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

TIP PROJECT: B-5123

CONTRACT: C203722

01-MAR-2016 10:49
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nddiuto

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

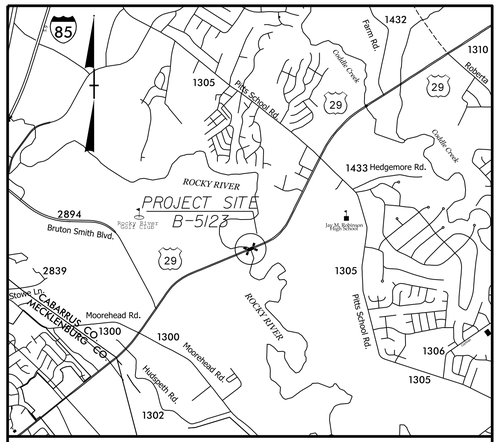
CABARRUS COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5123		

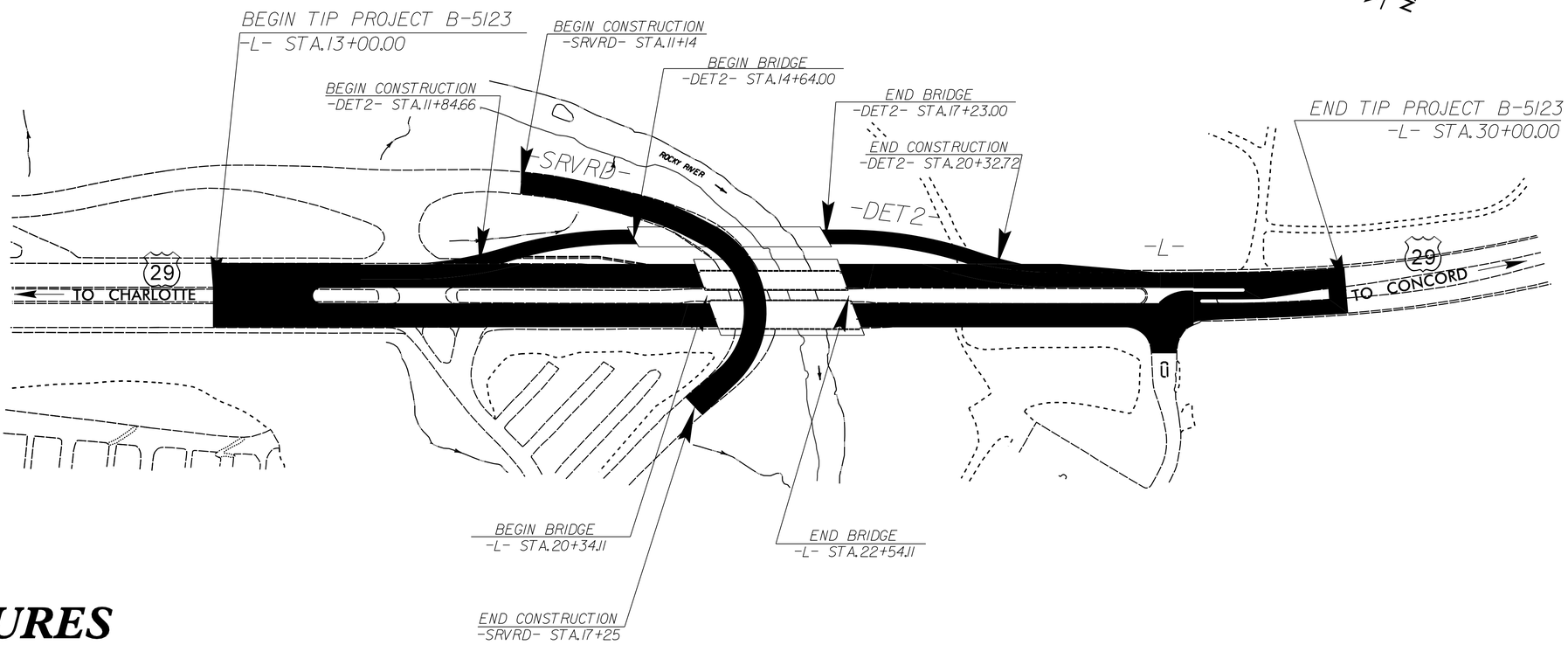
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
42265.1.1	BRSTP-0029(42)	P.E.
42265.2.1	BRSTP-0029(42)	ROW, UTIL.
42265.3.1	BRSTP-0029(42)	CONST.

LOCATION: BRIDGES #14 AND #19 ON US 29 OVER ROCKY RIVER AND ACCESS RD.

TYPE OF WORK: GRADING, DRAINAGE, GUARDRAIL, PAVING & STRUCTURES



VICINITY MAP



STRUCTURES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2016 = 32,300
ADT 2036 = 50,300
DHV = 11 %
D = 65 %
T = 5 % *
V = 50 MPH
* TTST = 2% DUAL 3%
FUNC CLASS = MAJOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5123 = 0.280 MILES

LENGTH OF STRUCTURE TIP PROJECT B-5123 = 0.042 MILES

TOTAL LENGTH OF TIP PROJECT B-5123 = 0.322 MILES

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

2012 STANDARD SPECIFICATIONS

LETTING DATE:
APRIL 19, 2016

E. E. MURRAY, P.E.
PROJECT ENGINEER

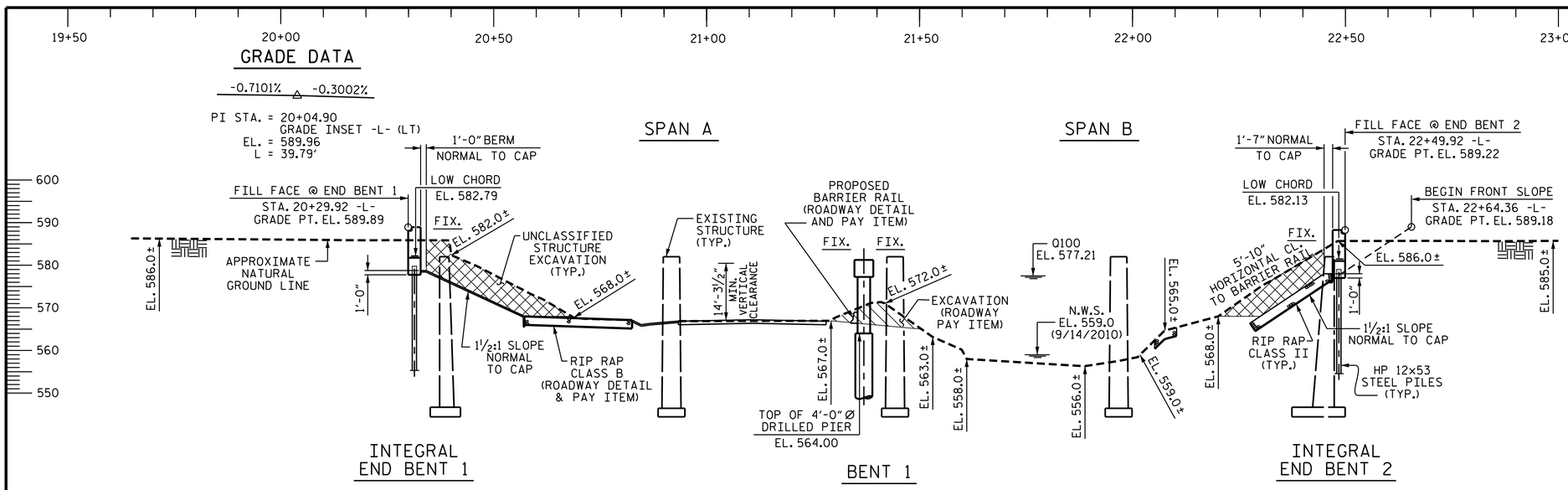
VIPUL A. PATEL, P.E.
PROJECT DESIGN ENGINEER

F.A. PROJECT NO: BRSTP-0029(42)

GRADE DATA

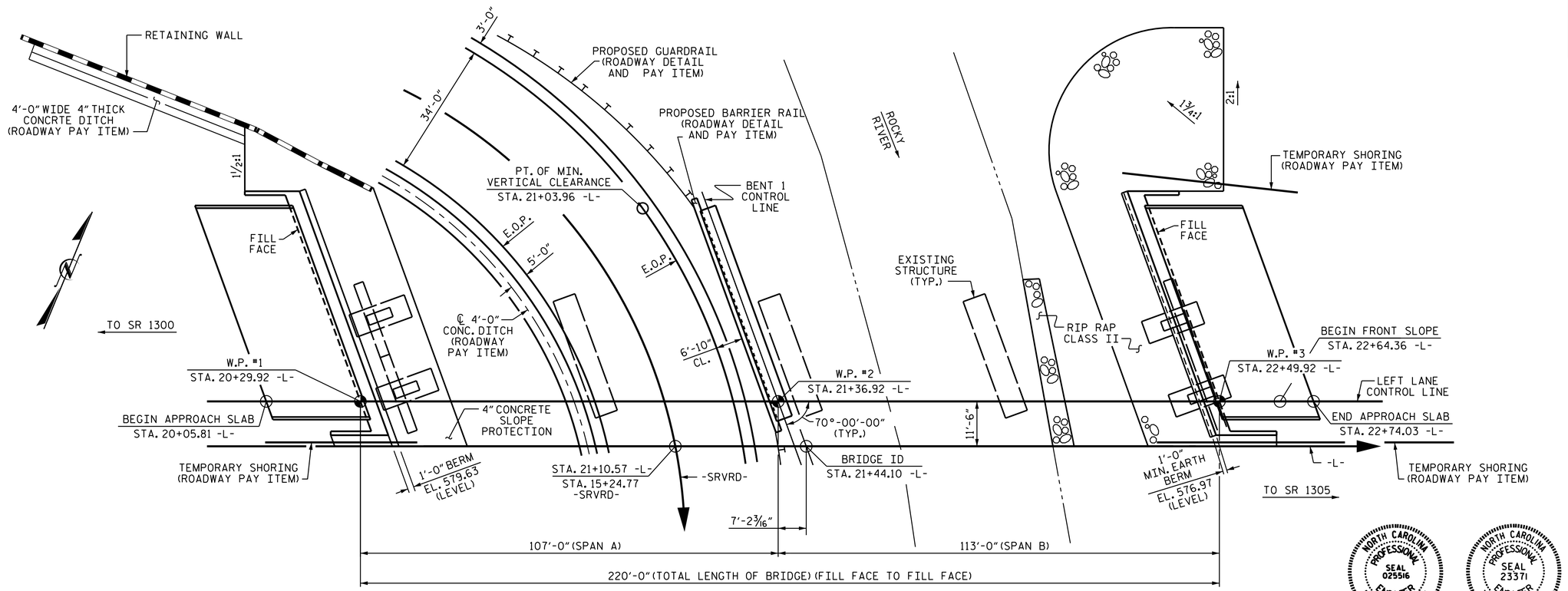
-0.7101% △ -0.3002%

PI STA. = 20+04.90
GRADE INSET -L- (LT)
EL. = 589.96
L = 39.79'



SECTION ALONG LEFT LANE CONTROL LINE

SECTION AT END BENTS AND BENT ARE TAKEN AT RIGHT ANGLES



PLAN

PILES NOT SHOWN FOR CLARITY

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

HORIZONTAL CURVE DATA

PI STA. = 15+90.27 -SRVRD-
△ = 109°-02'-43.5" (RT)
D = 44°-04'-25.2"
L = 247.42'
T = 182.41'
R = 130.00'

PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 1 OF 3 REPLACES BRIDGE #19

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 29 OVER ROCKY RIVER & SERVICE RD. BETWEEN SR 1300 AND SR 1305

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
DocuSigned by: Emily E Murray CAEB97AEDC584E0...
3/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			74

STR. #1

DRAWN BY : N.D'AIUTO DATE : 8/27/15
CHECKED BY : K.D.LAYNE DATE : 9/8/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/7/15

01-MAR-2016 10:51
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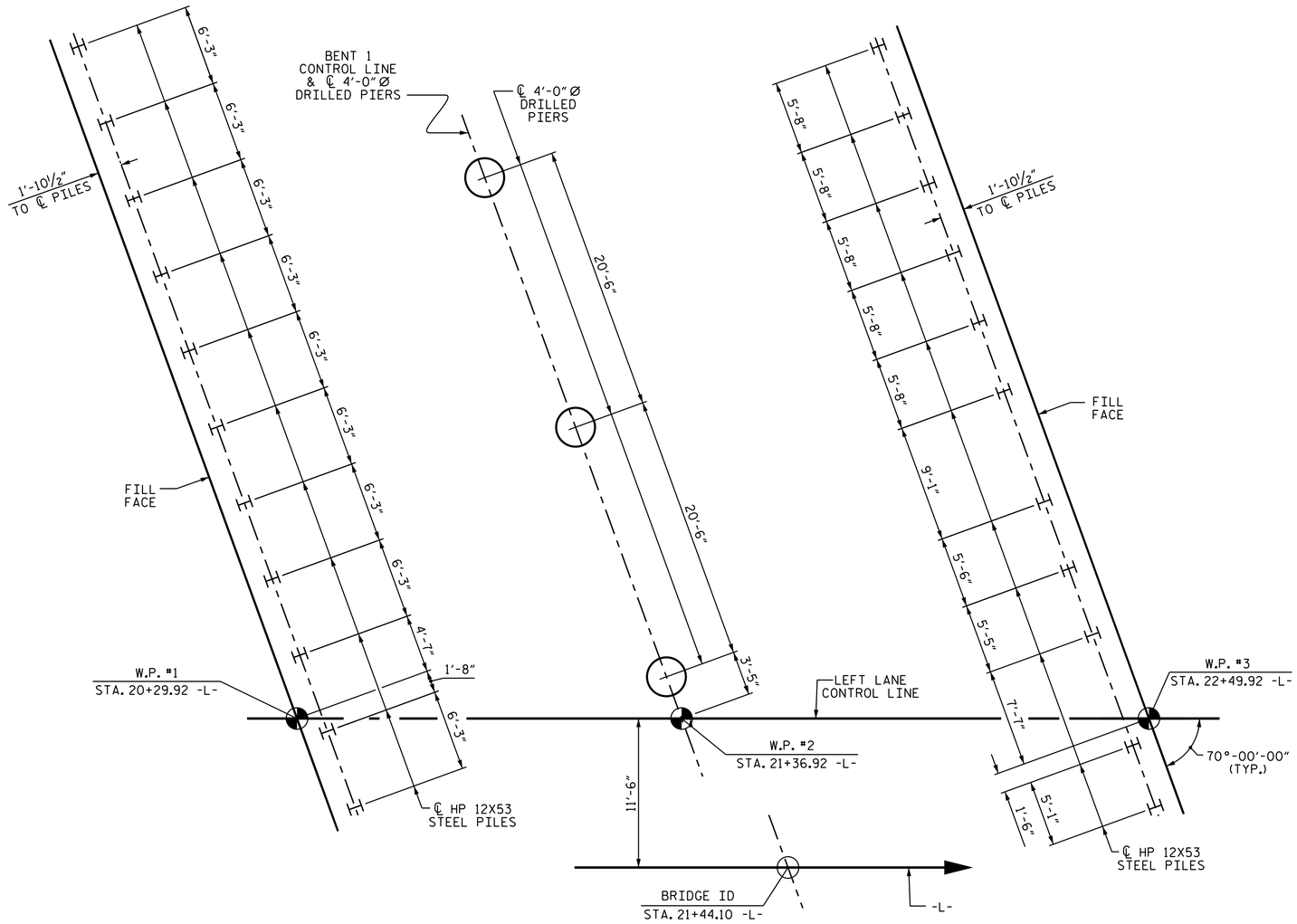

INTEGRAL
END BENT 1

BENT 1

INTEGRAL
END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE
SHOWN TO THE CENTERLINE OF PILES

FOUNDATION NOTES

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

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 183 TONS PER PILE.

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 725.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 60.0 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 542.0 WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 530.0 WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS 535.0. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS ARE REQUIRED FOR DRILLED PIERS AT BENT 1. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT IS REQUIRED FOR DRILLED PIERS AT BENT 1. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 183 TONS PER PILE.

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 29 OVER ROCKY RIVER & SERVICE RD. BETWEEN SR 1300 AND SR 1305

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			74

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : N.D'AIUTO DATE : 8/26/15
CHECKED BY : K.D.LAYNE DATE : 9/8/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/7/15

01-MAR-2016 10:51
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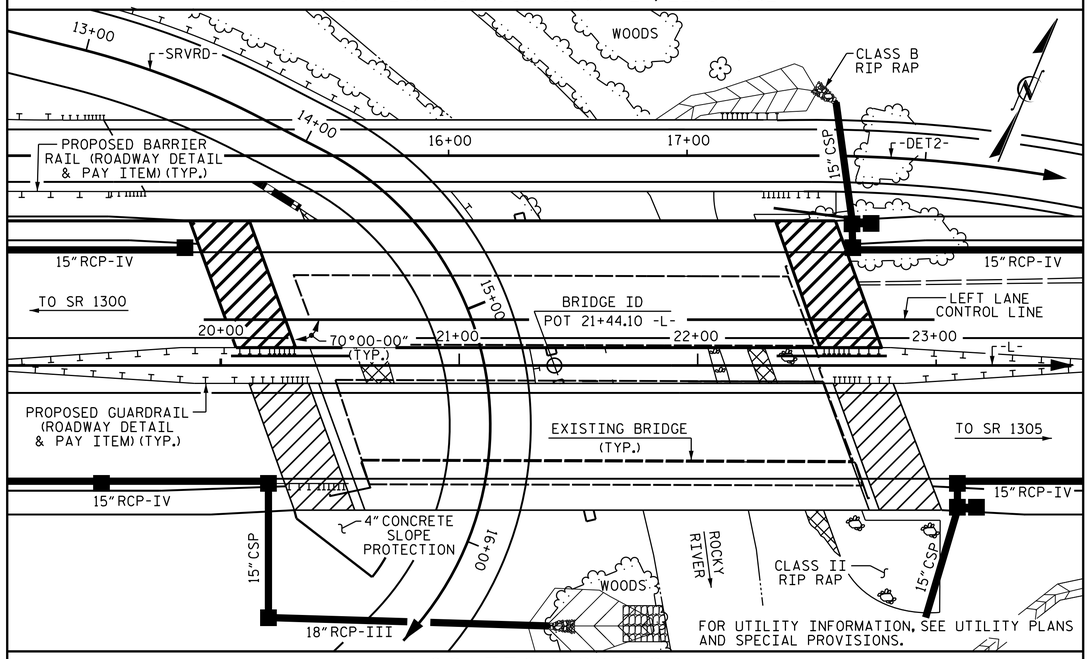
STR. #1

BM #2: RAILROAD SPIKE IN BASE OF POWER POLE
66.4' RIGHT. STA. 18+01.44 -L-, EL. 587.42



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, 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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE ELEVATION AND CLEARANCE SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORTANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

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

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 40 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 21+44.10 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS @ 52'-6" ON REINFORCED CONCRETE DECK GIRDERS WITH A CLEAR ROADWAY WIDTH OF 25'-10" ON REINFORCED CONCRETE ABUTMENTS ON SPREAD FOOTINGS AT END BENTS AND REINFORCED CONCRETE POST AND WEB ON SPREAD FOOTINS AT BENTS LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISITNG BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

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.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NOT TO DISTURB OR DAMAGE THE EXISTING 54 INCH SANITARY SEWER LINE WHILE CONSTRUCTING THE DETOUR BRIDGE. THE CONTRACTOR WILL BE RESPONSIBLE TO FIX ANY DAMAGE CAUSED DURING CONSTRUCTION AT NO ADDITIONAL COST TO THE UTILITY COMPANY OR STATE. FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE	REMOVAL OF EXISTING STRUCTURE	4'-0" DIA. DRILLED PIERS IN SOIL	4'-0" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" DIA. DRILLED PIER	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE										12,412	12,241		LUMP SUM	
END BENT 1												46.0		6,141
BENT 1			69.0	33.0	69.0	1	1	1				55.4		18,467
END BENT 2												46.2		6,298
TOTAL	LUMP SUM	LUMP SUM	69.0	33.0	69.0	1	1	1	LUMP SUM	12,412	12,241	147.6	LUMP SUM	30,906

	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS		HP 12X53 STEEL PILES		TWO BAR METAL RAIL	CONCRETE BARRIER RAIL	1'-2"X 2'-6" CONCRETE PARAPET	4" SLOPE PROTECTION	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		14	1,516.08			210.05	486.44	218.23	375			LUMP SUM	LUMP SUM
END BENT 1				11	445								
BENT 1	3,668												
END BENT 2				11	385					590	650		
TOTAL	3,668	14	1,516.08	22	830	210.05	486.44	218.23	375	590	650	LUMP SUM	LUMP SUM

HYDRAULIC DATA

DESIGN DISCHARGE	= 10,070 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 576.10
DRAINAGE AREA	= 87.5 SQ.MI.
BASE DISCHARGE (Q100)	= 12,060 C.F.S.
BASE HIGH WATER ELEVATION	= 577.21

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 33,000 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 588.90

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 29 OVER ROCKY RIVER & SERVICE RD. BETWEEN SR 1300 AND SR 1305

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			74

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STR. #1

DRAWN BY : N.D'AIUTO DATE : 8/27/15
CHECKED BY : K.D.LAYNE DATE : 9/8/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/7/15

01-MAR-2016 10:51
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ndaiuto

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⟩	1.01	--	1.75	0.781	1.49	A	ER	51.938	0.822	1.39	A	ER	72.713	0.80	0.781	**1.01**	B	ER	**54.938**	
		HL-93(Opr)	N/A	--	1.81	--	1.35	0.781	1.93	A	ER	51.938	0.822	1.81	A	ER	72.713	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	⟨2⟩	1.44	51.931	1.75	0.781	2.10	A	ER	51.938	0.822	1.78	A	ER	72.713	0.80	0.781	**1.44**	B	ER	**54.938**	
		HS-20(Opr)	36.000	--	2.3	82.949	1.35	0.781	2.72	A	ER	51.938	0.822	2.30	A	ER	72.713	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.47	46.786	1.40	0.781	6.26	A	ER	51.938	0.822	5.36	A	ER	72.713	0.80	0.781	3.47	B	ER	54.938	
		SNGARBS2	20.000	--	2.49	49.815	1.40	0.781	4.52	A	ER	51.938	0.822	3.79	A	ER	72.713	0.80	0.781	2.49	B	ER	54.938	
		SNAGRIS2	22.000	--	2.32	51.088	1.40	0.781	4.22	A	ER	51.938	0.822	3.51	A	ER	72.713	0.80	0.781	2.32	B	ER	54.938	
		SNCOTTS3	27.250	--	1.72	46.921	1.40	0.781	3.11	A	ER	51.938	0.822	2.67	A	ER	72.713	0.80	0.781	1.72	B	ER	54.938	
		SNAGGRS4	34.925	--	1.4	49.016	1.40	0.781	2.54	A	ER	51.938	0.822	2.20	A	ER	72.713	0.80	0.781	1.40	B	ER	54.938	
		SNS5A	35.550	--	1.38	48.874	1.40	0.781	2.49	A	ER	51.938	0.822	2.22	A	ER	72.713	0.80	0.781	1.37	B	ER	54.938	
		SNS6A	39.950	--	1.25	49.819	1.40	0.781	2.26	A	ER	51.938	0.822	2.02	A	ER	72.713	0.80	0.781	1.25	B	ER	54.938	
		SNS7B	42.000	--	1.19	49.855	1.40	0.781	2.15	A	ER	51.938	0.822	1.98	A	ER	72.713	0.80	0.781	1.19	B	ER	54.938	
	TTST	TNAGRIT3	33.000	--	1.52	50.044	1.40	0.781	2.75	A	ER	51.938	0.822	2.41	A	ER	72.713	0.80	0.781	1.52	B	ER	54.938	
		TNT4A	33.075	--	1.52	50.251	1.40	0.781	2.76	A	ER	51.938	0.822	2.36	A	ER	72.713	0.80	0.781	1.52	B	ER	54.938	
		TNT6A	41.600	--	1.23	51.124	1.40	0.781	2.23	A	ER	51.938	0.822	2.09	A	ER	31.163	0.80	0.781	1.23	B	ER	54.938	
		TNT7A	42.000	--	1.23	51.580	1.40	0.781	2.23	A	ER	51.938	0.822	2.05	A	ER	72.713	0.80	0.781	1.23	B	ER	54.938	
		TNT7B	42.000	--	1.25	52.649	1.40	0.781	2.28	A	ER	51.938	0.822	1.94	A	ER	72.713	0.80	0.781	1.25	B	ER	54.938	
		TNAGRIT4	43.000	--	1.21	51.817	1.40	0.781	2.19	A	ER	51.938	0.822	1.88	A	ER	72.713	0.80	0.781	1.21	B	ER	54.938	
		TNAGT5A	45.000	--	1.14	51.398	1.40	0.781	2.08	A	ER	51.938	0.822	1.86	A	ER	72.713	0.80	0.781	1.14	B	ER	54.938	
		TNAGT5B	45.000	⟨3⟩	1.13	51.017	1.40	0.781	2.06	A	ER	51.938	0.822	1.79	A	ER	72.713	0.80	0.781	**1.13**	B	ER	**54.938**	

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.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

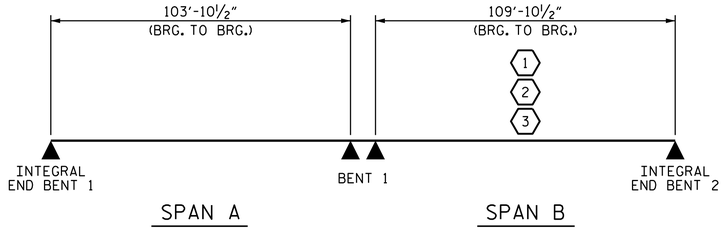
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨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. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET OF

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

Digitally signed by: vipul a patel
1C157DE15D464AA...
3/1/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SS-4
1			3			TOTAL SHEETS
2			4			74

STR. #1 STD. NO. LRFR1

ASSEMBLED BY: H. A. LOCKLEAR DATE: 2/22/16
CHECKED BY: T. H. CARROLL DATE: 2/29/16
DRAWN BY: MAA 1/08
CHECKED BY: MAA/GM
DESIGN ENGINEER OF RECORD: -

