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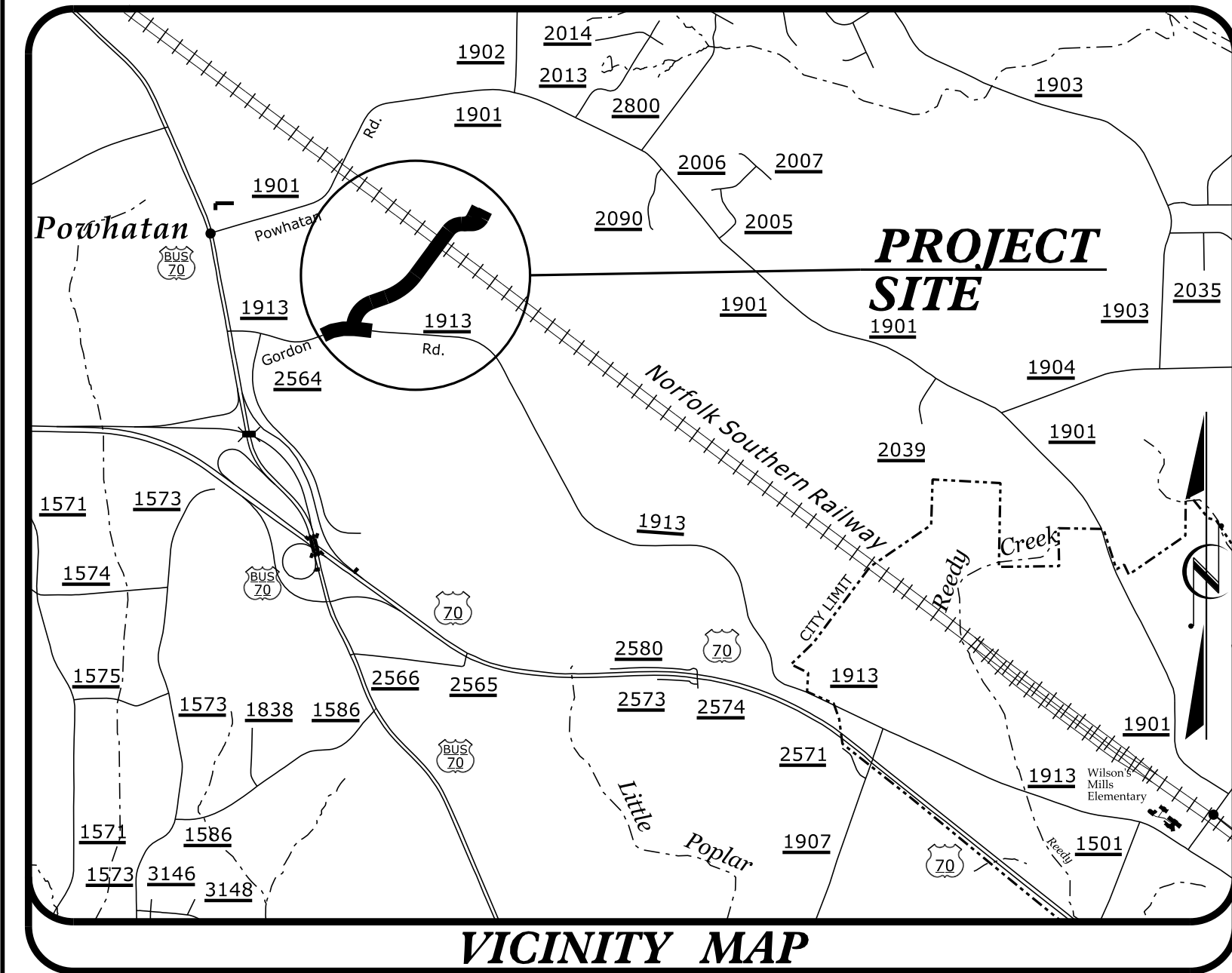
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09\_08/09

PROJECT: R-5769

CONTRACT:

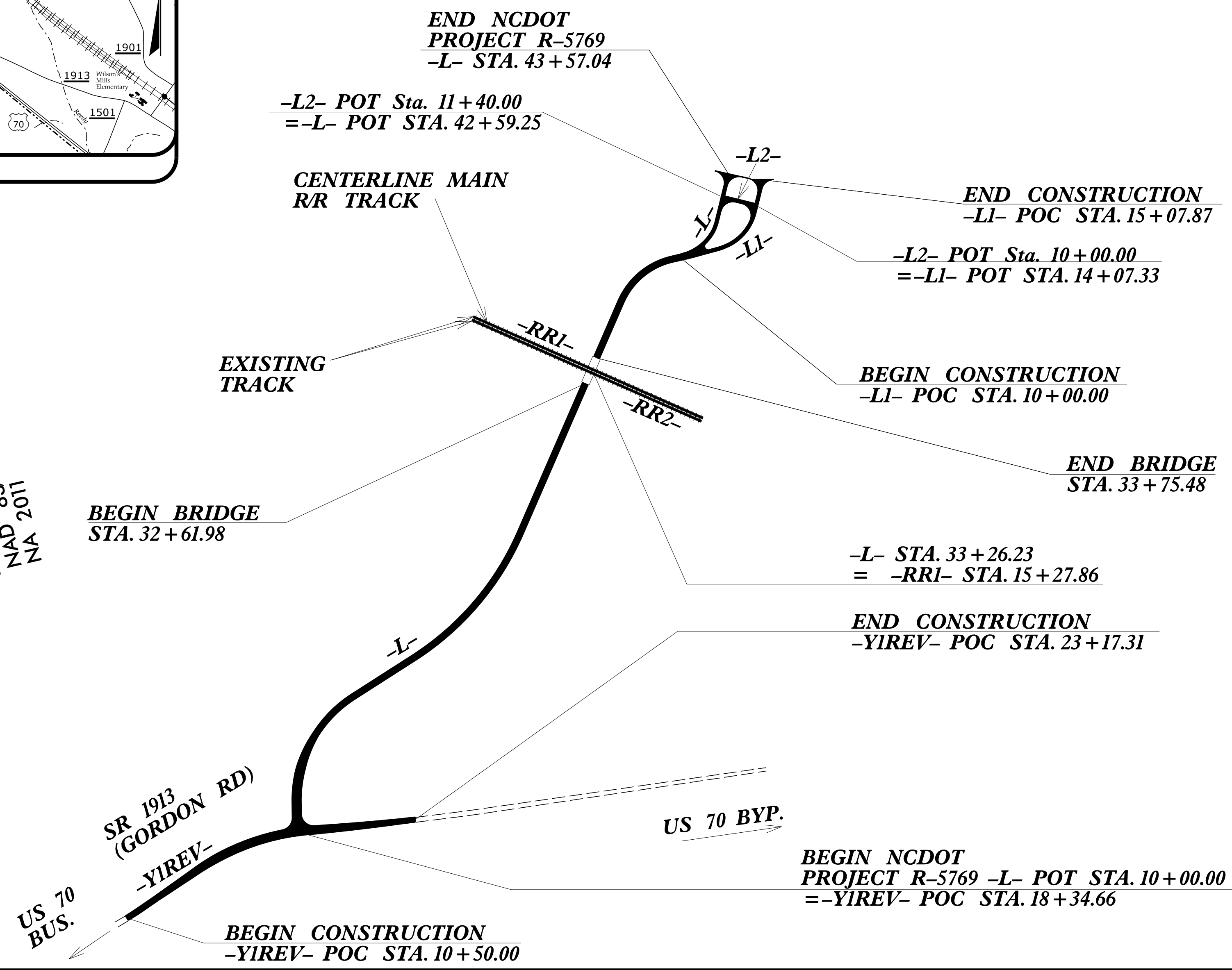


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**JOHNSTON COUNTY**

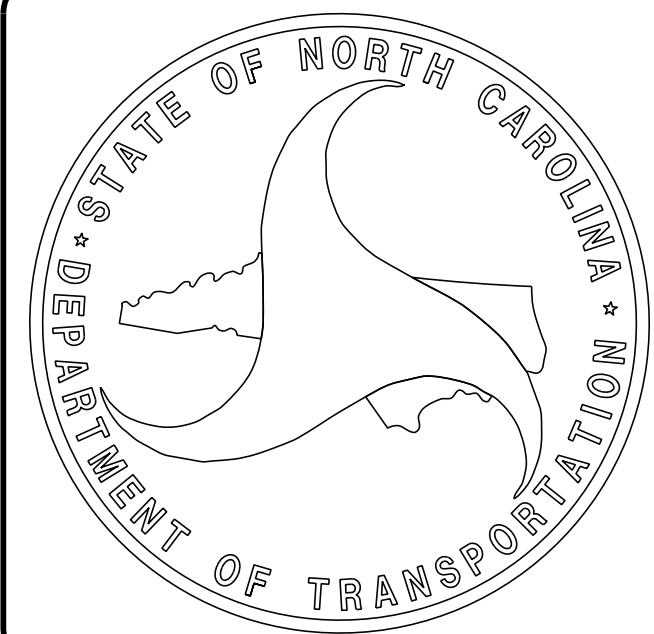
LOCATION: NOVO NORDISK ACCESS ROAD FROM  
SR 1913 (GORDON RD.) TO PROPOSED NOVO NORDISK SITE

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5769		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46448.1.1		PE, UTIL., RW CONST.	
		1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-03777 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION			



STRUCTURE



**DESIGN DATA**

ADT 2040 = 700

T = 4 % \*

V = 40 MPH

\* (TTST = 2% + DUAL = 2%)

FUNC CLASS =

RURAL LOCAL

SUB REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT R-5769 =	0.615 MILES
LENGTH STRUCTURE PROJECT R-5769 =	0.021 MILES
<b>TOTAL LENGTH PROJECT R-5769 =</b>	<b>0.636 MILES</b>

Prepared For:

**DIVISION OF HIGHWAYS**  
STRUCTURES MANAGEMENT UNIT  
1000 BIRCH RIDGE DR.  
RALEIGH, N.C. 27610

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2012 STANDARD SPECIFICATIONS

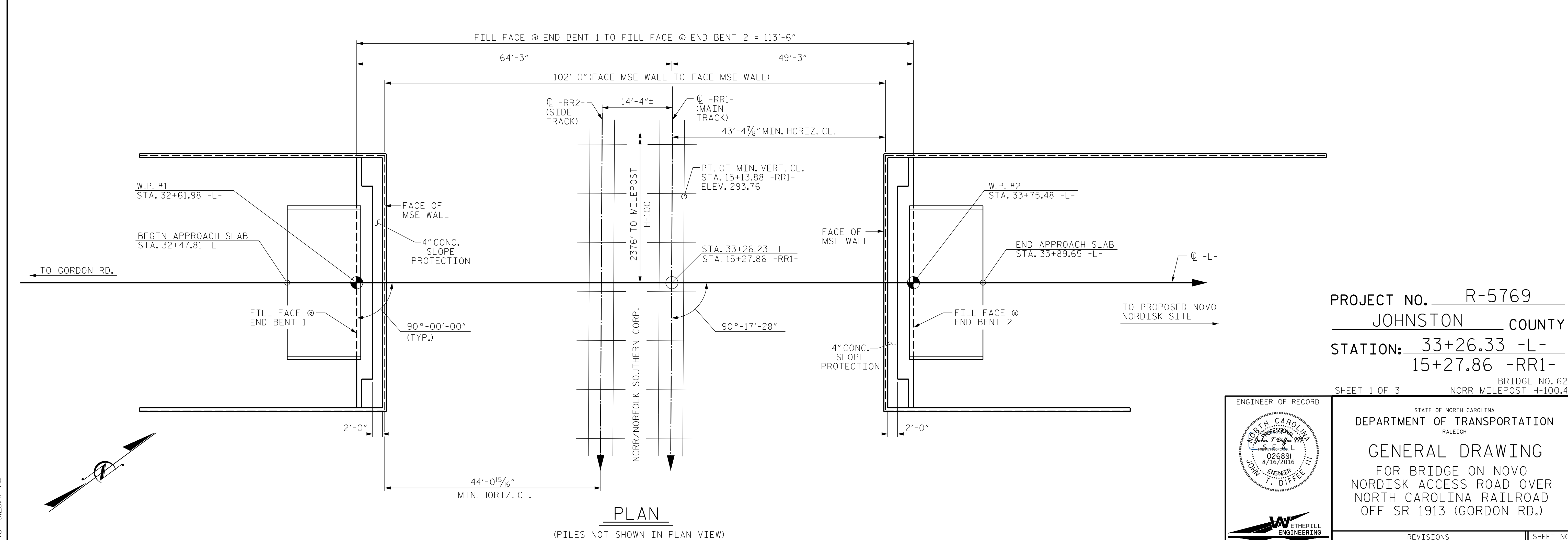
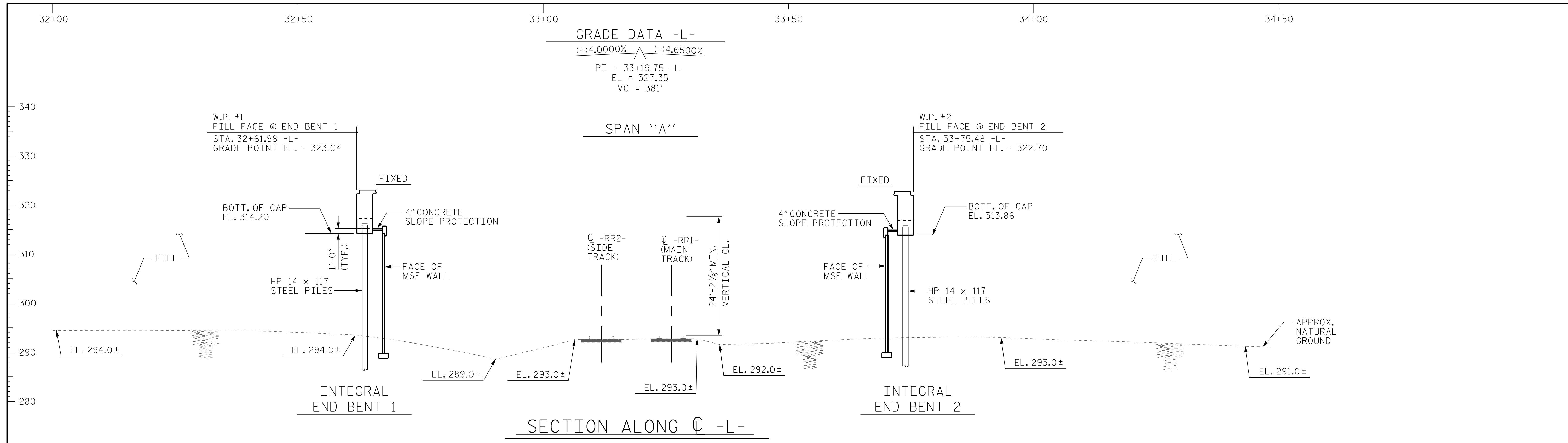
LETTING DATE :  
NOVEMBER 15, 2016

**EDWARD G. WETHERILL, PE**  
PROJECT ENGINEER

**GREG S. PURVIS, PE**  
PROJECT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/16/2016 10:20:10 AM  
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PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
15+27.86 -RR1-  
 SHEET 1 OF 3 BRIDGE NO. 622  
 NCRR MILEPOST H-100.45

ENGINEER OF RECORD

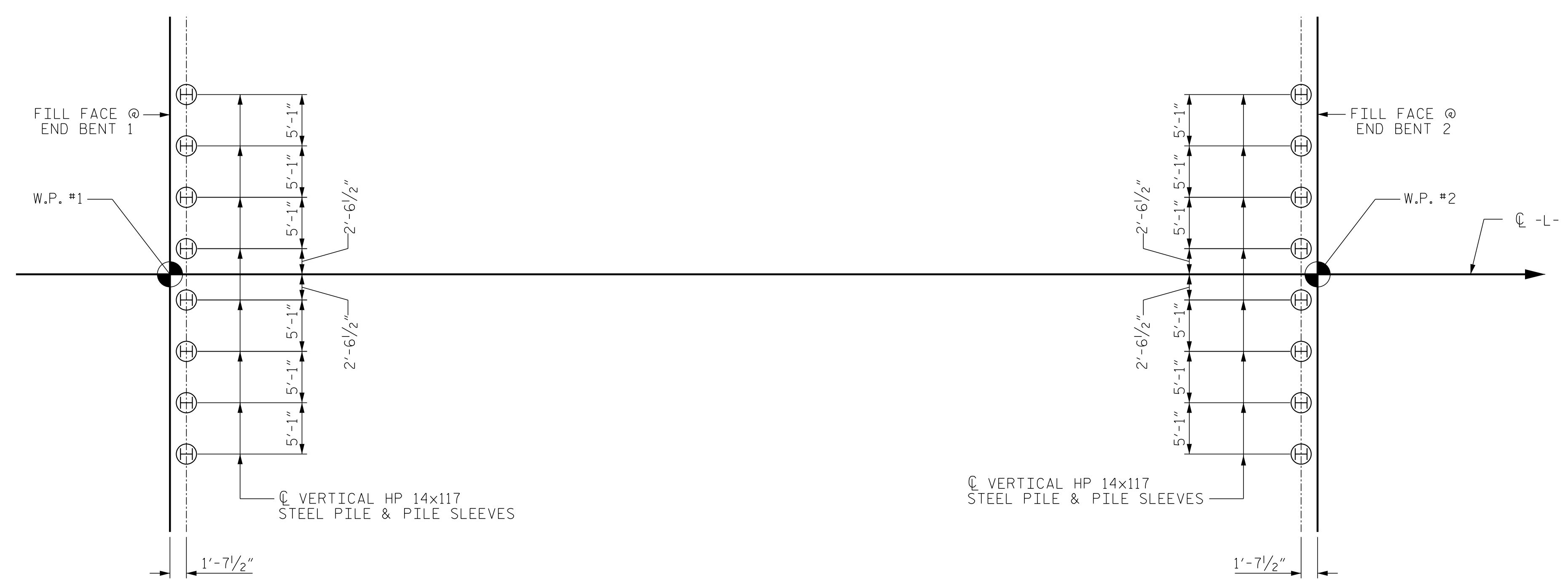
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING FOR BRIDGE ON NOVO NORDISK ACCESS ROAD OVER NORTH CAROLINA RAILROAD OFF SR 1913 (GORDON RD.)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-1
TOTAL SHEETS					23

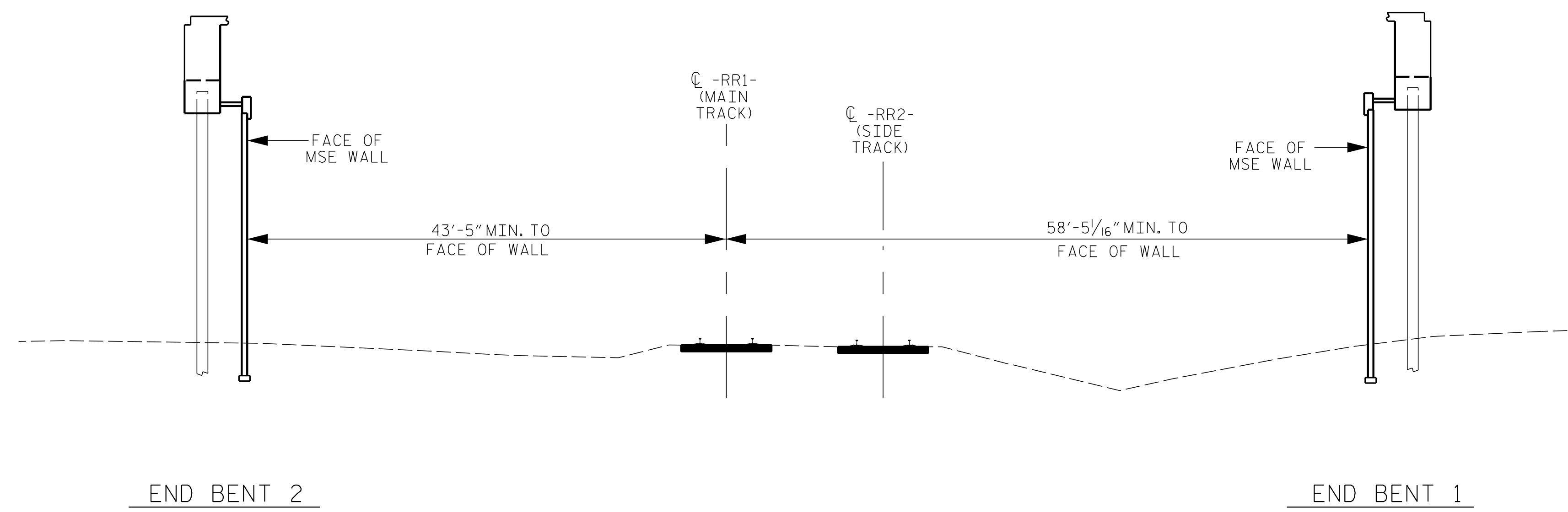
DRAWN BY: J. PENDERGRAFT DATE: 5-16  
 CHECKED BY: T. DIFFEE DATE: 5-16

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**FOUNDATION LAYOUT**



**SECTION THROUGH RAILROAD**

LOOKING IN DIRECTION OF INCREASING STATIONS ON RAILROAD  
(SPAN LENGTH BASED ON THIS SECTION)  
(FUTURE TRACKS NOT SHOWN FOR CLARITY)

**FOUNDATION NOTES**

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS NO.1 AND 2 ARE DESIGNED FOR A FACTOR RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 395 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 295 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 55,000 TO 120,000 FT-LBS. PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO.1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 35,000 TO 80,000 FT-LBS. PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO.2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION OR TEST PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING IS REQUIRED FOR BOTH END BENTS NO.1 AND 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS NO.1 AND 2 ARE TO BE DRIVEN BEFORE THE CONSTRUCTION OF THE MSE WALL.

PILES AT END BENTS NO.1 AND 2 ARE TO BE SLEEVED IN THE MSE WALL REINFORCED BACKFILL ZONE. SEE MSE WALL PLANS. NO SEPARATE PAYMENT WILL BE MADE FOR PIPE SLEEVES AND SHALL BE CONSIDERED INCIDENTAL TO OTHER CONTRACT ITEMS.

PILES AT END BENTS NO.1 AND 2 WILL REQUIRE PILE SLEEVES TO REDUCE DOWNDRAG LOADS.

TOP OF RAIL ELEVATIONS							
-RR1- (MAIN TRACK)				-RR2- (SIDE TRACK)			
LEFT RAIL		RIGHT RAIL		LEFT RAIL		RIGHT RAIL	
STA.	ELEV.	STA.	ELEV.	STA.	ELEV.	STA.	ELEV.
10+00.00	294.41	10+00.01	294.45	9+99.99	294.14	10+00.01	294.13
11+12.22	294.37	11+12.18	294.36	11+11.28	294.08	11+11.01	294.09
12+18.09	294.26	12+18.09	294.22	12+17.76	294.03	12+18.08	294.03
13+16.80	294.15	13+16.62	294.13	13+15.79	293.92	13+15.99	293.91
14+10.87	293.99	14+10.71	293.99	14+10.08	293.77	14+10.19	293.79
14+97.32	293.81	14+97.38	293.81	14+96.45	293.64	14+96.56	293.64
15+27.14	293.73	15+27.16	293.74	15+26.36	293.58	15+26.36	293.58
15+99.23	293.53	15+98.88	293.53	15+98.52	293.39	15+98.58	293.40
16+66.57	293.36	16+66.57	293.35	16+66.19	293.20	16+66.16	293.21
16+90.88	293.26	16+91.29	293.27	16+90.40	293.14	16+90.57	293.17
18+00.72	292.98	18+00.77	292.99	18+00.20	292.84	18+00.23	292.84
19+08.30	292.61	19+08.31	292.61	19+07.34	292.41	19+07.32	292.44
20+21.58	292.21	20+21.39	292.22	20+20.71	291.99	20+20.78	291.99

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 2 OF 3

ENGINEER OF RECORD

**ETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON NOVO  
 NORDISK ACCESS ROAD OVER  
 NORTH CAROLINA RAILROAD  
 OFF SR 1913 (GORDON RD.)

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

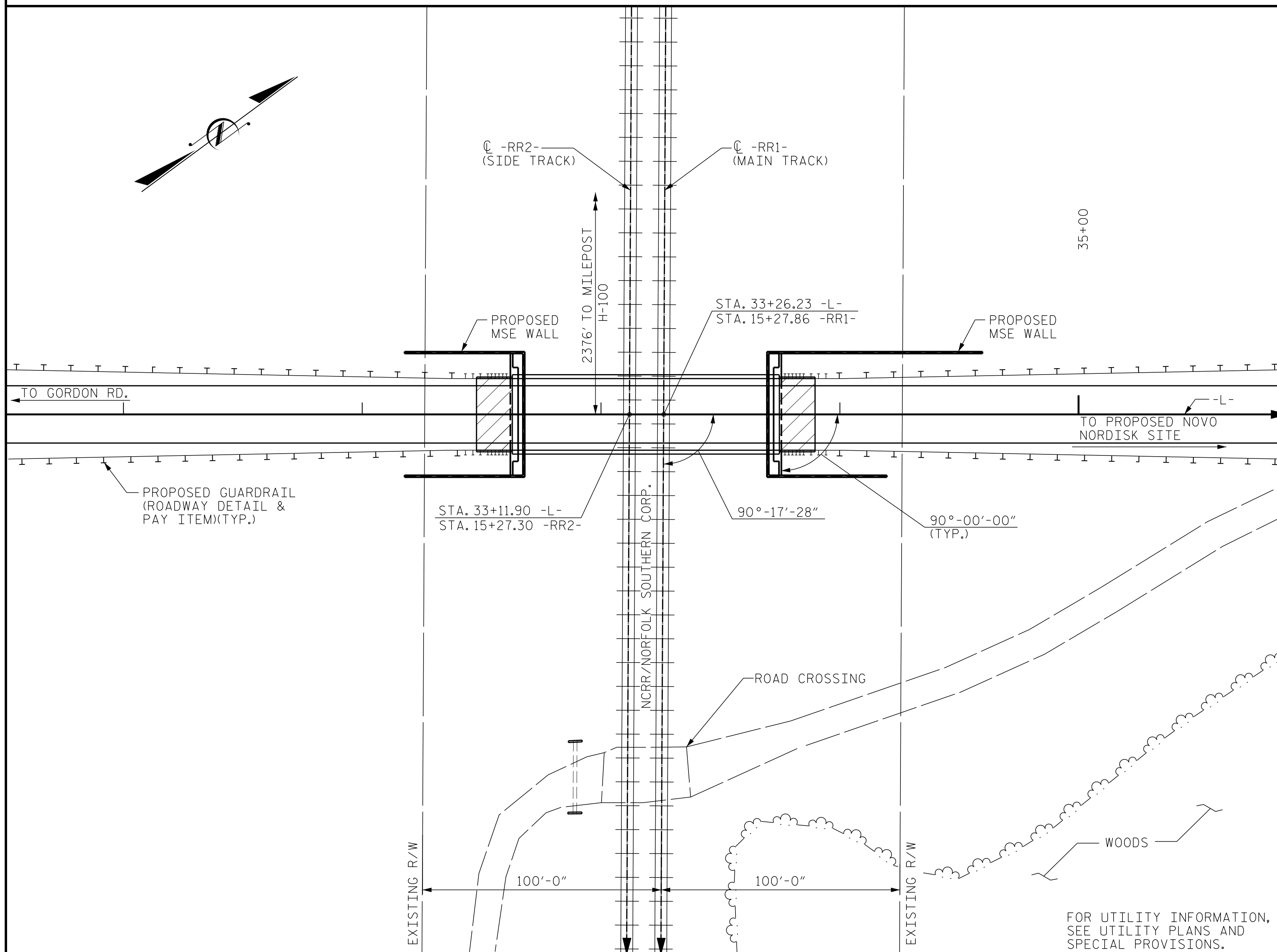
SHEET NO. S-2  
 TOTAL SHEETS 23

DRAWN BY : J. C. PENDERGRAFT DATE : 5-16  
 CHECKED BY : J. T. DIFFIE DATE : 5-16

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BM #3: BENCHLITE NAIL IN BASE OF 15" SWEET GUM, 99.24' LT. OF STA. 39+23.65 -L-, ELEV. = 286.33'



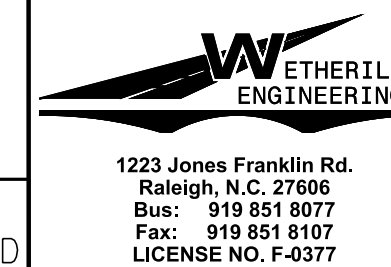
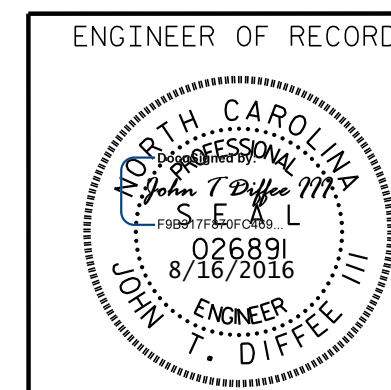
LOCATION SKETCH

**TOTAL BILL OF MATERIAL**

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		HP 14 x 117 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	CONCRETE PENETRATING STAIN
	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	No.	LIN. FT.	No.	LIN. FT.	EACH	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		3,774	3,785		LUMP SUM		4	446.67				223.67		LUMP SUM	
END BENT 1				19.1		3,311			8	696	8		15		
END BENT 2				19.1		3,311			8	596	8		15		
TOTAL	2	3,774	3,785	38.2	LUMP SUM	6,622	4	446.67	16	1,292	16	223.67	30	LUMP SUM	LUMP SUM

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON NOVO  
 NORDISK ACCESS ROAD OVER  
 NORTH CAROLINA RAILROAD  
 OFF SR 1913 (GORDON RD.)

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

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LOAD FACTORS:

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

### 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 ( $\gamma_{LL}$ )	MOMENT					SHEAR					LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	MOMENT						
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.21	--	1.75	0.800	1.600	1	E	55.130	0.800	1.560	1	E	99.790	0.80	0.800	1.210	1	E	55.130	1 & 2	
	HL-93 (OPERATING)	N/A		2.07	--	1.35	0.800	2.070	1	E	55.130	0.800	2.070	1	E	99.790	N/A	--	--	--	--	--	1 & 2	
	HS-20 (INVENTORY)	36.000	②	1.72	61.920	1.75	0.800	2.280	1	E	55.130	0.800	2.190	1	E	99.790	0.80	0.800	1.720	1	E	55.130	1 & 2	
	HS-20 (OPERATING)	36.000		2.89	104.040	1.35	0.800	2.960	1	E	55.130	0.800	2.890	1	E	99.790	N/A	--	--	--	--	--	1 & 2	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.14	55.890	1.40	0.800	6.850	1	E	55.130	0.800	7.160	1	E	99.790	0.80	0.800	4.140	1	E	55.130	1 & 2
		SNGARBS2	20.000		2.98	59.600	1.40	0.800	4.930	1	E	55.130	0.800	4.940	1	E	99.790	0.80	0.800	2.980	1	E	55.130	1 & 2
		SNAGRIS2	22.000		2.78	61.160	1.40	0.800	4.590	1	E	55.130	0.800	4.540	1	E	99.790	0.80	0.800	2.780	1	E	55.130	1 & 2
		SNCOTTS3	27.250		2.06	56.135	1.40	0.800	3.410	1	E	55.130	0.800	3.470	1	E	99.790	0.80	0.800	2.060	1	E	55.130	1 & 2
		SNAGGRS4	34.925		1.68	58.674	1.40	0.800	2.780	1	E	55.130	0.800	2.790	1	E	99.790	0.80	0.800	1.680	1	E	55.130	1 & 2
		SNS5A	35.550		1.64	58.302	1.40	0.800	2.720	1	E	55.130	0.800	2.790	1	E	99.790	0.80	0.800	1.640	1	E	55.130	1 & 2
		SNS6A	39.950		1.49	59.526	1.40	0.800	2.470	1	E	55.130	0.800	2.510	1	E	99.790	0.80	0.800	1.490	1	E	55.130	1 & 2
		SNS7B	42.000		1.42	59.640	1.40	0.800	2.350	1	E	55.130	0.800	2.430	1	E	99.790	0.80	0.800	1.420	1	E	55.130	1 & 2
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.81	59.730	1.40	0.800	3.000	1	E	55.130	0.800	3.040	1	E	99.790	0.80	0.800	1.810	1	E	55.130	1 & 2
		TNT4A	33.075		1.82	60.197	1.40	0.800	3.000	1	E	55.130	0.800	2.980	1	E	99.790	0.80	0.800	1.820	1	E	55.130	1 & 2
		TNT6A	41.600		1.47	61.152	1.40	0.800	2.430	1	E	55.130	0.800	2.540	1	E	99.790	0.80	0.800	1.470	1	E	55.130	1 & 2
		TNT7A	42.000		1.47	61.740	1.40	0.800	2.420	1	E	55.130	0.800	2.500	1	E	99.790	0.80	0.800	1.470	1	E	55.130	1 & 2
		TNT7B	42.000		1.50	63.000	1.40	0.800	2.480	1	E	55.130	0.800	2.390	1	E	99.790	0.80	0.800	1.500	1	E	55.130	1 & 2
		TNAGRIT4	43.000		1.44	61.920	1.40	0.800	2.380	1	E	55.130	0.800	2.320	1	E	99.790	0.80	0.800	1.440	1	E	55.130	1 & 2
		TNAGT5A	45.000		1.37	61.650	1.40	0.800	2.260	1	E	55.130	0.800	2.260	1	E	99.790	0.80	0.800	1.370	1	E	55.130	1 & 2
TNAGT5B	45.000	③	1.35	60.750	1.40	0.800	2.240	1	E	55.130	0.800	2.200	1	E	99.790	0.80	0.800	1.350	1	E	55.130	1 & 2		

**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. END RESTRAINT FOR INTEGRAL END BENTS IS NOT CONSIDERED FOR LOAD RATING ANALYSIS.  
 2. LOAD RATING ASSUMES SIMPLE SPAN CONDITIONS PER NCDOT BRIDGE DESIGN MANUAL, CHAPTER 6.

