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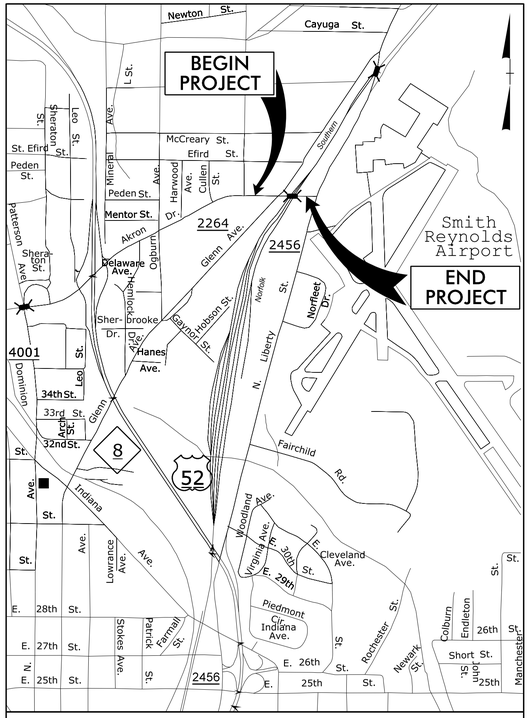
TIP PROJECT: B–4746

CONTRACT: C204109



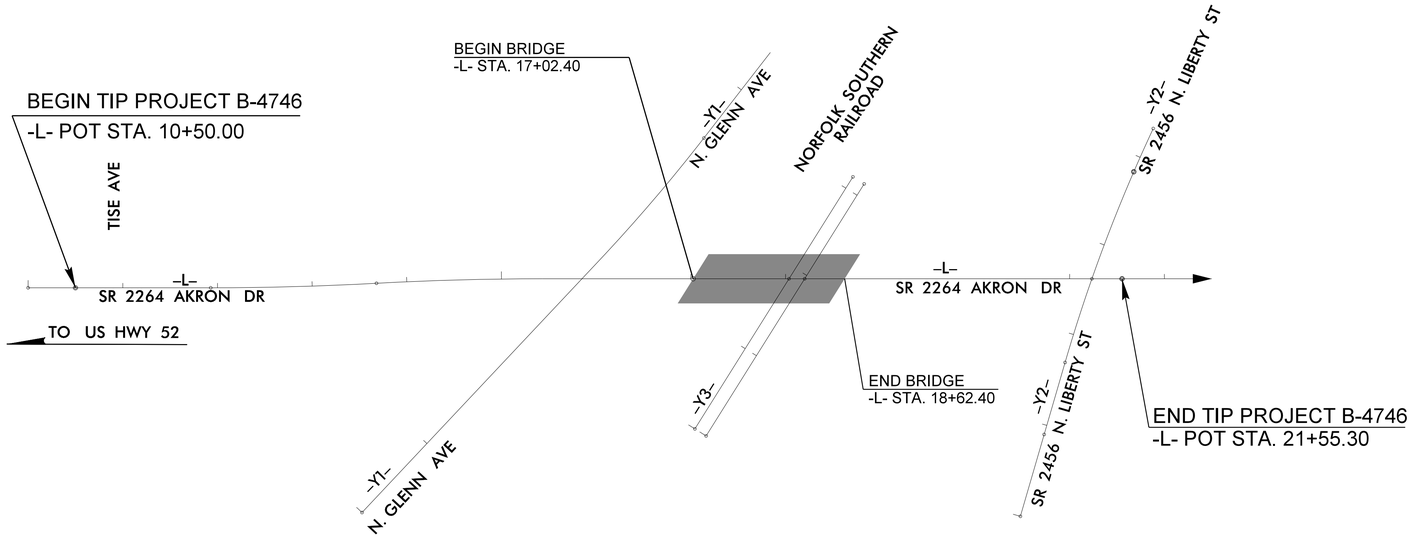
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B–4746	1	36

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38518.1.1	BRZ–2264(3)	P.E.
38518.2.2		UTILITIES
38518.3.1		CONST.

LOCATION: BRIDGE NO. 229 OVER NORFOLK SOUTHERN RAILROAD ON SR 2264 (AKRON DR.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE, AND PAVEMENT MARKINGS



STRUCTURES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT (2017)	=	8,900
ADT (2037)	=	10,600
K	=	10%
D	=	55%
T	=	7%*
V	=	40 MPH
*TTST	=	2% + DUAL 5%
FUNC CLASS	=	LOCAL

SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B–4746	=	0.179 MILES
LENGTH STRUCTURE TIP PROJECT B–4746	=	0.030 MILES
TOTAL LENGTH OF TIP PROJECT B–4746	=	0.209 MILES

PREPARED BY:
DRMP
5950 FAIRVIEW ROAD
SUITE 320
CHARLOTTE, NC 28210
(704) 332-2289
NC LICENSE NO. C-2213

2018 STANDARD SPECIFICATIONS

LETTING DATE :

APRIL 17, 2018

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

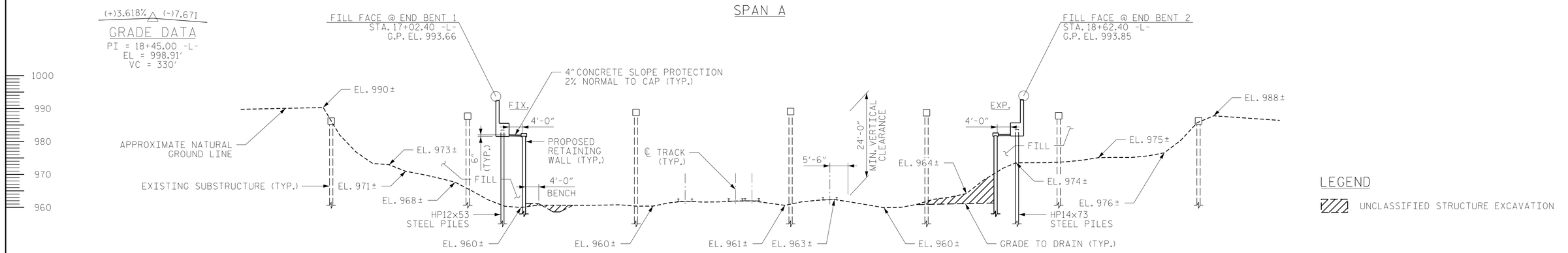
RUDY M. CASTILLO, E.I.
PROJECT ENGINEER

ROBERT A. ALONSO, P.E.
PROJECT DESIGN ENGINEER

F. A. PROJECT NO.: BRZ-2264(3)

16+00 17+00 18+00 19+00

SPAN A



END BENT 1 END BENT 2

-Y3- TOP OF RAIL ELEVATIONS
(LOOKING UPSTATION ALONG RAILROAD)

LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
11+29.23	961.82	11+29.23	961.82
11+58.66	962.09	11+58.66	962.09
11+85.24	962.39	11+85.24	962.38
12+26.43	962.83	12+26.43	962.82

-EY3A- TOP OF RAIL ELEVATIONS
(LOOKING UPSTATION ALONG RAILROAD)

LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
11+22.08	961.42	11+22.08	961.44
11+62.01	961.87	11+62.01	961.89
11+94.24	962.25	11+94.24	962.25
12+33.16	962.61	12+33.16	962.63

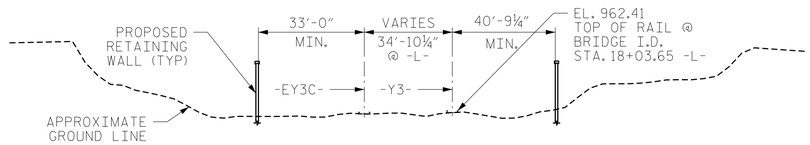
-EY3C- TOP OF RAIL ELEVATIONS
(LOOKING UPSTATION ALONG RAILROAD)

LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
11+16.28	961.40	11+16.16	961.42
11+49.41	961.78	11+52.25	961.81
11+59.78	961.88	11+77.39	962.02
12+09.85	962.34	12+30.92	962.54

-EY3B- TOP OF RAIL ELEVATIONS
(LOOKING UPSTATION ALONG RAILROAD)

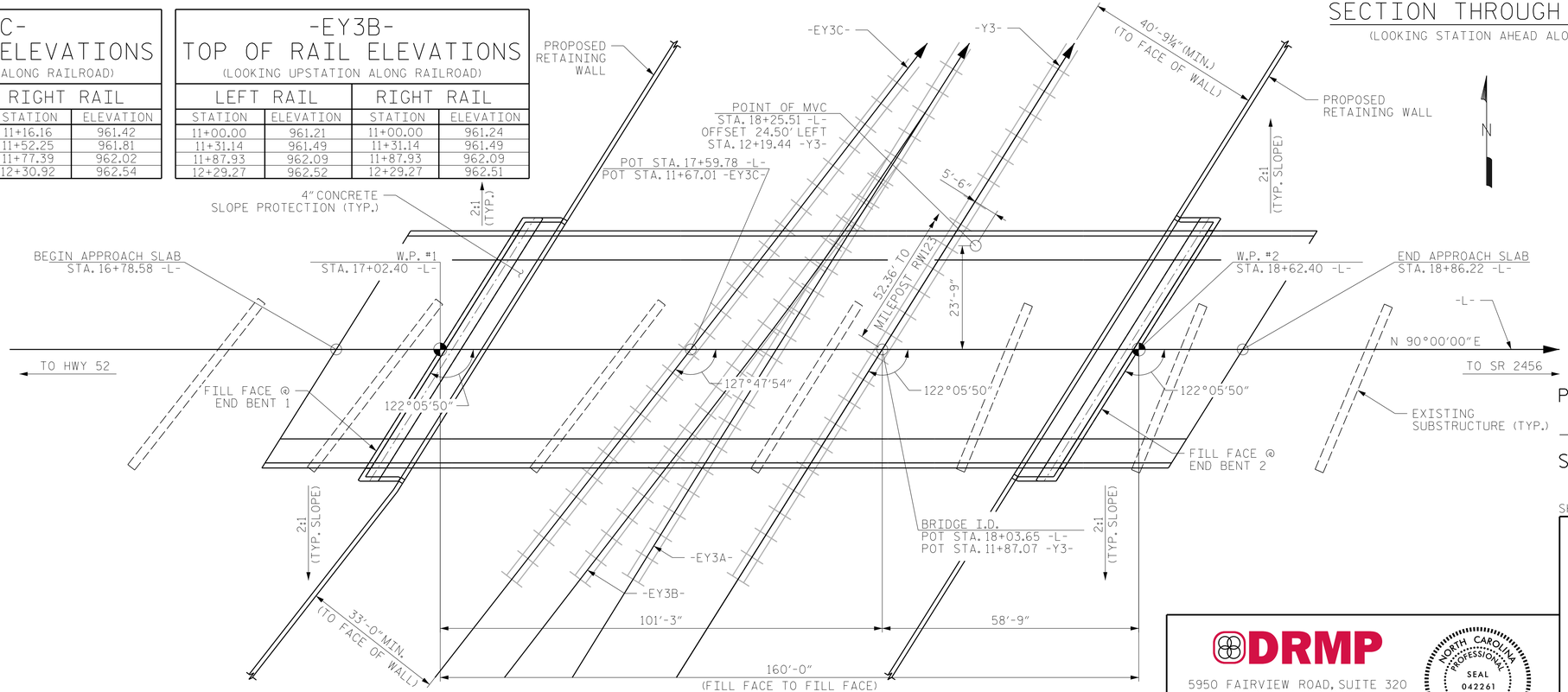
LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
11+00.00	961.21	11+00.00	961.24
11+31.14	961.49	11+31.14	961.49
11+87.93	962.09	11+87.93	962.09
12+29.27	962.52	12+29.27	962.51

SECTION ALONG -L-
SECTION THROUGH BENTS ARE TAKEN AT RIGHT ANGLES



END BENT 1 END BENT 2

SECTION THROUGH RAILROAD
(LOOKING STATION AHEAD ALONG RAILROAD)



PLAN
PILES NOT SHOWN FOR CLARITY

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-
REPLACES BRIDGE 229
SHEET 1 OF 4 MILEPOST RW123.01

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR2264 OVER NORFOLK SOUTHERN RAILROAD

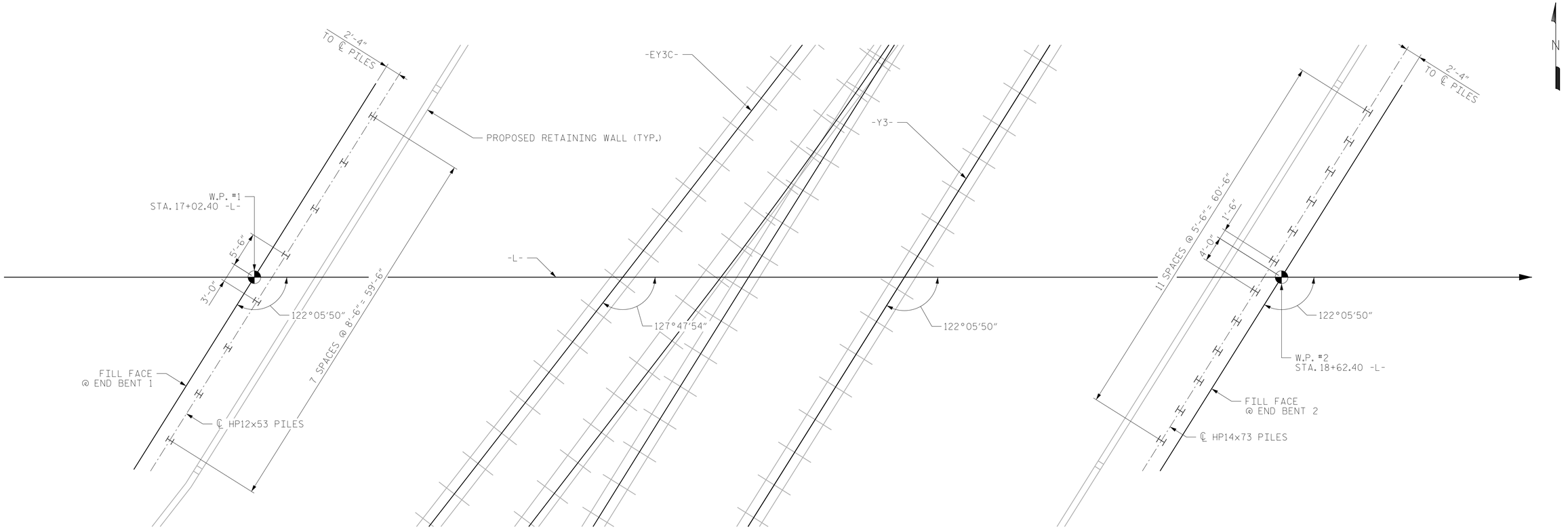
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			36

DRMP
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
(704) 332-2289
NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



END BENT 1

END BENT 2

FOUNDATION LAYOUT

FOUNDATION NOTES

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 195 TONS PER PILE.
3. DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 325 TONS PER PILE.
4. DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 1.
   EXCAVATE HOLES AT PILE LOCATIONS TO AN ELEVATION NO HIGHER THAN 10 FT. BELOW THE TOP OF MSE WALL LEVELING PAD.
   FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
5. CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1.
6. PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 140 TONS PER PILE.
7. DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 235 TONS PER PILE.
8. INSTALL PILES AT END BENTS TO A TIP ELEVATION NO HIGHER THAN 10 FT. BELOW THE TOP OF THE MSE WALL LEVELING PAD.
9. TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED.
   THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
10. DRIVE PILES AT EACH END BENT BEFORE CONSTRUCTING THE MSE WALL ABUTMENTS.

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 4

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DRMP
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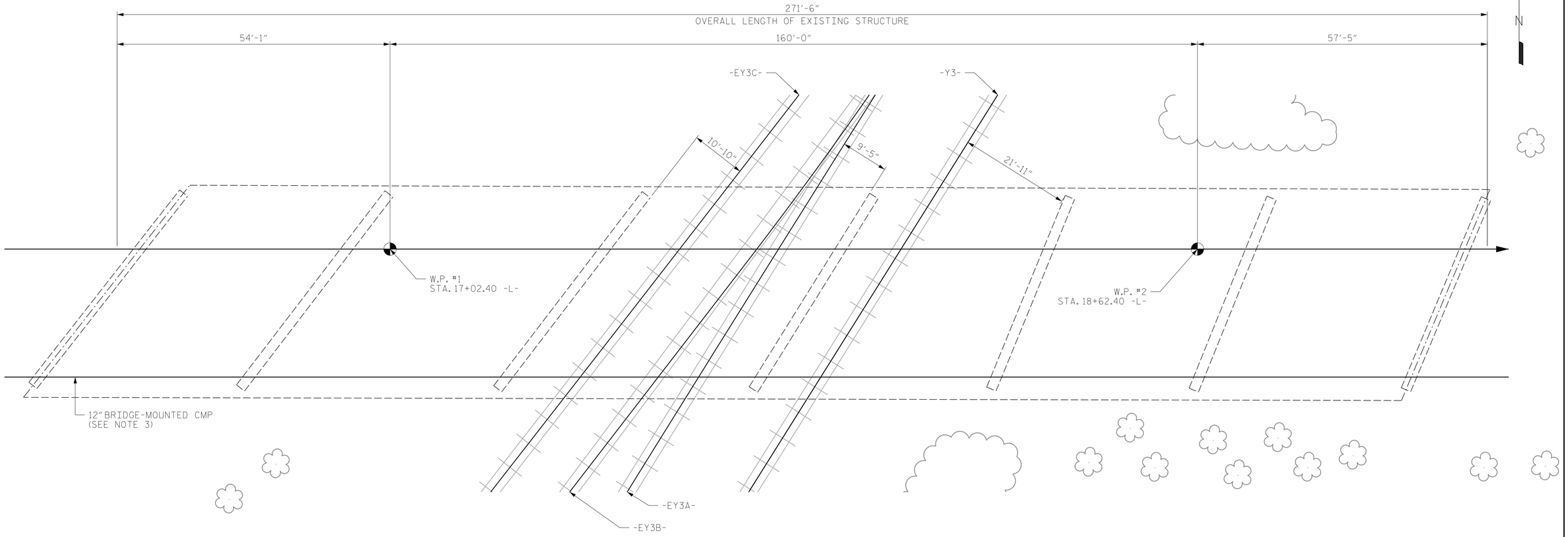
NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR2264 OVER NORFOLK SOUTHERN RAILROAD

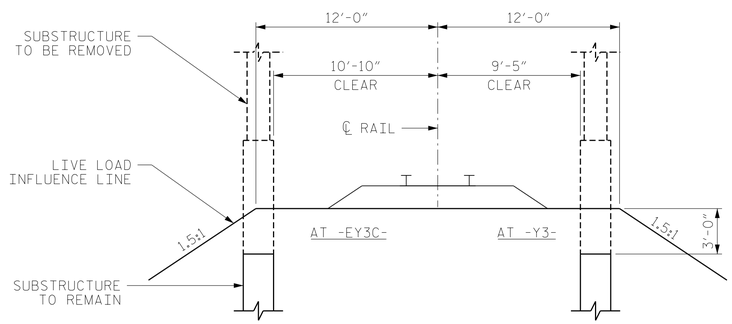
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			36



PLAN FOR STRUCTURE REMOVAL

REMOVAL NOTES

1. THE EXISTING STRUCTURE CONSISTS OF 6 SIMPLY SUPPORTED SPANS OF VARIOUS LENGTHS. THE SUPERSTRUCTURE CONSISTS OF 5 LINES OF 18″x 42″REINFORCED CONCRETE DECK GIRDERS WITH A CLEAR ROADWAY WIDTH OF 30′-0″ WITH A REINFORCED CONCRETE DECK. THE SUBSTRUCTURE CONSISTS OF REINFORCED CONCRETE END BENTS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS. THE EXISTING STRUCTURE SHALL BE REMOVED.
2. THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
3. UTILITIES MUST BE RELOCATED PRIOR TO REMOVAL OF STRUCTURE. FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.
4. THE CONTRACTOR SHALL COORDINATE WITH THE RAILROAD FLAGGER SO THAT REMOVAL ACTIVITIES OF SUBSTRUCTURE ADJACENT TO RAIL LINES ARE PERFORMED DURING STOPPAGES OF TRAINS. WHEN REMOVAL ACTIVITIES ARE SUSPENDED TO ALLOW FOR TRAIN PASSAGE, THE RAILROAD EMBANKMENT SHALL BE RESTORED AND COMPACTED TO AT LEAST THE CROSS SECTION OF THE LIVE LOAD INFLUENCE LINE SHOWN ON THE PLANS.



SECTION

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR2264 OVER NORFOLK SOUTHERN RAILROAD

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

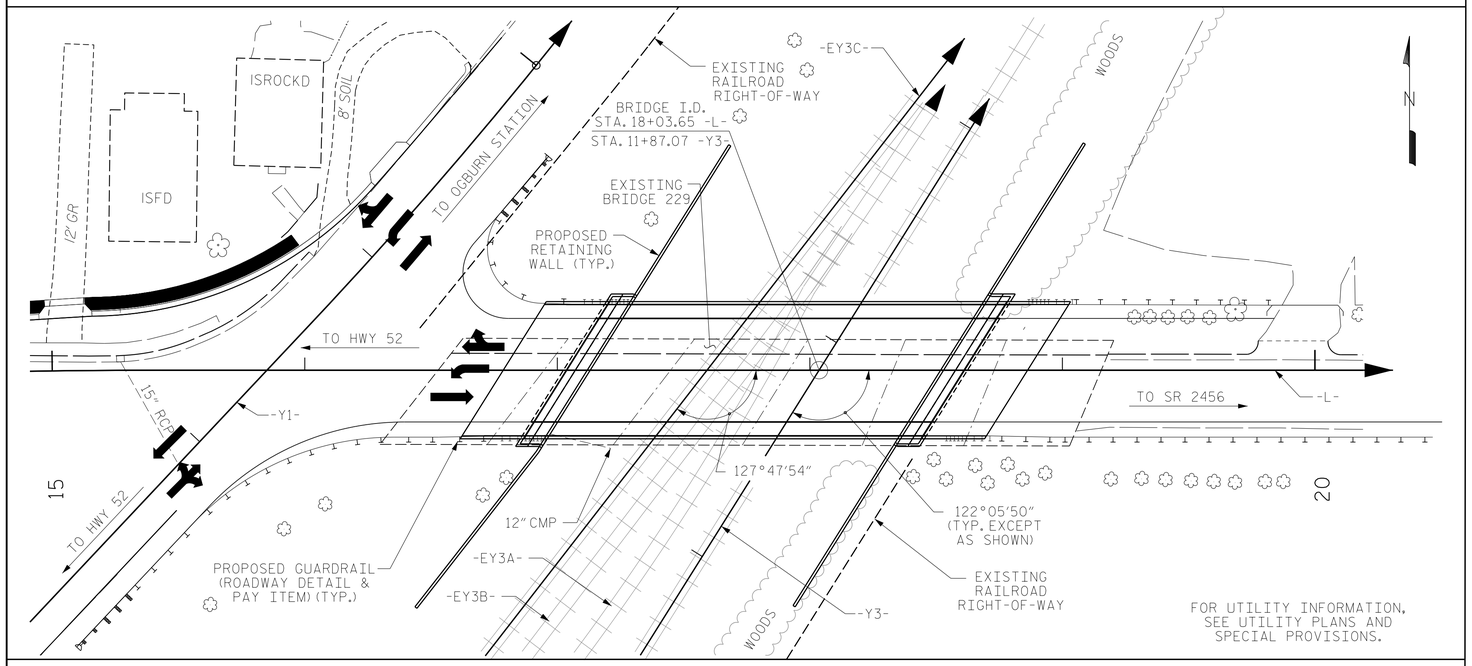
DRMP
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
(704) 332-2289
NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

BM 2: SCRIBED "X" IN TOP BACK OF CURB, 15' RIGHT OF STA. 22+48.00 -L-, EL. 975.33'



LOCATION SKETCH

GENERAL NOTES

1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH 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. THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30" SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30" 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.
10. FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
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 RAILROAD TRACK TOP OF RAIL ELEVATIONS ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
13. NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
14. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
15. FOR RAILROAD PROVISIONS, SEE SPECIAL PROVISIONS.
16. INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 18+03.65 -L-.
17. 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.
18. THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 100 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
19. FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATIONS, SEE SPECIAL PROVISIONS.
20. SEE SHEET 3 OF 4 FOR EXISTING STRUCTURE REMOVAL NOTES.
21. ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
22. FOR CLASSIC CONCRETE BRIDGE RAIL, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

LOCATION	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	STRUCTURAL STEEL (APPROX.) (352,000 LBS.)	PILE DRIVING EQUIPMENT SETUP FOR HP12x53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP14x73 STEEL PILES	HP12x53 STEEL PILES		HP14x73 STEEL PILES		CLASSIC CONCRETE BRIDGE RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	ASBESTOS ASSESSMENT	ELECTRICAL CONDUIT SYSTEM FOR SIGNALS AT STATION 18+03.65 -L-
	LUMP SUM	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LUMP SUM	EACH	EACH	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	SQ. YDS	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE				8,558	7,847				LUMP SUM							416.0					LUMP SUM
END BENT NO. 1			LUMP SUM			77.4		10,273		8		8	320				30.7				
END BENT NO. 2			LUMP SUM			77.1		10,386			12			12	480		30.7				
TOTAL	LUMP SUM	1	LUMP SUM	8,558	7,847	154.5	LUMP SUM	20,659	LUMP SUM	8	12	8	320	12	480	416.0	61.4	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR2264 OVER NORFOLK SOUTHERN RAILROAD

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DRMP
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CHARLOTTE, NC 28210
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NC LICENSE NO. C-2213

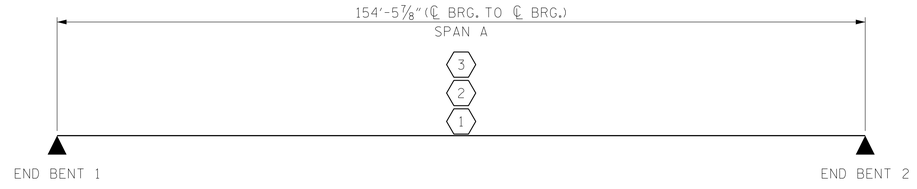
NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			36