REV. 11/12/08RR MAA/GM
REV. 10/7/11 MAA/GM

DATE: -
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 2/29/16

01-MAR-2016 11:54
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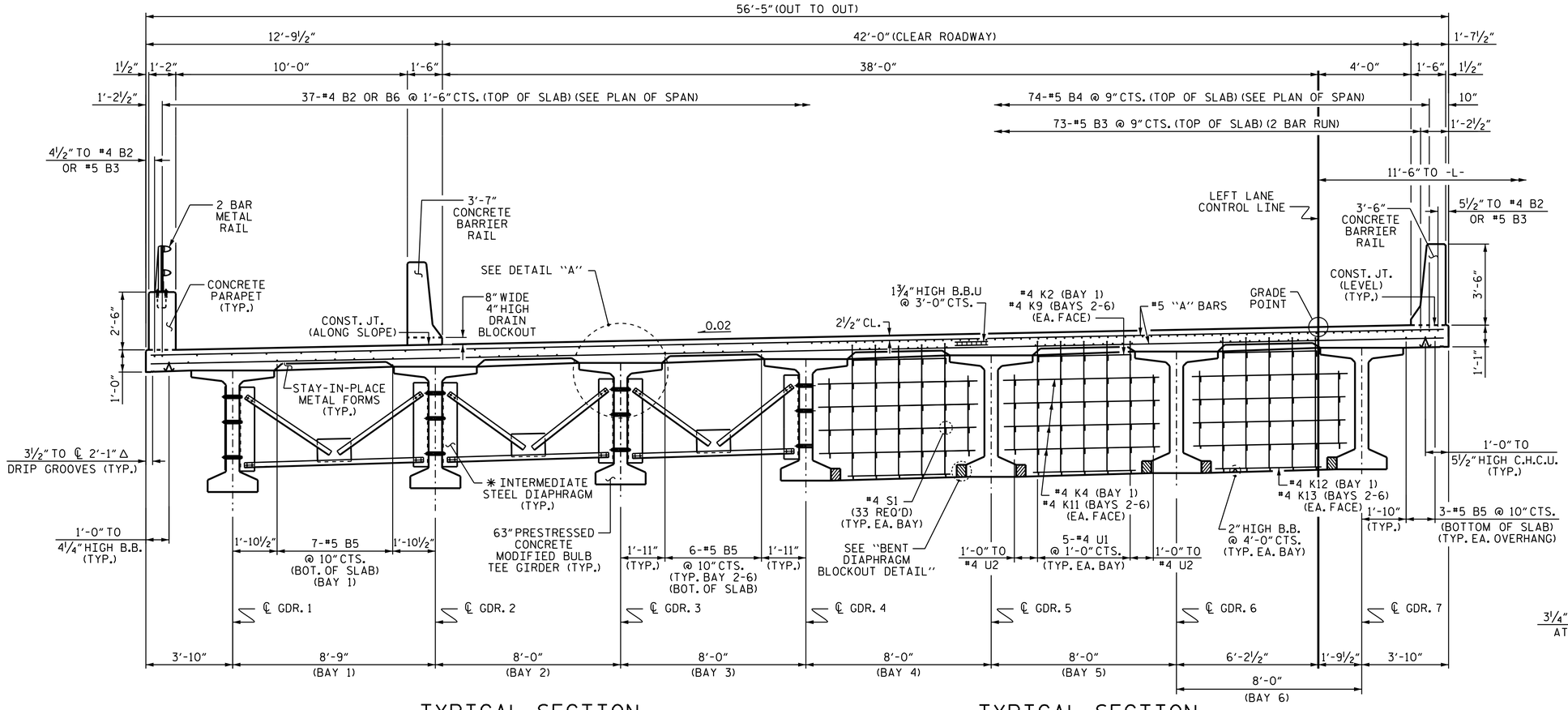
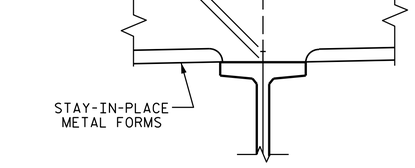
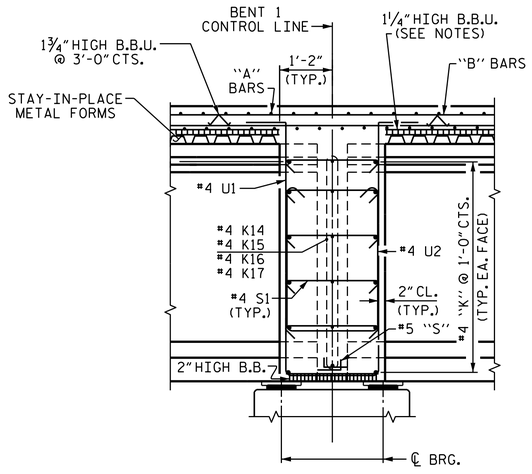


TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)

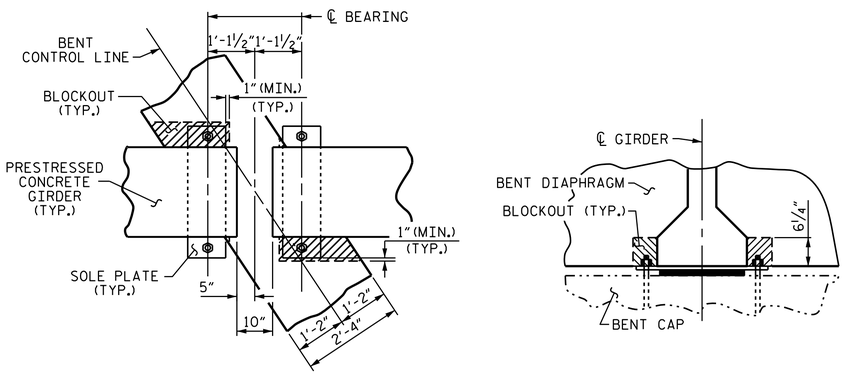
TYPICAL SECTION
(SHOWING BENT DIAPHRAGMS)



DETAIL "A"



SECTION THROUGH BENT DIAPHRAGM



BENT DIAPHRAGM BLOCKOUT DETAIL

PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D4644A... 3/1/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			74

DRAWN BY : N.D'AIUTO DATE : 6/16/15
CHECKED BY : K.D.LAYNE DATE : 8/7/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

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ngaluto

STR. #1

NOTES

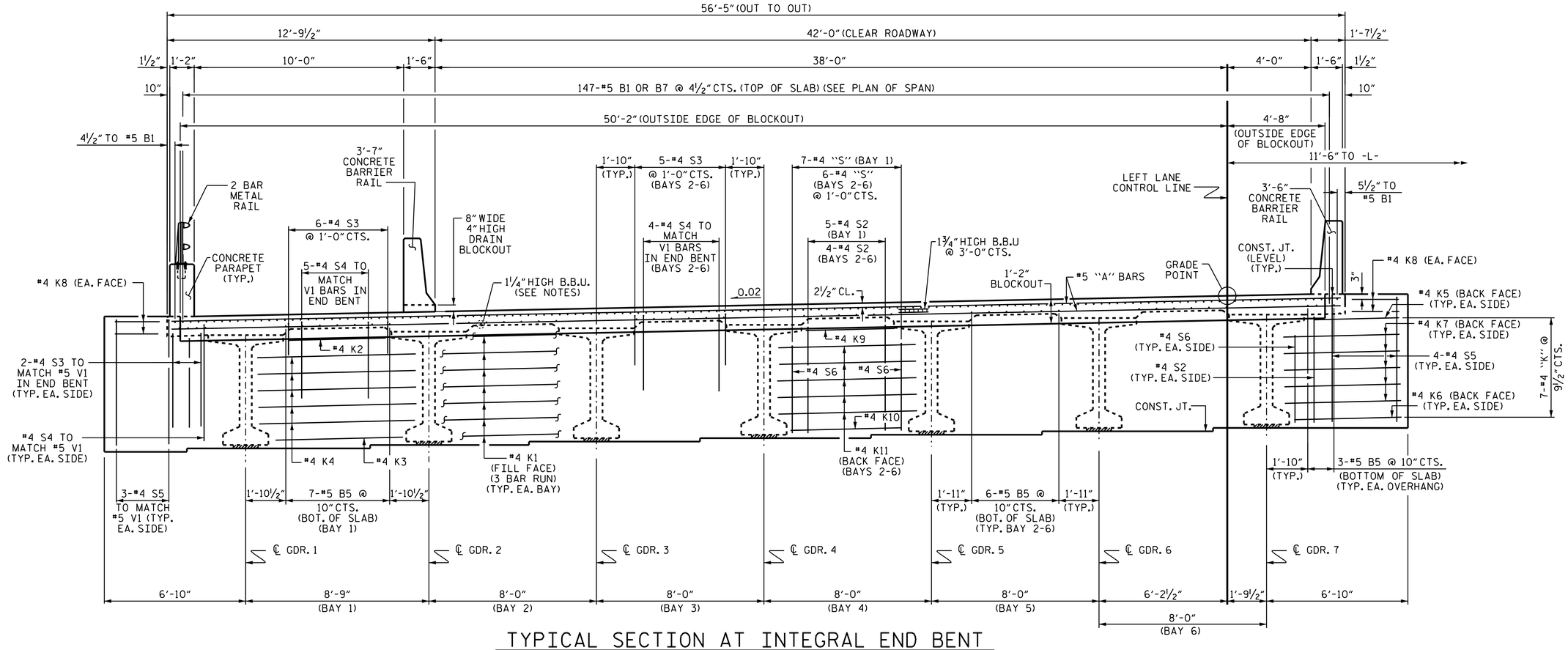
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

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

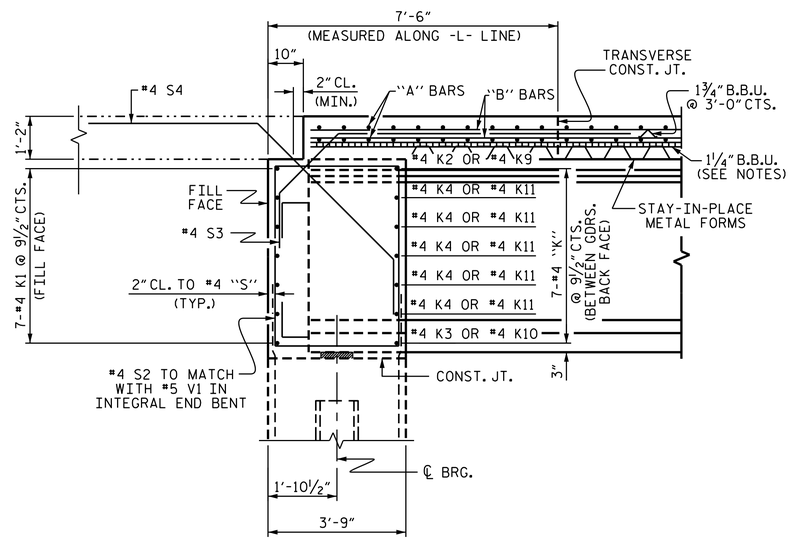
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

FOR WING ELEVATIONS AND DETAILS, SEE "PLAN OF SPAN DETAILS" SHEETS.

✳ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



TYPICAL SECTION AT INTEGRAL END BENT



SECTION THROUGH INTEGRAL END BENT

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

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NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO. S-6
1			3			TOTAL SHEETS 74
2			4			

STR. #1

DRAWN BY : N.D'AIUTO DATE : 6/16/15
CHECKED BY : K.D.LAYNE DATE : 8/7/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

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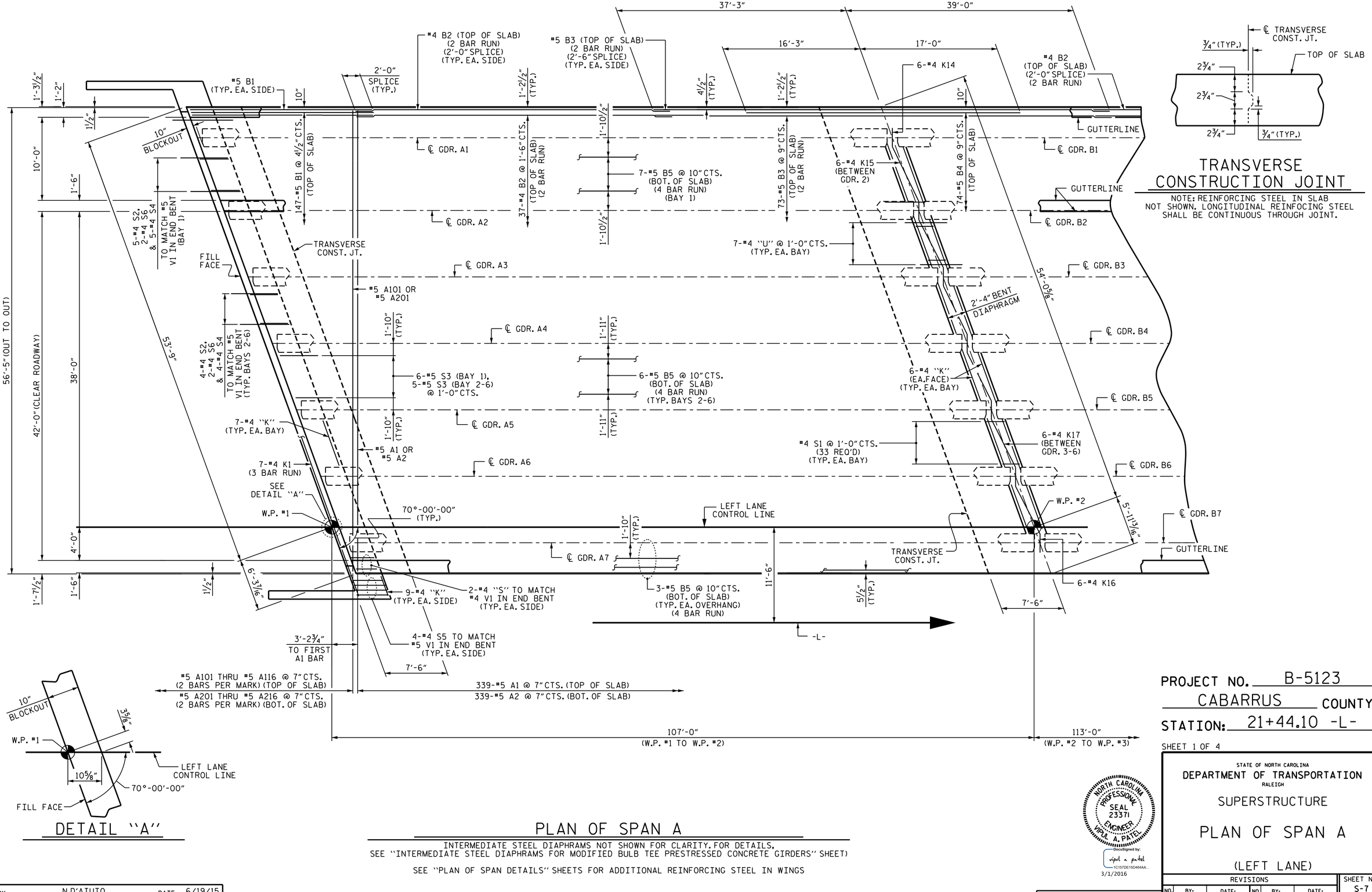

TRANSVERSE CONSTRUCTION JOINT

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

DETAIL "A"

PLAN OF SPAN A

INTERMEDIATE STEEL DIAPHRAMS NOT SHOWN FOR CLARITY. FOR DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAMS FOR MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET)

SEE "PLAN OF SPAN DETAILS" SHEETS FOR ADDITIONAL REINFORCING STEEL IN WINGS

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			74

STR. #1

DRAWN BY : N.D'AIUTO DATE : 6/19/15
CHECKED BY : K.D.LAYNE DATE : 8/7/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2/29/16

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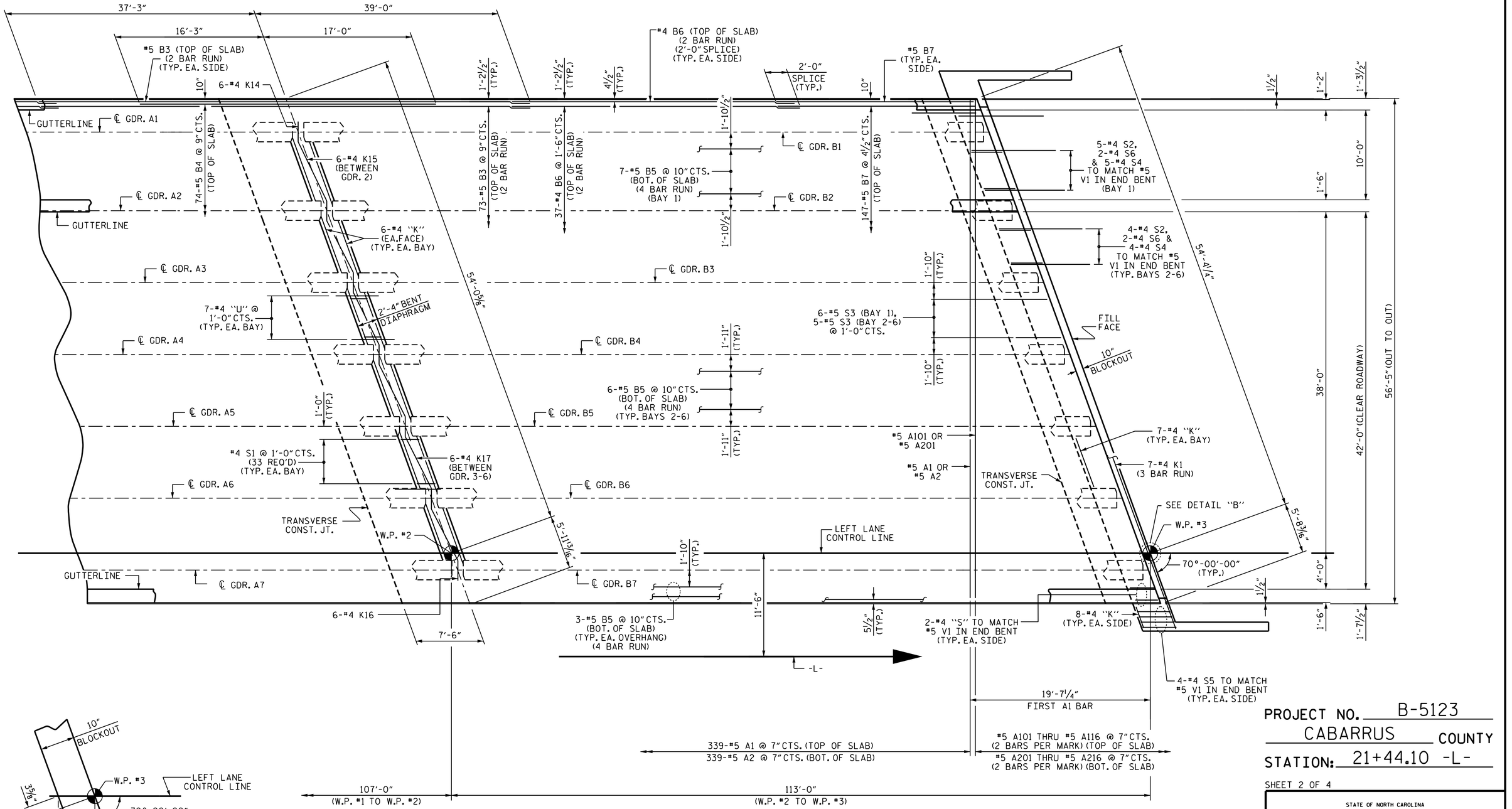

DETAIL "B"

PLAN OF SPAN B

INTERMEDIATE STEEL DIAPHRAMS NOT SHOWN FOR CLARITY. FOR DETAILS, SEE "INTEMEDIATE STEEL DIAPHRAMS FOR MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET

SEE "PLAN OF SPAN DETAILS" FOR ADDITIONAL REINFORCING STEEL IN WINGS

SEE SHEET 1 OF 4 FOR TRANSVERSE CONSTRUCTION JOINT DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

DRAWN BY : N.D'AIUTO DATE : 6/22/15
CHECKED BY : K.D.LAYNE DATE : 8/7/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2/29/16

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PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 2 OF 4

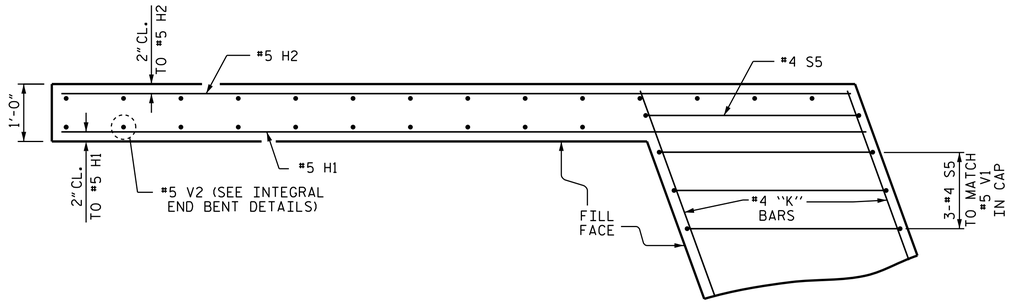
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

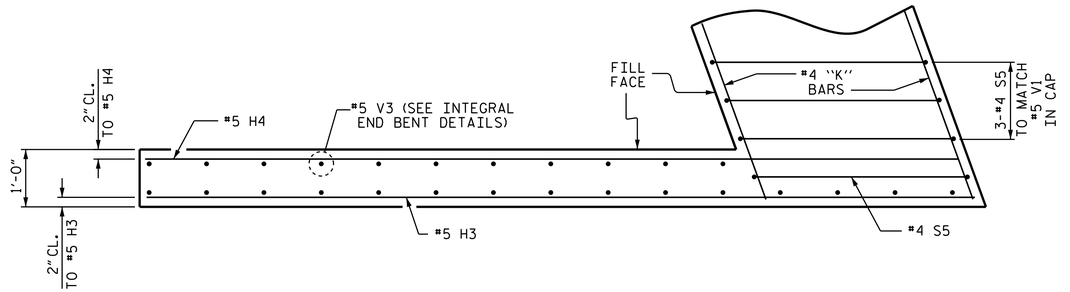
PLAN OF SPAN B

(LEFT LANE)

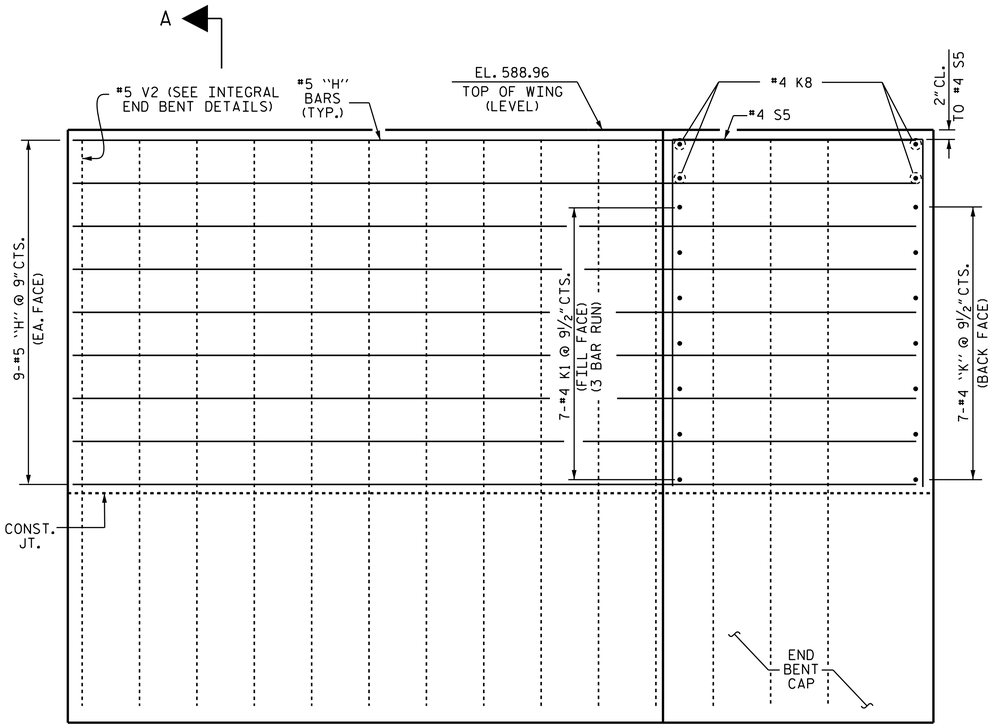
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			74

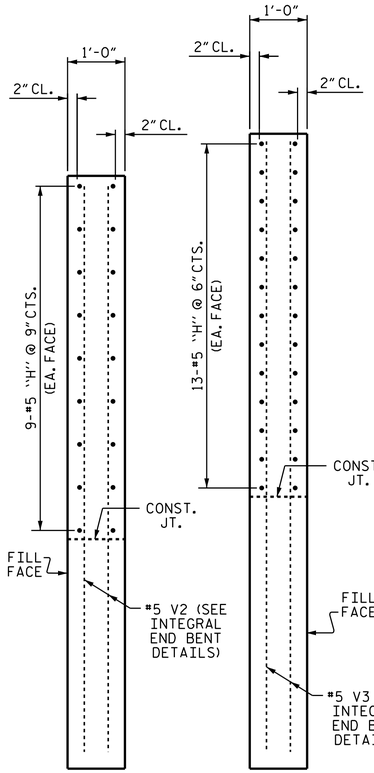
STR. #1





PLAN OF LEFT WING
@ END BENT 1





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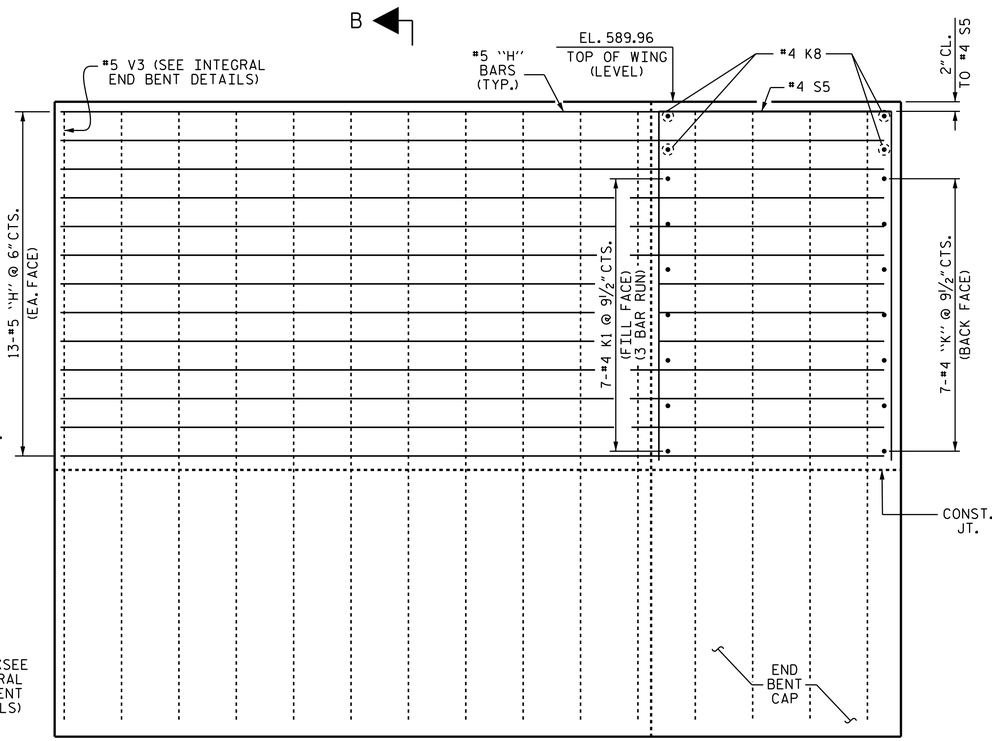

ELEVATION OF LEFT WING
@ END BENT 1

SECTION A-A

SECTION B-B

ELEVATION OF RIGHT WING
@ END BENT 1

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

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1			3			TOTAL SHEETS
2			4			74

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DRAWN BY : N.D'AIUTO DATE : 6/23/15
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DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2/29/16

STR. #1

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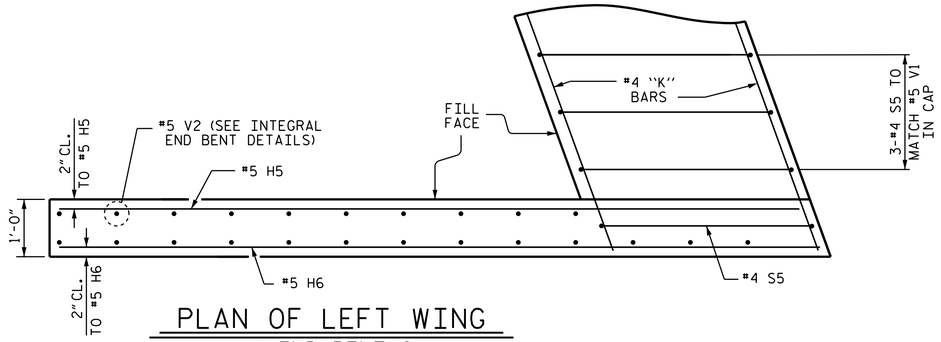