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

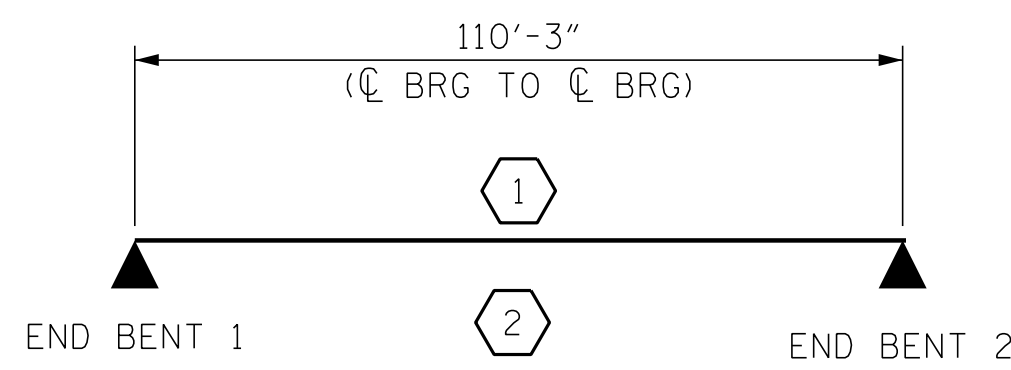
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

I - INTERIOR GIRDER  
 E - EXTERIOR LEFT AND RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

ENGINEER OF RECORD

ETHERILL ENGINEERING

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

STANDARD

LRFR SUMMARY FOR

PRESTRESSED

CONCRETE GIRDERS

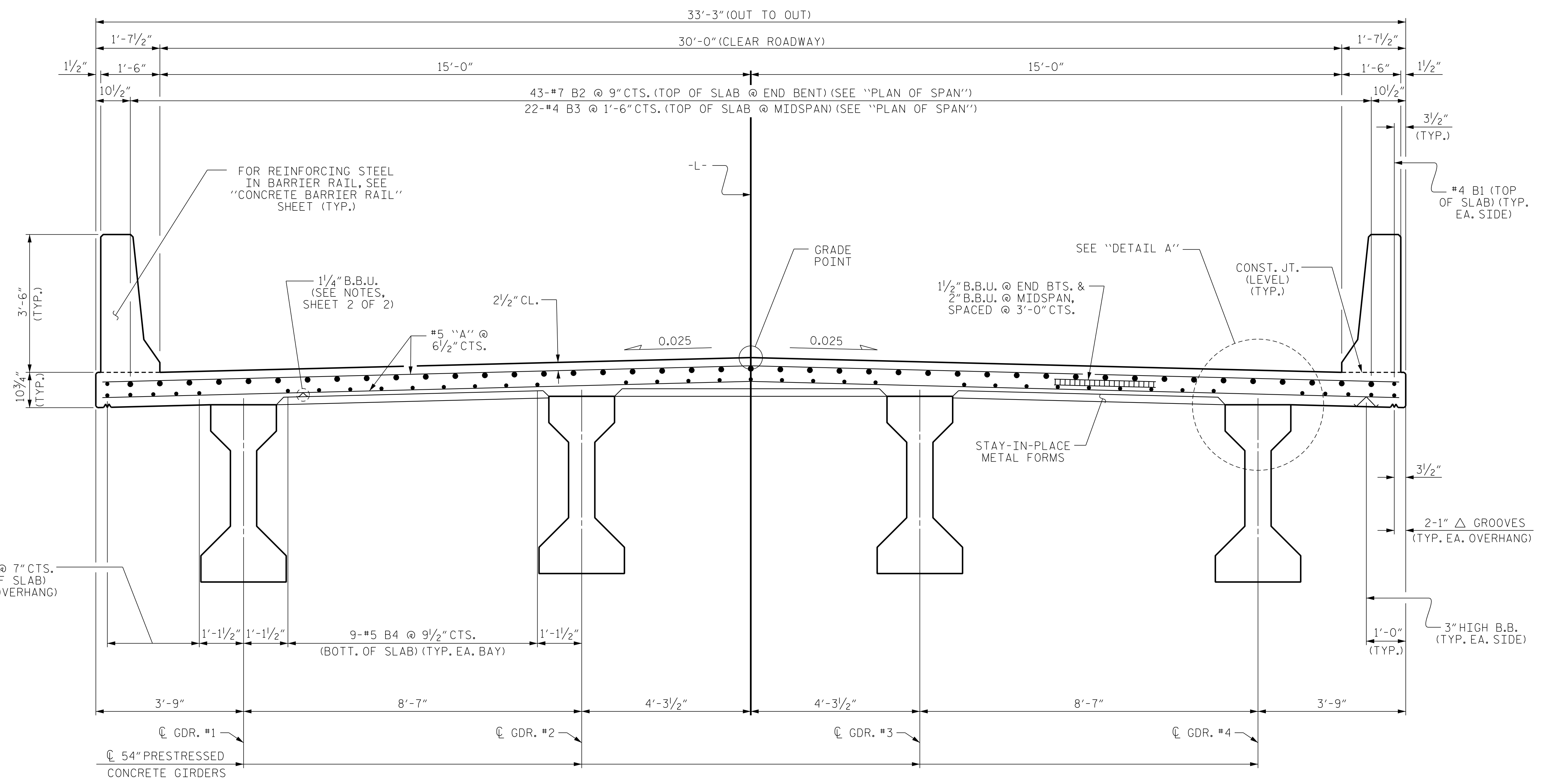
(NON-INTERSTATE TRAFFIC)

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

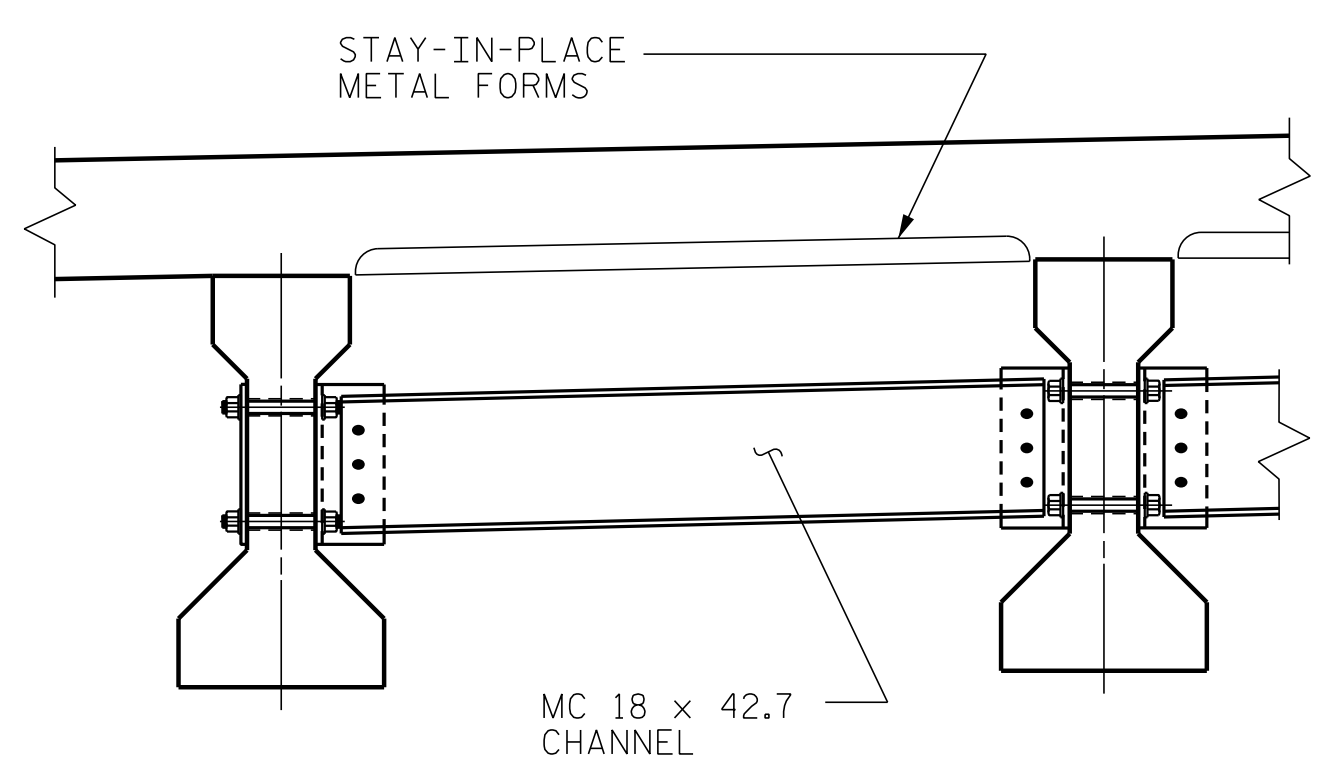
DRAWN BY : J. PENDERGRAFT DATE : 2-16  
 CHECKED BY : J. T. DIFFEE DATE : 6-16

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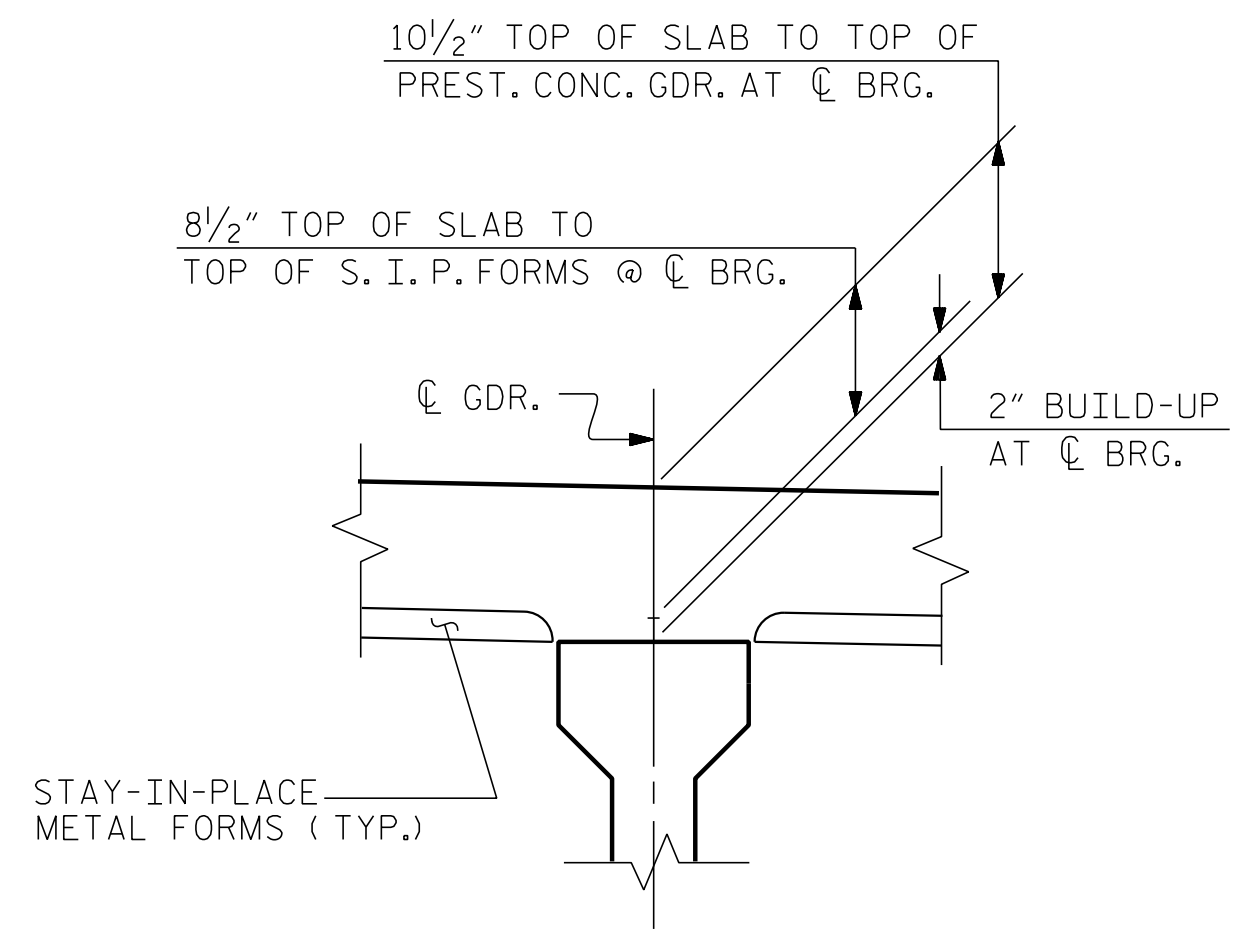


TYPICAL SECTION



TYPICAL INTERMEDIATE DIAPHRAGM

SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS



DETAIL "A"

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 1 OF 2

ENGINEER OF RECORD

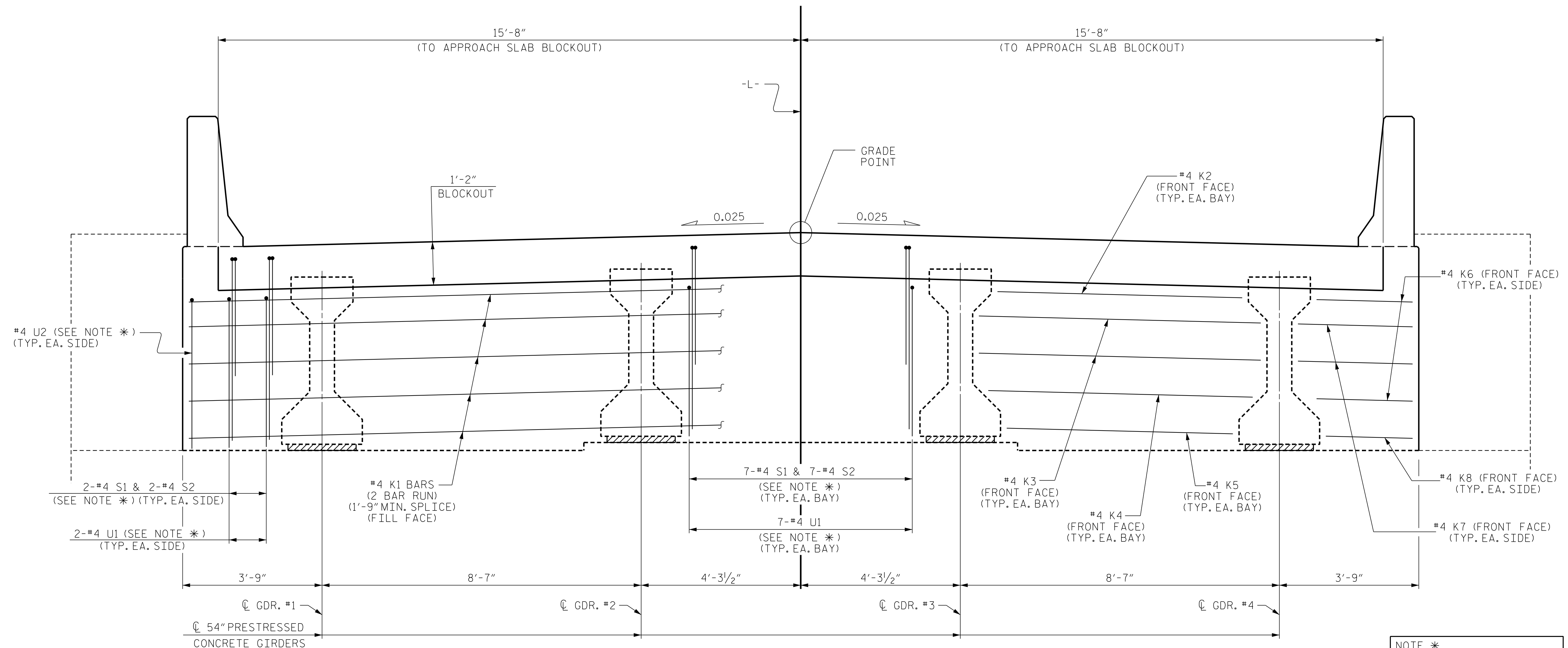
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-5
TOTAL SHEETS					23

DRAWN BY : D. HODGE DATE : 3/16  
 CHECKED BY : G.M. GILLAND DATE : 3/16

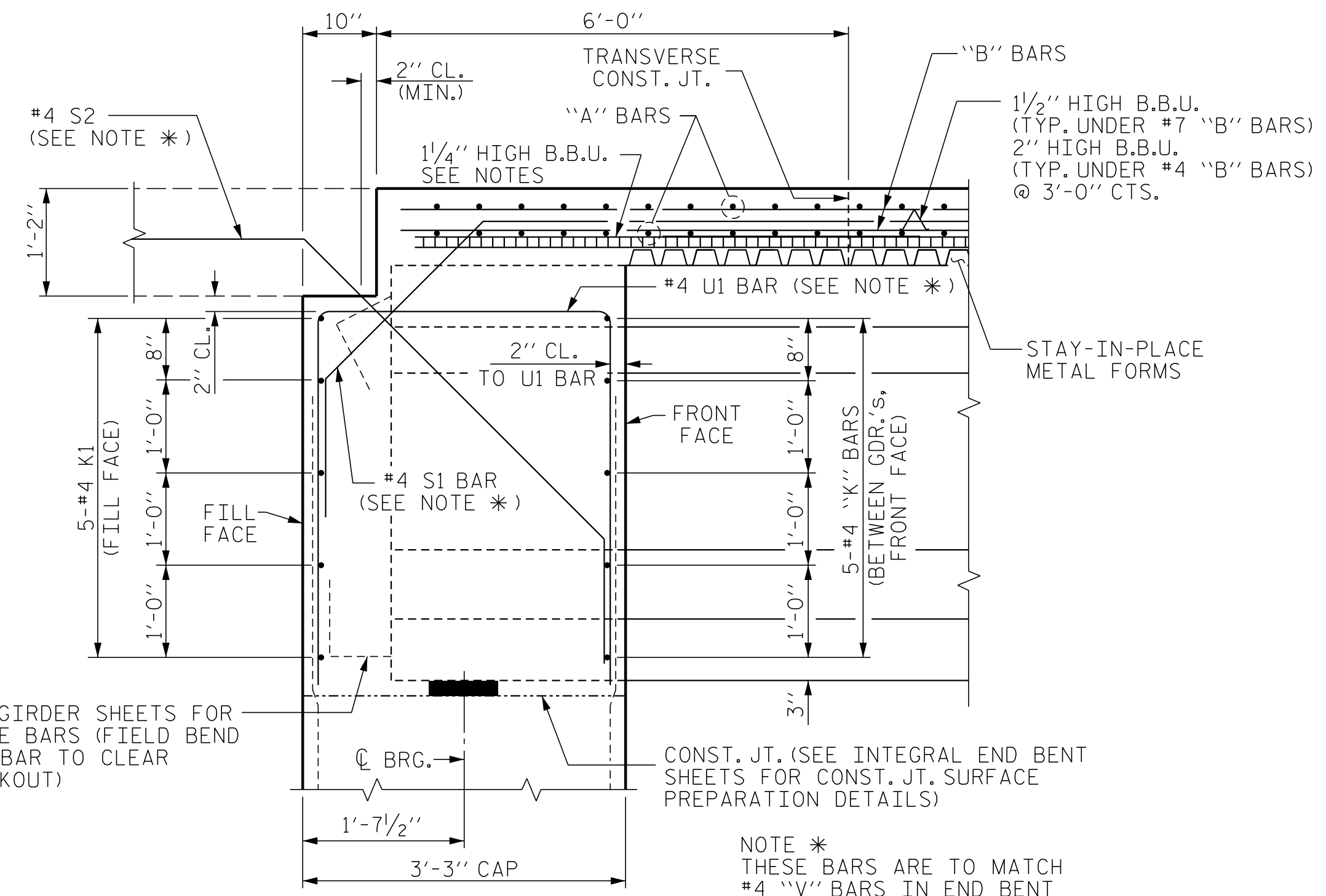
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TYPICAL SECTION THROUGH INTEGRAL END BENT  
DECK REINFORCEMENT NOT SHOWN FOR CLARITY

NOTE \*  
THESE BARS ARE TO MATCH  
#4 "V" BARS IN END BENT

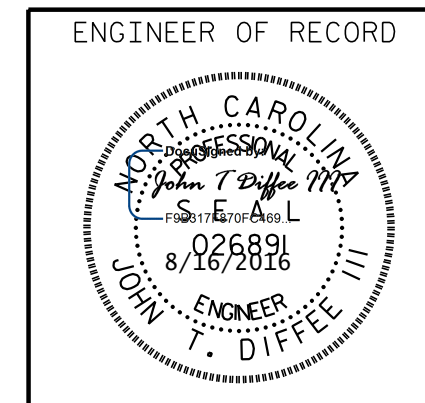


SECTION THRU INTEGRAL END BENT

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 SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST.
- CONCRETE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

PROJECT NO. R-5769  
JOHNSTON COUNTY  
STATION: 33+26.33 -L-  
SHEET 2 OF 2



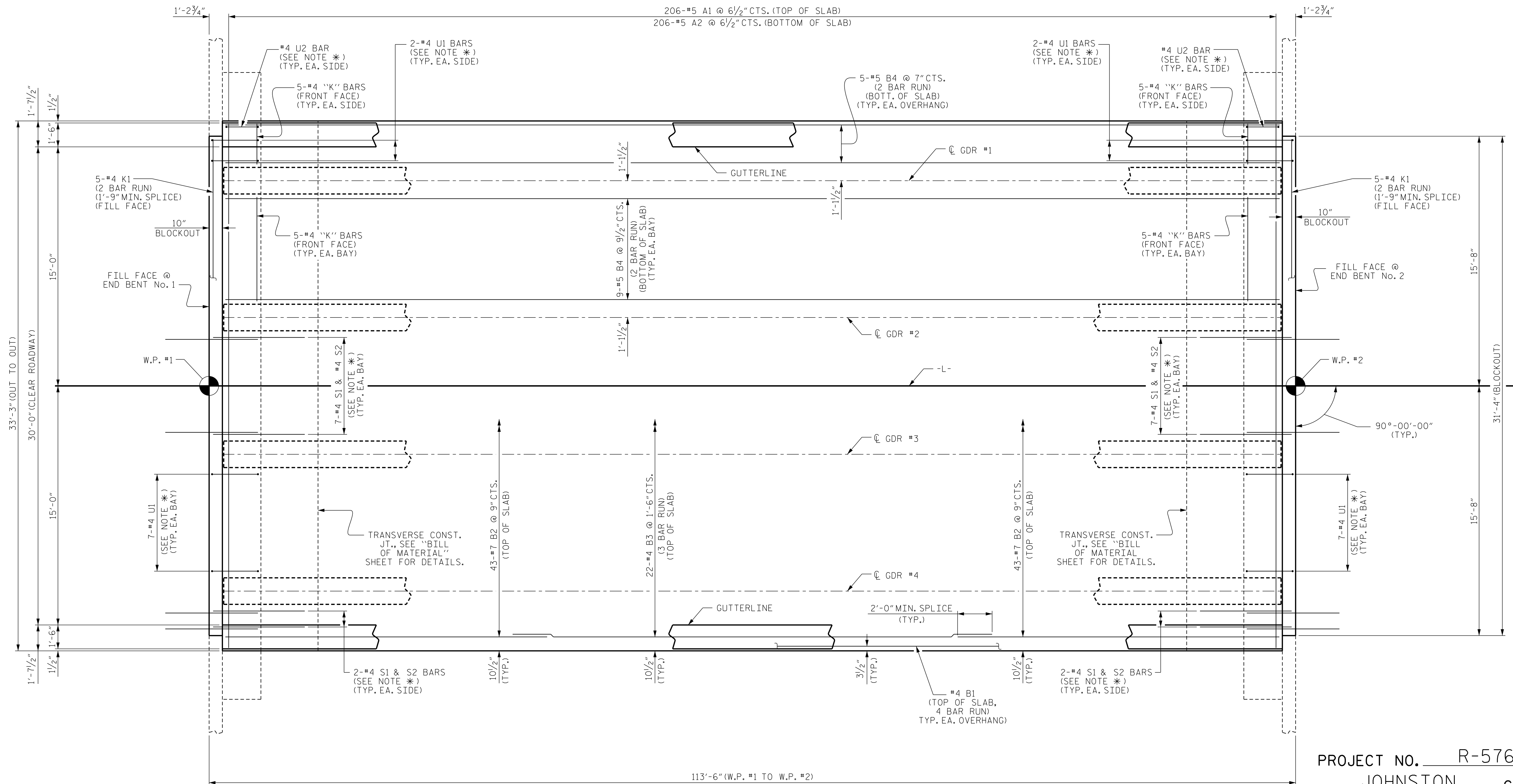
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-6
					TOTAL SHEETS 23

DRAWN BY: D. HODGE DATE: 3/16  
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JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

### PLAN OF SPAN A

FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER" SHEET.

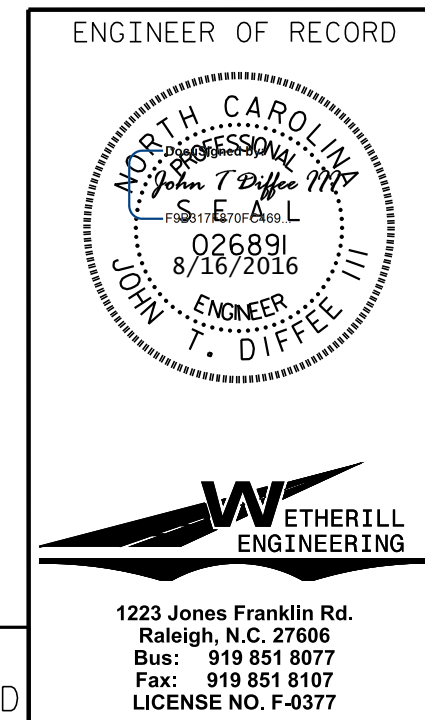
FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

\* THESE BARS ARE TO MATCH SPACING OF THE #4 V1 BARS IN END BENT.

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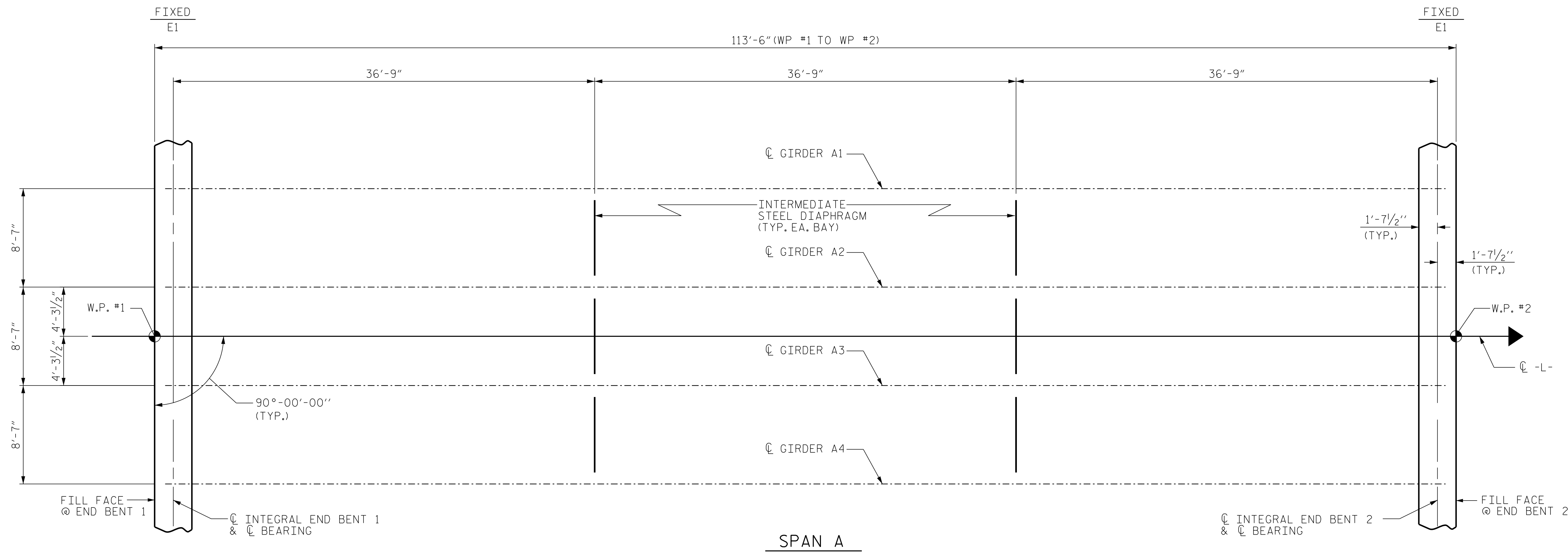
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 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

ENGINEER OF RECORD STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE PLAN OF SPAN					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-7
TOTAL SHEETS					23



**GIRDER LAYOUT**

NOTE: GIRDERS ARE STRAIGHT AND PARALLEL TO ONE ANOTHER

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

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ENGINEER OF RECORD

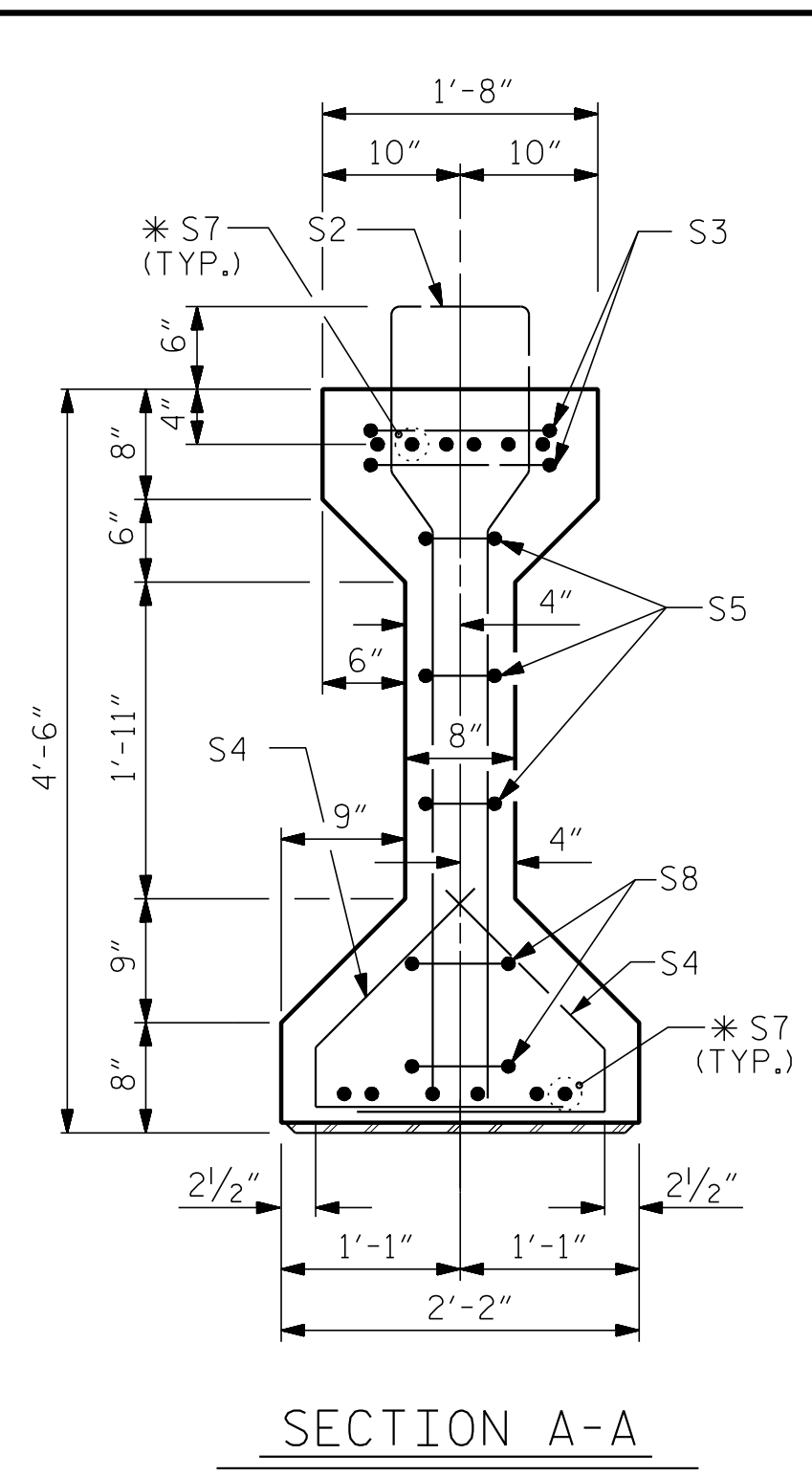
**WETHERILL ENGINEERING**

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
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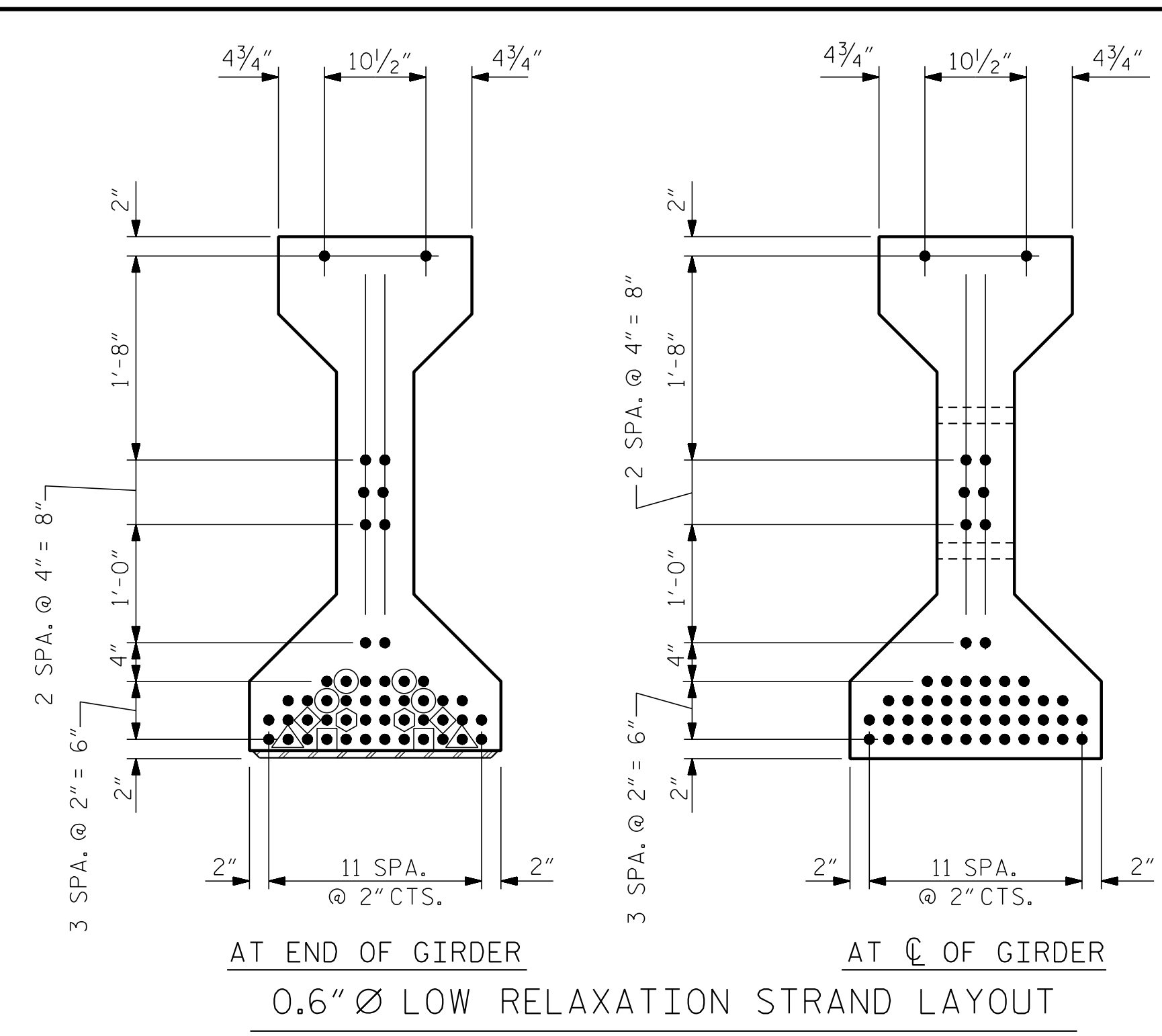
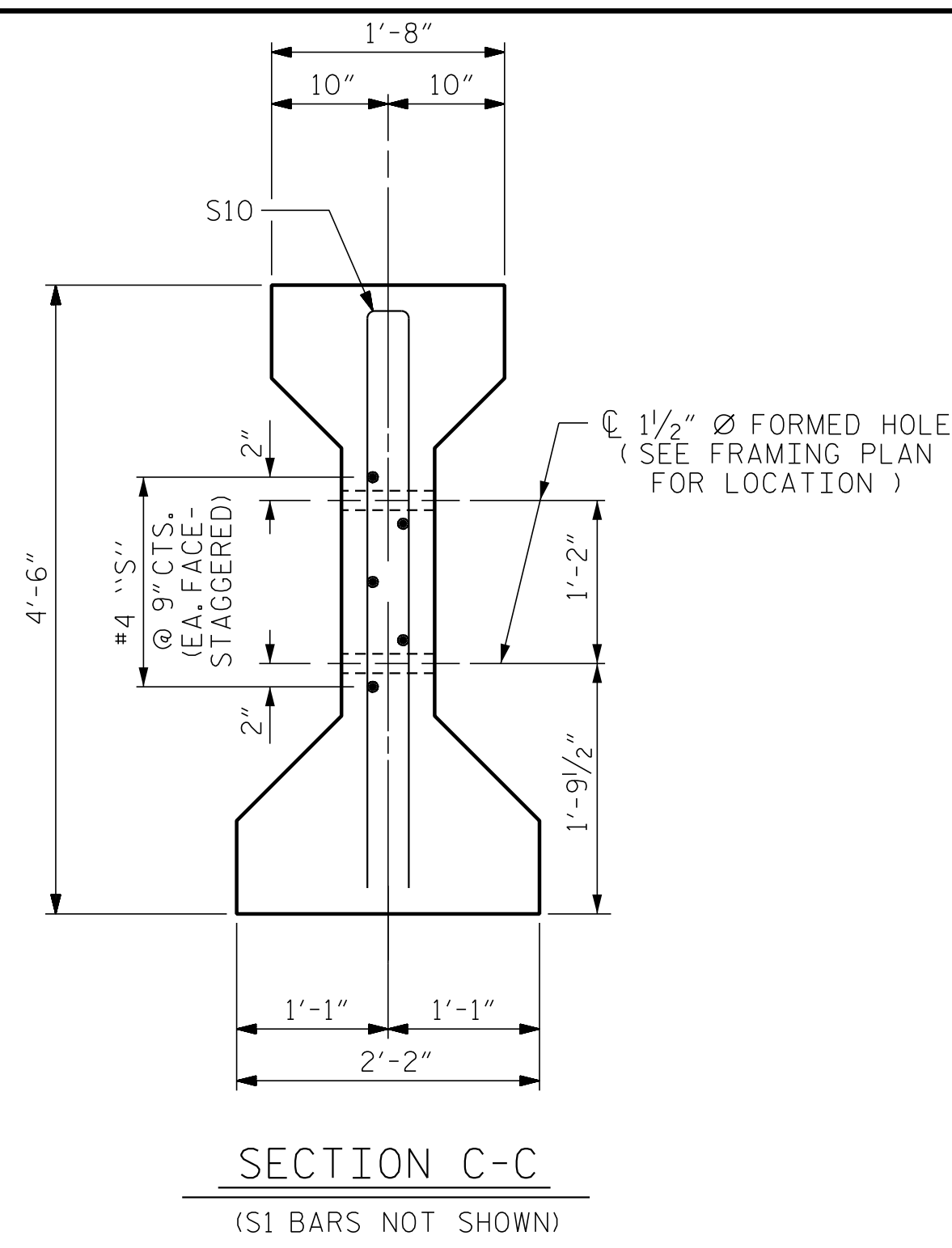
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 GIRDER LAYOUT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			23



