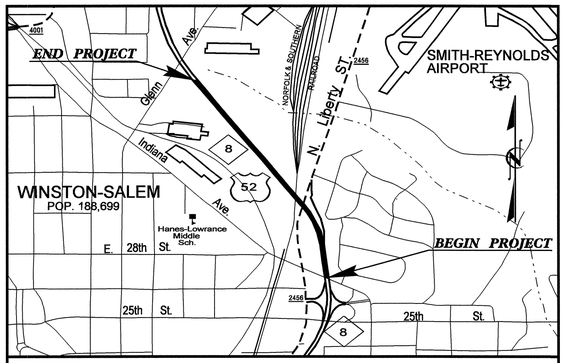
TIP PROJECT: U-2826A

CONTRACT: C202129



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

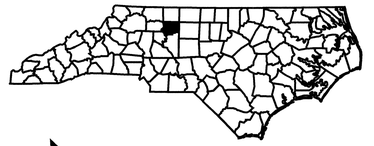
FORSYTH COUNTY

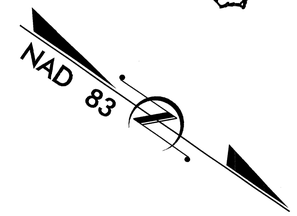
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2826A		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34871.1.1	NHF-52 (4)	P.E.
34871.2.2	NHF-52 (14)	R/W & UTIL.
34871.3.2	BRNHS-52(19)	CONST.

LOCATION: US 52 OVER THE NORFOLK SOUTHERN RAILROAD IN WINSTON-SALEM

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RESURFACING, WIDENING, CURB & GUTTER, SIGNING, SIGNALS, AND STRUCTURES

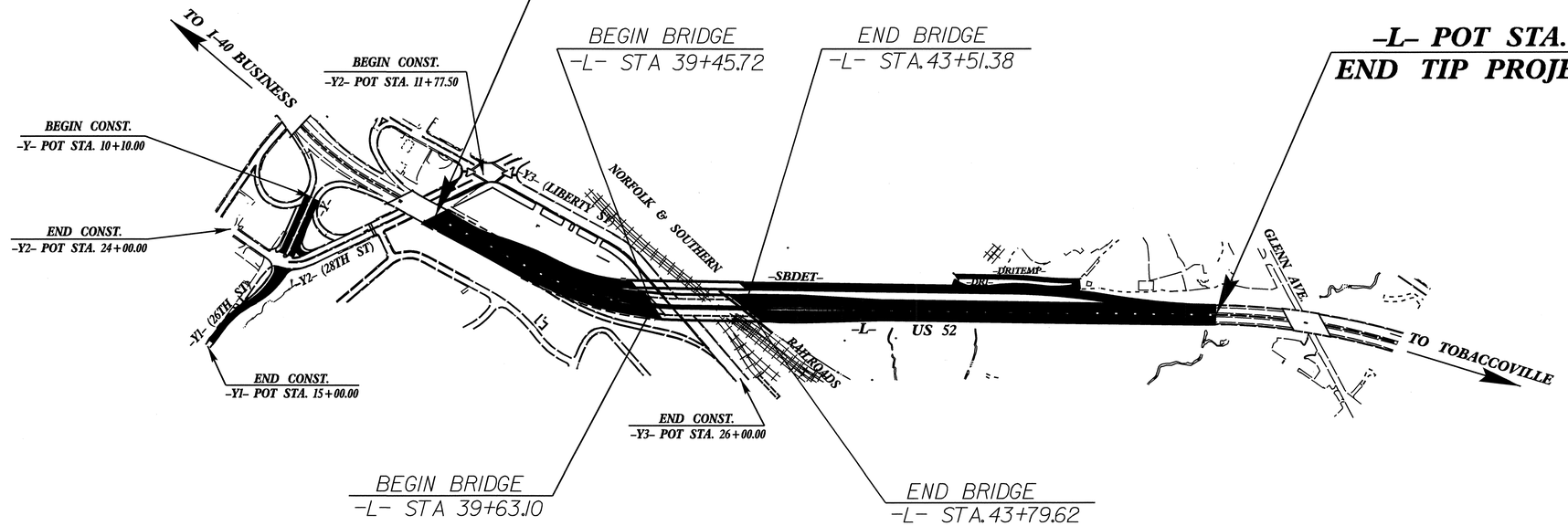




WINSTON-SALEM

-L- POT STA. 29+28.33
BEGIN TIP PROJECT U-2826A

-L- POT STA. 64+02.32
END TIP PROJECT U-2826A



STRUCTURES

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2009 =	77,800
ADT 2030 =	77,600
DHV =	10 %
D =	50 %
T =	12 % *
V =	55 MPH
V (DETOUR) =	45 MPH
* TTST 7 %	DUAL 5%
FUNC CLASS =	FREEWAY
STATEWIDE TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2826A	=	0.579 MILES
LENGTH STRUCTURE TIP PROJECT U-2826A	=	0.079 MILES
TOTAL LENGTH TIP PROJECT U-2826A	=	0.658 MILES

* LENGTHS BASED ON NBL BRIDGES

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:
FEBRUARY 16, 2010

ROY M. GIROLAMI, P.E.
PROJECT ENGINEER

LAURA E. SUTTON, P.E.
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

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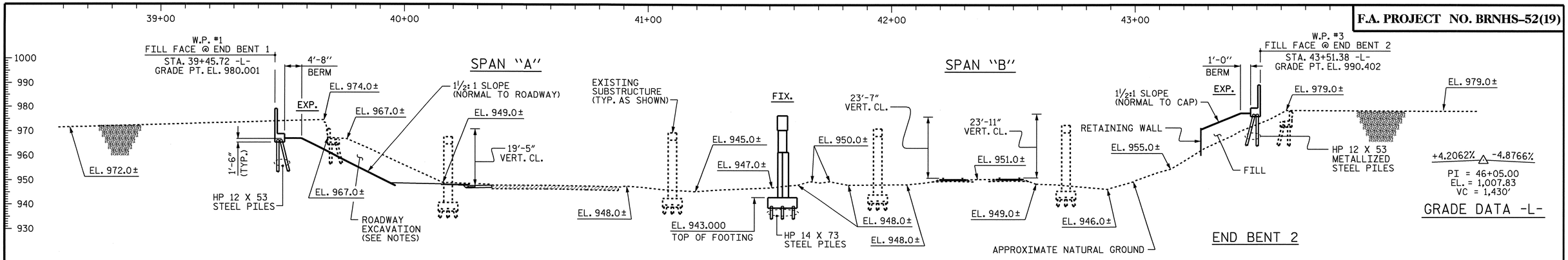
F.A. PROJECT NO. BRNHS-52(19)

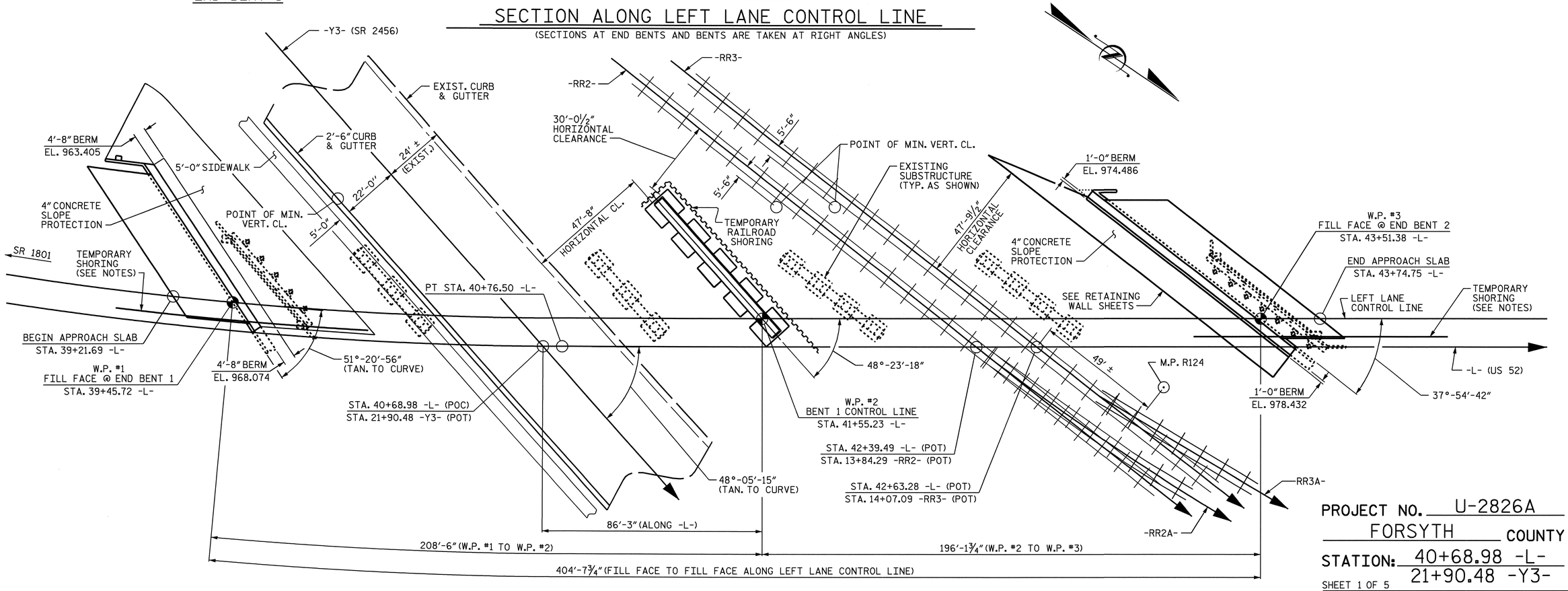


END BENT 1

BENT 1

SECTION ALONG LEFT LANE CONTROL LINE

(SECTIONS AT END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)



PLAN

(FOR CLARITY, PILES ARE NOT SHOWN IN PLAN VIEW)
(FOR TRACK PROFILE ELEVATIONS, SEE SHEET 4 OF 5)

HORIZONTAL CURVE DATA -L-

PI STA. 37+35.84
Δ = 27°-48'-44.1" (LT.)
D = 4°-00'-00.0"
L = 695.30'
T = 354.64'
R = 1,432.39'

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-
21+90.48 -Y3-

SHEET 1 OF 5

MILE POST R124 REPLACES BRIDGE NO. 257
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LEFT LANE BRIDGE OVER NORFOLK SOUTHERN RAILROAD AND SR 2456 ON US 52 SOUTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			94

STR. #1

DRAWN BY : A.S. CALLAWAY DATE : 2/20/09
CHECKED BY : L.E. SUTTON DATE : 5/01/09

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER ROY M. GIROLAMI 1-5-10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

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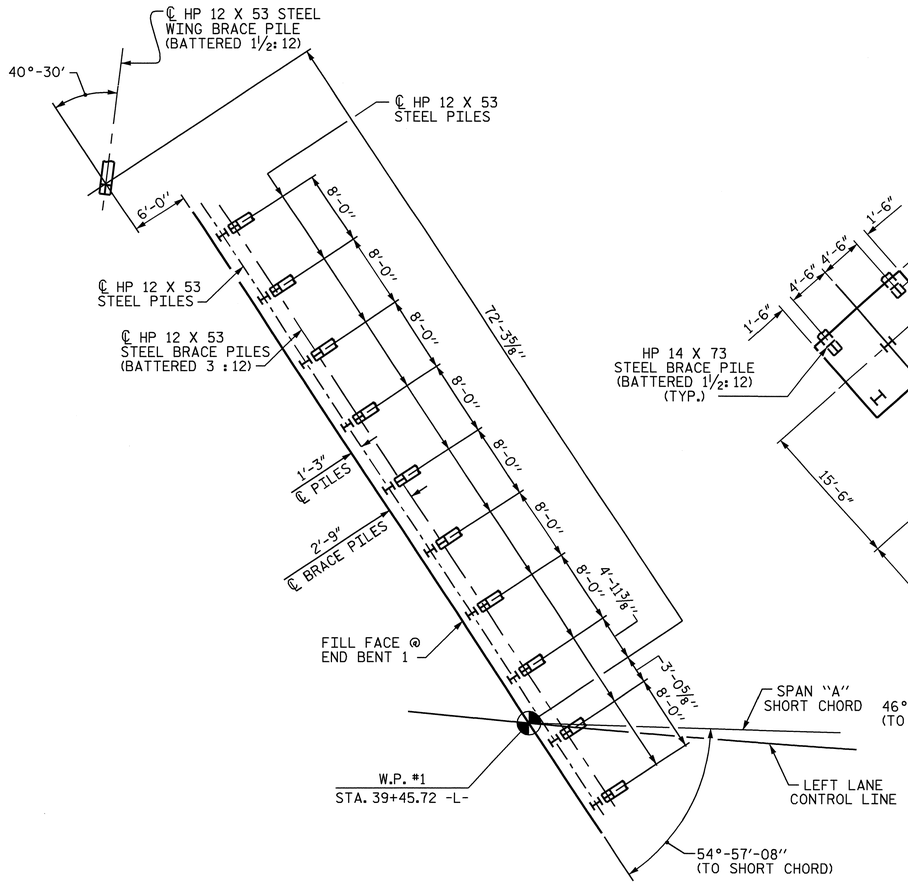
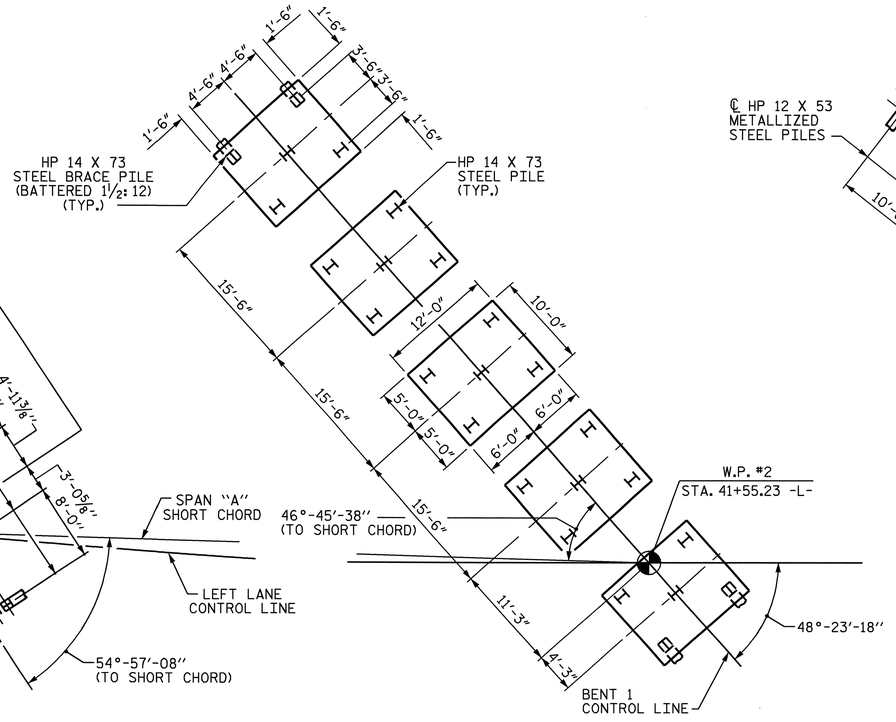
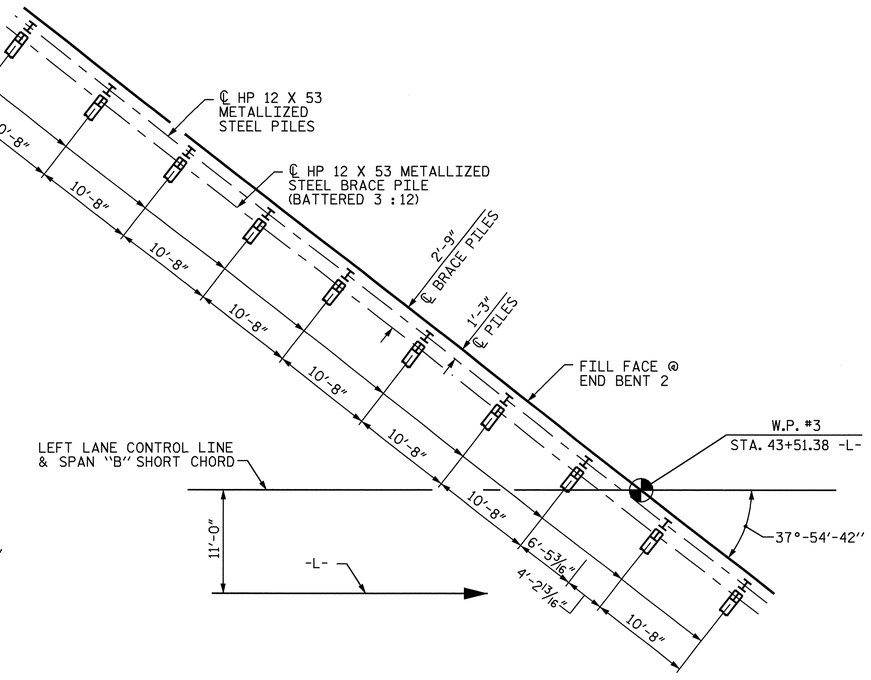
lsutton



END BENT 1



BENT 1



END BENT 2

NOTES (CONTINUED ON SHEET 5 OF 5)

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENTS 1 & 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 190 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 320 TONS PER PILE.

TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING.

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF CAP OR FOOTING.

DIMENSIONS LOCATING END BENT WING BRACE PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF WING.

DIMENSIONS AND PILE LAYOUT TYPICAL FOR EACH FOOTING.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE WING BRACE PILE BATTER IS 1½:12 TO AVOID IMPACTING SEWER LINE.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LEFT LANE BRIDGE OVER NORFOLK SOUTHERN RAILROAD AND SR 2456 ON US 52 NORTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 4/22/09
CHECKED BY : L.E. SUTTON DATE : 10/19/09

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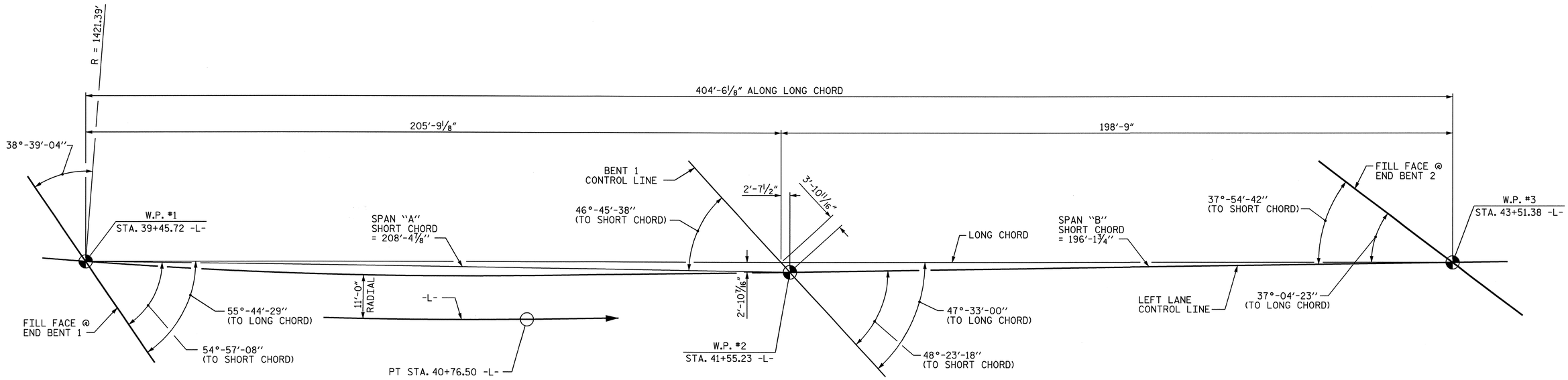

LONG CHORD LAYOUT

HORIZONTAL CURVE DATA -L-

PI STA. 37+35.84
Δ = 27°-48'-44.1" (LT.)
D = 4°-00'-00.0"
L = 695.30'
T = 354.64'
R = 1,432.39'

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LEFT LANE BRIDGE OVER
NORFOLK SOUTHERN
RAILROAD AND SR 2456
ON US 52 SOUTH BETWEEN
SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			94

NORTH CAROLINA PROFESSIONAL SEAL 21838 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/26/09
CHECKED BY : L.E. SUTTON DATE : 4/14/09

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STR. #1

-RR1-		
STATION	LEFT RAIL	RIGHT RAIL
14+07.78		948.406
14+10.45	948.542	
14+14.23	948.494	
14+15.17		948.309
14+55.23		947.891
14+55.30	947.974	
14+57.80	947.967	
14+74.38		947.789
14+97.15	947.482	
15+22.10		946.976
15+54.52	946.541	
15+54.70		946.366
16+08.03		945.830
16+09.43	945.848	

-RR1A-		
STATION	LEFT RAIL	RIGHT RAIL
10+31.27	947.529	
10+65.49	946.676	
10+73.88		946.657
10+95.86	946.147	
11+27.01		945.364
11+27.10	945.326	
11+77.15	944.855	
11+77.36		944.910

-RR2A-		
STATION	LEFT RAIL	RIGHT RAIL
10+00.63	950.150	
10+00.83		950.065
10+20.46	949.933	
10+43.76		949.652
10+58.87	949.493	
10+78.21		949.280
10+86.82		949.111
10+93.52	949.131	
11+17.09		948.958
11+28.42	948.852	
11+29.31	948.845	
11+58.74		948.595
11+58.90	948.664	

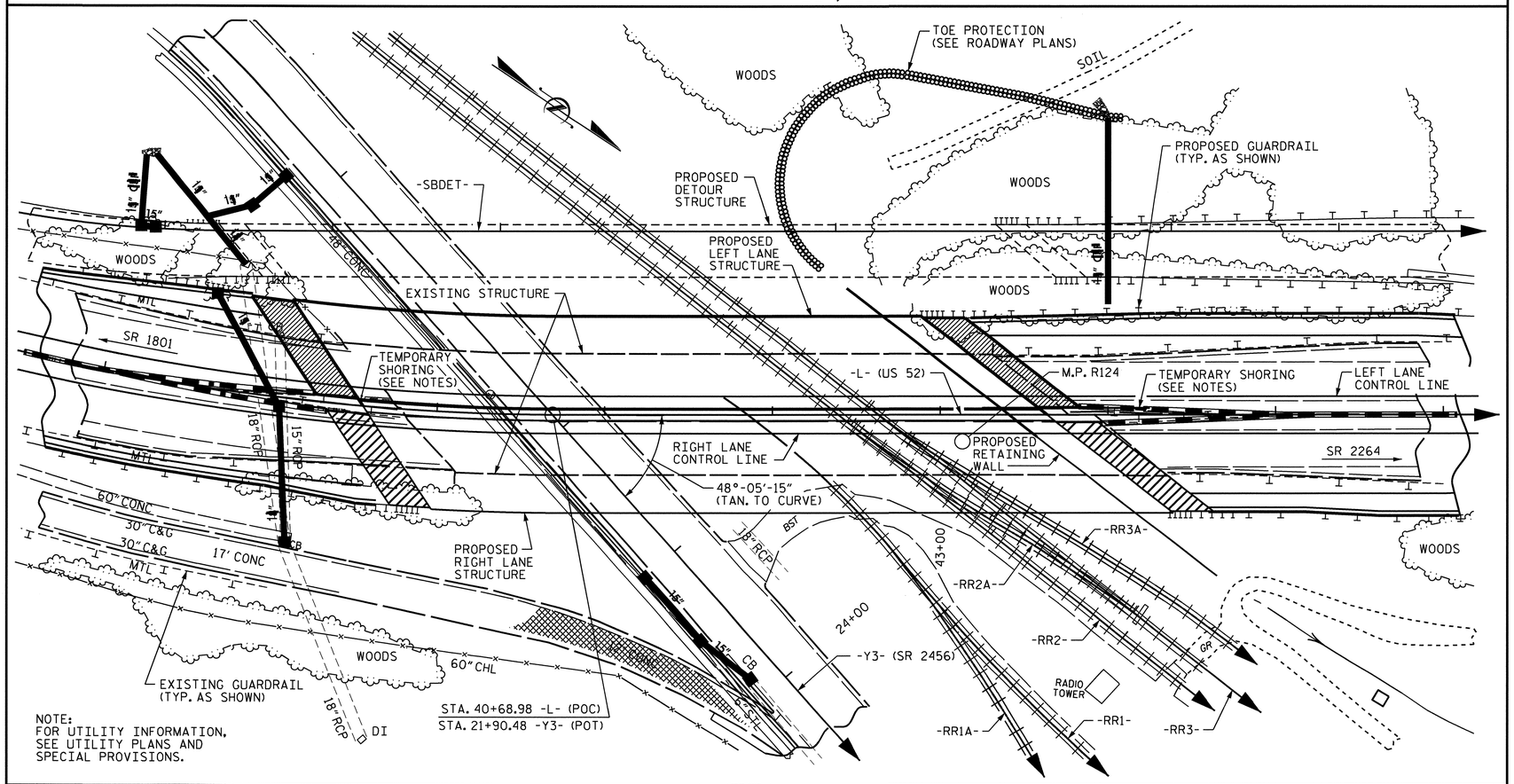
-RR3A-		
STATION	LEFT RAIL	RIGHT RAIL
10+28.60	950.108	
10+33.28		949.948
10+68.02	949.534	
10+73.36		949.350
10+74.15		949.340
10+81.23		949.254
11+15.19	948.760	
11+15.46		948.862
11+60.56	948.012	
11+60.81		948.062
12+07.55	947.353	
12+08.05		947.476
12+54.54	947.009	
12+54.67		946.957

TRACK ELEVATIONS

-RR2-		
STATION	LEFT RAIL	RIGHT RAIL
10+06.12		954.965
10+06.27	954.888	
10+76.15	954.049	
10+76.34		954.064
11+45.64	953.164	
11+45.70		953.179
12+14.23	952.268	
12+14.46		952.271
12+84.85	951.462	
12+84.90		951.469
13+48.06	950.678	
13+48.12		950.666
13+89.53	950.203	
13+94.28	950.150	
14+03.97		950.057
14+14.06	949.933	
14+37.25	949.677	
14+76.08	949.162	
14+80.78	949.166	
15+16.82		948.617
15+16.83	948.644	
15+76.23		947.925
15+76.38	947.932	
16+36.52		947.349
16+36.98	947.387	

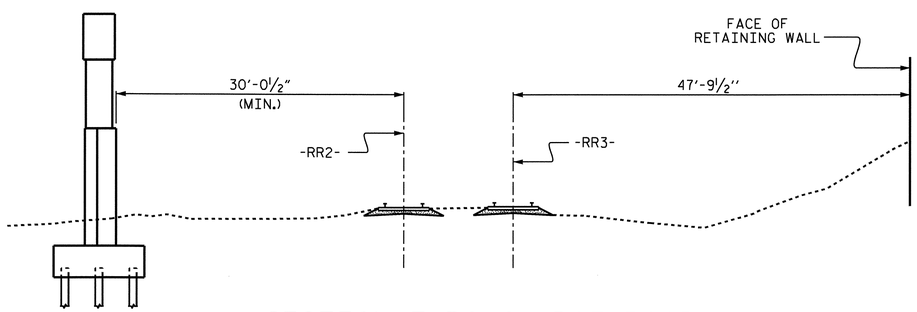
-RR3-		
STATION	LEFT RAIL	RIGHT RAIL
10+10.97		955.078
10+11.06	955.118	
10+32.32		954.988
10+32.37	954.967	
10+99.95		954.131
11+00.13	954.198	
11+64.04	953.407	
11+64.28		953.339
12+31.55		952.574
12+31.65	952.570	
12+96.78	951.776	
12+96.80		951.783
13+61.04		950.995
13+61.09	951.000	
13+66.04		950.928
13+92.24	950.511	
14+16.58		950.177
14+31.66	949.966	
14+66.21		949.429
14+67.82	949.419	
14+71.67	949.346	
14+79.14	949.329	
15+01.94	949.123	
15+25.86		948.849
15+54.96	948.616	
15+56.00		948.599
16+04.85		947.858
16+05.33	947.879	

BM #108: R/R SPIKE IN BASE OF 24"OAK, 80' EAST OF US 52 NORTH, 600' SOUTH OF GLENN AVE. WEST OF BRENNER STEEL. 64' RT. OF STA. 156+57 -BL-, EL. 948.69'



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

LOCATION SKETCH



SECTION THROUGH RAILROAD

(LOOKING IN DIRECTION OF DECREASING STATIONS ON RAILROAD)
BRIDGE LENGTH BASED ON THIS THEORETICAL SECTION.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LEFT LANE BRIDGE OVER NORFOLK SOUTHERN RAILROAD AND SR 2456 ON US 52 SOUTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/20/09
CHECKED BY : L.E. SUTTON DATE : 4/23/09

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TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMPORARY STRUCTURE	TEMPORARY RAILROAD SHORING	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION	PDA TESTING	PDA ASSISTANCE	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES		HP 14 X 73 STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	POT BEARINGS	EVAZOTE JOINT SEALS	HP 12 X 53 METALLIZED STEEL PILES	
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE							21,557	21,362		LUMP SUM			1,251,800					780.51		LUMP SUM	LUMP SUM		
END BENT 1									81.5		12,262			21	1,050				407				
BENT 1		LUMP SUM		LUMP SUM					330.3		38,838	1,030				25	750						
END BENT 2									96.6		16,185								152			20	1,400
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	1	1	21,557	21,362	508.4	LUMP SUM	67,285	1,030	1,251,800	21	1,050	25	750	780.51	559	LUMP SUM	LUMP SUM	20	1,400

NOTES (CONTINUED FROM SHEET 2 OF 5)

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 5 SPANS (1 @ 52.46', 1 @ 84.56', 1 @ 80.47', 1 @ 78.00' AND 1 @ 91.25') WITH A CLEAR ROADWAY WIDTH OF 28.0' ON A 6½" CONCRETE DECK WITH ASPHALT WEARING SURFACE ON STEEL I-BEAMS, CONCRETE CAPS AND PRESTRESSED CONCRETE PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

WORK SHALL NOT BE STARTED ON SLOPE PROTECTION AT END BENT 1 UNTIL ROADWAY SECTION FOR ALIGNMENT -Y3- HAS BEEN EXCAVATED.

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.

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.

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 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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STA. 40+68.98 -L-."

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

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STA. 40+68.98 -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.

FOR TEMPORARY RAILROAD SHORING, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGE DECKS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LEFT LANE BRIDGE OVER NORFOLK SOUTHERN RAILROAD AND SR 2456 ON US 52 SOUTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			94

STR. #1

DRAWN BY : A.S. CALLAWAY DATE : 2/20/09
CHECKED BY : L.E. SUTTON DATE : 5/01/09

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE							COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.38	--	1.75		1.38	A	ER	78.46						1.30						
		HL-93 (OPERATING)	N/A		1.78	--	1.35		1.78	A	ER	78.46						1.00						
		HS-20 (INVENTORY)	36.00	2	1.23	44.3	1.80		1.23	A	ER	78.46						1.30						
		HS-20 (OPERATING)	36.00		1.60	57.6	1.35		1.60	A	ER	78.46						1.00						
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50		7.51	101.4			7.51	A	ER	78.46						1.30						
		NGARBS2	20.00		5.25	105.0			5.25	A	ER	78.46						1.30						
		NAGRIS2	22.00		4.83	106.3			4.83	A	ER	78.46						1.30						
		NCOTTS3	27.25		3.73	101.6			3.73	A	ER	78.46						1.30						
		NAGGRS4	34.93		2.98	104.1			2.98	A	ER	78.46						1.30						
		NS5A	35.55		2.93	104.2			2.93	A	ER	78.46						1.30						
		NS6A	39.95		2.63	105.1			2.63	A	ER	78.46						1.30						
		NS7B	42.00		2.51	105.4			2.51	A	ER	78.46						1.30						
	TRUCK TRACTOR SEMI-TRAILER (TTST)	NAGRIT3	33.00		3.20	105.6			3.20	A	ER	78.46						1.30						
		NT4A	33.08		3.19	105.5			3.19	A	ER	78.46						1.30						
		NT6A	41.60		2.50	104.0			2.50	A	ER	78.46						1.30						
		NT7A	42.00		2.38	100.0			2.38	A	ER	78.46						1.30						
		NT7B	42.00	3	2.36	99.1			2.36	A	ER	78.46						1.30						
		NAGRIT4	43.00		2.56	110.1			2.56	A	ER	78.46						1.30						
		NAGRIT5A	45.00		2.55	114.8			2.55	A	ER	78.46						1.30						
		NAGRIT5B	45.00		2.57	115.7			2.57	A	ER	78.46						1.30						
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																					

LOAD FACTORS:

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

LEGAL LOAD RATING FACTORS	YEAR	ADTT	γ_L
	2009	4668	
	2030	4656	N/A

NOTES:

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

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

COMMENTS:

1. STRENGTH I SHEAR AND SERVICE II MOMENT RATINGS ARE NOT PROVIDED DUE TO CURVATURE OF THE BRIDGE.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **

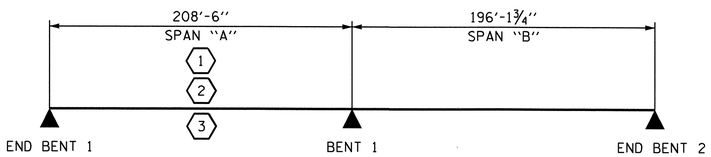
(2) DESIGN LOAD RATING (HS-20) **

(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. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			94

STR. #1 STD. NO. LRFR3

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/13/09
CHECKED BY : A.C. OUTLAW DATE : 8/28/09
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08R MAA/GM

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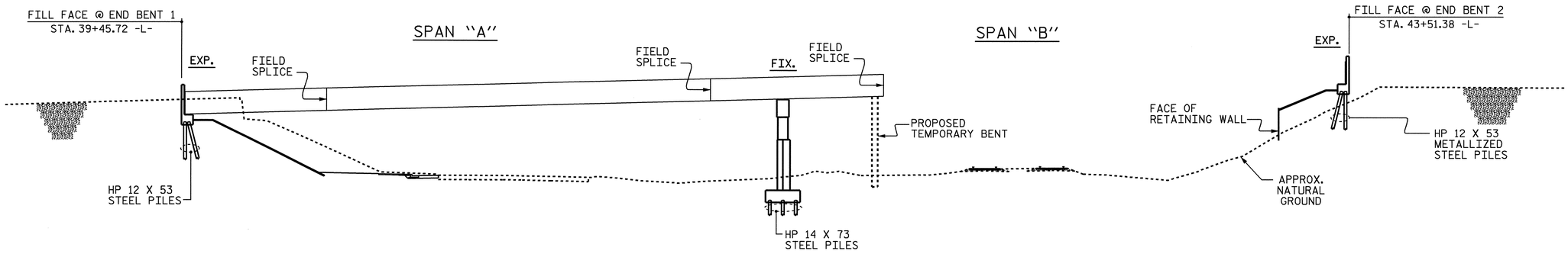
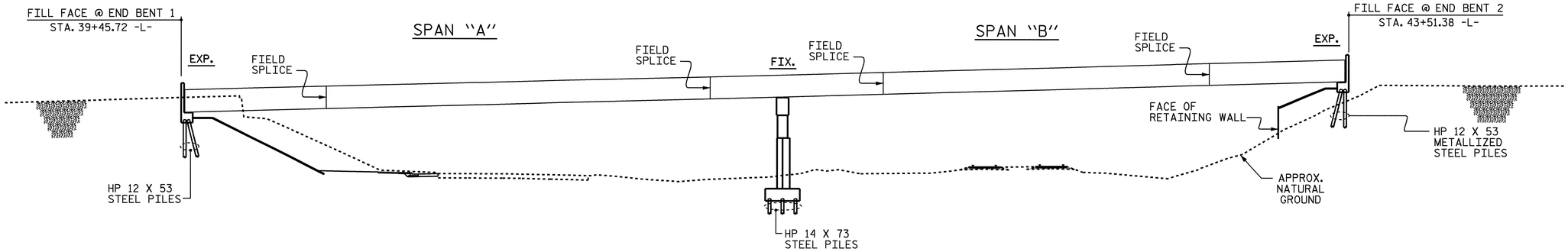


STAGE I GIRDER ERECTION

(SECTIONS AT END AND END BENTS ARE AT RIGHT ANGLES)



STAGE II GIRDER ERECTION

(SECTIONS AT END AND END BENTS ARE AT RIGHT ANGLES)

NOTES

PLACEMENT OF TEMPORARY BENTS SHALL BE COORDINATED WITH TRAFFIC PHASING REQUIREMENTS. SEE TRAFFIC CONTROL PLANS.

PLANS FOR TEMPORARY BENT ERECTION AND REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

TEMPORARY BENTS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER WHO IS REGISTERED IN THE STATE OF NORTH CAROLINA. THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WORKING DRAWINGS AND CALCULATIONS FOR APPROVAL BY THE ENGINEER.

DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY BENTS AND TO ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.

THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.

THE CONTRACTOR'S ERECTION PLAN SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT TRANSFERS THE STRUCTURAL STEEL WEIGHT UNIFORMLY TO THE DIAPHRAGMS WHILE THE GIRDERS REMAIN IN THE CAMBERED POSITION.

THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION. A MINIMUM OF ONE TEMPORARY BENT SHALL BE USED. TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL DIAPHRAGMS ARE IN PLACE AND HIGH STRENGTH BOLTS ARE TIGHTENED.

LOCATE TEMPORARY BENTS AT CONNECTOR PLATES. IF CONNECTOR PLATES ARE USED AS TEMPORARY BEARING STIFFENERS, DIAPHRAGMS MUST BE ATTACHED.

THE FIRST TWO GIRDERS SHALL BE ERECTED SIMULTANEOUSLY WITH ALL DIAPHRAGMS BETWEEN THE GIRDERS IN PLACE AND THE BOLTS TIGHTENED PRIOR TO RELEASING THE GIRDERS. CONNECT ADDITIONAL GIRDERS ADJACENT TO THE PREVIOUSLY ERECTED GIRDERS AND TIGHTEN ALL BOLTS PRIOR TO RELEASING ADDITIONAL GIRDERS.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PROVIDING THE TEMPORARY BENT. THE COST FOR ALL MATERIALS, EQUIPMENT, TOOLS, LABOR AND ANY INCIDENTALS NECESSARY TO PROVIDE THE TEMPORARY BENT SHALL BE CONSIDERED INCIDENTAL TO THE LUMP SUM BID PRICE FOR STRUCTURAL STEEL.

DRAWN BY : A.S. CALLAWAY DATE : 8/4/09
CHECKED BY : T.L. CLELLAND DATE : 8/4/09

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PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

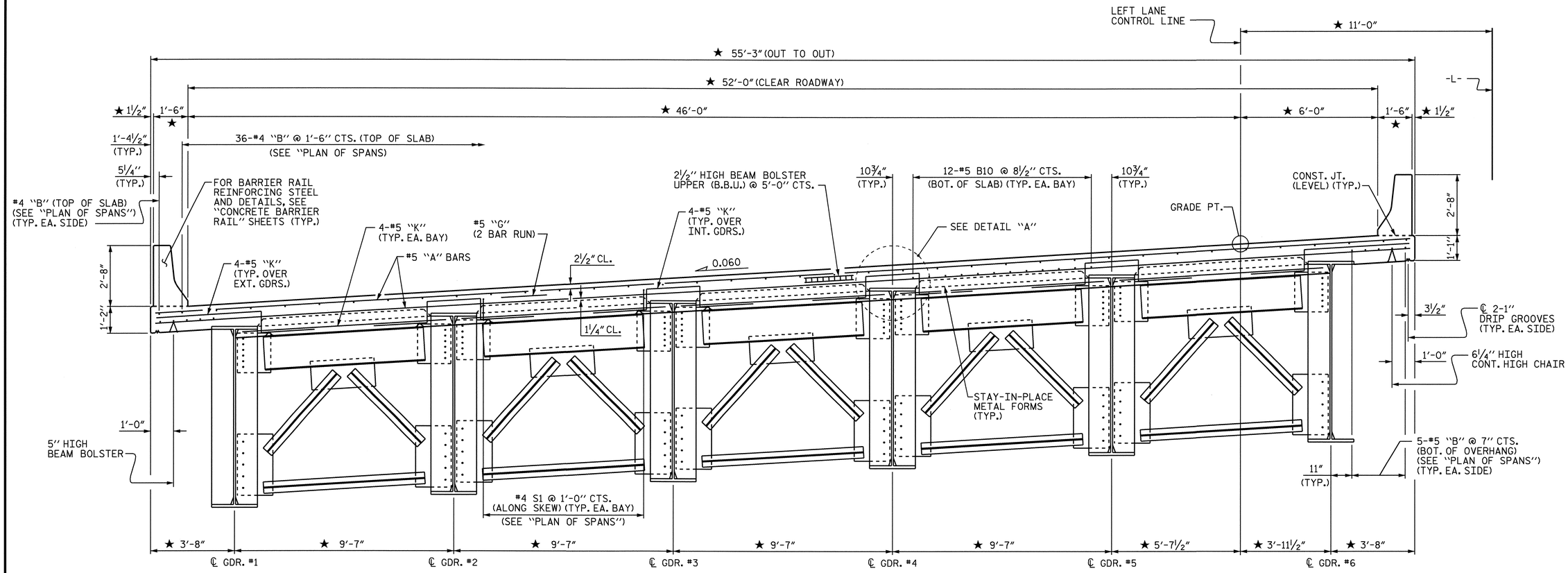
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GIRDER ERECTION DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			94

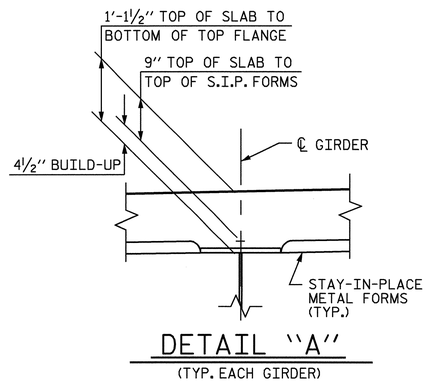
STR. #1



★ DIMENSIONS ARE RADIAL AT END BENT 1 ONLY.

AT END BENT DIAPHRAGMS

TYPICAL SECTION



DETAIL "A"

(TYP. EACH GIRDER)

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.

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

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

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF ½", SEE SPECIAL PROVISION FOR POT BEARINGS.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			94

STR. #1

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CHECKED BY : K.D. LAYNE DATE : 3/26/09

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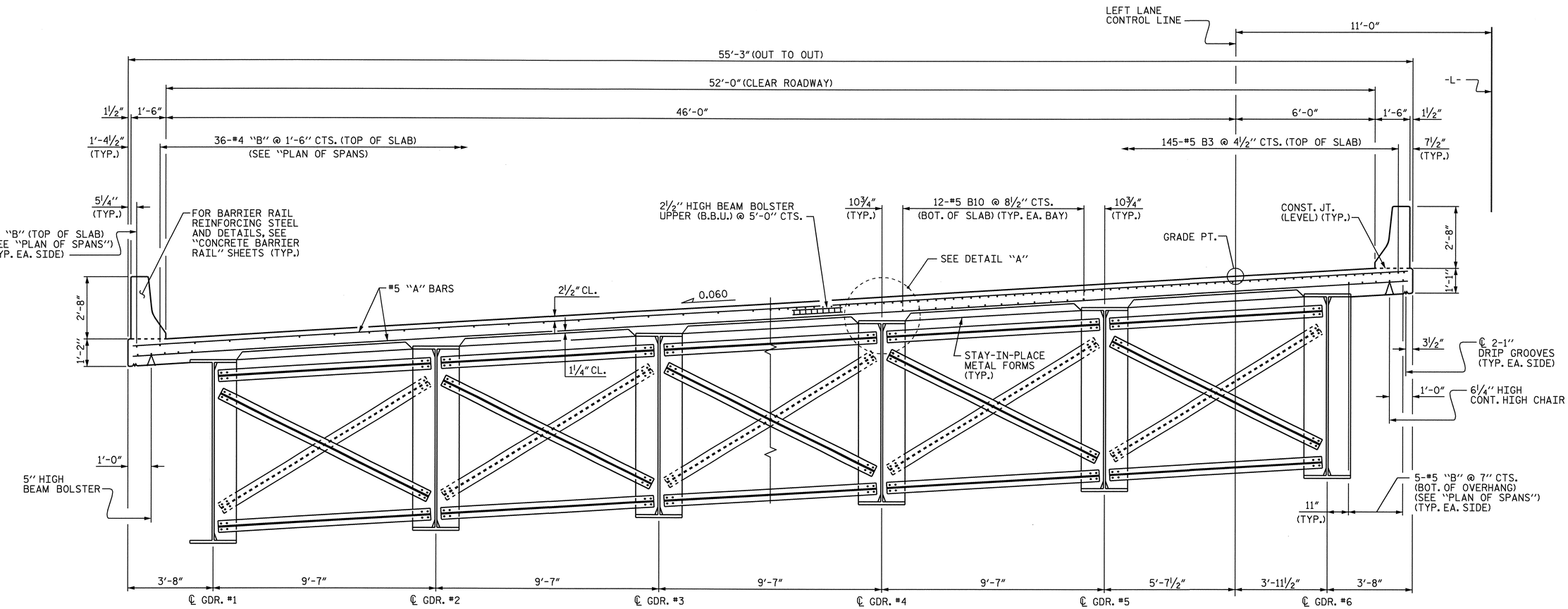
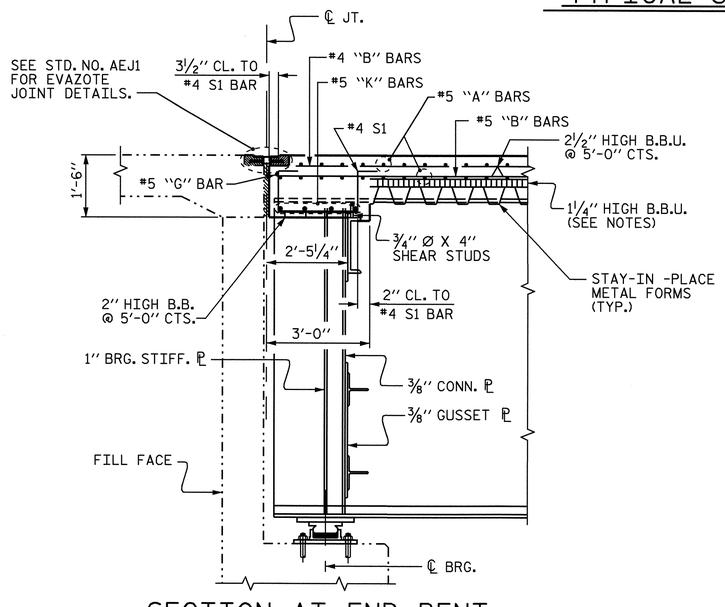


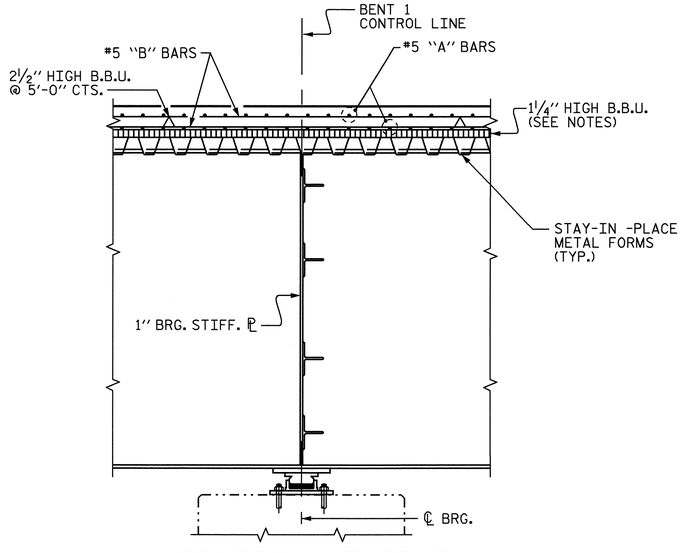
TYPICAL SECTION

AT INTERMEDIATE DIAPHRAGMS



SECTION AT END BENT

AT BENT DIAPHRAGMS



SECTION AT BENT

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CHECKED BY : K.D. LAYNE DATE : 3/26/09

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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 11/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

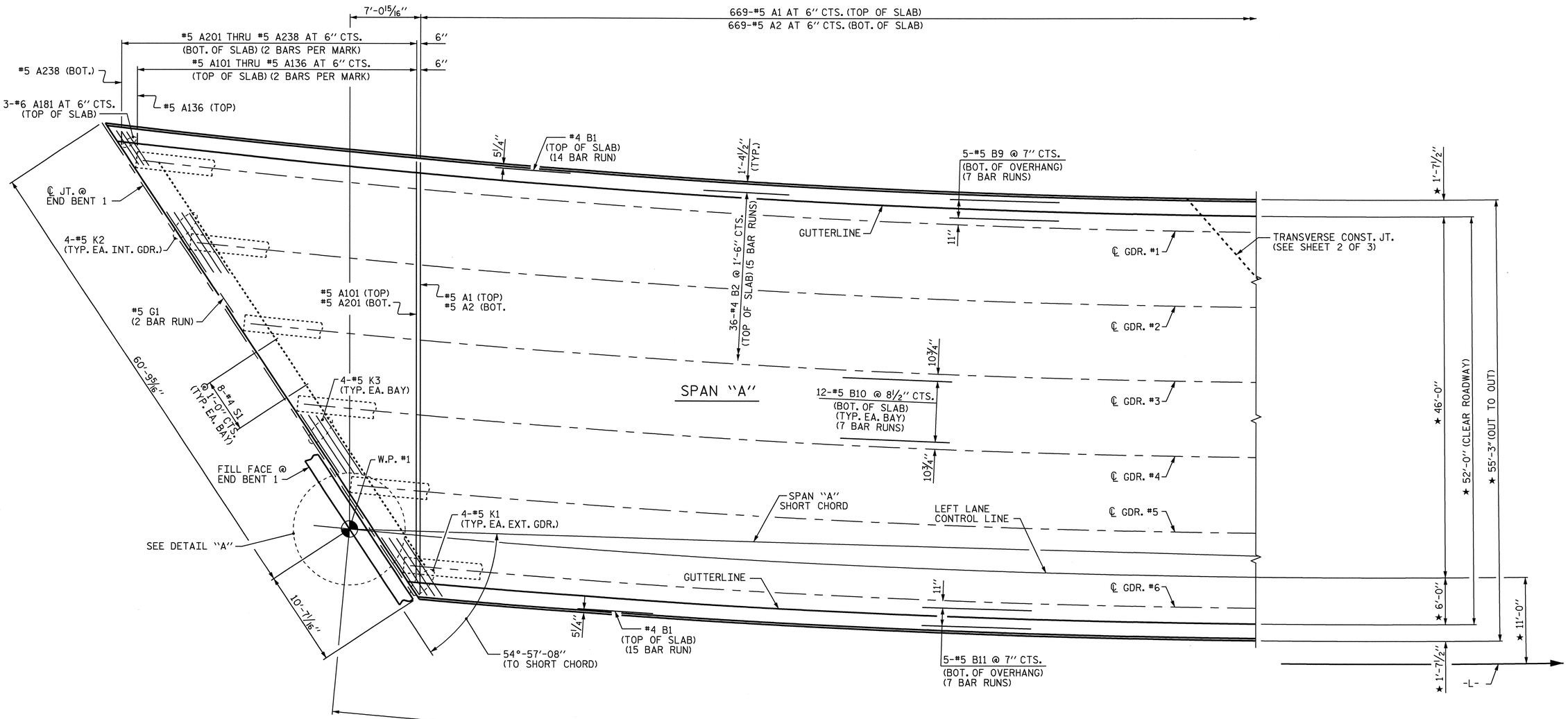
SUPERSTRUCTURE

TYPICAL SECTIONS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			94

STR. #1

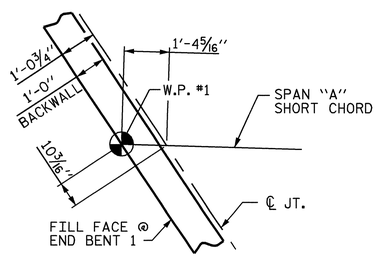


★ RADIAL DIMENSIONS

PARTIAL PLAN OF SPAN

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

FOR SPAN "A" OFFSETS, SEE "ARC OFFSETS" SHEET.



DETAIL "A"

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/21/09
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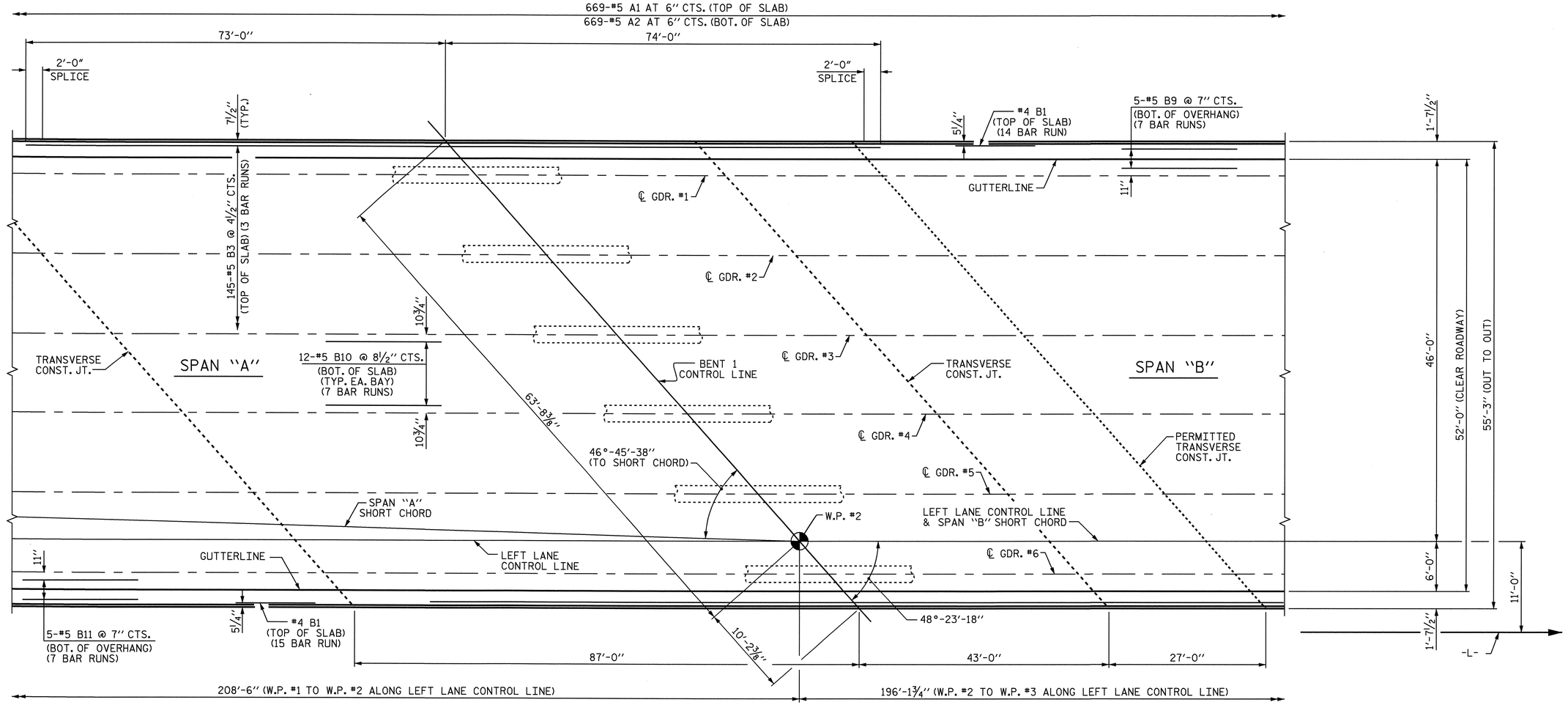
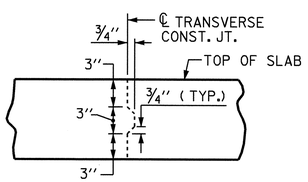


PARTIAL PLAN OF SPAN

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



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			94

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/21/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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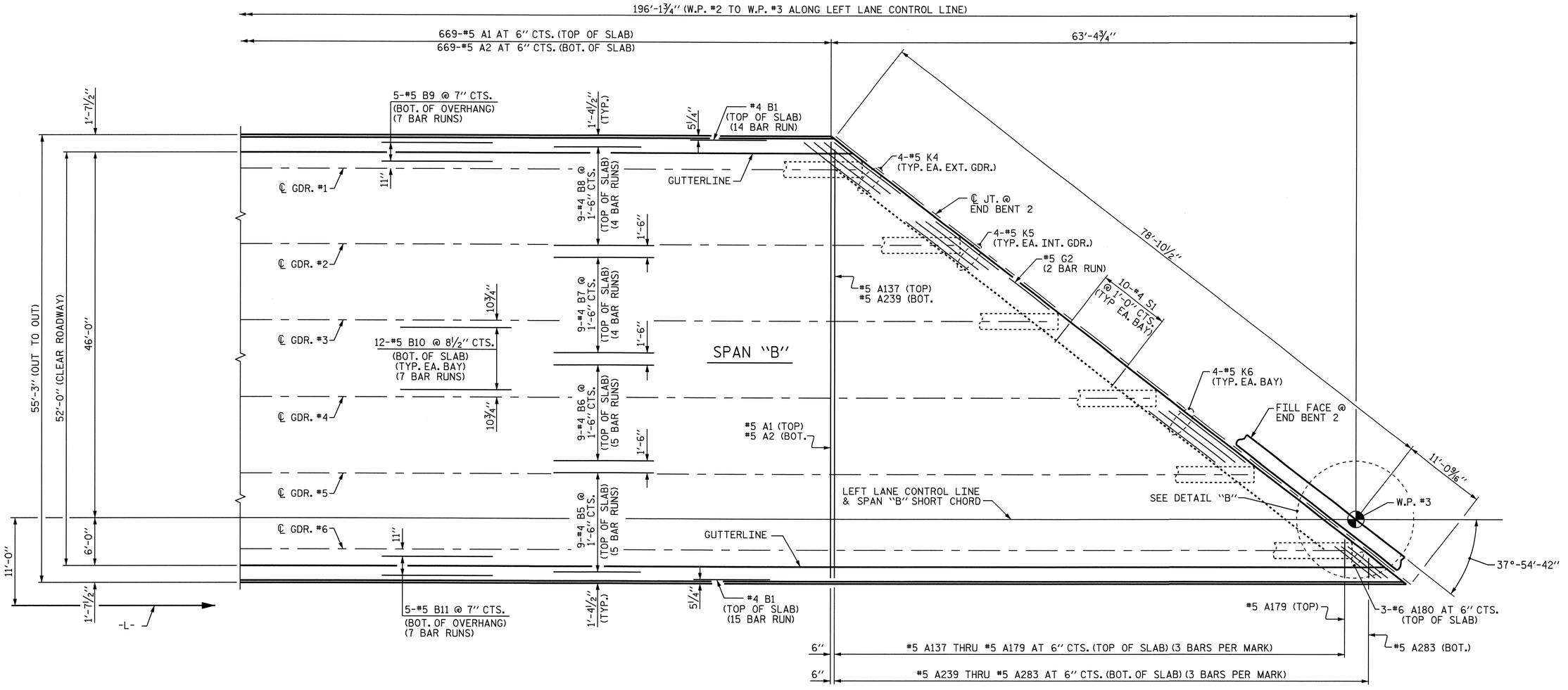
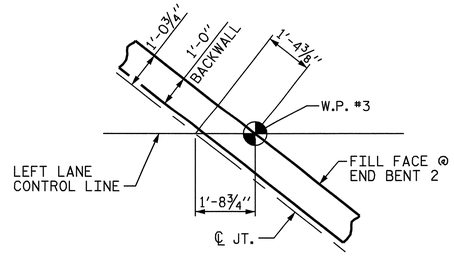
STR. #1



PARTIAL PLAN OF SPAN

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



DETAIL "B"

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/21/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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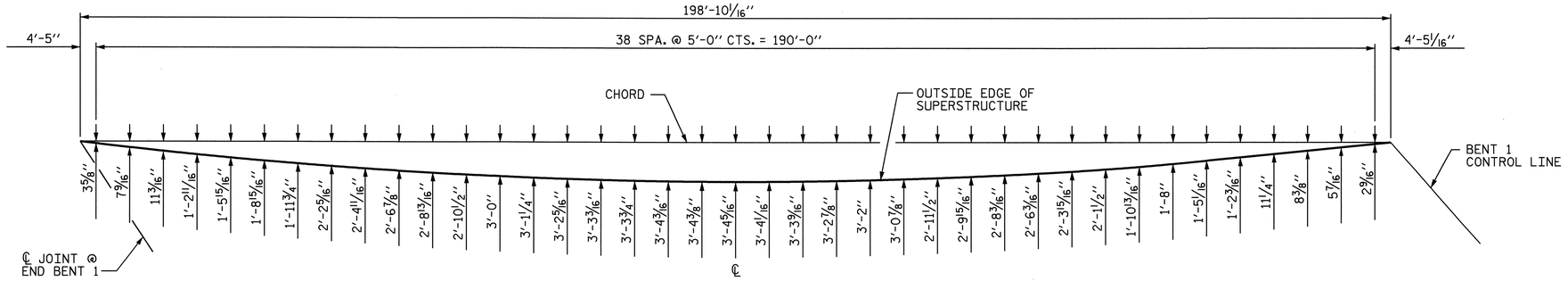
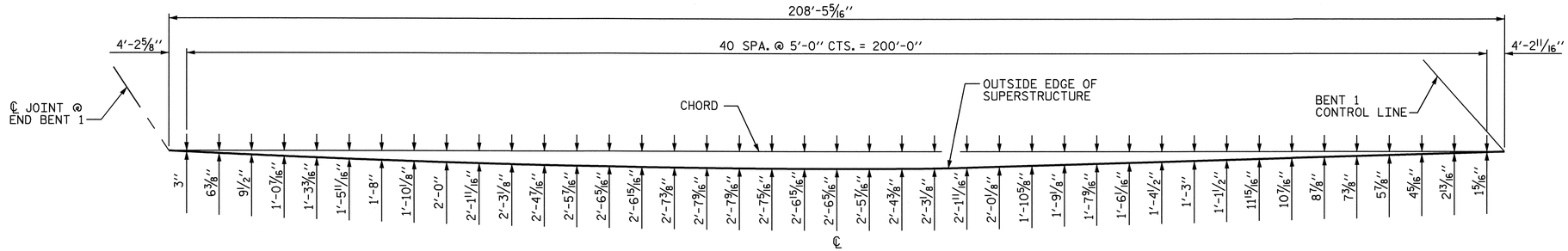


LEFT SIDE



RIGHT SIDE

SPAN "A" ARC OFFSETS

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			94

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 11/12/08
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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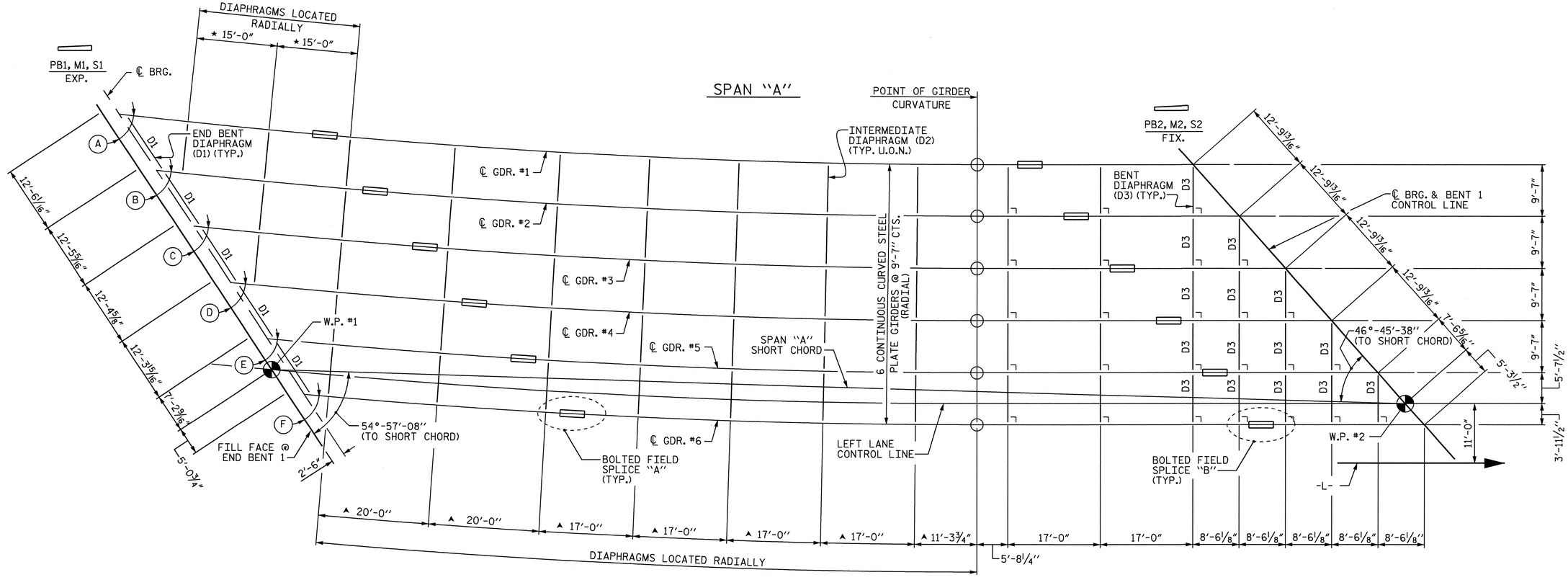
STR. #1



ANGLES	
A	49°-52'-16"
B	50°-12'-15"
C	50°-31'-51"
D	50°-51'-06"
E	51°-10'-00"
F	51°-28'-34"

ALL ANGLES ARE TANGENT TO CURVE.

