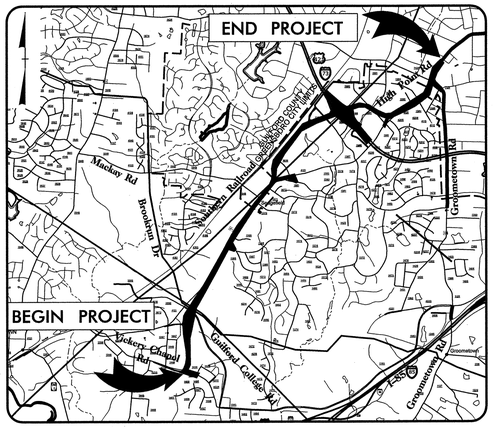
09/08/99

CONTRACT: C202881/C202881A TIP PROJECTS: U-2412B & U-2524AE



VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

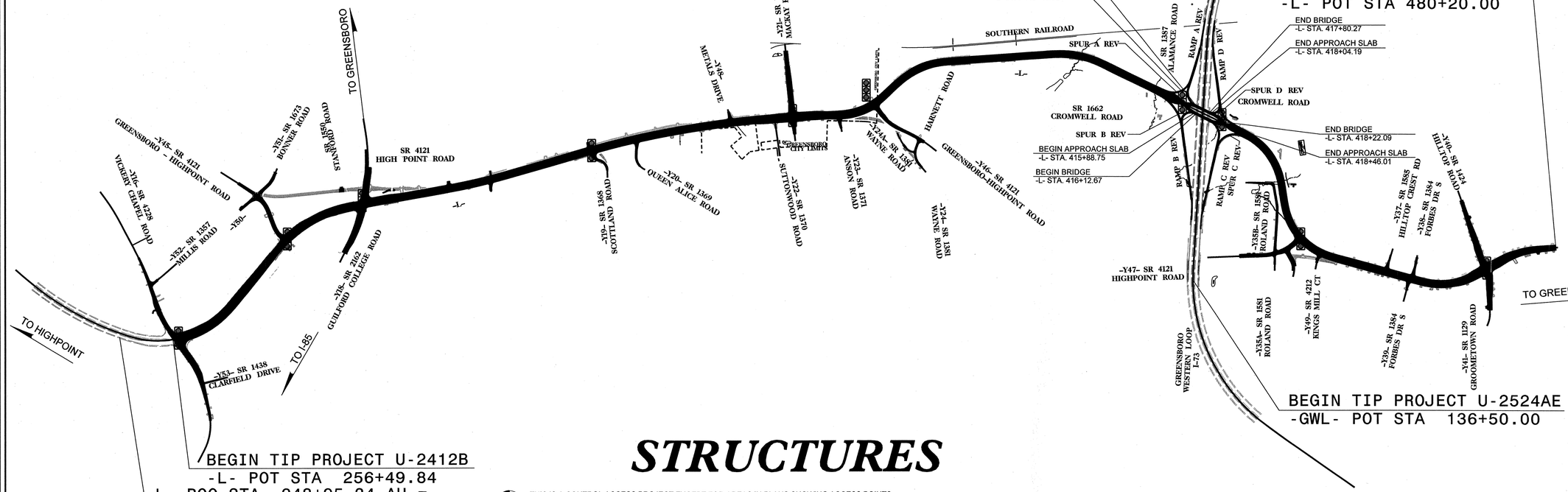
GUILFORD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2412B & U-2524AE		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34802.1.1	STP-4121(1)	P.E.
34802.2.3	STP-4121(4)	RW/UTIL
34820.2.17	NHS-124-1(16)	RW/UTIL
34802.3.4	STPDA-4121(7)	CONST
34820.3.23	NHS-124-1(17)	CONST

LOCATION: *SR 4121 (GREENSBORO /HIGH POINT ROAD) FROM SR 4228 (VICKERY CHAPEL ROAD) TO SR 1424 (HILLTOP ROAD) & GREENSBORO WESTERN LOOP INTERCHANGE AT SR 4121 (HIGH POINT ROAD)*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, SIGNALS WALLS, STRUCTURES, AND CULVERT EXTENSION*



STRUCTURES

THIS IS A CONTROL ACCESS PROJECT EXCEPT FOR AREAS IN PLANS SHOWING ACCESS POINTS.

DESIGN DATA

ADT 2012	=	26,700
ADT 2032	=	39,200
DHV	=	11 %
D	=	60 %
T	=	5 % *
V	=	50 MPH

* (TTST 2% + DUAL 3%)
FUNC CLASS URBAN ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2412B =	4.237 MILES
LENGTH STRUCTURE TIP PROJECT U-2412B =	0.044 MILES
TOTAL LENGTH TIP PROJECT U-2412B =	4.193 MILES

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

2012 STANDARD SPECIFICATIONS

LETTING DATE:
AUGUST 21, 2012

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

U-2524AE_SD_TSH.dgn

F.A. PROJECT NO. NHS-124-1 (17)

415+00 415+50 416+00 416+50 417+00 417+50 418+00 418+50

GRADE DATA -L-

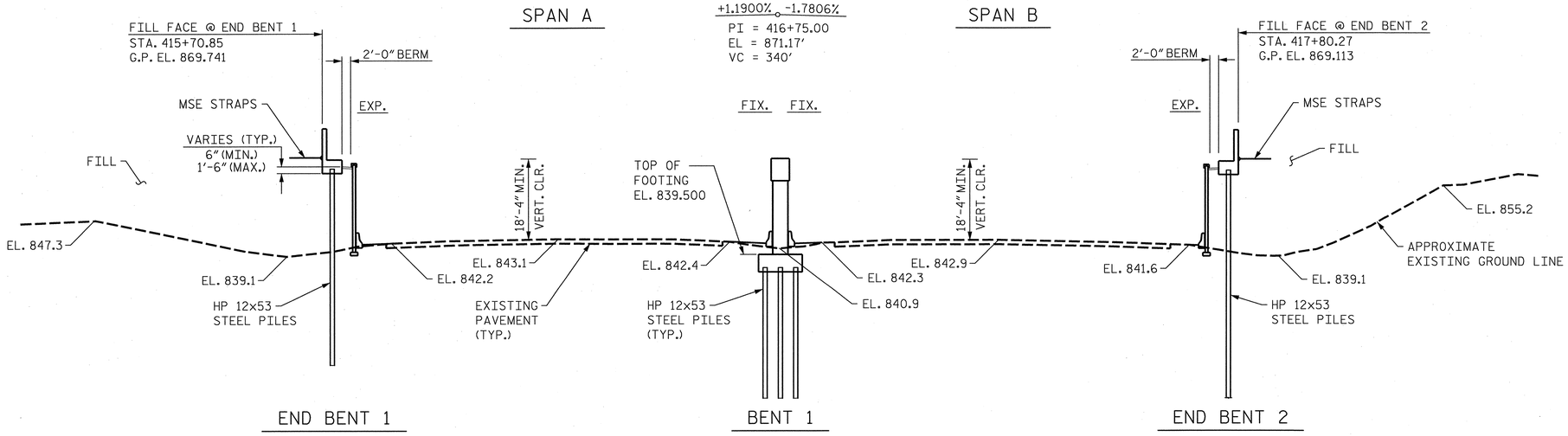
SPAN A | SPAN B

+1.1900% , -1.7806%
PI = 416+75.00
EL = 871.17'
VC = 340'

FIX. FIX.

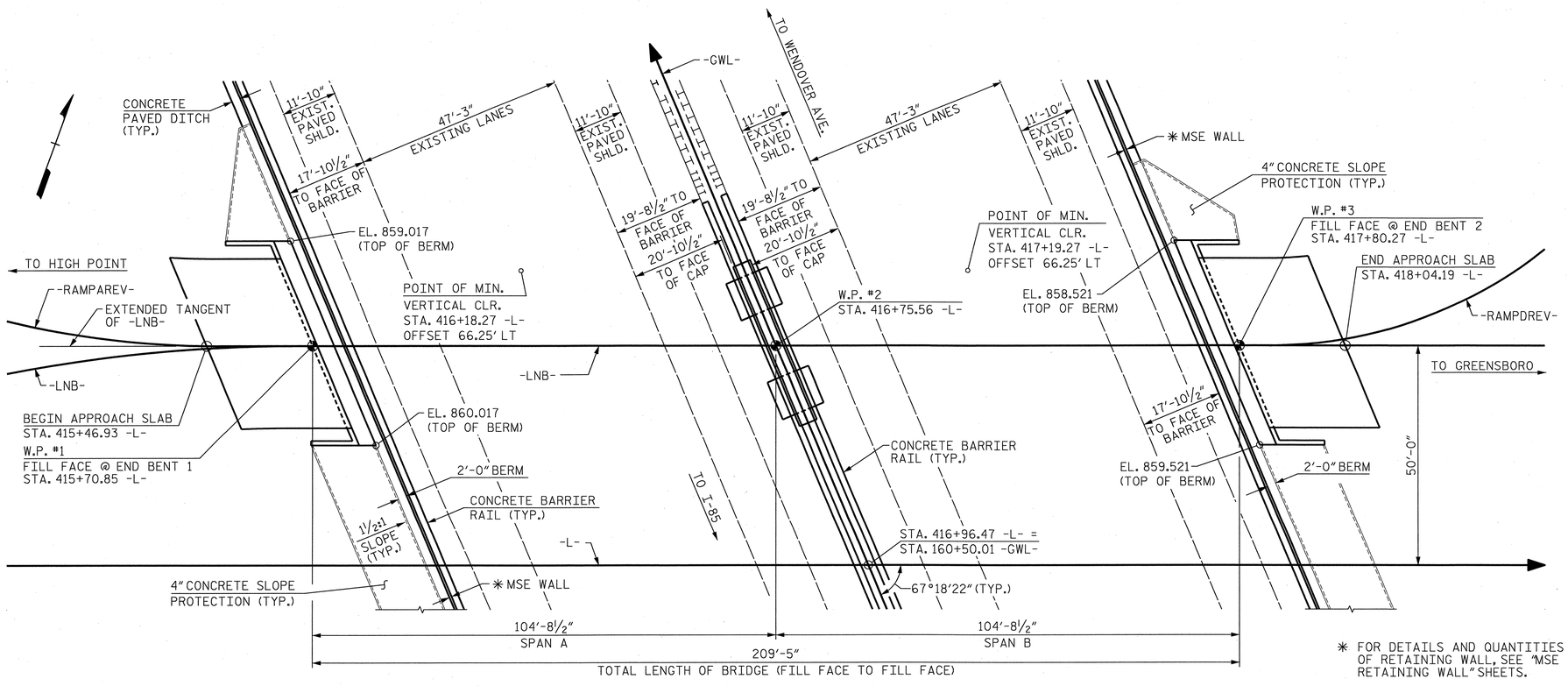
FILL FACE @ END BENT 1
STA. 415+70.85
G.P. EL. 869.741

FILL FACE @ END BENT 2
STA. 417+80.27
G.P. EL. 869.113



SECTION ALONG -LNB-

SECTIONS AT END BENTS AND BENT ARE AT RIGHT ANGLES



* FOR DETAILS AND QUANTITIES OF RETAINING WALL, SEE "MSE RETAINING WALL" SHEETS.

PLAN

PILES AND COLUMNS NOT SHOWN FOR CLARITY

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-
160+50.01 -GWL-

SHEET 1 OF 3 BRIDGE NO. 1123

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR DUAL BRIDGES ON SR 4121
OVER GREENSBORO WESTERN LOOP
LEFT LANE

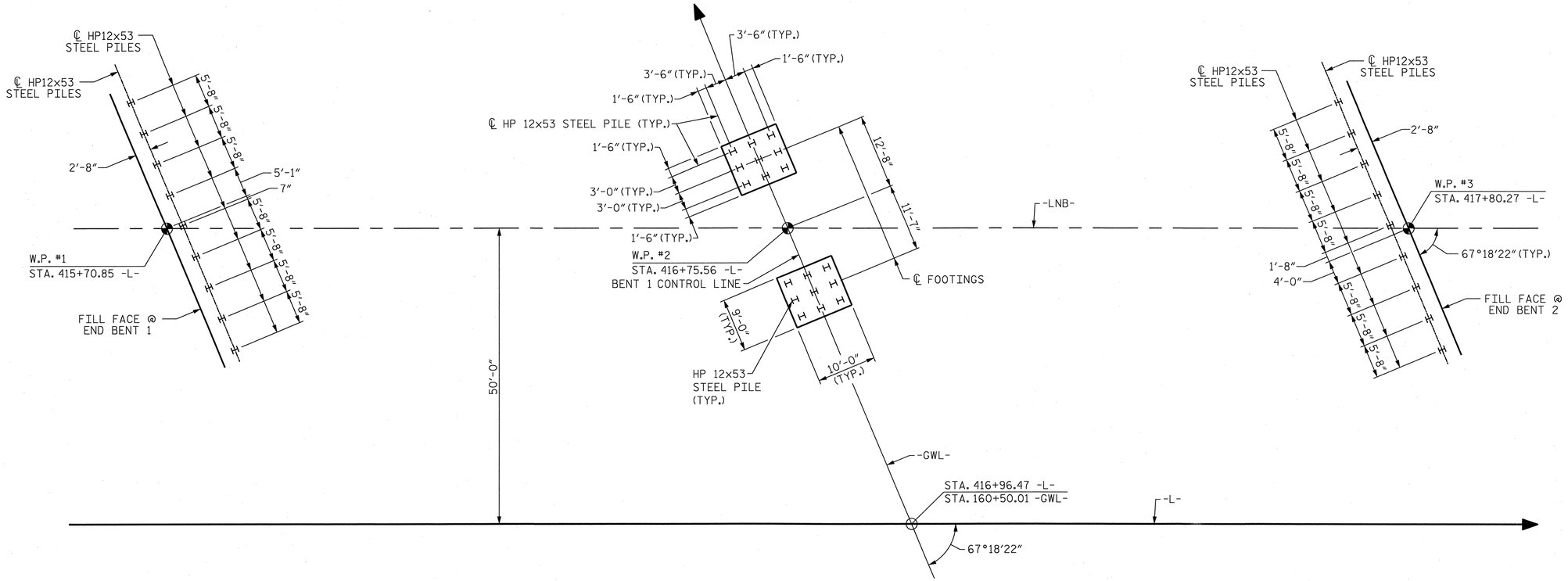
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 536-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN D. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_GD_L01.DGN



END BENT 1 | BENT 1 | END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES
ORIENT PILES AS SHOWN

NOTES

THE FOLLOWING FOUNDATION NOTES HAVE BEEN PROVIDED BY THE NCDOT GEOTECHNICAL ENGINEERING UNIT:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE.

INSTALL PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN 828.0 FT.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40 TO 70 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1, END BENT NO. 2, AND BENT NO. 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_GD_L02.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

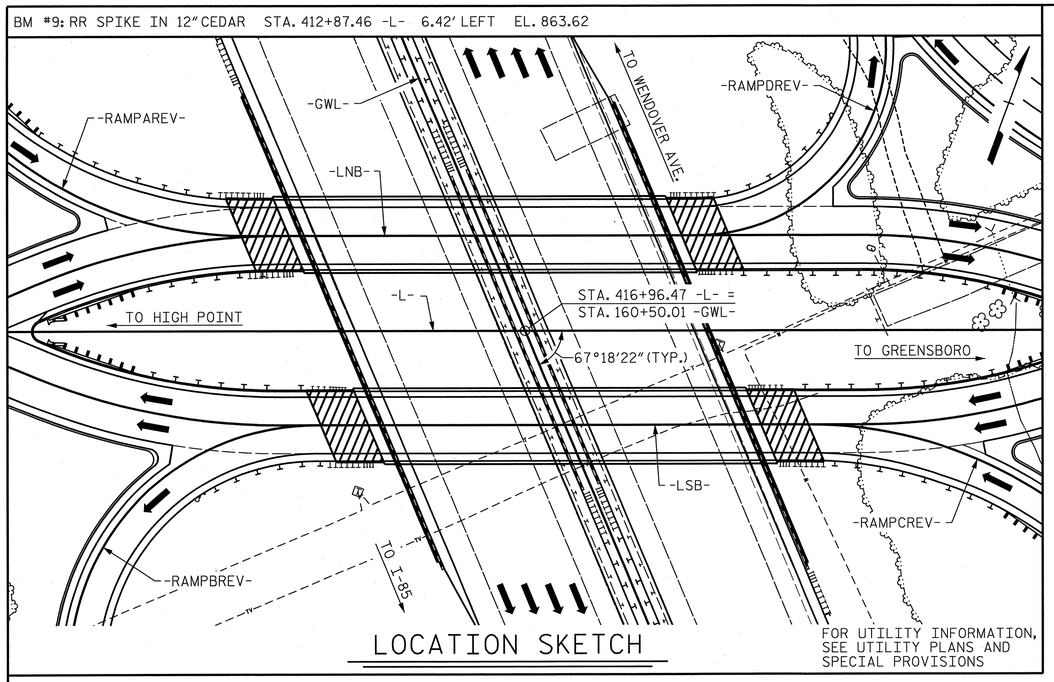
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN D. DOUGHTY 5/10/12

PROJECT NO. U-2412B/ U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-
160+50.01 -GWL-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR DUAL BRIDGES ON SR 4121
OVER GREENSBORO WESTERN LOOP
LEFT LANE

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



NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

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

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STA. 416+96.47	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		HP 12x53 STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	ELECTRICAL CONDUIT SYSTEM FOR SIGNALS STA. 416+96.47
	LUMP SUM	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			8,338	8,621		LUMP SUM			8	816.83			414.3		LUMP SUM	LUMP SUM	LUMP SUM
END BENT 1		1			45.1		5,970				9	405		110			
BENT 1	LUMP SUM				67.1		12,920	940			18	540					
END BENT 2					44.2		5,963				9	540		105			
TOTAL	LUMP SUM	1	8,338	8,621	156.4	LUMP SUM	24,853	940	8	816.83	36	1,485	414.3	215	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L- 160+50.01 -GWL-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR DUAL BRIDGES ON SR 4121
OVER GREENSBORO WESTERN LOOP
LEFT LANE

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOSEPH R. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/10/2012
U2524AE_SD_GD_L03.dgn

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.16	--	1.75	0.943	1.57	A	EL/ER	50.3	1.056	1.16	A	I	80.5	0.80	0.943	1.46	A	EL/ER	50.3	1, 2, 3
		HL-93 (OPERATING)	N/A		1.53	--	1.35	0.943	2.04	A	EL/ER	50.3	1.056	1.53	A	I	80.5	N/A	--	--	--	--	--	1, 2, 3
		HS-20 (INVENTORY)	36.000	2	1.61	58.0	1.75	0.943	2.22	A	EL/ER	50.3	1.056	1.61	A	I	80.5	0.80	0.943	2.06	A	EL/ER	50.3	1, 2, 3
		HS-20 (OPERATING)	36.000		2.12	76.3	1.35	0.943	2.88	A	EL/ER	50.3	1.056	2.12	A	I	80.5	N/A	--	--	--	--	--	1, 2, 3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.96	67.0	1.40	0.943	6.68	A	EL/ER	50.3	1.056	5.21	A	I	80.5	0.80	0.943	4.96	A	EL/ER	50.3	1, 2, 3
		SNGARBS2	20.000		3.55	71.0	1.40	0.943	4.79	A	EL/ER	50.3	1.056	3.60	A	I	80.5	0.80	0.943	3.55	A	EL/ER	50.3	1, 2, 3
		SNAGRIS2	22.000		3.29	72.4	1.40	0.943	4.44	A	EL/ER	50.3	1.056	3.31	A	I	80.5	0.80	0.943	3.29	A	EL/ER	50.3	1, 2, 3
		SNCOTTS3	27.250		2.44	66.5	1.40	0.943	3.28	A	EL/ER	50.3	1.056	2.54	A	I	80.5	0.80	0.943	2.44	A	EL/ER	50.3	1, 2, 3
		SNAGGRS4	34.925		1.99	69.5	1.40	0.943	2.69	A	EL/ER	50.3	1.056	2.04	A	I	80.5	0.80	0.943	1.99	A	EL/ER	50.3	1, 2, 3
		SNS5A	35.550		1.95	69.3	1.40	0.943	2.63	A	EL/ER	50.3	1.056	2.04	A	I	80.5	0.80	0.943	1.95	A	EL/ER	50.3	1, 2, 3
		SNS6A	39.950		1.78	71.1	1.40	0.943	2.39	A	EL/ER	50.3	1.056	1.84	A	I	80.5	0.80	0.943	1.78	A	EL/ER	50.3	1, 2, 3
		SNS7B	42.000		1.69	71.0	1.40	0.943	2.27	A	EL/ER	50.3	1.056	1.78	A	I	80.5	0.80	0.943	1.69	A	EL/ER	50.3	1, 2, 3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.16	71.3	1.40	0.943	2.91	A	EL/ER	50.3	1.056	2.22	A	I	80.5	0.80	0.943	2.16	A	EL/ER	50.3	1, 2, 3
		TNT4A	33.075		2.17	71.8	1.40	0.943	2.92	A	EL/ER	50.3	1.056	2.18	A	I	80.5	0.80	0.943	2.17	A	EL/ER	50.3	1, 2, 3
		TNT6A	41.600		1.74	72.4	1.40	0.943	2.35	A	EL/ER	50.3	1.056	1.87	A	I	80.5	0.80	0.943	1.74	A	EL/ER	50.3	1, 2, 3
		TNT7A	42.000		1.75	73.5	1.40	0.943	2.36	A	EL/ER	50.3	1.056	1.83	A	I	80.5	0.80	0.943	1.75	A	EL/ER	50.3	1, 2, 3
		TNT7B	42.000		1.76	73.9	1.40	0.943	2.40	A	EL/ER	50.3	1.056	1.76	A	I	80.5	0.80	0.943	1.78	A	EL/ER	50.3	1, 2, 3
		TNAGRIT4	43.000		1.70	73.1	1.40	0.943	2.31	A	EL/ER	50.3	1.056	1.70	A	I	80.5	0.80	0.943	1.71	A	EL/ER	50.3	1, 2, 3
		TNAGT5A	45.000		1.62	72.9	1.40	0.943	2.19	A	EL/ER	50.3	1.056	1.67	A	I	80.5	0.80	0.943	1.62	A	EL/ER	50.3	1, 2, 3
		TNAGT5B	45.000	3	1.61	72.5	1.40	0.943	2.17	A	EL/ER	50.3	1.056	1.62	A	I	80.5	0.80	0.943	1.61	A	EL/ER	50.3	1, 2, 3

LOAD FACTORS:

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

NOTES:

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

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN. ALLOWABLE TENSILE STRESS IS $0.19\sqrt{f'c}$ = 0.537 KSI.

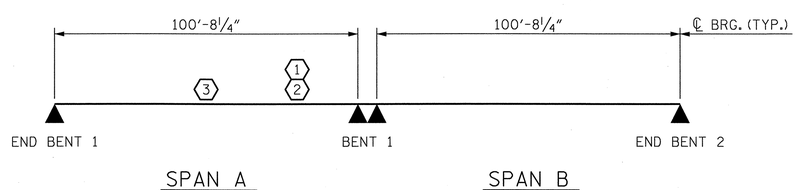
COMMENTS:

1. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 2½" HAUNCH ASSUMED. HAUNCH CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES. THE HAUNCH HEIGHT IS INCLUDED FOR ECCENTRICITY TO THE DECK.
3. Ec, GIRDER = 5,422 Ksi (FINAL)
   Ec, DECK = 4,067 Ksi
   Eps = 28,500 Ksi

(#) 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

TABLE OF SECTION RESISTANCES (SPAN A)												
		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	574	468	335	330	332	331	332	337	346	471	971
	ΦMn (KIP-FT)	--	9660	11263	12221	12221	12221	12221	12221	11263	9660	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	574	468	334	328	330	330	331	337	347	473	970
	ΦMn (KIP-FT)	--	9645	11209	12178	12178	12178	12178	12178	11209	9645	--

SPAN B RESISTANCES OPPOSITE HAND.
INTERIOR COMPOSITE Ixx = 1,314,490 IN^4
INTERIOR COMPOSITE y_b = 58.13 IN.
EXTERIOR COMPOSITE Ixx = 1,284,478 IN^4
EXTERIOR COMPOSITE y_b = 57.30 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 5422 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FORM BOTTOM OF GIRDER



LRFR SUMMARY

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

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

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

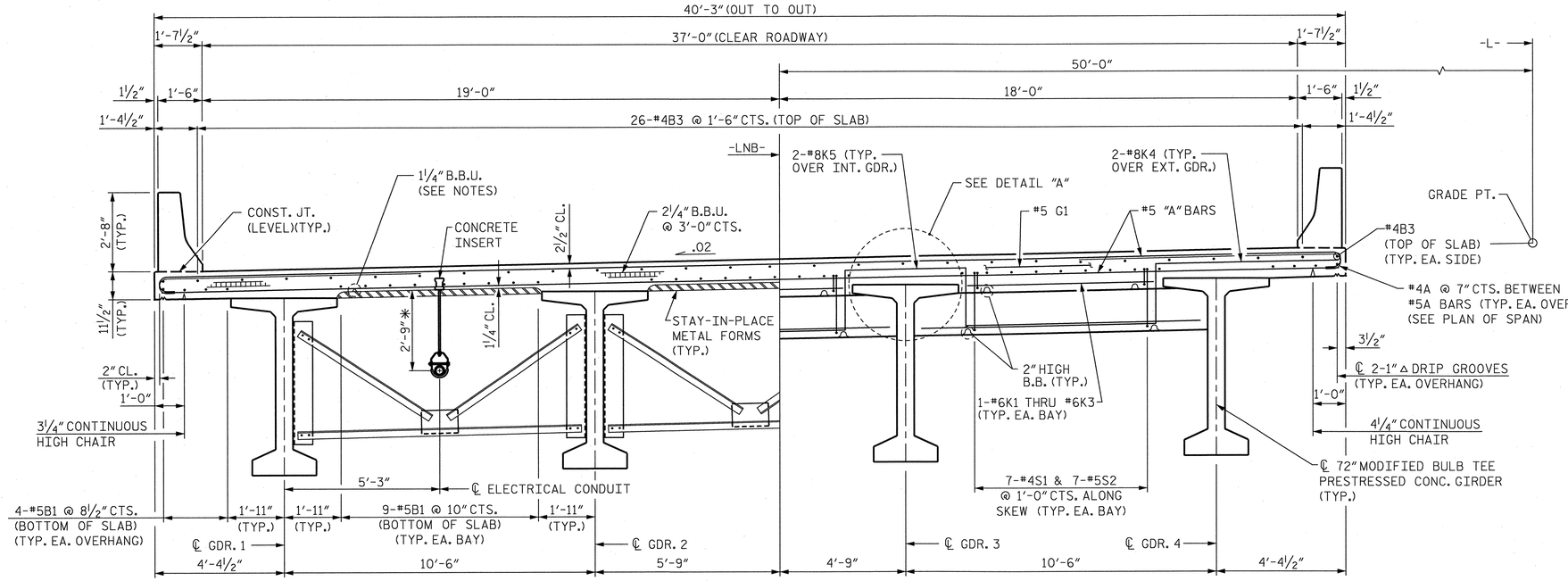
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN P. DOUGHTY
5/10/12

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012	REV. 11/12/08RR MAA/GM	
CHECKED BY : J. DOUGHTY	DATE : MAR 2012		
DRAWN BY : MAA 1/08			
CHECKED BY : GM/DI 2/08			

5/9/2012
U2524AE_SD_LR_L01.dgn

STD. NO. LRFR1

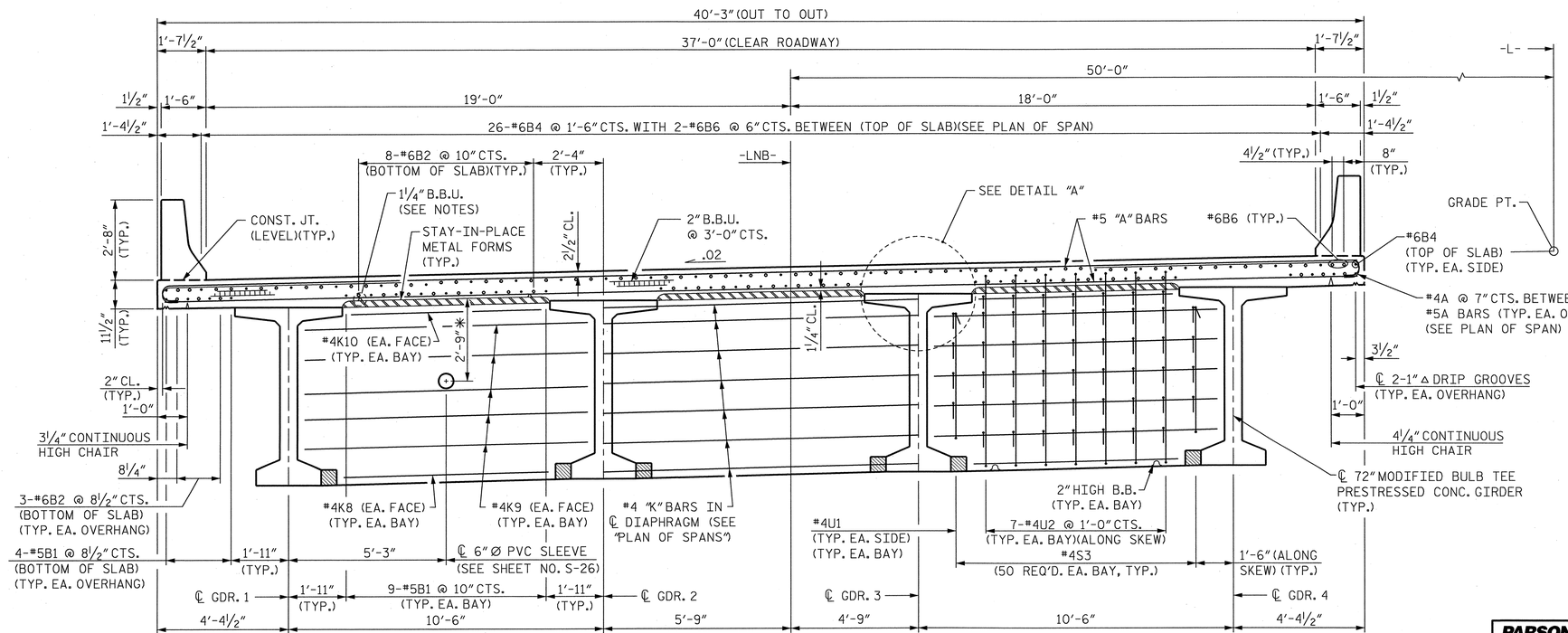


* MEASURED FROM BOTTOM OF SLAB TO ℄ CONDUIT

AT INTERMEDIATE DIAPHRAGM

AT END BENT

TYPICAL SECTION



TYPICAL SECTION @ BENT DIAPHRAGM

NOTES

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

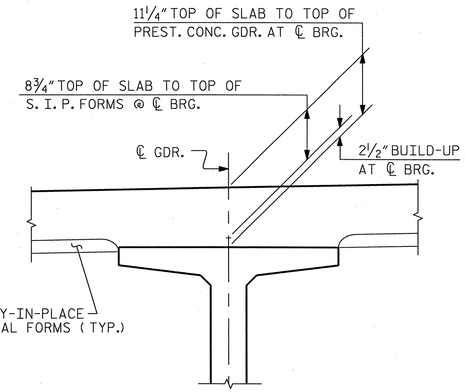
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 psi.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE ELECTRICAL CONDUIT THROUGH THE BENT DIAPHRAGM. REINFORCING STEEL MAY BE SHIFTED AS REQUIRED.

FOR LOCATION AND DETAILS OF THE MULTI-CELL RACEWAY, HANGER ASSEMBLY AND CONCRETE INSERT, SEE SHEET NO. S-26.



DETAIL "A"

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

LEFT LANE

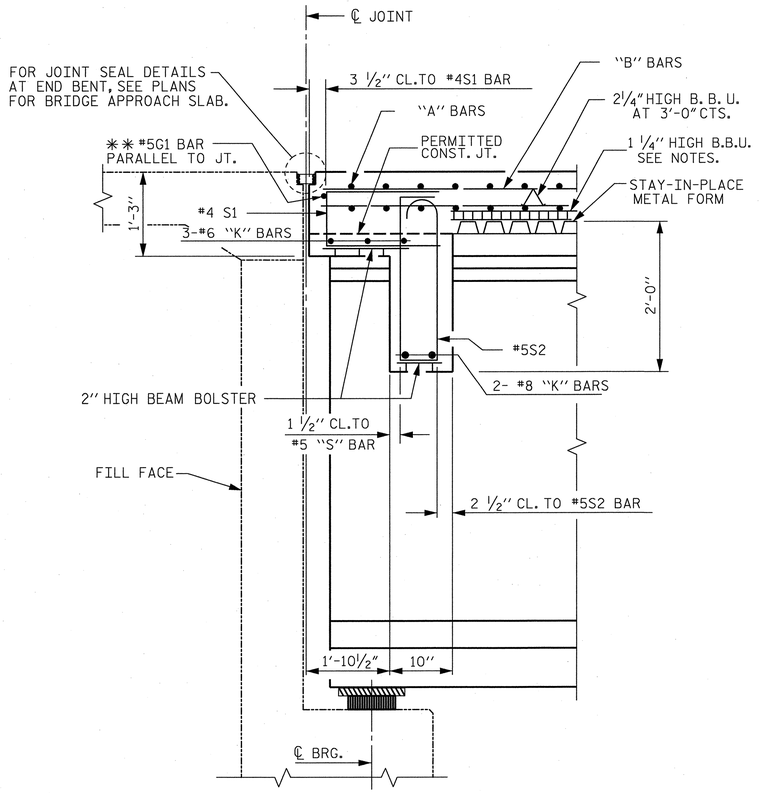
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN B. DOUGHTY
5/10/12

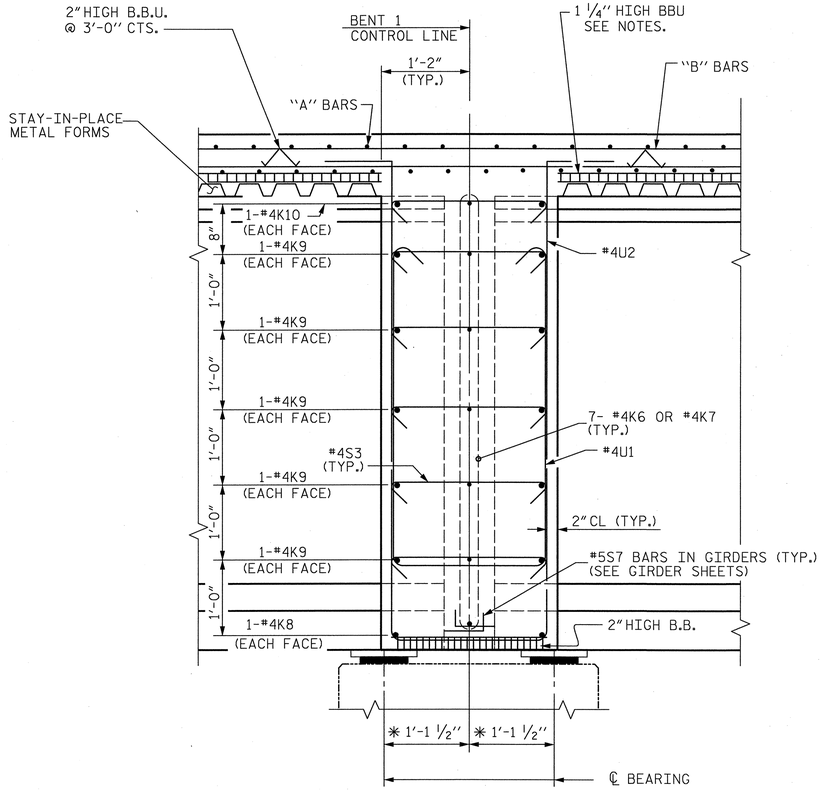
DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_TS_L01.dgn



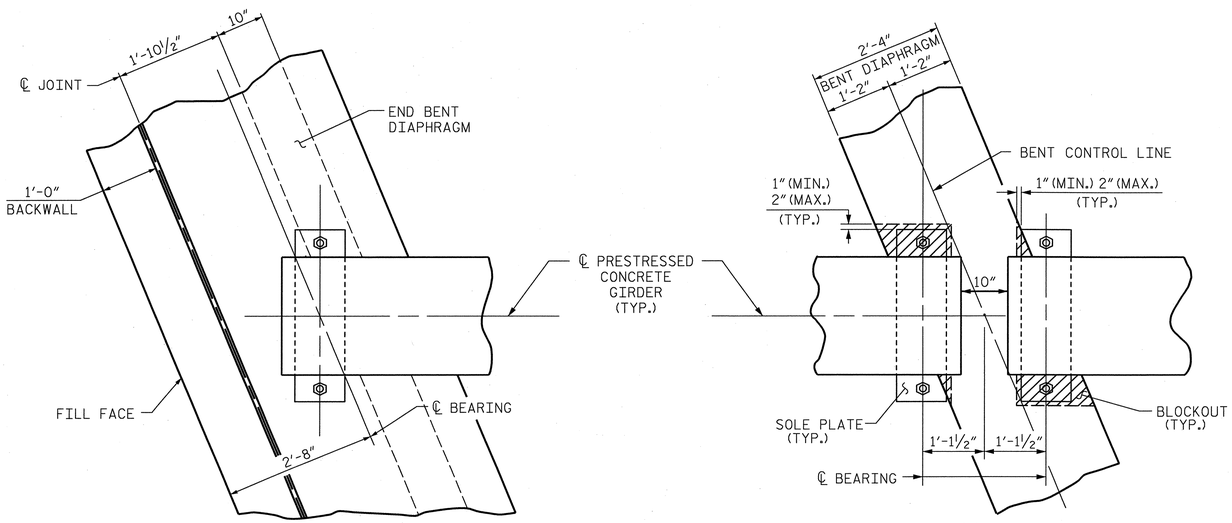
SECTION AT END BENT DIAPHRAGM

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



SECTION AT BENT DIAPHRAGM

* MEASURED ALONG ℄ GIRDER



END BENT DIAPHRAGM

PLAN

SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN P. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : JAN 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

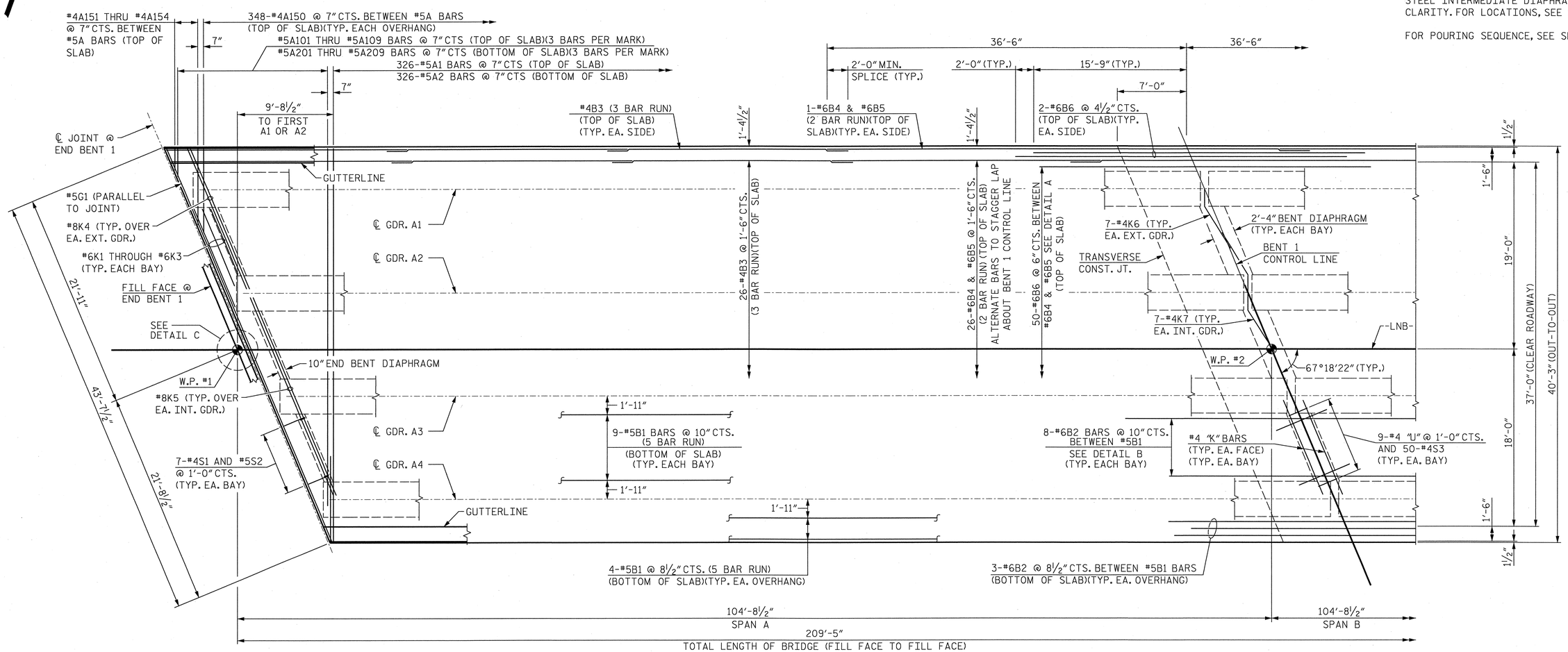
5/9/2012
U2524AE_SD_TS_L02.dgn

NOTES

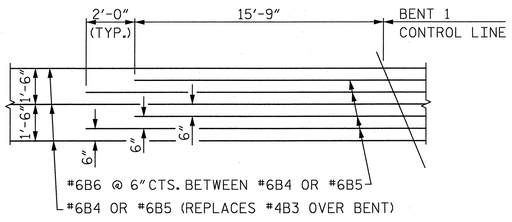
FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON SHEET NO. S-17.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE SHEET NO. S-9.

FOR POURING SEQUENCE, SEE SHEET NO. S-17.

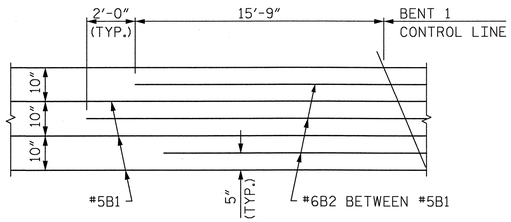


PLAN OF SPAN A



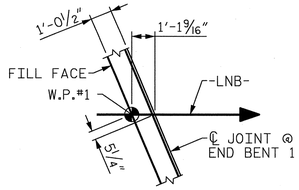
DETAIL A

TOP OF SLAB BARS



DETAIL B

BOTTOM OF SLAB BARS



DETAIL C

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN A

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON A. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

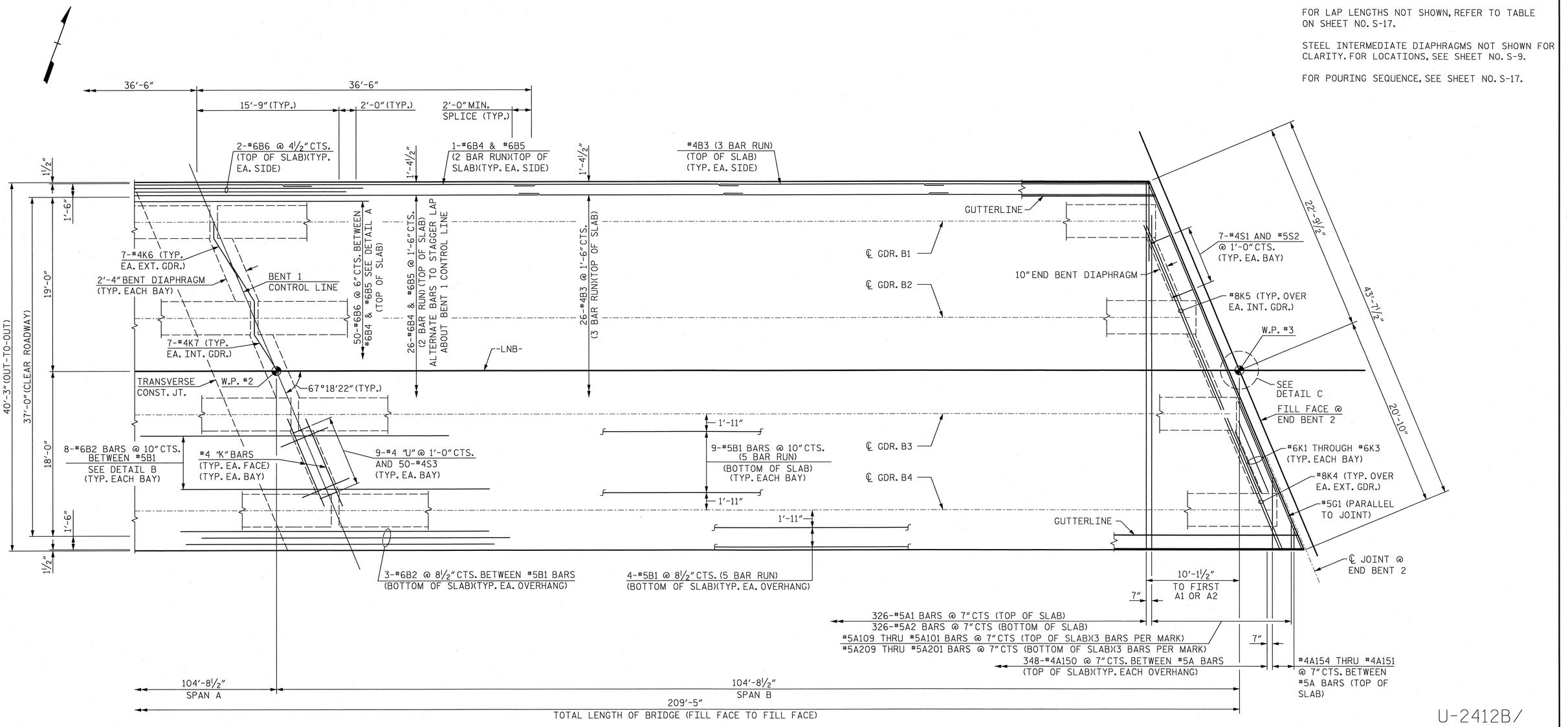
5/9/2012
U2524AE_SD_S1_L01.dgn

NOTES

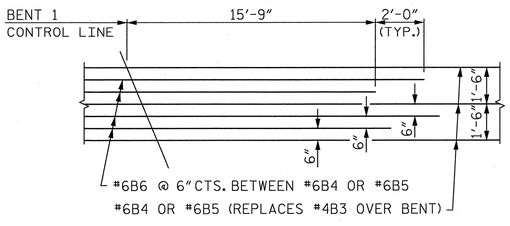
FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON SHEET NO. S-17.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE SHEET NO. S-9.

FOR POURING SEQUENCE, SEE SHEET NO. S-17.

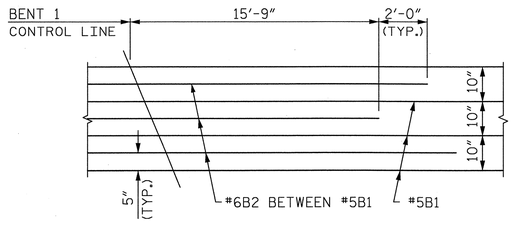


PLAN OF SPAN B



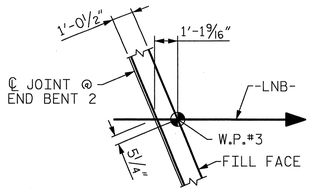
DETAIL A

TOP OF SLAB BARS



DETAIL B

BOTTOM OF SLAB BARS



DETAIL C

U-2412B/
PROJECT NO. U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN B

LEFT LANE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN M. DOUGHTY
5/10/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			57

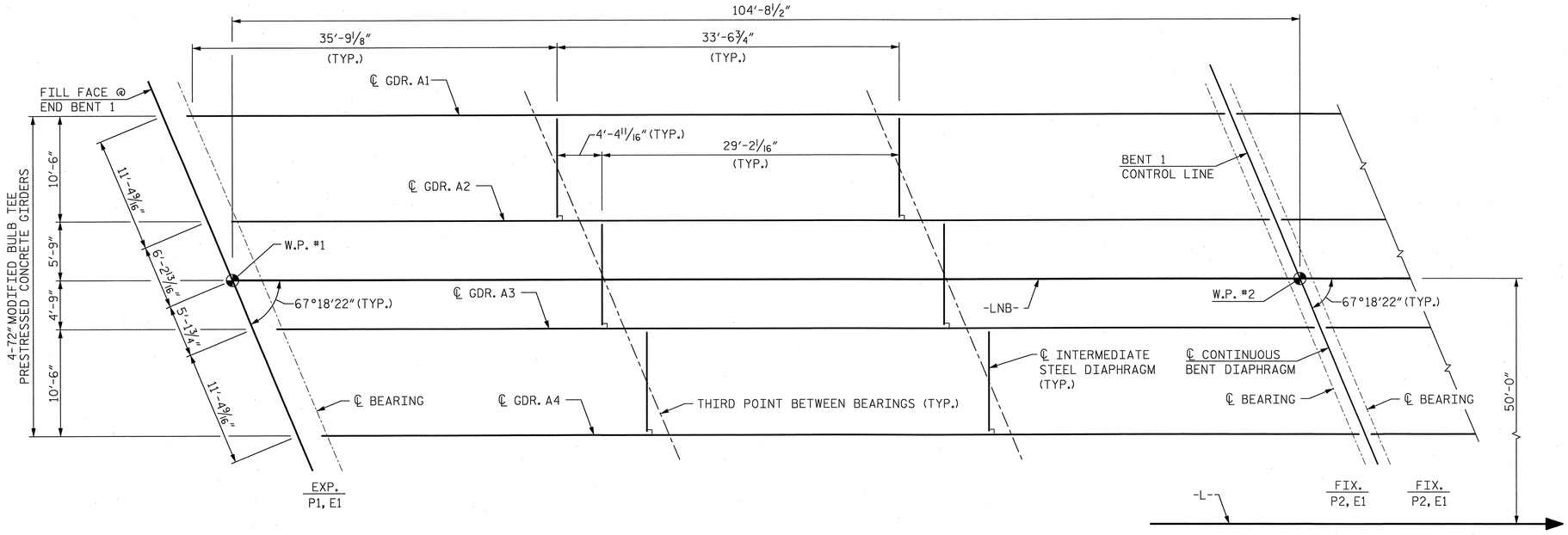
DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_S2_L02.dgn

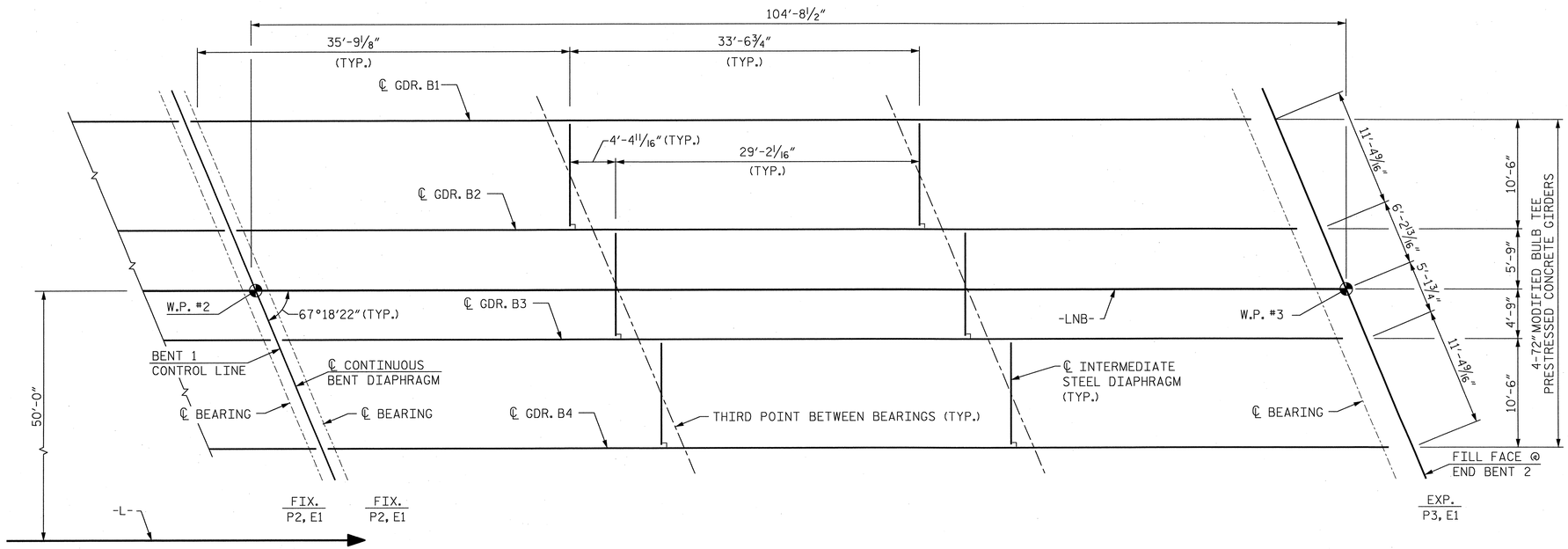
NOTES

ALL DIMENSIONS ARE HORIZONTAL.

CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.



SPAN A



SPAN B

FRAMING PLAN

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

LEFT LANE

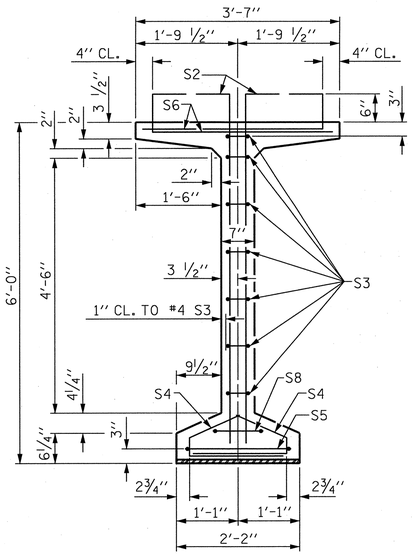
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

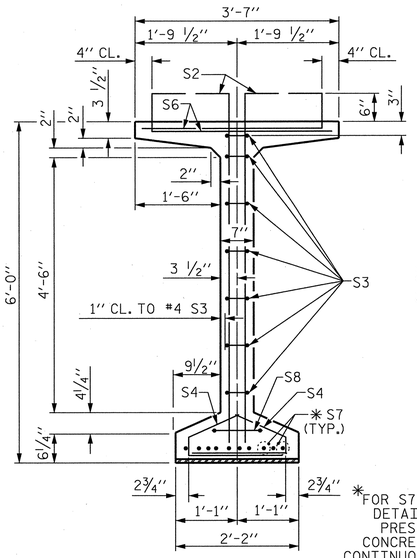
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : JAN 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_FP_L01.dgn

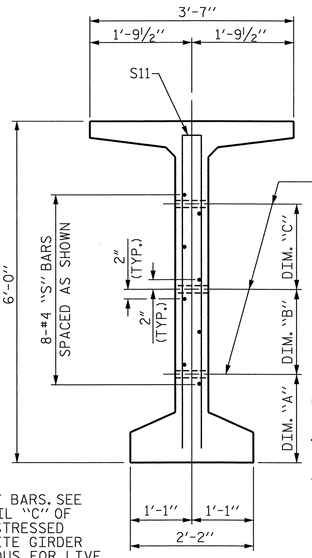


SECTION A-A



SECTION B-B

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

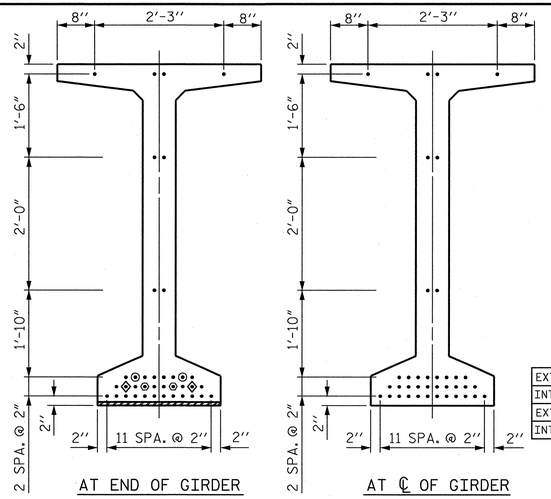


SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)

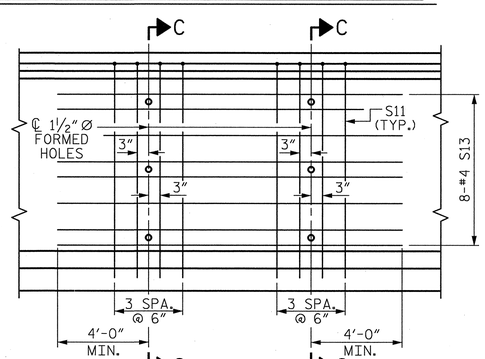
DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



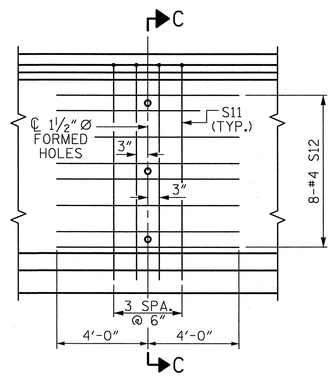
0.6" Ø LOW RELAXATION STRAND LAYOUT

EXTERIOR GDR.	S11	8	#5	2	11'-8"	97
INTERIOR GDR.	S11	16	#5	2	11'-8"	195
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	12'-5"	133



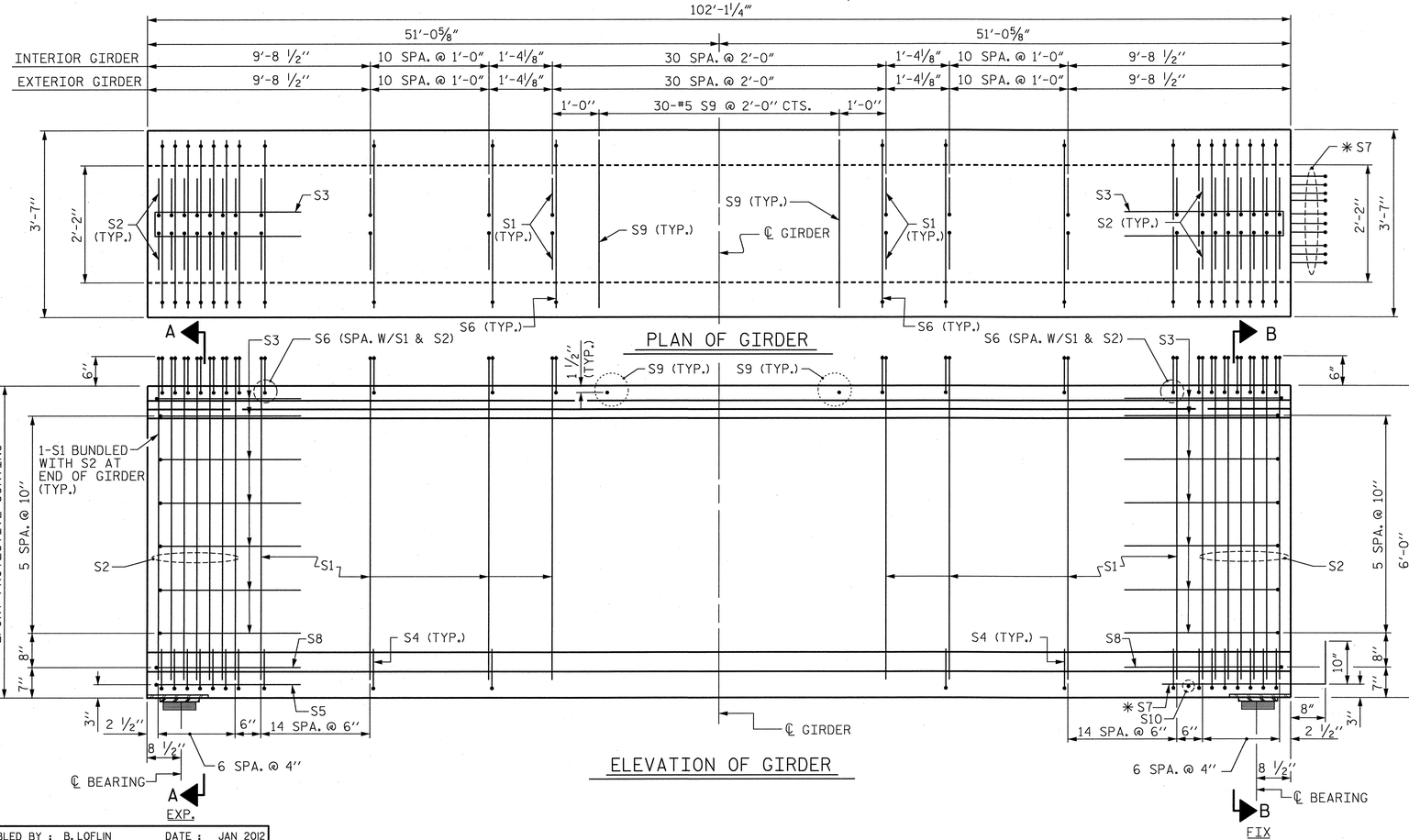
PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A2 AND A3



PARTIAL ELEVATION

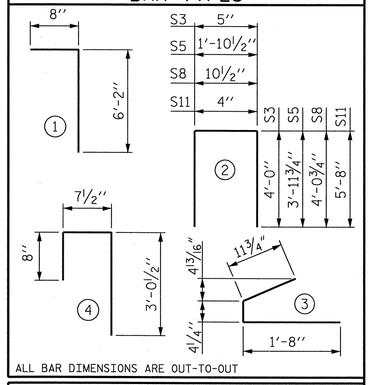
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A1 AND A4



PLAN OF GIRDER

ELEVATION OF GIRDER

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

0.6" Ø L.R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	166	#4	1	6'-10"	758
S2	28	#5	1	6'-10"	200
S3	14	#4	2	8'-5"	79
S4	128	#4	3	3'-0"	257
S5	1	#5	2	9'-10"	10
S6	190	#5	4	4'-4"	859
✱S7	10	#5	STR	3'-8"	38
S8	2	#5	2	9'-0"	19
S9	30	#5	STR	3'-3"	102
S10	1	#3	STR	1'-10"	1

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

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL (LB.)	8000 PSI CONCRETE (C.Y.)	0.6" Ø L.R. STRANDS (No.)
EXTERIOR GIRDER	2506	21.9	38
INTERIOR GIRDER	2651	21.9	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	102'-1 1/4"	408'-5"

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN A LEFT LANE

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : EEM 2/6/97	REV. 10/17/00 RWW/LES
CHECKED BY : VAP 2/6/97	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON A. DOUGHTY
5/10/12

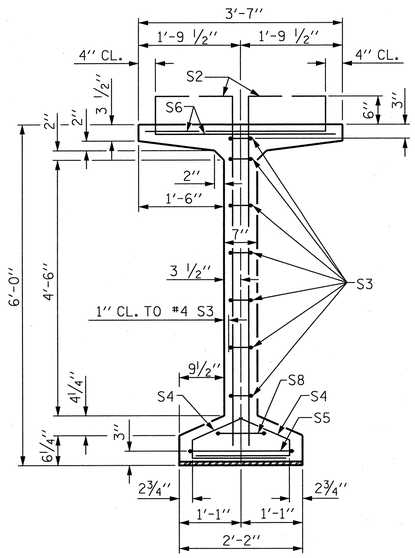
REVISIONS

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

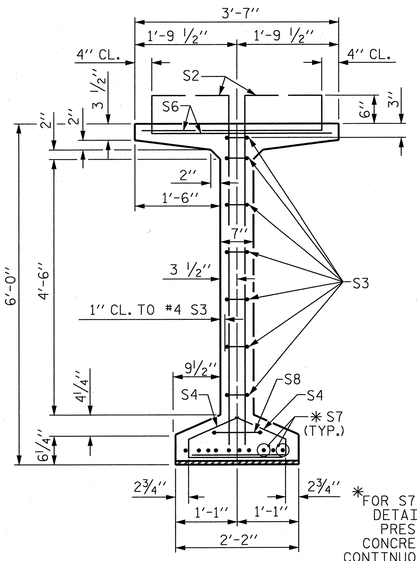
SHEET NO. S-10
TOTAL SHEETS 57

STD. NO. PCG8

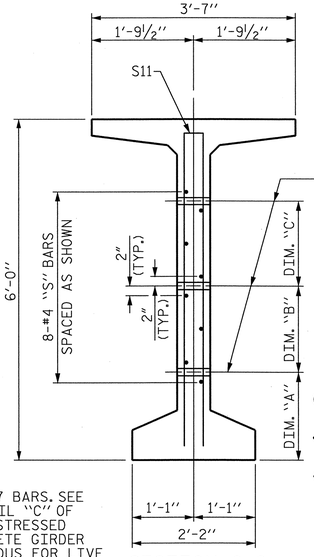
5/9/2012
U2524AE_SD_G1_L01.dgn



SECTION A-A



SECTION B-B



℄ 1½" Ø FORMED HOLE. SEE ELEVATION FOR LOCATION. FOR DIM. "A", "B" & "C" SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.)