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



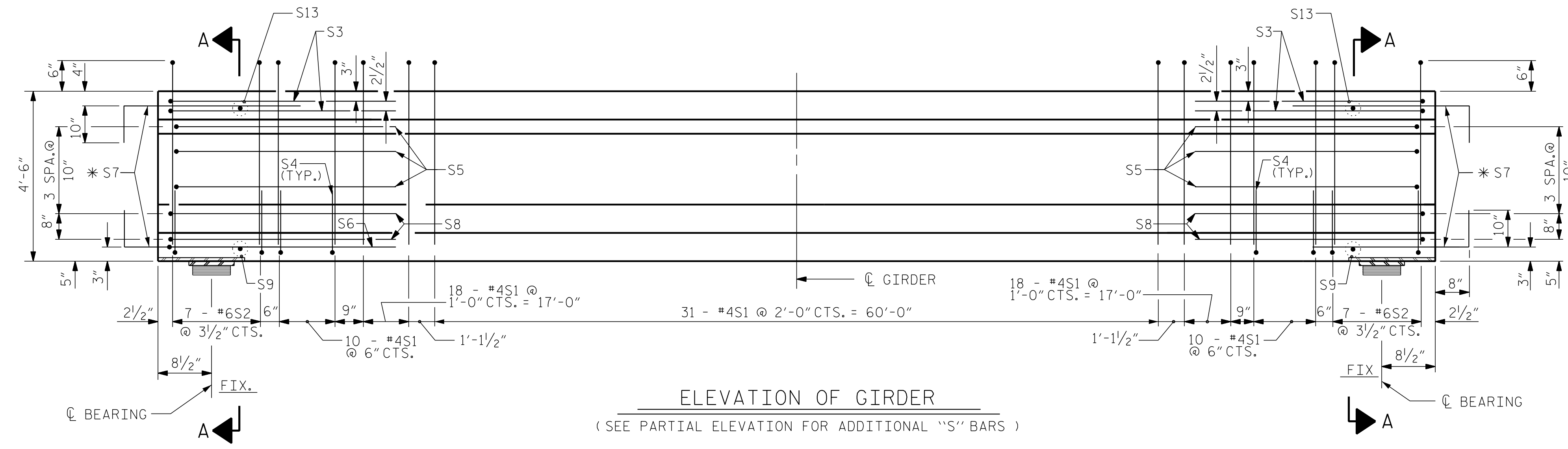
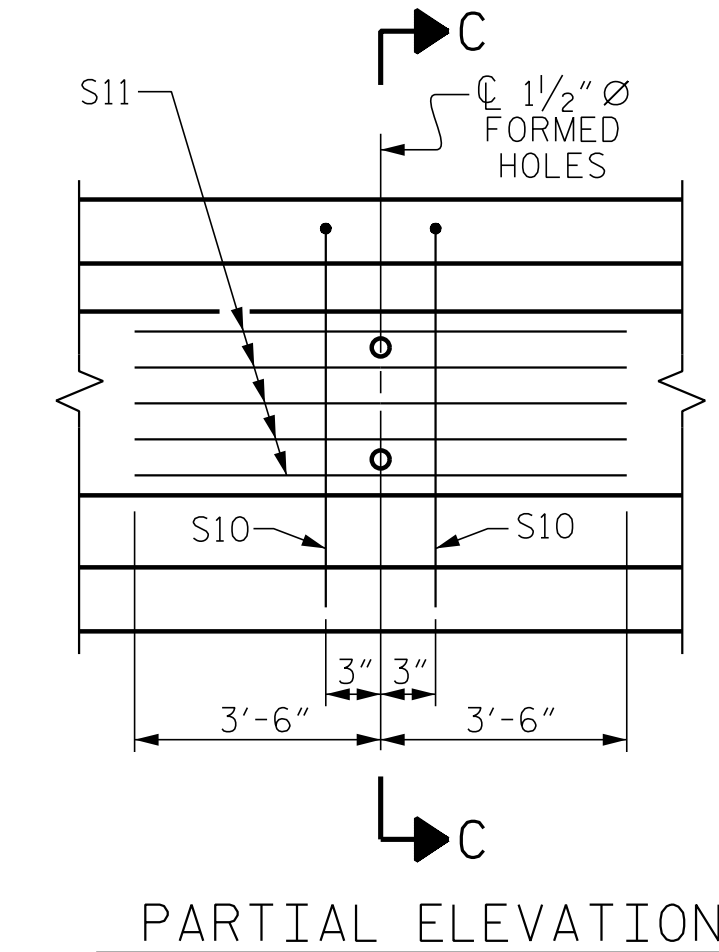
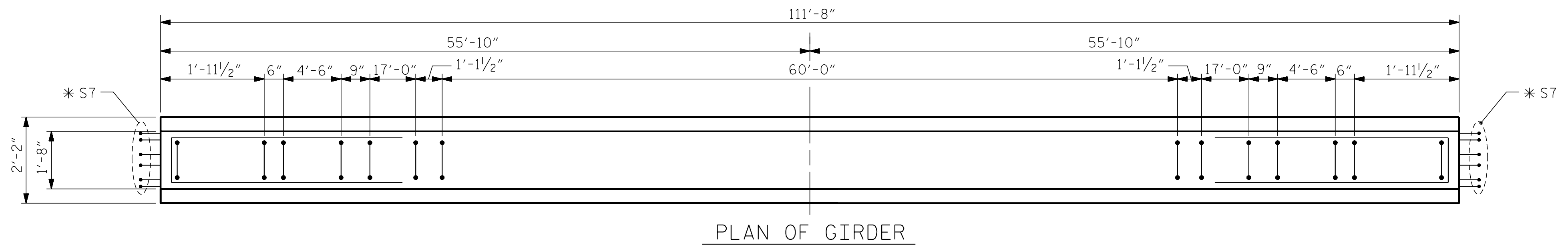
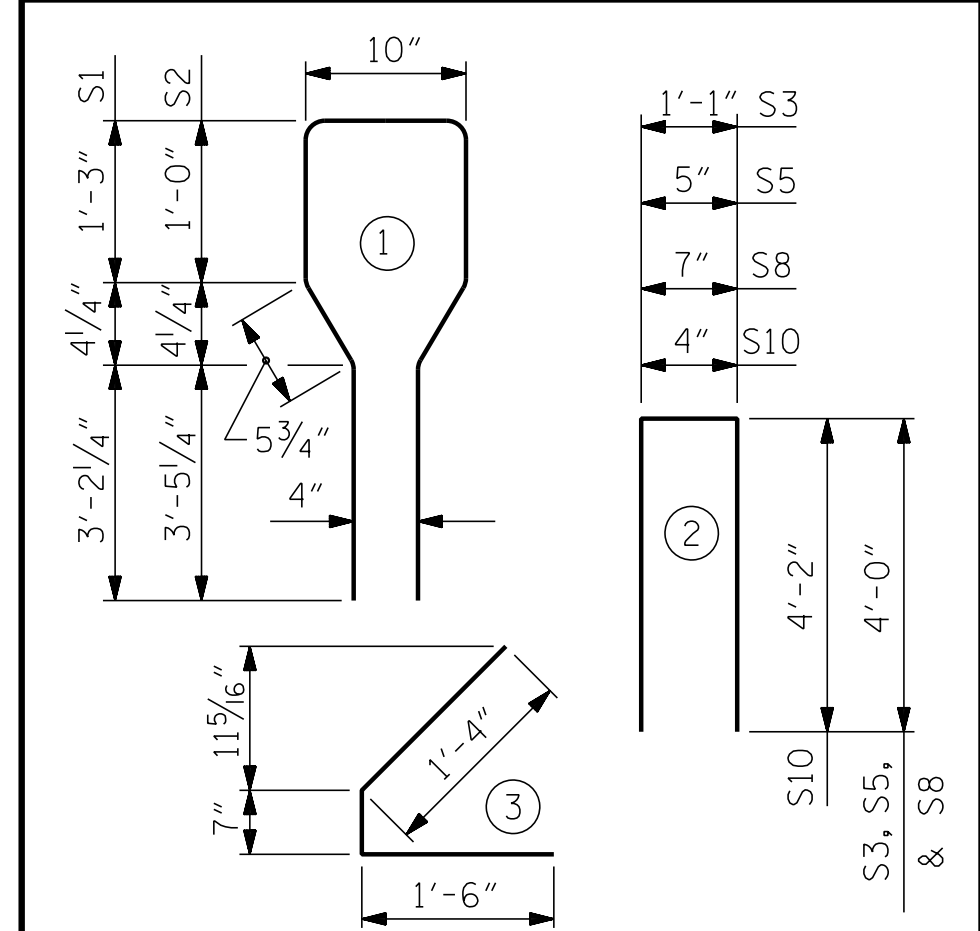
- FULLY BONDED STRAND
- DENOTES STRAND TO BE DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◐ DENOTES STRAND TO BE DEBONDED FOR 6'-0" FROM END OF GIRDER
- ◑ DENOTES STRAND TO BE DEBONDED FOR 10'-0" FROM END OF GIRDER
- ◒ DENOTES STRAND TO BE DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◓ DENOTES STRAND TO BE DEBONDED FOR 22'-0" FROM END OF GIRDER

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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	87	#4	1	10'-8"	620
S2	14	#6	1	10'-8"	224
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
* S7	24	#5	STR	3'-8"	92
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
S13	2	#3	STR	1'-4"	1

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

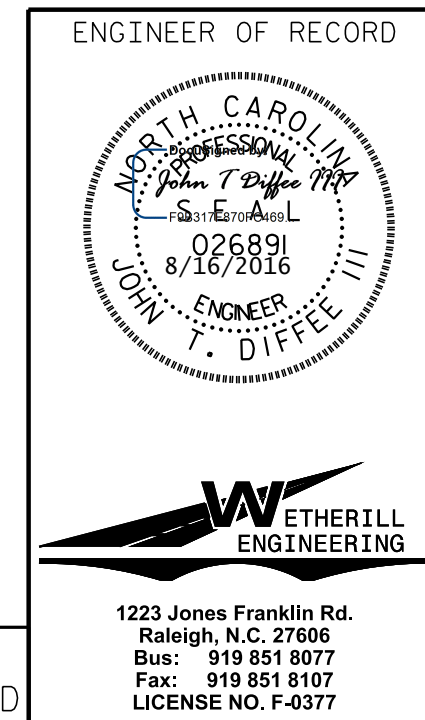
**BAR TYPES**  
ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L. R. STRANDS	
LB.	C.Y.	No.	
1257	22.7	50	

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	111'-8"	446.67

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 1 OF 3



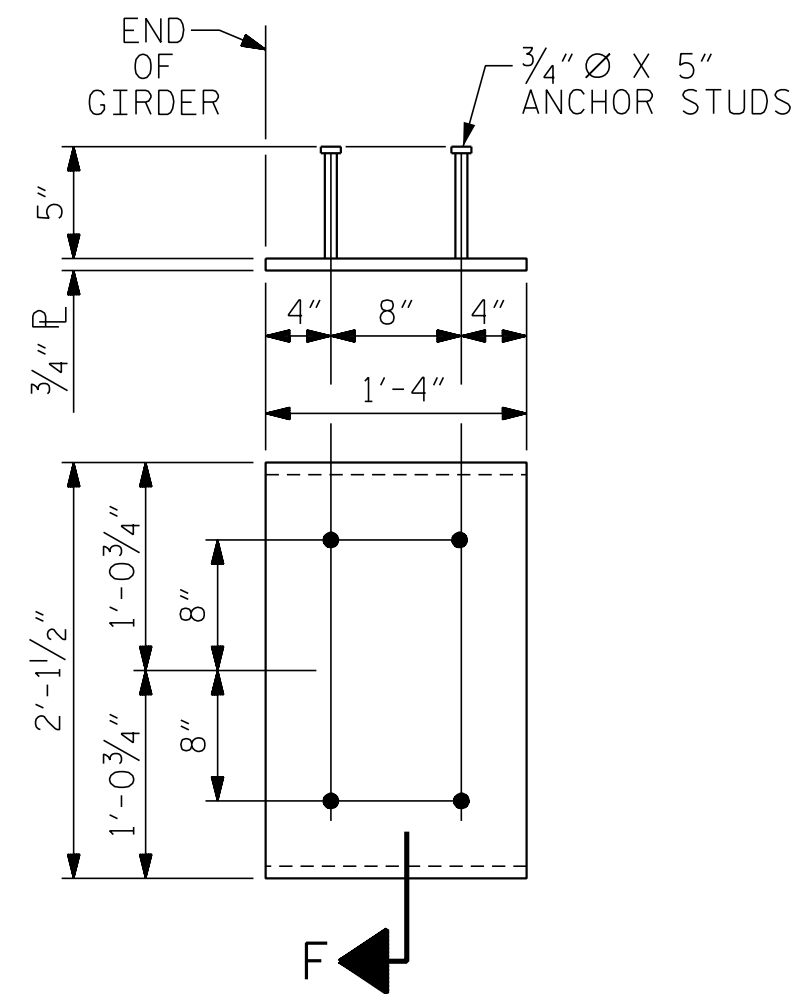
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

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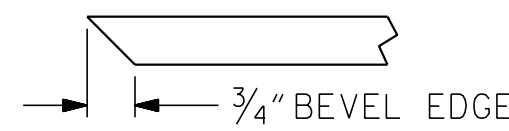
DRAWN BY : J. PENDERGRAFT DATE : 2-16  
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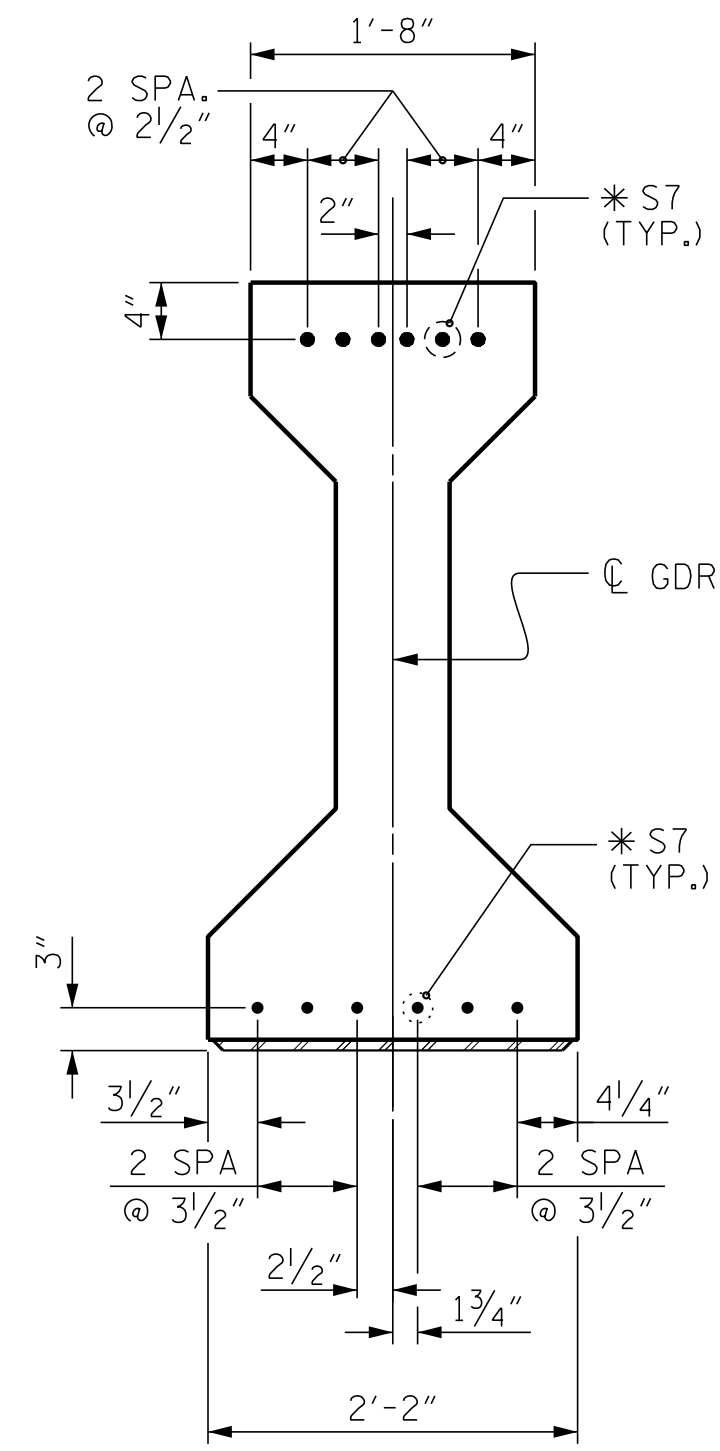
SHEET NO.  
S-9  
TOTAL SHEETS  
23



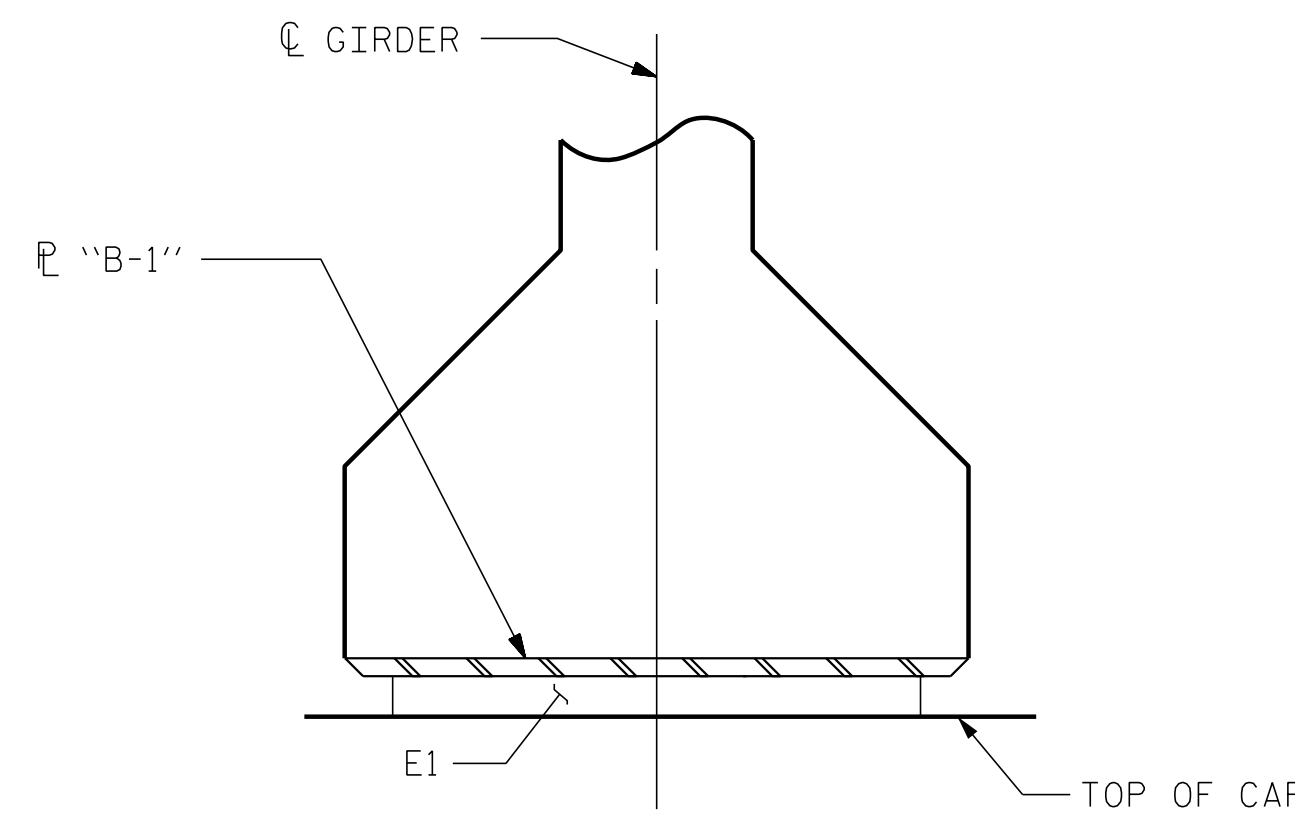
**EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER**  
(2 REQ'D PER GIRDER)



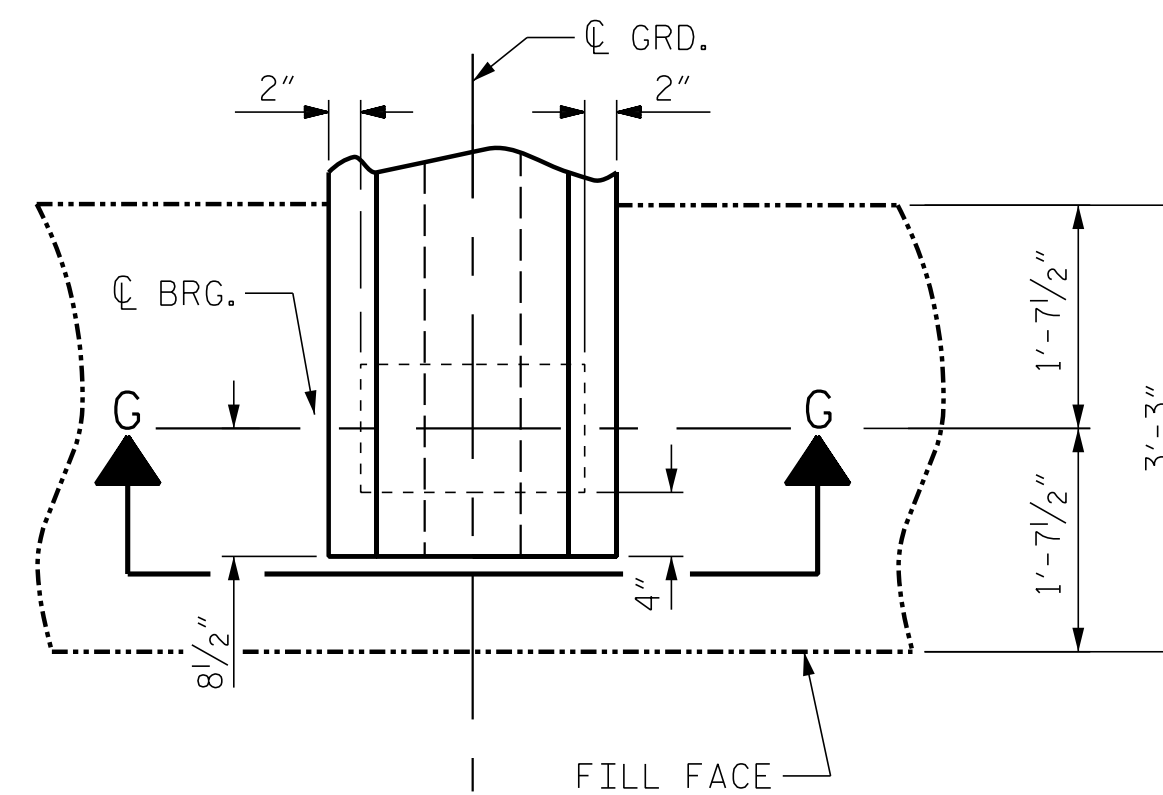
**SECTION "F"**  
(SEE NOTES)



**DETAIL "A"**  
(FOR AASHTO TYPE IV GIRDERS)



**SECTION G-G**



**TYPICAL PLAN @ END BENT**

**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 7,100 PSI.

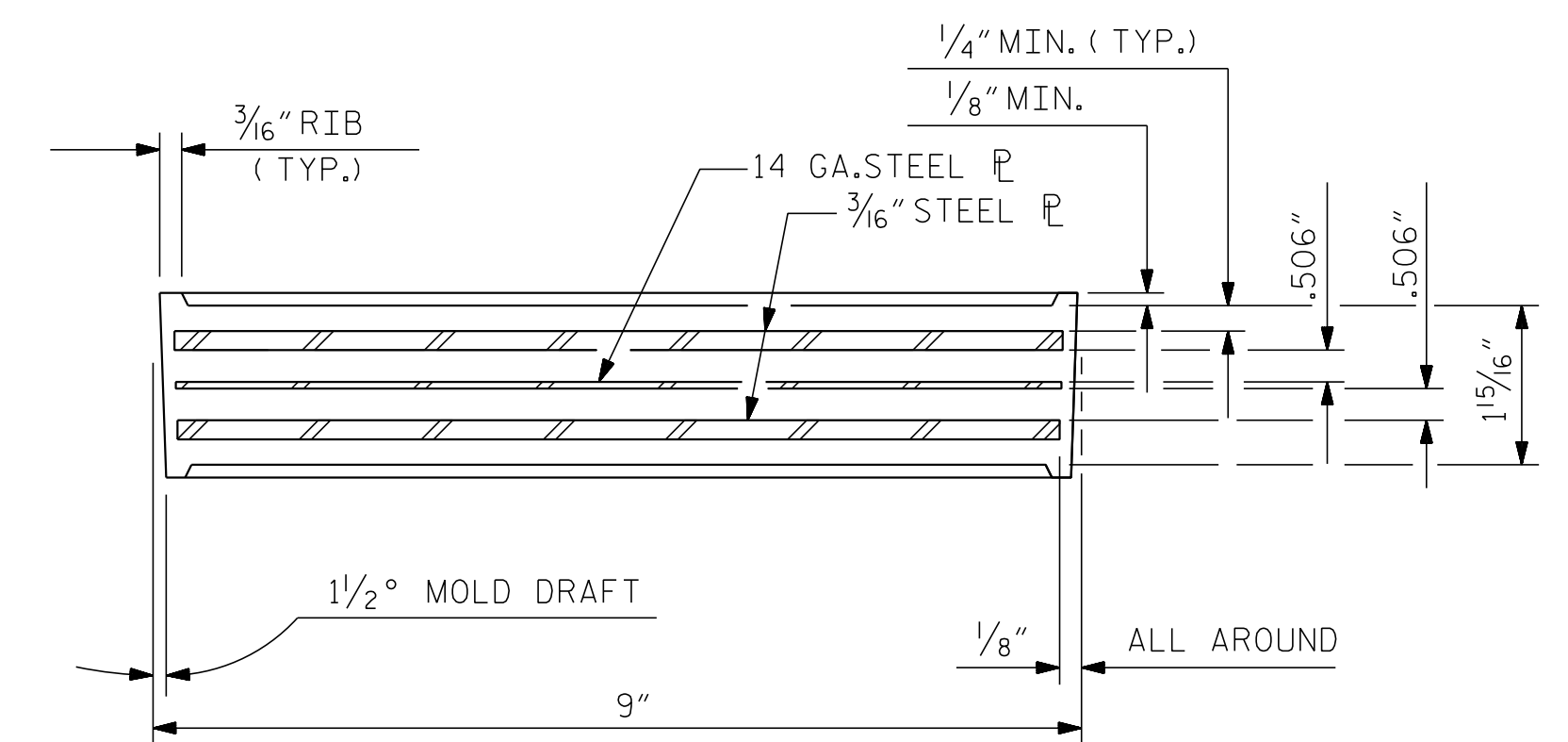
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

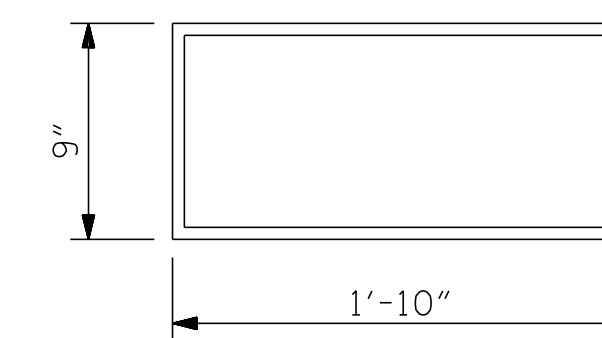
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



**TYPICAL SECTION OF ELASTOMERIC BEARINGS**



**E1 ( 8 REQ'D )**

**PLAN VIEW OF ELASTOMERIC BEARING**

**TYPE IV**

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

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

SHEET 2 OF 3

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
TWENTIETH POINTS	SPAN "A"																					
	GIRDERS 1 & 4																					
	0	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	0	
CAMBER ( GIRDER ALONE IN PLACE )	↑	0.000	0.051	0.101	0.148	0.192	0.230	0.262	0.288	0.307	0.319	0.323	0.319	0.307	0.288	0.262	0.230	0.192	0.148	0.101	0.051	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.040	0.079	0.116	0.151	0.183	0.210	0.232	0.249	0.258	0.260	0.258	0.249	0.232	0.210	0.183	0.151	0.116	0.079	0.040	0.000
FINAL CAMBER	↑	0	1/8"	1/4"	3/8"	1/2"	9/16"	5/8"	11/16"	11/16"	3/4"	3/4"	3/4"	11/16"	11/16"	5/8"	9/16"	1/2"	3/8"	1/4"	1/8"	0

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
TWENTIETH POINTS	SPAN "A"																					
	GIRDERS 2 & 3																					
	0	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	0	
CAMBER ( GIRDER ALONE IN PLACE )	↑	0.000	0.051	0.101	0.148	0.192	0.230	0.262	0.288	0.307	0.319	0.323	0.319	0.307	0.288	0.262	0.230	0.192	0.148	0.101	0.051	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.000	0.044	0.087	0.129	0.168	0.203	0.233	0.258	0.276	0.286	0.288	0.286	0.276	0.258	0.233	0.203	0.168	0.129	0.087	0.044	0.000
FINAL CAMBER	↑	0	1/16"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	1/4"	3/16"	1/16"	0

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

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ENGINEER OF RECORD

**W. ETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

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:	S-10
1			3			TOTAL SHEETS
2			4			23

