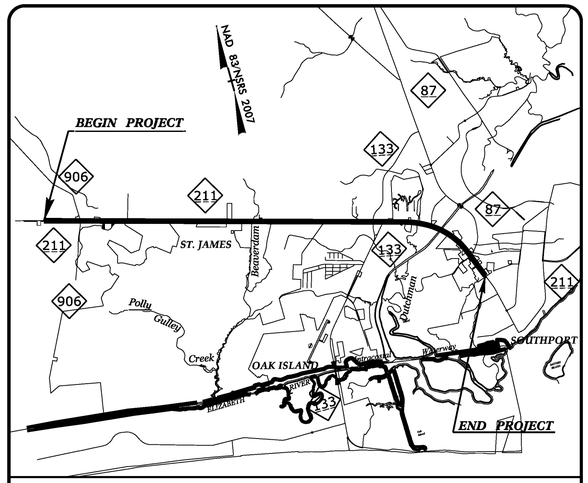
TIP PROJECT: R-5021

CONTRACT: C204123



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

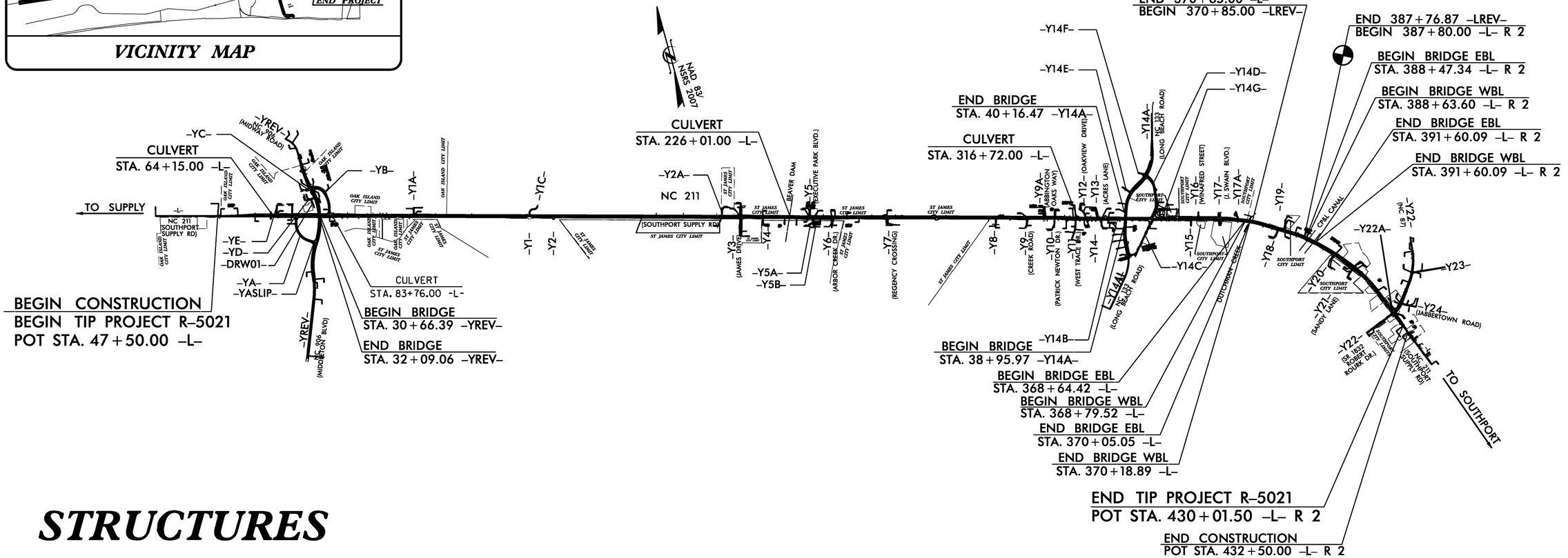
BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5021		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
41582.1.1	STP-0211(021)	P.E.
41582.2.2	STP-0211(021)	UTILITIES
41582.2.3	STP-0211(021)	R/W
41582.3.1	STP-0211(021)	CONST.

LOCATION: NC 211 FROM WEST OF NC 906 (MIDWAY ROAD) TO EAST OF NC 87

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, WALLS & SIGNALS



STRUCTURES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2019 = 28,000
ADT 2039 = 44,000
K = 8
D = 55
T = 6 % *
V = 40-60 MPH
* (TTST 2% + DUAL 4%)

FUNC CLASS = RURAL MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5021 = 7.158 MILES MILES
LENGTH STRUCTURE TIP PROJECT R-5021 = 0.086 MILES

TOTAL LENGTH TIP PROJECT R-5021 = 7.244 MILES MILES

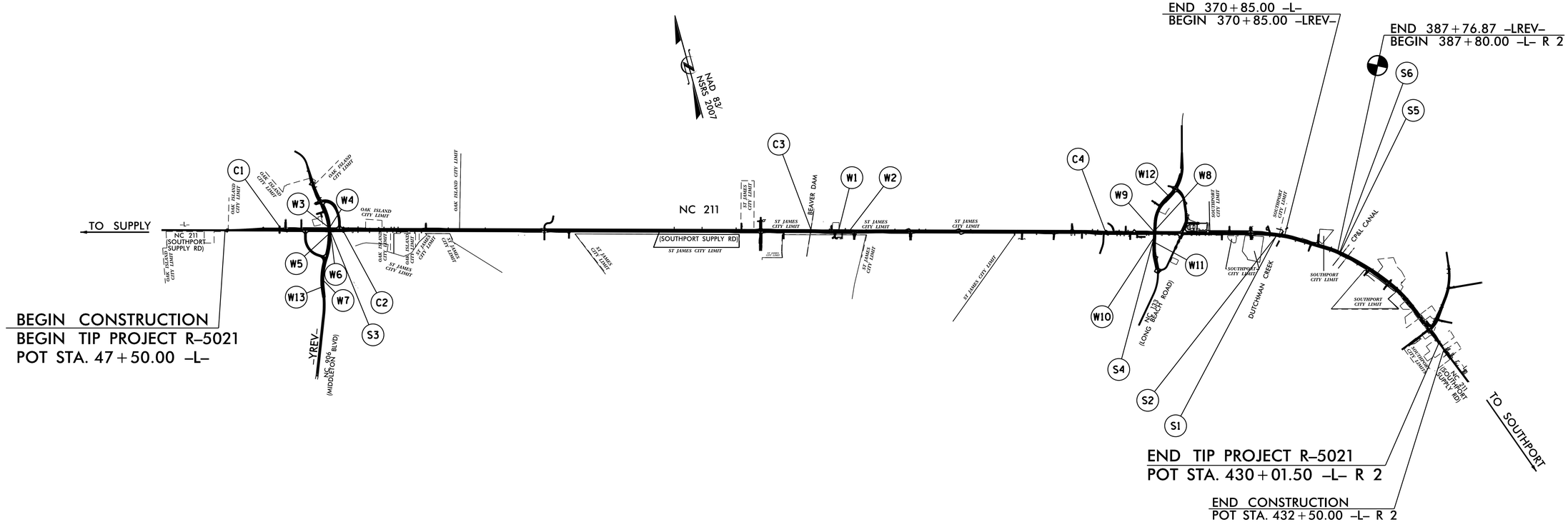
ALL LENGTH BASED ON -L- CENTERLINE
STRUCTURES LENGTH BASED ON EBL

Prepared in the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

LETTING DATE :

December 7, 2021



INDEX

STR. NO.	STATION	DESCRIPTION	SHEETS
S1	STA. 369+42.00 -L-	BRIDGE ON NC 211 OVER DUTCHMAN CREEK (WBL)	S1-1 THRU S1-38
S2	STA. 369+42.00 -L-	BRIDGE ON NC 211 OVER DUTCHMAN CREEK (EBL)	S2-1 THRU S2-38
S3	POC STA. 31+30.81 -YREV- POT STA. 79+32.24 -L-	BRIDGE OVER NC 211 ON SR 1500 BETWEEN US 17 AND OAK ISLAND DRIVE	S3-1 THRU S3-25
S4	STA. 39+52.37 -Y14A- STA. 331+20.00 -L-	BRIDGE OVER NC 211 ON NC 133 BETWEEN SR 1857 AND NC 87	S4-1 THRU S4-24
S5	STA. 390+15.00 -L-	BRIDGE OVER CP & L CANAL ON NC 211 BETWEEN NC 133 AND NC 87 (LEFT LANE)	S5-1 THRU S5-39
S6	STA. 390+15.00 -L-	BRIDGE OVER CP & L CANAL ON NC 211 BETWEEN NC 133 AND NC 87 (RIGHT LANE)	S6-1 THRU S6-39
C1	STA. 64+15.00 -L-	SINGLE 10'X5' RCBC 90° SKEW	C1-1 THRU C1-4
C2	STA. 83+76.00 -L-	DOUBLE 8'X6' RCBC 90° SKEW	C2-1 THRU C2-5
C3	STA. 226+01.00 -L-	DOUBLE 9'X8' RCBC 105° SKEW	C3-1 THRU C3-5
C4	STA. 316+72.00 -L-	DOUBLE 7'X7' RCBC 60° SKEW	C4-1 THRU C4-5
W1	232+85.00 -L-	MSE RETAINING WALL 1	W1 THRU W2
W2	232+85.00 -L-	MSE RETAINING WALL 2	

STR. NO.	STATION	DESCRIPTION	SHEETS
W3	31+30.81 -YREV-	MSE RETAINING WALL 3	W3 THRU W7
W4	31+30.81 -YREV-	MSE RETAINING WALL 4	
W5	31+30.81 -YREV-	MSE RETAINING WALL 5	
W6	31+30.81 -YREV-	MSE RETAINING WALL 6	
W7	38+00.00 -YREV-	MSE RETAINING WALL 7	W8 THRU W11
W8	39+52.37 -Y14A-	MSE RETAINING WALL 8	W12 THRU W17
W9	39+52.37 -Y14A-	MSE RETAINING WALL 9	
W10	39+52.37 -Y14A-	MSE RETAINING WALL 10	
W11	39+52.37 -Y14A-	MSE RETAINING WALL 11	
W12	48+50.00 -Y14A-	MSE RETAINING WALL 12	W18 THRU W22
W13	47+00.00 -YREV-	MSE RETAINING WALL 13	

01-MAR-2019 13:13
S:\PEF\Division Managed\R-5021\Title Sheet\TITLE_INDEX.dgn
tbarbour

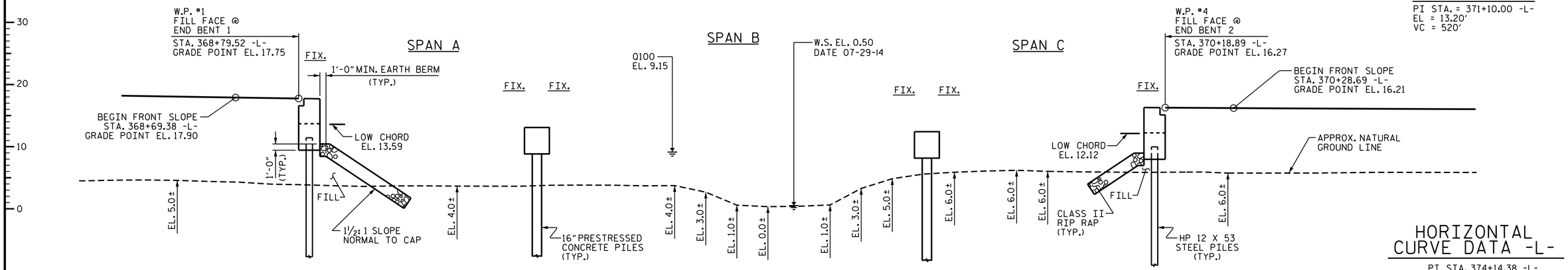
F.A. PROJECT STP-0211(21)

368+50 | 369+00 | 369+50 | 370+00 | 370+50

(-)1.6698% (+)1.5244%

GRADE DATA

PI STA. = 371+10.00 -L-
EL = 13.20'
VC = 520'

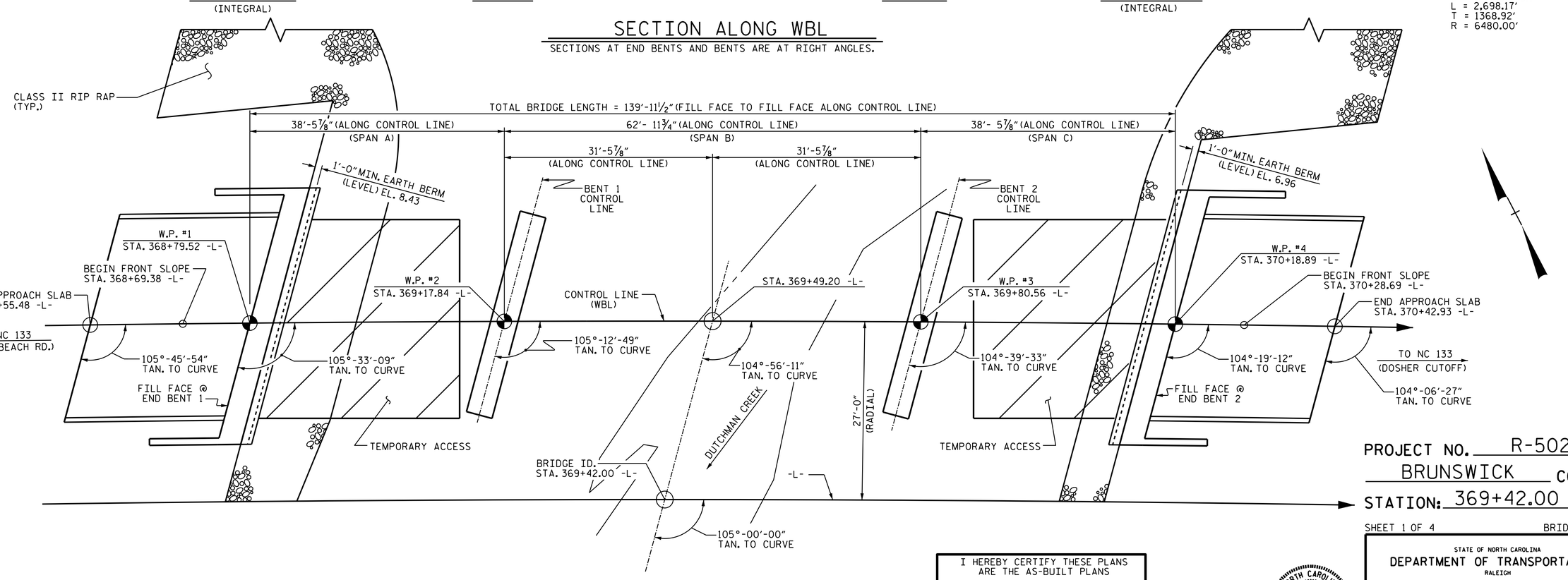


SECTION ALONG WBL

SECTIONS AT END BENTS AND BENTS ARE AT RIGHT ANGLES.

HORIZONTAL CURVE DATA -L-

PI STA. 374+14.38 -L-
Δ = 23°-51'-25.5" (RT)
D = 0°-53'-03.1"
L = 2,698.17'
T = 1368.92'
R = 6480.00'



PLAN

(PILES NOT SHOWN FOR CLARITY, BENTS ARE PARALLEL)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 4 BRIDGE NO. 259

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211
OVER DUTCHMAN CREEK
BETWEEN NC 133 (LONG BEACH RD.)
AND NC 133 (DOSHER CUTOFF)
(WBL)

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

SHEET NO. S1-1

TOTAL SHEETS 38

STR. #1

DRAWN BY : A. K. PATEL/S. B. WILLIAMS DATE : 4-25-18
CHECKED BY : M. K. BEARD DATE : 4-30-18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 4-2015

23-JAN-2019 08:24
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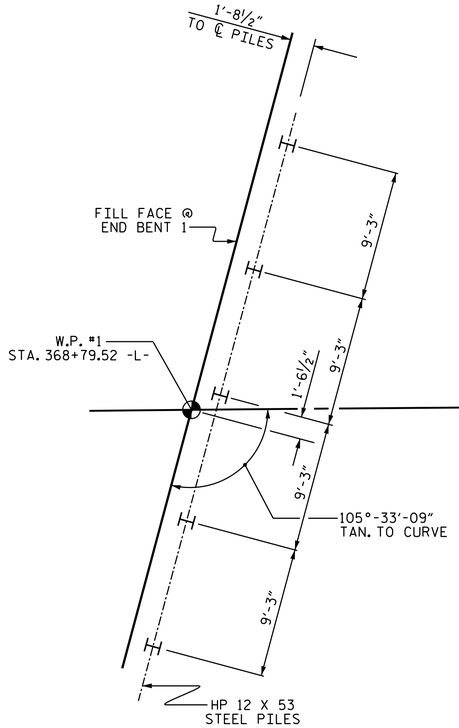
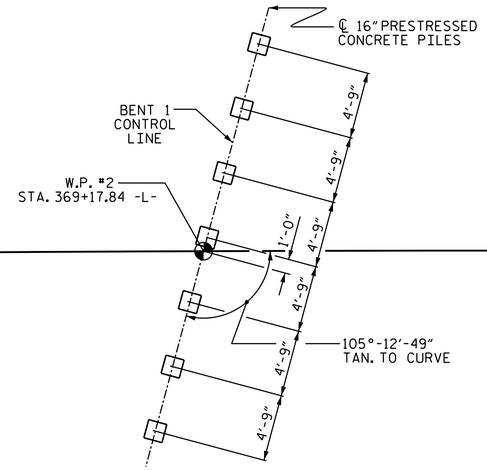
kalford



END BENT 1



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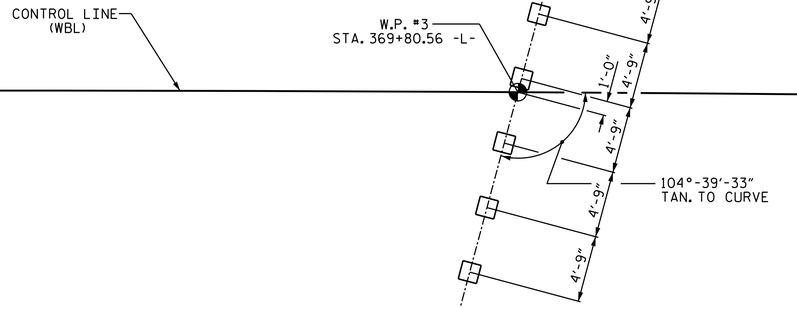
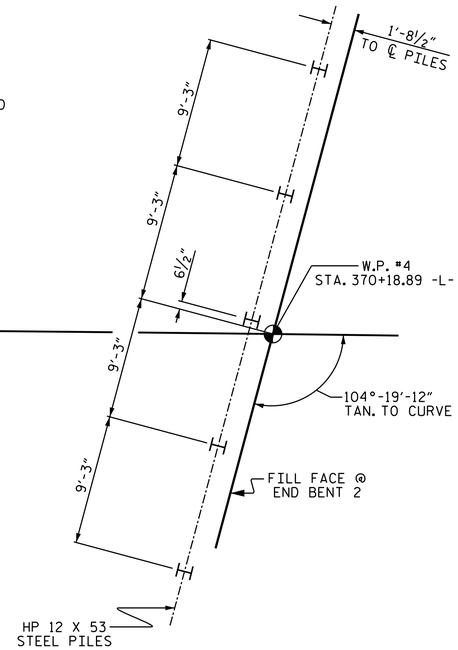


BENT 2



END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO CENTERLINE OF THE PILE AT THE BOTTOM OF THE CAP

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

PILES AT BENT 1 AND BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

DRIVE PILES AT BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

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

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.

INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN -25.0 FEET.

INSTALL PILES AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN -30.0 FEET.

STEEL PILE TIPS ARE REQUIRED FOR PRESTRESSED CONCRETE PILES AT BENTS 1 AND 2. FOR STEEL PILE TIPS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT, AND REINFORCED BRIDGE APPROACH FILL BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 AND BENT 2 IS ELEVATION -6.0 FEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211 OVER DUTCHMAN CREEK BETWEEN NC 133 (LONG BEACH RD.) AND NC 133 (DOSHER CUTOFF) (WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-2
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY :	S. B. WILLIAMS	DATE : 5-18
CHECKED BY :	M. K. BEARD	DATE : 5-24-18
DESIGN ENGINEER OF RECORD:	A. K. PATEL	DATE : 4-2015

23-JAN-2019 08:24
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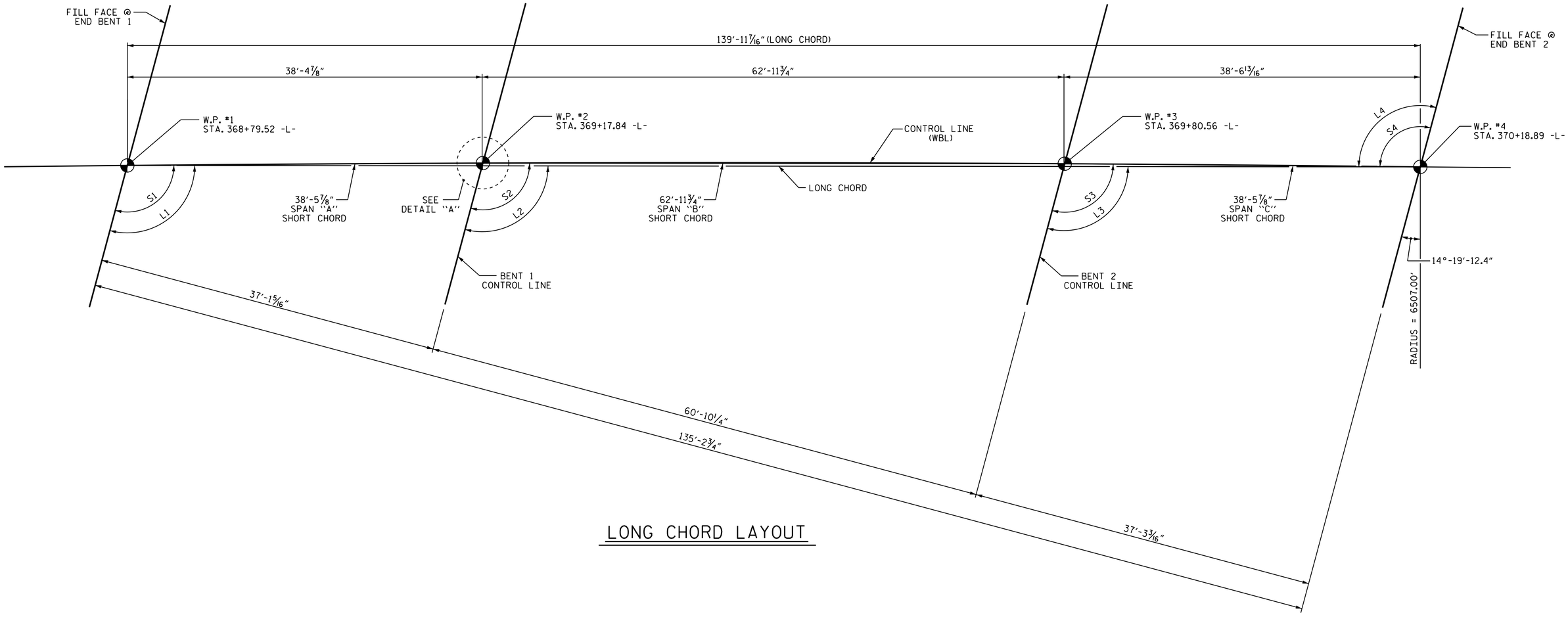
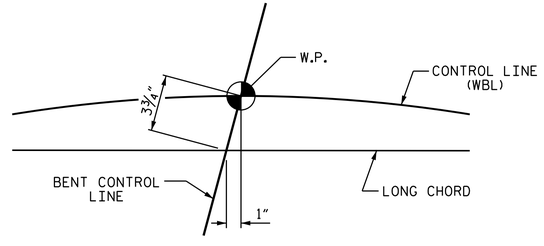
kalford



LONG CHORD LAYOUT

ANGLES				HORIZONTAL CURVE DATA
	LONG CHORD	SHORT CHORD		PI STA. 374+14.38 -L- Δ = 23°-51'-25.5"(RT) D = 0°-53'-03.1" L = 2,698.17' T = 1368.92' R = 6480.00'
L1	104°-56'-11"	S1	105°-22'-59"	
L2	104°-56'-11"	S2	104°-56'-11"	
L3	104°-56'-11"	S3	104°-29'-22"	
L4	104°-56'-11"	S4	104°-29'-22"	



DETAIL "A"
(TYPICAL EACH BENT)

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211 OVER DUTCHMAN CREEK BETWEEN NC 133 (LONG BEACH RD.) AND NC 133 (DOSHER CUTOFF) (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER D. KOREY NEWTON
DocuSigned by: P. Korey Newton 1/20/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-3
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : A.P./S. B. WILLIAMS DATE : 5-18
CHECKED BY : M. K. BEARD DATE : 5-24-18

20-JAN-2019 22:03
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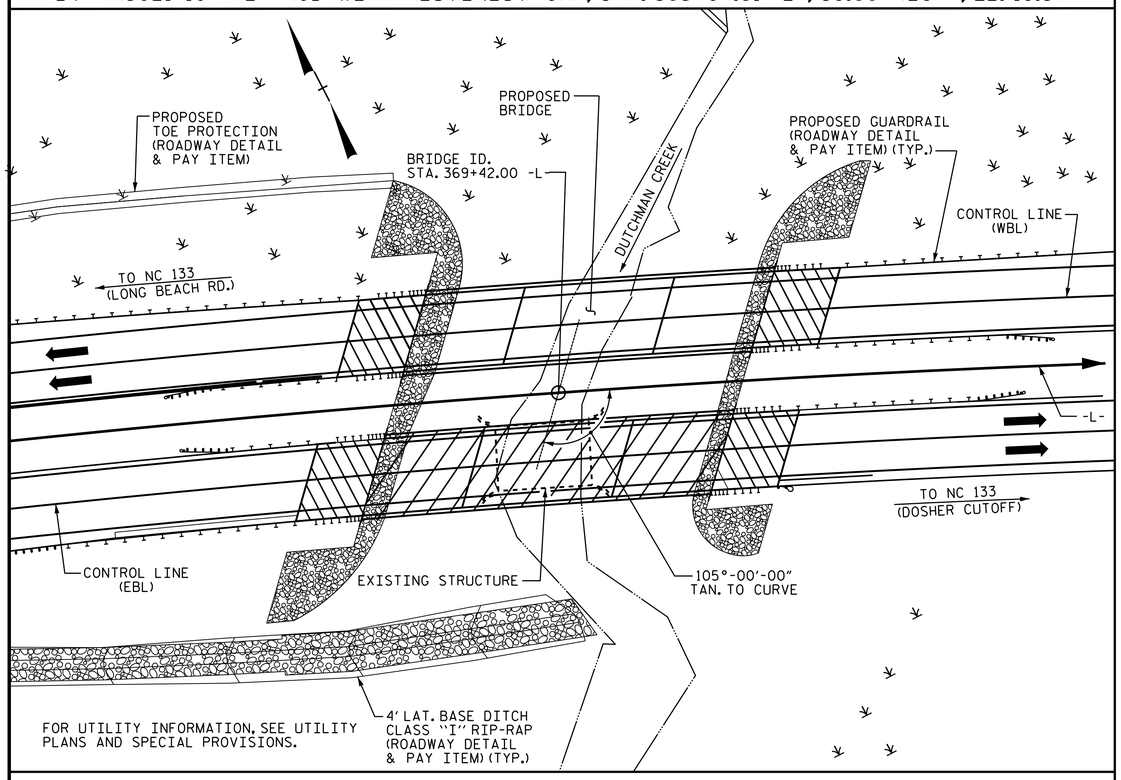
pknewton

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	36" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR 16" PRESTRESSED CONCRETE PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	16" PRESTRESSED CONCRETE PILES		HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	EACH	SQ.FT.	SQ.FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EACH	EACH	NO.	LIN. FT.	NO.	LIN. FT.	EACH	EACH	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE		4504	5026				15	680.4									260.84	276.47			
END BENT 1				29.3		3553				5			5	350	5	5			170	190	
BENT 1				11.5		2240			7		7	490				7					
BENT 2				11.5		2240			7		7	385				7					
END BENT 2				29.8		3541				5			5	325	5	5			125	140	
TOTAL	2	4504	5026	82.1	LUMP SUM	11574	15	680.4	14	10	14	875	10	675	10	24	260.84	276.47	295	330	LUMP SUM

BM #R5021-10 - 24"ROD WITH ALUMINIUM CAP, STA. 365+04.81 -L-, 39.66' RIGHT, EL. 18.37



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 2300 CFS
FREQUENCY OF DESIGN DISCHARGE	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 8.9 FT.
DRAINAGE AREA	= 5.2 SQ. MI.
BASE DISCHARGE (Q100)	= 2500 CFS
BASE HIGH WATER ELEVATION	= 9.15 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2900+ CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 16.37 FT.

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES".

ALL METALIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE GIRDERS, PRECAST DECK PANELS, AND PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE END BENT AND BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

ALL BAR SUPPORTS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE END BENT AND BENT CAPS, AND PRESTRESSED CONCRETE PILES OF BENTS 1 & 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30"(SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

DRAWN BY : A. K. PATEL/S. B. WILLIAMS DATE : 4-26-18
CHECKED BY : M. K. BEARD DATE : 4-30-18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 4-30-18

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kalford

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD
DocuSigned by: F2458389308F40E...
1/23/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211
OVER DUTCHMAN CREEK
BETWEEN NC 133 (LONG BEACH RD.)
AND NC 133 (DOSHER CUTOFF)
(WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-4
1			3			TOTAL SHEETS
2			4			38

STR. #1

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⬡ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE							COMMENT NUMBER
								MOMENT					SHEAR						MOMENT							
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.02	--	1.75	0.674	1.78	C	I	17.822	0.748	1.91	A	I	10.691	0.80	0.643	1.02	B	EL	30.402		
		HL-93(Opr)	N/A	--	2.30	--	1.35	0.674	2.30	C	I	17.822	0.748	2.47	A	I	10.691	N/A	--	--	--	--	--		
		HS-20(Inv)	36.000	2	1.30	46.963	1.75	0.674	2.29	C	I	21.386	0.748	2.16	A	I	24.945	0.80	0.643	1.30	B	EL	30.402		
		HS-20(Opr)	36.000	--	2.80	100.877	1.35	0.674	2.97	C	I	21.386	0.748	2.80	A	I	24.945	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.83	38.207	1.4	0.674	5.10	C	I	17.822	0.748	5.14	A	I	24.945	0.80	0.643	2.83	B	EL	30.402		
		SNGARBS2	20.000	--	2.16	43.144	1.4	0.674	4.24	C	I	21.386	0.748	4.05	A	I	24.945	0.80	0.643	2.16	B	EL	30.402		
		SNAGRIS2	22.000	--	2.06	45.403	1.4	0.674	4.18	C	I	21.386	0.748	3.93	A	I	24.945	0.80	0.643	2.06	B	EL	30.402		
		SNCOTTS3	27.250	--	1.41	38.415	1.4	0.674	2.55	C	I	17.822	0.748	2.60	A	I	24.945	0.80	0.643	1.41	B	EL	30.402		
		SNAGGRS4	34.925	--	1.20	41.785	1.4	0.674	2.34	C	I	17.822	0.748	2.45	A	I	24.945	0.80	0.643	1.20	B	EL	30.402		
		SNS5A	35.550	--	1.17	41.547	1.4	0.674	2.27	C	I	17.822	0.748	2.66	A	I	24.945	0.80	0.643	1.17	B	EL	30.402		
		SNS6A	39.950	--	1.08	43.150	1.4	0.674	2.18	C	I	17.822	0.748	2.56	A	I	24.945	0.80	0.643	1.08	B	EL	30.402		
		SNS7B	42.000	--	1.03	43.213	1.4	0.674	2.08	C	I	17.822	0.748	2.65	A	I	24.945	0.80	0.643	1.03	B	EL	30.402		
	TTST	TNAGRIT3	33.000	--	1.32	43.542	1.4	0.674	2.69	C	I	17.822	0.748	2.95	A	I	24.945	0.80	0.643	1.32	B	EL	30.402		
		TNT4A	33.075	--	1.33	43.905	1.4	0.674	2.72	C	I	17.822	0.748	2.71	A	I	24.945	0.80	0.643	1.33	B	EL	30.402		
		TNT6A	41.600	--	1.09	45.468	1.4	0.674	2.34	C	I	17.822	0.748	2.63	A	I	24.945	0.80	0.643	1.09	B	EL	30.402		
		TNT7A	42.000	--	1.10	46.307	1.4	0.674	2.41	C	I	17.822	0.748	2.57	A	I	24.945	0.80	0.643	1.10	B	EL	30.402		
		TNT7B	42.000	--	1.15	48.339	1.4	0.674	2.40	C	I	17.822	0.748	2.47	A	I	24.945	0.80	0.643	1.15	B	EL	30.402		
		TNAGRIT4	43.000	--	1.09	46.750	1.4	0.674	2.37	C	I	21.386	0.748	2.40	A	I	24.945	0.80	0.643	1.09	B	EL	30.402		
		TNAGT5A	45.000	--	1.02	45.970	1.4	0.674	2.21	C	I	17.822	0.748	2.58	A	I	24.945	0.80	0.643	1.02	B	EL	30.402		
		TNAGT5B	45.000	3	1.01	45.274	1.4	0.674	2.14	C	I	17.822	0.748	2.25	A	I	24.945	0.80	0.643	1.01	B	EL	30.402		

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

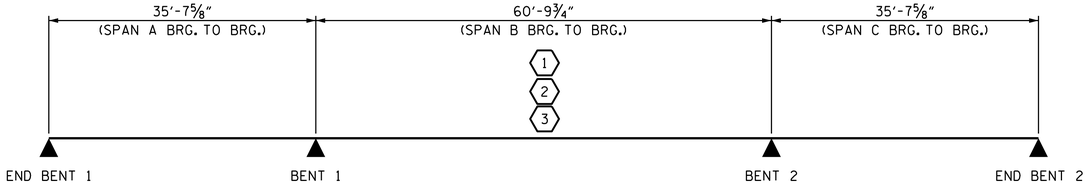
⬡ CONTROLLING LOAD RATING

1. DESIGN LOAD RATING (HL-93)
2. DESIGN LOAD RATING (HS-20)
3. LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
(WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-5
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. LRFR1

DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE : 7/31/17

ASSEMBLED BY : P. K. NEWTON DATE : 7/25/17
CHECKED BY : A. K. PATEL DATE : 7/28/17

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM

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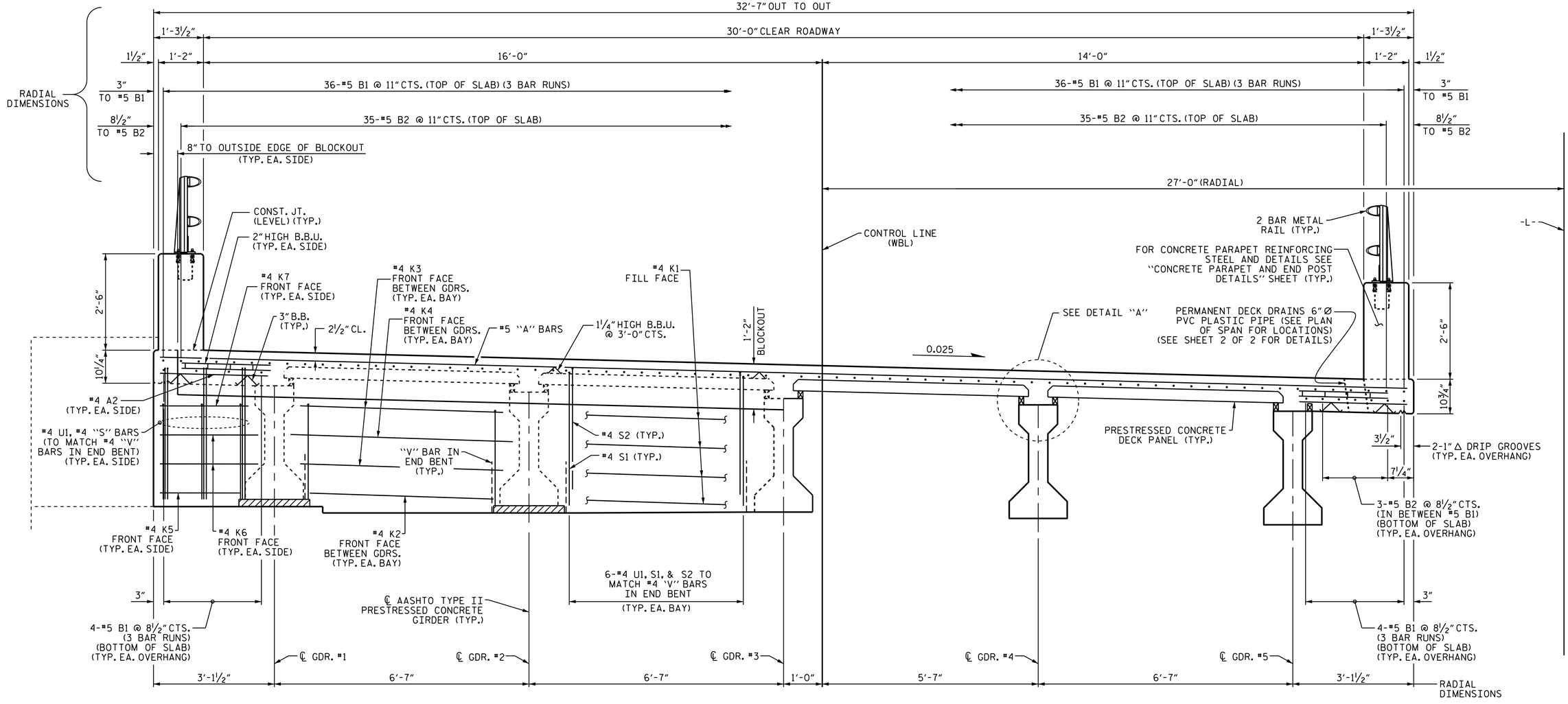
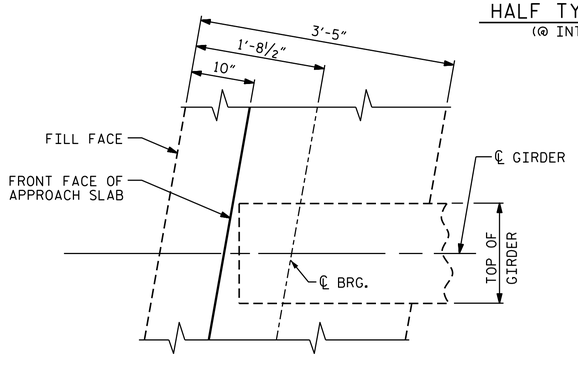


HALF TYPICAL SECTION
(@ INTEGRAL END BENT)

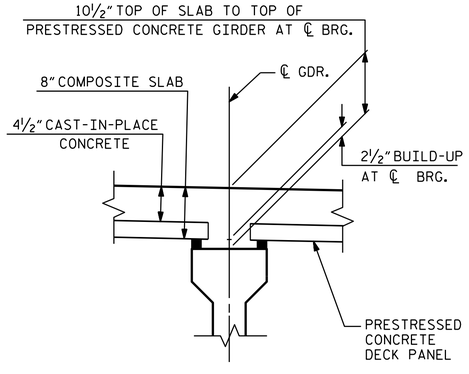
TYPICAL SECTION

HALF TYPICAL SECTION
(@ LINK SLAB--OVER BENTS)



PLAN OF GIRDER AT INTEGRAL END BENT

INTEGRAL END BENT DETAIL



DETAIL "A"

NOTES:

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

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

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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FE39D1431B407... 8/16/2021

DRAWN BY : WFP / QTN / MKB DATE : 7/29/21
CHECKED BY : D.R. SHACKELFORD DATE : 7/30/21
DESIGN ENGINEER OF RECORD: P.K. NEWTON DATE : 8/2/21

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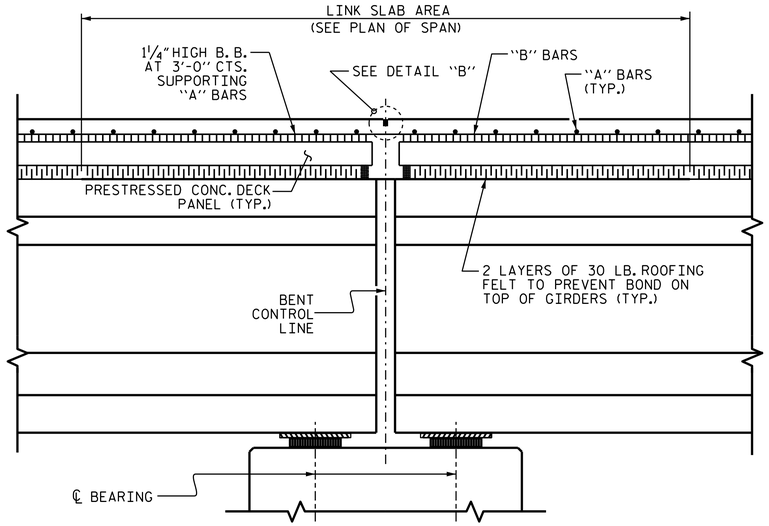
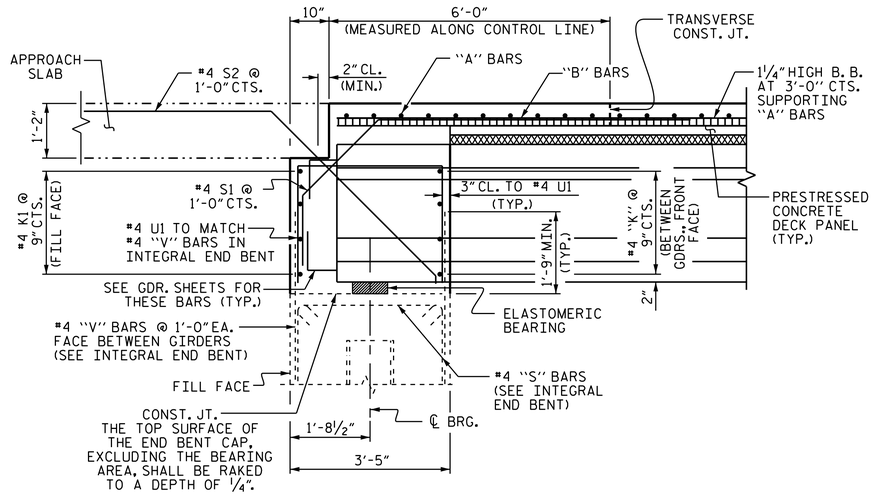
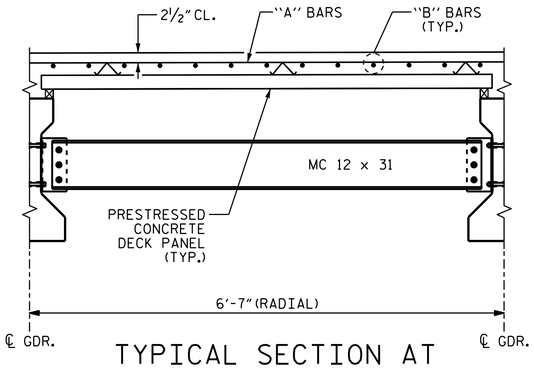


SECTION @ LINK SLAB

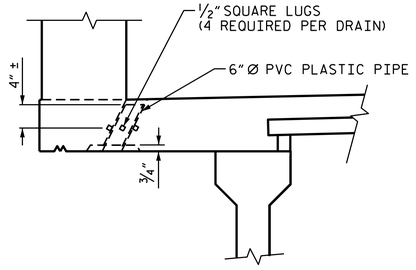


END OF GIRDER DETAIL AT INTEGRAL END BENT

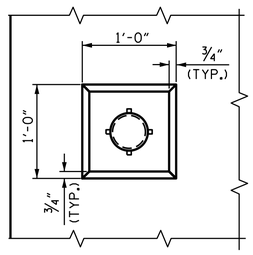


TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

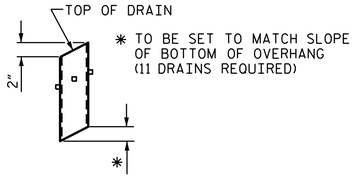
(TYP. EA. BAY IN SPAN B)



ELEVATION



PLAN OF RECESS



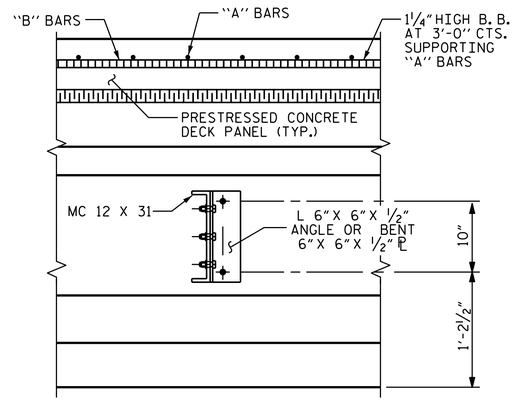
PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET ⅜" BELOW SURFACE OF SLAB.

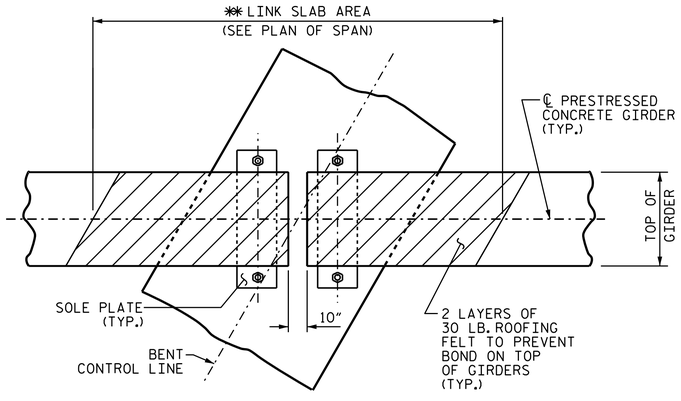
4 - ½" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS

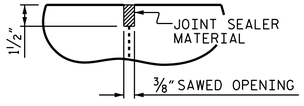


SECTION AT INTERMEDIATE DIAPHRAGM



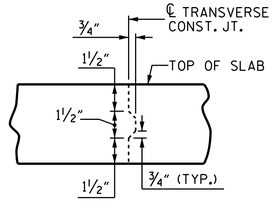
PLAN OF LINK SLAB

** THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.



DETAIL "B"

A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT THE BENT CONTROL LINE SHALL BE SAWED WITHIN 24 HOURS OF POURING THE LINK SLAB DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-7
1			3			TOTAL SHEETS
2			4			38

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DRAWN BY : WFP / OTN / MKB DATE : 7/29/21
CHECKED BY : D. R. SHACKELFORD DATE : 7/30/21
DESIGN ENGINEER OF RECORD: P.K. NEWTON DATE : 8/2/21

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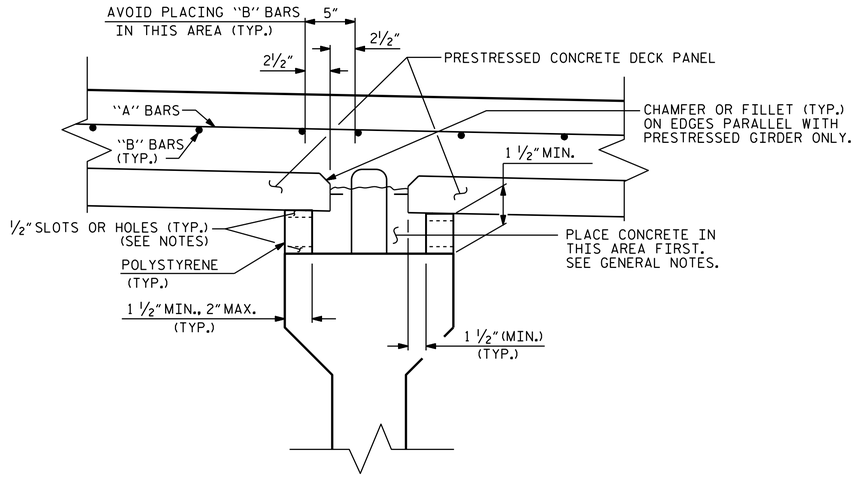
STR. #1

DECK PANEL SUPPORTS

THE CONTRACTOR SHALL PROVIDE THE DECK PANEL SUPPORT SYSTEM SHOWN OR HE MAY SUBMIT A DECK PANEL SUPPORT SYSTEM OF HIS OWN DESIGN TO THE ENGINEER FOR APPROVAL.

POLYSTYRENE SUPPORT SYSTEM

1. ALL POLYSTYRENE SHALL BE DOW STYROFOAM 60 HIGH-LOAD, UC INDUSTRIES FOAMULAR 600 OR APPROVED EQUAL.
2. THE POLYSTYRENE SUPPORT SYSTEM SHALL CONSIST OF ONE LAYER WITH A MINIMUM WIDTH OF 1½" AND A MAXIMUM WIDTH OF 2". THE POLYSTYRENE SHALL HAVE ½" X ½" WIDE SLOTS OR ½" DIAMETER HOLES AT 4'-0" CENTERS STAGGERED ALONG THE TOP AND BOTTOM.
3. THE POLYSTYRENE MAY BE CUT AND PLACED ON EDGE AS NECESSARY TO MATCH THE REQUIRED BUILDUP PROFILE ALONG THE GIRDER.
4. ADHESIVE, AS APPROVED BY THE ENGINEER, SHALL BE APPLIED TO THE TOP OF THE GIRDER IN A CONTINUOUS BEAD AND IN SUFFICIENT AMOUNT TO PREVENT THE POLYSTYRENE FROM BLOWING OUT AND TO PREVENT GAPS FROM FORMING BETWEEN THE POLYSTYRENE AND THE GIRDER. PRIOR TO PLACEMENT OF THE DECK PANELS, THE ADHESIVE SHALL ALSO BE APPLIED TO THE TOP OF THE POLYSTYRENE.
5. CONCRETE-FILLED BUCKETS, STACKS OF DECK PANELS, BUNDLED REINFORCING BARS OR OTHER HEAVY CONCENTRATED LOADS WILL NOT BE PERMITTED ON THE DECK PANEL ONCE THE PANEL HAS BEEN PLACED ON THE POLYSTYRENE SUPPORT SYSTEM.



POLYSTYRENE SUPPORT

GENERAL NOTES

1. THE DESIGN COMPRESSIVE STRENGTH (f'c) FOR THE CONCRETE IN PRESTRESSED PANELS SHALL BE 5000 PSI MINIMUM AT 28 DAYS. COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS SHALL BE 4000 PSI MINIMUM.
2. THE PRECAST PRESTRESSED PANEL SHALL HAVE A THICKNESS OF 3 ½" WITH THE PRESTRESSED STRANDS LOCATED AT HALF THE DEPTH OF THE PANEL.
3. FOR SKEWED SPANS, TRAPEZOIDAL CLOSURE PANELS SHALL HAVE A MINIMUM WIDTH OF 2 FEET ON THE SHORT SIDE.
4. ALL PRESTRESSING STRANDS SHALL EXTEND 2" BEYOND THE PANEL EDGES.
5. SHEAR REINFORCING OF 0.60 SQ. INCHES OF REINFORCING STEEL PER 10 SQ. FEET OF PANEL SURFACE SHALL BE PROVIDED IN THE PANEL TO ENSURE COMPOSITE ACTION BETWEEN PANEL AND THE CAST-IN-PLACE CONCRETE. SHEAR REINFORCEMENT SHALL BE MADE OF WELDED WIRE HAVING A MINIMUM YIELD STRENGTH OF 60 KSI.
6. SHEAR REINFORCEMENT AND LIFTING DEVICES SHALL BE CONSTRUCTED AND PLACED SO AS TO AVOID ANY INTERFERENCE WITH REINFORCING STEEL IN THE CAST-IN-PLACE DECK SLAB AND TO ALLOW FOR PROPER CONCRETE CONSOLIDATION IN THE DECK PANEL.
7. SHIFT LONGITUDINAL "B" BARS AS NECESSARY TO OBTAIN A MINIMUM CLEAR DISTANCE OF 2 ½" TO THE RIGHT OR LEFT OF THE EDGE OF THE DECK PANEL. IF, IN SHIFTING TO OBTAIN THIS CLEARANCE, THE "B" BAR INTERFERES WITH THE STIRRUP IN THE TOP OF THE GIRDER THE "B" BAR MAY BE ELIMINATED.
8. WHEN CASTING THE DECK, PLACE CONCRETE FIRST OVER THE GIRDERS IN CONTINUOUS STRIPS A MINIMUM OF THREE PANEL LENGTHS AHEAD OF THE REST OF THE CONCRETE. CAREFULLY VIBRATE THE CONCRETE OVER THE GIRDERS SO THAT CONCRETE COMPLETELY FILLS THE AREA UNDER THE DECK PANEL OVERHANGS. THEN PLACE AND VIBRATE THE REMAINING DECK CONCRETE.
9. PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.
10. PRECAST PANELS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
11. ALL BAR SUPPORTS AND INCIDENTAL REINFORCING STEEL USED IN THE PRECAST PANELS SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRECAST PRESTRESSED CONCRETE DECK PANELS (WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-8
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. PDP1

ASSEMBLED BY : WFP / OTN	DATE : 8/14/18	
CHECKED BY : M. K. BEARD	DATE : 11/18	
DRAWN BY : ELR 1/92	REV. 5/1/06R	TLA/GM
CHECKED BY : GRP 4/92	REV. 10/1/11	MAA/GM
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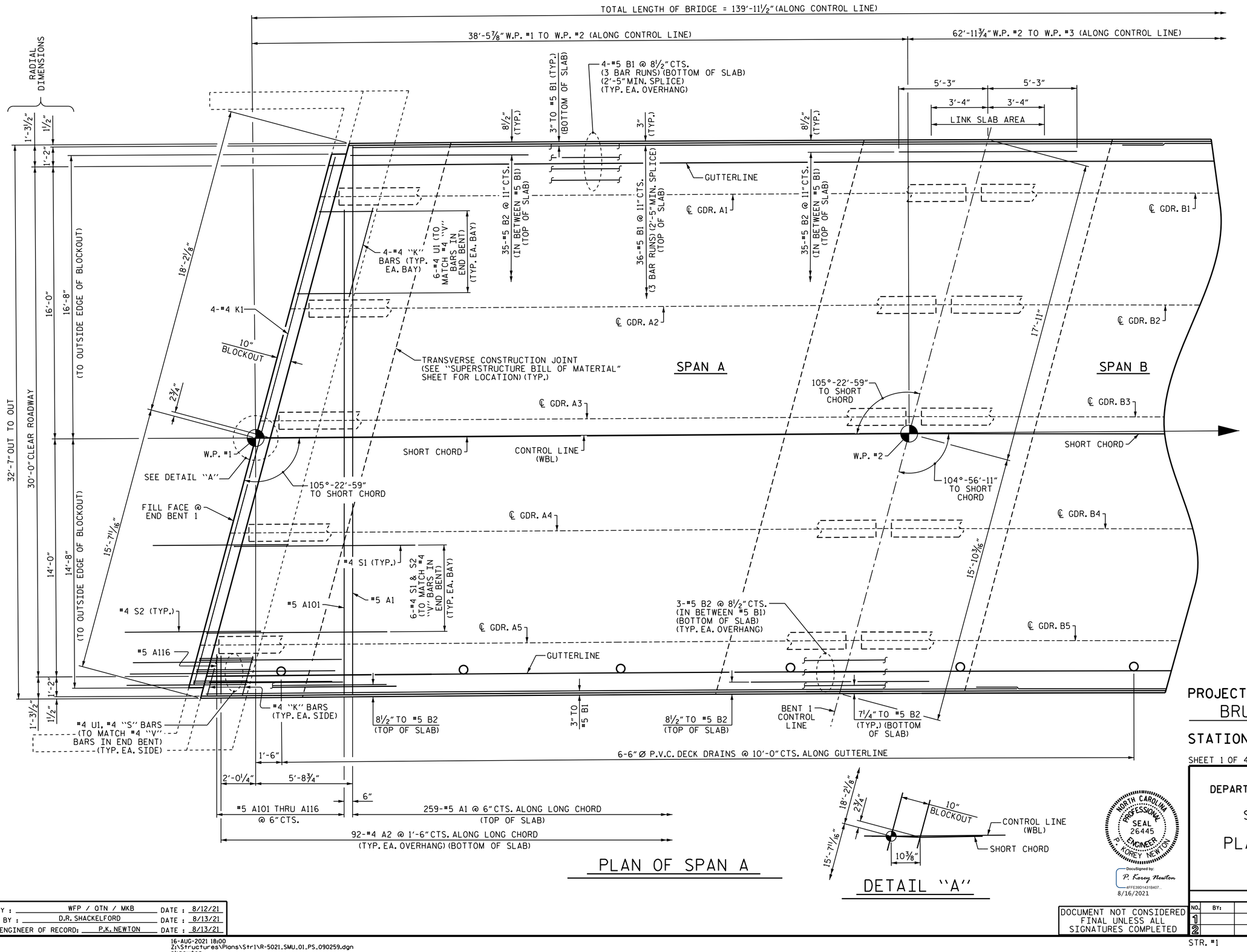

PLAN OF SPAN A

DETAIL "A"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-9
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : WFP / OTN / MKB DATE : 8/12/21
CHECKED BY : D.R. SHACKELFORD DATE : 8/13/21
DESIGN ENGINEER OF RECORD: P.K. NEWTON DATE : 8/13/21

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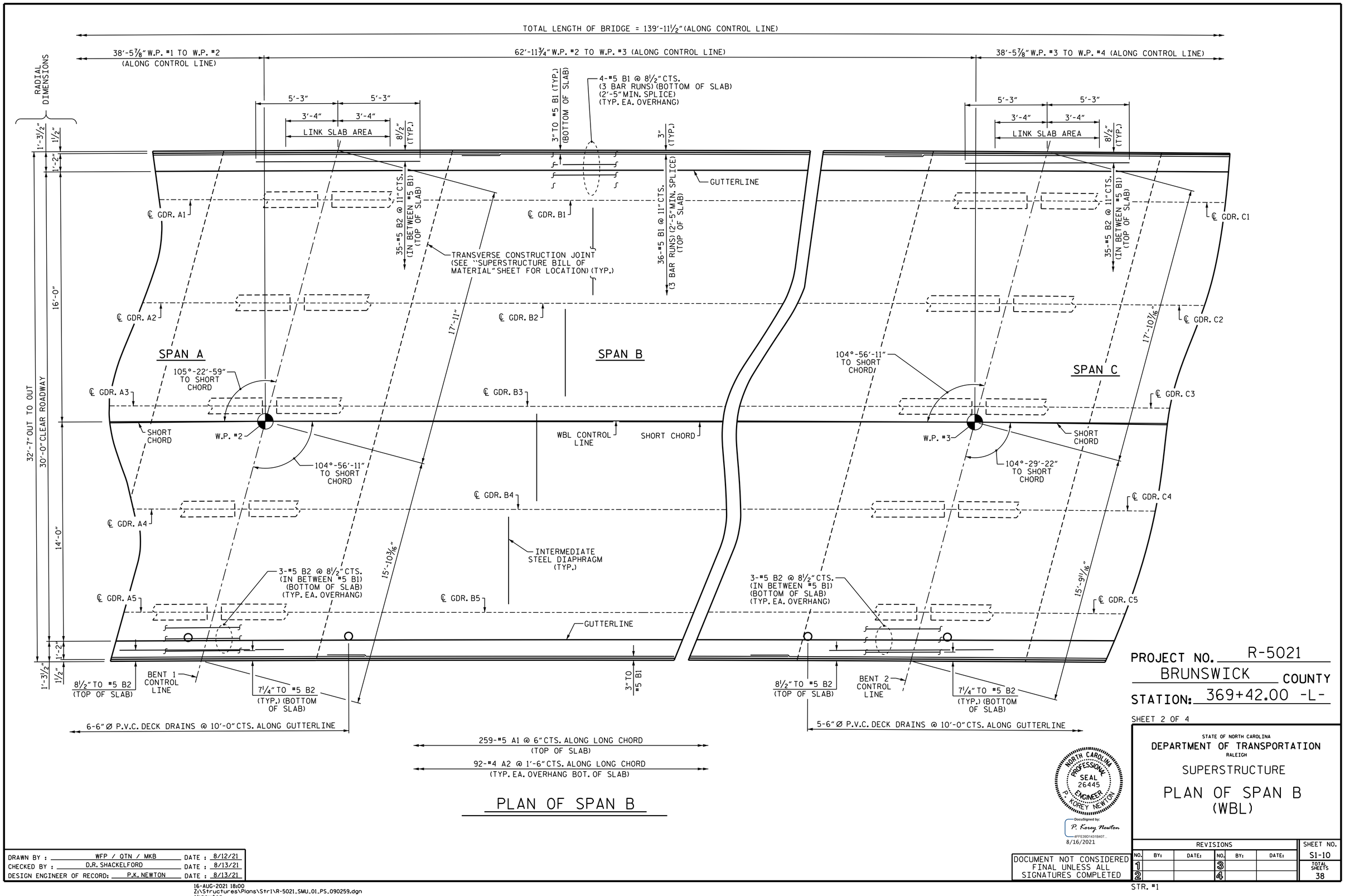
STR. #1



PLAN OF SPAN B

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FE39D1431B407...
8/16/2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
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DESIGN ENGINEER OF RECORD: P.K. NEWTON DATE : 8/13/21

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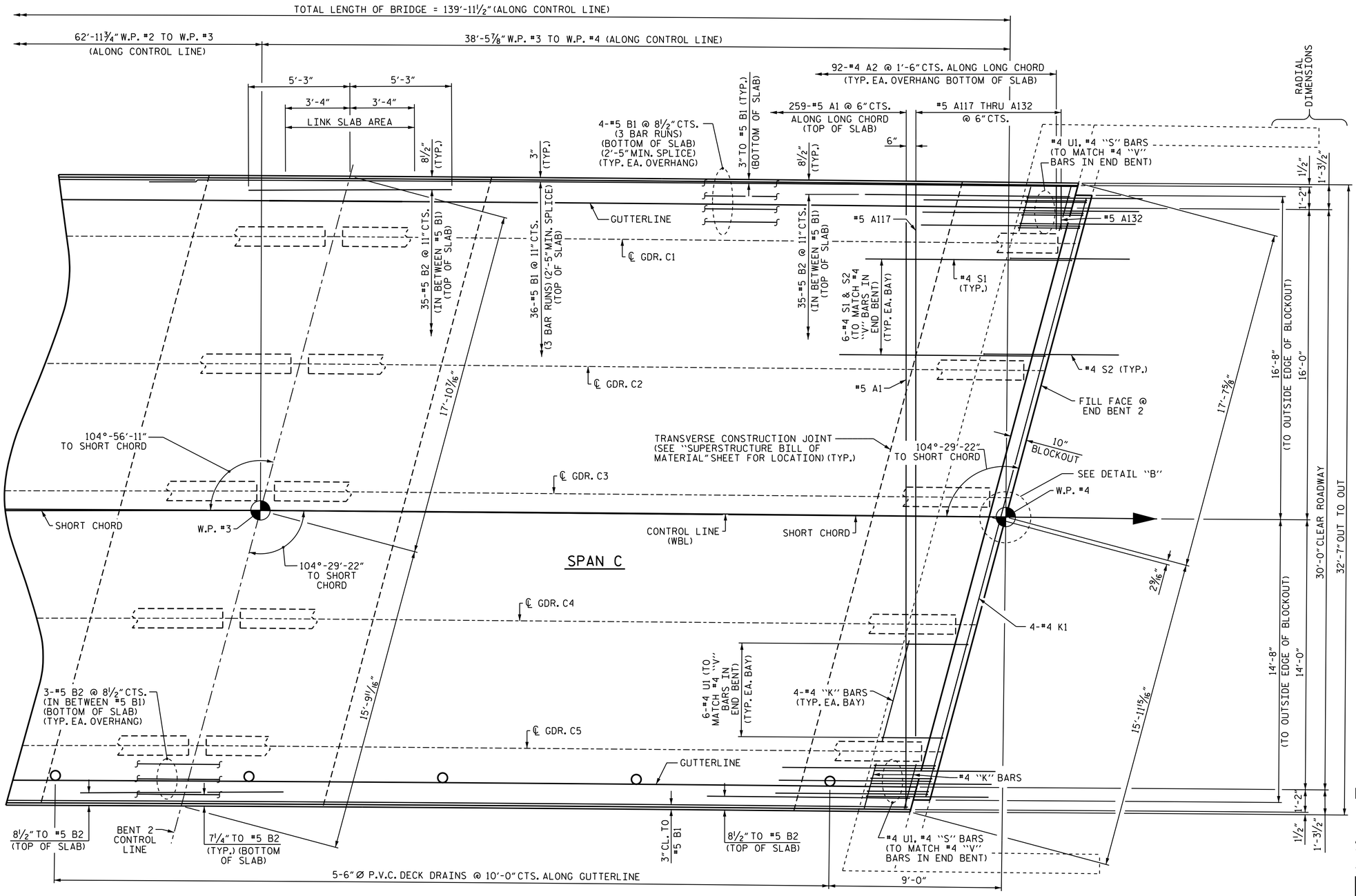
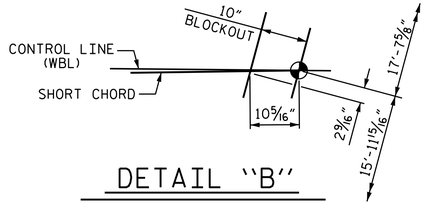
STR. #1



PLAN OF SPAN C



DETAIL "B"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

DRAWN BY : WFP / OTN / MKB DATE : 8/12/21
CHECKED BY : D.R. SHACKELFORD DATE : 8/13/21
DESIGN ENGINEER OF RECORD: P.K. NEWTON DATE : 8/13/21

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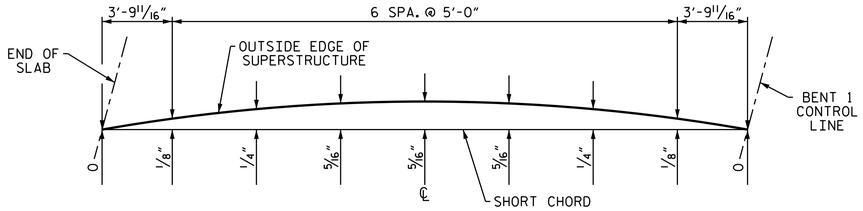
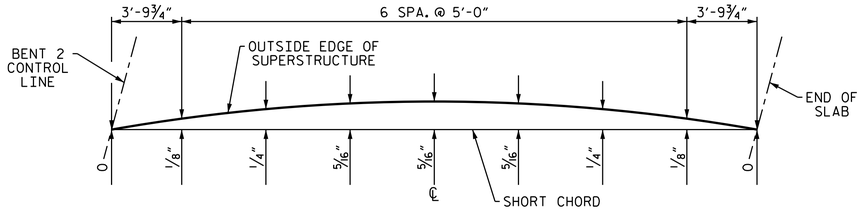
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			38

STR. #1



LEFT SIDE - SPAN A



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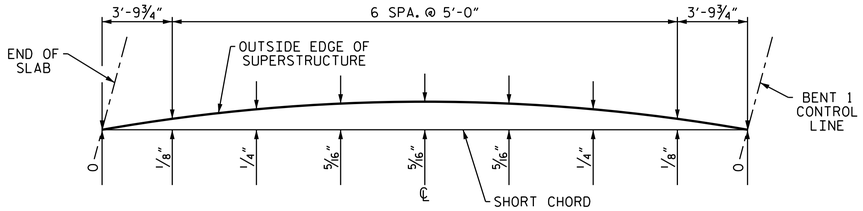
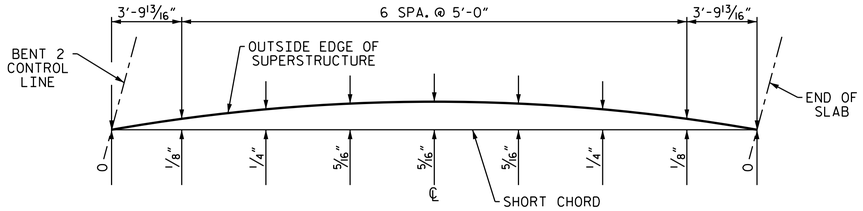


RIGHT SIDE - SPAN A



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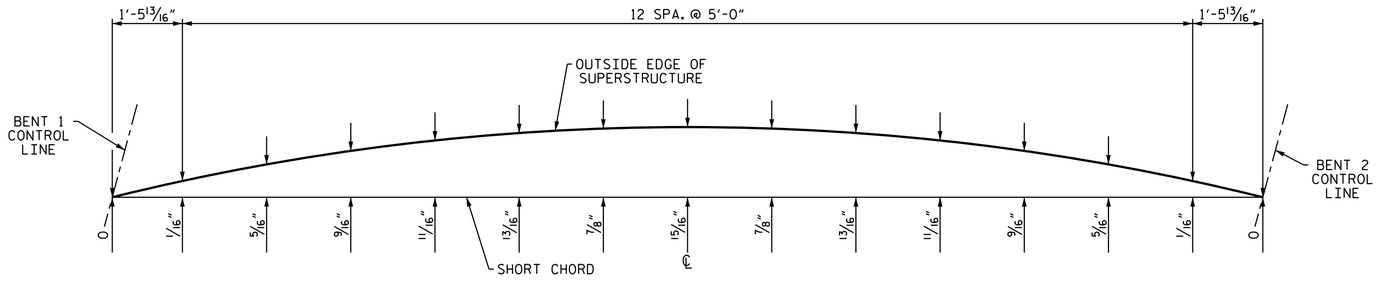
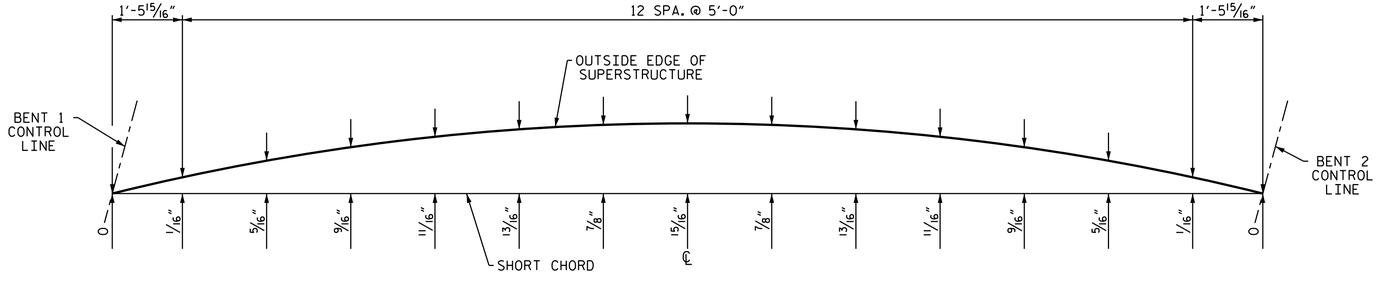


LEFT SIDE - SPAN B



RIGHT SIDE - SPAN B

ARC OFFSETS

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
ARC OFFSETS
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

Docusigned by:
P. Korey Newton
1/20/2019

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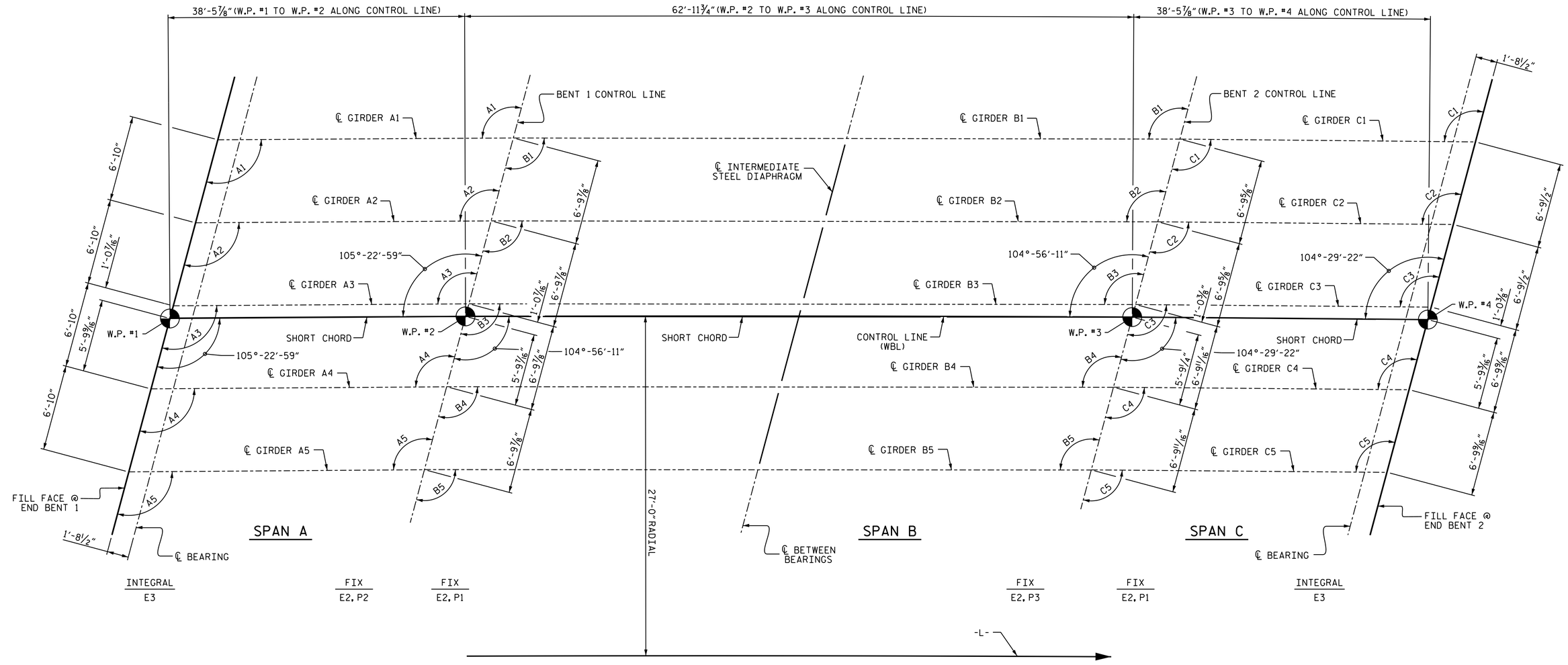

FRAMING PLAN

SKEW ANGLES					
SPAN A		SPAN B		SPAN C	
A1	105°-20'-56"	B1	104°-54'-11"	C1	104°-27'-27"
A2	105°-21'-53"	B2	104°-55'-07"	C2	104°-28'-20"
A3	105°-22'-50"	B3	104°-56'-02"	C3	104°-29'-14"
A4	105°-23'-48"	B4	104°-56'-58"	C4	104°-30'-08"
A5	105°-24'-45"	B5	104°-57'-54"	C5	104°-31'-02"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
(WBL)

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1			3			TOTAL SHEETS
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STR. #1

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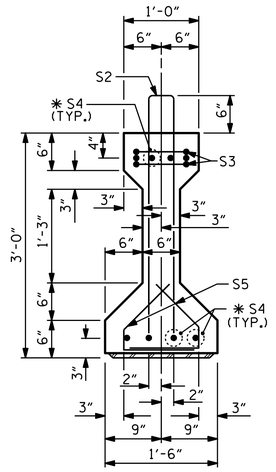
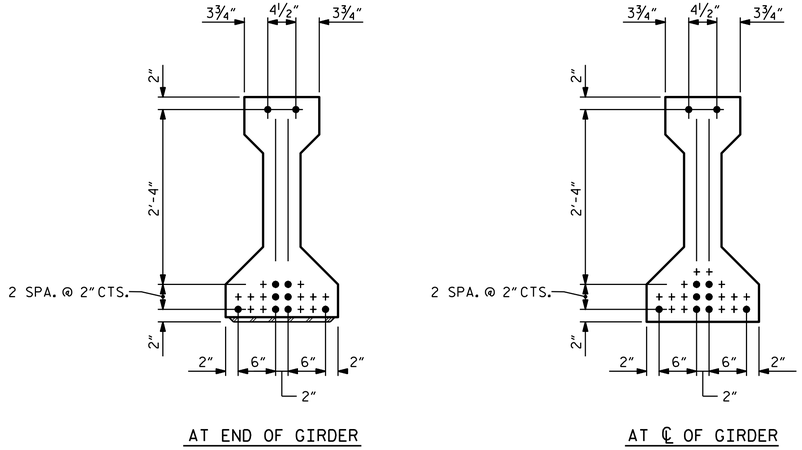
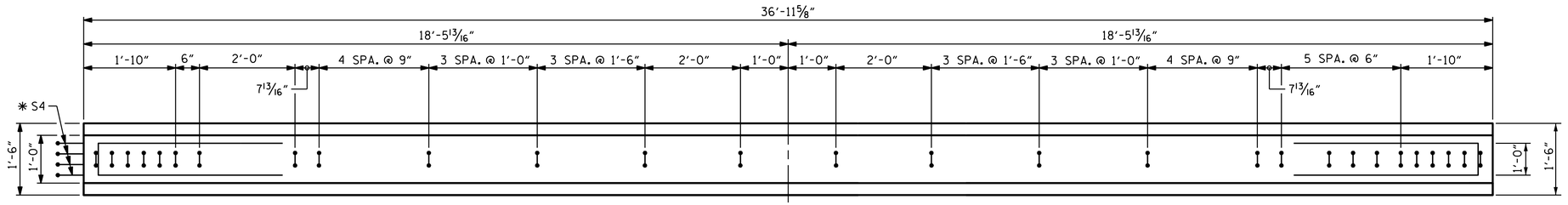


SECTION A-A

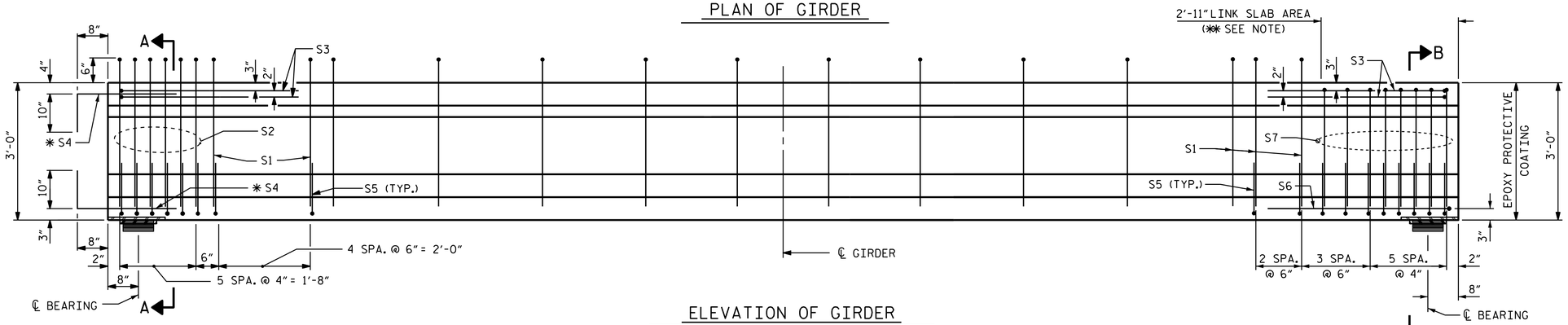
SECTION B-B



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



INTEGRAL END BENT

ELEVATION OF GIRDER

SPAN A SHOWN, SPAN C SIMILAR BY ROTATION

FIX

✱✱ THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.