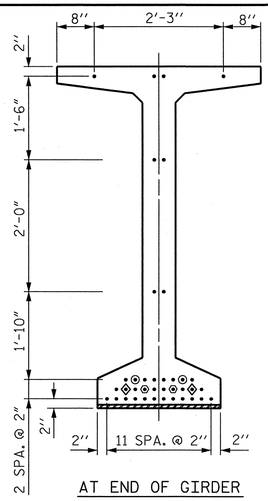
SECTION C-C

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

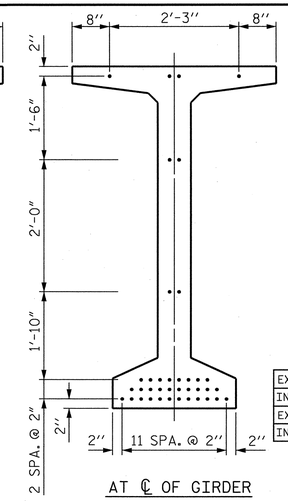
(S1, S6 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



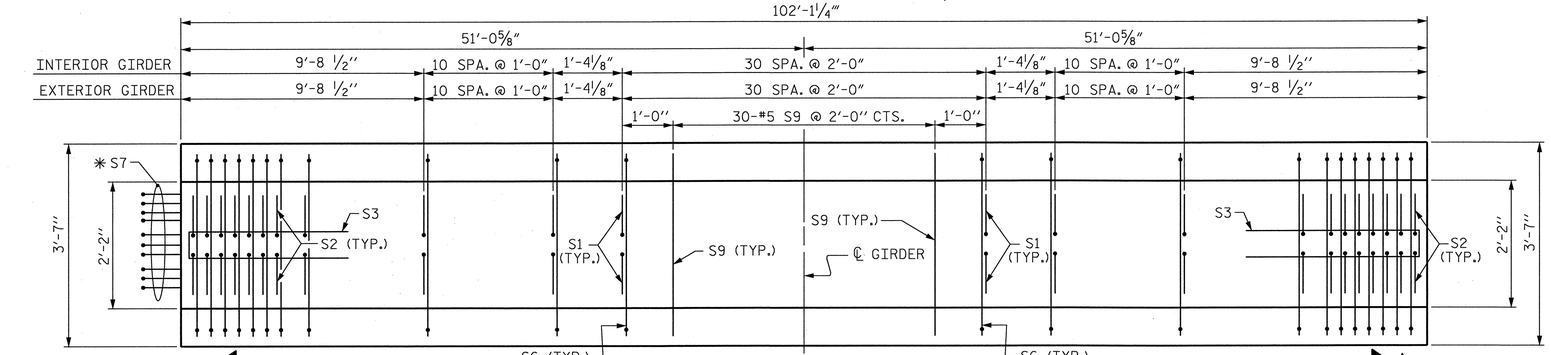
AT END OF GIRDER



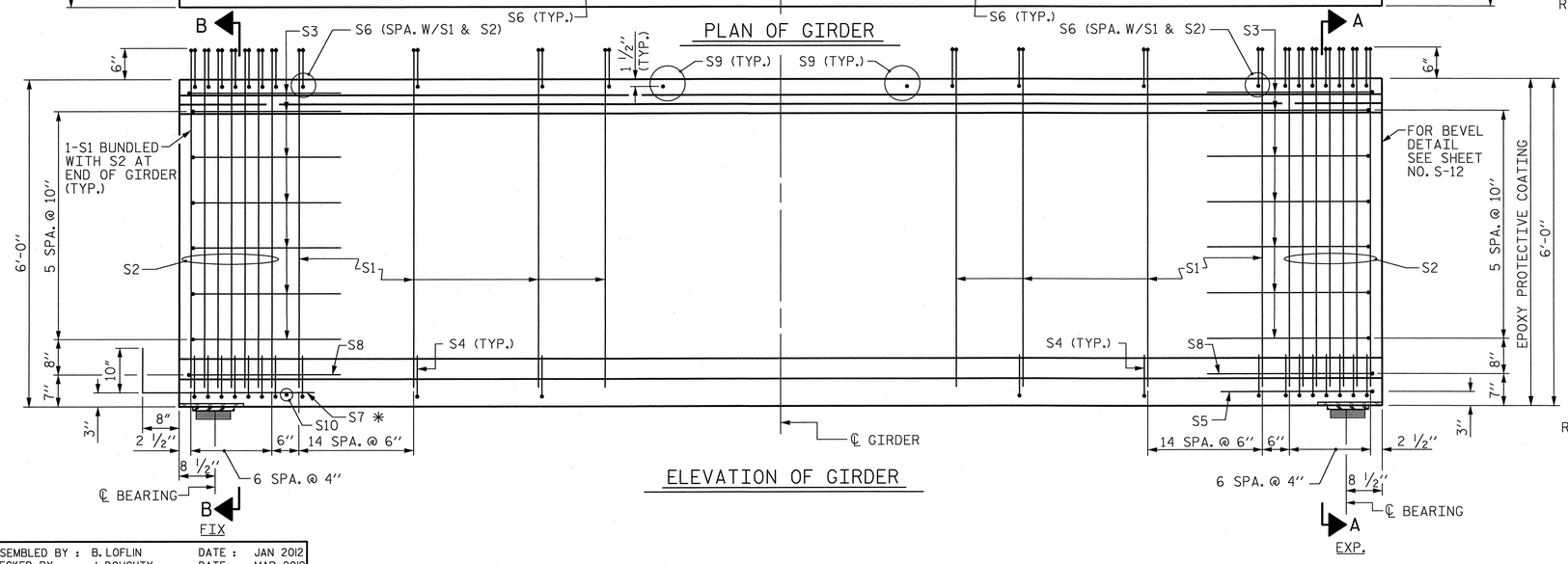
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

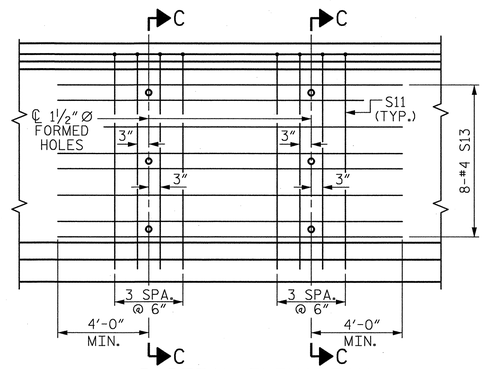
EXTERIOR GDR.	S11	8	#5	2	11'-8"	97
INTERIOR GDR.	S11	16	#5	2	11'-8"	195
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	12'-5"	133



PLAN OF GIRDER

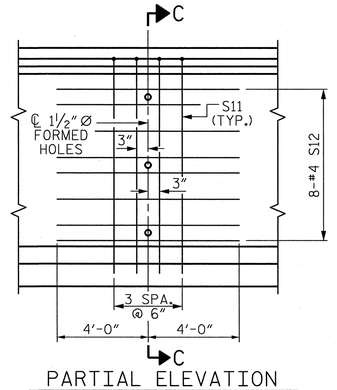


ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B2 AND B3



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B1 AND B4

0.6" Ø L. R. GRADE 270 STRANDS

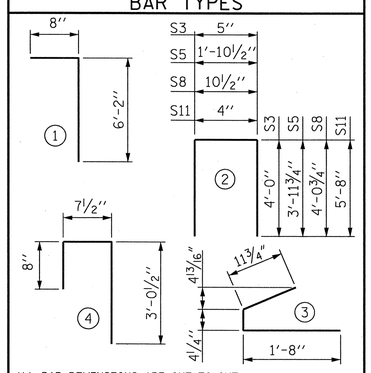
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	166	#4	1	6'-10"	758
S2	28	#5	1	6'-10"	200
S3	14	#4	2	8'-5"	79
S4	128	#4	3	3'-0"	257
S5	1	#5	2	9'-10"	10
S6	190	#5	4	4'-4"	859
* S7	10	#5	STR	3'-8"	38
S8	2	#5	2	9'-0"	19
S9	30	#5	STR	3'-3"	102
S10	1	#3	STR	1'-10"	1
S11	8	#5	2	11'-8"	97
S11	16	#5	2	11'-8"	195
S12	16	#4	STR	8'-0"	86
S13	16	#4	STR	12'-5"	133

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL (LB.)	8000 PSI CONCRETE (C.Y.)	0.6" Ø L.R. STRANDS (No.)
EXTERIOR GIRDER	2506	21.9	38
INTERIOR GIRDER	2651	21.9	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	102'-1¼"	408'-5"

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B LEFT LANE

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : EEM 2/6/97	REV. 10/17/00 RWW/LES
CHECKED BY : VAP 2/6/97	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

REVISIONS

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

SHEET NO. S-11

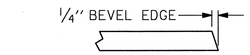
TOTAL SHEETS 57

STD. NO. PCG8

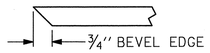
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/9/12

5/9/2012
U2524AE_SD_G2_L02.dgn

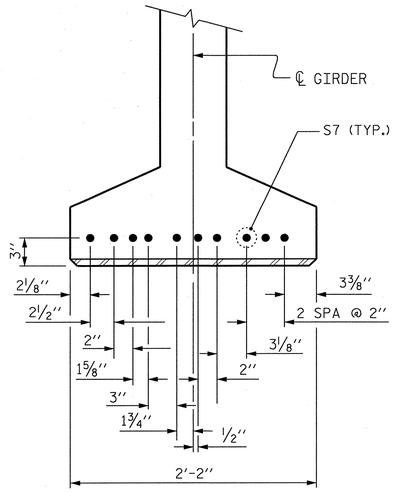


SECTION "G"

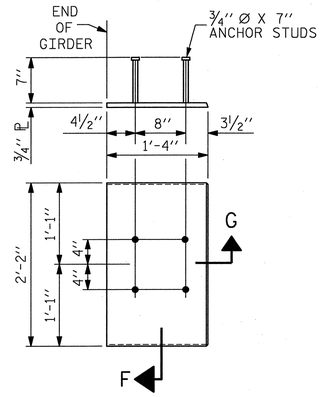


SECTION "F"

(SEE NOTES)



DETAIL "C"



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

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

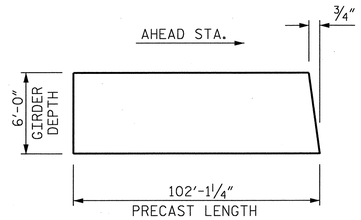
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

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

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

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 72" MODIFIED BULB TEES ONLY.



GIRDER BEVEL DETAIL

APPLIES TO ALL SPAN B GIRDERS

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPANS A AND B GIRDERS 1 AND 4										
TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.090	0.153	0.198	0.224	0.232	0.224	0.198	0.153	0.090	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.030	0.058	0.079	0.093	0.098	0.093	0.079	0.058	0.030	0.000
FINAL CAMBER ↑	0	11/16"	1 1/8"	1 7/16"	1 9/16"	1 5/8"	1 9/16"	1 7/16"	1 1/8"	11/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPANS A AND B GIRDERS 2 AND 3										
TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.090	0.153	0.198	0.224	0.232	0.224	0.198	0.153	0.090	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.033	0.063	0.087	0.102	0.107	0.102	0.087	0.063	0.033	0.000
FINAL CAMBER ↑	0	11/16"	1 1/16"	1 5/16"	1 7/16"	1 1/2"	1 7/16"	1 5/16"	1 1/16"	11/16"	0

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

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012	REV. 7/10/01RR	LES/RDR
CHECKED BY : J. DOUGHTY	DATE : MAR 2012	REV. 5/1/06	TLA/GM
DRAWN BY : ELR 11/91		REV. 10/1/11	MAA/GM
CHECKED BY : GRP 11/91			

5/9/2012
U2524AE_SD_03_L03.dgn

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SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

PROJECT NO. U-2412B/ U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

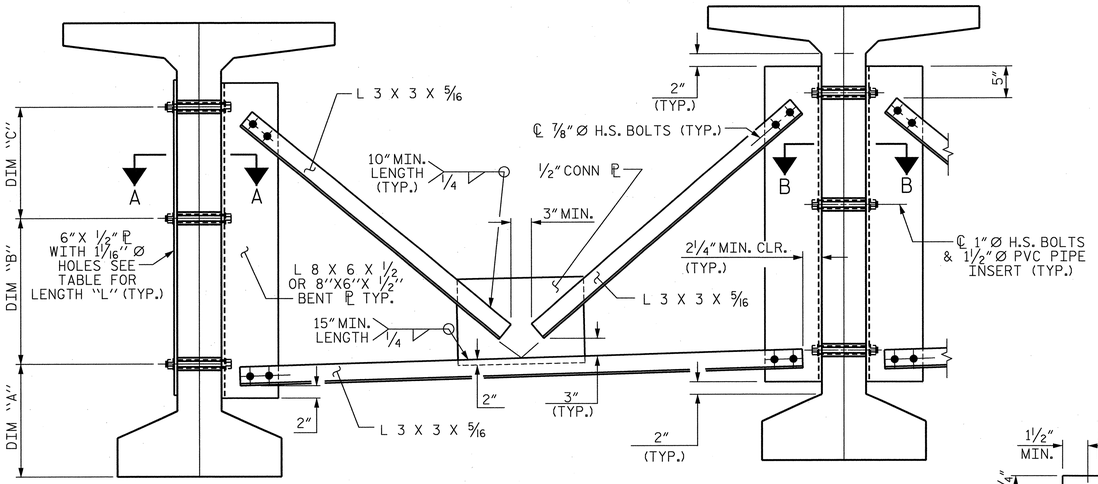
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			57

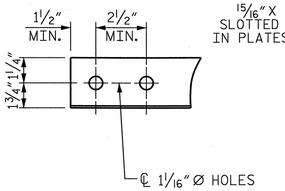
STD. NO. PCG9 (Sht. 5)



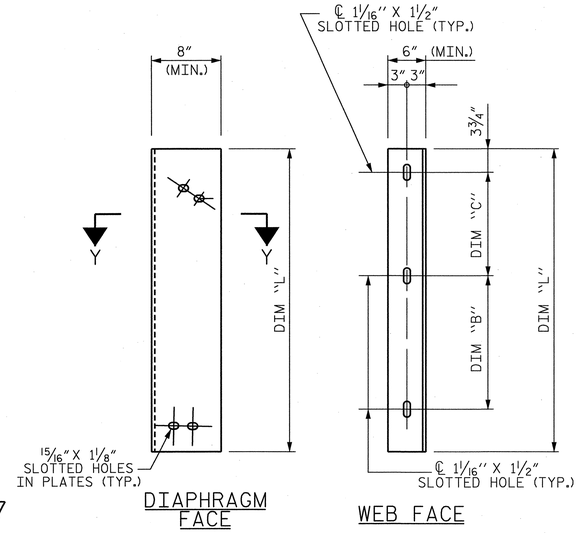
EXTERIOR GIRDER

INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

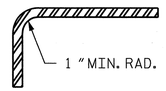


ANGLE END
(L 3 X 3 X 5/16)



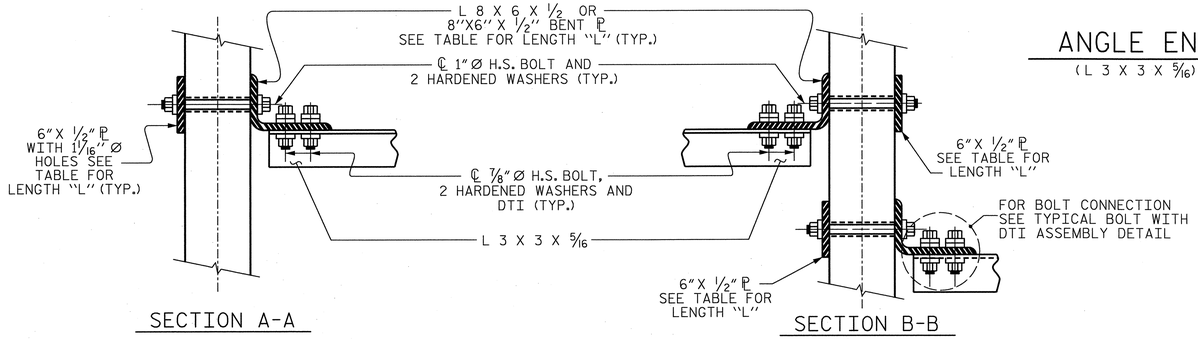
DIAPHRAGM FACE

WEB FACE



SECTION Y-Y

CONNECTION DETAILS



SECTION A-A

SECTION B-B

CONNECTION DETAILS

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

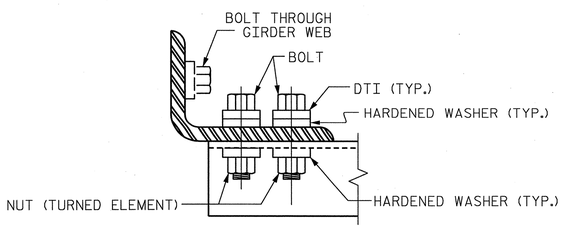
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-6"	1'-11"	1'-5 3/4"	4'-2"



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			57

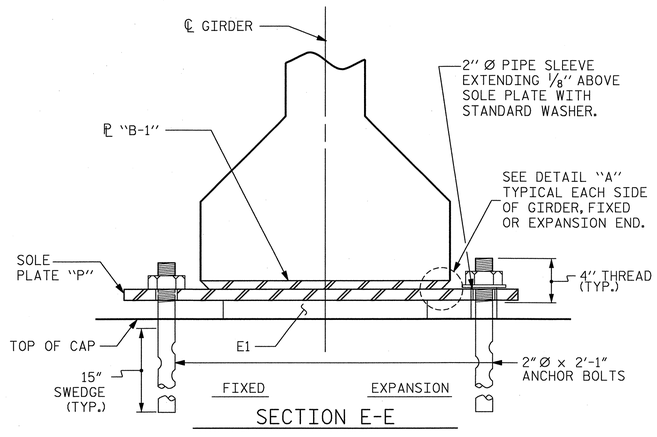
STD. NO. PCG11

ASSEMBLED BY : B. LOFLIN DATE : JAN 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012
DRAWN BY : RWW 11/09 ADDED 11/23/09R
CHECKED BY : GM 11/09 REV. 10/1/11 MAA/GM

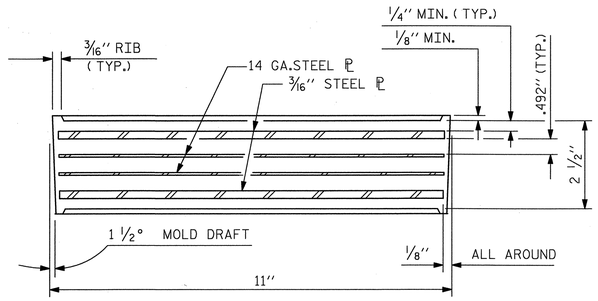
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/10/12

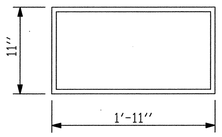
5/10/2012
U2524AE_SD_G4_L04.dgn



SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (16 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI

NOTES

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

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

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

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

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

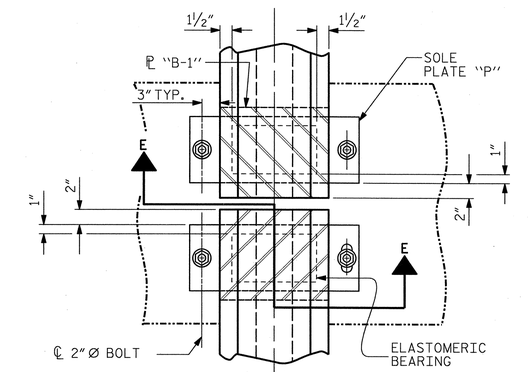
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

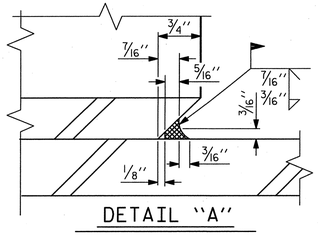
BEARINGS DESIGNED USING METHOD B.

NEOPRENE IN BEARING PADS SHALL HAVE A SHEAR MODULUS (G) OF 160 psi.

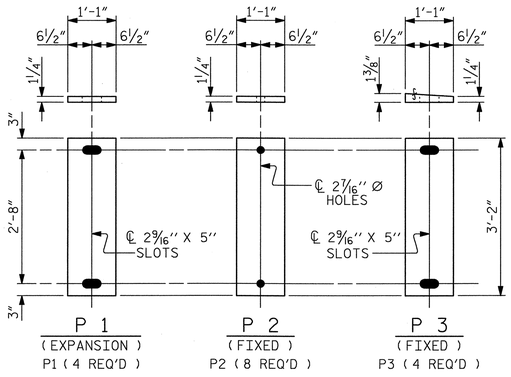


TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



DETAIL "A"



SOLE PLATE DETAILS ("P")

— SERVICE I — DESIGN REACTION	
	MAX.D.L.+ L.L.
TYPE VI	287 K

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			57

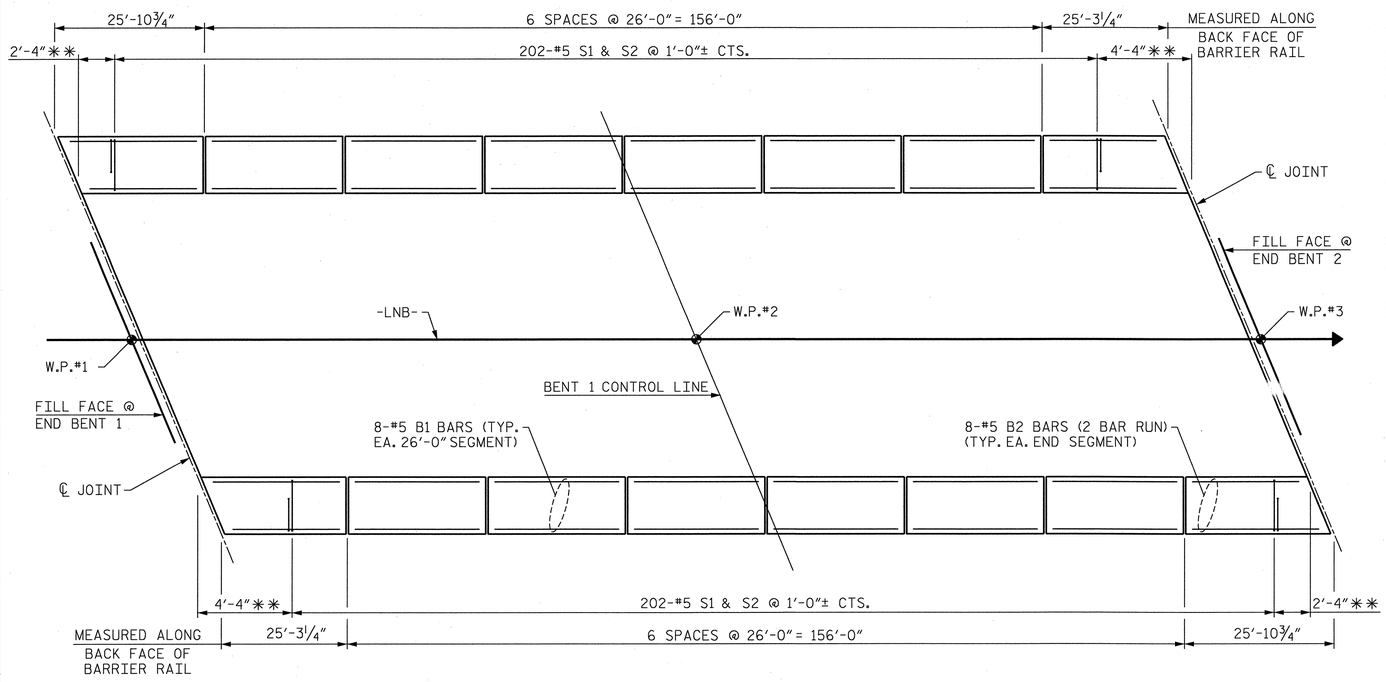
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 536-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/10/12

ASSEMBLED BY : K. WHITE	DATE : FEB 2012	REV. 10/17/00	RWW/LES
CHECKED BY : J. DOUGHTY	DATE : MAR 2012	REV. 5/1/06	TLA/GM
DRAWN BY : EEM 2/97		REV. 10/1/11	MAA/GM
CHECKED BY : VAP 2/97			

5/9/2012
U2524AE_SD_BG_L01.dgn

STD. NO. EB4



SPAN A SPAN B

PLAN OF CONCRETE BARRIER RAIL

** SEE "END OF RAIL DETAILS" FOR ADDITIONAL REINFORCEMENT

NOTES

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

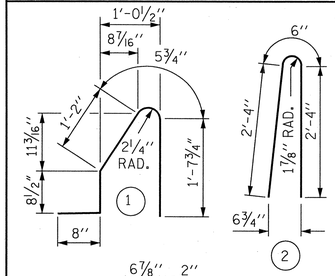
WHEN EVAZOTE JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 AND #5 S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 AND #5 S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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

BAR TYPES



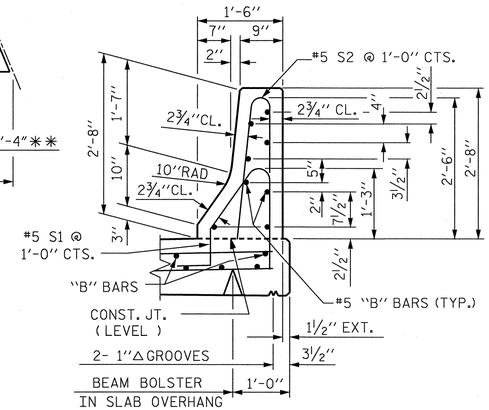
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

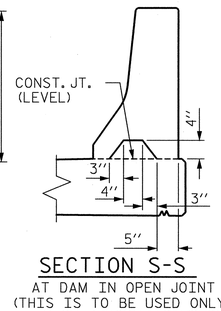
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	96	#5	STR	25'-7"	2562
* B2	64	#5	STR	14'-5"	962
* S1	404	#5	1	4'-8"	1966
* S2	404	#5	2	5'-2"	2177
* S3	12	#5	3	3'-4"	42
* S4	12	#5	STR	3'-2"	40

* EPOXY COATED REINFORCING STEEL	7749 LBS.
CLASS AA CONCRETE	41.5 CU. YDS.
CONCRETE BARRIER RAIL	414.3 LIN. FT.

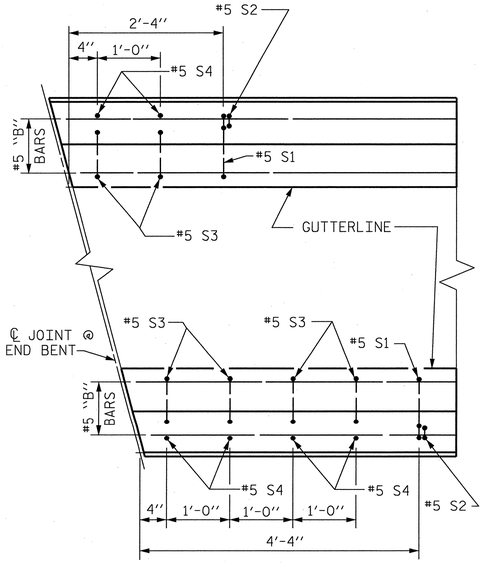


SECTION THRU RAIL

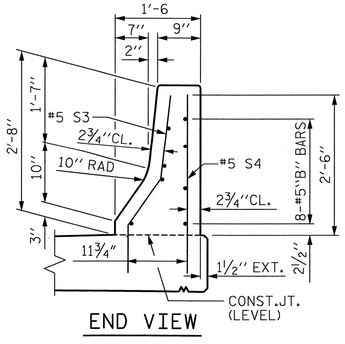


SECTION S-S

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

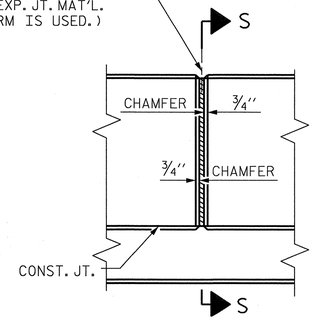


PLAN



END VIEW

℄ ½" EXP.JT.MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



ELEVATION AT EXPANSION JOINTS

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

BARRIER RAIL DETAILS

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

LEFT LANE

ASSEMBLED BY : B. LOFLIN	DATE : FEB 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : ARB 5/87	REV. 5/7/03R RWW/JTE
CHECKED BY : SJD 9/87	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

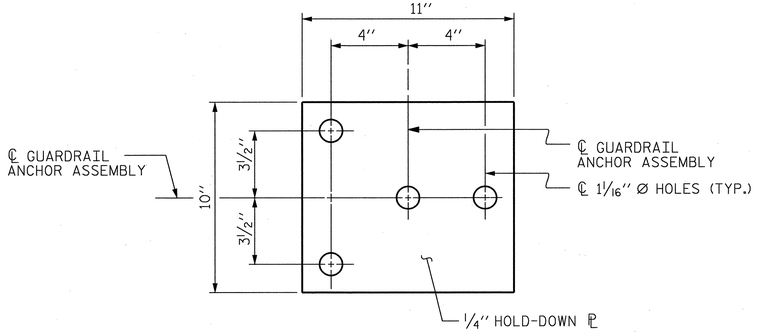
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

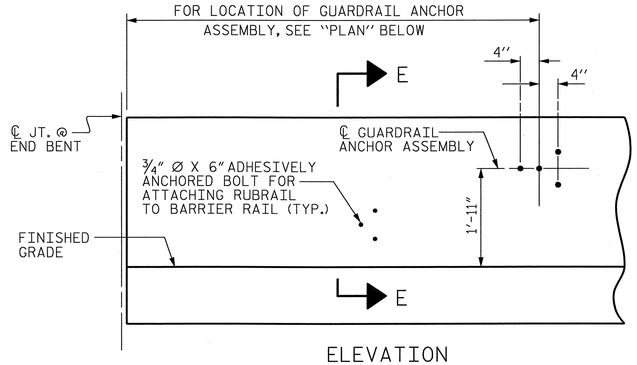
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN S. DOUGHTY
5/10/12

STD. NO. CBR1

5/9/2012
U2524AE_SD_BR_L01.dgn

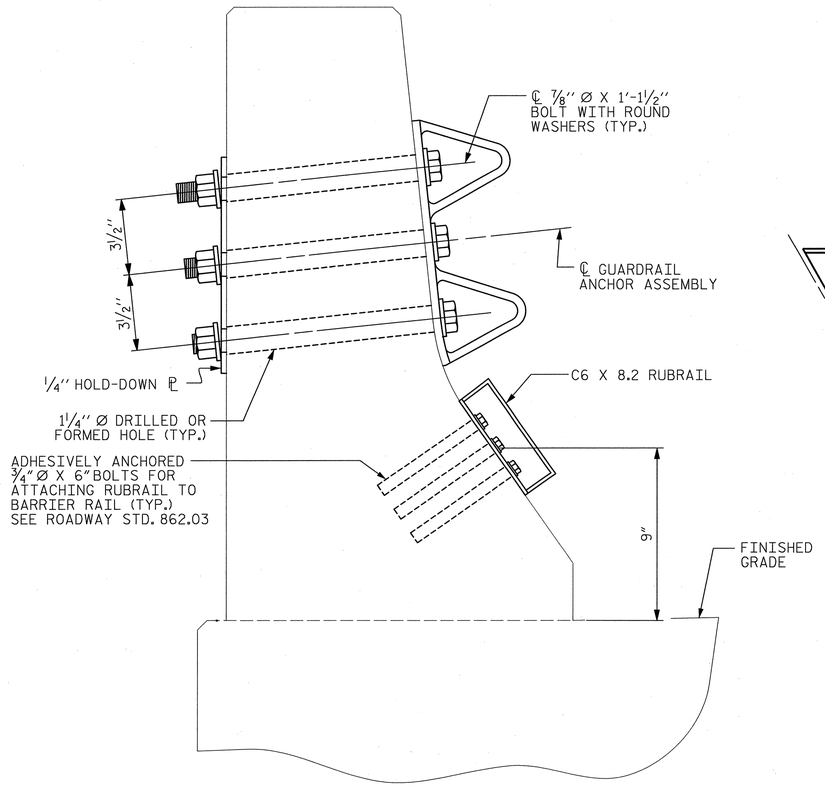


PLAN

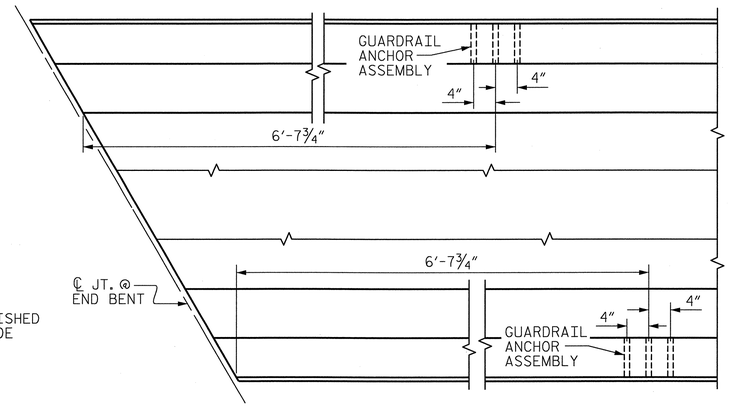


ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



SECTION E-E



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

NOTES

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

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

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

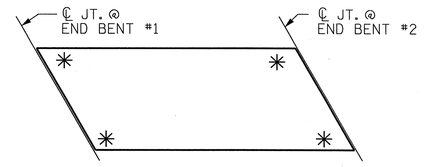
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

LEFT LANE

GUARDRAIL ANCHOR ASSEMBLY DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			57

STD. NO. GRA2

ASSEMBLED BY : B. LOFLIN	DATE : FEB 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : TLA 5/06	ADDED 5/1/06RR KMM/GM
CHECKED BY : GM 5/06	REV. 10/1/11 MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
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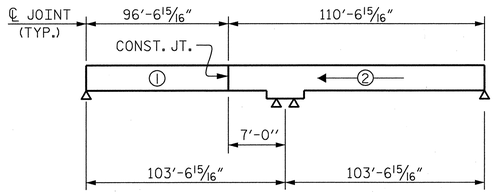
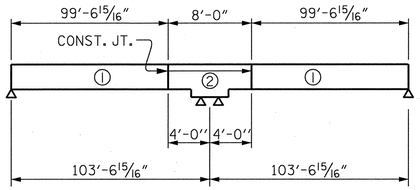
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOSEPH M. DOUGHTY
5/10/12

5/9/2012
U2524AE_SD_GR_L01.dgn



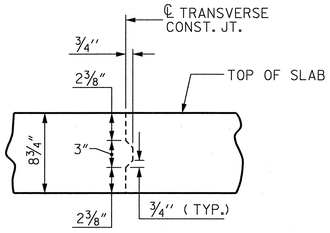
POURING SEQUENCE



OPTIONAL POURING SEQUENCE

POUR ② CANNOT BE STARTED UNTIL POUR ① REACHES A MINIMUM OF 3000 psi.

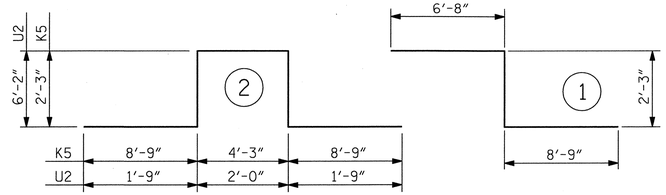
←(#)— = INDICATES POUR NUMBER AND DIRECTION OF POUR

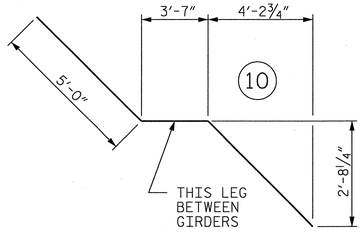


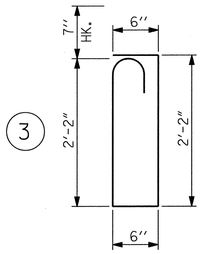
TRANSVERSE CONSTRUCTION JOINT DETAIL

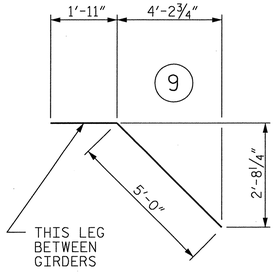
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT

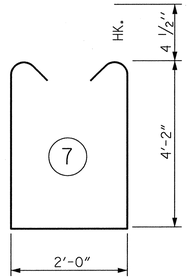
BAR TYPES

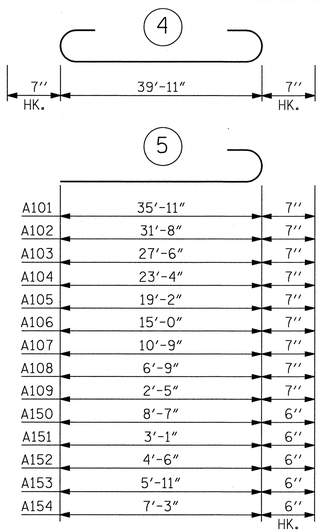


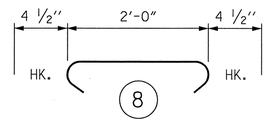


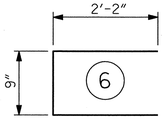












ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	326	5	4	41′-1″	13969
A2	326	5	STR	39′-11″	13572
✱A101	6	5	5	36′-6″	228
✱A102	6	5	5	32′-3″	202
✱A103	6	5	5	28′-1″	176
✱A104	6	5	5	23′-11″	150
✱A105	6	5	5	19′-9″	124
✱A106	6	5	5	15′-7″	98
✱A107	6	5	5	11′-4″	71
✱A108	6	5	5	7′-4″	46
✱A109	6	5	5	3′-0″	19
✱A150	696	4	5	9′-1″	4223
✱A151	2	4	5	3′-7″	5
✱A152	2	4	5	5′-0″	7
✱A153	2	4	5	6′-5″	9
✱A154	2	4	5	7′-9″	10
A201	6	5	STR	35′-11″	225
A202	6	5	STR	31′-8″	198
A203	6	5	STR	27′-6″	172
A204	6	5	STR	23′-4″	146
A205	6	5	STR	19′-2″	120
A206	6	5	STR	15′-0″	94
A207	6	5	STR	10′-9″	67
A208	6	5	STR	6′-9″	42
A209	6	5	STR	2′-5″	15

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	175	5	STR	43′-2″	7879
B2	30	6	STR	33′-6″	1510
✱B3	168	4	STR	24′-4″	2731
✱B4	28	6	STR	48′-9″	2050
✱B5	28	6	STR	27′-3″	1146
✱B6	54	6	STR	33′-6″	2717
✱G1	2	5	STR	43′-3″	90
✱K1	6	6	STR	10′-4″	93
✱K2	6	6	STR	8′-0″	72
✱K3	6	6	STR	7′-1″	64
✱K4	8	8	1	17′-8″	377
✱K5	8	8	2	26′-3″	561
K6	14	4	9	6′-11″	65
K7	14	4	10	13′-7″	127
K8	6	4	STR	7′-4″	29
K9	30	4	STR	10′-4″	207
K10	6	4	STR	7′-1″	28
✱S1	42	4	6	5′-1″	143
✱S2	42	5	3	5′-11″	259
S3	150	4	8	2′-9″	276
U1	6	4	7	11′-1″	44
✱U2	21	4	2	17′-10″	250

REINFORCING STEEL	(LBS.)	24816
✱ EPOXY COATED REINFORCING STEEL	(LBS.)	29890

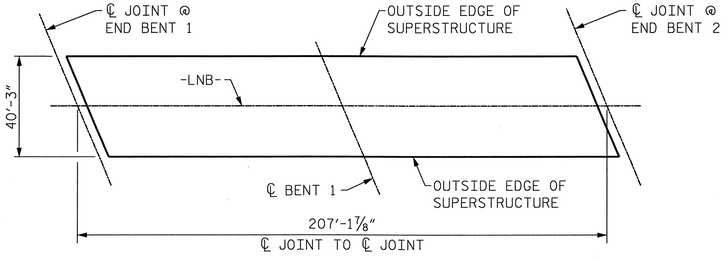
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	126.8		
POUR 2	161.6		
TOTALS✱✱	288.4	24816	29890

✱✱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 FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 8338)

GROOVING BRIDGE FLOORS

APPROACH SLABS	1623	SQ.FT.
BRIDGE DECK	6998	SQ.FT.
TOTAL	8621	SQ.FT.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

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-17
1			3			TOTAL SHEETS
2			4			57

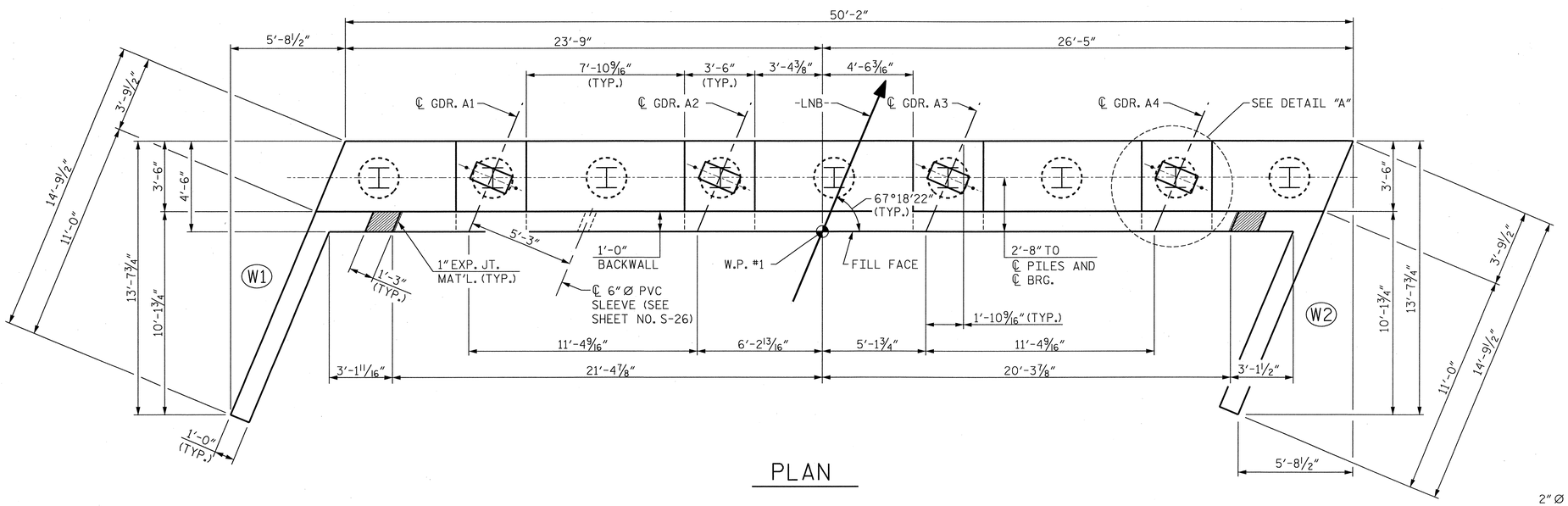
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/9/12

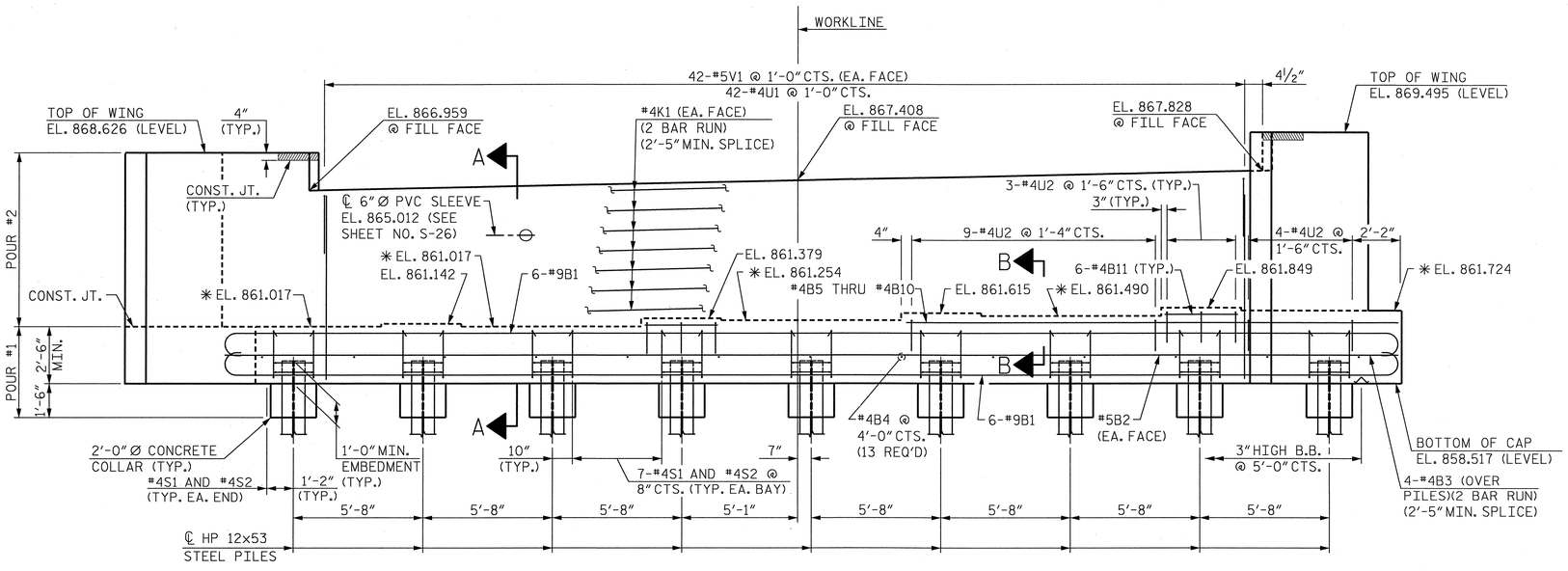
ASSEMBLED BY :	K. WHITE	DATE :	MAR 2012
CHECKED BY :	J. DOUGHTY	DATE :	MAR 2012
DRAWN BY : JMB 5/87	REV. 8/16/99		RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/06		TLA/GM
	REV. 10/1/11		MAA/GM

5/9/2012
U2524AE_SD_BM_L01.dgn

STD. NO. BOM2



PLAN



ELEVATION

✳ FOR LOCATION OF ELEVATIONS BETWEEN BUILDUPS, SEE SECTION A-A AND SECTION B-B ON SHEET 3 OF 3.

NOTES

STIRRUPS AND #4U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

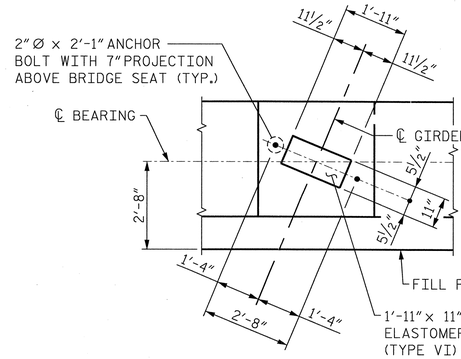
THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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 SAWED AND THE BARRIER RAIL ARE CAST IF SLIP FORMING IS USED.

FOR LOCATION AND DETAILS OF MULTI-CELL RACEWAY, SEE SHEET NO. S-26.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE ELECTRICAL CONDUIT SYSTEM THROUGH THE BACKWALL. REINFORCING STEEL MAY BE SHIFTED AS REQUIRED.



DETAIL "A"

(TYP. EA. GIRDER)

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

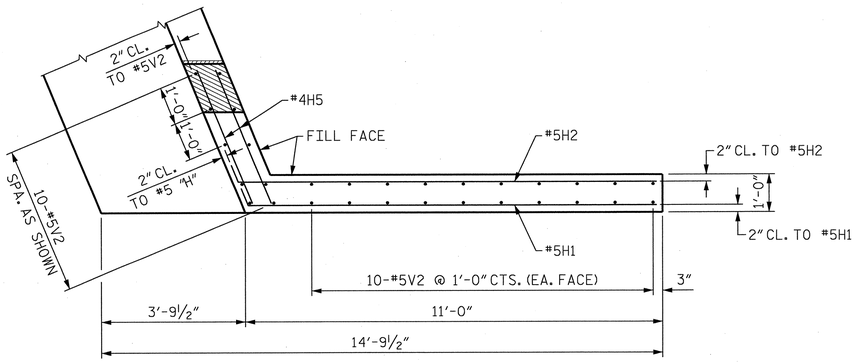
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

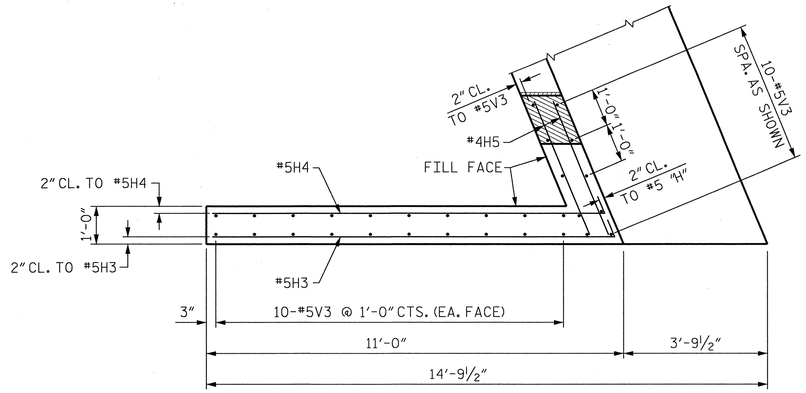
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

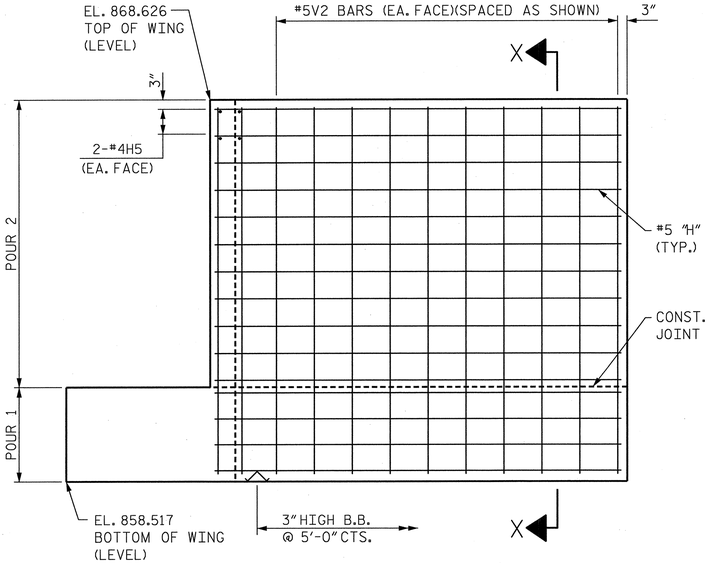
5/9/2012
U2524AE_SD_E1_L01.dgn



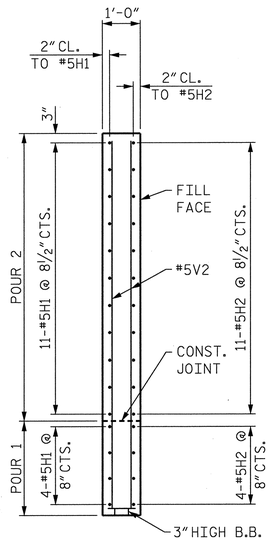
PLAN OF WING - W1



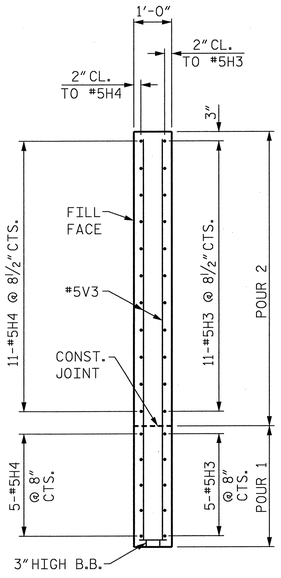
PLAN OF WING - W2



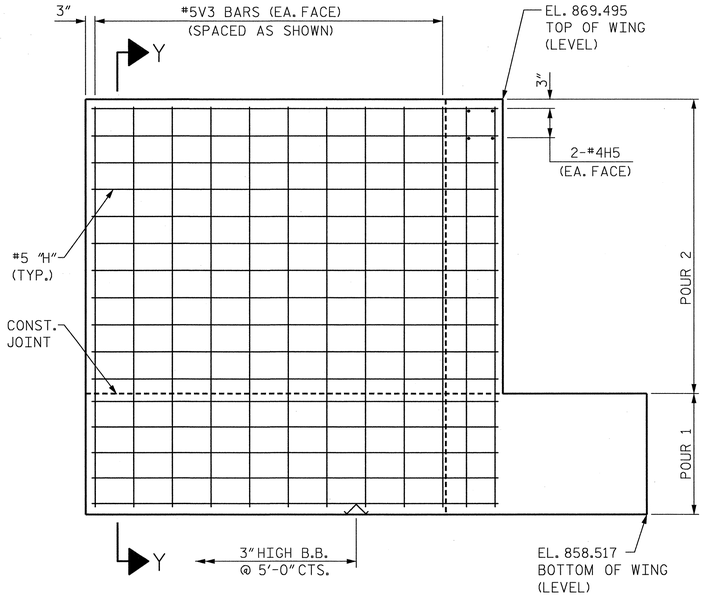
ELEVATION OF WING - W1



SECTION X-X



SECTION Y-Y



ELEVATION OF WING - W2

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -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-19
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
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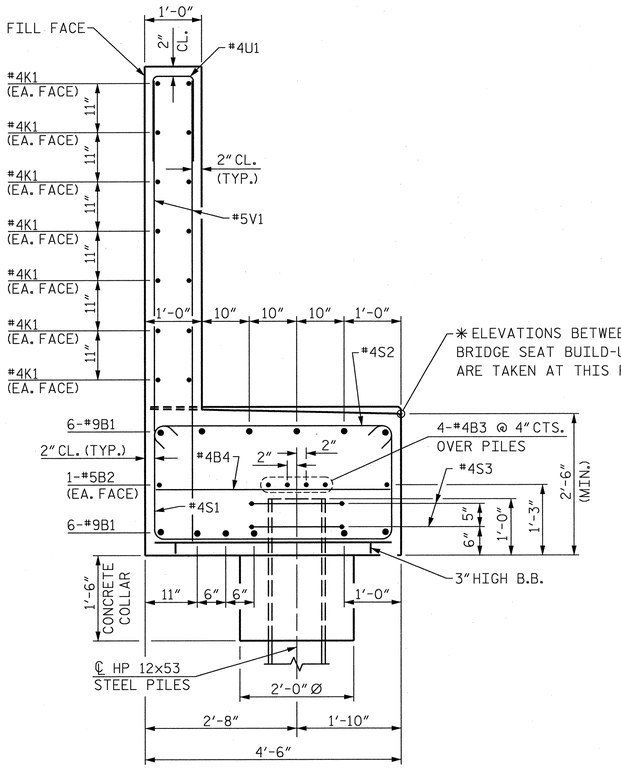
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON B. DOUGHTY
5/10/12

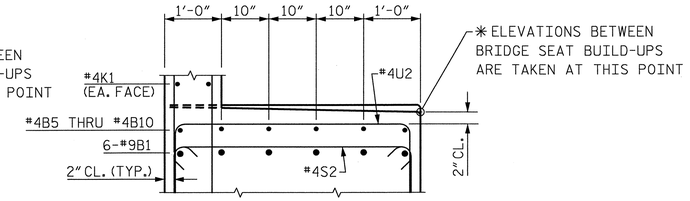
DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_E1_L02.dgn

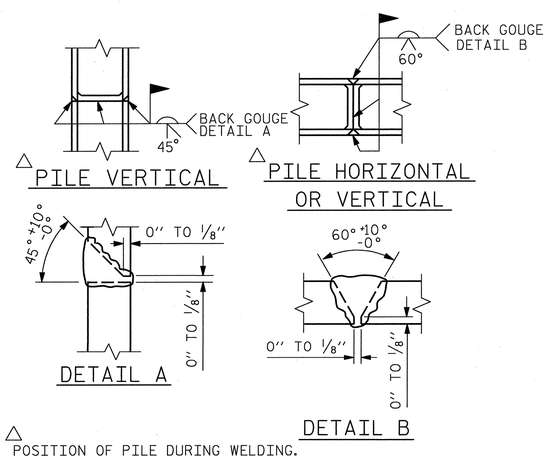


SECTION A-A

FOR LOCATION OF PVC SLEEVE FOR ELECTRICAL CONDUIT, SEE SHEET 1 OF 3.