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	**1.32**	--	1.75	0.678	1.54	A	I	77'-3"	1.125	1.47	A	ER	0'-0"	1.30	0.678	**1.32**	A	I	77'-3"	
		HL-93 (OPERATING)	N/A		1.71	--	1.35	0.678	1.99	A	I	77'-3"	1.125	1.91	A	ER	0'-0"	1.00	0.678	1.71	A	I	77'-3"	
		HS-20 (INVENTORY)	36.00	(2)	**2.07**	74.52	1.75	0.678	2.42	A	I	77'-3"	1.125	2.29	A	ER	0'-0"	1.30	0.678	**2.07**	A	I	77'-3"	
		HS-20 (OPERATING)	36.00		2.69	96.84	1.35	0.678	3.13	A	I	77'-3"	1.125	2.97	A	ER	0'-0"	1.00	0.678	2.69	A	I	77'-3"	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.14	69.39	1.40	0.678	7.50	A	I	77'-3"	1.125	7.29	A	ER	0'-0"	1.30	0.678	5.14	A	I	77'-3"	
		SNAGRBS2	20.000		3.62	72.40	1.40	0.678	5.28	A	I	77'-3"	1.125	5.03	A	ER	0'-0"	1.30	0.678	3.62	A	I	77'-3"	
		SNAGRIS2	22.000		3.35	73.70	1.40	0.678	4.88	A	I	77'-3"	1.125	4.61	A	ER	0'-0"	1.30	0.678	3.35	A	I	77'-3"	
		SNCOTTS3	27.250		2.55	69.49	1.40	0.678	3.72	A	I	77'-3"	1.125	3.62	A	ER	0'-0"	1.30	0.678	2.55	A	I	77'-3"	
		SNAGGRS4	34.925		2.05	71.60	1.40	0.678	2.99	A	I	77'-3"	1.125	2.90	A	ER	0'-0"	1.30	0.678	2.05	A	I	77'-3"	
		SNS5A	35.550		2.01	71.46	1.40	0.678	2.94	A	I	77'-3"	1.125	2.88	A	ER	0'-0"	1.30	0.678	2.01	A	I	77'-3"	
		SNS6A	39.950		1.82	72.71	1.40	0.678	2.65	A	I	77'-3"	1.125	2.59	A	ER	0'-0"	1.30	0.678	1.82	A	I	77'-3"	
		SNS7B	42.000		1.73	72.66	1.40	0.678	2.52	A	I	77'-3"	1.125	2.49	A	ER	0'-0"	1.30	0.678	1.73	A	I	77'-3"	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.21	72.93	1.40	0.678	3.22	A	I	77'-3"	1.125	3.11	A	ER	0'-0"	1.30	0.678	2.21	A	I	77'-3"	
		TNT4A	33.075		2.19	72.43	1.40	0.678	3.20	A	I	77'-3"	1.125	3.07	A	ER	0'-0"	1.30	0.678	2.19	A	I	77'-3"	
		TNT6A	41.600		1.77	73.63	1.40	0.678	2.59	A	I	77'-3"	1.125	2.57	A	ER	0'-0"	1.30	0.678	1.77	A	I	77'-3"	
		TNT7A	42.000		1.77	74.34	1.40	0.678	2.58	A	I	77'-3"	1.125	2.53	A	ER	0'-0"	1.30	0.678	1.77	A	I	77'-3"	
		TNT7B	42.000		1.79	75.18	1.40	0.678	2.61	A	I	77'-3"	1.125	2.47	A	ER	0'-0"	1.30	0.678	1.79	A	I	77'-3"	
		TNAGRIT4	43.000		1.72	73.96	1.40	0.678	2.51	A	I	77'-3"	1.125	2.40	A	ER	0'-0"	1.30	0.678	1.72	A	I	77'-3"	
		TNAGT5A	45.000		**1.64**	73.80	1.40	0.678	2.40	A	I	77'-3"	1.125	2.33	A	ER	0'-0"	1.30	0.678	**1.64**	A	I	77'-3"	
		TNAGT5B	45.000	(3)	**1.64**	73.80	1.40	0.678	2.39	A	I	77'-3"	1.125	2.29	A	ER	0'-0"	1.30	0.678	**1.64**	A	I	77'-3"	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																				



LRFR SUMMARY

LOAD FACTORS:

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

NOTES:

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

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

LEGAL LOADS ARE CONTROLLED EQUALLY BY TNAGT5A AND TNAGT5B.

(#) 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

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

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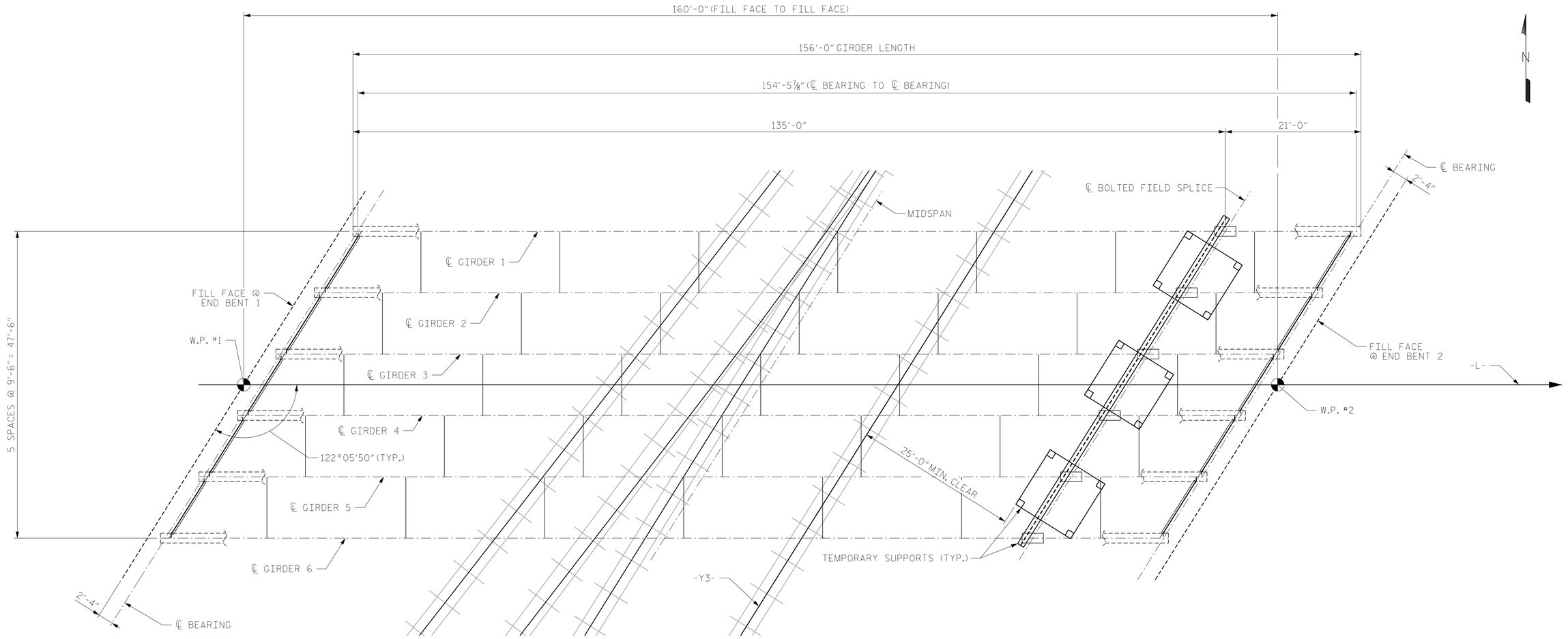
NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

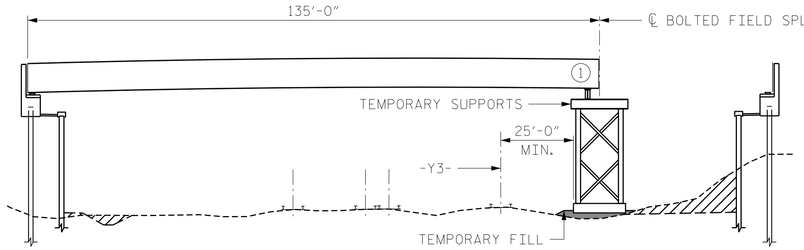
STANDARD
LRFR SUMMARY
FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			36

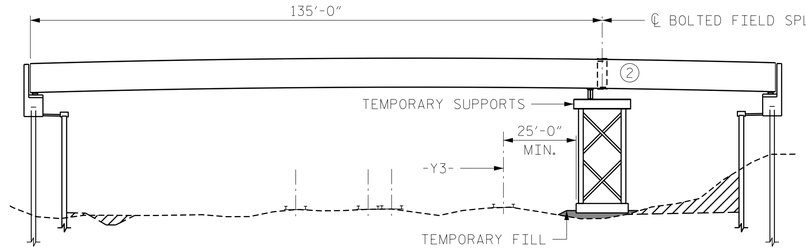
STD. NO. LRFR3



PLAN



ELEVATION - STAGE 1 OF 2



ELEVATION - STAGE 2 OF 2

NOTES

1. PLACEMENT OF THE TEMPORARY BENTS MUST BE COORDINATED WITH THE RAILROAD.
2. DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT, AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY SUPPORT AND ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.
3. THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.
4. FOR TEMPORARY BENTS, SEE SPECIAL PROVISIONS.

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DESIGN ENGINEER OF RECORD:	ROBERT A. ALONSO	DATE :	03/2017

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1/16/2018

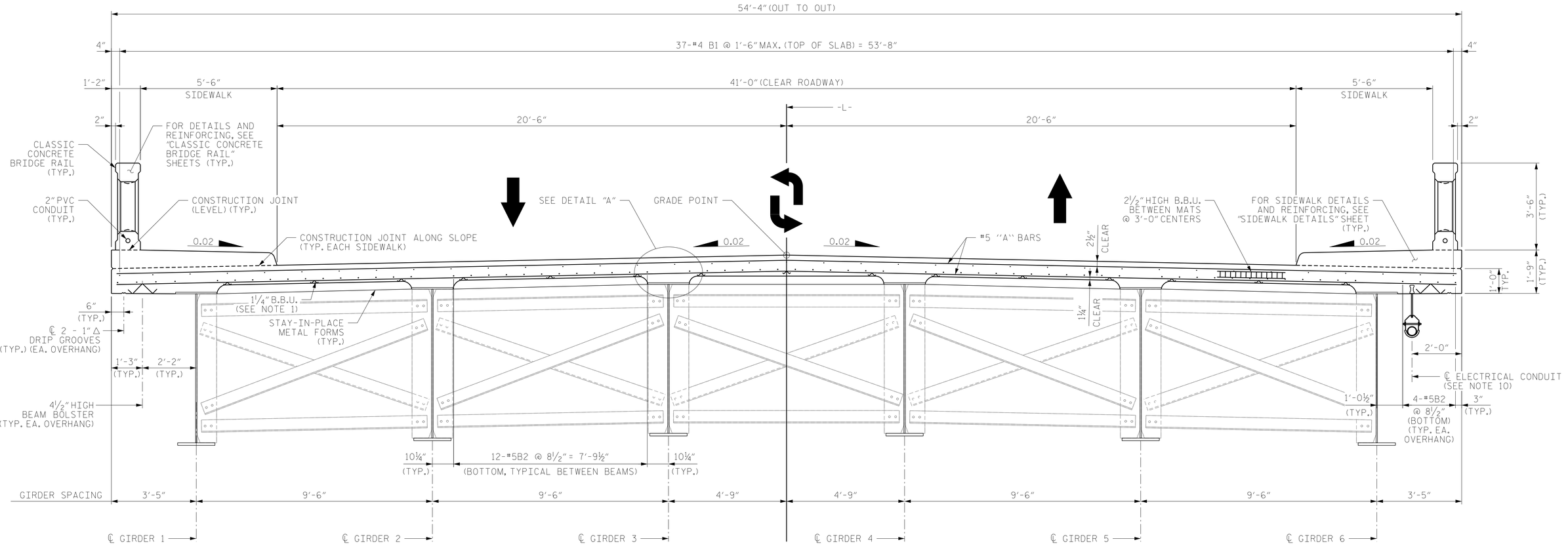
PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

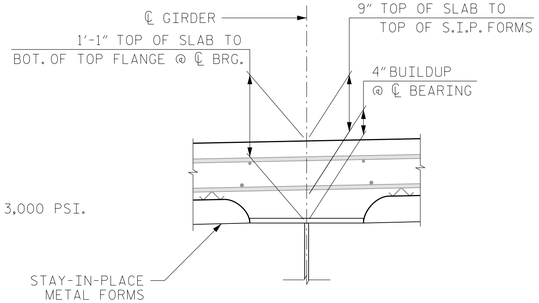
SUPERSTRUCTURE

GIRDER ERECTION SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			36



TYPICAL SECTION



DETAIL "A"

(TYP. EACH GIRDER)

NOTES

1. PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" MAXIMUM SPACING 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" MAXIMUM SPACING. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.
2. METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.
3. CLASSIC CONCRETE BRIDGE RAIL AND SIDEWALK SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
4. ALL REINFORCING STEEL IN BARRIER RAILS AND SIDEWALKS SHALL BE EPOXY COATED.
5. FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.
6. PREVIOUSLY CAST CONCRETE IN A SPAN MUST HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.
7. THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.
8. THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.
9. DIRECTION OF CASTING SHALL BE FROM THE FIXED BEARING END TOWARD THE EXPANSION BEARING END OF THE SPAN.
10. SEE "ELECTRICAL CONDUIT SYSTEM FOR SIGNALS" SHEET FOR CONDUIT AND HANGER DETAILS.

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1/16/2018

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

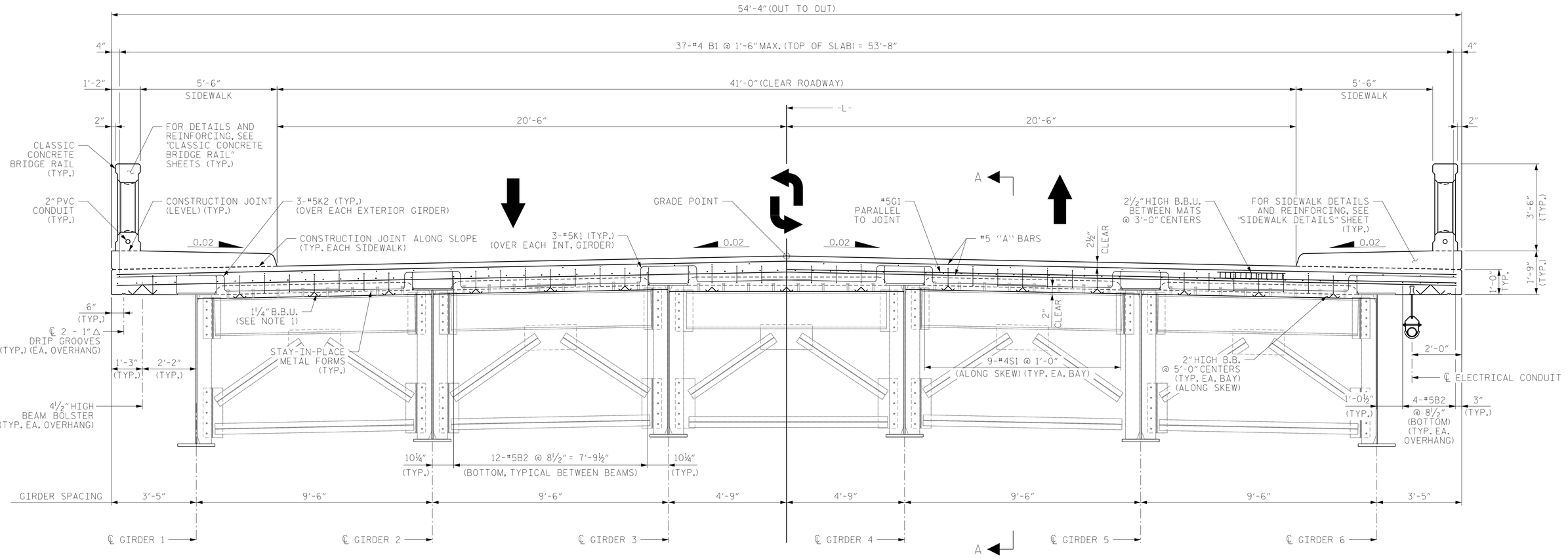
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

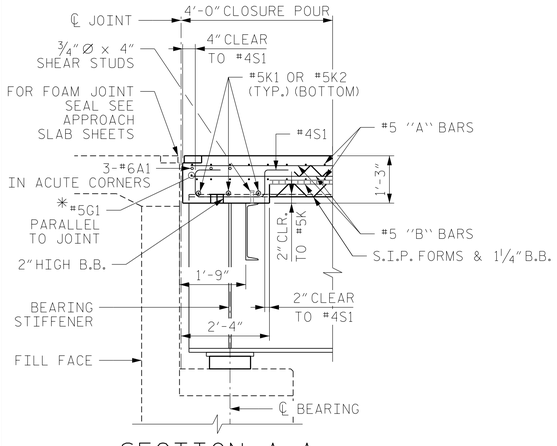
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			36



TYPICAL SECTION AT END DIAPHRAGM

FOR NOTES SEE SHEET 1 OF 2



SECTION A-A

*#5G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

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PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION AT END DIAPHRAGM

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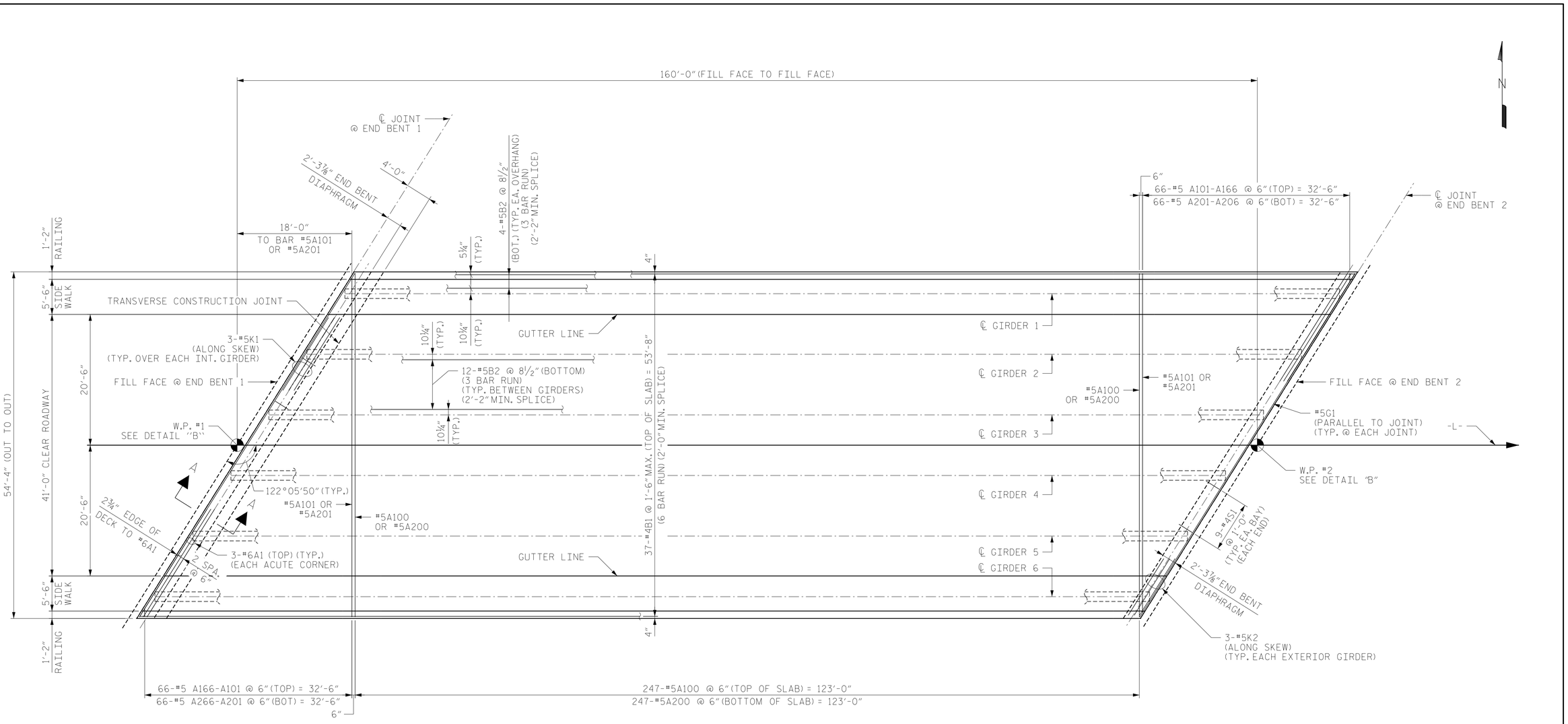
1/16/2018

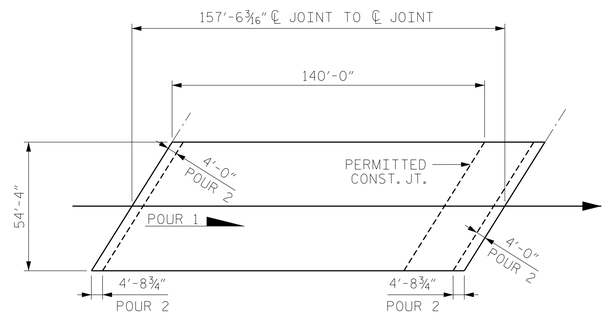
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			36



PLAN OF SPAN A

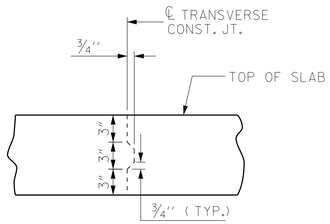
NOTES

1. FOR SIDEWALK REINFORCING STEEL, SEE "SIDEWALK DETAILS" SHEET.
2. #5U1 BARRIER REINFORCING MUST BE EMBEDDED IN THE DECK POUR. SEE "CLASSIC CONCRETE BRIDGE RAIL" SHEETS.
3. FOR "SECTION A-A", SEE "TYPICAL SECTION AT END DIAPHRAGM" SHEET.



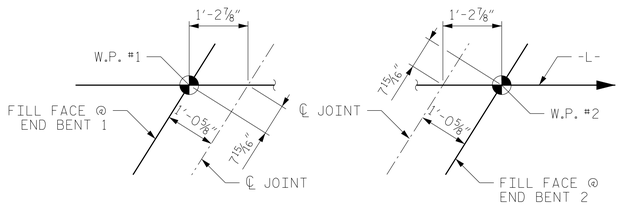
POURING SEQUENCE

POUR 3 (SIDEWALK POURS) NOT SHOWN FOR CLARITY.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



DETAIL "B"

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

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DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			36

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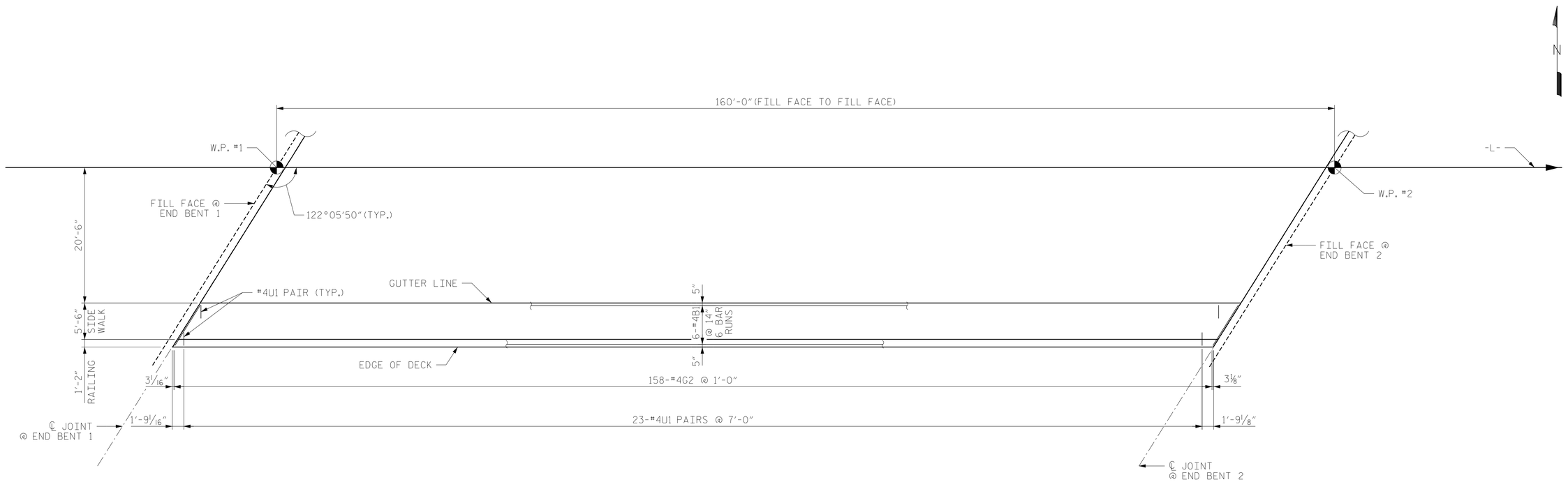
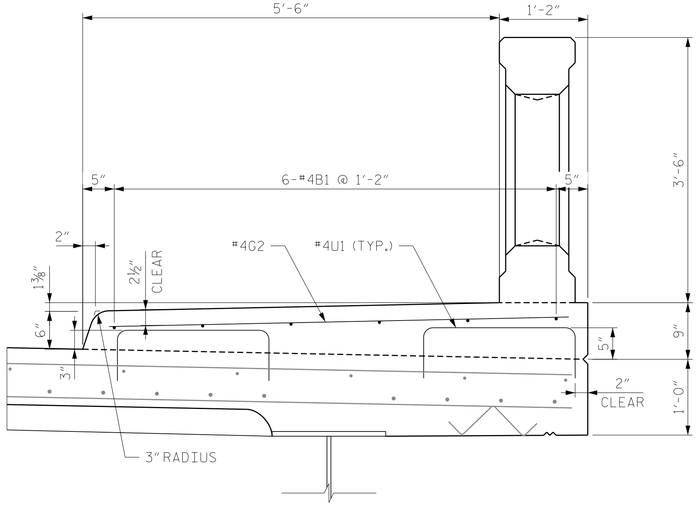


SIDEWALK PLAN

(RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR)



SECTION THRU SIDEWALK

(RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR)

NOTES

1. #4U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.
2. GROOVED CONTRACTION JOINT, ½" 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 JOINT SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.
3. SIDEWALK IN THE SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRESS OF 3,000 PSI.
4. ALL REINFORCING STEEL IN THE SIDEWALK MUST BE EPOXY COATED.
5. SEE "BRIDGE APPROACH SLAB DETAILS" SHEETS FOR COVER PLATE DETAILS.
6. FOR SIDEWALK ON APPROACH SLAB, SEE "BRIDGE APPROACH SLAB DETAILS" SHEETS.
7. FOR SIDEWALK REINFORCING STEEL AND CONCRETE QUANTITIES, SEE SUPERSTRUCTURE "BILL OF MATERIAL".