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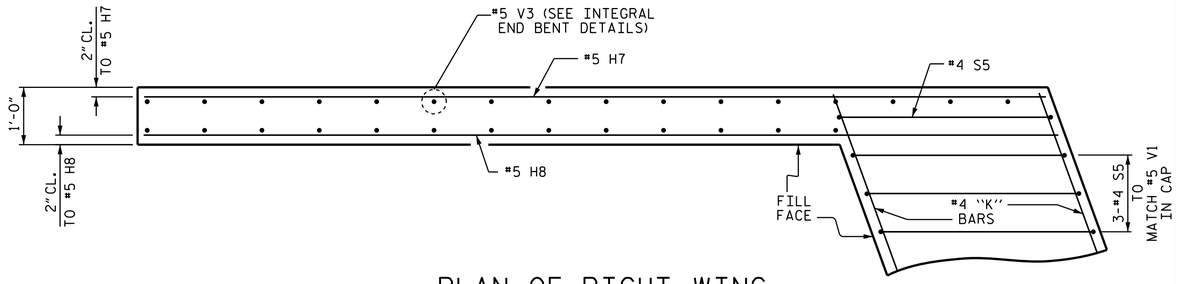
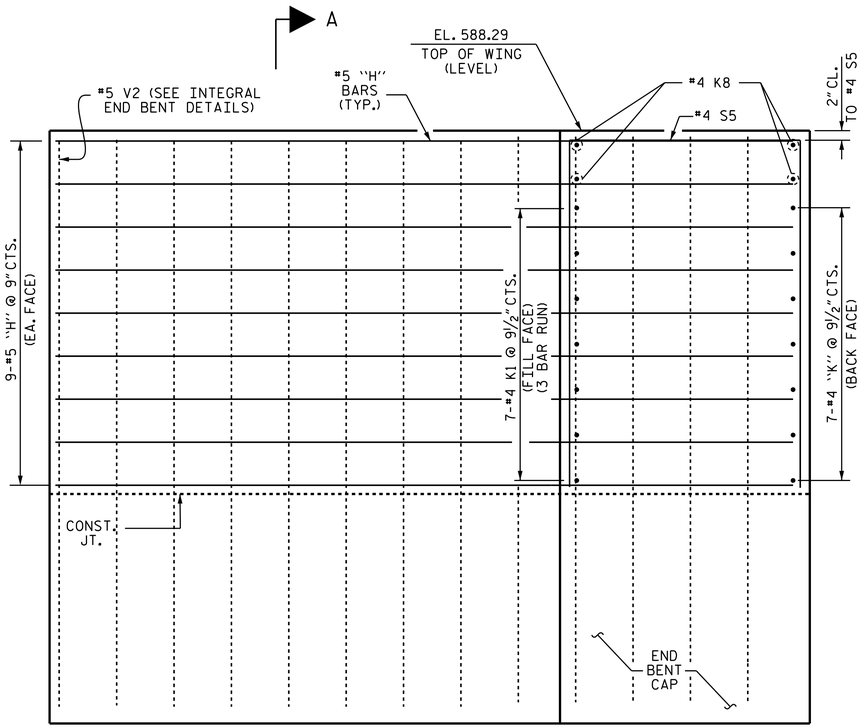
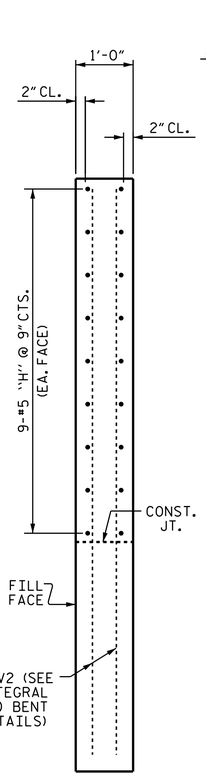
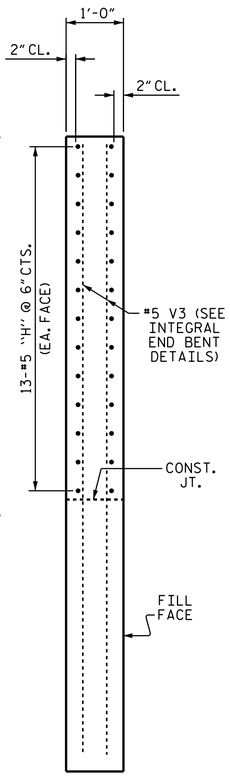
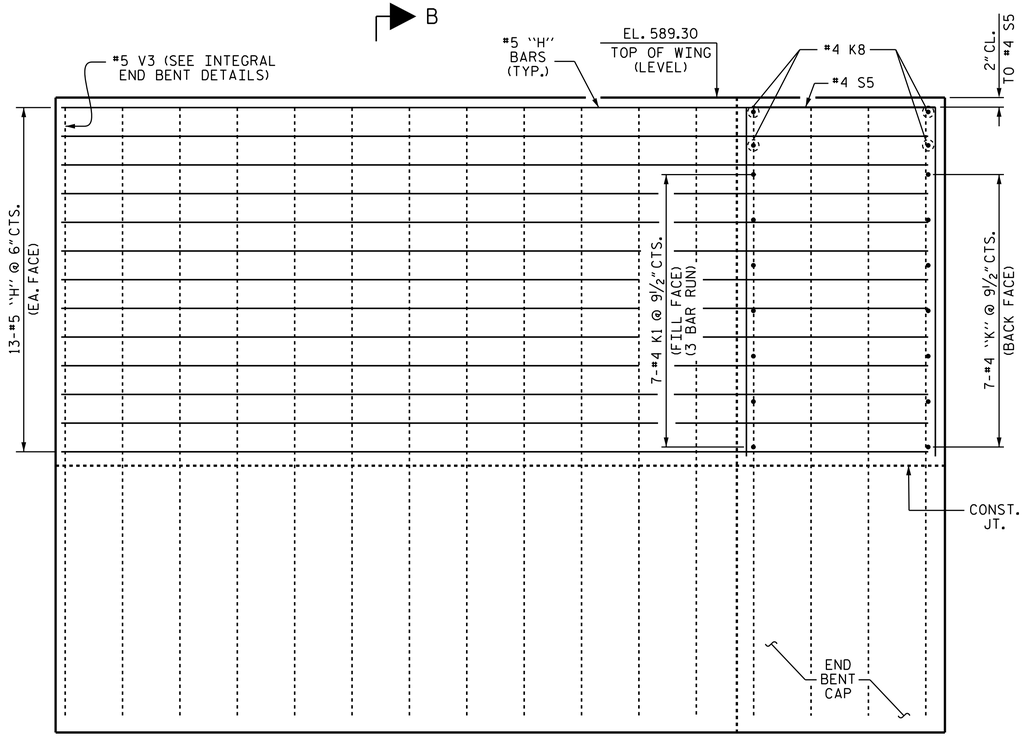


PLAN OF RIGHT WING
@ END BENT 2









ELEVATION OF LEFT WING
@ END BENT 2

SECTION A-A

SECTION B-B

ELEVATION OF RIGHT WING
@ END BENT 2

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

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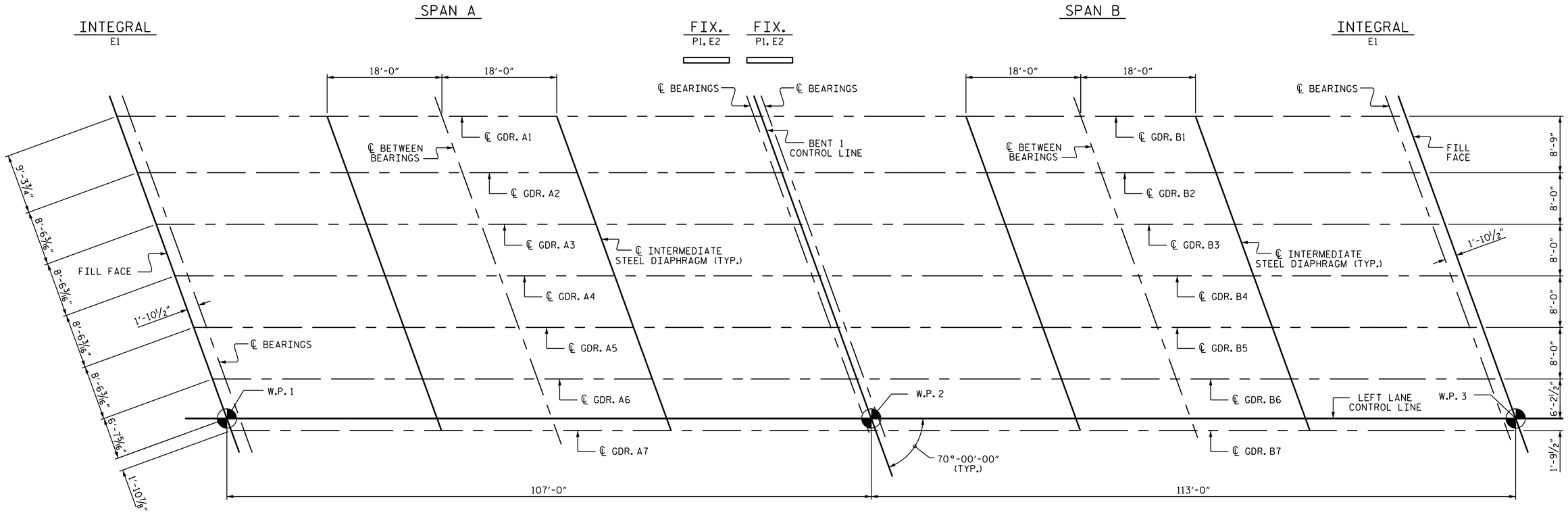
STR. #1



GIRDER LAYOUT

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER LAYOUT

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D4644A...
3/1/2016

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1			3			TOTAL SHEETS
2			4			74

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DRAWN BY : T. H. CARROLL DATE : 7/20/15
CHECKED BY : K. D. LAYNE DATE : 8/21/15
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : 12/7/15

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01-MAR-2016 10:51
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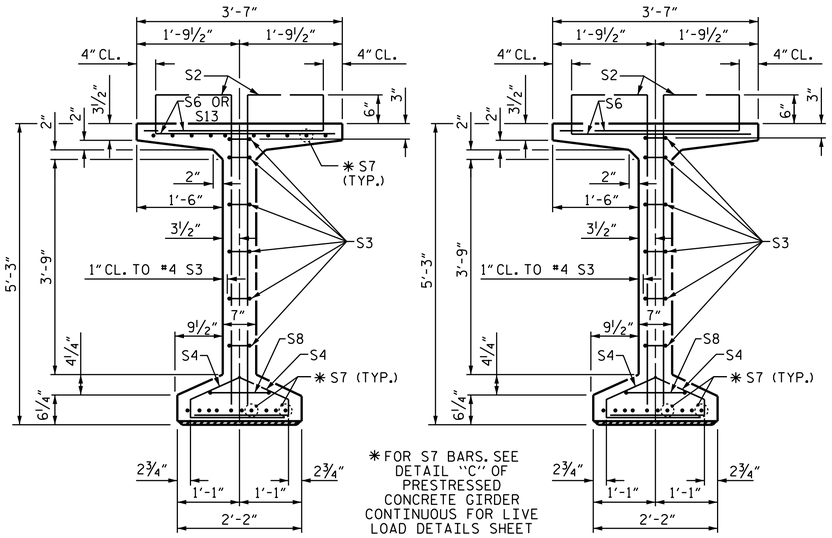
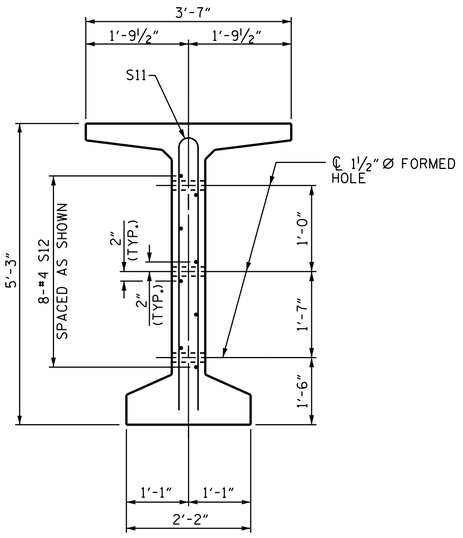


SECTION A-A

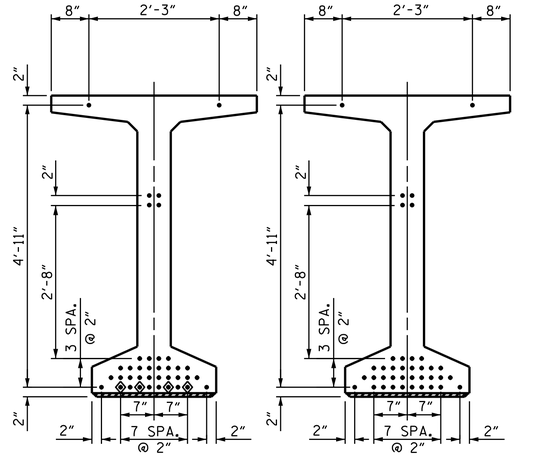
✱FOR S7 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION B-B



SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)



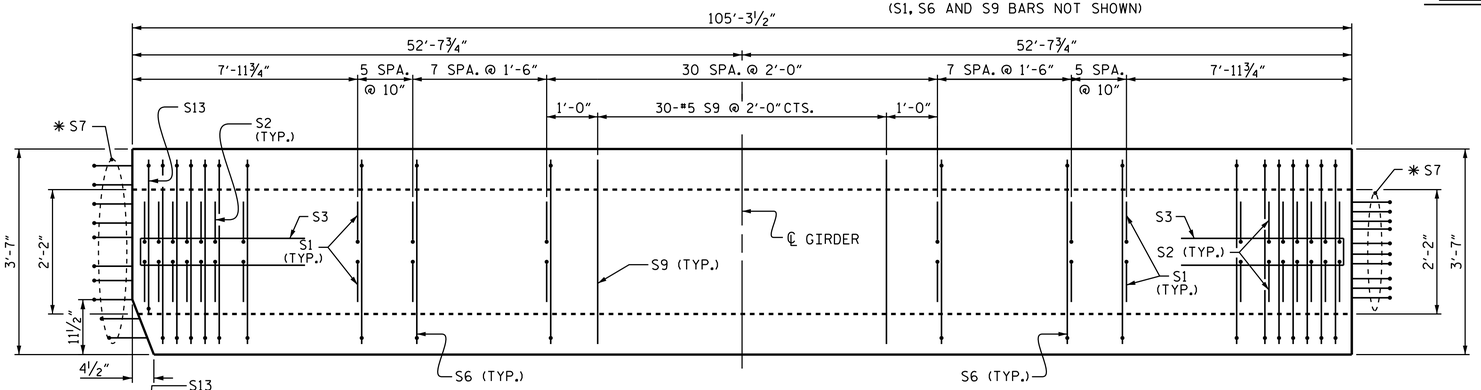
AT END OF GIRDER

AT ℄ OF GIRDER

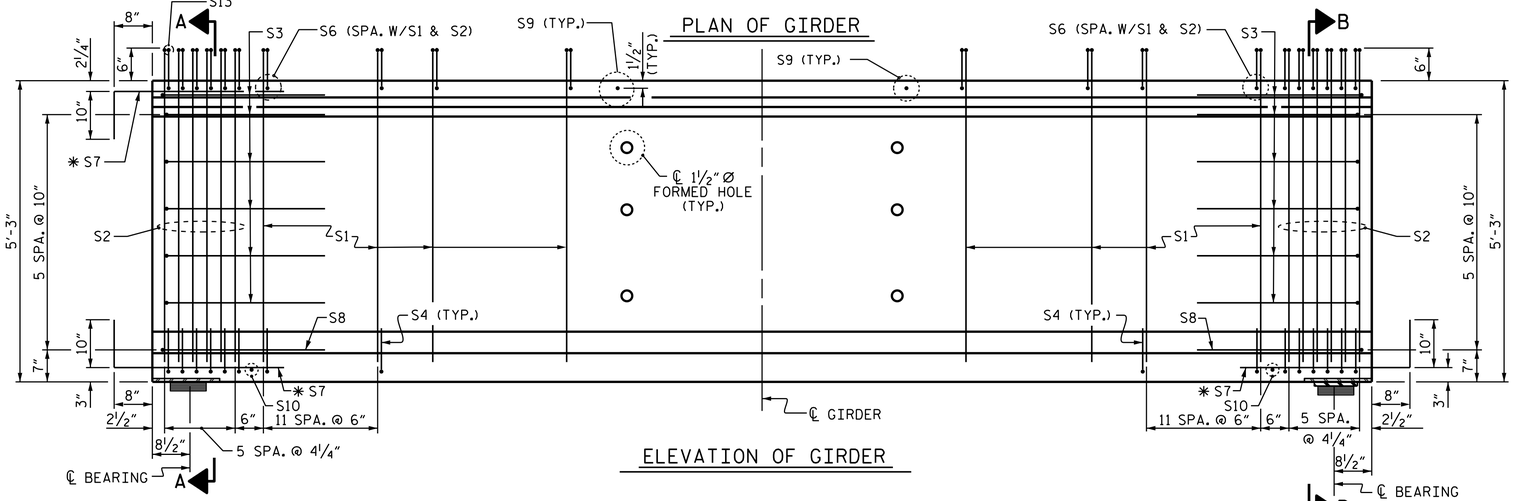
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

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



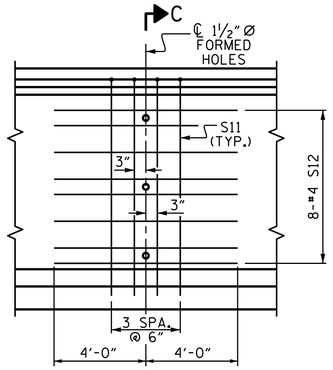
PLAN OF GIRDER



ELEVATION OF GIRDER

INTEGRAL END BENT

FIX



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ONE GIRDER

0.6"Ø L. R. GRADE 270 STRANDS

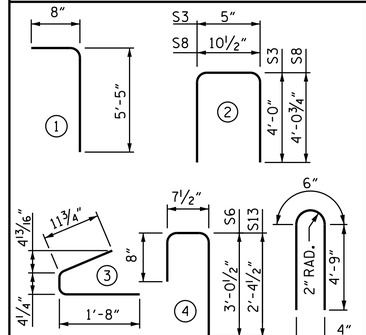
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	154	#4	1	6'-1"	626
S2	24	#6	1	6'-1"	219
S3	12	#4	2	8'-5"	67
S4	72	#4	3	3'-0"	144
S6	176	#5	4	4'-4"	795
✱S7	30	#5	STR	3'-8"	115
S8	2	#5	2	9'-0"	19
S9	30	#5	STR	3'-3"	102
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S12	16	#4	STR	8'-0"	86
S13	2	#5	4	3'-8"	8

✱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	8,500 PSI CONCRETE	0.6"Ø L.R. STRANDS
	LB.	C.Y.	No.
	2,265	20.9	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	105'-3½"	737'-0½"

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
63" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN A (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			74

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ASSEMBLED BY : T. H. CARROLL	DATE : 7/16/15		
CHECKED BY : K. D. LAYNE	DATE : 8/21/15		
DRAWN BY : EEM 2/6/97	REV. 10/1/11	MAA/GM	DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2-29-16
CHECKED BY : VAP 2/6/97	REV. 6/13	MAA/GM	
	REV. 1/15	MAA/TMG	

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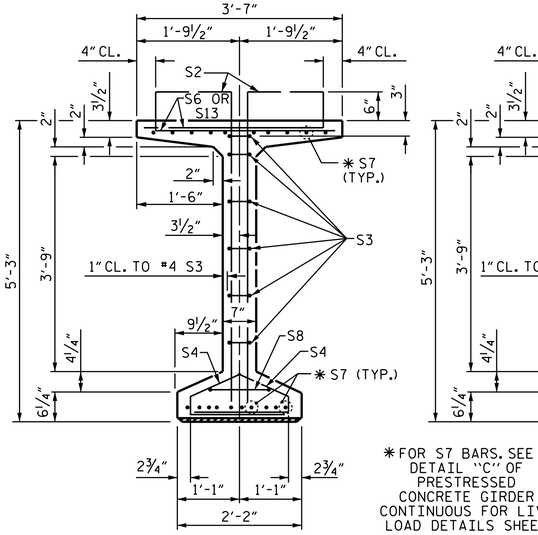
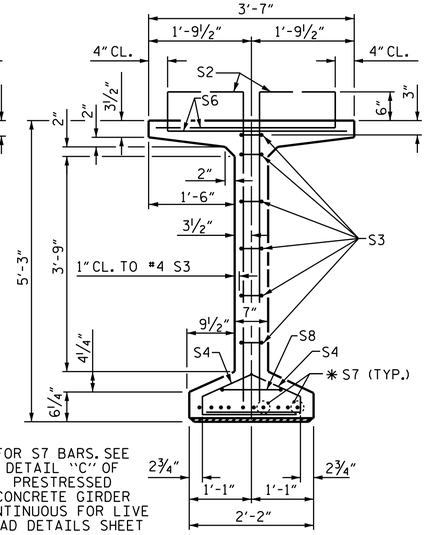
STR. #1 STD. NO. PCG7

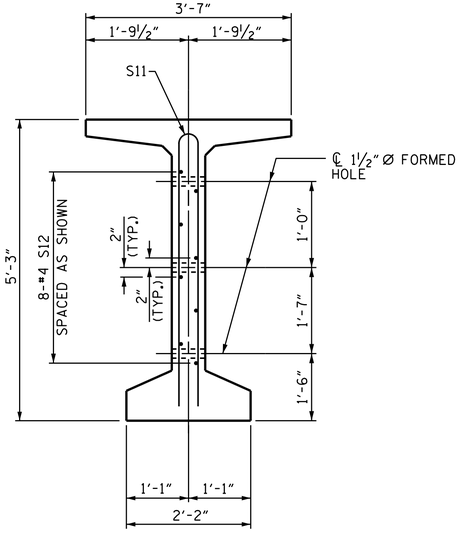


SECTION A-A



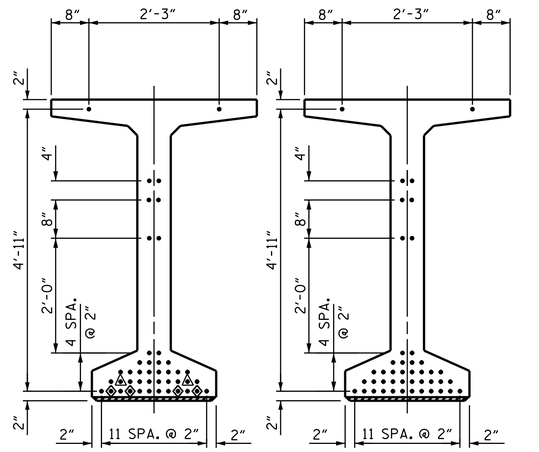
✱FOR S7 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION B-B



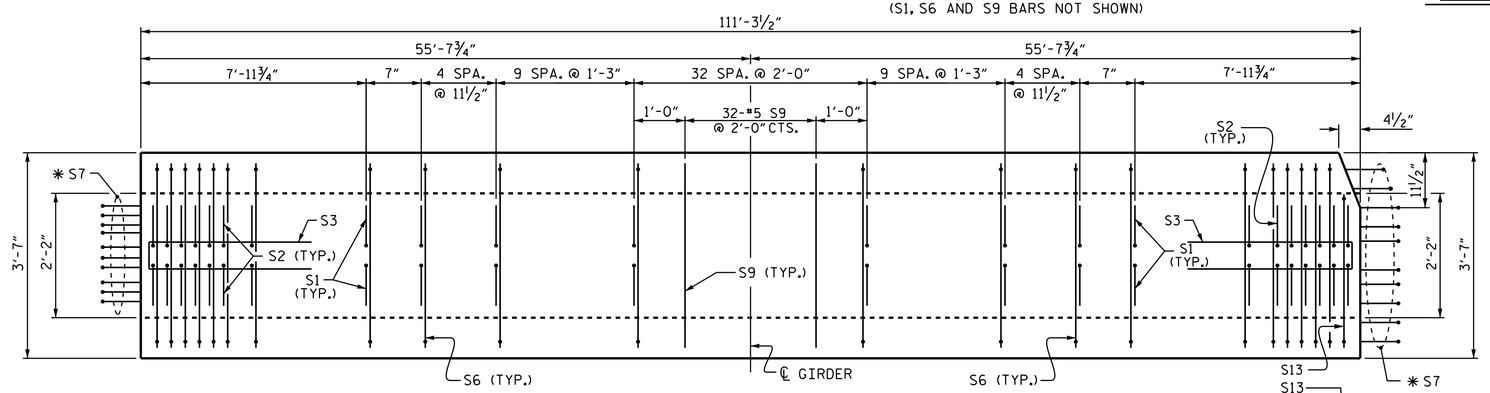
SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)

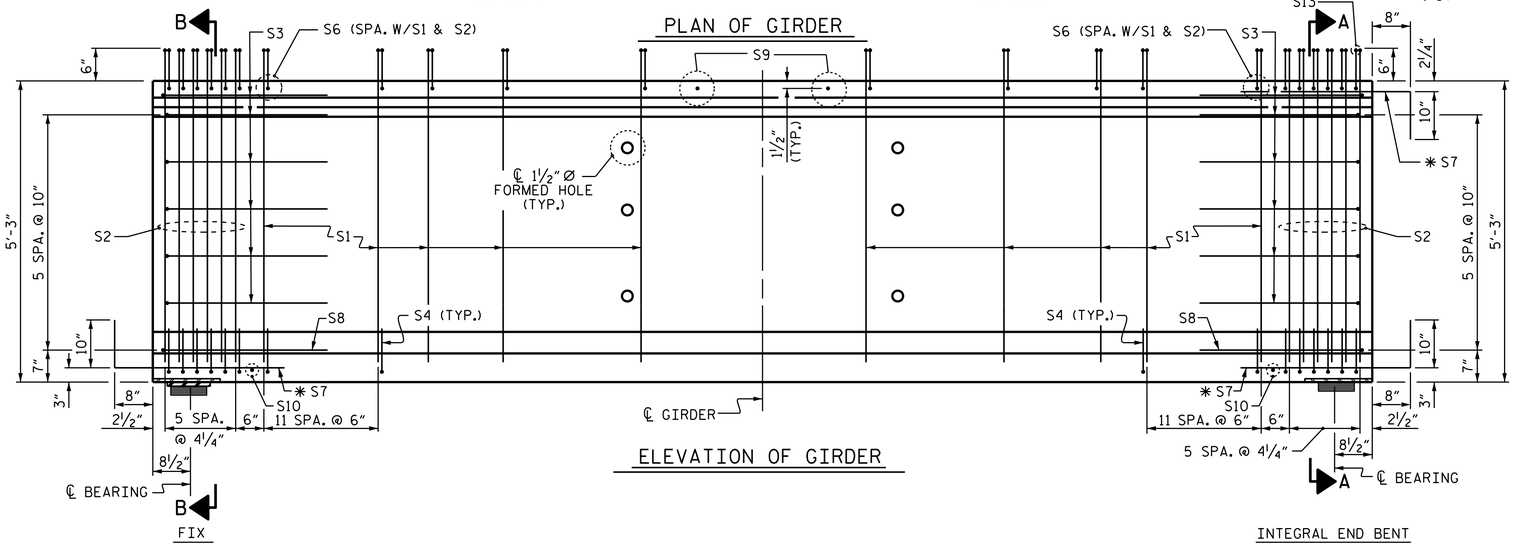


AT END OF GIRDER AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

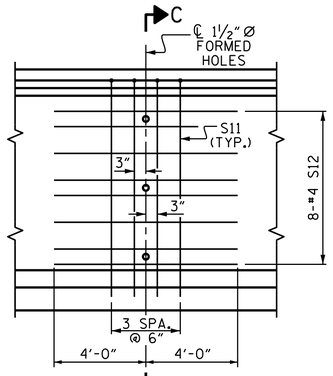


ELEVATION OF GIRDER

INTEGRAL END BENT

DEBONDING LEGEND

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



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ONE GIRDER

0.6" Ø L. R. GRADE 270 STRANDS

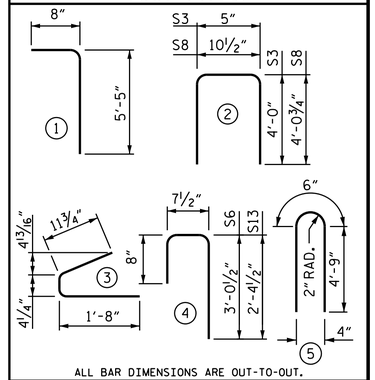
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	166	#4	1	6'-1"	675
S2	24	#6	1	6'-1"	219
S3	12	#4	2	8'-5"	67
S4	72	#4	3	3'-0"	144
S6	188	#5	4	4'-4"	850
✱S7	30	#5	STR	3'-8"	115
S8	2	#5	2	9'-0"	19
S9	32	#5	STR	3'-3"	108
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S12	16	#4	STR	8'-0"	86
S13	2	#5	4	3'-8"	8

✱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.
	2,375	22.0	44

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	111'-3½"	779'-0½"

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
63" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			74

ASSEMBLED BY : T. H. CARROLL	DATE : 7/16/15		
CHECKED BY : K. D. LAYNE	DATE : 8/21/15		
DRAWN BY : EEM 2/6/97	REV. 10/1/11	MAA/GM	DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2-29-16
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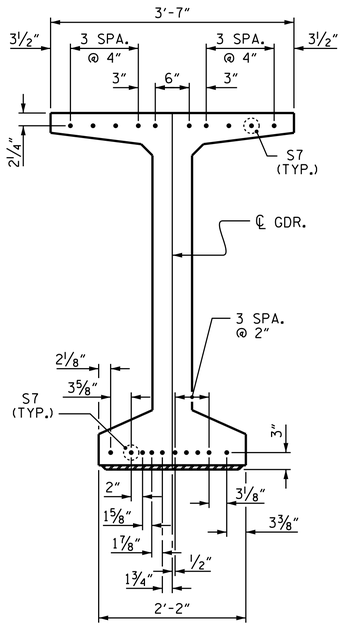
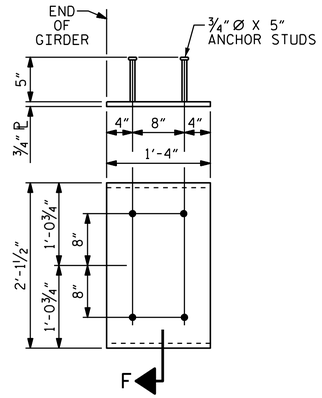
STR. #1 STD. NO. PCG7



DETAIL "C"



EMBEDDED PLATE "B-1" DETAILS
FOR 63" 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 6,700 PSI FOR SPAN A AND 7500 PSI FOR SPAN B.