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

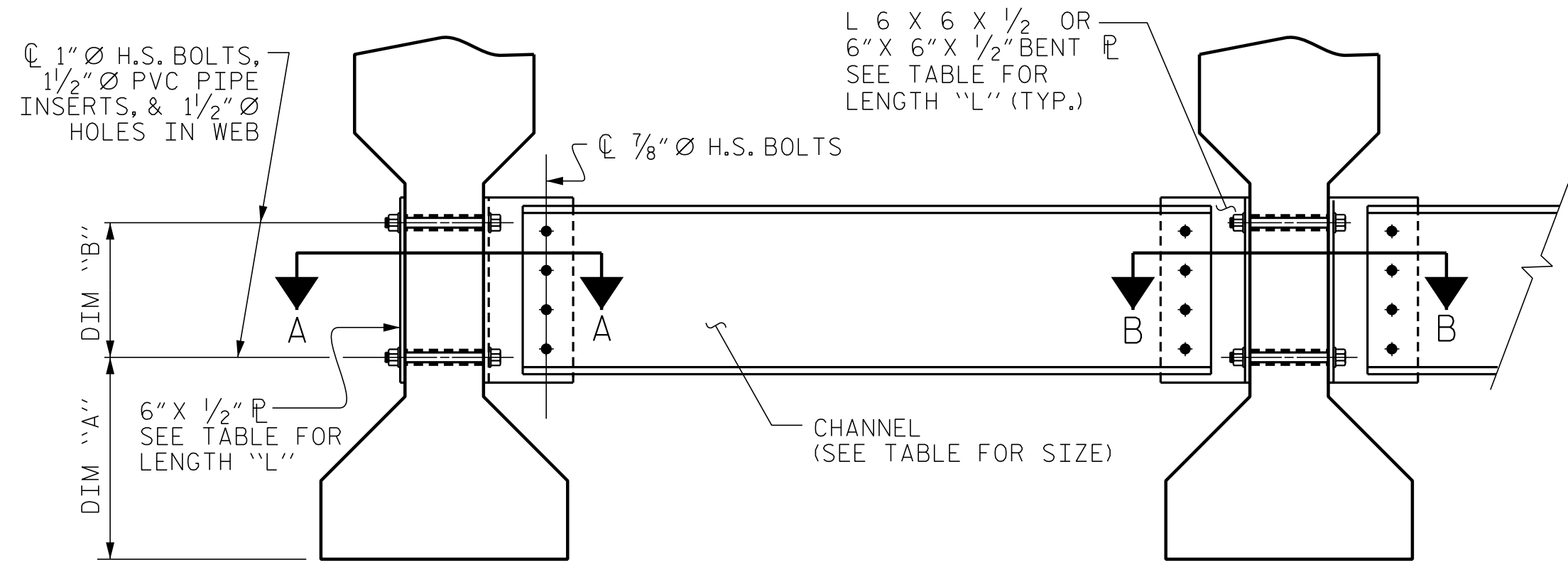
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

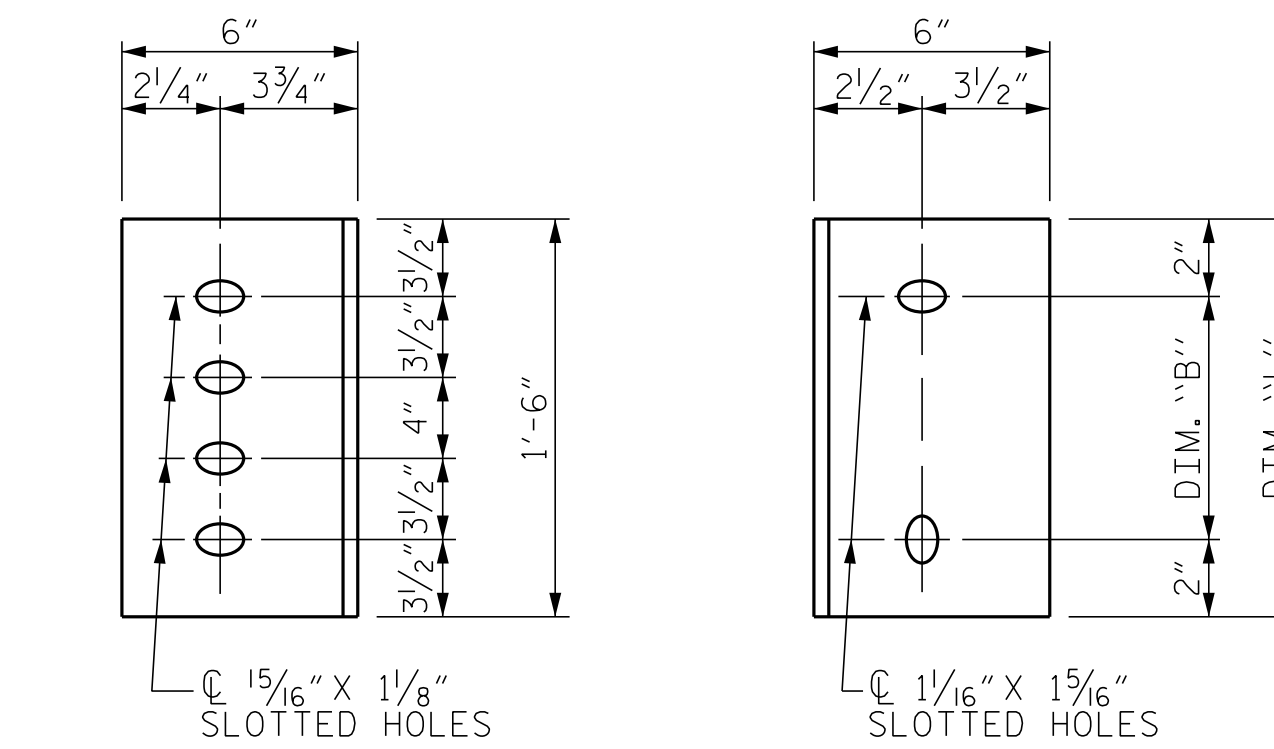
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

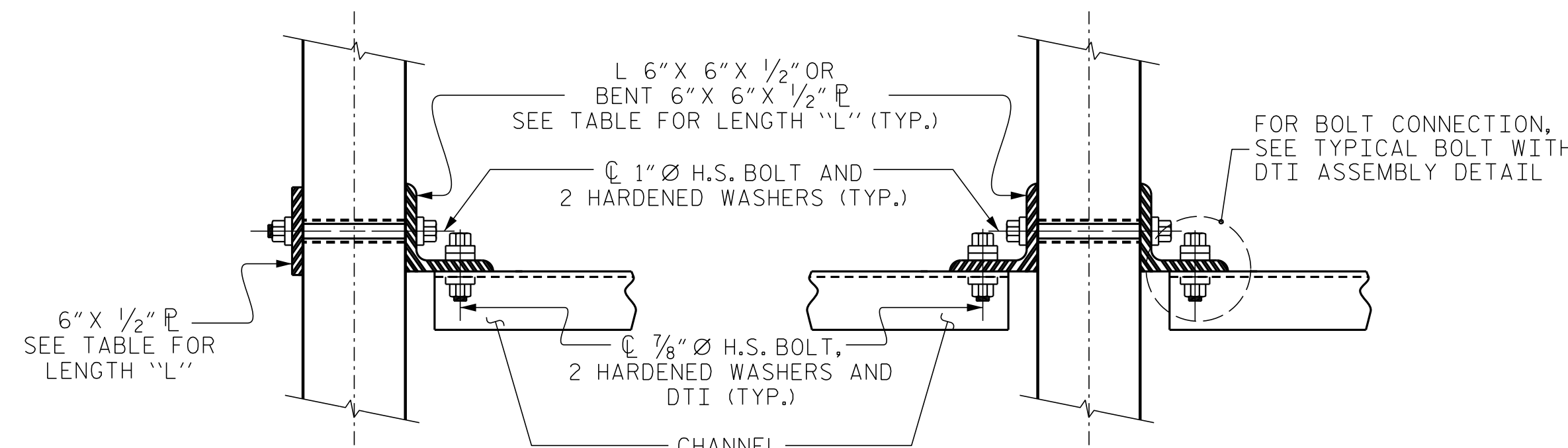
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER INTERIOR GIRDER  
PART SECTION AT INTERMEDIATE DIAPHRAGM  
(TYPE IV GIRDER SHOWN)



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



SECTION A-A SECTION B-B  
CONNECTION DETAILS

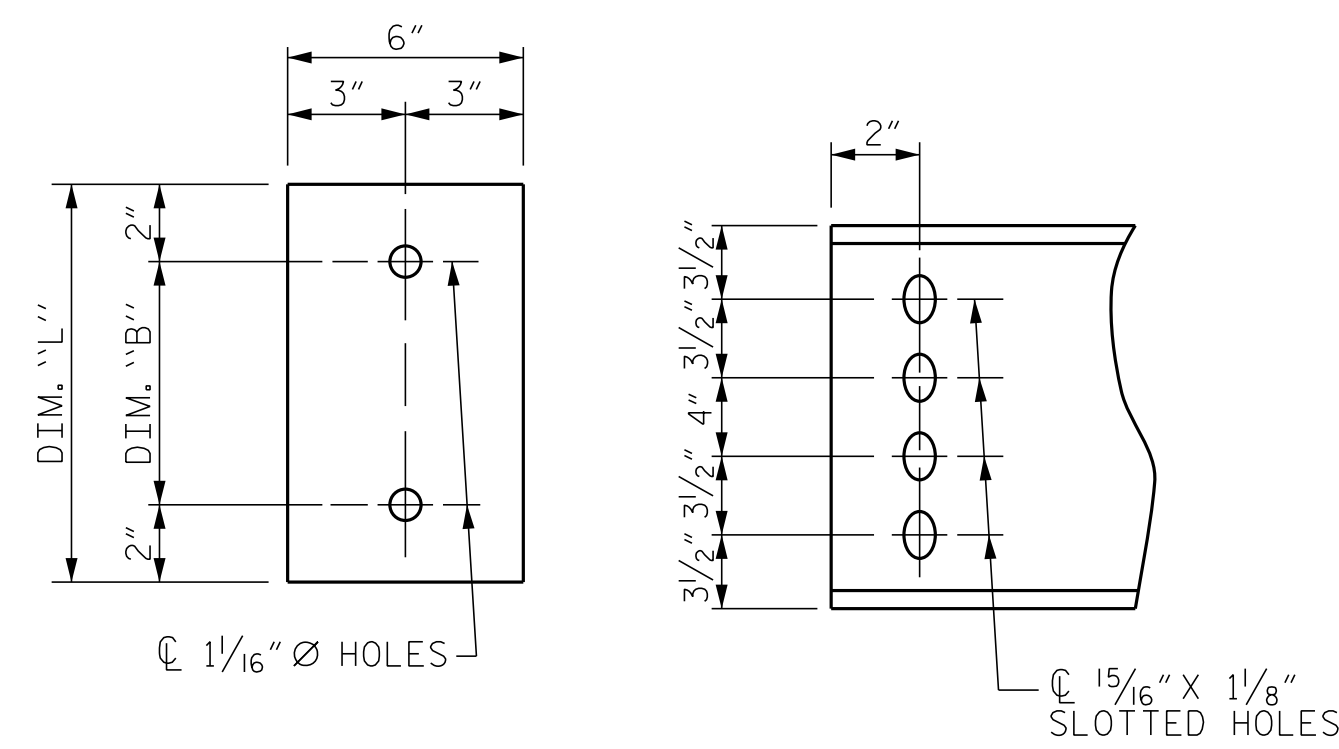
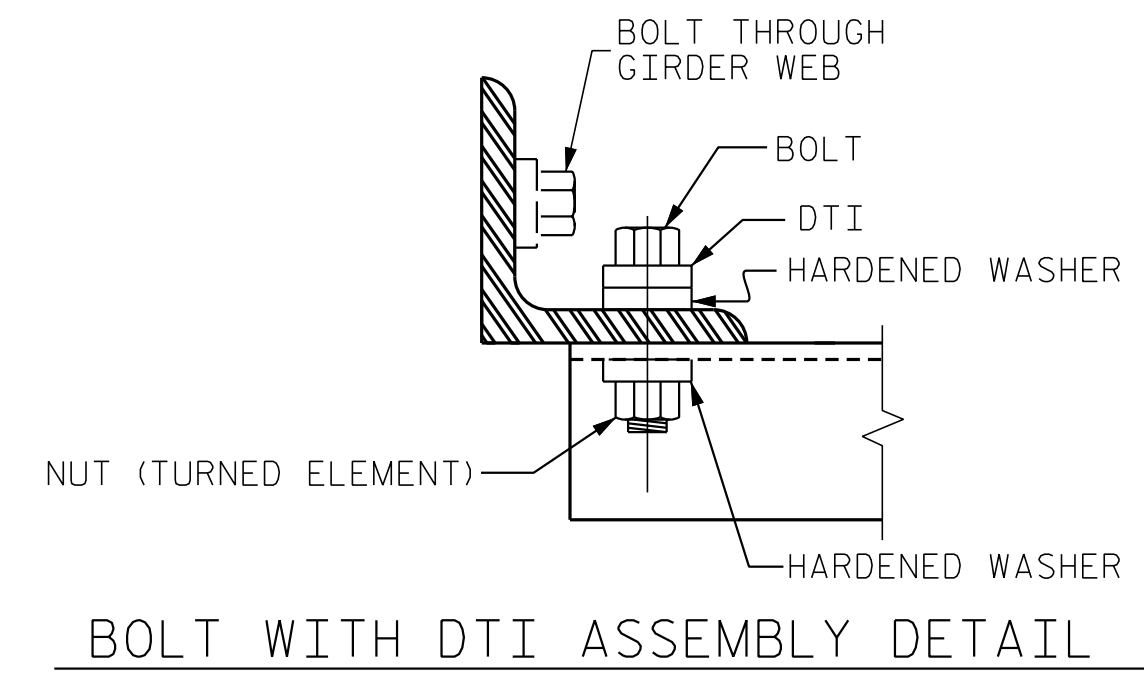


PLATE DETAILS CHANNEL END  
(TYPE IV GDR.)

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"



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-5769  
JOHNSTON COUNTY  
STATION: 33+26.33 -L-

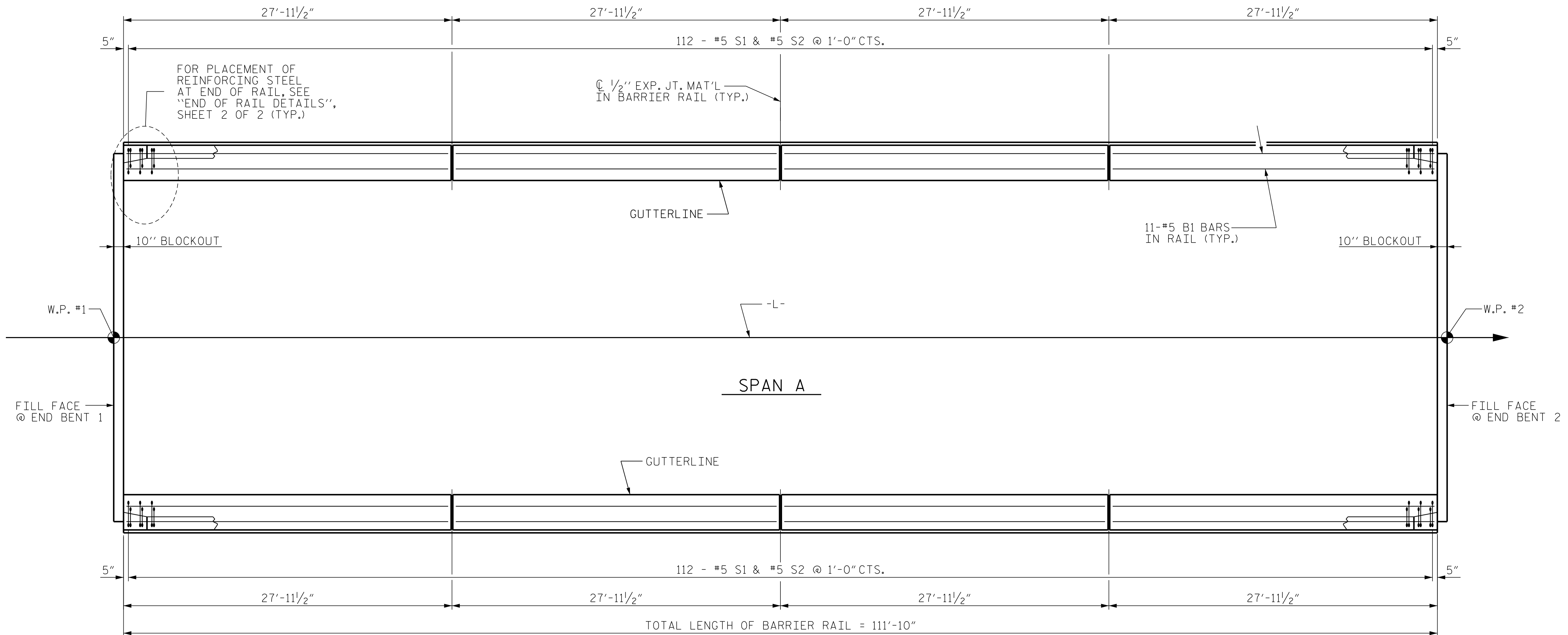
SHEET 3 OF 3

ENGINEER OF RECORD  JOHN T. DIFFE, P.E. ETHERILL ENGINEERING		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE II, III, & IV PRESTRESSED CONCRETE GIRDERS			
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-11					
TOTAL SHEETS 23					

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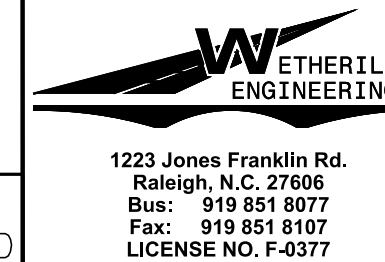
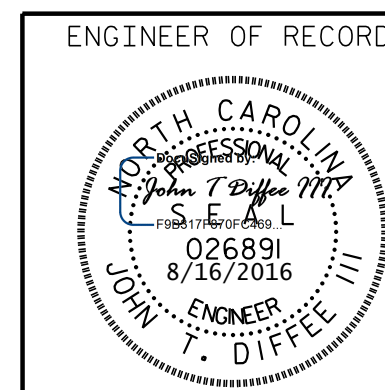


**PLAN OF CONCRETE BARRIER RAIL**

ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 CONCRETE  
 BARRIER RAIL

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

SHEET NO.
S-12
TOTAL SHEETS
23

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NOTES

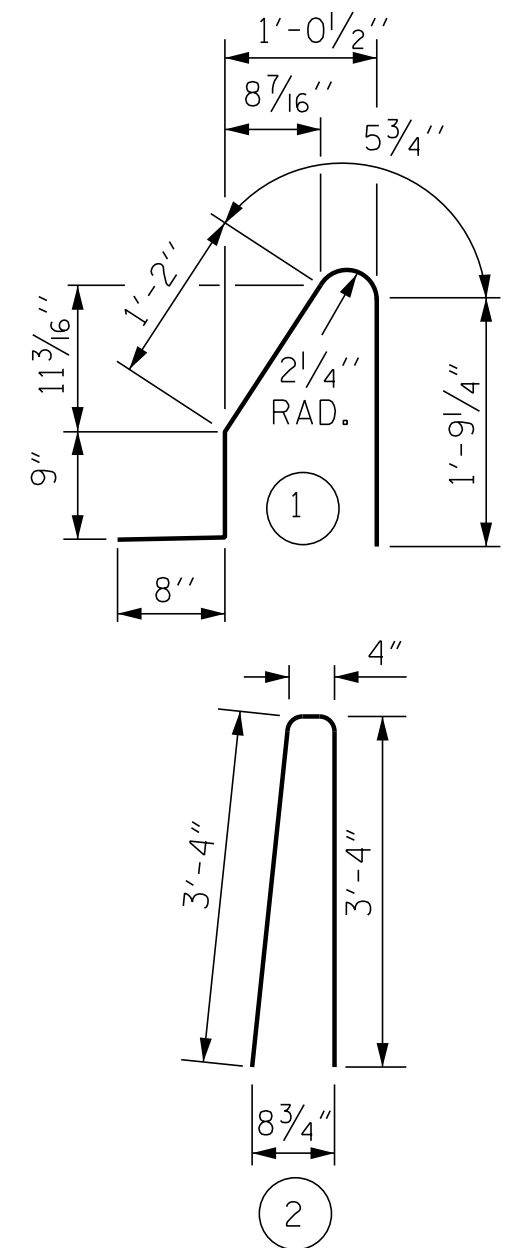
THE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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.

THE #5 S1 & S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN THE BARRIER RAIL.

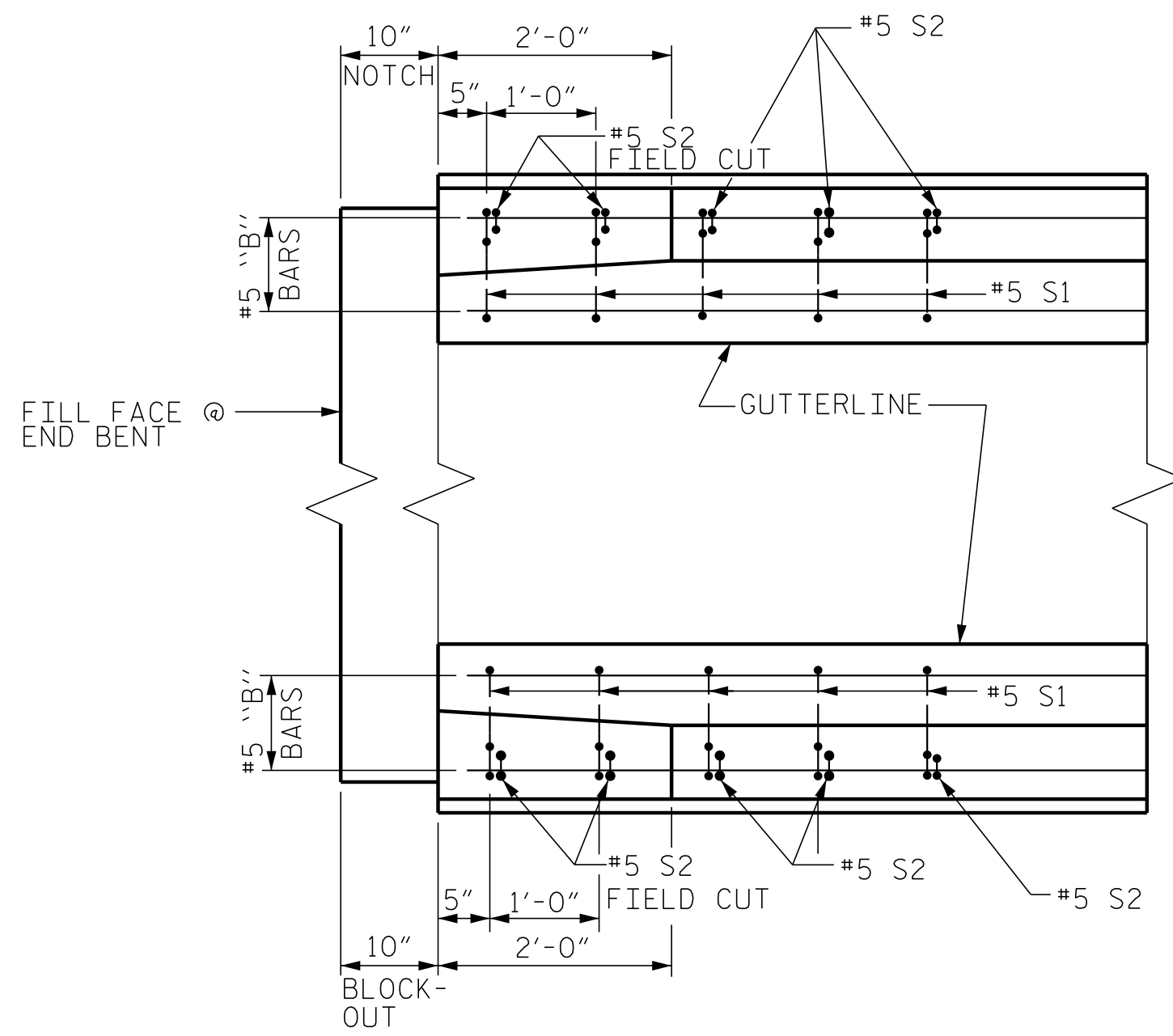
BAR TYPES



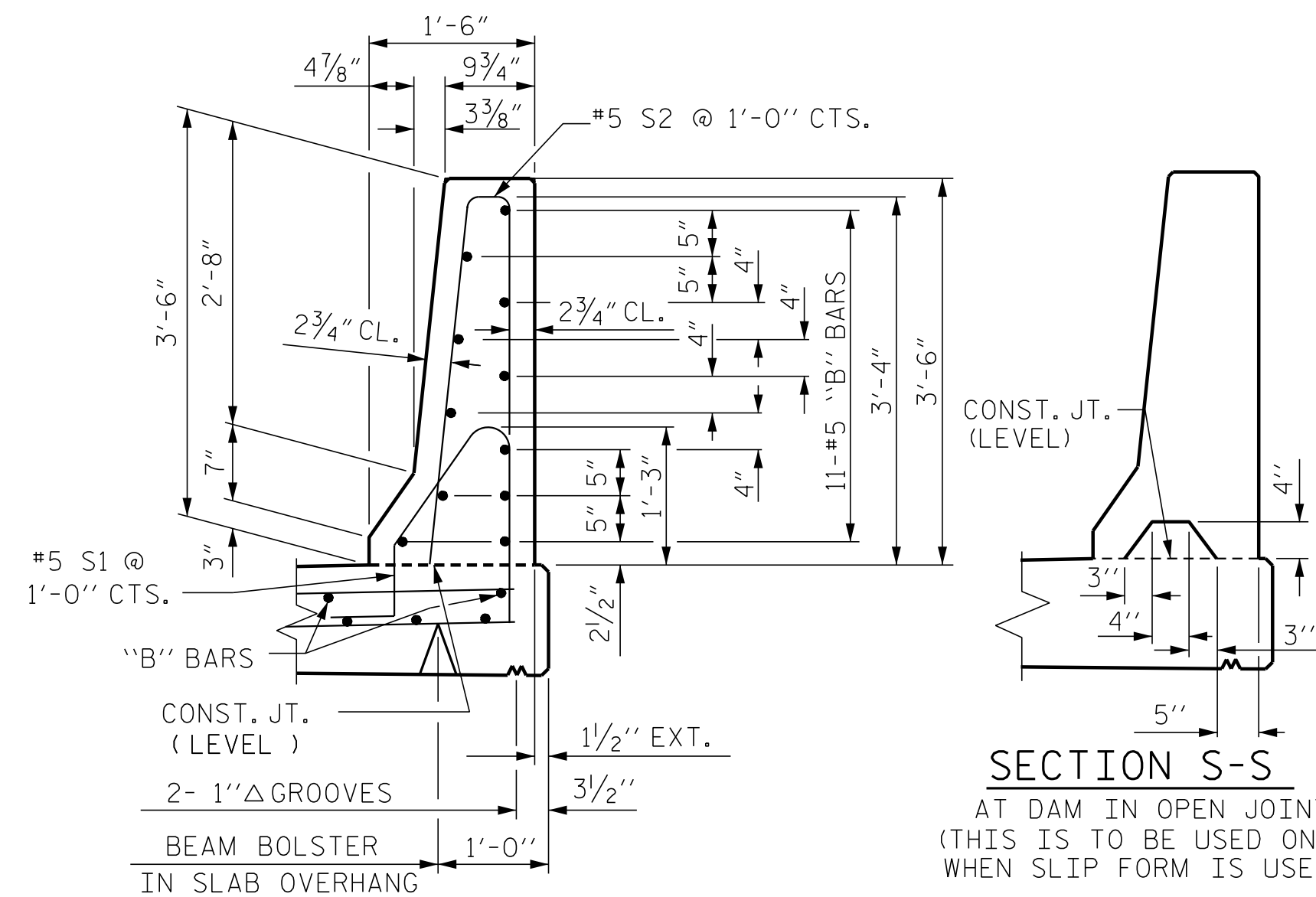
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

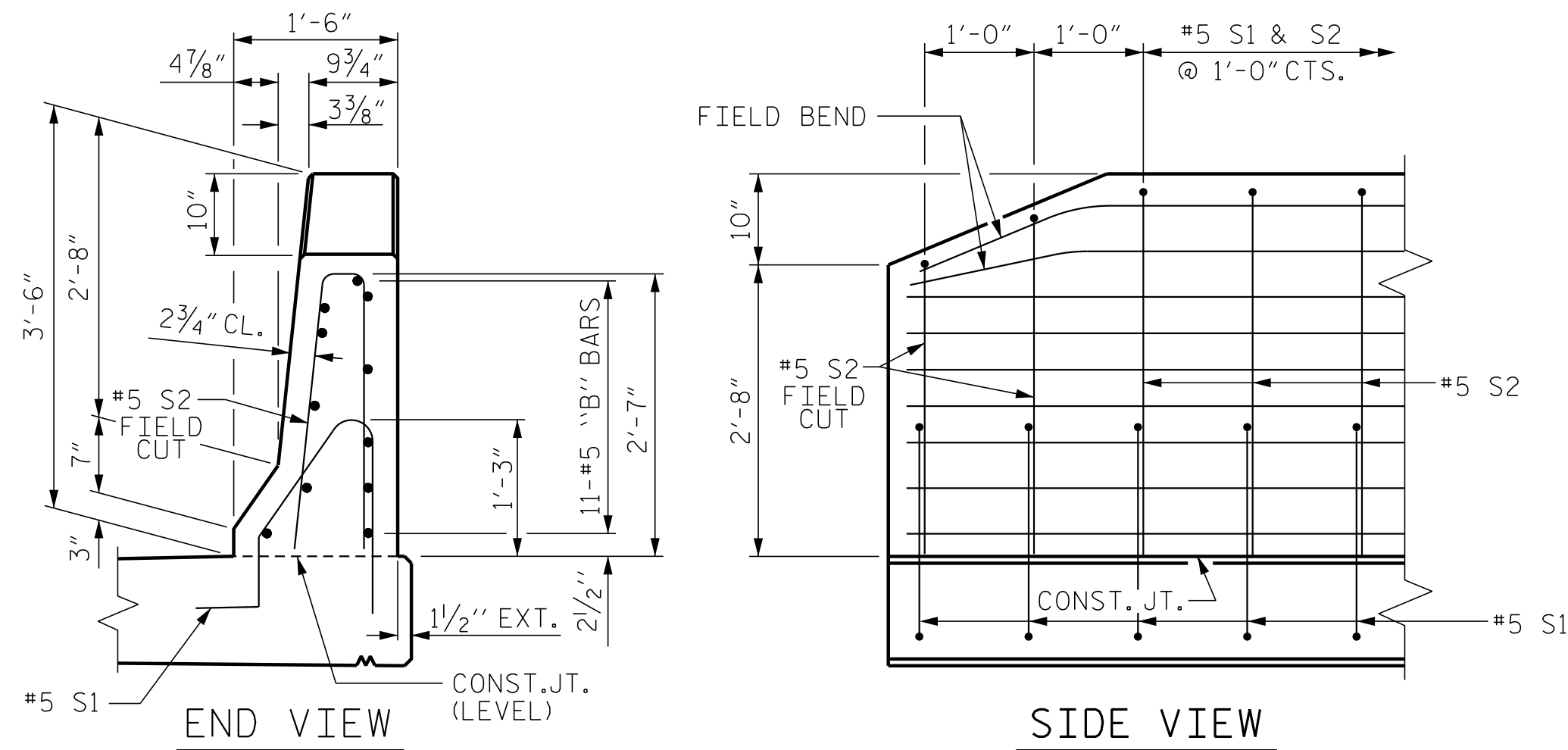
FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5	STR	27'-7"	2532
* S1	224	#5	1	4'-10"	1129
* S2	224	#5	2	7'-0"	1635
* EPOXY COATED REINFORCING STEEL					5296 LBS.
CLASS AA CONCRETE					30.4 CU. YDS.
CONCRETE BARRIER RAIL					223.67 LIN. FT.



