This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

TIP PROJECT: B-4766

CONTRACT: C203809

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

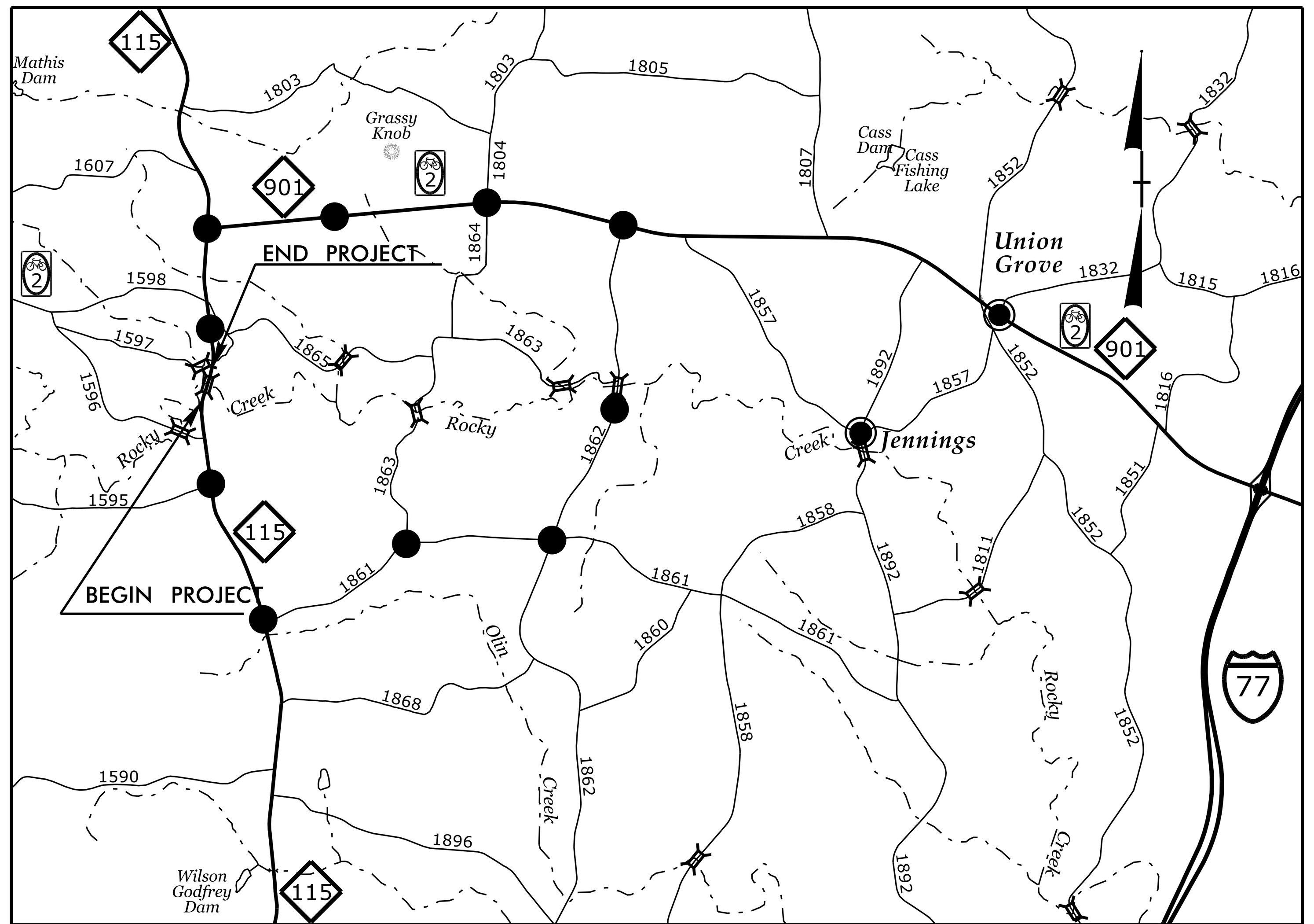
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4766		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38538.1.2		PE
38538.2.1		R/W, UTIL
38538.3.1		CONSTR.

IREDELL COUNTY

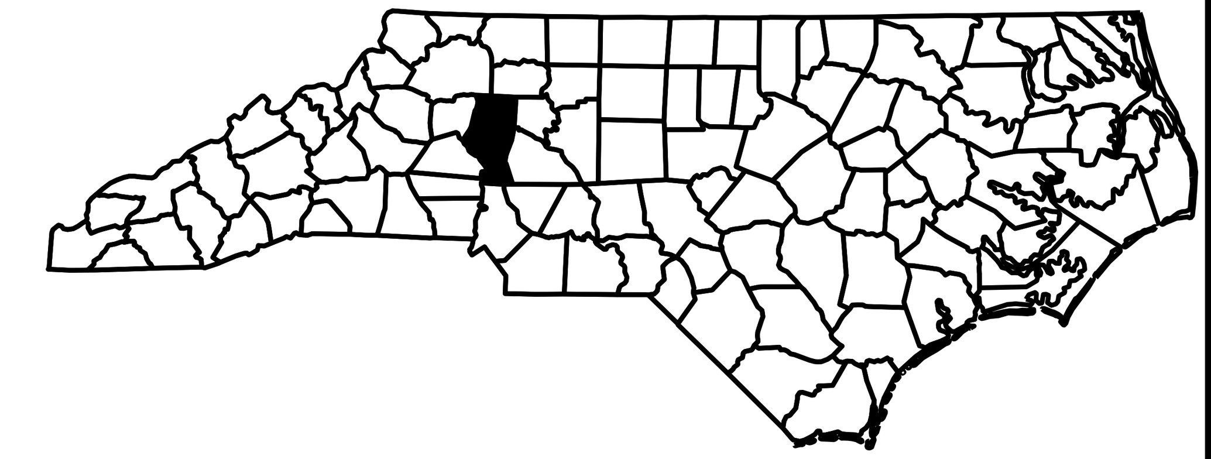
LOCATION: BRIDGE No. 69 OVER ROCKY CREEK ON NC 115

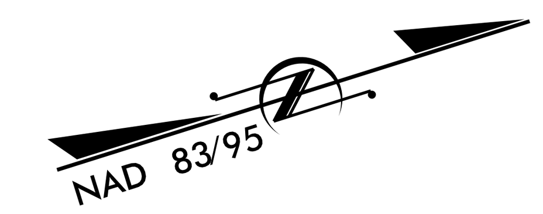
TYPE OF WORK: DRAINAGE, GRADING, PAVING, STRUCTURE & WALL

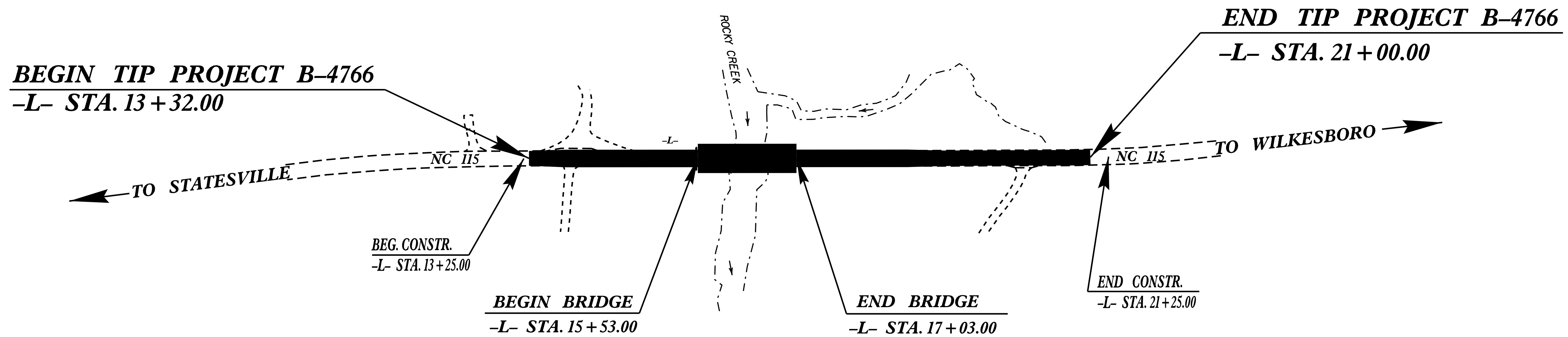


VICINITY MAP

●—●—● ***OFF-SITE DETOUR***







STRUCTURES

DESIGN DATA

ADT 2012 = 2,100
ADT 2040 = 3,600
DHV = 10 %
D = 55 %
T = 13 % *
V = 60 MPH
* TTST = 5% DUAL 8%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-4766 = 0.117 MI

LENGTH STRUCTURE T.I.P. PROJECT B-4766 = 0.028 MI

TOTAL LENGTH OF T.I.P. PROJECT B-4766 = 0.145 MI

Prepared in the Office of:

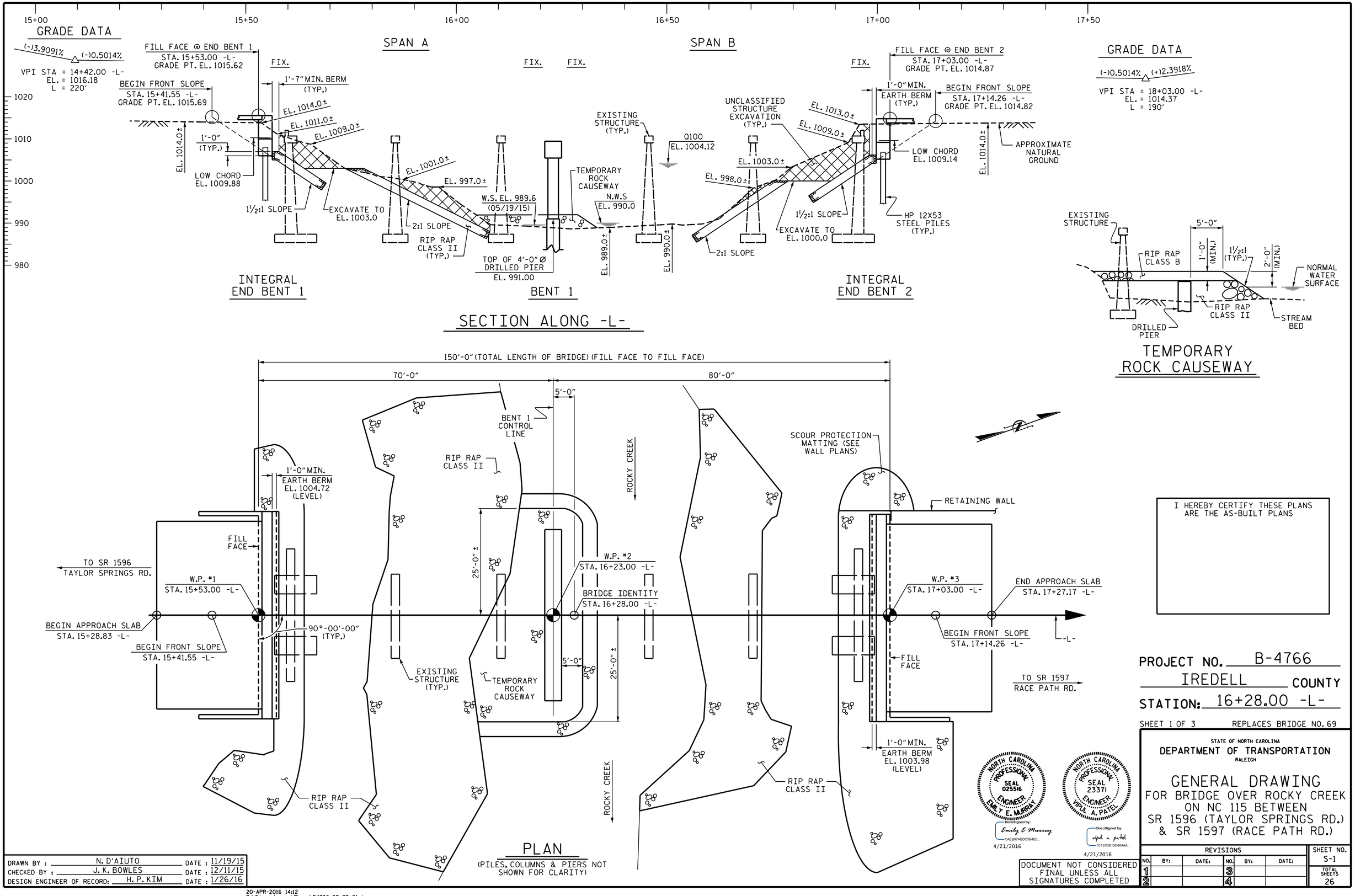
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE : JUNE 21, 2016

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

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



SECTION ALONG -L-

TEMPORARY ROCK CAUSEWAY

PLAN

(PILES, COLUMNS & PIERS NOT SHOWN FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 69

DRAWN BY : N. D'AIUTO DATE : 11/19/15
CHECKED BY : J. K. BOWLES DATE : 12/11/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 14:12
R:\Structures\Plans\B4766_SD_GD_01.dgn
vpatel

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
DocuSigned by: Emily E Murray CAEB97AEDC5B4E0...
4/21/2016

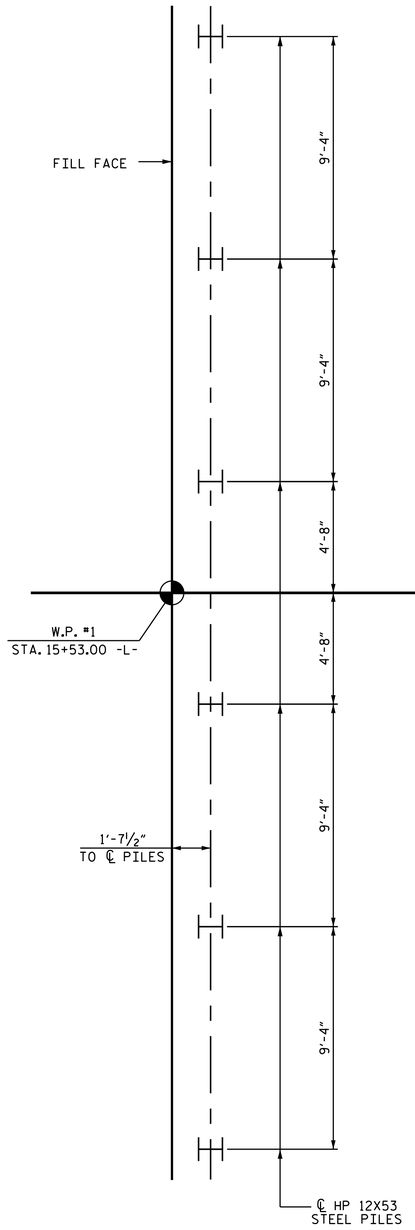
NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
4/21/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

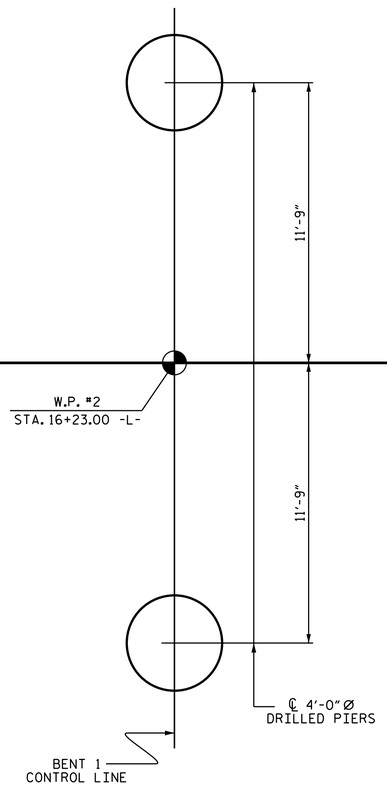
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER ROCKY CREEK ON NC 115 BETWEEN SR 1596 (TAYLOR SPRINGS RD.) & SR 1597 (RACE PATH RD.)