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" MODIFIED BULB TEES.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4,500 lbs.

SECTION "F"

(SEE NOTES)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A, GIRDERS 1 THROUGH 7																					
TWENTIETH POINTS	0.0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.038	0.074	0.109	0.140	0.168	0.192	0.211	0.225	0.233	0.236	0.233	0.225	0.211	0.192	0.168	0.140	0.109	0.074	0.038	0.000
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.018	0.035	0.051	0.066	0.079	0.091	0.099	0.106	0.109	0.112	0.109	0.106	0.099	0.091	0.079	0.066	0.051	0.035	0.018	0.000
FINAL CAMBER ↑	0	¼"	½"	11/16"	⅞"	1 1/16"	1 3/16"	1⅜"	1 7/16"	1½"	1½"	1½"	1 7/16"	1⅜"	1 3/16"	1 1/16"	⅞"	11/16"	½"	¼"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN B, GIRDERS 1 THROUGH 7																					
TWENTIETH POINTS	0.0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.086	0.125	0.162	0.194	0.222	0.244	0.260	0.269	0.273	0.269	0.260	0.244	0.222	0.194	0.162	0.125	0.086	0.043	0.000
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.021	0.042	0.060	0.079	0.093	0.108	0.117	0.126	0.129	0.132	0.129	0.126	0.117	0.108	0.093	0.079	0.060	0.042	0.021	0.000
FINAL CAMBER ↑	0	¼"	½"	13/16"	1"	1 3/16"	1 3/8"	1½"	1 5/8"	1 11/16"	1 11/16"	1 11/16"	1 5/8"	1½"	1 3/8"	1 3/16"	1"	13/16"	½"	¼"	0

✱ INCLUDES FUTURE WEARING SURFACE EXCEPT GIRDER 1.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

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SHEET NO. S-14
TOTAL SHEETS 74

STR. #1 STD. NO. PCG9

ASSEMBLED BY : T. H. CARROLL DATE : 7/16/15
CHECKED BY : K. D. LAYNE DATE : 8/21/15

DRAWN BY : ELR 11/91
CHECKED BY : GRP 11/91

REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 2/15 MAA/TMG

DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2-29-16

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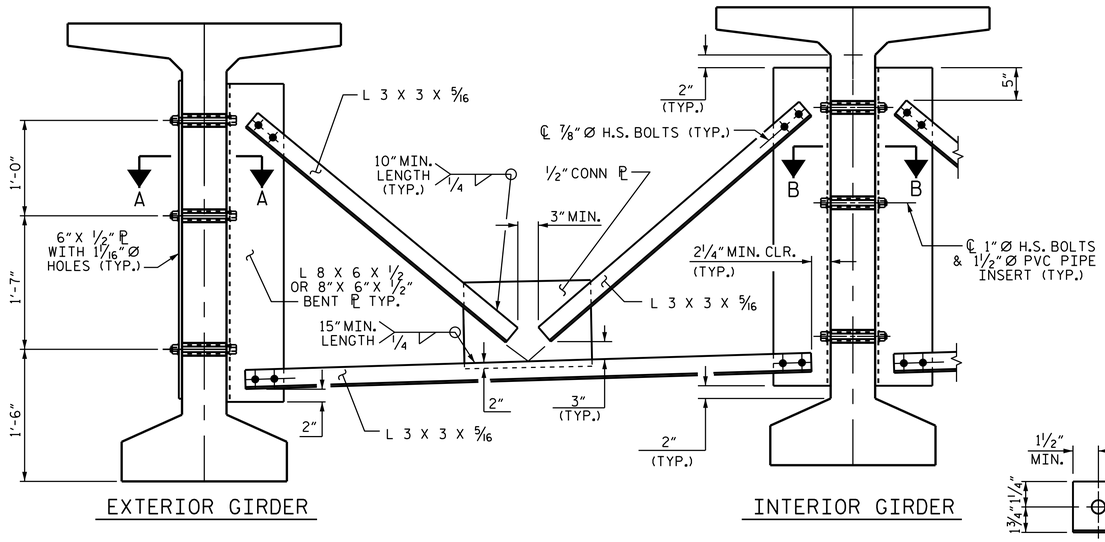
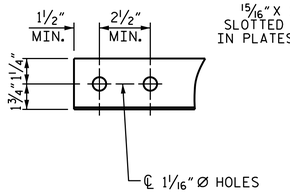


PART SECTION AT INTERMEDIATE DIAPHRAGM

SEE TYPICAL SECTION FOR VARYING GIRDER SPACING.



ANGLE END

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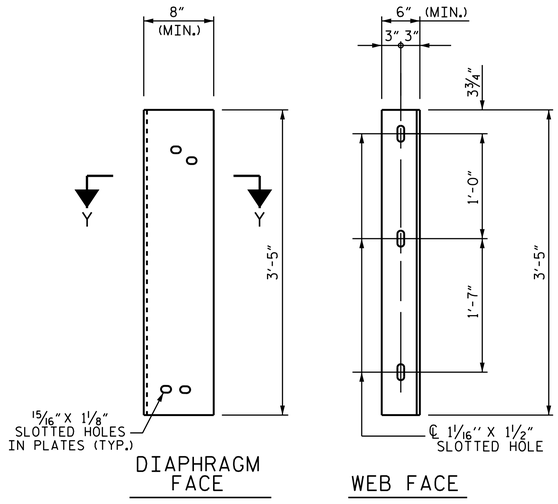
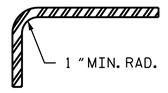




SECTION Y-Y

CONNECTOR PLATE DETAIL

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

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

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

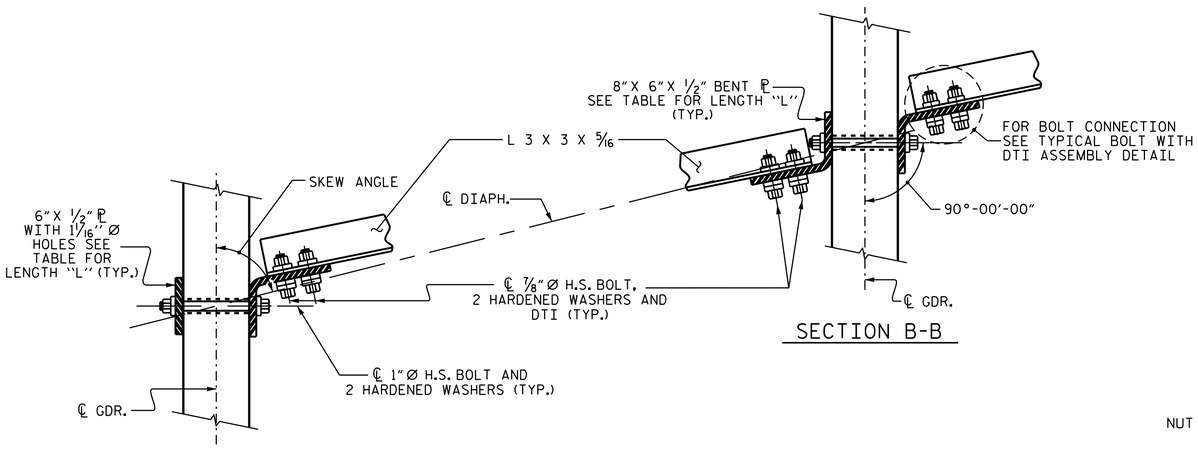
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

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

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

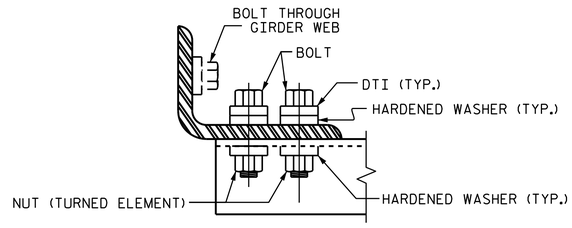
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS
(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

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1			3			TOTAL SHEETS
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STR. #1 STD. NO. PCG11

ASSEMBLED BY : T. H. CARROLL DATE : 7/16/15 CHECKED BY : K. D. LAYNE DATE : 8/21/15		
DRAWN BY : RWW 11/09 CHECKED BY : GM 11/09	ADDED 11/23/09R REV. 10/1/11 MAA/GM	DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 2-29-16

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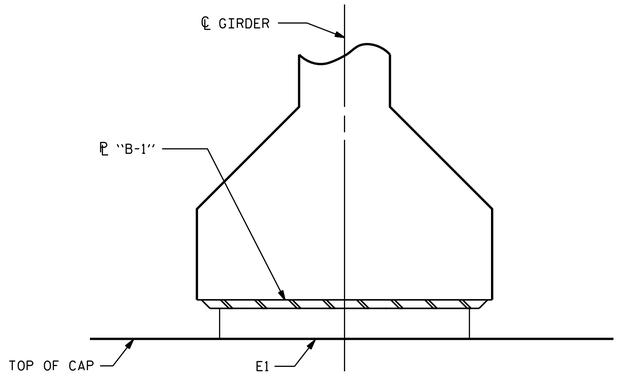

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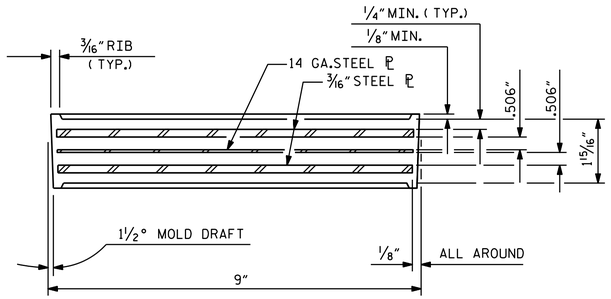
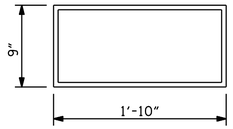


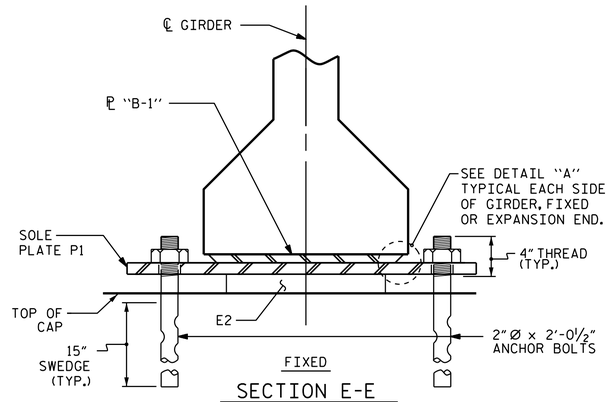
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (14 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



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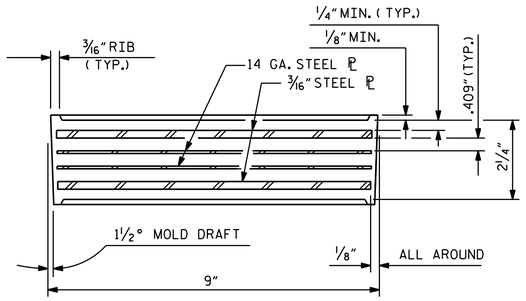
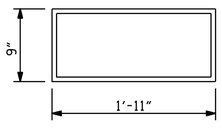
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (14 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

NOTES

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

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

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

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

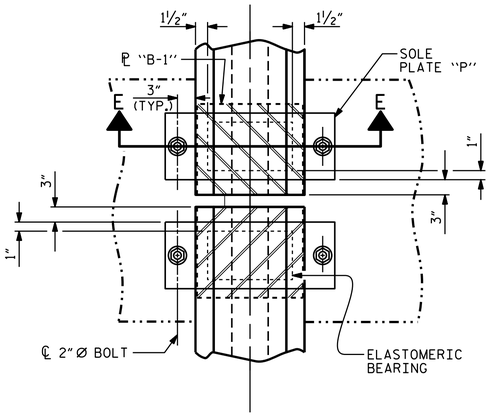
SOLE PLATE P1, BOLTS AND NUTS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

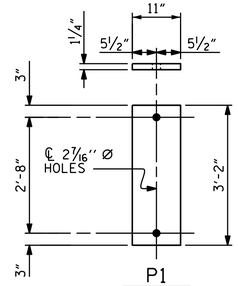
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



TYPICAL HALF-PLAN

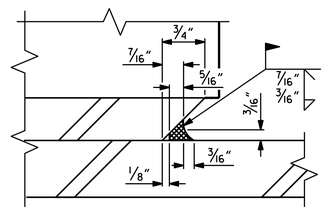
(SHOWING CONTINUOUS BENT)



P1

(FIXED)

(14 REQ'D)



DETAIL "A"

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE V	365 k

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE
(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			74

SOLE PLATE DETAILS (P1)

ASSEMBLED BY : T. H. CARROLL DATE : 7/20/15
CHECKED BY : K. D. LAYNE DATE : 8/21/15

DRAWN BY : EEM 2/97
CHECKED BY : VAP 2/97

REV. 10/1/11 MAA/GM
REV. 6/13 AAC/MAA
REV. 1/15 MAA/TMG

DESIGN ENGINEER OF RECORD:
T. H. CARROLL DATE : 12/7/15

01-MAR-2016 10:50
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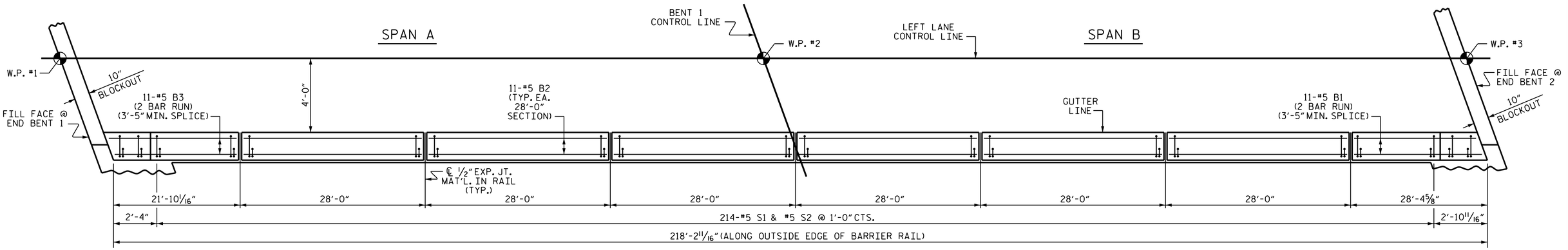
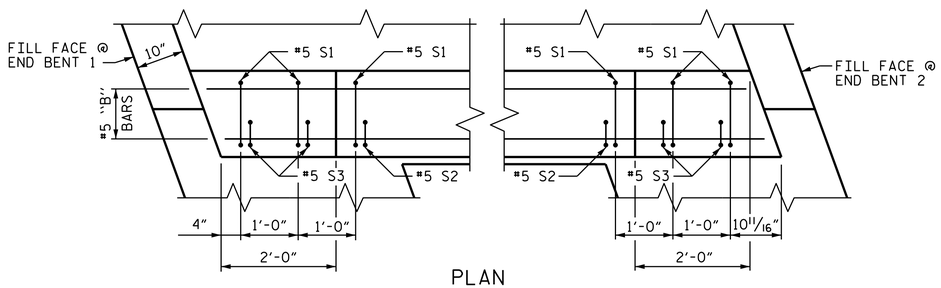
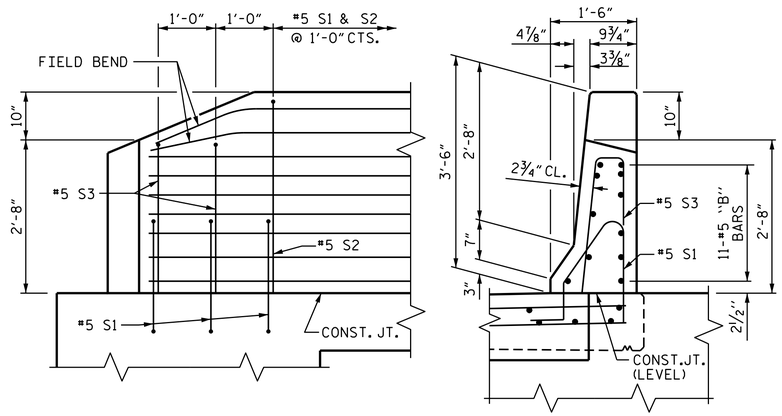
STR. #1 STD. NO. EB4



PLAN OF CONCRETE BARRIER RAIL

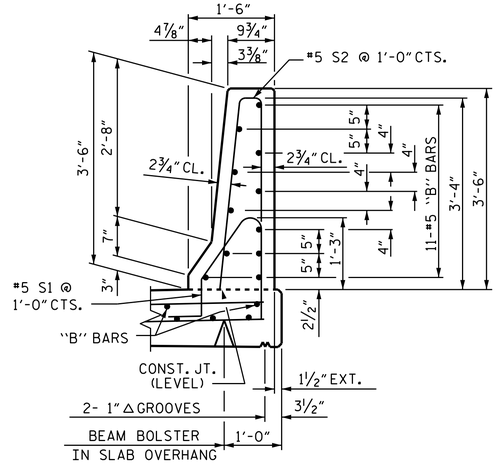


PLAN

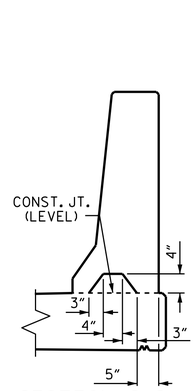


SIDE VIEW END VIEW

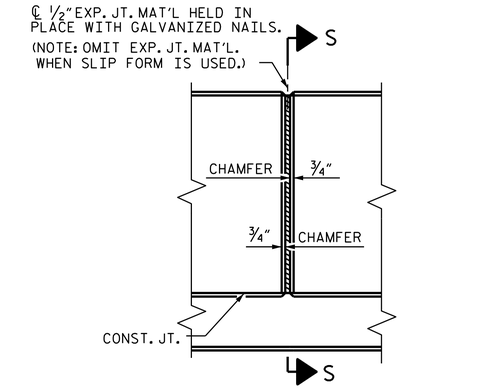
END OF RAIL DETAILS



SECTION THROUGH RAIL



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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

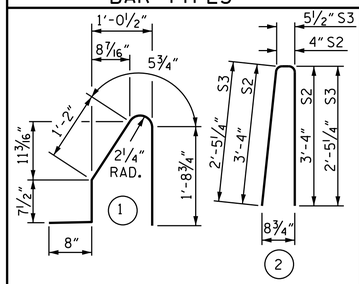
NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR	15'-8"	359
* B2	66	#5	STR	27'-7"	1899
* B3	22	#5	STR	12'-8"	291
* S1	218	#5	1	4'-8"	1061
* S2	214	#5	2	7'-0"	1562
* S3	4	#5	2	5'-4"	22
* EPOXY COATED REINFORCING STEEL				LBS.	5,194
CLASS AA CONCRETE				C.Y.	29.7
CONCRETE BARRIER RAIL				LIN. FT.	218.22

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-6" CONCRETE BARRIER RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S-17

TOTAL SHEETS 74

STR. #1 STD. NO. CBR1

ASSEMBLED BY : K. D. LAYNE		DATE : 8/7/15
CHECKED BY : N. D'AIUTO		DATE : 9/10/15
DRAWN BY : ARB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM
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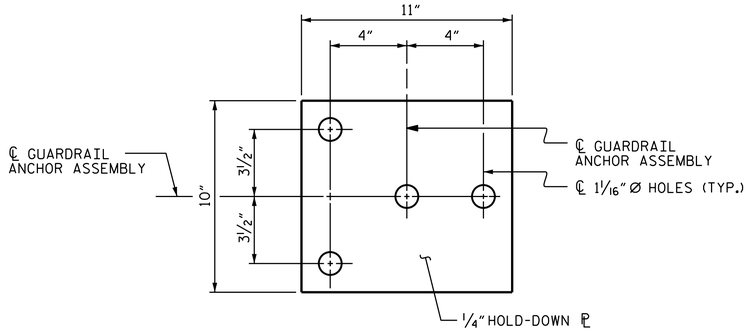
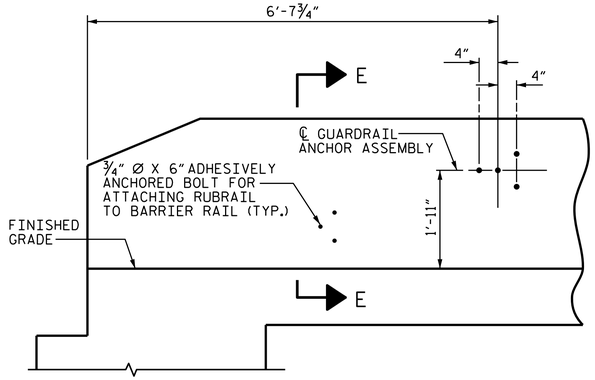


PLAN



ELEVATION

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.)

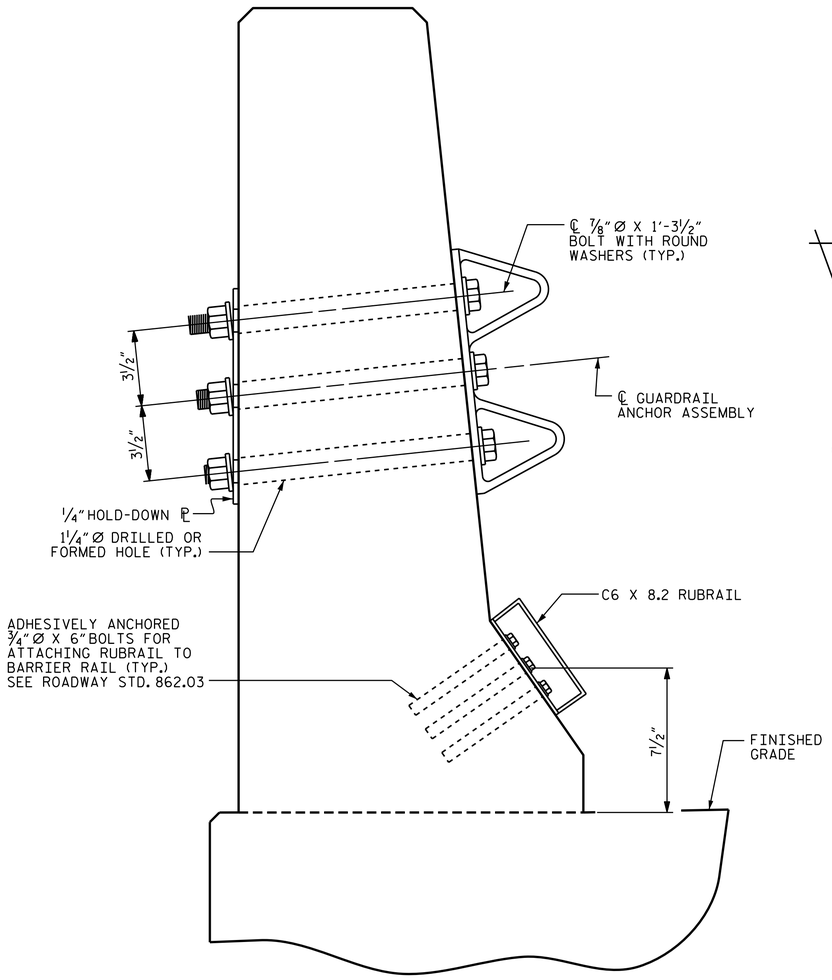
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

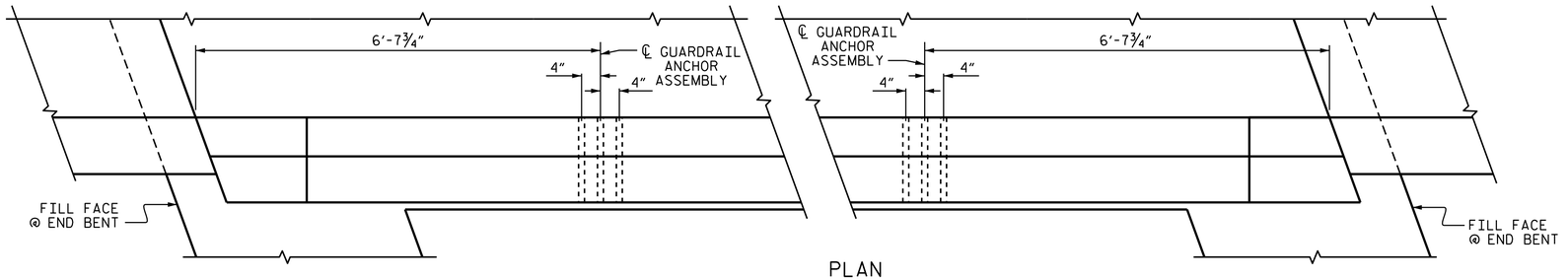
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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.



