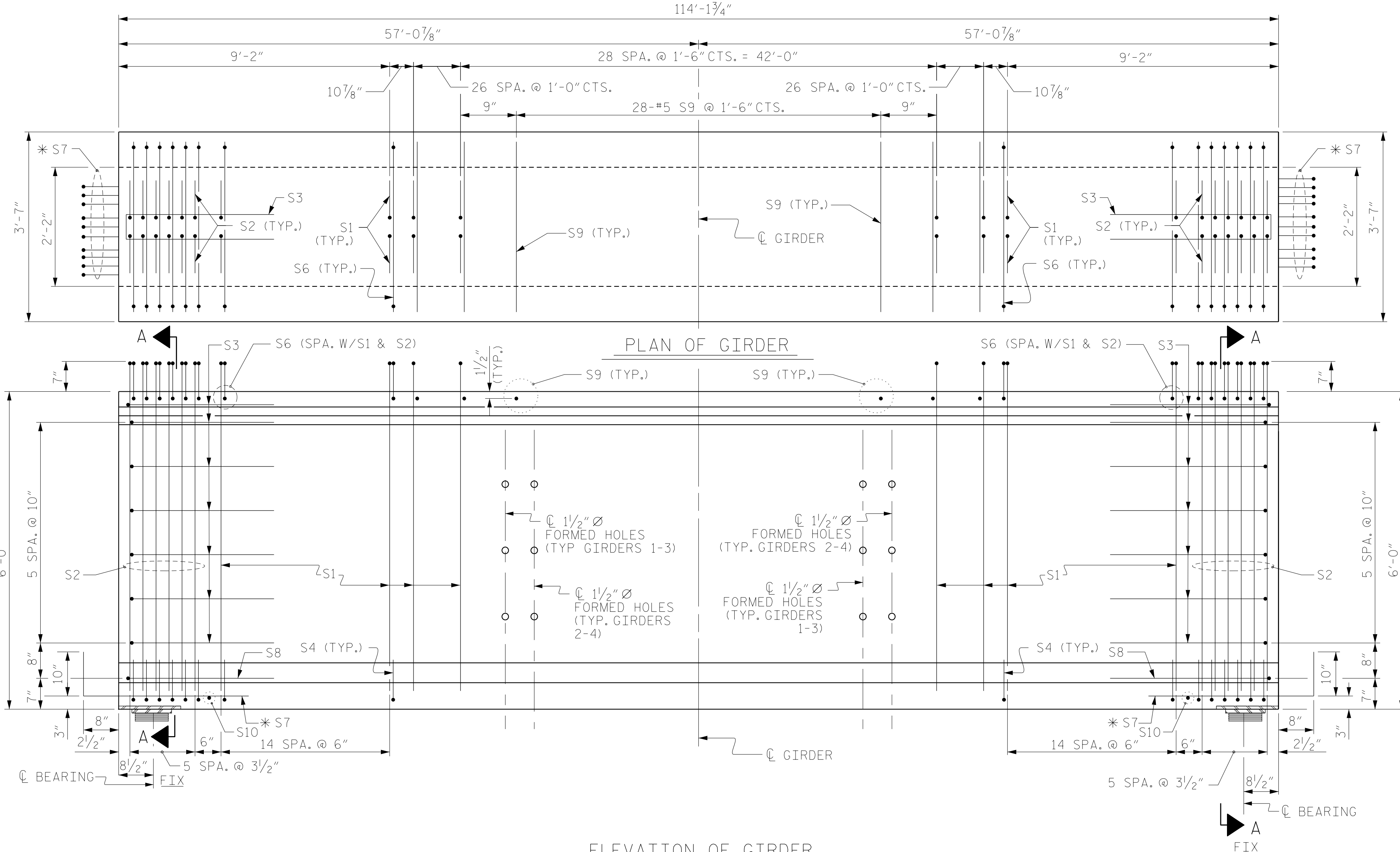
\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	8000 PSI CONCRETE	0.6" $\phi$ L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2389	24.5	42
INTERIOR GIRDER	2545	24.5	42

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	114'-1 3/4"	456.58'



ELEVATION OF GIRDER  
 FOR 1 1/2" HOLE LOCATION, SEE FRAMING PLAN.

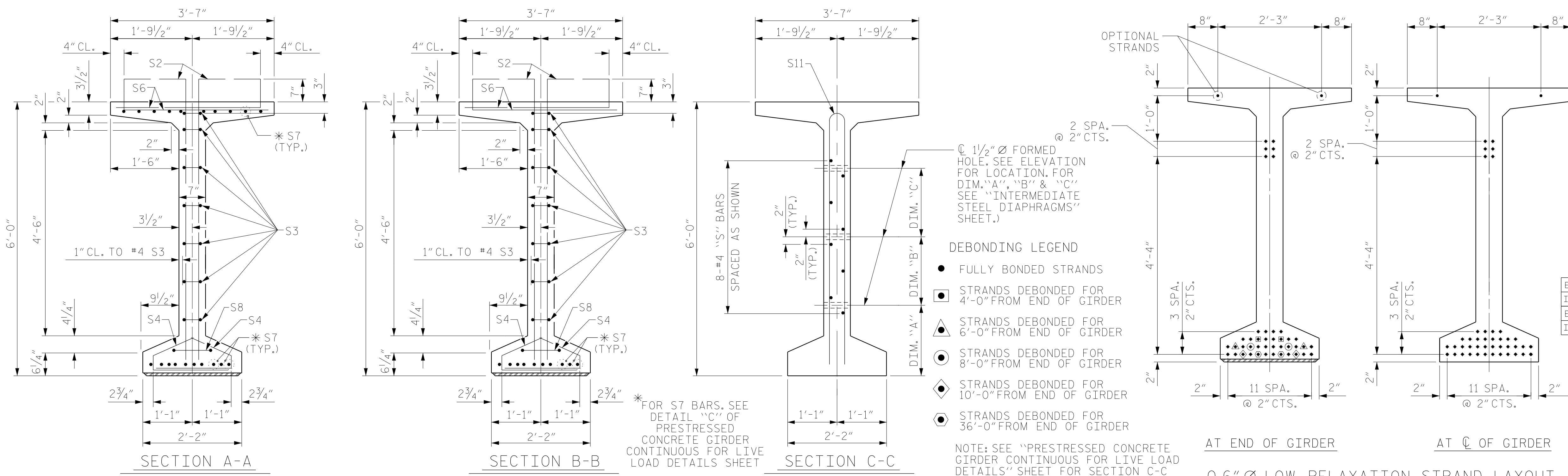
PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 2 OF 4



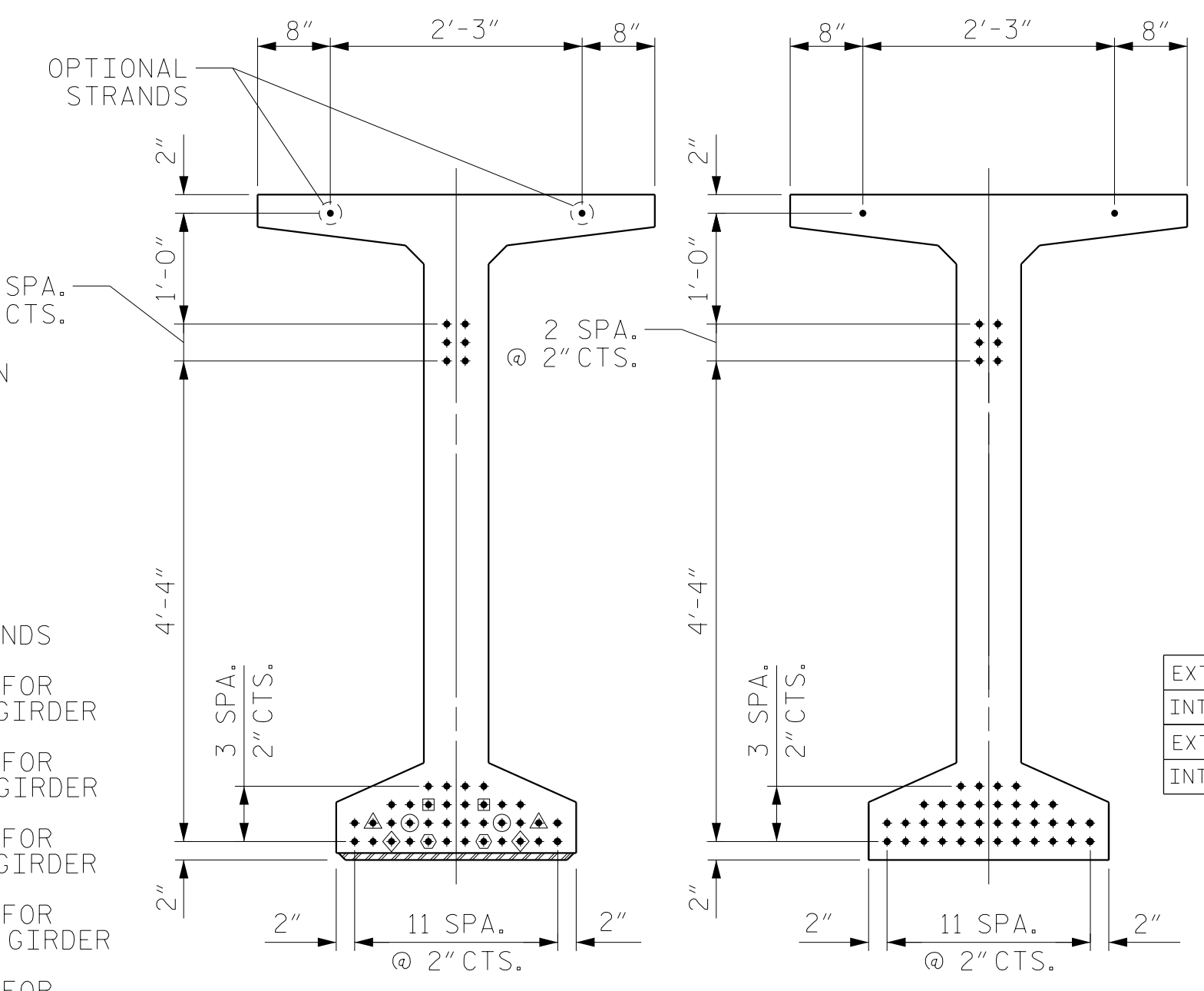
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-12
2			4			

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- DEBONDING LEGEND
- FULLY BONDED STRANDS
  - ◻ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
  - ◐ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
  - ◑ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
  - ◒ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
  - ◓ STRANDS DEBONDED FOR 36'-0" FROM END OF GIRDER
- NOTE: SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET FOR SECTION C-C LOCATION



AT END OF GIRDER AT  $\phi$  OF GIRDER  
 0.6"  $\phi$  LOW RELAXATION STRAND LAYOUT  
 (ALL STRANDS STRAIGHT)

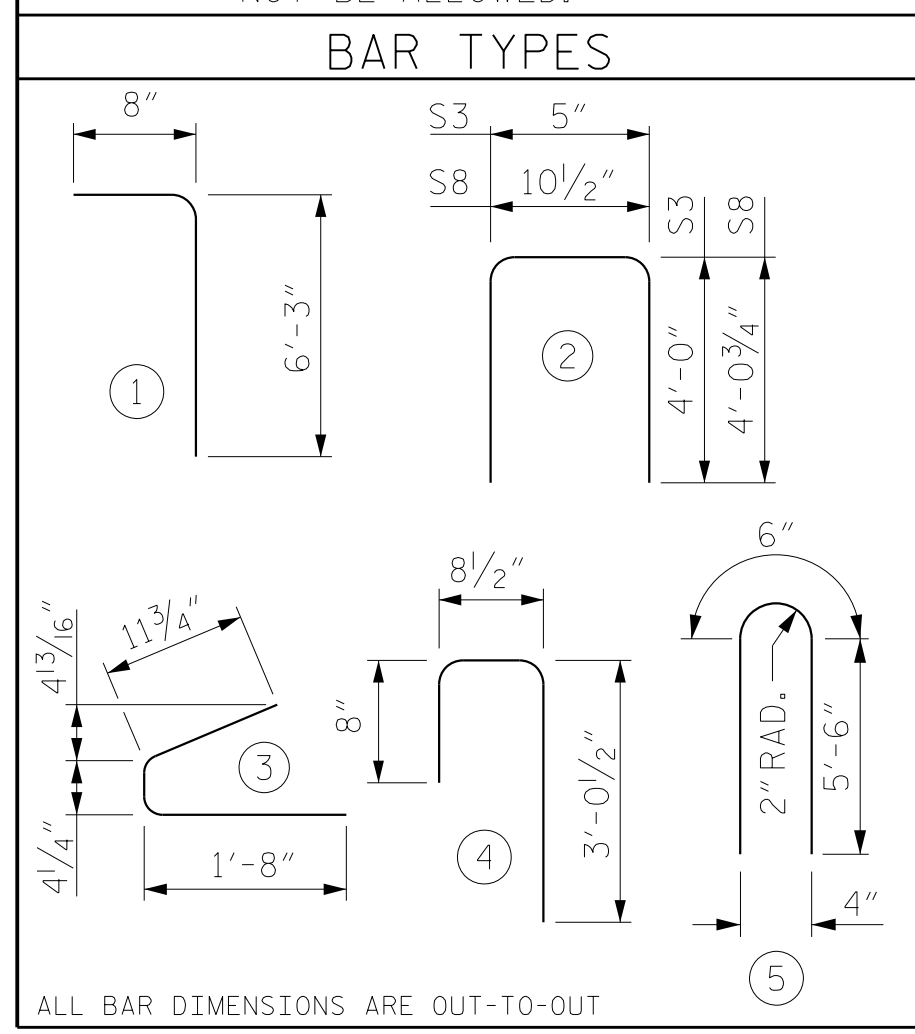
0.6"  $\phi$  L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	174	#4	1	6'-11"	804
S2	24	#5	1	6'-11"	173
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S6	83	#5	4	4'-5"	382
*S7	30	#5	STR	3'-8"	115
S8	2	#5	2	9'-0"	19
S9	58	#5	STR	3'-3"	197
S10	2	#3	STR	1'-10"	1
S11	4	#5	5	11'-6"	48
S11	8	#5	5	11'-6"	96
S12	8	#4	STR	8'-0"	43
S13	8	#4	STR	13'-8"	73
TOTAL					2198

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



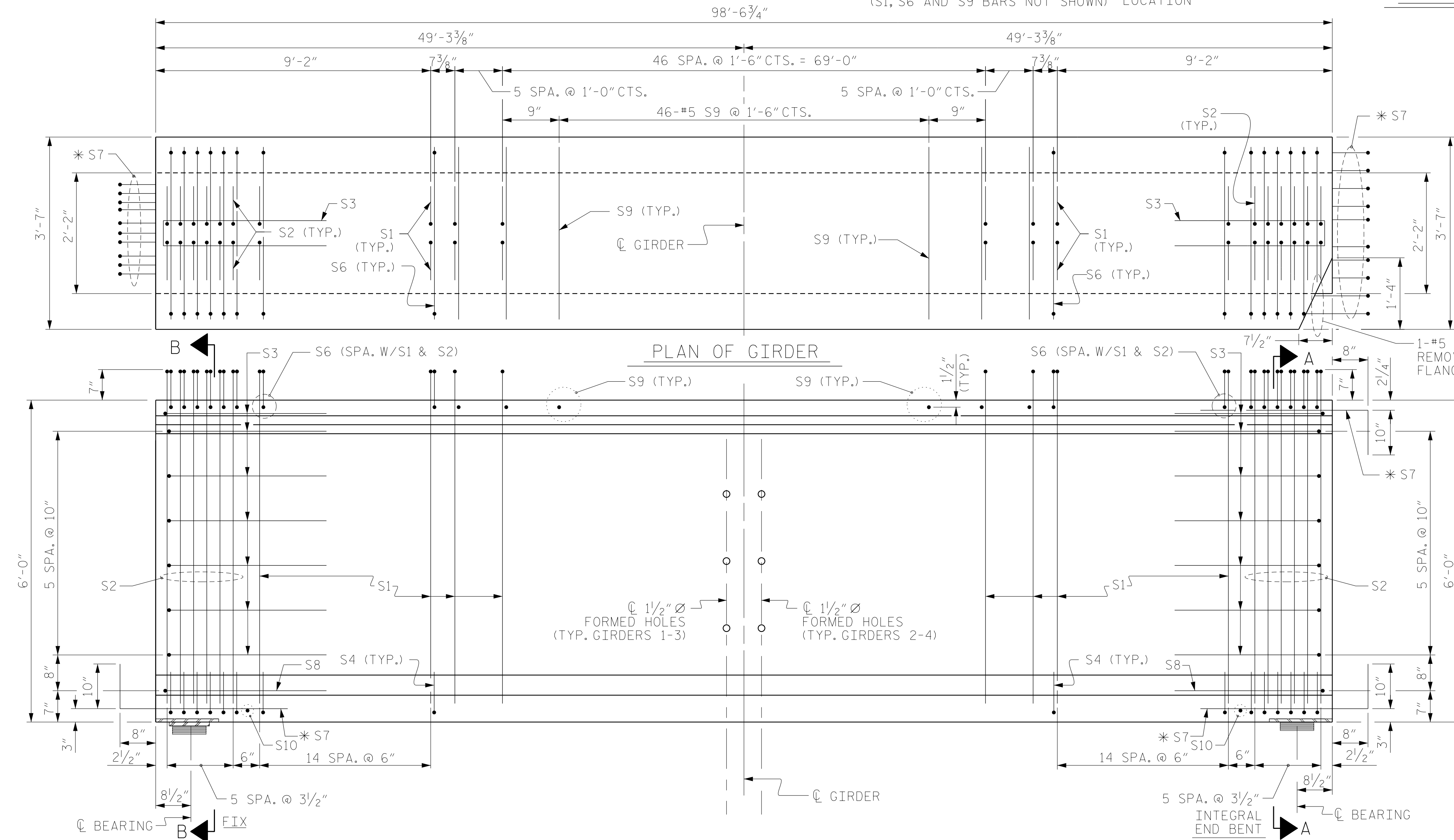
QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8000 PSI CONCRETE	0.6" $\phi$ L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2029	21.1	42
INTERIOR GIRDER	2107	21.1	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	98'-6 $\frac{3}{4}$ "	394.25'

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 3 OF 4



ELEVATION OF GIRDER  
 FOR 1/2" HOLE LOCATION, SEE FRAMING PLAN.

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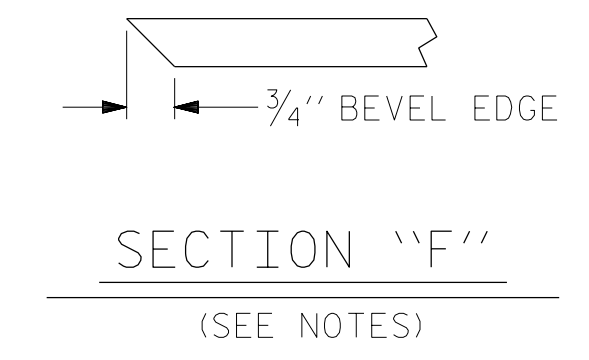
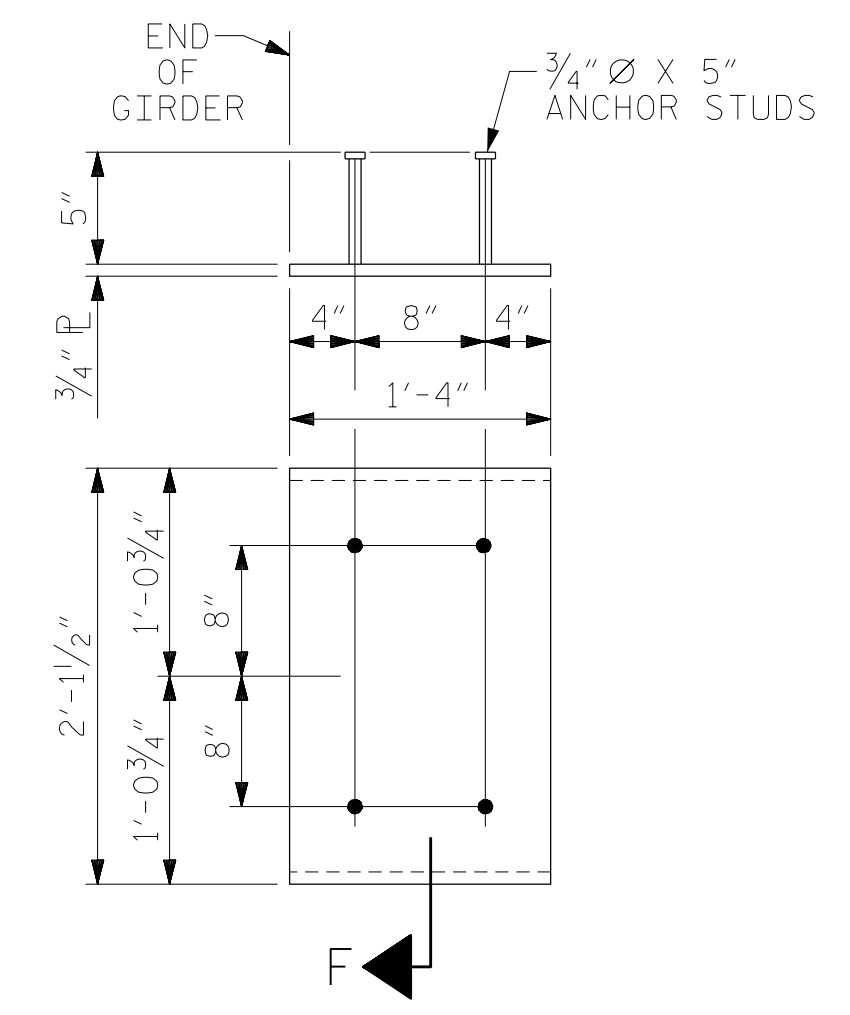
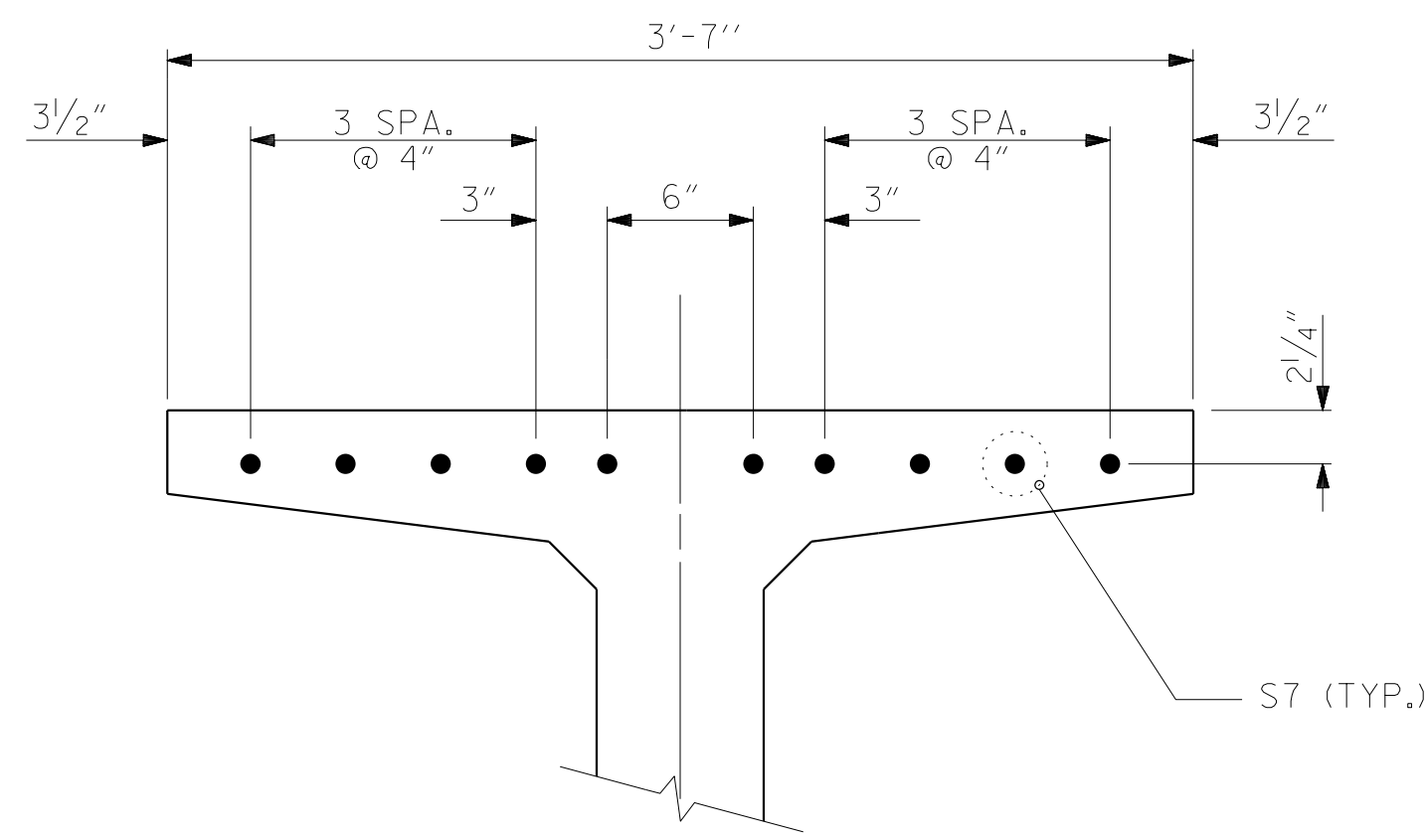
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 RALEIGH  
 SUPERSTRUCTURE  
 72" PRESTRESSED CONCRETE  
 MODIFIED BULB TEE  
 CONTINUOUS FOR LIVE LOAD  
 SPAN C  
 RIGHT LANE

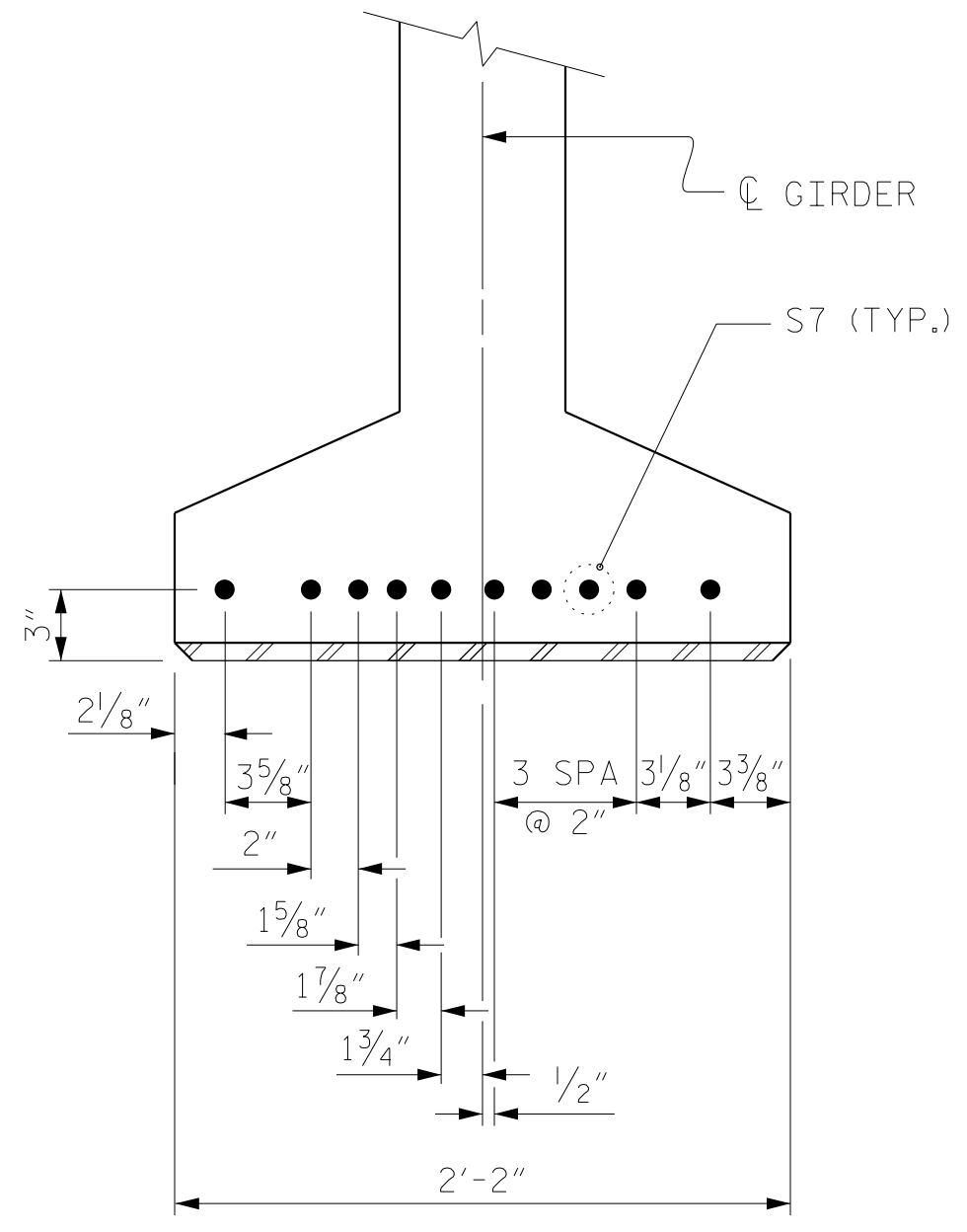
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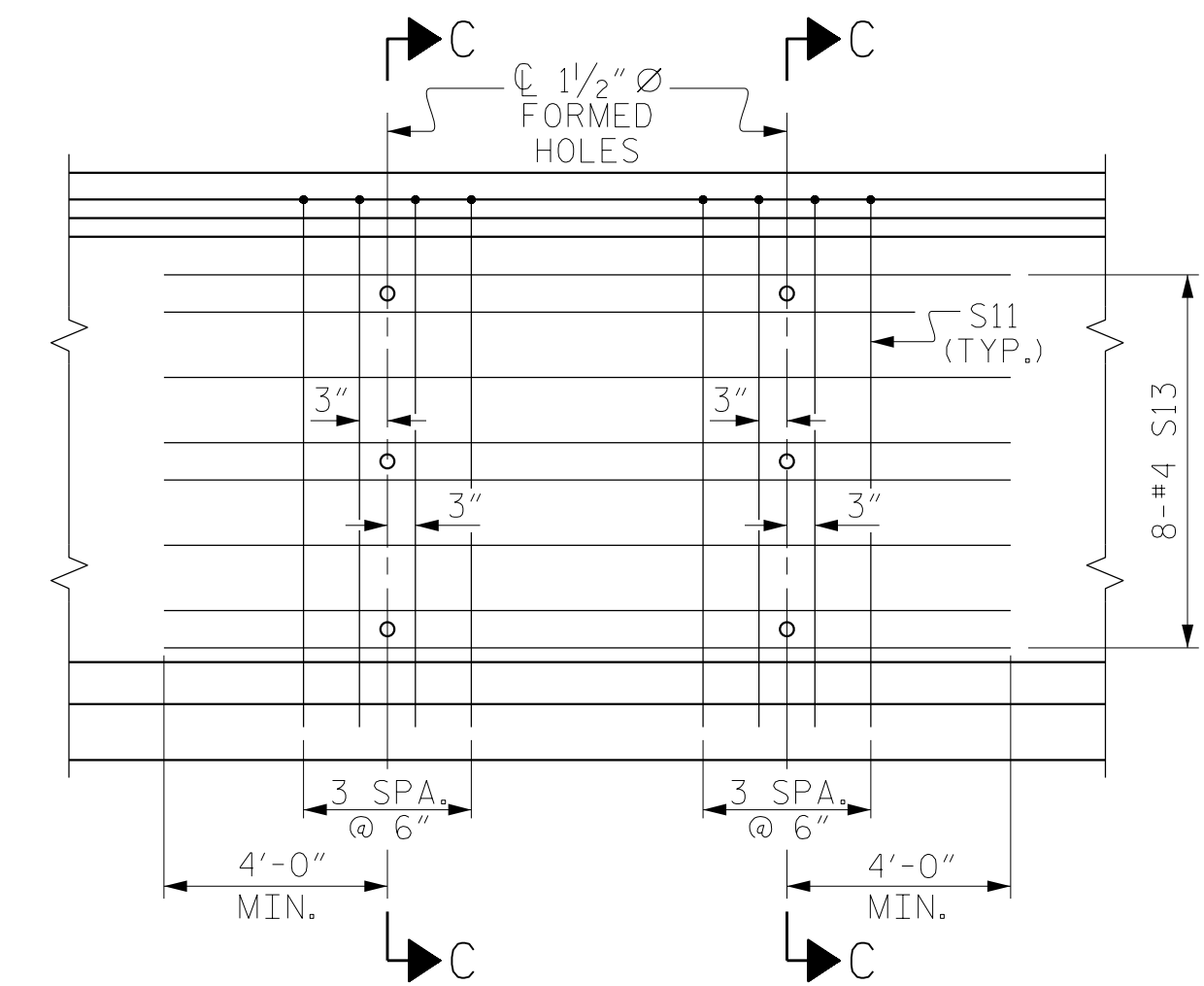
SHEET NO. S6-13  
 TOTAL SHEETS 37



**EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED PRESTRESSED CONCRETE GIRDER**  
(2 REQ'D PER GIRDER)

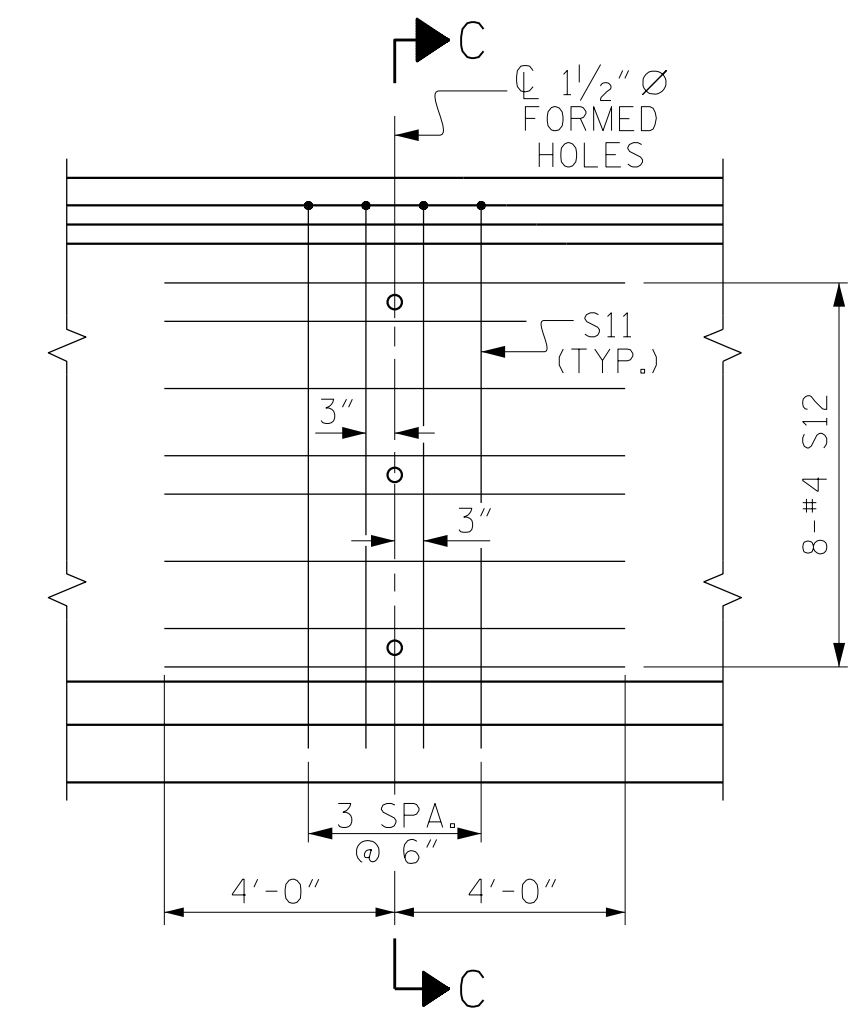


**DETAIL "C"**



**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 2 & 3  
FOR SECTION C-C, SEE "72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD" SHEETS.



**PARTIAL ELEVATION**

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 & 4  
FOR SECTION C-C, SEE "72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD" SHEETS.

**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 6400 PSI.
- 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".
- A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 72" MODIFIED BULB TEE.
- 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.

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-

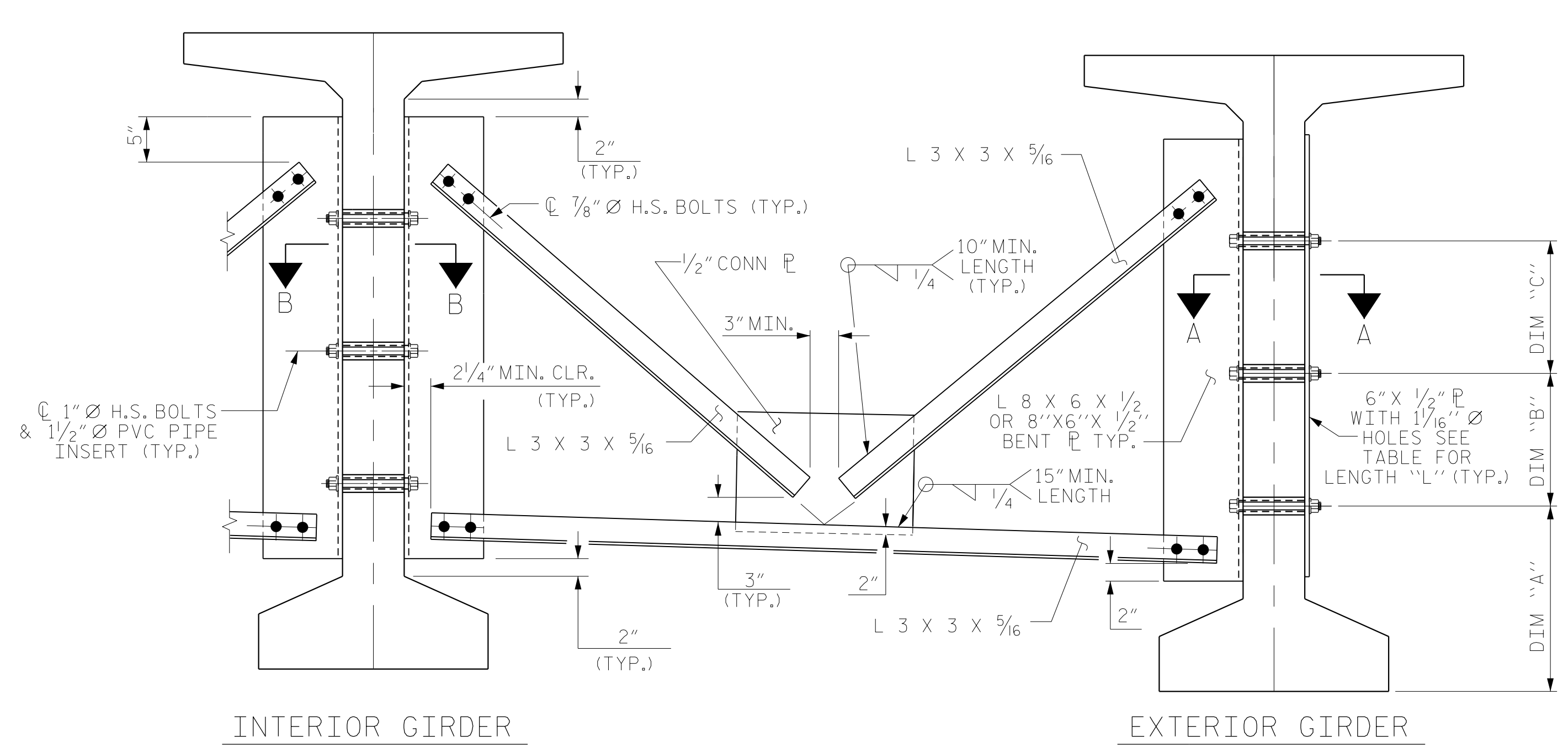
SHEET 4 OF 4

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North Carolina License No. 00793-F-0403-C-08

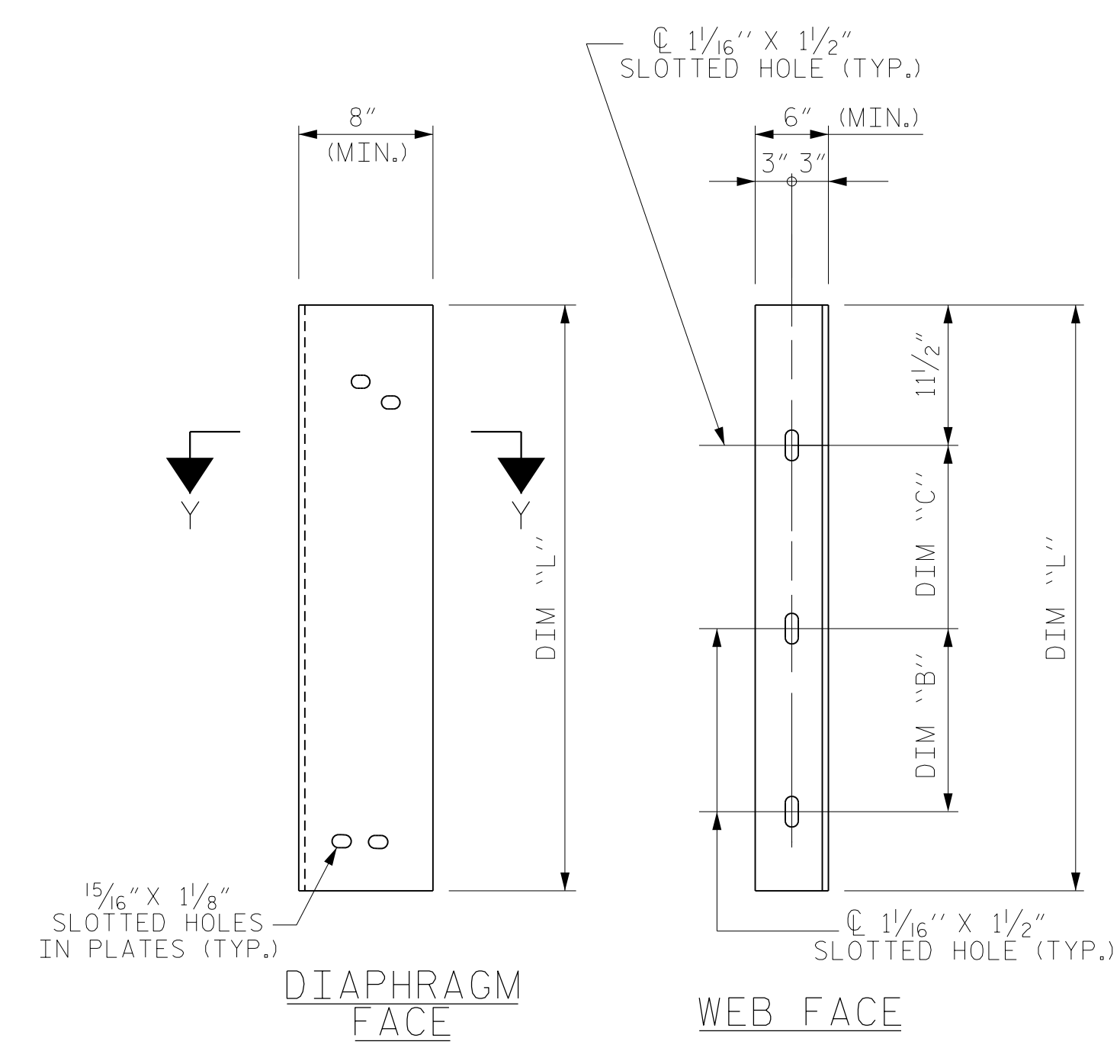
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S6-14	
STANDARD PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS RIGHT LANE						TOTAL SHEETS 37	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

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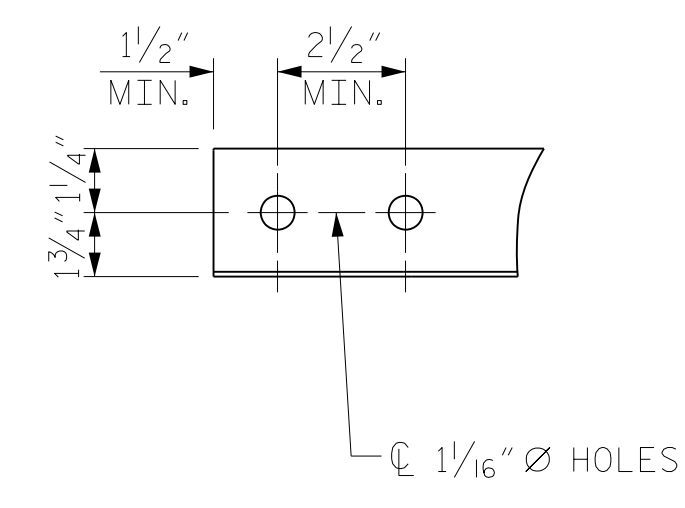
ASSEMBLED BY : MAL	DATE : 12/2017
CHECKED BY : CLG	DATE : 12/2017
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC



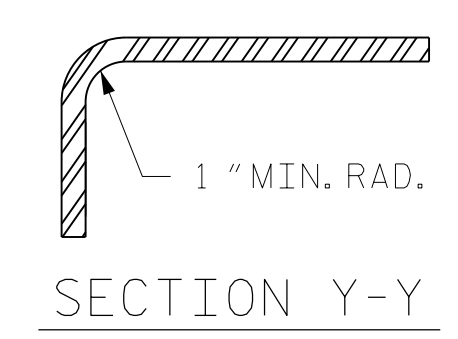
PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAIL



ANGLE END  
(L 3 x 3 x 5/16)



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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, 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.

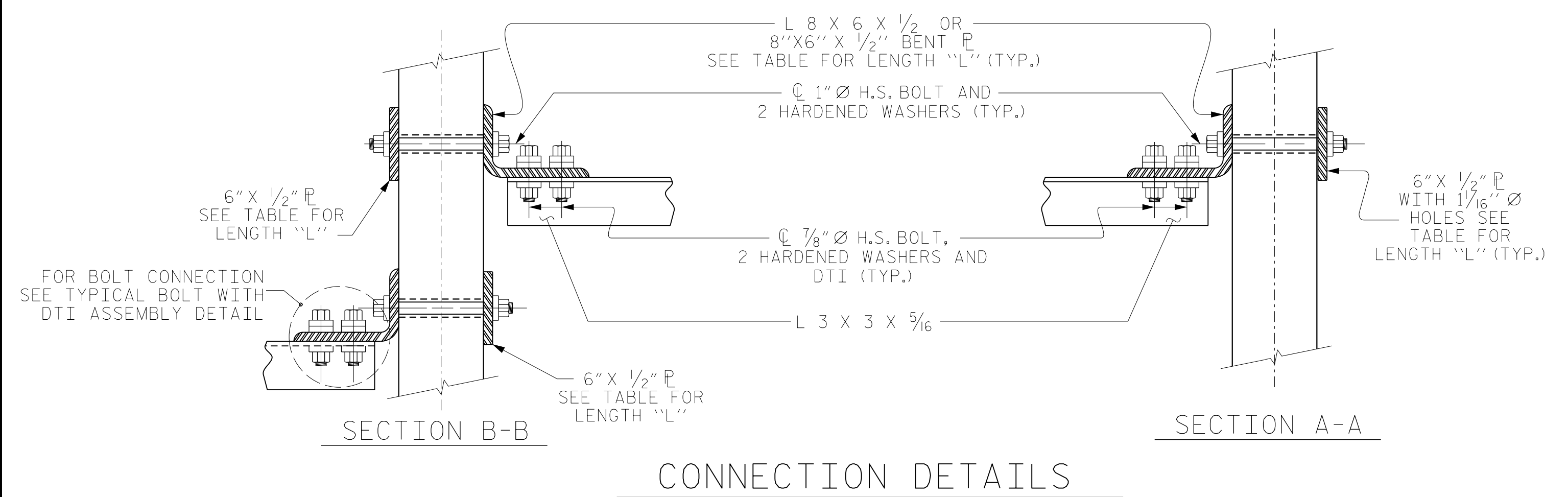
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

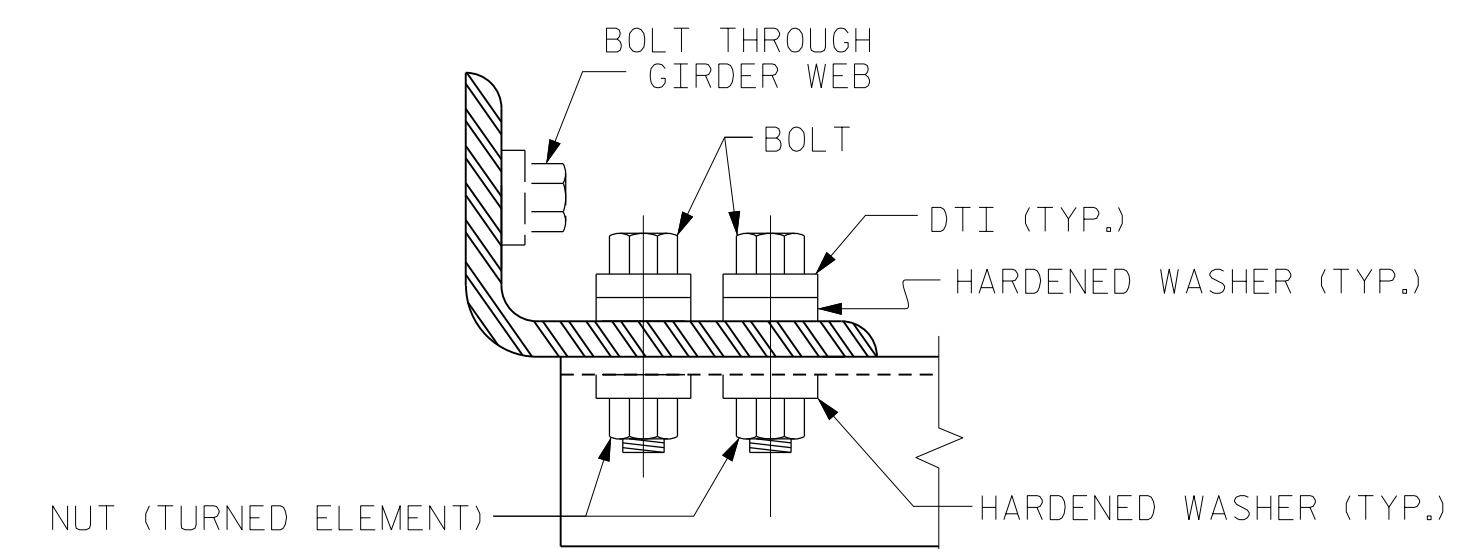
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-9"	1'-3"	1'-3"	4'-2"



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 INTERMEDIATE STEEL  
 DIAPHRAGMS FOR 72" MODIFIED  
 BULB TEE PRESTRESSED  
 CONCRETE GIRDERS  
 RIGHT LANE

REVISIONS						SHEET NO. S6-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 37
2			4			

ASSEMBLED BY : MAL	DATE : 12/2017
CHECKED BY : CLG	DATE : 01/2018
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

**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 AND NUTS 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 AND NUTS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

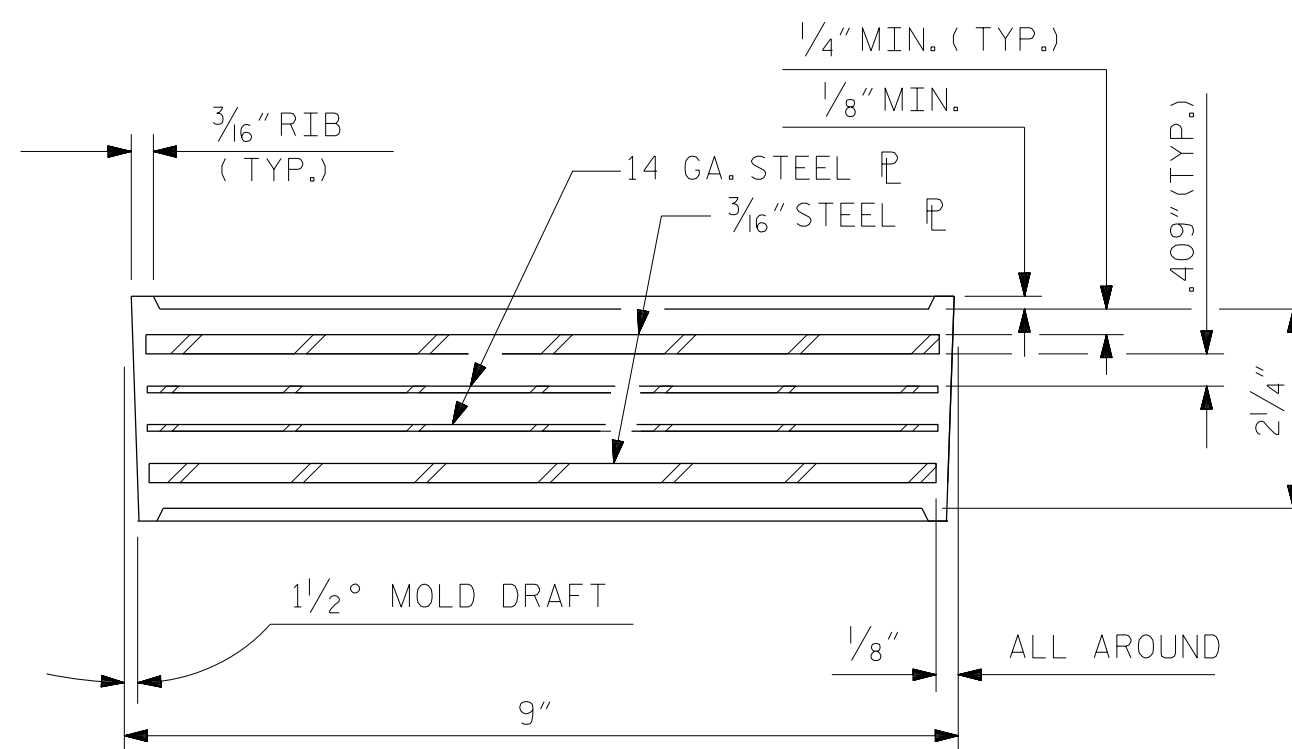
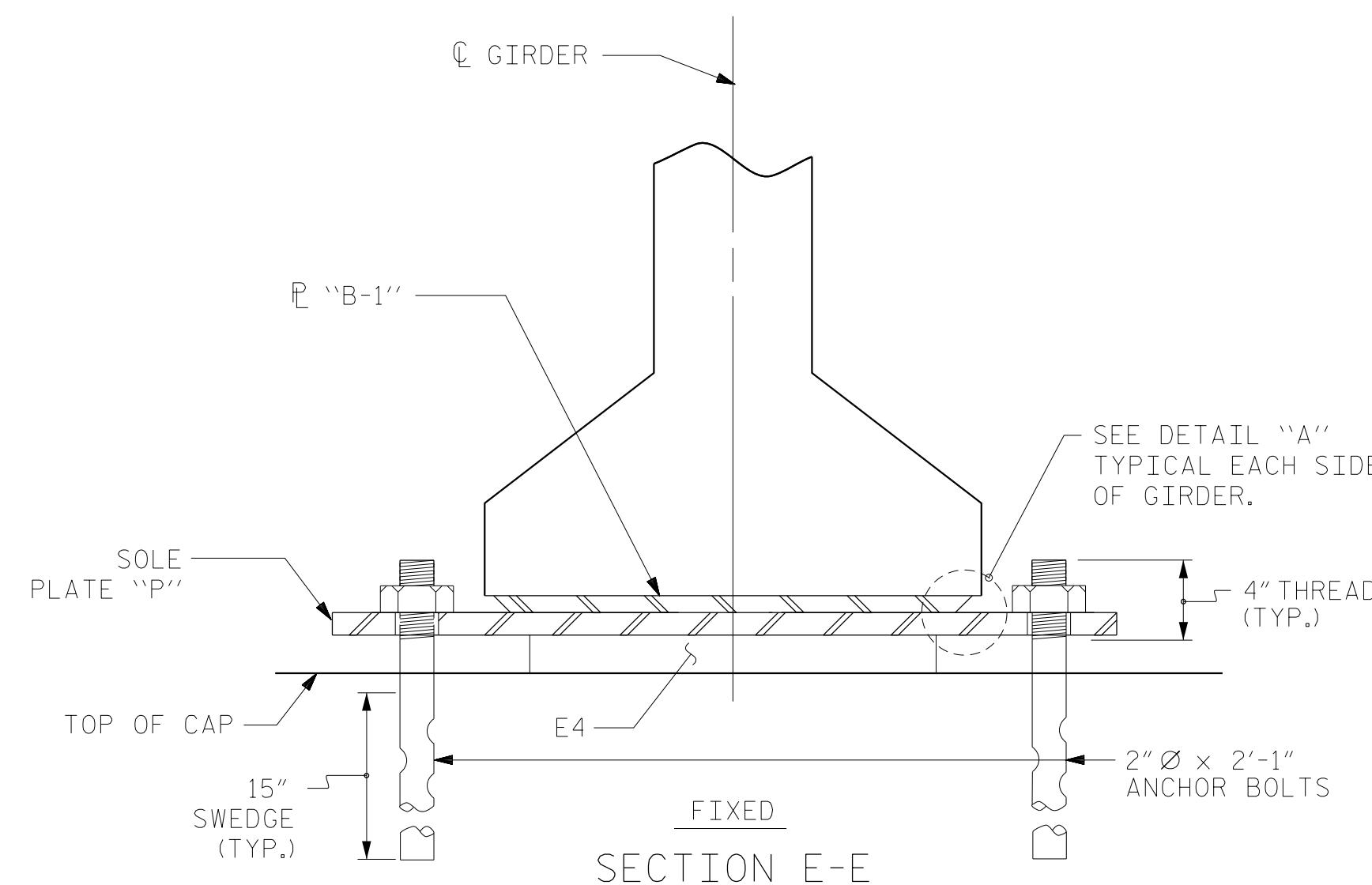
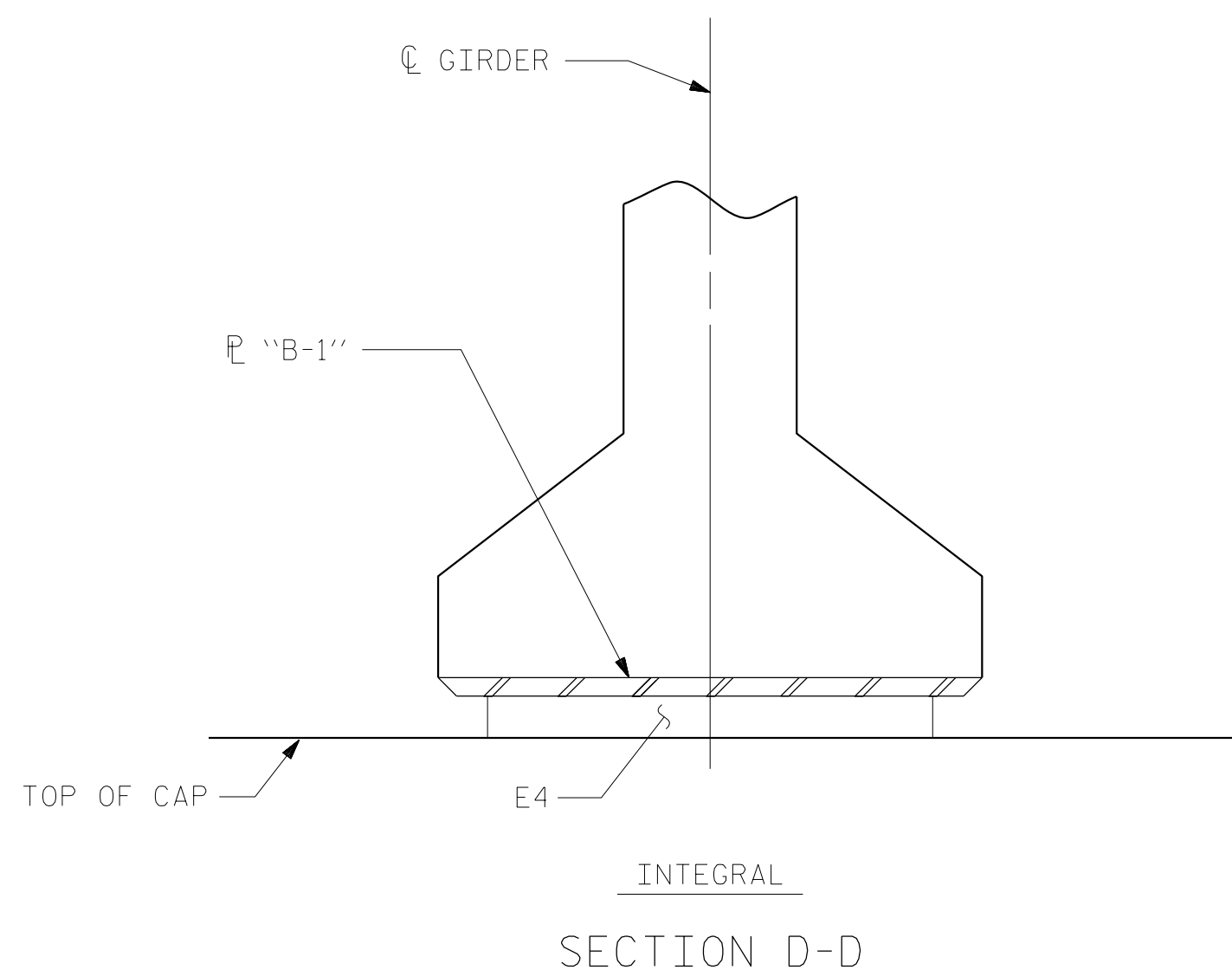
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS AND NUTS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

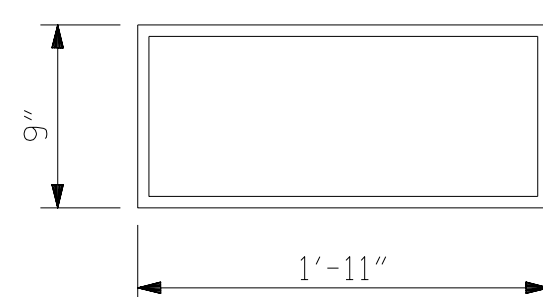
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36.



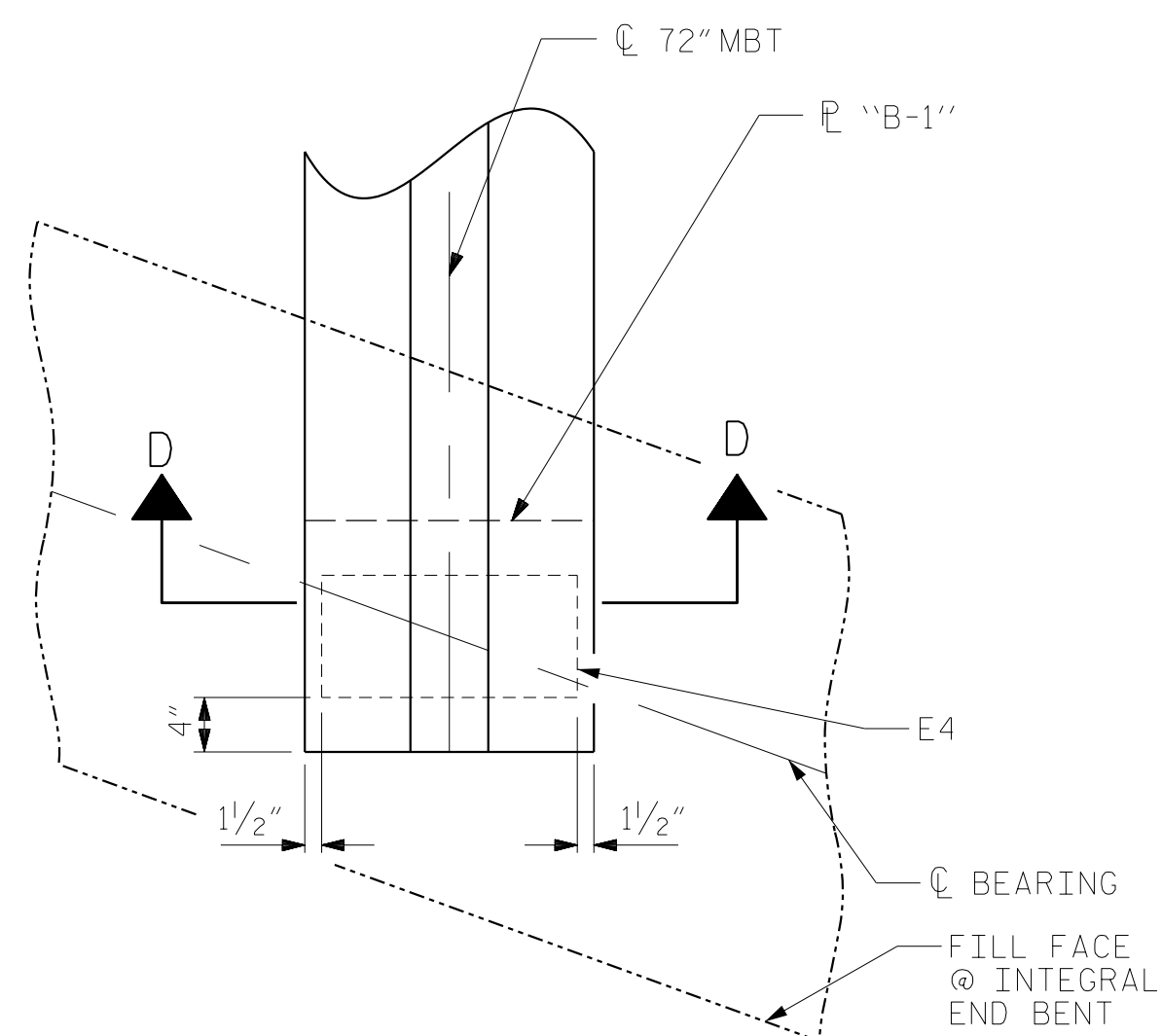
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 ( 24 REQ'D )

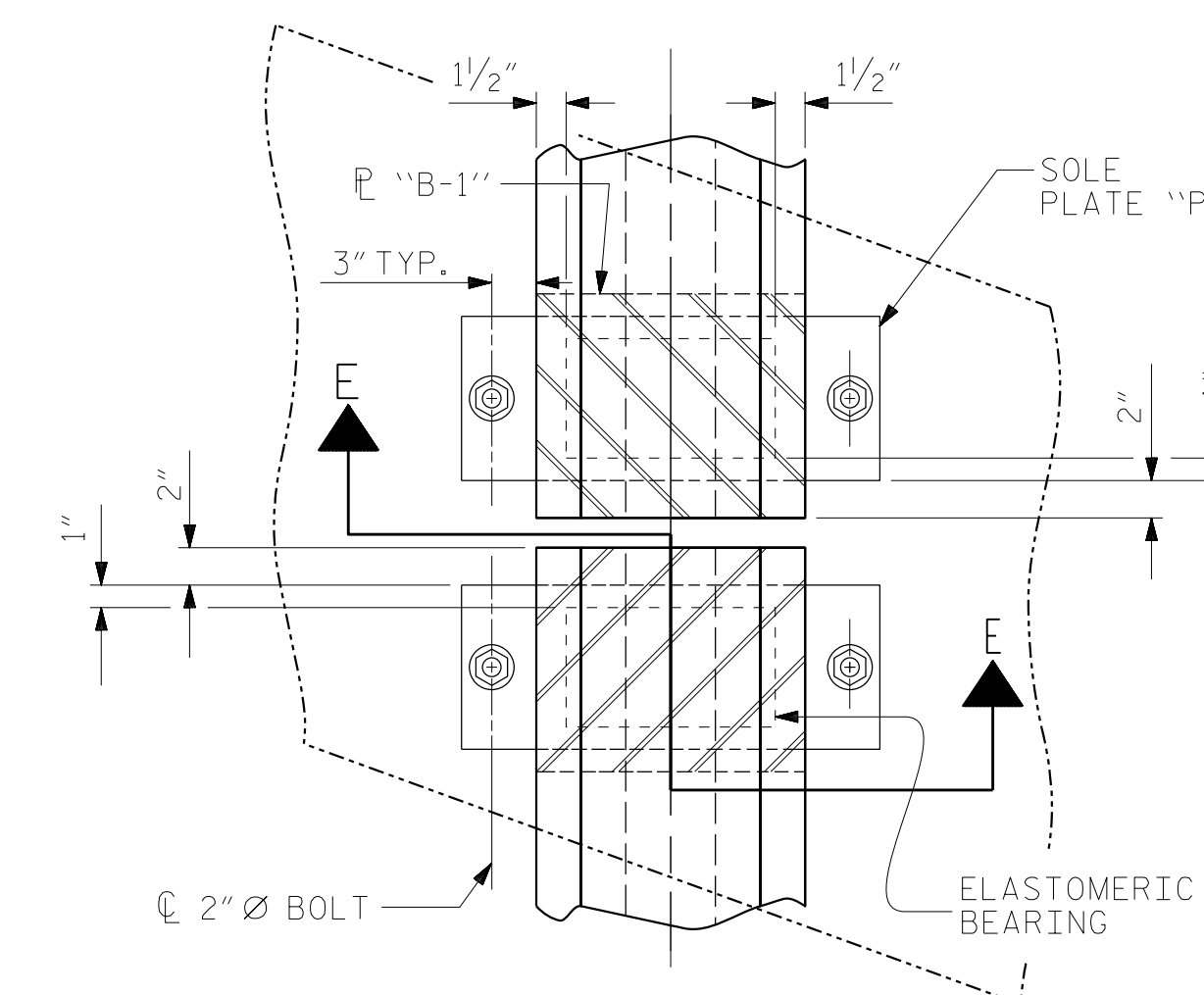
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



PLAN VIEW AT END BENTS

NOTE: BOTTOM FLANGE OF 72" MBT SHOWN, TOP FLANGE NOT SHOW FOR CLARITY

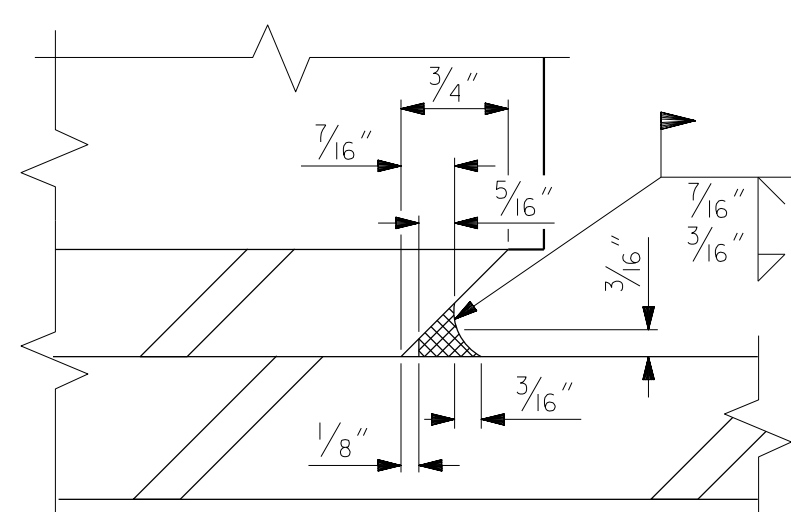


TYPICAL PLAN

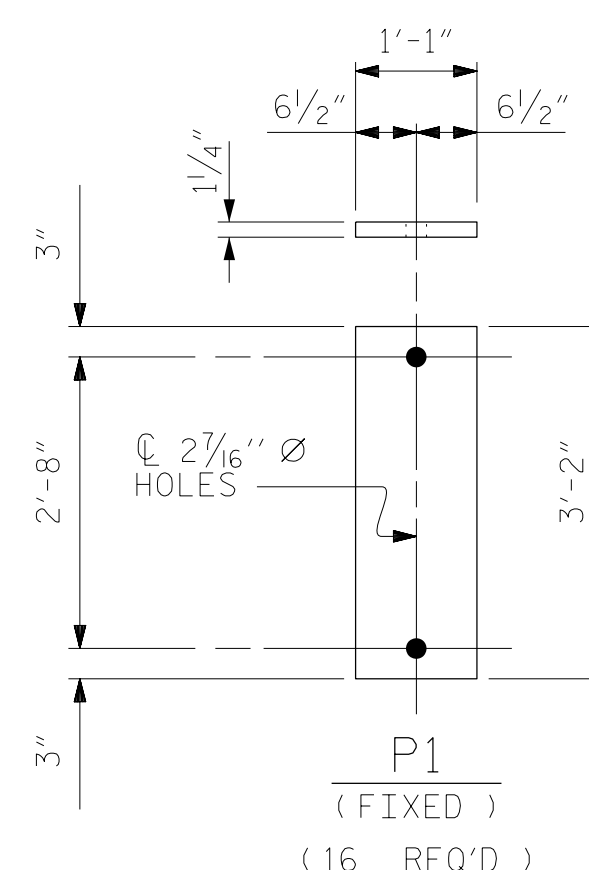
(SHOWING CONTINUOUS BENT)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-



DETAIL "A"



SOLE PLATE DETAILS ("P")

ASSEMBLED BY : TWL	DATE : 12/2017
CHECKED BY : TLC	DATE : 12/2017
DRAWN BY : WJH 8/89	REV. 6/13 AAC/MAA
CHECKED BY : CRK 8/89	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 ELASTOMERIC BEARING  
 AND SOLE PLATE DETAILS  
 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-16
2			4			TOTAL SHEETS 37



DEAD LOAD DEFLECTION TABLE FOR GIRDERS											
0.6" Ø LOW RELAXATION	SPAN A										
	GIRDER 1 (EXTERIOR)										
	TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90
CAMBER ( GIRDER ALONE IN PLACE ) ↑	0.000	0.059	0.111	0.152	0.178	0.187	0.178	0.152	0.111	0.059	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.017	0.032	0.044	0.051	0.054	0.051	0.044	0.032	0.017	0.000
FINAL CAMBER ↑	0"	1/2"	15/16"	1 5/16"	1 1/2"	1 5/8"	1 1/2"	1 5/16"	15/16"	1/2"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS											
0.6" Ø LOW RELAXATION	SPAN C										
	GIRDER 1 (EXTERIOR)										
	TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90
CAMBER ( GIRDER ALONE IN PLACE ) ↑	0.000	0.070	0.132	0.181	0.211	0.222	0.211	0.181	0.132	0.070	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.051	0.070	0.083	0.087	0.083	0.070	0.051	0.027	0.000
FINAL CAMBER ↑	0"	1/2"	1"	1 5/16"	1 9/16"	1 5/8"	1 9/16"	1 5/16"	1"	1/2"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.6" Ø LOW RELAXATION	SPAN B																					
	GIRDER 1 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
CAMBER ( GIRDER ALONE IN PLACE ) ↑	0.000	0.042	0.083	0.122	0.157	0.188	0.215	0.236	0.252	0.261	0.264	0.261	0.252	0.236	0.215	0.188	0.157	0.122	0.083	0.042	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.025	0.050	0.073	0.094	0.113	0.129	0.142	0.151	0.157	0.159	0.157	0.151	0.142	0.129	0.113	0.094	0.073	0.050	0.025	0.000	
FINAL CAMBER ↑	0"	3/16"	3/8"	9/16"	3/4"	7/8"	1 1/16"	1 1/8"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 1/8"	1 1/16"	1"	7/8"	3/4"	9/16"	3/8"	3/16"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN B																				
	GIRDER 2 (INTERIOR)																				
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
CAMBER ( GIRDER ALONE IN PLACE ) ↑	0.000	0.042	0.083	0.122	0.157	0.188	0.215	0.236	0.252	0.261	0.264	0.261	0.252	0.236	0.215	0.188	0.157	0.122	0.083	0.042	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.026	0.052	0.076	0.098	0.117	0.134	0.147	0.157	0.163	0.165	0.163	0.157	0.147	0.134	0.117	0.098	0.076	0.052	0.026	0.000
FINAL CAMBER ↑	0"	3/16"	3/8"	9/16"	11/16"	7/8"	1"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	1"	7/8"	11/16"	9/16"	3/8"	3/16"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN B																				
	GIRDER 3 (INTERIOR)																				
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
CAMBER ( GIRDER ALONE IN PLACE ) ↑	0.000	0.042	0.083	0.122	0.157	0.188	0.215	0.236	0.252	0.261	0.264	0.261	0.252	0.236	0.215	0.188	0.157	0.122	0.083	0.042	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.026	0.052	0.076	0.098	0.117	0.134	0.147	0.157	0.163	0.165	0.163	0.157	0.147	0.134	0.117	0.098	0.076	0.052	0.026	0.000
FINAL CAMBER ↑	0"	3/16"	3/8"	9/16"	11/16"	7/8"	1"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	1"	7/8"	11/16"	9/16"	3/8"	3/16"	0"

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN B																				
	GIRDER 4 (EXTERIOR)																				
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
CAMBER ( GIRDER ALONE IN PLACE ) ↑	0.000	0.042	0.083	0.122	0.157	0.188	0.215	0.236	0.252	0.261	0.264	0.261	0.252	0.236	0.215	0.188	0.157	0.122	0.083	0.042	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.025	0.049	0.071	0.092	0.110	0.126	0.138	0.147	0.153	0.155	0.153	0.147	0.138	0.126	0.110	0.092	0.071	0.049	0.025	0.000
FINAL CAMBER ↑	0"	3/16"	7/16"	5/8"	3/4"	15/16"	1 1/16"	1 3/16"	1 1/4"	1 5/16"	1 5/16"	1 5/16"	1 1/4"	1 3/16"	1 1/16"	15/16"	3/4"	5/8"	7/16"	3/16"	0"

DRAWN BY : MAL DATE : 12/2017  
 CHECKED BY : CLG DATE : 01/2018  
 DESIGN ENGINEER OF RECORD: MAL DATE : 12/2017

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



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

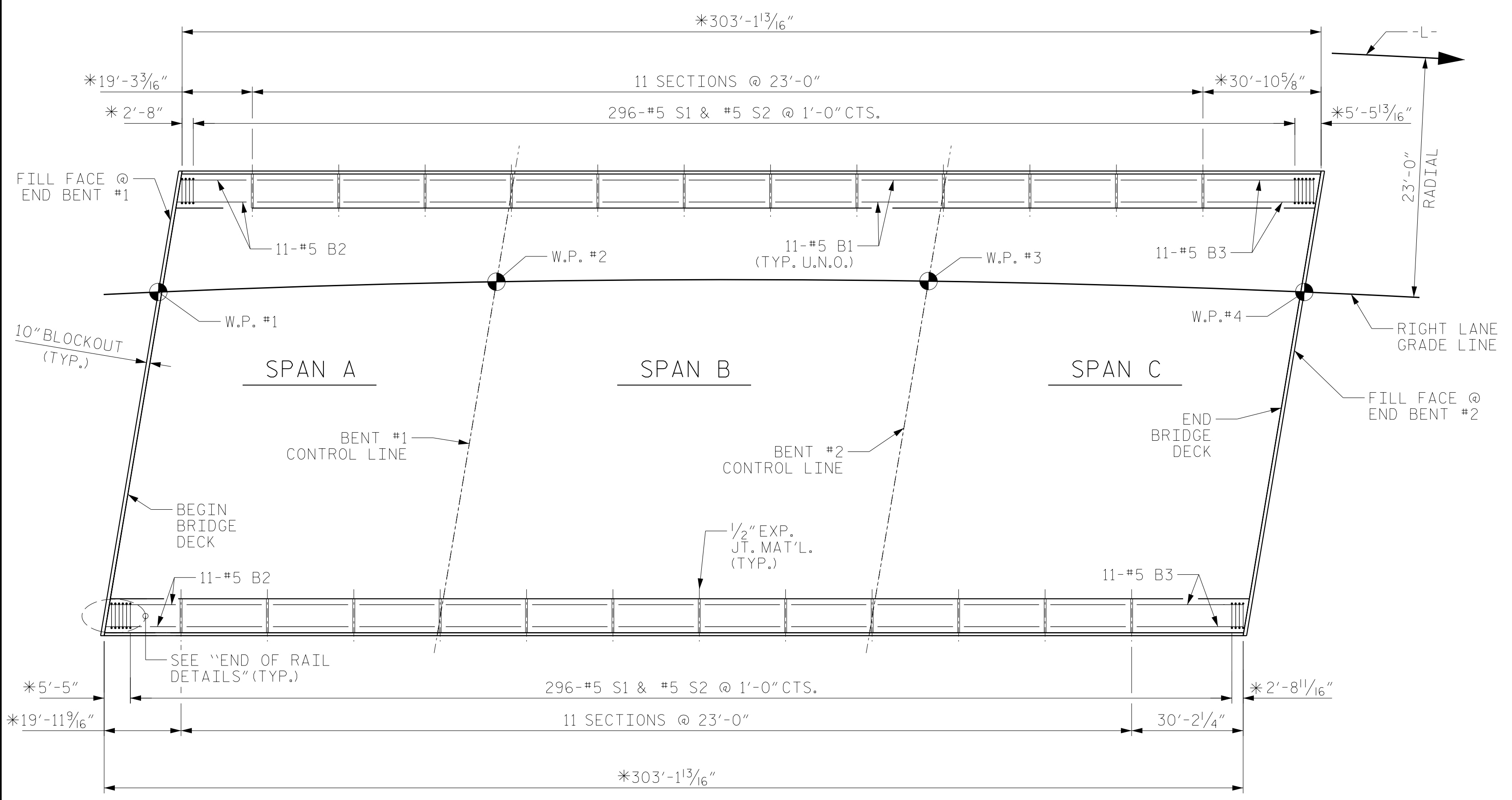
SUPERSTRUCTURE  
 DEAD LOAD DEFLECTION  
 SPANS A, B & C  
 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-17
2			4			TOTAL SHEETS 37

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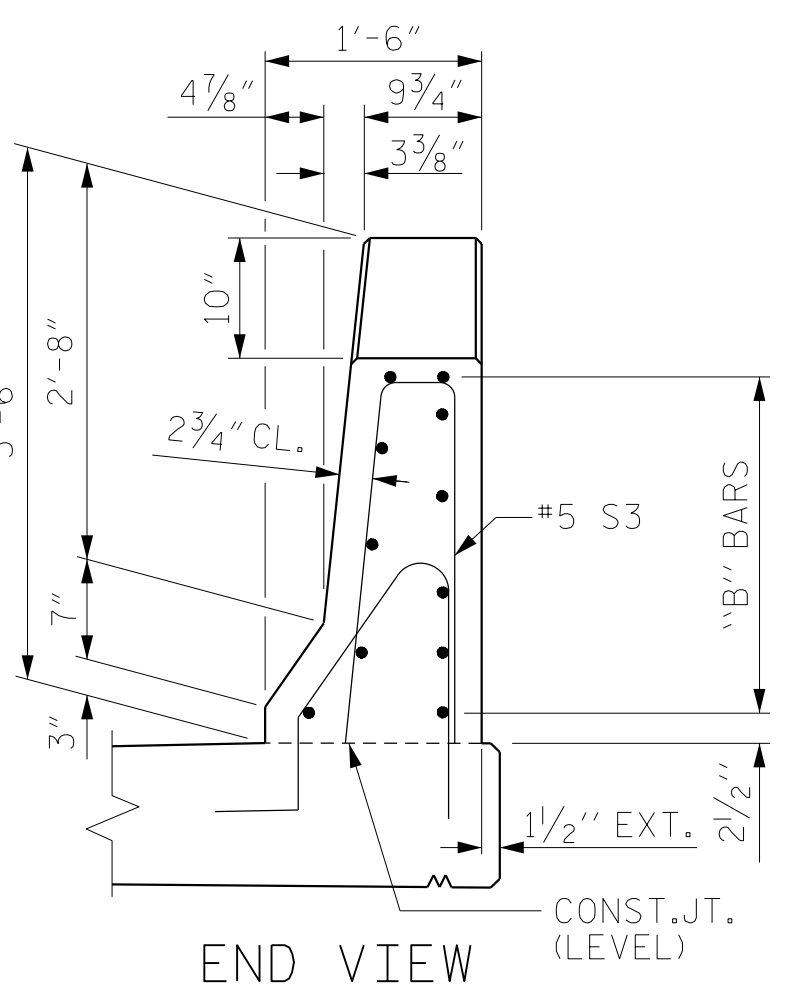
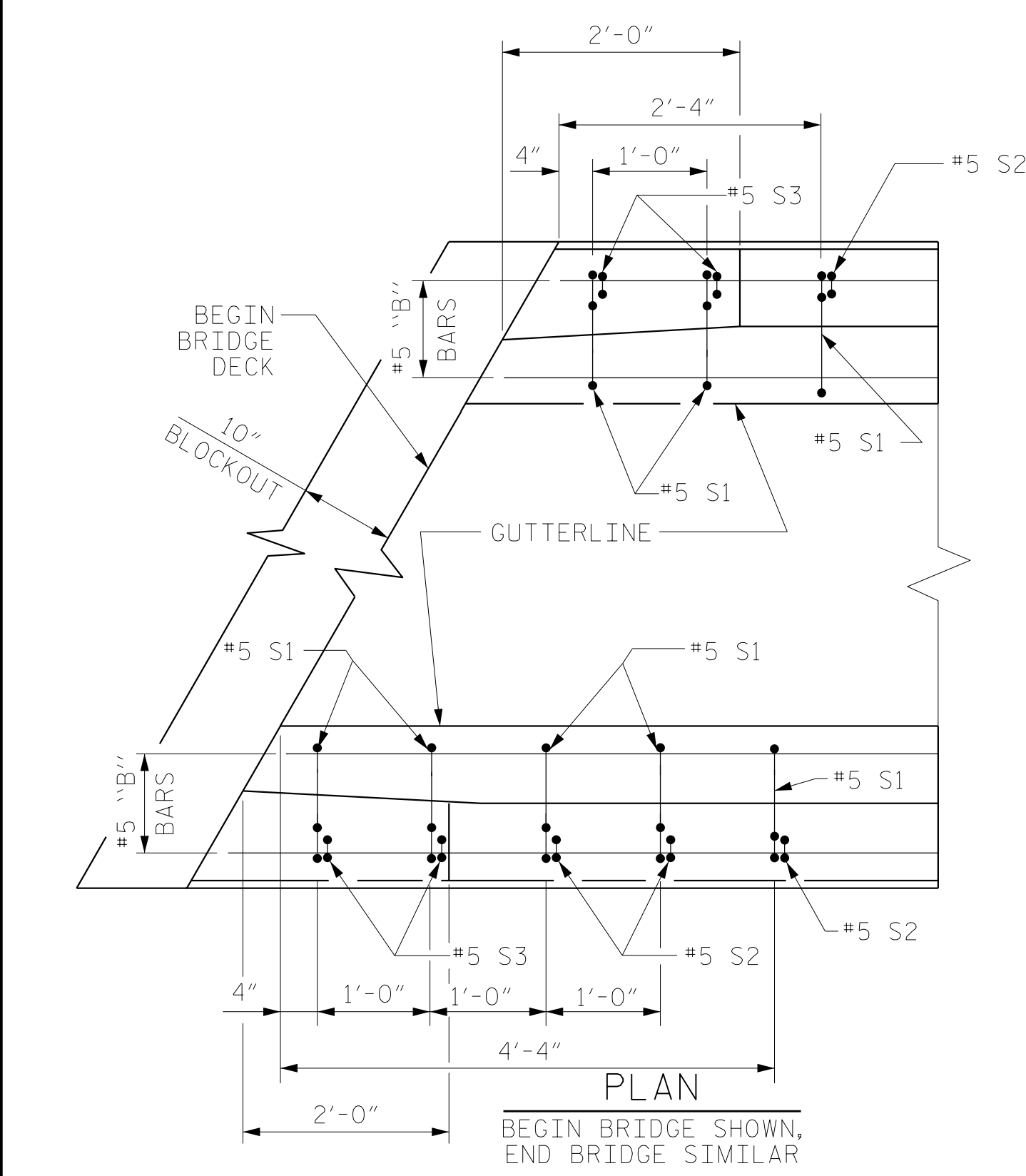
PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

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 SIGNATURES COMPLETED

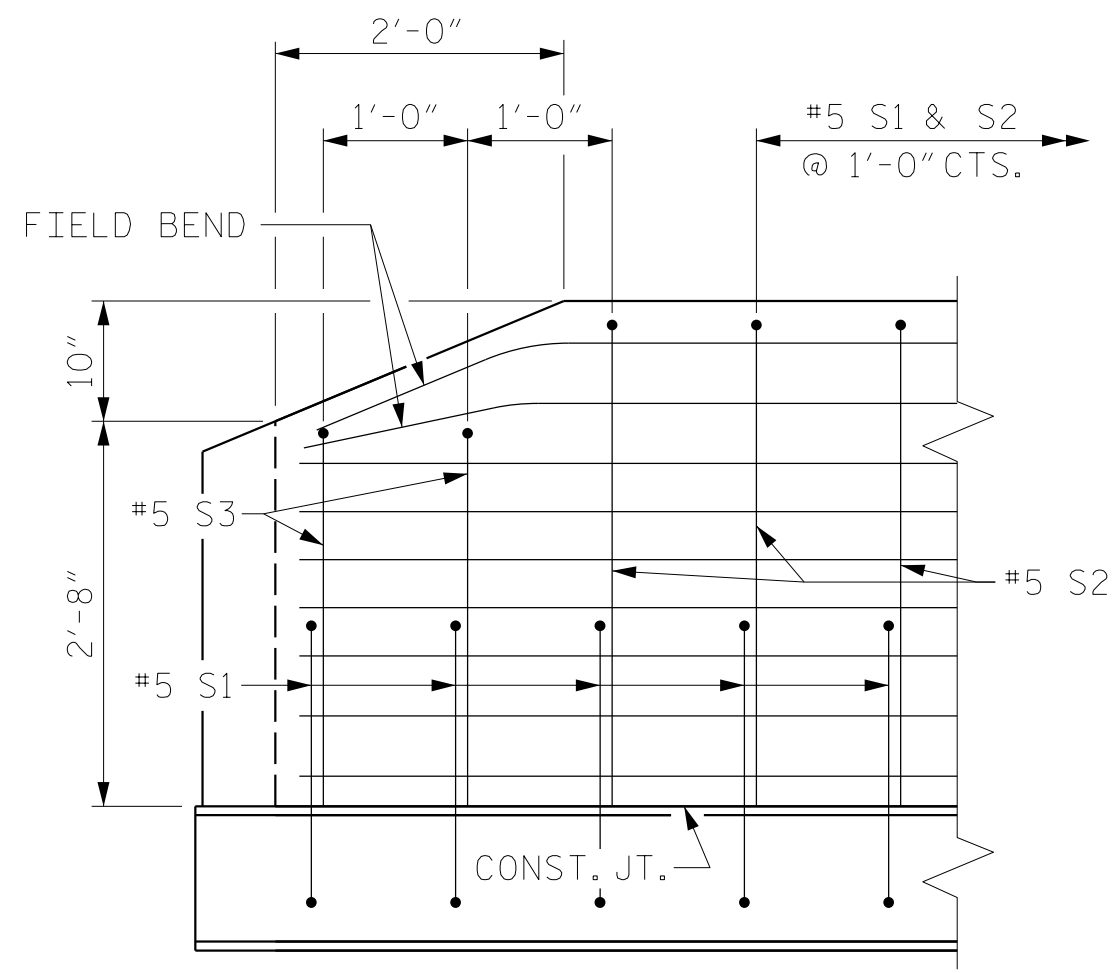


**PLAN**

\* MEASURED ALONG THE EDGE OF BRIDGE DECK



**END OF RAIL DETAILS**



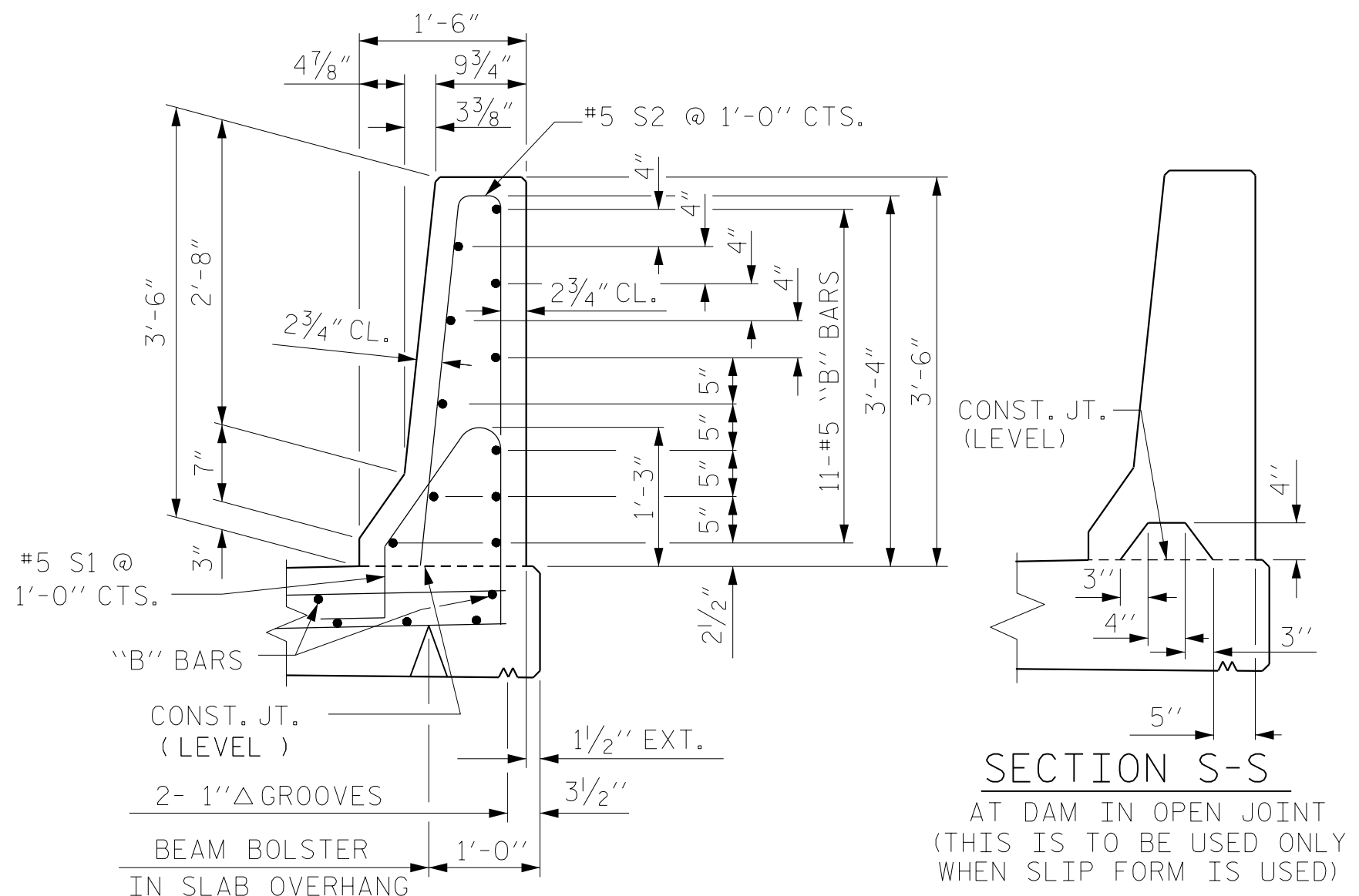
**SIDE VIEW**

**NOTES**

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

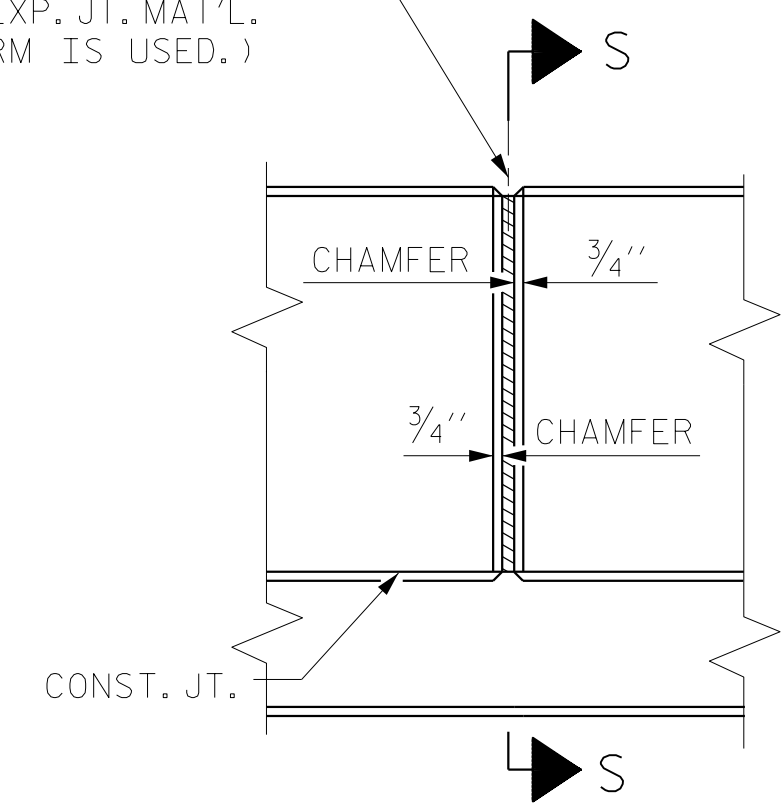
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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.



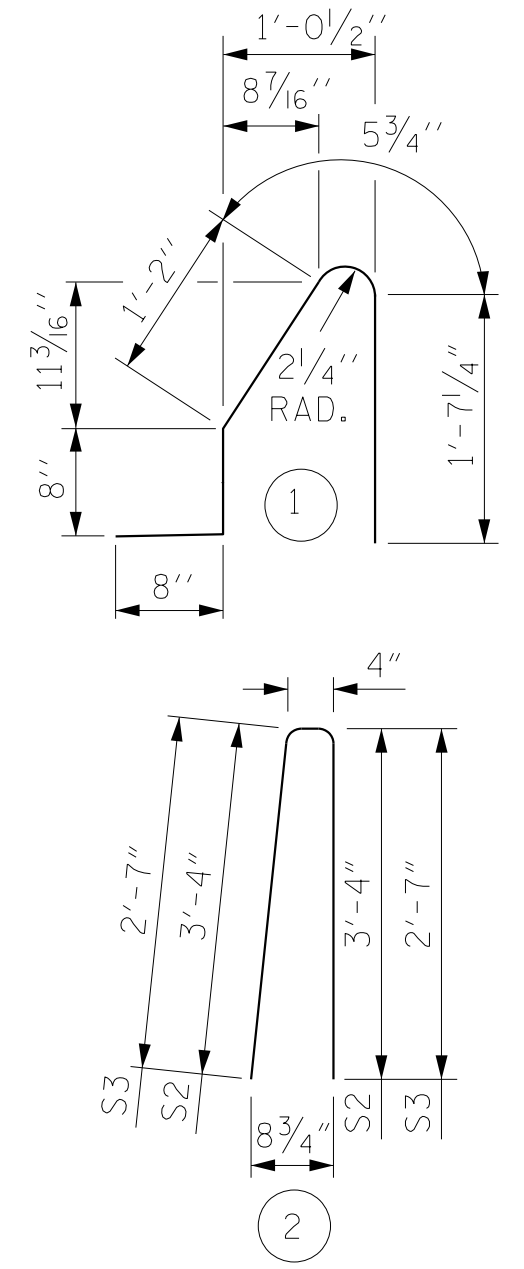
**SECTION THRU RAIL**

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**

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	242	#5	STR	22'-8"	5721
* B2	22	#5	STR	19'-0"	436
* B3	22	#5	STR	29'-10"	685
* S1	608	#5	1	4'-7"	2906
* S2	600	#5	2	7'-0"	4381
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL					14,175 LBS.
CLASS AA CONCRETE					82.4 CU. YDS.
CONCRETE BARRIER RAIL					606.3 LIN. FT.

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-



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

ASSEMBLED BY : TWL	DATE : 12/2017
CHECKED BY : JMR	DATE : 03/2018
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

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-18
2			4			TOTAL SHEETS 37

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.)

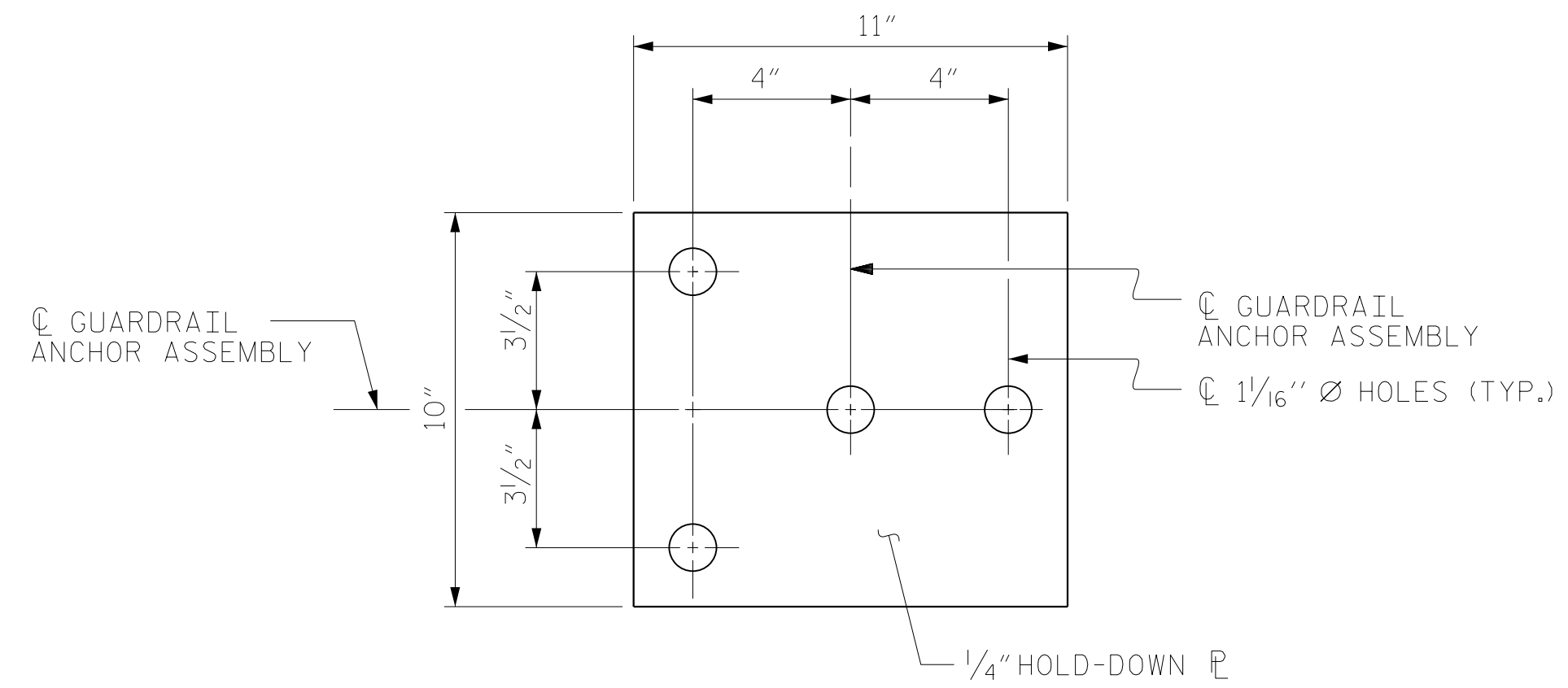
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

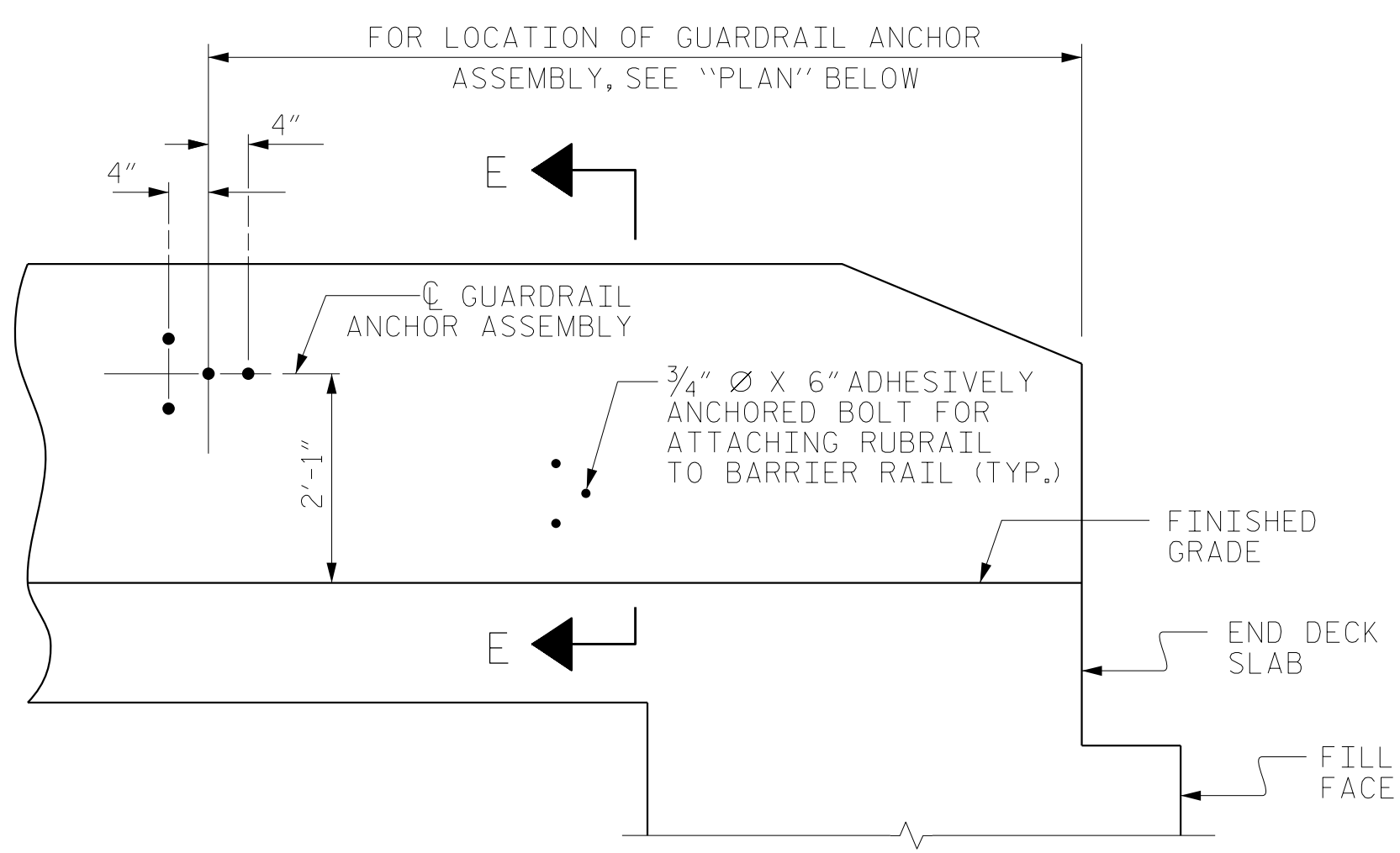
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

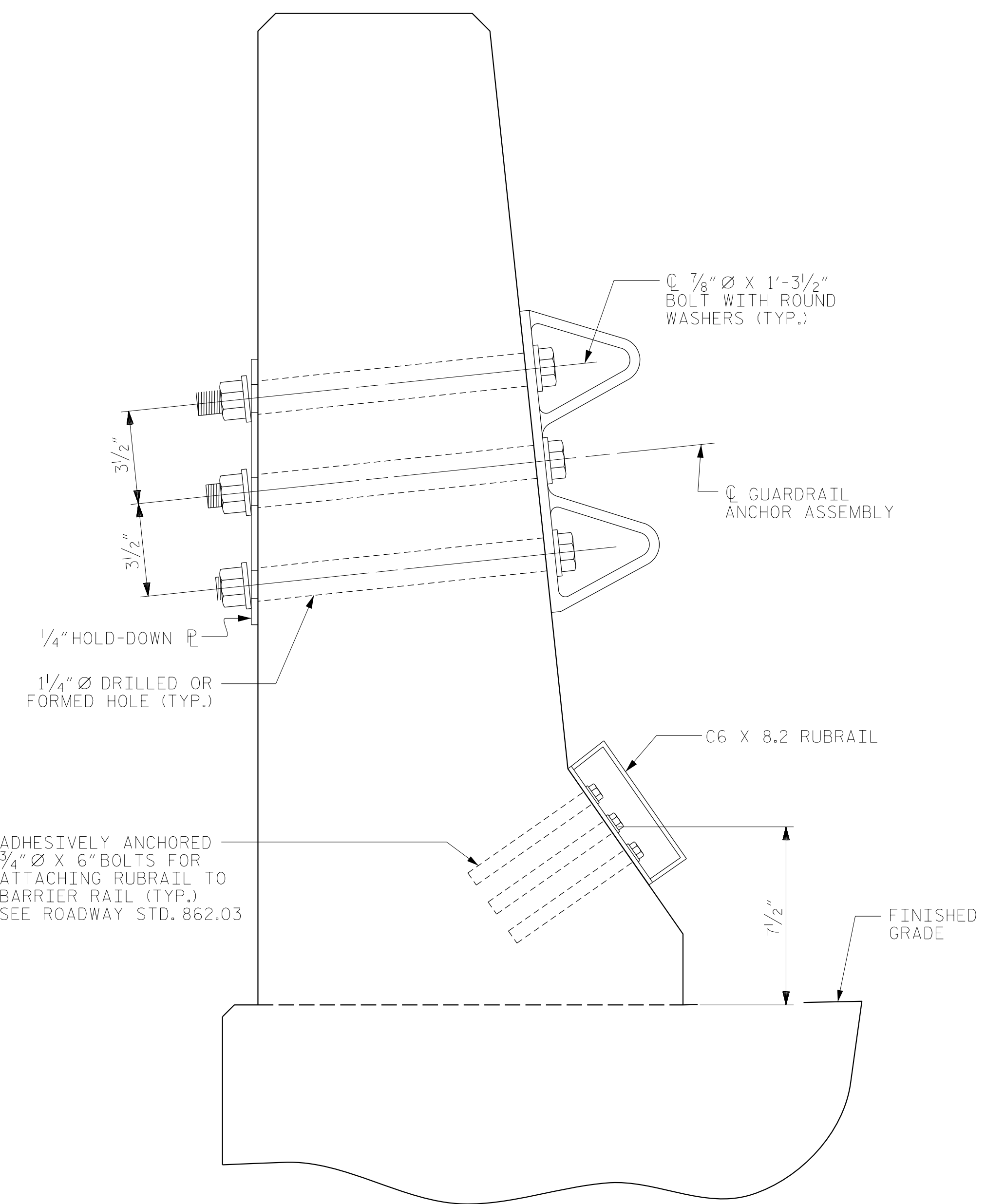
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



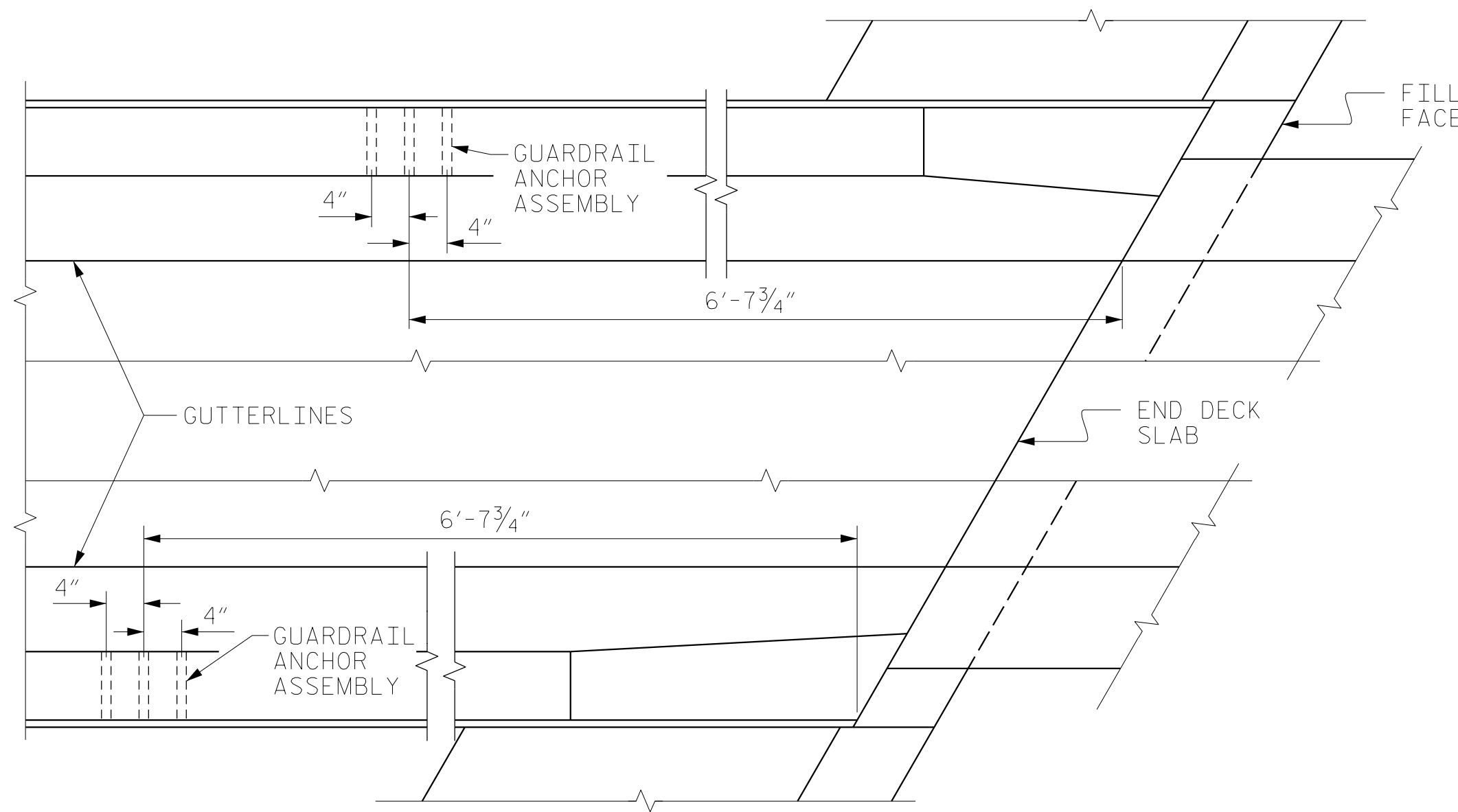
PLAN



ELEVATION



SECTION E-E  
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

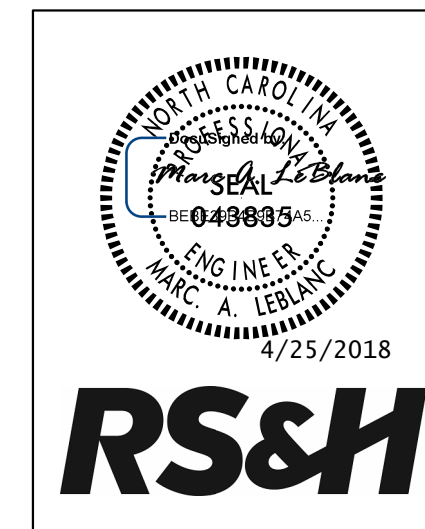
END BENT #2 SHOWN, END BENT #1 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-



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

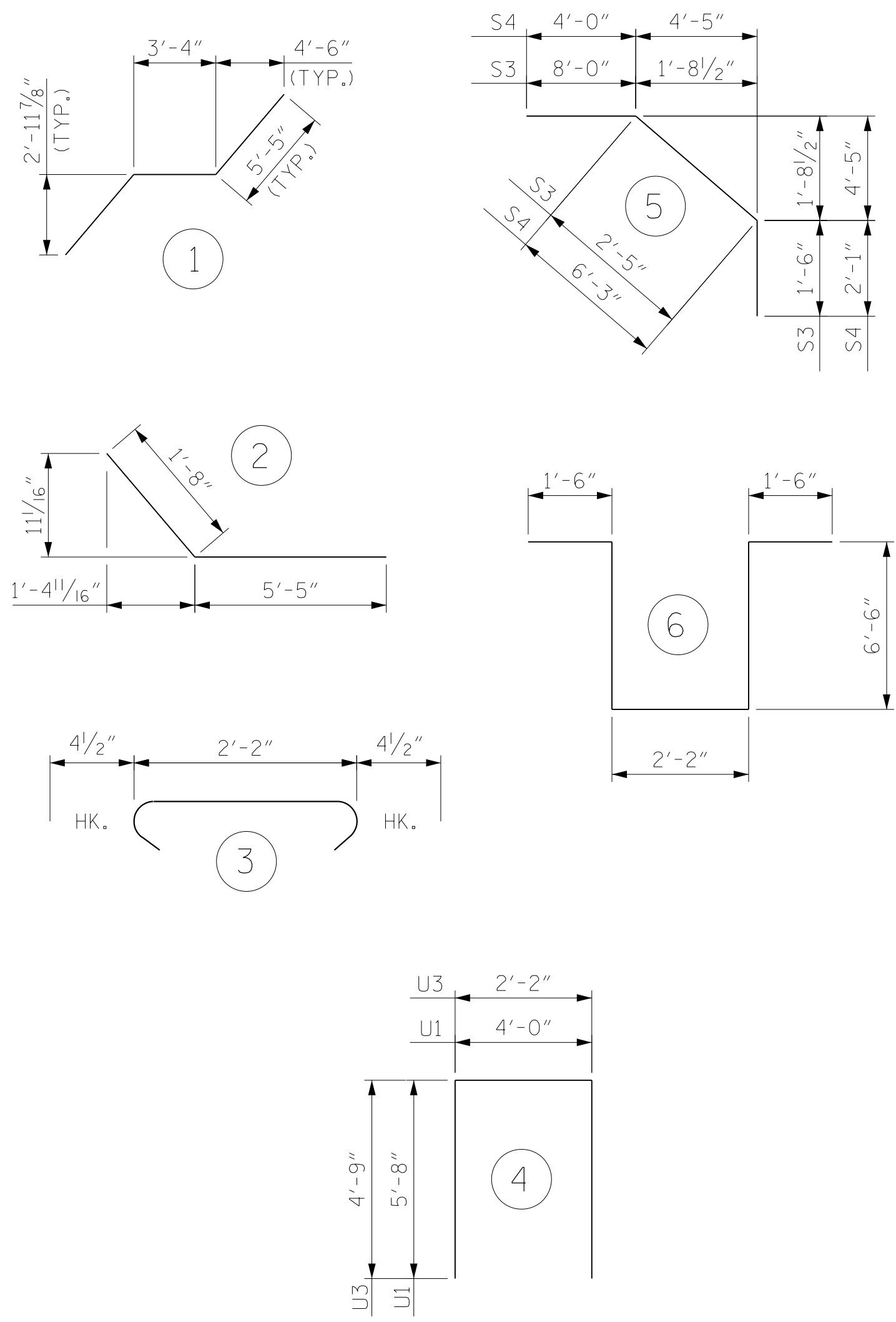
ASSEMBLED BY : TWL	DATE : 12/2017
CHECKED BY : PDS	DATE : 1/2018
DRAWN BY : TLA 5/06	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-19
1			3			TOTAL SHEETS
2			4			37

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	569	#5	STR	40'-5"	23986	A208	2	#5	STR	31'-5"	66						
A2	569	#5	STR	40'-5"	23986	A209	2	#5	STR	30'-4"	63	K1	14	#5	STR	44'-4"	647
						A210	2	#5	STR	29'-3"	61	K2	30	#5	STR	10'-10"	339
* A101	2	#5	STR	38'-11"	81	A211	2	#5	STR	28'-2"	59	K3	6	#5	STR	7'-6"	47
* A102	2	#5	STR	37'-10"	79	A212	2	#5	STR	27'-1"	56	K4	12	#4	STR	8'-6"	68
* A103	2	#5	STR	36'-9"	77	A213	2	#5	STR	26'-0"	54	K5	24	#4	2	7'-1"	114
* A104	2	#5	STR	35'-8"	74	A214	2	#5	STR	24'-11"	52	K6	24	#4	1	14'-2"	227
* A105	2	#5	STR	34'-7"	72	A215	2	#5	STR	23'-10"	50	K7	20	#5	STR	3'-7"	75
* A106	2	#5	STR	33'-6"	70	A216	2	#5	STR	22'-10"	48	K8	4	#5	STR	2'-10"	12
* A107	2	#5	STR	32'-5"	68	A217	2	#5	STR	21'-9"	45	K9	6	#5	STR	9'-1"	57
* A108	2	#5	STR	31'-5"	66	A218	2	#5	STR	20'-8"	43	K10	4	#5	STR	2'-4"	10
* A109	2	#5	STR	30'-4"	63	A219	2	#5	STR	19'-7"	41	K11	60	#4	STR	10'-8"	428
* A110	2	#5	STR	29'-3"	61	A220	2	#5	STR	18'-6"	39						
* A111	2	#5	STR	28'-2"	59	A221	2	#5	STR	17'-5"	36	S1	270	#4	3	2'-11"	526
* A112	2	#5	STR	27'-1"	56	A222	2	#5	STR	16'-4"	34	* S3	60	#4	5	11'-11"	478
* A113	2	#5	STR	26'-0"	54	A223	2	#5	STR	15'-4"	32	* S4	56	#4	5	12'-4"	461
* A114	2	#5	STR	24'-11"	52	A224	2	#5	STR	14'-3"	30						
* A115	2	#5	STR	23'-10"	50	A225	2	#5	STR	13'-2"	27	U1	60	#4	4	15'-4"	615
* A116	2	#5	STR	22'-10"	48	A226	2	#5	STR	12'-1"	25	U2	42	#4	6	18'-2"	510
* A117	2	#5	STR	21'-9"	45	A227	2	#5	STR	11'-0"	23	U3	12	#4	4	11'-8"	94
* A118	2	#5	STR	20'-8"	43	A228	2	#5	STR	9'-11"	21						
* A119	2	#5	STR	19'-7"	41	A229	2	#5	STR	8'-10"	18						
* A120	2	#5	STR	18'-6"	39	A230	2	#5	STR	7'-9"	16						
* A121	2	#5	STR	17'-5"	36	A231	2	#5	STR	6'-9"	14						
* A122	2	#5	STR	16'-4"	34	A232	2	#5	STR	5'-8"	12						
* A123	2	#5	STR	15'-4"	32	A233	2	#5	STR	4'-7"	10						
* A124	2	#5	STR	14'-3"	30	A234	2	#5	STR	3'-6"	7						
* A125	2	#5	STR	13'-2"	27	A235	2	#5	STR	2'-5"	5						
* A126	2	#5	STR	12'-1"	25												
* A127	2	#5	STR	11'-0"	23	* B1	162	#6	STR	20'-0"	4866						
* A128	2	#5	STR	9'-11"	21	* B2	82	#4	STR	21'-4"	1169						
* A129	2	#5	STR	8'-10"	18	B3	54	#5	STR	60'-0"	3379						
* A130	2	#5	STR	7'-9"	16	* B4	82	#6	STR	60'-0"	7390						
* A131	2	#5	STR	6'-9"	14	* B5	41	#6	STR	14'-6"	893						
* A132	2	#5	STR	5'-8"	12	* B6	82	#4	STR	21'-1"	1155						
* A133	2	#5	STR	4'-7"	10	* B7	41	#6	STR	17'-6"	1078						
* A134	2	#5	STR	3'-6"	7	* B8	82	#4	STR	25'-4"	1388						
* A135	2	#5	STR	2'-5"	5	* B9	40	#6	STR	30'-9"	1847						
						* B10	40	#6	STR	32'-3"	1938						
A201	2	#5	STR	38'-11"	81	B11	51	#5	STR	19'-4"	1028						
A202	2	#5	STR	37'-10"	79	B12	51	#5	STR	30'-9"	1636						
A203	2	#5	STR	36'-9"	77	B13	54	#5	STR	43'-6"	2450						
A204	2	#5	STR	35'-8"	74	B14	51	#5	STR	32'-3"	1715						
A205	2	#5	STR	34'-7"	72	B15	51	#5	STR	28'-9"	1529						
A206	2	#5	STR	33'-6"	70	B16	36	#5	STR	52'-4"	1965						
A207	2	#5	STR	32'-5"	68	B17	16	#4	STR	2'-0"	21						

REINFORCING STEEL 42,986 LBS.  
 \*EPOXY COATED REINFORCING STEEL 48,157 LBS.