FRAMING PLAN

★ MEASURED ALONG THE ℄ GIRDER #1

▲ MEASURED ALONG THE ℄ GIRDER #6

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/14/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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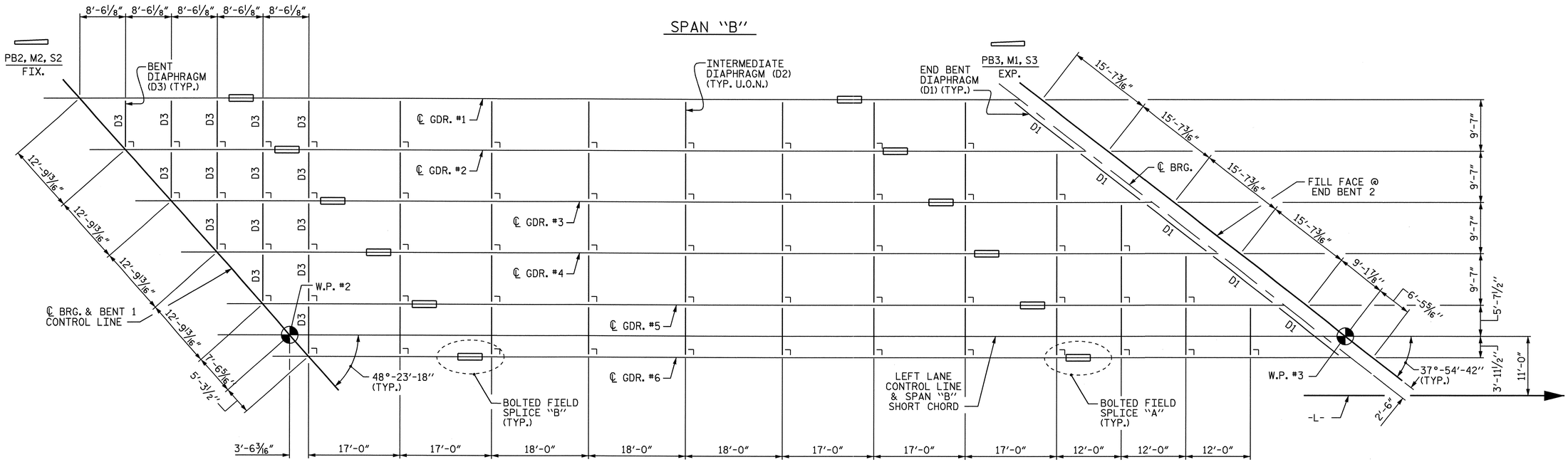

FRAMING PLAN

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/14/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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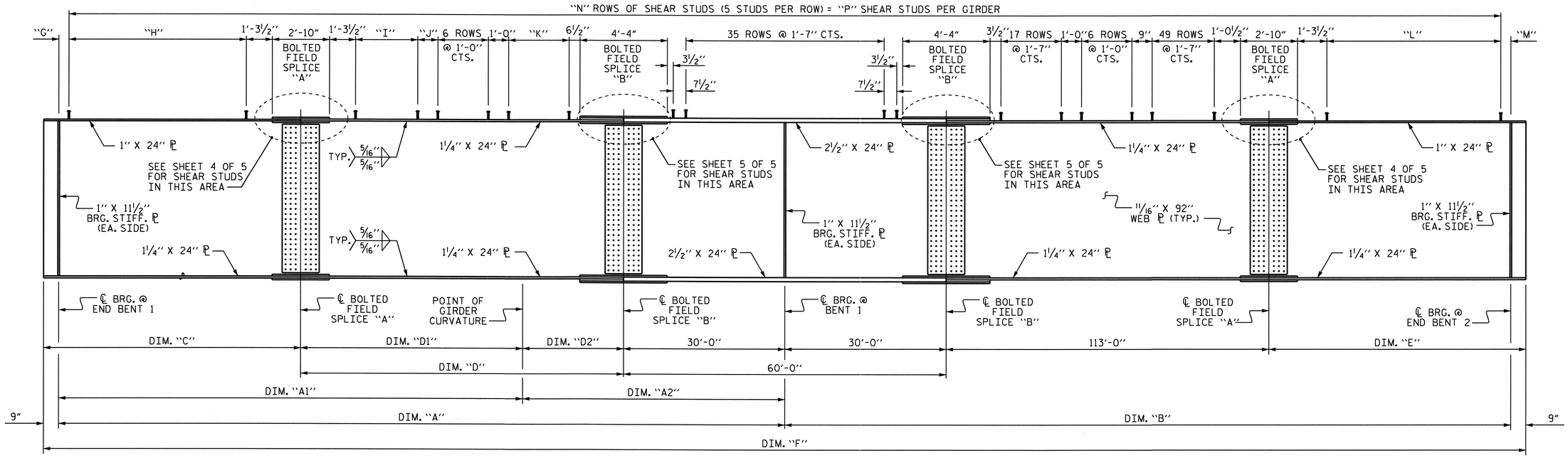
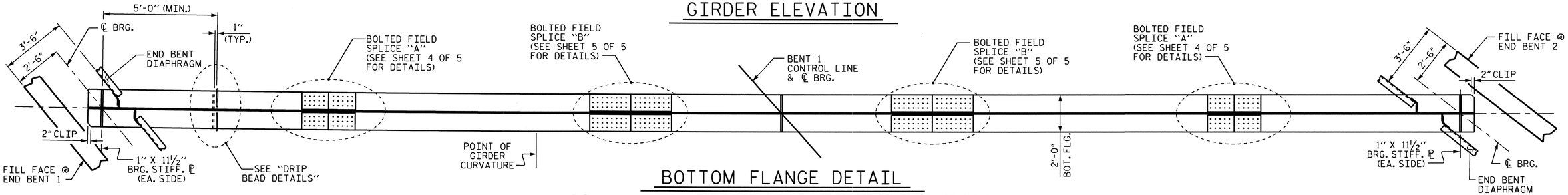


GIRDER ELEVATION



BOTTOM FLANGE DETAIL

(FOR CLARITY, INTERMEDIATE DIAPHRAGMS AND TRANSVERSE STIFFNERS NOT SHOWN.
TRANVSERSE STIFFNERS ARE LOCATED AT D3 DIAPHRAGMS, SEE FRAMING PLAN.)

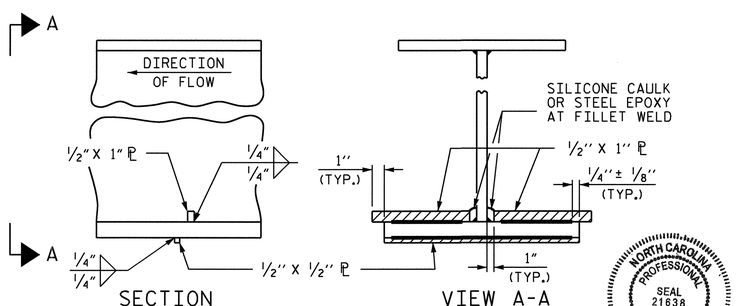
GIRDER DIMEMSIONS

GIRDER	RADIUS	A1	A2	A	B	C	D1	D2	D	E	F
1	1377'-5¼"	158'-0 3/16" (158'-1 3/8")	39'-8¼" (39'-8½")	197'-8 7/16" (197'-9 7/8")	174'-8⅛" (174'-8 11/16")	38'-9 9/16"	120'-0 3/16"	9'-8¼"	129'-8 7/16"	32'-5⅛"	373'-10 9/16"
2	1387'-0¼"	151'-1 3/16" (151'-2¼")	48'-2⅜" (48'-2 11/16")	199'-3 9/16" (199'-4 5/16")	178'-5⅝" (178'-6 3/16")	41'-1⅛"	110'-9"	18'-2⅜"	128'-11⅜"	36'-2⅝"	379'-3 1/16"
3	1396'-7¼"	144'-2 9/16" (144'-3½")	56'-8½" (56'-8⅞")	200'-11 1/16" (201'-0⅜")	182'-3 3/16" (182'-3 11/16")	43'-4 13/16"	101'-6¾"	26'-8½"	128'-3¼"	40'-0 3/16"	384'-8¼"
4	1406'-2¼"	137'-4 7/16" (137'-5¼")	65'-2 11/16" (65'-3 3/16")	202'-7⅛" (202'-8 5/16")	186'-0 11/16" (186'-1 3/16")	45'-8"	92'-5⅜"	35'-2 11/16"	127'-8 1/16"	43'-9 11/16"	390'-1 13/16"
5	1415'-9¼"	130'-6 11/16" (130'-7 1/16")	73'-8 13/16" (73'-9¼")	204'-3½" (204'-4 11/16")	189'-10 3/16" (189'-10 11/16")	47'-10 13/16"	83'-4⅞"	43'-8 13/16"	127'-1 11/16"	47'-7 3/16"	395'-7 11/16"
6	1425'-4¼"	123'-9 5/16" (123'-10 1/16")	82'-2 15/16" (82'-3 7/16")	206'-0¼" (206'-1½")	193'-7¾" (193'-8 3/16")	50'-1 5/16"	74'-5 1/16"	52'-2 15/16"	126'-8"	51'-4¾"	401'-2"

* SLOPED GIRDER LENGTHS SHOWN IN PARENTHESES.
ALL GIRDER DIMENSIONS IN THE ABOVE TABLE ARE MEASURED ALONG ℄ OF GIRDER.

STUD DIMENSIONS

GIRDER	G	H	I	J	K	L	M	N	P
1	5 9/16"	23 ROWS @ 1'-7" CTS.	66 ROWS @ 1'-7" CTS.	1'-1 7/16"	10 ROWS @ 1'-7" CTS.	19 ROWS @ 1'-7" CTS.	5⅝"	233	1165
2	1'-2⅝"	24 ROWS @ 1'-7" CTS.	66 ROWS @ 1'-7" CTS.	4⅜"	10 ROWS @ 1'-7" CTS.	21 ROWS @ 1'-7" CTS.	1'-1⅛"	236	1180
3	4 5/16"	26 ROWS @ 1'-7" CTS.	64 ROWS @ 1'-7" CTS.	1'-3¼"	11 ROWS @ 1'-7" CTS.	24 ROWS @ 1'-7" CTS.	1 11/16"	240	1200
4	1'-0½"	27 ROWS @ 1'-7" CTS.	63 ROWS @ 1'-7" CTS.	8 1/16"	12 ROWS @ 1'-7" CTS.	26 ROWS @ 1'-7" CTS.	9 3/16"	243	1215
5	1 5/16"	29 ROWS @ 1'-7" CTS.	60 ROWS @ 1'-7" CTS.	1'-8 11/16"	14 ROWS @ 1'-7" CTS.	28 ROWS @ 1'-7" CTS.	1'-4 11/16"	246	1230
6	8 13/16"	30 ROWS @ 1'-7" CTS.	58 ROWS @ 1'-7" CTS.	1'-3"	16 ROWS @ 1'-7" CTS.	31 ROWS @ 1'-7" CTS.	5¼"	250	1250



DRIP BEAD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			94

STR. #1

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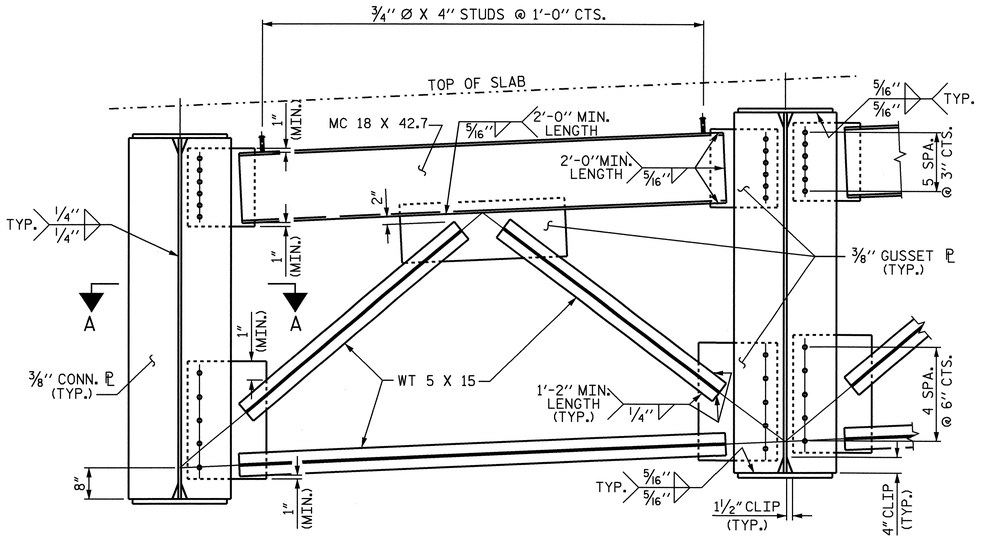
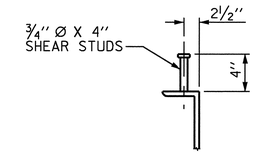


END BENT DIAPHRAGM (D1)

(BAY WIDTHS VARY AT END BENT 1)



SHEAR STUD DETAIL

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

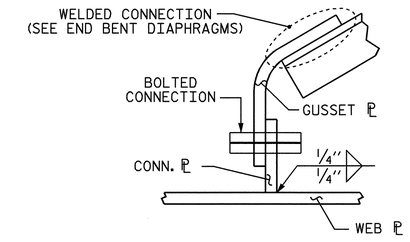
BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

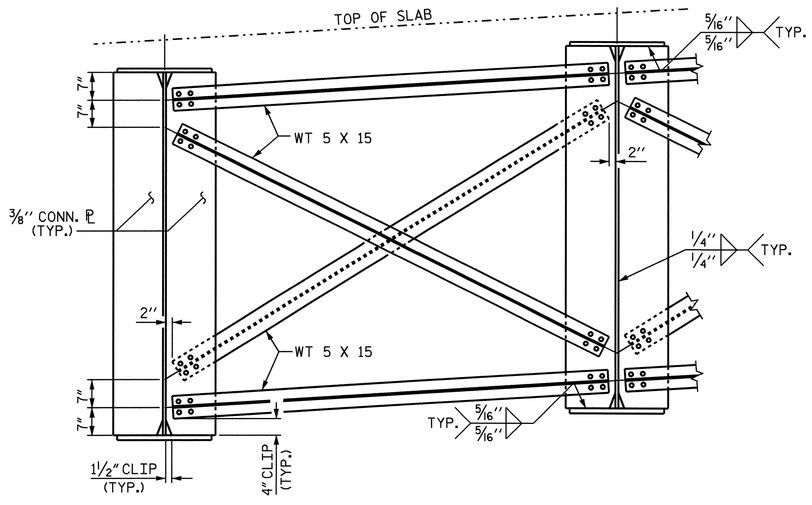
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSIONS INDICATORS, SEE SPECIAL PROVISIONS.

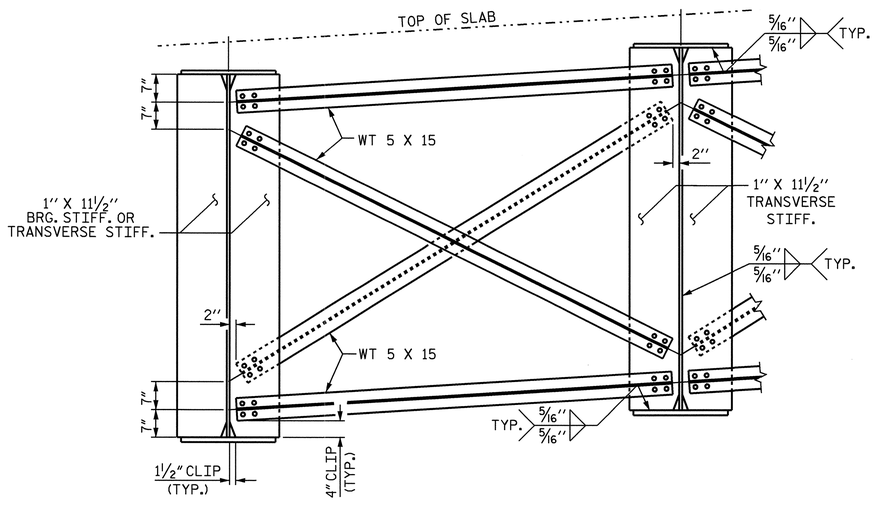
END OF GIRDERS SHALL BE PLUMB.



SECTION A-A



INTERMEDIATE DIAPHRAGM (D2)



BENT DIAPHRAGM (D3)

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/6/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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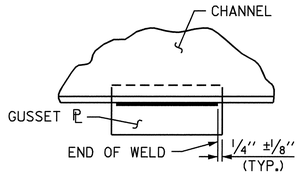
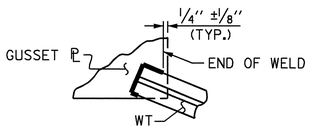
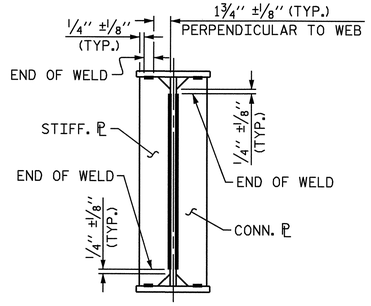


TYP. GUSSET PL CONNECTION

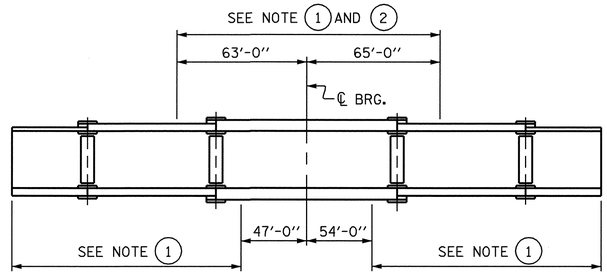


TYPICAL "TEE" TO GUSSET PLATE CONNECTION



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTION

WELD TERMINATION DETAILS



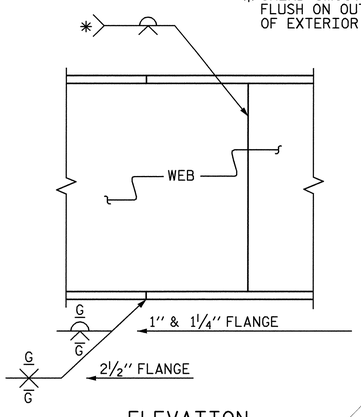
GIRDER MAKE UP

NOTE (1): CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS. ALL WEB PLATES AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-9 OF STANDARD SPECIFICATIONS.

NOTE (2): NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

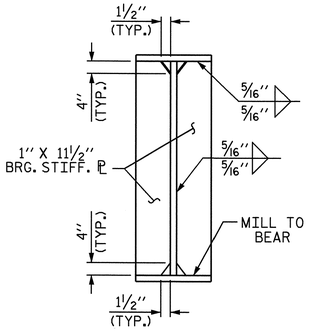
CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS.



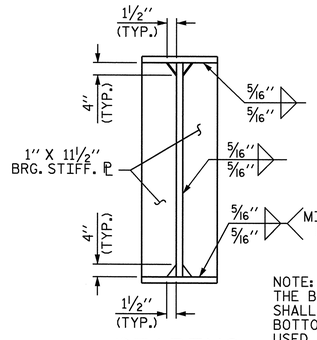
ELEVATION

TYPICAL FLANGE & WEB BUTT JOINT



BEARING STIFFENER

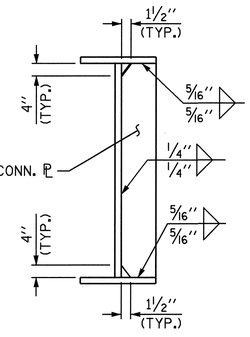
(AT END BENTS)



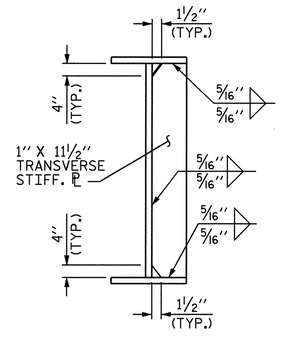
BEARING STIFFENER

(AT BENT)

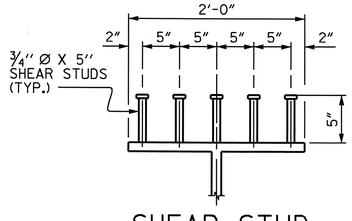
NOTE:
THE BEARING STIFFENER SHALL BE WELDED TO THE BOTTOM FLANGE ONLY WHEN USED AS A CONNECTOR PL.



CONNECTOR PLATE



TRANSVERSE STIFFENER



SHEAR STUD DETAIL

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/6/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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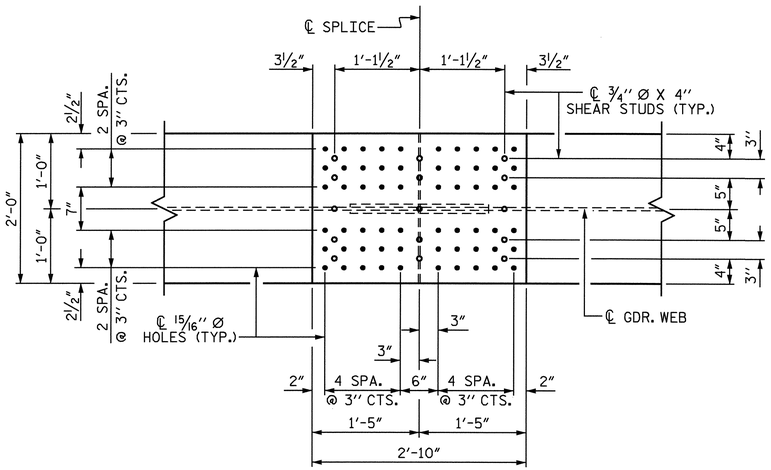
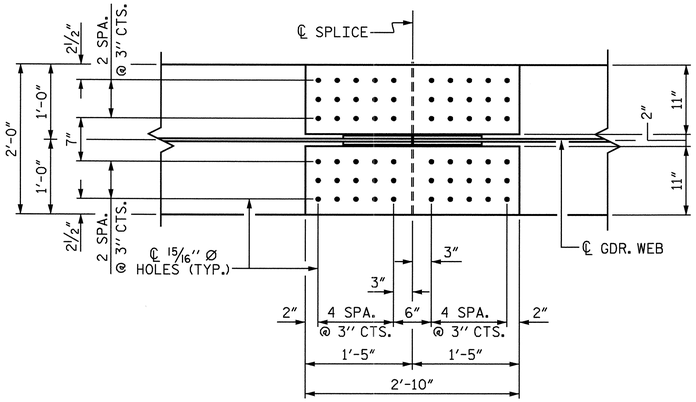
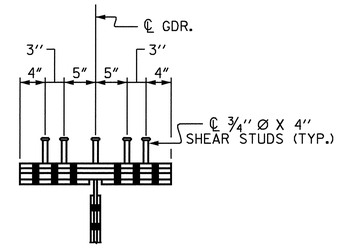


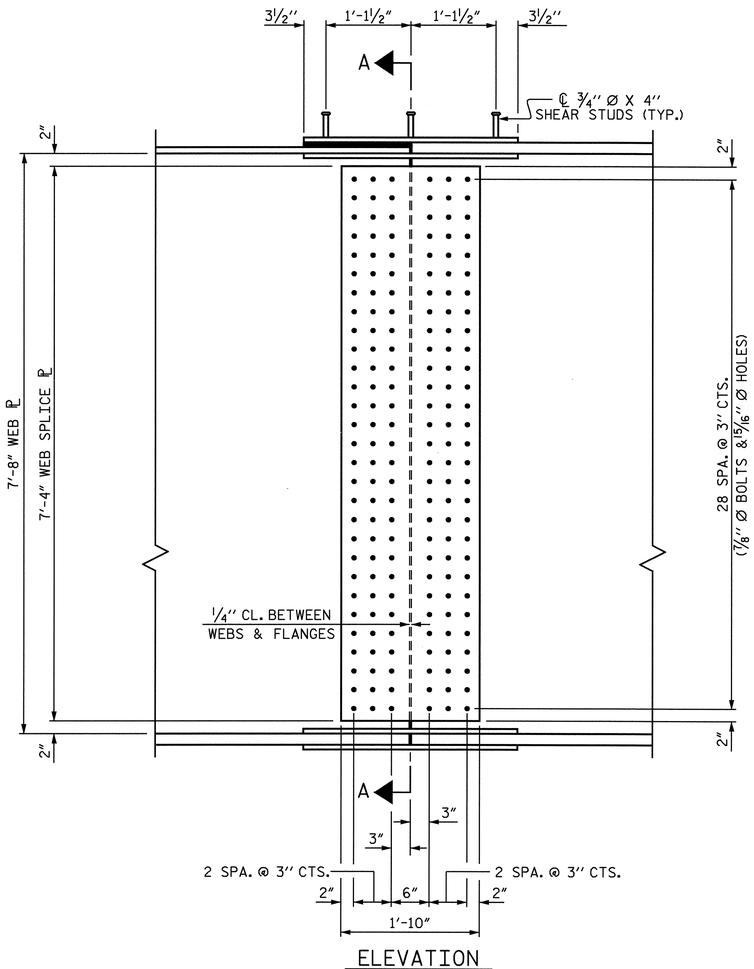
PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)



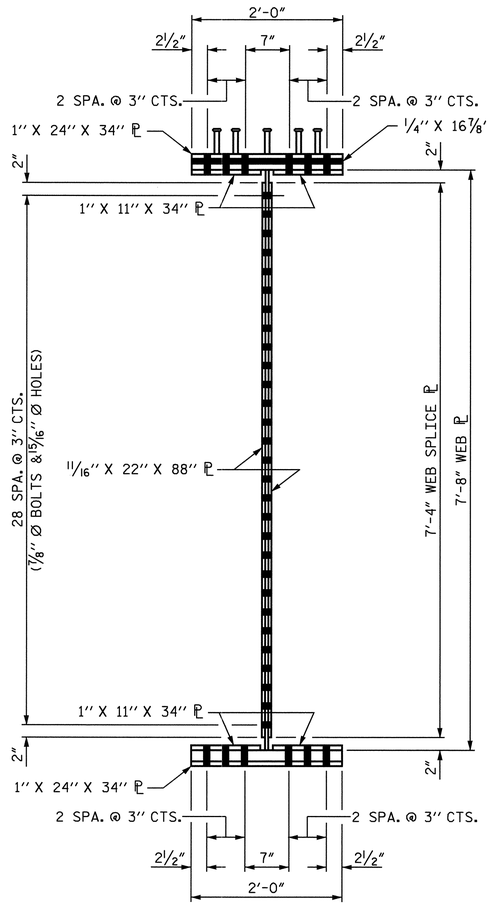
SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE



ELEVATION

UPSTATION SPAN "A"

UPSTATION SPAN "B"



SECTION A-A

DESCRIPTION	SIZE	NO. REQ'D FOR ONE FIELD SPLICE	TOTAL REQ'D
WEB SPLICE ℄	11⁄16" X 22" X 88"	2	24
TOP FLANGE SPLICE ℄ (TOP OF FLANGE)	1" X 24" X 34"	1	12
TOP FLANGE SPLICE ℄ (BOTTOM OF FLANGE)	1" X 11" X 34"	2	24
TOP FLANGE FILL ℄	1⁄4" X 16⅞" X 24"	1	12
BOTTOM FLANGE SPLICE ℄ (TOP OF FLANGE)	1" X 11" X 34"	2	24
BOTTOM FLANGE SPLICE ℄ (BOTTOM OF FLANGE)	1" X 24" X 34"	1	12

NOTE:
SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE A DETAILS

DRAWN BY : A.S. CALLAWAY DATE : 1/29/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

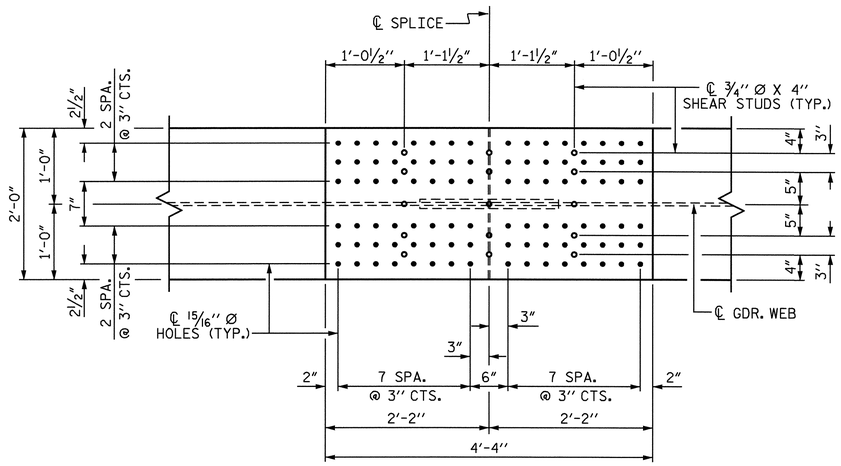
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

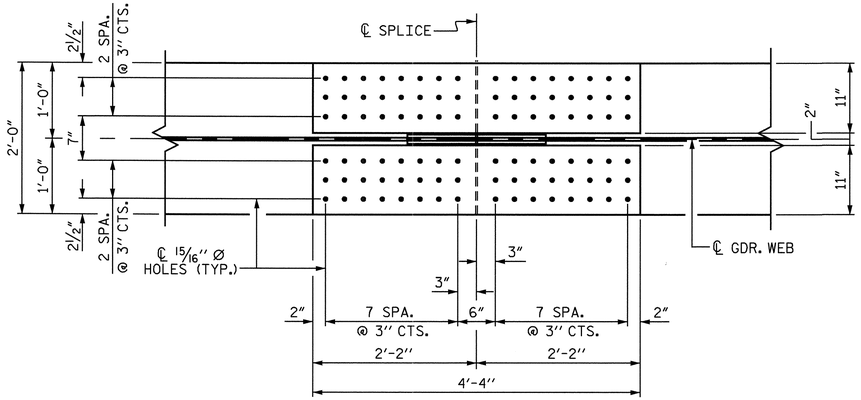
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			94

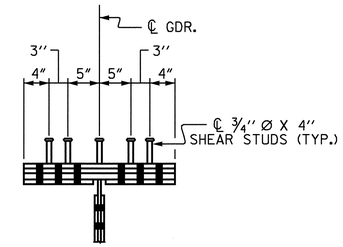
STR. #1



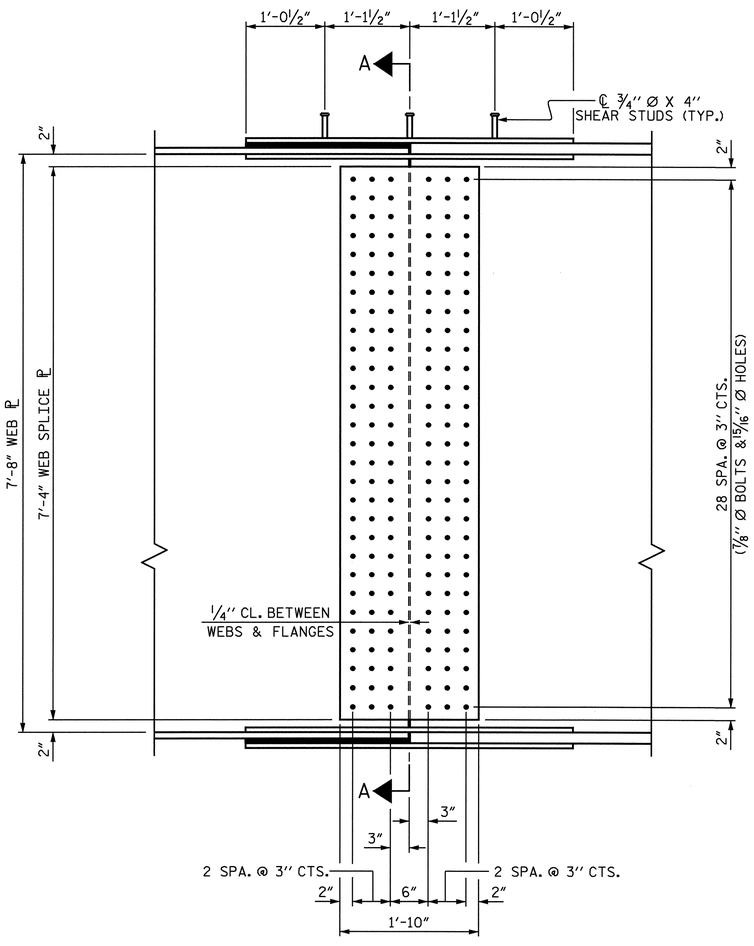
PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)



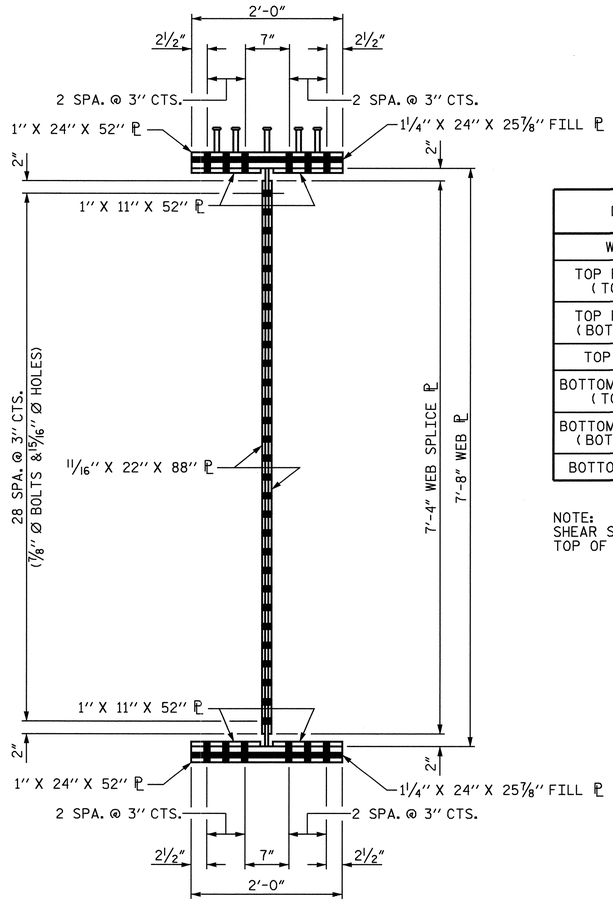
SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE



ELEVATION

UPSTATION SPAN "A"

UPSTATION SPAN "B"



SECTION A-A

DESCRIPTION	SIZE	NO. REQ'D FOR ONE FIELD SPLICE	TOTAL REQ'D
WEB SPLICE ℙ	11/16" X 22" X 88"	2	24
TOP FLANGE SPLICE ℙ (TOP OF FLANGE)	1" X 24" X 52"	1	12
TOP FLANGE SPLICE ℙ (BOTTOM OF FLANGE)	1" X 11" X 52"	2	24
TOP FLANGE FILL ℙ	1¼" X 24" X 25⅞"	1	12
BOTTOM FLANGE SPLICE ℙ (TOP OF FLANGE)	1" X 11" X 52"	2	24
BOTTOM FLANGE SPLICE ℙ (BOTTOM OF FLANGE)	1" X 24" X 52"	1	12
BOTTOM FLANGE FILL ℙ	1¼" X 24" X 25⅞"	1	12

NOTE:
SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE B DETAILS

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CHECKED BY : K.D. LAYNE DATE : 3/26/09

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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			94

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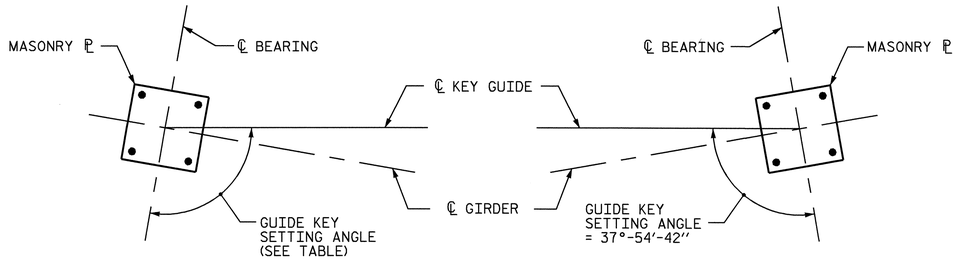


PB1
AT END BENT 1

PB3
AT END BENT 2

GUIDE KEY SETTING ANGLES FOR BEARING PB1

GDR. #1	53°-57′-12″	GDR. #4	54°-40′-57″
GDR. #2	54°-12′-51″	GDR. #5	54°-53′-31″
GDR. #3	54°-27′-25″	GDR. #6	55°-05′-08″

TABLE FOR LOADS AND MOVEMENTS

BEARING	LOCATION	VERTICAL LOAD (KIPS)			LATERAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)
		DEAD	LIVE	TOTAL		
PB1 (EXP.)	END BENT 1	216	82	298	44	2⅛″
PB3 (EXP.)	END BENT 2	155	65	220	31	2″

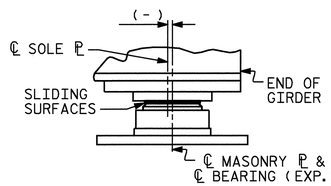


TABLE FOR PLATE SETTING DATA (EXPANSION POT BEARINGS)

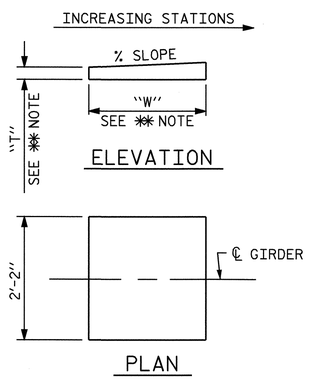
TEMPERATURE AT TIME OF SETTING	30° F	60° F	90° F	*
END BENT 1	-5/8″	0	5/8″	-9/16″
END BENT 2	-5/8″	0	5/8″	-3/8″

* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.

TEMPERATURE SETTING DETAIL

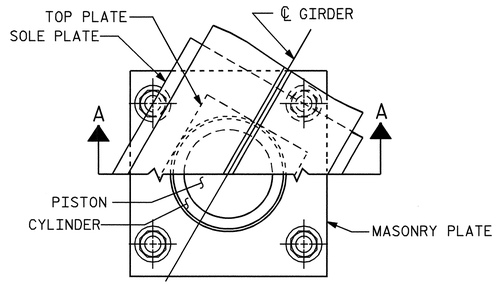
SLOPE TABLE

LOCATION	% SLOPE
END BENT 1	3
END BENT 2	2

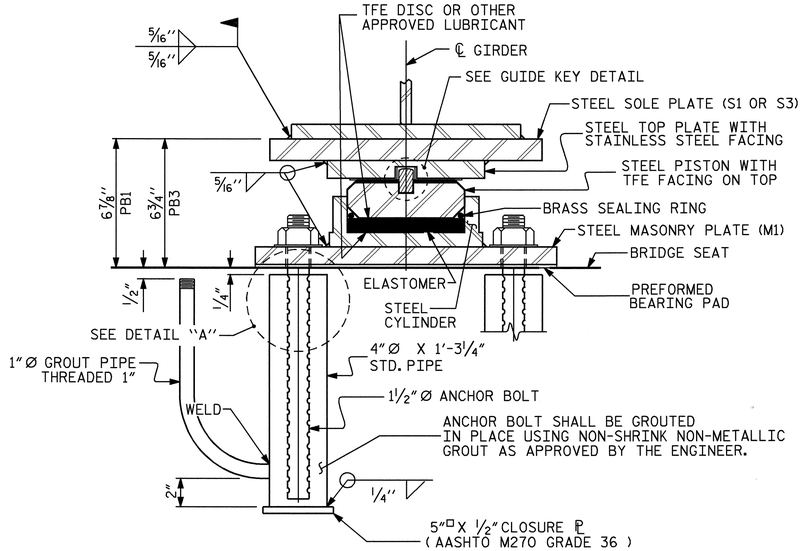


SOLE PLATE DETAILS

** NOTE:
DIMENSIONS "W" AND "T" ARE TO BE DETERMINED BY THE MANUFACTURER.

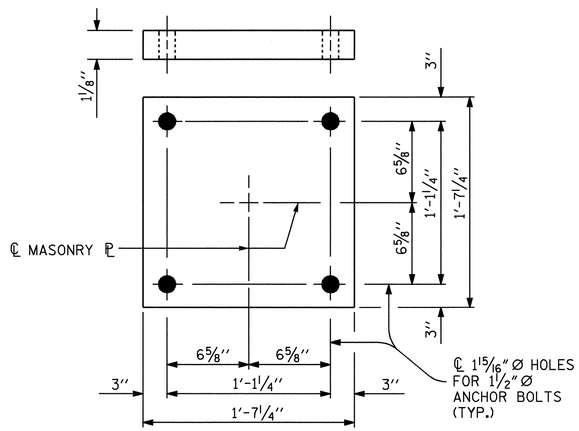


CUT-AWAY PLAN



SECTION A-A
PB1, EXP. (6 REQ'D.)
PB3, EXP. (6 REQ'D.)

POT BEARING DETAILS



PLAN
M1 (12 REQ'D.)

MASONRY PLATE DETAILS

NOTES

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

AT ALL POINTS OF SUPPORT IN SPANS A & B, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL ¼ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED. THEY SHALL BE GROUTED IN PLACE AS SHOWN.

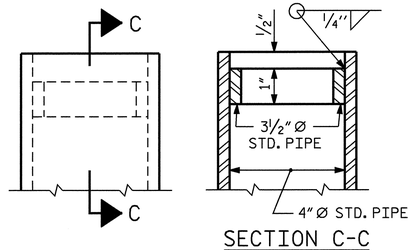
THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

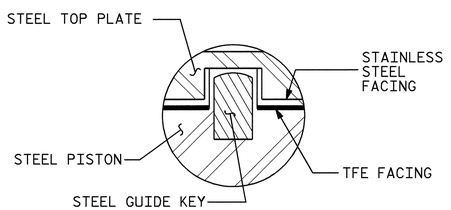
FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.



SECTION C-C

DETAIL "A"



GUIDE KEY DETAIL

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
POT BEARING DETAILS
(EXPANSION BEARING)
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			94

STR. #1

STD. NO. PB1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 11/13/08		
CHECKED BY : K.D. LAYNE	DATE : 3/26/09		
DRAWN BY : RWW 8/99	REV. 7/10/01	LES/RDR	
CHECKED BY : LES 8/99	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06	TLA/GM	

10-NOV-2009 12:31
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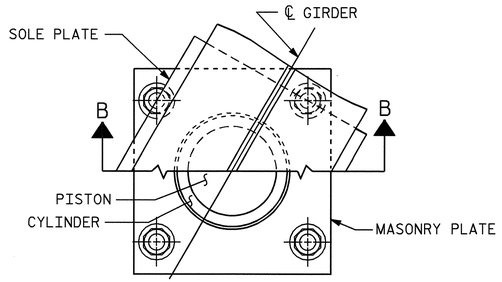
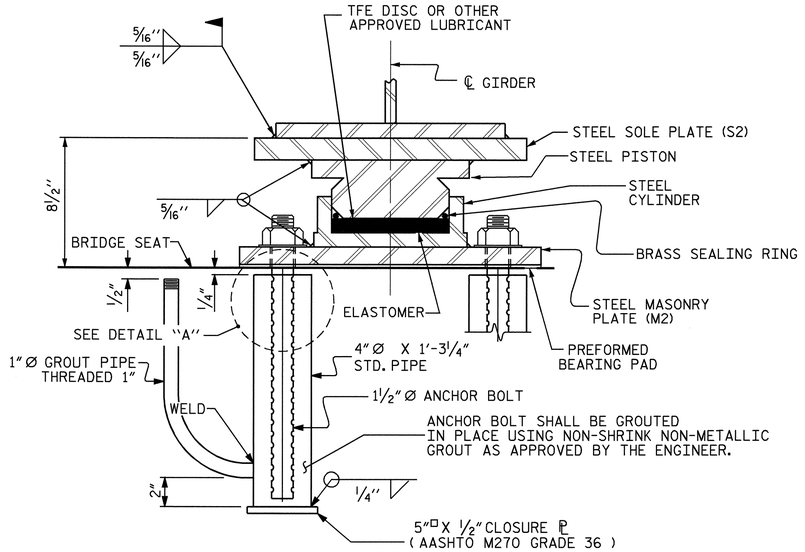
lsutton

TABLE FOR LOADS AND MOVEMENTS						
BEARING	LOCATION	VERTICAL LOAD (KIPS)			LATERAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)
		DEAD	LIVE	TOTAL		
PB2 (FIX.)	BENT 1	592	153	745	119	0



CUT-AWAY PLAN



SECTION B-B
PB2, FIXED (6 REQ'D)

POT BEARING DETAILS

NOTES

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

AT ALL POINTS OF SUPPORT IN SPANS A & B, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

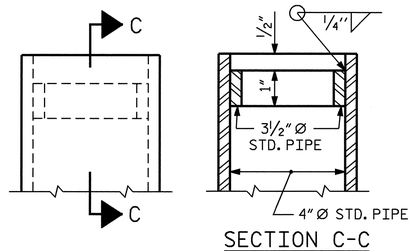
WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

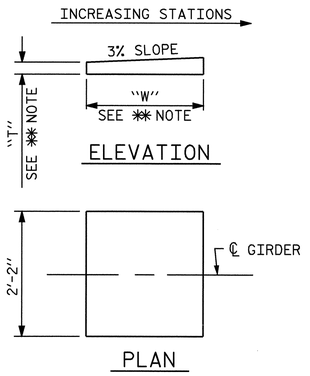
FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.



SECTION C-C

DETAIL ''A''

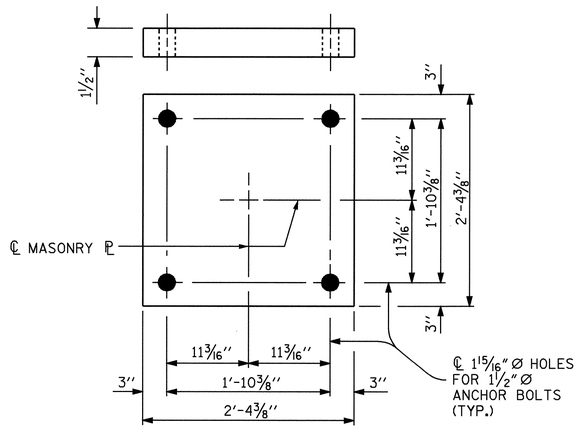


ELEVATION

PLAN

SOLE PLATE DETAILS

✱✱ NOTE:
DIMENSIONS ''W'' AND ''T'' ARE TO BE DETERMINED BY THE MANUFACTURER.



PLAN
M2 (6 REQ'D.)

MASONRY PLATE DETAILS

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
POT BEARING DETAILS
(FIXED BEARING)
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			94

STR. #1

STD. NO. PB1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 11/13/08		
CHECKED BY : K.D. LAYNE	DATE : 3/26/09		
DRAWN BY : RWW 8/99	REV. 7/10/01	LES/RDR	
CHECKED BY : LES 8/99	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06	TLA/GM	

10-NOV-2009 12:31
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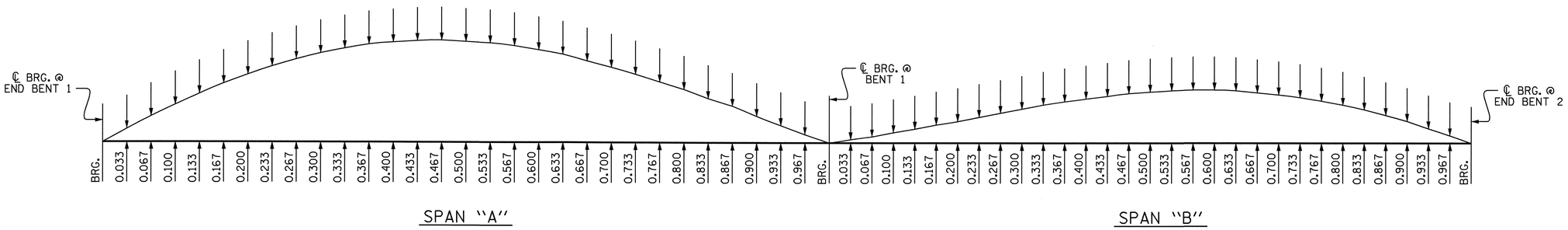
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #1

THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
	SPAN "A"																														
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.013	0.026	0.038	0.050	0.061	0.070	0.079	0.086	0.092	0.097	0.100	0.102	0.102	0.102	0.099	0.096	0.091	0.085	0.078	0.071	0.063	0.054	0.045	0.037	0.029	0.021	0.015	0.009	0.004	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.038	0.074	0.110	0.143	0.174	0.201	0.226	0.247	0.264	0.277	0.286	0.292	0.292	0.290	0.283	0.273	0.259	0.242	0.223	0.201	0.178	0.153	0.128	0.104	0.081	0.060	0.041	0.024	0.011	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.005	0.008	0.010	0.012	0.014	0.016	0.018	0.019	0.020	0.021	0.021	0.022	0.021	0.021	0.020	0.020	0.018	0.017	0.015	0.014	0.012	0.010	0.008	0.006	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.054	0.105	0.156	0.203	0.247	0.285	0.321	0.351	0.375	0.394	0.407	0.415	0.416	0.413	0.403	0.389	0.370	0.345	0.318	0.287	0.255	0.219	0.183	0.149	0.116	0.086	0.059	0.035	0.016	0
VERTICAL CURVE ORDINATE	0	0.045	0.087	0.126	0.162	0.195	0.225	0.252	0.276	0.297	0.315	0.330	0.342	0.351	0.357	0.360	0.360	0.357	0.351	0.342	0.330	0.315	0.297	0.276	0.252	0.217	0.179	0.138	0.095	0.049	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 3/16"	2 5/16"	3 3/8"	4 3/8"	5 5/16"	6 1/8"	6 7/8"	7 1/2"	8 1/16"	8 1/2"	8 7/8"	9 1/16"	9 3/16"	9 1/4"	9 1/8"	9"	8 3/4"	8 3/8"	7 15/16"	7 3/8"	6 13/16"	6 3/16"	5 1/2"	4 13/16"	4"	3 3/16"	2 3/8"	1 9/16"	3/4"	0
	SPAN "B"																														
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	-0.002	-0.003	-0.003	-0.002	-0.001	0.001	0.004	0.008	0.012	0.016	0.020	0.024	0.028	0.032	0.035	0.037	0.039	0.040	0.041	0.040	0.039	0.037	0.035	0.031	0.027	0.023	0.018	0.012	0.006	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	-0.006	-0.009	-0.009	-0.007	-0.003	0.003	0.011	0.022	0.033	0.044	0.057	0.068	0.079	0.089	0.097	0.105	0.110	0.113	0.115	0.114	0.111	0.106	0.098	0.089	0.078	0.064	0.050	0.034	0.017	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	-0.001	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005	0.005	0.006	0.007	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.008	0.008	0.007	0.006	0.005	0.004	0.003	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	-0.008	-0.013	-0.012	-0.009	-0.004	0.005	0.017	0.033	0.049	0.065	0.082	0.098	0.114	0.129	0.140	0.151	0.158	0.162	0.165	0.163	0.159	0.151	0.141	0.127	0.111	0.092	0.072	0.049	0.024	0
VERTICAL CURVE ORDINATE	0	0.032	0.061	0.089	0.114	0.137	0.158	0.177	0.193	0.207	0.219	0.229	0.237	0.242	0.246	0.247	0.246	0.242	0.237	0.229	0.219	0.207	0.193	0.177	0.158	0.137	0.114	0.089	0.061	0.032	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	5/16"	9/16"	15/16"	1 1/4"	1 5/8"	1 15/16"	2 5/16"	2 11/16"	3 1/16"	3 7/16"	3 3/4"	4"	4 1/4"	4 1/2"	4 5/8"	4 3/4"	4 13/16"	4 13/16"	4 3/4"	4 9/16"	4 3/8"	4 1/8"	3 13/16"	3 7/16"	3"	2 1/2"	1 15/16"	1 5/16"	11/16"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			94

STR. #1

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

10-NOV-2009 12:31
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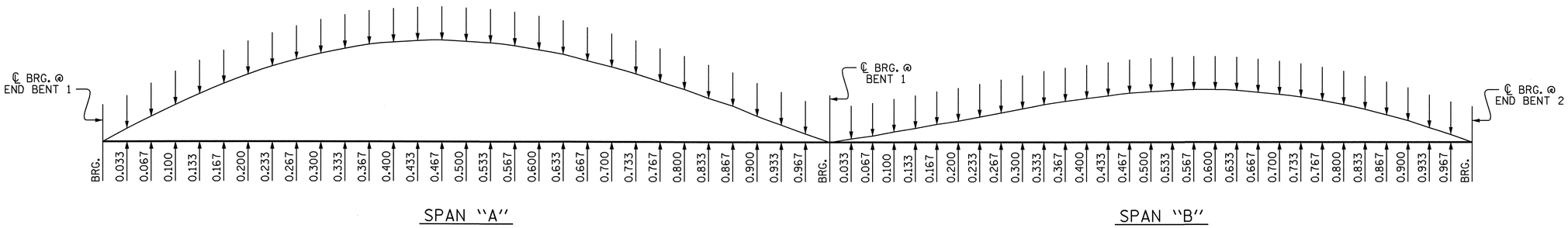
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #2

SPAN "A"																																
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.013	0.026	0.039	0.050	0.061	0.071	0.080	0.087	0.093	0.098	0.101	0.103	0.104	0.103	0.100	0.097	0.092	0.086	0.079	0.071	0.063	0.054	0.045	0.037	0.029	0.021	0.014	0.008	0.003	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.038	0.075	0.111	0.145	0.176	0.204	0.229	0.251	0.268	0.282	0.291	0.296	0.297	0.295	0.288	0.277	0.263	0.246	0.226	0.204	0.180	0.155	0.130	0.105	0.082	0.060	0.041	0.024	0.010	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.005	0.008	0.010	0.013	0.015	0.017	0.018	0.020	0.021	0.021	0.022	0.022	0.022	0.022	0.021	0.020	0.019	0.017	0.016	0.014	0.012	0.010	0.008	0.007	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.054	0.106	0.158	0.205	0.250	0.290	0.326	0.356	0.381	0.401	0.413	0.421	0.423	0.420	0.410	0.395	0.375	0.351	0.322	0.291	0.257	0.221	0.185	0.150	0.118	0.086	0.058	0.034	0.014	0
VERTICAL CURVE ORDINATE	0	0.045	0.087	0.126	0.162	0.195	0.225	0.252	0.277	0.298	0.316	0.330	0.342	0.351	0.357	0.360	0.360	0.357	0.351	0.342	0.330	0.315	0.296	0.274	0.243	0.210	0.173	0.134	0.092	0.048	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 3/16"	2 5/16"	3 7/16"	4 3/8"	5 5/16"	6 3/16"	6 15/16"	7 5/8"	8 1/8"	8 5/8"	8 15/16"	9 1/8"	9 5/16"	9 5/16"	9 1/4"	9 1/16"	8 13/16"	8 7/16"	7 15/16"	7 7/16"	6 7/8"	6 3/16"	5 1/2"	4 11/16"	3 15/16"	3 1/8"	2 5/16"	1 1/2"	3/4"	0

SPAN "B"																																
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	-0.002	-0.002	-0.002	-0.001	0.001	0.004	0.007	0.011	0.015	0.020	0.024	0.028	0.032	0.036	0.039	0.041	0.043	0.044	0.044	0.044	0.043	0.041	0.038	0.034	0.030	0.025	0.019	0.013	0.007	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	-0.005	-0.007	-0.006	-0.003	0.003	0.010	0.020	0.031	0.043	0.056	0.068	0.080	0.092	0.102	0.110	0.117	0.123	0.126	0.127	0.126	0.122	0.116	0.108	0.098	0.085	0.071	0.055	0.038	0.019	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.007	0.005	0.004	0.003	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	-0.007	-0.009	-0.008	-0.004	0.005	0.015	0.029	0.045	0.062	0.081	0.098	0.115	0.132	0.147	0.158	0.168	0.176	0.180	0.181	0.180	0.175	0.166	0.154	0.139	0.122	0.101	0.078	0.054	0.027	0
VERTICAL CURVE ORDINATE	0	0.033	0.064	0.093	0.119	0.143	0.165	0.184	0.201	0.216	0.229	0.239	0.247	0.253	0.256	0.257	0.256	0.253	0.247	0.239	0.229	0.216	0.201	0.184	0.165	0.143	0.119	0.093	0.064	0.033	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	5/16"	11/16"	1"	1 3/8"	1 3/4"	2 3/16"	2 9/16"	2 15/16"	3 5/16"	3 3/4"	4 1/16"	4 3/8"	4 5/8"	4 13/16"	5"	5 1/16"	5 1/8"	5 1/8"	5 1/16"	4 15/16"	4 11/16"	4 3/8"	4 1/16"	3 5/8"	3 3/16"	2 5/8"	2 1/16"	1 7/16"	3/4"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

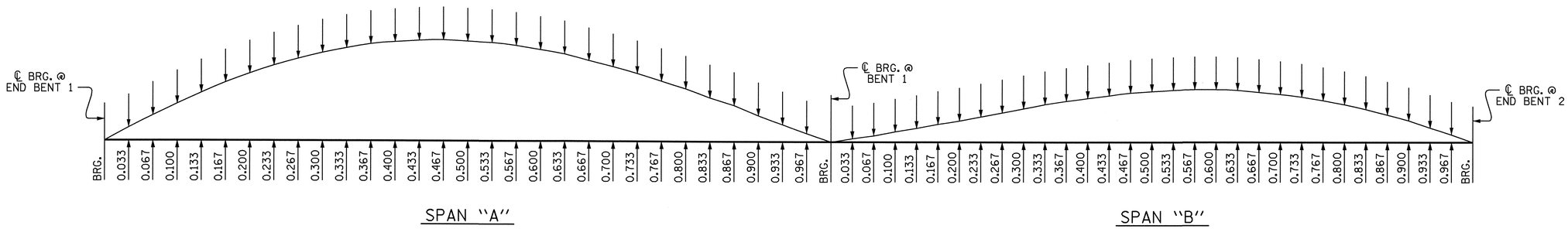
10-NOV-2009 12:30
R:\Structures\str-01\scallaway\u2826a_sd_dl_01.dgn
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #3

THIRTIETH POINTS	SPAN "A"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.014	0.027	0.040	0.052	0.063	0.073	0.082	0.090	0.096	0.101	0.104	0.106	0.106	0.105	0.103	0.099	0.094	0.088	0.081	0.072	0.064	0.055	0.046	0.037	0.028	0.021	0.014	0.008	0.003	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.039	0.078	0.115	0.149	0.182	0.211	0.237	0.259	0.277	0.291	0.300	0.305	0.306	0.303	0.296	0.285	0.270	0.252	0.231	0.208	0.183	0.157	0.131	0.106	0.081	0.059	0.040	0.023	0.009	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.008	0.011	0.013	0.015	0.017	0.019	0.020	0.021	0.022	0.023	0.023	0.023	0.022	0.022	0.021	0.019	0.018	0.016	0.014	0.013	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.056	0.111	0.163	0.212	0.258	0.299	0.336	0.368	0.393	0.413	0.426	0.434	0.435	0.431	0.421	0.406	0.385	0.359	0.330	0.296	0.261	0.225	0.188	0.152	0.116	0.085	0.057	0.033	0.013	0
VERTICAL CURVE ORDINATE	0	0.045	0.087	0.126	0.162	0.195	0.225	0.252	0.276	0.297	0.315	0.330	0.342	0.350	0.356	0.359	0.359	0.356	0.349	0.340	0.328	0.312	0.292	0.265	0.236	0.204	0.169	0.131	0.090	0.047	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 3/16"	2 3/8"	3 7/16"	4 1/2"	5 7/16"	6 5/16"	7 1/16"	7 3/4"	8 1/4"	8 3/4"	9 1/16"	9 5/16"	9 7/16"	9 7/16"	9 3/8"	9 3/16"	8 7/8"	8 1/2"	8 1/16"	7 1/2"	6 7/8"	6 3/16"	5 7/16"	4 5/8"	3 13/16"	3 1/16"	2 1/4"	1 1/2"	3/4"	0

THIRTIETH POINTS	SPAN "B"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	-0.001	-0.002	-0.001	0.001	0.003	0.006	0.010	0.015	0.019	0.024	0.029	0.033	0.037	0.041	0.044	0.047	0.049	0.050	0.050	0.049	0.048	0.046	0.042	0.038	0.033	0.028	0.021	0.015	0.007	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	-0.004	-0.005	-0.003	0.001	0.008	0.017	0.028	0.041	0.054	0.068	0.082	0.095	0.107	0.118	0.127	0.135	0.140	0.144	0.144	0.143	0.138	0.132	0.122	0.110	0.096	0.080	0.062	0.042	0.021	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.003	0.002	0
TOTAL DEAD LOAD DEFLECTION	0	-0.005	-0.007	-0.004	0.002	0.012	0.025	0.041	0.060	0.078	0.098	0.118	0.136	0.153	0.169	0.181	0.193	0.200	0.205	0.205	0.203	0.197	0.188	0.173	0.156	0.136	0.114	0.088	0.060	0.030	0
VERTICAL CURVE ORDINATE	0	0.035	0.067	0.097	0.124	0.149	0.172	0.192	0.210	0.225	0.239	0.249	0.258	0.264	0.267	0.268	0.267	0.264	0.258	0.249	0.239	0.225	0.210	0.192	0.172	0.149	0.124	0.097	0.067	0.035	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	3/8"	3/4"	1 1/8"	1 1/2"	1 15/16"	2 3/8"	2 13/16"	3 1/4"	3 5/8"	4 1/16'	4 3/8"	4 3/4"	5"	5 1/4"	5 3/8"	5 1/2"	5 5/16"	5 9/16"	5 7/16"	5 5/16"	5 1/16"	4 3/4"	4 3/8"	3 15/16"	3 7/16"	2 7/8"	2 1/4"	1 1/2"	3/4"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SPAN "A" SPAN "B"

SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

10-NOV-2009 12:30
R:\Structures\str01\scallaway\u2826a_sd_dl_01.dgn
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #4

THIRTIETH POINTS	SPAN "A"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.014	0.028	0.041	0.054	0.066	0.076	0.086	0.094	0.100	0.105	0.109	0.110	0.111	0.109	0.107	0.102	0.097	0.090	0.082	0.074	0.065	0.055	0.046	0.037	0.028	0.020	0.013	0.008	0.003	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.041	0.082	0.120	0.157	0.191	0.221	0.248	0.271	0.290	0.304	0.314	0.319	0.320	0.316	0.308	0.295	0.279	0.260	0.237	0.213	0.186	0.159	0.132	0.105	0.080	0.058	0.038	0.022	0.009	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.009	0.011	0.014	0.016	0.018	0.020	0.021	0.022	0.023	0.024	0.024	0.024	0.023	0.023	0.021	0.020	0.019	0.017	0.015	0.013	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.058	0.116	0.170	0.222	0.271	0.313	0.352	0.385	0.411	0.431	0.446	0.453	0.455	0.449	0.438	0.420	0.397	0.370	0.338	0.304	0.266	0.227	0.189	0.151	0.115	0.083	0.054	0.032	0.013	0
VERTICAL CURVE ORDINATE	0	0.045	0.087	0.126	0.162	0.195	0.224	0.251	0.275	0.296	0.313	0.328	0.340	0.348	0.354	0.356	0.356	0.352	0.346	0.336	0.324	0.306	0.284	0.258	0.230	0.199	0.165	0.128	0.088	0.046	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 1/4"	2 7/16"	3 9/16"	4 5/8"	5 9/16"	6 7/16"	7 1/4"	7 15/16"	8 1/2"	8 15/16"	9 5/16"	9 1/2"	9 5/8"	9 5/8"	9 1/2"	9 5/16"	9"	8 9/16"	8 1/16"	7 9/16"	6 7/8"	6 1/8"	5 3/8"	4 9/16"	3 3/4"	3"	2 3/16"	1 1/16"	11/16"	0

THIRTIETH POINTS	SPAN "B"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	-0.001	-0.001	0.000	0.002	0.005	0.009	0.014	0.019	0.024	0.030	0.035	0.040	0.044	0.048	0.052	0.054	0.057	0.057	0.057	0.057	0.055	0.052	0.048	0.043	0.038	0.031	0.024	0.017	0.008	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	-0.004	-0.003	0.000	0.006	0.014	0.026	0.039	0.053	0.069	0.084	0.099	0.114	0.128	0.139	0.149	0.157	0.163	0.166	0.166	0.164	0.158	0.150	0.139	0.126	0.110	0.091	0.070	0.048	0.024	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.009	0.010	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.005	0.004	0.002	0
TOTAL DEAD LOAD DEFLECTION	0	-0.005	-0.004	0.000	0.009	0.021	0.038	0.057	0.077	0.099	0.121	0.143	0.164	0.183	0.198	0.213	0.223	0.233	0.236	0.236	0.234	0.225	0.213	0.197	0.178	0.156	0.129	0.099	0.069	0.034	0
VERTICAL CURVE ORDINATE	0	0.036	0.070	0.101	0.129	0.155	0.179	0.200	0.219	0.235	0.248	0.260	0.268	0.275	0.278	0.280	0.278	0.275	0.268	0.260	0.248	0.235	0.219	0.200	0.179	0.155	0.129	0.101	0.070	0.036	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	3/8"	13/16"	1 3/16"	1 5/8"	2 1/8"	2 5/8"	3 1/16"	3 9/16"	4"	4 7/16"	4 13/16"	5 3/16"	5 1/2"	5 11/16"	5 15/16"	6"	6 1/8"	6 1/16"	5 15/16"	5 13/16"	5 1/2"	5 3/16"	4 3/4"	4 5/16"	3 3/4"	3 1/8"	2 3/8"	1 11/16"	13/16"	0

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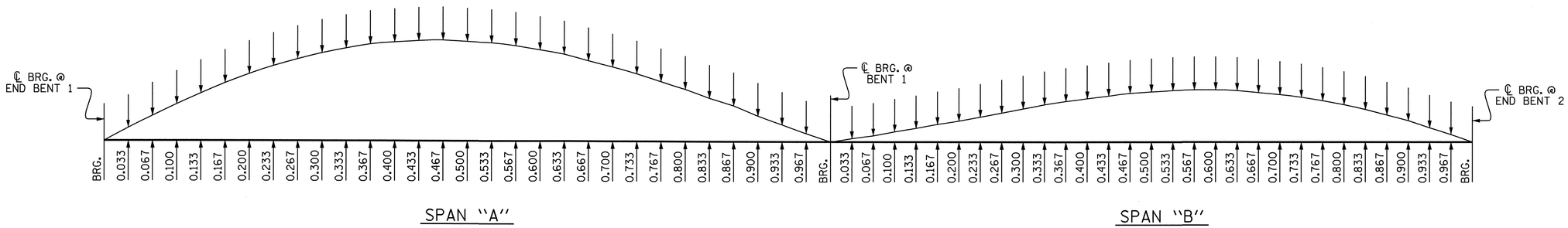

SPAN "A" SPAN "B"

SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

10-NOV-2009 12:30
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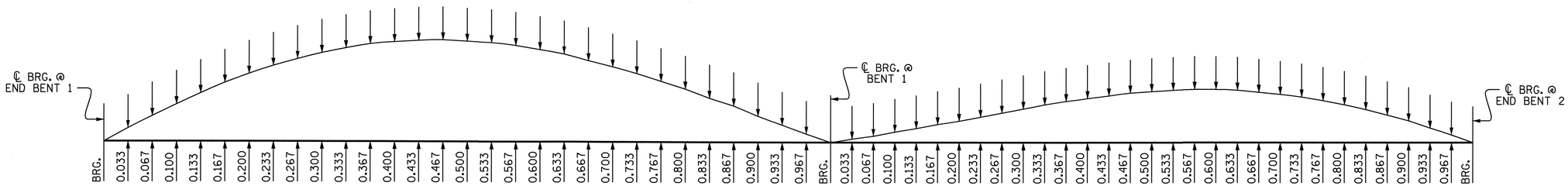
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #5

SPAN "A"																															
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.015	0.030	0.044	0.058	0.070	0.082	0.091	0.100	0.106	0.112	0.115	0.117	0.117	0.115	0.111	0.107	0.100	0.093	0.084	0.075	0.065	0.055	0.045	0.036	0.027	0.019	0.013	0.007	0.003	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.044	0.087	0.129	0.168	0.204	0.237	0.265	0.289	0.309	0.323	0.333	0.338	0.337	0.332	0.322	0.308	0.290	0.268	0.243	0.216	0.188	0.159	0.131	0.104	0.077	0.055	0.036	0.020	0.008	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.009	0.012	0.015	0.017	0.019	0.021	0.023	0.024	0.025	0.025	0.025	0.025	0.025	0.024	0.022	0.021	0.019	0.017	0.015	0.013	0.011	0.009	0.006	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.062	0.123	0.182	0.238	0.289	0.336	0.375	0.410	0.438	0.459	0.473	0.480	0.479	0.472	0.458	0.439	0.412	0.382	0.346	0.308	0.268	0.227	0.187	0.149	0.110	0.079	0.052	0.029	0.012	0
VERTICAL CURVE ORDINATE	0	0.045	0.087	0.125	0.161	0.193	0.223	0.250	0.273	0.294	0.311	0.325	0.337	0.345	0.350	0.353	0.352	0.348	0.341	0.331	0.316	0.298	0.277	0.253	0.225	0.195	0.162	0.126	0.087	0.045	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 5/16"	2 1/2"	3 11/16"	4 13/16"	5 13/16"	6 11/16"	7 1/2"	8 3/16"	8 13/16"	9 1/4"	9 9/16"	9 13/16"	9 7/8"	9 7/8"	9 3/4"	9 1/2"	9 1/8"	8 11/16"	8 1/8"	7 1/2"	6 13/16"	6 1/16"	5 1/4"	4 1/2"	3 11/16"	2 7/8"	2 1/8"	1 3/8"	11/16"	0

SPAN "B"																															
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	-0.001	0.000	0.002	0.005	0.008	0.013	0.018	0.024	0.030	0.036	0.043	0.048	0.053	0.057	0.061	0.064	0.066	0.067	0.067	0.065	0.063	0.059	0.055	0.049	0.043	0.036	0.027	0.019	0.009	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	-0.002	0.000	0.005	0.013	0.023	0.037	0.052	0.070	0.087	0.105	0.122	0.138	0.153	0.165	0.177	0.185	0.190	0.193	0.193	0.189	0.182	0.172	0.159	0.143	0.125	0.103	0.080	0.054	0.027	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.001	0.001	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.012	0.013	0.014	0.015	0.015	0.015	0.015	0.014	0.014	0.013	0.012	0.011	0.009	0.008	0.006	0.004	0.002	0
TOTAL DEAD LOAD DEFLECTION	0	-0.003	0.000	0.008	0.019	0.033	0.053	0.075	0.100	0.125	0.150	0.175	0.197	0.218	0.235	0.252	0.264	0.271	0.275	0.275	0.268	0.259	0.244	0.226	0.203	0.177	0.147	0.113	0.077	0.038	0
VERTICAL CURVE ORDINATE	0	0.038	0.072	0.105	0.135	0.162	0.186	0.208	0.228	0.244	0.259	0.270	0.279	0.286	0.290	0.291	0.290	0.286	0.279	0.270	0.259	0.244	0.228	0.208	0.186	0.162	0.135	0.105	0.072	0.038	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1/16"	1/8"	1 3/8"	1 7/8"	2 5/16"	2 7/8"	3 3/8"	3 15/16"	4 7/16"	4 15/16"	5 5/16"	5 11/16"	6 1/16"	6 5/16"	6 1/2"	6 5/8"	6 11/16"	6 5/8"	6 9/16"	6 5/16"	6 1/16"	5 11/16"	5 3/16"	4 11/16"	4 1/16"	3 3/8"	2 5/8"	1 13/16"	15/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SPAN "A" SPAN "B"

SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

10-NOV-2009 12:30
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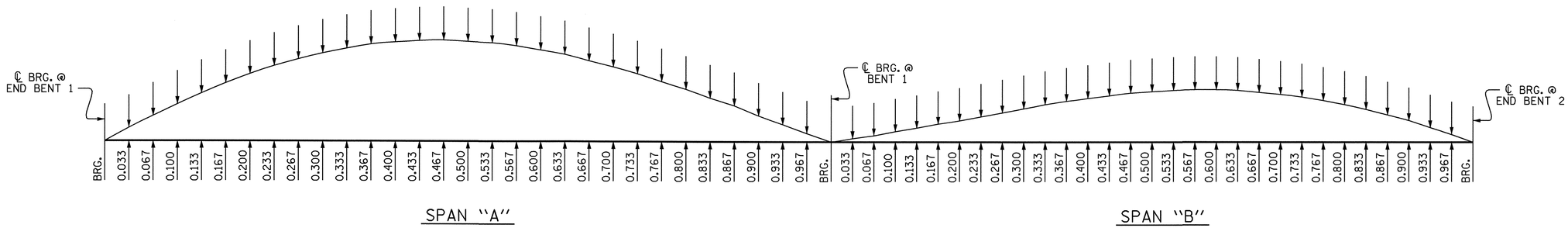
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #6

SPAN "A"																															
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.017	0.034	0.049	0.064	0.077	0.090	0.100	0.109	0.115	0.120	0.123	0.124	0.124	0.121	0.117	0.111	0.104	0.095	0.086	0.076	0.065	0.054	0.044	0.034	0.025	0.017	0.011	0.006	0.002	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.049	0.098	0.143	0.186	0.226	0.260	0.290	0.315	0.335	0.349	0.358	0.361	0.358	0.351	0.339	0.321	0.300	0.275	0.247	0.218	0.187	0.156	0.126	0.097	0.071	0.050	0.031	0.016	0.006	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.007	0.010	0.014	0.016	0.019	0.021	0.023	0.025	0.026	0.027	0.027	0.027	0.027	0.026	0.025	0.024	0.022	0.020	0.018	0.015	0.013	0.011	0.008	0.006	0.004	0.003	0.001	0.000	0
TOTAL DEAD LOAD DEFLECTION	0	0.070	0.139	0.202	0.264	0.319	0.369	0.411	0.447	0.475	0.495	0.508	0.512	0.509	0.499	0.482	0.457	0.428	0.392	0.353	0.312	0.267	0.223	0.181	0.139	0.102	0.071	0.045	0.023	0.008	0
VERTICAL CURVE ORDINATE	0	0.045	0.086	0.124	0.160	0.192	0.221	0.248	0.271	0.291	0.308	0.322	0.333	0.341	0.346	0.348	0.347	0.342	0.335	0.324	0.309	0.292	0.272	0.248	0.222	0.192	0.160	0.125	0.086	0.045	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 3/8"	2 11/16"	3 15/16"	5 1/16"	6 1/8"	7 1/16"	7 15/16"	8 5/8"	9 3/16"	9 5/8"	9 15/16"	10 1/8"	10 3/16"	10 1/8"	9 15/16"	9 5/8"	9 1/4"	8 3/4"	8 1/8"	7 7/16"	6 11/16"	5 15/16"	5 1/8"	4 5/16"	3 1/2"	2 3/4"	2 1/16"	1 5/16"	5/8"	0

SPAN "B"																															
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.000	0.001	0.004	0.008	0.012	0.018	0.025	0.031	0.039	0.046	0.052	0.059	0.064	0.069	0.073	0.076	0.077	0.078	0.077	0.075	0.072	0.067	0.062	0.055	0.048	0.039	0.030	0.021	0.010	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.000	0.004	0.011	0.022	0.035	0.052	0.071	0.090	0.111	0.132	0.151	0.170	0.186	0.199	0.210	0.219	0.224	0.225	0.223	0.218	0.208	0.196	0.180	0.161	0.139	0.115	0.088	0.060	0.031	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.008	0.009	0.011	0.012	0.014	0.015	0.016	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.015	0.013	0.012	0.010	0.008	0.006	0.004	0.002	0
TOTAL DEAD LOAD DEFLECTION	0	0.000	0.005	0.016	0.032	0.050	0.075	0.102	0.129	0.159	0.189	0.215	0.243	0.265	0.284	0.299	0.312	0.318	0.320	0.317	0.309	0.296	0.278	0.255	0.228	0.197	0.162	0.124	0.085	0.043	0
VERTICAL CURVE ORDINATE	0	0.039	0.075	0.109	0.140	0.168	0.194	0.217	0.237	0.254	0.269	0.281	0.291	0.297	0.301	0.303	0.301	0.297	0.291	0.281	0.269	0.254	0.237	0.217	0.194	0.168	0.140	0.109	0.075	0.039	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	7/16"	15/16"	1 1/2"	2 1/16"	2 5/8"	3 1/4"	3 13/16"	4 3/8"	4 15/16"	5 1/2"	5 15/16"	6 7/16"	6 3/4"	7"	7 1/4"	7 3/8"	7 3/8"	7 5/16"	7 3/16"	6 15/16"	6 5/8"	6 3/16"	5 11/16"	5 1/16"	4 3/8"	3 5/8"	2 13/16"	1 15/16"	1"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

10-NOV-2009 12:30
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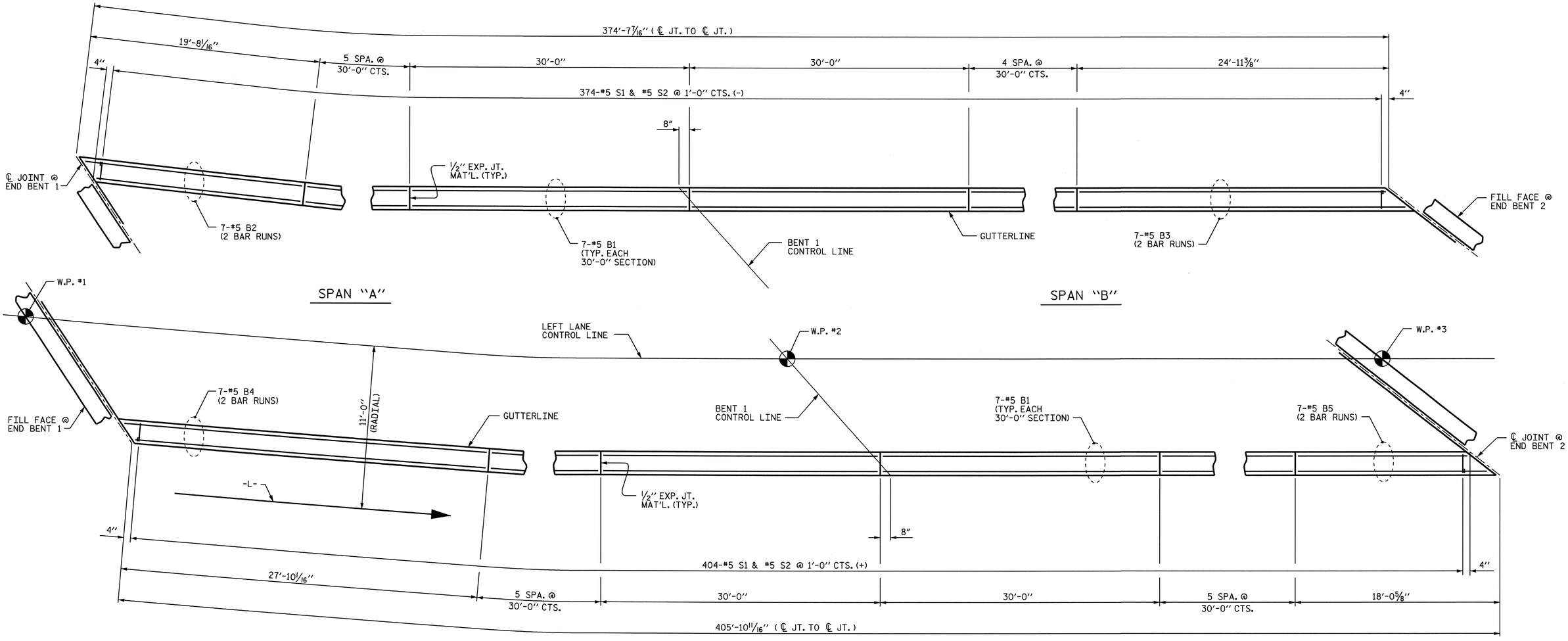
lsutton



PLAN

ALL DIMENSIONS ARE TAKEN ALONG THE BACK FACE OF BARRIER RAIL.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 10/31/08
CHECKED BY : K.D. LAYNE DATE : 3/26/09

19-OCT-2009 13:07
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NOTES

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

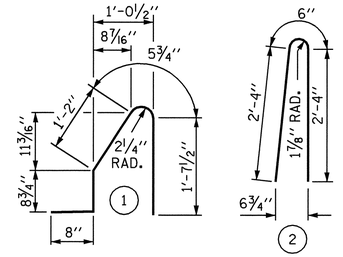
THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

THE #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, IN ORDER TO MAINTAIN 2" MIN. CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL.