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

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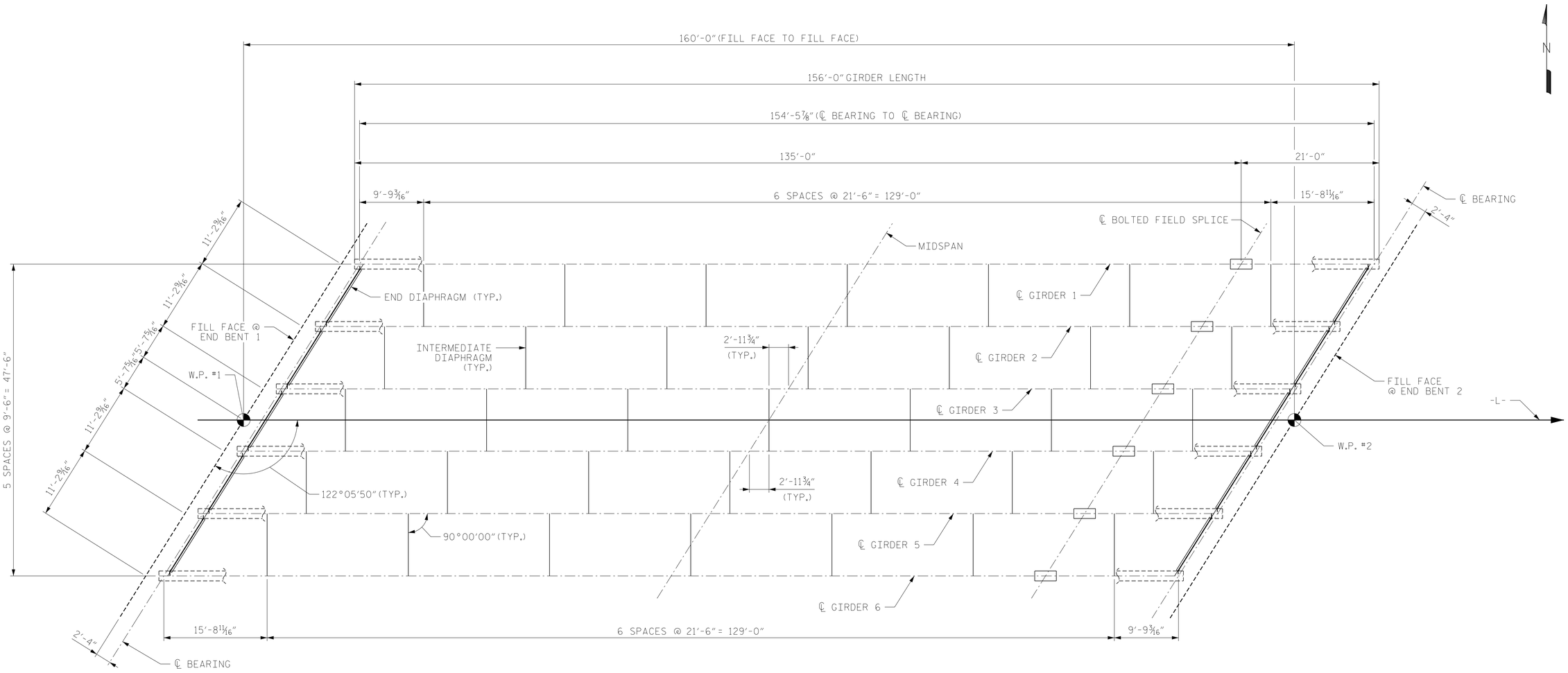
1/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			36



FIXED
(E9,P1)

EXPANSION
(E10,P2)

FRAMING PLAN - SPAN ''A''

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

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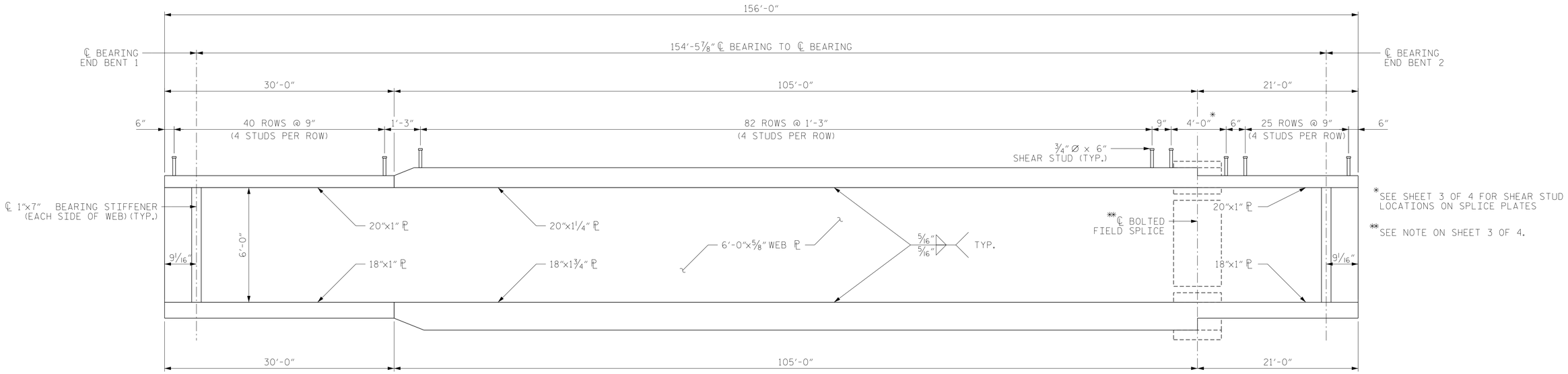
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			36

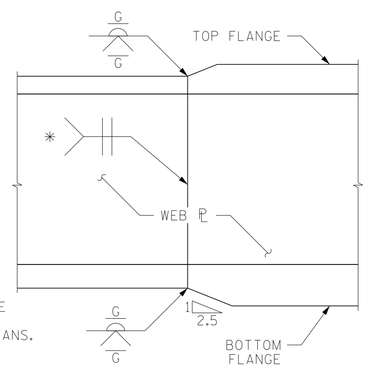


GIRDER ELEVATION

BOTTOM FLANGE DETAIL

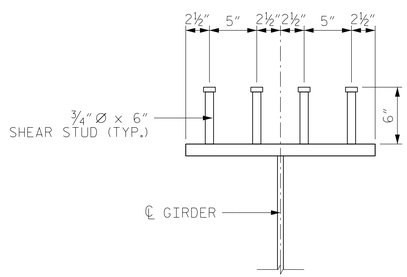
NOTES

1. ALL FIELD CONNECTIONS TO BE ⅞"Ø HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.
2. TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.
3. A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES, AND WEB SPLICE PLATES FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.
4. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MIDSPAN. KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.
5. END OF GIRDERS MUST BE PLUMB.
6. BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.
7. SHEAR STUDS MAY BE SHIFTED UP TO 1" TO CLEAR FLANGE SPLICE WELD.
8. ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
9. ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.
10. STRUCTURAL STEEL ERECTION IN SPAN SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED.



SHOP SPLICE DETAIL

*GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS



SHEAR STUD DETAIL

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			36

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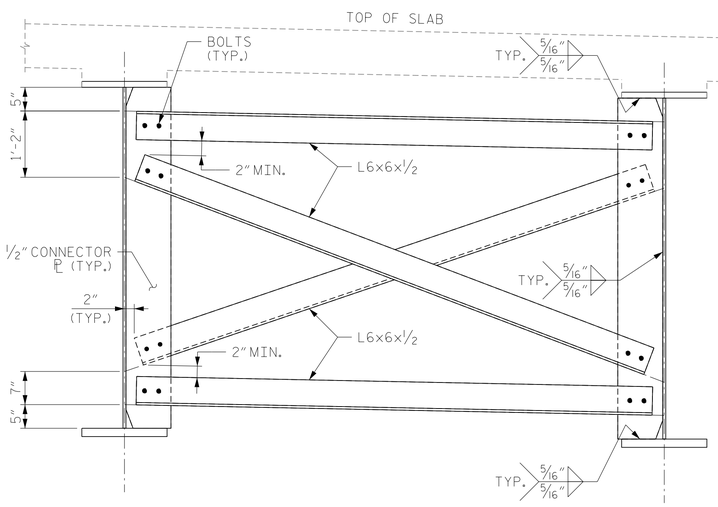
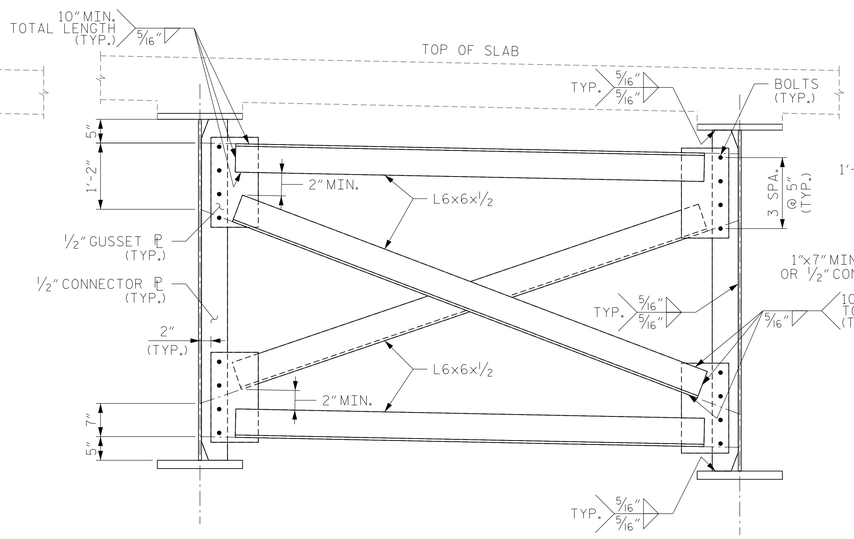
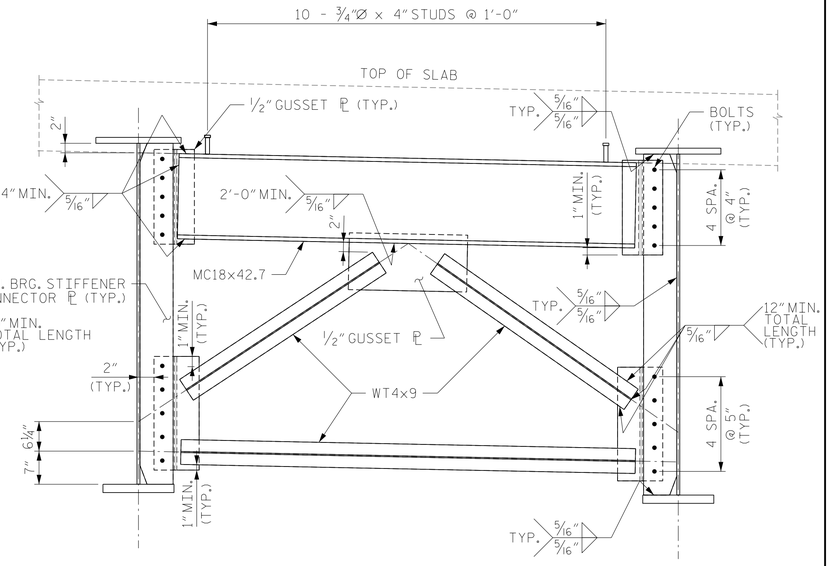


TYPICAL INTERMEDIATE DIAPHRAGM

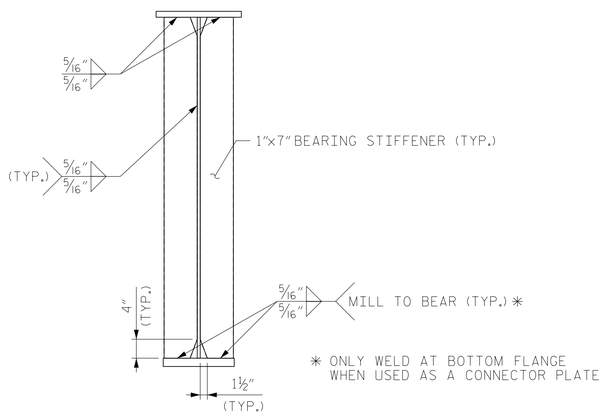


TYPICAL OPTIONAL INTERMEDIATE DIAPHRAGM

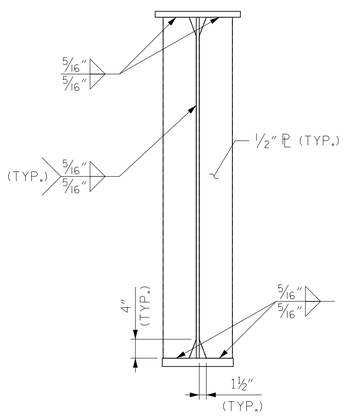


TYPICAL END DIAPHRAGM

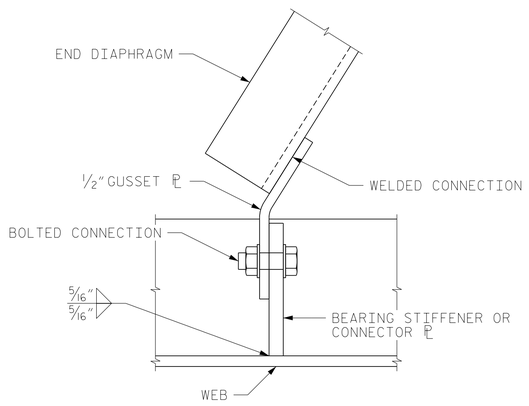
(LOOKING TOWARDS END BENT)



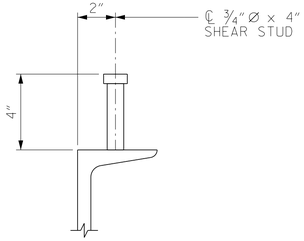
BEARING STIFFENER DETAIL



CONNECTOR PL DETAIL



BENT PLATE DETAIL



END DIAPHRAGM SHEAR STUD DETAIL

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 4

NOTES

1. AT THE CONTRACTOR'S OPTION, THE OPTIONAL INTERMEDIATE DIAPHRAGM WITH THE WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE INTERMEDIATE DIAPHRAGM WITH BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.
2. FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.
3. BEARING STIFFENER, WHEN USED AS A CONNECTOR PLATE, MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DRMP
5950 FAIRVIEW ROAD, SUITE 320
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(704) 332-2289
NC LICENSE NO. C-2213

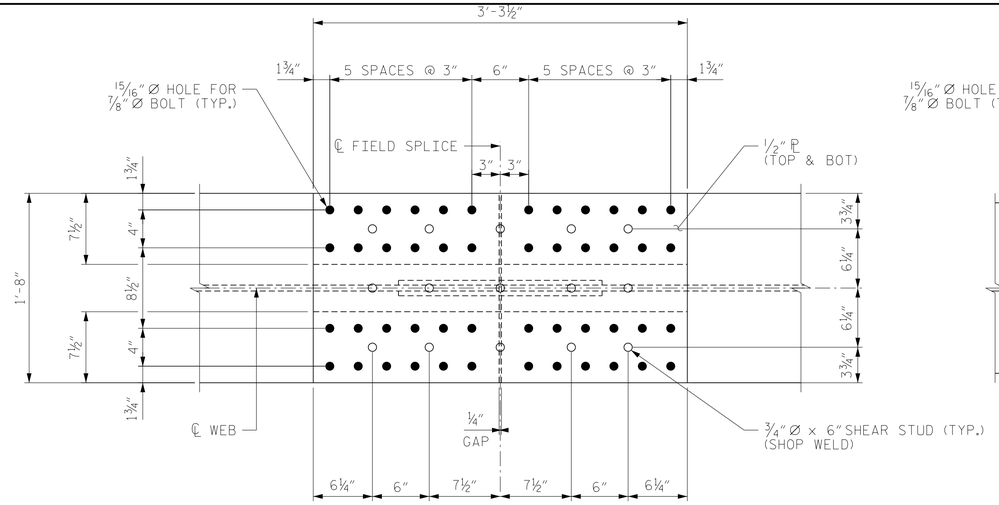
NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

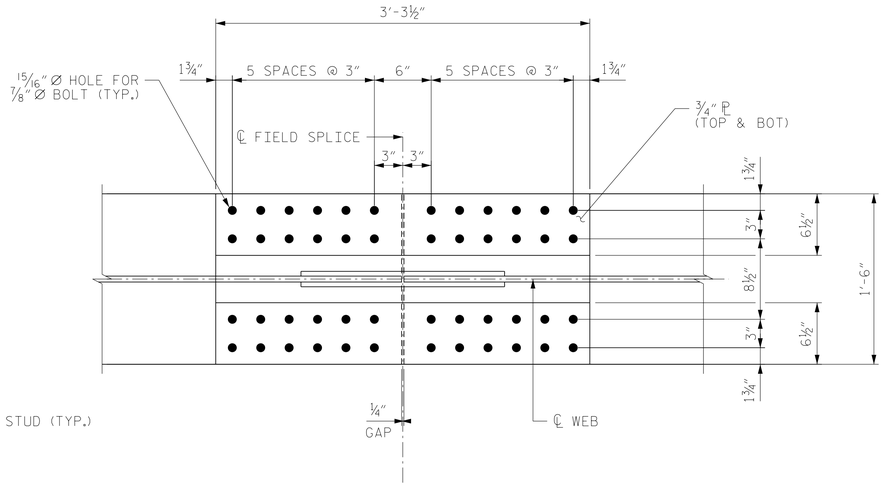
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			36



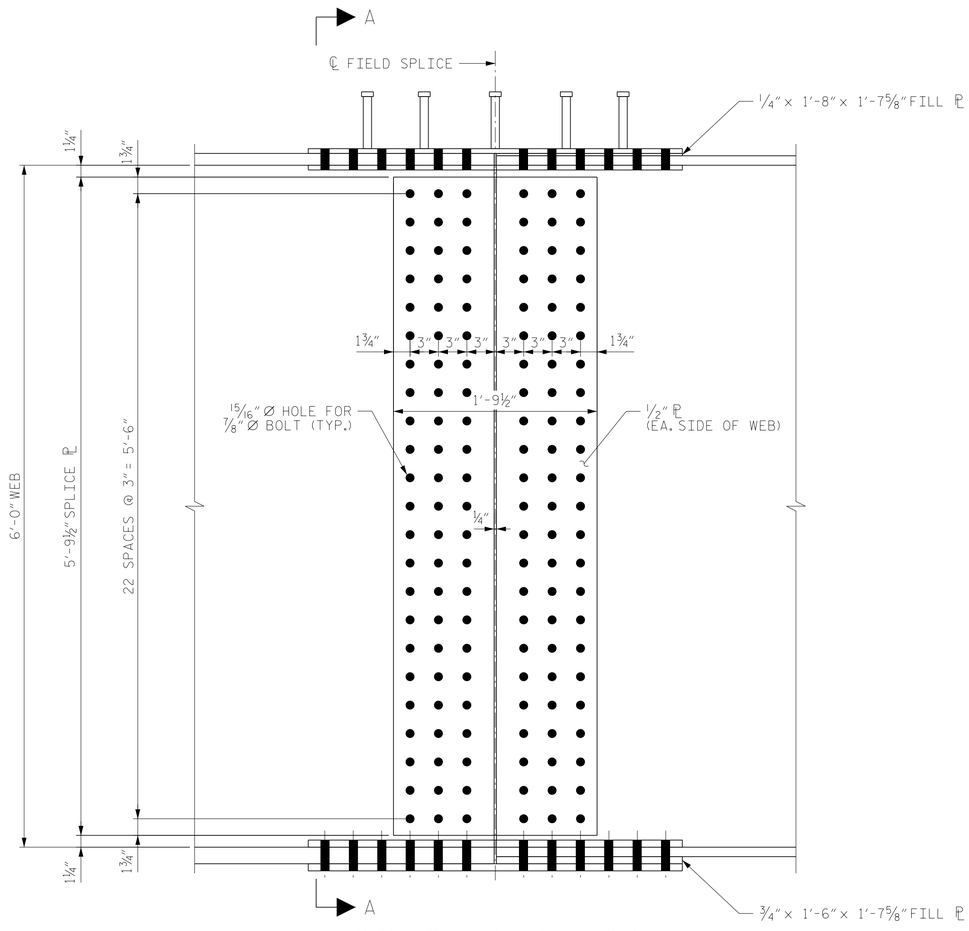
PLAN OF TOP FLANGE SPLICE



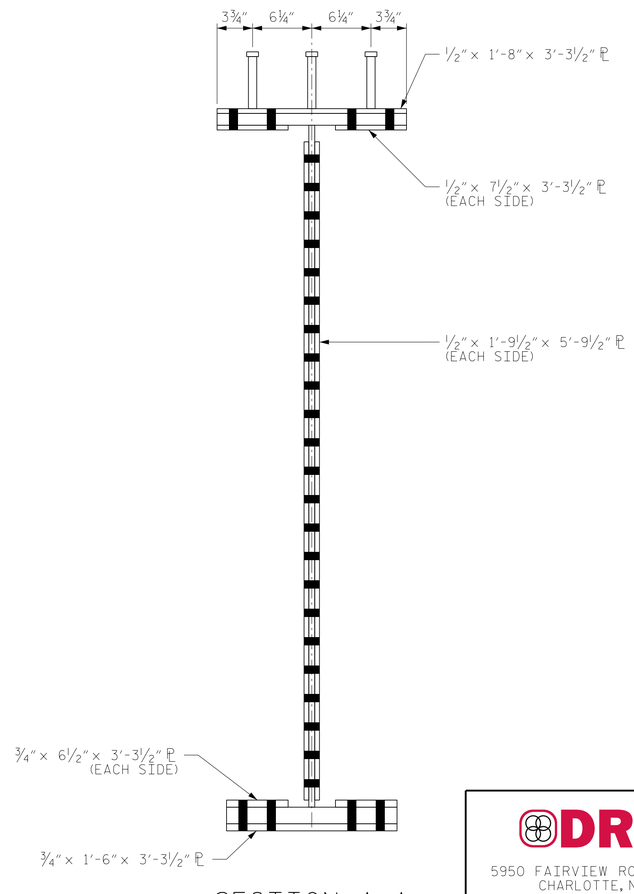
PLAN OF BOTTOM FLANGE SPLICE

NOTE

AT THE CONTRACTOR'S OPTION, THE BOLTED FIELD SPLICE MAY BE OMITTED, PROVIDED THE CONTRACTOR OBTAINS ALL PERMITS REQUIRED FOR TRANSPORTING THE LONGER PIECE LENGTHS.