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"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,699 SQ.FT.
BRIDGE DECK	10,446 SQ.FT.
TOTAL	12,145 SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	106.3		
POUR 2	182.9		
POUR 3	162.5		
POUR 4	100.4		
TOTALS**	552.1	42,986 LBS.	48,157 LBS.

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 1 OF 2



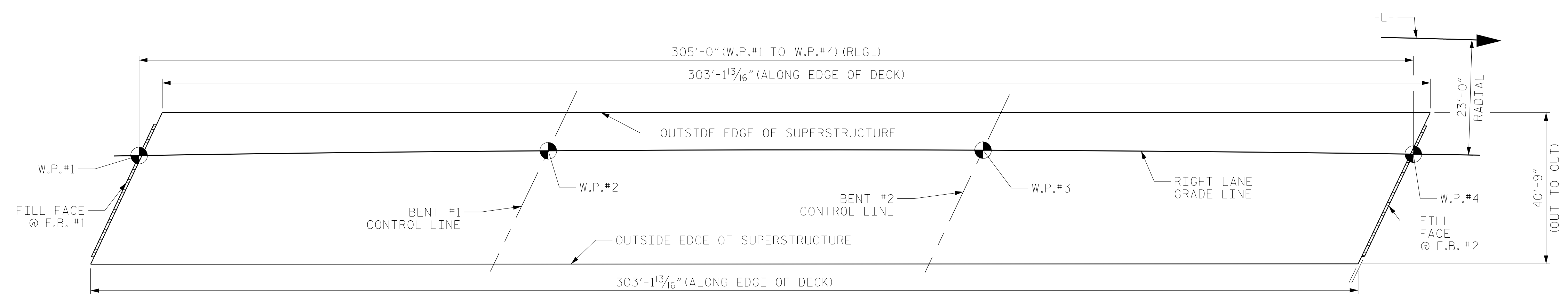
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 BILL OF MATERIAL  
 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-20
2			4			TOTAL SHEETS 37

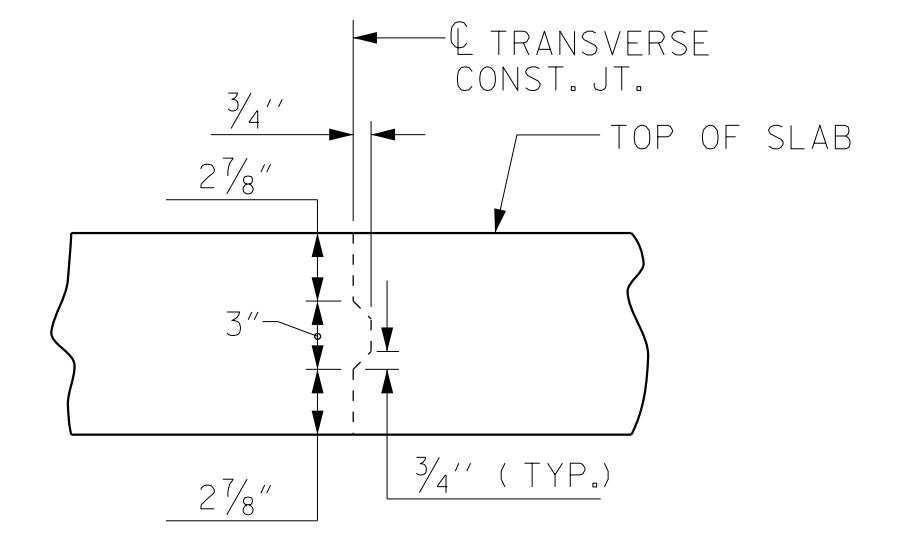
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 CHECKED BY : JMR DATE : 02/2018  
 DESIGN ENGINEER OF RECORD: MAL DATE : 03/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTE: BENT & INTEGRAL END BENT DIAPHRAGMS ARE PART OF SUPERSTRUCTURE POUR.

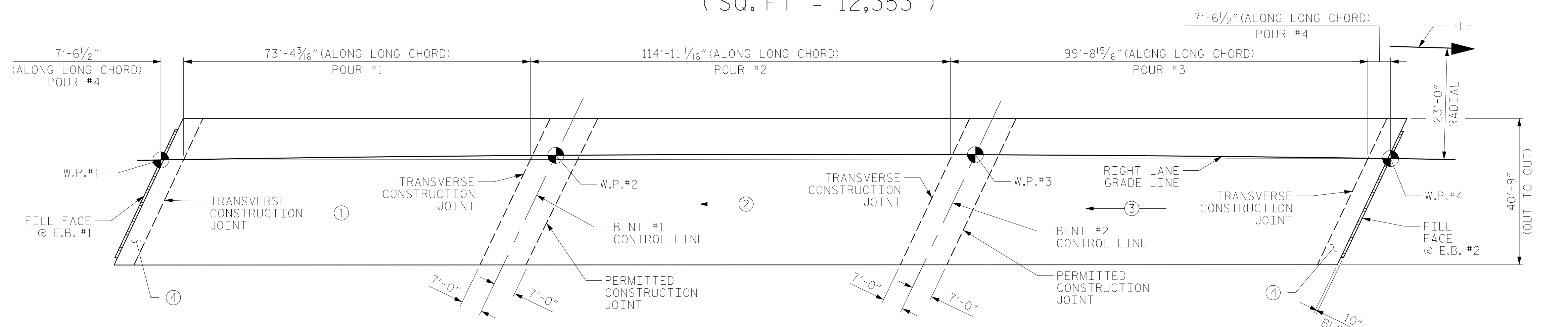


LAYOUT FOR COMPUTING  
AREA OF REINFORCED CONCRETE DECK SLAB  
( SQ. FT = 12,353 )

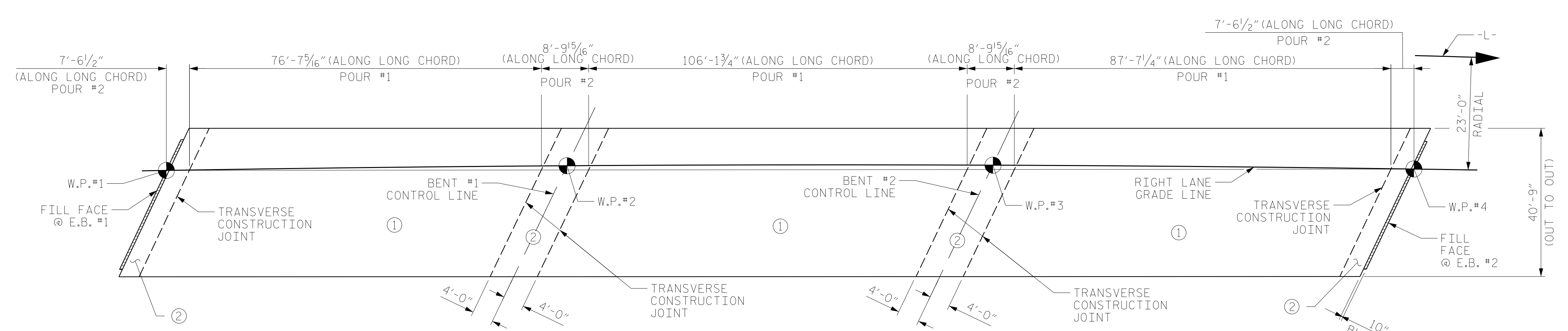


TRANSVERSE  
CONSTRUCTION  
JOINT DETAIL

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



POURING SEQUENCE

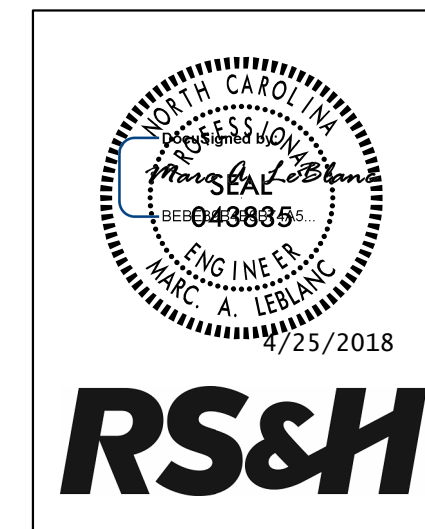


OPTIONAL POURING SEQUENCE

POUR 2 CAN NOT BE STARTED UNTIL BOTH ADJACENT ①POURS REACH A MINIMUM OF 3000 PSI

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-

SHEET 2 OF 2

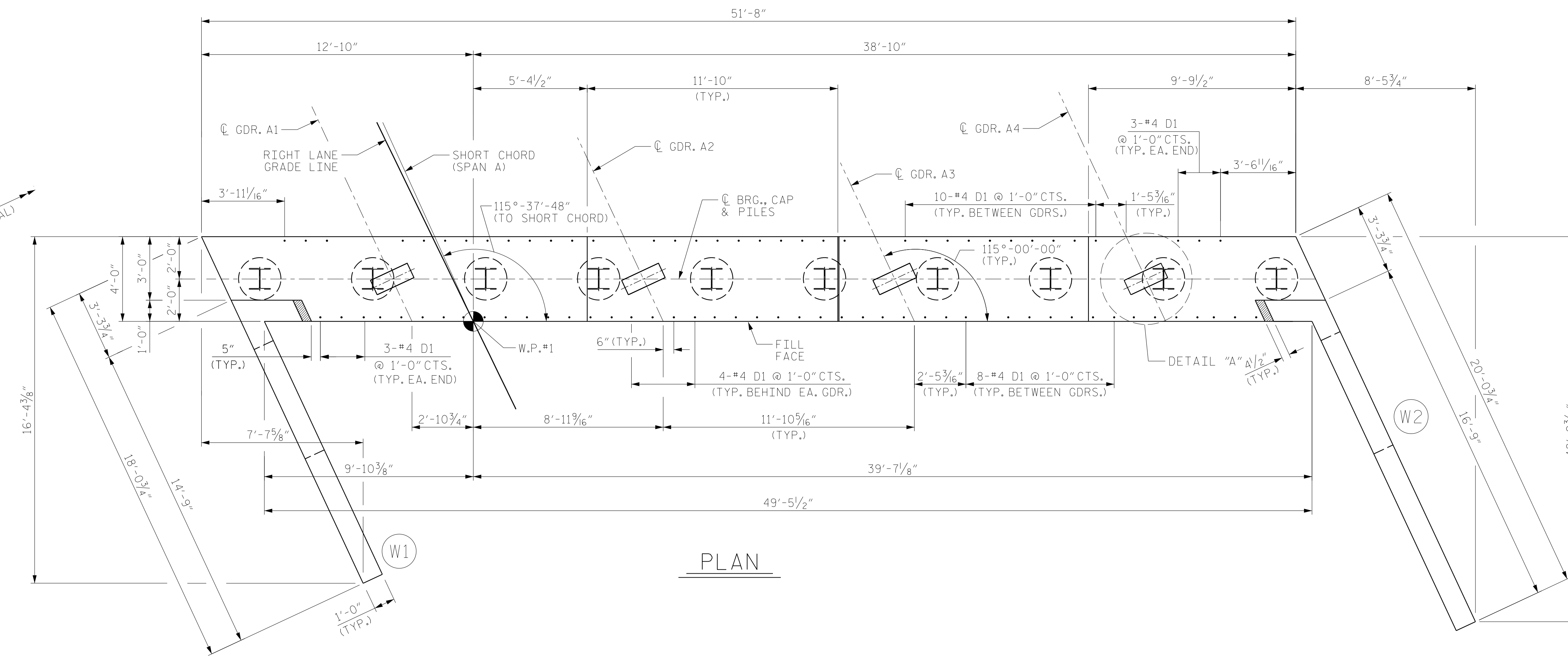


STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
BILL OF MATERIAL  
RIGHT LANE

DRAWN BY : NSC DATE : 12/2017  
CHECKED BY : TLC DATE : 01/2018  
DESIGN ENGINEER OF RECORD: MAL DATE : 01/2018

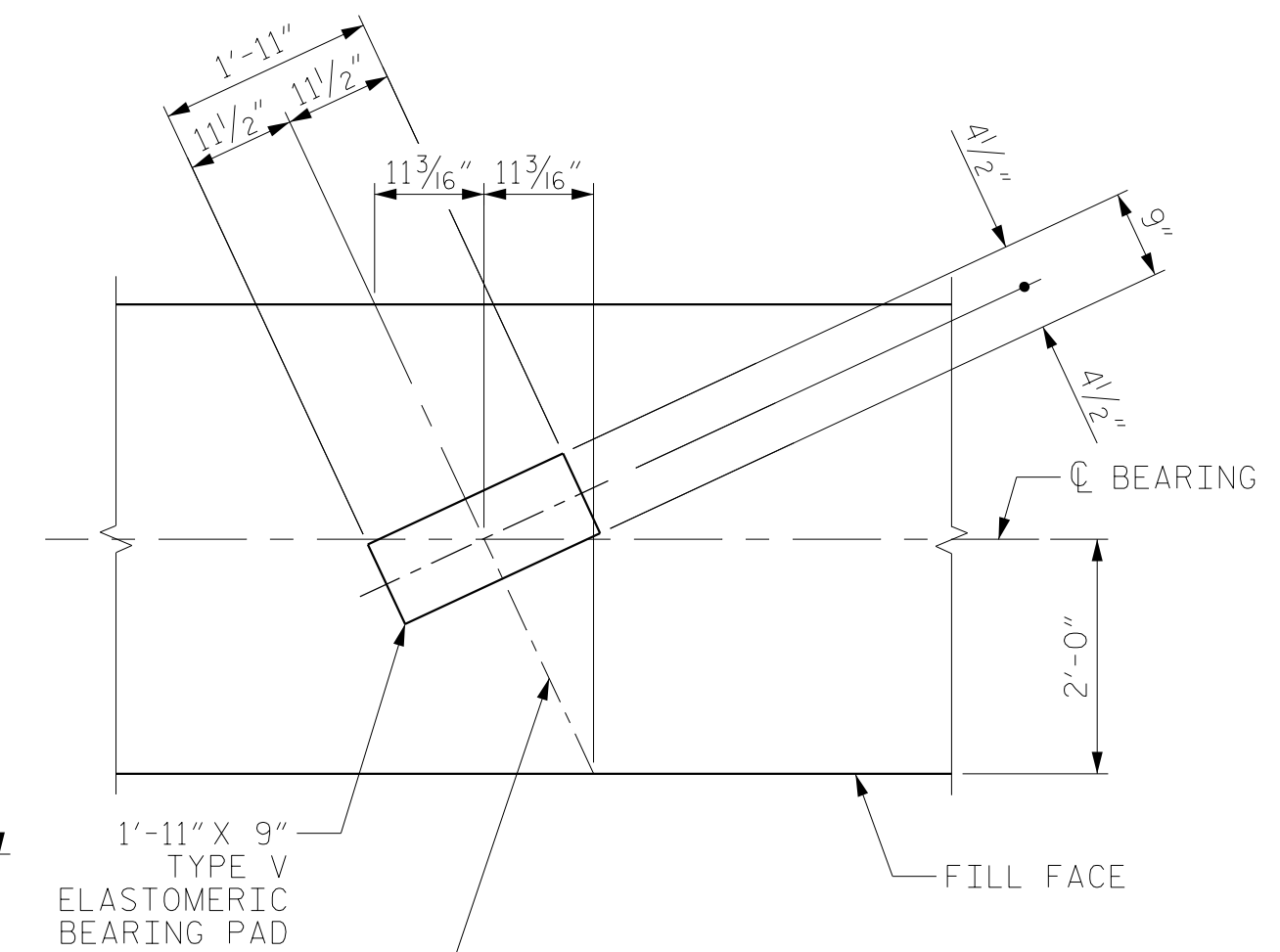
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SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-21
1			3			TOTAL SHEETS
2			4			37

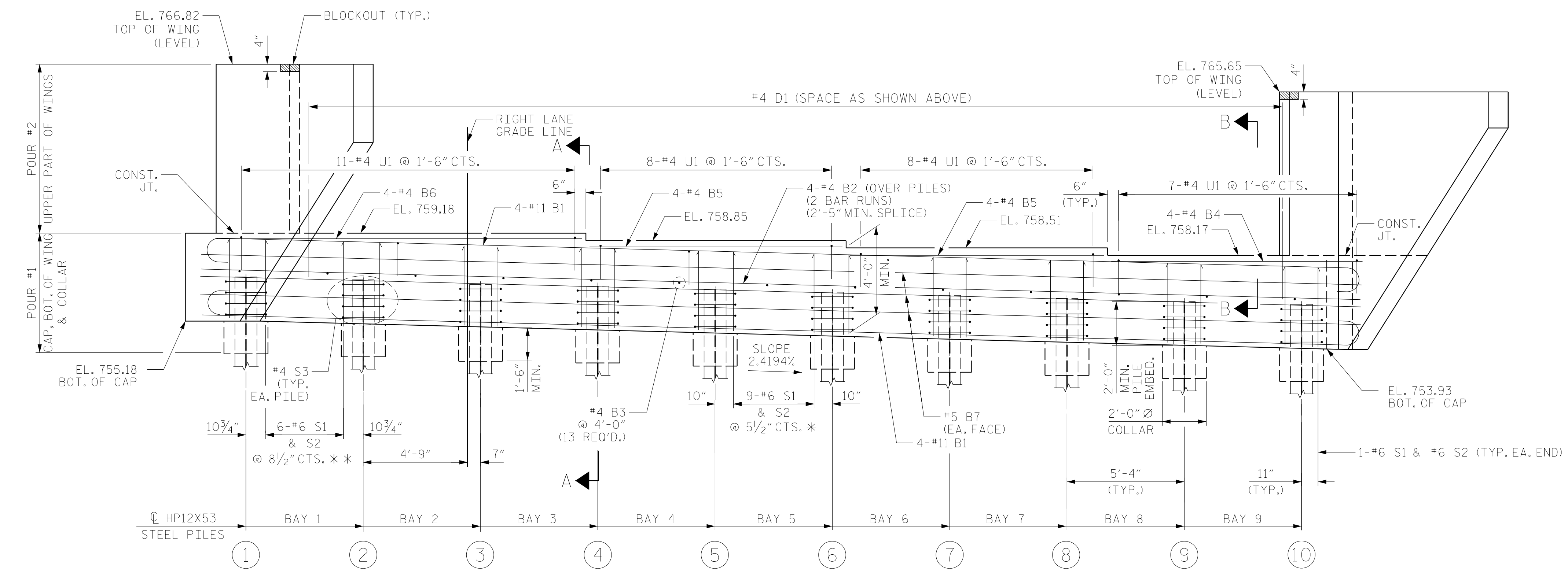


PLAN

**NOTES:**  
 THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 6" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.  
 FOR SECTION A-A AND SECTION B-B, SEE SHEET 4 OF 4.  
 #4 D1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.  
 IT SHALL BE CALLED TO THE CONTRACTOR'S ATTENTION THAT THE WINGWALLS ARE TO RETAIN NO FILL UNTIL THE INTEGRAL END BENT DIAPHRAGM (SUPERSTRUCTURE POUR #4) CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.  
 SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER IS CAST IF SLIP FORMING IS USED.  
 RLGL = RIGHT LANE GRADE LINE.



DETAIL "A"  
 DIMENSIONS TYP. EA. BRG. PILE NOT SHOWN FOR CLARITY



ELEVATION

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
1	757.17
2	757.04
3	756.90
4	756.77
5	756.63
6	756.50
7	756.36
8	756.23
9	756.09
10	755.96

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 1 OF 4

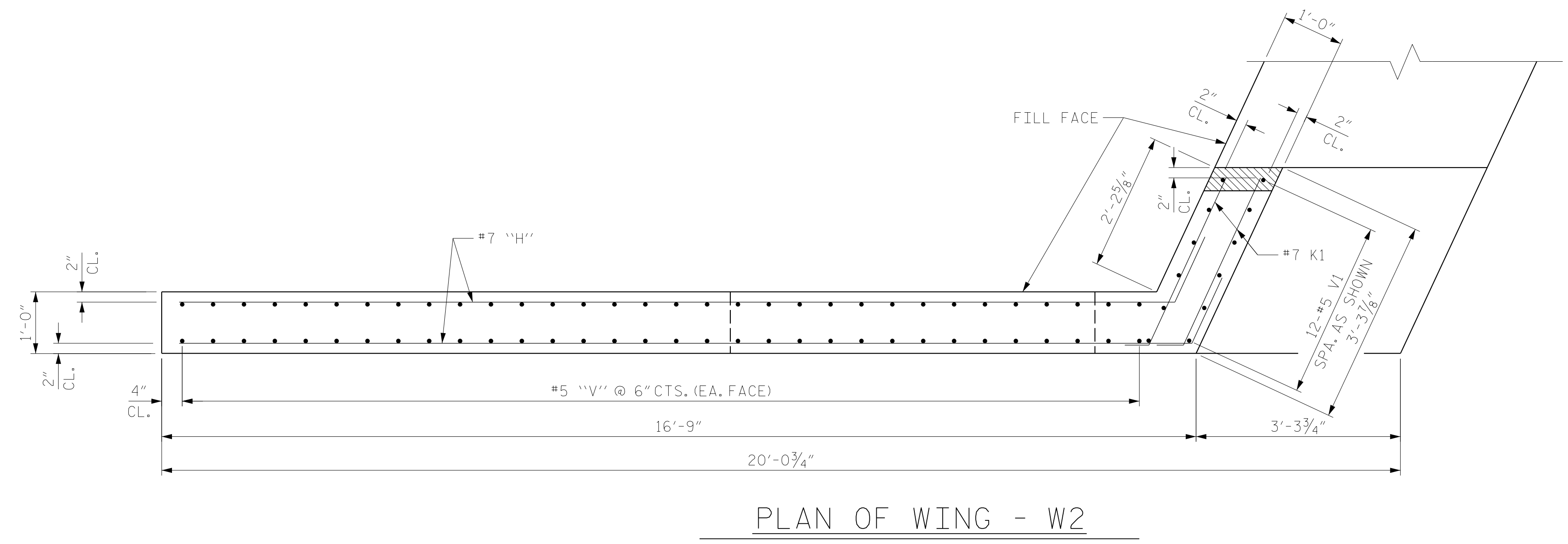


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-22
1			3			TOTAL SHEETS 37
2			4			

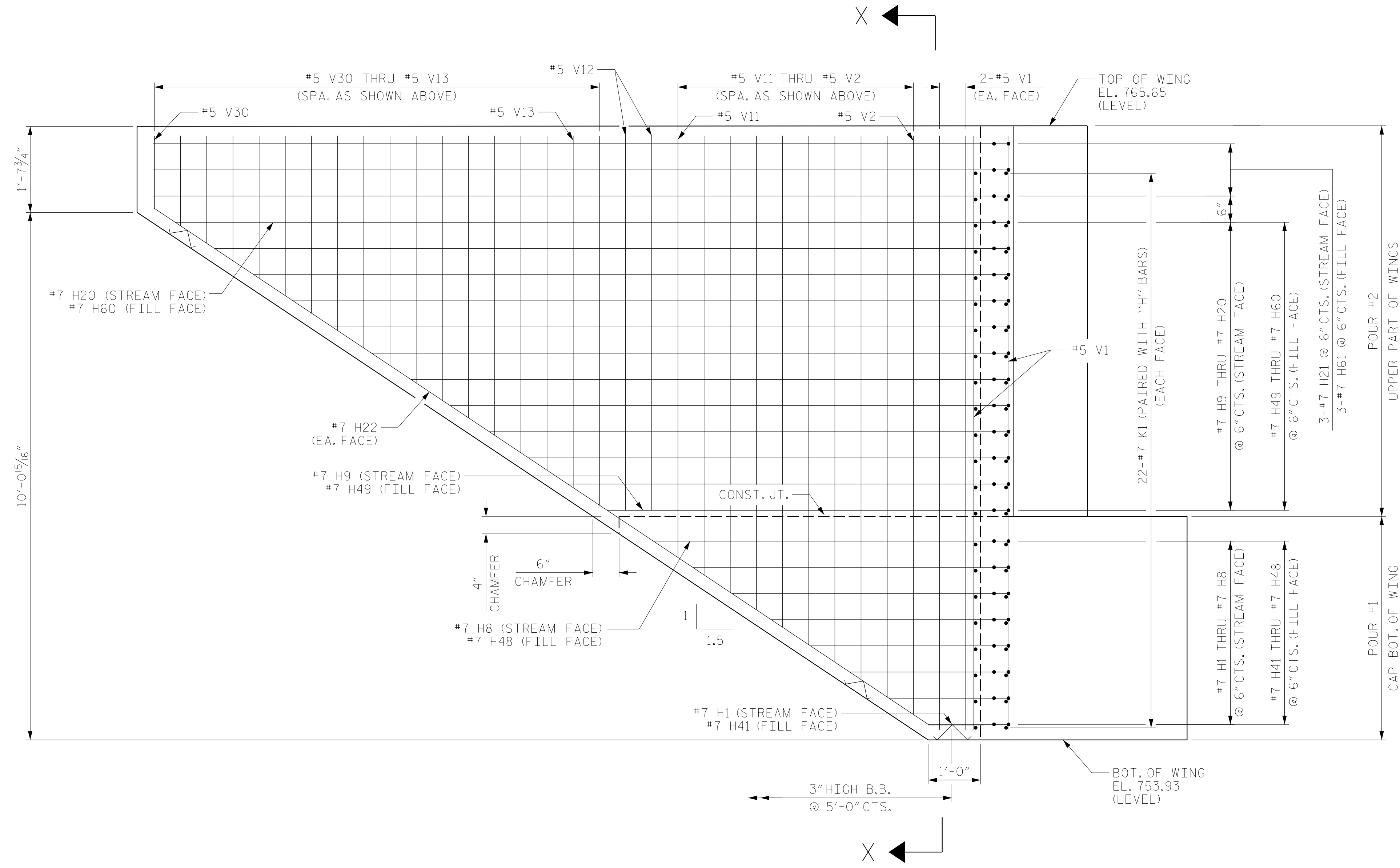
DRAWN BY : JTC DATE : 01/2018  
 CHECKED BY : MKO DATE : 04/2018  
 DESIGN ENGINEER OF RECORD: MKO DATE : 04/2018

\* = TYPICAL BAY 4 THRU BAY 6  
 \*\* = TYPICAL BAY 1 THRU BAY 3 AND BAY 7 THRU BAY 9

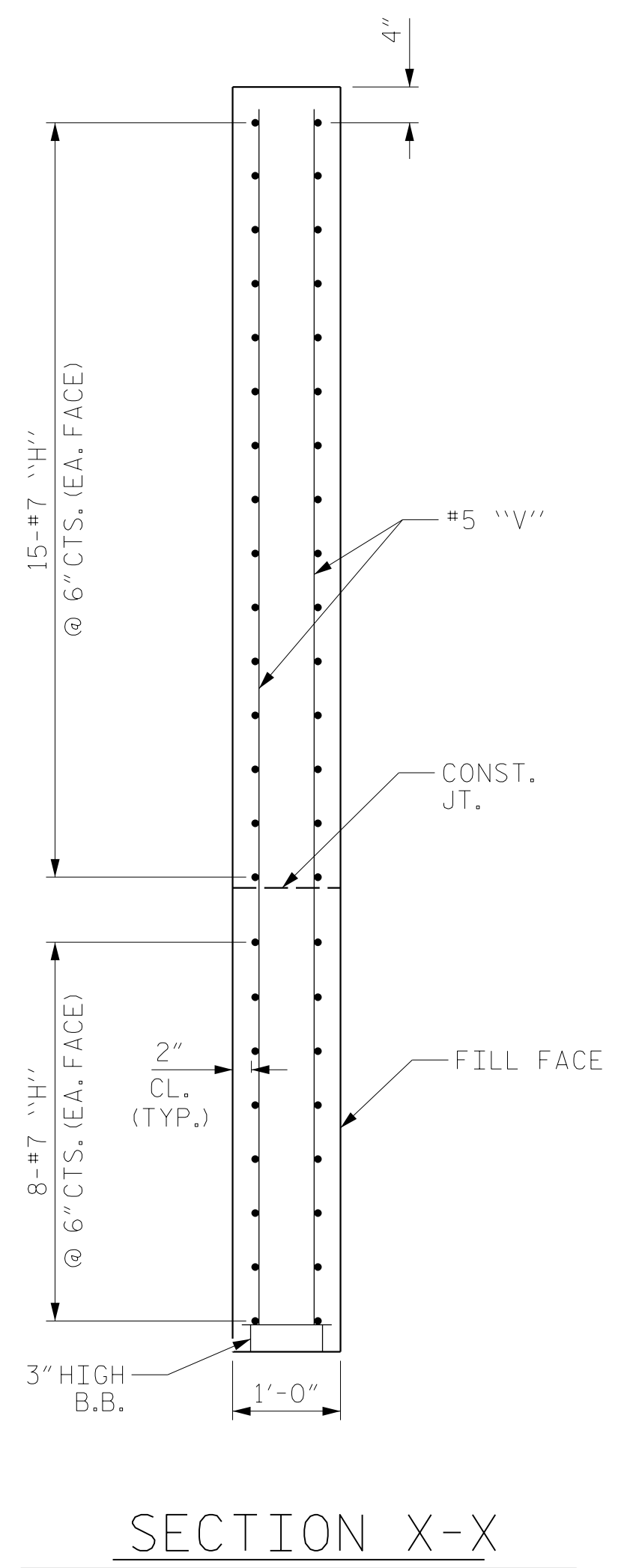
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PLAN OF WING - W2



ELEVATION OF WING - W2



SECTION X-X

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 2 OF 4

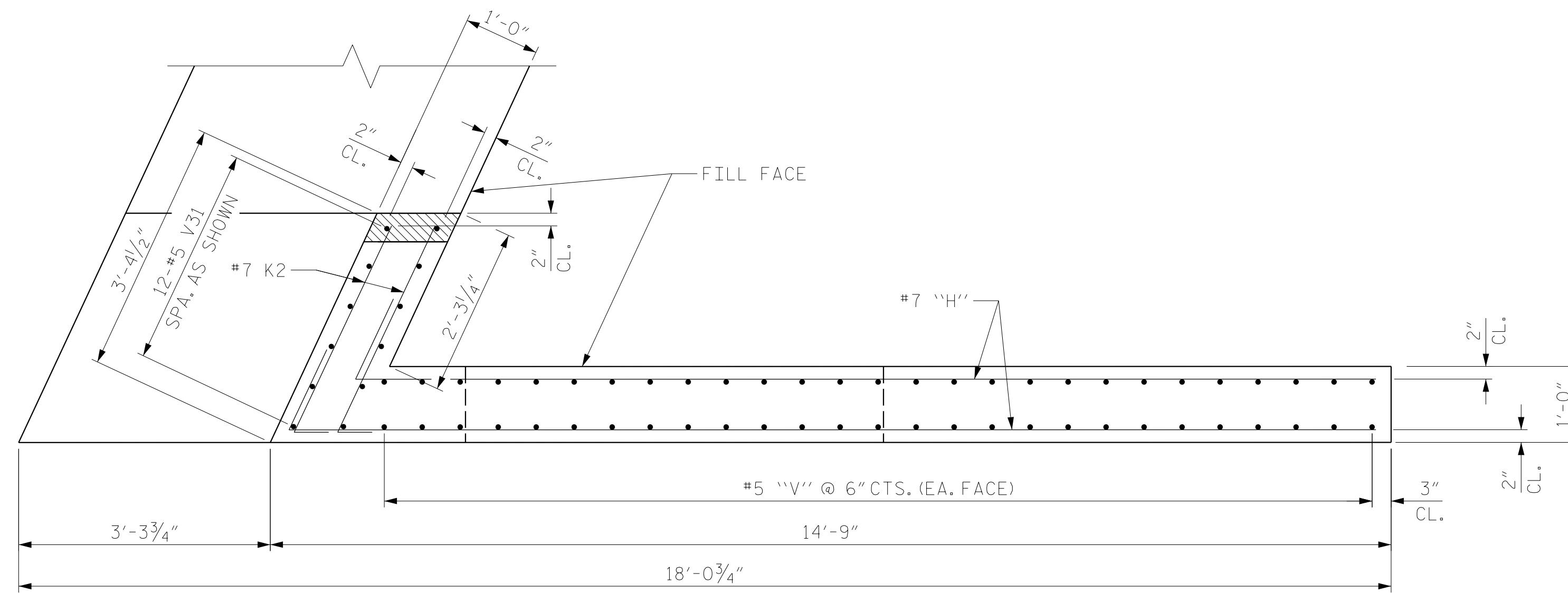


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL  
 END BENT NO. 1  
 RIGHT LANE

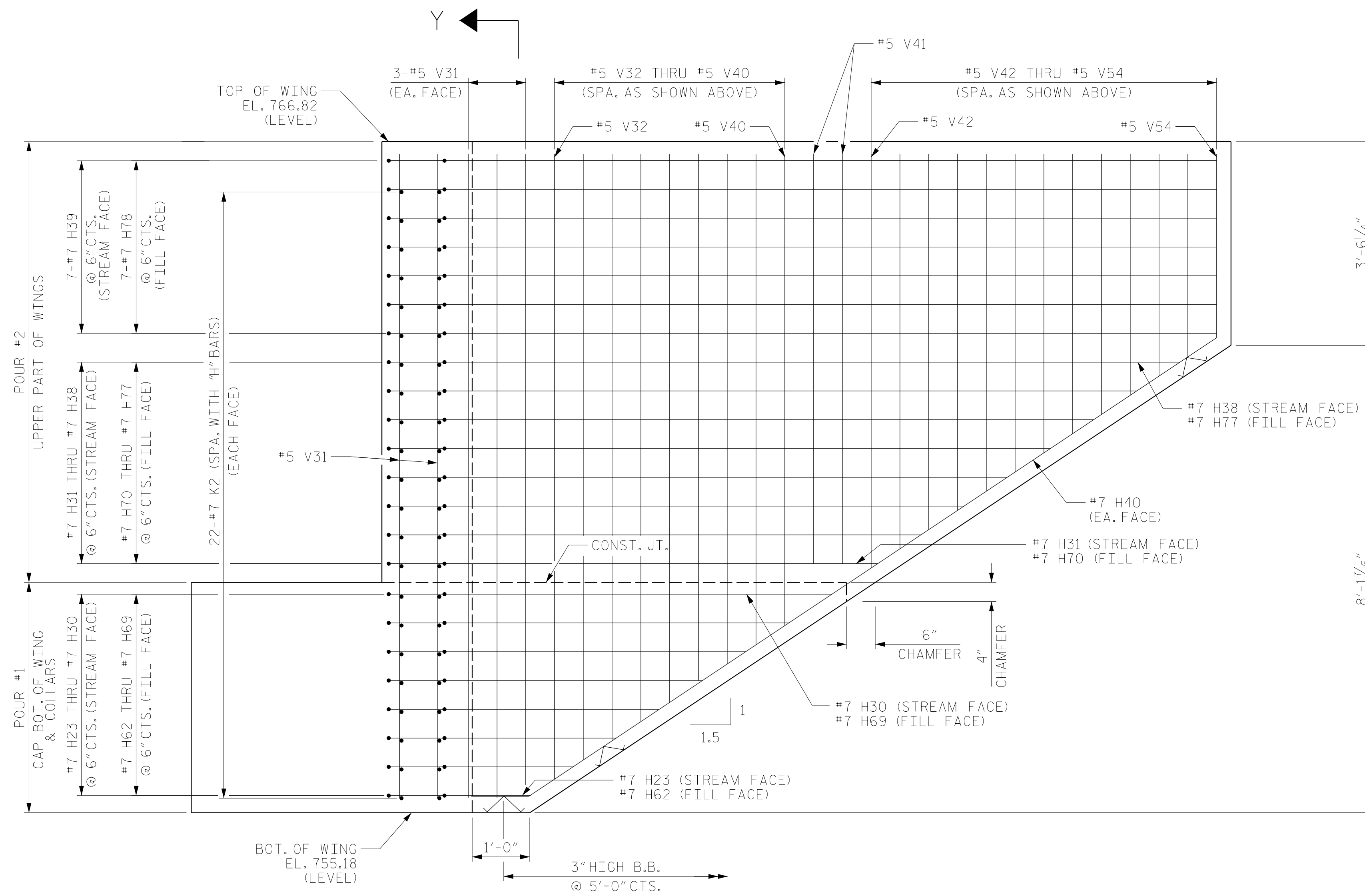
DRAWN BY :	JTC	DATE :	01/2018
CHECKED BY :	MKO	DATE :	04/2018
DESIGN ENGINEER OF RECORD:	MKO	DATE :	04/2018

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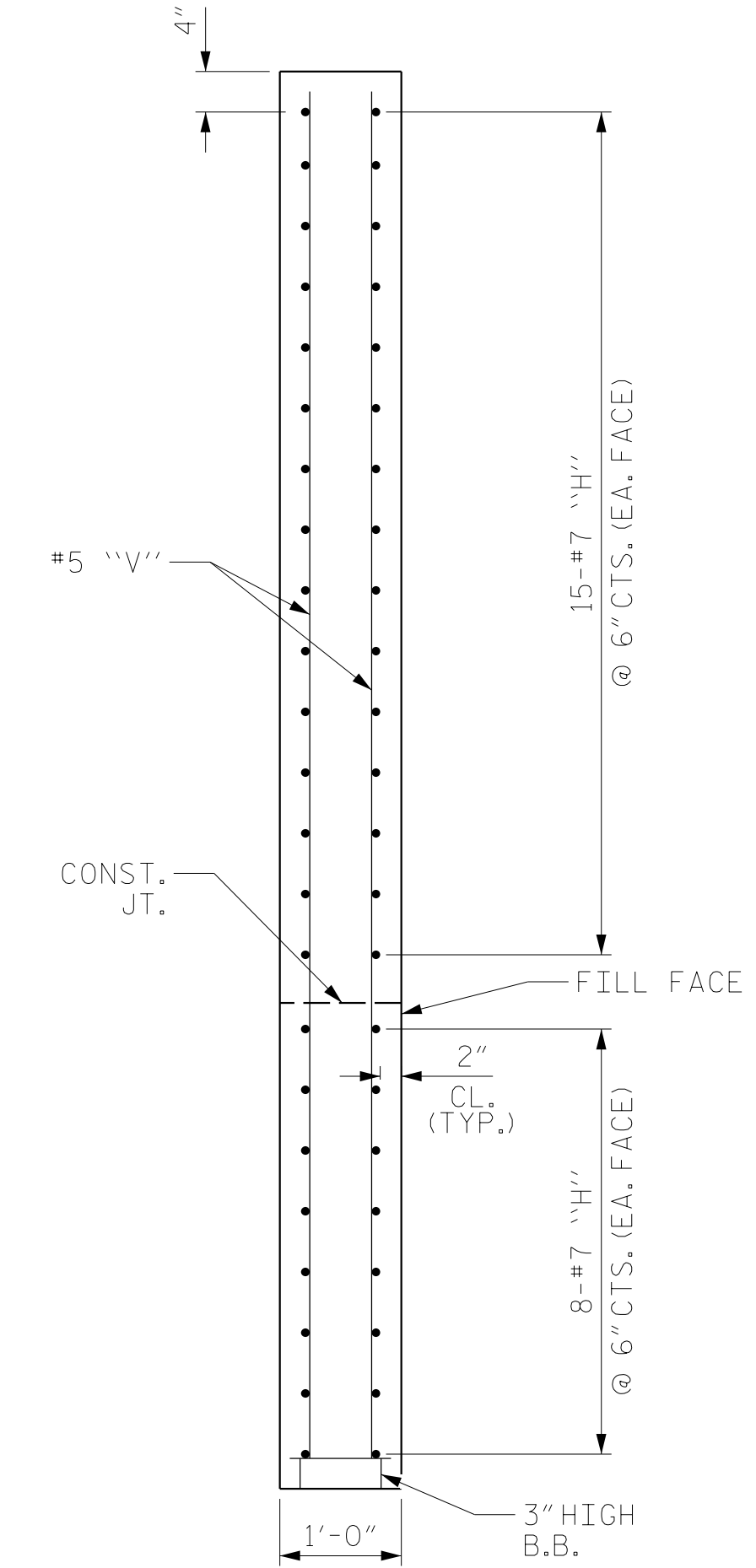
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-23
1			3			TOTAL SHEETS
2			4			37



PLAN OF WING - W1



ELEVATION OF WING - W1



SECTION Y-Y

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 3 OF 4



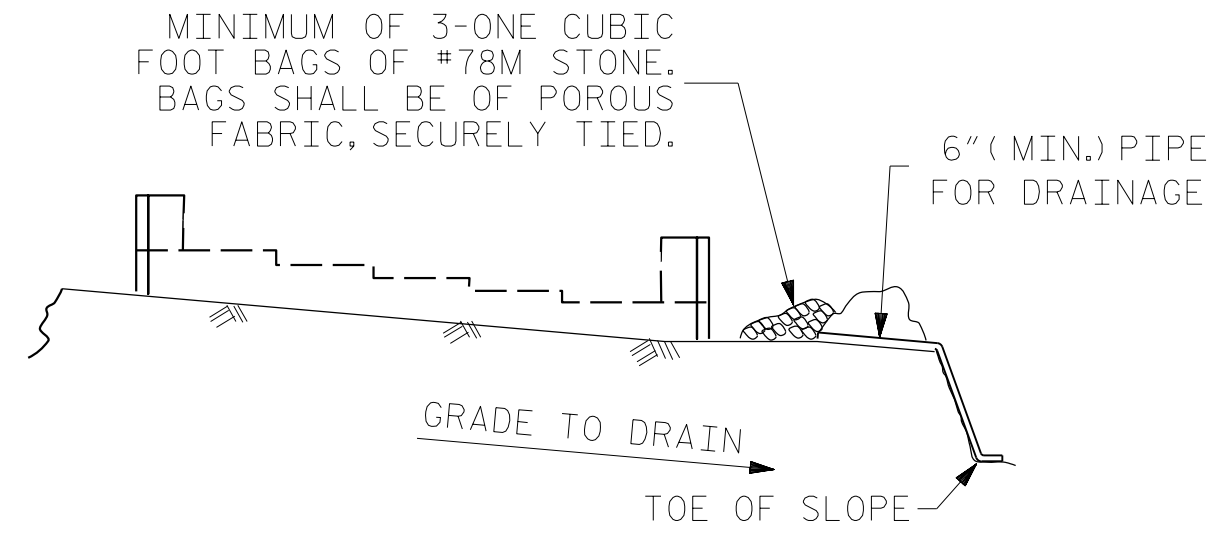
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL  
 END BENT NO. 1  
 RIGHT LANE

DRAWN BY : JTC DATE : 01/2018  
 CHECKED BY : MKO DATE : 04/2018  
 DESIGN ENGINEER OF RECORD: MKO DATE : 04/2018

DOCUMENT NOT CONSIDERED  
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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-24
1			3			TOTAL SHEETS
2			4			37



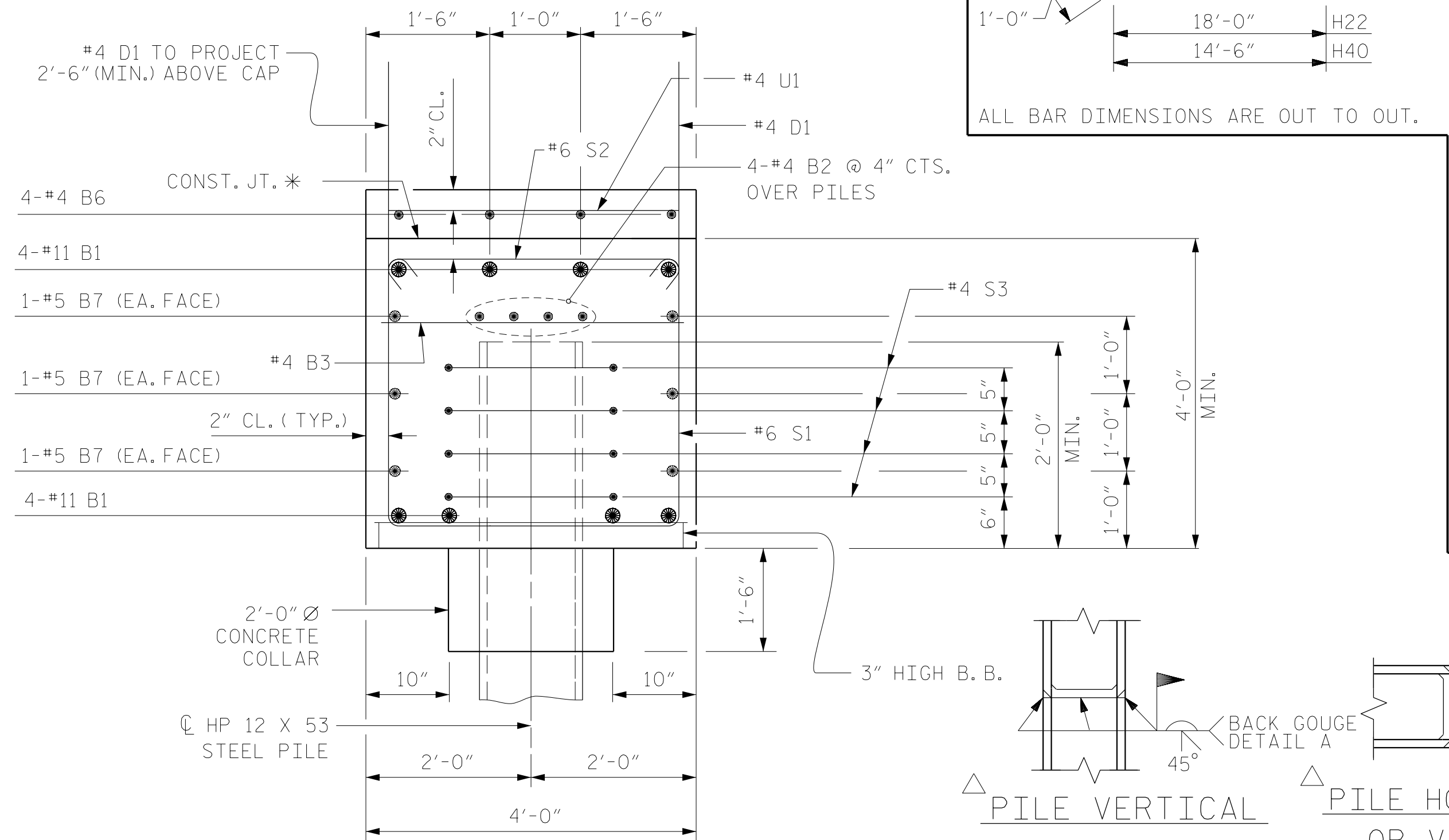


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

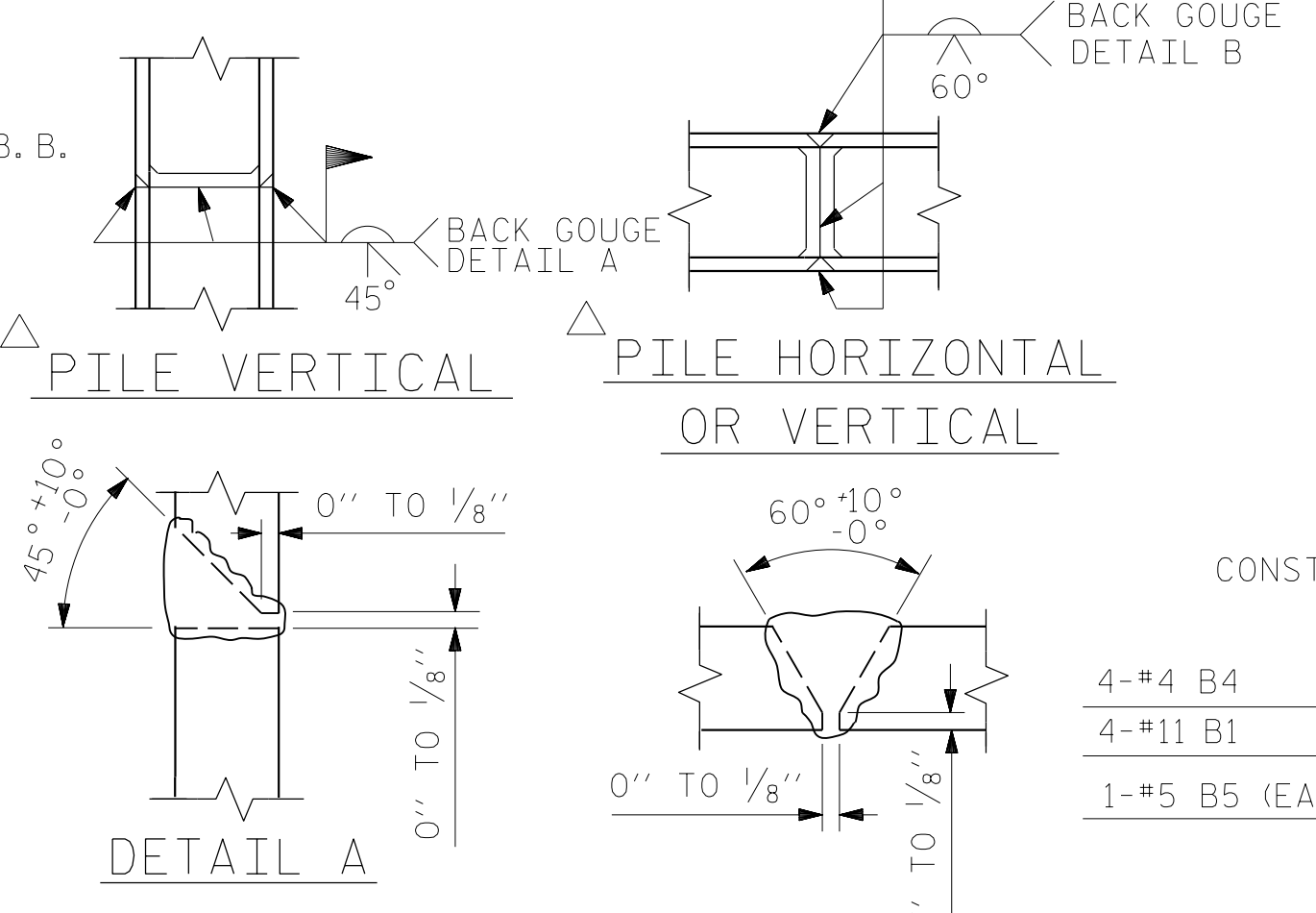
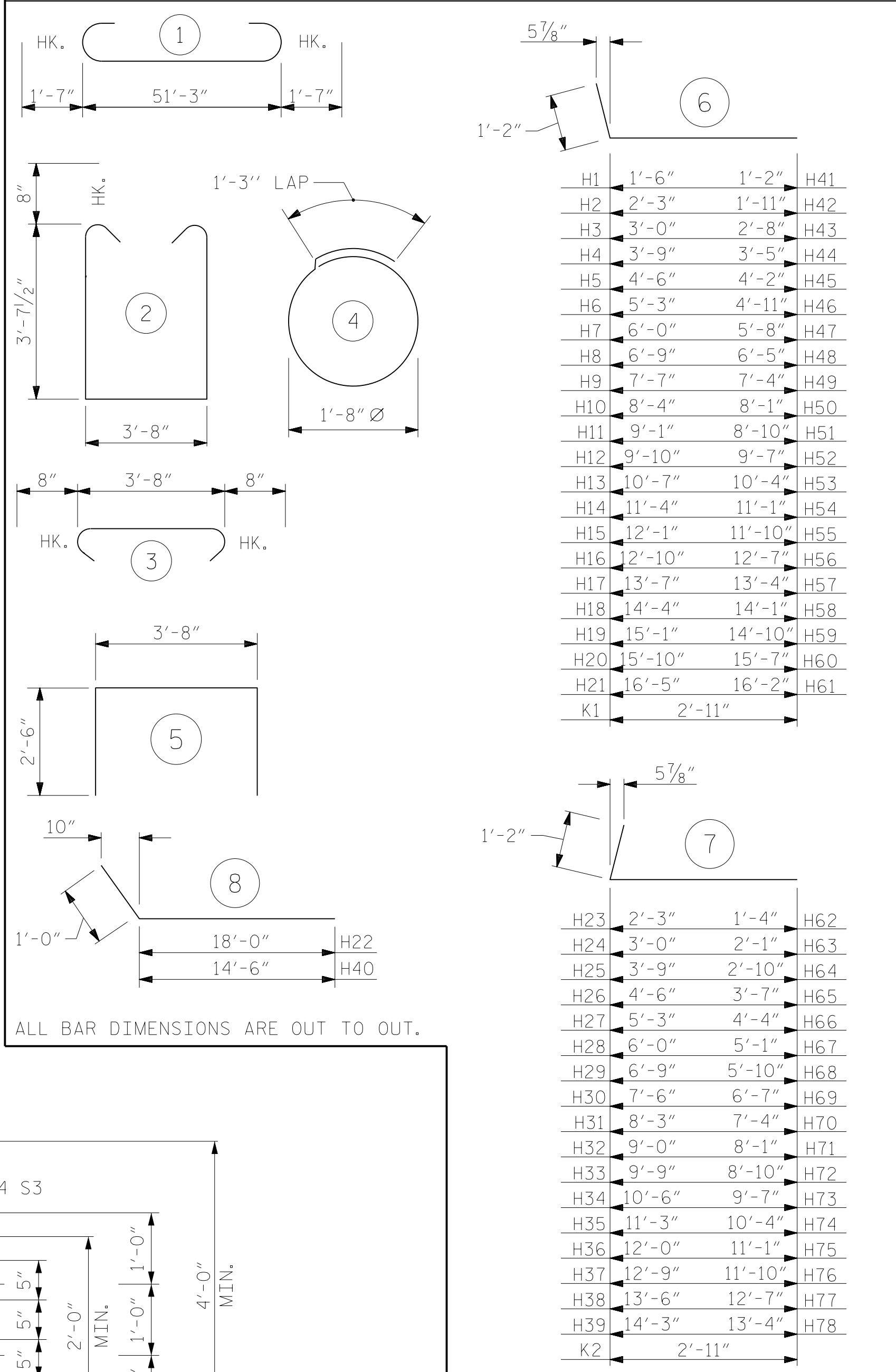


### SECTION A-A

\* THE TOP SURFACE OF THE END BENT CAP & WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

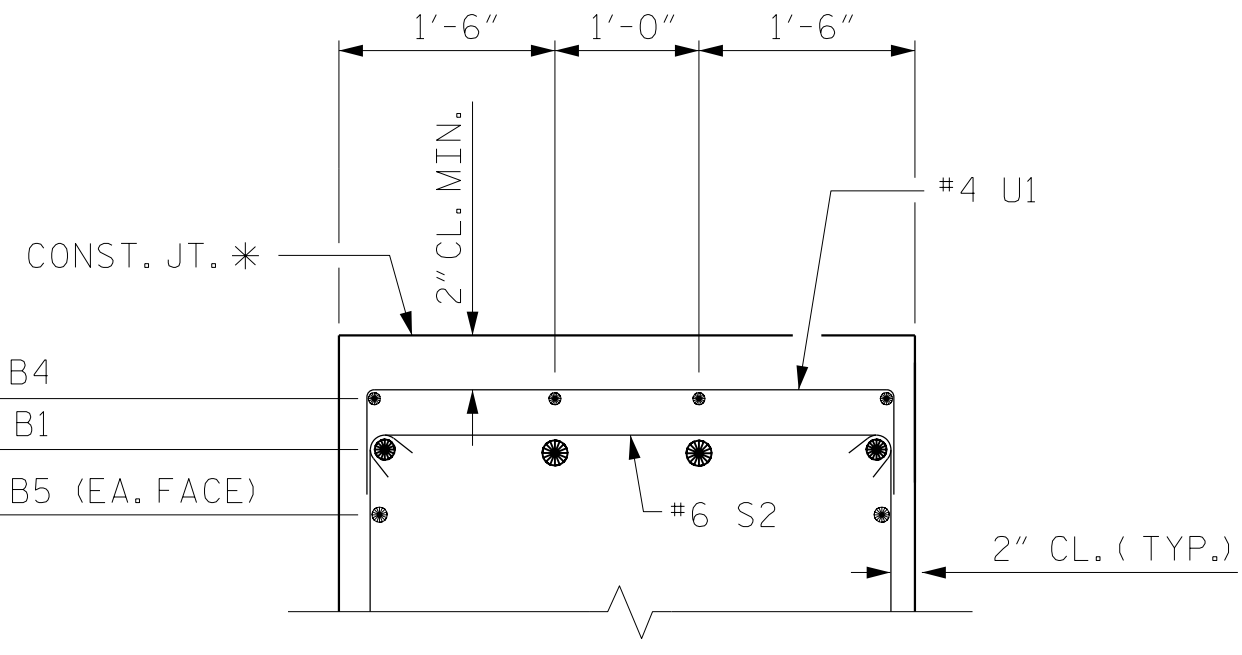
DRAWN BY: JTC DATE: 01/2018  
CHECKED BY: MKO DATE: 04/2018  
DESIGN ENGINEER OF RECORD: MKO DATE: 04/2018

### BAR TYPES



POSITION OF PILE DURING WELDING. DETAIL B

### PILE SPLICE DETAILS



### PARTIAL SECTION B-B

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### BILL OF MATERIAL

#### END BENT NO. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11		54'-5"	2313	H47	1	#7	6	6'-10"	14	V15	2	#5	STR	6'-4"	13
B2	8	#4	STR	26'-10"	143	H48	1	#7	6	7'-7"	16	V16	2	#5	STR	6'-0"	13
B3	13	#4	STR	3'-8"	32	H49	1	#7	6	8'-6"	17	V17	2	#5	STR	5'-8"	12
B4	4	#4	STR	11'-5"	31	H50	1	#7	6	9'-3"	19	V18	2	#5	STR	5'-4"	11
B5	8	#4	STR	11'-7"	62	H51	1	#7	6	10'-0"	20	V19	2	#5	STR	5'-0"	10
B6	4	#4	STR	17'-9"	47	H52	1	#7	6	10'-9"	22	V20	2	#5	STR	4'-8"	10
B7	6	#5	STR	51'-3"	321	H53	1	#7	6	11'-6"	24	V21	2	#5	STR	4'-4"	9
						H54	1	#7	6	12'-3"	25	V22	2	#5	STR	4'-0"	8
D1	82	#4	STR	4'-6"	246	H55	1	#7	6	13'-0"	27	V23	2	#5	STR	3'-8"	8
						H56	1	#7	6	13'-9"	28	V24	2	#5	STR	3'-4"	7
H1	1	#7	6	2'-8"	5	H57	1	#7	6	14'-6"	30	V25	2	#5	STR	3'-0"	6
H2	1	#7	6	3'-5"	7	H58	1	#7	6	15'-3"	31	V26	2	#5	STR	2'-8"	6
H3	1	#7	6	4'-2"	9	H59	1	#7	6	16'-0"	33	V27	2	#5	STR	2'-4"	5
H4	1	#7	6	4'-11"	10	H60	1	#7	6	16'-9"	34	V28	2	#5	STR	2'-0"	4
H5	1	#7	6	5'-8"	12	H61	3	#7	6	17'-4"	106	V29	2	#5	STR	1'-8"	3
H6	1	#7	6	6'-5"	13	H62	1	#7	7	2'-6"	5	V30	2	#5	STR	1'-4"	3
H7	1	#7	6	7'-2"	15	H63	1	#7	7	3'-3"	7	V31	18	#5	STR	11'-2"	210
H8	1	#7	6	7'-11"	16	H64	1	#7	7	4'-0"	8	V32	2	#5	STR	10'-11"	23
H9	1	#7	6	8'-9"	18	H65	1	#7	7	4'-9"	10	V33	2	#5	STR	10'-7"	22
H10	1	#7	6	9'-6"	19	H66	1	#7	7	5'-6"	11	V34	2	#5	STR	10'-3"	21
H11	1	#7	6	10'-3"	21	H67	1	#7	7	6'-3"	13	V35	2	#5	STR	9'-11"	21
H12	1	#7	6	11'-0"	22	H68	1	#7	7	7'-0"	14	V36	2	#5	STR	9'-7"	20
H13	1	#7	6	11'-9"	24	H69	1	#7	7	7'-9"	16	V37	2	#5	STR	9'-3"	19
H14	1	#7	6	12'-6"	26	H70	1	#7	7	8'-6"	17	V38	2	#5	STR	8'-11"	19
H15	1	#7	6	13'-3"	27	H71	1	#7	7	9'-3"	19	V39	2	#5	STR	8'-7"	18
H16	1	#7	6	14'-0"	29	H72	1	#7	7	10'-0"	20	V40	2	#5	STR	8'-3"	17
H17	1	#7	6	14'-9"	30	H73	1	#7	7	10'-9"	22	V41	4	#5	STR	7'-5"	31
H18	1	#7	6	15'-6"	32	H74	1	#7	7	11'-6"	24	V42	2	#5	STR	7'-3"	15
H19	1	#7	6	16'-3"	33	H75	1	#7	7	12'-3"	25	V43	2	#5	STR	6'-11"	14
H20	1	#7	6	17'-0"	35	H76	1	#7	7	13'-0"	27	V44	2	#5	STR	6'-7"	14
H21	3	#7	6	17'-7"	108	H77	1	#7	7	13'-9"	28	V45	2	#5	STR	6'-3"	13
H22	2	#7	8	19'-0"	78	H78	7	#7	7	13'-8"	196	V46	2	#5	STR	5'-11"	12
H23	1	#7	7	3'-5"	7							V47	2	#5	STR	5'-7"	12
H24	1	#7	7	4'-2"	9	K1	44	#7	6	4'-1"	367	V48	2	#5	STR	5'-3"	11
H25	1	#7	7	4'-11"	10	K2	44	#7	7	4'-1"	367	V49	2	#5	STR	4'-11"	10
H26	1	#7	7	5'-8"	12							V50	2	#5	STR	4'-7"	10
H27	1	#7	7	6'-5"	13	S1	65	#6	2	12'-3"	1196	V51	2	#5	STR	4'-3"	9
H28	1	#7	7	7'-2"	15	S2	65	#6	3	5'-0"	488	V52	2	#5	STR	3'-11"	8
H29	1	#7	7	7'-11"	16	S3	40	#4	4	6'-6"	174	V53	2	#5	STR	3'-7"	7
H30	1	#7	7	8'-8"	18												
H31	1	#7	7	9'-5"	19	U1	34	#4	5	8'-8"	197						
H32	1	#7	7	10'-2"	21												
H33	1	#7	7	10'-11"	22	V1	16	#5	STR	11'-3"	188						
H34	1	#7	7	11'-8"	24	V2	2	#5	STR	11'-0"	23						
H35	1	#7	7	12'-5"	25	V3	2	#5	STR	10'-8"	22						
H36	1	#7	7	13'-2"	27	V4	2	#5	STR	10'-4"	22						
H37	1	#7	7	13'-11"	28	V5	2	#5	STR	10'-0"	21						
H38	1	#7	7	14'-8"	30	V6	2	#5	STR	9'-8"	20						
H39	7	#7	7	15'-5"	221	V7	2	#5	STR	9'-4"	19						
H40	2	#7	8	15'-6"	63	V8	2	#5	STR	9'-0"	19						
H41	1	#7	6	2'-4"	5	V9	2	#5	STR	8'-8"	18						
H42	1	#7	6	3'-1"	6	V10	2	#5	STR	8'-4"	17						
H43	1	#7	6	3'-10"	8	V11	2	#5	STR	8'-0"	17						
H44	1	#7	6	4'-7"	9	V12	4	#5	STR	7'-3"	30						
H45	1	#7	6	5'-4"	11	V13	2	#5	STR	7'-0"	15						
H46	1	#7	6	6'-1"	12	V14	2	#5	STR	6'-8"	14						

\*\* B6 SHALL BE FIELD CUT TO MAINTAIN CLEAR COVER.

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-

SHEET 4 OF 4

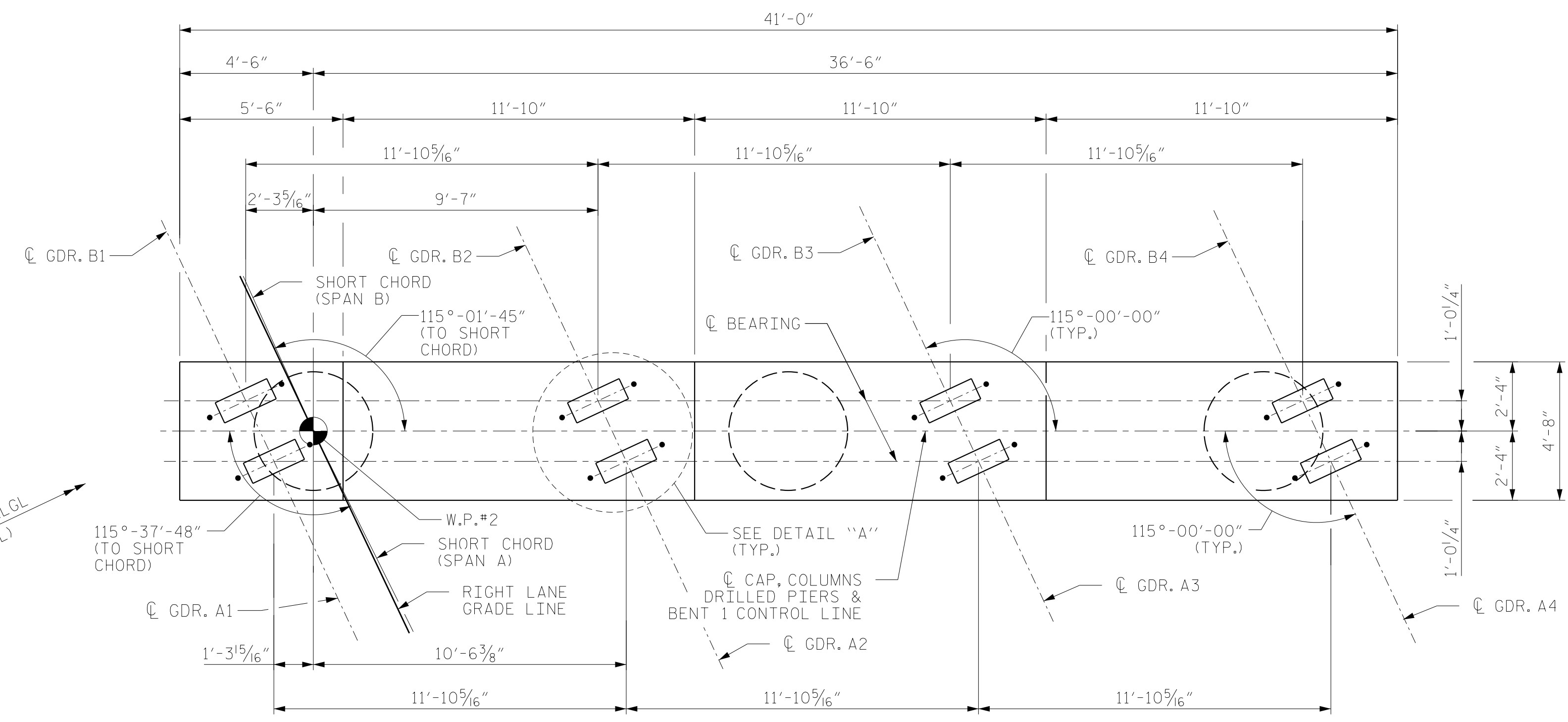
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
INTEGRAL END BENT NO. 1  
RIGHT LANE

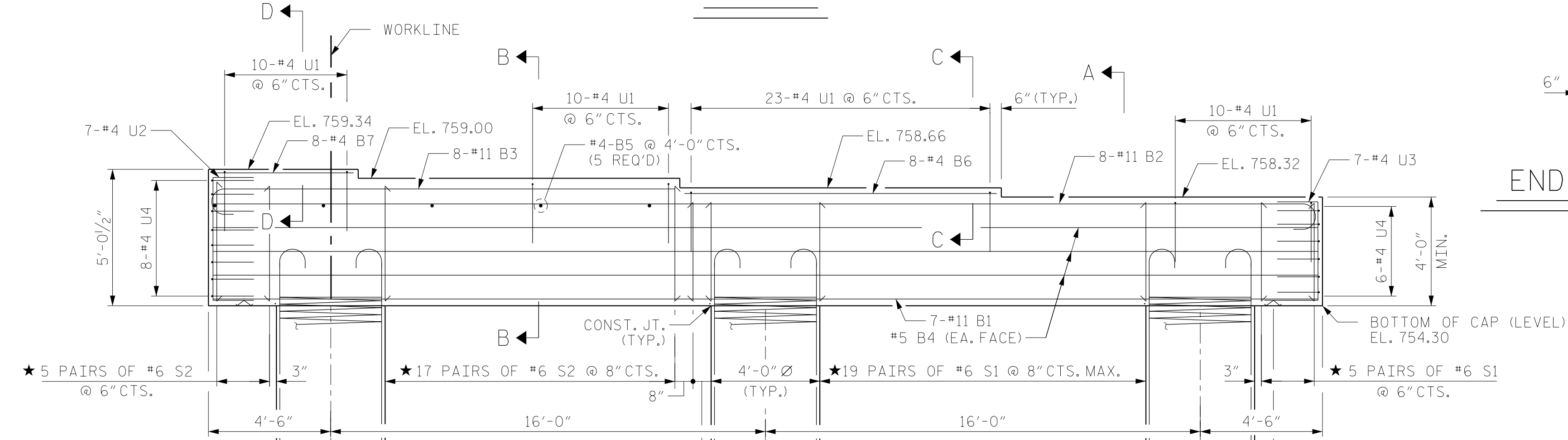
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-25	
1			3			TOTAL SHEETS	37
2			4				

NOTES

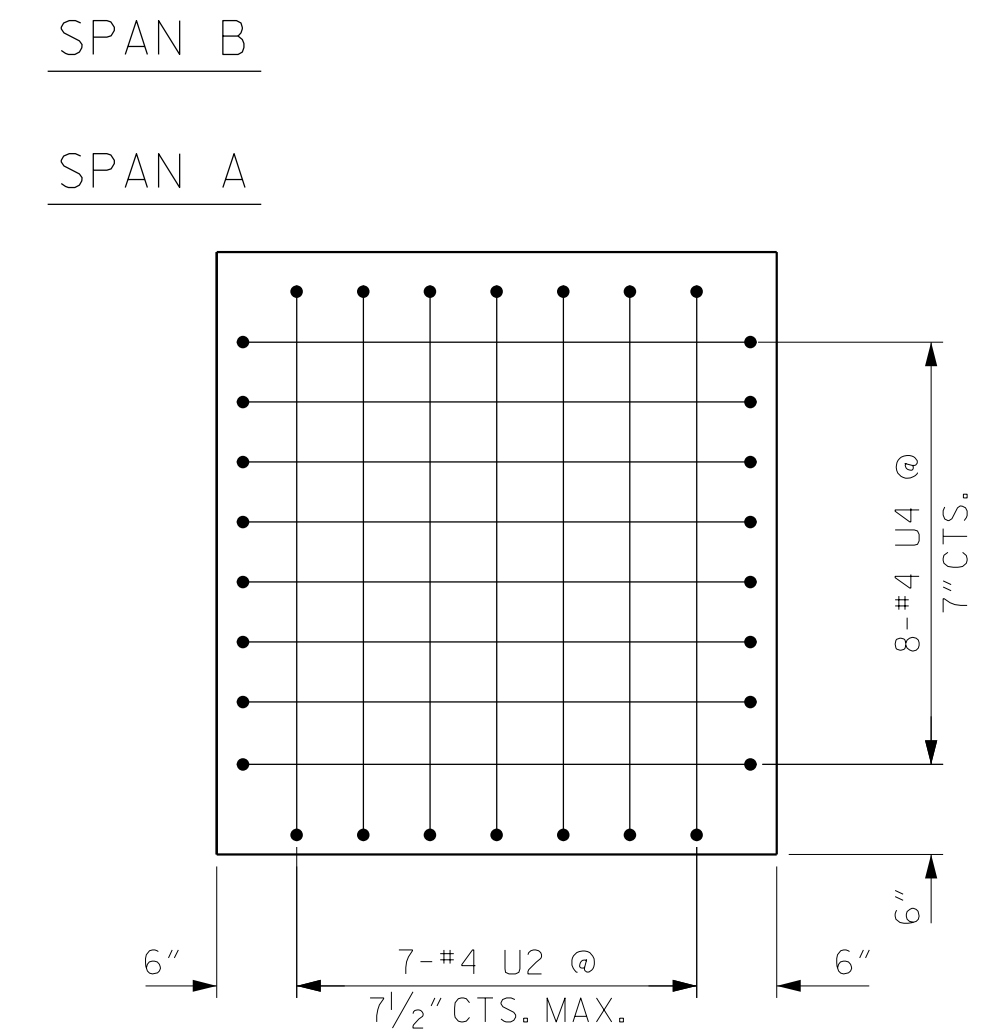
- FOR SECTIONS A-A AND B-B AND VIEWS C-C AND D-D, SEE SHEET 2 OF 2.
- FOR REINFORCING STEEL BILL OF MATERIAL, SEE SHEET 2 OF 2.
- "U" AND STIRRUP BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
- ★ INVERT ALTERNATE #6 S1 AND S2 STIRRUP PAIRS.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.
- RLGL = RIGHT LANE GRADE LINE



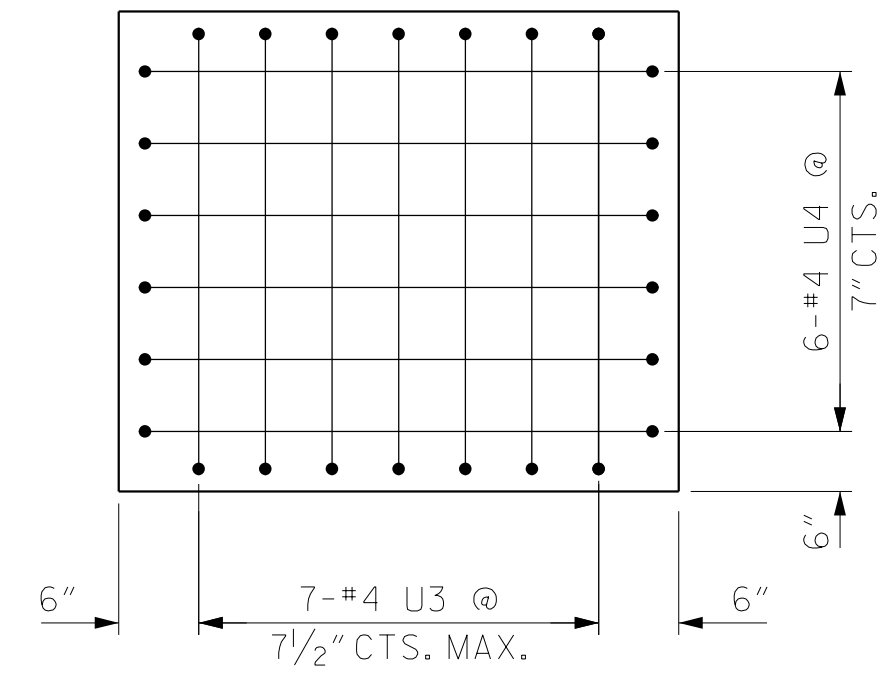
PLAN



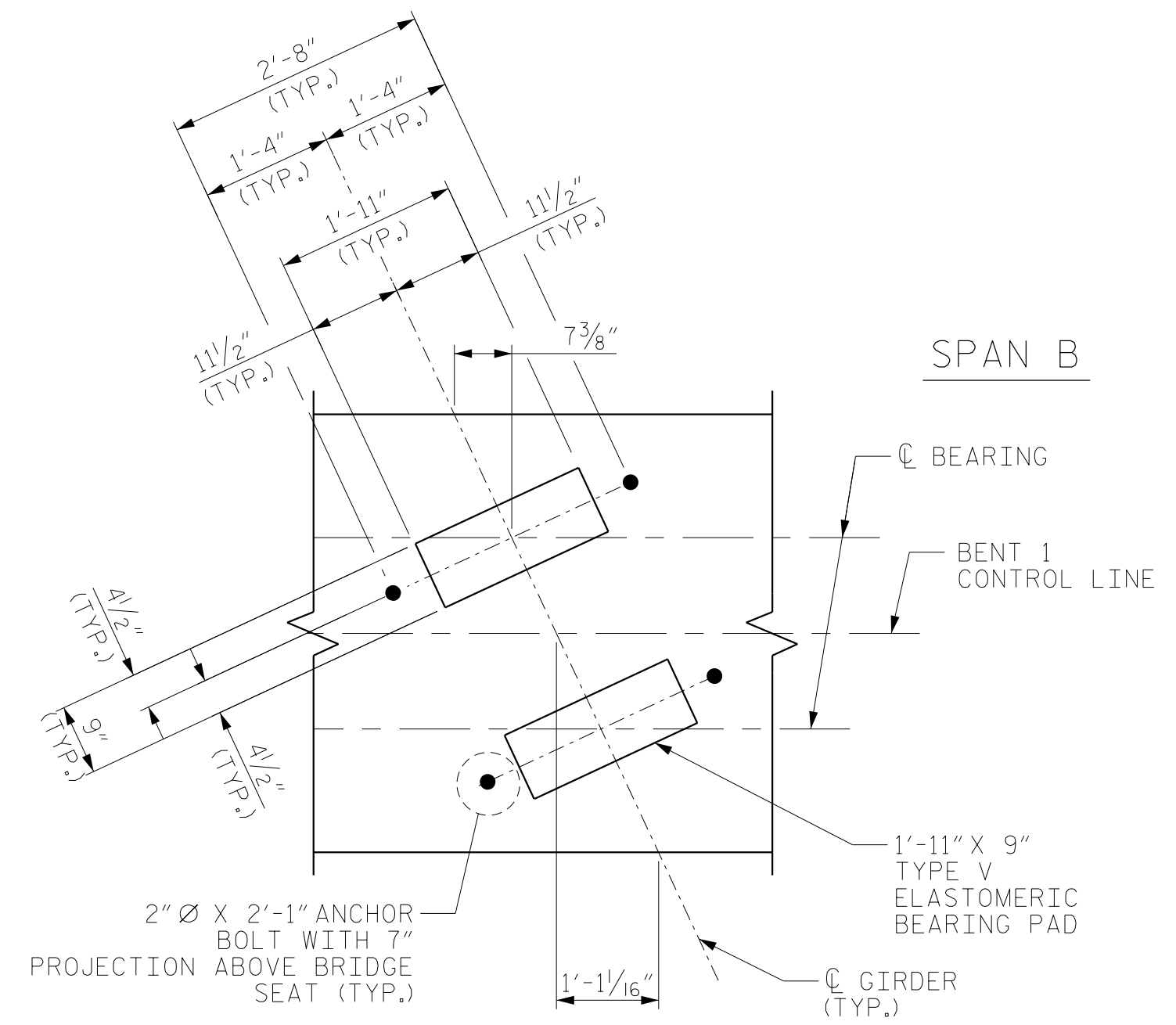
ELEVATION



END OF LEFT CAP VIEW



END OF RIGHT CAP VIEW



DETAIL "A"  
DIMENSIONS ARE TYPICAL FOR EACH GIRDER

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 1 OF 2

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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT NO. 1  
 RIGHT LANE

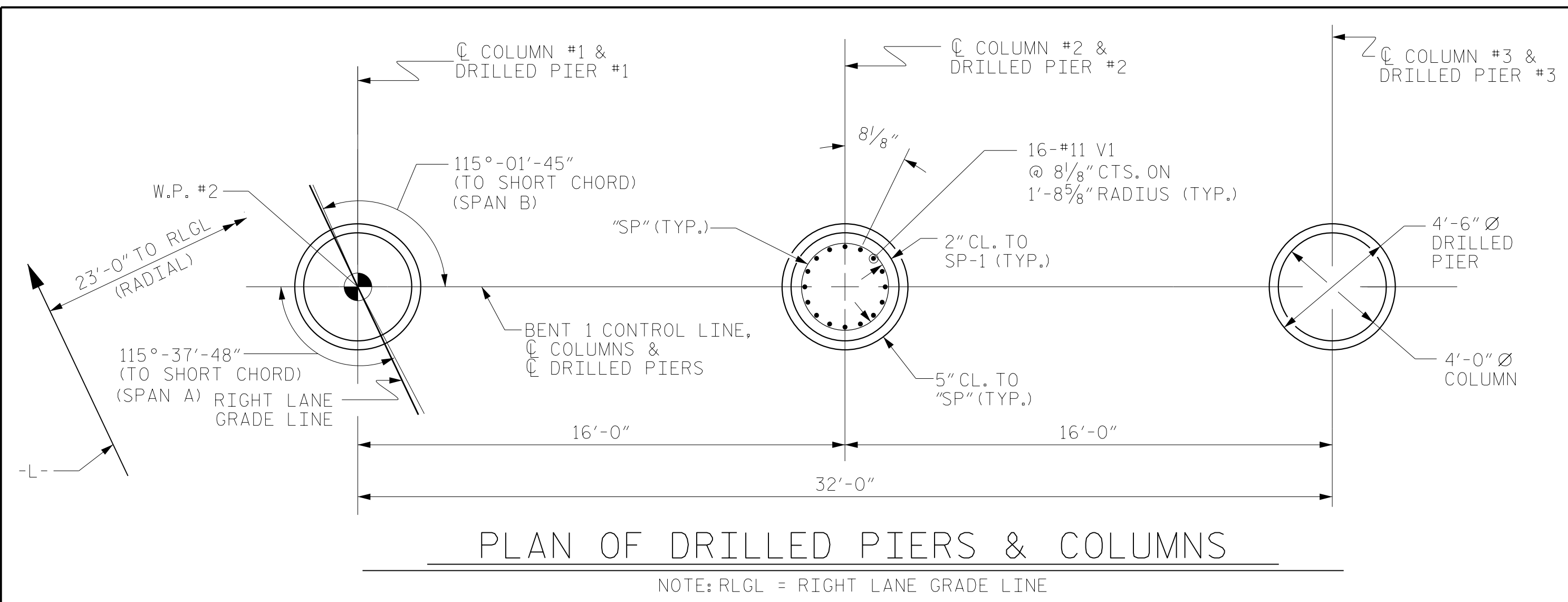
SHEET NO.  
 S6-26

TOTAL SHEETS  
 37

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

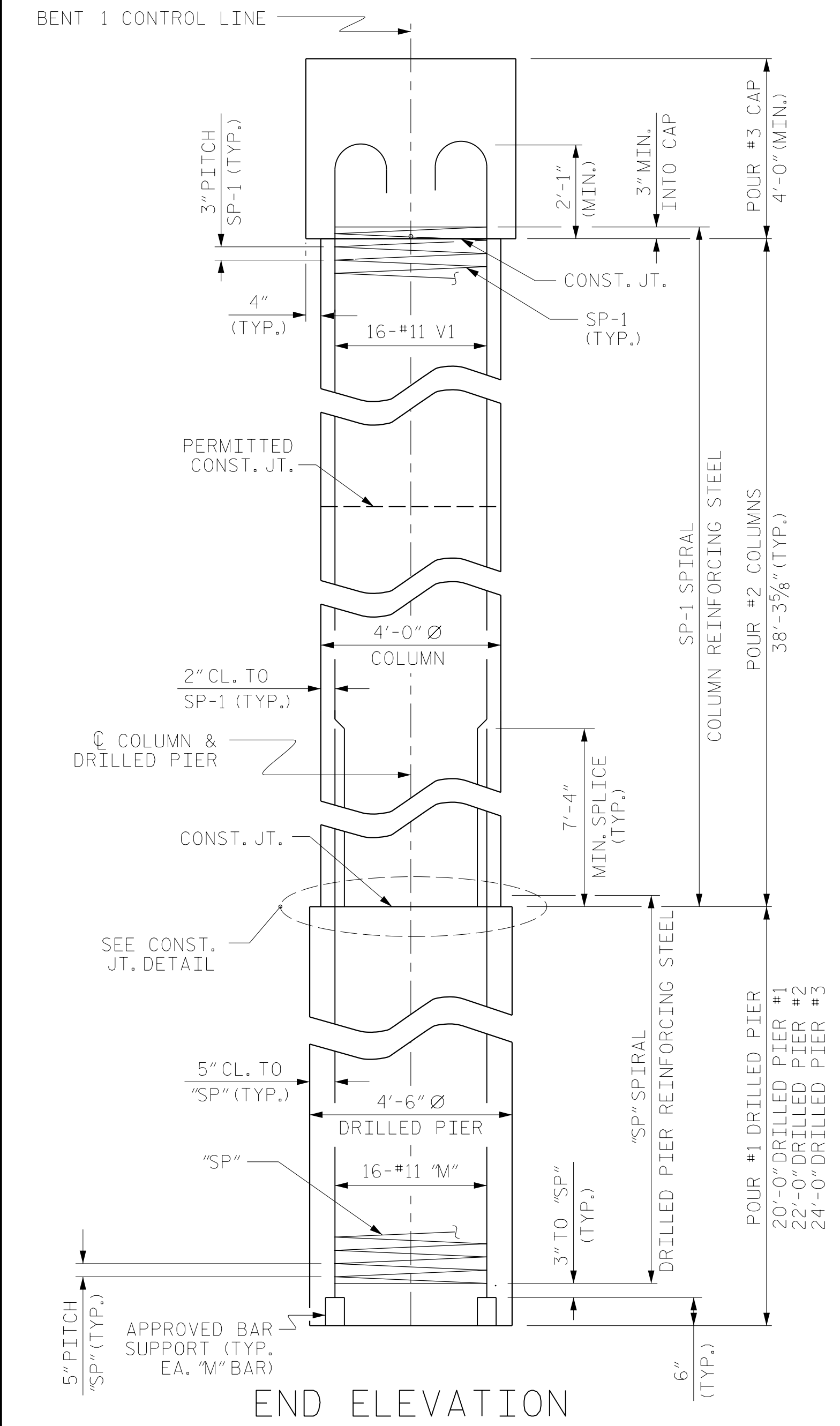
DRAWN BY : JTC DATE : 01/2018  
 CHECKED BY : MKO DATE : 03/2018  
 DESIGN ENGINEER OF RECORD: MKO DATE : 04/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

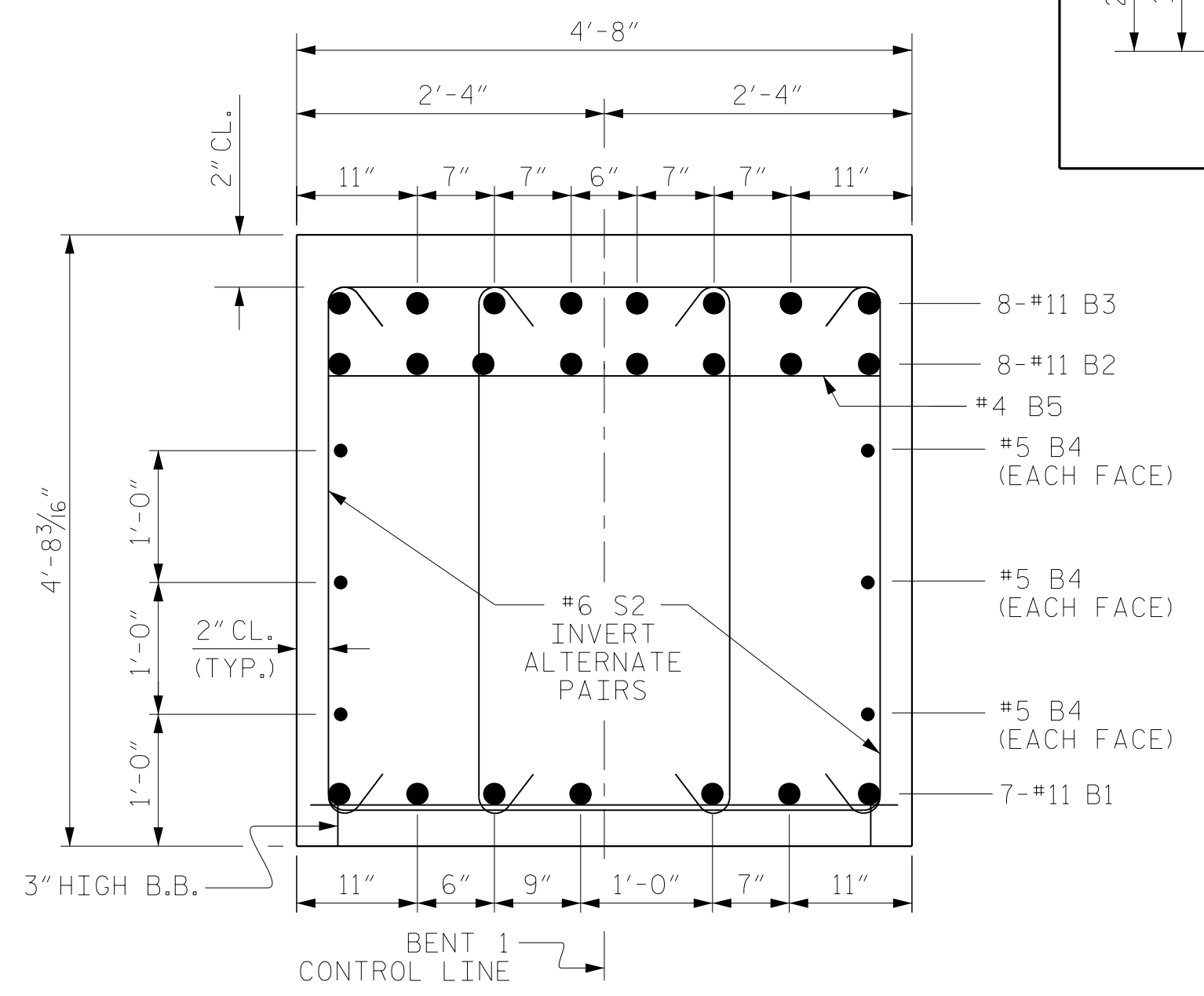


PLAN OF DRILLED PIERS & COLUMNS

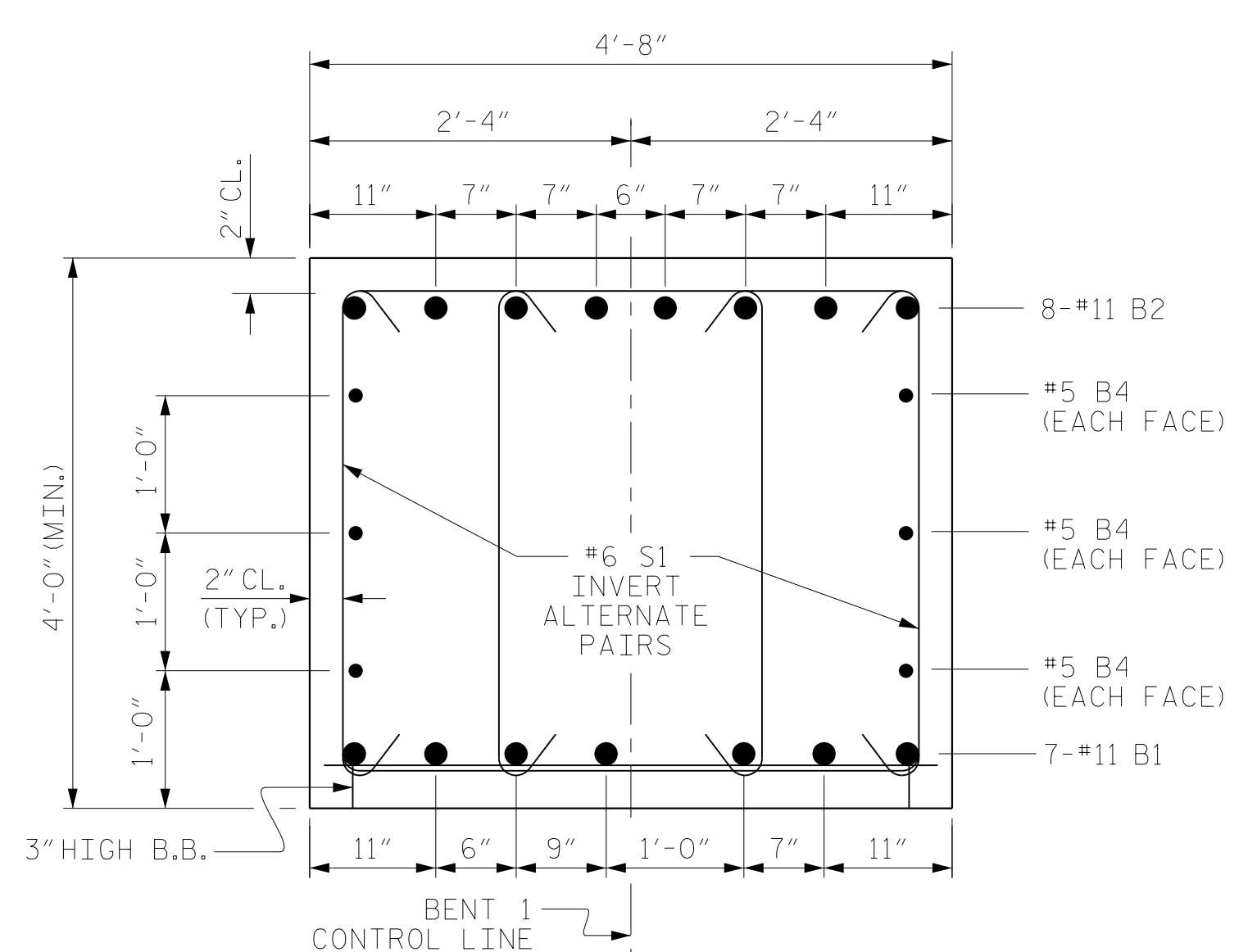
NOTE: RLGL = RIGHT LANE GRADE LINE



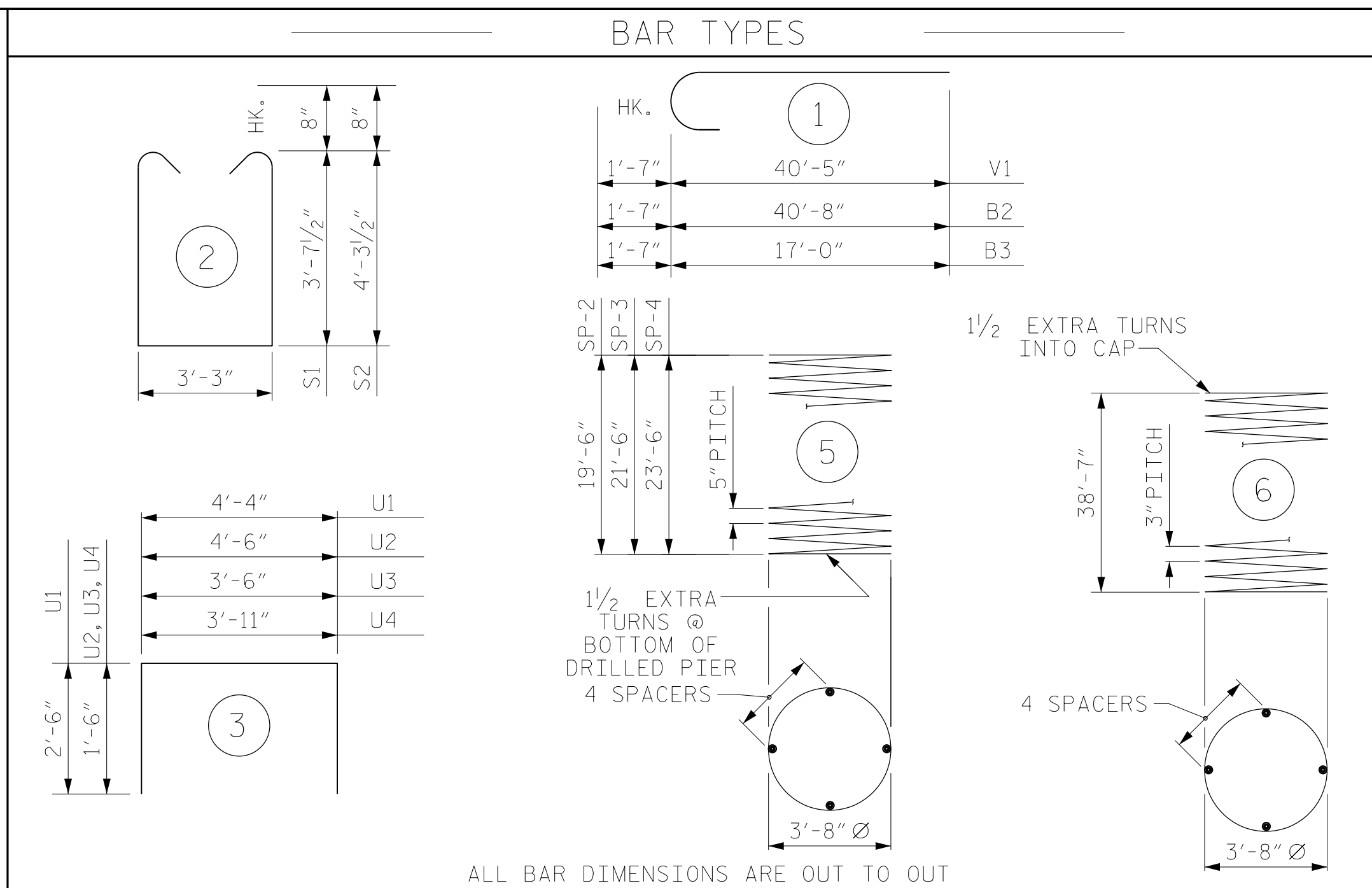
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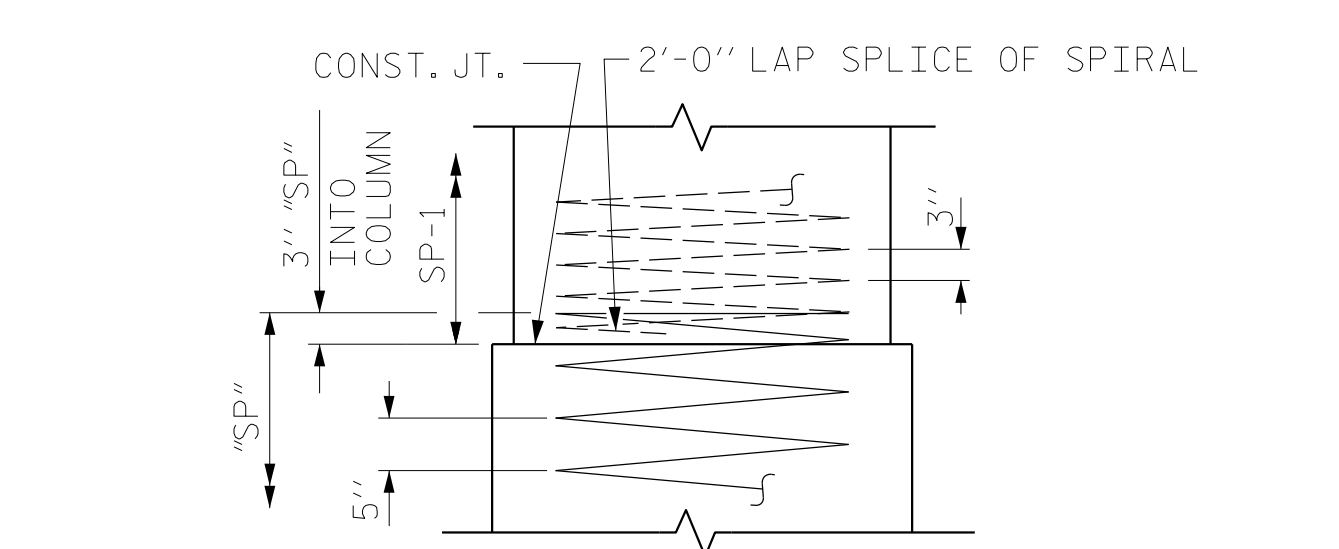
SECTION B-B



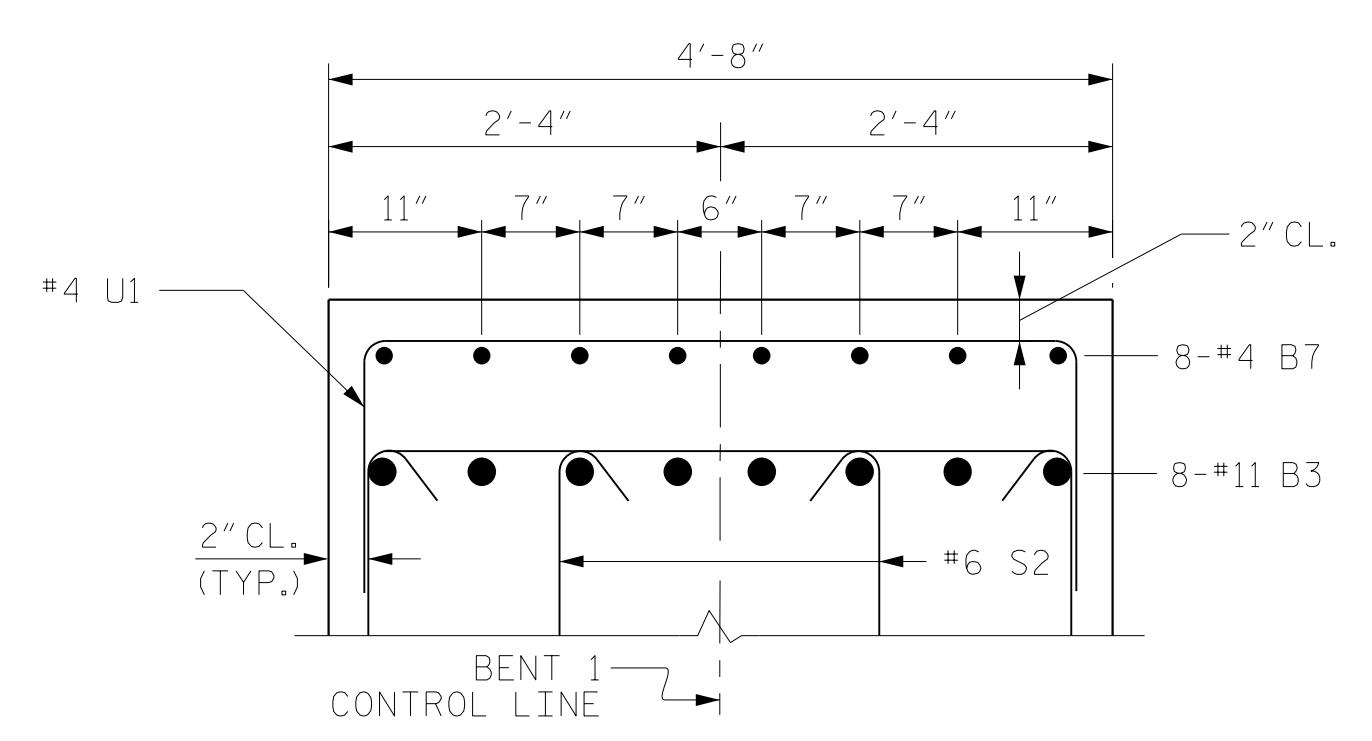
SECTION A-A



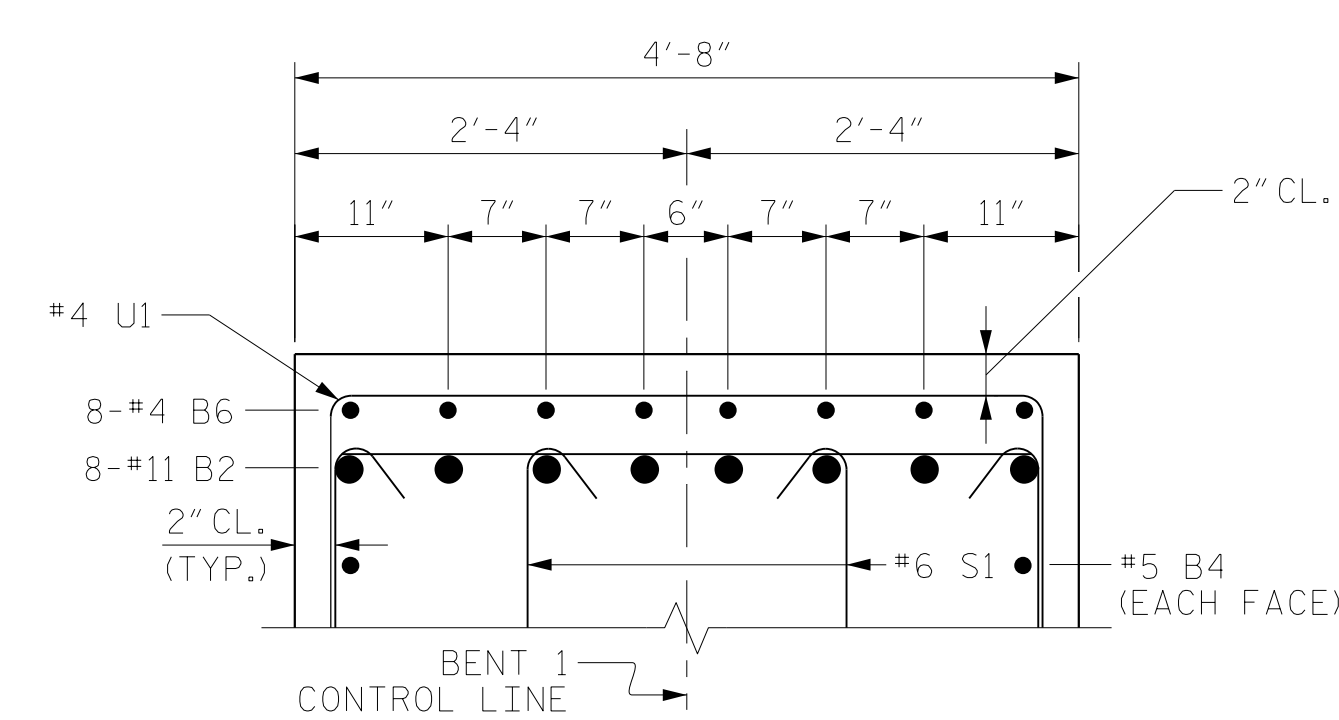
ALL BAR DIMENSIONS ARE OUT TO OUT



CONSTRUCTION JOINT DETAIL



VIEW D-D



VIEW C-C

BILL OF MATERIAL FOR BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11	STR	40'-8"	1512
B2	8	#11	1	42'-3"	1796
B3	8	#11	1	18'-7"	790
B4	6	#5	STR	40'-8"	254
B5	5	#4	STR	4'-4"	14
B6	8	#4	STR	11'-6"	61
B7	8	#4	STR	5'-2"	28
M1	16	#11	STR	29'-10"	2536
M2	16	#11	STR	31'-10"	2706
M3	16	#11	STR	33'-10"	2876
S1	52	#6	2	11'-10"	924
S2	44	#6	2	13'-2"	870
U1	53	#4	3	9'-4"	330
U2	7	#4	3	7'-6"	35
U3	7	#4	3	6'-6"	30
U4	14	#4	3	6'-11"	65
V1	48	#11	1	42'-0"	10711
REINFORCING STEEL (FOR BENT 1)					25,538 LBS.
SP-1	3	*	6	1777'-0"	3561
SP-2	1	**	5	551'-2"	575
SP-3	1	**	5	608'-0"	634
SP-4	1	**	5	659'-1"	687
SPIRAL COLUMN REINFORCING STEEL (FOR BENT 1)					5,457 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
** THE SP-2, SP-3, SP-4 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR BENT 1)					
POUR #2 (COLUMNS)					53.5 C.Y.
POUR #3 (CAP)					31.4 C.Y.
TOTAL CLASS A CONCRETE					84.9 C.Y.
DRILLED PIERS: (FOR BENT 1)					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					38.9 C.Y.
4'-6" Ø DRILLED PIER NOT IN SOIL					36.0 LIN. FT.
4'-6" Ø DRILLED PIER IN SOIL					30.0 LIN. FT.
CSL TUBES					282.0 LIN. FT.