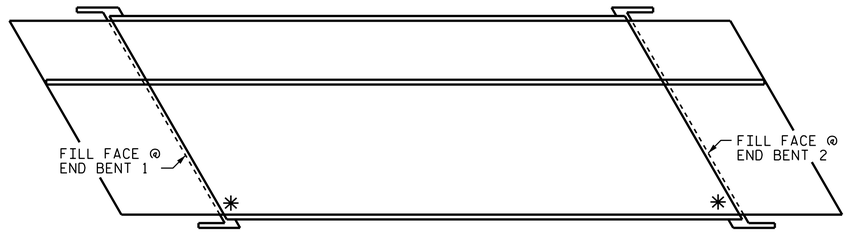
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR 3'-6" BARRIER RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

ASSEMBLED BY : K. D. LAYNE	DATE : 8/7/15
CHECKED BY : N. D'AIUTO	DATE : 9/10/15
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			74

STR. #1 STD. NO. GRA2

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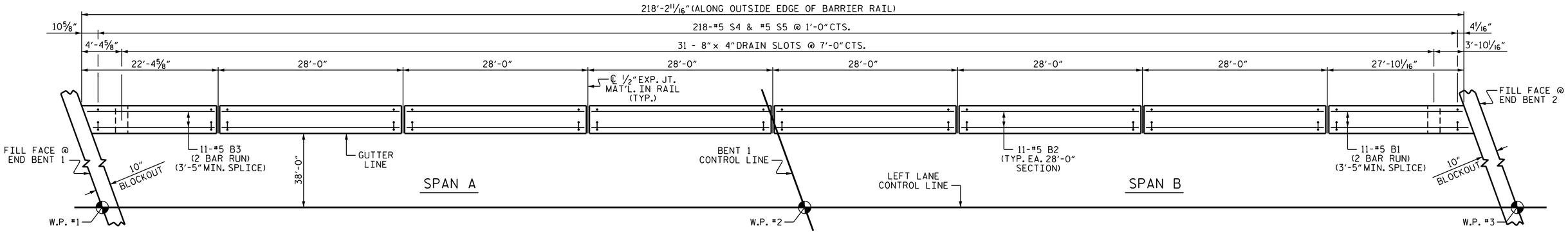


PLAN OF CONCRETE BARRIER RAIL

NOTES

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

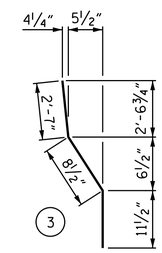
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

LONGITUDNAL BARS IN THE RAIL MAY BE FIELD CUT TO AVOID DRAIN SLOTS.

** THE CONTRACTOR MAY USE ADHESIVELY ANCHORED #5 S4 & S5 BARS. LEVEL 2 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE #5 S4 & S5 IS 18.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWLES, SEE STANDARD SPECIFICATIONS.

BAR TYPE



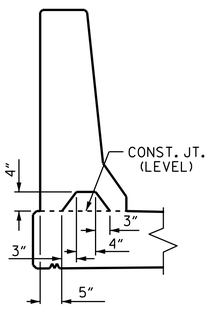
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

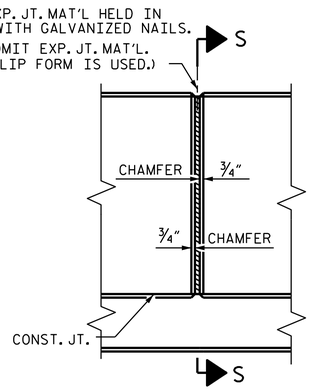
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR	15'-8"	359
* B2	66	#5	STR	27'-7"	1899
* B3	22	#5	STR	12'-8"	291
* S4	218	#5	3	4'-3"	966
* S5	218	#5	STR	4'-1"	928

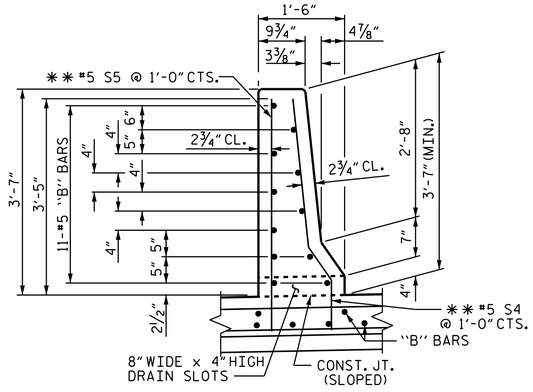
* EPOXY COATED REINFORCING STEEL	LBS.	4,443
CLASS AA CONCRETE	C.Y.	30.9
CONCRETE BARRIER RAIL	LIN. FT.	218.22



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



ELEVATION AT EXPANSION JOINTS



SECTION THROUGH RAIL

BARRIER RAIL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
Docusigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-7" CONCRETE BARRIER RAIL

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			74

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : K. D. LAYNE DATE : 8/7/15
CHECKED BY : N. D'AIUTO DATE : 9/10/15

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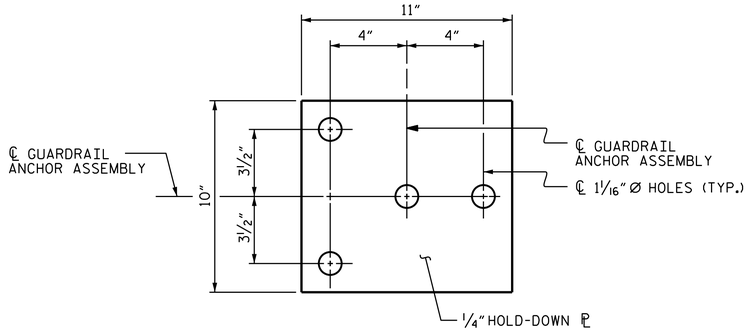
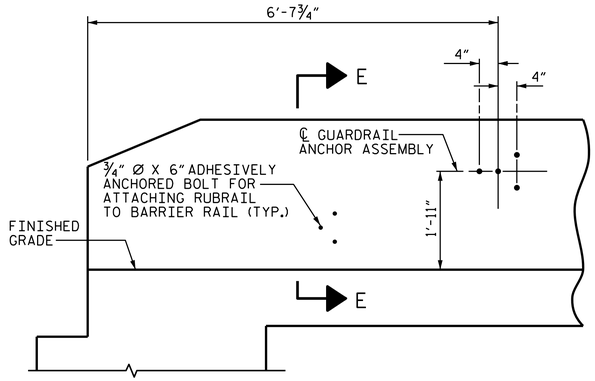
STR. #1 STD. NO. CBR1



PLAN



ELEVATION

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.)

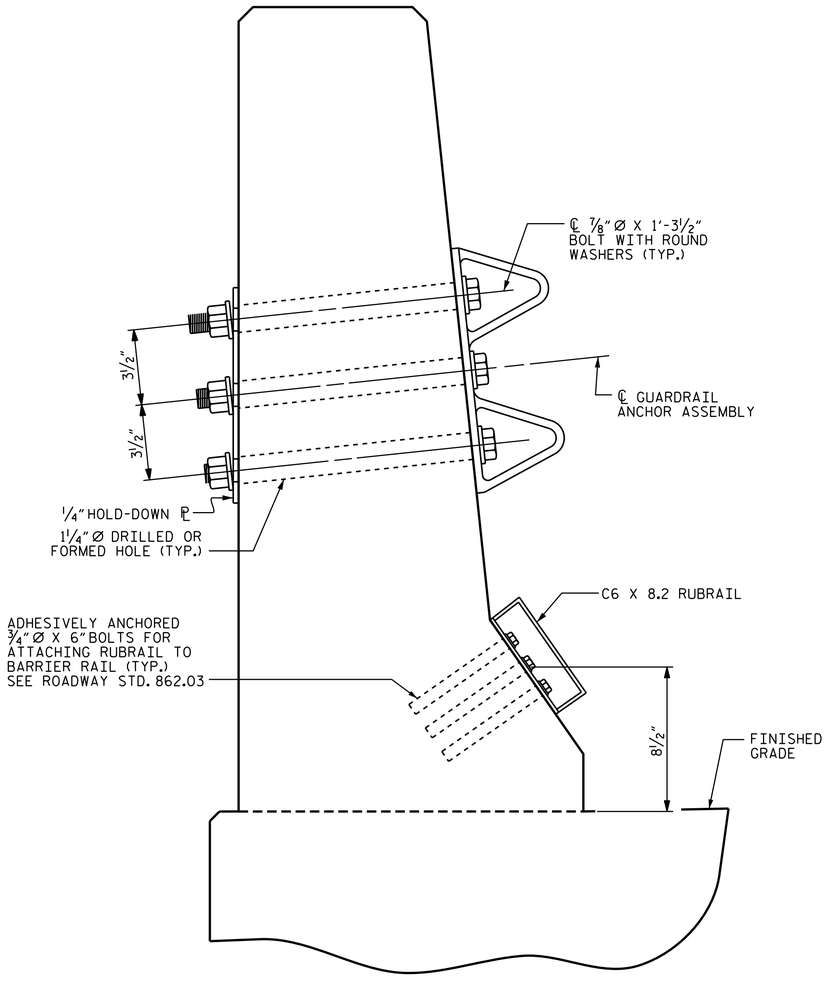
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

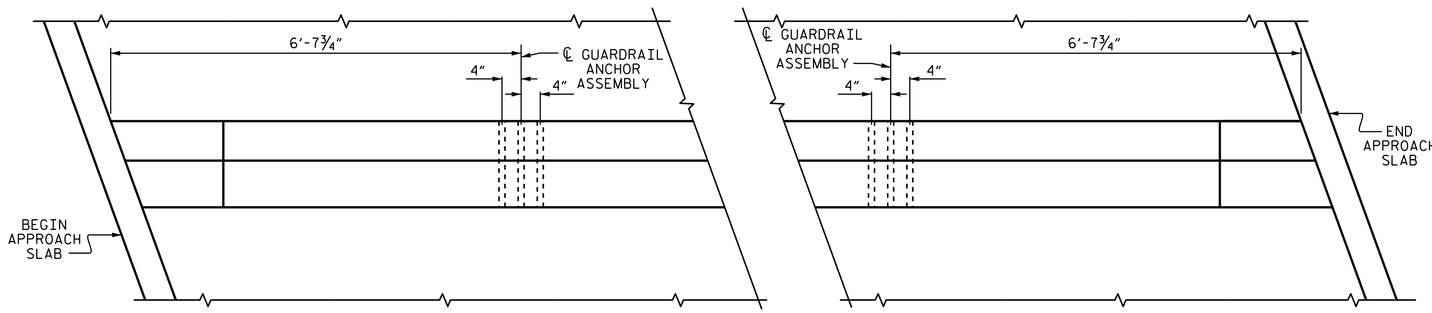
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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.



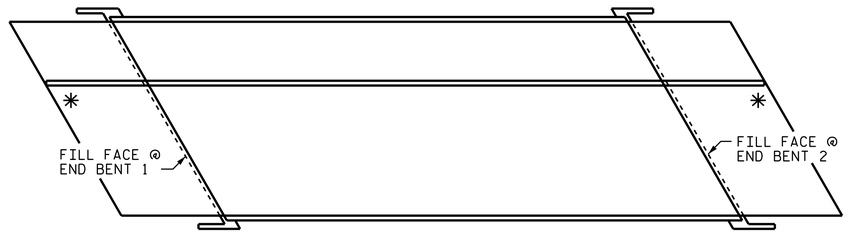
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR 3'-7" BARRIER RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			74

STR. #1 STD. NO. GRA2

ASSEMBLED BY : K. D. LAYNE		DATE : 8/7/15	
CHECKED BY : N. D'AIUTO		DATE : 9/10/15	
DRAWN BY : TLA 5/06	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 7/12	MAA/GM	
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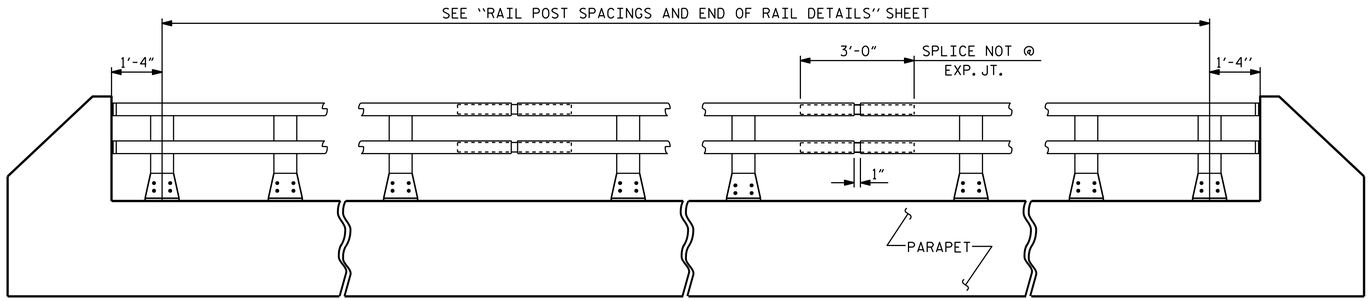
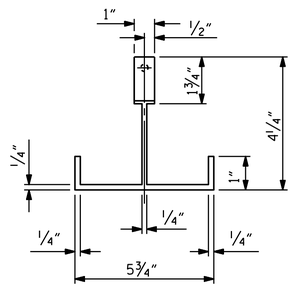
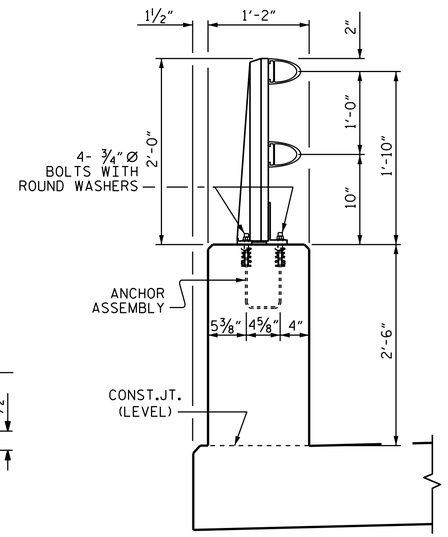


ELEVATION

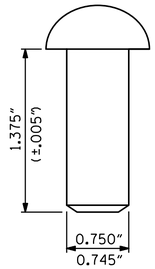
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



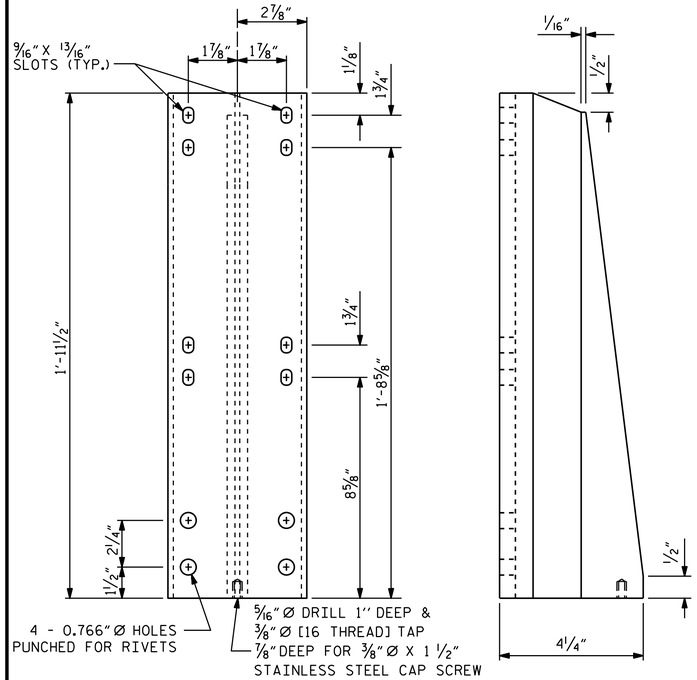
PLAN



SECTION THROUGH PARAPET AND RAIL



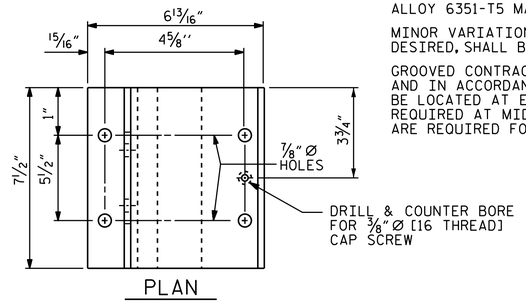
RIVET DETAIL



FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



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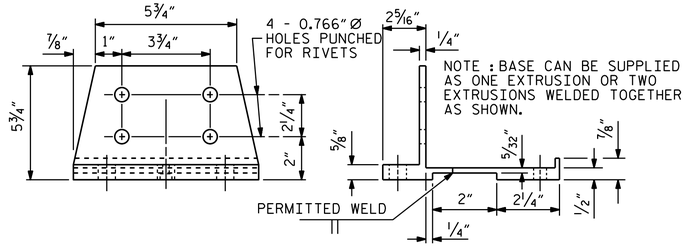

FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS

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 LRFD BRIDGE 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, 1/2" 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 = 210.05 LIN. FT.

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

ASSEMBLED BY : K. D. LAYNE	DATE : 8/11/15
CHECKED BY : N. D'AIUTO	DATE : 9/10/15
DRAWN BY : EEM 6/94	REV. 5/1/06 TLA/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 6/13 MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			74

STR. #1 STD. NO. BMR3

01-MAR-2016 10:50
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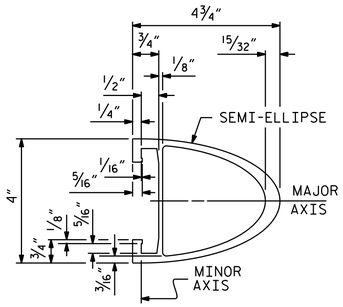
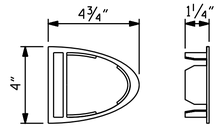
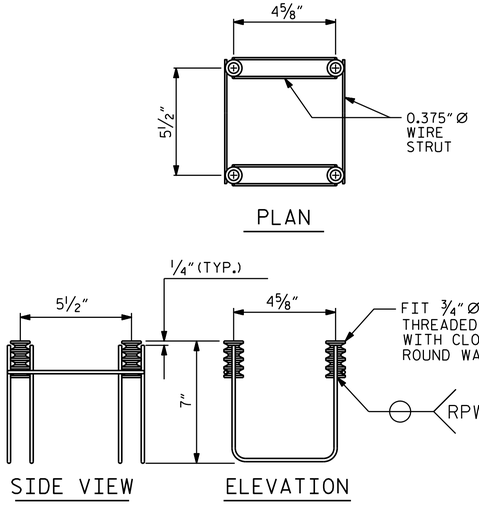


RAIL SECTION



RAIL CAP



4-BOLT METAL RAIL ANCHOR ASSEMBLY

(37 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 ¾" FERRULES.

B. 4 - ¾"Ø X 2½" 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 ¾"Ø X 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.

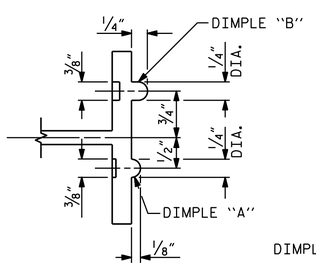
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

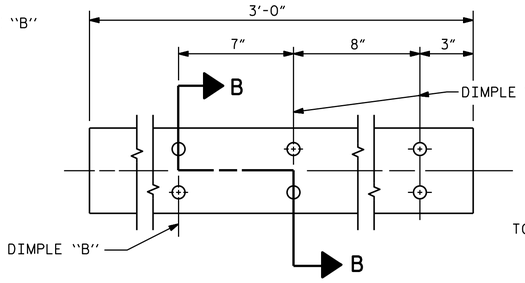
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

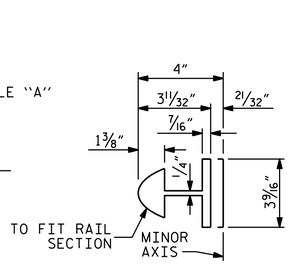
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾"Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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.



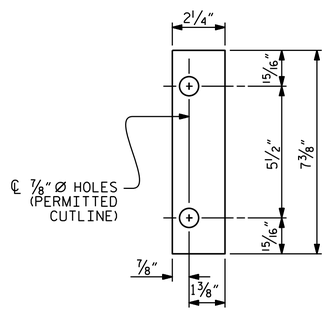
SECTION B - B



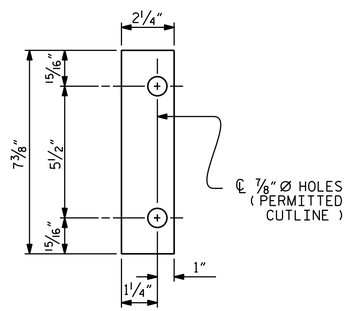


BAR SECTION

EXPANSION BAR DETAILS



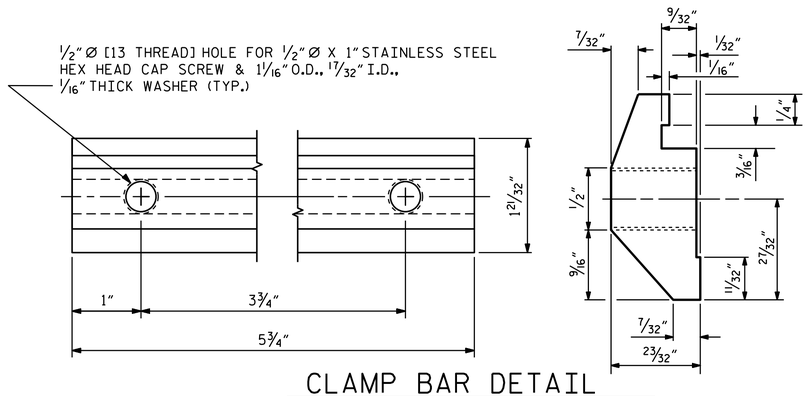
FRONT PLATE



REAR PLATE

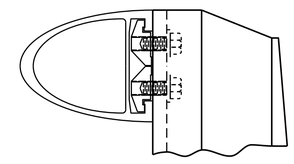
SHIM DETAILS

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



CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

ASSEMBLED BY : K. D. LAYNE	DATE : 8/11/15
CHECKED BY : N. D'AIUTO	DATE : 9/10/15

DRAWN BY : EEM 6/94	REV. 8/16/99	MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R	KMM/GM
	REV. 10/1/11	MAA/GM

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REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
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SHEET NO. S-22

TOTAL SHEETS 74

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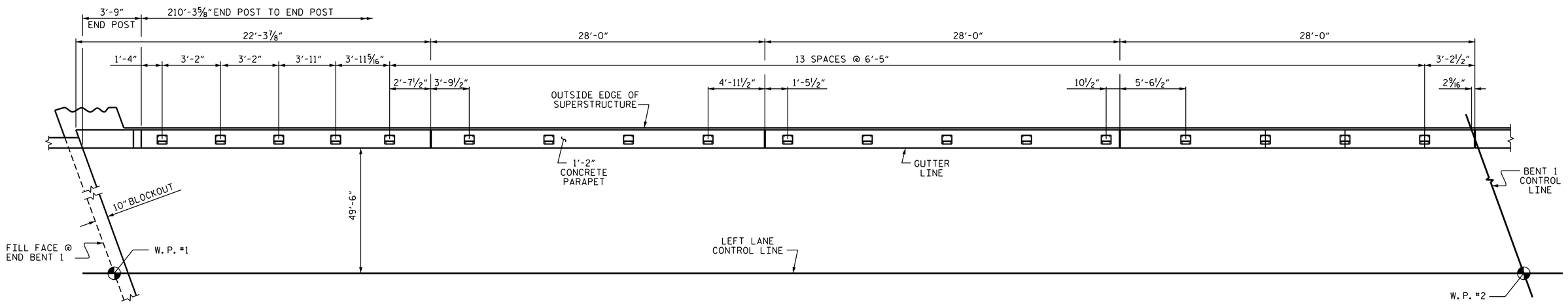
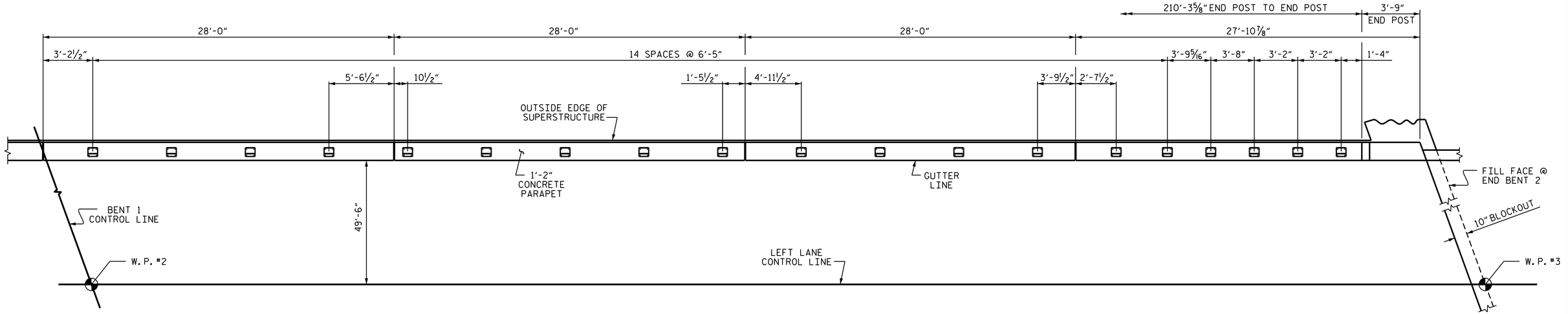


SPAN A



SPAN B

PLAN OF RAIL POST SPACING

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF RAIL POST SPACING

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			74

DRAWN BY : K. D. LAYNE DATE : 8/11/15
CHECKED BY : N. D'AIUTO DATE : 9/10/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

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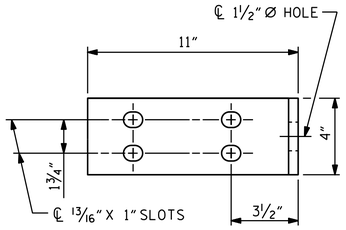
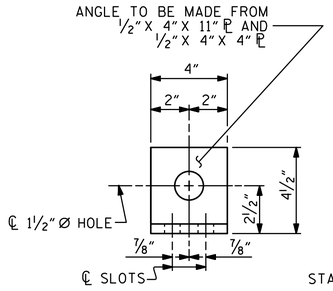
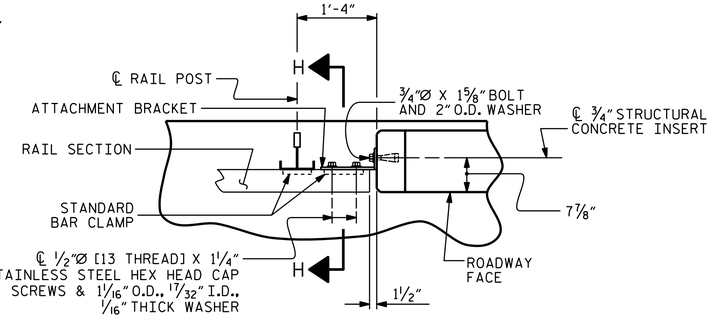


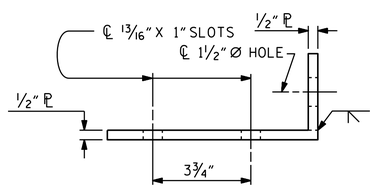
ELEVATION



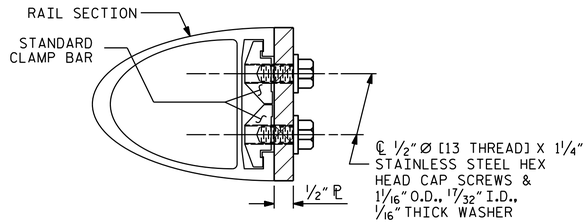
END VIEW



PLAN - RAIL AND END POST

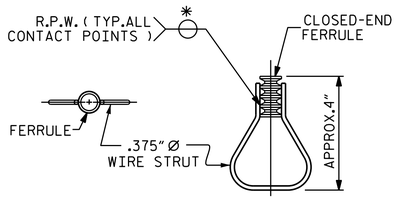


TOP VIEW



SECTION H-H (FIX)

DETAILS FOR ATTACHING METAL RAIL TO END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

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.