BAR TYPES

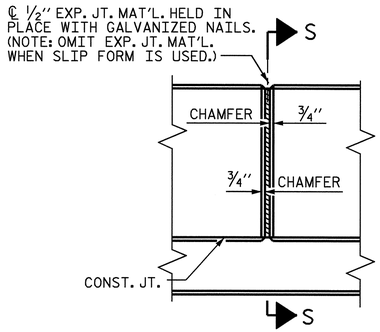


ALL BAR DIMENSIONS ARE OUT TO OUT.

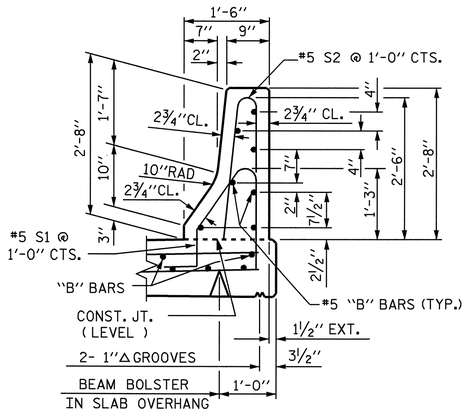
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

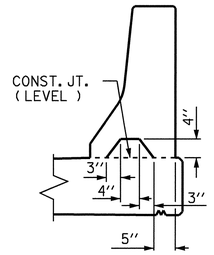
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	161	#5	STR	29'-7"	4968
✳ B2	14	#5	STR	11'-3"	164
✳ B3	14	#5	STR	14'-9"	215
✳ B4	14	#5	STR	15'-11"	232
✳ B5	14	#5	STR	10'-4"	151
✳ S1	778	#5	1	4'-8"	3787
✳ S2	778	#5	2	5'-2"	4193
✳ EPOXY COATED REINFORCING STEEL				LBS.	13,710
CLASS AA CONCRETE				CU. YDS.	78.2
CONCRETE BARRIER RAIL				LIN. FT.	780.51



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL



SECTION S-S

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

BARRIER RAIL DETAILS

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			94

STR. #1

STD. NO. CBR1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
11/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 10/31/08		
CHECKED BY : K.D. LAYNE	DATE : 3/26/09		
DRAWN BY : ARB 5/87	REV. 10/17/00	RWW/LES	
CHECKED BY : SJD 9/87	REV. 5/7/03R	RWW/JTE	
	REV. 5/1/06	TLA/GM	

10-NOV-2009 12:30
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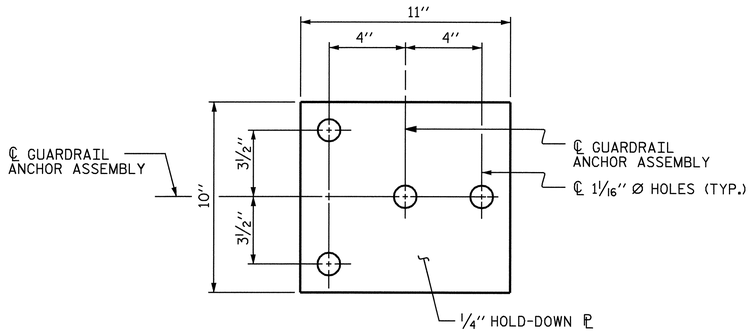
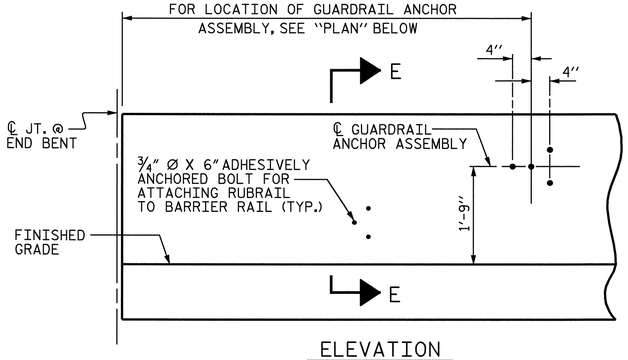
lsutton



PLAN



ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 4 - ⅞'' 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 ⅞'' 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.)

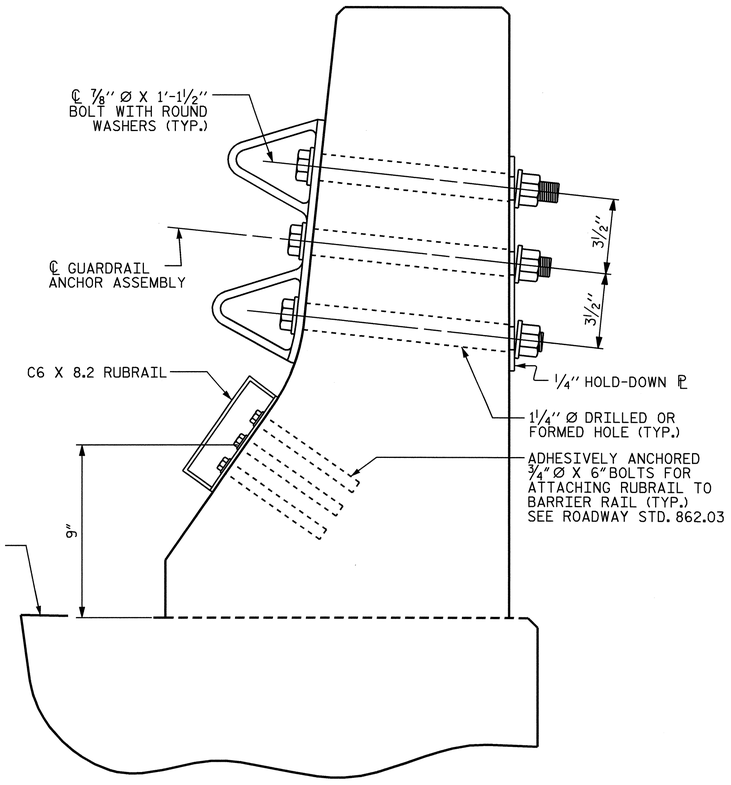
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

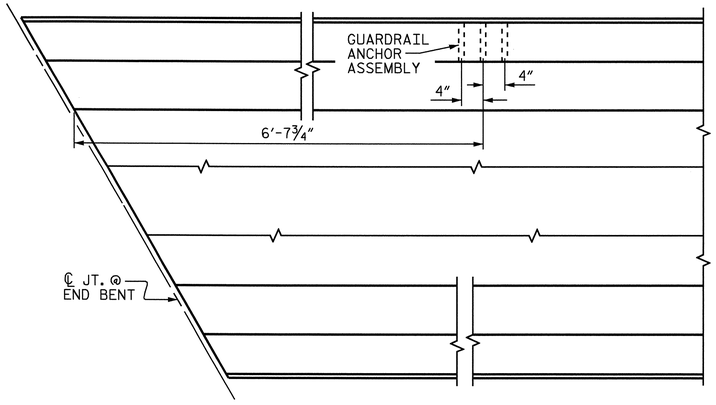
THE 1 ¼'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ¾"Ø X 6"BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾"Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SECTION E-E

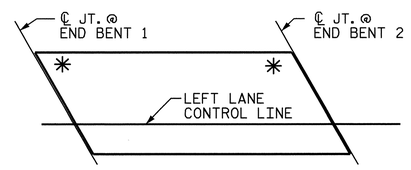
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			94

STR. #1

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 3/30/09
CHECKED BY : K.D. LAYNE	DATE : 4/2/09
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

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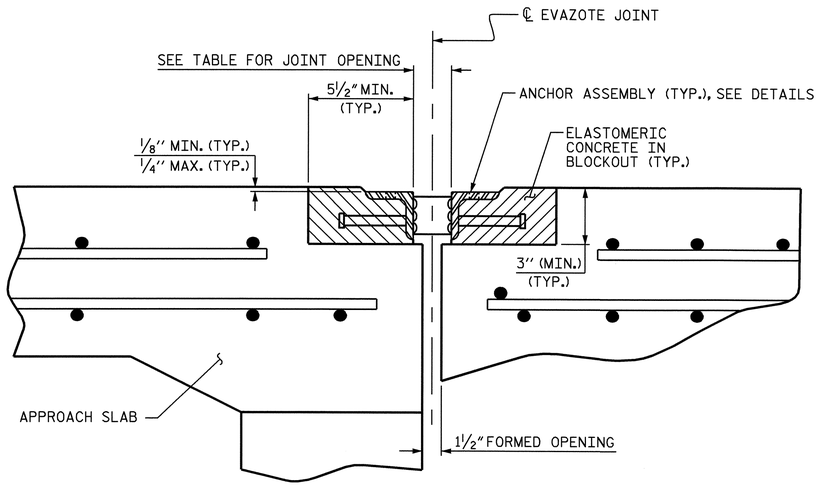
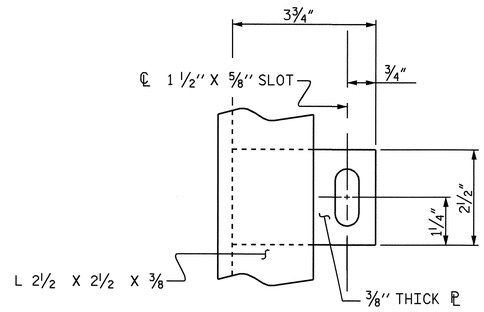
lsutton

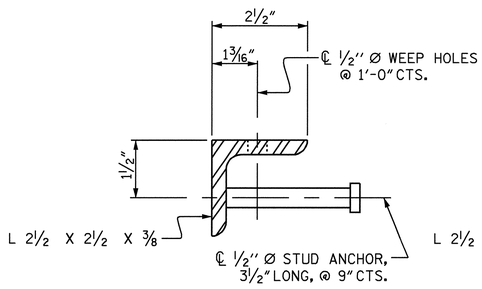


ARMORED JOINT DETAILS

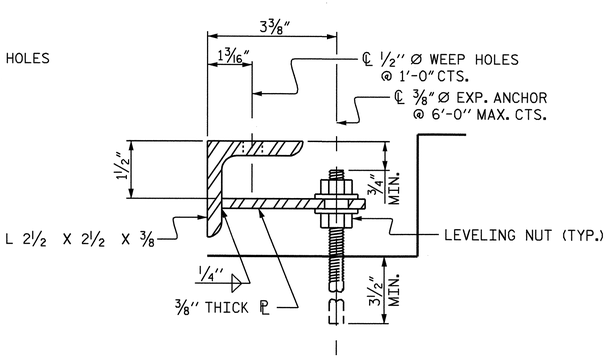
SECTION NORMAL TO JOINT AT END BENTS



PLAN VIEW OF TAB

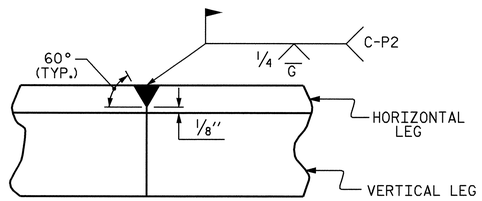


SECTION VIEW OF STUD



SECTION VIEW OF TAB

ARMORED JOINT ANCHOR ASSEMBLY DETAILS



DETAIL- FIELD WELD SPLICE OF ANGLE

NOTES

ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169 GRADES 1010 THRU 1020 OR APPROVED EQUAL.

STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON THE PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

UPON COMPLETION OF SHOP FABRICATION, THE ENTIRE ANCHOR ASSEMBLY SHALL BE METALLIZED. THE ½" Ø STUD ANCHORS AND ANCHOR TABS NEED NOT BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

ANCHOR ASSEMBLY SHALL BE MADE CONTINUOUS THE LENGTH OF THE JOINT FROM GUTTER TO GUTTER. FOR FIELD SPLICES AT ALL CROWN BREAK POINTS, THE ENDS OF THE STEEL ANGLES SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE. FINISHED FIELD WELDS SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR ASSEMBLY SEGMENTS SHALL NOT BE LESS THAN 12 FEET NOR MORE THAN 20 FEET IN LENGTH. SHORTER SEGMENTS MAY BE USED AT THE EDGE OF ROADWAY OR AT POINTS OF STAGED CONSTRUCTION.

THE ANCHOR ASSEMBLY SHALL BE SECURED AND LEVELED AS SHOWN IN THE "ARMORED JOINT ANCHOR ASSEMBLY DETAILS". NO SUBMITTALS ARE REQUIRED FOR ⅜" Ø EXPANSION ANCHORS, NUTS OR WASHERS. THE CONTRACTOR MAY SUBMIT FOR APPROVAL AN ALTERNATE METHOD OF ALIGNING AND LEVELING THE ANGLES. THE ALTERNATE METHOD SHALL NOT INCLUDE ANY WELDING TO THE OUTSIDE FACE OF THE ANGLES.

AFTER THE ELASTOMERIC CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE ANY EXCESS CONCRETE THAT COMES THROUGH THE WEEP HOLES AND THOROUGHLY CLEAN THE ANGLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM OF 4 MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

SEE SPECIAL PROVISIONS FOR EVAZOTE JOINT SEALS.

SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

MOVEMENT AND SETTING AT EVAZOTE JOINT

END BENT	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	51°-24'-14"	3 7/16"	2⅛"	2 13/16"	2 9/16"	2 1/16"
2	37°-54'-42"	3 7/16"	2"	2¾"	2 9/16"	2 3/16"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY.
JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.

BILL OF MATERIAL

END BENT	ELASTOMERIC CONCRETE * (CU. FT.)	TOTAL LENGTH OF ANGLE (FT)
1	15.4	134.33
2	19.4	169.26

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ARMORED EVAZOTE JOINT DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			94

STR. #1 STD. NO. AEJ1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 11/13/08
CHECKED BY : K.D. LAYNE	DATE : 3/26/09
DRAWN BY : EEM 1/96	REV. 7/10/01 LES/RDR
CHECKED BY : RGW 1/96	REV. 5/7/03RR RWW/JTE
	REV. 5/1/06 TLA/GM

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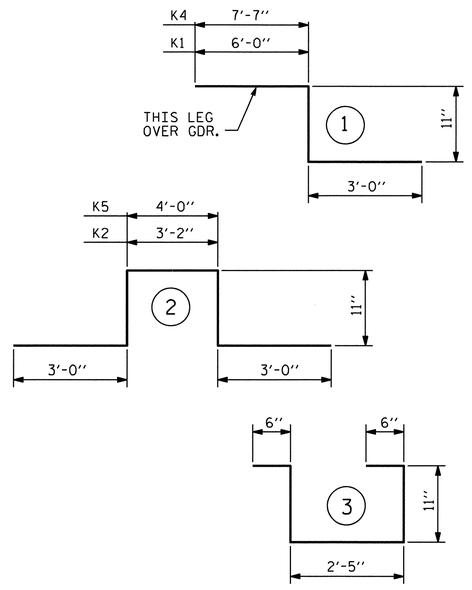
BILL OF MATERIAL

SPANS "A" & "B"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	669	#5	STR	54'-10"	38261	✳ A142	3	#5	STR	47'-6"	149	A201	2	#5	STR	54'-0"	113	A243	3	#5	STR	49'-3"	154	✳ B1	29	#4	STR	28'-10"	559
✳ A101	2	#5	STR	53'-2"	111	✳ A143	3	#5	STR	46'-4"	145	A202	2	#5	STR	52'-7"	110	A244	3	#5	STR	48'-1"	150	✳ B2	180	#4	STR	28'-11"	3477
✳ A102	2	#5	STR	51'-9"	108	✳ A144	3	#5	STR	45'-7"	143	A203	2	#5	STR	51'-2"	107	A245	3	#5	STR	46'-11"	147	✳ B3	435	#5	STR	50'-8"	22988
✳ A103	2	#5	STR	50'-4"	105	✳ A145	3	#5	STR	44'-0"	138	A204	2	#5	STR	49'-9"	104	A246	3	#5	STR	45'-9"	143						
✳ A104	2	#5	STR	48'-11"	102	✳ A146	3	#5	STR	42'-10"	134	A205	2	#5	STR	48'-4"	101	A247	3	#5	STR	44'-7"	140	✳ B5	45	#4	STR	26'-4"	792
✳ A105	2	#5	STR	47'-6"	99	✳ A147	3	#5	STR	41'-8"	130	A206	2	#5	STR	46'-11"	98	A248	3	#5	STR	43'-5"	136	✳ B6	45	#4	STR	25'-3"	759
✳ A106	2	#5	STR	46'-1"	96	✳ A148	3	#5	STR	40'-6"	127	A207	2	#5	STR	45'-6"	95	A249	3	#5	STR	42'-3"	132	✳ B7	36	#4	STR	29'-9"	715
✳ A107	2	#5	STR	44'-8"	93	✳ A149	3	#5	STR	39'-4"	123	A208	2	#5	STR	44'-1"	92	A250	3	#5	STR	41'-1"	129	✳ B8	36	#4	STR	28'-5"	683
✳ A108	2	#5	STR	43'-9"	91	✳ A150	3	#5	STR	38'-2"	119	A209	2	#5	STR	42'-8"	89	A251	3	#5	STR	39'-11"	125	B9	35	#5	STR	55'-6"	2026
✳ A109	2	#5	STR	41'-10"	87	✳ A151	3	#5	STR	36'-11"	116	A210	2	#5	STR	41'-2"	86	A252	3	#5	STR	38'-9"	121	B10	420	#5	STR	59'-4"	25992
✳ A110	2	#5	STR	40'-4"	84	✳ A152	3	#5	STR	35'-9"	112	A211	2	#5	STR	39'-9"	83	A253	3	#5	STR	37'-6"	117	B11	35	#5	STR	59'-9"	2181
✳ A111	2	#5	STR	38'-11"	81	✳ A153	3	#5	STR	34'-7"	108	A212	2	#5	STR	38'-4"	80	A254	3	#5	STR	36'-4"	114						
✳ A112	2	#5	STR	37'-6"	78	✳ A154	3	#5	STR	33'-5"	105	A213	2	#5	STR	36'-11"	77	A255	3	#5	STR	35'-2"	110	✳ G1	2	#5	STR	36'-8"	76
✳ A113	2	#5	STR	36'-1"	75	✳ A155	3	#5	STR	32'-3"	101	A214	2	#5	STR	35'-6"	74	A256	3	#5	STR	34'-0"	106	✳ G2	2	#5	STR	45'-10"	96
✳ A114	2	#5	STR	34'-8"	72	✳ A156	3	#5	STR	31'-1"	97	A215	2	#5	STR	34'-1"	71	A257	3	#5	STR	32'-10"	103						
✳ A115	2	#5	STR	32'-3"	67	✳ A157	3	#5	STR	29'-11"	94	A216	2	#5	STR	32'-9"	68	A258	3	#5	STR	31'-8"	99	✳ K1	8	#5	1	9'-11"	83
✳ A116	2	#5	STR	31'-11"	67	✳ A158	3	#5	STR	28'-9"	90	A217	2	#5	STR	31'-4"	65	A259	3	#5	STR	30'-6"	95	✳ K2	16	#5	2	11'-0"	184
✳ A117	2	#5	STR	30'-6"	64	✳ A159	3	#5	STR	27'-7"	86	A218	2	#5	STR	29'-11"	62	A260	3	#5	STR	29'-4"	92	✳ K3	20	#5	STR	11'-8"	243
✳ A118	2	#5	STR	29'-1"	61	✳ A160	3	#5	STR	26'-5"	83	A219	2	#5	STR	28'-6"	59	A261	3	#5	STR	28'-2"	88	✳ K4	8	#5	1	11'-6"	96
✳ A119	2	#5	STR	27'-8"	58	✳ A161	3	#5	STR	25'-3"	79	A220	2	#5	STR	27'-1"	56	A262	3	#5	STR	27'-0"	84	✳ K5	16	#5	2	11'-10"	197
✳ A120	2	#5	STR	26'-3"	55	✳ A162	3	#5	STR	24'-1"	75	A221	2	#5	STR	25'-8"	54	A263	3	#5	STR	25'-10"	81	✳ K6	20	#5	STR	14'-11"	311
✳ A121	2	#5	STR	24'-10"	52	✳ A163	3	#5	STR	22'-11"	72	A222	2	#5	STR	24'-3"	51	A264	3	#5	STR	24'-8"	77						
✳ A122	2	#5	STR	23'-5"	49	✳ A164	3	#5	STR	21'-9"	68	A223	2	#5	STR	22'-10"	48	A265	3	#5	STR	23'-6"	74	✳ S1	90	#4	3	5'-3"	316
✳ A123	2	#5	STR	22'-0"	46	✳ A165	3	#5	STR	20'-7"	64	A224	2	#5	STR	21'-5"	45	A266	3	#5	STR	22'-4"	70						
✳ A124	2	#5	STR	20'-7"	43	✳ A166	3	#5	STR	19'-5"	61	A225	2	#5	STR	20'-0"	42	A267	3	#5	STR	21'-2"	66						
✳ A125	2	#5	STR	19'-2"	40	✳ A167	3	#5	STR	18'-3"	57	A226	2	#5	STR	18'-7"	39	A268	3	#5	STR	20'-0"	63						
✳ A126	2	#5	STR	17'-9"	37	✳ A168	3	#5	STR	17'-1"	53	A227	2	#5	STR	17'-2"	36	A269	3	#5	STR	18'-10"	59						
✳ A127	2	#5	STR	16'-4"	34	✳ A169	3	#5	STR	15'-11"	50	A228	2	#5	STR	15'-9"	33	A270	3	#5	STR	17'-8"	55						
✳ A128	2	#5	STR	14'-11"	31	✳ A170	3	#5	STR	14'-9"	46	A229	2	#5	STR	14'-5"	30	A271	3	#5	STR	16'-6"	52						
✳ A129	2	#5	STR	13'-7"	28	✳ A171	3	#5	STR	13'-7"	43	A230	2	#5	STR	13'-0"	27	A272	3	#5	STR	15'-4"	48						
✳ A130	2	#5	STR	12'-2"	25	✳ A172	3	#5	STR	12'-5"	39	A231	2	#5	STR	11'-7"	24	A273	3	#5	STR	14'-2"	44						
✳ A131	2	#5	STR	10'-9"	22	✳ A173	3	#5	STR	11'-3"	35	A232	2	#5	STR	10'-2"	21	A274	3	#5	STR	13'-0"	41						
✳ A132	2	#5	STR	9'-4"	19	✳ A174	3	#5	STR	10'-1"	32	A233	2	#5	STR	8'-9"	18	A275	3	#5	STR	11'-10"	37						
✳ A133	2	#5	STR	7'-11"	17	✳ A175	3	#5	STR	8'-11"	28	A234	2	#5	STR	7'-4"	15	A276	3	#5	STR	10'-8"	33						
✳ A134	2	#5	STR	6'-6"	14	✳ A176	3	#5	STR	7'-9"	24	A235	2	#5	STR	6'-0"	13	A277	3	#5	STR	9'-6"	30						
✳ A135	2	#5	STR	3'-0"	6	✳ A177	3	#5	STR	6'-7"	21	A236	2	#5	STR	4'-7"	10	A278	3	#5	STR	8'-4"	26						
✳ A136	2	#5	STR	1'-7"	3	✳ A178	3	#5	STR	5'-5"	17	A237	2	#5	STR	3'-2"	7	A279	3	#5	STR	7'-2"	22						
✳ A137	3	#5	STR	53'-4"	167	✳ A179	3	#5	STR	2'-9"	9	A238	2	#5	STR	1'-9"	4	A280	3	#5	STR	6'-0"	19						
✳ A138	3	#5	STR	52'-2"	163	✳ A180	3	#6	STR	6'-5"	29	A239	3	#5	STR	53'-11"	169	A281	3	#5	STR	4'-10"	15						
✳ A139	3	#5	STR	51'-0"	160	✳ A181	3	#6	STR	5'-2"	23	A240	3	#5	STR	52'-9"	165	A282	3	#5	STR	3'-8"	11						
✳ A140	3	#5	STR	49'-10"	156							A241	3	#5	STR	51'-7"	161	A283	3	#5	STR	2'-6"	8						
✳ A141	3	#5	STR	48'-8"	152	A2	669	#5	STR	54'-10"	38261	A242	3	#5	STR	50'-5"	158												

BAR TYPES



ALL BARS DIMENSIONS ARE OUT TO OUT.

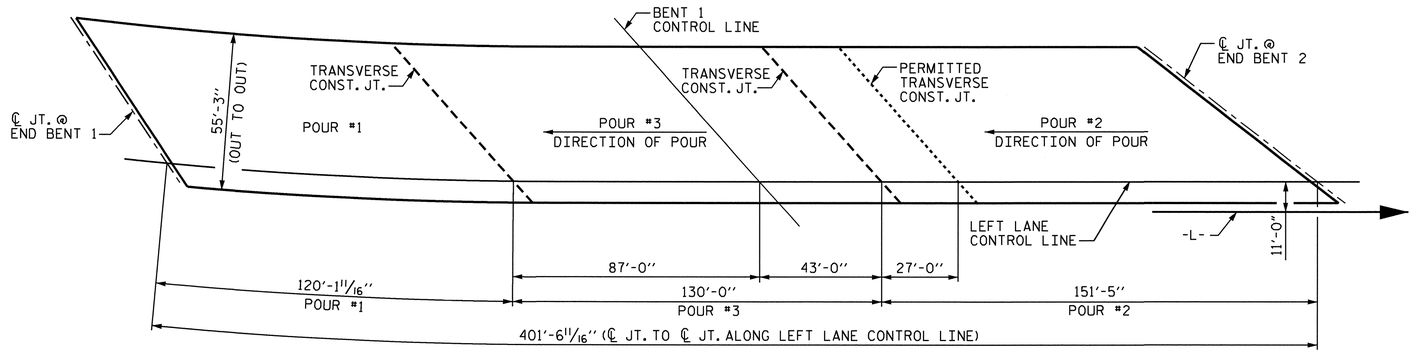
SUPERSTRUCTURE BILL OF MATERIAL

SPAN "A" & "B"	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	210.4		
POUR #2	256.5		
POUR #3	243.8		
TOTALS ✳✳	710.7	74636	75879

✳✳ QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

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"			



LAYOUT OF REINFORCED CONCRETE DECK SLAB AREA & POURING SEQUENCE (SQ. FT. = 21,557)

GROOVING BRIDGE FLOORS	
APPROACH SLABS	2,349 SQ.FT.
BRIDGE DECK	19,013 SQ.FT.
TOTAL	21,362 SQ.FT.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			94

STR. #1 STD. NO. BOM1

ASSEMBLED BY : A.S. CALLAWAY DATE : 11/17/08
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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

REV. 6/1/94 EEM/GRP
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM

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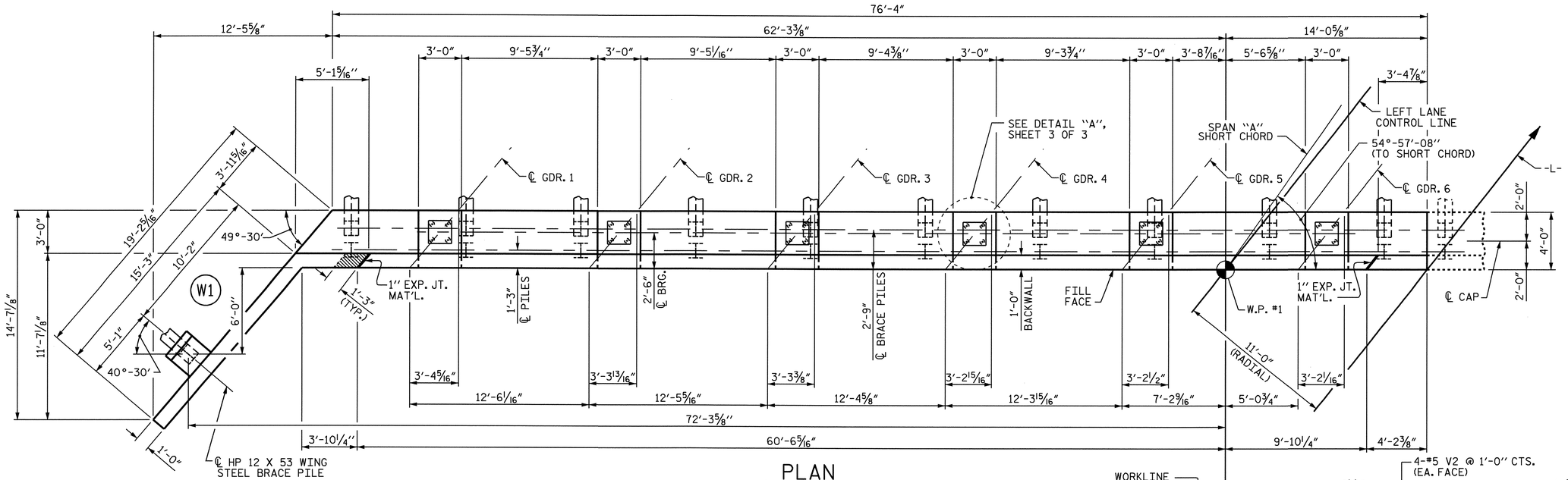
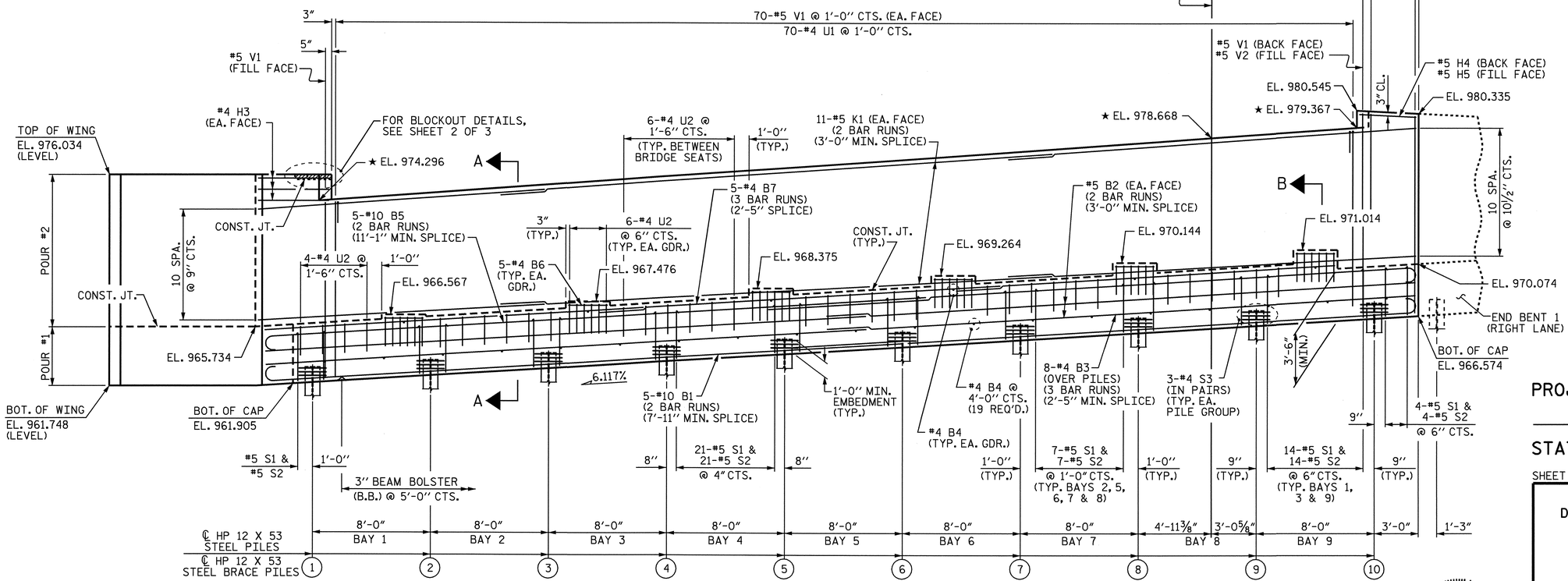


PLAN

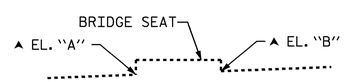


ELEVATION

(FOR CLARITY, BRACE PILE CAPS AT WING NOT SHOWN)

★ ELEVATION TAKEN ON THE FILL FACE OF THE BACKWALL.

TOP OF PILE ELEVATIONS	
WING	EL. 962.748
1	EL. 963.017
2	EL. 963.507
3	EL. 963.996
4	EL. 964.485
5	EL. 964.974
6	EL. 965.464
7	EL. 965.953
8	EL. 966.442
9	EL. 966.932
10	EL. 967.421



ELEVATIONS BETWEEN BRIDGE SEATS		
LOCATION	EL. A	EL. B
GDR. #1	966.258	966.442
GDR. #2	967.022	967.205
GDR. #3	967.782	967.965
GDR. #4	968.538	968.721
GDR. #5	969.291	969.474
GDR. #6	970.040	969.737

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/4/09
CHECKED BY : L.E. SUTTON DATE : 10/23/09

23-NOV-2009 14:35
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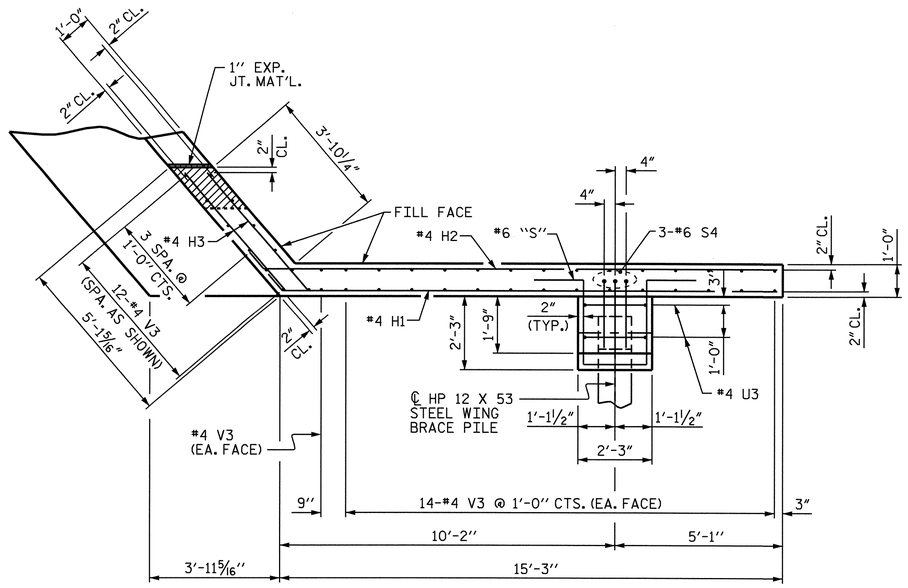
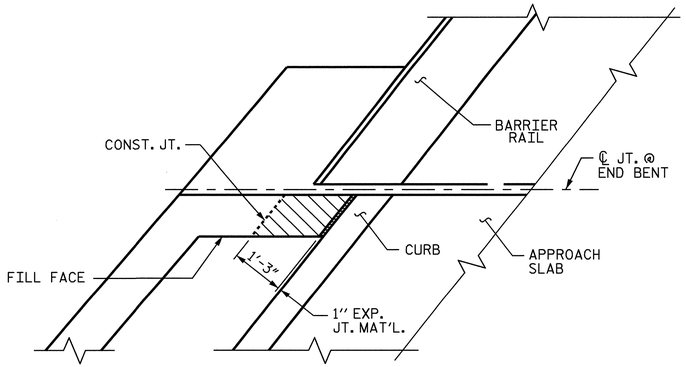
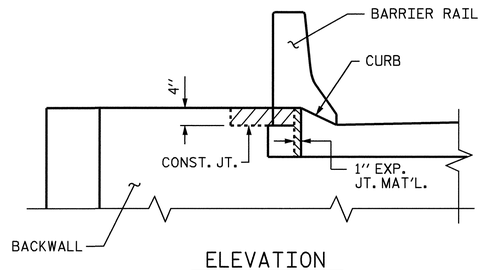
lsutton



PLAN OF WING (W1)

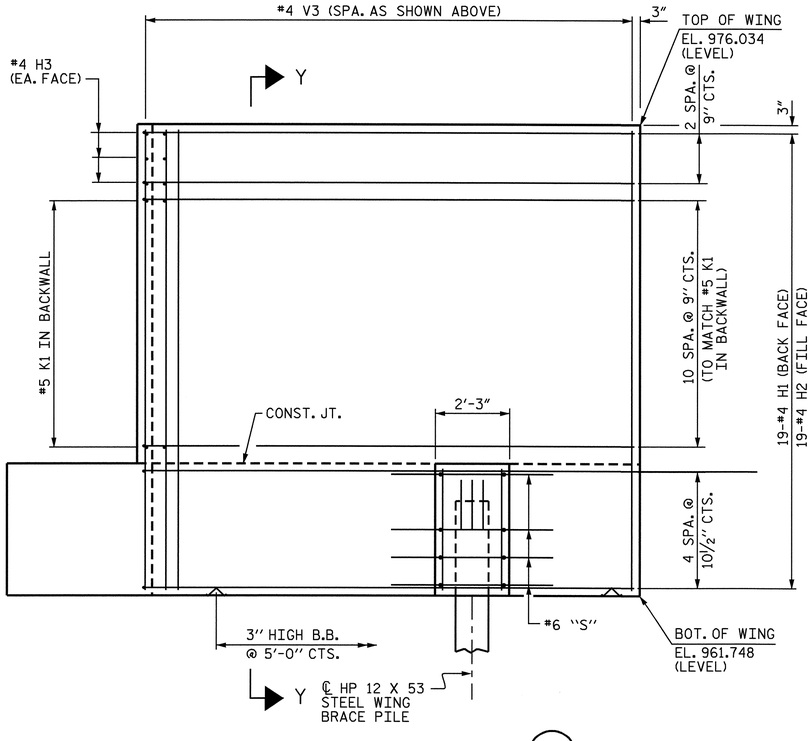


PLAN

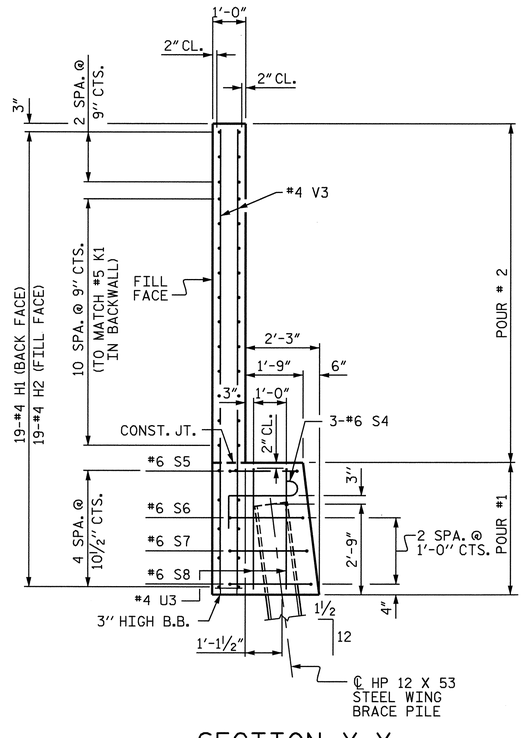


ELEVATION

BLOCKOUT IN WING WALL



ELEVATION OF WING (W1)



SECTION Y-Y

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/9/09
CHECKED BY : L.E. SUTTON DATE : 10/23/09

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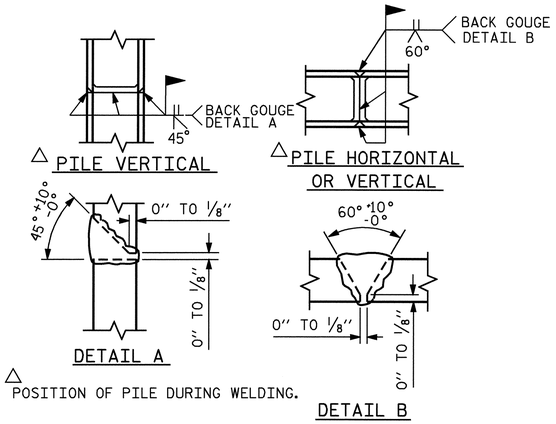
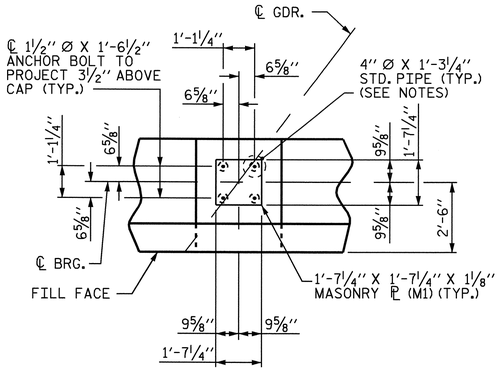
lsutton

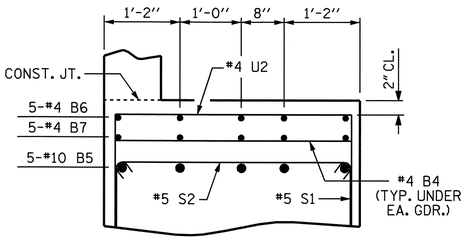


PILE SPLICE DETAILS

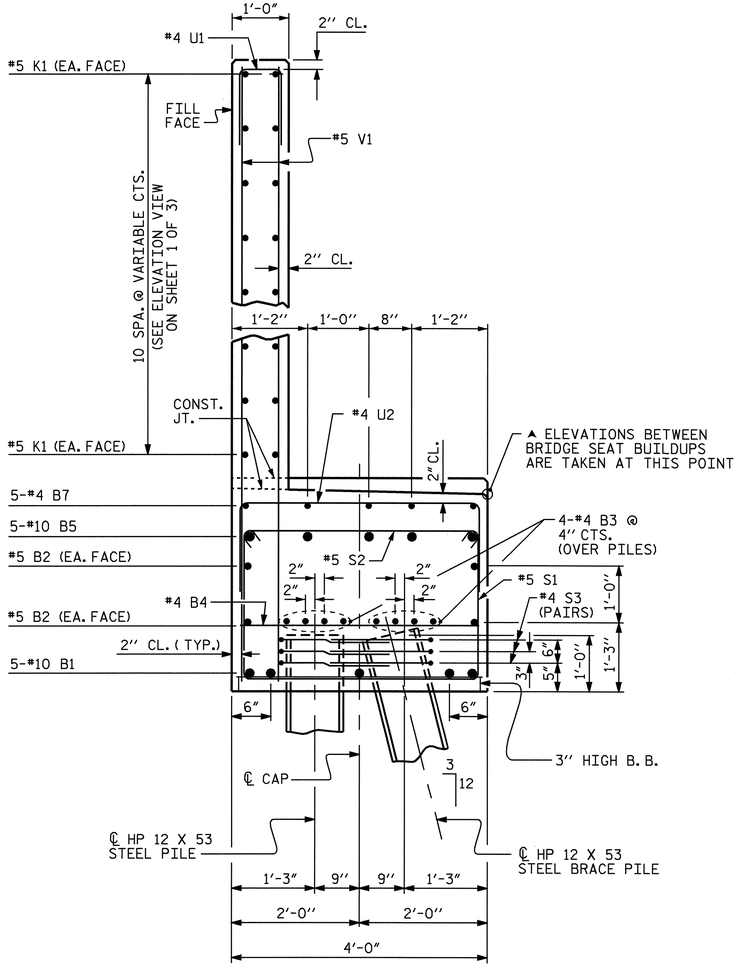


DETAIL "A"

(TYP. EA. GDR.)



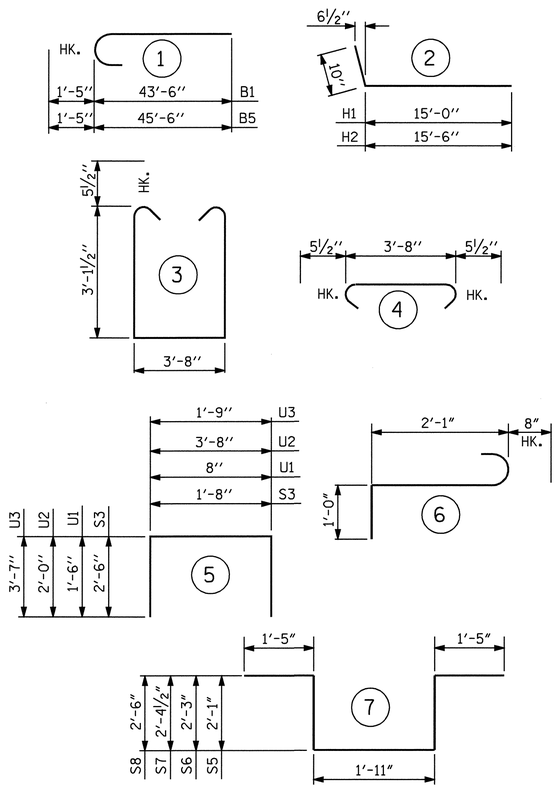
PART SECTION B



SECTION A-A

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	44'-11"	1933
B2	8	#5	STR	41'-2"	343
B3	24	#4	STR	28'-0"	449
B4	25	#4	STR	3'-8"	61
B5	10	#10	1	46'-11"	2019
B6	30	#4	STR	2'-8"	53
B7	15	#4	STR	26'-3"	263
H1	19	#4	2	15'-10"	201
H2	19	#4	2	16'-4"	207
H3	6	#4	STR	4'-8"	19
H4	1	#5	STR	3'-1"	3
H5	1	#5	STR	3'-8"	4
K1	44	#5	STR	41'-2"	1889
S1	103	#5	3	10'-10"	1164
S2	103	#5	4	4'-7"	492
S3	60	#4	5	6'-8"	267
S4	3	#6	6	3'-9"	17
S5	1	#6	7	8'-11"	13
S6	1	#6	7	9'-3"	14
S7	1	#6	7	9'-6"	14
S8	1	#6	7	9'-9"	15
U1	70	#4	5	3'-8"	171
U2	70	#4	5	7'-8"	358
U3	2	#4	5	8'-11"	12
V1	142	#5	STR	11'-11"	1765
V2	9	#5	STR	13'-5"	126
V3	42	#4	STR	13'-11"	390

REINFORCING STEEL	LBS.	12,262
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WING	CU. YDS.	50.3
POUR #2 - BACKWALL & UPPER WING	CU. YDS.	31.2
TOTAL	CU. YDS.	81.5
HP 12 x 53 STEEL PILES NO. = 21	LIN. FT.	1,050

NOTES

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

FOR TEMPORARY DRAINAGE AT END BENT, SEE END BENT 2.

FOR PIPE INSERT DETAILS, SEE POT BEARING DETAILS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN FORMED AND THE BARRIER RAIL HAS BEEN CAST IF SLIP FORMING IS USED.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4"DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE #5 V1 BARS SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE WING BRACE PILE BATTER IS 1½:12 TO AVOID IMPACTING SEWER LINE.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			94

STR. #1

DRAWN BY : A.S. CALLAWAY DATE : 5/4/09
CHECKED BY : L.E. SUTTON DATE : 10/23/09

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NOTES

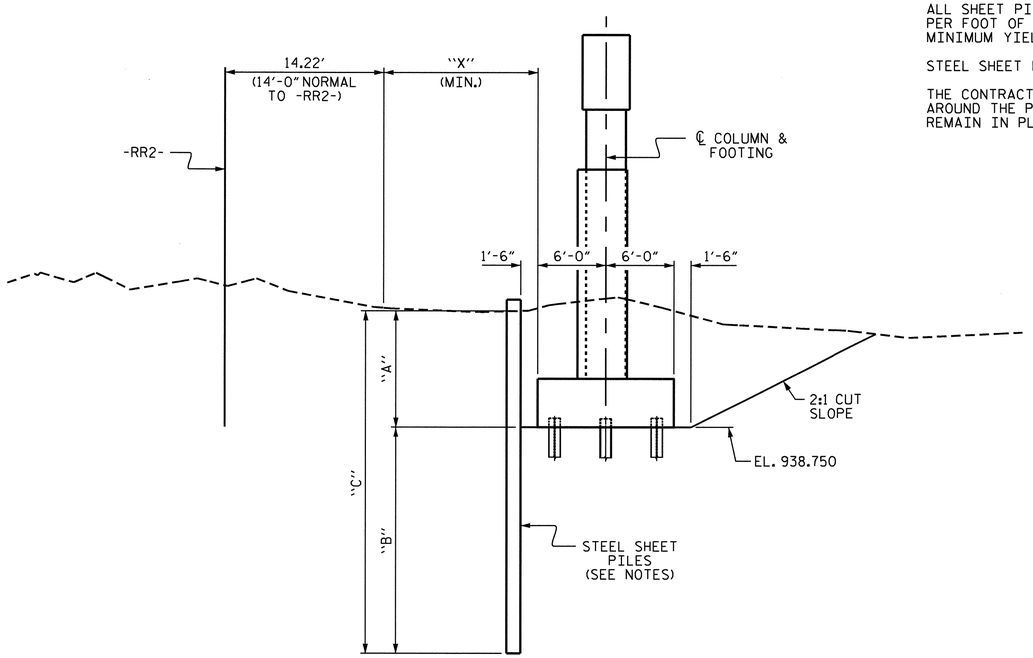
FOR TEMPORARY RAILROAD SHORING, SEE SPECIAL PROVISIONS.

ALL SHEET PILES HAVE A MINIMUM SECTION MODULUS OF 48.5 in³ PER FOOT OF WALL AND SHALL CONFORM TO ASTM A328 WITH A MINIMUM YIELD STRENGTH OF 39 KSI.

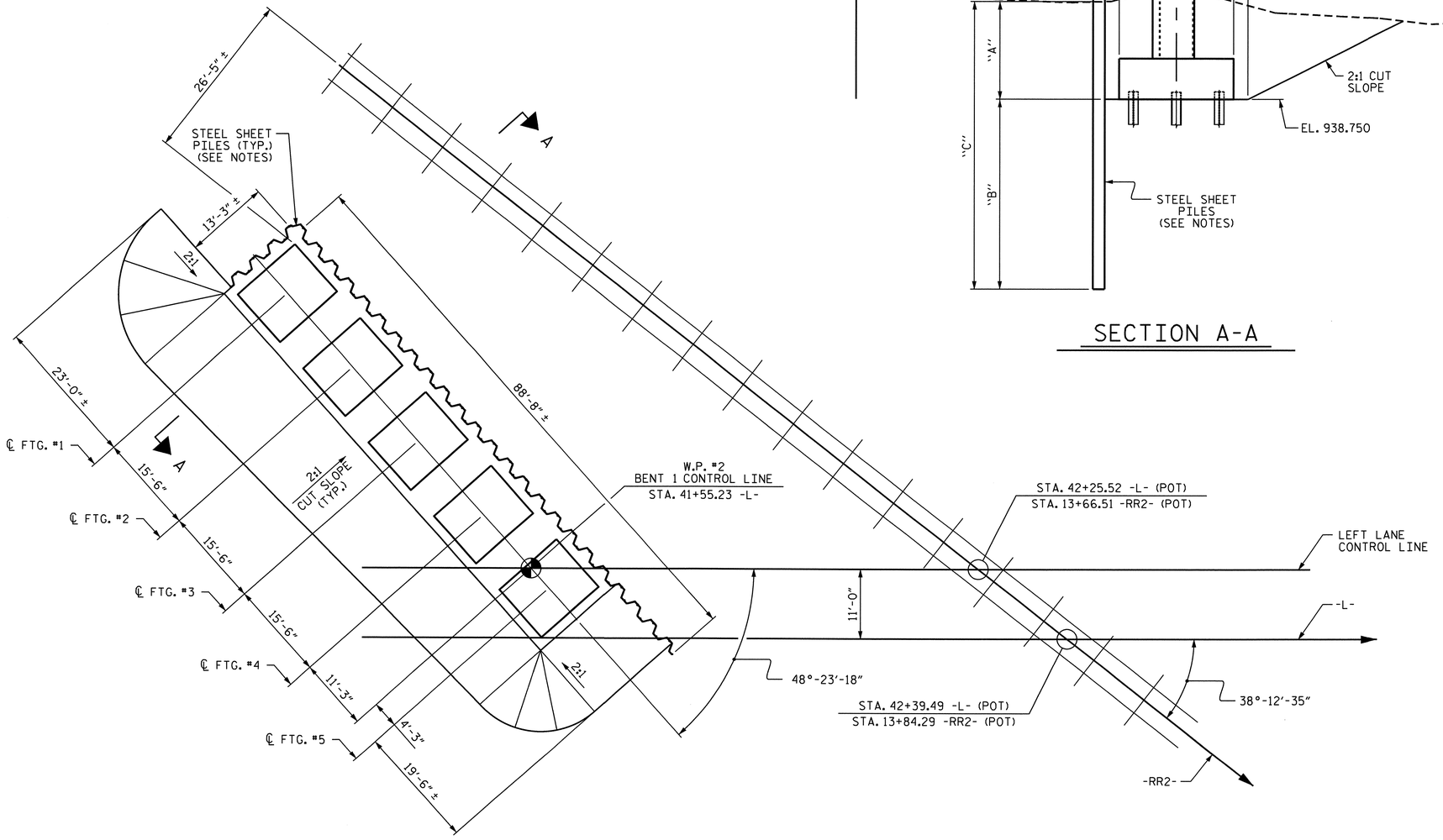
STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

THE CONTRACTOR SHALL INSTALL APPROPRIATE SAFETY FENCING AROUND THE PROPOSED EXCAVATION AREA. SAFETY FENCING SHALL REMAIN IN PLACE UNTIL THE REMOVAL OF THE STEEL SHEET PILES.

DIMENSION TABLE				
FTG. #	"A"	"B"	"C"	"X"
1	10.195'	23.805'	34.000'	12.68'
2	10.325'	23.675'	34.000'	15.47'
3	10.496'	23.504'	34.000'	18.25'
4	10.646'	23.354'	34.000'	21.03'
5	9.983'	24.017'	34.000'	23.81'



SECTION A-A



PLAN

SHOWING RELATIONSHIP OF SHORING TO RAILROAD

(CAP, CRASHWALL, COLUMNS AND PILES NOT SHOWN FOR CLARITY)

DRAWN BY : L.E. SUTTON DATE : 5/05/09
CHECKED BY : A.S. CALLAWAY DATE : 6/09/09

05-JAN-2010 08:38
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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

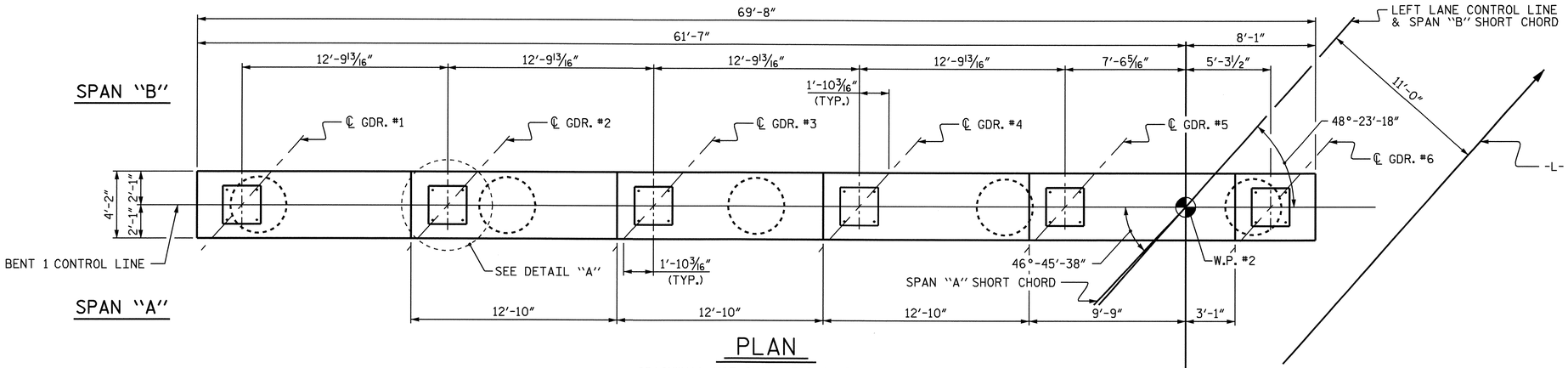
PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-
MILE POST R124

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1
TEMPORARY SHORING
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			94

STR. #1



PLAN

CRASHWALL NOT SHOWN FOR CLARITY

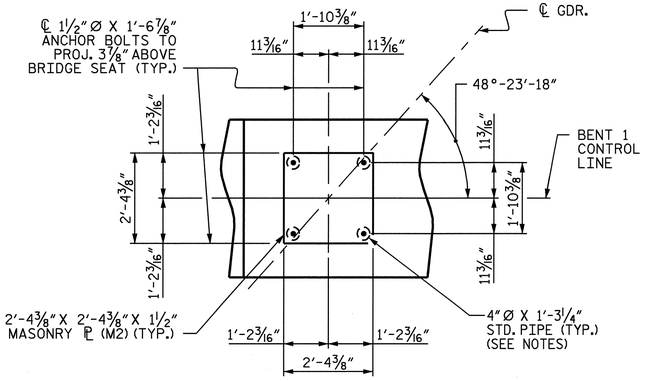
NOTES

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

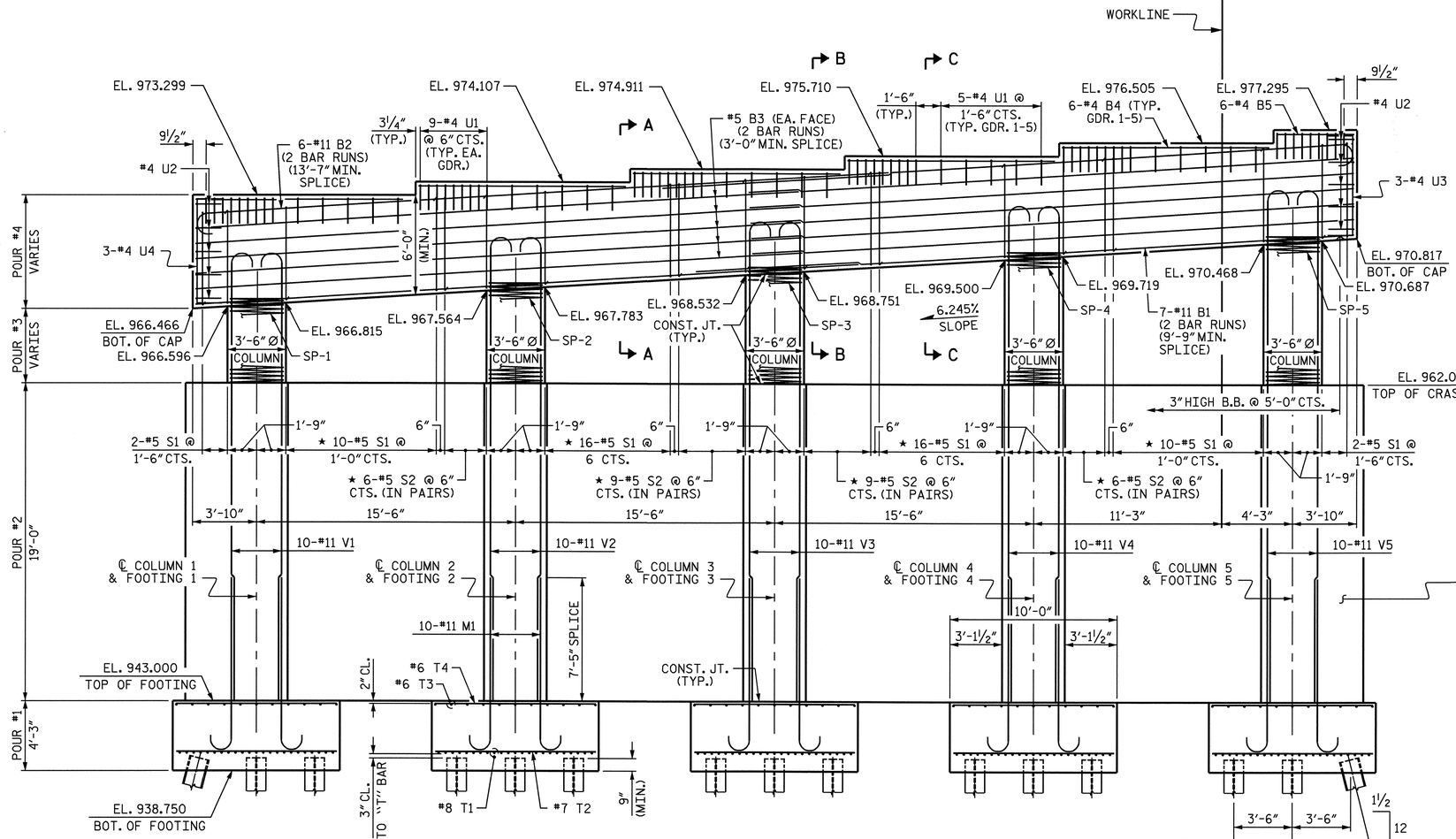
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR PIPE INSERT DETAILS, SEE "POT BEARING DETAILS" SHEETS.

FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEETS.



DETAIL "A"



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : D.R. WITHROW/LES DATE : 4/2/09
CHECKED BY : A.S. CALLAWAY DATE : 9/2/09

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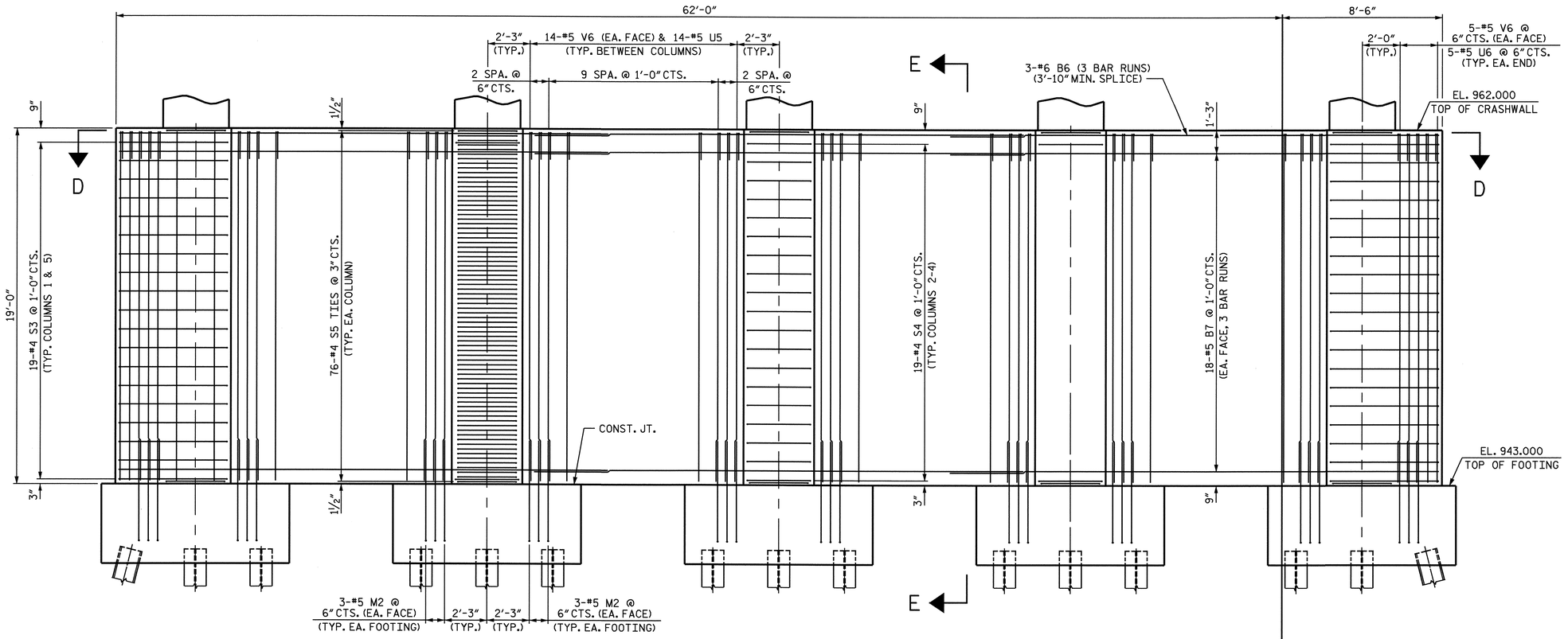
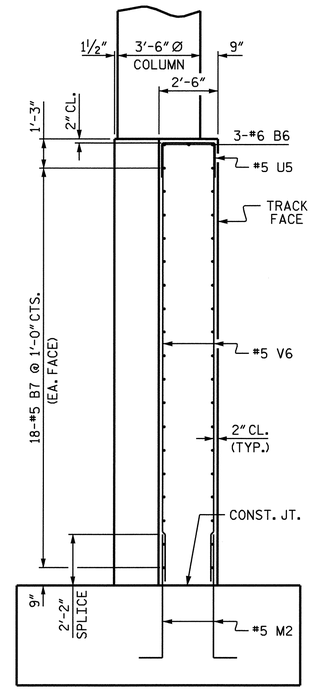
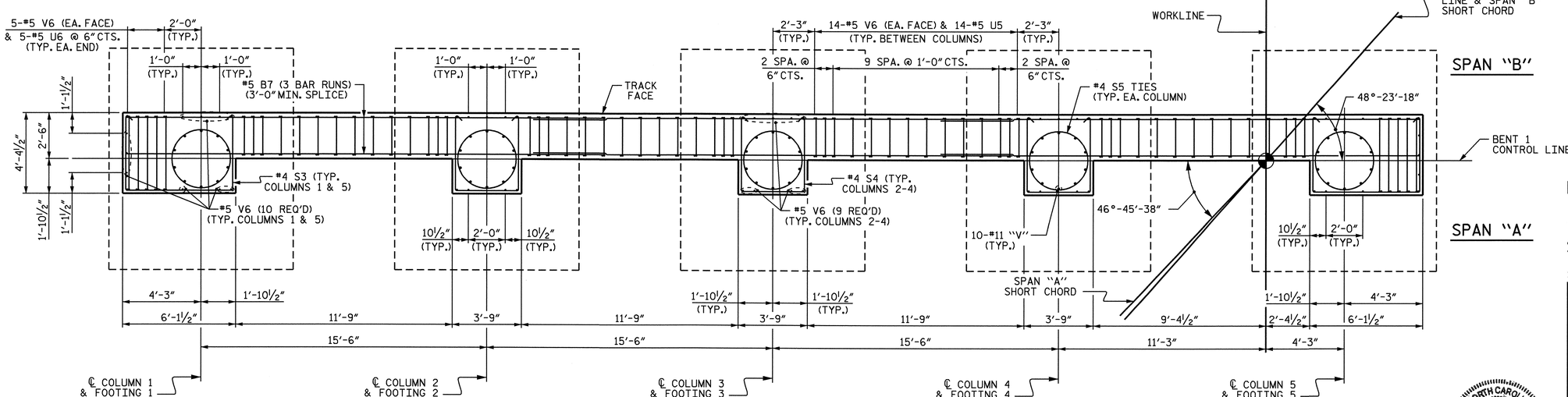


ELEVATION OF CRASHWALL



SECTION E-E



SECTION D-D

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			94

STR. #1

DRAWN BY : L.E. SUTTON DATE : 8/31/09
CHECKED BY : A.S. CALLAWAY DATE : 9/2/09

23-NOV-2009 14:35
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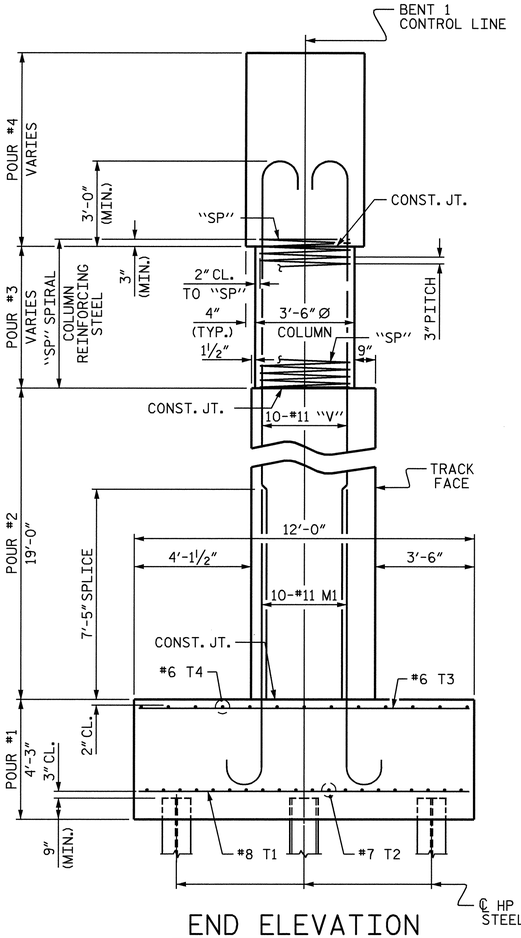
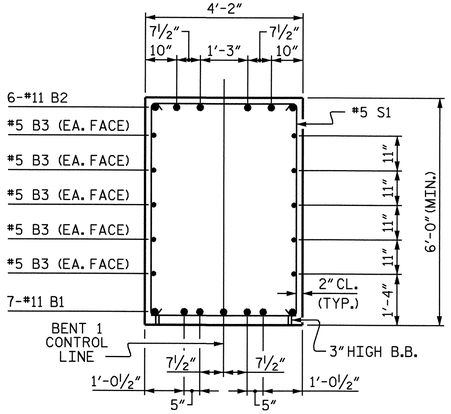
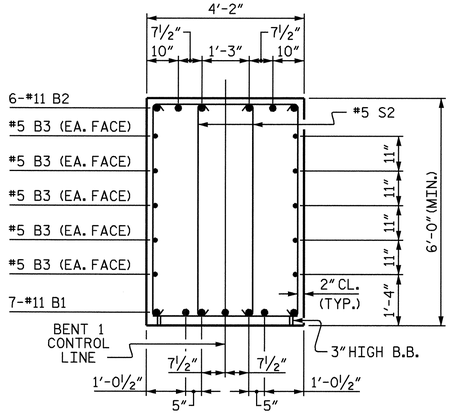


END ELEVATION

FOR CRASHWALL REINFORCING STEEL,
SEE SHEET 2 OF 3



SECTION A-A



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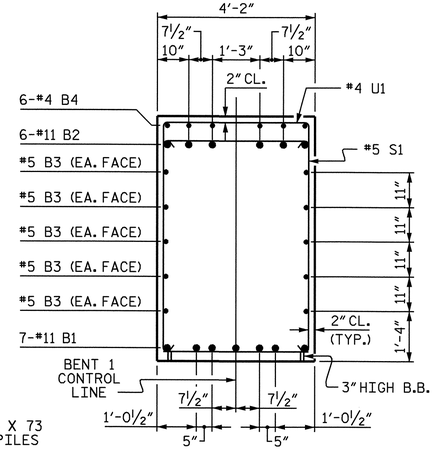
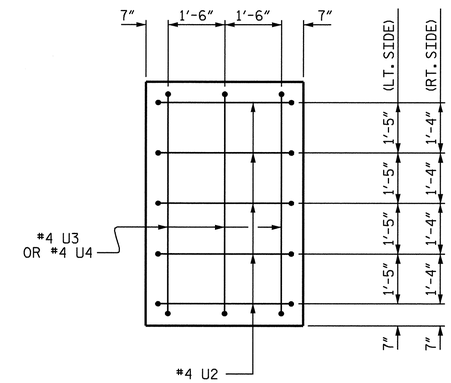
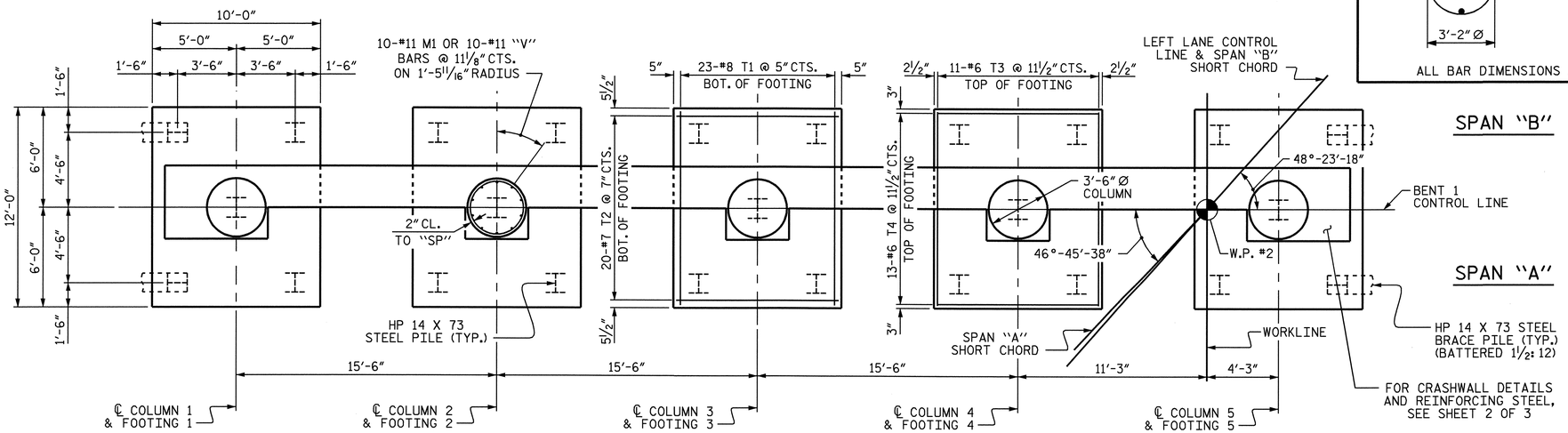


SECTION C-C



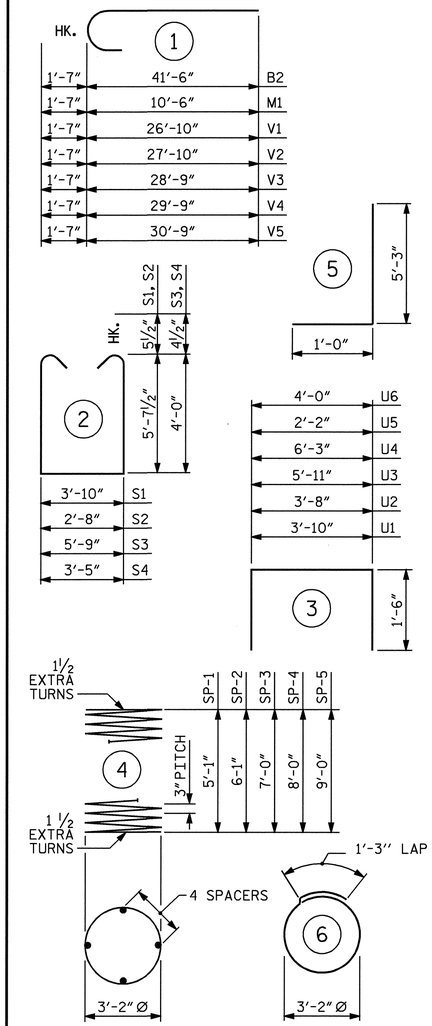
END VIEW



PLAN OF COLUMNS & FOOTINGS

DIMENSIONS AND REINFORCING STEEL ARE
TYPICAL FOR EACH COLUMN AND FOOTING

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#11	STR	39'-8"	2950
B2	12	#11	1	43'-1"	2747
B3	20	#5	STR	36'-3"	756
B4	30	#4	STR	12'-5"	249
B5	6	#4	STR	4'-8"	19
B6	9	#6	STR	26'-0"	351
B7	108	#5	STR	25'-5"	2863
M1	50	#11	1	12'-1"	3210
M2	60	#5	5	6'-3"	391
S1	56	#5	2	16'-0"	935
S2	60	#5	2	14'-10"	928
S3	38	#4	2	14'-6"	368
S4	57	#4	2	12'-2"	463
S5	380	#4	6	11'-3"	2856
T1	115	#8	STR	11'-6"	3531
T2	100	#7	STR	9'-6"	1942
T3	55	#6	STR	11'-6"	950
T4	65	#6	STR	9'-6"	927
U1	79	#4	3	6'-10"	361
U2	10	#4	3	6'-8"	45
U3	3	#4	3	8'-11"	18
U4	3	#4	3	9'-3"	19
U5	56	#5	3	5'-2"	302
U6	10	#5	3	7'-0"	73
V1	10	#11	1	28'-5"	1510
V2	10	#11	1	29'-5"	1563
V3	10	#11	1	30'-4"	1612
V4	10	#11	1	31'-4"	1665
V5	10	#11	1	32'-4"	1718
V6	179	#5	STR	18'-10"	3516
REINFORCING STEEL				LBS.	38,838
SP-1	1	**	4	235'-9"	157
SP-2	1	**	4	275'-0"	184
SP-3	1	**	4	304'-6"	203
SP-4	1	**	4	343'-9"	230
SP-5	1	**	4	383'-0"	256
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,030

CLASS A CONCRETE BREAKDOWN:		
POUR #1 - FOOTINGS	CU. YDS.	94.4
POUR #2 - CRASHWALL	CU. YDS.	155.0
POUR #3 - COLUMNS	CU. YDS.	11.8
POUR #4 - CAP	CU. YDS.	69.1
TOTAL	CU. YDS.	330.3

HP 14 x 73 STEEL PILES		
NO. = 25	LIN. FT.	750
FOUNDATION EXCAVATION		LUMP SUM

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

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : D.R. WITHROW/LES DATE : 4/2/09
CHECKED BY : A.S. CALLAWAY DATE : 9/2/09

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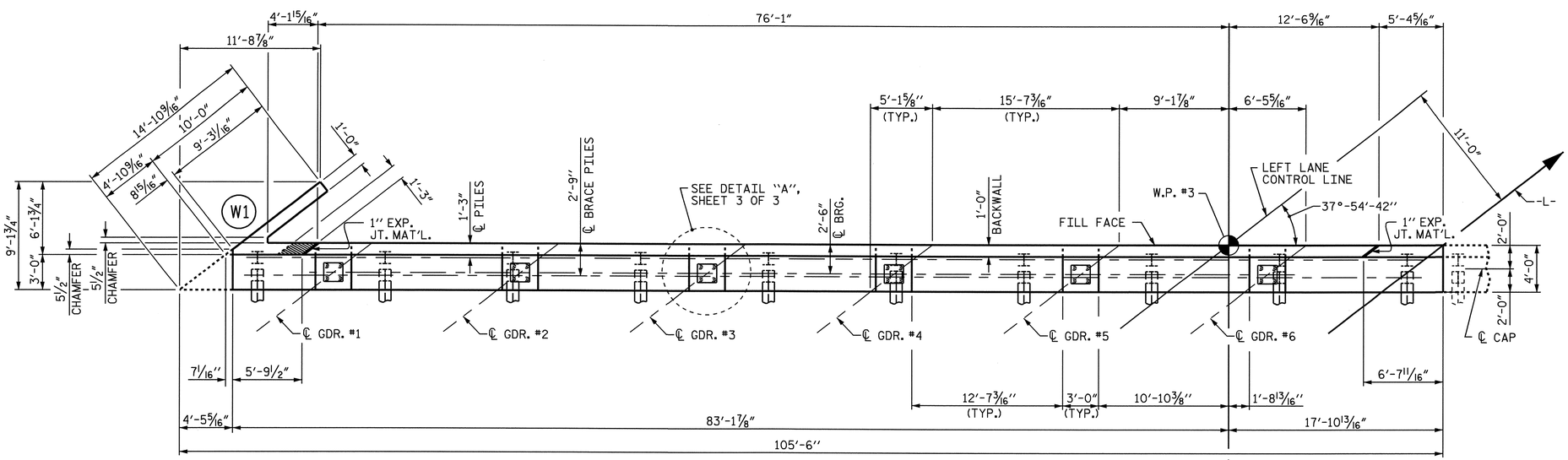
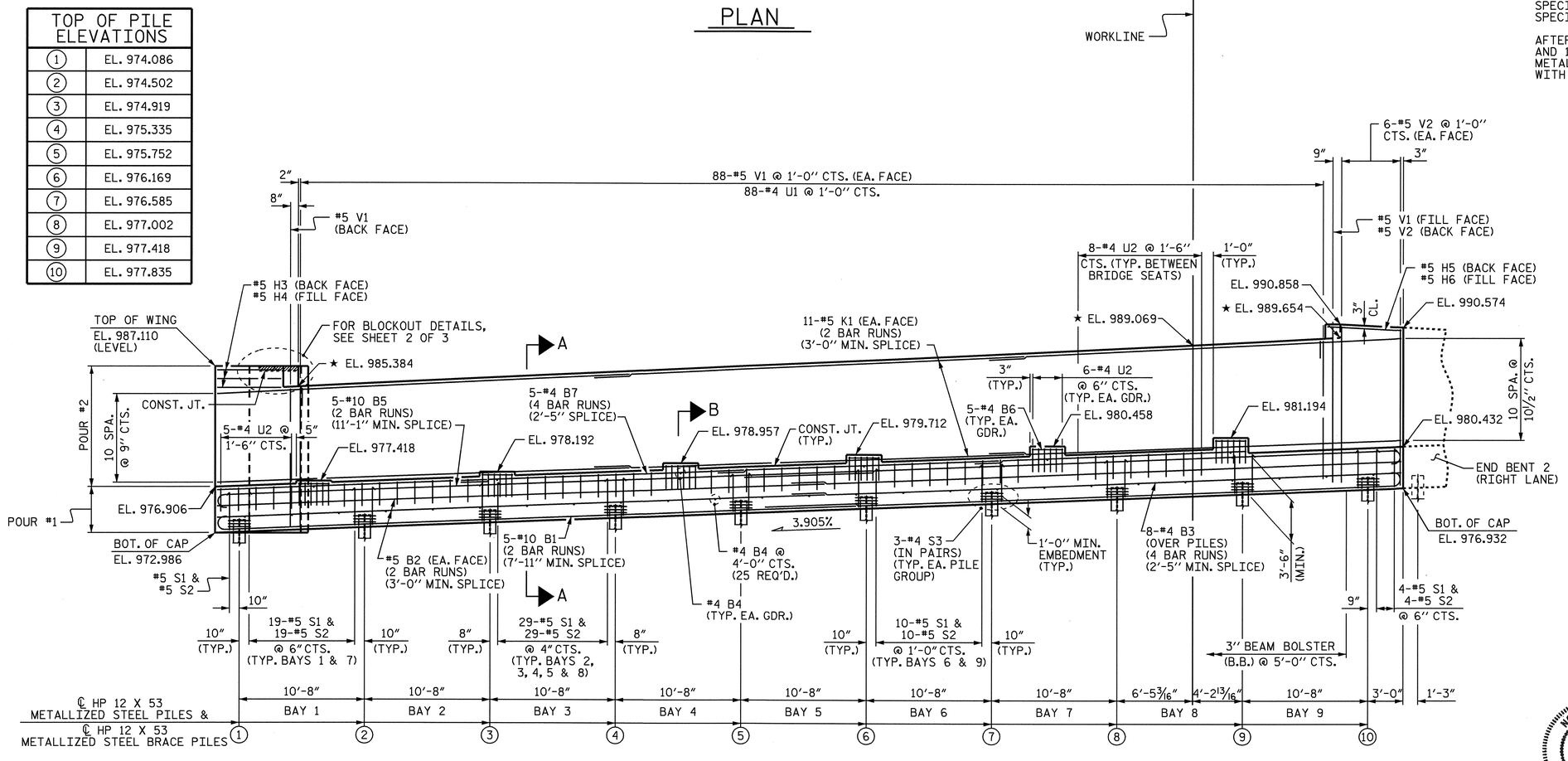


PLAN

TOP OF PILE ELEVATIONS	
①	EL. 974.086
②	EL. 974.502
③	EL. 974.919
④	EL. 975.335
⑤	EL. 975.752
⑥	EL. 976.169
⑦	EL. 976.585
⑧	EL. 977.002
⑨	EL. 977.418
⑩	EL. 977.835



ELEVATION

★ ELEVATION TAKEN ON THE FILL FACE OF THE BACKWALL.

NOTES

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

FOR PILE SPLICE DETAILS, SEE END BENT 1.

FOR PIPE INSERT DETAILS, SEE POT BEARING DETAILS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN FORMED AND THE BARRIER RAIL HAS BEEN CAST IF SLIP FORMING IS USED.

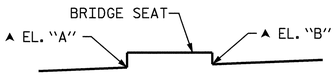
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE #5 V1 BARS SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

FOR HP 12 X 53 METALLIZED STEEL PILES, SEE SPECIAL PROVISIONS.

APPLY AN 8 MIL THICK 1350 ALUMINUM (W-A1-1350) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO THE PILES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-12 BROWN AND 1080-12 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.



ELEVATIONS BETWEEN BRIDGE SEATS		
LOCATION	EL. "A"	EL. "B"
GDR. #1	977.176	977.293
GDR. #2	977.785	977.902
GDR. #3	978.394	978.511
GDR. #4	979.003	979.120
GDR. #5	979.612	979.729
GDR. #6	980.221	979.918

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/7/09
CHECKED BY : L.E. SUTTON DATE : 10/6/09

23-NOV-2009 14:34
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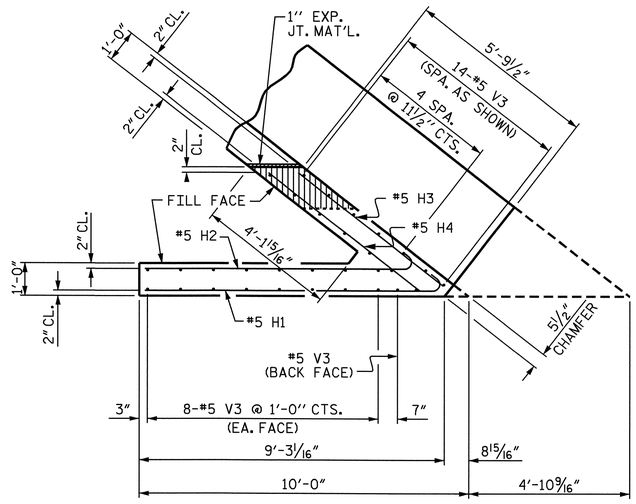
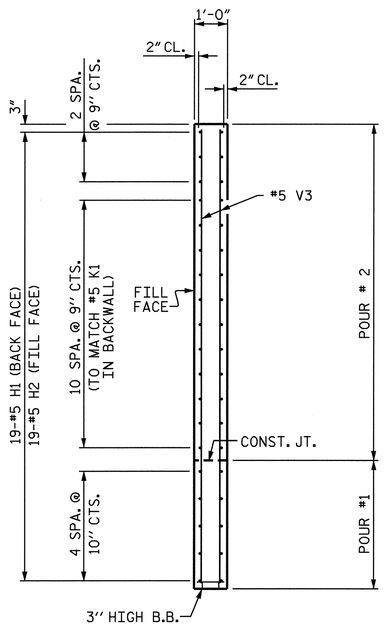
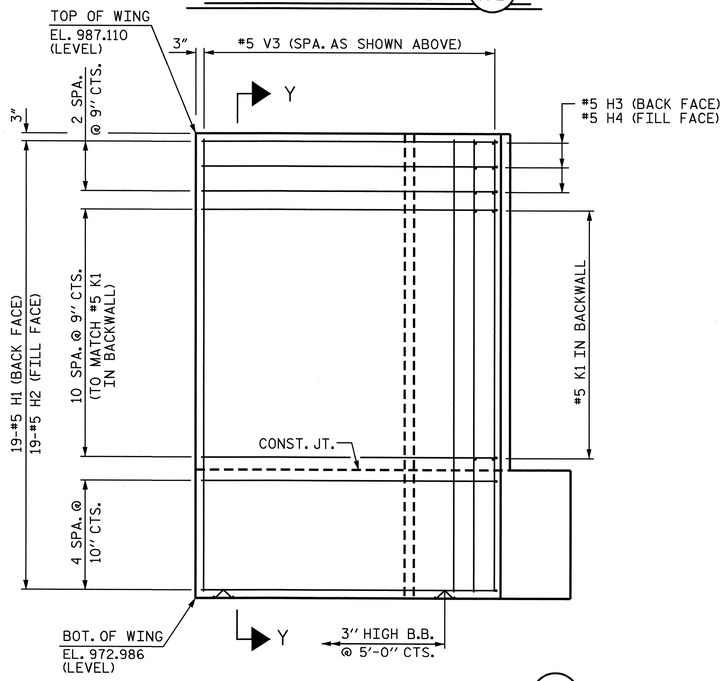
lsutton



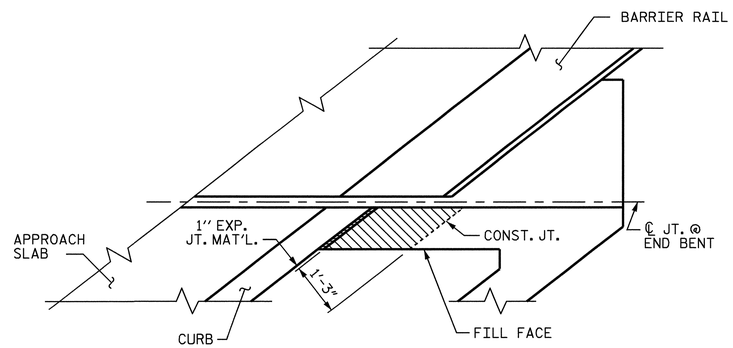
PLAN OF WING (W1)



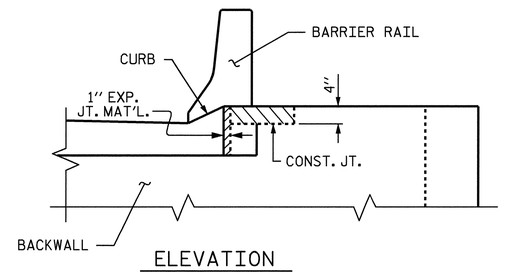
SECTION Y-Y



ELEVATION OF WING (W1)



PLAN



ELEVATION

BLOCKOUT IN WING WALL

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21838 ENGINEER LAURA E SUTTON
11/5/09

DRAWN BY : A.S. CALLAWAY DATE : 5/9/09
CHECKED BY : L.E. SUTTON DATE : 10/6/09

23-NOV-2009 14:34
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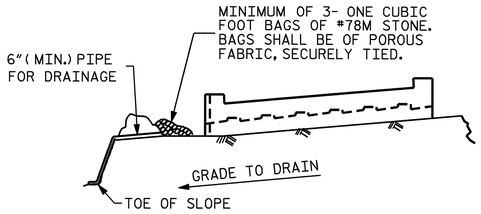
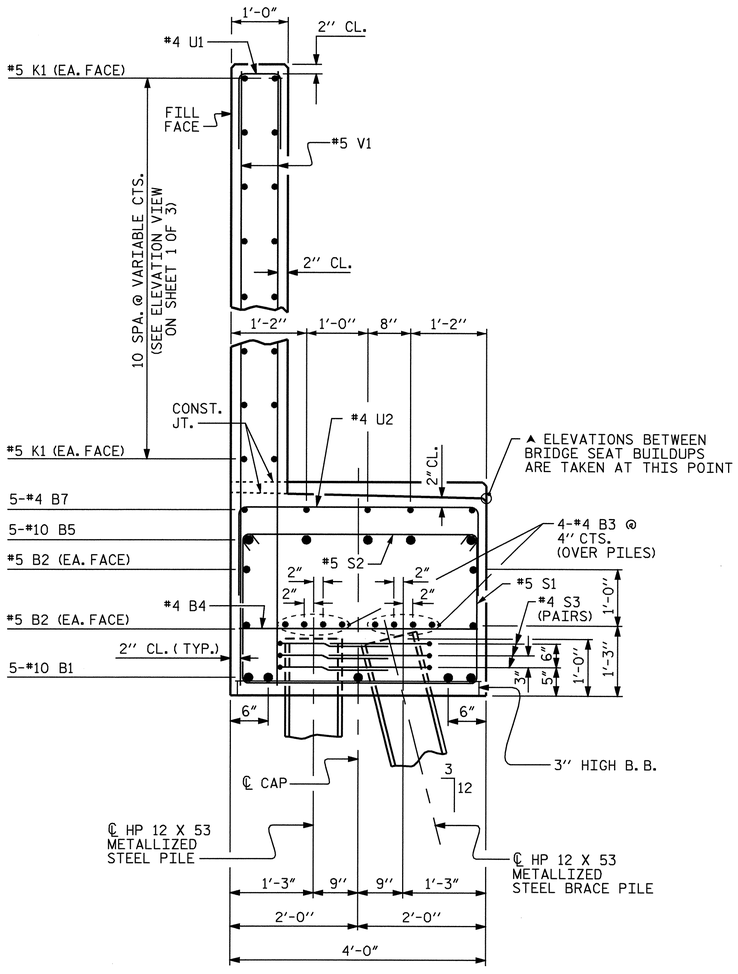


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

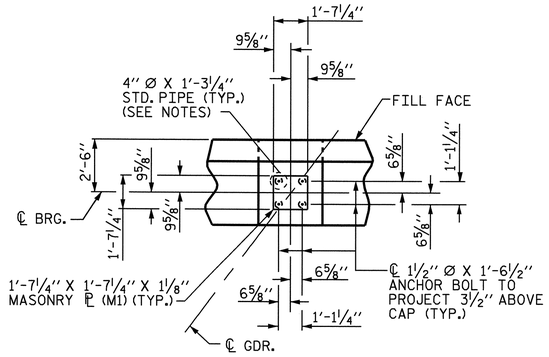
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

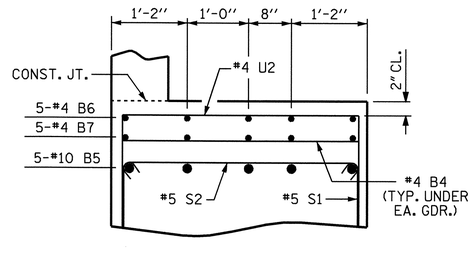


SECTION A-A



DETAIL "A"

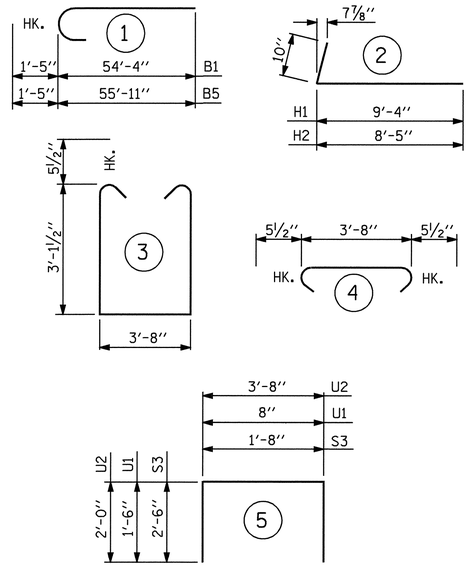
(TYP. EA. GDR.)



PART SECTION B

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	55'-9"	2399
B2	8	#5	STR	51'-11"	433
B3	32	#4	STR	27'-1"	579
B4	31	#4	STR	3'-8"	76
B5	10	#10	1	57'-4"	2467
B6	30	#4	STR	2'-8"	53
B7	20	#4	STR	23'-9"	317
H1	19	#5	2	10'-2"	201
H2	19	#5	2	9'-3"	183
H3	3	#5	STR	5'-7"	17
H4	3	#5	STR	5'-10"	18
H5	1	#5	STR	5'-11"	6
H6	1	#5	STR	5'-1"	5
K1	44	#5	STR	51'-11"	2383
S1	208	#5	3	10'-10"	2350
S2	208	#5	4	4'-7"	994
S3	60	#4	5	6'-8"	267
U1	88	#4	5	3'-8"	216
U2	81	#4	5	7'-8"	415
V1	178	#5	STR	11'-9"	2181
V2	13	#5	STR	13'-3"	180
V3	31	#5	STR	13'-9"	445
REINFORCING STEEL				LBS.	16,185

CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WING	CU. YDS.	61.0
POUR #2 - BACKWALL & UPPER WING	CU. YDS.	35.6
TOTAL	CU. YDS.	96.6

HP 12 x 53 METALLIZED STEEL PILES NO. = 20	LIN. FT.	1,400

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/7/09
CHECKED BY : L.E. SUTTON DATE : 10/6/09

23-NOV-2009 14:34
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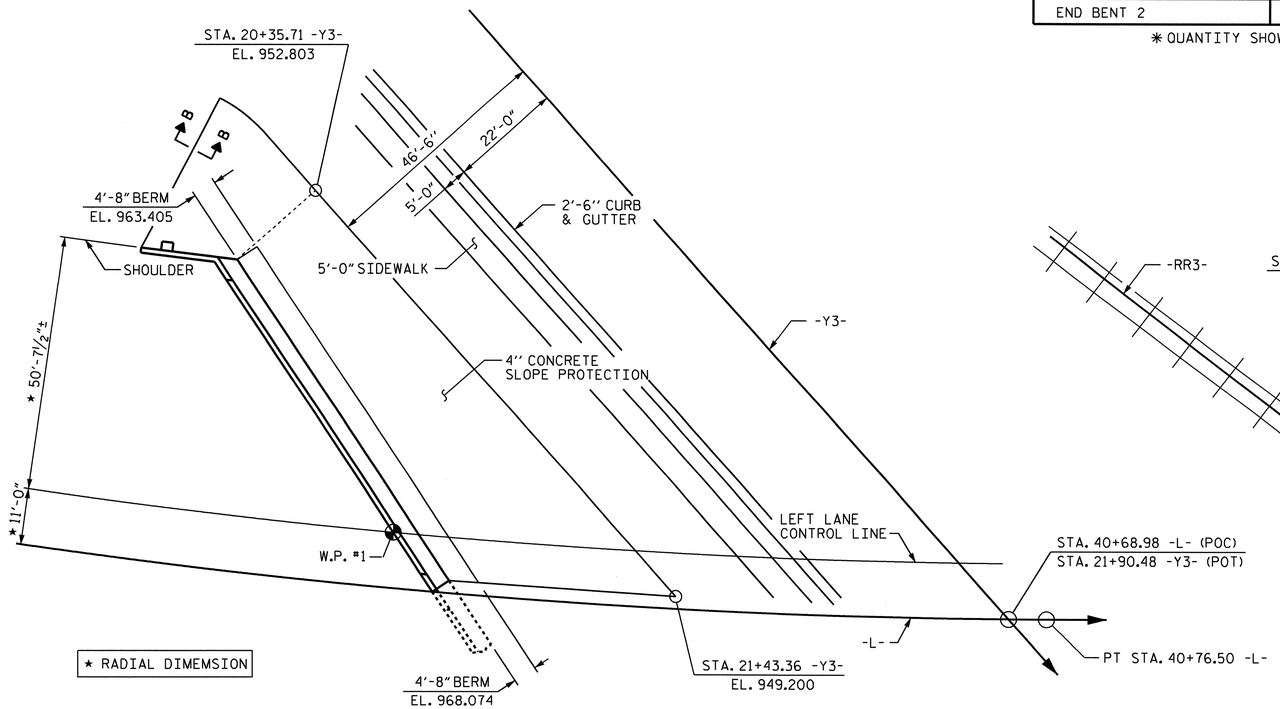
BRIDGE @ STA. 40+68.98 -L- — LEFT LANE —	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	407	814
END BENT 2	152	304

* QUANTITY SHOWN IS BASED ON 5' POURS.

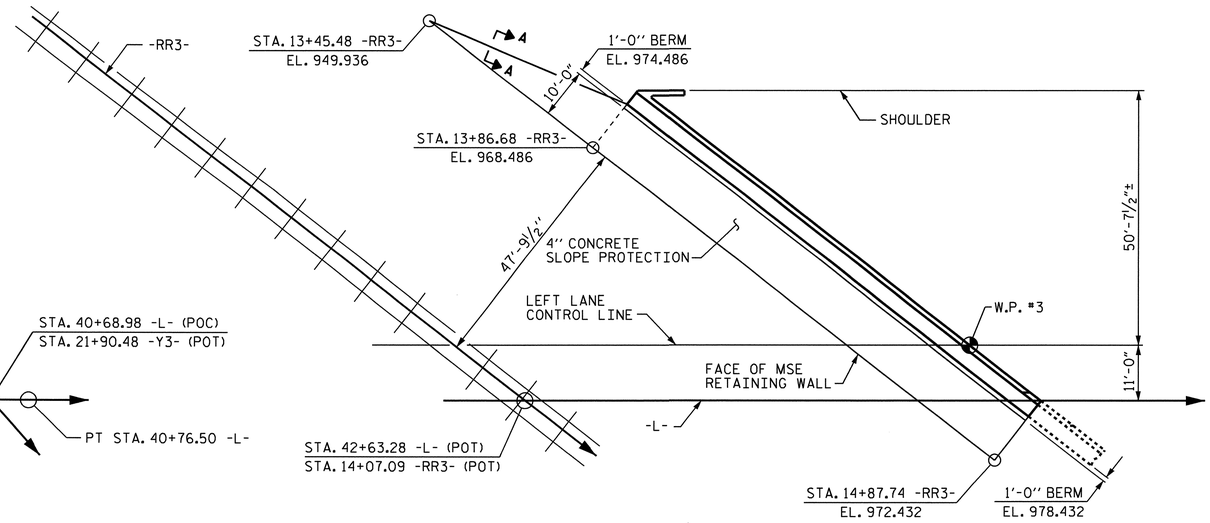
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS 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.

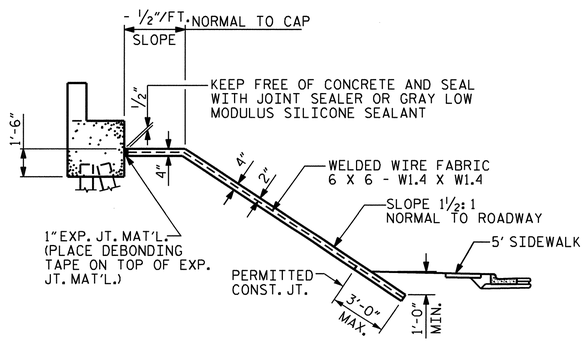
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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.



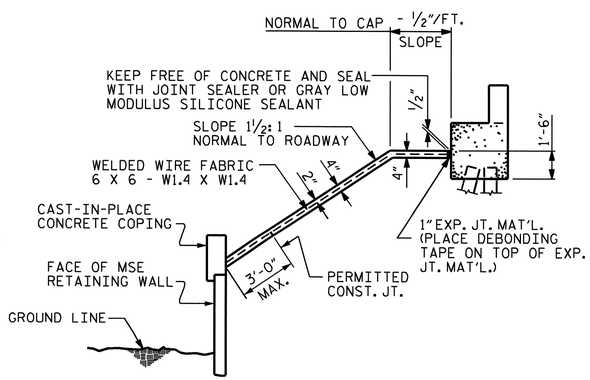
END BENT 1



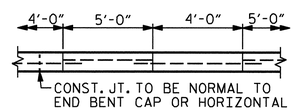
END BENT 2



SECTION ALONG -L- AT END BENT 1

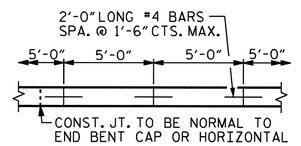


SECTION ALONG -L- AT END BENT 2



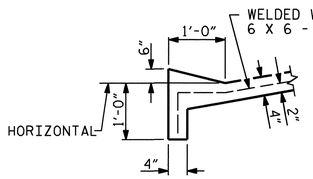
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

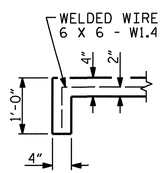


STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



SECTION B-B



SECTION A-A

DETAILS FOR SLOPE PROTECTION

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/28/09
CHECKED BY : L.E. SUTTON DATE : 4/17/09

05-JAN-2010 09:03
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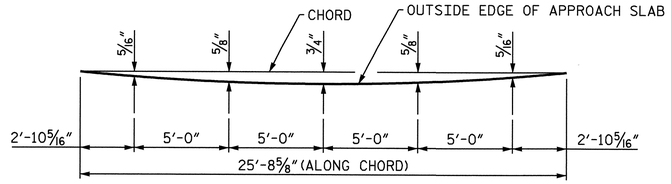
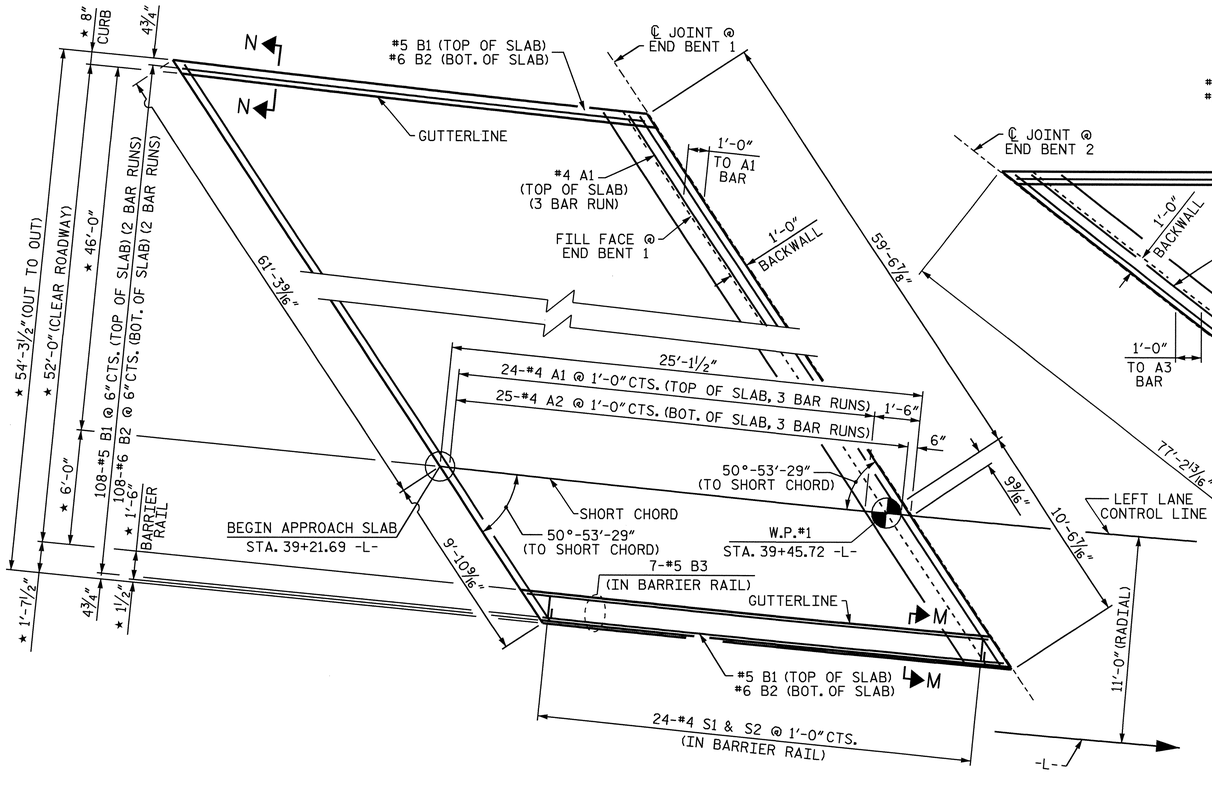
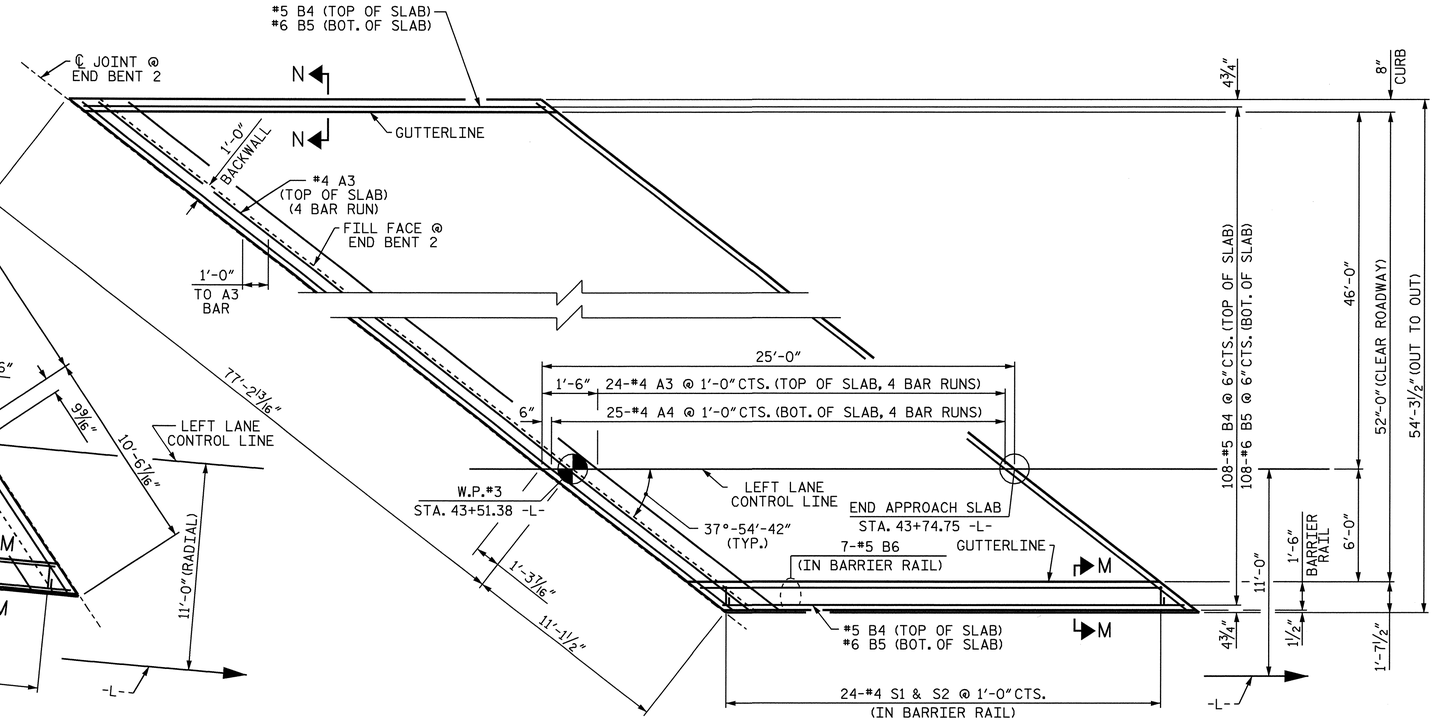


ARC OFFSETS
(LEFT OUTSIDE EDGE OF APPROACH SLAB)

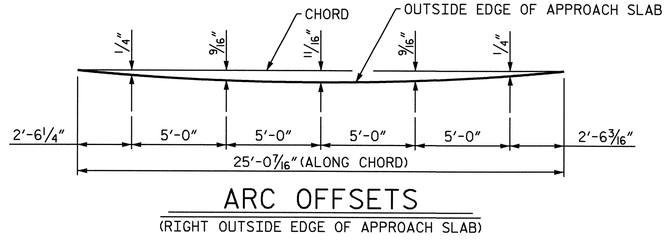


★ DIMENSIONS ARE RADIAL AT END BENT 1 ONLY.

PLAN @ END BENT 1



PLAN @ END BENT 2



ARC OFFSETS
(RIGHT OUTSIDE EDGE OF APPROACH SLAB)

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR RIGID PAVEMENT

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-45
1			3			TOTAL SHEETS
2			4			94

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

DRAWN BY : William T Parker DATE : 03/25/09
CHECKED BY : A.S. CALLAWAY DATE : 3/30/09

30-OCT-2009 15:03
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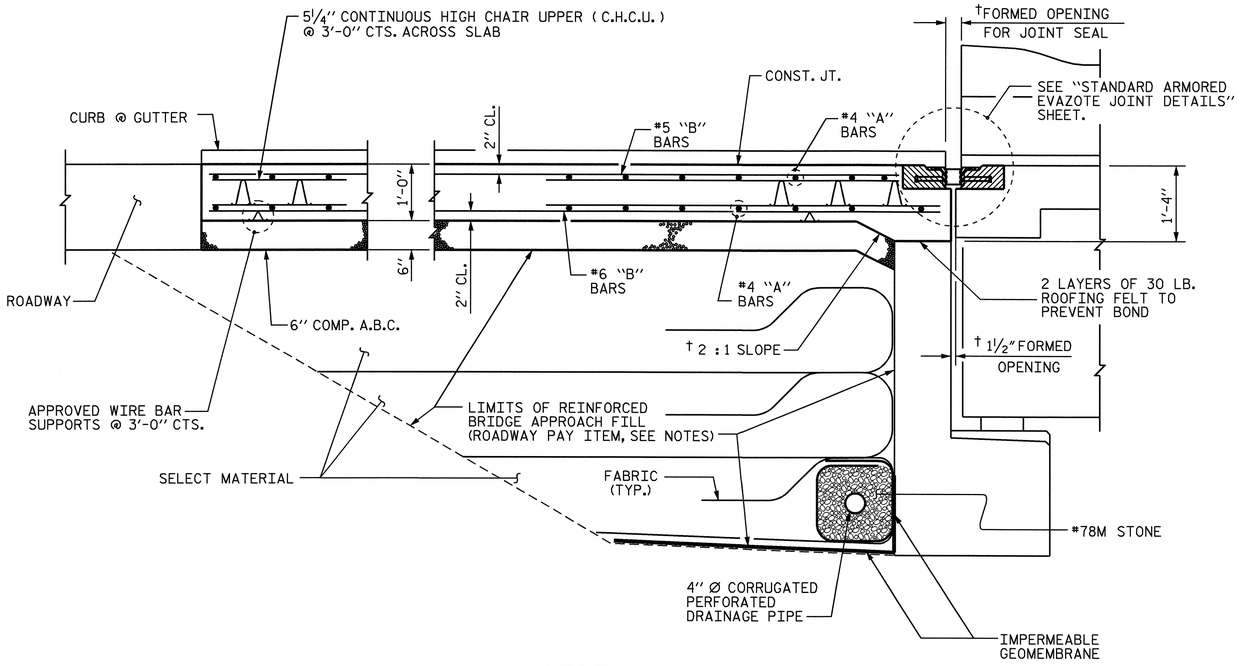
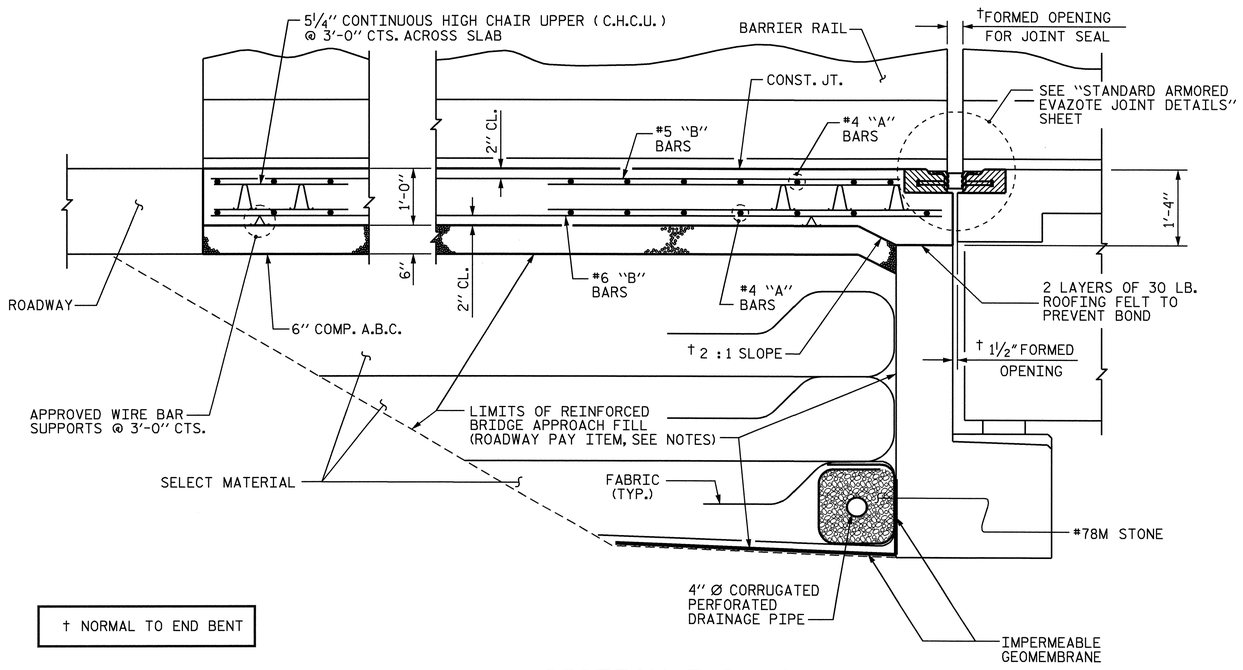


SECTION THRU SLAB

SHOWING SECTION WITH CURB



† NORMAL TO END BENT

SECTION THRU SLAB

SHOWING SECTION WITH BARRIER RAIL

DRAWN BY : William T. Parker DATE : 03/25/09
CHECKED BY : A.S. CALLAWAY DATE : 3/30/09

09-NOV-2009 14:50
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NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

AREAS BETWEEN THE APPROACH SLAB AND WINGWALL AND BEHIND THE BARRIER RAIL BETWEEN THE STRUCTURES SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF THE 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND THE WIDTH SHALLBE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

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

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

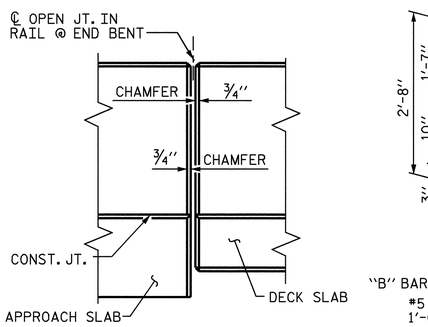
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

VERTICAL 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.