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 2 OF 2

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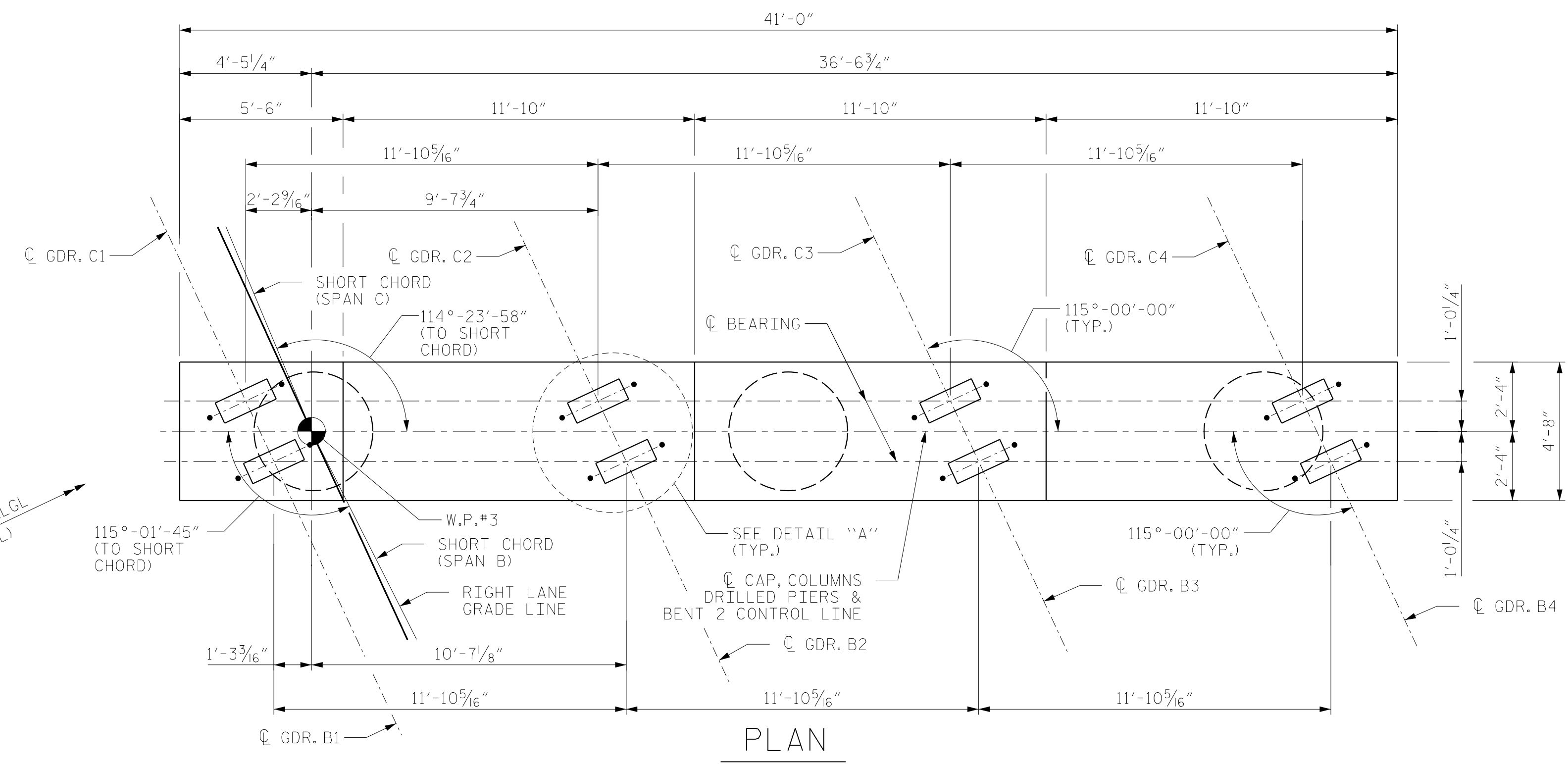
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-27
1			3			TOTAL SHEETS
2			4			37

DRAWN BY: JTC DATE: 01/2018  
 CHECKED BY: MKO DATE: 03/2018  
 DESIGN ENGINEER OF RECORD: MKO DATE: 04/2018

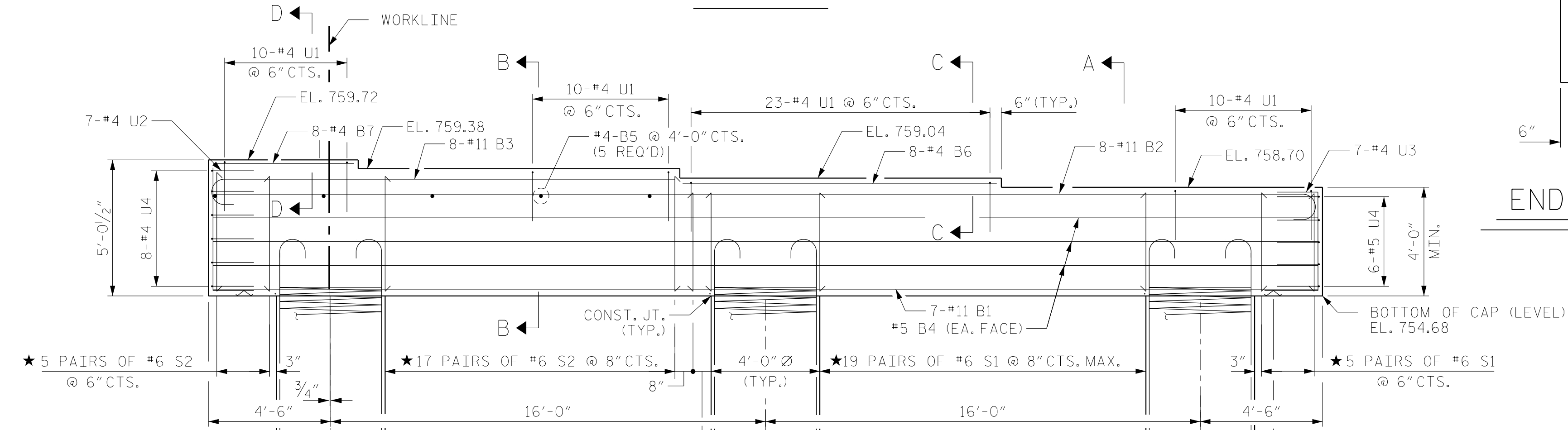
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES

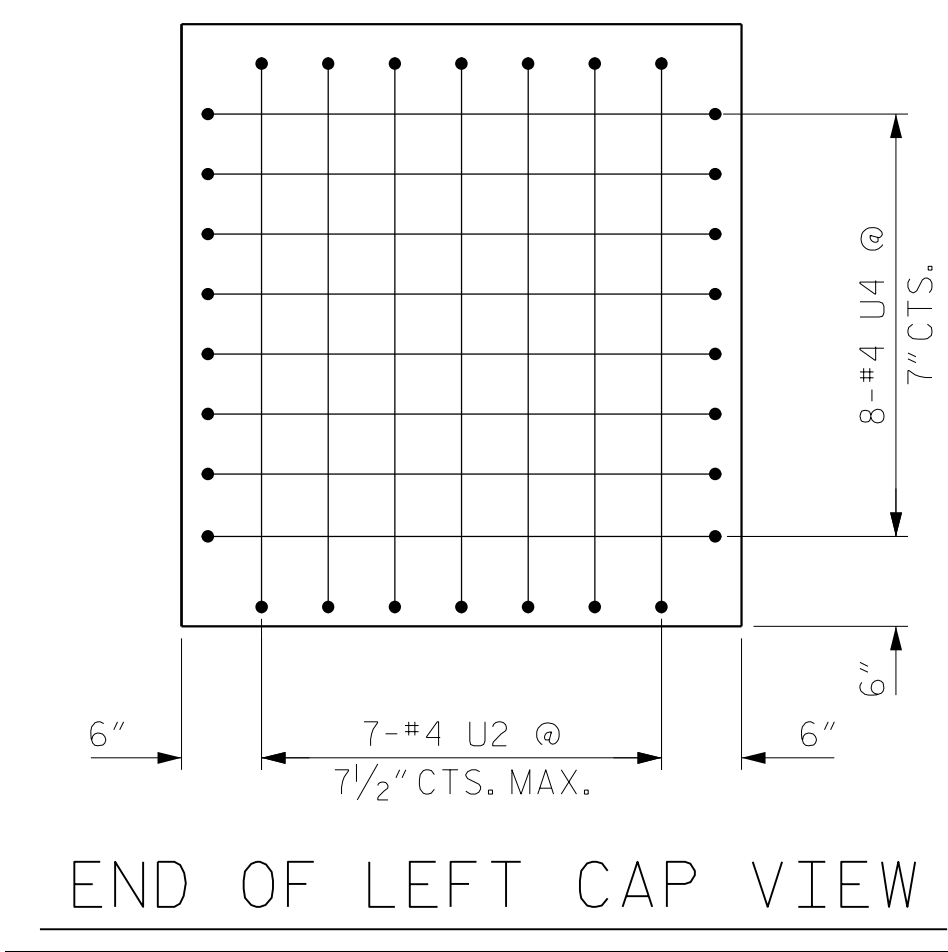
- FOR SECTIONS A-A AND B-B AND VIEWS C-C AND D-D, SEE SHEET 2 OF 2.
- FOR REINFORCING STEEL BILL OF MATERIAL, SEE SHEET 2 OF 2.
- "U" AND STIRRUP BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
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- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."
- ★ INVERT ALTERNATE #6 S1 AND S2 STIRRUP PAIRS.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.
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- RLGL = RIGHT LANE GRADE LINE



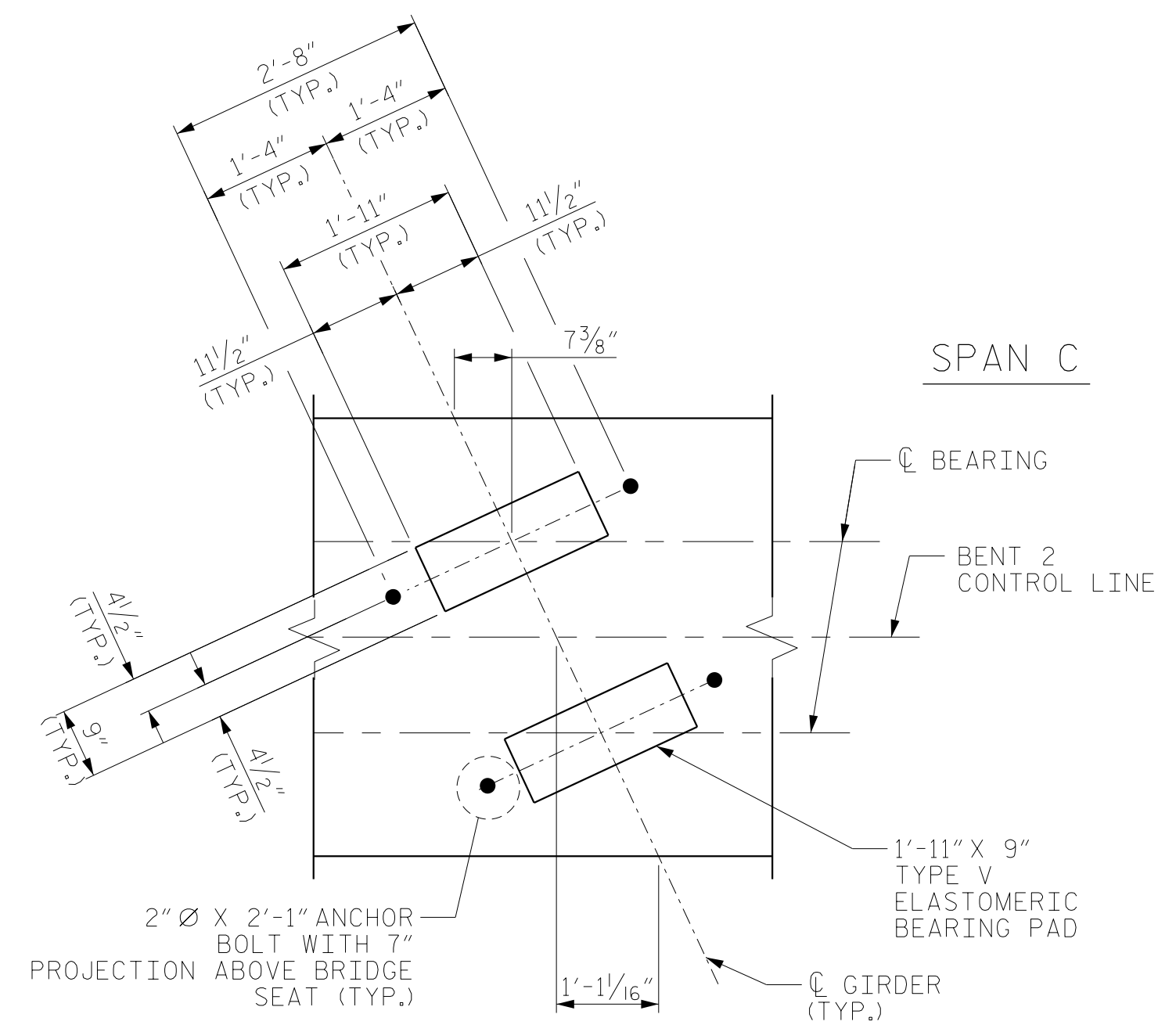
PLAN



ELEVATION

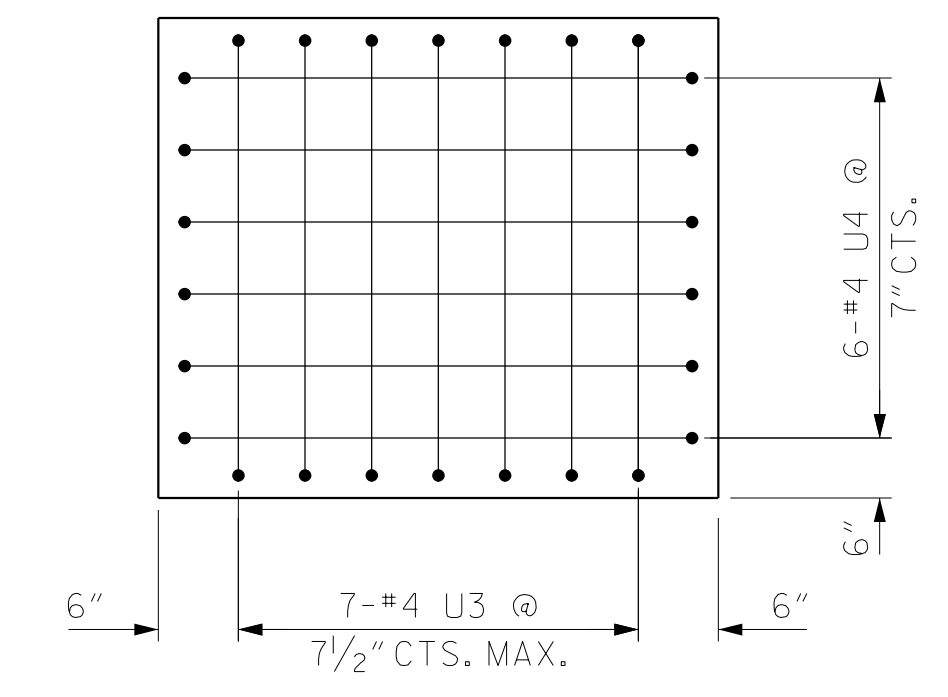


END OF LEFT CAP VIEW



DETAIL "A"

DIMENSIONS ARE TYPICAL FOR EACH GIRDER



END OF RIGHT CAP VIEW

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 1 OF 2



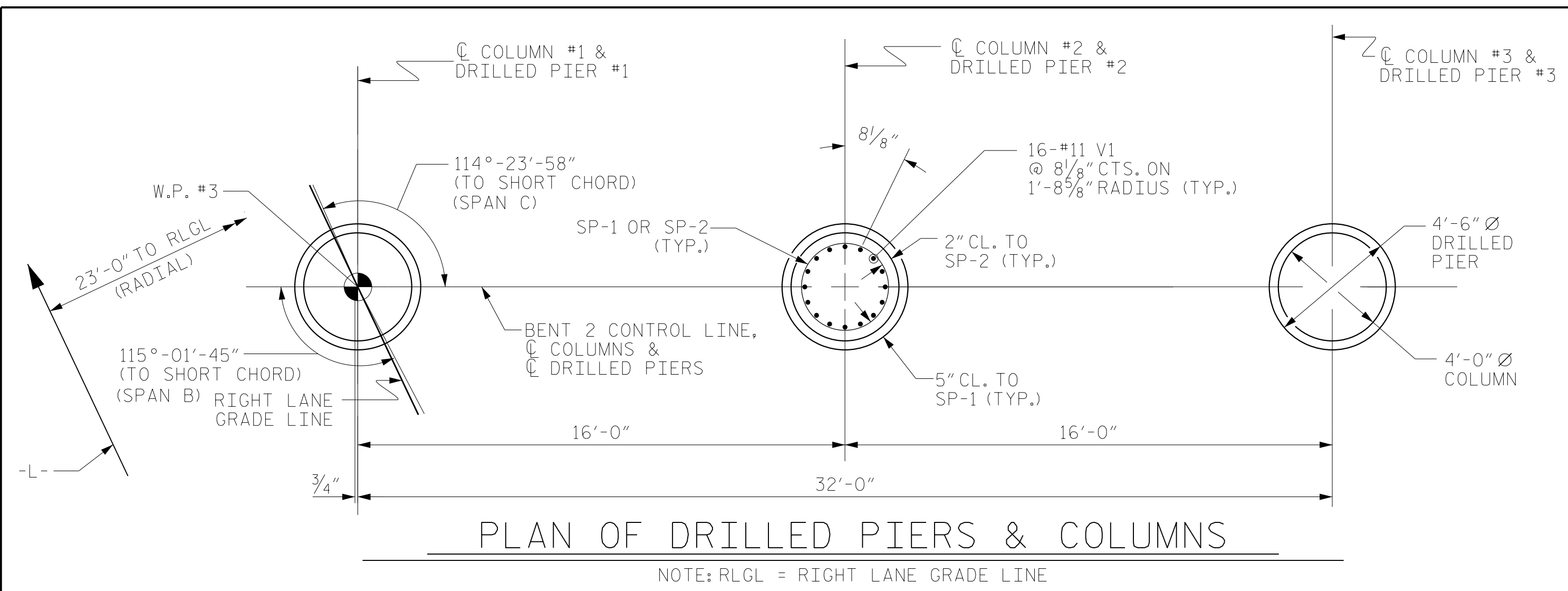
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT NO. 2 RIGHT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S6-28
TOTAL SHEETS	37

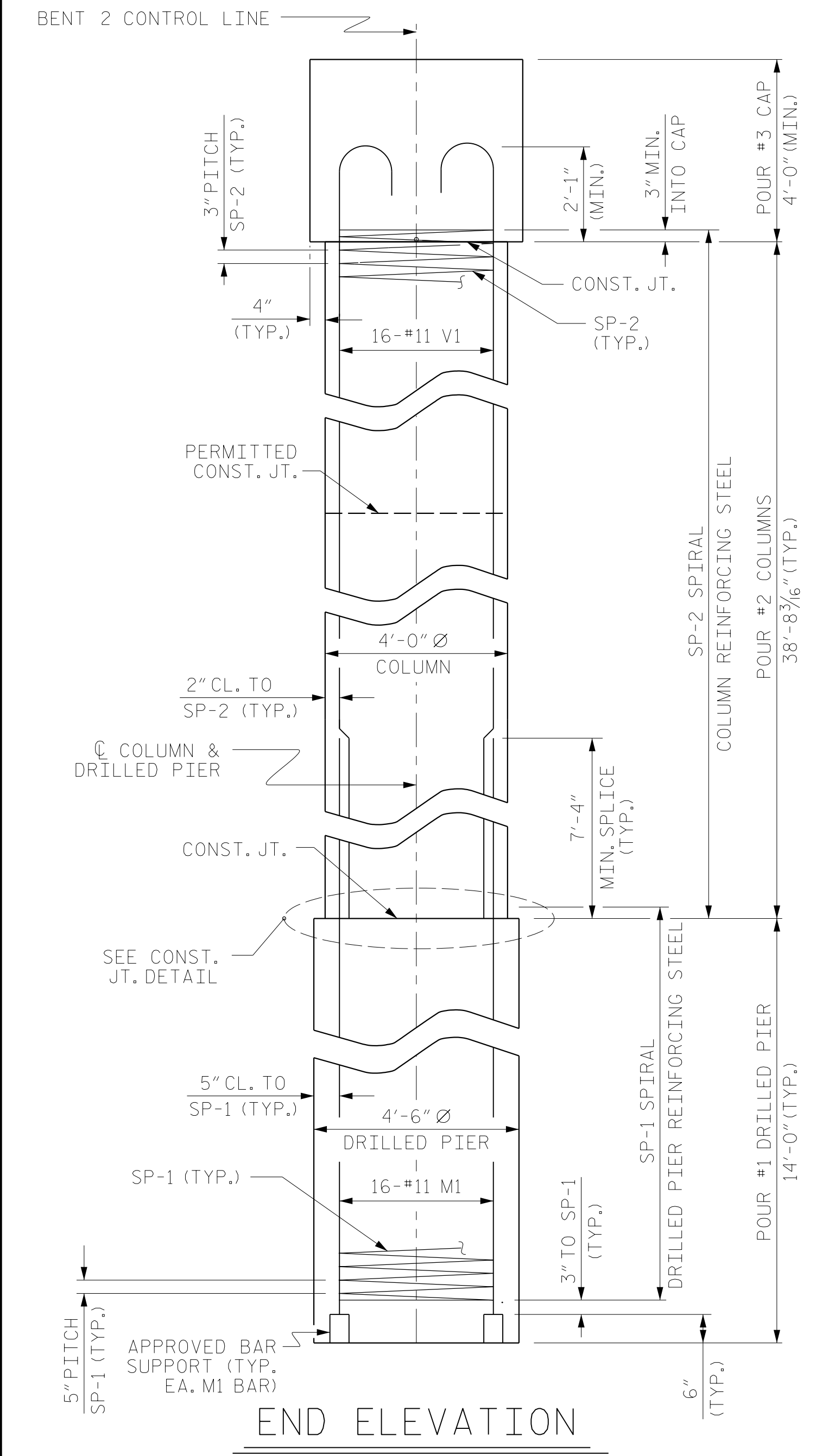
DRAWN BY :	JTC	DATE :	01/2018
CHECKED BY :	MKO	DATE :	03/2018
DESIGN ENGINEER OF RECORD:	MKO	DATE :	04/2018

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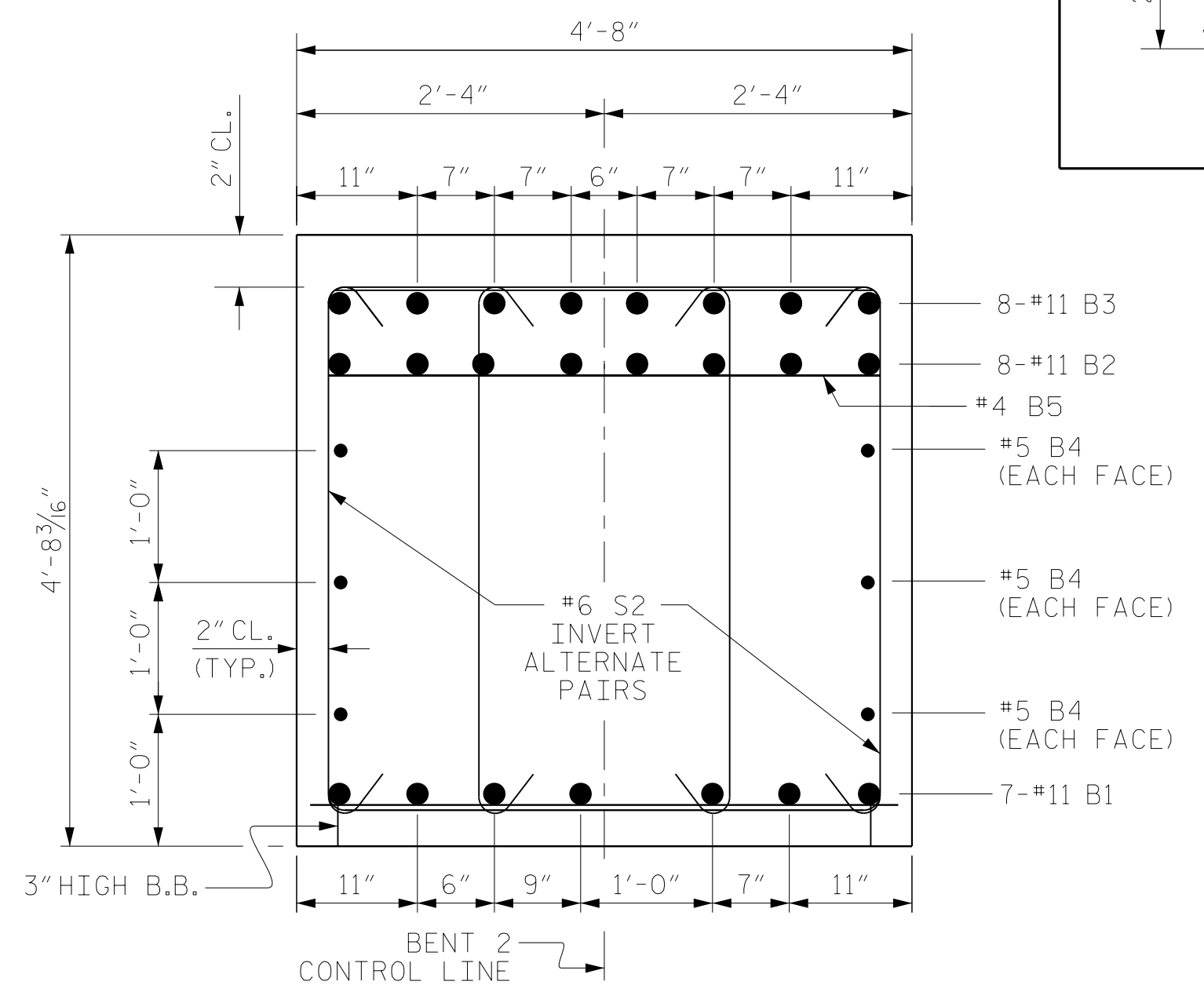


PLAN OF DRILLED PIERS & COLUMNS

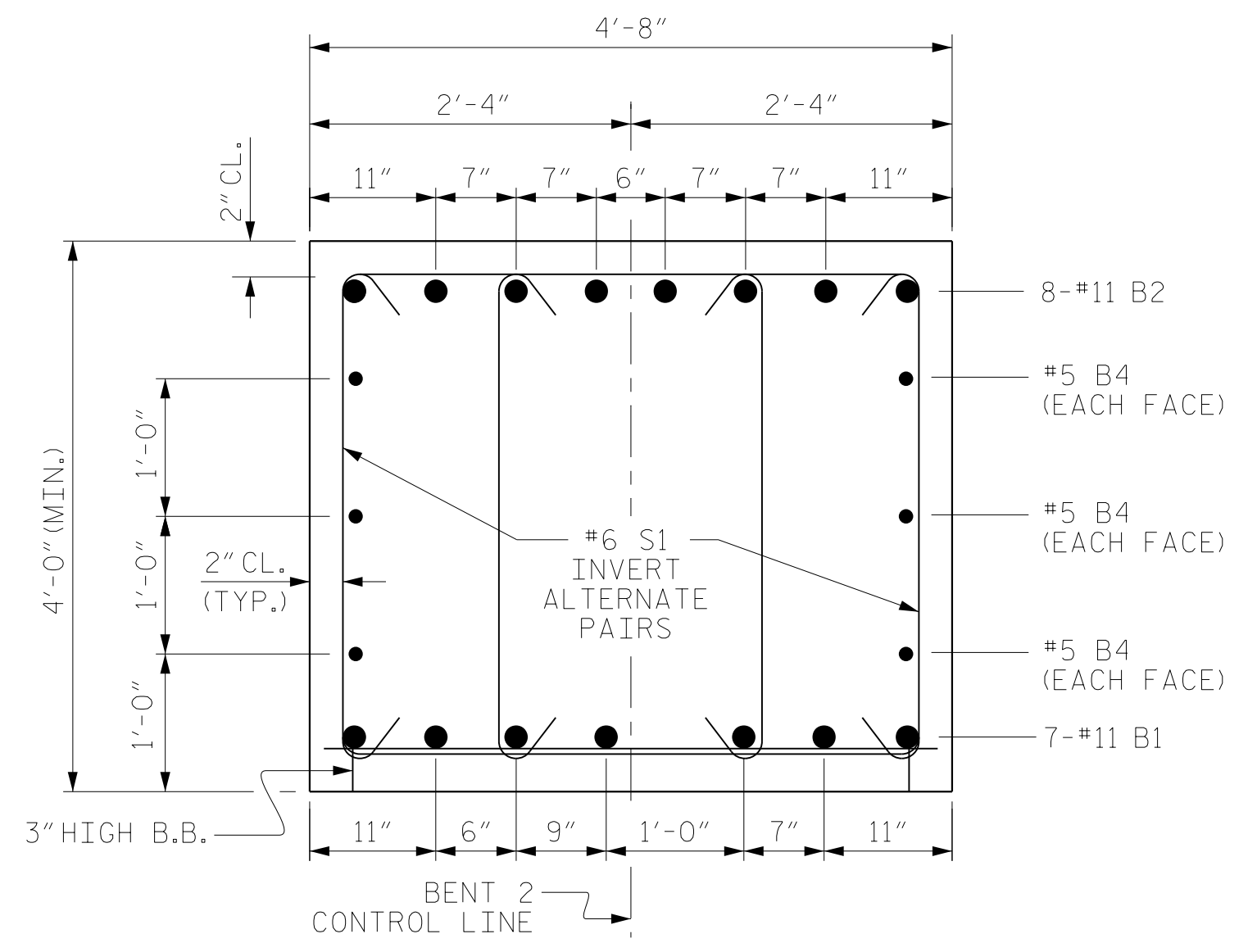
NOTE: RLGL = RIGHT LANE GRADE LINE



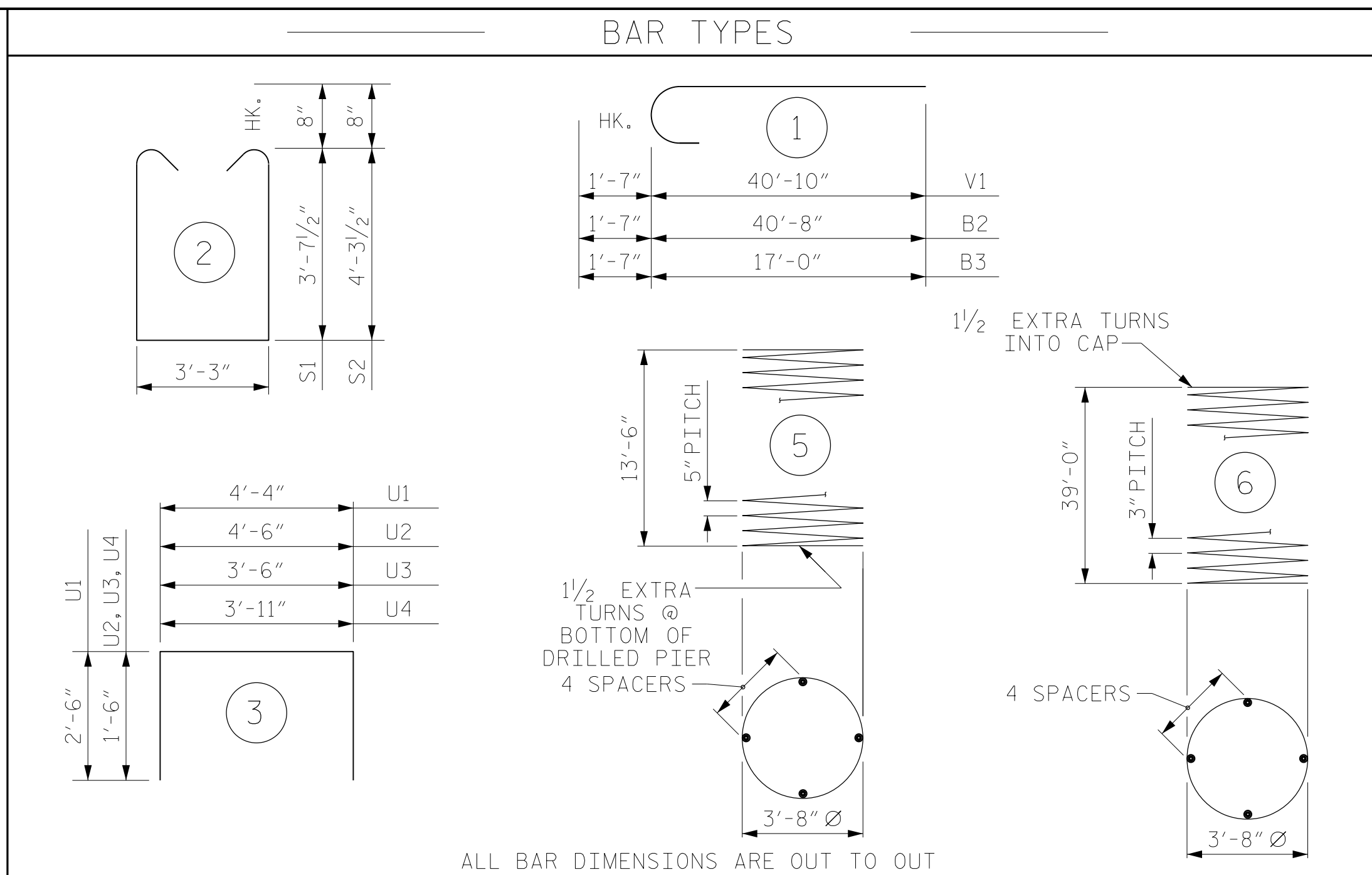
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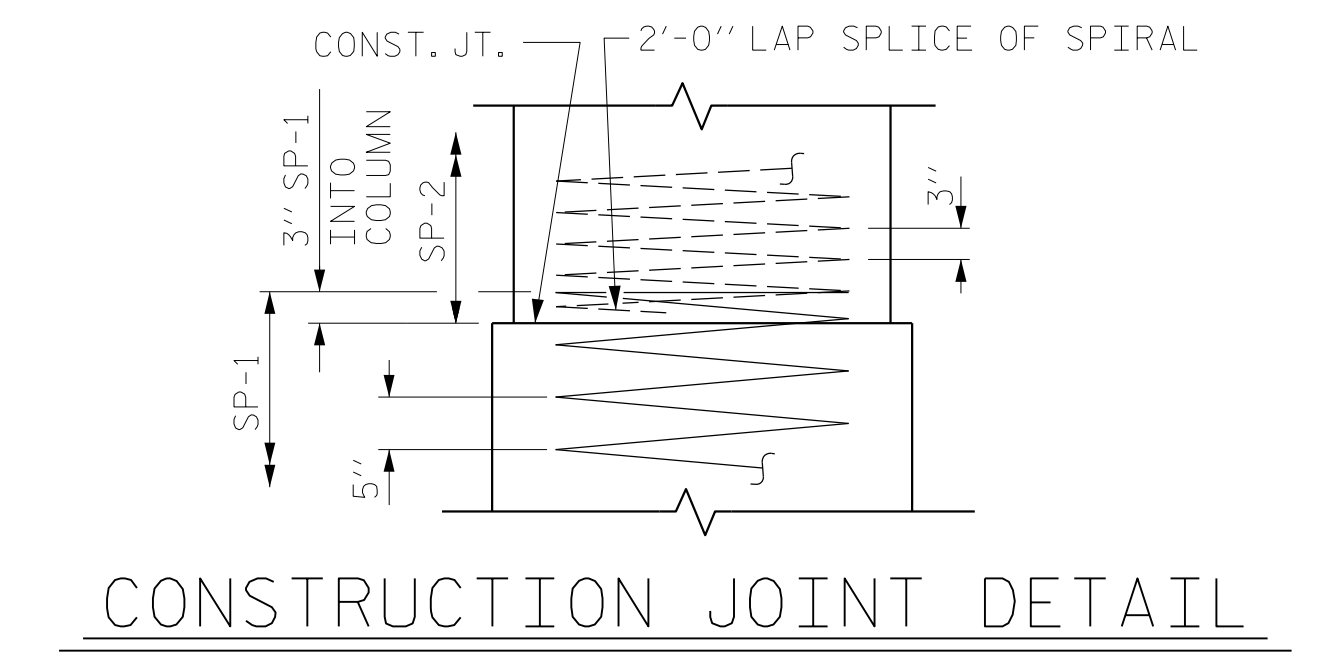
SECTION B-B



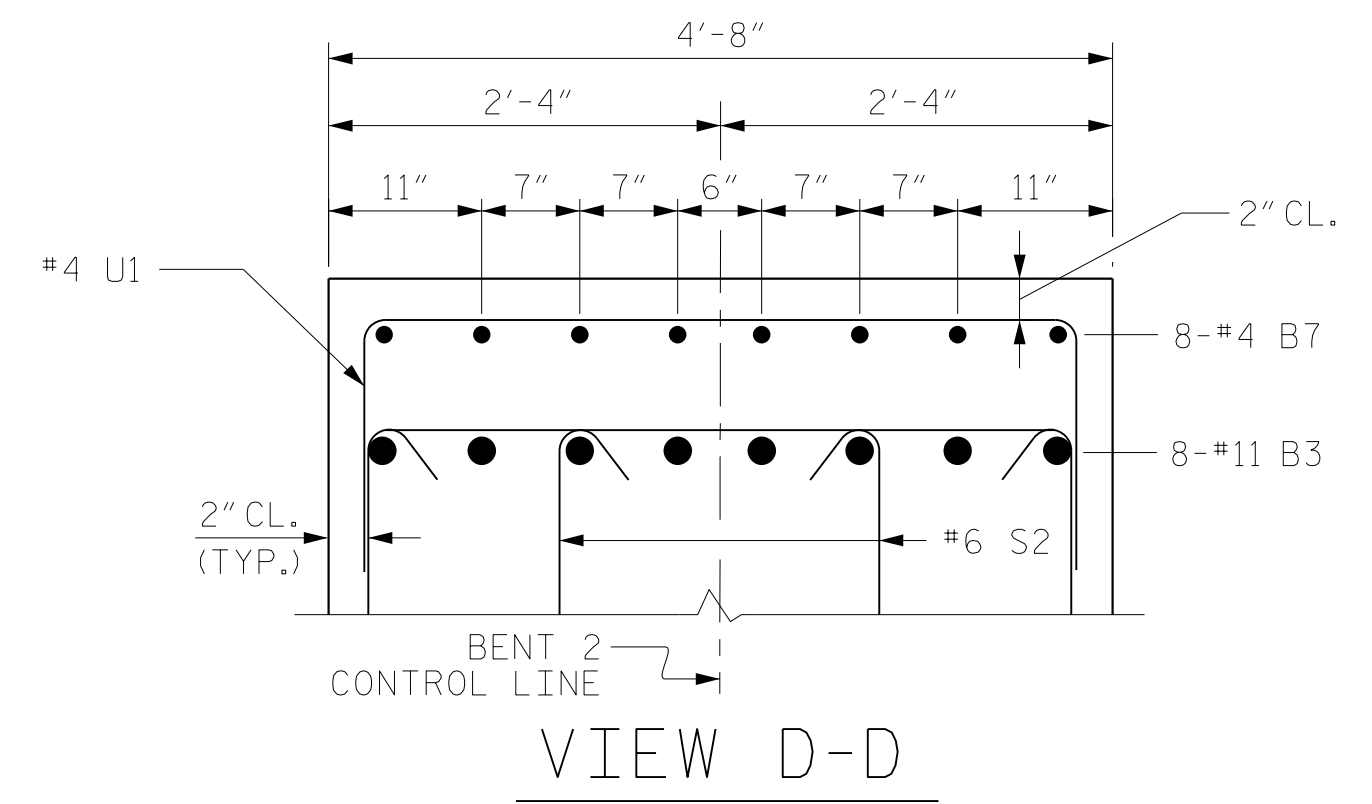
SECTION A-A



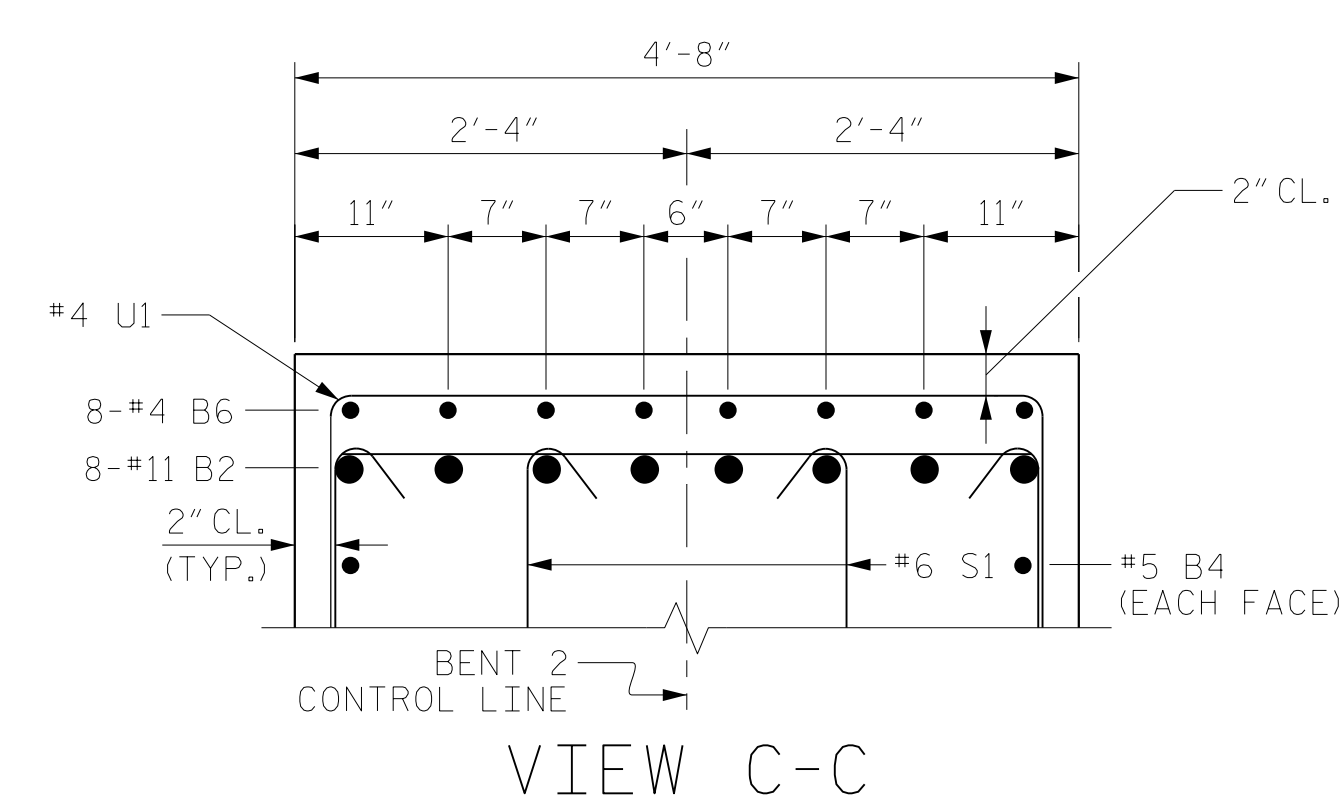
ALL BAR DIMENSIONS ARE OUT TO OUT



CONSTRUCTION JOINT DETAIL



VIEW D-D



VIEW C-C

BILL OF MATERIAL FOR BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11	STR	40'-8"	1512
B2	8	#11	1	42'-3"	1796
B3	8	#11	1	18'-7"	790
B4	6	#5	STR	40'-8"	254
B5	5	#4	STR	4'-4"	14
B6	8	#4	STR	11'-6"	61
B7	8	#4	STR	5'-2"	28
M1	48	#11	STR	23'-10"	6078
S1	52	#6	2	11'-10"	924
S2	44	#6	2	13'-2"	870
U1	53	#4	3	9'-4"	330
U2	7	#4	3	7'-6"	35
U3	7	#4	3	6'-6"	30
U4	14	#4	3	7'-2"	67
V1	48	#11	1	42'-5"	10817
REINFORCING STEEL (FOR BENT 2)					23,606 LBS.
SP-1	3	**	5	386'-5"	1209
SP-2	3	*	6	1794'-2"	3596
SPIRAL COLUMN REINFORCING STEEL (FOR BENT 2)					4,805 LBS.
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
* THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR BENT 2)					
POUR #2 (COLUMNS)					54.1 C.Y.
POUR #3 (CAP)					31.4 C.Y.
TOTAL CLASS A CONCRETE					85.5 C.Y.
DRILLED PIERS: (FOR BENT 2)					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)					24.8 C.Y.
4'-6" Ø DRILLED PIER NOT IN SOIL					30.0 LIN. FT.
4'-6" Ø DRILLED PIER IN SOIL					12.0 LIN. FT.
CSL TUBES					186.0 LIN. FT.

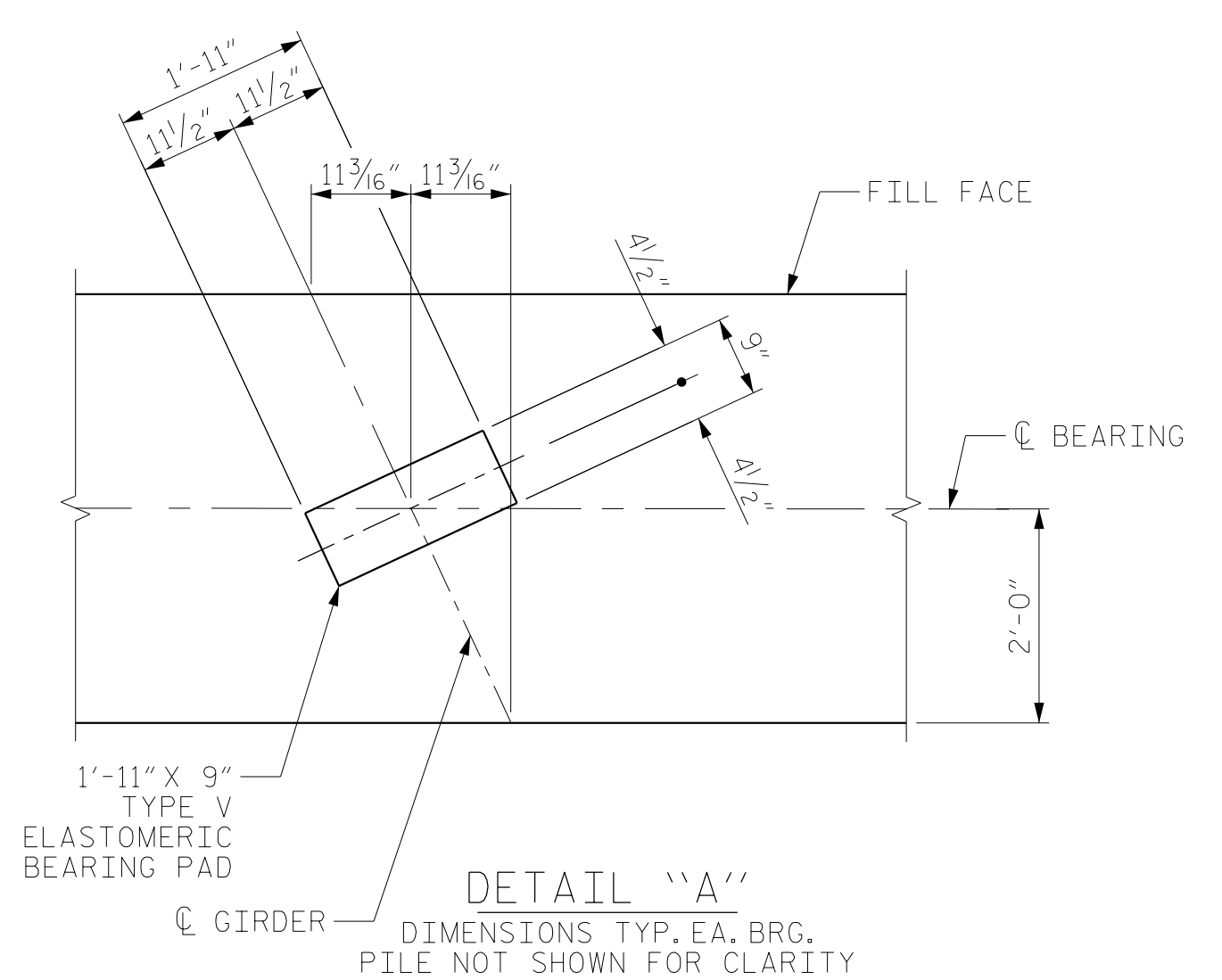
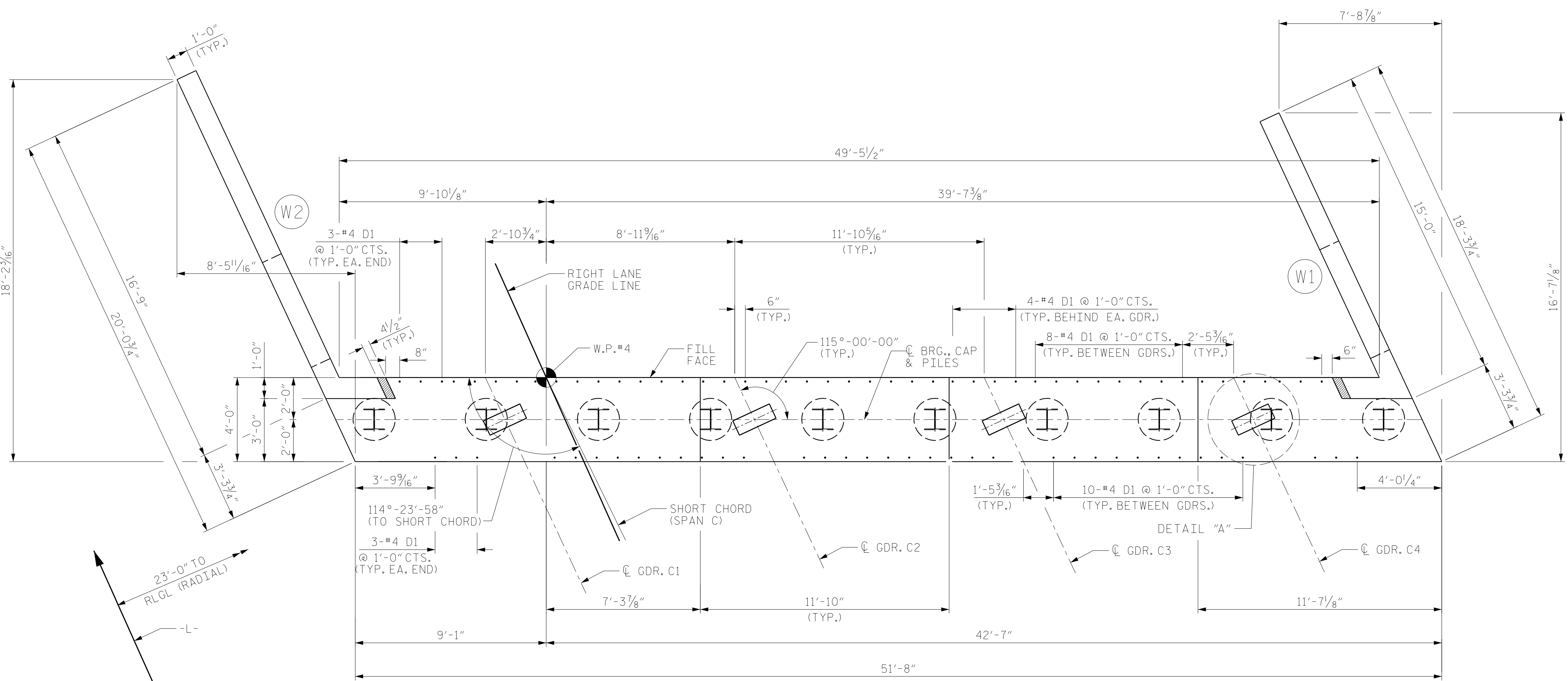
PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 2 OF 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-29
2			4			TOTAL SHEETS 37

DRAWN BY: JTC	DATE: 12/2017
CHECKED BY: MKO	DATE: 03/2018
DESIGN ENGINEER OF RECORD: MKO	DATE: 04/2018

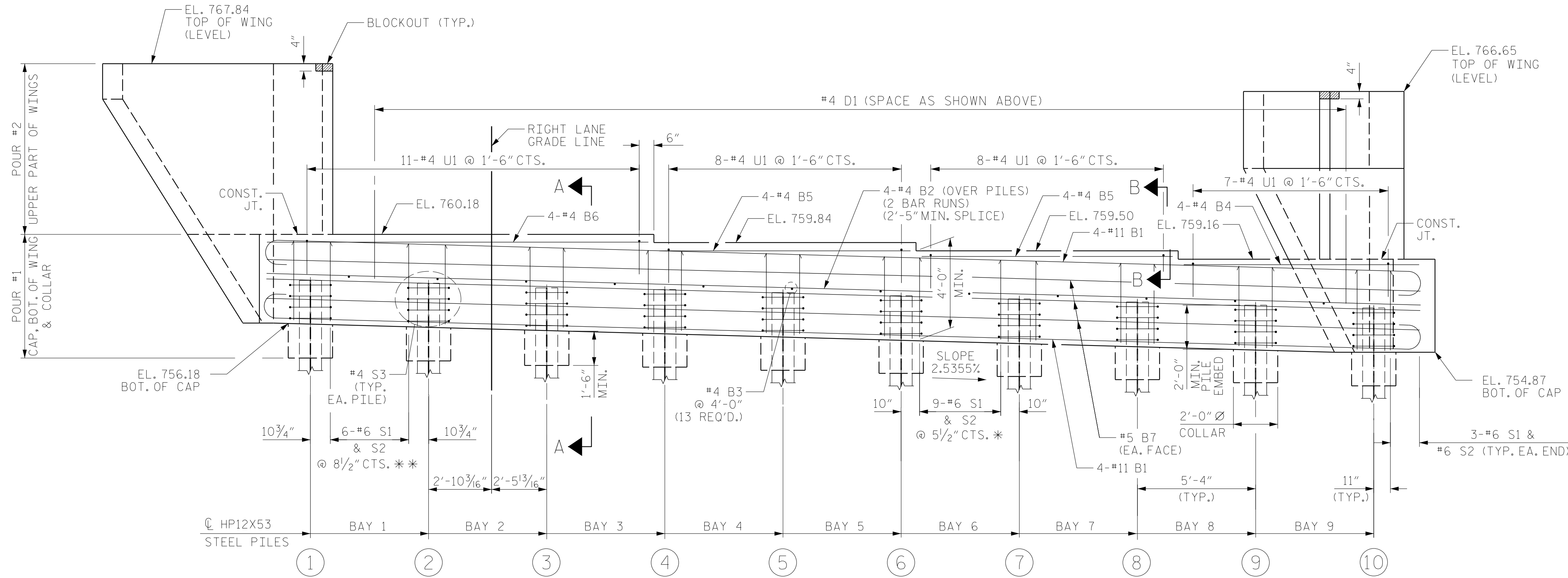
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**NOTES:**  
 THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 6" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.  
 FOR SECTION A-A AND SECTION B-B, SEE SHEET 4 OF 4.  
 #4 D1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN CAP.  
 IT SHALL BE CALLED TO THE CONTRACTOR'S ATTENTION THAT THE WINGWALLS ARE TO RETAIN NO FILL UNTIL THE INTEGRAL END BENT DIAPHRAGM (SUPERSTRUCTURE POUR #4) CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.  
 SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER IS CAST IF SLIP FORMING IS USED.  
 RLGL = RIGHT LANE GRADE LINE.



TOP OF PILE ELEVATIONS	
PILE	ELEVATION
1	758.17
2	758.04
3	757.90
4	757.77
5	757.63
6	757.49
7	757.36
8	757.22
9	757.08
10	756.95

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 1 OF 4



DRAWN BY: JTC DATE: 01/2018  
 CHECKED BY: MKO DATE: 04/2018  
 DESIGN ENGINEER OF RECORD: MKO DATE: 04/2018

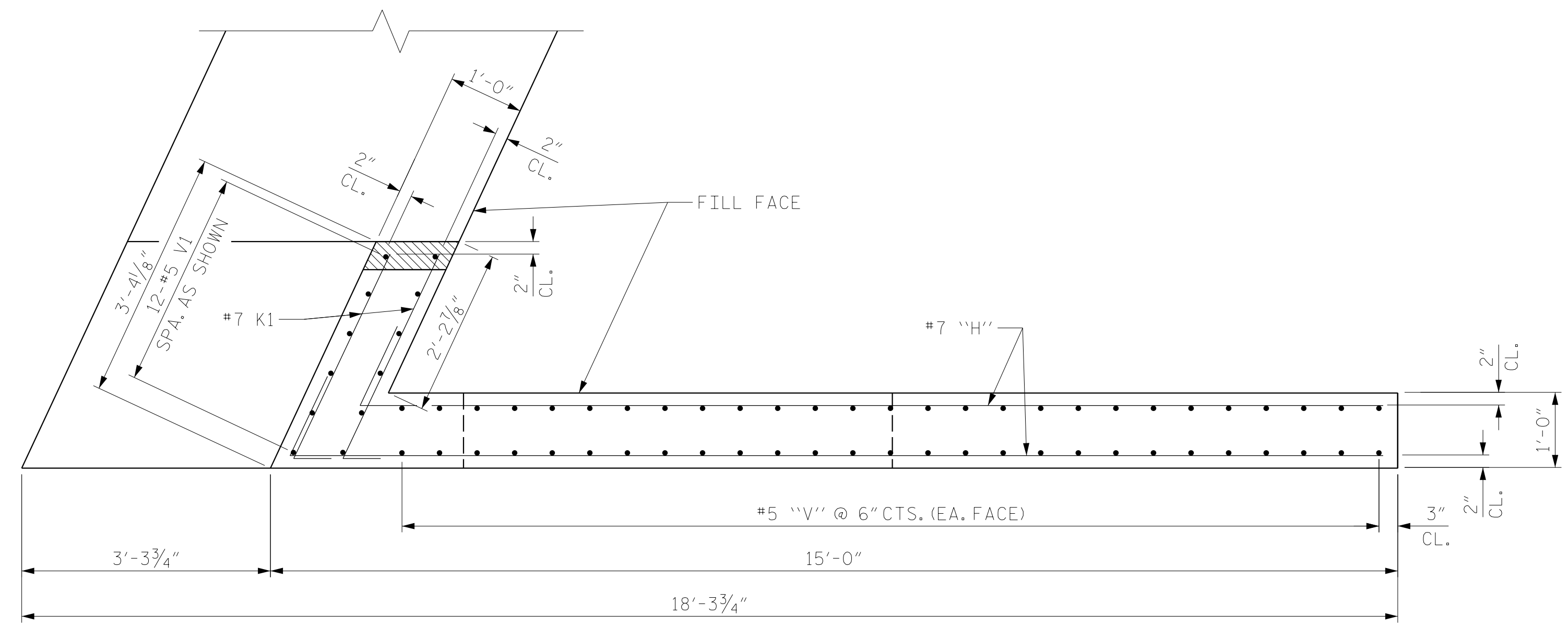
\* = TYPICAL BAY 4 THRU BAY 6  
 \*\* = TYPICAL BAY 1 THRU BAY 3 AND BAY 7 THRU BAY 9

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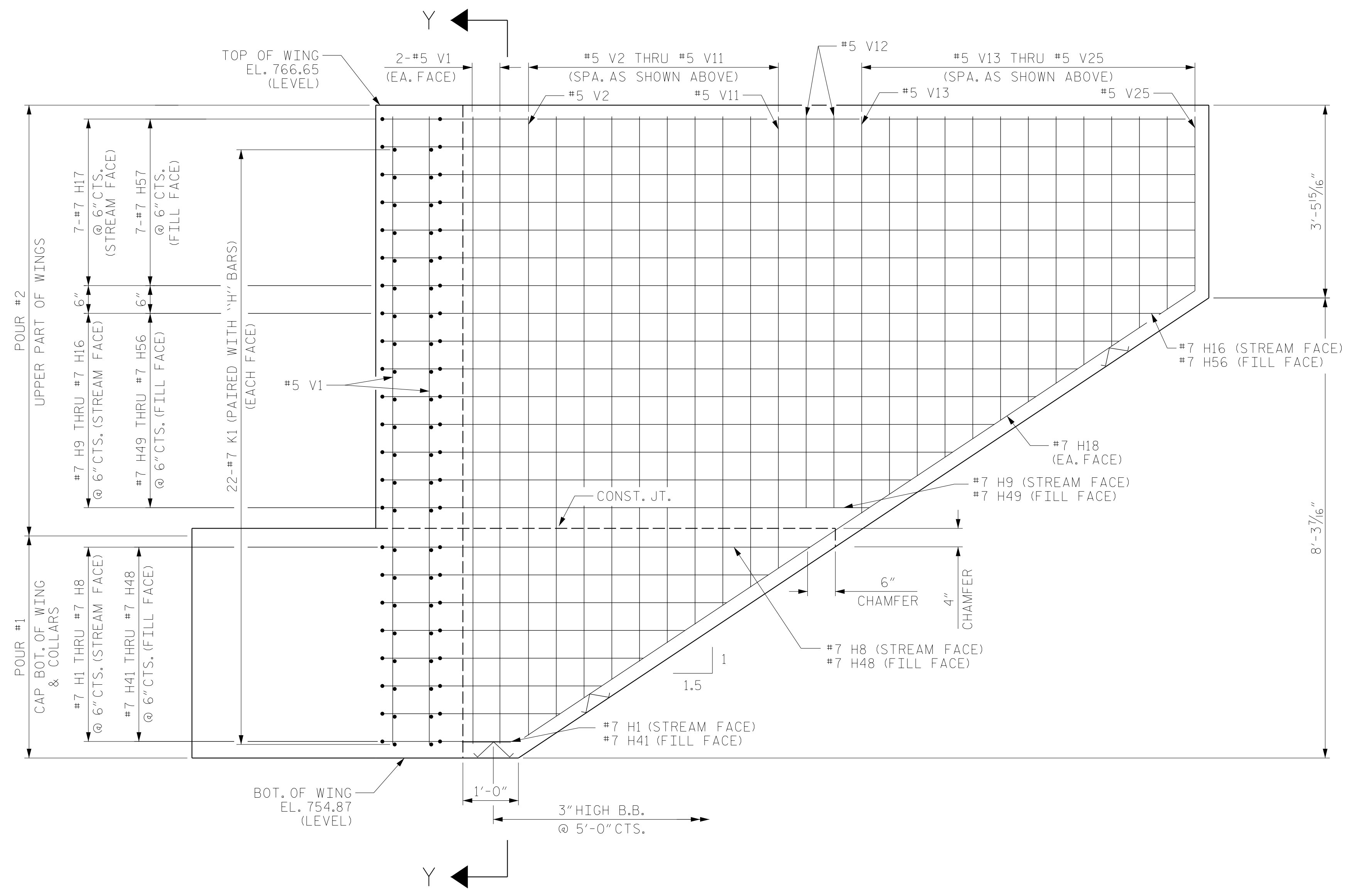
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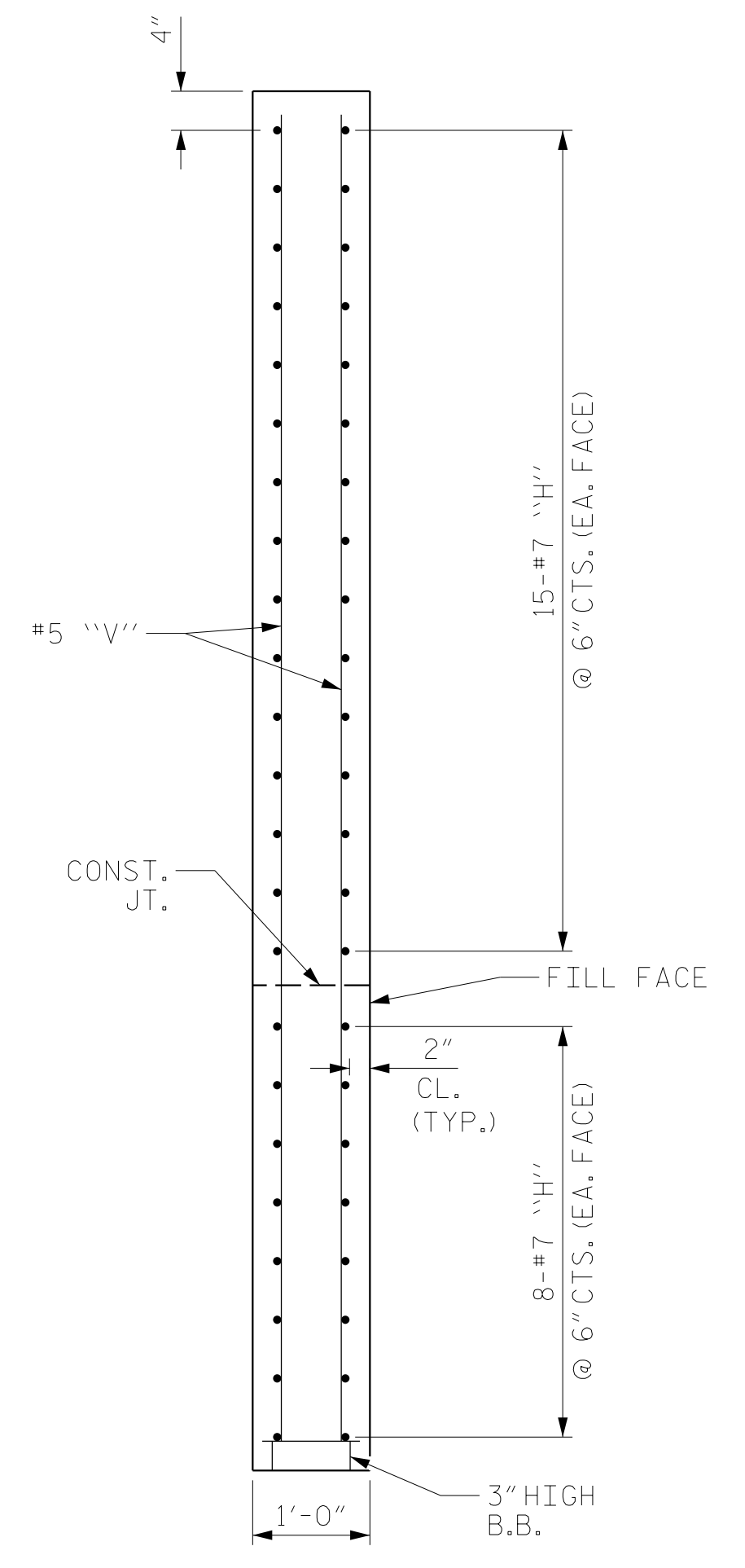
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NO.	BY:	DATE:	NO.	BY:	DATE:	S6-30
1			3			TOTAL SHEETS
2			4			37



PLAN OF WING - W1



ELEVATION OF WING - W1



SECTION Y-Y

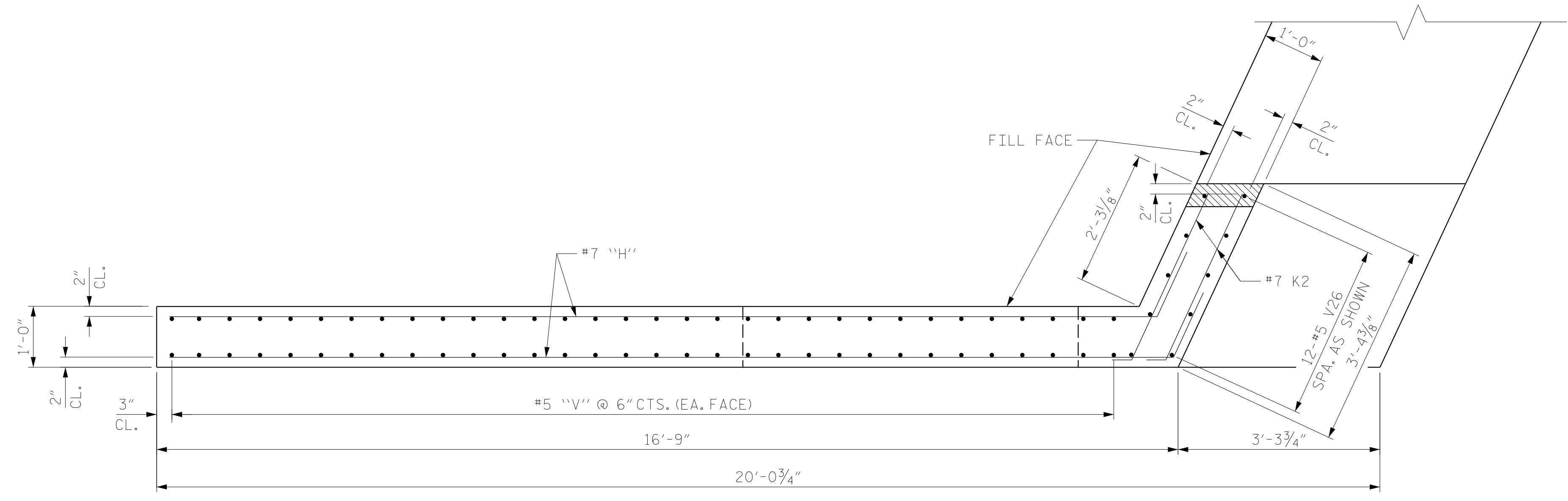
PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-  
 SHEET 2 OF 4

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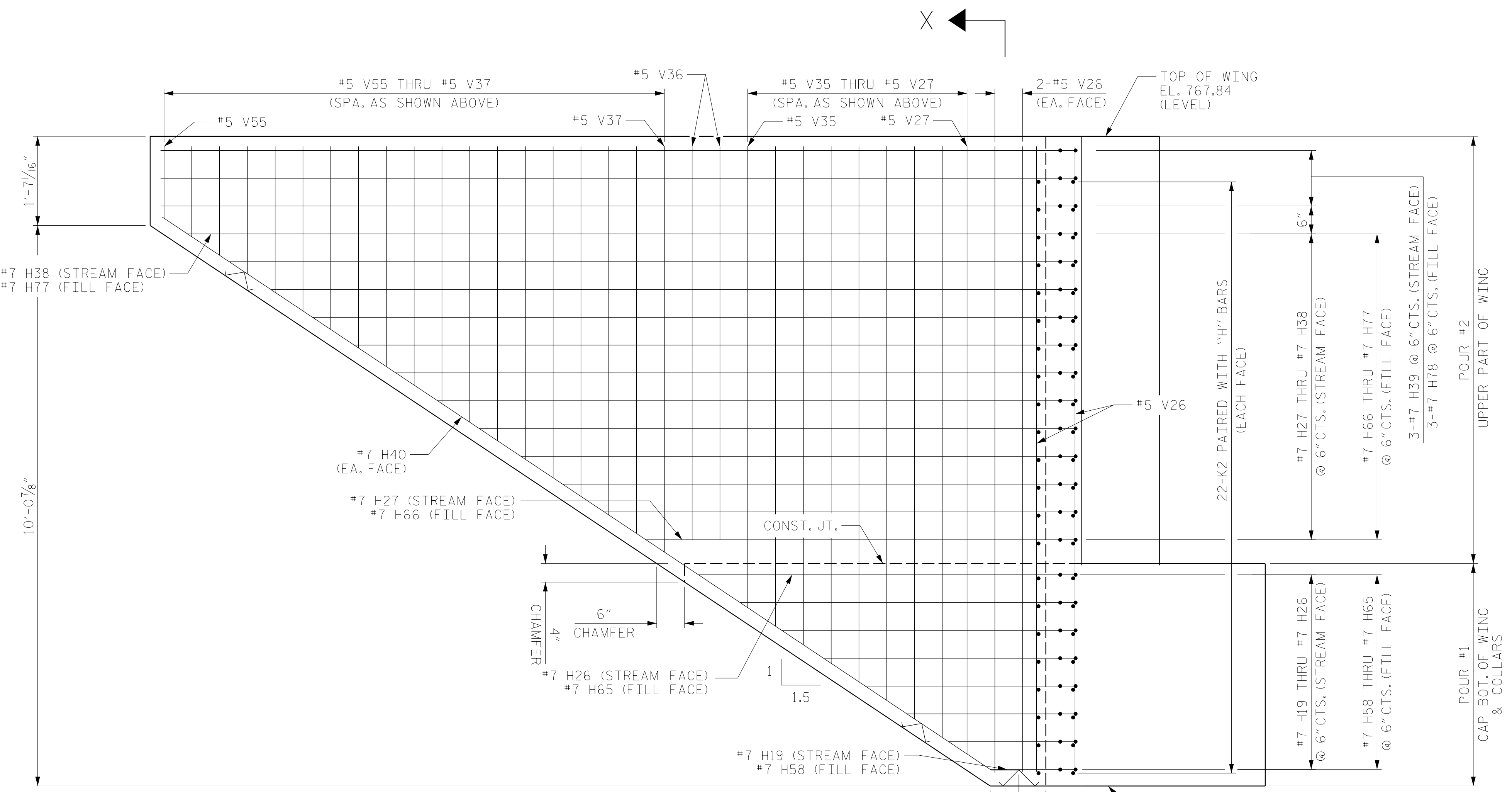
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S6-31	
SUBSTRUCTURE INTEGRAL END BENT NO. 2 RIGHT LANE						TOTAL SHEETS 37	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	
1			3			S6-31	
2			4			TOTAL SHEETS 37	

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DESIGN ENGINEER OF RECORD:	MKO	DATE :	04/2018

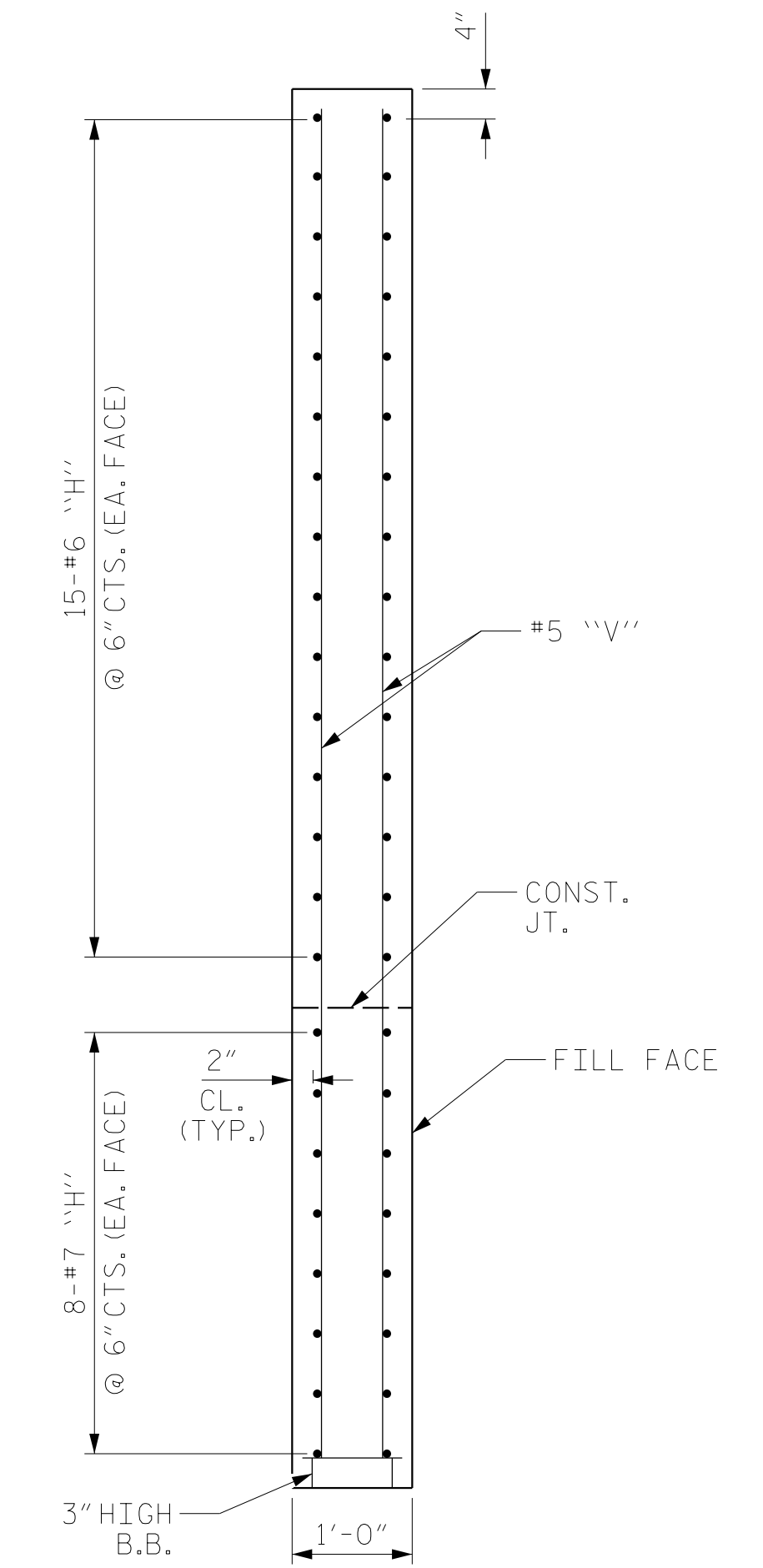
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PLAN OF WING - W2



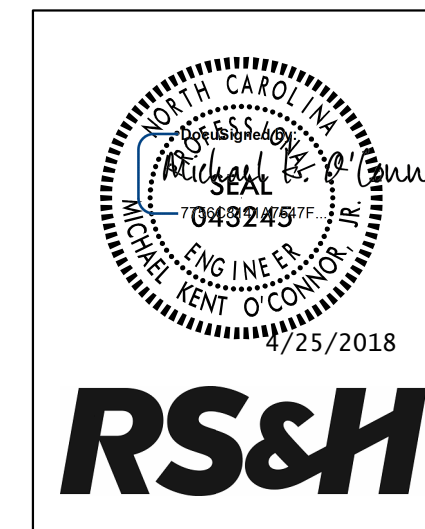
ELEVATION OF WING - W2



SECTION X-X

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 3 OF 4



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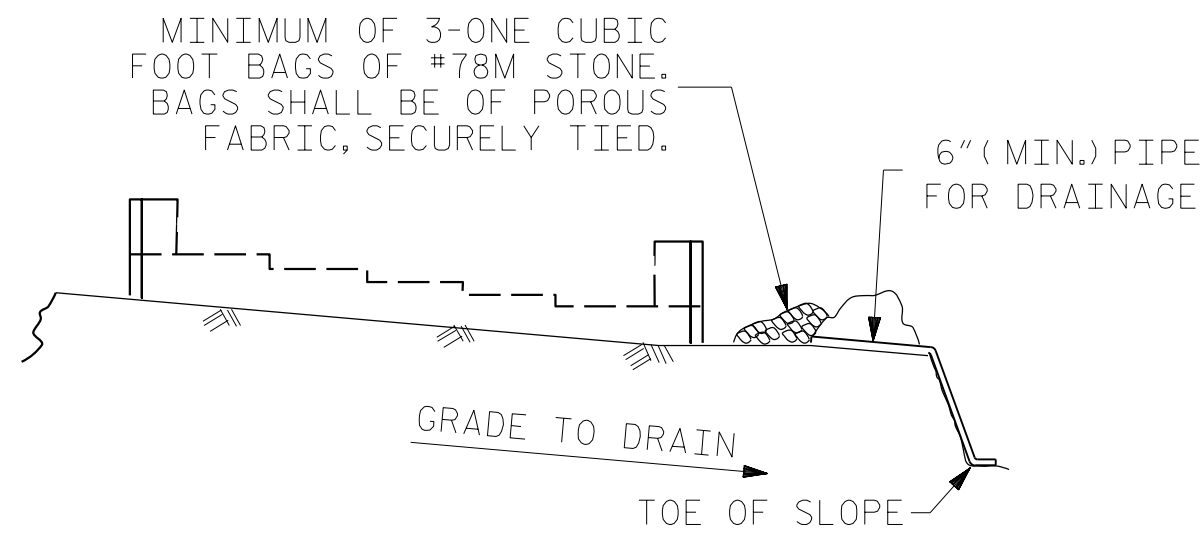
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL  
 END BENT NO. 2  
 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-32
1			3			TOTAL SHEETS
2			4			37

DRAWN BY :	JTC	DATE :	01/2018
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BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

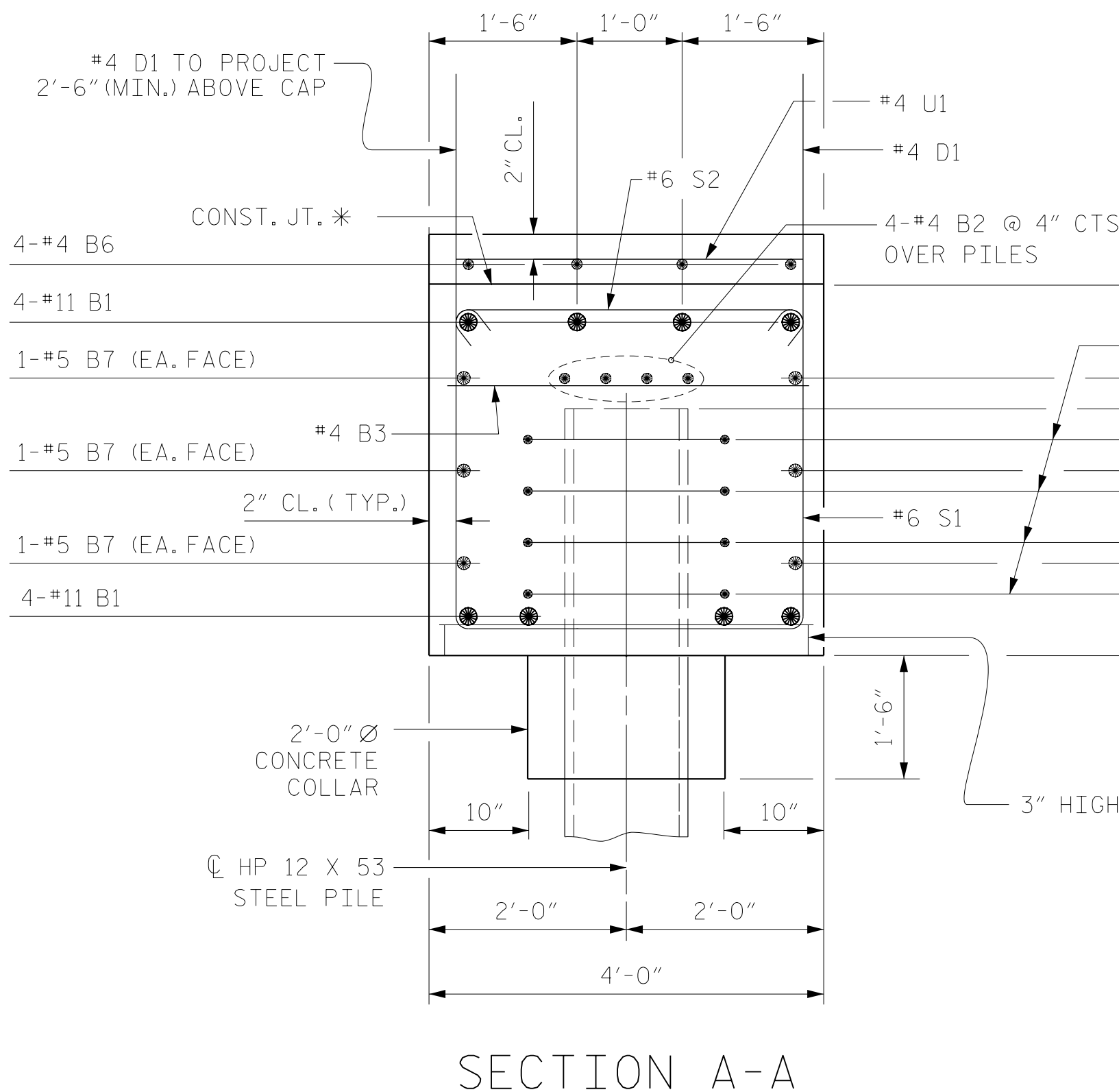
TEMPORARY DRAINAGE AT END BENT

BAR TYPES

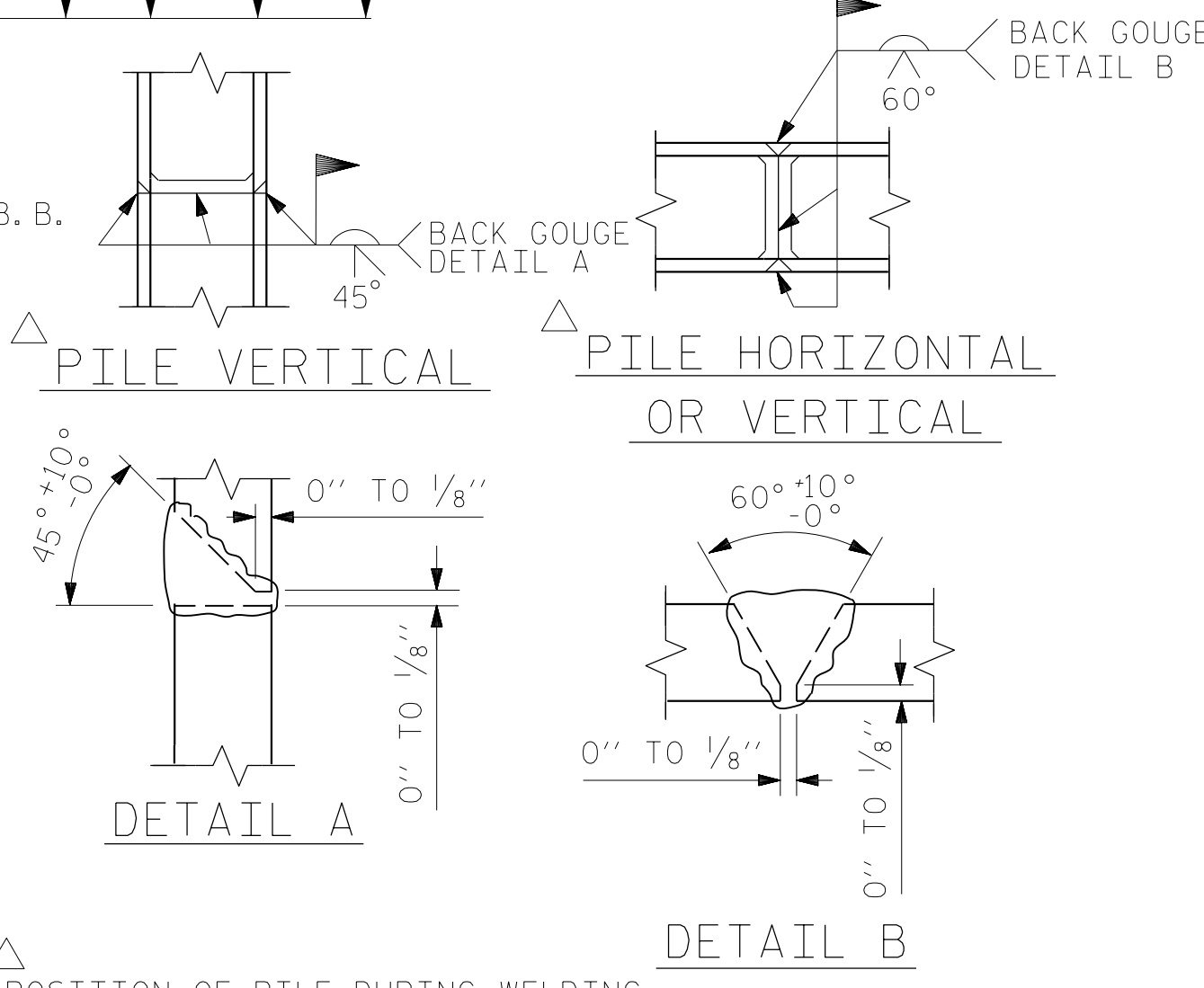
H1	2'-3"	1'-4"	H41
H2	3'-0"	2'-1"	H42
H3	3'-9"	2'-10"	H43
H4	4'-6"	3'-7"	H44
H5	5'-3"	4'-4"	H45
H6	6'-0"	5'-1"	H46
H7	6'-9"	5'-10"	H47
H8	7'-6"	6'-7"	H48
H9	8'-6"	7'-7"	H49
H10	9'-3"	8'-4"	H50
H11	10'-0"	9'-1"	H51
H12	10'-9"	9'-10"	H52
H13	11'-6"	10'-7"	H53
H14	12'-3"	11'-4"	H54
H15	13'-0"	12'-1"	H55
H16	13'-9"	12'-10"	H56
H17	14'-6"	13'-7"	H57
K1	2'-11"		

ALL BAR DIMENSIONS ARE OUT TO OUT.

H19	1'-6"	1'-2"	H58
H20	2'-3"	1'-11"	H59
H21	3'-0"	2'-8"	H60
H22	3'-9"	3'-5"	H61
H23	4'-6"	4'-2"	H62
H24	5'-3"	4'-11"	H63
H25	6'-0"	5'-8"	H64
H26	6'-9"	6'-5"	H65
H27	7'-6"	7'-2"	H66
H28	8'-3"	7'-11"	H67
H29	9'-0"	8'-8"	H68
H30	9'-9"	9'-5"	H69
H31	10'-6"	10'-2"	H70
H32	11'-3"	10'-11"	H71
H33	12'-0"	11'-8"	H72
H34	12'-9"	12'-5"	H73
H35	13'-6"	13'-2"	H74
H36	14'-3"	13'-11"	H75
H37	15'-0"	14'-8"	H76
H38	15'-9"	15'-5"	H77
H39	16'-5"	16'-2"	H78
K2	2'-11"		



\* THE TOP SURFACE OF THE END BENT CAP & WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

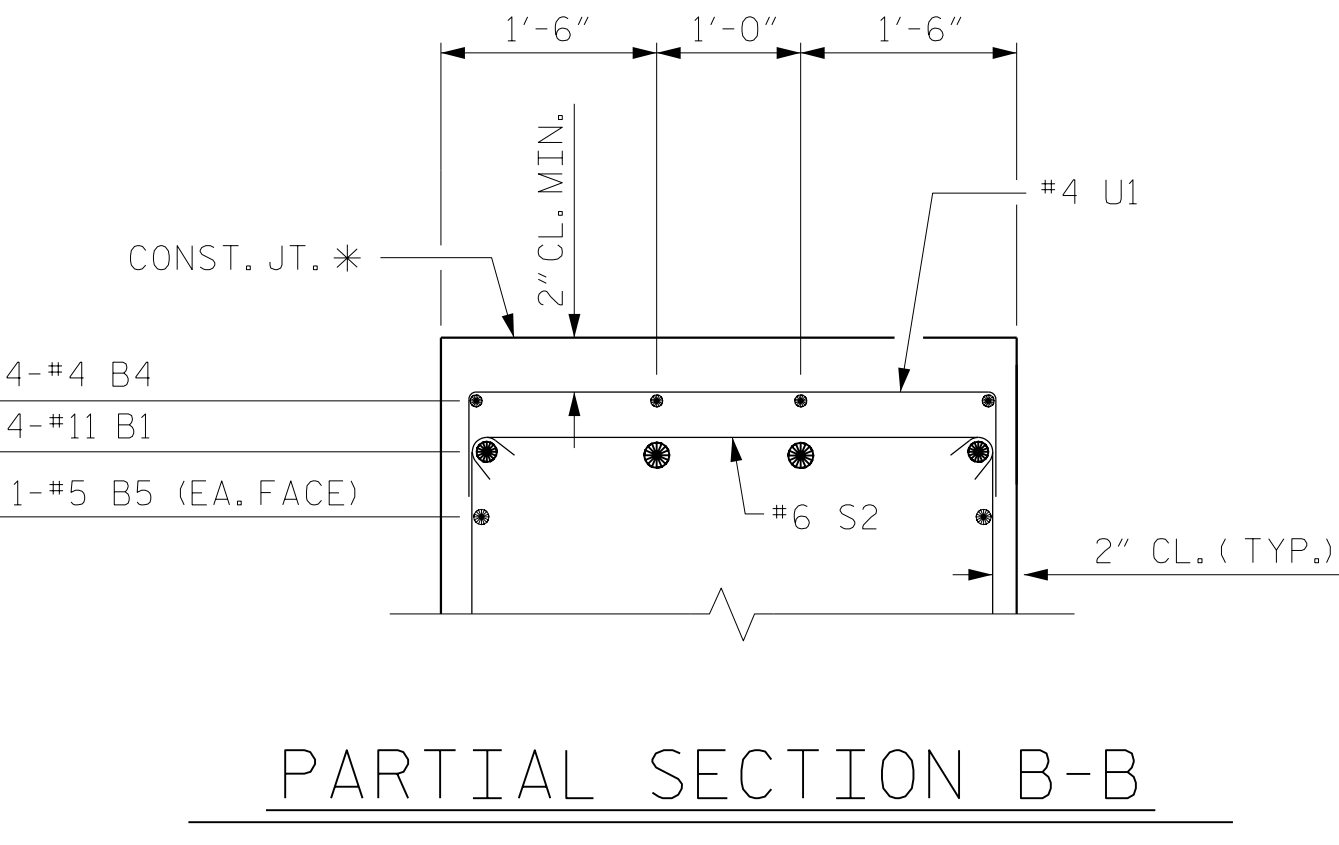


PILE SPLICE DETAILS

BILL OF MATERIAL  
END BENT NO. 2

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	#8	#11	1	54'-5"	2313	H46	#7	6	6'-3"	13	V13	#5	STR	7'-2"	15	
B2	#8	#4	STR	26'-10"	143	H47	#7	6	6'-12"	14	V14	#5	STR	6'-10"	14	
B3	13	#4	STR	3'-8"	32	H48	#7	6	7'-9"	16	V15	#5	STR	6'-6"	14	
B4	4	#4	STR	11'-4"	30	H49	#7	6	8'-9"	18	V16	#5	STR	6'-2"	13	
B5	8	#4	STR	11'-7"	62	H50	#7	6	9'-6"	19	V17	#5	STR	5'-10"	12	
B6	4	#4	STR	17'-9"	47	H51	#7	6	10'-3"	21	V18	#5	STR	5'-6"	11	
B7	6	#5	STR	51'-3"	321	H52	#7	6	10'-12"	22	V19	#5	STR	5'-2"	11	
						H53	#7	6	11'-9"	24	V20	#5	STR	4'-10"	10	
D1	82	#4	STR	4'-6"	246	H54	#7	6	12'-6"	26	V21	#5	STR	4'-6"	9	
						H55	#7	6	13'-3"	27	V22	#5	STR	4'-2"	9	
H1	1	#7	6	3'-5"	7	H56	#7	6	13'-12"	29	V23	#5	STR	3'-10"	8	
H2	1	#7	6	4'-2"	9	H57	#7	6	14'-9"	211	V24	#5	STR	3'-6"	8	
H3	1	#7	6	4'-11"	10	H58	#7	7	2'-4"	5	V25	#5	STR	3'-2"	7	
H4	1	#7	6	5'-8"	12	H59	#7	7	3'-1"	6	V26	#5	STR	11'-3"	188	
H5	1	#7	6	6'-5"	13	H60	#7	7	3'-10"	8	V27	#5	STR	10'-11"	23	
H6	1	#7	6	7'-2"	15	H61	#7	7	4'-7"	9	V28	#5	STR	10'-7"	22	
H7	1	#7	6	7'-11"	16	H62	#7	7	5'-4"	11	V29	#5	STR	10'-3"	21	
H8	1	#7	6	8'-8"	18	H63	#7	7	6'-1"	12	V30	#5	STR	9'-11"	21	
H9	1	#7	6	9'-8"	20	H64	#7	7	6'-10"	14	V31	#5	STR	9'-7"	20	
H10	1	#7	6	10'-5"	21	H65	#7	7	7'-7"	16	V32	#5	STR	9'-3"	19	
H11	1	#7	6	11'-2"	23	H66	#7	7	8'-4"	17	V33	#5	STR	8'-11"	19	
H12	1	#7	6	11'-11"	24	H67	#7	7	9'-1"	19	V34	#5	STR	8'-7"	18	
H13	1	#7	6	12'-8"	26	H68	#7	7	9'-10"	20	V35	#5	STR	8'-3"	17	
H14	1	#7	6	13'-5"	27	H69	#7	7	10'-7"	22	V36	#5	STR	7'-6"	31	
H15	1	#7	6	14'-2"	29	H70	#7	7	11'-4"	23	V37	#5	STR	7'-3"	15	
H16	1	#7	6	14'-11"	30	H71	#7	7	12'-1"	25	V38	#5	STR	6'-11"	14	
H17	7	#7	6	15'-8"	224	H72	#7	7	12'-10"	26	V39	#5	STR	6'-7"	14	
H18	2	#7	8	15'-10"	65	H73	#7	7	13'-7"	28	V40	#5	STR	6'-3"	13	
H19	1	#7	7	2'-8"	5	H74	#7	7	14'-4"	29	V41	#5	STR	5'-11"	12	
H20	1	#7	7	3'-5"	7	H75	#7	7	15'-1"	31	V42	#5	STR	5'-7"	12	
H21	1	#7	7	4'-2"	9	H76	#7	7	15'-10"	32	V43	#5	STR	5'-3"	11	
H22	1	#7	7	4'-11"	10	H77	#7	7	16'-7"	34	V44	#5	STR	4'-11"	10	
H23	1	#7	7	5'-8"	12	H78	#7	7	17'-4"	106	V45	#5	STR	4'-7"	10	
H24	1	#7	7	6'-5"	13						V46	#5	STR	4'-3"	9	
H25	1	#7	7	7'-2"	15	K1	#4	#7	6	4'-1"	367	V47	#5	STR	3'-11"	8
H26	1	#7	7	7'-11"	16	K2	#4	#7	7	4'-1"	367	V48	#5	STR	3'-7"	7
H27	1	#7	7	8'-8"	18						V49	#5	STR	3'-3"	7	
H28	1	#7	7	9'-5"	19	S1	#6	#6	2	12'-3"	1196	V50	#5	STR	2'-11"	6
H29	1	#7	7	10'-2"	21	S2	#6	#6	3	5'-0"	488	V51	#5	STR	2'-7"	5
H30	1	#7	7	10'-11"	22	S3	#4	#4	4	6'-6"	174	V52	#5	STR	2'-3"	5
H31	1	#7	7	11'-8"	24						V53	#5	STR	1'-11"	4	
H32	1	#7	7	12'-5"	25	U1	#4	#4	5	8'-8"	197	V54	#5	STR	1'-7"	3
H33	1	#7	7	13'-2"	27						V55	#5	STR	1'-3"	3	
H34	1	#7	7	13'-11"	28	V1	#5	STR	11'-4"	190						
H35	1	#7	7	14'-8"	30	V2	#5	STR	11'-2"	23						
H36	1	#7	7	15'-5"	32	V3	#5	STR	10'-10"	23						
H37	1	#7	7	16'-2"	33	V4	#5	STR	10'-6"	22						
H38	1	#7	7	16'-11"	35	V5	#5	STR	10'-2"	21						
H39	3	#7	7	17'-7"	108	V6	#5	STR	9'-10"	21						
H40	2	#7	8	19'-0"	78	V7	#5	STR	9'-6"	20						
H41	1	#7	6	2'-6"	5	V8	#5	STR	9'-2"	20						
H42	1	#7	6	3'-3"	7	V9	#5	STR	8'-10"	19						
H43	1	#7	6	3'-12"	8	V10	#5	STR	8'-6"	18						
H44	1	#7	6	4'-9"	10	V11	#5	STR	8'-2"	17						
H45	1	#7	6	5'-6"	11	V12	#5	STR	7'-3"	30						

\*\*B6 BARS SHALL BE FIELD CUT TO MAINTAIN CLEAR COVER.