PLAN

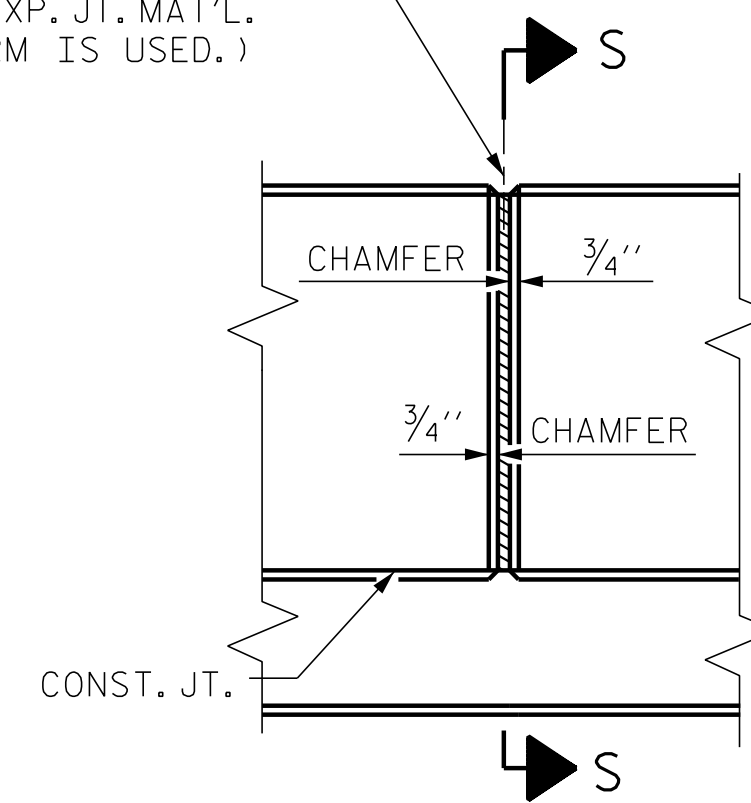


SECTION THRU RAIL



END OF RAIL DETAILS

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



ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS

PROJECT NO. R-5769  
JOHNSTON COUNTY  
STATION: 33+26.33 -L-

SHEET 2 OF 2

ENGINEER OF RECORD

KEITH T. DIFFIE, P.E.  
026891  
8/16/2016

ETHERILL ENGINEERING

1223 Jones Franklin Rd.  
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : J. PENDERGRAFT DATE : 2-16  
CHECKED BY : D. HODGE DATE : 5-16

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NOTES

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

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

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

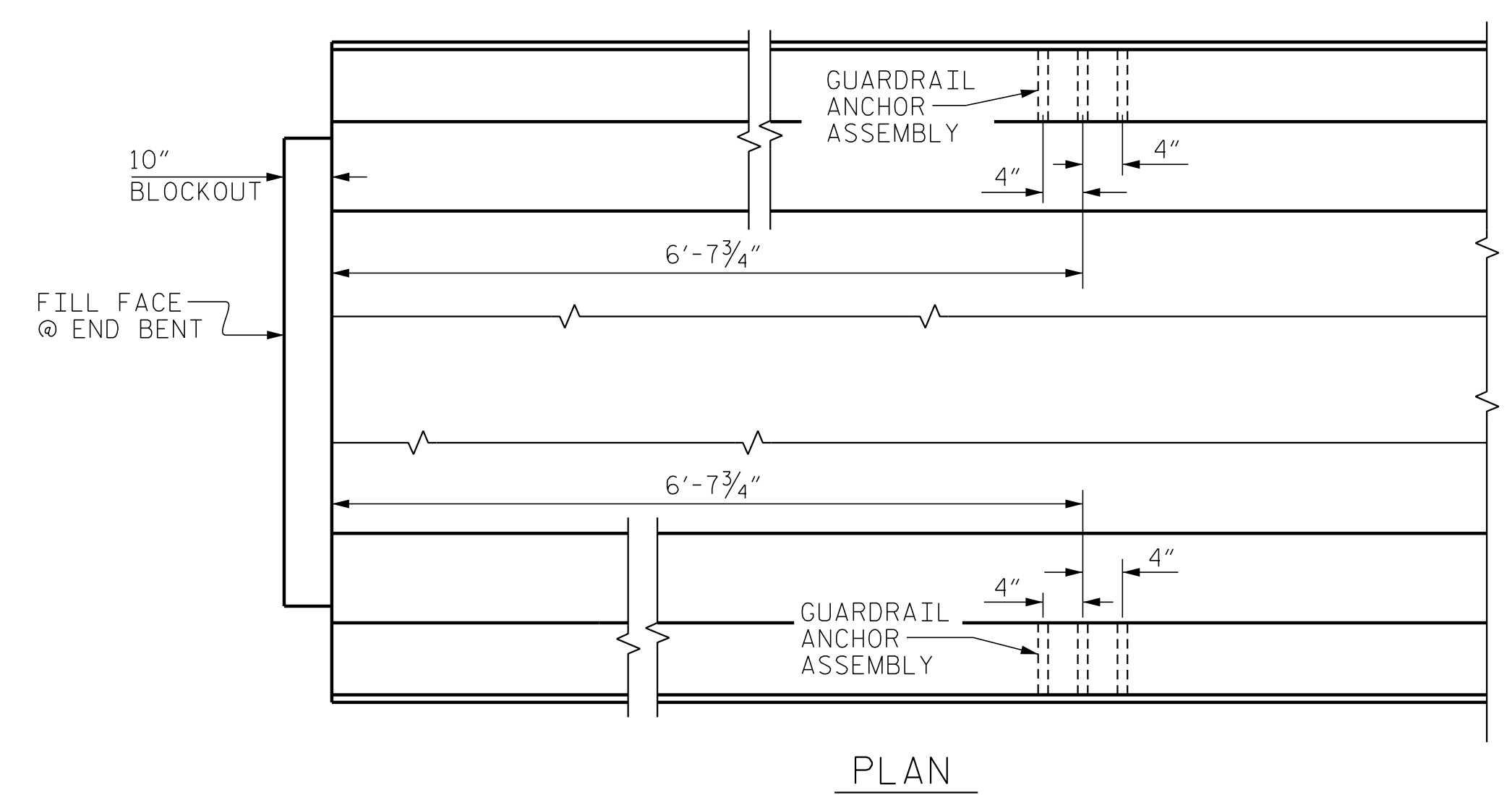
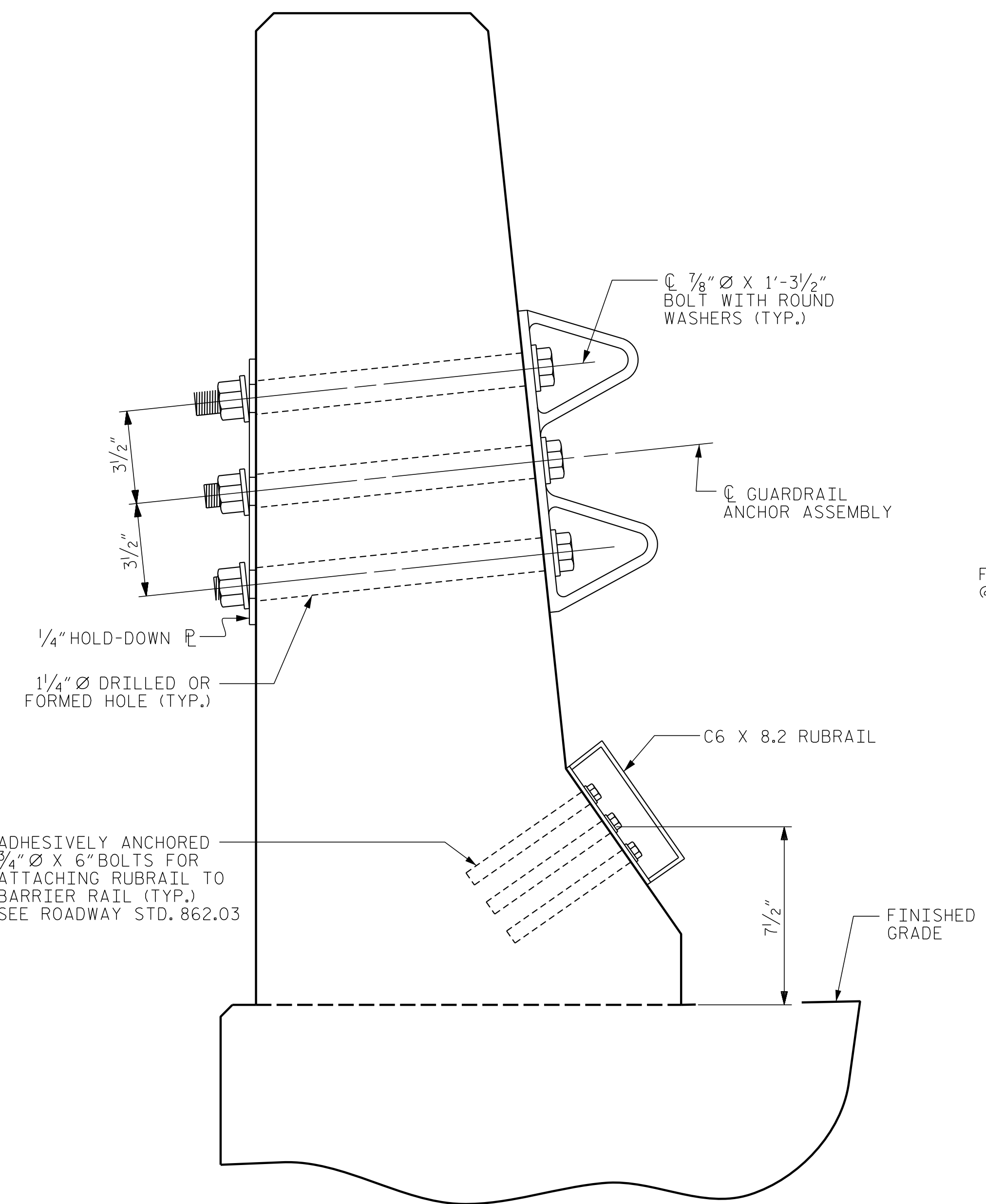
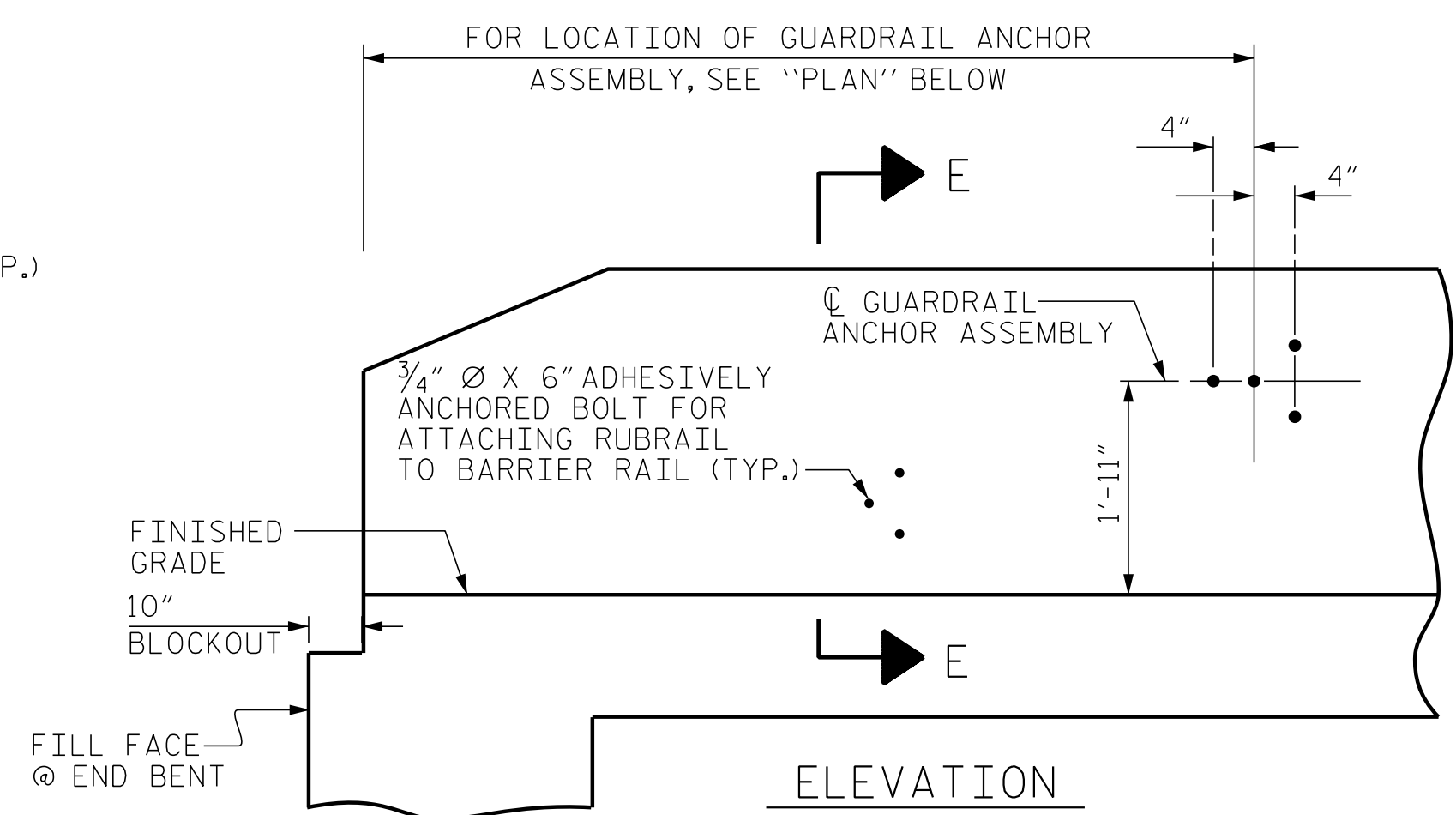
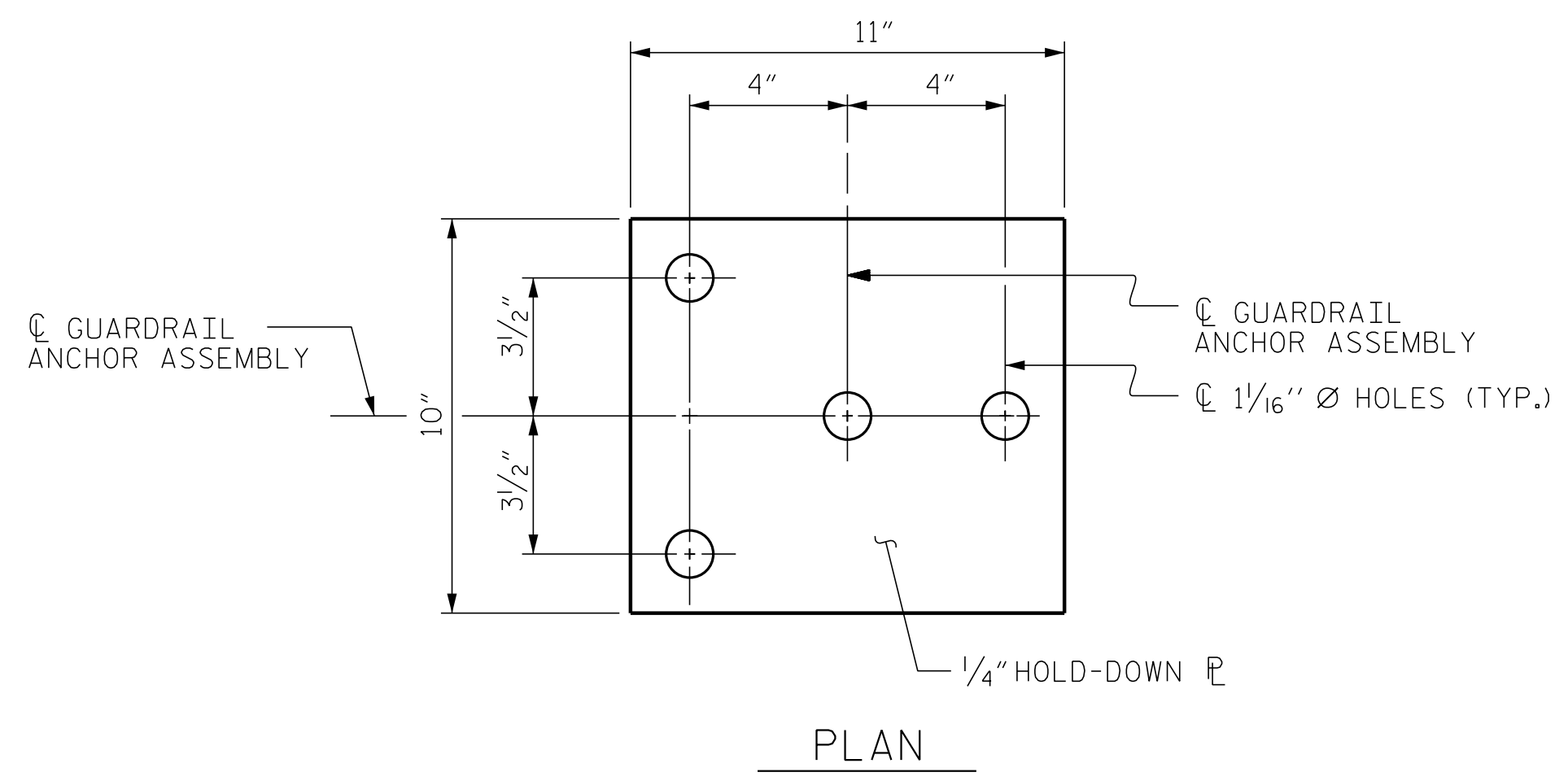
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

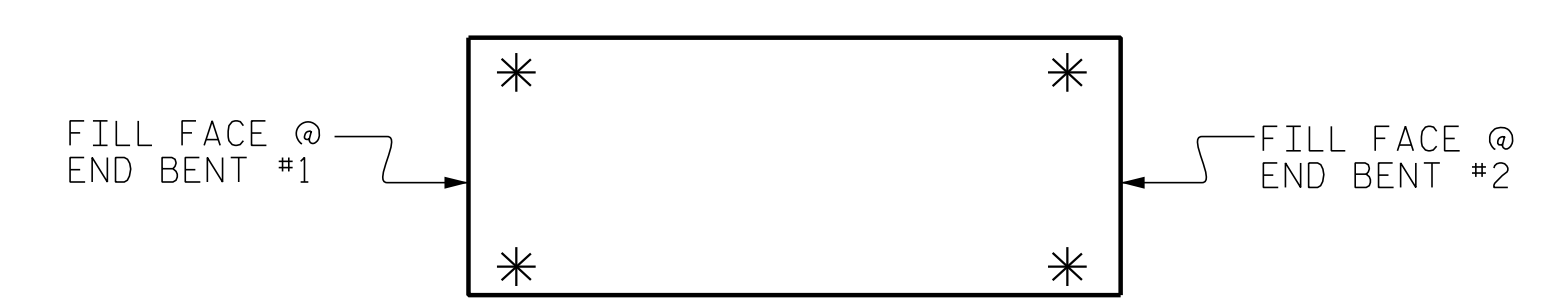
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

ENGINEER OF RECORD

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 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL

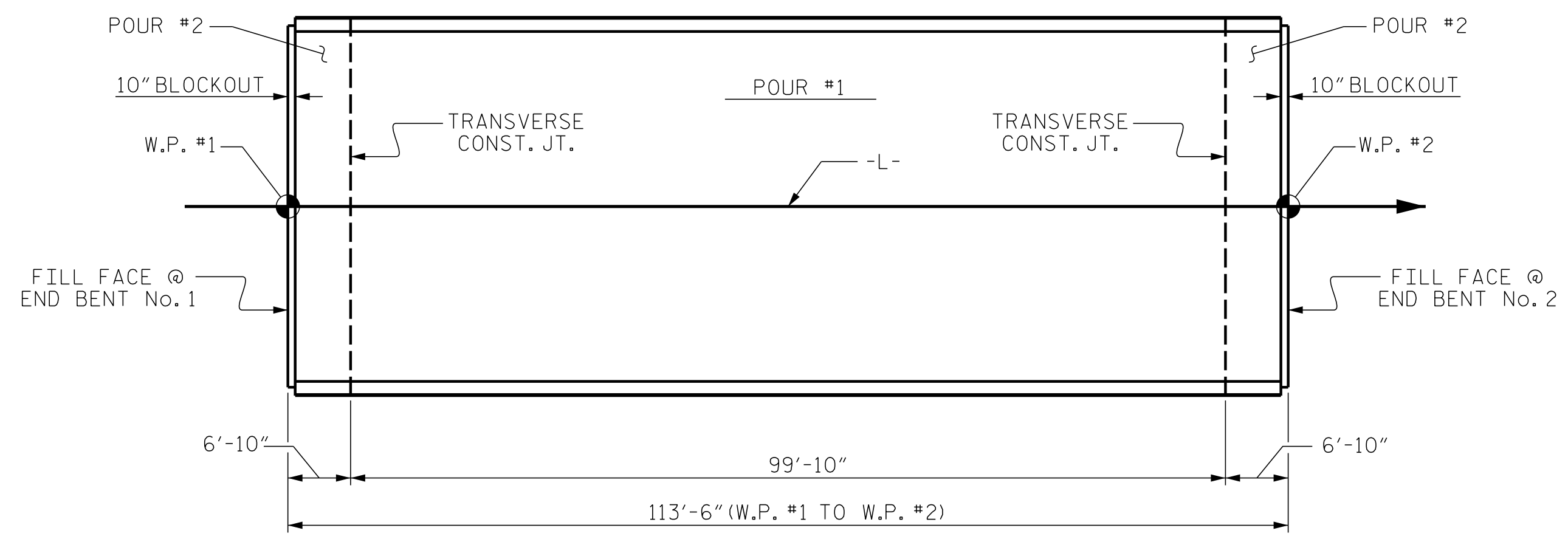
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : J. PENDERGRAFT DATE : 2-16  
 CHECKED BY : D. HODGE DATE : 5-16

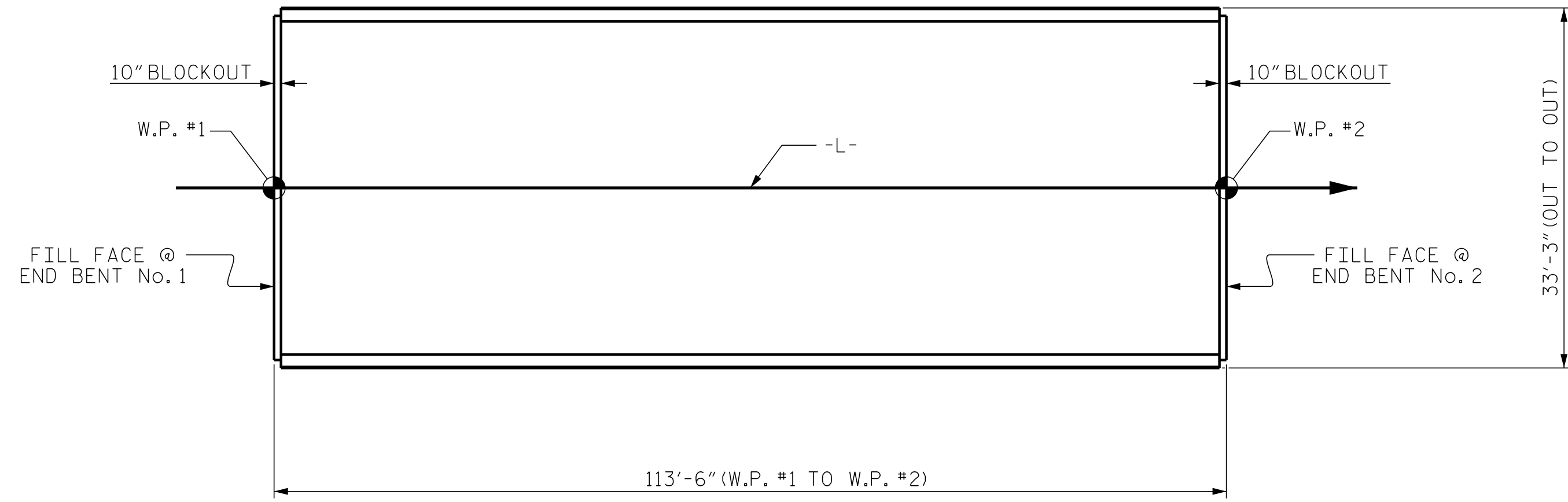
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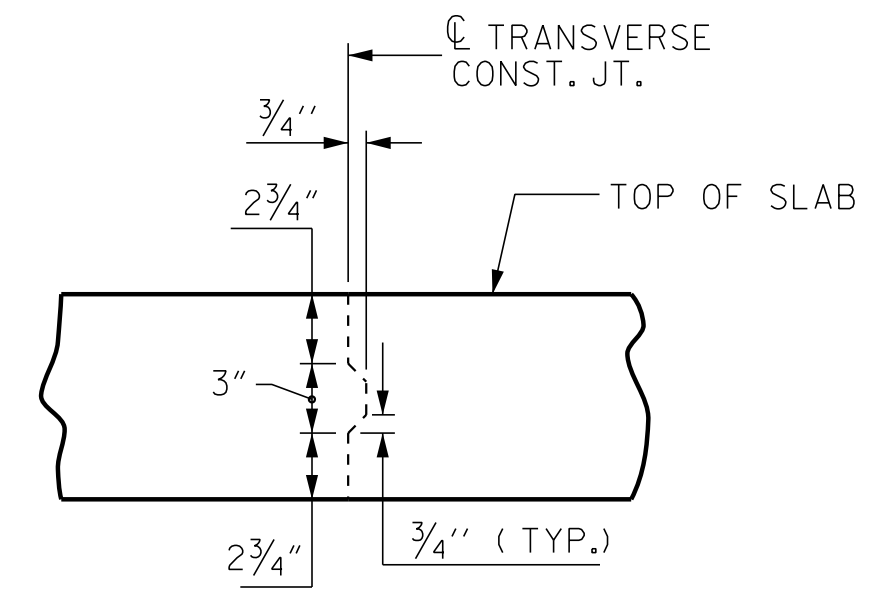


**POURING SEQUENCE**



**LAYOUT FOR COMPUTING AREA  
REINFORCED CONCRETE DECK SLAB  
(SQ. FT. = 3,774 )**

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"			



**TRANSVERSE CONSTRUCTION JOINT DETAIL**

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

GROOVING BRIDGE FLOORS	
APPROACH SLABS	774 SQ.FT.
BRIDGE DECK	3,011 SQ.FT.
<b>TOTAL</b>	<b>3,785 SQ.FT.</b>

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT

**—SUPERSTRUCTURE BILL OF MATERIAL—**

	CLASS AA CONCRETE ( CU. YDS. )	REINFORCING STEEL ( LBS. )	* EPOXY COATED REINFORCING STEEL ( LBS. )
POUR #1	102.6		
POUR #2	44.8		
<b>TOTALS**</b>	<b>147.4</b>	<b>12,245</b>	<b>13,022</b>

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

**BILL OF MATERIAL**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	206	#5	STR	32'-11"	7072
A2	206	#5	STR	32'-11"	7072
* B1	8	#4	STR	29'-5"	157
* B2	86	#7	STR	22'-6"	3955
* B3	66	#4	STR	24'-10"	1095
B4	74	#5	STR	56'-10"	4387
K1	20	#4	STR	16'-5"	219
K2	6	#4	STR	6'-7"	26
K3	12	#4	STR	7'-7"	61
K4	6	#4	STR	7'-1"	28
K5	6	#4	STR	6'-1"	24
K6	8	#4	STR	2'-7"	14
K7	8	#4	STR	3'-1"	16
K8	4	#4	STR	2'-4"	6
* S1	50	#4	1	11'-11"	398
* S2	50	#4	1	10'-4"	345
U1	50	#4	2	10'-11"	365
U2	4	#4	2	10'-1"	27
REINFORCING STEEL				LBS.	12,245
* EPOXY COATED REINFORCING STEEL				LBS.	13,022

\* THESE BARS ARE EPOXY COATED.

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

ENGINEER OF RECORD

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 Fax: 919 851 8107  
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 RALEIGH

**SUPERSTRUCTURE  
 BILL OF MATERIAL**

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

TOTAL SHEETS: 23

DRAWN BY : D. HODGE DATE : 3/16  
 CHECKED BY : G.M. GILLAND DATE : 3/16

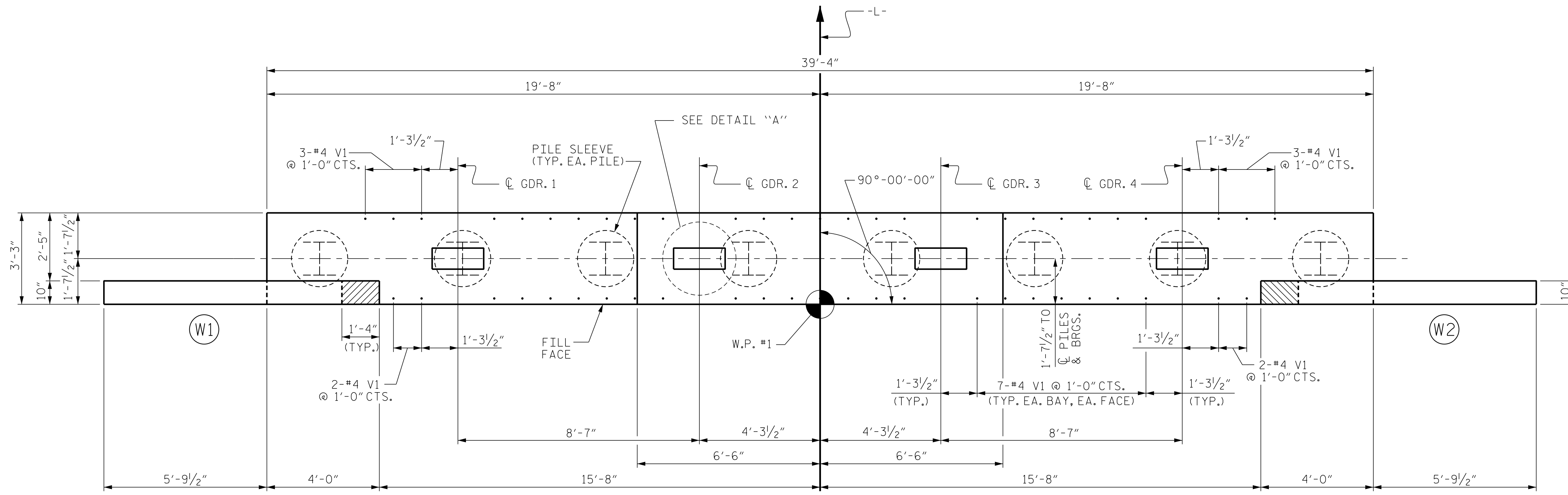
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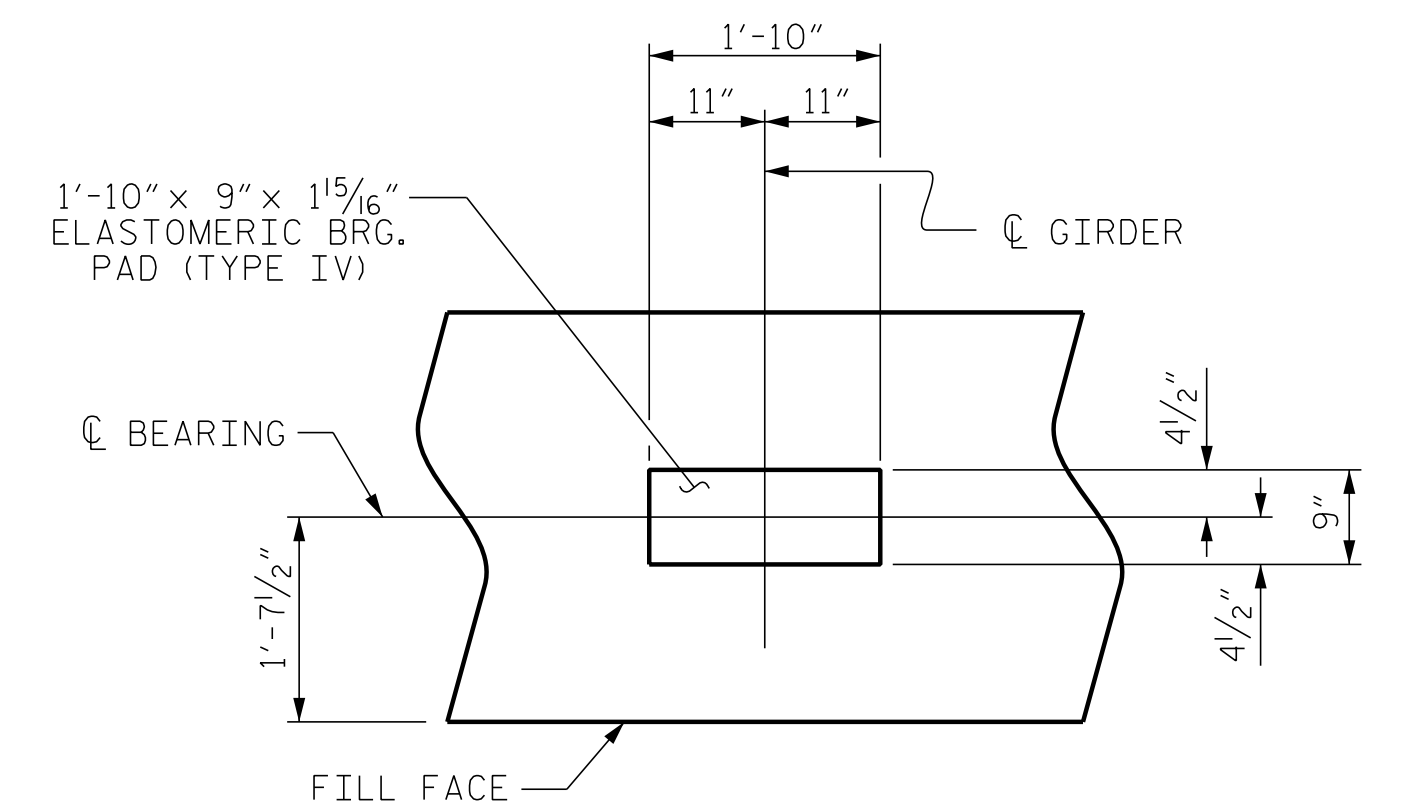
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND AREA PAST THE EDGE OF THE SUPERSTRUCTURE AS SHOWN ON DETAIL B, SHEET 3 OF 3, SHALL BE RAKED TO A DEPTH OF 1/4".

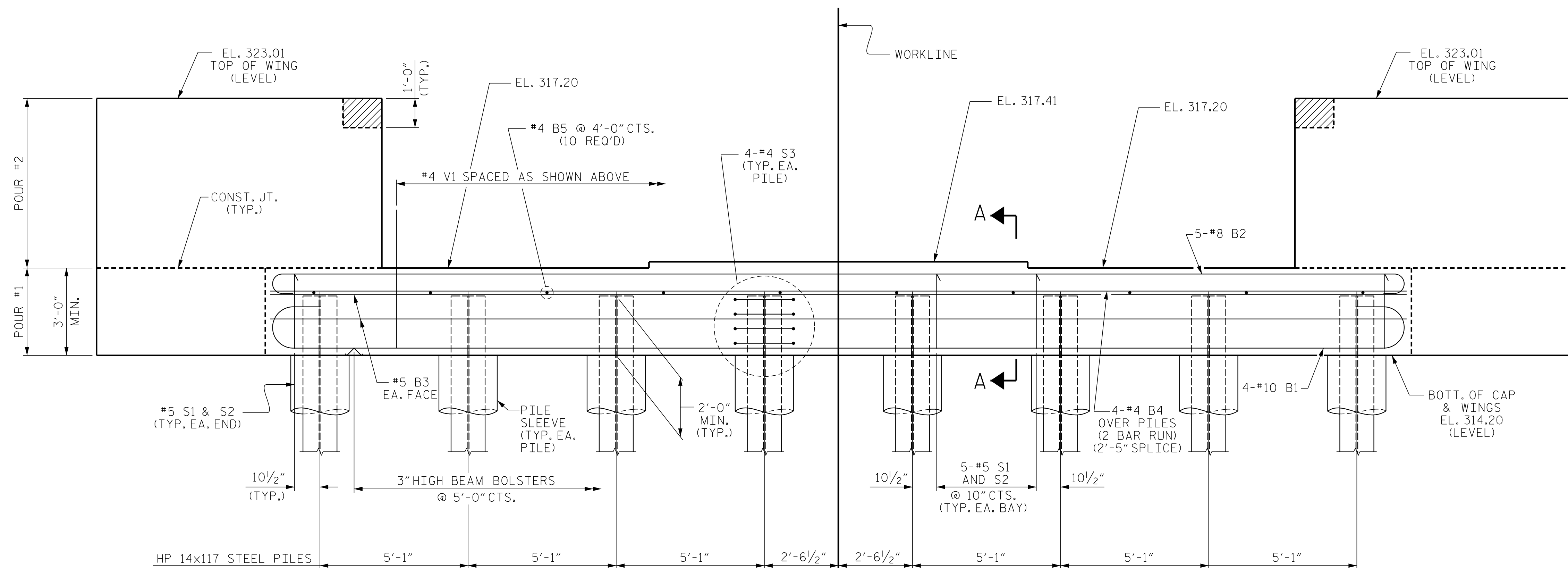
FOR PILE SLEEVE NOTES, SEE "GENERAL DRAWING", SHEET 2 OF 3.