SPLICE ELEVATION



SECTION A-A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

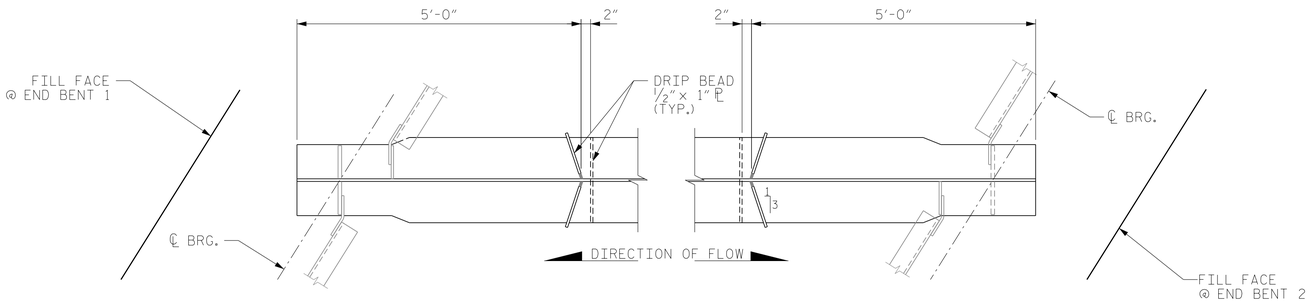
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

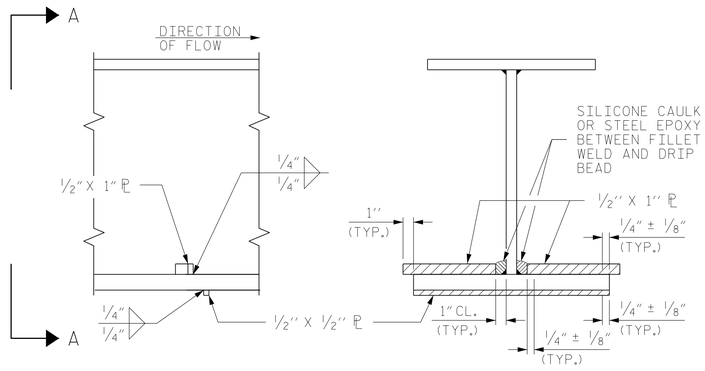
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			36

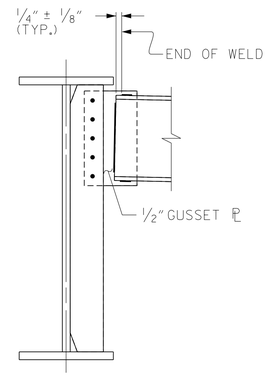


PLAN OF BOTTOM FLANGE

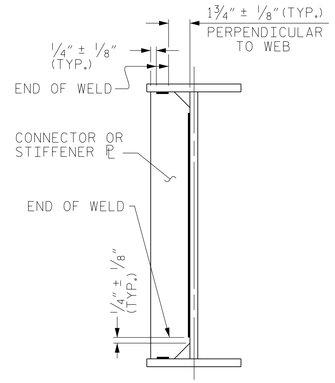


SECTION VIEW A-A

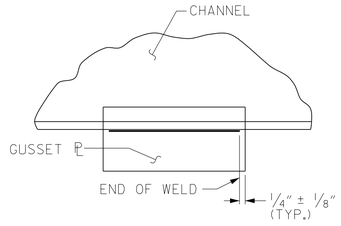
DRIP BEAD DETAILS



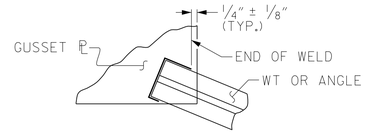
END DIAPHRAGM CONNECTOR PLATE



STIFFENER OR CONNECTOR PLATE



GUSSET PLATE CONNECTION



WT OR ANGLE TO GUSSET PLATE CONNECTION

WELD TERMINATION DETAILS

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			36

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5950 FAIRVIEW ROAD, SUITE 320
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(704) 332-2289

NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

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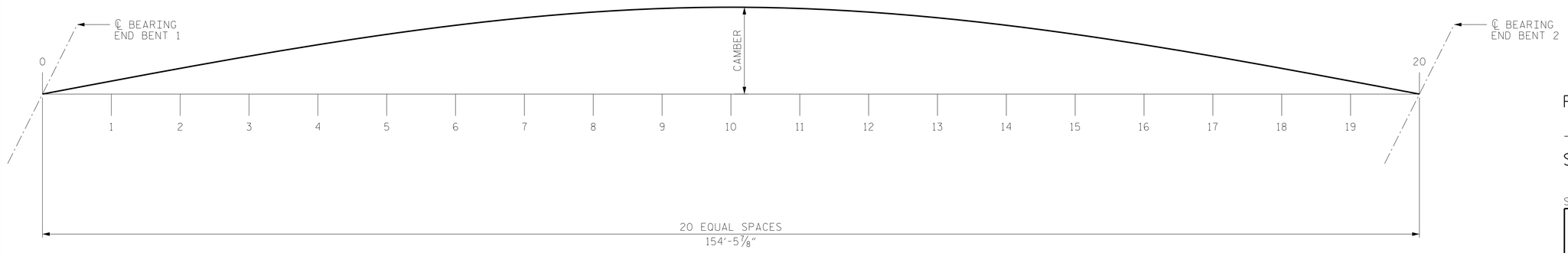
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DEAD LOAD DEFLECTION TABLE FOR STEEL GIRDERS

GIRDER		SPAN A																				
	TWENTIETH POINTS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
GIRDER 1	DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0	0.025	0.049	0.071	0.091	0.108	0.123	0.135	0.143	0.148	0.150	0.148	0.143	0.135	0.123	0.108	0.091	0.071	0.049	0.025	0
	DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.004	0.072	0.143	0.206	0.260	0.306	0.343	0.369	0.385	0.391	0.385	0.369	0.343	0.306	0.260	0.206	0.143	0.072	0.004	0
	DEFLECTION DUE TO WEIGHT OF BARRIER AND SIDEWALK ↓	0	0.018	0.035	0.050	0.064	0.077	0.087	0.095	0.101	0.105	0.106	0.105	0.101	0.095	0.087	0.077	0.064	0.050	0.035	0.018	0
	TOTAL DEAD LOAD DEFLECTION ↓	0	0.040	0.156	0.264	0.361	0.445	0.516	0.573	0.613	0.638	0.647	0.638	0.613	0.573	0.516	0.445	0.361	0.264	0.156	0.040	0
	VERTICAL CURVE ORDINATE ↑	0	0.194	0.367	0.521	0.653	0.765	0.857	0.929	0.980	1.010	1.021	1.010	0.980	0.929	0.857	0.765	0.653	0.521	0.367	0.194	0
	SUPERELEVATION ORDINATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER ↑	0″	2 13/16″	6 5/16″	9 7/16″	1′-0 3/16″	1′-2 1/2″	1′-4 1/2″	1′-6″	1′-7 1/8″	1′-7 13/16″	1′-8″	1′-7 13/16″	1′-7 1/8″	1′-6″	1′-4 1/2″	1′-2 1/2″	1′-0 3/16″	9 7/16″	6 5/16″	2 13/16″	0″
GIRDER 2	DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0	0.025	0.049	0.071	0.091	0.108	0.123	0.135	0.143	0.148	0.150	0.148	0.143	0.135	0.123	0.108	0.091	0.071	0.049	0.025	0
	DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.004	0.073	0.143	0.206	0.260	0.307	0.343	0.370	0.386	0.391	0.386	0.370	0.343	0.307	0.260	0.206	0.143	0.073	0.004	0
	DEFLECTION DUE TO WEIGHT OF BARRIER AND SIDEWALK ↓	0	0.012	0.025	0.036	0.046	0.054	0.062	0.067	0.072	0.074	0.075	0.074	0.072	0.067	0.062	0.054	0.046	0.036	0.025	0.012	0
	TOTAL DEAD LOAD DEFLECTION ↓	0	0.034	0.147	0.250	0.343	0.422	0.492	0.545	0.585	0.608	0.616	0.608	0.585	0.545	0.492	0.422	0.343	0.250	0.147	0.034	0
	VERTICAL CURVE ORDINATE ↑	0	0.194	0.367	0.521	0.653	0.765	0.857	0.929	0.980	1.010	1.021	1.010	0.980	0.929	0.857	0.765	0.653	0.521	0.367	0.194	0
	SUPERELEVATION ORDINATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER ↑	0″	2 3/4″	6 3/16″	9 1/4″	11 15/16″	1′-2 1/4″	1′-4 3/16″	1′-5 11/16″	1′-6 3/4″	1′-7 7/16″	1′-7 5/8″	1′-7 7/16″	1′-6 3/4″	1′-5 11/16″	1′-4 3/16″	1′-2 1/4″	11 15/16″	9 1/4″	6 3/16″	2 3/4″	0″
GIRDER 3	DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0	0.025	0.049	0.071	0.091	0.108	0.123	0.135	0.143	0.148	0.150	0.148	0.143	0.135	0.123	0.108	0.091	0.071	0.049	0.025	0
	DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.004	0.073	0.143	0.206	0.260	0.307	0.344	0.370	0.386	0.391	0.386	0.370	0.344	0.307	0.260	0.206	0.143	0.073	0.004	0
	DEFLECTION DUE TO WEIGHT OF BARRIER AND SIDEWALK ↓	0	0.009	0.017	0.025	0.032	0.038	0.043	0.047	0.050	0.052	0.053	0.052	0.050	0.047	0.043	0.038	0.032	0.025	0.017	0.009	0
	TOTAL DEAD LOAD DEFLECTION ↓	0	0.031	0.139	0.239	0.329	0.406	0.473	0.526	0.563	0.586	0.594	0.586	0.563	0.526	0.473	0.406	0.329	0.239	0.139	0.031	0
	VERTICAL CURVE ORDINATE ↑	0	0.194	0.367	0.521	0.653	0.765	0.857	0.929	0.980	1.010	1.021	1.010	0.980	0.929	0.857	0.765	0.653	0.521	0.367	0.194	0
	SUPERELEVATION ORDINATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER ↑	0″	2 11/16″	6 1/16″	9 1/8″	11 13/16″	1′-2 1/16″	1′-3 15/16″	1′-5 7/16″	1′-6 1/2″	1′-7 1/8″	1′-7 3/8″	1′-7 1/8″	1′-6 1/2″	1′-5 7/16″	1′-3 15/16″	1′-2 1/16″	11 13/16″	9 1/8″	6 1/16″	2 11/16″	0″

* INCLUDES SLAB, BUILDUP, & STAY-IN-PLACE FORMS
ALL VALUES ARE SHOWN IN DECIMAL FEET, EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN FRACTIONAL INCHES.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			36

DRMP
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
(704) 332-2289

NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

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DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DEAD LOAD DEFLECTION TABLE FOR STEEL GIRDERS

GIRDER		SPAN A																				
	TWENTIETH POINTS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
GIRDER 4	DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0	0.025	0.049	0.071	0.091	0.108	0.123	0.135	0.143	0.148	0.150	0.148	0.143	0.135	0.123	0.108	0.091	0.071	0.049	0.025	0
	DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.004	0.073	0.143	0.206	0.260	0.307	0.344	0.370	0.386	0.391	0.386	0.370	0.344	0.307	0.260	0.206	0.143	0.073	0.004	0
	DEFLECTION DUE TO WEIGHT OF BARRIER AND SIDEWALK ↓	0	0.009	0.017	0.025	0.032	0.038	0.043	0.047	0.050	0.052	0.053	0.052	0.050	0.047	0.043	0.038	0.032	0.025	0.017	0.009	0
	TOTAL DEAD LOAD DEFLECTION ↓	0	0.031	0.139	0.239	0.329	0.406	0.473	0.526	0.563	0.586	0.594	0.586	0.563	0.526	0.473	0.406	0.329	0.239	0.139	0.031	0
	VERTICAL CURVE ORDINATE ↑	0	0.194	0.367	0.521	0.653	0.765	0.857	0.929	0.980	1.010	1.021	1.010	0.980	0.929	0.857	0.765	0.653	0.521	0.367	0.194	0
	SUPERELEVATION ORDINATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER ↑	0″	2 11/16″	6 1/16″	9 1/8″	11 13/16″	1′-2 1/16″	1′-3 15/16″	1′-5 7/16″	1′-6 1/2″	1′-7 1/8″	1′-7 3/8″	1′-7 1/8″	1′-6 1/2″	1′-5 7/16″	1′-3 15/16″	1′-2 1/16″	11 13/16″	9 1/8″	6 1/16″	2 11/16″	0″
GIRDER 5	DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0	0.025	0.049	0.071	0.091	0.108	0.123	0.135	0.143	0.148	0.150	0.148	0.143	0.135	0.123	0.108	0.091	0.071	0.049	0.025	0
	DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.004	0.073	0.143	0.206	0.260	0.307	0.343	0.370	0.386	0.391	0.386	0.370	0.343	0.307	0.260	0.206	0.143	0.073	0.004	0
	DEFLECTION DUE TO WEIGHT OF BARRIER AND SIDEWALK ↓	0	0.012	0.025	0.036	0.046	0.054	0.062	0.067	0.072	0.074	0.075	0.074	0.072	0.067	0.062	0.054	0.046	0.036	0.025	0.012	0
	TOTAL DEAD LOAD DEFLECTION ↓	0	0.034	0.147	0.250	0.343	0.422	0.492	0.545	0.585	0.608	0.616	0.608	0.585	0.545	0.492	0.422	0.343	0.250	0.147	0.034	0
	VERTICAL CURVE ORDINATE ↑	0	0.194	0.367	0.521	0.653	0.765	0.857	0.929	0.980	1.010	1.021	1.010	0.980	0.929	0.857	0.765	0.653	0.521	0.367	0.194	0
	SUPERELEVATION ORDINATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER ↑	0″	2 3/4″	6 3/16″	9 1/4″	11 15/16″	1′-2 1/4″	1′-4 3/16″	1′-5 11/16″	1′-6 3/4″	1′-7 7/16″	1′-7 5/8″	1′-7 7/16″	1′-6 3/4″	1′-5 11/16″	1′-4 3/16″	1′-2 1/4″	11 15/16″	9 1/4″	6 3/16″	2 3/4″	0″
GIRDER 6	DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0	0.025	0.049	0.071	0.091	0.108	0.123	0.135	0.143	0.148	0.150	0.148	0.143	0.135	0.123	0.108	0.091	0.071	0.049	0.025	0
	DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.004	0.072	0.143	0.206	0.260	0.306	0.343	0.369	0.385	0.391	0.385	0.369	0.343	0.306	0.260	0.206	0.143	0.072	0.004	0
	DEFLECTION DUE TO WEIGHT OF BARRIER AND SIDEWALK ↓	0	0.018	0.035	0.050	0.064	0.077	0.087	0.095	0.101	0.105	0.106	0.105	0.101	0.095	0.087	0.077	0.064	0.050	0.035	0.018	0
	TOTAL DEAD LOAD DEFLECTION ↓	0	0.040	0.156	0.264	0.361	0.445	0.516	0.573	0.613	0.638	0.647	0.638	0.613	0.573	0.516	0.445	0.361	0.264	0.156	0.040	0
	VERTICAL CURVE ORDINATE ↑	0	0.194	0.367	0.521	0.653	0.765	0.857	0.929	0.980	1.010	1.021	1.010	0.980	0.929	0.857	0.765	0.653	0.521	0.367	0.194	0
	SUPERELEVATION ORDINATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	REQUIRED CAMBER ↑	0″	2 13/16″	6 5/16″	9 7/16″	1′-0 3/16″	1′-2 1/2″	1′-4 1/2″	1′-6″	1′-7 1/8″	1′-7 13/16″	1′-8″	1′-7 13/16″	1′-7 1/8″	1′-6″	1′-4 1/2″	1′-2 1/2″	1′-0 3/16″	9 7/16″	6 5/16″	2 13/16″	0″

* INCLUDES SLAB, BUILDUP, & STAY-IN-PLACE FORMS
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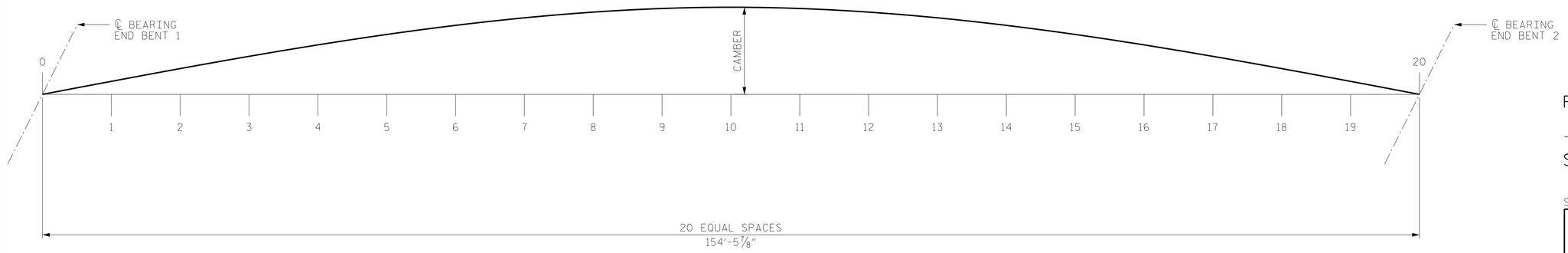

SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			36

DRMP
5950 FAIRVIEW ROAD, SUITE 320
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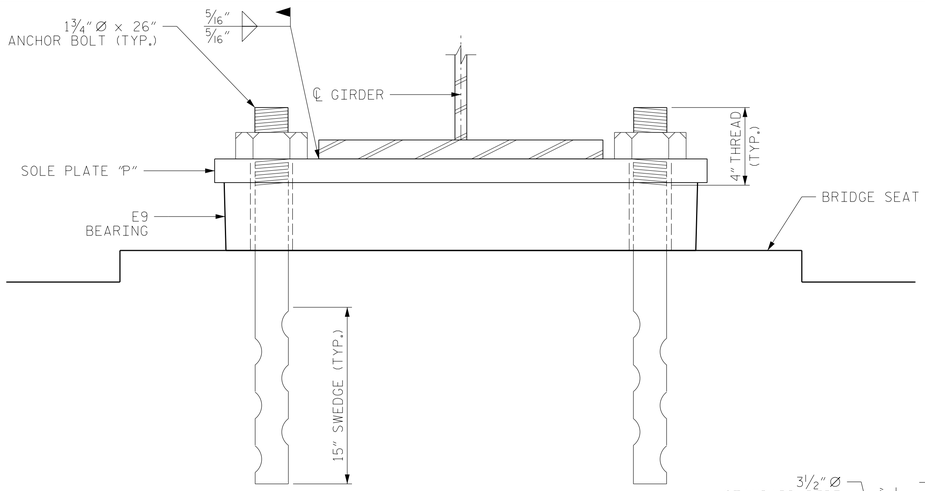
(704) 332-2289

NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

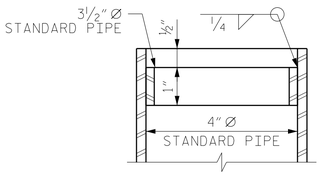
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

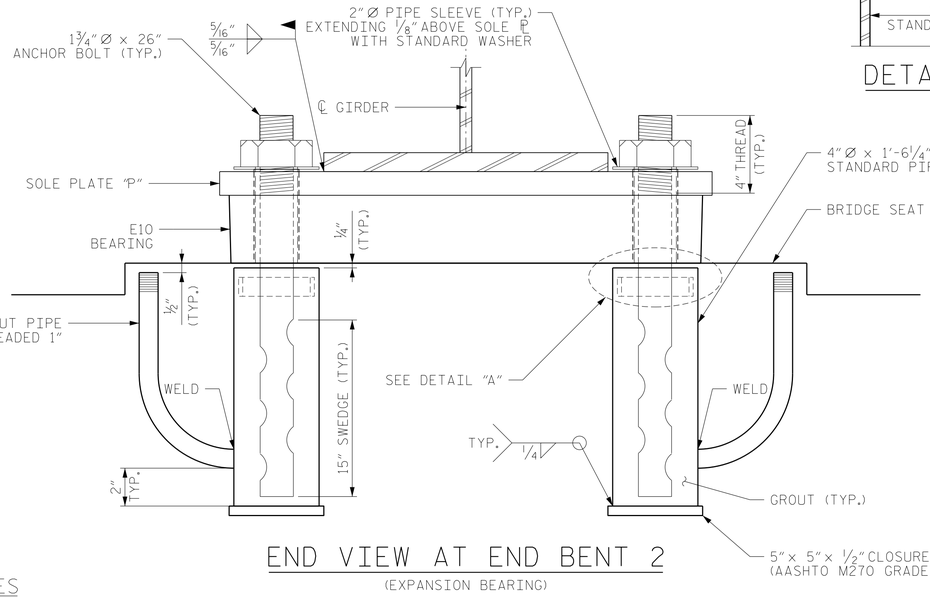


END VIEW AT END BENT 1

(FIXED BEARING)

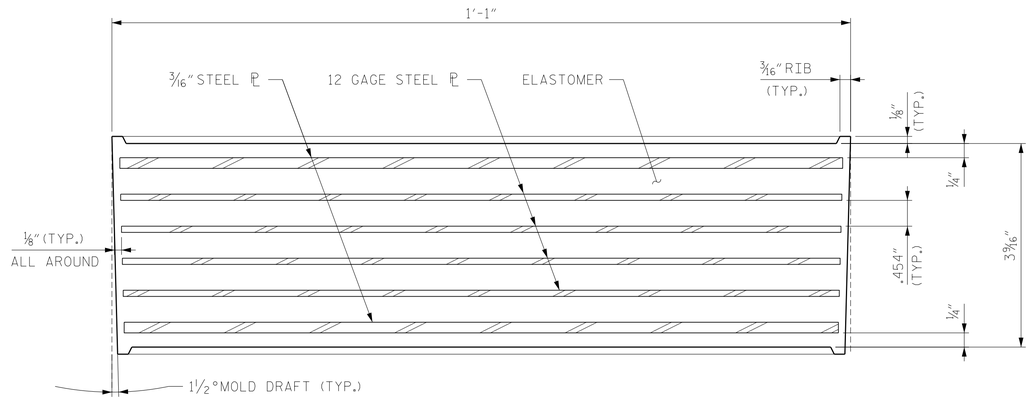


DETAIL "A"

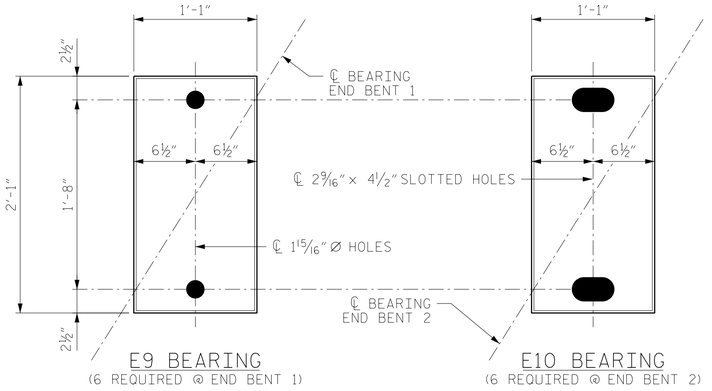


END VIEW AT END BENT 2

(EXPANSION BEARING)



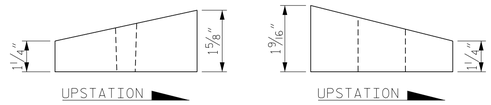
TYPICAL SECTION OF ELASTOMERIC BEARING



E9 BEARING
(6 REQUIRED @ END BENT 1)

E10 BEARING
(6 REQUIRED @ END BENT 2)

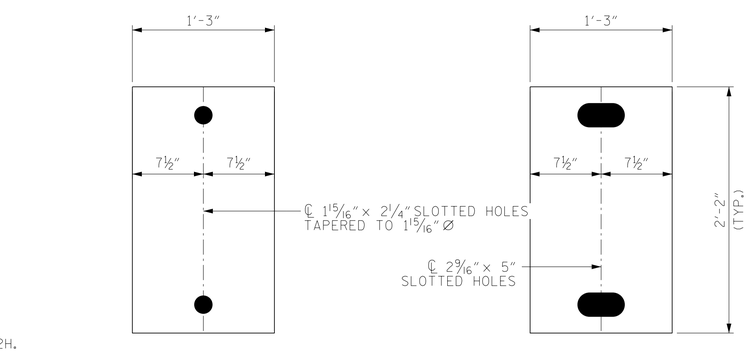
PLAN OF TYPE V ELASTOMERIC BEARINGS



P1
(END BENT 1)

P2
(END BENT 2)

SOLE ℙ PLACEMENT DETAIL



SOLE PLATE P1 (FIXED)
(6 REQUIRED @ END BENT 1)

SOLE PLATE P2 (EXPANSION)
(6 REQUIRED @ END BENT 2)

PLAN OF STEEL SOLE PLATES

MAXIMUM ALLOWABLE SERVICE LOADS	
DL+LL (NO IMPACT)	
TYPE V	335 KIPS

NOTES

1. AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.
2. THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE AND SHALL MEET THE REQUIREMENTS OF ASTM D1785.
3. THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.
4. SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
5. ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.
6. WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.
7. 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.
8. FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.
9. THE CLOSURE PLATE, GROUT PIPE, AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.
10. THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:
    1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60°F.
    2. AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUTED.

    THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
11. WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

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DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

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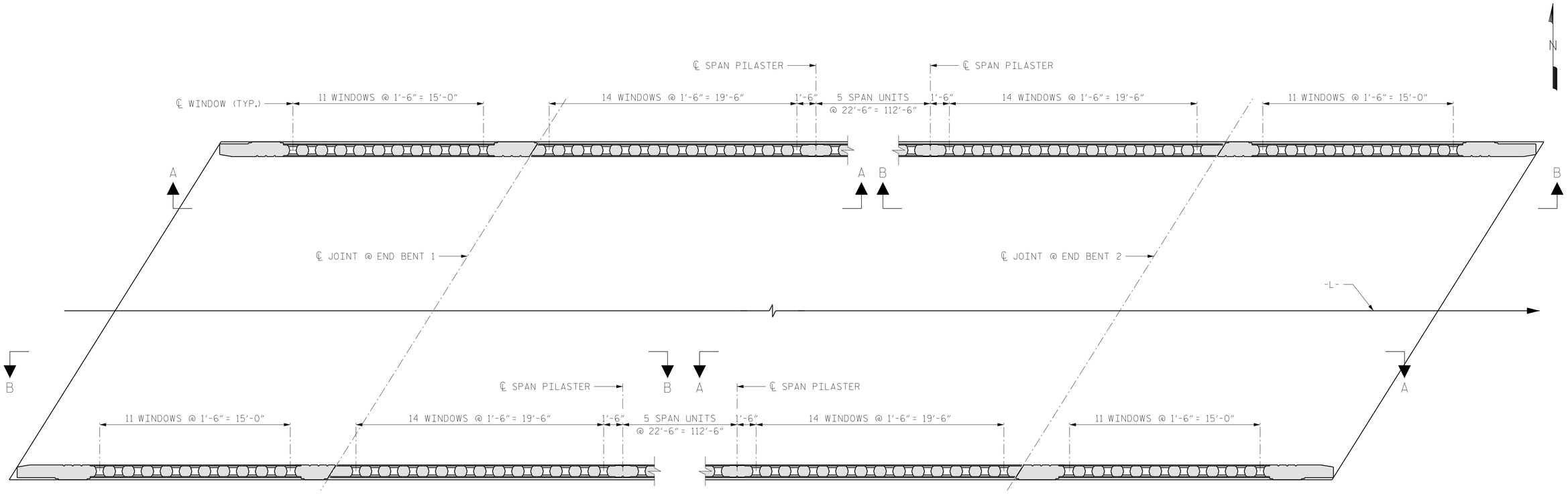
NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

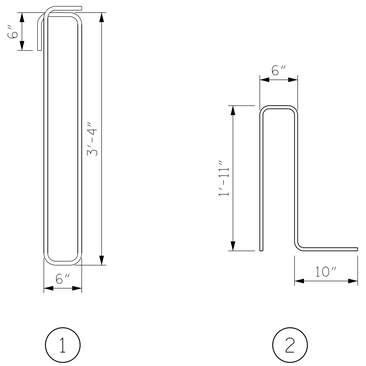
ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			36



PLAN

BAR TYPES



REINFORCING BAR SCHEDULE

CLASSIC CONCRETE BRIDGE RAIL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* H1	8	5	STR	24'-3"	202
* H2	12	5	STR	54'-8"	684
* H3	12	5	STR	5'-0"	63
* H4	12	5	STR	3'-2"	40
* H5	12	5	STR	5'-8"	71
* H6	12	5	STR	2'-6"	31
* H7	72	5	STR	2'-0"	150
* R1	8	7	STR	24'-3"	397
* R2	12	7	STR	55'-11"	1,372
* S1	580	5	1	8'-8"	5,243
* U1	568	5	2	5'-2"	3,061

TOTAL FOR BOTH RAILS

* EPOXY COATED REINFORCING STEEL	11,313	LBS
CLASS AA CONCRETE	42.0	CY
CLASSIC CONCRETE BRIDGE RAIL	416	LF

NOTES

1. FOR VIEWS A-A AND B-B, SEE SHEET 2 OF 4 AND 4 OF 4.
2. CLASSIC CONCRETE BRIDGE RAIL IN SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSION STRENGTH OF 3,000 PSI.
3. ALL REINFORCING STEEL IN CLASSIC CONCRETE BRIDGE RAILS SHALL BE EPOXY COATED.