PARTIAL SECTION B-B

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-  
SHEET 4 OF 4

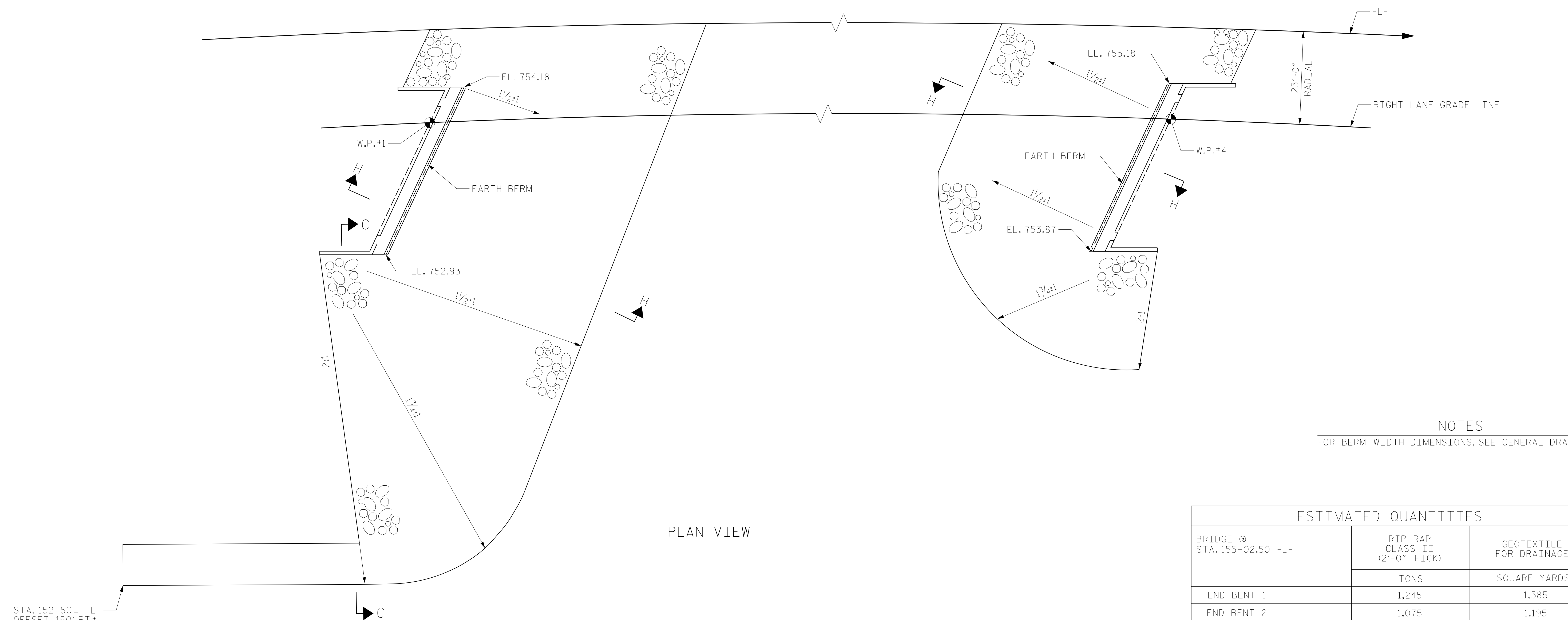
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DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
INTEGRAL  
END BENT NO. 2  
RIGHT LANE

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2			4				STR. #6

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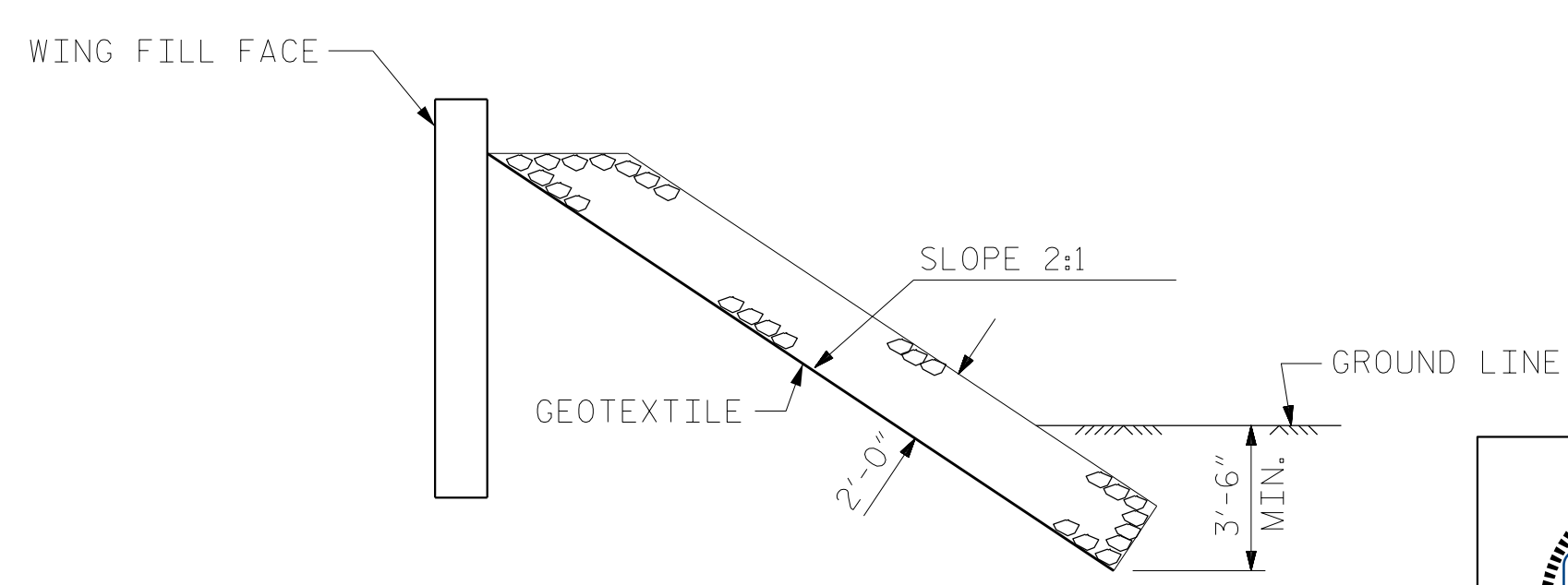
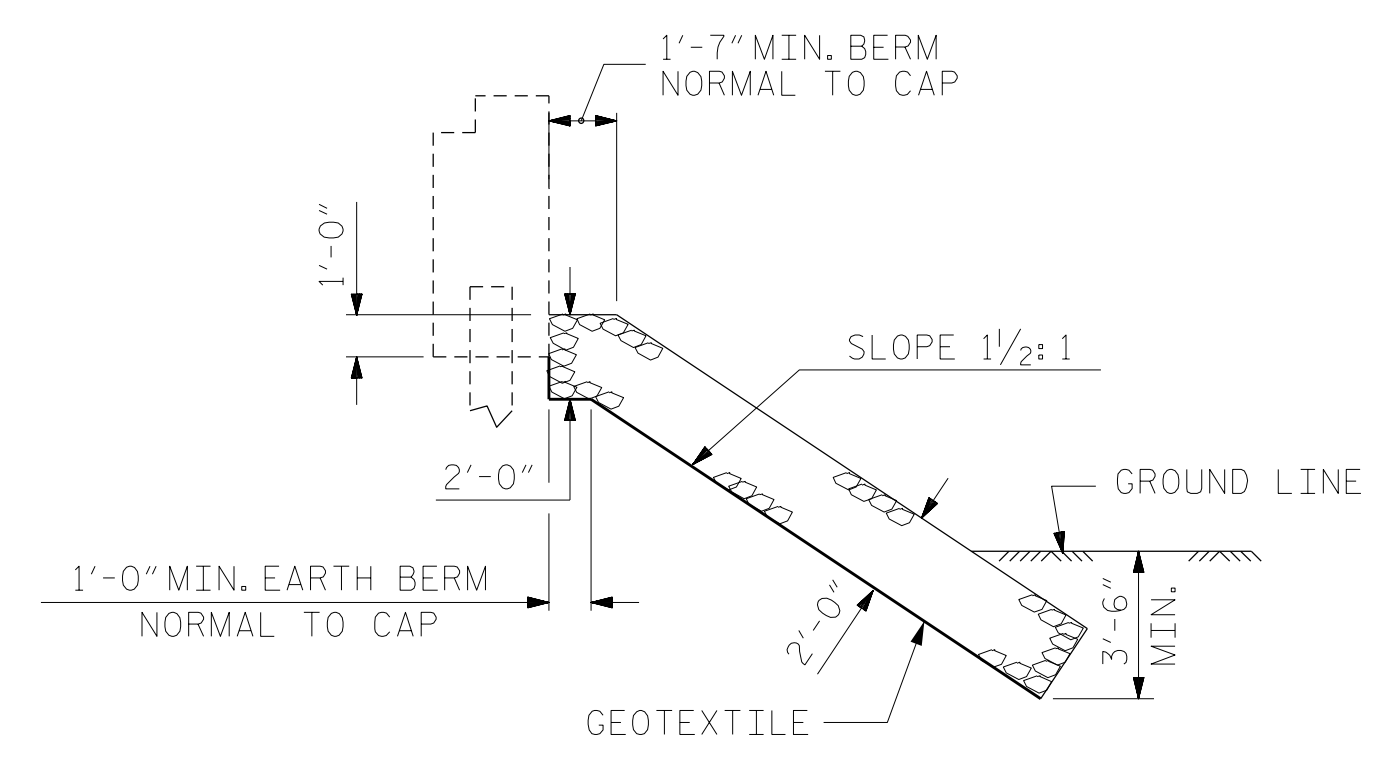
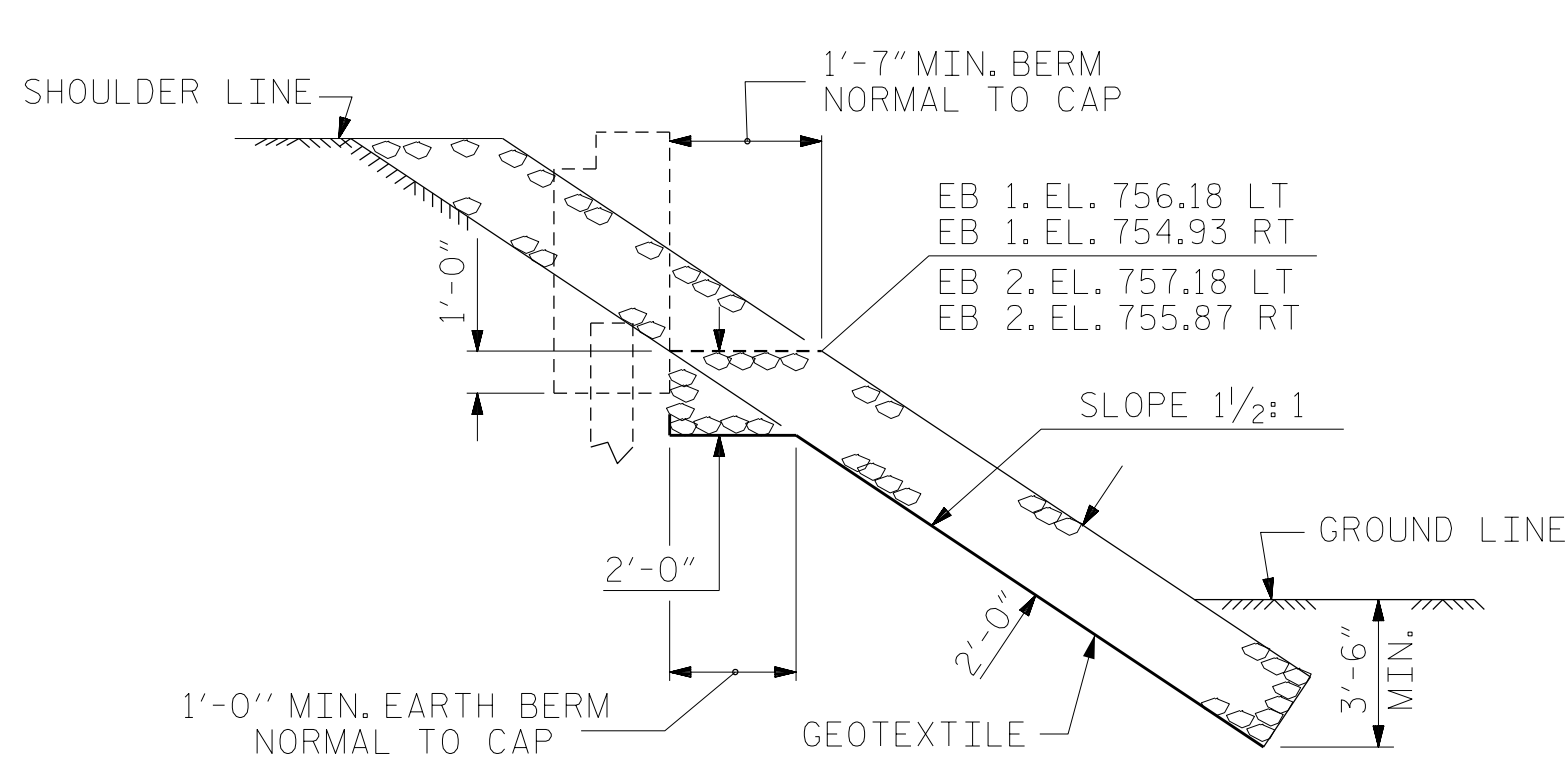
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STA. 152+50± -L-  
 OFFSET 150' RT±  
 BERM EL. 722.90

NOTES  
 FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

ESTIMATED QUANTITIES		
BRIDGE @ STA. 155+02.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	1,245	1,385
END BENT 2	1,075	1,195



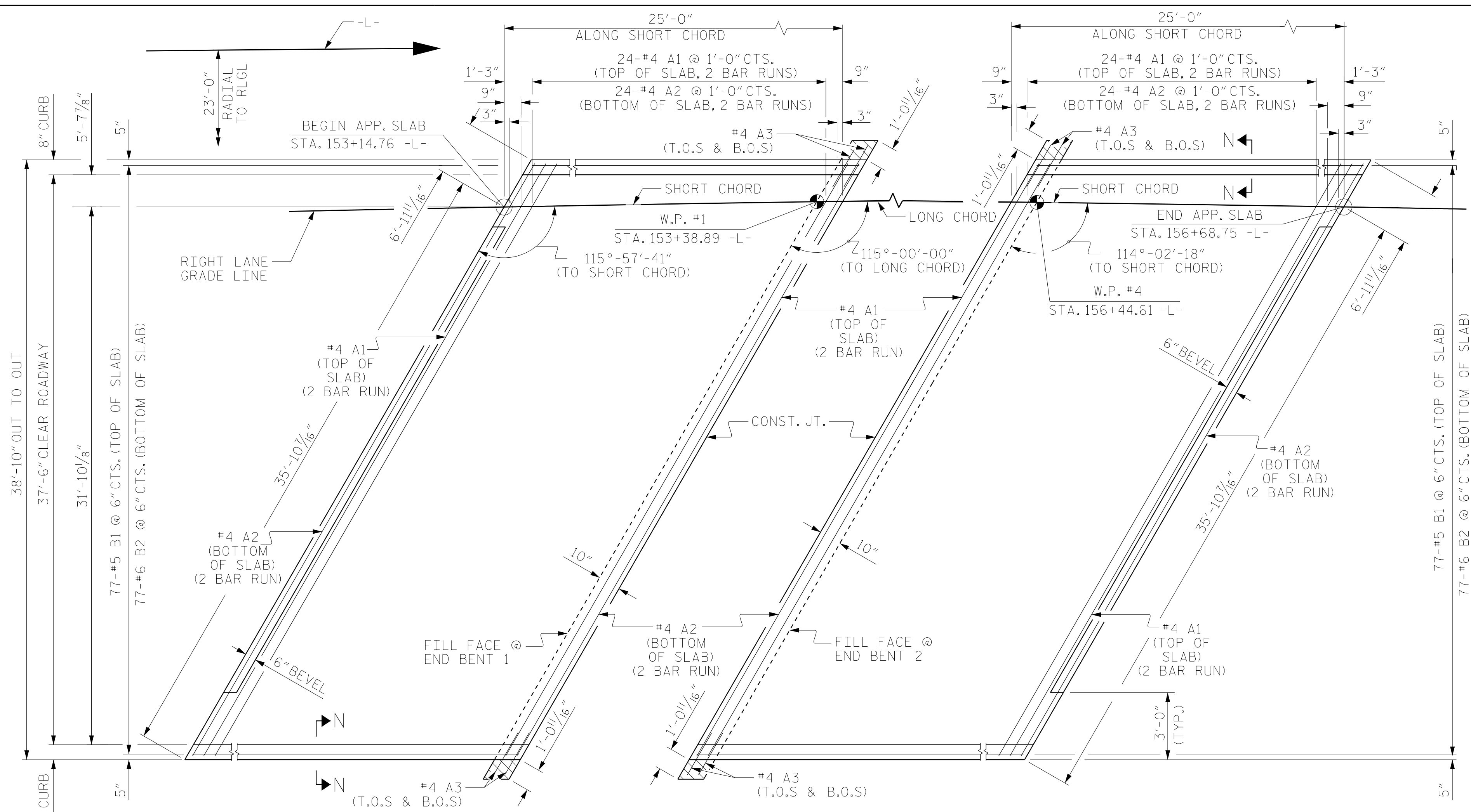
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 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
RIP RAP DETAILS RIGHT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S6-34					TOTAL SHEETS 37

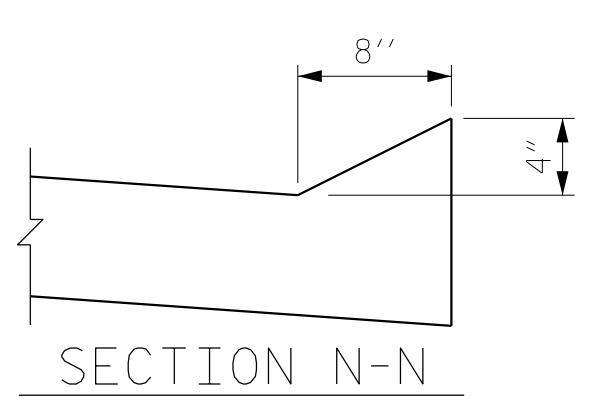
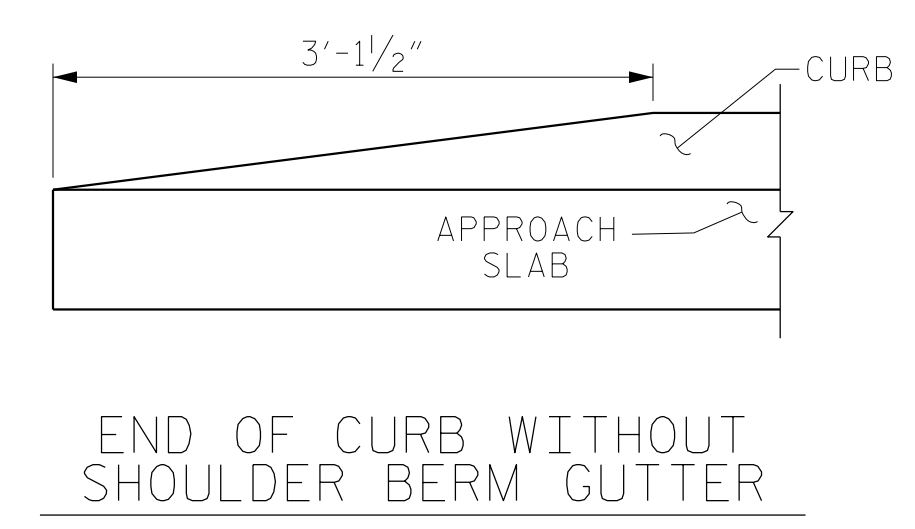
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PLAN @ END BENT 1                      PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS  
 [Hatched Box] CONCRETE TO BE FILLED IN DURING CONSTRUCTION OF APPROACH SLABS



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.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE. 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.
- T.O.S.= TOP OF SLAB  
B.O.S.= BOTTOM OF SLAB
- GEOTEXTILE SHALL BE TYPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH THE 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" DIAMETER DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- "A" BARS ARE PLACED PARALLEL TO THE SKEW OF EACH END BENT.
- "B" BARS ARE PLACED PARALLEL TO THE EDGES OF THE APPROACH SLAB.
- RLGL = RIGHT LANE GRADE LINE

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

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	22'-3"	773
A2	52	#4	STR	22'-2"	770
* A3	8	#4	STR	3'-0"	16
* B1	77	#5	STR	23'-10"	1914
B2	77	#6	STR	24'-5"	2824
REINFORCING STEEL				LBS.	3,594
* EPOXY COATED REINFORCING STEEL				LBS.	2,703
CLASS AA CONCRETE				C. Y.	42.0

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 155+02.50 -L-

SHEET 1 OF 2

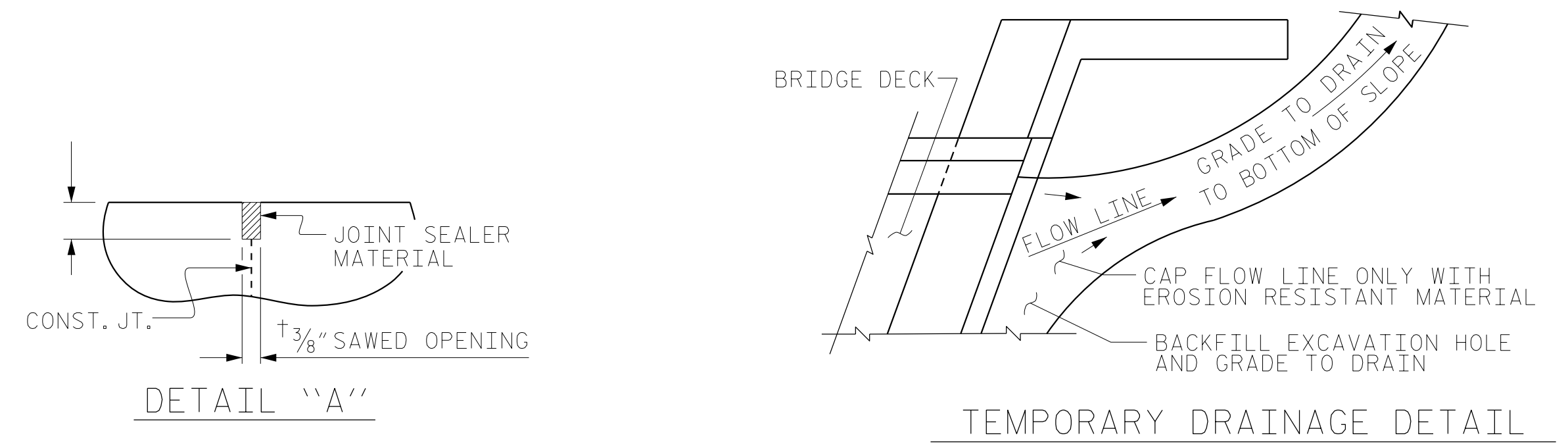
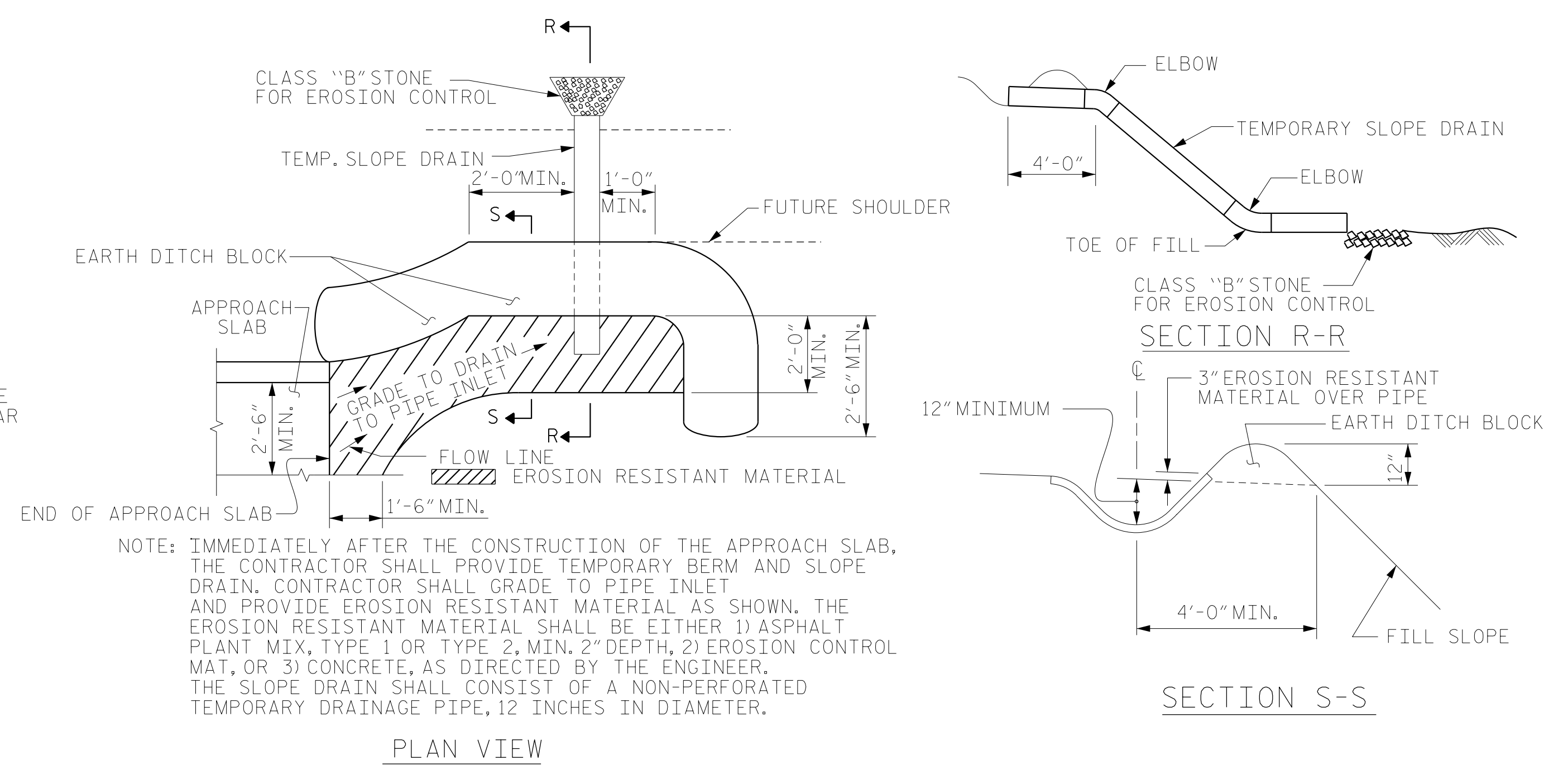
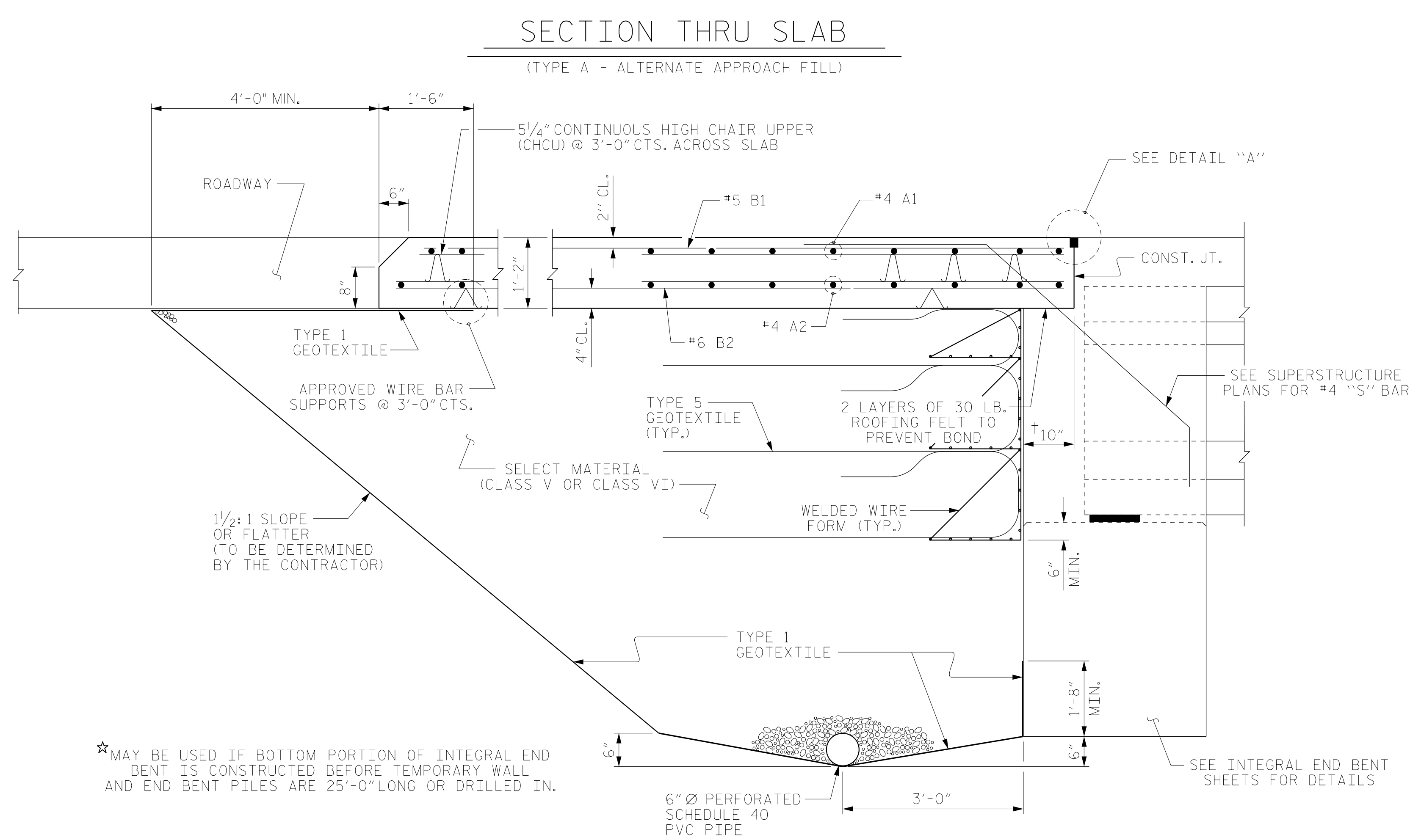
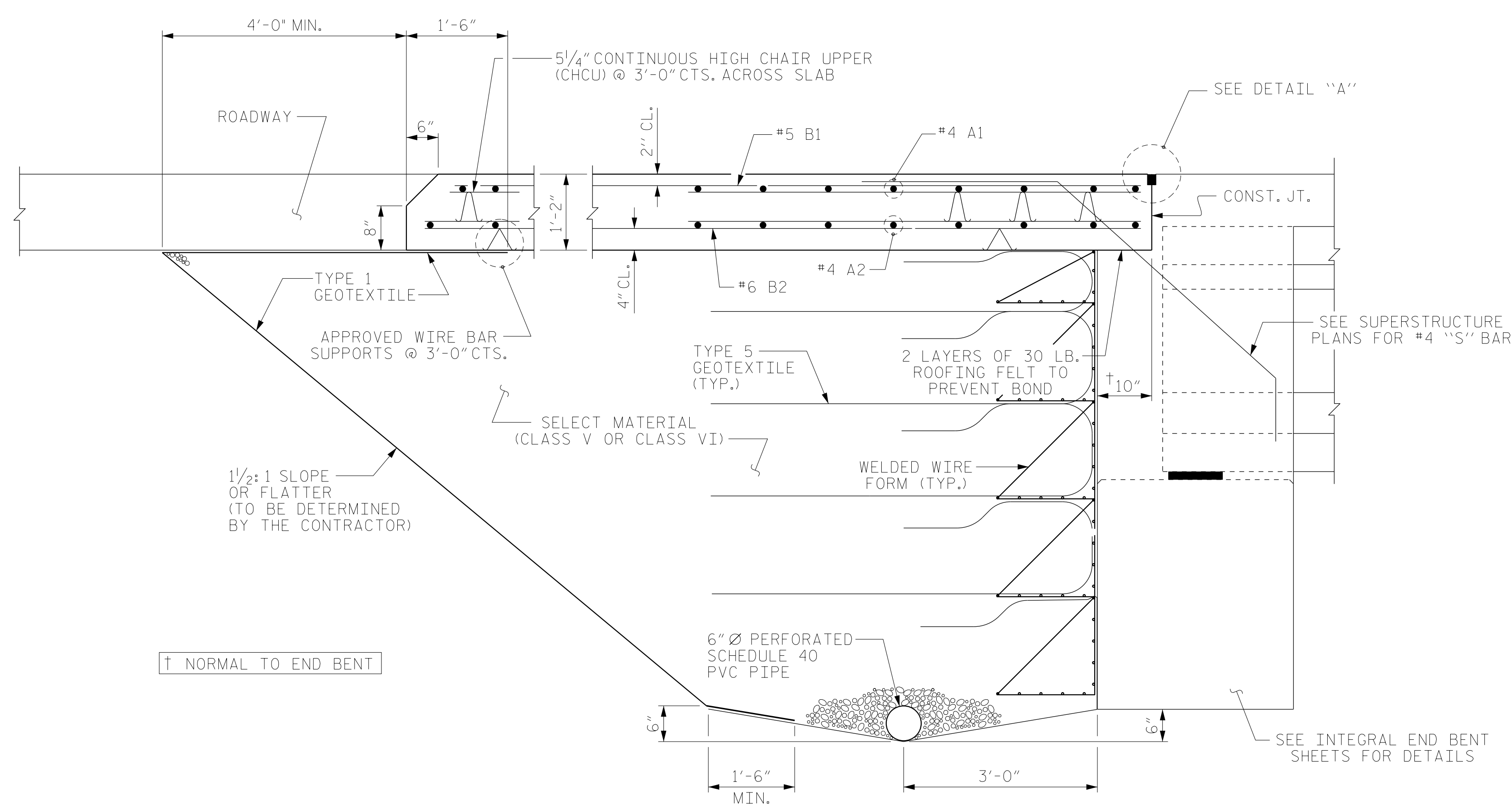


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S6-35
2			4			TOTAL SHEETS 37

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ASSEMBLED BY : TWL	DATE : 12/2017
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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



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.

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-  
SHEET 2 OF 2

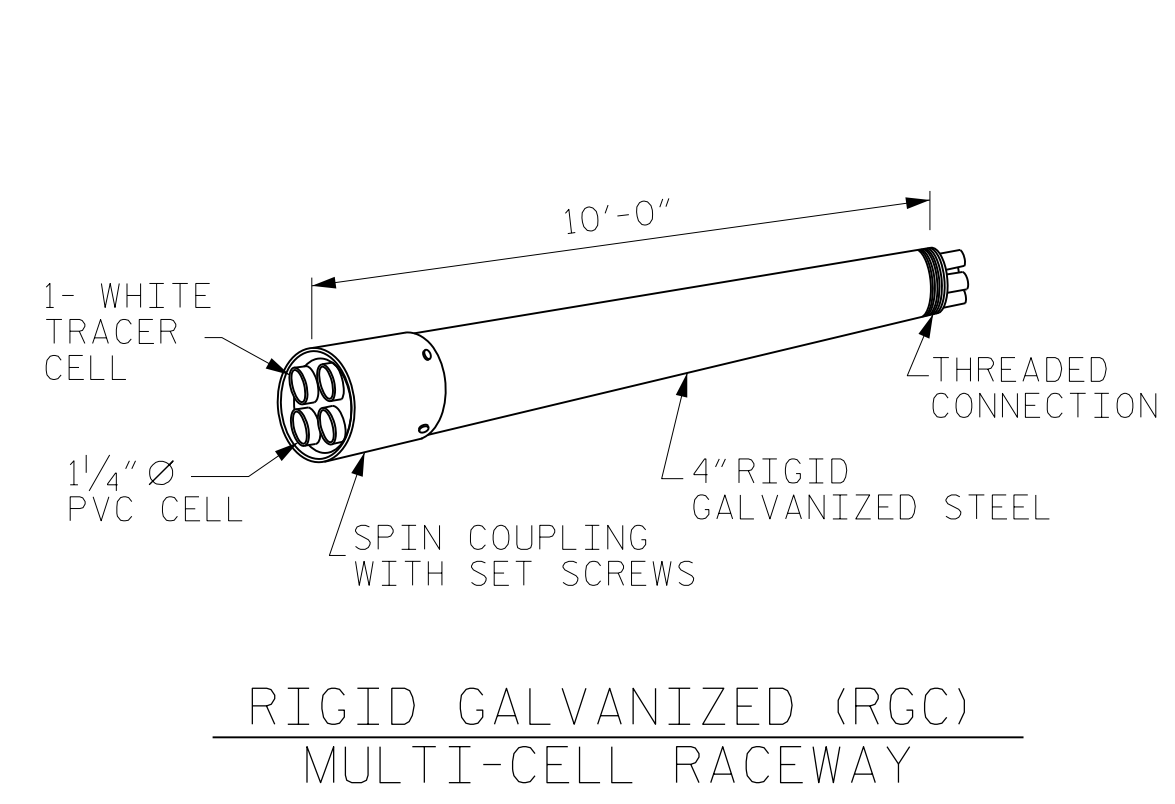
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
BRIDGE APPROACH  
SLAB DETAILS  
RIGHT LANE

RS&H  
RS&H Architects-Engineers-Planners, Inc.  
8521 Six Forks Road, Suite 400  
919-926-4100 FAX 919-846-9080  
www.rsandh.com  
North Carolina License No. 043889 - C&E

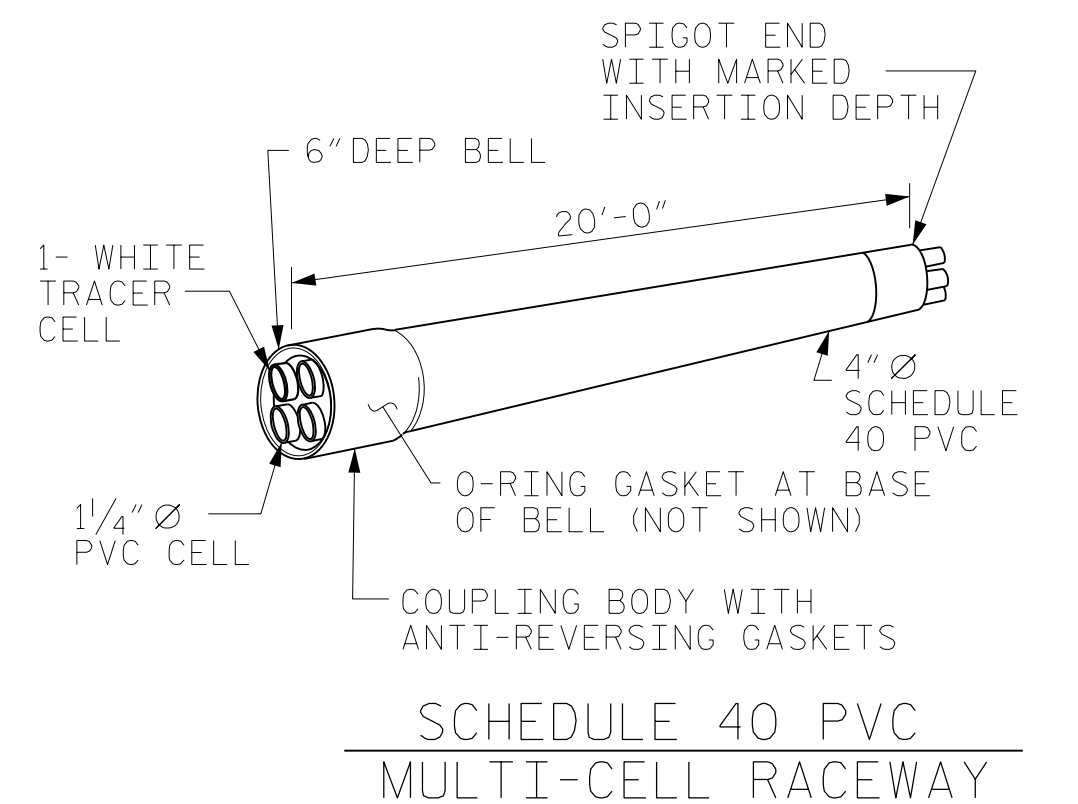
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S6-36
1			3			TOTAL SHEETS
2			4			37

ASSEMBLED BY : NSC	DATE : 12/2017
CHECKED BY : PDS	DATE : 01/2018
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

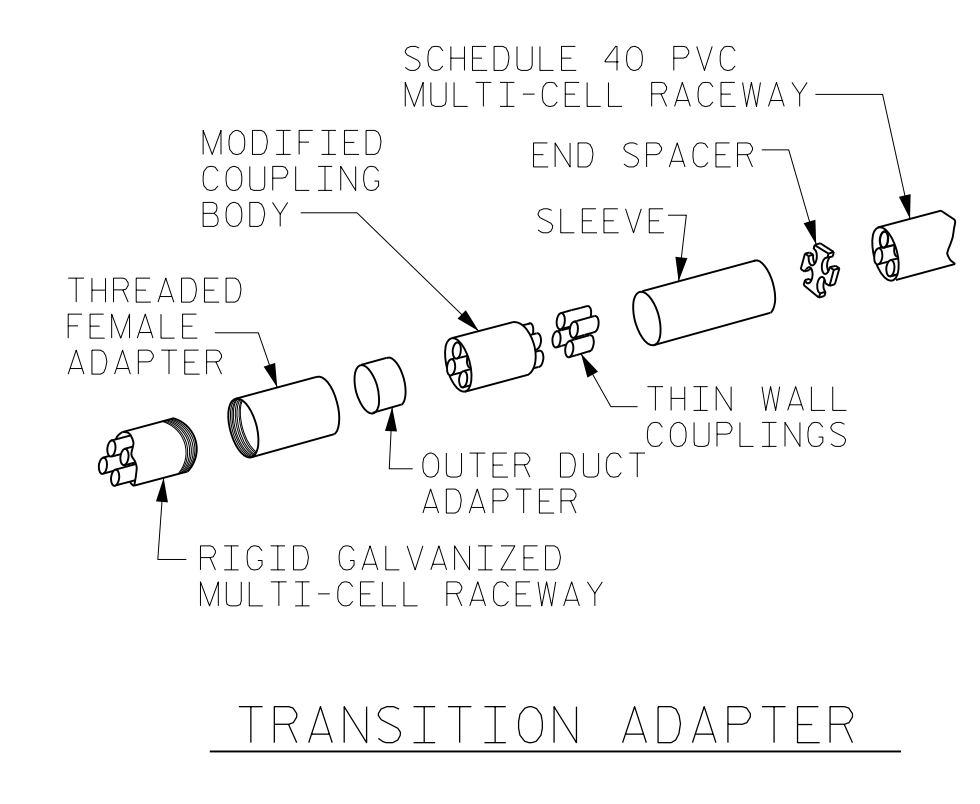
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



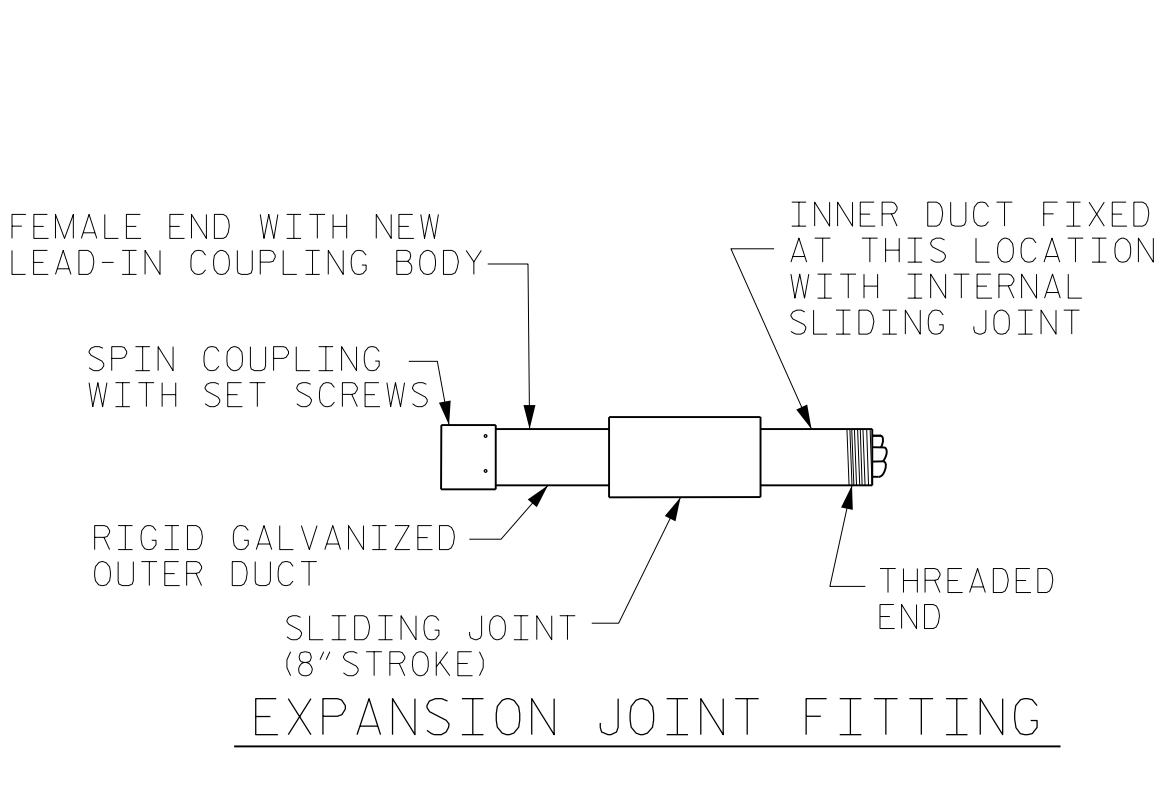
**RIGID GALVANIZED (RGC) MULTI-CELL RACEWAY**



**SCHEDULE 40 PVC MULTI-CELL RACEWAY**



**TRANSITION ADAPTER**



**EXPANSION JOINT FITTING**

**NOTES**

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE QUANTITY(S) ARE PLACED AT THE NOTED DIMENSION AND ABOVE THE BOTTOM OF THE GIRDER.

THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE PAID FOR AS LUMP SUM. THE PRICE SHALL INCLUDE ALL CONDUIT, HANGERS, STABILIZERS, EXPANSION JOINTS, CONCRETE INSERTS, PVC SLEEVES AND ALL NECESSARY HARDWARE TO COMPLETE THE WORK.

THE CONTRACTOR SHALL FIELD VERIFY THAT THE CONDUIT SYSTEM IS NOT IN CONFLICT WITH THE GUARDRAIL POSTS.

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

PROVIDE TRANSITION ADAPTOR FOR CONDUIT AT END BENT 1 (AND END BENT 2).

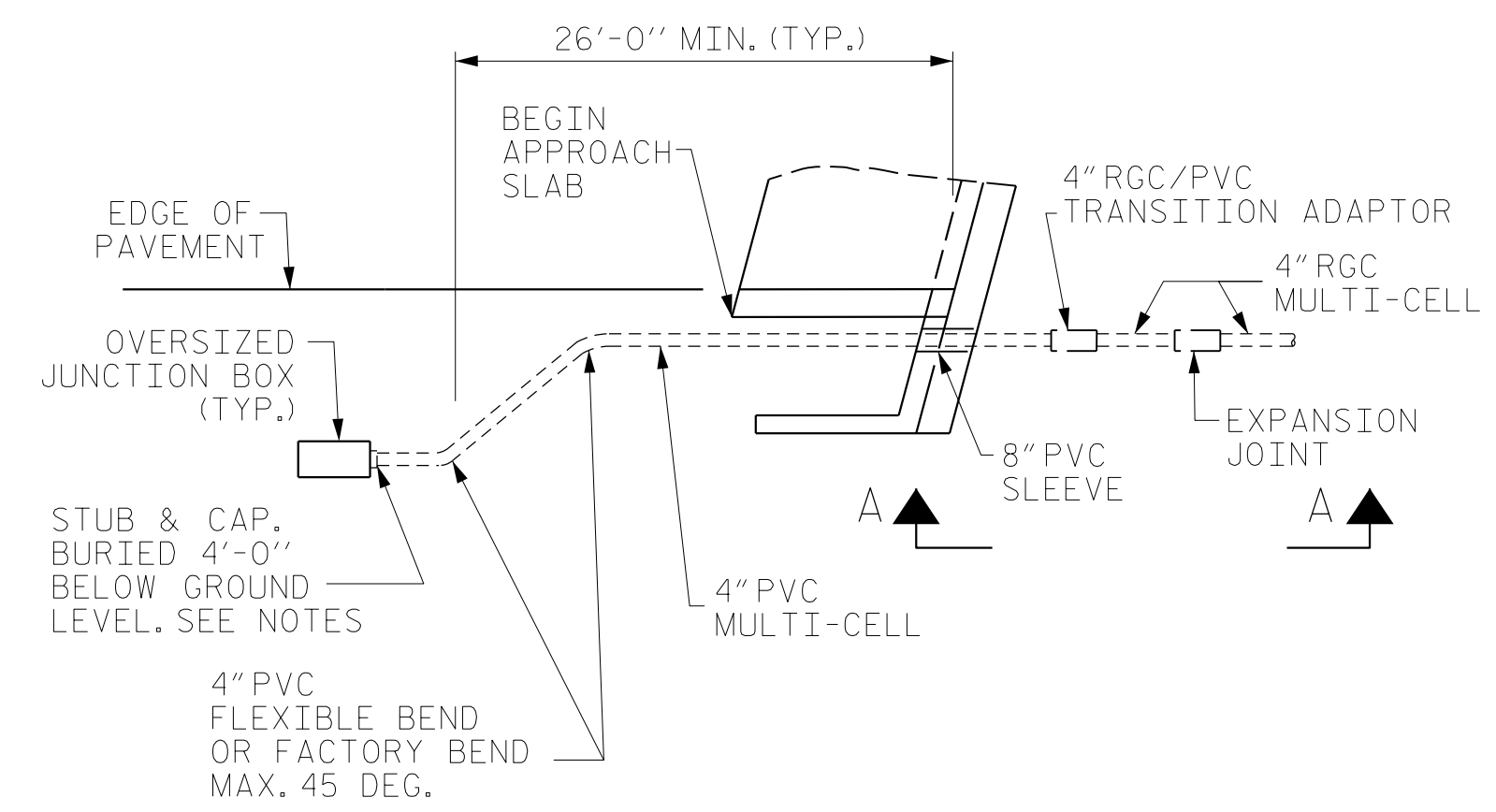
INSTALL STABILIZER'S MIDWAY BETWEEN EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

INSTALL EXPANSION JOINTS AT END BENT 1 AND END BENT 2.

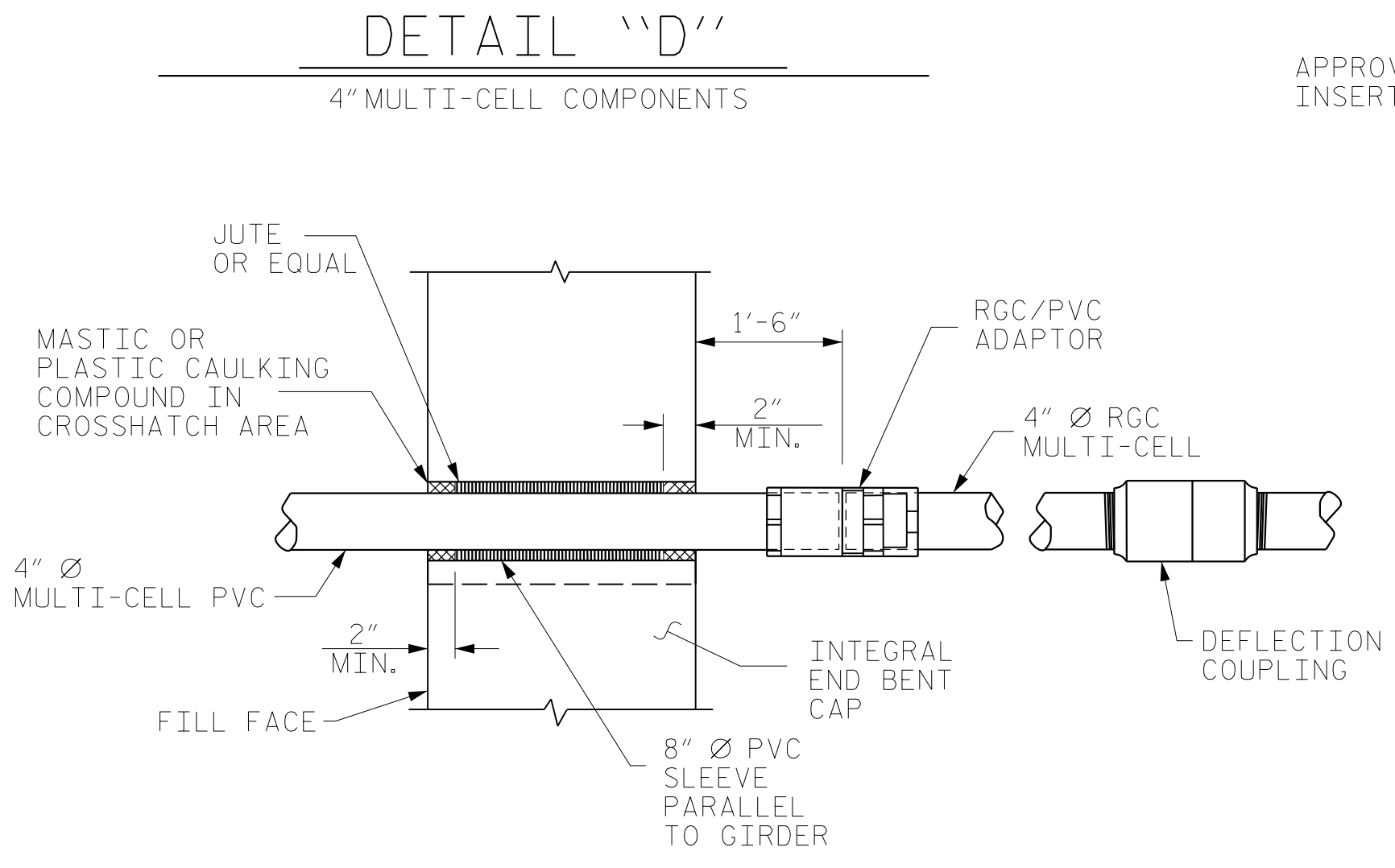
THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF 5/8" AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.

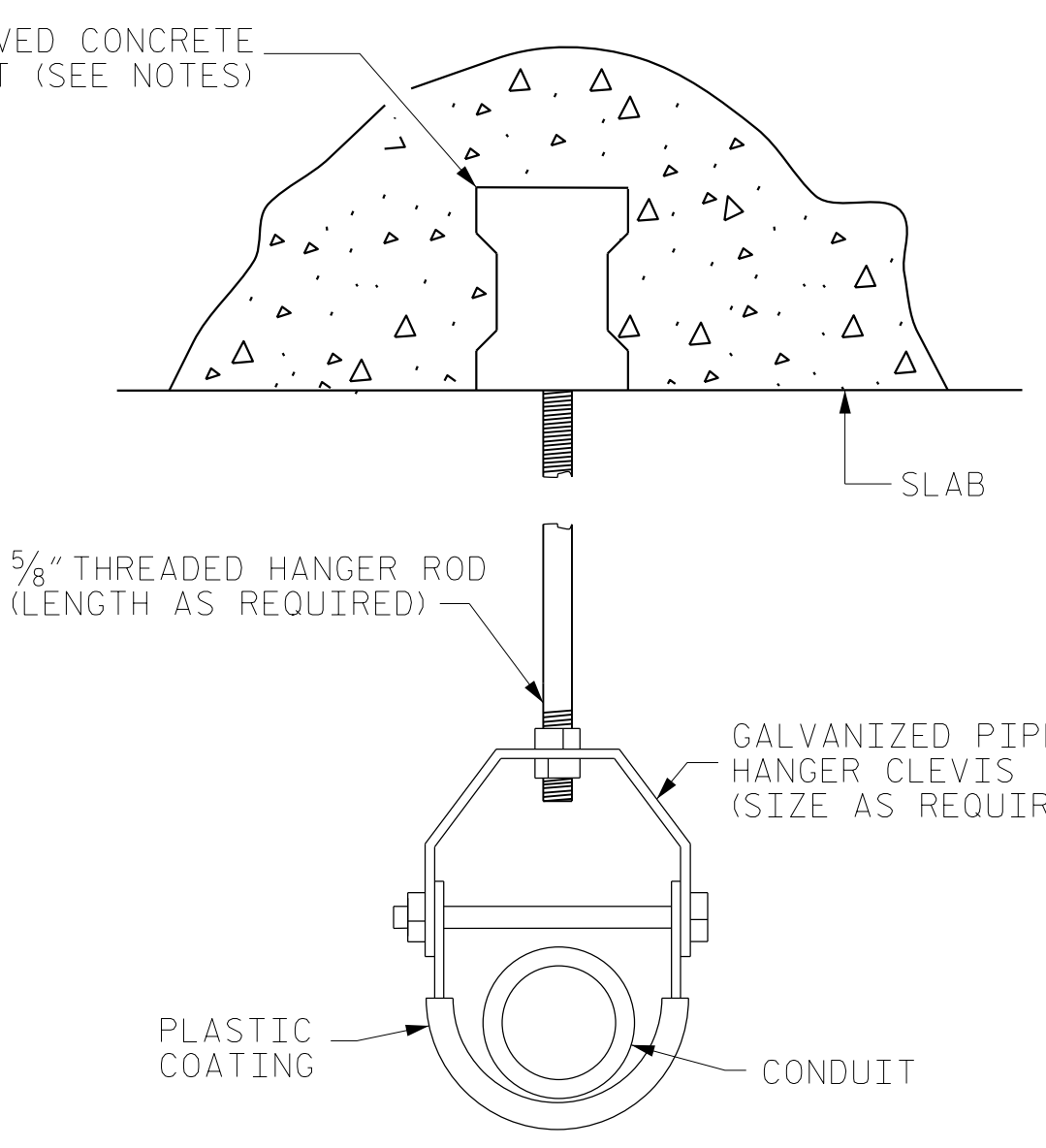
FOR OVERSIZED JUNCTION BOX, SEE STANDARD SPECIFICATIONS 1098-5.



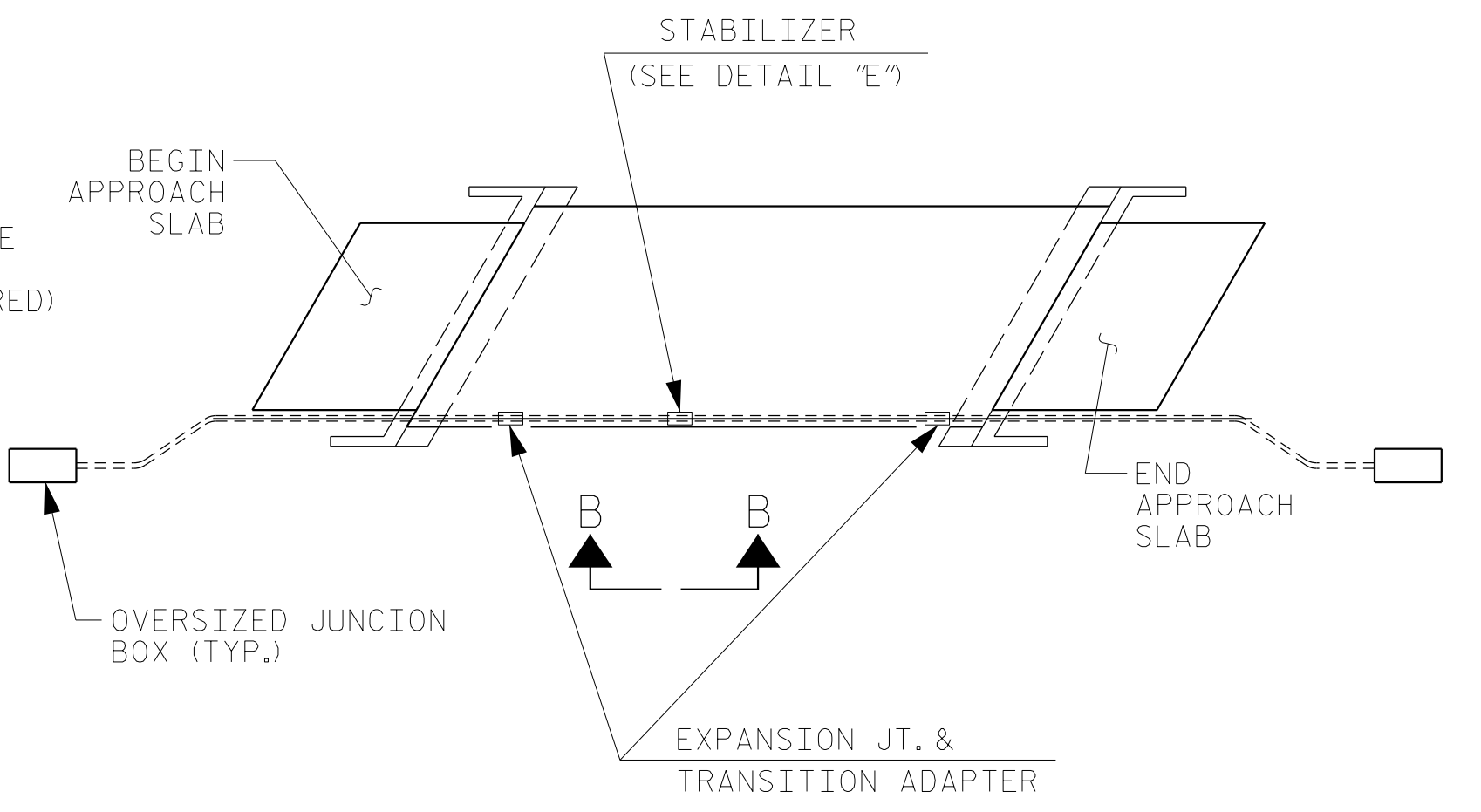
**DETAIL "A"**  
TERMINATION OF CONDUIT AT WING WALL END BENT 1 SHOWN, END BENT 2 SIMILAR



**DETAIL "B"**  
PVC SLEEVE INSTALLATION & RGC/PVC ADAPTOR AT INTEGRAL CAP.

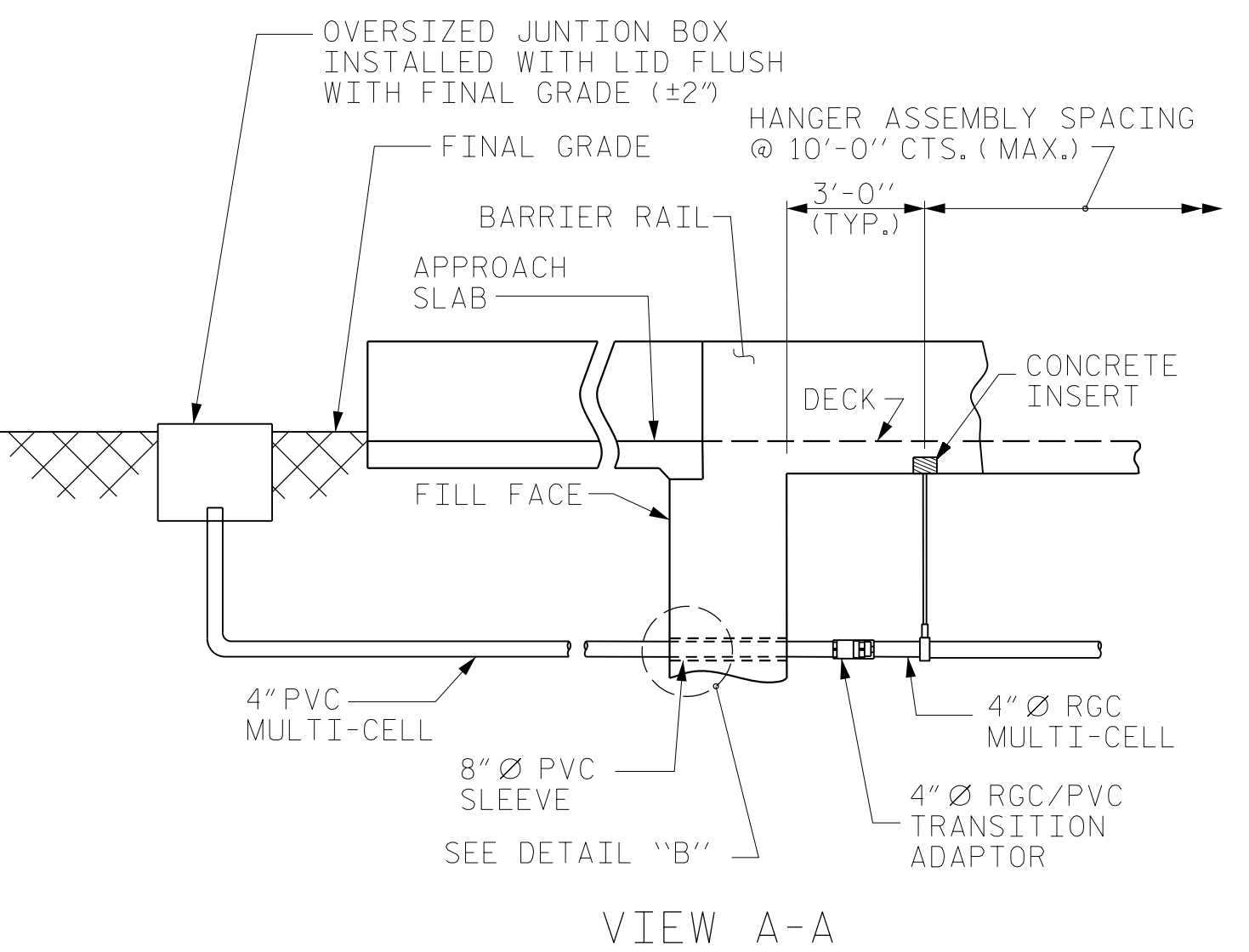


**DETAIL "C"**  
HANGER ASSEMBLY

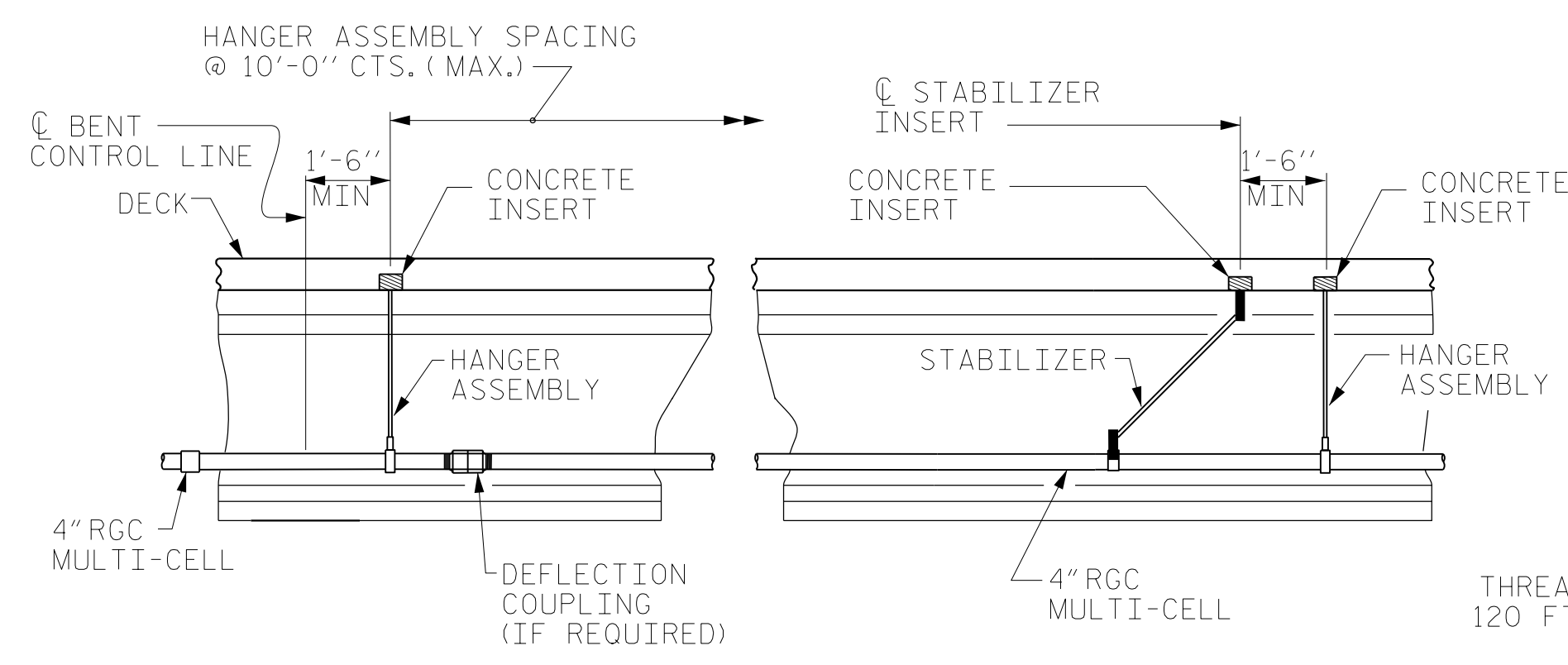


**CONDUIT LAYOUT**

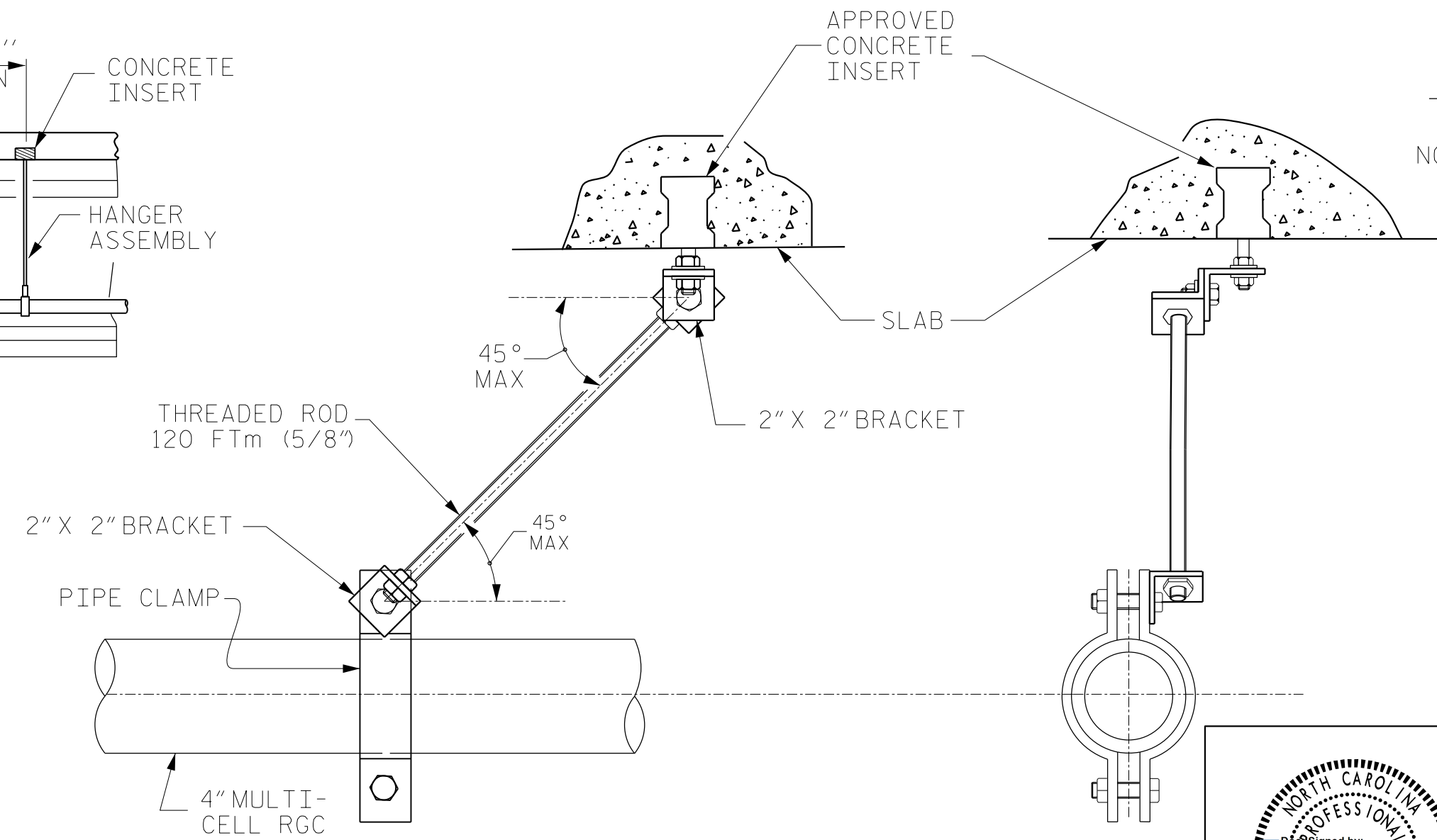
NOTE: SUPERSTRUCTURE IS CONTINUOUS FOR LIVE LOAD OVER INTERIOR BENTS & INTEGRAL THROUGH END BENTS.



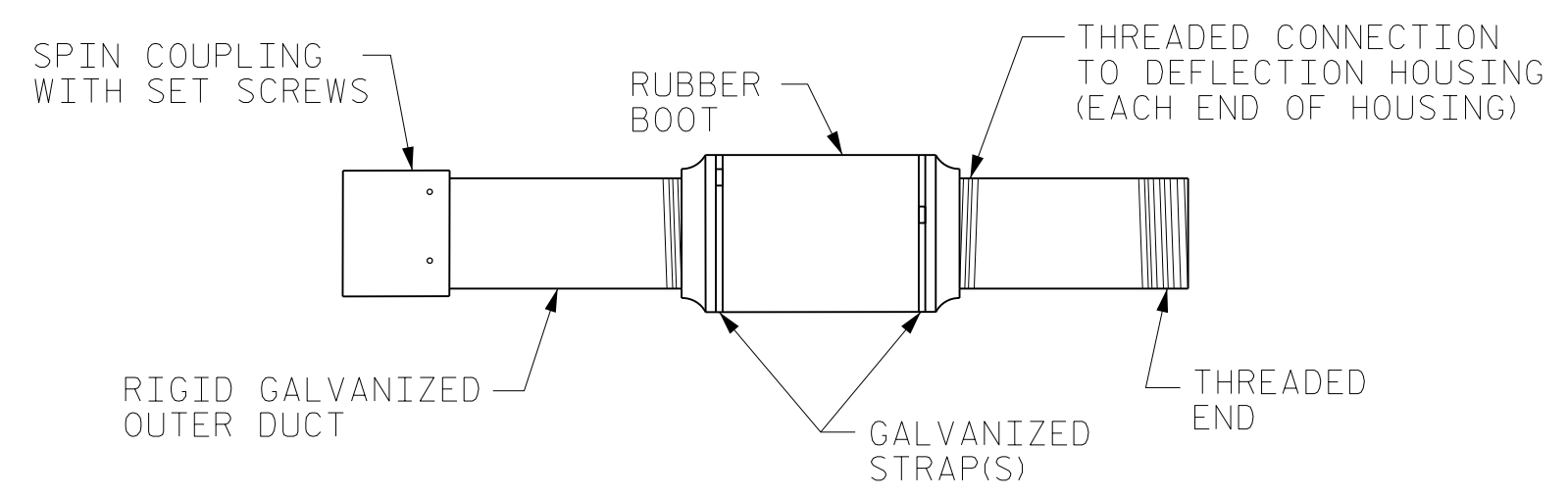
**VIEW A-A**



**VIEW B-B**  
PRESTRESSED GIRDERS CONTINUOUS FOR LIVE LOAD



**DETAIL "E"**  
STABILIZER



**DETAIL "F"**  
DEFLECTION COUPLING

**ELECTRIC CONDUIT DETAILS**

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 155+02.50 -L-

ASSEMBLED BY : NSC	DATE : 1/2018
CHECKED BY : PDS	DATE : 1/2018
DRAWN BY : RWW 2-4-03	REV. 5/1/06 TLA/GM
CHECKED BY : DBM 2-4-03	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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919-926-4100 FAX 919-846-9080  
www.rsandh.com  
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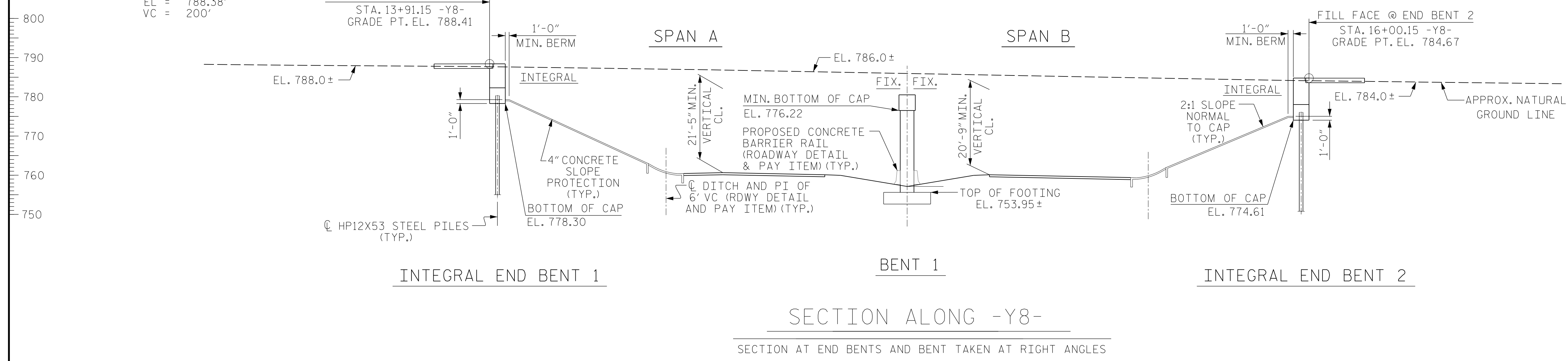
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						STANDARD		SHEET NO. S6-37	
ELECTRICAL CONDUIT SYSTEM FOR SIGNALS						RIGHT LANE		TOTAL SHEETS 37	
REVISIONS									
NO.	BY:	DATE:	NO.	BY:	DATE:				
1			3						
2			4						

GRADE DATA

(-)-0.6300% Δ (-)-2.2650%  
 PI = 14+25.00 -Y8-  
 EL = 788.38'  
 VC = 200'

GRADE DATA

(-)-2.2650% Δ (-)-0.4480%  
 PI = 16+25.00 -Y8-  
 EL = 783.85'  
 VC = 200'

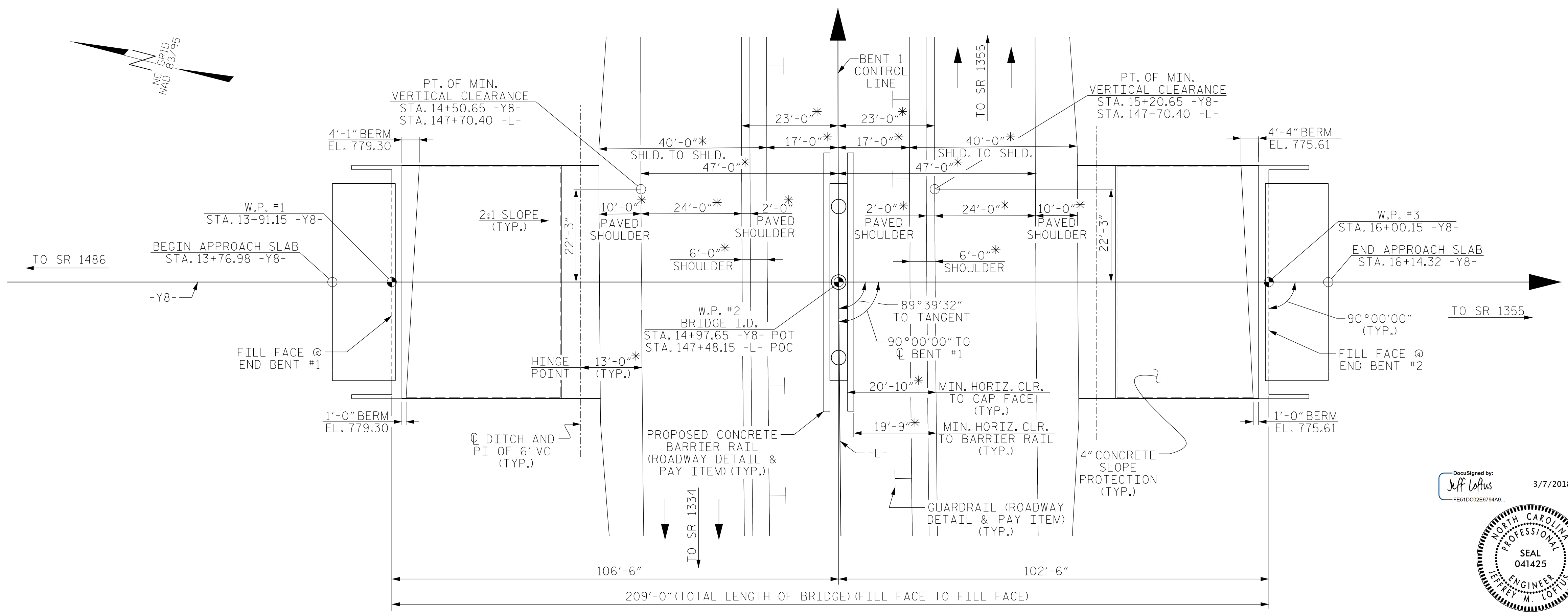


GRADE DATA

(+)-3.0306% Δ (+)-0.3319%  
 PI = 149+40.00 -L-  
 EL = 765.00'  
 VC = 600'

HORIZONTAL CURVE DATA FOR -L-

PI STA. = 149+31.07  
 Δ = 15°31'57.9" (RT)  
 D = 0°35'04.7"  
 L = 2,656.76'  
 T = 1,336.57'  
 R = 9,800.00'



DocuSigned by:  
 Jeff Loftus  
 3/7/2018  
 FES10C02E794A9...



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 SIGNATURES COMPLETED

Firm License No. C-1051  
 421 Fayetteville St,  
 Suite 400  
 Raleigh, NC 27601  
 T 919.380.8750  
 www.stewartinc.com

**STEWART**

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT  
 147+48.15 -L- POC  
 SHEET 1 OF 4 BRIDGE NO. 401276

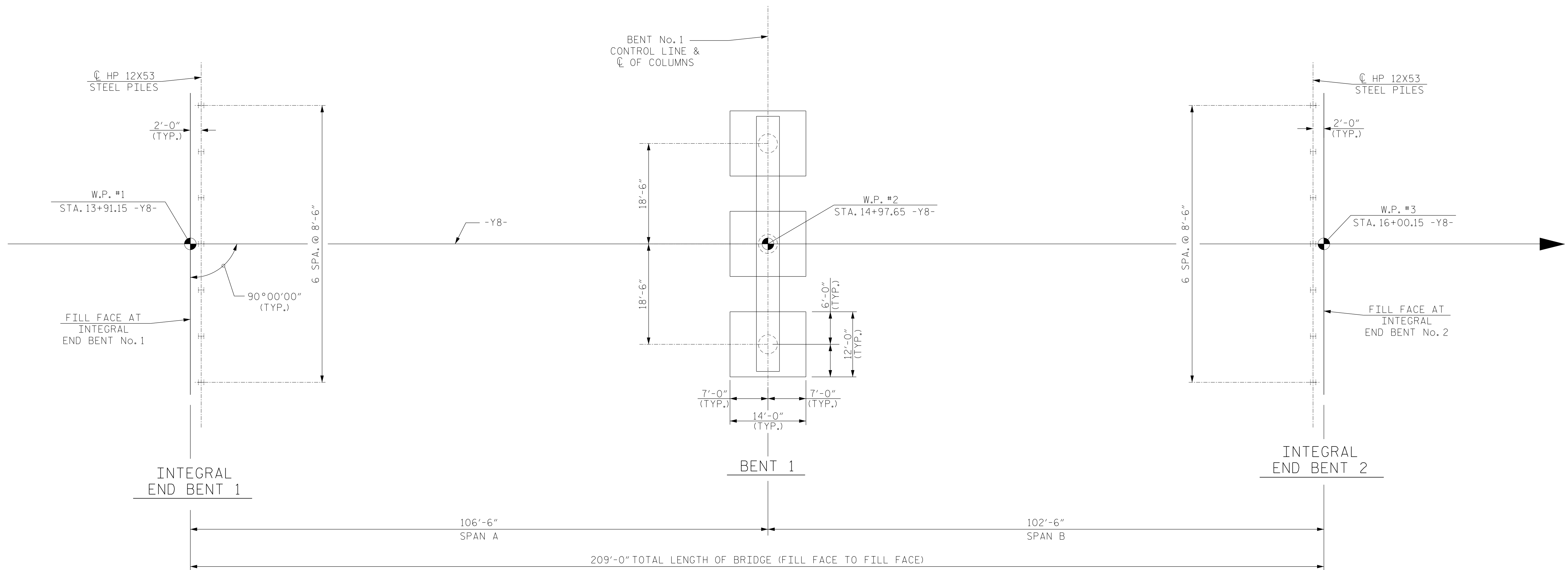
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE OVER  
 SR 1486/SR 4121  
 (GREENSBORO/HIGH POINT RD)  
 ON SR 1352 (OAKDALE RD)  
 BETWEEN SR 1486 AND SR 1355

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-1
1			3			TOTAL SHEETS
2			4			35

3/7/2018  
 DRAWN BY: E. PHELPS DATE: 12-18  
 CHECKED BY: J. LOFTUS DATE: 12-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
 \\V07\_001\_U2412A\_SMJ\_G001\_S7-1.dgn  
 USER: jloftus



### FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES.

### FOUNDATION NOTES

#### PILES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 140 TONS PER PILE AND 135 TONS PER PILE, RESPECTIVELY.
- DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 235 TONS PER PILE AND 225 TONS PER PILE, RESPECTIVELY.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- DRILLED-IN PILES #3 THROUGH PILE #7 ARE REQUIRED FOR INTEGRAL END BENT NO.1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 768.3 FT, FILL THE BOTTOM 3 FT OF HOLES FOR PILE EXCAVATION WITH CONCRETE OR GROUT AND THE REST OF THE HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- DRILLED-IN PILES #1 THROUGH PILE #3 ARE REQUIRED FOR INTEGRAL END BENT NO.2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 764.7 FT, FILL THE BOTTOM 3 FT OF HOLES FOR PILE EXCAVATION WITH CONCRETE OR GROUT AND THE REST OF THE HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS. FOR PILES EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

#### SPREAD FOOTING

- THE SPREAD FOOTINGS AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 5 TSF. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE OF 12 TSF JUST BEFORE PLACING CONCRETE.
- CARRY IN SPREAD FOOTINGS AT BENT NO.1 AT LEAST 12" INTO ROCK WITH MINIMUM THICKNESS AS SHOWN ON THE PLANS.
- FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE ARTICLE 410-9 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 2 OF 4

DocuSigned by:  
 Jeff Loftus 3/7/2018  
 FES10C22E8794A9



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 Firm License No. C-1051  
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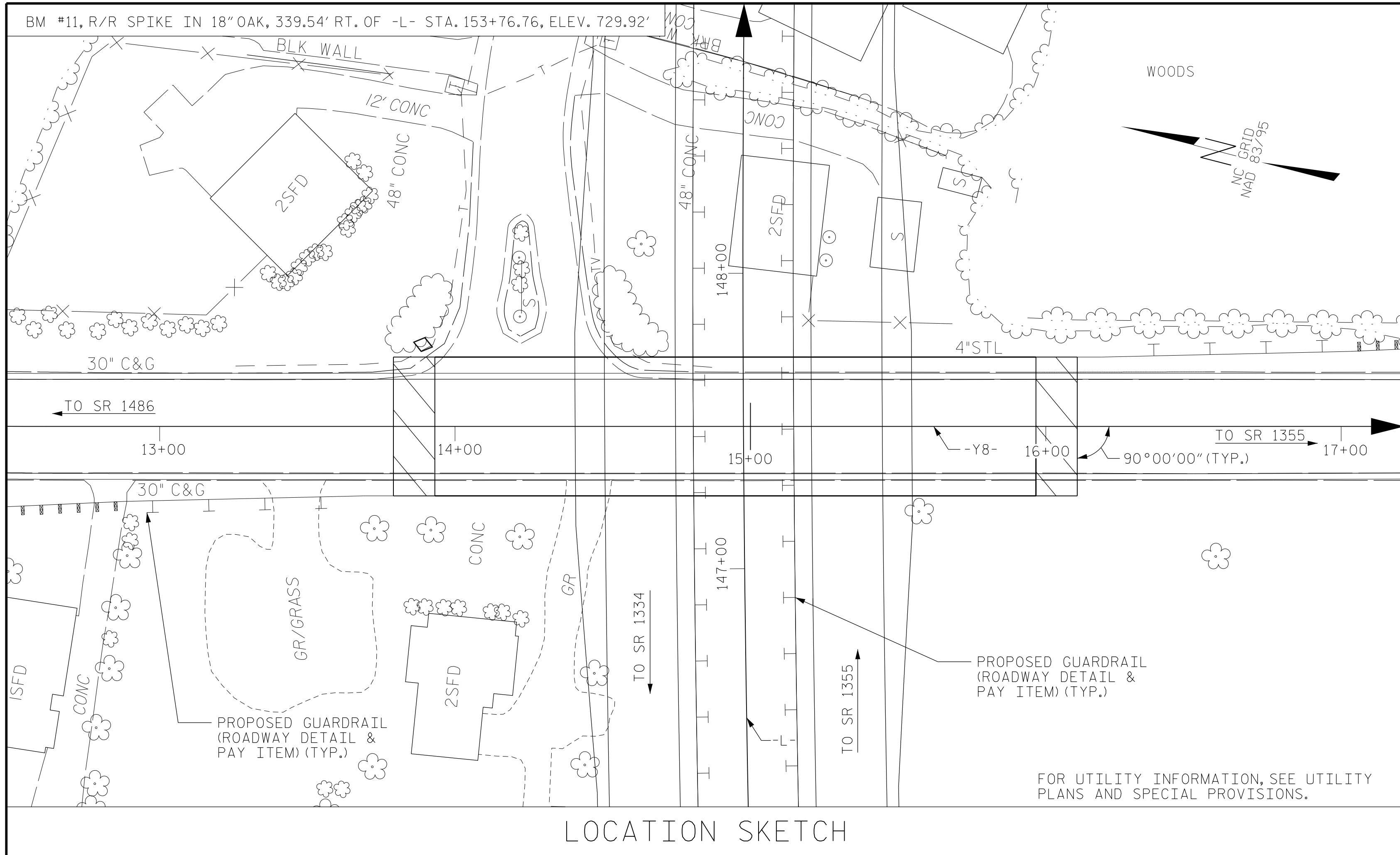
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

FOUNDATION LAYOUT

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

DRAWN BY: E. PHELPS DATE: 01-18  
 CHECKED BY: J. LOFTUS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

3/7/2018  
 \\407\_003\_U-2412A\_SMU\_FL2\_S7-2.dgn  
 USER: jloftus



### NOTES

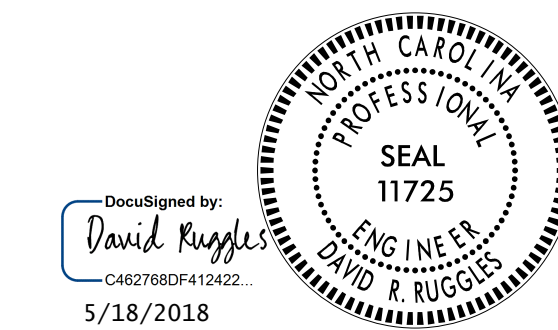
1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING
2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
3. THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
4. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
5. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
6. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
7. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
8. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
9. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
10. NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
11. REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
12. 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.
13. FOR FOUNDATION NOTES, SEE SHEET S7-2.
14. THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS (360,000 KG) OF REINFORCING STEEL, ONE 30 INCH (760 MM) SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS (360,000 KG) OF REINFORCING STEEL, TWO 30 INCH (760 MM) SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

### TOTAL BILL OF MATERIAL

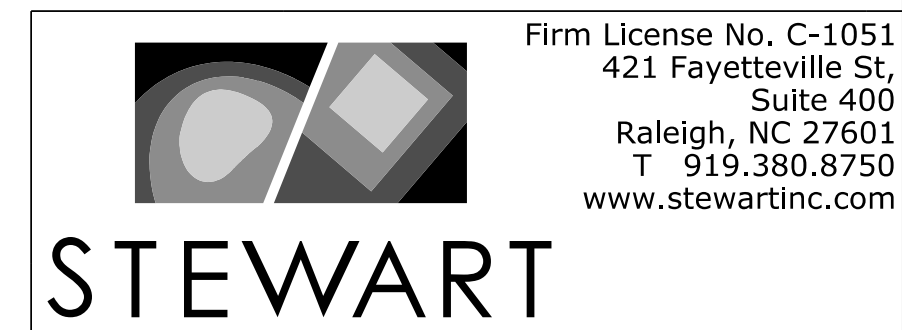
	FOUNDATION EXCAVATION FOR BENT NO. 1	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOOR	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES	STEEL PILE POINTS	THREE BAR METAL RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	
	LUMP SUM	LIN. FT.	LIN. FT.	SQ. FT.	SQ. FT.	CY. YDS.	LUMP SUM	LBS	LBS	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	SO. YDS.	LUMP SUM
SUPERSTRUCTURE				10,281	7,832		LUMP SUM			10	1027.92						LUMP SUM
END BENT No. 1		35	15			48.6		7,467				7	80			321	
BENT No. 1	LUMP SUM					111.1		18,769	1,737								
END BENT No. 2		25	5			47.7		7,287				7	85			292	
TOTAL	LUMP SUM	60	20	10,281	7,832	207.4	LUMP SUM	33,523	1,737	10	1027.92	14	165	14	399.67	613	LUMP SUM

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 3 OF 4



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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE OVER  
 SR 1486/SR 4121  
 (GREENSBORO/HIGH POINT RD)  
 ON SR 1352 (OAKDALE RD)  
 BETWEEN SR 1486 AND SR 1355

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-3
1			3			TOTAL SHEETS
2			4			35

STR. #7

DRAWN BY: J. LOFTUS DATE: 01-18  
 CHECKED BY: E. PHELPS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
 5/18/2018  
 \\407\_005\_U2412A-SMU-LLS03-S7-3.dgn  
 USER:ephelps



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			
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ <sub>LL</sub> )	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (Ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (Ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (Ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.14	--	1.75	0.790	1.72	A	I	51.7	1.01	1.53	A	I	9.8	0.80	0.790	1.14	A	I	51.7		
	HL-93 (OPERATING)	N/A		1.99	--	1.35	0.790	2.23	A	I	51.7	1.01	1.99	A	I	9.8	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.62	57.96	1.75	0.790	2.43	A	I	51.7	1.01	2.07	A	I	9.8	0.80	0.790	1.61	A	I	51.7		
	HS-20 (OPERATING)	36.000		2.68	96.48	1.35	0.790	3.15	A	I	51.7	1.01	2.68	A	I	9.8	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		3.20	43.20	1.40	0.790	7.04	A	I	51.7	1.01	5.90	A	I	30.7	0.80	0.790	3.10	A	I	51.7		
		SNGARBS2	20.000		2.22	44.40	1.40	0.790	5.05	A	I	51.7	1.01	4.31	A	I	9.8	0.80	0.790	2.22	A	I	51.7	
		SNAGRIS2	22.000		2.07	45.54	1.40	0.790	4.70	A	I	51.7	1.01	3.97	A	I	9.8	0.80	0.790	2.07	A	I	51.7	
		SNCOTTS3	27.250		1.53	41.69	1.40	0.790	3.47	A	I	51.7	1.01	3.07	A	I	9.8	0.80	0.790	1.53	A	I	51.7	
		SNAGGRS4	34.925		1.25	43.66	1.40	0.790	2.84	A	I	51.7	1.01	2.50	A	I	9.8	0.80	0.790	1.25	A	I	51.7	
		SNS5A	35.550		1.22	43.37	1.40	0.790	2.78	A	I	51.7	1.01	2.50	A	I	9.8	0.80	0.790	1.22	A	I	51.7	
		SNS6A	39.950		1.11	44.34	1.40	0.790	2.53	A	I	51.7	1.01	2.27	A	I	9.8	0.80	0.790	1.11	A	I	51.7	
	SNS7B	42.000		1.06	44.52	1.40	0.790	2.40	A	I	51.7	1.01	2.20	A	I	9.8	0.80	0.790	1.06	A	I	51.7		
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		1.35	44.55	1.40	0.790	3.08	A	I	51.7	1.01	2.71	A	I	9.8	0.80	0.790	1.35	A	I	51.7	
		TNT4A	33.075		1.36	44.98	1.40	0.790	3.08	A	I	51.7	1.01	2.66	A	I	9.8	0.80	0.790	1.36	A	I	51.7	
		TNT6A	41.600		1.09	45.34	1.40	0.790	2.49	A	I	51.7	1.01	2.30	A	I	9.8	0.80	0.790	1.09	A	I	51.7	
		TNT7A	42.000		1.10	46.20	1.40	0.790	2.50	A	I	51.7	1.01	2.26	A	I	9.8	0.80	0.790	1.10	A	I	51.7	
		TNT7B	42.000		1.12	47.04	1.40	0.790	2.54	A	I	51.7	1.01	2.16	A	I	9.8	0.80	0.790	1.12	A	I	51.7	
		TNAGRIT4	43.000		1.07	46.01	1.40	0.790	2.44	A	I	51.7	1.01	2.10	A	I	9.8	0.80	0.790	1.07	A	I	51.7	
TNAGT5A		45.000		1.02	45.90	1.40	0.790	2.32	A	I	51.7	1.01	2.06	A	I	9.8	0.80	0.790	1.02	A	I	51.7		
TNAGT5B	45.000		③	1.01	45.45	1.40	0.790	2.30	A	I	51.7	1.01	2.01	A	I	9.8	0.80	0.790	1.01	A	I	51.7		

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

⊕ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

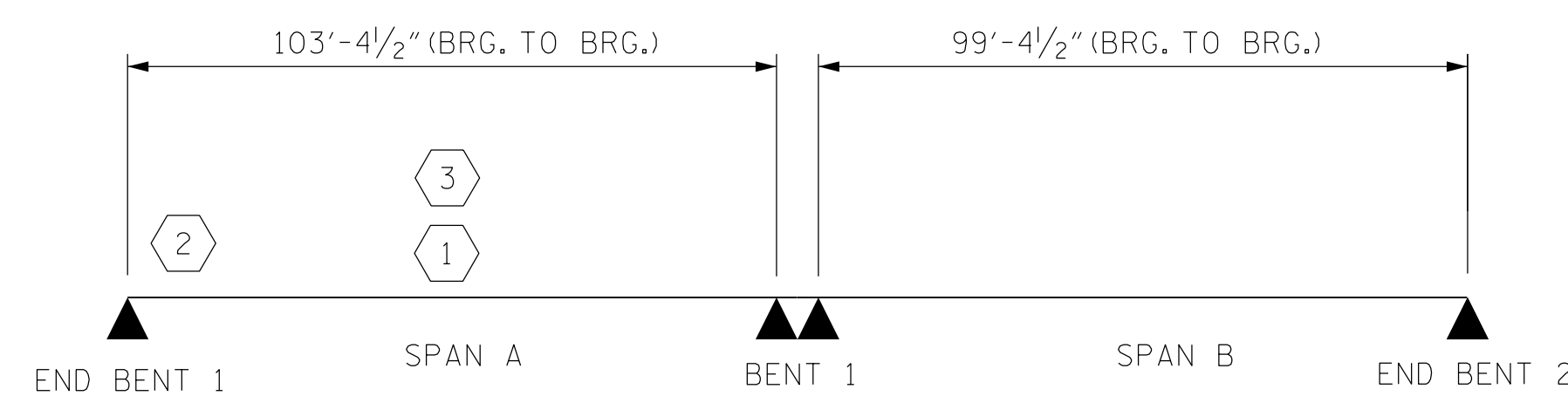
GIRDER LOCATION

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

NOTES:

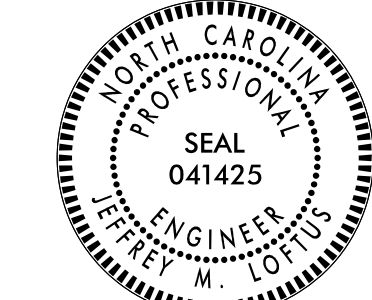
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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



LRFR SUMMARY

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3/7/2018  
FES1DC02E79448



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PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 4 OF 4

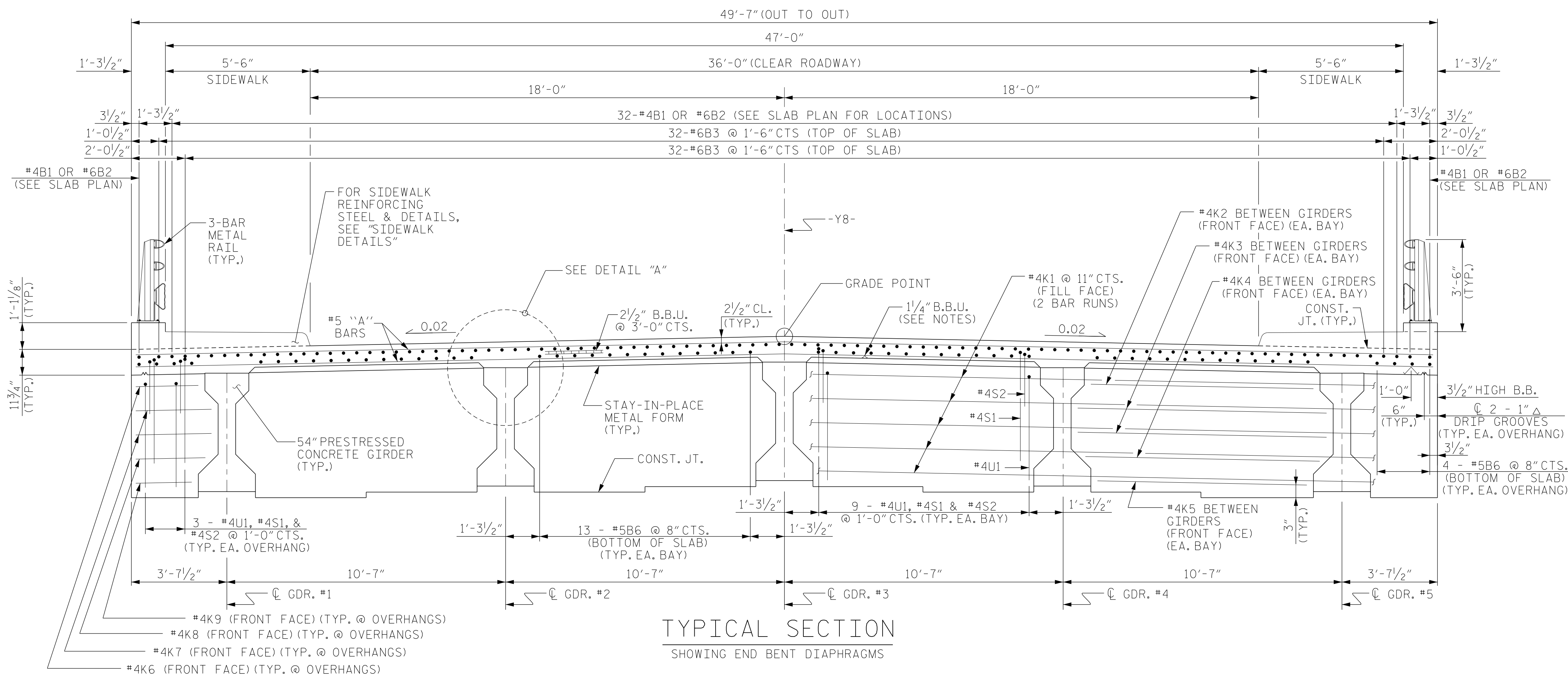
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
LRFR SUMMARY FOR  
PRESTRESSED  
CONCRETE GIRDERS  
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-4
1			3			TOTAL SHEETS
2			4			35

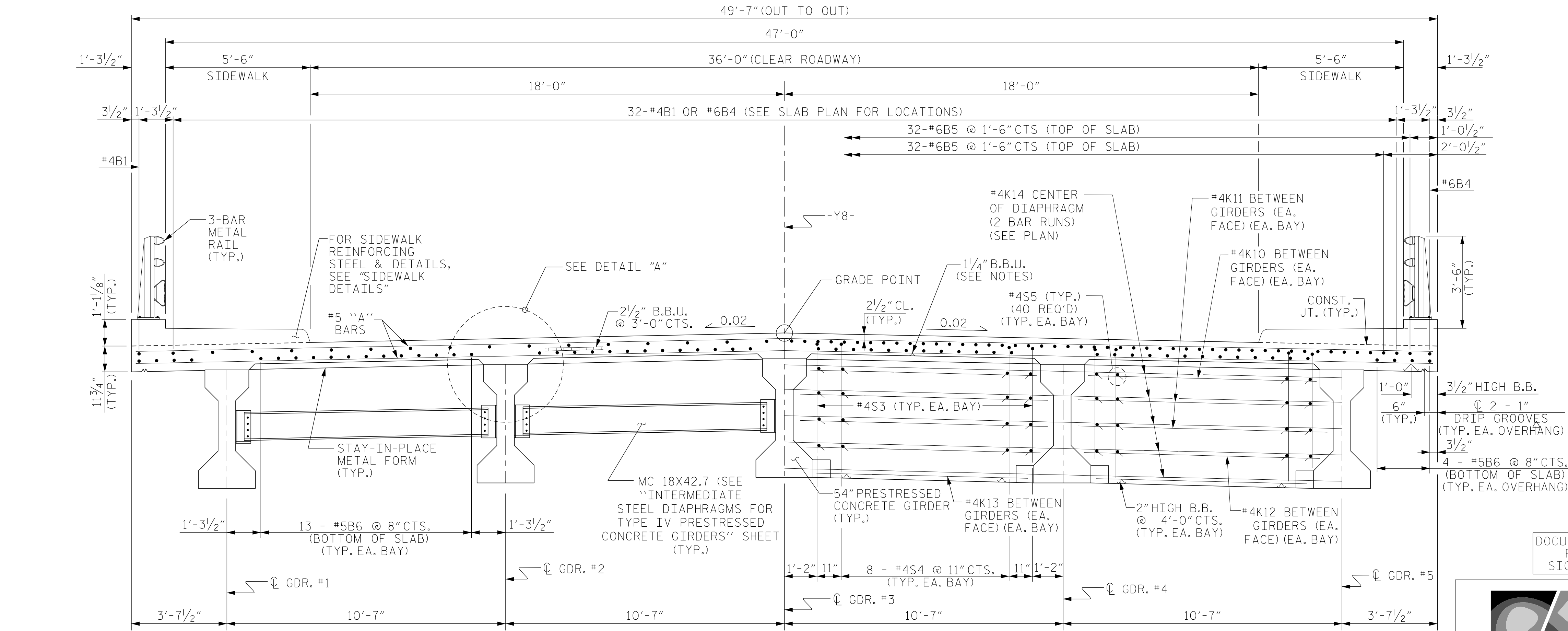
STR. #7

DRAWN BY: J. LOFTUS DATE: 01-18  
CHECKED BY: E. PHELPS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
3/7/2018  
\\407\_007\_U2412A-SMU-LRFR04\_S7-4.dgn  
USER: jloftus



TYPICAL SECTION  
SHOWING END BENT DIAPHRAGMS



TYPICAL HALF SECTION  
SHOWING INTERMEDIATE DIAPHRAGMS

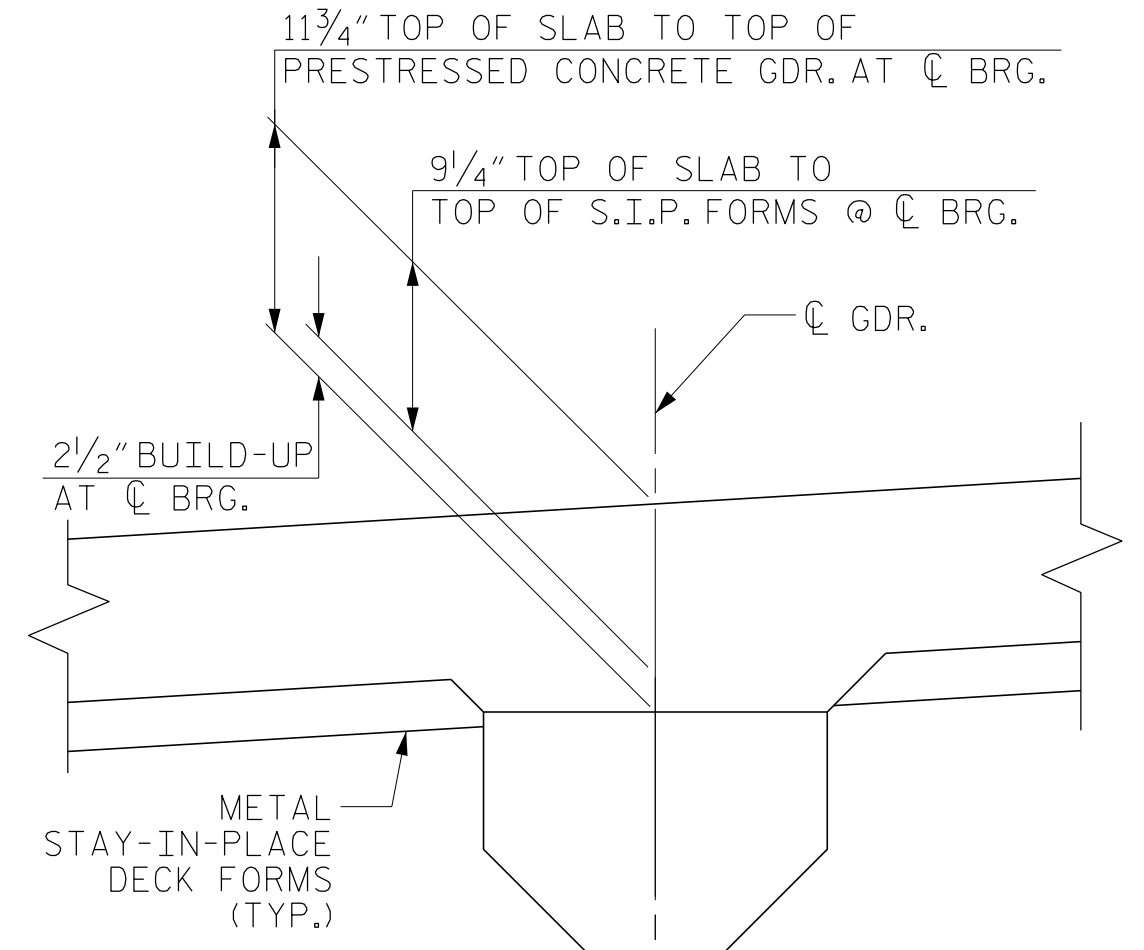
TYPICAL HALF SECTION  
SHOWING INTERIOR BENT DIAPHRAGMS

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.