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
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2			4			74

STR. #1 STD. NO. BMR2

ASSEMBLED BY : K.D.LAYNE		DATE : 8/25/15
CHECKED BY : N.D'AIUTO		DATE : 9/10/15
DRAWN BY : FCJ 1/88	REV. 5/7/03	RWW/JTE
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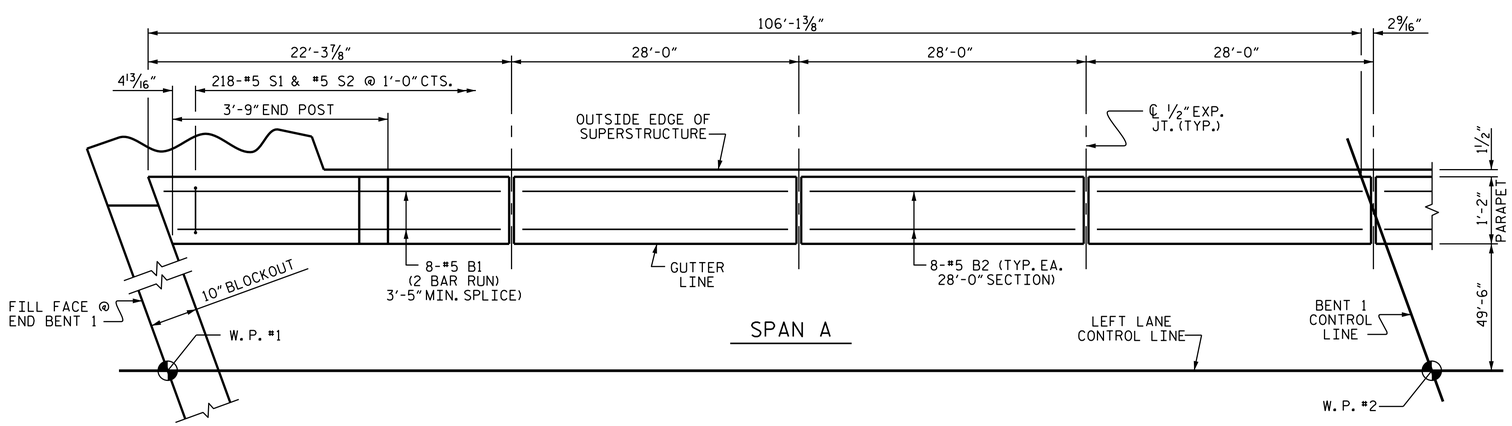
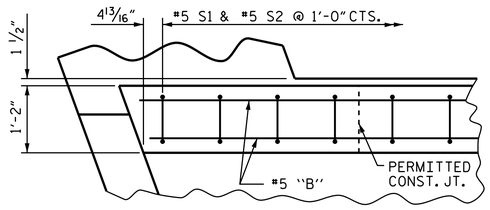
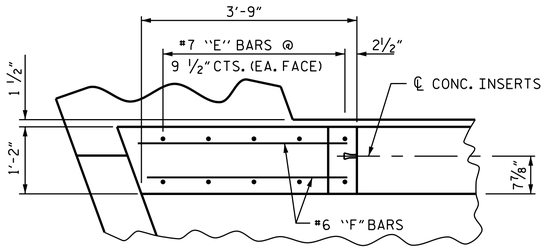


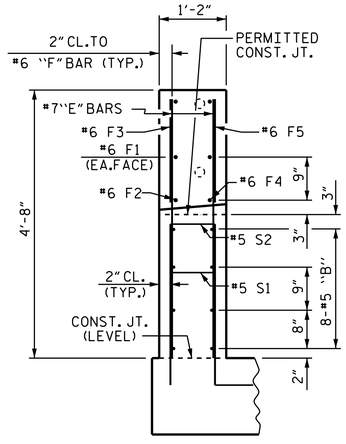
PLAN OF PARAPET



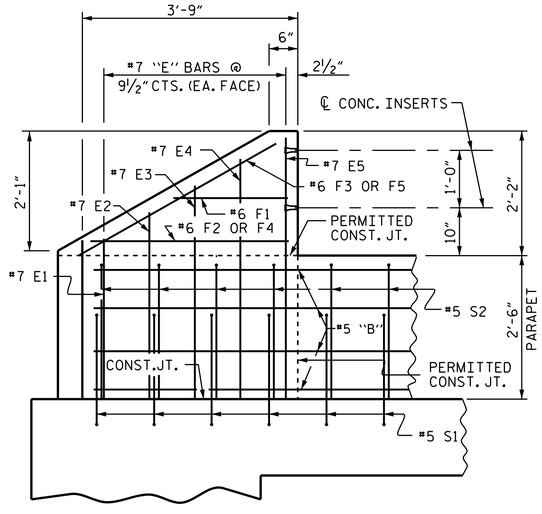
PLAN OF PARAPET



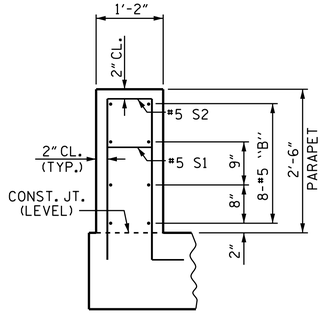
PLAN OF END POST



END VIEW



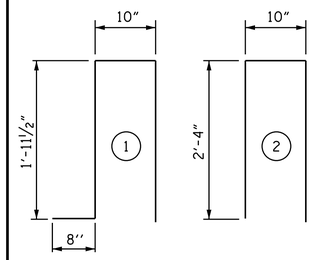
ELEVATION



SECTION THROUGH PARAPET

PARAPET AND END POST FOR TWO BAR RAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

PARAPET AND END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	16	#5	STR	12'-8"	211
✳B2	48	#5	STR	27'-7"	1,381
✳B3	16	#5	STR	15'-8"	261
✳E1	4	#7	STR	2'-6"	20
✳E2	4	#7	STR	3'-0"	25
✳E3	4	#7	STR	3'-6"	29
✳E4	4	#7	STR	4'-0"	33
✳E5	4	#7	STR	4'-4"	35
✳F1	4	#6	STR	1'-10"	11
✳F2	2	#6	STR	3'-4"	10
✳F3	2	#6	STR	3'-11"	12
✳F4	2	#6	STR	3'-0"	9
✳F5	2	#6	STR	3'-8"	11
✳S1	218	#5	1	5'-5"	1,232
✳S2	218	#5	2	5'-6"	1,251

✳EPOXY COATED REINFORCING STEEL = LBS. 4,531

CLASS AA CONCRETE = C.Y. 24.0

1'-2" x 2'-6" CONCRETE PARAPET = LIN. FT. 218.23

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

1'-2" PARAPET AND END POST DETAILS FOR TWO BAR METAL RAIL (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D4644A...
3/1/2016

DRAWN BY : K. D. LAYNE DATE : 8/12/15
CHECKED BY : N. D'AIUTO DATE : 9/10/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			74

STR. #1

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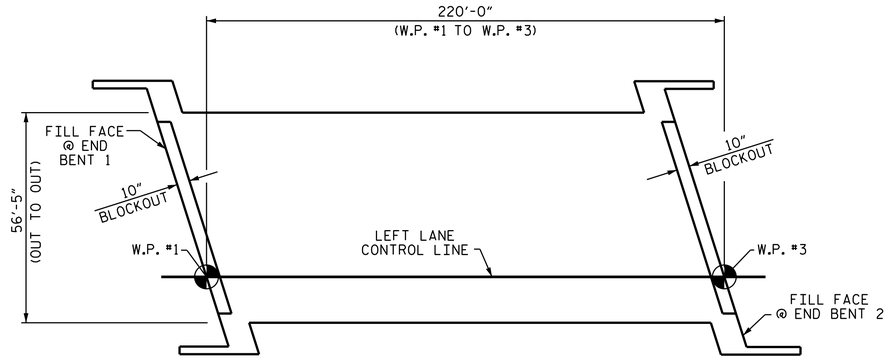
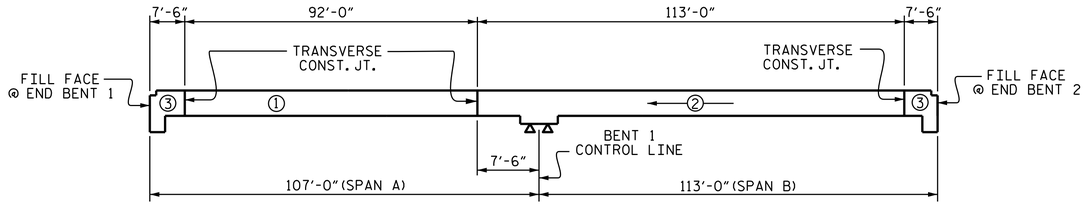
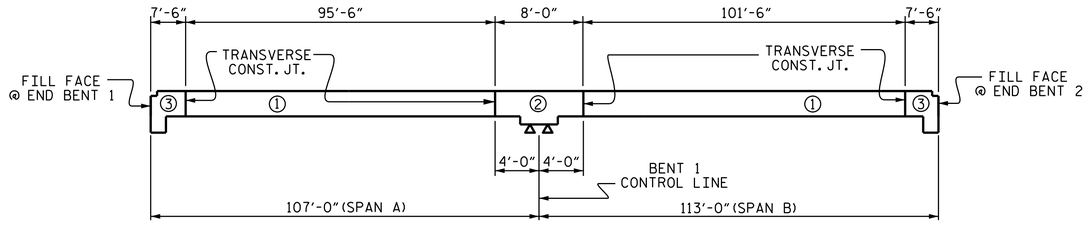


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 12,412)



POUR SEQUENCE

= INDICATES POUR NUMBER AND DIRECTION OF POUR



OPTIONAL POUR SEQUENCE

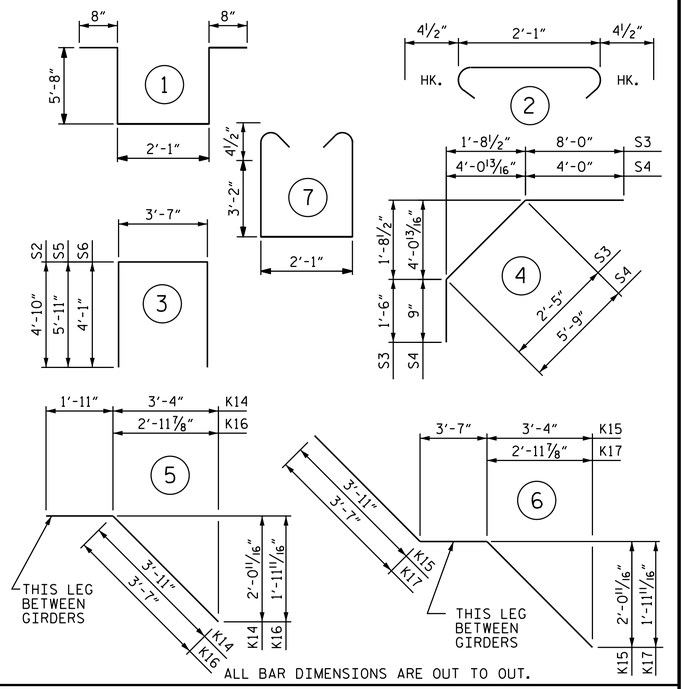
POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENT ①POURS REACH A MINIMUM OF 3,000 PSI.

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	339	#5	STR	56'-1"	19800	✱B1	149	#5	STR	21'-5"	3328
A2	339	#5	STR	56'-1"	19800	✱B2	78	#4	STR	26'-9"	1394
						✱B3	150	#5	STR	39'-5"	6167
✱A101	4	#5	STR	53'-2"	222	✱B4	74	#5	STR	33'-3"	2566
✱A102	4	#5	STR	50'-0"	209	B5	172	#5	STR	56'-2"	10076
✱A103	4	#5	STR	46'-9"	195	✱B6	78	#4	STR	28'-3"	1472
✱A104	4	#5	STR	43'-7"	182	✱B7	149	#5	STR	22'-8"	3523
✱A105	4	#5	STR	40'-4"	168						
✱A106	4	#5	STR	37'-2"	155	H1	9	#5	STR	13'-11"	131
✱A107	4	#5	STR	33'-11"	142	H2	9	#5	STR	13'-8"	128
✱A108	4	#5	STR	30'-9"	128	H3	13	#5	STR	14'-4"	194
✱A109	4	#5	STR	27'-6"	115	H4	13	#5	STR	14'-1"	191
✱A110	4	#5	STR	24'-4"	102	H5	9	#5	STR	12'-7"	118
✱A111	4	#5	STR	21'-1"	88	H6	9	#5	STR	12'-10"	120
✱A112	4	#5	STR	17'-11"	75	H7	13	#5	STR	15'-2"	206
✱A113	4	#5	STR	14'-8"	61	H8	13	#5	STR	15'-5"	209
✱A114	4	#5	STR	11'-6"	48						
✱A115	4	#5	STR	8'-4"	35	K1	42	#4	STR	23'-3"	652
✱A116	4	#5	STR	5'-1"	21	K2	4	#4	STR	5'-2"	14
						K3	2	#4	STR	6'-7"	9
A201	4	#5	STR	53'-2"	222	K4	18	#4	STR	8'-4"	100
A202	4	#5	STR	50'-0"	209	K5	4	#4	STR	5'-0"	13
A203	4	#5	STR	46'-9"	195	K6	4	#4	STR	5'-9"	15
A204	4	#5	STR	43'-7"	182	K7	20	#4	STR	6'-7"	88
A205	4	#5	STR	40'-4"	168	K8	16	#4	STR	3'-6"	37
A206	4	#5	STR	37'-2"	155	K9	20	#4	STR	4'-5"	59
A207	4	#5	STR	33'-11"	142	K10	10	#4	STR	5'-10"	39
A208	4	#5	STR	30'-9"	128	K11	90	#4	STR	7'-6"	451
A209	4	#5	STR	27'-6"	115	K12	2	#4	STR	5'-4"	7
A210	4	#5	STR	24'-4"	102	K13	10	#4	STR	4'-7"	31
A211	4	#5	STR	21'-1"	88	K14	6	#4	5	5'-10"	23
A212	4	#5	STR	17'-11"	75	K15	6	#4	6	11'-5"	46
A213	4	#5	STR	14'-8"	61	K16	6	#4	5	5'-6"	22
A214	4	#5	STR	11'-6"	48	K17	24	#4	6	10'-9"	172
A215	4	#5	STR	8'-4"	35						
A216	4	#5	STR	5'-1"	21	S1	198	#4	2	2'-10"	375
						S2	54	#4	3	13'-3"	478
						✱S3	70	#4	4	11'-11"	557
						✱S4	54	#4	4	10'-6"	379
						S5	16	#4	3	15'-5"	165
						S6	28	#4	3	11'-9"	220
						U1	30	#4	1	14'-9"	296
						U2	12	#4	7	9'-2"	73

REINFORCING STEEL	LBS.	36,504
✱EPOXY COATED REINFORCING STEEL	LBS.	41,132

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	167.6	36,504	41,132
POUR #2	228.8		
POUR #3	129.8		
TOTALS**	526.2	36,504	41,132

**QUANTITIES FOR PARAPET AND CONCRETE BARRIER RAILS ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,219 SQ.FT.
BRIDGE DECK	10,022 SQ.FT.
TOTAL	12,241 SQ.FT.

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

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

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			74

DRAWN BY : N.D'AIUTO DATE: 6/30/15
CHECKED BY : K.D.LAYNE DATE: 8/7/15
DESIGN ENGINEER OF RECORD : H.A.LOCKLEAR DATE: 8/7/15

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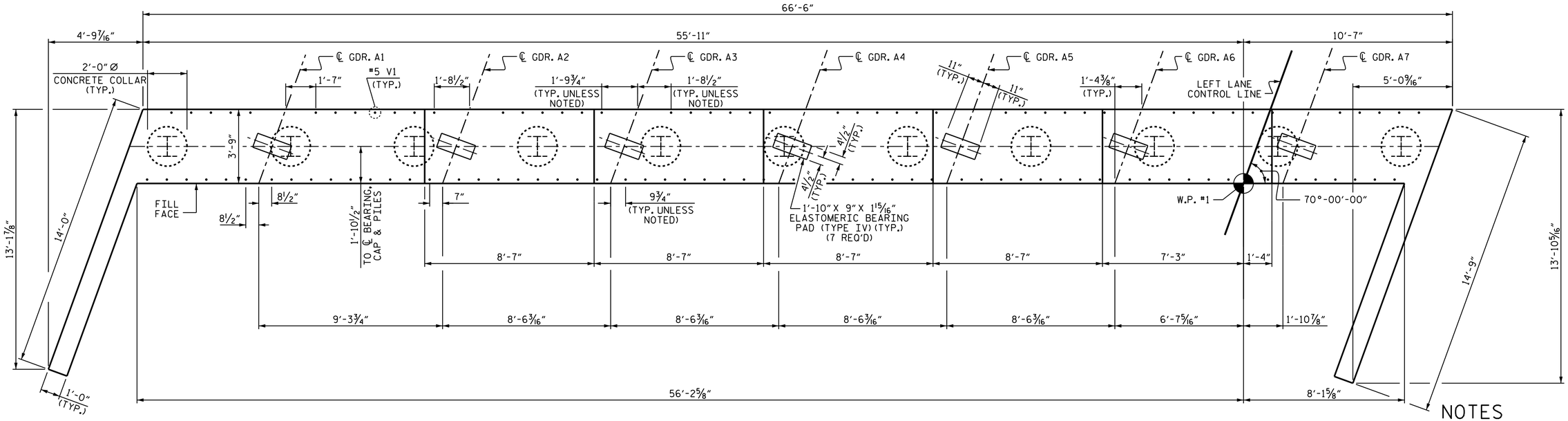
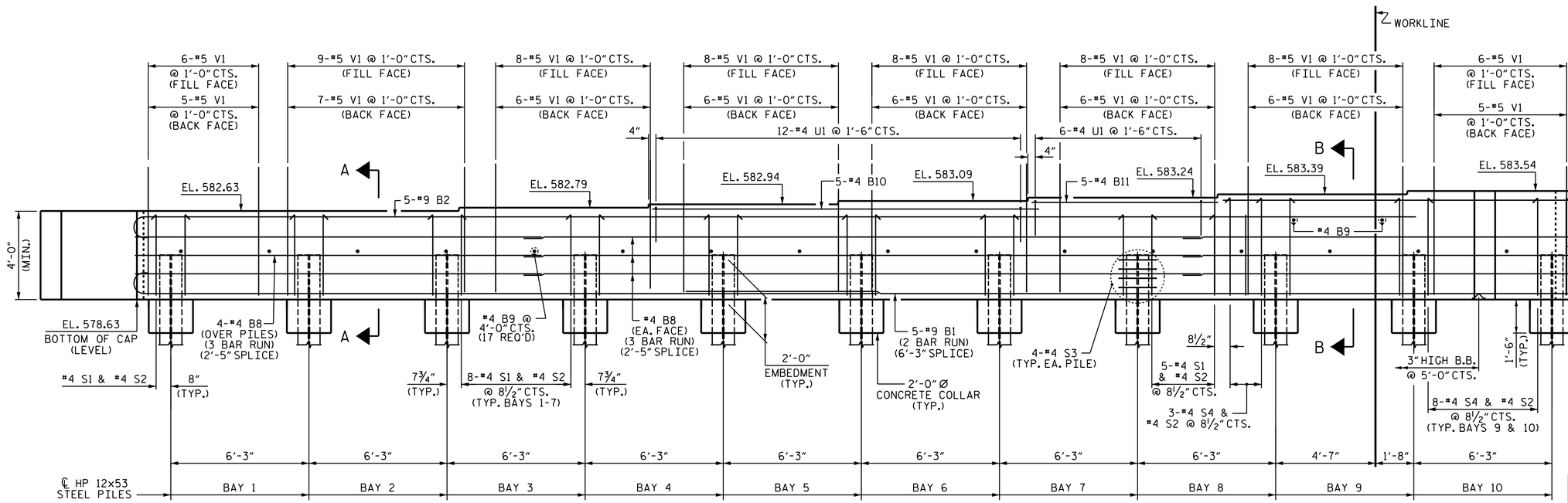
STR. #1



PLAN



ELEVATION

NOTES

SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE UPPER PART OF WING IS TO BE POURED WITH SUPERSTRUCTURE.

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

FOR TEMPORARY DRAINAGE FOR END BENTS, SEE SHEET 2 OF 2 OF INTEGRAL END BENT 2.

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D4644A...

3/1/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			74

DRAWN BY : N.D'AIUTO DATE : 8/5/15
CHECKED BY : K.D.LAYNE DATE : 8/24/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

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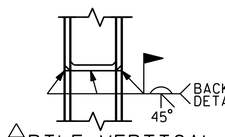
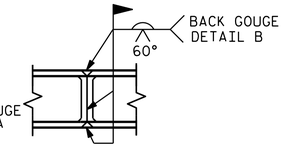
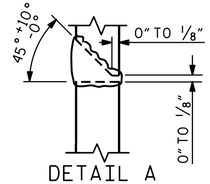


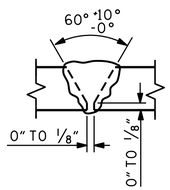
△PILE VERTICAL



△PILE HORIZONTAL
OR VERTICAL

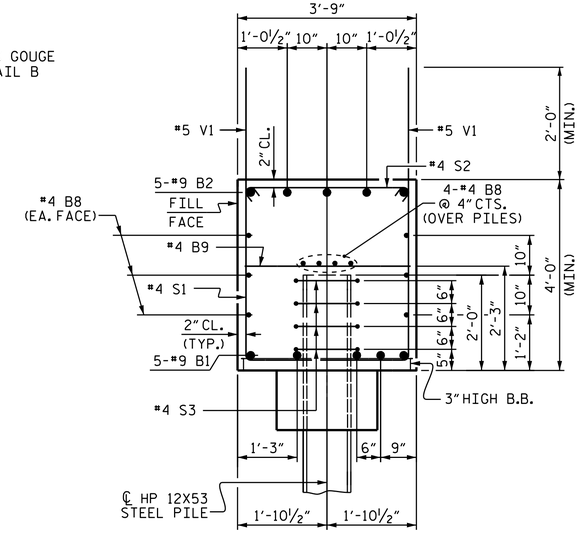


DETAIL A

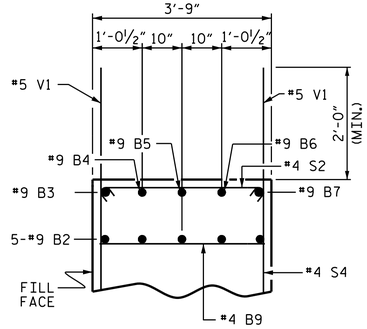


DETAIL B

△POSITION OF PILE DURING WELDING.

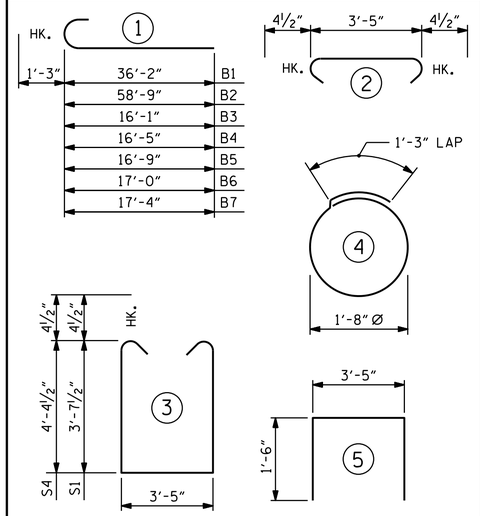


SECTION A-A



PARTIAL SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

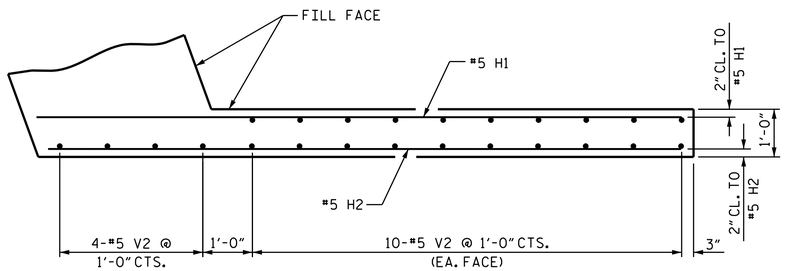
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	37'-5"	1272
B2	5	#9	1	60'-0"	1020
B3	1	#9	1	17'-4"	59
B4	1	#9	1	17'-8"	60
B5	1	#9	1	18'-0"	61
B6	1	#9	1	18'-3"	62
B7	1	#9	1	18'-7"	63
B8	30	#4	STR	23'-8"	474
B9	19	#4	STR	3'-5"	43
B10	5	#4	STR	17'-2"	57
B11	5	#4	STR	8'-7"	29
H1	6	#5	STR	13'-11"	87
H2	6	#5	STR	13'-8"	86
H3	10	#5	STR	14'-4"	149
H4	10	#5	STR	14'-1"	147
S1	62	#4	3	11'-5"	473
S2	82	#4	2	4'-2"	228
S3	44	#4	4	6'-6"	191
S4	20	#4	3	12'-11"	173
U1	18	#4	5	6'-5"	77
V1	108	#5	STR	6'-11"	779
V2	24	#5	STR	10'-0"	250
V3	26	#5	STR	11'-1"	301

REINFORCING STEEL LBS. 6,141

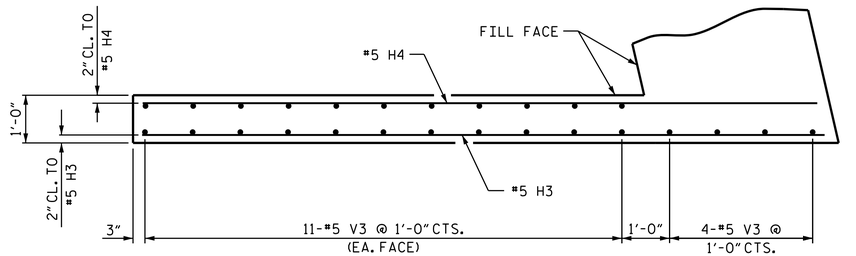
CLASS A CONCRETE
CAP, LOWER WINGS & COLLARS C.Y. 46.0