0.6" Ø L. R. GRADE 270 STRANDS

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

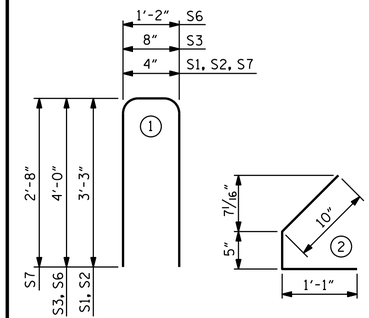
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	32	#4	1	6'-10"	146
S2	6	#5	1	6'-10"	43
S3	4	#4	1	8'-8"	23
✱S4	8	#5	STR	3'-8"	31
S5	44	#4	2	2'-4"	69
S6	1	#4	1	9'-2"	6
S7	8	#5	1	5'-8"	47

✱NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	5000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
PER GIRDER	365	3.5	10

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	5	36'-11⅝"	184.84'
SPAN C	5	36'-11⅝"	184.84'

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE II PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN A & C (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

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STR. #1

STD. NO. PCG4

ASSEMBLED BY : OTN / PKN	DATE : 7/29/21
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DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMC
	REV. 12/17 MAA/THC

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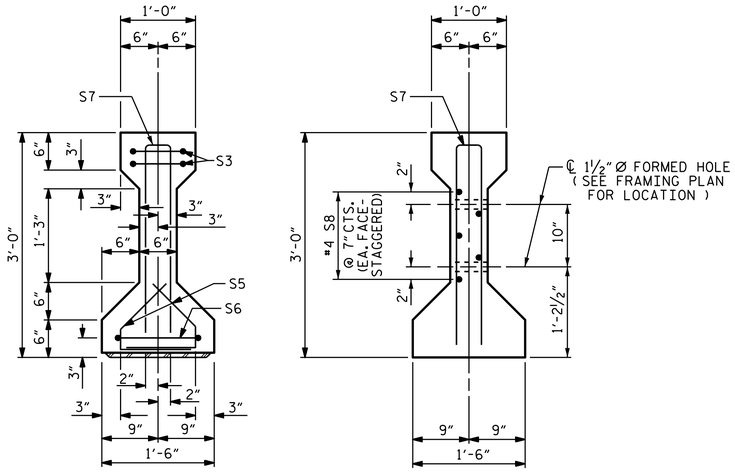
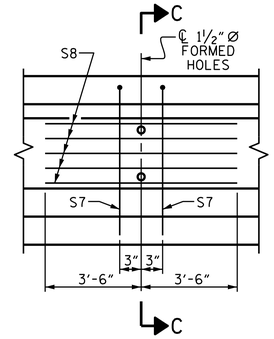


SECTION B-B

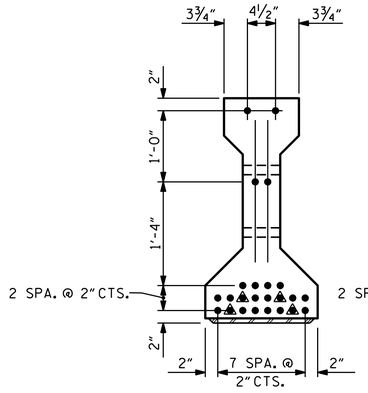
SECTION C-C

(S1 BARS NOT SHOWN)

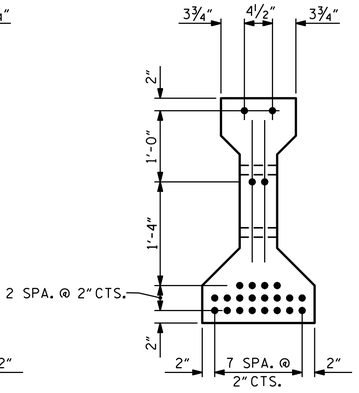


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR ALL GIRDERS



AT END OF GIRDER



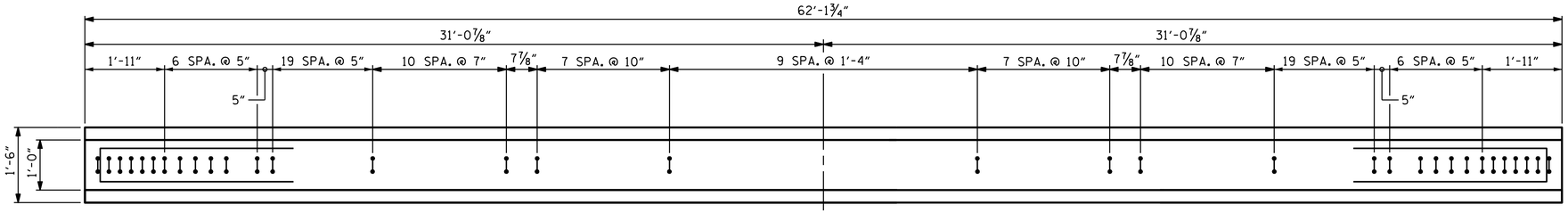
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

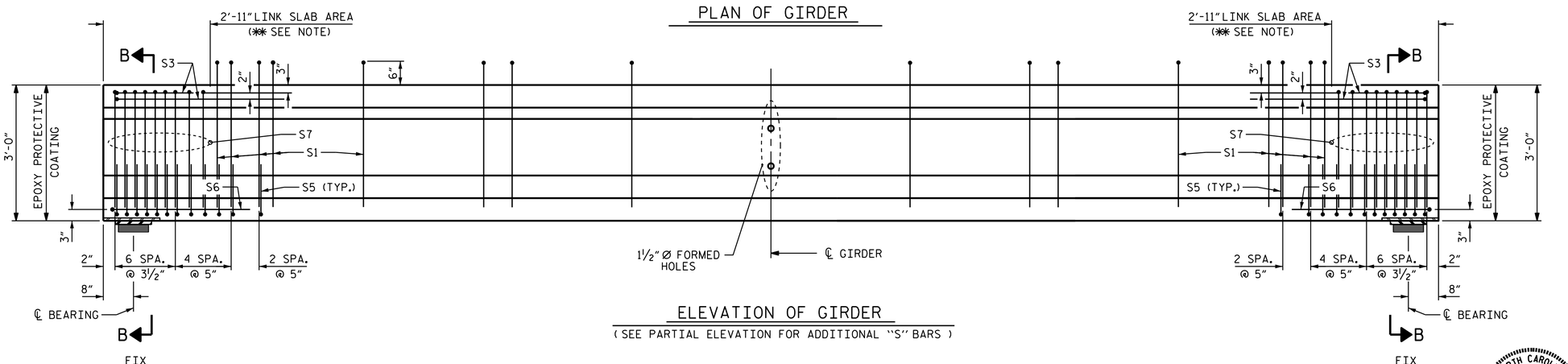
(24 STRANDS)

● = FULLY BONDED

▲ = STRANDS DEBONDED FOR 13'-0" FROM END OF GIRDER



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

✱✱ THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.

0.6" Ø L. R. GRADE 270 STRANDS

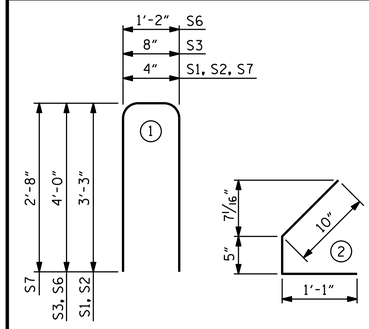
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	92	#4	1	6'-10"	420
S3	4	#4	1	8'-8"	23
S5	52	#4	2	2'-4"	81
S6	1	#4	1	9'-2"	6
S7	20	#5	STR	5'-8"	118
S8	5	#4	STR	7'-0"	23

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
PER GIRDER	671	5.9	24

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN B	5	62'-1¾"	310.73'

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE II
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

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STR. #1

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ASSEMBLED BY : OTN / PKN	DATE : 7/29/21	
CHECKED BY : D. SHACKELFORD	DATE : __/__/__	
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	REV. 12/17	MAA/THC

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

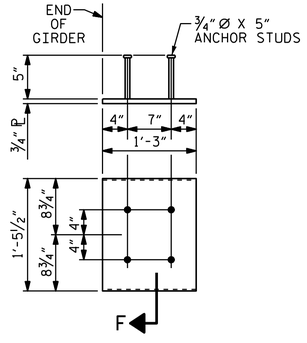
SPANS A & C											
0.6"Ø LOW RELAXATION	GIRDERS 1 & 5										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.010	0.019	0.026	0.031	0.033	0.031	0.026	0.019	0.010	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/16"	0

SPANS A & C											
0.6"Ø LOW RELAXATION	GIRDERS 2 - 4										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.010	0.019	0.026	0.031	0.033	0.031	0.026	0.019	0.010	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.004	0.007	0.010	0.012	0.012	0.012	0.010	0.007	0.004	0
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/16"	0

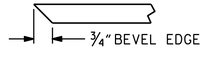
SPAN B											
0.6"Ø LOW RELAXATION	GIRDERS 1 & 5										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.049	0.093	0.127	0.149	0.157	0.149	0.127	0.093	0.049	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.026	0.048	0.066	0.077	0.081	0.077	0.066	0.048	0.026	0
FINAL CAMBER ↑	0	5/16"	9/16"	3/4"	7/8"	7/8"	7/8"	3/4"	9/16"	5/16"	0

SPAN B											
0.6"Ø LOW RELAXATION	GIRDERS 2 - 4										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.049	0.093	0.127	0.149	0.157	0.149	0.127	0.093	0.049	0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.025	0.048	0.065	0.076	0.080	0.076	0.065	0.048	0.025	0
FINAL CAMBER ↑	0	5/16"	9/16"	3/4"	7/8"	15/16"	7/8"	3/4"	9/16"	5/16"	0

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



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



SECTION "F"
(SEE NOTES)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPANS A AND C, AND 7400 PSI FOR SPAN B.

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

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

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2			4		

SHEET NO. S1-16
TOTAL SHEETS 38

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CHECKED BY : M. K. BEARD	DATE : 11/18	
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	REV. 12/17	MAA/THC

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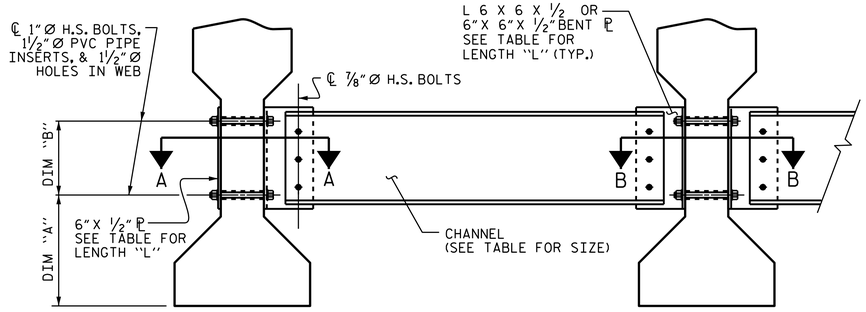
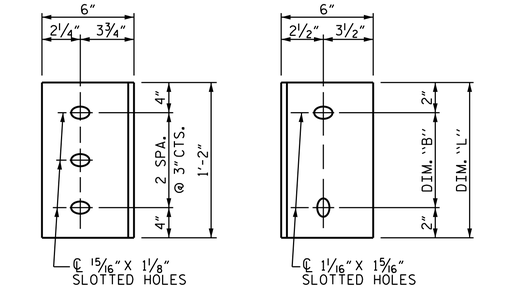
STR. #1

STD. NO. PCG9



PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPE II GIRDER SHOWN)



CONNECTOR PLATE DETAILS

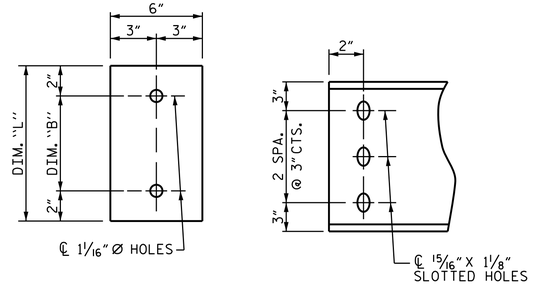


PLATE DETAILS CHANNEL END

(TYPE II GDR.)

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

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

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT PERCENT 1350 ALUMINUM (W-A1-1350) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL PLATES, BENT PLATES, CHANNELS, ANGLES, AND PLATE WASHERS IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

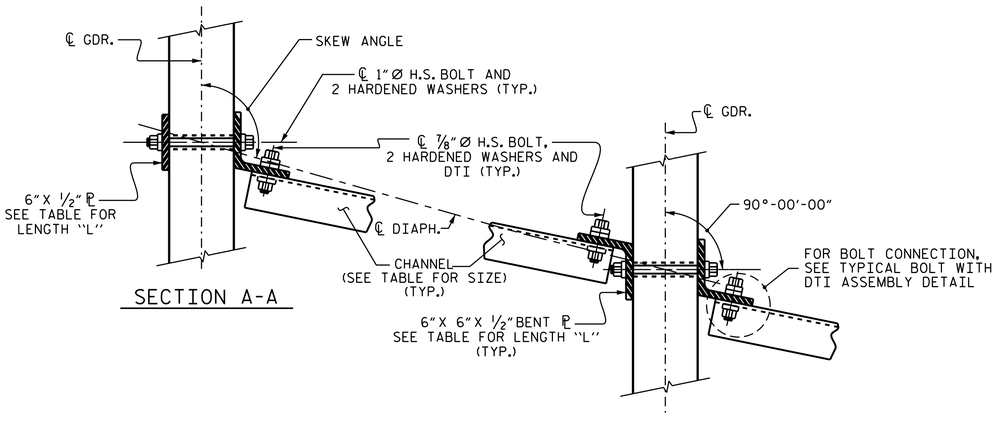
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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

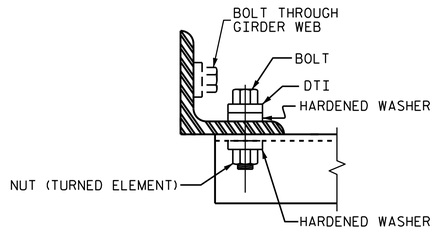
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
II	MC 12 x 31	1'-2½"	10"	1'-2"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE II PRESTRESSED CONCRETE GIRDERS (WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-17
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. PCG10

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ASSEMBLED BY :	WFP / QTN	DATE :	8/14/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DRAWN BY :	TLA 6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY :	VC 6/05	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC

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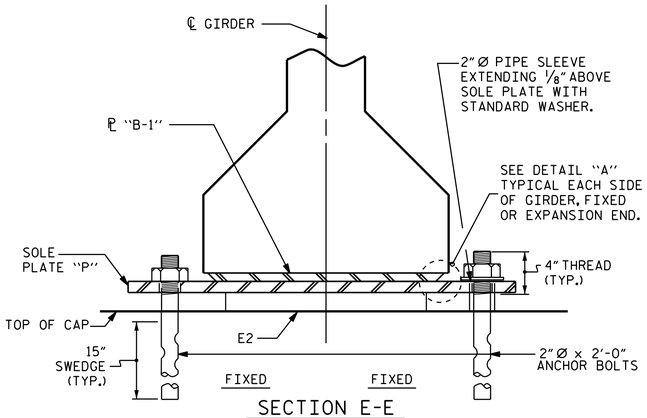
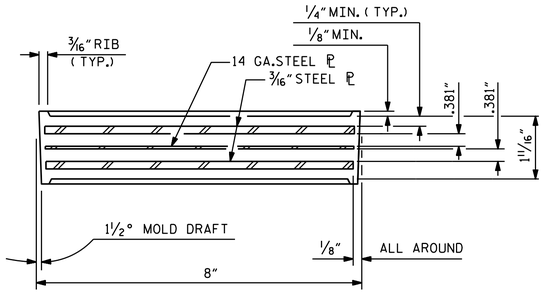
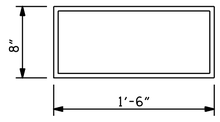


SECTION E-E



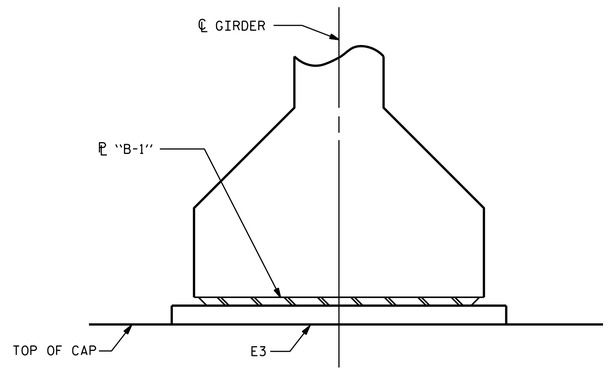
TYPICAL SECTION OF ELASTOMERIC BEARINGS



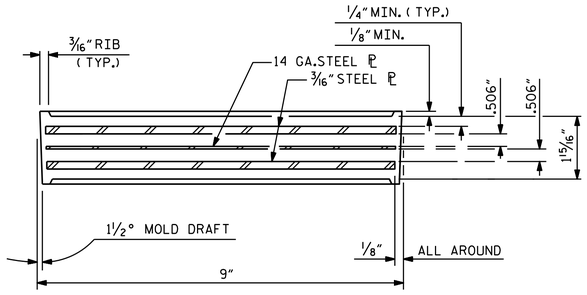
E2 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

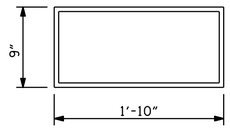
TYPE III



SECTION F-F



TYPICAL SECTION OF ELASTOMERIC BEARINGS

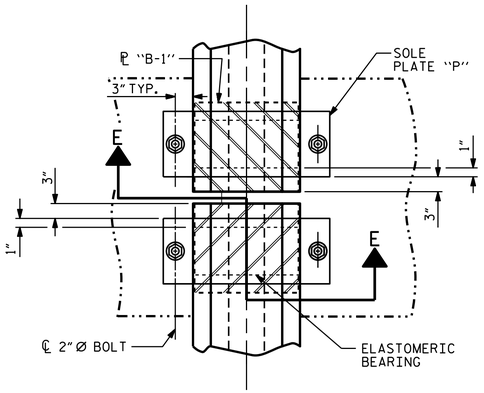


E3 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

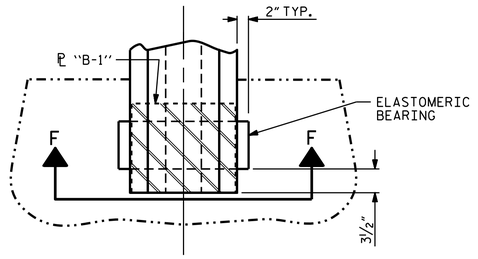
TYPE IV

(FOR INTEGRAL END BENTS ONLY)



TYPICAL HALF-PLAN

(SHOWING CONTINUOUS BENT)



TYPICAL HALF-PLAN

(SHOWING INTEGRAL END BENT)

NOTES

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

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

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

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

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

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

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

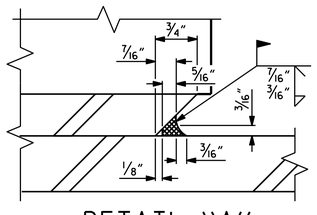
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

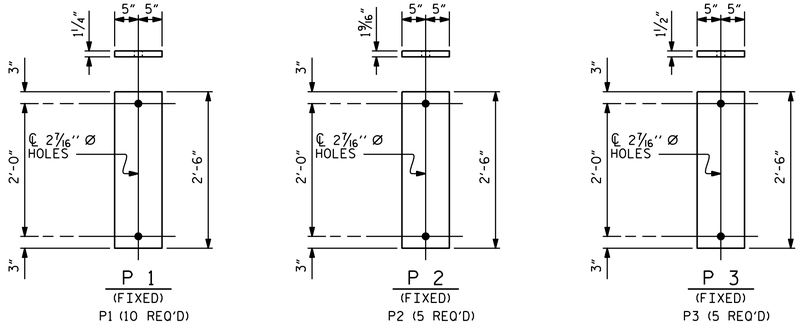
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k
TYPE IV	225 k



DETAIL "A"



P1 (10 REQ'D)

P2 (5 REQ'D)

P3 (5 REQ'D)

SOLE PLATE DETAILS ("P")

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KORREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
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ASSEMBLED BY :	WFP / QTN	DATE :	8/14/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DRAWN BY :	WJH 8/89	REV. 6/13	AAC/MAA
CHECKED BY :	CRK 8/89	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

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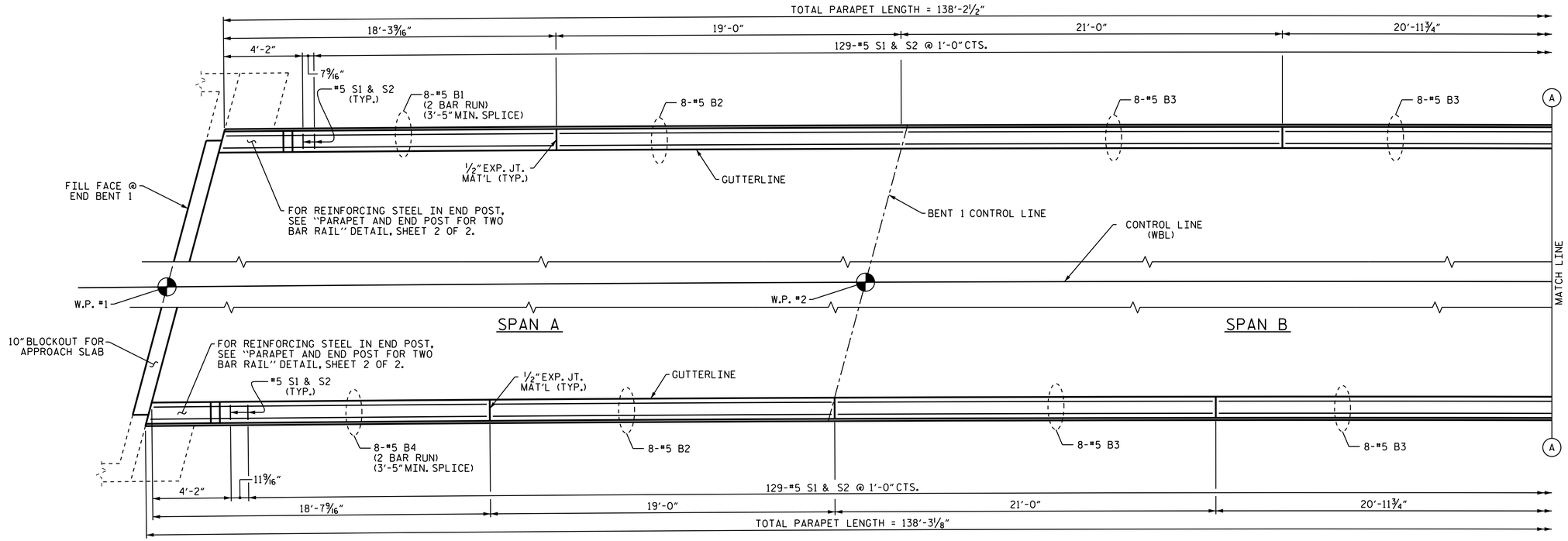
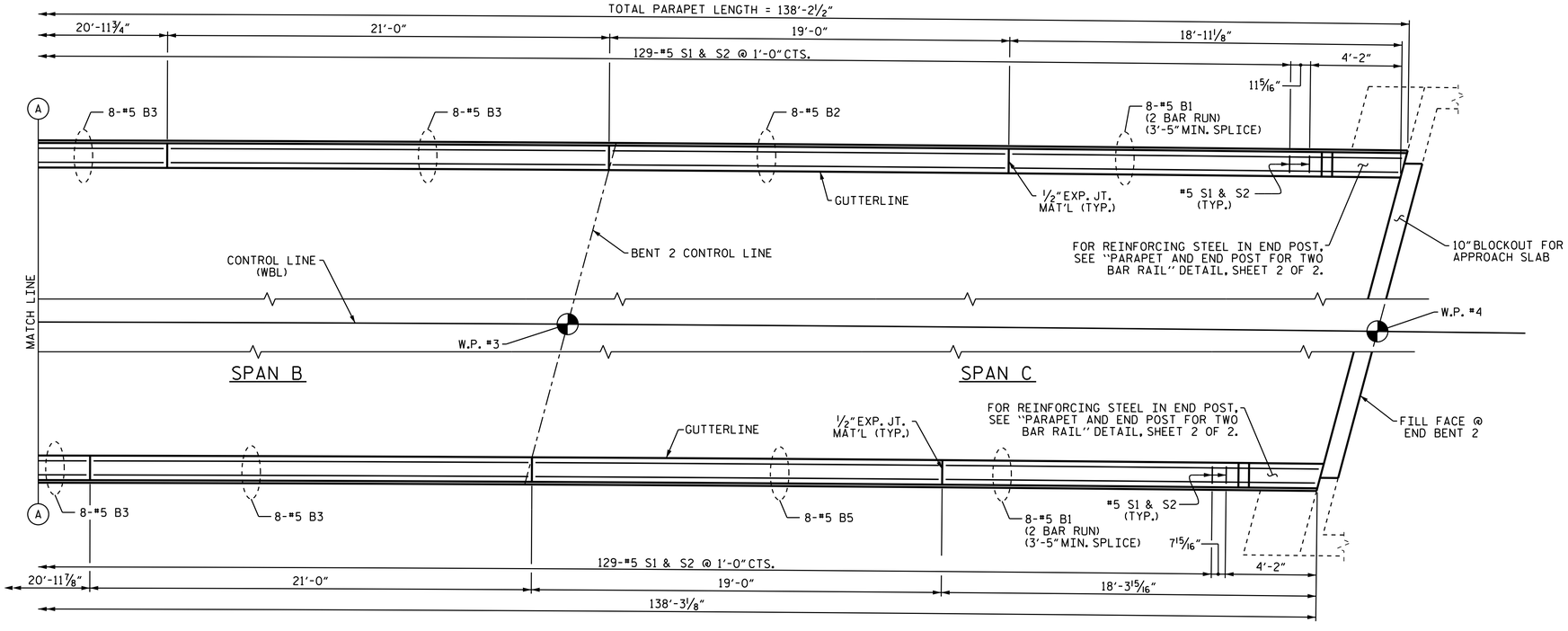
STR. #1

STD. NO. EB3





PLAN OF PARAPET

DIMENSIONS ARE ALONG OUTSIDE EDGE OF PARAPET

DRAWN BY : WFP / OTN DATE : 8/14/18
CHECKED BY : M. K. BEARD DATE : 11/18
DESIGN ENGINEER OF RECORD: A.K. PATEL DATE : 1/17/19

20-JAN-2019 22:04
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NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

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PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF PARAPET AND END POST DETAILS (WBL)

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			38

STR. #1

NOTES

THE PARAPET FOR ANY SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS REACHED A MINIMUM COMPRESIVE STRENGTH OF 3000 PSI.

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

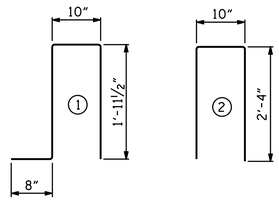
THE #5 S1 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½"EXPANSION JOINT MATERIAL IN THE PARAPET.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

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

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPE

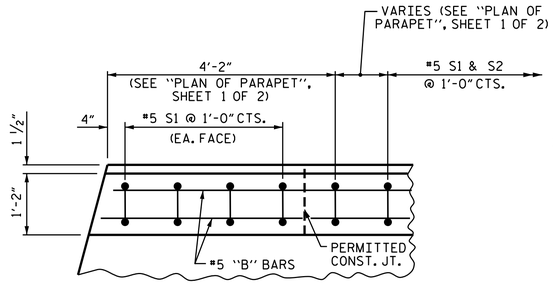


BAR DIMENSIONS ARE OUT TO OUT.

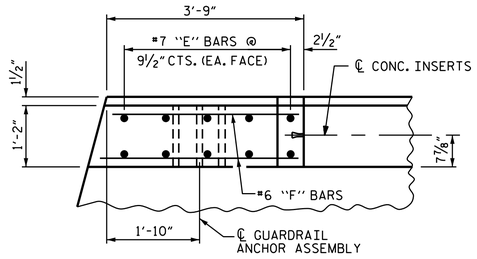
BILL OF MATERIAL FOR PARAPET & END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	64	#5	STR	11'-0"	734
✳B2	32	#5	STR	18'-7"	620
✳B3	48	#5	STR	20'-7"	1030
✳E1	8	#7	STR	2'-6"	41
✳E2	8	#7	STR	3'-0"	49
✳E3	8	#7	STR	3'-6"	57
✳E4	8	#7	STR	4'-0"	65
✳E5	8	#7	STR	4'-4"	71
✳F1	8	#6	STR	1'-11"	23
✳F2	8	#6	STR	3'-2"	38
✳F3	8	#6	STR	3'-6"	42
✳S1	278	#5	1	5'-5"	1571
✳S2	262	#5	2	5'-6"	1503

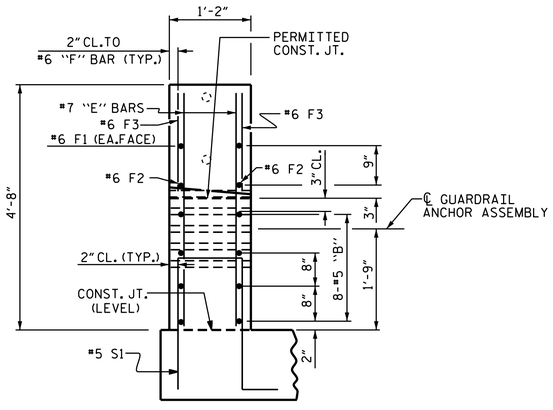
✳EPOXY COATED REINFORCING STEEL	5844	LBS.
CLASS AA CONCRETE	30.7	CU.YDS.
LENGTH OF CONCRETE PARAPET	276.47	LIN.FT.



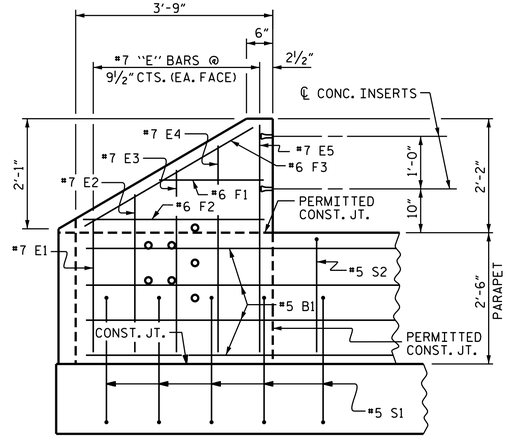
PLAN OF PARAPET



PLAN OF END POST

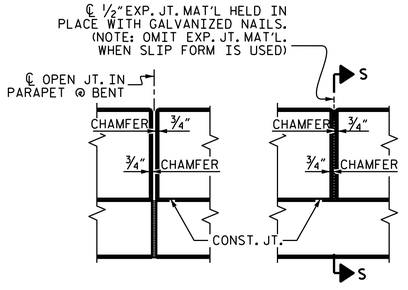


END VIEW

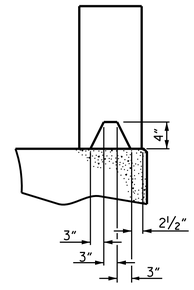


ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL



ELEVATION AT EXPANSION JOINTS



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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF PARAPET AND END POST DETAILS (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-20
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY :	WFP / OTN	DATE : 8/14/18
CHECKED BY :	M. K. BEARD	DATE : 11/18
DESIGN ENGINEER OF RECORD:	A.K. PATEL	DATE : 1/17/19

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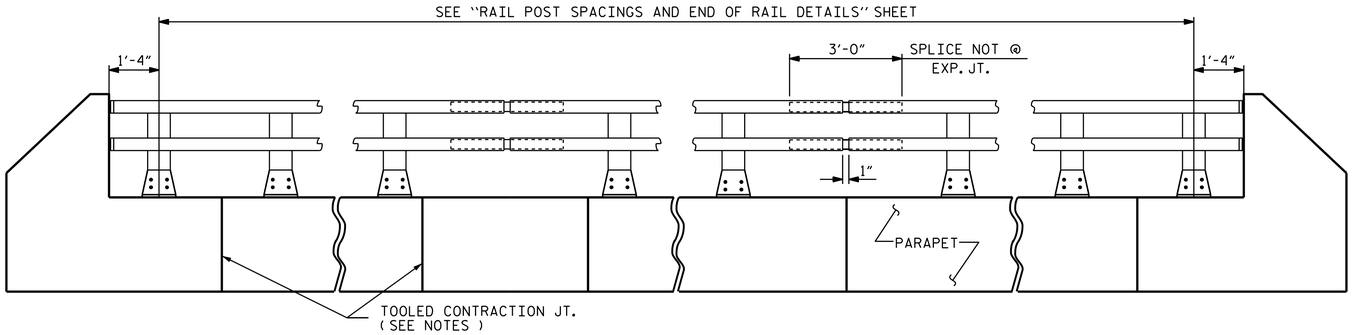
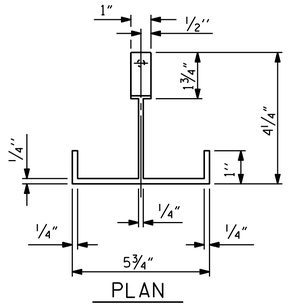
kalford

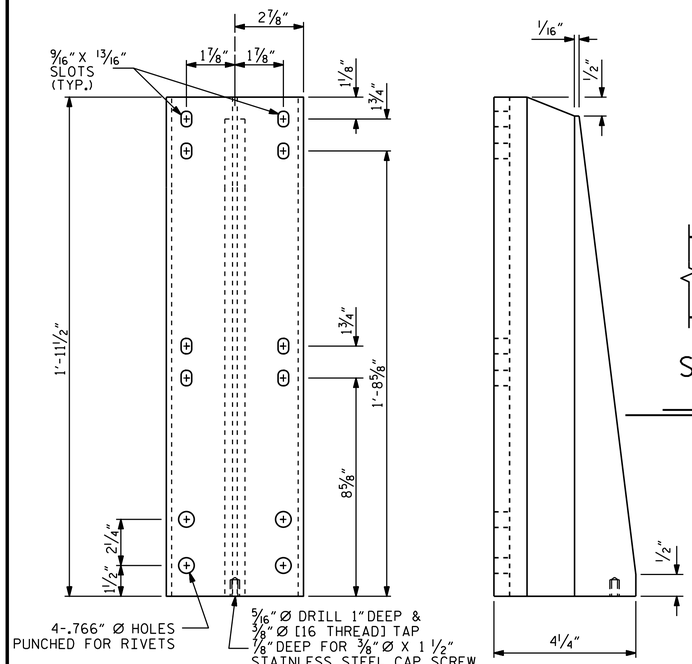


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



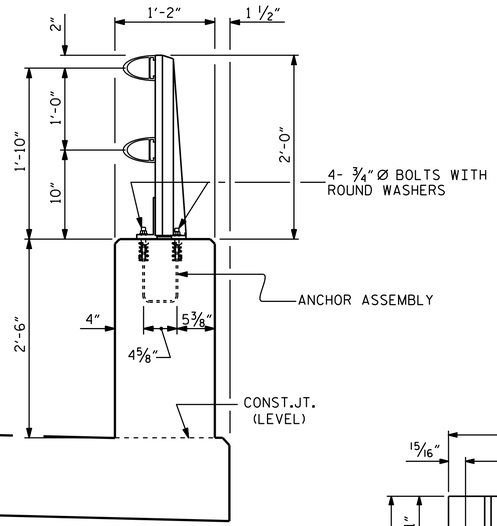
PLAN



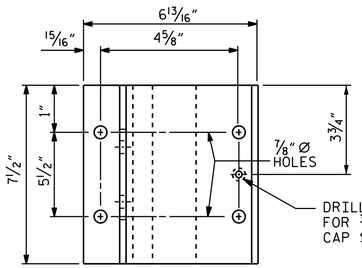
FRONT ELEVATION

SIDE ELEVATION

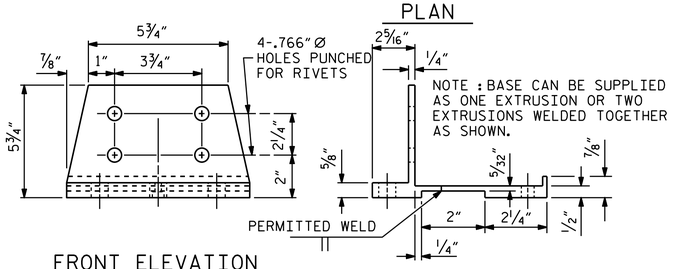
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



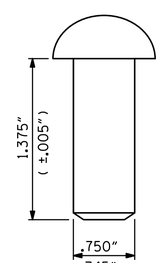
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

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

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFDBRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 260.84 LIN. FT.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

ASSEMBLED BY : WFP / QTN	DATE : 8/14/18
CHECKED BY : M. K. BEARD	DATE : 11/18
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS					
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2			4		

SHEET NO. S1-21

TOTAL SHEETS 38

STR. #1

STD. NO. BMR3

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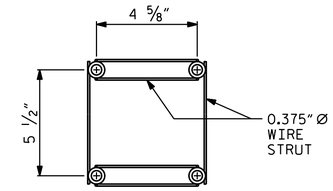
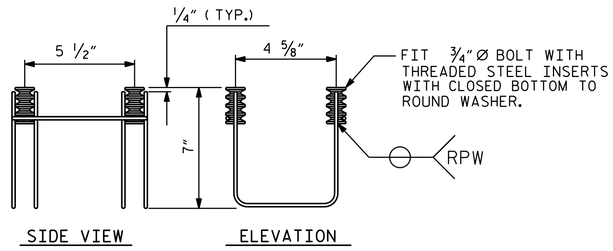


PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(46 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

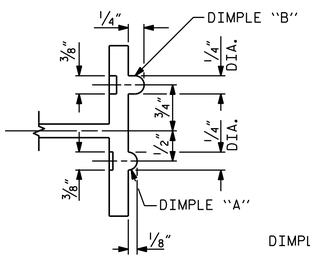
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4"Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



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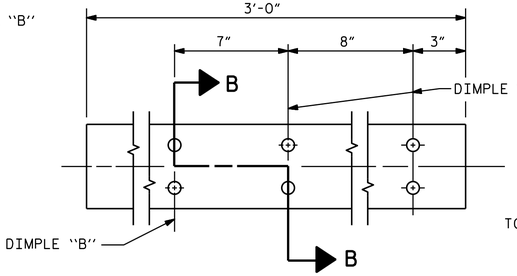
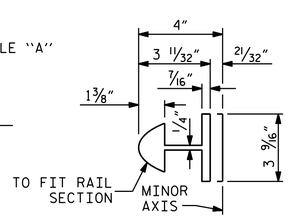
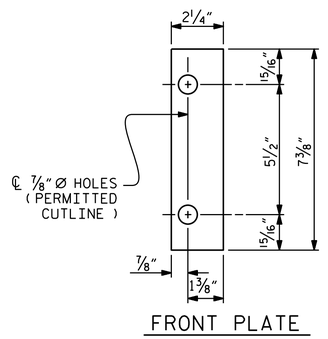


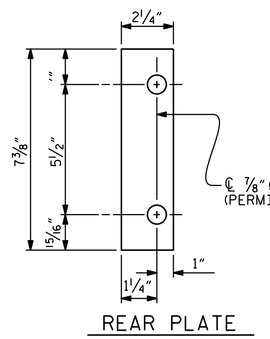


BAR SECTION

EXPANSION BAR DETAILS



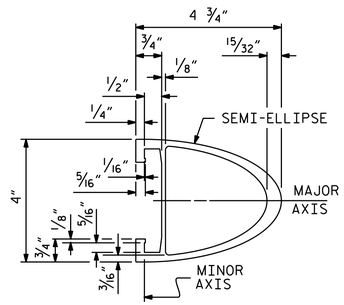
FRONT PLATE



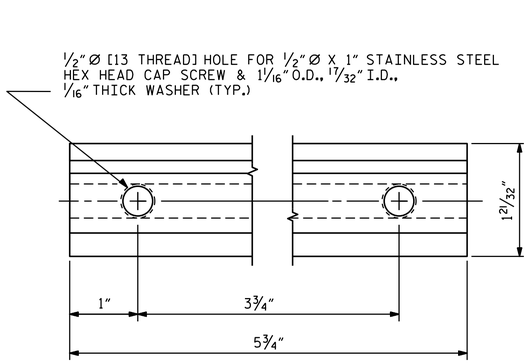
REAR PLATE

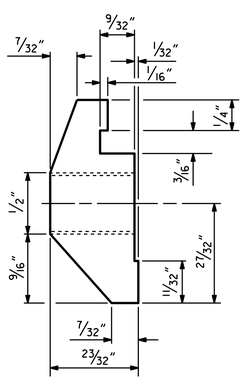
SHIM DETAILS

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



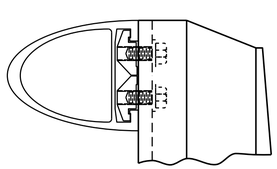
RAIL SECTION



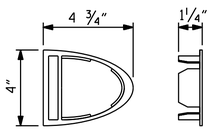


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

ASSEMBLED BY : WFP / QTN	DATE : 8/14/18
CHECKED BY : M. K. BEARD	DATE : 11/18
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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SHEET NO. S1-22

TOTAL SHEETS 38

STR. #1

STD. NO. BMR4

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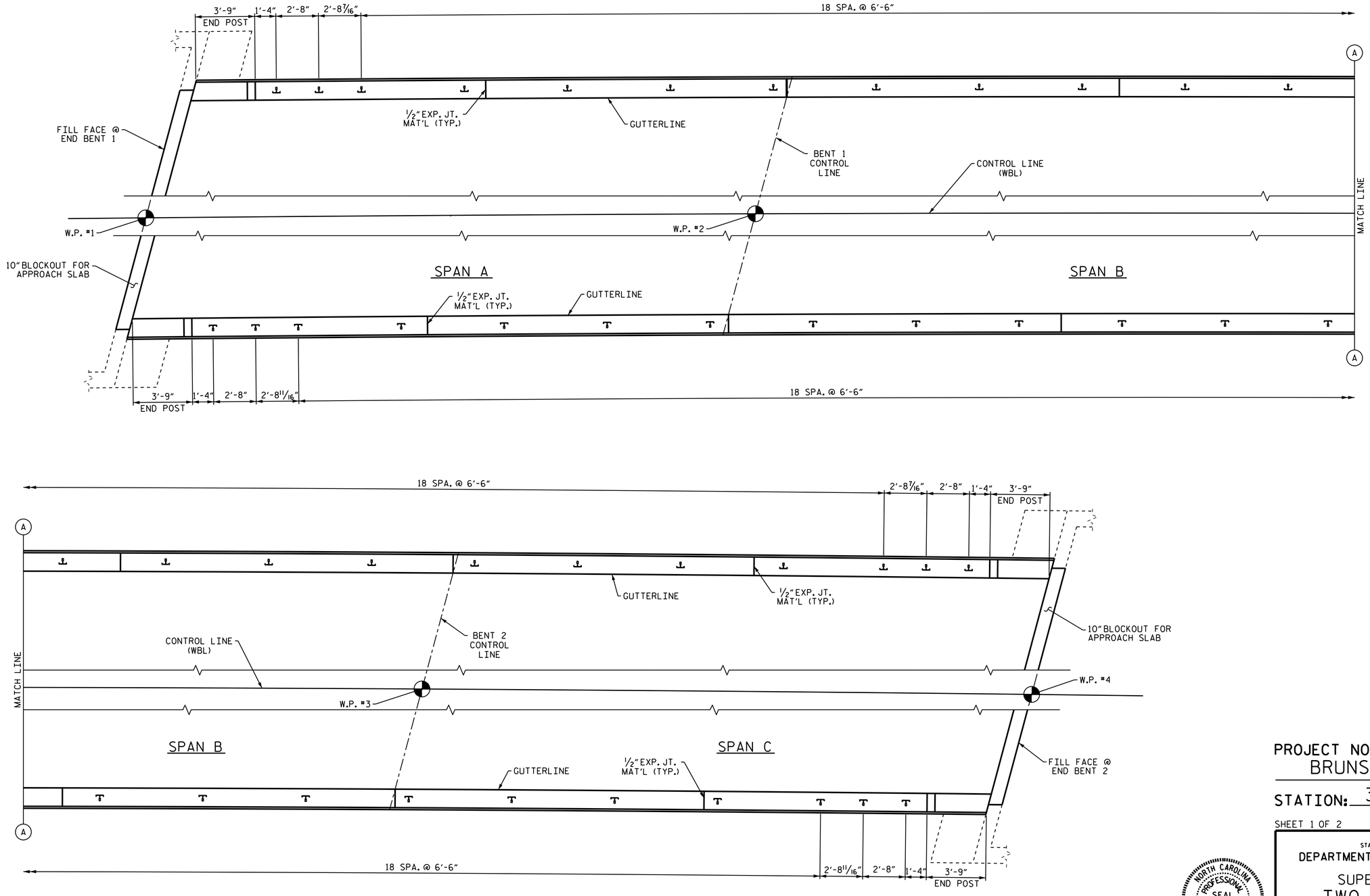

PLAN OF RAIL POST SPACING

DIMENSIONS ARE ALONG OUTSIDE EDGE OF PARAPET

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TWO BAR METAL RAIL POST SPACINGS AND END POST DETAILS (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : WFP / QTN DATE : 8/14/18
CHECKED BY : M. K. BEARD DATE : 11/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/11/19

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NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

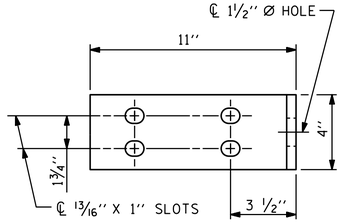
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

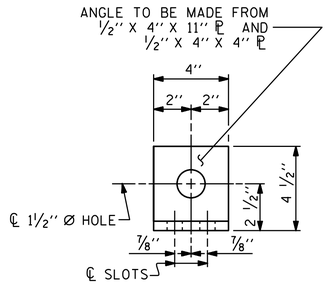
THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

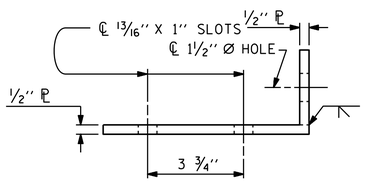
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTIEM IS NOT REQUIRED.



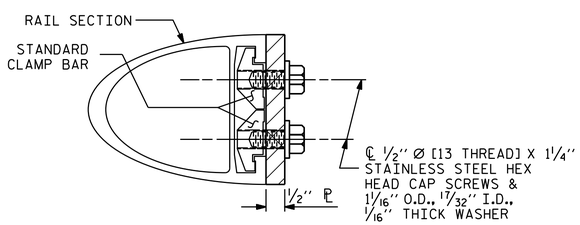
ELEVATION



END VIEW



TOP VIEW



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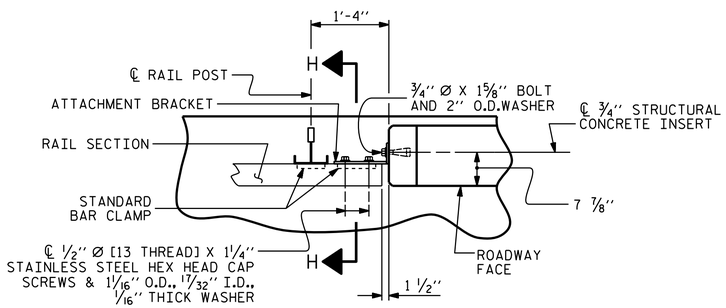
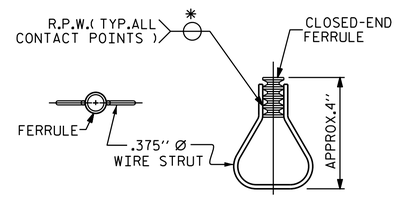


PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR TWO BAR METAL RAILS
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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SHEET NO. S1-24

TOTAL SHEETS 38

STR. #1

STD. NO. BMR2

ASSEMBLED BY : WFP / QTN	DATE : 8/14/18	
CHECKED BY : M. K. BEARD	DATE : 11/18	
DRAWN BY : FCJ 1/88	REV. 5/1/06	TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

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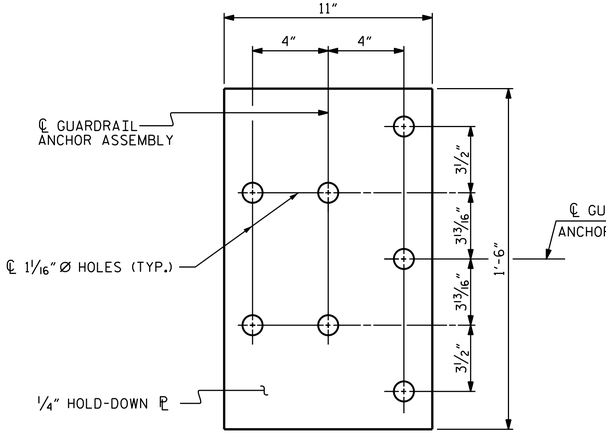
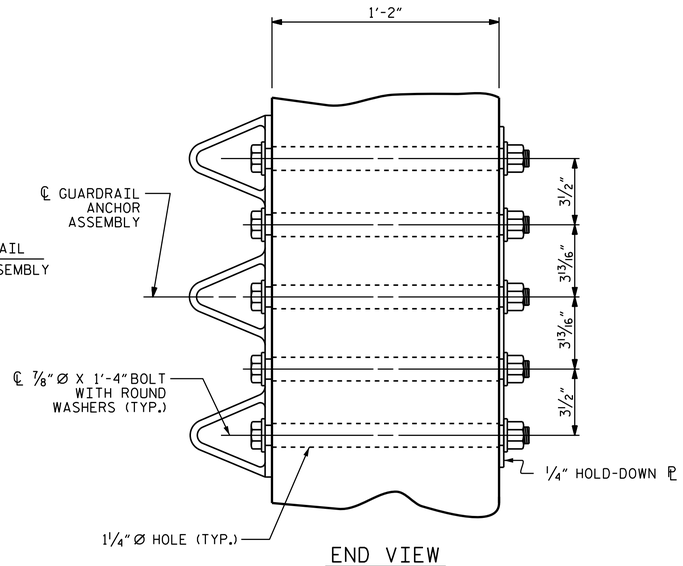


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

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

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

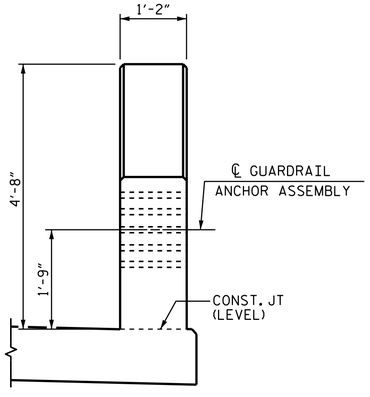
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

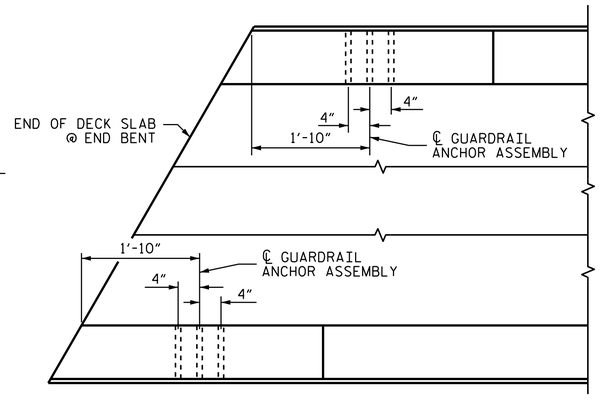
THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

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

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

SHEET NO. S1-25
TOTAL SHEETS 38

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY :	WFP / OTN	DATE :	8/14/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DRAWN BY : MAA	5/10	REV. 1/15	MAA/TMG
CHECKED BY : GM	5/10	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

20-JAN-2019 22:04
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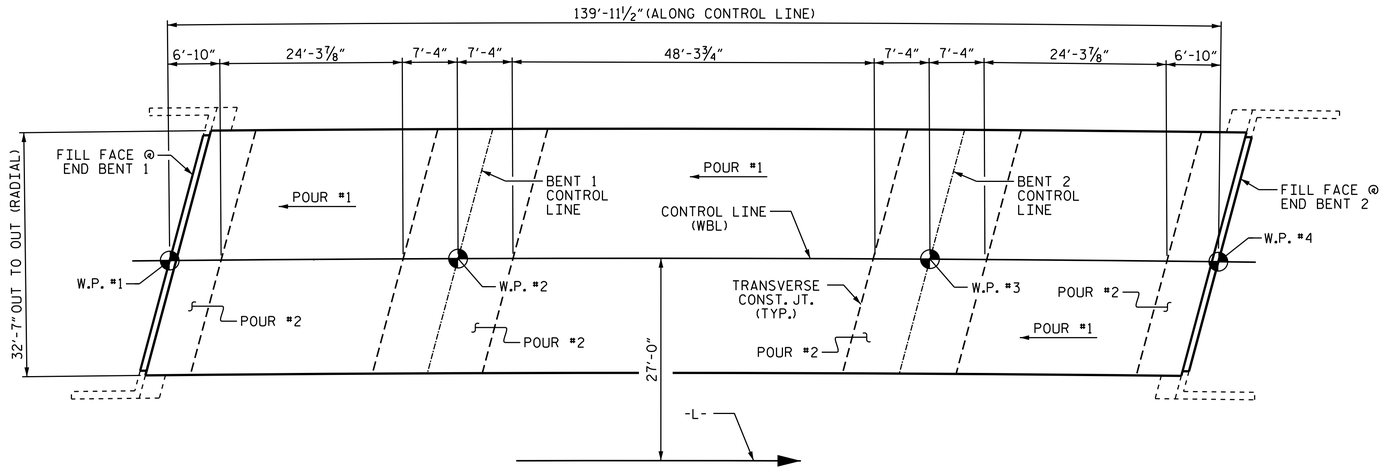
pknewton

STR. #1

STD. NO. GRA3



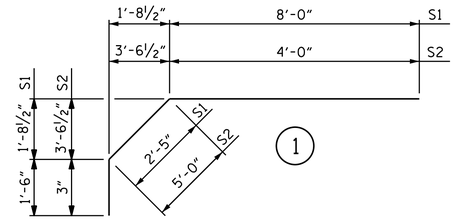
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB & POURING SEQUENCE (SQ.FT. = 4504)

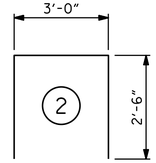
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	259	#5	STR	32'-2"	8689
✳ A2	184	#4	STR	2'-11"	358
✳ A101	2	#5	STR	30'-7"	64
✳ A102	2	#5	STR	28'-9"	60
✳ A103	2	#5	STR	26'-10"	56
✳ A104	2	#5	STR	25'-0"	52
✳ A105	2	#5	STR	23'-1"	48
✳ A106	2	#5	STR	21'-3"	44
✳ A107	2	#5	STR	19'-5"	41
✳ A108	2	#5	STR	17'-6"	37
✳ A109	2	#5	STR	15'-8"	33
✳ A110	2	#5	STR	13'-9"	29
✳ A111	2	#5	STR	11'-11"	25
✳ A112	2	#5	STR	10'-0"	21
✳ A113	2	#5	STR	8'-2"	17
✳ A114	2	#5	STR	6'-4"	13
✳ A115	2	#5	STR	4'-5"	9
✳ A116	2	#5	STR	2'-7"	5
✳ A117	2	#5	STR	30'-10"	64
✳ A118	2	#5	STR	28'-11"	60
✳ A119	2	#5	STR	27'-1"	56
✳ A120	2	#5	STR	25'-2"	52
✳ A121	2	#5	STR	23'-4"	49
✳ A122	2	#5	STR	21'-5"	45
✳ A123	2	#5	STR	19'-7"	41
✳ A124	2	#5	STR	17'-8"	37
✳ A125	2	#5	STR	15'-10"	33
✳ A126	2	#5	STR	13'-11"	29
✳ A127	2	#5	STR	12'-0"	25
✳ A128	2	#5	STR	10'-2"	21
✳ A129	2	#5	STR	8'-3"	17
✳ A130	2	#5	STR	6'-5"	13
✳ A131	2	#5	STR	4'-6"	9
✳ A132	2	#5	STR	2'-8"	6
✳ B1	132	#5	STR	47'-9"	6574
✳ B2	152	#5	STR	10'-6"	1665
✳ K1	8	#4	STR	39'-7"	212
✳ K2	8	#4	STR	4'-11"	26
✳ K3	16	#4	STR	5'-5"	58
✳ K4	8	#4	STR	5'-11"	32
✳ K5	4	#4	STR	2'-0"	5
✳ K6	8	#4	STR	2'-6"	13
✳ K7	4	#4	STR	2'-3"	6
✳ S1	60	#4	1	11'-11"	478
✳ S2	60	#4	1	9'-3"	371
✳ U1	60	#4	2	8'-0"	321

✳EPOXY COATED REINF. STEEL = 19,919 LBS.

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR #1	58.8	——
POUR #2	50.8	——
TOTALS✳✳	109.6	19919

✳✳QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1303	SQ.FT.
BRIDGE DECK	3723	SQ.FT.
TOTAL	5026	SQ.FT.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FE39014518407...

8/16/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S1-26

TOTAL SHEETS 38

STR. #1

STD. NO. BOM2

DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE: 8/2/21

ASSEMBLED BY : OTN / PKN DATE : 8/2/21
CHECKED BY : M. K. BEARD DATE : 8/2/21

DRAWN BY : JMB 5/87
CHECKED BY : SJD 9/87

REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

16-AUG-2021 18:00
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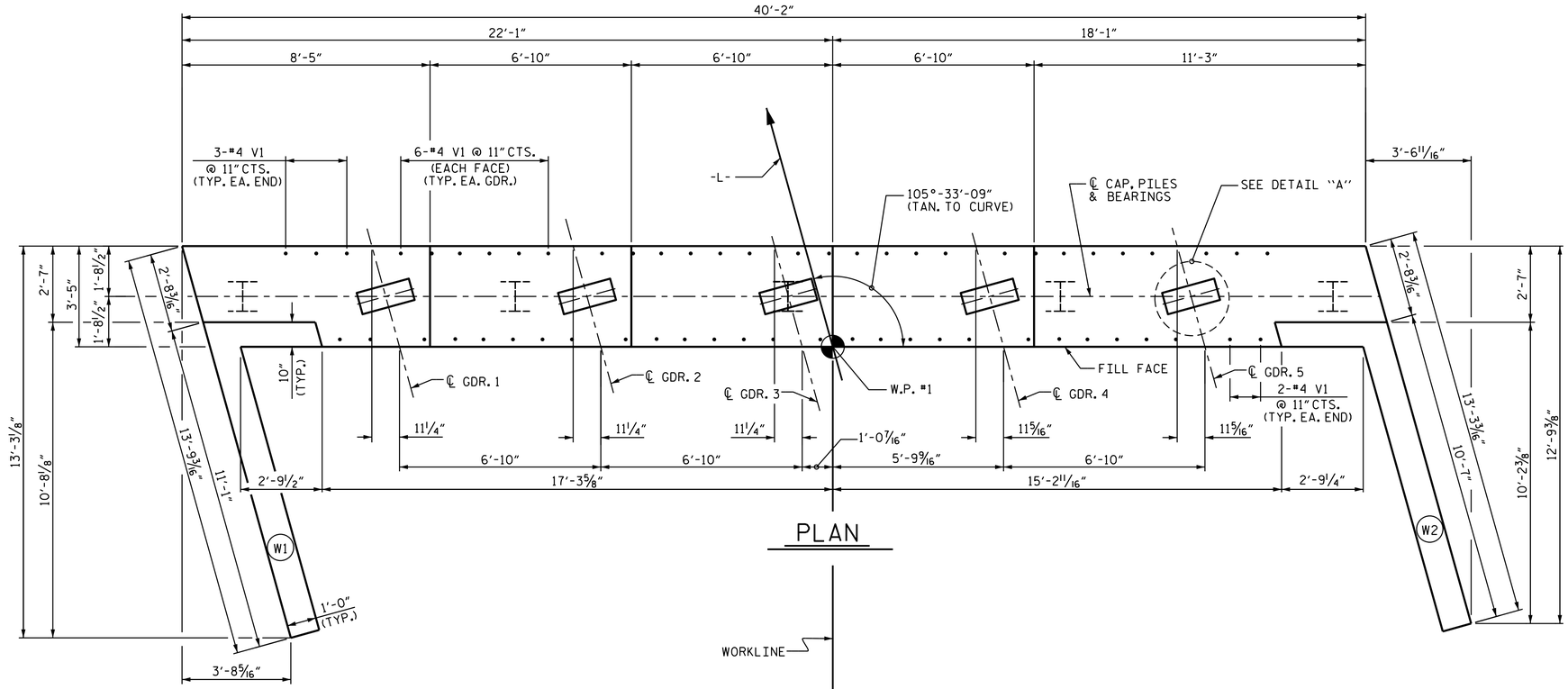
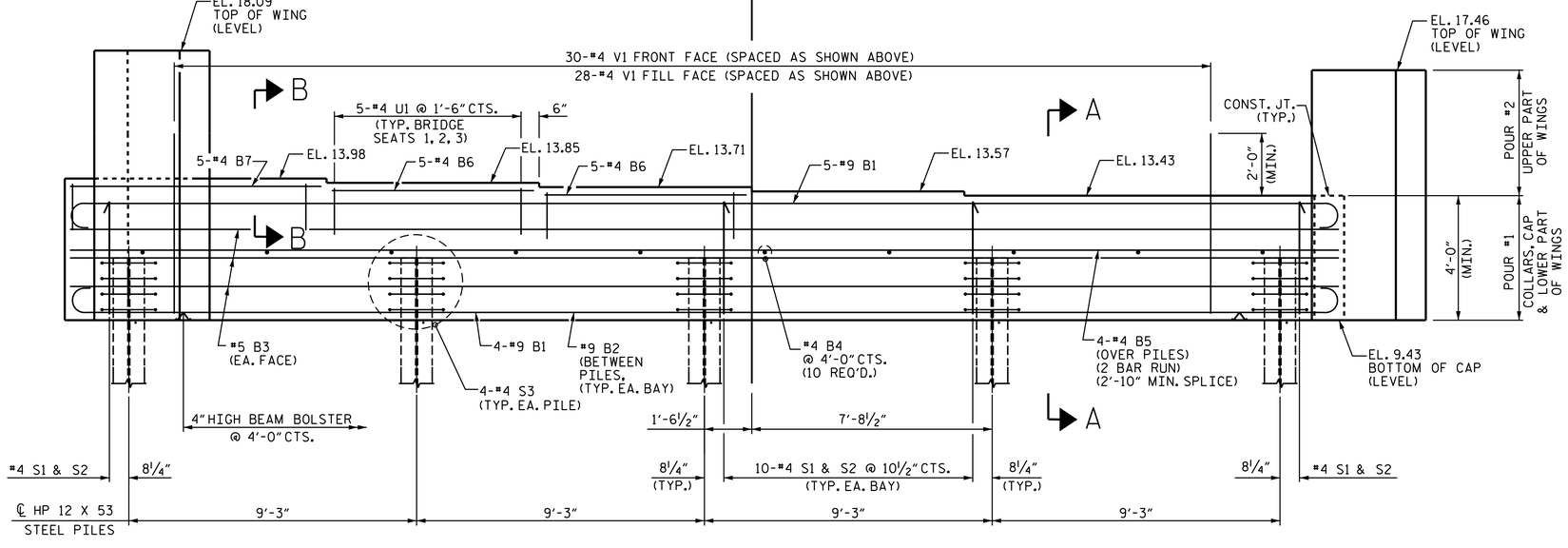
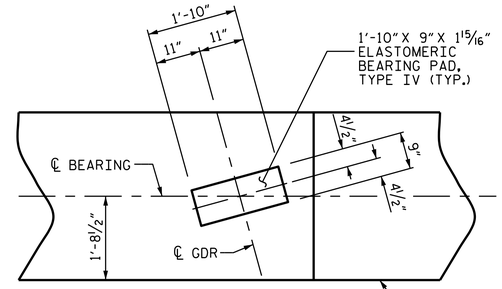


PLAN



ELEVATION

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.



DETAIL "A"

(TYP. EA. GDR.)

NOTES

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

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

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1 (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

DRAWN BY : O. T. NGUYEN DATE : 5/2/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			38

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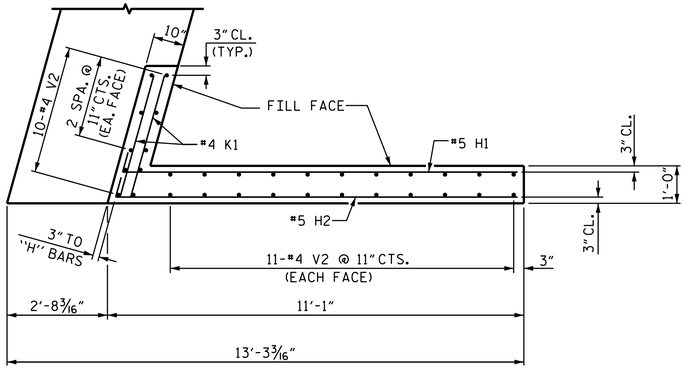
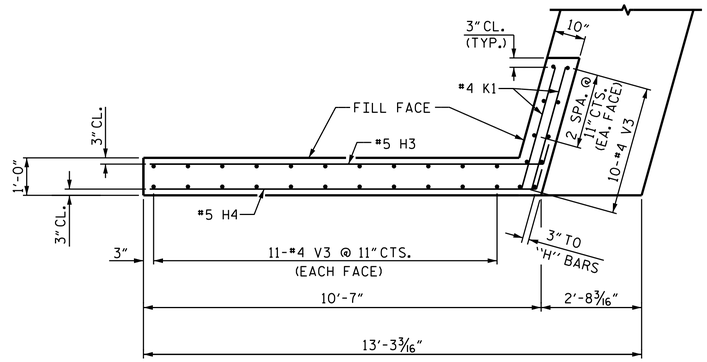
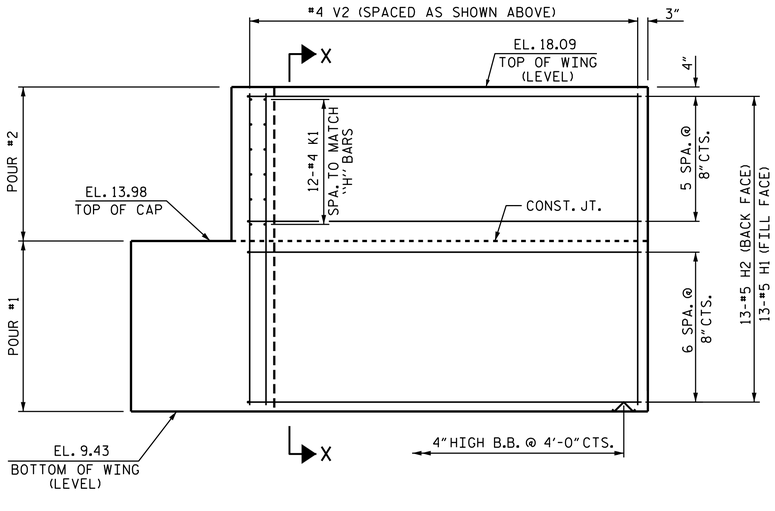


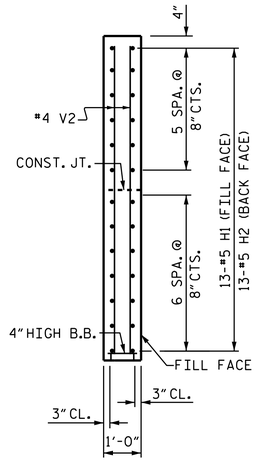
PLAN OF WING W1



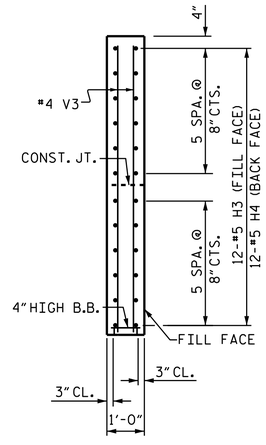
PLAN OF WING W2



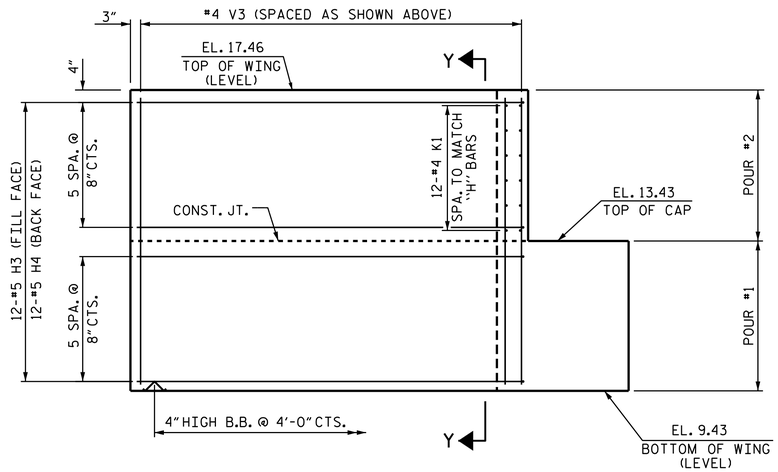
ELEVATION OF WING W1



SECTION X-X



SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1 (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-28
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : O. T. NGUYEN DATE : 5/2/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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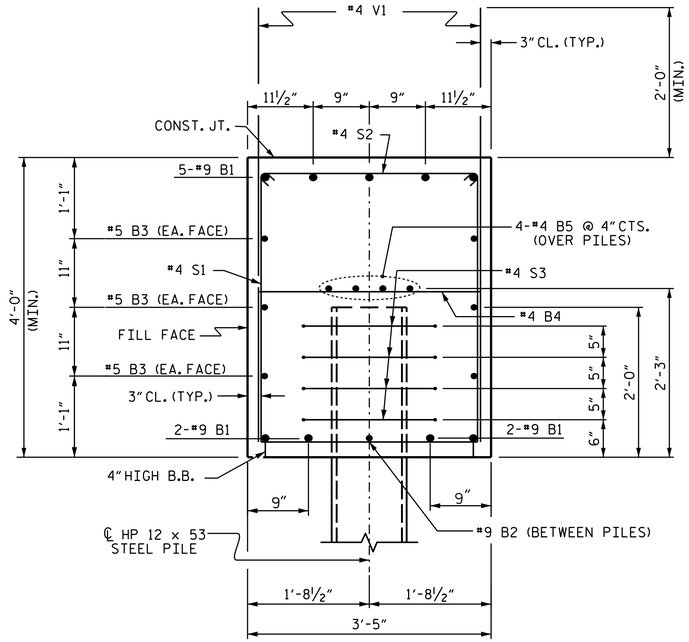
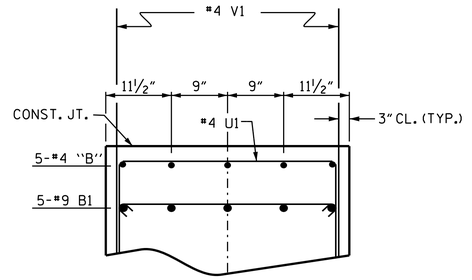
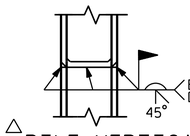


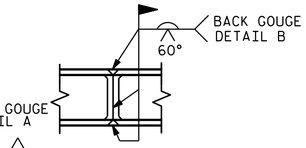
SECTION A-A



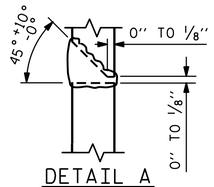
PARTIAL SECTION B-B



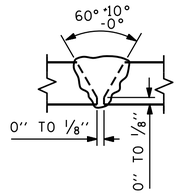
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



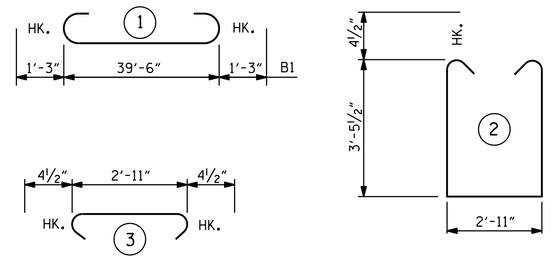
DETAIL A



DETAIL B

△ POSITION OF PILE DURING WELDING.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	9	#9	1	42'-0"	1285
✱B2	4	#9	STR	8'-9"	119
✱B3	6	#5	STR	39'-8"	248
✱B4	10	#4	STR	2'-11"	19
✱B5	8	#4	STR	21'-4"	114
✱B6	10	#4	STR	6'-6"	43
✱B7	5	#4	STR	7'-2"	24
✱H1	13	#5	4	11'-0"	149
✱H2	13	#5	4	11'-2"	151
✱H3	12	#5	5	10'-11"	137
✱H4	12	#5	5	10'-10"	136
✱K1	24	#4	STR	3'-4"	53
✱S1	42	#4	2	10'-7"	297
✱S2	42	#4	3	3'-8"	103
✱S3	20	#4	6	6'-6"	87
✱U1	15	#4	7	6'-1"	61
✱V1	58	#4	STR	5'-0"	194
✱V2	32	#4	STR	8'-1"	173
✱V3	32	#4	STR	7'-6"	160

✱EPOXY COATED REINFORCING STEEL = 3553 LBS.