DETAIL "A"

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 1 OF 2

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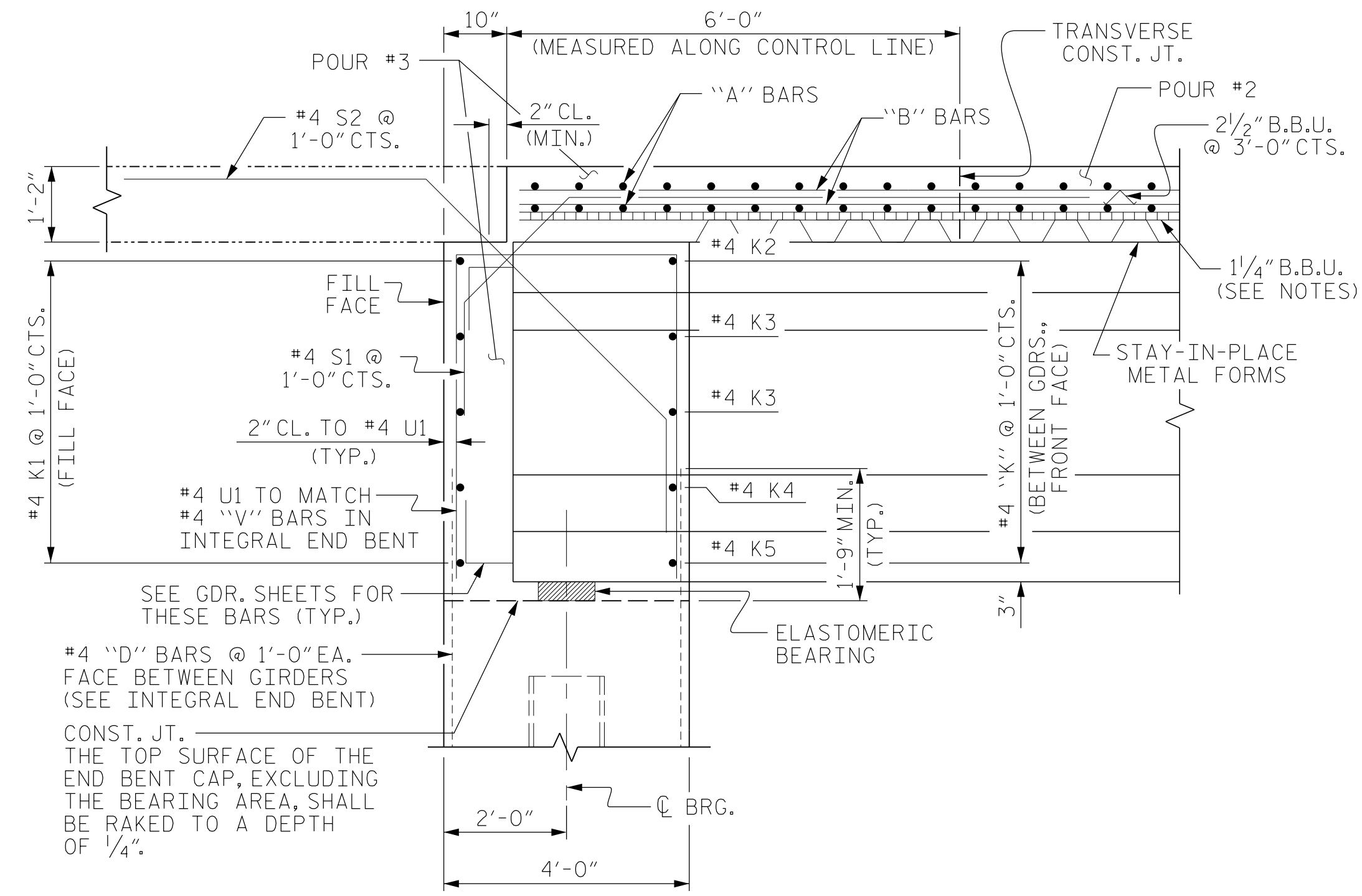
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SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
S7-5  
TOTAL SHEETS  
35

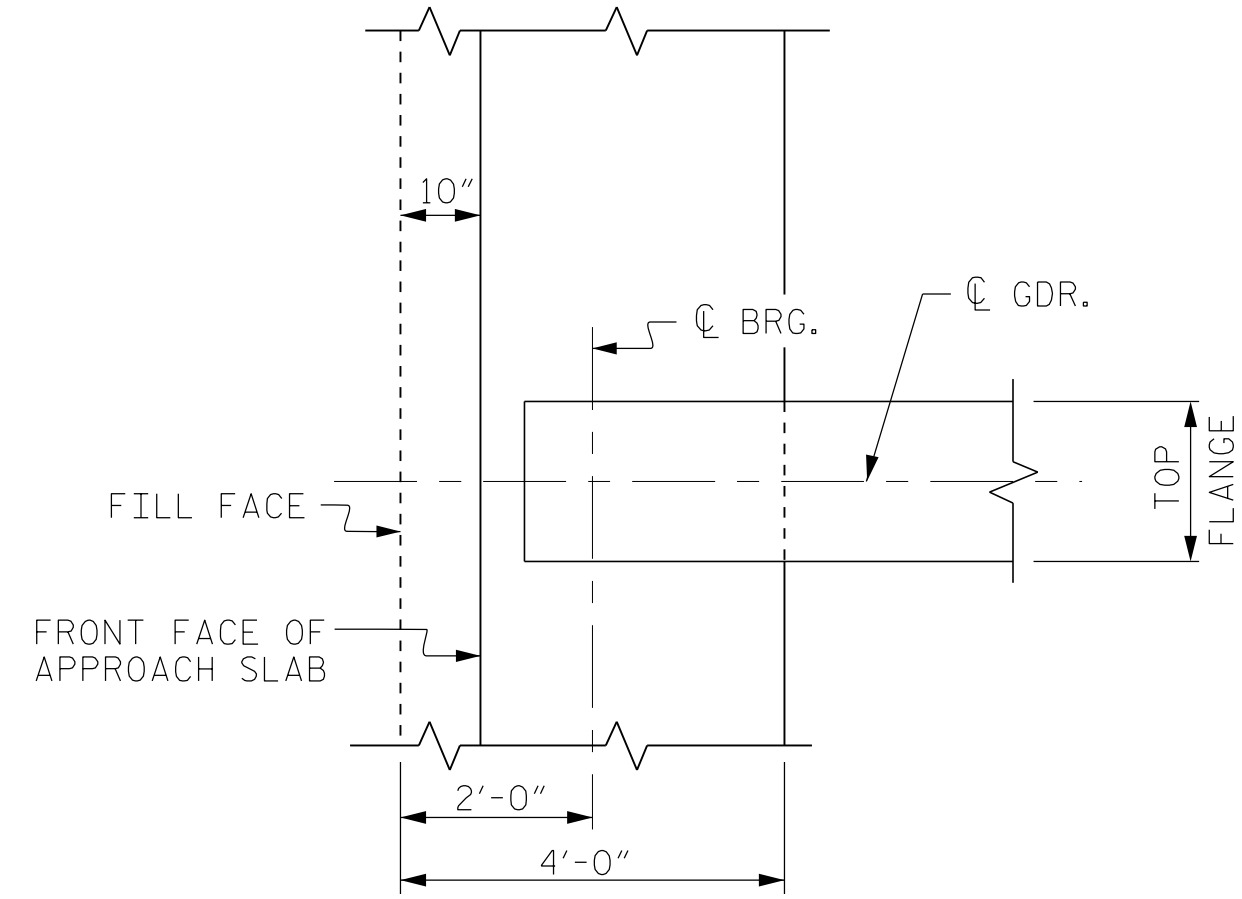
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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

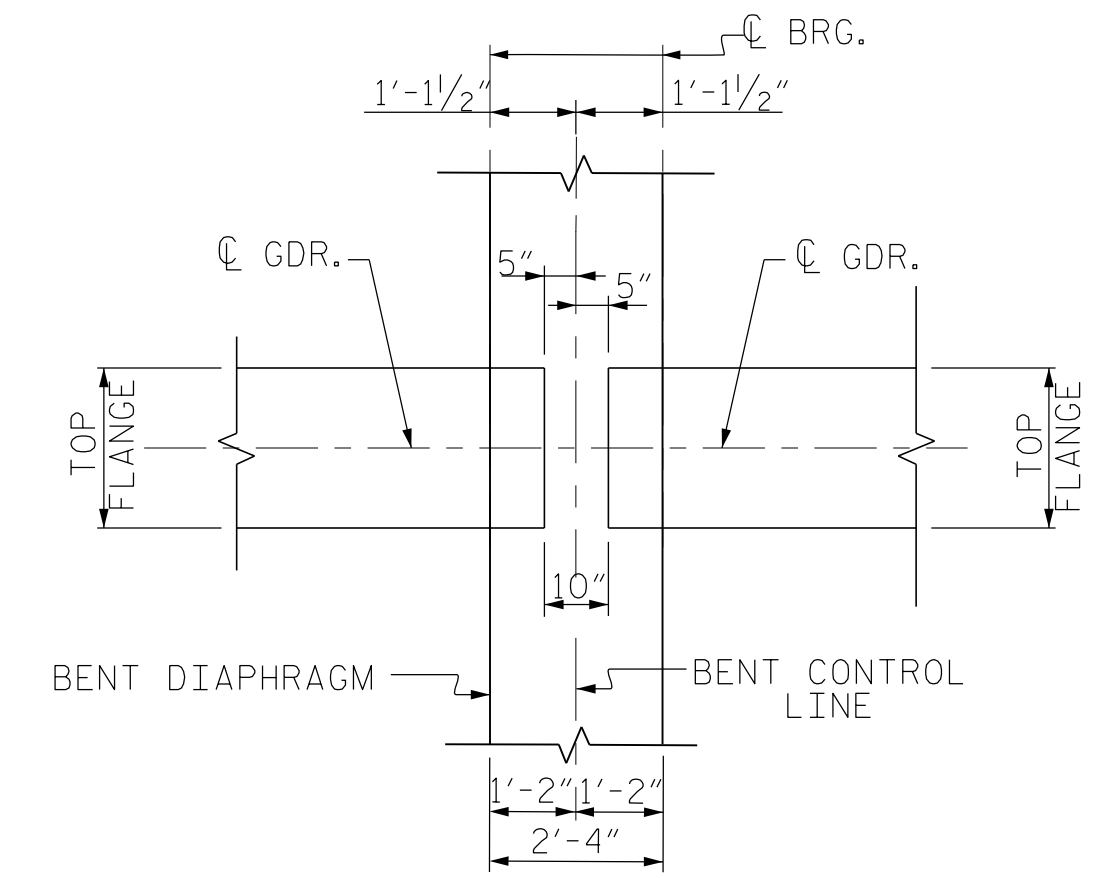
U-2412A  
3/7/2018  
\\407\_009\_U2412A-SMU\_TS01-S7-5.dgn  
USER: jloftus



END OF GIRDER DETAIL AT INTEGRAL END BENT  
BETWEEN GIRDERS SHOWN, OUTSIDE OF GIRDERS SIMILAR

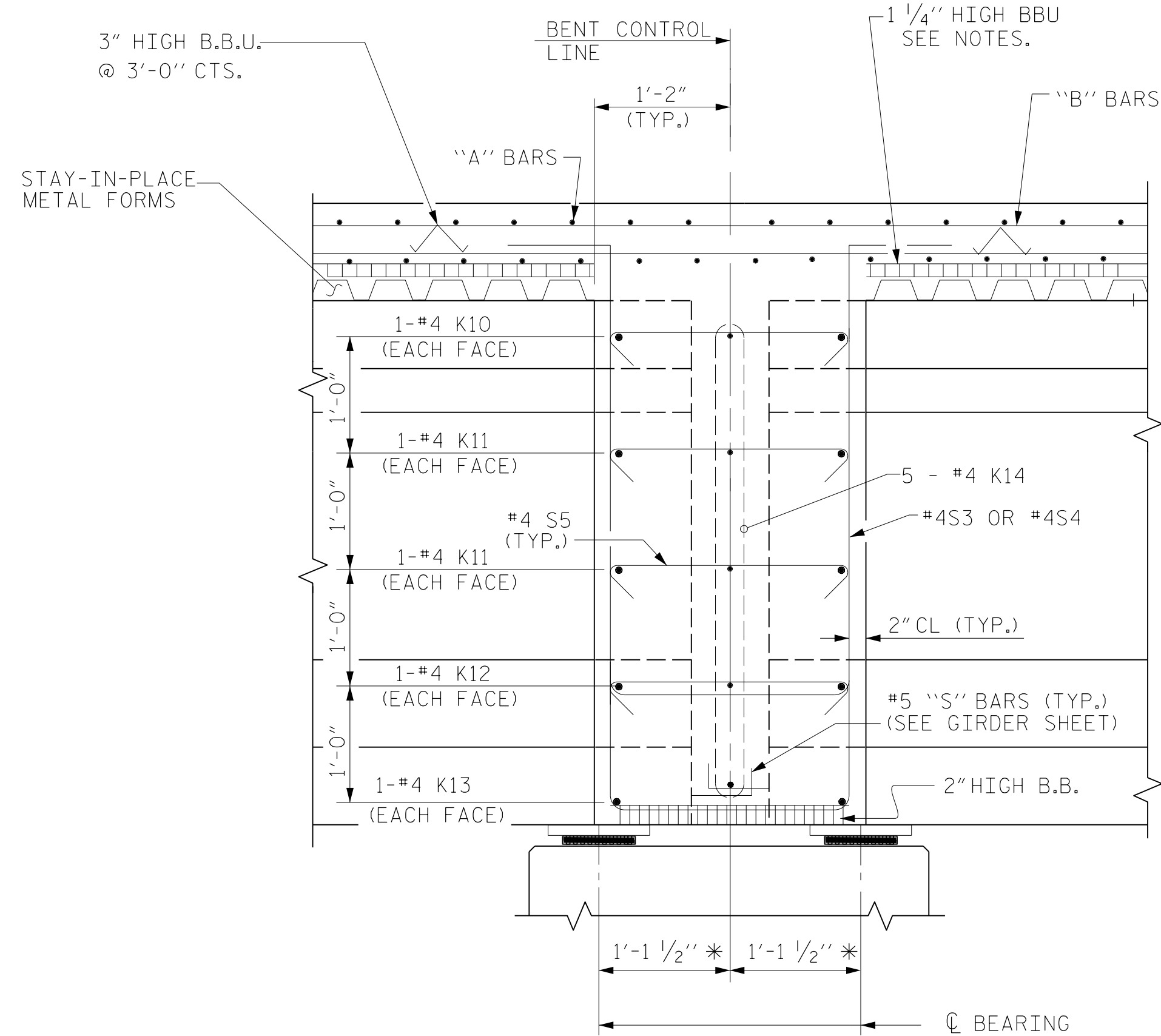


INTEGRAL END BENT DIAPHRAGM

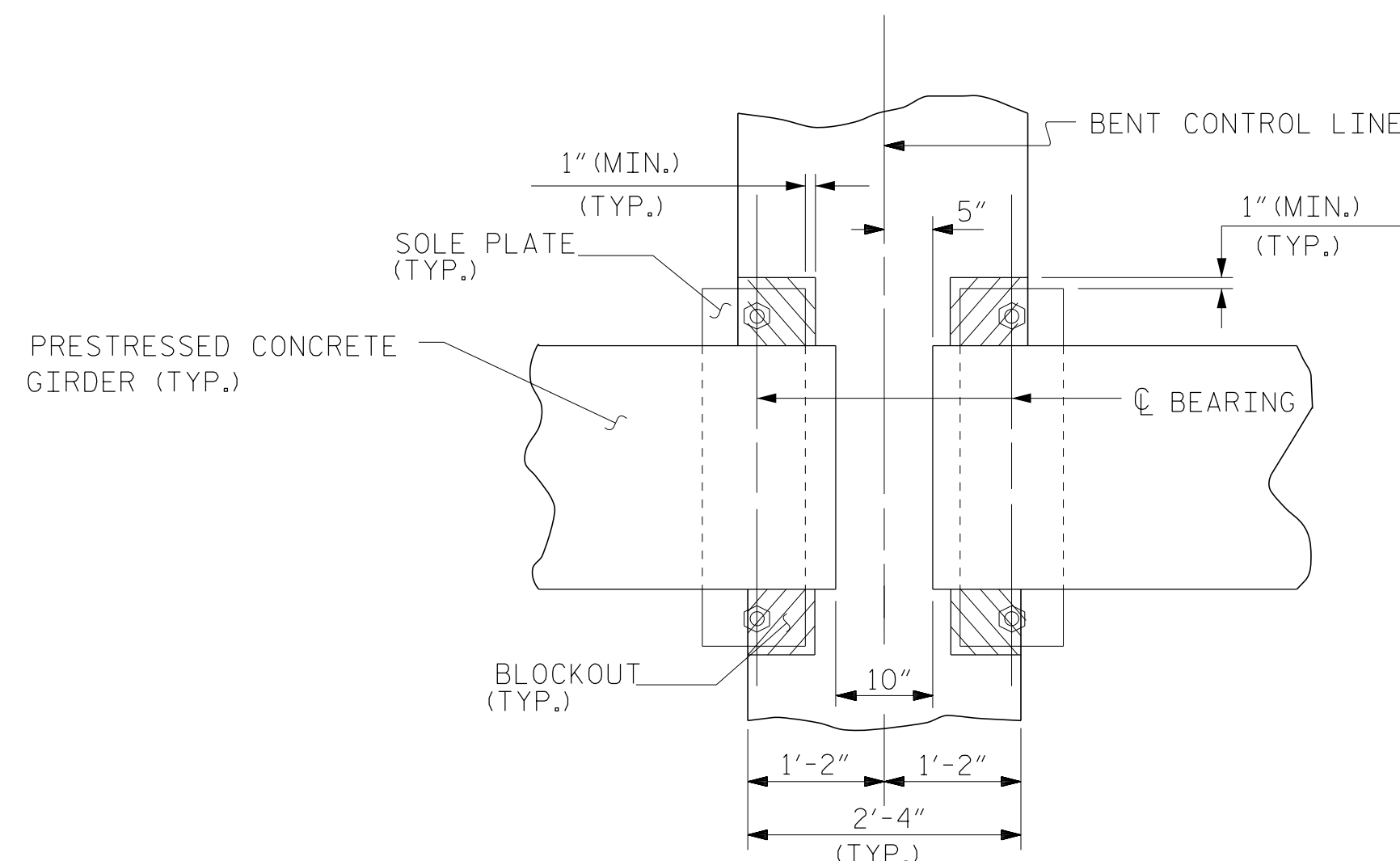


BENT DIAPHRAGM

PLAN

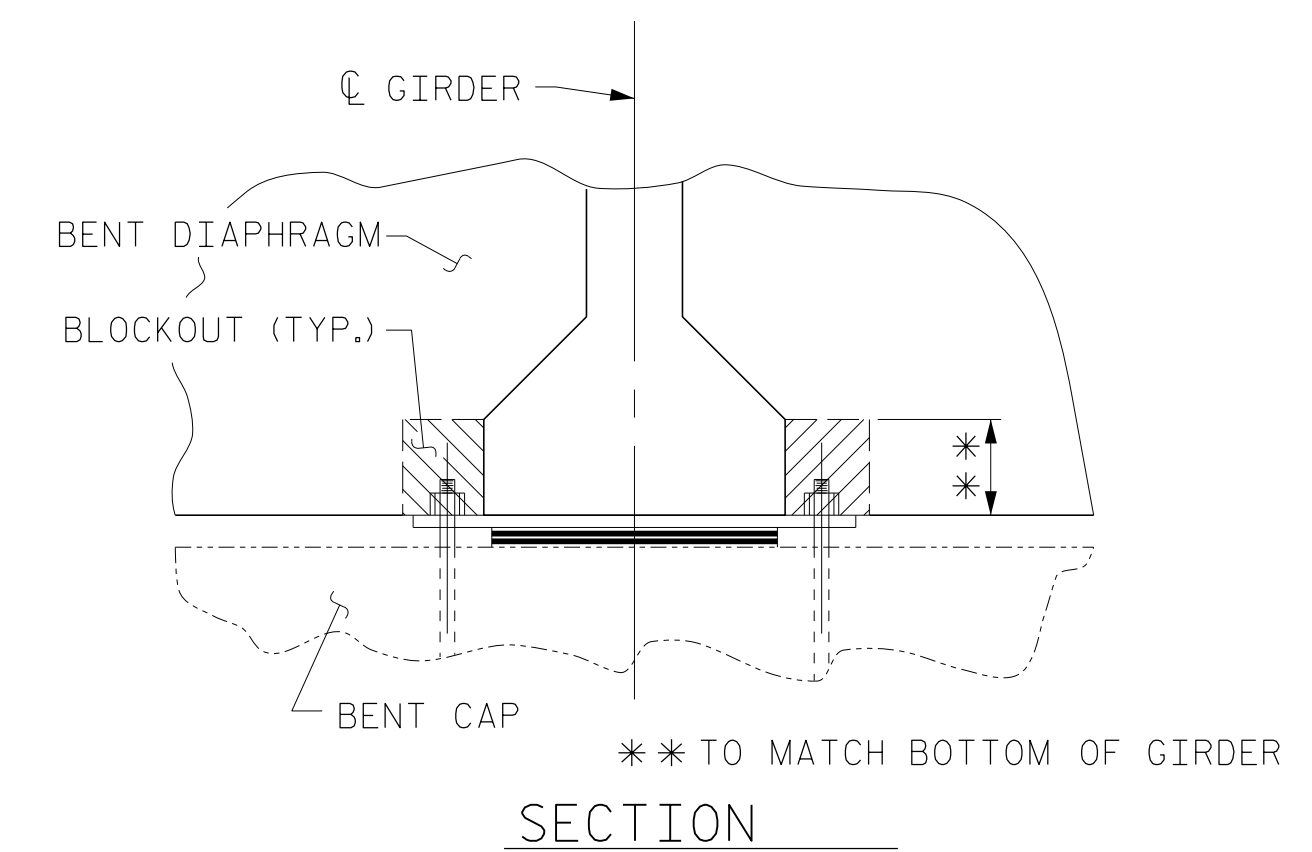


SECTION @ BENT DIAPHRAGM  
\* MEASURED ALONG GIRDER



PLAN

BENT DIAPHRAGM BLOCK-OUT DETAIL

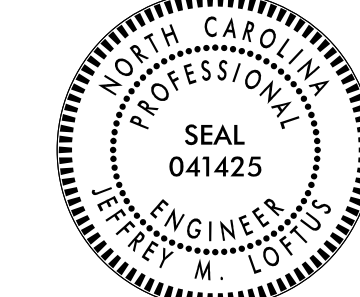


SECTION

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 2 OF 2

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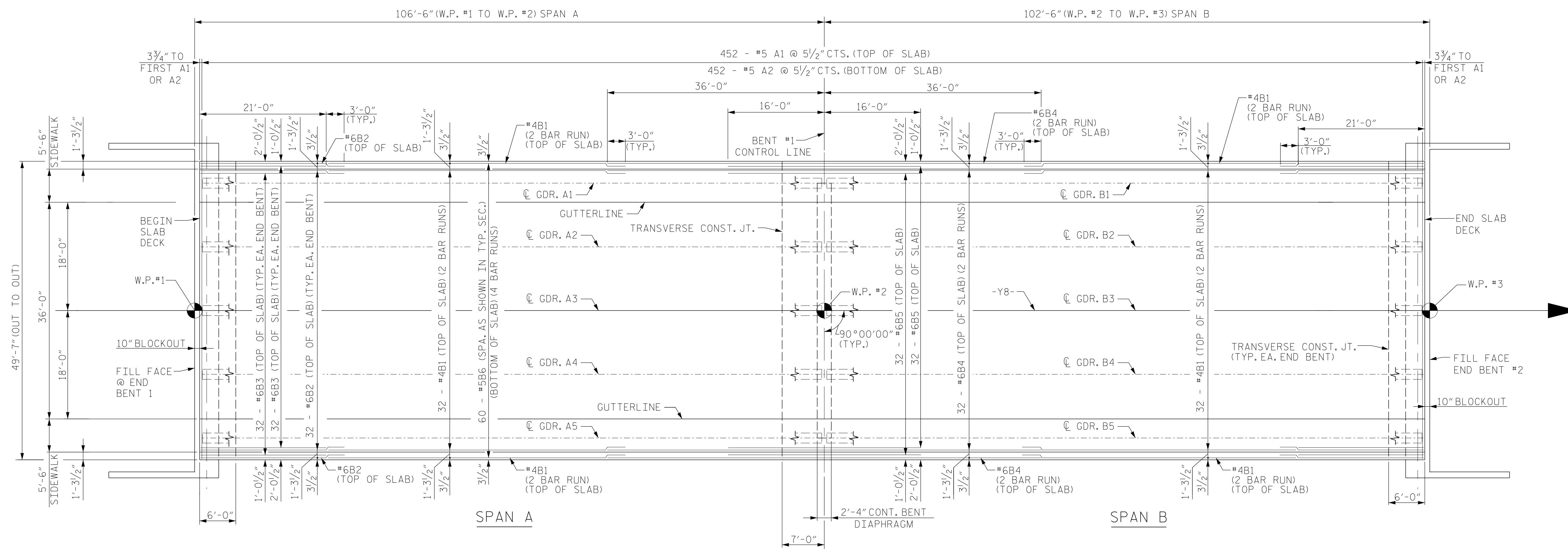
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-6
1			3			TOTAL SHEETS
2			4			35

STR. #7

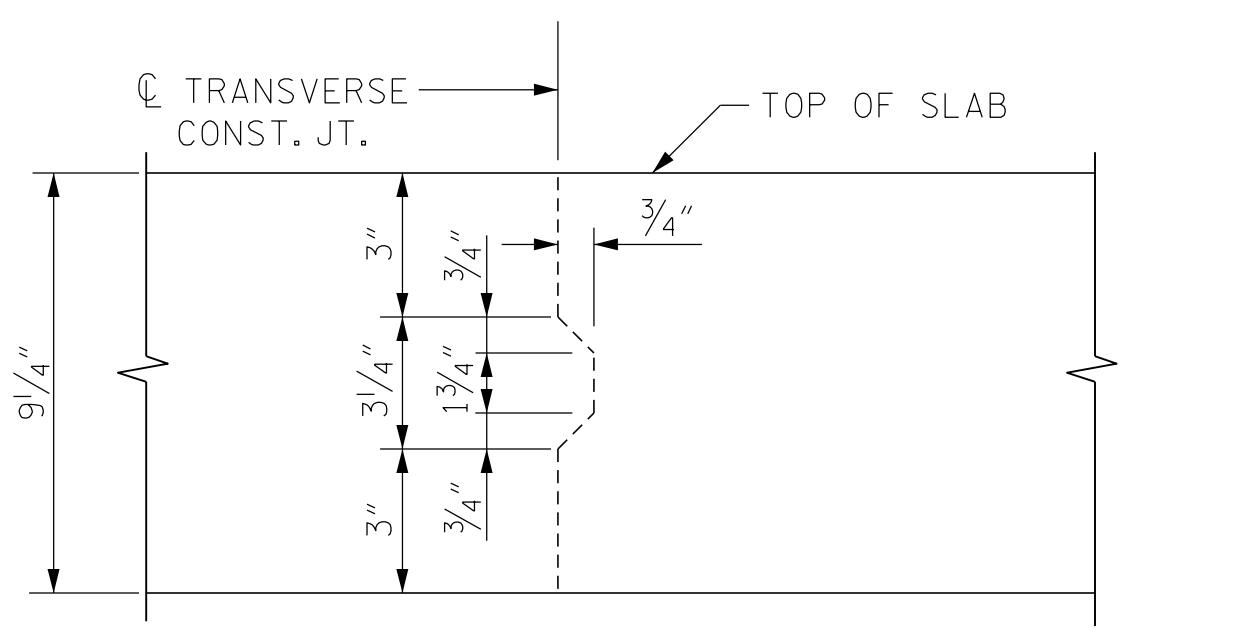
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DRAWN BY: J. LOFTUS DATE: 01/18  
CHECKED BY: E. PHELPS DATE: 02/18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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\\407\_011\_U2412A\_SMU\_TS02\_S7-6.dgn  
USER: jloftus



PLAN OF SPANS

NOTE: FOR REINFORCING STEEL AT ABUTMENT WALL & DIAPHRAGM, SEE SHEET S7-8



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

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SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS

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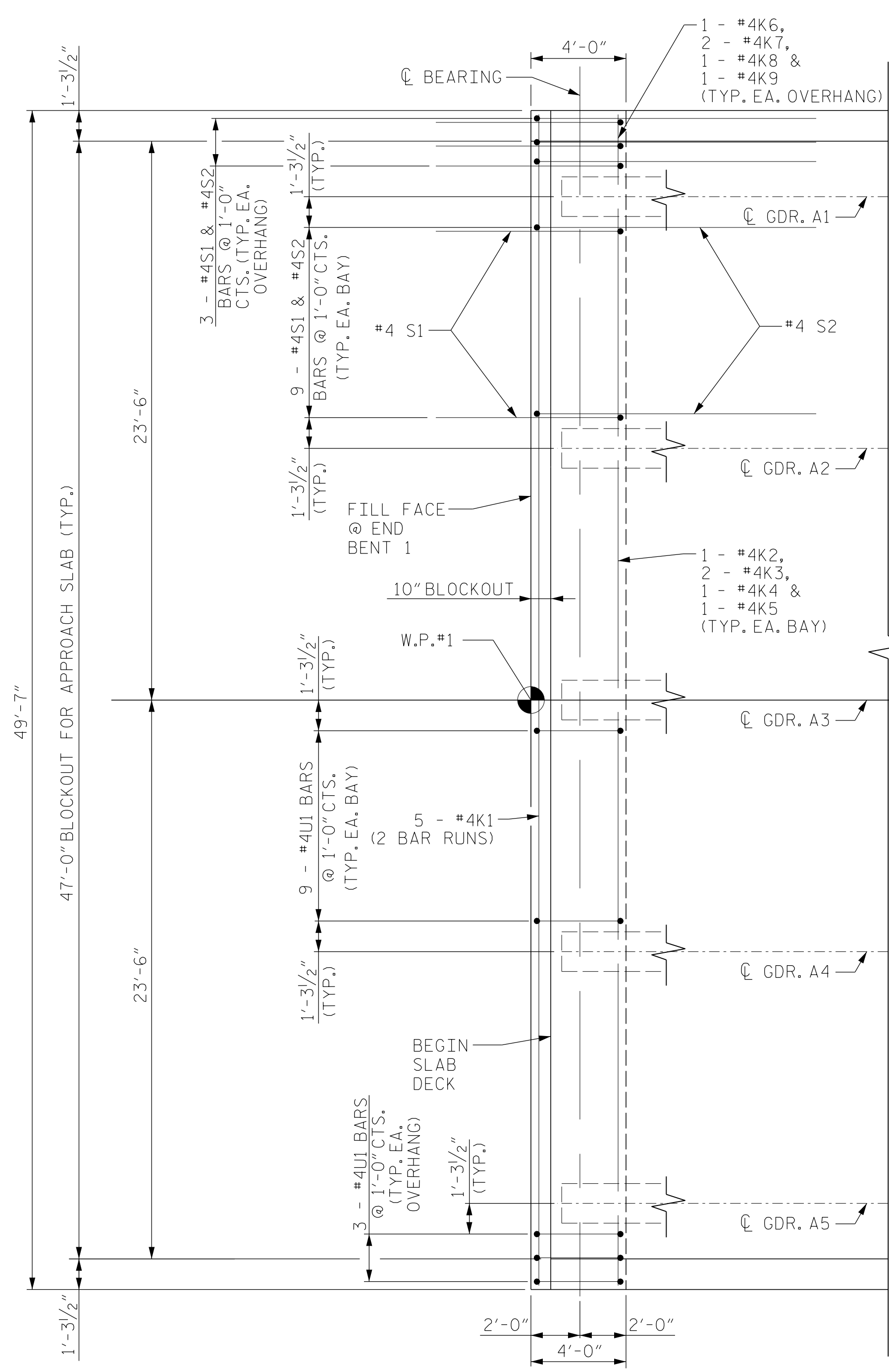
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-7
1			3			TOTAL SHEETS
2			4			35

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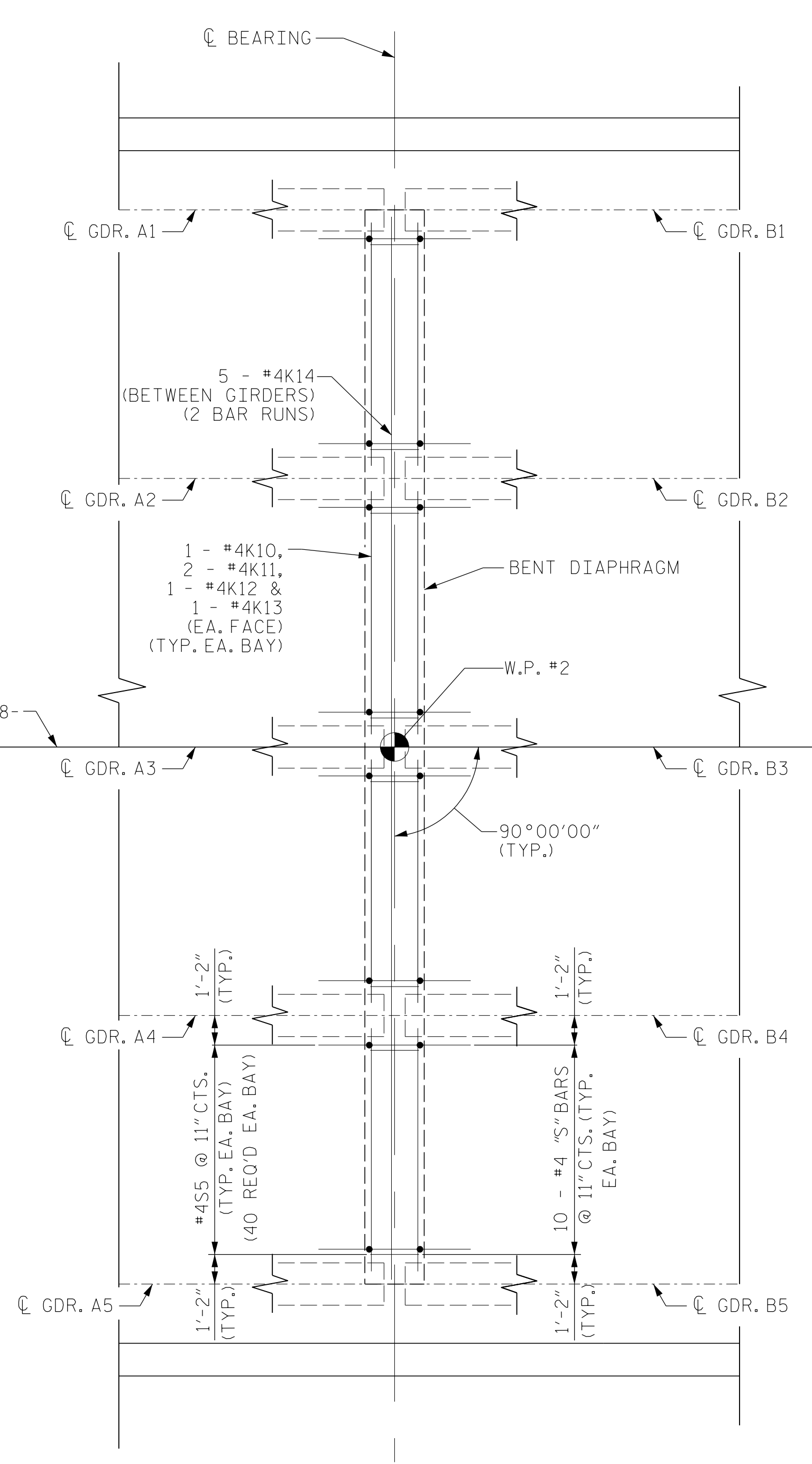
STR. #7

U-2412A

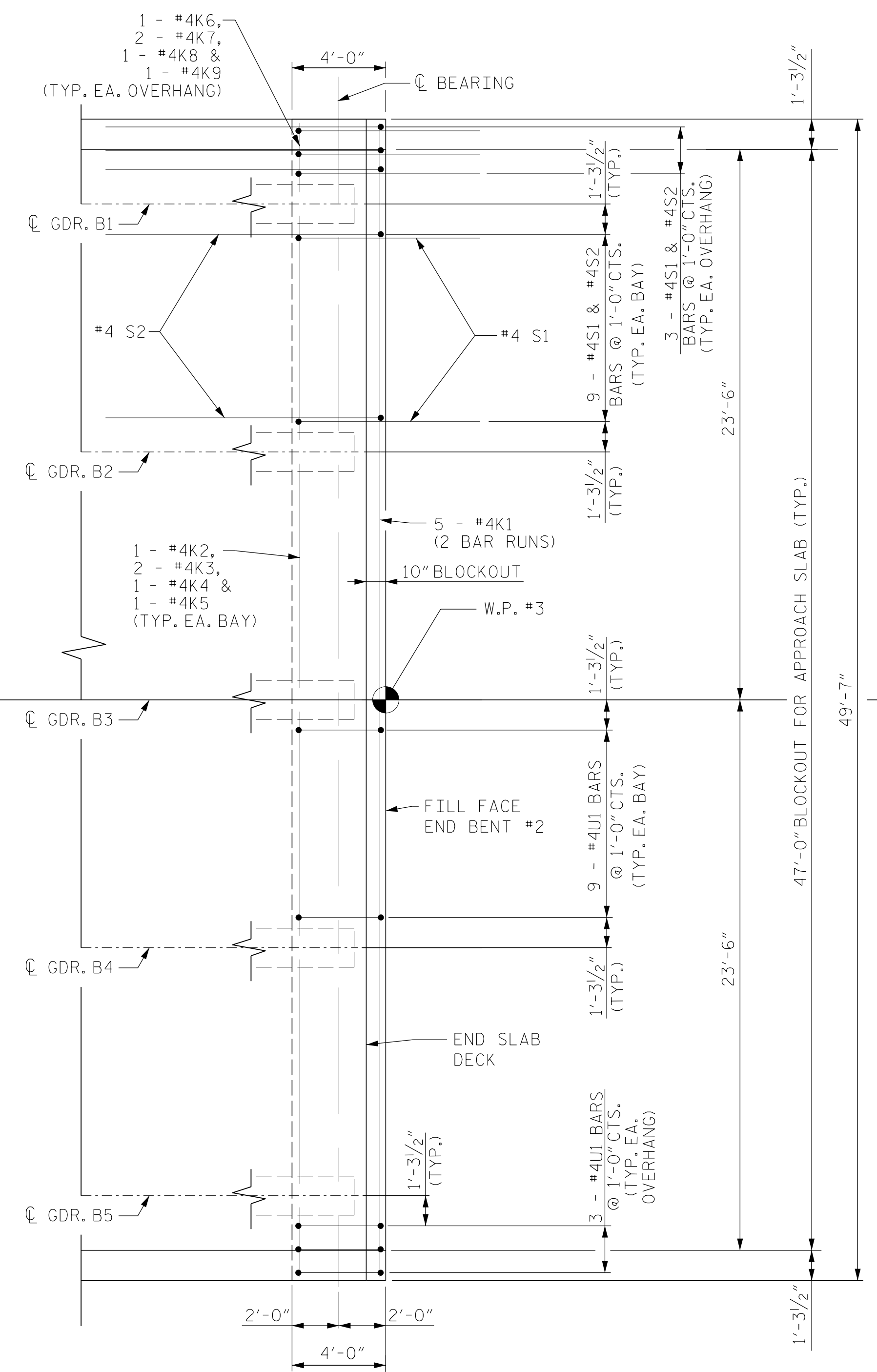
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 USER: jloftus



INTEGRAL END BENT 1



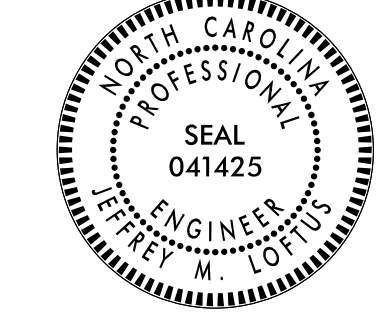
BENT 1 DIAPHRAGM



INTEGRAL END BENT 2

PLAN OF DIAPHRAGMS

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GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

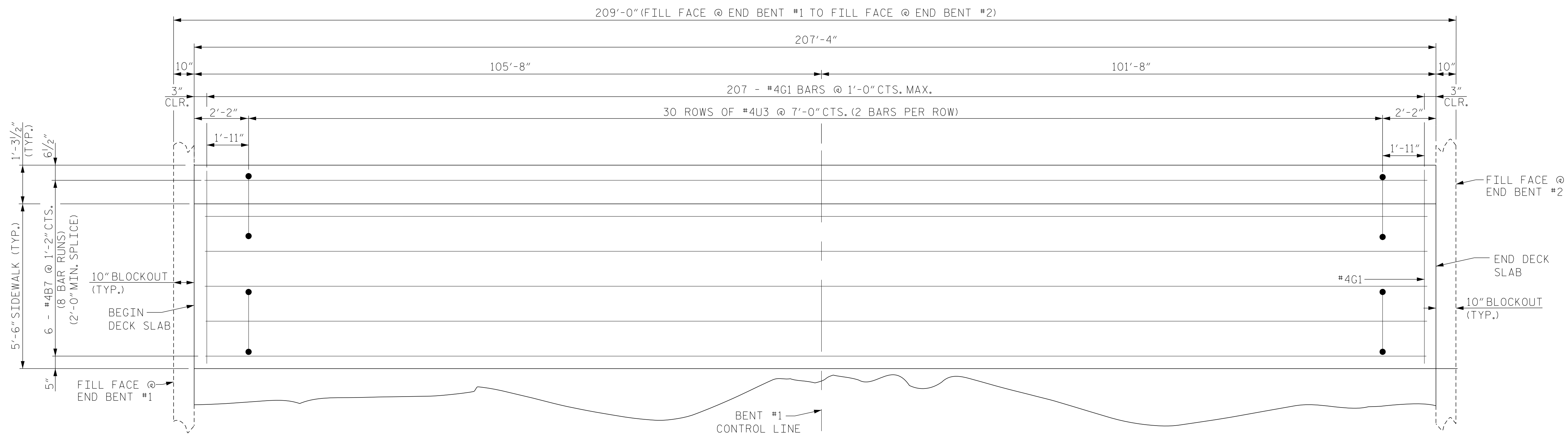
SUPERSTRUCTURE  
PLAN OF SPANS  
DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-8	
1			3			TOTAL SHEETS	
2			4			35	

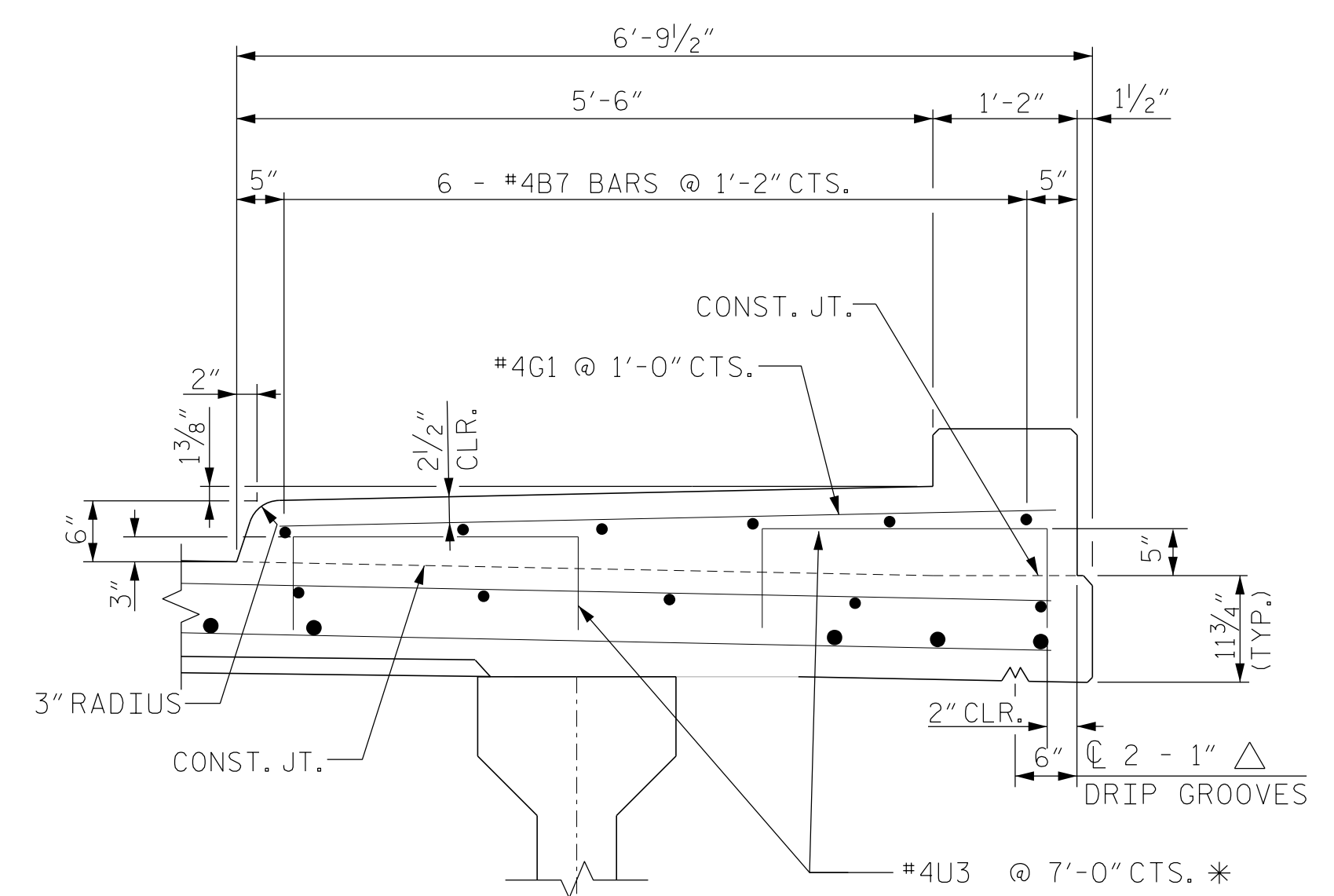
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3/7/2018  
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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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**PLAN OF SIDEWALK**  
LEFT SIDE SHOWN, RIGHT SIDE SIMILAR BUT MIRRORED



**SECTION THRU SIDEWALK**

**NOTES**

THE #4U3 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

THE SIDEWALK 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 THE SIDEWALK SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS OR END OF SLABS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. CONTRACTOR SHALL NOT INSTALL GROOVED CONTRACTION JOINTS WITHIN 1'-0" OF RAIL POST CONNECTIONS. FOR POST SPACINGS SEE 'RAIL POST SPACINGS FOR THREE BAR METAL RAILS' SHEET.

PAYMENT FOR SIDEWALK SHALL BE INCLUDED IN PAY ITEM FOR "REINFORCED CONCRETE DECK SLAB".

FOR SIDEWALK QUANTITIES, SEE SUPERSTRUCTURE BILL OF MATERIAL SHEET.

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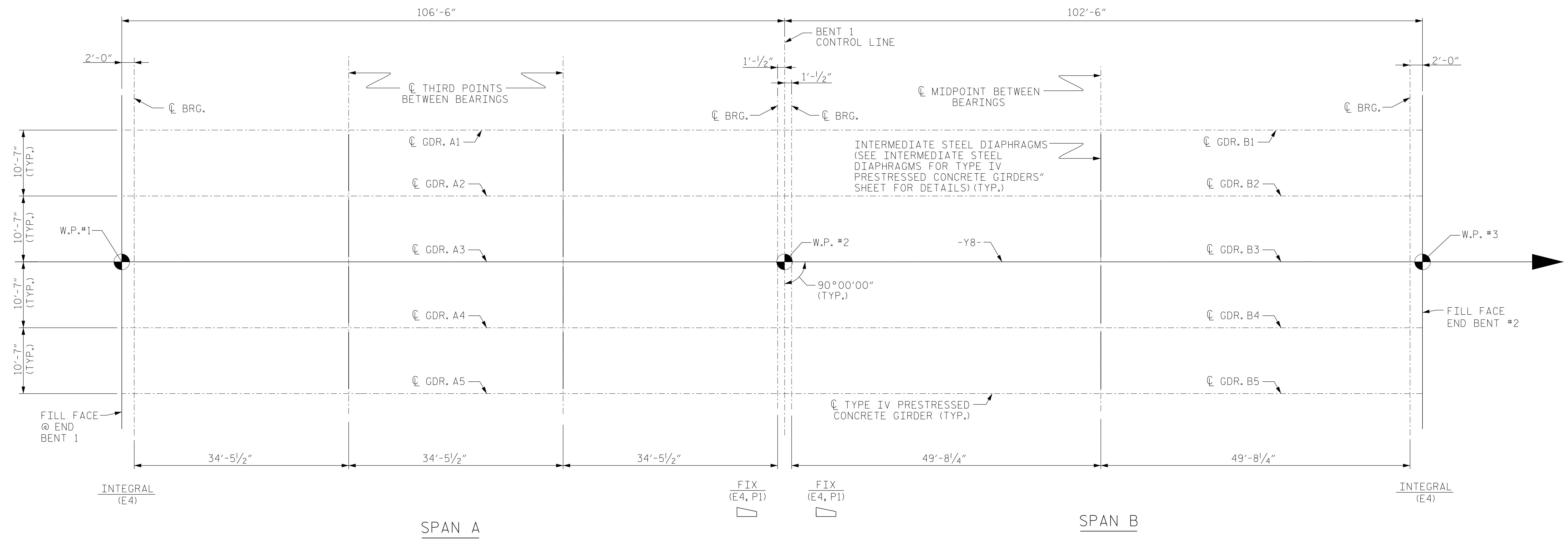
**SUPERSTRUCTURE  
SIDEWALK DETAILS**

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

SHEET NO.  
S7-9  
TOTAL SHEETS  
35

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U-2412A  
3/7/2018  
...V407\_017\_U2412A\_SMUJ\_SWI\_S7-9.dgn  
USER: jloftus



FRAMING PLAN

PROJECT NO. U-2412A  
GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

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 RALEIGH

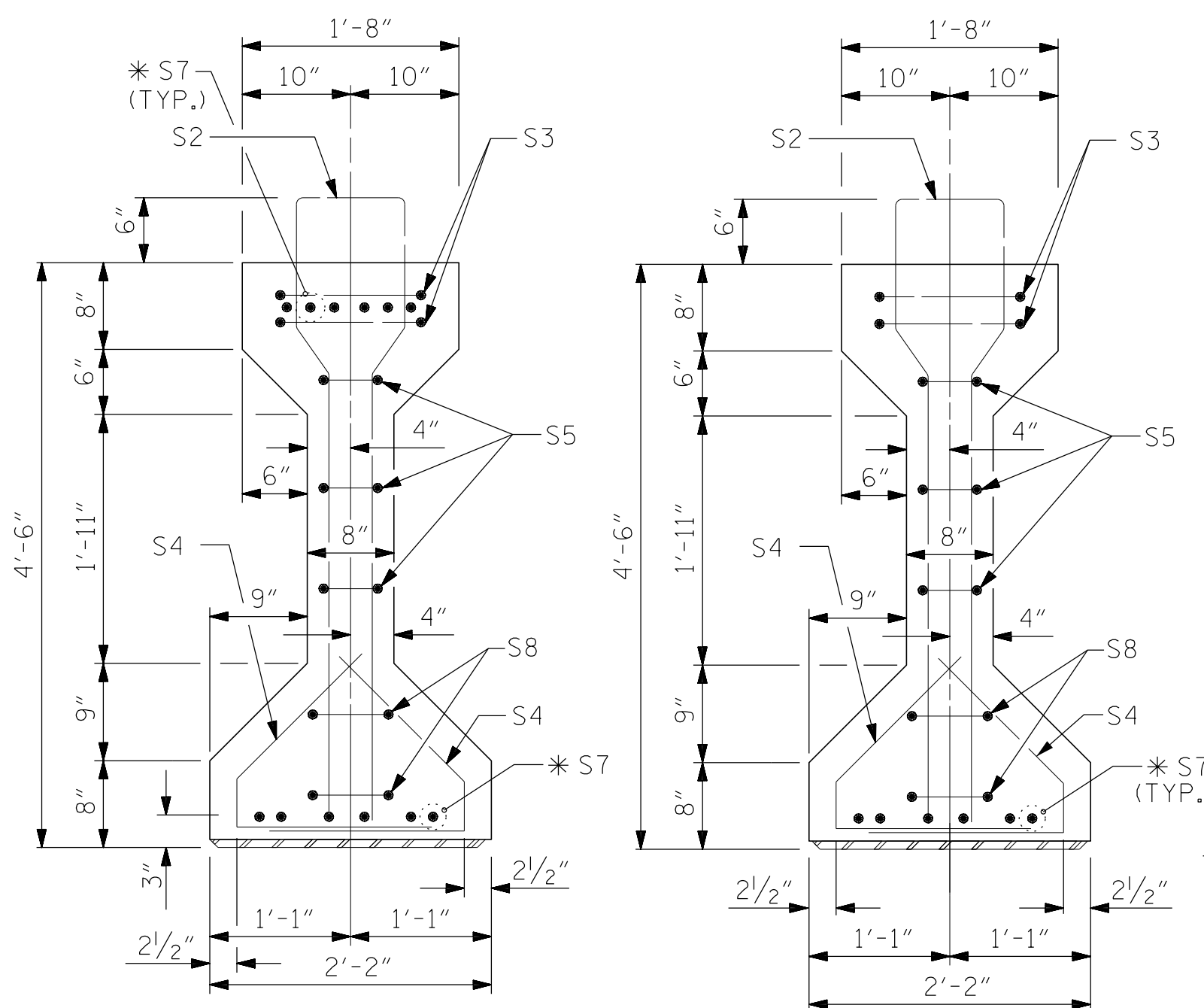
SUPERSTRUCTURE  
 FRAMING PLAN

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

STR. #7

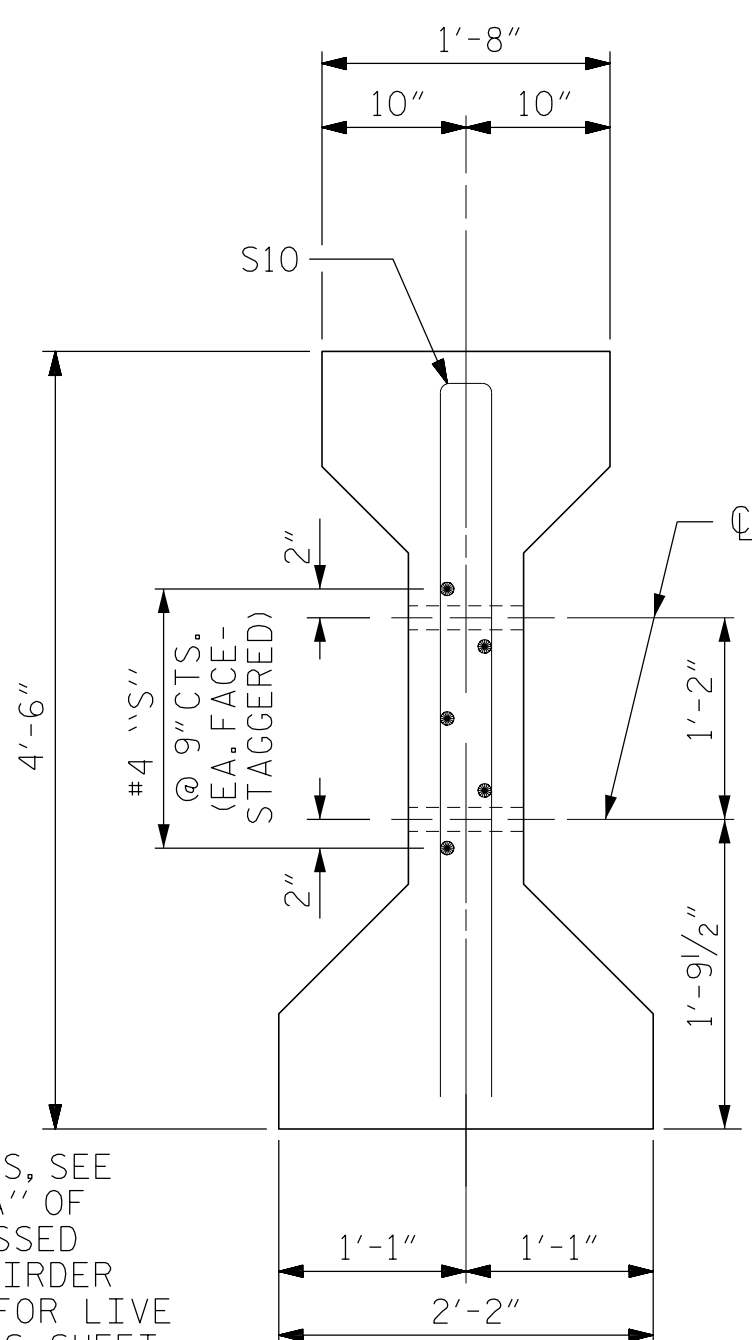
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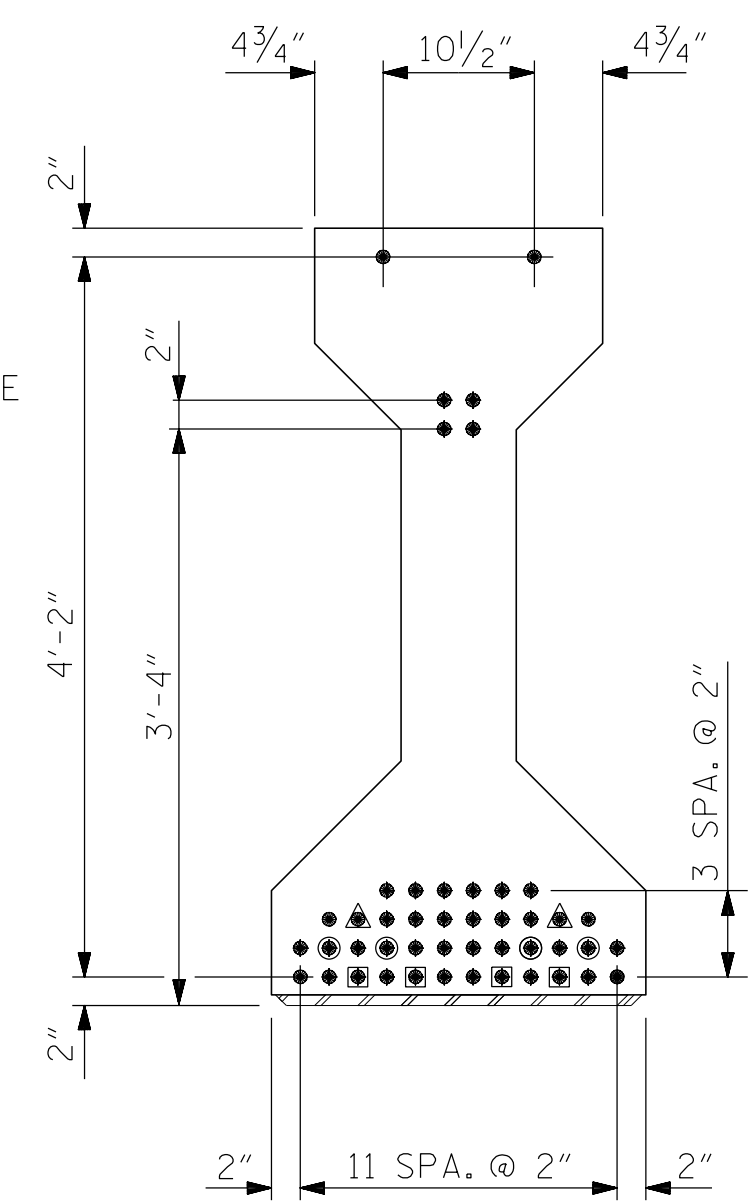


SECTION A-A

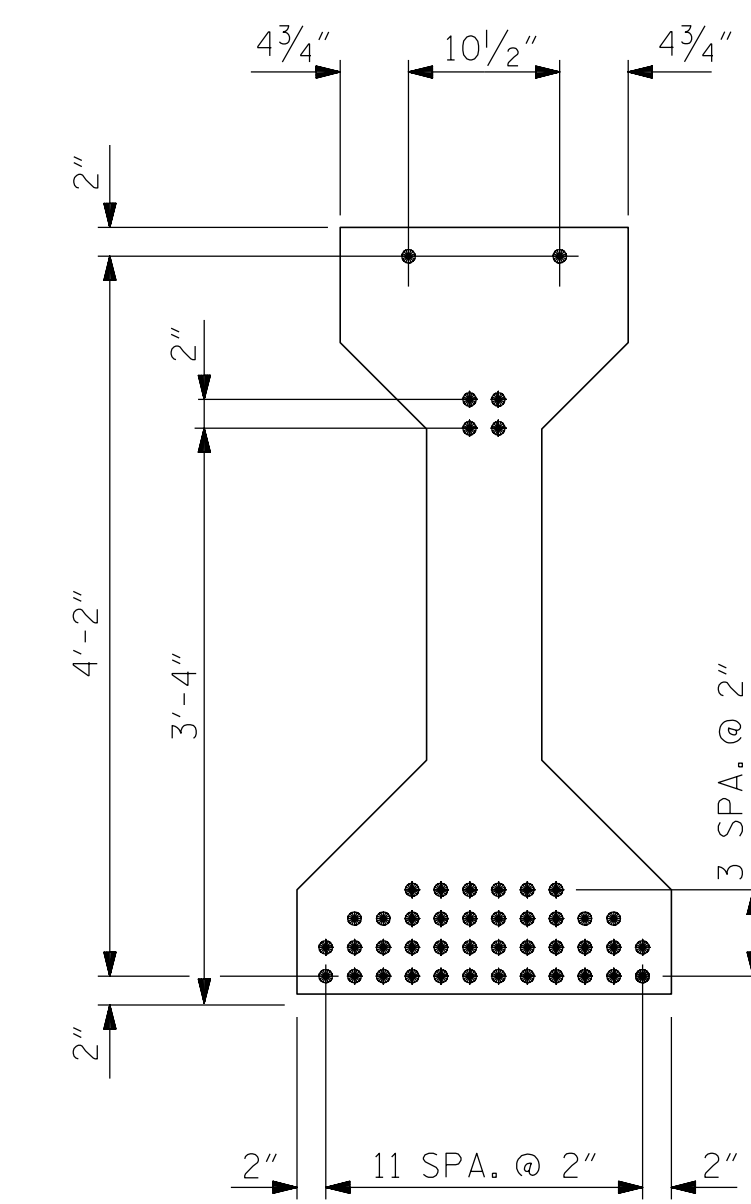
SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)



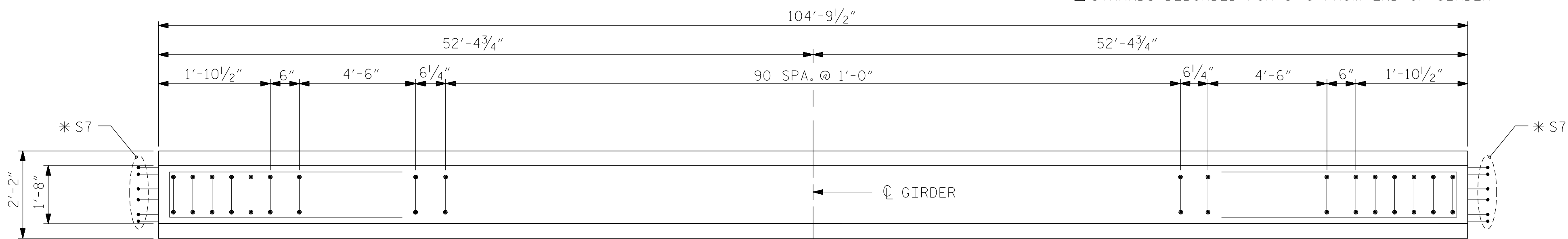
AT END OF GIRDER



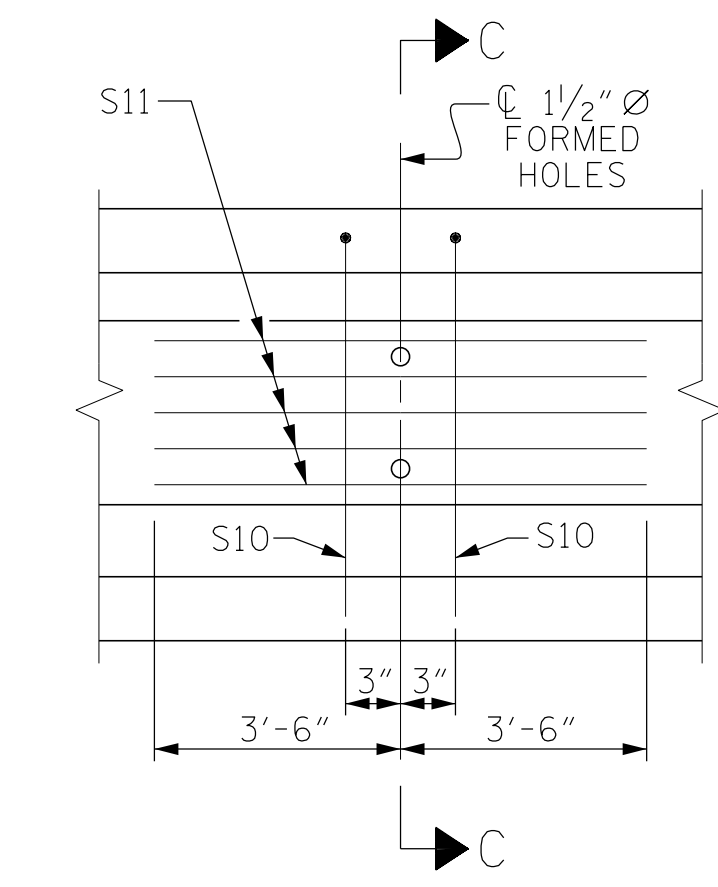
AT C/L OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- △ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

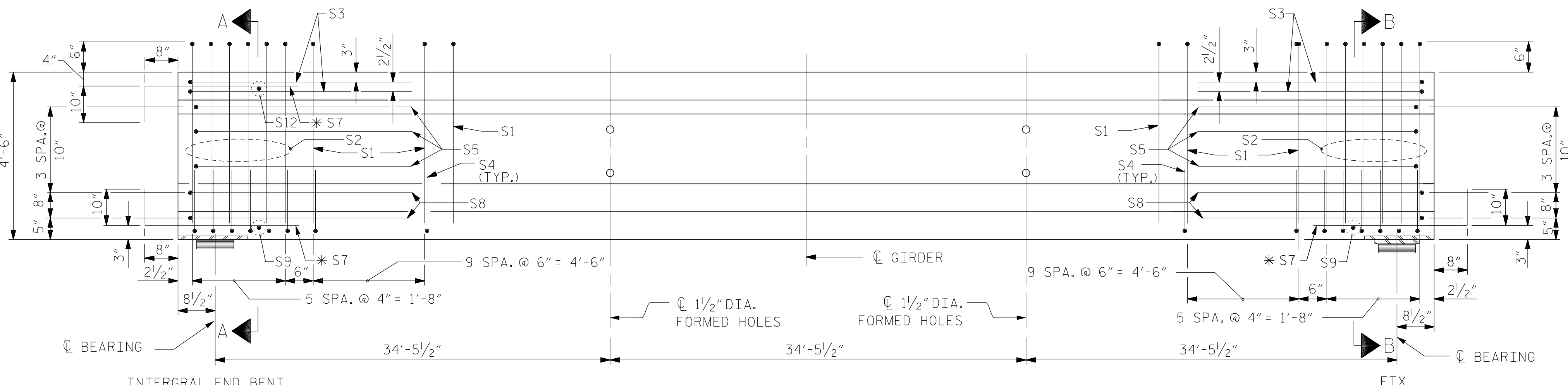


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 THRU 5



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

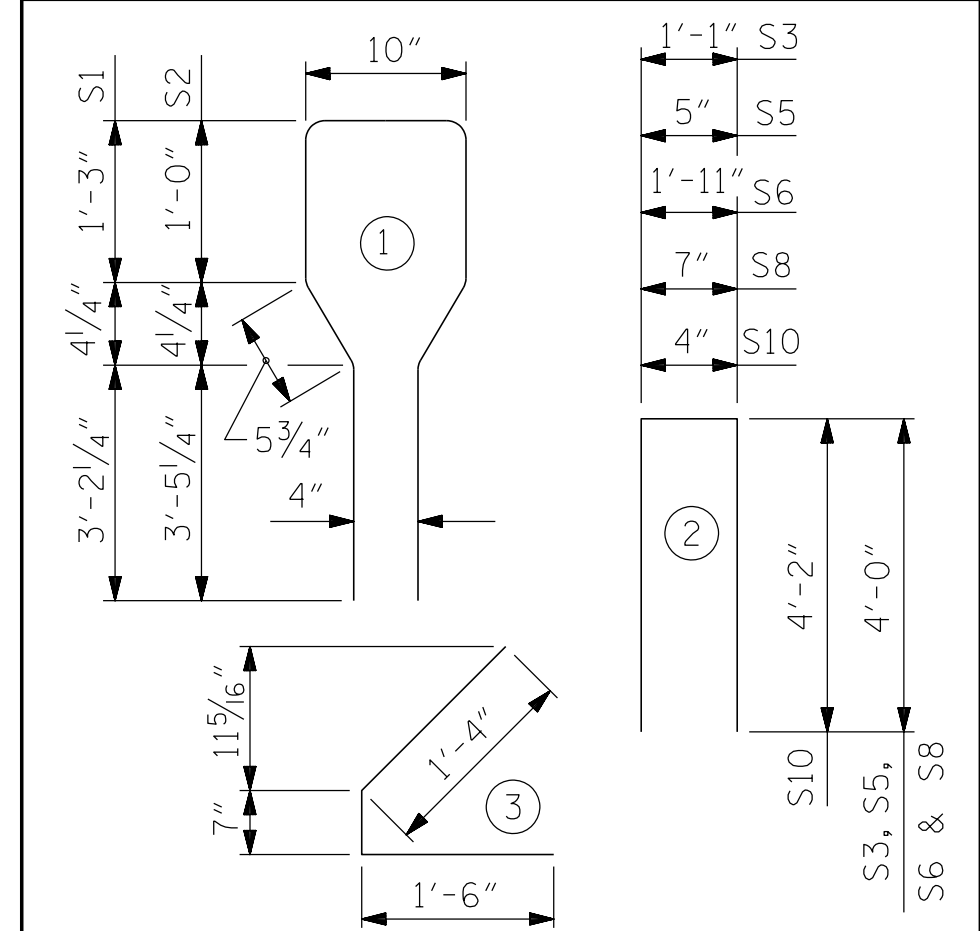
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	111	#4	1	10'-8"	791
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
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	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S12	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	9,500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1364	21.3	46
INTERIOR GIRDER	1364	21.3	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	104'-9 1/2"	523'-11 1/2"

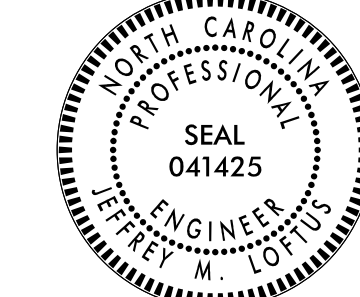
PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 1 OF 3

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 RALEIGH  
 STANDARD  
 AASHTO TYPE IV  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 SPAN A

REVISIONS						SHEET NO. S7-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 35
2			4			

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 FES10C02E794A9 3/7/2018



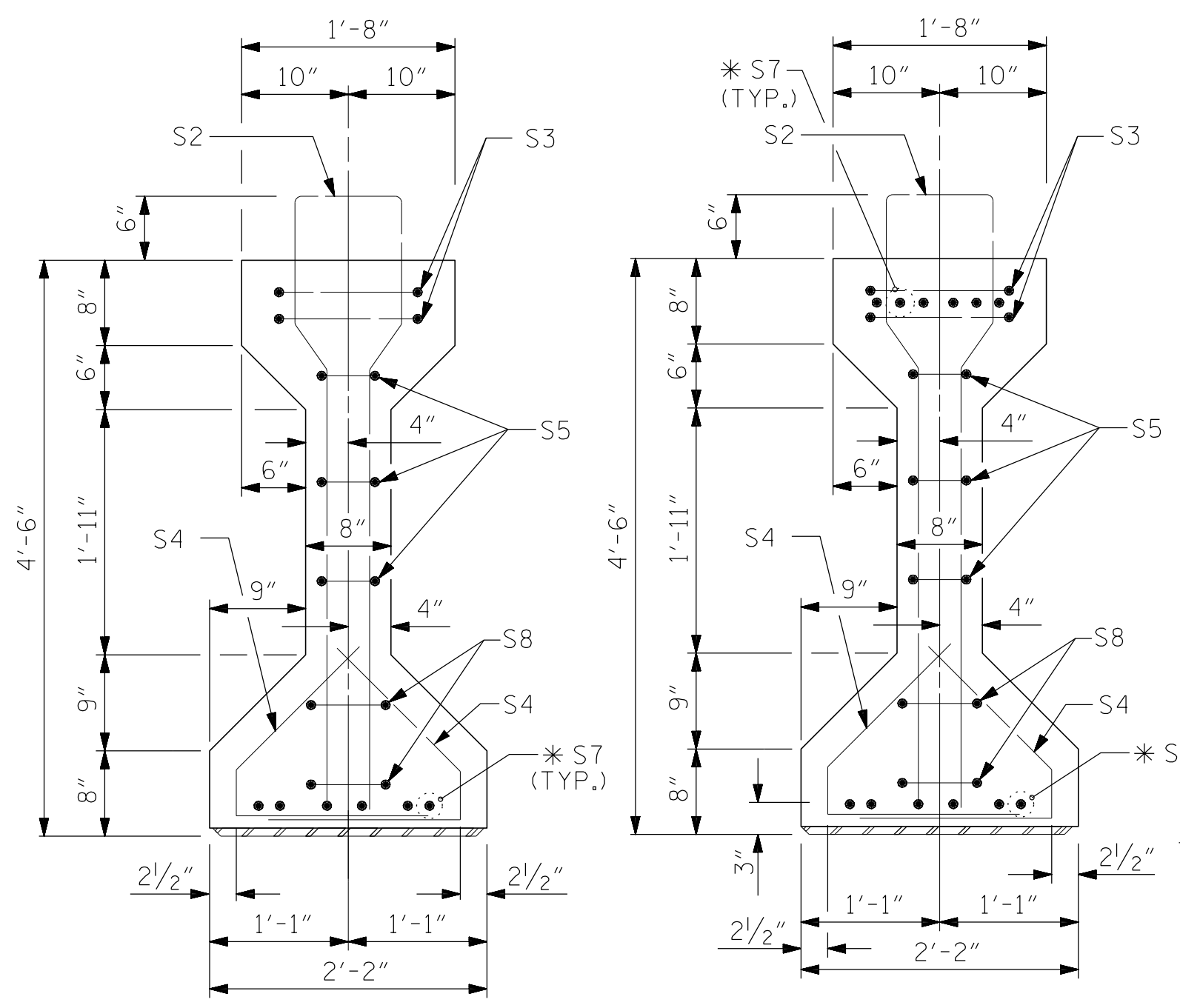
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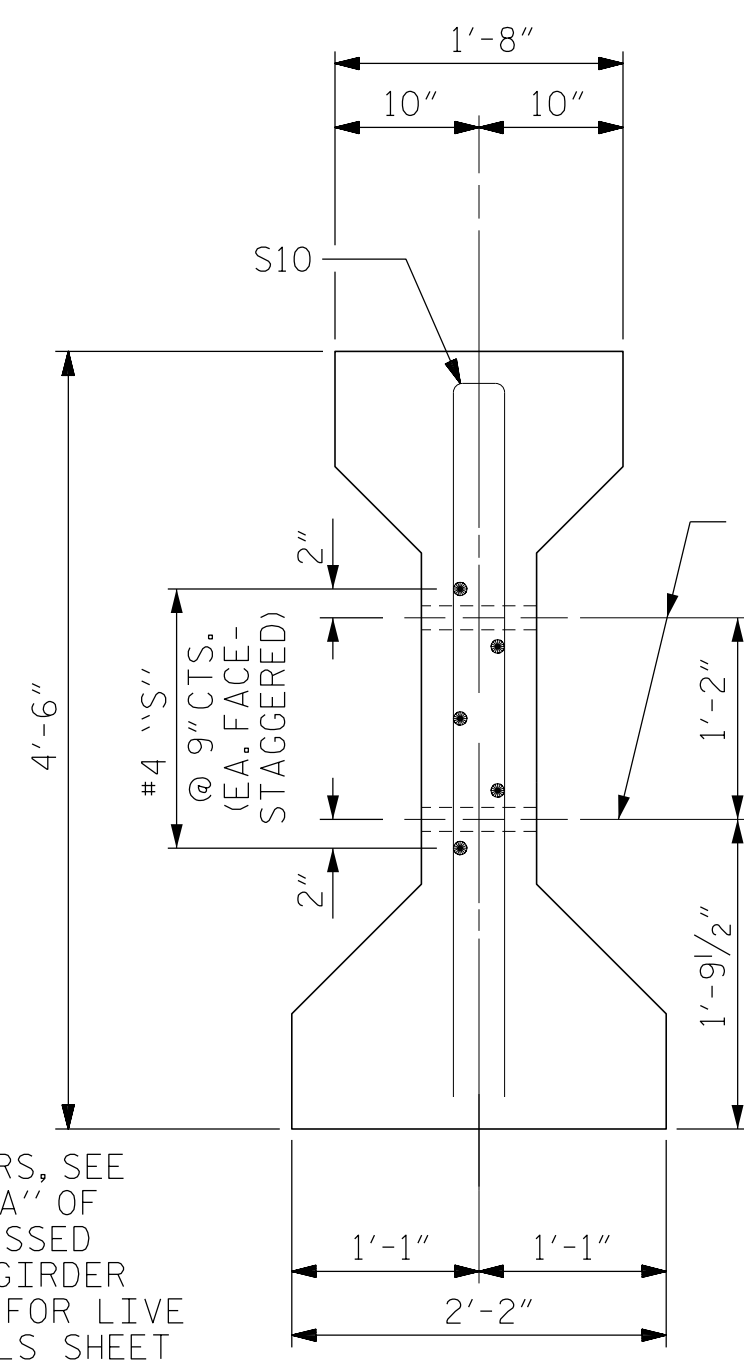
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 USER: jloftus



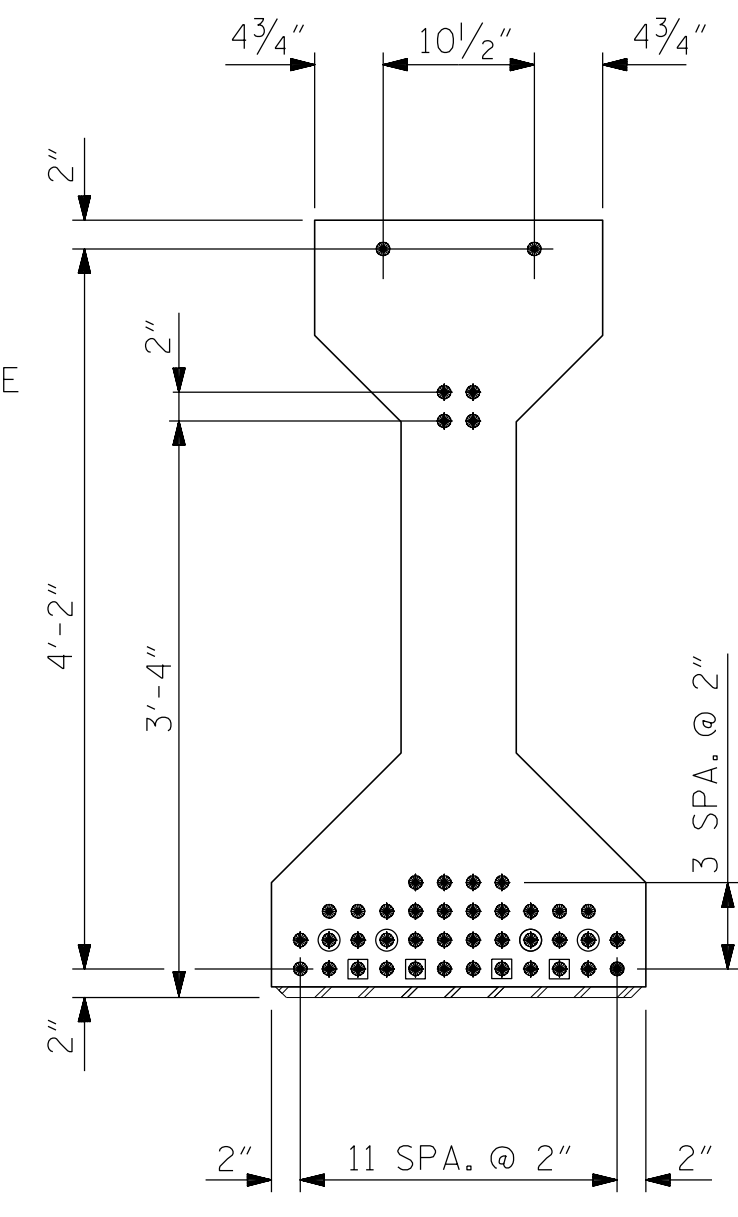


SECTION A-A

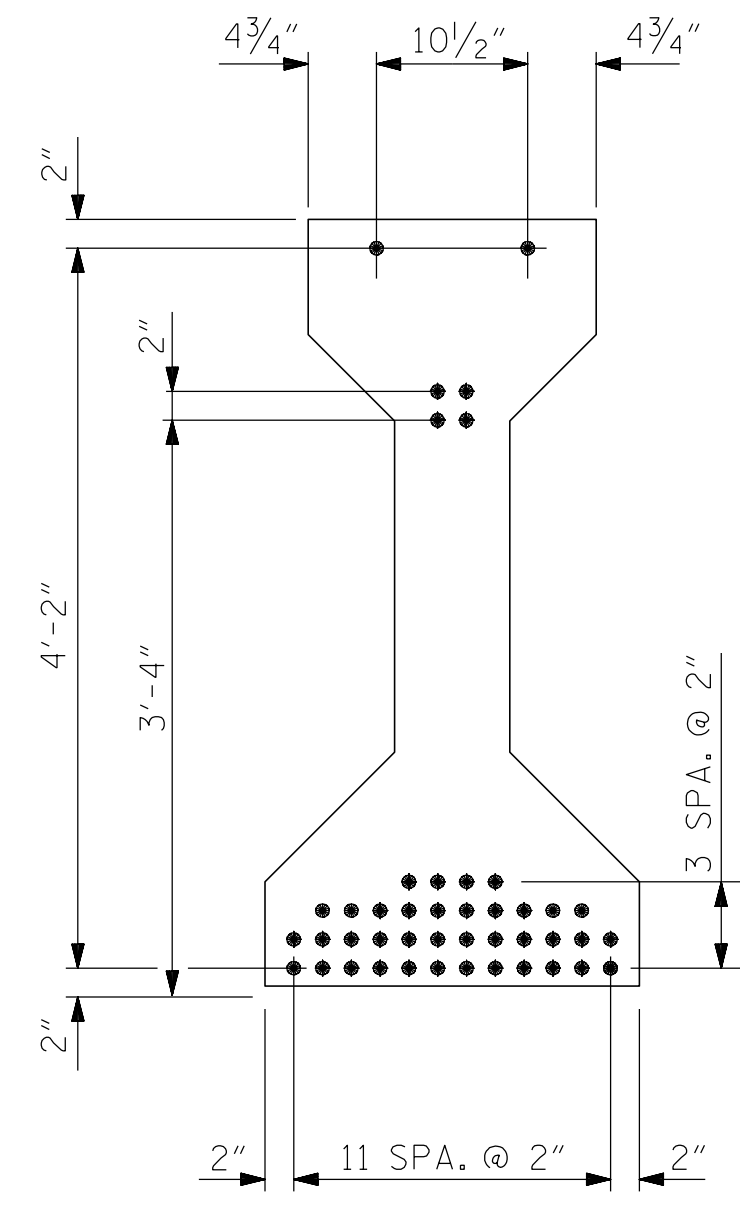
SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)



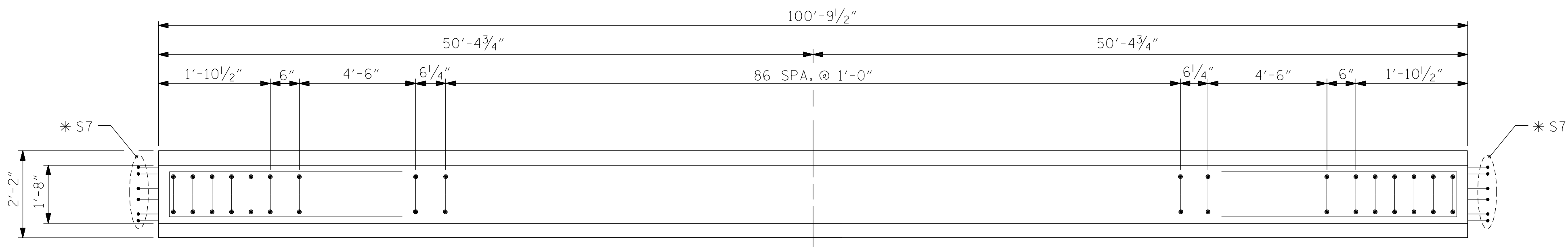
AT END OF GIRDER



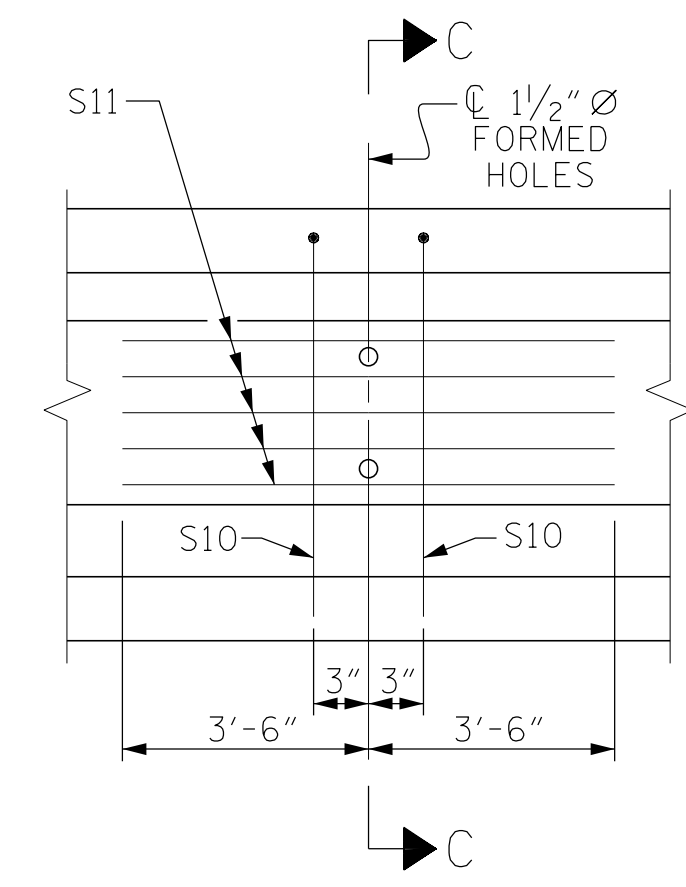
AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

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

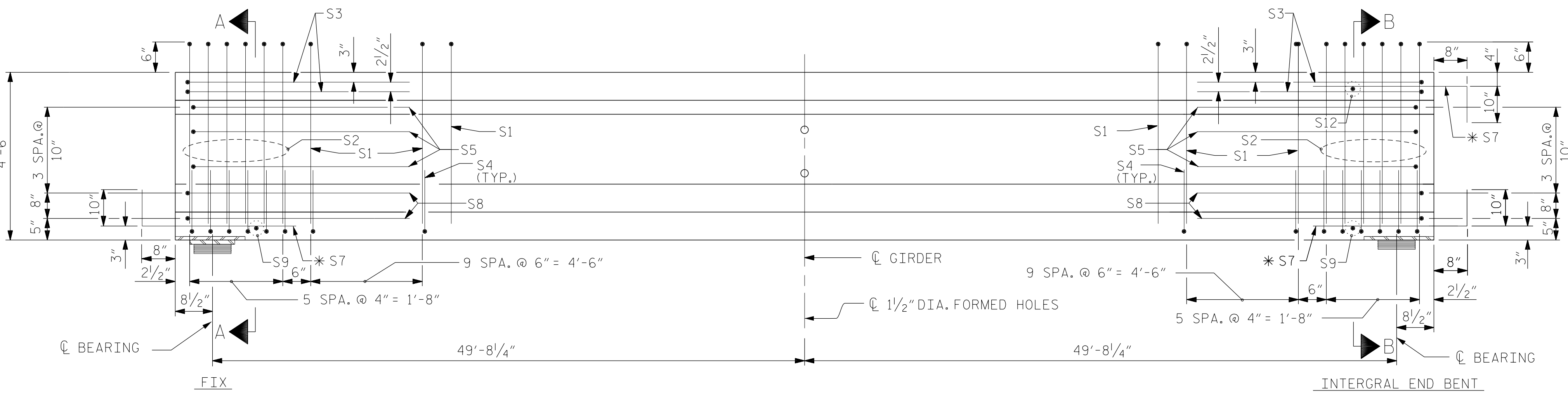


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 THRU 5



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

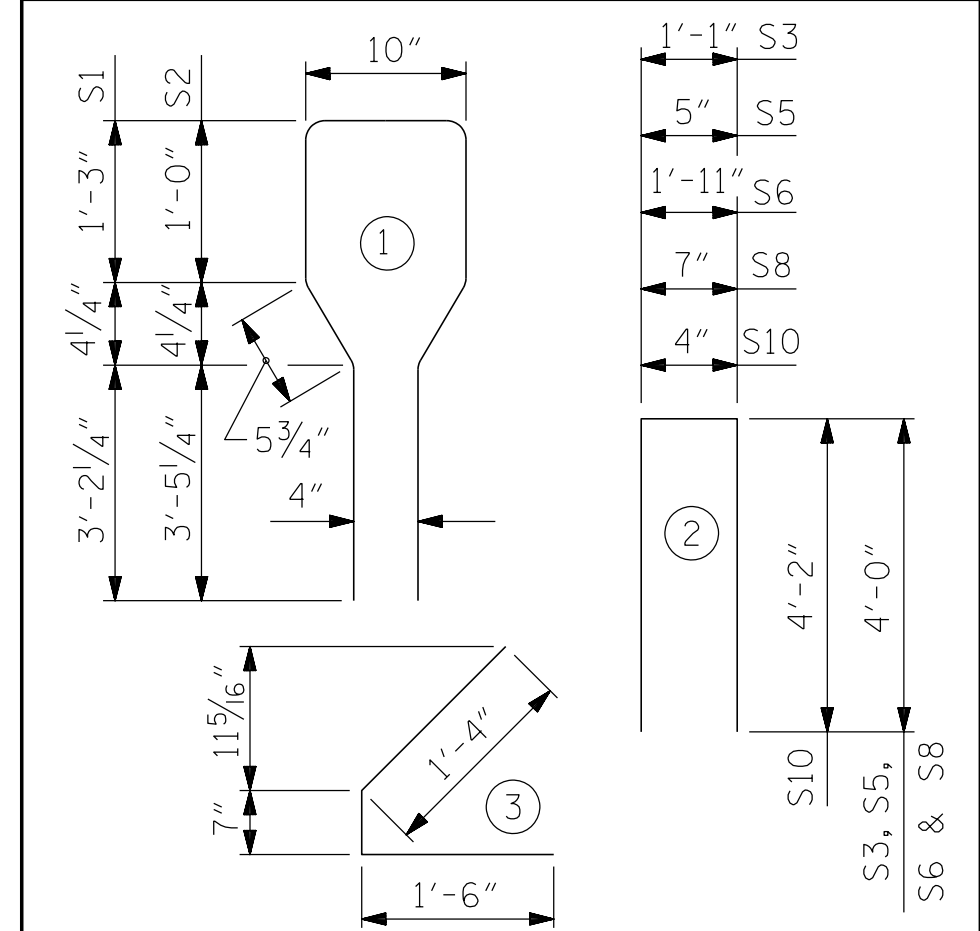
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	107	#4	1	10'-8"	762
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
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
S12	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	9,500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1293	20.5	44
INTERIOR GIRDER	1293	20.5	44

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	100'-9 1/2"	503'-11 1/2"

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 2 OF 3

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

REVISIONS						SHEET NO. S7-12
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 35
2			4			

Designed by:  
 Jeff Loftus  
 FES1D002679410 3/7/2018



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CHECKED BY: E. PHELPS	DATE: 02-18
DESIGN ENGINEER OF RECORD: J. LOFTUS	DATE: 02-18

U-2412A  
 3/7/2018  
 \\407\_023\_U2412A-SMU-PC002\_S7-12.dgn  
 USER: jloftus

# 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.

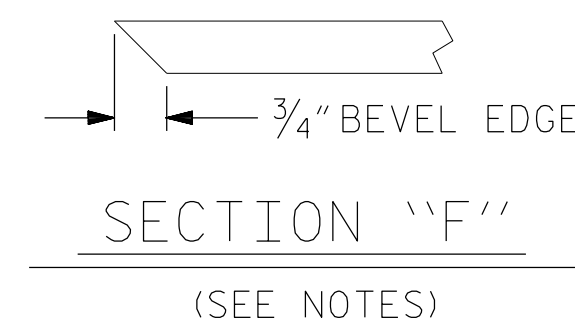
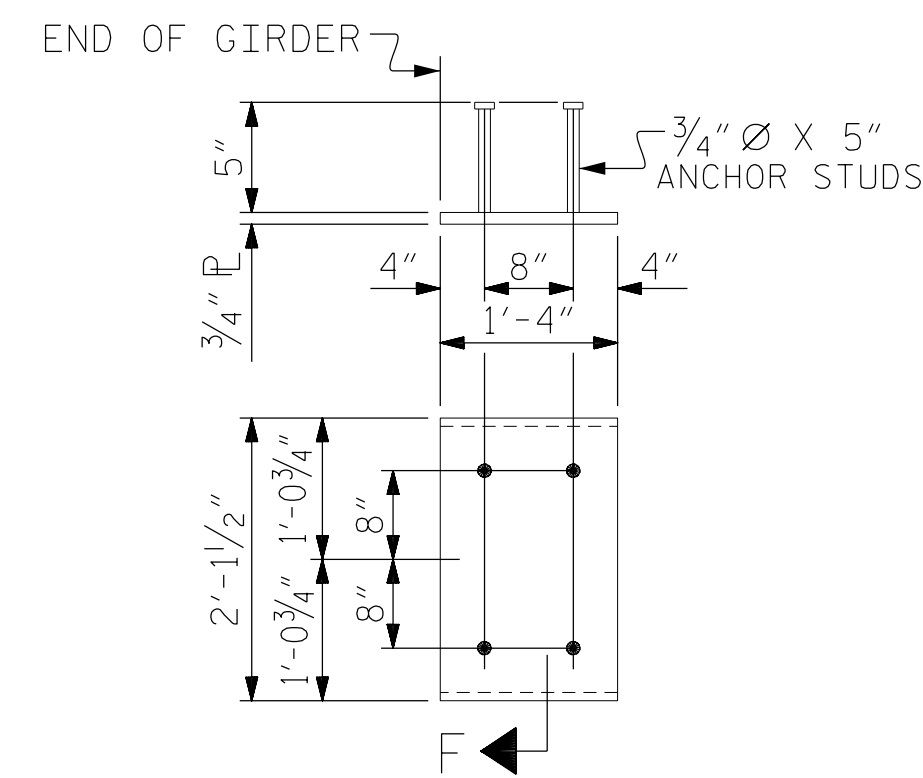
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7500 PSI.

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

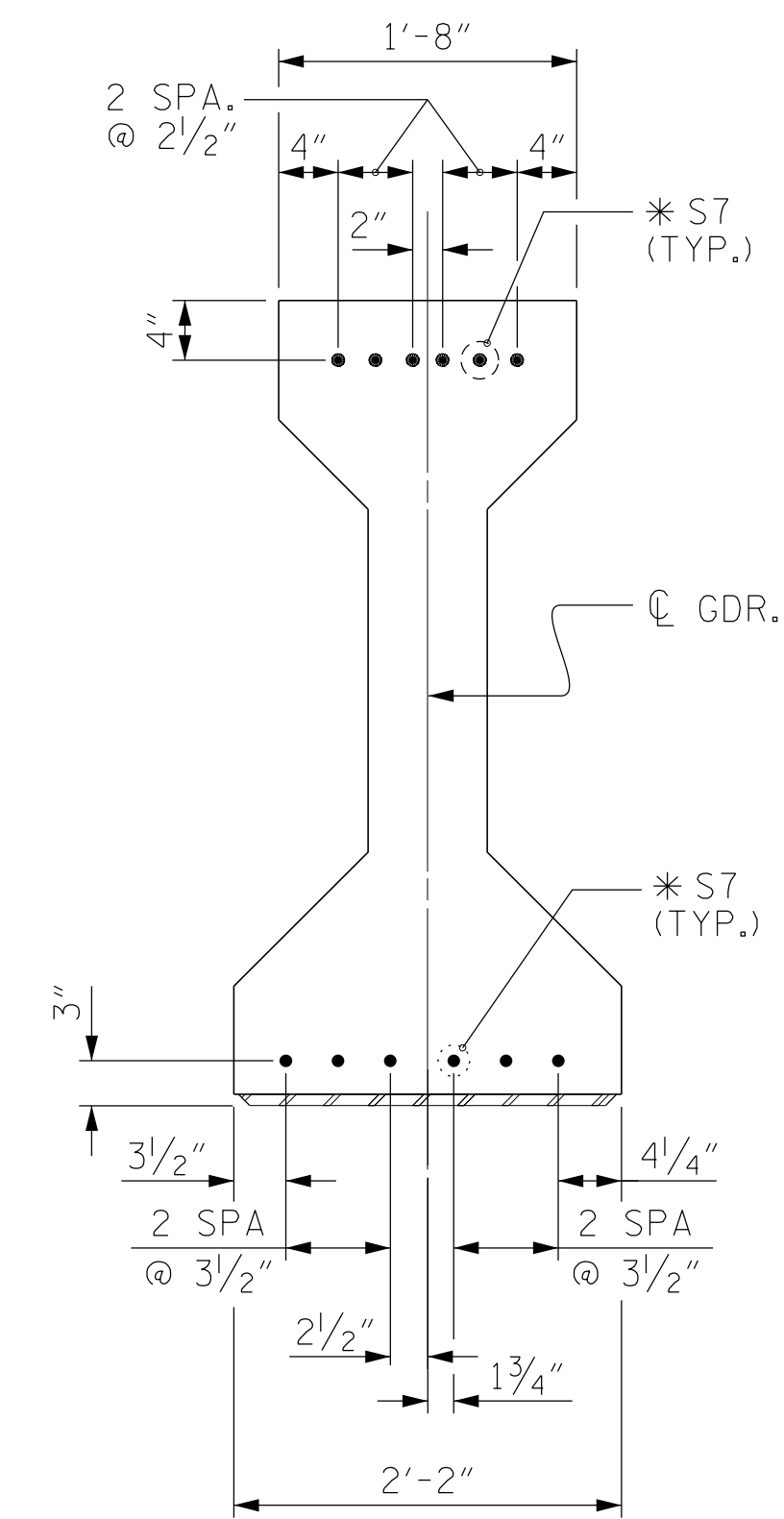
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

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.



## EMBEDDED PLATE "B-1" DETAILS

TWO EMBEDDED PLATES "B-1" ARE REQUIRED FOR EACH GIRDER.



## DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

Designed by:  
**Jeff Loftus**  
FE51DC02E079448 3/7/2018



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SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PRESTRESSED CONCRETE  
 GIRDER CONTINUOUS FOR  
 LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-13
1			3			TOTAL SHEETS
2			4			35

STR. #7

DRAWN BY: J. LOFTUS DATE: 01/18  
 CHECKED BY: E. PHELPS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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 3/7/2018  
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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.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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, WASHERS, AND PIPE SLEEVE 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. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

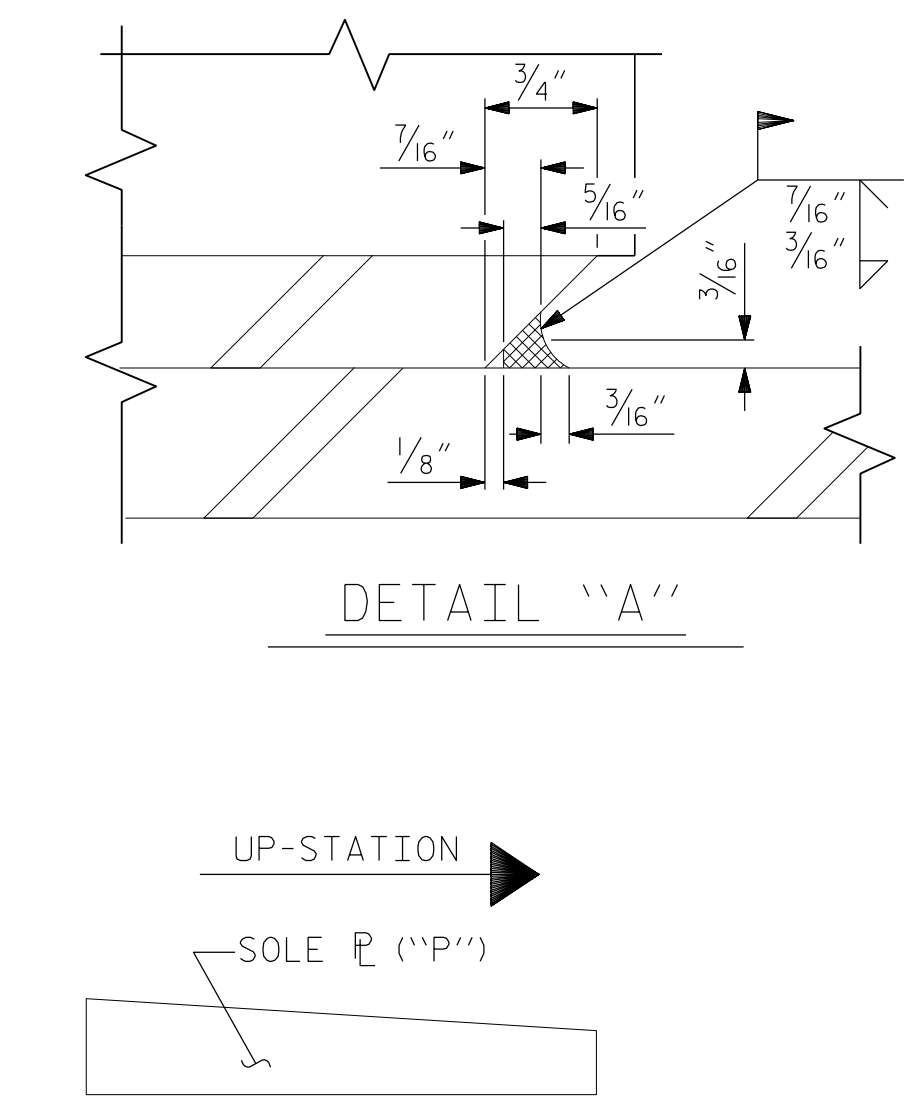
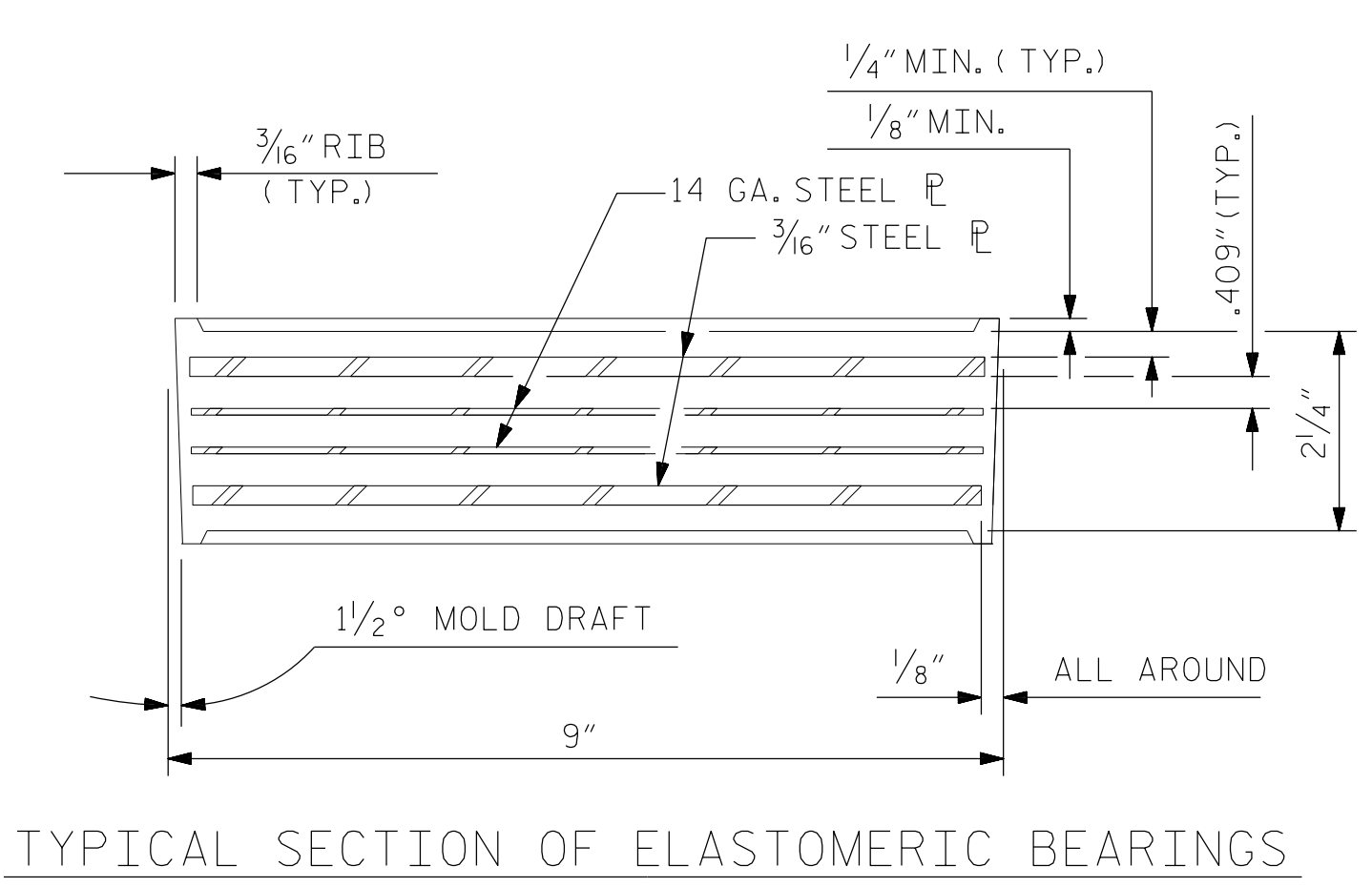
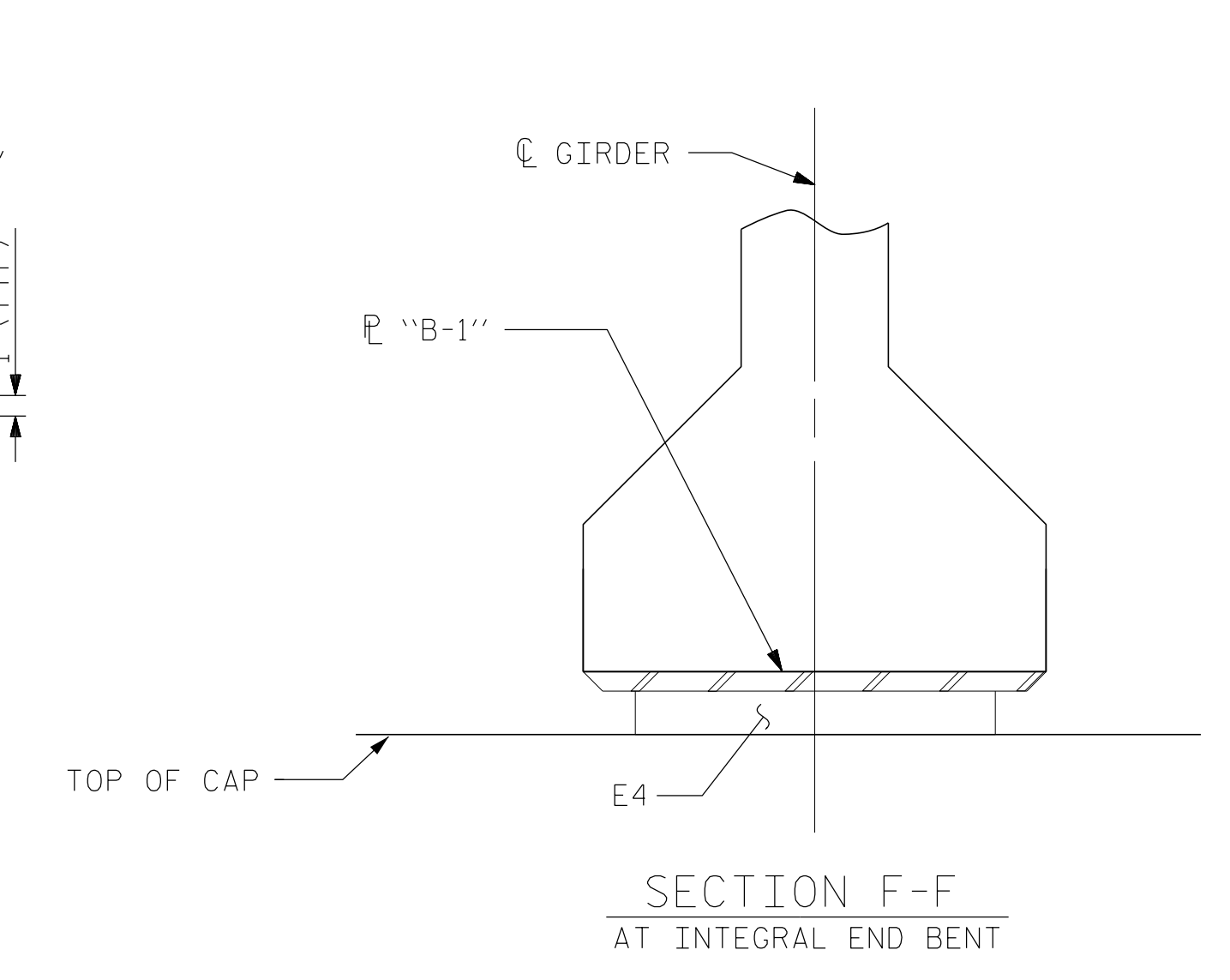
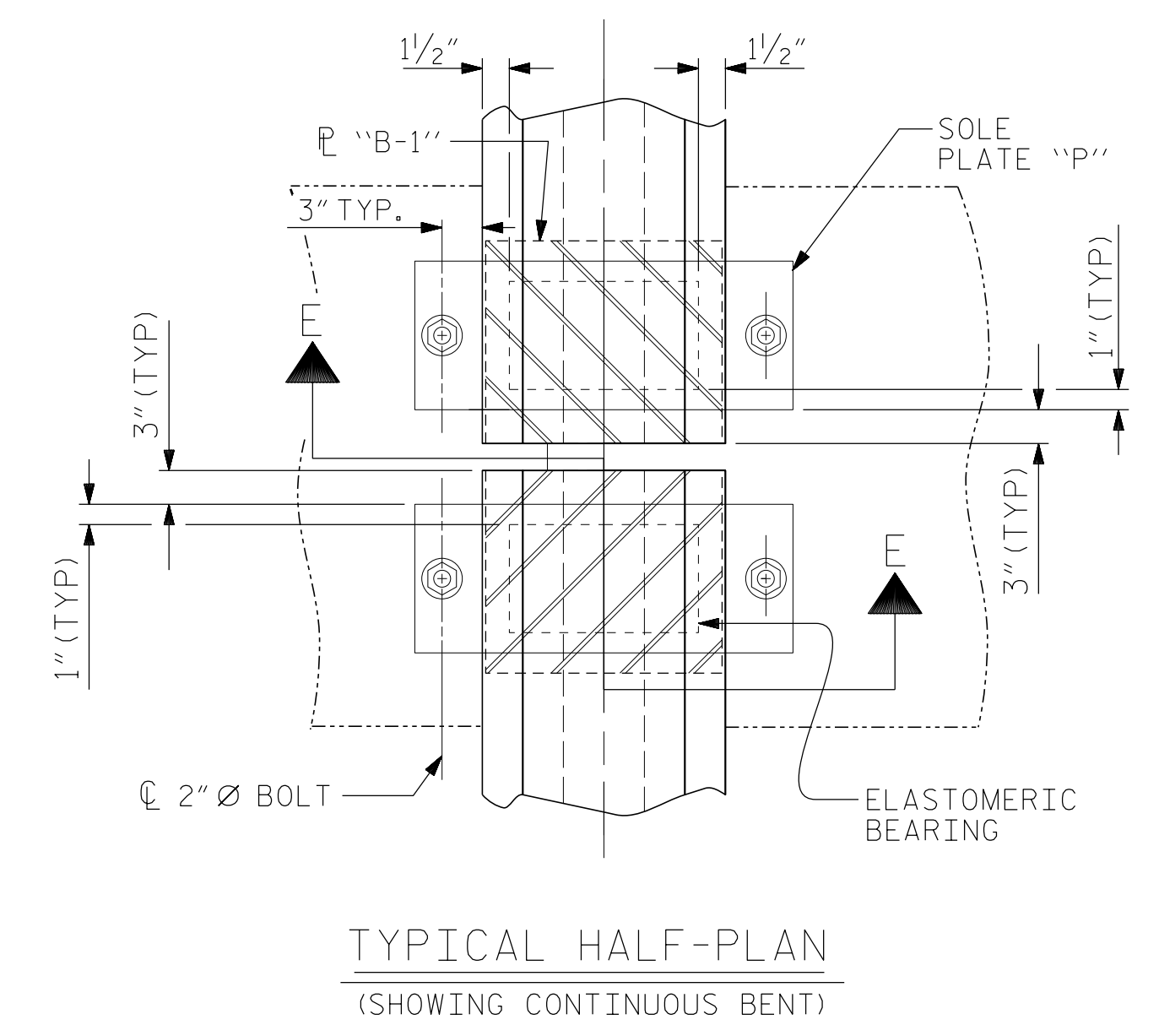
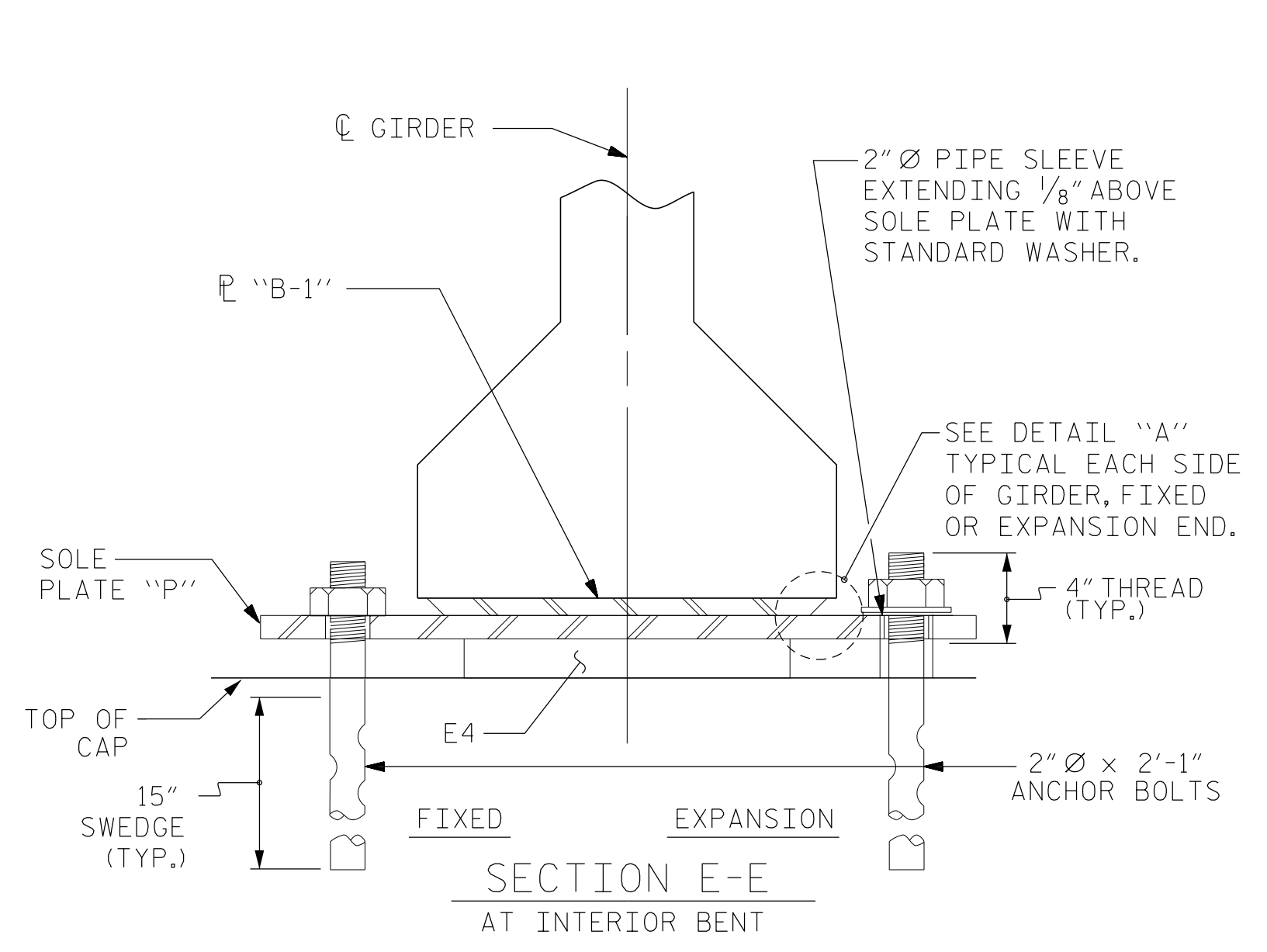
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

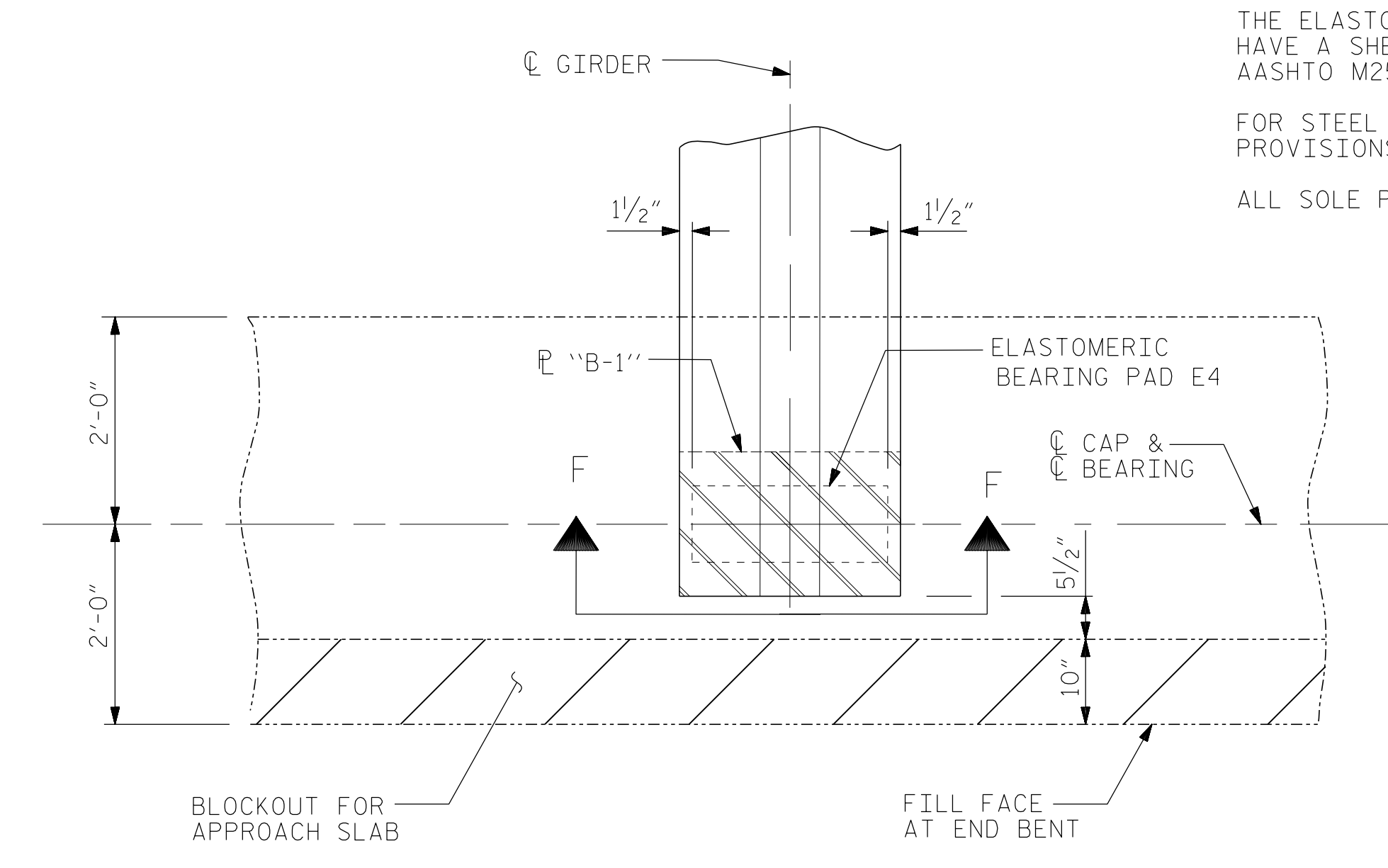
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

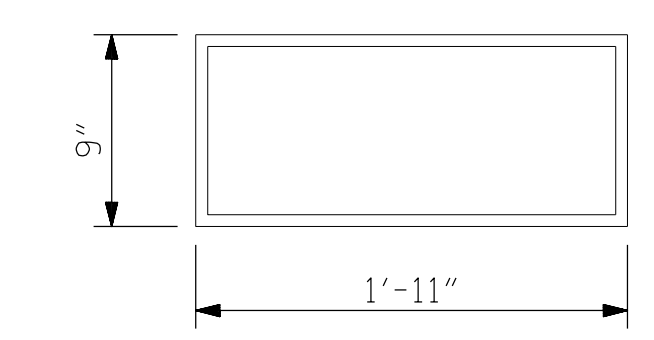
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k



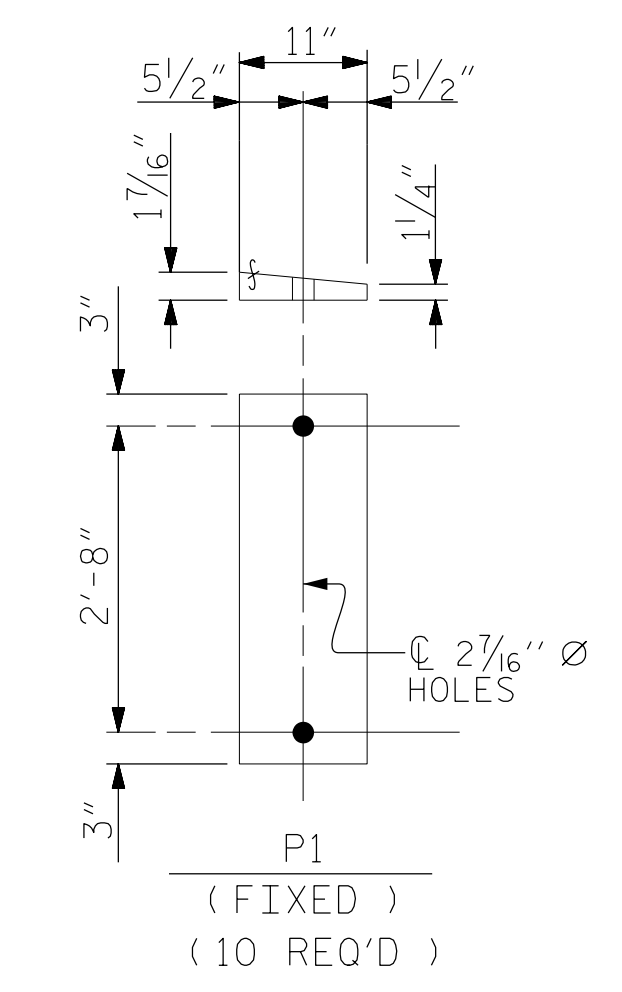
SOLE PLATE PLACEMENT DETAIL



TYPICAL PLAN AT END BENT

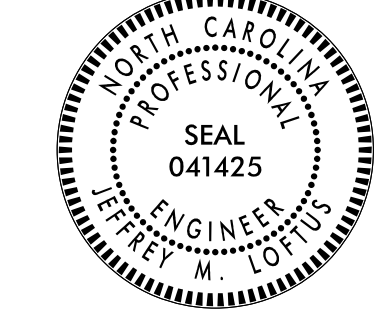


E4 (20 REQ'D)  
PLAN VIEW OF ELASTOMERIC BEARING  
TYPE V



SOLE PLATE DETAILS ("P")

Designed by: Jeff Loftus 3/7/2018  
FES10002670408



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GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
ELASTOMERIC BEARING  
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-14
1			3			TOTAL SHEETS 35
2			4			

STR. #7

STD. NO. EB4

U-2412A  
3/7/2018  
\\407-027-U2412A-SMU-BRG03-S7-14.dgn  
USER: jloftus

DRAWN BY: J. LOFTUS DATE: 01-18  
CHECKED BY: E. PHELPS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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 A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, 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.