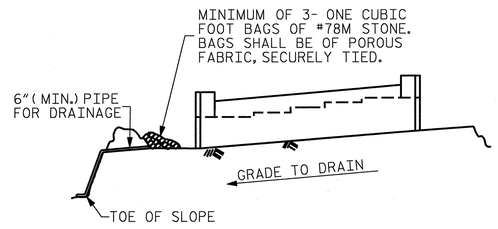


PARTIAL SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



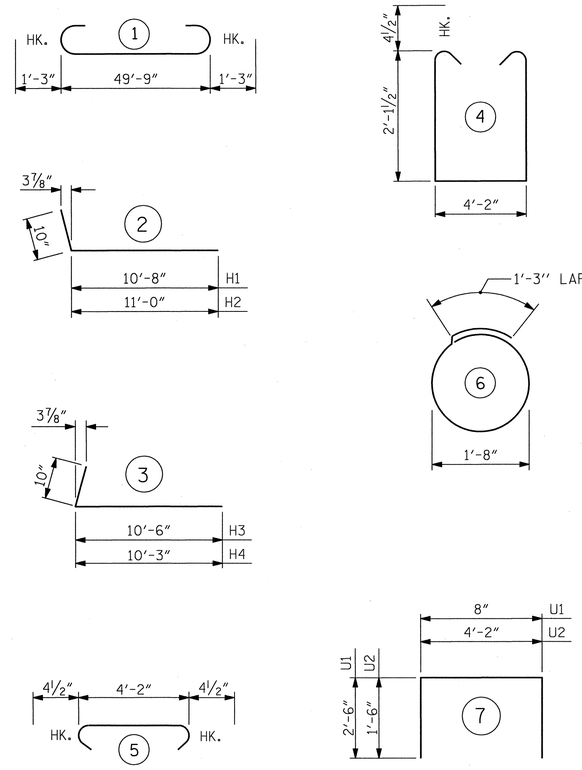
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	52'-3"	2132
B2	2	5	STR	49'-9"	104
B3	8	4	STR	26'-1"	139
B4	13	4	STR	4'-2"	36
B5	1	4	STR	19'-7"	13
B6	1	4	STR	19'-11"	13
B7	1	4	STR	20'-3"	14
B8	1	4	STR	20'-7"	14
B9	1	4	STR	20'-11"	14
B10	1	4	STR	21'-3"	14
B11	12	4	STR	3'-2"	25
H1	15	5	2	11'-6"	180
H2	15	5	2	11'-10"	185
H3	16	5	3	11'-4"	189
H4	16	5	3	11'-1"	185
H5	8	4	STR	3'-10"	20
K1	28	4	STR	26'-1"	488
S1	58	4	4	9'-2"	355
S2	58	4	5	4'-11"	190
S3	18	4	6	6'-6"	78
U1	42	4	7	5'-8"	159
U2	19	4	7	7'-2"	91
V1	84	5	STR	8'-0"	701
V2	30	5	STR	9'-8"	302
V3	30	5	STR	10'-6"	329

REINFORCING STEEL	LBS.	5970
CLASS A CONCRETE		
POUR #1: CAP, LOWER WINGS AND COLLARS	CU. YDS.	27.8
POUR #2: BACKWALL AND UPPER WINGS	CU. YDS.	17.3
TOTAL CLASS A CONCRETE	CU. YDS.	45.1
HP 12x53 STEEL PILES		
NO. 9	LIN. FT.	405

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

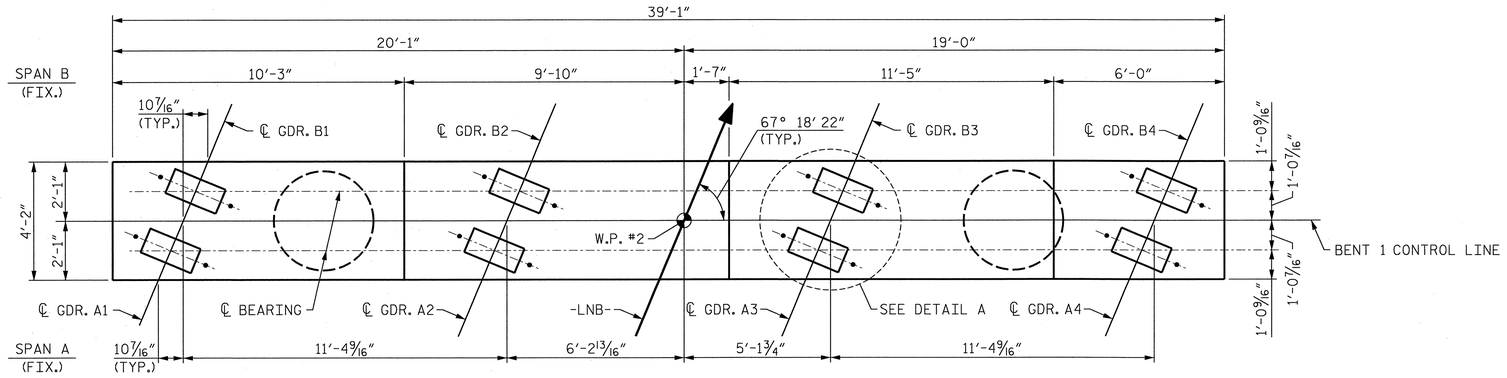
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

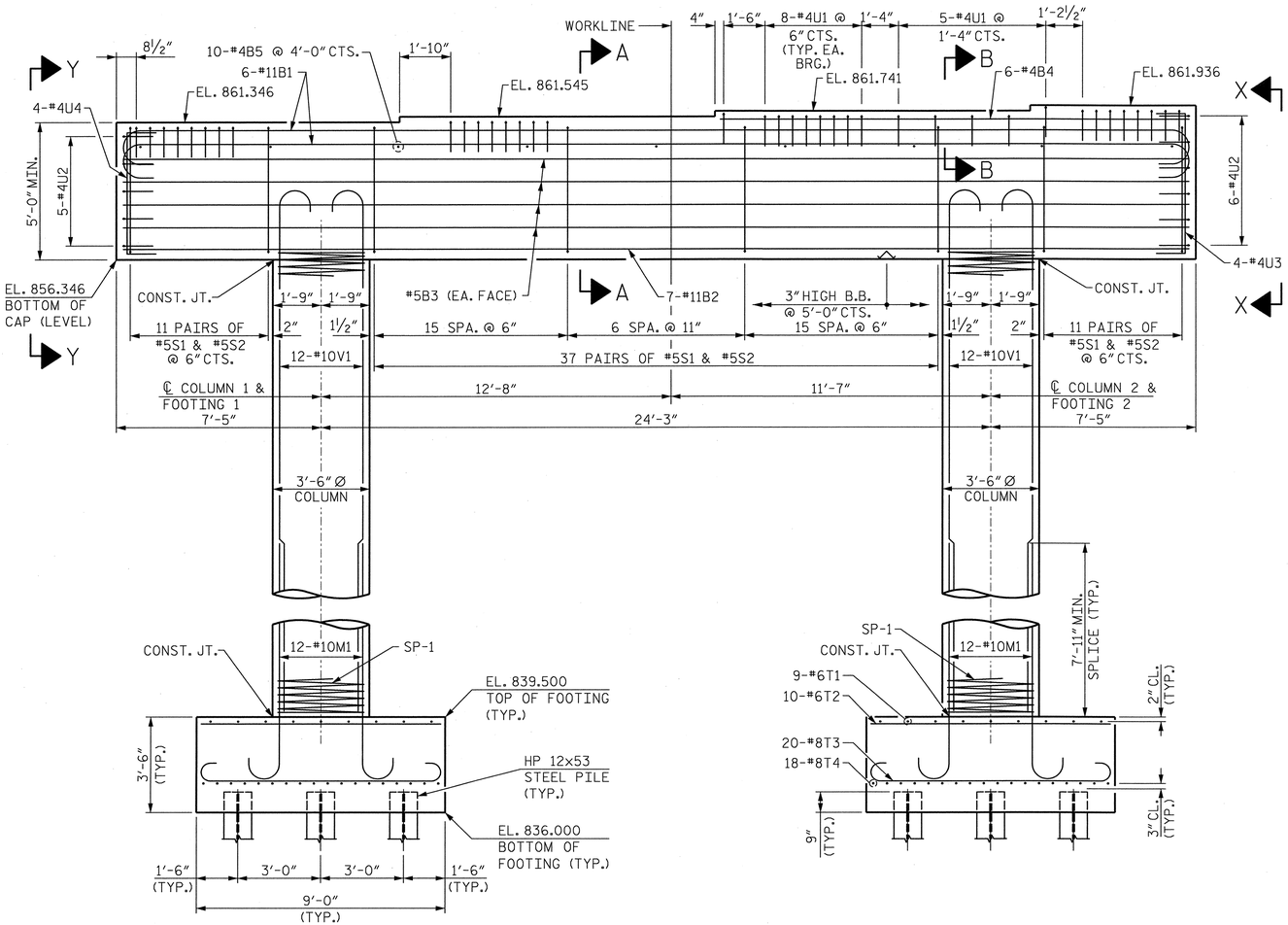
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_E1_L03.dgn

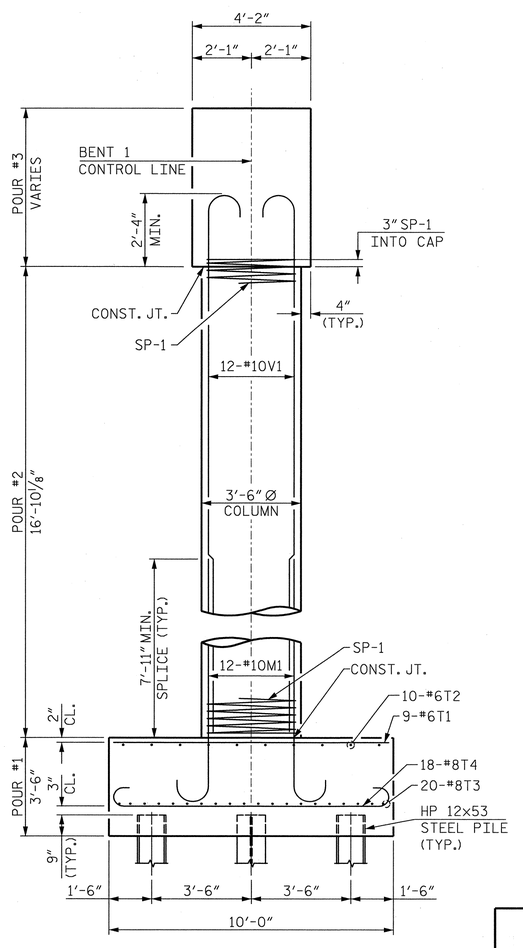


PLAN

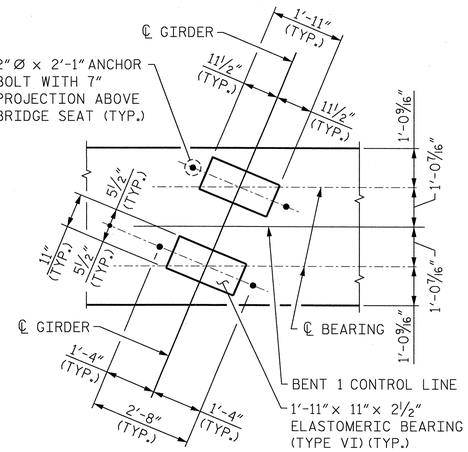


ELEVATION

PILES SHOWN WITH ORIENTATION ALONG BENT 1 CONTROL LINE



END VIEW



DETAIL "A"

(TYP. EA. GIRDER LINE)

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET NO. S-20.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

LEFT LANE

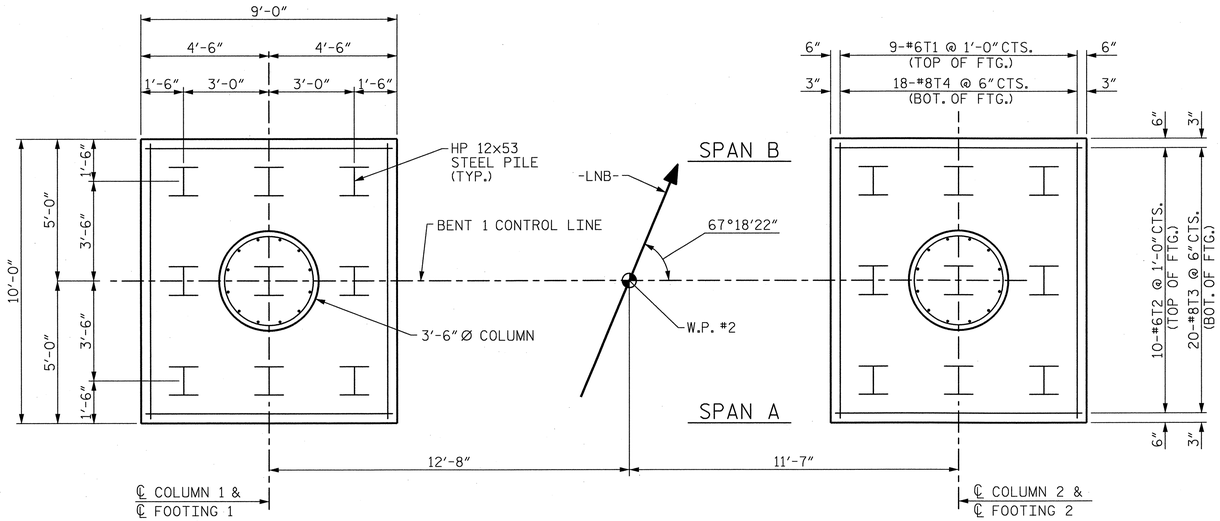
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/10/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			57

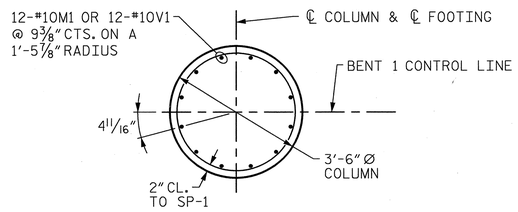
DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_B1_L01.dgn



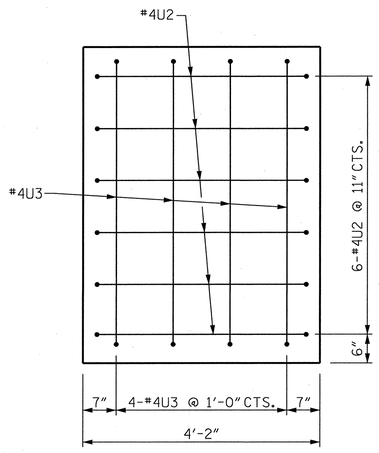
PLAN OF FOOTINGS

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING

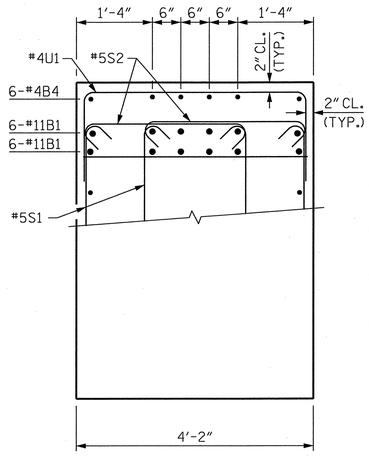


COLUMN SECTION

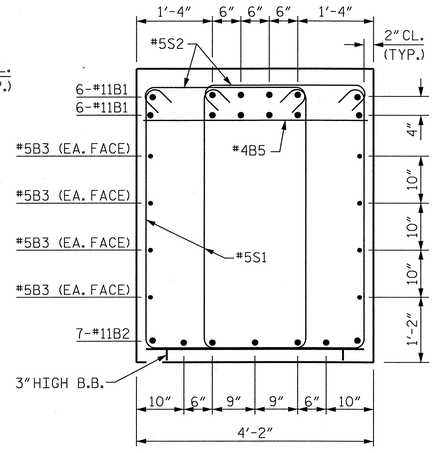
DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN



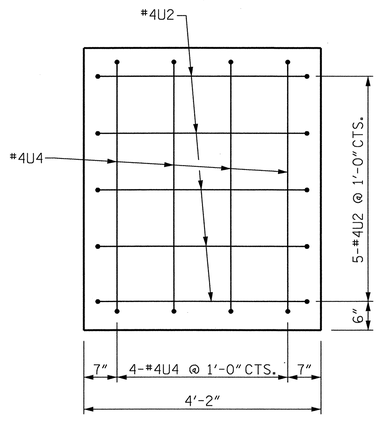
VIEW X-X



SECTION B-B

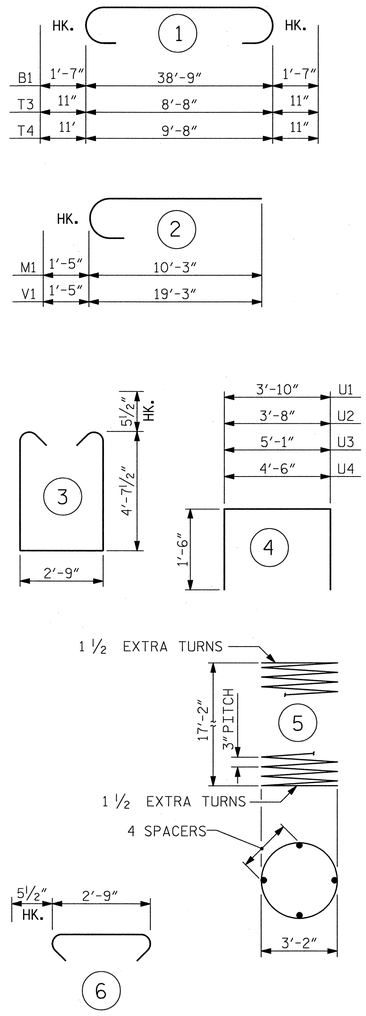


SECTION A-A



VIEW Y-Y

BAR TYPES



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	11	1	41'-11"	2672
B2	7	11	STR	38'-9"	1441
B3	8	5	STR	38'-9"	323
B4	6	4	STR	17'-1"	68
B5	10	4	STR	3'-10"	26
M1	24	10	2	11'-8"	1205
S1	118	5	3	12'-11"	1590
S2	118	5	6	3'-8"	451
T1	18	6	STR	9'-8"	261
T2	20	6	STR	8'-8"	260
T3	40	8	1	10'-6"	1121
T4	36	8	1	11'-6"	1105
U1	38	4	4	6'-10"	173
U2	11	4	4	6'-8"	49
U3	4	4	4	8'-1"	21
U4	4	4	4	7'-6"	20
V1	24	10	2	20'-8"	2134
REINFORCING STEEL				LBS	12920
SP-1	2	*	5	703'-10"	940
SPIRAL COLUMN REINFORCING STEEL				LBS	940

CLASS A CONCRETE	CU. YDS.
POUR #1: FOOTINGS	23.3
POUR #2: COLUMNS	12.0
POUR #3: CAP	31.8
TOTAL CLASS A CONCRETE	67.1
HP 12x53 STEEL PILES NO. 18	LIN. FT. 540
FOUNDATION EXCAVATION FOR BENT	LUMP SUM

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

LEFT LANE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN W. DOUGHTY
5/10/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/10/2012
U2524AE_SD_B1_L02.dgn

NOTES

STIRRUPS AND #4U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

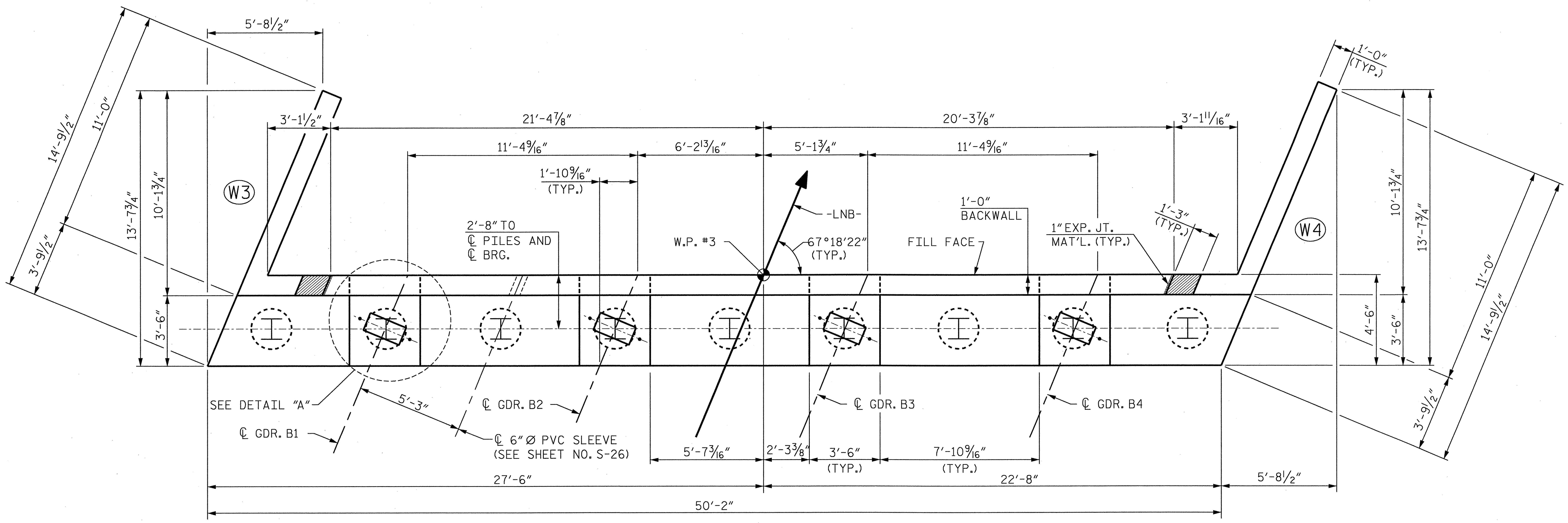
THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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%.

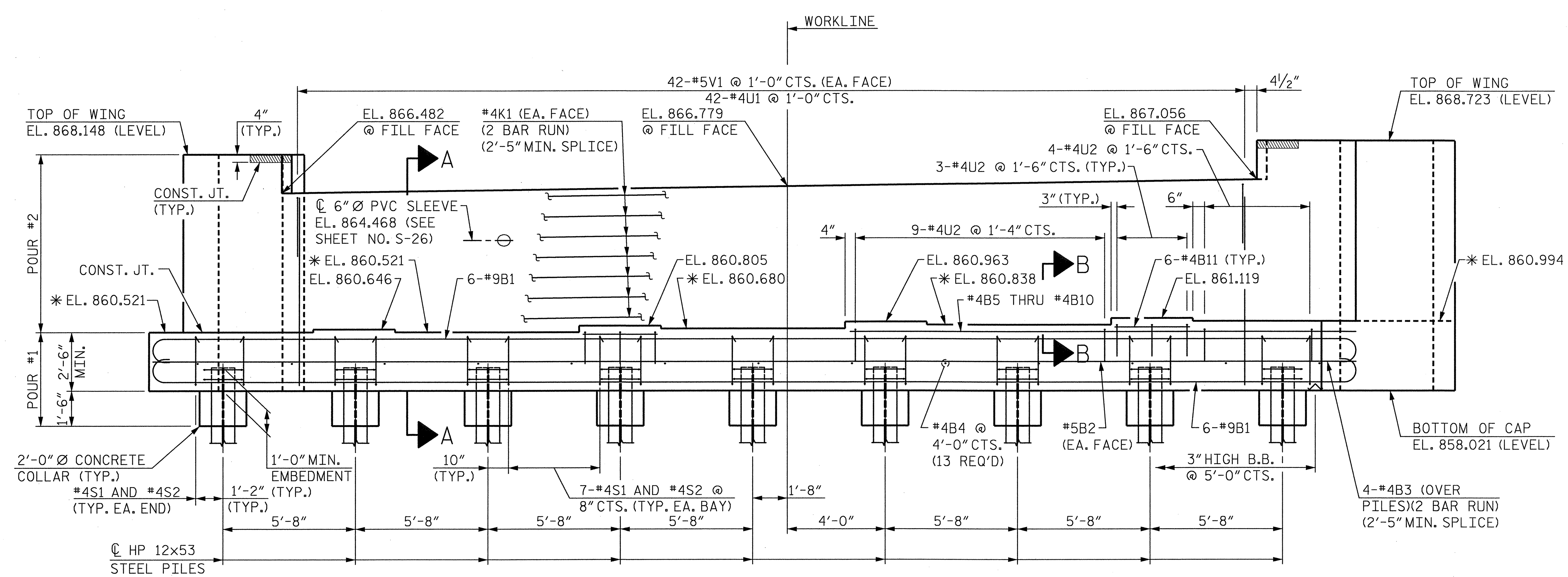
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL ARE CAST IF SLIP FORMING IS USED.

FOR LOCATION AND DETAILS OF MULTI-CELL RACEWAY, SEE SHEET NO. S-26.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE ELECTRICAL CONDUIT SYSTEM THROUGH THE BACKWALL. REINFORCING STEEL MAY BE SHIFTED AS REQUIRED.

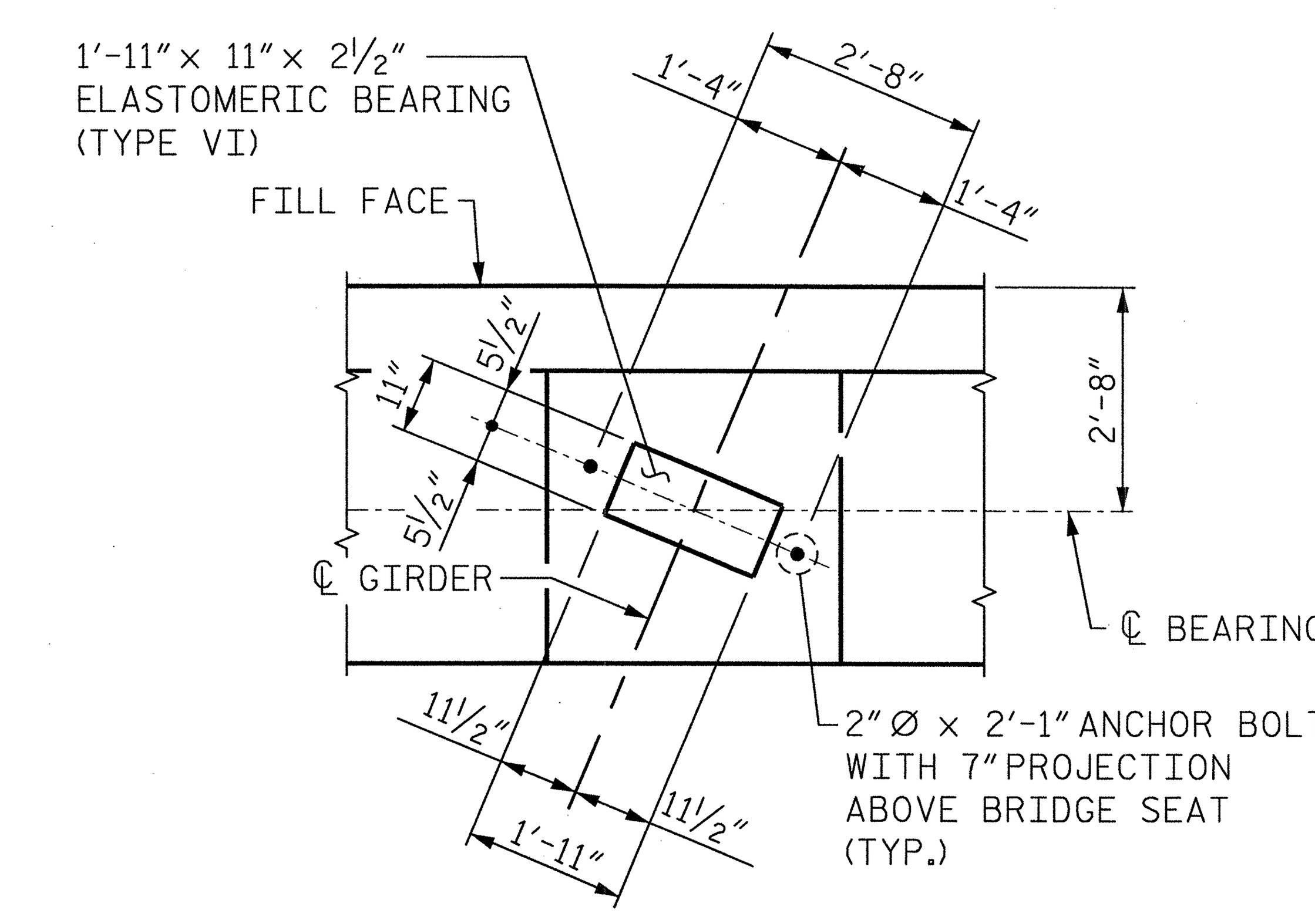


PLAN



ELEVATION

✱ FOR LOCATION OF ELEVATIONS BETWEEN BUILDUPS, SEE SECTION A-A AND SECTION B-B ON SHEET 3 OF 3.



DETAIL "A"

(TYP. EA. GIRDER)

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

LEFT LANE

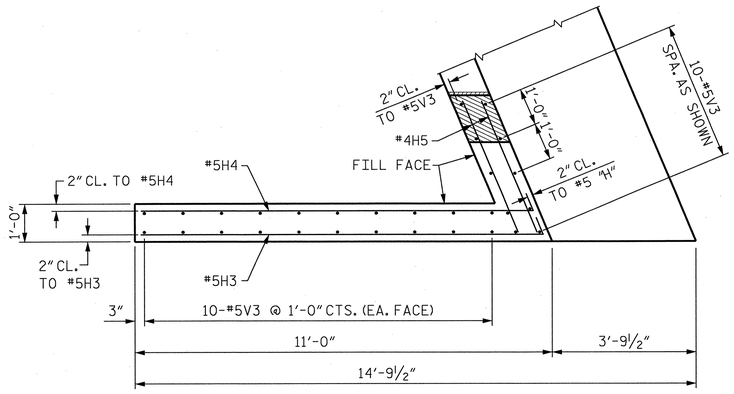
REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-23
1			3					TOTAL SHEETS
2			4					57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

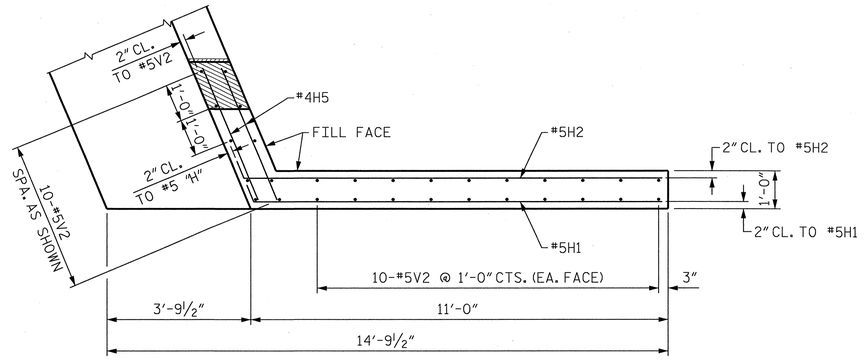
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

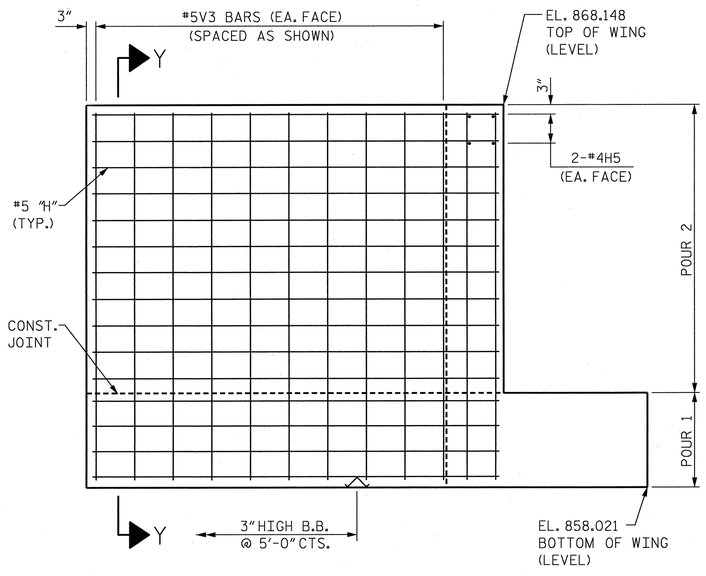
5/9/2012
U2524AE_SD_E2_L04.dgn



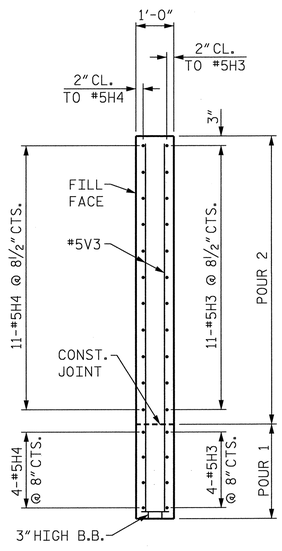
PLAN OF WING - W3



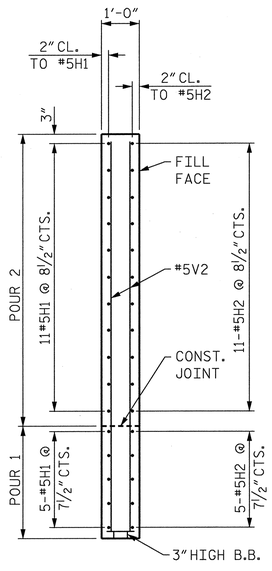
PLAN OF WING - W4



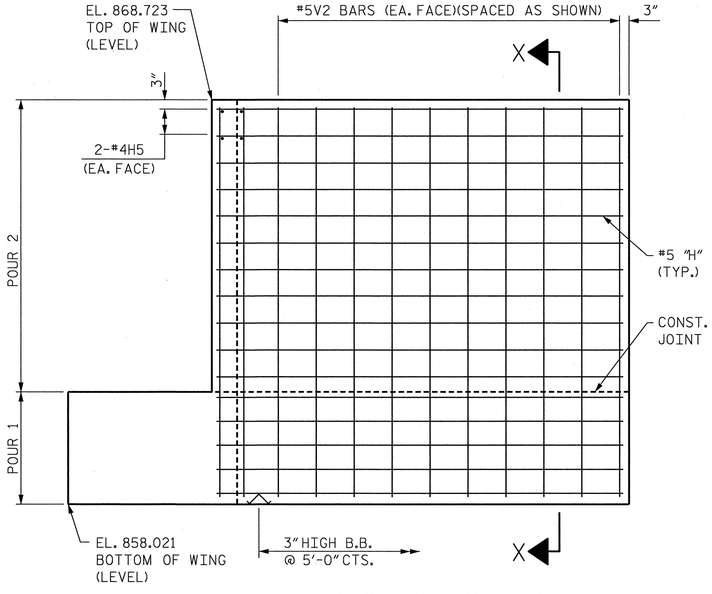
ELEVATION OF WING - W3



SECTION Y-Y



SECTION X-X



ELEVATION OF WING - W4

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

LEFT LANE

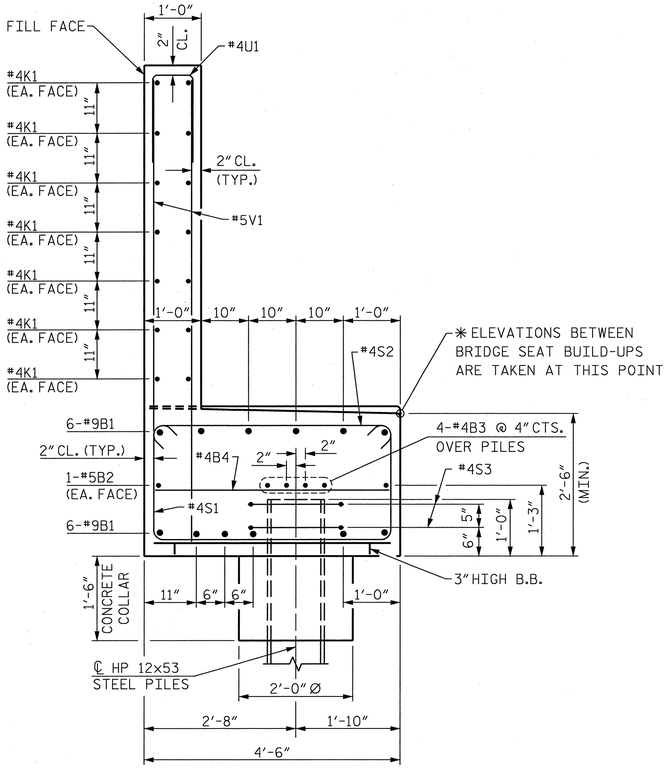
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN R. DOUGHTY 5/9/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			57

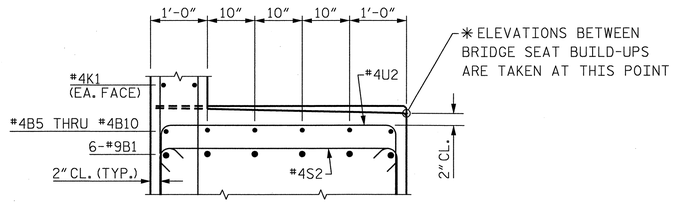
DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_E2_L05.dgn

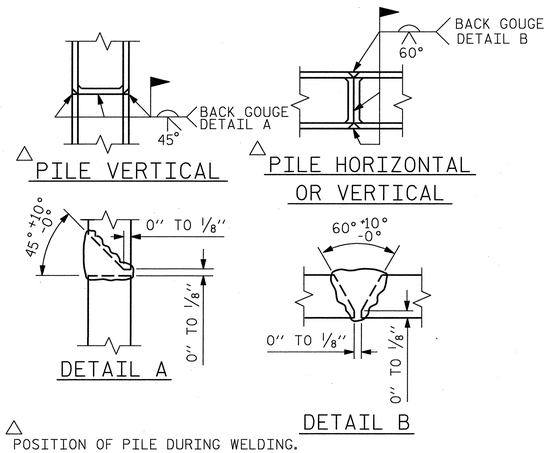


SECTION A-A

FOR LOCATION OF PVC SLEEVE FOR ELECTRICAL CONDUIT, SEE SHEET 1 OF 3.

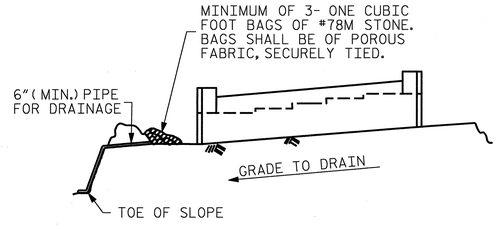


PARTIAL SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



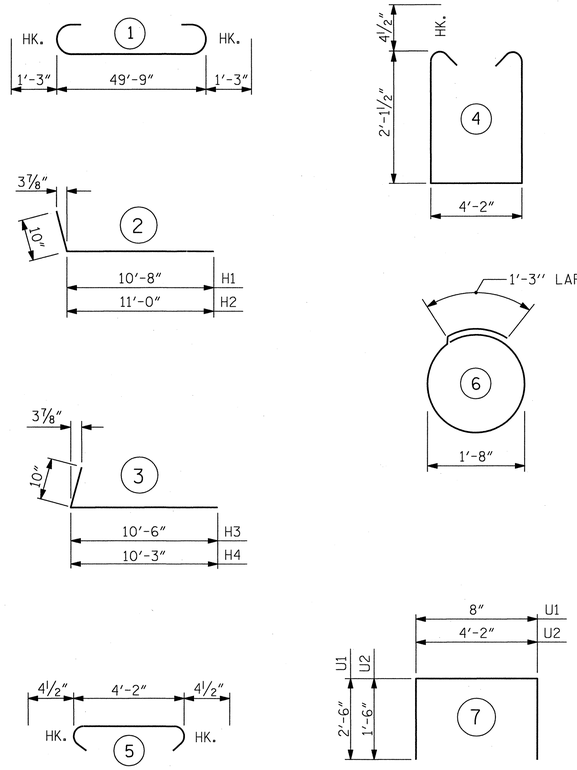
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	52'-3"	2132
B2	2	5	STR	49'-9"	104
B3	8	4	STR	26'-1"	139
B4	13	4	STR	4'-2"	36
B5	1	4	STR	20'-0"	13
B6	1	4	STR	20'-4"	14
B7	1	4	STR	20'-8"	14
B8	1	4	STR	21'-0"	14
B9	1	4	STR	21'-4"	14
B10	1	4	STR	21'-8"	14
B11	12	4	STR	3'-2"	25
H1	16	5	2	11'-6"	192
H2	16	5	2	11'-10"	197
H3	15	5	3	11'-4"	177
H4	15	5	3	11'-1"	173
H5	8	4	STR	3'-10"	20
K1	28	4	STR	26'-1"	488
S1	58	4	4	9'-2"	355
S2	58	4	5	4'-11"	190
S3	18	4	6	6'-6"	78
U1	42	4	7	5'-8"	159
U2	19	4	7	7'-2"	91
V1	84	5	STR	8'-0"	701
V2	30	5	STR	10'-3"	321
V3	30	5	STR	9'-8"	302

REINFORCING STEEL	LBS.	5963
CLASS A CONCRETE		
POUR #1: CAP, LOWER WINGS AND COLLARS	CU. YDS.	26.9
POUR #2: BACKWALL AND UPPER WINGS	CU. YDS.	17.3
TOTAL CLASS A CONCRETE	CU. YDS.	44.2
HP 12x53 STEEL PILES		
NO. 9	LIN. FT.	540

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

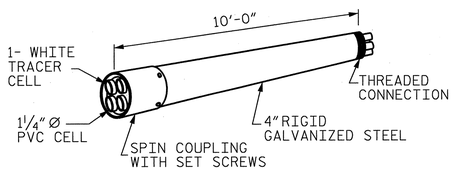
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON B. BOWERS
5/10/12

PROJECT NO. U-2412B/ U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-
SHEET 3 OF 3

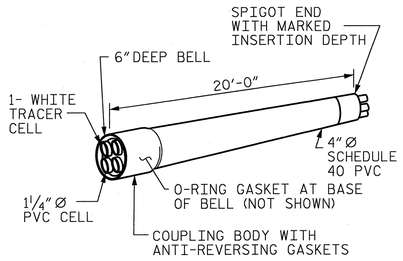
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 2
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			57

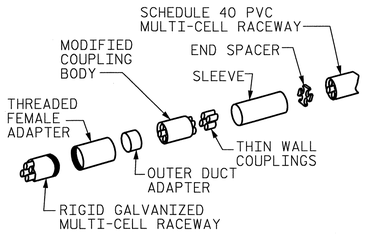
5/9/2012
U2524AE_SD_E2_L06.dgn



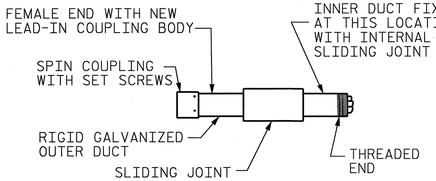
RIGID GALVANIZED (RGC)
MULTI-CELL RACEWAY



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.

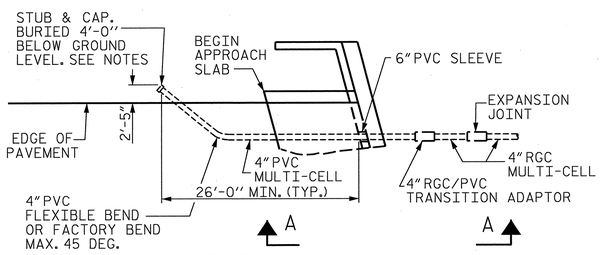
INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

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

INSTALL STABILIZERS MIDWAY BETWEEN DECK EXPANSION JOINTS AND BENT DIAPHRAGM. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

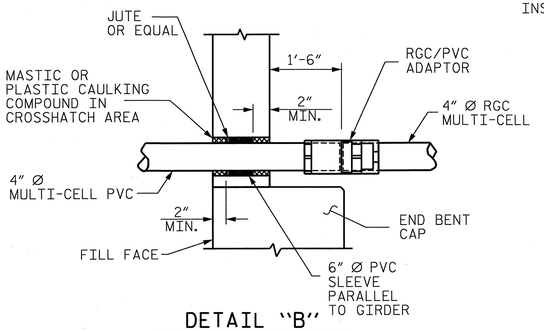
THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF ⅝" AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.



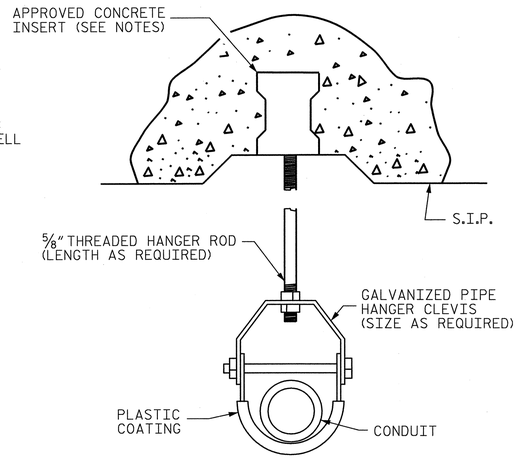
DETAIL "A"

TERMINATION OF CONDUIT AT WING WALL



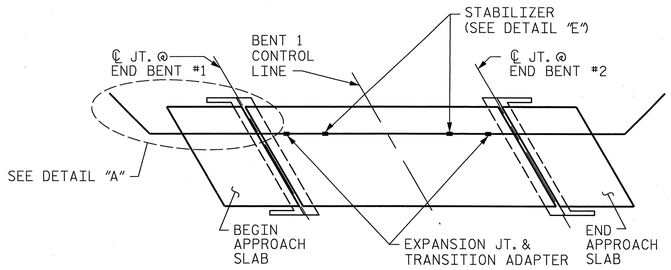
DETAIL "B"

PVC SLEEVE INSTALLATION & RGC/PVC ADAPTOR AT BACKWALL.

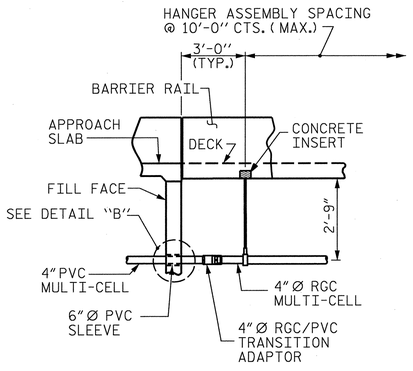


DETAIL "C"

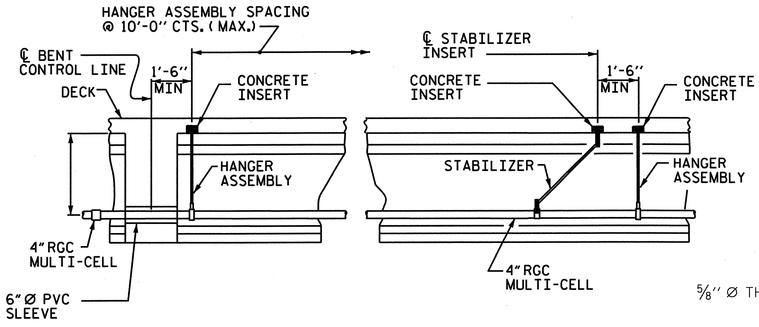
HANGER ASSEMBLY



CONDUIT LAYOUT

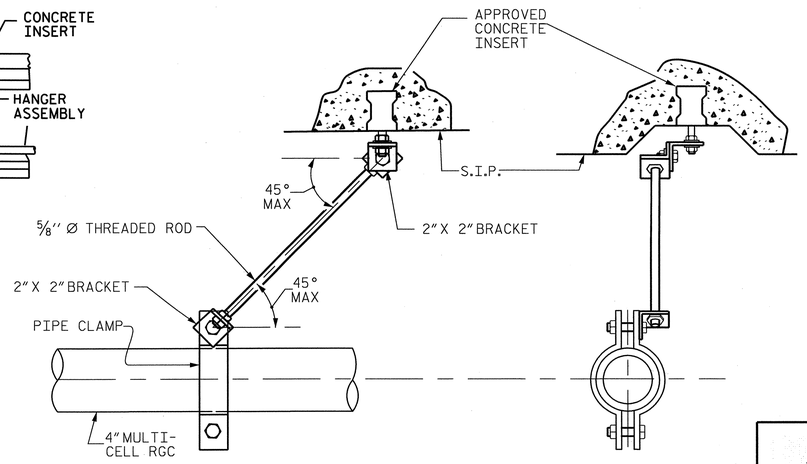


VIEW A-A



VIEW B-B

PRESTRESSED GIRDERS
CONTINUOUS FOR LIVE LOAD



DETAIL "E"

STABILIZER

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELECTRICAL CONDUIT SYSTEM FOR SIGNALS

LEFT LANE

ASSEMBLED BY : K. WHITE	DATE : MAR 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : RWW 2-4-03	REV. 5/1/06 TLA/GM
CHECKED BY : DBM 2-4-03	REV. 10/1/11 MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

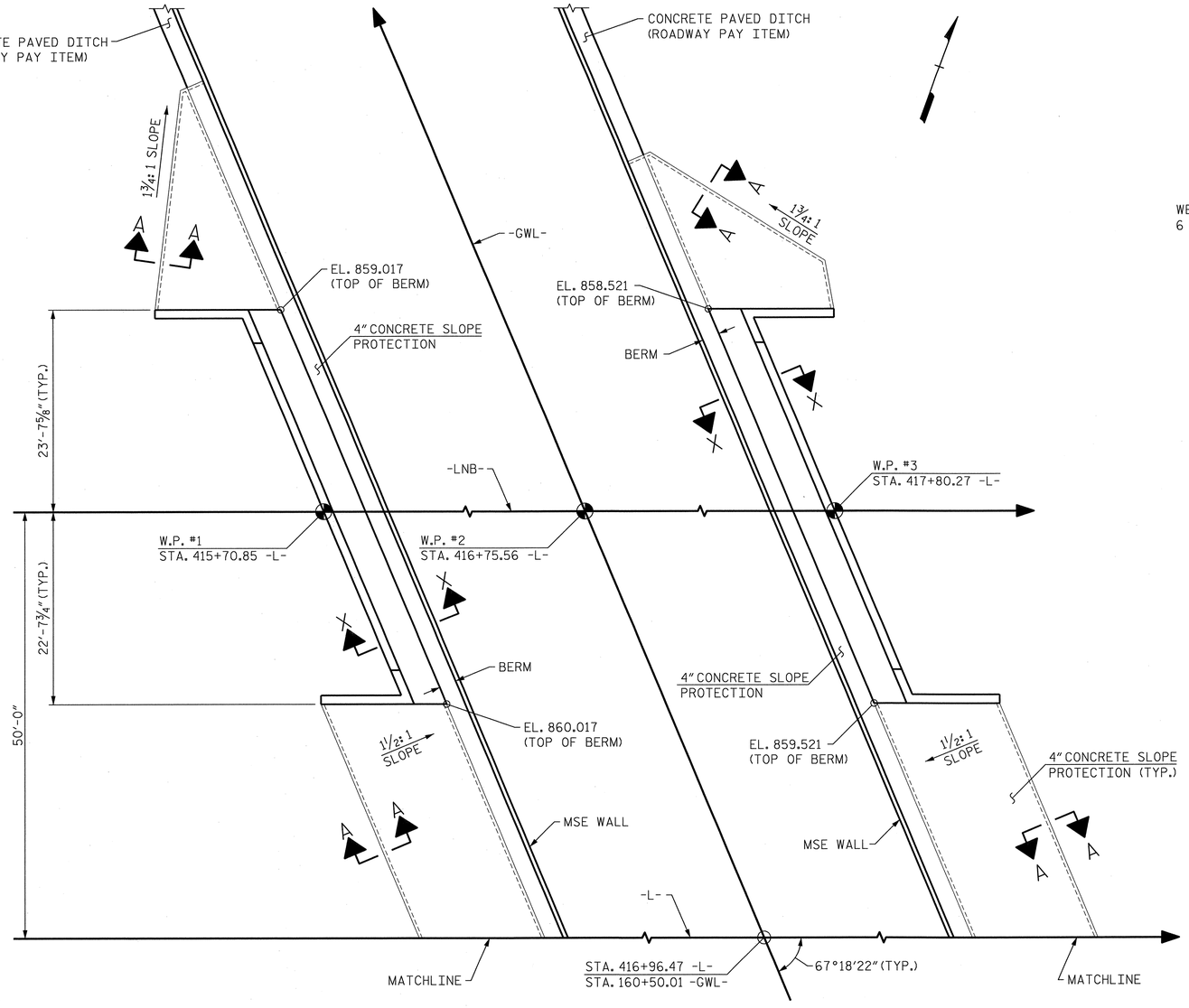
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN M. DOUGHTY
5/10/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			57

STD. NO. ECS1

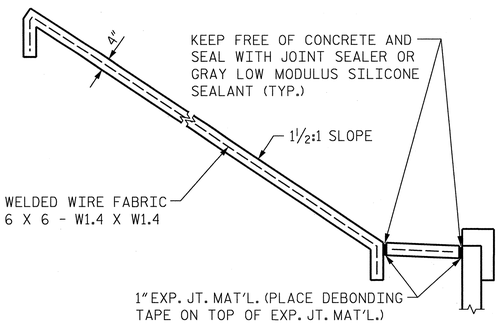
5/9/2012
U2524AE_SD_ECS_L01.dgn

ELECTRIC CONDUIT DETAILS



END BENT 1 — END BENT 2

PLAN

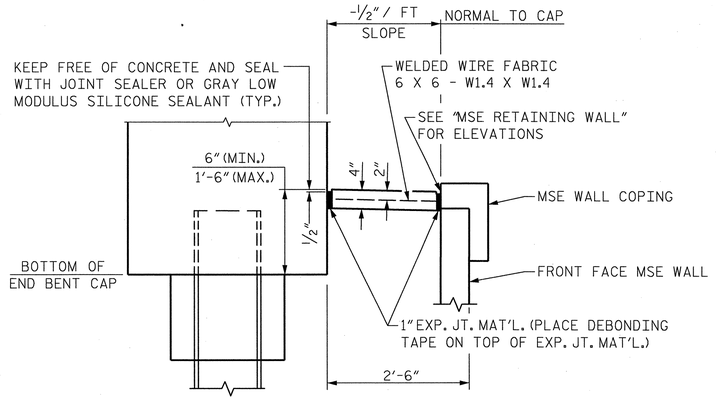


SECTION BETWEEN BRIDGES

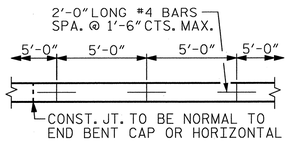
NOTES

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. FOR BERM WIDTH, SEE GENERAL DRAWING.

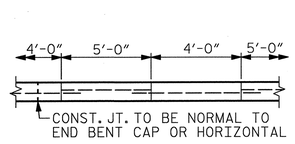
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



SECTION X-X

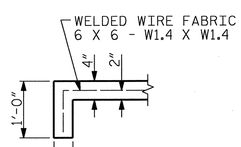


POURING DETAIL



POUR A 4'-0" STRIP FIRST.

OPTIONAL POURING DETAIL



SECTION A-A

BRIDGE @ STA. 416+96.47 -L- STA. 160+50.01 -GWL-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	110	220
END BENT 2	105	210

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

DETAILS FOR SLOPE PROTECTION

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

LEFT LANE

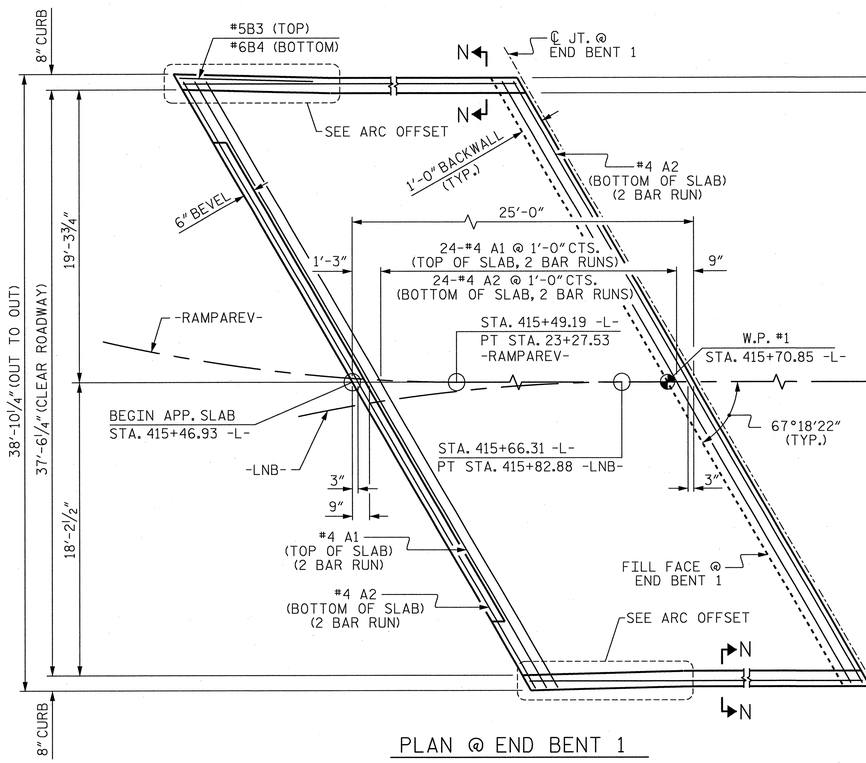
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN R. DOUGHTY
5/10/12

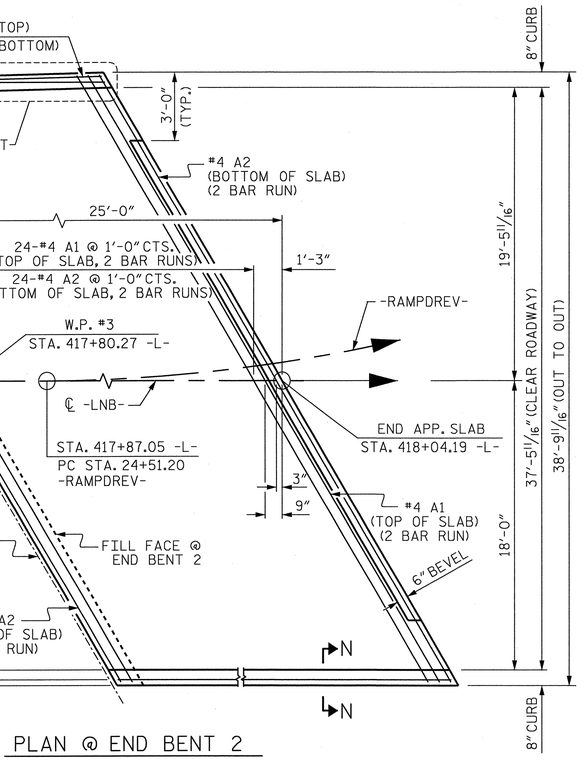
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_SP_L01.dgn



PLAN @ END BENT 1



PLAN @ END BENT 2

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	52	#4	STR	21'-11"	761
A2	52	#4	STR	21'-9"	756
✳B1	76	#5	STR	23'-6"	1863
B2	76	#6	STR	24'-7"	2806
✳B3	1	#5	STR	8'-0"	8
B4	1	#6	STR	8'-0"	12
REINFORCING STEEL				LBS.	3574
✳EPOXY COATED REINFORCING STEEL				LBS.	2632
CLASS AA CONCRETE				C.Y.	42.0

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	52	#4	STR	21'-11"	761
A2	52	#4	STR	21'-9"	756
✳B1	76	#5	STR	23'-6"	1863
B2	76	#6	STR	24'-7"	2806
✳B3	1	#5	STR	8'-0"	8
B4	1	#6	STR	8'-0"	12
REINFORCING STEEL				LBS.	3574
✳EPOXY COATED REINFORCING STEEL				LBS.	2632
CLASS AA CONCRETE				C.Y.	42.0

NOTES

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

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

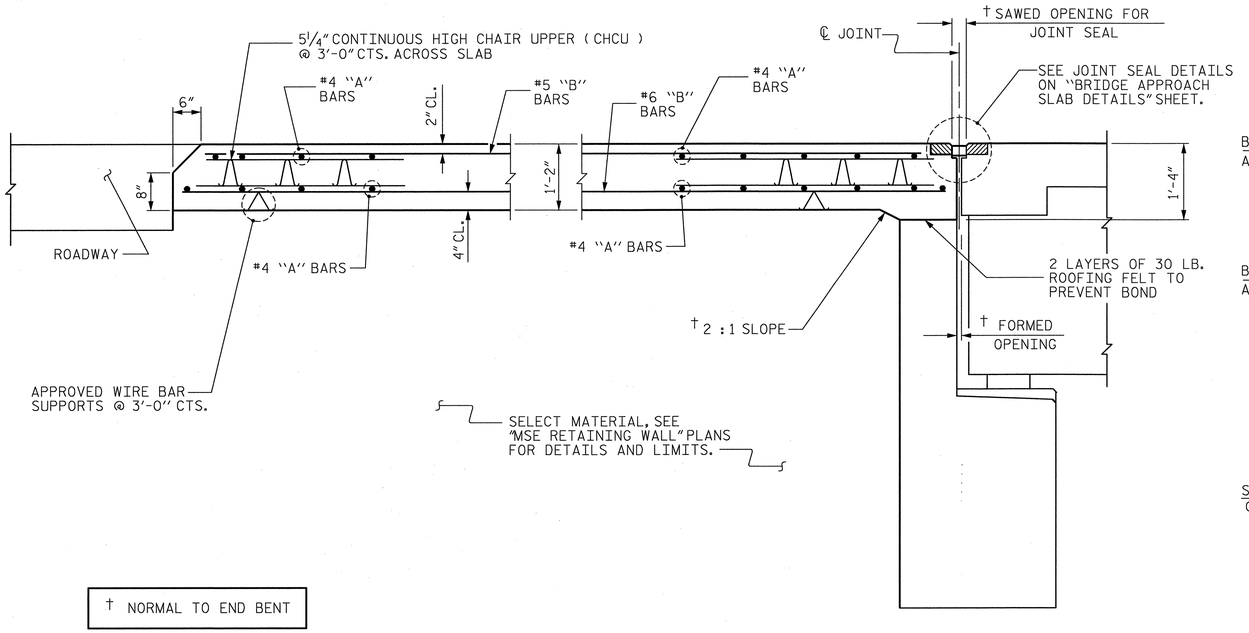
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

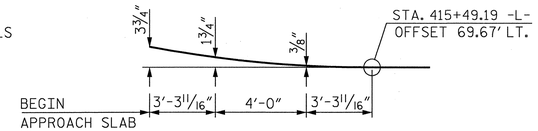
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

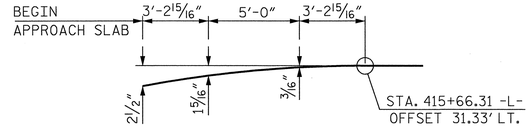


† NORMAL TO END BENT

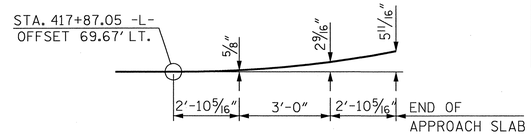
SECTION THRU SLAB



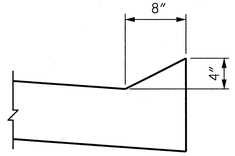
ARC OFFSET
APPROACH SLAB @ END BENT 1
LEFT SIDE



ARC OFFSET
APPROACH SLAB @ END BENT 1
RIGHT SIDE



ARC OFFSET
APPROACH SLAB @ END BENT 2
LEFT SIDE ONLY



SECTION N-N

SPLICE LENGTHS

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

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			57

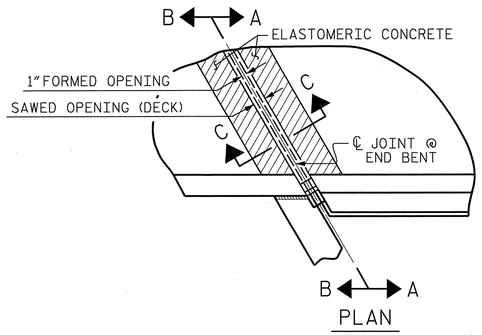
STD. NO. BAS2

ASSEMBLED BY : K. WHITE		DATE : FEB 2012	
CHECKED BY : J. DOUGHTY		DATE : MAR 2012	
DRAWN BY : EEM 3/95	REV. 5/1/06RR	KMM/GM	
CHECKED BY : VAP 3/95	REV. 10/1/11	MAA/GM	
	REV. 12/21/11	MAA/GM	

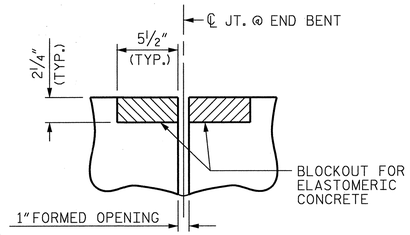
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/10/12

5/9/2012
U2524AE_SD_AS_L01.DGN

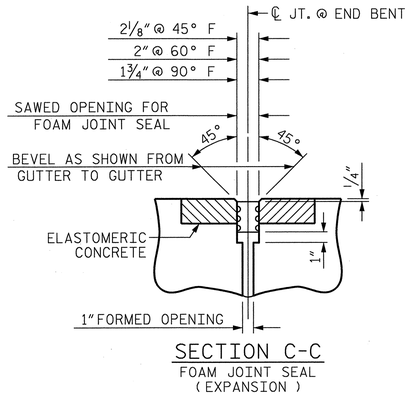


PLAN



SECTION C-C

FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

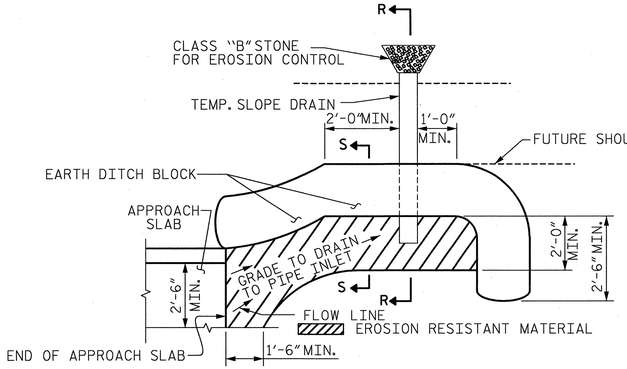


SECTION C-C

FOAM JOINT SEAL
(EXPANSION)

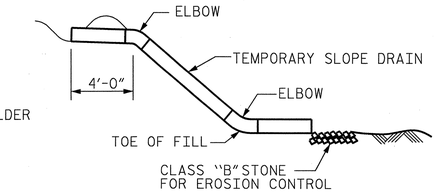
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.9
2	6.9
TOTAL	13.8

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

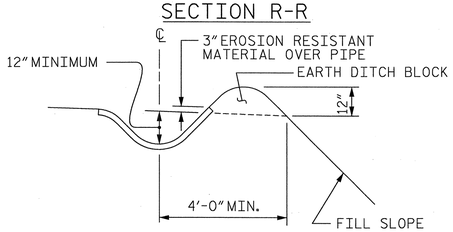


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



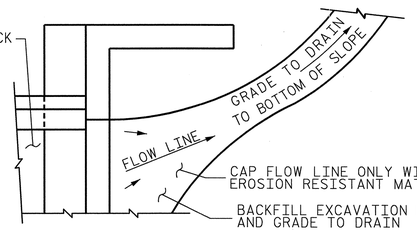
SECTION R-R



SECTION S-S

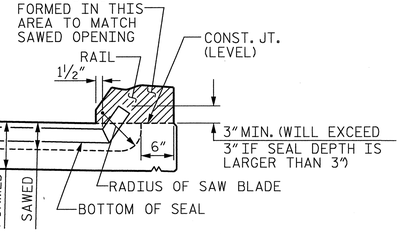
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

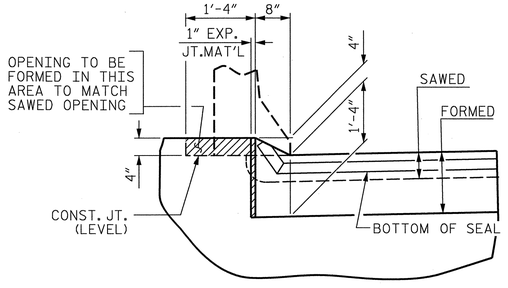


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT 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

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

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

ASSEMBLED BY :	K. WHITE	DATE :	FEB 2012
CHECKED BY :	J. DOUGHTY	DATE :	MAR 2012
DRAWN BY : FCJ	11/88	REV. 5/7/03	RWW/JTE
CHECKED BY : ARB	11/88	REV. 5/1/06RRR	MAA/KMM
		REV. 10/1/11	MAA/GM

5/9/2012
U2524AE_SD_AS_L02.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN R. BRADY
5/9/12

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

LEFT LANE

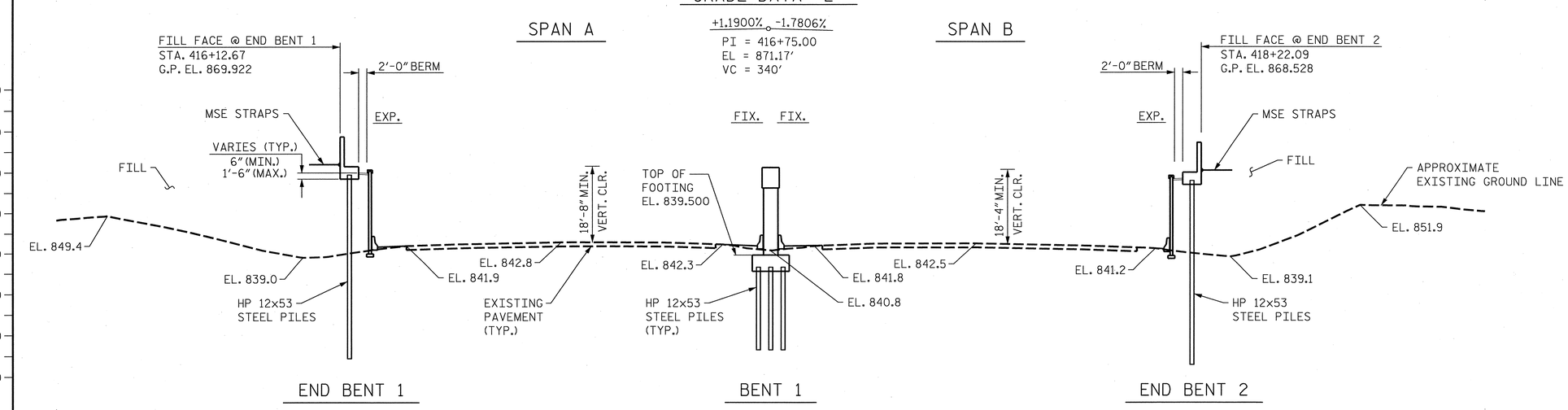
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			57

STD. NO. BAS4

F.A. PROJECT NO. NHS-124-1 (17)

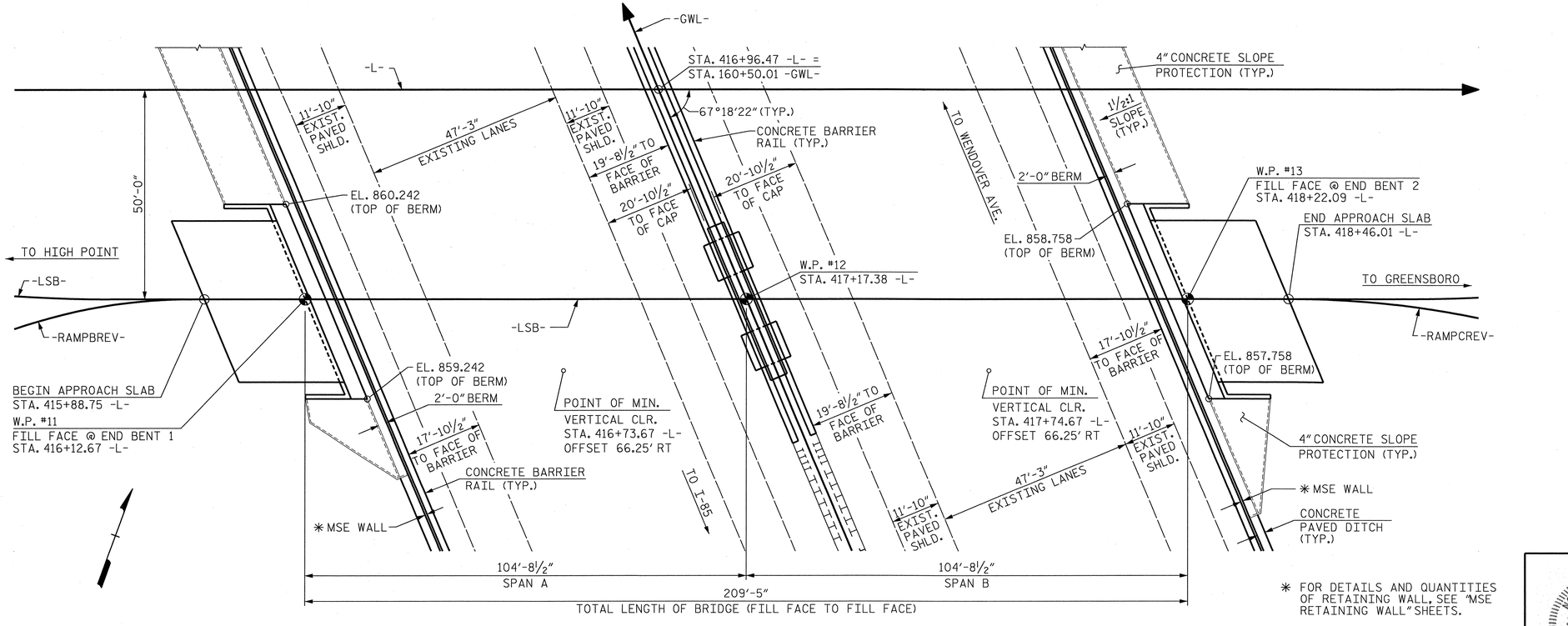
415+50 416+00 416+50 417+00 417+50 418+00 418+50

GRADE DATA -L-



SECTION ALONG -LSB-

SECTIONS AT END BENTS AND BENT ARE AT RIGHT ANGLES



PLAN

PILES AND COLUMNS NOT SHOWN FOR CLARITY

* FOR DETAILS AND QUANTITIES OF RETAINING WALL, SEE "MSE RETAINING WALL" SHEETS.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-
160+50.01 -GWL-

SHEET 1 OF 3 BRIDGE NO. 1124

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR DUAL BRIDGES ON SR 4121
OVER GREENSBORO WESTERN LOOP
RIGHT LANE

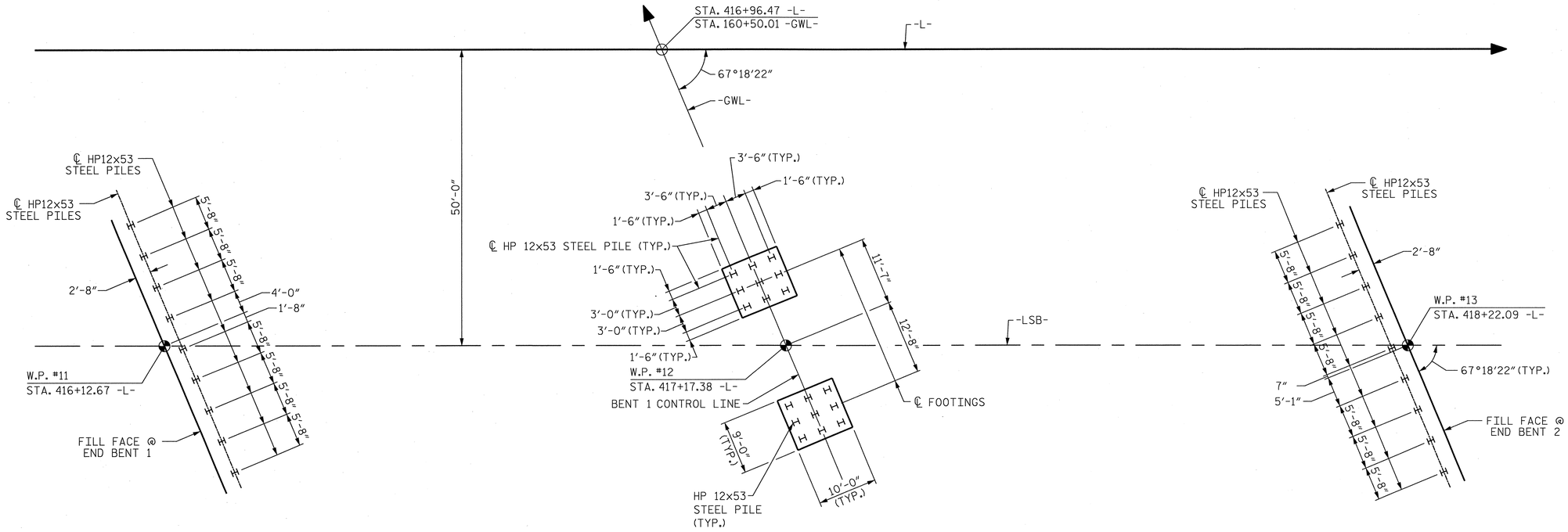
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_GD_R04.DGN



END BENT 1 | BENT 1 | END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES
ORIENT PILES AS SHOWN

NOTES

THE FOLLOWING FOUNDATION NOTES HAVE BEEN PROVIDED BY THE NCDOT GEOTECHNICAL ENGINEERING UNIT:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE.