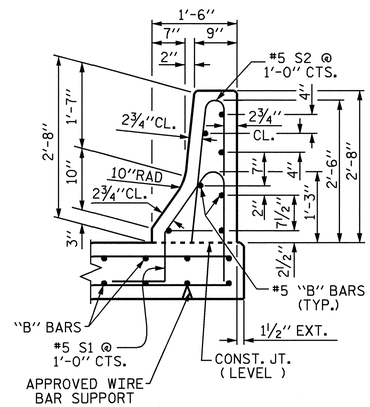
FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 3 3/16".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

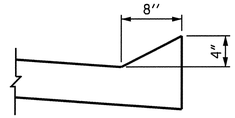


ELEVATION AT JOINT



SECTION M-M

BARRIER RAIL DETAILS



SECTION N-N

CURB DETAILS

BILL OF MATERIAL

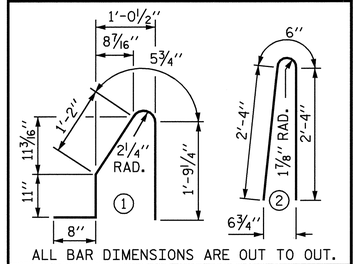
APPROACH SLAB @ END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	75	#4	STR	24'-11"	1248
A2	75	#4	STR	24'-9"	1240
✳B1	216	#5	STR	13'-7"	3060
B2	216	#6	STR	14'-0"	4542
✳B3	7	#5	STR	24'-6"	179
✳S1	24	#5	1	5'-0"	125
✳S2	24	#5	2	5'-2"	129
REINFORCING STEEL				LBS.	5,782
✳EPOXY COATED REINFORCING STEEL				LBS.	4,741
CLASS AA CONCRETE					
POUR #1 - SLAB & CURB				CU. YDS.	52.3
POUR #2 - RAIL				CU. YDS.	2.5
TOTAL				CU. YDS.	54.8

APPROACH SLAB @ END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A3	100	#4	STR	23'-6"	1570
A4	100	#4	STR	23'-4"	1559
✳B4	108	#5	STR	23'-7"	2657
B5	108	#6	STR	24'-5"	3961
✳B6	7	#5	STR	24'-5"	178
✳S1	24	#5	1	5'-0"	125
✳S2	24	#5	2	5'-2"	129
REINFORCING STEEL				LBS.	5,520
✳EPOXY COATED REINFORCING STEEL				LBS.	4,659
CLASS AA CONCRETE					
POUR #1 - SLAB & CURB				CU. YDS.	51.8
POUR #2 - RAIL				CU. YDS.	2.5
TOTAL				CU. YDS.	54.3

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

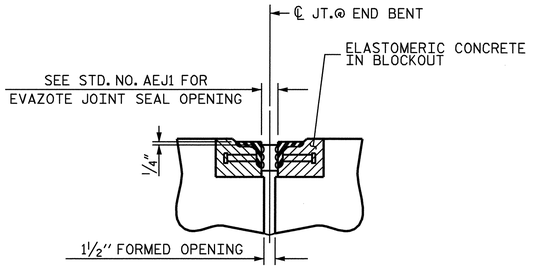
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR RIGID PAVEMENT

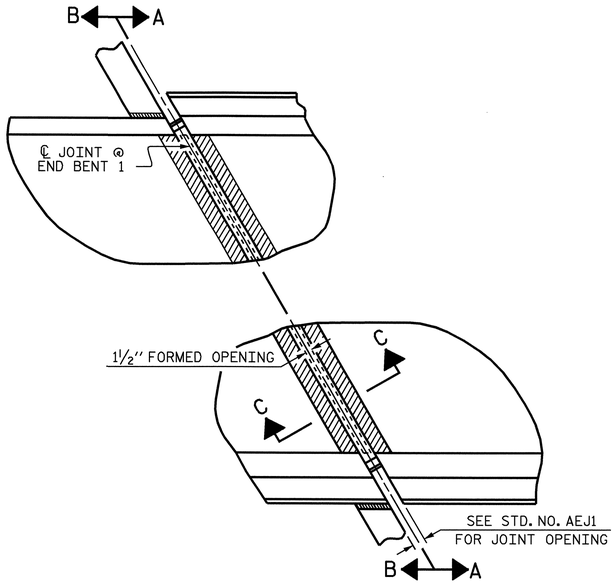
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			94

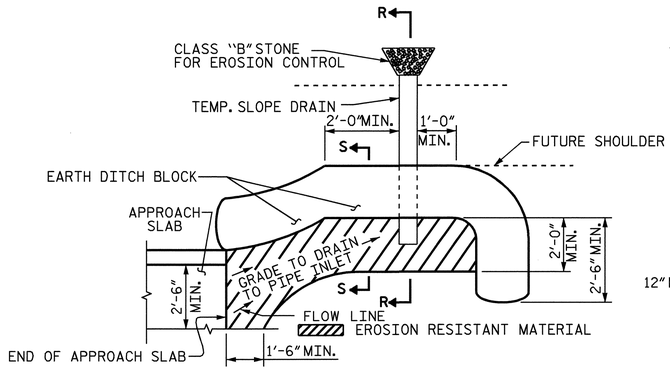
STR. #1



SECTION C-C
ARMORED EVAZOTE JOINT SEAL

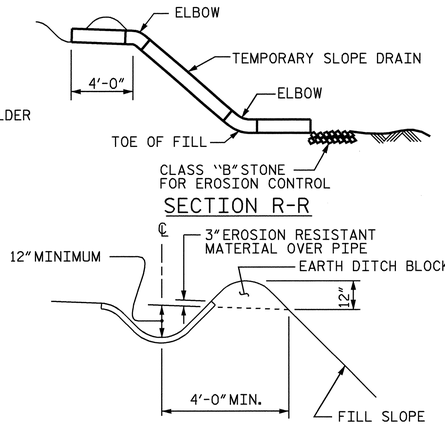


PLAN



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

PLAN VIEW

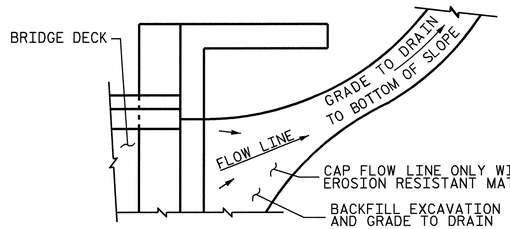


SECTION R-R

SECTION S-S

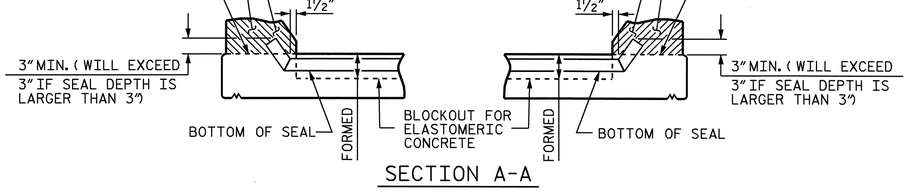
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

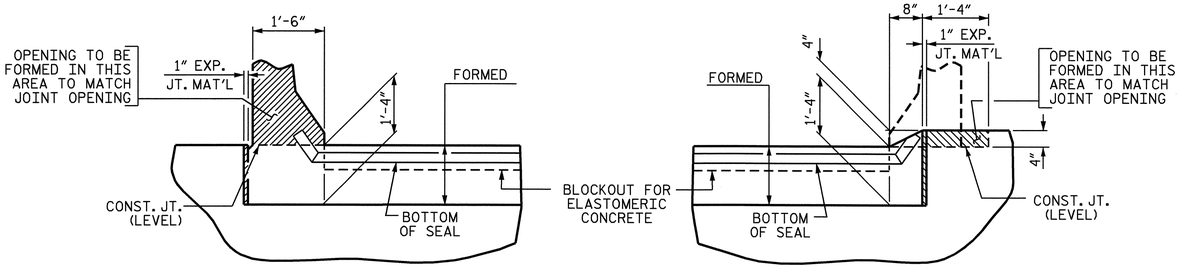


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



SECTION A-A



SECTION B-B

JOINT SEAL DETAILS @ END BENT

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

ASSEMBLED BY : William T. Parker	DATE : 03/25/09		
CHECKED BY : A.S. CALLAWAY	DATE : 3/30/09		
DRAWN BY : FCJ 11/88	REV. 10/17/00	RWW/LES	
CHECKED BY : ARB 11/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06R	MAA/KMM	

30-OCT-2009 15:03
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lsutton

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

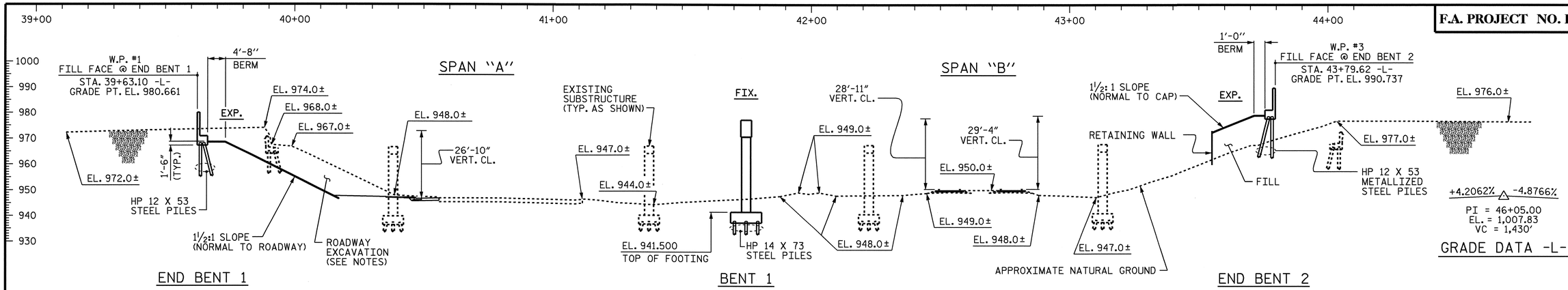
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			94

STR. #1

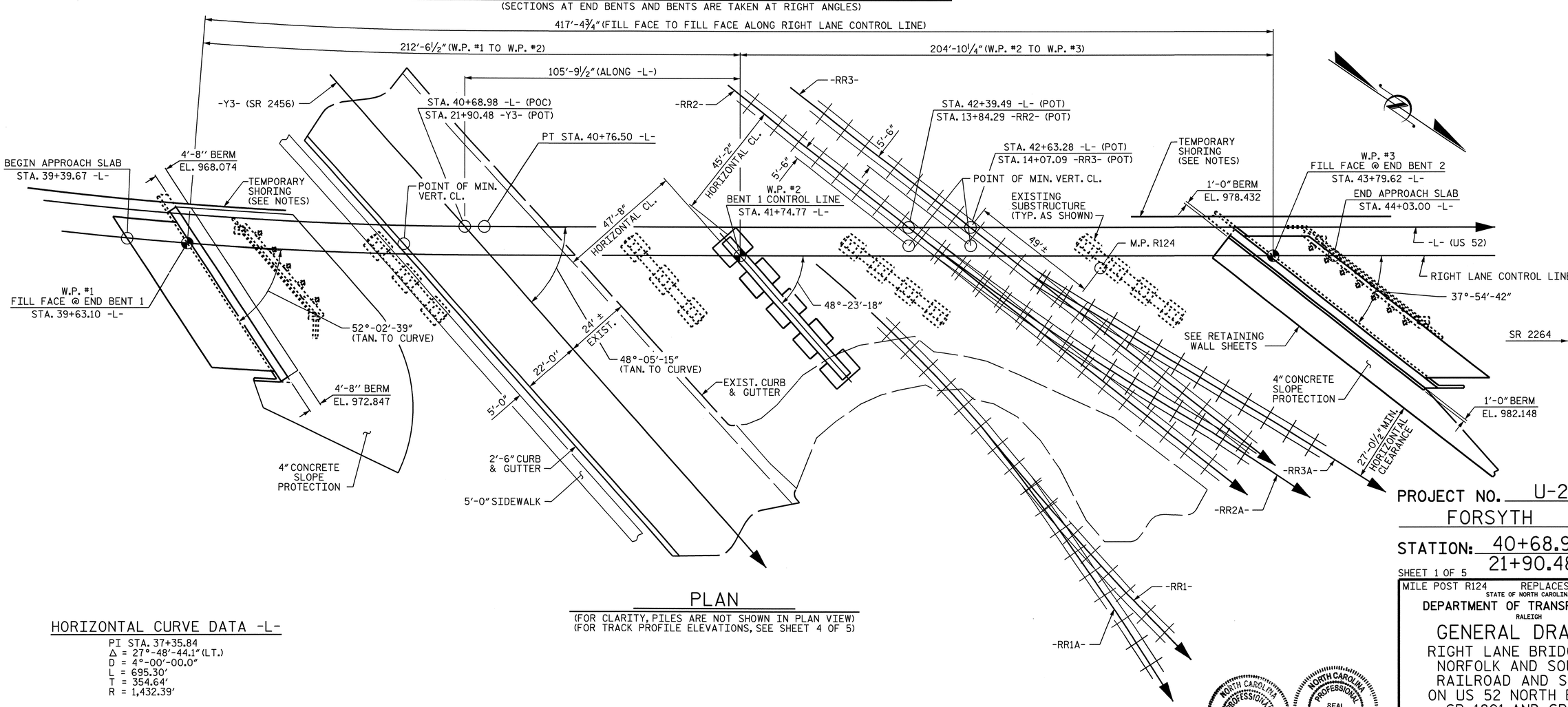
STD. NO. BAS10

F.A. PROJECT NO. BRNHS-52(19)



SECTION ALONG RIGHT LANE CONTROL LINE

(SECTIONS AT END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)



PLAN

(FOR CLARITY, PILES ARE NOT SHOWN IN PLAN VIEW)
(FOR TRACK PROFILE ELEVATIONS, SEE SHEET 4 OF 5)

HORIZONTAL CURVE DATA -L-

PI STA. 37+35.84
Δ = 27°-48'-44.1" (LT.)
D = 4°-00'-00.0"
L = 695.30'
T = 354.64'
R = 1,432.39'

DRAWN BY : A.S. CALLAWAY DATE : 2/20/09
CHECKED BY : L.E. SUTTON DATE : 5/01/09

09-NOV-2009 14:50
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lsutton

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-
21+90.48 -Y3-

SHEET 1 OF 5

MILE POST R124 REPLACES BRIDGE NO. 256
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

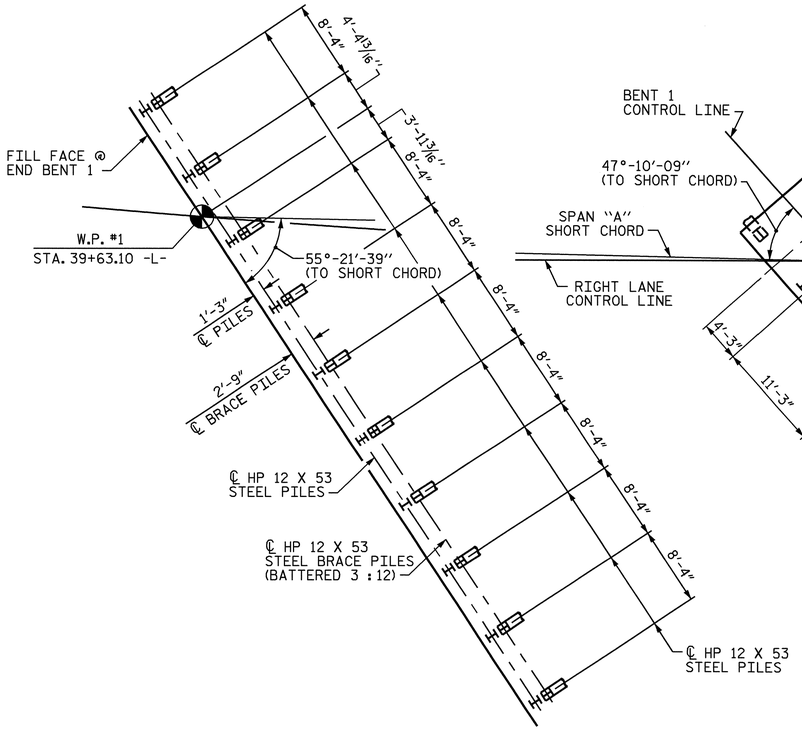
RIGHT LANE BRIDGE OVER NORFOLK AND SOUTHERN RAILROAD AND SR 2456 ON US 52 NORTH BETWEEN SR 1801 AND SR 2264

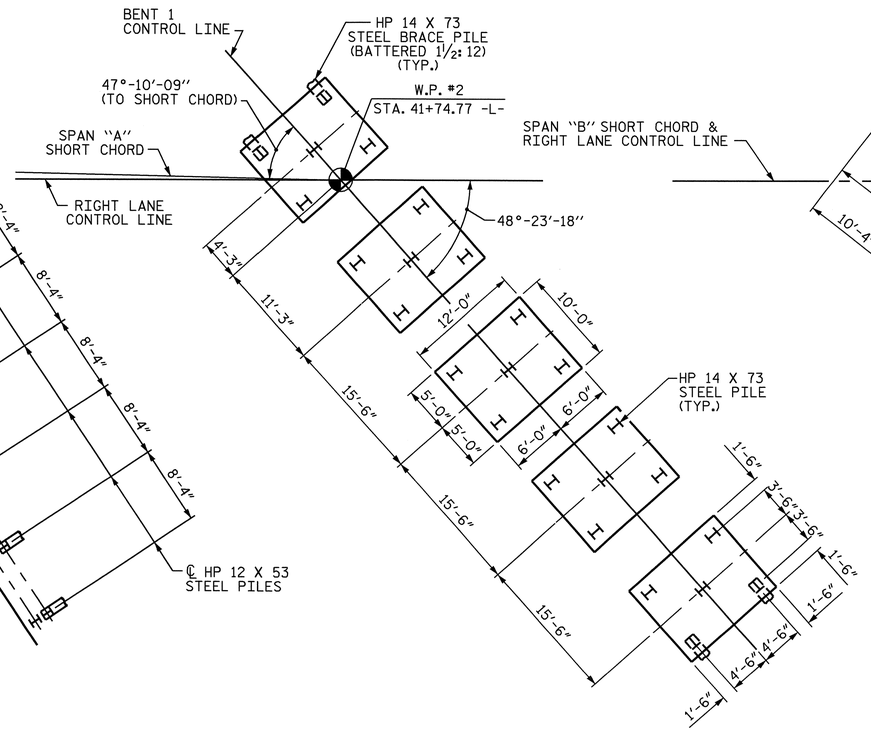
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			94

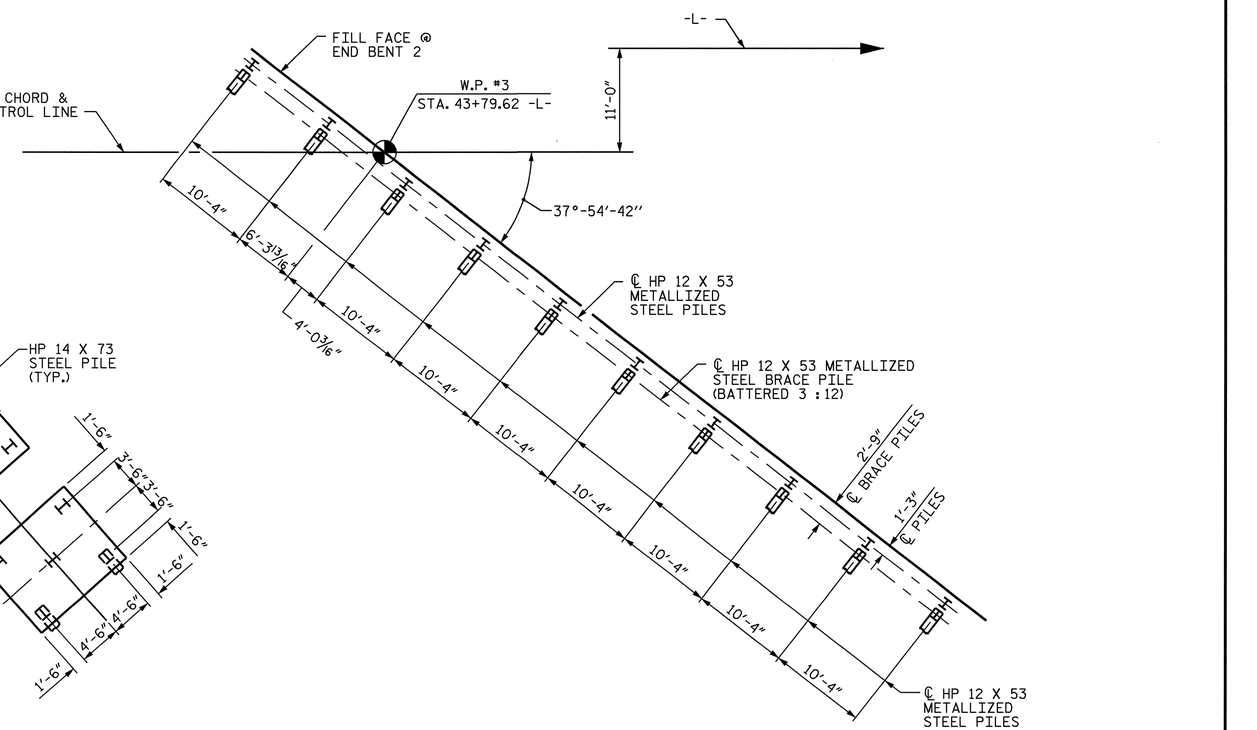
STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER ROBERT MALCOLM RAMSAY
1-5-10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10







END BENT 1

BENT 1

END BENT 2

NOTES (CONTINUED ON SHEET 5 OF 5)

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENTS 1 & 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 190 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 320 TONS PER PILE.

TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING.

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF CAP OR FOOTING.

DIMENSIONS AND PILE LAYOUT TYPICAL FOR EACH FOOTING.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

RIGHT LANE BRIDGE OVER NORFOLK AND SOUTHERN RAILROAD AND SR 2456 ON US 52 NORTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 4/22/09
CHECKED BY : L.E. SUTTON DATE : 10/19/09

23-NOV-2009 14:33
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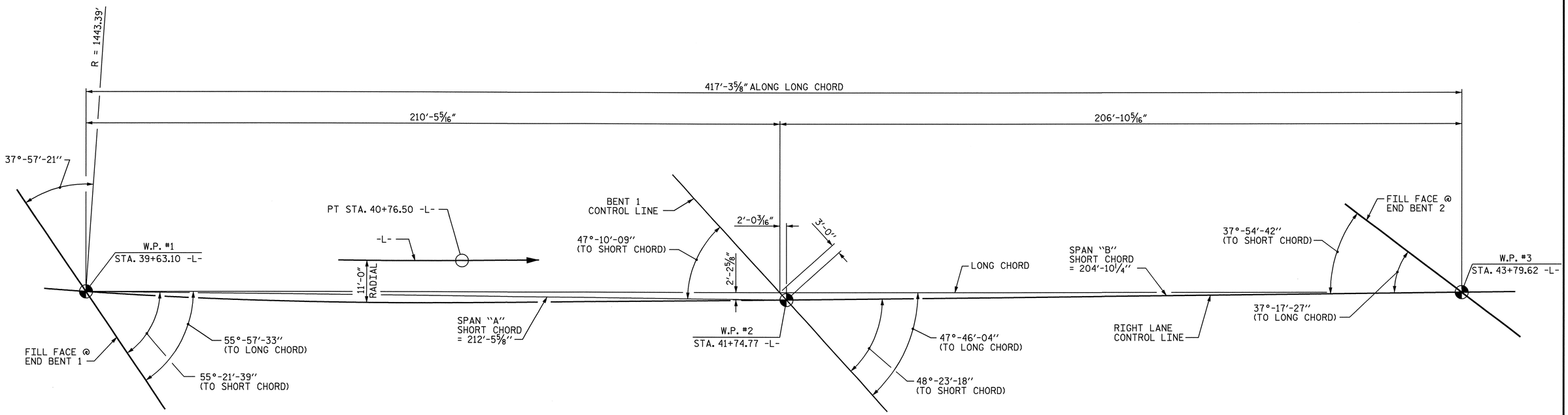

LONG CHORD LAYOUT

HORIZONTAL CURVE DATA -L-

PI STA. 37+35.84
Δ = 27°-48'-44.1" (LT.)
D = 4°-00'-00.0"
L = 695.30'
T = 354.64'
R = 1,432.39'

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
RIGHT LANE BRIDGE OVER
NORFOLK AND SOUTHERN
RAILROAD AND SR 2456
ON US 52 NORTH BETWEEN
SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			94

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/26/09
CHECKED BY : L.E. SUTTON DATE : 4/14/09

21-OCT-2009 08:38
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lsutton

STR. #2

-RR1-		
STATION	LEFT RAIL	RIGHT RAIL
14+07.78		948.406
14+10.45	948.542	
14+14.23	948.494	
14+15.17		948.309
14+55.23		947.891
14+55.30	947.974	
14+57.80	947.967	
14+74.38		947.789
14+97.15	947.482	
15+22.10		946.976
15+54.52	946.541	
15+54.70		946.366
16+08.03		945.830
16+09.43	945.848	

-RR1A-		
STATION	LEFT RAIL	RIGHT RAIL
10+31.27	947.529	
10+65.49	946.676	
10+73.88		946.657
10+95.86	946.147	
11+27.01		945.364
11+27.10	945.326	
11+77.15	944.855	
11+77.36		944.910

-RR2A-		
STATION	LEFT RAIL	RIGHT RAIL
10+00.63	950.150	
10+00.83		950.065
10+20.46	949.933	
10+43.76		949.652
10+58.87	949.493	
10+78.21		949.280
10+86.82		949.111
10+93.52	949.131	
11+17.09		948.958
11+28.42	948.852	
11+29.31	948.845	
11+58.74		948.595
11+58.90	948.664	

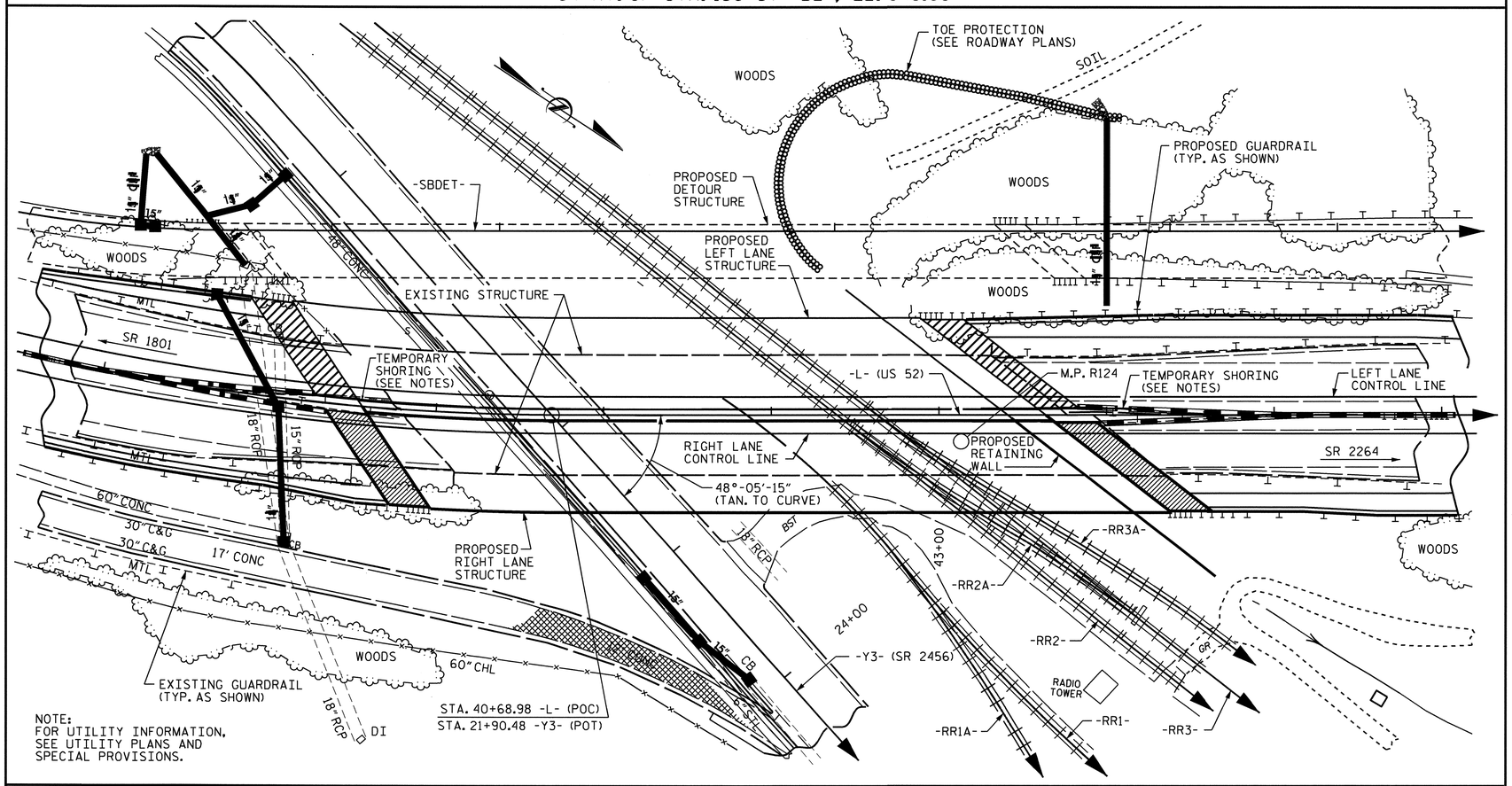
-RR3A-		
STATION	LEFT RAIL	RIGHT RAIL
10+28.60	950.108	
10+33.28		949.948
10+68.02	949.534	
10+73.36		949.350
10+74.15		949.340
10+81.23		949.254
11+15.19	948.760	
11+15.46		948.862
11+60.56	948.012	
11+60.81		948.062
12+07.55	947.353	
12+08.05		947.476
12+54.54	947.009	
12+54.67		946.957

TRACK ELEVATIONS

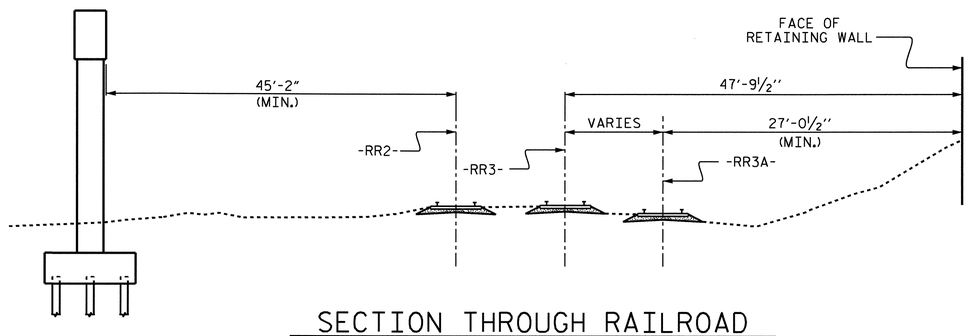
-RR2-		
STATION	LEFT RAIL	RIGHT RAIL
10+06.12		954.965
10+06.27	954.888	
10+76.15	954.049	
10+76.34		954.064
11+45.64	953.164	
11+45.70		953.179
12+14.23	952.268	
12+14.46		952.271
12+84.85	951.462	
12+84.90		951.469
13+48.06	950.678	
13+48.12		950.666
13+89.53	950.203	
13+94.28	950.150	
14+03.97		950.057
14+14.06	949.933	
14+37.25	949.677	
14+76.08	949.162	
14+80.78	949.166	
15+16.82		948.617
15+16.83	948.644	
15+76.23		947.925
15+76.38	947.932	
16+36.52		947.349
16+36.98	947.387	

-RR3-		
STATION	LEFT RAIL	RIGHT RAIL
10+10.97		955.078
10+11.06	955.118	
10+32.32		954.988
10+32.37	954.967	
10+99.95		954.131
11+00.13	954.198	
11+64.04	953.407	
11+64.28		953.339
12+31.55		952.574
12+31.65	952.570	
12+96.78	951.776	
12+96.80		951.783
13+61.04		950.995
13+61.09	951.000	
13+66.04		950.928
13+92.24	950.511	
14+16.58		950.177
14+31.66	949.966	
14+66.21		949.429
14+67.82	949.419	
14+71.67	949.346	
14+79.14	949.329	
15+01.94	949.123	
15+25.86		948.849
15+54.96	948.616	
15+56.00		948.599
16+04.85		947.858
16+05.33	947.879	

BM #108: R/R SPIKE IN BASE OF 24" OAK, 80' EAST OF US 52 NORTH, 600' SOUTH OF GLENN AVE. WEST OF BRENNER STEEL. 64' RT. OF STA. 156+57 -BL-, EL. 948.69'



LOCATION SKETCH



SECTION THROUGH RAILROAD

(LOOKING IN DIRECTION OF DECREASING STATIONS ON RAILROAD)
BRIDGE LENGTH BASED ON THIS THEORETICAL SECTION.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

RIGHT LANE BRIDGE OVER NORFOLK AND SOUTHERN RAILROAD AND SR 2456 ON US 52 NORTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/20/09
CHECKED BY : L.E. SUTTON DATE : 4/23/09

05-JAN-2010 08:40
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TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION	PDA TESTING	PDA ASSISTANCE	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES		HP 14 X 73 STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	POT BEARINGS	EVAZOTE JOINT SEALS	ELECTRICAL CONDUIT SYSTEM	HP 12 X 53 METALLIZED STEEL PILES	
	LUMP SUM	LUMP SUM	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE					23,542	23,090		LUMP SUM			1,351,400					852.34		LUMP SUM	LUMP SUM	LUMP SUM		
END BENT 1							71.7		12,332			20	1,000				590					
BENT 1		LUMP SUM					218.4		29,057	4,218				25	750							
END BENT 2							87.6		14,787								175				20	1,400
TOTAL	LUMP SUM	LUMP SUM	1	1	23,542	23,090	377.7	LUMP SUM	56,176	4,218	1,351,400	20	1,000	25	750	852.34	765	LUMP SUM	LUMP SUM	LUMP SUM	20	1,400

NOTES

(CONTINUED FROM SHEET 2 OF 5)

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF 5 SPANS (1 @ 50.08', 1 @ 90.33', 1 @ 99.67' AND 2 @ 91.25') WITH A CLEAR ROADWAY WIDTH OF 28.0' ON A 6½" CONCRETE DECK WITH ASPHALT WEARING SURFACE ON STEEL I-BEAMS, CONCRETE CAPS AND PRESTRESSED CONCRETE PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

WORK SHALL NOT BE STARTED ON SLOPE PROTECTION AT END BENT 1 UNTIL ROADWAY SECTION FOR ALIGNMENT -Y3- HAS BEEN EXCAVATED.

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.

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.

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 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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STA. 40+68.98 -L-."

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

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGE DECKS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
RIGHT LANE BRIDGE OVER NORFOLK AND SOUTHERN RAILROAD AND SR 2456 ON US 52 NORTH BETWEEN SR 1801 AND SR 2264

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 2/20/09
CHECKED BY : L.E. SUTTON DATE : 5/01/09

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE							COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.19	--	1.75		1.19	A	ER	73.40						1.30						
		HL-93 (OPERATING)	N/A		1.54	--	1.35		1.54	A	ER	73.40						1.00						
		HS-20 (INVENTORY)	36.00	⟨2⟩	1.06	38.2	1.80		1.06	A	ER	73.40						1.30						
		HS-20 (OPERATING)	36.00		1.38	49.7	1.35		1.38	A	ER	73.40						1.00						
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50		5.94	80.2			5.94	A	ER	58.40						1.30						
		NGARBS2	20.00		4.33	86.6			4.33	A	ER	62.96						1.30						
		NAGRIS2	22.00		4.05	89.1			4.05	A	ER	62.96						1.30						
		NCOTTS3	27.25		2.98	81.2			2.98	A	ER	58.40						1.30						
		NAGGRS4	34.93		2.58	90.1			2.58	A	ER	58.40						1.30						
		NS5A	35.55		2.54	90.3			2.54	A	ER	58.40						1.30						
		NS6A	39.95		2.35	93.9			2.35	A	ER	58.40						1.30						
		NS7B	42.00		2.24	94.1			2.24	A	ER	58.40						1.30						
	TRUCK TRACTOR SEMI-TRAILER (TTST)	NAGRIT3	33.00		2.91	96.0			2.91	A	ER	62.96						1.30						
		NT4A	33.08		2.76	91.3			2.76	A	ER	58.40						1.30						
		NT6A	41.60		2.26	94.0			2.26	A	ER	62.96						1.30						
		NT7A	42.00	⟨3⟩	2.13	89.5			2.13	A	ER	62.96						1.30						
		NT7B	42.00		2.14	89.9			2.14	A	ER	62.96						1.30						
		NAGRIT4	43.00		2.27	97.6			2.27	A	ER	58.40						1.30						
		NAGRIT5A	45.00		2.25	101.3			2.25	A	ER	62.96						1.30						
		NAGRIT5B	45.00		2.32	104.4			2.32	A	ER	62.96						1.30						
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																					

LOAD FACTORS:

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

LEGAL LOAD RATING FACTORS	YEAR	ADTT	γ_L
	2009	4668	
	2030	4656	N/A

NOTES:

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

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

COMMENTS:

1. STRENGTH I SHEAR AND SERVICE II MOMENT RATINGS ARE NOT PROVIDED DUE TO CURVATURE OF THE BRIDGE.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93) **

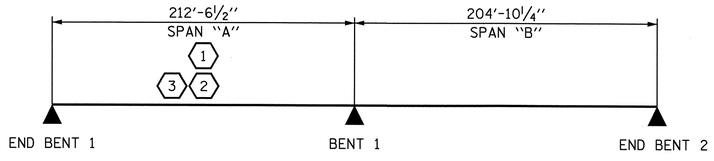
⟨2⟩ DESIGN LOAD RATING (HS-20) **

⟨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. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			94

STR. #2 STD. NO. LRFR3

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/13/09
CHECKED BY : A.C. OUTLAW DATE : 8/28/09
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08R MAA/GM

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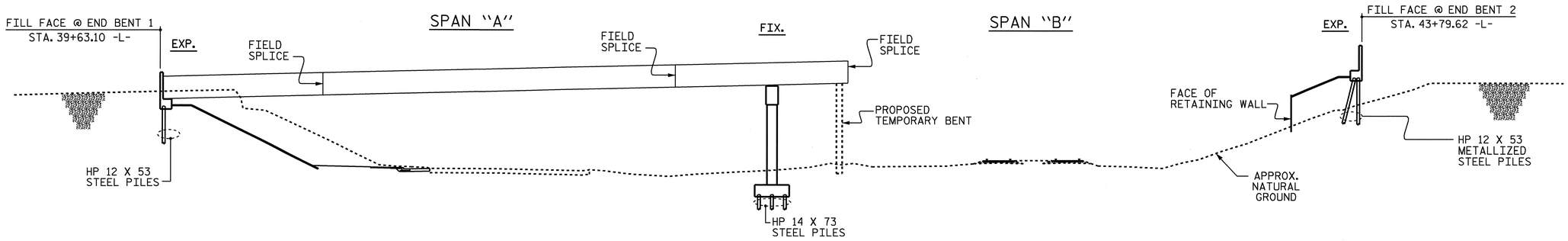
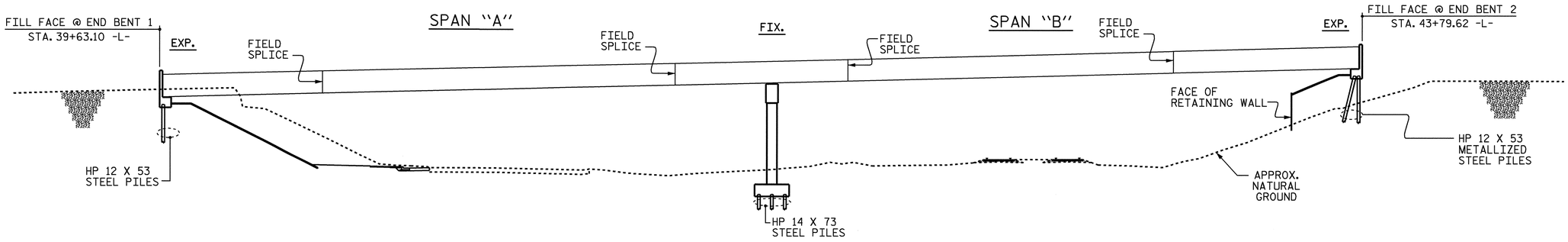


STAGE I GIRDER ERECTION

(SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)



STAGE II GIRDER ERECTION

(SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)

NOTES

PLACEMENT OF TEMPORARY BENTS SHALL BE COORDINATED WITH TRAFFIC PHASING REQUIREMENTS. SEE TRAFFIC CONTROL PLANS.

PLANS FOR TEMPORARY BENT ERECTION AND REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

TEMPORARY BENTS SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER WHO IS REGISTERED IN THE STATE OF NORTH CAROLINA. THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WORKING DRAWINGS AND CALCULATIONS FOR APPROVAL BY THE ENGINEER.

DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY BENTS AND TO ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.

THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.

THE CONTRACTOR'S ERECTION PLAN SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT TRANSFERS THE STRUCTURAL STEEL WEIGHT UNIFORMLY TO THE DIAPHRAGMS WHILE THE GIRDERS REMAIN IN THE CAMBERED POSITION.

THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION. A MINIMUM OF ONE TEMPORARY BENT SHALL BE USED. TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL DIAPHRAGMS ARE IN PLACE AND HIGH STRENGTH BOLTS ARE TIGHTENED.

LOCATE TEMPORARY BENTS AT CONNECTOR PLATES. IF CONNECTOR PLATES ARE USED AS TEMPORARY BEARING STIFFENERS, DIAPHRAGMS MUST BE ATTACHED.

THE FIRST TWO GIRDERS SHALL BE ERECTED SIMULTANEOUSLY WITH ALL DIAPHRAGMS BETWEEN THE GIRDERS IN PLACE AND THE BOLTS TIGHTENED PRIOR TO RELEASING THE GIRDERS. CONNECT ADDITIONAL GIRDERS ADJACENT TO THE PREVIOUSLY ERECTED GIRDERS AND TIGHTEN ALL BOLTS PRIOR TO RELEASING ADDITIONAL GIRDERS.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PROVIDING THE TEMPORARY BENT. THE COST FOR ALL MATERIALS, EQUIPMENT, TOOLS, LABOR AND ANY INCIDENTALS NECESSARY TO PROVIDE THE TEMPORARY BENT SHALL BE CONSIDERED INCIDENTAL TO THE LUMP SUM BID PRICE FOR STRUCTURAL STEEL.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GIRDER ERECTION DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			94

STR. #2

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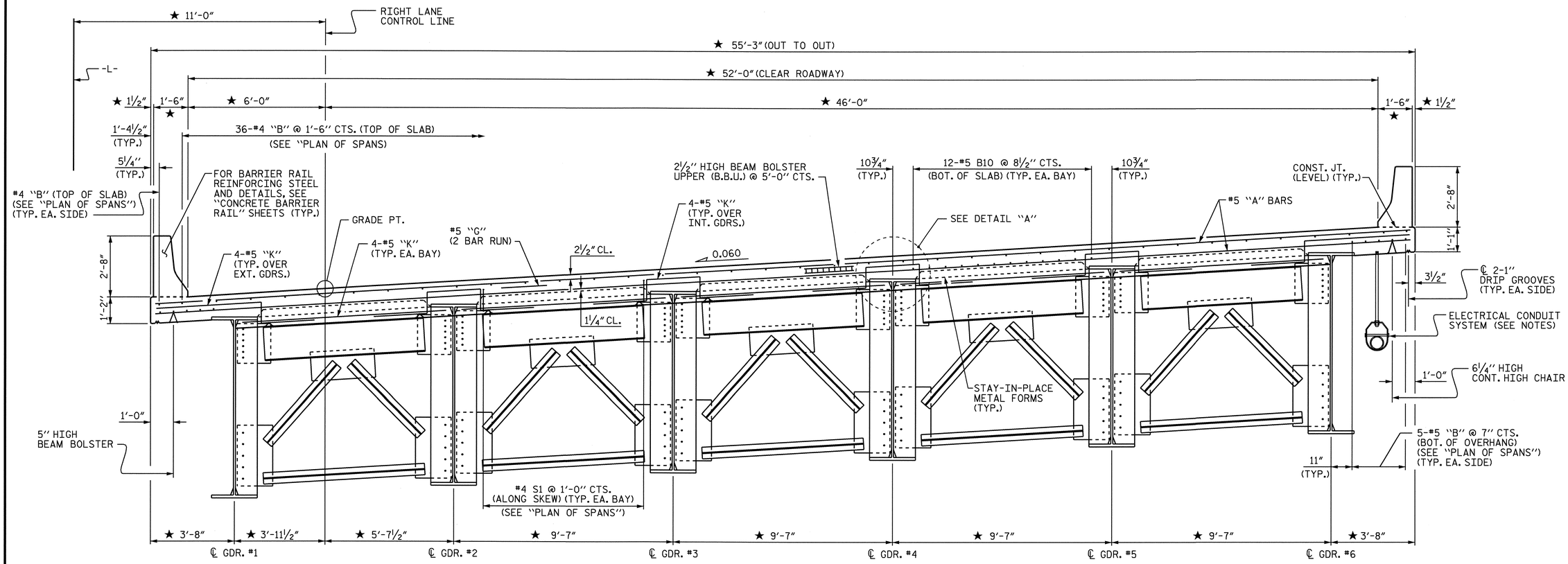
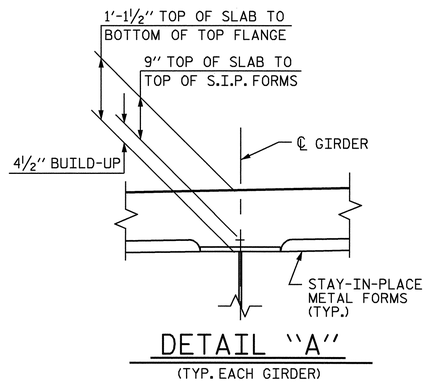


★ DIMENSIONS ARE RADIAL AT END BENT 1 ONLY.

AT END BENT DIAPHRAGMS

TYPICAL SECTION



DETAIL "A"

(TYP. EACH GIRDER)

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.

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

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

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF ½", SEE SPECIAL PROVISION FOR POT BEARINGS.

FOR DETAILS OF ELECTRICAL CONDUIT SYSTEM, SEE "ELECTRICAL CONDUIT SYSTEM DETAILS" SHEETS.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			94

STR. #2

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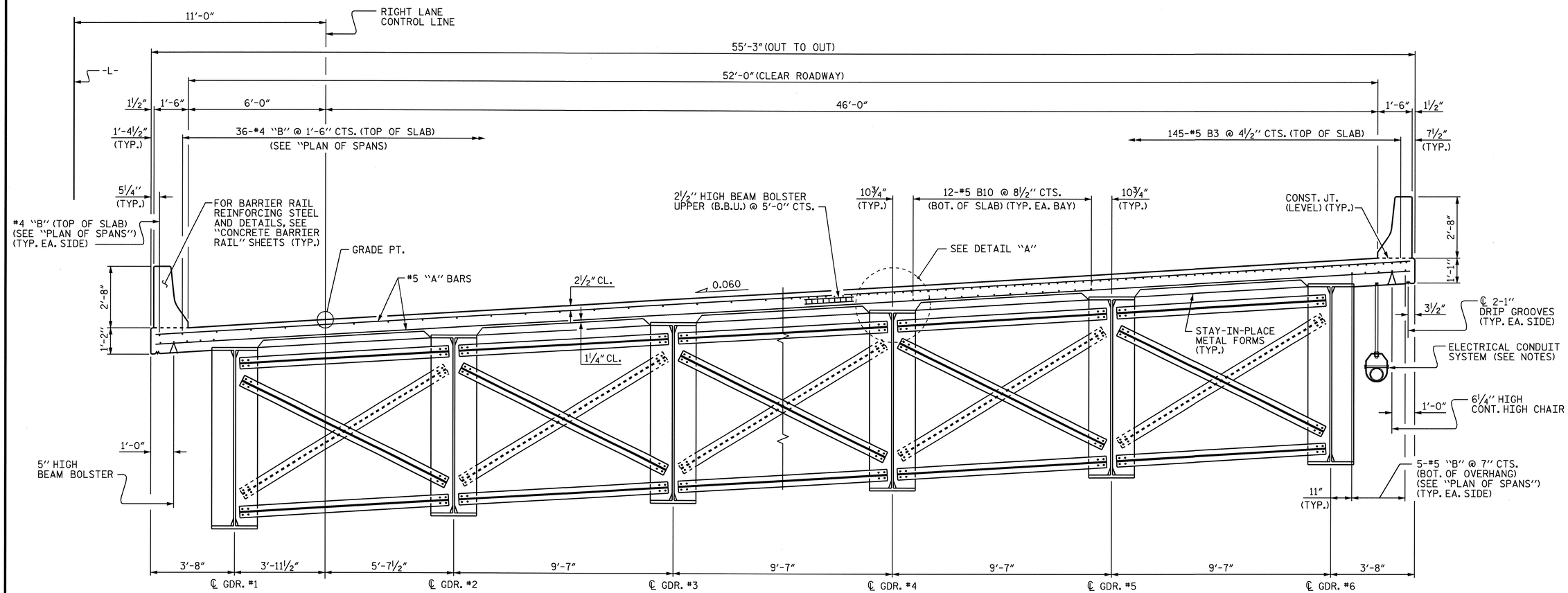
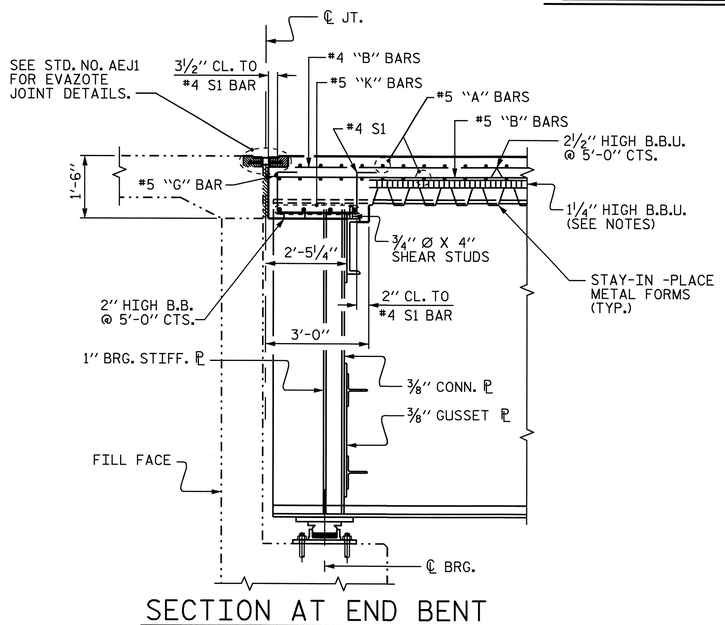


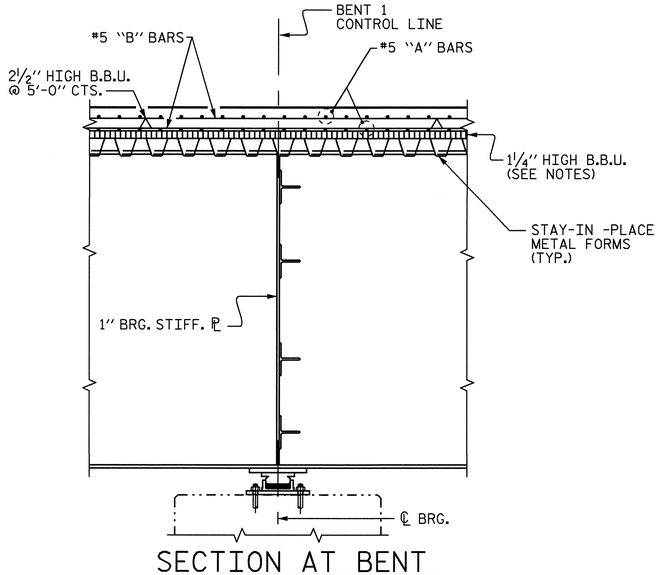
TYPICAL SECTION

AT INTERMEDIATE DIAPHRAGMS



SECTION AT END BENT

AT BENT DIAPHRAGMS



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PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			94

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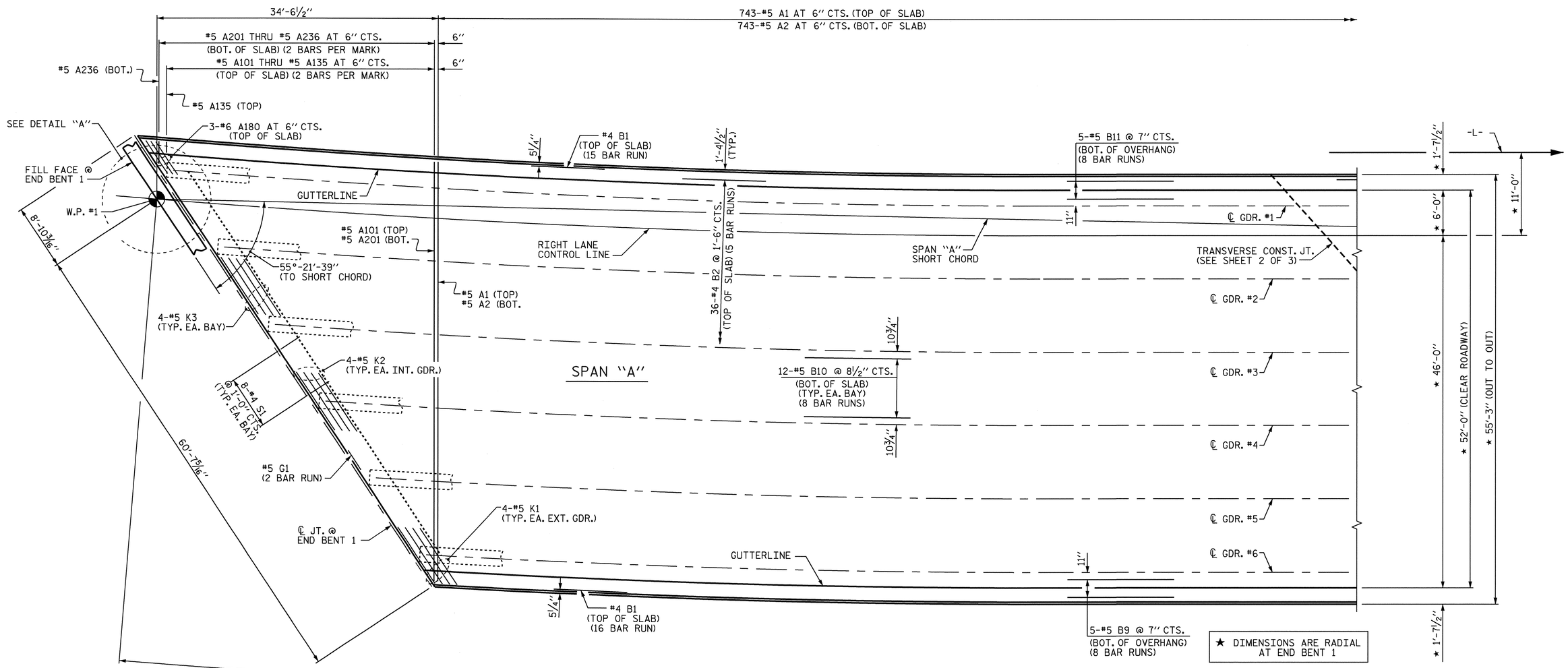

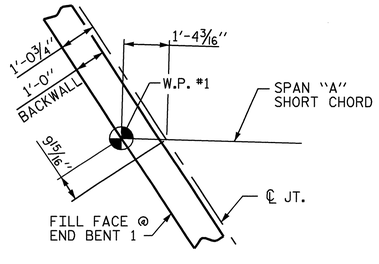

DETAIL "A"

PARTIAL PLAN OF SPAN

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

FOR SPAN "A" OFFSETS, SEE "ARC OFFSETS" SHEET.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-57
1			3			TOTAL SHEETS
2			4			94

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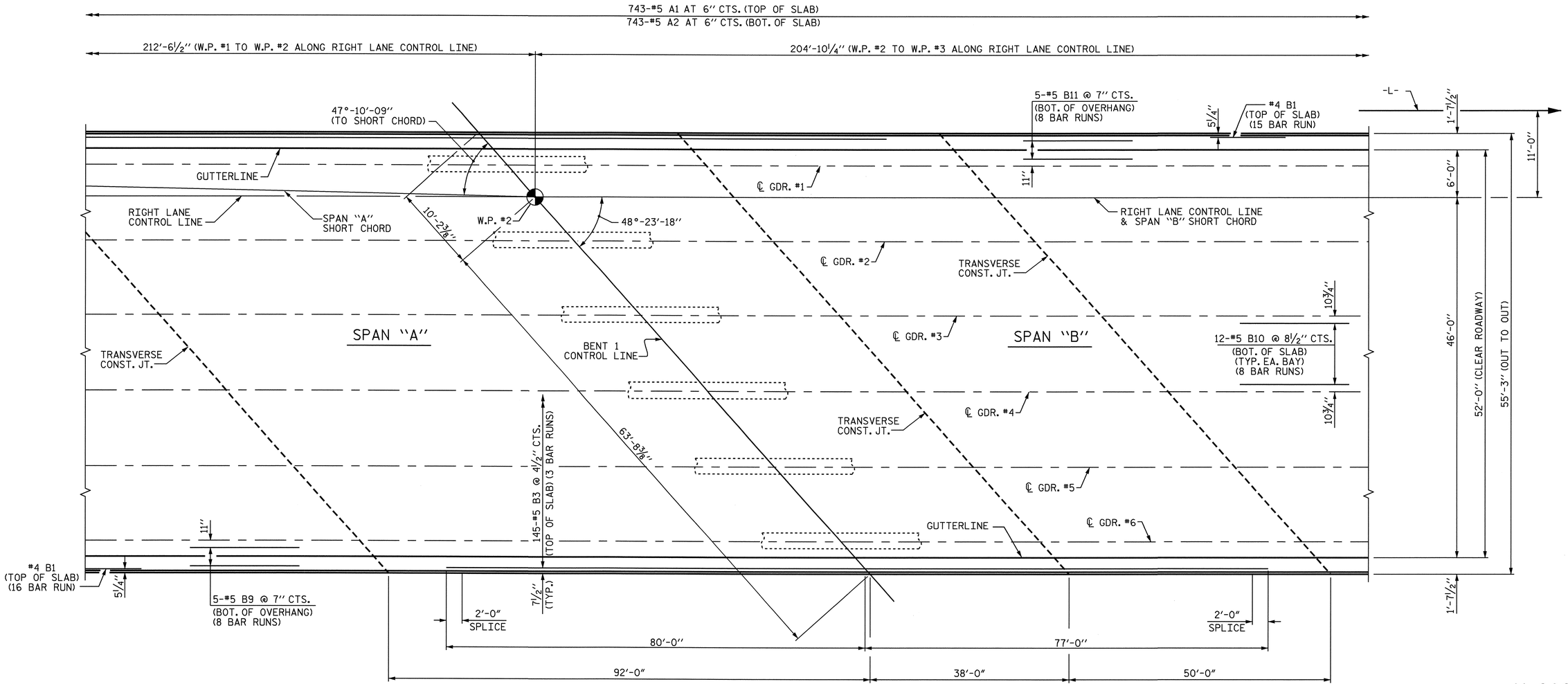
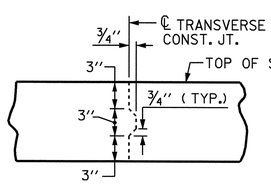


PARTIAL PLAN OF SPAN

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



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-58
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 1/21/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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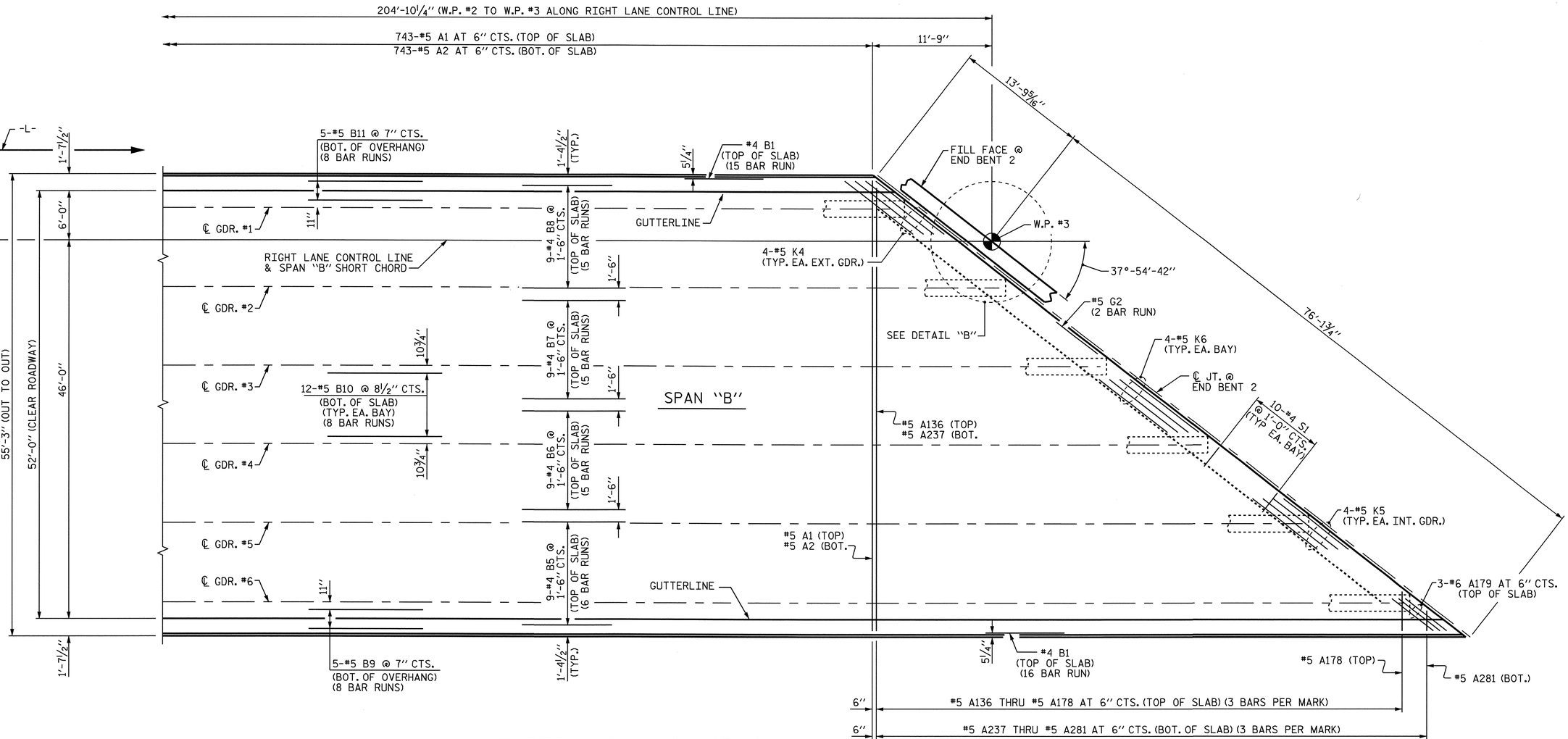
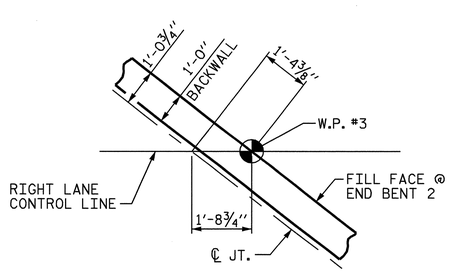


PARTIAL PLAN OF SPAN

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



DETAIL "B"

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-59
1			3			TOTAL SHEETS
2			4			94

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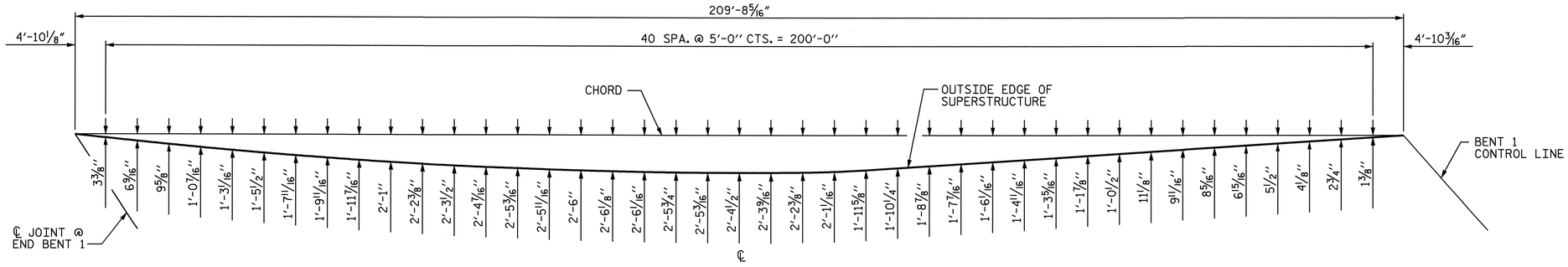
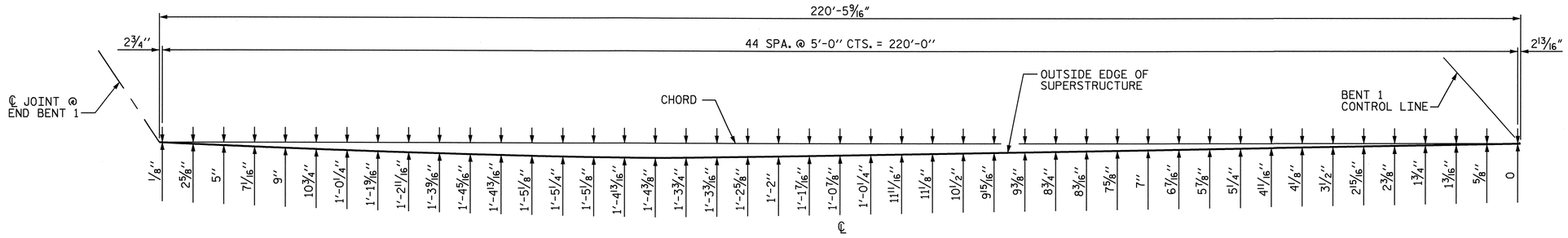
NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 11/5/10



LEFT SIDE



RIGHT SIDE

SPAN "A" ARC OFFSETS

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-60
1			3			TOTAL SHEETS
2			4			94

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 11/10/08
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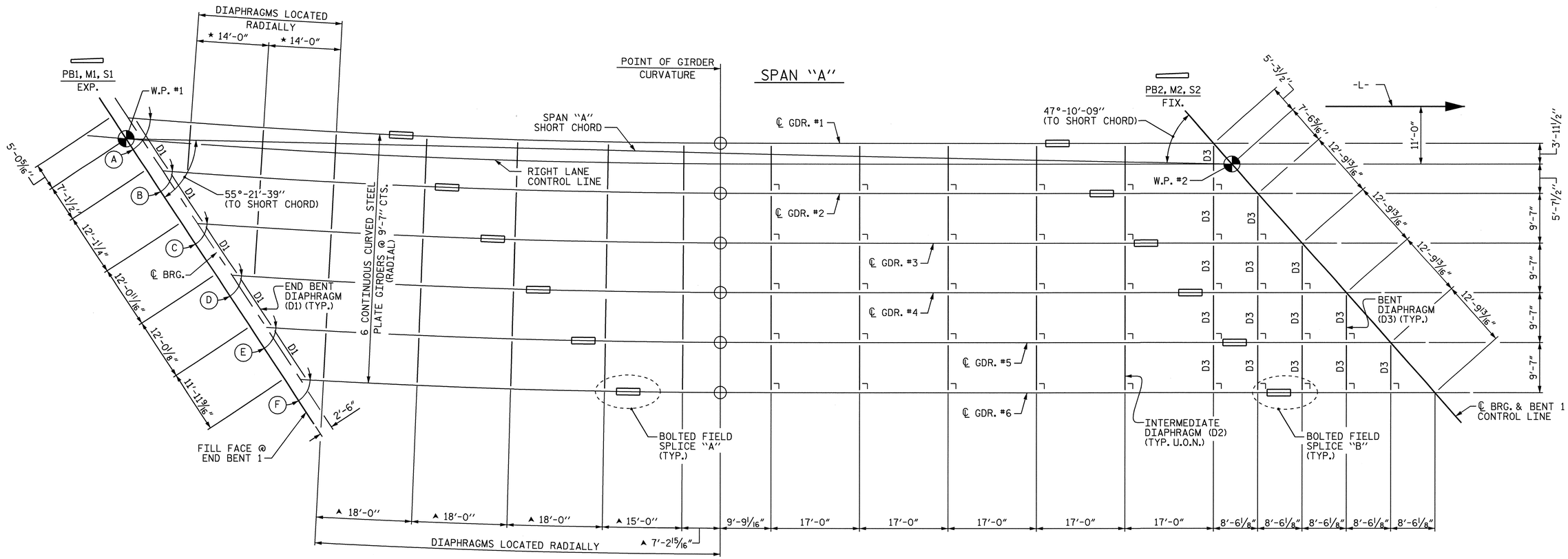
STR. #2



FRAMING PLAN

★ MEASURED ALONG THE ℄ GIRDER #1

▲ MEASURED ALONG THE ℄ GIRDER #6

ANGLES	
A	51°-55'-16"
B	52°-13'-02"
C	52°-30'-31"
D	52°-47'-42"
E	53°-04'-35"
F	53°-21'-12"

ALL ANGLES ARE TANGENT TO CURVE.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— RIGHT LANE —

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-61
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

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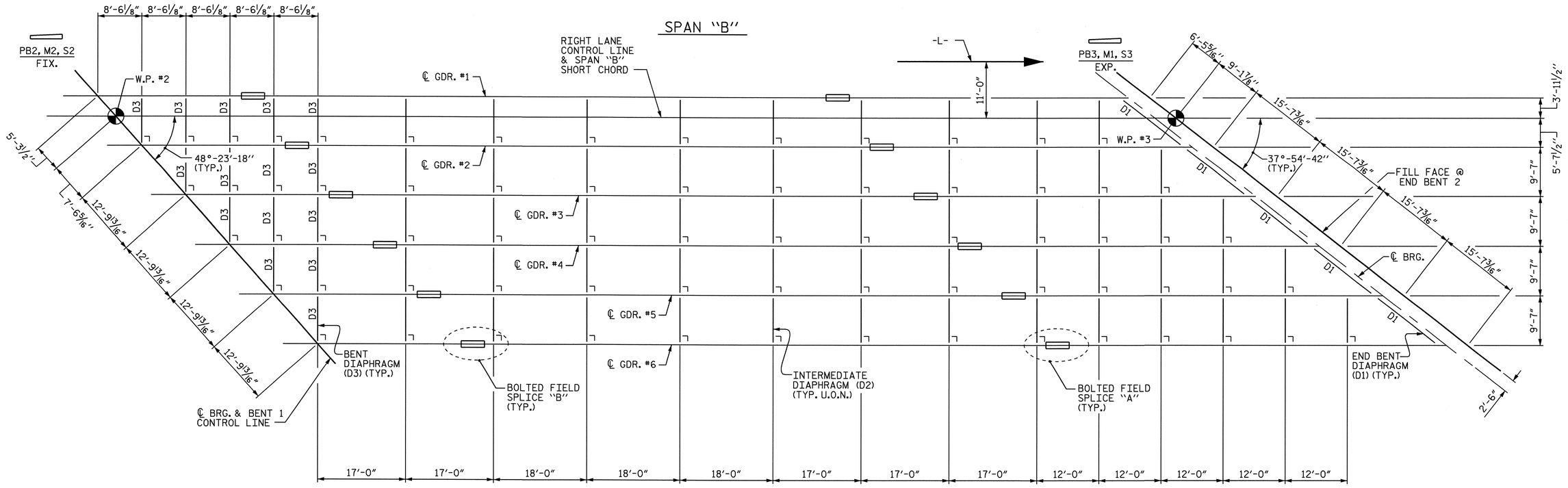

FRAMING PLAN

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-62
1			3			TOTAL SHEETS
2			4			94

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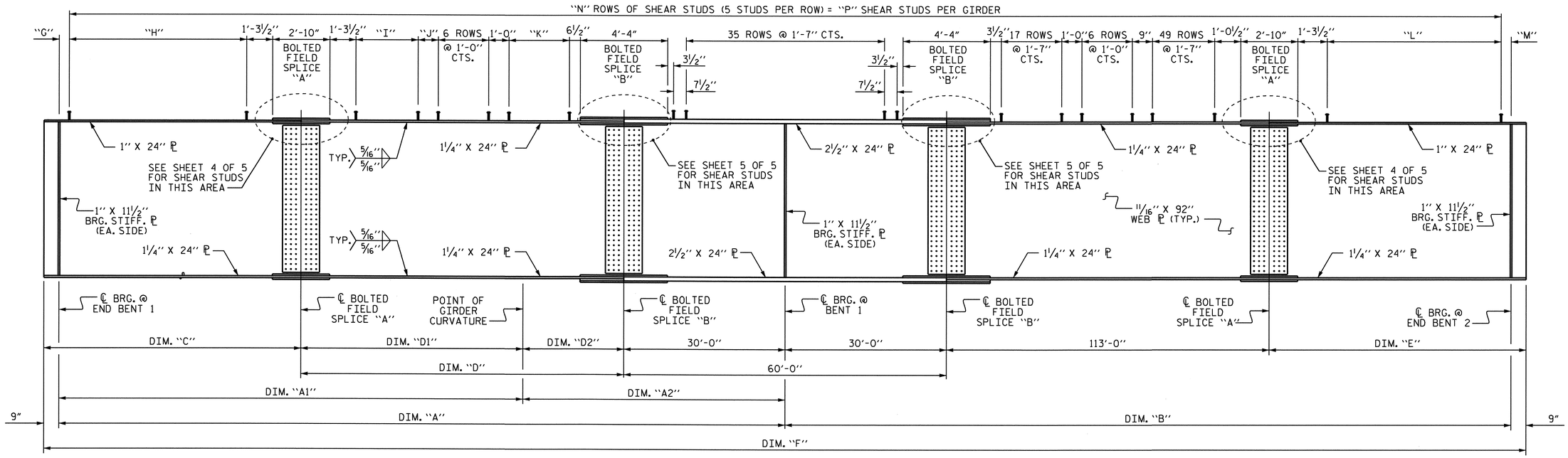
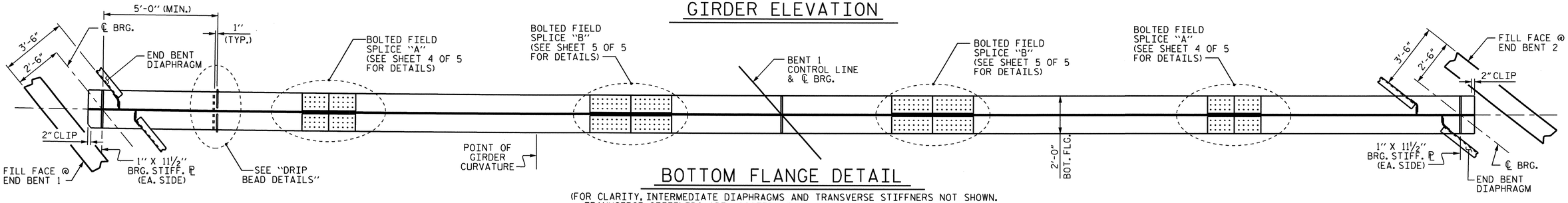


GIRDER ELEVATION



BOTTOM FLANGE DETAIL

(FOR CLARITY, INTERMEDIATE DIAPHRAGMS AND TRANSVERSE STIFFNERS NOT SHOWN. TRANVERSE STIFFNERS ARE LOCATED AT D3 DIAPHRAGMS, SEE FRAMING PLAN.)