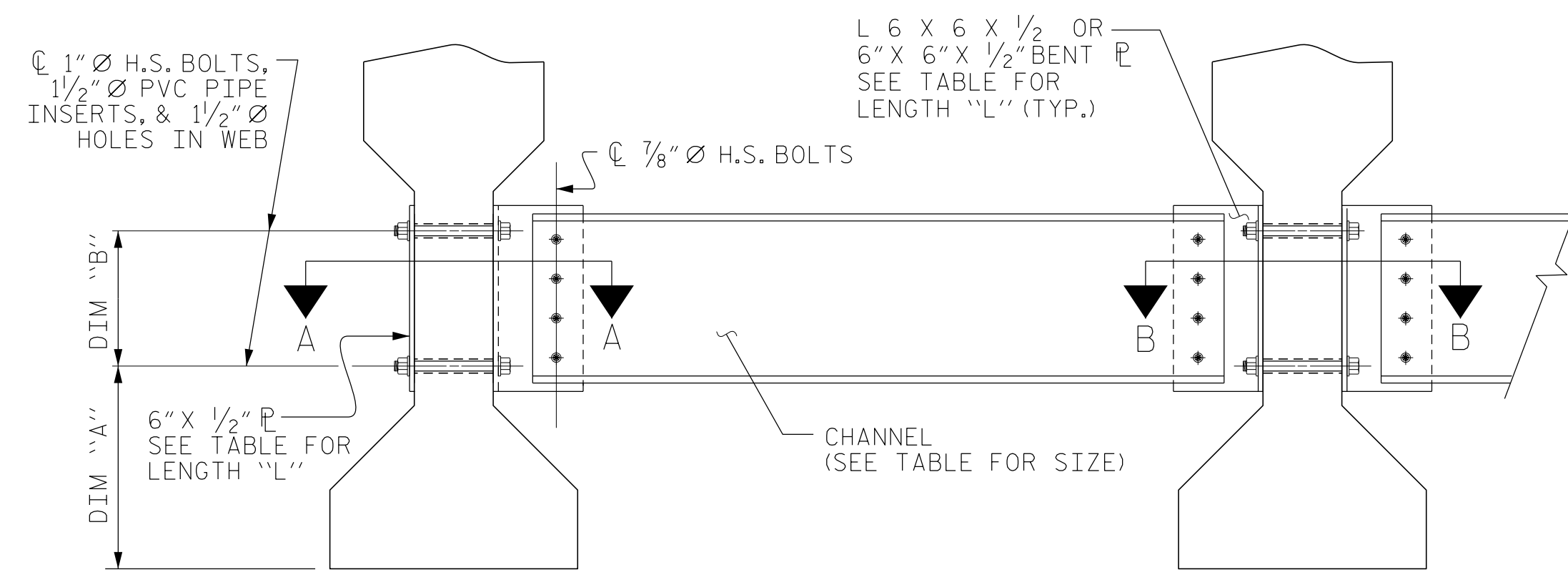
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

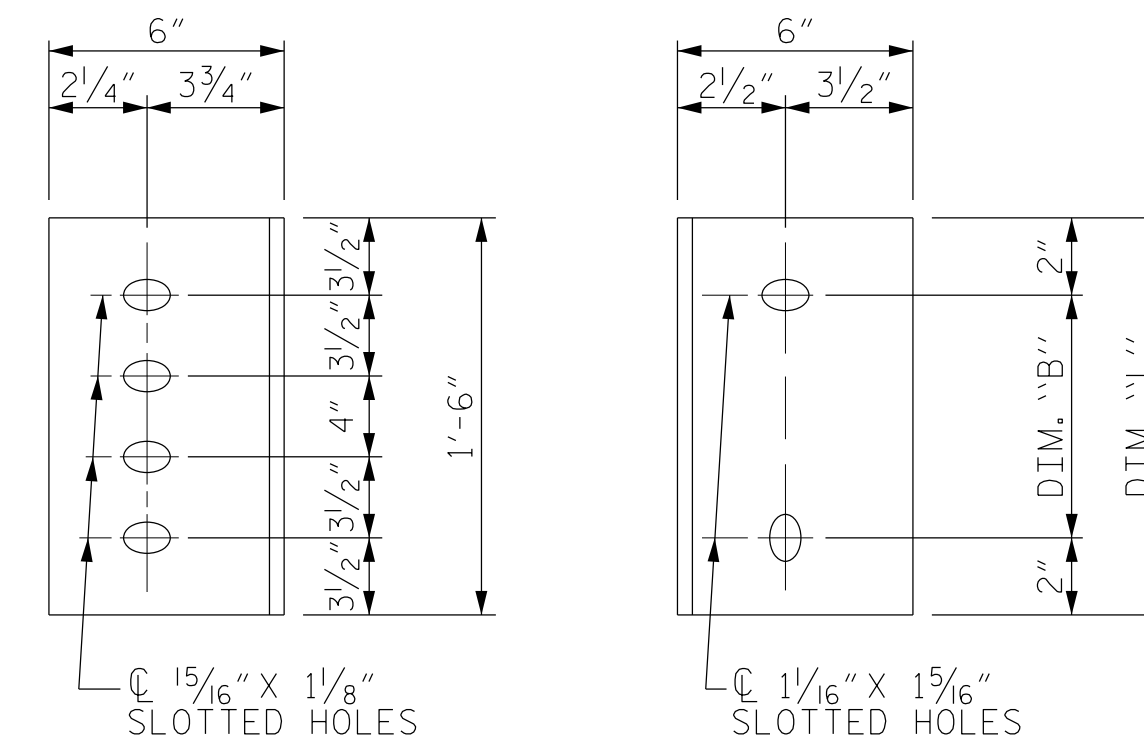
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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  
(TYPE IV GIRDER SHOWN)



DIAPHRAGM FACE WEB FACE  
(TYPE IV GDR.)  
CONNECTOR PLATE DETAILS

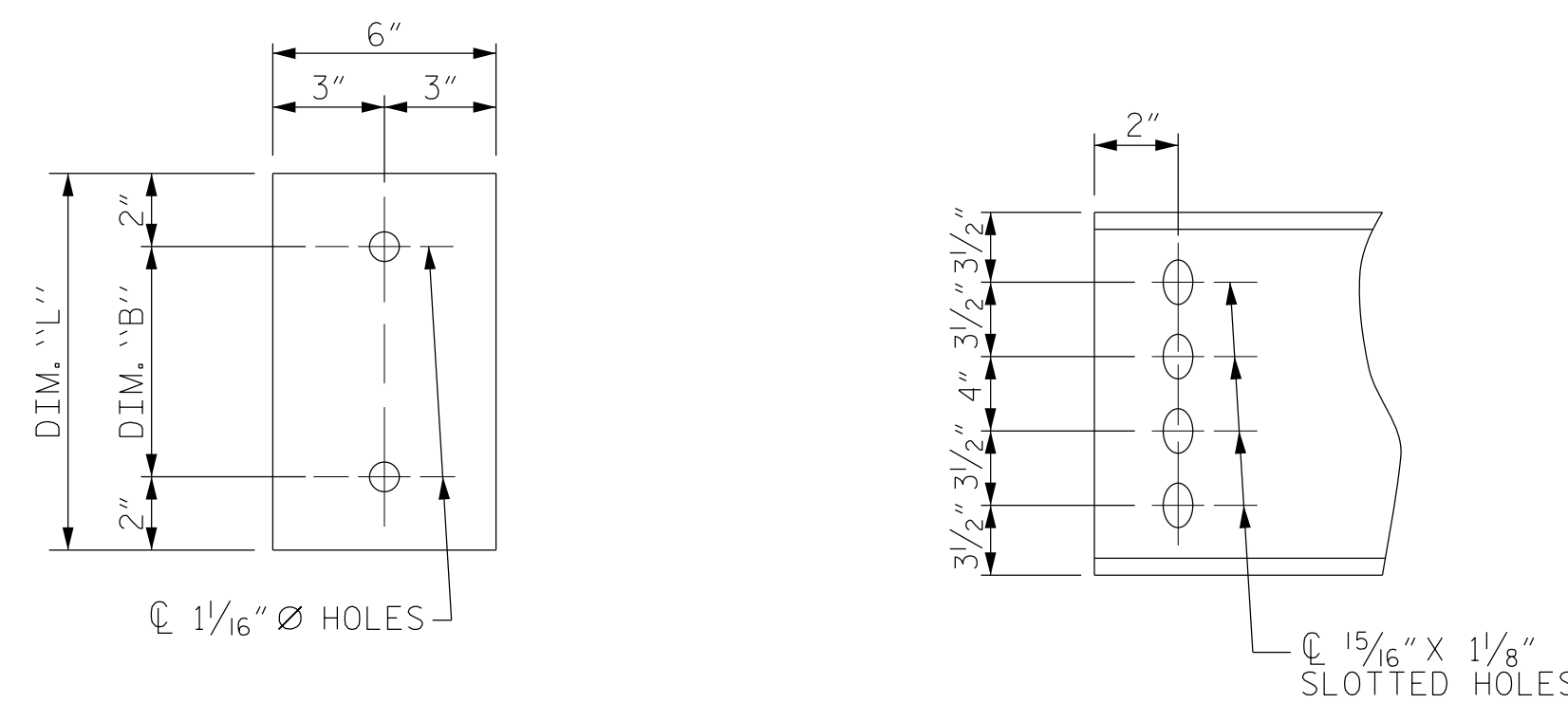
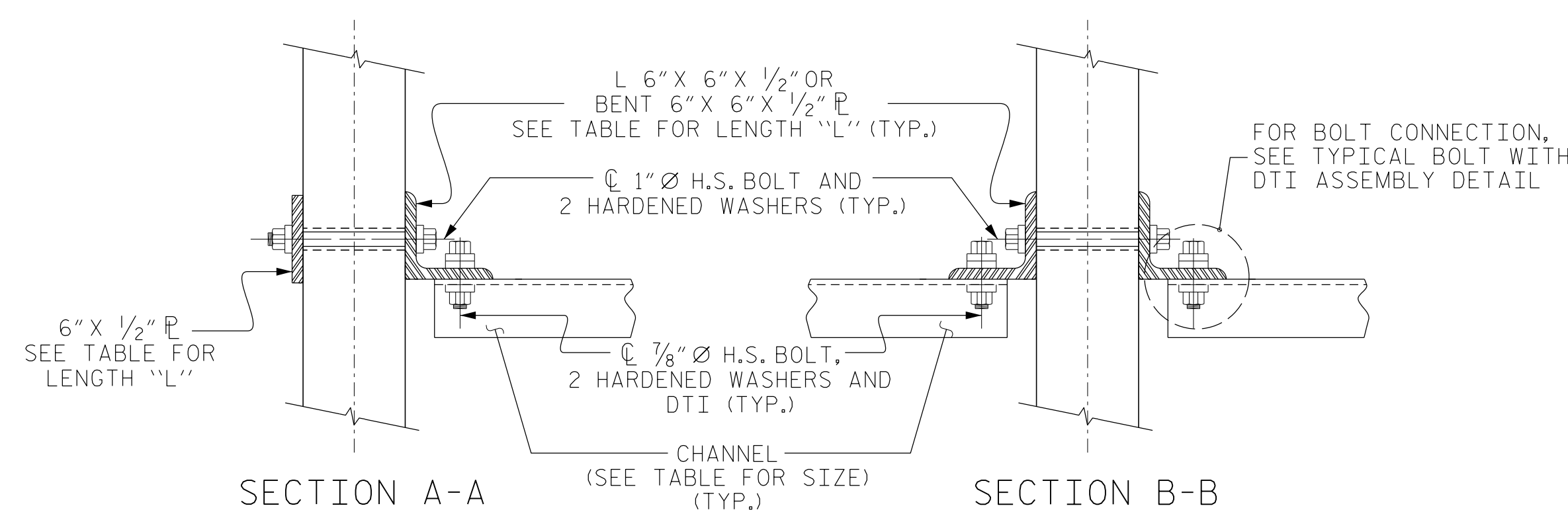
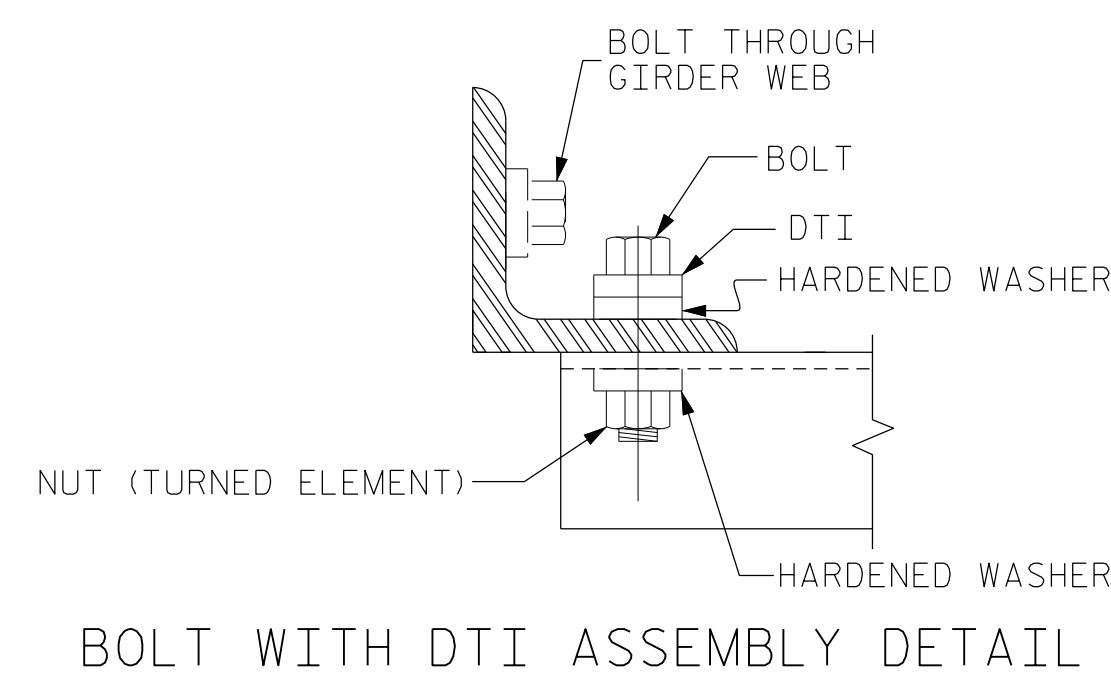


PLATE DETAILS CHANNEL END  
(TYPE TYPE IV GDR.)



SECTION A-A SECTION B-B  
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. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

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INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR TYPE IV  
PRESTRESSED CONCRETE  
GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-15
1			3			TOTAL SHEETS
2			4			35

STR. #7 STD. NO. PCG10 (SHT 3)

DRAWN BY: E. PHELPS DATE: 12-17  
CHECKED BY: J. LOFTUS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
3/7/2018  
\\407\_029\_U2412A-SMU-DIAP1\_S7-15.dgn  
USER: jloftus

## DEAD LOAD DEFLECTION TABLE - SPAN A

0.6 Ø LOW RELAXATION																						
TWENTIETH POINTS		CL BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	CL BRG.
	GIRDER																					
CAMBER (GIRDER ALONE IN PLACE) ↑	A1, A5	0	0.039	0.077	0.113	0.146	0.175	0.199	0.219	0.233	0.242	0.245	0.242	0.233	0.219	0.199	0.175	0.146	0.113	0.077	0.039	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0	0.030	0.061	0.091	0.120	0.143	0.166	0.181	0.195	0.202	0.205	0.201	0.196	0.181	0.167	0.143	0.120	0.091	0.062	0.031	0
FINAL CAMBER ↑		0	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	0
	GIRDER																					
CAMBER (GIRDER ALONE IN PLACE) ↑	A2, A3, A4	0	0.039	0.077	0.113	0.146	0.175	0.199	0.219	0.233	0.242	0.245	0.242	0.233	0.219	0.199	0.175	0.146	0.113	0.077	0.039	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0	0.034	0.068	0.101	0.134	0.160	0.185	0.202	0.219	0.225	0.230	0.225	0.219	0.202	0.186	0.160	0.135	0.101	0.069	0.034	0
FINAL CAMBER ↑		0	1/16"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/16"	0

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

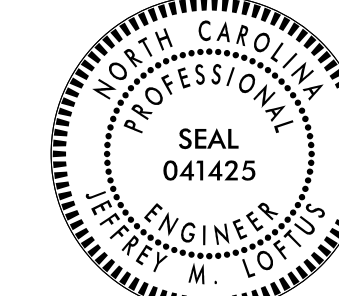
## DEAD LOAD DEFLECTION TABLE - SPAN B

0.6 Ø LOW RELAXATION												
TENTH POINTS		CL BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	CL BRG.
	GIRDER											
CAMBER (GIRDER ALONE IN PLACE) ↑	B1, B5	0	0.070	0.133	0.182	0.213	0.224	0.213	0.182	0.133	0.070	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0	0.053	0.103	0.142	0.167	0.175	0.167	0.141	0.102	0.052	0
FINAL CAMBER ↑		0	3/16"	3/8"	1/2"	9/16"	9/16"	9/16"	1/2"	3/8"	3/16"	0
	GIRDER											
CAMBER (GIRDER ALONE IN PLACE) ↑	B2, B3, B4	0	0.070	0.133	0.182	0.213	0.224	0.213	0.182	0.133	0.070	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓		0	0.058	0.115	0.159	0.187	0.196	0.186	0.158	0.114	0.058	0
FINAL CAMBER ↑		0	1/8"	3/16"	1/4"	5/16"	5/16"	5/16"	1/4"	3/16"	1/8"	0

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

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

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*Jeff Loftus*  
3/7/2018  
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

DEAD LOAD DEFLECTION  
FOR PRESTRESSED  
CONCRETE GIRDER

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-16
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: J. LOFTUS DATE: 01-18  
CHECKED BY: E. PHELPS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

NOTES

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

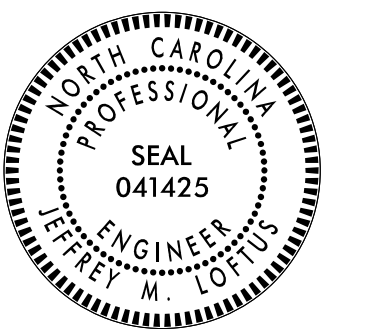
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 399.67 LIN.FT.



Designed by: Jeff Loftus  
3/7/2018

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PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 1 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD

3 BAR METAL RAIL

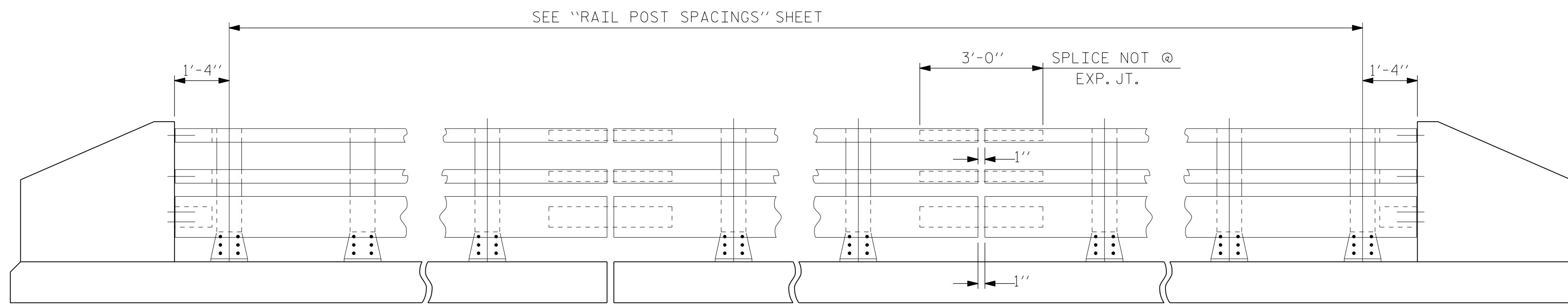
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-17	
1			3			TOTAL SHEETS	
2			4			35	

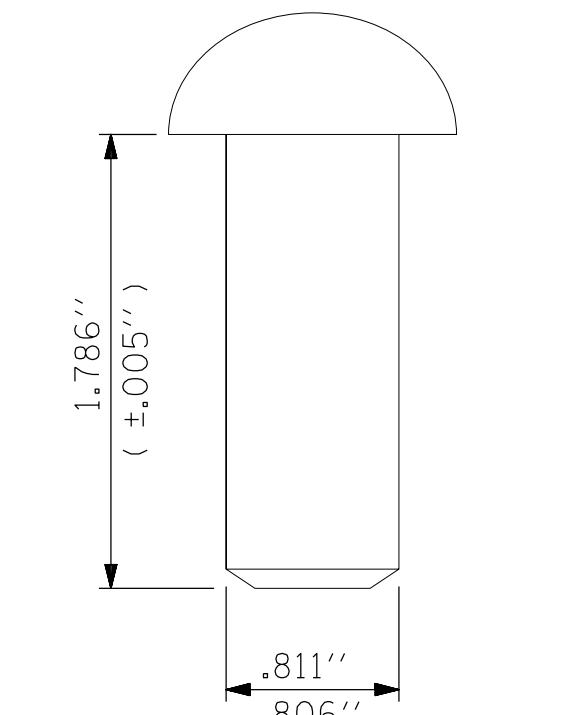
STR. #7

STD. NO. BMR5

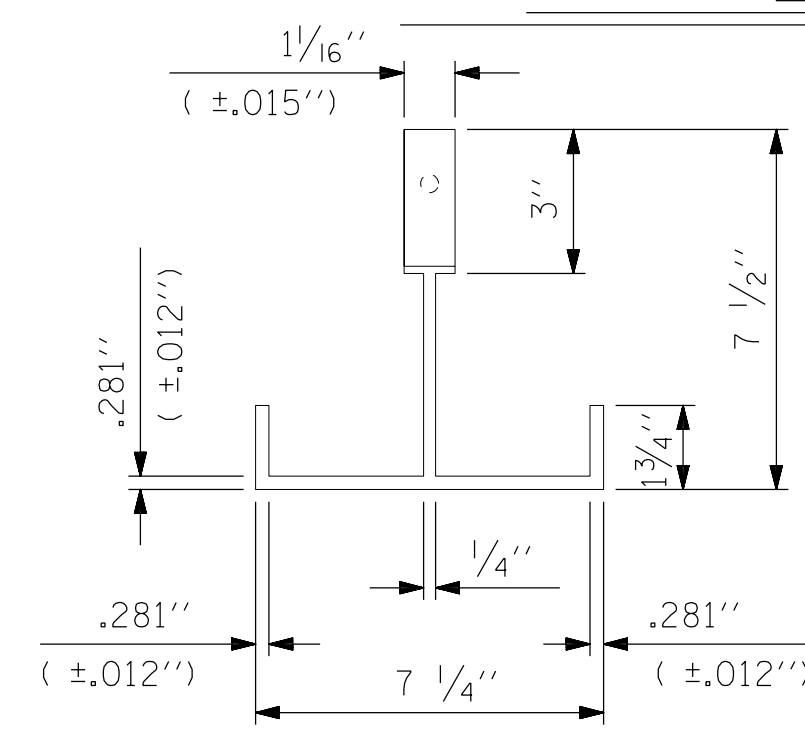


NOTE: FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

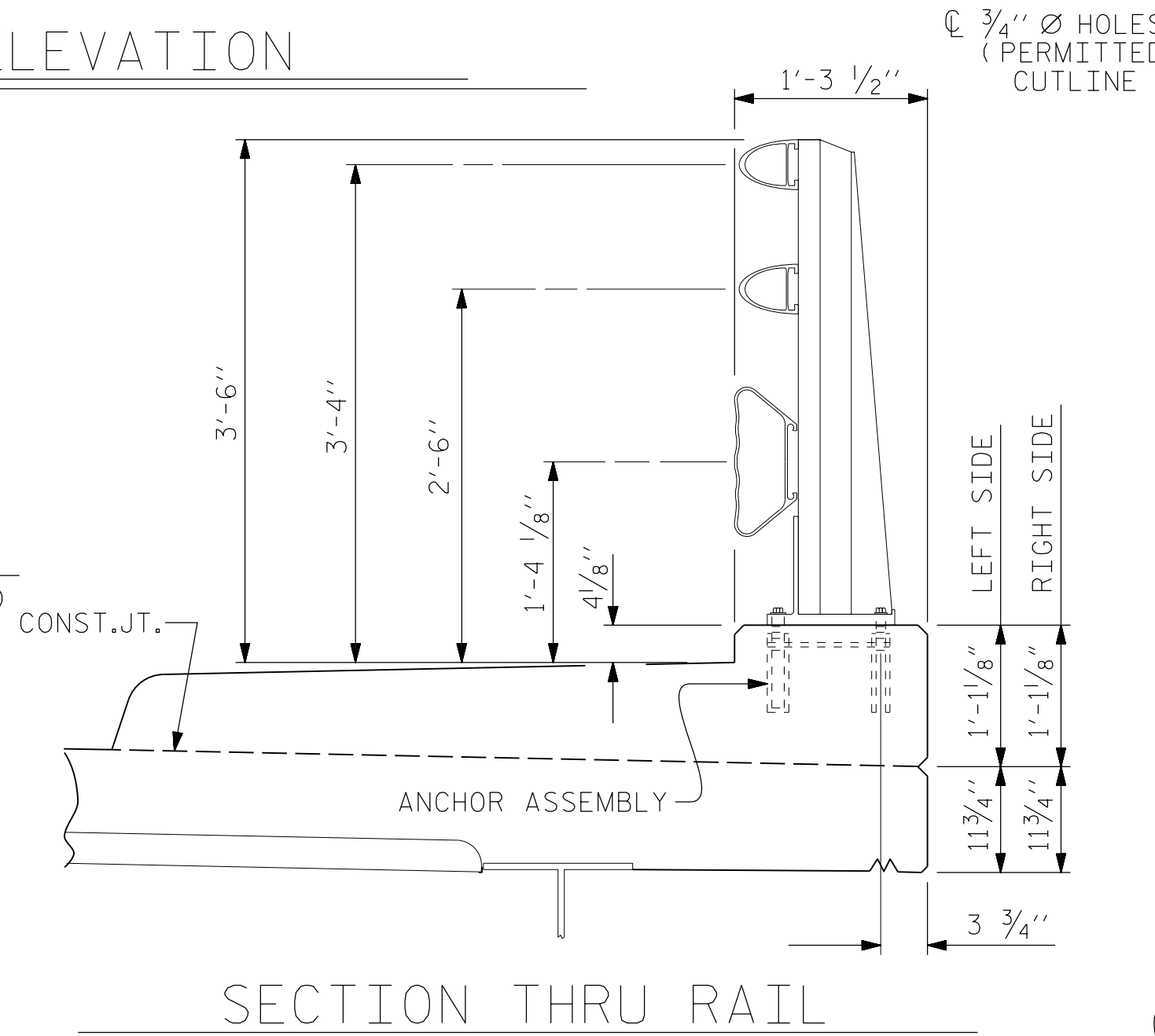
ELEVATION



RIVET DETAIL

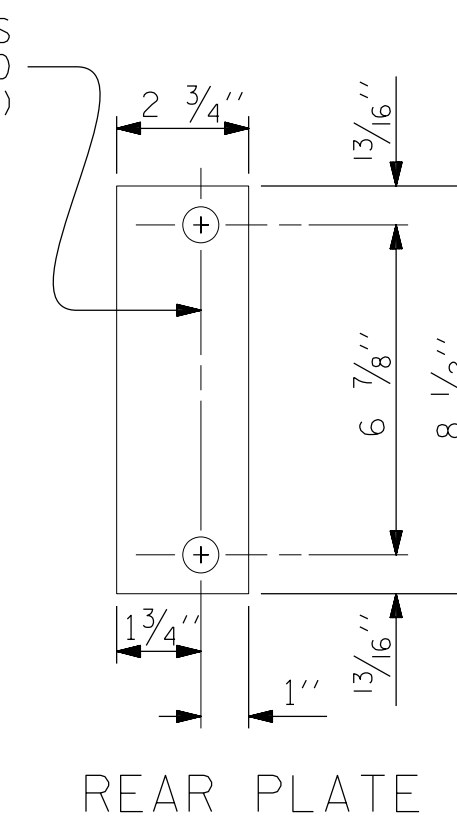


PLAN

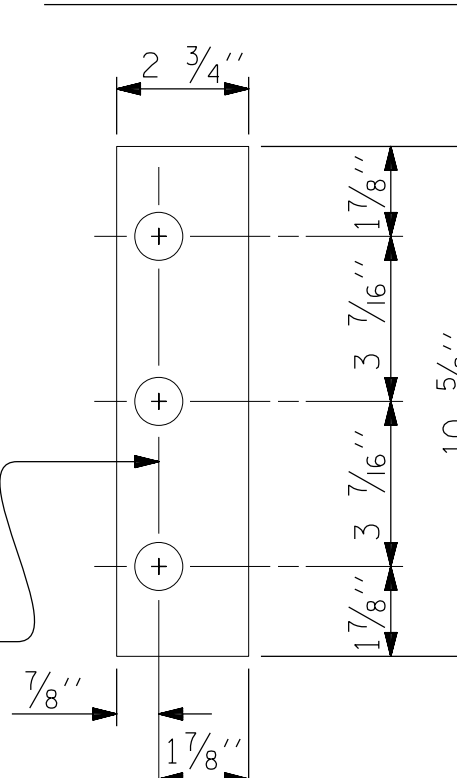


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



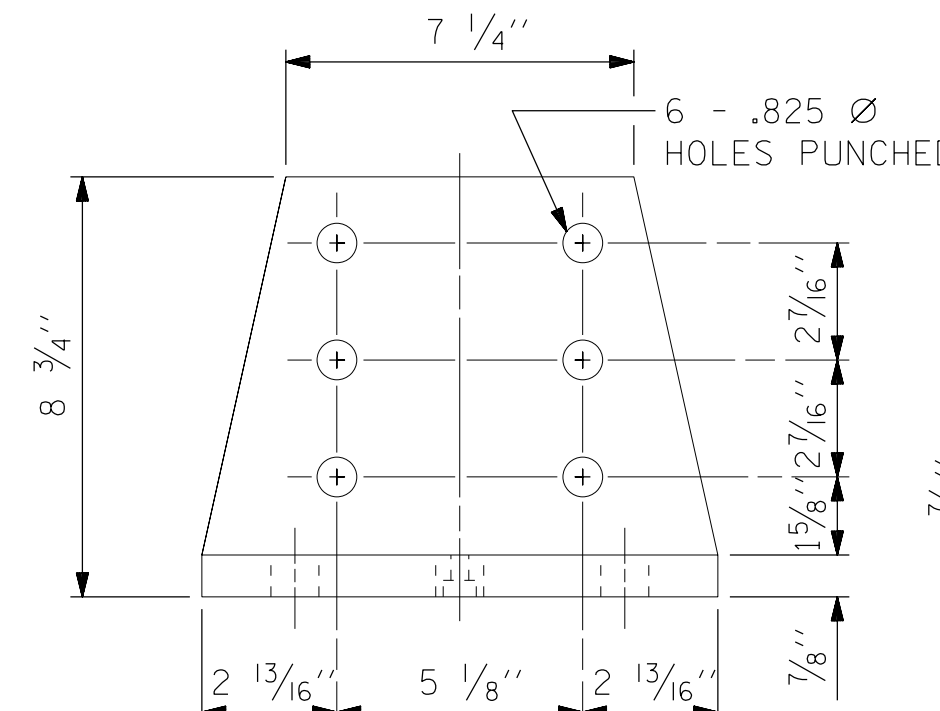
REAR PLATE



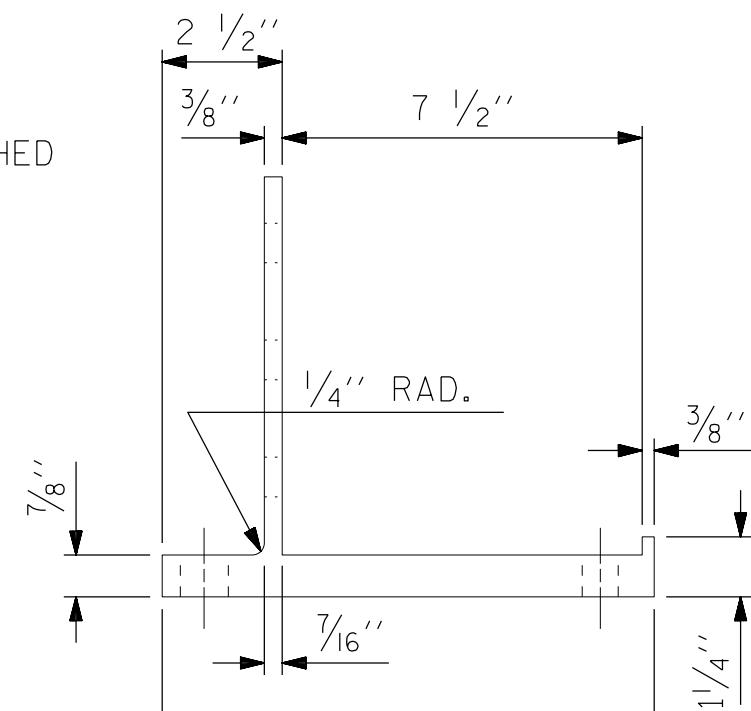
FRONT PLATE

SHIM DETAILS

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

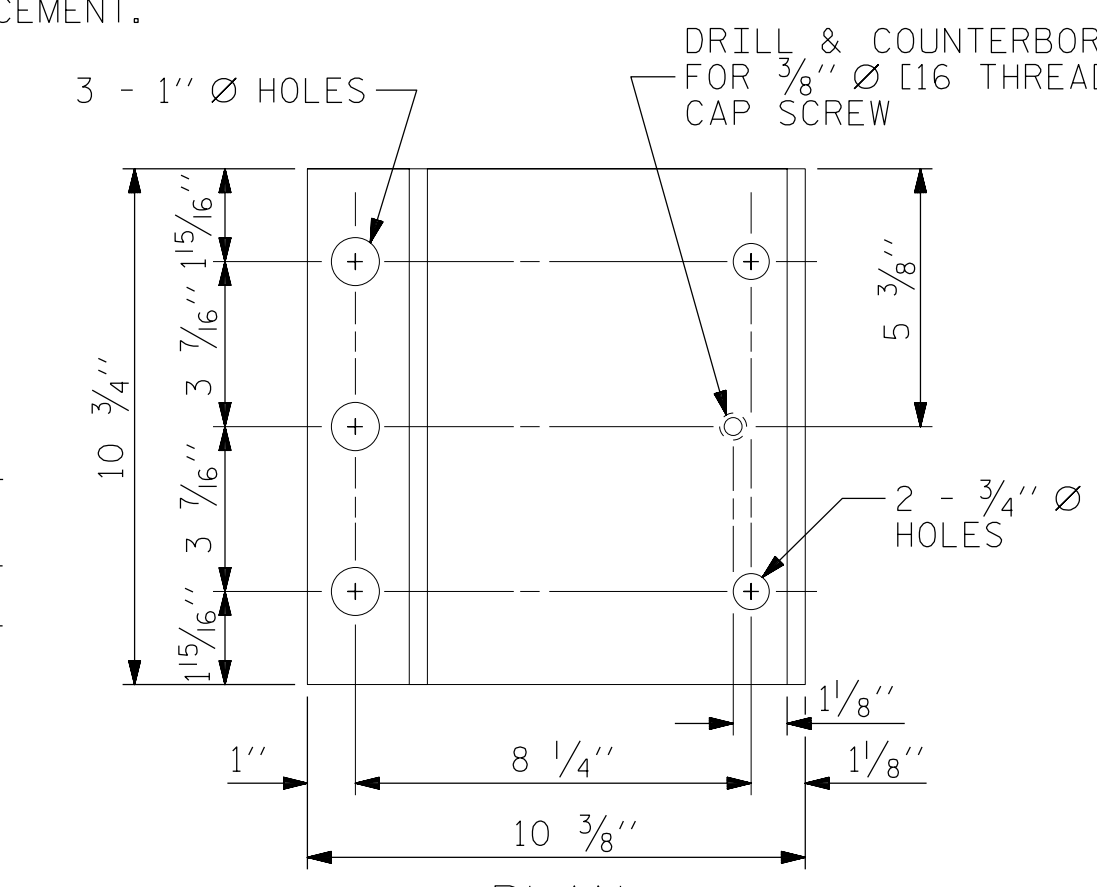


FRONT ELEVATION

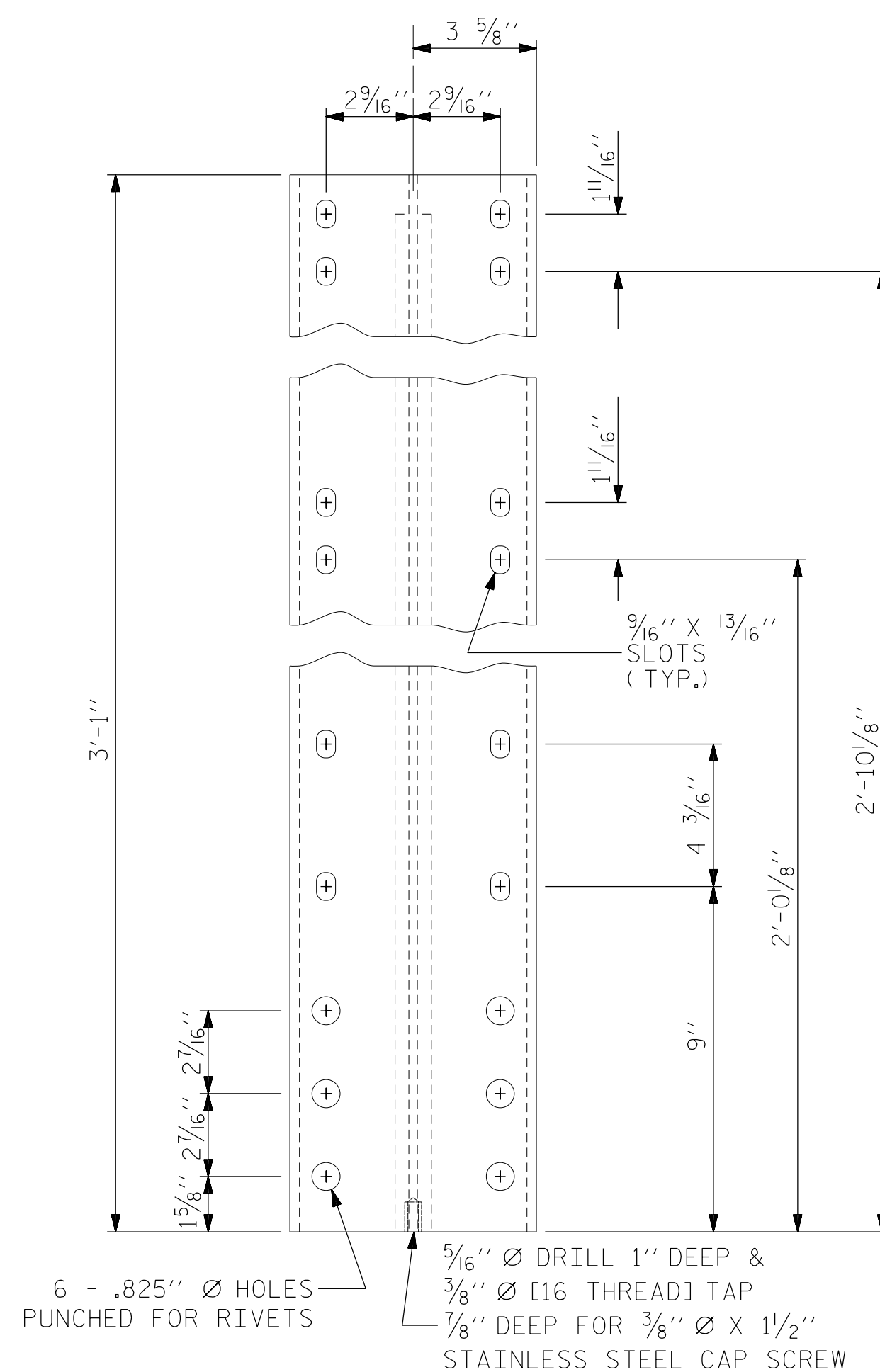


SIDE ELEVATION

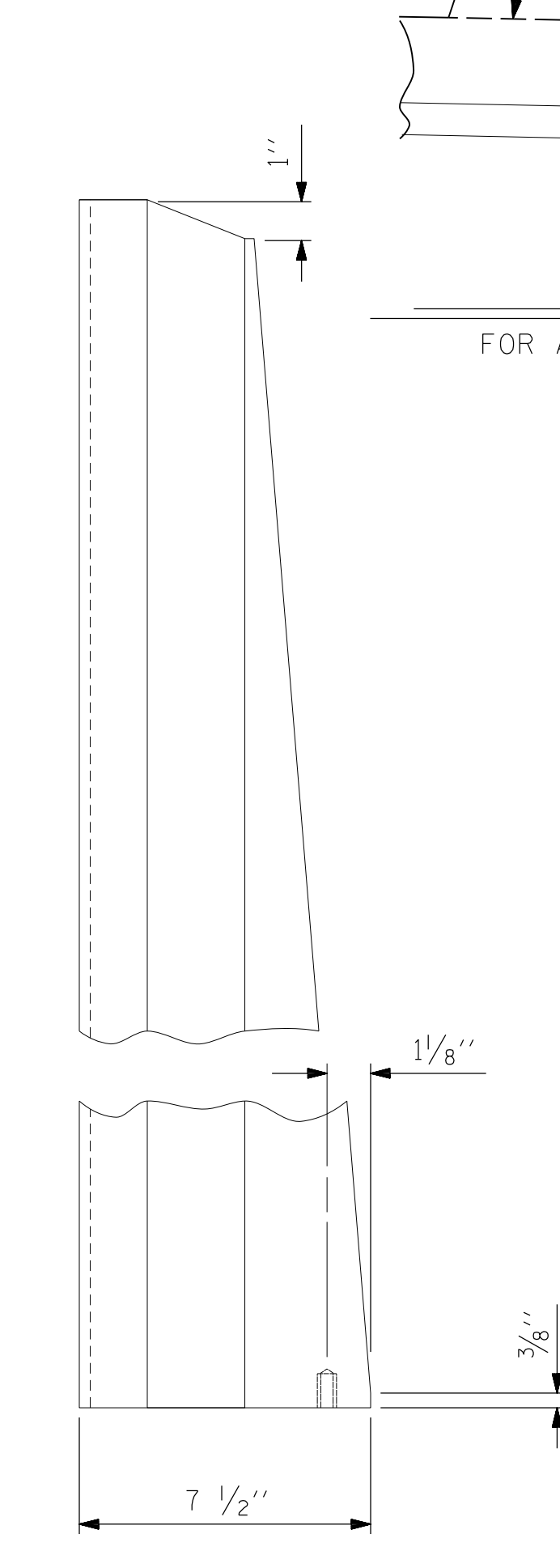
POST BASE DETAILS



PLAN



FRONT ELEVATION



SIDE ELEVATION

DETAILS OF POST

DRAWN BY: J. LOFTUS DATE: 01-18  
CHECKED BY: E. PHELPS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

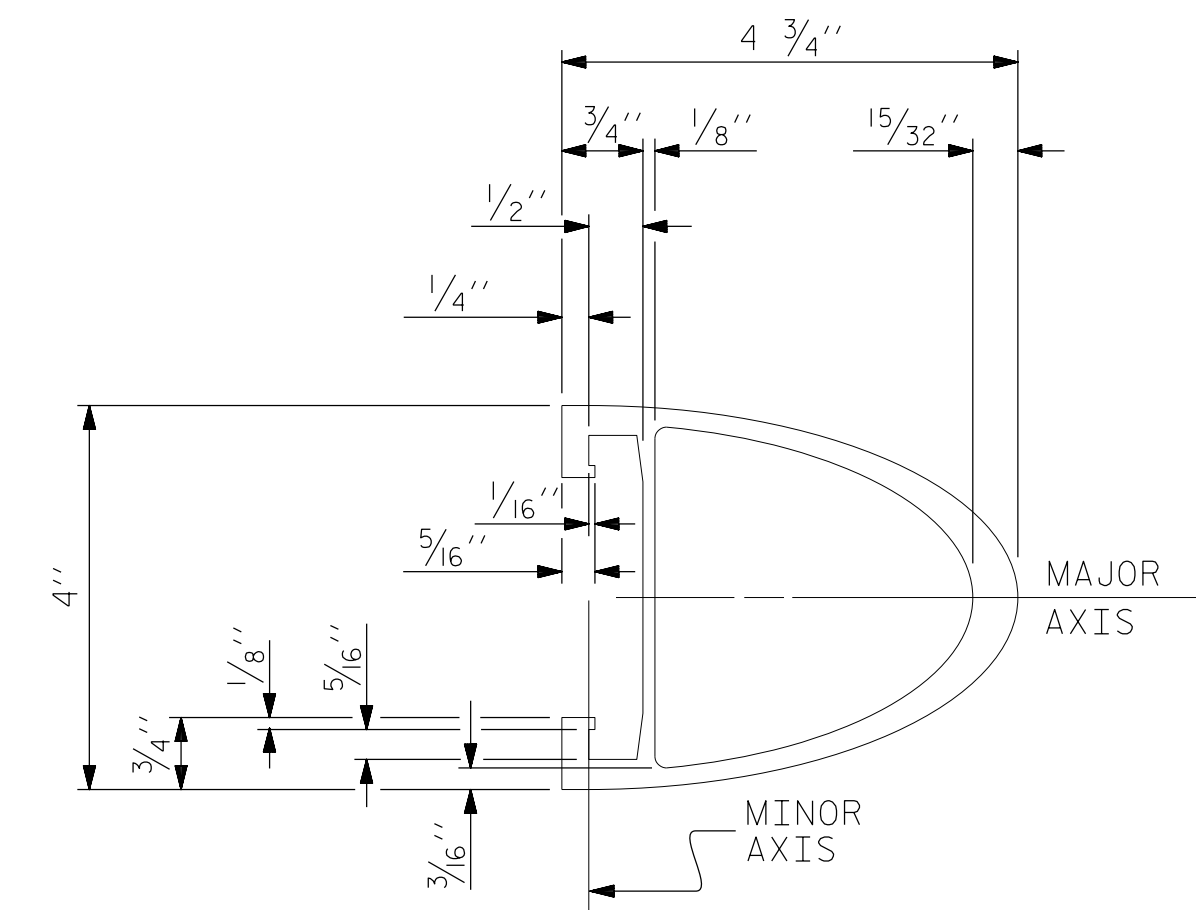
U-2412A  
3/7/2018  
\\407-033-U2412A-SMU-RAIL01.ST-17.dgn  
USER: jloftus

NOTES

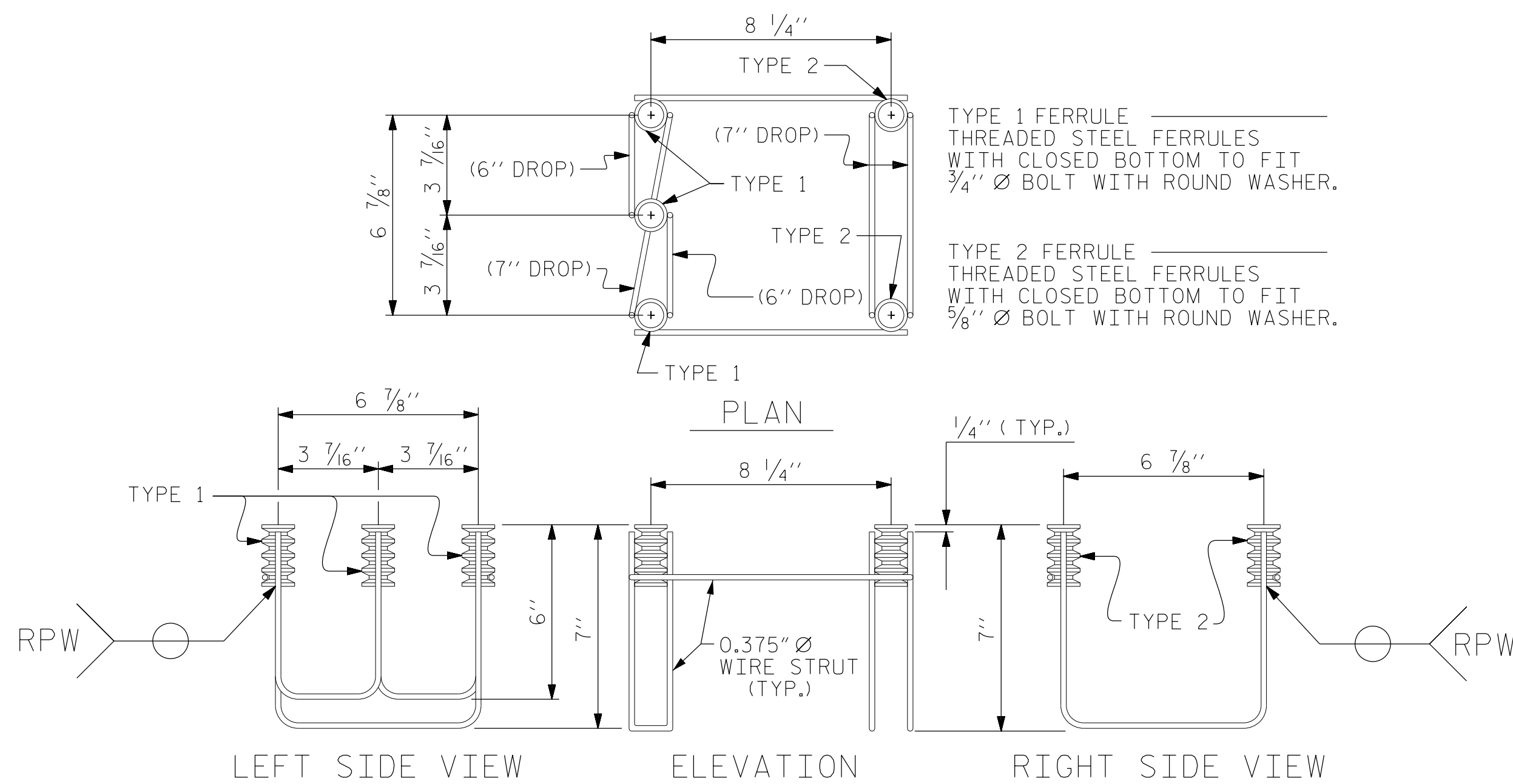
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.
- B. 3 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- D. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- F. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

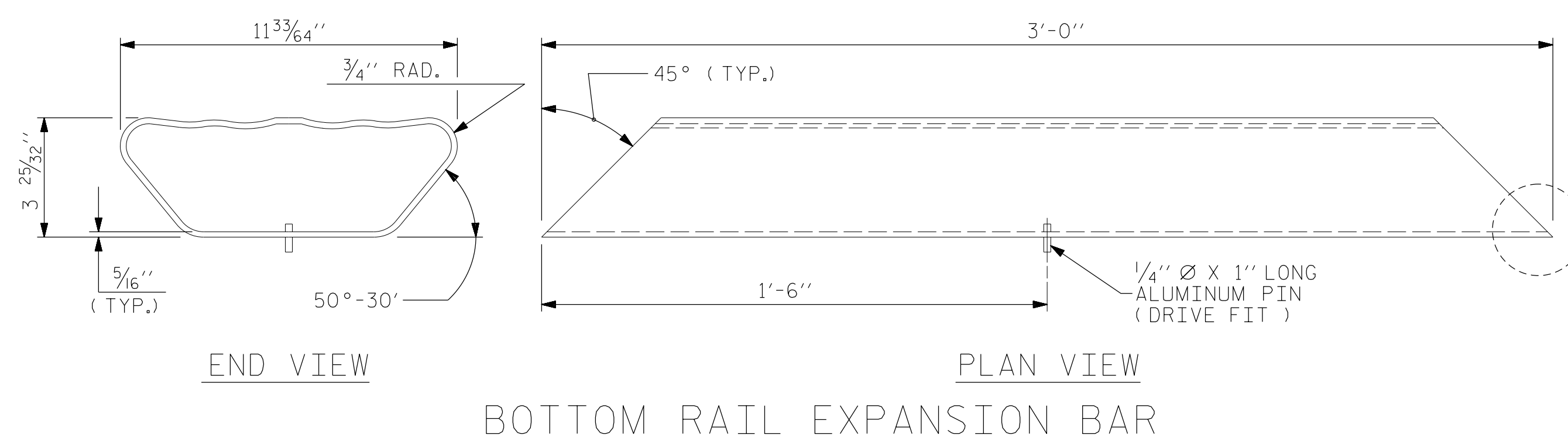


TOP & MIDDLE RAIL SECTION

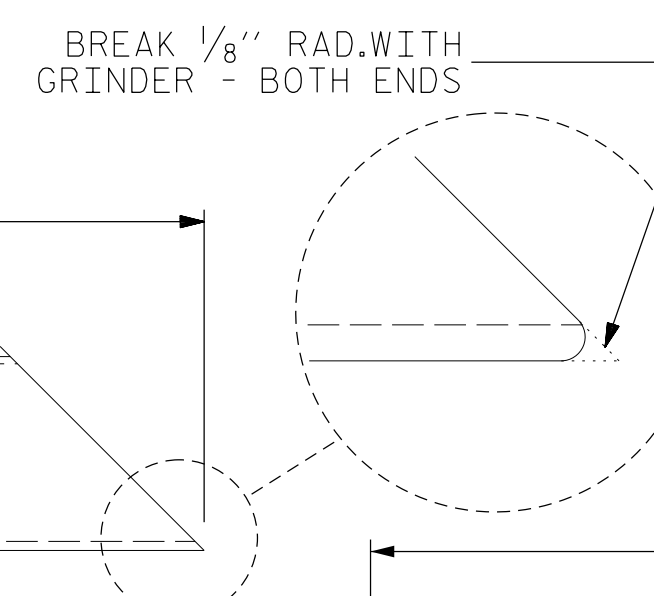


5-BOLT METAL RAIL ANCHOR ASSEMBLY

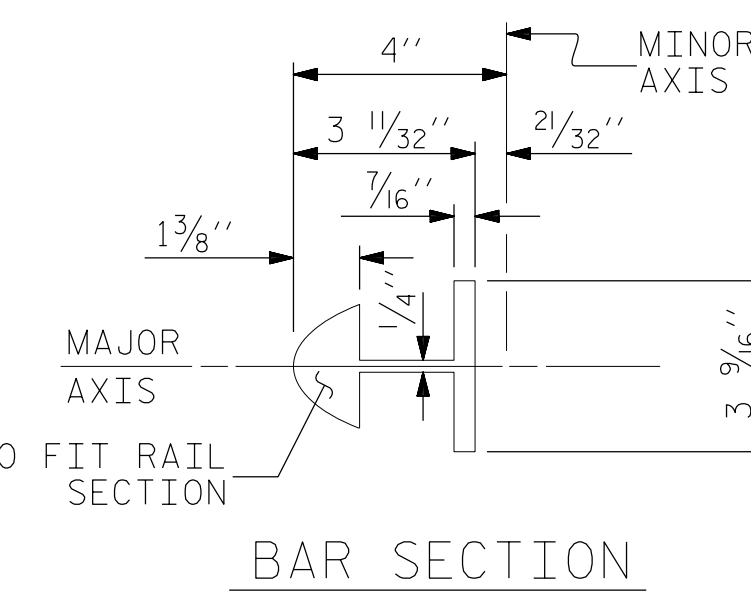
(68 ASSEMBLIES REQUIRED)



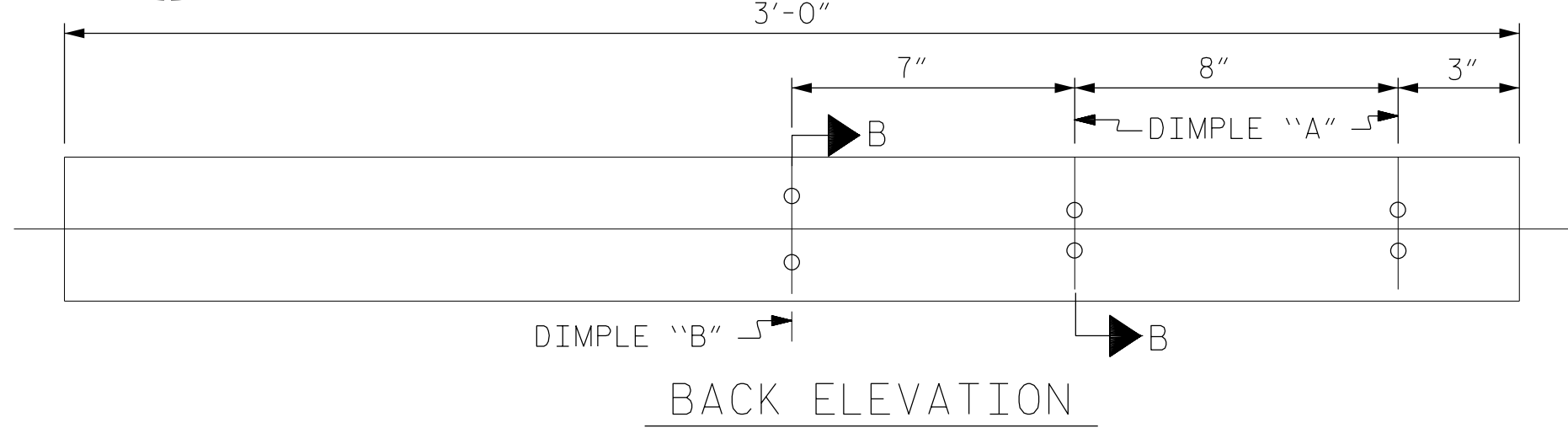
BOTTOM RAIL EXPANSION BAR



SECTION B-B

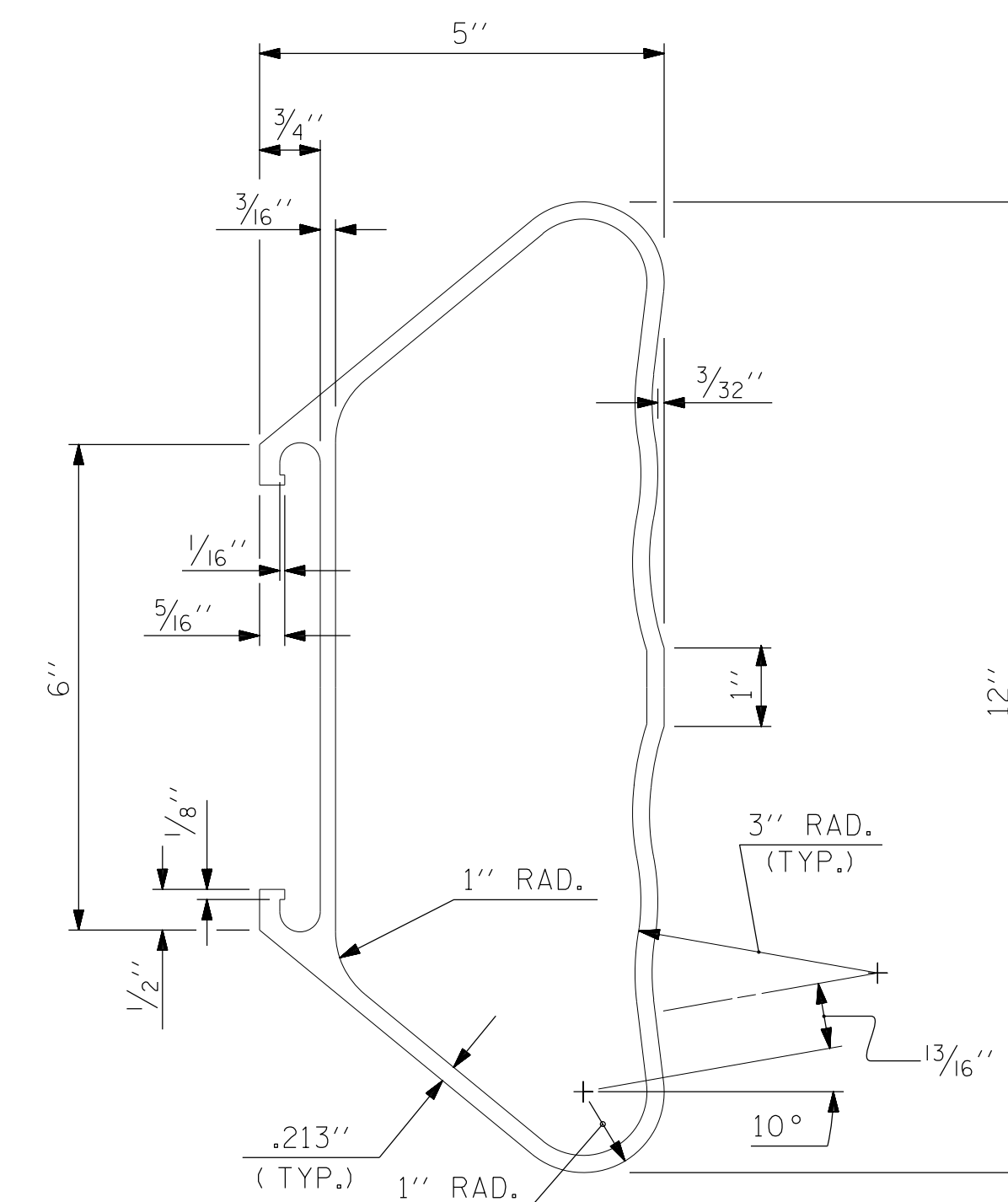


BAR SECTION

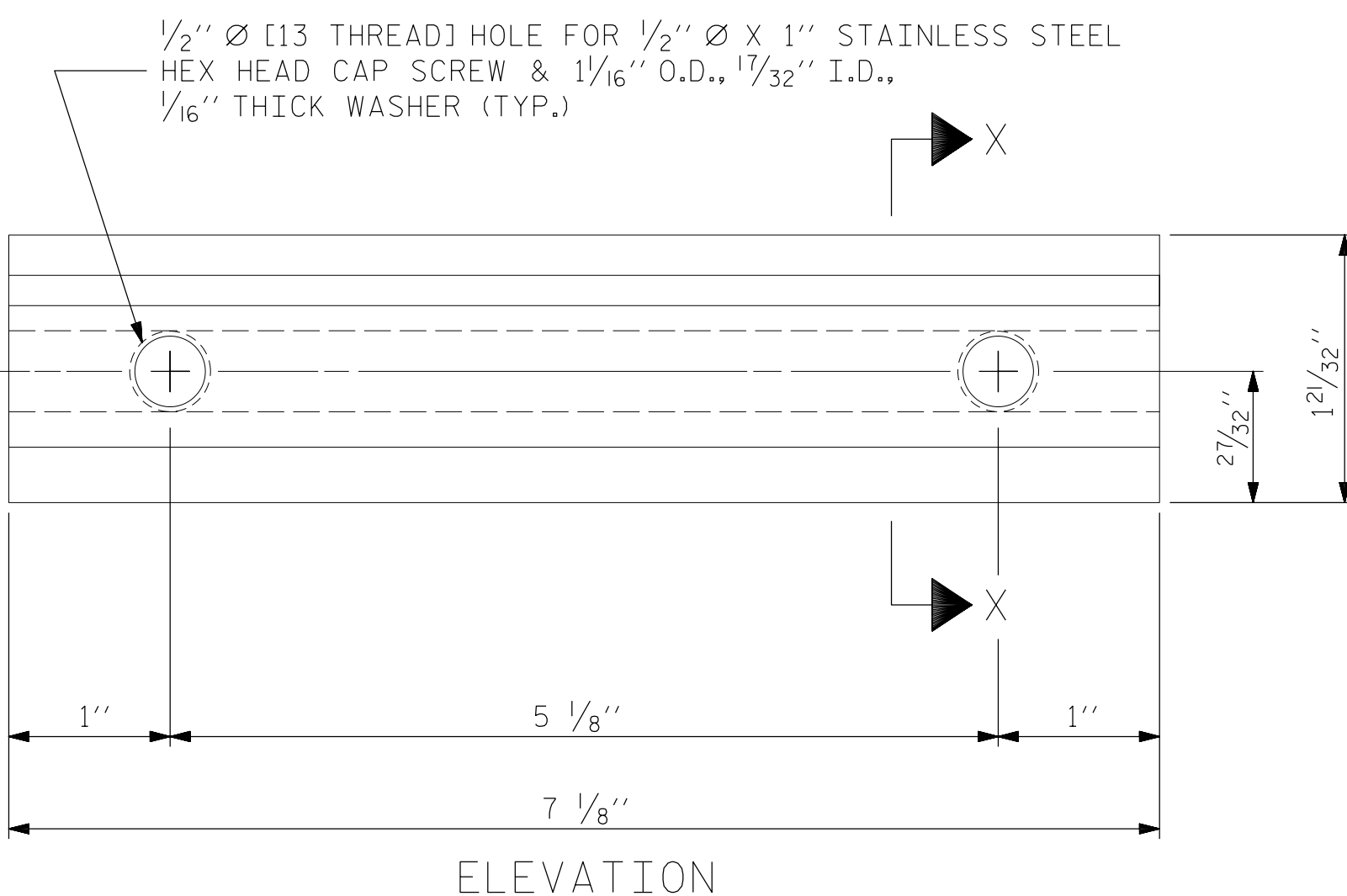


BACK ELEVATION

TOP & MIDDLE RAIL EXPANSION BAR

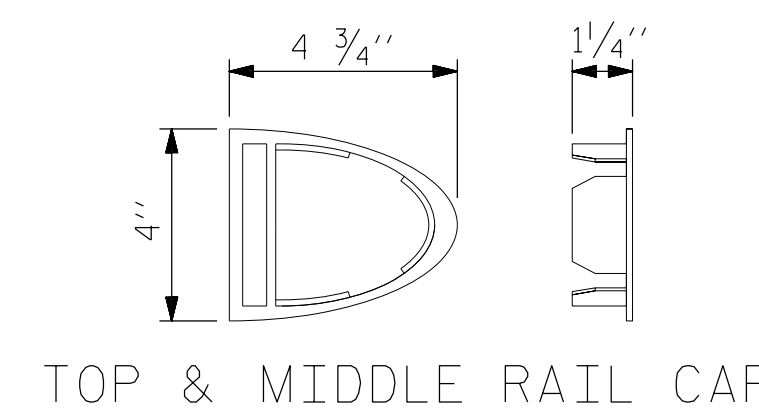


BOTTOM RAIL SECTION

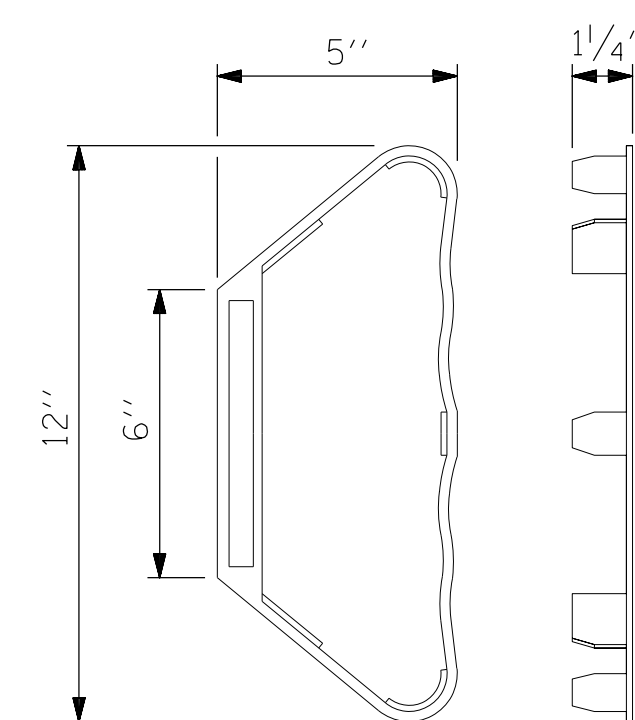


CLAMP BAR DETAIL

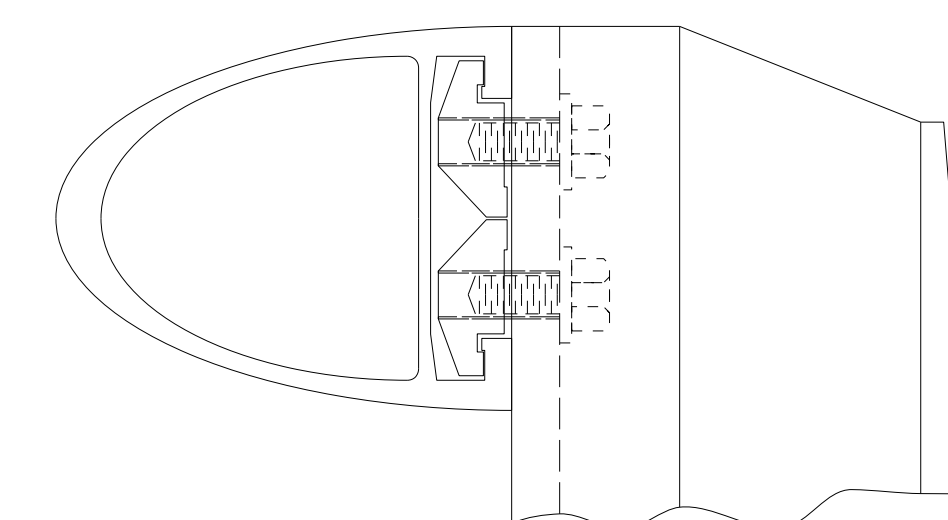
(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP



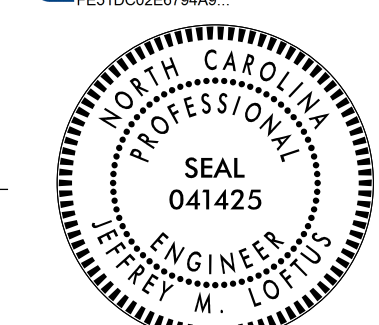
BOTTOM RAIL CAP



CLAMP ASSEMBLY

(MIDDLE & BOTTOM RAIL ARE SIMILAR)

DocuSigned by:  
Jeff Loftus  
3/7/2018



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SHEET 2 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD

3 BAR METAL RAIL

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-18	
1			3			TOTAL SHEETS	
2			4			35	

STR. #7

STD. NO. BMR6

U-2412A

3/7/2018  
\\407\_035\_U2412A-SMU-RA IL 02.S7-18.dgn  
USER: jloftus

DRAWN BY: J. LOFTUS DATE: 01-18  
CHECKED BY: E. PHELPS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
  - D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

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

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

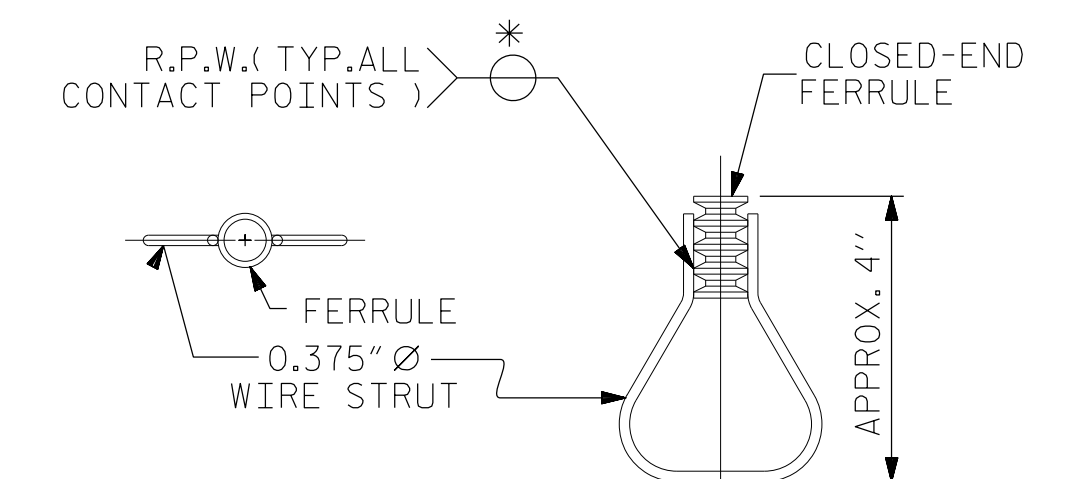
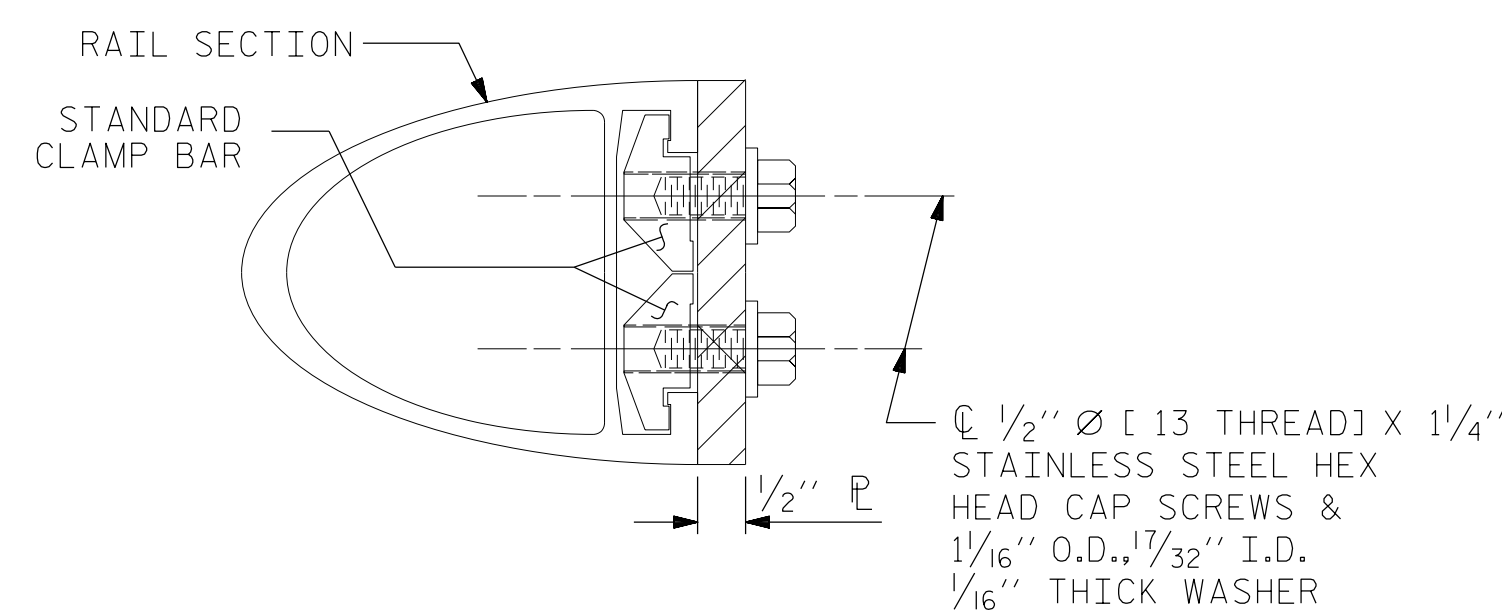
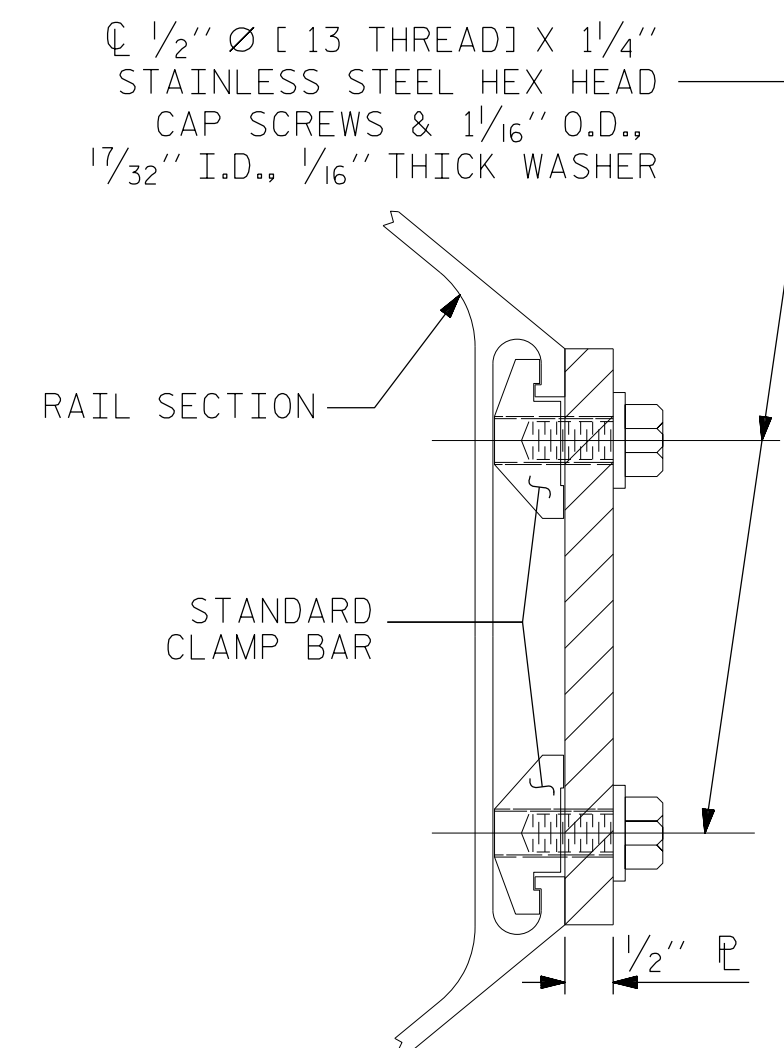
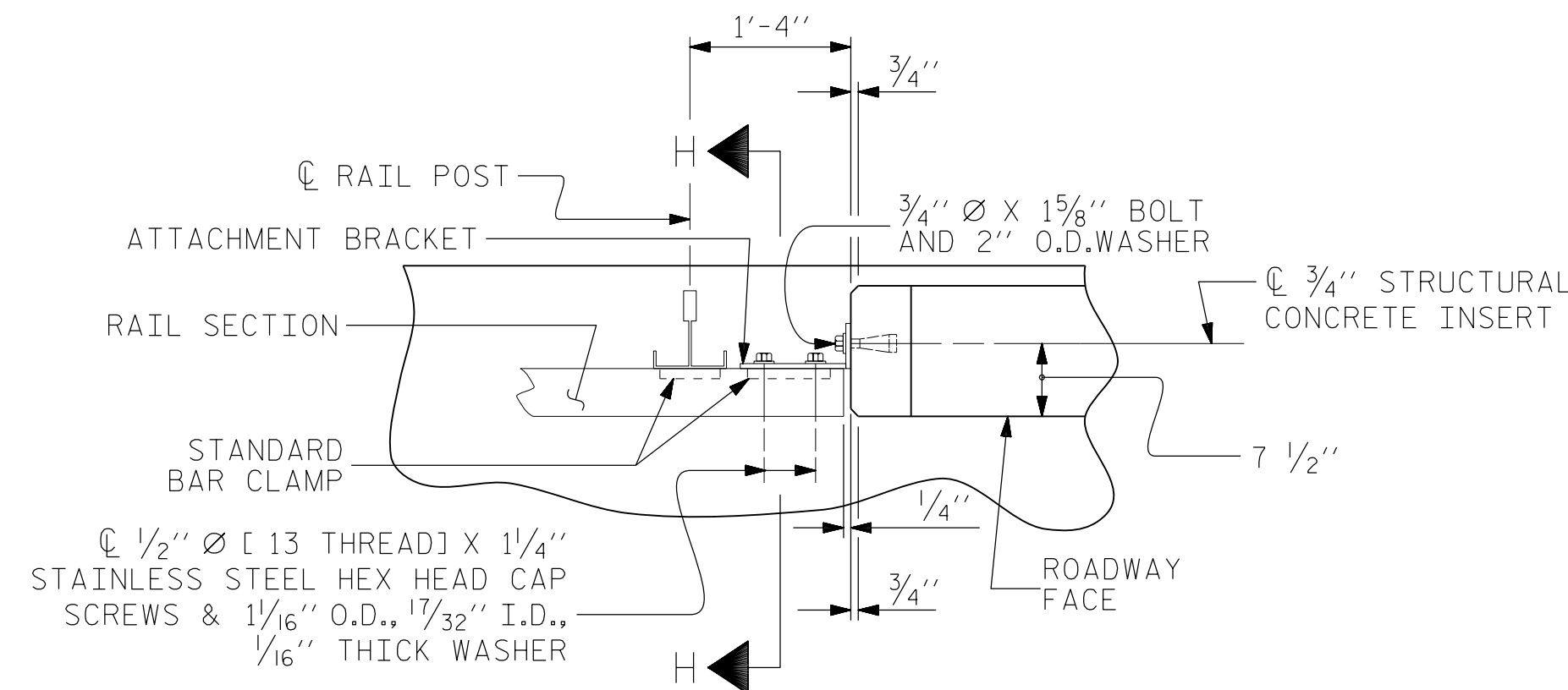
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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

NOTES

STRUCTURAL CONCRETE INSERT

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

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



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

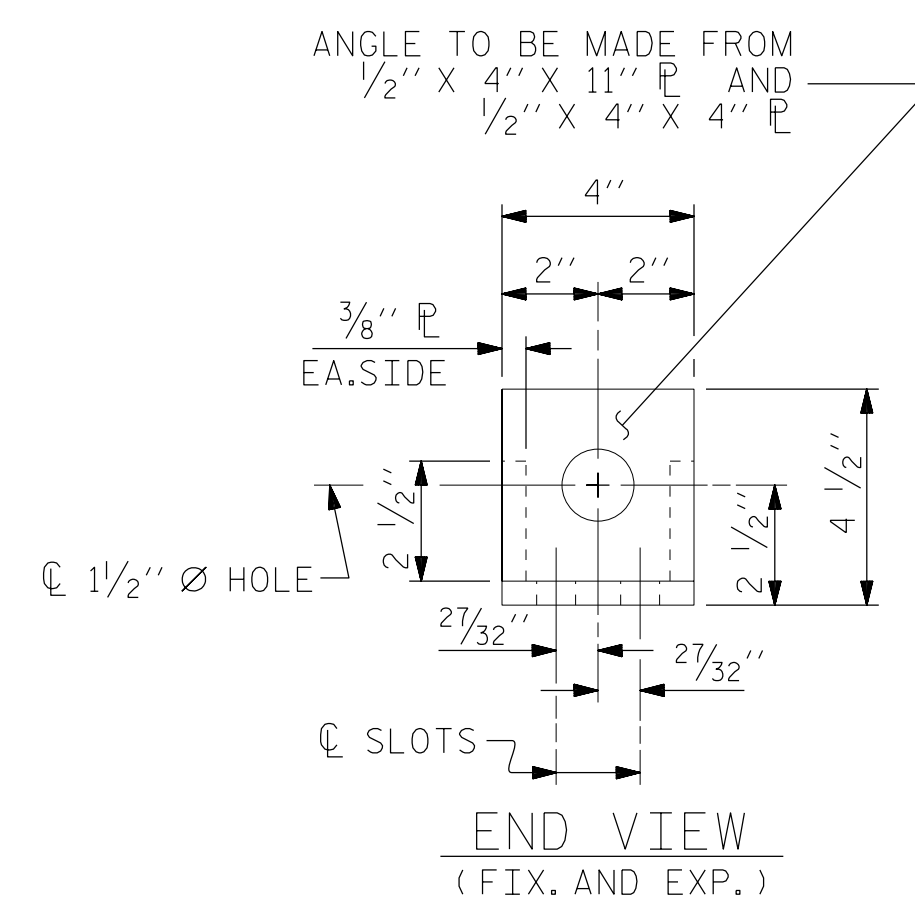
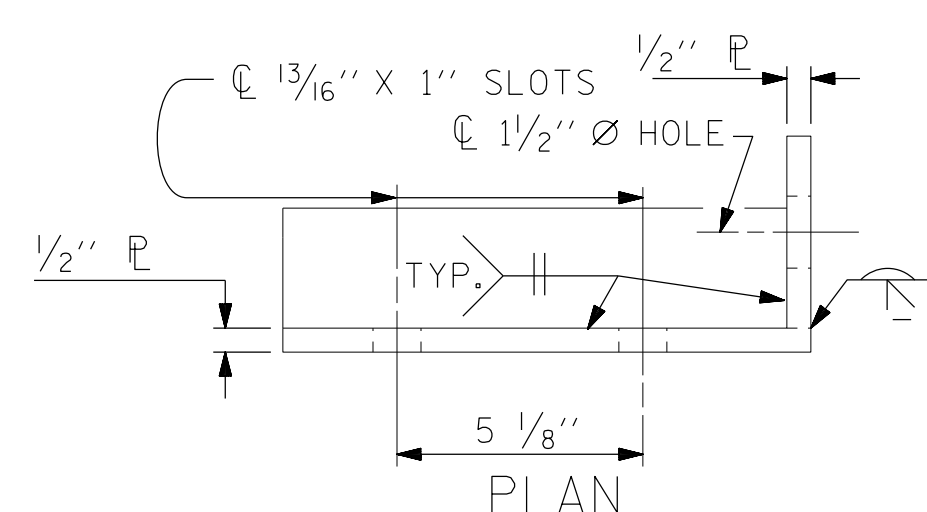
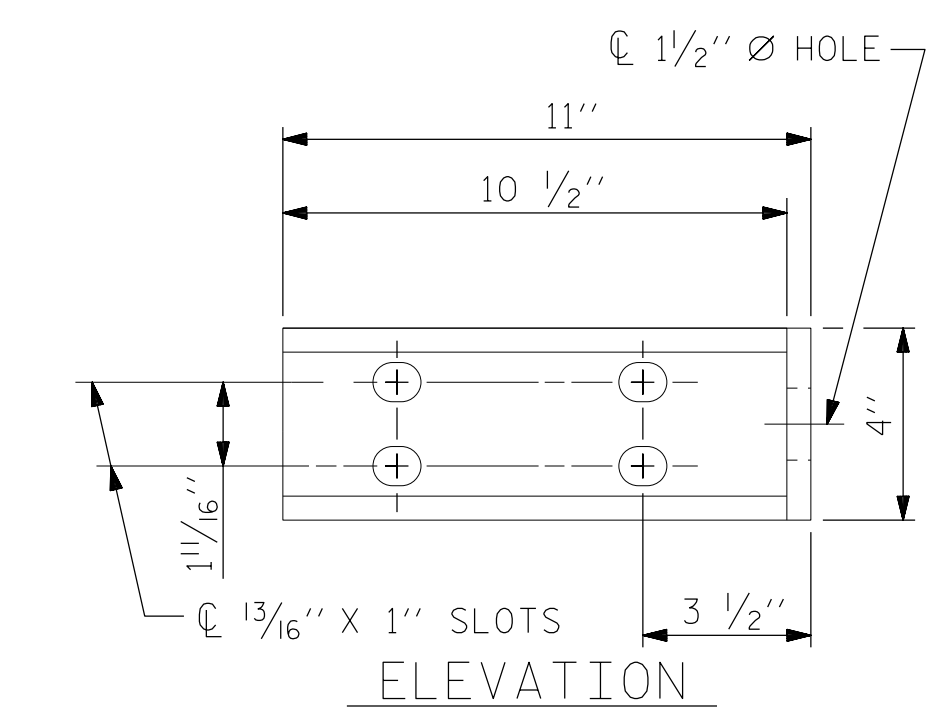
PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 3 OF 6

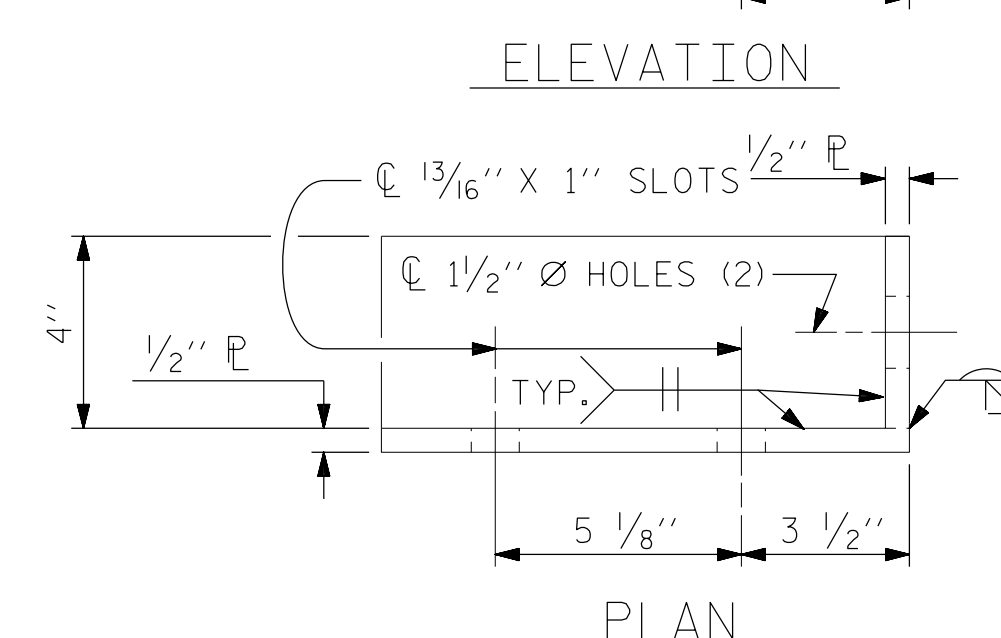
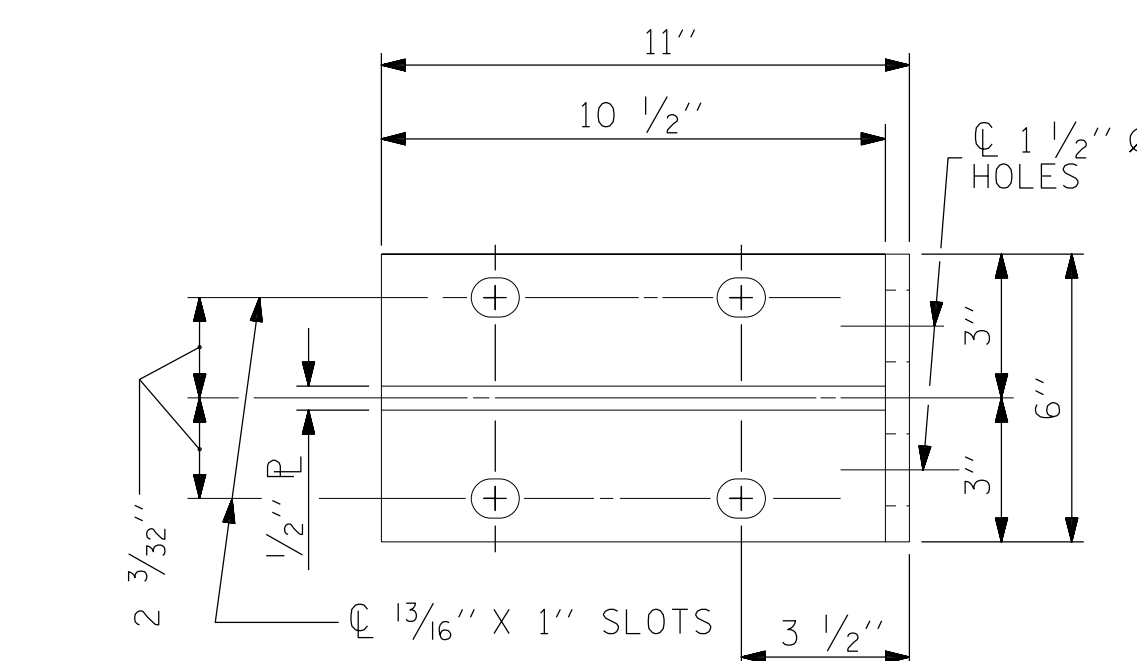
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3 BAR METAL RAIL

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

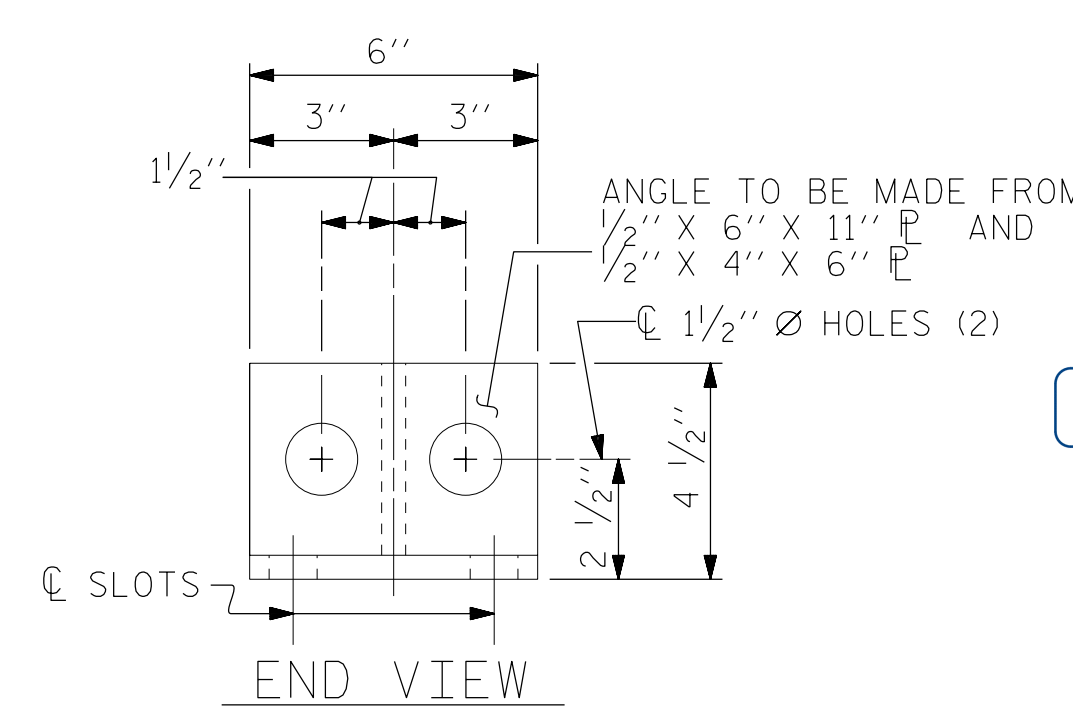
STR. #7 STD. NO. BMR7



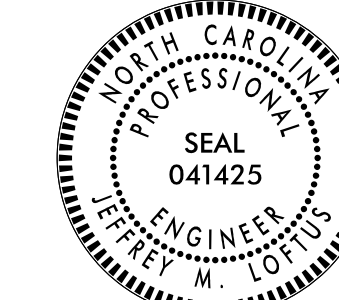
DETAILS FOR ATTACHMENT BRACKET  
(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET  
(BOTTOM RAIL ONLY)



DocuSigned by:  
Jeff Loftus  
FES1DC02E8794A0  
3/7/2018



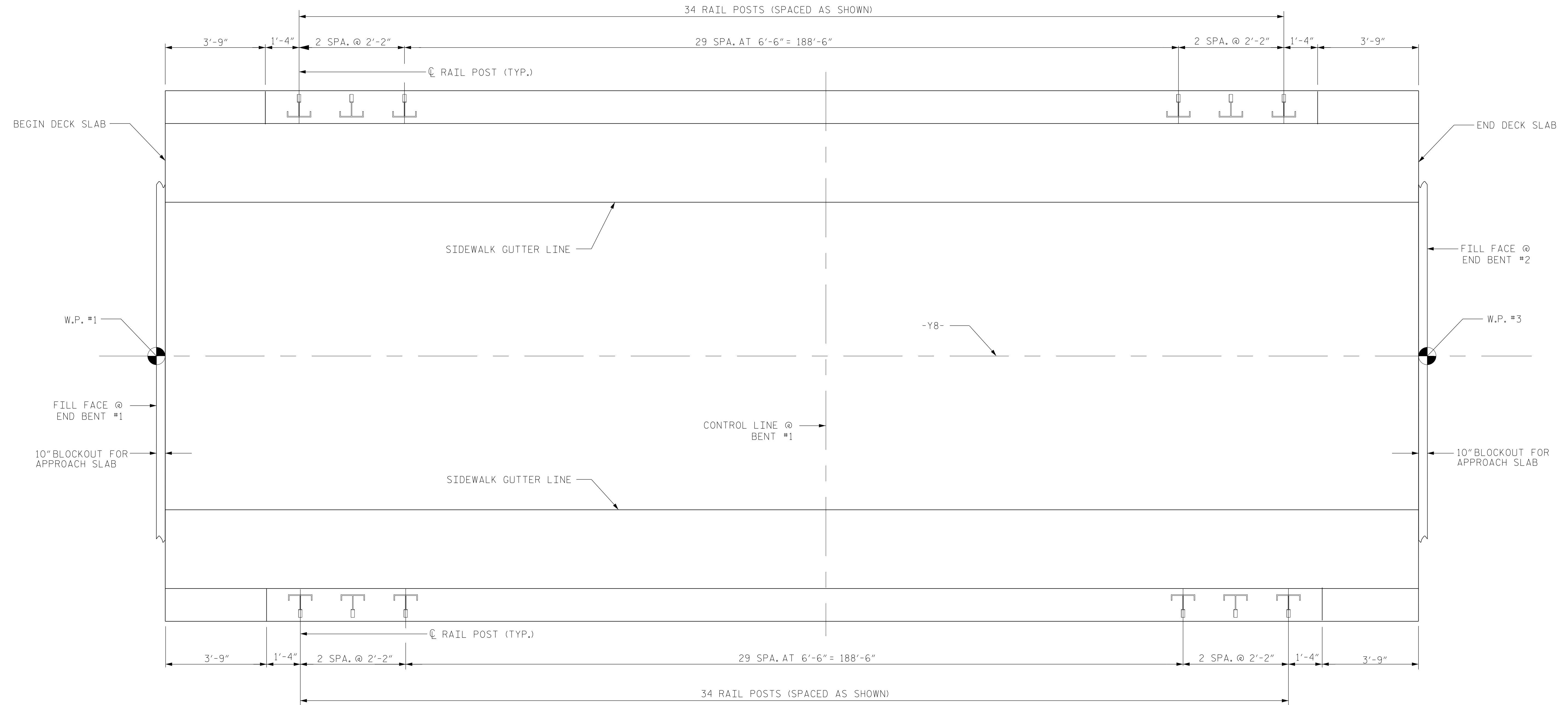
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DRAWN BY: J. LOFTUS	DATE: 01-18
CHECKED BY: E. PHELPS	DATE: 02-18
DESIGN ENGINEER OF RECORD: J. LOFTUS	DATE: 02-18

U-2412A  
3/7/2018  
\\407-037-LJ2412A-SMU-RAIL03\_S7-19.dgn  
USER: jloftus



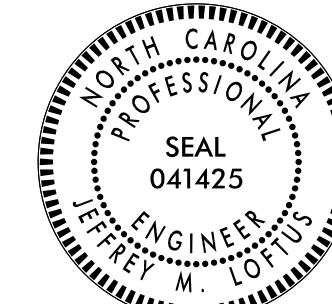


PLAN OF RAIL POST SPACINGS

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 4 OF 6

DocuSigned by:  
 Jeff Loftus 3/7/2018  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 RAIL POST SPACINGS  
 FOR THREE BAR  
 METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S7-20
2			4			TOTAL SHEETS 35

STR. #7

DRAWN BY: J. LOFTUS DATE: 01-18  
 CHECKED BY: E. PHELPS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
 3/7/2018  
 \\407\_039\_U2412A-SMU-RAIL04\_S7-20.dgn  
 USER:jloftus

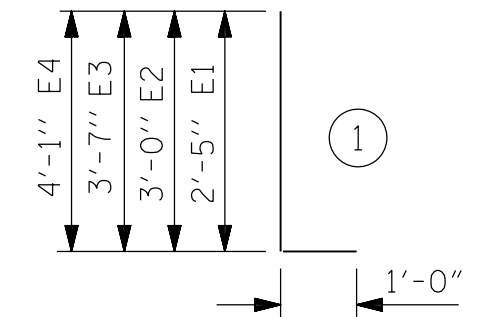
NOTES

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

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "3 BAR METAL RAIL" SHEET 3 OF 6.

FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET 6 OF 6.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS OR END OF SLABS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. CONTRACTOR SHALL NOT INSTALL GROOVED CONTRACTION JOINTS WITHIN 1'-0" OF RAIL POST CONNECTIONS. FOR POST SPACINGS SEE "RAIL POST SPACINGS FOR THREE BAR METAL RAILS" SHEET 4 OF 6.



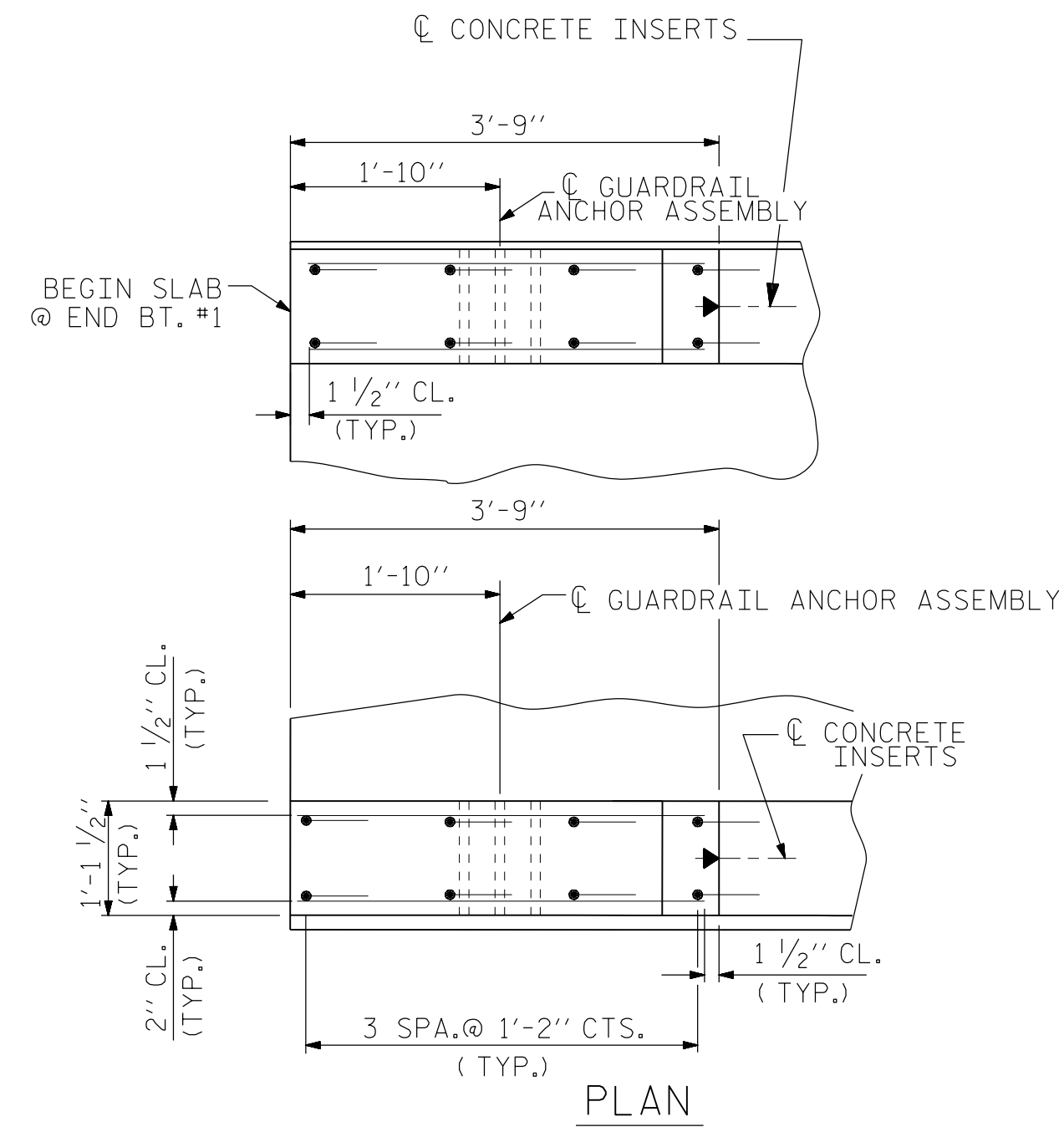
BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

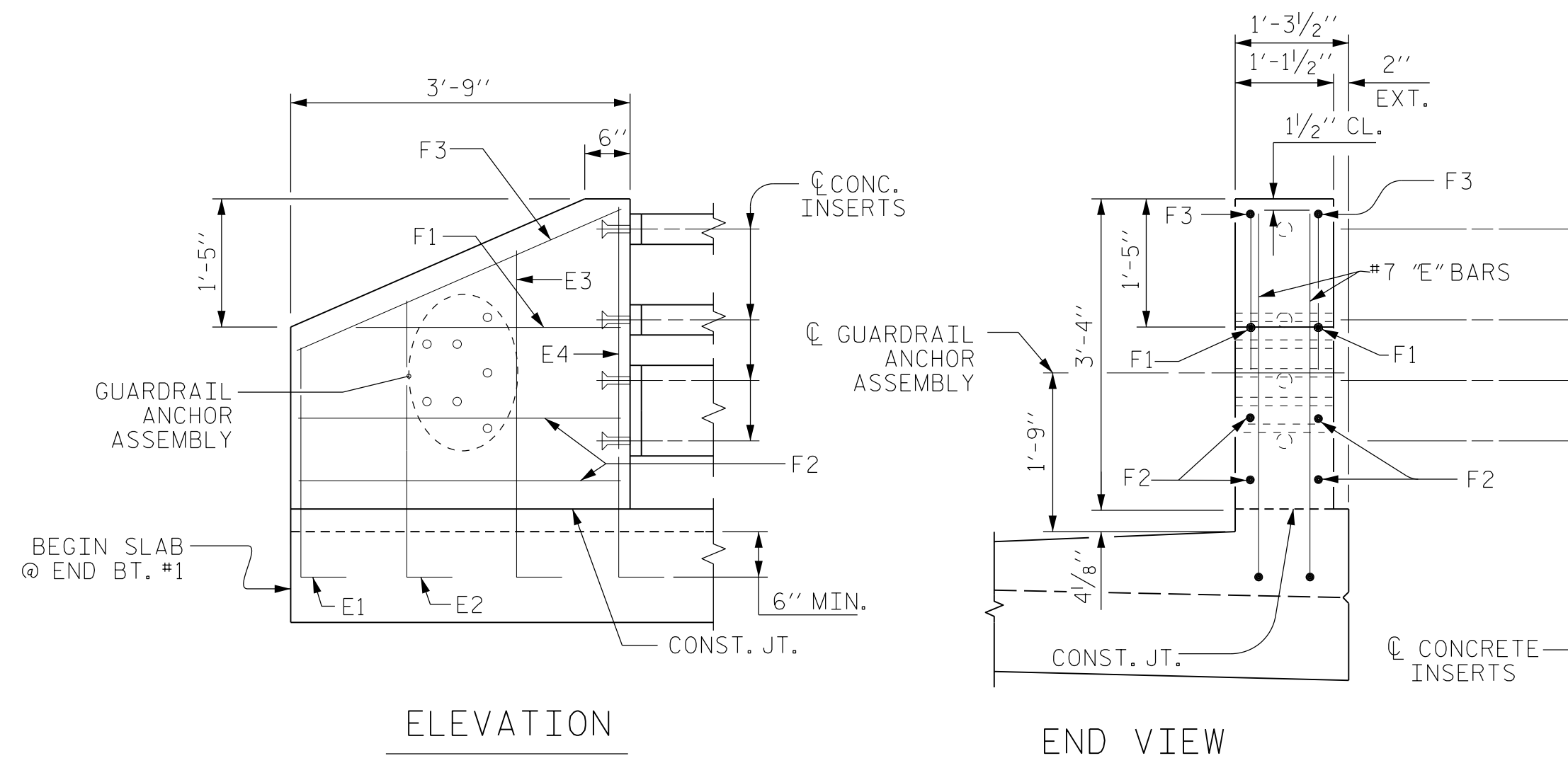
BILL OF MATERIAL FOR PARAPET & END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* E1	8	# 7	STR	3'-5"	56
* E2	8	# 7	STR	4'-0"	65
* E3	8	# 7	STR	4'-7"	75
* E4	8	# 7	STR	5'-1"	83
* F1	8	# 6	STR	3'-1"	37
* F2	16	# 6	STR	3'-6"	84
* F3	8	# 6	STR	3'-7"	43

\* EPOXY COATED REINFORCING STEEL 443 LBS.  
CLASS AA CONCRETE 1.7 CU.YDS.



PLAN

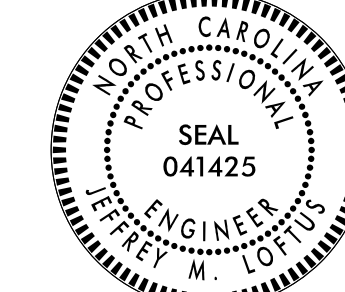


ELEVATION

END VIEW

END POST DETAILS

Designed by: *Jeff Loftus* 3/7/2018  
FES10C02E79A68



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PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 5 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

PARAPET AND END POST  
DETAILS FOR THREE BAR  
METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-21
1			3			TOTAL SHEETS
2			4			35

STR. #7

DRAWN BY: J. LOFTUS	DATE: 01-18
CHECKED BY: E. PHELPS	DATE: 02-18
DESIGN ENGINEER OF RECORD: J. LOFTUS	DATE: 02-18

3/7/2018  
... \407\_041\_U2412A\_SMU\_RAIL05\_ST-21.dgn  
USER: jloftus

U-2412A

NOTES

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

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

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

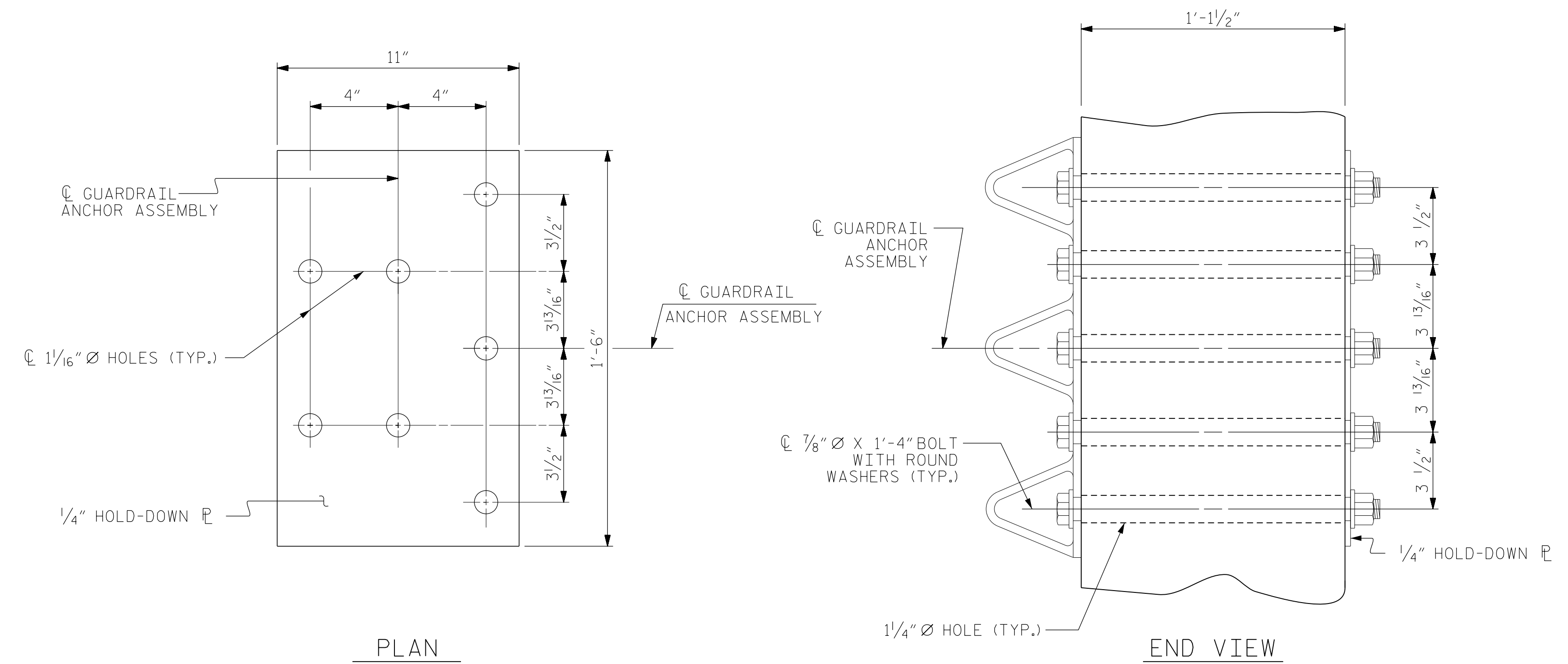
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

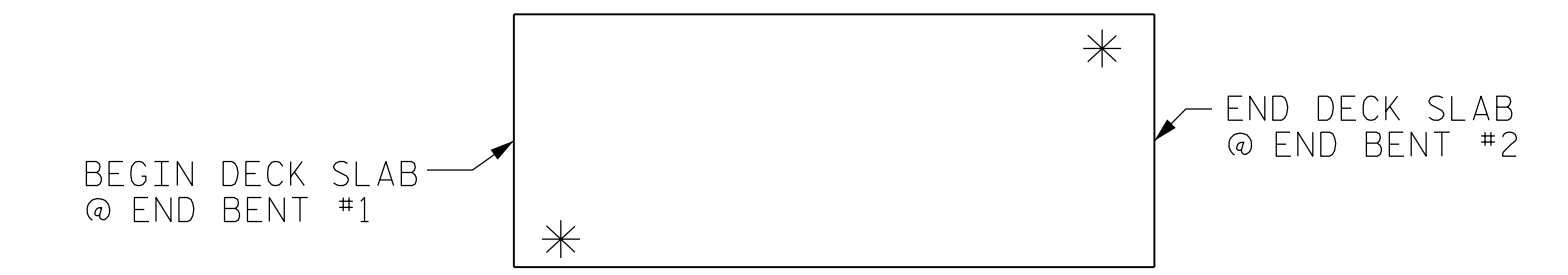
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

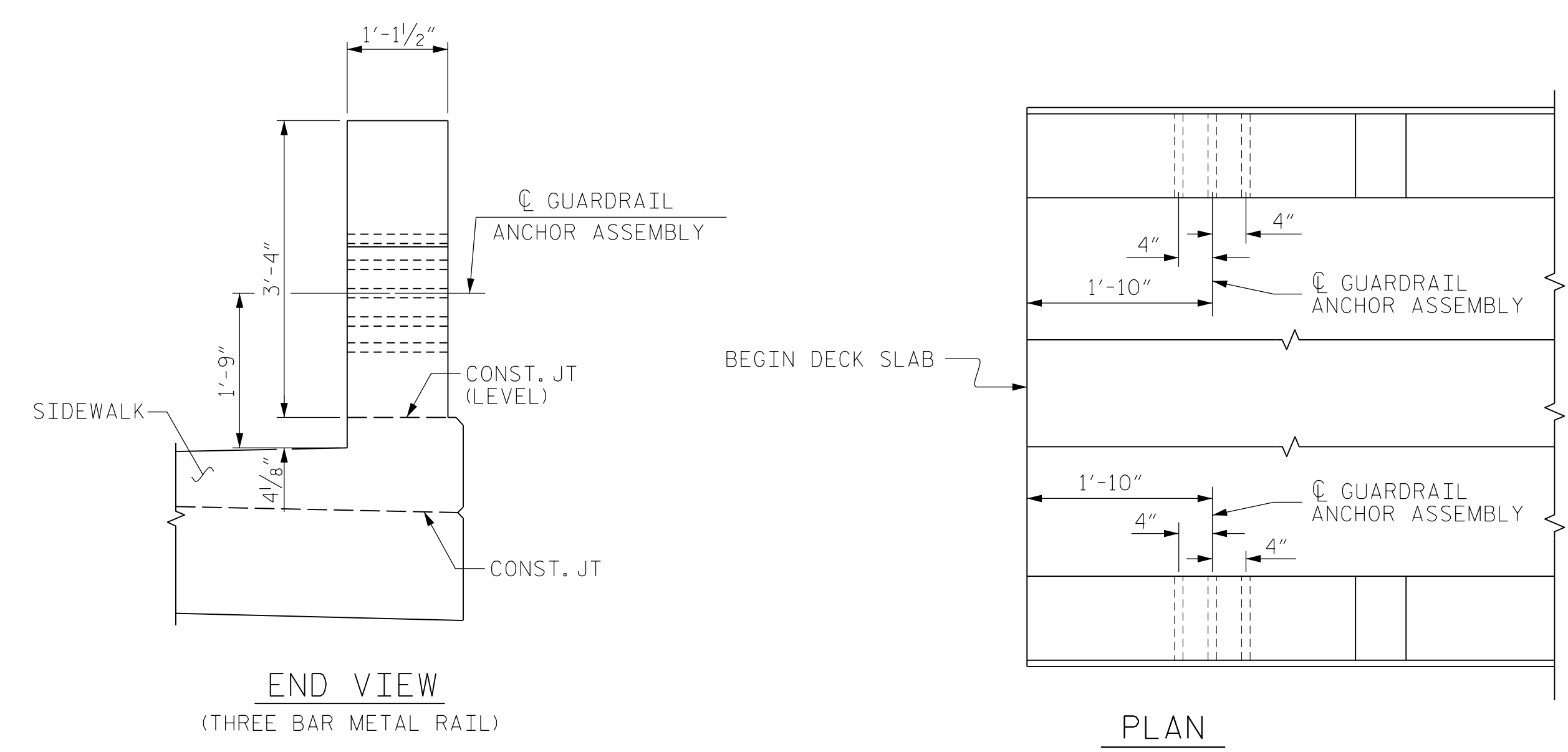


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 6 OF 6

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 Jeff Loftus  
 3/7/2018



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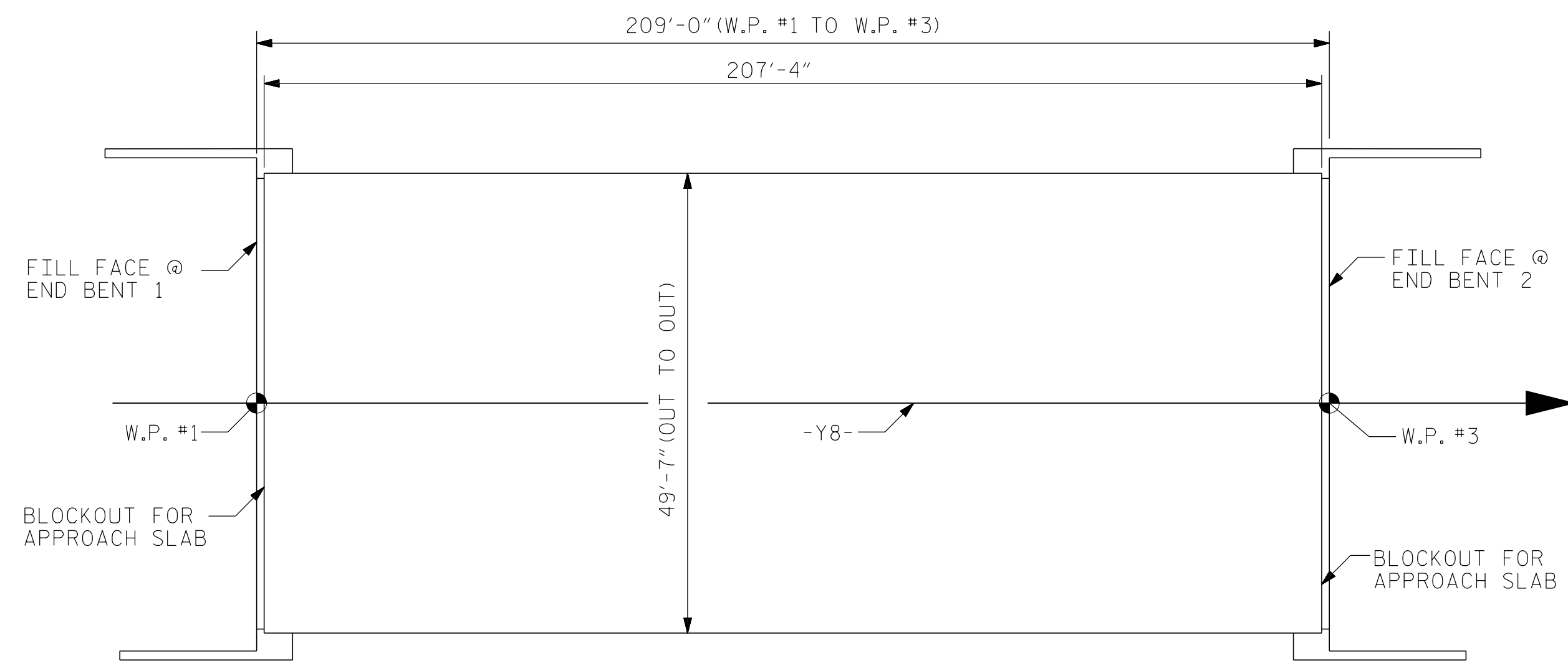
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			57-22
2			4			TOTAL SHEETS 35

STR. #7 (SHT 2) STD. NO. GRA3

DRAWN BY: J. LOFTUS DATE: 01-18  
 CHECKED BY: E. PHELPS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
 3/7/2018  
 \\407\_043\_U2412A-SMU-RAIL06\_S7-22.dgn  
 USER: jloftus

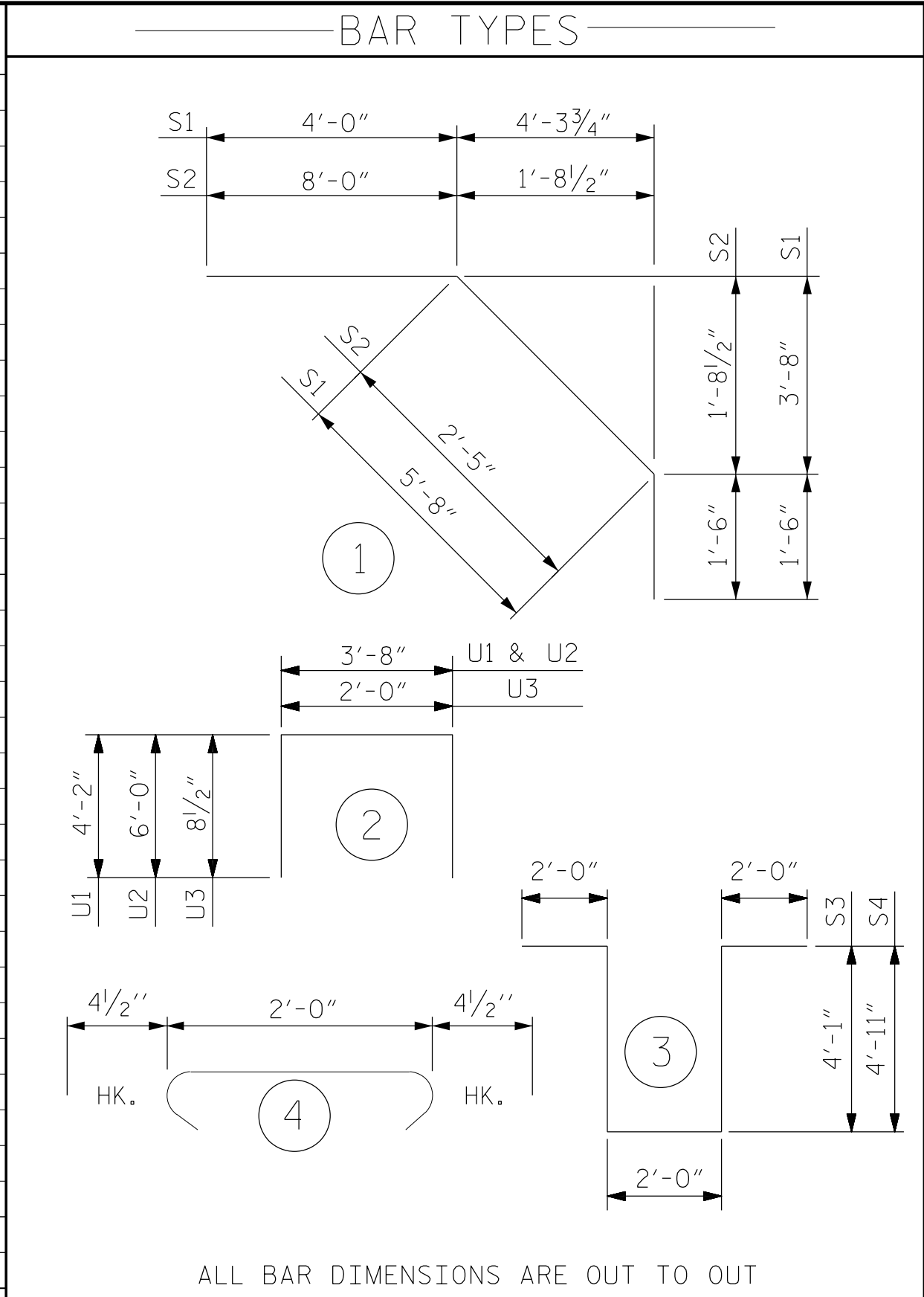


LAYOUT FOR COMPUTING AREA  
REINFORCED CONCRETE DECK SLAB  
(SQ. FT. = 10,281)

GROOVING BRIDGE FLOORS	
BRIDGE DECK	6,842 SQ.FT.
APPROACH SLABS	990 SQ.FT.
TOTAL	7,832 SQ.FT.