INSTALL PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN 828.0 FT.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40 TO 70 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1, END BENT NO. 2, AND BENT NO. 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

5/9/2012
U2524AE_SD_GD_R05.DGN

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN DOUGHTY
5/10/12

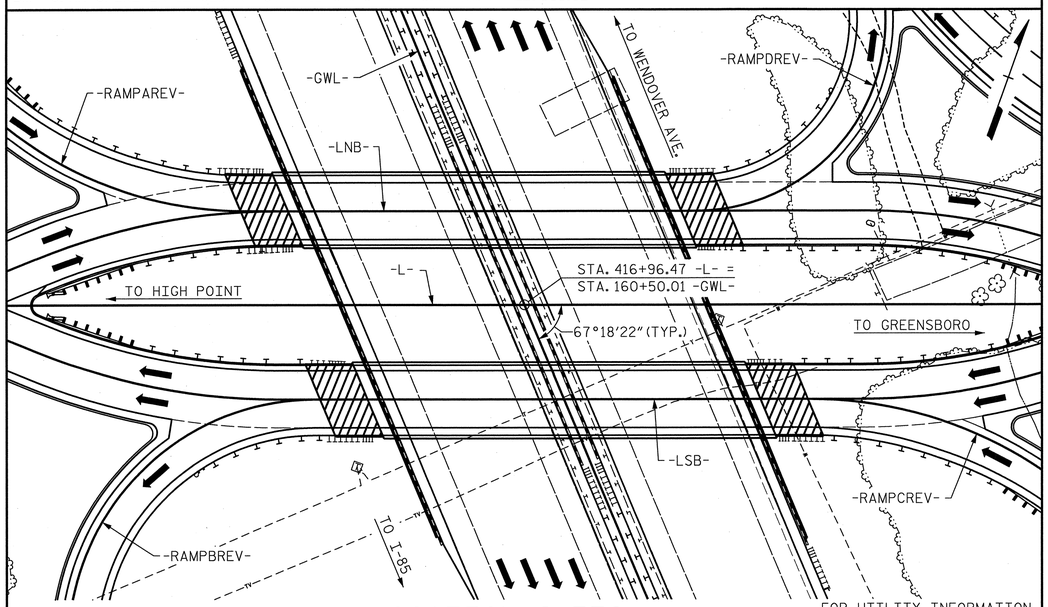
PROJECT NO. U-2412B/ U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L- 160+50.01 -GWL-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR DUAL BRIDGES ON SR 4121
OVER GREENSBORO WESTERN LOOP
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			57

BM #9: RR SPIKE IN 12"CEDAR STA. 412+87.46 -L- 6.42' LEFT EL. 863.62



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

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

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STA. 416+96.47	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		HP 12x53 STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	LUMP SUM	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			8,338	8,618		LUMP SUM			8	816.83			414.3		LUMP SUM	LUMP SUM
END BENT 1		1			45.0		5,993				9	405		105		
BENT 1	LUMP SUM				67.2		12,887	923			18	360				
END BENT 2					45.8		5,997				9	540		110		
TOTAL	LUMP SUM	1	8,338	8,618	158.0	LUMP SUM	24,877	923	8	816.83	36	1,305	414.3	215	LUMP SUM	LUMP SUM

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L- 160+50.01 -GWL-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR DUAL BRIDGES ON SR 4121
OVER GREENSBORO WESTERN LOOP
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
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RALEIGH, NC 27601
(919) 536-4040
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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/9/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/10/2012
U2524AE_SD_GD_R06.DGN

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							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)	1.16	--	1.75	0.943	1.57	A	EL/ER	50.3	1.056	1.16	A	I	80.5	0.80	0.943	1.46	A	EL/ER	50.3	1, 2, 3
		HL-93 (OPERATING)	N/A		1.53	--	1.35	0.943	2.04	A	EL/ER	50.3	1.056	1.53	A	I	80.5	N/A	--	--	--	--	--	1, 2, 3
		HS-20 (INVENTORY)	36.000	(2)	1.61	58.0	1.75	0.943	2.22	A	EL/ER	50.3	1.056	1.61	A	I	80.5	0.80	0.943	2.06	A	EL/ER	50.3	1, 2, 3
		HS-20 (OPERATING)	36.000		2.12	76.3	1.35	0.943	2.88	A	EL/ER	50.3	1.056	2.12	A	I	80.5	N/A	--	--	--	--	--	1, 2, 3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.96	67.0	1.40	0.943	6.68	A	EL/ER	50.3	1.056	5.21	A	I	80.5	0.80	0.943	4.96	A	EL/ER	50.3	1, 2, 3
		SNGARBS2	20.000		3.55	71.0	1.40	0.943	4.79	A	EL/ER	50.3	1.056	3.60	A	I	80.5	0.80	0.943	3.55	A	EL/ER	50.3	1, 2, 3
		SNAGRIS2	22.000		3.29	72.4	1.40	0.943	4.44	A	EL/ER	50.3	1.056	3.31	A	I	80.5	0.80	0.943	3.29	A	EL/ER	50.3	1, 2, 3
		SNCOTTS3	27.250		2.44	66.5	1.40	0.943	3.28	A	EL/ER	50.3	1.056	2.54	A	I	80.5	0.80	0.943	2.44	A	EL/ER	50.3	1, 2, 3
		SNAGGRS4	34.925		1.99	69.5	1.40	0.943	2.69	A	EL/ER	50.3	1.056	2.04	A	I	80.5	0.80	0.943	1.99	A	EL/ER	50.3	1, 2, 3
		SNS5A	35.550		1.95	69.3	1.40	0.943	2.63	A	EL/ER	50.3	1.056	2.04	A	I	80.5	0.80	0.943	1.95	A	EL/ER	50.3	1, 2, 3
		SNS6A	39.950		1.78	71.1	1.40	0.943	2.39	A	EL/ER	50.3	1.056	1.84	A	I	80.5	0.80	0.943	1.78	A	EL/ER	50.3	1, 2, 3
		SNS7B	42.000		1.69	71.0	1.40	0.943	2.27	A	EL/ER	50.3	1.056	1.78	A	I	80.5	0.80	0.943	1.69	A	EL/ER	50.3	1, 2, 3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.16	71.3	1.40	0.943	2.91	A	EL/ER	50.3	1.056	2.22	A	I	80.5	0.80	0.943	2.16	A	EL/ER	50.3	1, 2, 3
		TNT4A	33.075		2.17	71.8	1.40	0.943	2.92	A	EL/ER	50.3	1.056	2.18	A	I	80.5	0.80	0.943	2.17	A	EL/ER	50.3	1, 2, 3
		TNT6A	41.600		1.74	72.4	1.40	0.943	2.35	A	EL/ER	50.3	1.056	1.87	A	I	80.5	0.80	0.943	1.74	A	EL/ER	50.3	1, 2, 3
		TNT7A	42.000		1.75	73.5	1.40	0.943	2.36	A	EL/ER	50.3	1.056	1.83	A	I	80.5	0.80	0.943	1.75	A	EL/ER	50.3	1, 2, 3
		TNT7B	42.000		1.76	73.9	1.40	0.943	2.40	A	EL/ER	50.3	1.056	1.76	A	I	80.5	0.80	0.943	1.78	A	EL/ER	50.3	1, 2, 3
		TNAGRIT4	43.000		1.70	73.1	1.40	0.943	2.31	A	EL/ER	50.3	1.056	1.70	A	I	80.5	0.80	0.943	1.71	A	EL/ER	50.3	1, 2, 3
		TNAGT5A	45.000		1.62	72.9	1.40	0.943	2.19	A	EL/ER	50.3	1.056	1.67	A	I	80.5	0.80	0.943	1.62	A	EL/ER	50.3	1, 2, 3
		TNAGT5B	45.000	(3)	1.61	72.5	1.40	0.943	2.17	A	EL/ER	50.3	1.056	1.62	A	I	80.5	0.80	0.943	1.61	A	EL/ER	50.3	1, 2, 3

LOAD FACTORS:

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

NOTES:

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

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN. ALLOWABLE TENSILE STRESS IS $0.19\sqrt{f'c}$ = 0.537 KSI.

COMMENTS:

1. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 2½" HAUNCH ASSUMED. HAUNCH CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES. THE HAUNCH HEIGHT IS INCLUDED FOR ECCENTRICITY TO THE DECK.
3. Ec, GIRDER = 5,422 Ksi (FINAL)
   Ec, DECK = 4,067 Ksi
   Eps = 28,500 Ksi

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

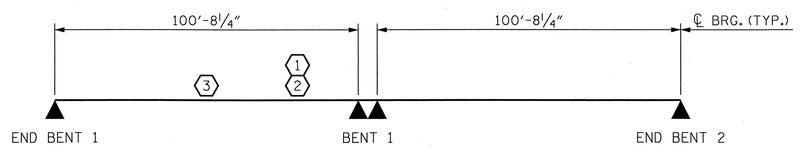
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

TABLE OF SECTION RESISTANCES (SPAN A)												
		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	574	468	335	330	332	331	332	337	346	471	971
	ΦMn (KIP-FT)	--	9660	11263	12221	12221	12221	12221	12221	11263	9660	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	574	468	334	328	330	330	331	337	347	473	970
	ΦMn (KIP-FT)	--	9645	11209	12178	12178	12178	12178	12178	11209	9645	--

SPAN B RESISTANCES OPPOSITE HAND.
INTERIOR COMPOSITE Ixx = 1,314,490 IN^4
INTERIOR COMPOSITE y_b = 58.13 IN.
EXTERIOR COMPOSITE Ixx = 1,284,478 IN^4
EXTERIOR COMPOSITE y_b = 57.30 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 5422 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FORM BOTTOM OF GIRDER



LRFR SUMMARY

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

SHEET NO. S-33
TOTAL SHEETS 57

STD. NO. LRFR1

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
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RALEIGH, NC 27601
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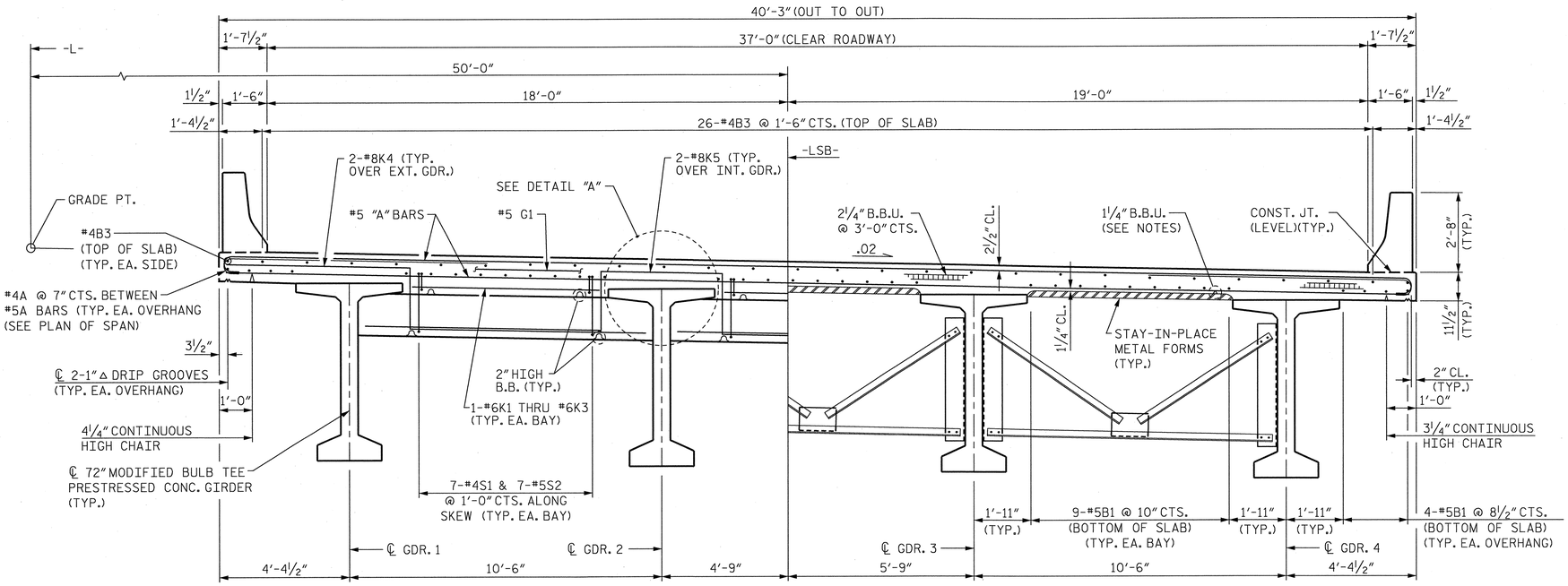
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY 5/9/12

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012	REV. 11/12/08RR MAA/GM	
CHECKED BY : J. DOUGHTY	DATE : MAR 2012		
DRAWN BY : MAA 1/08			
CHECKED BY : GM/DI 2/08			

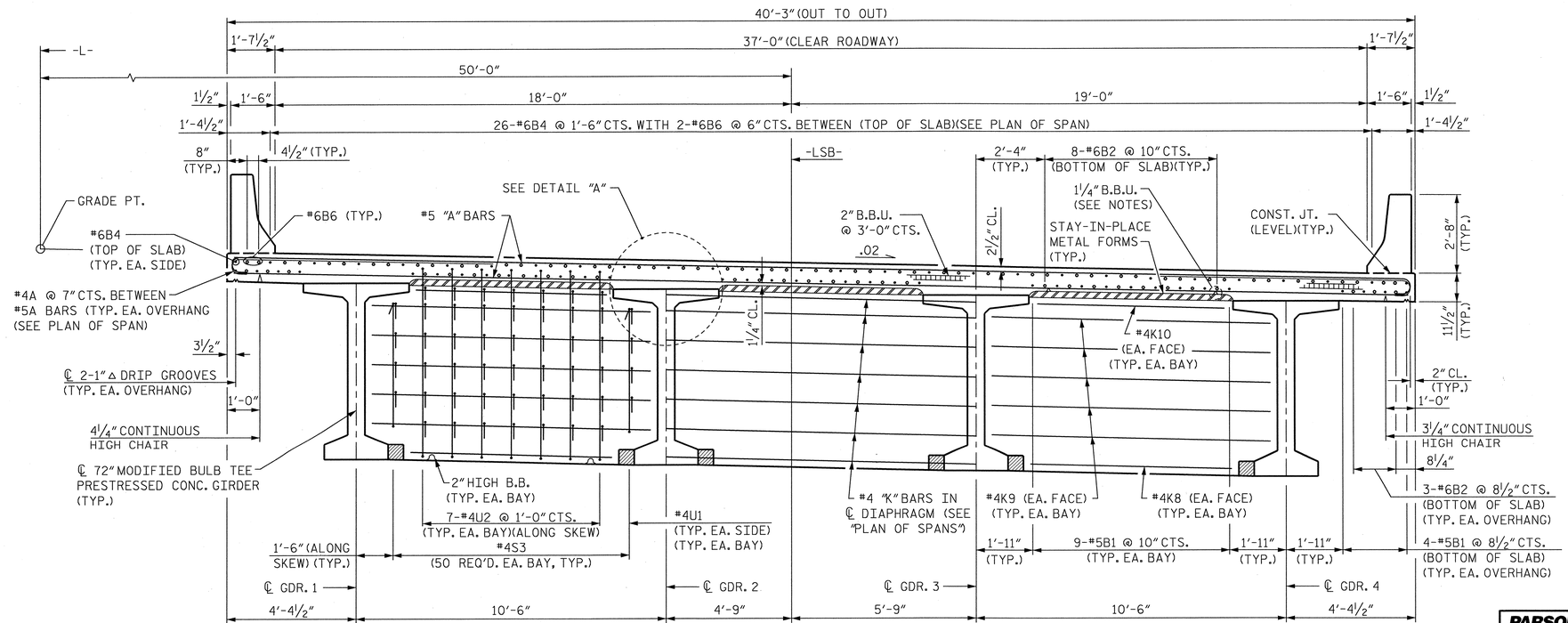
5/9/2012
U2524AE_SD_LR_R02.DGN



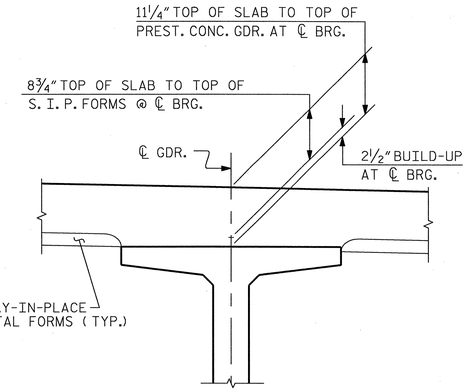
AT END BENT

AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION



TYPICAL SECTION @ BENT DIAPHRAGM



DETAIL "A"

NOTES

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

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

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

BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000 psi.

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
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DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

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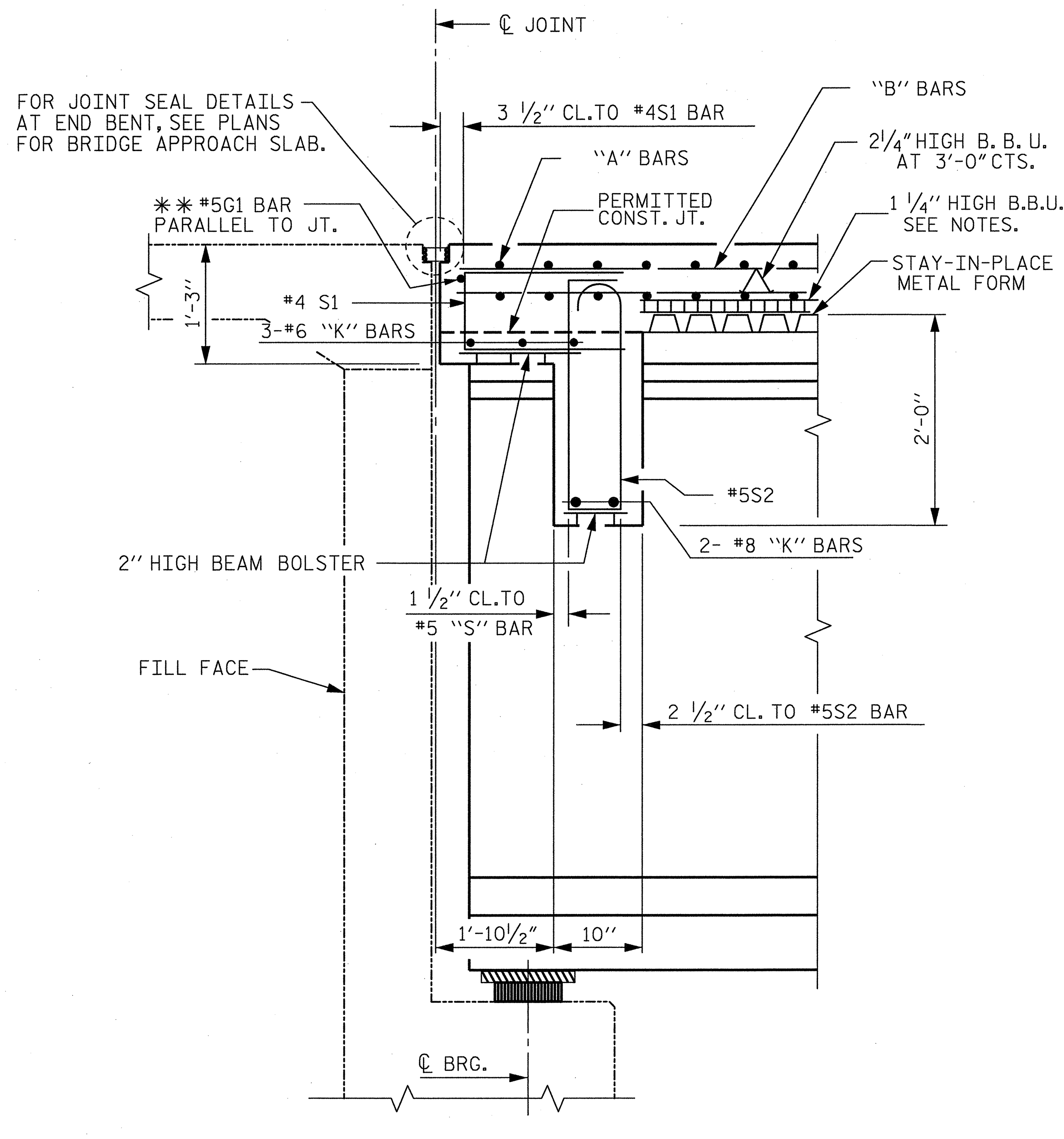
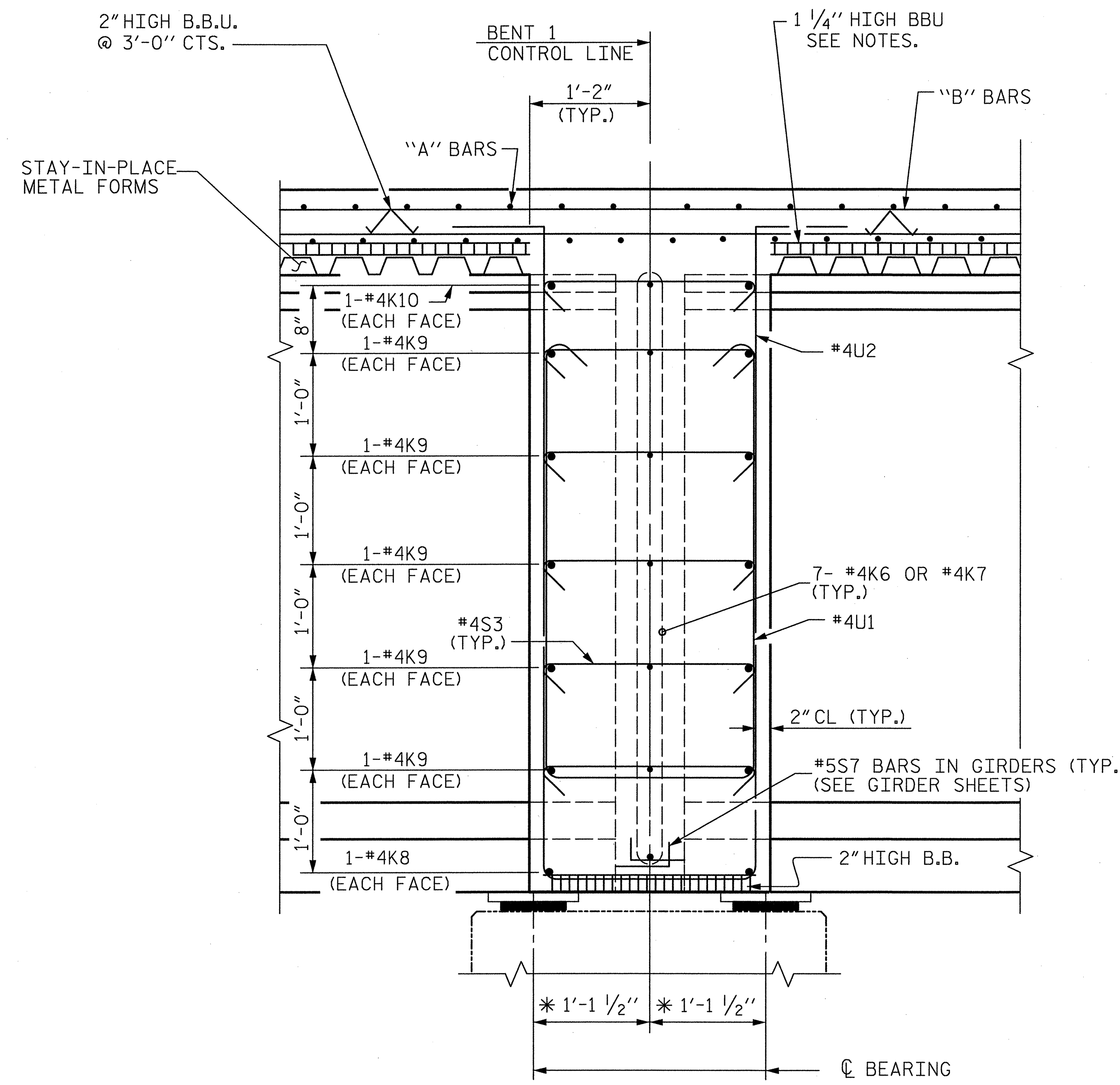


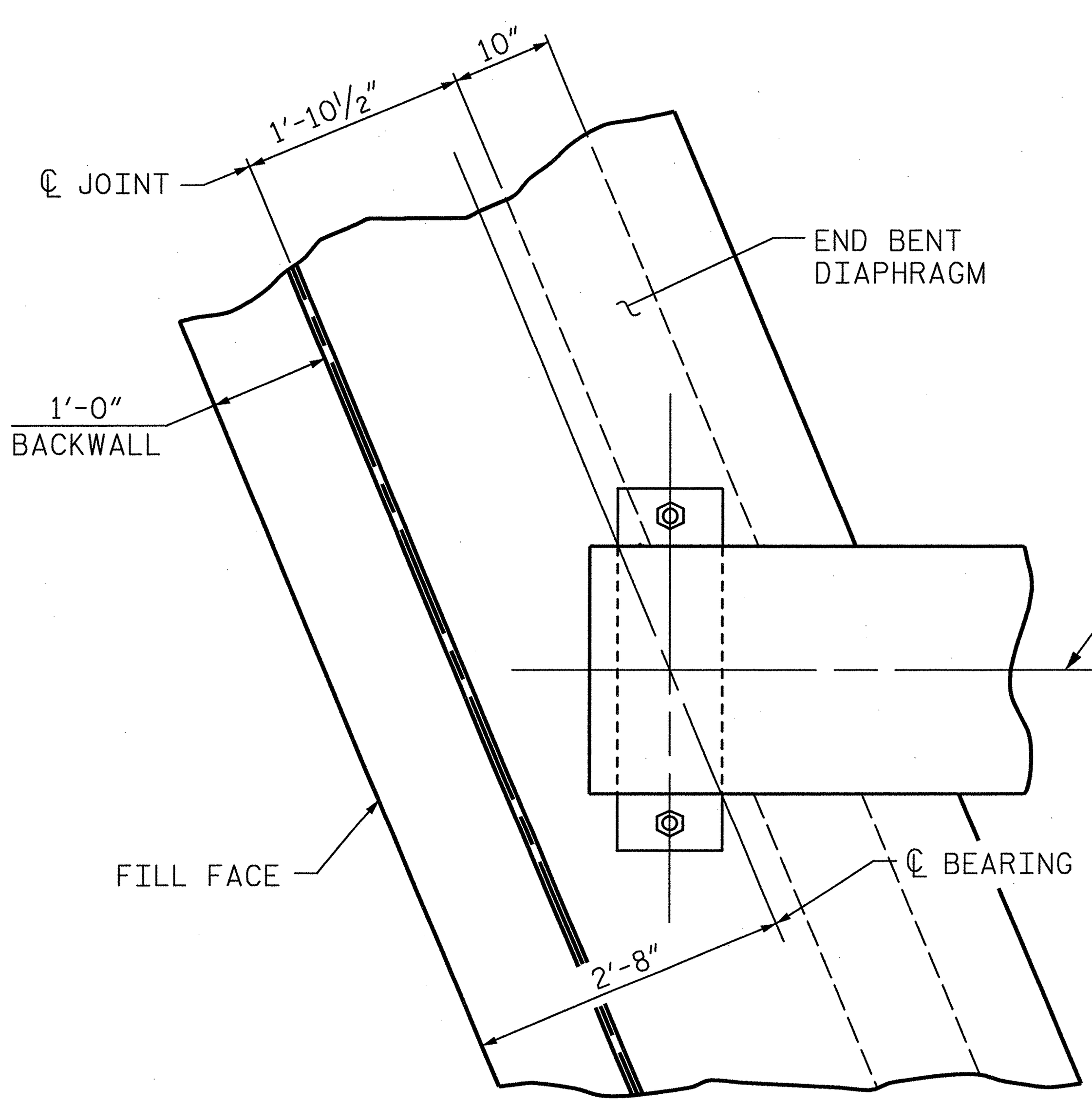
SECTION AT END BENT DIAPHRAGM

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

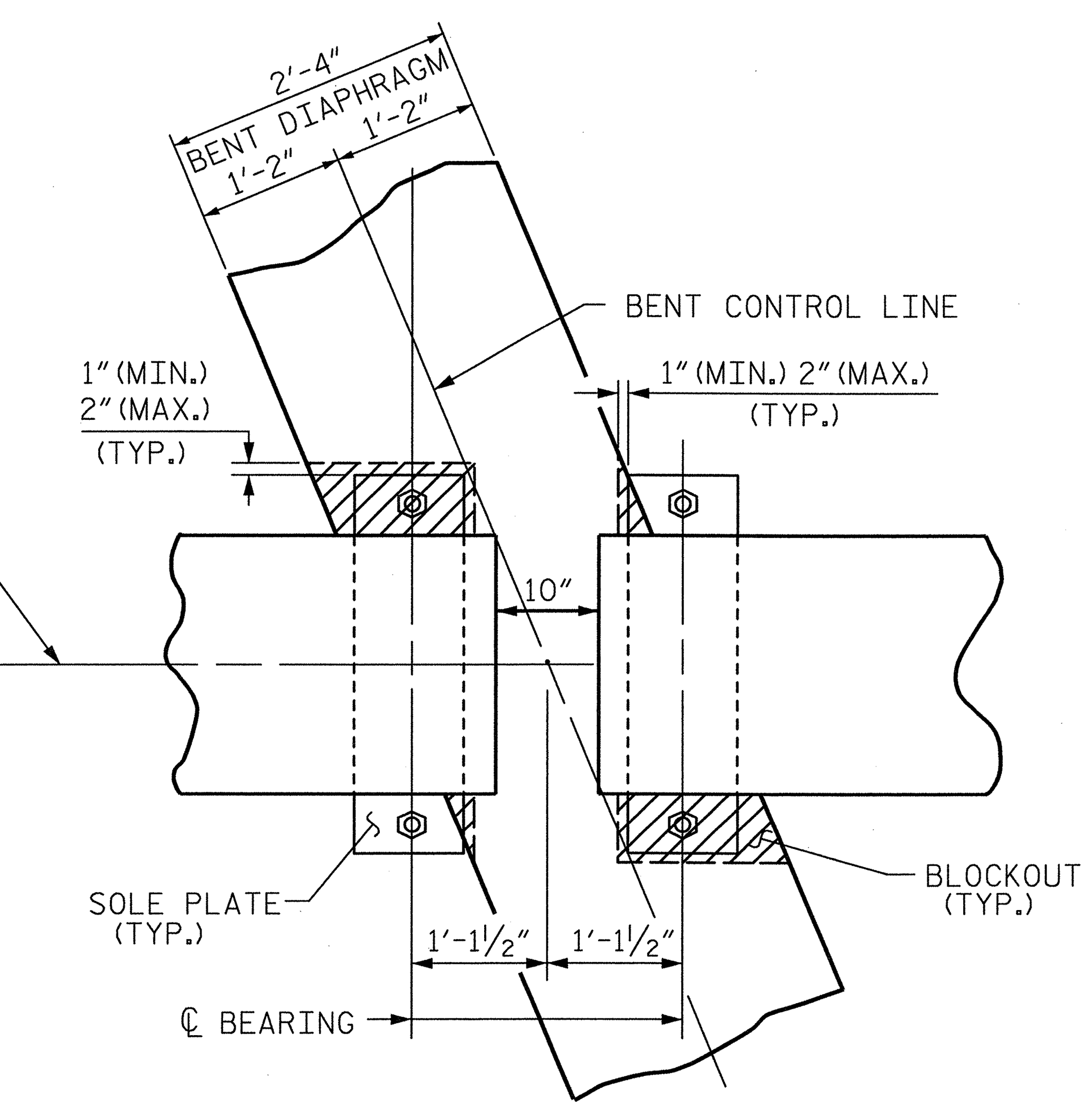


SECTION AT BENT DIAPHRAGM

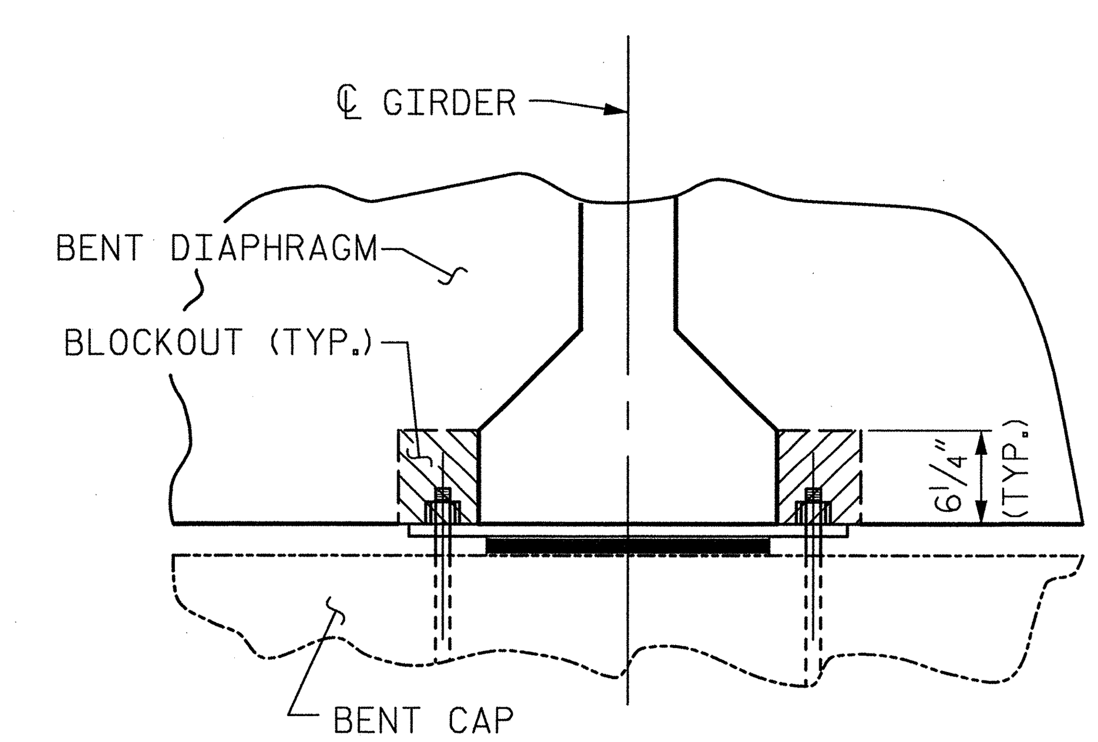
* MEASURED ALONG ℄ GIRDER



END BENT DIAPHRAGM



PLAN



SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

DETAILS

RIGHT LANE

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

SHEET NO. S-35

TOTAL SHEETS 57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/9/12

DRAWN BY : K. WHITE DATE : JAN 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

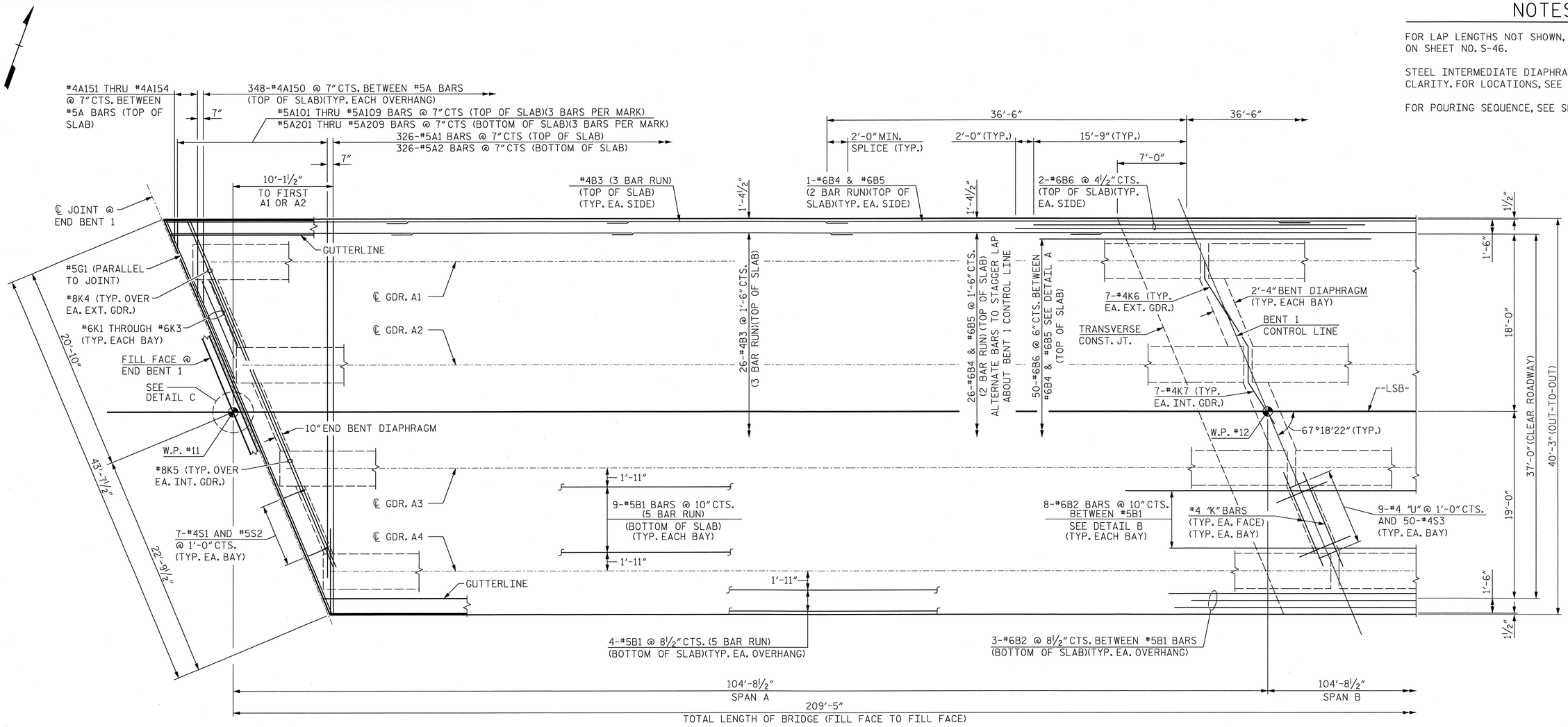
5/9/2012
U2524AE_SD_TS_R04.DGN

NOTES

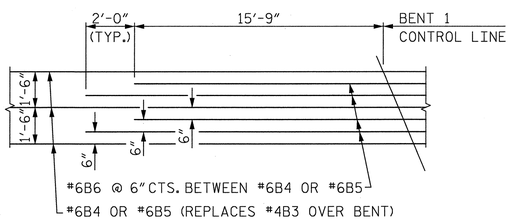
FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON SHEET NO. S-46.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE SHEET NO. S-38.

FOR POURING SEQUENCE, SEE SHEET NO. S-46.

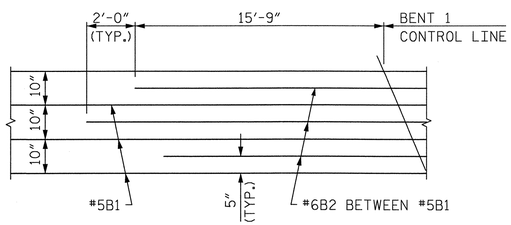


PLAN OF SPAN A



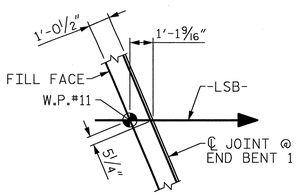
DETAIL A

TOP OF SLAB BARS



DETAIL B

BOTTOM OF SLAB BARS



DETAIL C

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN A

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

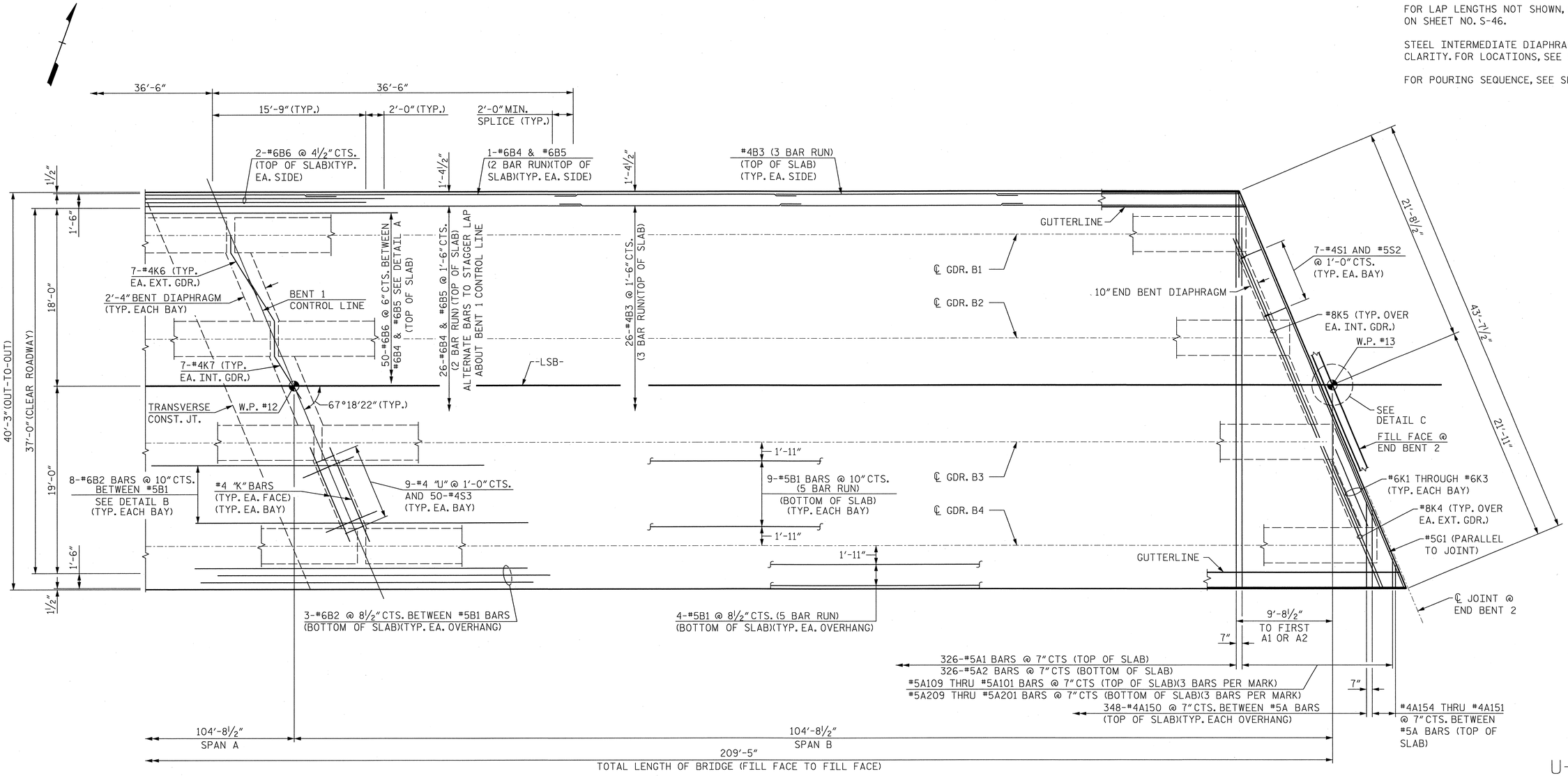
5/9/2012
U2524AE_SD_S3_R03.DGN

NOTES

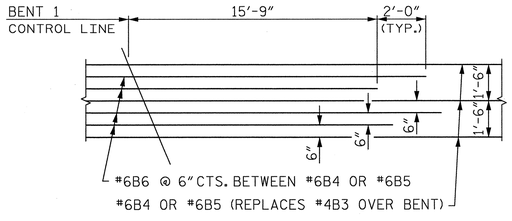
FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON SHEET NO. S-46.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE SHEET NO. S-38.

FOR POURING SEQUENCE, SEE SHEET NO. S-46.

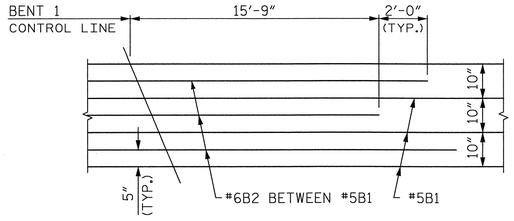


PLAN OF SPAN B



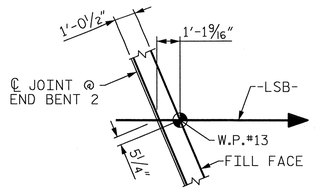
DETAIL A

TOP OF SLAB BARS



DETAIL B

BOTTOM OF SLAB BARS



DETAIL C

U-2412B/
PROJECT NO. U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN B

RIGHT LANE

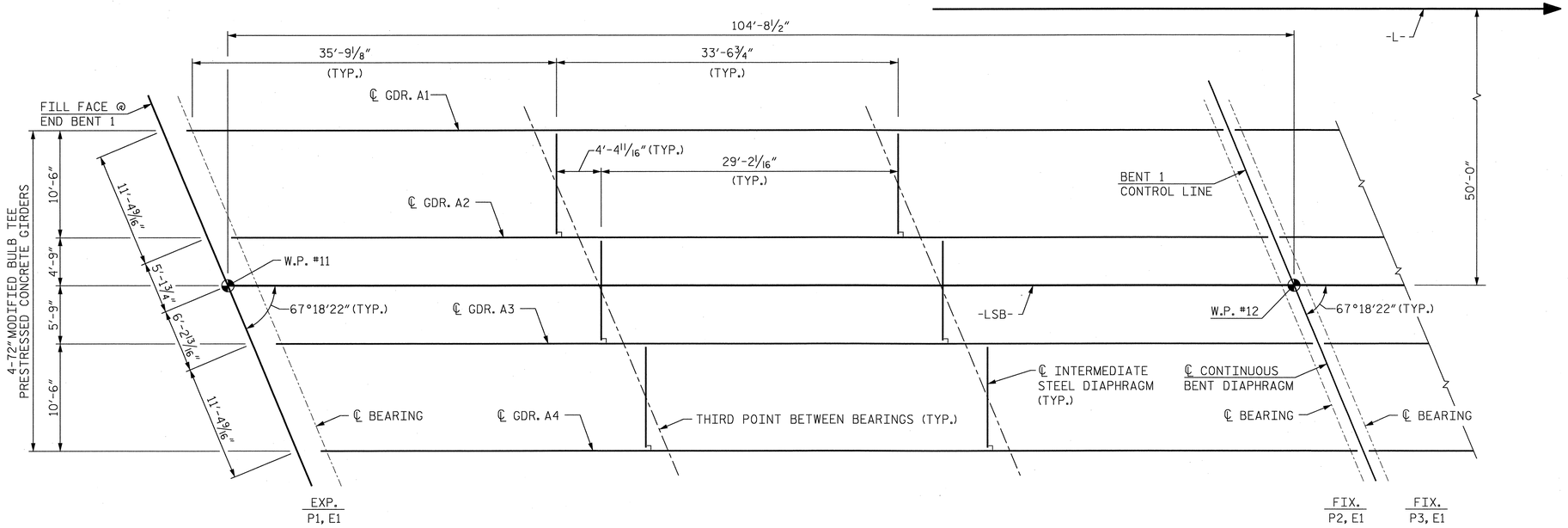
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

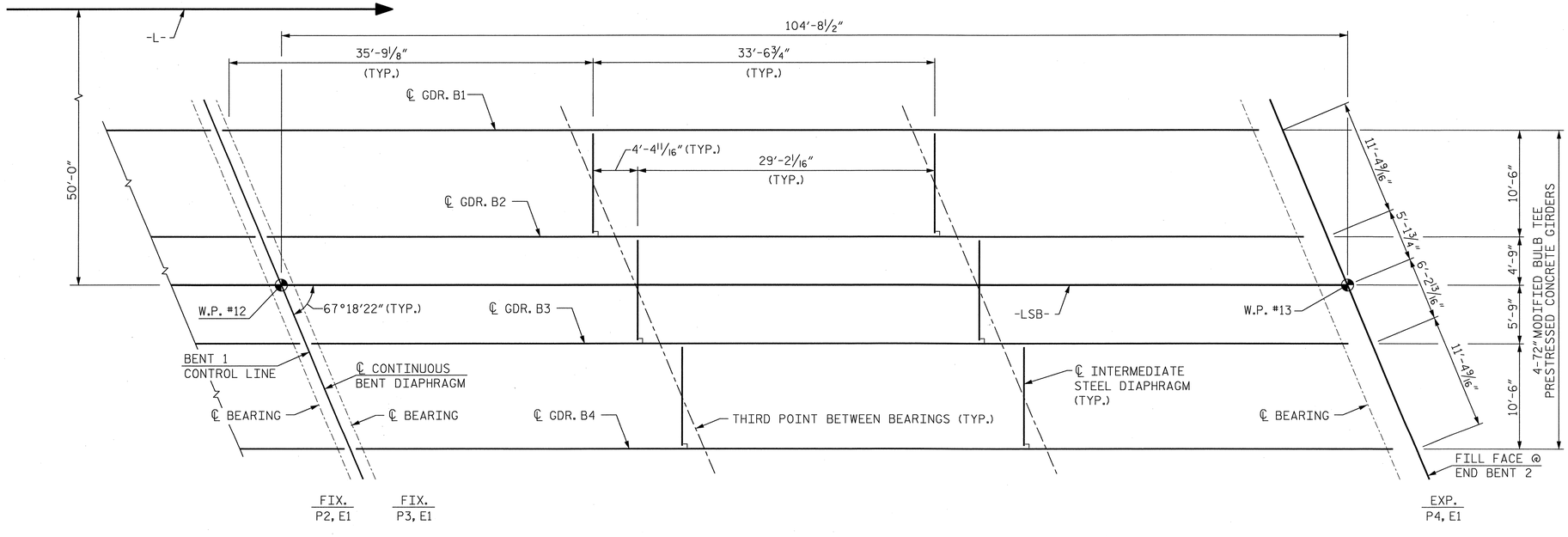
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN D. DOUGHTY
5/10/12

5/9/2012
U2524AE_SD_S4_R04.DGN



SPAN A



SPAN B

FRAMING PLAN

NOTES

ALL DIMENSIONS ARE HORIZONTAL.

CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ANY NECESSARY TEMPORARY BRACING OF GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

RIGHT LANE

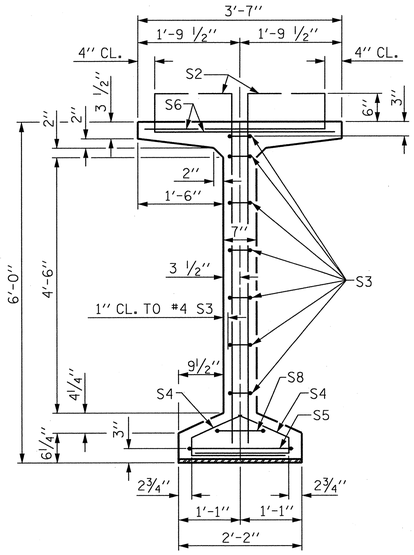
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

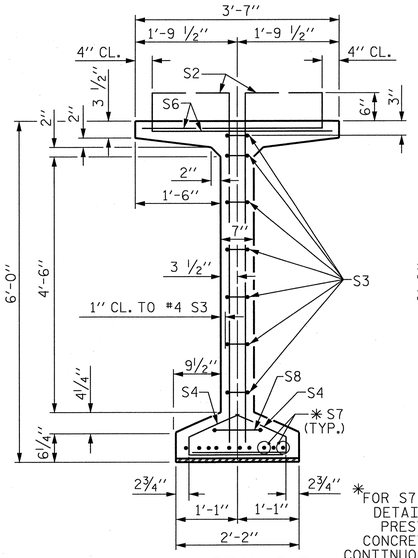
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN T. DOUGHTY
5/10/12

DRAWN BY : K. WHITE DATE : JAN 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

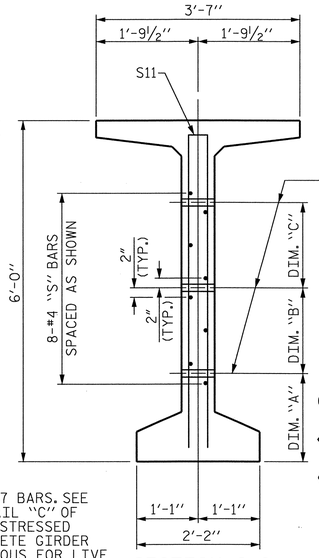
5/9/2012
U2524AE_SD_FP_R02.DGN



SECTION A-A



SECTION B-B



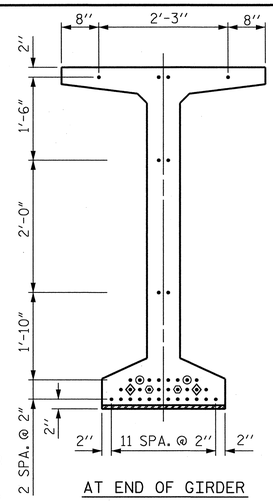
SECTION C-C

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

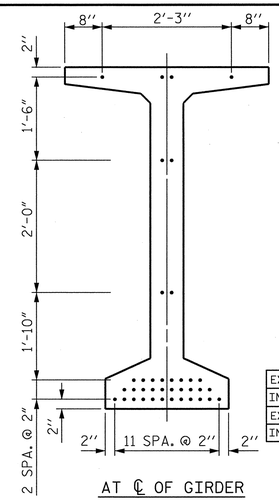
(S1, S6 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



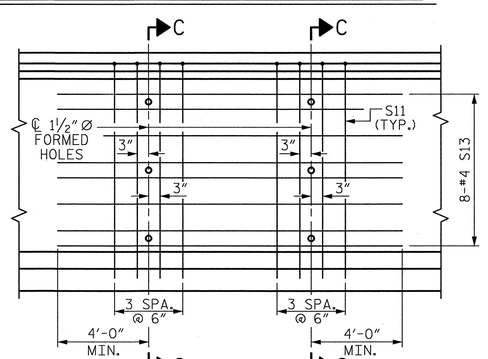
AT END OF GIRDER



AT ℄ OF GIRDER

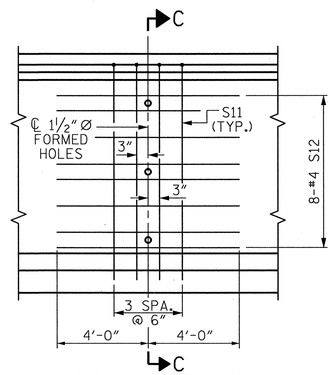
0.6" Ø LOW RELAXATION STRAND LAYOUT

EXTERIOR GDR.	S11	8	#5	2	11'-8"	97
INTERIOR GDR.	S11	16	#5	2	11'-8"	195
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	12'-5"	133



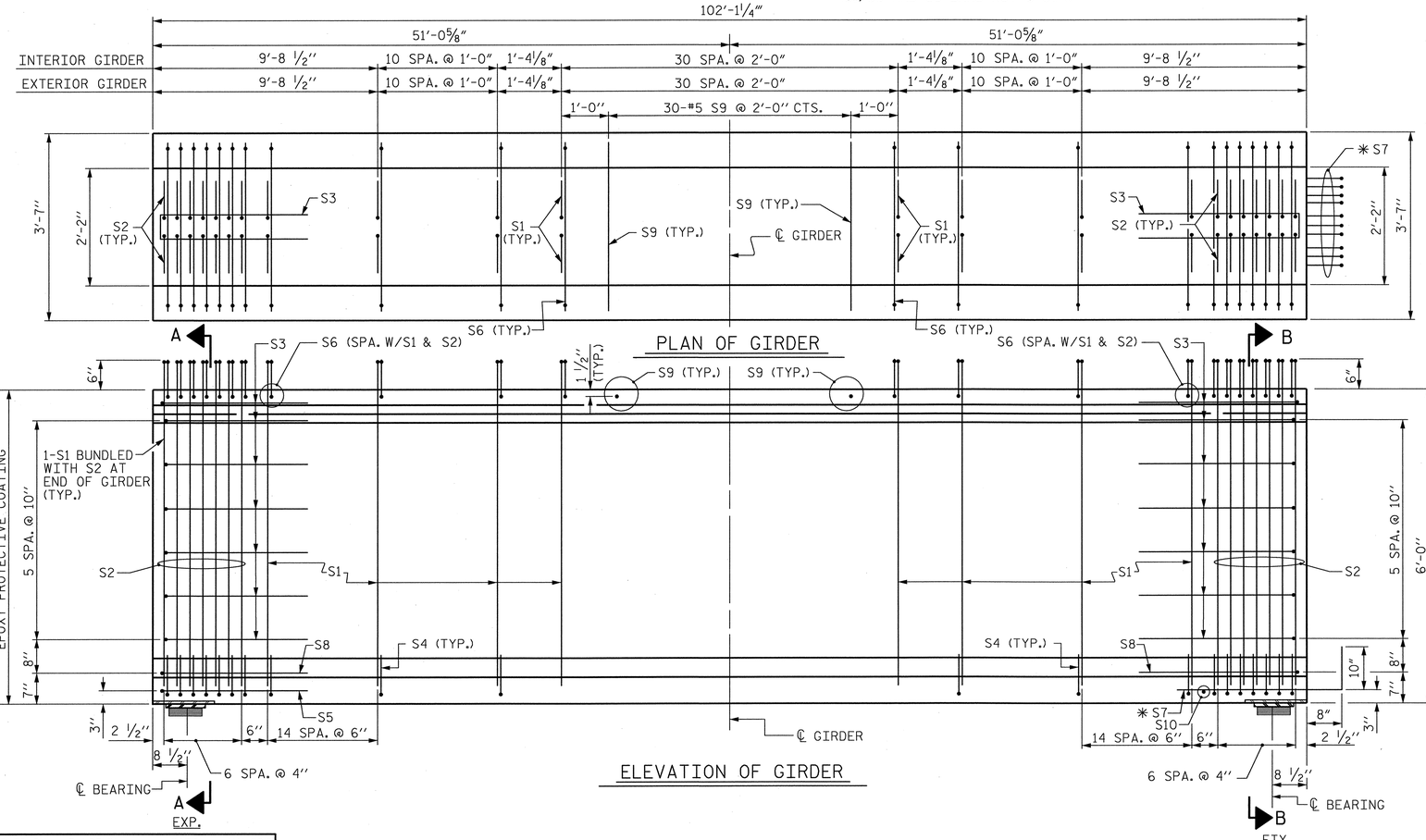
PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A2 AND A3



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A1 AND A4



PLAN OF GIRDER

ELEVATION OF GIRDER

0.6" Ø L. R. GRADE 270 STRANDS

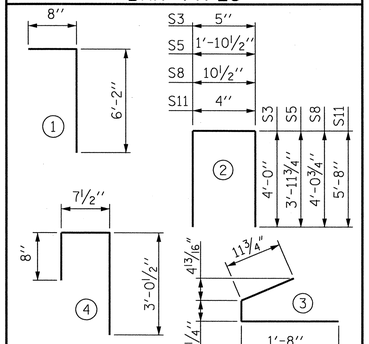
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	166	#4	1	6'-10"	758
S2	28	#5	1	6'-10"	200
S3	14	#4	2	8'-5"	79
S4	128	#4	3	3'-0"	257
S5	1	#5	2	9'-10"	10
S6	190	#5	4	4'-4"	859
* S7	10	#5	STR	3'-8"	38
S8	2	#5	2	9'-0"	19
S9	30	#5	STR	3'-3"	102
S10	1	#3	STR	1'-10"	1

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2506	21.9	38
INTERIOR GIRDER	2651	21.9	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	102'-1 1/4"	408'-5"

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN A RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			57

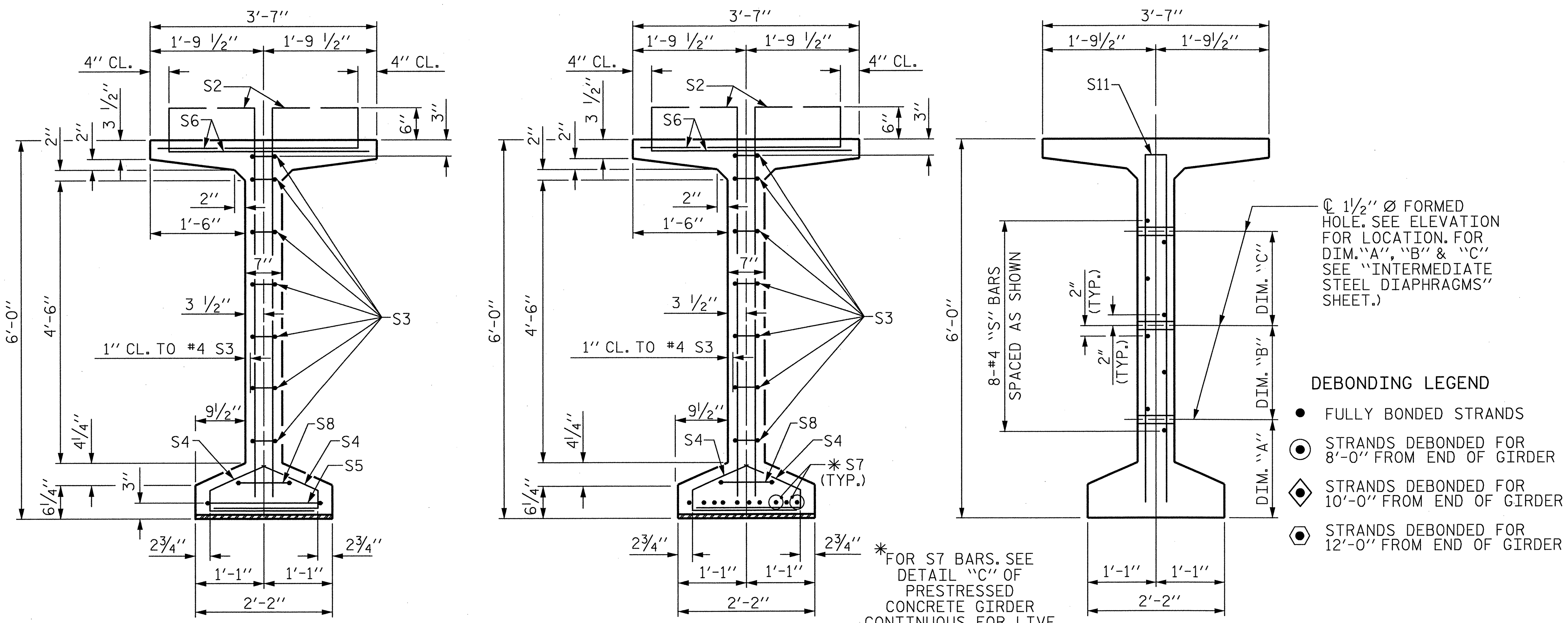
STD. NO. PCG8

ASSEMBLED BY : B. LOFLIN		DATE :	JAN 2012
CHECKED BY : J. DOUGHTY		DATE :	MAR 2012
DRAWN BY : EEM 2/6/97	REV. 10/17/00		RWW/LES
CHECKED BY : VAP 2/6/97	REV. 5/1/06R		TLA/GM
	REV. 10/1/11		MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON A. DOUGHTY 5/10/12

5/9/2012
U2524AE_SD_05_ROS.DGN



SECTION A-A

SECTION B-B

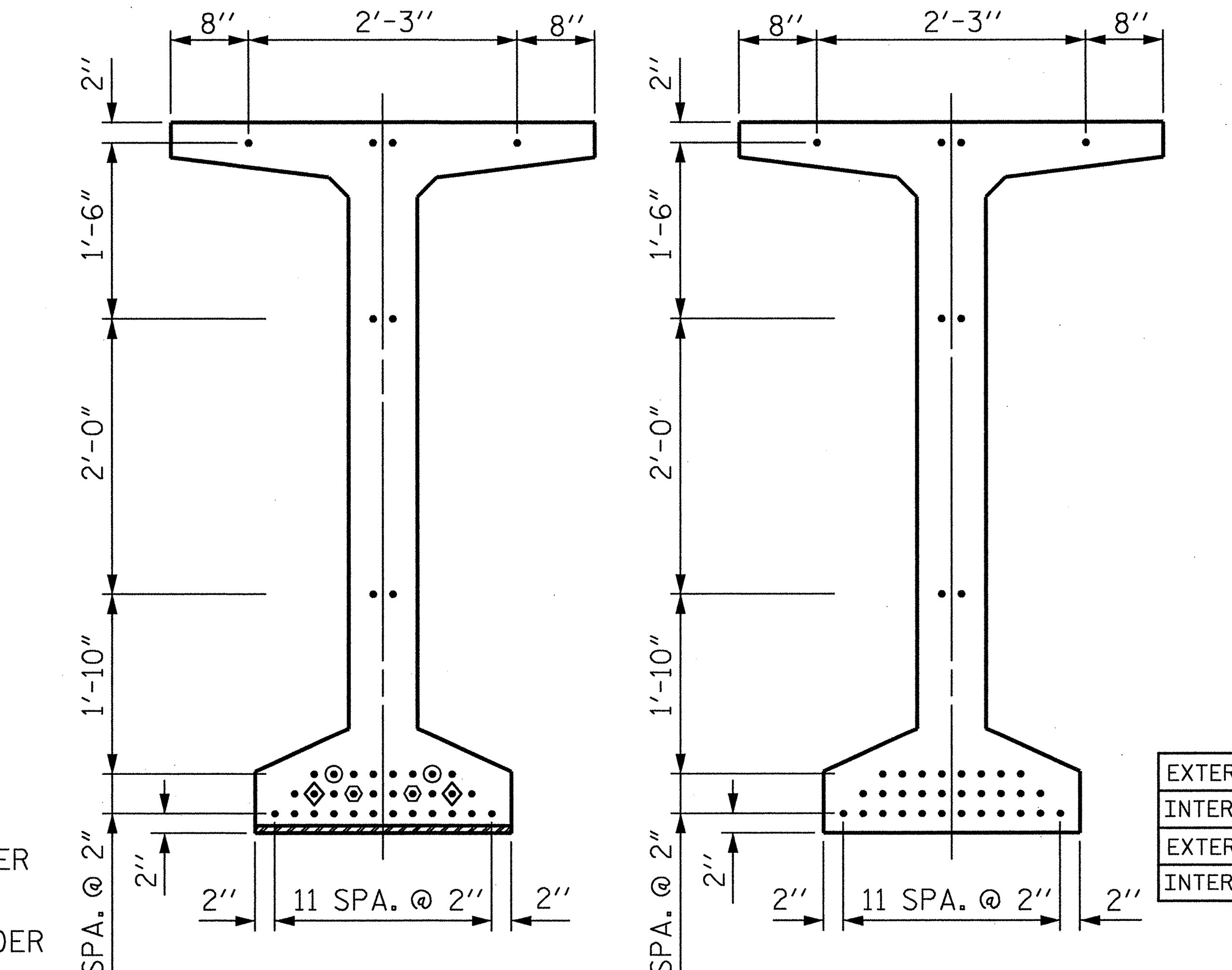
*FOR S7 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

(S1, S6 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

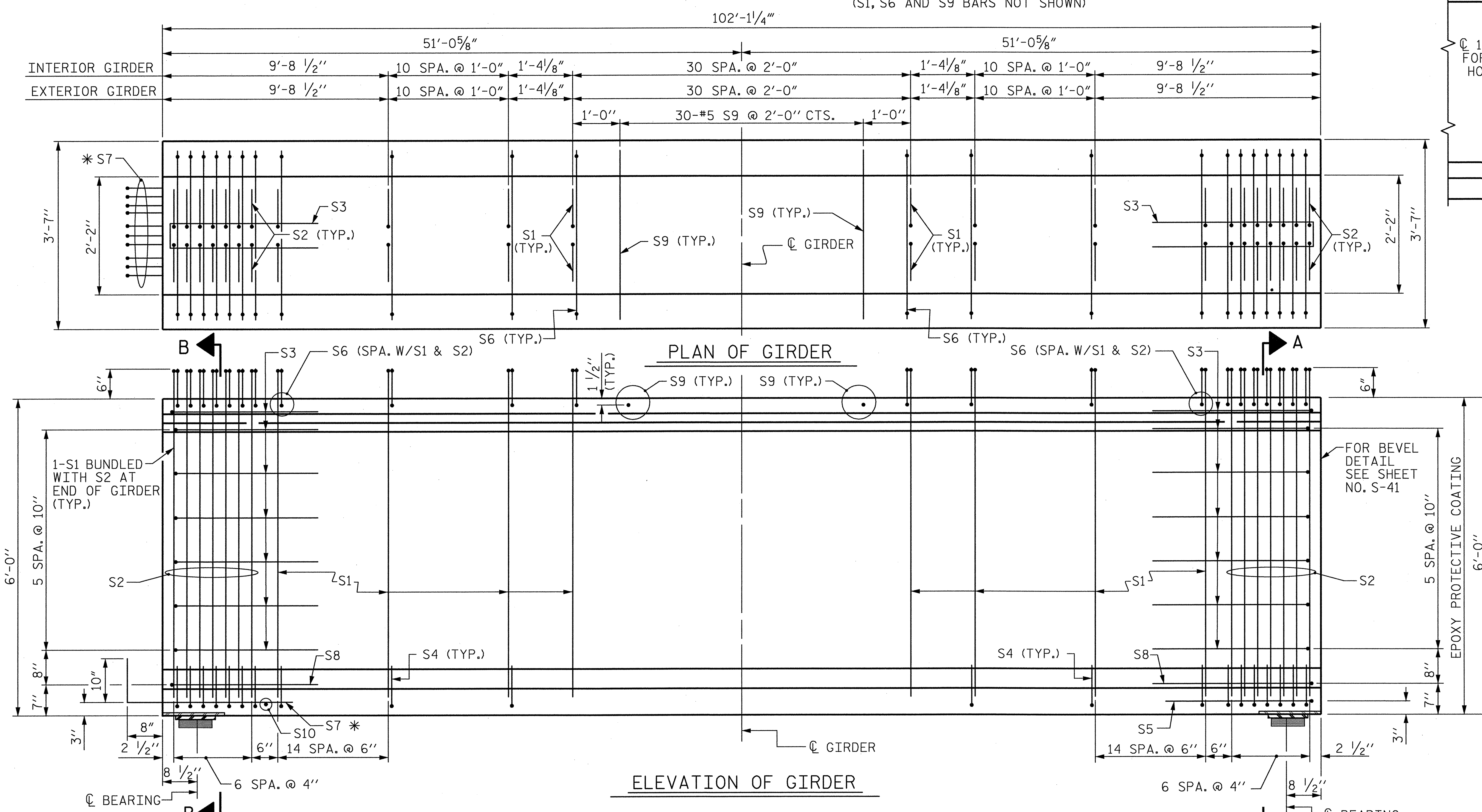
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



AT END OF GIRDER

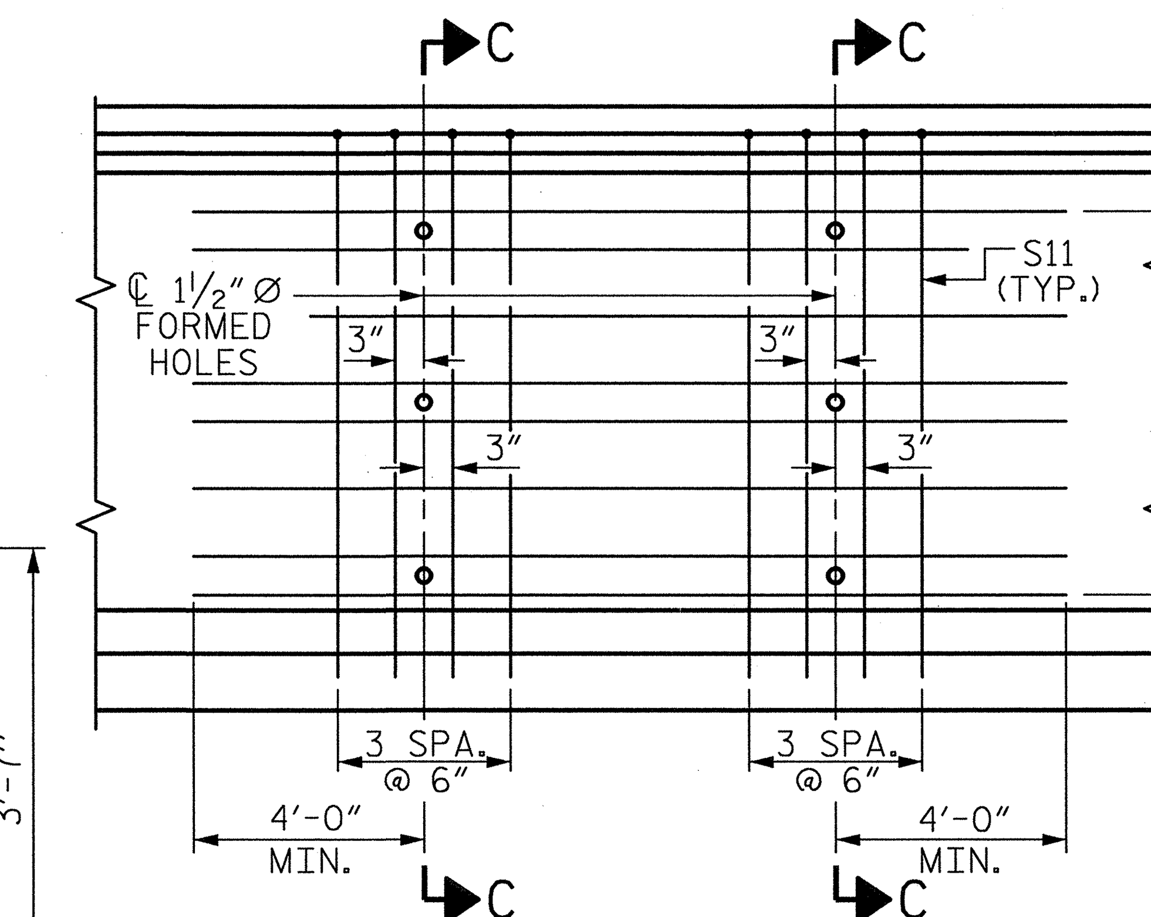
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



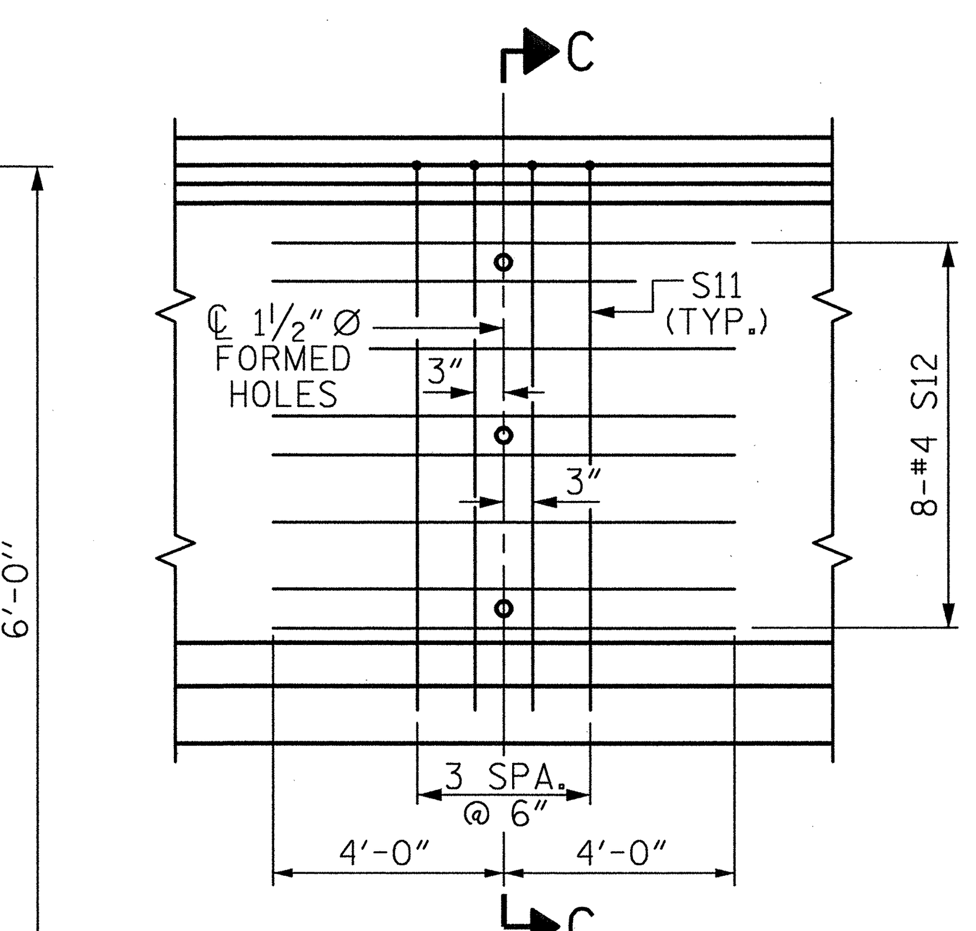
PLAN OF GIRDER

ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B2 AND B3



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B1 AND B4

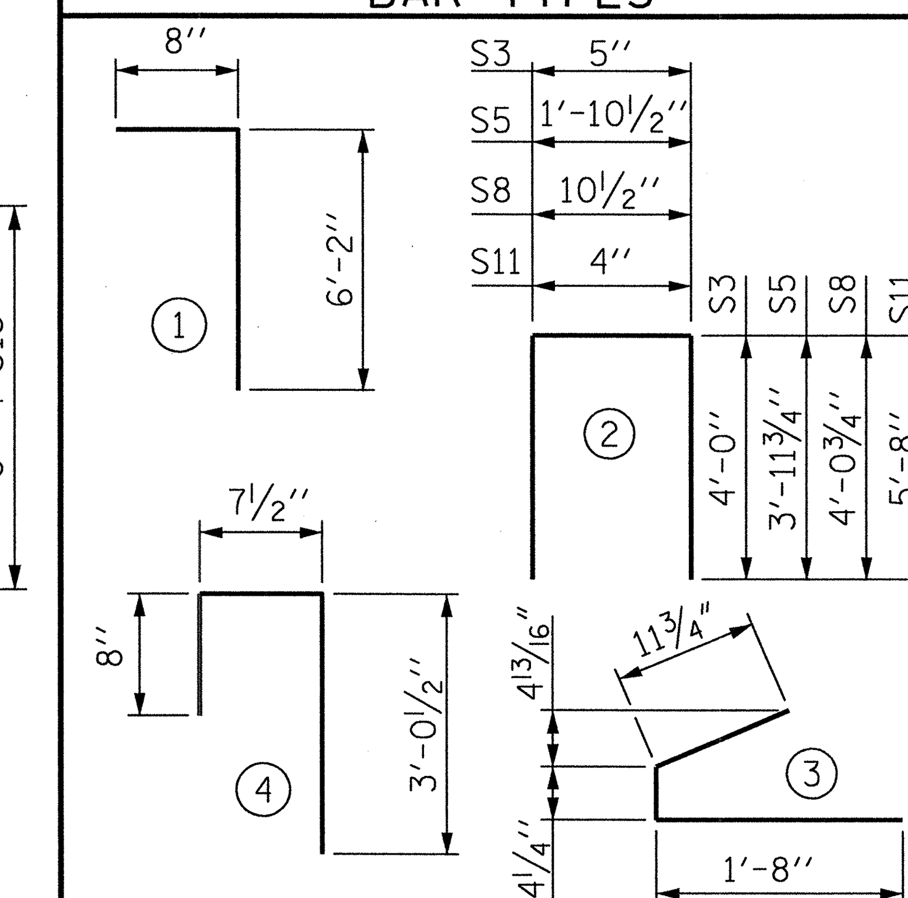
0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	166	#4	1	6'-10"	758
	S2	28	#5	1	6'-10"	200
	S3	14	#4	2	8'-5"	79
	S4	128	#4	3	3'-0"	257
	S5	1	#5	2	9'-10"	10
	S6	190	#5	4	4'-4"	859
	* S7	10	#5	STR	3'-8"	38
	S8	2	#5	2	9'-0"	19
	S9	30	#5	STR	3'-3"	102
	S10	1	#3	STR	1'-10"	1
EXTERIOR GDR.	S11	8	#5	2	11'-8"	97
INTERIOR GDR.	S11	16	#5	2	11'-8"	195
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	12'-5"	133

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	2506	21.9	38
INTERIOR GIRDER	2651	21.9	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	102'-1 1/4"	408'-5"

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B RIGHT LANE

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-40
1			3					TOTAL SHEETS
2			4					57

STD. NO. PCG8

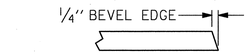
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032967
5/10/12

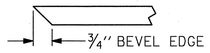
ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012

DRAWN BY : EEM 2/6/97	REV. 10/17/00	RWW/LES
CHECKED BY : VAP 2/6/97	REV. 5/1/06R	TLA/GM
	REV. 10/1/11	MAA/GM

5/9/2012
U2524AE_SD_G6_R06.DGN

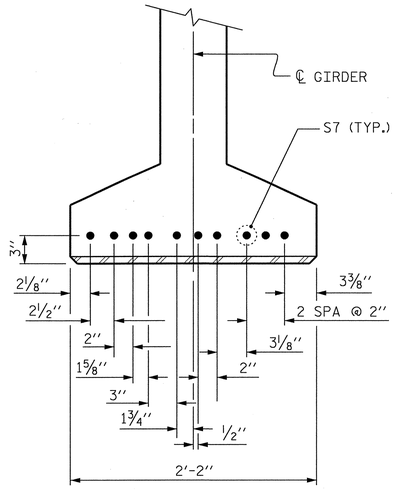


SECTION "G"

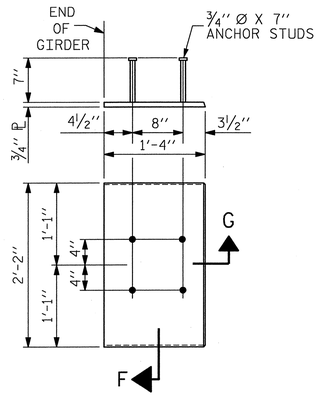


SECTION "F"

(SEE NOTES)



DETAIL "C"



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

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

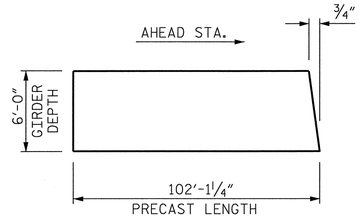
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

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

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

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 72" MODIFIED BULB TEES ONLY.



GIRDER BEVEL DETAIL

APPLIES TO ALL SPAN B GIRDERS

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPANS A AND B GIRDERS 1 AND 4										
TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.090	0.153	0.198	0.224	0.232	0.224	0.198	0.153	0.090	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.030	0.058	0.079	0.093	0.098	0.093	0.079	0.058	0.030	0.000
FINAL CAMBER ↑	0	11/16"	1 1/8"	1 7/16"	1 9/16"	1 5/8"	1 9/16"	1 7/16"	1 1/8"	11/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPANS A AND B GIRDERS 2 AND 3										
TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.090	0.153	0.198	0.224	0.232	0.224	0.198	0.153	0.090	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.033	0.063	0.087	0.102	0.107	0.102	0.087	0.063	0.033	0.000
FINAL CAMBER ↑	0	11/16"	1 1/16"	1 5/16"	1 7/16"	1 1/2"	1 7/16"	1 5/16"	1 1/16"	11/16"	0

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

PROJECT NO. U-2412B/ U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			57

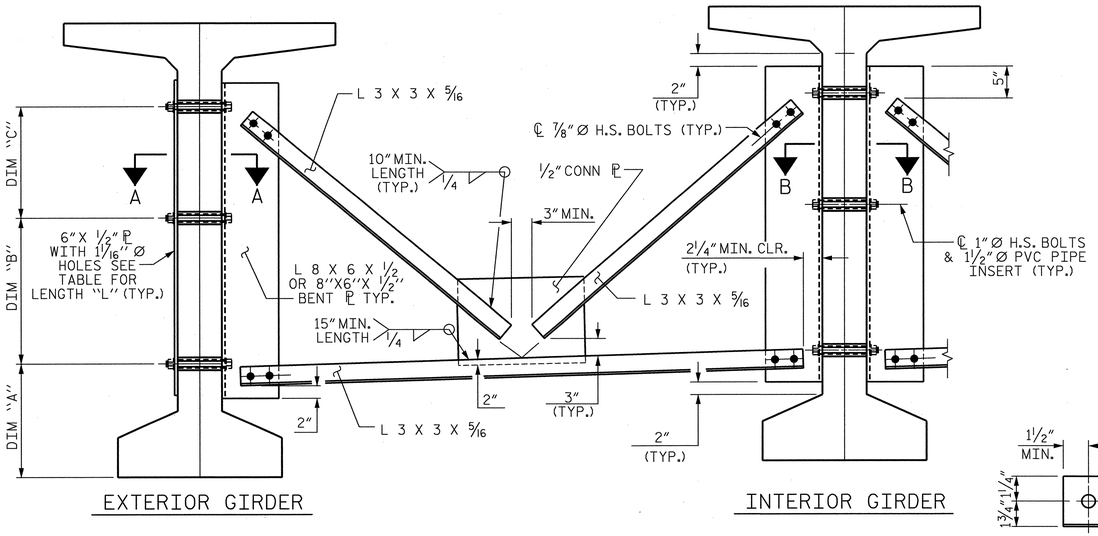
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. POOLE 5/10/12

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012		
CHECKED BY : J. DOUGHTY	DATE : MAR 2012		
DRAWN BY : ELR 11/91	REV. 7/10/01RR	LES/RDR	
CHECKED BY : GRP 11/91	REV. 5/1/06	TLA/GM	
	REV. 10/1/11	MAA/GM	

5/9/2012
U2524AE_SD_G7_R07.DGN

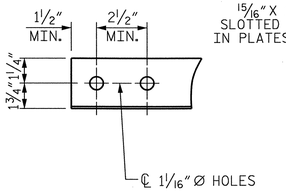
STD. NO. PCG9 (Sht. 5)



EXTERIOR GIRDER

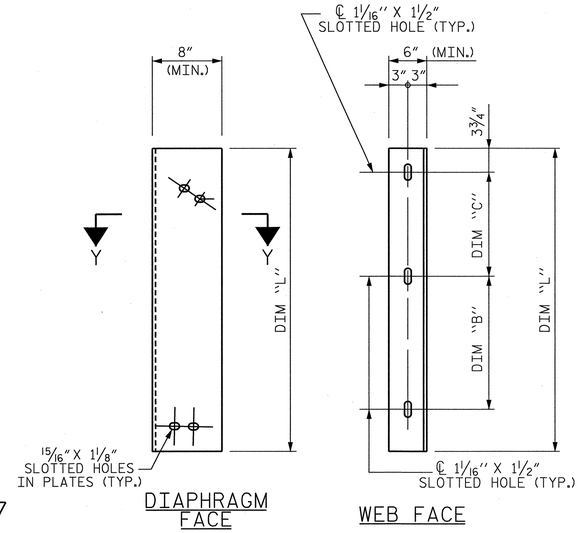
INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



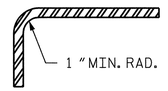
ANGLE END

(L 3 X 3 X 5/16)



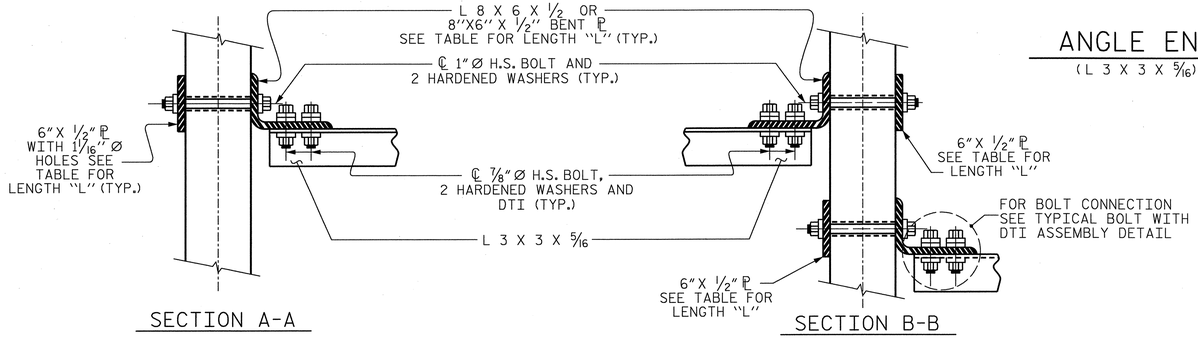
DIAPHRAGM FACE

WEB FACE



SECTION Y-Y

CONNECTION DETAILS



SECTION A-A

SECTION B-B

CONNECTION PLATE DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

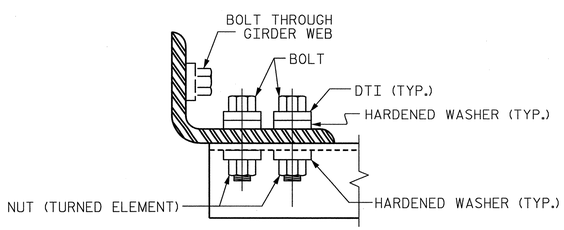
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-6"	1'-11"	1'-5 3/4"	4'-2"



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR 72" MODIFIED BULB TEE
PRESTRESSED CONCRETE
GIRDERS
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			57

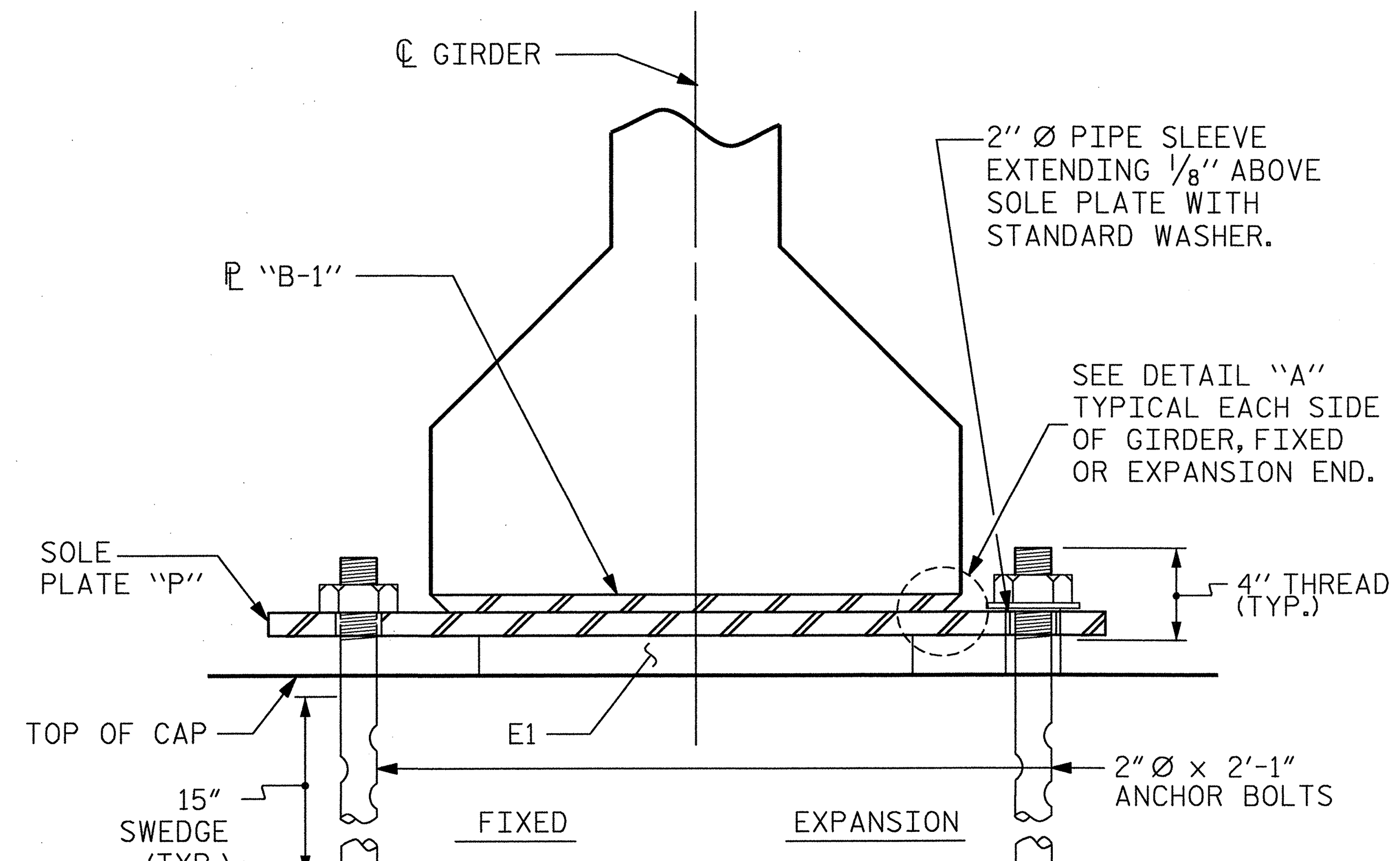
STD. NO. PCG11

ASSEMBLED BY : B. LOFLIN	DATE : JAN 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : RWW 11/09	ADDED 11/23/09R
CHECKED BY : GM 11/09	REV. 10/1/11 MAA/GM

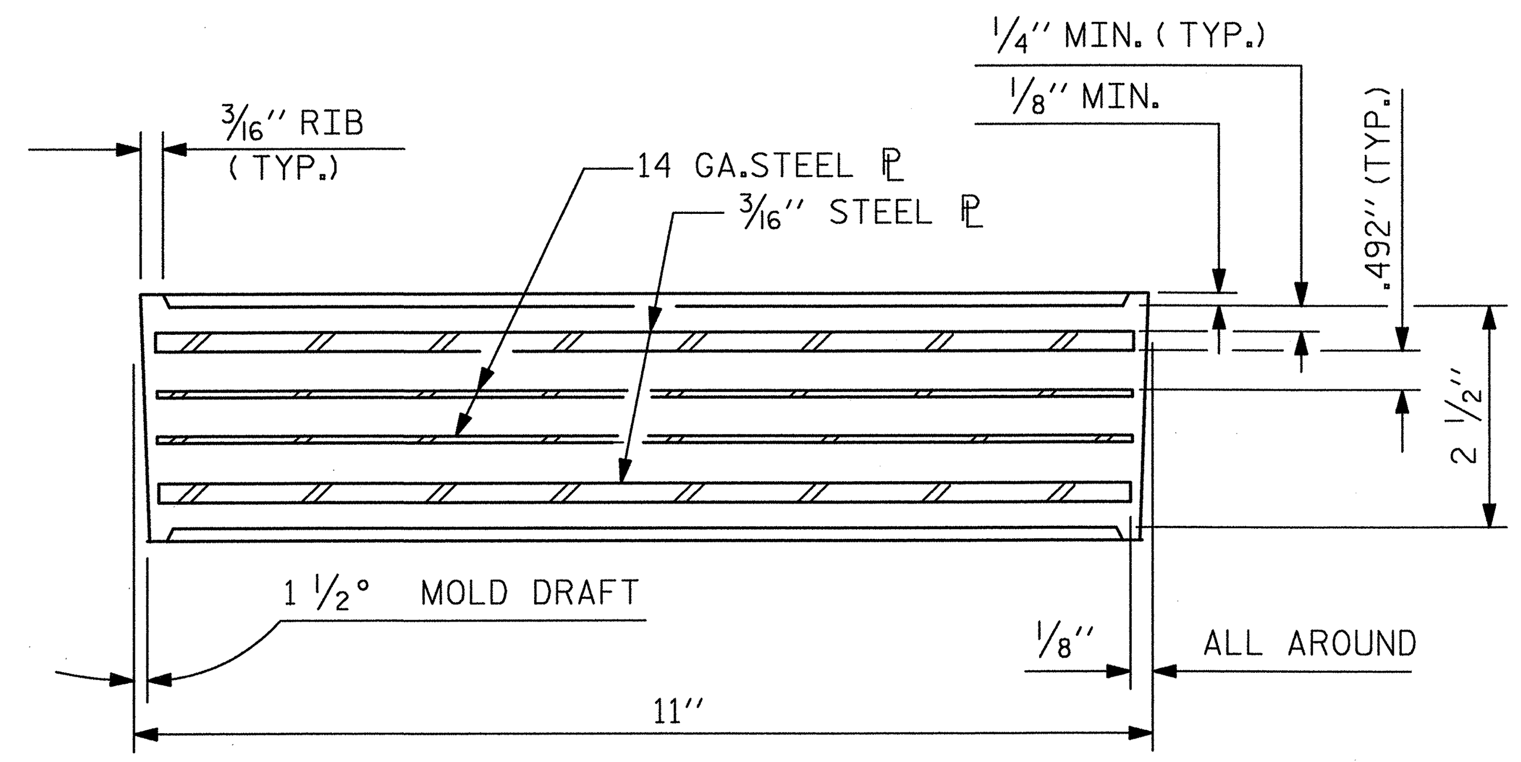
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN R. DOUGHTY
5/9/12

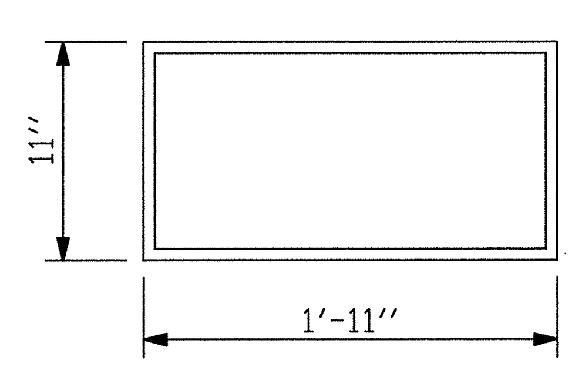
5/10/2012
U2524AE_SD_G8_R08.DGN



SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (16 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI

NOTES

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

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

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

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

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

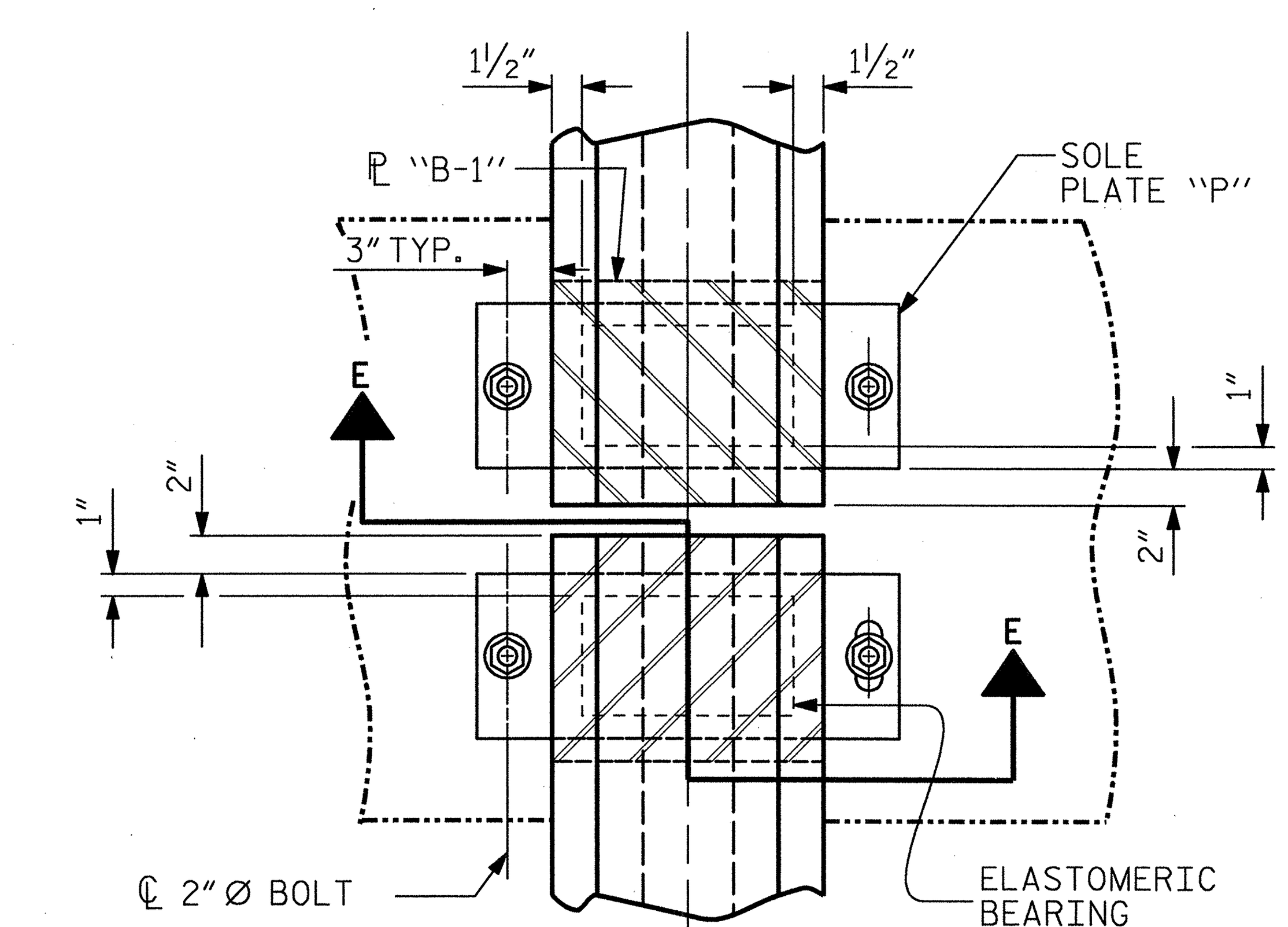
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

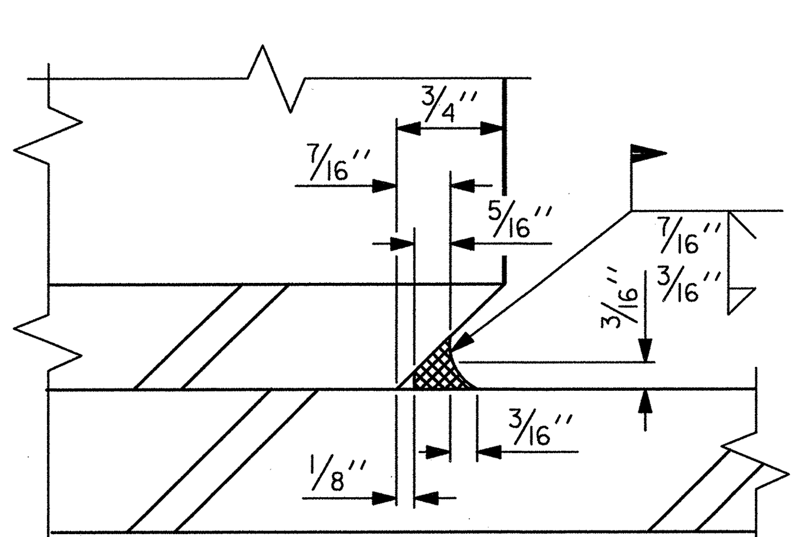
BEARINGS DESIGNED USING METHOD B.

NEOPRENE IN BEARING PADS SHALL HAVE A SHEAR MODULUS (G) OF 160 psi.

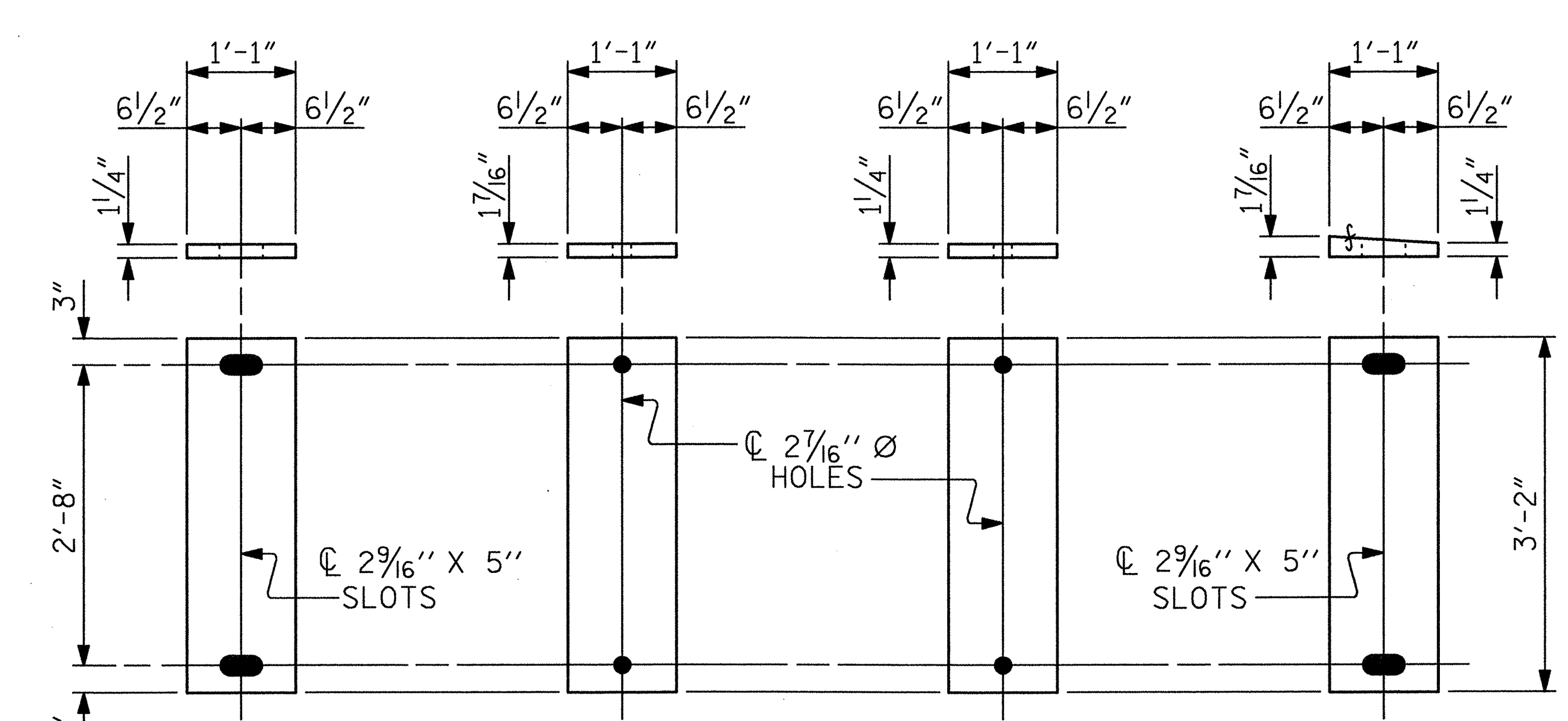


TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



DETAIL "A"



SOLE PLATE DETAILS ("P")

— SERVICE I — DESIGN REACTION	
	MAX.D.L.+ L.L.
TYPE VI	287 K

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE
RIGHT LANE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

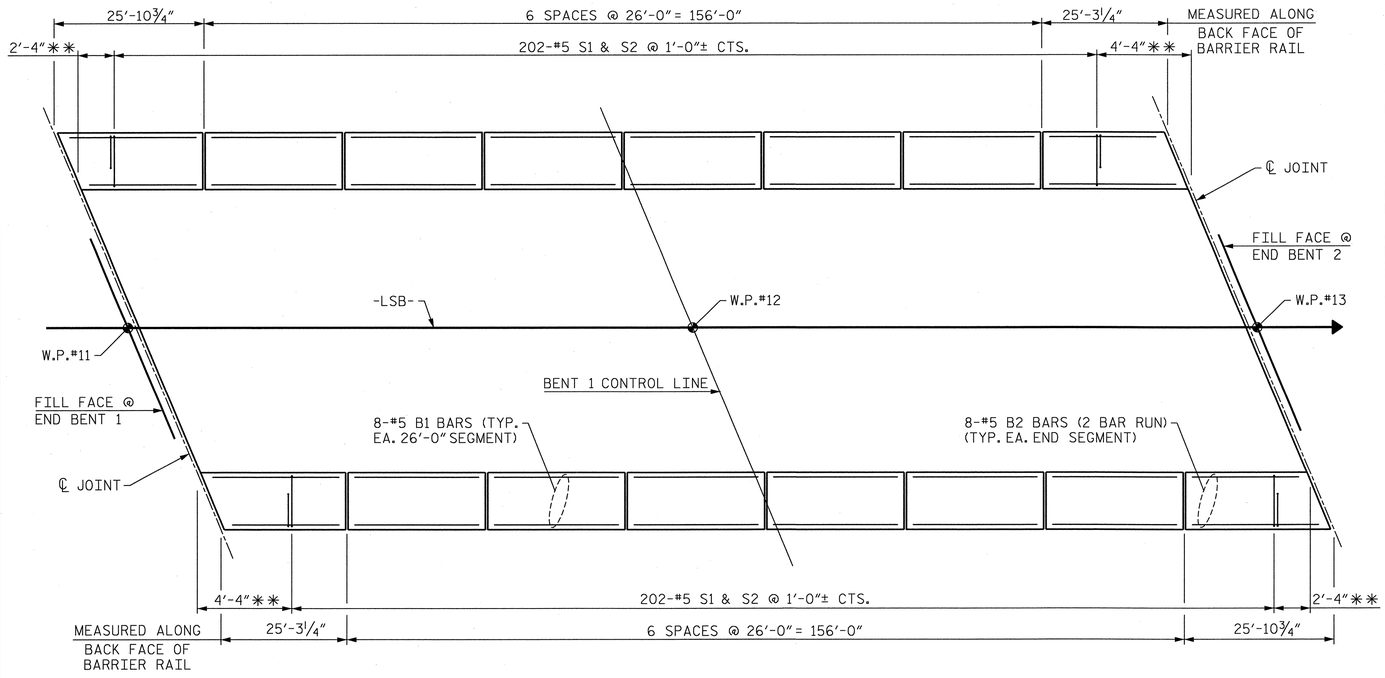
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/10/12

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-43
1			3					TOTAL SHEETS
2			4					57

ASSEMBLED BY : K. WHITE	DATE : FEB 2012
CHECKED BY : J. DOUGHTY	DATE : MAR 2012
DRAWN BY : EEM 2/97	REV. 10/17/00 RWW/LES
CHECKED BY : VAP 2/97	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

STD. NO. EB4

5/9/2012
U2524AE_SD_BG_R02.DGN



SPAN A SPAN B

PLAN OF CONCRETE BARRIER RAIL

** SEE "END OF RAIL DETAILS" FOR ADDITIONAL REINFORCEMENT

NOTES

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

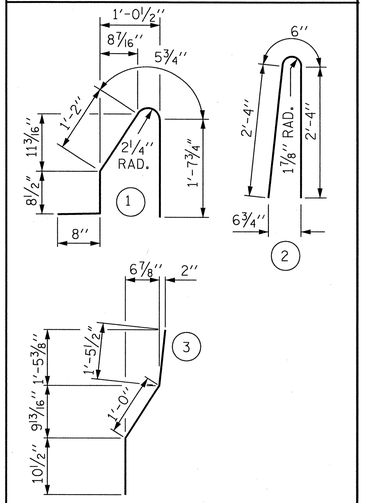
WHEN EVAZOTE JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 AND #5 S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 AND #5 S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

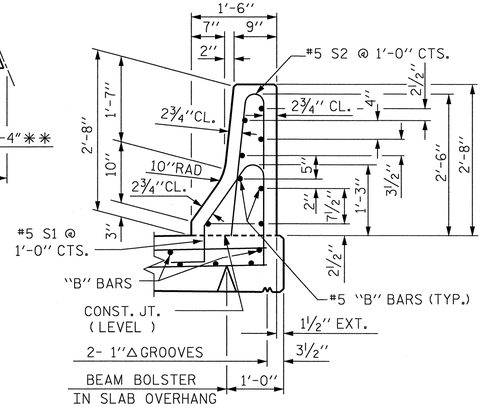
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	96	#5	STR	25'-7"	2562
* B2	64	#5	STR	14'-5"	962
* S1	404	#5	1	4'-8"	1966
* S2	404	#5	2	5'-2"	2177
* S3	12	#5	3	3'-4"	42
* S4	12	#5	STR	3'-2"	40

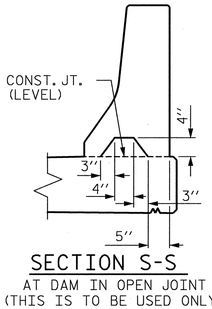
* EPOXY COATED REINFORCING STEEL 7749 LBS.

CLASS AA CONCRETE 41.5 CU. YDS.

CONCRETE BARRIER RAIL 414.3 LIN. FT.



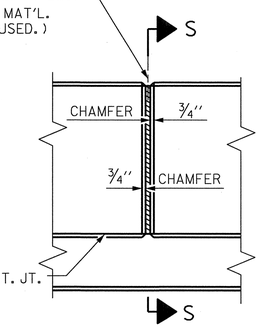
SECTION THRU RAIL



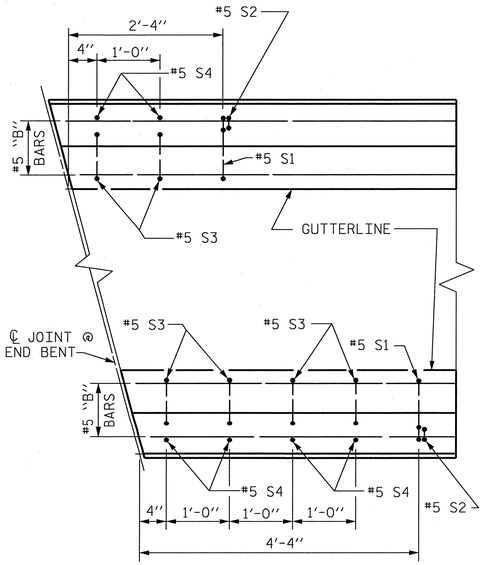
SECTION S-S

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

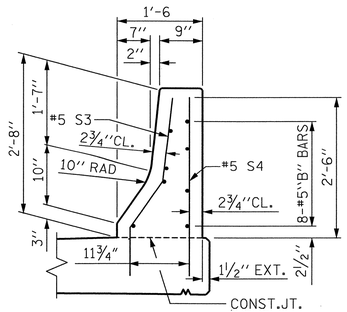
℄ ½" EXP.JT.MAT'L HELD IN PLACE WITH GALVANIZED NAILS.
(NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



ELEVATION AT EXPANSION JOINTS



PLAN



END VIEW

BARRIER RAIL DETAILS

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE BARRIER RAIL

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			57

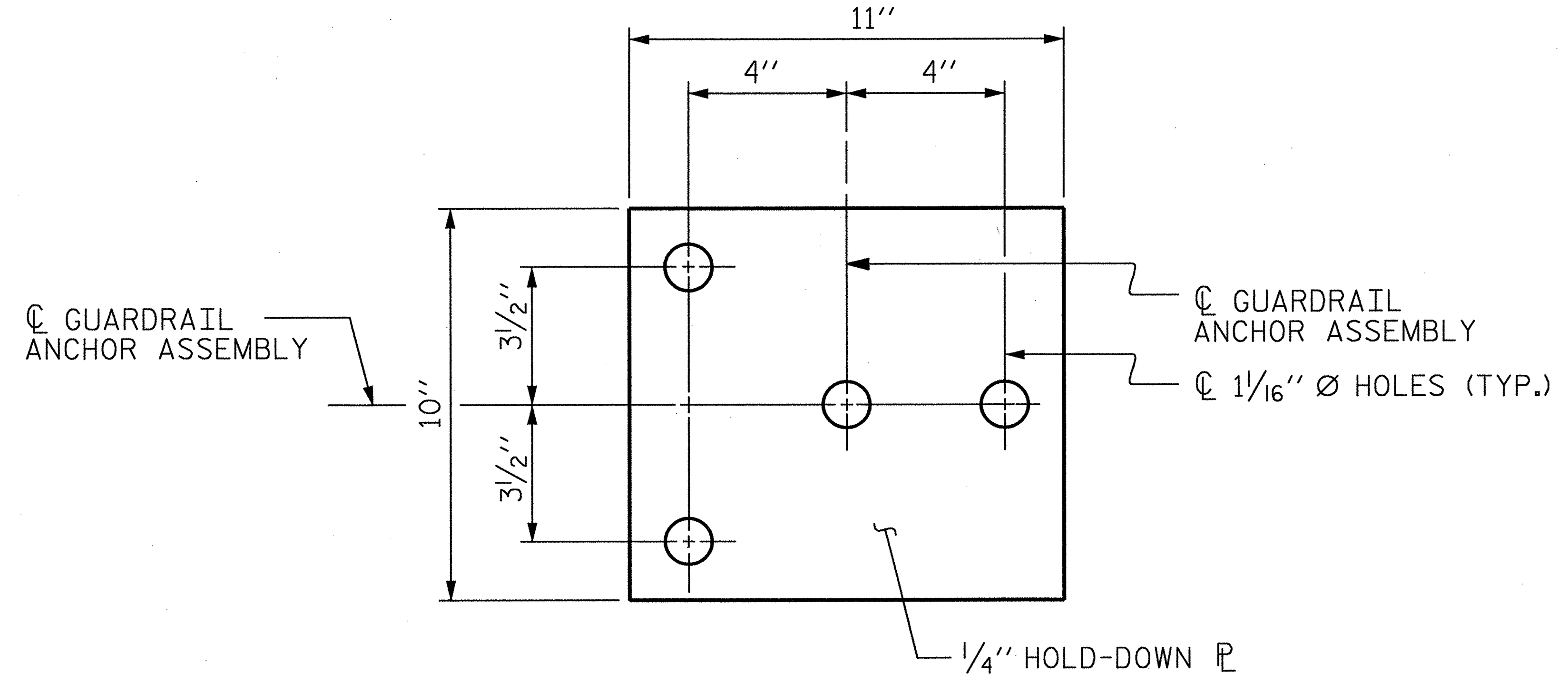
STD. NO. CBR1

ASSEMBLED BY : B. LOFLIN		DATE : FEB 2012	
CHECKED BY : J. DOUGHTY		DATE : FEB 2012	
DRAWN BY : ARB 5/87	REV. 5/7/03R	RWW/JTE	
CHECKED BY : SJD 9/87	REV. 5/1/06R	TLA/GM	
	REV. 10/1/11	MAA/GM	

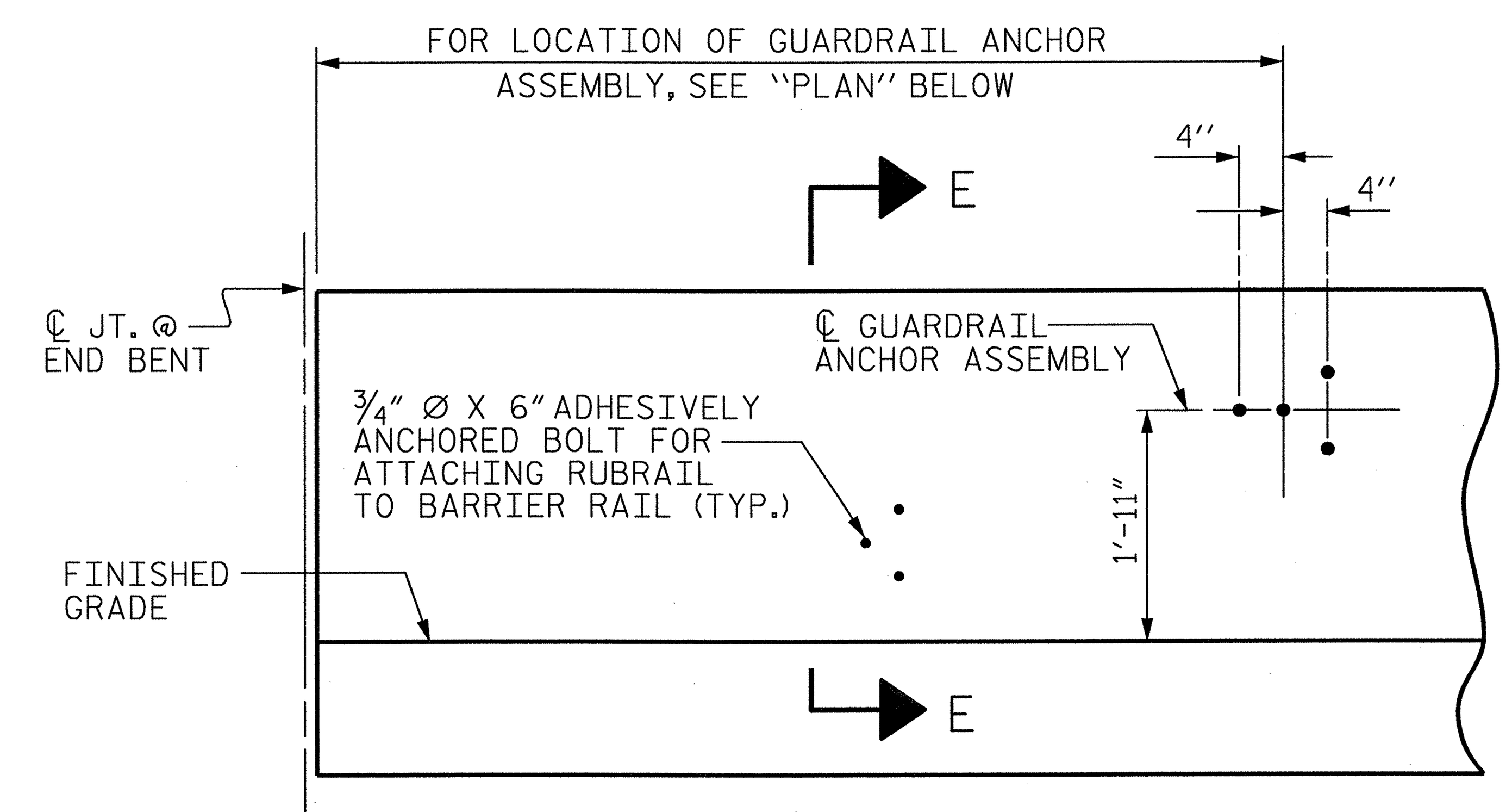
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

5/9/2012
U2524AE_SD_BR_R02.DGN



PLAN



ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03

NOTES

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

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

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

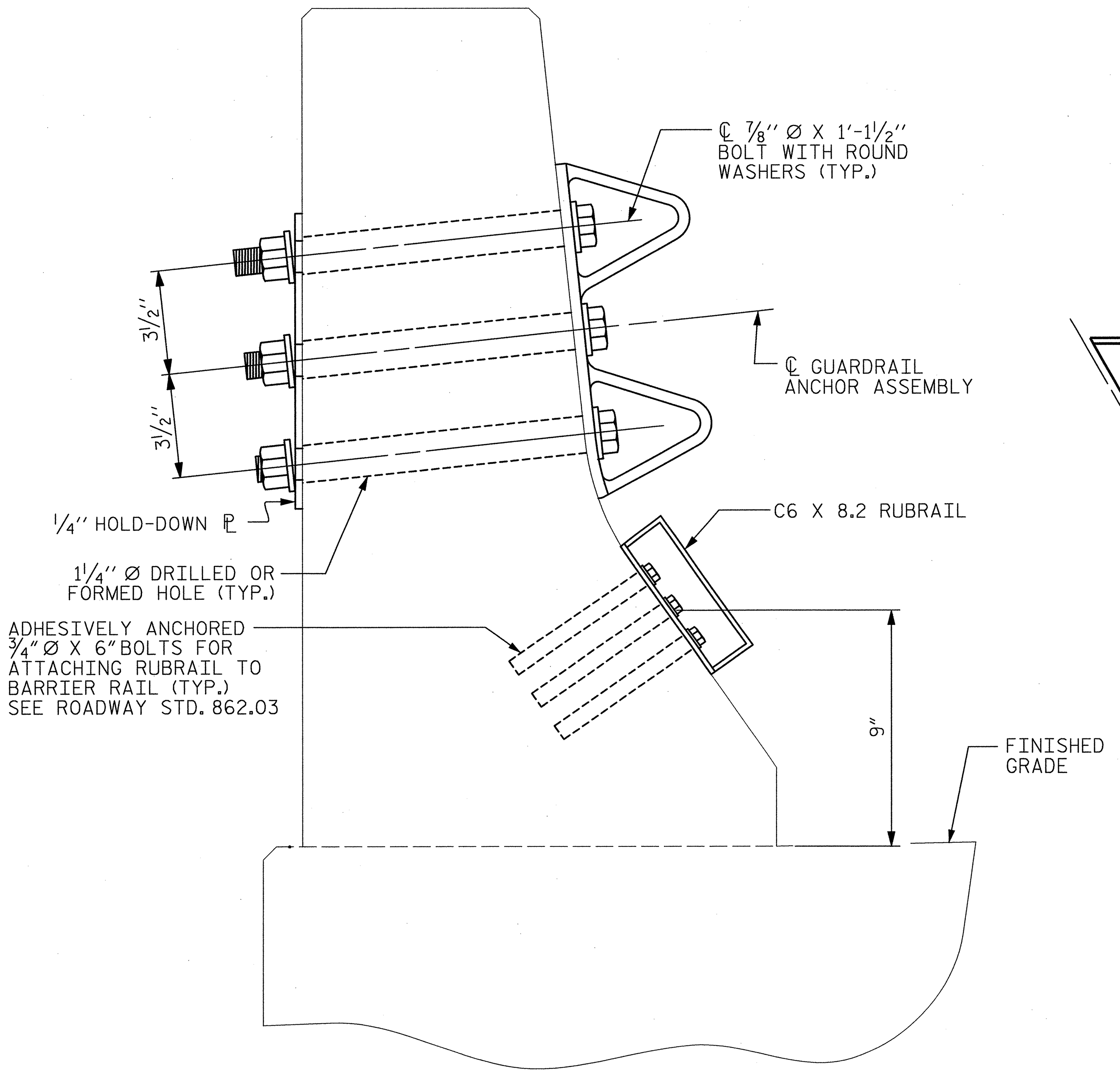
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

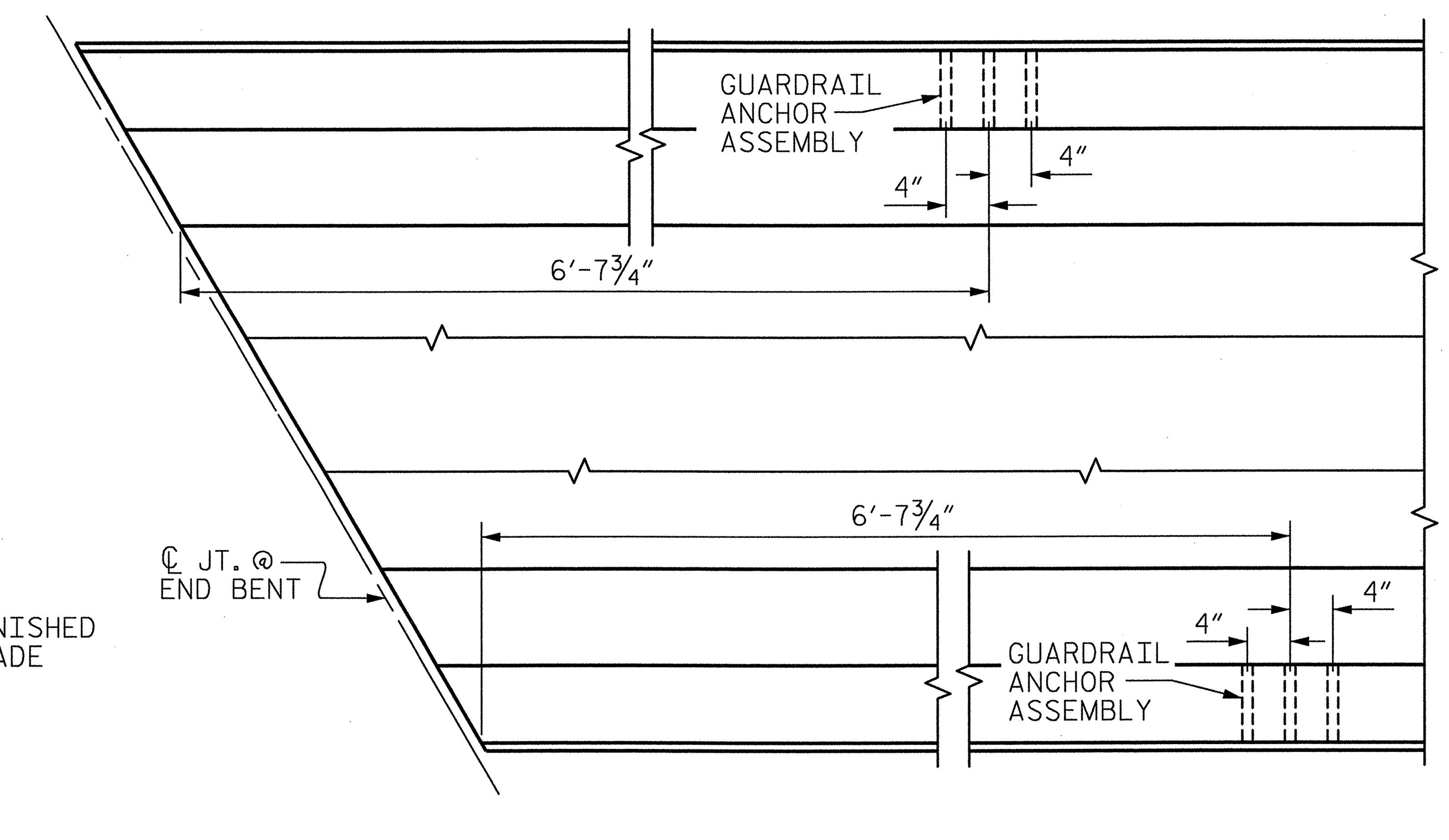
THE 1 1/4″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



SECTION E-E

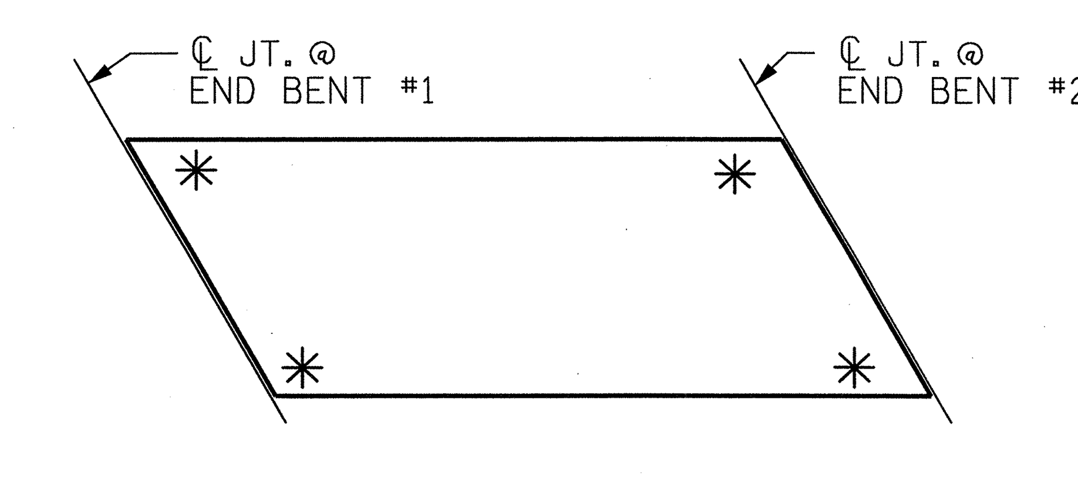
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE FOR BARRIER RAIL
RIGHT LANE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

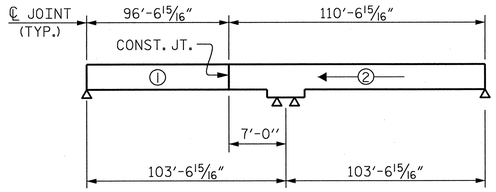
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-45
1			3				TOTAL SHEETS 57
2			4				

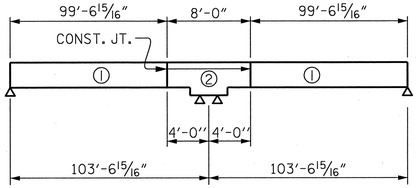
ASSEMBLED BY : B. LOFLIN	DATE : FEB 2012
CHECKED BY : J. DOUGHTY	DATE : FEB 2012
DRAWN BY : TLA 5/06	ADDED 5/1/06RR KMM/GM
CHECKED BY : GM 5/06	REV. 10/1/11 MAA/GM

5/9/2012
U2524AE_SD_GR_R02.DGN

STD. NO. GRA2



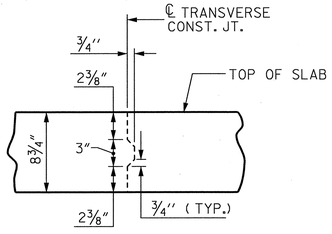
POURING SEQUENCE



OPTIONAL POURING SEQUENCE

POUR ② CANNOT BE STARTED UNTIL POUR ① REACHES A MINIMUM OF 3000 psi.