GIRDER DIMEMSIONS

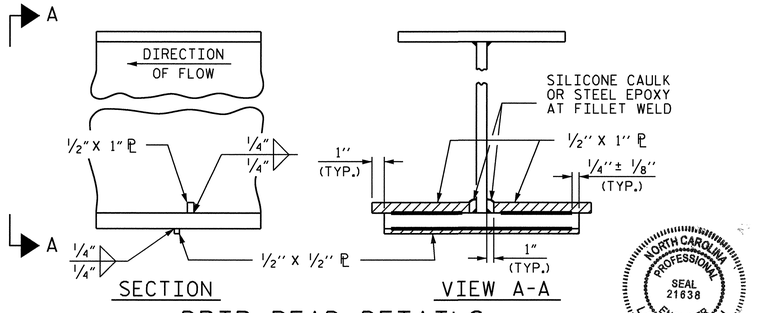
GIRDER	RADIUS	A1	A2	A	B	C	D1	D2	D	E	F
1	1439'-5¼"	113'-10½" (113'-11⅛")	94'-9/16" (94'-9⅝")	208'-7⅝" (208'-8 11/16")	199'-2⅝" (199'-3 1/16")	53'-3½"	61'-4"	64'-9/16"	126'-1 1/16"	56'-11⅝"	409'-4⅜"
2	1449'-0¼"	107'-2 1/16" (107'-2⅝")	103'-3⅜" (103'-3¾")	210'-5¼" (210'-6⅜")	203'-0⅛" (203'-0½")	55'-5⅛"	52'-5 5/16"	73'-3⅜"	125'-9⅛"	60'-9⅛"	414'-11⅜"
3	1458'-7¼"	100'-6" (100'-6½")	111'-9⅜" (111'-9 5/16")	212'-3⅜" (212'-4⅞")	206'-9 11/16" (206'-10")	57'-6⅞"	43'-8⅝"	81'-9⅝"	125'-5⅞"	64'-6 11/16"	420'-7 1/16"
4	1468'-2¼"	93'-10¼" (93'-10¾")	120'-3½" (120'-4 1/16")	214'-1¾" (214'-2 13/16")	210'-7⅜" (210'-7½")	59'-7⅜"	34'-11⅞"	90'-3½"	125'-3⅜"	68'-4⅜"	426'-2 15/16"
5	1477'-9¼"	87'-2⅞" (87'-3¼")	128'-9⅝" (128'-10¼")	216'-0½" (216'-1½")	214'-4 11/16" (214'-5")	61'-8⅛"	26'-3¾"	98'-9⅝"	125'-1⅜"	72'-1 11/16"	431'-11 3/16"
6	1487'-4¼"	80'-7¾" (80'-8⅛")	137'-3¾" (137'-4⅜")	217'-11½" (218'-0½")	218'-2¼" (218'-2½")	63'-8 9/16"	17'-8¼"	107'-3¾"	125'-0"	75'-11 3/16"	437'-7¾"

* SLOPED GIRDER LENGTHS SHOWN IN PARENTHESES.

ALL GIRDER DIMENSIONS IN THE ABOVE TABLE ARE MEASURED ALONG ℄ OF GIRDER.

STUD DIMENSIONS

GIRDER	G	H	I	J	K	L	M	N	P
1	9"	32 ROWS @ 1'-7" CTS.	61 ROWS @ 1'-7" CTS.	8/16"	13 ROWS @ 1'-7" CTS.	34 ROWS @ 1'-7" CTS.	1'-3⅜"	255	1275
2	1'-3⅝"	33 ROWS @ 1'-7" CTS.	60 ROWS @ 1'-7" CTS.	4⅛"	14 ROWS @ 1'-7" CTS.	37 ROWS @ 1'-7" CTS.	3⅝"	259	1295
3	2⅞"	35 ROWS @ 1'-7" CTS.	58 ROWS @ 1'-7" CTS.	1'-7 15/16"	15 ROWS @ 1'-7" CTS.	39 ROWS @ 1'-7" CTS.	11 3/16"	262	1310
4	8⅞"	36 ROWS @ 1'-7" CTS.	57 ROWS @ 1'-7" CTS.	1'-5⅜"	16 ROWS @ 1'-7" CTS.	41 ROWS @ 1'-7" CTS.	1'-6 11/16"	265	1325
5	1'-2⅝"	37 ROWS @ 1'-7" CTS.	55 ROWS @ 1'-7" CTS.	1'-3⅜"	18 ROWS @ 1'-7" CTS.	44 ROWS @ 1'-7" CTS.	7 3/16"	269	1345
6	1 1/16"	39 ROWS @ 1'-7" CTS.	53 ROWS @ 1'-7" CTS.	1'-2"	20 ROWS @ 1'-7" CTS.	46 ROWS @ 1'-7" CTS.	1'-2¾"	273	1365



DRIP BEAD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-63
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 1/30/09
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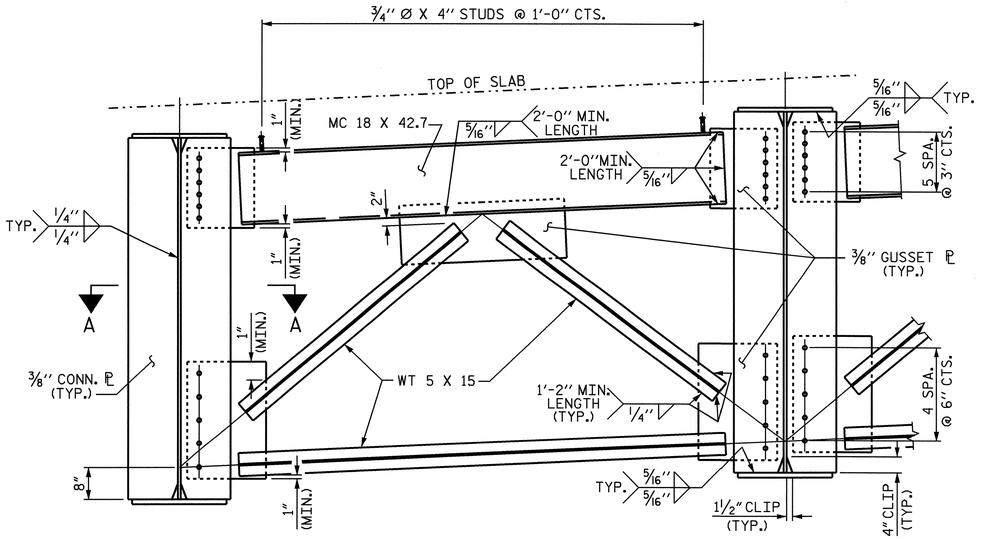
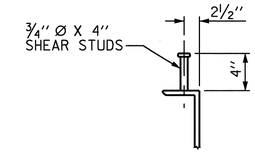


END BENT DIAPHRAGM (D1)

(BAY WIDTHS VARY AT END BENT 1)



SHEAR STUD DETAIL

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

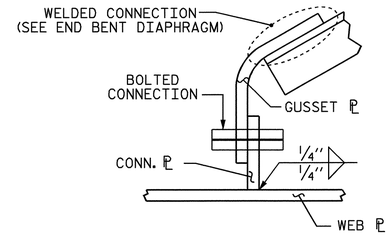
BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

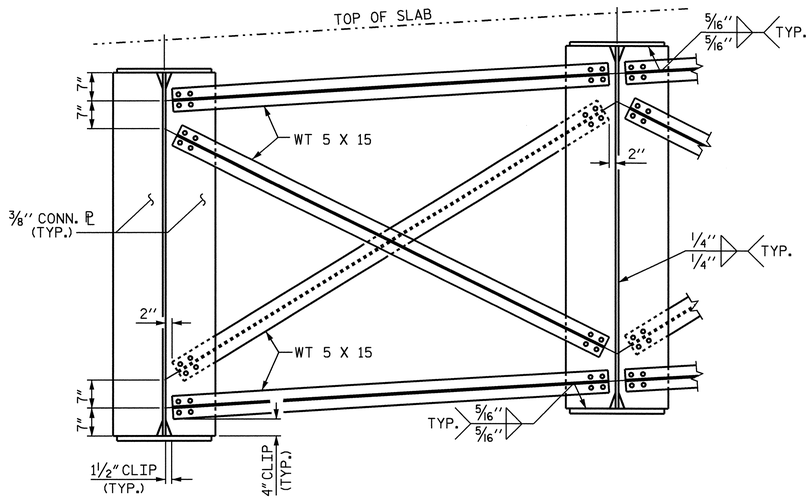
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

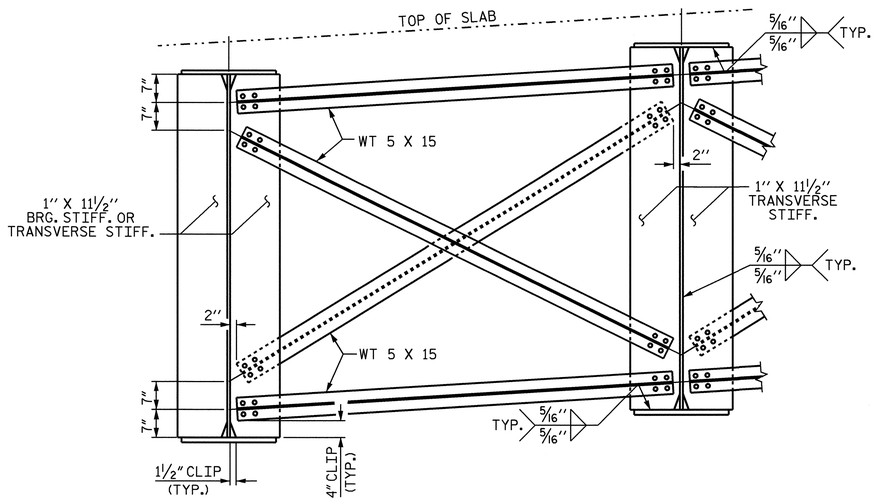
END OF GIRDERS SHALL BE PLUMB.



SECTION A-A



INTERMEDIATE DIAPHRAGM (D2)



BENT DIAPHRAGM (D3)

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-64
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

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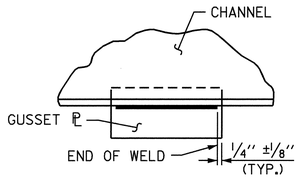
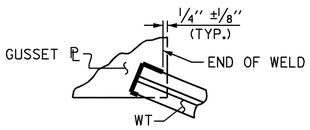
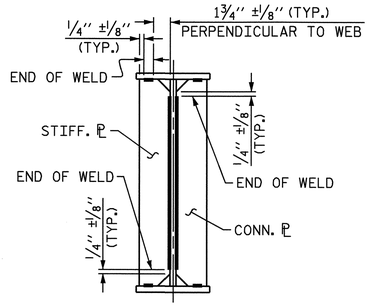


TYP. GUSSET PL CONNECTION

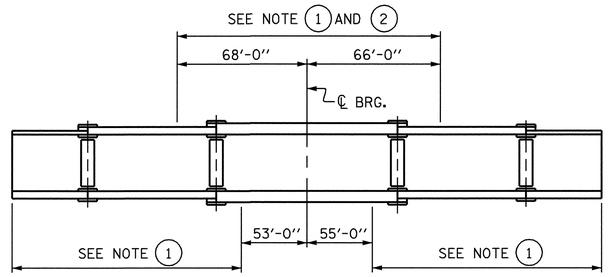


TYPICAL "TEE" TO GUSSET PLATE CONNECTION



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTION

WELD TERMINATION DETAILS



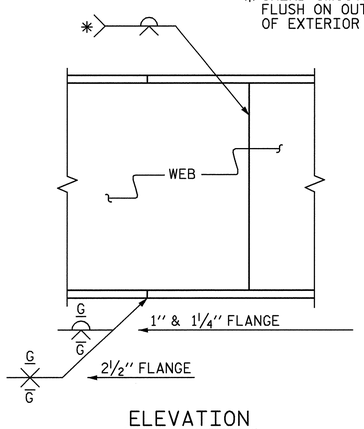
GIRDER MAKE UP

NOTE (1): CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS. ALL WEB PLATES AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-9 OF STANDARD SPECIFICATIONS.

NOTE (2): NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

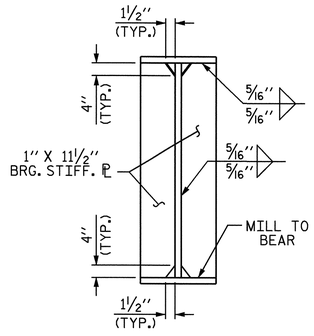
CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS.



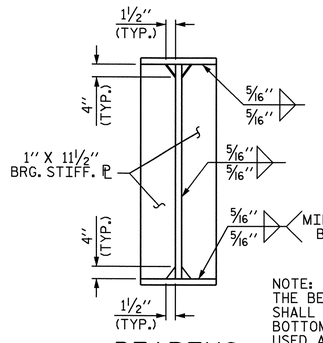
ELEVATION

TYPICAL FLANGE & WEB BUTT JOINT



BEARING STIFFENER

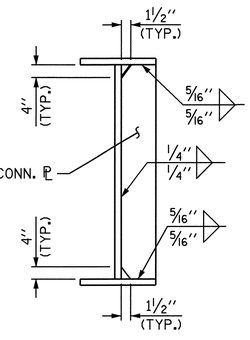
(AT END BENTS)



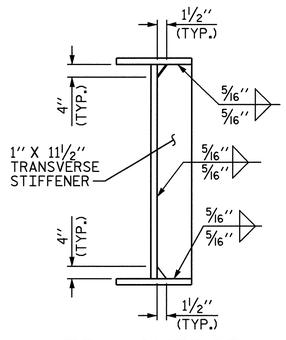
BEARING STIFFENER

(AT BENT)

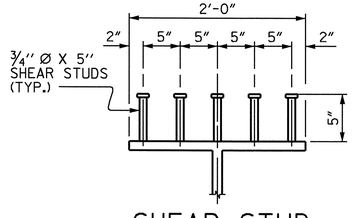
NOTE:
THE BEARING STIFFENER SHALL BE WELDED TO THE BOTTOM FLANGE ONLY WHEN USED AS A CONNECTOR PL.



CONNECTOR PLATE



TRANSVERSE STIFFENER



SHEAR STUD DETAIL

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-65
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/6/09
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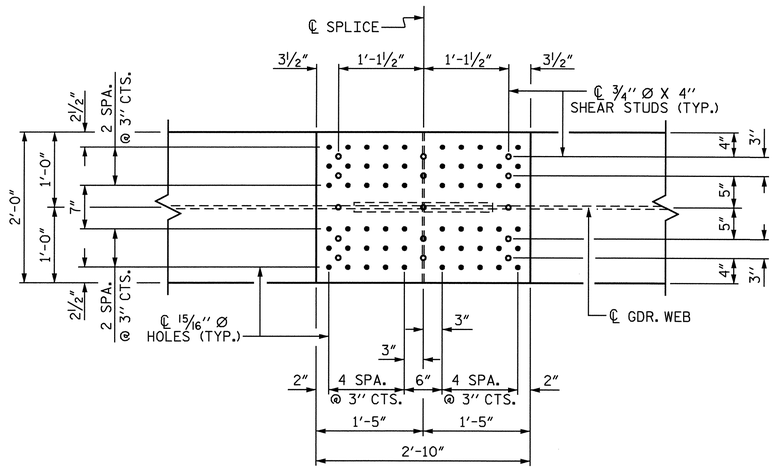
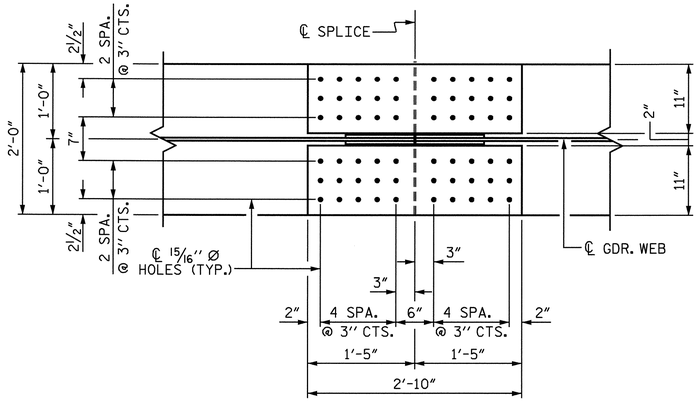
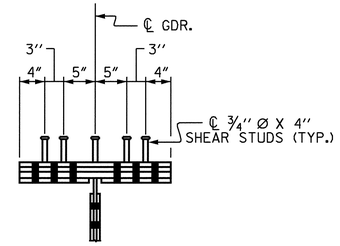


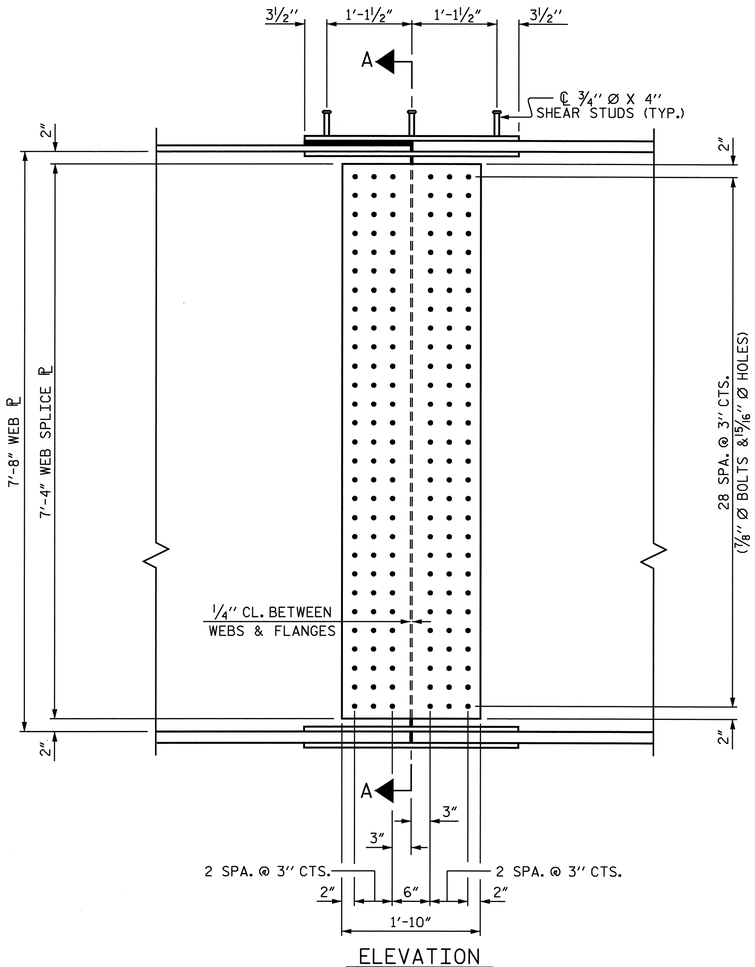
PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)



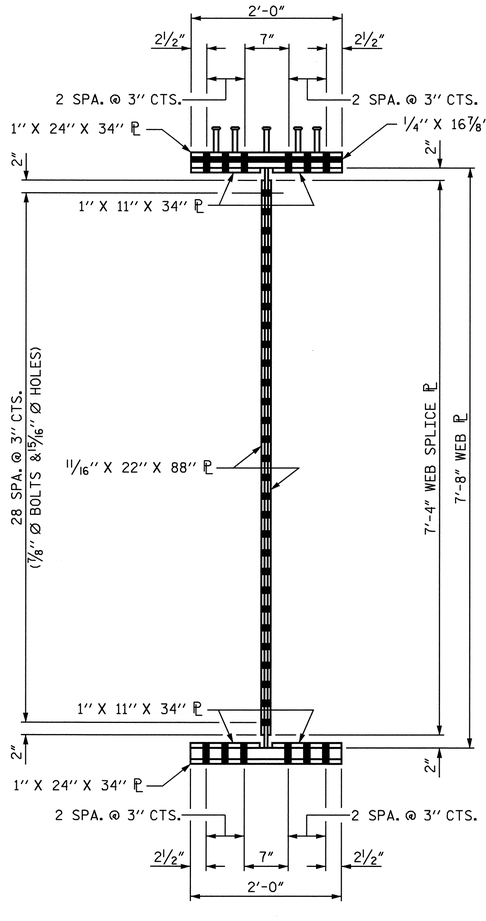
SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE



ELEVATION

UPSTATION SPAN "A"

UPSTATION SPAN "B"



SECTION A-A

DESCRIPTION	SIZE	NO. REQ'D FOR ONE FIELD SPLICE	TOTAL REQ'D
WEB SPLICE ℄	11⁄16" X 22" X 88"	2	24
TOP FLANGE SPLICE ℄ (TOP OF FLANGE)	1" X 24" X 34"	1	12
TOP FLANGE SPLICE ℄ (BOTTOM OF FLANGE)	1" X 11" X 34"	2	24
TOP FLANGE FILL ℄	1⁄4" X 16⅞" X 24"	1	12
BOTTOM FLANGE SPLICE ℄ (TOP OF FLANGE)	1" X 11" X 34"	2	24
BOTTOM FLANGE SPLICE ℄ (BOTTOM OF FLANGE)	1" X 24" X 34"	1	12

NOTE:
SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE A DETAILS

DRAWN BY : A.S. CALLAWAY DATE : 1/29/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

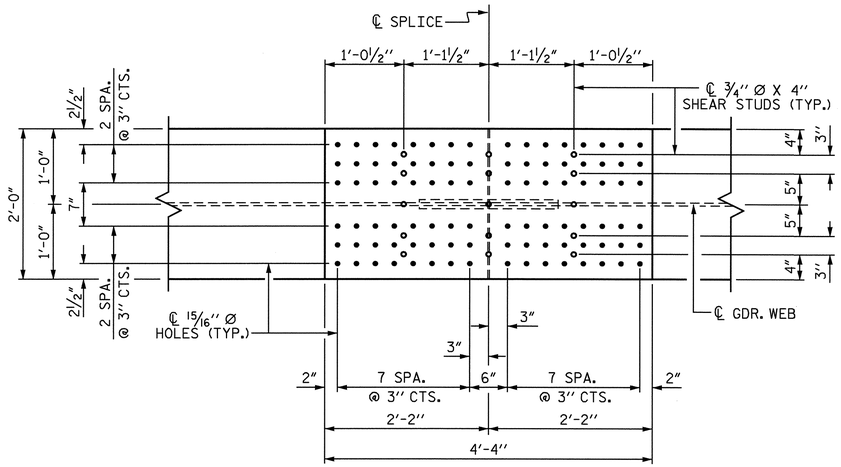
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

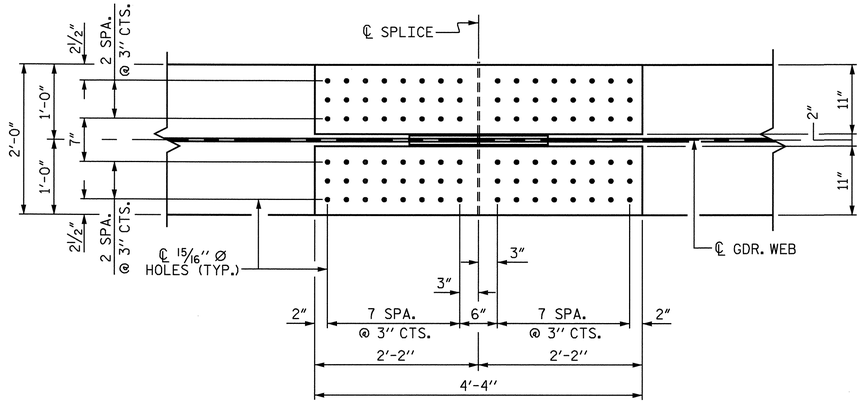
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-66
1			3			TOTAL SHEETS
2			4			94

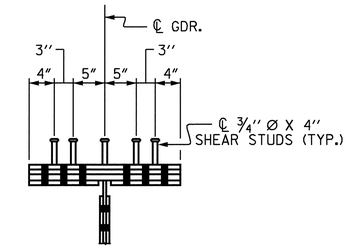
STR. #2



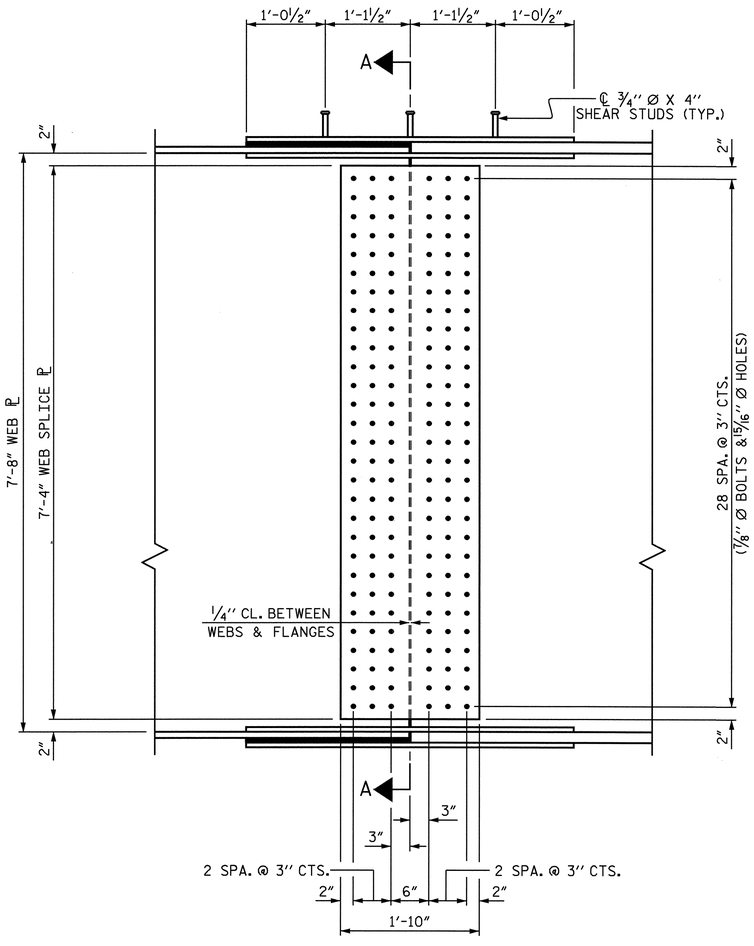
PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)



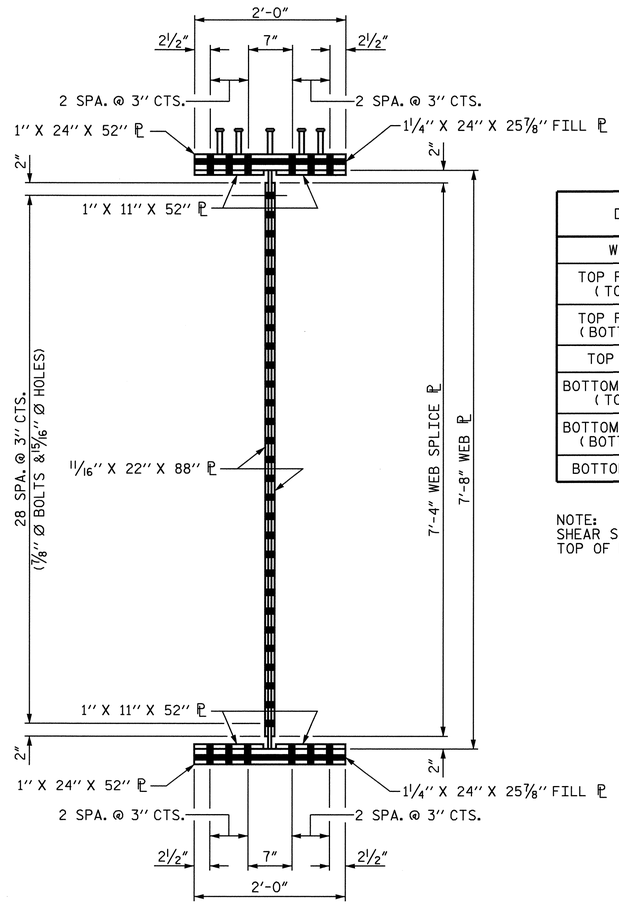
SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE



ELEVATION

UPSTATION SPAN "A"

UPSTATION SPAN "B"



SECTION A-A

DESCRIPTION	SIZE	NO. REQ'D FOR ONE FIELD SPLICE	TOTAL REQ'D
WEB SPLICE ℙ	11/16" X 22" X 88"	2	24
TOP FLANGE SPLICE ℙ (TOP OF FLANGE)	1" X 24" X 52"	1	12
TOP FLANGE SPLICE ℙ (BOTTOM OF FLANGE)	1" X 11" X 52"	2	24
TOP FLANGE FILL ℙ	1¼" X 24" X 25⅞"	1	12
BOTTOM FLANGE SPLICE ℙ (TOP OF FLANGE)	1" X 11" X 52"	2	24
BOTTOM FLANGE SPLICE ℙ (BOTTOM OF FLANGE)	1" X 24" X 52"	1	12
BOTTOM FLANGE FILL ℙ	1¼" X 24" X 25⅞"	1	12

NOTE:
SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE B DETAILS

DRAWN BY : A.S. CALLAWAY DATE : 1/29/09
CHECKED BY : K.D. LAYNE DATE : 3/26/09

10-NOV-2009 12:56
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lsutton

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

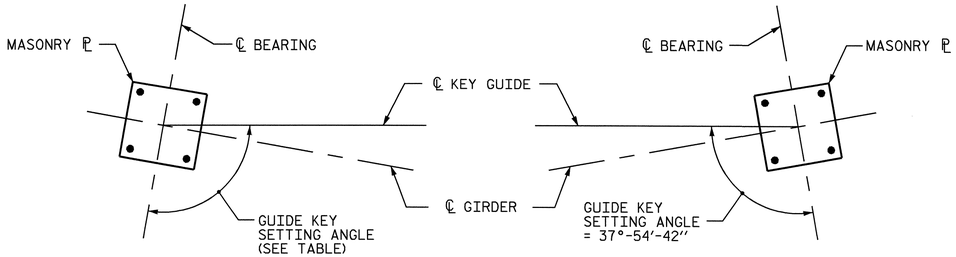
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-67
1			3			TOTAL SHEETS
2			4			94

STR. #2



PB1
AT END BENT 1

PB3
AT END BENT 2

GUIDE KEY SETTING ANGLES FOR BEARING PB1

GDR. #1	55°-20′-35″	GDR. #4	55°-46′-39″
GDR. #2	55°-30′-04″	GDR. #5	55°-53′-50″
GDR. #3	55°-38′-44″	GDR. #6	56°-00′-19″

TABLE FOR LOADS AND MOVEMENTS

BEARING	LOCATION	VERTICAL LOAD (KIPS)			LATERAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)
		DEAD	LIVE	TOTAL		
PB1 (EXP.)	END BENT 1	215	84	299	43	2 1/8″
PB3 (EXP.)	END BENT 2	180	69	249	36	2 1/16″

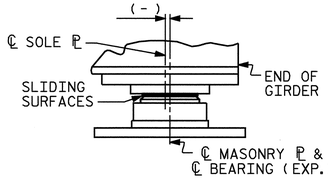


TABLE FOR PLATE SETTING DATA (EXPANSION POT BEARINGS)

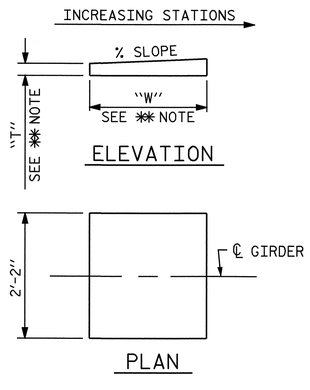
TEMPERATURE AT TIME OF SETTING	30° F	60° F	90° F	*
END BENT 1	-5/8″	0	5/8″	-9/16″
END BENT 2	-5/8″	0	5/8″	-5/8″

* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.

TEMPERATURE SETTING DETAIL

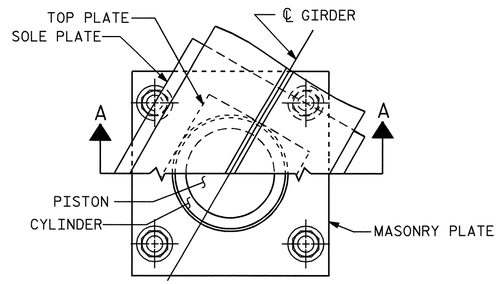
SLOPE TABLE

LOCATION	% SLOPE
END BENT 1	3
END BENT 2	2

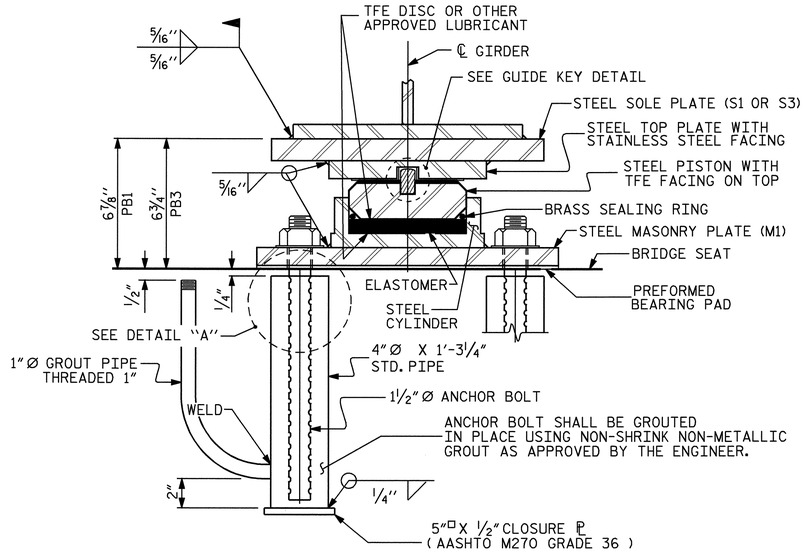


SOLE PLATE DETAILS

** NOTE:
DIMENSIONS "W" AND "T" ARE TO BE DETERMINED BY THE MANUFACTURER.

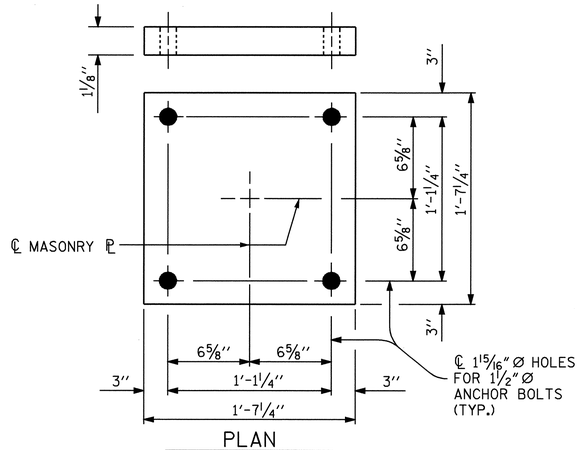


CUT-AWAY PLAN



SECTION A-A
PB1, EXP. (6 REQ'D.)
PB3, EXP. (6 REQ'D.)

POT BEARING DETAILS



PLAN
M1 (12 REQ'D.)

MASONRY PLATE DETAILS

NOTES

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

AT ALL POINTS OF SUPPORT IN SPANS A & B, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED. THEY SHALL BE GROUTED IN PLACE AS SHOWN.

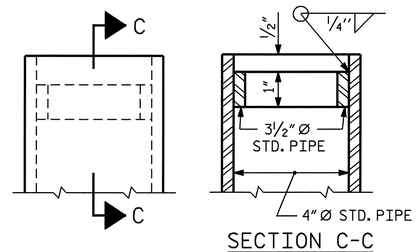
THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

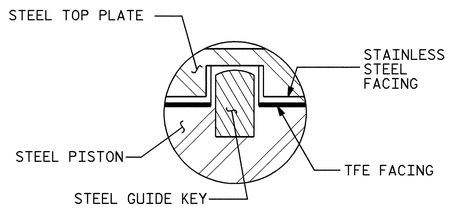
FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.



SECTION C-C

DETAIL "A"



GUIDE KEY DETAIL

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
POT BEARING DETAILS
(EXPANSION BEARING)
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-68
1			3			TOTAL SHEETS
2			4			94

STR. #2

STD. NO. PB1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 11/13/08		
CHECKED BY : K.D. LAYNE	DATE : 3/26/09		
DRAWN BY : RWW 8/99	REV. 7/10/01	LES/RDR	
CHECKED BY : LES 8/99	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06	TLA/GM	

10-NOV-2009 12:56
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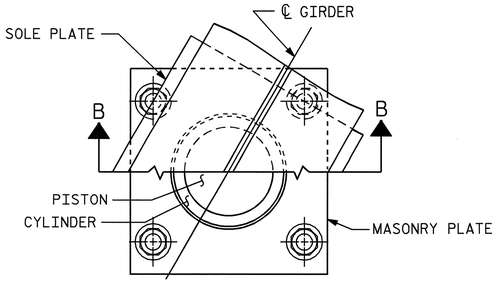
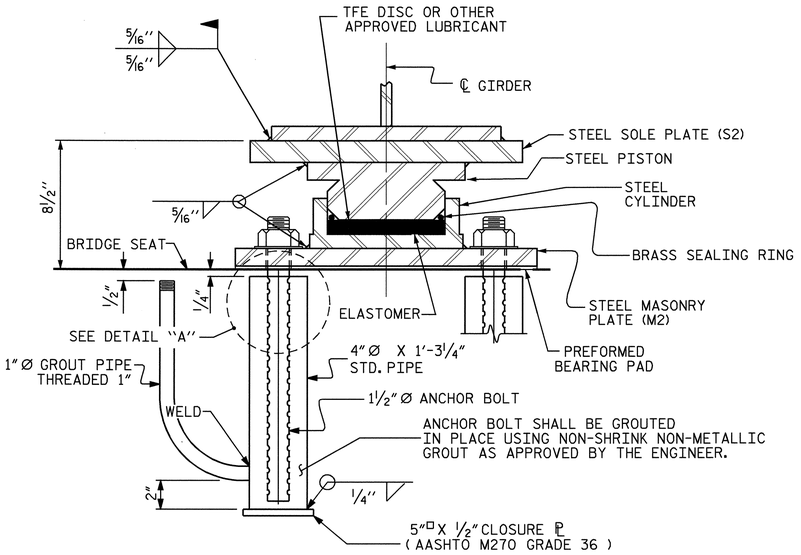
lsutton

TABLE FOR LOADS AND MOVEMENTS

BEARING	LOCATION	VERTICAL LOAD (KIPS)			LATERAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)
		DEAD	LIVE	TOTAL		
PB2 (FIX.)	BENT 1	693	158	797	128	0



CUT-AWAY PLAN



SECTION B-B
PB2, FIXED (6 REQ'D)

POT BEARING DETAILS

NOTES

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

AT ALL POINTS OF SUPPORT IN SPANS A & B, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

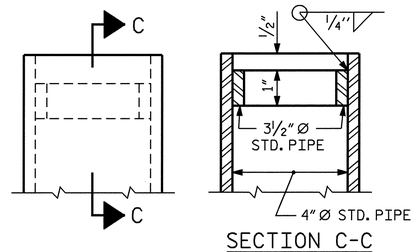
WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

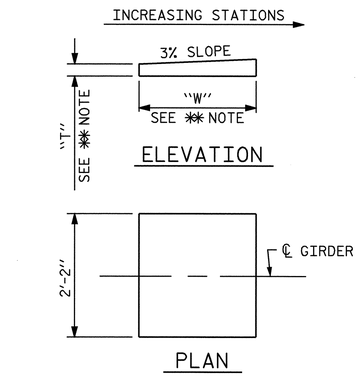
FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.



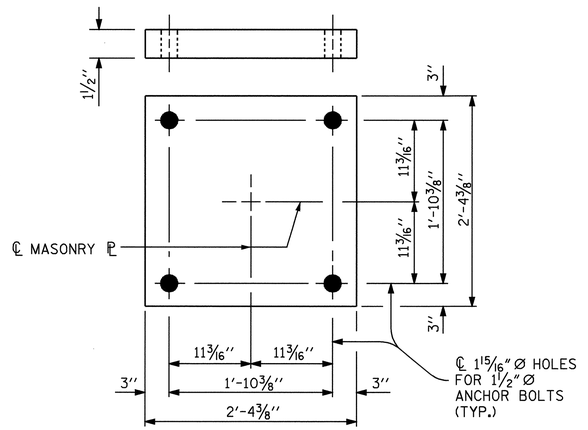
SECTION C-C

DETAIL ''A''



SOLE PLATE DETAILS

✱✱ NOTE:
DIMENSIONS ''W'' AND ''T'' ARE TO BE DETERMINED BY THE MANUFACTURER.



PLAN
M2 (6 REQ'D.)

MASONRY PLATE DETAILS

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
POT BEARING DETAILS
(FIXED BEARING)
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-69
1			3			TOTAL SHEETS
2			4			94

STR. #2

STD. NO. PB1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
11/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 11/13/08		
CHECKED BY : K.D. LAYNE	DATE : 3/26/09		
DRAWN BY : RWW 8/99	REV. 7/10/01	LES/RDR	
CHECKED BY : LES 8/99	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06	TLA/GM	

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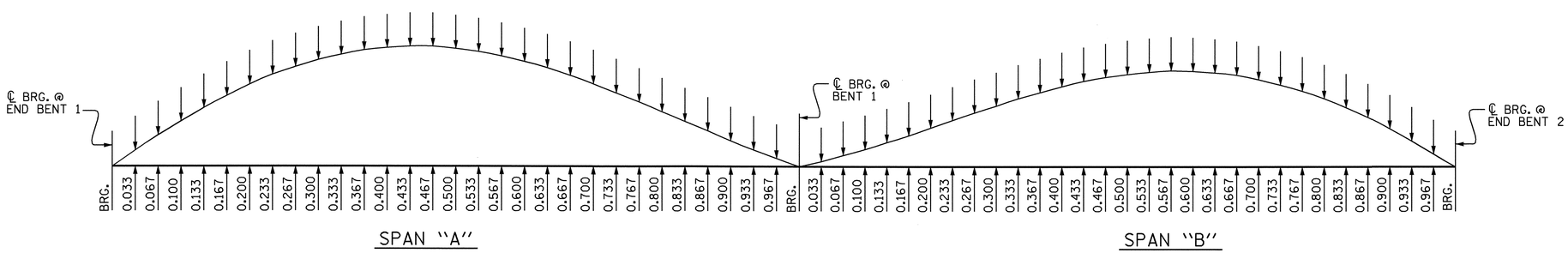
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #1

THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
	SPAN "A"																														
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.046	0.059	0.072	0.084	0.094	0.102	0.109	0.114	0.118	0.120	0.120	0.118	0.115	0.110	0.104	0.097	0.089	0.079	0.069	0.059	0.049	0.039	0.029	0.021	0.014	0.008	0.003	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.045	0.089	0.131	0.171	0.208	0.241	0.270	0.294	0.313	0.328	0.338	0.343	0.343	0.339	0.329	0.315	0.297	0.276	0.252	0.225	0.196	0.167	0.137	0.110	0.082	0.059	0.039	0.022	0.009	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.009	0.012	0.015	0.017	0.020	0.021	0.023	0.024	0.025	0.026	0.026	0.026	0.025	0.024	0.023	0.022	0.020	0.018	0.016	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.064	0.126	0.186	0.242	0.295	0.342	0.384	0.417	0.445	0.466	0.481	0.489	0.489	0.483	0.469	0.449	0.424	0.395	0.361	0.322	0.281	0.240	0.197	0.158	0.118	0.085	0.056	0.032	0.013	0
VERTICAL CURVE ORDINATE	0	0.044	0.085	0.123	0.158	0.190	0.218	0.244	0.266	0.286	0.302	0.316	0.326	0.333	0.338	0.339	0.337	0.333	0.326	0.315	0.302	0.286	0.267	0.244	0.218	0.190	0.158	0.123	0.085	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 5/16"	2 9/16"	3 11/16"	4 13/16"	5 13/16"	6 3/4"	7 9/16"	8 3/16"	8 3/4"	9 3/16"	9 9/16"	9 3/4"	9 7/8"	9 7/8"	9 11/16"	9 7/16"	9 1/16"	8 5/8"	8 1/8"	7 1/2"	6 13/16"	6 1/16"	5 5/16"	4 1/2"	3 11/16"	2 15/16"	2 1/8"	1 3/8"	1 1/16"	0

THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
	SPAN "B"																														
DEFLECTION DUE TO WEIGHT OF GIRDER	0	-0.001	0.000	0.002	0.005	0.009	0.015	0.022	0.029	0.037	0.045	0.052	0.060	0.067	0.073	0.077	0.081	0.084	0.085	0.085	0.084	0.081	0.076	0.071	0.064	0.055	0.046	0.035	0.024	0.012	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	-0.003	-0.001	0.004	0.013	0.026	0.042	0.061	0.083	0.104	0.128	0.150	0.172	0.191	0.208	0.222	0.233	0.242	0.245	0.245	0.242	0.233	0.221	0.204	0.184	0.159	0.132	0.102	0.069	0.035	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.001	0.001	0.003	0.004	0.006	0.007	0.009	0.011	0.013	0.014	0.016	0.017	0.018	0.018	0.019	0.019	0.019	0.018	0.018	0.016	0.015	0.014	0.012	0.010	0.007	0.005	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	-0.004	-0.001	0.007	0.019	0.038	0.061	0.089	0.119	0.150	0.184	0.215	0.246	0.274	0.298	0.317	0.332	0.345	0.349	0.349	0.344	0.332	0.313	0.290	0.262	0.226	0.188	0.144	0.098	0.050	0
VERTICAL CURVE ORDINATE	0	0.041	0.080	0.115	0.148	0.178	0.205	0.229	0.250	0.269	0.285	0.297	0.307	0.314	0.319	0.320	0.319	0.314	0.307	0.297	0.285	0.269	0.250	0.229	0.205	0.178	0.148	0.115	0.080	0.041	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	7/16"	1 5/16"	1 7/16"	2"	2 9/16"	3 3/16"	3 13/16"	4 7/16"	5"	5 5/8"	6 1/8"	6 5/8"	7 1/16"	7 3/8"	7 5/8"	7 13/16"	7 15/16"	7 7/8"	7 3/4"	7 9/16"	7 3/16"	6 3/4"	6 1/4"	5 5/8"	4 7/8"	4 1/16"	3 1/8"	2 1/8"	1 1/16"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-70
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/36/09

10-NOV-2009 12:56
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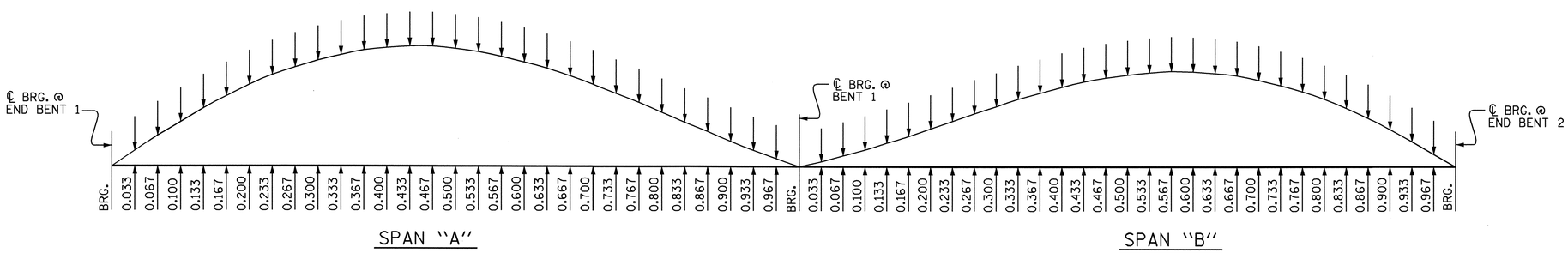
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #2

SPAN "A"																																
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.046	0.060	0.073	0.084	0.095	0.103	0.110	0.115	0.119	0.120	0.120	0.119	0.115	0.110	0.104	0.097	0.088	0.079	0.068	0.058	0.048	0.038	0.028	0.020	0.013	0.007	0.003	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.046	0.090	0.133	0.173	0.210	0.244	0.273	0.297	0.317	0.332	0.341	0.346	0.346	0.341	0.331	0.317	0.298	0.277	0.251	0.224	0.195	0.166	0.136	0.107	0.081	0.057	0.037	0.020	0.007	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.010	0.012	0.015	0.018	0.020	0.022	0.023	0.025	0.025	0.026	0.026	0.026	0.025	0.024	0.023	0.022	0.020	0.018	0.016	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.065	0.127	0.189	0.245	0.298	0.346	0.388	0.422	0.450	0.472	0.485	0.492	0.492	0.486	0.471	0.451	0.425	0.396	0.359	0.321	0.279	0.238	0.195	0.154	0.116	0.082	0.053	0.029	0.011	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.122	0.156	0.187	0.216	0.241	0.263	0.282	0.298	0.311	0.321	0.327	0.331	0.332	0.331	0.328	0.321	0.312	0.299	0.284	0.265	0.243	0.217	0.189	0.158	0.123	0.085	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 5/16"	2 9/16"	3 3/4"	4 13/16"	5 13/16"	6 3/4"	7 9/16"	8 1/4"	8 13/16"	9 1/4"	9 9/16"	9 3/4"	9 13/16"	9 13/16"	9 5/8"	9 3/8"	9 1/16"	8 5/8"	8 1/16"	7 7/16"	6 3/4"	6 1/16"	5 1/4"	4 7/16"	3 11/16"	2 7/8"	2 1/8"	1 3/8"	1 1/16"	0

SPAN "B"																																
THIRTIETH POINTS	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.000	0.001	0.004	0.007	0.012	0.019	0.026	0.034	0.042	0.050	0.059	0.066	0.073	0.079	0.084	0.088	0.090	0.091	0.091	0.089	0.086	0.082	0.075	0.068	0.059	0.049	0.038	0.026	0.013	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	-0.001	0.002	0.010	0.021	0.035	0.054	0.075	0.098	0.122	0.145	0.169	0.191	0.210	0.227	0.242	0.254	0.261	0.265	0.264	0.260	0.251	0.237	0.219	0.198	0.172	0.142	0.110	0.075	0.038	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.000	0.001	0.002	0.003	0.005	0.007	0.009	0.010	0.012	0.014	0.016	0.017	0.018	0.019	0.020	0.020	0.020	0.020	0.019	0.019	0.018	0.016	0.014	0.013	0.010	0.008	0.005	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	-0.001	0.003	0.015	0.030	0.050	0.078	0.108	0.141	0.174	0.207	0.242	0.273	0.300	0.324	0.345	0.362	0.371	0.376	0.375	0.368	0.356	0.337	0.310	0.280	0.244	0.201	0.156	0.106	0.054	0
VERTICAL CURVE ORDINATE	0	0.043	0.083	0.120	0.154	0.185	0.213	0.238	0.260	0.279	0.295	0.309	0.319	0.326	0.331	0.332	0.331	0.326	0.319	0.309	0.295	0.279	0.260	0.238	0.213	0.185	0.154	0.120	0.083	0.043	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1/2"	1 1/16"	1 5/8"	2 3/16"	2 13/16"	3 1/2"	4 1/8"	4 13/16"	5 7/16"	6"	6 5/8"	7 1/8"	7 1/2"	7 7/8"	8 1/8"	8 5/16"	8 3/8"	8 5/16"	8 3/16"	7 15/16"	7 5/8"	7 3/16"	6 9/16"	5 15/16"	5 1/8"	4 1/4"	3 5/16"	2 1/4"	1 3/16"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-71
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
11/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/36/09

10-NOV-2009 12:56
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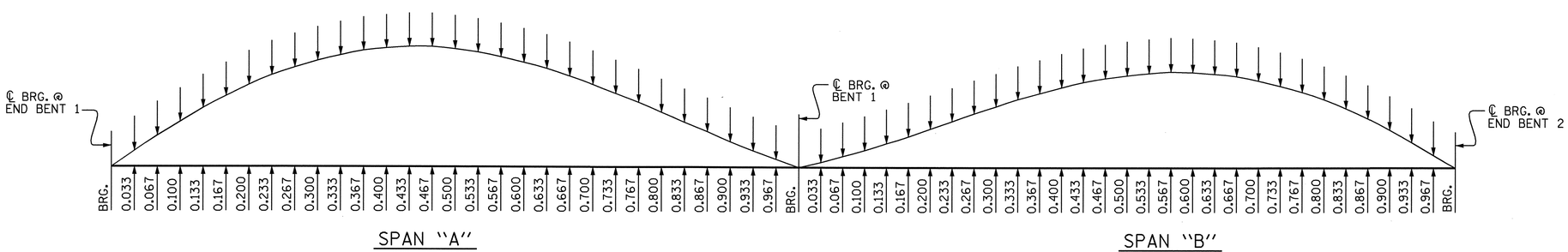
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #3

THIRTIETH POINTS	SPAN "A"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.032	0.047	0.061	0.074	0.086	0.096	0.105	0.112	0.117	0.121	0.122	0.122	0.120	0.117	0.111	0.105	0.097	0.088	0.078	0.068	0.057	0.047	0.037	0.027	0.019	0.012	0.006	0.002	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.047	0.092	0.136	0.177	0.216	0.250	0.279	0.304	0.324	0.339	0.349	0.353	0.353	0.347	0.336	0.321	0.302	0.279	0.253	0.225	0.195	0.164	0.133	0.105	0.077	0.054	0.034	0.018	0.006	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.007	0.010	0.013	0.016	0.018	0.020	0.022	0.024	0.025	0.026	0.026	0.027	0.026	0.026	0.025	0.023	0.022	0.020	0.018	0.016	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.066	0.131	0.193	0.251	0.306	0.354	0.395	0.431	0.460	0.481	0.496	0.501	0.502	0.493	0.479	0.457	0.430	0.398	0.361	0.321	0.279	0.235	0.191	0.151	0.111	0.078	0.049	0.026	0.009	0
VERTICAL CURVE ORDINATE	0	0.043	0.083	0.120	0.154	0.185	0.213	0.238	0.259	0.278	0.293	0.305	0.315	0.321	0.324	0.327	0.327	0.325	0.319	0.310	0.298	0.282	0.264	0.242	0.217	0.189	0.158	0.123	0.085	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 5/16"	2 9/16"	3 3/4"	4 7/8"	5 7/8"	6 13/16"	7 5/8"	8 1/4"	8 7/8"	9 5/16"	9 5/8"	9 13/16"	9 7/8"	9 13/16"	9 11/16"	9 7/16"	9 1/16"	8 5/8"	8 1/16"	7 7/16"	6 3/4"	6"	5 3/16"	4 7/16"	3 5/8"	2 13/16"	2 1/16"	1 5/16"	5/8"	0

THIRTIETH POINTS	SPAN "B"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.000	0.002	0.005	0.010	0.016	0.023	0.031	0.040	0.049	0.058	0.066	0.074	0.081	0.088	0.093	0.097	0.099	0.100	0.100	0.098	0.094	0.089	0.083	0.074	0.064	0.053	0.041	0.028	0.014	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.000	0.005	0.015	0.028	0.046	0.066	0.090	0.115	0.140	0.167	0.191	0.215	0.236	0.254	0.269	0.281	0.289	0.292	0.291	0.286	0.276	0.261	0.241	0.217	0.188	0.156	0.120	0.082	0.042	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.001	0.001	0.003	0.004	0.006	0.008	0.010	0.012	0.014	0.016	0.017	0.019	0.020	0.021	0.022	0.022	0.022	0.022	0.021	0.020	0.019	0.018	0.016	0.014	0.011	0.009	0.006	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	0.000	0.008	0.021	0.041	0.066	0.095	0.129	0.165	0.201	0.239	0.273	0.306	0.336	0.362	0.383	0.400	0.410	0.414	0.413	0.405	0.390	0.369	0.342	0.307	0.266	0.220	0.170	0.116	0.059	0
VERTICAL CURVE ORDINATE	0	0.044	0.086	0.124	0.159	0.192	0.221	0.247	0.270	0.290	0.306	0.320	0.331	0.339	0.343	0.345	0.343	0.339	0.331	0.320	0.306	0.290	0.270	0.247	0.221	0.192	0.159	0.124	0.086	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1/2"	1 1/8"	1 3/4"	2 3/8"	3 1/8"	3 13/16"	4 1/2"	5 1/4"	5 7/8"	6 9/16"	7 1/8"	7 5/8"	8 1/8"	8 7/16"	8 3/4"	8 15/16"	9"	8 15/16"	8 13/16"	8 9/16"	8 3/16"	7 11/16"	7 1/16"	6 5/16"	5 1/2"	4 9/16"	3 1/2"	2 7/16"	1 1/4"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-72
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/36/09

10-NOV-2009 12:55
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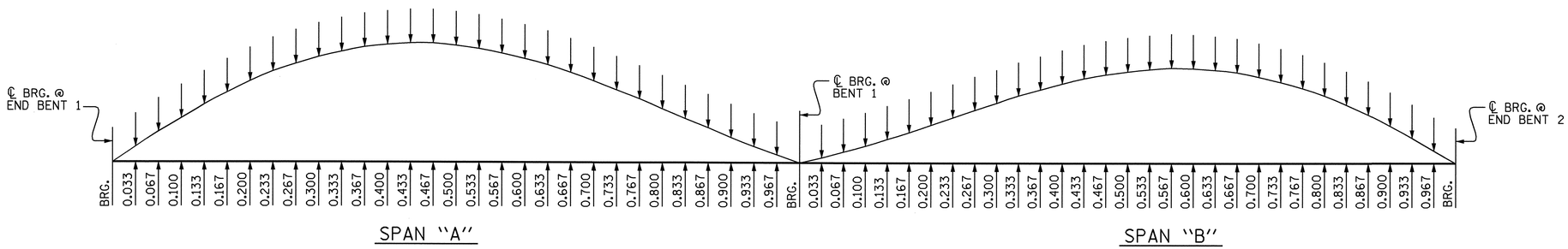
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #4

THIRTIETH POINTS	SPAN "A"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.017	0.033	0.049	0.063	0.077	0.089	0.100	0.108	0.116	0.121	0.124	0.126	0.125	0.123	0.119	0.113	0.106	0.098	0.088	0.078	0.067	0.056	0.045	0.035	0.026	0.017	0.011	0.005	0.002	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.048	0.096	0.141	0.184	0.223	0.259	0.290	0.315	0.335	0.350	0.360	0.364	0.362	0.355	0.344	0.327	0.306	0.282	0.254	0.225	0.193	0.161	0.130	0.100	0.073	0.049	0.030	0.015	0.005	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.007	0.010	0.013	0.016	0.019	0.021	0.023	0.025	0.026	0.027	0.027	0.027	0.027	0.026	0.025	0.024	0.022	0.020	0.018	0.016	0.013	0.011	0.008	0.006	0.004	0.003	0.001	0.000	0
TOTAL DEAD LOAD DEFLECTION	0	0.068	0.136	0.200	0.260	0.316	0.367	0.411	0.446	0.476	0.497	0.511	0.517	0.514	0.505	0.489	0.465	0.436	0.402	0.362	0.321	0.276	0.230	0.186	0.143	0.105	0.070	0.044	0.021	0.007	0
VERTICAL CURVE ORDINATE	0	0.043	0.082	0.119	0.152	0.183	0.210	0.234	0.255	0.273	0.288	0.300	0.308	0.314	0.320	0.325	0.326	0.324	0.318	0.310	0.298	0.283	0.264	0.243	0.218	0.190	0.158	0.124	0.086	0.045	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 5/16"	2 5/8"	3 13/16"	4 15/16"	6"	6 15/16"	7 3/4"	8 7/16"	9"	9 7/16"	9 3/4"	9 7/8"	9 15/16"	9 7/8"	9 3/4"	9 1/2"	9 1/8"	8 5/8"	8 1/16"	7 7/16"	6 11/16"	5 15/16"	5 1/8"	4 5/16"	3 9/16"	2 3/4"	2"	1 5/16"	5/8"	0

THIRTIETH POINTS	SPAN "B"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.001	0.003	0.007	0.013	0.020	0.028	0.037	0.047	0.057	0.066	0.076	0.084	0.092	0.099	0.105	0.109	0.111	0.112	0.111	0.109	0.105	0.099	0.091	0.082	0.071	0.059	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.002	0.009	0.021	0.037	0.057	0.081	0.107	0.136	0.164	0.192	0.220	0.245	0.269	0.289	0.304	0.316	0.324	0.327	0.326	0.319	0.307	0.290	0.268	0.240	0.209	0.173	0.133	0.091	0.046	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.001	0.002	0.003	0.005	0.007	0.009	0.011	0.014	0.016	0.018	0.019	0.021	0.022	0.023	0.024	0.025	0.025	0.024	0.024	0.023	0.021	0.019	0.017	0.015	0.012	0.010	0.006	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	0.003	0.013	0.030	0.053	0.082	0.116	0.153	0.194	0.235	0.274	0.314	0.348	0.382	0.410	0.432	0.449	0.460	0.464	0.461	0.452	0.435	0.410	0.378	0.339	0.295	0.244	0.188	0.128	0.065	0
VERTICAL CURVE ORDINATE	0	0.046	0.089	0.129	0.165	0.199	0.229	0.256	0.280	0.300	0.318	0.332	0.343	0.351	0.356	0.357	0.356	0.351	0.343	0.332	0.318	0.300	0.280	0.256	0.229	0.199	0.165	0.129	0.089	0.046	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	9/16"	1 1/4"	1 15/16"	2 5/8"	3 3/8"	4 1/8"	4 15/16"	5 11/16"	6 7/16"	7 1/8"	7 3/4"	8 5/16"	8 13/16"	9 3/16"	9 7/16"	9 11/16"	9 3/4"	9 11/16"	9 1/2"	9 1/4"	8 13/16"	8 1/4"	7 5/8"	6 13/16"	5 15/16"	4 15/16"	3 13/16"	2 5/8"	1 5/16"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-73
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/36/09

10-NOV-2009 12:55
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lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #5

THIRTIETH POINTS	SPAN "A"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.017	0.035	0.051	0.066	0.081	0.094	0.105	0.114	0.121	0.126	0.129	0.130	0.129	0.126	0.122	0.115	0.108	0.098	0.088	0.077	0.066	0.055	0.043	0.033	0.023	0.015	0.009	0.004	0.001	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.051	0.101	0.149	0.194	0.236	0.273	0.305	0.331	0.352	0.367	0.375	0.378	0.375	0.367	0.353	0.334	0.312	0.285	0.255	0.223	0.190	0.157	0.124	0.094	0.067	0.043	0.025	0.011	0.003	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.007	0.011	0.014	0.017	0.020	0.022	0.024	0.026	0.027	0.028	0.028	0.028	0.028	0.027	0.026	0.024	0.023	0.021	0.018	0.016	0.013	0.011	0.008	0.006	0.004	0.002	0.001	0.000	0
TOTAL DEAD LOAD DEFLECTION	0	0.072	0.143	0.211	0.274	0.334	0.387	0.432	0.469	0.499	0.520	0.532	0.536	0.532	0.521	0.502	0.475	0.444	0.406	0.364	0.318	0.272	0.225	0.178	0.135	0.096	0.062	0.036	0.016	0.004	0
VERTICAL CURVE ORDINATE	0	0.042	0.081	0.117	0.150	0.180	0.207	0.230	0.251	0.268	0.282	0.293	0.301	0.312	0.320	0.325	0.326	0.324	0.319	0.311	0.299	0.284	0.266	0.244	0.219	0.191	0.159	0.125	0.086	0.045	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 3/8"	2 11/16"	3 15/16"	5 1/16"	6 3/16"	7 1/8"	7 15/16"	8 5/8"	9 3/16"	9 5/8"	9 7/8"	10 1/16"	10 1/8"	10 1/16"	9 15/16"	9 5/8"	9 3/16"	8 11/16"	8 1/8"	7 3/8"	6 11/16"	5 7/8"	5 1/16"	4 1/4"	3 7/16"	2 5/8"	1 15/16"	1 1/4"	9/16"	0

THIRTIETH POINTS	SPAN "B"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.001	0.005	0.010	0.017	0.025	0.034	0.045	0.056	0.067	0.078	0.088	0.098	0.106	0.113	0.119	0.123	0.126	0.126	0.125	0.122	0.117	0.110	0.101	0.091	0.079	0.065	0.050	0.034	0.017	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.004	0.015	0.030	0.049	0.072	0.099	0.131	0.162	0.194	0.226	0.256	0.285	0.310	0.330	0.347	0.360	0.368	0.370	0.367	0.358	0.344	0.323	0.298	0.266	0.231	0.190	0.147	0.100	0.050	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.000	0.001	0.003	0.004	0.006	0.008	0.011	0.013	0.016	0.018	0.020	0.022	0.024	0.025	0.027	0.027	0.028	0.028	0.027	0.026	0.025	0.024	0.022	0.019	0.017	0.014	0.010	0.007	0.004	0
TOTAL DEAD LOAD DEFLECTION	0	0.005	0.021	0.043	0.070	0.103	0.141	0.187	0.231	0.277	0.322	0.364	0.405	0.440	0.468	0.493	0.510	0.522	0.524	0.519	0.506	0.486	0.457	0.421	0.376	0.327	0.269	0.207	0.141	0.071	0
VERTICAL CURVE ORDINATE	0	0.048	0.092	0.133	0.171	0.206	0.237	0.265	0.290	0.311	0.329	0.344	0.356	0.364	0.369	0.370	0.369	0.364	0.356	0.344	0.329	0.311	0.290	0.265	0.237	0.206	0.171	0.133	0.092	0.048	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	5/8"	1 3/8"	2 1/8"	2 7/8"	3 11/16"	4 9/16"	5 7/16"	6 1/4"	7 1/16"	7 13/16"	8 1/2"	9 1/8"	9 5/8"	10 1/16"	10 3/8"	10 9/16"	10 5/8"	10 9/16"	10 3/8"	10"	9 9/16"	8 15/16"	8 1/4"	7 3/8"	6 3/8"	5 1/4"	4 1/16"	2 13/16"	1 7/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
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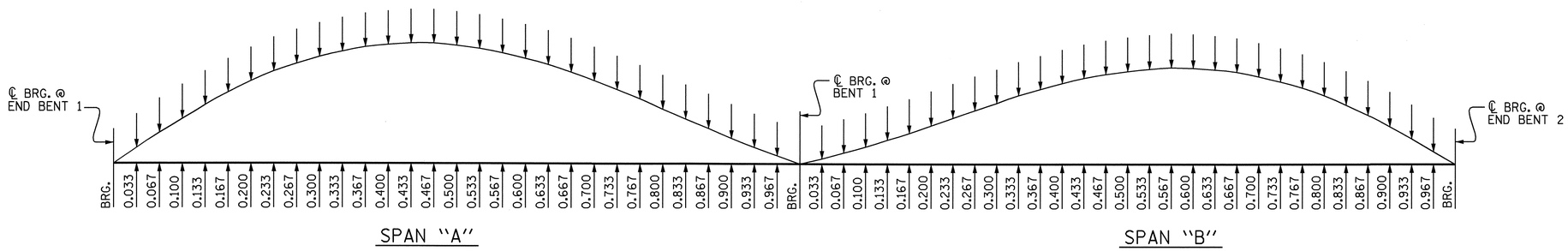

SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-74
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/36/09

10-NOV-2009 12:55
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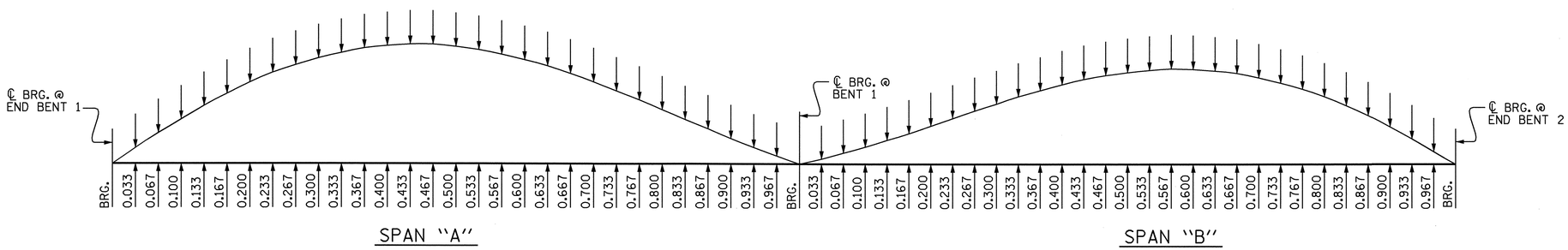
lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDER #6

THIRTIETH POINTS	SPAN "A"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.019	0.038	0.055	0.072	0.087	0.100	0.112	0.121	0.128	0.133	0.136	0.136	0.134	0.130	0.125	0.118	0.109	0.099	0.088	0.076	0.064	0.052	0.040	0.029	0.020	0.012	0.006	0.002	0.000	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.056	0.111	0.162	0.211	0.255	0.294	0.327	0.354	0.374	0.388	0.395	0.396	0.390	0.379	0.363	0.341	0.315	0.286	0.253	0.219	0.184	0.148	0.115	0.083	0.056	0.034	0.018	0.006	0.000	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.008	0.012	0.015	0.019	0.021	0.024	0.026	0.028	0.029	0.030	0.030	0.030	0.029	0.028	0.027	0.025	0.023	0.021	0.018	0.015	0.013	0.010	0.007	0.005	0.003	0.002	0.001	0.000	0
TOTAL DEAD LOAD DEFLECTION	0	0.079	0.157	0.229	0.298	0.361	0.415	0.463	0.501	0.530	0.550	0.561	0.562	0.554	0.538	0.516	0.486	0.449	0.408	0.362	0.313	0.263	0.213	0.165	0.119	0.081	0.049	0.026	0.009	0.000	0
VERTICAL CURVE ORDINATE	0	0.042	0.080	0.116	0.148	0.177	0.203	0.226	0.246	0.263	0.276	0.287	0.301	0.313	0.321	0.326	0.328	0.327	0.322	0.314	0.302	0.287	0.269	0.247	0.222	0.193	0.161	0.126	0.087	0.045	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	1 7/16"	2 7/8"	4 1/8"	5 3/8"	6 7/16"	7 7/16"	8 1/4"	8 15/16"	9 1/2"	9 15/16"	10 3/16"	10 3/8"	10 3/8"	10 5/16"	10 1/8"	9 3/4"	9 5/16"	8 3/4"	8 1/8"	7 3/8"	6 5/8"	5 13/16"	4 15/16"	4 1/16"	3 5/16"	2 1/2"	1 13/16"	1 1/8"	9/16"	0

THIRTIETH POINTS	SPAN "B"																														
	BRG.	0.033	0.067	0.100	0.133	0.167	0.200	0.233	0.267	0.300	0.333	0.367	0.400	0.433	0.467	0.500	0.533	0.567	0.600	0.633	0.667	0.700	0.733	0.767	0.800	0.833	0.867	0.900	0.933	0.967	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.003	0.007	0.014	0.022	0.032	0.043	0.055	0.068	0.080	0.092	0.104	0.114	0.124	0.131	0.137	0.141	0.143	0.143	0.141	0.137	0.131	0.122	0.112	0.100	0.086	0.070	0.054	0.037	0.019	0
DEFLECTION DUE TO WEIGHT OF SLAB ✳	0	0.008	0.022	0.041	0.064	0.093	0.126	0.160	0.197	0.234	0.269	0.303	0.334	0.361	0.383	0.401	0.413	0.419	0.420	0.414	0.402	0.384	0.359	0.329	0.293	0.252	0.207	0.159	0.108	0.055	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.001	0.002	0.003	0.005	0.008	0.011	0.013	0.016	0.019	0.021	0.024	0.026	0.028	0.029	0.030	0.031	0.031	0.031	0.031	0.029	0.028	0.026	0.024	0.021	0.018	0.015	0.011	0.008	0.004	0
TOTAL DEAD LOAD DEFLECTION	0	0.012	0.031	0.058	0.091	0.133	0.180	0.228	0.281	0.333	0.382	0.431	0.474	0.513	0.543	0.568	0.585	0.593	0.594	0.586	0.568	0.543	0.507	0.465	0.414	0.356	0.292	0.224	0.153	0.078	0
VERTICAL CURVE ORDINATE	0	0.049	0.095	0.138	0.177	0.213	0.245	0.274	0.300	0.322	0.341	0.356	0.368	0.377	0.382	0.383	0.382	0.377	0.368	0.356	0.341	0.322	0.300	0.274	0.245	0.213	0.177	0.138	0.095	0.049	0
ORDINATE DUE TO SUPERELEVATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING ▲	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
REQUIRED CAMBER	0	3/4"	1 1/2"	2 3/8"	3 3/16"	4 1/8"	5 1/8"	6"	7"	7 7/8"	8 11/16"	9 7/16"	10 1/8"	10 11/16"	11 1/8"	11 7/16"	11 5/8"	11 5/8"	11 9/16"	11 5/16"	10 15/16"	10 3/8"	9 11/16"	8 7/8"	7 15/16"	6 13/16"	5 5/8"	4 3/8"	3"	1 1/2"	0

✳ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).
▲ HEAT CURVING IS ALLOWED. CAMBER DISSIPATION DUE TO HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-75
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 2/17/09
CHECKED BY : K.D. LAYNE DATE : 3/36/09

10-NOV-2009 12:55
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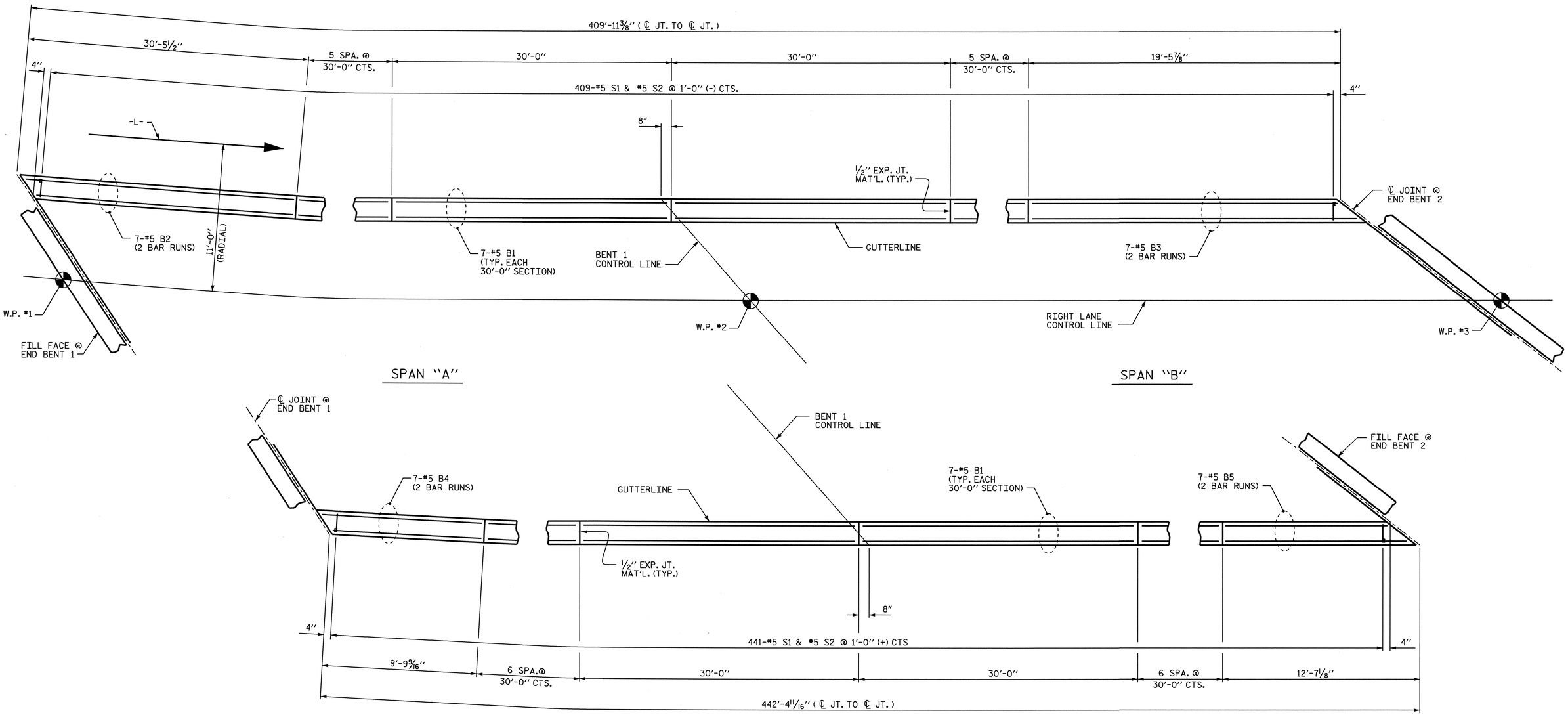
lsutton



PLAN

ALL DIMENSIONS ARE TAKEN ALONG THE BACK FACE OF BARRIER RAIL.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-76
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 10/31/08
CHECKED BY : K.D. LAYNE DATE : 3/26/09

19-OCT-2009 13:09
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lsutton

NOTES

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

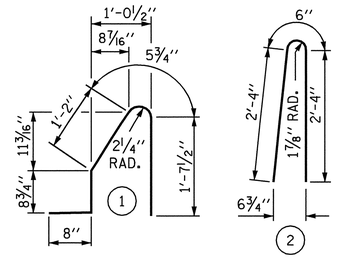
THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

THE #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, IN ORDER TO MAINTAIN 2'' MIN. CLEARANCE TO THE 1/2'' EXPANSION JOINT MATERIAL.