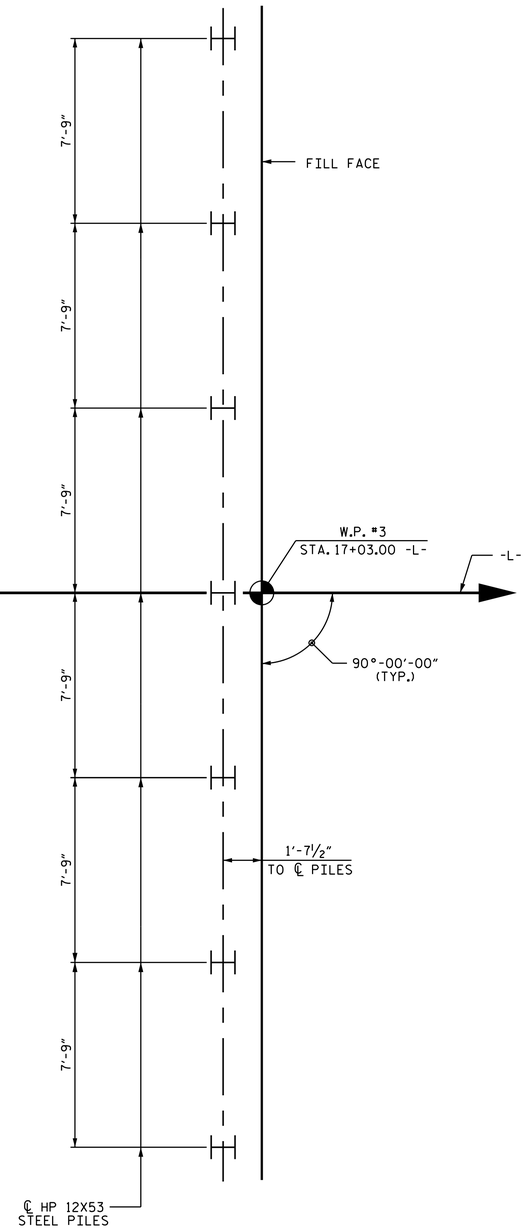
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			26



INTEGRAL
END BENT 1



BENT 1



INTEGRAL
END BENT 2

FOUNDATION LAYOUT

FOUNDATION NOTES

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

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 192 TONS PER PILE.

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

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 640 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30.0 TSF.

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 983.0 (LT) AND 978.0 (RT) WITHOUT PRIOR APPROVAL FROM THE ENGINEER. THE ENGINEER WILL DETERMINE THE NEED FOR PERMANENT CASINGS.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 964.0 (LT) AND 959.0 (RT) WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 12 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS 982.0 (LT) AND 976.0 (RT). THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

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

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

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

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

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.

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER ROCKY CREEK
ON NC 115 BETWEEN
SR 1596 (TAYLOR SPRINGS RD.)
& SR 1597 (RACE PATH RD.)

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C15TDE15D464AA...

4/21/2016

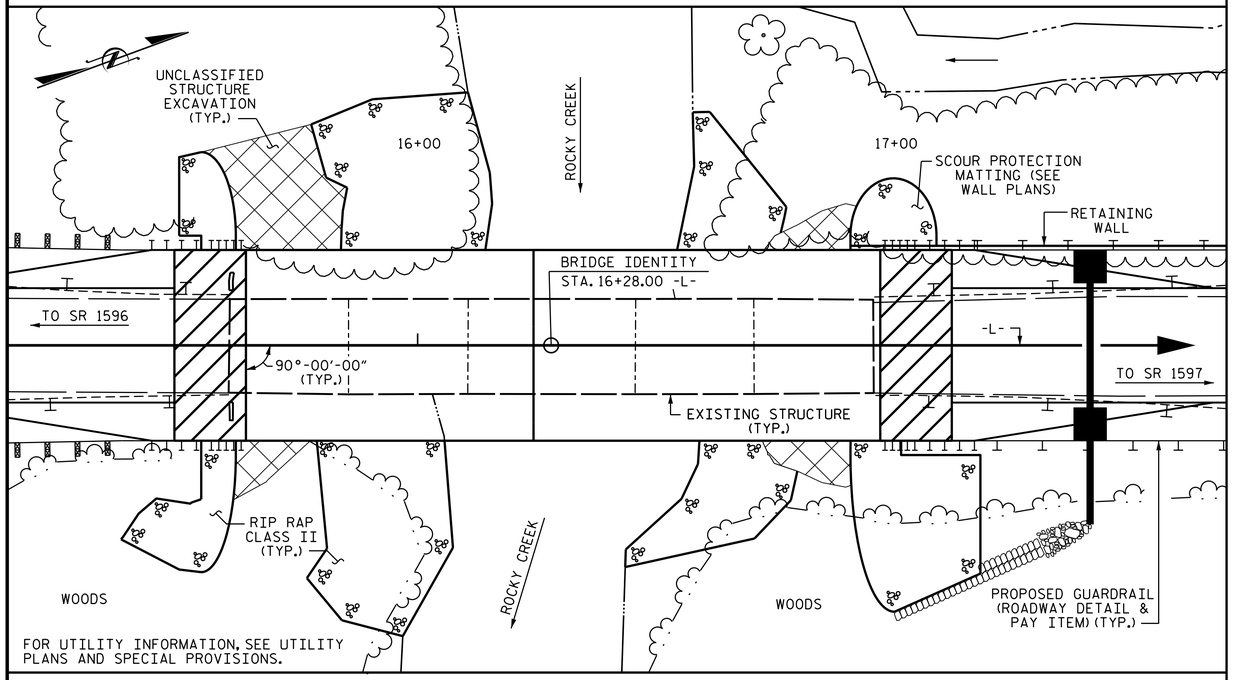
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY : N. D'AIUTO DATE : 9/29/15
CHECKED BY : J. K. BOWLES DATE : 12/11/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B4766_SD_GD_01.dgn
vpatel

BM #2: R.R. SPIKE SET IN ROOT OF 28" X 48" TRI-FORKED BEECH TREE;
143' RIGHT OF STA. 14+77.00 -L-, EL. 1,008.63



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE, SEE SPECIAL PROVISIONS.

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

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

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 16+28.00 -L-.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+28.00 -L-."

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 SUSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 45 FT. LT. & 30 FT. RT. OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF 5 SPANS (1 @ 24'-7", 1 @ 25'-0", 1 @ 35'-0", 1 @ 25'-0", 1 @ 24'-7") ON REINFORCED CONCRETE DECK ON I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 20'-0" ON REINFORCED CONCRETE END BENTS ON SPREAD FOOTINGS AND REINFORCED CONCRETE POST AND BEAM BENTS LOCATED AT THE PROPOSED SITE SHALL BE REMOVED. THE EXISITNG BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT.

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	4'-0" Ø DRILLED PIERS IN SOIL	4'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	PDA TESTING	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM
SUPERSTRUCTURE											6,488	7,264		LUMP SUM
END BENT 1													35.0	
BENT 1			26.0	33.0	21.0		1	1	1				38.4	
END BENT 2													30.9	
TOTAL	LUMP SUM	LUMP SUM	26.0	33.0	21.0	1	1	1	1	LUMP SUM	6,488	7,264	104.3	LUMP SUM

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		HP 12x53 STEEL PILES		CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LBS.	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			10	736.67			296.70			LUMP SUM	
END BENT 1	4,322				6	180		465	510		
BENT 1	11,703	2,217									
END BENT 2	3,661				7	200		390	430		
TOTAL	19,686	2,217	10	736.67	13	380	296.70	855	940	LUMP SUM	LUMP SUM

HYDRAULIC DATA

DESIGN DISCHARGE	= 5,360 C.F.S.
FREQUENCY OF DESIGN DISCHARGE	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 1,002.8
DRAINAGE AREA	= 30.8 SQ. MI.
BASE DISCHARGE (Q100)	= 6,409 C.F.S.
BASE HIGH WATER ELEVATION	= 1,004.12

OVERTOPPING DATA

OVERTOPPING DISCHARGE	= 18,000 C.F.S.
FREQUENCY OF OVERTOPPING	= 500+ YRS.
OVERTOPPING ELEVATION	= 1,014.4

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

4/21/2016

DRAWN BY : N. D'AIUTO DATE : 11/19/15

CHECKED BY : J. K. BOWLES DATE : 12/11/15

DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B4766_SD_GD_01.dgn
vpatel

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER ROCKY CREEK
ON NC 115 BETWEEN
SR 1596 (TAYLOR SPRINGS RD.)
& SR 1597 (RACE PATH RD.)

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

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	**1.07**	--	1.75	0.79	1.19	A	I	33.625	0.88	1.19	A	I	47.075	0.80	0.88	**1.07**	A	I	**33.625**	
		HL-93(Opr)	N/A	--	1.54	--	1.35	0.79	1.54	A	I	33.625	0.88	1.55	A	I	47.075	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	**1.38**	49.612	1.75	0.79	1.53	A	I	33.625	0.88	1.43	A	I	47.075	0.80	0.79	**1.38**	A	I	**33.625**	
		HS-20(Opr)	36.000	--	1.85	66.609	1.35	0.79	1.99	A	I	33.625	0.88	1.85	A	I	47.075	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.06	41.323	1.40	0.79	4.26	A	I	33.625	0.88	4.04	A	I	47.075	0.80	0.79	3.06	A	I	33.625	
		SNGARBS2	20.000	--	2.30	46.044	1.40	0.79	3.20	A	I	33.625	0.88	2.93	A	I	20.175	0.80	0.79	2.30	A	I	33.625	
		SNAGRIS2	22.000	--	2.19	48.163	1.40	0.79	3.04	A	I	33.625	0.88	2.75	A	I	47.075	0.80	0.79	2.19	A	I	33.625	
		SNCOTTS3	27.250	--	1.52	41.524	1.40	0.79	2.12	A	I	33.625	0.88	2.02	A	I	20.175	0.80	0.79	1.52	A	I	33.625	
		SNAGGRS4	34.925	--	1.28	44.756	1.40	0.79	1.78	A	I	33.625	0.88	1.72	A	I	47.075	0.80	0.79	1.28	A	I	33.625	
		SNS5A	35.550	--	1.25	44.531	1.40	0.79	1.74	A	I	33.625	0.88	1.77	A	I	47.075	0.80	0.79	1.25	A	I	33.625	
		SNS6A	39.950	--	1.15	46.050	1.40	0.79	1.60	A	I	33.625	0.88	1.63	A	I	47.075	0.80	0.79	1.15	A	I	33.625	
		SNS7B	42.000	--	1.10	46.109	1.40	0.79	1.53	A	I	33.625	0.88	1.63	A	I	47.075	0.80	0.79	1.10	A	I	33.625	
	TTST	TNAGRIT3	33.000	--	1.41	46.419	1.40	0.79	1.96	A	I	33.625	0.88	1.93	A	I	47.075	0.80	0.79	1.41	A	I	33.625	
		TNT4A	33.075	--	1.41	46.761	1.40	0.79	1.97	A	I	33.625	0.88	1.86	A	I	47.075	0.80	0.79	1.41	A	I	33.625	
		TNT6A	41.600	--	1.16	48.224	1.40	0.79	1.61	A	I	33.625	0.88	1.79	A	I	20.175	0.80	0.79	1.16	A	I	33.625	
		TNT7A	42.000	--	1.17	49.004	1.40	0.79	1.62	A	I	33.625	0.88	1.72	A	I	47.075	0.80	0.79	1.17	A	I	33.625	
		TNT7B	42.000	--	1.21	50.879	1.40	0.79	1.68	A	I	33.625	0.88	1.57	A	I	47.075	0.80	0.79	1.21	A	I	33.625	
		TNAGRIT4	43.000	--	1.15	49.415	1.40	0.79	1.60	A	I	33.625	0.88	1.52	A	I	47.075	0.80	0.79	1.15	A	I	33.625	
		TNAGT5A	45.000	--	1.08	48.691	1.40	0.79	1.50	A	I	33.625	0.88	1.54	A	I	47.075	0.80	0.79	1.08	A	I	33.625	
		TNAGT5B	45.000	3	**1.07**	48.043	1.40	0.79	1.48	A	I	33.625	0.88	1.44	A	I	47.075	0.80	0.79	**1.07**	A	I	**33.625**	

LOAD FACTORS:

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

NOTES:

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

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

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

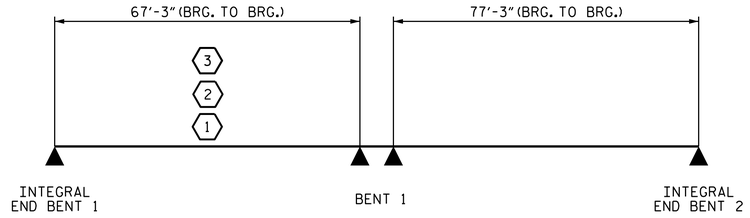
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

DocuSigned by: Hyen kim 07A78571E44145F...

4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

SHEET NO. S-4

TOTAL SHEETS 26

STD. NO. LRFR1

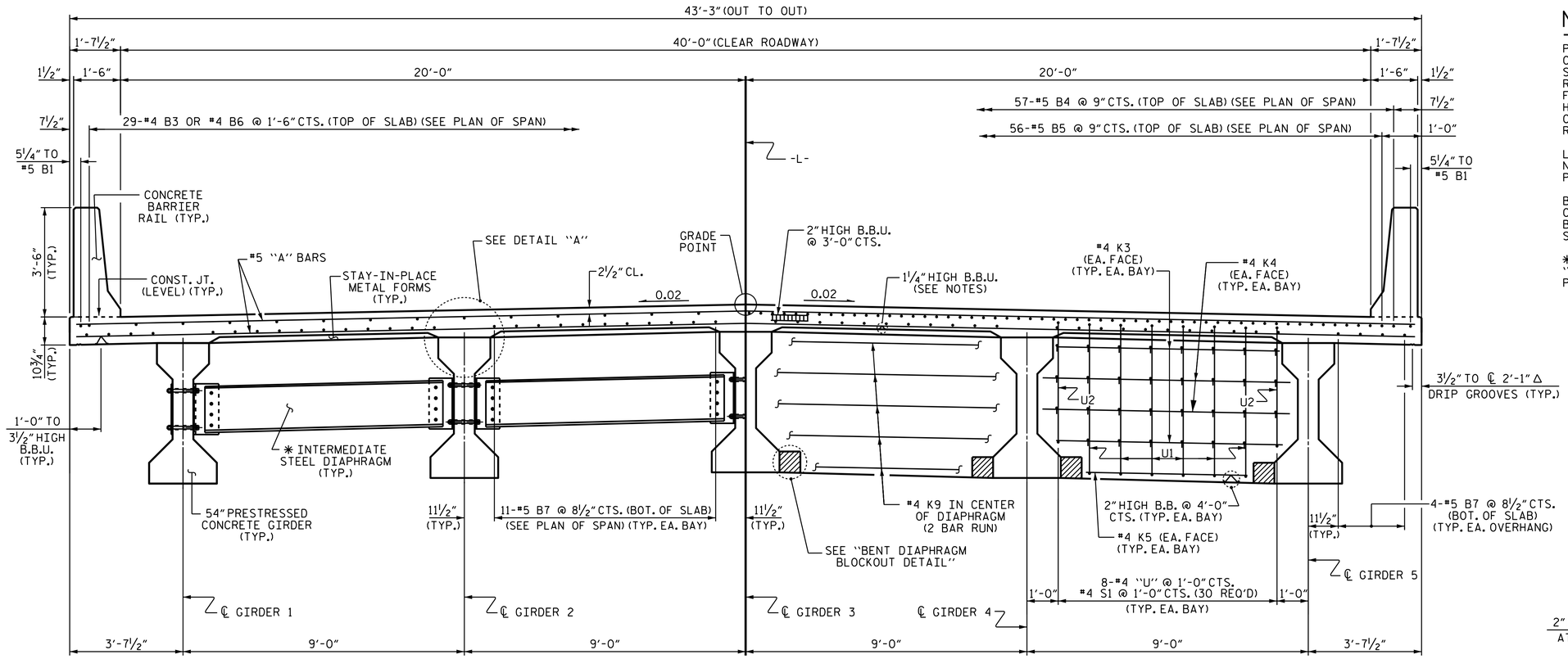
ASSEMBLED BY : H. P. KIM DATE : 8/5/2015
CHECKED BY : H. A. LOCKLEAR DATE : 8/5/2015