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"			

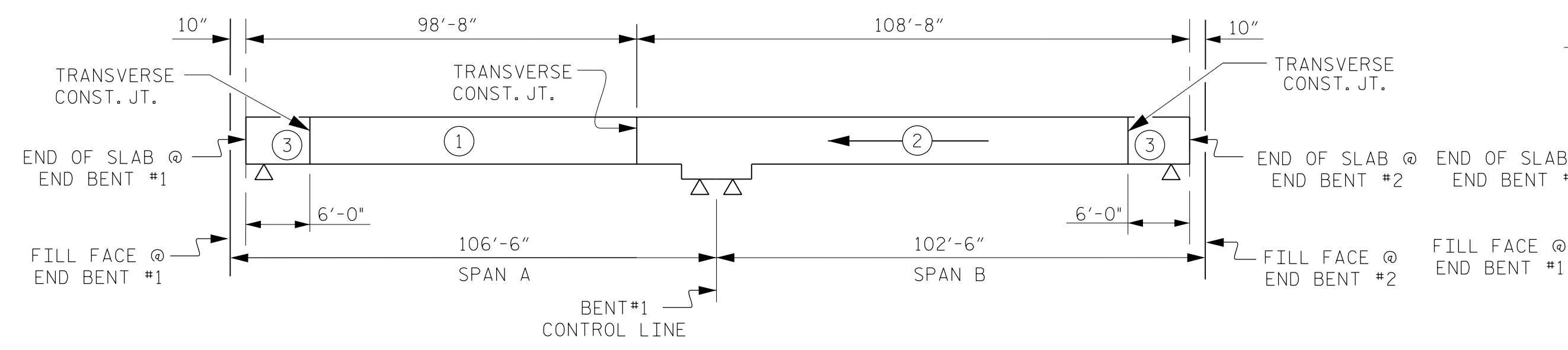
BILL OF MATERIAL											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	452	#5	STR	49'-3"	23,218	H1	52	#6	STR	17'-11"	1,399
						H2	52	#6	STR	16'-11"	1,321
A2	452	#5	STR	49'-3"	23,218						
* B1	136	#4	STR	26'-9"	2,430	K1	20	#4	STR	25'-6"	341
* B2	68	#6	STR	24'-0"	2,451	K2	8	#4	STR	8'-7"	46
* B3	128	#6	STR	21'-0"	4,037	K3	16	#4	STR	9'-7"	102
* B4	68	#6	STR	37'-6"	3,830	K4	8	#4	STR	9'-3"	49
* B5	64	#5	STR	32'-0"	2,136	K5	8	#4	STR	8'-1"	43
B6	240	#5	STR	53'-3"	13,330	K6	4	#4	STR	2'-5"	6
* B7	96	#4	STR	27'-8"	1,774	K7	8	#4	STR	2'-11"	16
						K8	4	#4	STR	2'-9"	7
						K9	4	#4	STR	2'-2"	6
* G1	414	#4	STR	6'-3"	1,728	K10	8	#4	STR	8'-7"	46
						K11	16	#4	STR	9'-7"	102
						K12	8	#4	STR	9'-3"	49
						K13	8	#4	STR	8'-1"	43
						K14	10	#4	STR	21'-11"	146
						* S1	84	#4	1	11'-2"	627
						* S2	84	#4	1	11'-11"	669
						S3	8	#4	3	14'-2"	76
						S4	32	#4	3	15'-10"	338
						S5	160	#4	4	2'-9"	294
						U1	84	#4	2	12'-0"	673
						* U3	120	#4	2	3'-5"	274
						V2	66	#5	STR	6'-1"	419
						V3	62	#5	STR	5'-11"	383



ALL BAR DIMENSIONS ARE OUT TO OUT

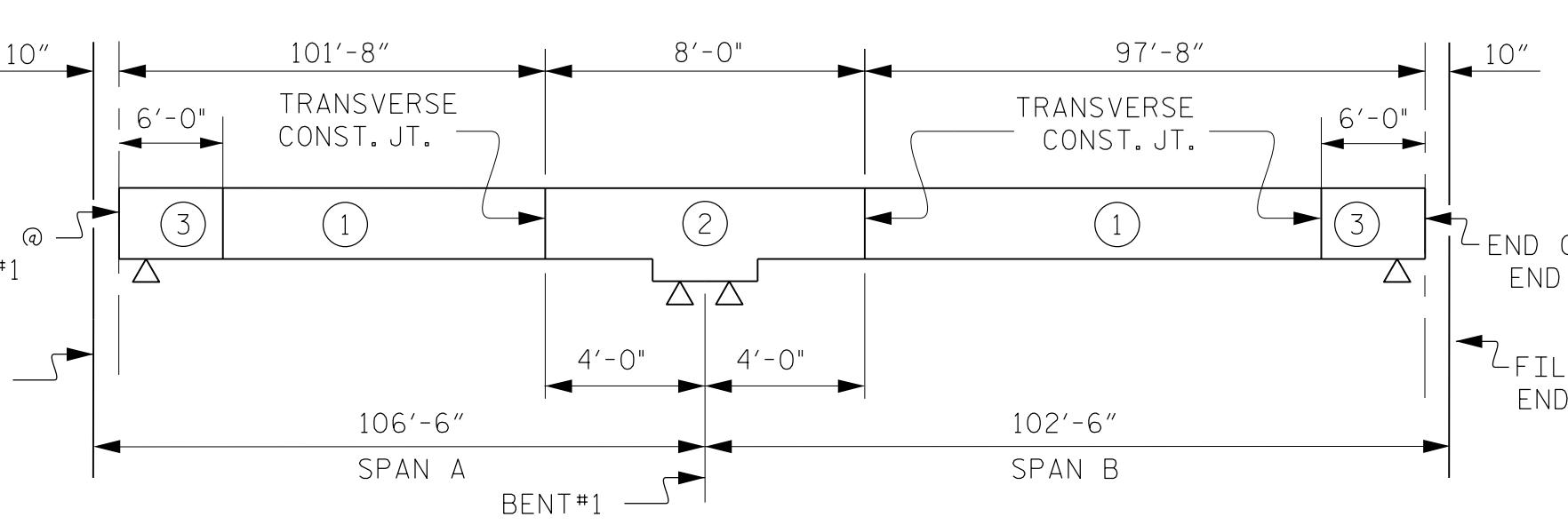
SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	( CU. YDS. )	( LBS. )	( LBS. )
POUR 1	141.2		
POUR 2	156.4	42,453	39,398
POUR 3	106.0		
SIDEWALK	69.9		3,776
TOTALS**	473.5	42,453	43,174

\*\* QUANTITIES FOR END POSTS ARE NOT INCLUDED



POURING SEQUENCE  
(CONTINUOUS FOR LIVE LOAD)

KEY  
⊕ = INDICATES POUR NUMBER AND DIRECTION OF POUR



OPTIONAL POURING SEQUENCE  
(CONTINUOUS FOR LIVE LOAD)

KEY  
⊕ = INDICATES POUR NUMBER

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Jeff Loftus  
FES1002267946

3/7/2018



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PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE BILL OF MATERIAL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S7-23  
TOTAL SHEETS 35

STR. #7

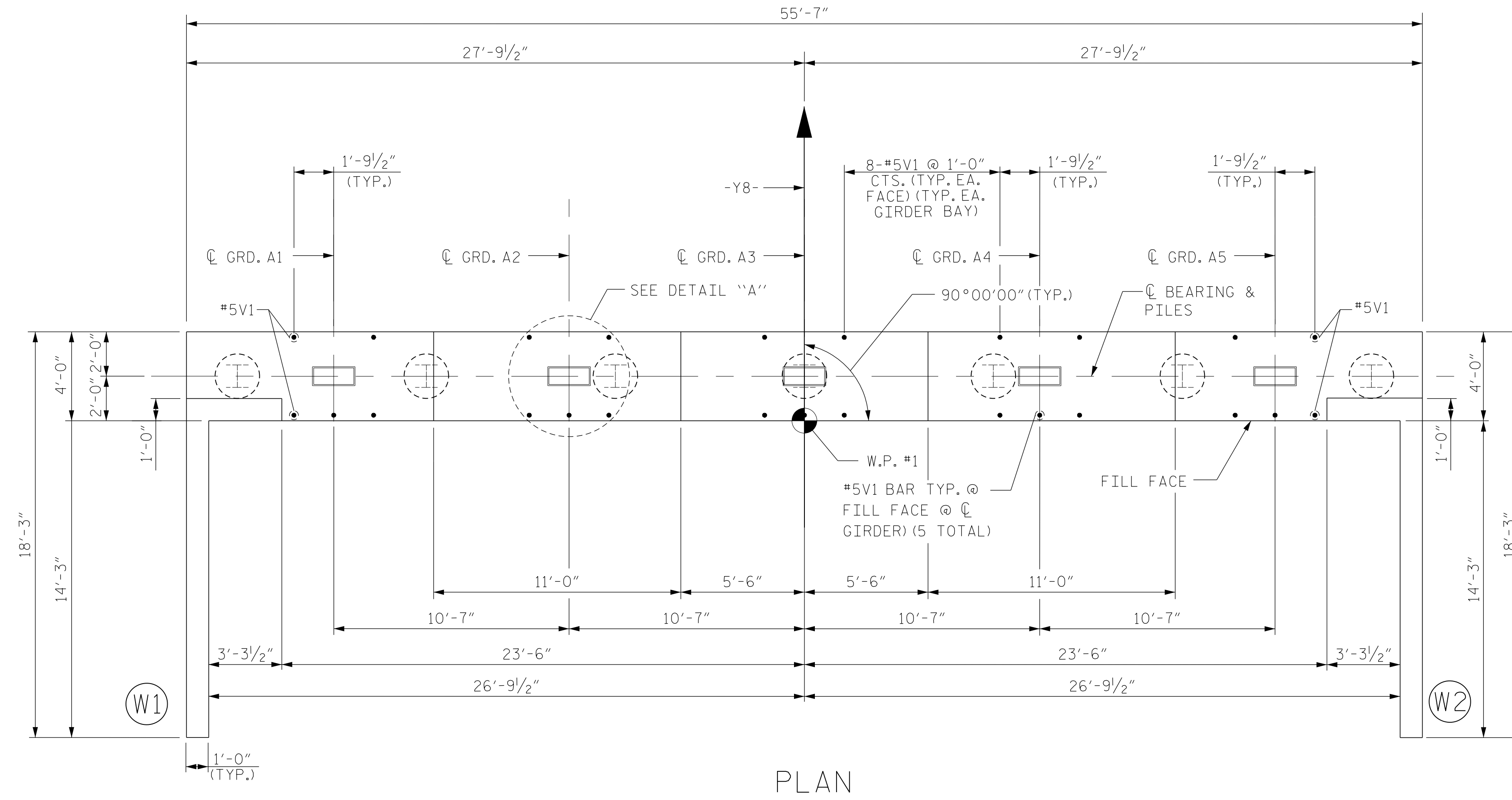
3/7/2018  
DRAWN BY: J. LOFTUS DATE: 01-18  
CHECKED BY: E. PHELPS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A

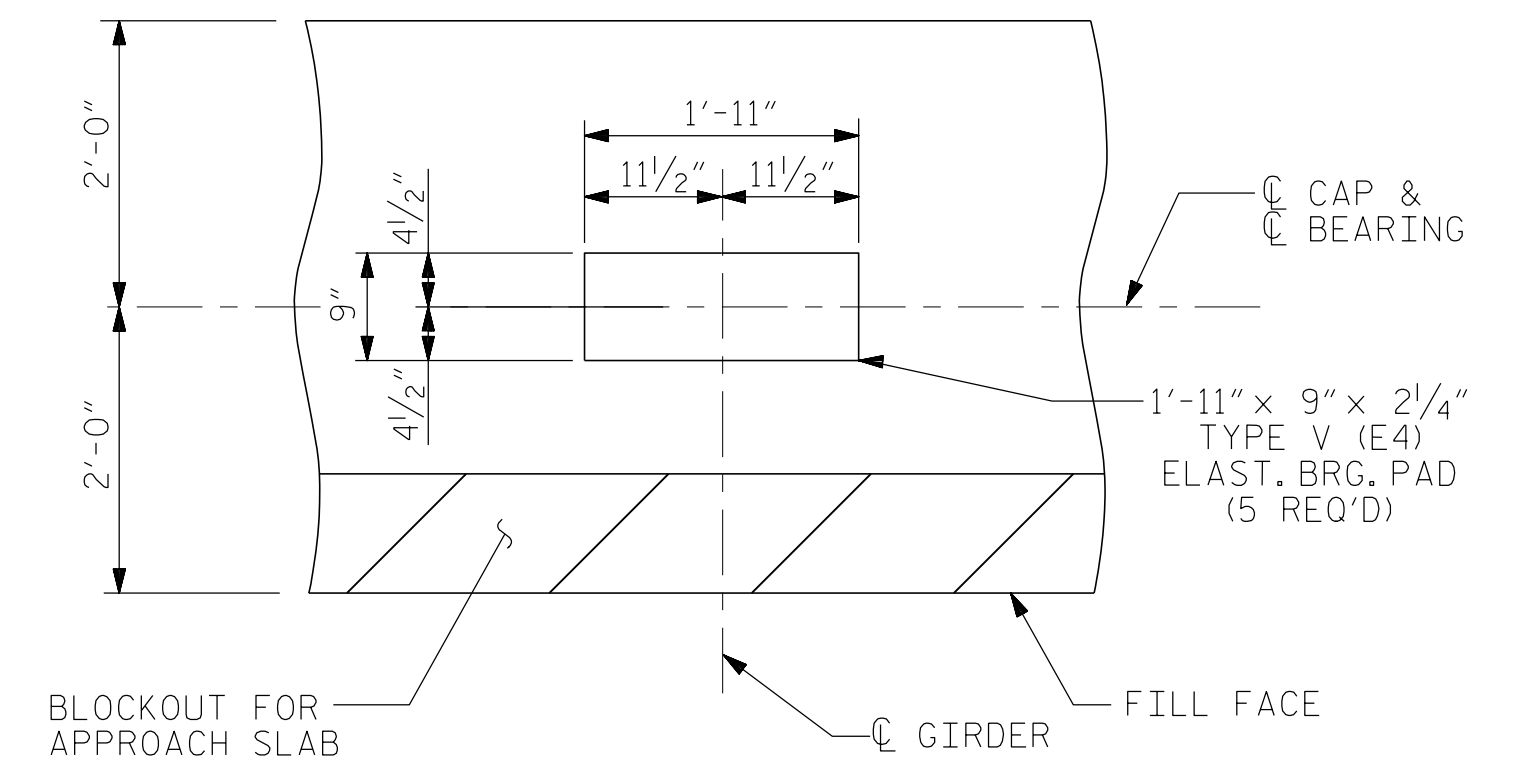
3/7/2018  
... \407\_045\_U2412A-SMU-BOM01\_S7-23.dgn  
USER: jloftus

NOTES

- FOR BEARING DETAILS, SEE ELASTOMERIC BEARING DETAILS SHEET.
- FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
- THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".
- FOR CONCRETE COLLAR DETAIL, SEE SHEET 3 OF 3.

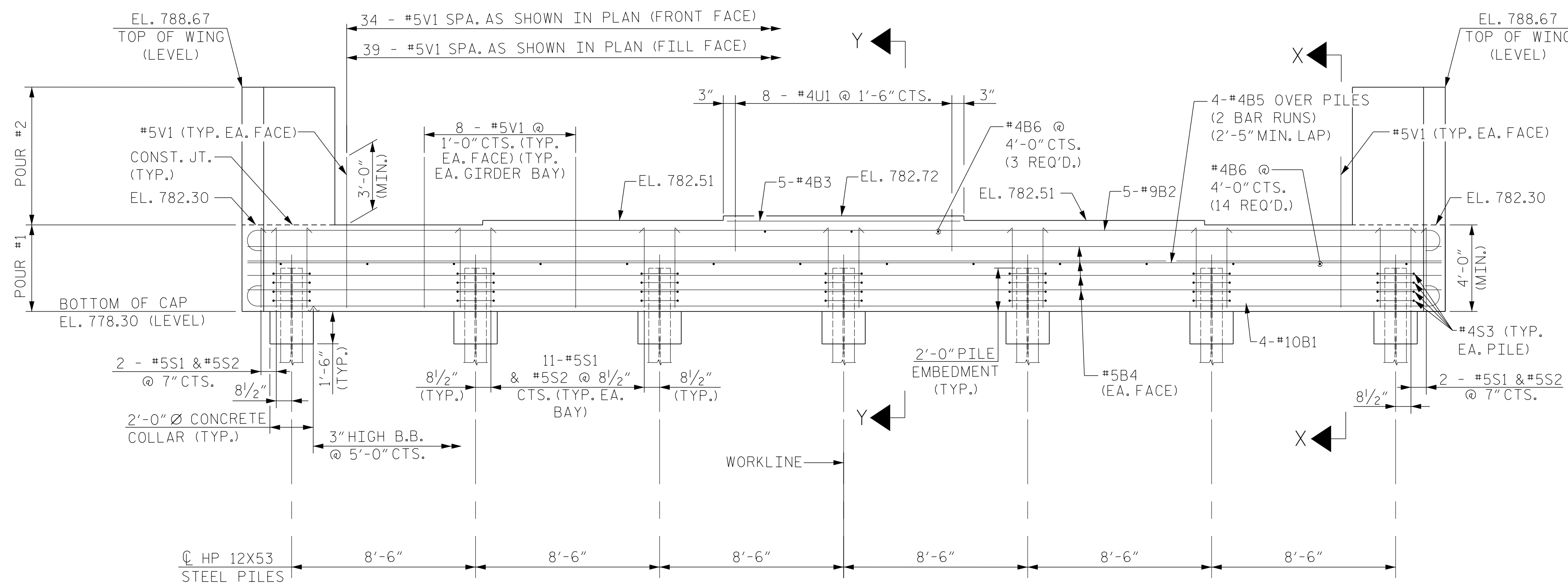


PLAN



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH GIRDER)  
(HP 12X53 PILES NOT SHOWN FOR CLARITY)

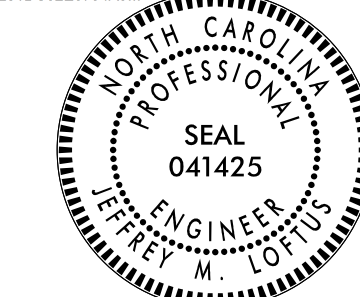


ELEVATION

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 1 OF 3

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Jeff Loftus  
3/7/2018



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
INTEGRAL END BENT No. 1

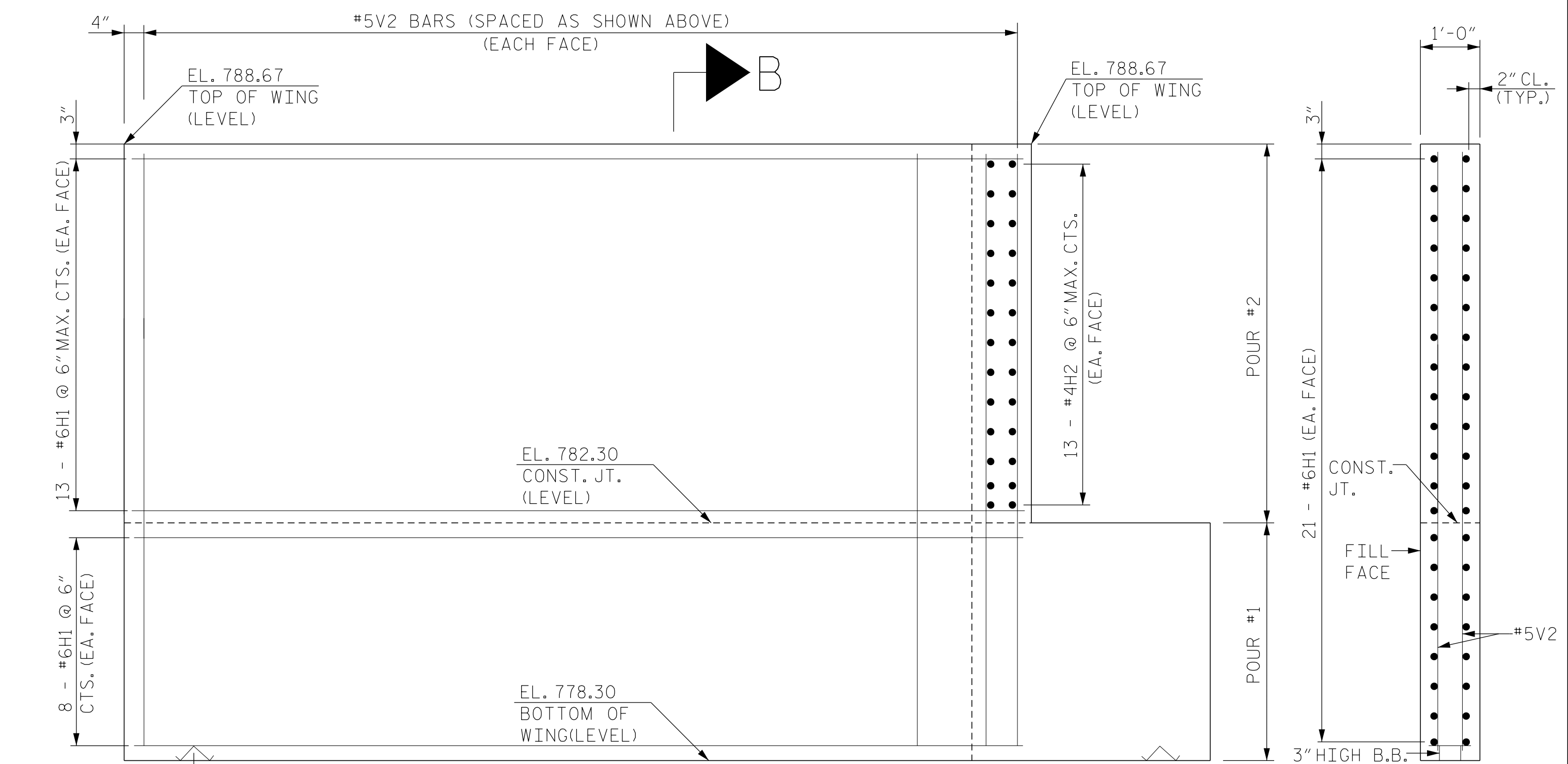
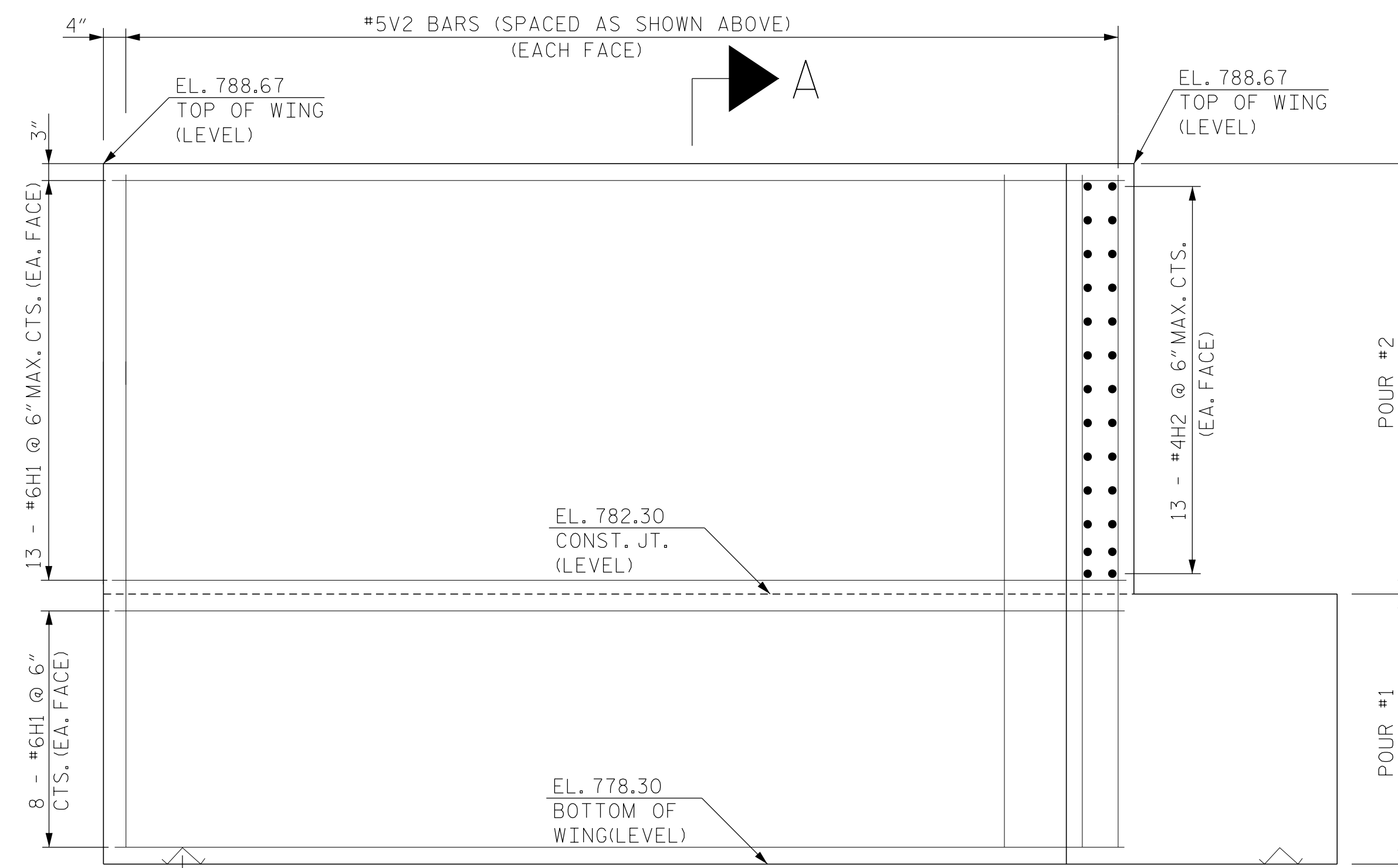
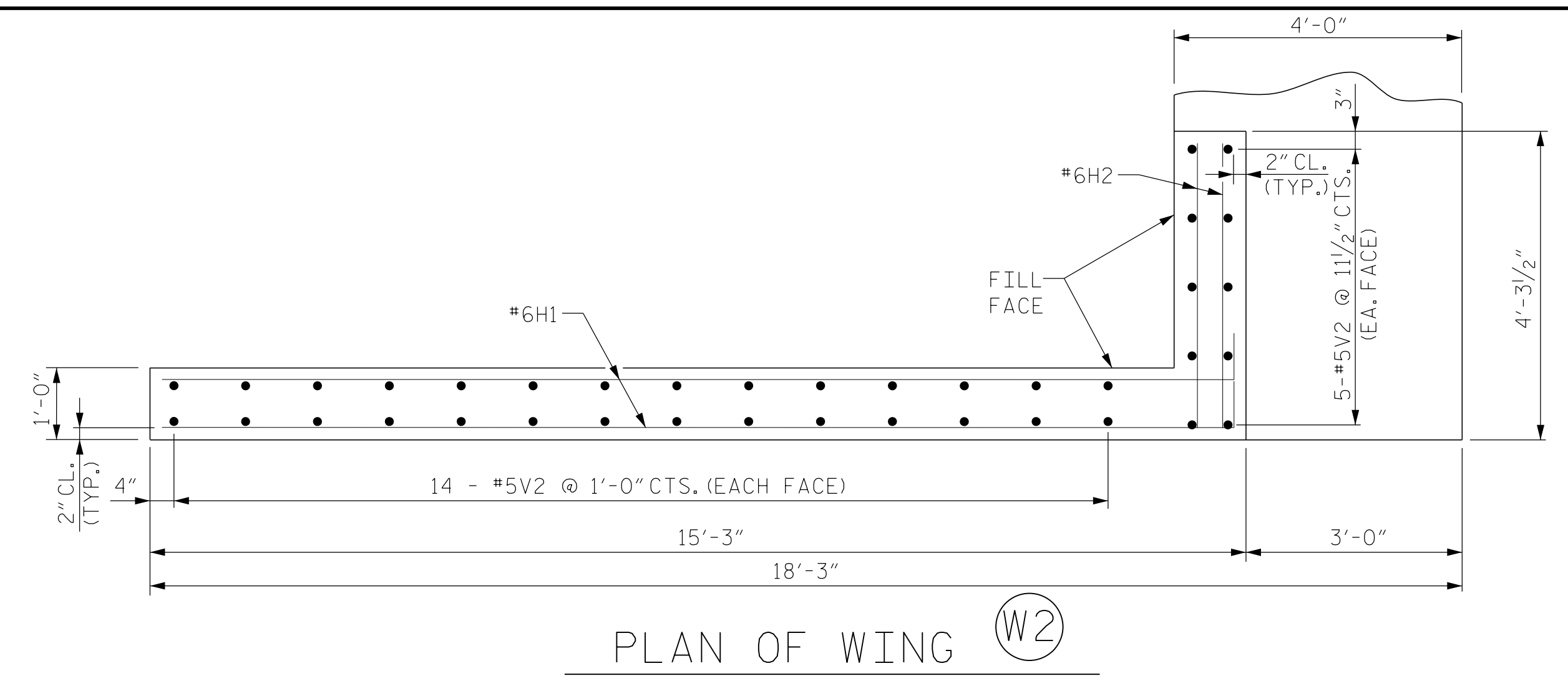
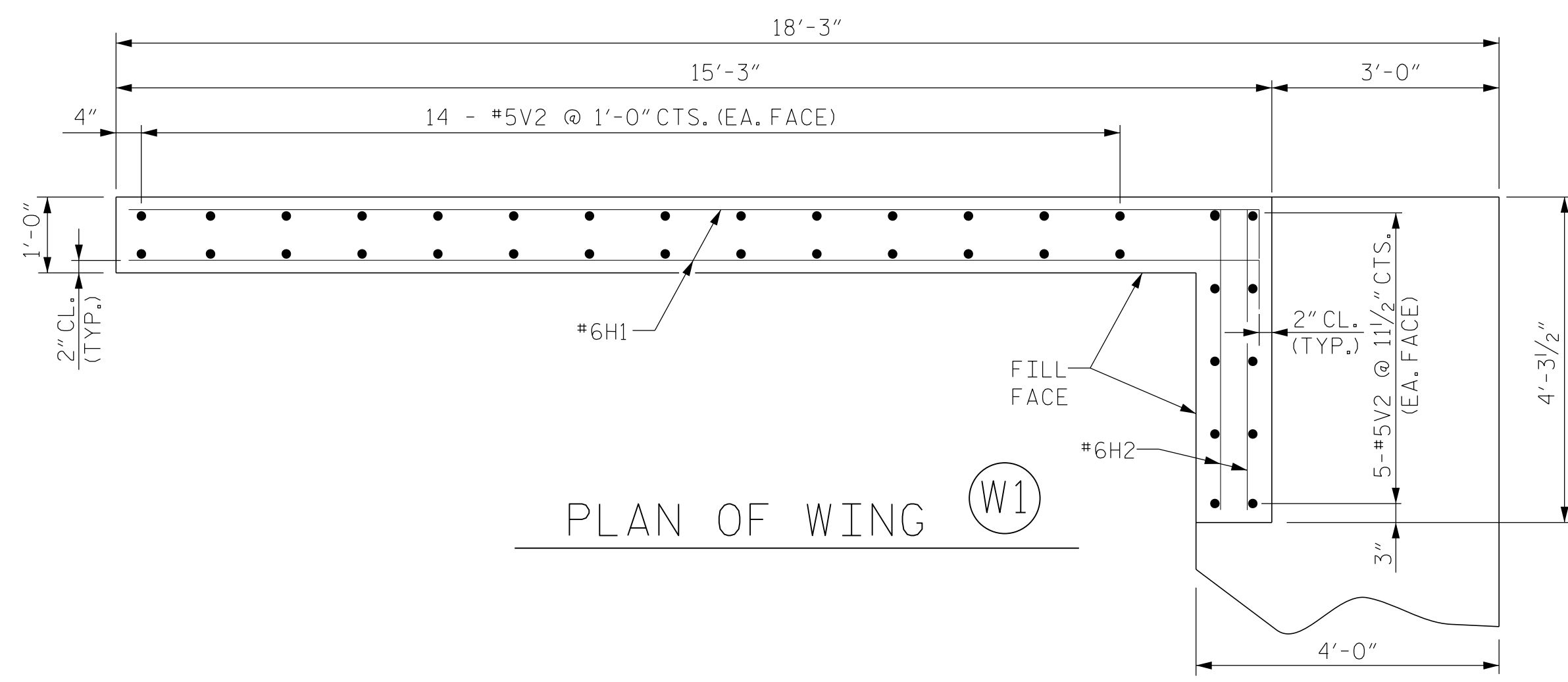


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-24
1			3			TOTAL SHEETS
2			4			35

STR. #7

DRAWN BY: E. PHELPS DATE: 01-18  
CHECKED BY: J. LOFTUS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

U-2412A  
 3/7/2018  
 \\V07-047-U2412A-SMU-1EB1-S7-24.dgn  
 USER: jloftus



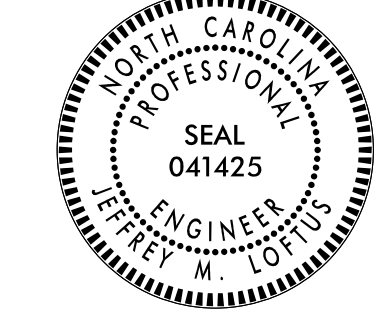
ELEVATION OF WING (W1)

SECTION A-A

ELEVATION OF WING (W2)

SECTION B-B

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Jeff Loftus  
3/7/2018



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PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

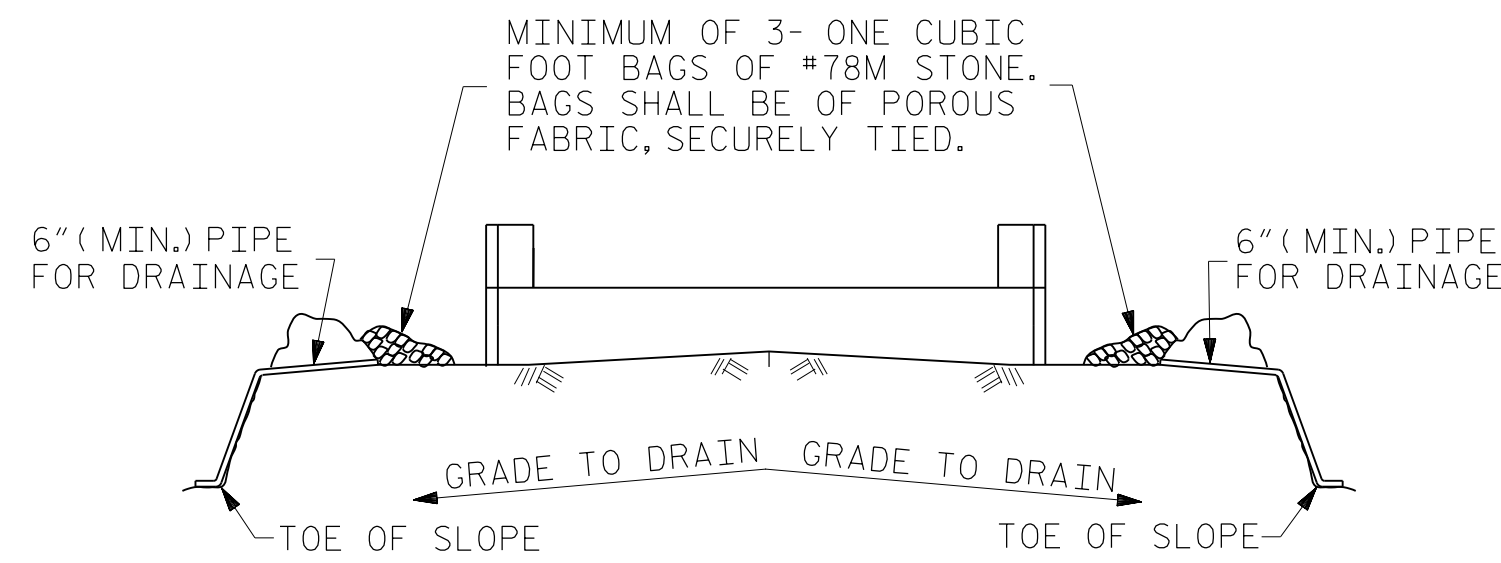
SHEET 2 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
INTEGRAL END BENT NO.1  
DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-25	
1			3			TOTAL SHEETS	
2			4			35	

STR. #7

DRAWN BY: E. PHELPS	DATE: 01-18
CHECKED BY: J. LOFTUS	DATE: 02-18
DESIGN ENGINEER OF RECORD: J. LOFTUS	DATE: 02-18

3/7/2018  
 U-2412A  
 \407\_049\_U2412A-SMU\_1EB2-S7-25.dgn  
 USER: jloftus

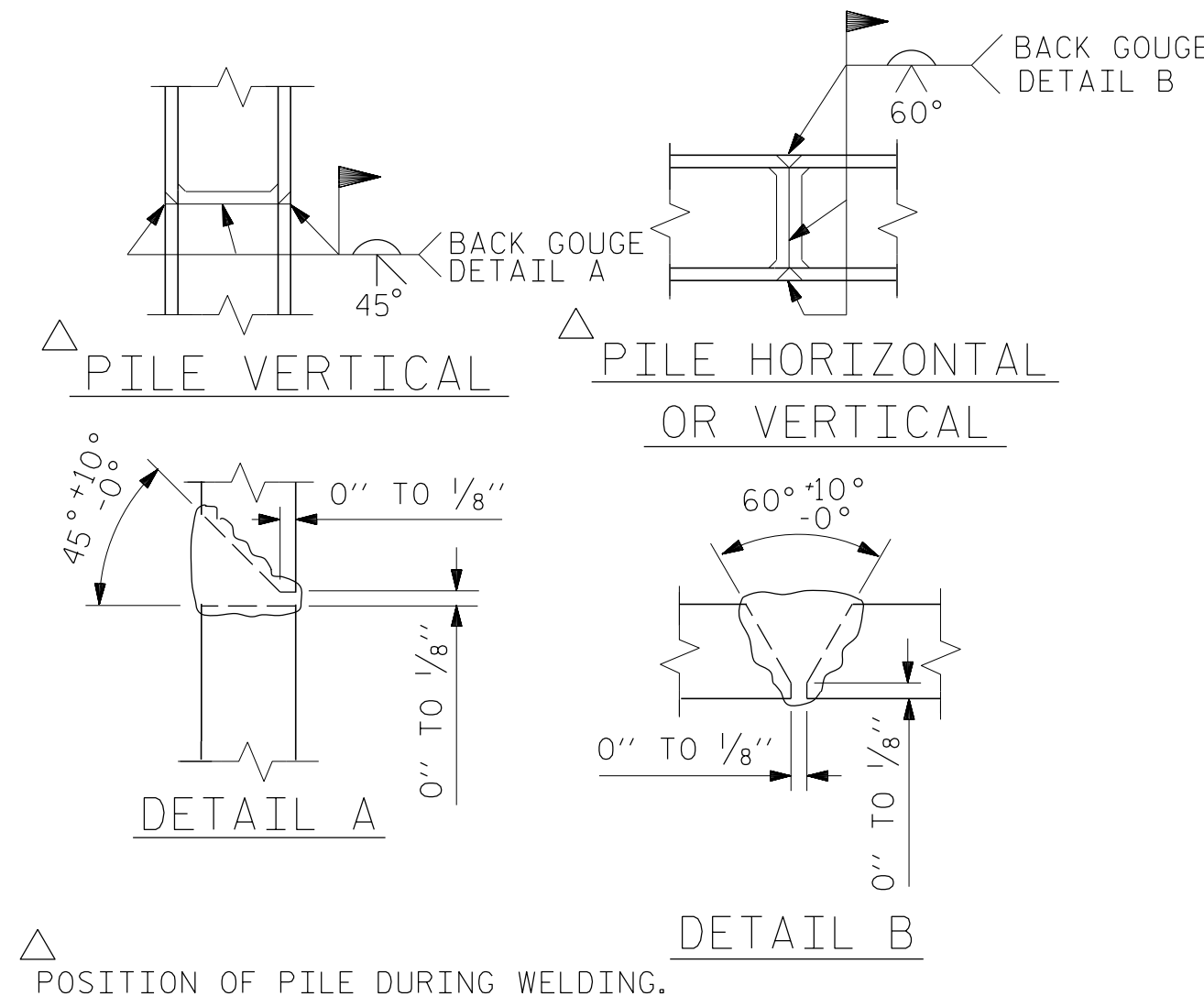


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

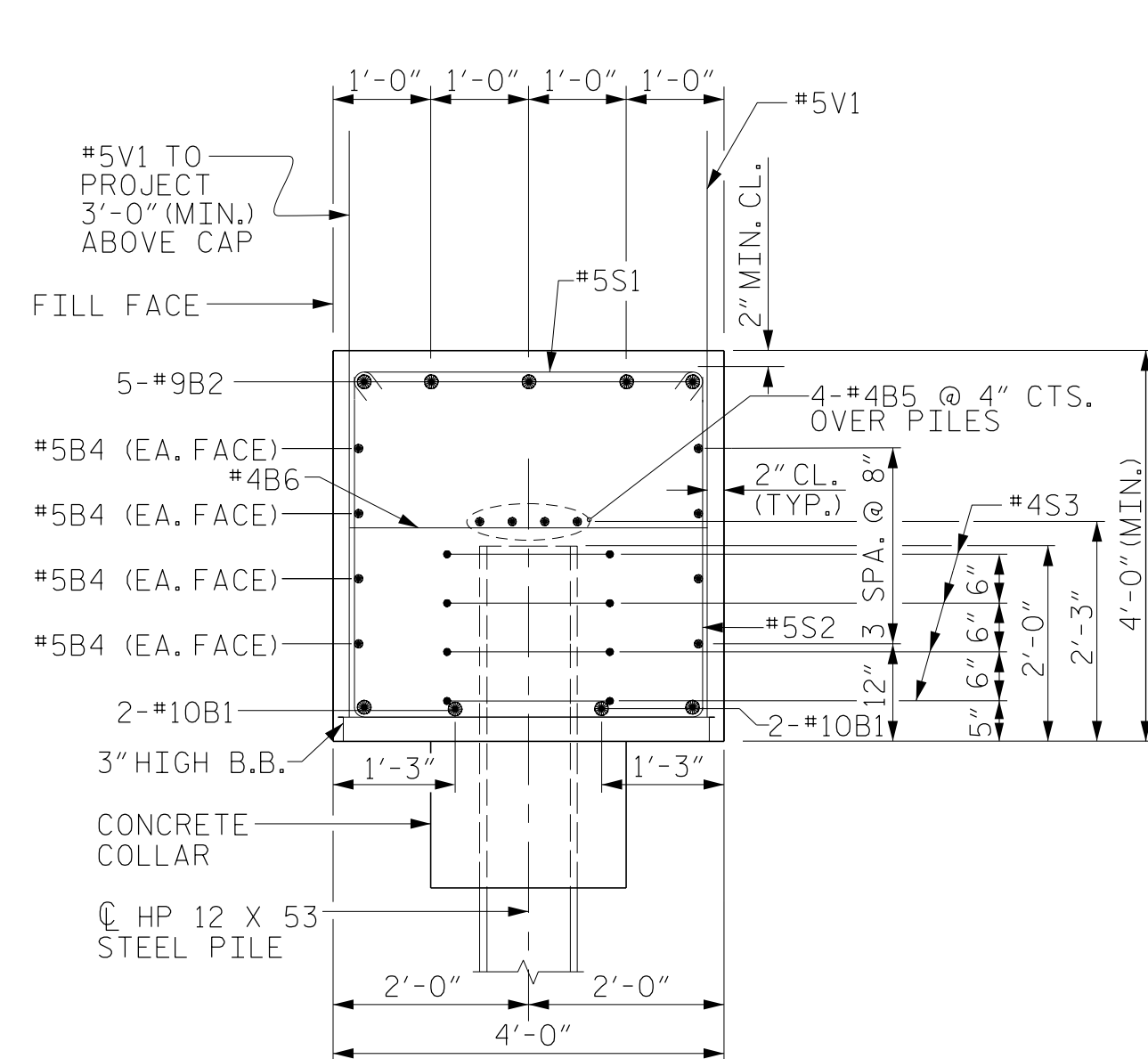
### TEMPORARY DRAINAGE AT END BENT



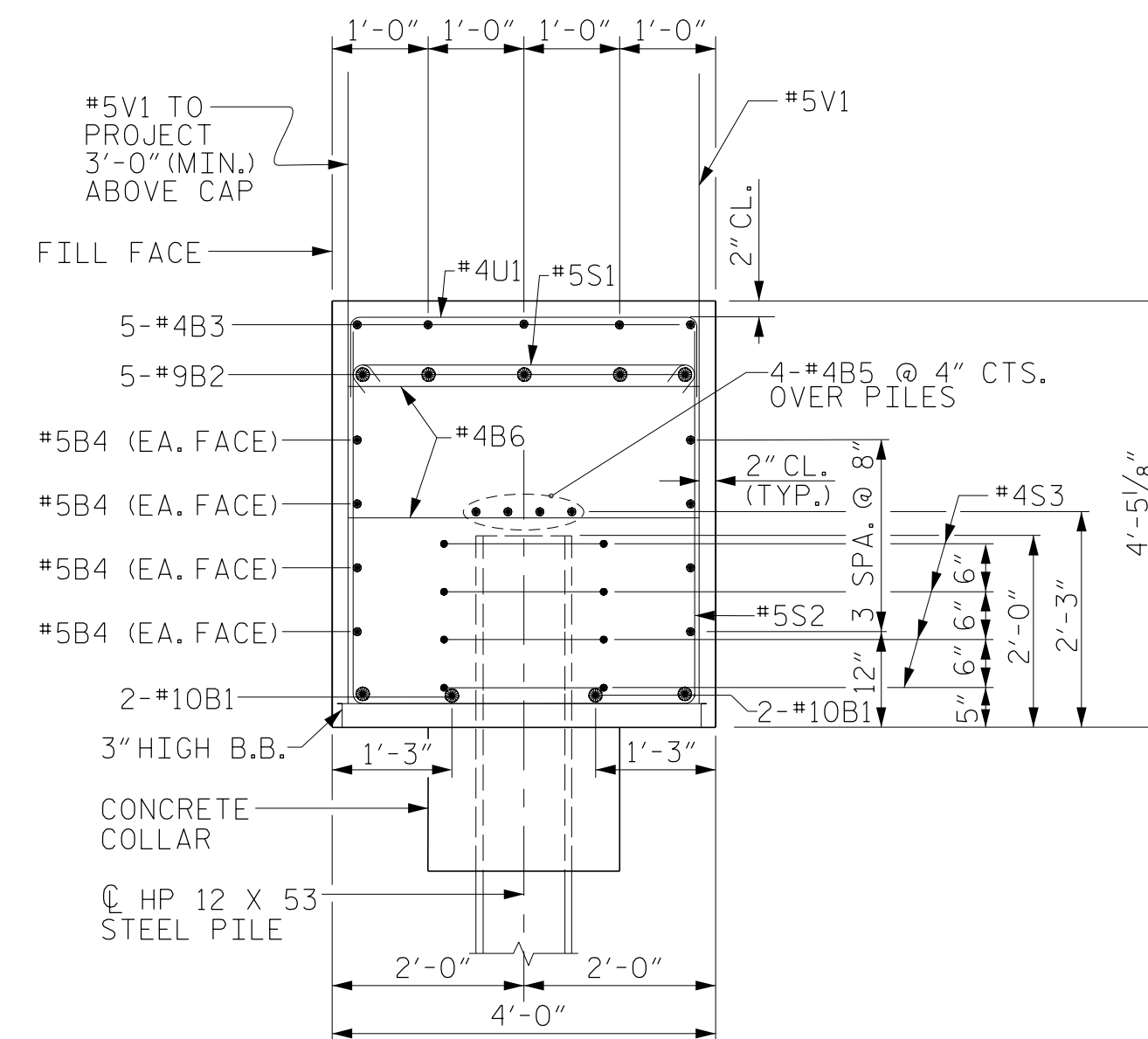
### PILE SPLICE DETAILS

BILL OF MATERIAL FOR END BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	57'-11"	997
B2	5	#9	1	57'-7"	979
B3	5	#4	STR	10'-6"	35
B4	8	#5	STR	55'-3"	461
B5	8	#4	STR	28'-10"	154
B6	17	#4	STR	3'-8"	42
H1	84	#6	6	15'-7"	1966
H2	52	#4	STR	3'-11"	136
S1	70	#5	2	4'-7"	335
S2	70	#5	3	11'-10"	864
S3	28	#4	4	6'-6"	122
U1	8	#4	5	7'-2"	38
V1	73	#5	STR	7'-3"	552
V2	76	#5	STR	9'-11"	786
REINFORCING STEEL FOR END BENT No. 1					7467 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1: CAP, LOWER PART OF WINGS & COLLARS					39.8 C.Y.
POUR #2: TOP PORTION ON WINGS					8.8 C.Y.
TOTAL					48.6 C.Y.
PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES					NO: 7
HP 12 X 53 STEEL PILES					NO: 7 LIN. FT.= 80
STEEL PILE POINTS					NO: 7
PILE EXCAVATION IN SOIL					LIN. FT.= 35
PILE EXCAVATION NOT IN SOIL					LIN. FT.= 15

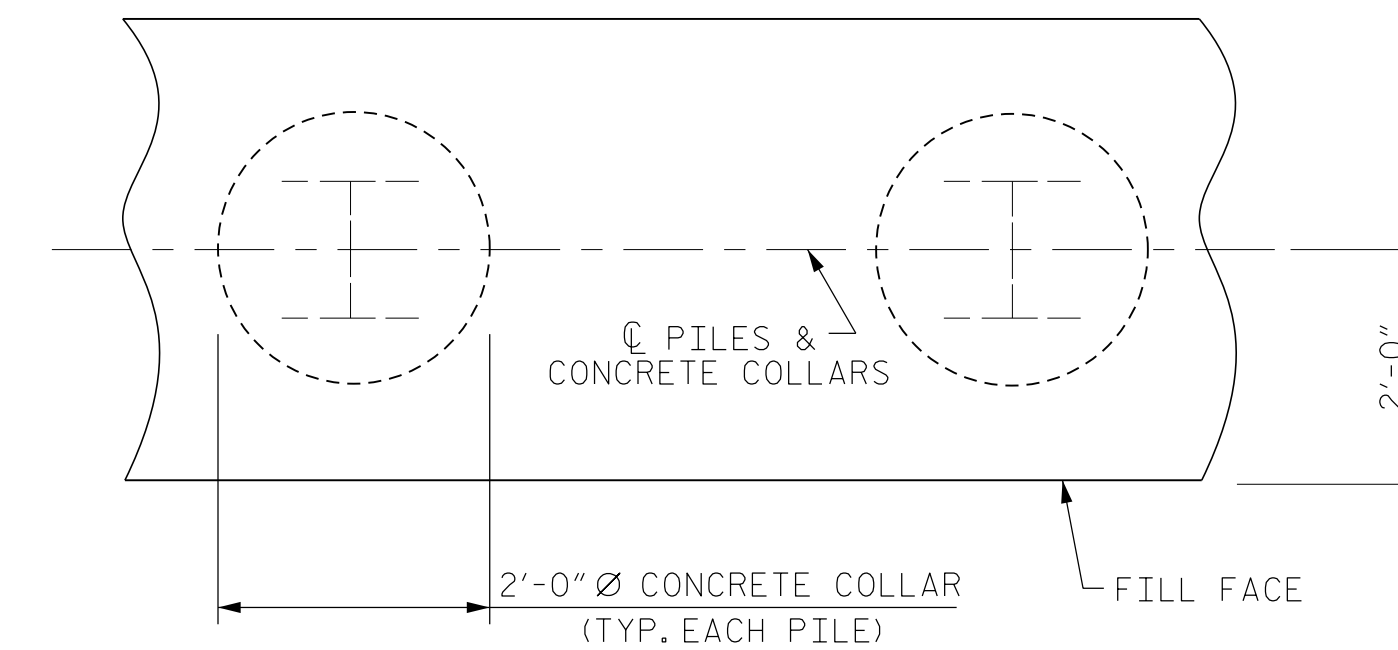
ALL BAR DIMENSIONS ARE OUT TO OUT.



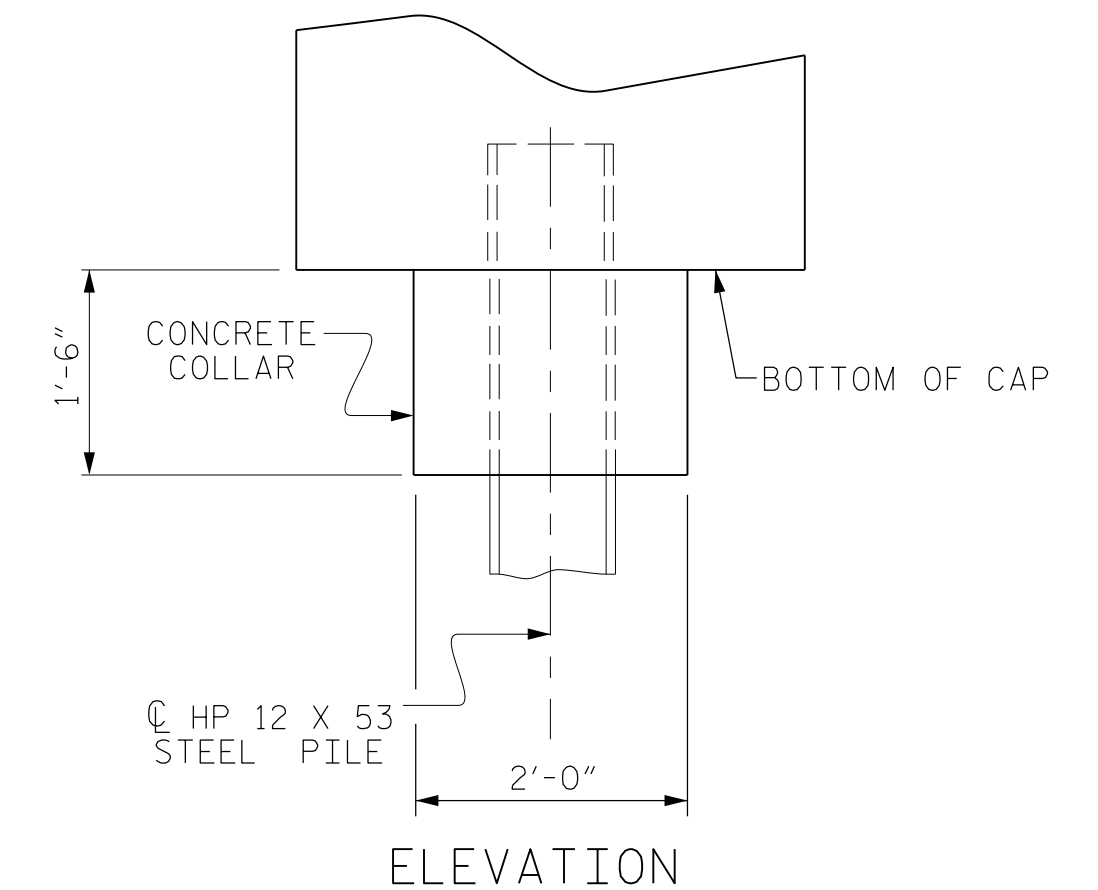
### SECTION X-X



### SECTION Y-Y



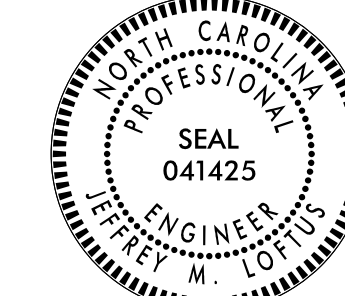
### CORROSION PROTECTION FOR STEEL PILES DETAIL



PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 3 OF 3

Designed by: Jeff Loftus 3/7/2018



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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 INTEGRAL END BENT No. 1  
 DETAILS

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

SHEET NO. S7-26  
 TOTAL SHEETS 35

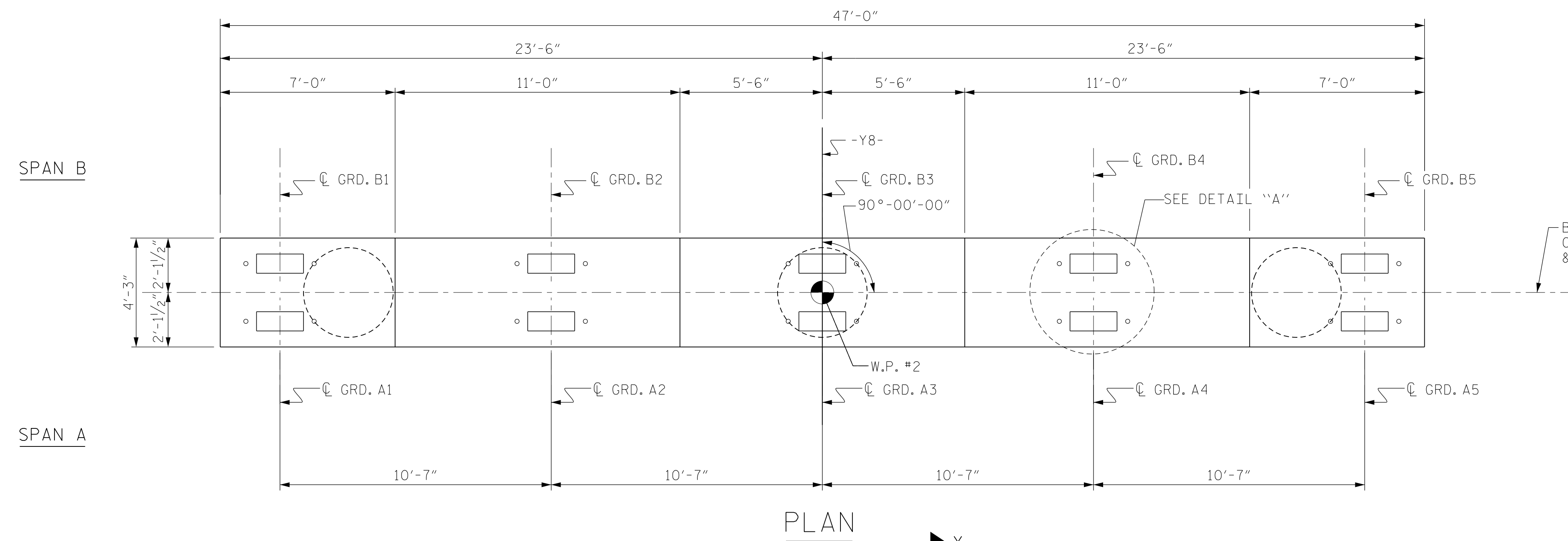
STR. #7

DRAWN BY: E. PHELPS DATE: 01-18  
 CHECKED BY: J. LOFTUS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

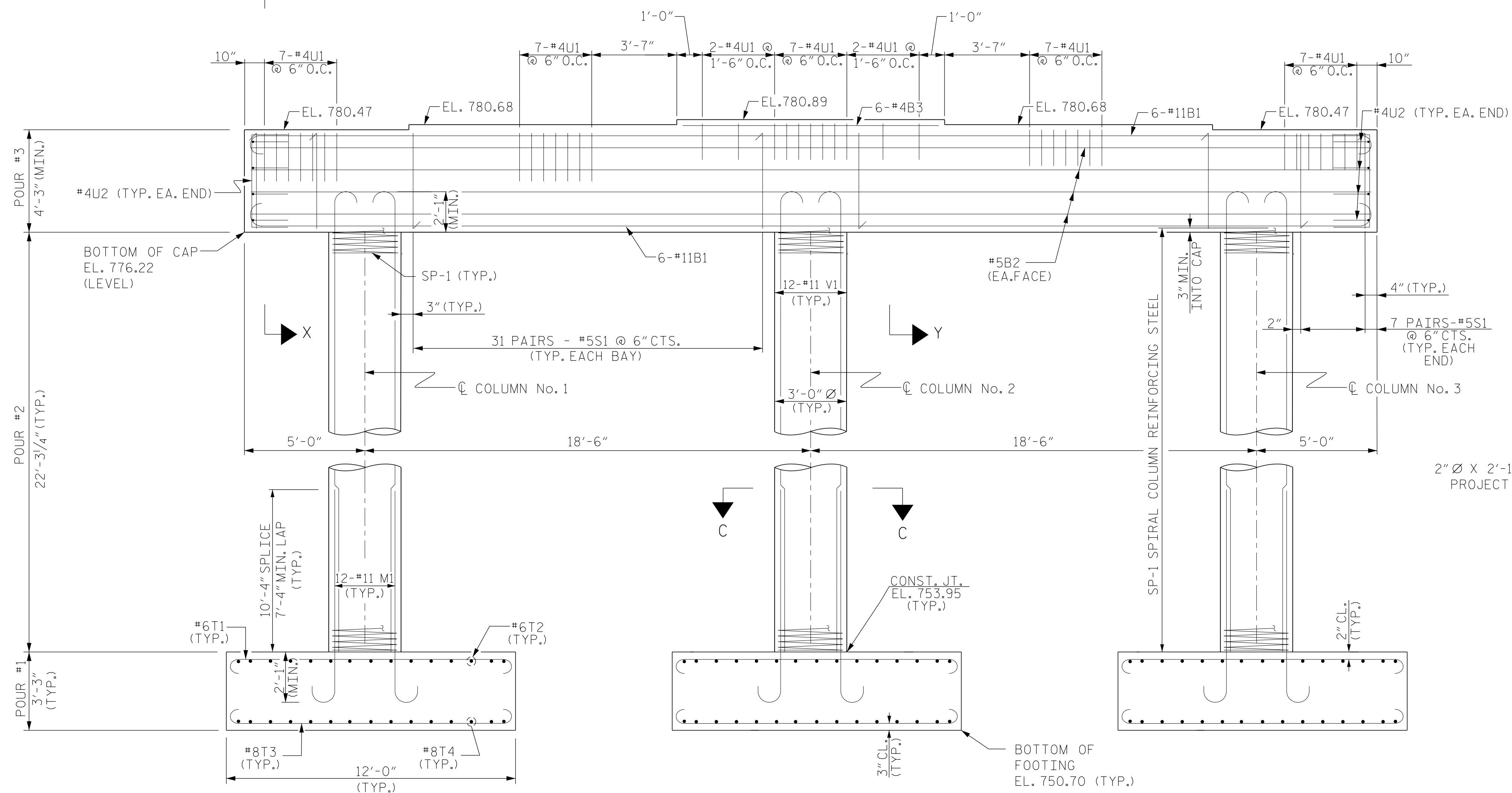
U-2412A  
 3/7/2018  
 \\407\_051\_U2412A\_SMU\_1EB3\_S7-26.dgn  
 USER: jloftus

**NOTES**

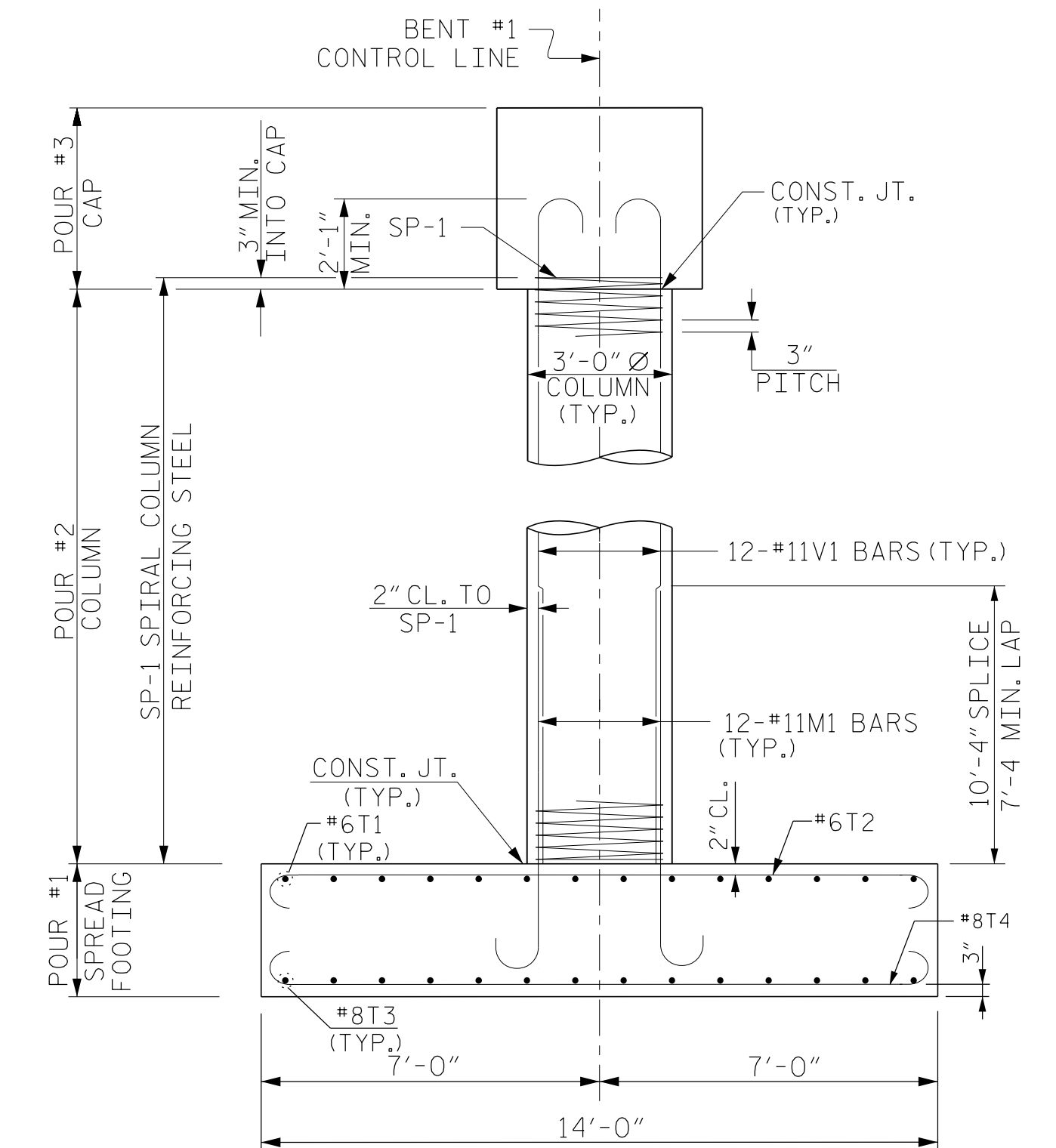
STIRRUPS TO BE PLACED VERTICALLY AND INVERTED ALTERNATELY.  
 STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 HOOKS ON "V" AND "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.  
 THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE COLUMN REINFORCEMENT IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



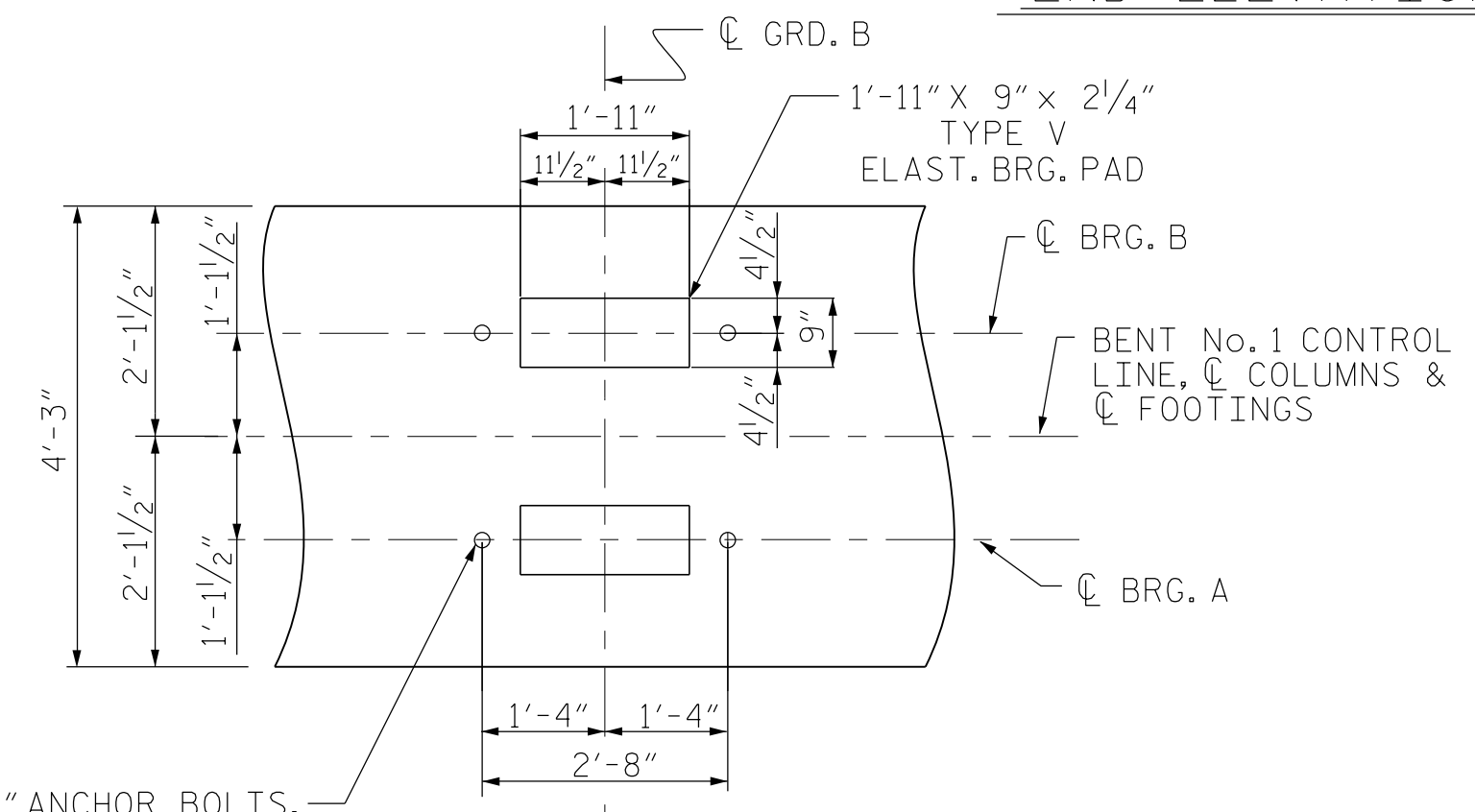
**PLAN**



**ELEVATION**



**END ELEVATION**



**DETAIL "A"**

(DIMENSIONS ARE TYP. FOR EACH GIRDER)  
 (COLUMNS NOT SHOWN FOR CLARITY)



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PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

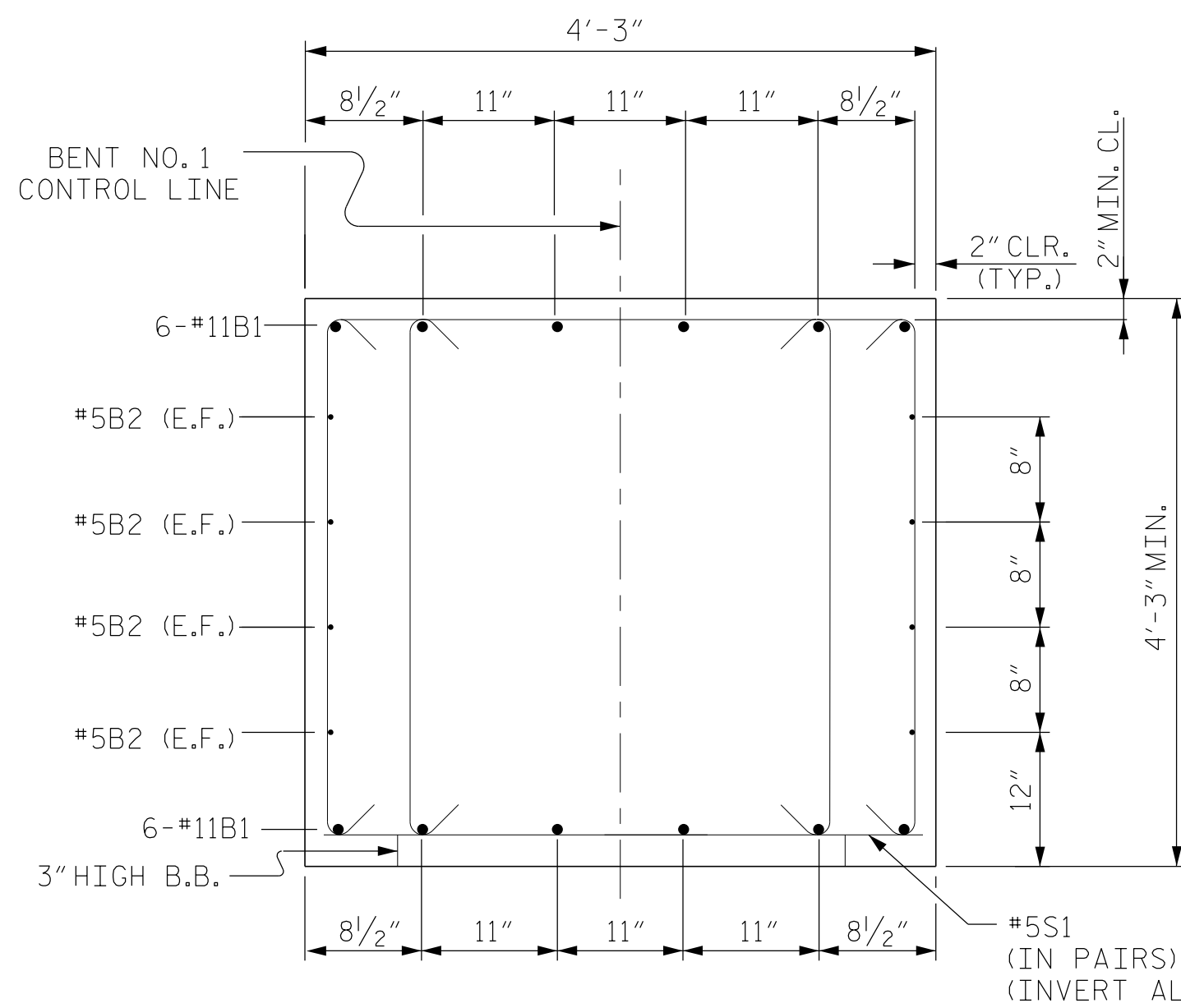
SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT NO. 1					
SHEET NO. S7-27					
TOTAL SHEETS 35					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

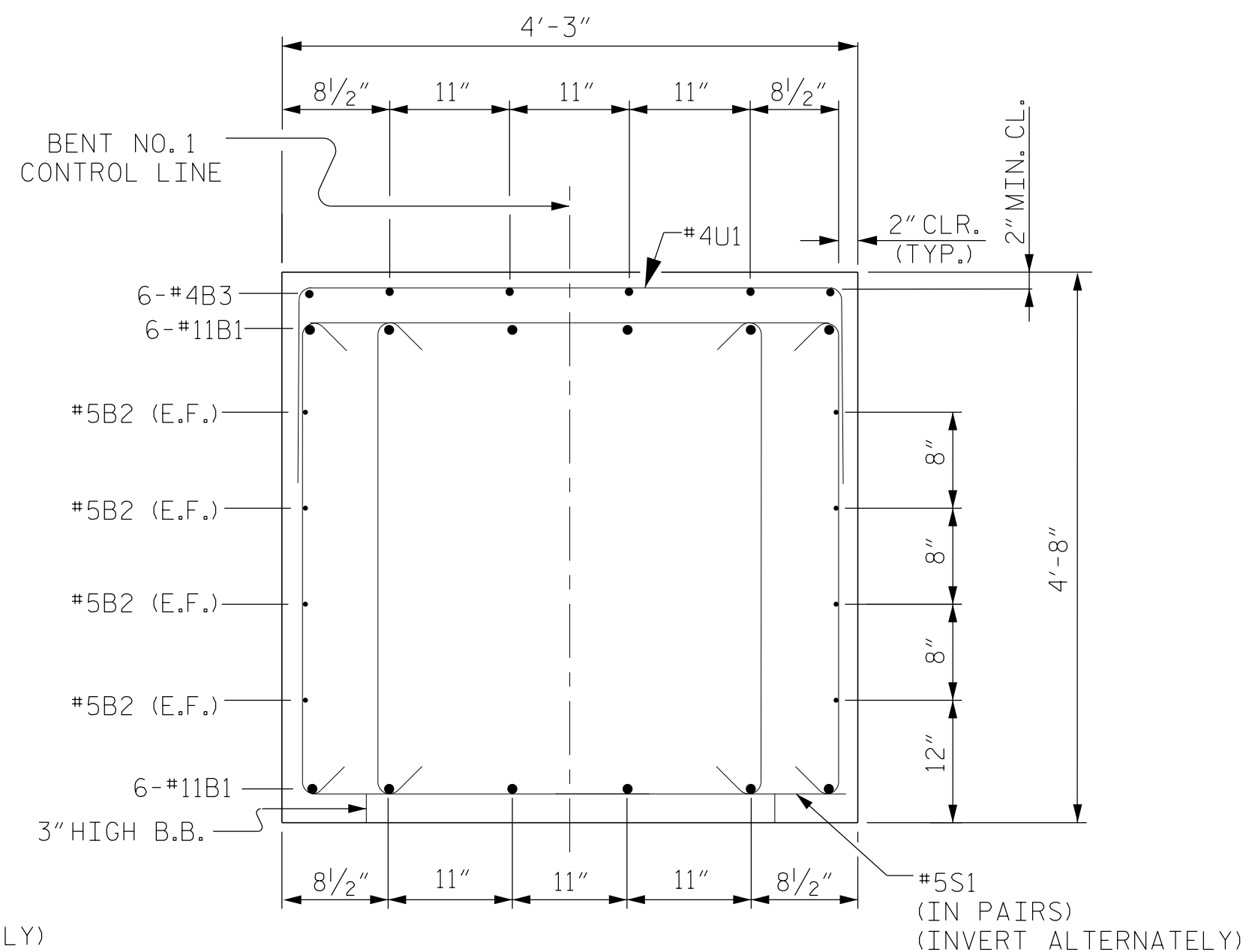
DRAWN BY: E. PHELPS	DATE: 01-18
CHECKED BY: J. LOFTUS	DATE: 02-18
DESIGN ENGINEER OF RECORD: J. LOFTUS	DATE: 02-18

5/18/2018  
 \\407-053-U2412A-SMU-BENT1\_S7-27.dgn  
 USER:ephelps

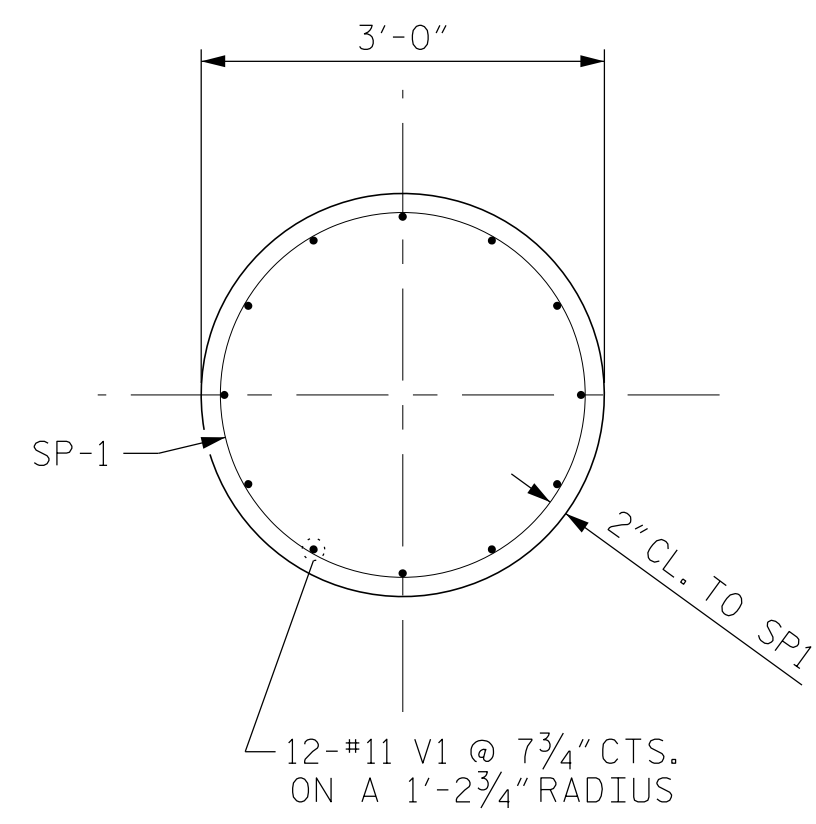




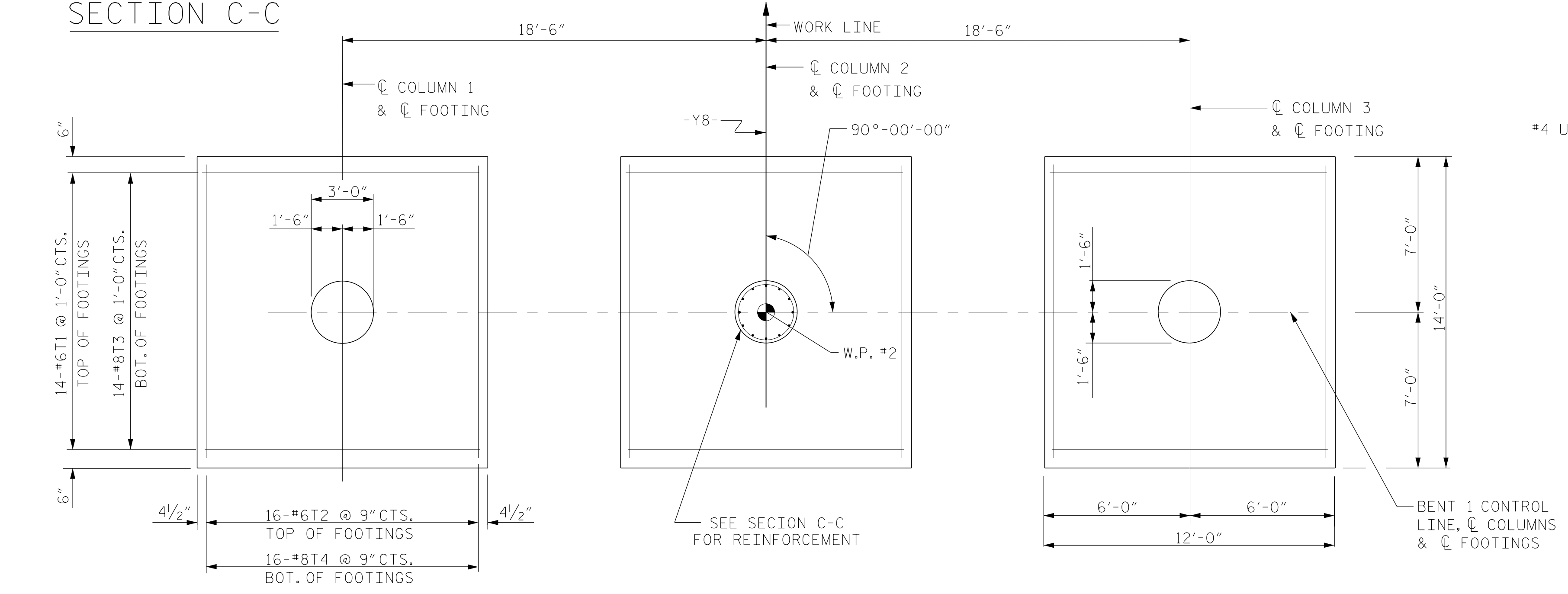
SECTION X-X



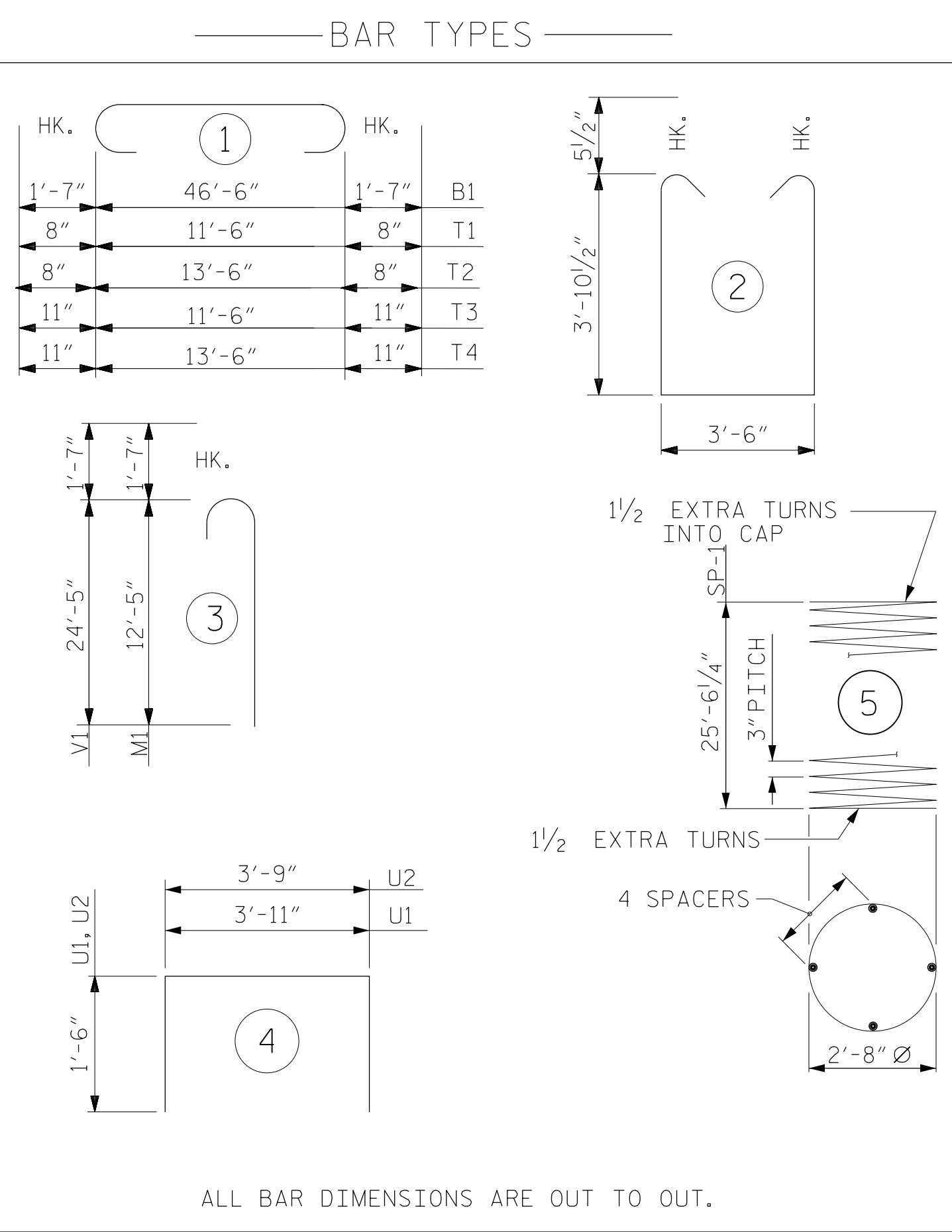
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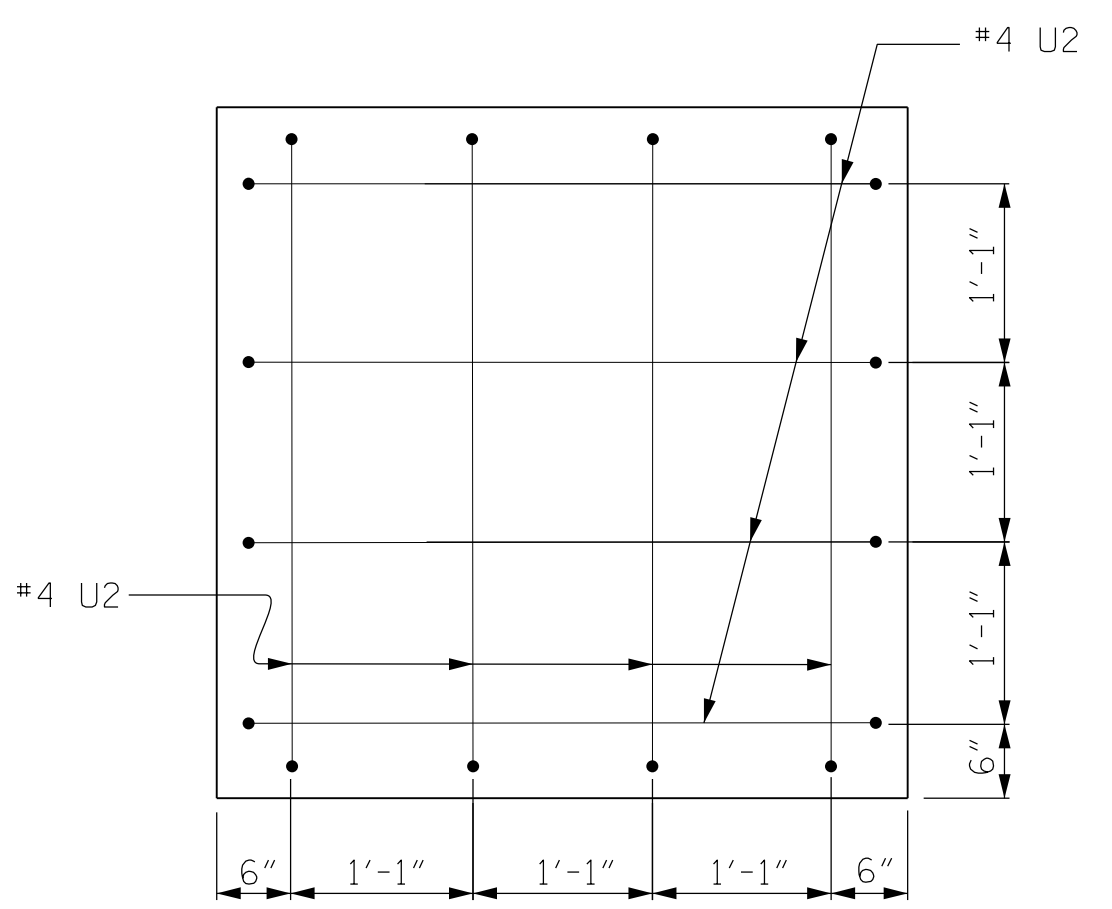
SECTION C-C



PLAN OF FOOTINGS



ALL BAR DIMENSIONS ARE OUT TO OUT.



END OF CAP VIEW

BILL OF MATERIAL FOR BENT NO. 1

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#11	1	49'-8"	3,167
B2	8	#5	STR	46'-8"	389
B3	6	#4	STR	10'-6"	42
M1	36	#11	3	14'-0"	2,678
S1	152	#5	2	12'-2"	1,929
T1	42	#6	1	12'-10"	810
T2	48	#6	1	14'-10"	1,069
T3	42	#8	1	13'-4"	1,495
T4	48	#8	1	15'-4"	1,965
U1	39	#4	4	6'-11"	180
U2	16	#4	4	6'-9"	72
V1	36	#11	3	26'-0"	4,973

REINFORCING STEEL (BENT NO. 1) 18,769 LBS.

SP-1 3 \* 5 867'-00" 1,737

SPIRAL COLUMN REINFORCING STEEL (BENT NO. 1) 1,737 LBS.