BAR TYPES

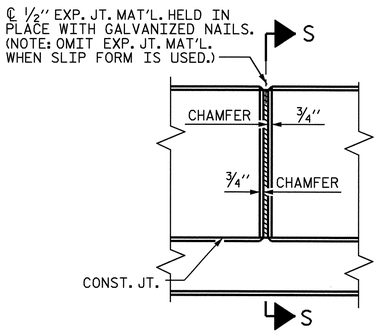


ALL BAR DIMENSIONS ARE OUT TO OUT.

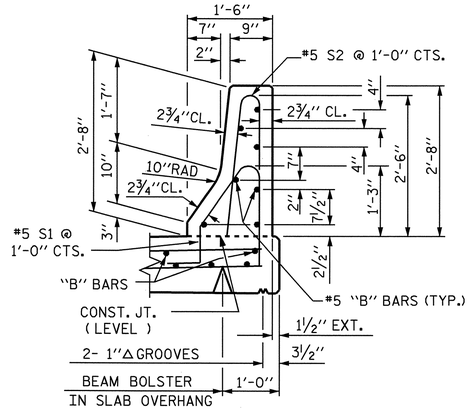
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

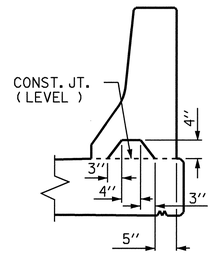
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	182	#5	STR	29'-7''	5616
✳ B2	14	#5	STR	16'-8''	243
✳ B3	14	#5	STR	12'-0''	175
✳ B4	14	#5	STR	6'-10''	100
✳ B5	14	#5	STR	7'-7''	111
✳ S1	850	#5	1	4'-8''	4137
✳ S2	850	#5	2	5'-2''	4581
✳ EPOXY COATED REINFORCING STEEL				LBS.	14,963
CLASS AA CONCRETE				CU. YDS.	85.4
CONCRETE BARRIER RAIL				LIN. FT.	852.34



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL



SECTION S-S

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

BARRIER RAIL DETAILS

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-77
1			3			TOTAL SHEETS
2			4			94

STR. #2

STD. NO. CBR1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

ASSEMBLED BY : A.S. CALLAWAY		DATE :	10/31/08
CHECKED BY : K.D. LAYNE		DATE :	3/26/09
DRAWN BY : ARB 5/87	REV. 10/17/00		RWW/LES
CHECKED BY : SJD 9/87	REV. 5/7/03R		RWW/JTE
	REV. 5/1/06		TLA/GM

10-NOV-2009 12:55
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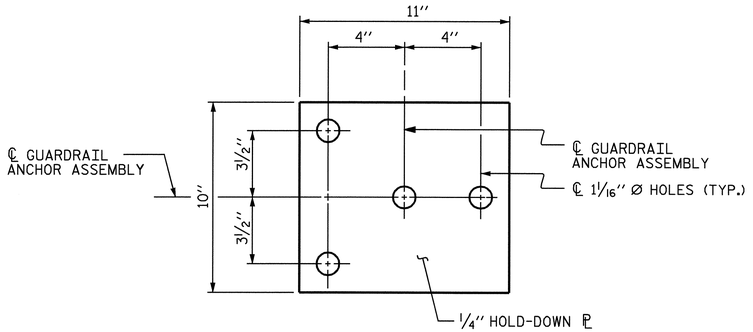
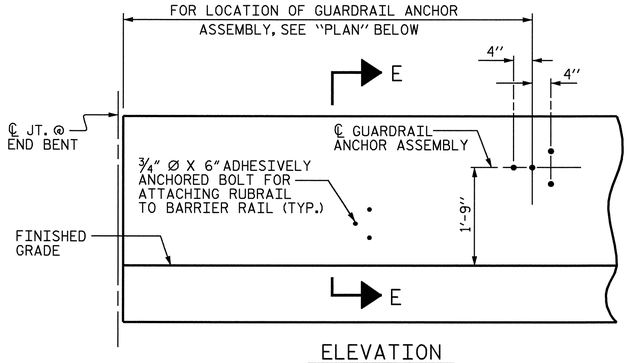
lsutton

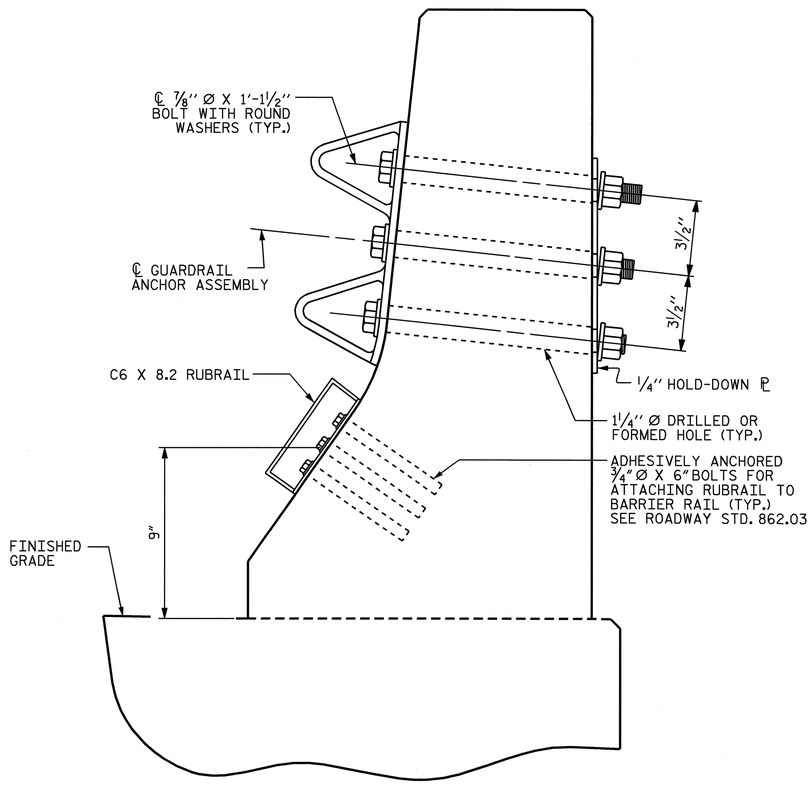


PLAN



ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 4 - ⅞'' 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 ⅞'' 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.)

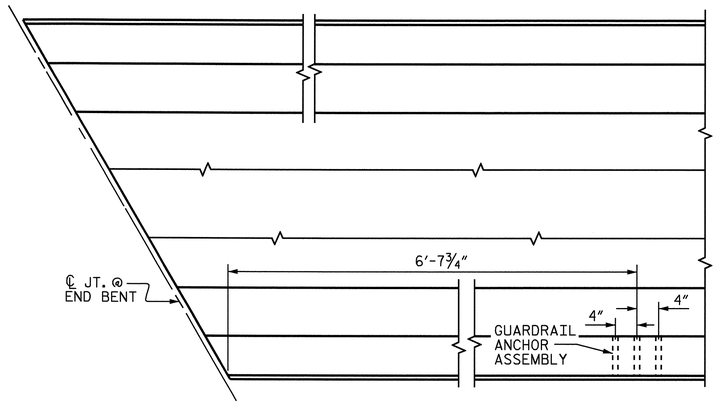
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 ¼'' 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.

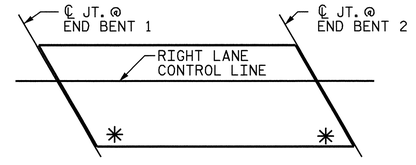
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ¾" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BEND 2 SIMILAR



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-78
1			3			TOTAL SHEETS
2			4			94

STR. #2

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 3/30/09
CHECKED BY : K.D. LAYNE	DATE : 4/2/09
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

19-OCT-2009 13:09
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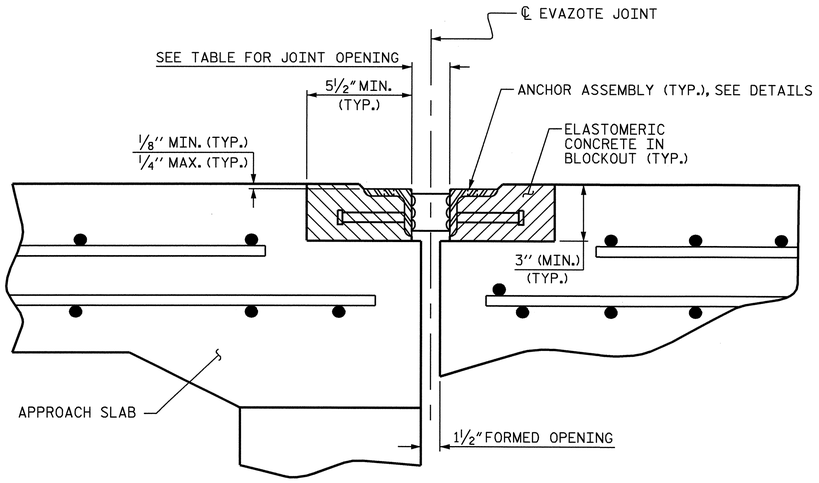
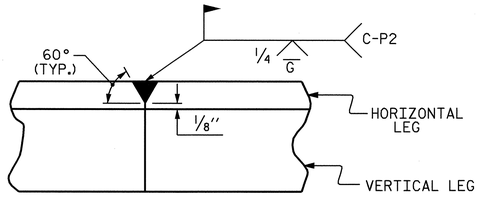
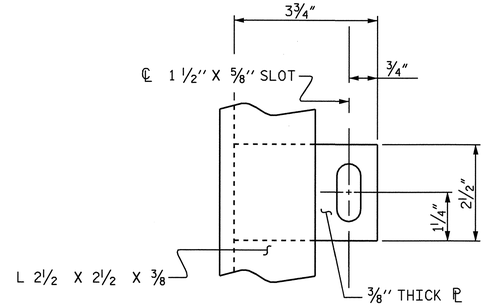


ARMORED JOINT DETAILS

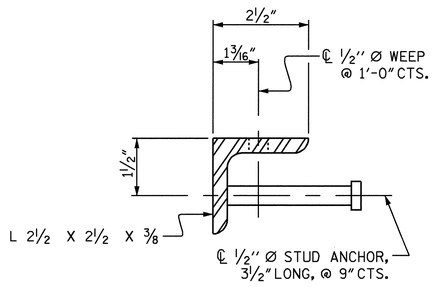
SECTION NORMAL TO JOINT AT END BENTS



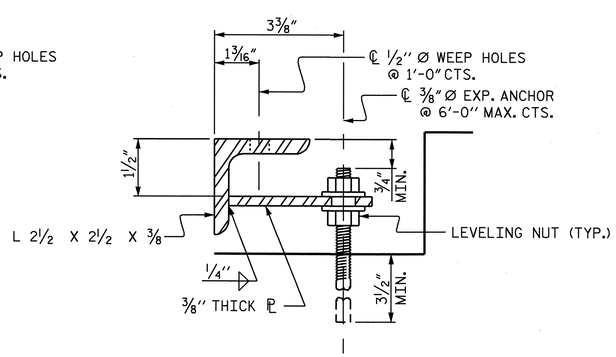
DETAIL- FIELD WELD SPLICE OF ANGLE



PLAN VIEW OF TAB



SECTION VIEW OF STUD



SECTION VIEW OF TAB

ARMORED JOINT ANCHOR ASSEMBLY DETAILS

NOTES

ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169 GRADES 1010 THRU 1020 OR APPROVED EQUAL.

STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON THE PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

UPON COMPLETION OF SHOP FABRICATION, THE ENTIRE ANCHOR ASSEMBLY SHALL BE METALLIZED. THE ½" Ø STUD ANCHORS AND ANCHOR TABS NEED NOT BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

ANCHOR ASSEMBLY SHALL BE MADE CONTINUOUS THE LENGTH OF THE JOINT FROM GUTTER TO GUTTER. FOR FIELD SPLICES AT ALL CROWN BREAK POINTS, THE ENDS OF THE STEEL ANGLES SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE. FINISHED FIELD WELDS SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR ASSEMBLY SEGMENTS SHALL NOT BE LESS THAN 12 FEET NOR MORE THAN 20 FEET IN LENGTH. SHORTER SEGMENTS MAY BE USED AT THE EDGE OF ROADWAY OR AT POINTS OF STAGED CONSTRUCTION.

THE ANCHOR ASSEMBLY SHALL BE SECURED AND LEVELED AS SHOWN IN THE "ARMORED JOINT ANCHOR ASSEMBLY DETAILS". NO SUBMITTALS ARE REQUIRED FOR ⅜" Ø EXPANSION ANCHORS, NUTS OR WASHERS. THE CONTRACTOR MAY SUBMIT FOR APPROVAL AN ALTERNATE METHOD OF ALIGNING AND LEVELING THE ANGLES. THE ALTERNATE METHOD SHALL NOT INCLUDE ANY WELDING TO THE OUTSIDE FACE OF THE ANGLES.

AFTER THE ELASTOMERIC CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE ANY EXCESS CONCRETE THAT COMES THROUGH THE WEEP HOLES AND THOROUGHLY CLEAN THE ANGLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM OF 4 MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

SEE SPECIAL PROVISIONS FOR EVAZOTE JOINT SEALS.

SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

MOVEMENT AND SETTING AT EVAZOTE JOINT

END BENT	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	52°-05'-51"	3⅞6"	2⅛"	2⅜6"	2⅜6"	2⅛6"
2	37°-54'-42"	3⅞6"	2⅛6"	2¾"	2⅜6"	2⅜6"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY.
JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.

BILL OF MATERIAL

END BENT	ELASTOMERIC CONCRETE * (CU. FT.)	TOTAL LENGTH OF ANGLE (FT)
1	15.0	130.73
2	19.4	169.26

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ARMORED EVAZOTE JOINT DETAILS

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
1/5/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-79
1			3			TOTAL SHEETS
2			4			94

STR. #2 STD. NO. AEJ1

ASSEMBLED BY : A.S. CALLAWAY DATE : 11/13/08
CHECKED BY : K.D. LAYNE DATE : 3/26/09

DRAWN BY : EEM 1/96
CHECKED BY : RGW 1/96

REV. 7/10/01 LES/RDR
REV. 5/7/03RR RWW/JTE
REV. 5/1/06 TLA/GM

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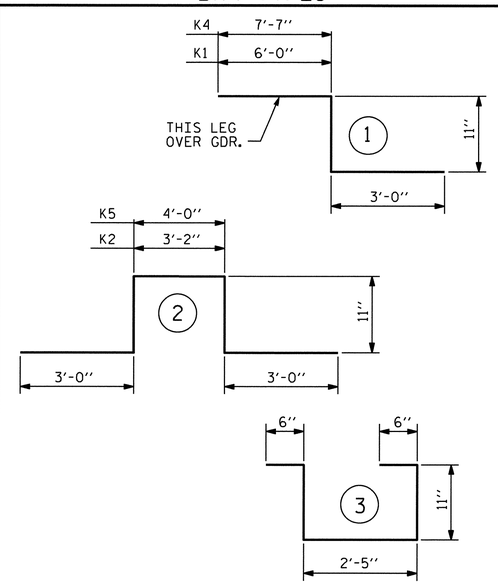
BILL OF MATERIAL

SPANS "A" & "B"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	743	#5	STR	54'-10"	42493	✳ A142	3	#5	STR	46'-2"	144	A202	2	#5	STR	52'-1"	109	A244	3	#5	STR	45'-7"	143						
✳ A101	2	#5	STR	52'-9"	110	✳ A143	3	#5	STR	45'-0"	141	A203	2	#5	STR	50'-8"	106	A245	3	#5	STR	44'-5"	139	✳ B5	54	#4	STR	25'-10"	932
✳ A102	2	#5	STR	51'-3"	107	✳ A144	3	#5	STR	43'-10"	137	A204	2	#5	STR	49'-2"	103	A246	3	#5	STR	43'-3"	135	✳ B6	45	#4	STR	29'-7	889
✳ A103	2	#5	STR	49'-10"	104	✳ A145	3	#5	STR	42'-8"	134	A205	2	#5	STR	47'-9"	100	A247	3	#5	STR	42'-1"	132	✳ B7	45	#4	STR	28'-6"	857
✳ A104	2	#5	STR	48'-4"	101	✳ A146	3	#5	STR	41'-6"	130	A206	2	#5	STR	46'-3"	96	A248	3	#5	STR	40'-11"	128	✳ B8	45	#4	STR	27'-5"	824
✳ A105	2	#5	STR	46'-11"	98	✳ A147	3	#5	STR	40'-4"	126	A207	2	#5	STR	44'-10"	94	A249	3	#5	STR	39'-9"	124	B9	40	#5	STR	57'-1"	2382
✳ A106	2	#5	STR	45'-5"	95	✳ A148	3	#5	STR	39'-2"	123	A208	2	#5	STR	43'-5"	91	A250	3	#5	STR	38'-7"	121	B10	480	#5	STR	56'-9"	28411
✳ A107	2	#5	STR	44'-0"	92	✳ A149	3	#5	STR	38'-0"	119	A209	2	#5	STR	41'-11"	87	A251	3	#5	STR	37'-5"	117	B11	40	#5	STR	53'-3"	2222
✳ A108	2	#5	STR	42'-7"	89	✳ A150	3	#5	STR	36'-10"	115	A210	2	#5	STR	40'-6"	84	A252	3	#5	STR	36'-3"	113						
✳ A109	2	#5	STR	41'-1"	86	✳ A151	3	#5	STR	35'-8"	112	A211	2	#5	STR	39'-0"	81	A253	3	#5	STR	35'-1"	110	✳ G1	2	#5	STR	35'-9"	75
✳ A110	2	#5	STR	39'-8"	83	✳ A152	3	#5	STR	34'-6"	108	A212	2	#5	STR	37'-7"	78	A254	3	#5	STR	33'-11"	106	✳ G2	2	#5	STR	45'-11"	96
✳ A111	2	#5	STR	38'-2"	80	✳ A153	3	#5	STR	33'-4"	104	A213	2	#5	STR	36'-1"	75	A255	3	#5	STR	32'-9"	102						
✳ A112	2	#5	STR	36'-9"	77	✳ A154	3	#5	STR	32'-2"	101	A214	2	#5	STR	34'-8"	72	A256	3	#5	STR	31'-7"	99	✳ K1	8	#5	1	9'-11"	83
✳ A113	2	#5	STR	35'-3"	74	✳ A155	3	#5	STR	31'-0"	97	A215	2	#5	STR	33'-3"	69	A257	3	#5	STR	30'-5"	95	✳ K2	16	#5	2	11'-0"	184
✳ A114	2	#5	STR	33'-10"	71	✳ A156	3	#5	STR	29'-10"	93	A216	2	#5	STR	31'-9"	66	A258	3	#5	STR	29'-3"	92	✳ K3	20	#5	STR	11'-7"	242
✳ A115	2	#5	STR	32'-5"	68	✳ A157	3	#5	STR	28'-8"	90	A217	2	#5	STR	30'-4"	63	A259	3	#5	STR	28'-1"	88	✳ K4	8	#5	1	11'-6"	96
✳ A116	2	#5	STR	30'-11"	64	✳ A158	3	#5	STR	27'-6"	86	A218	2	#5	STR	28'-10"	60	A260	3	#5	STR	26'-11"	84	✳ K5	16	#5	2	11'-10"	197
✳ A117	2	#5	STR	29'-6"	62	✳ A159	3	#5	STR	26'-4"	82	A219	2	#5	STR	27'-5"	57	A261	3	#5	STR	25'-9"	81	✳ K6	20	#5	STR	14'-11"	311
✳ A118	2	#5	STR	28'-0"	58	✳ A160	3	#5	STR	25'-2"	79	A220	2	#5	STR	26'-0"	54	A262	3	#5	STR	24'-7"	77						
✳ A119	2	#5	STR	26'-7"	55	✳ A161	3	#5	STR	24'-0"	75	A221	2	#5	STR	24'-6"	51	A263	3	#5	STR	23'-4"	73	✳ S1	90	#4	3	5'-3"	316
✳ A120	2	#5	STR	25'-2"	52	✳ A162	3	#5	STR	22'-9"	71	A222	2	#5	STR	23'-1"	48	A264	3	#5	STR	22'-2"	69						
✳ A121	2	#5	STR	23'-8"	49	✳ A163	3	#5	STR	21'-7"	68	A223	2	#5	STR	21'-8"	45	A265	3	#5	STR	21'-0"	66						
✳ A122	2	#5	STR	22'-3"	46	✳ A164	3	#5	STR	20'-5"	64	A224	2	#5	STR	20'-2"	42	A266	3	#5	STR	19'-10"	62						
✳ A123	2	#5	STR	20'-10"	43	✳ A165	3	#5	STR	19'-3"	60	A225	2	#5	STR	18'-9"	39	A267	3	#5	STR	18'-8"	58						
✳ A124	2	#5	STR	19'-4"	40	✳ A166	3	#5	STR	18'-1"	57	A226	2	#5	STR	17'-4"	36	A268	3	#5	STR	17'-6"	55						
✳ A125	2	#5	STR	17'-11"	37	✳ A167	3	#5	STR	16'-11"	53	A227	2	#5	STR	15'-10"	33	A269	3	#5	STR	16'-4"	51						
✳ A126	2	#5	STR	16'-6"	34	✳ A168	3	#5	STR	15'-9"	49	A228	2	#5	STR	14'-5"	30	A270	3	#5	STR	15'-2"	47						
✳ A127	2	#5	STR	15'-0"	31	✳ A169	3	#5	STR	14'-7"	46	A229	2	#5	STR	13'-0"	27	A271	3	#5	STR	14'-0"	44						
✳ A128	2	#5	STR	13'-7"	28	✳ A170	3	#5	STR	13'-5"	42	A230	2	#5	STR	11'-7"	24	A272	3	#5	STR	12'-10"	40						
✳ A129	2	#5	STR	12'-2"	25	✳ A171	3	#5	STR	12'-3"	38	A231	2	#5	STR	10'-1"	21	A273	3	#5	STR	11'-8"	37						
✳ A130	2	#5	STR	10'-9"	22	✳ A172	3	#5	STR	11'-1"	35	A232	2	#5	STR	8'-8"	18	A274	3	#5	STR	10'-6"	33						
✳ A131	2	#5	STR	9'-3"	19	✳ A173	3	#5	STR	9'-11"	31	A233	2	#5	STR	7'-3"	15	A275	3	#5	STR	9'-4"	29						
✳ A132	2	#5	STR	7'-10"	16	✳ A174	3	#5	STR	8'-9"	27	A234	2	#5	STR	5'-10"	12	A276	3	#5	STR	8'-2"	26						
✳ A133	2	#5	STR	6'-5"	13	✳ A175	3	#5	STR	7'-7"	24	A235	2	#5	STR	4'-4"	9	A277	3	#5	STR	7'-0"	22						
✳ A134	2	#5	STR	3'-10"	8	✳ A176	3	#5	STR	6'-5"	20	A236	2	#5	STR	2'-11"	6	A278	3	#5	STR	5'-10"	18						
✳ A135	2	#5	STR	1'-5"	3	✳ A177	3	#5	STR	5'-3"	16	A237	3	#5	STR	53'-9"	168	A279	3	#5	STR	4'-8"	15						
✳ A136	3	#5	STR	53'-2"	166	✳ A178	3	#5	STR	2'-7"	8	A238	3	#5	STR	52'-7"	165	A280	3	#5	STR	3'-6"	11						
✳ A137	3	#5	STR	52'-0"	163	✳ A179	3	#6	STR	6'-5"	29	A239	3	#5	STR	51'-5"	161	A281	3	#5	STR	2'-4"	7						
✳ A138	3	#5	STR	50'-10"	159	✳ A180	3	#6	STR	5'-2"	23	A240	3	#5	STR	50'-3"	157												
✳ A139	3	#5	STR	49'-8"	155							A241	3	#5	STR	49'-1"	154	✳ B1	31	#4	STR	29'-6"	611						
✳ A140	3	#5	STR	48'-6"	152	A2	743	#5	STR	54'-10"	42493	A242	3	#5	STR	47'-11"	150	✳ B2	180	#4	STR	29'-10"	3587						
✳ A141	3	#5	STR	47'-4"	148	A201	2	#5	STR	53'-7"	112	A243	3	#5	STR	46'-9"	146	✳ B3	435	#5	STR	54'-0"	24500						

BAR TYPES



ALL BARS DIMENSIONS ARE OUT TO OUT.

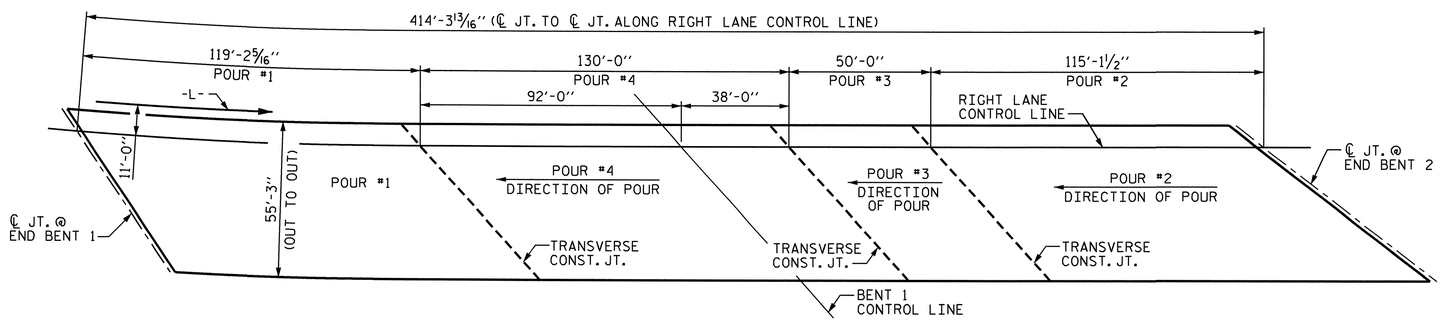
SUPERSTRUCTURE BILL OF MATERIAL

SPAN "A" & "B"	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	221.4		
POUR #2	221.3		
POUR #3	93.8		
POUR #4	243.8		
TOTALS ✳✳	780.3	81571	82233

✳✳ QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

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"			



LAYOUT OF REINFORCED CONCRETE DECK SLAB AREA & POURING SEQUENCE (SQ. FT. = 23,542)

GROOVING BRIDGE FLOORS	
APPROACH SLABS	2,315 SQ.FT.
BRIDGE DECK	20,775 SQ.FT.
TOTAL	23,090 SQ.FT.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

ASSEMBLED BY : A.S. CALLAWAY DATE : 11/17/08
CHECKED BY : K.D. LAYNE DATE : 3/26/09

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

REV. 6/1/94 EEM/GRP
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM

05-JAN-2010 10:41
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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

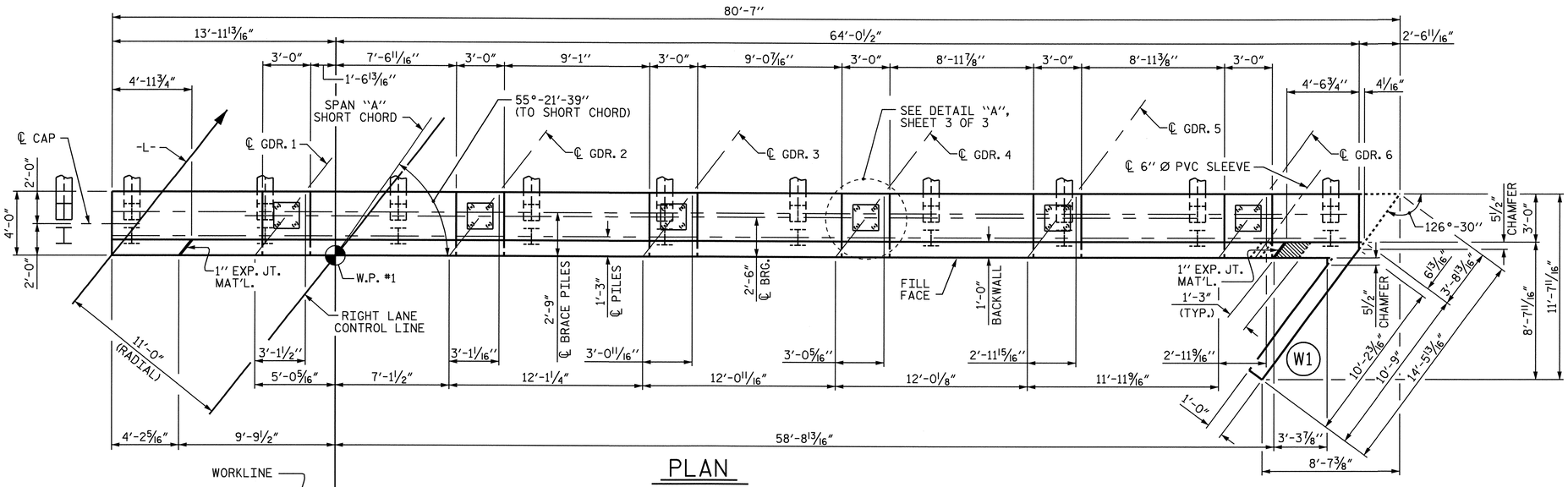
SUPERSTRUCTURE BILL OF MATERIAL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-80
1			3			TOTAL SHEETS
2			4			94

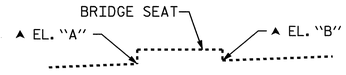
STR. #2

STD. NO. BOM1



* THE CONTRACTOR MAY INSTALL DOWELS DURING CONSTRUCTION OF END BENT 1 (LEFT LANE) USING AN ADHESIVE ANCHORING SYSTEM. THE YIELD LOAD OF THE #6 D1 DOWELS IS 26.4 KIPS. FIELD TESTING IS NOT REQUIRED. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

★ ELEVATION TAKEN ON THE FILL FACE OF THE BACKWALL.



ELEVATIONS BETWEEN BRIDGE SEATS		
LOCATION	EL. A	EL. B
GDR. #1	970.649	970.833
GDR. #2	971.391	971.575
GDR. #3	972.130	972.314
GDR. #4	972.867	973.050
GDR. #5	973.600	973.784
GDR. #6	974.331	974.515

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3

TOP OF PILE ELEVATIONS			
(1)	EL. 967.681	(6)	EL. 970.230
(2)	EL. 968.191	(7)	EL. 970.740
(3)	EL. 968.701	(8)	EL. 971.249
(4)	EL. 969.210	(9)	EL. 971.759
(5)	EL. 969.720	(10)	EL. 972.269

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-81
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/4/09
CHECKED BY : L.E. SUTTON DATE : 10/28/09

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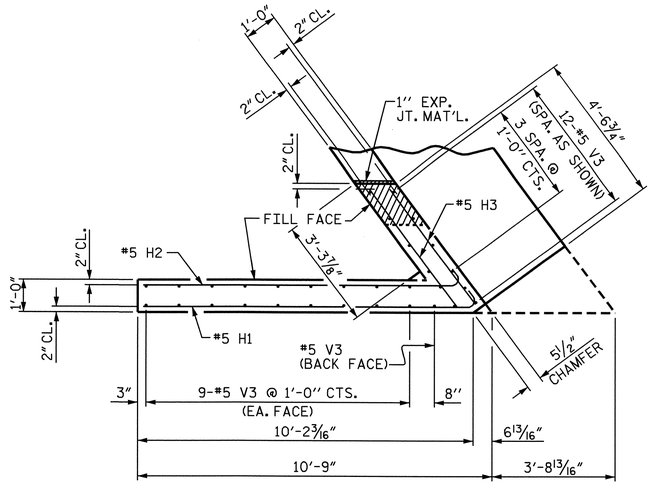
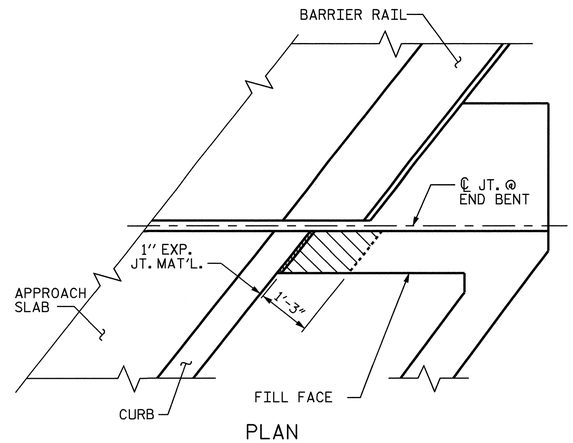
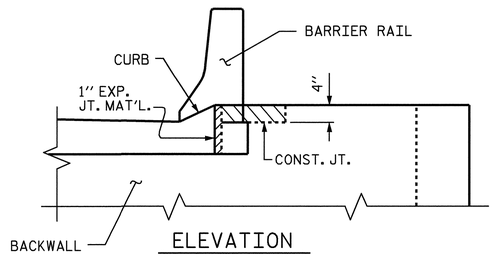
lsutton



PLAN OF WING (W1)

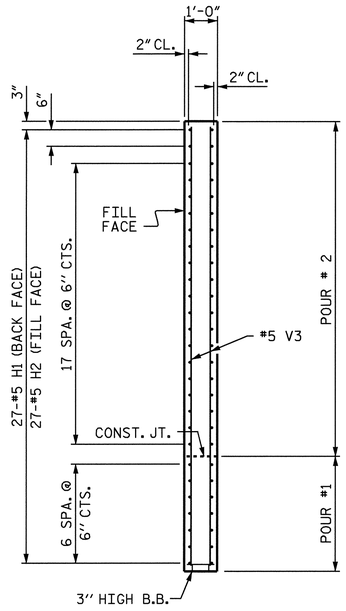


PLAN

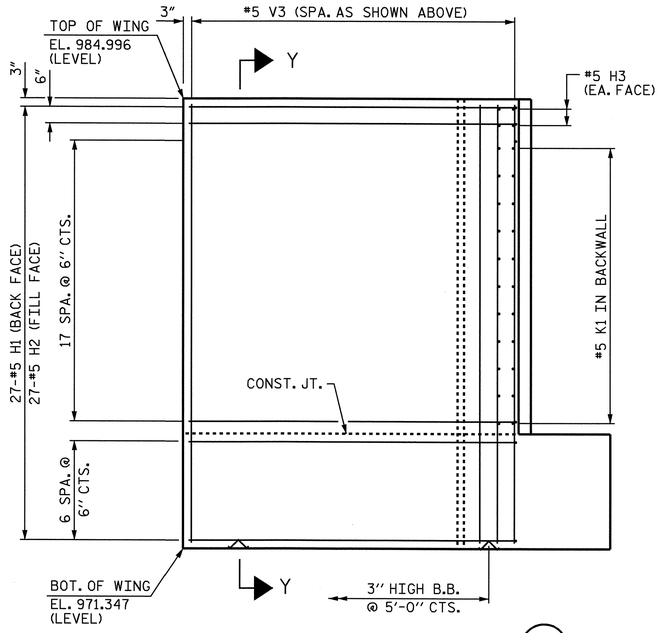


ELEVATION

BLOCKOUT IN WING WALL



SECTION Y-Y



ELEVATION OF WING (W1)

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-82
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/9/09
CHECKED BY : L.E. SUTTON DATE : 10/28/09

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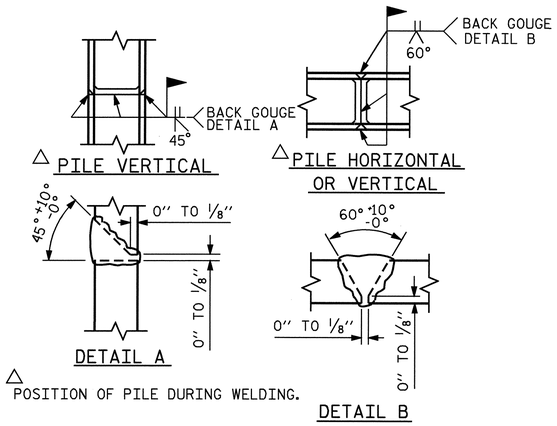
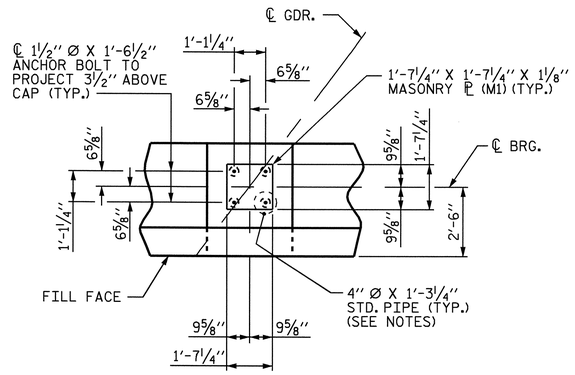
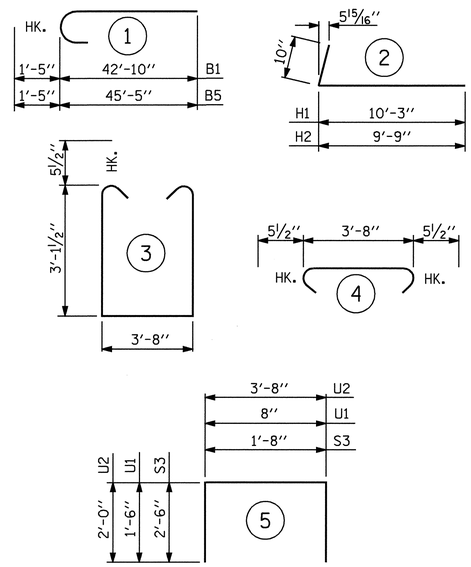


PILE SPLICE DETAILS



DETAIL "A"

(TYP. EA. GDR.)



BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

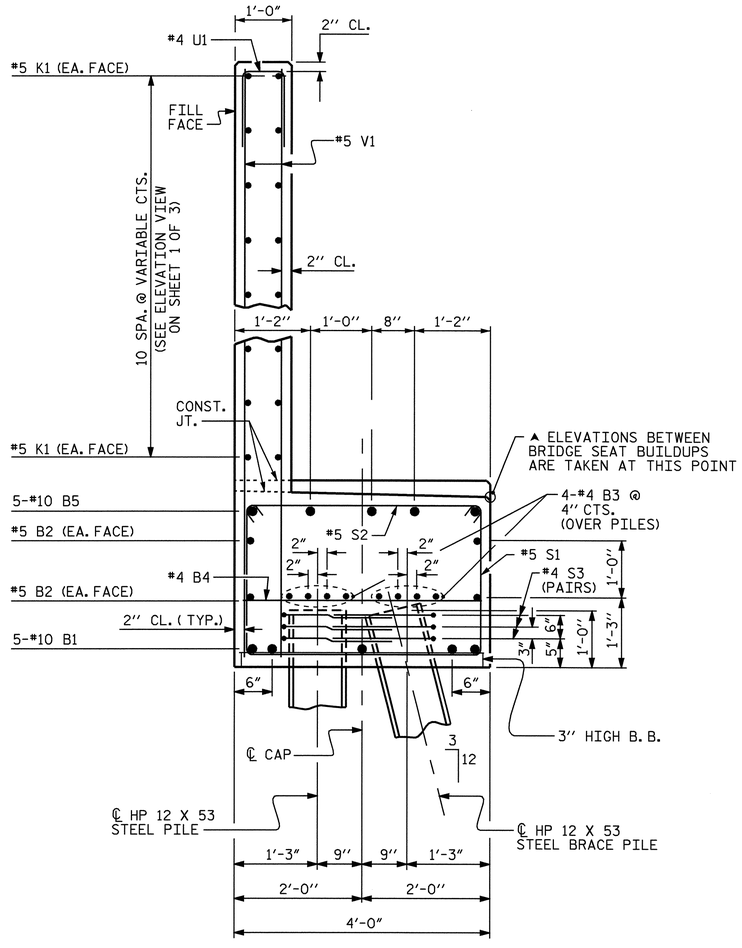
BILL OF MATERIAL

END BENT 1

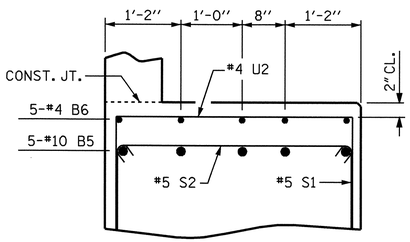
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	44'-3"	1904
B2	8	#5	STR	40'-5"	337
B3	24	#4	STR	27'-7"	442
B4	19	#4	STR	3'-8"	47
B5	10	#10	1	45'-10"	1972
B6	30	#4	STR	2'-8"	53
D1	9	#6	STR	1'-6"	20
H1	27	#5	2	11'-1"	312
H2	27	#5	2	10'-7"	298
H3	6	#5	STR	4'-4"	27
H4	2	#5	STR	3'-11"	8
K1	44	#5	STR	40'-5"	1855
S1	137	#5	3	10'-10"	1548
S2	137	#5	4	4'-7"	655
S3	60	#4	5	6'-8"	267
S4	8	#5	STR	2'-0"	17
U1	68	#4	5	3'-8"	167
U2	36	#4	5	7'-8"	184
V1	138	#5	STR	11'-5"	1643
V2	11	#5	STR	12'-11"	148
V3	31	#5	STR	13'-3"	428
REINFORCING STEEL				LBS.	12,332

CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WING	CU. YDS.	43.2
POUR #2 - BACKWALL & UPPER WING	CU. YDS.	28.5
TOTAL	CU. YDS.	71.7

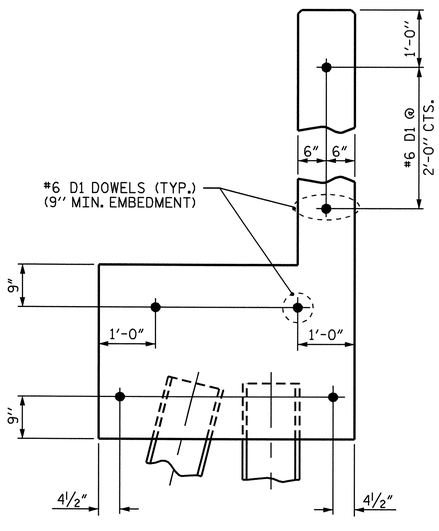
HP 12 x 53 STEEL PILES NO. = 20	LIN. FT.	1,000



SECTION A-A



PART SECTION B



SECTION X-X

NOTES

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

FOR TEMPORARY DRAINAGE AT END BENT, SEE END BENT 2.

FOR PIPE INSERT DETAILS, SEE POT BEARING DETAILS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN FORMED AND THE BARRIER RAIL HAS BEEN CAST IF SLIP FORMING IS USED.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE #5 V1 BARS SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

ELEVATION OF 6" Ø PVC SLEEVE FOR ELECTRICAL CONDUIT SYSTEM SHALL BE VERIFIED BY THE ENGINEER PRIOR TO POURING CONCRETE IN BACKWALL.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-83
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 5/4/09
CHECKED BY : L.E. SUTTON DATE : 10/28/09

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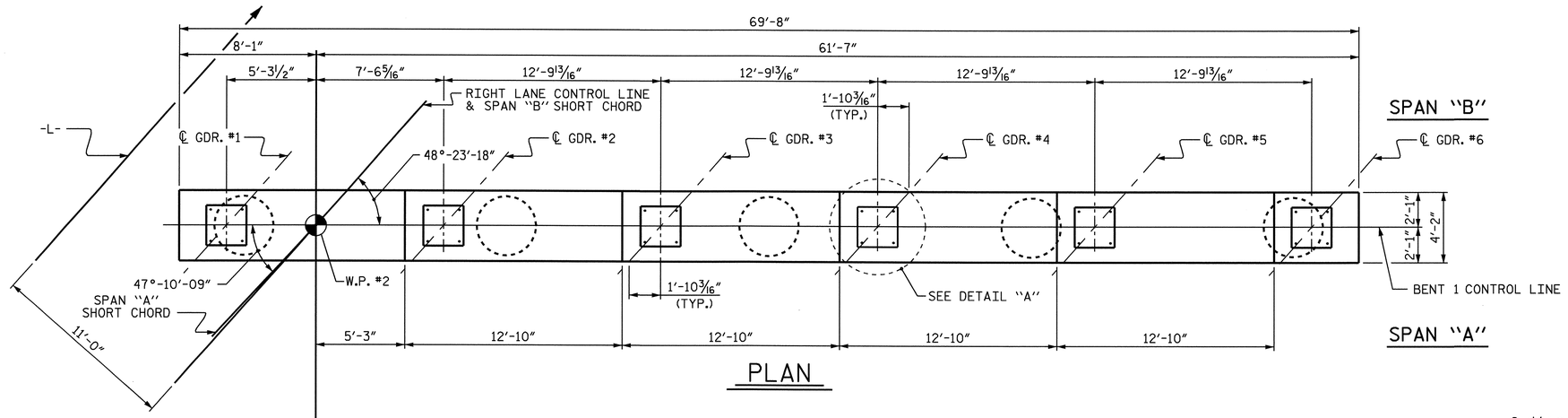


PLAN

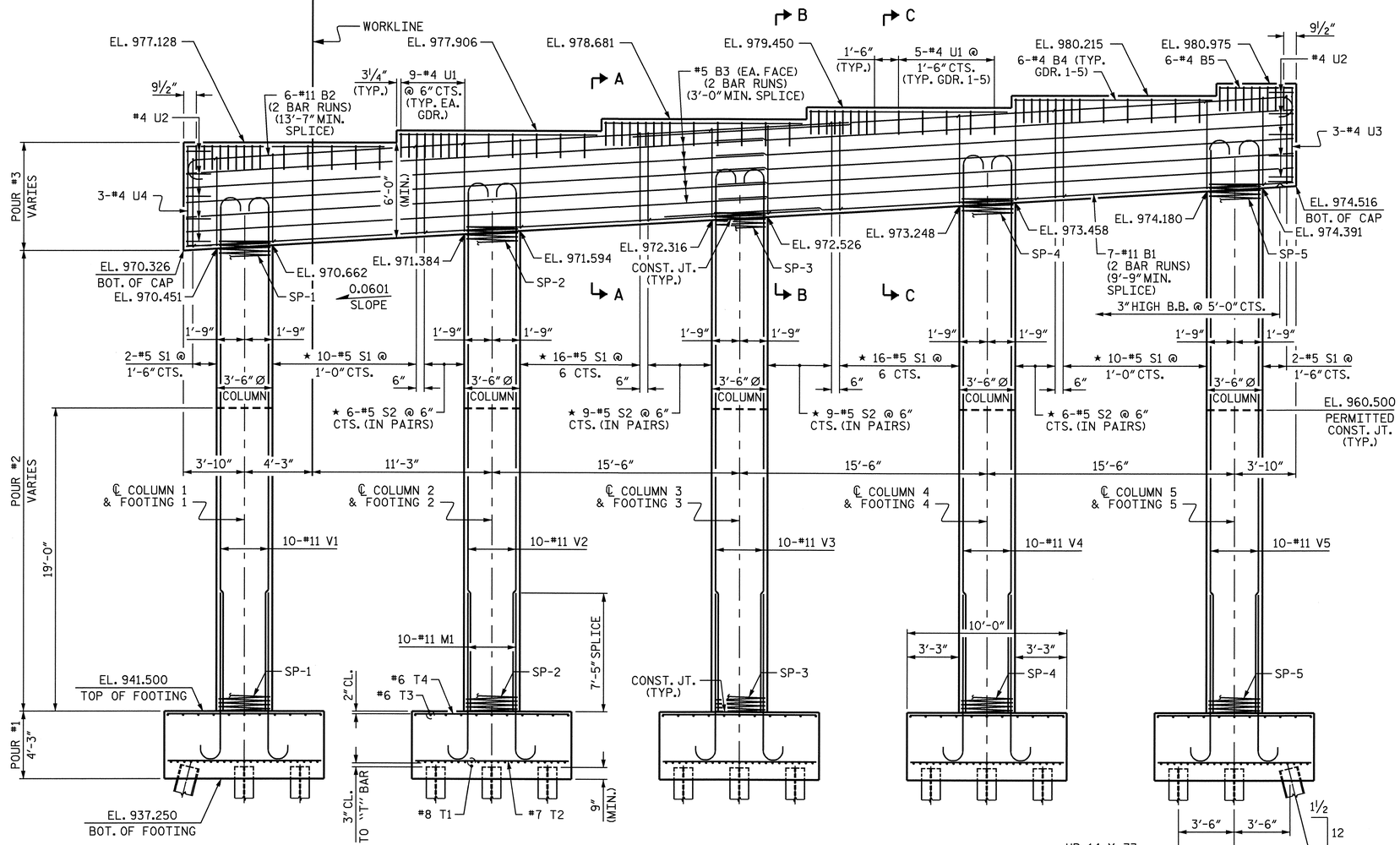
NOTES

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

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

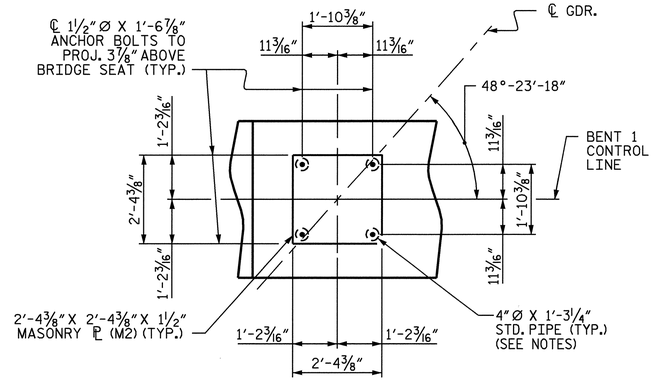
FOR PIPE INSERT DETAILS, SEE "POT BEARING DETAILS" SHEETS.

FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEETS.



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING



DETAIL "A"

★ INVERT ALTERNATE STIRRUPS

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-84
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : D.R. WITHROW/LES DATE : 4/2/09
CHECKED BY : A.S. CALLAWAY DATE : 4/21/09

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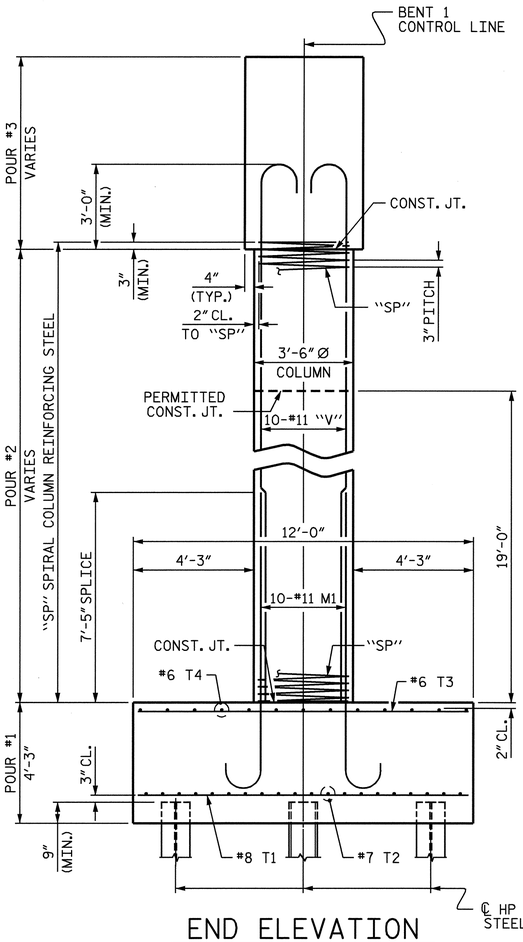
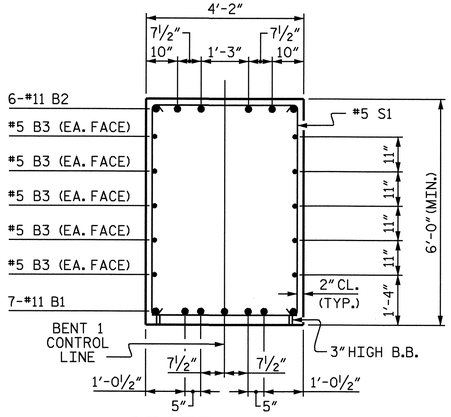
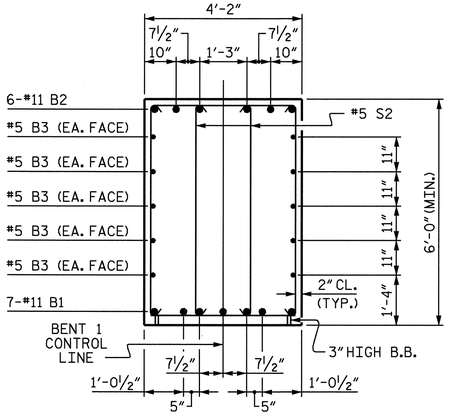


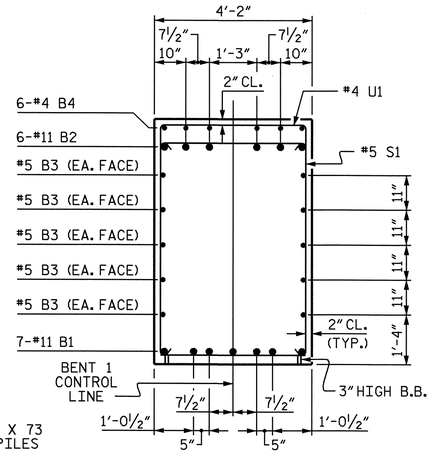
END ELEVATION



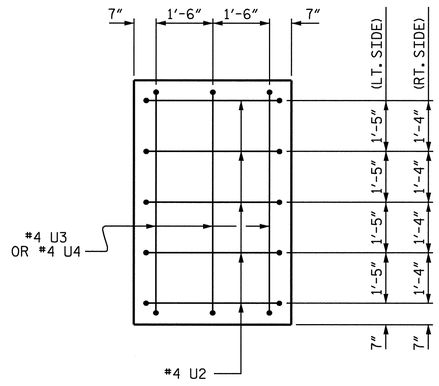
SECTION A-A



SECTION B-B

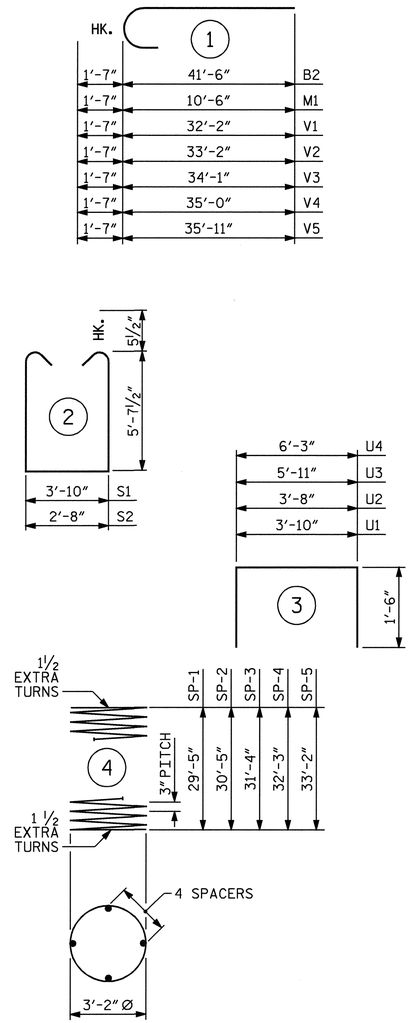


SECTION C-C



END VIEW

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

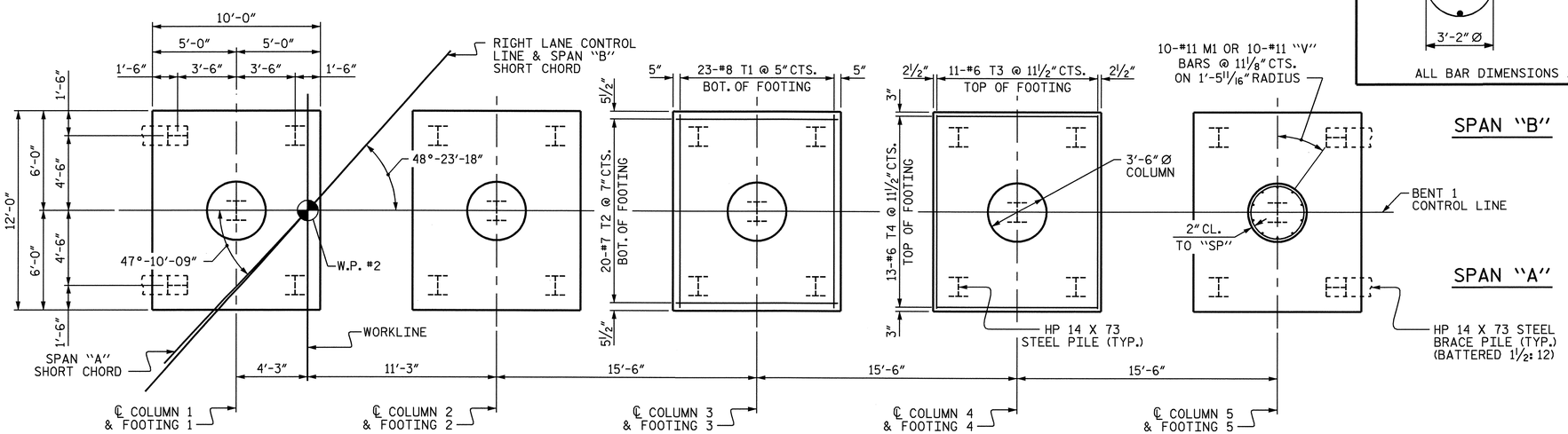
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#11	STR	39'-8"	2950
B2	12	#11	1	43'-1"	2747
B3	20	#5	STR	36'-3"	756
B4	30	#4	STR	12'-5"	249
B5	6	#4	STR	4'-8"	19
M1	50	#11	1	12'-1"	3210
S1	56	#5	2	16'-0"	935
S2	60	#5	2	14'-10"	928
T1	115	#8	STR	11'-6"	3531
T2	100	#7	STR	9'-6"	1942
T3	55	#6	STR	11'-6"	950
T4	65	#6	STR	9'-6"	927
U1	79	#4	3	6'-10"	361
U2	10	#4	3	6'-8"	45
U3	3	#4	3	8'-11"	18
U4	3	#4	3	9'-3"	19
V1	10	#11	1	33'-9"	1793
V2	10	#11	1	34'-9"	1846
V3	10	#11	1	35'-8"	1895
V4	10	#11	1	36'-7"	1944
V5	10	#11	1	37'-6"	1992
REINFORCING STEEL				LBS.	29,057
SP-1	1	**	4	1188'-4"	794
SP-2	1	**	4	1227'-7"	820
SP-3	1	**	4	1266'-11"	846
SP-4	1	**	4	1296'-4"	866
SP-5	1	**	4	1335'-8"	892
SPIRAL COLUMN REINFORCING STEEL				LBS.	4,218

CLASS A CONCRETE BREAKDOWN:

POUR #1 -	FOOTINGS	CU. YDS.	94.4
POUR #2 -	COLUMNS	CU. YDS.	55.1
POUR #3 -	CAP	CU. YDS.	68.9
TOTAL		CU. YDS.	218.4

HP 14 x 73 STEEL PILES NO. = 25	LIN. FT.	750
FOUNDATION EXCAVATION		LUMP SUM

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



PLAN OF COLUMNS & FOOTINGS

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-85
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
11/5/10

DRAWN BY : D.R. WITHROW/LES DATE : 4/2/09
CHECKED BY : A.S. CALLAWAY DATE : 4/21/09

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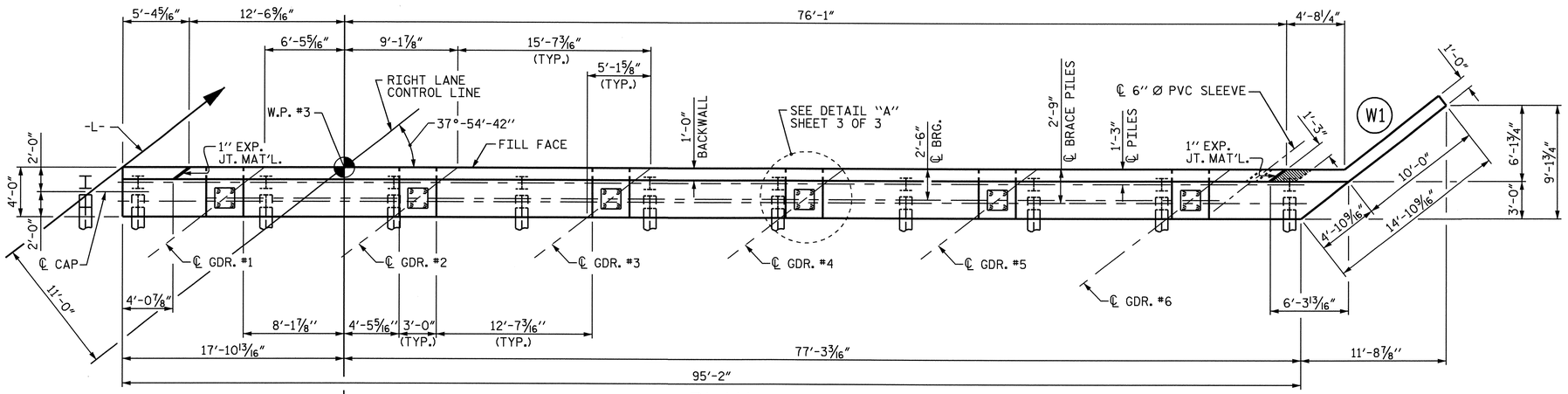
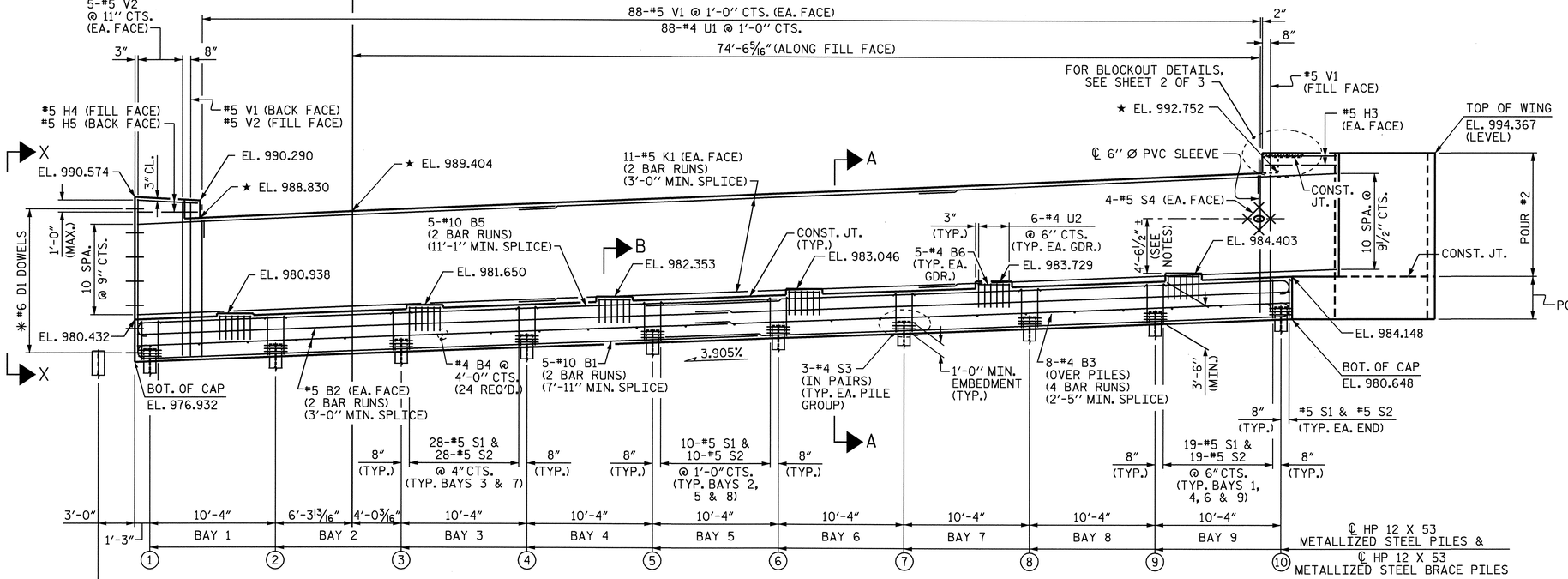


PLAN

TOP OF PILE ELEVATIONS			
①	EL. 978.000	⑥	EL. 980.018
②	EL. 978.404	⑦	EL. 980.421
③	EL. 978.807	⑧	EL. 980.825
④	EL. 979.211	⑨	EL. 981.228
⑤	EL. 979.614	⑩	EL. 981.632



ELEVATION

* THE CONTRACTOR MAY INSTALL DOWELS DURING CONSTRUCTION OF END BENT 2 (LEFT LANE) USING AN ADHESIVE ANCHORING SYSTEM. THE YIELD LOAD OF THE #6 D1 DOWELS IS 26.4 KIPS. FIELD TESTING IS NOT REQUIRED. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

★ ELEVATION TAKEN ON THE FILL FACE OF THE BACKWALL.