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

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

DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B-4766_SD_LR_01.dgn
vpatel



TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)

TYPICAL SECTION
(SHOWING BENT DIAPHRAGMS)

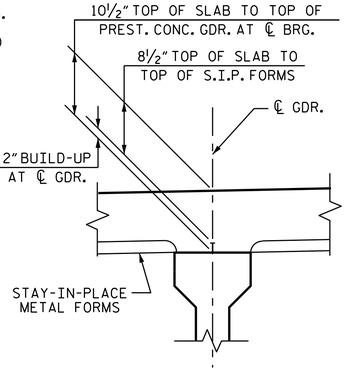
NOTES

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

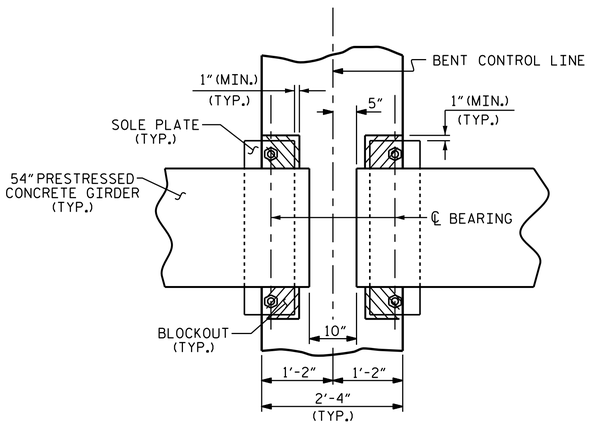
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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

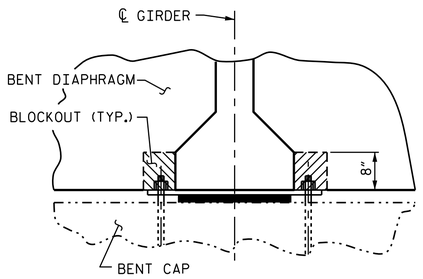
✱ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL "A"

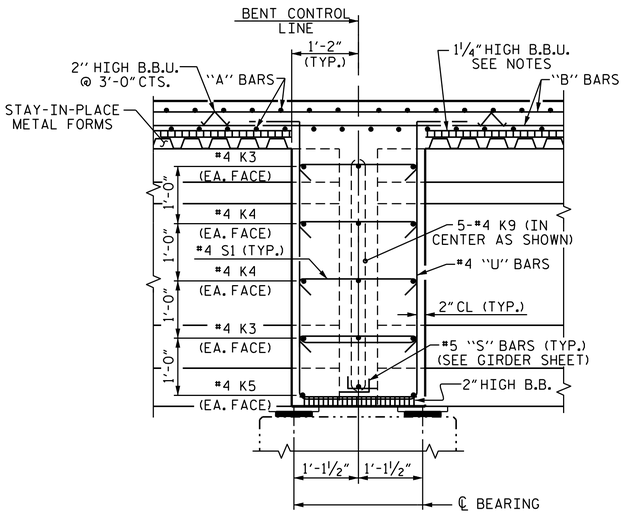


PLAN



SECTION

BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION THROUGH BENT DIAPHRAGM

PROJECT NO. B-4766
IREDELL COUNTY
STATION: 16+28.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

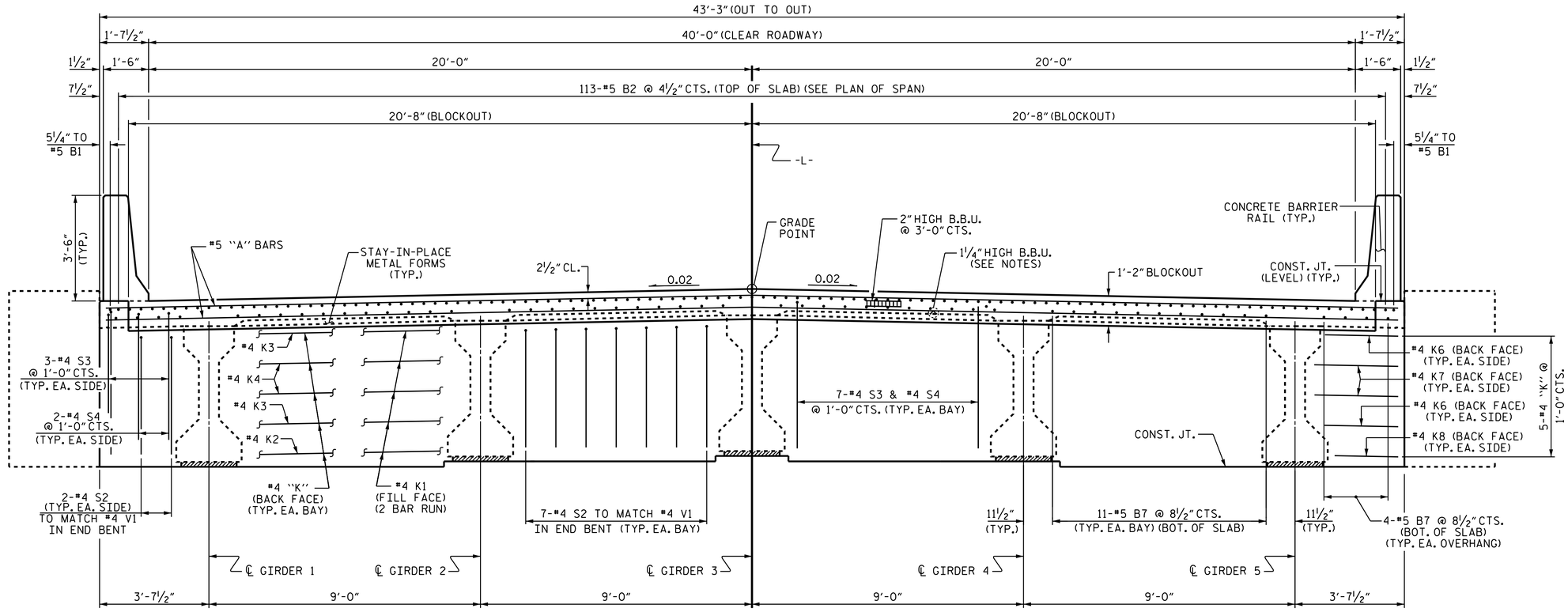
NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM
DocuSigned by: Hyer Kim 07A78571E44145F...
4/22/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			26

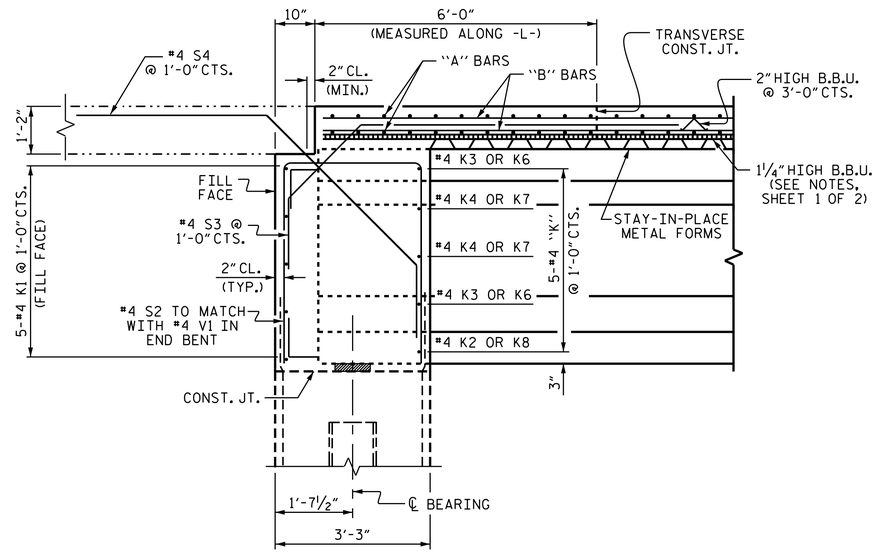
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : J. K. BOWLES DATE : 8/24/15
CHECKED BY : N. D'AIUTO DATE : 9/14/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B4766_SD_TS_01.dgn
vpatel



TYPICAL SECTION @ INTEGRAL END BENT



SECTION THROUGH INTEGRAL END BENT

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim 07A78571E44145F...

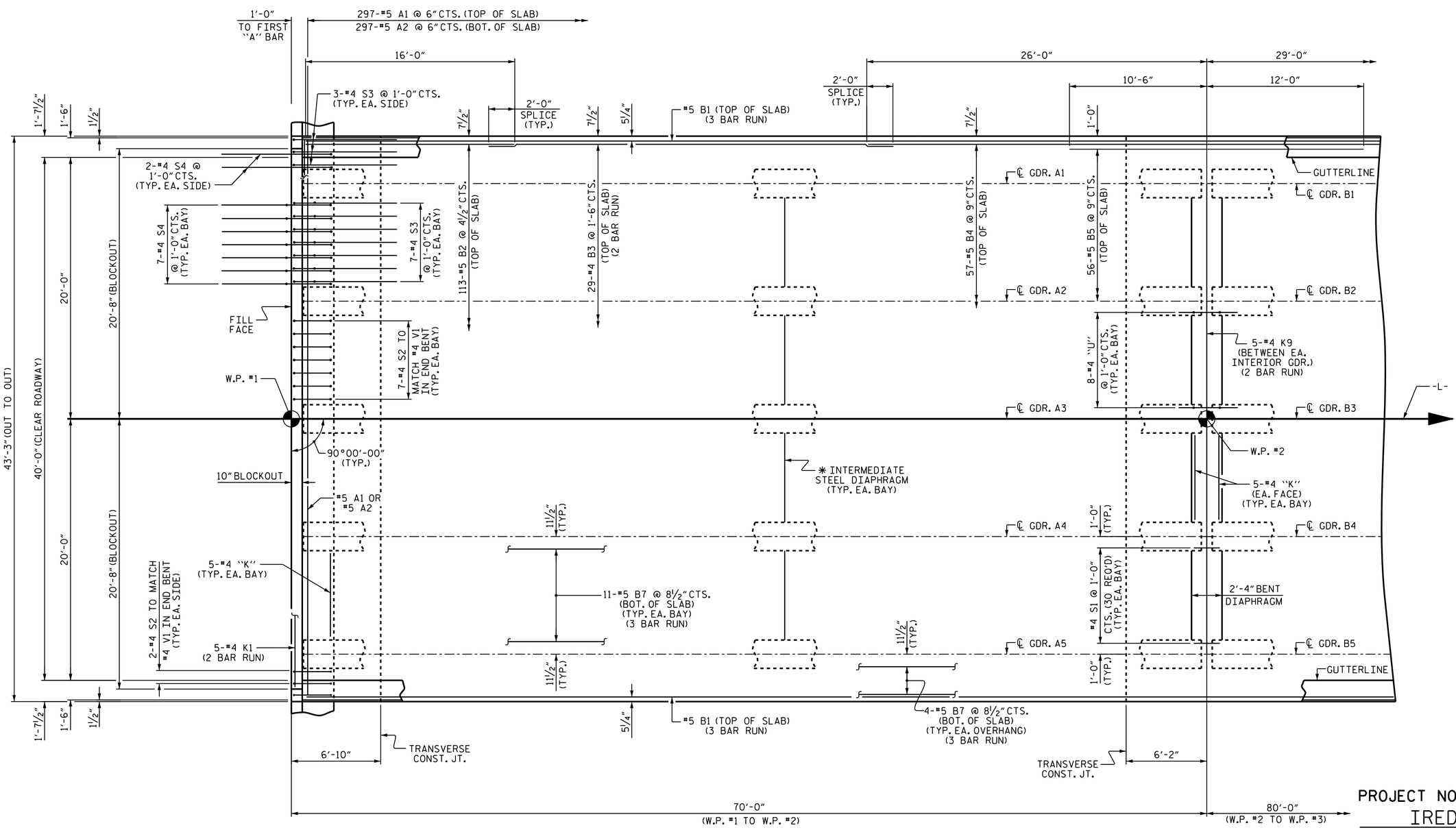
4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			26

DRAWN BY : J. K. BOWLES DATE : 8/24/15
CHECKED BY : N. D'AIUTO DATE : 9/14/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B4766_SD_TS_01.dgn
vpatel



PLAN OF SPAN A

* FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00-L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

DocuSigned by: Hyen Kim 07A78571E44145F...

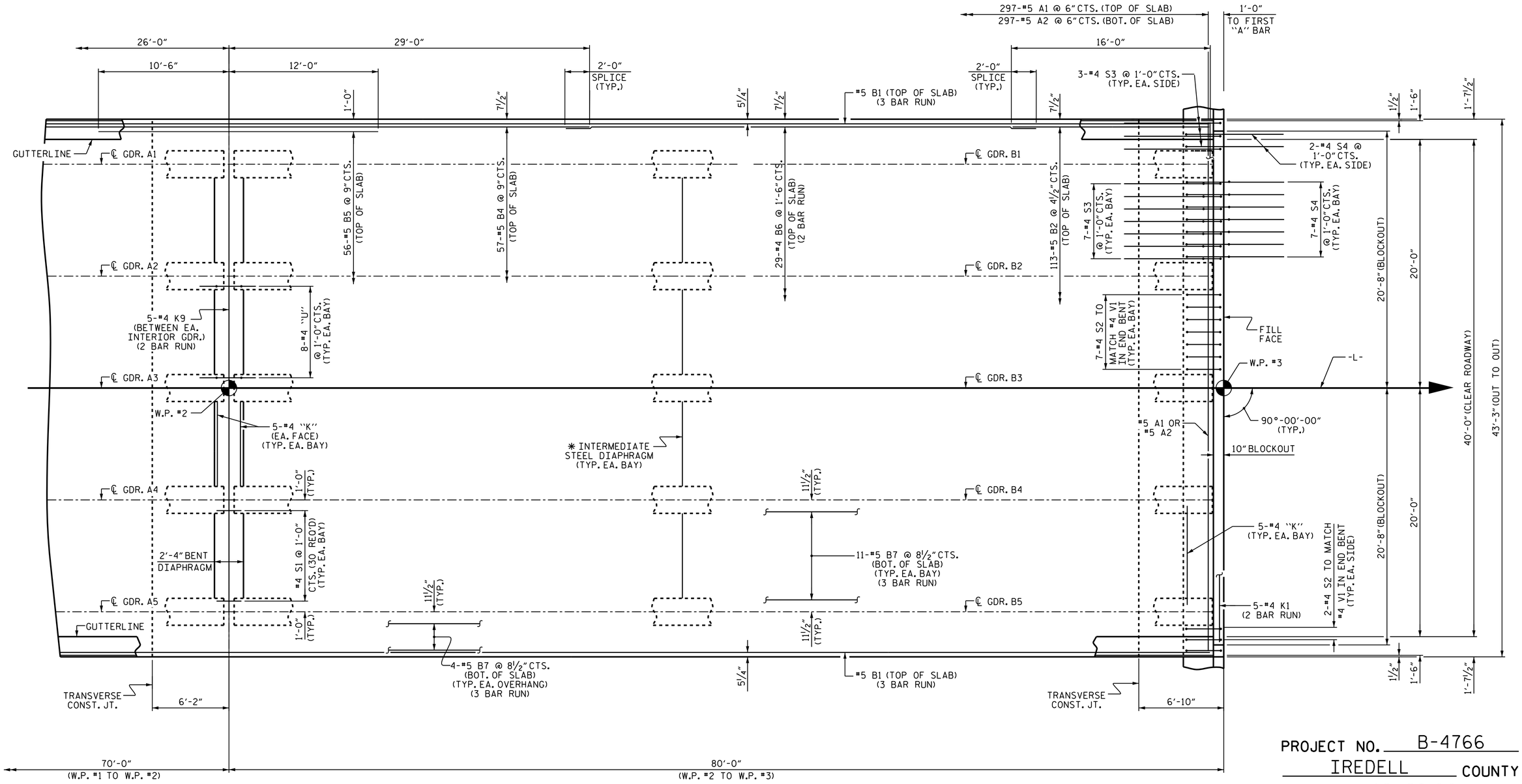
4/22/2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			26

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : J. K. BOWLES DATE : 8/24/15
CHECKED BY : N. D'AIUTO DATE : 9/14/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B-4766_SD_S*_01.dgn
vpatel



PLAN OF SPAN B

*FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

Docusigned by: Hyen Kim 07A78571E44145F...