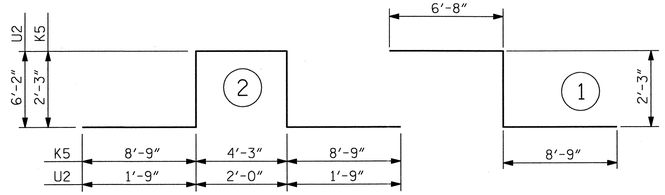
⟵(#)— = INDICATES POUR NUMBER AND DIRECTION OF POUR

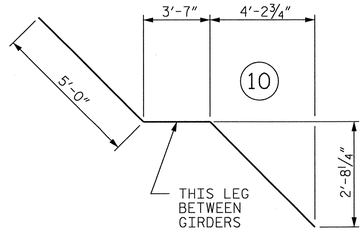


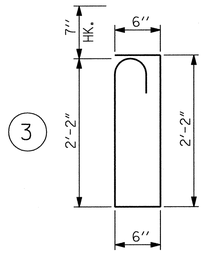
TRANSVERSE CONSTRUCTION JOINT DETAIL

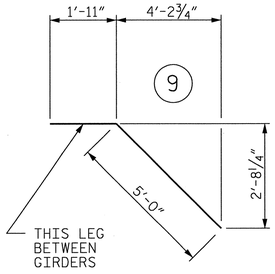
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT

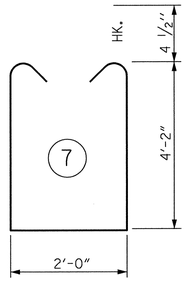
BAR TYPES

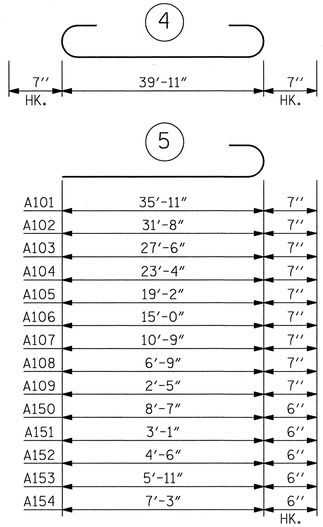


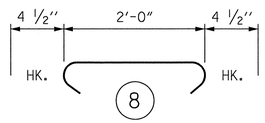


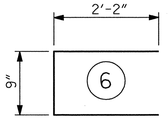












ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	326	5	4	41′-1″	13969
A2	326	5	STR	39′-11″	13572
✱A101	6	5	5	36′-6″	228
✱A102	6	5	5	32′-3″	202
✱A103	6	5	5	28′-1″	176
✱A104	6	5	5	23′-11″	150
✱A105	6	5	5	19′-9″	124
✱A106	6	5	5	15′-7″	98
✱A107	6	5	5	11′-4″	71
✱A108	6	5	5	7′-4″	46
✱A109	6	5	5	3′-0″	19
✱A150	696	4	5	9′-1″	4223
✱A151	2	4	5	3′-7″	5
✱A152	2	4	5	5′-0″	7
✱A153	2	4	5	6′-5″	9
✱A154	2	4	5	7′-9″	10
A201	6	5	STR	35′-11″	225
A202	6	5	STR	31′-8″	198
A203	6	5	STR	27′-6″	172
A204	6	5	STR	23′-4″	146
A205	6	5	STR	19′-2″	120
A206	6	5	STR	15′-0″	94
A207	6	5	STR	10′-9″	67
A208	6	5	STR	6′-9″	42
A209	6	5	STR	2′-5″	15

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	175	5	STR	43′-2″	7879
B2	30	6	STR	33′-6″	1510
✱B3	168	4	STR	24′-4″	2731
✱B4	28	6	STR	48′-9″	2050
✱B5	28	6	STR	27′-3″	1146
✱B6	54	6	STR	33′-6″	2717
✱ G1	2	5	STR	43′-3″	90
✱ K1	6	6	STR	10′-4″	93
✱ K2	6	6	STR	8′-0″	72
✱ K3	6	6	STR	7′-1″	64
✱ K4	8	8	1	17′-8″	377
✱ K5	8	8	2	26′-3″	561
K6	14	4	9	6′-11″	65
K7	14	4	10	13′-7″	127
K8	6	4	STR	7′-4″	29
K9	30	4	STR	10′-4″	207
K10	6	4	STR	7′-1″	28
✱ S1	42	4	6	5′-1″	143
✱ S2	42	5	3	5′-11″	259
S3	150	4	8	2′-9″	276
U1	6	4	7	11′-1″	44
✱ U2	21	4	2	17′-10″	250

REINFORCING STEEL (LBS.) 24816

✱ EPOXY COATED REINFORCING STEEL (LBS.) 29890

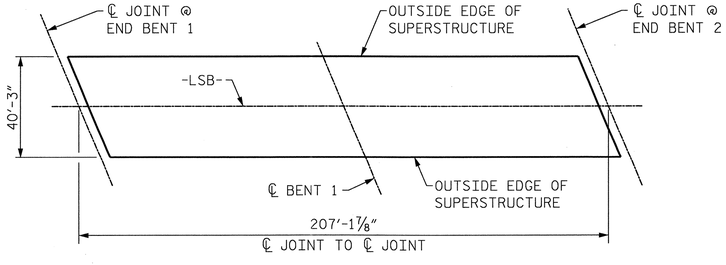
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	126.8		
POUR 2	161.6		
TOTALS✱✱	288.4	24816	29890

✱✱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 FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 8338)

GROOVING BRIDGE FLOORS

APPROACH SLABS	1620	SQ.FT.
BRIDGE DECK	6998	SQ.FT.
TOTAL	8618	SQ.FT.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

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-46
1			3			TOTAL SHEETS
2			4			57

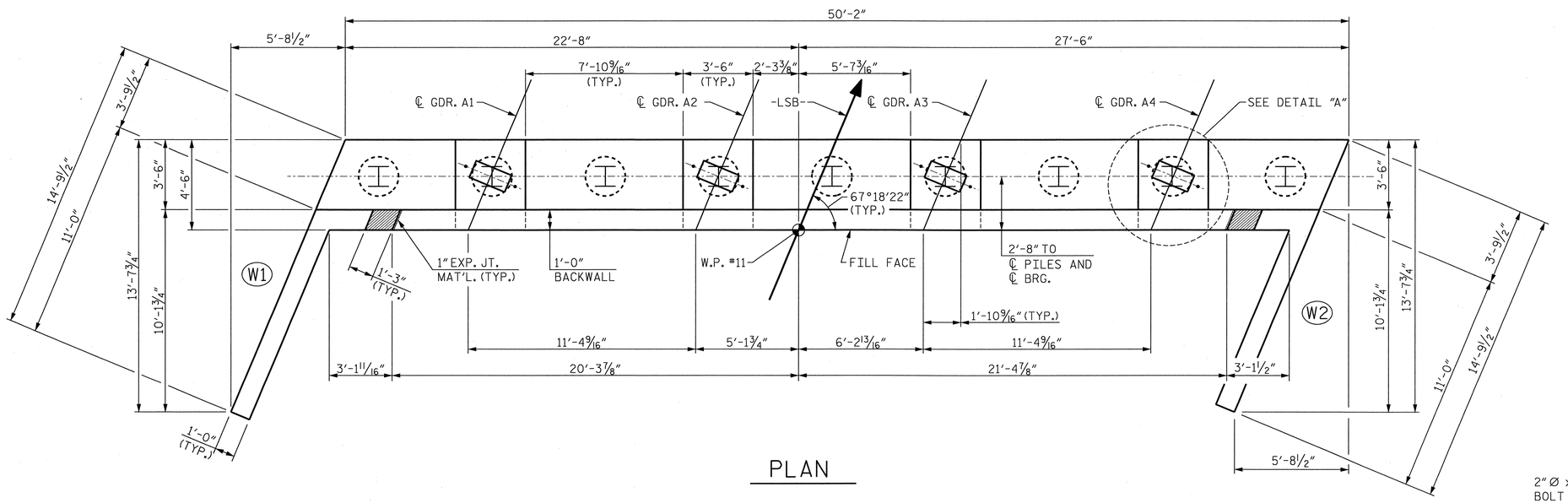
STD. NO. BOM2

ASSEMBLED BY :	K. WHITE	DATE :	MAR 2012
CHECKED BY :	J. DOUGHTY	DATE :	MAR 2012
DRAWN BY : JMB 5/87	REV. 8/16/99		RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/06		TLA/GM
	REV. 10/1/11		MAA/GM

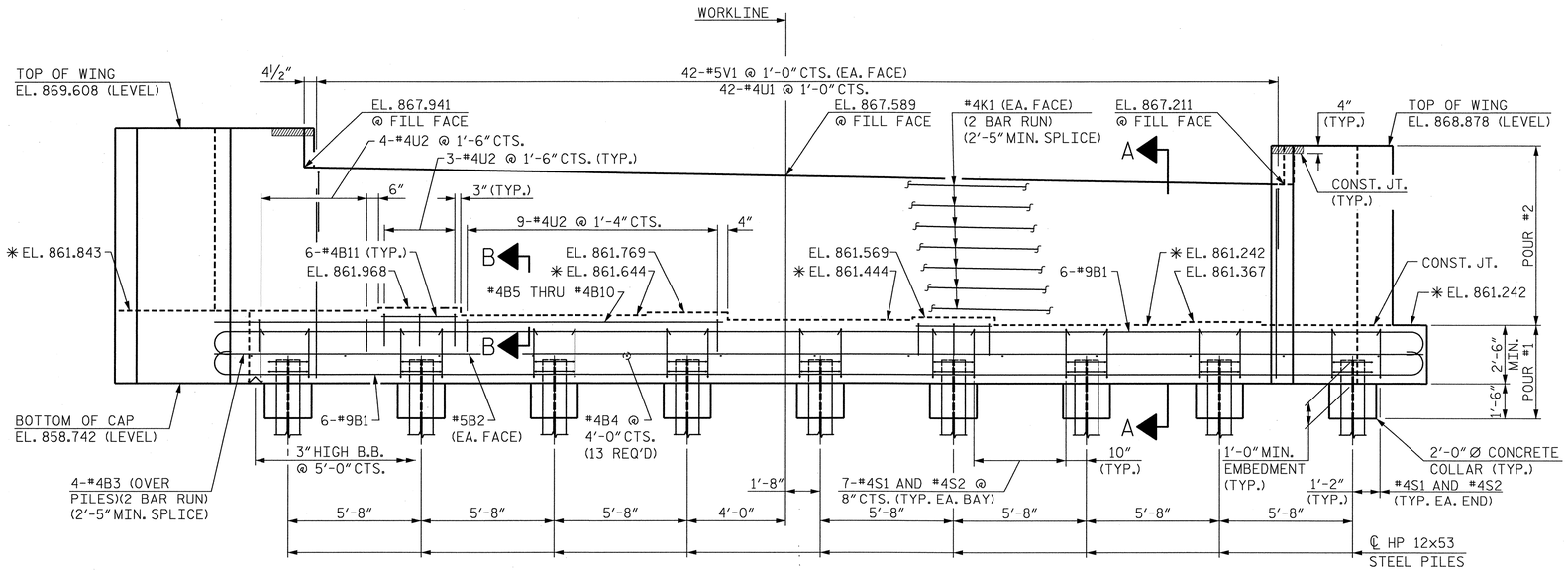
5/9/2012
U2524AE_SD_BM_R02.DGN

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON S. DAVIS
5/10/12

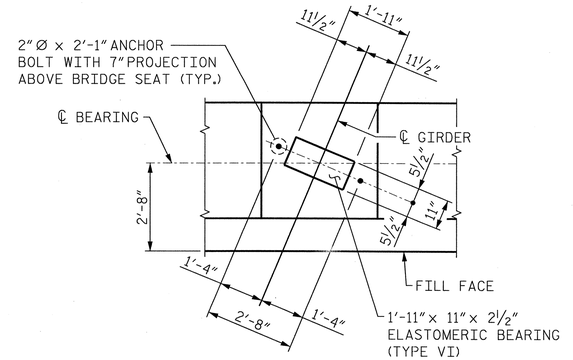


PLAN



ELEVATION

✳ FOR LOCATION OF ELEVATIONS BETWEEN BUILDUPS, SEE SECTION A-A AND SECTION B-B ON SHEET 3 OF 3.



DETAIL "A"

(TYP. EA. GIRDER)

NOTES

STIRRUPS AND #4U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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 SAWED AND THE BARRIER RAIL ARE CAST IF SLIP FORMING IS USED.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

RIGHT LANE

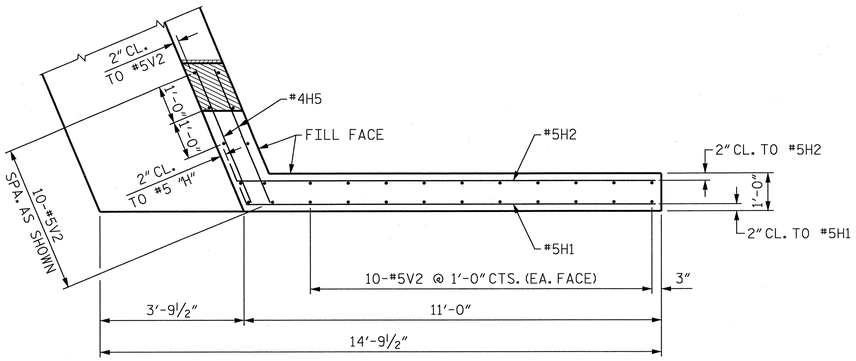
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

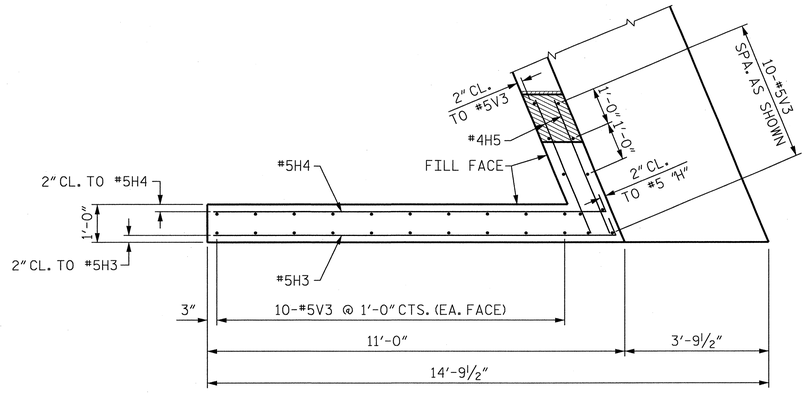
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. BRIGHT
5/9/12

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

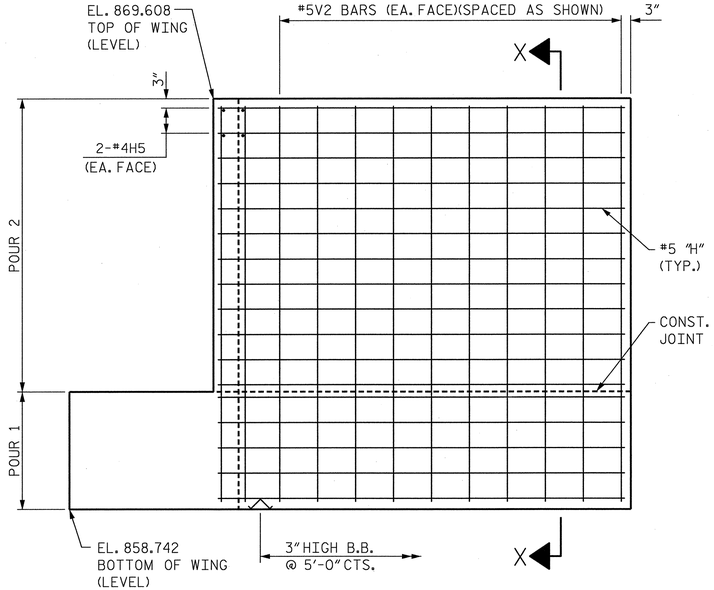
5/9/2012
U2524AE_SD_E3_R07.DGN



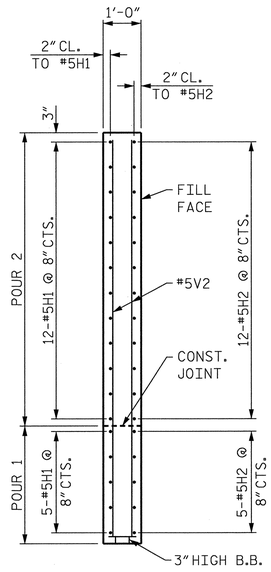
PLAN OF WING - W1



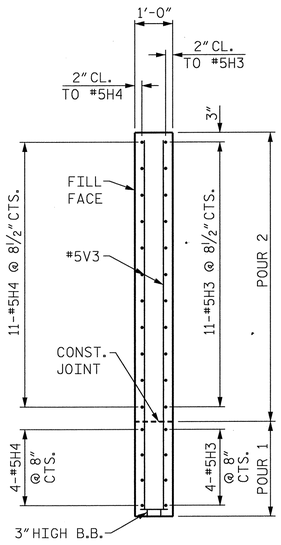
PLAN OF WING - W2



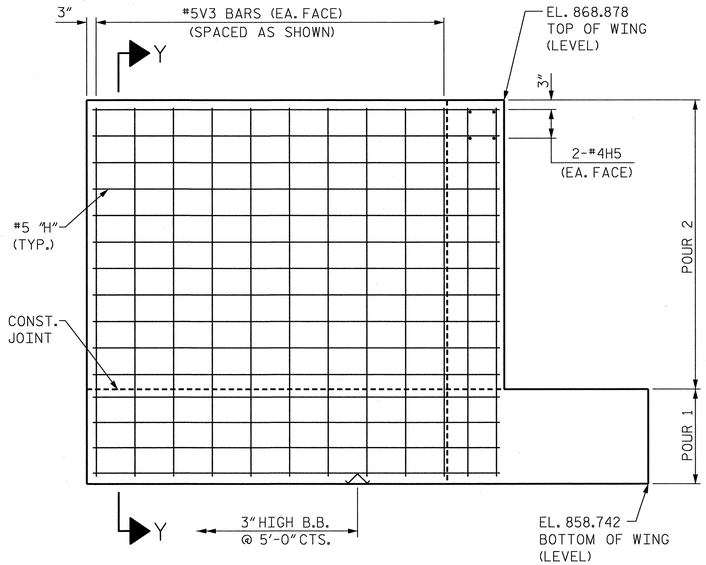
ELEVATION OF WING - W1



SECTION X-X



SECTION Y-Y



ELEVATION OF WING - W2

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

RIGHT LANE

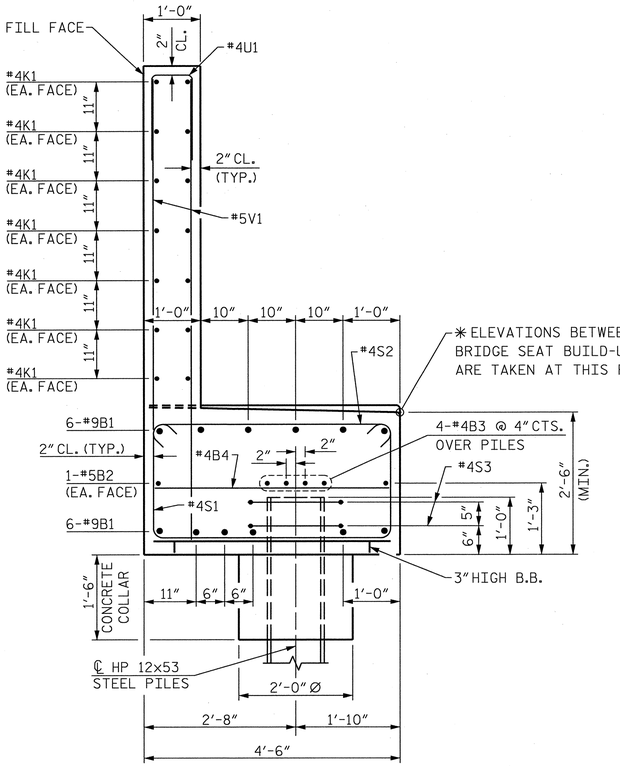
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. DOUGHTY
5/10/12

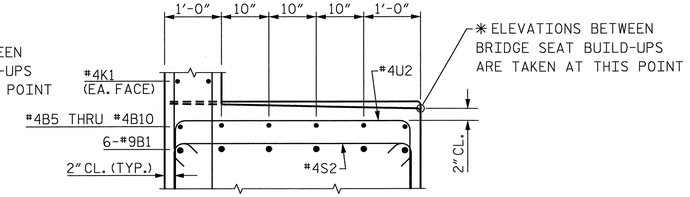
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_E3_R08.DGN

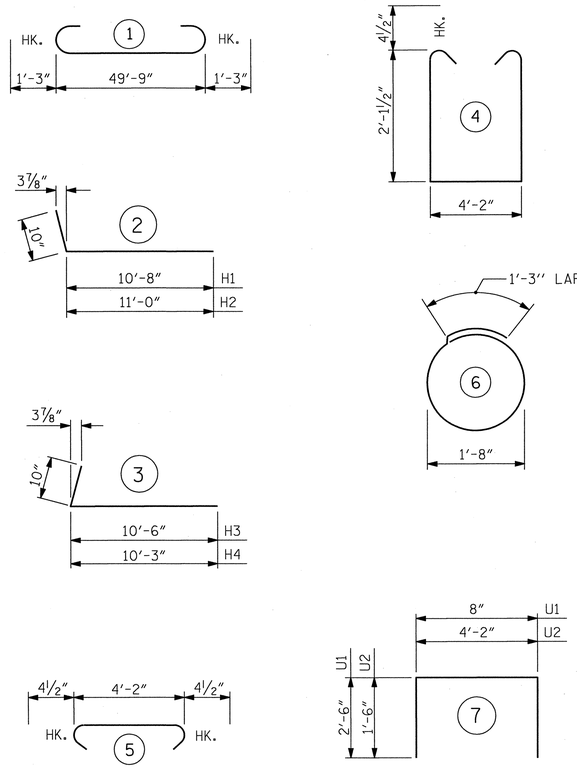


SECTION A-A



PARTIAL SECTION B-B

BAR TYPES

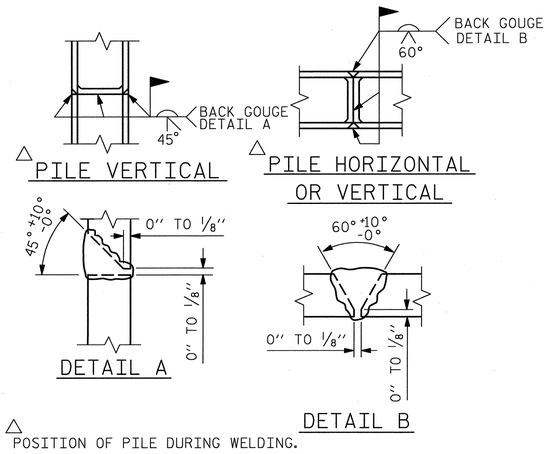


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

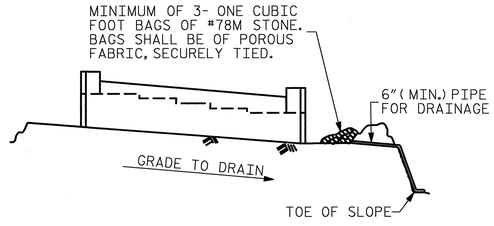
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	52'-3"	2132
B2	2	5	STR	49'-9"	104
B3	8	4	STR	26'-1"	139
B4	13	4	STR	4'-2"	36
B5	1	4	STR	20'-0"	13
B6	1	4	STR	20'-4"	14
B7	1	4	STR	20'-8"	14
B8	1	4	STR	21'-0"	14
B9	1	4	STR	21'-4"	14
B10	1	4	STR	21'-8"	14
B11	12	4	STR	3'-2"	25
H1	17	5	2	11'-6"	204
H2	17	5	2	11'-10"	210
H3	15	5	3	11'-4"	177
H4	15	5	3	11'-1"	173
H5	8	4	STR	3'-10"	20
K1	28	4	STR	26'-1"	488
S1	58	4	4	9'-2"	355
S2	58	4	5	4'-11"	190
S3	18	4	6	6'-6"	78
U1	42	4	7	5'-8"	159
U2	19	4	7	7'-2"	91
V1	84	5	STR	8'-0"	701
V2	30	5	STR	10'-5"	326
V3	30	5	STR	9'-8"	302

REINFORCING STEEL	LBS.	5993
CLASS A CONCRETE		
POUR #1: CAP, LOWER WINGS AND COLLARS	CU. YDS.	27.5
POUR #2: BACKWALL AND UPPER WINGS	CU. YDS.	17.5
TOTAL CLASS A CONCRETE	CU. YDS.	45.0
HP 12x53 STEEL PILES		
NO. 9	LIN. FT.	405



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



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

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

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

TEMPORARY DRAINAGE AT END BENT

5/9/2012
U2524AE_SD_E3_R09.DGN

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DAY
5/10/12

PROJECT NO. U-2412B/ U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1
RIGHT LANE

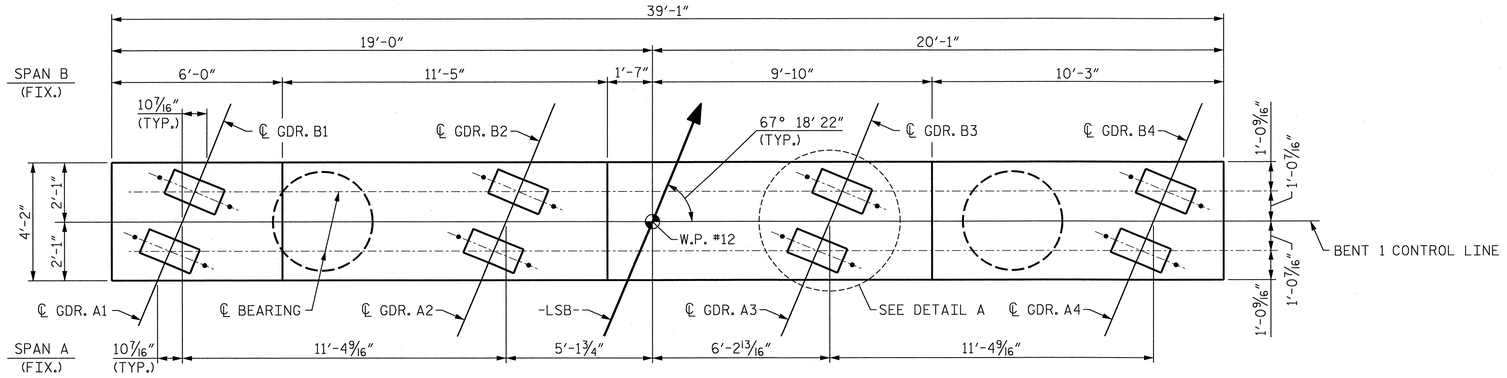
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			57

NOTES

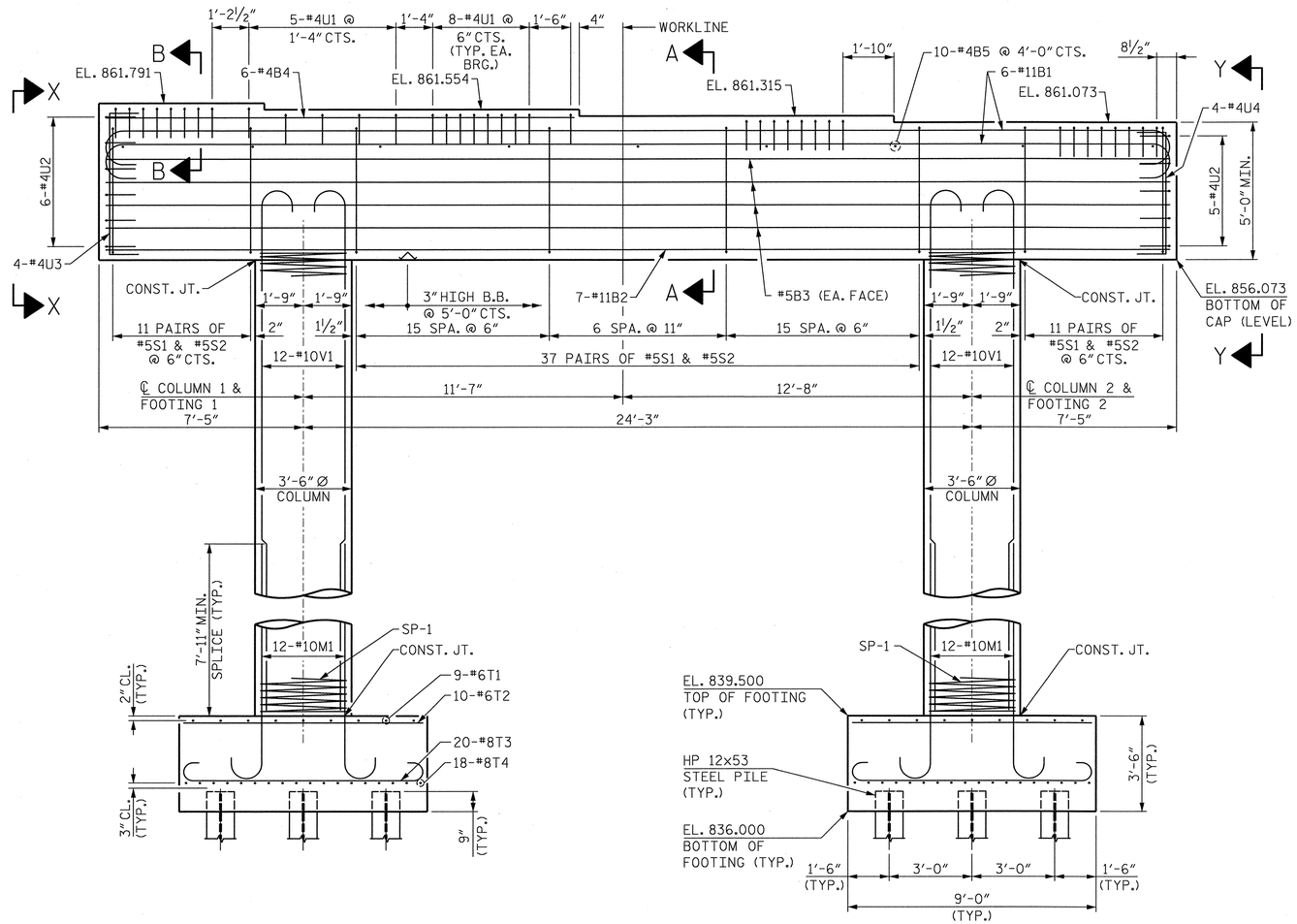
STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

FOR PILE SPLICE DETAILS, SEE SHEET NO. S-49.

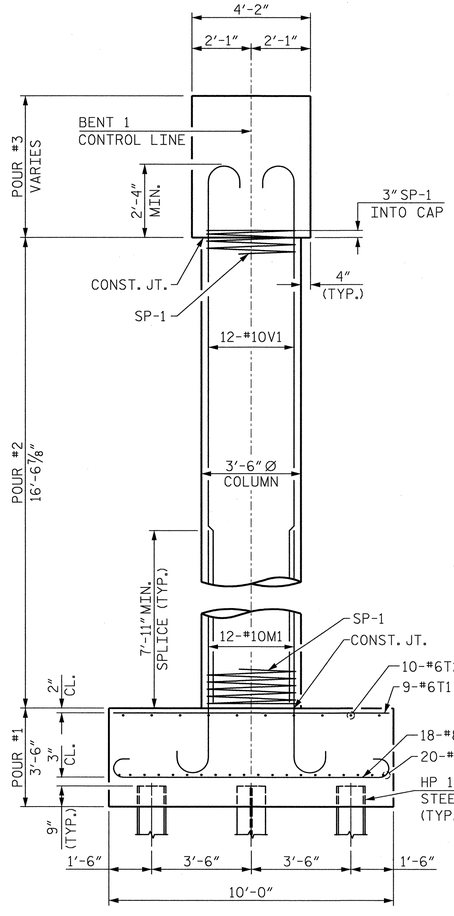


PLAN

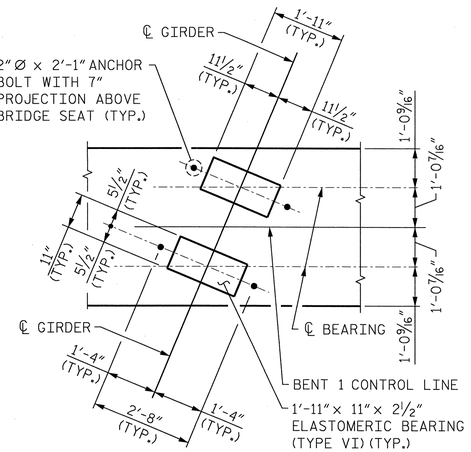


ELEVATION

PILES SHOWN WITH ORIENTATION ALONG BENT 1 CONTROL LINE



END VIEW



DETAIL "A"

(TYP. EA. GIRDER LINE)

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

RIGHT LANE

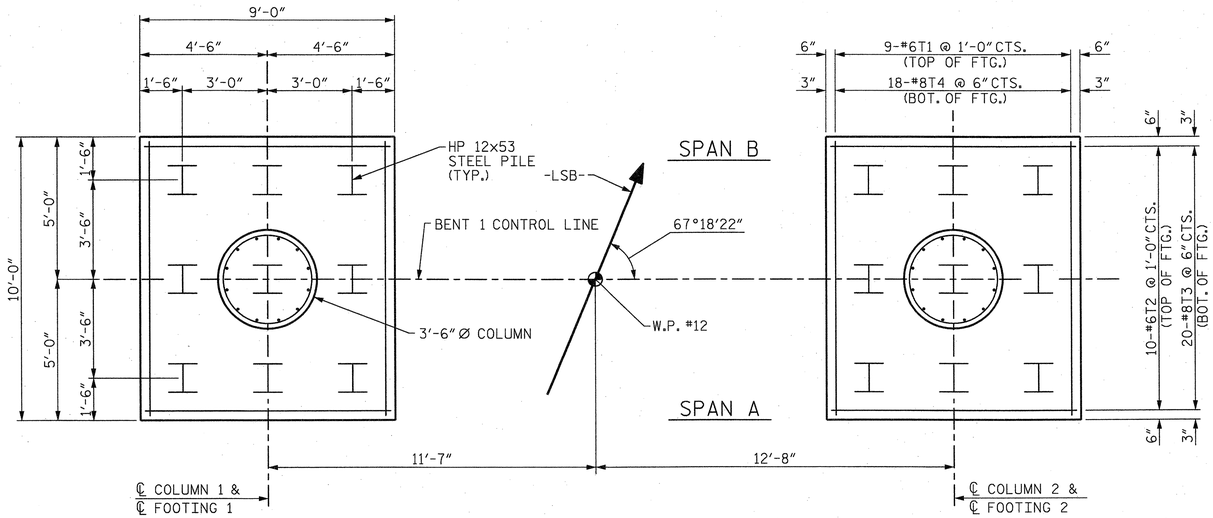
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN B. DOUGHTY 5/10/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			57

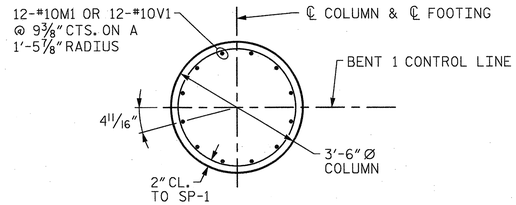
DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : FEB 2012

5/9/2012
U2524AE_SD_B2_R03.DGN



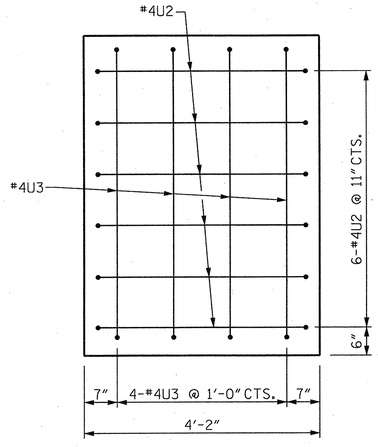
PLAN OF FOOTINGS

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING

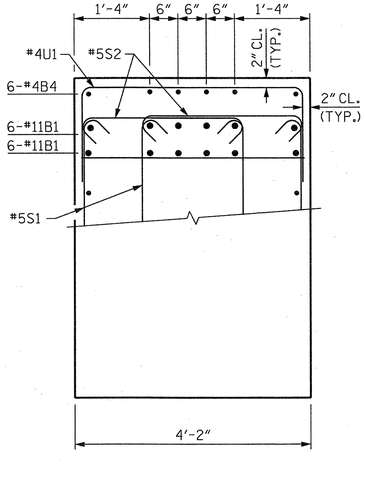


COLUMN SECTION

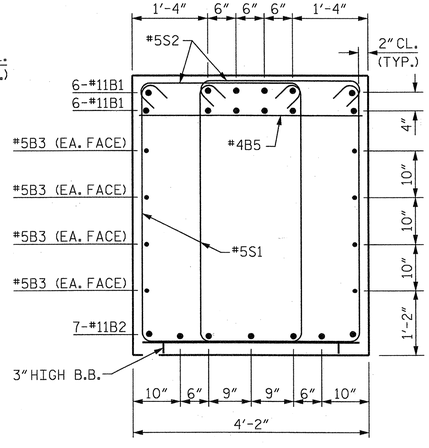
DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN



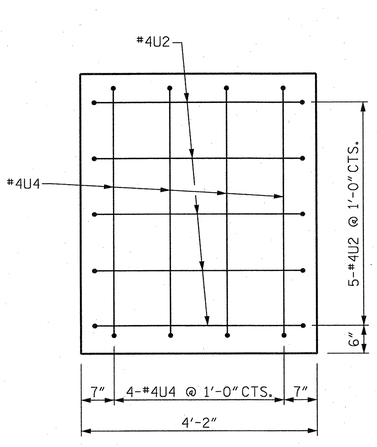
VIEW X-X



SECTION B-B

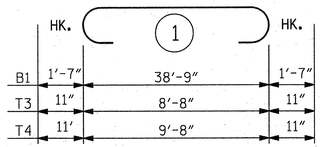


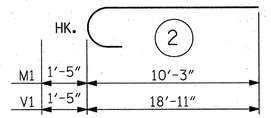
SECTION A-A

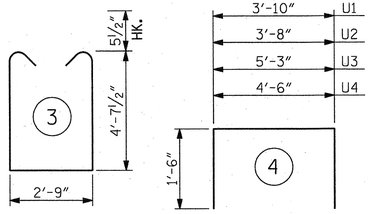


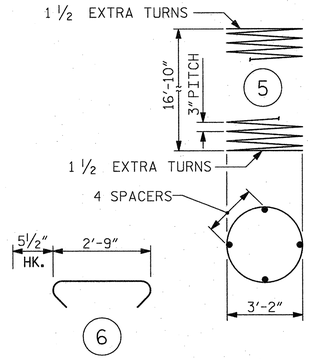
VIEW Y-Y

BAR TYPES









ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	11	1	41'-11"	2672
B2	7	11	STR	38'-9"	1441
B3	8	5	STR	38'-9"	323
B4	6	4	STR	17'-1"	68
B5	10	4	STR	3'-10"	26
M1	24	10	2	11'-8"	1205
S1	118	5	3	12'-11"	1590
S2	118	5	6	3'-8"	451
T1	18	6	STR	9'-8"	261
T2	20	6	STR	8'-8"	260
T3	40	8	1	10'-6"	1121
T4	36	8	1	11'-6"	1105
U1	38	4	4	6'-10"	173
U2	11	4	4	6'-8"	49
U3	4	4	4	8'-3"	22
U4	4	4	4	7'-6"	20
V1	24	10	2	20'-4"	2100
REINFORCING STEEL				LBS	12887
SP-1	2	*	5	690'-8"	923
SPIRAL COLUMN REINFORCING STEEL				LBS	923

CLASS A CONCRETE	CU. YDS.
POUR #1: FOOTINGS	23.3
POUR #2: COLUMNS	11.8
POUR #3: CAP	32.1
TOTAL CLASS A CONCRETE	67.2
HP 12x53 STEEL PILES NO. 18	LIN. FT. 360
FOUNDATION EXCAVATION FOR BENT	LUMP SUM

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

RIGHT LANE

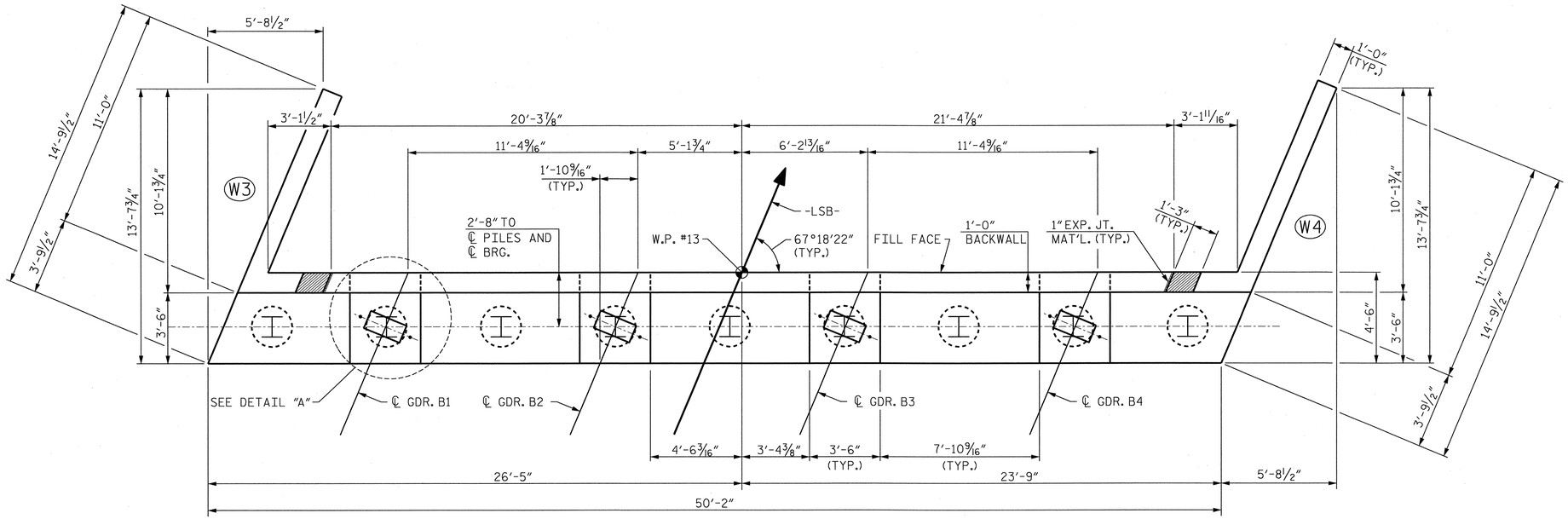
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER K. WHITE 5/11/12

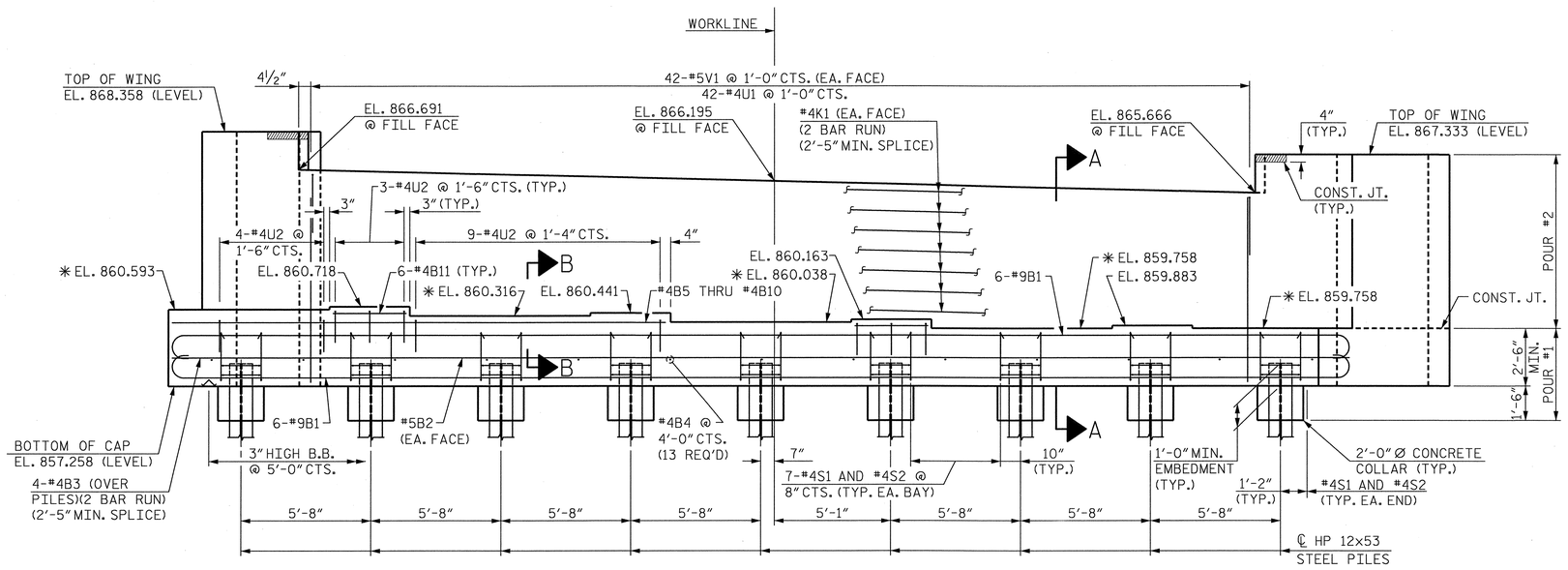
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/11/2012
U2524AE_SD_B2_R04.DGN



PLAN



ELEVATION

✳ FOR LOCATION OF ELEVATIONS BETWEEN BUILDUPS, SEE SECTION A-A AND SECTION B-B ON SHEET 3 OF 3.

NOTES

STIRRUPS AND #4U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

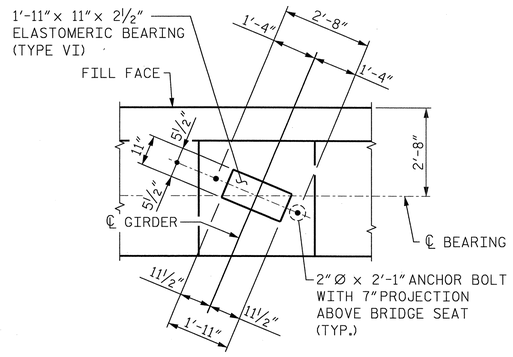
THE #5V1 BARS SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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 SAWED AND THE BARRIER RAIL ARE CAST IF SLIP FORMING IS USED.



DETAIL "A"

(TYP. EA. GIRDER)

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

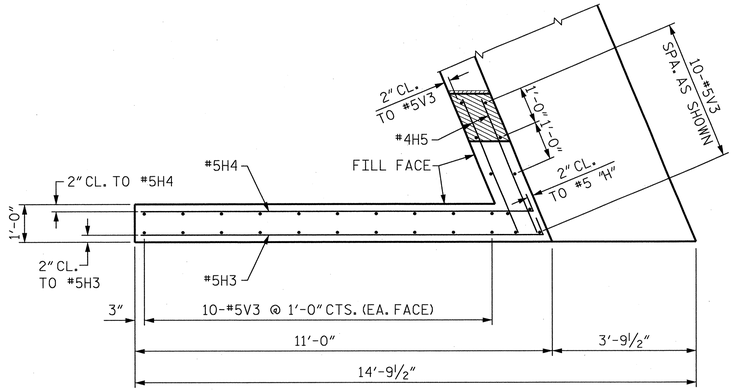
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 835-4040
LICENSE NO. F-0165

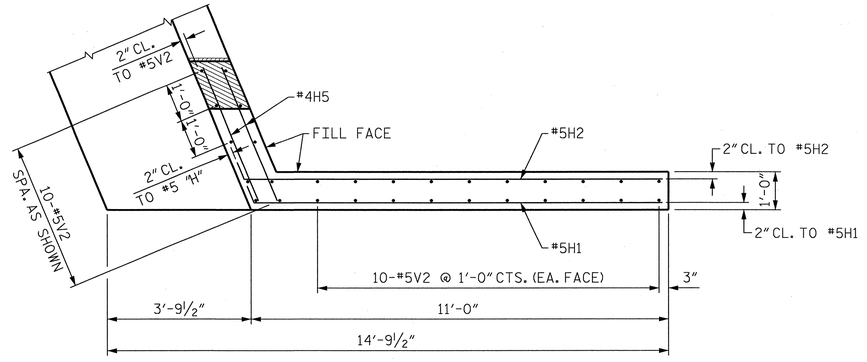
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN M. DOUGHTY 5/10/12

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

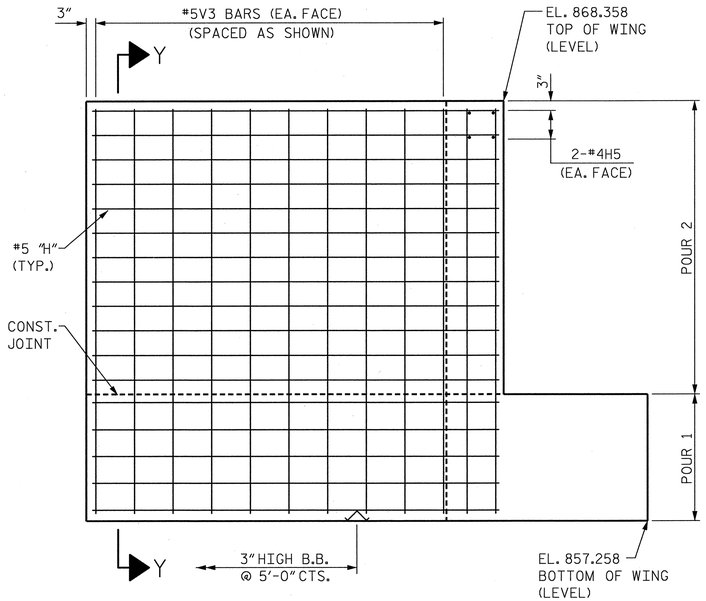
5/9/2012
U2524AE_SD_E4_R10.DGN



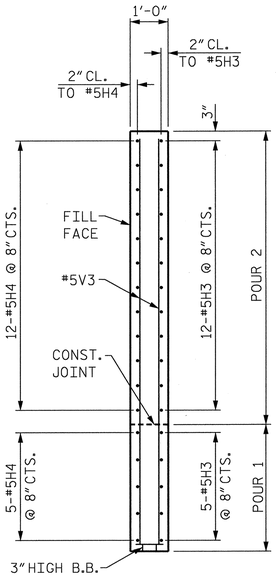
PLAN OF WING - W3



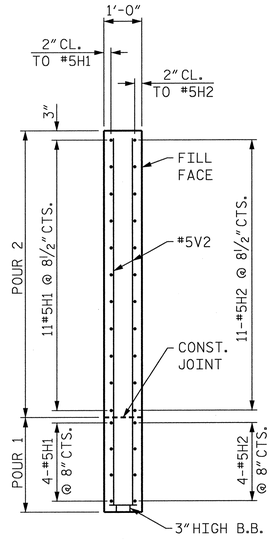
PLAN OF WING - W4



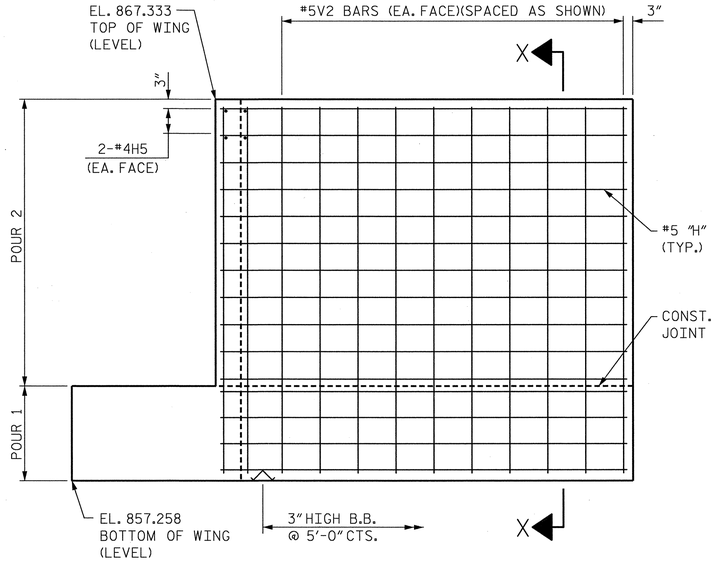
ELEVATION OF WING - W3



SECTION Y-Y



SECTION X-X



ELEVATION OF WING - W4

U-2412B/
PROJECT NO. U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

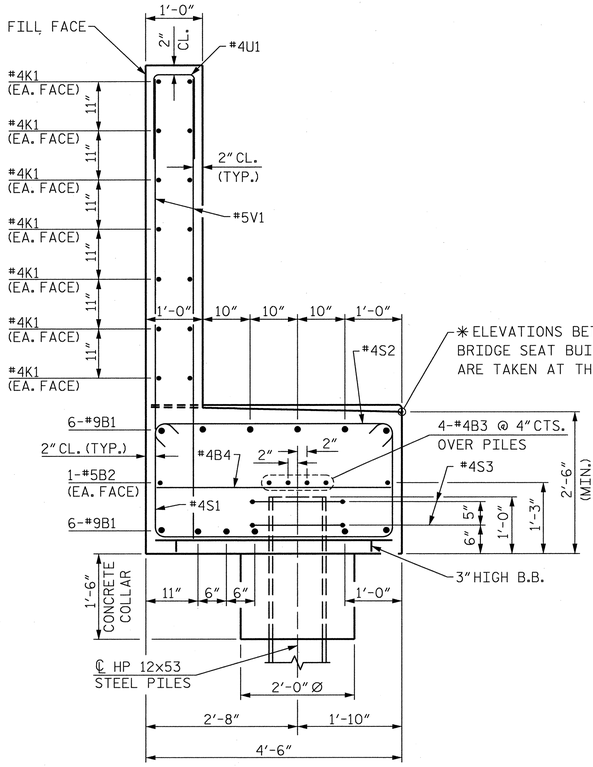
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 536-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/9/12

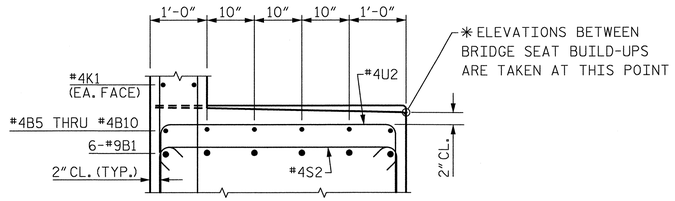
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

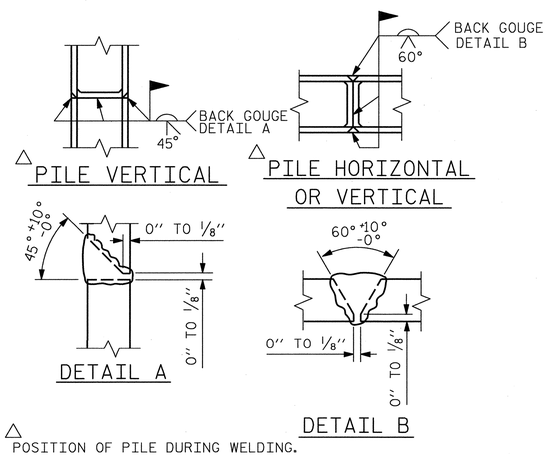
5/9/2012
U2524AE_SD_E4_R11.DGN



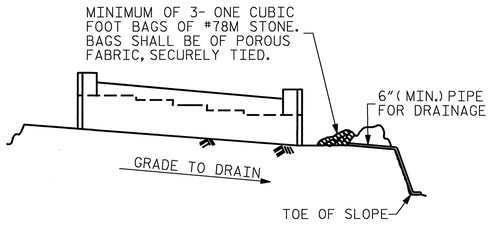
SECTION A-A



PARTIAL SECTION B-B



PILE SPLICE DETAILS



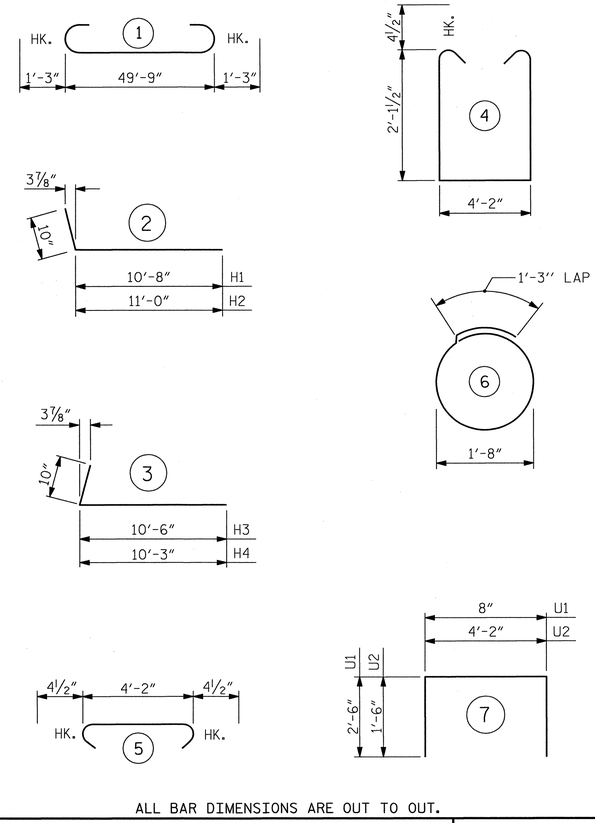
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	52'-3"	2132
B2	2	5	STR	49'-9"	104
B3	8	4	STR	26'-1"	139
B4	13	4	STR	4'-2"	36
B5	1	4	STR	19'-7"	13
B6	1	4	STR	19'-11"	13
B7	1	4	STR	20'-3"	14
B8	1	4	STR	20'-7"	14
B9	1	4	STR	20'-11"	14
B10	1	4	STR	21'-3"	14
B11	12	4	STR	3'-2"	25
H1	15	5	2	11'-6"	180
H2	15	5	2	11'-10"	185
H3	17	5	3	11'-4"	201
H4	17	5	3	11'-1"	197
H5	8	4	STR	3'-10"	20
K1	28	4	STR	26'-1"	488
S1	58	4	4	9'-2"	355
S2	58	4	5	4'-11"	190
S3	18	4	6	6'-6"	78
U1	42	4	7	5'-8"	159
U2	19	4	7	7'-2"	91
V1	84	5	STR	8'-0"	701
V2	30	5	STR	9'-7"	300
V3	30	5	STR	10'-8"	334

REINFORCING STEEL	LBS.	5997
CLASS A CONCRETE		
POUR #1: CAP, LOWER WINGS AND COLLARS	CU. YDS.	28.4
POUR #2: BACKWALL AND UPPER WINGS	CU. YDS.	17.4
TOTAL CLASS A CONCRETE	CU. YDS.	45.8
HP 12x53 STEEL PILES		
NO. 9	LIN. FT.	540

U-2412B/
PROJECT NO. U-2524AE
GUILFORD COUNTY
STATION: 416+96.47 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

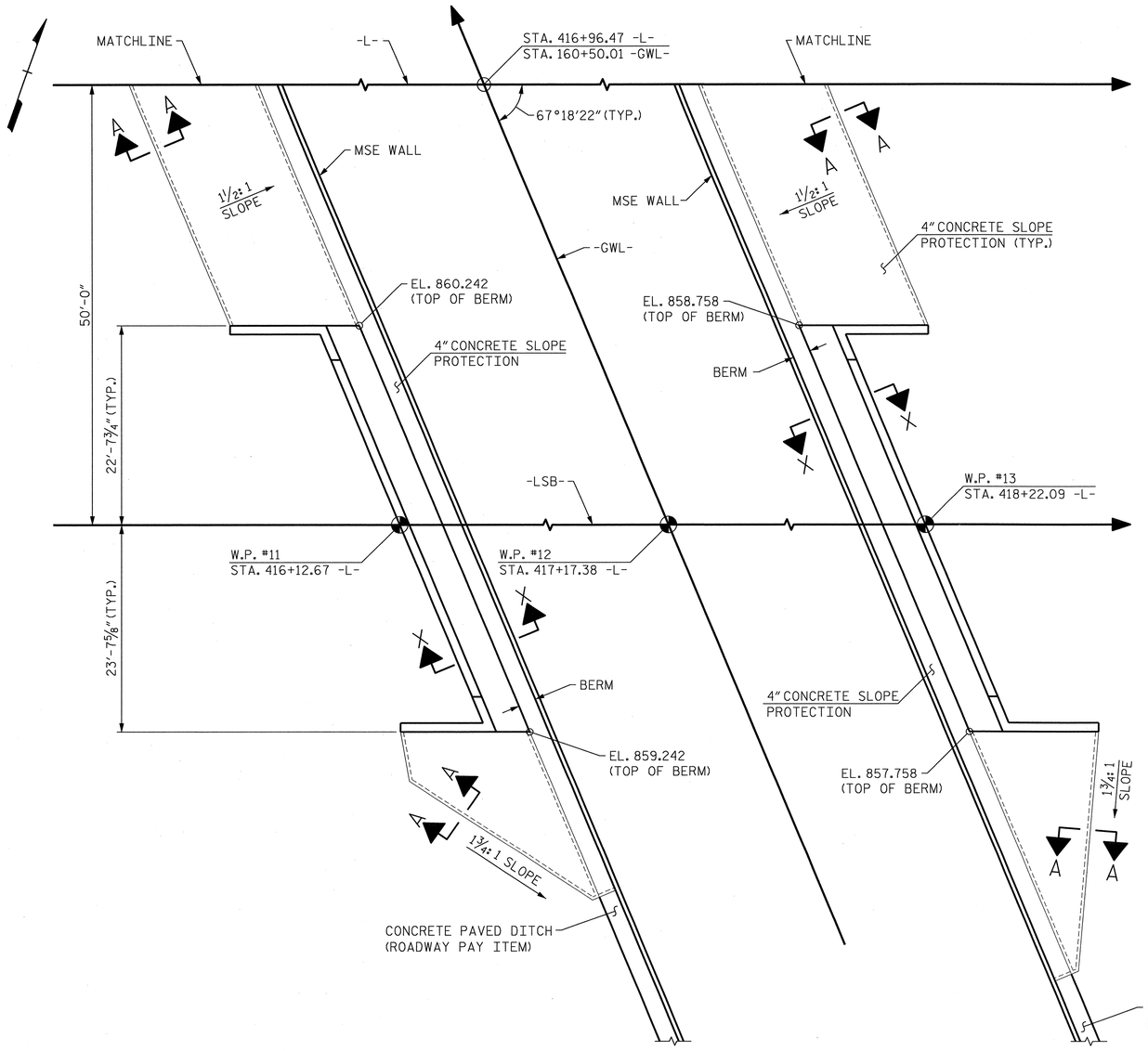
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON B. DOUGHTY
5/9/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

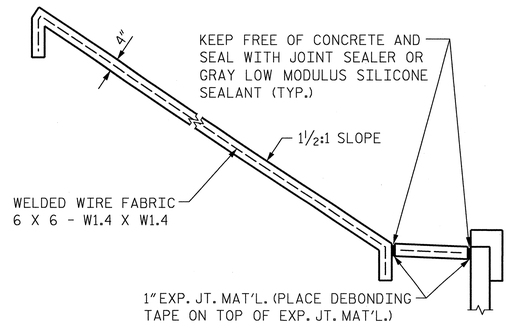
5/9/2012
U2524AE_SD_E4_R12.DGN



END BENT 1

END BENT 2

PLAN

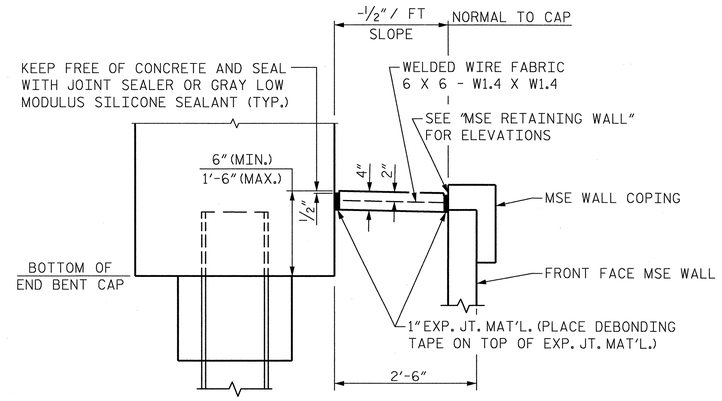


SECTION BETWEEN BRIDGES

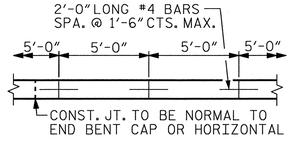
NOTES

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. FOR BERM WIDTH, SEE GENERAL DRAWING.