PLAN



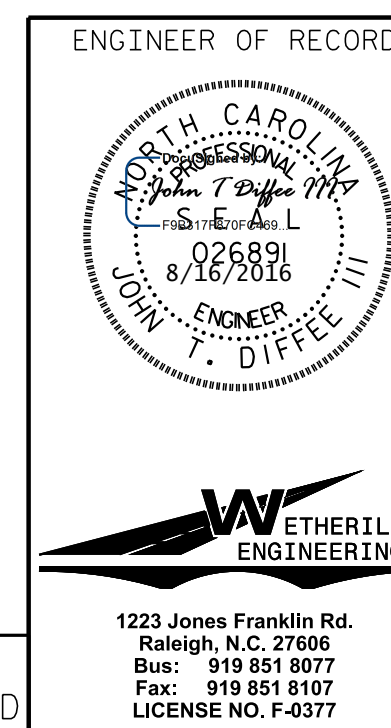
DETAIL A  
(TYP. EA. GIRDER)



ELEVATION

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

PROJECT NO. R-5769  
JOHNSTON COUNTY  
STATION: 33+26.33 -L-  
SHEET 1 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 1

REVISIONS

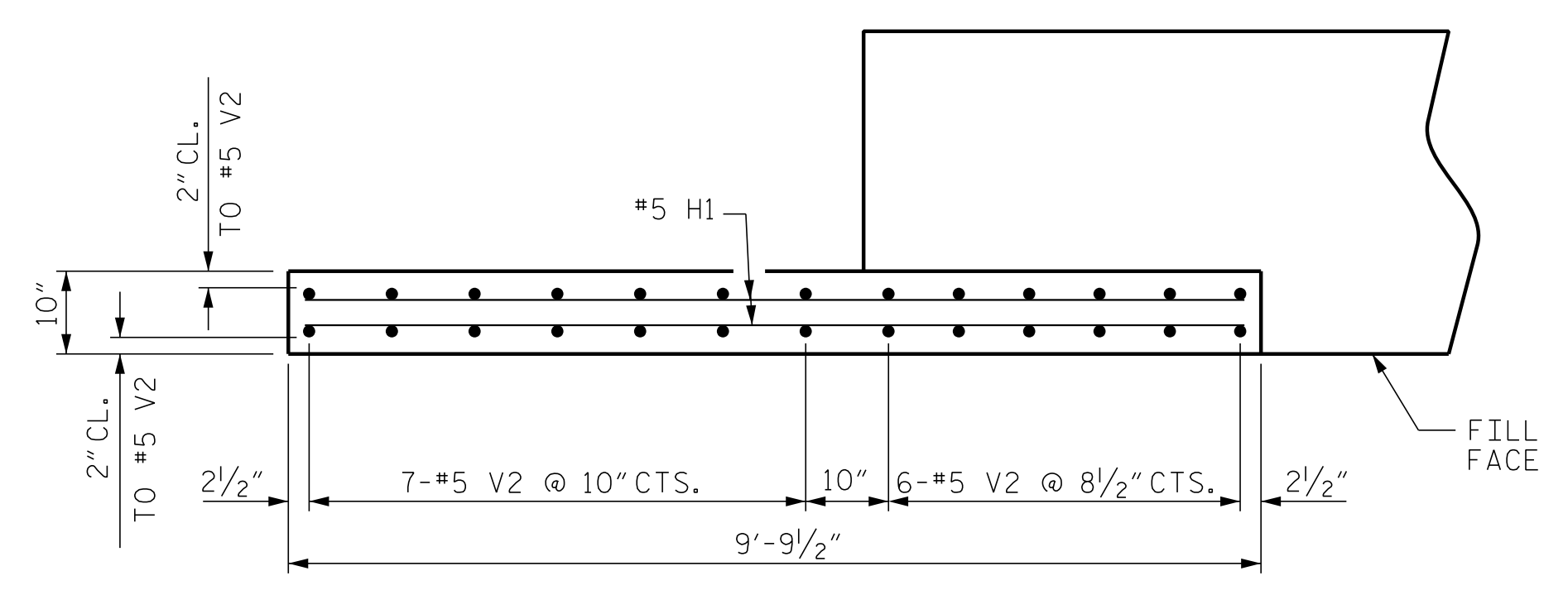
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SHEET NO.
S-16
TOTAL SHEETS
23

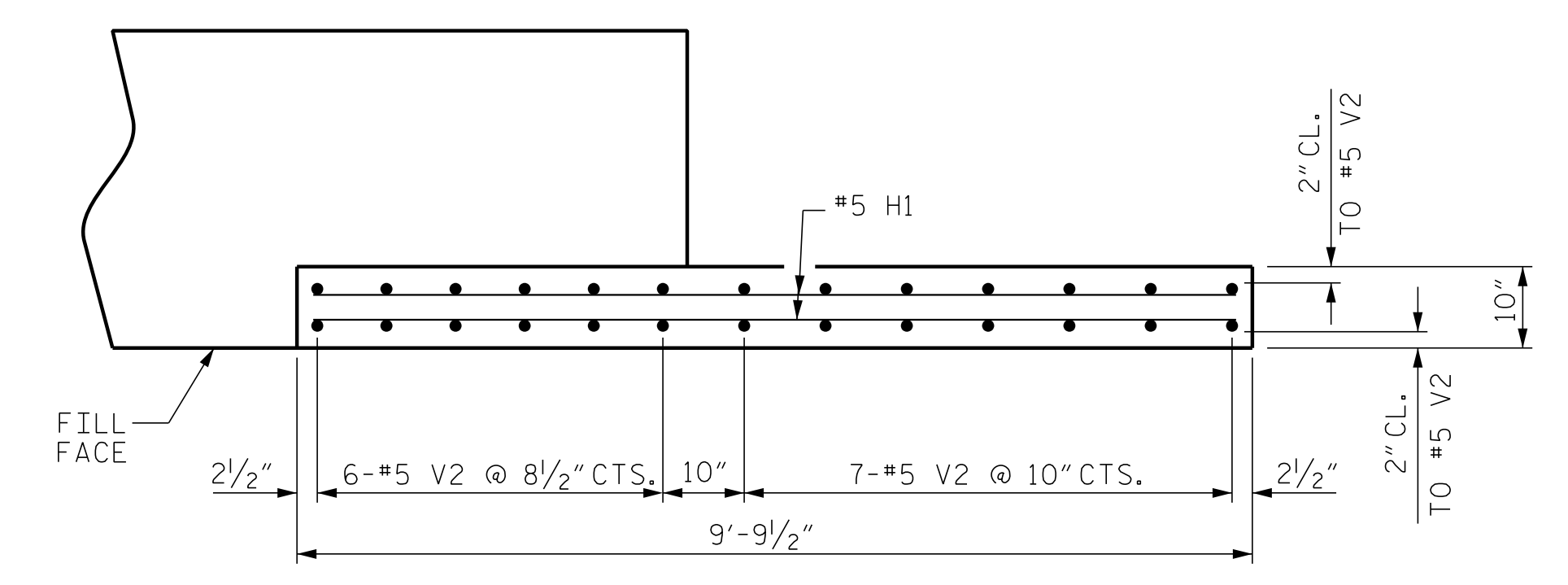
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CHECKED BY: J. DILWORTH DATE: 6/16

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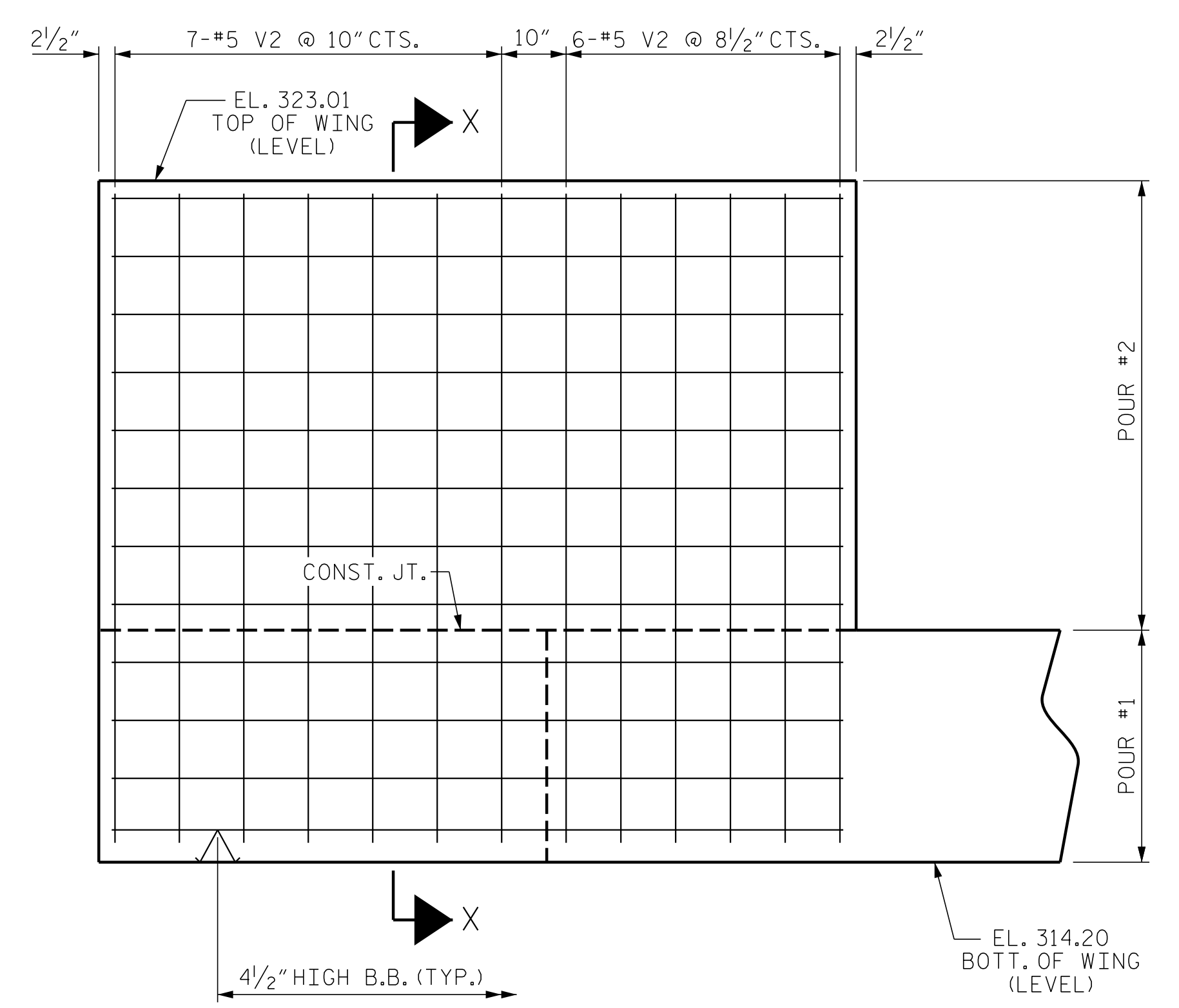
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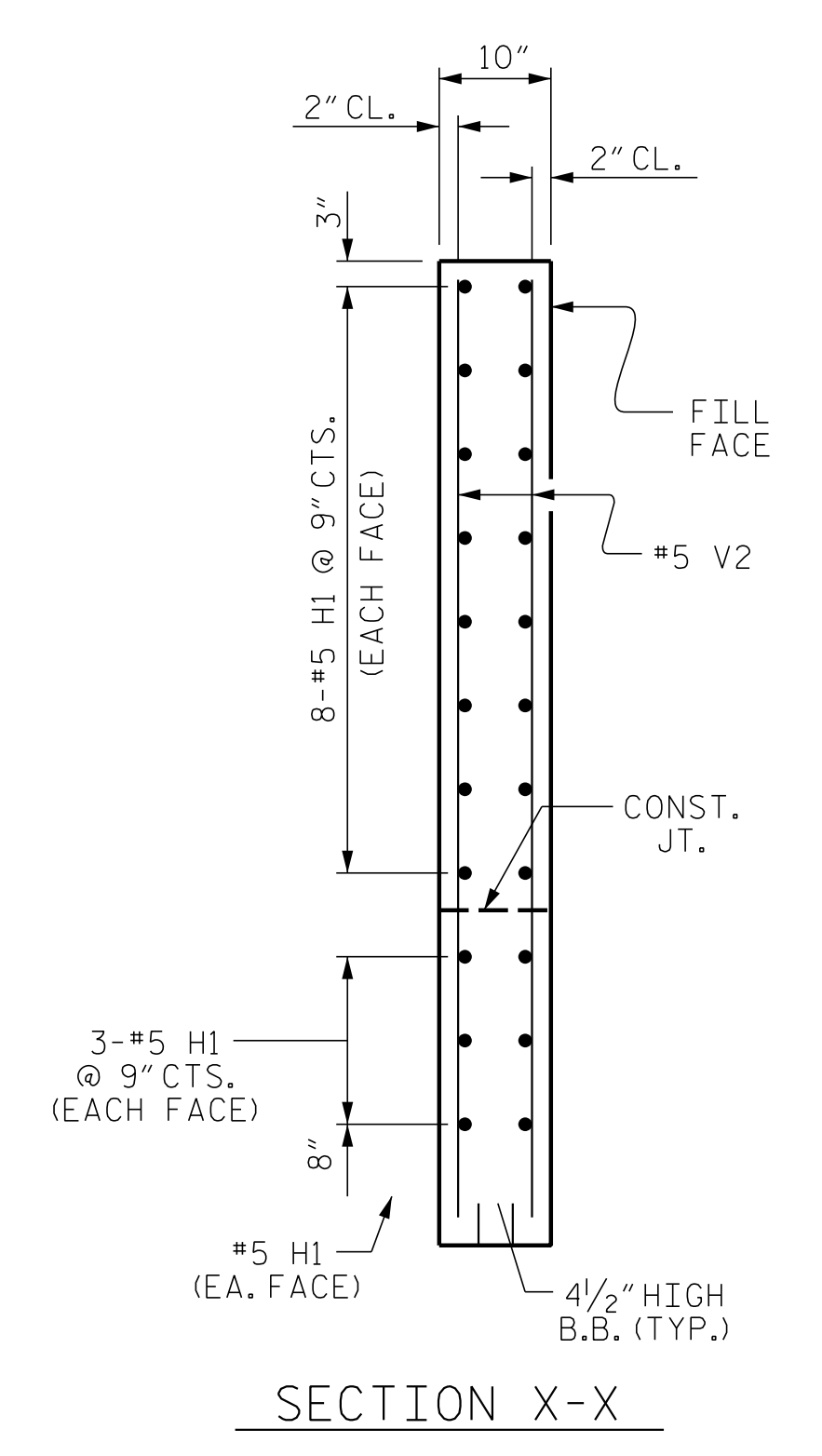
PLAN OF WING - W1



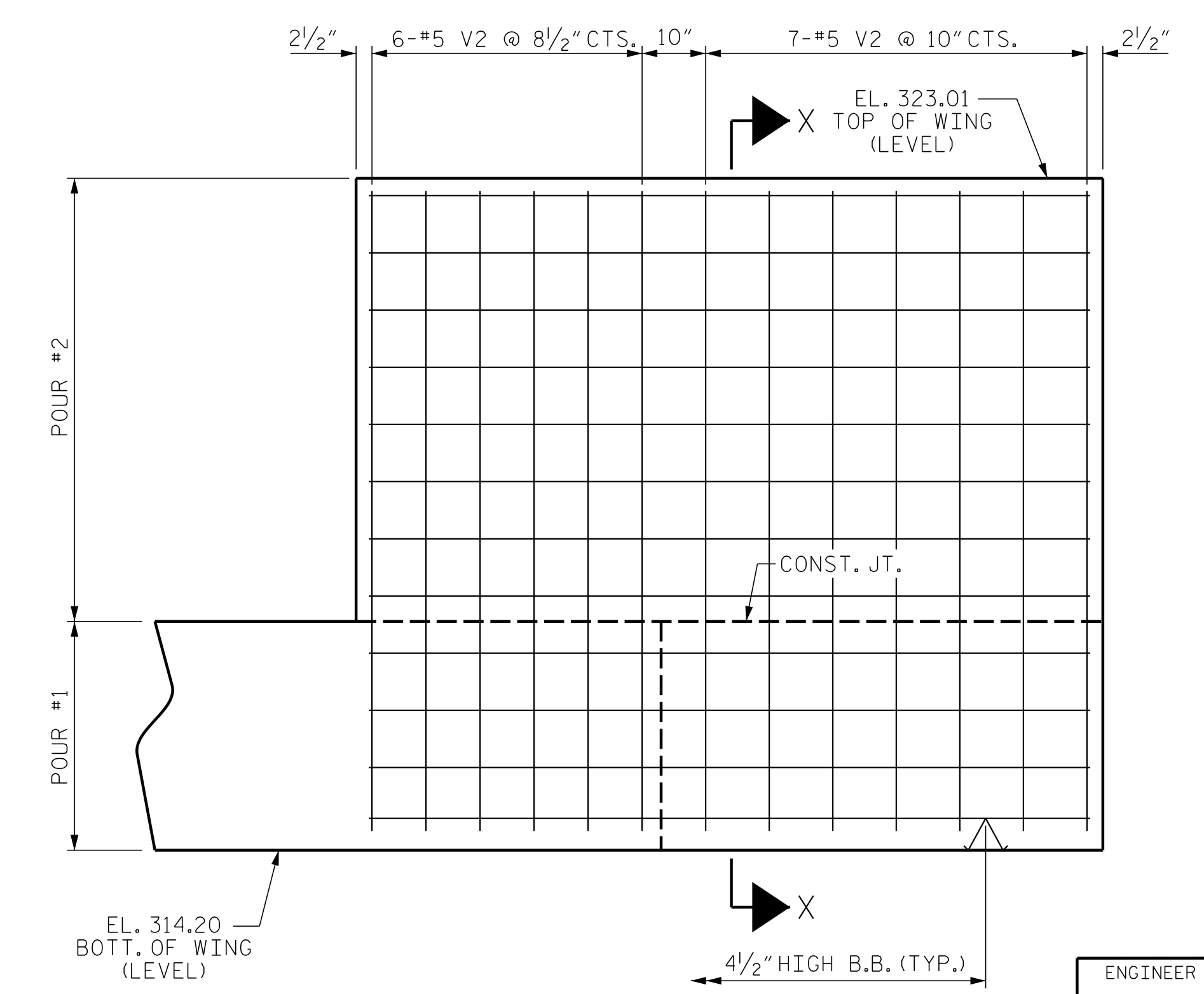
PLAN OF WING - W2



ELEVATION OF WING - W1

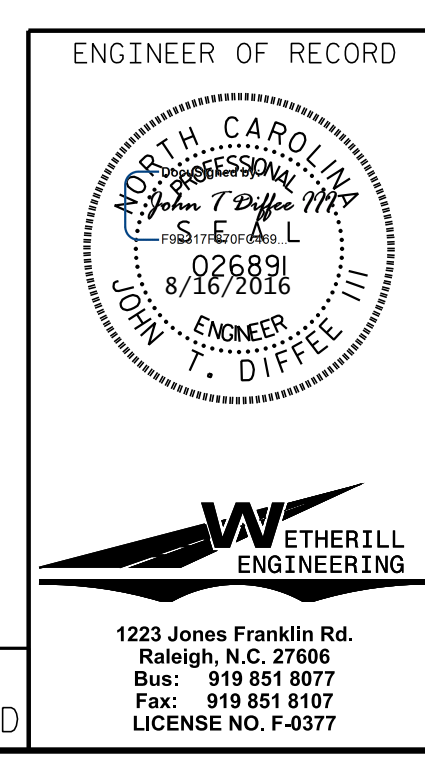


SECTION X-X



ELEVATION OF WING - W2

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 2 OF 3

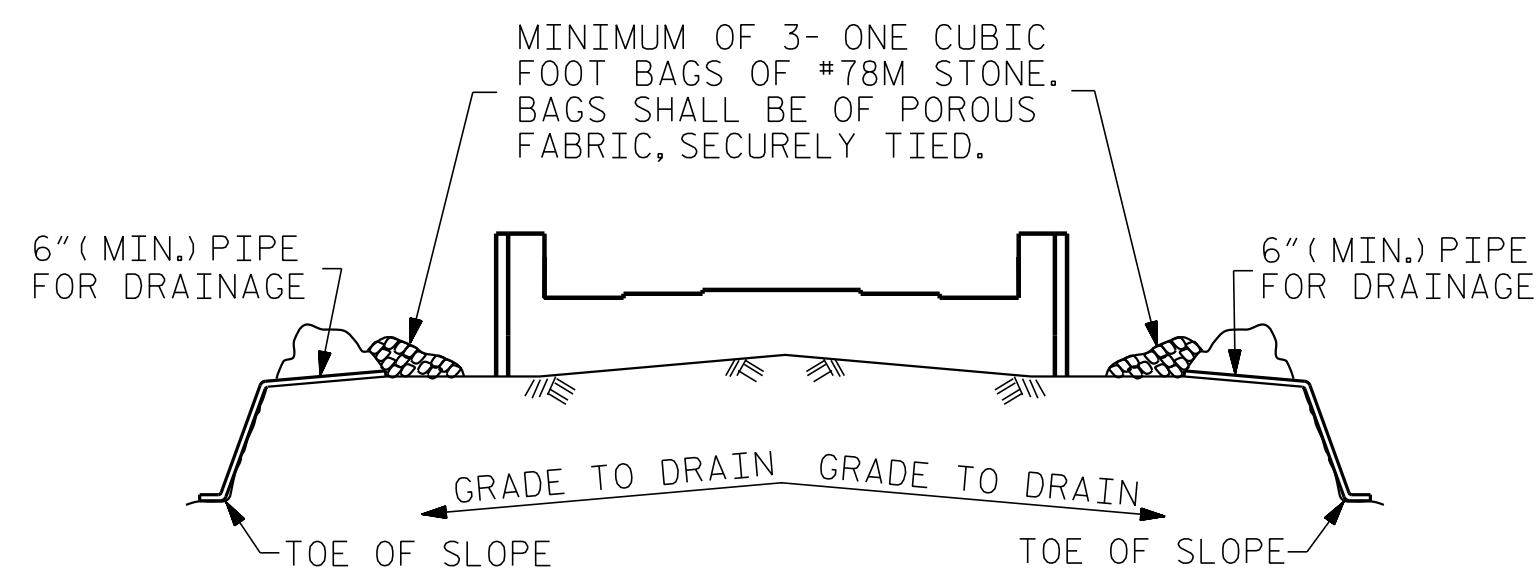


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-17
					TOTAL SHEETS 23

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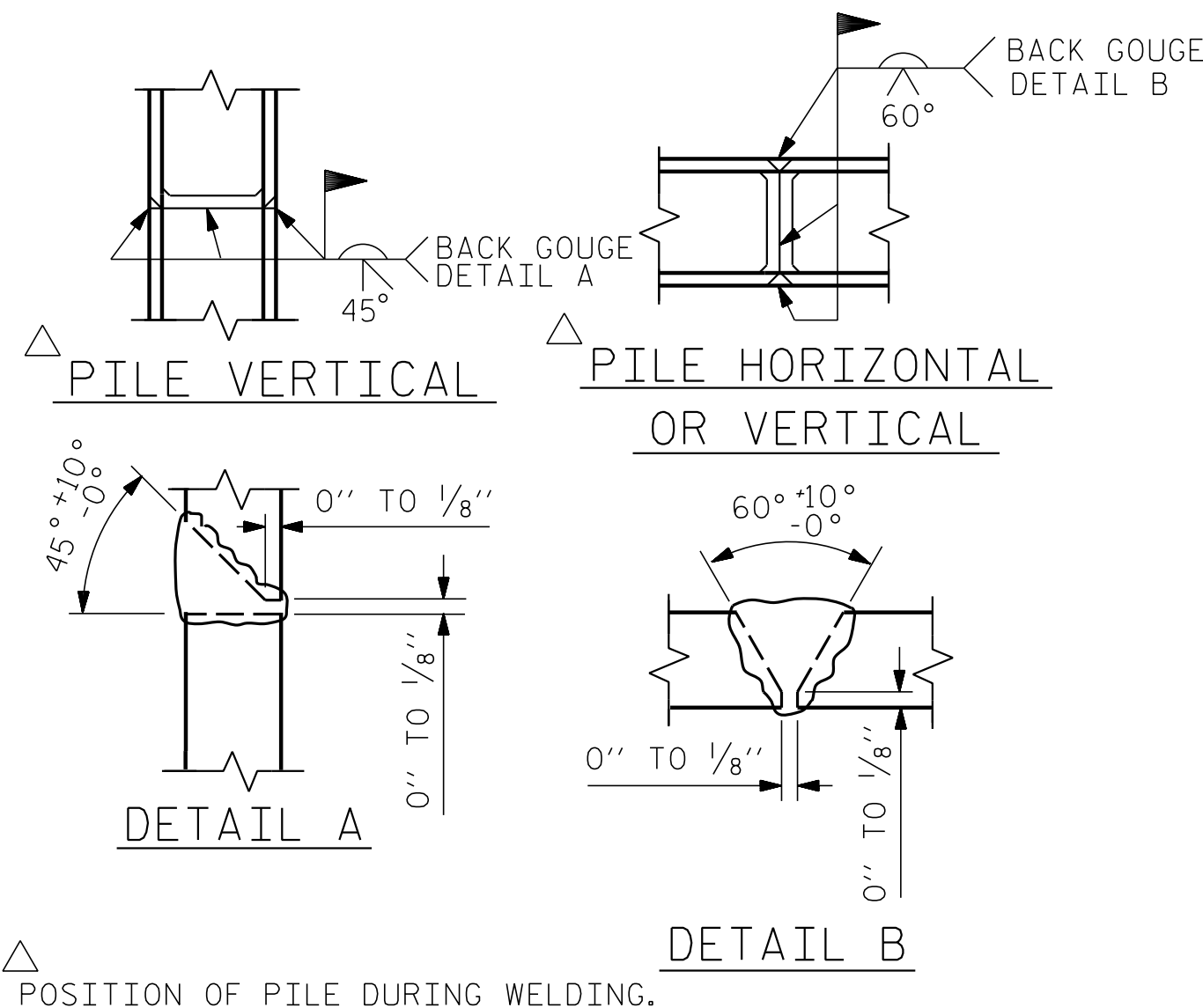


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

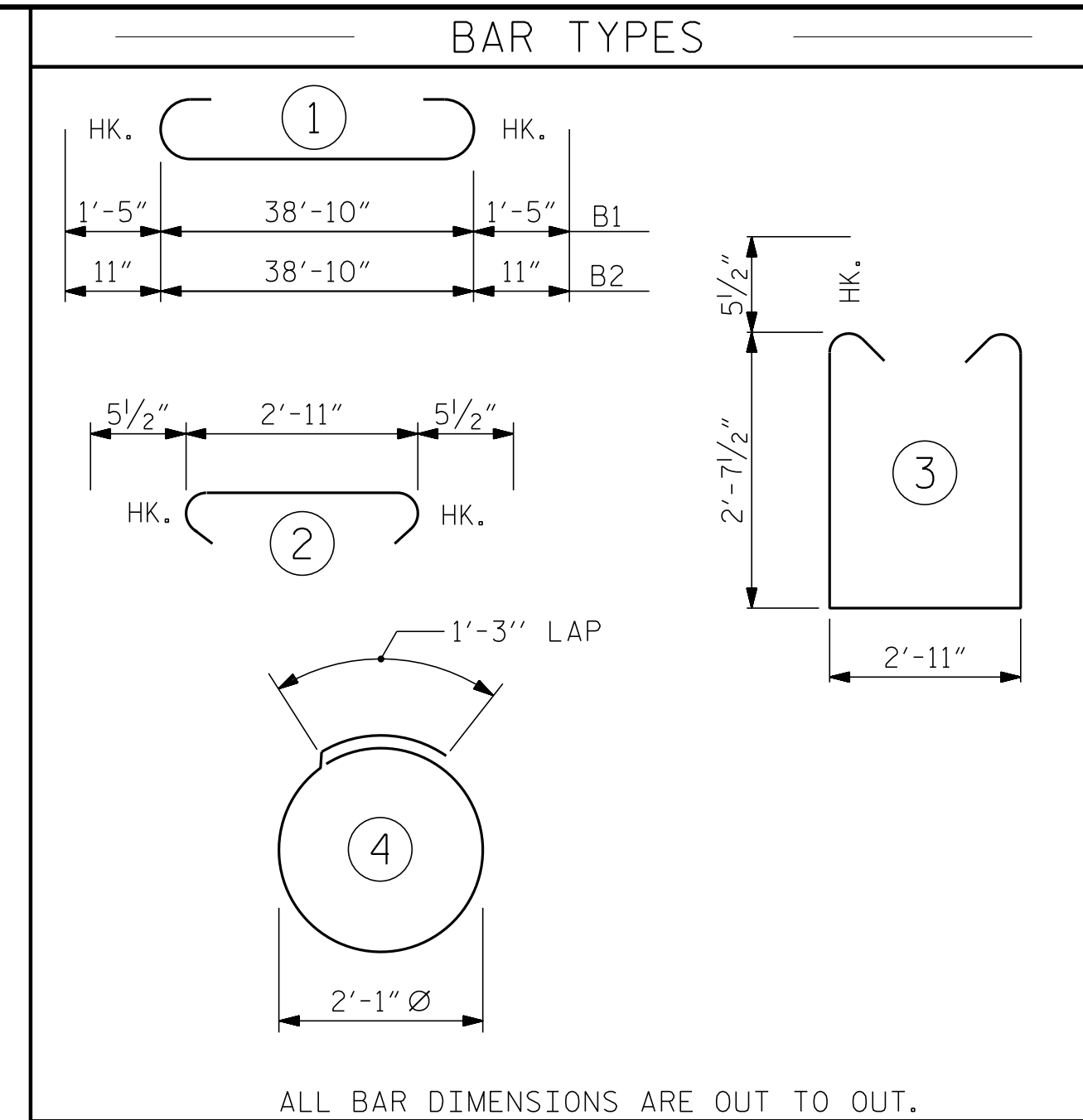
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

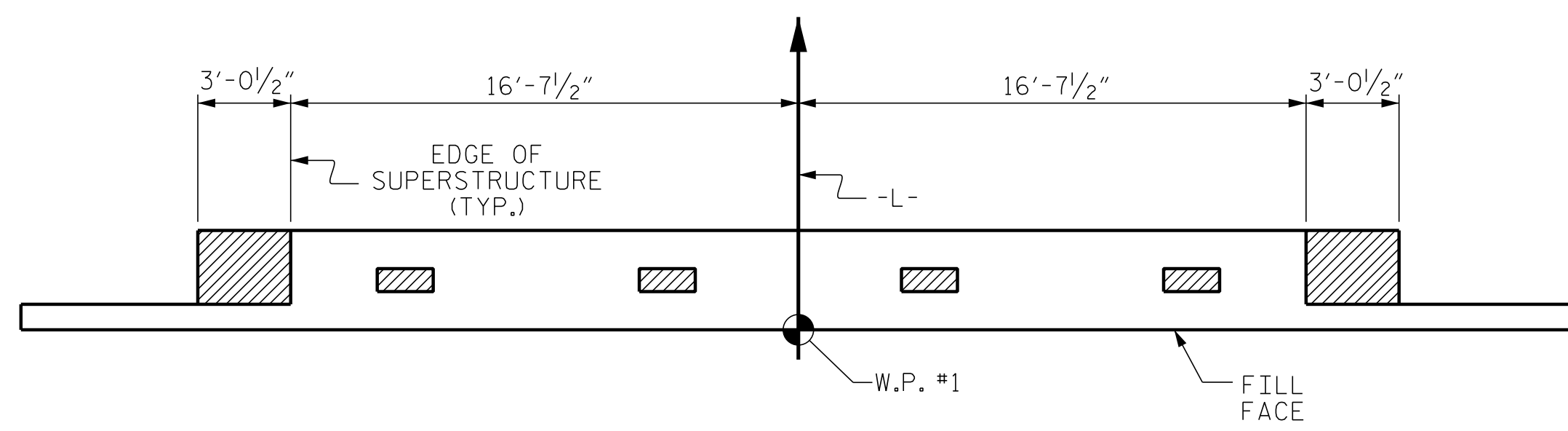
**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**

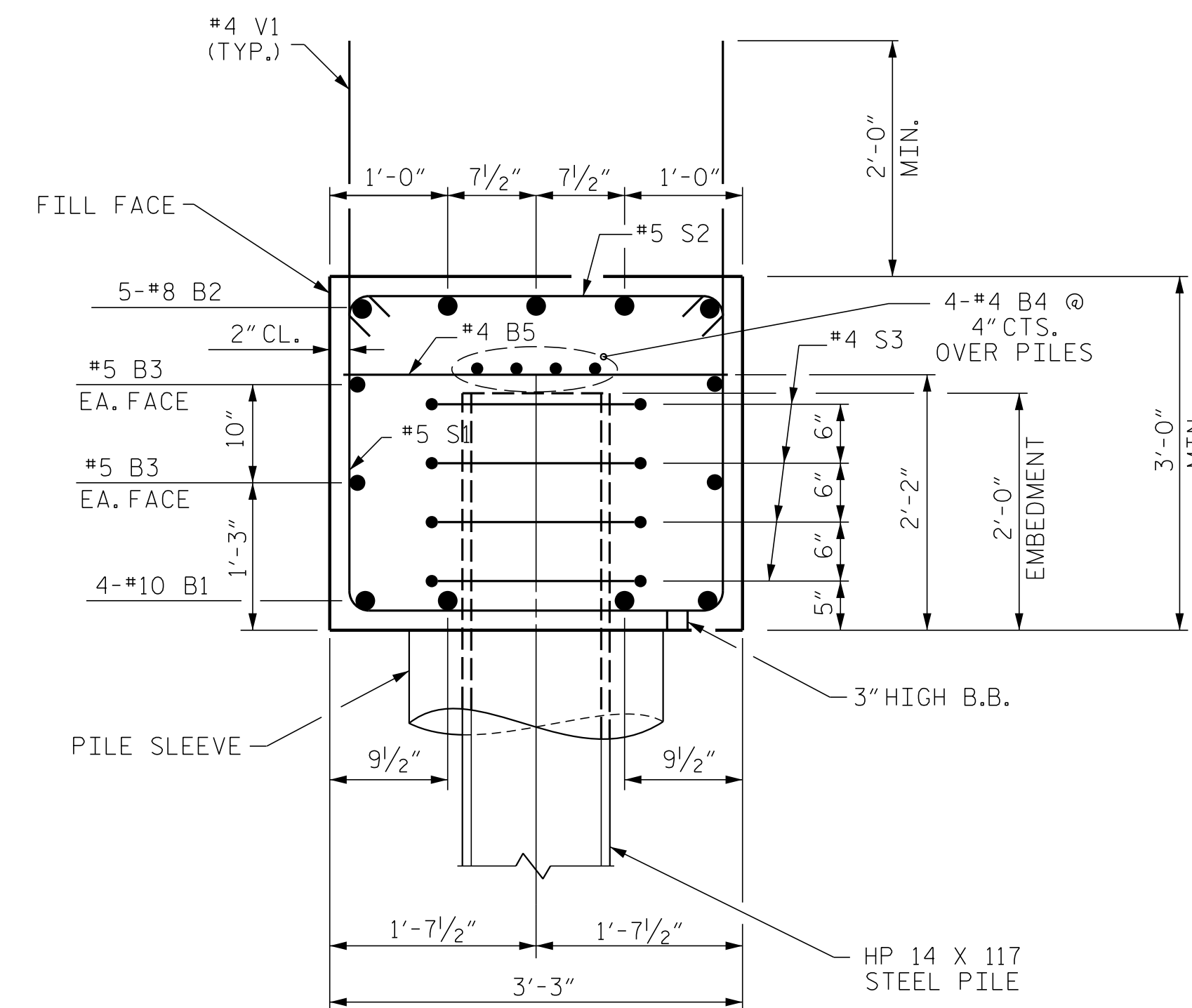


BILL OF MATERIAL					
END BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	41'-8"	717
B2	5	#8	1	40'-8"	543
B3	4	#5	STR	39'-0"	163
B4	8	#4	STR	20'-9"	111
B5	10	#4	STR	2'-11"	19
H1	48	#5	STR	9'-5"	471
S1	37	#5	3	9'-1"	351
S2	37	#5	2	3'-10"	148
S3	32	#4	4	7'-10"	167
V1	52	#4	STR	4'-9"	165
V2	52	#5	STR	8'-5"	456
REINFORCING STEEL					3,311 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP & LOWER PART OF WINGS					15.6 C.Y.
POUR #2 UPPER PART OF WINGS					3.5 C.Y.
TOTAL CLASS A CONCRETE					19.1 C.Y.
HP 14 X 117 STEEL PILES					
NO: 8					LIN. FT. = 696
PILE REDRIVE					8 EA.