4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

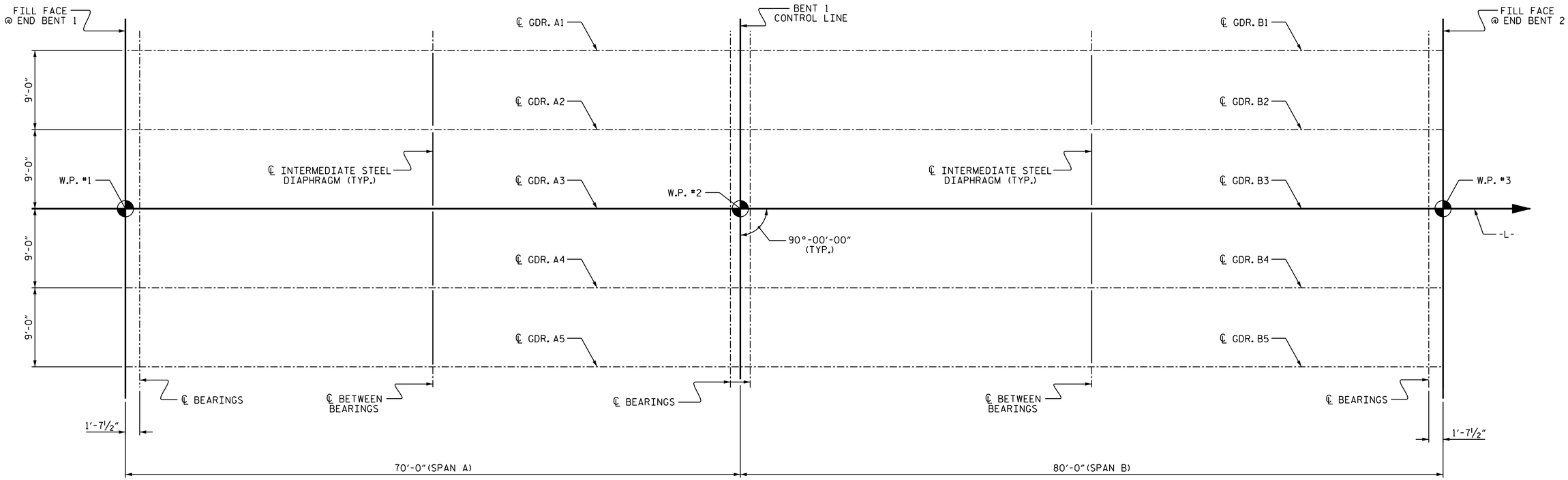
SUPERSTRUCTURE

PLAN OF SPAN B

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-8
1			3				TOTAL SHEETS
2			4				26

DRAWN BY : J. K. BOWLES DATE : 8/24/15
CHECKED BY : N. D'AIUTO DATE : 9/14/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:27
R:\Structures\Plans\B-4766_SD_S*_01.dgn
vpatel



GIRDER LAYOUT

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim 07A78571E44145F...

4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

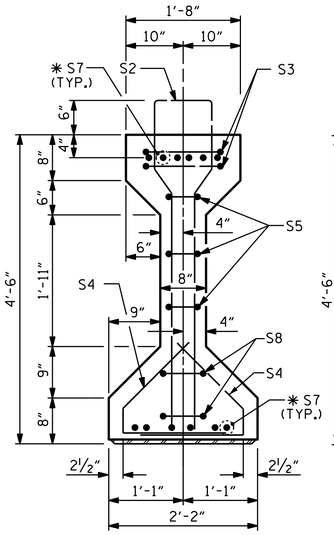
SUPERSTRUCTURE

GIRDER LAYOUT

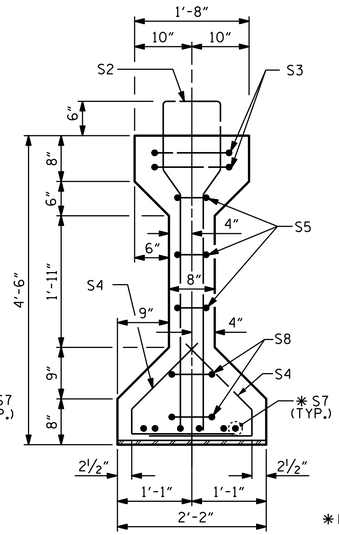
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			26

DRAWN BY : J. K. BOWLES DATE : 9/3/15
CHECKED BY : N. D'AIUTO DATE : 9/14/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

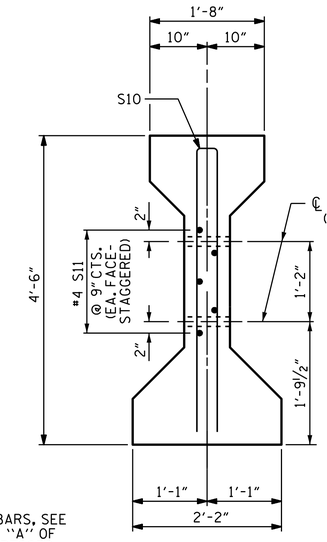
20-APR-2016 09:27
R:\Structures\Plans\B-4766_SD_FP_01.dgn
vpatel



SECTION A-A

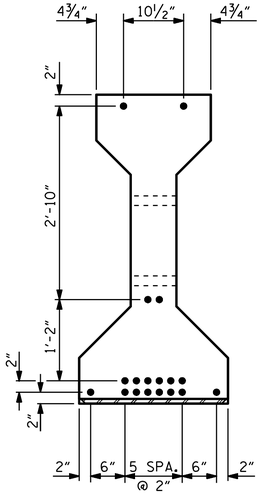


SECTION B-B



SECTION C-C
(S1 BARS NOT SHOWN)

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



0.6" Ø LOW RELAXATION STRAND LAYOUT

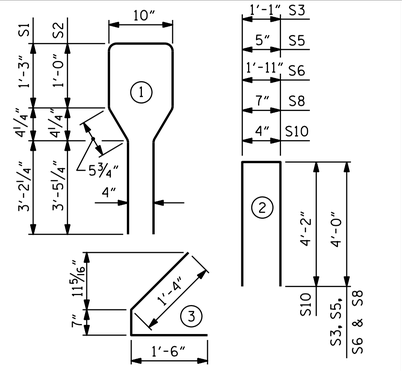
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	72	#4	1	10'-8"	513
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
✱S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	1

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

BAR TYPES



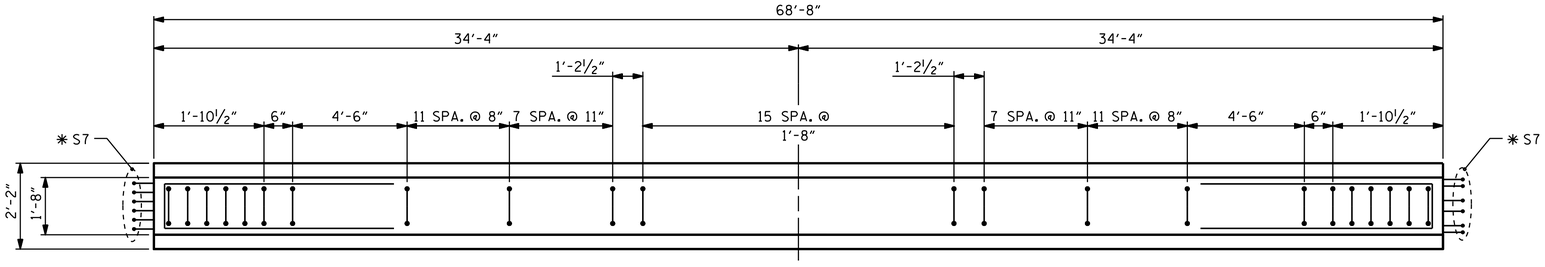
ALL BAR DIMENSIONS ARE OUT TO OUT.

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	5,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	NO.
	1,044	13.9	18

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	68'-8"	343'-4"



PLAN OF GIRDER

PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER A1 THROUGH A5.

ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

PROJECT NO. B-4766
IREDELL COUNTY
STATION: 16+28.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD

SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEIN P. KIM
DocuSigned by: Hyein Kim 07A78571E44145F...
4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			26

STD. NO. PCG6

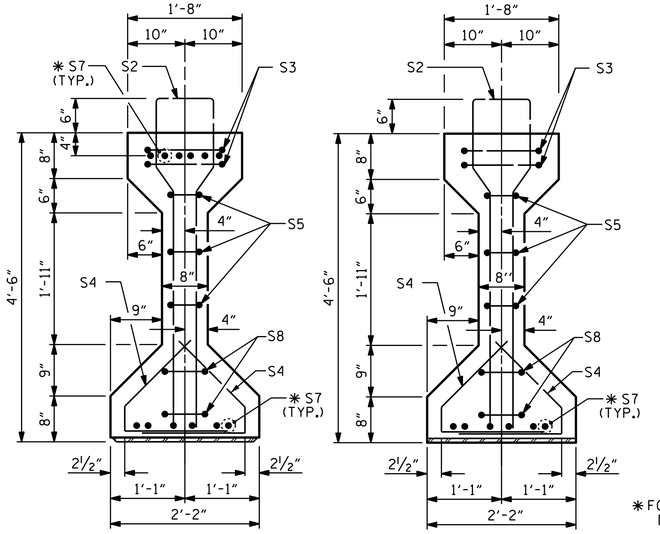
ASSEMBLED BY : J. K. BOWLES DATE : 9/2/15
CHECKED BY : N. D'AIUTO DATE : 9/15/15

DRAWN BY : ELR 8/91
CHECKED BY : GRP 8/91

REV. 5/1/06R TLA/GM
REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG

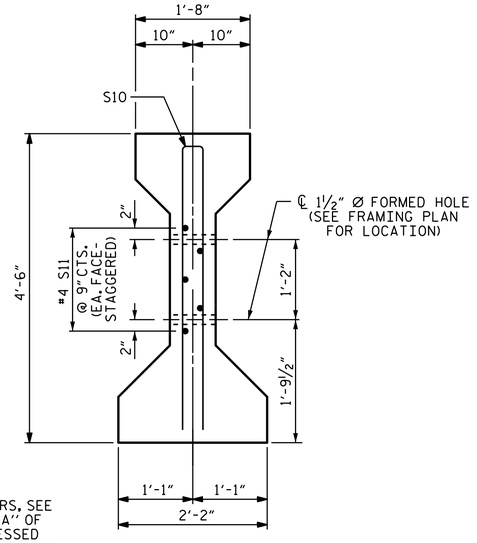
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_G*_01.dgn
vpatel



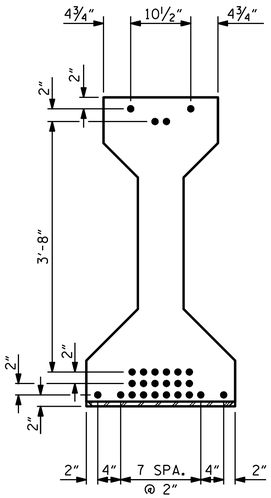
SECTION A-A

SECTION B-B

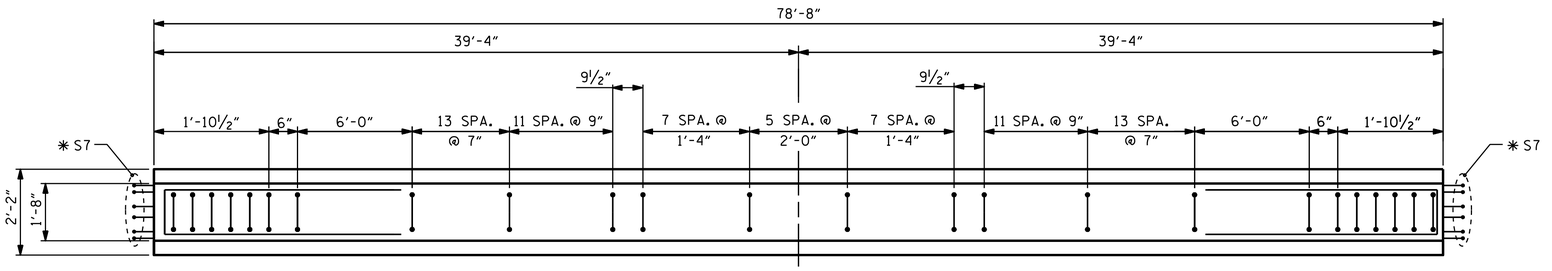


SECTION C-C
(S1 BARS NOT SHOWN)

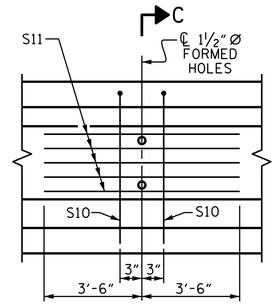
✱FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



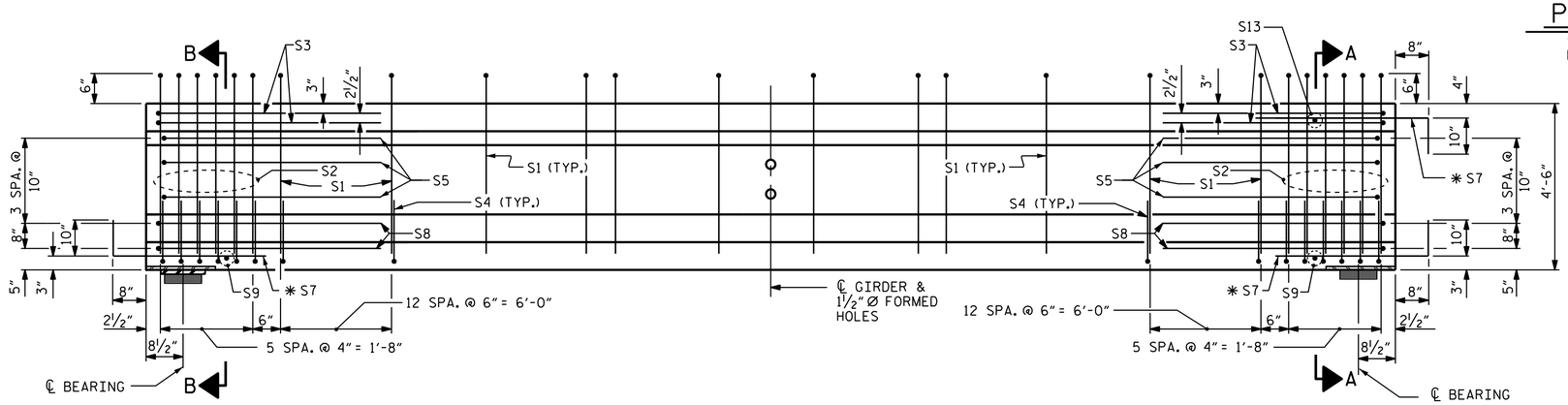
0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER B1 THROUGH B5.



ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

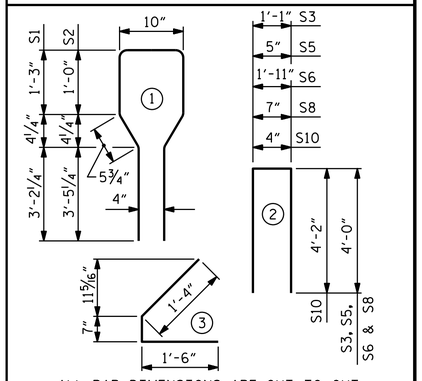
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	94	#4	1	10'-8"	670
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	76	#4	3	3'-5"	173
S5	6	#4	2	8'-5"	34
✱S7	16	#5	STR	3'-8"	61
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	1	#3	STR	1'-4"	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	6,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	NO.
	1,220	16.0	26

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	78'-8"	393'-4"

PROJECT NO. B-4766
IREDELL COUNTY
STATION: 16+28.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM
Docusigned by: Hyen Kim 07A78571E44145F...
4/22/2016

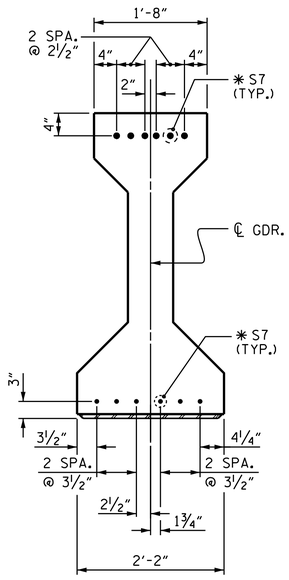
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			26

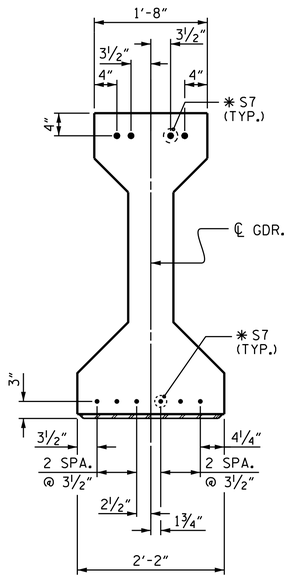
STD. NO. PCG6

ASSEMBLED BY : J. K. BOWLES DATE : 9/2/15
CHECKED BY : N. D'AIUTO DATE : 9/15/15
DRAWN BY : ELR 8/91
CHECKED BY : GRP 8/91
REV. 5/1/06R TLA/GM
REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

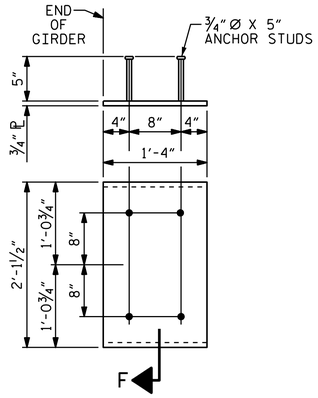
20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_G*_01.dgn
vpatel

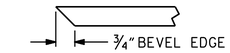


SPAN A



SPAN B





SECTION "F"
(SEE NOTES)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPAN A AND 4,400 FOR SPAN B.

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

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

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

DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS)

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A GIRDERS 1 THROUGH 5											SPAN B GIRDERS 1 THROUGH 5										
TENTH POINTS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.0
CAMBER (GIRDER ALONE IN PLACE) †	0.000	0.021	0.039	0.054	0.063	0.066	0.063	0.054	0.039	0.021	0.000	0.000	0.034	0.064	0.088	0.103	0.109	0.103	0.088	0.064	0.034	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. †	0.000	0.013	0.025	0.034	0.040	0.042	0.040	0.034	0.025	0.013	0.000	0.000	0.021	0.040	0.055	0.064	0.067	0.064	0.055	0.040	0.021	0.000
FINAL CAMBER †	0	1/16"	3/16"	1/4"	1/4"	5/16"	1/4"	1/4"	3/16"	1/16"	0	0	1/8"	5/16"	3/8"	1/2"	1/2"	1/2"	3/8"	5/16"	1/8"	0

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

PROJECT NO. B-4766
IREDELL COUNTY
STATION: 16+28.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM
DocuSigned by: Hyer Kim 07A78571E44145F...
4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			26

ASSEMBLED BY : J. K. BOWLES DATE : 9/4/15
CHECKED BY : N. D'AIUTO DATE : 9/15/15

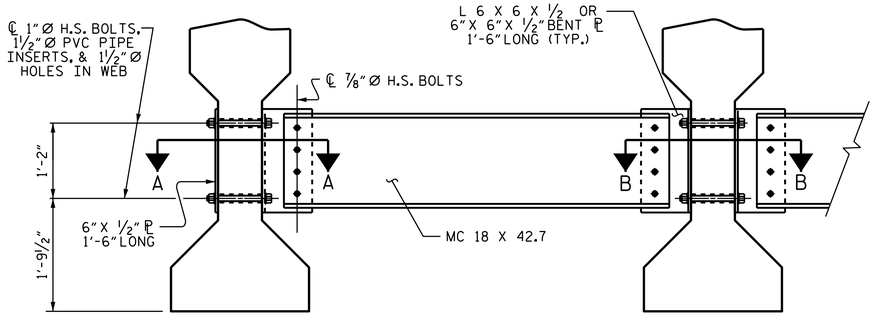
DRAWN BY : ELR 11/91
CHECKED BY : GRP 11/91

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

DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

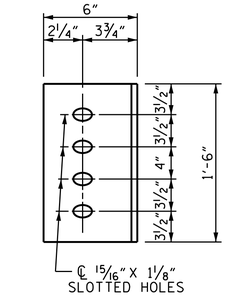
20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_G*_01.dgn
vpatel

STD. NO. PCG9

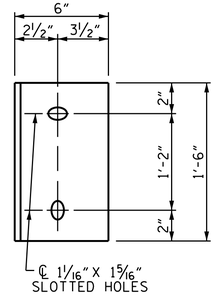


EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS

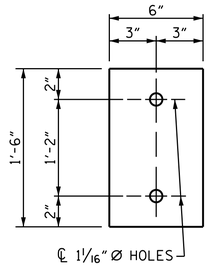
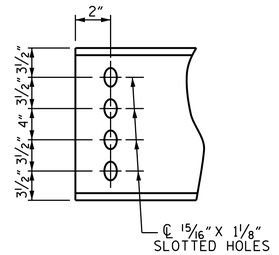
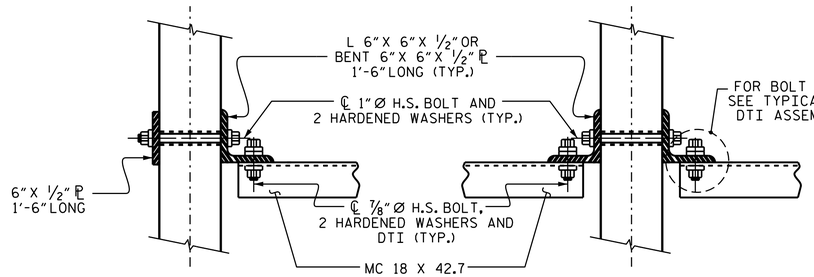


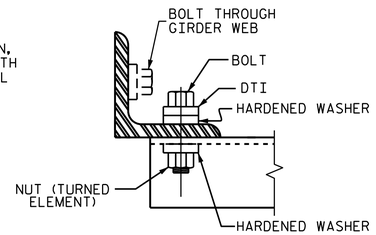
PLATE DETAILS



CHANNEL END



SECTION A-A SECTION B-B



BOLT WITH DTI ASSEMBLY DETAIL

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 CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE 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 ¼" PROJECTION BEYOND THE NUT.

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

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

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

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

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

DocuSigned by: Hyen Kim 07A78571E44145F...

4/22/2016

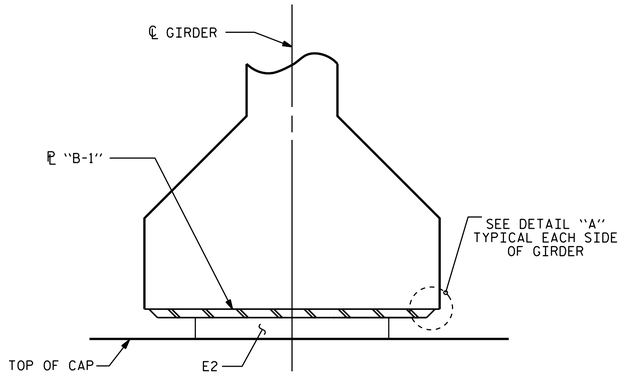
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			26

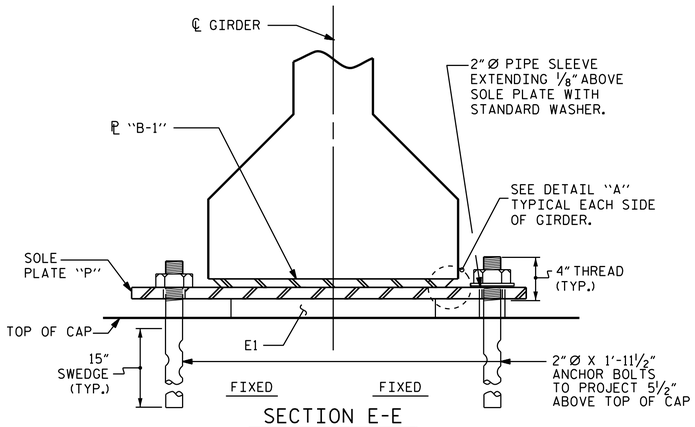
ASSEMBLED BY : J. K. BOWLES	DATE : 9/2/15		
CHECKED BY : N. D'AIUTO	DATE : 9/15/15		
DRAWN BY : TLA 6/05	ADDED 10/21/05		DESIGN ENGINEER OF RECORD:
CHECKED BY : VC 6/05	REV. 5/1/06RRR KMM/GM		H. P. KIM DATE : 1/26/16
	REV. 10/1/11 MAA/GM		

20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_G*_01.dgn
vpatel

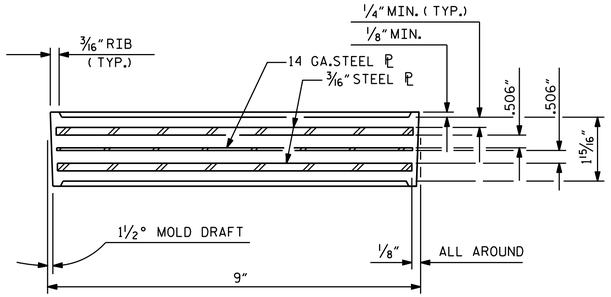
STD. NO. PCG10



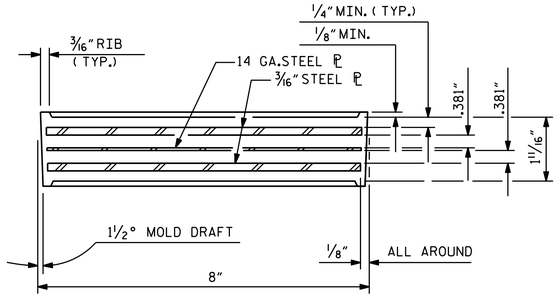
SECTION D-D



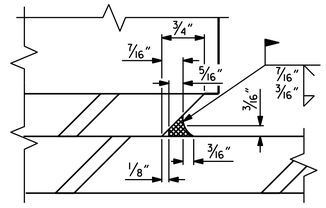
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL SECTION OF ELASTOMERIC BEARINGS



DETAIL "A"

NOTES

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

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

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

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

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

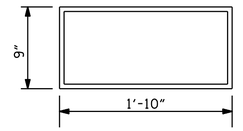
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

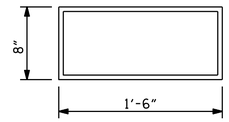


E2 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

AT INTEGRAL END BENTS

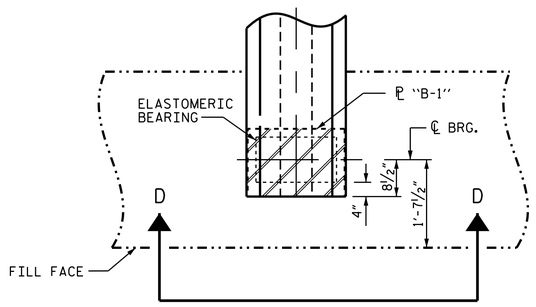


E1 (10 REQ'D)

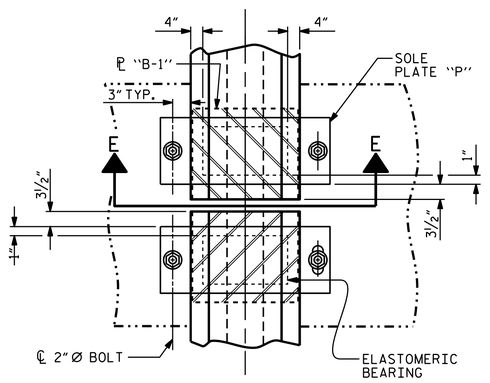
PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

AT BENT

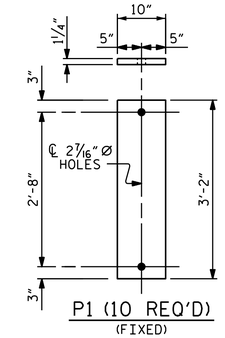


PLAN VIEW AT INTEGRAL END BENT



PLAN VIEW AT BENT

(SHOWING CONTINUOUS BENT)



P1 (10 REQ'D)

(FIXED)

SOLE PLATE DETAILS (P1)

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

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

DocuSigned by: Hyen Kim 07A78571E44145F...

4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			26

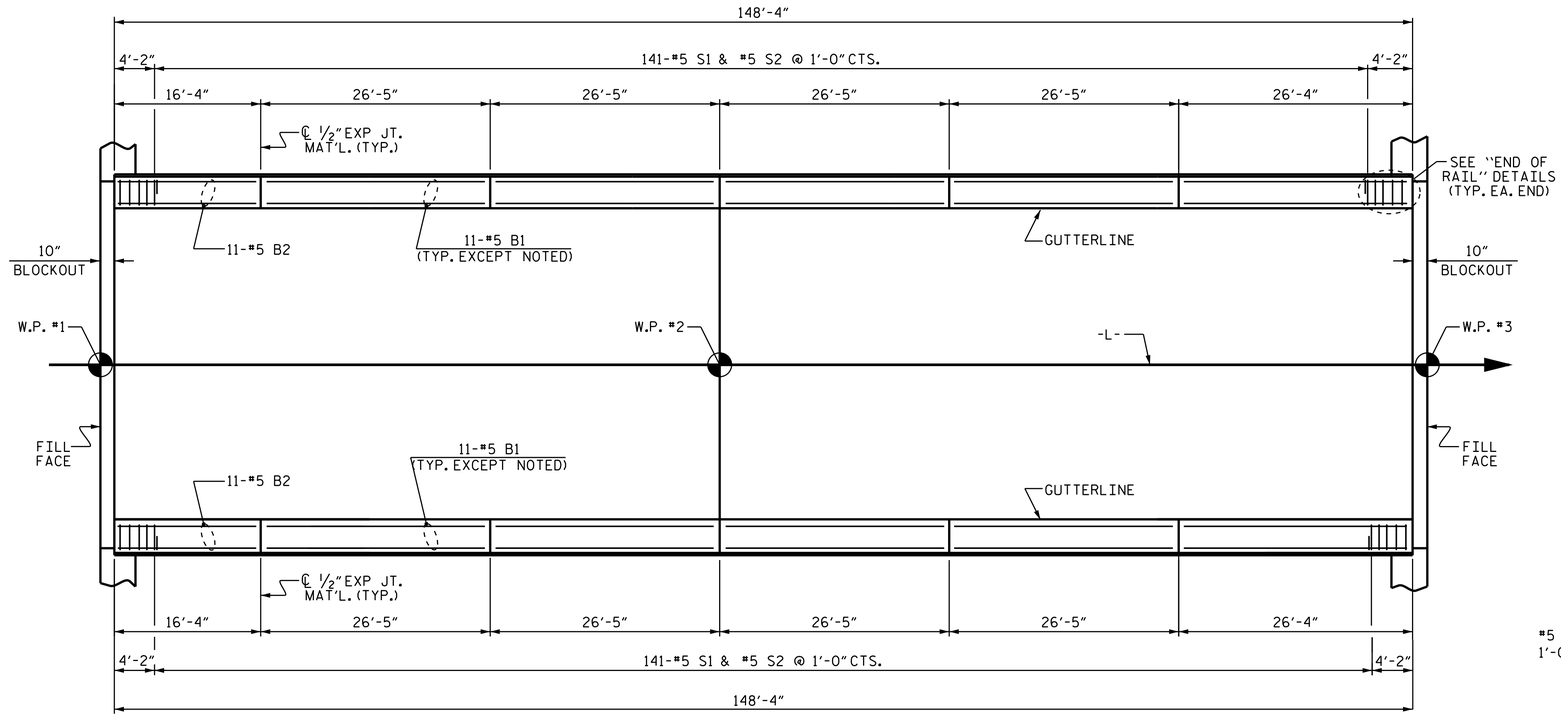
ASSEMBLED BY :	J. K. BOWLES	DATE :	9/4/15
CHECKED BY :	N. D'AIUTO	DATE :	9/16/15
DRAWN BY :	WJH 8/89		
CHECKED BY :	CRK 8/89		

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

DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_BG_01.dgn
vpatel

STD. NO. EB3



PLAN

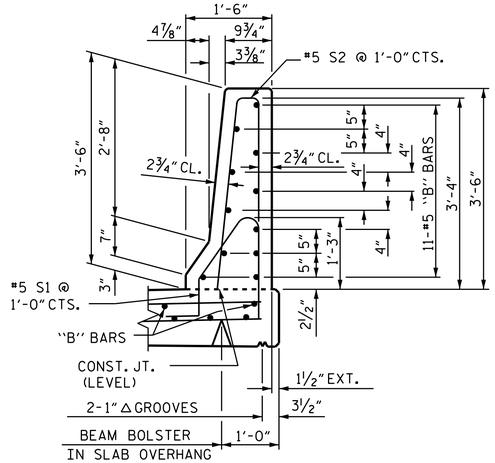
NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

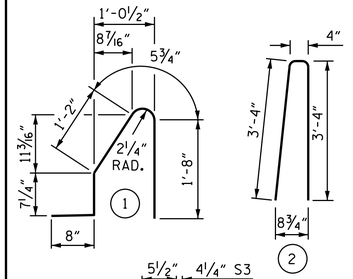
THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM. AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

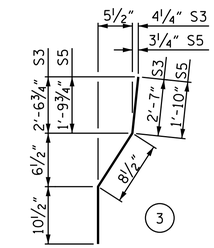
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



SECTION THROUGH RAIL

BAR TYPES



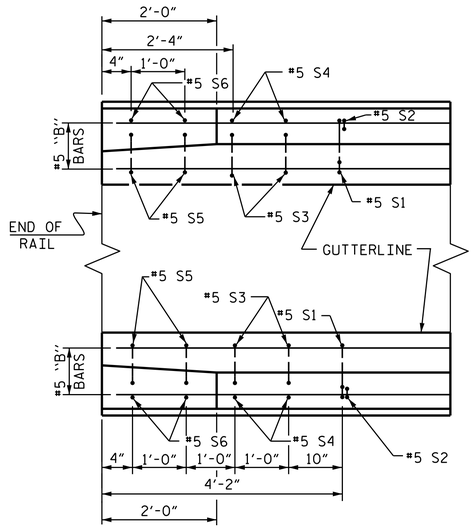


ALL BAR DIMENSIONS ARE OUT TO OUT.