NOTES

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

FOR PILE SPLICE DETAILS, SEE END BENT 1.

FOR PIPE INSERT DETAILS, SEE POT BEARING DETAILS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN FORMED AND THE BARRIER RAIL HAS BEEN CAST IF SLIP FORMING IS USED.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

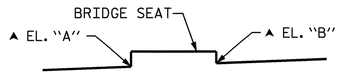
THE #5 V1 BARS SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

FOR HP 12 X 53 METALLIZED STEEL PILES, SEE SPECIAL PROVISIONS.

APPLY AN 8 MIL THICK 1350 ALUMINUM (W-A1-1350) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO THE PILES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-12 BROWN AND 1080-12 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

ELEVATION OF 6" Ø PVC SLEEVE FOR ELECTRICAL CONDUIT SYSTEM SHALL BE VERIFIED BY THE ENGINEER PRIOR TO POURING CONCRETE IN BACKWALL.



ELEVATIONS BETWEEN BRIDGE SEATS		
LOCATION	EL. "A"	EL. "B"
GDR. #1	980.696	980.813
GDR. #2	981.305	981.422
GDR. #3	981.914	982.031
GDR. #4	982.523	982.640
GDR. #5	983.132	983.249
GDR. #6	983.741	983.858

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-86
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/7/09
CHECKED BY : L.E. SUTTON DATE : 10/7/09

23-NOV-2009 14:33
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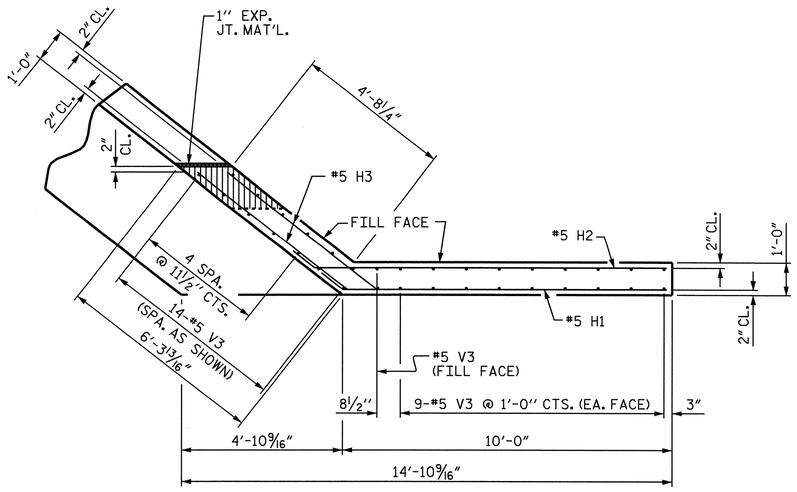
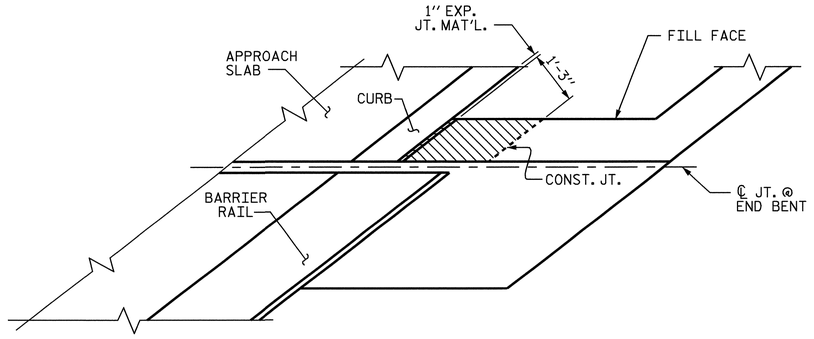
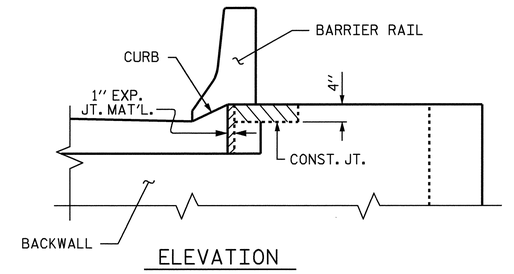
lsutton



PLAN OF WING (W1)

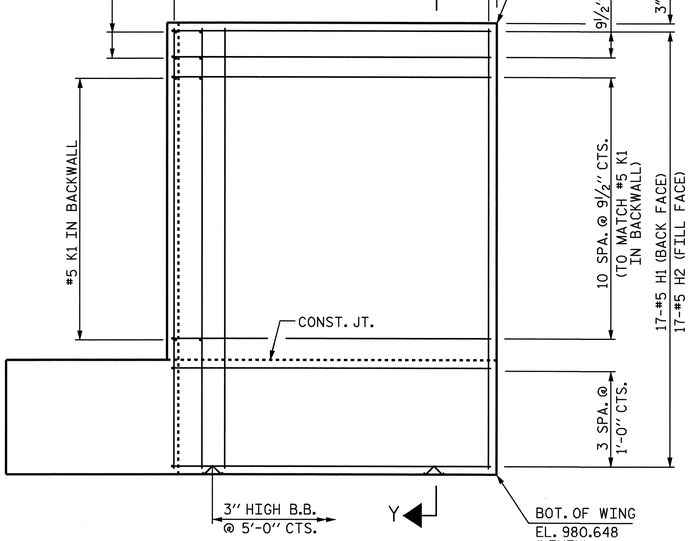


PLAN

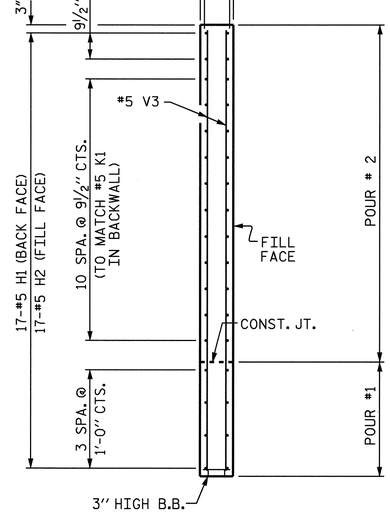


ELEVATION

BLOCKOUT IN WING WALL



ELEVATION OF WING (W1)



SECTION Y-Y

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-87
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 5/9/09
CHECKED BY : L.E. SUTTON DATE : 10/7/09

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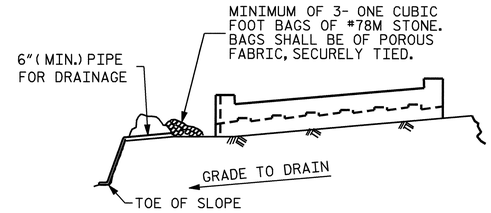
lsutton

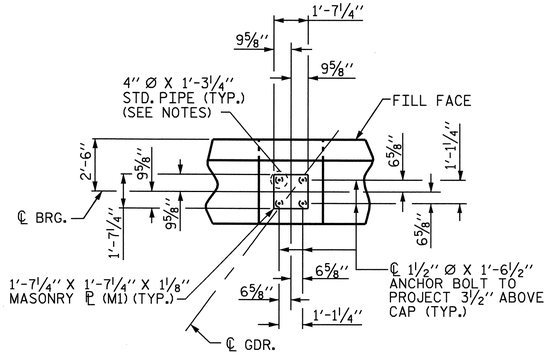


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

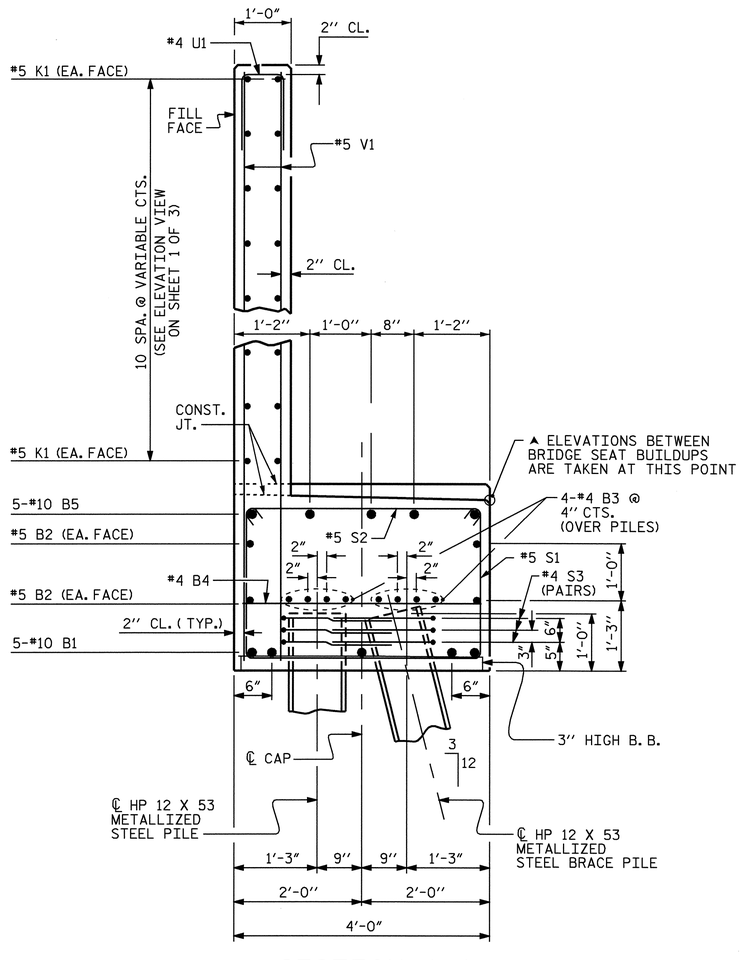
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

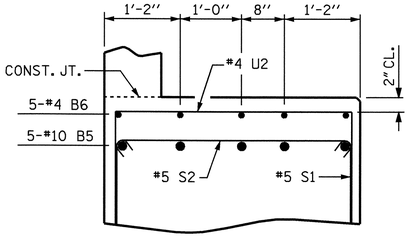


DETAIL "A"

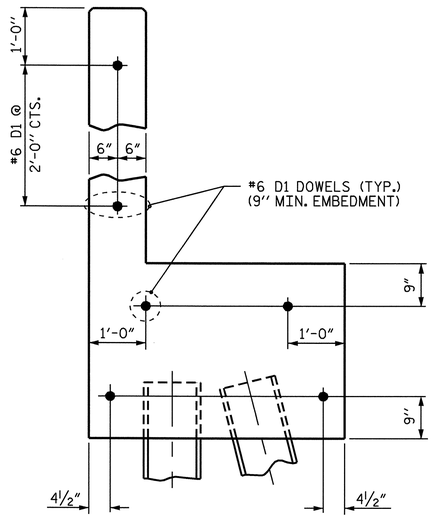
(TYP. EA. GDR.)



SECTION A-A



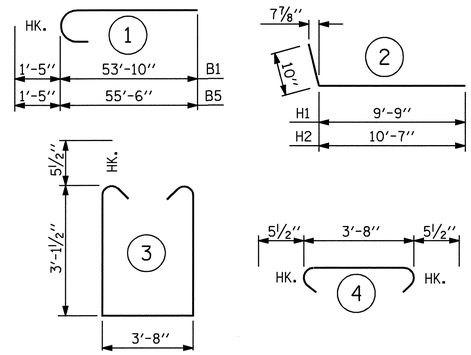
PART SECTION B



SECTION X-X

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	55'-3"	2377
B2	8	#5	STR	51'-6"	430
B3	32	#4	STR	26'-10"	574
B4	24	#4	STR	3'-8"	59
B5	10	#10	1	56'-11"	2449
B6	30	#4	STR	2'-8"	53
D1	9	#6	STR	1'-6"	20
H1	17	#5	2	10'-7"	188
H2	17	#5	2	11'-5"	202
H3	4	#5	STR	5'-9"	24
H4	2	#5	STR	4'-8"	10
H5	2	#5	STR	3'-10"	8
K1	44	#5	STR	51'-6"	2363
S1	164	#5	3	10'-10"	1853
S2	164	#5	4	4'-7"	784
S3	60	#4	5	6'-8"	267
S4	8	#5	STR	2'-0"	17
U1	88	#4	5	3'-8"	216
U2	36	#4	5	7'-8"	184
V1	178	#5	STR	11'-4"	2104
V2	11	#5	STR	12'-9"	146
V3	33	#5	STR	13'-4"	459

REINFORCING STEEL	LBS.	14,787
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WING	CU. YDS.	53.4
POUR #2 - BACKWALL & UPPER WING	CU. YDS.	34.2
TOTAL	CU. YDS.	87.6
HP 12 x 53 METALLIZED STEEL PILES NO. = 20	LIN. FT.	1,400

DRAWN BY : A.S. CALLAWAY DATE : 5/7/09
CHECKED BY : L.E. SUTTON DATE : 10/7/09

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lsutton

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

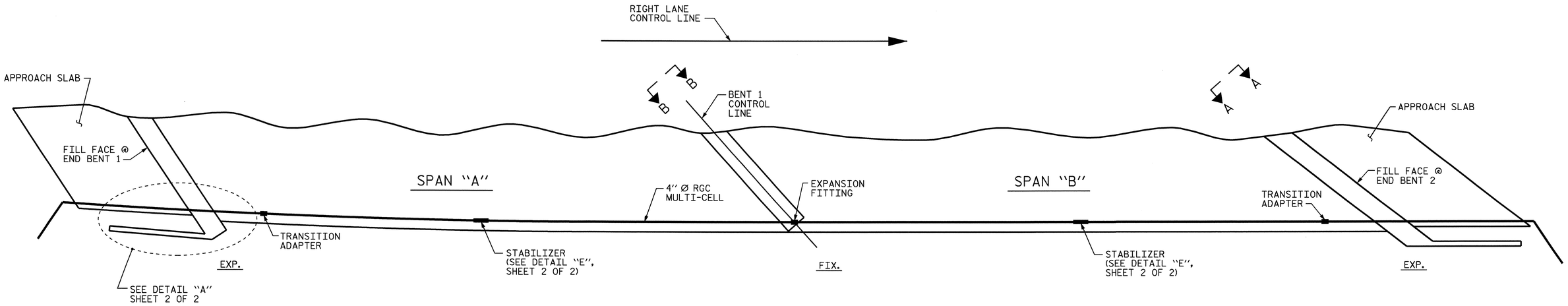
SUBSTRUCTURE

END BENT 2

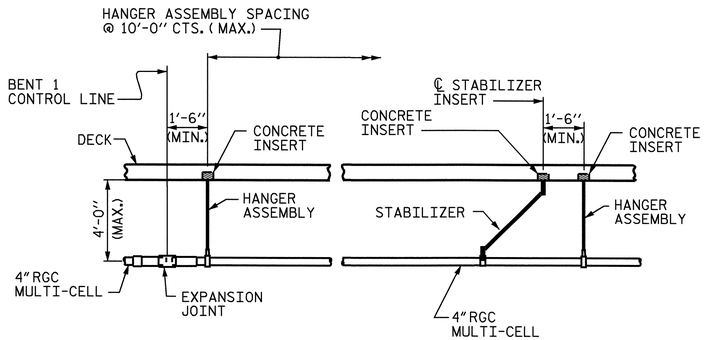
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-88
1			3			TOTAL SHEETS
2			4			94

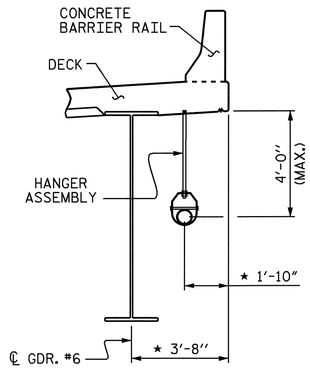
STR. #2



ELECTRICAL CONDUIT LAYOUT



VIEW B-B



CONDUIT LOCATION

★ DIMENSIONS ARE RADIAL AT END BENT 1 ONLY

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELECTRICAL CONDUIT SYSTEM DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-89
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : A.S. CALLAWAY DATE : 4/16/09
CHECKED BY : W.F. PARKER DATE : 4/30/09

30-OCT-2009 15:08
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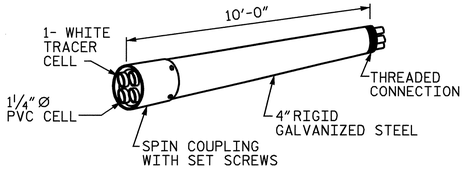
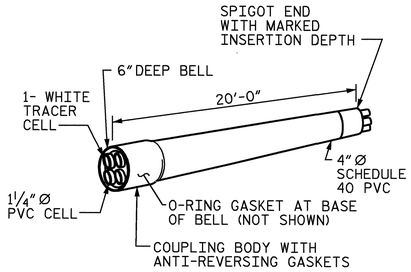
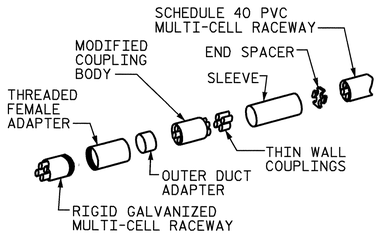
lsutton



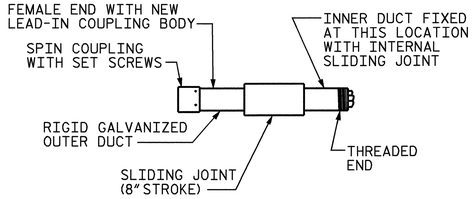
RIGID GALVANIZED (RGC)
MULTI-CELL RACEWAY



SCHEDULE 40 PVC
MULTI-CELL RACEWAY



TRANSITION ADAPTER



EXPANSION JOINT FITTING

DETAIL "D"

4" MULTI-CELL COMPONENTS

NOTES

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

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

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

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

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

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

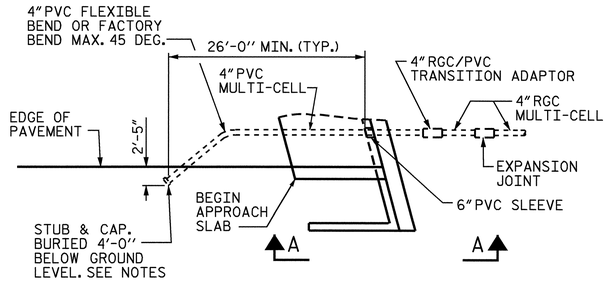
INSTALL STABILIZER'S MIDWAY BETWEEN DECK EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

INSTALL EXPANSION JOINTS AT BENT 1.

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

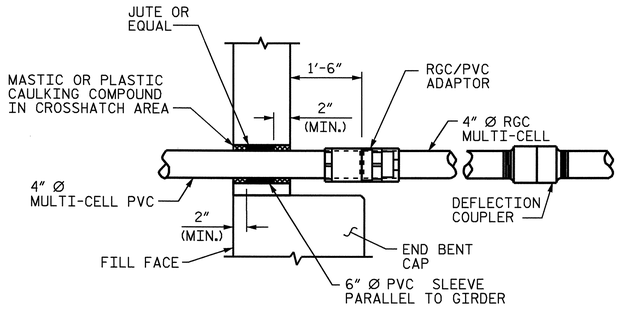
FOR ELECTRICAL CONDUIT SYSTEM, SEE SPECIAL PROVISIONS.

INSTALL DEFLECTION COUPLER AT END BENT 1. SEE DETAIL "F".



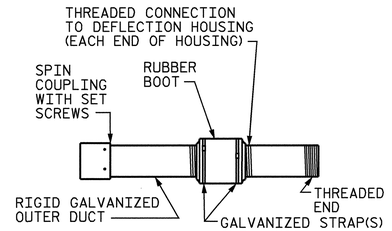
DETAIL "A"

TERMINATION OF CONDUIT AT WING WALL.
END BENT 1 SHOWN, END BENT 2 SIMILAR.



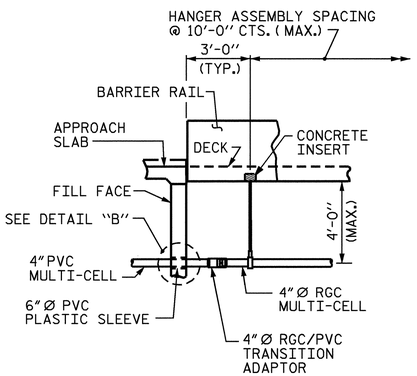
DETAIL "B"

PVC SLEEVE INSTALLATION &
RGC/PVC ADAPTOR AT BACKWALL.

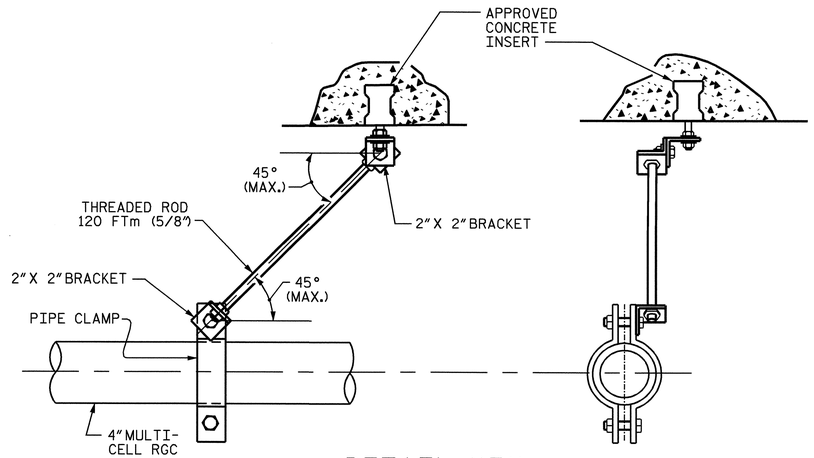


DETAIL "F"

DEFLECTION COUPLING

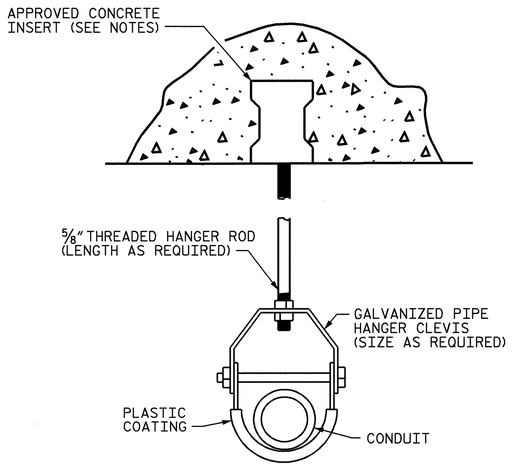


VIEW A-A



DETAIL "E"

STABILIZER



DETAIL "C"

HANGER ASSEMBLY

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELECTRICAL CONDUIT SYSTEM DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-90
1			3			TOTAL SHEETS
2			4			94

STR. #2

STD. NO. ECS1

ASSEMBLED BY : A.S. CALLAWAY	DATE : 4/16/09
CHECKED BY : W.F. PARKER	DATE : 4/30/09
DRAWN BY : RWW 2-4-03	REV. 5/1/06 TLA/GM
CHECKED BY : DBM 2-4-03	

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lsutton

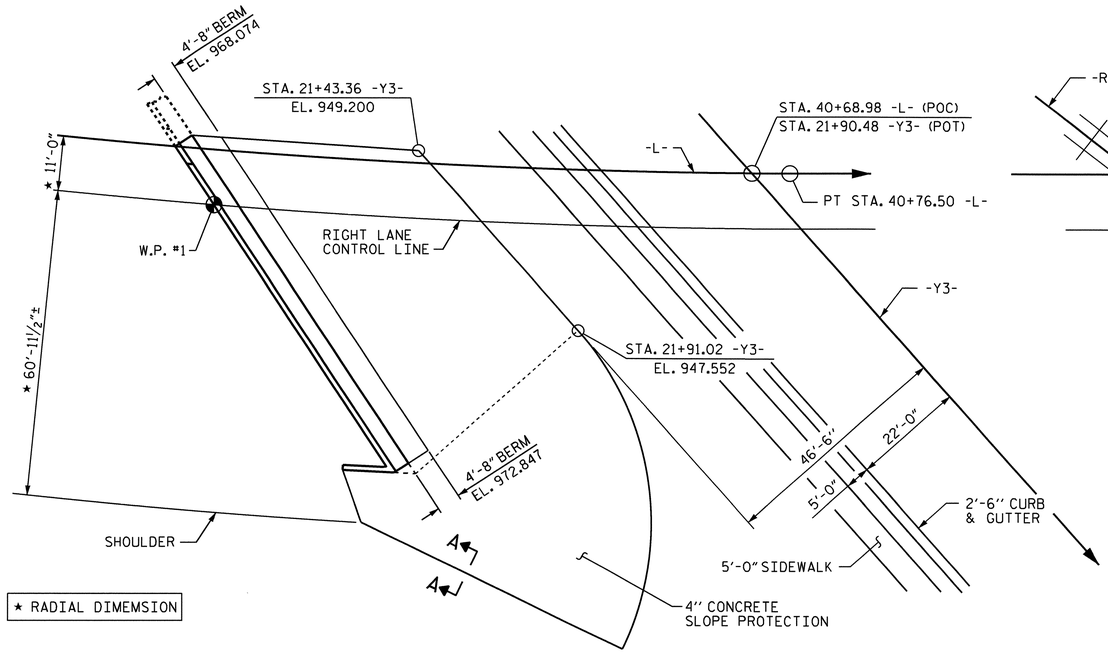
BRIDGE @ STA. 40+68.98 -L- —RIGHT LANE—	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	590	1180
END BENT 2	175	350

* QUANTITY SHOWN IS BASED ON 5' POURS.

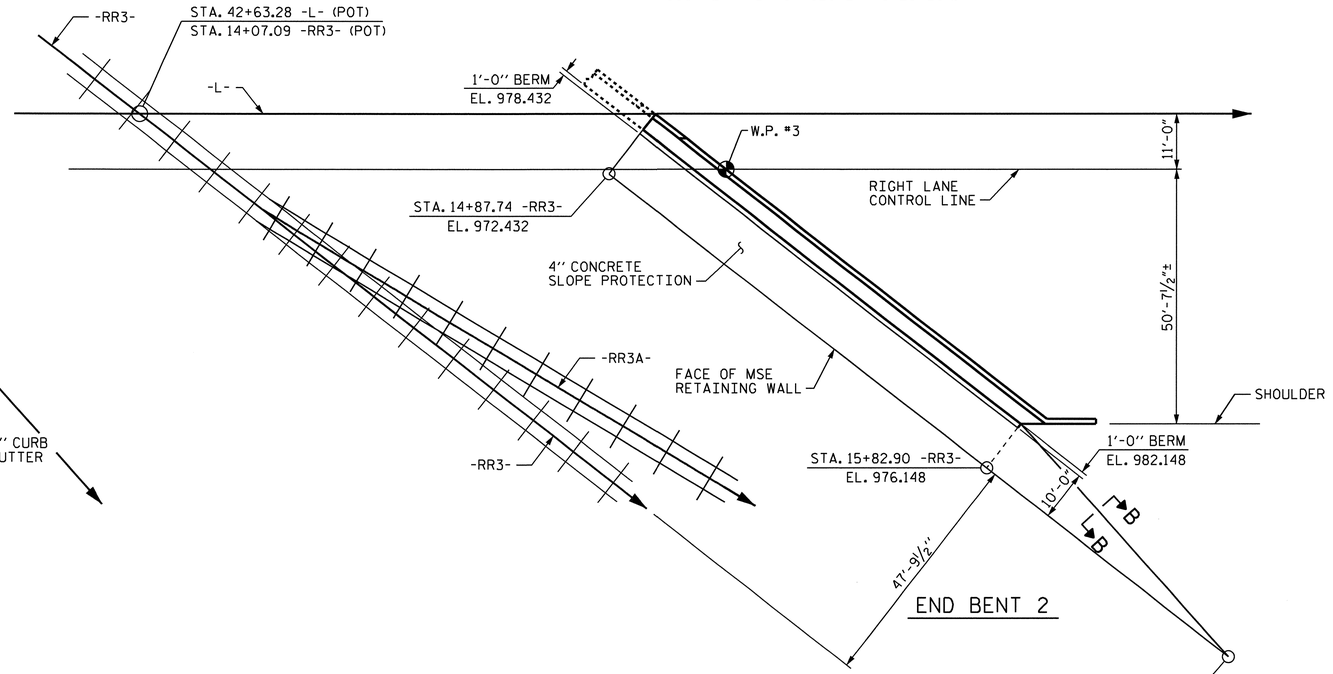
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS 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.

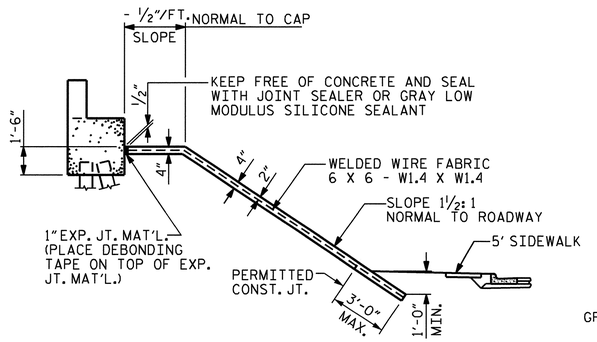
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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.



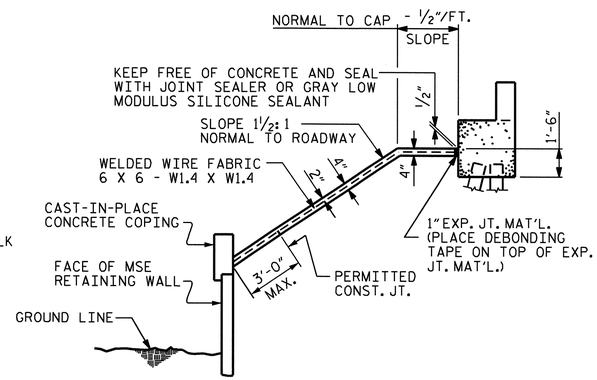
END BENT 1



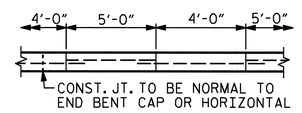
END BENT 2



SECTION ALONG -L- AT END BENT 1

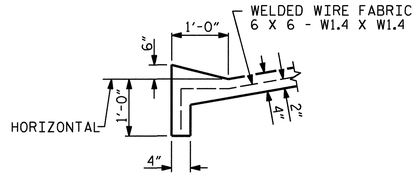


SECTION ALONG -L- AT END BENT 2

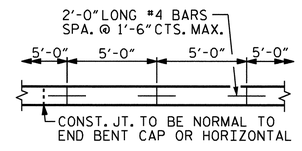


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

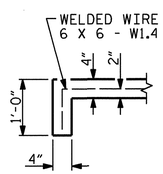


SECTION B-B



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



SECTION A-A

DETAILS FOR SLOPE PROTECTION

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-91
1			3			TOTAL SHEETS
2			4			94

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 1/28/09
CHECKED BY : L.E. SUTTON DATE : 4/17/09

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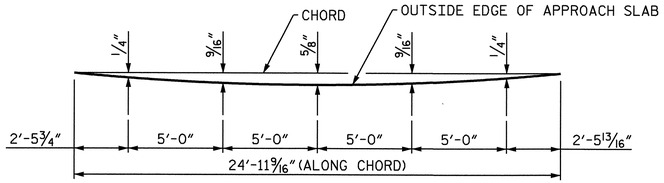
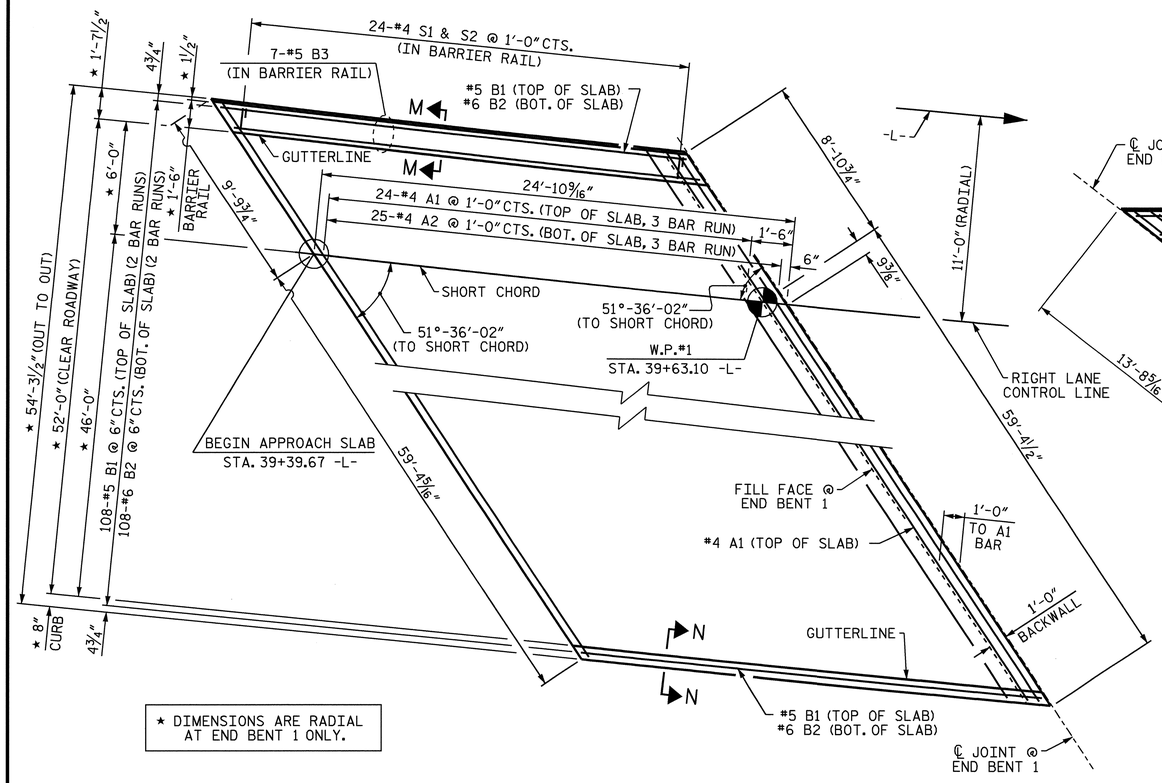
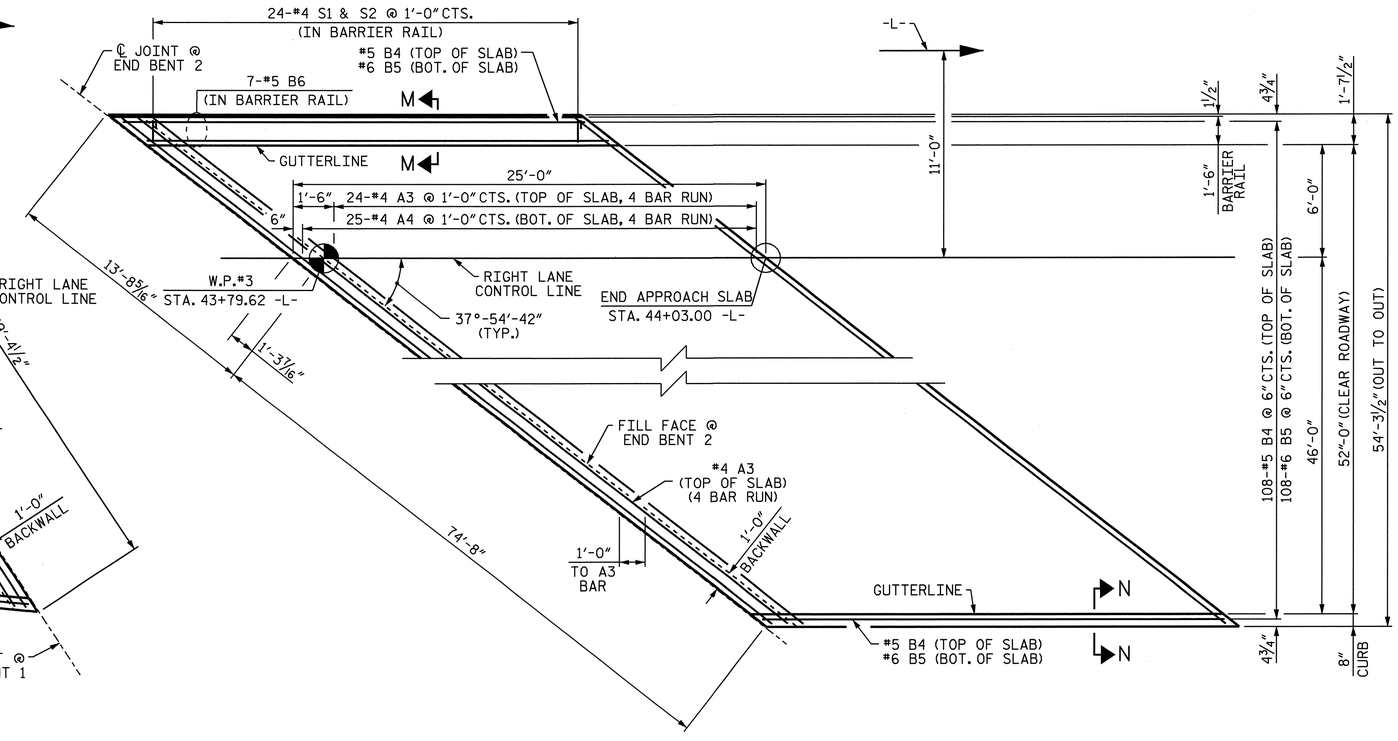


ARC OFFSETS
(LEFT OUTSIDE EDGE OF APPROACH SLAB)

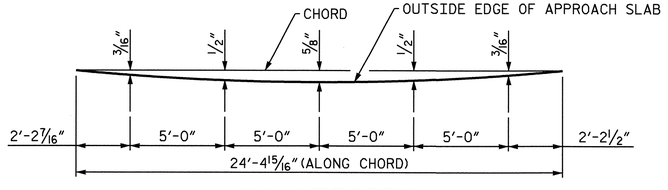


★ DIMENSIONS ARE RADIAL AT END BENT 1 ONLY.

PLAN @ END BENT 1



PLAN @ END BENT 2



ARC OFFSETS
(RIGHT OUTSIDE EDGE OF APPROACH SLAB)

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR RIGID PAVEMENT

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-92
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : William T. Parker DATE : 03/25/09
CHECKED BY : A.S. CALLAWAY DATE : 3/30/09

30-OCT-2009 15:08
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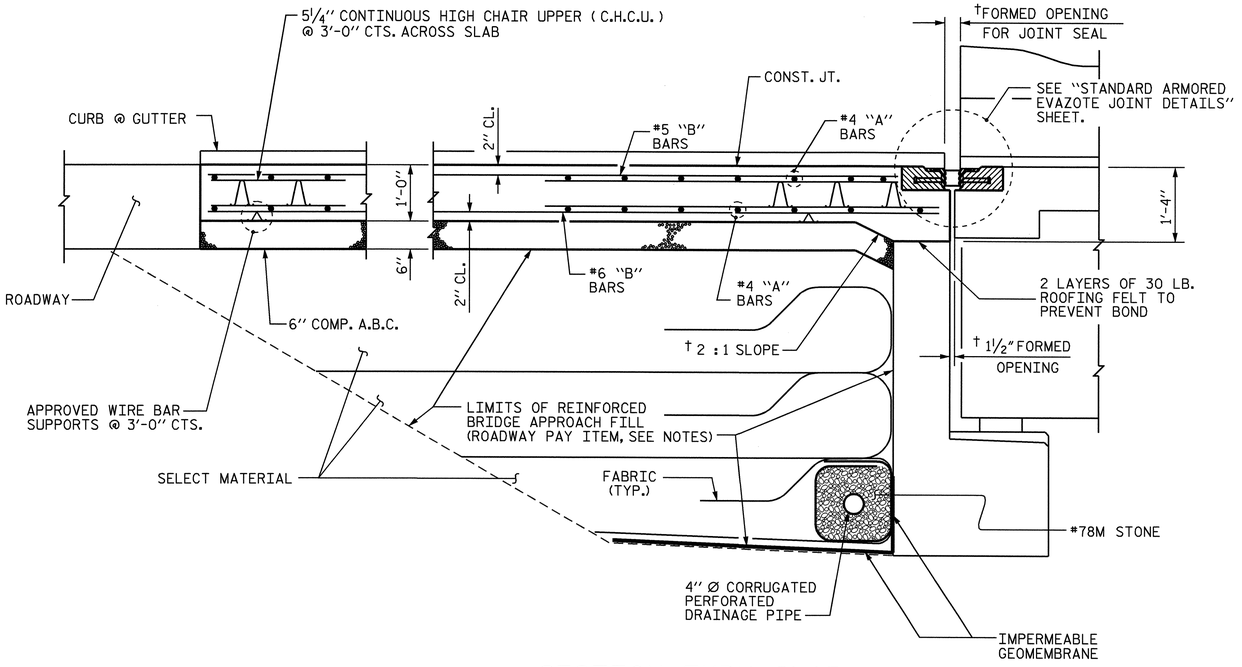
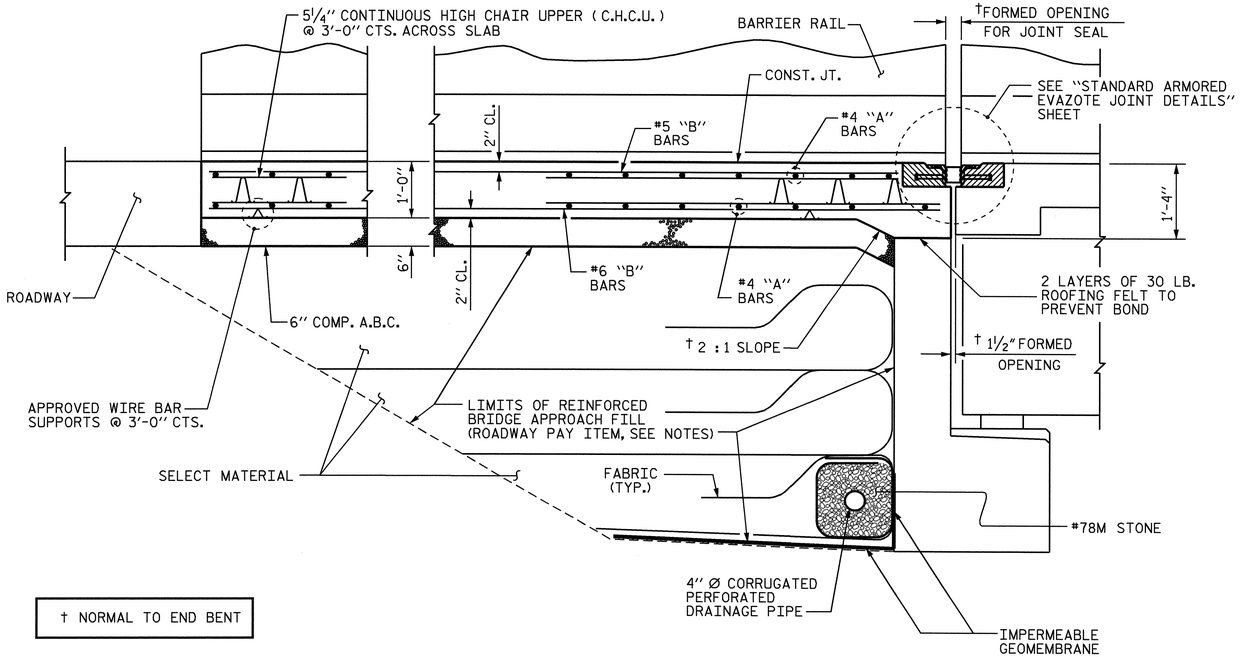


SECTION THRU SLAB

SHOWING SECTION WITH CURB



† NORMAL TO END BENT

SECTION THRU SLAB

SHOWING SECTION WITH BARRIER RAIL

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

AREAS BETWEEN THE APPROACH SLAB AND WINGWALL AND BEHIND THE BARRIER RAIL BETWEEN THE STRUCTURES SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF THE 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND THE WIDTH SHALLBE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

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

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

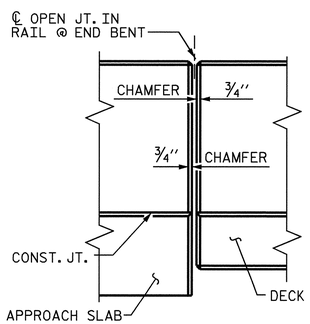
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

VERTICAL 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.

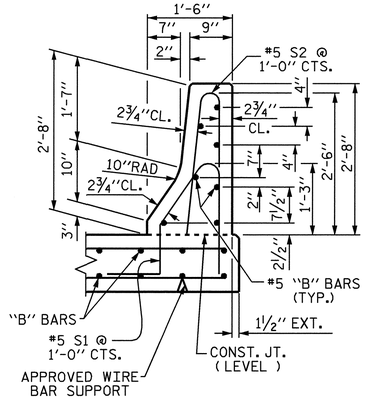
FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 3 3/16".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

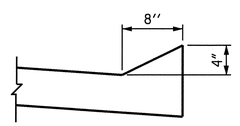


ELEVATION AT JOINT



SECTION M-M

BARRIER RAIL DETAILS



SECTION N-N

CURB DETAILS

BILL OF MATERIAL

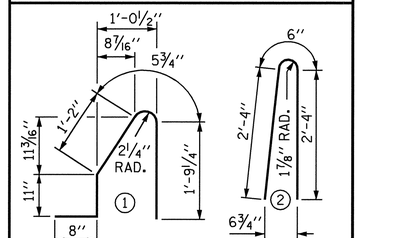
APPROACH SLAB @ END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	75	#4	STR	24'-3"	1205
A2	75	#4	STR	24'-1"	1207
✳B1	216	#5	STR	13'-3"	2985
B2	216	#6	STR	13'-7"	4407
✳B3	7	#5	STR	24'-6"	179
✳S1	24	#5	1	5'-0"	125
✳S2	24	#5	2	5'-2"	129
REINFORCING STEEL				LBS.	5,614
✳EPOXY COATED REINFORCING STEEL				LBS.	4,633
CLASS AA CONCRETE					
POUR #1 - SLAB & CURB				CU. YDS.	50.9
POUR #2 - RAIL				CU. YDS.	2.5
TOTAL				CU. YDS.	53.4

APPROACH SLAB @ END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A3	100	#4	STR	23'-6"	1570
A4	100	#4	STR	23'-4"	1559
✳B4	108	#5	STR	23'-7"	2657
B5	108	#6	STR	24'-5"	3961
✳B6	7	#5	STR	24'-5"	178
✳S1	24	#5	1	5'-0"	125
✳S2	24	#5	2	5'-2"	129
REINFORCING STEEL				LBS.	5,520
EPOXY COATED REINFORCING STEEL				LBS.	4,659
CLASS AA CONCRETE					
POUR #1 - SLAB & CURB				CU. YDS.	51.8
POUR #2 - RAIL				CU. YDS.	2.5
TOTAL				CU. YDS.	54.3

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. U-2826A

FORSYTH COUNTY

STATION: 40+68.98 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR RIGID PAVEMENT

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-93
1			3			TOTAL SHEETS
2			4			94

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

DRAWN BY : William T. Parker DATE : 03/25/09
CHECKED BY : A.S. CALLAWAY DATE : 3/30/09

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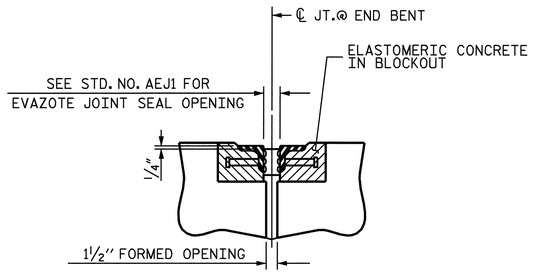
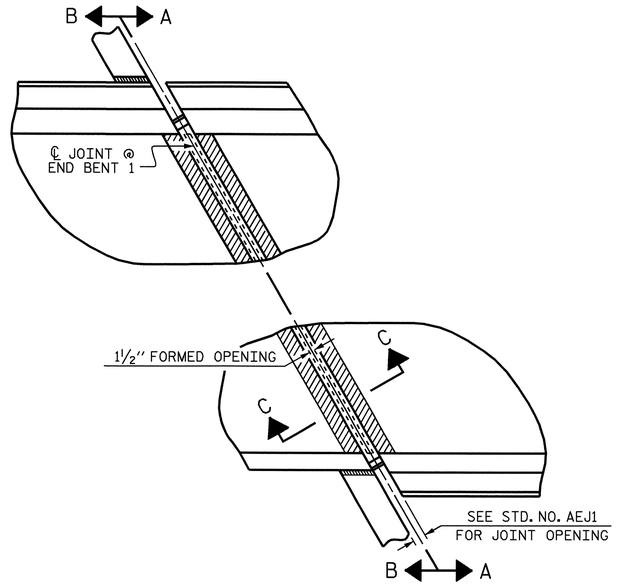
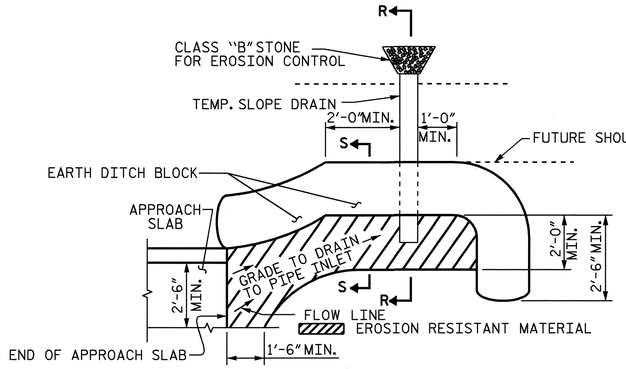


SECTION C-C
ARMOURED EVAZOTE JOINT SEAL

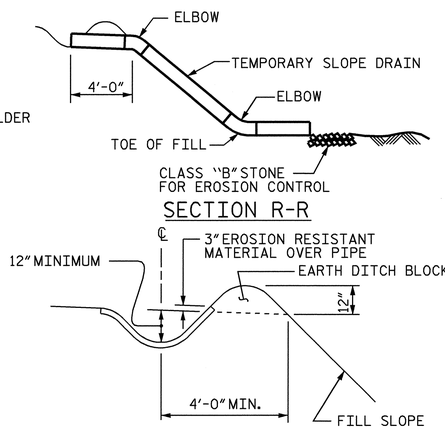


PLAN



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

PLAN VIEW

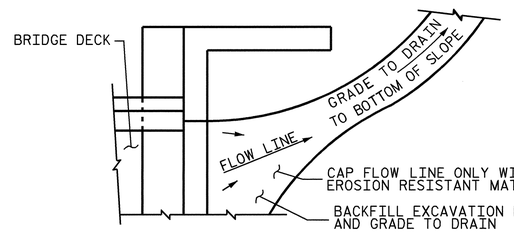


SECTION R-R

SECTION S-S

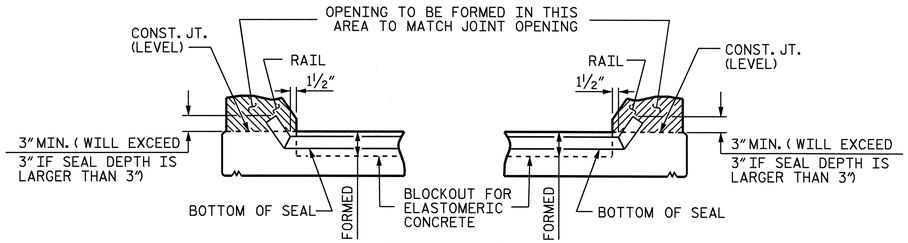
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

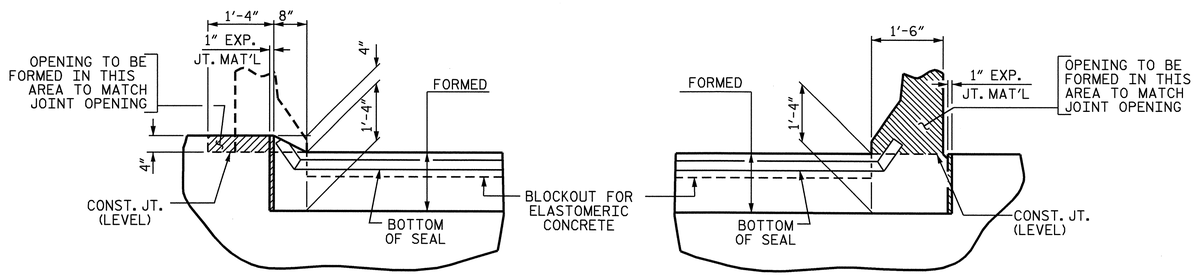


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



SECTION A-A



SECTION B-B

JOINT SEAL DETAILS @ END BENT

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

ASSEMBLED BY : William T. Parker	DATE : 03/25/09		
CHECKED BY : A.S. CALLAWAY	DATE : 3/30/09		
DRAWN BY : FCJ 11/88	REV. 10/17/00	RWW/LES	
CHECKED BY : ARB 11/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06R	MAA/KMM	

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
1/5/10

PROJECT NO. U-2826A
FORSYTH COUNTY
STATION: 40+68.98 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-94
1			3			TOTAL SHEETS
2			4			94

STR. #2

STD. NO. BAS10

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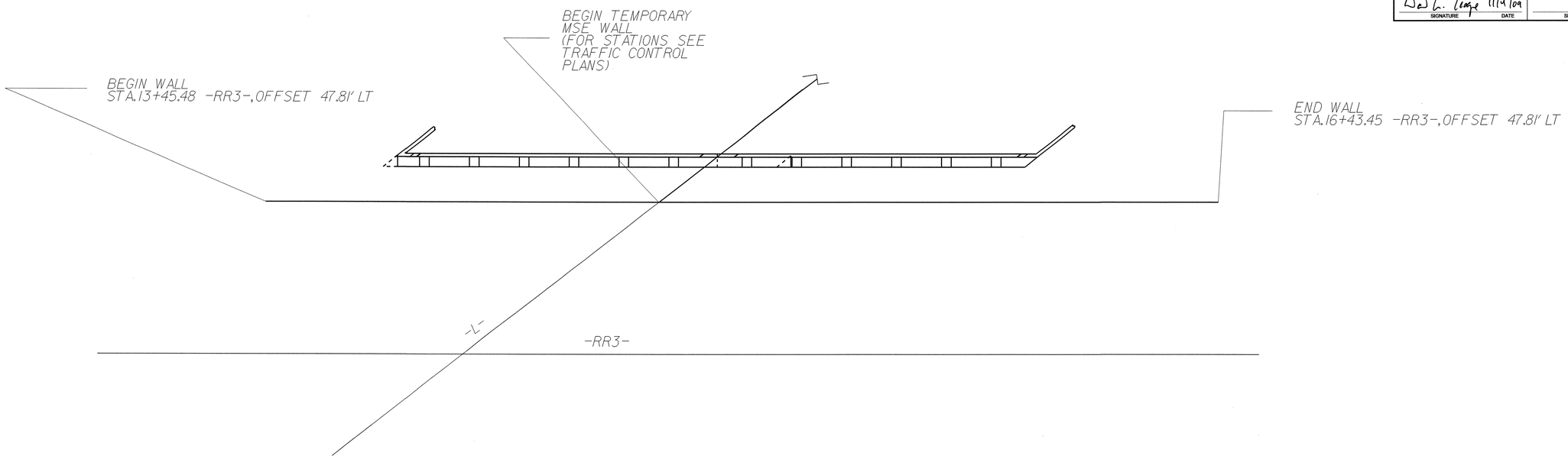
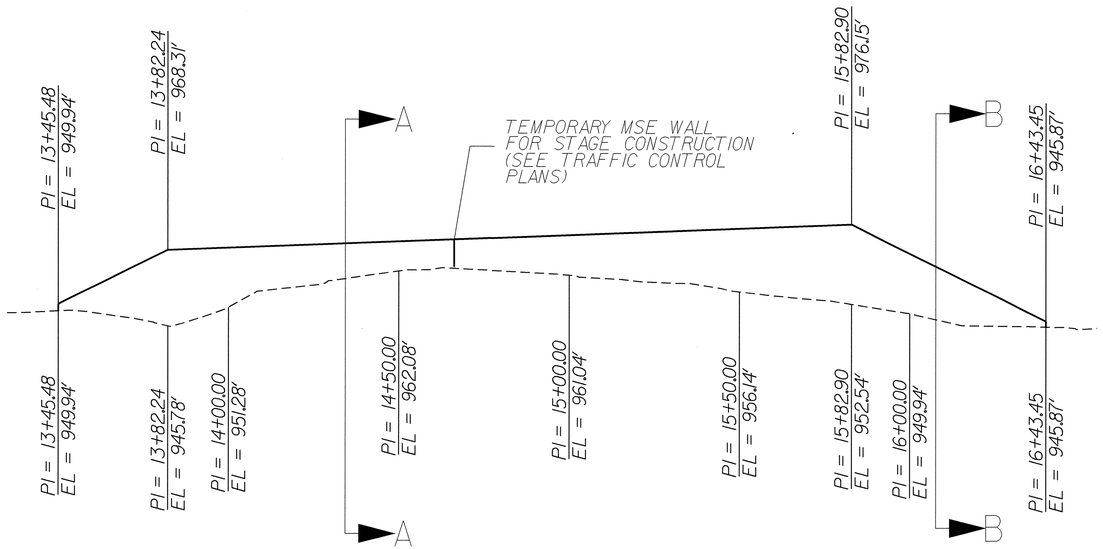
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE D. L. Teague 11/4/09	
SIGNATURE DATE	SIGNATURE DATE





ESTIMATED WALL FACE AREA	4,080 SQ.FT.

PREPARED BY: D. TEAGUE	DATE: 3/09
REVIEWED BY: E. WILLIAMS	DATE: 3/09

PROJECT NO.: U-2826A (34871.1.1)

FORSYTH ***COUNTY***

STATION: 13+45.48 -RR3-

SHEET 1 OF 2

GEOTECHNICAL ENGINEERING UNIT

☐ ***EASTERN REGIONAL OFFICE***

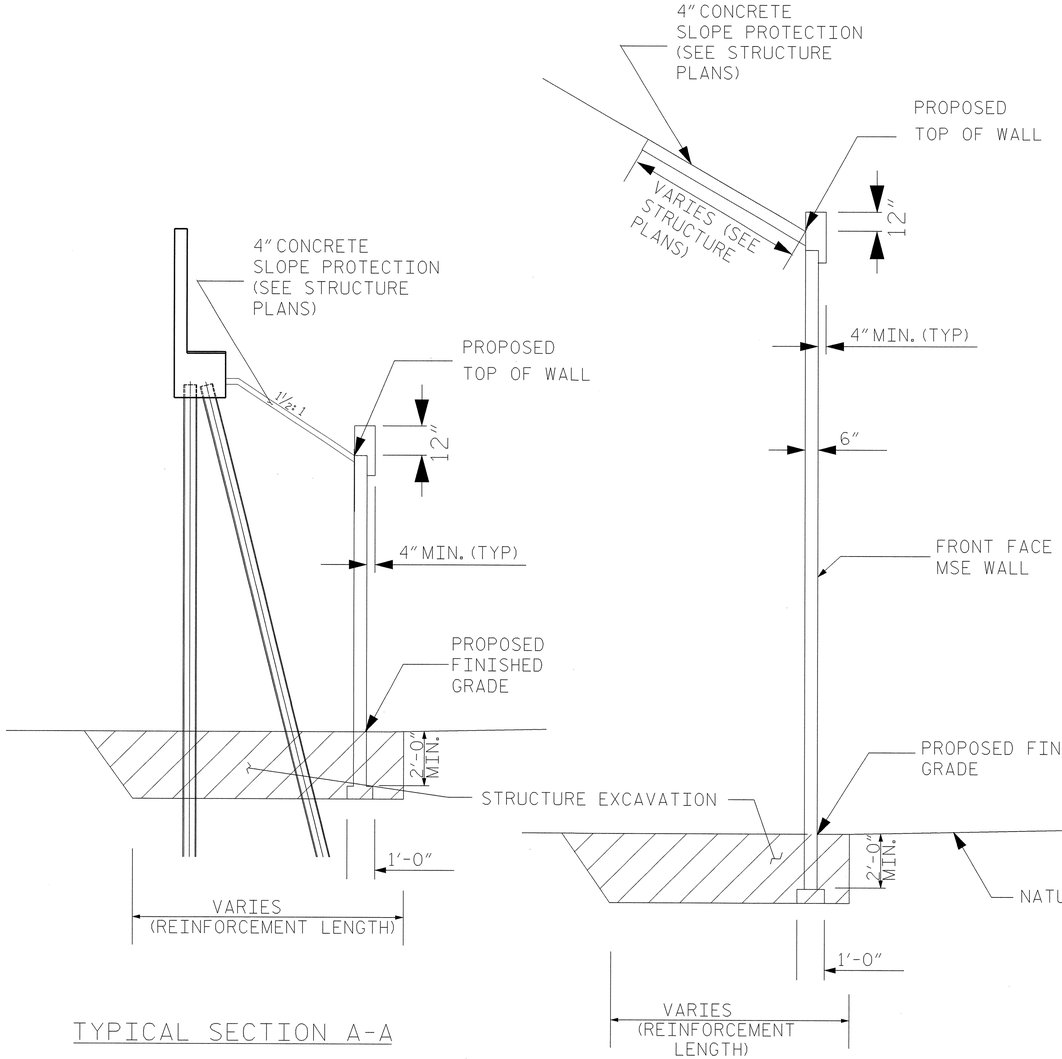
☐ ***WESTERN REGIONAL OFFICE***

☒ ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #1 MSE PLAN VIEW AND PROFILE

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



TYPICAL SECTION A-A

TYPICAL SECTION B-B

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE SIGNATURE: D. L. Teague 11/4/09 DATE	SIGNATURE DATE

NOTES

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

DO NOT USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL UNITS FOR RETAINING WALL NO. 1.

DO NOT USE STANDARD SIZE NO. 2S OR 2MS FOR SELECT MATERIAL FOR RETAINING WALL NO. 1.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO 1.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1, SURVEY EXISTING GROUND ELEVATIONS SHOWN ON THE WALL PROFILE VIEW (WALL ENVELOPE) AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 FOR WALL HEIGHTS EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEAVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) MINIMUM SERVICE LIFE = 100 YEARS
2) ALLOWABLE BEARING CAPACITY = 5,700 PSF
3) SELECT MATERIAL PARAMETERS:

MATERIAL STANDARD SIZE NO. (IN ACCORDANCE WITH SECTIONS 1005 AND 1014 OF THE STANDARD SPECIFICATIONS)	UNIT WEIGHT (gamma) PCF	FRICTION ANGLE (phi) DEGREES	COHESION (c) PSF
57, 67 AND 78M	110	38	0

4) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (gamma) PCF	FRICTION ANGLE (phi) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	200

FOUNDATIONS FOR END BENT NO. 2 LOCATED AT STATION 43+51.38 -L- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, SELECT MATERIAL OR REINFORCEMENT FOR RETAINING WALL NO. 1 UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO. 1 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.

DESIGN RETAINING WALL NO. 1 FOR A BACKSLOPE AND LIVE LOAD (TRAFFIC) SURCHARGE.

FOR HANDLING OF STRUCTURE EXCAVATION, SEE CONTAMINATED SOIL SPECIAL PROVISION.

PREPARED BY: D. TEAGUE	DATE: 3/09
REVIEWED BY: E. WILLIAMS	DATE: 3/09

PROJECT NO.: U-2826A (34871.1.1)
FORSYTH ***COUNTY***
STATION: 13+45.48 -RR3-
SHEET 2 OF 2

GEOTECHNICAL ENGINEERING UNIT
☐ ***EASTERN REGIONAL OFFICE***
☐ ***WESTERN REGIONAL OFFICE***
☒ ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #1
MSE
TYPICAL SECTION
NOTES

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

GEC248236 11/3/2009 u2826a_geo_rwall_plan sheets dteague GEC-Oce860-34bond

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM W/ RGW REV. 5-7-03 RWW W/ JTE
REV. 8-16-99 RWW W/ LES REV. 5-1-06 TLA W/ GW

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