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1/16/2018

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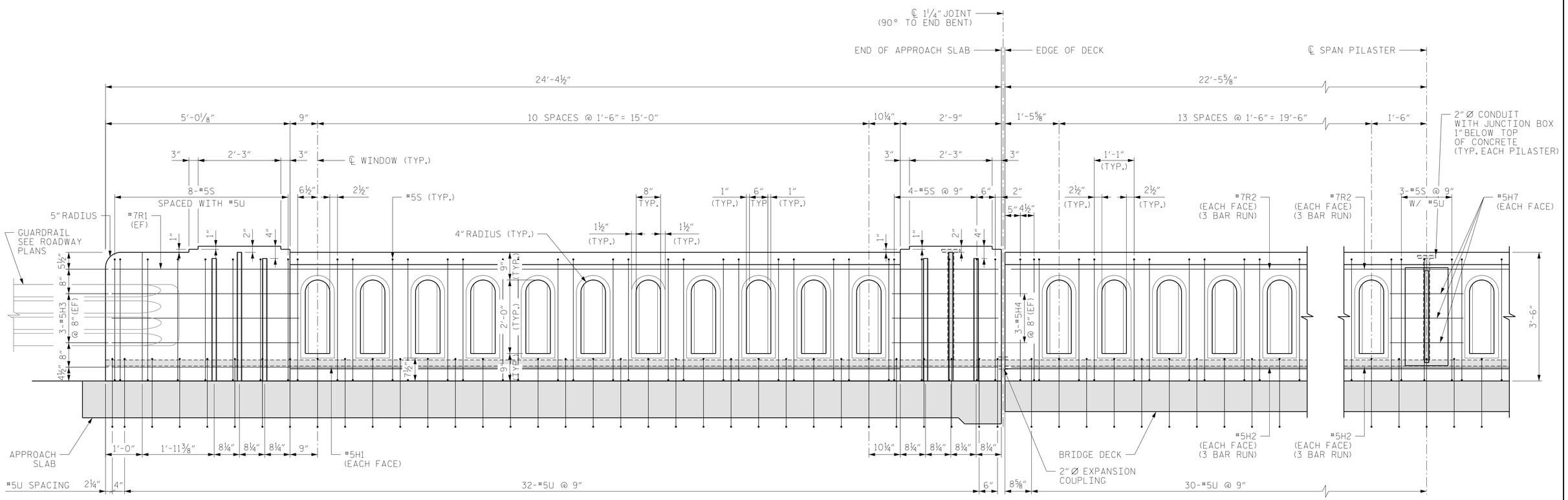
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 1 OF 4

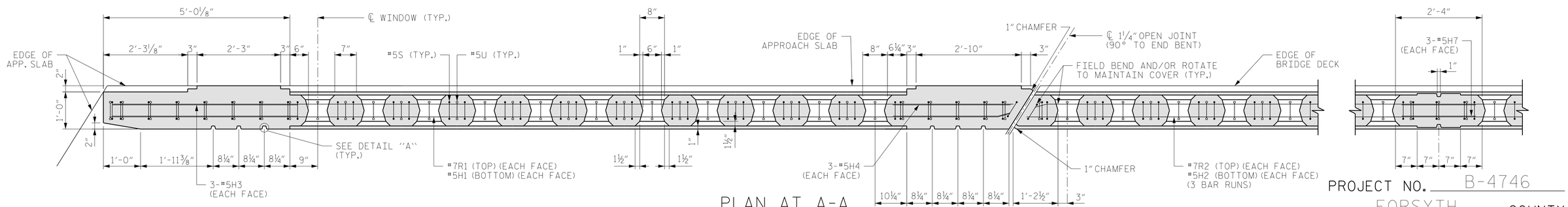
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CLASSIC CONCRETE BRIDGE RAIL

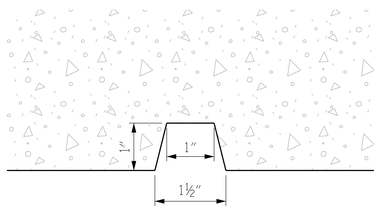
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			36



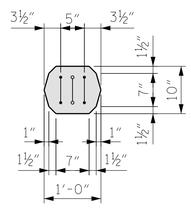
VIEW A-A



PLAN AT A-A



DETAIL "A"



POST DETAIL

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CLASSIC CONCRETE BRIDGE RAIL

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			36

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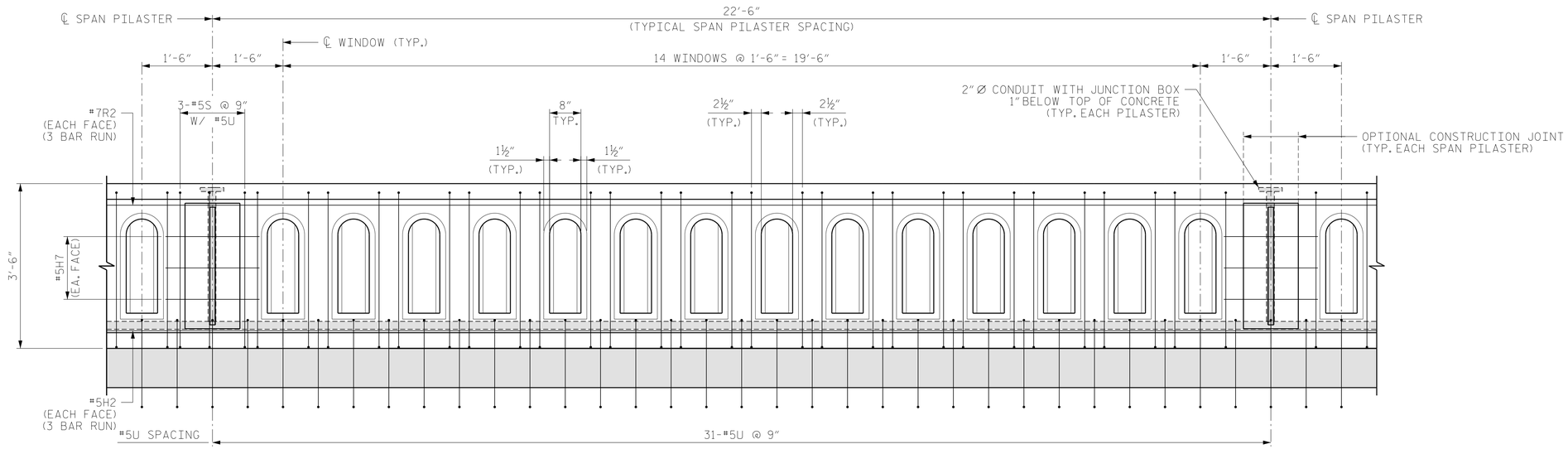
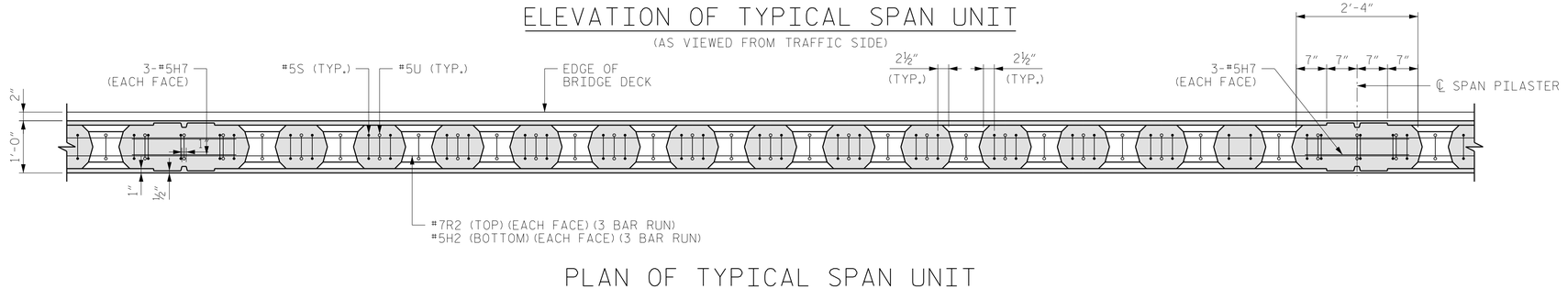
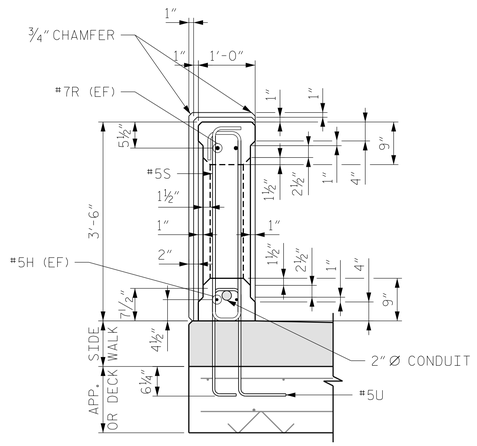


ELEVATION OF TYPICAL SPAN UNIT

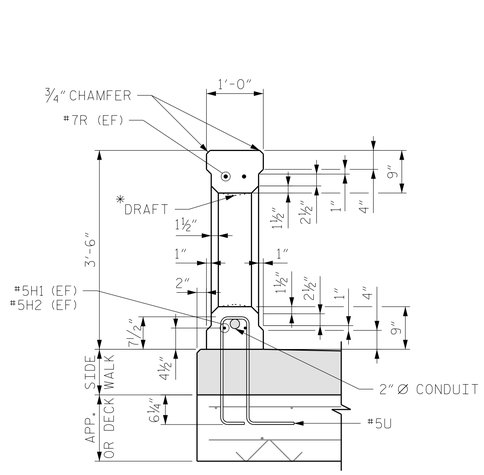
(AS VIEWED FROM TRAFFIC SIDE)



PLAN OF TYPICAL SPAN UNIT

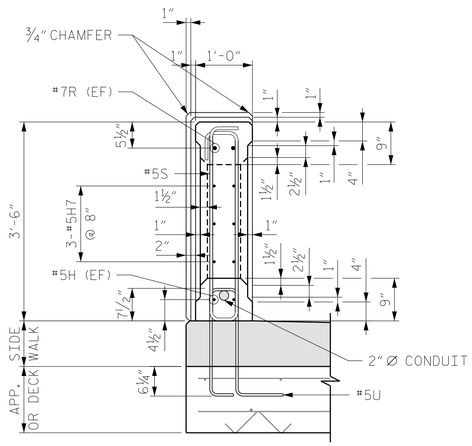


SECTION THRU POST



SECTION THRU WINDOW

* 3½ DRAFT PERMISSIBLE
AT TOP & BOTTOM OF WINDOWS
FOR FORM REMOVAL



SECTION THRU PILASTER

JUNCTION BOX NOT SHOWN FOR CLARITY

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1/16/2018

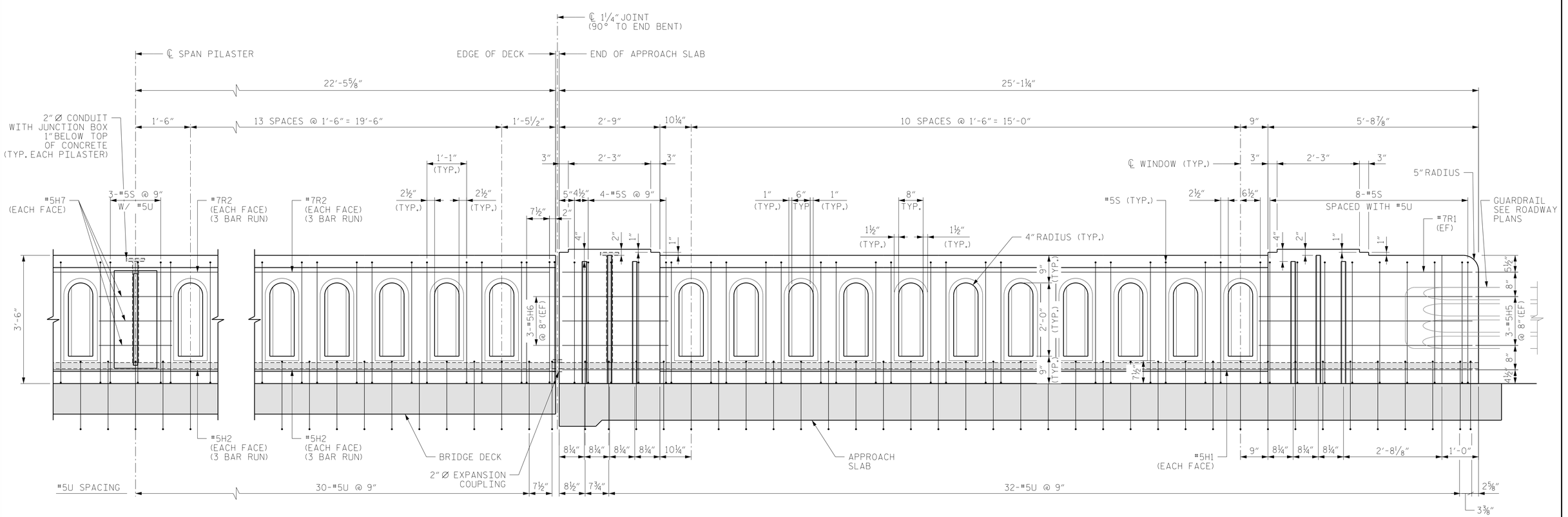
PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 3 OF 4

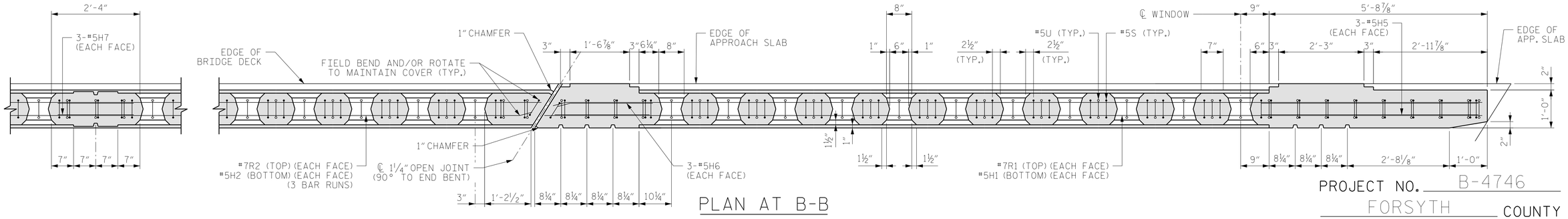
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CLASSIC CONCRETE BRIDGE RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			36



VIEW B-B



PLAN AT B-B

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CLASSIC CONCRETE BRIDGE RAIL

DRMP
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(704) 332-2289

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NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			36

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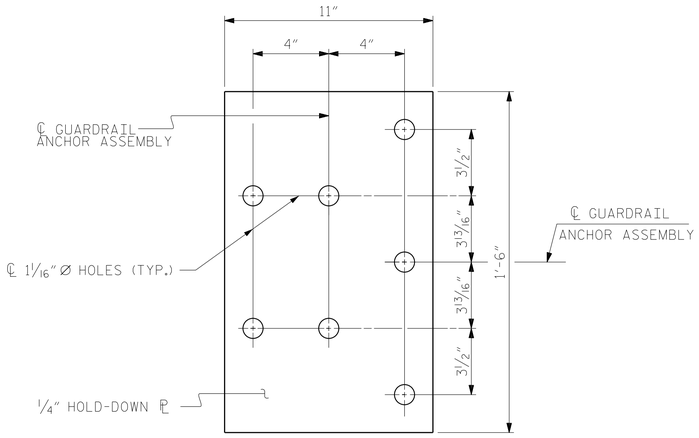
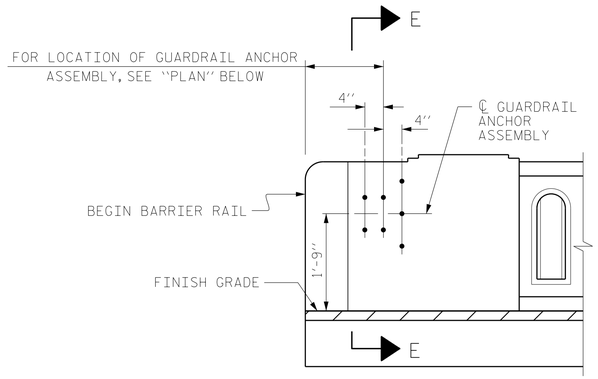
Plotted By: Robert A. Alonso, PE, SE 1/16/2018 10:15:24 AM A:\B4746\Structures\CADD\B4746_SMU_BR_21_330229.dgn

DRMP JOB NUMBER: 15-0323.001



PLAN OF HOLD-DOWN PLATE



ELEVATION

NOTES

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

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

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

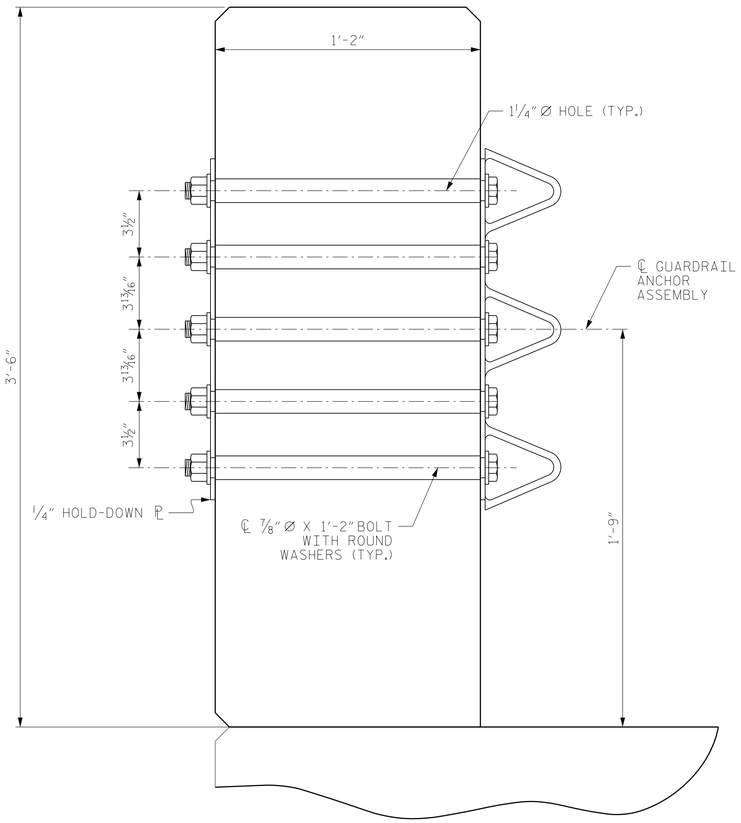
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

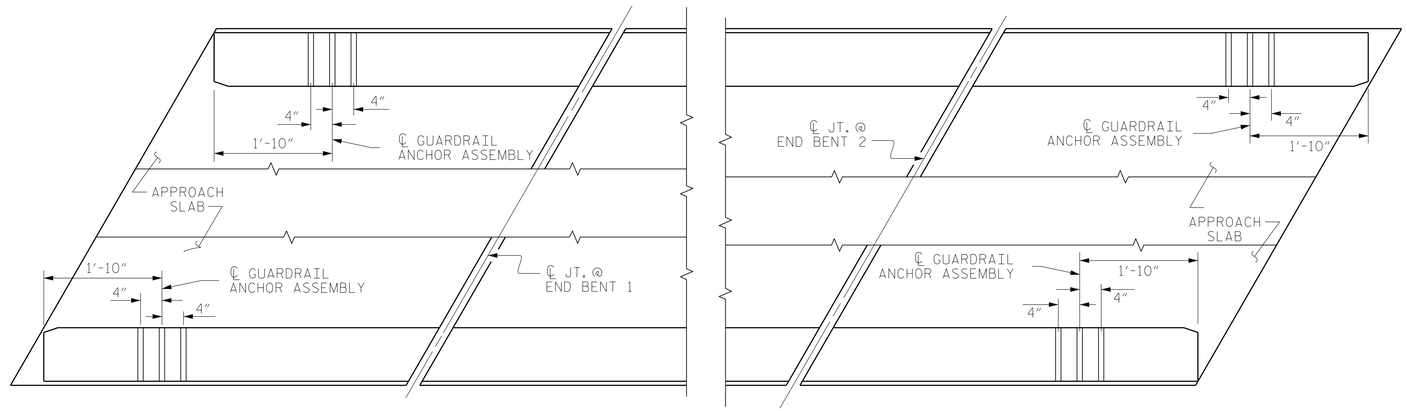
THE VERTICAL AND HORIZONTAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE CLASSIC CONCRETE BRIDGE RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-

11+87.07 -Y3-

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1/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			36

ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING BAR SCHEDULE

BRIDGE DECK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	6	6	STR	20'-0"	180
* A100	247	5	STR	53'-11"	13,890
* A101	2	5	STR	53'-2"	111
* A102	2	5	STR	52'-5"	109
* A103	2	5	STR	51'-7"	108
* A104	2	5	STR	50'-10"	106
* A105	2	5	STR	50'-0"	104
* A106	2	5	STR	49'-2"	103
* A107	2	5	STR	48'-5"	101
* A108	2	5	STR	47'-7"	99
* A109	2	5	STR	46'-10"	98
* A110	2	5	STR	46'-0"	96
* A111	2	5	STR	45'-3"	94
* A112	2	5	STR	44'-5"	93
* A113	2	5	STR	43'-7"	91
* A114	2	5	STR	42'-10"	89
* A115	2	5	STR	42'-0"	88
* A116	2	5	STR	41'-3"	86
* A117	2	5	STR	40'-5"	84
* A118	2	5	STR	39'-8"	83
* A119	2	5	STR	38'-10"	81
* A120	2	5	STR	38'-0"	79
* A121	2	5	STR	37'-3"	78
* A122	2	5	STR	36'-5"	76
* A123	2	5	STR	35'-8"	74
* A124	2	5	STR	34'-10"	73
* A125	2	5	STR	34'-1"	71
* A126	2	5	STR	33'-3"	69
* A127	2	5	STR	32'-5"	68
* A128	2	5	STR	31'-8"	66
* A129	2	5	STR	30'-10"	64
* A130	2	5	STR	30'-1"	63
* A131	2	5	STR	29'-3"	61
* A132	2	5	STR	28'-6"	59
* A133	2	5	STR	27'-8"	58
* A134	2	5	STR	26'-11"	56
* A135	2	5	STR	26'-1"	54
* A136	2	5	STR	25'-3"	53
* A137	2	5	STR	24'-6"	51
* A138	2	5	STR	23'-8"	49
* A139	2	5	STR	22'-11"	48
* A140	2	5	STR	22'-1"	46
* A141	2	5	STR	21'-4"	45
* A142	2	5	STR	20'-6"	43
* A143	2	5	STR	19'-8"	41

BRIDGE DECK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A144	2	5	STR	18'-11"	39
* A145	2	5	STR	18'-1"	38
* A146	2	5	STR	17'-4"	36
* A147	2	5	STR	16'-6"	34
* A148	2	5	STR	15'-9"	33
* A149	2	5	STR	14'-11"	31
* A150	2	5	STR	14'-1"	29
* A151	2	5	STR	13'-4"	28
* A152	2	5	STR	12'-6"	26
* A153	2	5	STR	11'-9"	25
* A154	2	5	STR	10'-11"	23
* A155	2	5	STR	10'-2"	21
* A156	2	5	STR	9'-4"	19
* A157	2	5	STR	8'-7"	18
* A158	2	5	STR	7'-9"	16
* A159	2	5	STR	6'-11"	14
* A160	2	5	STR	6'-2"	13
* A161	2	5	STR	5'-4"	11
* A162	2	5	STR	4'-7"	10
* A163	2	5	STR	3'-9"	8
* A164	2	5	STR	3'-0"	6
* A165	2	5	STR	2'-2"	5
* A166	2	5	STR	1'-4"	3
A200	247	5	STR	53'-11"	13,890
A201	2	5	STR	53'-2"	111
A202	2	5	STR	52'-5"	109
A203	2	5	STR	51'-7"	108
A204	2	5	STR	50'-10"	106
A205	2	5	STR	50'-0"	104
A206	2	5	STR	49'-2"	103
A207	2	5	STR	48'-5"	101
A208	2	5	STR	47'-7"	99
A209	2	5	STR	46'-10"	98
A210	2	5	STR	46'-0"	96
A211	2	5	STR	45'-3"	94
A212	2	5	STR	44'-5"	93
A213	2	5	STR	43'-7"	91
A214	2	5	STR	42'-10"	89
A215	2	5	STR	42'-0"	88
A216	2	5	STR	41'-3"	86
A217	2	5	STR	40'-5"	84
A218	2	5	STR	39'-8"	83
A219	2	5	STR	38'-10"	81
A220	2	5	STR	38'-0"	79

BRIDGE DECK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A221	2	5	STR	37'-3"	78
A222	2	5	STR	36'-5"	76
A223	2	5	STR	35'-8"	74
A224	2	5	STR	34'-10"	73
A225	2	5	STR	34'-1"	71
A226	2	5	STR	33'-3"	69
A227	2	5	STR	32'-5"	68
A228	2	5	STR	31'-8"	66
A229	2	5	STR	30'-10"	64
A230	2	5	STR	30'-1"	63
A231	2	5	STR	29'-3"	61
A232	2	5	STR	28'-6"	59
A233	2	5	STR	27'-8"	58
A234	2	5	STR	26'-11"	56
A235	2	5	STR	26'-1"	54
A236	2	5	STR	25'-3"	53
A237	2	5	STR	24'-6"	51
A238	2	5	STR	23'-8"	49
A239	2	5	STR	22'-11"	48
A240	2	5	STR	22'-1"	46
A241	2	5	STR	21'-4"	45
A242	2	5	STR	20'-6"	43
A243	2	5	STR	19'-8"	41
A244	2	5	STR	18'-11"	39
A245	2	5	STR	18'-1"	38
A246	2	5	STR	17'-4"	36
A247	2	5	STR	16'-6"	34
A248	2	5	STR	15'-9"	33
A249	2	5	STR	14'-11"	31
A250	2	5	STR	14'-1"	29
A251	2	5	STR	13'-4"	28
A252	2	5	STR	12'-6"	26
A253	2	5	STR	11'-9"	25
A254	2	5	STR	10'-11"	23
A255	2	5	STR	10'-2"	21
A256	2	5	STR	9'-4"	19
A257	2	5	STR	8'-7"	18
A258	2	5	STR	7'-9"	16
A259	2	5	STR	6'-11"	14
A260	2	5	STR	6'-2"	13
A261	2	5	STR	5'-4"	11
A262	2	5	STR	4'-7"	10
A263	2	5	STR	3'-9"	8
A264	2	5	STR	3'-0"	6
A265	2	5	STR	2'-2"	5

BRIDGE DECK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A266	2	5	STR	1'-4"	3
* B1	222	4	STR	27'-11"	4,140
B2	204	5	STR	53'-10"	11,454
* G1	8	5	STR	33'-1"	276
* K1	24	5	1	14'-11"	373
* K2	12	5	2	11'-1"	139
* S1	90	4	3	4'-7"	276

SIDEWALK

* B1	72	4	STR	27'-11"	1,343
* G2	316	4	STR	7'-3"	1,530
* U1	92	4	4	3'-4"	205

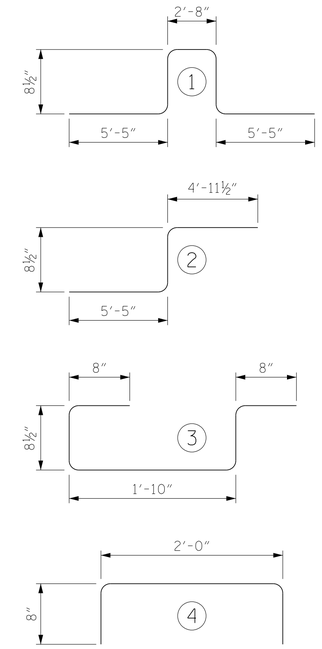
TOTAL

REINFORCING STEEL	29,100	LBS
* EPOXY COATED REINFORCING STEEL	26,107	LBS

CLASS AA CONCRETE BREAKDOWN

POUR 1	252.1	C.Y.
POUR 2	21.0	C.Y.
POUR 3 (SIDEWALKS)	48.7	C.Y.