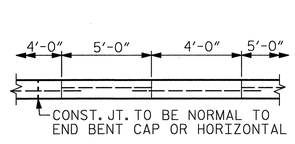
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



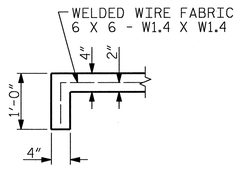
SECTION X-X



POURING DETAIL



OPTIONAL POURING DETAIL



SECTION A-A

BRIDGE @ STA. 416+96.47 -L- STA. 160+50.01 -GWL-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	105	210
END BENT 2	110	220

* QUANTITY SHOWN IS BASED ON 5' POURS.

DETAILS FOR SLOPE PROTECTION

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

RIGHT LANE

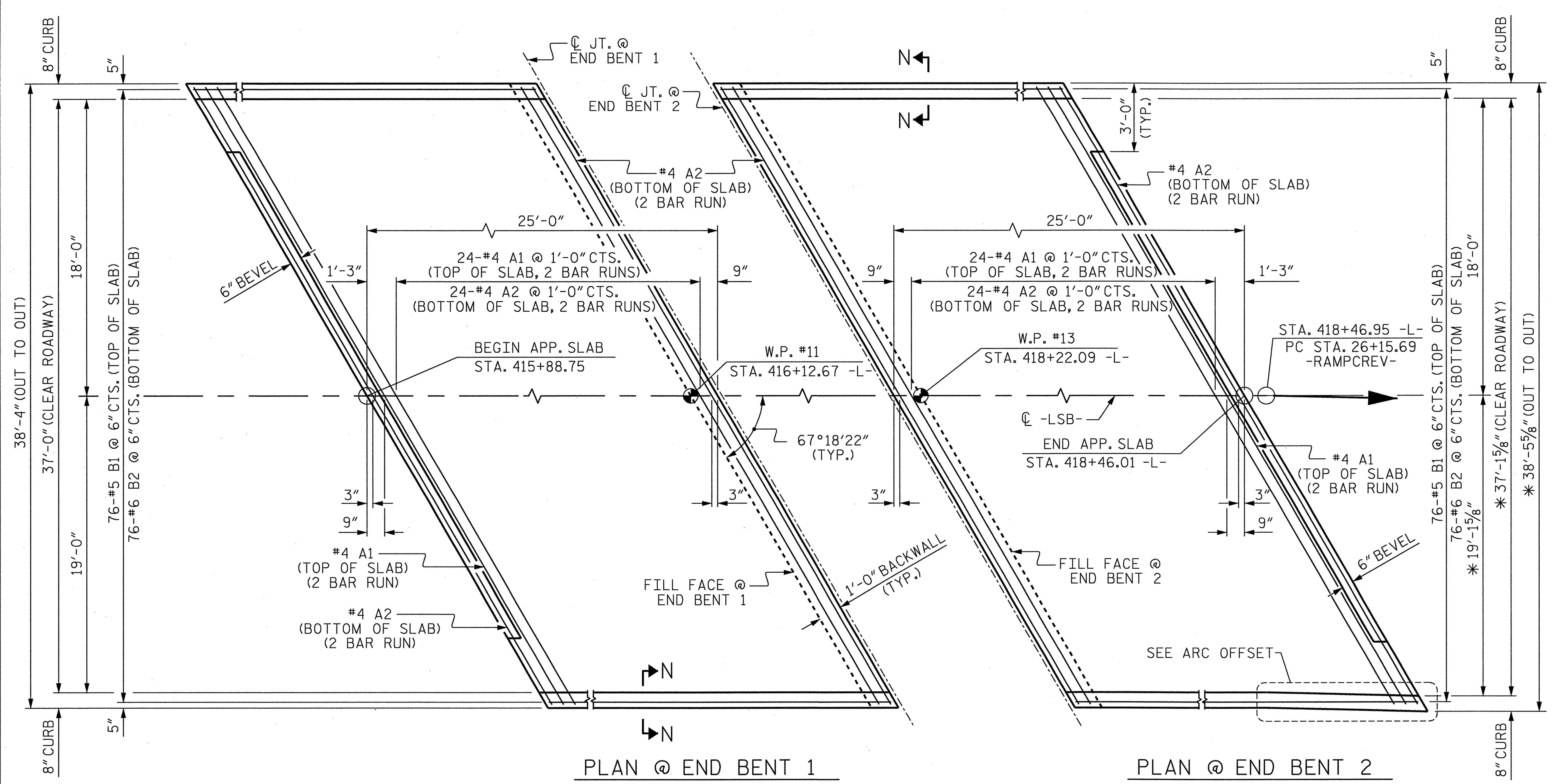
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			57

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN A. PAGE
5/9/12

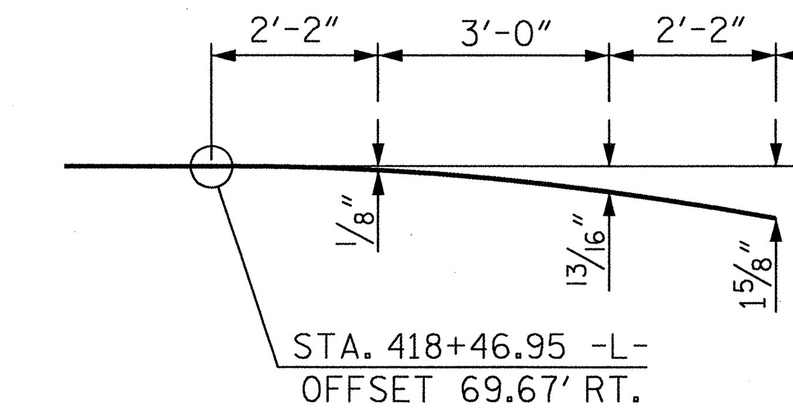
DRAWN BY : K. WHITE DATE : MAR 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012

5/9/2012
U2524AE_SD_SP_R02.DGN



PLAN @ END BENT 1 — PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS UNLESS OTHERWISE NOTED
* END APPROACH SLAB AT END BENT 2 ONLY



ARC OFFSET

APPROACH SLAB @ END BENT 2 RIGHT SIDE ONLY

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	21'-8"	753
A2	52	#4	STR	21'-6"	747
* B1	76	#5	STR	23'-6"	1863
B2	76	#6	STR	24'-7"	2806
REINFORCING STEEL				LBS.	3553
* EPOXY COATED REINFORCING STEEL				LBS.	2616
CLASS AA CONCRETE				C.Y.	41.9

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	21'-8"	753
A2	52	#4	STR	21'-6"	747
* B1	76	#5	STR	23'-6"	1863
B2	76	#6	STR	24'-7"	2806
REINFORCING STEEL				LBS.	3553
* EPOXY COATED REINFORCING STEEL				LBS.	2616
CLASS AA CONCRETE				C.Y.	41.9

NOTES

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

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

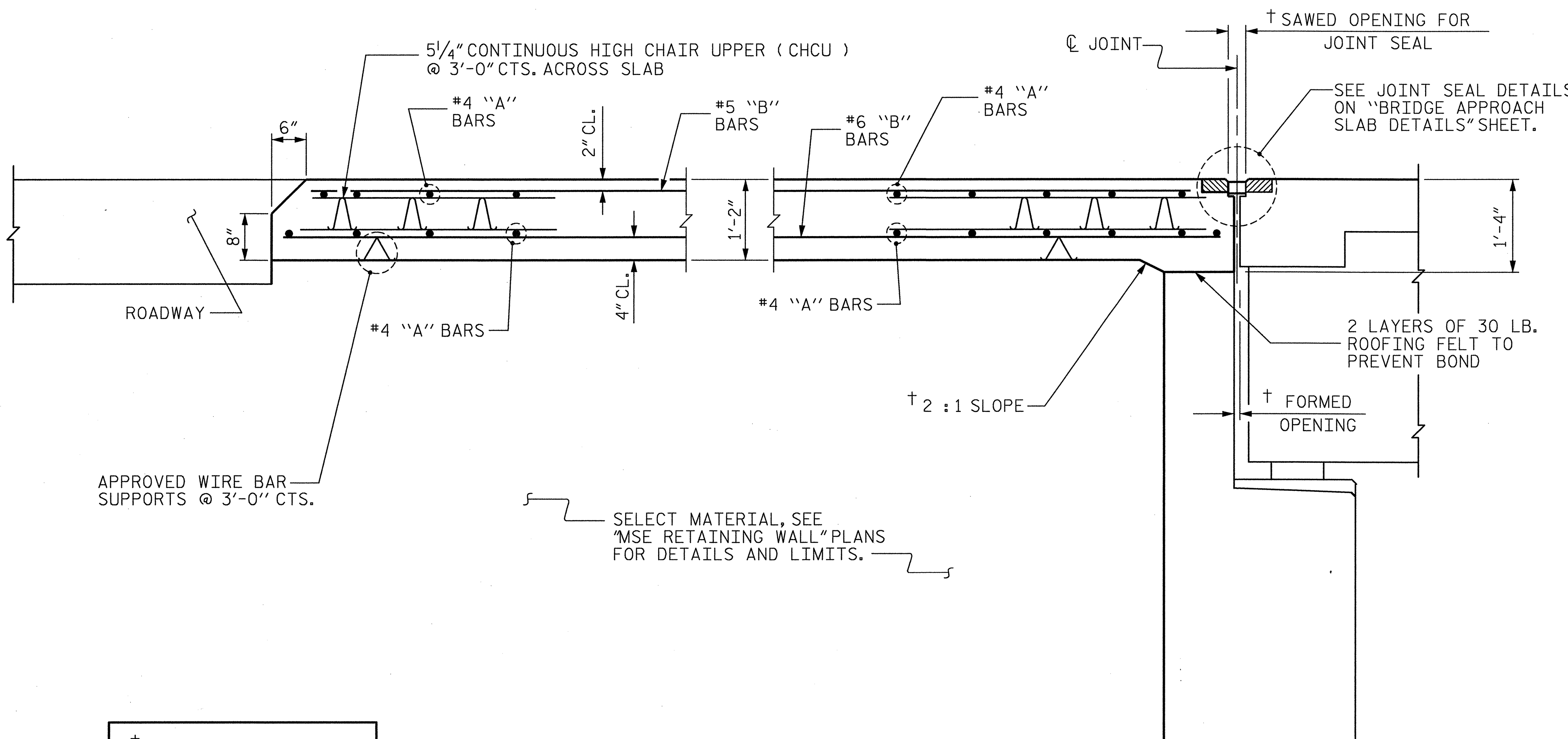
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

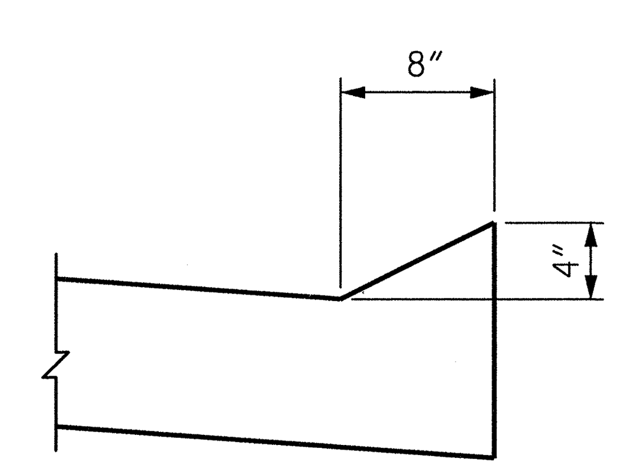
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.



† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N

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

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

RIGHT LANE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

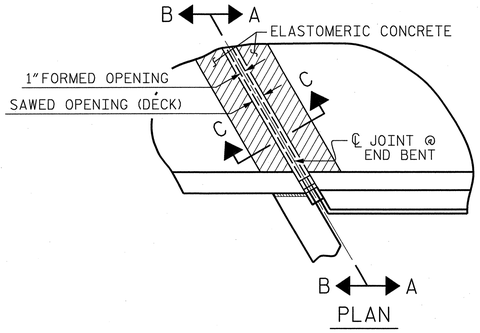
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER
5/10/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			57

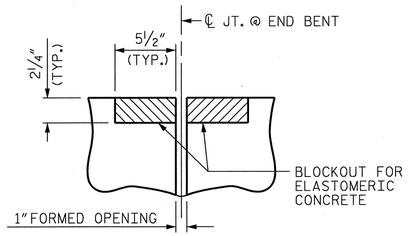
ASSEMBLED BY : K. WHITE DATE : FEB 2012
CHECKED BY : J. DOUGHTY DATE : MAR 2012
DRAWN BY : EEM 3/95 — REV. 5/1/06RR KMM/GM
CHECKED BY : VAP 3/95 — REV. 10/1/11 MAA/GM — REV. 12/21/11 MAA/GM

STD. NO. BAS2

5/9/2012
U2524AE_SD_AS_R03.DGN

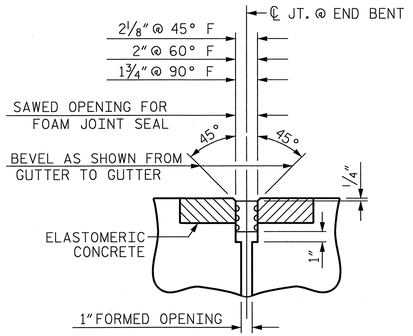


PLAN



SECTION C-C

FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

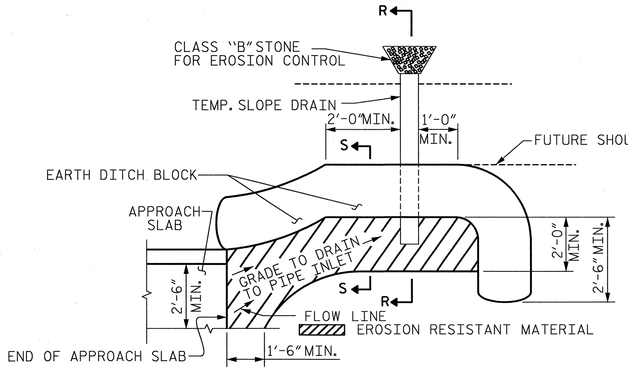


SECTION C-C

FOAM JOINT SEAL
(EXPANSION)

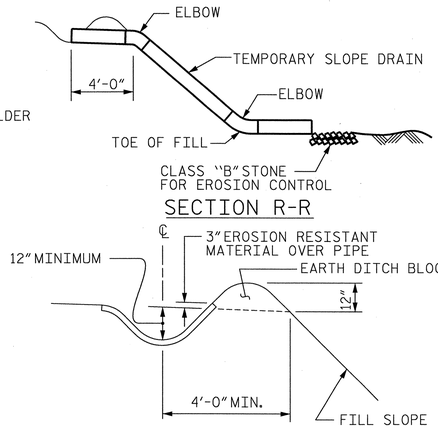
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.9
2	6.9
TOTAL	13.8

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



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

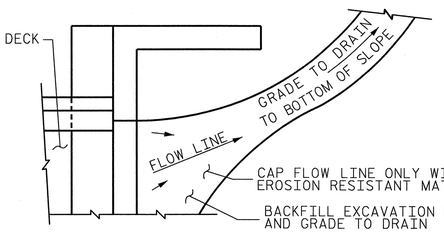


SECTION R-R

SECTION S-S

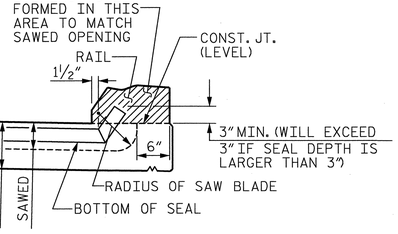
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

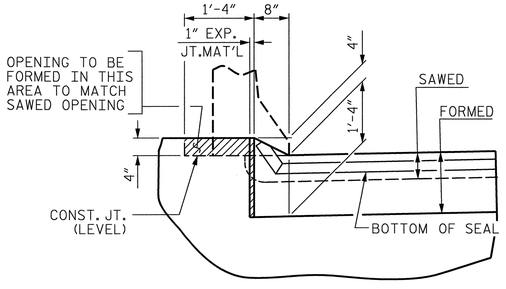


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT 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

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

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

ASSEMBLED BY :	K. WHITE	DATE :	FEB 2012
CHECKED BY :	J. DOUGHTY	DATE :	MAR 2012
DRAWN BY : FCJ	11/88	REV. 5/7/03	RWW/JTE
CHECKED BY : ARB	11/88	REV. 5/1/06RRR	MAA/KMM
		REV. 10/1/11	MAA/GM

5/9/2012
U2524AE_SD_AS_R04.DGN

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
(919) 836-4040
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JOHN R. DOUGHTY 5/10/12

PROJECT NO. U-2412B/ U-2524AE

GUILFORD COUNTY

STATION: 416+96.47 -L-

SHEET 2 OF 2

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-57
1			3			TOTAL SHEETS
2			4			57

STD. NO. BAS4

25-JUN-2012 11:45
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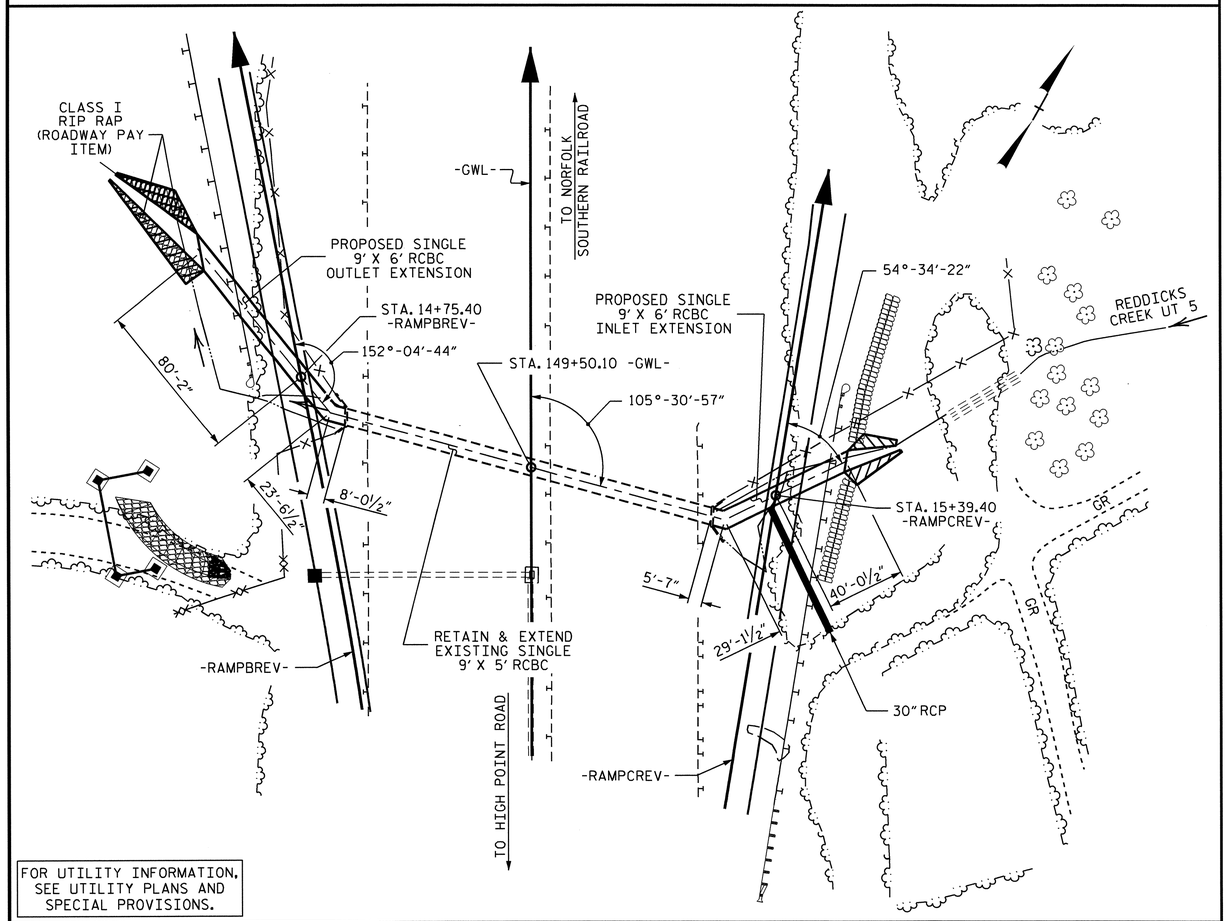
asorsenginh

F.A. PROJECT NO.: STPDA-4121(7)

BM #9: RAIL ROAD SPIKE SET IN 12 INCH Ø CEDAR 6.42' LEFT. OF -L- STA. 412+87.46, EL. 863.62



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 370 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 837.00
DRAINAGE AREA	= 0.17 SQ. MI.
BASE DISCHARGE (Q100)	= 420 CFS
BASE HIGH WATER ELEVATION	= 837.50

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 520 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 200 YRS.±
OVERTOPPING FLOOD ELEVATION	= 839.60

GRADE DATA

GRADE POINT ELEVATION @ STA. 14+75.40 -RAMPBREV-	= 838.95'
GRADE POINT ELEVATION @ STA. 15+39.40 -RAMPCREV-	= 840.27'
BED ELEVATION @ STA. 14+75.40 -RAMPBREV-	= 827.15'
BED ELEVATION @ STA. 15+39.40 -RAMPCREV-	= 829.47'
ROADWAY FILL SLOPES	= 2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
LEFT EXTENSION	120.2	C.Y.
RIGHT EXTENSION	81.8	C.Y.
TOTAL	202.0	C.Y.
REINFORCING STEEL		
LEFT EXTENSION	15,568	LBS.
RIGHT EXTENSION	10,768	LBS.
TOTAL	26,336	LBS.
FOUNDATION CONDITIONING MATERIAL		
LEFT EXTENSION	113	TONS
RIGHT EXTENSION	76	TONS
TOTAL	189	TONS
CULVERT EXCAVATION	LUMP SUM	

NOTES

ASSUMED LIVE LOAD ----------HS20-44 OR ALTERNATE LOADING.

DESIGN FILL---------- 5.31' (LEFT EXTENSION) AND 3.85' (RIGHT EXTENSION).

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

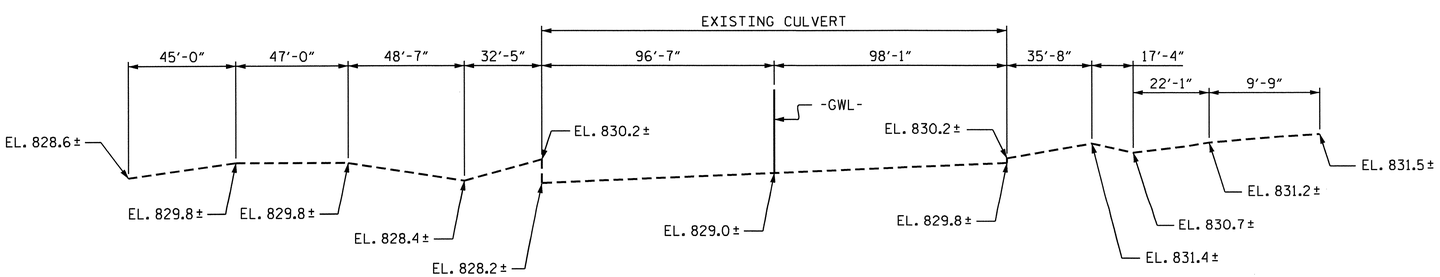
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



PROFILE ALONG ℄ CULVERT

PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 149+50.10 -GWL-

SHEET 1 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

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

STD. NO. CB221A

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

25-JUN-2012 11:45
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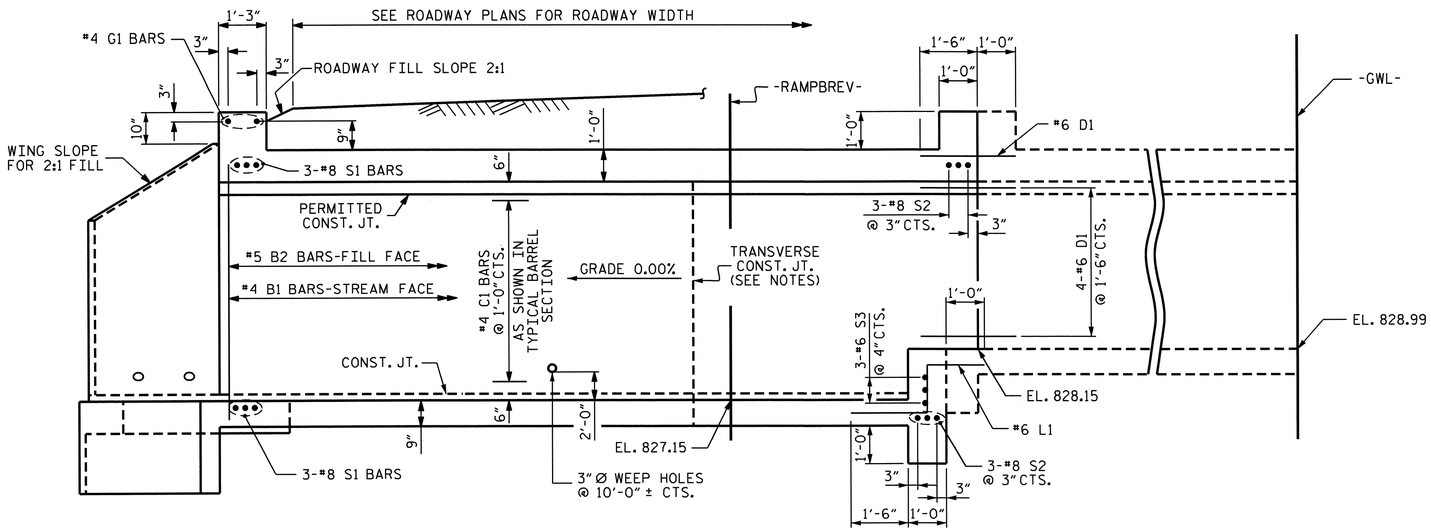
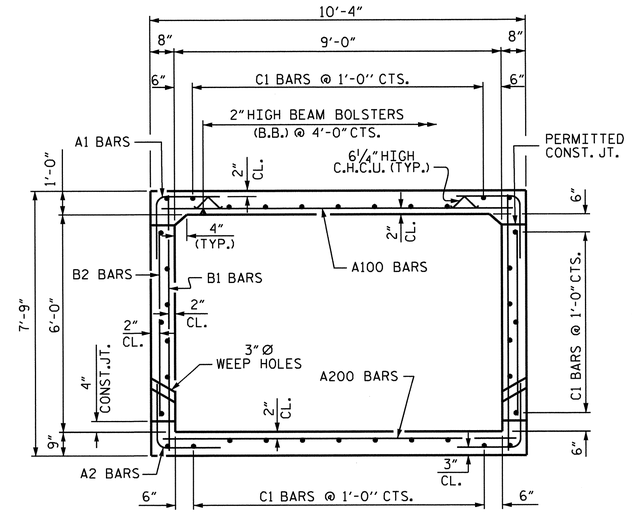
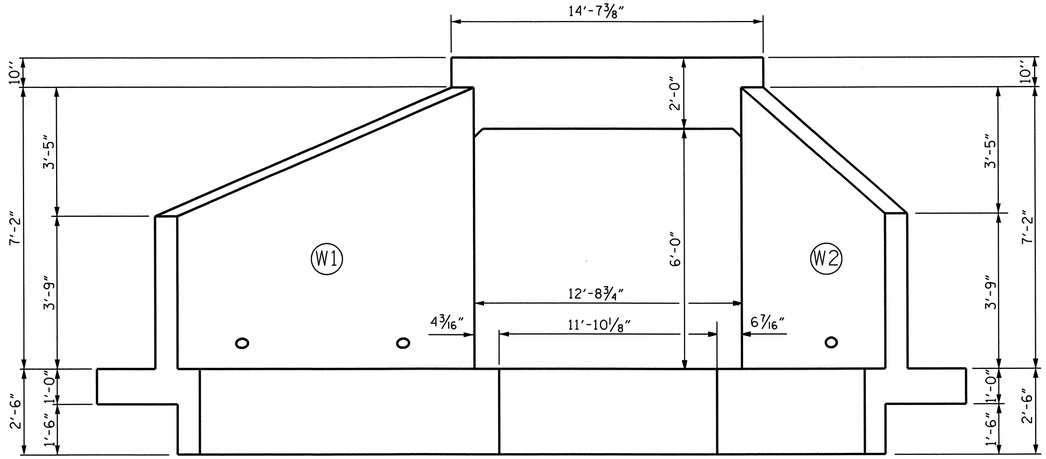


LEFT CULVERT EXTENSION SECTION NORMAL TO ROADWAY



RIGHT ANGLE SECTION OF BARREL

THERE ARE 36 "C" BARS IN SECTION OF BARREL



OUTLET END ELEVATION NORMAL TO SKEW

(135°-00'-00")

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

PROJECT NO. U-2412B
GUILFORD COUNTY
STATION: 149+50.10 -GWL-

SHEET 2 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW LEFT EXTENSION

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

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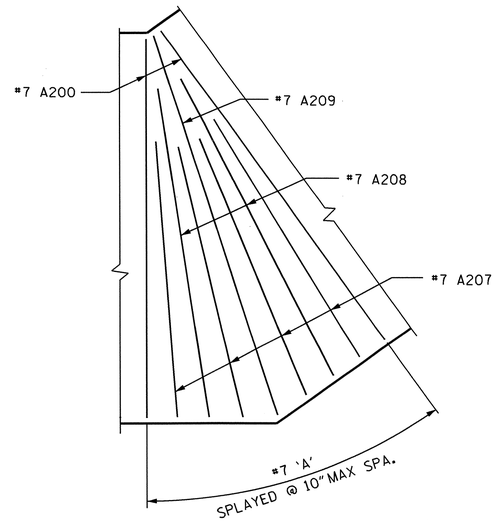
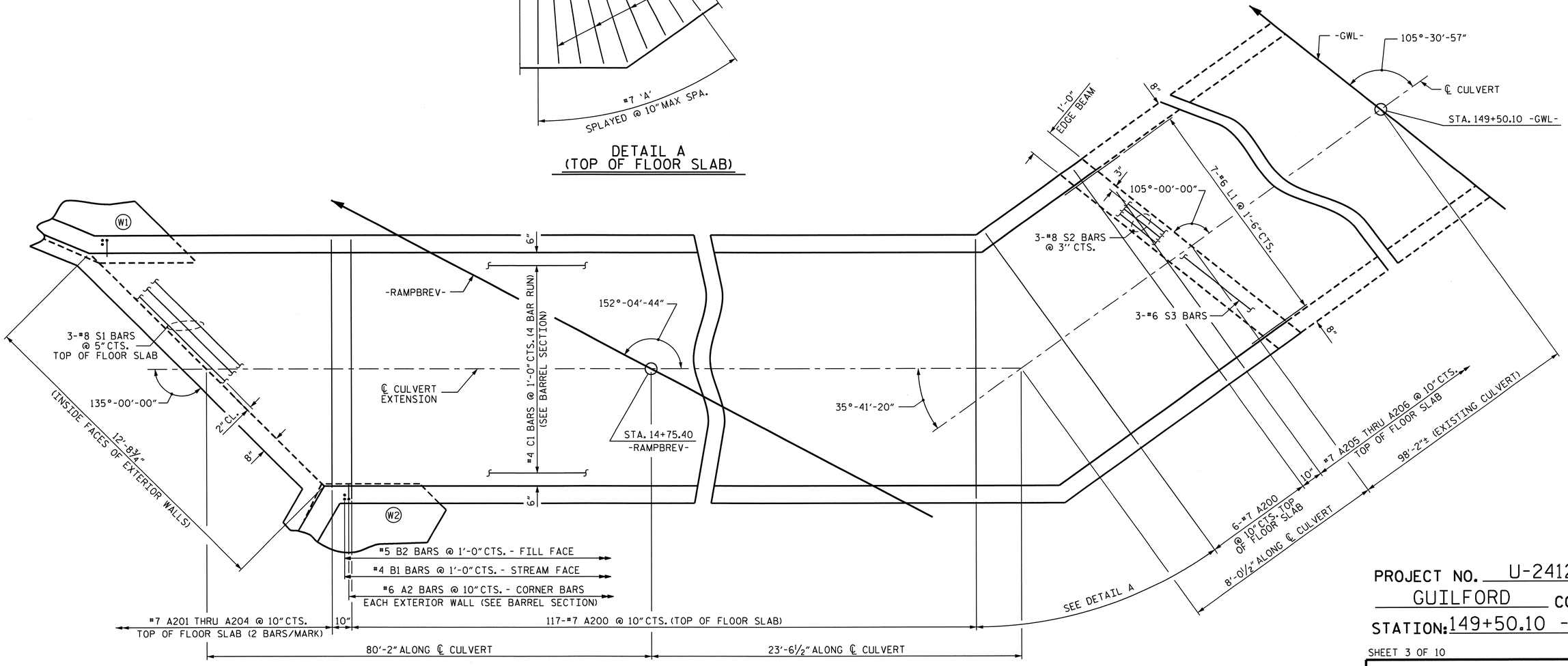


DETAIL A
(TOP OF FLOOR SLAB)



PLAN OF FLOOR SLAB

* "C" BARS SHALL BE FIELD BENT AS NECESSARY

PROJECT NO. U-2412B
GUILFORD COUNTY
STATION: 149+50.10 -GWL-

SHEET 3 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW LEFT EXTENSION

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

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DAVID A. R. CALHOUN
6/25/12

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

25-JUN-2012 11:46
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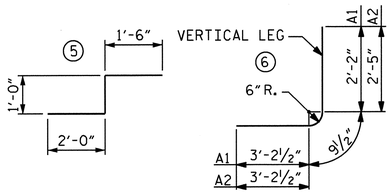
asorsenginh

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

BAR	SIZE	LENGTH
C1	#4	1'-11"

BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	270	#5	6	6'-2"	1737
A2	270	#6	6	6'-5"	2602
A100	136	#6	STR	9'-11"	2026
A101	2	#6	STR	8'-10"	27
A102	2	#6	STR	7'-4"	22
A103	2	#6	STR	5'-10"	18
A104	2	#6	STR	4'-4"	13
A105	1	#6	STR	7'-11"	12
A106	1	#6	STR	5'-3"	8
A107	4	#6	STR	6'-2"	37
A108	2	#6	STR	8'-5"	25
A109	2	#6	STR	10'-0"	30
A200	123	#7	STR	9'-11"	2493
A201	2	#7	STR	8'-4"	34
A202	2	#7	STR	6'-8"	27
A203	2	#7	STR	5'-0"	20
A204	2	#7	STR	3'-4"	14
A205	1	#7	STR	8'-4"	17
A206	1	#7	STR	5'-4"	11

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A207	4	#7	STR	7'-3"	59
A208	2	#7	STR	8'-9"	36
A209	1	#7	STR	10'-6"	21
B1	224	#4	STR	7'-3"	1085
B2	224	#5	STR	5'-4"	1246
C1	144	#4	STR	29'-5"	2830
D1	15	#6	STR	2'-6"	56
G1	2	#4	STR	14'-1"	19
L1	7	#4	5	4'-6"	21
S1	6	#8	STR	14'-1"	226
S2	6	#8	STR	10'-4"	166
S3	3	#6	STR	10'-4"	47

REINFORCING STEEL = 14,985 LBS

LEFT EXTENSION STRUCTURE QUANTITIES

CLASS A CONCRETE

BARREL @ 0.970 CY/FT 108.4 C.Y.

WINGS, ETC. 11.8 C.Y.

TOTAL 120.2 C.Y.

REINFORCING STEEL

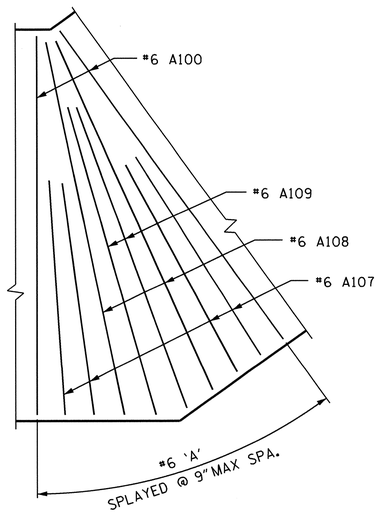
BARREL 14,985 LBS.

WINGS, ETC. 583 LBS.

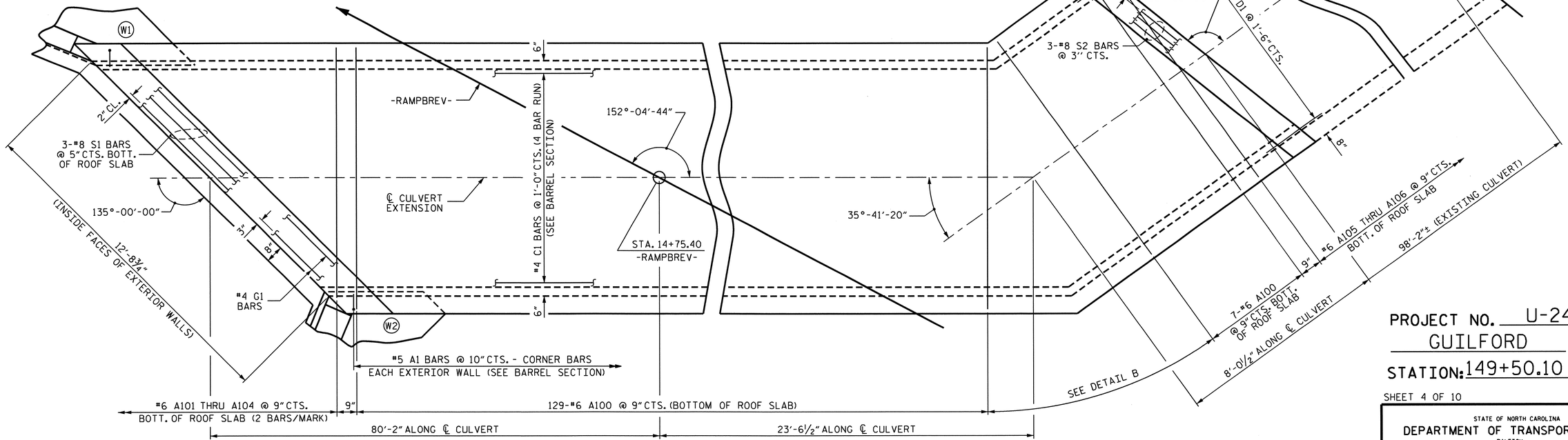
TOTAL 15,568 LBS.

FOUNDATION CONDITIONING MATERIAL 113 TONS

CULVERT EXCAVATION LUMP SUM



DETAIL B
(BOTTOM OF ROOF SLAB)



PLAN OF ROOF SLAB

* "C" BARS SHALL BE FIELD BENT AS NECESSARY

PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 149+50.10 -GWL-

SHEET 4 OF 10

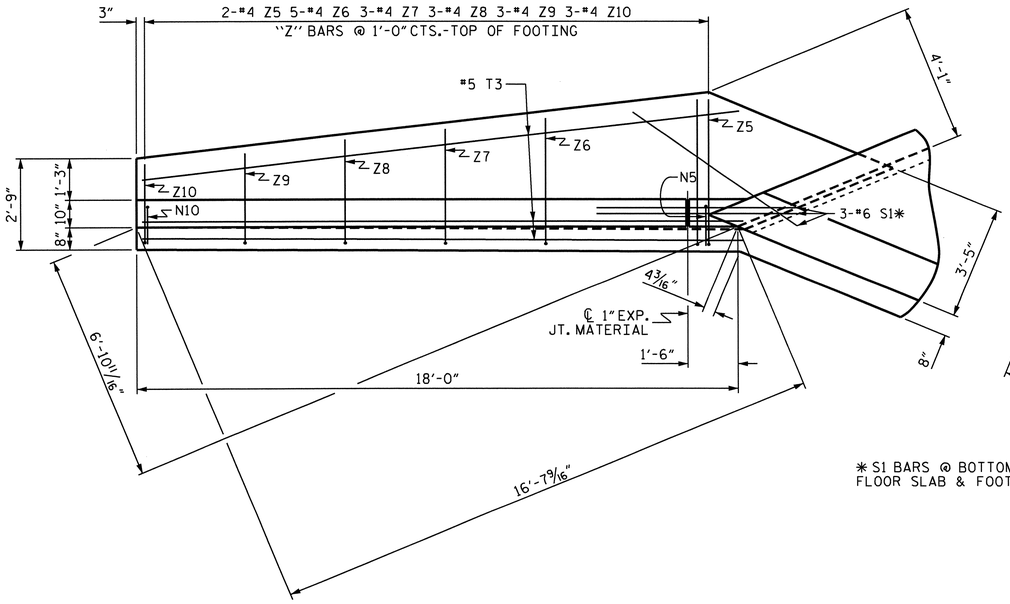
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW LEFT EXTENSION

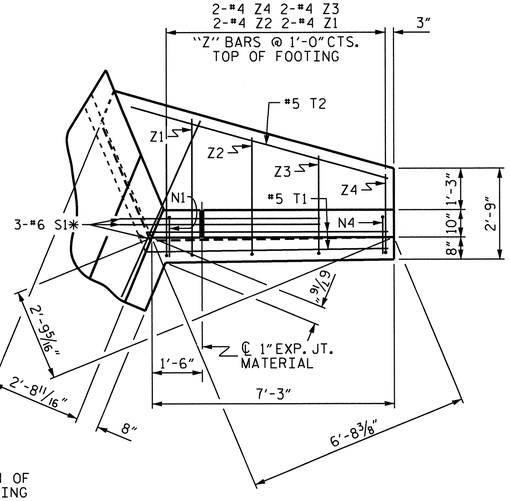
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

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

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

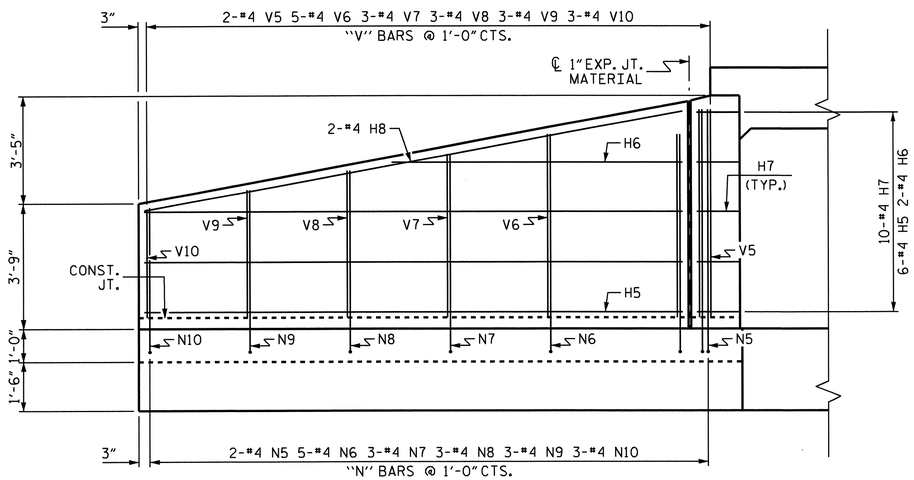


PLAN W1

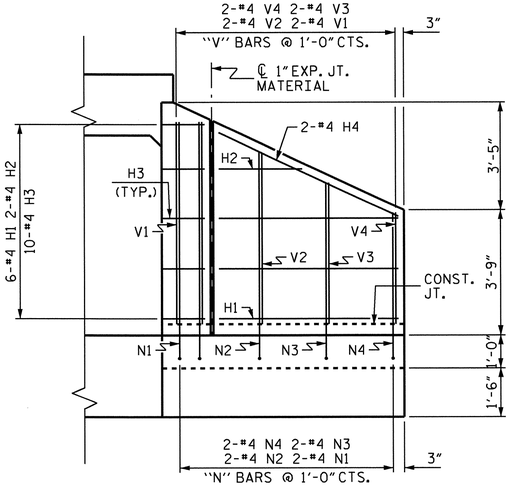


PLAN W2

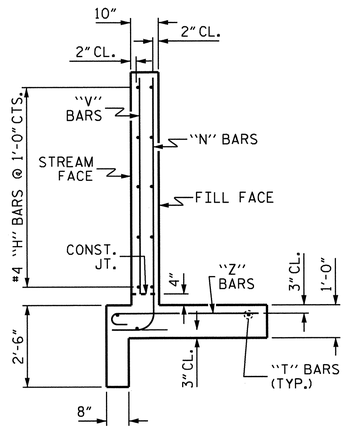
* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING



ELEVATION W1



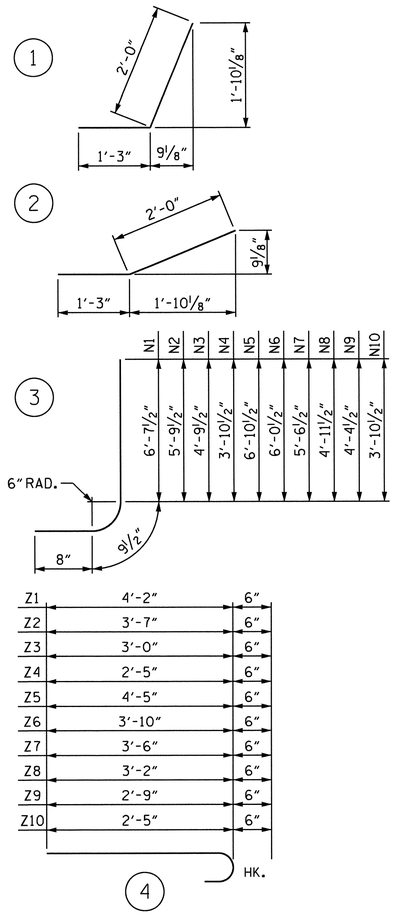
ELEVATION W2



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	5'-4"	21
H2	2	#4	STR	2'-6"	3
H3	10	#4	1	3'-3"	22
H4	2	#4	STR	5'-11"	8
H5	6	#4	STR	16'-1"	64
H6	2	#4	STR	8'-8"	12
H7	10	#4	2	3'-3"	22
H8	2	#4	STR	16'-4"	22
N1	2	#4	3	8'-1"	11
N2	2	#4	3	7'-3"	10
N3	2	#4	3	6'-3"	8
N4	2	#4	3	5'-4"	7
N5	2	#4	3	8'-4"	11
N6	5	#4	3	7'-6"	25
N7	3	#4	3	7'-0"	14
N8	3	#4	3	6'-5"	13
N9	3	#4	3	5'-10"	12
N10	3	#4	3	5'-4"	11
S1	6	#6	STR	6'-0"	54
T1	2	#5	STR	7'-3"	15
T2	1	#5	STR	8'-0"	8
T3	3	#5	STR	18'-0"	56
V1	2	#4	STR	6'-1"	8
V2	2	#4	STR	5'-2"	7
V3	2	#4	STR	4'-3"	6
V4	2	#4	STR	3'-4"	4
V5	2	#4	STR	6'-3"	8
V6	5	#4	STR	5'-6"	18
V7	3	#4	STR	4'-11"	10
V8	3	#4	STR	4'-5"	9
V9	3	#4	STR	3'-10"	8
V10	3	#4	STR	3'-3"	7
Z1	2	#4	4	4'-8"	6
Z2	2	#4	4	4'-1"	5
Z3	2	#4	4	3'-6"	5
Z4	2	#4	4	2'-11"	4
Z5	2	#4	4	4'-11"	7
Z6	5	#4	4	4'-4"	14
Z7	3	#4	4	4'-0"	8
Z8	3	#4	4	3'-8"	7
Z9	3	#4	4	3'-3"	7
Z10	3	#4	4	2'-11"	6

REINFORCING STEEL FOR 2 WINGS	583	LBS
CLASS A CONCRETE		
2 WINGS	9.3	CY
1 HEADWALL	0.7	CY
1 END CURTAIN WALL	0.7	CY
2 EDGE BEAMS	1.1	CY
TOTAL	11.8	CY

PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 149+50.10 -GWL-

SHEET 5 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1

135° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY :	A. SORSENGINH	DATE :	4/2012
CHECKED BY :	SH. SOCKWELL	DATE :	4/2012
DRAWN BY :	CCJ		01/00
CHECKED BY :	RWW		03/00

STD. NO. CW4506

25-JUN-2012 11:47
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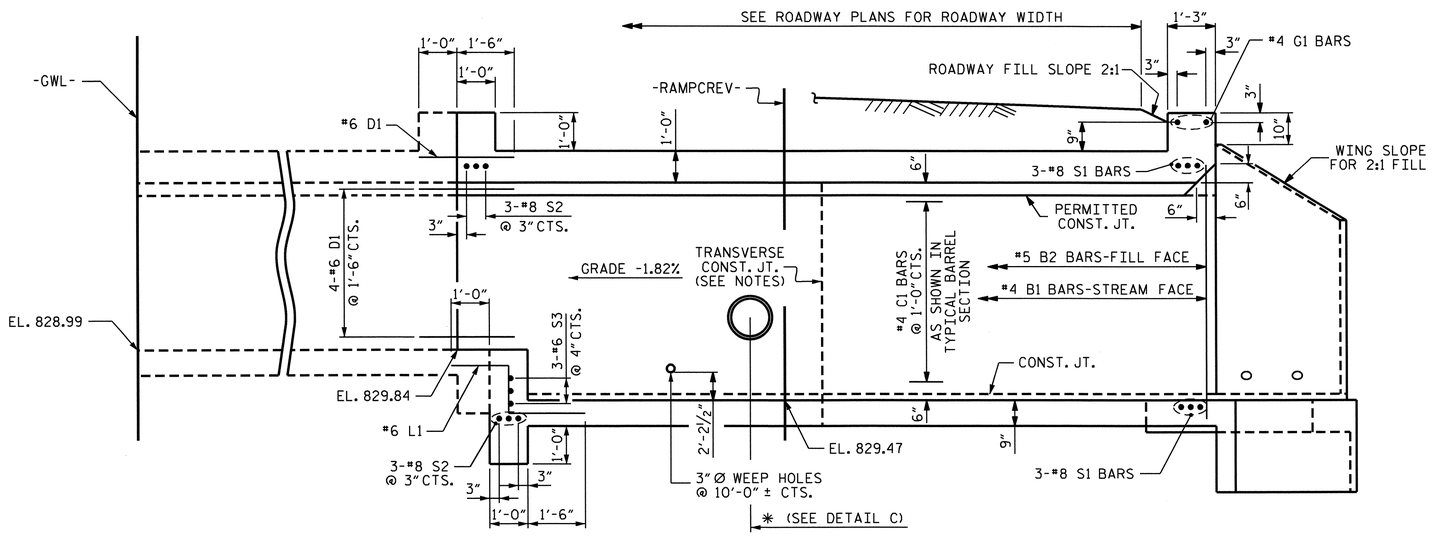
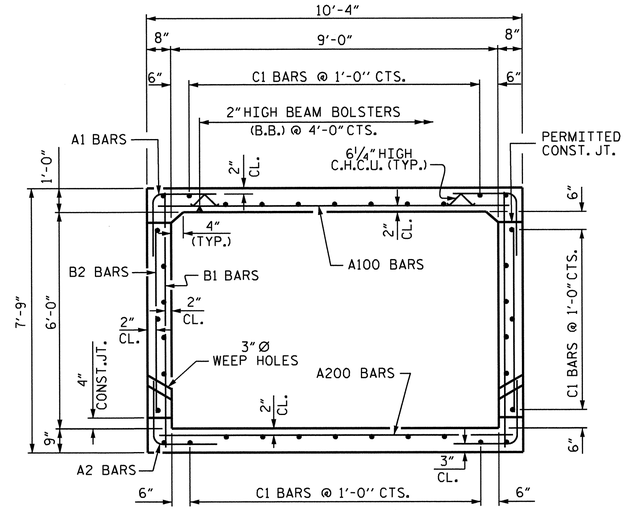
osorsenginh

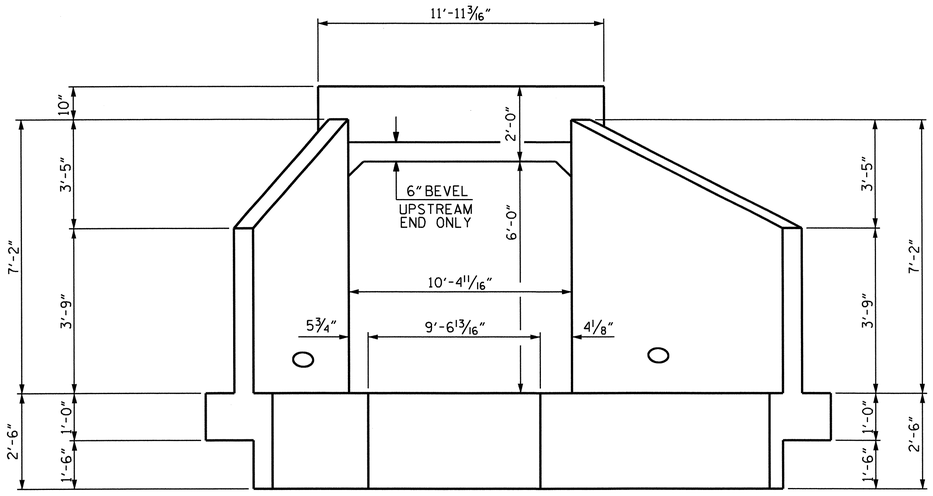


RIGHT CULVERT EXTENSION SECTION NORMAL TO ROADWAY



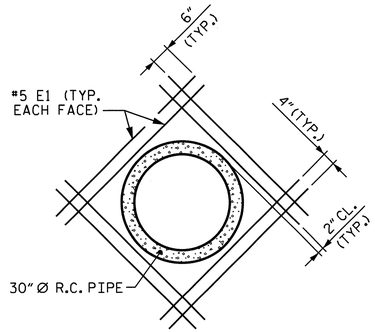
RIGHT ANGLE SECTION OF BARREL

THERE ARE 36 "C" BARS IN SECTION OF BARREL



INLET END ELEVATION NORMAL TO SKEW

(60°-00'-00")



DETAIL C

* THE 30" Ø DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

PROJECT NO. U-2412B
GUILFORD COUNTY
STATION: 149+50.10 -GWL-

SHEET 6 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW RIGHT EXTENSION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			10

25-JUN-2012 11:47
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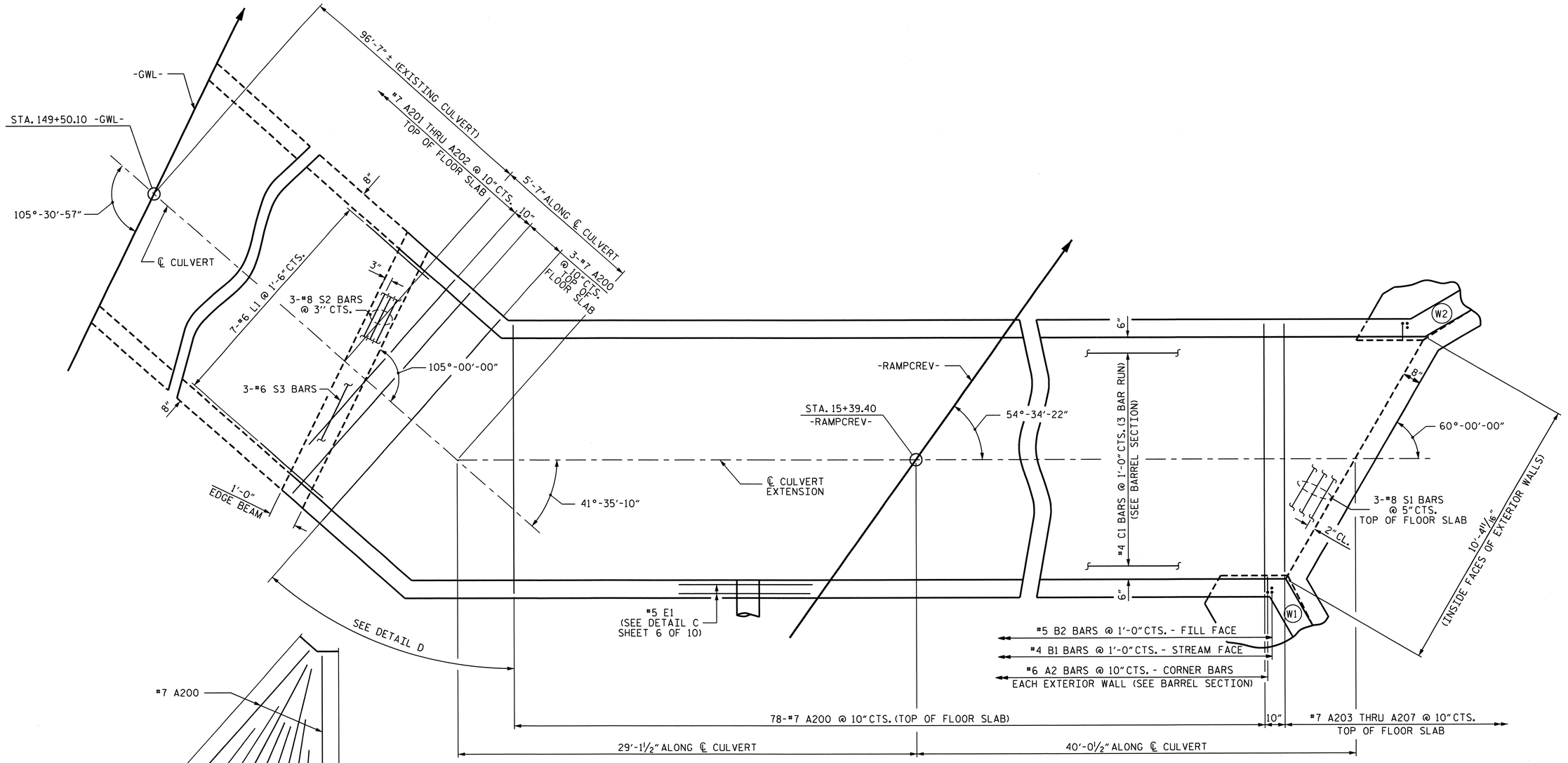
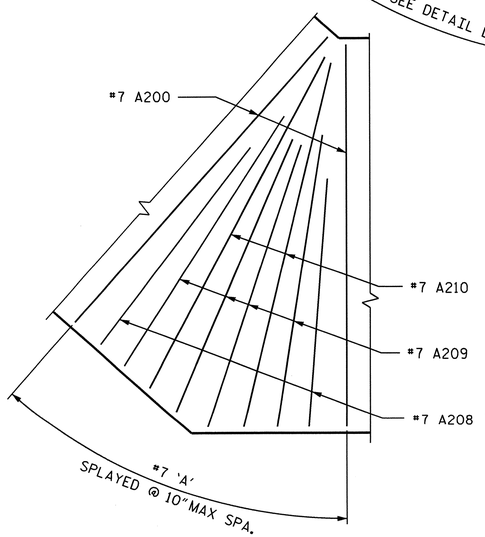
asorsenginh



PLAN OF FLOOR SLAB

* "C" BARS SHALL BE FIELD BENT AS NECESSARY



DETAIL D
(TOP OF FLOOR SLAB)

PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 149+50.10 -GWL-

SHEET 7 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW RIGHT EXTENSION

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

25-JUN-2012 11:47
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asorsenginh

RIGHT EXTENSION STRUCTURE QUANTITIES

CLASS A CONCRETE

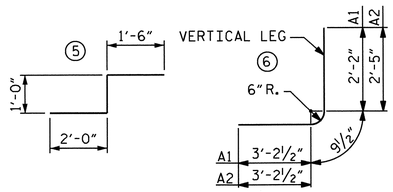
BARREL @	0.970 CY/FT	72.5	C.Y.
WINGS, ETC.		9.3	C.Y.
TOTAL		81.8	C.Y.