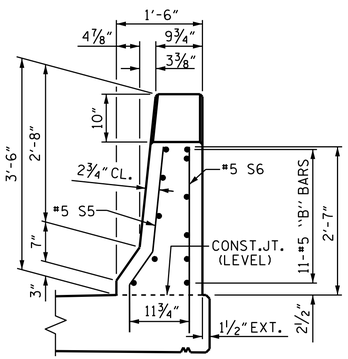
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

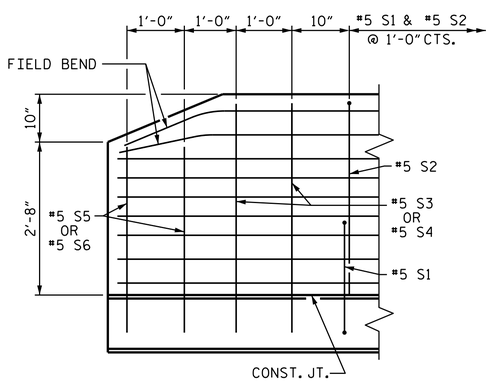
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	110	#5	STR	26'-0"	2983
* B2	22	#5	STR	15'-11"	365
* S1	282	#5	1	4'-7"	1348
* S2	282	#5	2	7'-0"	2059
* S3	8	#5	3	4'-2"	35
* S4	8	#5	STR	4'-0"	33
* S5	8	#5	3	3'-5"	29
* S6	8	#5	STR	3'-3"	27
* EPOXY COATED REINFORCING STEEL				LBS.	6,879
CLASS AA CONCRETE				C.Y.	40.2
CONCRETE BARRIER RAIL				LIN. FT.	296.7



PLAN

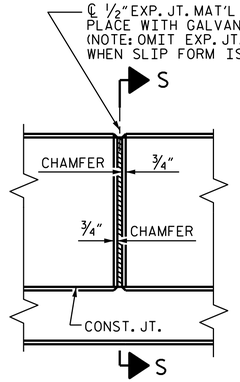


END VIEW

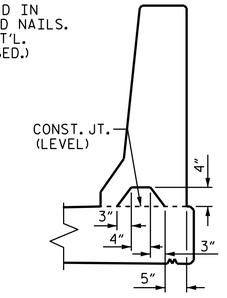


SIDE VIEW

END OF RAIL DETAILS



ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

BARRIER RAIL DETAILS

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim 07A78571E64145F...

4/22/2016

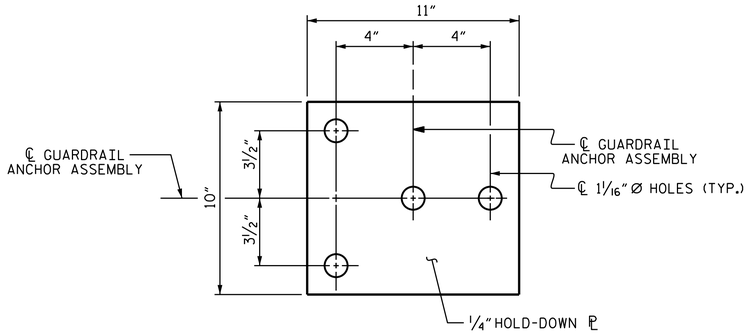
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			26

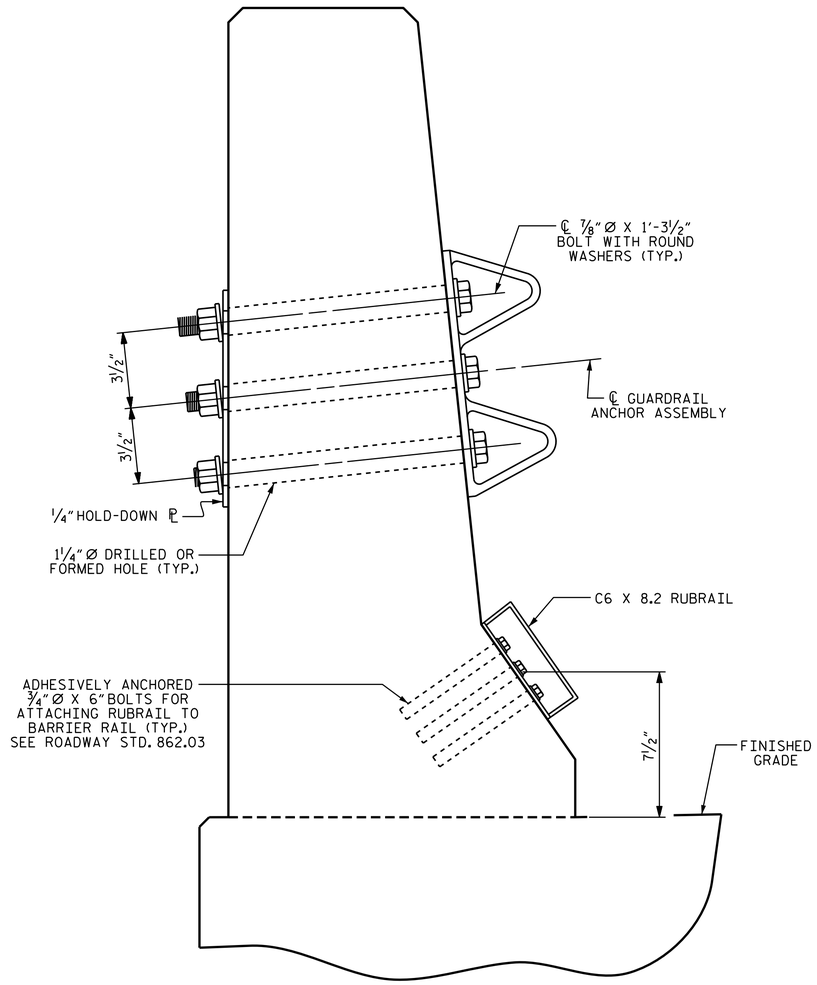
ASSEMBLED BY : J. K. BOWLES	DATE : 9/8/15	REV. 10/1/11	MAA/GM
CHECKED BY : N. D'AIUTO	DATE : 9/16/15	REV. 7/12	MAA/GM
DRAWN BY : ARB 5/87		REV. 6/13	MAA/GM
CHECKED BY : SJD 9/87			

21-APR-2016 08:22
R:\Structures\Plans\B-4766_SD_BR_01.dgn
vpatel

STD. NO. CBR1

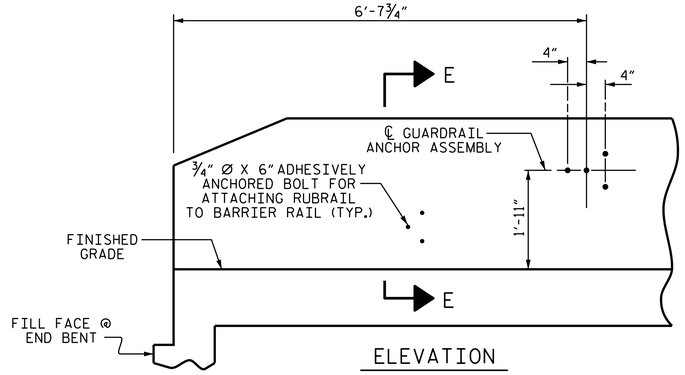


PLAN

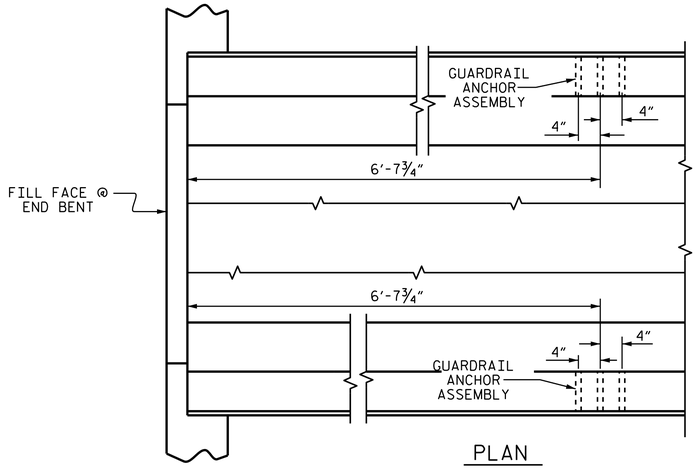


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



ELEVATION



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.)

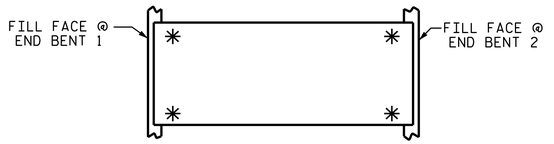
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

DocuSigned by: Hyen Kim 07A78571E44145F...

4/22/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

ASSEMBLED BY : J. K. BOWLES	DATE : 9/8/15
CHECKED BY : N. D'AIUTO	DATE : 9/16/15

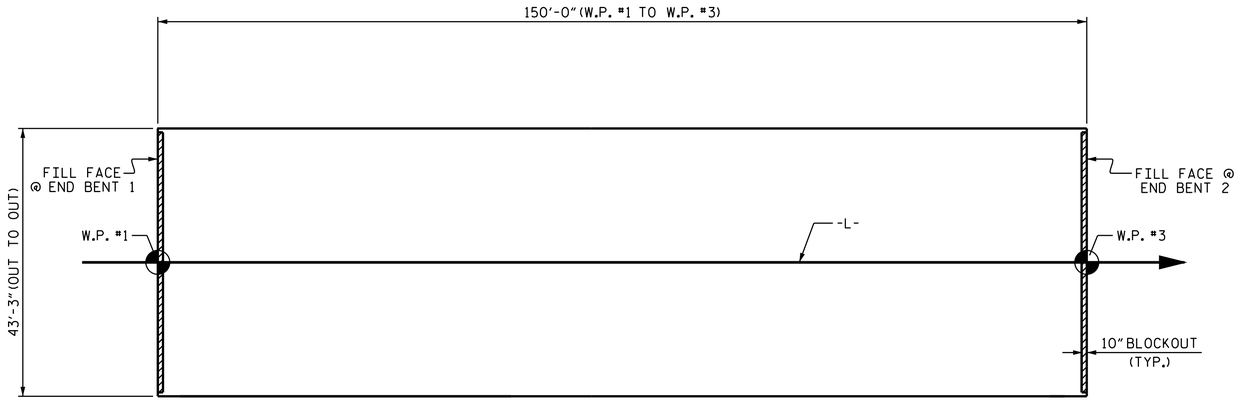
DRAWN BY : TLA 5/06	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

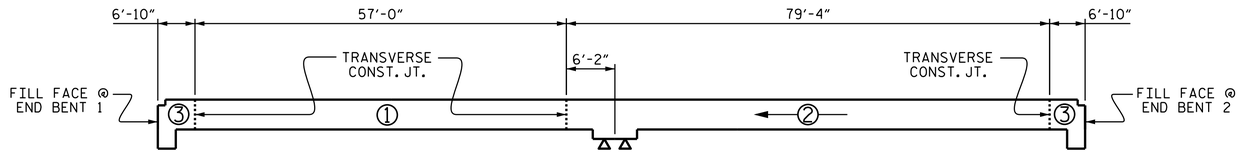
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			26

STD. NO. GRA2

20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_GR_01.dgn
vpatel

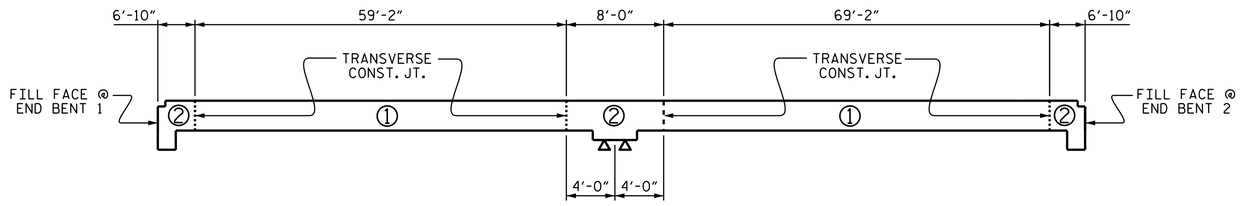


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. 6,488)



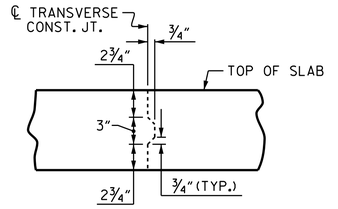
DECK POURING SEQUENCE

⊖ = INDICATES THE NUMBER AND DIRECTION OF POUR.