HP 12X53 STEEL PILES
NO. 11 LIN. FT. 445

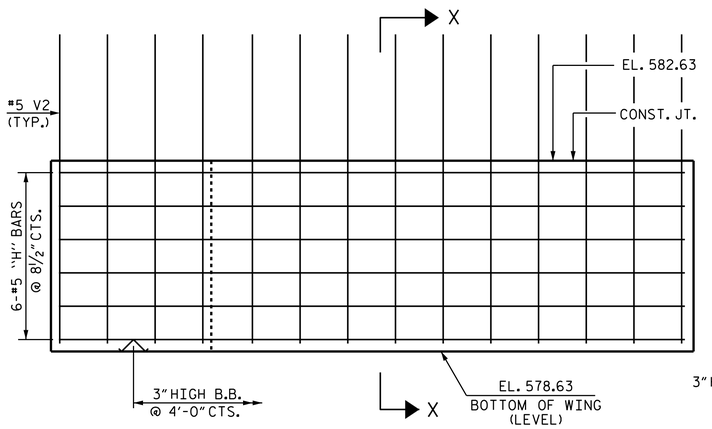
PILE SPLICE DETAILS



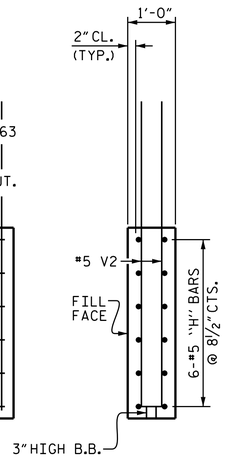
PLAN OF LEFT WING



PLAN OF RIGHT WING



ELEVATION OF LEFT WING



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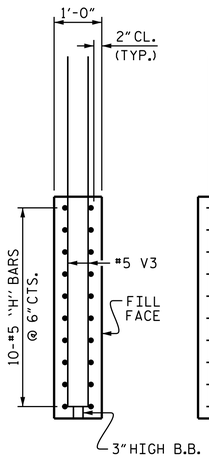
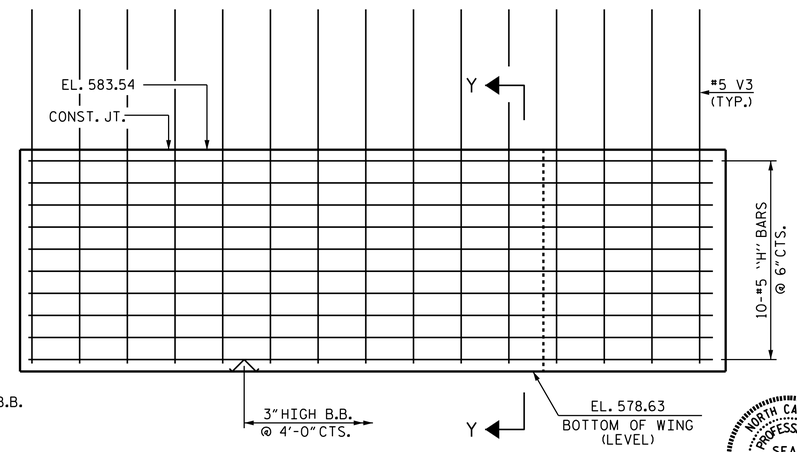


SECTION Y-Y



ELEVATION OF RIGHT WING

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			74

STR. #1

DRAWN BY : N.D'AIUTO DATE : 8/5/15
CHECKED BY : K.D.LAYNE DATE : 8/24/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

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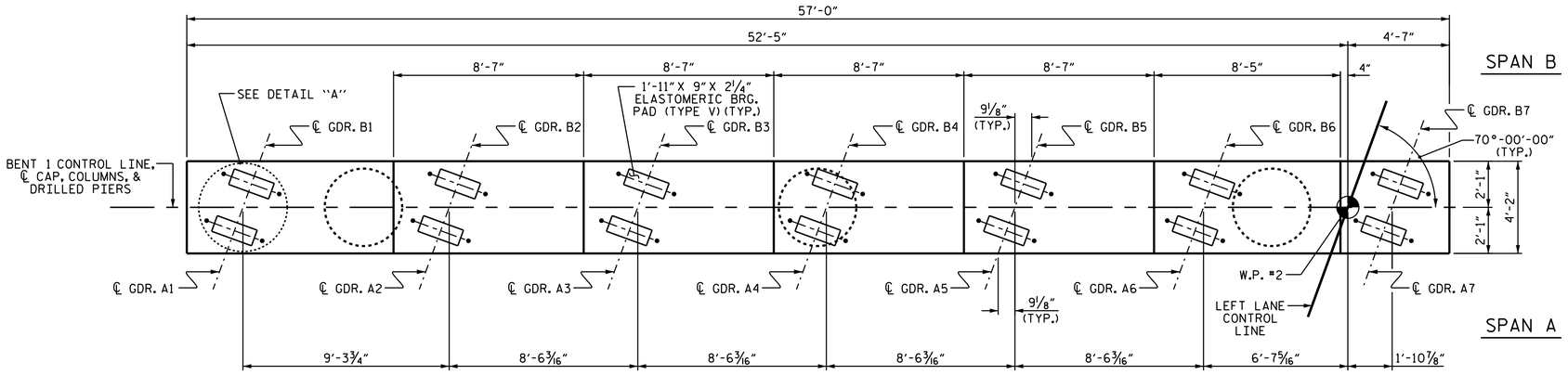
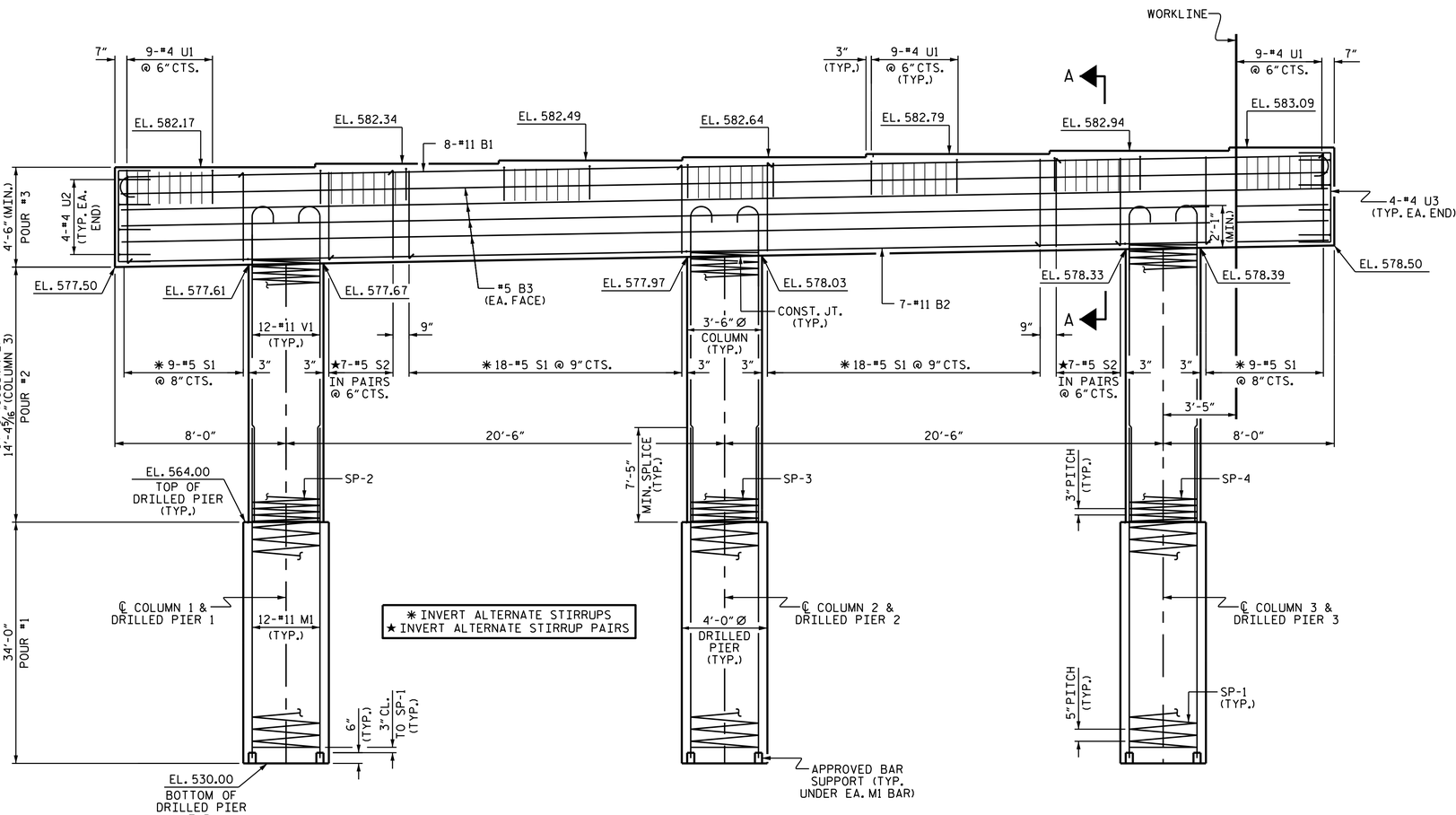


PLAN



ELEVATION

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

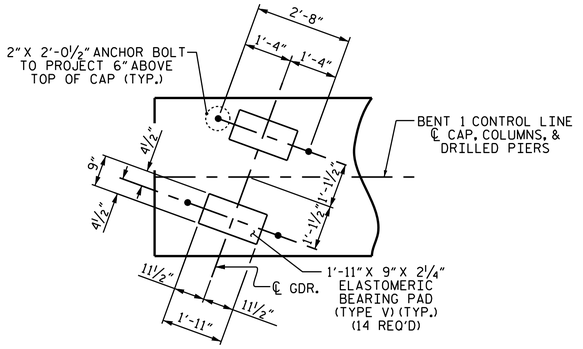
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

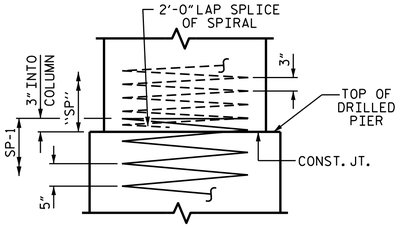
FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

DIMENSIONS ARE TYPICAL EACH BEARING



CONSTRUCTION JOINT DETAIL

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 3/1/2016

DRAWN BY : J.K. BOWLES DATE : 8/6/15
CHECKED BY : N. D'AIUTO DATE : 8/20/15
DESIGN ENGINEER OF RECORD: T.H. CARROLL DATE : 12/7/15

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1			3			TOTAL SHEETS
2			4			74

STR. #1

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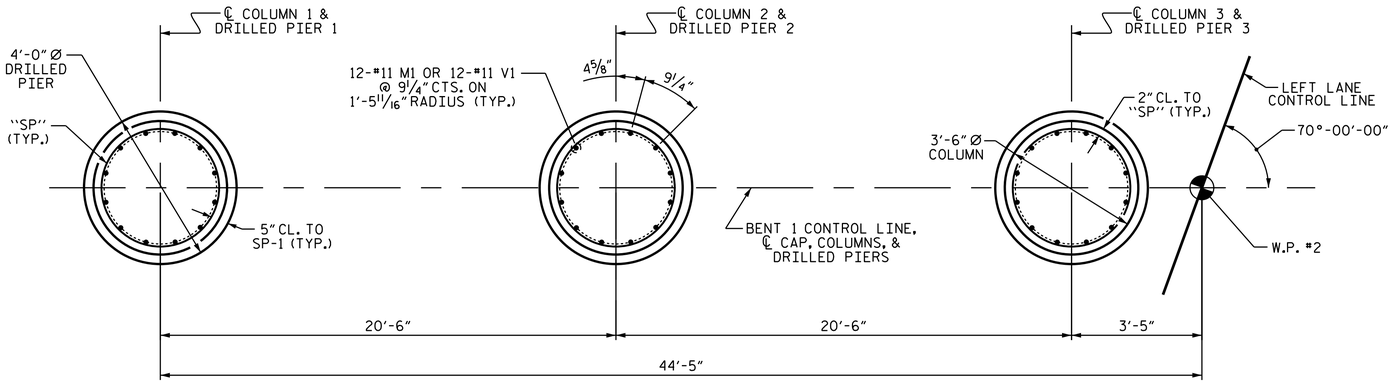
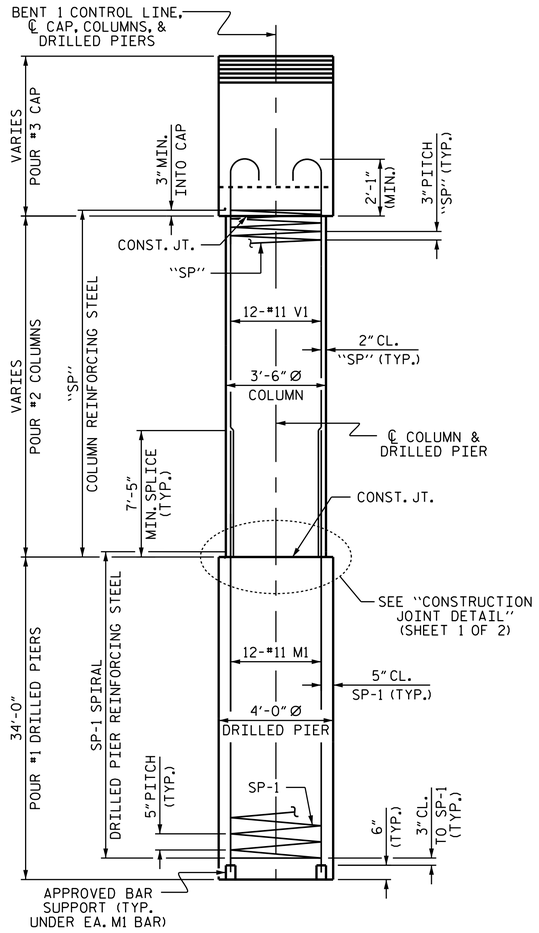
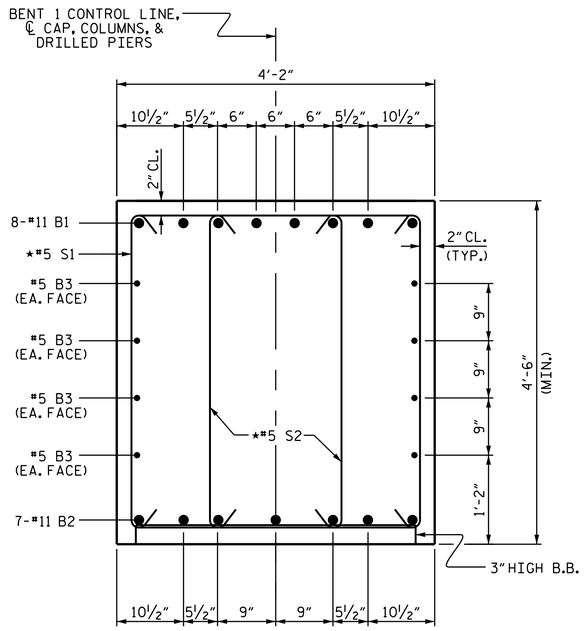
vpatel



PLAN OF COLUMNS & DRILLED PIERS

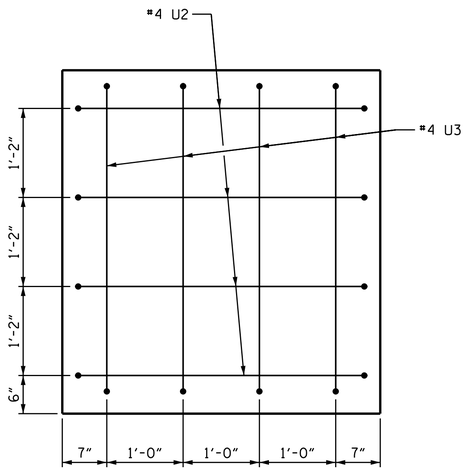


LEFT END ELEVATION



SECTION A-A

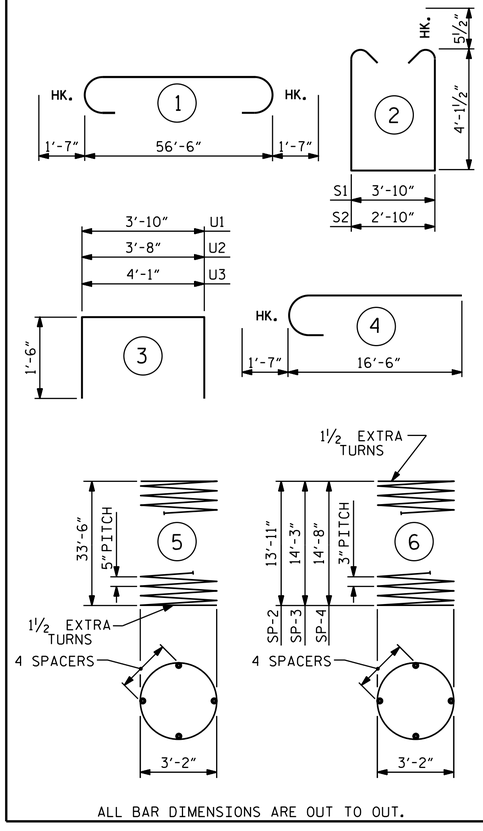
*INVERT ALTERNATE STIRRUPS



END VIEW

(TYP. EACH END)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	59'-8"	2536
B2	7	#11	STR	56'-8"	2107
B3	8	#5	STR	56'-8"	473
M1	36	#11	STR	44'-2"	8448
S1	54	#5	2	13'-0"	732
S2	28	#5	2	12-0"	350
U1	63	#4	3	6'-10"	288
U2	8	#4	3	6'-8"	36
U3	8	#4	3	7'-1"	38
V1	36	#11	4	18'-1"	3,459
REINFORCING STEEL				LBS.	18,467
SP-1	3	**	5	803'-1"	2513
SP-2	1	*	6	562'-3"	376
SP-3	1	*	6	574'-7"	384
SP-4	1	*	6	591'-9"	395
SPIRAL COLUMN REINFORCING STEEL				LBS.	3,668

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

* THE SP-2, SP-3, & SP-4 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE		
POUR #3 (CAP)	C.Y.	40.4
POUR #2 (COLUMNS)	C.Y.	15.0
TOTAL CLASS A CONCRETE	C.Y.	55.4

DRILLED PIER QUANTITIES

DRILLED PIER CONCRETE		
POUR #1 (DRILLED PIERS)	C.Y.	47.5
4'-0" Ø DRILLED PIERS IN SOIL	LIN. FT.	69.00
4'-0" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	33.00
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	LIN. FT.	69.00
SID INSPECTIONS	EA.	1
SPT TESTING	EA.	1
CSL TESTING	EA.	1
CSL TUBES	LIN. FT.	426

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 3/1/2016

DRAWN BY : J.K. BOWLES DATE : 8/7/15
CHECKED BY : N. D'AIUTO DATE : 8/20/15
DESIGN ENGINEER OF RECORD: T.H. CARROLL DATE : 12/7/15

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2			4			74

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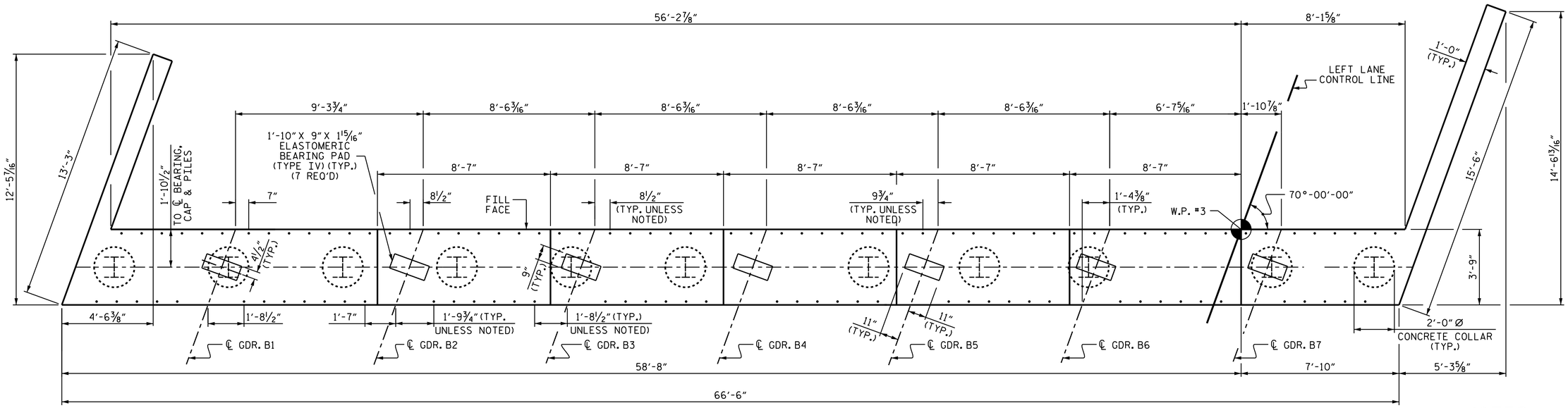

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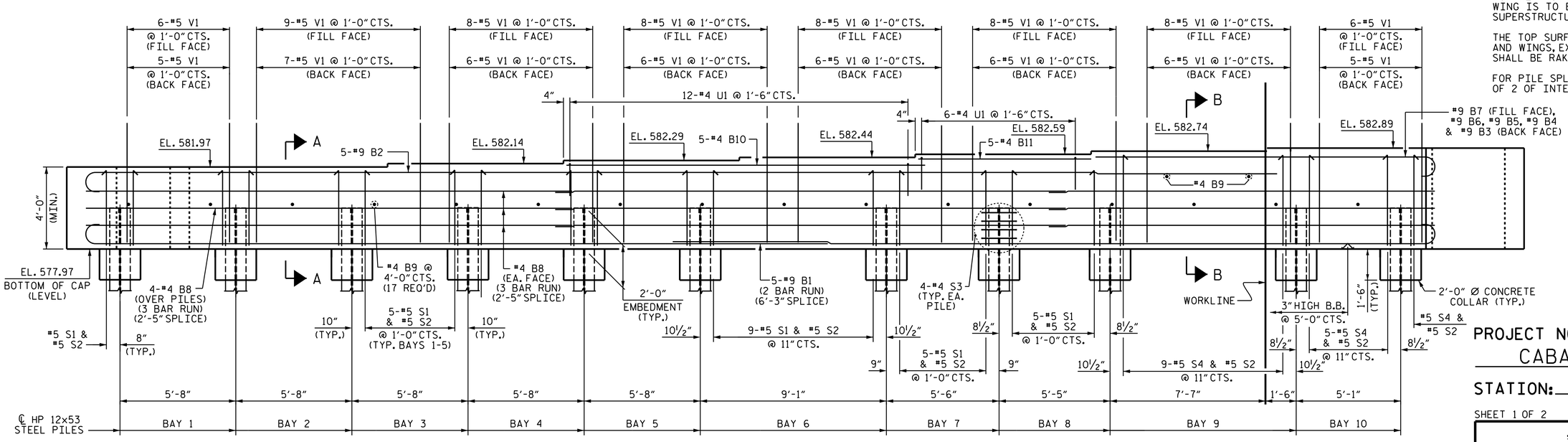

ELEVATION

NOTES

SEE SUPERSTRUCTURE SHEETS FOR UPPER PART OF INTEGRAL END BENT DETAILS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE UPPER PART OF WING IS TO BE POURED WITH SUPERSTRUCTURE.

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

FOR PILE SPLICE DETAILS, SEE SHEET 2 OF 2 OF INTEGRAL END BENT 1.

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			32

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DRAWN BY : N.D'AIUTO DATE : 8/10/15
CHECKED BY : K.D.LAYNE DATE : 8/24/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/7/15

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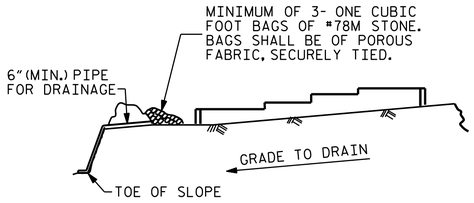
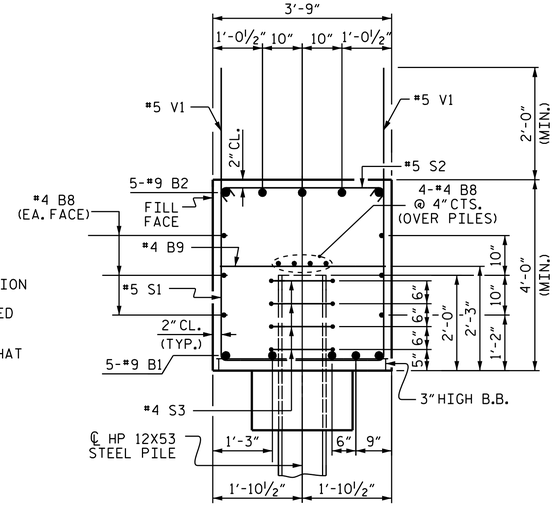


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

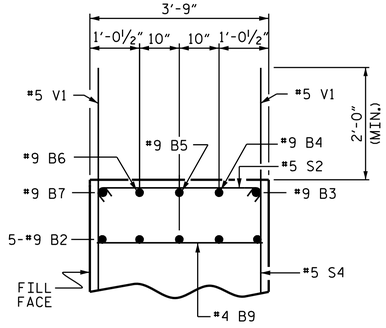
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

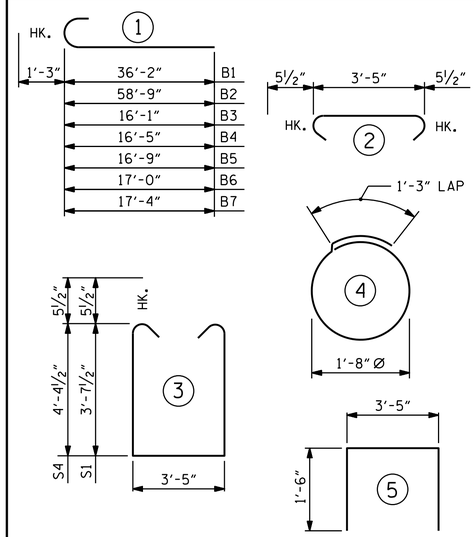


SECTION A-A



PARTIAL SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

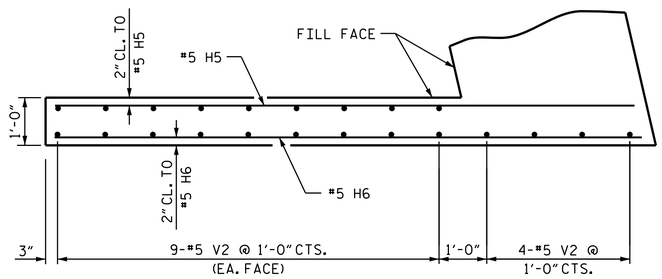
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	37'-4"	1272
B2	5	#9	1	59'-10"	1020
B3	1	#9	1	17'-3"	59
B4	1	#9	1	17'-7"	60
B5	1	#9	1	17'-10"	61
B6	1	#9	1	18'-2"	62
B7	1	#9	1	18'-5"	63
B8	30	#4	STR	23'-8"	474
B9	19	#4	STR	3'-5"	43
B10	5	#4	STR	17'-2"	57
B11	5	#4	STR	8'-7"	29
H5	6	#5	STR	12'-7"	79
H6	6	#5	STR	12'-10"	80
H7	10	#5	STR	15'-2"	158
H8	10	#5	STR	15'-5"	161
S1	45	#5	3	11'-7"	544
S2	60	#5	2	4'-4"	271
S3	44	#4	4	6'-6"	191
S4	15	#5	3	13'-1"	205
U1	18	#4	5	6'-5"	77
V1	108	#5	STR	6'-11"	779
V2	22	#5	STR	10'-0"	229
V3	28	#5	STR	11'-1"	324