CLASS AA CONCRETE

POUR #1
(CAP, CON. COLLARS, & LOWER PART OF WINGS) _____ = 25.6 C.Y.

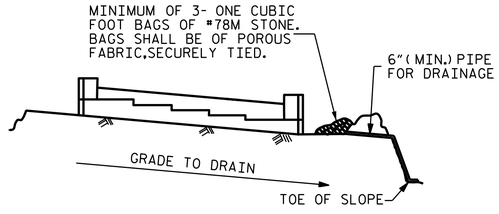
POUR #2
(UPPER PART OF WINGS) _____ = 3.9 C.Y.

TOTAL = 29.3 C.Y.

HP 12 X 53 STEEL PILES
No. 5 _____ LIN FT. 350

PILE REDRIVES _____ EA. 5

STEEL PILE POINTS _____ NO. 5



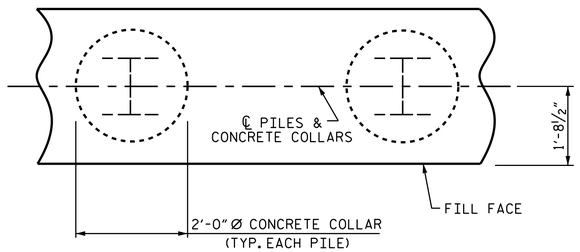
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

PILE SPLICE DETAILS



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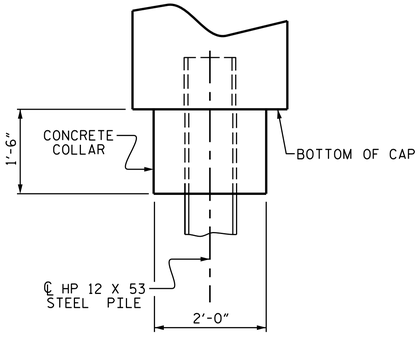

ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton 1/20/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S1-29
TOTAL SHEETS 38

STR. #1

DRAWN BY : Q. T. NGUYEN DATE : 5/2/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

20-JAN-2019 22:04
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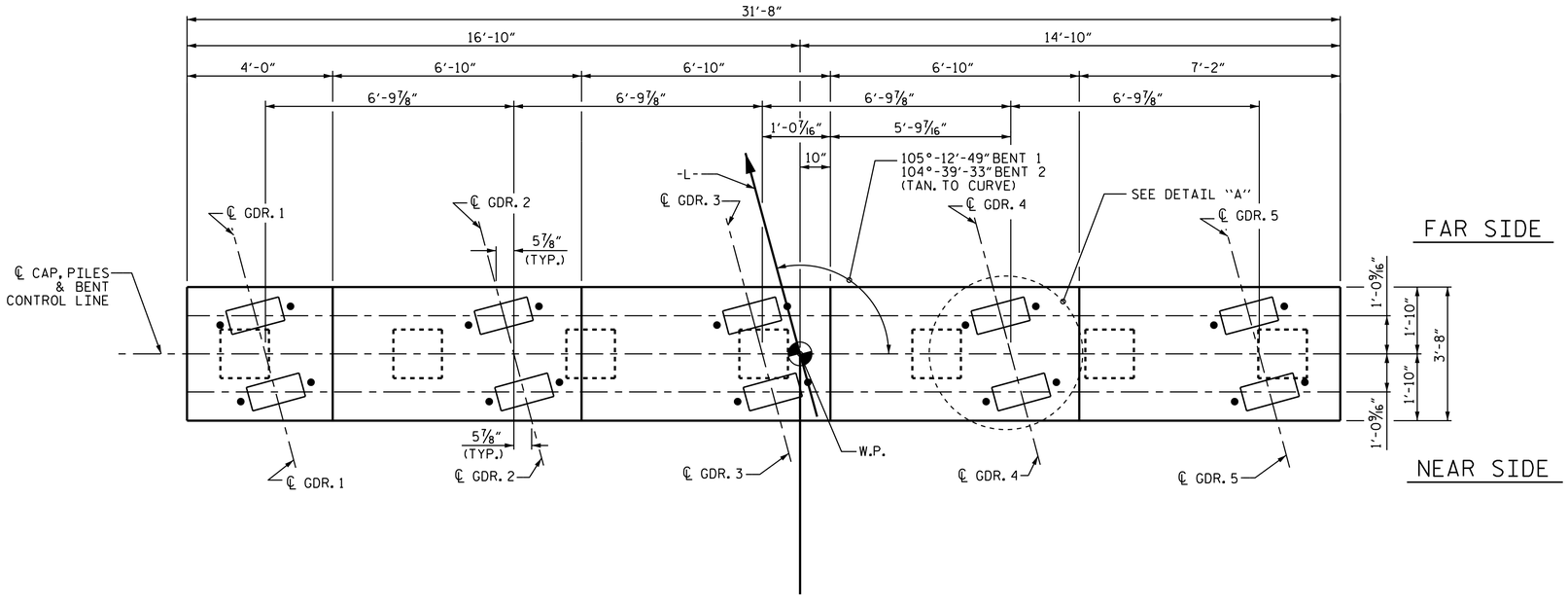

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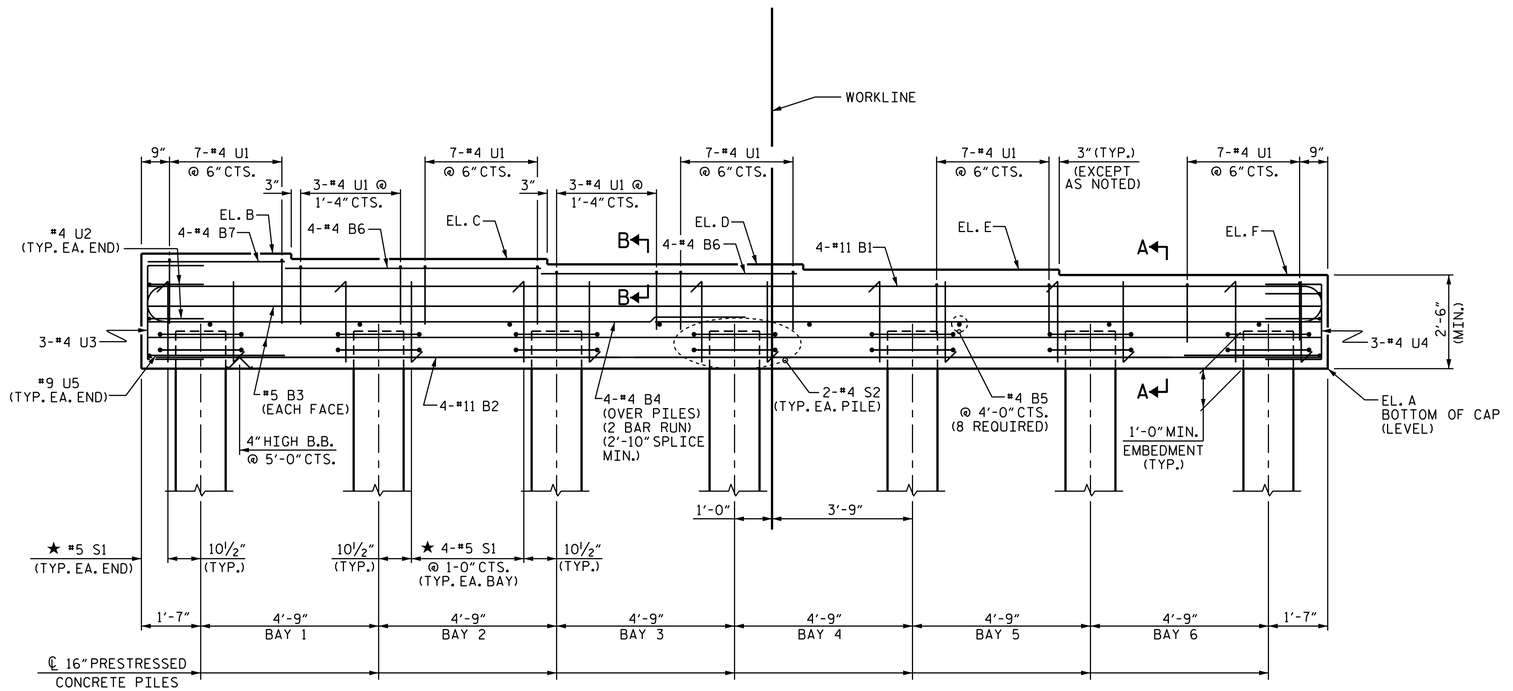


ELEVATION

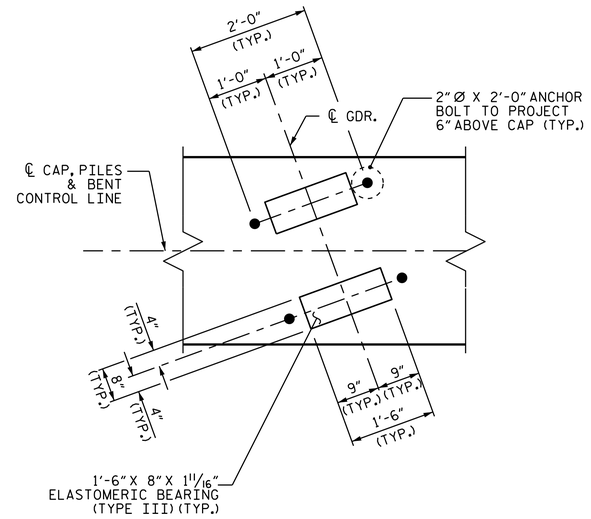
★ INVERT ALTERNATE STIRRUPS

NOTES

STIRRUPS & U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

FOR PRESTRESSED CONCRETE PILE DETAILS, SEE SHEET 3 OF 3.

"U" BARS IN END OF CAP MAY BE SHFTED SLIGHTLY AN NECESSARY TO CLEAR "B" BARS.



DETAIL "A"
(TYP. EA. GDR.)

CAP ELEVATIONS

	BENT 1	BENT 2
A	10.33	9.65
B	13.40	12.75
C	13.26	12.60
D	13.11	12.45
E	12.97	12.30
F	12.83	12.15

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 1 & 2
(WBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-30
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : O. T. NGUYEN DATE : 5/11/18
CHECKED BY : M. K. BEARD DATE : 7/25/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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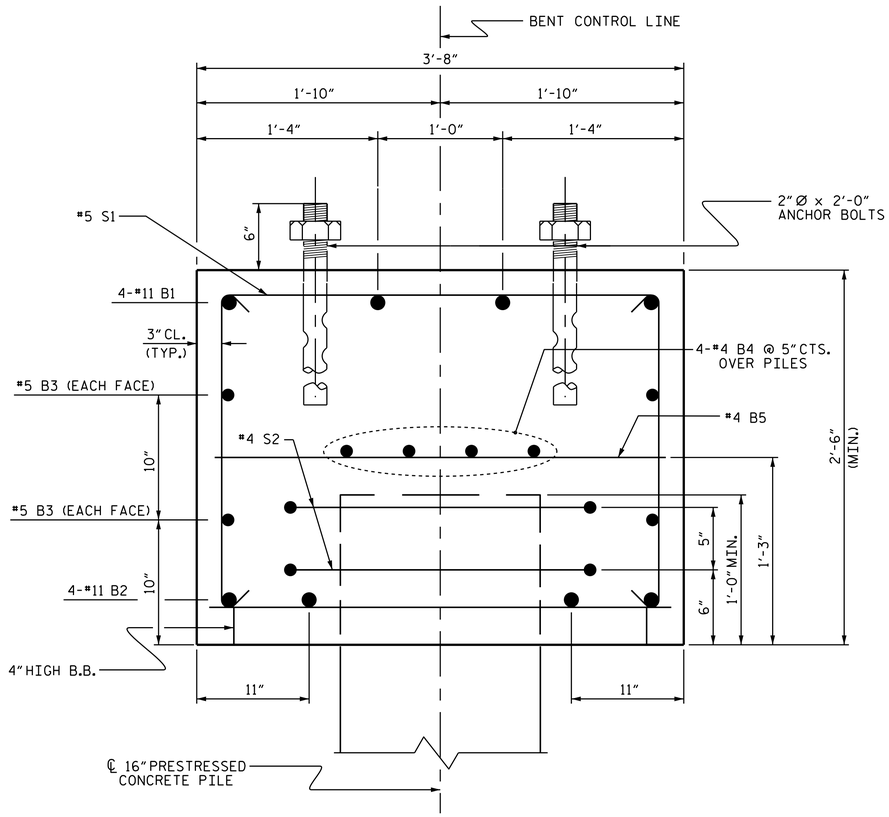

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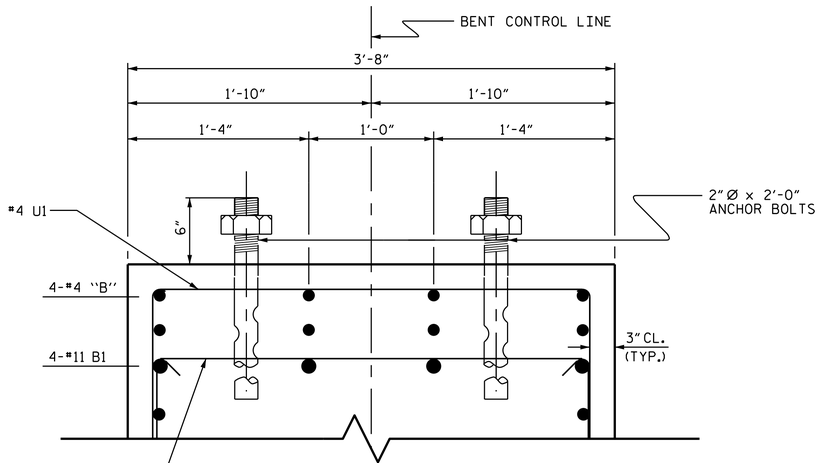

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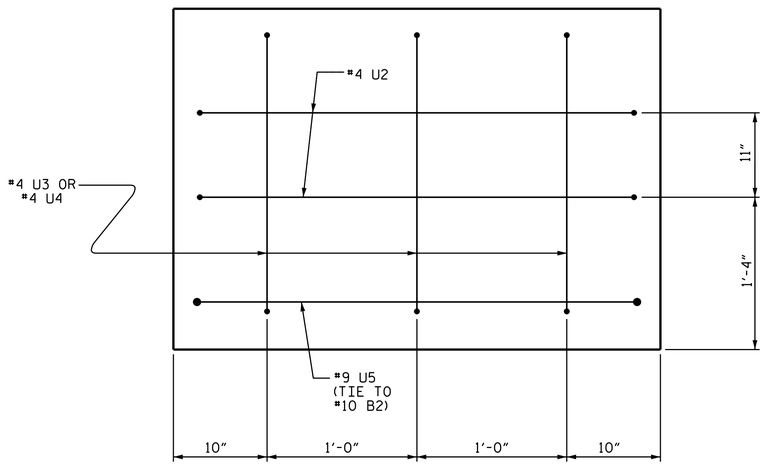
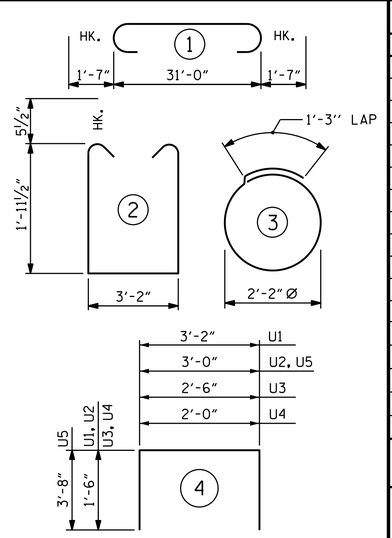


END OF CAP VIEW

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	4	#11	1	34'-2"	726
✳B2	4	#11	STR	31'-2"	662
✳B3	4	#5	STR	31'-2"	130
✳B4	8	#4	STR	17'-0"	91
✳B5	8	#4	STR	3'-2"	17
✳B6	8	#4	STR	6'-8"	36
✳B7	4	#4	STR	3'-6"	9
✳S1	26	#5	2	8'-0"	217
✳S2	14	#4	3	8'-1"	76
✳U1	41	#4	4	6'-2"	169
✳U2	4	#4	4	6'-0"	16
✳U3	3	#4	4	5'-6"	11
✳U4	3	#4	4	5'-0"	10
✳U5	2	#9	4	10'-4"	70

✳EPOXY COATED REINFORCING STEEL = 2240 LBS

CLASS AA CONCRETE

TOTAL CLASS AA CONCRETE _____ ▲11.5 C.Y.

BENT 1

16" PRESTRESSED CONCRETE PILES

No. 7 _____ LIN. FT. 490

PILE REDRIVES _____ EA. 7

BENT 2

16" PRESTRESSED CONCRETE PILES

No. 7 _____ LIN. FT. 385

PILE REDRIVES _____ EA. 7

▲ CONCRETE DISPLACED BY THE 16" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 1 & 2
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

DRAWN BY : Q. T. NGUYEN DATE : 5/11/18
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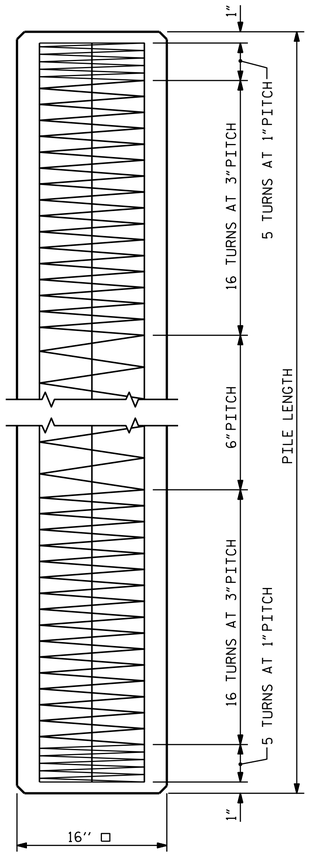
2			4		

SHEET NO. S1-31

TOTAL SHEETS 38

STR. #1



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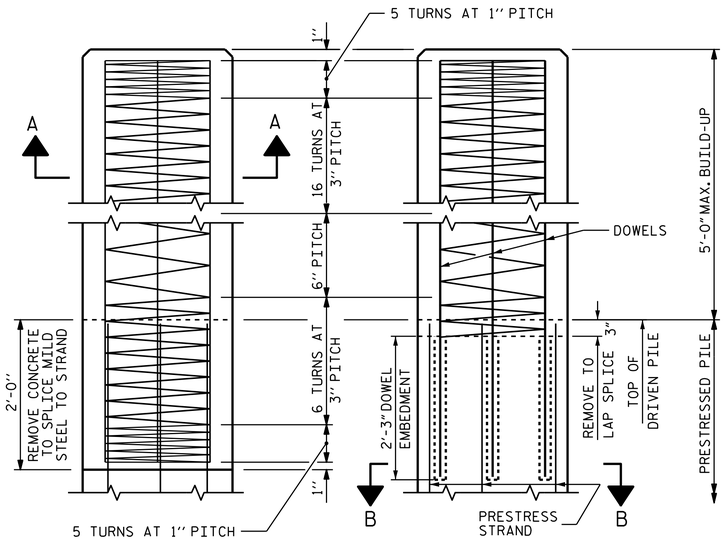
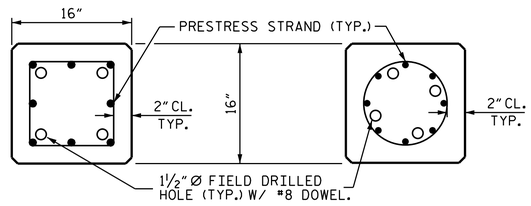


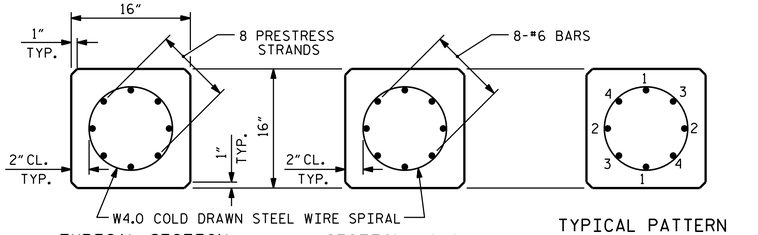
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



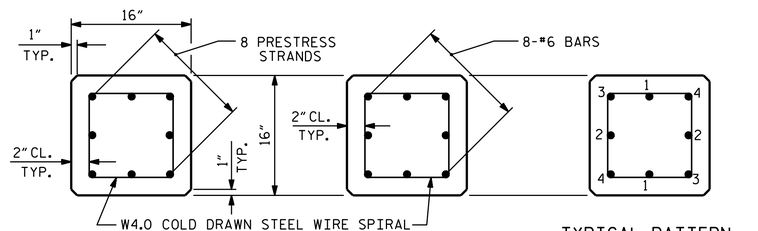
SECTION "B-B"

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION SECTION "A-A" TYPICAL PATTERN FOR BURNING STRANDS

½" OR 0.6" Ø GRADE 270 L.R. PRESTRESS STRANDS



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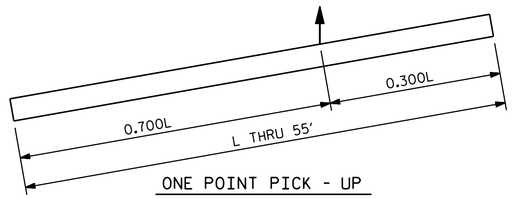
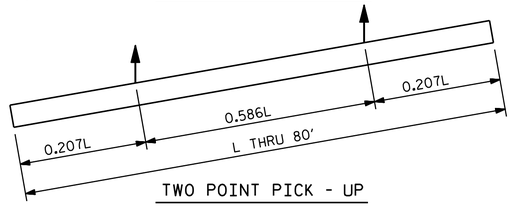


ONE POINT PICK - UP

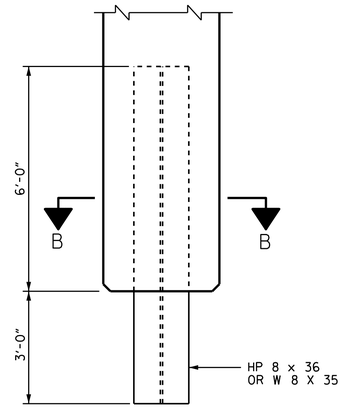


TWO POINT PICK - UP

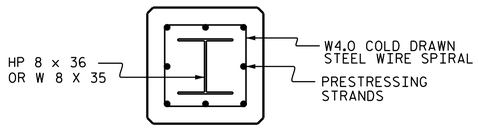
PICK - UP POINTS

QUANTITIES FOR ONE 16" PRESTRESSED PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.300L	ONE POINT PICK-UP 0.700L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0"	1.63	3.31	7'-6"	17'-6"	5'-2"	14'-8"
30'-0"	1.96	3.97	9'-0"	21'-0"	6'-2½"	17'-7"
35'-0"	2.29	4.63	10'-6"	24'-6"	7'-3"	20'-6"
40'-0"	2.61	5.29	12'-0"	28'-0"	8'-3½"	23'-5"
45'-0"	2.94	5.95	13'-6"	31'-6"	9'-4"	26'-4"
50'-0"	3.27	6.61	15'-0"	35'-0"	10'-4"	29'-4"
55'-0"	3.59	7.28	16'-6"	38'-6"	11'-4½"	32'-3"
60'-0"	3.92	7.94			12'-5"	35'-2"
65'-0"	4.25	8.60			13'-5½"	38'-1"
70'-0"	4.57	9.26			14'-6"	41'-0"
75'-0"	4.90	9.92			15'-6½"	43'-11"
80'-0"	5.23	10.58			16'-7"	46'-10"



ELEVATION



SECTION B-B

PILE TIP DETAILS

FOR 16" SQUARE PRESTRESSED CONCRETE PILE

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½"	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6"	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½" OR 0.6" STRANDS MAY BE USED IN EITHER STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

CORROSION PROTECTION

THE WATER/CEMENT RATIO FOR PRESTRESSED CONCRETE PILES SHALL NOT EXCEED 0.40.

ALL BAR SUPPORTS USED IN THE PRESTRESSED CONCRETE PILES, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE CONCRETE IN THE PRESTRESSED CONCRETE PILES SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

16" PRESTRESSED CONCRETE PILE (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

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1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. PCP2 (SHT 2)

ASSEMBLED BY : QTN	DATE : 1/19
CHECKED BY : PKN	DATE : 1/19
DRAWN BY : RH 9/98	REV. 10/1/11 MAA/GM
CHECKED BY : LES 10/98	REV. 12/14 MAA/TMG
	REV. 12/17 MAA/THC

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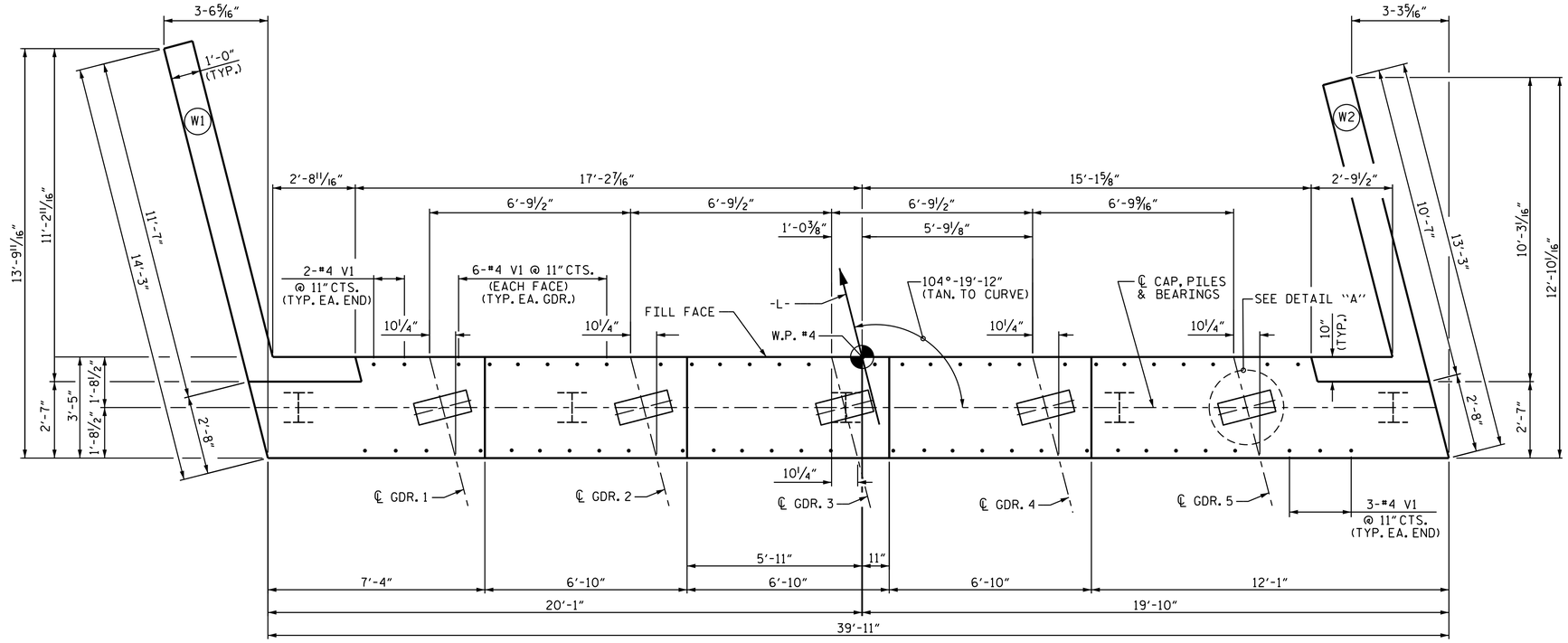
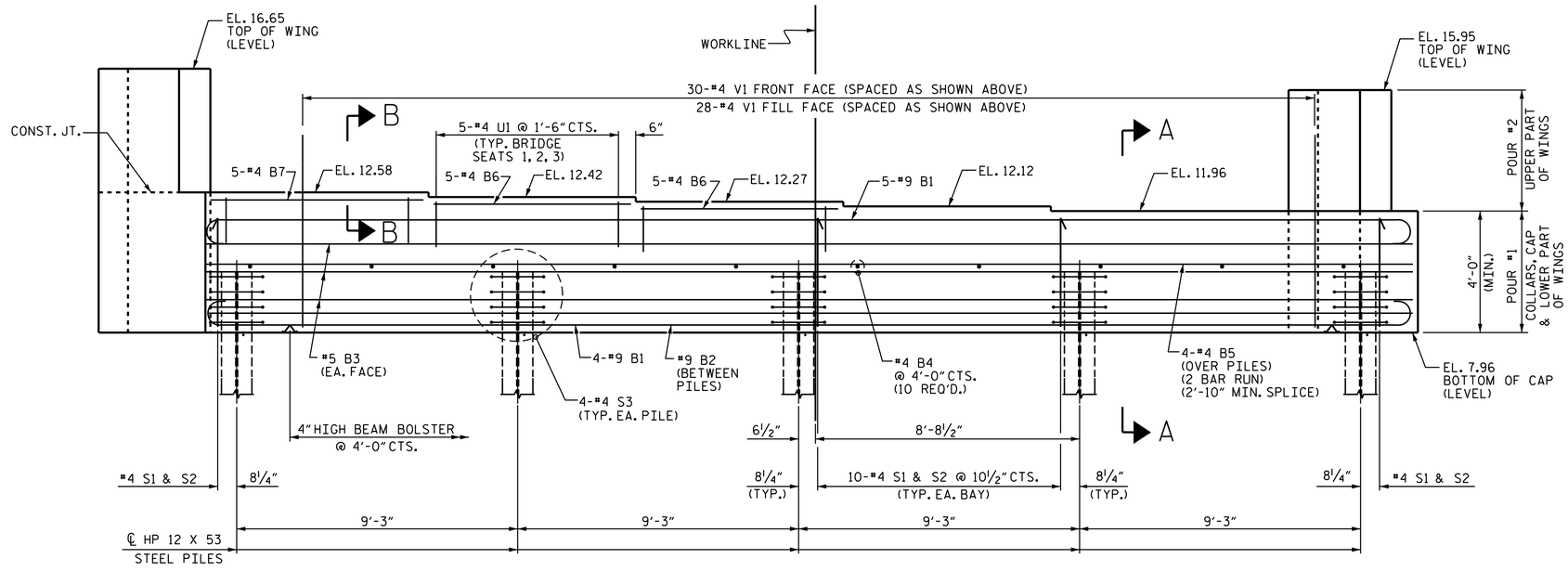


PLAN



ELEVATION

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

NOTES

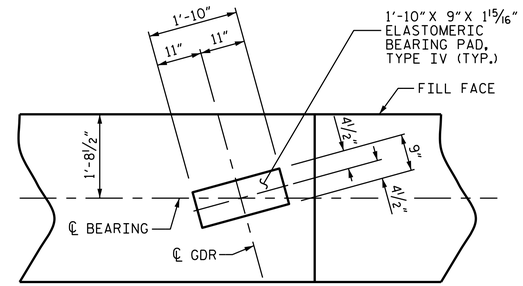
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

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

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.



DETAIL "A"

(TYP. EA. GDR.)

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2 (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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1/23/2019

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2			4		

SHEET NO. S1-33

TOTAL SHEETS 38

STR. #1

DRAWN BY : O. T. NGUYEN DATE : 5/2/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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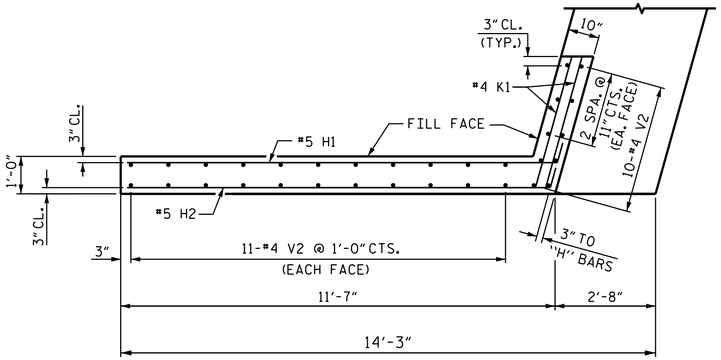
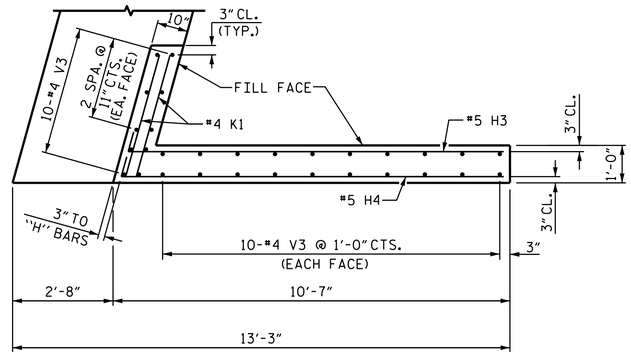
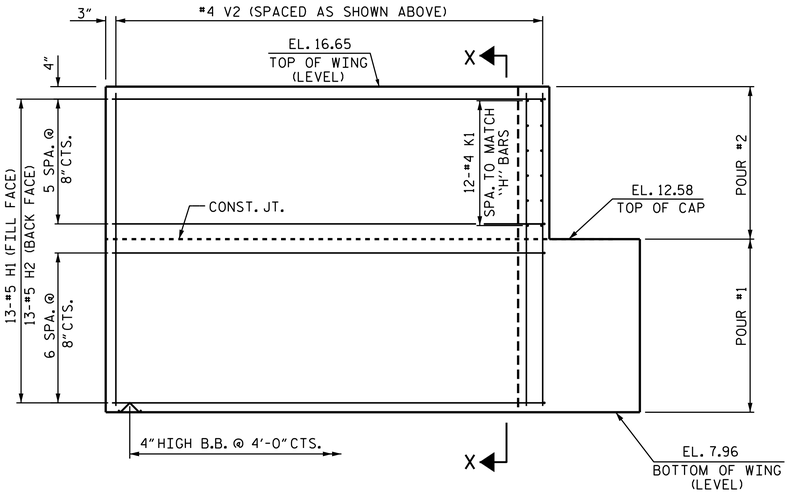


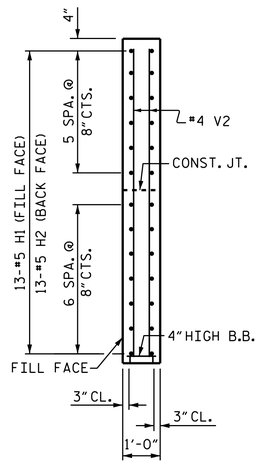
PLAN OF WING W1



PLAN OF WING W2



ELEVATION OF WING W1



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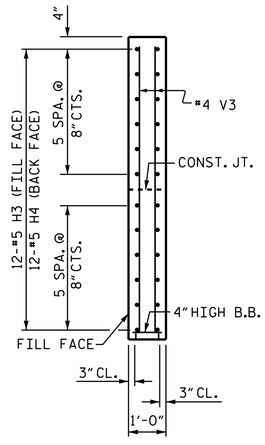
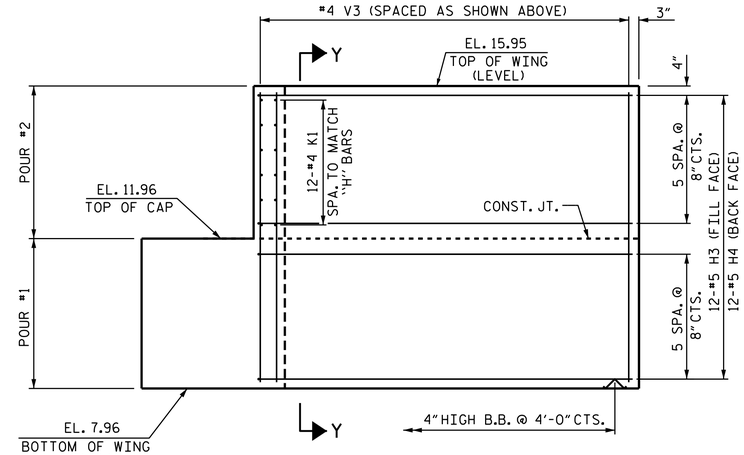


SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

DRAWN BY :	O. T. NGUYEN	DATE :	5/2/18
CHECKED BY :	M. K. BEARD	DATE :	8/18
DESIGN ENGINEER OF RECORD:	A. K. PATEL	DATE :	1/10/19

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2			4		

SHEET NO. S1-34

TOTAL SHEETS 38

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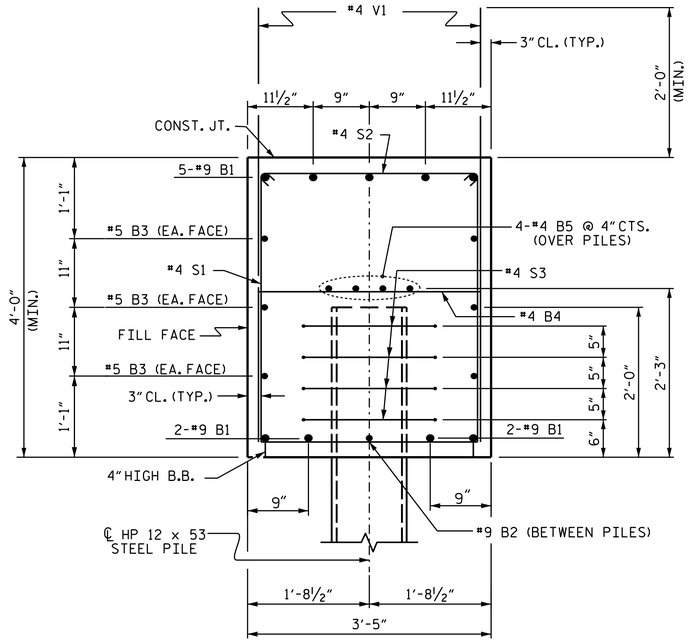
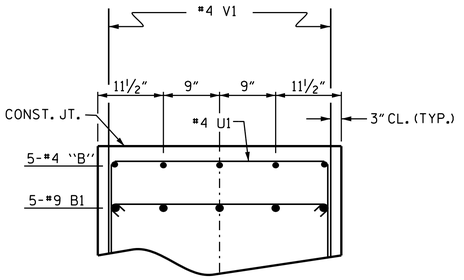
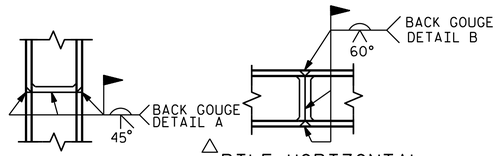


SECTION A-A

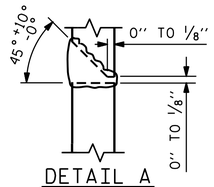


PARTIAL SECTION B-B

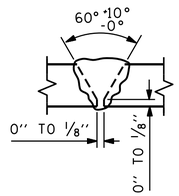


△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



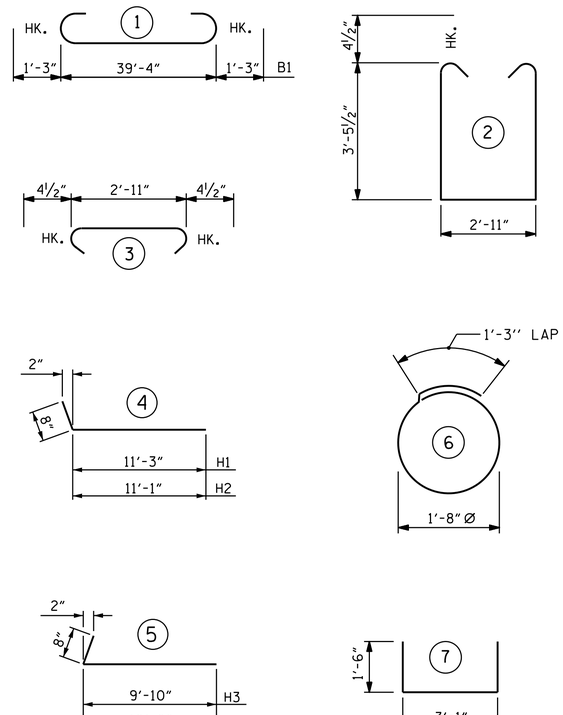
DETAIL A



DETAIL B

△ POSITION OF PILE DURING WELDING.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	9	#9	1	41'-7"	1272
✱B2	4	#9	STR	8'-9"	119
✱B3	6	#5	STR	39'-5"	247
✱B4	10	#4	STR	2'-11"	19
✱B5	8	#4	STR	21'-1"	113
✱B6	10	#4	STR	6'-6"	43
✱B7	5	#4	STR	7'-0"	23
✱H1	13	#5	4	11'-11"	162
✱H2	13	#5	4	11'-9"	159
✱H3	12	#5	5	10'-6"	131
✱H4	12	#5	5	10'-8"	134
✱K1	24	#4	STR	3'-4"	53
✱S1	42	#4	2	10'-7"	297
✱S2	42	#4	3	3'-8"	103
✱S3	20	#4	6	6'-6"	87
✱U1	15	#4	7	6'-1"	61
✱V1	58	#4	STR	5'-0"	194
✱V2	32	#4	STR	8'-2"	175
✱V3	30	#4	STR	7'-5"	149

✱EPOXY COATED REINFORCING STEEL = 3541 LBS

CLASS AA CONCRETE

POUR #1 (CAP, CONC. COLLARS, & LOWER PART OF WINGS) = 25.8 C.Y.

POUR #2 (UPPER PART OF WINGS) = 4.0 C.Y.

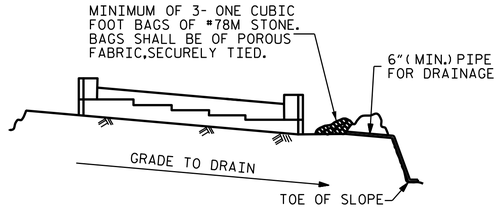
TOTAL = 29.8 C.Y.

HP 12 X 53 STEEL PILES

No. 5 LIN FT. 325

PILE REDRIVES EA. 5

STEEL PILE POINTS NO. 5



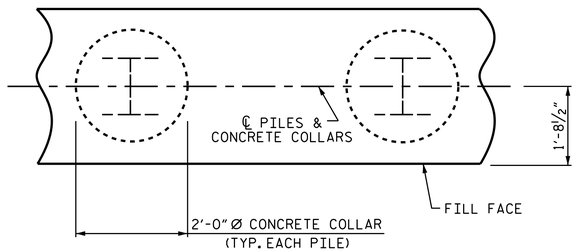
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

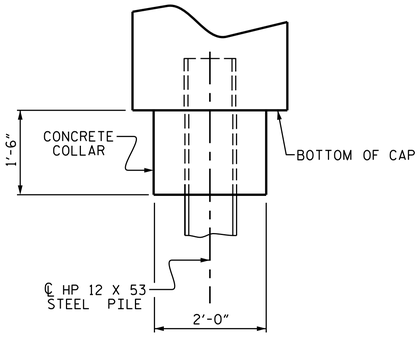
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

PILE SPLICE DETAILS



PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2
(WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

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

SHEET NO. S1-35

TOTAL SHEETS 38

STR. #1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : O. T. NGUYEN DATE : 5/2/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

20-JAN-2019 22:04
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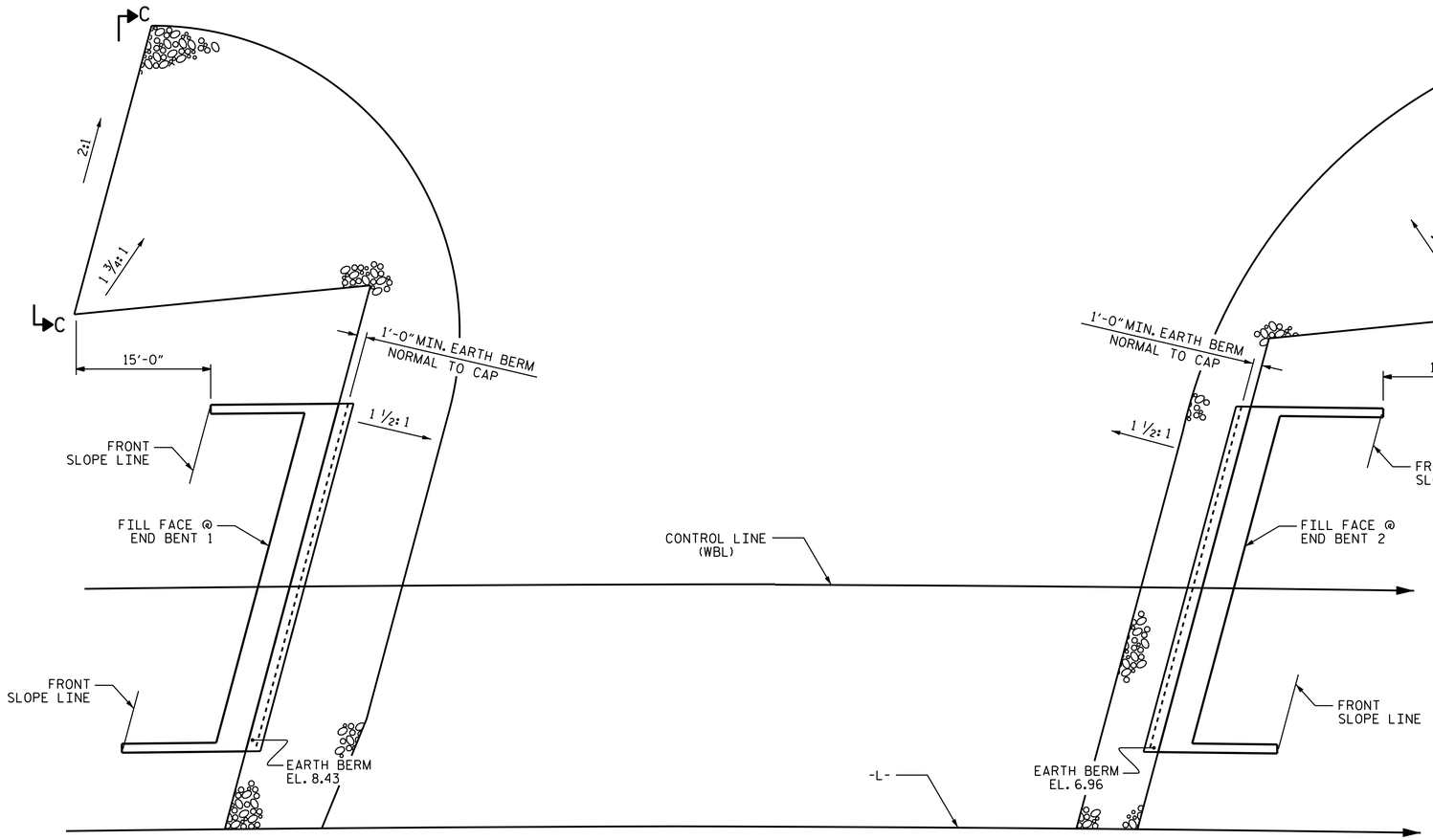
pknewton



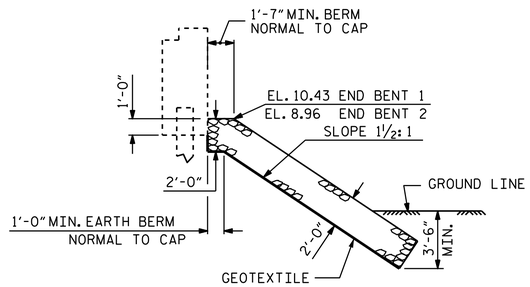
END BENT 1

END BENT 2

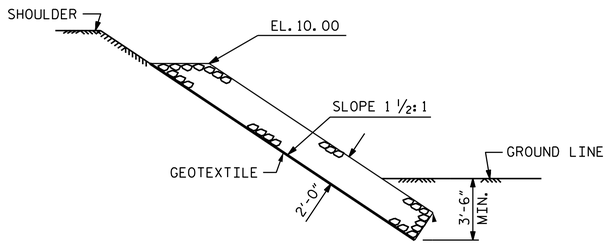
PLAN

NOTE :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

ESTIMATED QUANTITIES		
BRIDGE @ STA. 369+42.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	170	190
END BENT 2	125	140



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALCORD
DocuSigned by:
F2458389300BF40E...
1/23/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-36
1			3			TOTAL SHEETS
2			4			38

STR. #1

ASSEMBLED BY : G. KOUCHEKI/OTN	DATE : 5/18	
CHECKED BY : M. K. BEARD	DATE : 11/18	
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM
	REV. 12/17	MAA/THC

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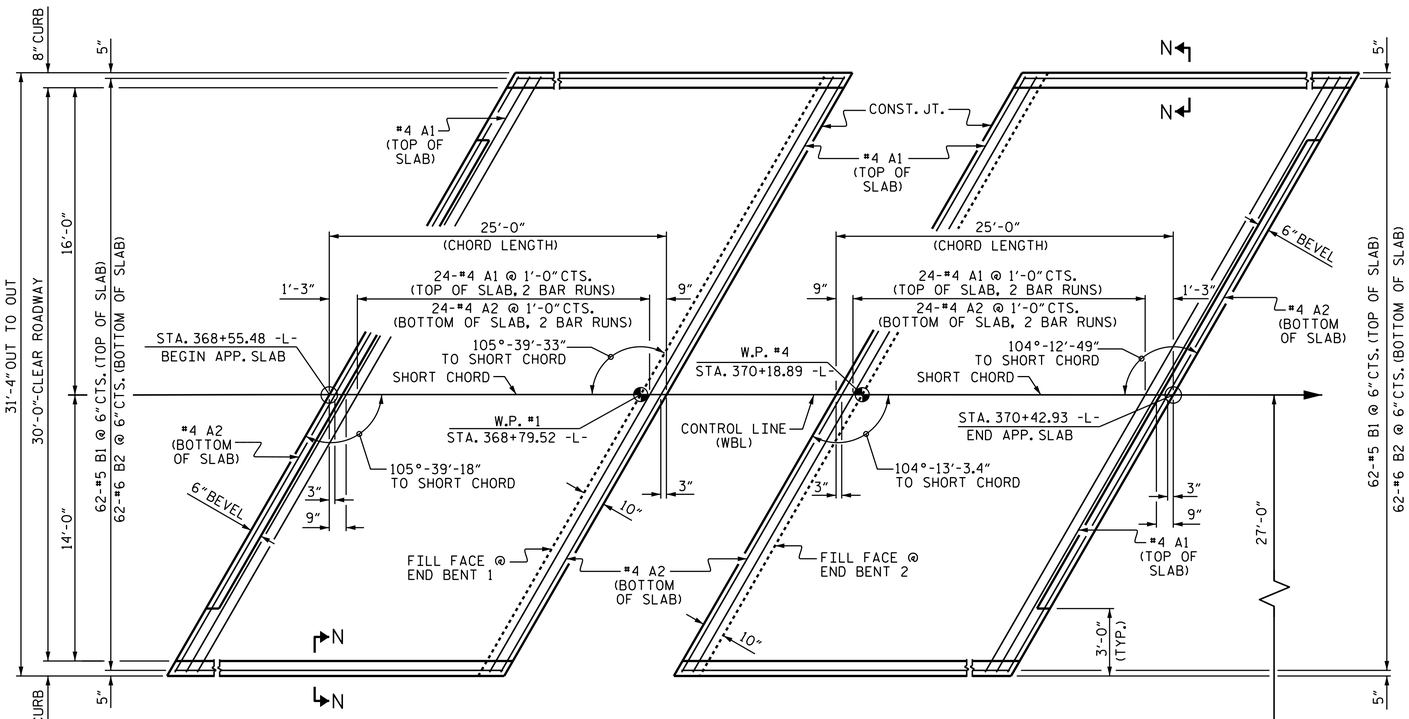
kalford

STD. NO. RR1

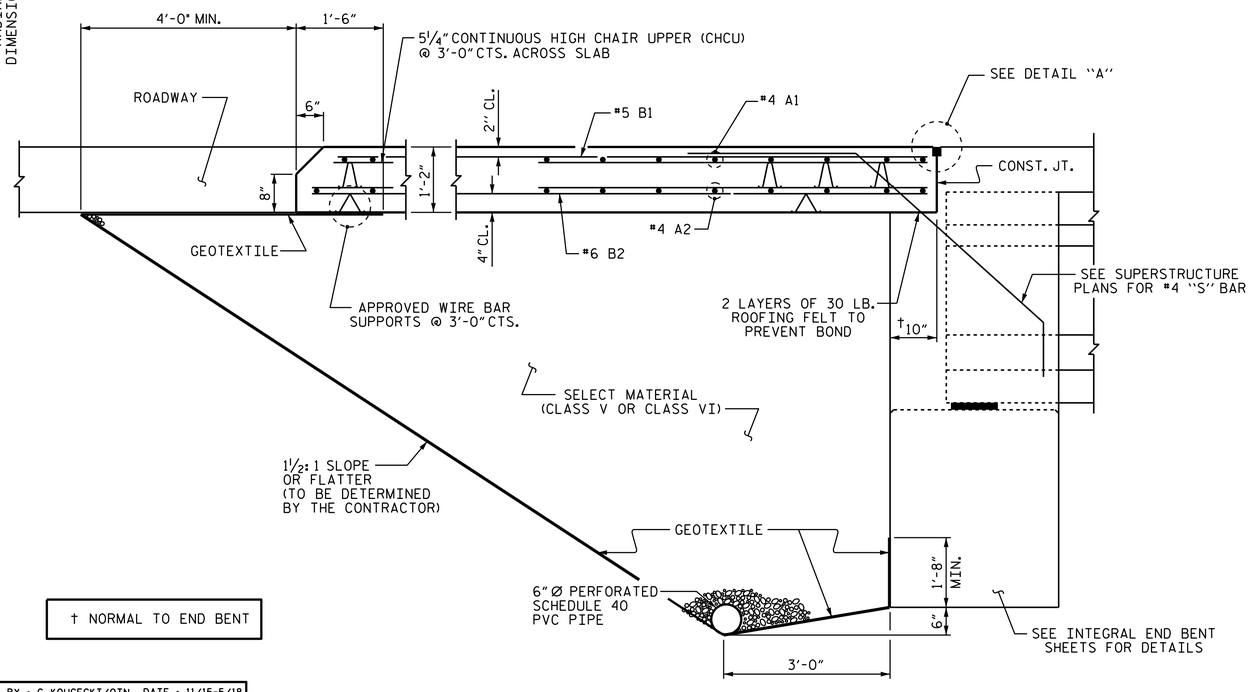


PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

RADIAL DIMENSIONS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

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

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

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

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

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

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

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

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

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

ARC OFFSETS ARE NEGLIGIBLE, THEREFORE NOT SHOWN.

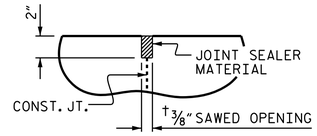
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

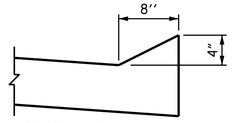
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	52	#4	STR	16'-5"	580
✳ A2	52	#4	STR	16'-5"	580
✳ B1	63	#5	STR	24'-0"	1552
✳ B2	63	#6	STR	24'-6"	2281
✳ EPOXY COATED REINFORCING STEEL					4994 LBS.
CLASS AA CONCRETE					35.2 C.Y.

SPLICE LENGTHS

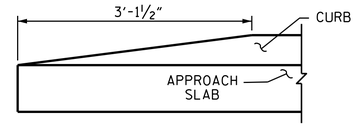
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



DETAIL "A"



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KORREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT (WBL)

ASSEMBLED BY : G. KOUGECKI/OTN	DATE : 11/15-5/18
CHECKED BY : M. K. BEARD	DATE : 11/18
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

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

SHEET NO. S1-37

TOTAL SHEETS 38

STR. #1

STD. NO. BAS5

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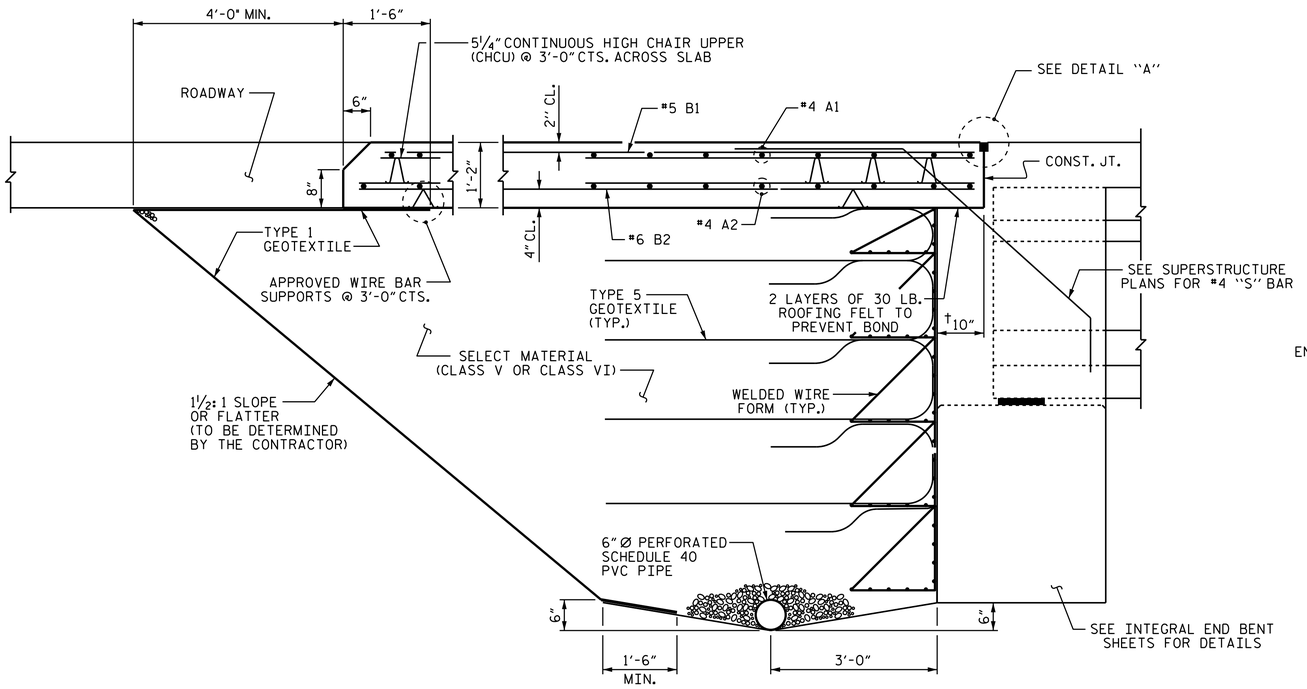
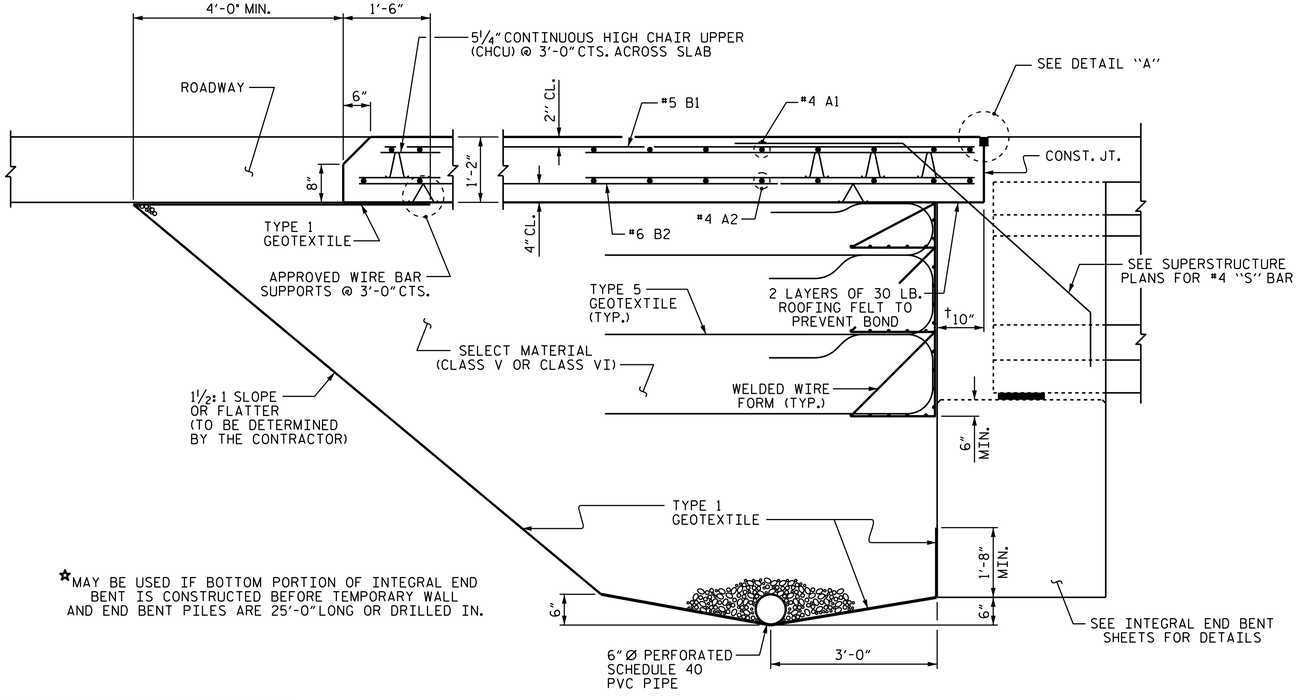
pknewton



SECTION THRU SLAB

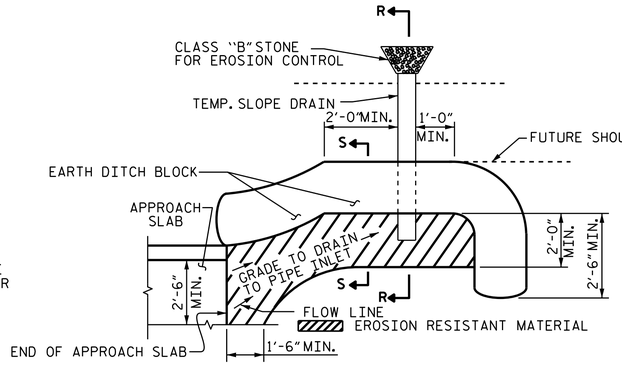
(TYPE A - ALTERNATE APPROACH FILL)



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

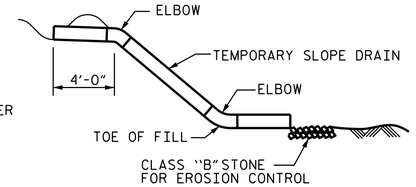
SECTION THRU SLAB

★(TYPE A - ALTERNATE APPROACH FILL)

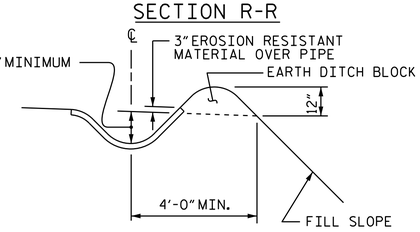


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



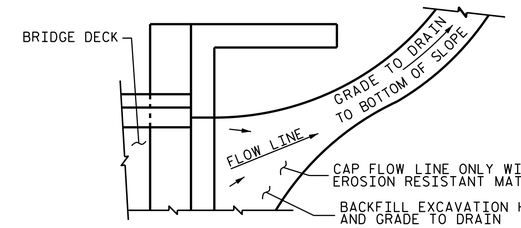
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

NOTES

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

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

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

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

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

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

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

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

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS (WBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...

8/17/2021

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-38
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. BAS5 (SHT 1b)

ASSEMBLED BY : P.K.NEWTON		DATE :	8/16/21
CHECKED BY : M.K.BEARD		DATE :	8/16/21
DRAWN BY : TLA 10/05	REV. 12/21/11		MAA/GM
CHECKED BY : GM 5/06	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

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pknewton

F.A. PROJECT STP-0211(21)

368+50 369+00 369+50 370+00 370+50

(-)1.6698% (+)1.5244%

GRADE DATA

PI STA. = 371+10.00 -L-
EL = 13.20'
VC = 520'

30 20 10 0

W.P. #1
FILL FACE @
END BENT 1
STA. 368+64.42 -L-
GRADE POINT EL. 16.63

W.P. #4
FILL FACE @
END BENT 2
STA. 370+05.05 -L-
GRADE POINT EL. 15.02

SPAN A SPAN B SPAN C

W.S. EL. 0.50
DATE 07-29-14

0100
EL. 9.15

BEGIN FRONT SLOPE
STA. 368+54.21 -L-
GRADE POINT EL. 16.80

BEGIN FRONT SLOPE
STA. 370+14.88 -L-
GRADE POINT EL. 14.95

FIX. 1'-0" MIN. EARTH BERM (TYP.)

LOW CHORD EL. 12.44

LOW CHORD EL. 10.82

FIX. FIX. FIX. FIX. FIX.

EL. 11.0±

1'-0" (TYP.)

1½:1 SLOPE NORMAL TO CAP

EL. 2.0± EL. 1.0± EL. 1.0± EL. 0.0± EL. 1.0± EL. 2.0±

RETAIN EXISTING CONCRETE ABUTMENTS AND CUT OFF AT EL. 5.0

EXCAVATE TO EL. 5.0 (TYP.)

CLASS II RIP RAP (TYP.)

16" PRESTRESSED CONCRETE PILES (TYP.)

HP 12 X 53 STEEL PILES (TYP.)

APPROX. NATURAL GROUND LINE

UNCLASSIFIED EXCAVATION

END BENT 1 (INTEGRAL) BENT 1 BENT 2 END BENT 2 (INTEGRAL)

SECTION ALONG EBL

SECTIONS AT END BENTS AND BENTS ARE AT RIGHT ANGLES.

BRIDGE I.D.
STA. 369+42.00 -L-

-L-

TO NC 133
(LONG BEACH RD.)

TO NC 133
(DOSHER CUTOFF)

1'-0" MIN. EARTH BERM (LEVEL) EL. 7.28

1'-0" MIN. EARTH BERM (LEVEL) EL. 5.67

BEGIN APPROACH SLAB
STA. 368+40.18 -L-

W.P. #1
STA. 368+64.42 -L-

BEGIN FRONT SLOPE
STA. 368+54.21 -L-

BENT 1 CONTROL LINE

BENT 2 CONTROL LINE

EXISTING STRUCTURE

105°-00'-00" (TAN. TO CURVE)

W.P. #4
STA. 370+05.05 -L-

END APPROACH SLAB
STA. 370+29.29 -L-

BEGIN FRONT SLOPE
STA. 370+14.88 -L-

27'-0" (RADIAL)

CONTROL LINE (EBL)

W.P. #2
STA. 369+03.09 -L-

STA. 369+34.73 -L-

W.P. #3
STA. 369+66.38 -L-

105°-54'-01" TAN. TO CURVE

105°-41'-10" TAN. TO CURVE

105°-20'-39" TAN. TO CURVE

105°-03'-51" TAN. TO CURVE

104°-47'-04" TAN. TO CURVE

104°-26'-33" TAN. TO CURVE

104°-13'-42" TAN. TO CURVE

FILL FACE @
END BENT 1

FILL FACE @
END BENT 2

DUTCHMAN CREEK

31'-6⅛" (ALONG CONTROL LINE)

31'-6⅛" (ALONG CONTROL LINE)

38'-6⅛" (ALONG CONTROL LINE) (SPAN A)

63'-0¼" (ALONG CONTROL LINE) (SPAN B)

38'-6⅛" (ALONG CONTROL LINE) (SPAN C)

TOTAL BRIDGE LENGTH = 140'-0½" (FILL FACE TO FILL FACE ALONG CONTROL LINE)

CLASS II RIP RAP (TYP.)

PLAN

(PILES NOT SHOWN FOR CLARITY, BENTS ARE PARALLEL)

HORIZONTAL CURVE DATA -L-

PI STA. 374+14.38 -L-
Δ = 23°-51'-25.5" (RT)
D = 0°-53'-03.1"
L = 2,698.17'
T = 1368.92'
R = 6480.00'

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by:
F24583893OBF40E...
1/23/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : A. K. PATEL/S. B. WILLIAMS DATE : 4-30-2018
CHECKED BY : M. K. BEARD DATE : 5-3-18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 4-18

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kalford

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 24

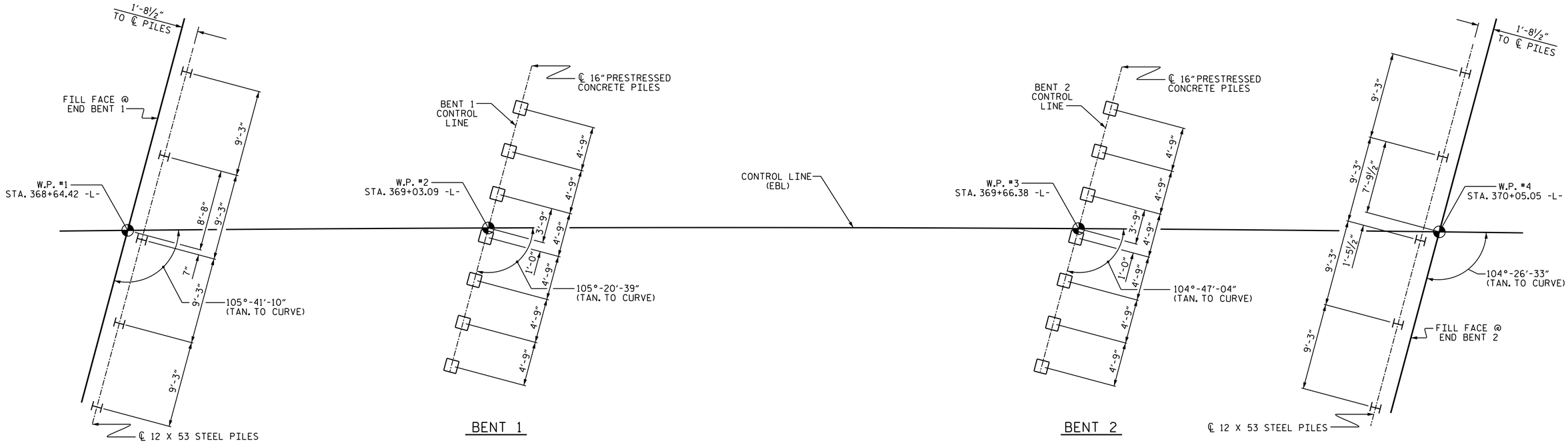
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 211
OVER DUTCHMAN CREEK
BETWEEN NC 133 (LONG BEACH RD.)
AND NC 133 (DOSHER CUTOFF)
(EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-1
1			3			TOTAL SHEETS
2			4			38

STR. #2



END BENT 1

BENT 1

BENT 2

END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO CENTERLINE OF THE PILE AT THE BOTTOM OF THE CAP

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

PILES AT BENT 1 AND BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

DRIVE PILES AT BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

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

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.

INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN -28.0 FEET.

INSTALL PILES AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN -30.0 FEET.