BAR TYPES



SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
TOTALS**	321.8	29,100	26,107

** INCLUDES DECK AND SIDEWALK ON BRIDGE.
QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.
FOR SIDEWALK QUANTITY ON APP. SLAB, SEE APP. SLAB SHEETS.

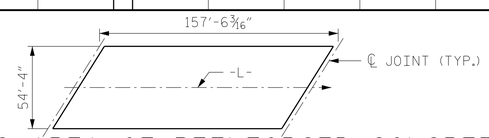
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

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	1,886	SQ. FT.
BRIDGE DECK	5,961	SQ. FT.
TOTAL	7,847	SQ. FT.

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT = 8,558)

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DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

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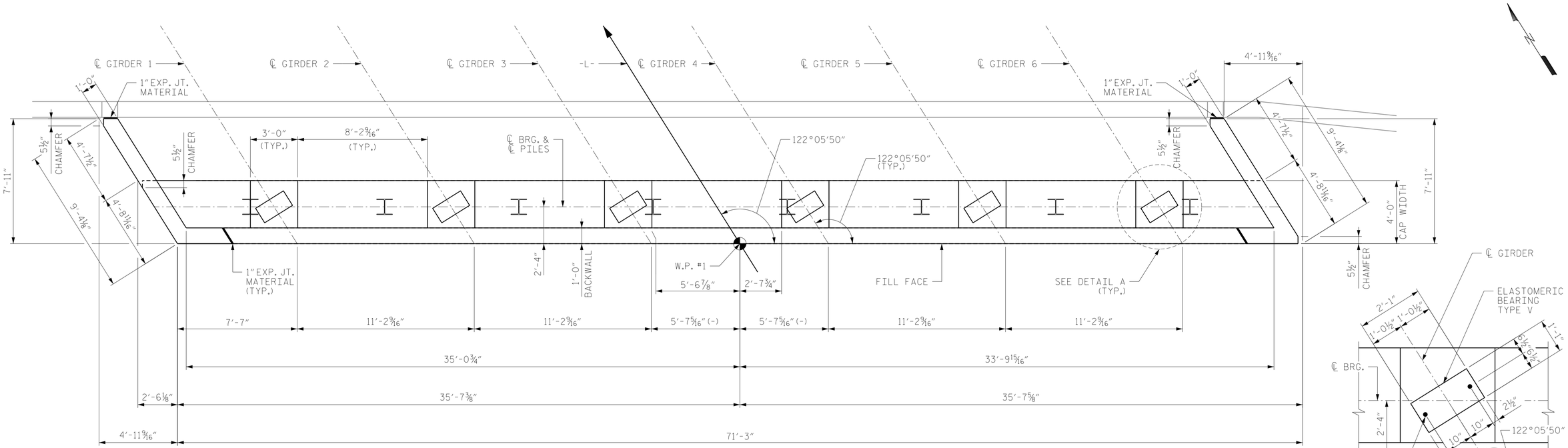
1/16/2018

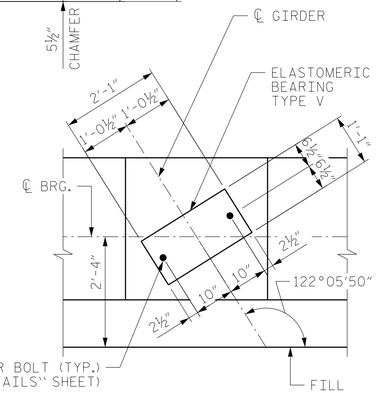
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
BILL OF MATERIAL

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

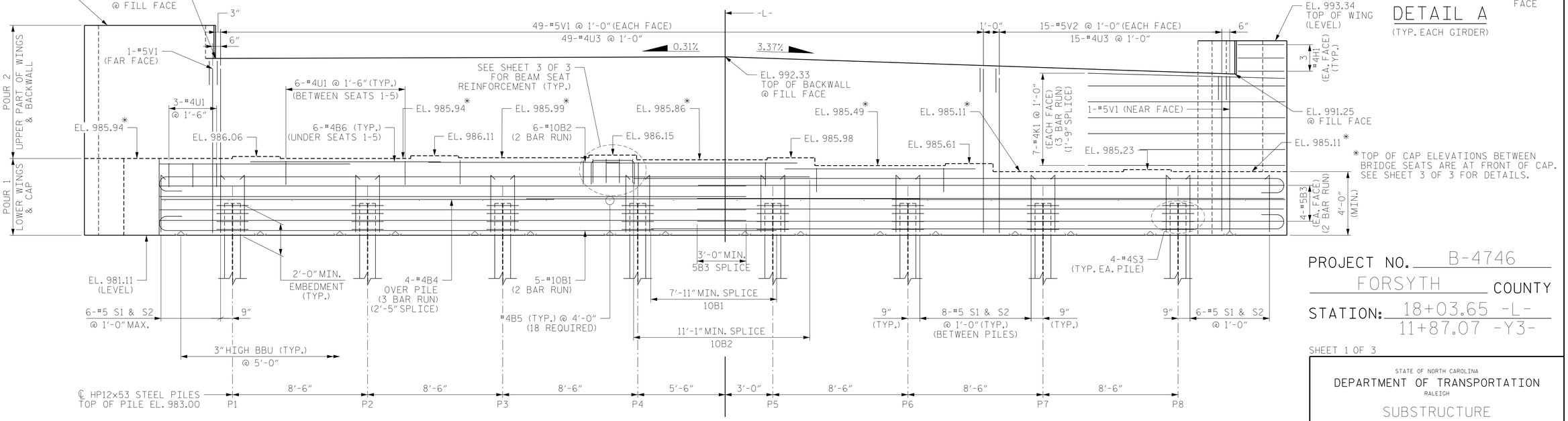
SHEET NO. S-25
TOTAL SHEETS 36



PLAN



DETAIL A
(TYP. EACH GIRDER)



ELEVATION

NOTES

1. STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
2. THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
3. THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
4. EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.
5. BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
6. FOR PIPE INSERT DETAILS, SEE BEARINGS SHEET.

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1/16/2018

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

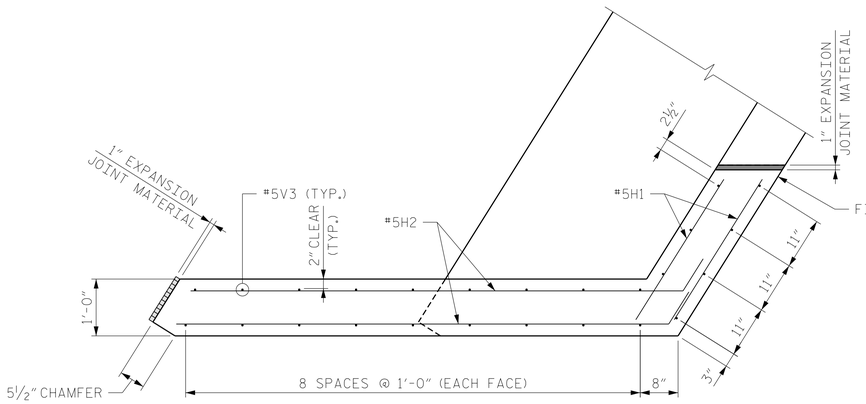
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

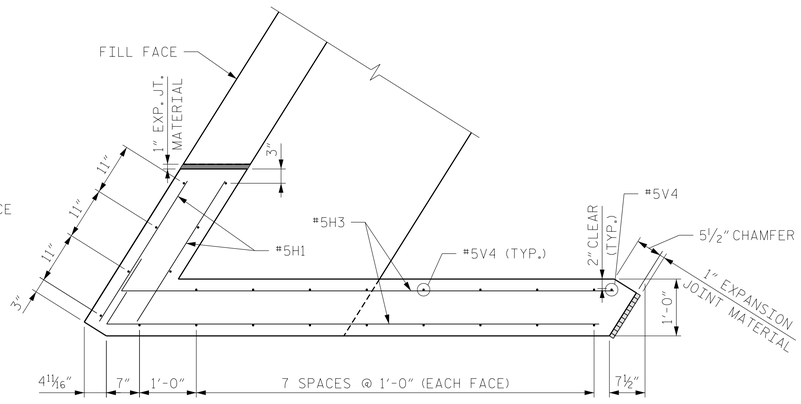
SUBSTRUCTURE

END BENT 1

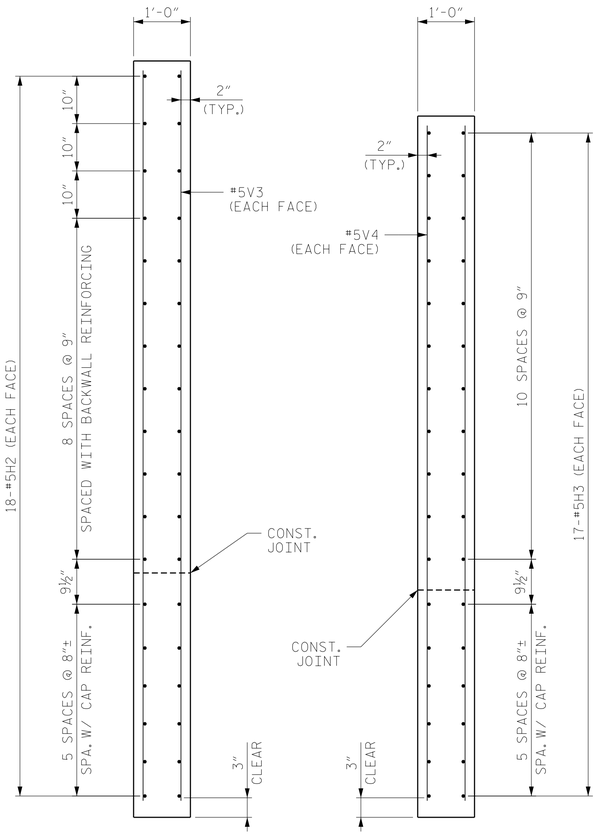
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			36



PLAN OF LEFT WING

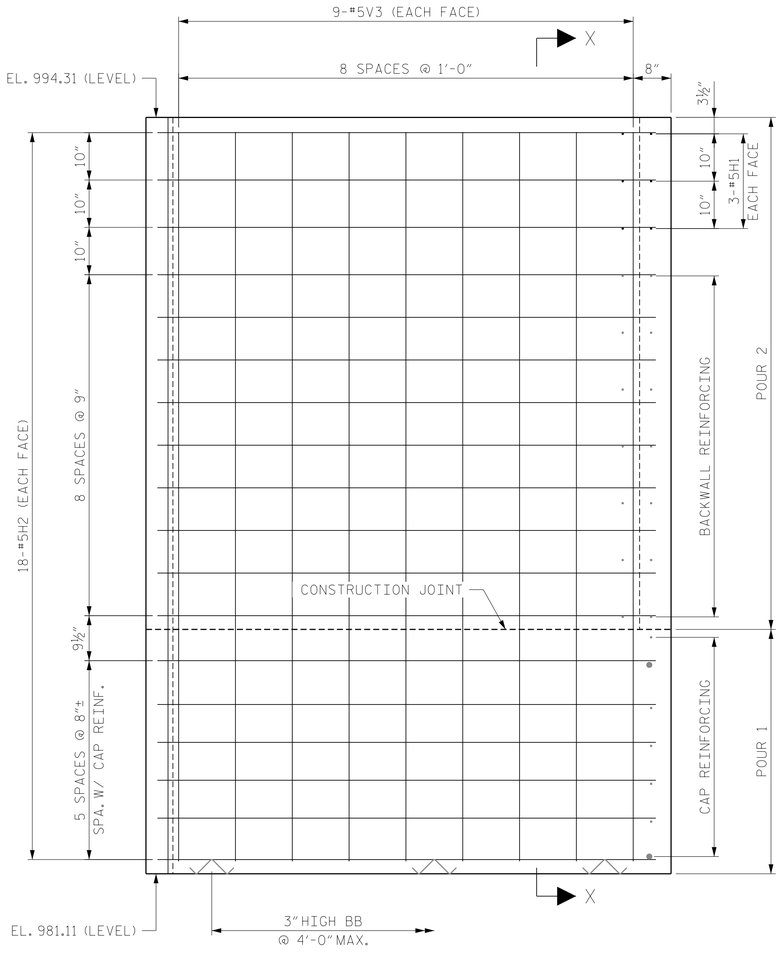


PLAN OF RIGHT WING

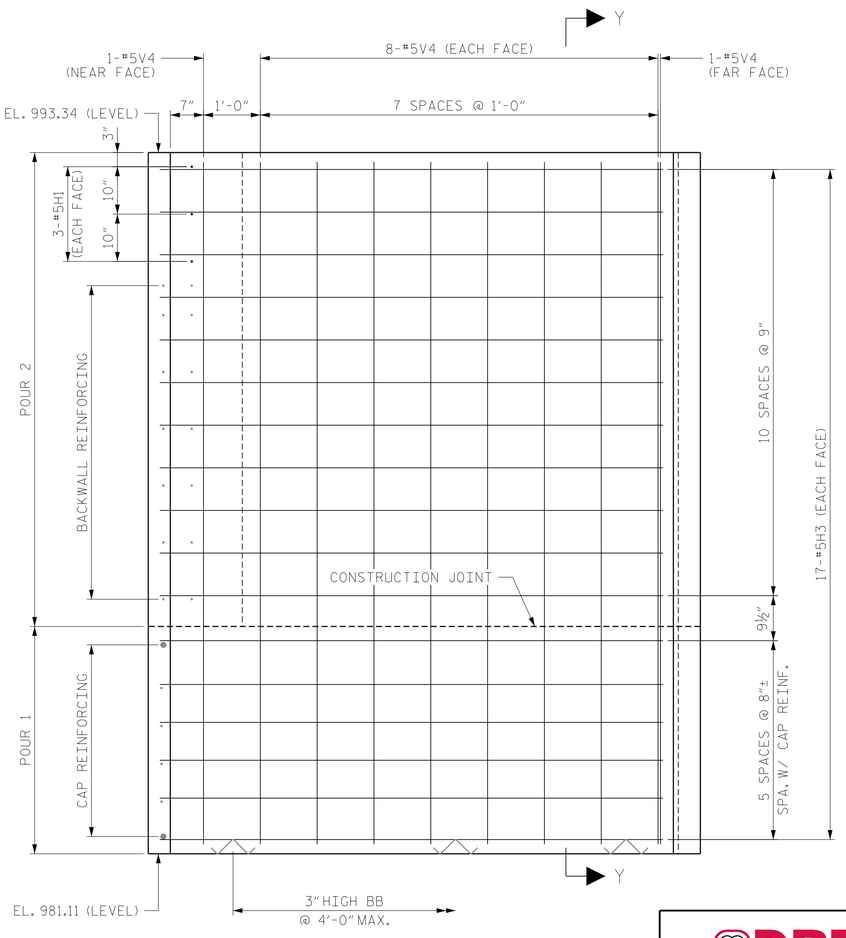


SECTION X-X

SECTION Y-Y



ELEVATION OF LEFT WING



ELEVATION OF RIGHT WING

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			36

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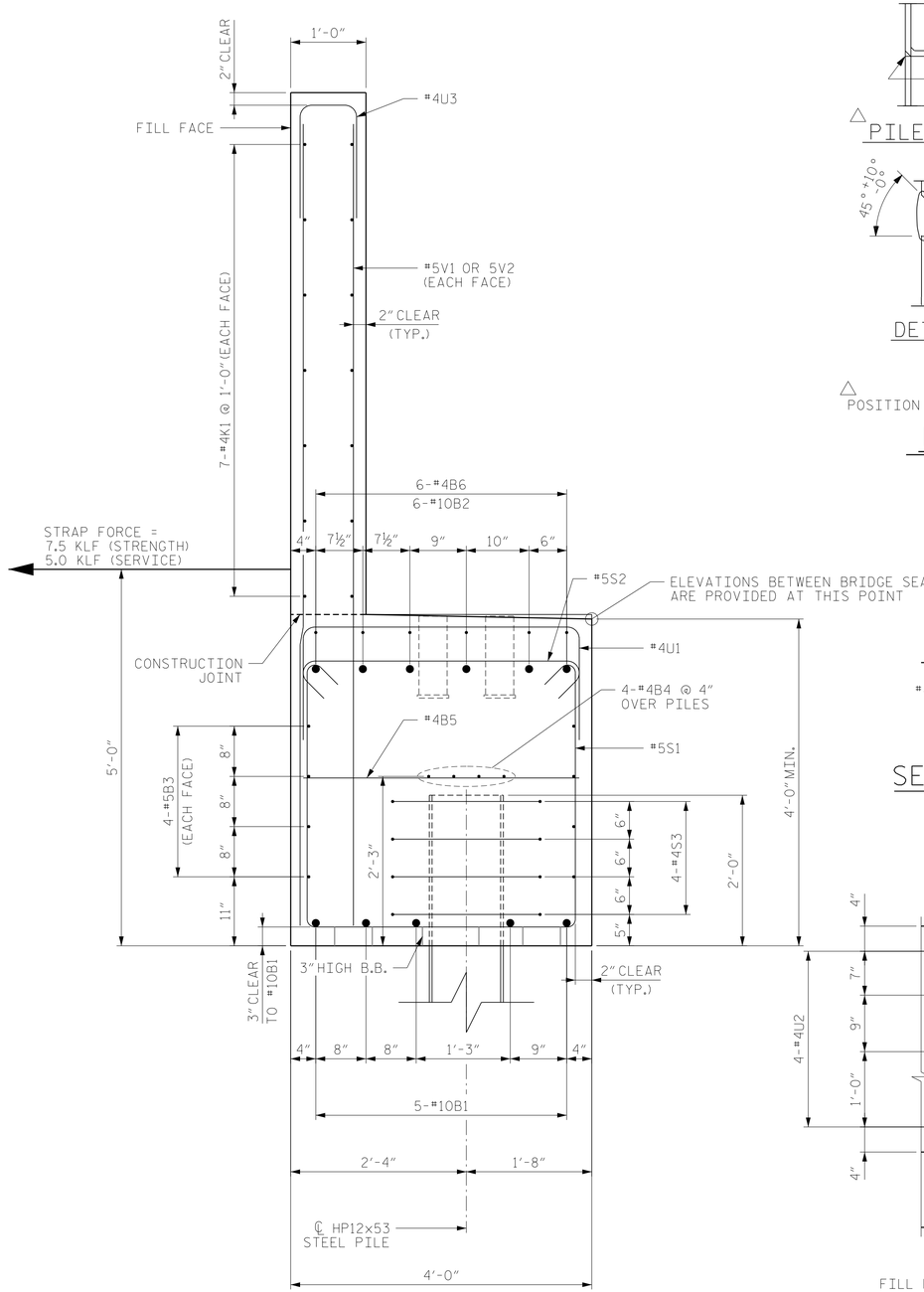
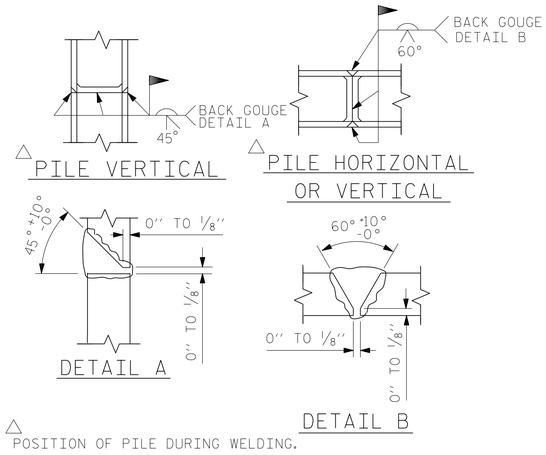
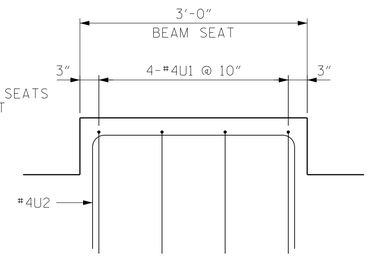


SECTION A-A

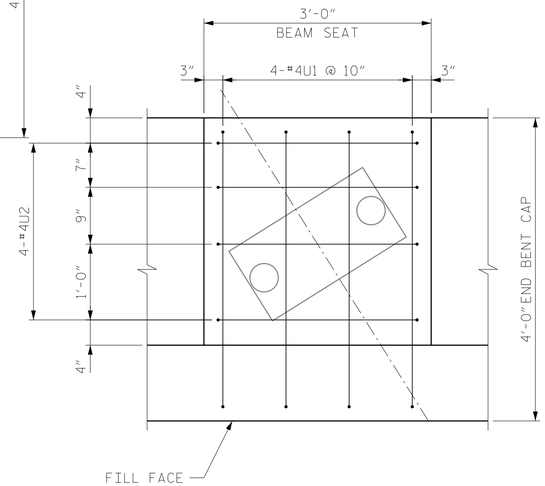


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



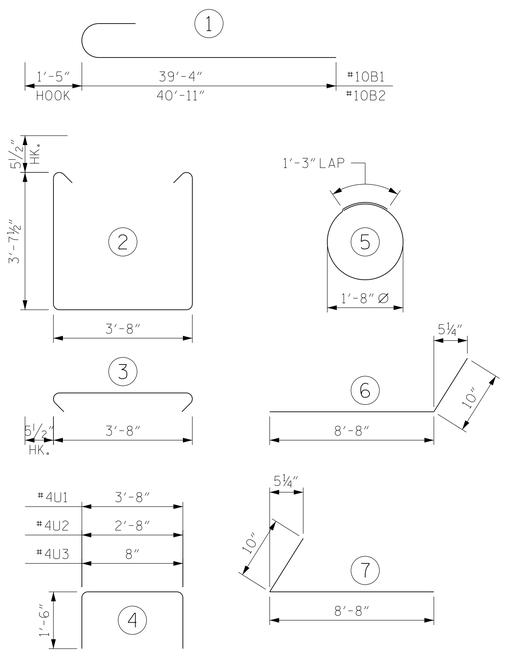
SECTION THRU BEAM SEAT



BEAM SEAT PLAN

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT



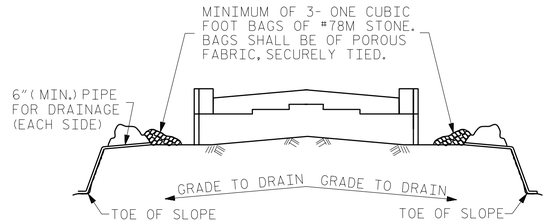
BILL OF MATERIAL

FOR END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	10	1	40'-9"	1,753
B2	12	10	1	42'-4"	2,186
B3	16	5	STR	36'-11"	616
B4	12	4	STR	25'-3"	202
B5	18	4	STR	3'-8"	44
B6	30	4	STR	12'-0"	240
H1	12	5	STR	2'-11"	37
H2	36	5	6	9'-6"	357
H3	34	5	7	9'-6"	337
K1	42	4	STR	24'-10"	697
S1	68	5	2	11'-10"	839
S2	68	5	3	4'-7"	325
S3	32	4	5	6'-6"	139
U1	51	4	4	6'-8"	227
U2	24	4	4	5'-8"	91
U3	66	4	4	3'-8"	162
V1	99	5	STR	10'-4"	1,067
V2	31	5	STR	9'-9"	315
V3	25	5	STR	12'-9"	332
V4	25	5	STR	11'-9"	306