**DETAIL B**

SHADING DEFINES AREAS NOT TO BE RAKED, SEE NOTE SHEET 1 OF 3



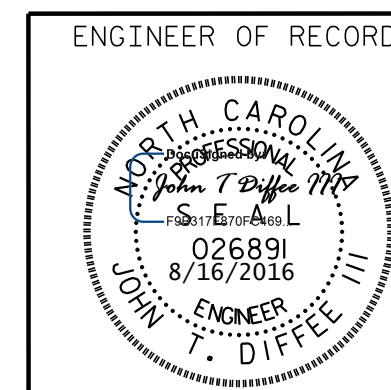
**SECTION A-A**

PROJECT NO. R-5769

JOHNSTON COUNTY

STATION: 33+26.33 -L-

SHEET 3 OF 3



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**SUBSTRUCTURE  
END BENT No. 1**

REVISIONS

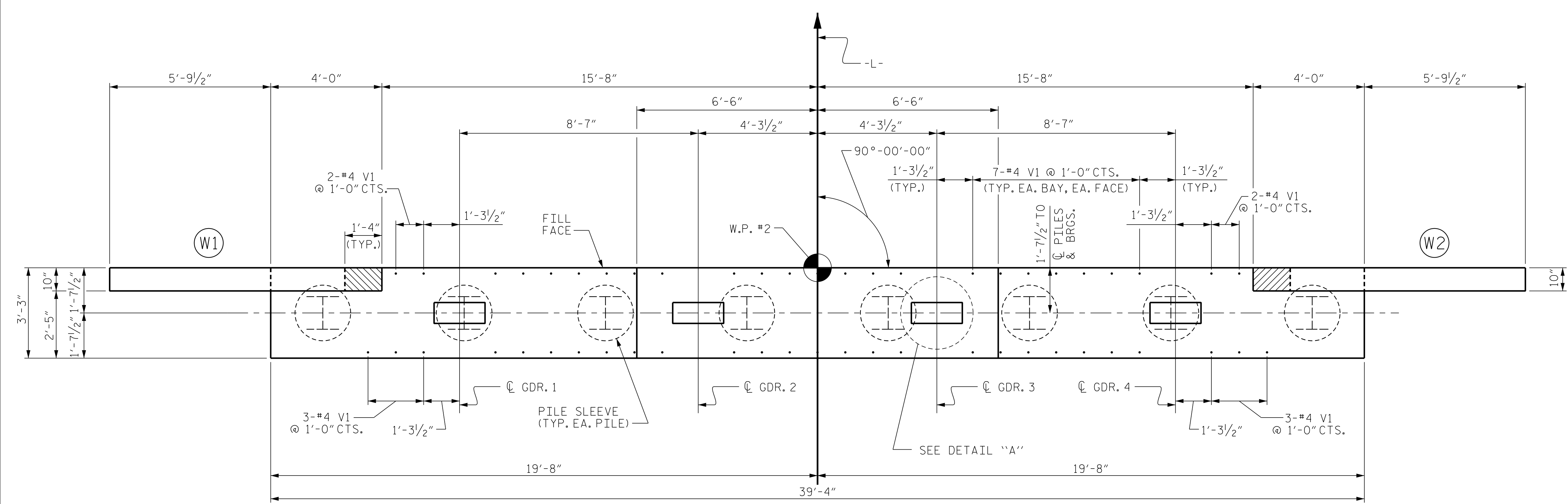
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SHEET NO.  
S-18  
TOTAL SHEETS  
23

DRAWN BY: D. HODGE DATE: 5/16

CHECKED BY: J. DILWORTH DATE: 6/16

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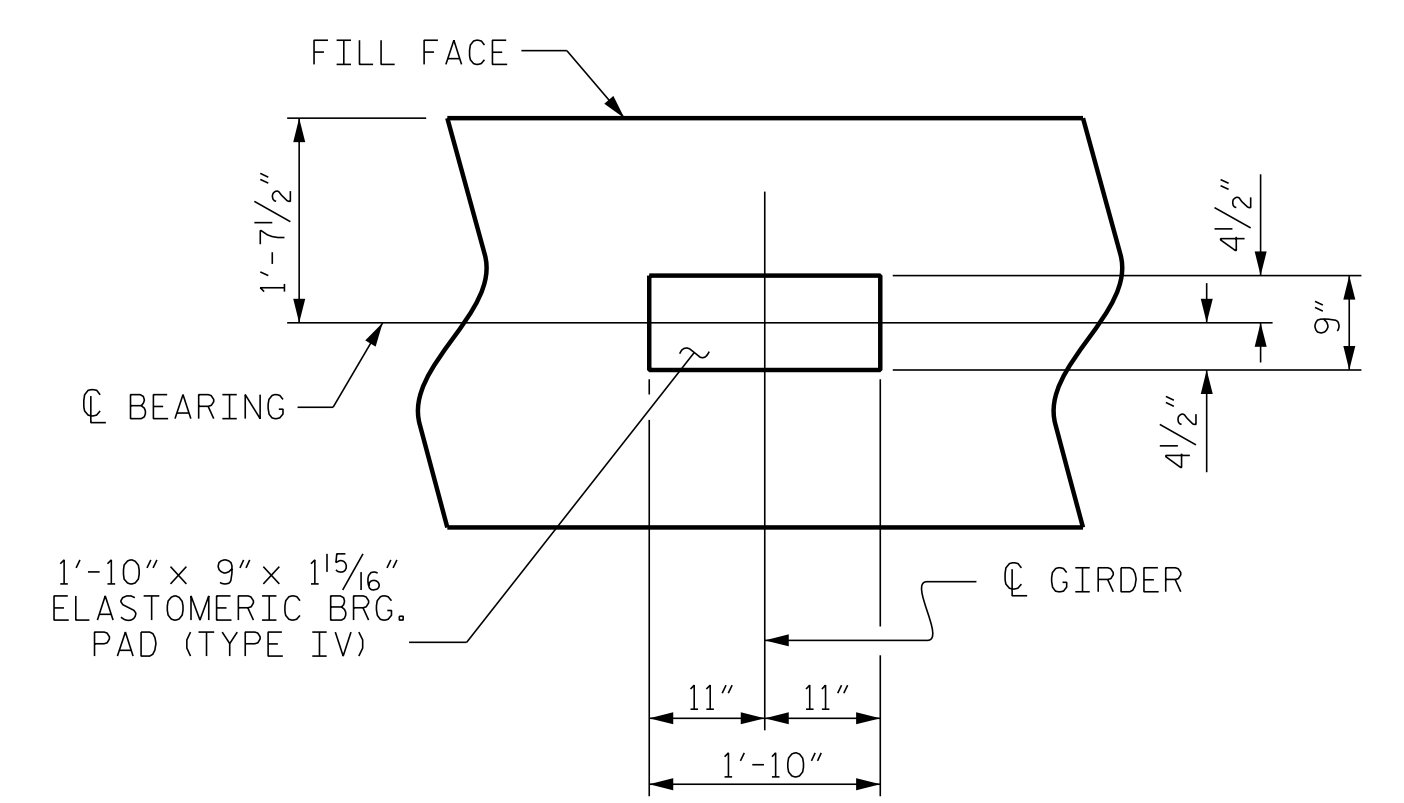
PLAN

NOTES

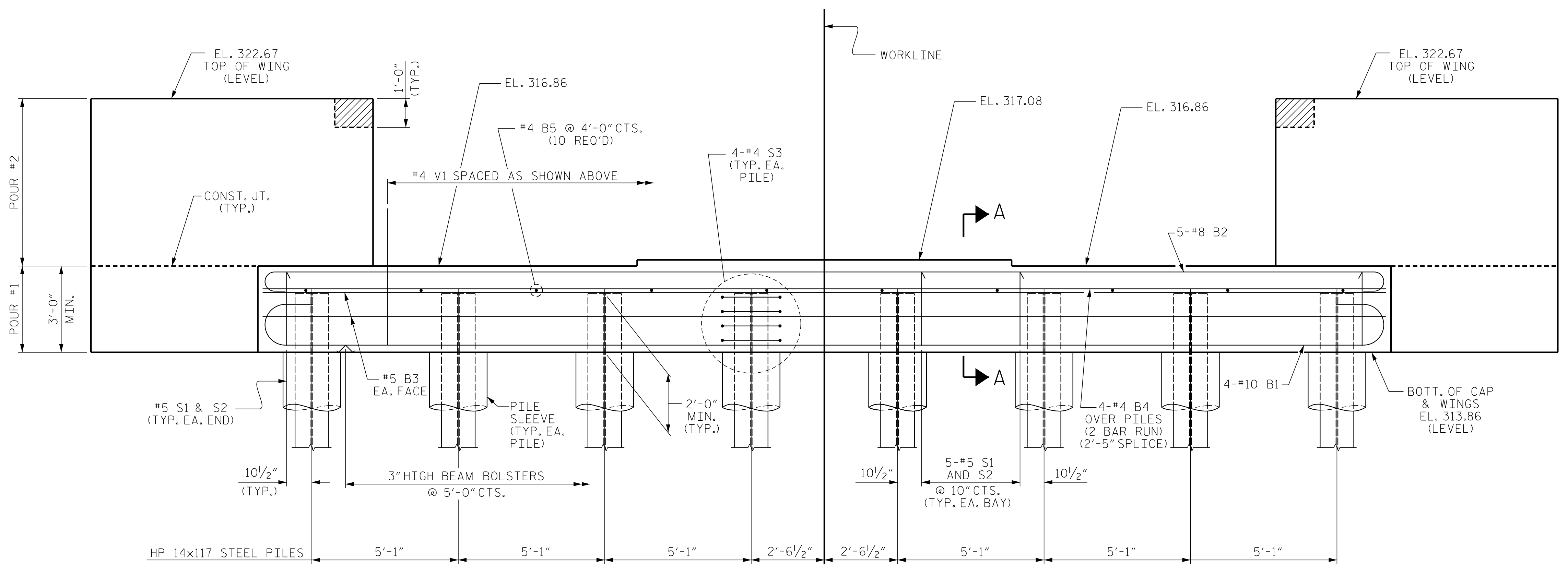
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND AREA PAST THE EDGE OF THE SUPERSTRUCTURE AS SHOWN ON DETAIL B, SHEET 3 OF 3, SHALL BE RAKED TO A DEPTH OF 1/4\".

FOR PILE SLEEVE NOTES, SEE "GENERAL DRAWING", SHEET 2 OF 3.



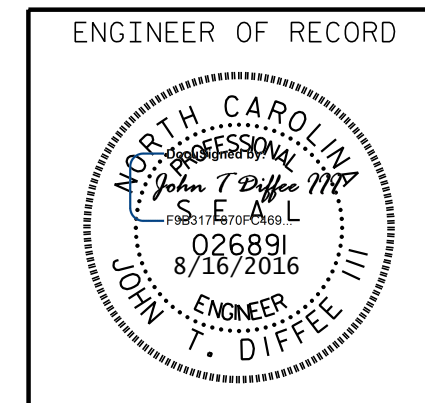
DETAIL A  
(TYP. EA. GIRDER)



ELEVATION

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

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

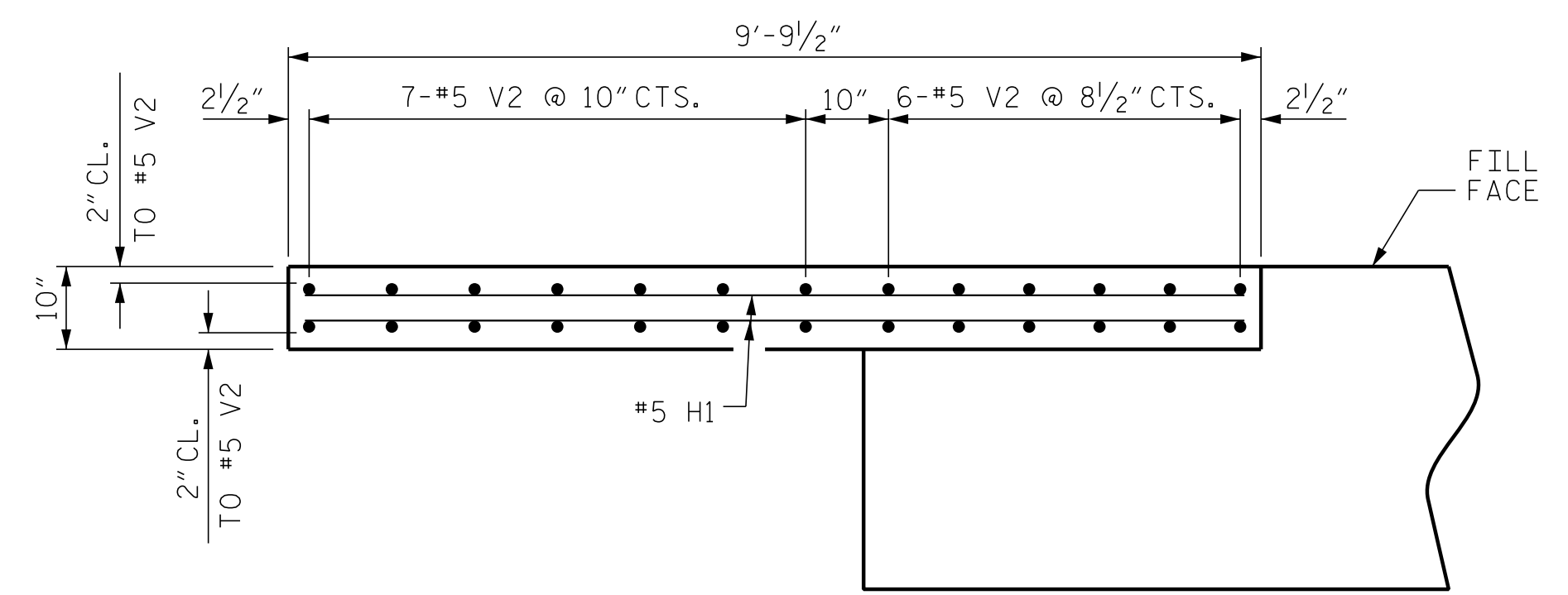
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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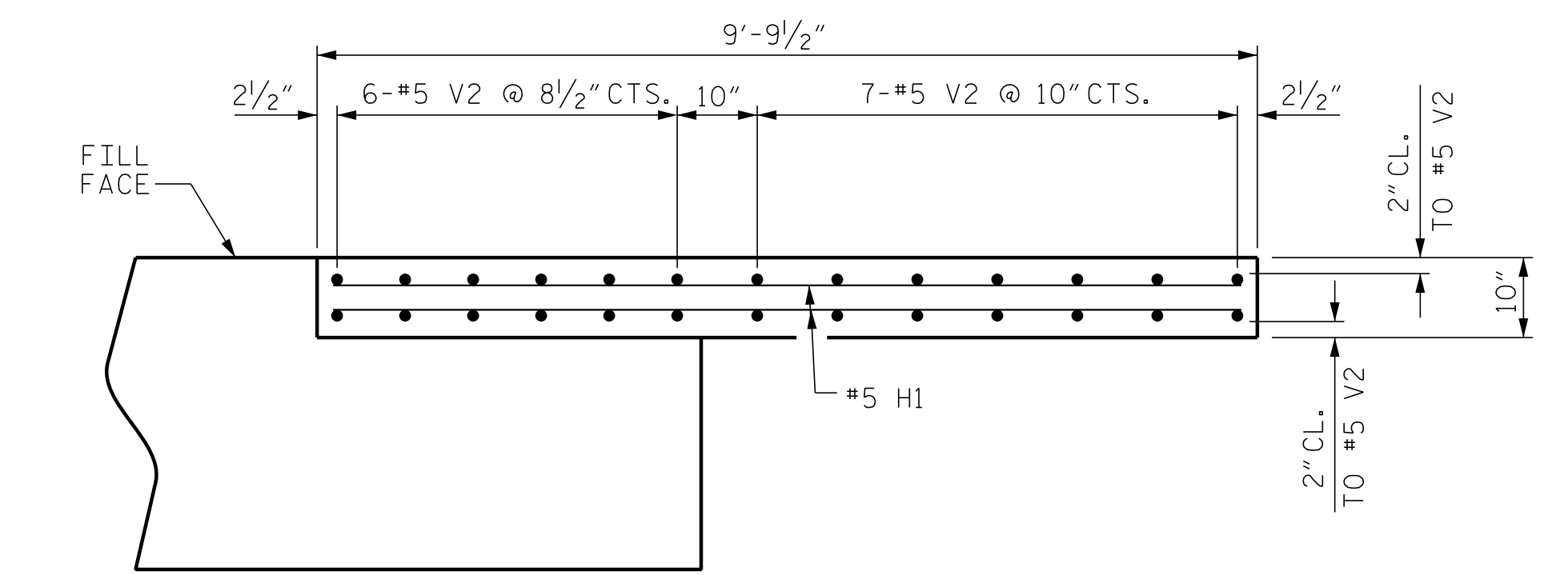
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DRAWN BY: D. HODGE DATE: 5/16  
 CHECKED BY: J. DILWORTH DATE: 6/16

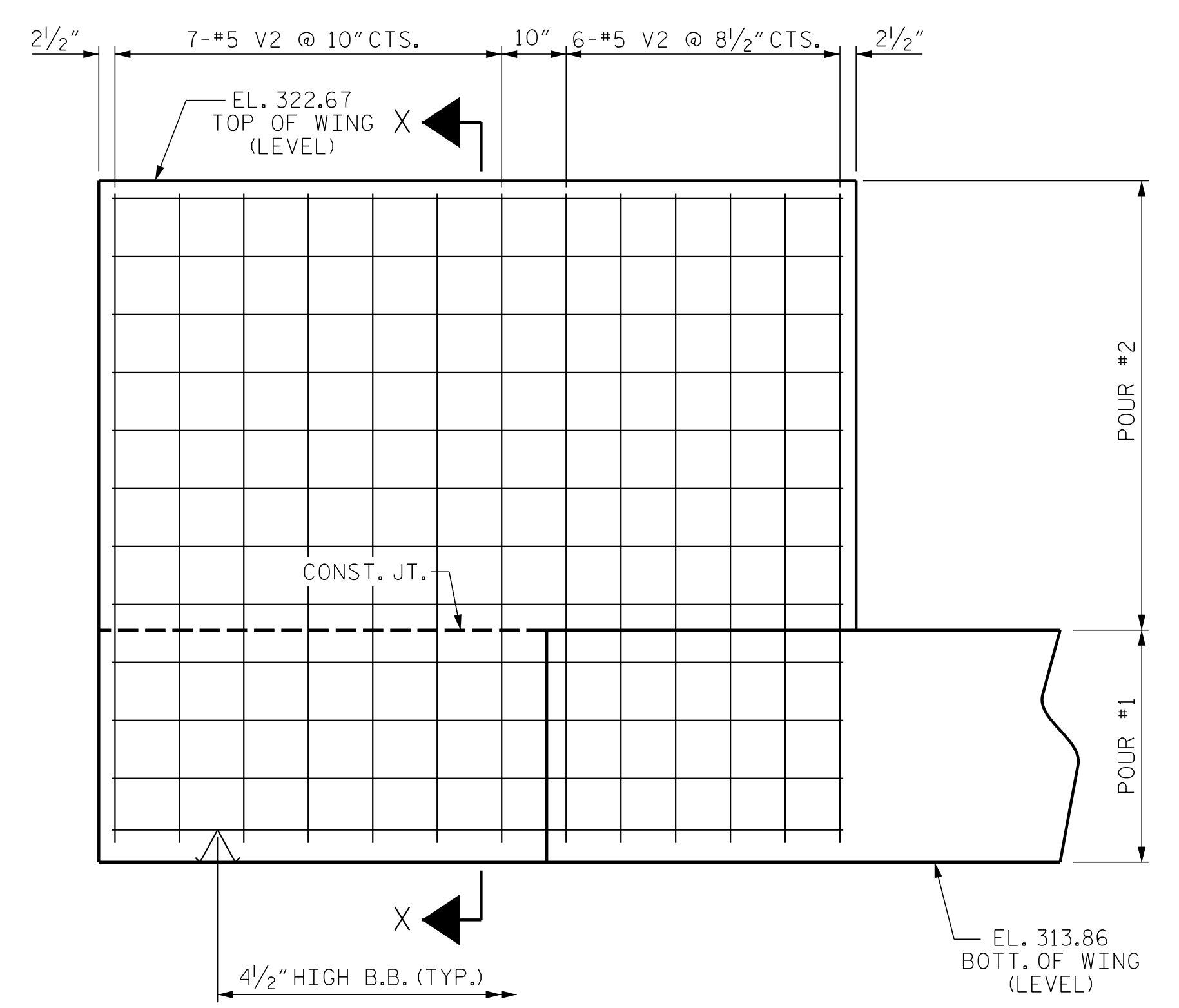
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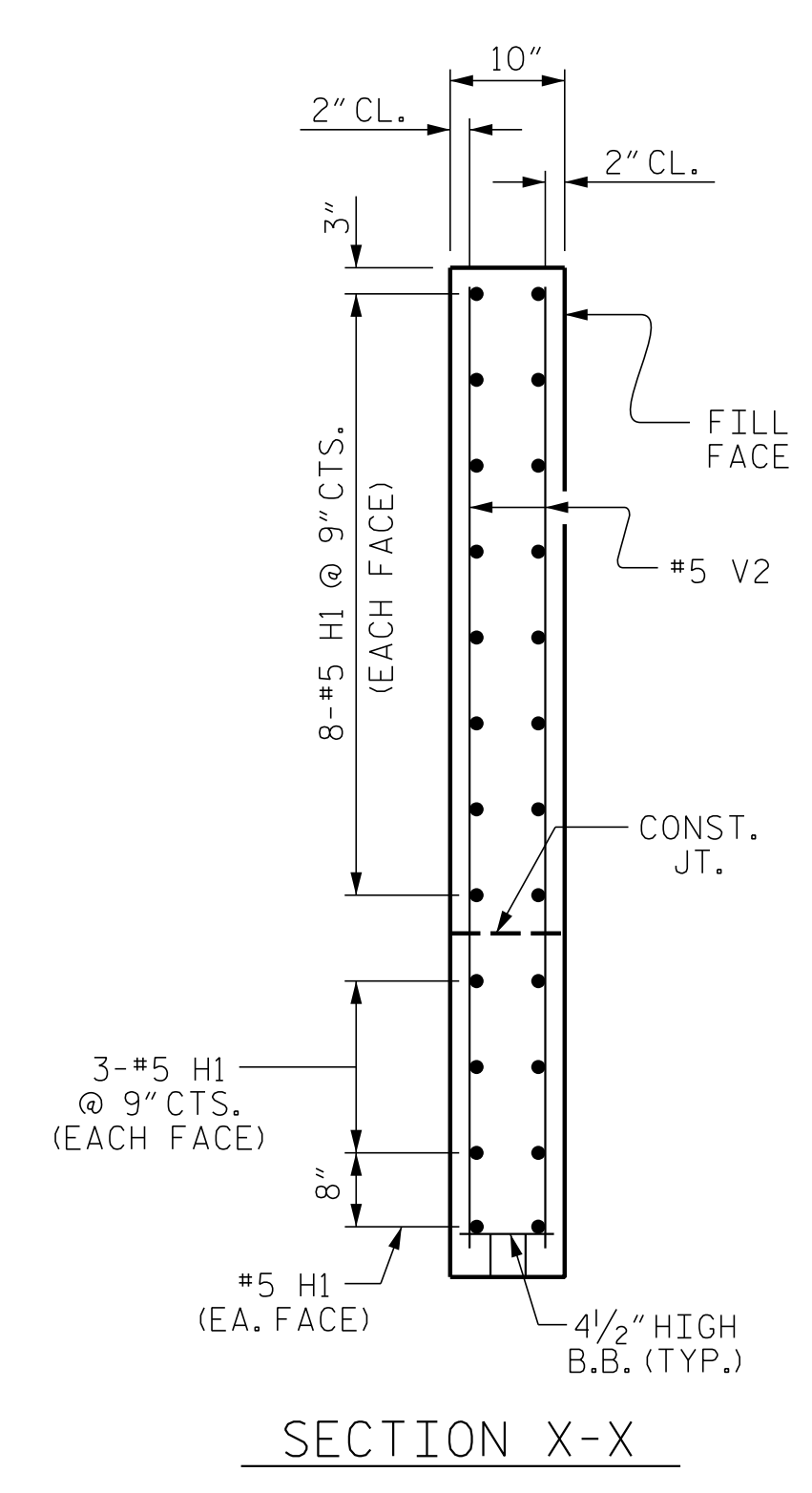
PLAN OF WING - W1



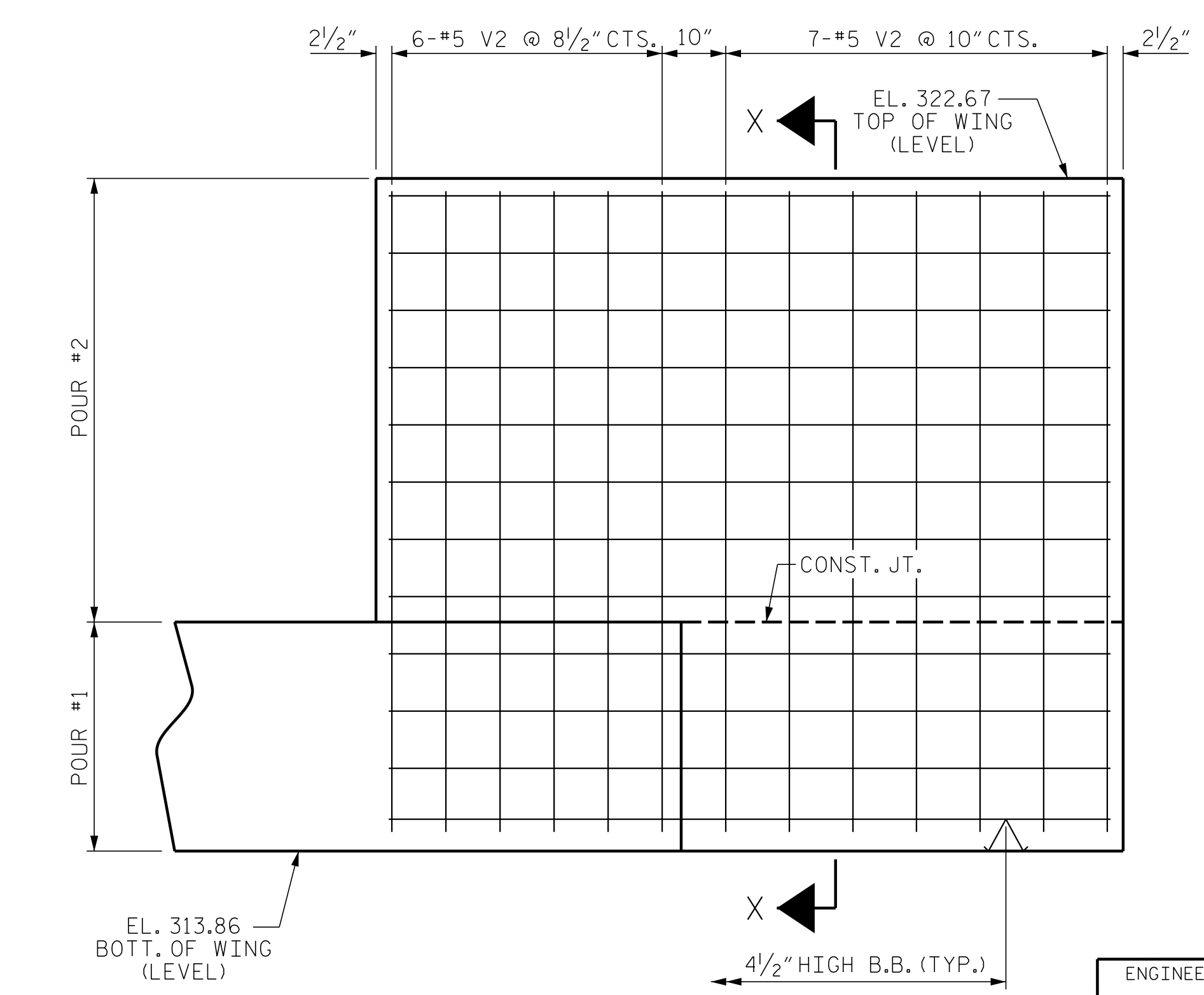
PLAN OF WING - W2



ELEVATION OF WING - W1

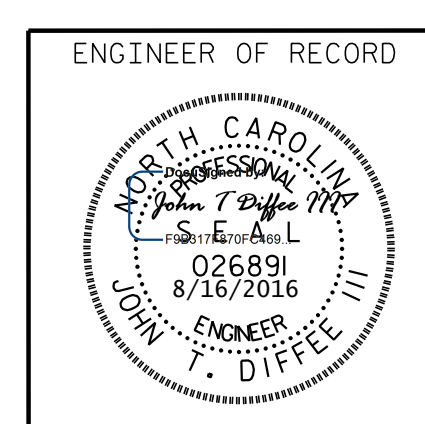


SECTION X-X



ELEVATION OF WING - W2

PROJECT NO. R-5769  
 JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 2 OF 3



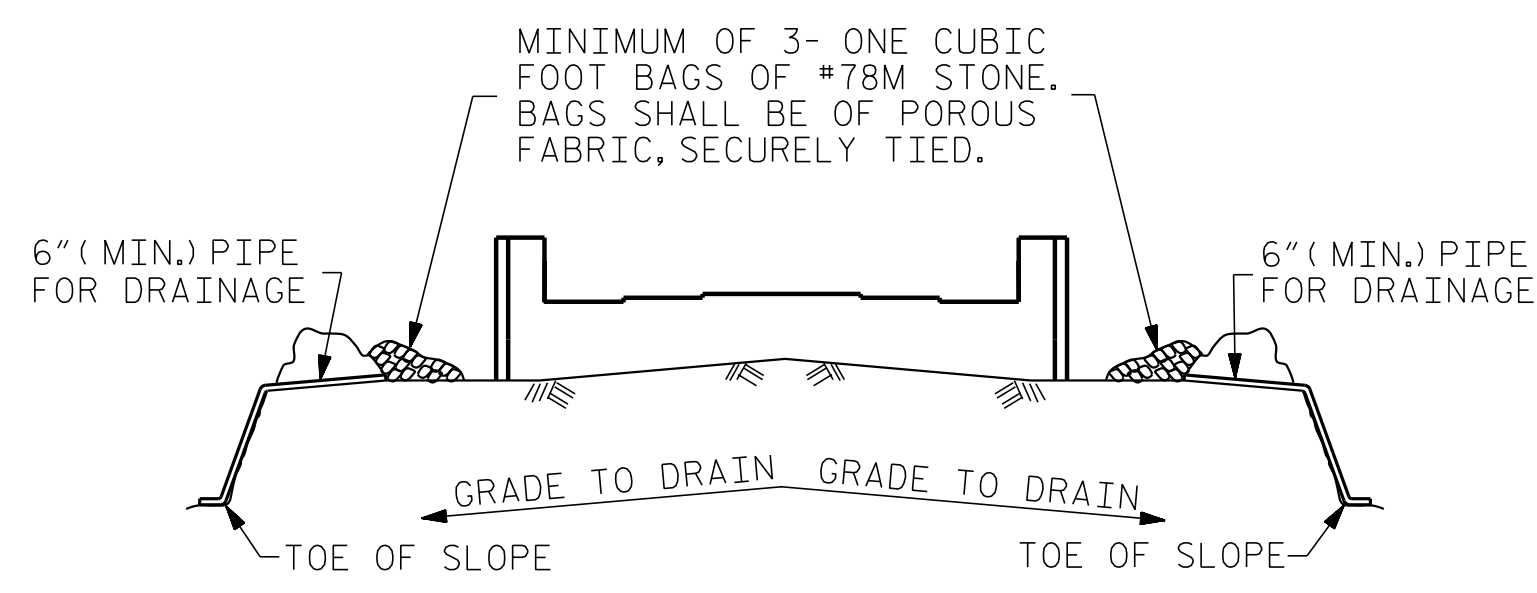
1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-20					TOTAL SHEETS 23

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DRAWN BY: D. HODGE DATE: 5/16  
 CHECKED BY: J. DILWORTH DATE: 6/16

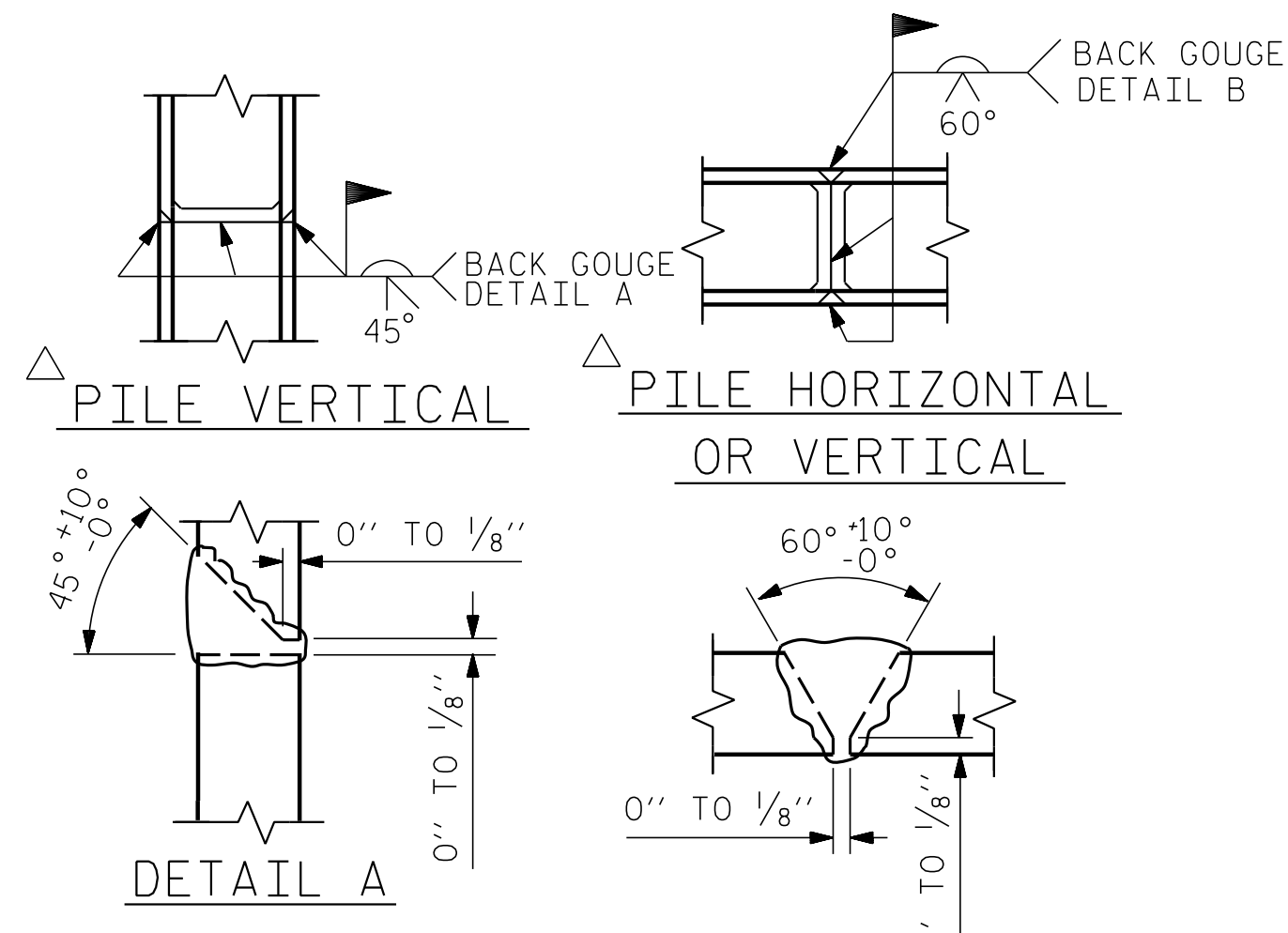


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

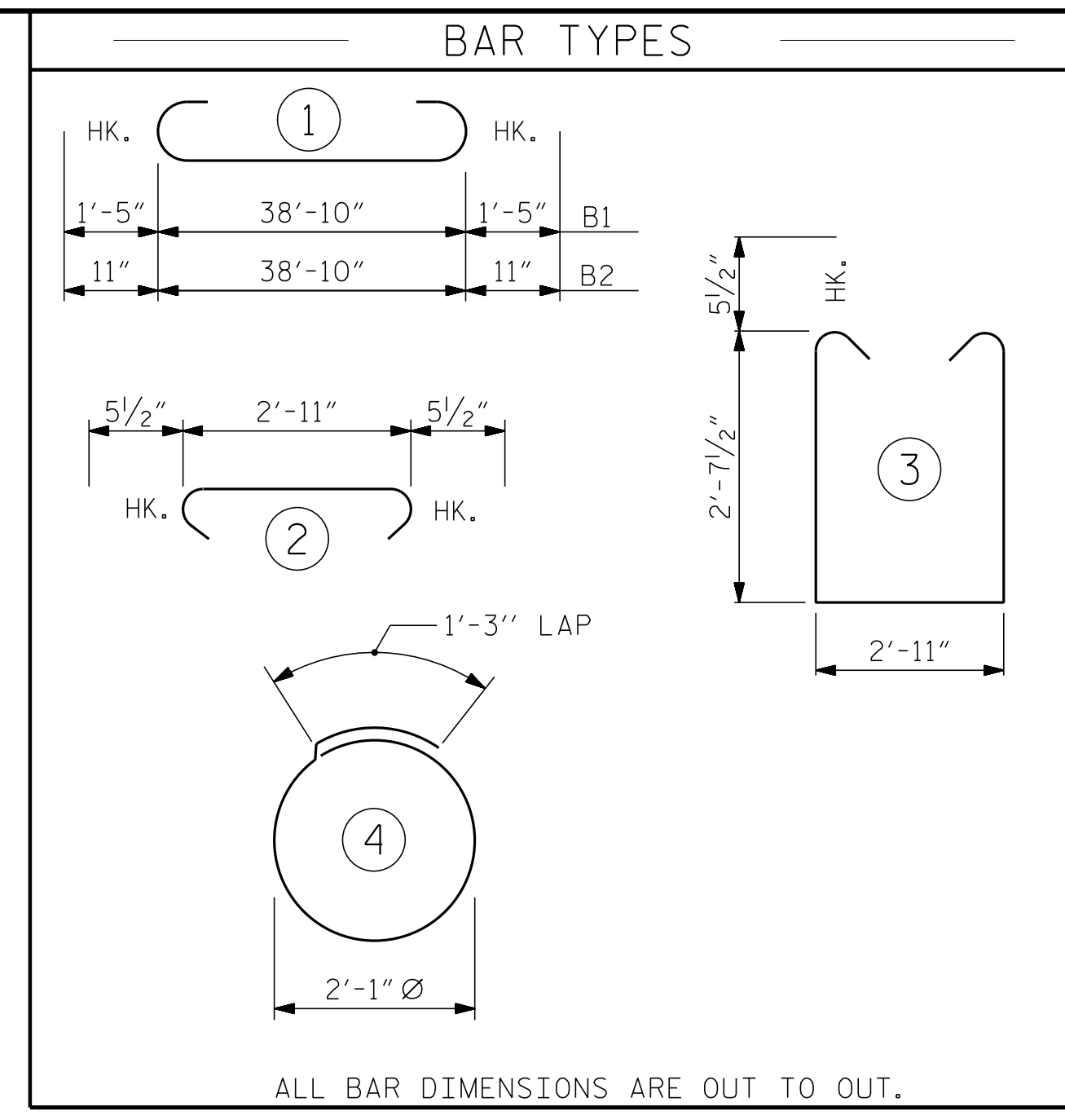
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



POSITION OF PILE DURING WELDING.