STEEL PILE TIPS ARE REQUIRED FOR PRESTRESSED CONCRETE PILES AT BENTS 1 AND 2. FOR STEEL PILE TIPS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT, AND REINFORCED BRIDGE APPROACH FILL BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENTS 1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 AND BENT 2 IS ELEVATION -6.0 FEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F24583893OBF40E... 1/23/2019

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PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211 OVER DUTCHMAN CREEK BETWEEN NC 133 (LONG BEACH RD.) AND NC 133 (DOSHER CUTOFF) (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-2
1			3			TOTAL SHEETS
2			4			38

STR. #2

DRAWN BY : S. B. WILLIAMS DATE : 5/18
CHECKED BY : M. K. BEARD DATE : 5/24/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/17/19

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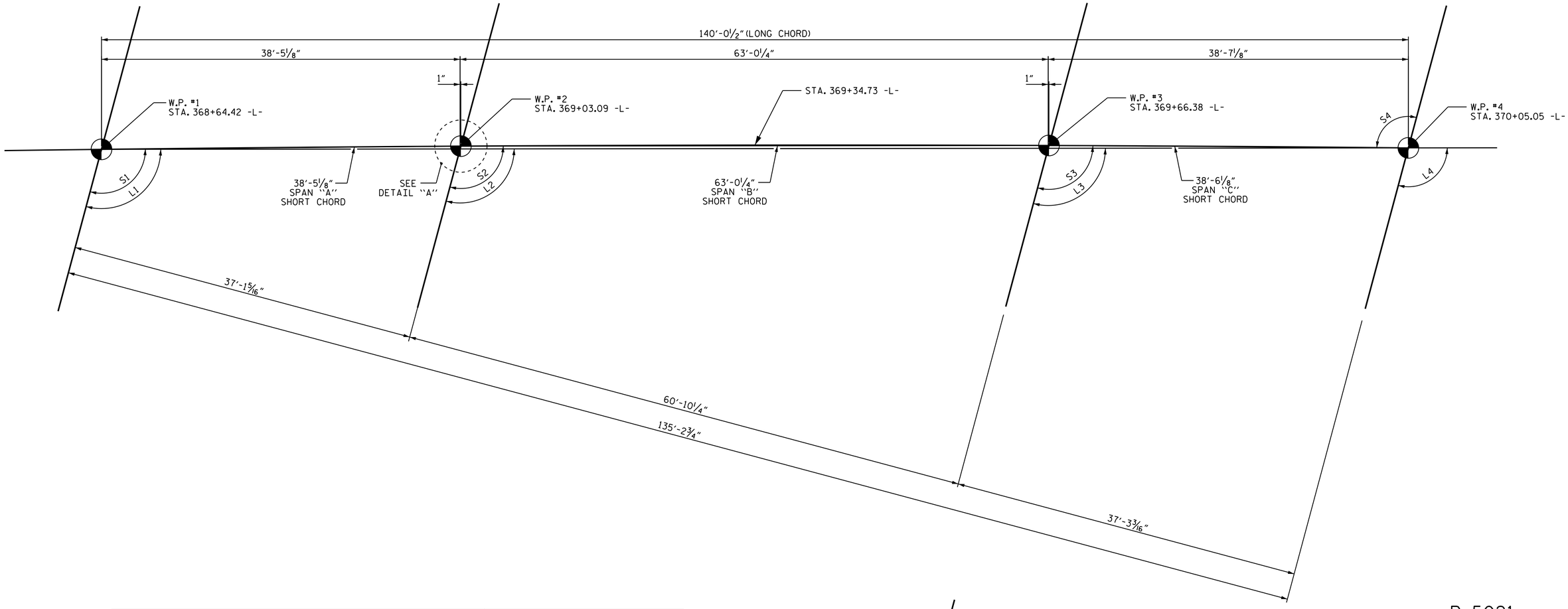
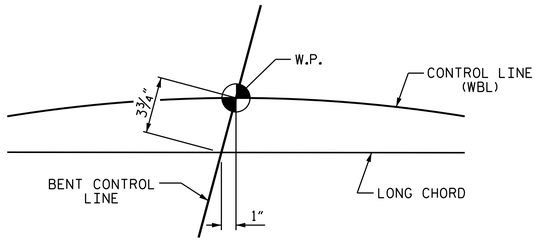
kalford



ANGLES			
LONG CHORD		SHORT CHORD	
L1	105°-03'-51"	S1	105°-30'-54"
L2	105°-03'-51"	S2	105°-03'-51"
L3	105°-03'-51"	S3	104°-36'-49"
L4	105°-03'-51"	S4	104°-36'-49"

HORIZONTAL CURVE DATA

PI STA. 374+14.38 -L-
Δ = 23°-51'-25.5"(RT)
D = 0°-53'-03.1"
L = 2,698.17'
T = 1368.92'
R = 6480.00'



DETAIL "A"
(TYPICAL EACH BENT)

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211 OVER DUTCHMAN CREEK BETWEEN NC 133 (LONG BEACH RD.) AND NC 133 (DOSHER CUTOFF) (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

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

SHEET NO. S2-3

TOTAL SHEETS 38

DRAWN BY : A.P./S. B. WILLIAMS DATE : 5/18
CHECKED BY : M. K. BEARD DATE : 5/24/18

20-JAN-2019 22:05
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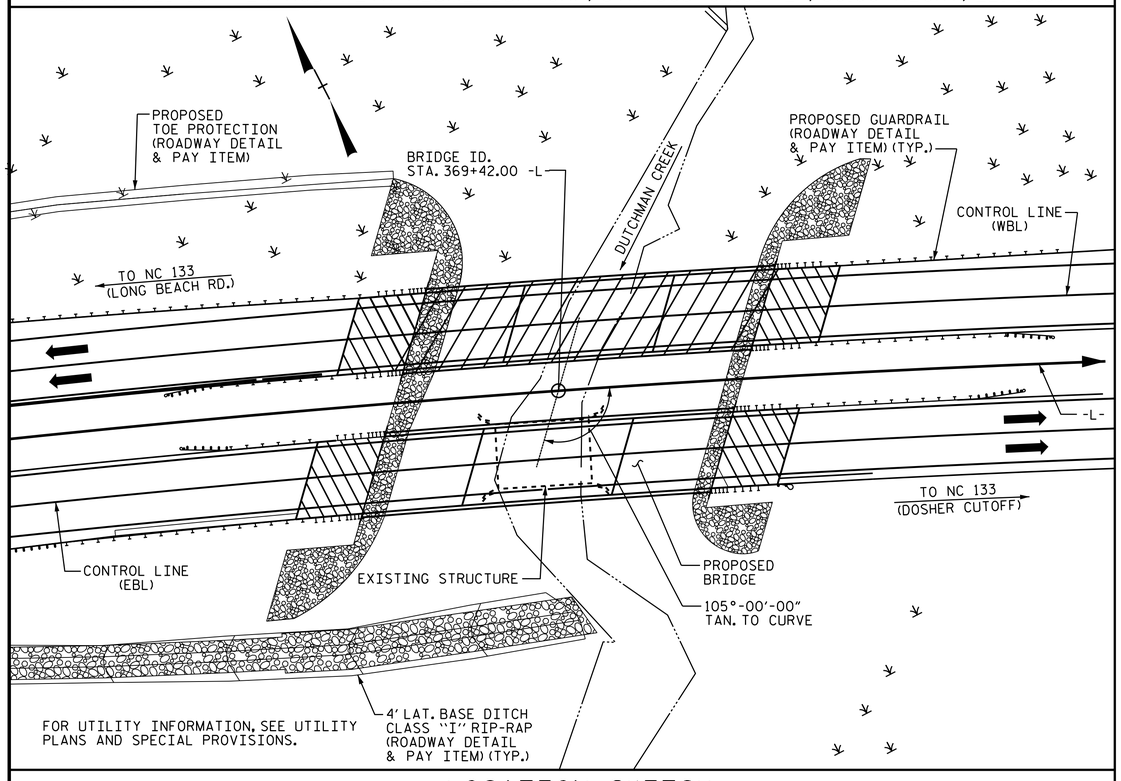
pknewton

STR. #2

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	36" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR 16" PRESTRESSED CONCRETE PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	16" PRESTRESSED CONCRETE PILES		HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LUMP SUM	EACH	LUMP SUM	SQ.FT.	SQ.FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EACH	EACH	NO.	LIN. FT.	NO.	LIN. FT.	EACH	EACH	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE				4507	5028				15	680.9									261.02	276.63				
END BENT 1			LUMP SUM			29.6		3519				5			5	325	5	5			130	145		
BENT 1						11.5		2239			7		7	490				7						
BENT 2						11.5		2239			7		7	350				7						
END BENT 2			LUMP SUM			29.6		3513				5			5	325	5	5			120	135		
TOTAL	LUMP SUM	2	LUMP SUM	4507	5028	82.2	LUMP SUM	11510	15	680.9	14	10	14	840	10	650	10	24	261.02	276.63	250	280	LUMP SUM	LUMP SUM

BM #R5021-10 - 24" ROD WITH ALUMINIUM CAP, STA. 365+04.81 -L-, 39.66' RIGHT, EL. 18.37



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 2300 CFS
FREQUENCY OF DESIGN DISCHARGE	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 8.9 FT.
DRAINAGE AREA	= 5.2 SQ. MI.
BASE DISCHARGE (Q100)	= 2500 CFS
BASE HIGH WATER ELEVATION	= 9.15 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2900+ CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 16.37 FT.

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES".

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE, CONSISTING OF 1 SPAN @ 31'-0" WITH A CLEAR ROADWAY WIDTH OF 28'-11" AND REINFORCED CONCRETE DECK GIRDERS WITH 3" AWS ON REINFORCED CONCRETE ABUTMENTS SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING THE CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

ALL METALIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDTITIONS.

PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE GIRDERS, PRECAST DECK PANELS, AND PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE END BENT AND BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

ALL BAR SUPPORTS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE END BENT AND BENT CAPS, AND PRESTRESSED CONCRETE PILES OF BENTS 1 & 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 34 FT. EACH SIDE OF CENTERLINE ROADWAY AT END BENT 1 AND 55 FT. EACH SIDE OF CENTERLINE ROADWAY AT END BENT 2 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.

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

Docusigned by: 1/23/2019

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

DRAWN BY : A. K. PATEL/S. B. WILLIAMS DATE : 4/30/18
CHECKED BY : M. K. BEARD DATE : 5/3/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/17/19

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Kalford

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PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 211 OVER DUTCHMAN CREEK BETWEEN NC 133 (LONG BEACH RD.) AND NC 133 (DOSHER CUTOFF) (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-4
1			3			TOTAL SHEETS
2			4			38

STR. #2

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⬡ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.02	--	1.75	0.674	1.77	C	I	17.833	0.748	1.91	A	I	10.698	0.80	0.643	1.02	B	EL	30.422	
		HL-93(Opr)	N/A	--	2.30	--	1.35	0.674	2.3	C	I	17.833	0.748	2.47	A	I	10.698	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.30	46.801	1.75	0.674	2.29	C	I	14.266	0.748	2.16	A	I	24.962	0.80	0.643	1.30	B	EL	30.422	
		HS-20(Opr)	36.000	--	2.80	100.834	1.35	0.674	2.97	C	I	14.266	0.748	2.80	A	I	24.962	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.82	38.081	1.4	0.674	5.1	C	I	17.833	0.748	5.14	A	I	24.962	0.80	0.643	2.82	B	EL	30.422	
		SNGARBS2	20.000	--	2.15	42.998	1.4	0.674	4.24	C	I	14.266	0.748	4.05	A	I	24.962	0.80	0.643	2.15	B	EL	30.422	
		SNAGRIS2	22.000	--	2.06	45.247	1.4	0.674	4.18	C	I	14.266	0.748	3.93	A	I	24.962	0.80	0.643	2.06	B	EL	30.422	
		SNCOTTS3	27.250	--	1.41	38.288	1.4	0.674	2.55	C	I	17.833	0.748	2.60	A	I	24.962	0.80	0.643	1.41	B	EL	30.422	
		SNAGGRS4	34.925	--	1.19	41.644	1.4	0.674	2.34	C	I	17.833	0.748	2.45	A	I	24.962	0.80	0.643	1.19	B	EL	30.422	
		SNS5A	35.550	--	1.17	41.408	1.4	0.674	2.27	C	I	17.833	0.748	2.66	A	I	24.962	0.80	0.643	1.16	B	EL	30.422	
		SNS6A	39.950	--	1.08	43.004	1.4	0.674	2.18	C	I	17.833	0.748	2.56	A	I	24.962	0.80	0.643	1.08	B	EL	30.422	
		SNS7B	42.000	--	1.03	43.067	1.4	0.674	2.08	C	I	17.833	0.748	2.65	A	I	24.962	0.80	0.643	1.03	B	EL	30.422	
	TTST	TNAGRIT3	33.000	--	1.32	43.395	1.4	0.674	2.69	C	I	17.833	0.748	2.95	A	I	24.962	0.80	0.643	1.31	B	EL	30.422	
		TNT4A	33.075	--	1.32	43.756	1.4	0.674	2.72	C	I	17.833	0.748	2.71	A	I	24.962	0.80	0.643	1.32	B	EL	30.422	
		TNT6A	41.600	--	1.09	45.312	1.4	0.674	2.33	C	I	17.833	0.748	2.63	A	I	24.962	0.80	0.643	1.09	B	EL	30.422	
		TNT7A	42.000	--	1.10	46.148	1.4	0.674	2.41	C	I	17.833	0.748	2.57	A	I	24.962	0.80	0.643	1.10	B	EL	30.422	
		TNT7B	42.000	--	1.15	48.171	1.4	0.674	2.4	C	I	17.833	0.748	2.47	A	I	24.962	0.80	0.643	1.15	B	EL	30.422	
		TNAGRIT4	43.000	--	1.08	46.589	1.4	0.674	2.36	C	I	14.266	0.748	2.40	A	I	24.962	0.80	0.643	1.08	B	EL	30.422	
		TNAGT5A	45.000	--	1.02	45.812	1.4	0.674	2.21	C	I	17.833	0.748	2.58	A	I	24.962	0.80	0.643	1.02	B	EL	30.422	
		TNAGT5B	45.000	3	1.00	45.119	1.4	0.674	2.14	C	I	17.833	0.748	2.25	A	I	24.962	0.80	0.643	1.00	B	EL	30.422	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

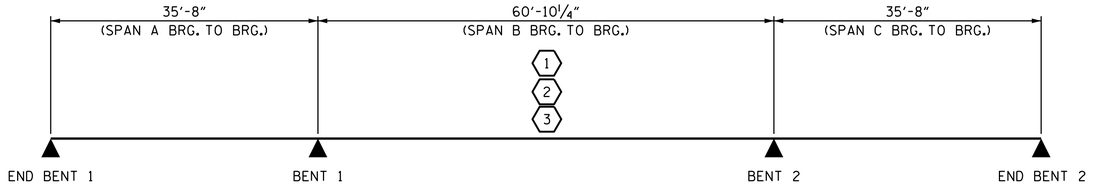
⬡ CONTROLLING LOAD RATING

1. DESIGN LOAD RATING (HL-93)
2. DESIGN LOAD RATING (HS-20)
3. LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE : 7/31/17
ASSEMBLED BY : P. K. NEWTON DATE : 7/25/17
CHECKED BY : A. K. PATEL DATE : 7/28/17
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
(EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-5
1			3			TOTAL SHEETS
2			4			38

STR. #2 STD. NO. LRFR1

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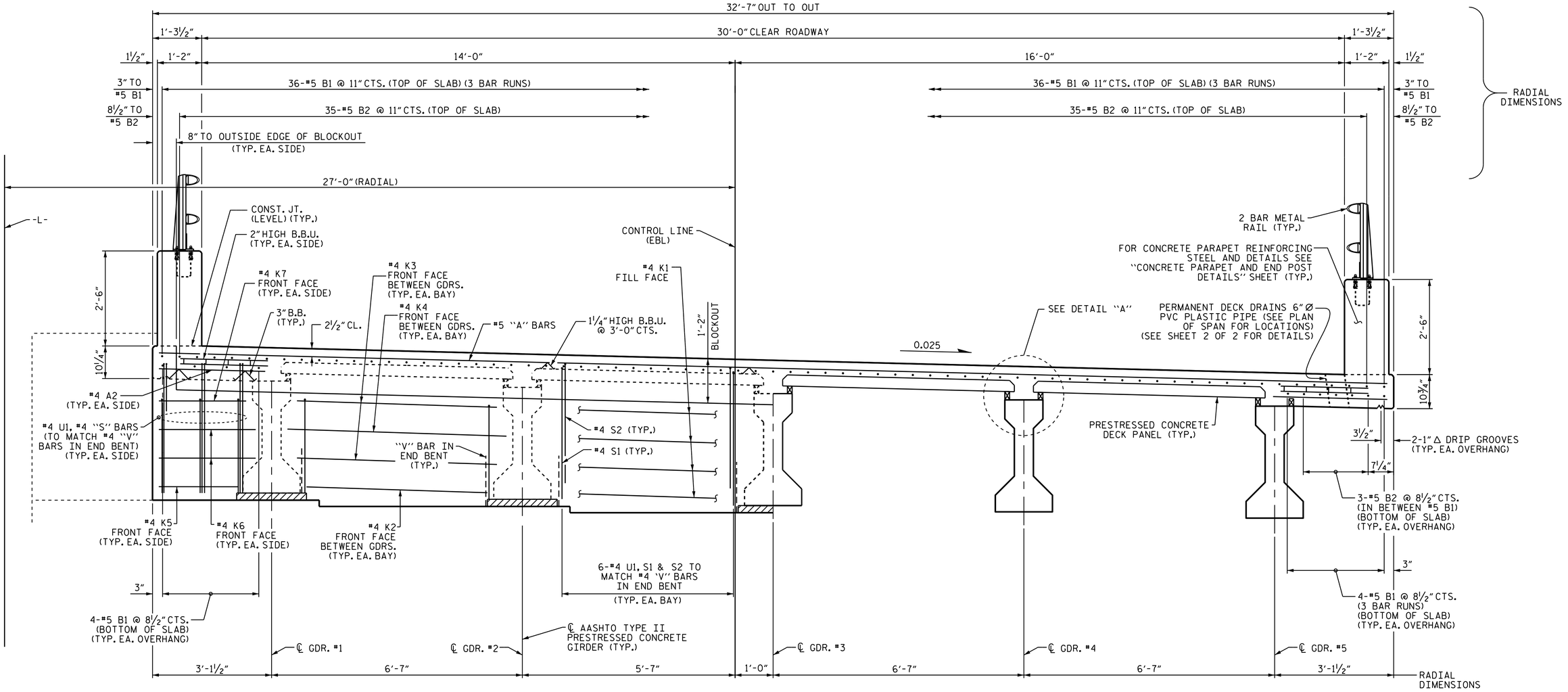
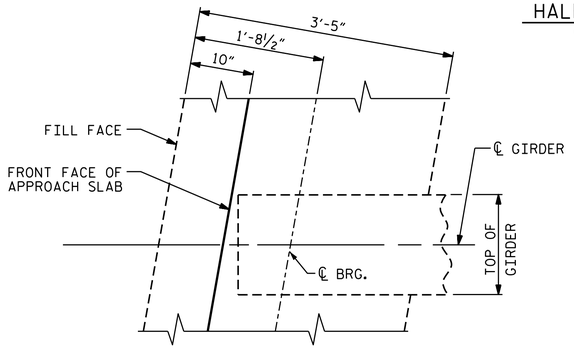


HALF TYPICAL SECTION
(@ INTEGRAL END BENT)

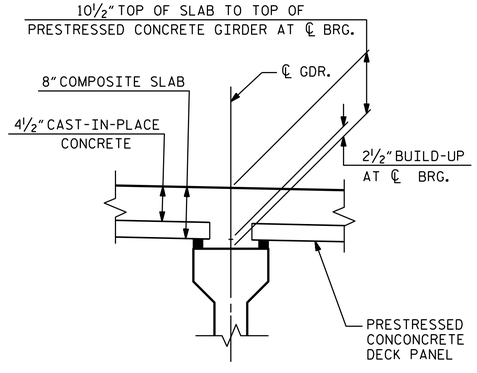
TYPICAL SECTION

HALF TYPICAL SECTION
(@ LINK SLAB--OVER BENTS)



PLAN OF GIRDER AT INTEGRAL END BENT

INTEGRAL END BENT DETAIL



DETAIL "A"

NOTES:

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

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

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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton 47E93D1451B407...
8/27/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION
(EBL)

DRAWN BY :	WFP / OTN / MKB	DATE :	7/29/21
CHECKED BY :	D. R. SHACKELFORD	DATE :	8/11/21
DESIGN ENGINEER OF RECORD:	P. K. NEWTON	DATE :	8/12/21

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-6
1			3			TOTAL SHEETS
2			4			38

STR. #2

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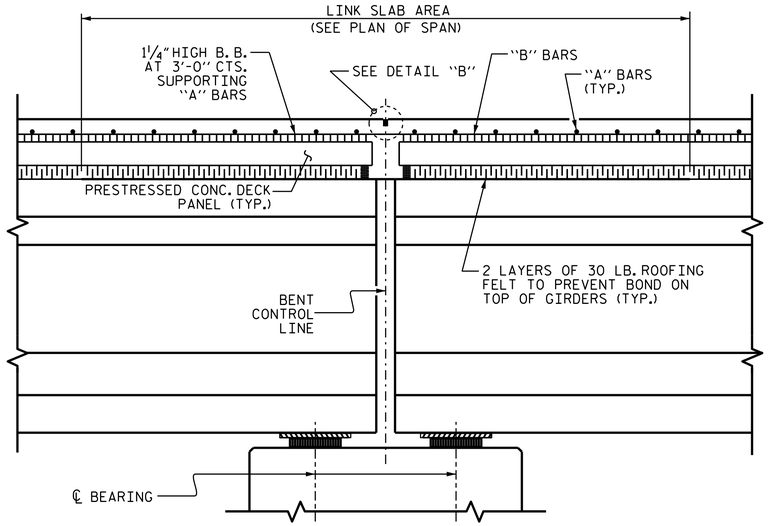
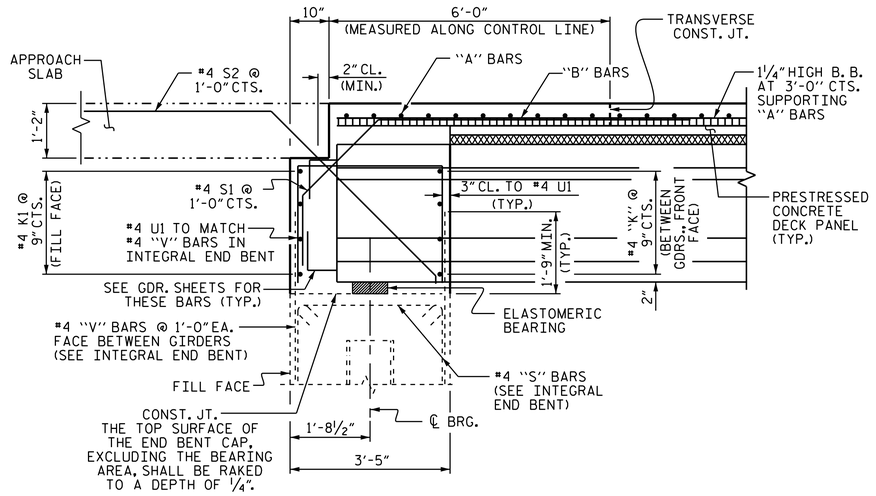
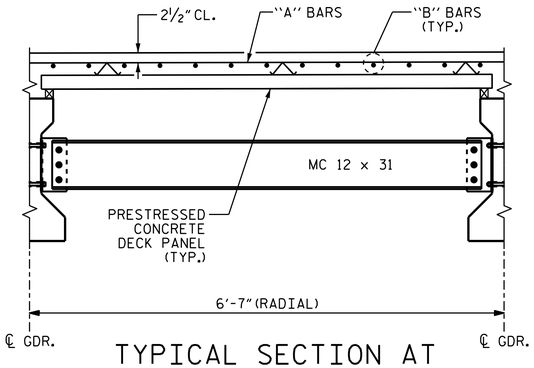


SECTION @ LINK SLAB

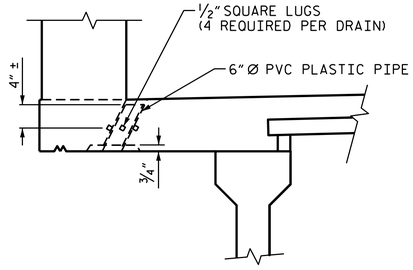


END OF GIRDER DETAIL AT INTEGRAL END BENT

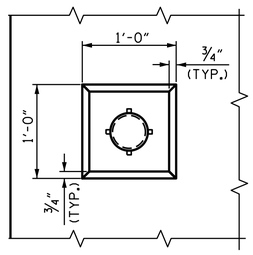


TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

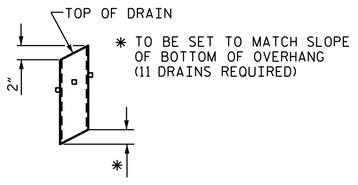
(TYP. EA. BAY IN SPAN B)



ELEVATION



PLAN OF RECESS



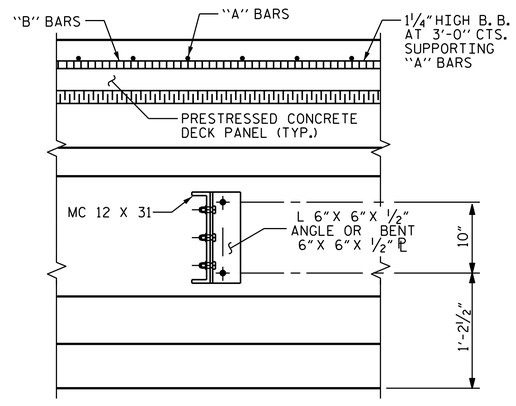
PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET ⅜" BELOW SURFACE OF SLAB.

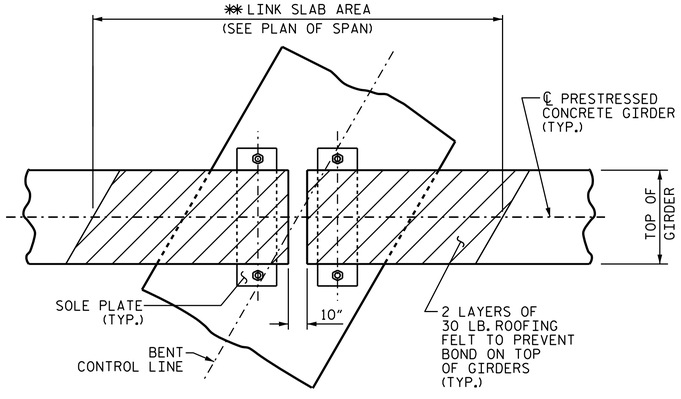
4 - 1"2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS

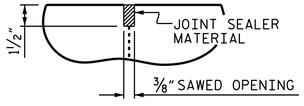


SECTION AT INTERMEDIATE DIAPHRAGM



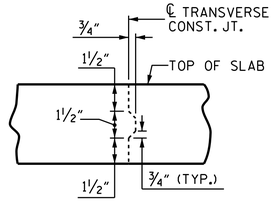
PLAN OF LINK SLAB

** THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.



DETAIL "B"

A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT THE BENT CONTROL LINE SHALL BE SAWED WITHIN 24 HOURS OF POURING THE LINK SLAB DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

NORTH CAROLINA PROFESSIONAL SEAL 26445 P. ENGINEER KOREY NEWTON

DocuSigned by: P. Korey Newton 8/16/2021

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-7
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : WFP / OTN / MKB DATE : 7/29/21
CHECKED BY : D. R. SHACKELFORD DATE : 8/11/21
DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE : 8/12/21

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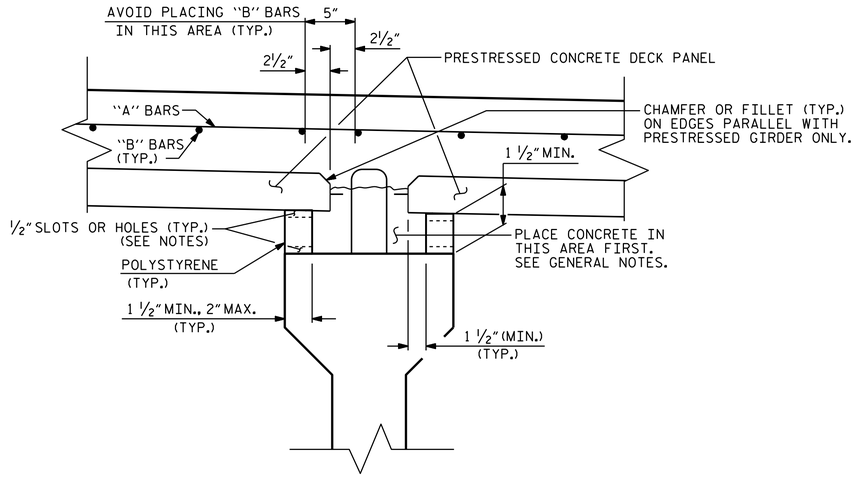
STR. #2

DECK PANEL SUPPORTS

THE CONTRACTOR SHALL PROVIDE THE DECK PANEL SUPPORT SYSTEM SHOWN OR HE MAY SUBMIT A DECK PANEL SUPPORT SYSTEM OF HIS OWN DESIGN TO THE ENGINEER FOR APPROVAL.

POLYSTYRENE SUPPORT SYSTEM

1. ALL POLYSTYRENE SHALL BE DOW STYROFOAM 60 HIGH-LOAD, UC INDUSTRIES FOAMULAR 600 OR APPROVED EQUAL.
2. THE POLYSTYRENE SUPPORT SYSTEM SHALL CONSIST OF ONE LAYER WITH A MINIMUM WIDTH OF 1½" AND A MAXIMUM WIDTH OF 2". THE POLYSTYRENE SHALL HAVE ½" X ½" WIDE SLOTS OR ½" DIAMETER HOLES AT 4'-0" CENTERS STAGGERED ALONG THE TOP AND BOTTOM.
3. THE POLYSTYRENE MAY BE CUT AND PLACED ON EDGE AS NECESSARY TO MATCH THE REQUIRED BUILDUP PROFILE ALONG THE GIRDER.
4. ADHESIVE, AS APPROVED BY THE ENGINEER, SHALL BE APPLIED TO THE TOP OF THE GIRDER IN A CONTINUOUS BEAD AND IN SUFFICIENT AMOUNT TO PREVENT THE POLYSTYRENE FROM BLOWING OUT AND TO PREVENT GAPS FROM FORMING BETWEEN THE POLYSTYRENE AND THE GIRDER. PRIOR TO PLACEMENT OF THE DECK PANELS, THE ADHESIVE SHALL ALSO BE APPLIED TO THE TOP OF THE POLYSTYRENE.
5. CONCRETE-FILLED BUCKETS, STACKS OF DECK PANELS, BUNDLED REINFORCING BARS OR OTHER HEAVY CONCENTRATED LOADS WILL NOT BE PERMITTED ON THE DECK PANEL ONCE THE PANEL HAS BEEN PLACED ON THE POLYSTYRENE SUPPORT SYSTEM.



POLYSTYRENE SUPPORT

GENERAL NOTES

1. THE DESIGN COMPRESSIVE STRENGTH (f'c) FOR THE CONCRETE IN PRESTRESSED PANELS SHALL BE 5000 PSI MINIMUM AT 28 DAYS. COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS SHALL BE 4000 PSI MINIMUM.
2. THE PRECAST PRESTRESSED PANEL SHALL HAVE A THICKNESS OF 3 ½" WITH THE PRESTRESSED STRANDS LOCATED AT HALF THE DEPTH OF THE PANEL.
3. FOR SKEWED SPANS, TRAPEZOIDAL CLOSURE PANELS SHALL HAVE A MINIMUM WIDTH OF 2 FEET ON THE SHORT SIDE.
4. ALL PRESTRESSING STRANDS SHALL EXTEND 2" BEYOND THE PANEL EDGES.
5. SHEAR REINFORCING OF 0.60 SQ. INCHES OF REINFORCING STEEL PER 10 SQ. FEET OF PANEL SURFACE SHALL BE PROVIDED IN THE PANEL TO ENSURE COMPOSITE ACTION BETWEEN PANEL AND THE CAST-IN-PLACE CONCRETE. SHEAR REINFORCEMENT SHALL BE MADE OF WELDED WIRE HAVING A MINIMUM YIELD STRENGTH OF 60 KSI.
6. SHEAR REINFORCEMENT AND LIFTING DEVICES SHALL BE CONSTRUCTED AND PLACED SO AS TO AVOID ANY INTERFERENCE WITH REINFORCING STEEL IN THE CAST-IN-PLACE DECK SLAB AND TO ALLOW FOR PROPER CONCRETE CONSOLIDATION IN THE DECK PANEL.
7. SHIFT LONGITUDINAL "B" BARS AS NECESSARY TO OBTAIN A MINIMUM CLEAR DISTANCE OF 2 ½" TO THE RIGHT OR LEFT OF THE EDGE OF THE DECK PANEL. IF, IN SHIFTING TO OBTAIN THIS CLEARANCE, THE "B" BAR INTERFERES WITH THE STIRRUP IN THE TOP OF THE GIRDER THE "B" BAR MAY BE ELIMINATED.
8. WHEN CASTING THE DECK, PLACE CONCRETE FIRST OVER THE GIRDERS IN CONTINUOUS STRIPS A MINIMUM OF THREE PANEL LENGTHS AHEAD OF THE REST OF THE CONCRETE. CAREFULLY VIBRATE THE CONCRETE OVER THE GIRDERS SO THAT CONCRETE COMPLETELY FILLS THE AREA UNDER THE DECK PANEL OVERHANGS. THEN PLACE AND VIBRATE THE REMAINING DECK CONCRETE.
9. PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.
10. PRECAST PANELS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
11. ALL BAR SUPPORTS AND INCIDENTAL REINFORCING STEEL USED IN THE PRECAST PANELS SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5021

BRUNSWICK COUNTY

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NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRECAST PRESTRESSED CONCRETE DECK PANELS (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-8
1			3			TOTAL SHEETS
2			4			38

STR. #2

STD. NO. PDP1

ASSEMBLED BY : WFP / OTN	DATE : 8/15/18	
CHECKED BY : M. K. BEARD	DATE : 11/18	
DRAWN BY : ELR 1/92	REV. 5/1/06R	TLA/GM
CHECKED BY : GRP 4/92	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

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TOTAL LENGTH OF BRIDGE = 140'-0½" (ALONG CONTROL LINE)

38'-6⅛" W.P. #1 TO W.P. #2 (ALONG CONTROL LINE)

63'-0¼" W.P. #2 TO W.P. #3 (ALONG CONTROL LINE)

RADIAL DIMENSIONS

#4 U1, #4 "S" BARS (TO MATCH #4 "V" BARS IN END BENT)

4-#5 B1 @ 8½" CTS. BOTTOM OF SLAB (3 BAR RUN, 2'-5" MIN. SPLICE) (TYP. EA. OVERHANG)

3" TO #5 B1 (TYP.) (BOTTOM OF SLAB)

8½" (TYP.)

3" (TYP.)

5'-3" 5'-3" 3'-4" 3'-4" LINK SLAB AREA

#4 "K" BARS

GUTTERLINE

℄ GDR. A1

℄ GDR. B1

35-#5 B2 @ 11" CTS. (IN BETWEEN #5 B1) (TOP OF SLAB)

36-#5 B1 @ 11" CTS. (3 BAR RUNS) (12'-5" MIN. SPLICE) (TOP OF SLAB)

4-#4 "K" BARS (TYP. EA. BAY)

6-#4 U1 (TO MATCH #4 "V" BARS IN END BENT) (TYP. EA. BAY)

16'-1⅜"

14'-0"

14'-8" (TO OUTSIDE OF BLOCKOUT)

32'-7" OUT TO OUT

30'-0" CLEAR ROADWAY

4-#4 K1

℄ GDR. A2

℄ GDR. B2

15'-10¼"

10" BLOCKOUT

2¾"

TRANSVERSE CONSTRUCTION JOINT (SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET FOR LOCATION)

105°-30'-54" TO SHORT CHORD

CONTROL LINE (EBL)

W.P. #2

SHORT CHORD

W.P. #1

SHORT CHORD

℄ GDR. A3

℄ GDR. B3

SEE DETAIL "A"

105°-30'-54" TO SHORT CHORD

105°-03'-51" TO SHORT CHORD

SPAN A

SPAN B

FILL FACE @ END BENT 1

℄ GDR. A4

℄ GDR. B4

17'-8¾"

#4 S1 (TYP.)

6-#4 S1 & S2 (TO MATCH #4 "V" BARS IN END BENT) (TYP. EA. BAY)

#5 A1

#4 S2 (TYP.)

3-#5 B2 @ 8½" CTS. (IN BETWEEN #5 B1) (BOTTOM OF SLAB) (TYP. EA. OVERHANG)

17'-11⅜"

16'-0"

16'-8" (TO OUTSIDE OF BLOCKOUT)

#4 U1, #4 "S" BARS (TO MATCH #4 "V" BARS IN END BENT)

#5 A101

℄ GDR. A5

℄ GDR. B5

GUTTERLINE

1'-3½" 1'-2" 1½"

#5 A116

8½" TO #5 B2 (TOP OF SLAB)

3" TO #5 B1

8½" TO #5 B2 (TOP OF SLAB)

BENT 1 CONTROL LINE

7¼" TO #5 B2 (TYP.) (BOTTOM OF SLAB)

7"

5-6" Ø P.V.C. DECK DRAINS @ 10'-0" CTS. ALONG GUTTERLINE

2'-5¾" 5'-3¼"

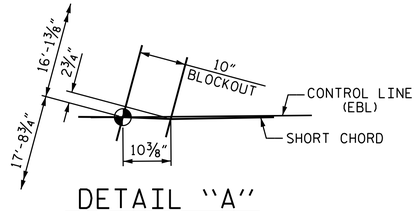
6"

#5 A101 THRU A116 @ 6" CTS.

259-#5 A1 @ 6" CTS. ALONG LONG CHORD (TOP OF SLAB)

92-#4 A2 @ 1'-6" CTS. ALONG LONG CHORD (TYP. EA. OVERHANG, BOTTOM OF SLAB)

PLAN OF SPAN A



DETAIL "A"

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER K. KOREY NEWTON

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8/16/2021

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CHECKED BY : D. R. SHACKELFORD DATE : 8/13/21

DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE : 8/13/21

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PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 4

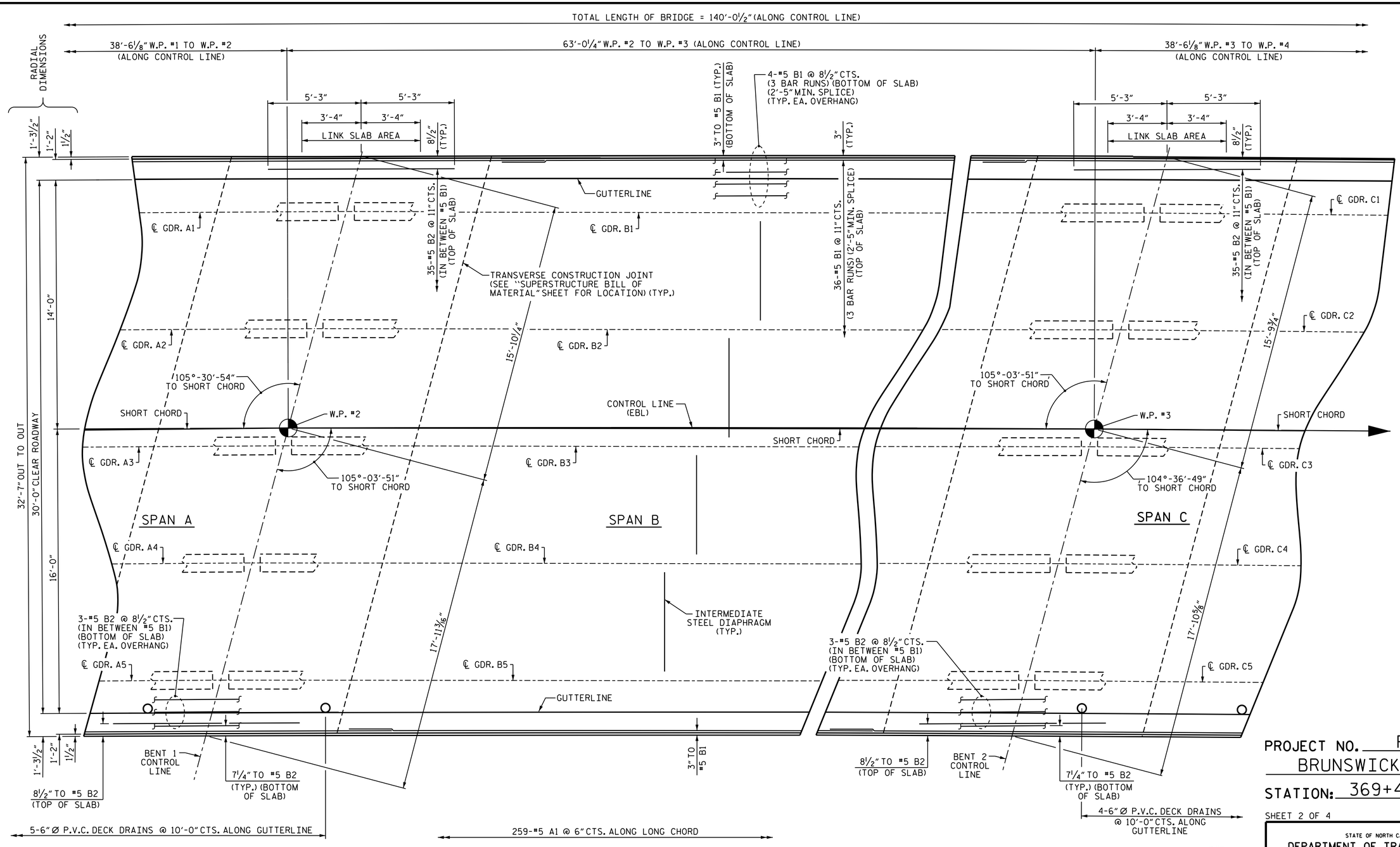
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-9
1			3			TOTAL SHEETS
2			4			38

STR. #2



PLAN OF SPAN B

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

DRAWN BY : WFP / QTN / MKB DATE : 8/12/21
CHECKED BY : D. R. SHACKELFORD DATE : 8/13/21
DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE : 8/13/21

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-10
1			3			TOTAL SHEETS
2			4			38

STR. #2

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TOTAL LENGTH OF BRIDGE = 140'-0½" (ALONG CONTROL LINE)

63'-0¼" W.P. #2 TO W.P. #3 (ALONG CONTROL LINE)

38'-6⅛" W.P. #3 TO W.P. #4 (ALONG CONTROL LINE)

92-#4 A2 @ 1'-6" CTS. ALONG LONG CHORD (TYP. EA. OVERHANG, BOTTOM OF SLAB)

RADIAL DIMENSIONS

259-#5 A1 @ 6" CTS. (ALONG LONG CHORD) (TOP OF SLAB)

#5 A117 THRU A132 @ 6" CTS.

5'-3" 5'-3"

3'-4" 3'-4"

LINK SLAB AREA

8½" (TYP.)

3" (TYP.)

3" TO #5 B1 (TYP.) (BOTTOM OF SLAB)

4-#5 B1 @ 8½" CTS. (3 BAR RUNS) (BOTTOM OF SLAB) (2'-5" MIN. SPLICE) (TYP. EA. OVERHANG)

8½" (TYP.)

6"

#5 A132

1½" 1'-2" 1'-3½"

GUTTERLINE

℄ GDR. B1

35-#5 B2 @ 11" CTS. (IN BETWEEN #5 B1) (TOP OF SLAB)

36-#5 B1 @ 11" CTS. (3 BAR RUNS) (2'-5" MIN. SPLICE) (TOP OF SLAB)

℄ GDR. C1

35-#5 B2 @ 11" CTS. (IN BETWEEN #5 B1) (TOP OF SLAB)

#4 U1, #4 "S" BARS (TO MATCH #4 "V" BARS IN END BENT)

#4 S1 (TYP.)

#5 A117

10" BLOCKOUT

6-#4 S1 & S2 ("V" BARS IN END BENT) (TYP. EA. BAY)

#4 S2 (TYP.)

℄ GDR. B2

15'-9¾"

℄ GDR. C2

FILL FACE @ END BENT 2

15'-6⅞"

14'-8" (TO OUTSIDE EDGE OF BLOCKOUT)

14'-0"

105°-03'-51" TO SHORT CHORD

SHORT CHORD

W.P. #3

CONTROL LINE (EBL)

TRANSVERSE CONSTRUCTION JOINT (SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET FOR LOCATION)

104°-36'-49" TO SHORT CHORD

W.P. #4

SHORT CHORD

℄ GDR. B3

℄ GDR. C3

SEE DETAIL "B"

2⅝"

104°-36'-49" TO SHORT CHORD

SPAN B

SPAN C

30'-0" CLEAR ROADWAY

32'-7" OUT TO OUT

℄ GDR. B4

℄ GDR. C4

4-#4 K1

17'-10⅜"

3-#5 B2 @ 8½" CTS. (IN BETWEEN #5 B1) (BOTTOM OF SLAB) (TYP. EA. OVERHANG)

6-#4 U1 (TO MATCH #4 "V" BARS IN END BENT) (TYP. EA. BAY)

4-#4 "K" BARS (TYP. EA. BAY)

18'-0⅞"

16'-8" (TO OUTSIDE EDGE OF BLOCKOUT)

16'-0"

℄ GDR. B5

℄ GDR. C5

GUTTERLINE

8½" TO #5 B2 (TOP OF SLAB)

BENT 2 CONTROL LINE

7¼" TO #5 B2 (TYP.) (BOTTOM OF SLAB)

3" CL. TO #5 B1

8½" TO #5 B2 (TOP OF SLAB)

#4 U1, #4 "S" BARS (TO MATCH #4 "V" BARS IN END BENT)

1½" 1'-2" 1'-3½"

4-6" Ø P.V.C. DECK DRAINS @ 10'-0" CTS. ALONG GUTTERLINE

9'-0"

PLAN OF SPAN C

CONTROL LINE (EBL)

10" BLOCKOUT

SHORT CHORD

10⅝"

2⅝"

15'-6⅞"

18'-0⅞"

DETAIL "B"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...

8/16/2021

DRAWN BY : WFP / QTN / MKB DATE : 8/12/21

CHECKED BY : D. R. SHACKELFORD DATE : 8/13/21

DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE : 8/13/21

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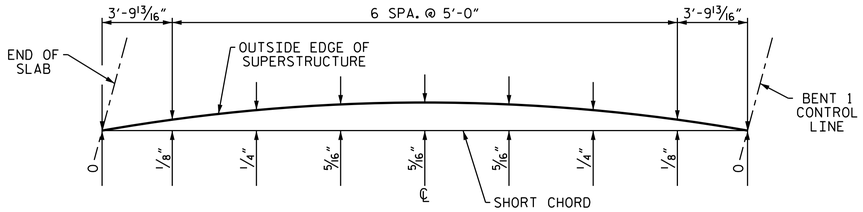
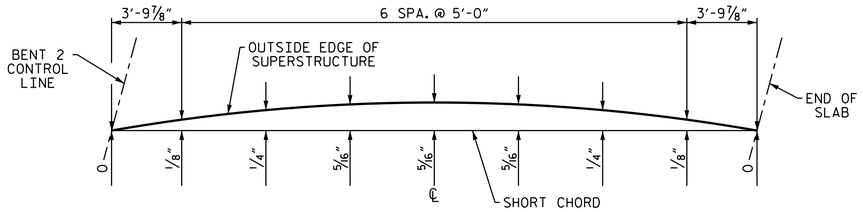
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS
2			4			38

STR. #2



LEFT SIDE - SPAN A



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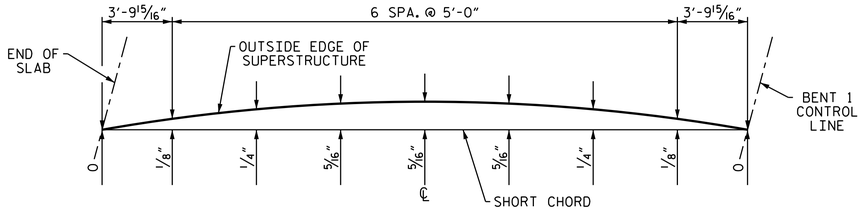

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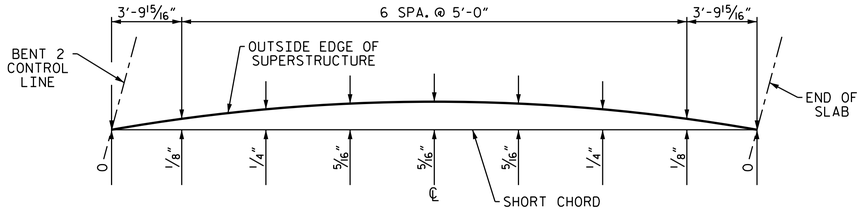

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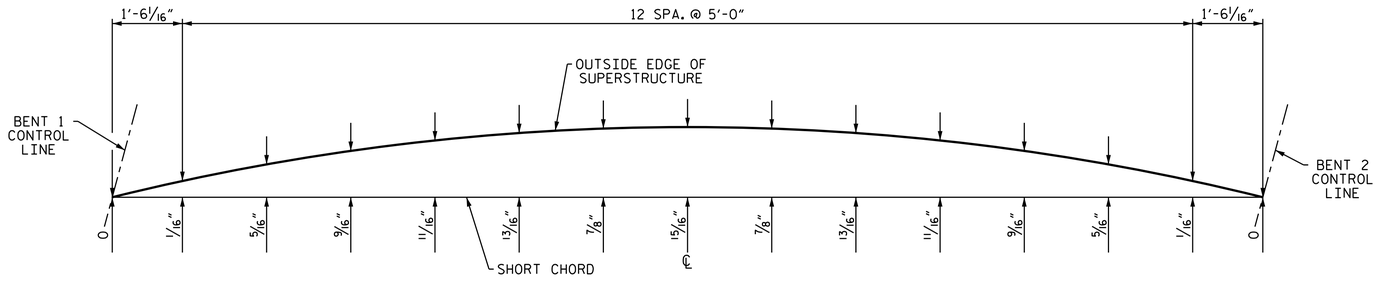
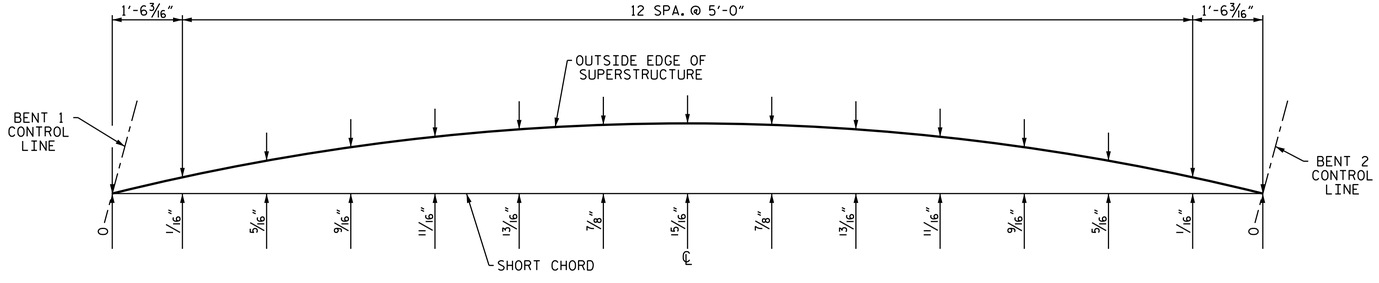


LEFT SIDE - SPAN B



RIGHT SIDE - SPAN B

ARC OFFSETS

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
ARC OFFSETS
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

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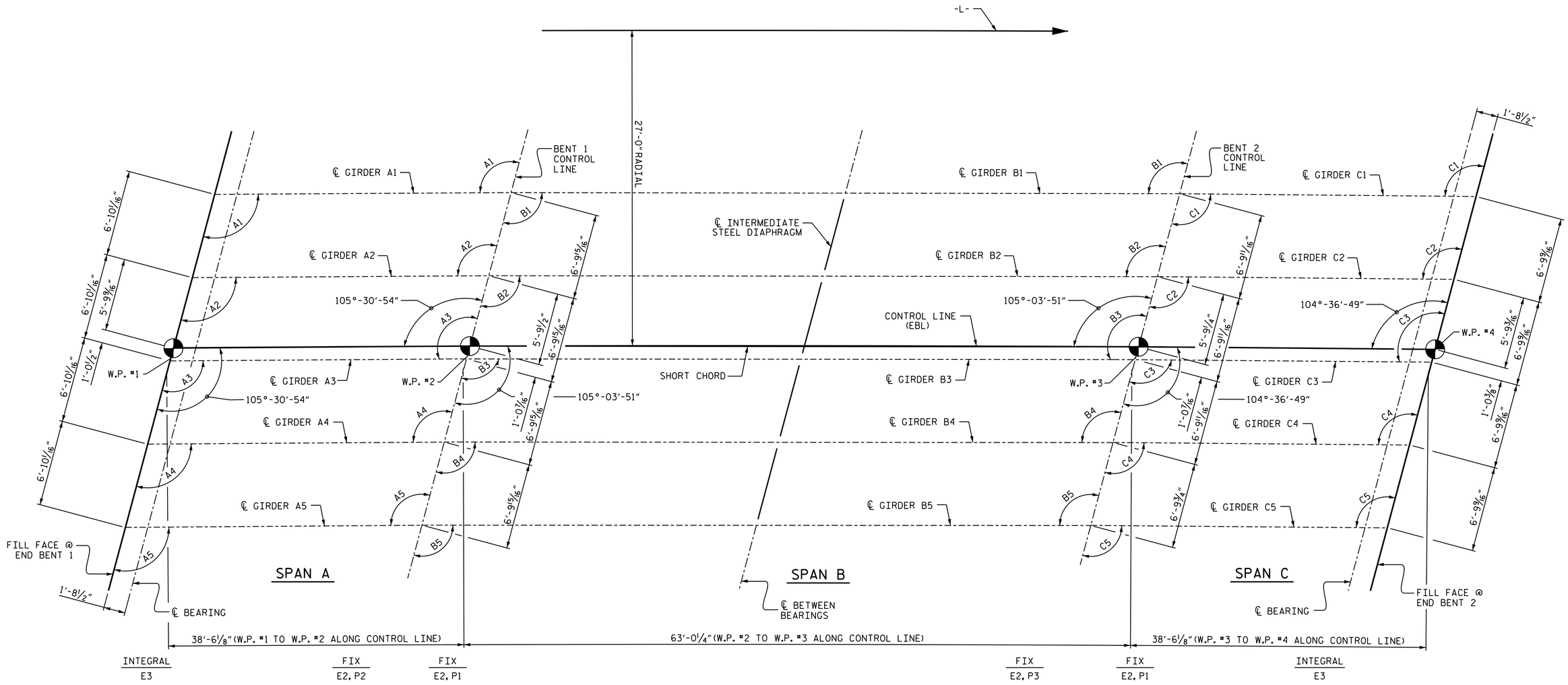

FRAMING PLAN

SKEW ANGLES					
SPAN A		SPAN B		SPAN C	
A1	105°-29'-06"	B1	105°-02'-07"	C1	104°-35'-07"
A2	105°-30'-05"	B2	105°-03'-03"	C2	104°-36'-02"
A3	105°-31'-03"	B3	105°-04'-00"	C3	104°-36'-57"
A4	105°-32'-01"	B4	105°-04'-57"	C4	104°-37'-52"
A5	105°-33'-00"	B5	105°-05'-54"	C5	104°-38'-47"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F24583930BF40E...

1/23/2019

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2			4		

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STR. #2

DRAWN BY : WFP / OTN DATE : 8/15/18
CHECKED BY : M. K. BEARD DATE : 11/18
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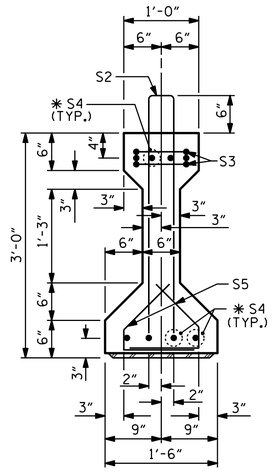
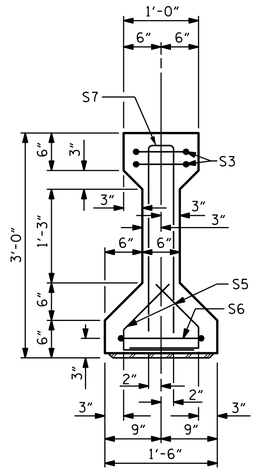
kalford



SECTION A-A



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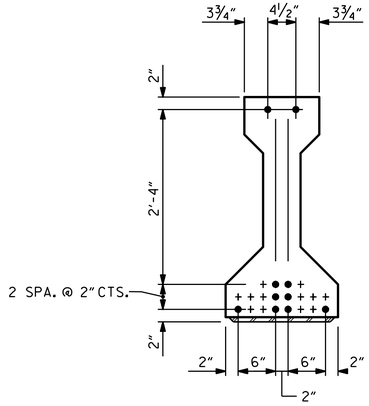
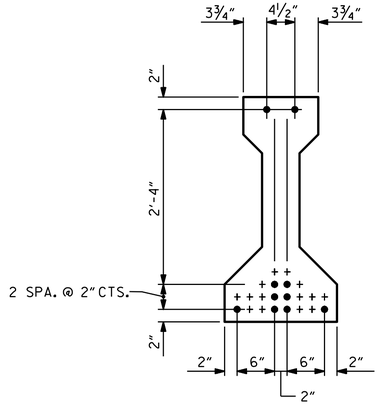
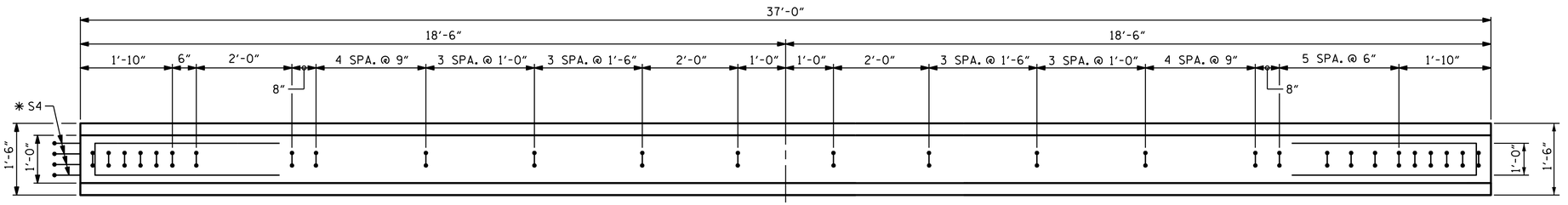


AT END OF GIRDER

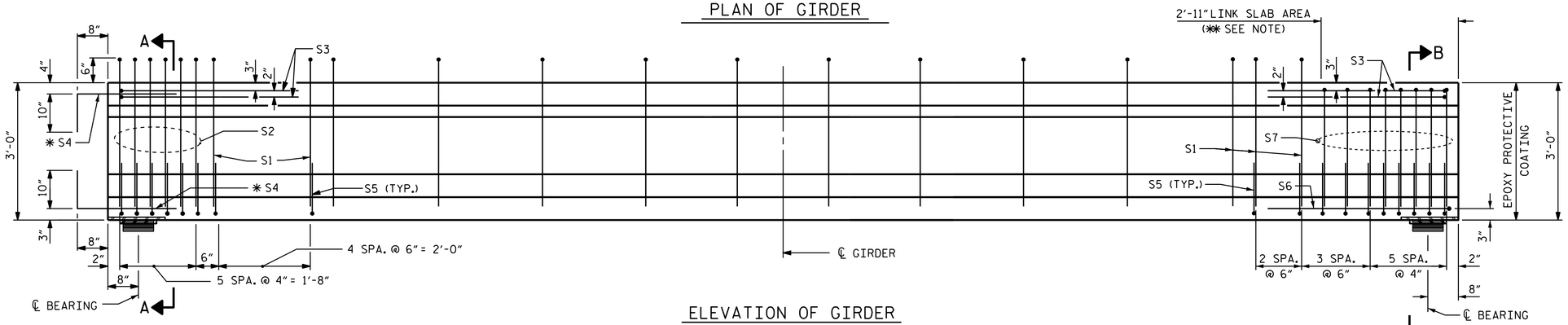


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



INTEGRAL END BENT

ELEVATION OF GIRDER

SPAN A SHOWN, SPAN C SIMILAR BY ROTATION

FIX

✱✱ THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.

0.6" Ø L. R. GRADE 270 STRANDS

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

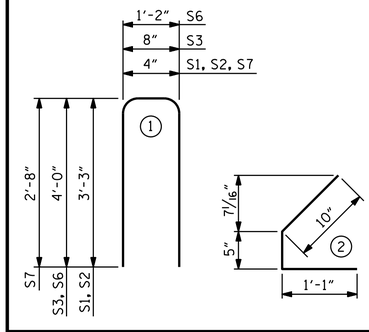
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	32	#4	1	6'-10"	146
S2	6	#5	1	6'-10"	43
S3	4	#4	1	8'-8"	23
✱S4	8	#5	STR	3'-8"	31
S5	44	#4	2	2'-4"	69
S6	1	#4	1	9'-2"	6
S7	8	#5	1	5'-8"	47

✱NOTE: S4 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	5000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
PER GIRDER	365	3.5	10

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	5	37'-0"	185.00'
SPAN C	5	37'-0"	185.00'

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE II PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN A & C (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

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STR. #2

STD. NO. PCG4

ASSEMBLED BY : OTN / PKN	DATE : 8/11/21	
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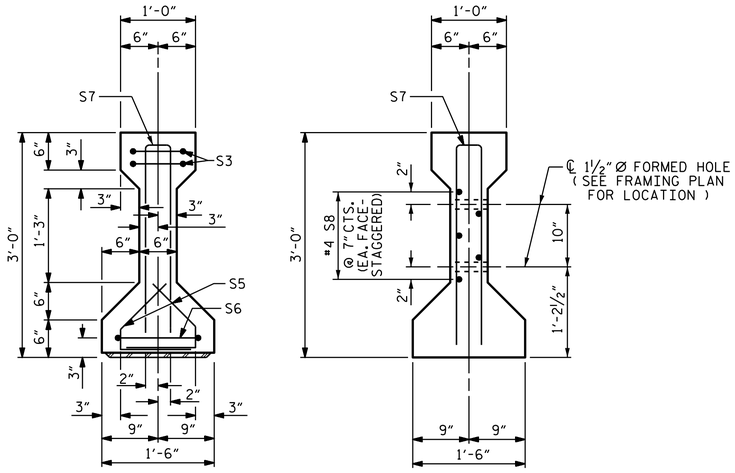
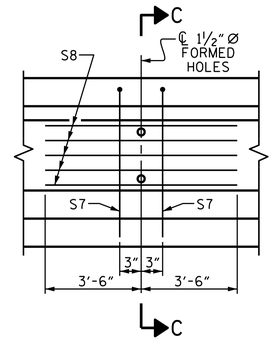


SECTION B-B

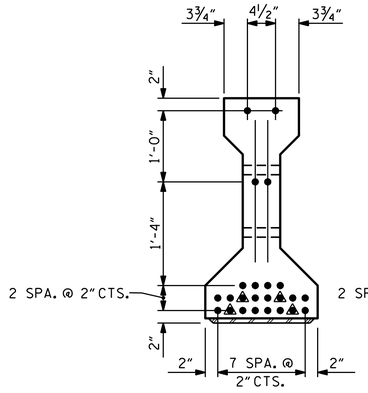
SECTION C-C

(S1 BARS NOT SHOWN)

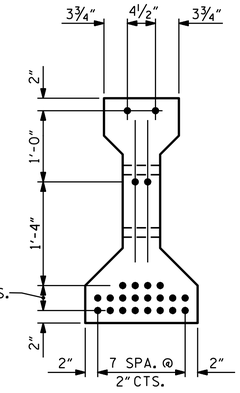


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR ALL GIRDERS



AT END OF GIRDER



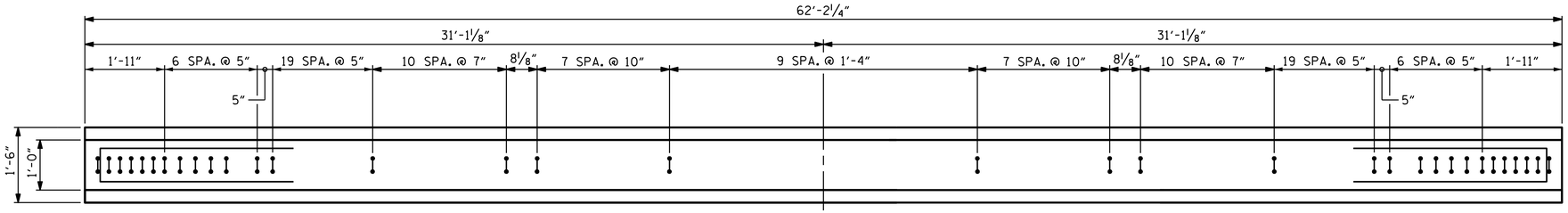
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

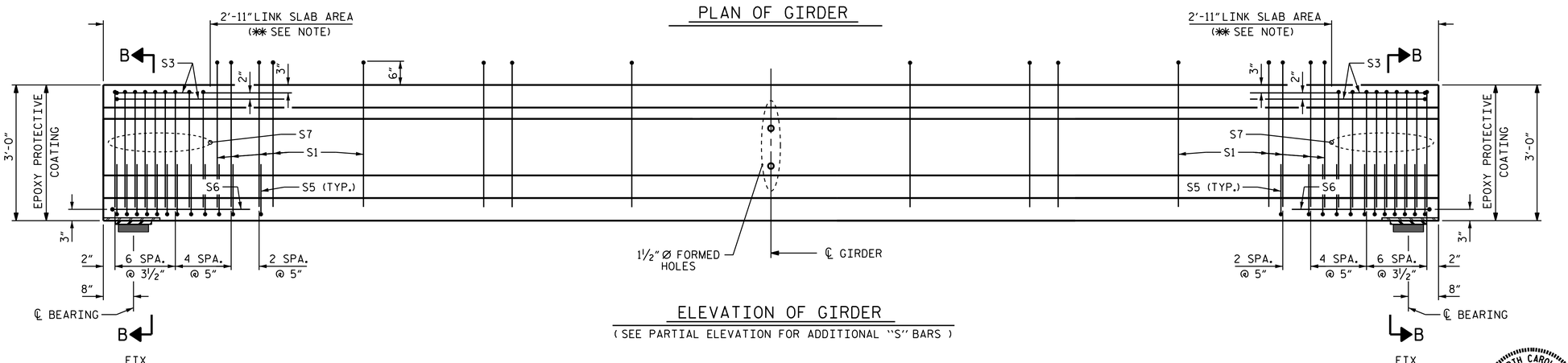
(24 STRANDS)

● = FULLY BONDED

▲ = STRANDS DEBONDED FOR 13'-0" FROM END OF GIRDER



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

✱✱ THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.

0.6" Ø L. R. GRADE 270 STRANDS

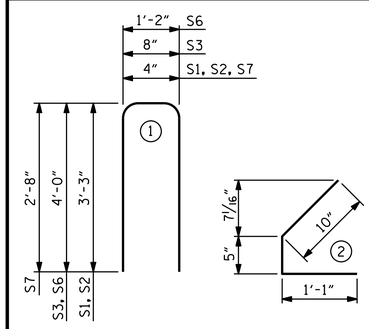
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	92	#4	1	6'-10"	420
S3	4	#4	1	8'-8"	23
S5	52	#4	2	2'-4"	81
S6	1	#4	1	9'-2"	6
S7	20	#5	1	5'-8"	118
S8	5	#4	STR	7'-0"	23

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
PER GIRDER	671	5.9	24

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN B	5	62'-2¼"	310.94'

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE II
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

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	REV. 12/17	MAA/THC

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STR. #2

STD. NO. PCG4

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

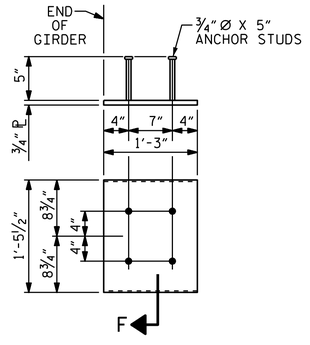
SPANS A & C											
0.6"Ø LOW RELAXATION	GIRDERS 1 & 5										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.010	0.019	0.026	0.031	0.033	0.031	0.026	0.019	0.010	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.004	0.008	0.010	0.012	0.013	0.012	0.010	0.008	0.004	0
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/16"	0

SPANS A & C											
0.6"Ø LOW RELAXATION	GIRDERS 2 - 4										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.010	0.019	0.026	0.031	0.033	0.031	0.026	0.019	0.010	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.004	0.007	0.010	0.012	0.012	0.012	0.010	0.007	0.004	0
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/16"	0

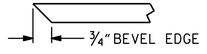
SPAN B											
0.6"Ø LOW RELAXATION	GIRDERS 1 & 5										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.049	0.093	0.128	0.149	0.157	0.149	0.128	0.093	0.049	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.026	0.048	0.066	0.078	0.081	0.078	0.066	0.048	0.026	0
FINAL CAMBER ↑	0	5/16"	9/16"	3/4"	7/8"	7/8"	7/8"	3/4"	9/16"	5/16"	0

SPAN B											
0.6"Ø LOW RELAXATION	GIRDERS 2 - 4										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.049	0.093	0.128	0.149	0.157	0.149	0.128	0.093	0.049	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.025	0.048	0.065	0.076	0.080	0.076	0.065	0.048	0.025	0
FINAL CAMBER ↑	0	5/16"	9/16"	3/4"	7/8"	15/16"	7/8"	3/4"	9/16"	5/16"	0

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



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



SECTION "F"
(SEE NOTES)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPANS A AND C, AND 7400 PSI FOR SPAN B.

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

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD
DocuSigned by: F2458389308F40E...
1/23/2019

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS (EBL)

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

SHEET NO. S2-16
TOTAL SHEETS 38

ASSEMBLED BY : WFP / OTN	DATE : 8/14/18	
CHECKED BY : M. K. BEARD	DATE : 11/18	
DRAWN BY : ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15	MAA/TMG
	REV. 12/17	MAA/THC

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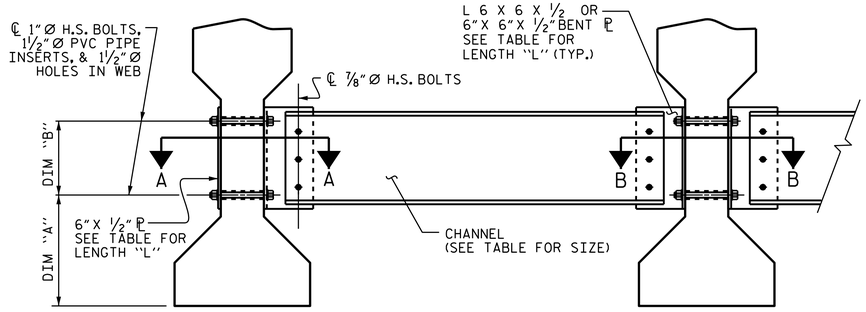
STR. #2

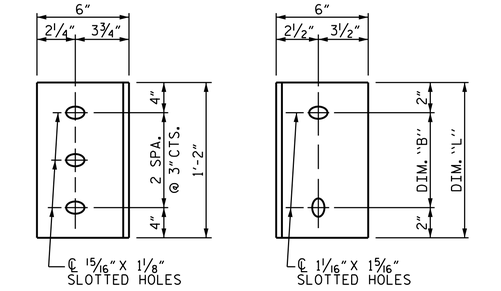
STD. NO. PCG9



EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPE II GIRDER SHOWN)



DIAPHRAGM FACE (TYPE II GDR.) WEB FACE

CONNECTOR PLATE DETAILS

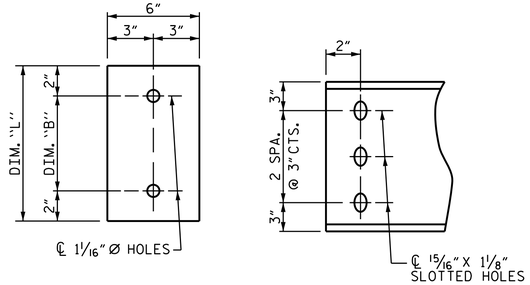


PLATE DETAILS CHANNEL END (TYPE II GDR.)