OPTIONAL DECK POURING DETAIL

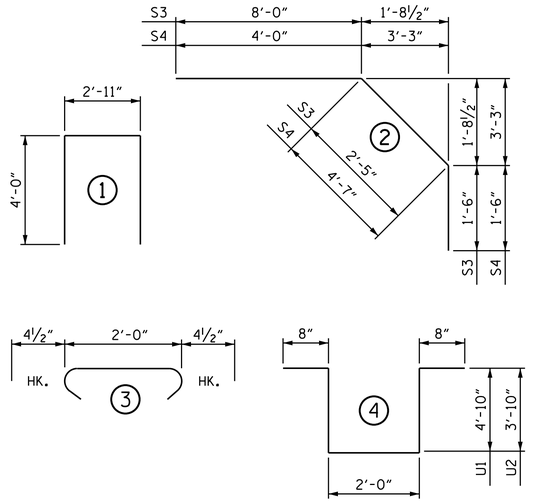
POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT POUR ① REACH A MINIMUM OR 3000 PSI



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	297	#5	STR	42'-11"	13294
A2	297	#5	STR	42'-11"	13294
✱B1	6	#5	STR	51'-7"	323
✱B2	226	#5	STR	16'-0"	3771
✱B3	58	#4	STR	16'-6"	639
✱B4	57	#5	STR	55'-0"	3270
✱B5	56	#5	STR	22'-6"	1,314
✱B6	58	#4	STR	20'-0"	775
B7	156	#5	STR	50'-10"	8271
K1	20	#4	STR	22'-4"	298
K2	8	#4	STR	6'-6"	35
K3	32	#4	STR	7'-0"	150
K4	32	#4	STR	8'-0"	171
K5	8	#4	STR	5'-2"	28
K6	8	#4	STR	2'-5"	13
K7	8	#4	STR	2'-11"	16
K8	4	#4	STR	2'-2"	6
K9	10	#4	STR	19'-1"	127
S1	120	#4	3	2'-9"	220
S2	64	#4	1	10'-11"	467
✱S3	68	#4	2	11'-11"	541
✱S4	64	#4	2	10'-1"	431
U1	24	#4	4	13'-0"	208
U2	8	#4	4	11'-0"	59
REINFORCING STEEL				LBS.	23,363
✱ EPOXY COATED REINFORCING STEEL				LBS.	24,358

SPLICE CHART

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

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(C.Y.)	(LBS.)	(LBS.)
POUR #1	75.0	23,363	24,358
POUR #2	116.8		
POUR #3	61.0		
TOTAL ✱✱	252.8	23,363	24,358

✱✱ QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,788	SQ. FT.
BRIDGE DECK	5,476	SQ. FT.
TOTAL	7,264	SQ. FT.

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00-L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim 07A78571E44145F...

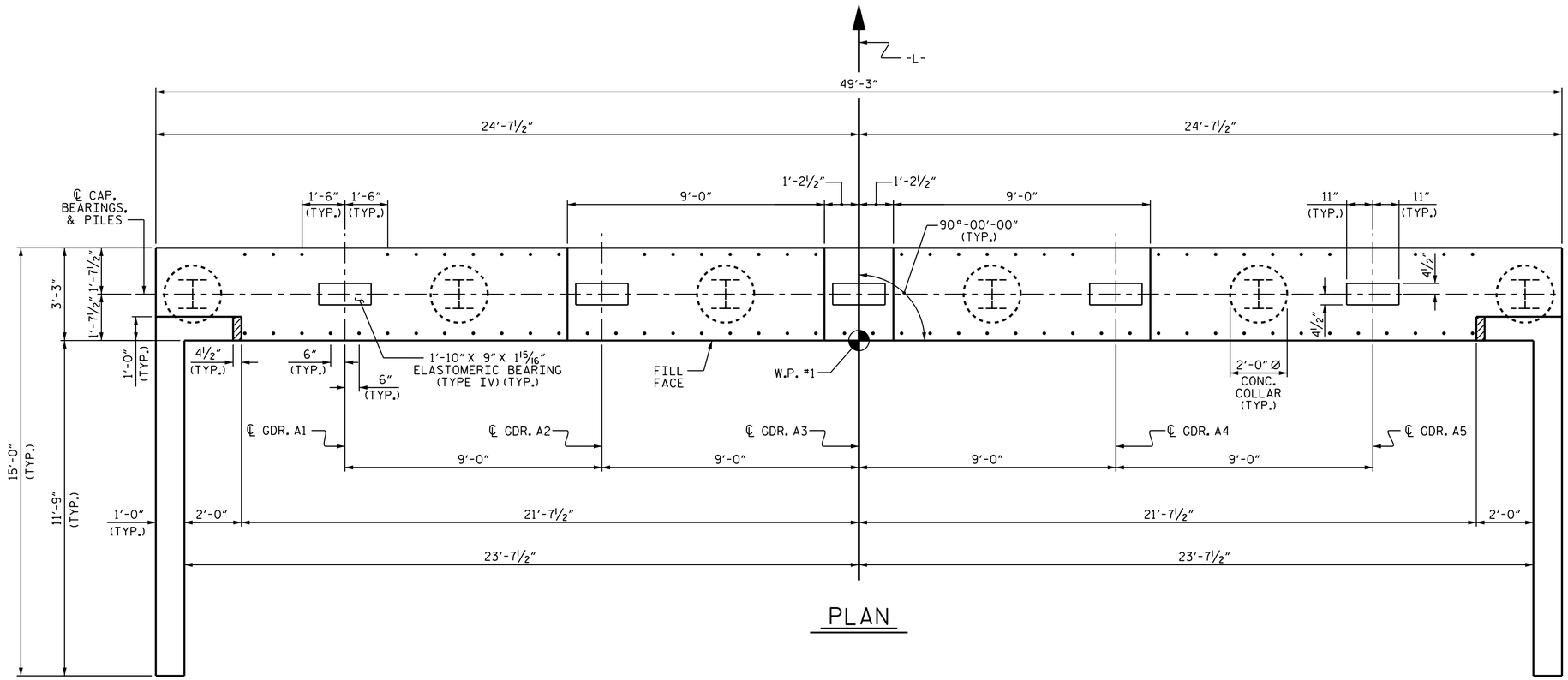
4/22/2016

DRAWN BY : J.K. BOWLES DATE : 8/31/15
CHECKED BY : N. D'AIUTO DATE : 9/16/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

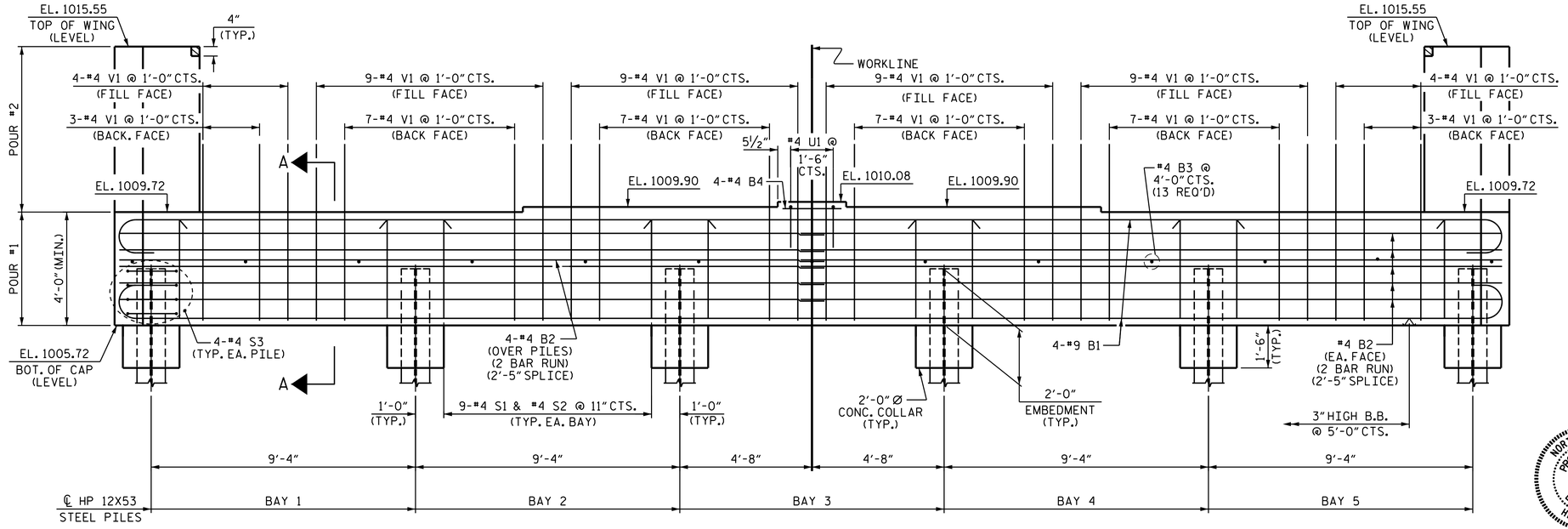
20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_BM_01.dgn
vpatel

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			26



PLAN



ELEVATION

NOTES

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

THE CONCRTE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYERI P. KIM

DocuSigned by: Hyeri Kim 07A78571E44145F...

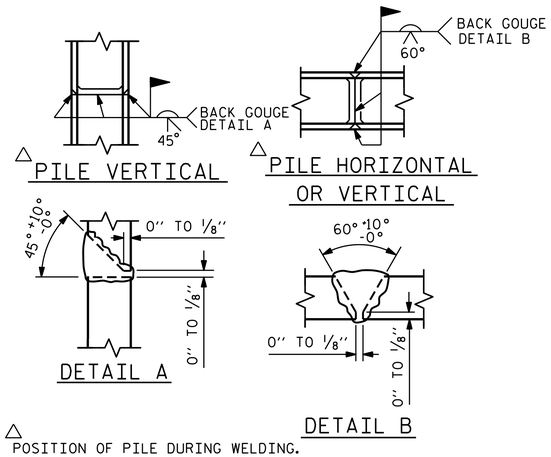
4/27/2016

DRAWN BY : J. K. BOWLES DATE : 10/14/15
CHECKED BY : N. D'AIUTO DATE : 11/16/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

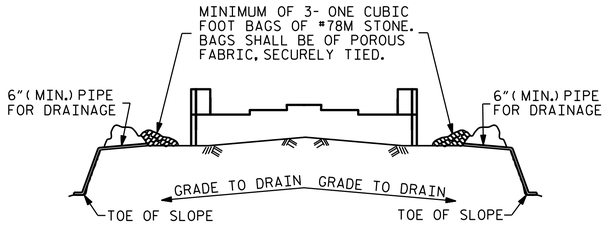
27-APR-2016 12:00
R:\Structures\Plans\B-4766_SD_E*_01.dgn
vpatel

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-18
1			3				TOTAL SHEETS
2			4				26



PILE SPLICE DETAILS



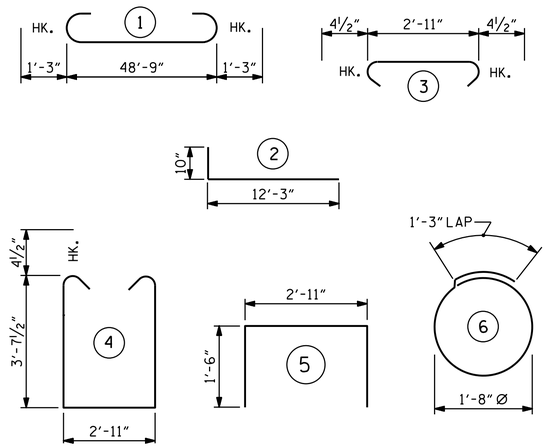
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	51'-3"	1394
B2	28	#4	STR	25'-8"	480
B3	13	#4	STR	2'-11"	25
B4	4	#4	STR	2'-1"	6
H1	80	#5	2	13'-1"	1092
K1	24	#4	STR	2'-8"	43
S1	45	#4	4	10'-11"	328
S2	45	#4	3	3'-8"	110
S3	24	#4	6	6'-6"	104
U1	2	#4	5	5'-11"	8
V1	78	#4	STR	6'-3"	326
V2	64	#4	STR	9'-6"	406

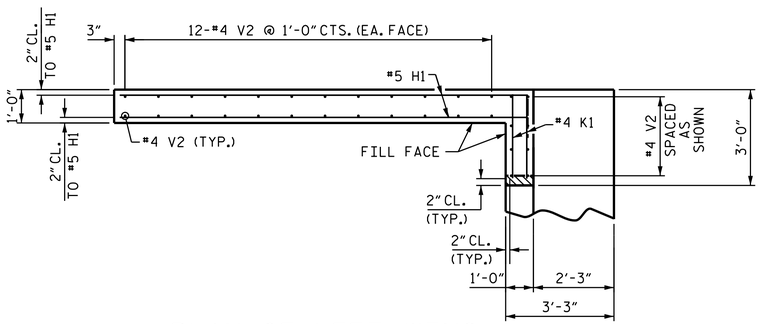
REINFORCING STEEL LBS. 4,322

CLASS A CONCRETE

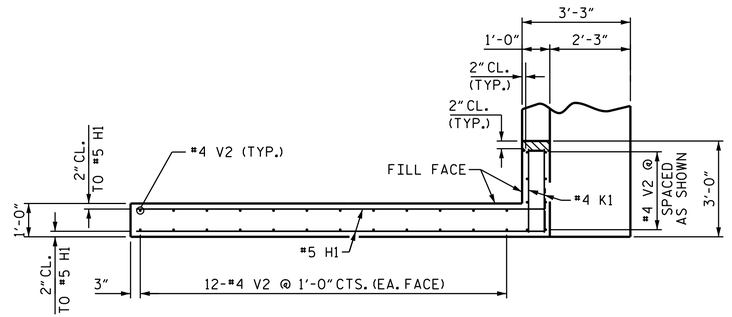
POUR #1 - CAP, LOWER WINGS, & CONC. COLLARS	C.Y.	28.9
POUR #2 - UPPER PART OF WINGS	C.Y.	6.1
TOTAL	C.Y.	35.0