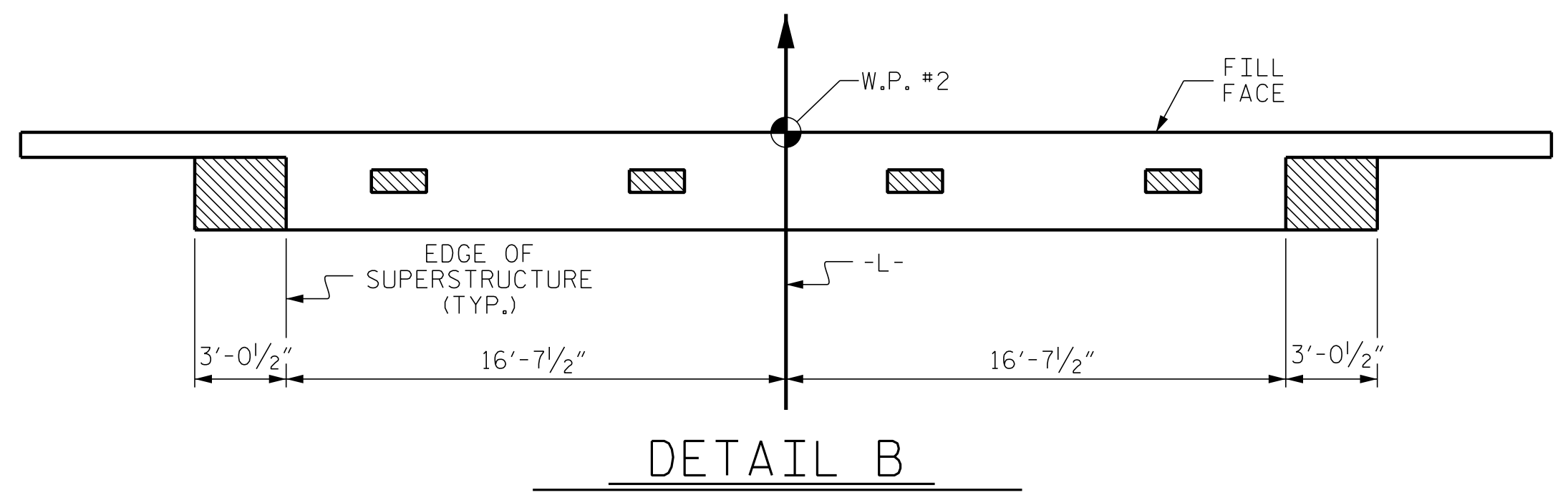
**PILE SPLICE DETAILS**



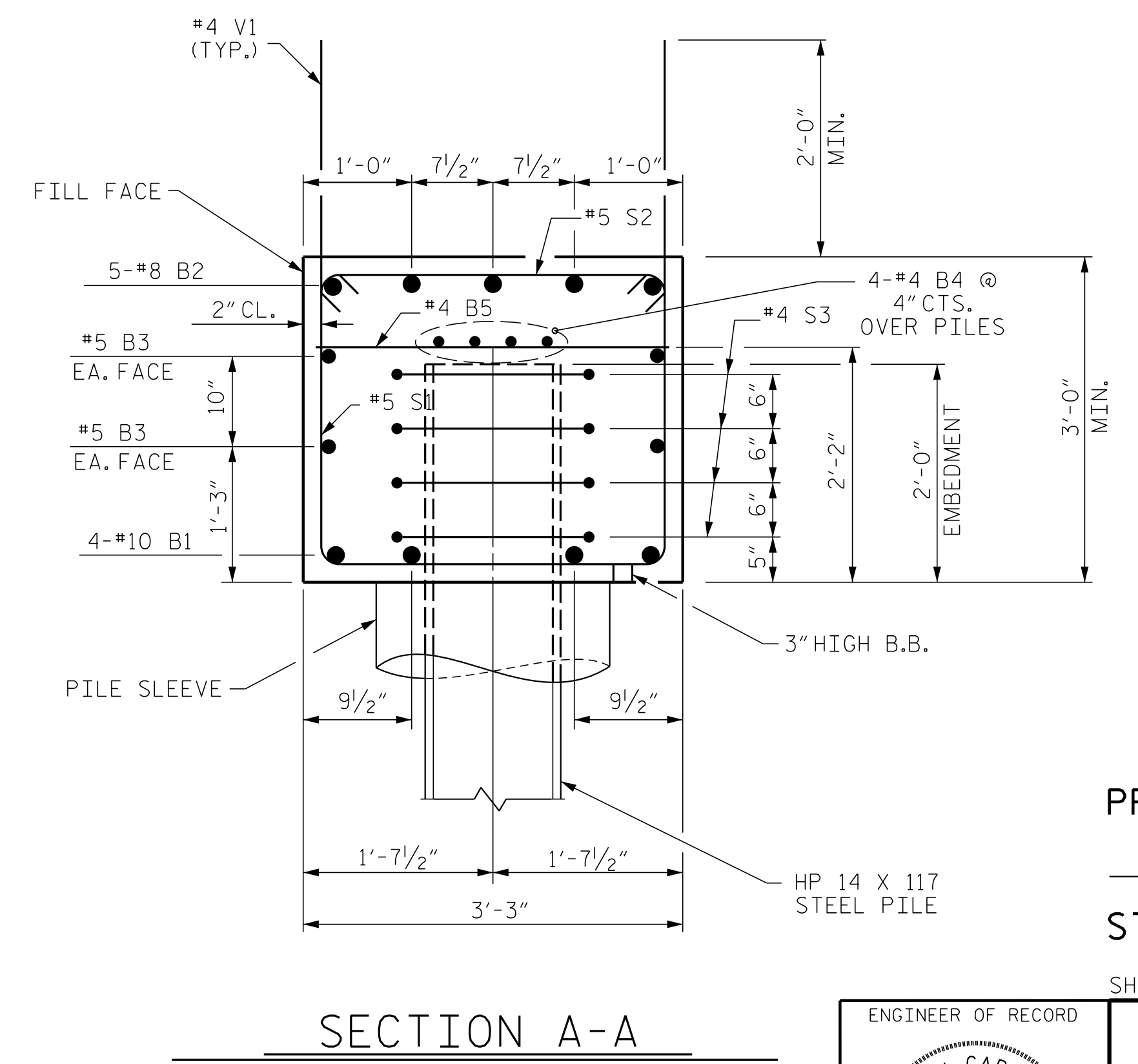
BILL OF MATERIAL					
END BENT No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	41'-8"	717
B2	5	#8	1	40'-8"	543
B3	4	#5	STR	39'-0"	163
B4	8	#4	STR	20'-9"	111
B5	10	#4	STR	2'-11"	19
H1	48	#5	STR	9'-5"	471
S1	37	#5	3	9'-1"	351
S2	37	#5	2	3'-10"	148
S3	32	#4	4	7'-10"	167
V1	52	#4	STR	4'-9"	165
V2	52	#5	STR	8'-5"	456
REINFORCING STEEL					3,311 LBS.

CLASS A CONCRETE BREAKDOWN	
POUR #1 CAP & LOWER PART OF WINGS	15.6 C.Y.
POUR #2 UPPER PART OF WINGS	3.5 C.Y.
TOTAL CLASS A CONCRETE	19.1 C.Y.

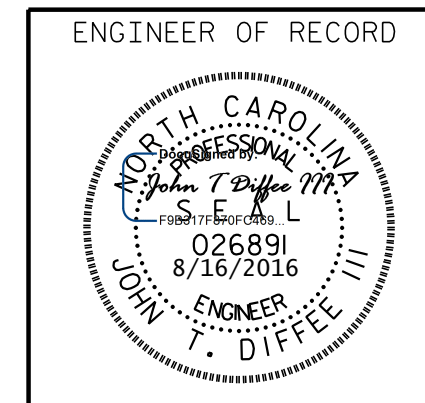
HP 14 X 117 STEEL PILES	
NO: 8	LIN. FT. = 596
PILE REDRIVE	8 EA.



SHADING DEFINES AREAS NOT TO BE RAKED, SEE NOTE SHEET 1 OF 3



PROJECT NO. R-5769  
 JOHNSTON COUNTY  
 STATION: 33+26.33 -L-  
 SHEET 3 OF 3



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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

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

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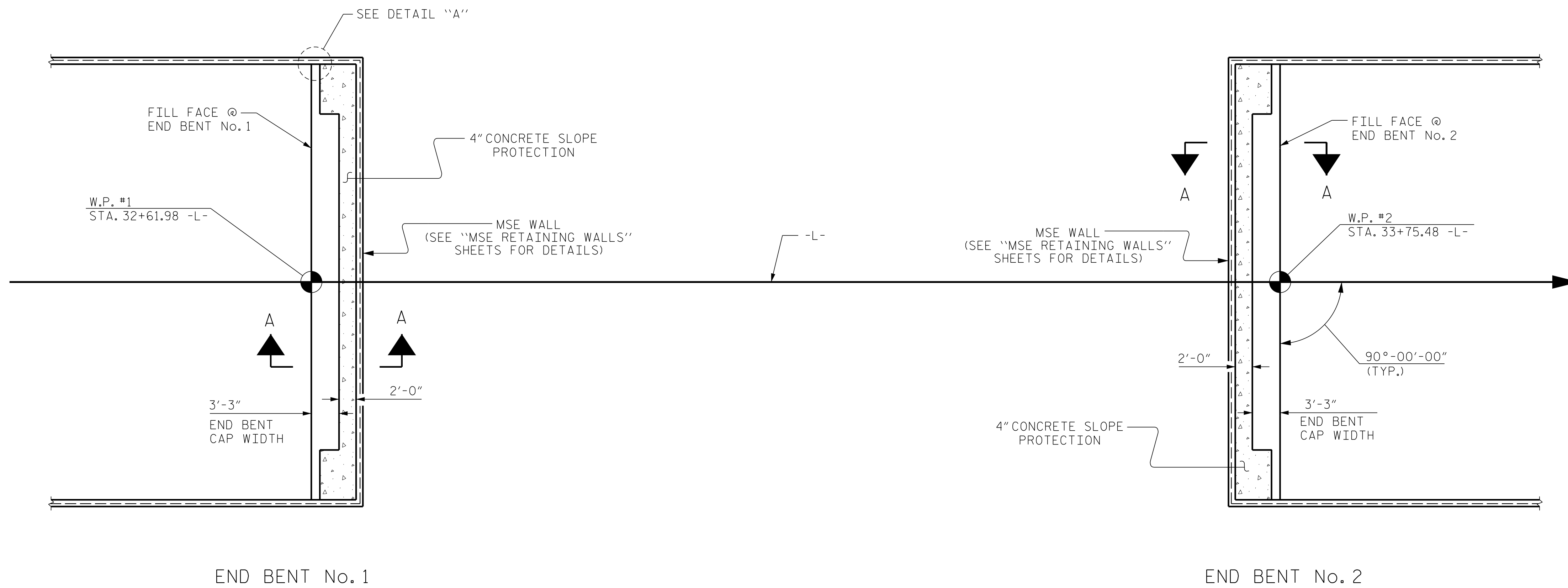
DRAWN BY: D. HODGE DATE: 5/16  
 CHECKED BY: J. DILWORTH DATE: 6/16

**NOTES**

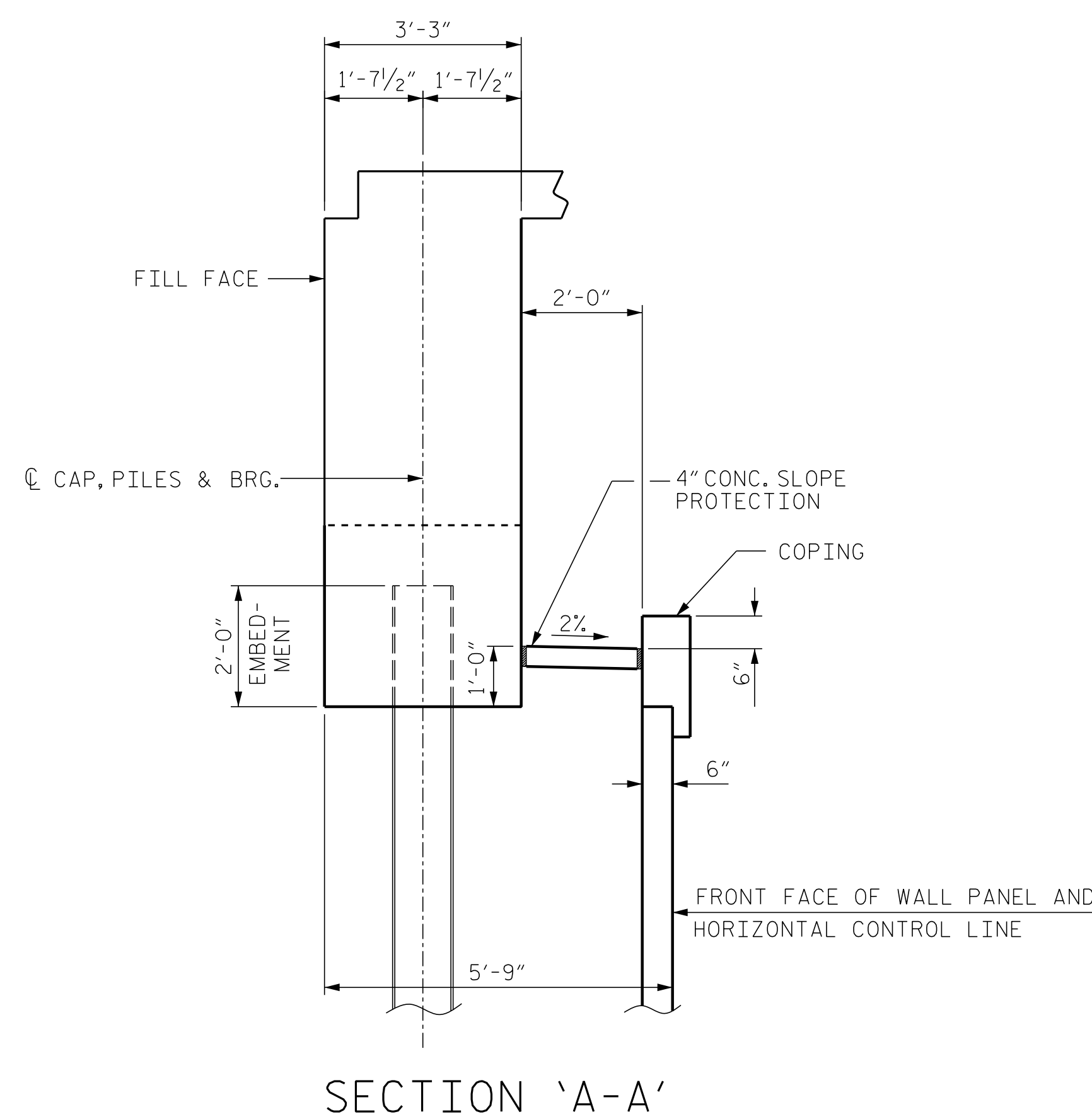
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20" WIDE AND PLACED IN THE MIDDLE OF THE 4" CONCRETE SLOPE PROTECTION. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

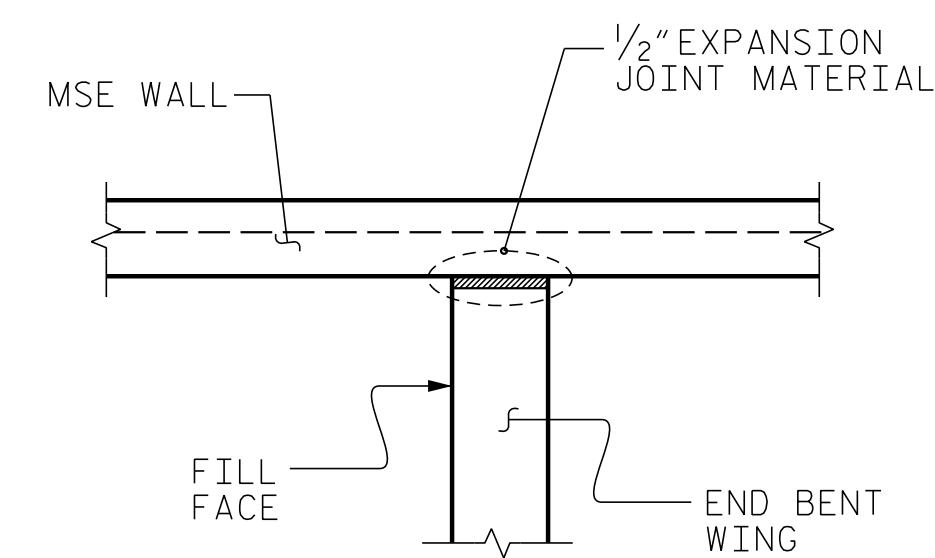
BRIDGE @ STA. 33+26.33 -L-	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	15	73
END BENT 2	15	73



**PLAN**



**SECTION 'A-A'**



**DETAIL "A"**

(TYP. EACH WING TO MSE WALL CONNECTION)

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-

ENGINEER OF RECORD

**ETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
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 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SLOPE PROTECTION DETAILS**

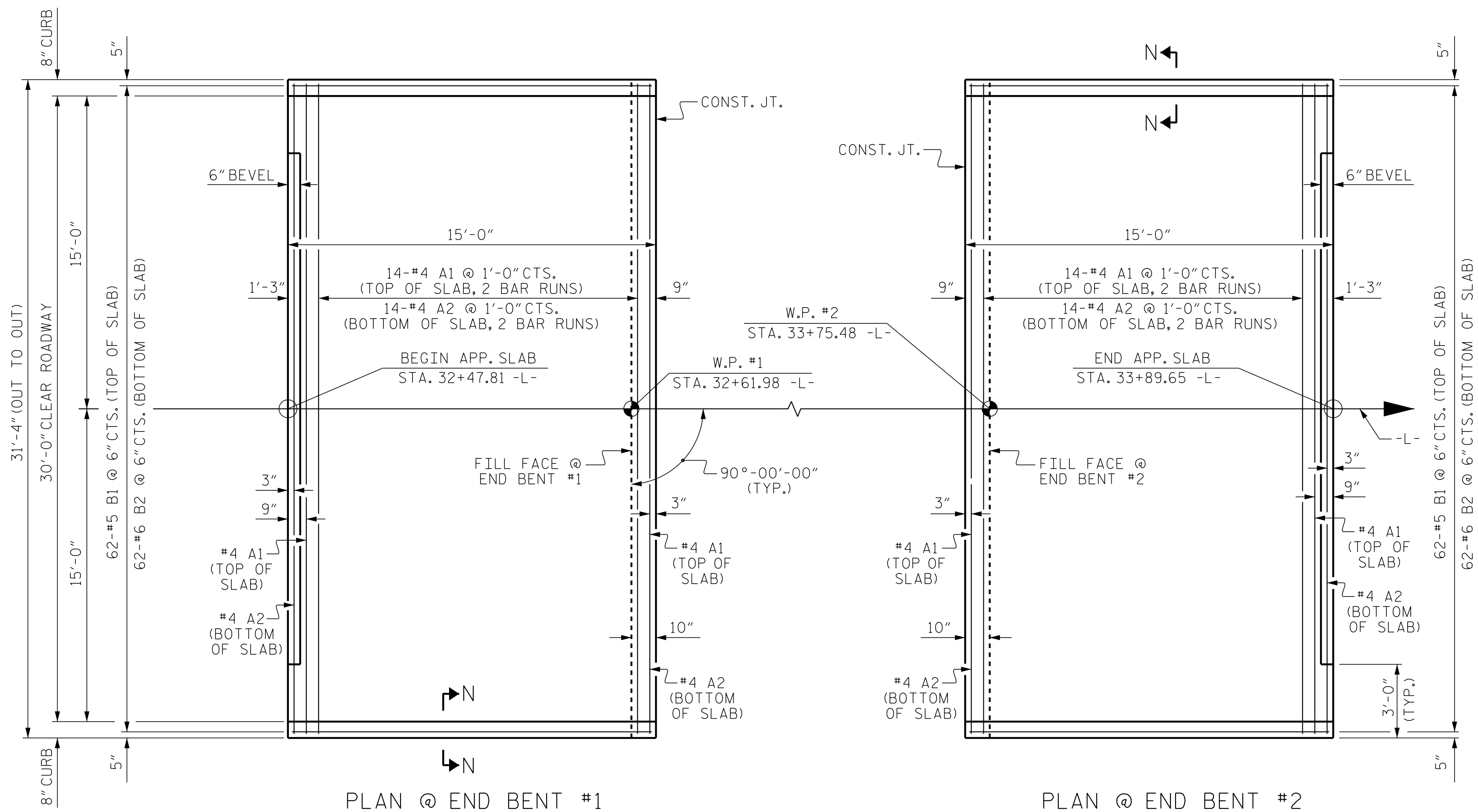
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			23

DRAWN BY : J. C. PENDERGRAFT DATE : 5-16  
 CHECKED BY : J. T. DIFFEE DATE : 5-16

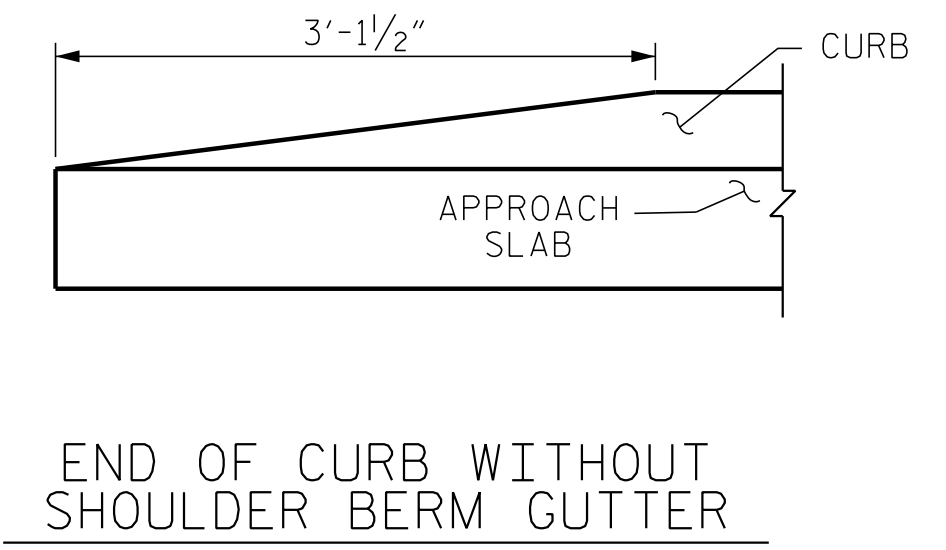
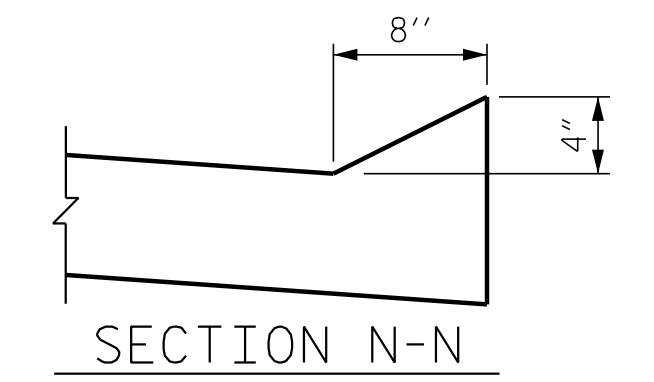
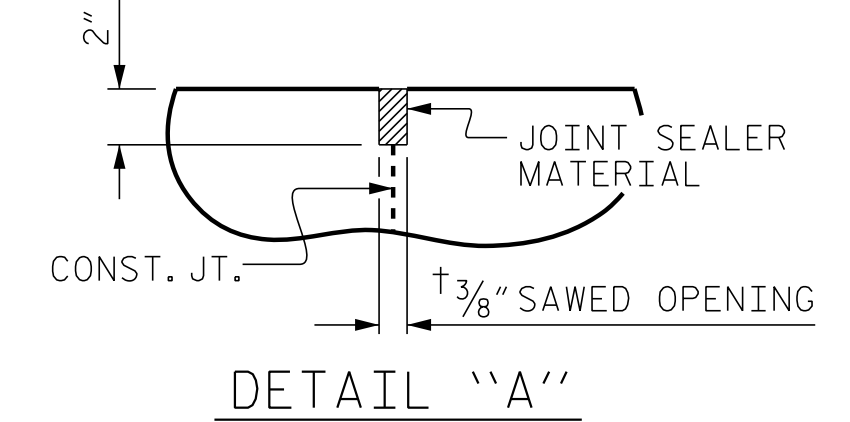
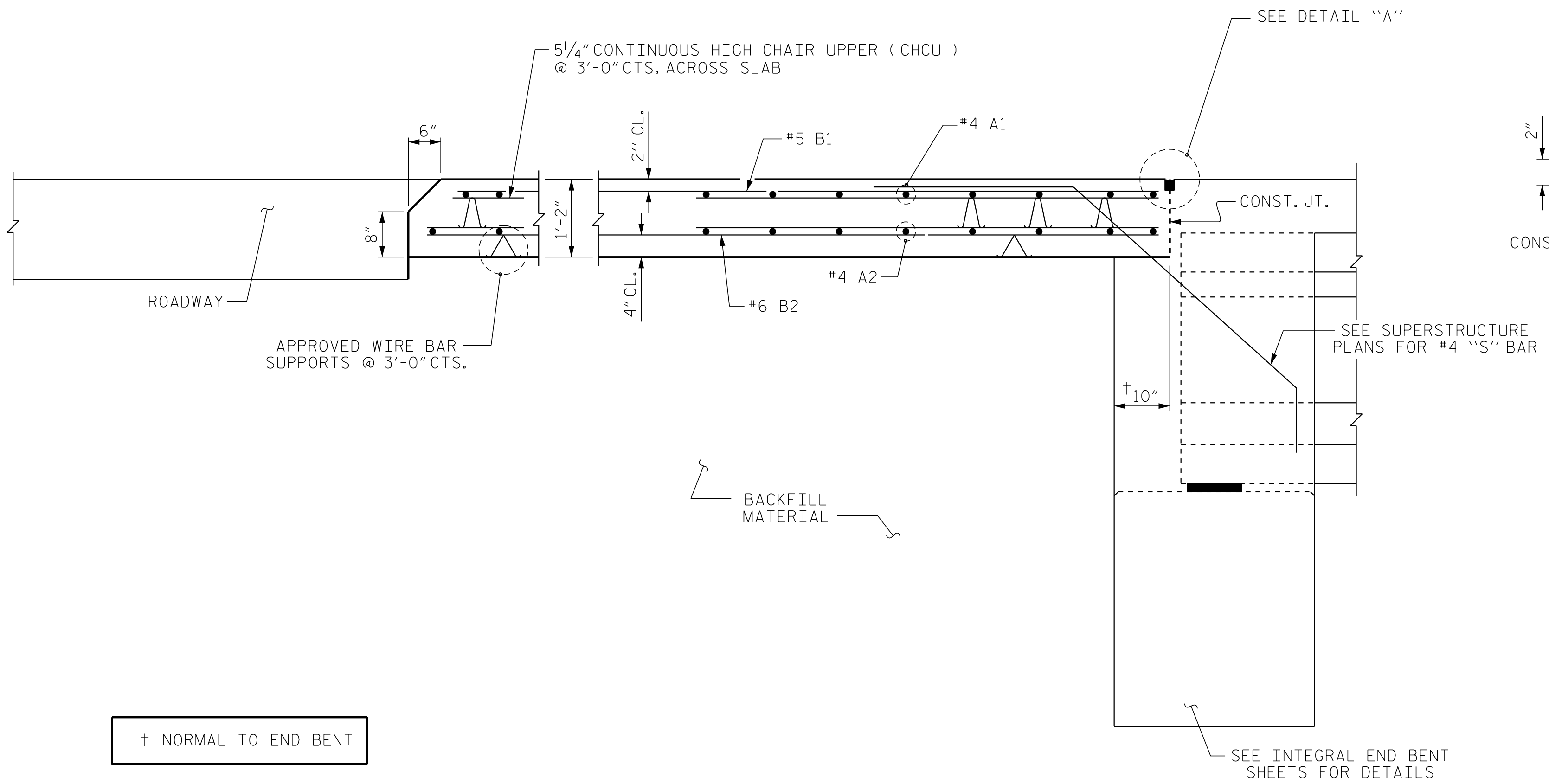
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DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



**NOTES**

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.  
 FOR GALVANIZED REINFORCING STRAPS AND BACKFILL MATERIAL, SEE MSE WALL PLANS AND SPECIAL PROVISIONS.  
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.  
 THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

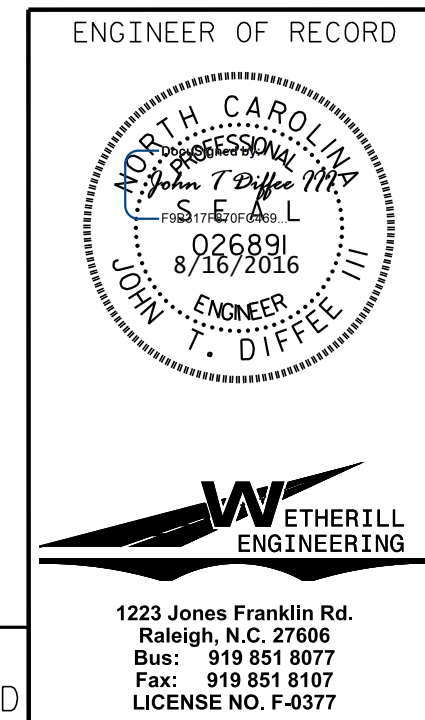
**BILL OF MATERIAL**  
 FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	32	#4	STR	16'-6"	353
A2	32	#4	STR	16'-5"	351
* B1	62	#5	STR	14'-2"	916
B2	62	#6	STR	14'-8"	1366
REINFORCING STEEL				1717 LBS.	
* EPOXY COATED REINFORCING STEEL				1269 LBS.	
CLASS AA CONCRETE				20.3 C. Y.	

**SPLICE LENGTH CHART**

#4A1	2'-0"
#4A2	1'-9"

PROJECT NO. R-5769  
JOHNSTON COUNTY  
 STATION: 33+26.33 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT

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

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