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

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

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT PERCENT 1350 ALUMINUM (W-A1-1350) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL PLATES, BENT PLATES, CHANNELS, ANGLES, AND PLATE WASHERS IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

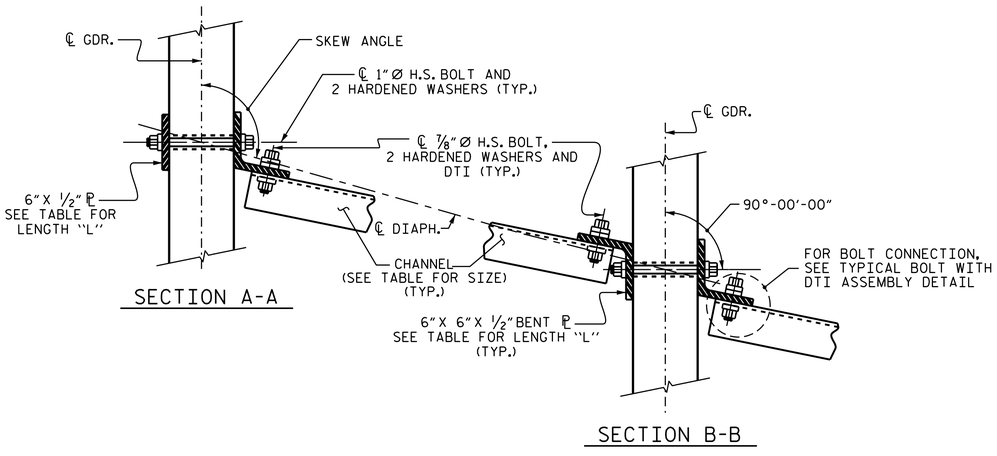
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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

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

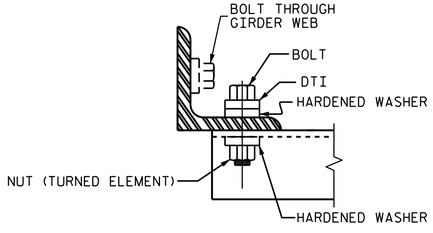
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
II	MC 12 x 31	1'-2½"	10"	1'-2"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE II PRESTRESSED CONCRETE GIRDERS (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			38

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STR. #2

STD. NO. PCG10

ASSEMBLED BY :	WFP / OTN	DATE :	8/14/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DRAWN BY :	TLA 6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY :	VC 6/05	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC

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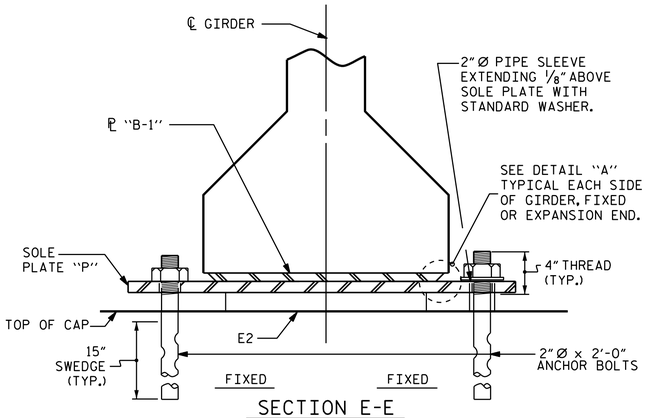
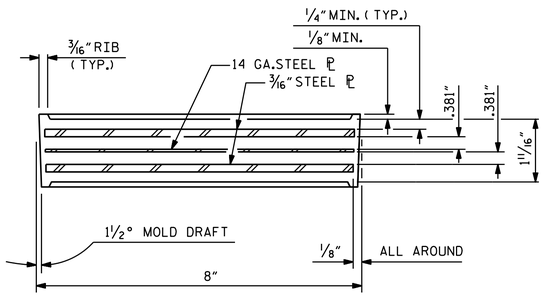
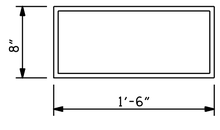


SECTION E-E



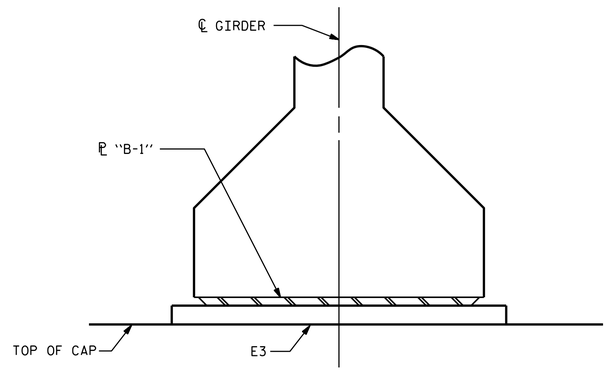
TYPICAL SECTION OF ELASTOMERIC BEARINGS



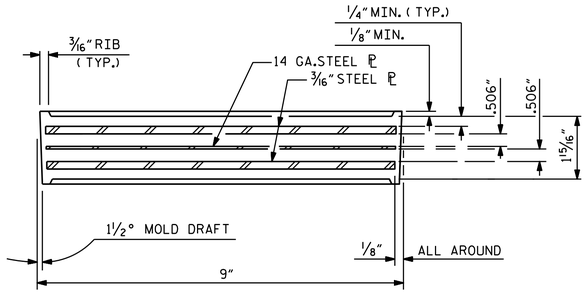
E2 (20 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

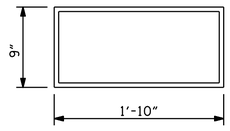
TYPE III



SECTION F-F



TYPICAL SECTION OF ELASTOMERIC BEARINGS

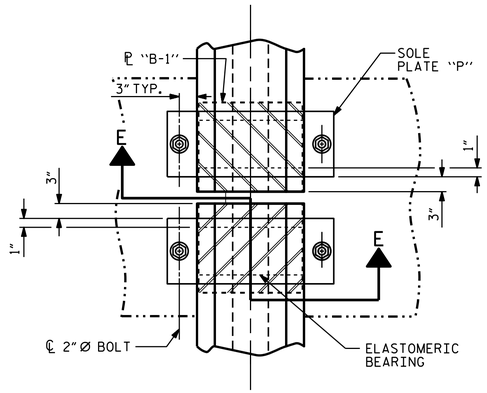


E3 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

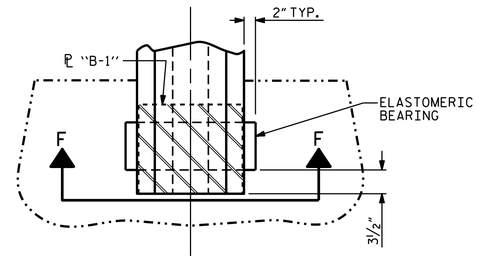
TYPE IV

(FOR INTEGRAL END BENTS ONLY)



TYPICAL HALF-PLAN

(SHOWING CONTINUOUS BENT)



TYPICAL HALF-PLAN

(SHOWING INTEGRAL END BENT)

NOTES

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

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

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

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

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

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

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

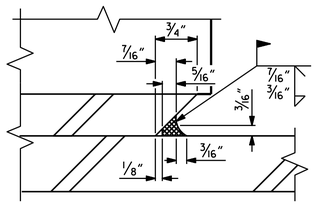
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

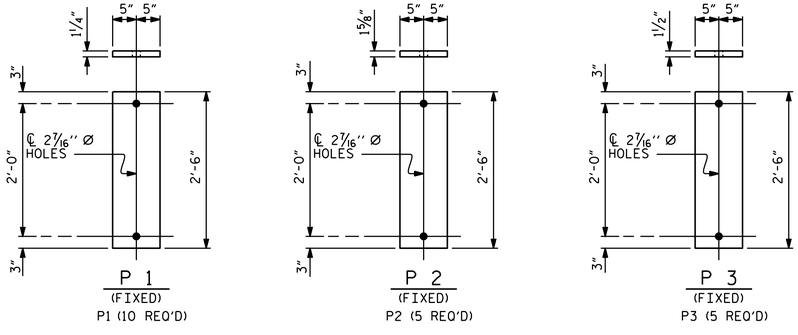
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k
TYPE IV	225 k



DETAIL "A"



SOLE PLATE DETAILS ("P")

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KORREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-18
1			3			TOTAL SHEETS
2			4			38

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ASSEMBLED BY :	WFP / QTN	DATE :	8/14/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DRAWN BY :	WJH 8/89	REV. 6/13	AAC/MAA
CHECKED BY :	CRK 8/89	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

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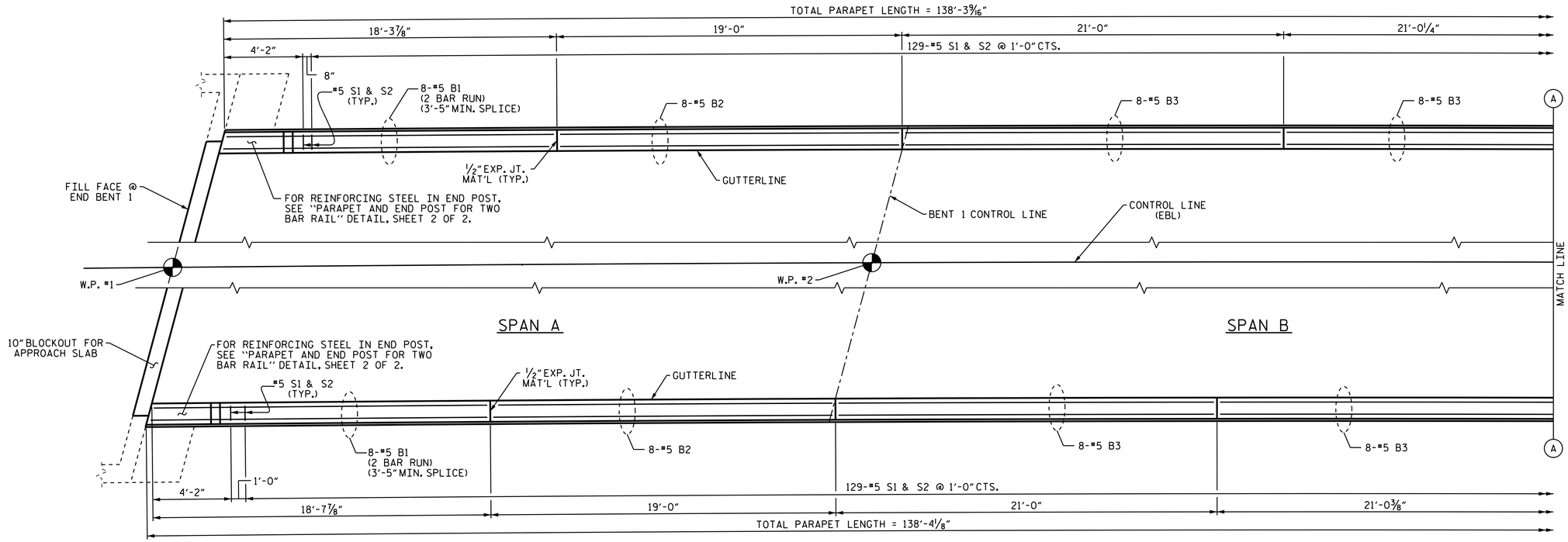
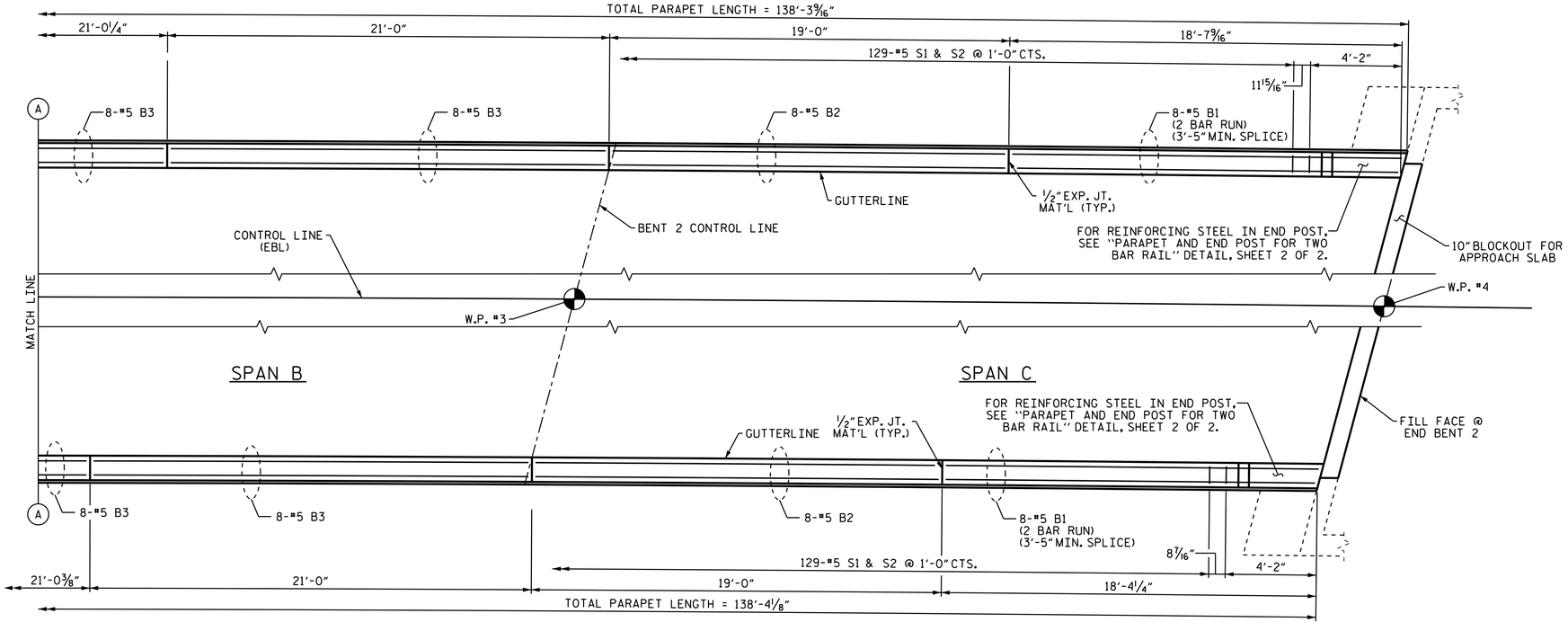
STR. #2

STD. NO. EB3





PLAN OF PARAPET

DIMENSIONS ARE ALONG OUTSIDE EDGE OF PARAPET

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF PARAPET AND END POST DETAILS (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
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STR. #2

DRAWN BY : WFP / OTN DATE : 8/15/18
CHECKED BY : M. K. BEARD DATE : 11/18
DESIGN ENGINEER OF RECORD: A.K. PATEL DATE : 1/10/19

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NOTES

THE PARAPET FOR ANY SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS REACHED A MINIMUM COMPRESIVE STRENGTH OF 3000 PSI.

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

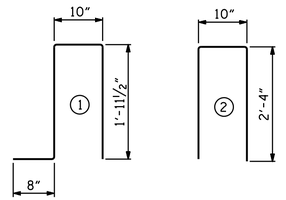
THE #5 S1 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½"EXPANSION JOINT MATERIAL IN THE PARAPET.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

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

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPE

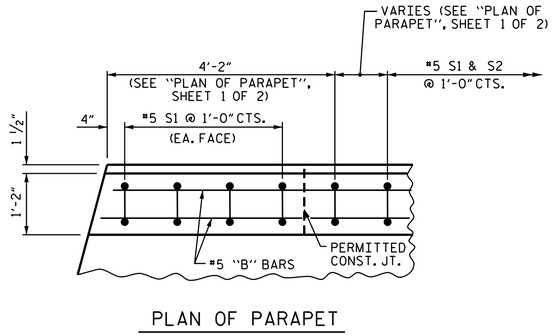


BAR DIMENSIONS ARE OUT TO OUT.

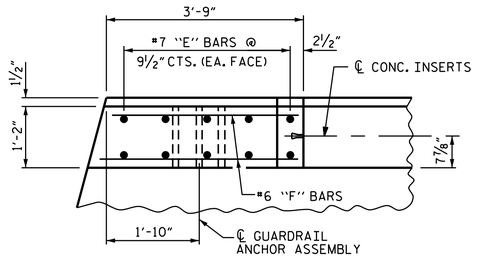
BILL OF MATERIAL FOR PARAPET & END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	64	#5	STR	11'-0"	734
✳B2	32	#5	STR	18'-7"	620
✳B3	48	#5	STR	20'-7"	1030
✳E1	8	#7	STR	2'-6"	41
✳E2	8	#7	STR	3'-0"	49
✳E3	8	#7	STR	3'-6"	57
✳E4	8	#7	STR	4'-0"	65
✳E5	8	#7	STR	4'-4"	71
✳F1	8	#6	STR	1'-11"	23
✳F2	8	#6	STR	3'-2"	38
✳F3	8	#6	STR	3'-6"	42
✳S1	278	#5	1	5'-5"	1571
✳S2	262	#5	2	5'-6"	1503

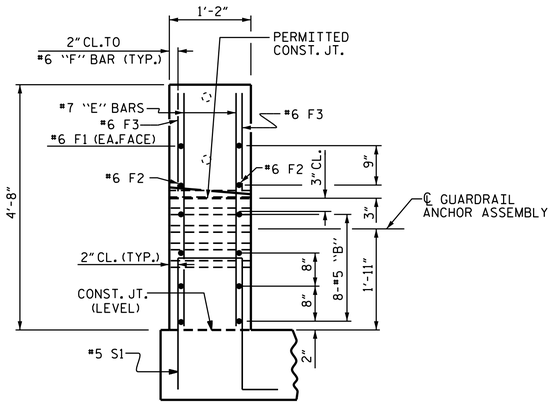
✳EPOXY COATED REINFORCING STEEL	5844	LBS.
CLASS AA CONCRETE	30.7	CU.YDS.
LENGTH OF CONCRETE PARAPET	276.63	LIN.FT.



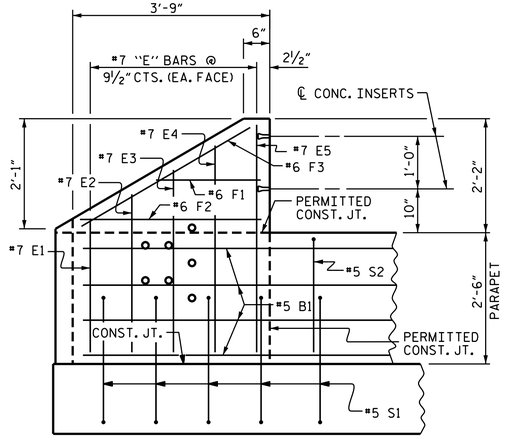
PLAN OF PARAPET



PLAN OF END POST

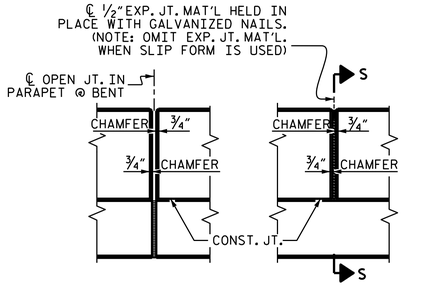


END VIEW

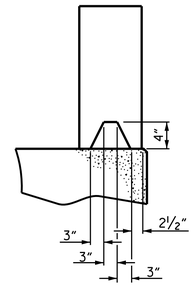


ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL



ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF PARAPET AND END POST DETAILS (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

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SHEET NO. S2-20

TOTAL SHEETS 38

STR. #2

DRAWN BY :	WFP / OTN	DATE :	8/15/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DESIGN ENGINEER OF RECORD:	A.K. PATEL	DATE :	1/10/19

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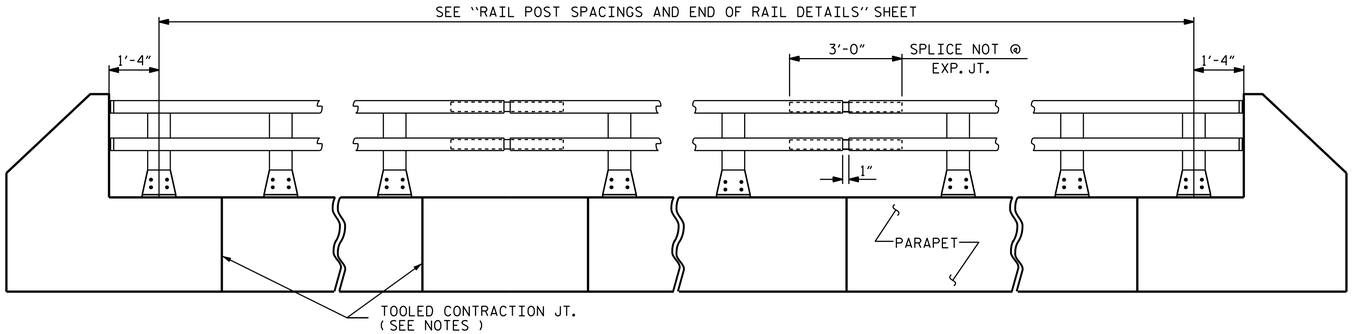
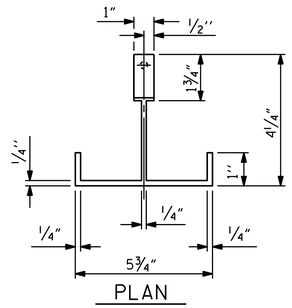
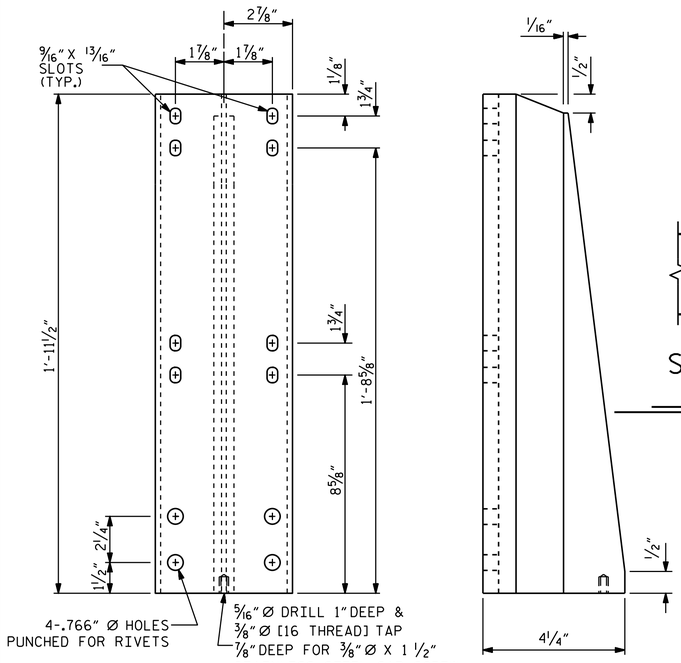


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



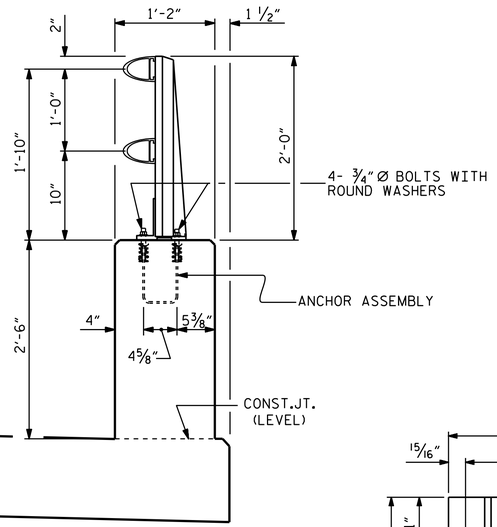
PLAN



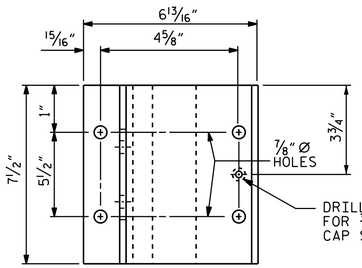
FRONT ELEVATION

SIDE ELEVATION

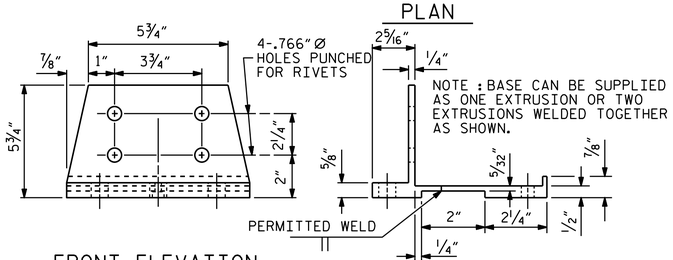
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



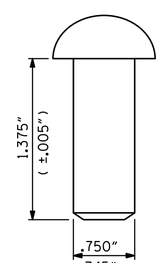
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

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

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFDBRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 261.02 LIN. FT.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

ASSEMBLED BY : WFP / QTN	DATE : 8/14/18
CHECKED BY : M. K. BEARD	DATE : 11/18
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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SHEET NO. S2-21

TOTAL SHEETS 38

STR. #2

STD. NO. BMR3

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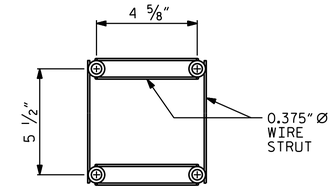
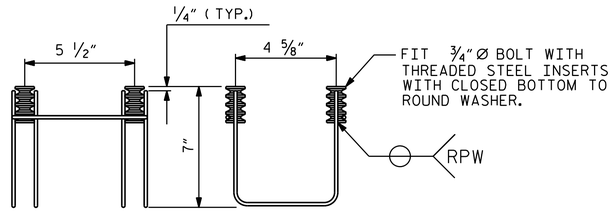


PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(46 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

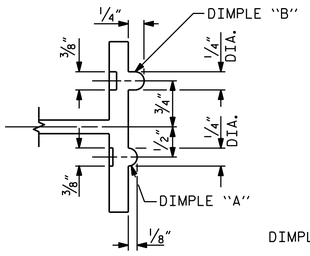
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4"Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



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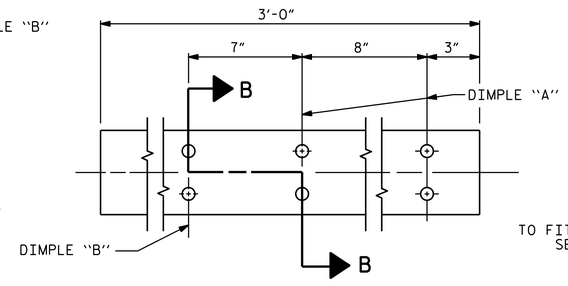
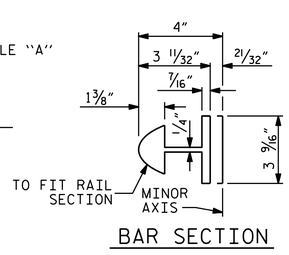
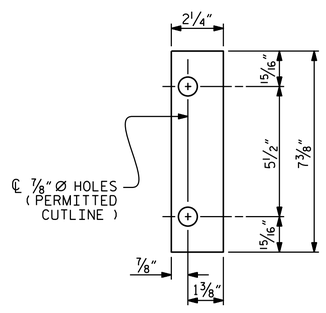


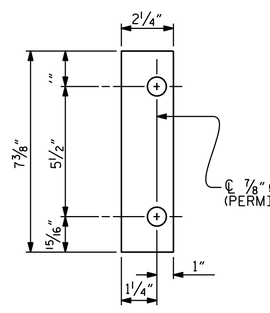


BAR SECTION

EXPANSION BAR DETAILS



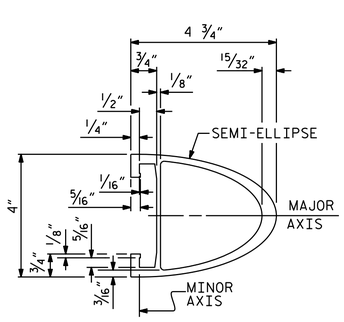
FRONT PLATE



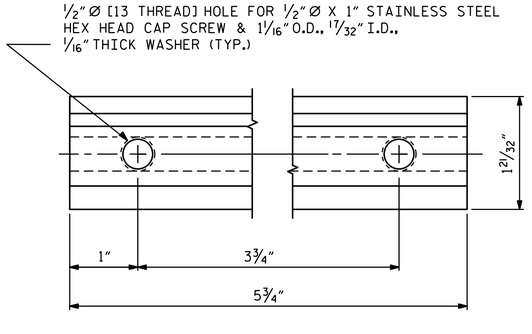
REAR PLATE

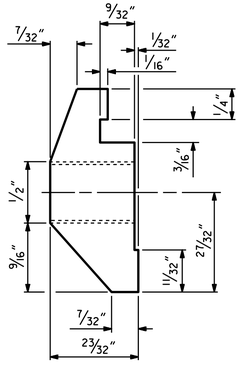
SHIM DETAILS

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



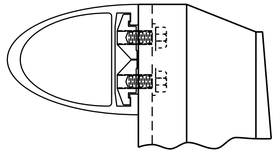
RAIL SECTION



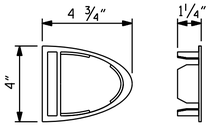


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

ASSEMBLED BY : WFP / QTN	DATE : 8/14/18
CHECKED BY : M. K. BEARD	DATE : 11/18
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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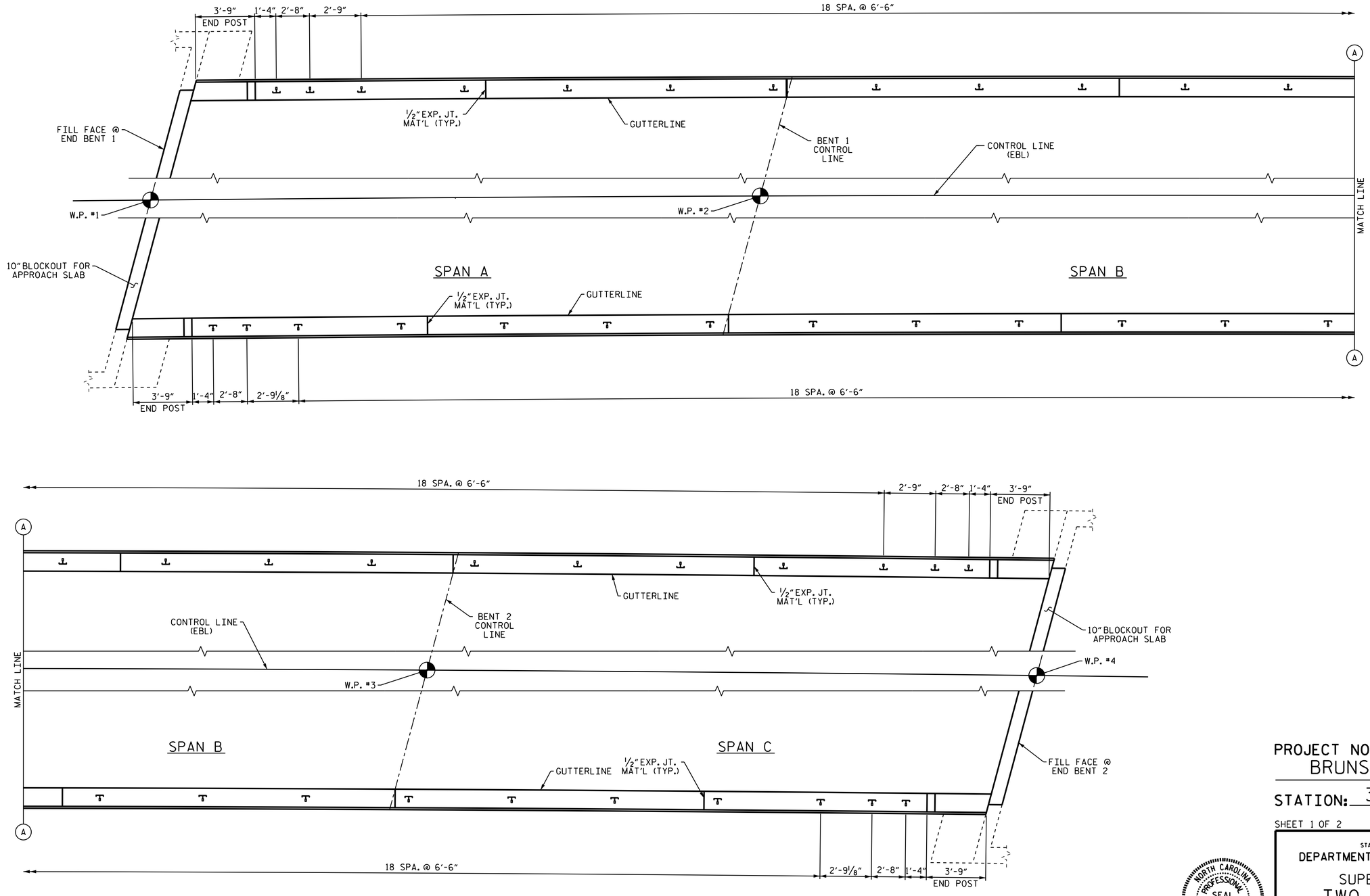

PLAN OF RAIL POST SPACING

DIMENSIONS ARE ALONG OUTSIDE EDGE OF PARAPET

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TWO BAR METAL RAIL POST SPACINGS AND END POST DETAILS (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
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DRAWN BY :	WFP / QTN	DATE :	8/15/18
CHECKED BY :	M. K. BEARD	DATE :	11/18
DESIGN ENGINEER OF RECORD:	A.K. PATEL	DATE :	1/10/19

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STR. #2

NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

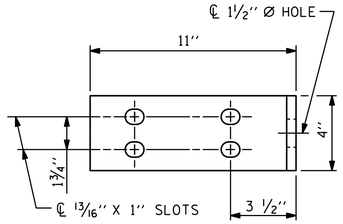
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

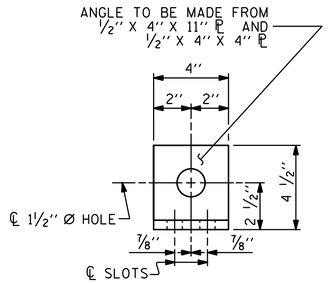
THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

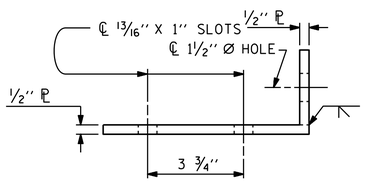
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



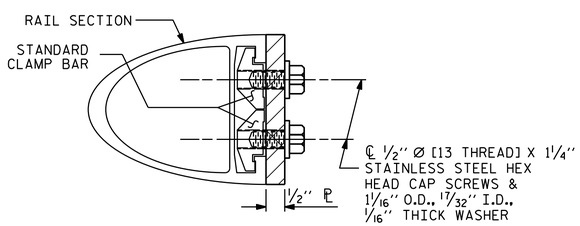
ELEVATION



END VIEW



TOP VIEW



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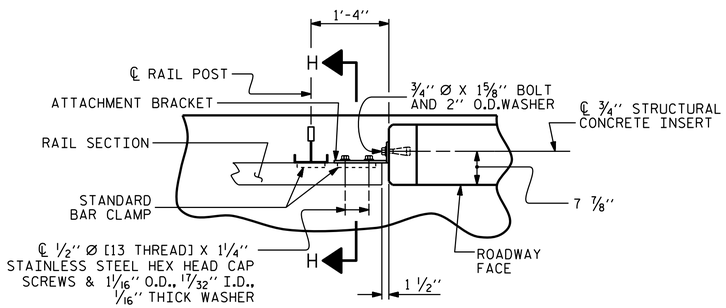
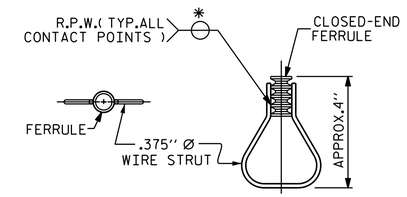


PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR TWO BAR METAL RAILS
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

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DRAWN BY :	FCJ 1/88	REV. 5/1/06	TLA/GM
CHECKED BY :	CRK 3/89	REV. 10/1/11	MAA/GM
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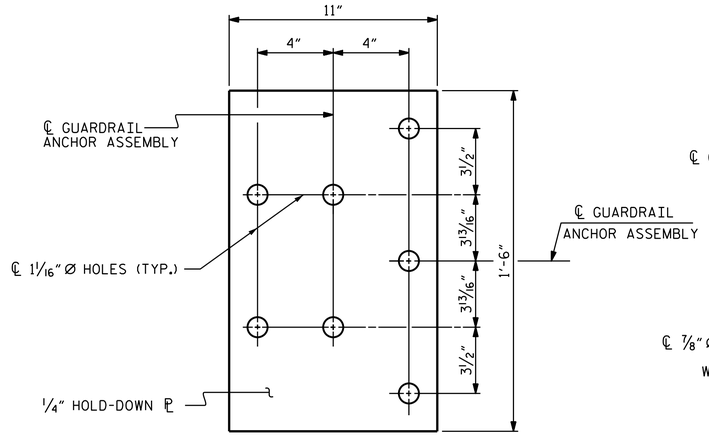
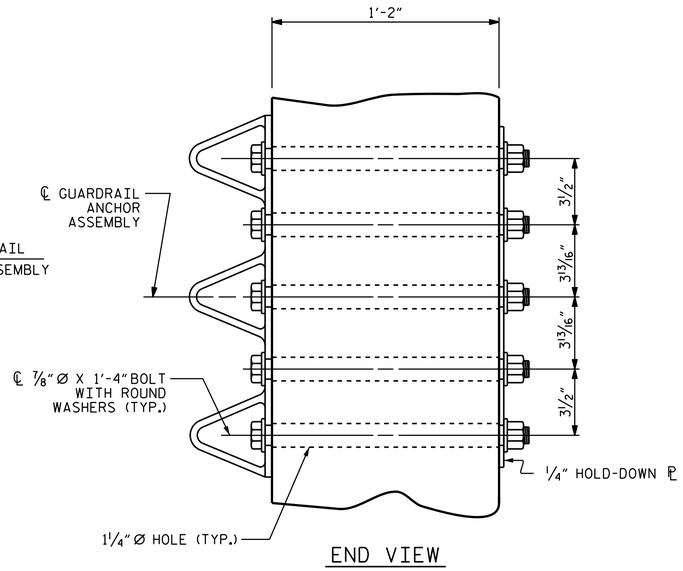


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

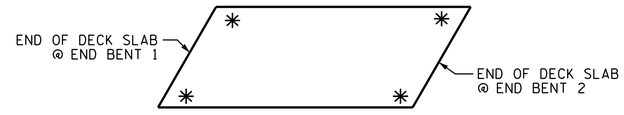
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

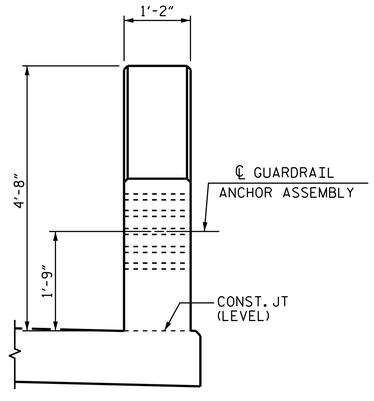
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

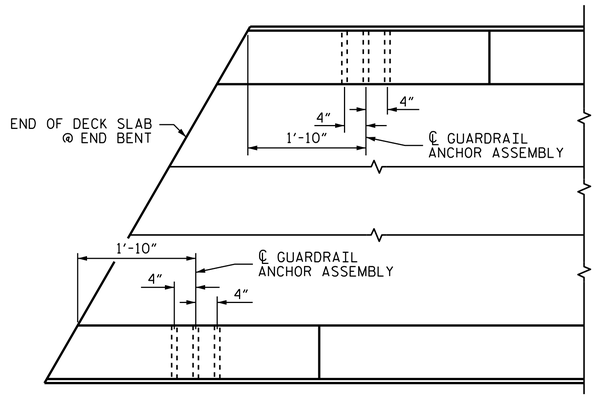


SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

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

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

SHEET NO. S2-25
TOTAL SHEETS 38

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ASSEMBLED BY : WFP / OTN		DATE : 8/14/18	
CHECKED BY : M. K. BEARD		DATE : 11/18	
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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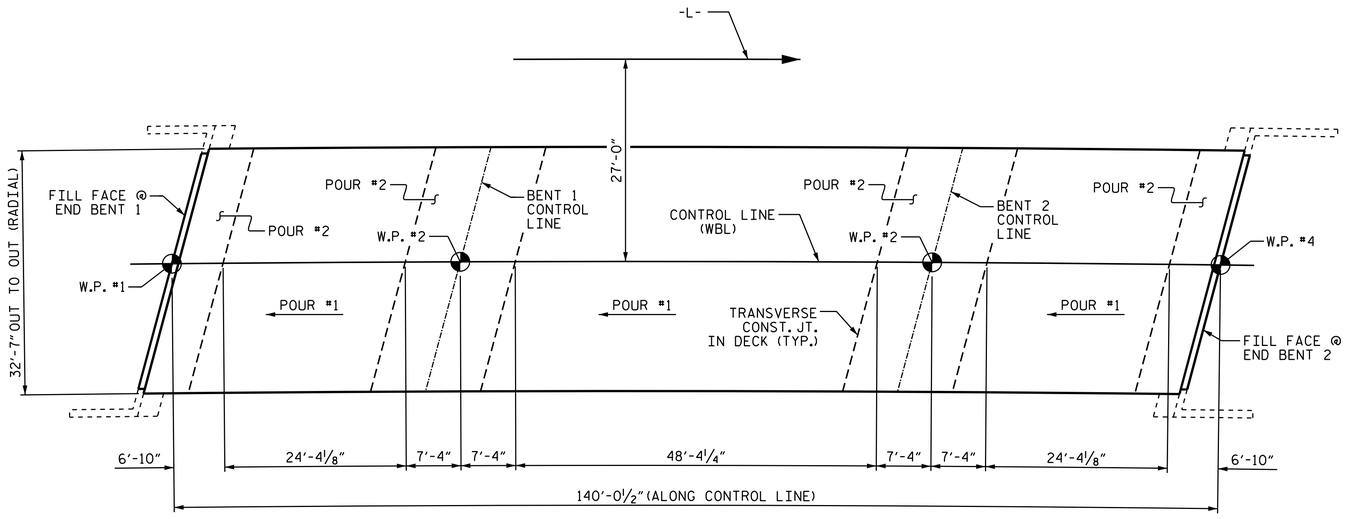
pknewton

STR. #2

STD. NO. GRA3



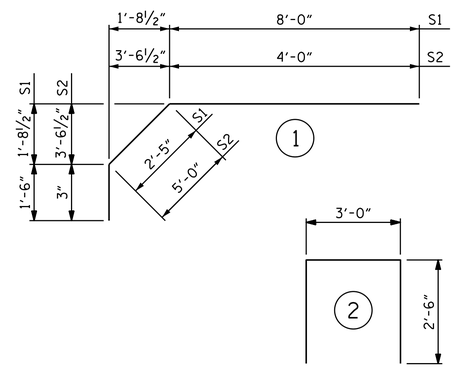
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB & POURING SEQUENCE (SQ.FT. = 4507)

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	259	#5	STR	32'-2"	8689
✳ A2	184	#4	STR	2'-11"	358
✳ A101	2	#5	STR	30'-9"	64
✳ A102	2	#5	STR	28'-11"	60
✳ A103	2	#5	STR	27'-1"	56
✳ A104	2	#5	STR	25'-2"	52
✳ A105	2	#5	STR	23'-4"	49
✳ A106	2	#5	STR	21'-6"	45
✳ A107	2	#5	STR	19'-8"	41
✳ A108	2	#5	STR	17'-10"	37
✳ A109	2	#5	STR	15'-11"	33
✳ A110	2	#5	STR	14'-1"	29
✳ A111	2	#5	STR	12'-3"	26
✳ A112	2	#5	STR	10'-5"	22
✳ A113	2	#5	STR	8'-6"	18
✳ A114	2	#5	STR	6'-8"	14
✳ A115	2	#5	STR	4'-10"	10
✳ A116	2	#5	STR	3'-0"	6
✳ A117	2	#5	STR	30'-9"	64
✳ A118	2	#5	STR	28'-10"	60
✳ A119	2	#5	STR	27'-0"	56
✳ A120	2	#5	STR	25'-2"	52
✳ A121	2	#5	STR	23'-3"	48
✳ A122	2	#5	STR	21'-5"	45
✳ A123	2	#5	STR	19'-7"	41
✳ A124	2	#5	STR	17'-8"	37
✳ A125	2	#5	STR	15'-10"	33
✳ A126	2	#5	STR	14'-0"	29
✳ A127	2	#5	STR	12'-1"	25
✳ A128	2	#5	STR	10'-3"	21
✳ A129	2	#5	STR	8'-4"	17
✳ A130	2	#5	STR	6'-6"	14
✳ A131	2	#5	STR	4'-8"	10
✳ A132	2	#5	STR	2'-9"	6
✳ B1	132	#5	STR	47'-9"	6574
✳ B2	152	#5	STR	10'-6"	1665
✳ K1	8	#4	STR	39'-7"	212
✳ K2	8	#4	STR	4'-11"	26
✳ K3	16	#4	STR	5'-5"	58
✳ K4	8	#4	STR	5'-11"	32
✳ K5	4	#4	STR	2'-0"	5
✳ K6	8	#4	STR	2'-6"	13
✳ K7	4	#4	STR	2'-3"	6
✳ S1	60	#4	1	11'-11"	478
✳ S2	60	#4	1	9'-3"	371
✳ U1	60	#4	2	8'-0"	321

✳ EPOXY COATED REINF. STEEL = 19,928 LBS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR #1	58.9	——
POUR #2	50.8	——
TOTALS**	109.7	19928

** QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1303	SQ.FT.
BRIDGE DECK	3725	SQ.FT.
TOTAL	5028	SQ.FT.

DESIGN ENGINEER OF RECORD: P. K. NEWTON DATE: 8/12/21

ASSEMBLED BY : OTN / MKB / PKN DATE : 8/12/21
CHECKED BY : D. R. SHACKELFORD DATE : 8/12/21

DRAWN BY : JMB 5/87
CHECKED BY : SJD 9/87

REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

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PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

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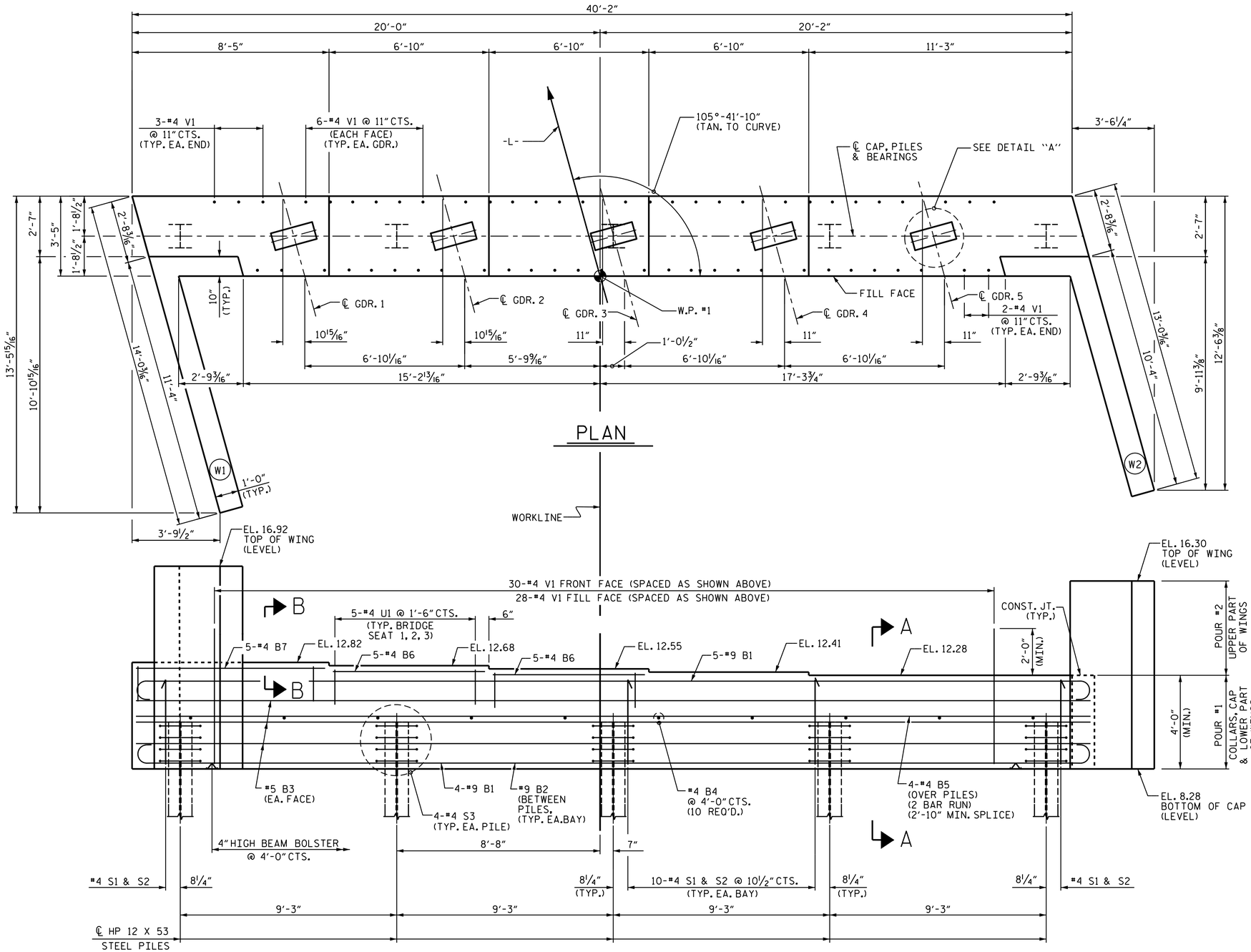
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL (EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-26
1			3			TOTAL SHEETS
2			4			38

STR. #2

STD. NO. BOM2



ELEVATION

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

NOTES

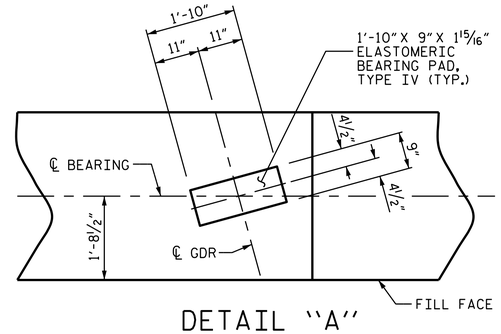
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.



DETAIL "A"

(TYP. EA. GDR.)

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1 (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

1/23/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-27
1			3			TOTAL SHEETS
2			4			38

STR. #2

DRAWN BY : Q. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

23-JAN-2019 13:02
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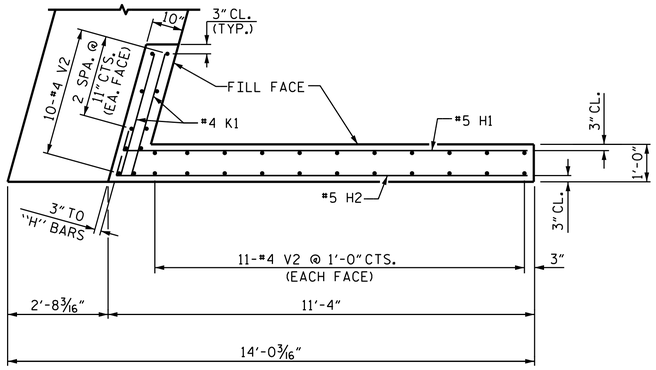
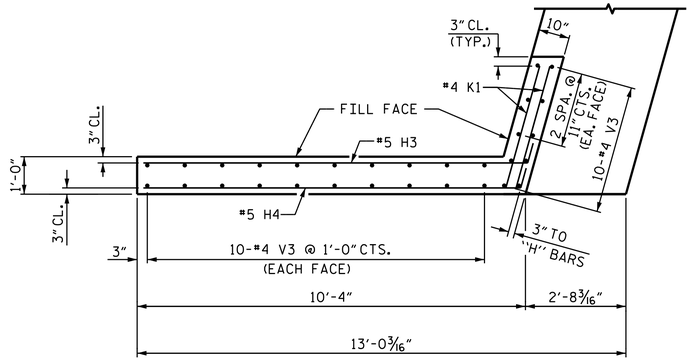
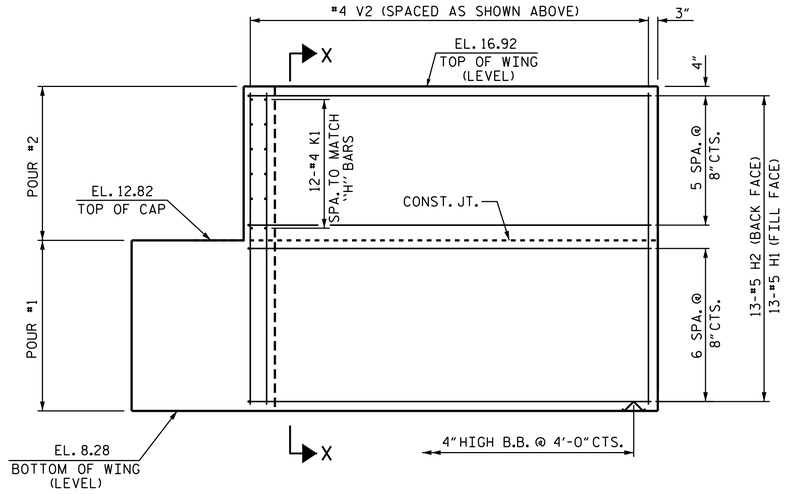
kalford



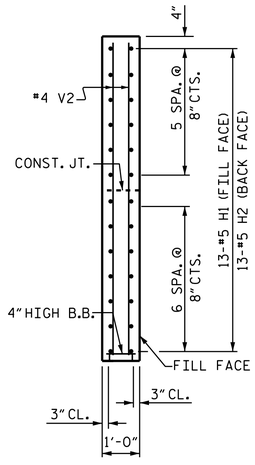
PLAN OF WING W1



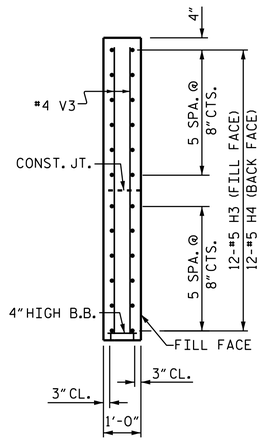
PLAN OF WING W2



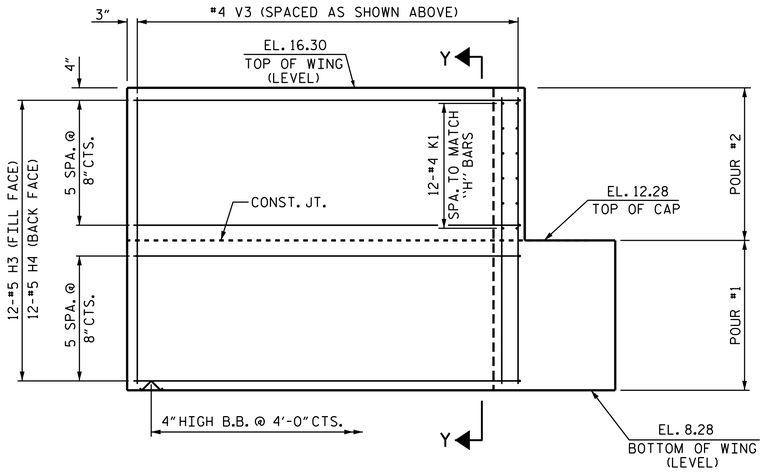
ELEVATION OF WING W1



SECTION X-X



SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-28
1			3			TOTAL SHEETS
2			4			38

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STR. #2

DRAWN BY : O. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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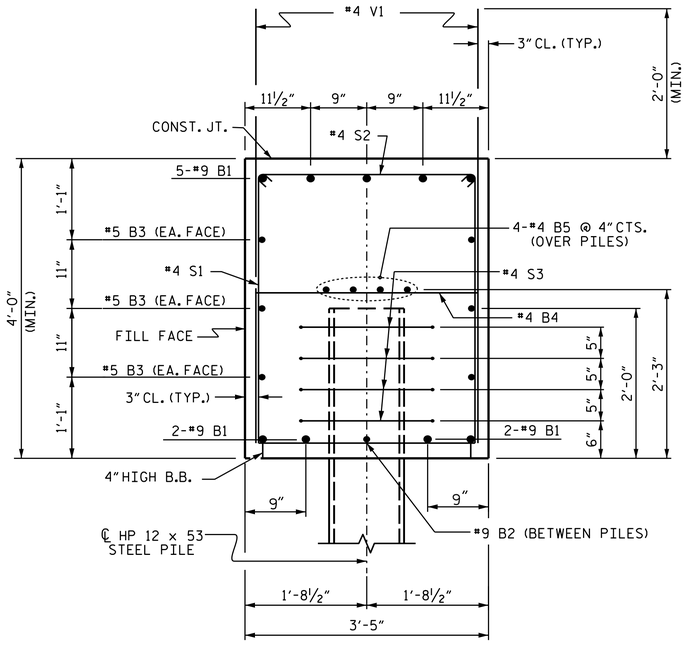
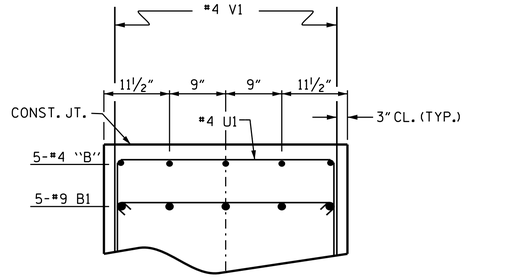
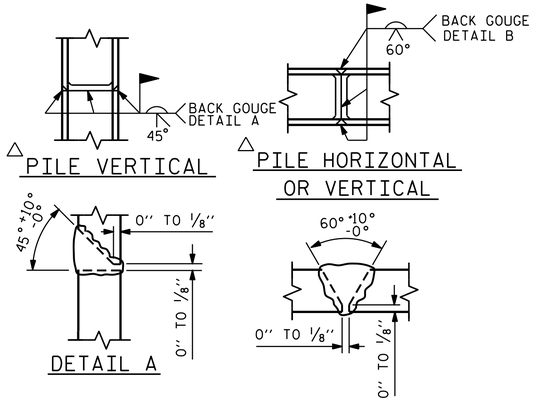


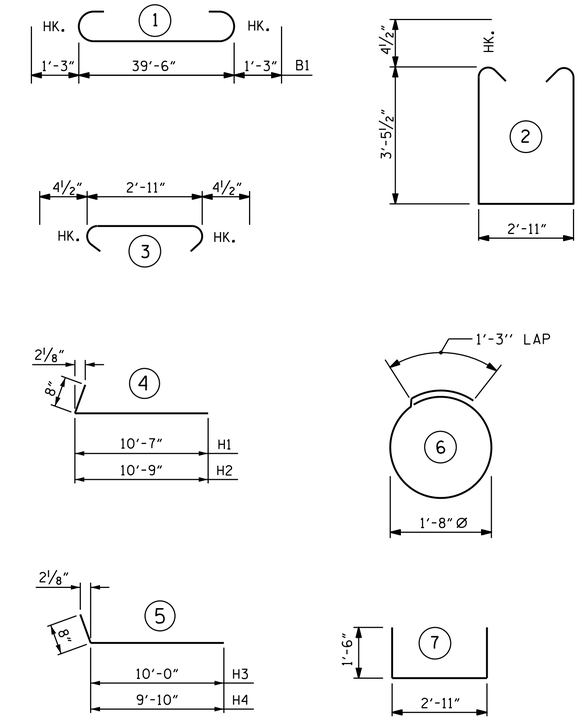
SECTION A-A



PARTIAL SECTION B-B



△ POSITION OF PILE DURING WELDING.



ALL BAR DIMENSIONS ARE OUT TO OUT.

BAR TYPES

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	9	#9	1	42'-0"	1285
✱B2	4	#9	STR	8'-9"	119
✱B3	6	#5	STR	39'-8"	248
✱B4	10	#4	STR	2'-11"	19
✱B5	8	#4	STR	21'-1"	113
✱B6	10	#4	STR	6'-6"	43
✱B7	5	#4	STR	7'-0"	23
✱H1	13	#5	4	11'-3"	153
✱H2	13	#5	4	11'-5"	155
✱H3	12	#5	5	10'-8"	134
✱H4	12	#5	5	10'-6"	131
✱K1	24	#4	STR	3'-4"	53
✱S1	42	#4	2	10'-7"	297
✱S2	42	#4	3	3'-8"	103
✱S3	20	#4	6	6'-6"	87
✱U1	15	#4	7	5'-11"	59
✱V1	58	#4	STR	5'-0"	174
✱V2	32	#4	STR	8'-1"	173
✱V3	30	#4	STR	7'-6"	150

✱EPOXY COATED REINFORCING STEEL = 3519 LBS.

CLASS AA CONCRETE

POUR #1
(CAP, CONC. COLLARS, & LOWER PART OF WINGS) _____ = 25.6 C.Y.

POUR #2
(UPPER PART OF WINGS) _____ = 4.0 C.Y.

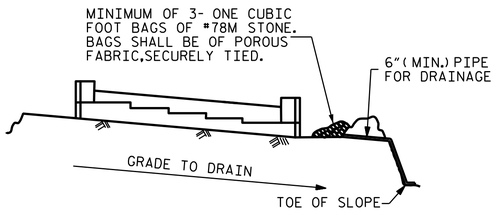
TOTAL = 29.6 C.Y.

HP 12 X 53 STEEL PILES

No. 5 _____ LIN FT. 325

PILE REDRIVES _____ EA. 5

STEEL PILE POINTS _____ NO. 5

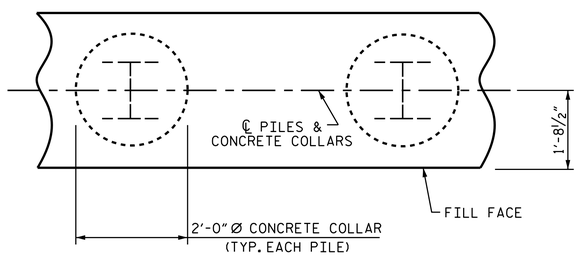


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

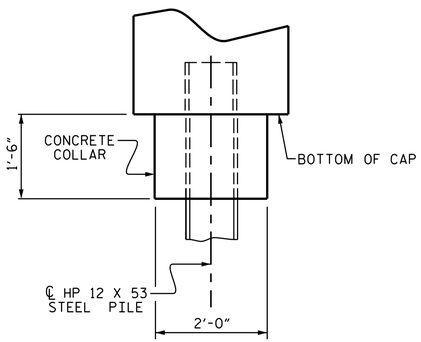
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



PLAN



ELEVATION

PILE SPLICE DETAILS

CORROSION PROTECTION FOR STEEL PILES DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton 1/20/2019

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1
(EBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-29
1			3			TOTAL SHEETS
2			4			38

STR. #2

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DRAWN BY : O. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

20-JAN-2019 22:06
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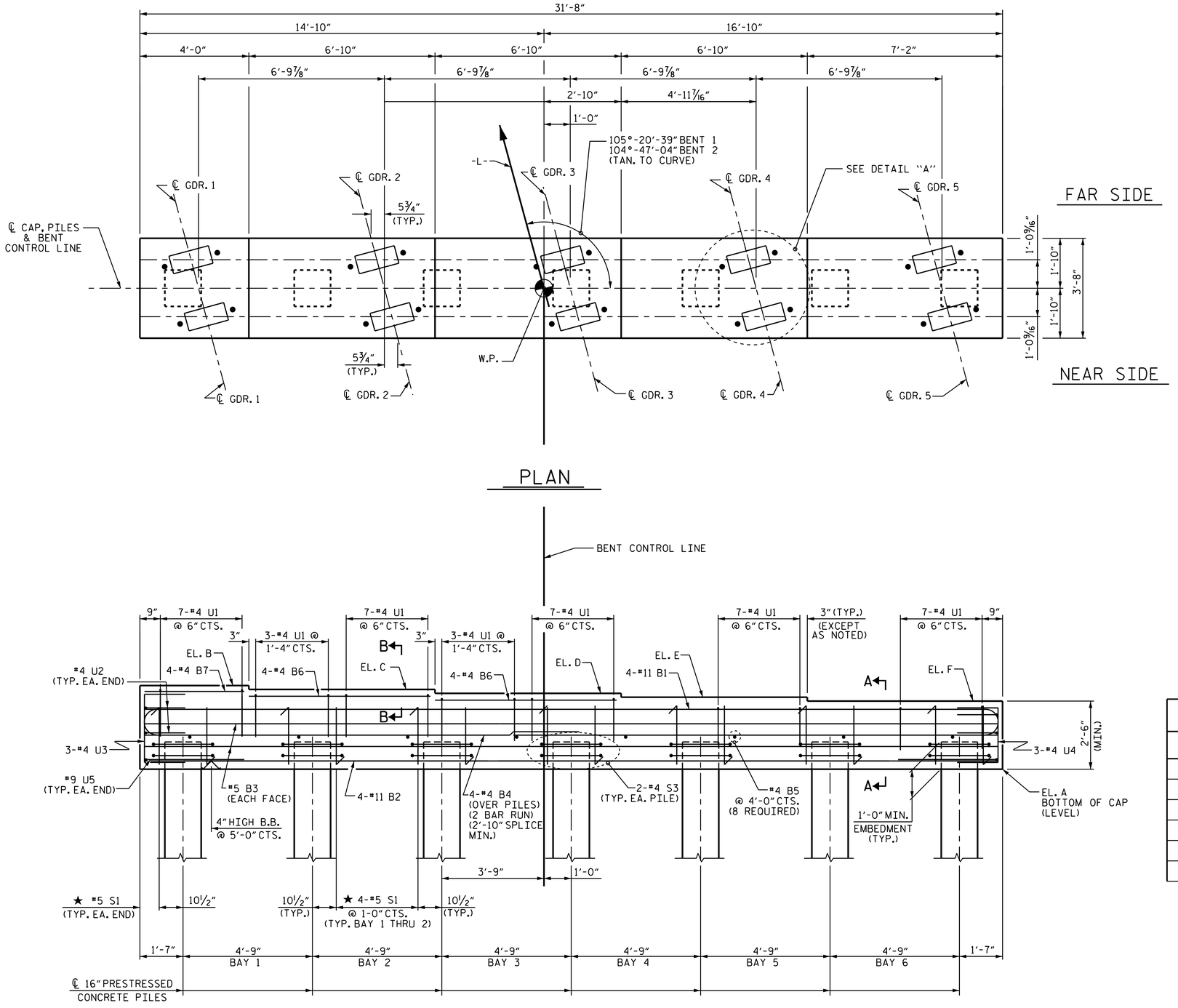


PLAN

ELEVATION

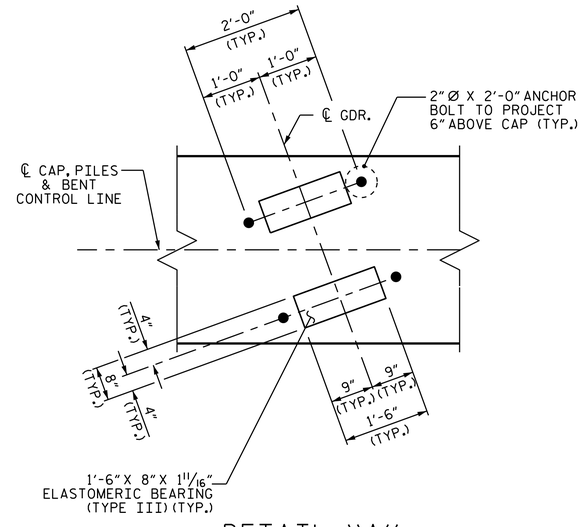
★ INVERT ALTERNATE STIRRUPS

NOTES

STIRRUPS & U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

FOR PRESTRESSED CONCRETE PILE DETAILS, SEE SHEET 3 OF 3.

"U" BARS IN END OF CAP MAY BE SHIFTED SLIGHTLY AN NECESSARY TO CLEAR "B" BARS.



DETAIL "A"
(TYP. EA. GDR.)

CAP ELEVATION		
	BENT 1	BENT 2
A	9.13	8.39
B	12.19	11.48
C	12.05	11.33
D	11.91	11.19
E	11.77	11.04
F	11.63	10.89

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 1 & 2
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD
DocuSigned by: F24583893OBF40E...
1/23/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-30
1			3			TOTAL SHEETS
2			4			38

STR. #2

DRAWN BY :	O. T. NGUYEN	DATE : 5/17/18
CHECKED BY :	M. K. BEARD	DATE : 8/18
DESIGN ENGINEER OF RECORD:	A. K. PATEL	DATE : 1/10/19

23-JAN-2019 13:03
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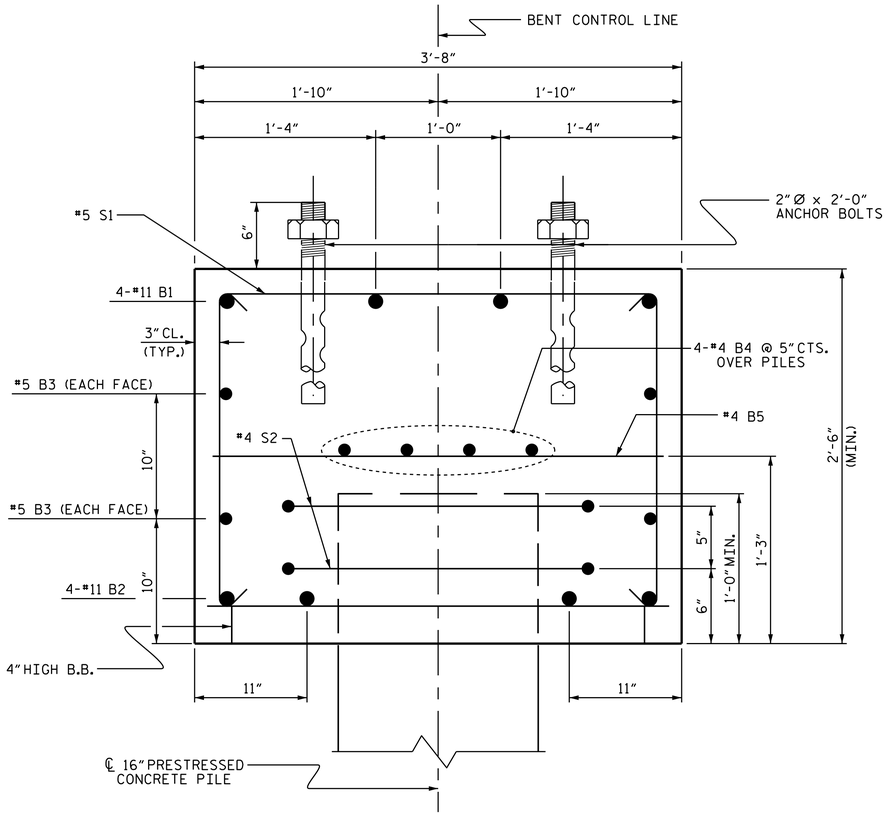
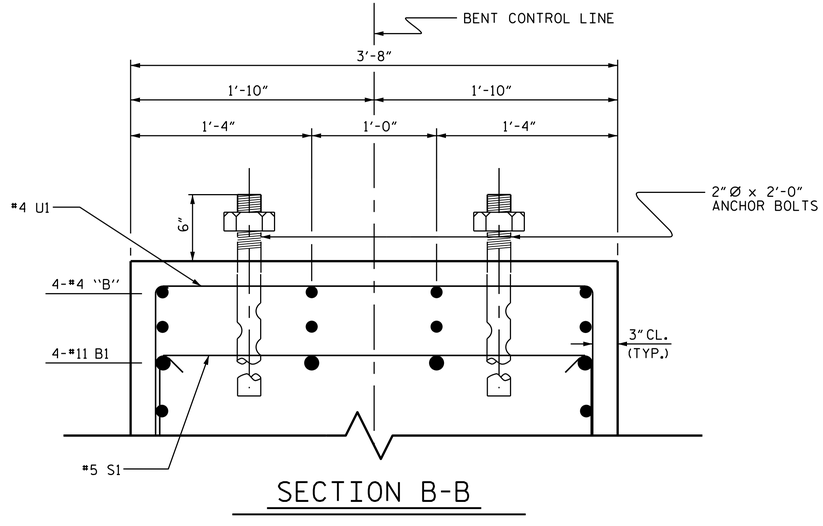
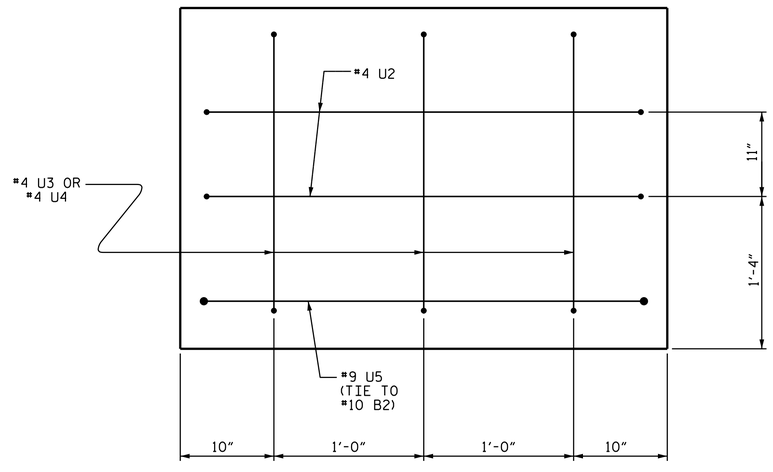
kalford



SECTION A-A

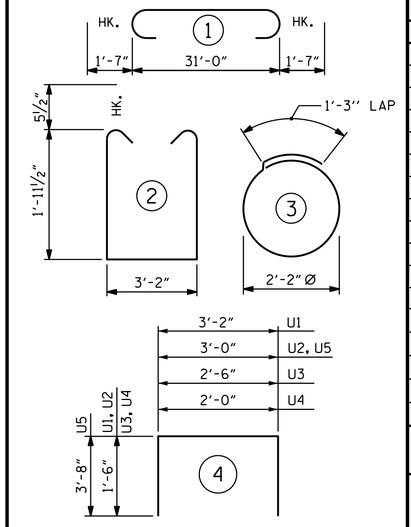


SECTION B-B



END OF CAP VIEW

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	4	#11	1	34'-2"	726
✳B2	4	#11	STR	31'-2"	662
✳B3	4	#5	STR	31'-2"	130
✳B4	8	#4	STR	16'-10"	90
✳B5	8	#4	STR	3'-2"	17
✳B6	8	#4	STR	6'-8"	36
✳B7	4	#4	STR	3'-6"	9
✳S1	26	#5	2	8'-0"	217
✳S2	14	#4	3	8'-1"	76
✳U1	41	#4	4	6'-2"	169
✳U2	4	#4	4	6'-0"	16
✳U3	3	#4	4	5'-6"	11
✳U4	3	#4	4	5'-0"	10
✳U5	2	#9	4	10'-4"	70

✳EPOXY COATED REINFORCING STEEL __ 2239 LBS

CLASS AA CONCRETE

TOTAL CLASS AA CONCRETE _____ ▲11.5 C.Y.