REINFORCING STEEL

BARREL	10,303	LBS.
WINGS, ETC.	465	LBS.
TOTAL	10,768	LBS.

FOUNDATION CONDITIONING MATERIAL	76	TONS
CULVERT EXCAVATION		LUMP SUM

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

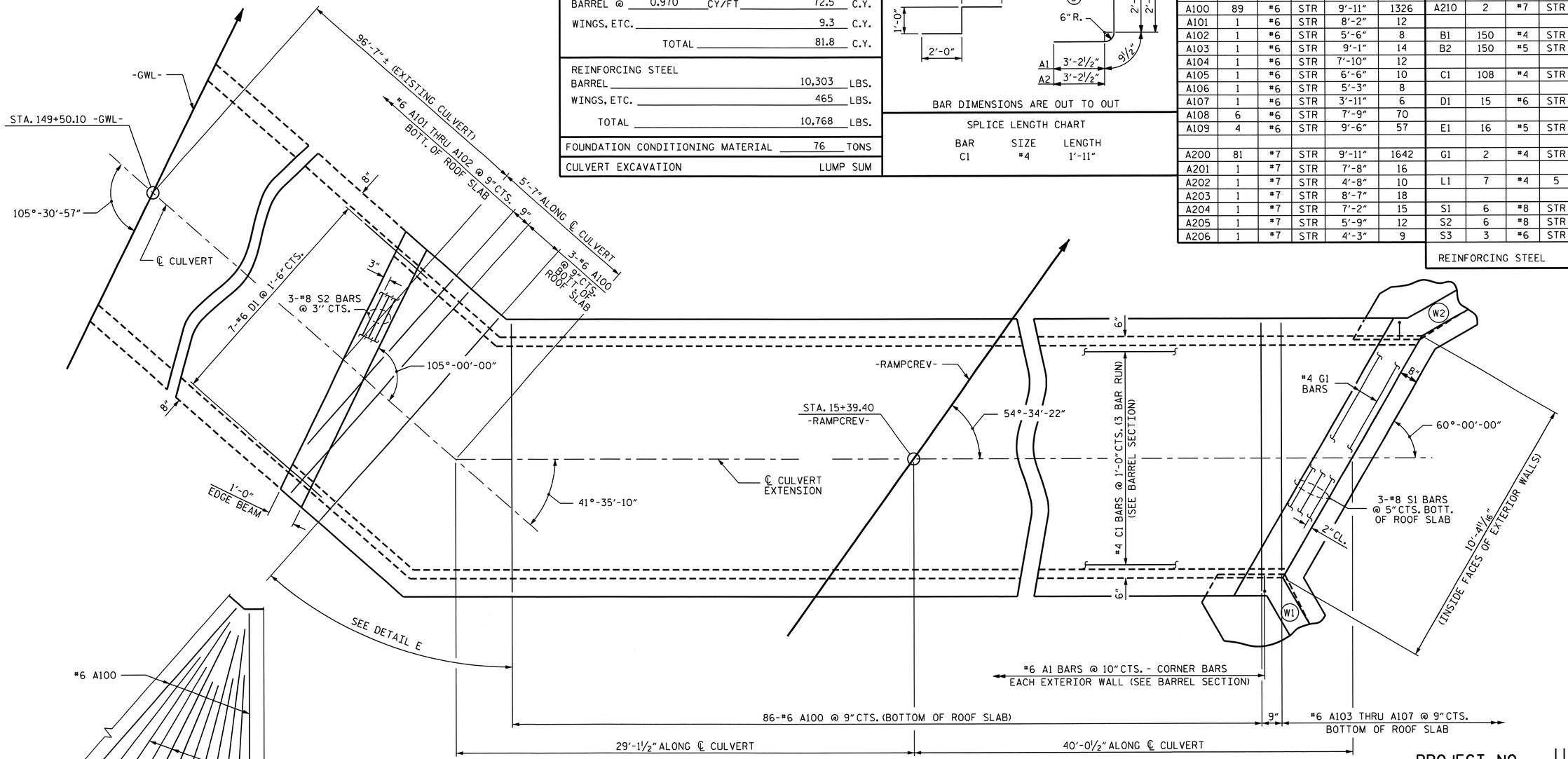
BAR	SIZE	LENGTH
C1	#4	1'-11"

BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	180	#5	6	6'-2"	1158
A2	180	#6	6	6'-5"	1735
A100	89	#6	STR	9'-11"	1326
A101	1	#6	STR	8'-2"	12
A102	1	#6	STR	5'-6"	8
A103	1	#6	STR	9'-1"	14
A104	1	#6	STR	7'-10"	12
A105	1	#6	STR	6'-6"	10
A106	1	#6	STR	5'-3"	8
A107	1	#6	STR	3'-11"	6
A108	6	#6	STR	7'-9"	70
A109	4	#6	STR	9'-6"	57
A200	81	#7	STR	9'-11"	1642
A201	1	#7	STR	7'-8"	16
A202	1	#7	STR	4'-8"	10
A203	1	#7	STR	8'-7"	18
A204	1	#7	STR	7'-2"	15
A205	1	#7	STR	5'-9"	12
A206	1	#7	STR	4'-3"	9

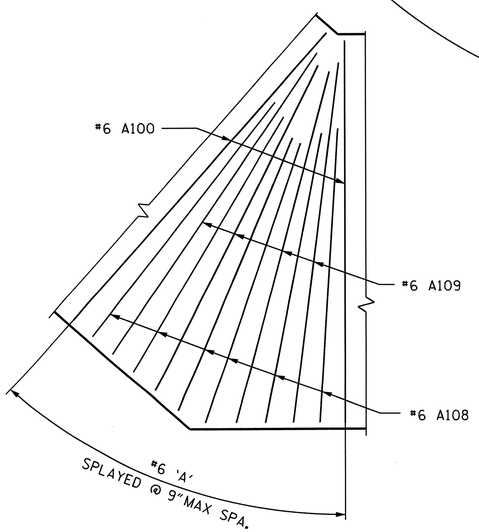
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A207	1	#7	STR	2'-10"	6
A208	2	#7	STR	6'-6"	27
A209	4	#7	STR	7'-9"	63
A210	2	#7	STR	9'-9"	40
B1	150	#4	STR	7'-3"	726
B2	150	#5	STR	5'-4"	834
C1	108	#4	STR	26'-3"	1894
D1	15	#6	STR	2'-6"	56
E1	16	#5	STR	5'-2"	86
G1	2	#4	STR	11'-6"	15
L1	7	#4	5	4'-6"	21
S1	6	#8	STR	11'-6"	184
S2	6	#8	STR	10'-4"	166
S3	3	#6	STR	10'-4"	47

REINFORCING STEEL = 10,303 LBS



PLAN OF ROOF SLAB

* "C" BARS SHALL BE FIELD BENT AS NECESSARY



DETAIL E
(BOTTOM OF ROOF SLAB)

PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 149+50.10 -GWL-

SHEET 8 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 9 FT. X 6 FT. CONCRETE BOX CULVERT 105° SKEW RIGHT EXTENSION

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY : A. SORSENGINH DATE : 4/2012
CHECKED BY : SH. SOCKWELL DATE : 4/2012

25-JUN-2012 11:47
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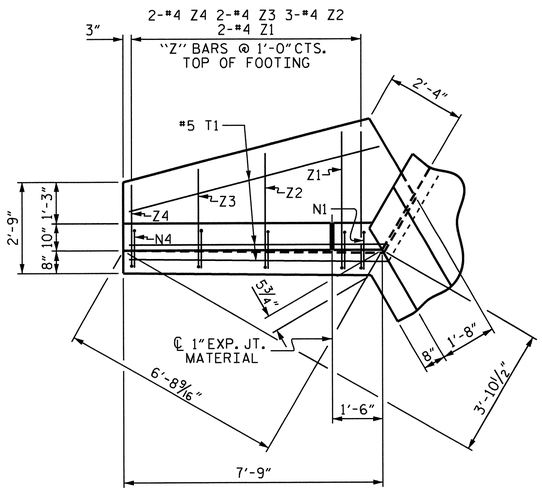
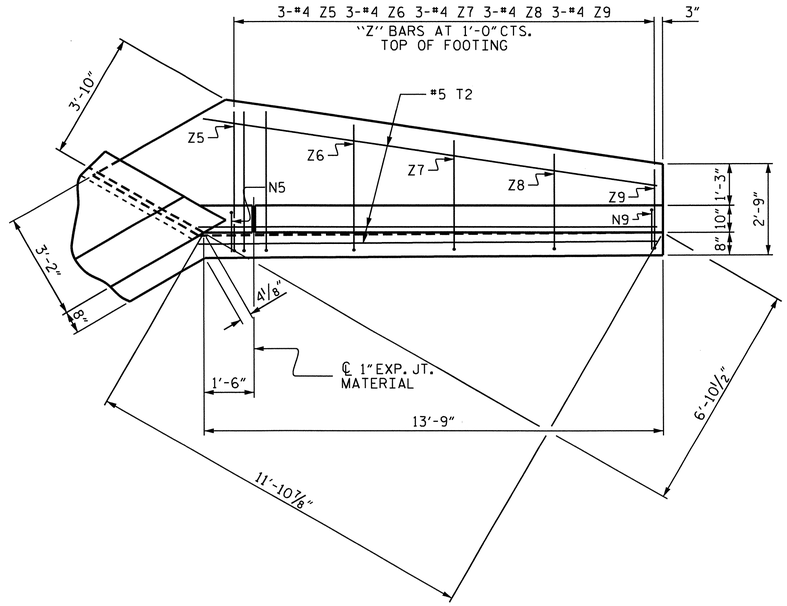
asorsenginh



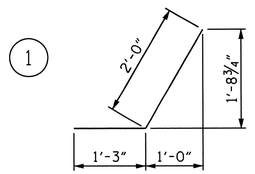
PLAN W1

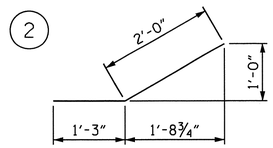


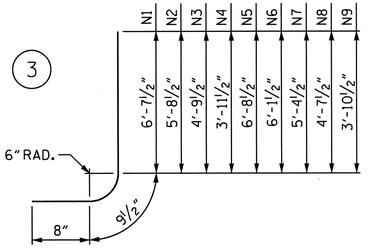
PLAN W2

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.







Z1	4'-2"
Z2	3'-6"
Z3	3'-0"
Z4	2'-6"
Z5	4'-3"
Z6	3'-10"
Z7	3'-4"
Z8	2'-11"
Z9	2'-5"

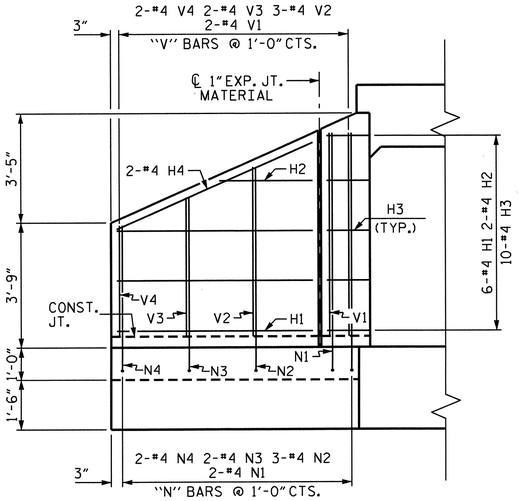
HK. 6"

4

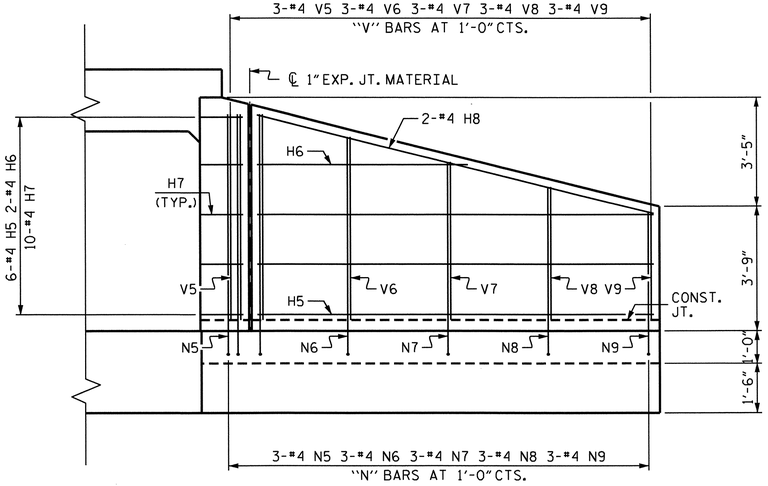
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	5'-10"	23
H2	2	#4	STR	2'-9"	4
H3	10	#4	1	3'-3"	22
H4	2	#4	STR	6'-5"	9
H5	6	#4	STR	11'-10"	47
H6	2	#4	STR	6'-3"	8
H7	10	#4	2	3'-3"	22
H8	2	#4	STR	12'-2"	16
N1	2	#4	3	8'-1"	11
N2	3	#4	3	7'-2"	14
N3	2	#4	3	6'-3"	8
N4	2	#4	3	5'-5"	7
N5	3	#4	3	8'-2"	16
N6	3	#4	3	7'-7"	15
N7	3	#4	3	6'-10"	14
N8	3	#4	3	6'-1"	12
N9	3	#4	3	5'-4"	11
T1	3	#5	STR	7'-9"	24
T2	3	#5	STR	13'-9"	43
V1	2	#4	STR	6'-1"	8
V2	3	#4	STR	5'-1"	10
V3	2	#4	STR	4'-2"	6
V4	2	#4	STR	3'-4"	4
V5	3	#4	STR	6'-2"	12
V6	3	#4	STR	5'-6"	11
V7	3	#4	STR	4'-9"	10
V8	3	#4	STR	4'-0"	8
V9	3	#4	STR	3'-3"	7
Z1	2	#4	4	4'-8"	6
Z2	3	#4	4	4'-0"	8
Z3	2	#4	4	3'-6"	5
Z4	2	#4	4	3'-0"	4
Z5	3	#4	4	4'-9"	10
Z6	3	#4	4	4'-4"	9
Z7	3	#4	4	3'-10"	8
Z8	3	#4	4	3'-5"	7
Z9	3	#4	4	2'-11"	6

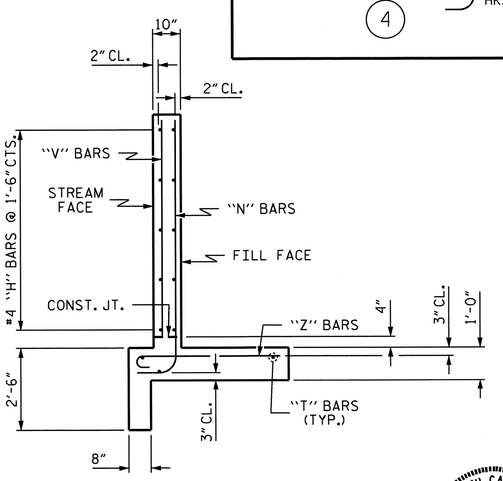
REINFORCING STEEL FOR 2 WINGS		465 LBS
CLASS A CONCRETE		
2 WINGS	7.2	CY
1 HEADWALL	0.6	CY
1 END CURTAIN WALL	0.6	CY
2 EDGE BEAMS	0.9	CY
TOTAL	9.3	CY



ELEVATION W1



ELEVATION W2



TYPICAL WING SECTION

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALVIN
6/25/12

PROJECT NO. U-2412B
GUILFORD COUNTY
STATION: 149+50.10 -GWL-

SHEET 9 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1
60° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY :	A. SORSENGINH	DATE :	4/2012
CHECKED BY :	SH. SOCKWELL	DATE :	4/2012
DRAWN BY :	CCJ	11/99	
CHECKED BY :	RWW	03/00	

STD. NO. CW6006

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.07	--	1.75	1.07	1	TOP SLAB	5.17	1.32	1	BOTTOM SLAB	8.79	
		HL-93 (OPERATING)	N/A		1.39	--	1.35	1.39	1	TOP SLAB	5.17	1.71	1	BOTTOM SLAB	8.79	
		HS-20 (INVENTORY)	36.000	(2)	1.36	49.13	1.75	1.36	1	TOP SLAB	5.17	2.03	1	BOTTOM SLAB	0.87	
		HS-20 (OPERATING)	36.000		1.77	63.69	1.35	1.77	1	TOP SLAB	5.17	2.63	1	BOTTOM SLAB	0.87	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500		2.73	34.12	1.40	2.73	1	TOP SLAB	5.17	4.07	1	BOTTOM SLAB	0.87	
		S3C	21.500	(3)	1.77	37.98	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		S3A	22.750		1.77	40.19	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		S4A	26.750		1.77	47.26	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		S5A	30.500		1.77	53.88	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		S6A	34.500		1.77	60.95	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		S7B	38.500		1.77	68.01	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		S7A	40.000		1.77	70.66	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	8.79	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250		1.77	49.91	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		T5B	32.000		1.77	56.53	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		T6A	36.000		1.77	63.60	1.40	1.77	1	TOP SLAB	5.17	2.10	1	BOTTOM SLAB	8.79	
		T7A	40.000		1.77	70.66	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	
		T7B	40.000		1.77	70.66	1.40	1.77	1	TOP SLAB	5.17	2.16	1	BOTTOM SLAB	0.87	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.
2.
3.
4.

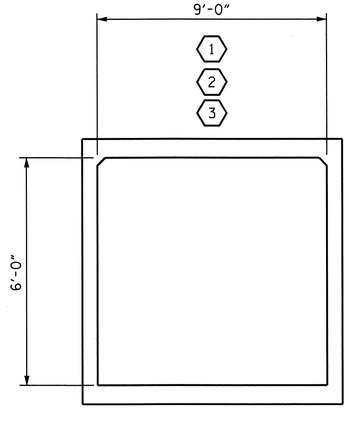
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 149+50.10 -GWL-

SHEET 10 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6/25/12

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

STD. NO. LRFR6

ASSEMBLED BY :	A. SORSENGINH	DATE :	4/2012
CHECKED BY :	SH. SOCKWELL	DATE :	4/2012
DRAWN BY :	WMC 7/11	REV. 10/1/11	MAA/GM
CHECKED BY :	GM 7/11		

25-JUN-2012 11:48
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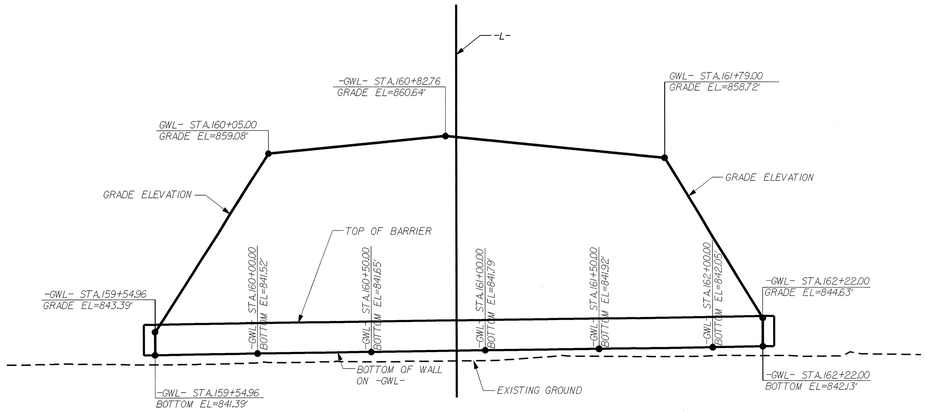
asorsenginh



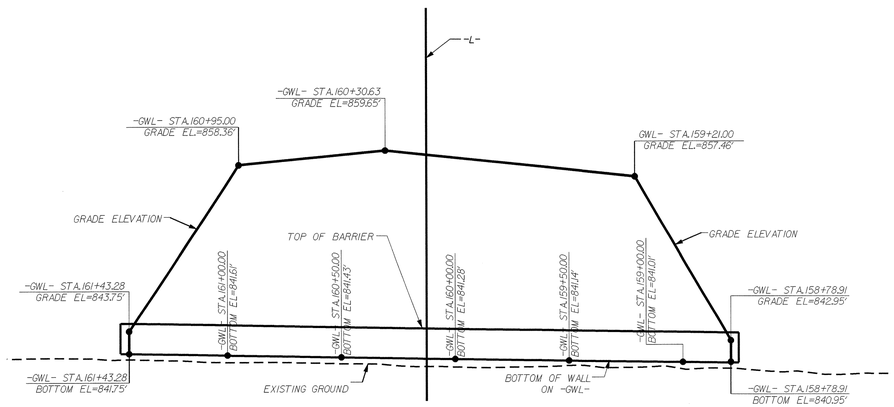
WALL NO. 1 ENVELOPE

MSE WALL ELEVATION AT END BENT 1

-GWL- OFFSET 89.60' LEFT

LOOKING AT EXPOSED FRONT FACE OF WALL

N.T.S.



WALL NO. 2 ENVELOPE

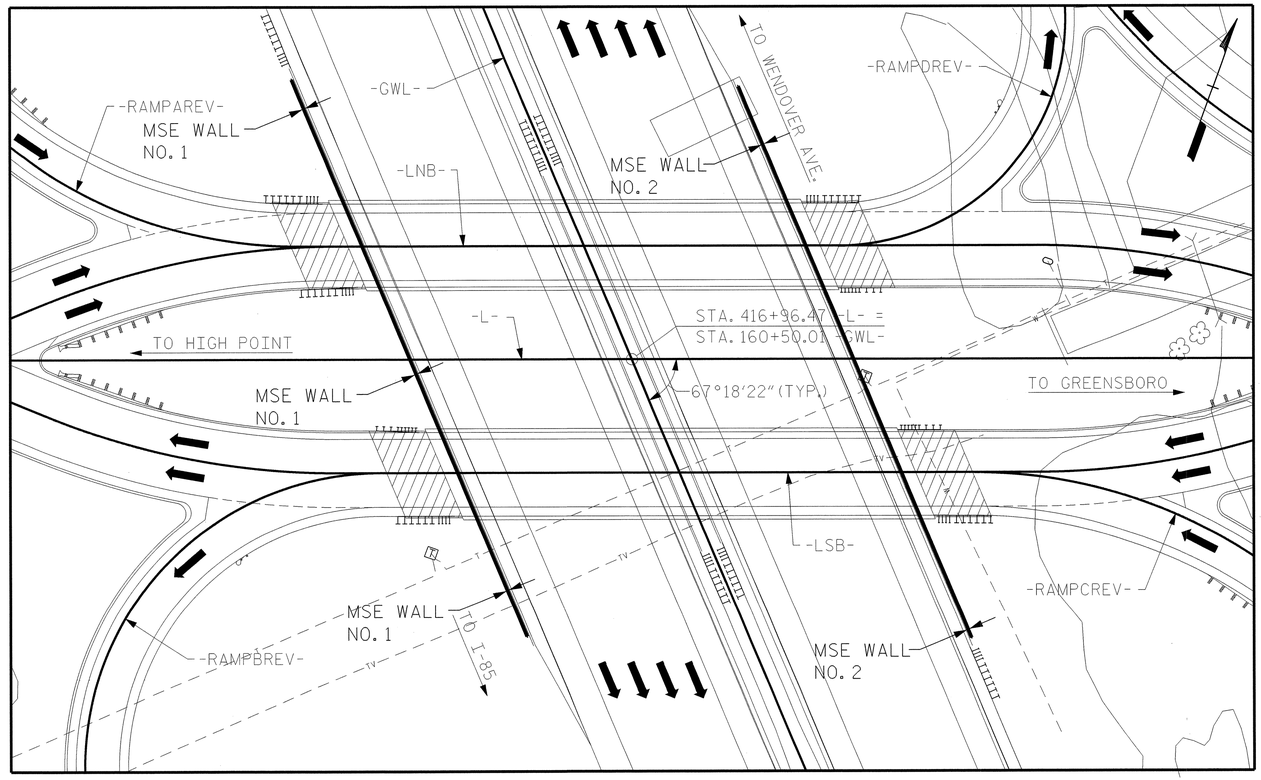
MSE WALL ELEVATION AT END BENT 2

-GWL- OFFSET 89.60' RIGHT

LOOKING AT EXPOSED FRONT FACE OF WALL

N.T.S.

MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO. 1	4035 SF
MSE RETAINING WALL NO. 2	3865 SF



LOCATION SKETCH

N.T.S.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

SIGNATURE DATE 5-24-12

ENGINEER

SIGNATURE DATE

PROJECT NO.: U-2412B/U2524AE

GUILFORD ***COUNTY***

STATION: 415+98.80 -L- / 417+94.14 -L-

SHEET 1 OF 4

PREPARED BY: MK	DATE: 3/7/2012
REVIEWED BY: JRB	DATE: 3/9/12

GEOTECHNICAL ENGINEERING UNIT

☒ ***EASTERN REGIONAL OFFICE***

☐ ***WESTERN REGIONAL OFFICE***

☐ ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MSE RETAINING WALLS NO. 1 AND 2 AT END BENTS FOR DUAL BRIDGES ON SR 4121 OVER GREENSBORO WESTERN LOOP

REVISIONS

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

SHEET NO. W-1

TOTAL SHEETS 4

GEJ248333 5/22/2012 U2412B_U2524AE_GEO_RWALL_PLANS mkhazaei RD-Oce860-34

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

5-24-12

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS NO. 1 AND 2.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALLS NO. 1 AND 2.

DESIGN RETAINING WALLS NO. 1 AND 2 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL = 6250 LB/SF
4) MINIMUM REINFORCEMENT LENGTH TO DESIGN HEIGHT RATIO (L/H) = 0.9
5) AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	125	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	0

BEFORE BEGINNING MSE WALL DESIGNS FOR RETAINING WALLS NO. 1 AND 2, SURVEY WALL LOCATIONS AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

A DRAIN IS NOT REQUIRED FOR RETAINING WALLS NO. 1 AND 2.

DESIGN RETAINING WALLS NO. 1 AND 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

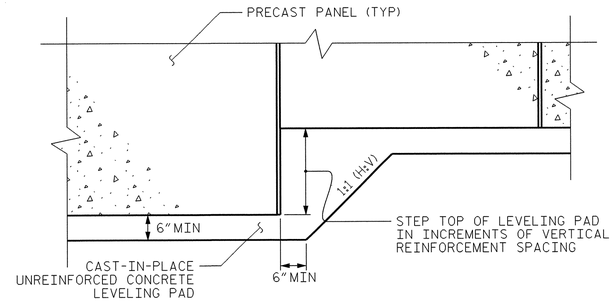
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED STRAP LOAD OF 4.8 KIPS/FT ACTING 2 FT AND 11 INCHES ABOVE BOTTOM OF THE CAP ELEVATION AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L) SHOWN. CAST REINFORCEMENT CONNECTORS INTO CAP BACKWALL FOR END BENTS NO. 1 AND 2. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR END BENTS NO. 1 AND 2 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS NO. 1 AND 2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS NO. 1 AND 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

FOUNDATIONS FOR SIGNS, LIGHTING or SIGNALS WILL BE LOCATED BEHIND RETAINING WALLS NO. 1 AND 2 AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMITPROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS NO. 1 AND 2.



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PREPARED BY: MK	DATE: 3/7/2012
REVIEWED BY: JRB	DATE: 3/9/2012

PROJECT NO.: U-2412B/U2524AE

GUILFORD ***COUNTY***

STATION: 415+98.80 -L- / 417+94.14 -L-

SHEET 2 OF 4

GEOTECHNICAL ENGINEERING UNIT

☒ ***EASTERN REGIONAL OFFICE***
☐ ***WESTERN REGIONAL OFFICE***
☐ ***CONTRACT OFFICE***

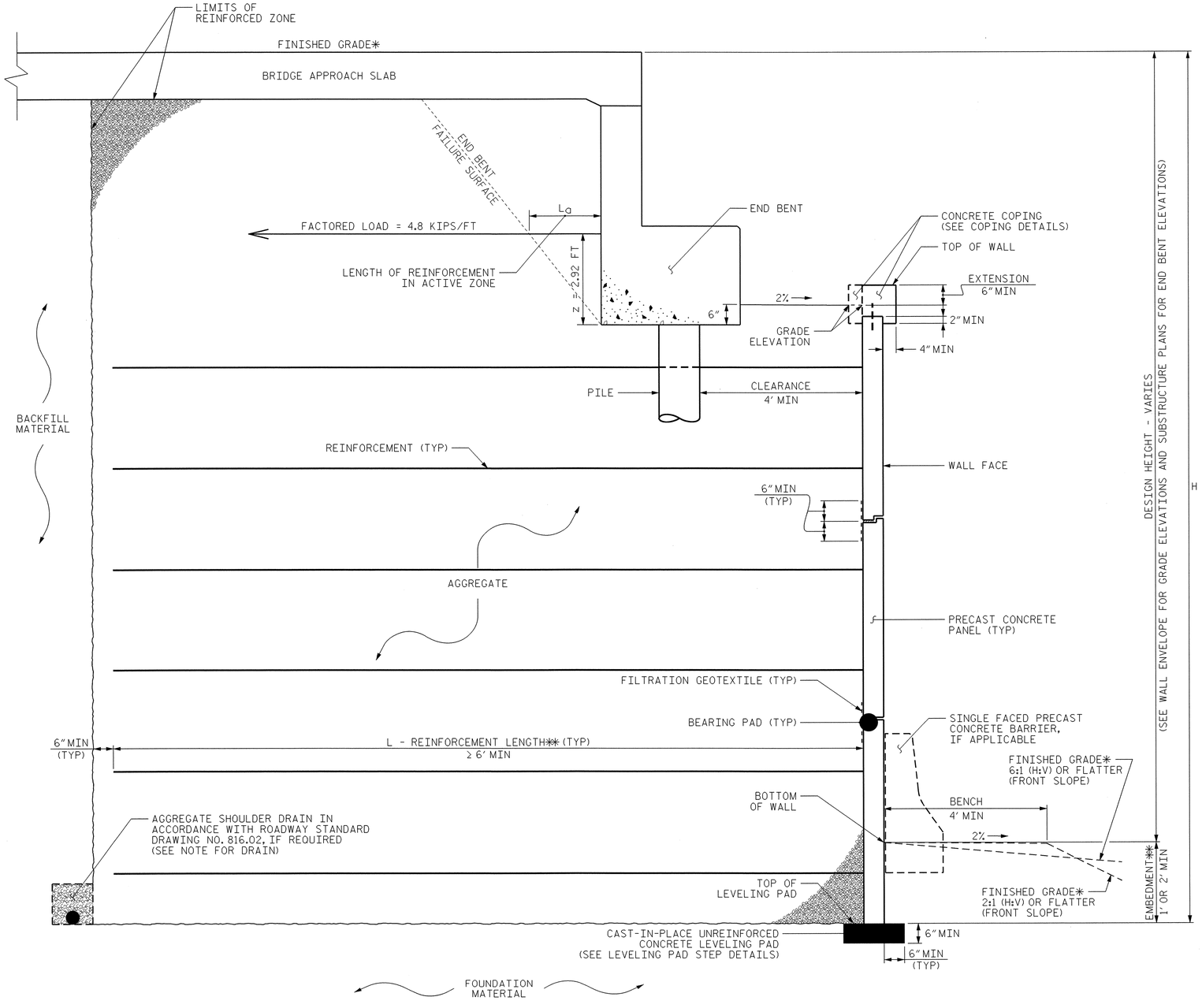
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MSE RETAINING WALLS NO. 1 AND 2 AT END BENTS FOR DUAL BRIDGES ON SR 4121 OVER GREENSBORO WESTERN LOOP

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

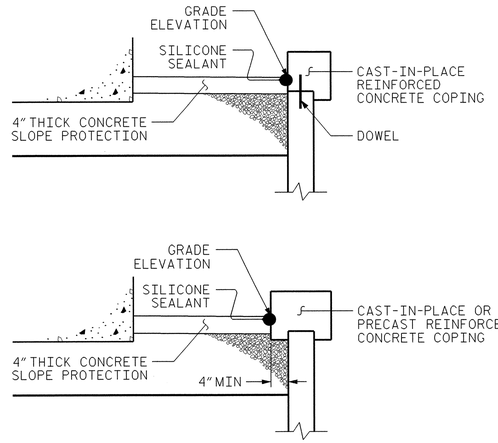
GEJ248333 5/22/2012 U2412B_U2524AE_GEO_RWALL_PLANS mkhazaei RD-Oce860-34

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI 5-24-12	
SIGNATURE DATE	SIGNATURE DATE



MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

PREPARED BY: MK	DATE: 3/7/2012
REVIEWED BY: JRB	DATE: 3/9/2012

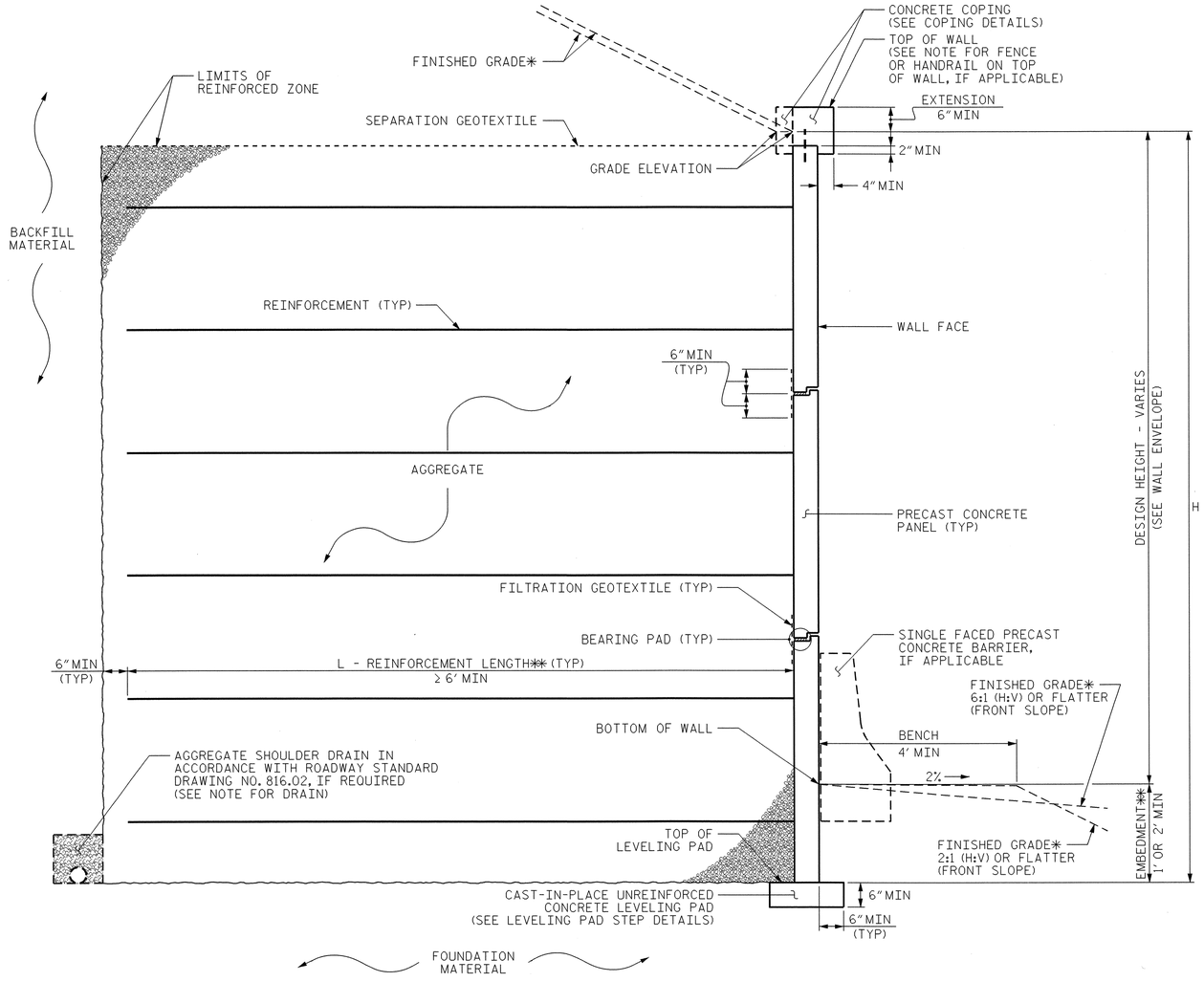
PROJECT NO.: U-2412B/U2524AE
GUILFORD ***COUNTY***
STATION: 415+98.80 -L- / 417+94.14 -L-
SHEET 3 OF 4

GEOTECHNICAL ENGINEERING UNIT
[X] ***EASTERN REGIONAL OFFICE***
[ ] ***WESTERN REGIONAL OFFICE***
[ ] ***CONTRACT OFFICE***
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

MSE RETAINING WALLS NO. 1 AND 2 AT END BENTS FOR DUAL BRIDGES ON SR 4121 OVER GREENSBORO WESTERN LOOP

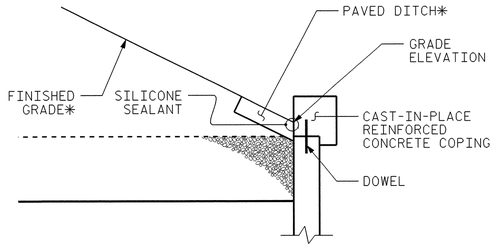
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-3
1	_	_	3	_	_	TOTAL SHEETS
2	_	_	4	_	_	4

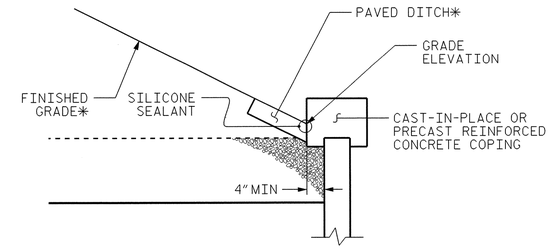
GEJ248333 5/22/2012 U2412B_U2524AE_GEO_RWALL_PLANS mkhazaei RD-Oce860-34



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.
**SEE MSE RETAINING WALLS PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036278 ENGINEER MAJID KHAZAEI

5-24-12

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

PREPARED BY: MK DATE: 3/7/2012

REVIEWED BY: JRB DATE: 3/9/2012

PROJECT NO.: U-2412B/U2524AE

GUILFORD ***COUNTY***

STATION: 415+98.80 -L- / 417+94.14 -L-

SHEET 4 OF 4

GEOTECHNICAL ENGINEERING UNIT

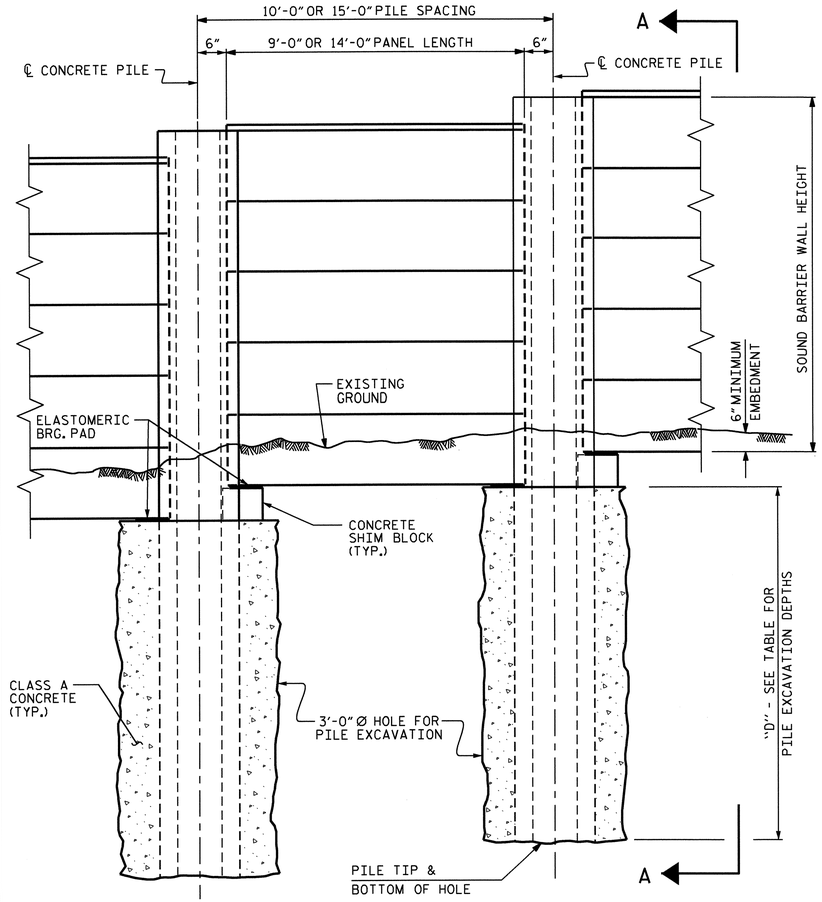
[X] ***EASTERN REGIONAL OFFICE***
[ ] ***WESTERN REGIONAL OFFICE***
[ ] ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

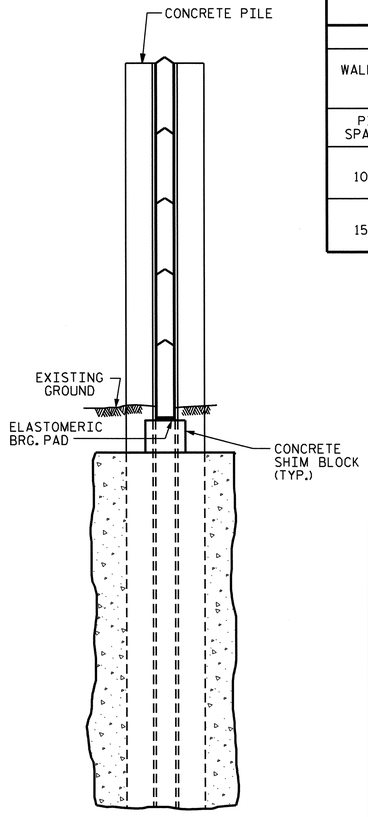
MSE RETAINING WALLS
NO. 1 AND 2 AT END BENTS FOR
DUAL BRIDGES ON SR 4121 OVER
GREENSBORO WESTERN LOOP

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

GEJ248333 5/22/2012 U2412B_U2524AE_GEO_RWALL_PLANS mkhazaei RD-Oce860-34



ELEVATION



SECTION A-A

3'-0" Ø PILE EXCAVATION

	WALL STATIONS		
WALL NW3	FROM: 10+00.00 -NW3- TO: 17+69.00 -NW3-	FROM: 17+69.00 -NW3- TO: 25+32.00 -NW3-	FROM: 25+32.00 -NW3- TO: 26+20.00 -NW3-
PILE SPACING	DEPTH "D"	DEPTH "D"	DEPTH "D"
10'-0"	13	19	8
15'-0"	15	21	9

NOTES

FOR SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.

CONSTRUCT SOUND BARRIER WALL TO LINES AND GRADES SHOWN ON THE ROADWAY PLANS.

PROVIDE PANELS WITH A FLAT BOTTOM.

VERIFY THE LOCATION OF UNDERGROUND UTILITIES BEFORE DRILLING HOLES TO ENSURE SUFFICIENT CLEARANCE IS AVAILABLE.

ADJUST PILE EXCAVATION ELEVATIONS TO MAINTAIN 6" MINIMUM EMBEDMENT OF THE BOTTOM PANEL.

USE CLASS AA FOR PANELS AND CLASS A CONCRETE PILE EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-4 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE EITHER 10 FOOT OR 15 FOOT PILE SPACINGS.

FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.

PLACE 1" Ø BACKER RODS FULL HEIGHT ON EACH SIDE OF THE PRECAST PANELS. SET AND SEAL THE BACKER ROD IN PLACE WITH SEALANT THAT CONFORMS WITH ARTICLE 1028-3 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

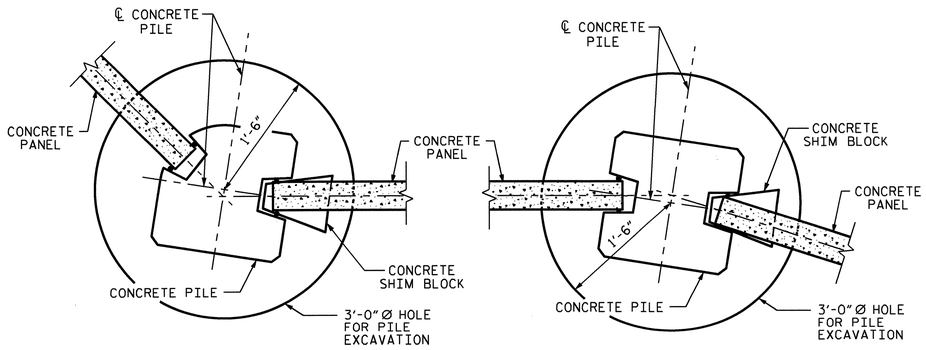
FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

EXPOSURE CATEGORY B - PILE REINFORCING STEEL

DESIGN WIND PRESSURE =
20 PSF (0' < H ≤ 14'); 25 PSF (14' < H ≤ 25')

PILE TYPE I				PILE TYPE III			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	H ≤ 25'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	10'-0"	H ≤ 25'	3 - #7 SHORT FACE 4 - #7 LONG FACE	#3 @ 1'-4" CTS.
15'-0"	H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4" CTS.	15'-0"	H ≤ 25'	3 - #8 SHORT FACE 4 - #8 LONG FACE	#3 @ 1'-4" CTS.

PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	H ≤ 25'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	10'-0"	H ≤ 25'	3 - #7 SHORT FACE 4 - #7 LONG FACE	#3 @ 1'-4" CTS.
15'-0"	H ≤ 25'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	15'-0"	H ≤ 25'	3 - #8 SHORT FACE 4 - #8 LONG FACE	#3 @ 1'-4" CTS.



15° TO 45° TURNS
(PILE TYPE III)

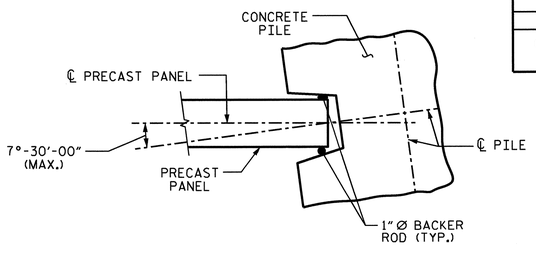
0° TO 15° TURNS
(PILE TYPE I)

TYPICAL WALL TURN DETAILS

BILL OF MATERIAL

SOUND BARRIER WALL	S.F. 26,595.0

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.



PILE ROTATION LIMIT FOR WALL TURN

(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMODATE WALL TURN.)

PROJECT NO. U-2412B
GUILFORD COUNTY
STATION: 368+68.70 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL

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

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
7/3/12

ASSEMBLED BY :	A.C. OUTLAW	DATE :	5/16/12
CHECKED BY :	D.R. CALHOUN	DATE :	7/2/12
DRAWN BY :	MAA 6/11	ADDED	10/1/11
CHECKED BY :	GM 6/11		

03-JUL-2012 11:18
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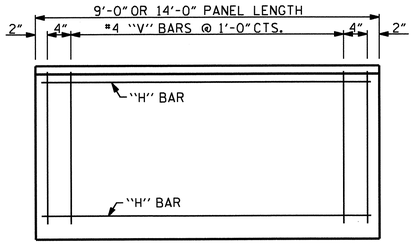
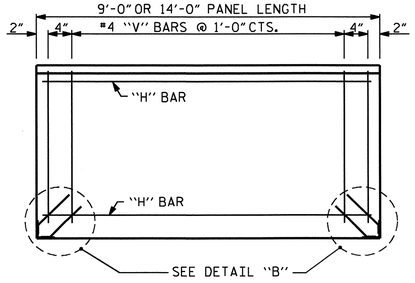
STD. NO. SBW1



FRONT ELEVATION
OF UPPER PRECAST PANELS



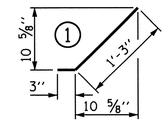
FRONT ELEVATION
OF BOTTOM PRECAST PANEL

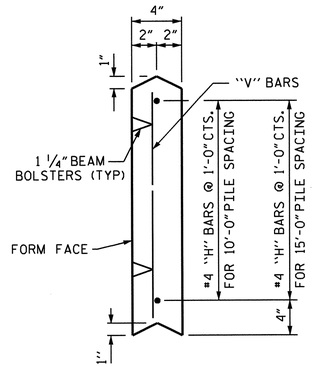
QUANTITIES FOR ONE PRECAST PANEL (FOR 10'-0" PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
2'-0"	0.22	3	H1	#4	STR	8'-8"	17	11	V1	#4	STR	1'-8"	12
3'-0"	0.33	4	H2	#4	STR	8'-8"	23	11	V2	#4	STR	2'-8"	20
4'-0"	0.44	5	H3	#4	STR	8'-8"	29	11	V3	#4	STR	3'-8"	27

QUANTITIES FOR ONE PRECAST PANEL (FOR 15'-0" PILE SPACING)													
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3'-0"	0.52	4	H1	#4	STR	13'-8"	37	16	V1	#4	STR	2'-8"	29
4'-0"	0.69	5	H2	#4	STR	13'-8"	46	16	V2	#4	STR	3'-8"	39
5'-0"	0.86	6	H3	#4	STR	13'-8"	57	16	V3	#4	STR	4'-8"	50
6'-0"	1.04	7	H4	#4	STR	13'-8"	67	16	V4	#4	STR	5'-8"	61

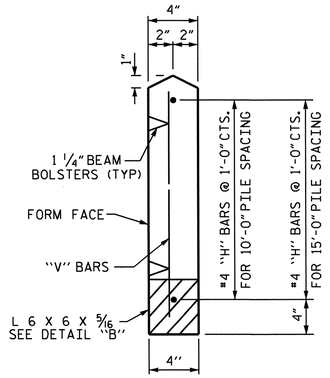
ADDITIONAL BARS FOR ONE BOTTOM PANEL					
NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
4	S1	#5	1	1'-6"	6

BAR TYPE

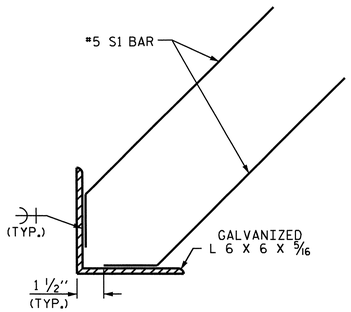




UPPER PANEL

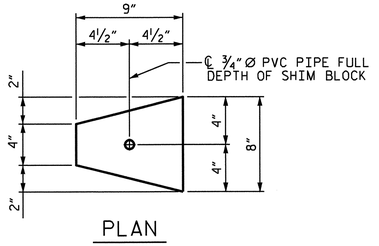


BOTTOM PANEL

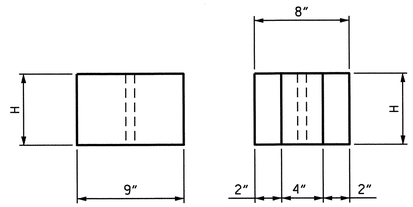


DETAIL "B"

SECTION THROUGH PRECAST PANELS



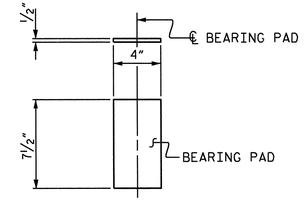
PLAN



ELEVATION END

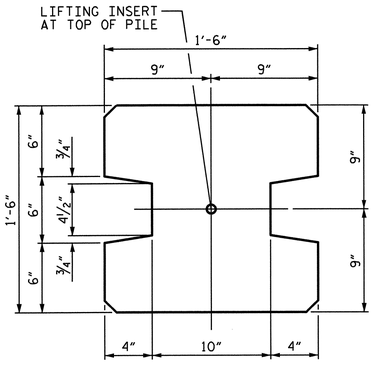
CONCRETE SHIM BLOCK

H = 3", 6" or 1'-0"

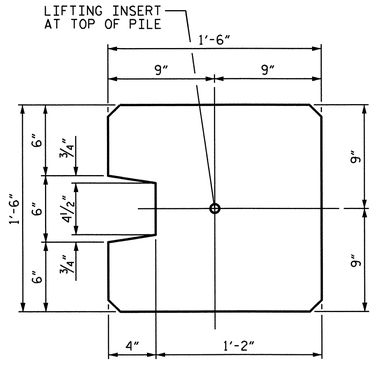


ELASTOMERIC
BEARING DETAILS

ELASTOMER IN BEARINGS SHALL
BE 50 DUROMETER HARDNESS.



TYPE - I
(AREA = 1.9444 SQ. FT.)



TYPE - II
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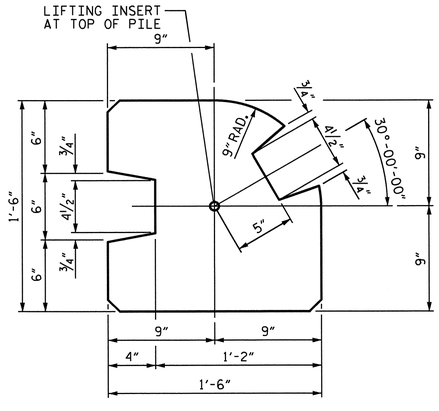
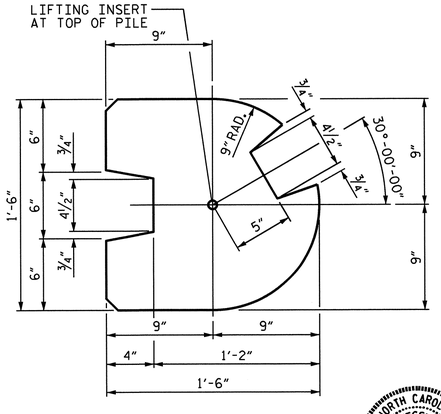


TYPE - III
(AREA = 1.8336 SQ. FT.)



TYPE - III (ALT.)
(AREA = 1.7163 SQ. FT.)

PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1")

PROJECT NO. U-2412B
GUILFORD COUNTY
STATION: 368+68.70 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SOUND BARRIER WALL
DETAILS

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

STD. NO. SBW2

ASSEMBLED BY :	A.C. OUTLAW	DATE :	5/16/12
CHECKED BY :	D.R. CALHOUN	DATE :	7/2/12
DRAWN BY :	MAA 6/11	ADDED	8/31/11
CHECKED BY :	GM 6/11		

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DAVID R. CALHOUN
7/3/12

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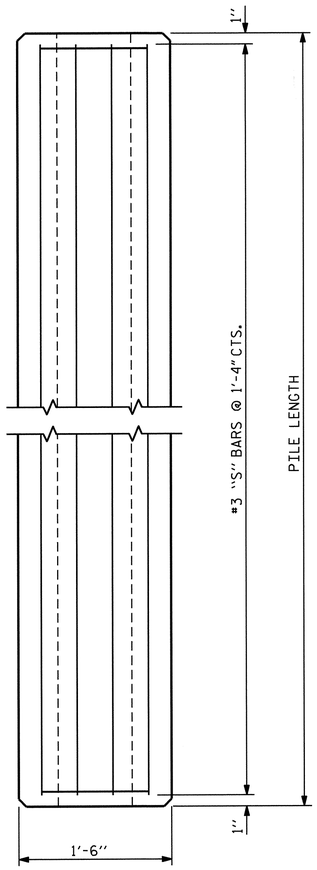
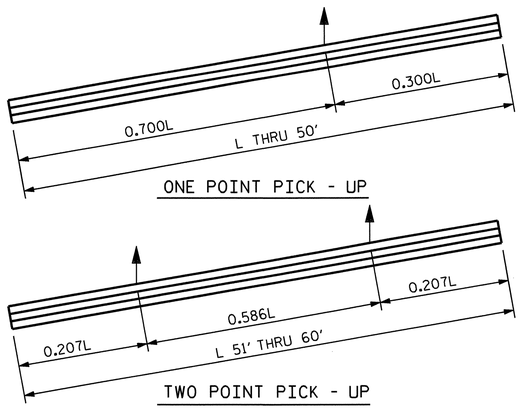


ELEVATION



PICK - UP POINTS

NOTES

CONCRETE DESIGN DATA : f'c = 5,000 PSI

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

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

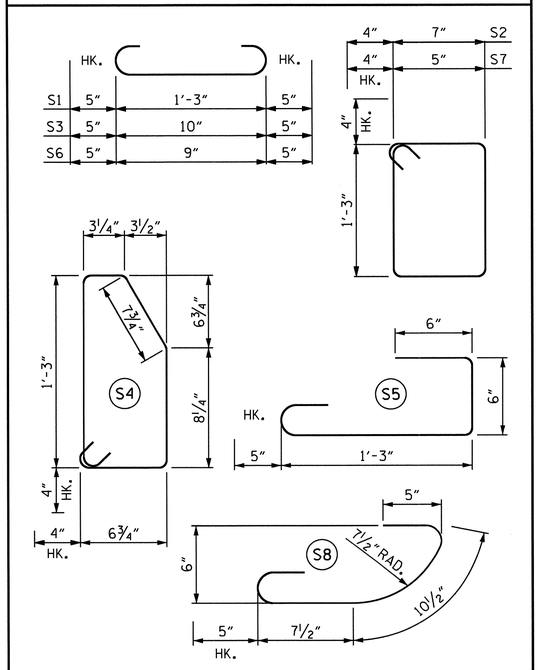
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

ALL CORNERS TO BE CHAMFERED 1".

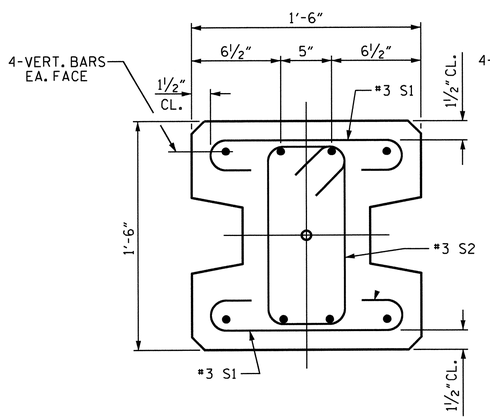
QUANTITIES FOR ONE PRECAST CONCRETE PILE

LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINT	
		0.300L	0.700L	0.207L	0.586L
10'-0"	1.56	3'-0"	7'-0"		
15'-0"	2.35	4'-6"	10'-6"		
20'-0"	3.14	6'-0"	14'-0"		
25'-0"	3.93	7'-6"	17'-6"		
30'-0"	4.70	9'-0"	21'-0"		
35'-0"	5.49	10'-6"	24'-6"		
40'-0"	6.28	12'-0"	28'-0"		
45'-0"	7.05	13'-6"	31'-6"		
50'-0"	7.84	15'-0"	35'-0"		
55'-0"	8.63			11'-4½"	32'-3"
60'-0"	9.42			12'-5"	35'-2"

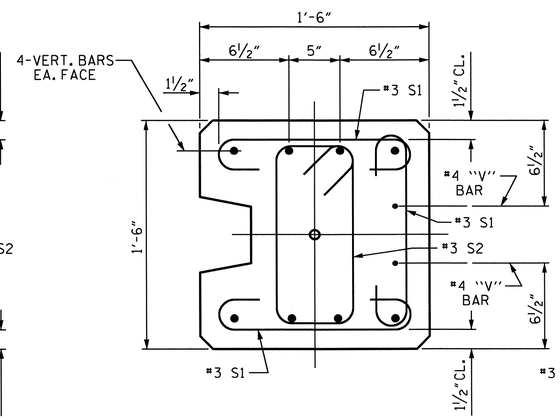
BAR TYPES



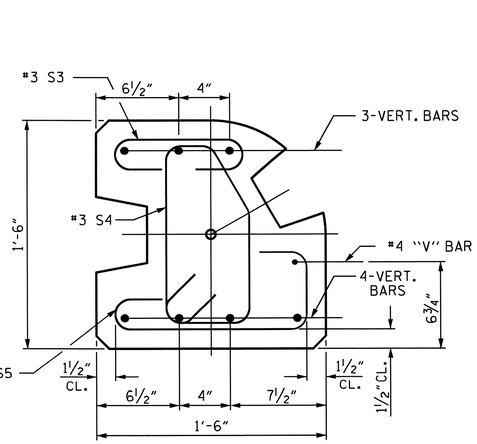
ALL BAR DIMENSIONS ARE OUT TO OUT.



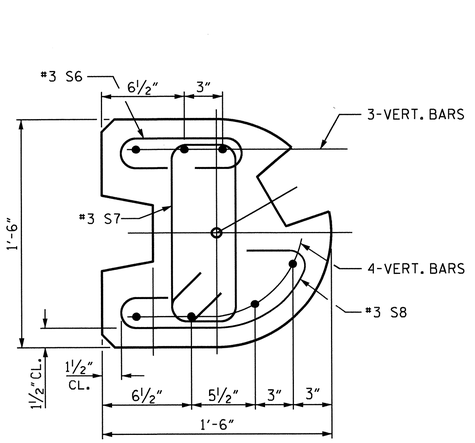
TYPE - I



TYPE - II



TYPE - III



TYPE - III (ALT.)

PILE DETAIL

SEE EXPOSURE CATEGORY CHART FOR VERT. BAR PILE REINFORCING (SHEET 1 OF 3)

ASSEMBLED BY : A.C. OUTLAW	DATE : 5/16/12		
CHECKED BY : D.R. CALHOUN	DATE : 7/2/12		
DRAWN BY : MAA 6/11	ADDED 8/31/11		
CHECKED BY : GM 6/11			

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PROJECT NO. U-2412B

GUILFORD COUNTY

STATION: 368+68.70 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL DETAILS

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

STD. NO. SBW3

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 (r) RGW REV. 5-7-03 RWW (r) JTE
REV. 8-16-99 RWW (r) LES REV. 5-1-06 TLA (r) GM

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