TOTAL

REINFORCING STEEL	10,273	LBS.
CLASS A CONCRETE		
POUR 1 (CAP & LOWER WING)	55.2	C.Y.
POUR 2 (BACKWALL & UPPER WING)	22.2	C.Y.
CLASS A CONCRETE TOTAL	77.4	C.Y.
HP12x53 STEEL PILES		
NO. 8	320	LIN. FT.
PILE DRIVING EQUIPMENT SETUP FOR HP12x53 STEEL PILES	8	EA



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

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-

11+87.07 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

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1/16/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			36

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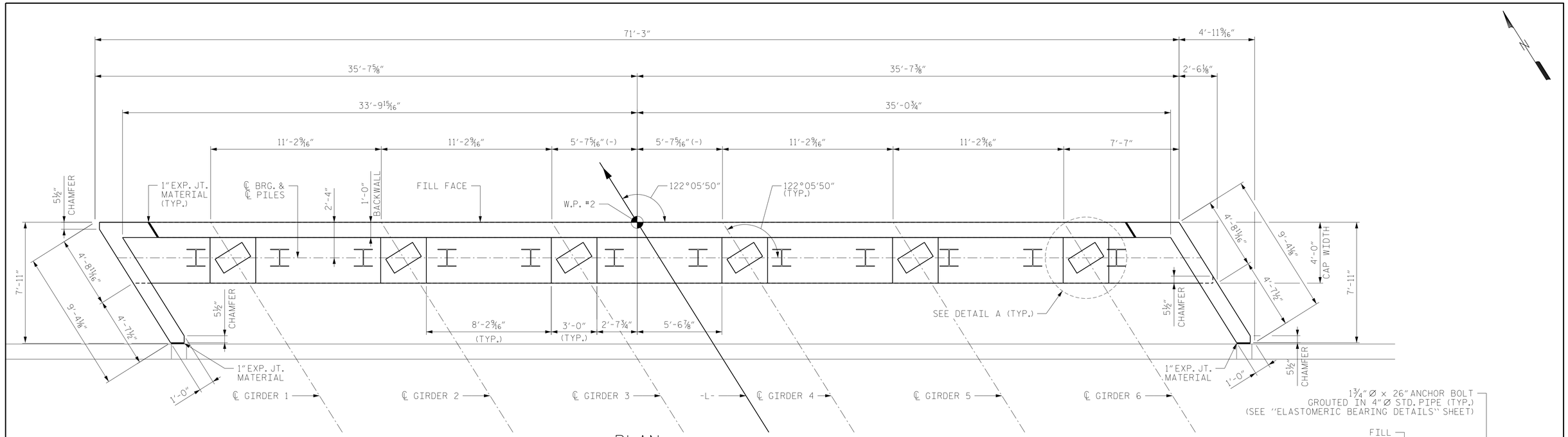
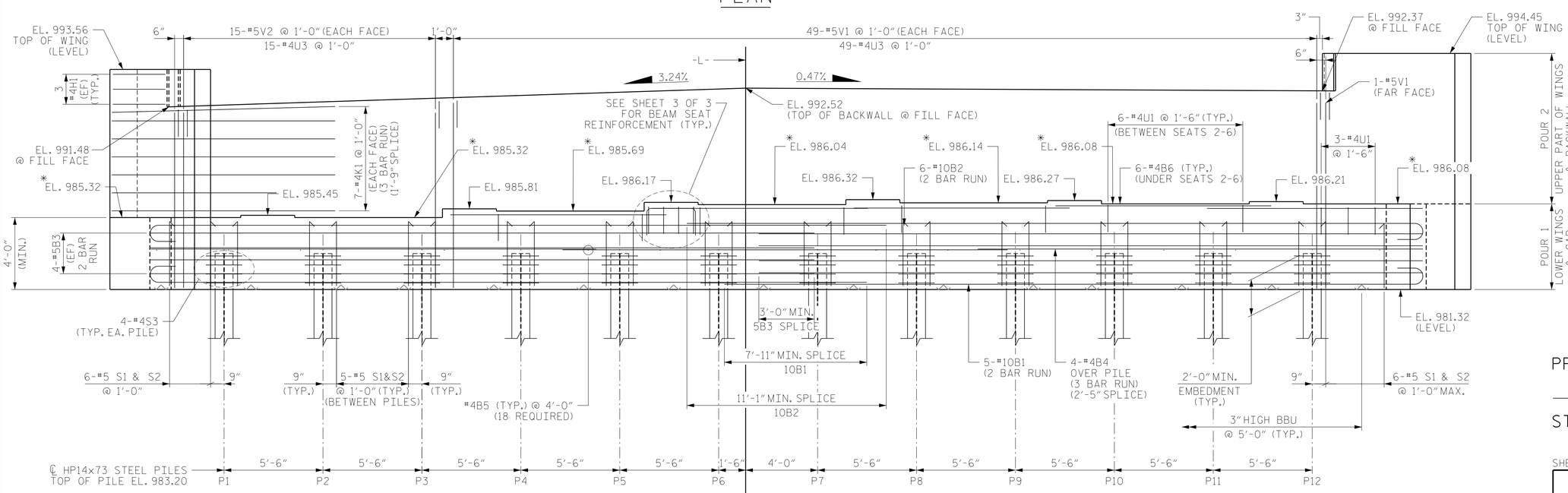
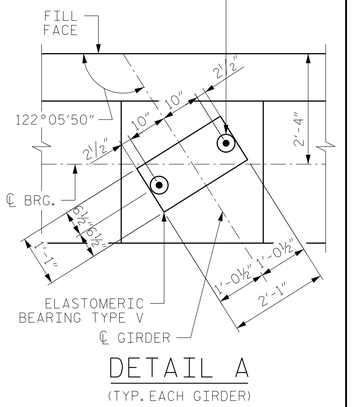


PLAN



ELEVATION



DETAIL A

(TYP. EACH GIRDER)

NOTES

1. STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
2. THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
3. THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
4. EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.
5. BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
6. FOR PIPE INSERT DETAILS, SEE BEARINGS SHEET.

*TOP OF CAP ELEVATIONS BETWEEN BRIDGE SEATS ARE AT FRONT OF CAP. SEE SHEET 3 OF 3 FOR DETAILS.

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PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

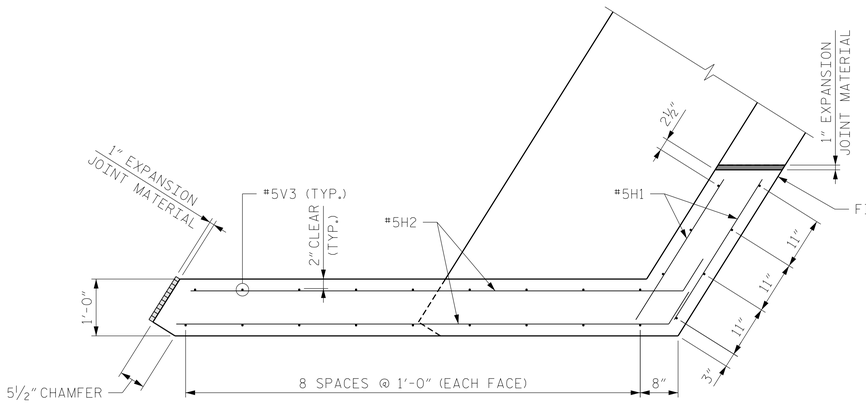
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

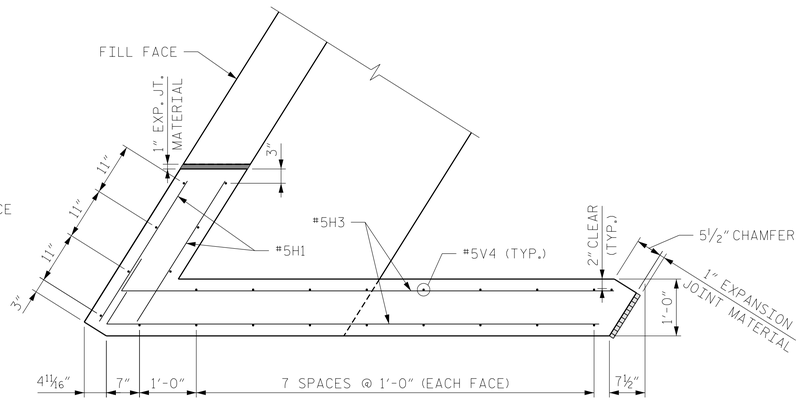
SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			36



PLAN OF RIGHT WING



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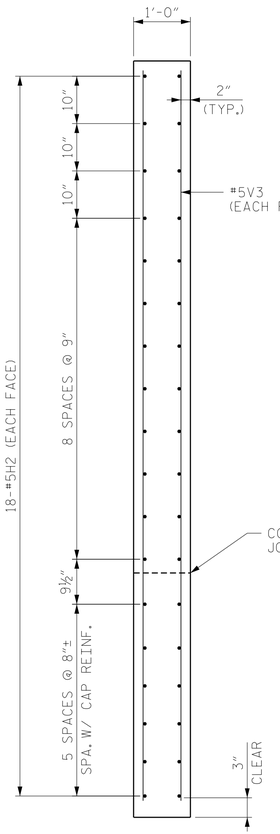
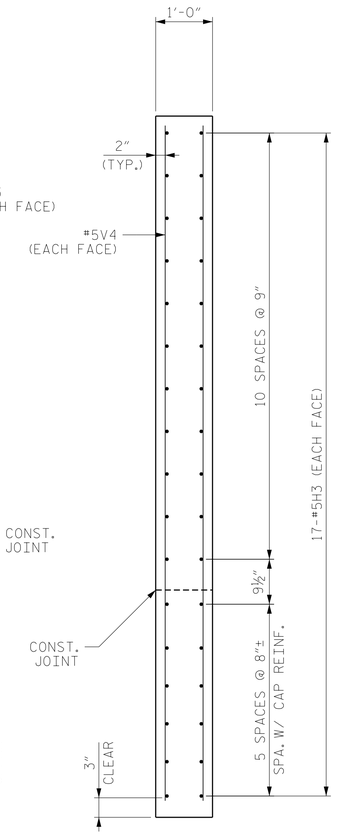
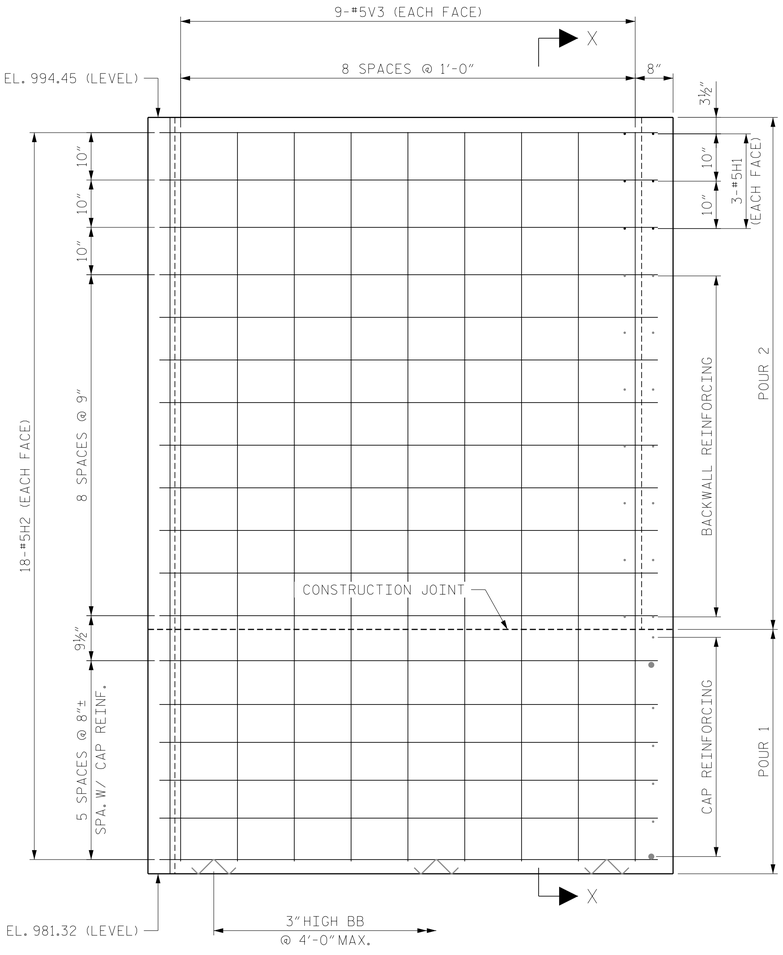


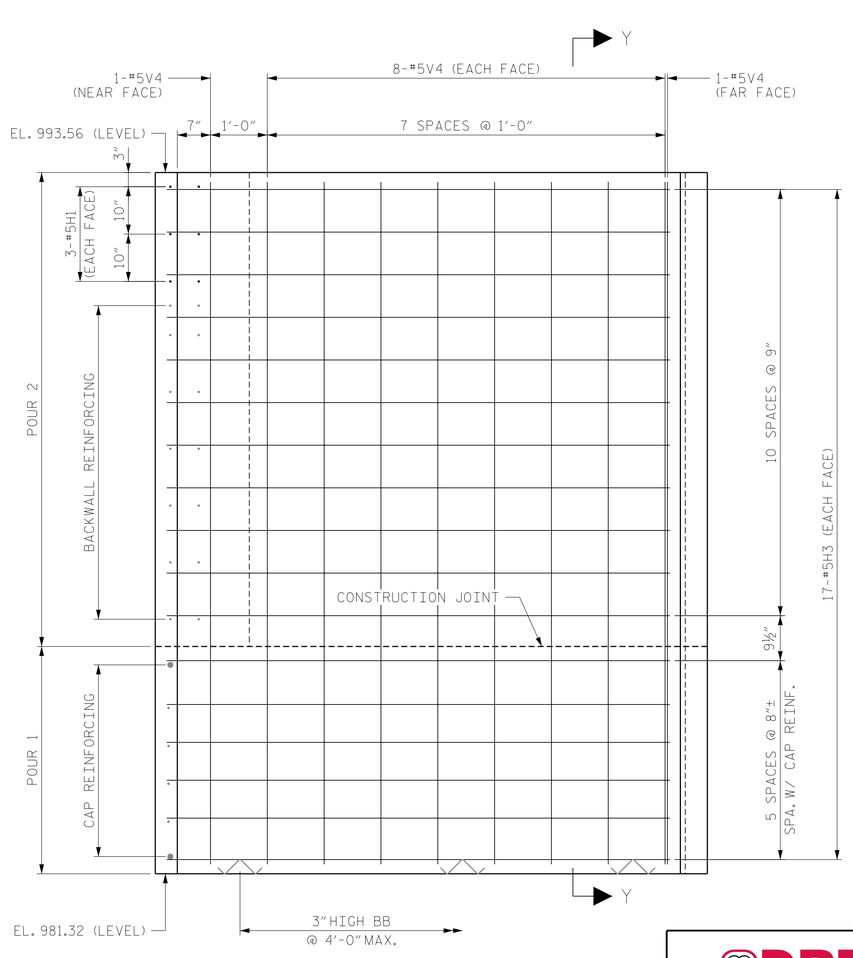
SECTION X-X



SECTION Y-Y



ELEVATION OF RIGHT WING



ELEVATION OF LEFT WING

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NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

PROJECT NO. B-4746
FORSYTH COUNTY
STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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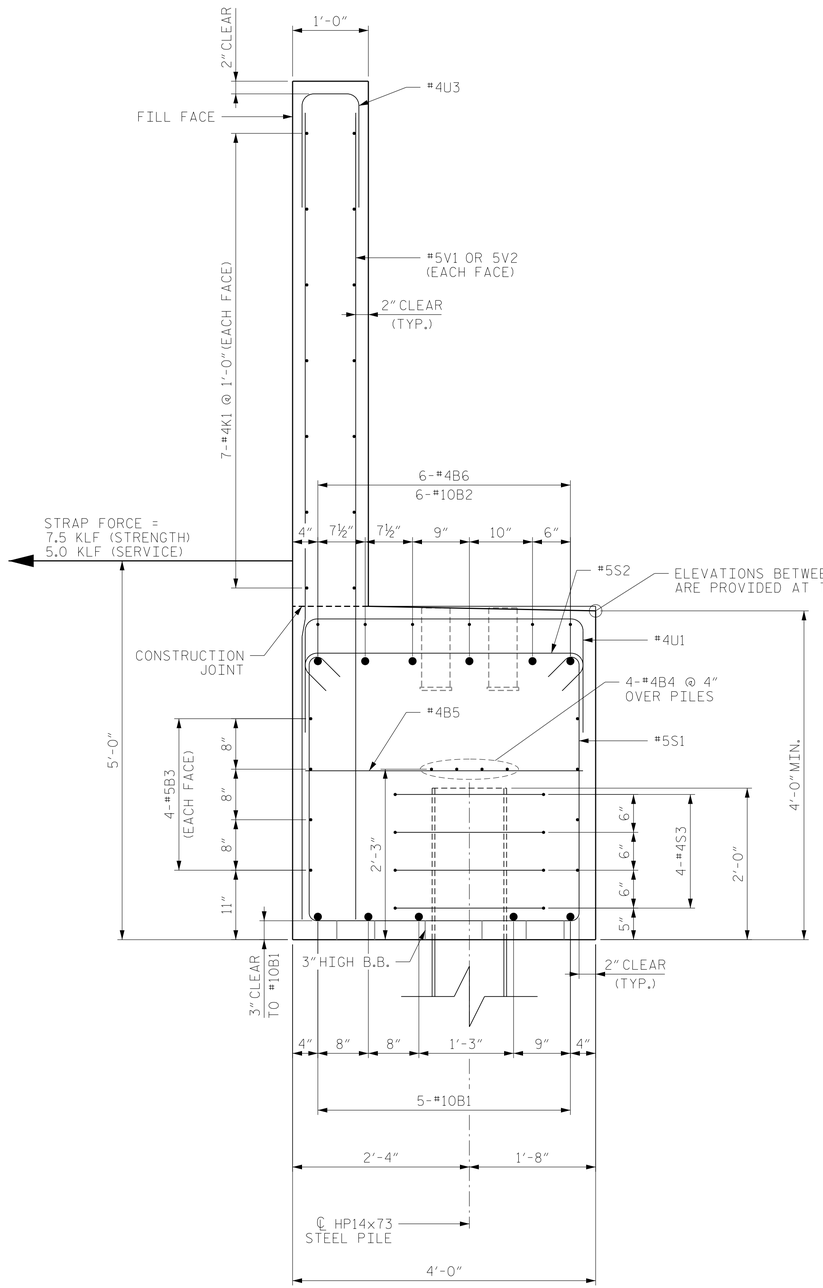
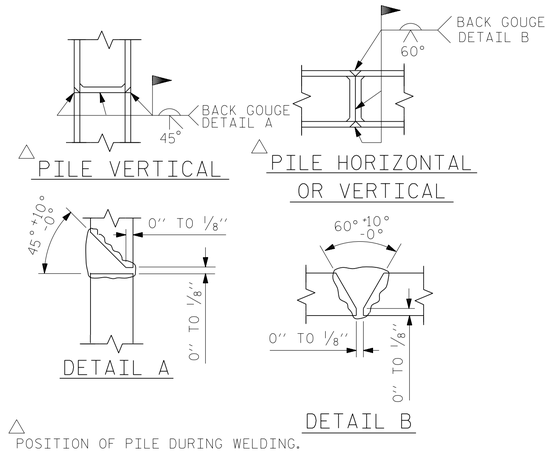
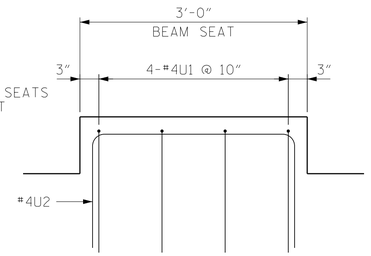


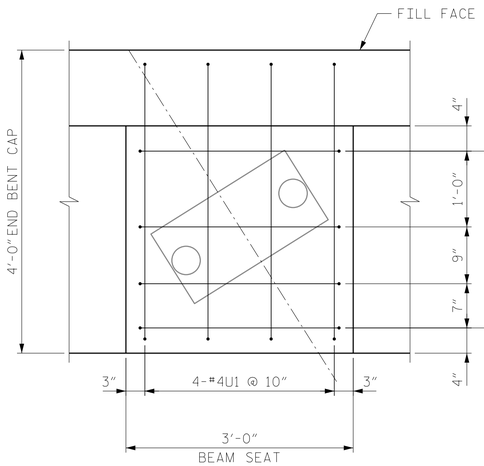
SECTION A-A



PILE SPLICE DETAILS



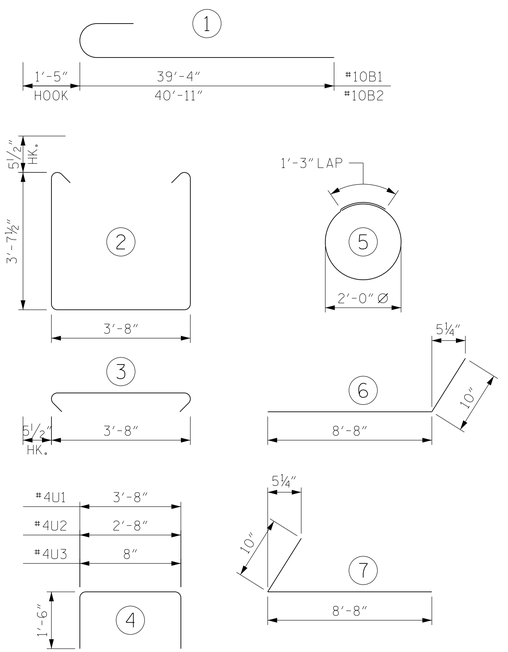
SECTION THRU BEAM SEAT



BEAM SEAT PLAN

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT



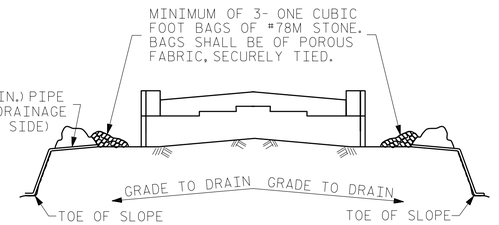
BILL OF MATERIAL

FOR END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	10	1	40'-9"	1,753
B2	12	10	1	42'-4"	2,186
B3	16	5	STR	36'-11"	616
B4	12	4	STR	25'-3"	202
B5	18	4	STR	3'-8"	44
B6	30	4	STR	12'-0"	240
H1	12	5	STR	2'-11"	37
H2	36	5	6	9'-6"	357
H3	34	5	7	9'-6"	337
K1	42	4	STR	24'-10"	697
S1	67	5	2	11'-10"	827
S2	67	5	3	4'-7"	320
S3	48	4	5	7'-7"	243
U1	51	4	4	6'-8"	227
U2	24	4	4	5'-8"	91
U3	66	4	4	3'-8"	162
V1	99	5	STR	10'-7"	1,093
V2	31	5	STR	9'-9"	315
V3	25	5	STR	12'-8"	330
V4	25	5	STR	11'-10"	309

TOTAL

REINFORCING STEEL	10,386	LBS.
CLASS A CONCRETE		
POUR 1 (CAP & LOWER WING)	54.8	C.Y.
POUR 2 (BACKWALL & UPPER WING)	22.3	C.Y.
CLASS A CONCRETE TOTAL	77.1	C.Y.
HP14x73 STEEL PILES		
NO. 12	480	LIN. FT.
PILE DRIVING EQUIPMENT SETUP FOR HP14x73 STEEL PILES	12	EA.



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

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

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NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO

1/16/2018

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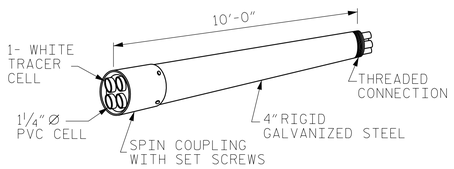
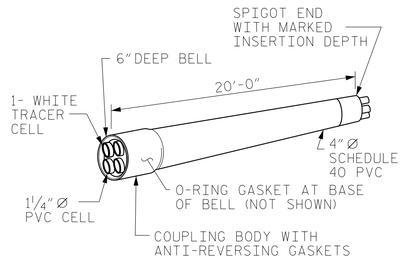
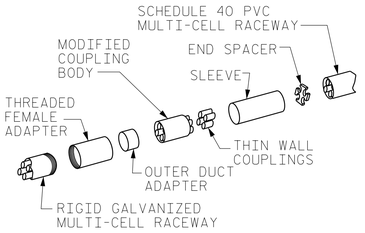


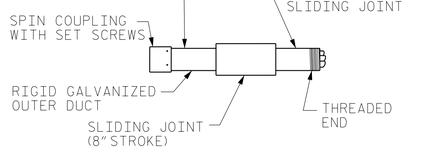
RIGID GALVANIZED (RGC)
MULTI-CELL RACEWAY



SCHEDULE 40 PVC
MULTI-CELL RACEWAY



TRANSITION ADAPTOR



EXPANSION JOINT FITTING

DETAIL ''D''

4" MULTI-CELL COMPONENTS

NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE CONDUIT(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.