BENT 1

16" PRESTRESSED CONCRETE PILES

No. 7 _____ LIN. FT. 490

PILE REDRIVES _____ EA. 7

BENT 2

16" PRESTRESSED CONCRETE PILES

No. 7 _____ LIN. FT. 350

PILE REDRIVES _____ EA. 7

▲ CONCRETE DISPLACED BY THE 16" PRESTRESSED CONCRETE PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 1 & 2
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-31
1			3			TOTAL SHEETS
2			4			38

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STR. #2

DRAWN BY : O. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

20-JAN-2019 22:06
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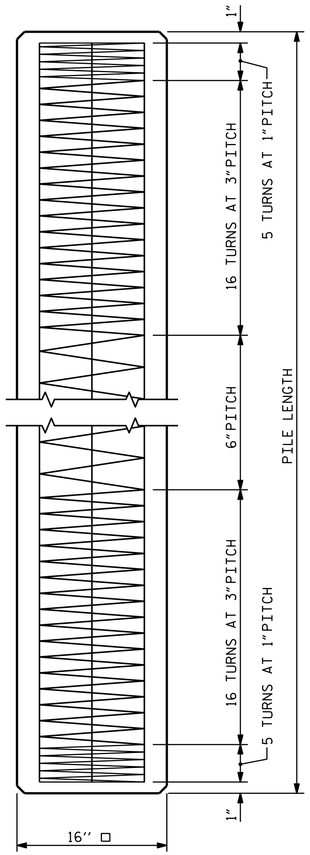
pknewton



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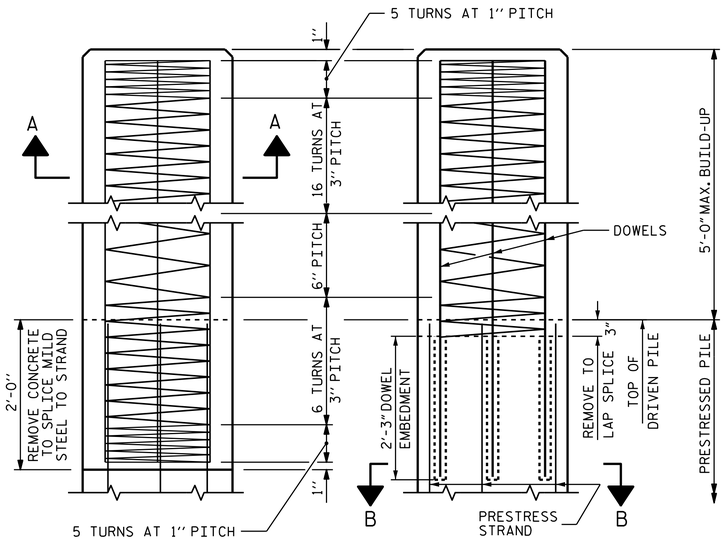
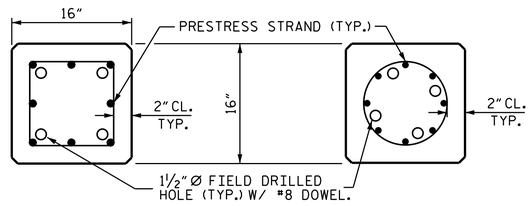


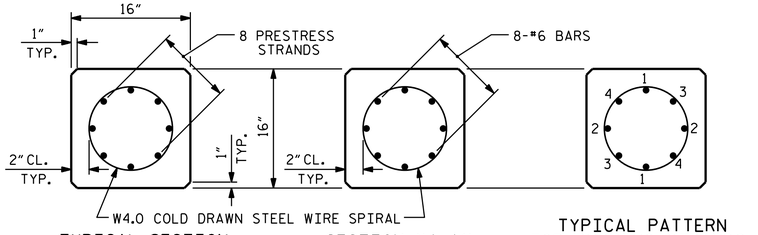
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



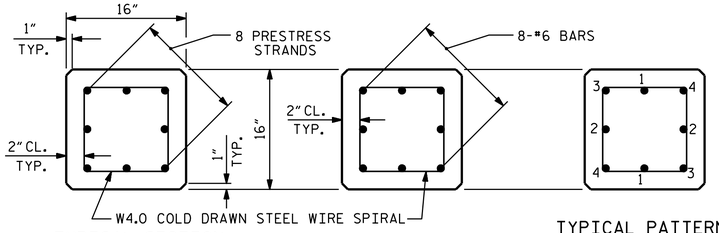
SECTION "B-B"

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION SECTION "A-A" TYPICAL PATTERN FOR BURNING STRANDS

½" OR 0.6" Ø GRADE 270 L.R. PRESTRESS STRANDS



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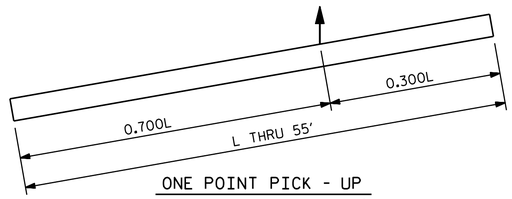
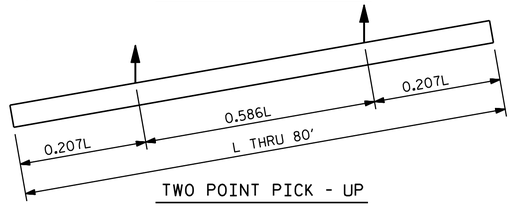


ONE POINT PICK - UP



TWO POINT PICK - UP

PICK - UP POINTS

QUANTITIES FOR ONE 16" PRESTRESSED PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.300L	ONE POINT PICK-UP 0.700L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0"	1.63	3.31	7'-6"	17'-6"	5'-2"	14'-8"
30'-0"	1.96	3.97	9'-0"	21'-0"	6'-2½"	17'-7"
35'-0"	2.29	4.63	10'-6"	24'-6"	7'-3"	20'-6"
40'-0"	2.61	5.29	12'-0"	28'-0"	8'-3½"	23'-5"
45'-0"	2.94	5.95	13'-6"	31'-6"	9'-4"	26'-4"
50'-0"	3.27	6.61	15'-0"	35'-0"	10'-4"	29'-4"
55'-0"	3.59	7.28	16'-6"	38'-6"	11'-4½"	32'-3"
60'-0"	3.92	7.94			12'-5"	35'-2"
65'-0"	4.25	8.60			13'-5½"	38'-1"
70'-0"	4.57	9.26			14'-6"	41'-0"
75'-0"	4.90	9.92			15'-6½"	43'-11"
80'-0"	5.23	10.58			16'-7"	46'-10"

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½"	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6"	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½" OR 0.6" STRANDS MAY BE USED IN EITHER STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

CORROSION PROTECTION

THE WATER/CEMENT RATIO FOR PRESTRESSED CONCRETE PILES SHALL NOT EXCEED 0.40.

ALL BAR SUPPORTS USED IN THE PRESTRESSED CONCRETE PILES, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE CONCRETE IN THE PRESTRESSED CONCRETE PILES SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

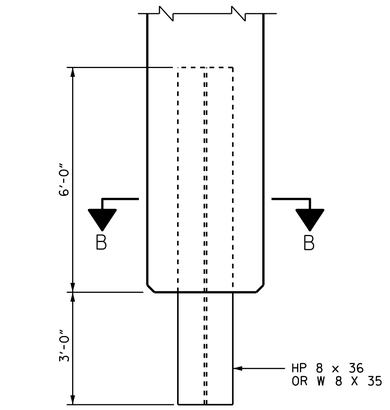
BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.



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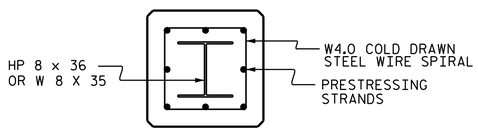

SECTION B-B

PILE TIP DETAILS

FOR 16" SQUARE PRESTRESSED CONCRETE PILE

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

16" PRESTRESSED CONCRETE PILE (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F24583893D8F40E...
1/23/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-32
1			3			TOTAL SHEETS
2			4			38

STR. #2

STD. NO. PCP2 (SHT 2)

ASSEMBLED BY : QTN	DATE : 1/19
CHECKED BY : PKN	DATE : 1/19
DRAWN BY : RH 9/98	REV. 10/1/11 MAA/GM
CHECKED BY : LES 10/98	REV. 12/14 MAA/TMG
	REV. 12/17 MAA/THC

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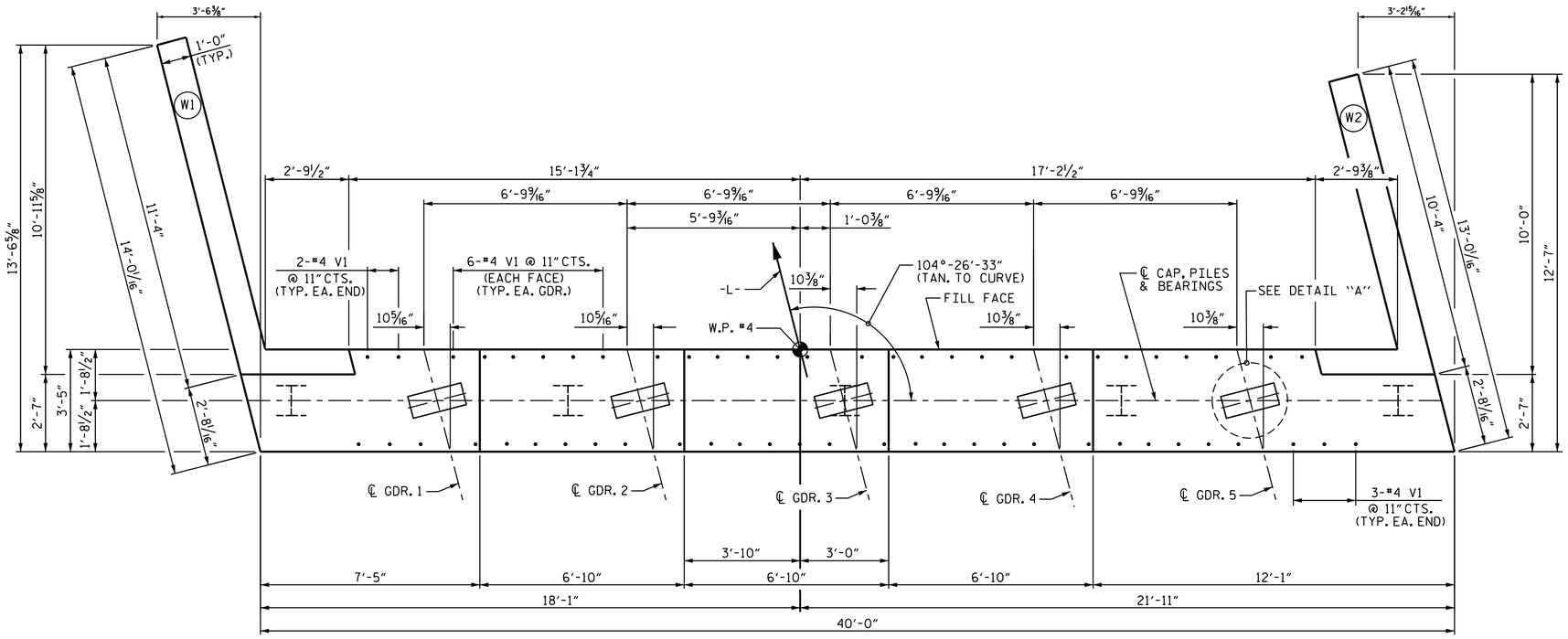
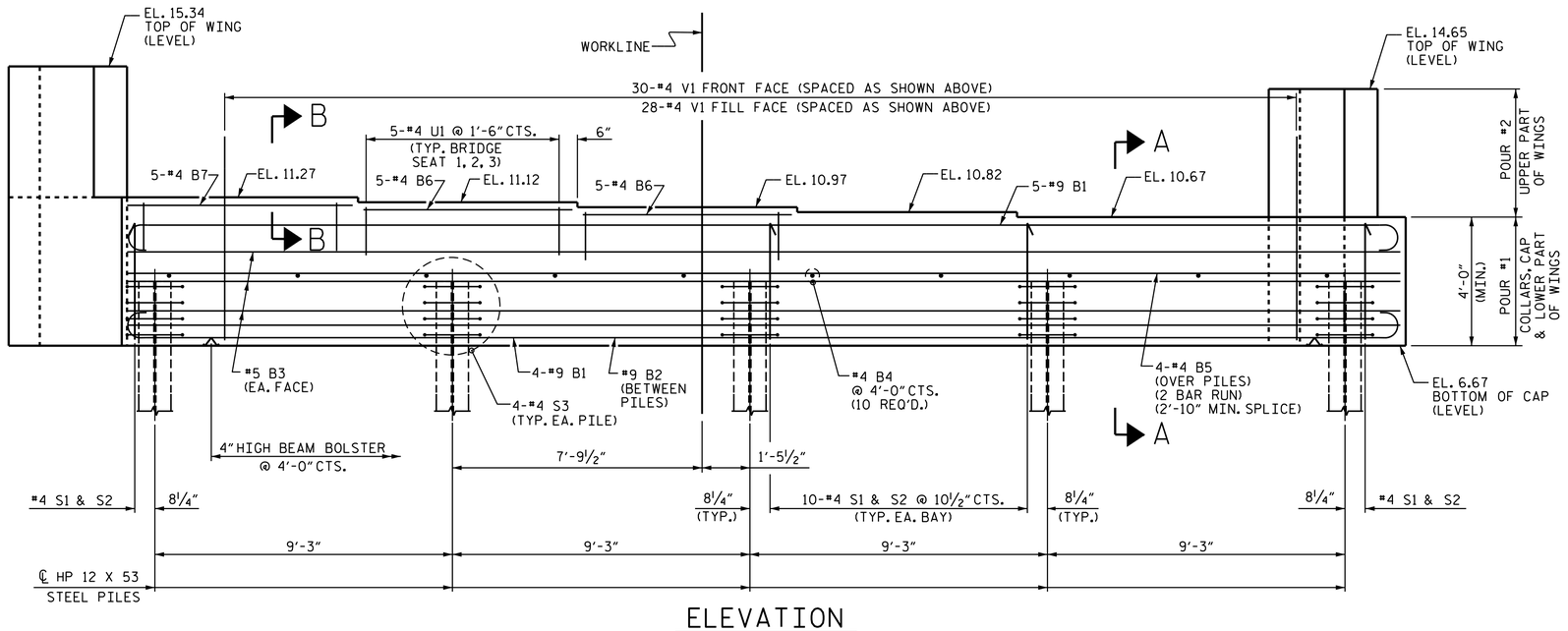
kalford

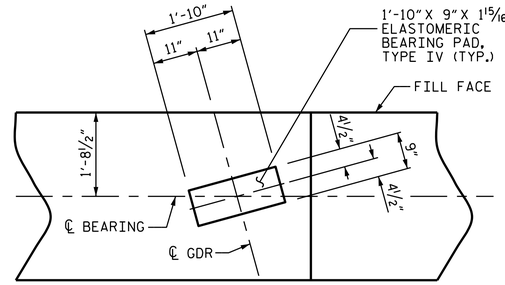


PLAN



ELEVATION

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.



DETAIL "A"

(TYP. EA. GDR.)

NOTES

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

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2 (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458380D0F40E...
1/23/2019

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1			3		
2			4		

SHEET NO. S2-33

TOTAL SHEETS 38

STR. #2

DRAWN BY : O. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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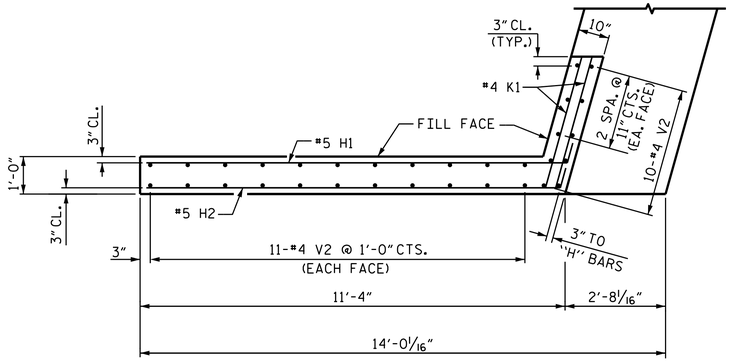
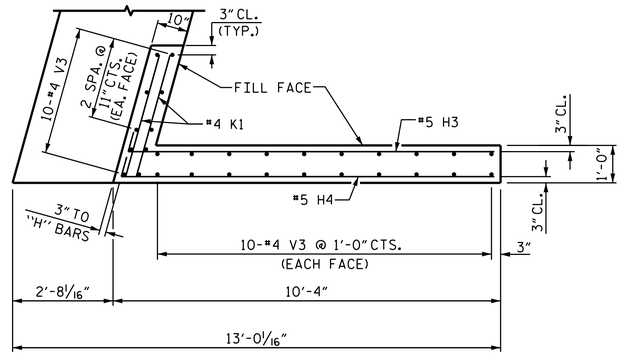
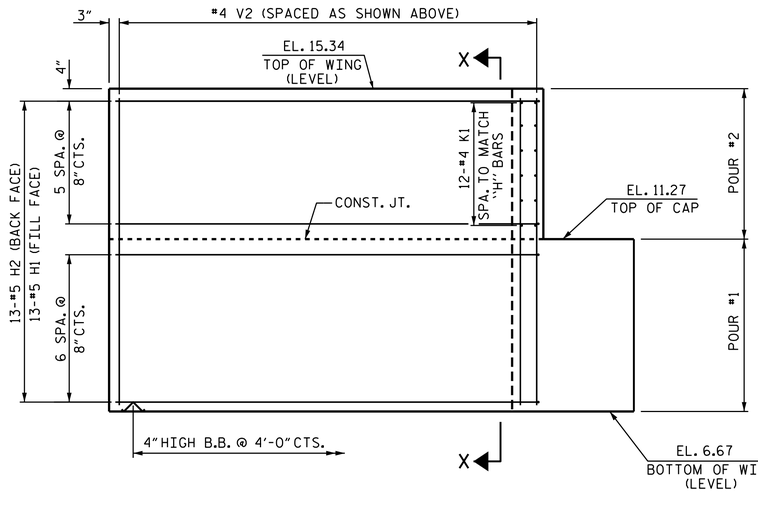


PLAN OF WING W1



PLAN OF WING W2



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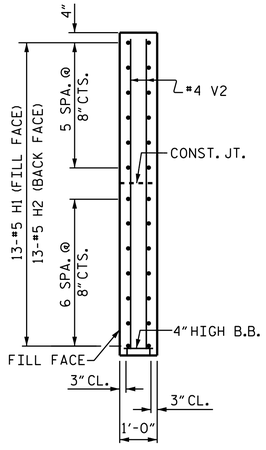
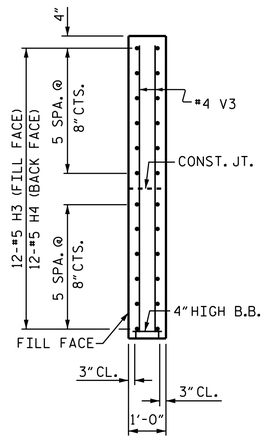


SECTION X-X



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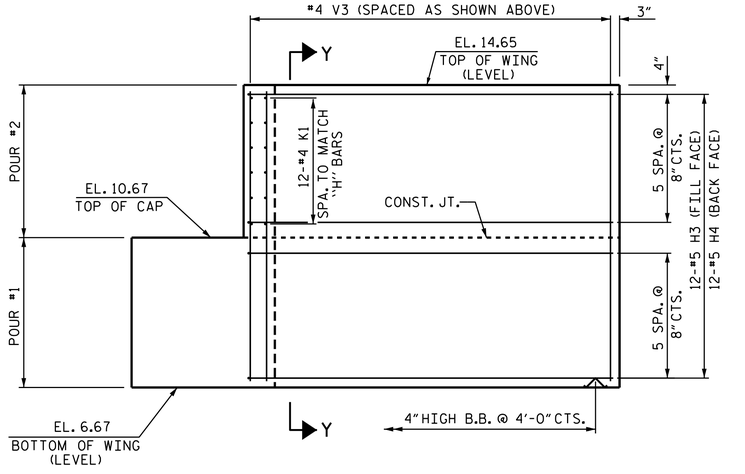

ELEVATION OF WING W2

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2 (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 P. ENGINEER KORREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

DRAWN BY : Q. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

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pknewton

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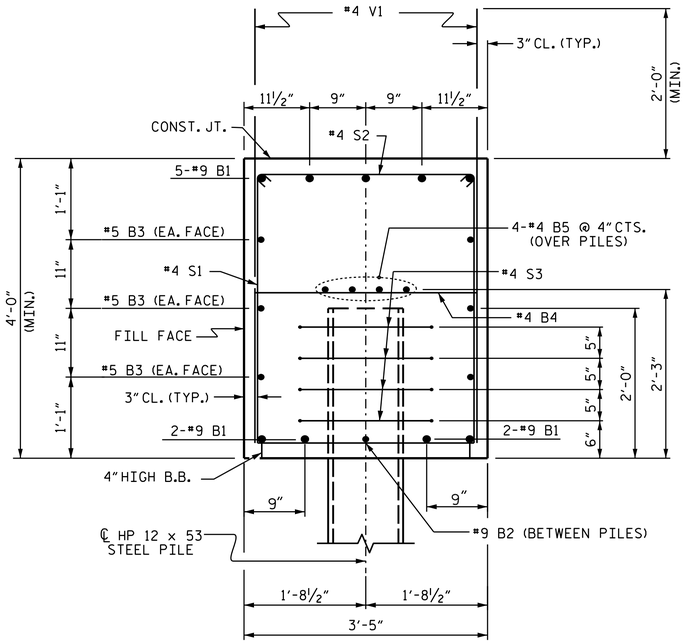
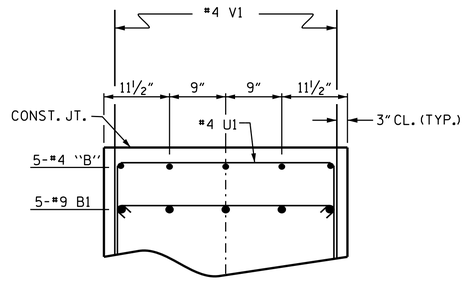
TOTAL SHEETS 38

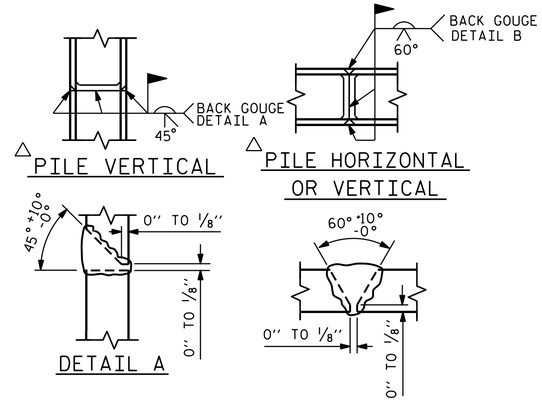
STR. #2



SECTION A-A

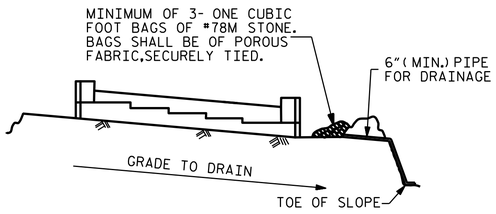


PARTIAL SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

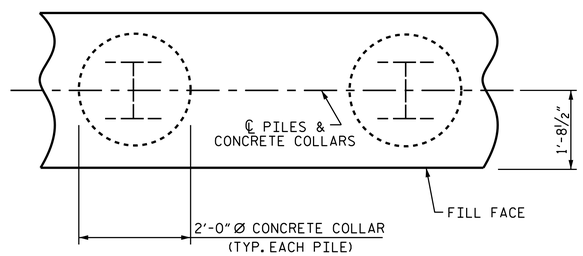


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

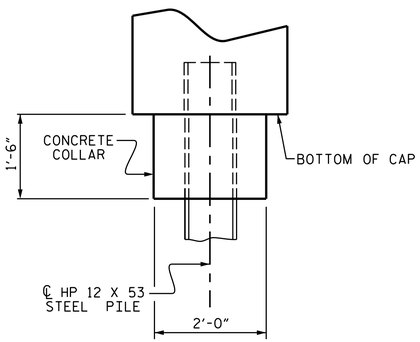
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT



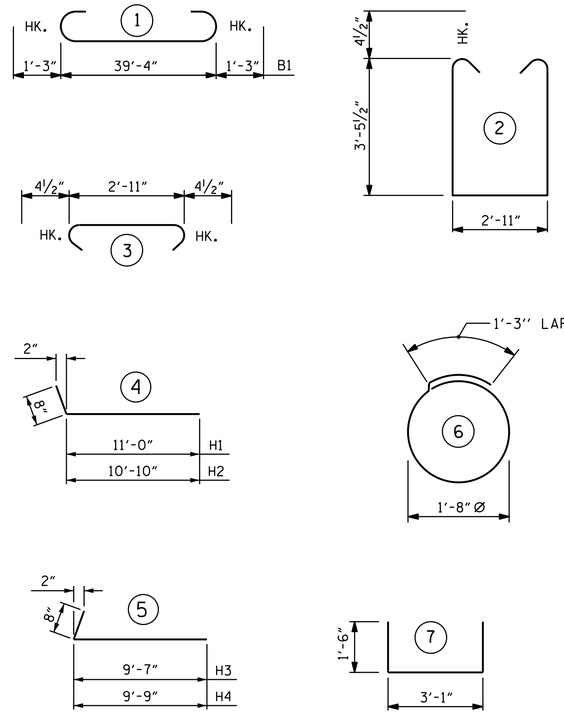
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	9	#9	1	41'-10"	1281
✳B2	4	#9	STR	8'-9"	119
✳B3	6	#5	STR	39'-6"	247
✳B4	10	#4	STR	2'-11"	19
✳B5	8	#4	STR	21'-2"	113
✳B6	5	#4	STR	6'-6"	22
✳B7	5	#4	STR	7'-0"	23
✳H1	13	#5	4	11'-8"	158
✳H2	13	#5	4	11'-6"	156
✳H3	12	#5	5	10'-3"	128
✳H4	12	#5	5	10'-5"	130
✳K1	24	#4	STR	3'-4"	53
✳S1	42	#4	2	10'-7"	297
✳S2	42	#4	3	3'-8"	103
✳S3	20	#4	6	6'-6"	87
✳U1	15	#4	7	5'-11"	59
✳V1	58	#4	STR	5'-0"	194
✳V2	32	#4	STR	8'-2"	175
✳V3	30	#4	STR	7'-5"	149

✳EPOXY COATED REINFORCING STEEL = 3513 LBS.

CLASS AA CONCRETE

POUR #1
(CAP, CONC. COLLARS, & LOWER PART OF WINGS) = 25.7 C.Y.

POUR #2
(UPPER PART OF WINGS) = 3.9 C.Y.

TOTAL = 29.6 C.Y.

HP 12 X 53 STEEL PILES
No. 5 LIN FT. 325

PILE REDRIVES EA. 5

STEEL PILE POINTS NO. 5

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2
(EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 P. ENGINEER KOREY NEWTON

DocuSigned by: P. Korey Newton
1/20/2019

DRAWN BY : O. T. NGUYEN DATE : 5/17/18
CHECKED BY : M. K. BEARD DATE : 8/18
DESIGN ENGINEER OF RECORD: A. K. PATEL DATE : 1/10/19

20-JAN-2019 22:06
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pknewton

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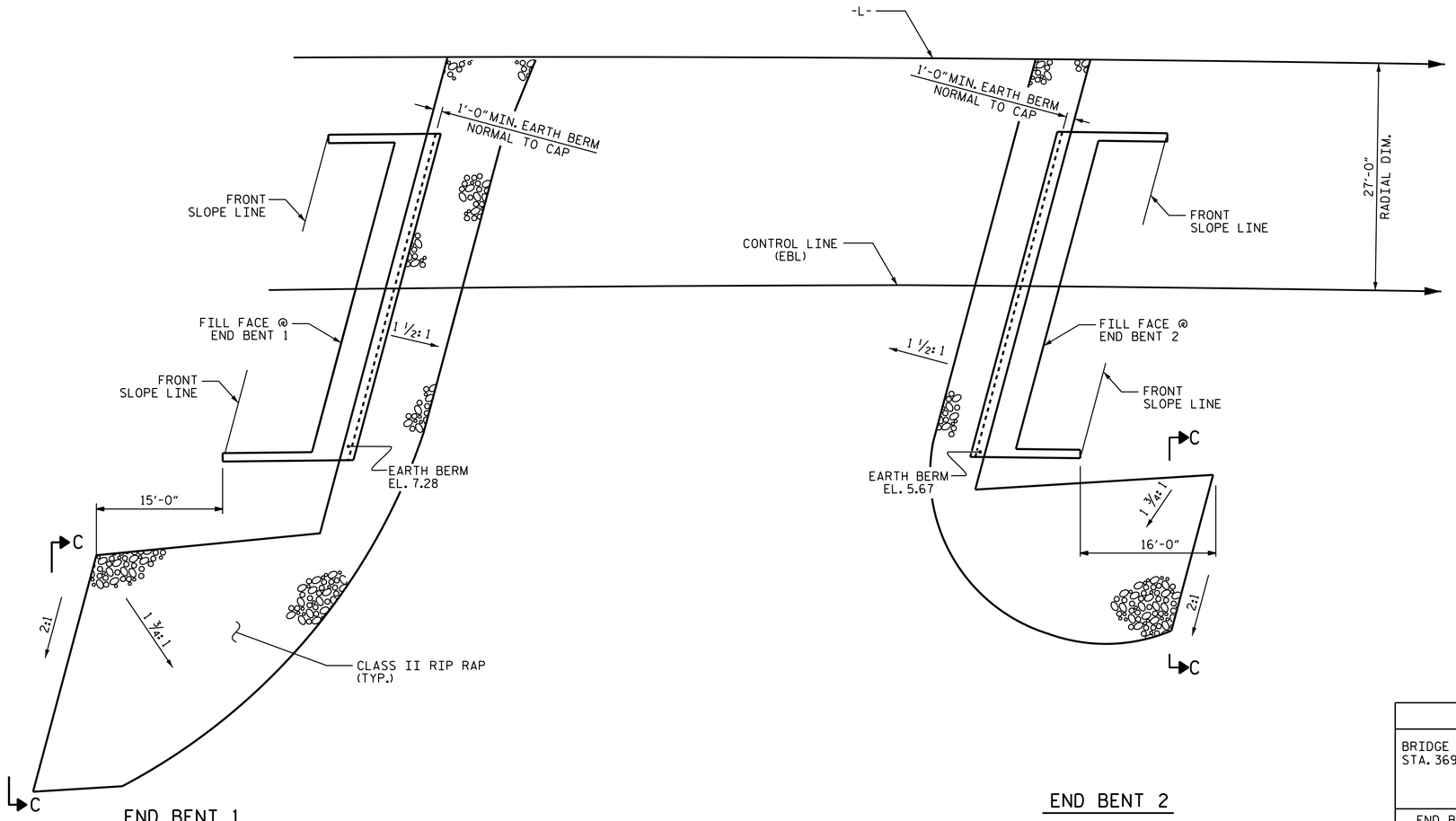
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-35
1			3			TOTAL SHEETS
2			4			38

STR. #2

NOTE :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

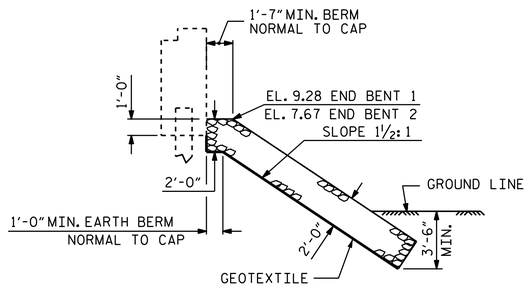


END BENT 1

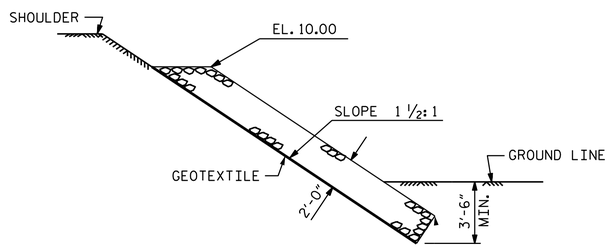
PLAN

END BENT 2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 369+42.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	130	145
END BENT 2	120	135



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 369+42.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER P. KOREY NEWTON
DocuSigned by: P. Korey Newton
1/20/2019

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

SHEET NO. S2-36
TOTAL SHEETS 38

STR. #2

STD. NO. RR1

ASSEMBLED BY : G. KOUCHEKI/OTN	DATE : 5/18	
CHECKED BY : M. K. BEARD	DATE : 11/18	
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM
	REV. 12/17	MAA/THC

20-JAN-2019 22:06
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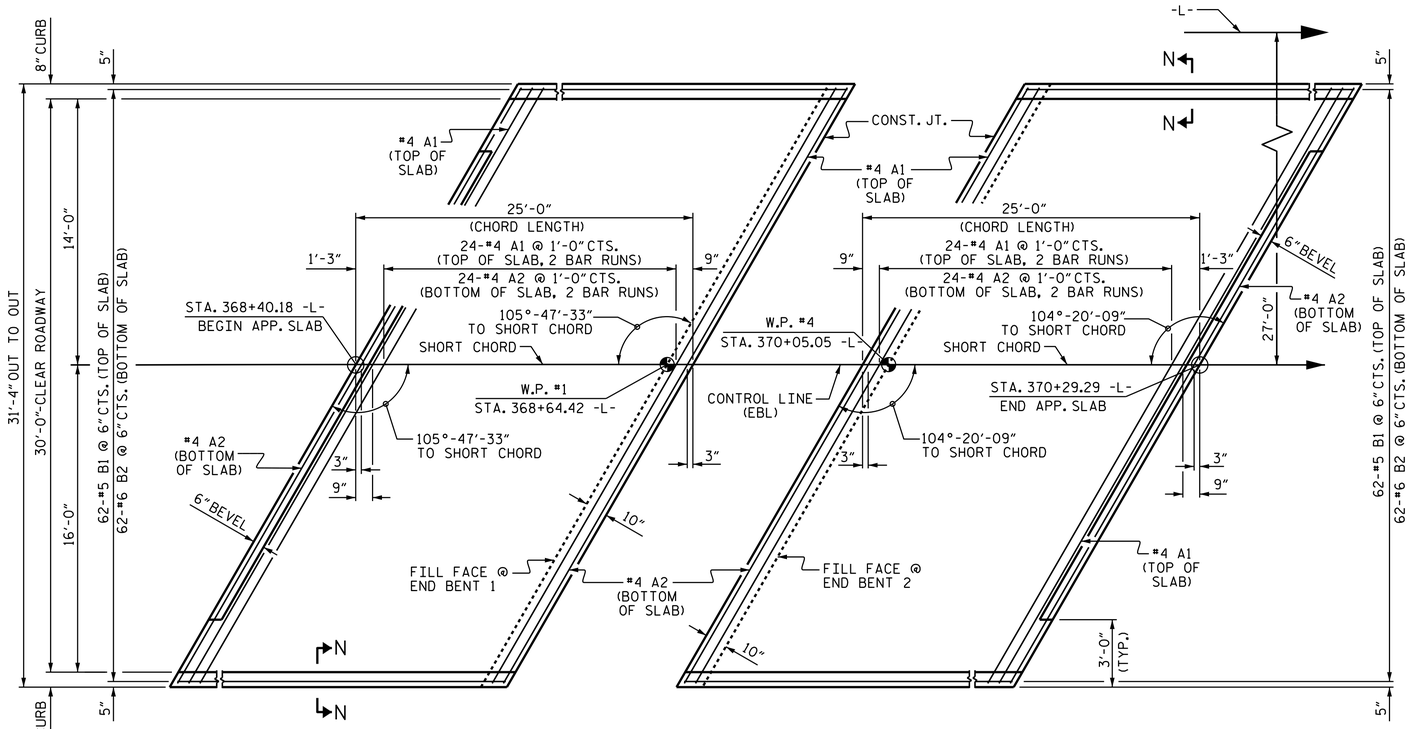
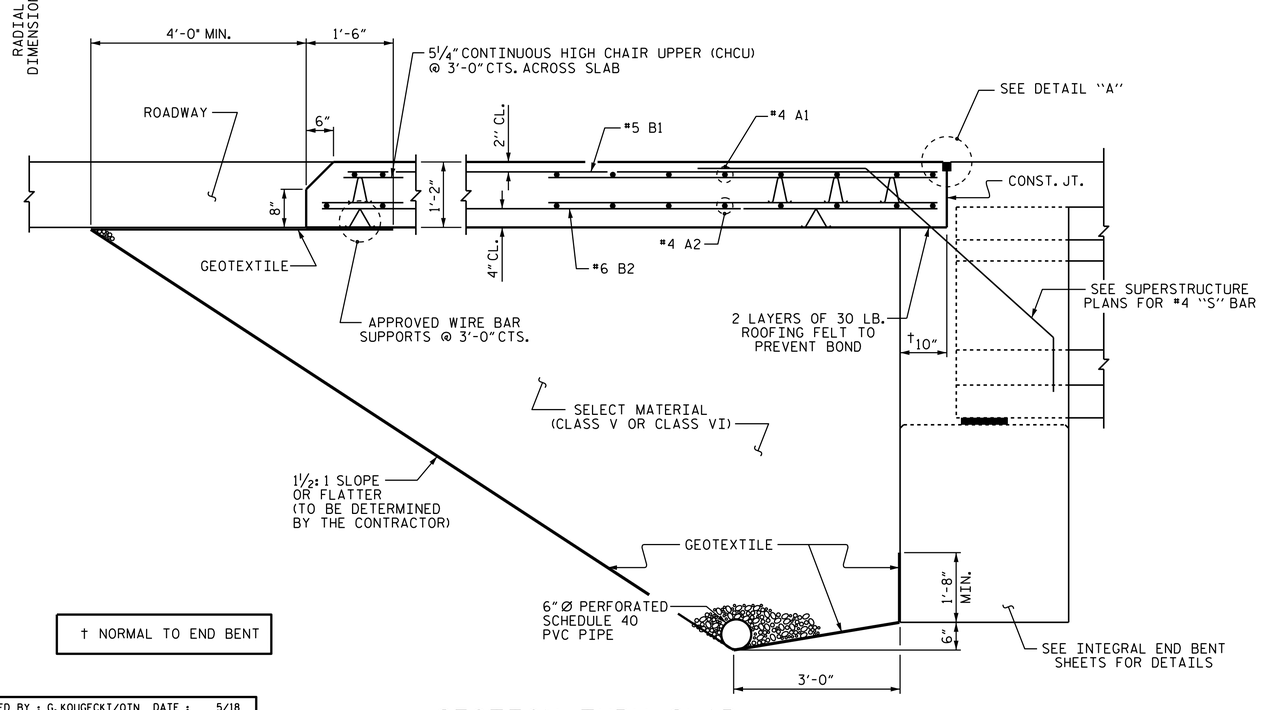
pknewton



PLAN @ END BENT 1

PLAN @ END BENT 2

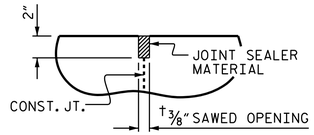
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



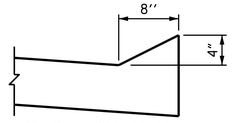
† NORMAL TO END BENT

SECTION THRU SLAB

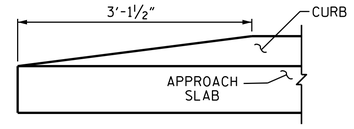
(TYPE I - STANDARD APPROACH FILL)



DETAIL "A"



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

NOTES

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

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

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

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

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

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

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

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

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

ARC OFFSETS ARE NEGLIGIBLE, THEREFORE NOT SHOWN.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	52	#4	STR	16'-5"	580
✱ A2	52	#4	STR	16'-5"	580
✱ B1	63	#5	STR	24'-0"	1552
✱ B2	63	#6	STR	24'-6"	2281
✱ EPOXY COATED REINFORCING STEEL				4994	LBS.
CLASS AA CONCRETE				35.2	C. Y.

SPLICE LENGTHS

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

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 P.E. ENGINEER K. COREY NEWTON

DocuSigned by: P. Korey Newton 1/20/2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-37
1			3			TOTAL SHEETS
2			4			38

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STR. #2

STD. NO. BAS5

ASSEMBLED BY : G. KOUGECKI/OTN	DATE : 5/18		
CHECKED BY : M. K. BEARD	DATE : 11/18		
DRAWN BY : TLA 10/05	REV. 12/21/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

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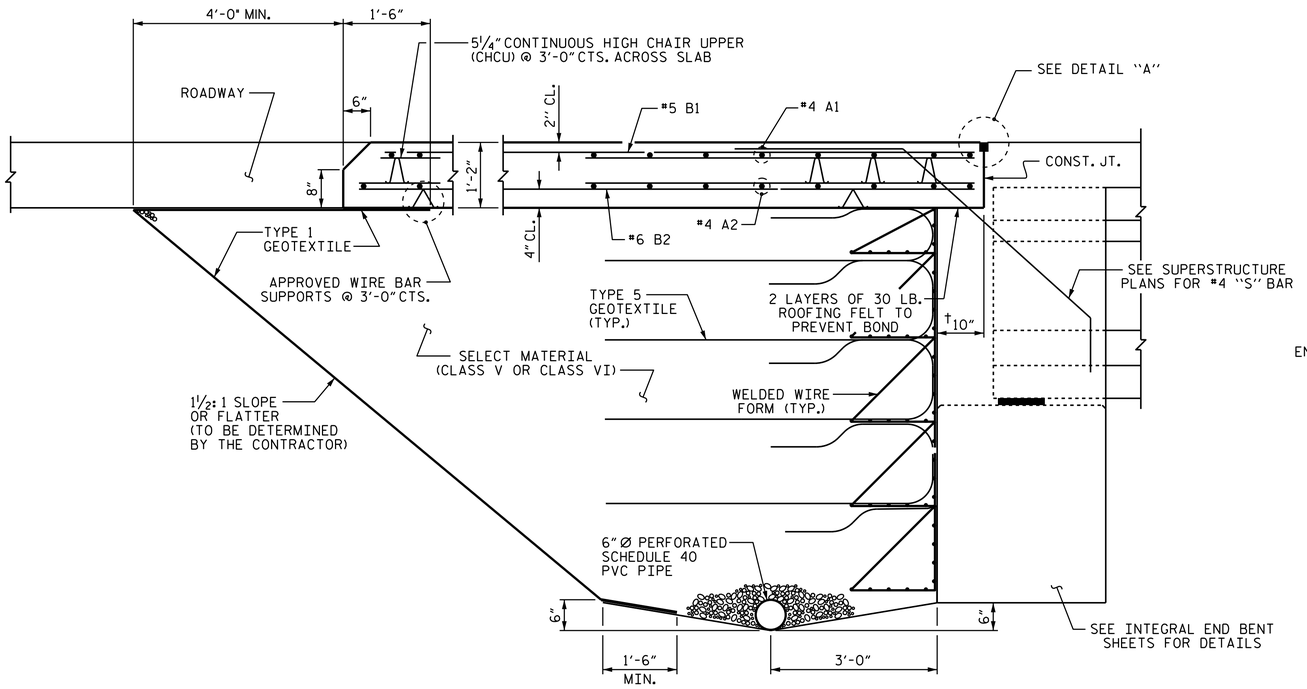
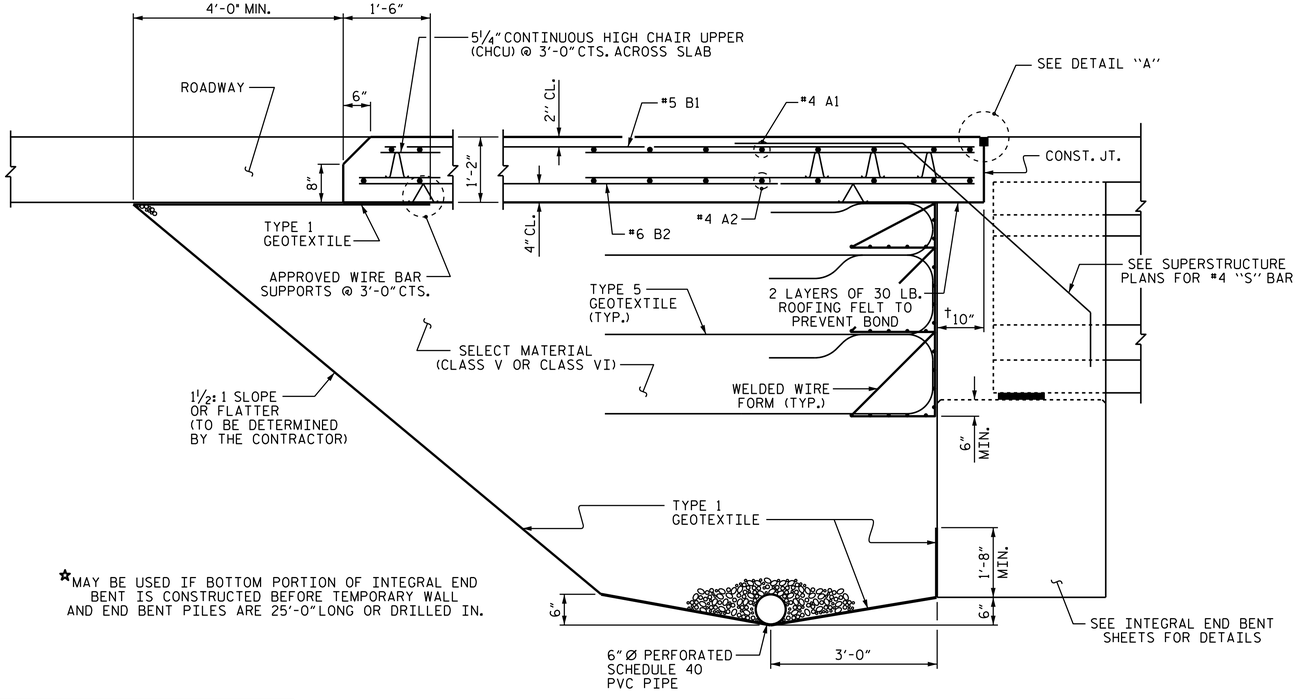


SECTION THRU SLAB

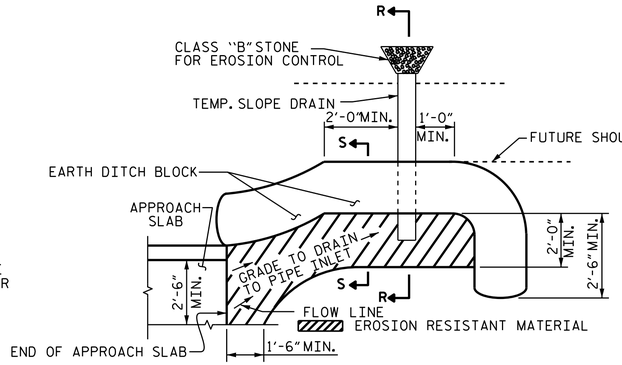
(TYPE A - ALTERNATE APPROACH FILL)



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

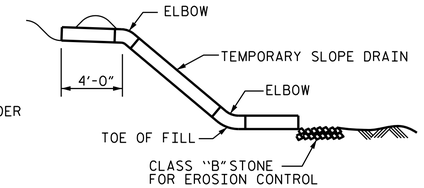
SECTION THRU SLAB

★(TYPE A - ALTERNATE APPROACH FILL)

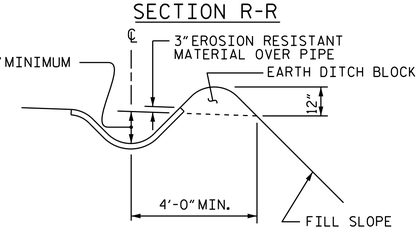


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



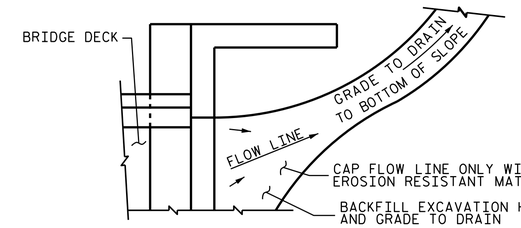
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

NOTES

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

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

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

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

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

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

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

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

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 369+42.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS (EBL)

NORTH CAROLINA PROFESSIONAL SEAL 26445 ENGINEER KOREY NEWTON

DocuSigned by: P. Korey Newton 4FFE39D1431B407...
8/16/2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-38
1			3			TOTAL SHEETS
2			4			38

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ASSEMBLED BY : P.K. NEWTON		DATE : 8/16/21	
CHECKED BY : M.K. BEARD		DATE : 8/16/21	
DRAWN BY : TLA 10/05	REV. 12/21/11		MAA/GM
CHECKED BY : GM 5/06	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

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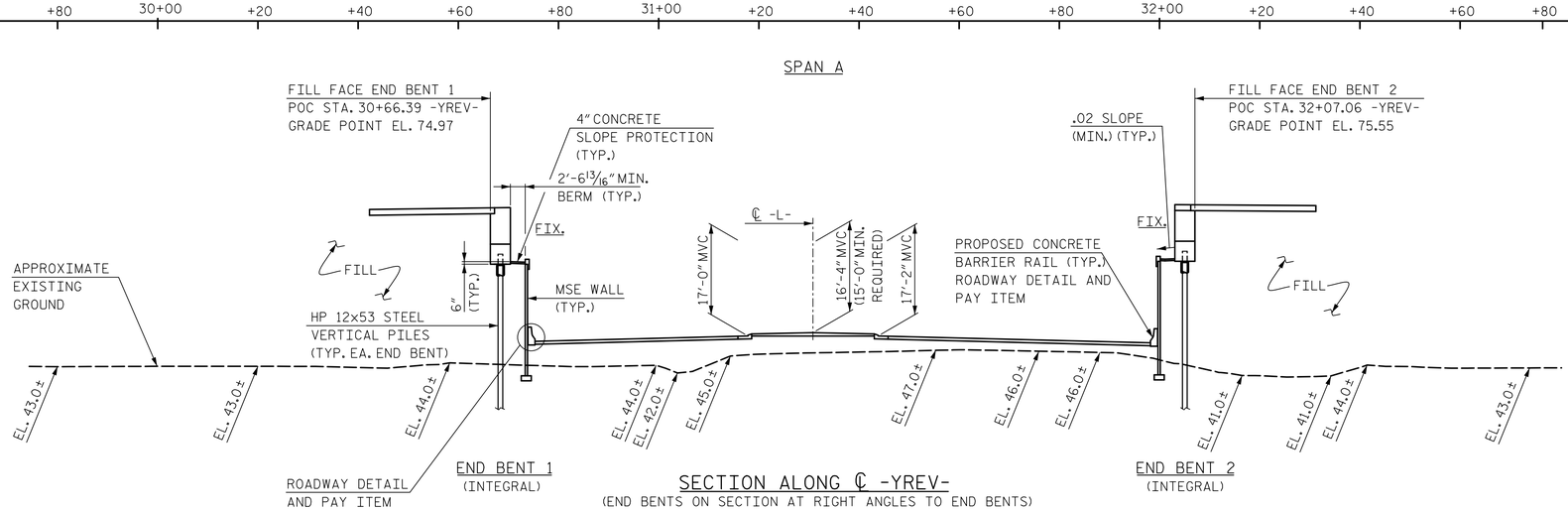
pknewton

STR. #2

STD. NO. BAS5 (SHT 1b)

F.A. PROJECT NO. STP-0211(21)

SPAN A



SECTION ALONG ℄ -YREV-

(END BENTS ON SECTION AT RIGHT ANGLES TO END BENTS)

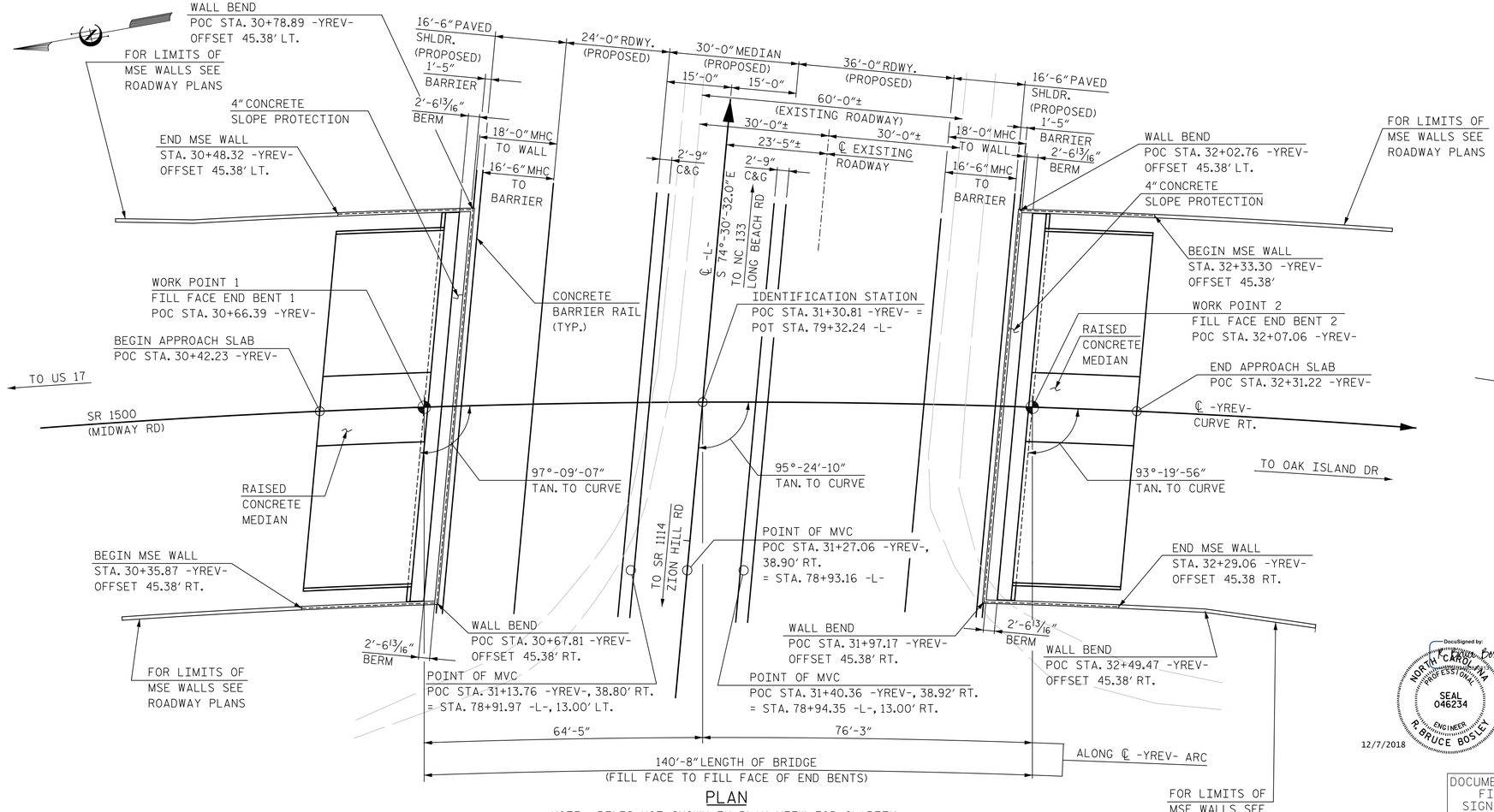
NOTES:

FOR GENERAL NOTES, SEE SHEET 4 OF 4.

MVC= MIN. VERTICAL CLEARANCE
MHC= MIN. HORIZONTAL CLEARANCE

PI STA. = 31+60.00
ELEV = 85.11
V.C. = 800'

GRADE DATA -YREV-



PLAN

NOTE: PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.

END BENTS ARE PARALLEL.

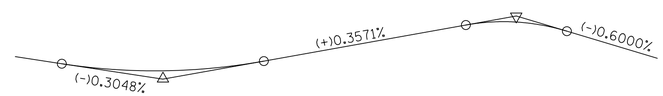
STATIONS AND OFFSETS TO PROPOSED MSE WALL ARE TO FRONT FACE OF WALL.

CURVE DATA -YREV-

PI STA. = 31+80.66
Δ = 47°-44'-36.4"(RT)
D = 2°-42'-55.6"
L = 1,758.22'
T = 933.78'
R = 2,110.00'
SE = 0.040

PI STA. = 75+00.00
ELEV = 48.50
V.C. = 400'

PI STA. = 82+00.00
ELEV = 51.00
V.C. = 200'



GRADE DATA -L-

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-
= POT 79+32.24 -L-

SHEET 1 OF 4 BRIDGE NO. 90263

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER NC 211 ON SR 1500 BETWEEN US 17 AND OAK ISLAND DRIVE

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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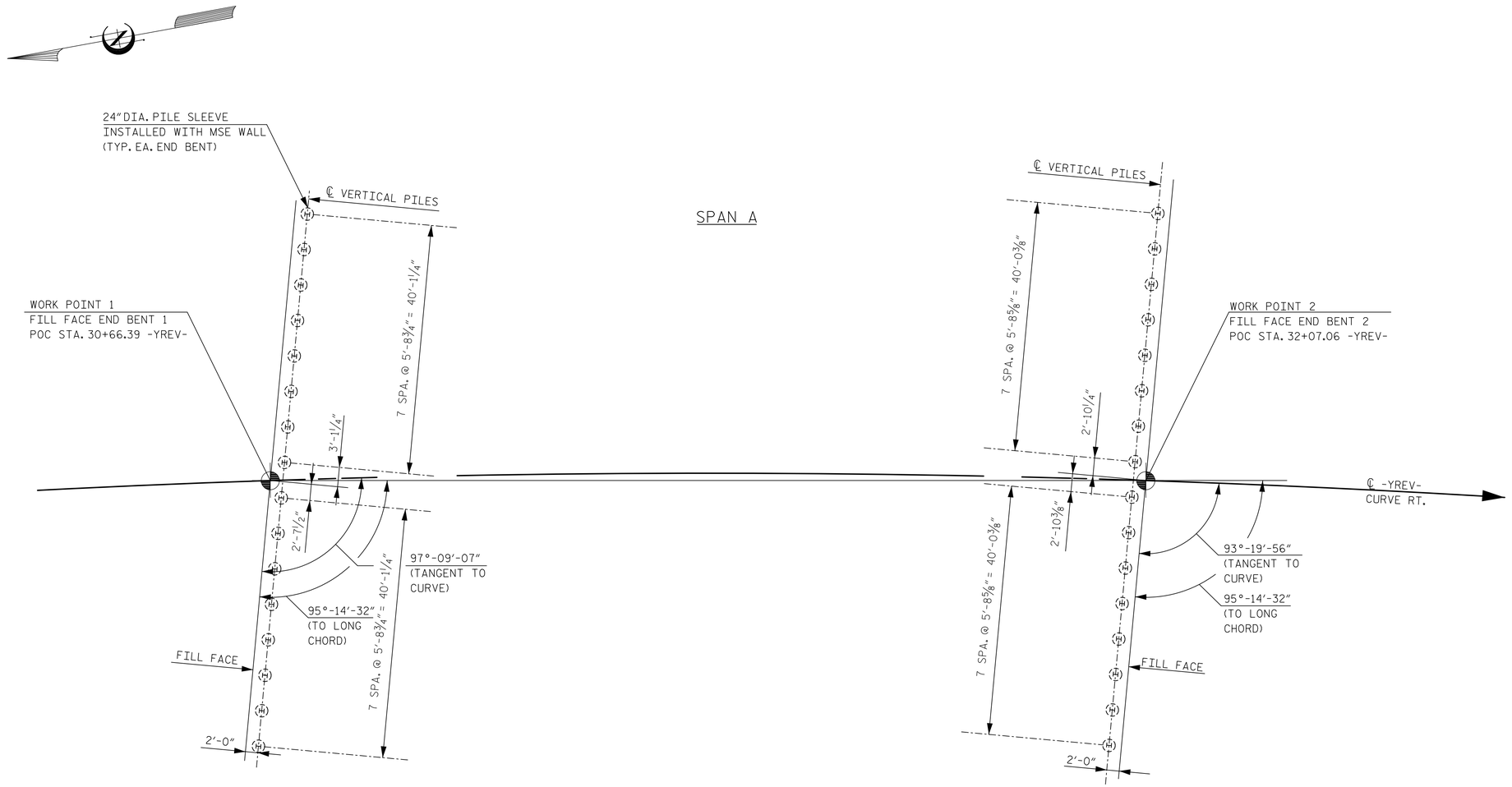
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 6/18
CHECKED BY P. BARBER DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18
DWG. NO. 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-1
1			3			TOTAL SHEETS
2			4			25



END BENT 1

END BENT 2

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1 AND END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

FOUNDATION LAYOUT PLAN

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO FILL FACES AT END BENTS.

ALL PILE DIMENSIONS ARE TO CENTERS OF PILES.

PILES AT END BENT 1 AND END BENT 2 ARE HP 12x53 STEEL PILES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE END BENT SHEETS.

DocuSigned by: R Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY A. GOFF DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 2

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

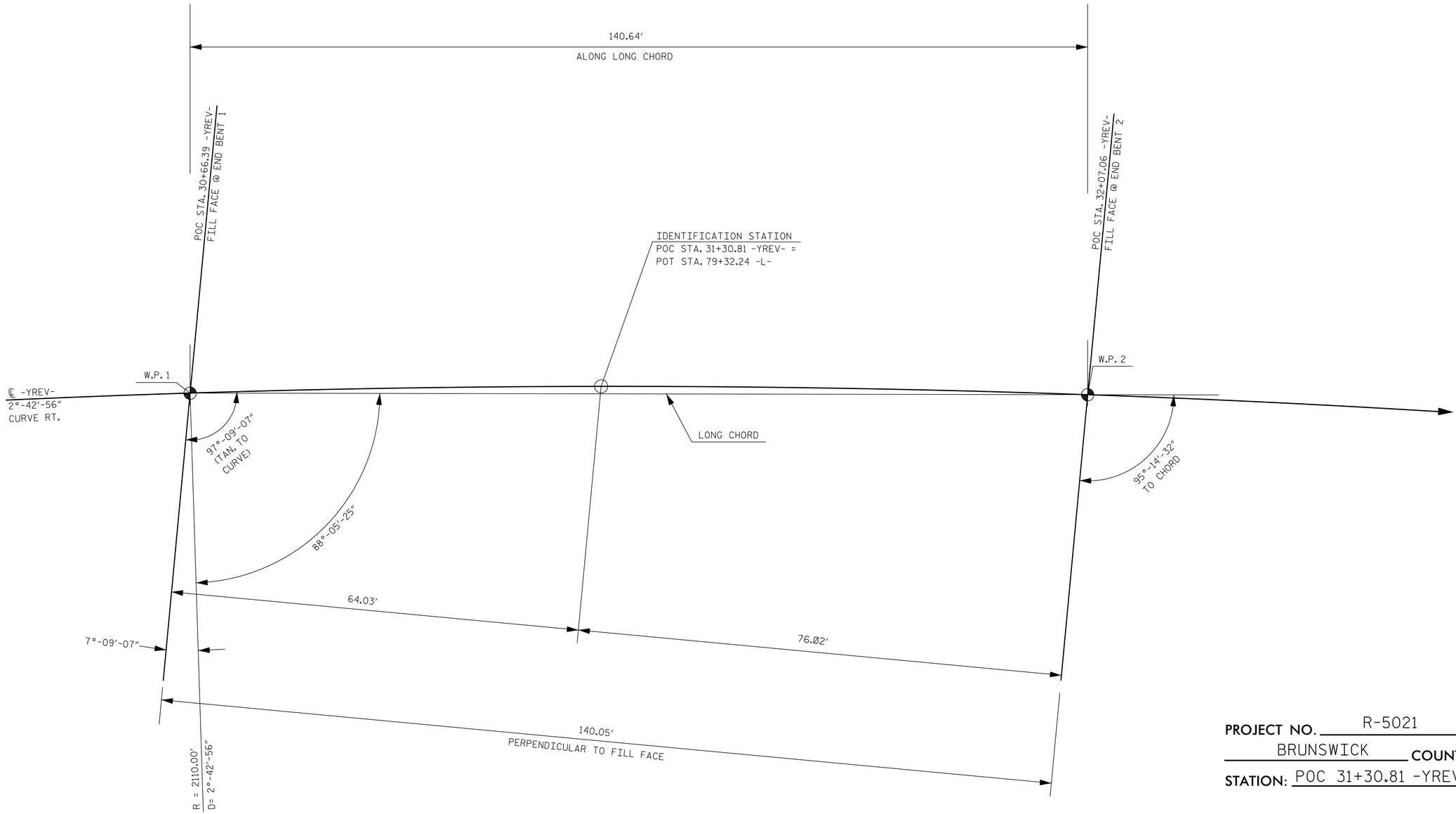
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-2
1			3			TOTAL SHEETS
2			4			25



LONG CHORD LAYOUT

NOTE: END BENTS ARE PARALLEL

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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DRAWN BY	A. GOFF	DATE 6/18	DWG. NO. 3
CHECKED BY	B. BOSLEY	DATE 6/18	
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE 12/18	

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

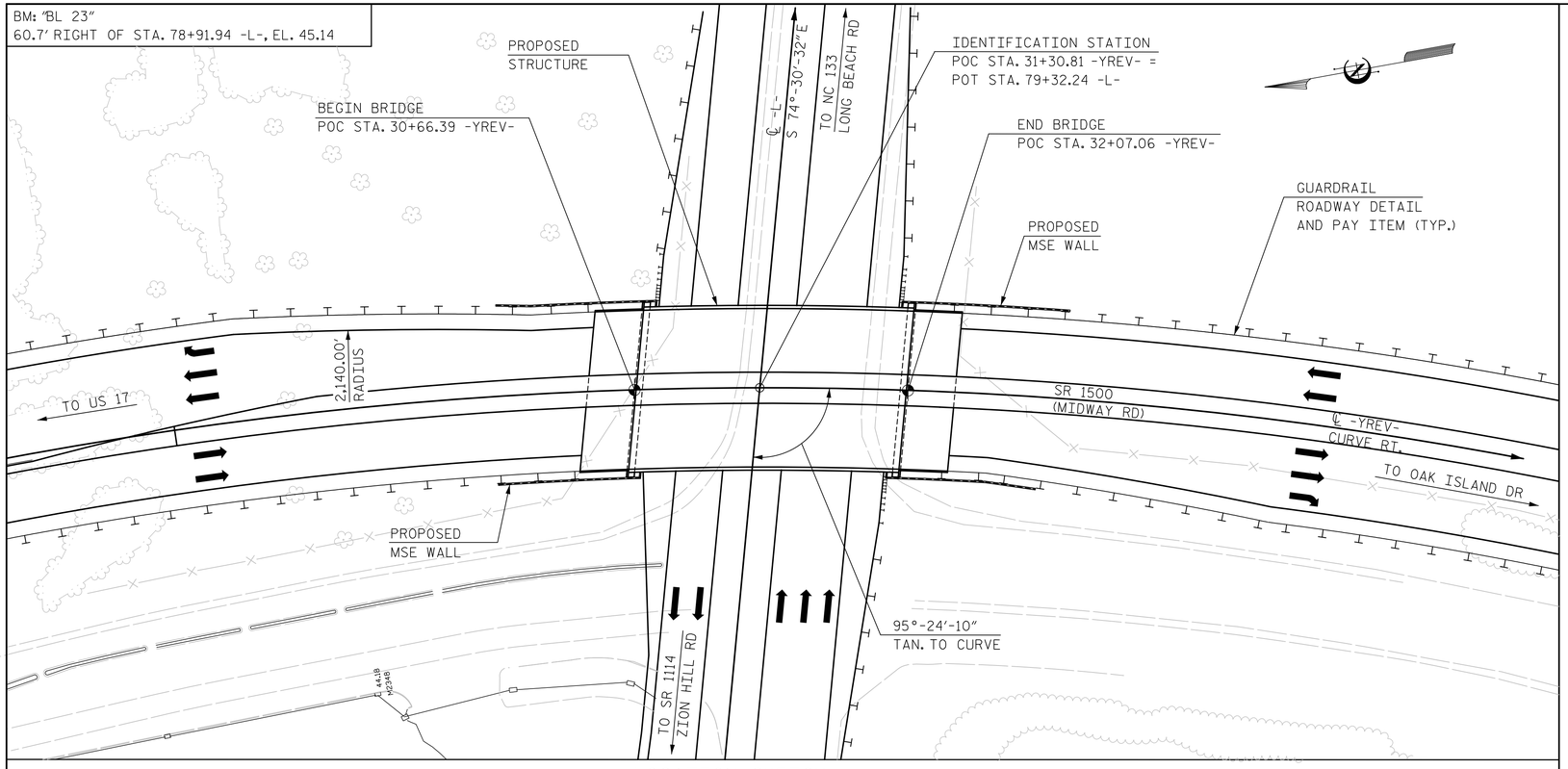
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LONG CHORD LAYOUT

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-3
1			3			TOTAL SHEETS
2			4			25



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION POC 31+30.81 -YREV-	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	L.F.	EA.	NO.	L.F.	EA.	EA.	L.F.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE	———	11,740.0	11,236.0	———	LUMP SUM	———	9	1,242.8	———	———	———	———	———	278.0	———	LUMP SUM
END BENT 1	———	———	———	54.2	———	9,931.0	———	———	16	16	1,440.0	16	8	———	34.0	———
END BENT 2	———	———	———	53.9	———	9,890.0	———	———	16	16	1,440.0	16	8	———	33.0	———
TOTAL	1	11,740.0	11,236.0	108.1	LUMP SUM	19,821.0	9	1,242.8	32	32	2,880.0	32	16	278.0	67.0	LUMP SUM

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

DocuSigned by: Paul J. Barber

7/22/2021

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DRAWN BY A. GOFF DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH, GENERAL NOTES, AND TOTAL BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-4
1			3			TOTAL SHEETS
2			4			25

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										SERVICE III 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⟩	1.05	--	1.75	0.87	1.38	A	ER	68.3	0.954	1.32	A	I	13.1	0.80	0.87	1.05	A	EL	68.3	
		HL-93 (OPERATING)	N/A	--	1.75	--	1.35	0.87	1.79	A	ER	68.3	0.954	1.75	A	I	13.1	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.59	57.2	1.75	0.87	2.09	A	ER	68.3	0.954	1.96	A	I	13.1	0.80	0.87	1.59	A	EL	68.3	
		HS-20 (OPERATING)	36.000	--	2.59	93.2	1.35	0.87	2.71	A	ER	68.3	0.954	2.59	A	I	13.1	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.90	52.6	1.40	0.87	6.42	A	ER	68.3	0.954	6.49	A	I	13.1	0.80	0.87	3.90	A	EL	68.3	
		SNGARBS2	20.000	--	2.77	55.4	1.40	0.87	4.55	A	ER	68.3	0.954	4.45	A	I	13.1	0.80	0.87	2.77	A	EL	68.3	
		SNAGRIS2	22.000	--	2.56	56.3	1.40	0.87	4.22	A	ER	68.3	0.954	4.08	A	I	13.1	0.80	0.87	2.56	A	EL	68.3	
		SNCOTTS3	27.250	--	1.94	52.8	1.40	0.87	3.19	A	ER	68.3	0.954	3.16	A	I	13.1	0.80	0.87	1.94	A	EL	68.3	
		SNAGGRS4	34.925	--	1.56	54.4	1.40	0.87	2.58	A	ER	68.3	0.954	2.52	A	I	13.1	0.80	0.87	1.56	A	EL	68.3	
		SNS5A	35.550	--	1.53	54.4	1.40	0.87	2.52	A	ER	68.3	0.954	2.51	A	I	13.1	0.80	0.87	1.53	A	EL	68.3	
		SNS6A	39.950	--	1.38	55.1	1.40	0.87	2.28	A	ER	68.3	0.954	2.25	A	I	13.1	0.80	0.87	1.38	A	EL	68.3	
		SNS7B	42.000	--	1.32	55.4	1.40	0.87	2.17	A	ER	68.3	0.954	2.17	A	I	13.1	0.80	0.87	1.32	A	EL	68.3	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.68	55.4	1.40	0.87	2.77	A	ER	68.3	0.954	2.73	A	I	13.1	0.80	0.87	1.68	A	EL	68.3	
		TNT4A	33.075	--	1.68	55.5	1.40	0.87	2.77	A	ER	68.3	0.954	2.69	A	I	13.1	0.80	0.87	1.68	A	EL	68.3	
		TNT6A	41.600	--	1.36	56.5	1.40	0.87	2.23	A	ER	68.3	0.954	2.25	A	I	13.1	0.80	0.87	1.36	A	EL	68.3	
		TNT7A	42.000	--	1.35	56.7	1.40	0.87	2.23	A	ER	68.3	0.954	2.22	A	I	13.1	0.80	0.87	1.35	A	EL	68.3	
		TNT7B	42.000	--	1.38	57.9	1.40	0.87	2.26	A	ER	68.3	0.954	2.14	A	I	13.1	0.80	0.87	1.38	A	EL	68.3	
		TNAGRIT4	43.000	--	1.33	57.1	1.40	0.87	2.18	A	ER	68.3	0.954	2.08	A	I	13.1	0.80	0.87	1.33	A	EL	68.3	
		TNAGRT5A	45.000	--	1.26	56.7	1.40	0.87	2.07	A	ER	68.3	0.954	2.02	A	I	13.1	0.80	0.87	1.26	A	EL	68.3	
		TNAGRT5B	45.000	⟨3⟩	1.25	56.2	1.40	0.87	2.06	A	ER	68.3	0.954	1.98	A	I	13.1	0.80	0.87	1.25	A	EL	68.3	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

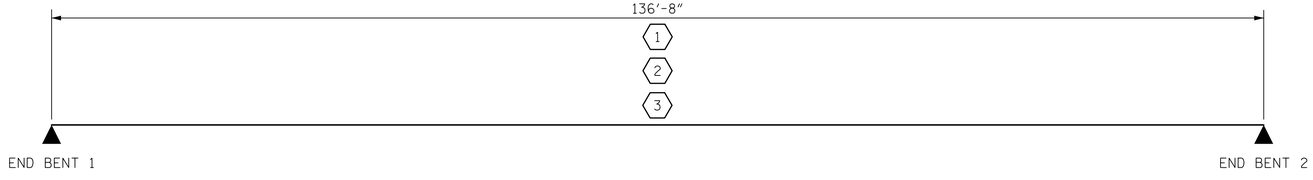
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

DocuSigned by: R Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

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DRAWN BY L. WATERS DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

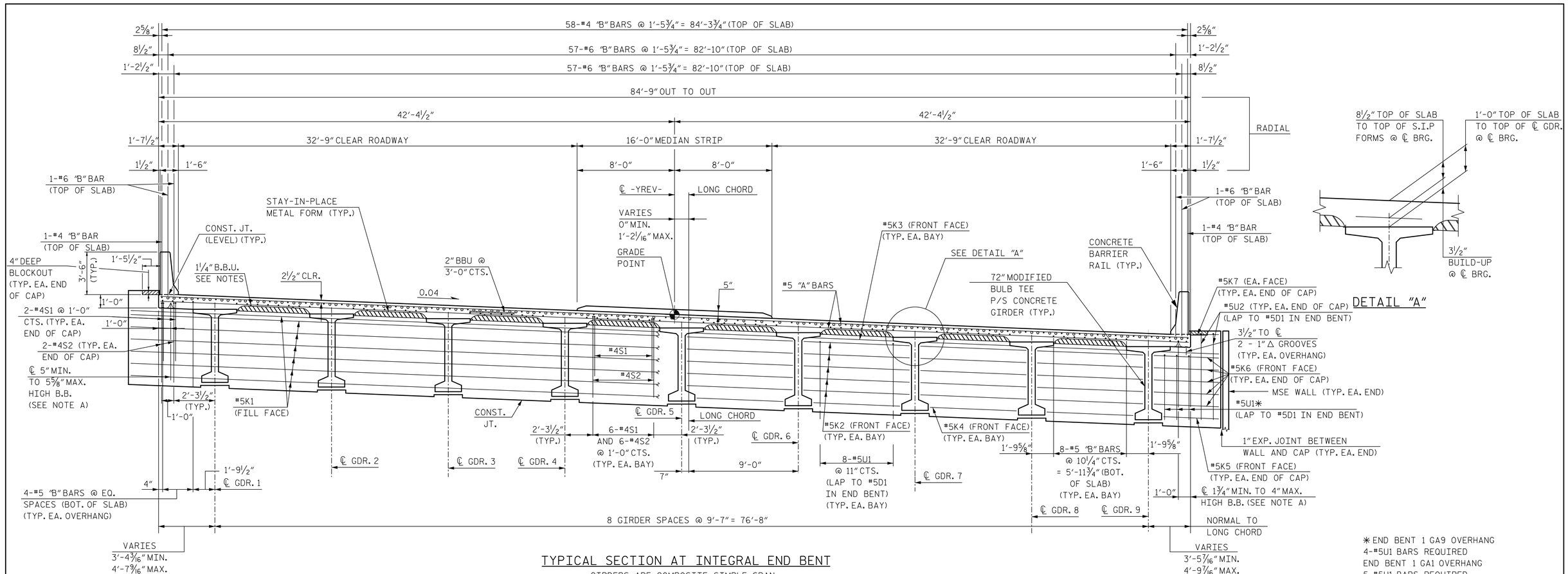
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-5
1			3			TOTAL SHEETS
2			4			25

ASSEMBLED BY : LLW DATE : 12/17
CHECKED BY : RBB DATE : 12/17

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM

STD. NO. LRFR1



DETAIL "A"

TYPICAL SECTION AT INTEGRAL END BENT

GIRDERS ARE COMPOSITE, SIMPLE SPAN.
ABUTMENTS ARE INTEGRAL.
FOR SECTION THRU END BENT, SEE SECTION A-A, SHEET 2 OF 2

* END BENT 1 GA9 OVERHANG
4-#5U1 BARS REQUIRED
END BENT 1 GA1 OVERHANG
5-#5U1 BARS REQUIRED
END BENT 2 GA9 OVERHANG
3-#5U1 BARS REQUIRED
END BENT 2 GA1 OVERHANG
5-#5U1 BARS REQUIRED

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

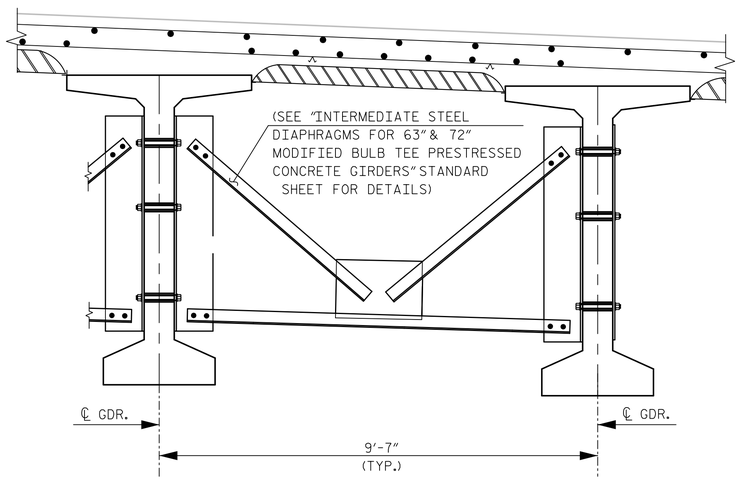
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

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

TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2¼" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 OR #7 "B" BARS ARE PRESENT, A 2" BBU SHALL BE USED.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILD-UPS.