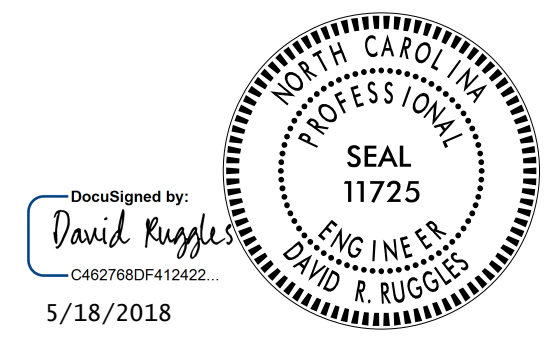
\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #1 (FOOTINGS)	60.7 C.Y.
POUR #2 (COLUMNS)	17.5 C.Y.
POUR #3 (CAP)	32.9 C.Y.
TOTAL CLASS A CONCRETE	111.1 C.Y.
FOUNDATION EXCAVATION	LUMP SUM

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 2 OF 2



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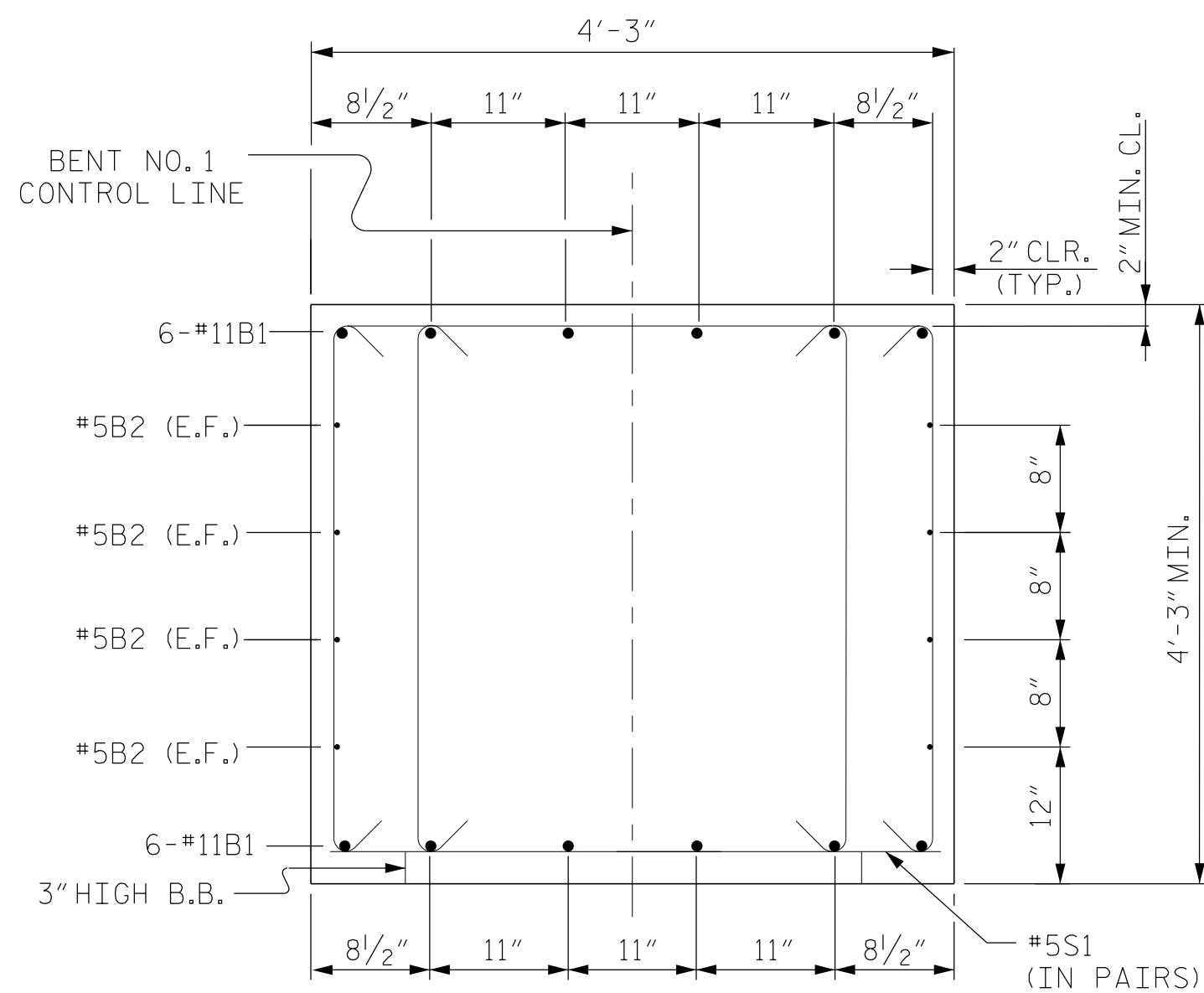
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 35
2			4			

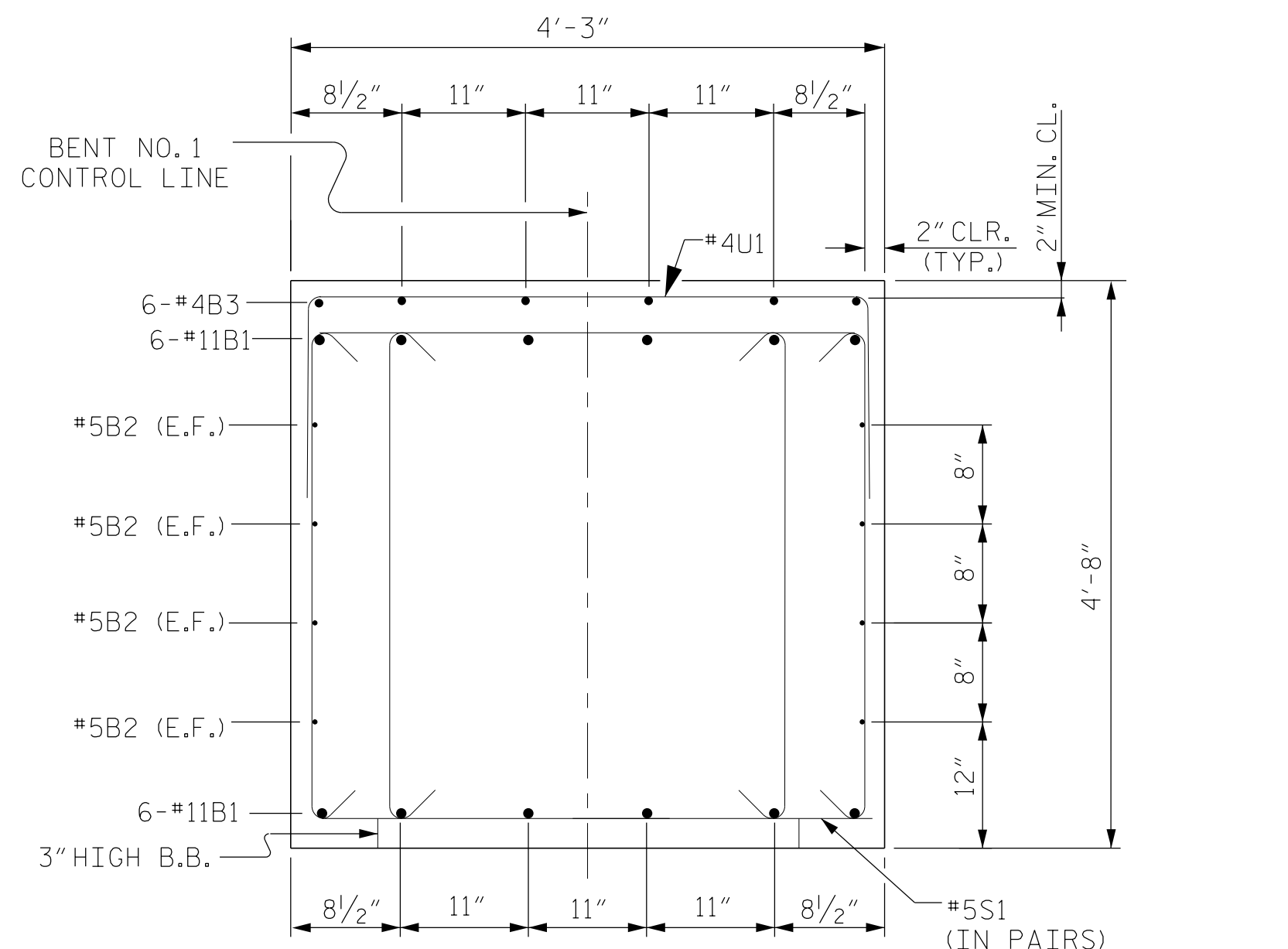
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U-2412A  
 5/18/2018  
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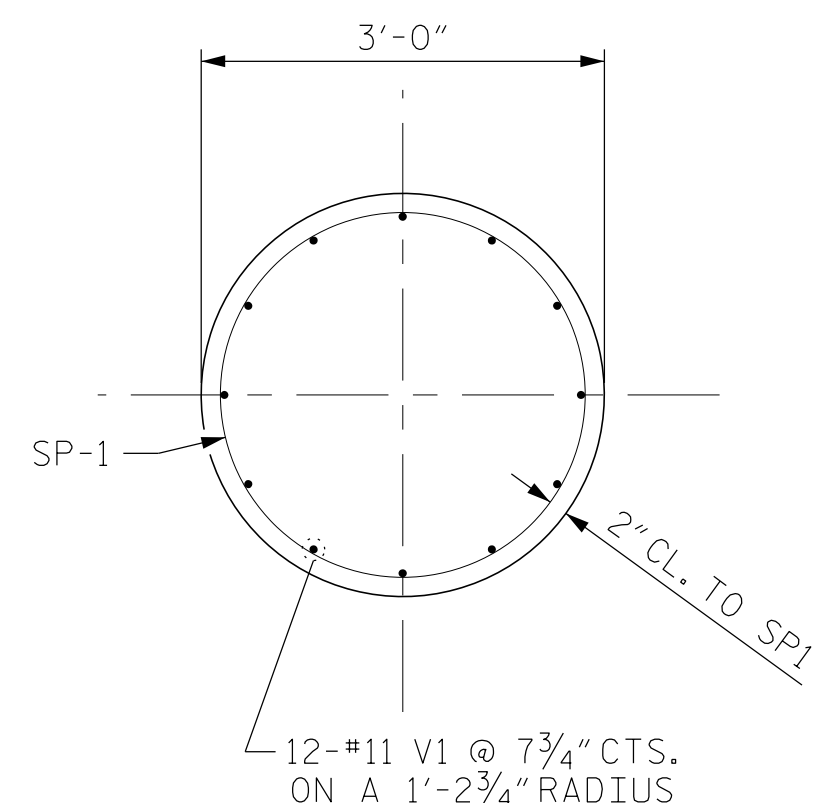
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 CHECKED BY: J. LOFTUS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18



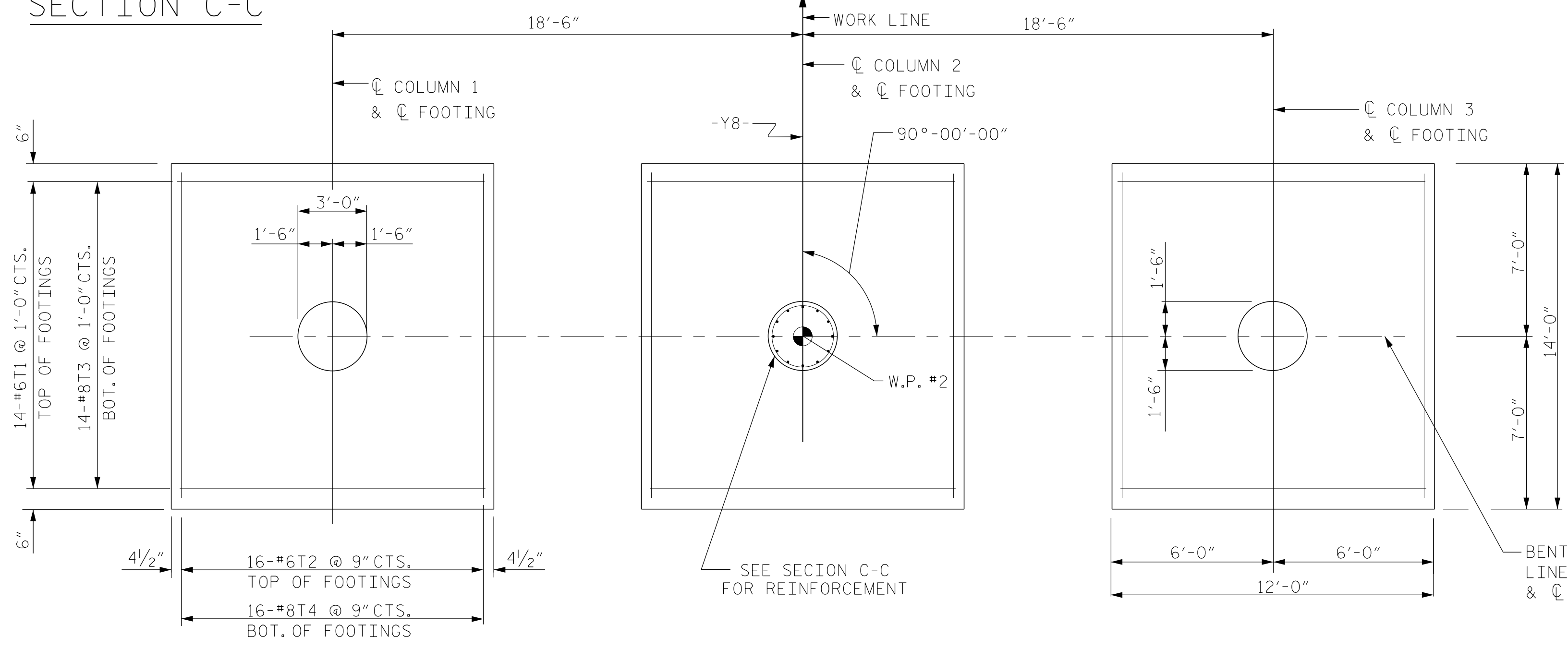
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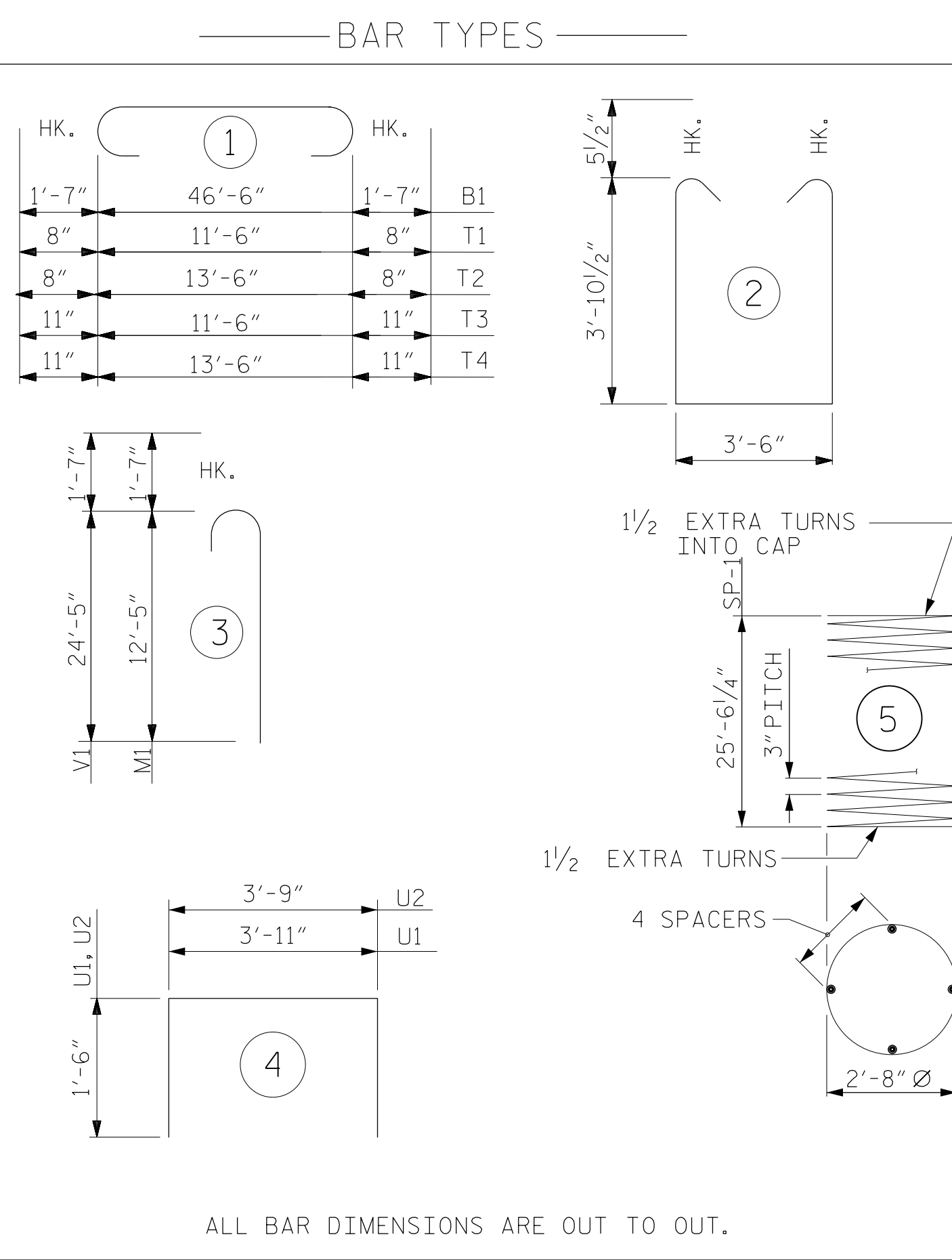
SECTION Y-Y



SECTION C-C

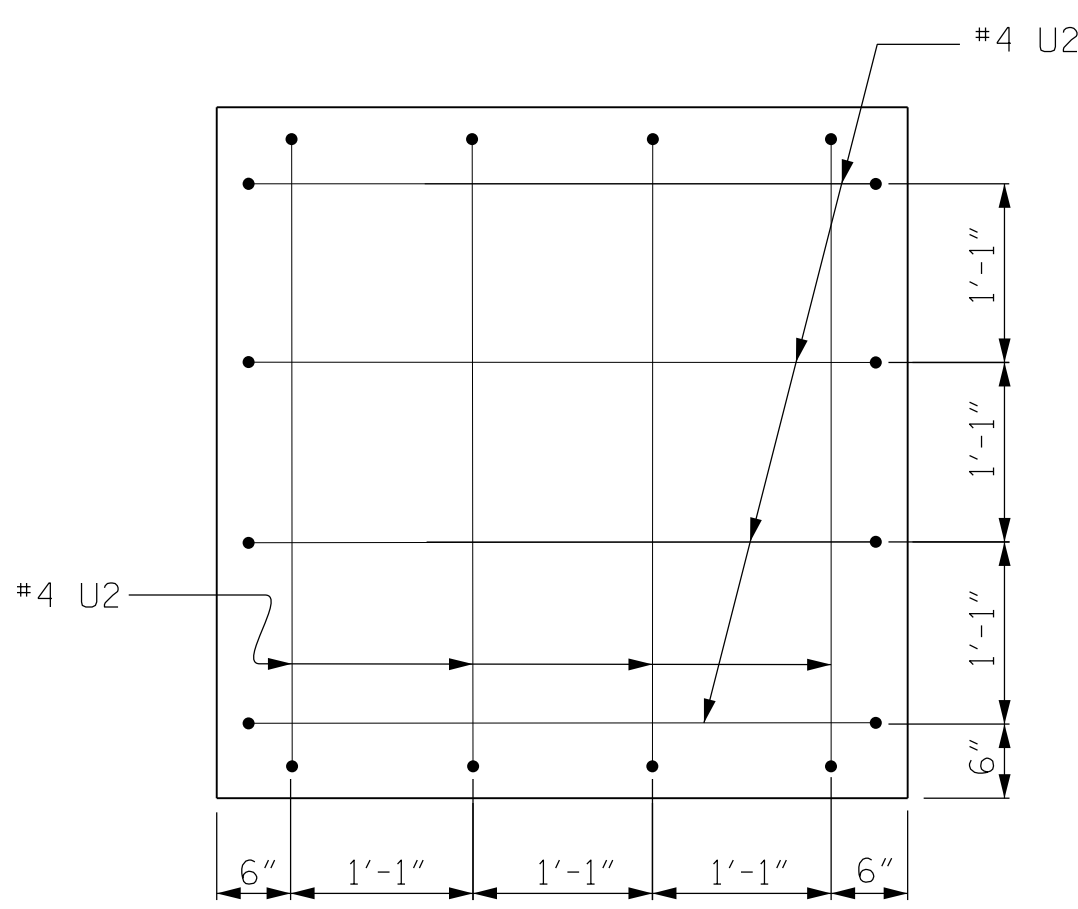


PLAN OF FOOTINGS



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR BENT NO. 1					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#11	1	49'-8"	3,167
B2	8	#5	STR	46'-8"	389
B3	6	#4	STR	10'-6"	42
M1	36	#11	3	14'-0"	2,678
S1	152	#5	2	12'-2"	1,929
T1	42	#6	1	12'-10"	810
T2	48	#6	1	14'-10"	1,069
T3	42	#8	1	13'-4"	1,495
T4	48	#8	1	15'-4"	1,965
U1	39	#4	4	6'-11"	180
U2	16	#4	4	6'-9"	72
V1	36	#11	3	26'-0"	4,973
REINFORCING STEEL (BENT NO. 1)					18,769 LBS.
SP-1	3	*	5	867'-00"	1,737
SPIRAL COLUMN REINFORCING STEEL (BENT NO. 1)					1,737 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)					
POUR #1 (FOOTINGS)					20.3 C.Y.
POUR #2 (COLUMNS)					19.8 C.Y.
POUR #3 (CAP)					32.9 C.Y.
TOTAL CLASS A CONCRETE					73.0 C.Y.
FOUNDATION EXCAVATION					LUMP SUM



END OF CAP VIEW

Designed by: Jeff Loftus 3/7/2018



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PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT NO. 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S7-28
					TOTAL SHEETS 35

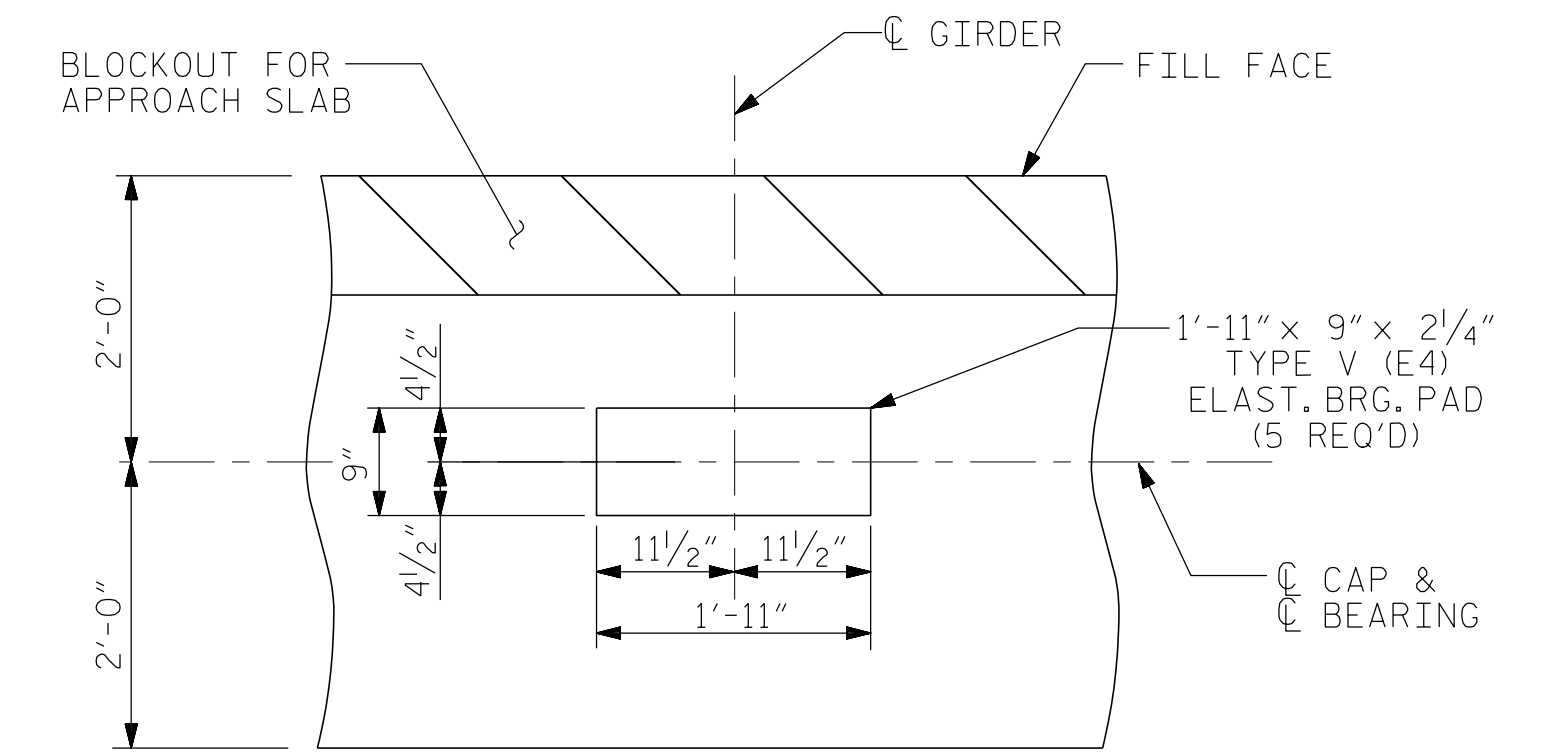
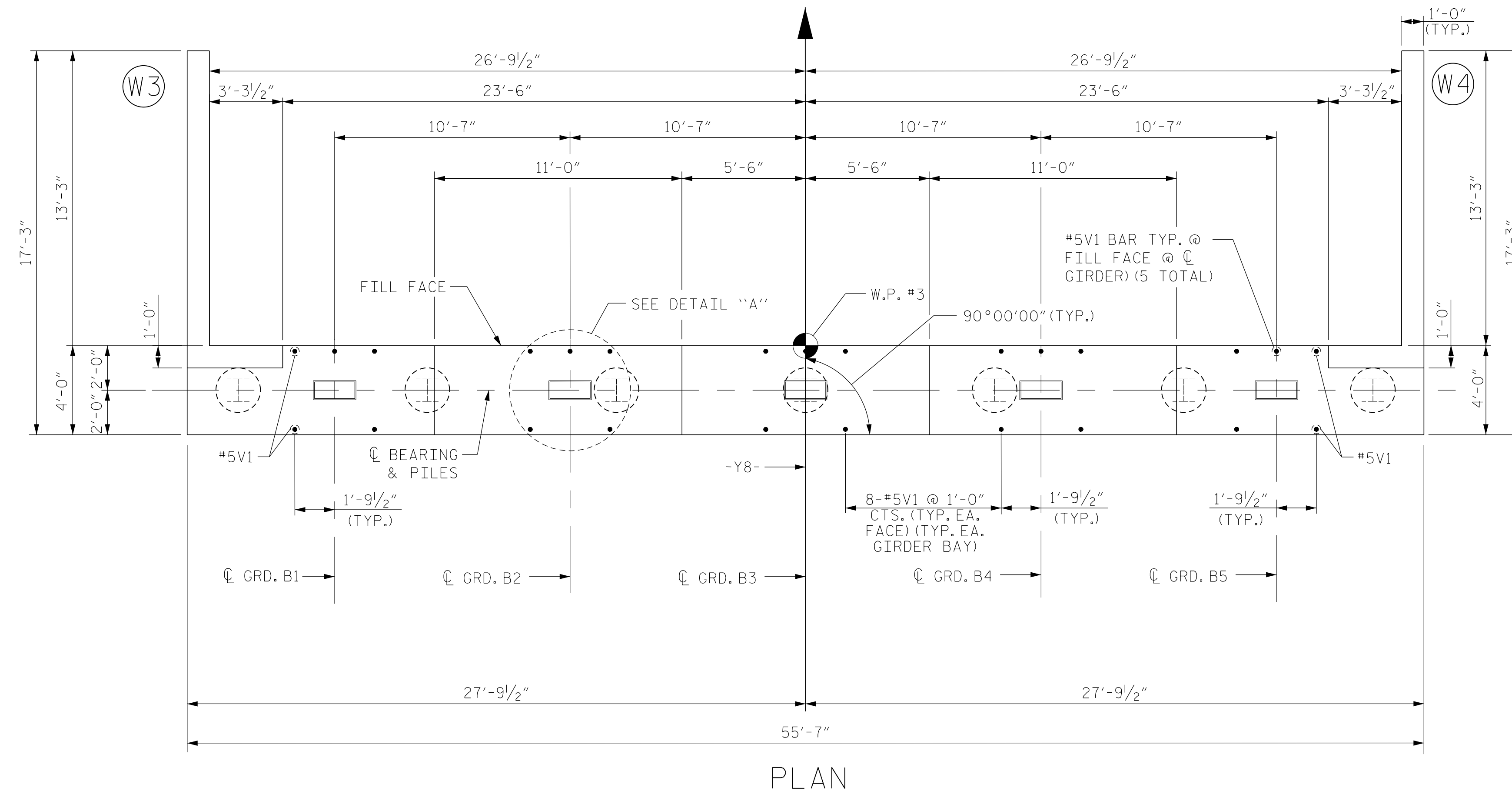
STR. #7

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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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3/7/2018  
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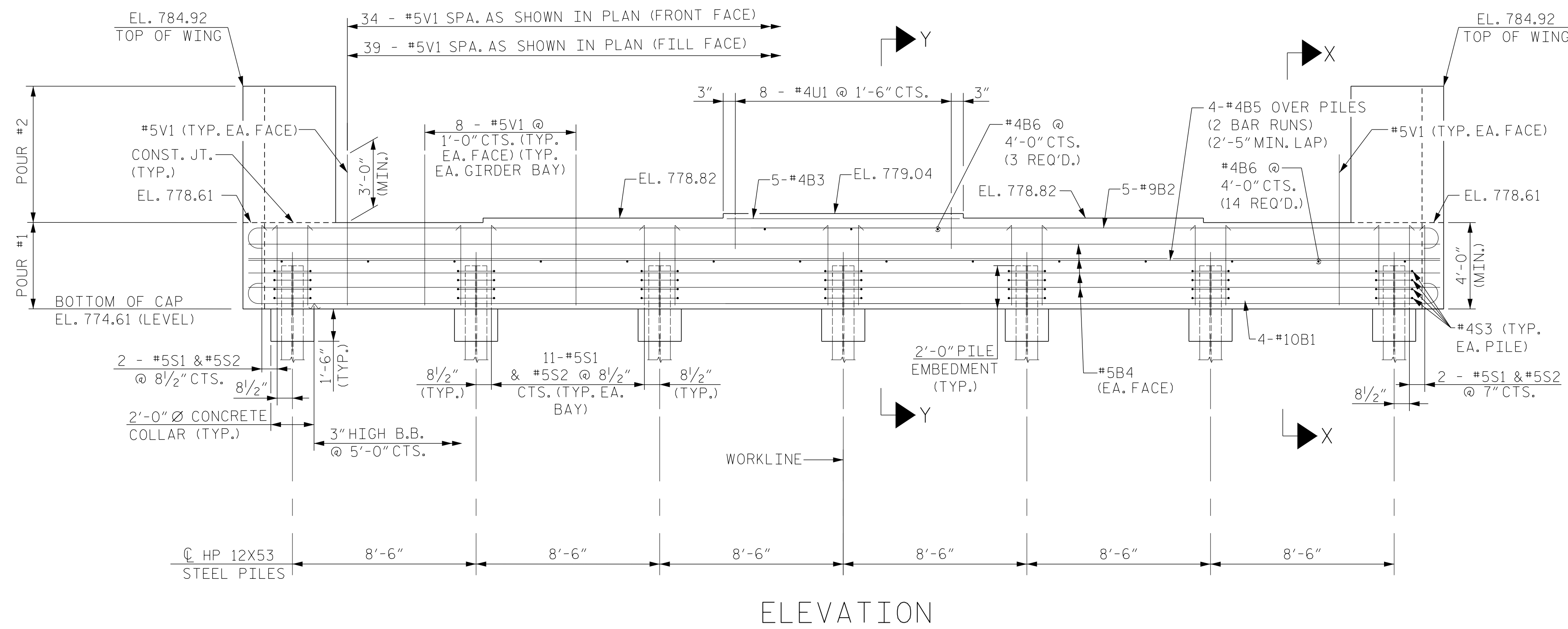
NOTES

- FOR BEARING DETAILS, SEE ELASTOMERIC BEARING DETAILS SHEET.
- FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
- THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".
- FOR CONCRETE COLLAR DETAIL, SEE SHEET 3 OF 3.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH GIRDER)  
(HP 12X53 PILES NOT SHOWN FOR CLARITY)

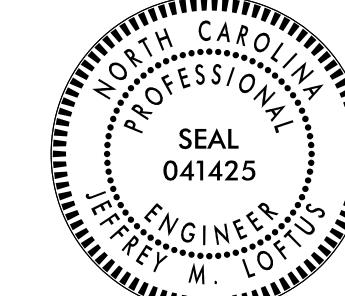


ELEVATION

PROJECT NO. U-2412A  
GUILFORD COUNTY  
STATION: 14+97.65 -Y8- POT

SHEET 1 OF 3

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
INTEGRAL END BENT No. 2

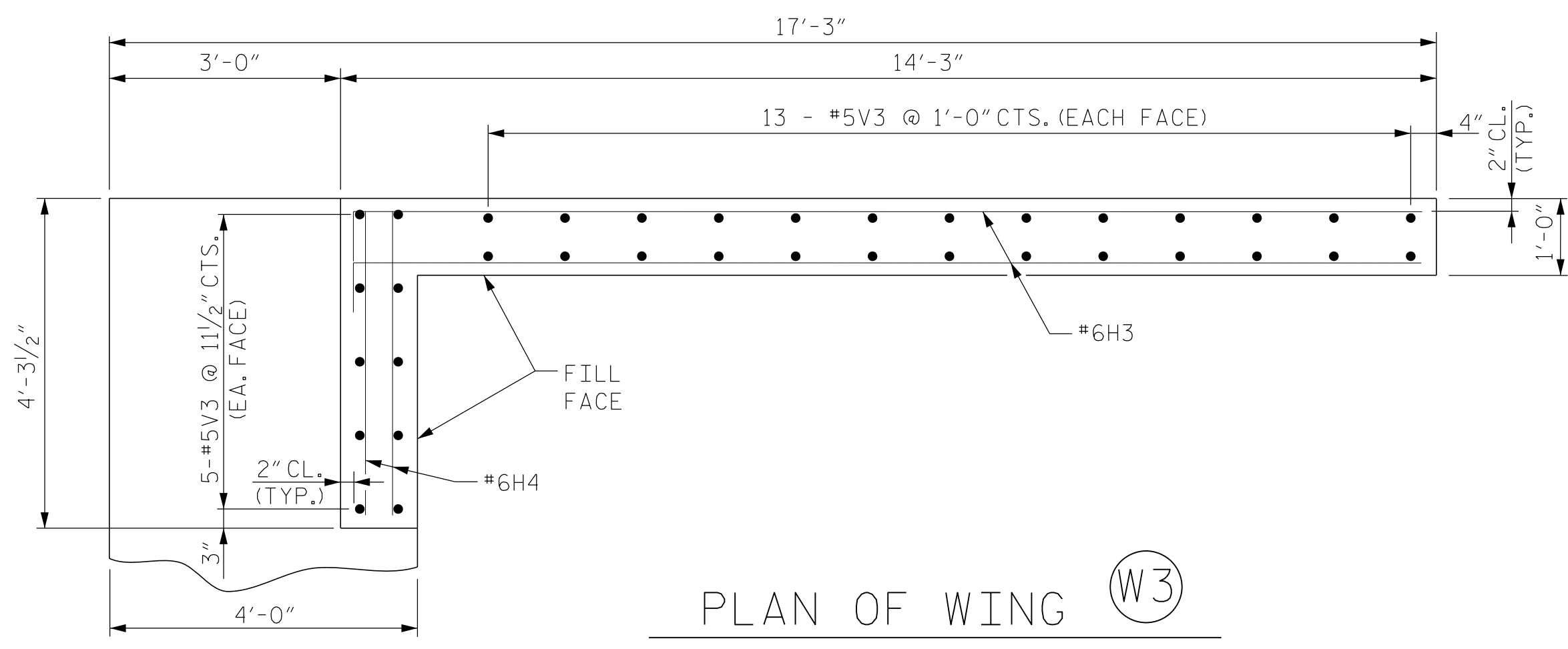
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-29
1			3			TOTAL SHEETS
2			4			35

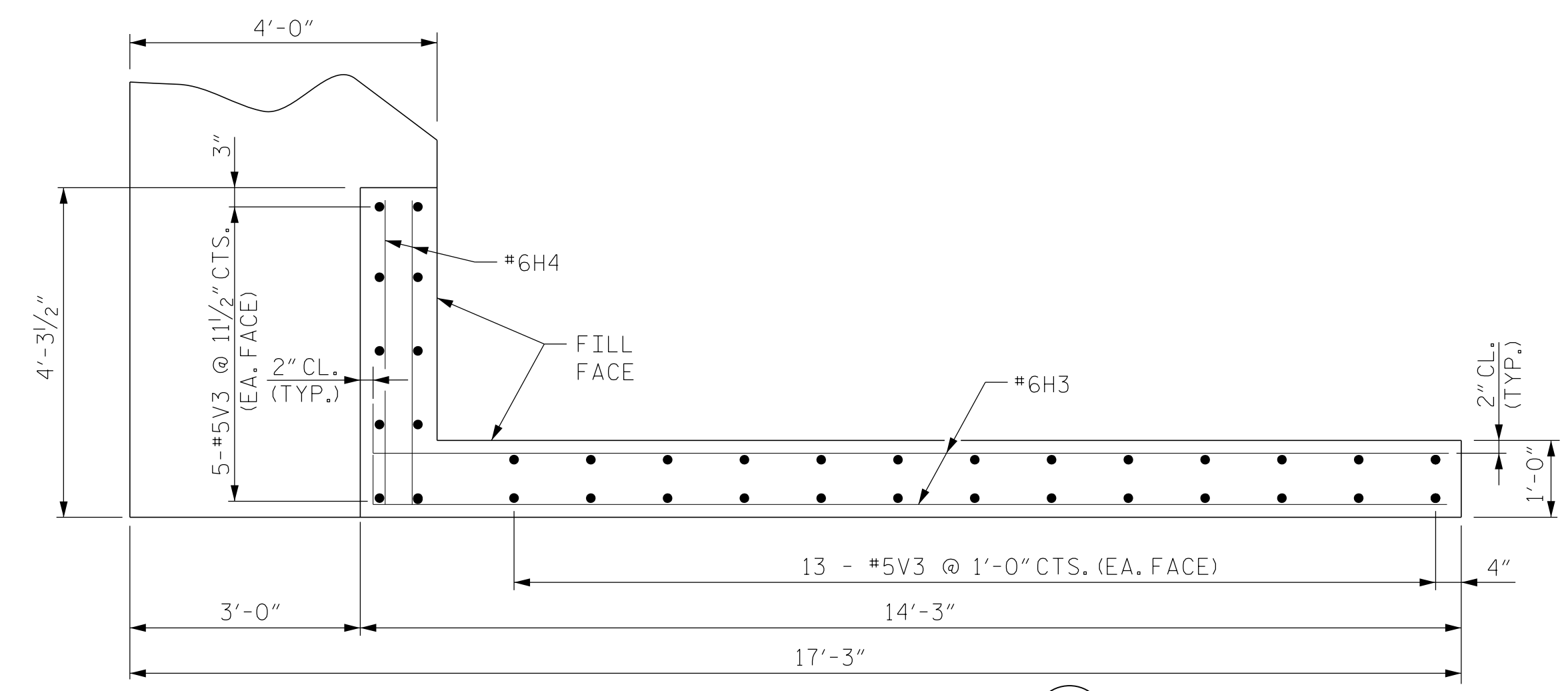
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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

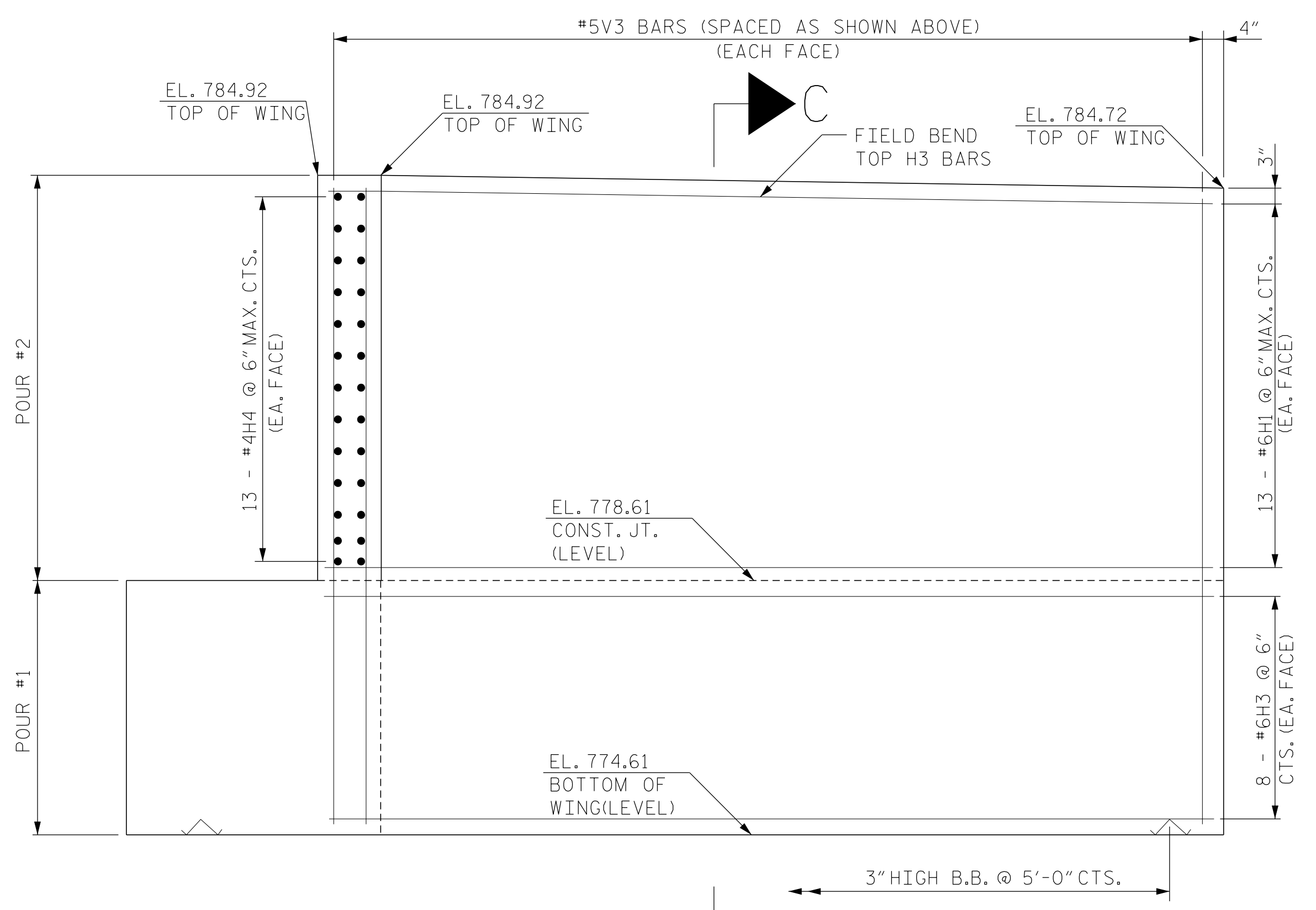
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3/7/2018  
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USER: jloftus



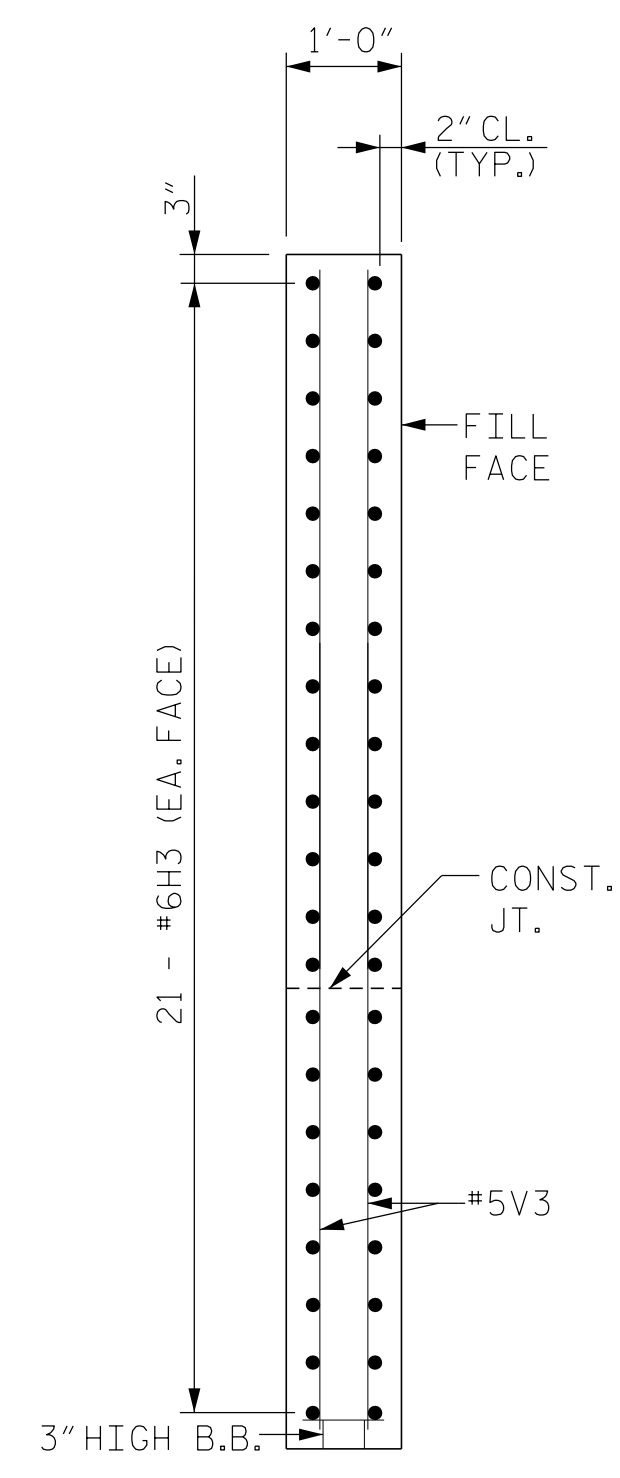
PLAN OF WING (W3)



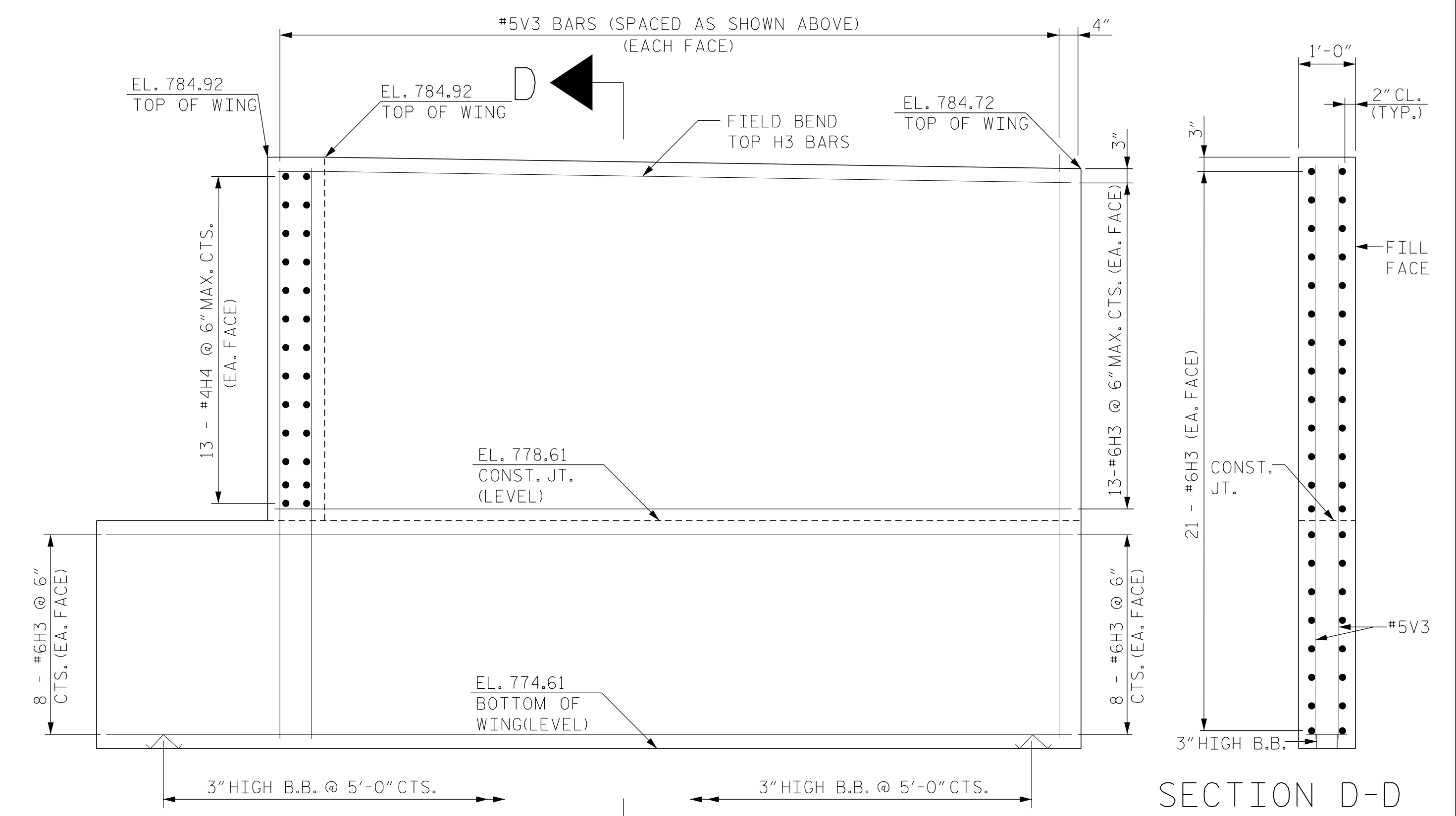
PLAN OF WING (W4)



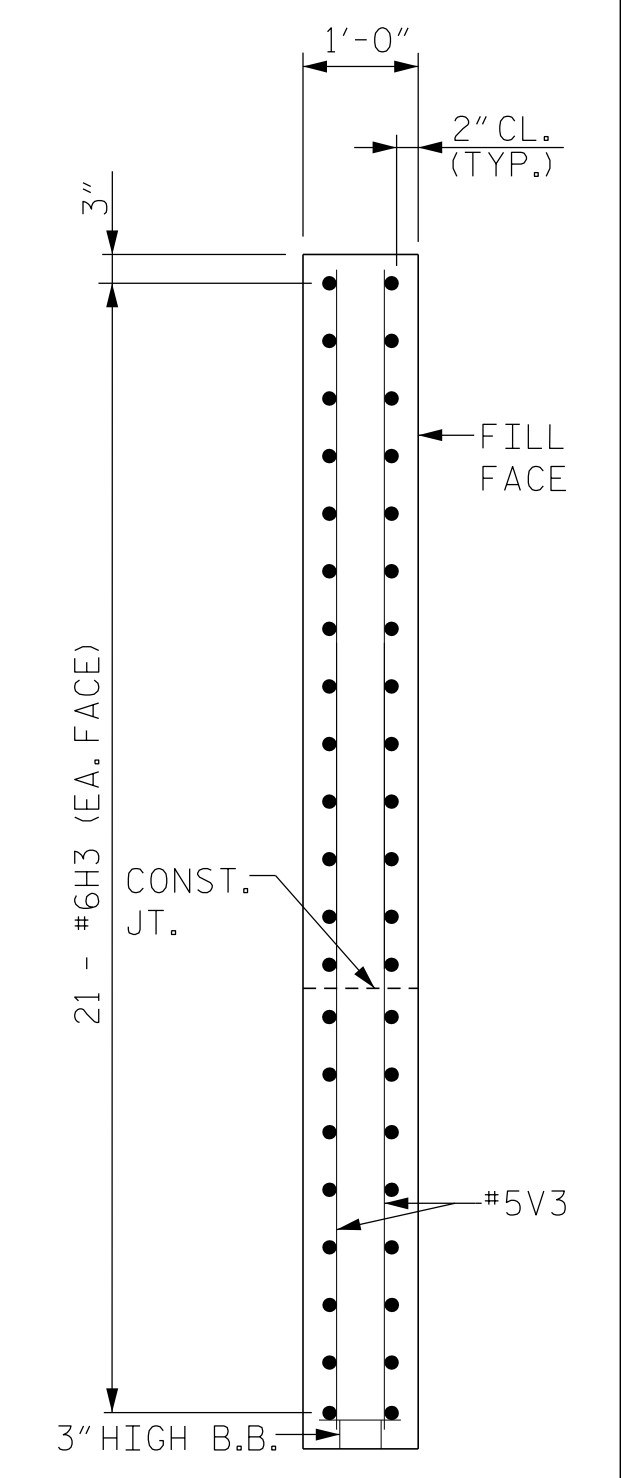
ELEVATION OF WING (W3)



SECTION C-C



ELEVATION OF WING (W4)

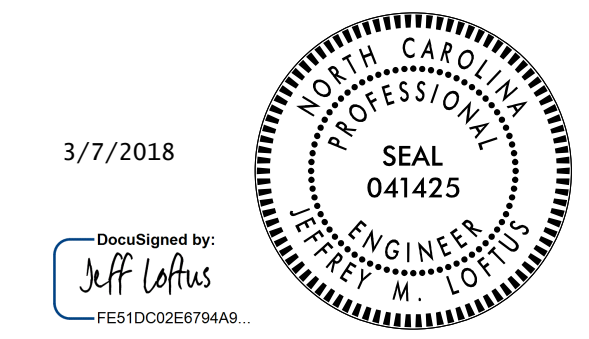


SECTION D-D

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 INTEGRAL END BENT NO. 2  
 DETAILS



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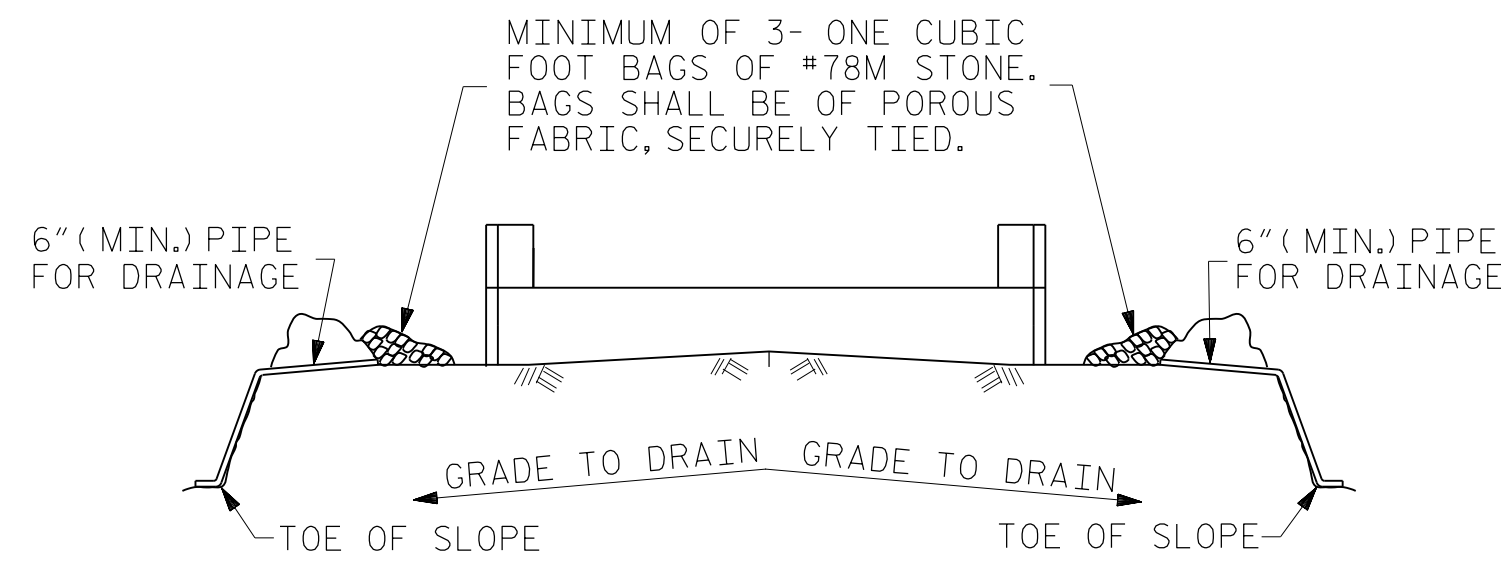
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			35

STR. #7

DRAWN BY: E. PHELPS DATE: 01-18  
 CHECKED BY: J. LOFTUS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

3/7/2018  
 U-2412A  
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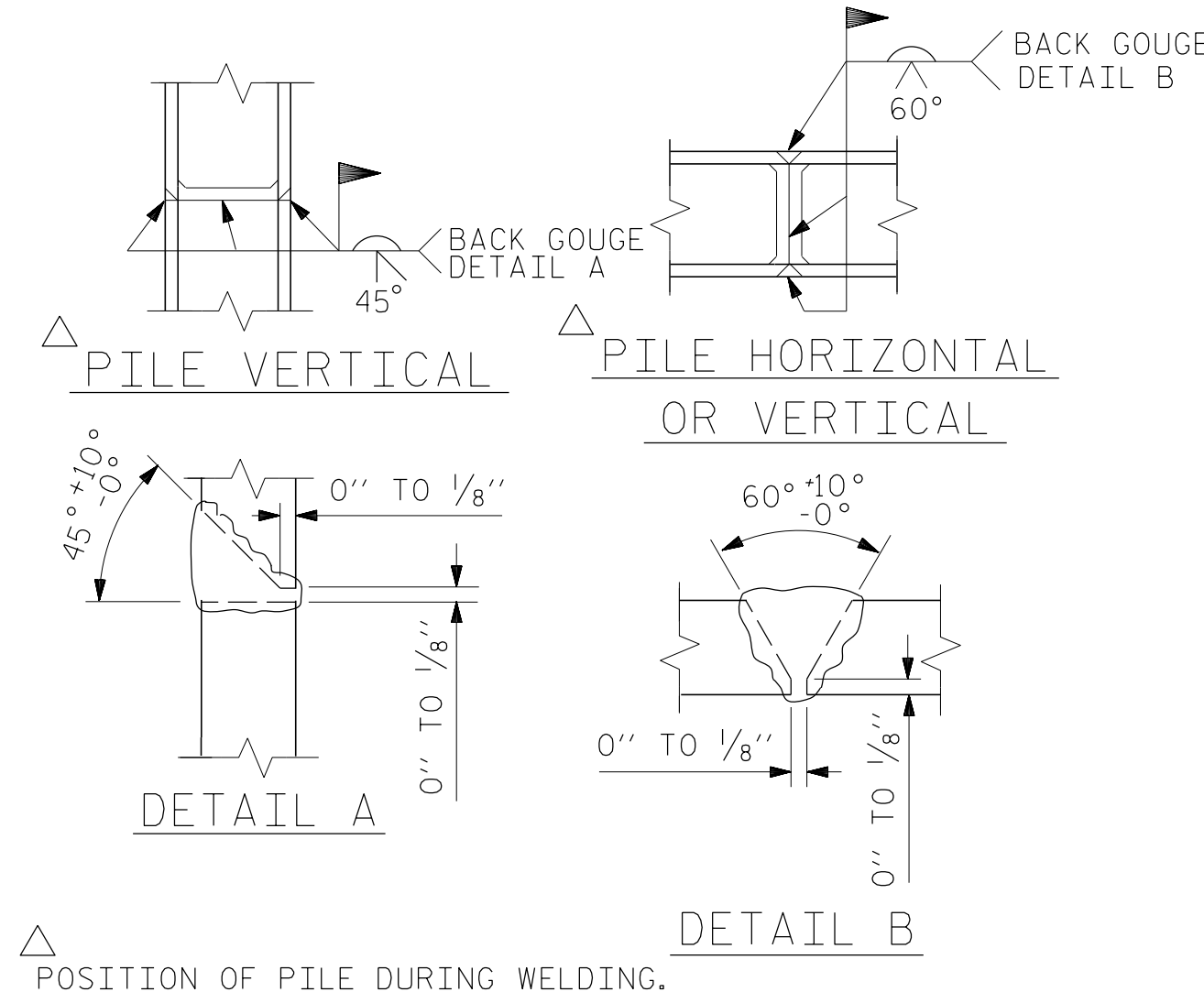


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

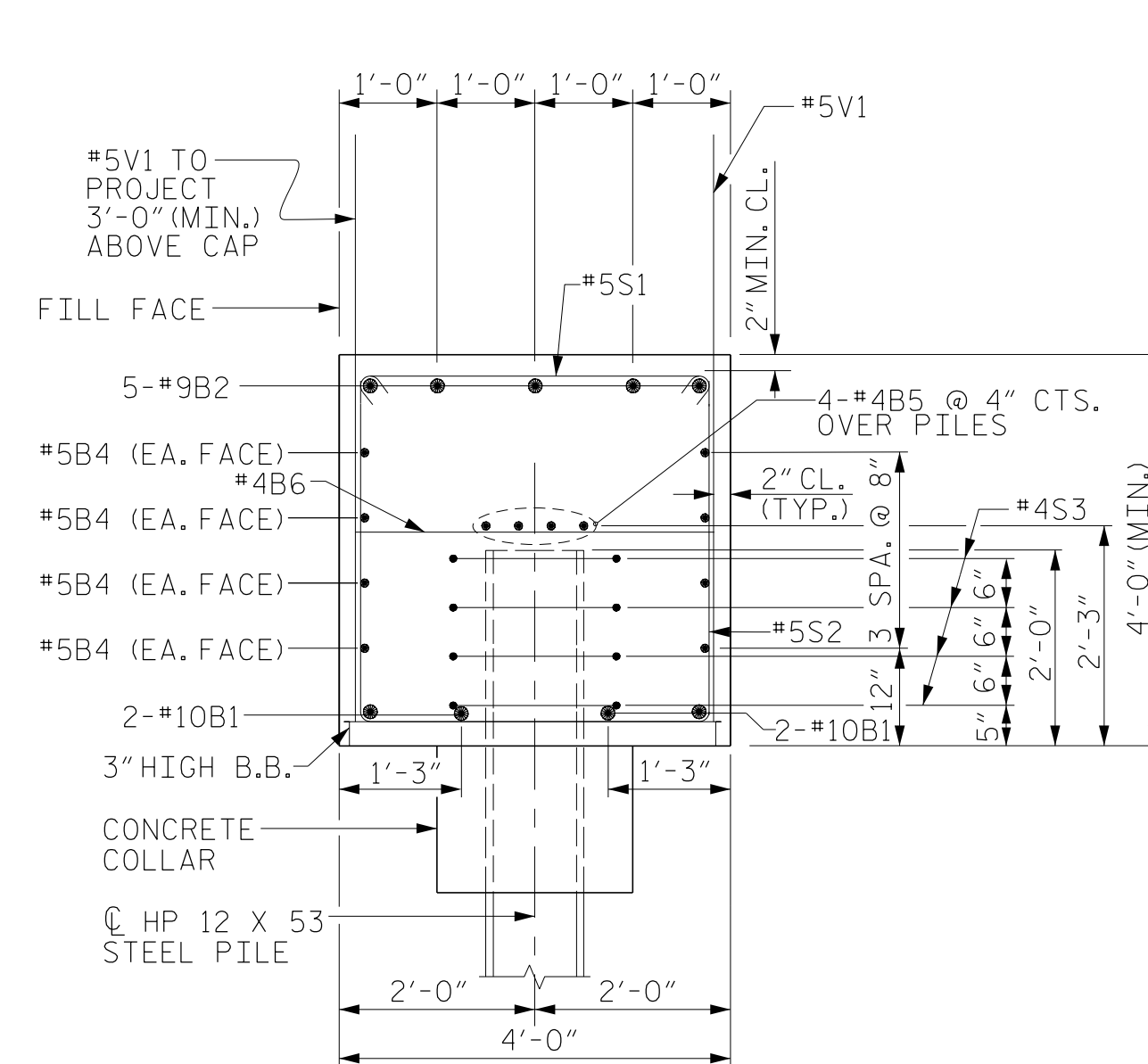
TEMPORARY DRAINAGE AT END BENT



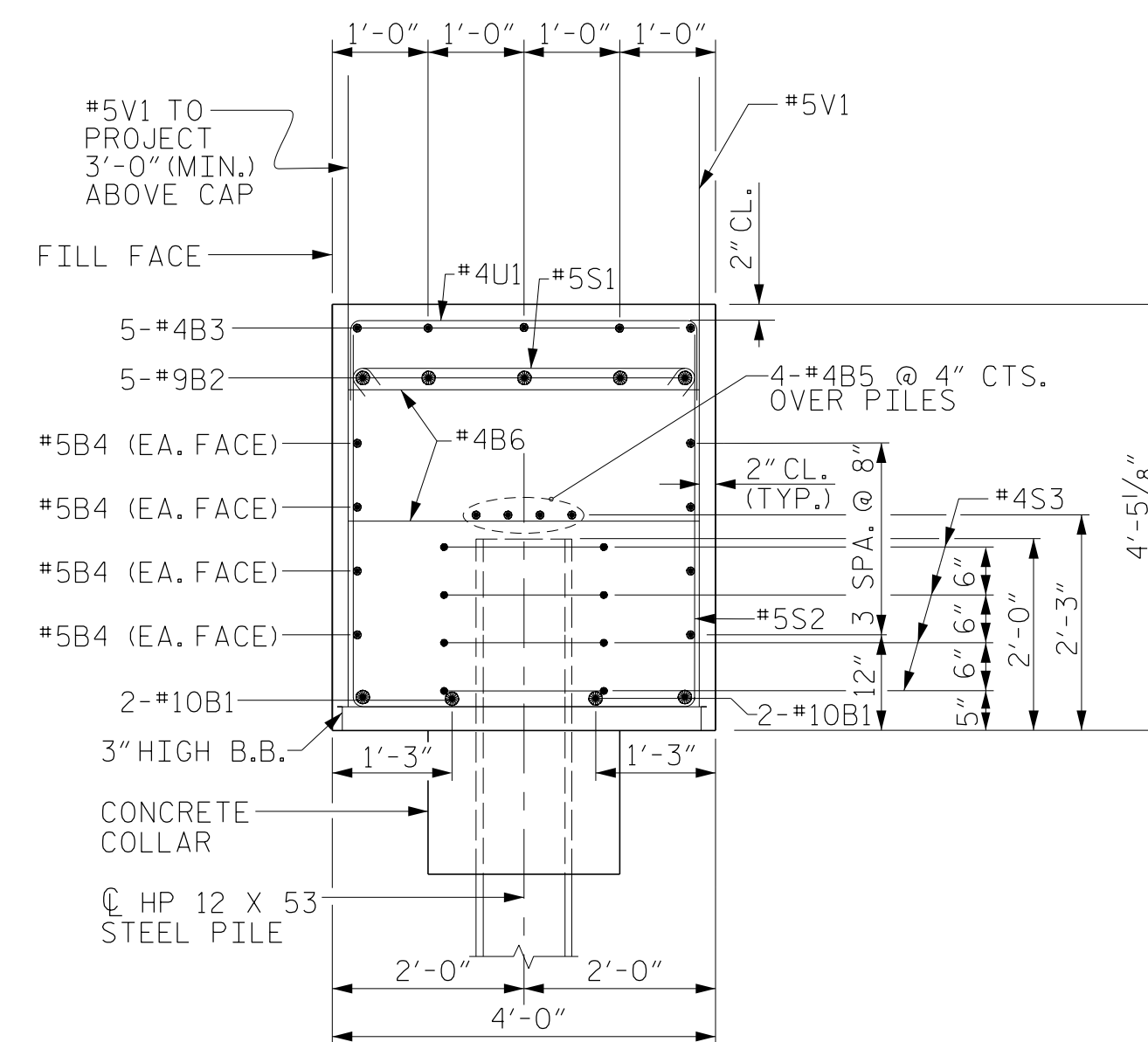
PILE SPLICE DETAILS

BAR TYPES						BILL OF MATERIAL FOR END BENT No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	57'-11"	997	H3	84	#6	6	14'-7"	1840
B2	5	#9	1	57'-7"	979	H4	52	#4	STR	3'-11"	136
B3	5	#4	STR	10'-6"	35	S1	70	#5	2	4'-7"	335
B4	8	#5	STR	55'-3"	461	S2	70	#5	3	11'-10"	864
B5	8	#4	STR	28'-10"	154	S3	28	#4	4	6'-6"	122
B6	17	#4	STR	3'-8"	42	U1	8	#4	5	7'-2"	38
						REINFORCING STEEL FOR END BENT No. 2 7287 LBS.					
						CLASS A CONCRETE BREAKDOWN					
						POUR #1: CAP, LOWER PART OF WINGS & COLLARS 39.5 C.Y.					
						POUR #2: TOP PORTION ON WINGS 8.2 C.Y.					
						TOTAL 47.7 C.Y.					
						PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES NO: 7					
						HP 12 X 53 STEEL PILES NO: 7 LIN. FT.= 85					
						STEEL PILE POINTS NO: 7					
						PILE EXCAVATION IN SOIL LIN. FT.= 25					
						PILE EXCAVATION NOT IN SOIL LIN. FT.= 5					

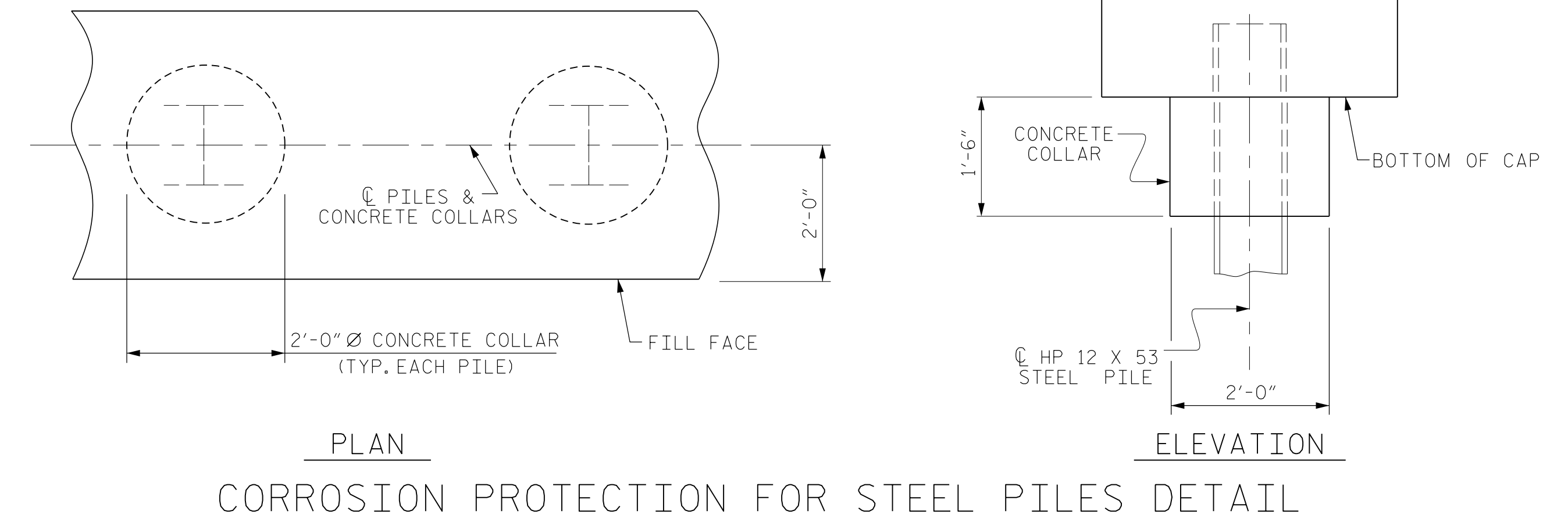
ALL BAR DIMENSIONS ARE OUT TO OUT.



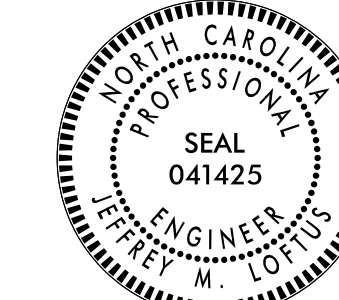
SECTION X-X



SECTION Y-Y



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SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

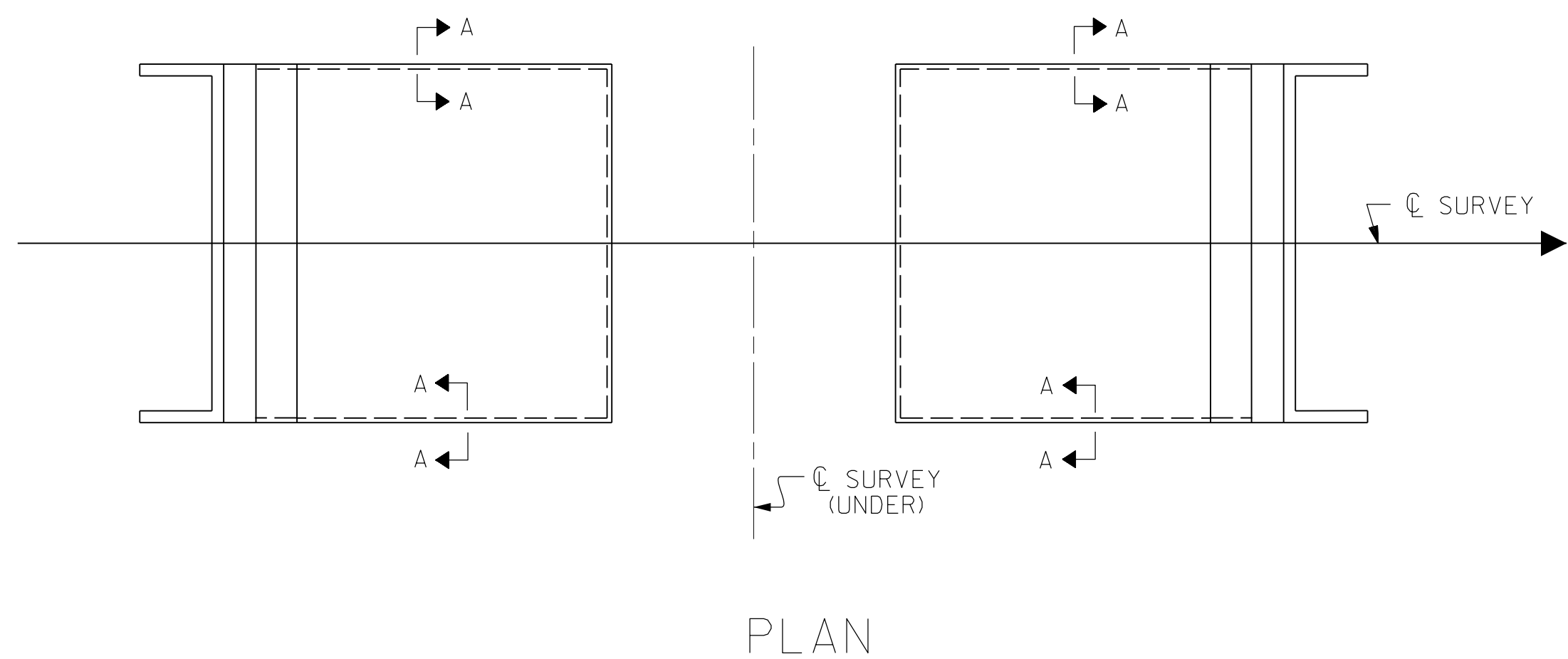
SUBSTRUCTURE  
INTEGRAL END BENT No. 2  
DETAILS

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S7-31	
1			3			TOTAL SHEETS 35	
2			4				

STR. #7

DRAWN BY: E. PHELPS DATE: 01-18  
CHECKED BY: J. LOFTUS DATE: 02-18  
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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3/7/2018  
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USER: jloftus



GENERAL NOTES

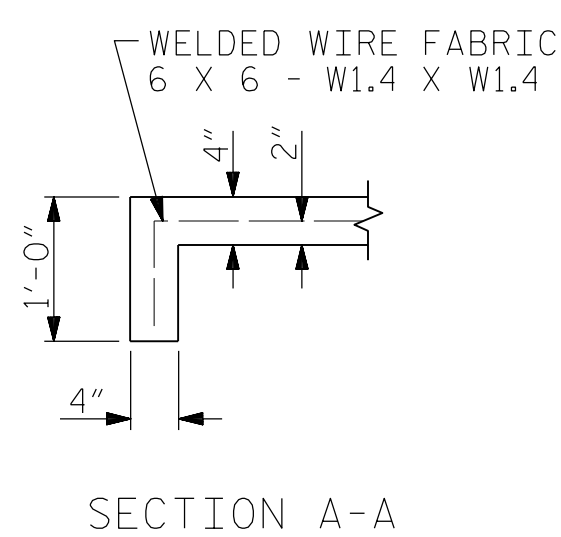
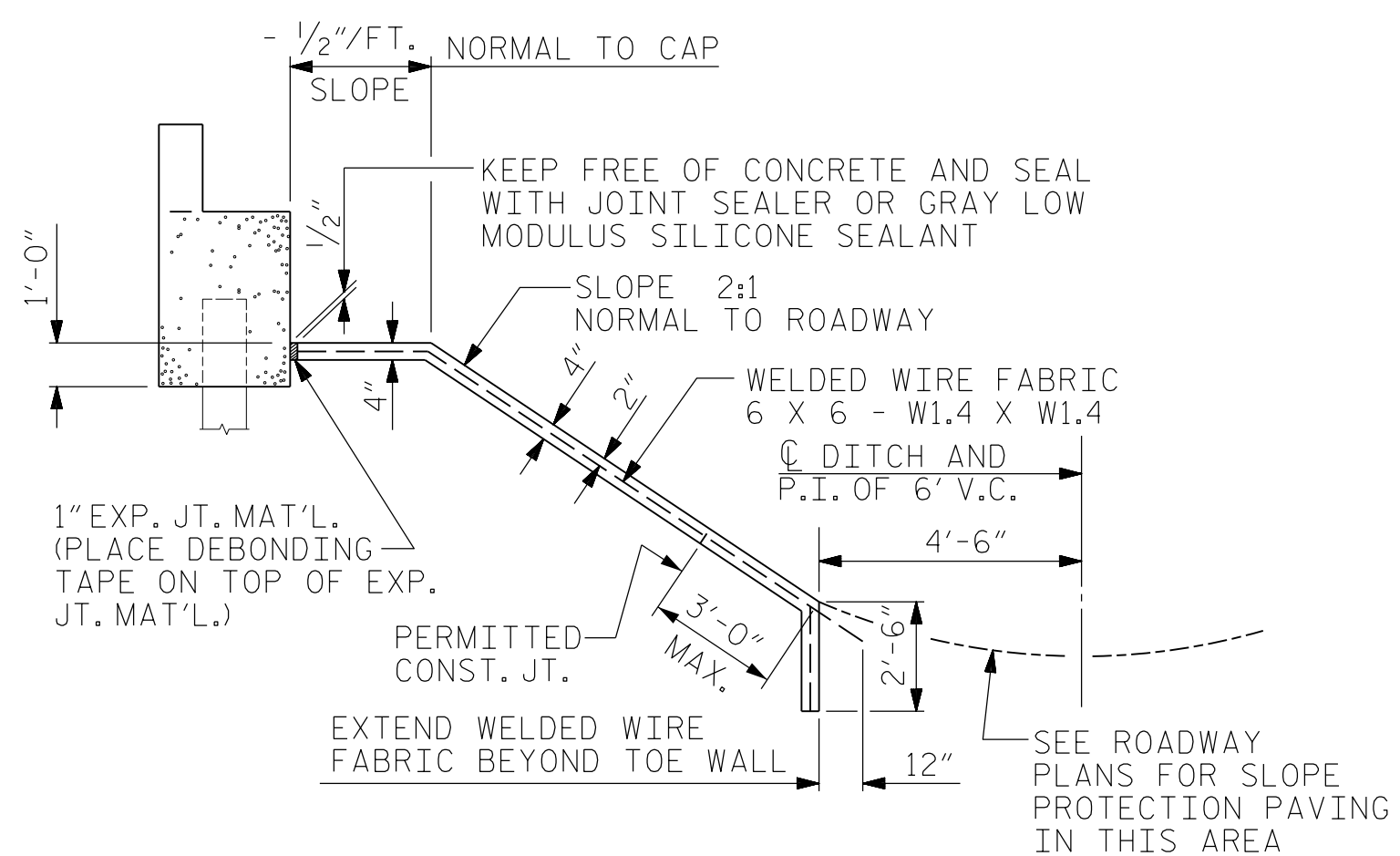
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

ALTERNATE "A"

ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

ALTERNATE "B"

ALTERNATE "B" SHALL CONSIST OF A COMBINATION CONCRETE SLAB AND STONE SLOPE PROTECTION. THE CONCRETE PORTIONS SHALL CONSIST OF PAVED STRIPS ALONG THE DITCH AS SHOWN IN THE DETAILS. FILTER FABRIC AND 8" OF STONE SHALL BE PLACED OVER THE REMAINING AREA SHOWN ON THE PLANS TO BE COVERED WITH SLOPE PROTECTION. CONCRETE SHALL BE CLASS "B". THE COST OF THE CONCRETE, FILTER FABRIC, STONE AND WELDED WIRE FABRIC 6 X 6 - W1.4 X W1.4, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION. SUBGRADING, STONE TYPE, STONE SIZING, AND HERBICIDE PROTECTION, SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE HERBICIDE TYPE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO APPLICATION.

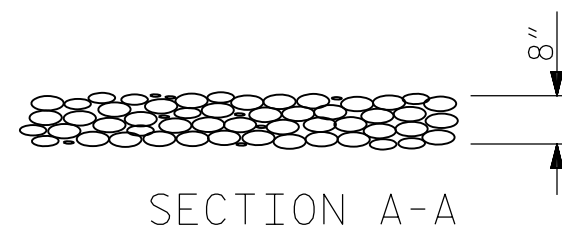
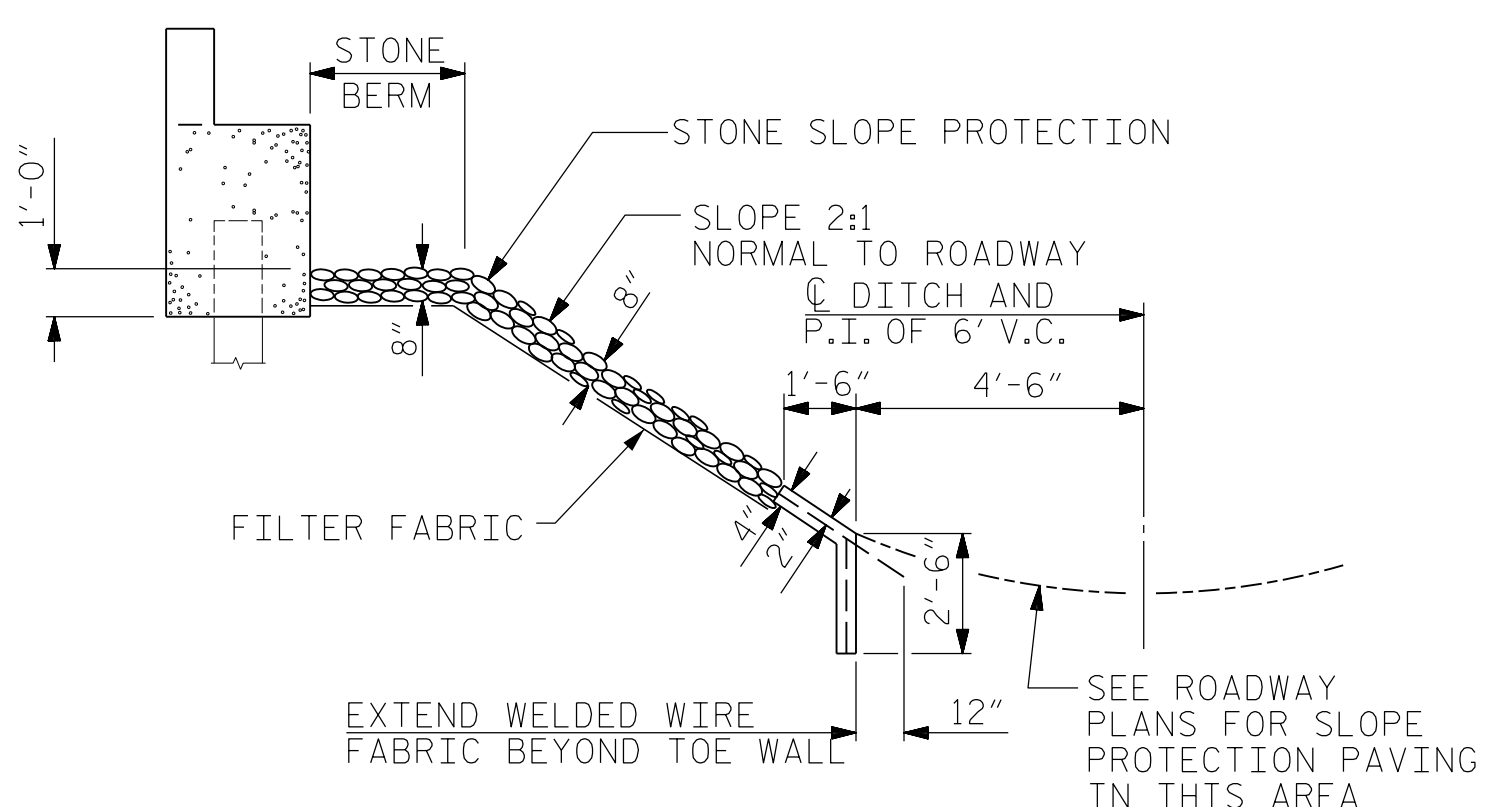
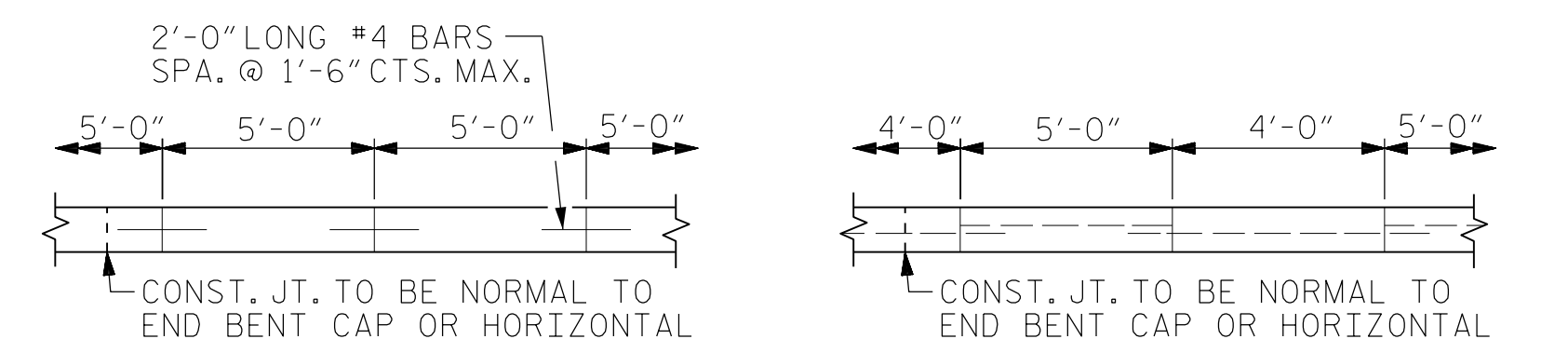


BRIDGE @ STA. 14+97.65 -Y8- POT	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	321	628
END BENT 2	292	575

\* QUANTITY SHOWN IS BASED ON 5' POURS.

SECTION ALONG  $\bar{C}$  ROADWAY WHEN FILL CATCHES IN DITCH

DETAILS FOR ALTERNATE "A"



SECTION ALONG  $\bar{C}$  ROADWAY WHEN FILL CATCHES IN DITCH

DETAILS FOR ALTERNATE "B"

PROJECT NO. U-2412A  
 GUILFORD COUNTY  
 STATION: 14+97.65 -Y8- POT

SHEET 1 OF 2

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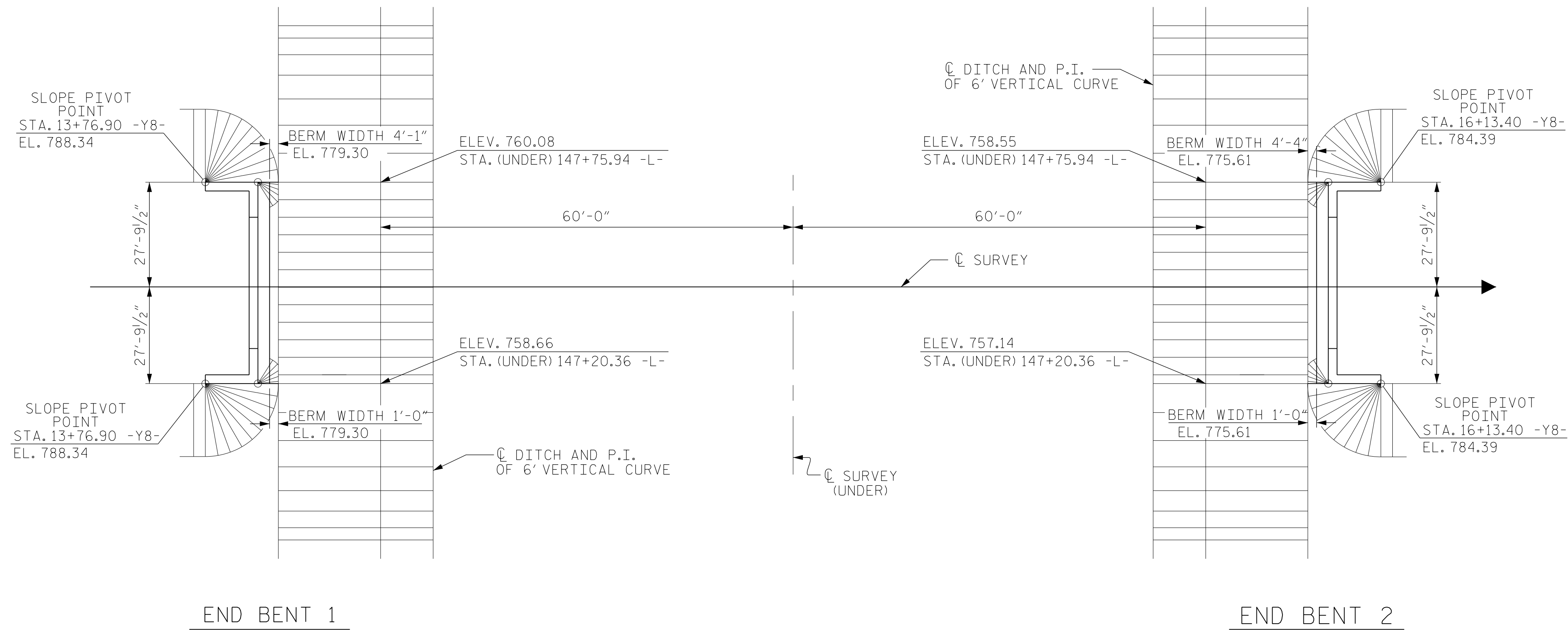
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SLOPE PROTECTION  
 DETAILS

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

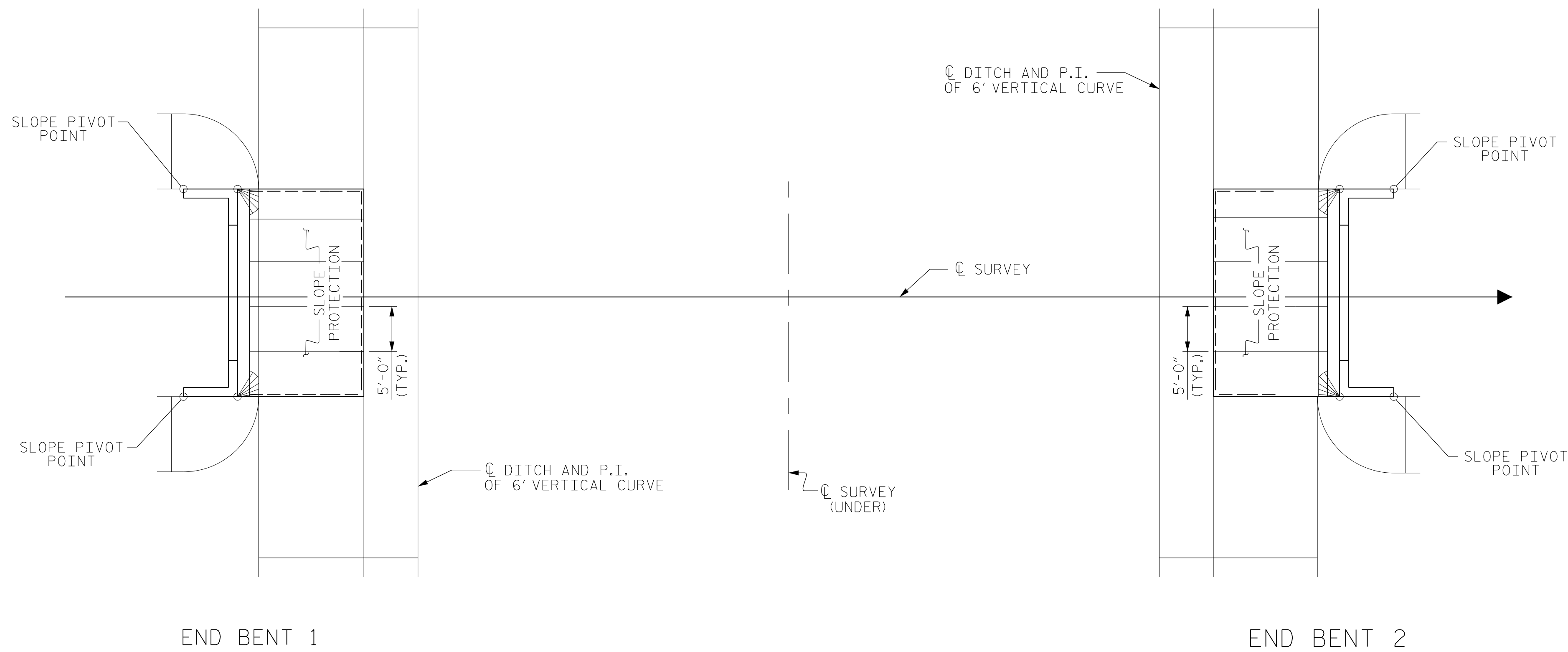
STR. #7

DRAWN BY: E. PHELPS DATE: 01-18  
 CHECKED BY: J. LOFTUS DATE: 02-18  
 DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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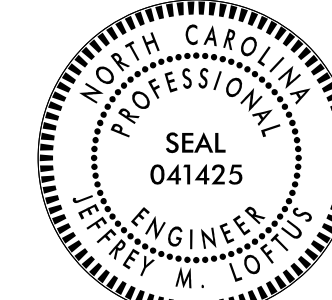


PLAN - GRADING



PLAN - CONCRETE PLACEMENT

DocuSigned by:  
Jeff Loftus  
FES1DC02E6794A9  
3/7/2018



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SHEET 2 OF 2

STATE OF NORTH CAROLINA  
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STANDARD  
SLOPE PROTECTION  
DETAILS

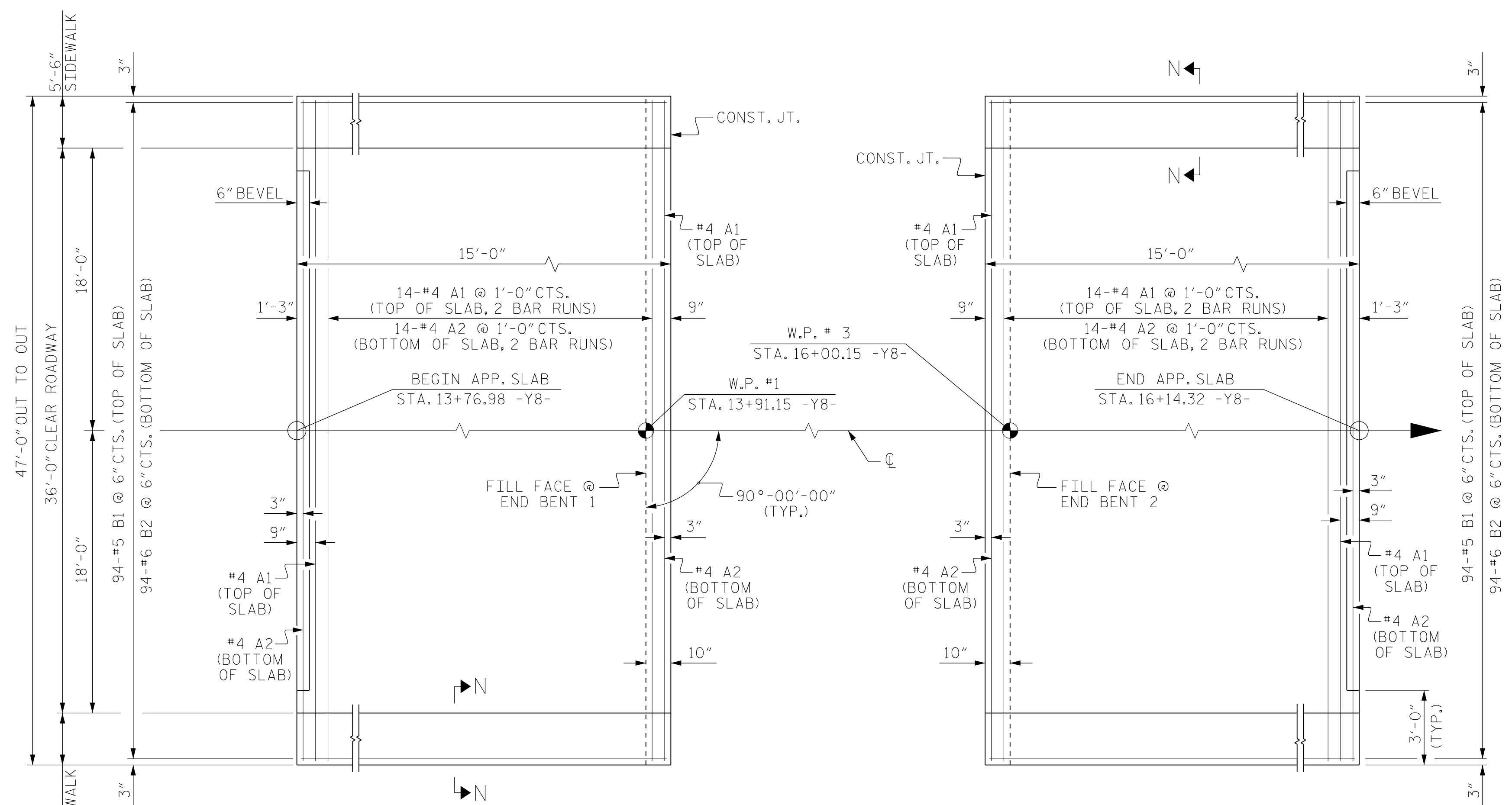
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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE: 02-18

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3/7/2018  
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### NOTES

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

FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE 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.

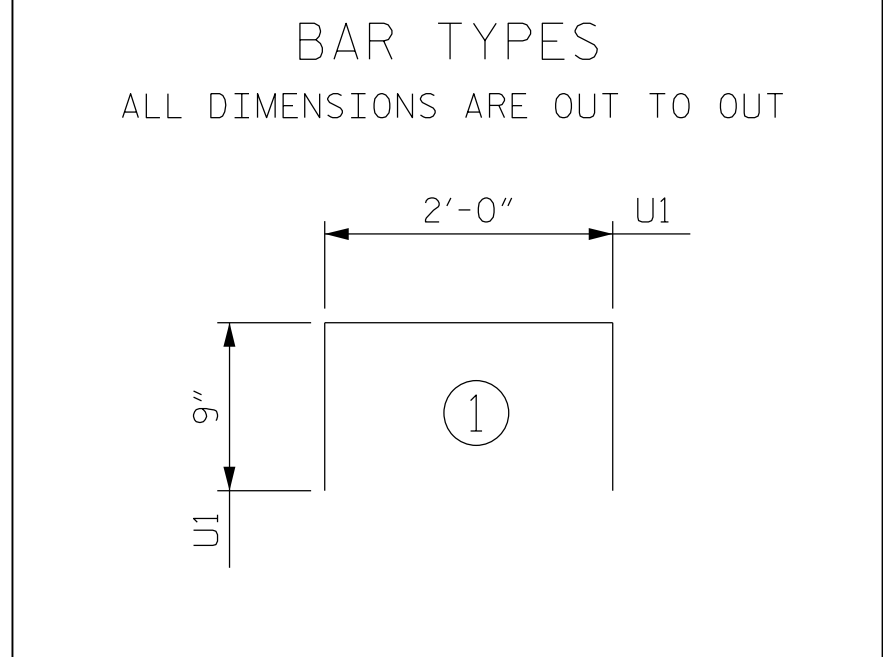
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS 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.

### BILL OF MATERIAL

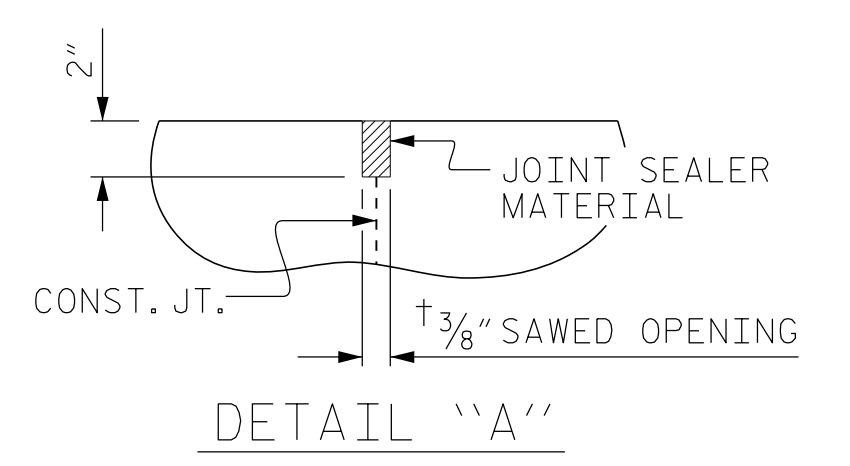
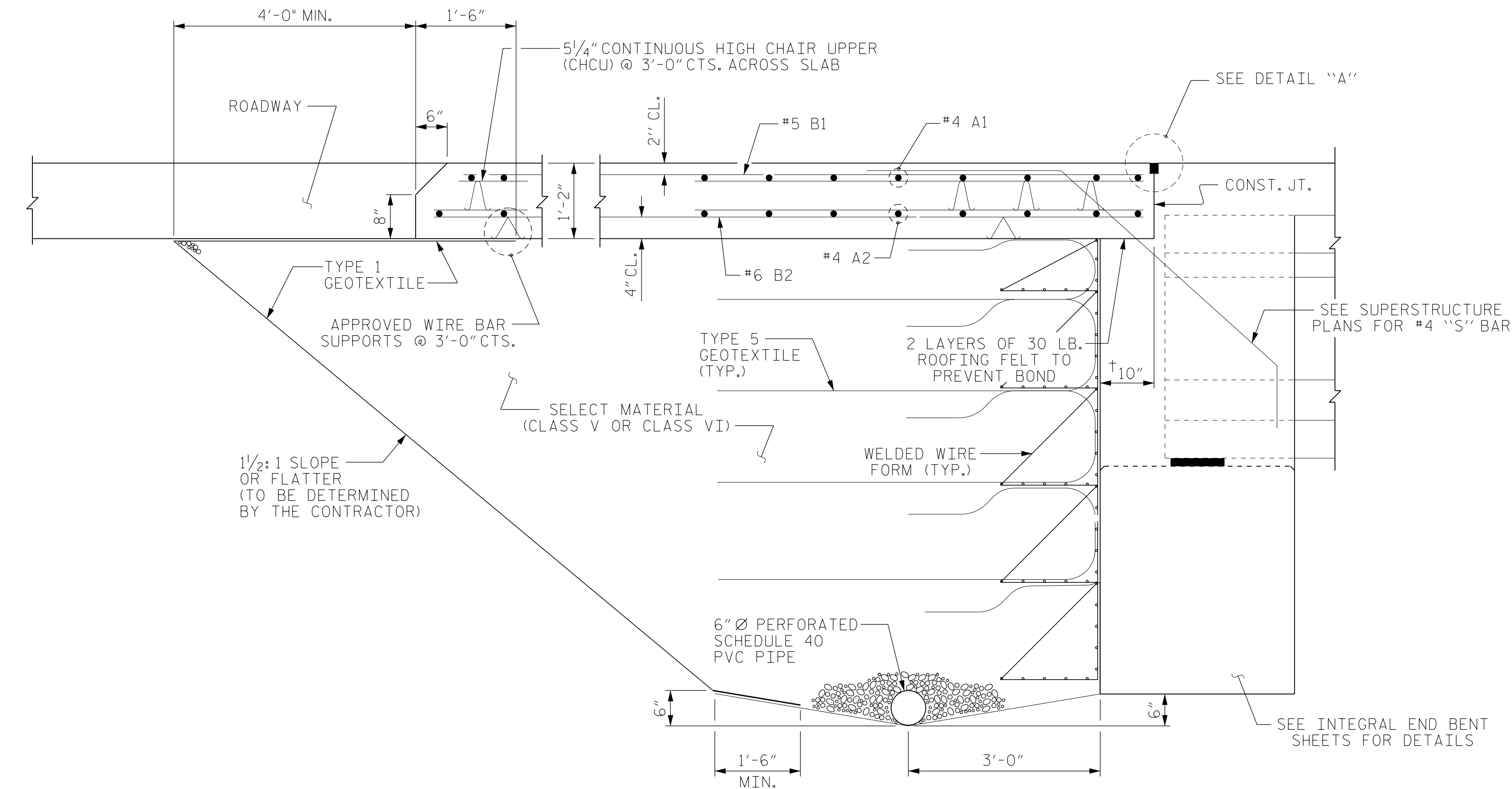
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	32	#4	STR	24'-4"	520
A2	32	#4	STR	24'-3"	518
* B1	94	#5	STR	14'-2"	1389
B2	94	#6	STR	14'-8"	2071
* B3	8	#4	STR	14'-8"	78
* G1	30	#4	STR	5'-0"	100
* U1	12	#4	STR	3'-6"	28
REINFORCING STEEL				2,589 LBS.	
* EPOXY COATED REINFORCING STEEL				2,115 LBS.	
CLASS AA CONCRETE					
POUR 1				30.2 C. Y.	
POUR 2 (SIDEWALK)				3.7 C. Y.	
TOTAL				33.9 C. Y.	

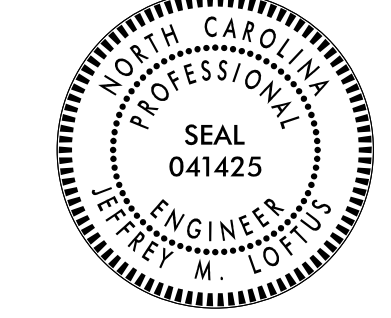


### SPLICE LENGTHS

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



Designed by: **Jeff Loftus** 3/7/2018  
 FE5100202879448



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SHEET 1 OF 2

STATE OF NORTH CAROLINA  
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 RALEIGH

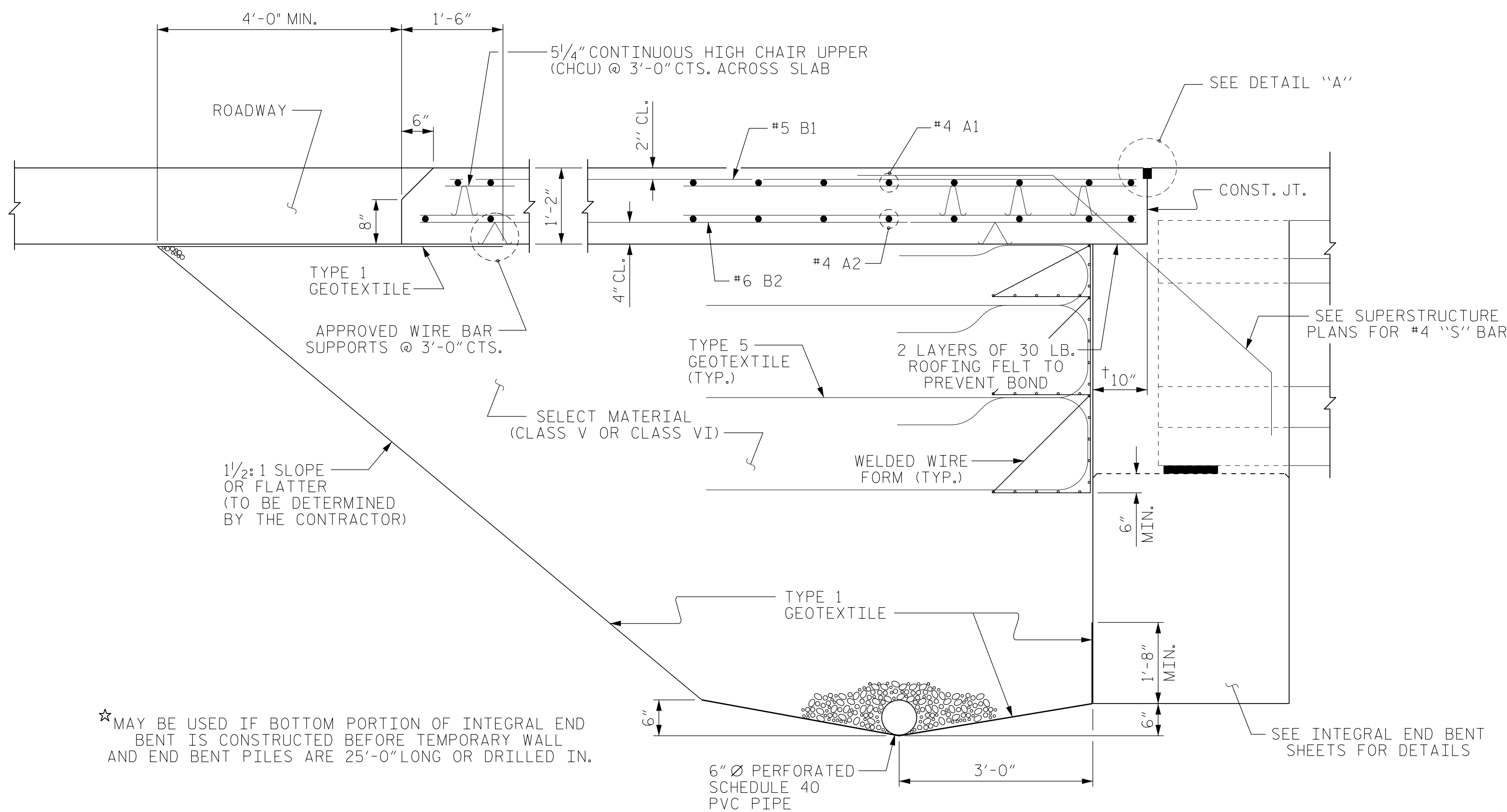
STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT  
 WITH FLEXIBLE PAVEMENT

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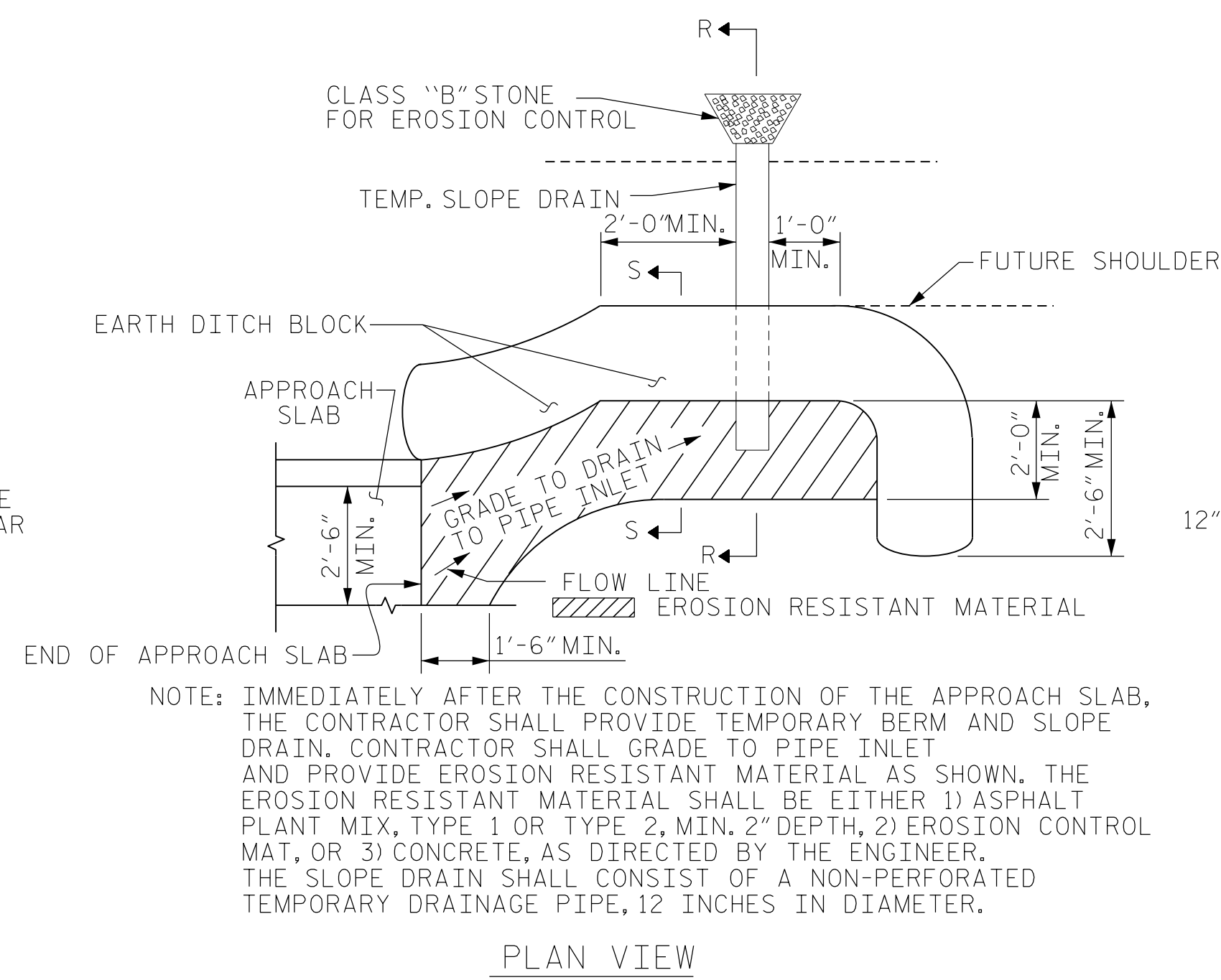
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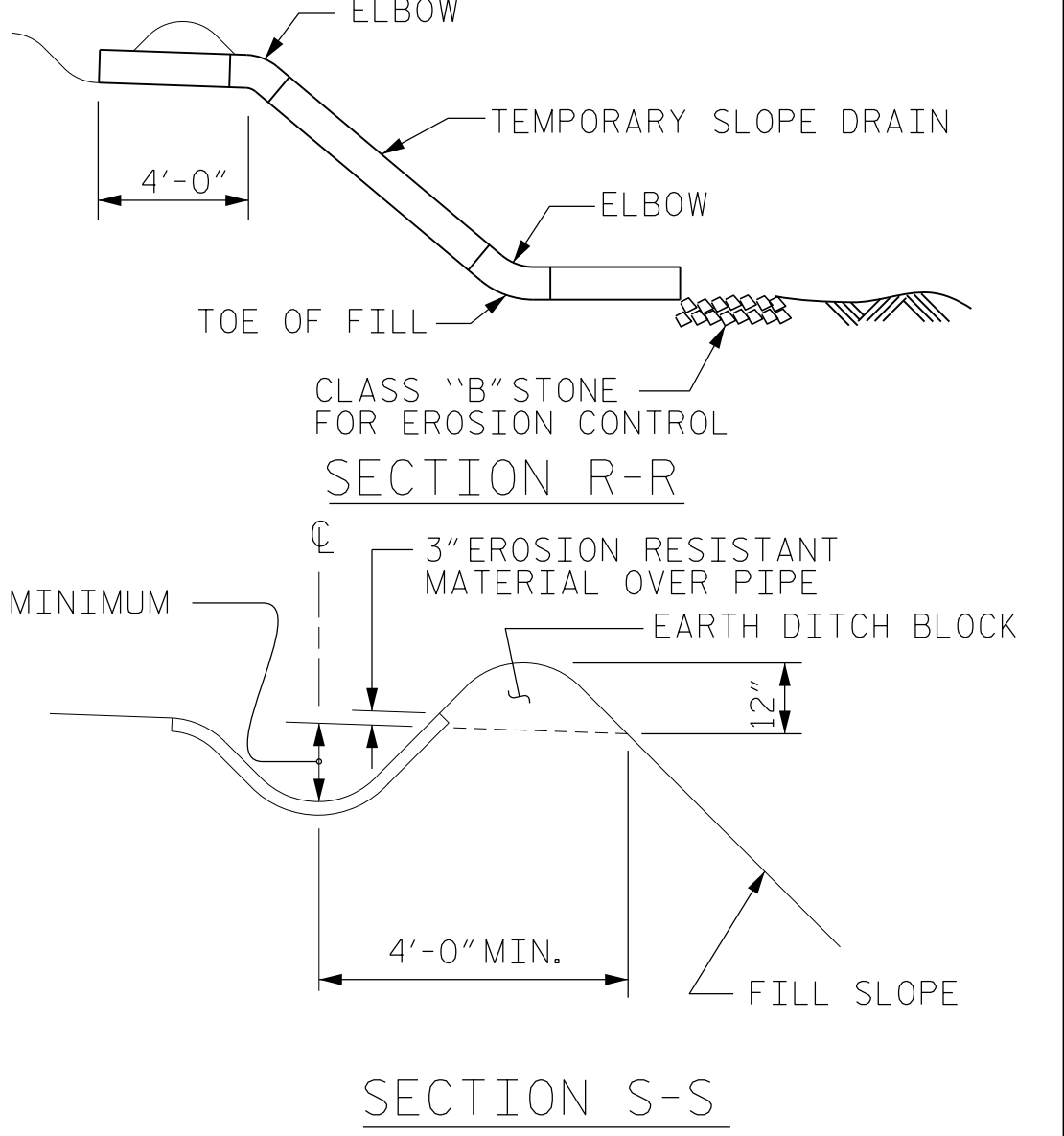
SECTION THRU SLAB  
 \*(TYPE A - ALTERNATE APPROACH FILL)

\*MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

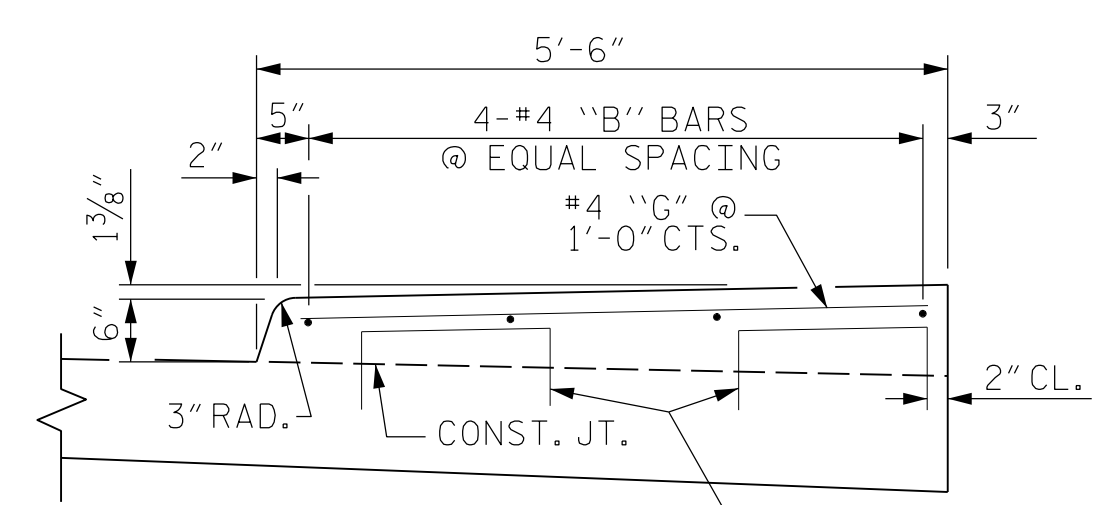


PLAN VIEW

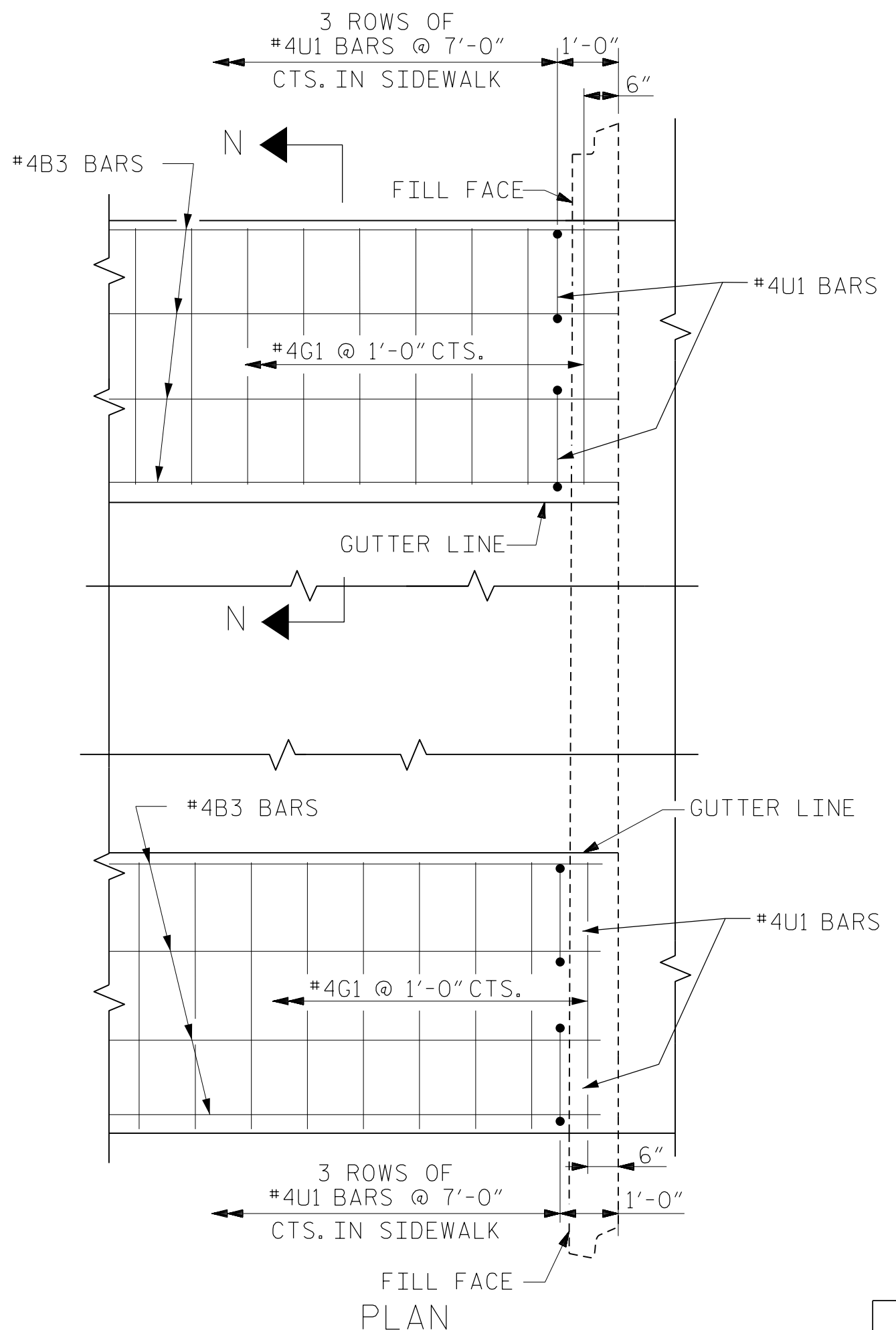
TEMPORARY BERM AND SLOPE DRAIN DETAILS  
 (TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



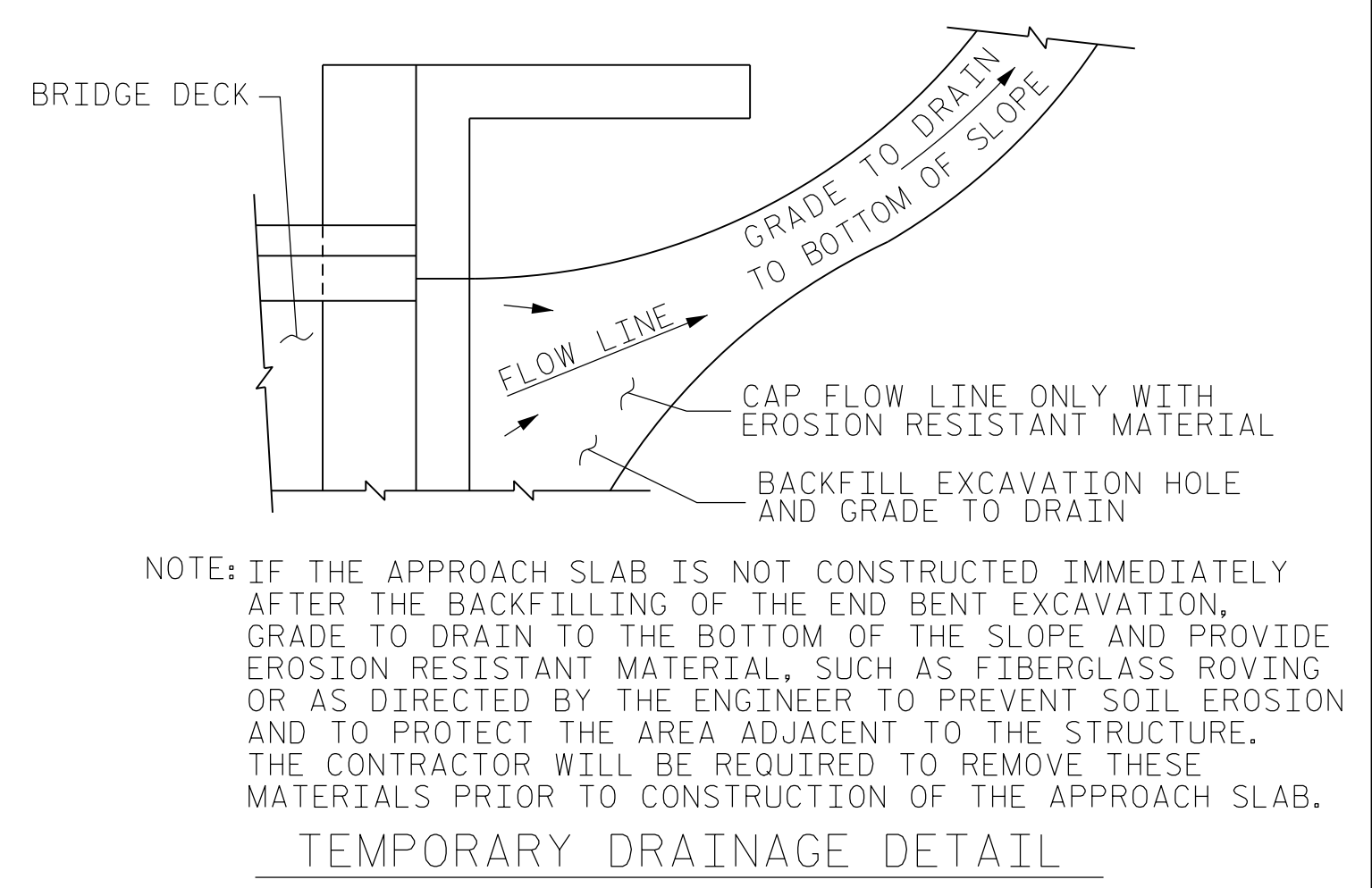
SECTION S-S



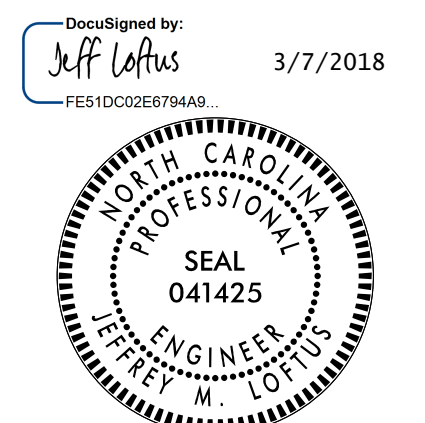
SECTION N-N  
 SIDEWALK DETAILS



DETAILS OF SIDEWALK ON APPROACH SLAB



TEMPORARY DRAINAGE DETAIL



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 BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT DETAILS

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