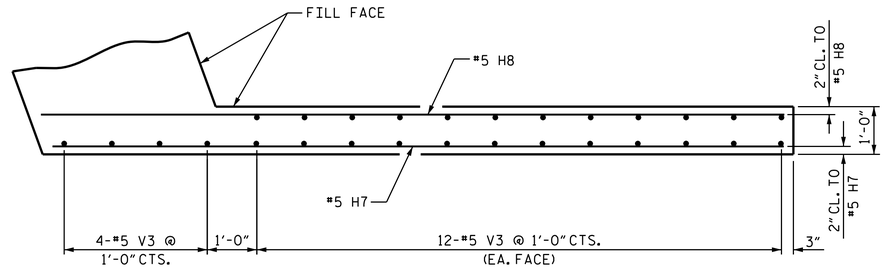
REINFORCING STEEL LBS. 6,298

CLASS A CONCRETE
CAP, LOWER WINGS & COLLARS C.Y. 46.2

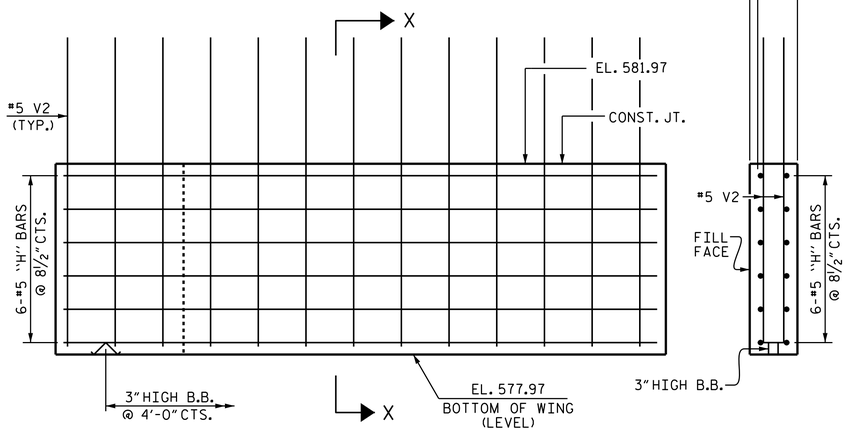
HP 12X53 STEEL PILES
NO. 11 LIN. FT. 385



PLAN OF LEFT WING

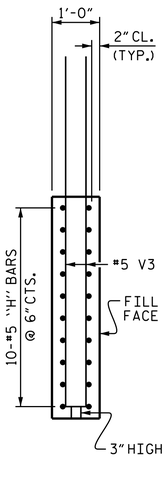


PLAN OF RIGHT WING

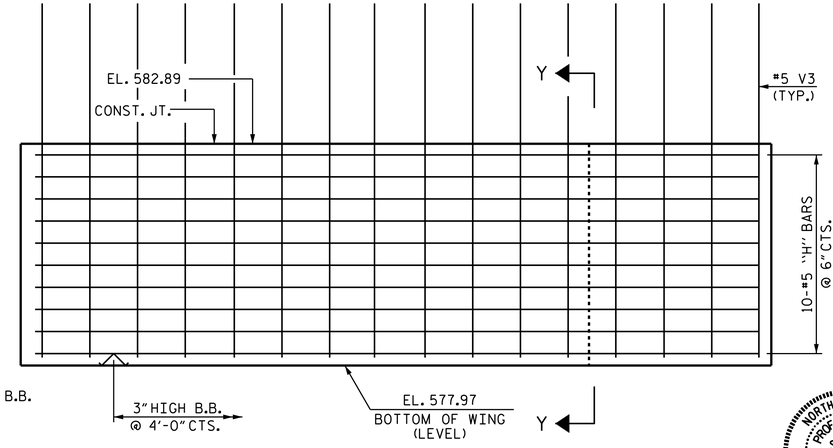


ELEVATION OF LEFT WING

SECTION X-X



SECTION Y-Y



ELEVATION OF RIGHT WING

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

Docusigned by: vipul a patel 1C157DE15D464AA...
3/1/2016

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DRAWN BY : N.D'AIUTO DATE : 8/10/15
CHECKED BY : K.D.LAYNE DATE : 8/24/15
DESIGN ENGINEER OF RECORD: H.A.LOCKLEAR DATE : 12/7/15

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PROJECT NO. B-5123
CABARRUS COUNTY
STATION: 21+44.10 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

(LEFT LANE)

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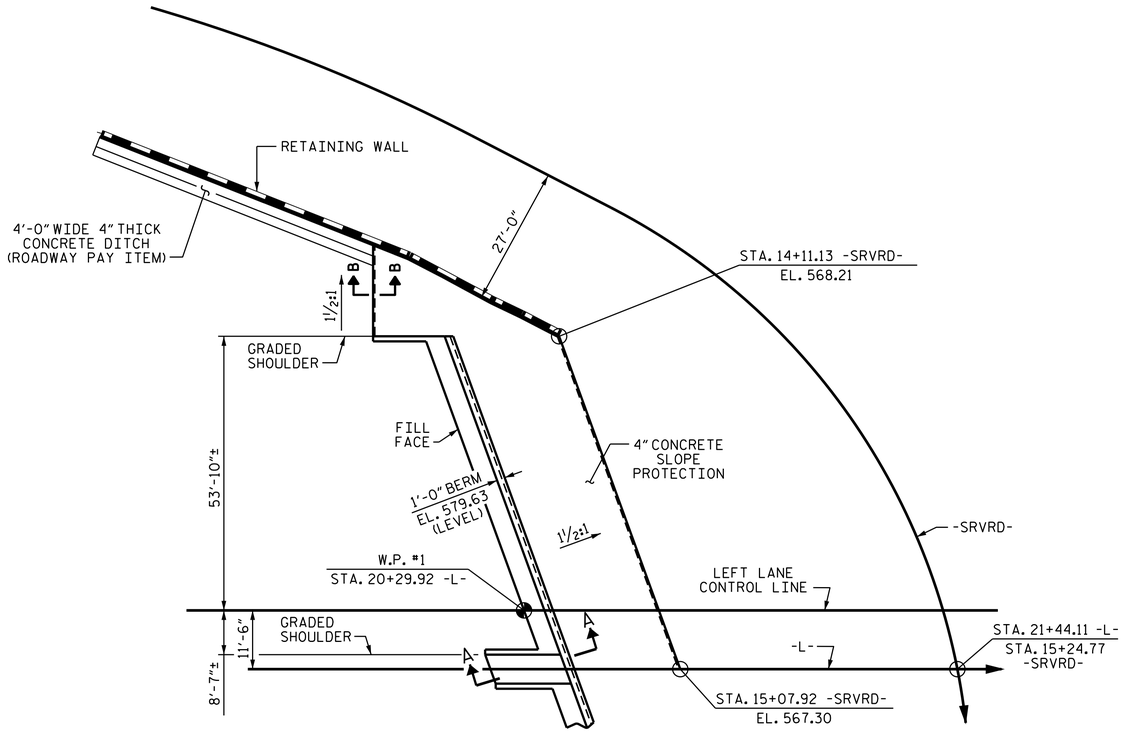
STR. #1



PLAN

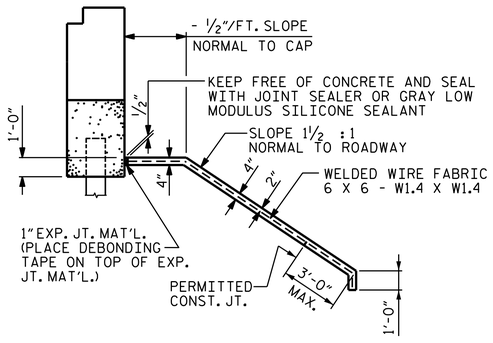
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE END OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

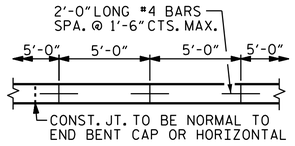
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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. 21+44.10 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	375	750

* QUANTITY SHOWN IS BASED ON 5' POURS.

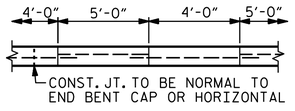


SECTION ALONG ℄ ROADWAY



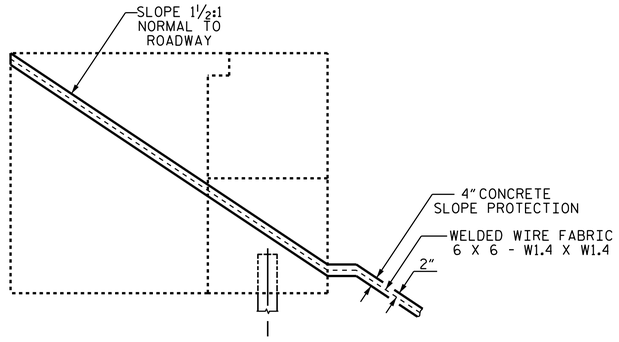
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

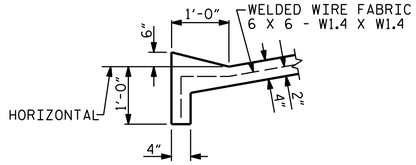


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



SECTION A-A



SECTION B-B

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

ASSEMBLED BY : K.D.LAYNE	DATE : 10/22/15
CHECKED BY : H.A.LOCKLEAR	DATE : 11/19/15

DRAWN BY : ELR 5/92	REV. 5/1/06 TLA/GM
CHECKED BY : GRP 6/92	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

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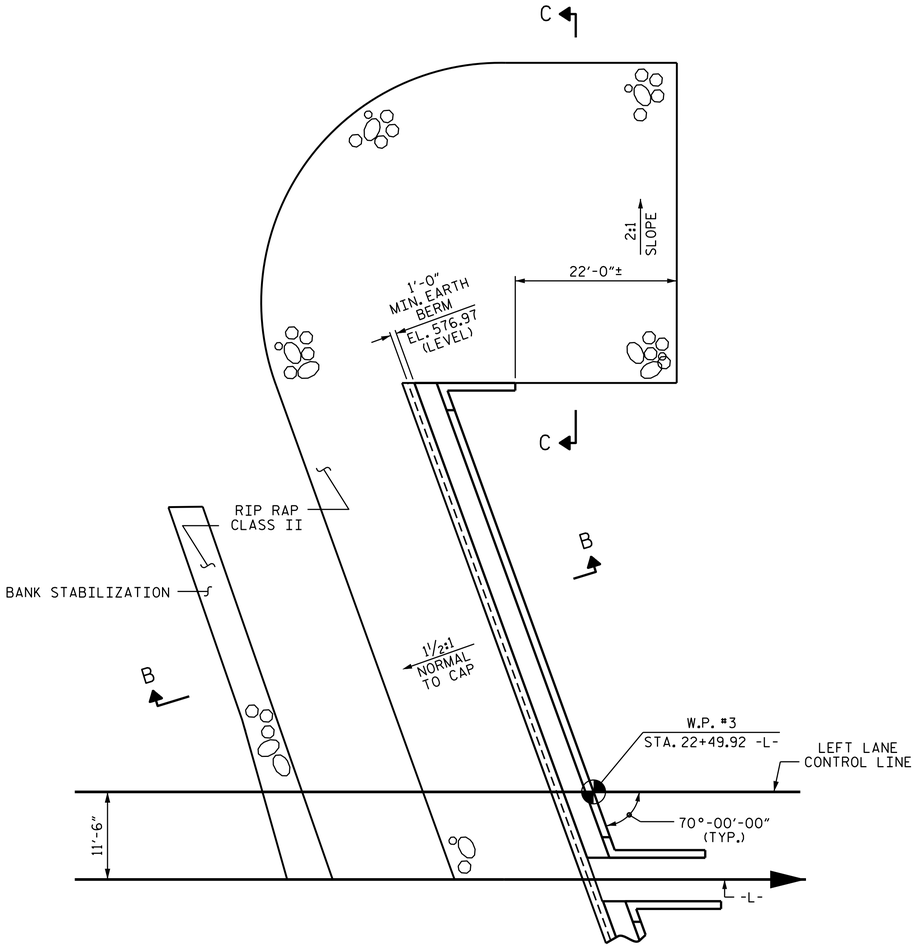
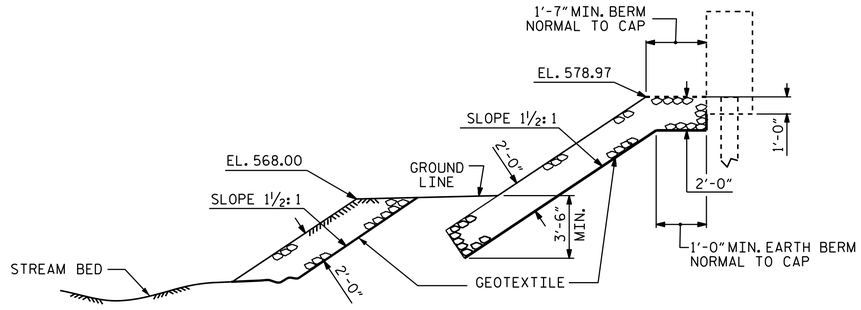
STR. #1 STD. NO. SP1

ESTIMATED QUANTITIES

BRIDGE @ STA. 21+44.10 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
BANK STABILIZATION NEAR END BENT 2	75	70
END BENT 2	520	580
TOTAL	590	650



PLAN OF RIP RAP



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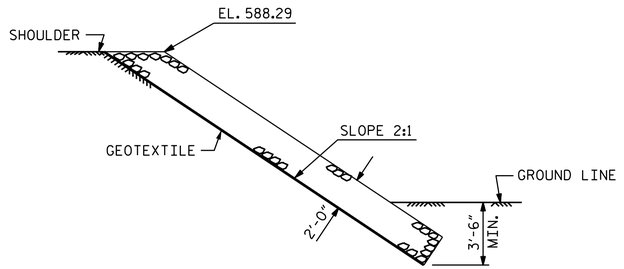

SECTION C-C

PROJECT NO. B-5123

IREDELL COUNTY

STATION: 21+44.10 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

3/1/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			74

ASSEMBLED BY: N.D'AIUTO DATE : 8/27/15
CHECKED BY: K.D.LAYNE DATE : 9/18/15
DESIGN ENGINEER OF RECORD: T.H.CARROLL DATE : 12/7/15

01-MAR-2016 10:50
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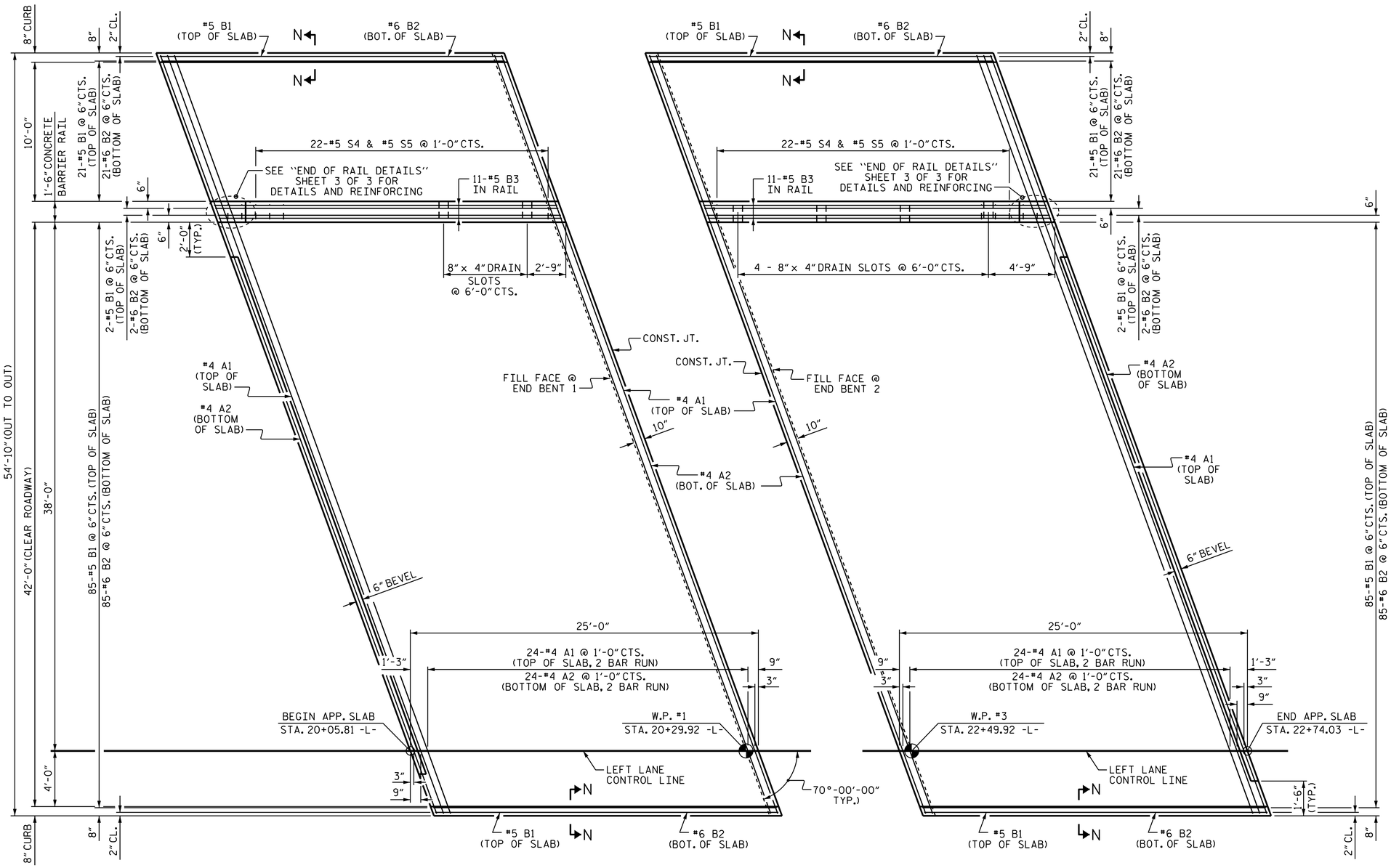
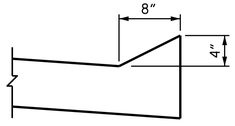
STR. #1



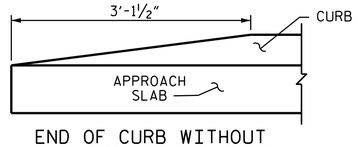
PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



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 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.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	30'-0"	1042
A2	52	#4	STR	29'-11"	1039
* B1	110	#5	STR	24'-1"	2763
B2	110	#6	STR	24'-7"	4062
REINFORCING STEEL				LBS.	5,101
* EPOXY COATED REINFORCING STEEL				LBS.	3,805
CLASS AA CONCRETE				C.Y.	59.3

SPLICE LENGTHS

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

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
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ASSEMBLED BY : K. D. LAYNE DATE : 8/25/15
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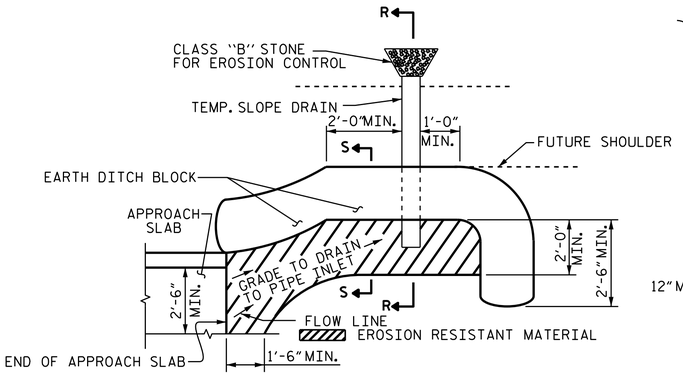
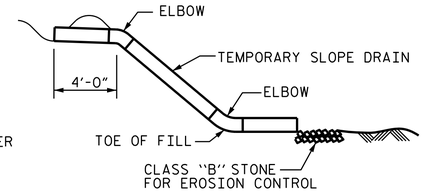
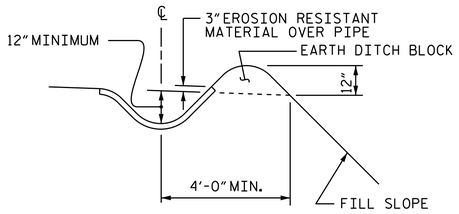


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

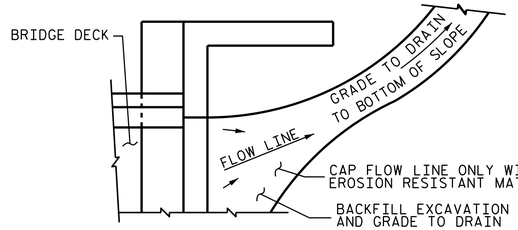
PLAN VIEW



SECTION R-R



SECTION S-S

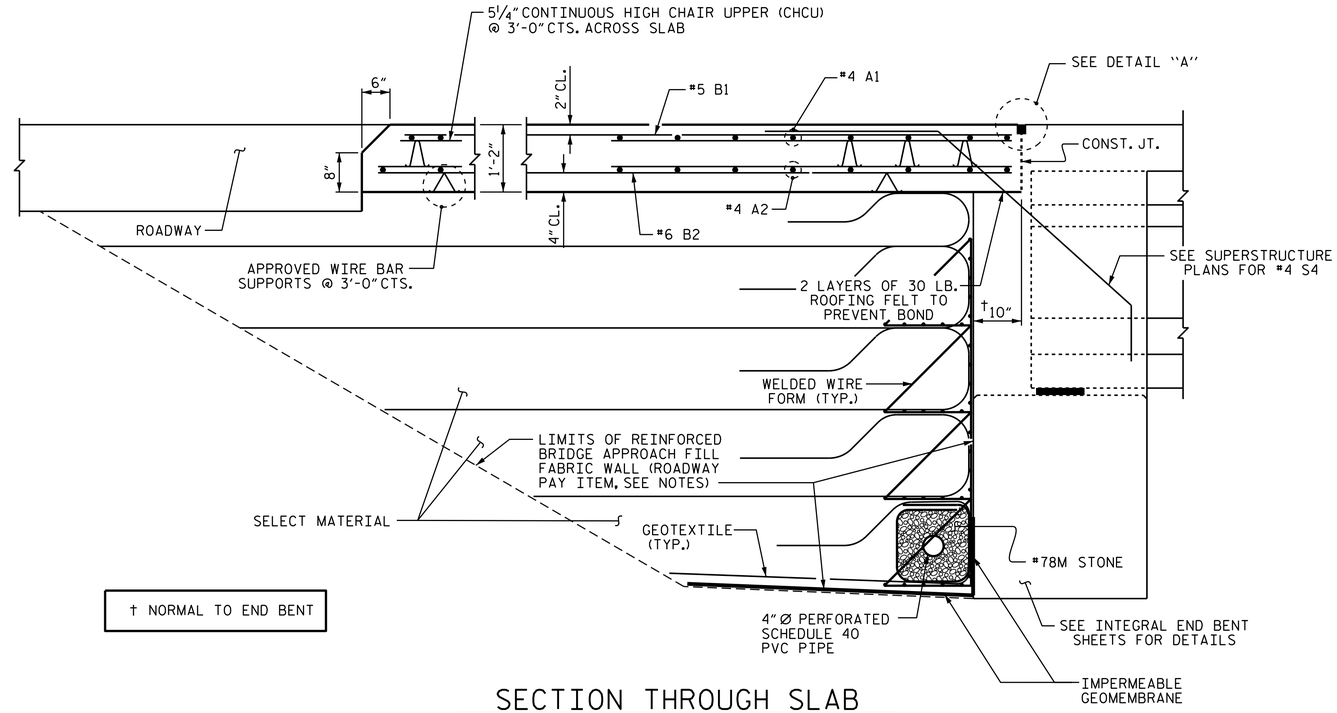


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

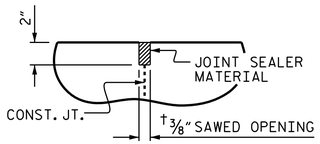
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



† NORMAL TO END BENT

SECTION THROUGH SLAB



DETAIL "A"

PROJECT NO. B-5123

CABARRUS COUNTY

STATION: 21+44.10 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
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1			3			TOTAL SHEETS
2			4			74

STR. #1 STD. NO. BAS4

ASSEMBLED BY : K. D. LAYNE DATE : 8/25/15
CHECKED BY : N. D'AIUTO DATE : 9/10/15

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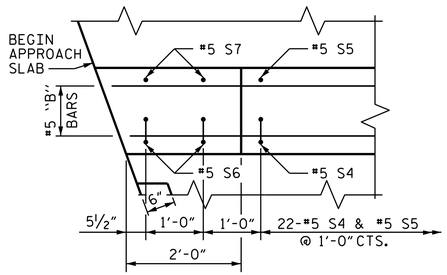
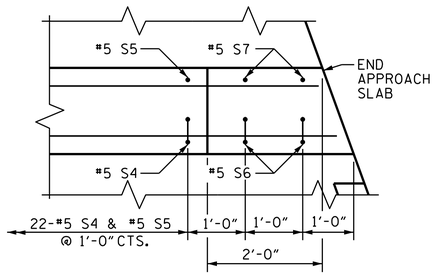
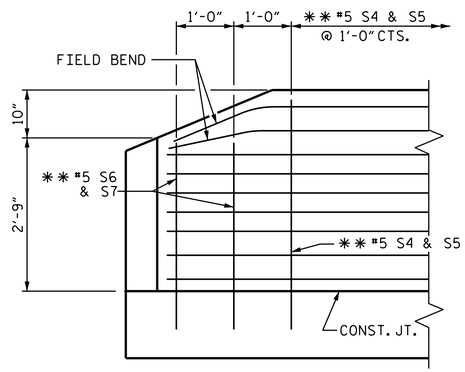


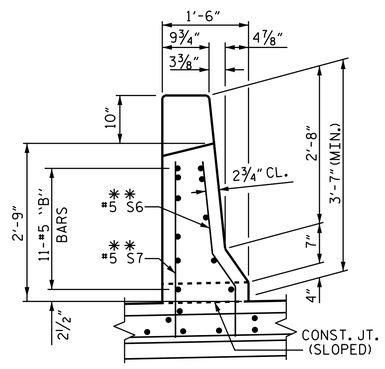
PLAN
AT END BENT 1



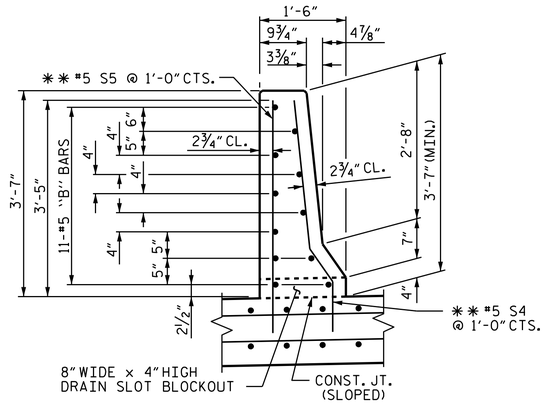
PLAN
AT END BENT 2



SIDE VIEW



END VIEW



SECTION THROUGH RAIL

END OF RAIL DETAILS

NOTES

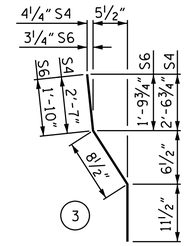
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

** THE #5 S4, S5, S6 & S7 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. THE YIELD LOAD FOR THE #5 S4, S5, S6, & S7 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BOND SYSTEM IS NOT REQUIRED.

REINFORCING BARS IN THE RAIL MAY BE FIELD CUT TO AVOID DRAIN SLOTS.

GROOVED CONTRACTION JOINTS, ½" 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

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B3	22	#5	STR	24'-7"	564
* S4	44	#5	3	4'-3"	195
* S5	44	#5	STR	4'-1"	187
* S6	4	#5	3	3'-6"	15
* S7	4	#5	STR	3'-4"	14
* EPOXY COATED REINFORCING STEEL				LBS.	975
CLASS AA CONCRETE BARRIER RAIL =				C.Y.	7.0
CONCRETE BARRIER RAIL =				LIN. FT.	50.0

PROJECT NO. B-5123

CABARRUS COUNTY

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SHEET 3 OF 3

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BRIDGE APPROACH SLAB DETAILS

(LEFT LANE)

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STR. #1

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CHECKED BY : N. D'AIUTO DATE : 9/10/15

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