PARTIAL TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)

'B" BAR KEY

- • = CONTINUOUS BAR RUN, SEE PLAN OF SPAN SHEETS.
- ° = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE PLAN OF SPAN SHEETS.

NOTE A: THE HEIGHT OF THE OVERHANG BEAM BOLSTERS VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

DocuSigned by: R Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

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DRAWN BY A. GOFF DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 6

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

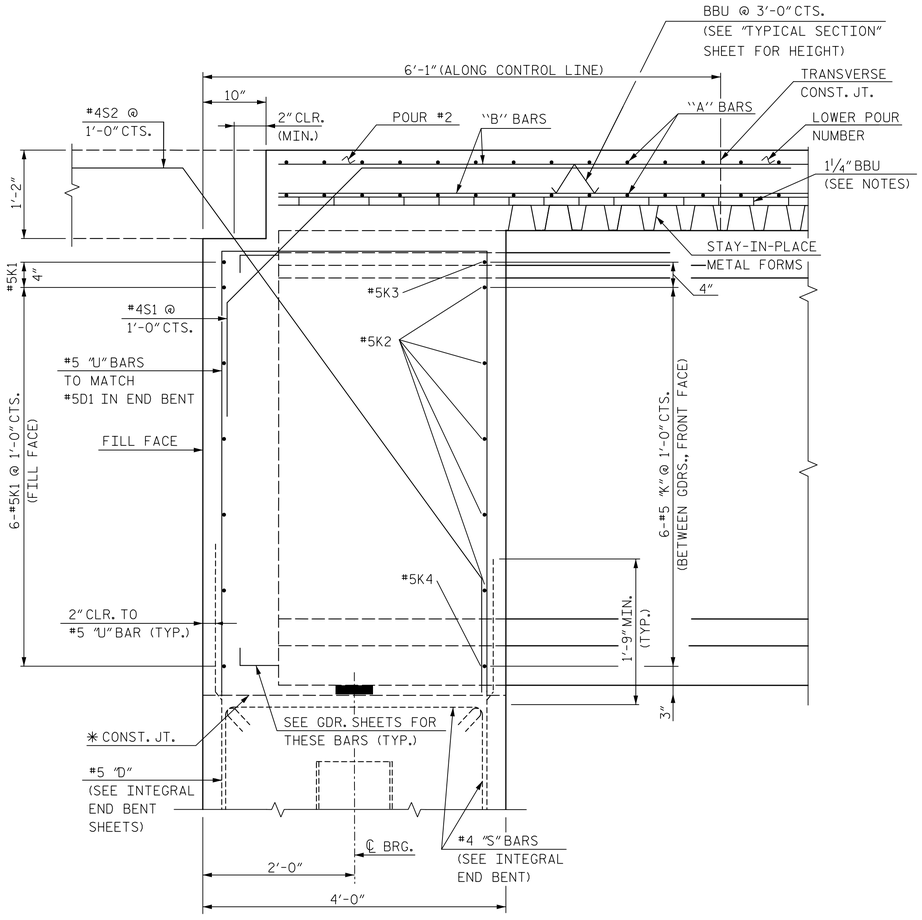
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

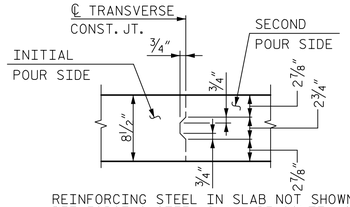
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-6
1			3			TOTAL SHEETS
2			4			25



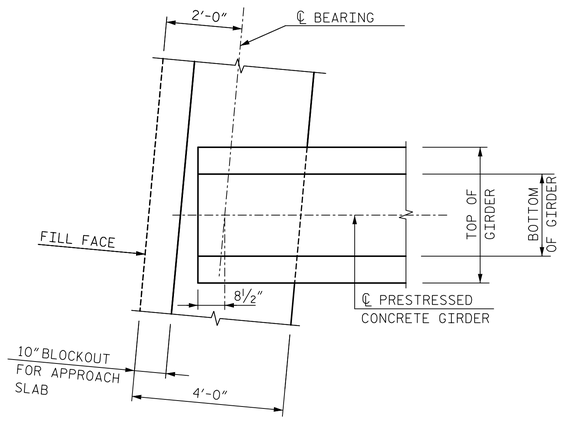
SECTION A-A
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

* THE TOP SURFACE OF THE END BENT CAP EXCLUDING THE BEARING AREA SHALL BE RAKED TO A DEPTH OF ¼".



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

TRANSVERSE CONSTRUCTION JOINT DETAIL



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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

SHEET 2 OF 2

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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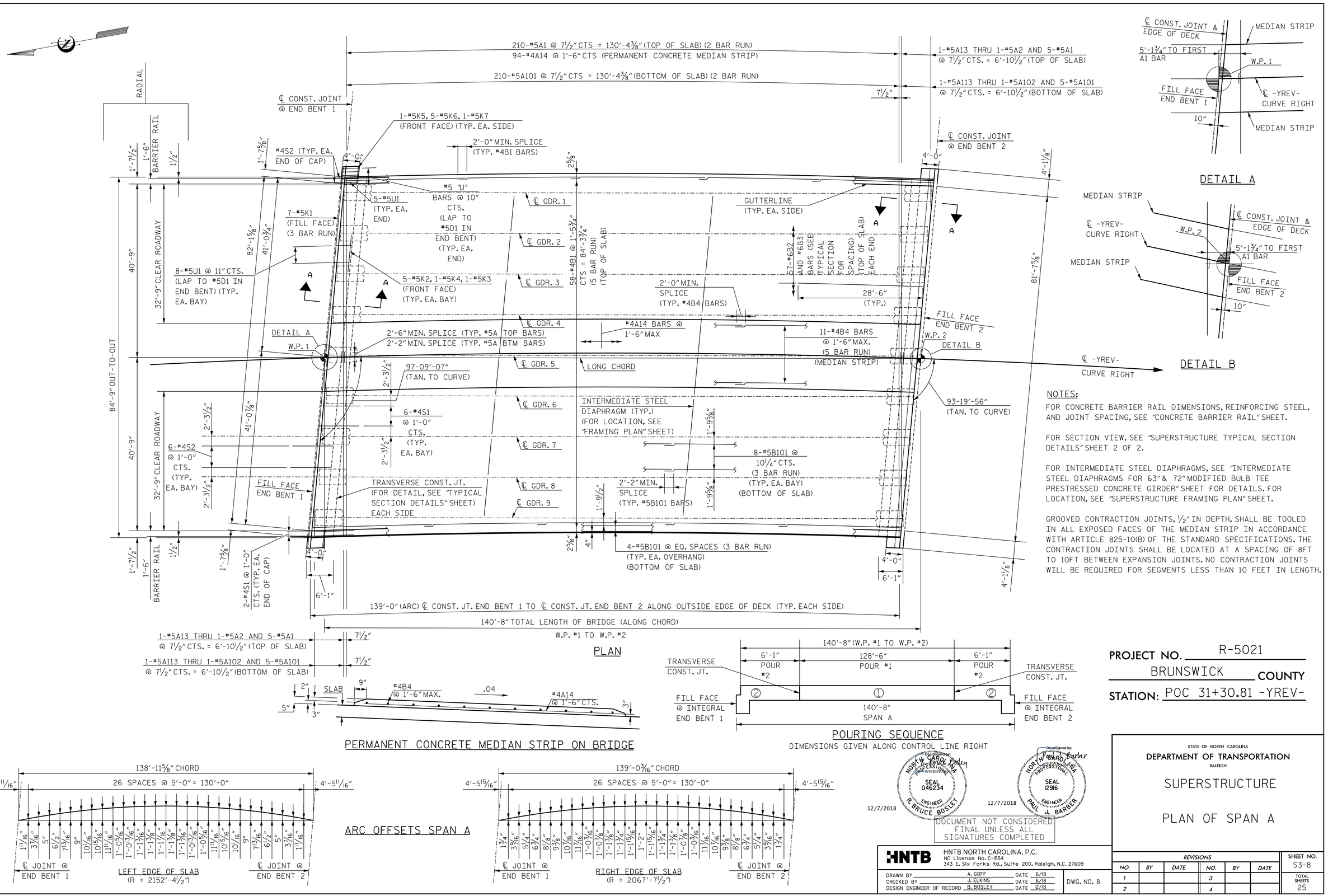
DRAWN BY A. GOFF DATE 6/18
CHECKED BY J. ELKINS DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18
DWG. NO. 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-7
1			3			TOTAL SHEETS
2			4			25



PLAN

DETAIL A

DETAIL B

NOTES:

FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR SECTION VIEW, SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 2 OF 2.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" & 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MEDIAN STRIP IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8FT TO 10FT BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PERMANENT CONCRETE MEDIAN STRIP ON BRIDGE

POURING SEQUENCE

DIMENSIONS GIVEN ALONG CONTROL LINE RIGHT

ARC OFFSETS SPAN A

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
12/7/2018

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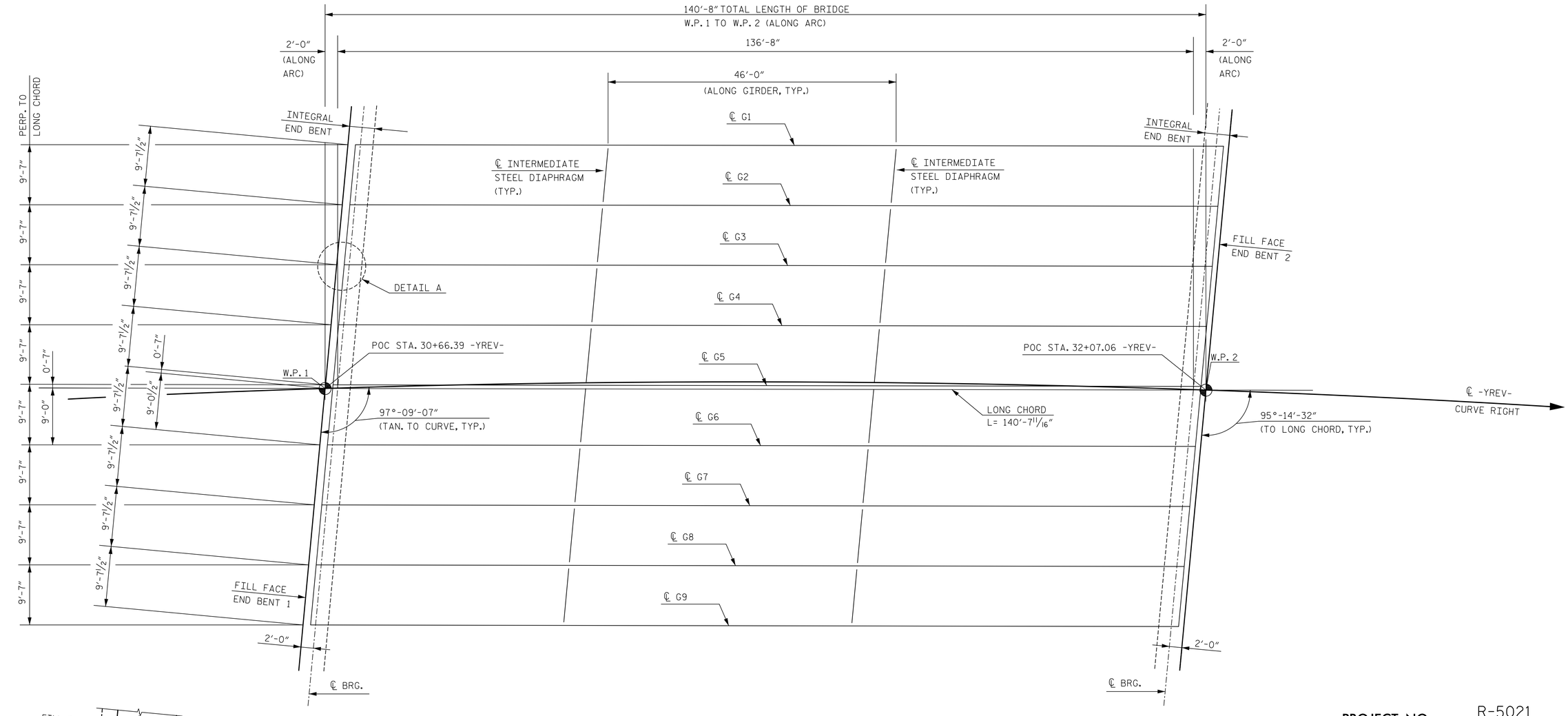
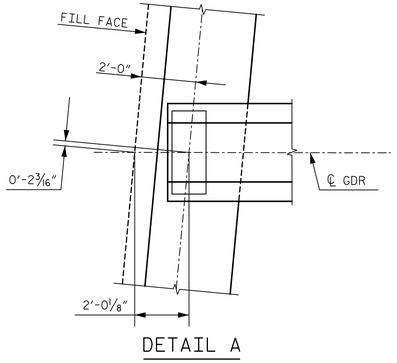
CHECKED BY J. ELKINS DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 8

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-8
1			3			TOTAL SHEETS
2			4			25





DETAIL A

FRAMING PLAN

NOTES:

"FIX" DENOTES FIXED BEARING ASSEMBLY.
"E" DENOTES ELASTOMERIC BEARING PAD MARK.

NO SOLE PLATES ARE REQUIRED AT INTEGRAL END BENTS.

ALL GIRDERS ARE PARALLEL TO LONG CHORD.

DocuSigned by: R Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 1/22/2019 ENGINEER R BRUCE BOSLEY

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 1/22/2019 ENGINEER PAUL J. BARBER

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DRAWN BY A. GOFF DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18
DWG. NO. 9

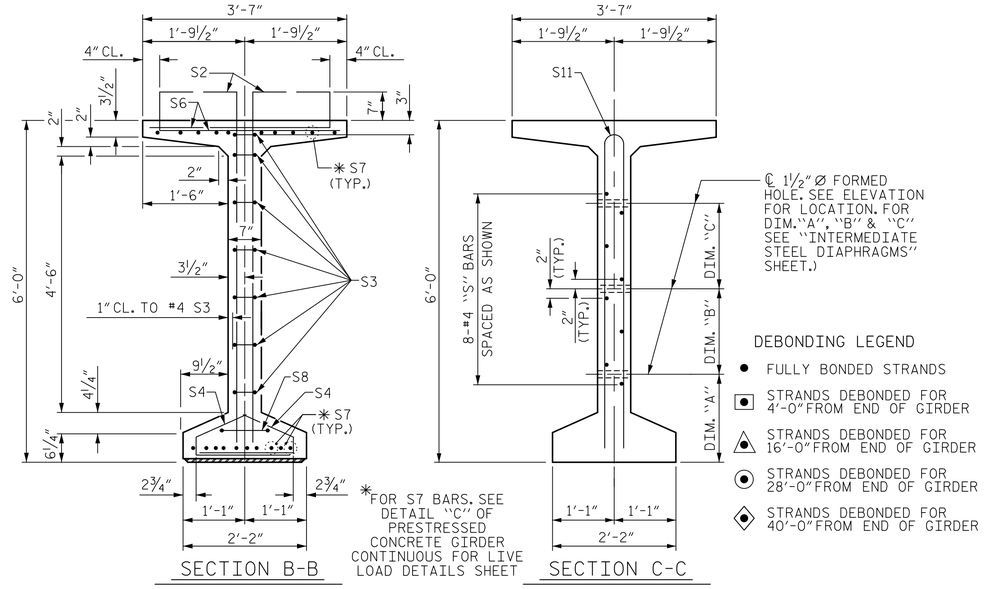
PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

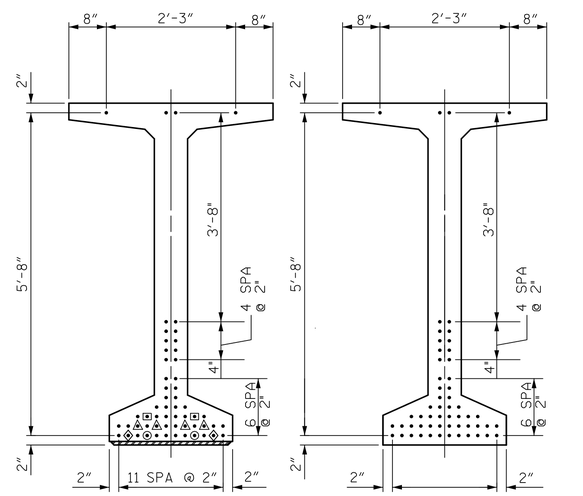
FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-9
1			3			TOTAL SHEETS
2			4			25



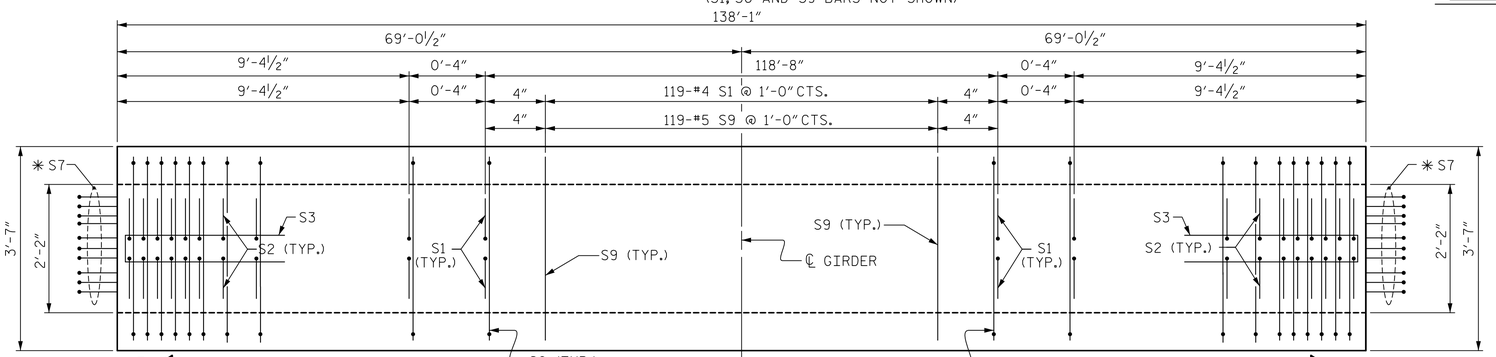
DEBONDING LEGEND

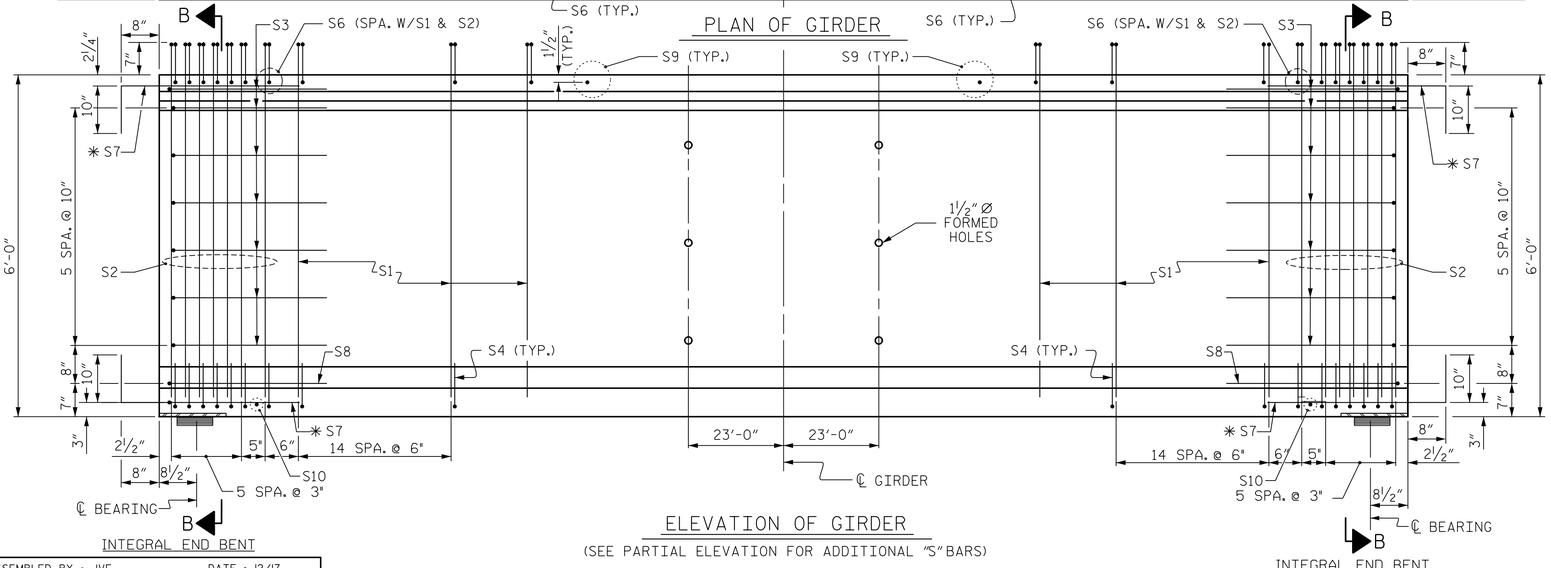
- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER
- ⦿ STRANDS DEBONDED FOR 28'-0" FROM END OF GIRDER
- ◈ STRANDS DEBONDED FOR 40'-0" FROM END OF GIRDER



0.6" Ø LOW RELAXATION STRAND LAYOUT

(S1, S6 AND S9 BARS NOT SHOWN)



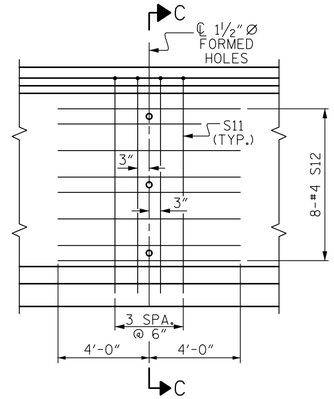


INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

INTEGRAL END BENT



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL

0.6" Ø L. R. GRADE 270 STRANDS

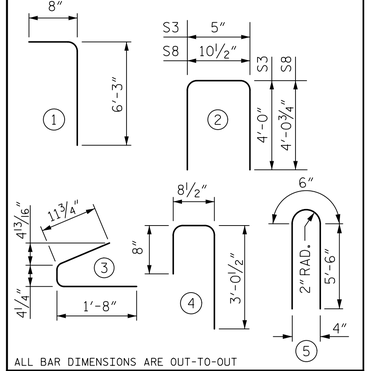
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	270	#4	1	6'-11"	1247
S2	28	#6	1	6'-11"	291
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S6	326	#5	4	4'-5"	1502
✳S7	40	#5	STR	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	119	#5	STR	3'-3"	403
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	11'-6"	96
S12	16	#4	STR	8'-0"	86

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER	4045	29.6	56

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
9	138'-1"	1242'-9"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

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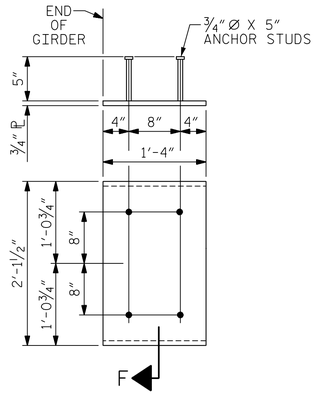
DRAWN BY L. WATERS DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-10
1			3			TOTAL SHEETS
2			4			25

ASSEMBLED BY : JVE		DATE : 12/17	
CHECKED BY : RBB		DATE : 12/17	
DRAWN BY : EEM 2/6/97	REV. 10/1/11		MAA/GM
CHECKED BY : VAP 2/6/97	REV. 6/13		MAA/GM
	REV. 1/15		MAA/TMG

STD. NO. PCG8



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,700 PSI.

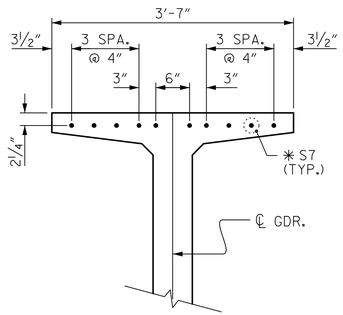
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

SECTION "F"

(SEE NOTES)



DETAIL "B"

(FOR 72" MODIFIED BULB TEES)

DETAIL "C"

(FOR 72" MODIFIED BULB TEES)

DocuSigned by: R Bruce Bosley — NORTH CAROLINA PROFESSIONAL — SEAL 046234 — ENGINEER — R BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul Barber — NORTH CAROLINA PROFESSIONAL — SEAL 12916 — ENGINEER — PAUL J. BARBER — 12/7/2018

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PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

ASSEMBLED BY : LLW	DATE : 5/18
CHECKED BY : JVE	DATE : 5/18
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG

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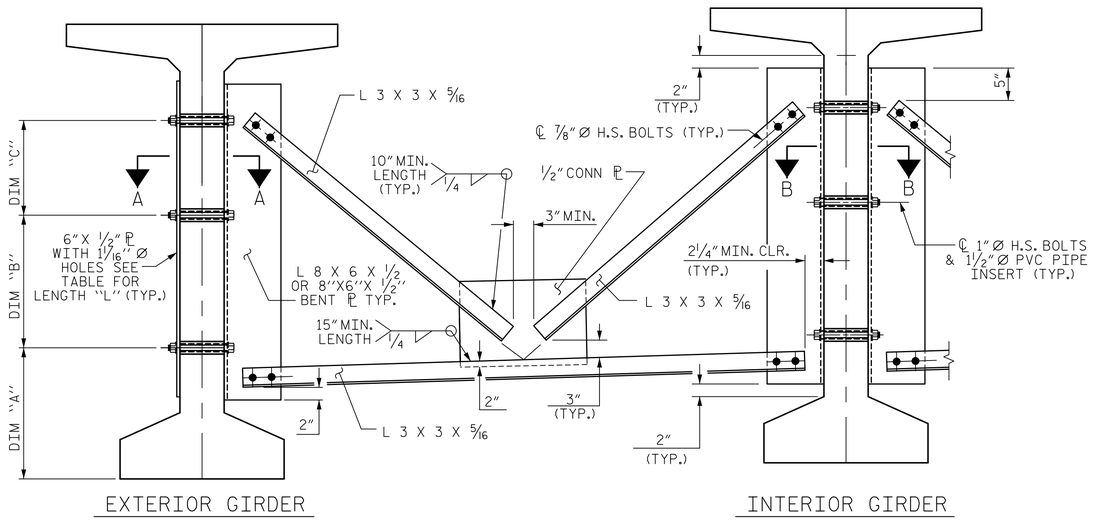
DRAWN BY L. WATERS DATE 6/18
CHECKED BY J. ELKINS DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 11

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-11
1			3			TOTAL SHEETS
2			4			25

STD. NO. PCG9

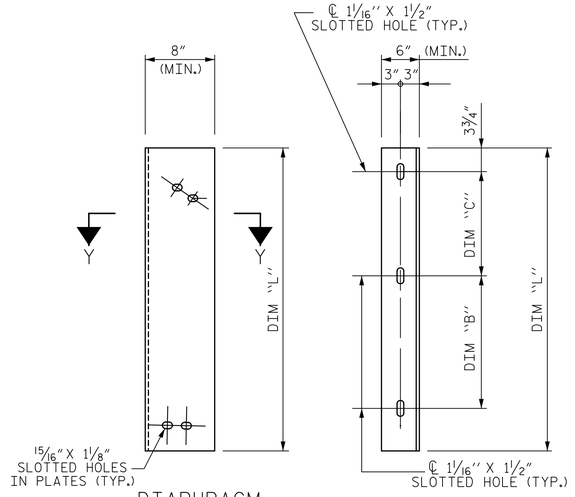


EXTERIOR GIRDER

INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

(72" BULB TEE GIRDER SHOWN)



DIAPHRAGM FACE

WEB FACE

STRUCTURAL STEEL NOTES

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

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

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

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

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

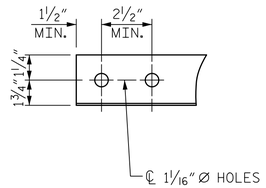
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

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

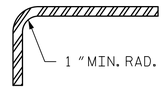
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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



ANGLE END

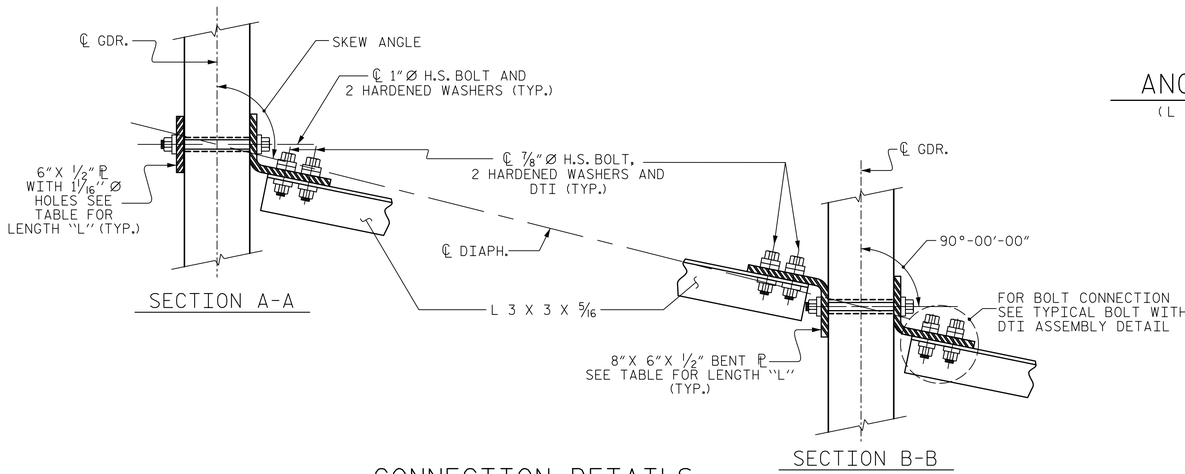
(L 3 X 3 X 5/16)



SECTION Y-Y

TABLE

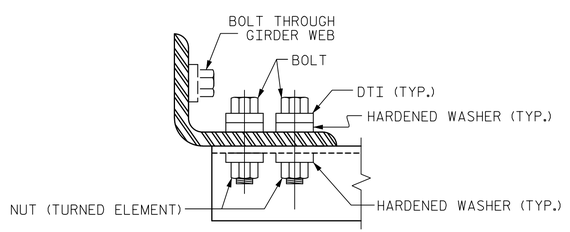
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-4 1/4"	1'-9 1/4"	1'-9 1/4"	4'-2"



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

CONNECTOR PLATE DETAIL

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 3 OF 3

DocuSigned by: R Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-12
1			3			TOTAL SHEETS
2			4			25

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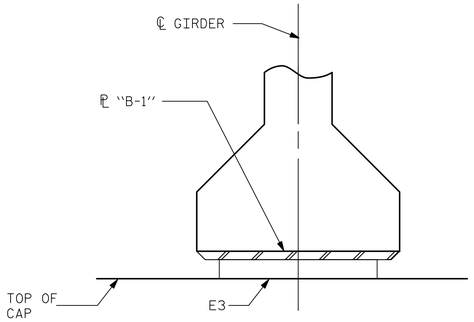
DRAWN BY	L. WATERS	DATE	6/18
CHECKED BY	B. BOSLEY	DATE	6/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18

DWG. NO. 12

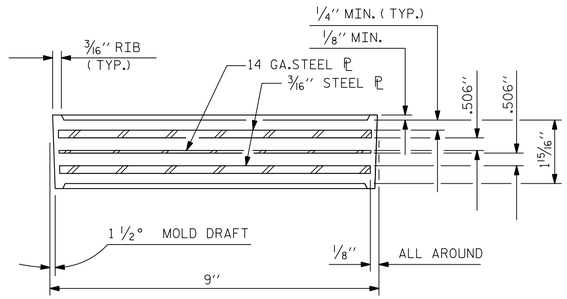
ASSEMBLED BY : JVE	DATE : 12/17
CHECKED BY : RBB	DATE : 12/17
DRAWN BY : RWW 11/09	ADDED 11/23/09R
CHECKED BY : GM 11/09	REV. 10/1/11 MAA/GM

STD. NO. PCG11

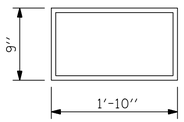


FIXED

SECTION D-D



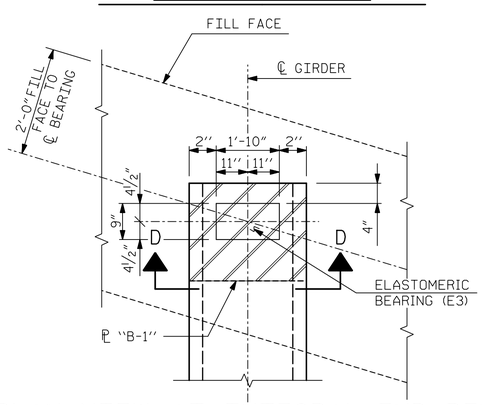
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (18 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



PLAN VIEW AT INTEGRAL END BENTS

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)

NOTES

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

FOR BEARING LOCATIONS, SEE "FRAMING PLAN" SHEET.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225.0 k

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R. BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul Barber — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 12/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

ASSEMBLED BY : ADG	DATE : 12/17
CHECKED BY : RBB	DATE : 12/17
DRAWN BY : EEM 2/97	REV. 5/1/06 TLA/GM
CHECKED BY : VAP 2/97	REV. 10/1/11 MAA/GM
	REV. 6/13 AAC/MAA

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DRAWN BY A. GOFF DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 13

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-13
1			3			TOTAL SHEETS
2			4			25

STD. NO. EB3 AND EB4

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 1																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.120	0.175	0.227	0.272	0.310	0.341	0.363	0.377	0.381	0.377	0.363	0.341	0.310	0.272	0.227	0.175	0.120	0.061	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.045	0.089	0.133	0.173	0.208	0.239	0.263	0.281	0.292	0.295	0.292	0.281	0.263	0.239	0.208	0.173	0.132	0.089	0.045	0.000
FINAL CAMBER ↑	0	3/16	3/8	1/2	5/8	3/4	7/8	15/16	1	1	1 1/16	1	1	15/16	7/8	3/4	5/8	1/2	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 2 AND 8																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.120	0.175	0.227	0.272	0.310	0.341	0.363	0.377	0.381	0.377	0.363	0.341	0.310	0.272	0.227	0.175	0.120	0.061	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.045	0.088	0.131	0.171	0.206	0.236	0.260	0.278	0.289	0.292	0.289	0.278	0.260	0.236	0.206	0.171	0.131	0.088	0.044	0.000
FINAL CAMBER ↑	0	3/16	3/8	1/2	11/16	13/16	7/8	15/16	1	1 1/16	1 1/16	1 1/16	1	15/16	7/8	13/16	11/16	1/2	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 3 AND 7																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.120	0.175	0.227	0.272	0.310	0.341	0.363	0.377	0.381	0.377	0.363	0.341	0.310	0.272	0.227	0.175	0.120	0.061	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.044	0.087	0.129	0.168	0.202	0.232	0.256	0.273	0.284	0.287	0.284	0.273	0.256	0.232	0.202	0.168	0.129	0.087	0.044	0.000
FINAL CAMBER ↑	0	3/16	3/8	9/16	11/16	13/16	15/16	1	1 1/16	1 1/8	1 1/8	1 1/8	1 1/16	1	15/16	13/16	11/16	9/16	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 4, 5 AND 6																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.120	0.175	0.227	0.272	0.310	0.341	0.363	0.377	0.381	0.377	0.363	0.341	0.310	0.272	0.227	0.175	0.120	0.061	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.047	0.093	0.138	0.180	0.216	0.248	0.274	0.292	0.304	0.307	0.304	0.292	0.274	0.248	0.216	0.180	0.138	0.093	0.047	0.000
FINAL CAMBER ↑	0	3/16	5/16	7/16	9/16	11/16	3/4	13/16	7/8	7/8	7/8	7/8	7/8	13/16	3/4	11/16	9/16	7/16	5/16	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 9																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.120	0.175	0.227	0.272	0.310	0.341	0.363	0.377	0.381	0.377	0.363	0.341	0.310	0.272	0.227	0.175	0.120	0.061	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.044	0.087	0.129	0.168	0.203	0.233	0.256	0.274	0.284	0.287	0.284	0.274	0.256	0.233	0.203	0.168	0.129	0.087	0.044	0.000
FINAL CAMBER ↑	0	3/16	3/8	9/16	11/16	13/16	15/16	1	1 1/16	1 1/8	1 1/8	1 1/8	1 1/16	1	15/16	13/16	11/16	9/16	3/8	3/16	0

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

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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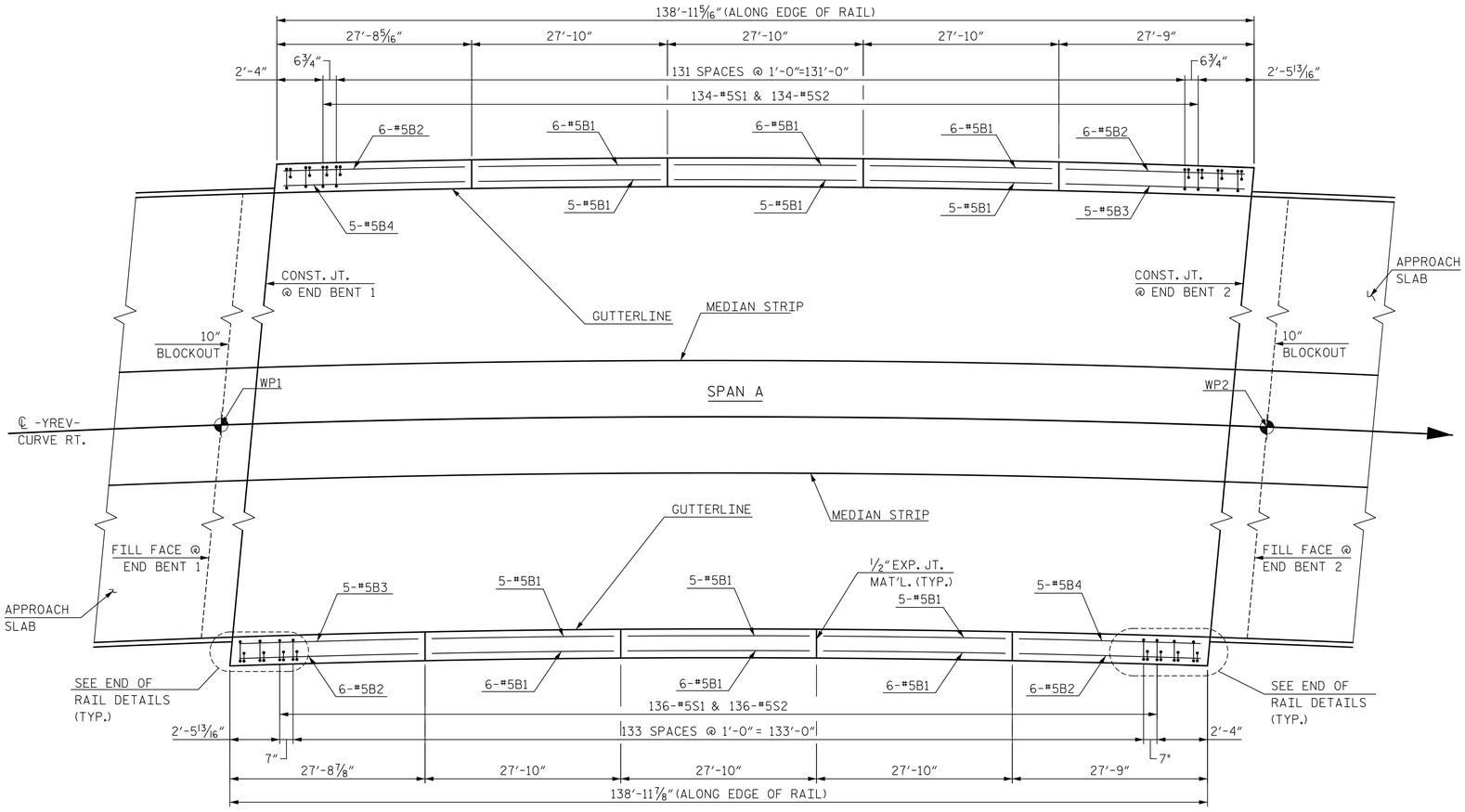
DRAWN BY L. WATERS DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 14

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
GIRDER
DEAD LOAD DEFLECTIONS
AND CAMBER

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-14
1			3			TOTAL SHEETS
2			4			25



PLAN OF BARRIER RAIL

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

NOTES

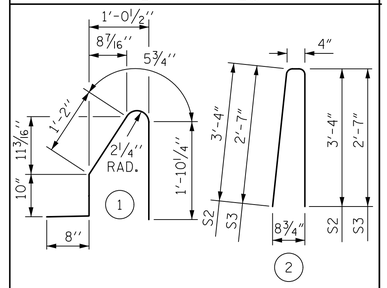
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S1 AND #5 S2 MAY BE SHIFTED SLIGHTLY AS REQUIRED TO PROVIDE 2" MINIMUM CONCRETE COVER AT THE 1/2" EXPANSION JOINTS IN THE BARRIER RAIL

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

BAR TYPES



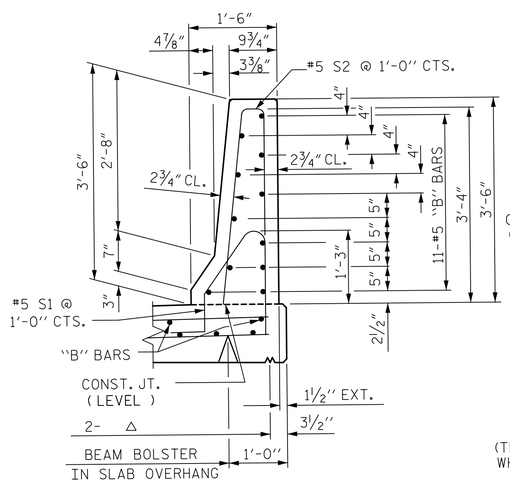
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

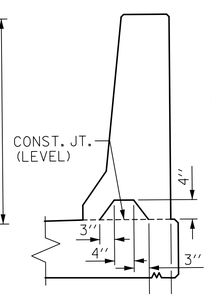
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	66	#5	STR.	27'-4"	1,882
✳ B2	24	#5	STR.	27'-3"	682
✳ B3	10	#5	STR.	26'-11"	281
✳ B4	10	#5	STR.	27'-8"	289
✳ S1	280	#5	1	4'-7"	1,339
✳ S2	272	#5	2	7'-0"	1,986
✳ S3	8	#5	2	5'-6"	46

✳ EPOXY COATED REINFORCING STEEL	6,505 LBS.
CLASS AA CONCRETE	37.8 CU. YDS.
CONCRETE BARRIER RAIL	278.0 LIN. FT.



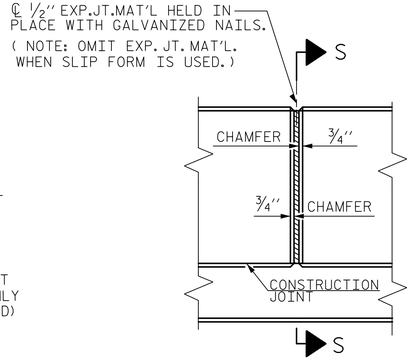
SECTION THRU RAIL

BARRIER RAIL DETAILS

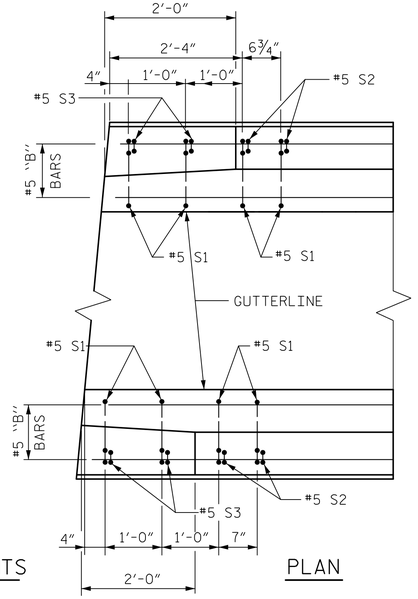


SECTION S-S

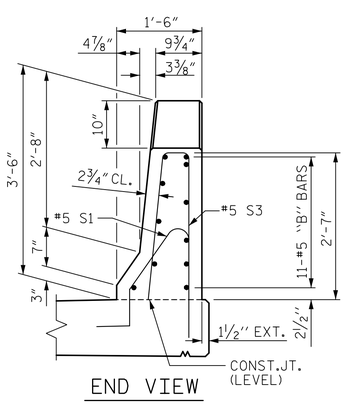
AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



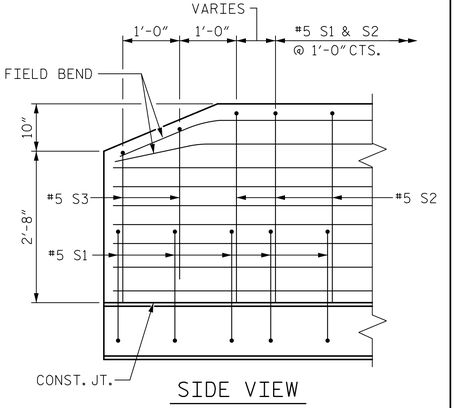
ELEVATION AT EXPANSION JOINTS



PLAN



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

DocuSigned by: R Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
CONCRETE BARRIER RAIL

ASSEMBLED BY : LLW	DATE : 12/17	
CHECKED BY : JVE	DATE : 12/17	
DRAWN BY : ARB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

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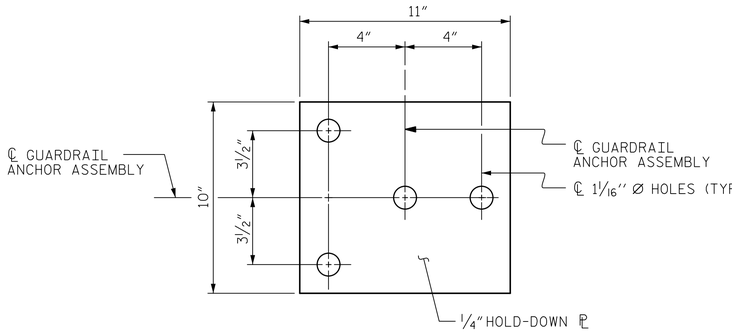
DRAWN BY	L. WATERS	DATE 6/18
CHECKED BY	J. ELKINS	DATE 6/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE 12/18

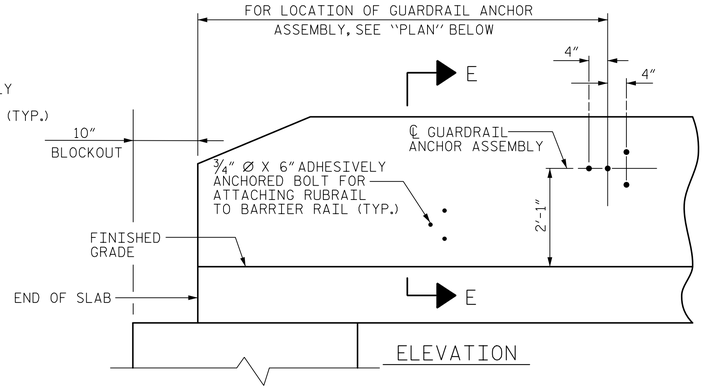
DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-15
1			3			TOTAL SHEETS
2			4			25

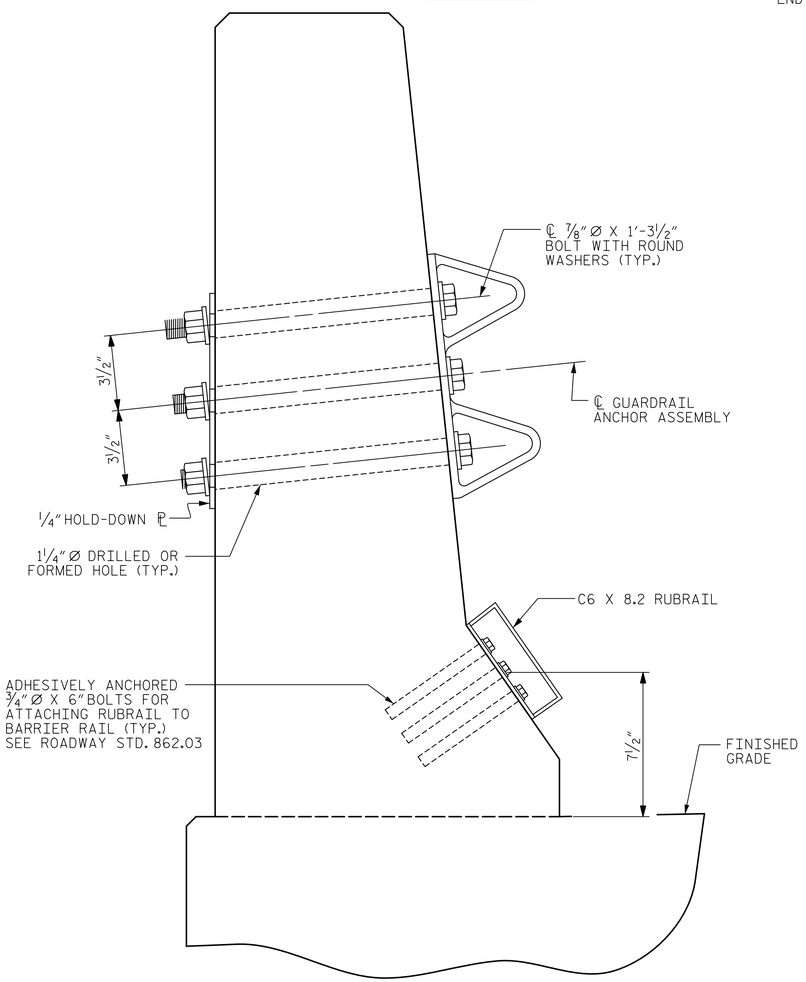
STD. NO. CBR1



PLAN

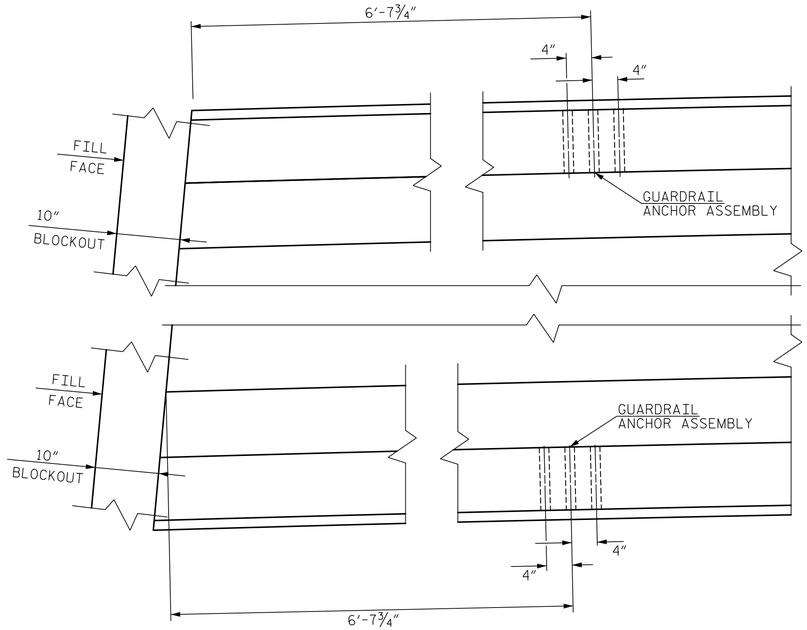


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 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.)

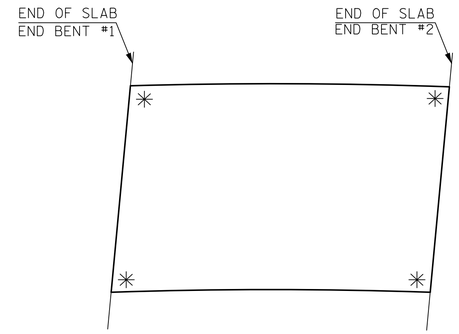
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 CONCRETE BARRIER RAIL.

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

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

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ASSEMBLED BY : LLW		DATE : 12/17	
CHECKED BY : JVE		DATE : 12/17	
DRAWN BY : TLA 5/06	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 7/12	MAA/GM	
	REV. 6/13	MAA/GM	

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DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18

DWG. NO. 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-16
1			3			TOTAL SHEETS
2			4			25

STD. NO. GRA2

BILL OF MATERIAL

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	430	5	STR.	43′-6″	19,509
A2	2	5	STR.	38′-7″	80
A3	2	5	STR.	31′-10″	66
A4	2	5	STR.	25′-3″	53
A5	2	5	STR.	18′-7″	39
A6	2	5	STR.	11′-11″	25
A7	2	5	STR.	46′-1″	96
A8	2	5	STR.	39′-5″	82
A9	2	5	STR.	32′-9″	68
A10	2	5	STR.	26′-1″	54
A11	2	5	STR.	19′-5″	41
A12	2	5	STR.	12′-8″	26
A13	2	5	STR.	6′-0″	13
A14	94	4	STR.	14′-10″	931

BILL OF MATERIAL

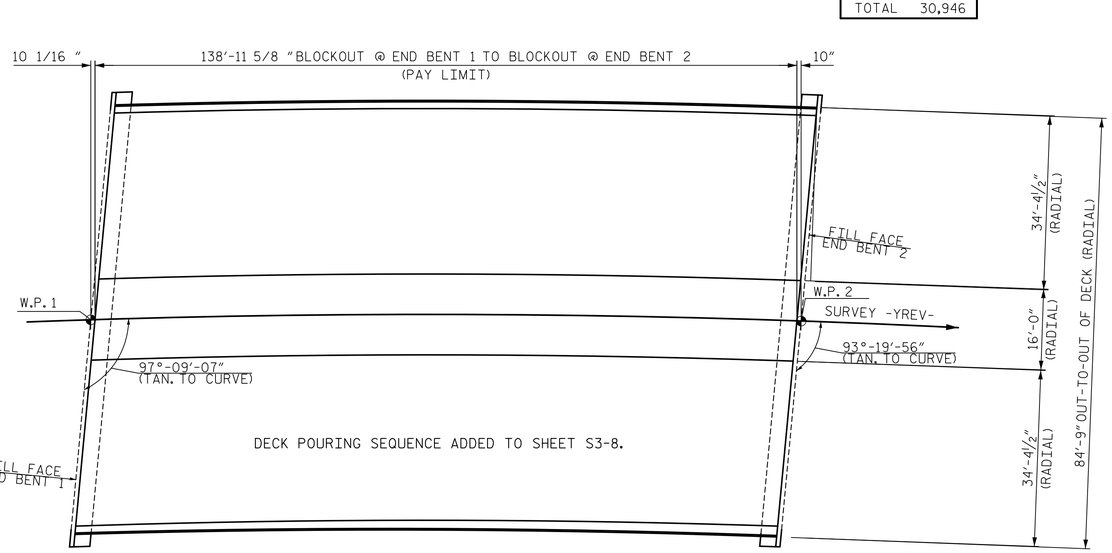
EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	290	4	STR.	29′-6″	5,715
B2	114	6	STR.	28′-6″	4,880
B3	114	6	STR.	28′-6″	4,880
B4	55	4	STR.	29′-9″	1,093
S1	104	4	3	11′-11″	828
S2	104	4	3	12′-3″	851
U1	145	5	5	14′-0″	2,117
U2	8	5	5	17′-6″	146
K1	42	5	STR.	31′-6″	1,380
K2	80	5	STR.	8′-8″	723
K3	16	5	STR.	6′-8″	111
K4	16	5	STR.	7′-1″	118
K5	4	5	STR.	4′-6″	19
K6	20	5	STR.	5′-3″	110
K7	8	5	STR.	2′-1″	17
				TOTAL	42,047

BILL OF MATERIAL

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A101	430	5	STR.	43′-4″	19,435
A102	2	5	STR.	38′-5″	80
A103	2	5	STR.	31′-8″	66
A104	2	5	STR.	25′-1″	52
A105	2	5	STR.	18′-5″	38
A106	2	5	STR.	11′-9″	25
A107	2	5	STR.	46′-1″	96
A108	2	5	STR.	39′-5″	82
A109	2	5	STR.	32′-9″	68
A110	2	5	STR.	26′-1″	54
A111	2	5	STR.	19′-5″	41
A112	2	5	STR.	12′-8″	26
A113	2	5	STR.	6′-0″	13
B101	216	5	STR.	48′-3″	10,870
				TOTAL	30,946

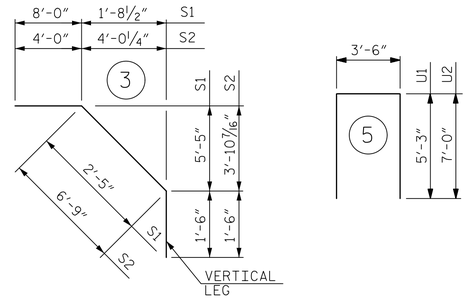


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 11740)

GROOVING BRIDGE FLOORS

APPROACH SLABS	2916 SQ.FT.
BRIDGE DECK	8320 SQ.FT.
TOTAL	11236 SQ.FT.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	326.1		
POUR 2	233.4		
MEDIAN	33.4		
TOTALS**	592.9	30,946	42,047

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

NOTE: QUANTITIES INCLUDE THE CONCRETE AND REINFORCING STEEL FOR THE UPPER PORTION OF THE INTEGRAL END BENTS.

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"			

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

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DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

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CHECKED BY R. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 17

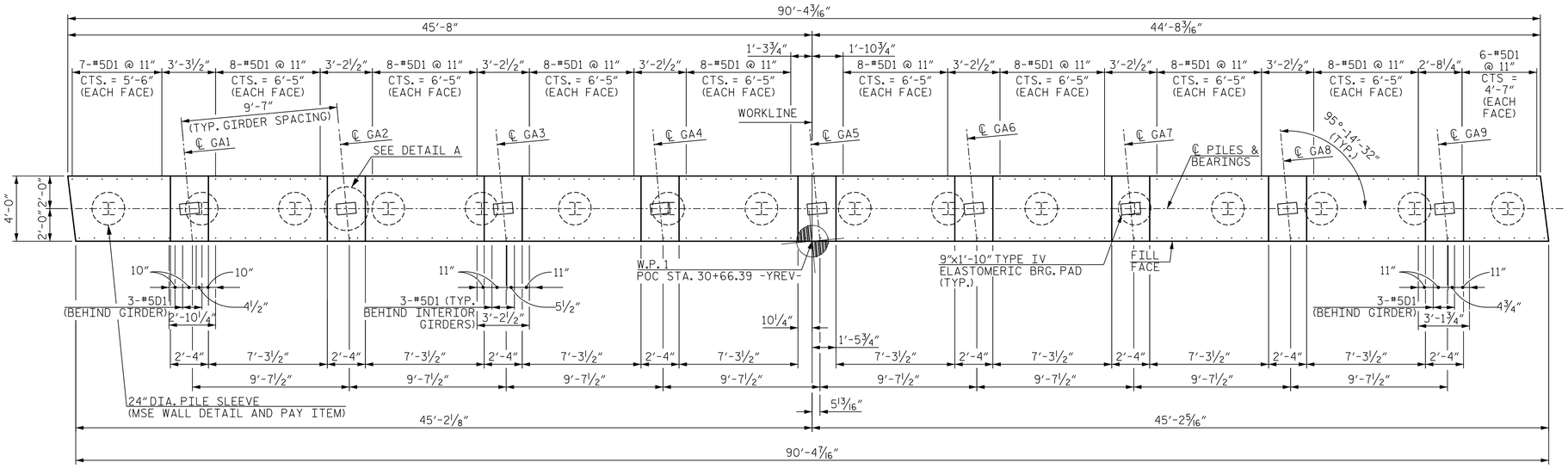
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL

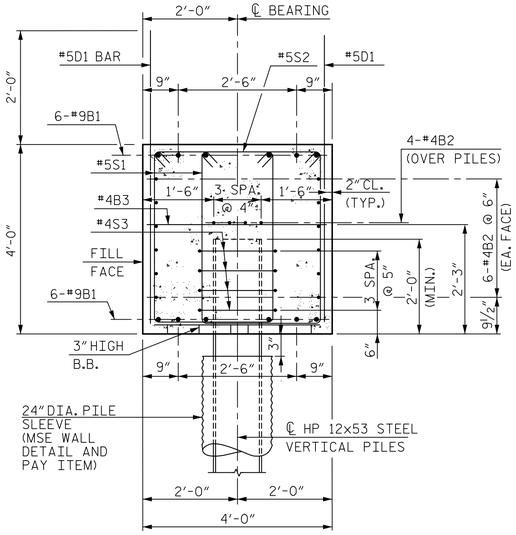
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-17
1			3			TOTAL SHEETS
2			4			25

STD. NO. BOM2

ASSEMBLED BY : LLW		DATE : 12/17	
CHECKED BY : RBB		DATE : 12/17	
DRAWN BY : JMB 5/87	REV. 8/16/99	RWW/LES	
CHECKED BY : SJD 9/87	REV. 5/1/06	TLA/GM	
	REV. 10/1/11	MAA/GM	



PLAN



SECTION A-A

DETAIL A

ELEVATION

NOTES:

THE END BENT DIAPHRAGM SHALL BE POURED WITH THE SUPERSTRUCTURE. CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIALS. FOR DETAILS, SEE SUPERSTRUCTURE PLANS.

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	L. WATERS	DATE	6/18
CHECKED BY	J. ELKINS	DATE	6/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18

DWG. NO. 18

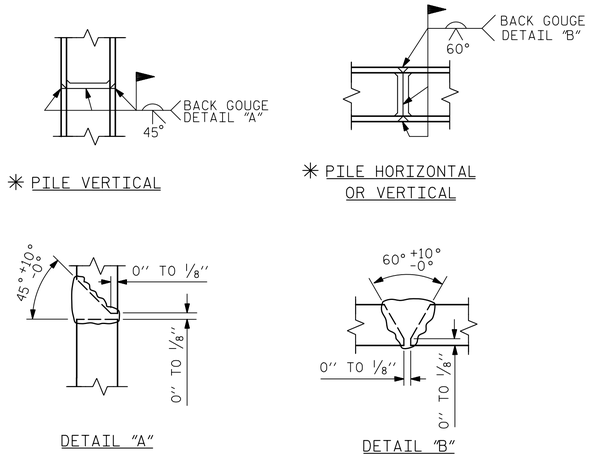
PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

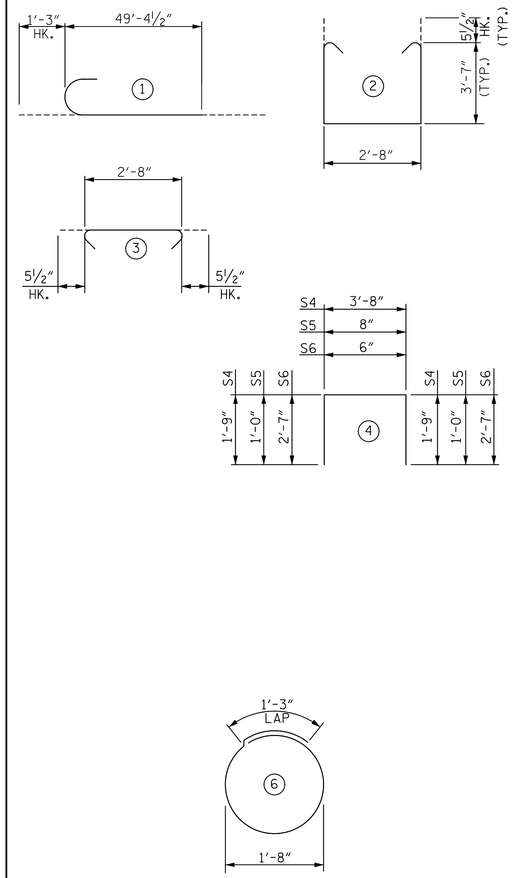
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-18
1			3			TOTAL SHEETS
2			4			25



✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

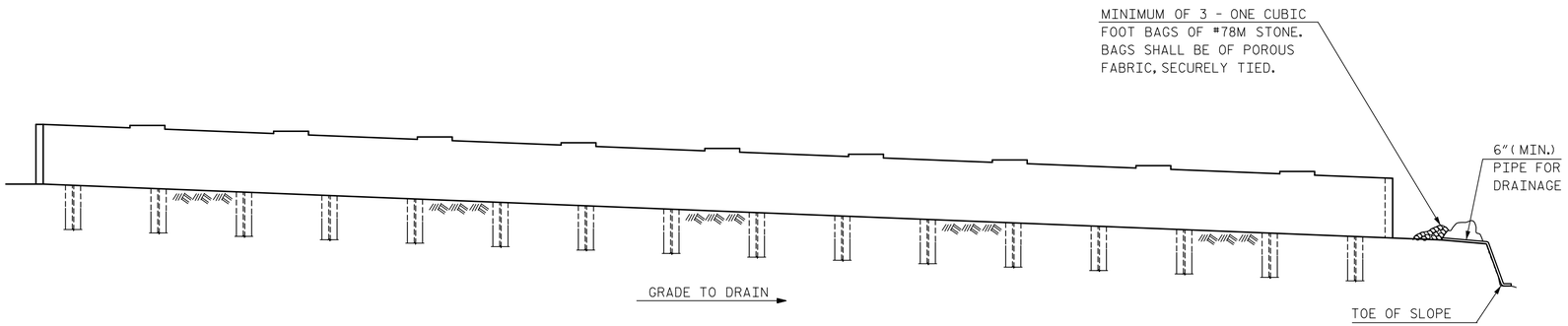
BILL OF REINFORCING

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	9	1	50'-8"	4,134
B2	64	4	STR.	24'-4"	1,040
B3	24	4	STR.	3'-8"	59
D1	181	5	STR.	5'-10"	1,101
S1	222	5	2	10'-9"	2,489
S2	222	5	3	3'-7"	830
S3	64	4	6	6'-6"	278

QUANTITIES

REINFORCING STEEL	LBS.	9,931
CLASS "A" CONCRETE	CU. YDS.	54.2
PILE REDRIVES	EA.	8
PILE DRIVING EQUIPMENT SETUP	EA.	16
STEEL PILE POINTS	EA.	16
HP 12x53 STEEL PILES	NO.	16
	FEET	1,440



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R. BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
12/7/2018

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DRAWN BY L. WATERS DATE 6/18
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DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 19

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

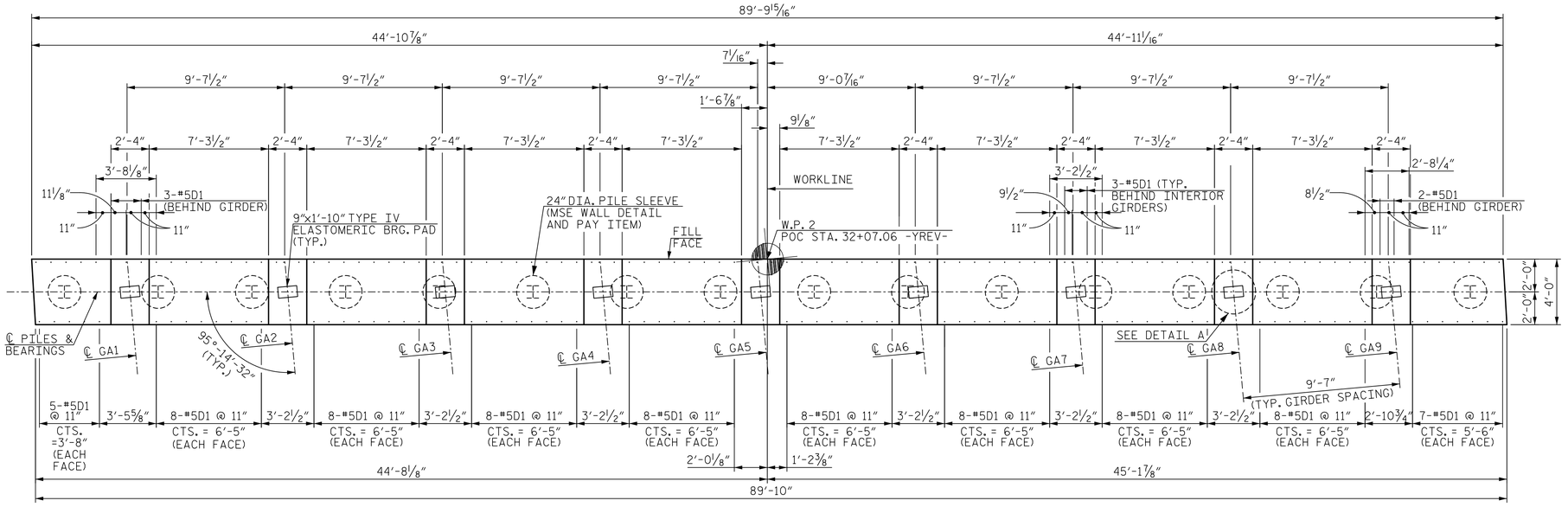
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

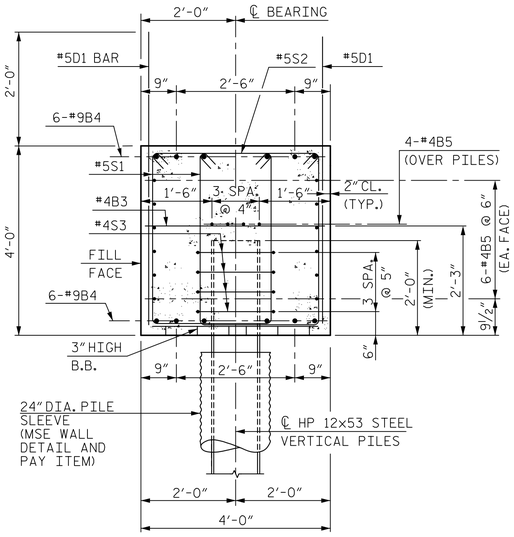
SUBSTRUCTURE

END BENT 1

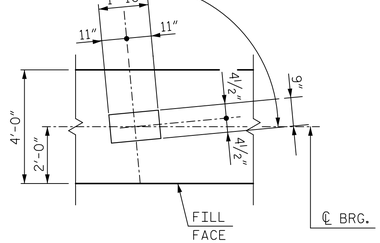
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-19
1			3			TOTAL SHEETS
2			4			25



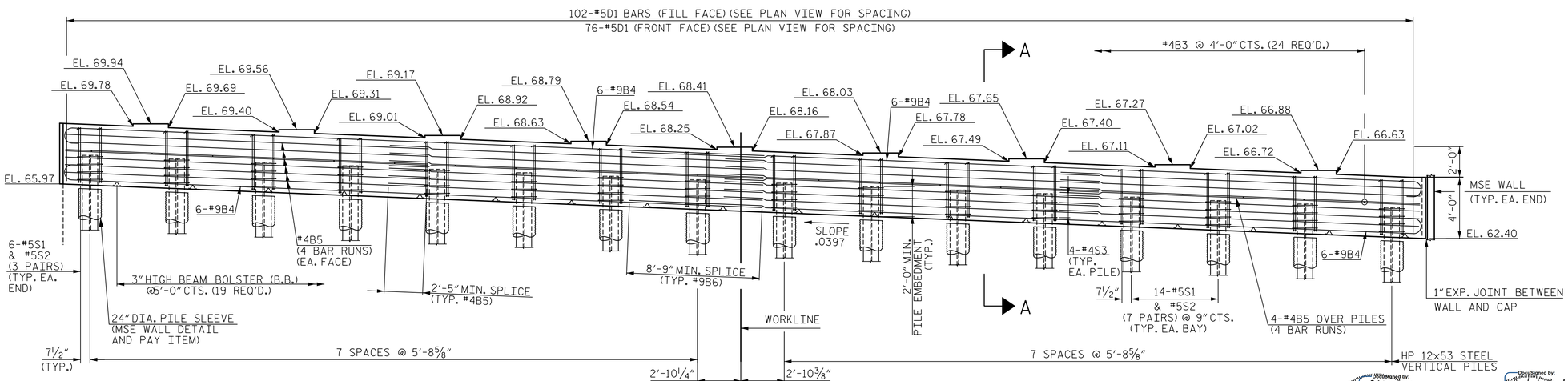
PLAN



SECTION A-A



DETAIL A



ELEVATION

NOTES:

THE END BENT DIAPHRAGM SHALL BE POURED WITH THE SUPERSTRUCTURE. CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIALS. FOR DETAILS, SEE SUPERSTRUCTURE PLANS.