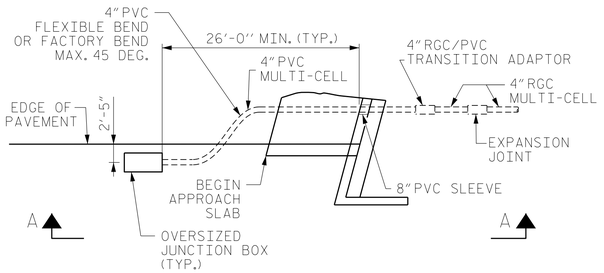
INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL ''B'' FOR SLEEVE INSTALLATION.

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

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

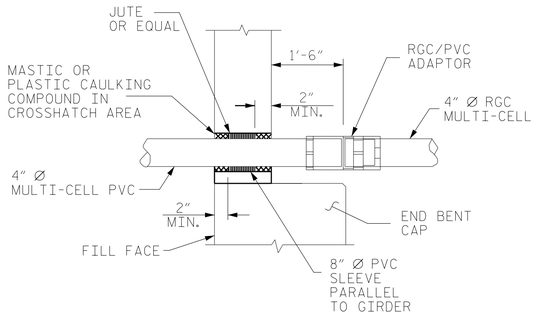
THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF ⅝'' AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.



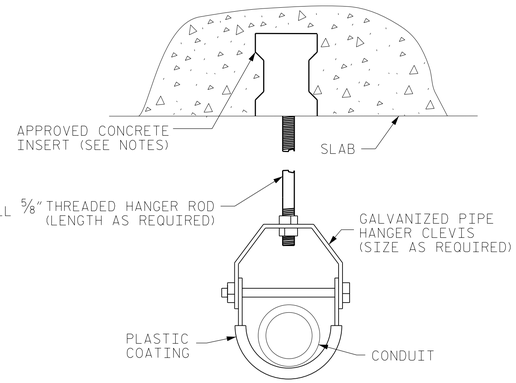
DETAIL ''A''

TERMINATION OF CONDUIT THROUGH WING WALL TO OVERSIZED JUNCTION BOX



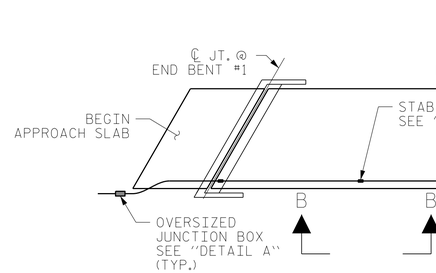
DETAIL ''B''

PVC SLEEVE INSTALLATION & RGC/PVC ADAPTOR AT BACKWALL.

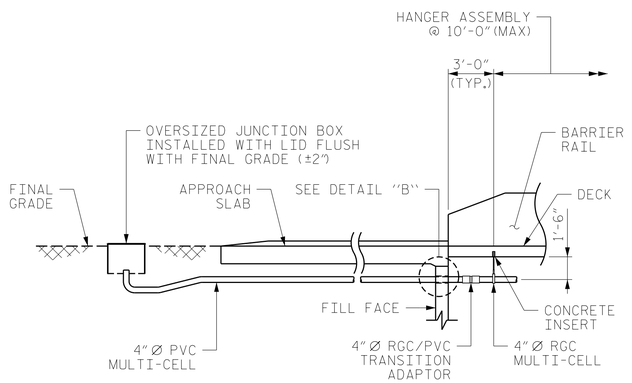


DETAIL ''C''

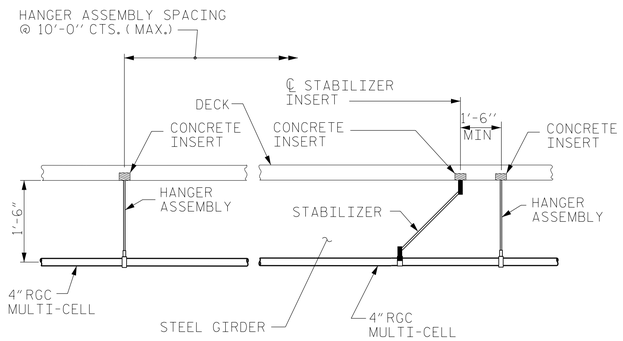
HANGER ASSEMBLY



CONDUIT LAYOUT

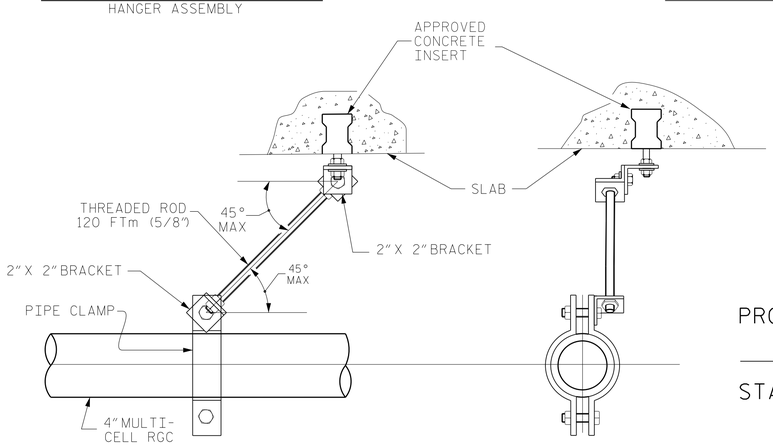


VIEW ''A-A''



VIEW ''B-B''

STEEL GIRDERS



DETAIL ''E''

STABILIZER

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

ELECTRIC CONDUIT DETAILS

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1/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELECTRICAL CONDUIT SYSTEM FOR SIGNALS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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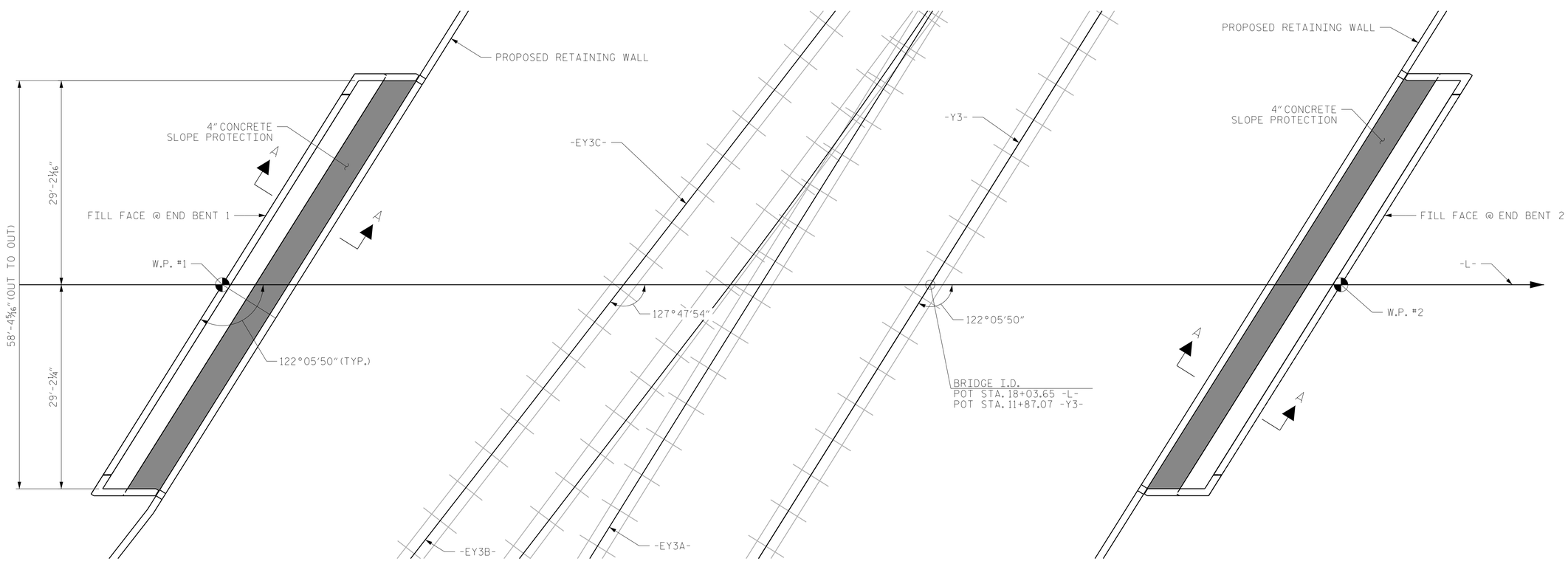


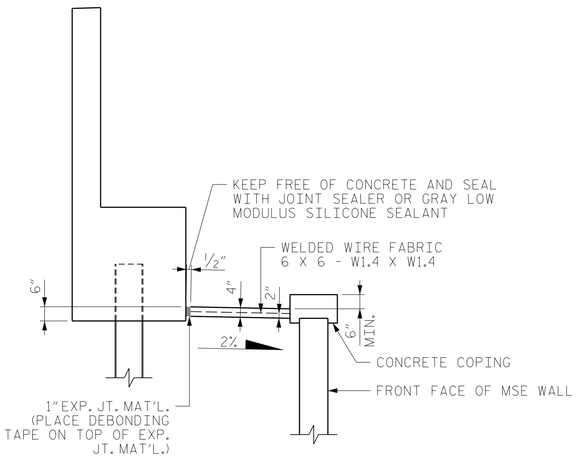
PLAN

NOTES

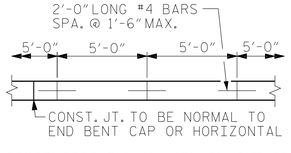
1. SLOPE PROTECTON SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.
2. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6x6 - W1.4xW1.4, 60" WIDE. SLOPE 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.

BRIDGE @ STA. 18+03.65 -L-	4" SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	30.6	75.5
END BENT 2	30.6	75.5

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

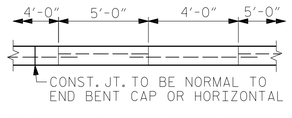


SECTION A-A



POURING DETAIL

STRIP WIDTHS MAY VARY IN CURVED PORTION.



OPTIONAL POURING DETAIL

POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

PROJECT NO. B-4746

FORSYTH COUNTY

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SLOPE PROTECTION DETAILS

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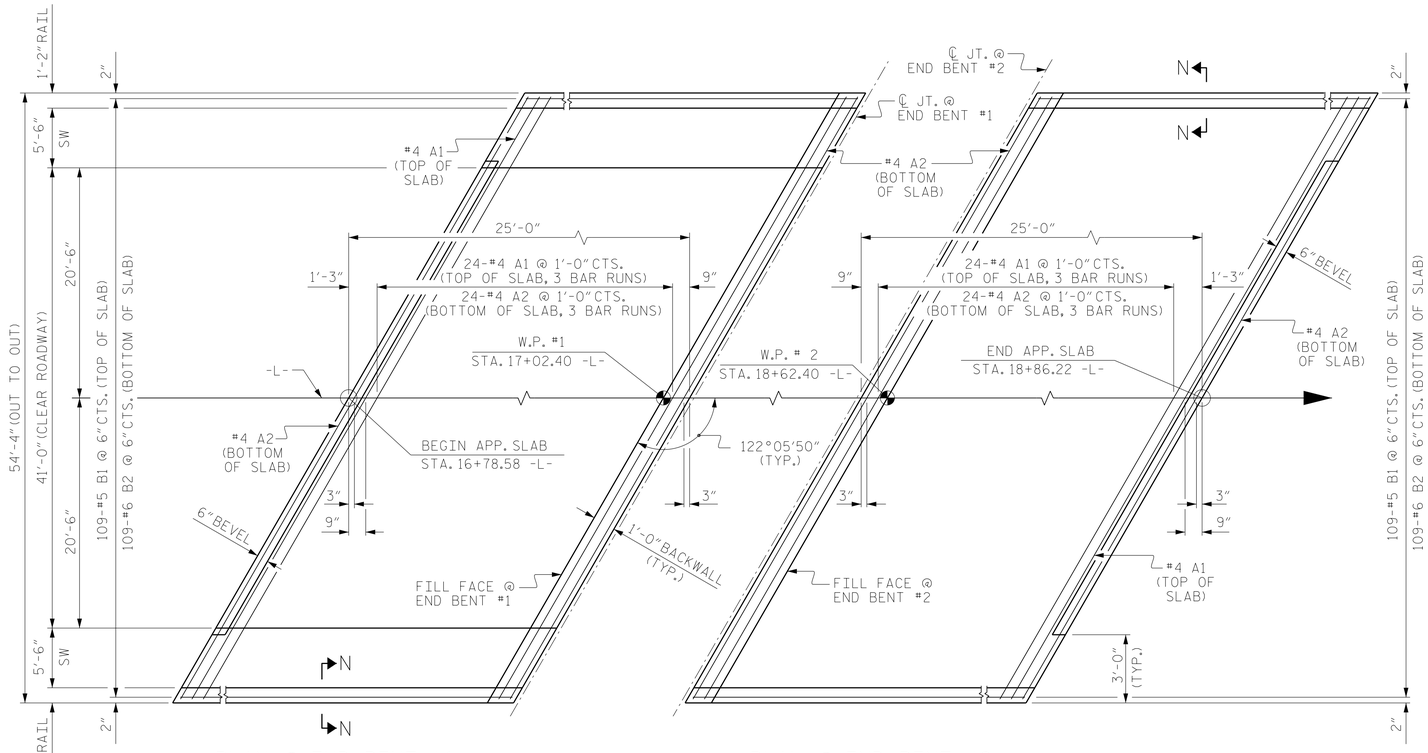
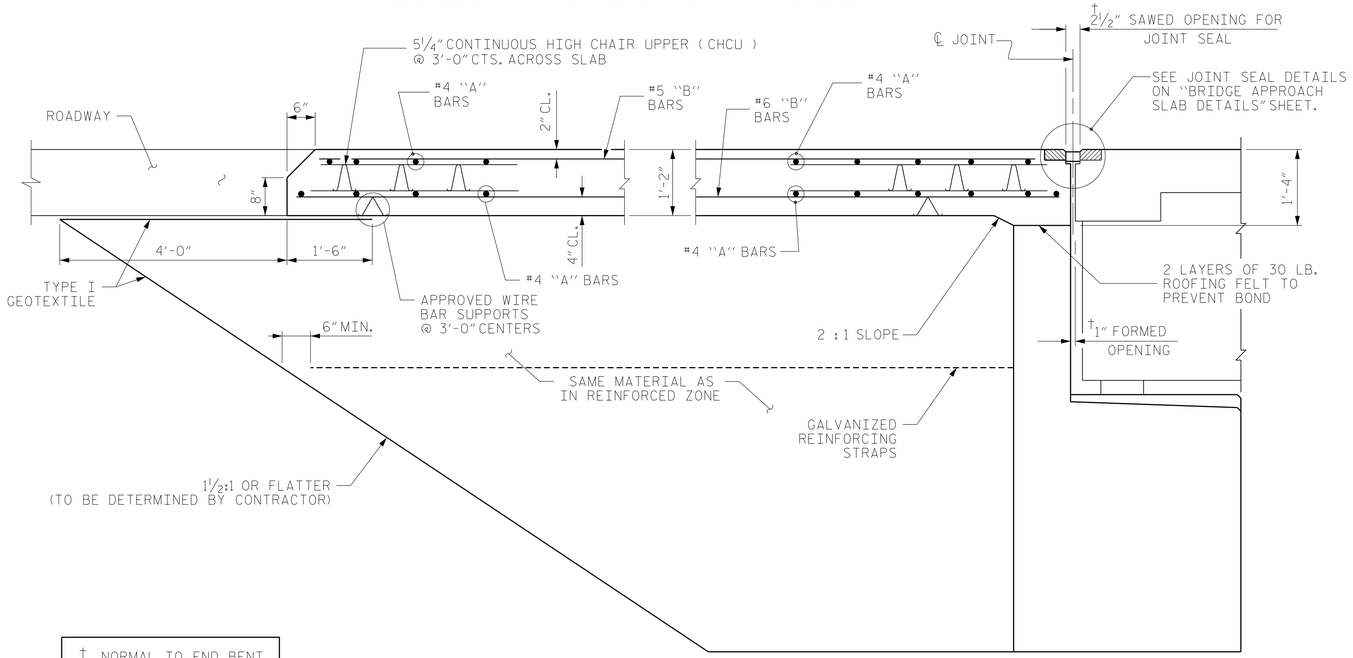


PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

(TYPE III - REINFORCED APPROACH FILL FOR MSE ABUTMENT WALL)

NOTES

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

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

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

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

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

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

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

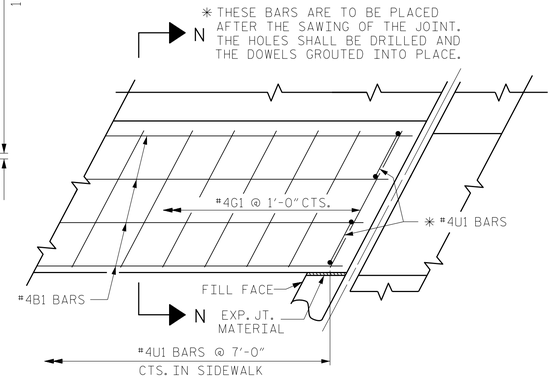
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

5U BARRIER REINFORCING MUST BE EMBEDDED IN THE APPROACH SLAB POUR. SEE "CLASSIC CONCRETE BRIDGE RAIL" SHEETS.



PLAN

SECTION N-N

DETAILS OF SIDEWALK ON APPROACH SLAB

(RIGHT SIDE SHOWN, LEFT SIDE SIMILAR)

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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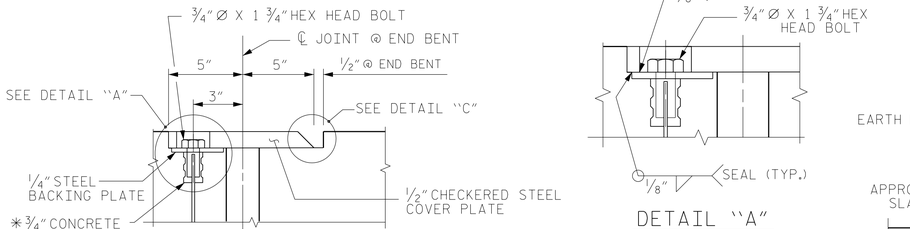
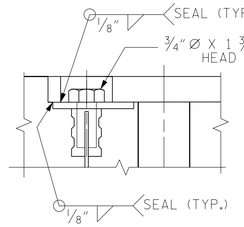
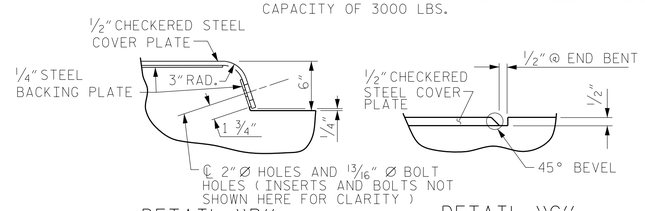


SECTION K-K

*THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.



DETAIL "A"



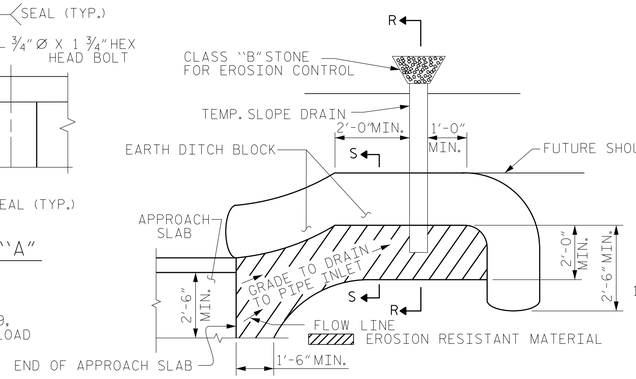
DETAIL "B" DETAIL "C"

JOINT SEAL DETAILS @ END BENT

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS INACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

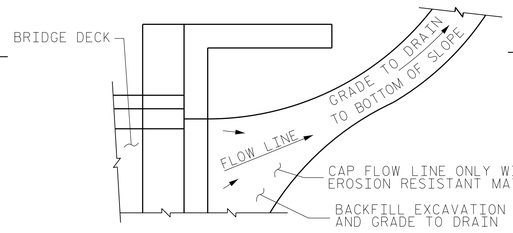
THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "FOAM JOINT SEALS".



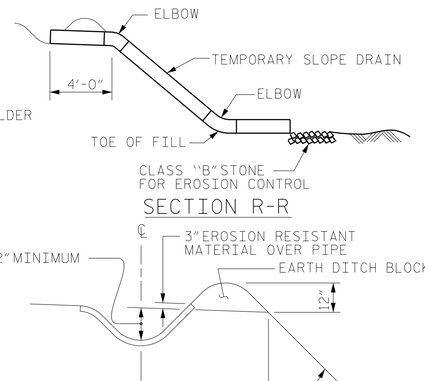
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW

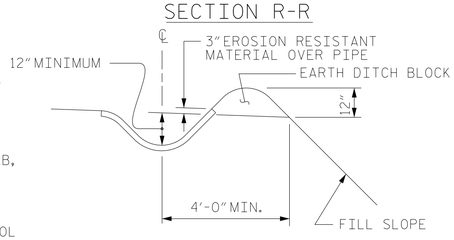


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



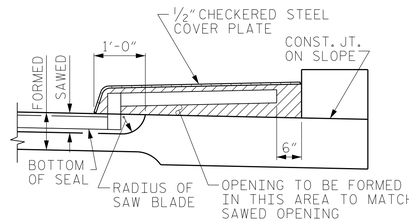
SECTION R-R



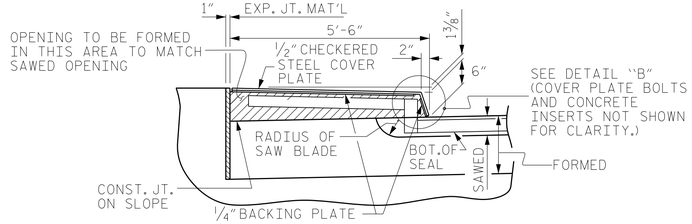
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

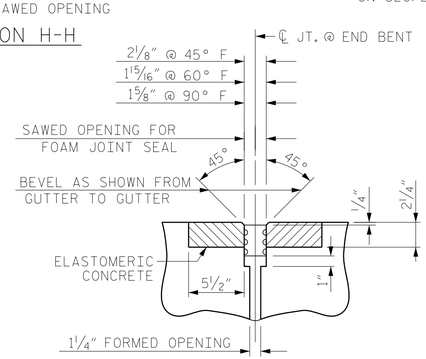
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION H-H



SECTION I-I

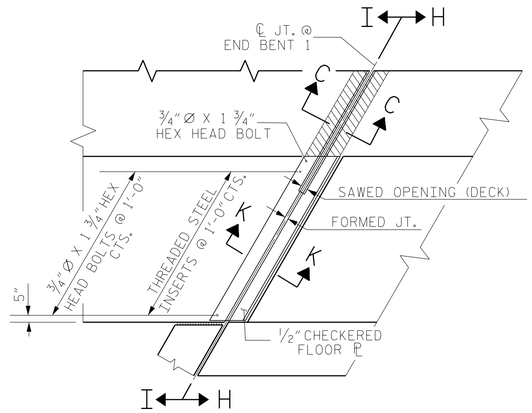


SECTION C-C
FOAM JOINT SEAL

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

ELASTOMERIC CONCRETE	
APPROACH SLAB NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	8.7
2	8.7
TOTAL	17.4

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



PLAN VIEW OF FOAM
JOINT SEAL @ END BENT FOR SIDEWALK

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	72	#4	STR	22'-11"	1,102
A2	72	#4	STR	22'-9"	1,094
*B1	109	#5	STR	24'-2"	2,747
B2	109	#6	STR	24'-8"	4,038
REINFORCING STEEL				LBS.	5,133
*EPOXY COATED REINFORCING STEEL				LBS.	3,850
CLASS AA CONCRETE				C. Y.	61.3

APPROACH SLAB AT EB #2

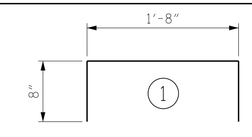
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	72	#4	STR	22'-11"	1,102
A2	72	#4	STR	22'-9"	1,094
*B1	109	#5	STR	24'-2"	2,747
B2	109	#6	STR	24'-8"	4,038
REINFORCING STEEL				LBS.	5,133
*EPOXY COATED REINFORCING STEEL				LBS.	3,850
CLASS AA CONCRETE				C. Y.	61.3

APPROACH SLAB 1 SIDEWALK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	8	#4	STR	24'-10"	133
*G1	50	#4	STR	7'-3"	242
*U1	8	#4	1	3'-4"	18
*EPOXY COATED REINFORCING STEEL				LBS.	393
CLASS AA CONCRETE				C. Y.	7.8

APPROACH SLAB 2 SIDEWALK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	8	#4	STR	24'-10"	133
*G1	50	#4	STR	7'-3"	242
*U1	8	#4	1	3'-4"	18
*EPOXY COATED REINFORCING STEEL				LBS.	393
CLASS AA CONCRETE				C. Y.	7.8



PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			36

DRAWN BY : ROBERT A. ALONSO, P.E. DATE : 03/2017
CHECKED BY : RUDY M. CASTILLO, E.I. DATE : 03/2017
DESIGN ENGINEER OF RECORD: ROBERT A. ALONSO DATE : 03/2017

DRMP
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
(704) 332-2289
NC LICENSE NO. C-2213

NORTH CAROLINA PROFESSIONAL SEAL 042261 ENGINEER ROBERT A. ALONSO
1/16/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

PROJECT NO. B-4746

FORSYTH COUNTY

STATION: 18+03.65 -L-
11+87.07 -Y3-

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STANDARD

ENGLISH
NOTES

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

Plotted By: Robert A. Alonso, PE, SE 1/16/2018 10:17:31 AM A:\B4746\Structures\CADD\B4746_SMU_SN_36_330229.dgn
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STD. NO. SN JANUARY, 1990