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R BRUCE BOSLEY — 12/7/2018

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 12/7/2018

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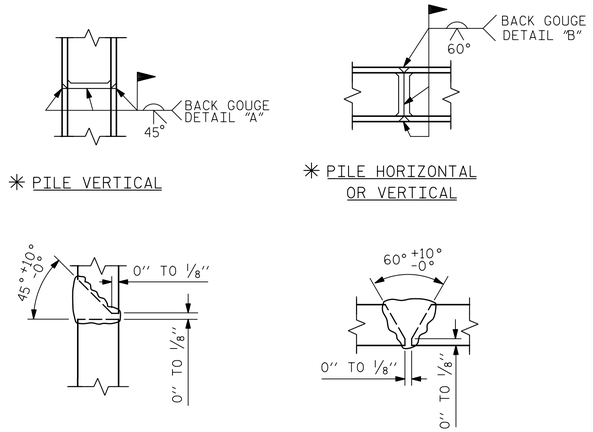
DRAWN BY L. WATERS DATE 6/18
CHECKED BY J. ELKINS DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 20

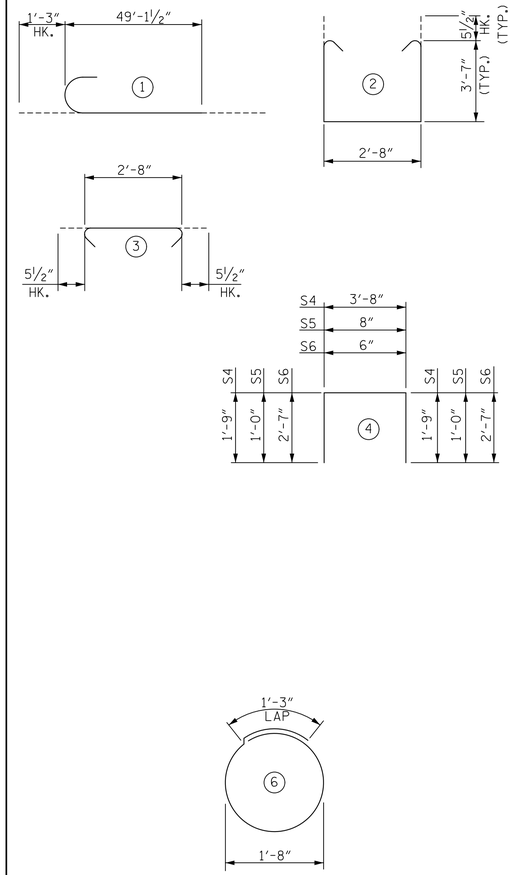
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-20
1			3			TOTAL SHEETS
2			4			25



✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

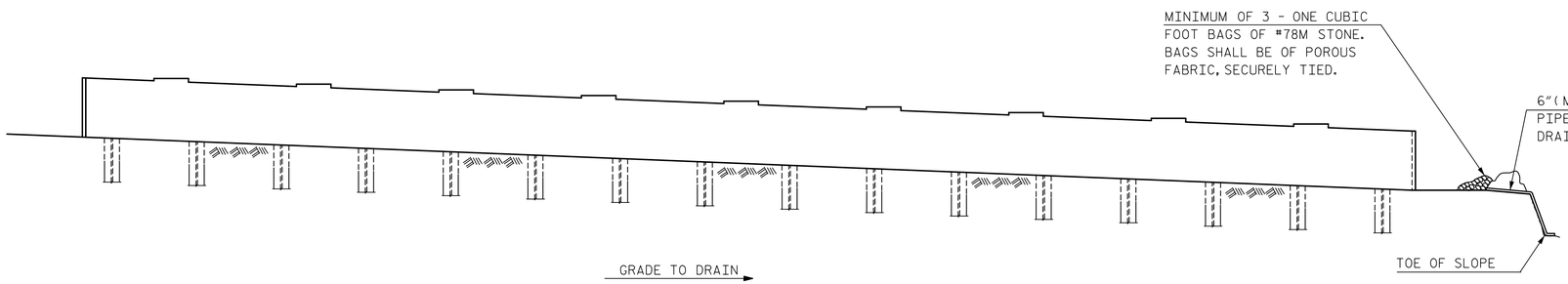
BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B4	24	9	1	50'-5"	4,114
B5	64	4	STR.	24'-3"	1,037
B3	24	4	STR.	3'-8"	59
D1	178	5	STR.	5'-10"	1,083
S1	222	5	2	10'-9"	2,489
S2	222	5	3	3'-7"	830
S3	64	4	6	6'-6"	278

QUANTITIES

REINFORCING STEEL	LBS.	9,890
CLASS "A" CONCRETE	CU. YDS.	53.9
PILE REDRIVES	EA.	8
PILE DRIVING EQUIPMENT SETUP	EA.	16
STEEL PILE POINTS	EA.	16
HP 12x53 STEEL PILES	NO.	16
	FEET	1,440



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TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 2 OF 2

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R. BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 12/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

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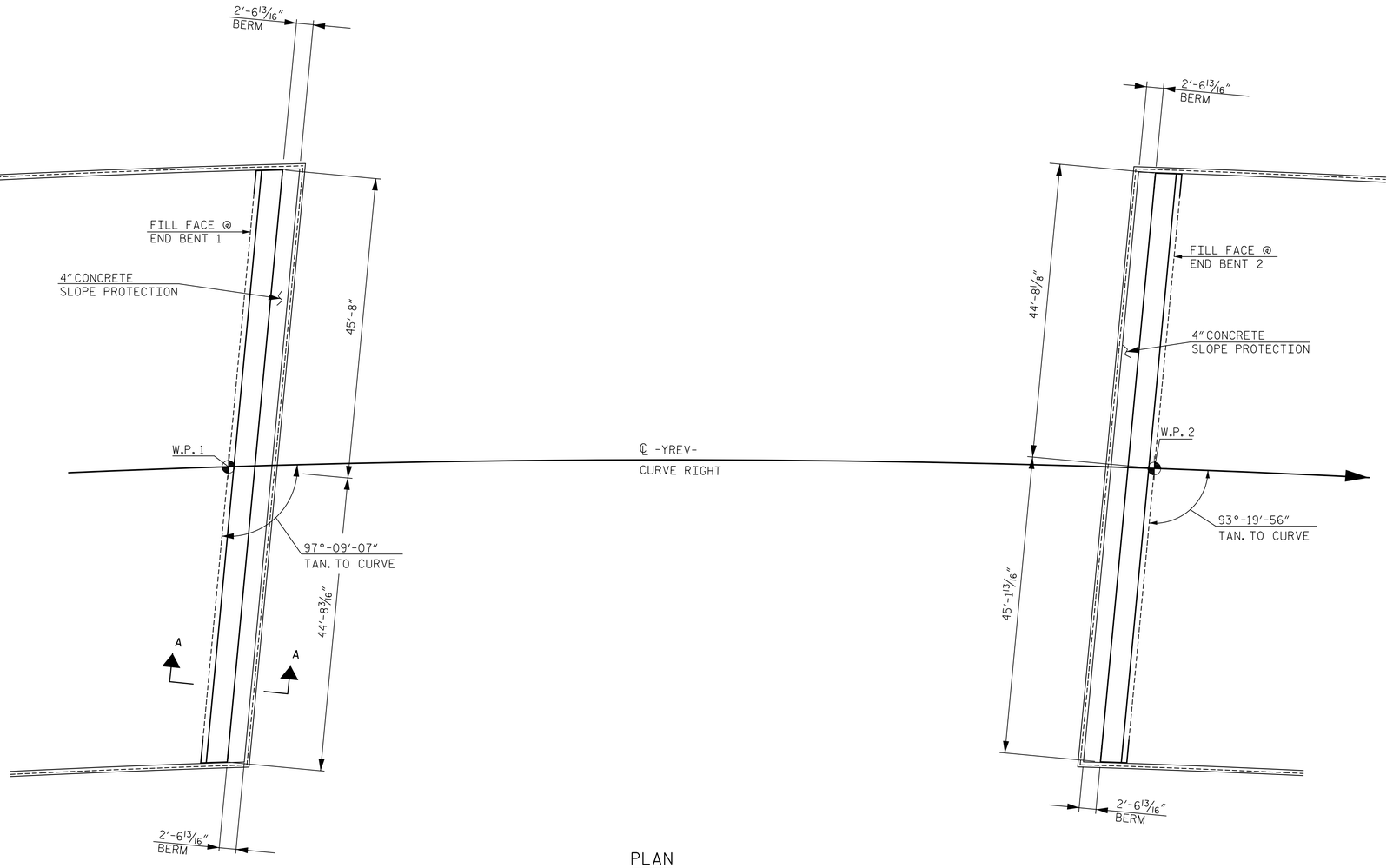
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

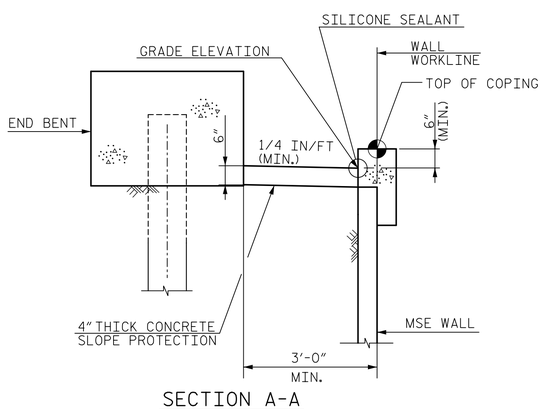
DRAWN BY L. WATERS DATE 6/18
CHECKED BY J. ELKINS DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 21

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-21
1			3			TOTAL SHEETS
2			4			25



PLAN



SECTION A-A

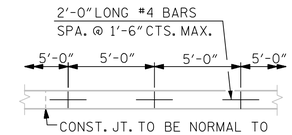
NOTES:

FOR BERM WIDTHS AND ELEVATIONS, SEE GENERAL DRAWING.

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 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

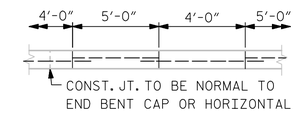
BRIDGE @ STA. POC 31+30.81 -YREV-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	34	60
END BENT 2	33	60

* QUANTITY SHOWN IS BASED ON 5' POURS.



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

DocuSigned by: R Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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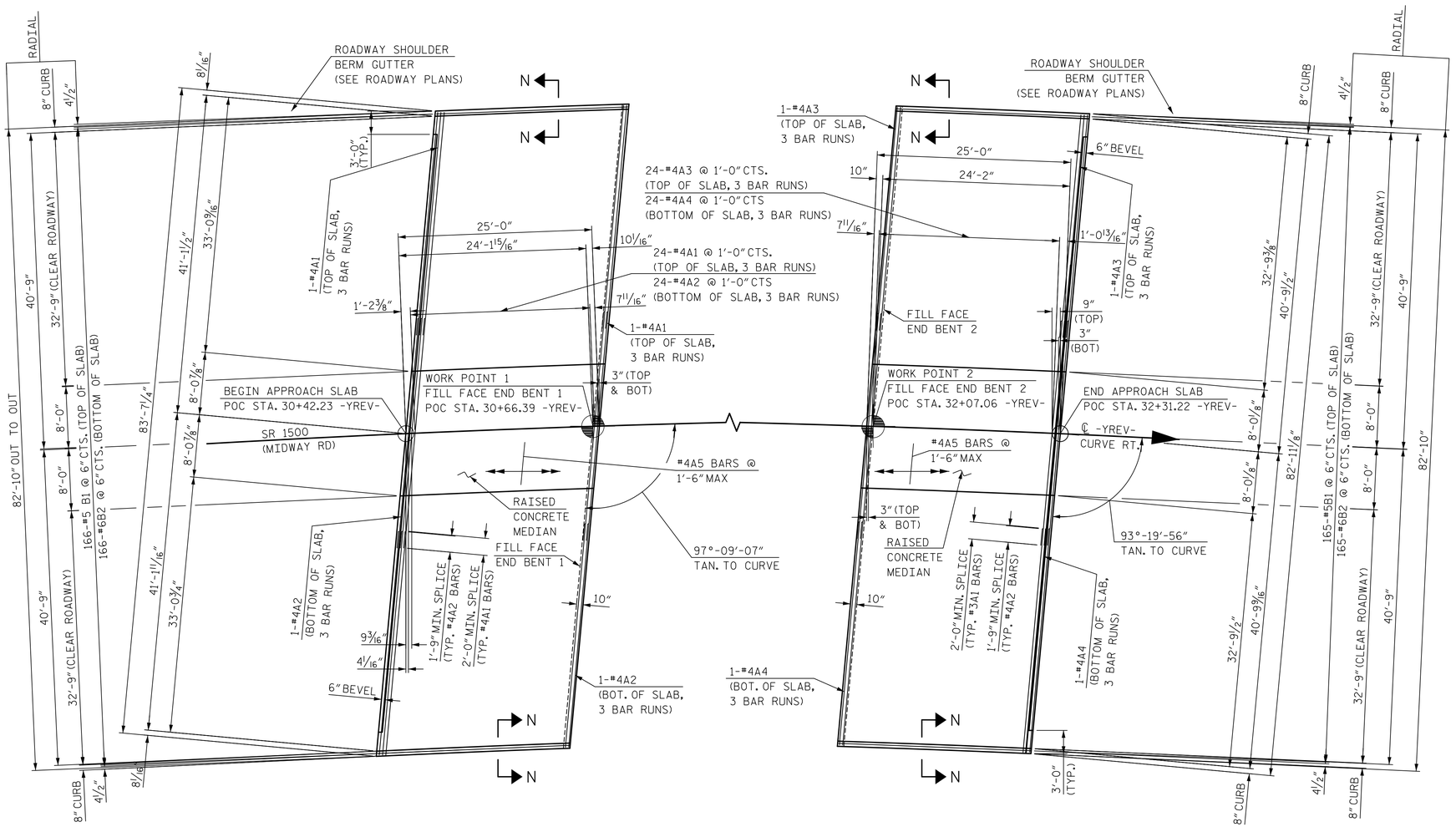
DRAWN BY A. GOFF DATE 6/18
CHECKED BY B. BOSLEY DATE 6/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 22

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

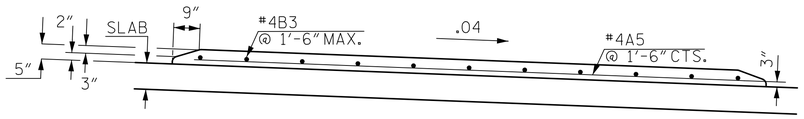
SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-22
1			3			TOTAL SHEETS
2			4			25



PLAN @ END BENT 1

PLAN @ END BENT 2



PERMANENT CONCRETE MEDIAN STRIP ON BRIDGE

NOTES:

FOR SECTION N-N, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.

FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R. BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 12/7/2018

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DRAWN BY L. WATERS DATE 6/18
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DESIGN ENGINEER OF RECORD R. BOSLEY DATE 12/18

DWG. NO. 23

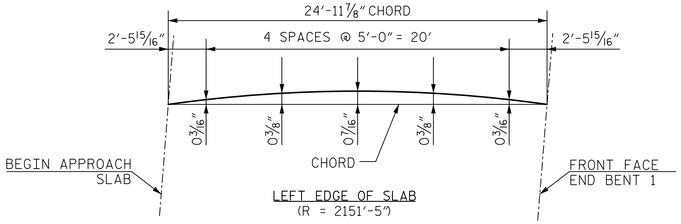
PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 31+30.81 -YREV-

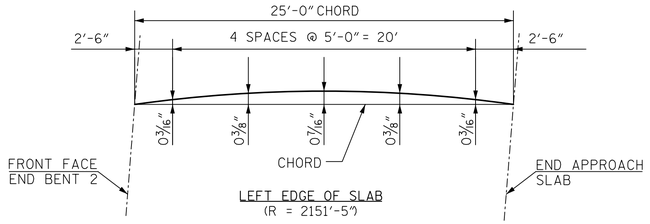
SHEET 1 OF 3

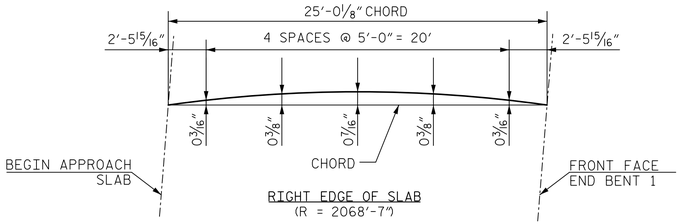
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

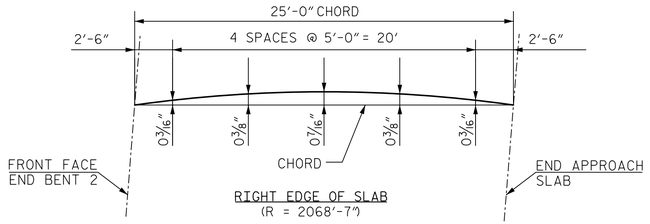
BRIDGE APPROACH SLAB PLAN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-23
1			3			TOTAL SHEETS
2			4			25



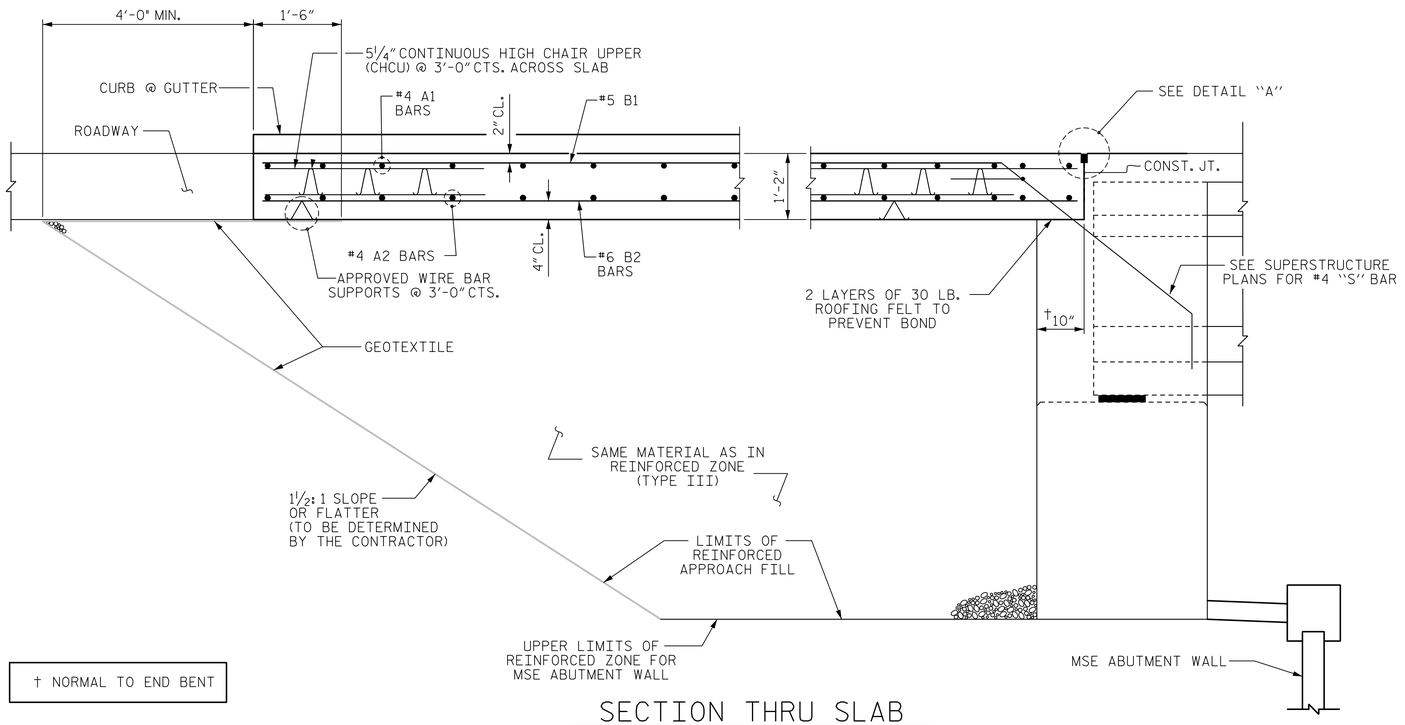






CURVE OFFSETS - APPROACH SLAB AT END BENT 1

CURVE OFFSETS - APPROACH SLAB AT END BENT 2



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE III - REINFORCED APPROACH FILL)

NOTES

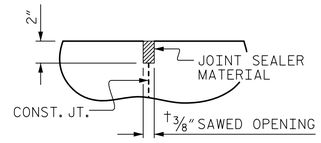
APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4″ Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

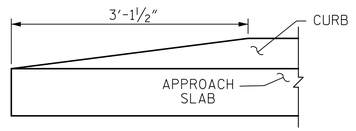
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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

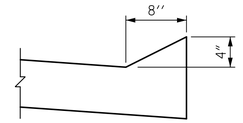
FOR PLAN VIEW OF APPROACH SLABS AT END BENT 1 AND END BENT 2, SEE SHEET 1 OF 3.



DETAIL ″A″



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

BILL OF MATERIAL

FOR APPROACH SLAB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	78	#4	STR	29′-2″	1,520
A2	78	#4	STR	29′-0″	1,511
✳ A5	17	#4	STR	24′-6″	278
✳ B1	166	#5	STR	24′-2″	4,184
B2	166	#6	STR	24′-8″	6,150
✳ B3	11	#4	STR	14′-10″	109
REINFORCING STEEL				LBS.	7,661
✳ EPOXY COATED REINFORCING STEEL				LBS.	6,091
CLASS AA CONCRETE				C. Y.	89.8

FOR APPROACH SLAB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	78	#4	STR	28′-11″	1,507
A4	78	#4	STR	28′-9″	1,498
✳ A5	17	#4	STR	24′-6″	278
✳ B1	165	#5	STR	24′-2″	4,159
B2	165	#6	STR	24′-8″	6,113
✳ B3	11	#4	STR	14′-10″	109
REINFORCING STEEL				LBS.	7,611
✳ EPOXY COATED REINFORCING STEEL				LBS.	6,053
CLASS AA CONCRETE				C. Y.	89.0

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: POC 31+30.81 -YREV-

SHEET 2 OF 3

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY — 11/22/2019

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 11/22/2019

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ASSEMBLED BY : LLW		DATE : 12/17	
CHECKED BY : JVE		DATE : 12/17	
DRAWN BY : TLA 10/05	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 12/21/11	MAA/GM	
	REV. 6/13	MAA/GM	

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DRAWN BY	L. WATERS	DATE	6/18
CHECKED BY	J. ELKINS	DATE	6/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18

DWG. NO. 24

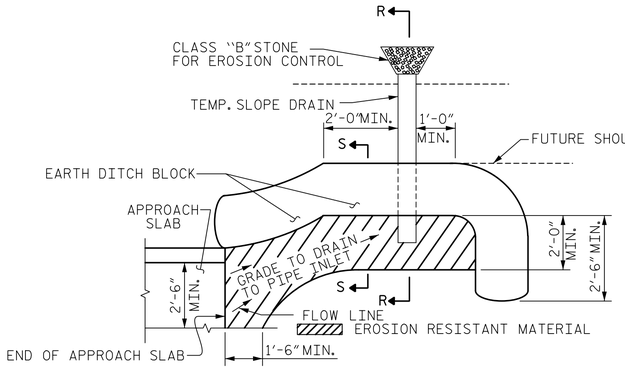
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

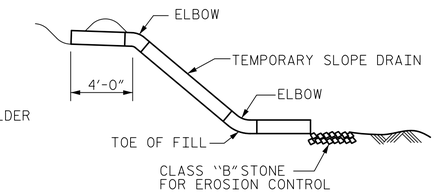
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-24
1			3			TOTAL SHEETS 25
2			4			

STD. NO. BAS5

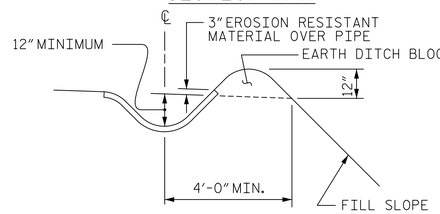


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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.

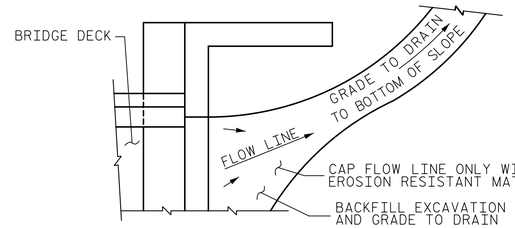
PLAN VIEW



SECTION R-R



SECTION S-S



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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-5021

BRUNSWICK **COUNTY**

STATION: POC 31+30.81 -YREV-

SHEET 3 OF 3

DocuSigned by: R. Bruce Bosley — NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R. BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER — 12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

ASSEMBLED BY : LLW	DATE : 12/17
CHECKED BY : JVE	DATE : 12/17

DRAWN BY : FCJ	11/88	REV. 10/1/11	MAA/GM
CHECKED BY : ARB	11/88	REV. 7/12	MAA/GM
		REV. 6/13	MAA/GM

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

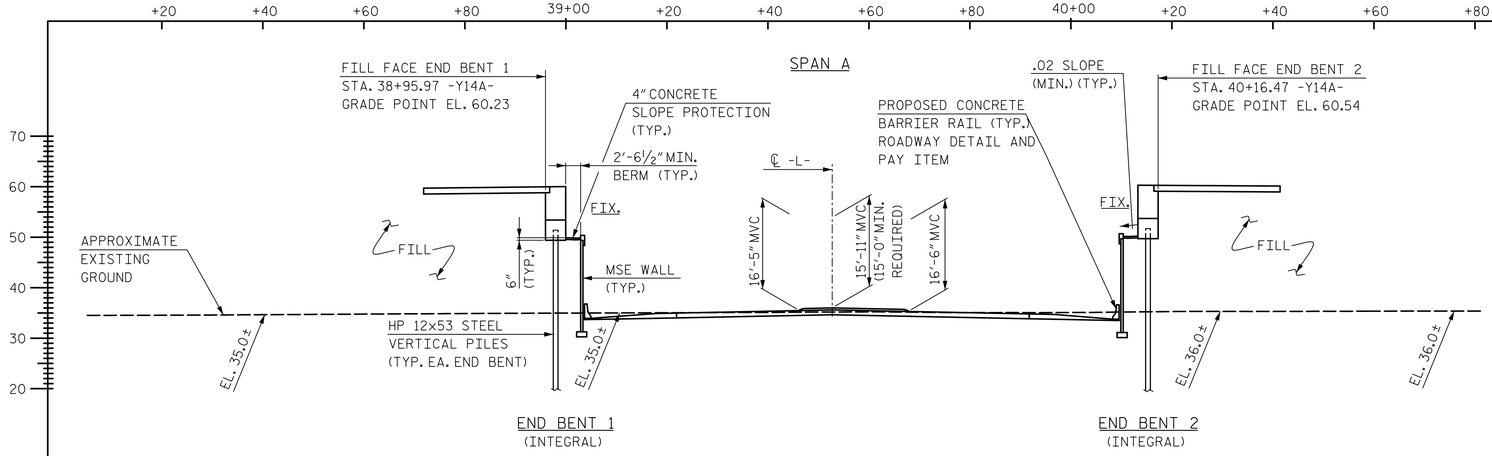
DRAWN BY	L. WATERS	DATE 6/18
CHECKED BY	J. ELKINS	DATE 6/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE 12/18

DWG. NO. 25

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-25
1			3			TOTAL SHEETS
2			4			25

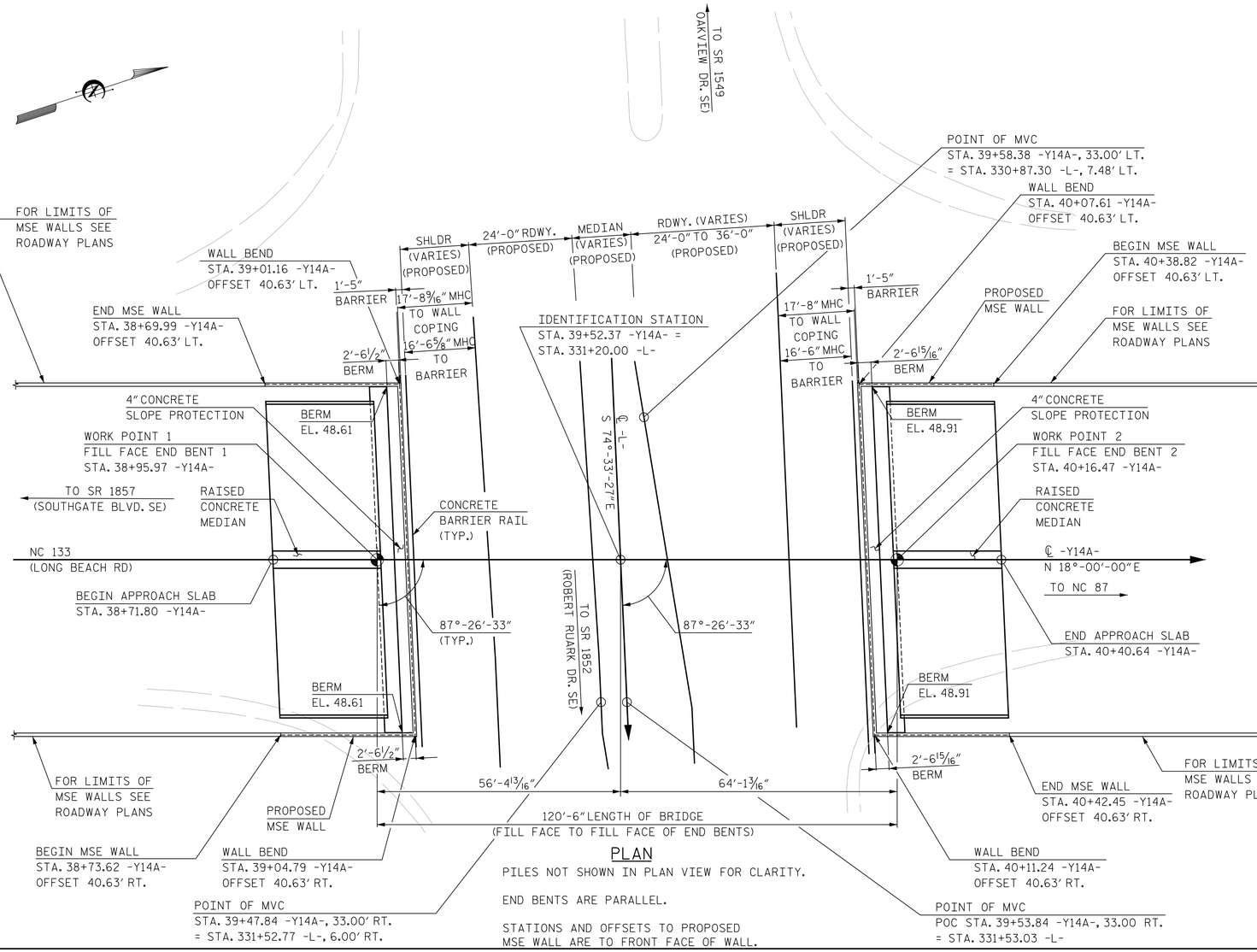
STD. NO. BAS4

F.A. PROJECT NO. STP-0211(21)



SECTION ALONG ℄ -Y14A-

(END BENTS ON SECTION AT RIGHT ANGLES TO END BENTS)



PLAN

PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.

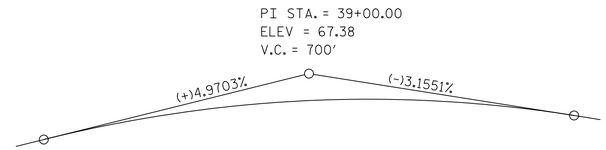
END BENTS ARE PARALLEL.

STATIONS AND OFFSETS TO PROPOSED MSE WALL ARE TO FRONT FACE OF WALL.

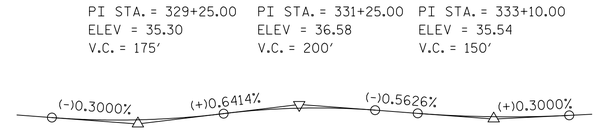
NOTES:

FOR GENERAL NOTES, SEE SHEET 3 OF 3.

MVC = MIN. VERTICAL CLEARANCE
MHC = MIN. HORIZONTAL CLEARANCE



GRADE DATA -Y14A-



GRADE DATA -L-

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 39+52.37 -Y14A-

SHEET 1 OF 3 BRIDGE NO. 90264

DocuSigned by: R. Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

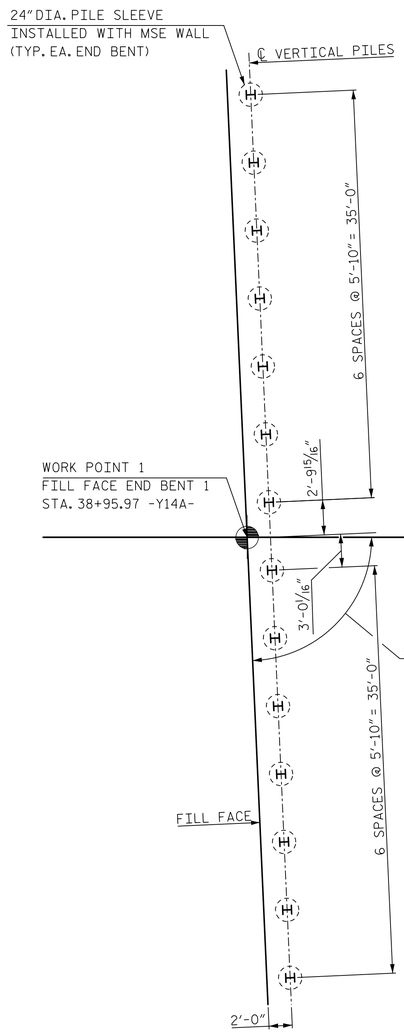
GENERAL DRAWING
FOR BRIDGE OVER NC 211 ON NC 133 BETWEEN SR 1857 AND NC 87

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 7/18
CHECKED BY P. BARBER DATE 7/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-1
1			3			TOTAL SHEETS
2			4			24



END BENT 1

END BENT 2

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATIONS BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

FOUNDATION LAYOUT PLAN

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO FILL FACES AT END BENTS.

ALL PILE DIMENSIONS ARE TO CENTERS OF PILES.

PILES AT END BENT 1 AND END BENT 2 ARE HP 12x53 STEEL PILES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE END BENT SHEETS.

DocuSigned by: Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 ENGINEER R BRUCE BOSLEY
12/7/2018

DocuSigned by: Paul Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	L. WATERS	DATE 7/18
CHECKED BY	B. BOSLEY	DATE 7/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE 12/18

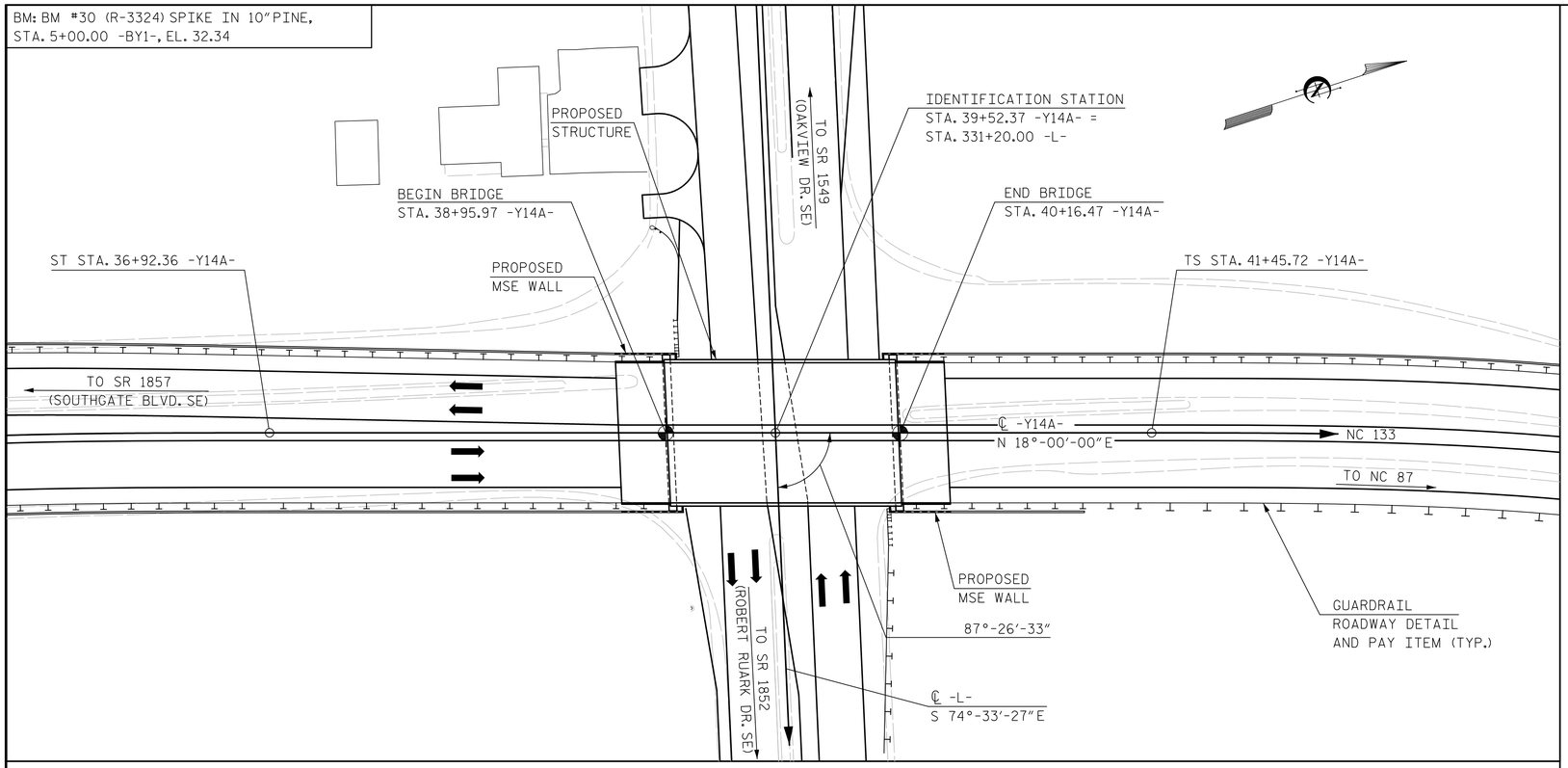
DWG. NO. 2

PROJECT NO. R-5021
BRUNSWICK **COUNTY**
STATION: 39+52.37 -Y14A-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-2
1			3			TOTAL SHEETS
2			4			24



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION 39+52.37 -Y14A-	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	L.F.	EA.	NO.	L.F.	EA.	EA.	L.F.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE	———	8,942	10,405.6	———	LUMP SUM	———	7	825.4	———	——	——	———	———	237.7	———	LUMP SUM
END BENT 1	———	———	———	50.6	———	9,041	——	——	14	14	1,078	14	7	———	26	———
END BENT 2	———	———	———	50.6	———	9,041	——	——	14	14	1,078	14	7	———	26	———
TOTAL	1	8,942	10,405.6	101.2	LUMP SUM	18,082	7	825.4	28	28	2,156	28	14	237.7	52	LUMP SUM

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 39+52.37 -Y14A-

SHEET 3 OF 3

DocuSigned by: R Bruce Bosley
NORTH CAROLINA PROFESSIONAL SEAL 046234 1/22/2019 ENGINEER R. BRUCE BOSLEY

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 1/22/2019 ENGINEER PAUL J. BARBER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH, GENERAL NOTES, AND TOTAL BILL OF MATERIALS

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY L. WATERS DATE 7/18
CHECKED BY B. BOSLEY DATE 7/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-3
1			3			TOTAL SHEETS
2			4			24

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										SERVICE III 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⟩	1.07	--	1.75	0.982	1.23	A	E	58.2	1.040	1.10	A	I	11.1	0.80	0.982	1.07	A	E	58.2	
		HL-93 (OPERATING)	N/A	--	1.46	--	1.35	0.982	1.59	A	E	58.2	1.040	1.46	A	I	11.1	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.55	55.8	1.75	0.982	1.78	A	E	58.2	1.040	1.56	A	I	11.1	0.80	0.982	1.55	A	E	58.2	
		HS-20 (OPERATING)	36.000	--	2.06	74.2	1.35	0.982	2.31	A	E	58.2	1.040	2.06	A	I	11.1	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.75	50.6	1.40	0.982	5.38	A	E	58.2	1.040	5.10	A	I	11.1	0.80	0.982	3.75	A	E	58.2	
		SNGARBS2	20.000	--	2.68	53.6	1.40	0.982	3.85	A	E	58.2	1.040	3.52	A	I	11.1	0.80	0.982	2.68	A	E	58.2	
		SNAGRIS2	22.000	--	2.50	55.0	1.40	0.982	3.59	A	E	58.2	1.040	3.23	A	I	11.1	0.80	0.982	2.50	A	E	58.2	
		SNCOTTS3	27.250	--	1.86	50.9	1.40	0.982	2.67	A	E	58.2	1.040	2.48	A	I	11.1	0.80	0.982	1.86	A	E	58.2	
		SNAGGRS4	34.925	--	1.51	52.7	1.40	0.982	2.17	A	E	58.2	1.040	1.99	A	I	11.1	0.80	0.982	1.51	A	E	58.2	
		SNS5A	35.550	--	1.48	52.6	1.40	0.982	2.13	A	E	58.2	1.040	1.98	A	I	11.1	0.80	0.982	1.48	A	E	58.2	
		SNS6A	39.950	--	1.34	53.5	1.40	0.982	1.93	A	E	58.2	1.040	1.78	A	I	11.1	0.80	0.982	1.34	A	E	58.2	
		SNS7B	42.000	--	1.28	53.8	1.40	0.982	1.84	A	E	58.2	1.040	1.72	A	I	11.1	0.80	0.982	1.28	A	E	58.2	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.63	53.8	1.40	0.982	2.35	A	E	58.2	1.040	2.16	A	I	11.1	0.80	0.982	1.63	A	E	58.2	
		TNT4A	33.075	--	1.64	54.2	1.40	0.982	2.35	A	E	58.2	1.040	2.12	A	I	11.1	0.80	0.982	1.64	A	E	58.2	
		TNT6A	41.600	--	1.32	54.9	1.40	0.982	1.90	A	E	58.2	1.040	1.80	A	I	11.1	0.80	0.982	1.32	A	E	58.2	
		TNT7A	42.000	--	1.32	55.4	1.40	0.982	1.90	A	E	58.2	1.040	1.77	A	I	11.1	0.80	0.982	1.32	A	E	58.2	
		TNT7B	42.000	--	1.35	56.7	1.40	0.982	1.93	A	E	58.2	1.040	1.69	A	I	11.1	0.80	0.982	1.35	A	E	58.2	
		TNAGRIT4	43.000	--	1.29	55.5	1.40	0.982	1.86	A	E	58.2	1.040	1.65	A	I	11.1	0.80	0.982	1.29	A	E	58.2	
		TNAGRT5A	45.000	--	1.23	55.3	1.40	0.982	1.76	A	E	58.2	1.040	1.61	A	I	11.1	0.80	0.982	1.23	A	E	58.2	
		TNAGRT5B	45.000	⟨3⟩	1.22	54.9	1.40	0.982	1.75	A	E	58.2	1.040	1.57	A	I	11.1	0.80	0.982	1.22	A	E	58.2	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

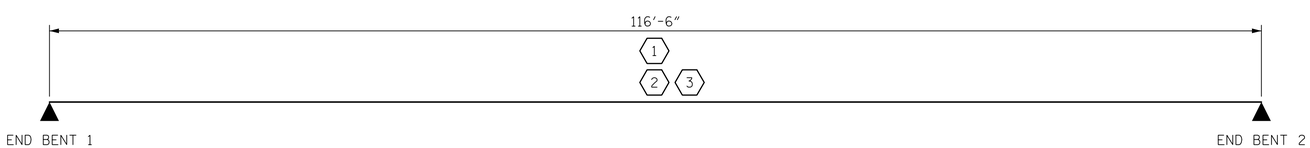
⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

E - EXTERIOR GIRDER



LRFR SUMMARY

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 39+52.37 -Y14A-

DocuSigned by: R Bruce Bosley — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046234 R BRUCE BOSLEY — 12/7/2018

DocuSigned by: Paul J. Barber — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY L. WATERS DATE 7/18
CHECKED BY A. GOFF DATE 7/18
DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

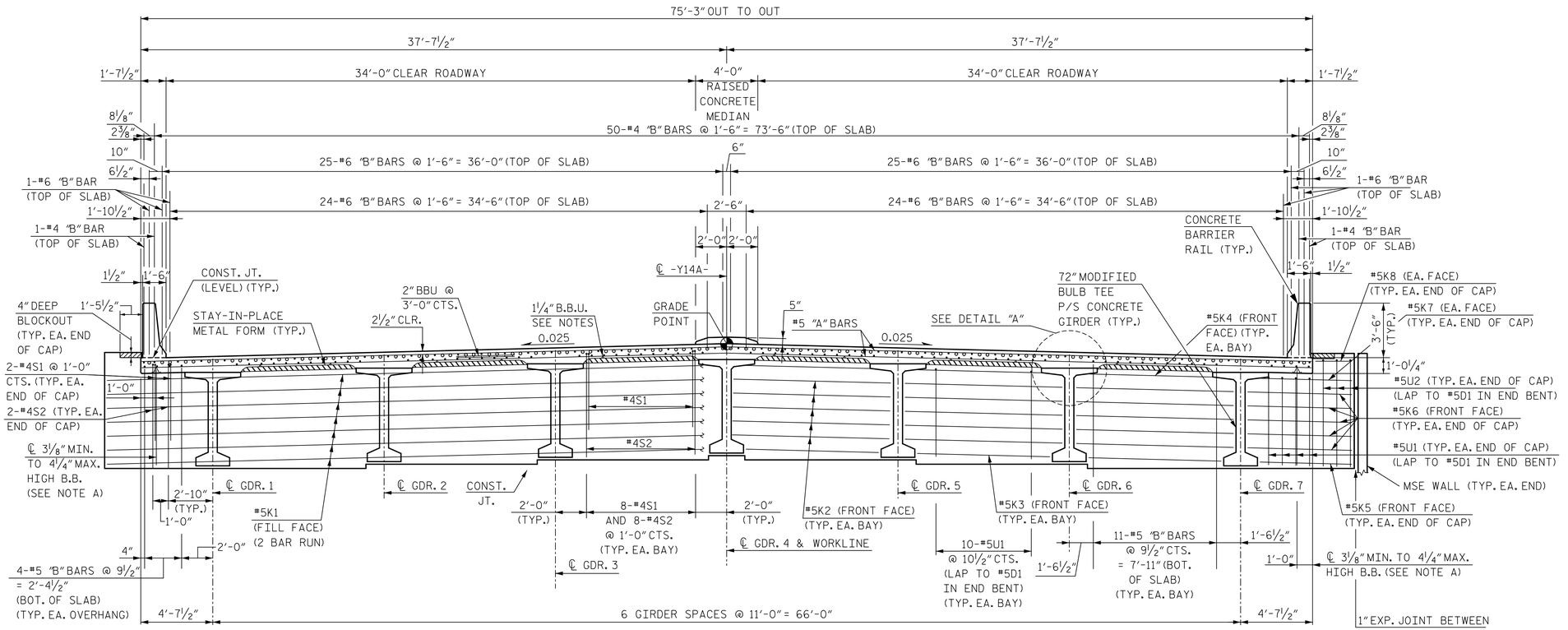
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-4
1			3			TOTAL SHEETS
2			4			24

STD. NO. LRFR1

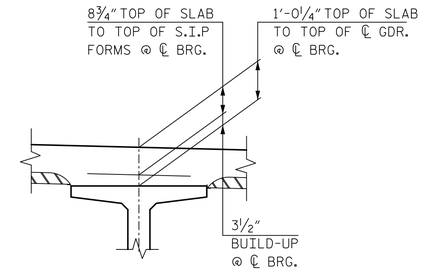
ASSEMBLED BY : LLW DATE : 3/18
CHECKED BY : ADG DATE : 4/18

DRAWN BY : MAA 1/08 — REV. 11/12/08RR MAA/GM — REV. 10/1/11 MAA/GM
CHECKED BY : GM/DI 2/08



TYPICAL SECTION AT INTEGRAL END BENT

FOR SECTION THRU END BENT, SEE SECTION A-A, SHEET 2 OF 2



DETAIL "A"

NOTE A: THE HEIGHT OF THE OVERHANG BEAM BOLSTERS VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

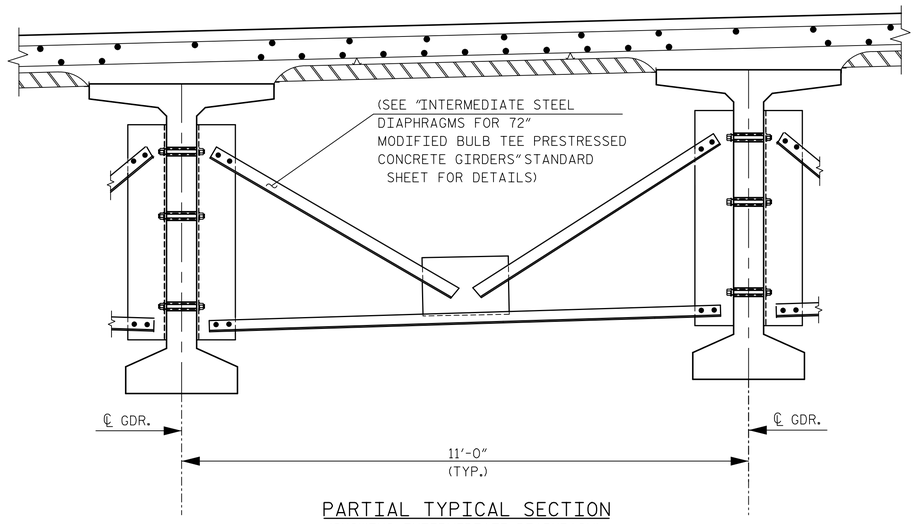
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

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

TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2¼" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 2" BBU SHALL BE USED.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILD-UPS.



PARTIAL TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)

"B" BAR KEY

• = CONTINUOUS BAR RUN, SEE PLAN OF SPAN SHEETS.

◦ = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE PLAN OF SPAN SHEETS.

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12/7/2018

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/7/2018

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DESIGN ENGINEER OF RECORD B. BOSLEY DATE 12/18

DWG. NO. 5

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 39+52.37 -Y14A-

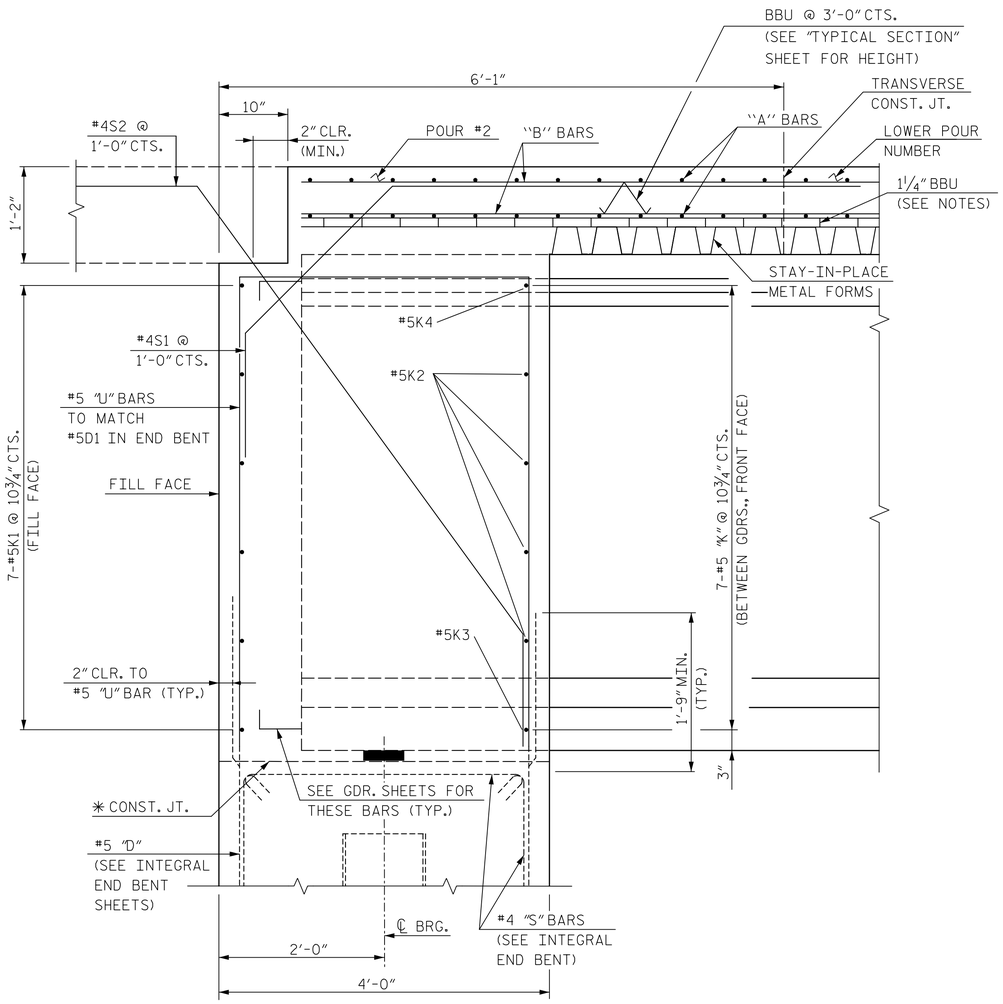
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

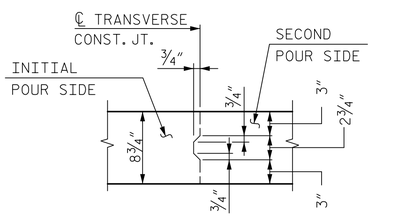
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-5
1			3			TOTAL SHEETS
2			4			24



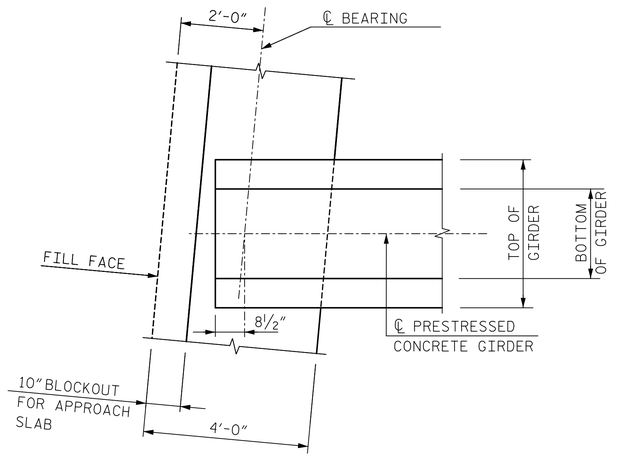
SECTION A-A
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

* THE TOP SURFACE OF THE END BENT CAP EXCLUDING THE BEARING AREA SHALL BE RAKED TO A DEPTH OF ¼".



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

TRANSVERSE CONSTRUCTION JOINT DETAIL



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

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BRUNSWICK COUNTY
STATION: 39+52.37 -Y14A-

SHEET 2 OF 2

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TYPICAL SECTION DETAILS

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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-6
1			3			TOTAL SHEETS
2			4			24

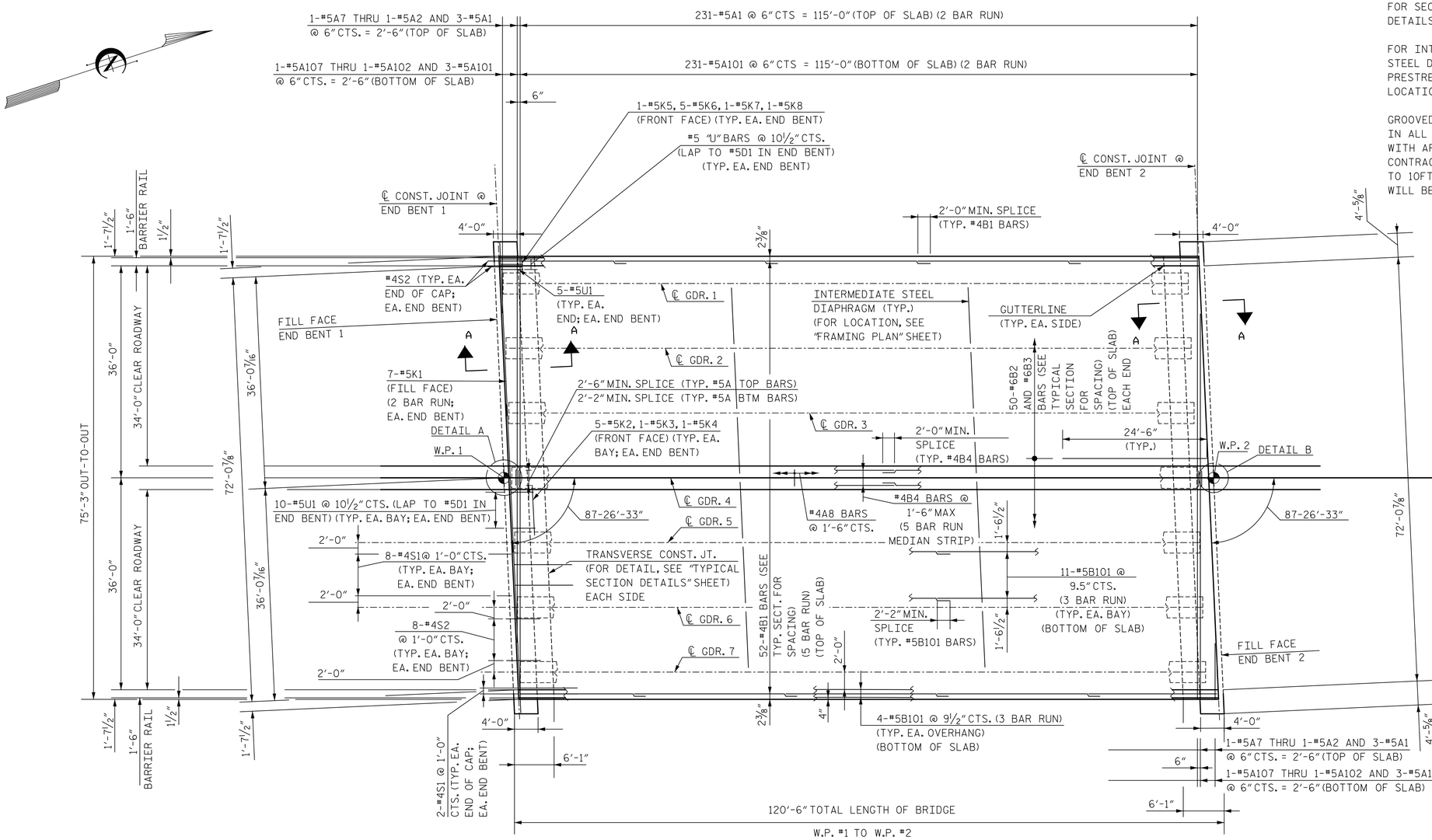
NOTES:

FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.

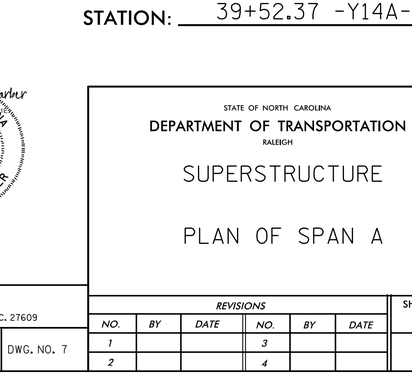
FOR SECTION VIEW, SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 2 OF 2.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MEDIAN STRIP IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8FT TO 10FT BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.



PLAN



DETAIL A

DETAIL B

POURING SEQUENCE

DIMENSIONS GIVEN ALONG CONTROL LINE RIGHT

PERMANENT CONCRETE MEDIAN STRIP ON BRIDGE

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SUPERSTRUCTURE

PLAN OF SPAN A

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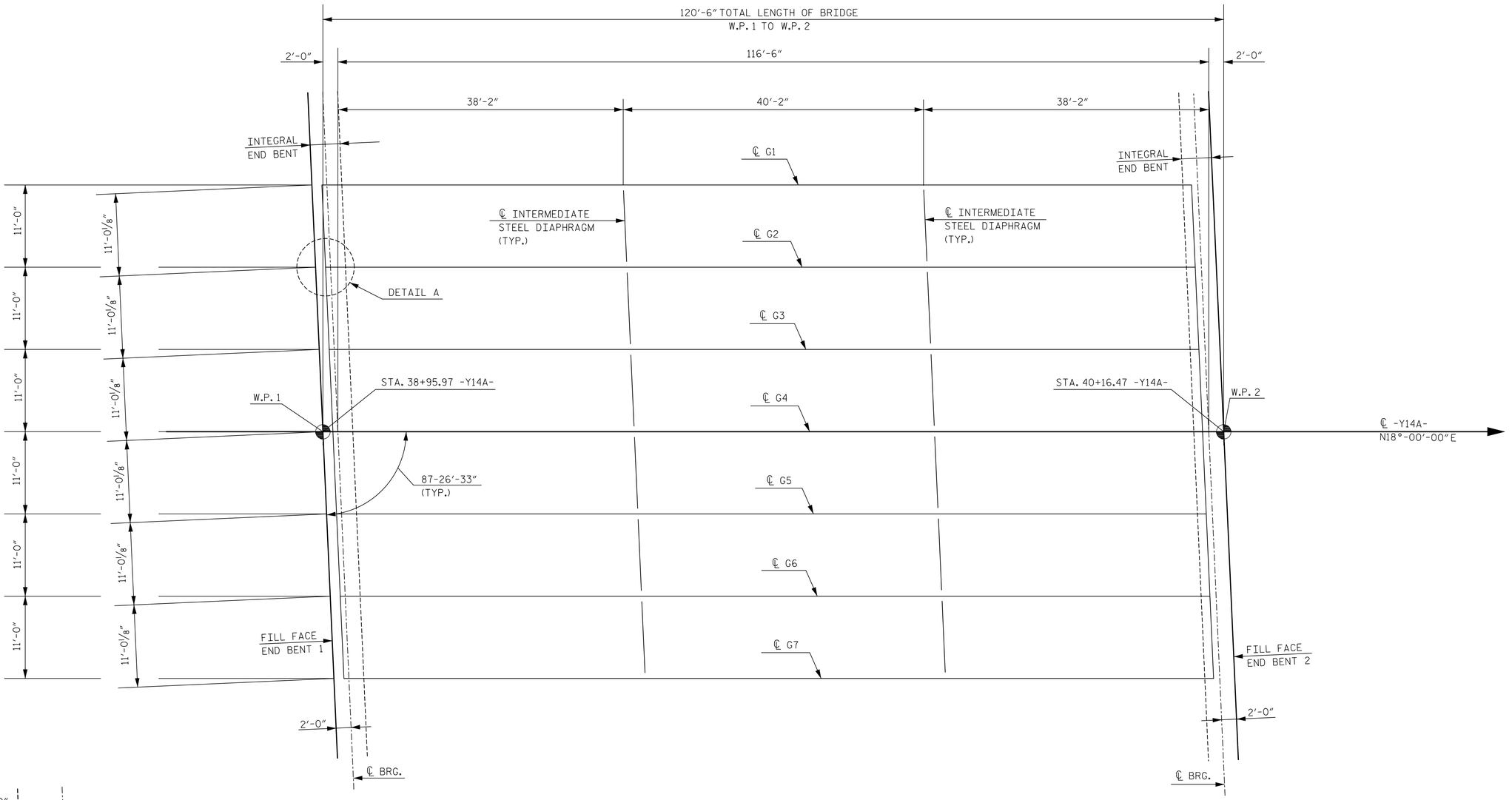
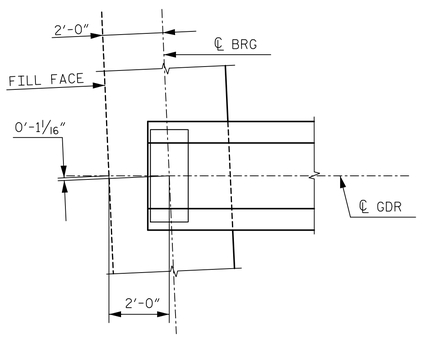
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-7
1			3			TOTAL SHEETS
2			4			24



FIX
E3

FIX
E3



DETAIL A

HORIZONTAL AND SKEW DIMENSIONS ARE SAME, DIFFERENCE IS NEGLIGIBLE.

FRAMING PLAN

NOTES:

"FIX" DENOTES FIXED BEARING ASSEMBLY.
"E" DENOTES ELASTOMERIC BEARING PAD MARK.

NO SOLE PLATES ARE REQUIRED AT INTEGRAL END BENTS.

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FRAMING PLAN

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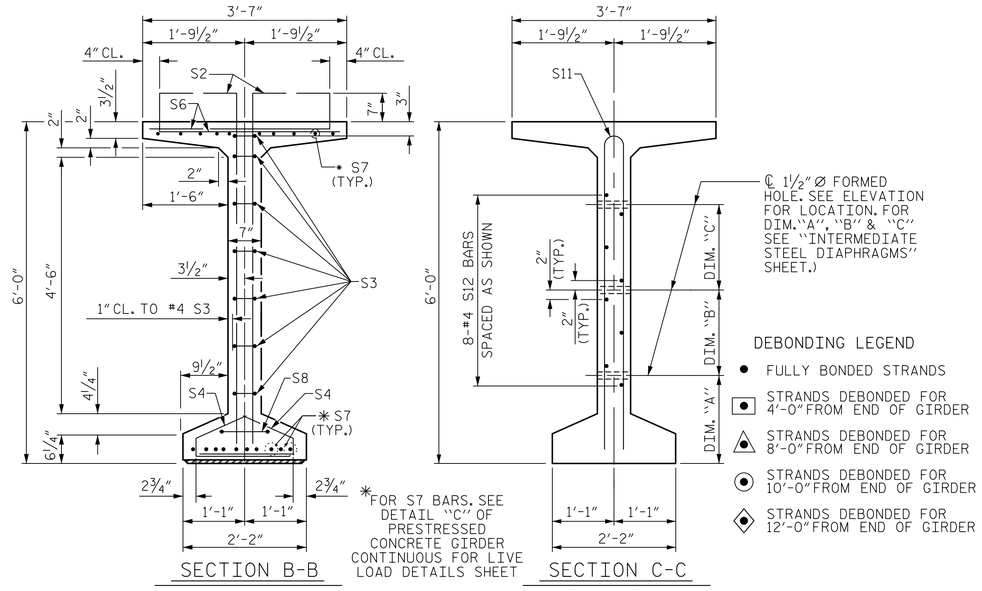
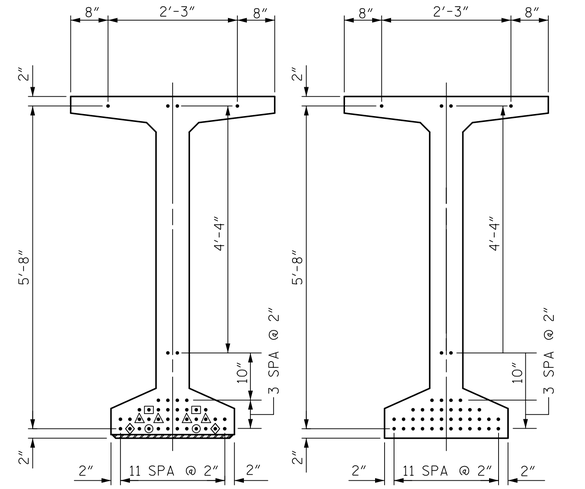
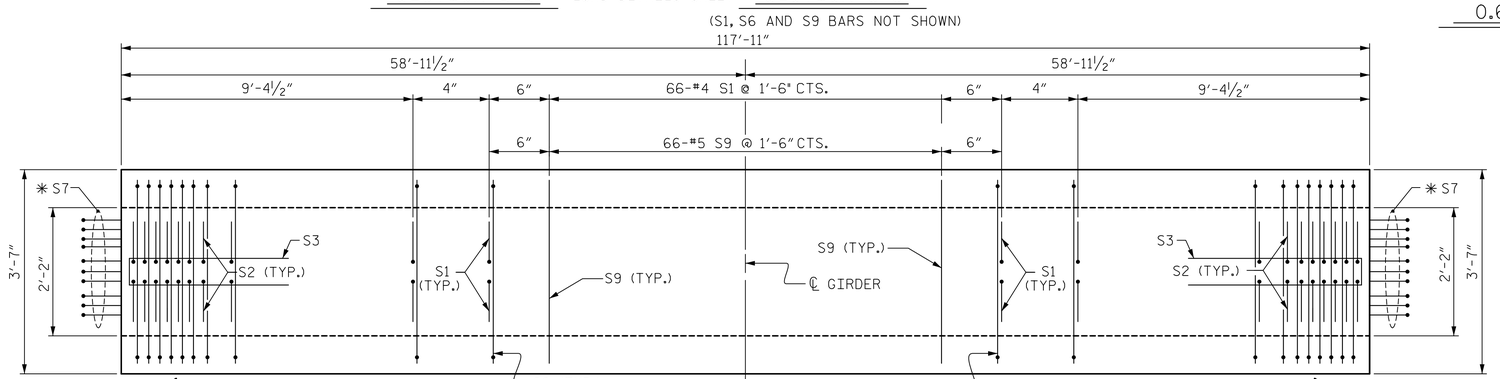
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-8
1			3			TOTAL SHEETS
2			4			24



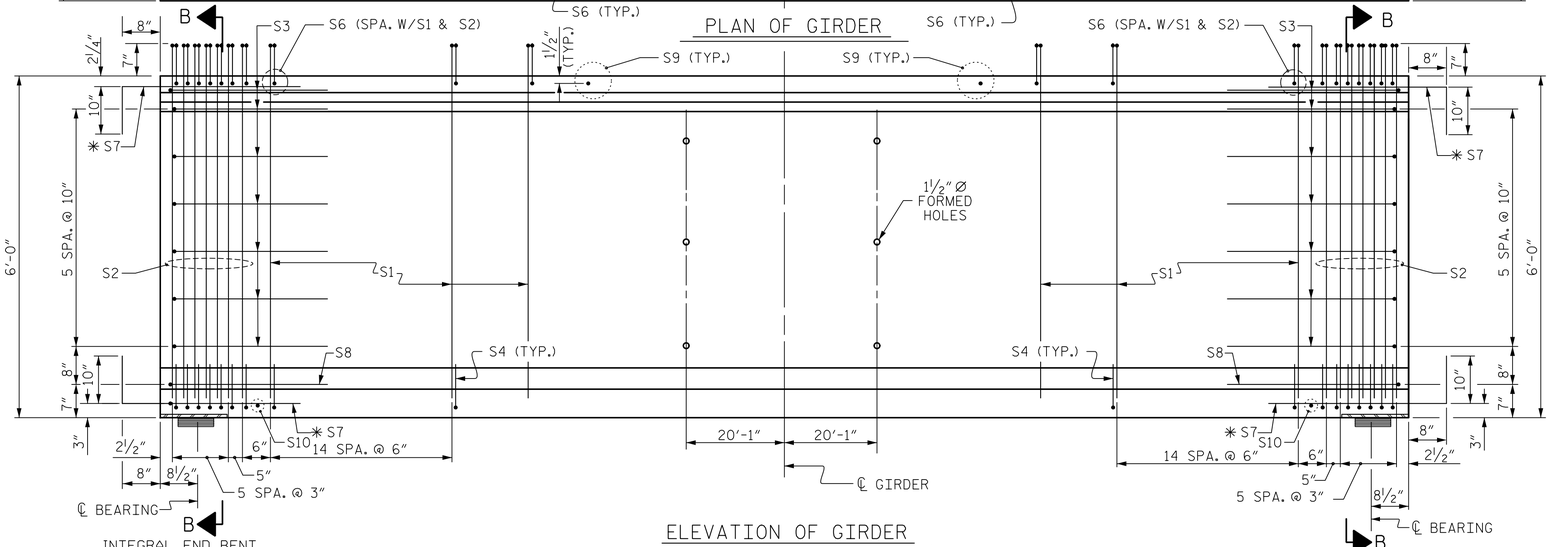


0.6"Ø LOW RELAXATION STRAND LAYOUT

(S1, S6 AND S9 BARS NOT SHOWN)



PLAN OF GIRDER



INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

INTEGRAL END BENT

PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL

0.6"Ø L. R. GRADE 270 STRANDS

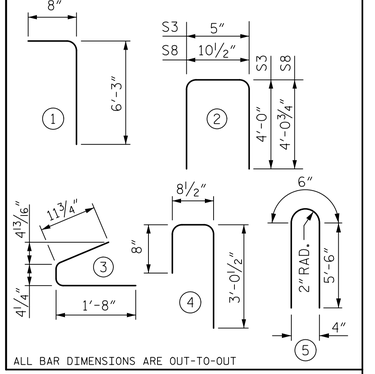
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	196	#4	1	6'-11"	906
S2	28	#6	1	6'-11"	291
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S6	220	#5	4	4'-5"	1013
✱ S7	40	#5	STR	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	66	#5	STR	3'-3"	224
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	11'-6"	96
S12	16	#4	STR	8'-0"	86

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,500 PSI CONCRETE	0.6"Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER	3036	25.3	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	117'-11"	825'-5"

PROJECT NO. R-5021

BRUNSWICK COUNTY

STATION: 39+52.37 -Y14A-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE

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CHECKED BY : JVE	DATE : 4/18		
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CHECKED BY : VAP 2/6/97	REV. 6/13	MAA/GM	
	REV. 1/15	MAA/TMG	

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DWG. NO. 9

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-9
1			3			TOTAL SHEETS
2			4			24

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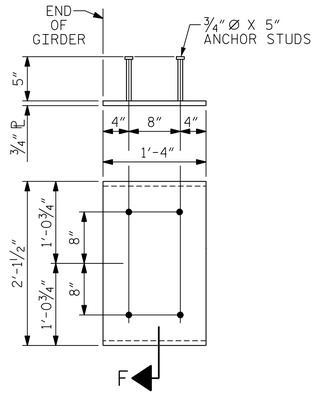


EMBEDDED PLATE "B-1" DETAILS
72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

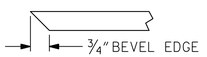
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,100 PSI.

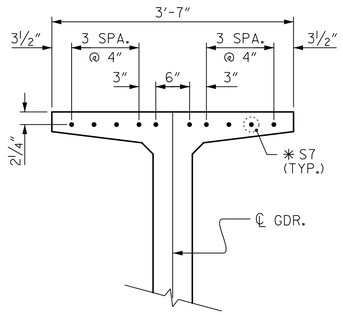
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

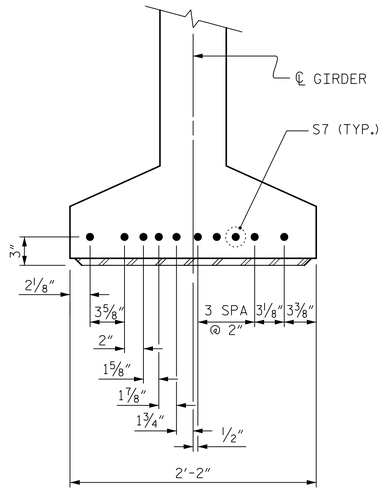
A 2" × 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 72" MODIFIED BULB TEES ONLY.



SECTION "F"
(SEE NOTES)



DETAIL "B"
(FOR 72" MODIFIED BULB TEES)



DETAIL "C"
(FOR 72" MODIFIED BULB TEES)

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BRUNSWICK COUNTY

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SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER DETAILS

ASSEMBLED BY : LLW	DATE : 4/18
CHECKED BY : JVE	DATE : 4/18
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG

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DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-10
1			3			TOTAL SHEETS
2			4			24

STD. NO. PCG9