HP 12X53 STEEL PILES

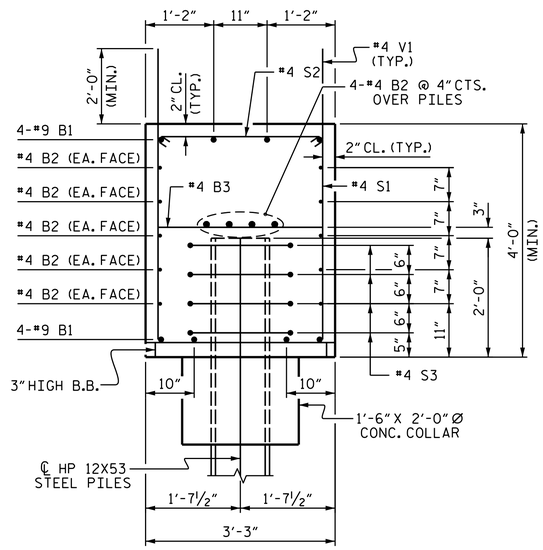
NO. 6	LIN. FT.	180



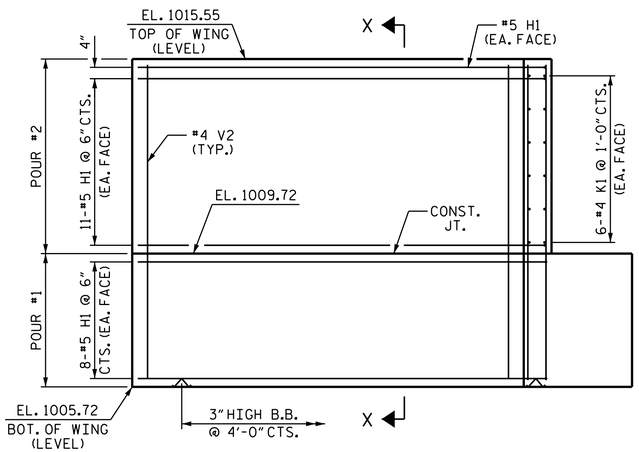
PLAN OF LEFT WING



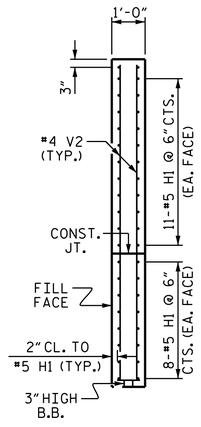
PLAN OF RIGHT WING



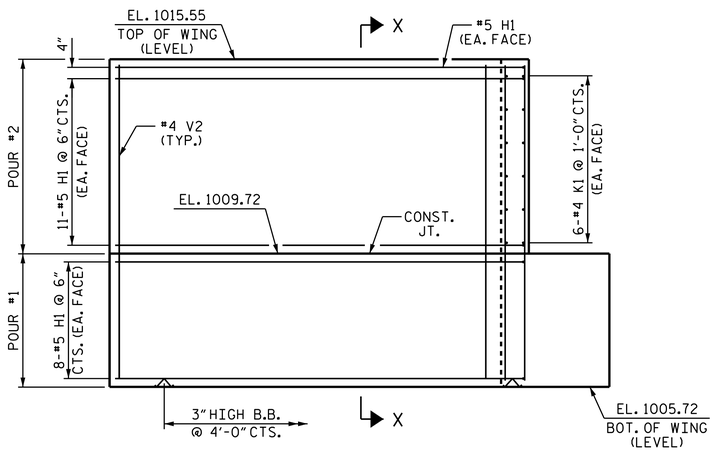
SECTION A-A



ELEVATION OF LEFT WING



SECTION X-X



ELEVATION OF RIGHT WING

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim

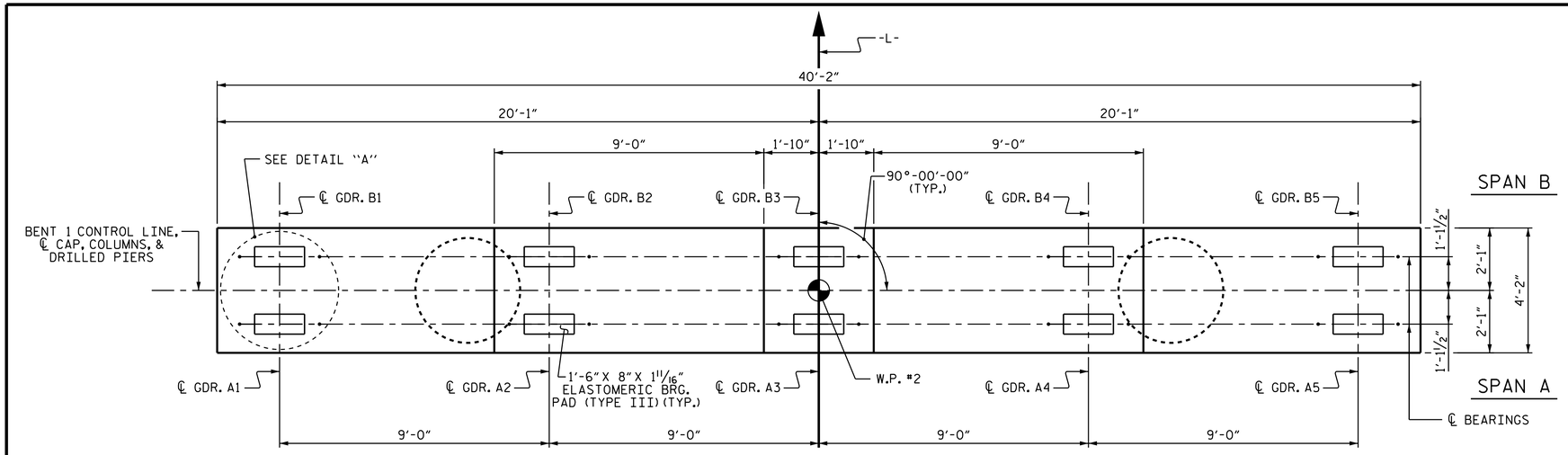
4/27/2016

DRAWN BY : J. K. BOWLES DATE : 10/14/15
CHECKED BY : N. D'AIUTO DATE : 11/16/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

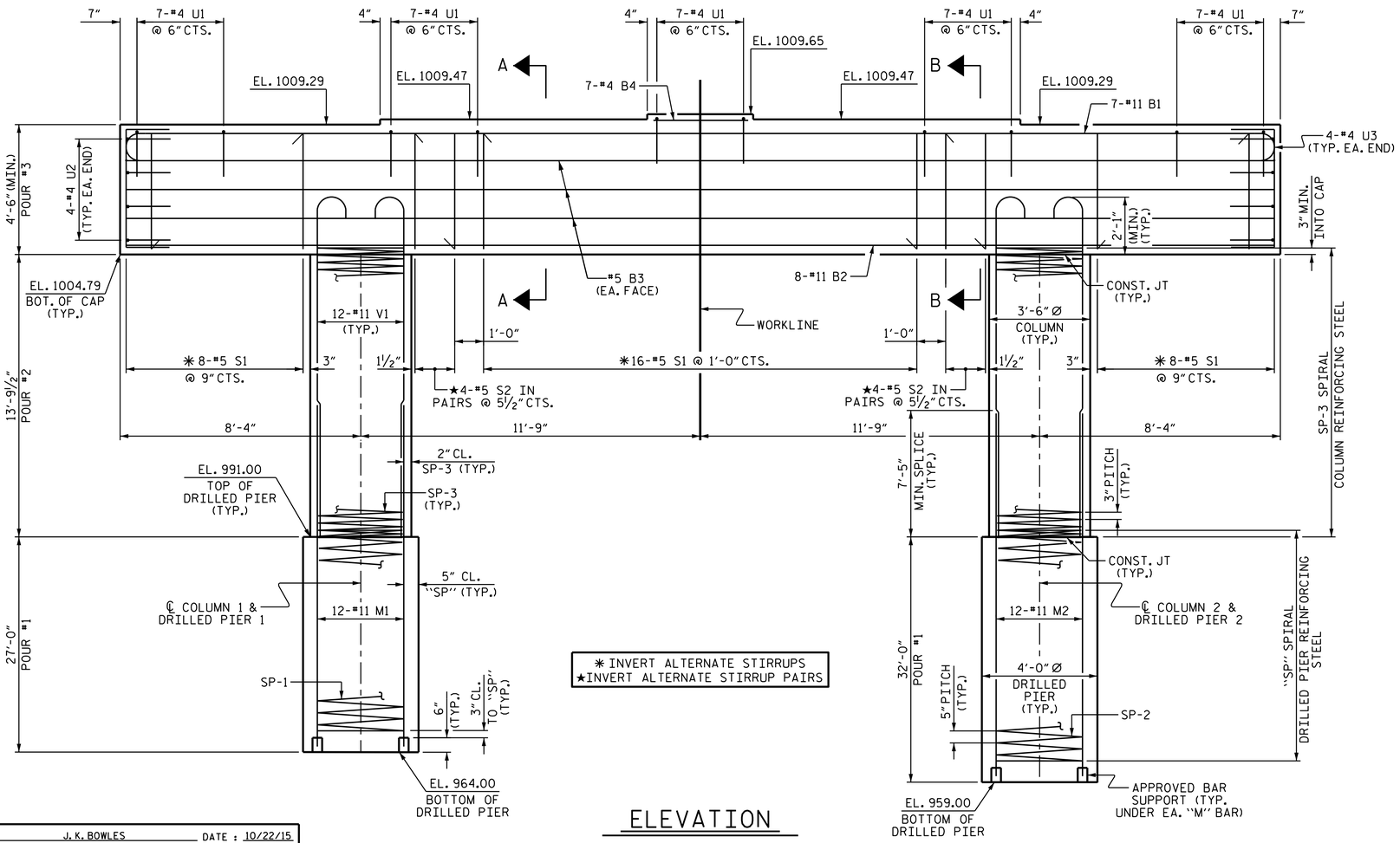
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			26

27-APR-2016 12:29
R:\Structures\Plans\B-4766_SD_E*_01.dgn
vpatel



PLAN



✳ INVERT ALTERNATE STIRRUPS
★ INVERT ALTERNATE STIRRUP PAIRS

ELEVATION

NOTES

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

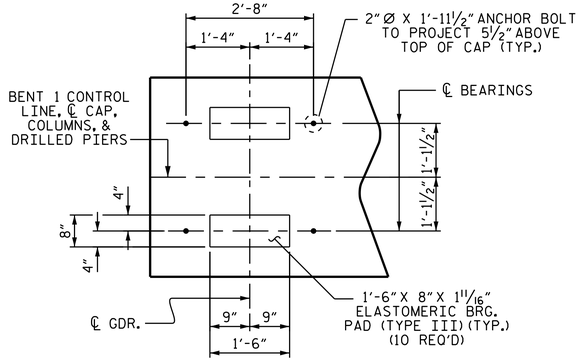
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

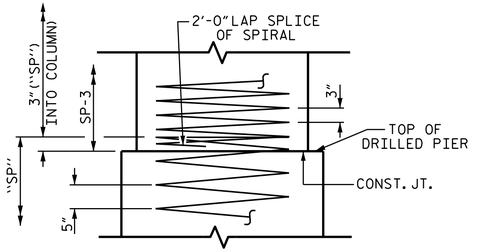
DRILLED PIERS SHOULD BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

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



DETAIL "A"

DIMENSIONS ARE TYPICAL FOR EACH BEARING.



CONSTRUCTION JOINT DETAIL

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYEN P. KIM

Docusigned by: Hyeri Kim 07A7857E44145F...

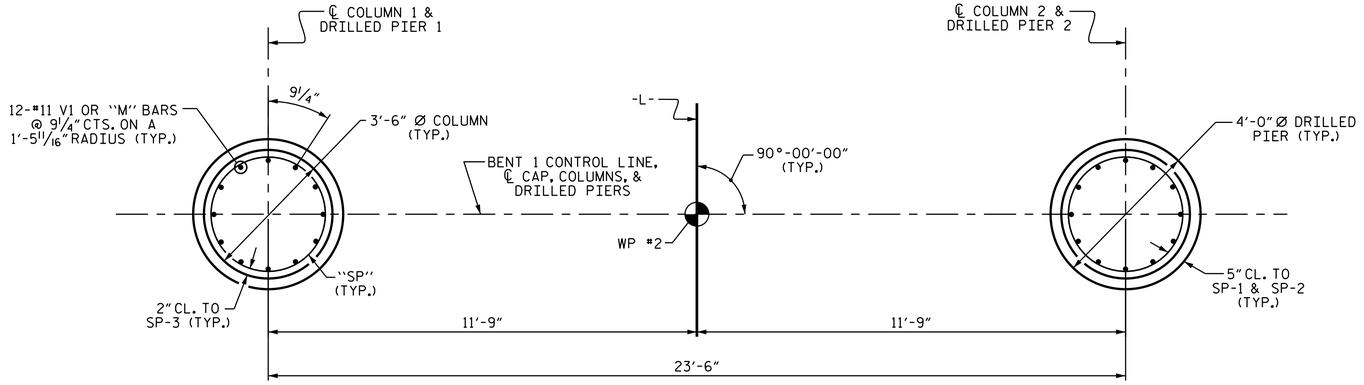
4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			26

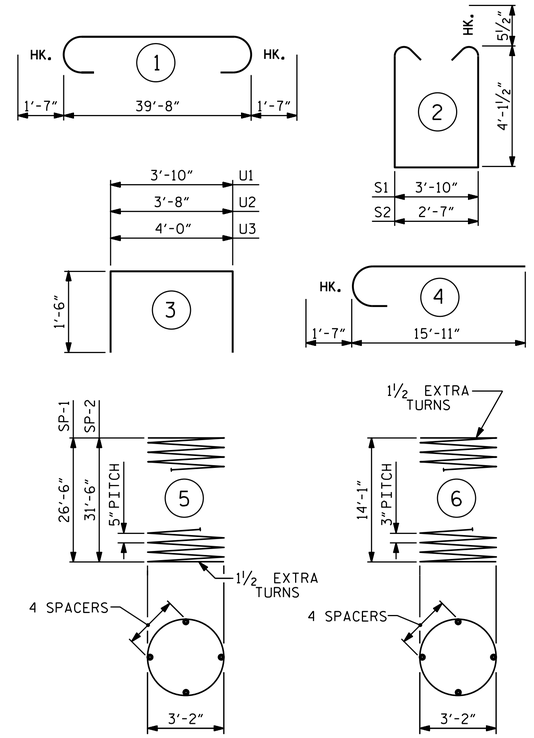
DRAWN BY : J. K. BOWLES DATE : 10/22/15
CHECKED BY : N. D'AIUTO DATE : 11/18/15
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 11/18/15

20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_B*_01.dgn
vpatel



PLAN OF DRILLED PIERS & COLUMNS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11	1	42'-10"	1593
B2	8	#11	STR	39'-10"	1693
B3	6	#5	STR	39'-10"	249
B4	7	#4	STR	3'-4"	16
M1	12	#11	STR	37'-2"	2370
M2	12	#11	STR	42'-2"	2688
S1	32	#5	2	13'-0"	434
S2	16	#5	2	11'-9"	196
U1	35	#4	3	6'-10"	160
U2	8	#4	3	6'-8"	36
U3	8	#4	3	7'-0"	37
V1	24	#11	4	17'-6"	2231

REINFORCING STEEL				LBS.	11,703
SP-1	1	**	5	639'-1"	667
SP-2	1	**	5	756'-7"	789
SP-3	2	*	6	569'-8"	758

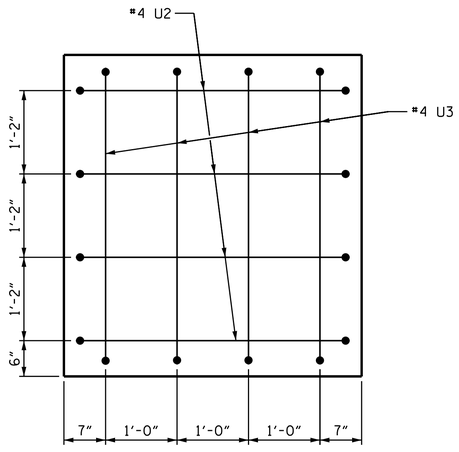
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,217

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

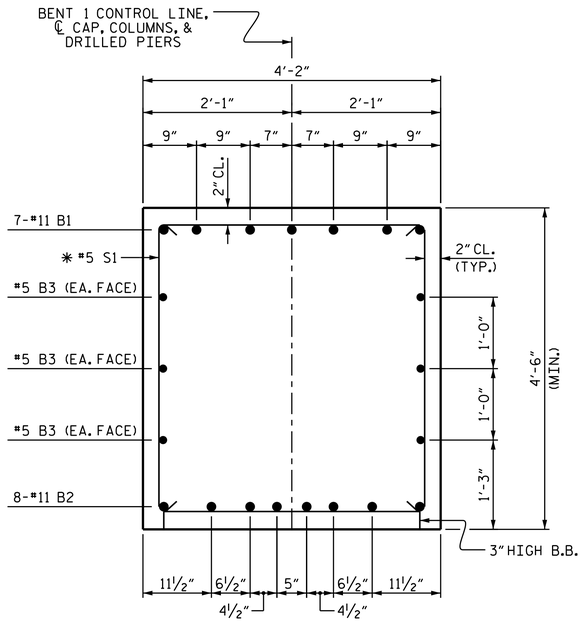
** THE SP-1 & SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE		
POUR #2 (COLUMNS)	C.Y.	9.8
POUR #3 (CAP)	C.Y.	28.6
TOTAL CLASS A CONCRETE	C.Y.	38.4

DRILLED PIER QUANTITIES		
DRILLED PIER CONCRETE		
POUR #1 (DRILLED PIERS)	C.Y.	27.5
4'-0" Ø DRILLED PIERS IN SOIL	LIN. FT.	26
4'-0" Ø DRILLED PIERS NOT IN SOIL	LIN. FT.	33
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	LIN. FT.	21
SID INSPECTIONS	EACH	1
SPT TESTING	EACH	1
CSL TESTING	EACH	1
CSL TUBES	LIN. FT.	248

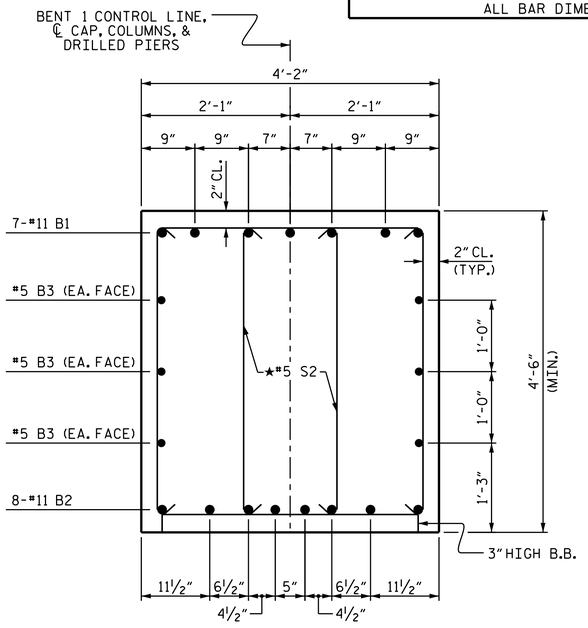


END VIEW



SECTION A-A

* INVERT ALTERNATE STIRRUPS



SECTION B-B

★ INVERT ALTERNATE STIRRUP PAIRS

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim 07A78571E44145F...

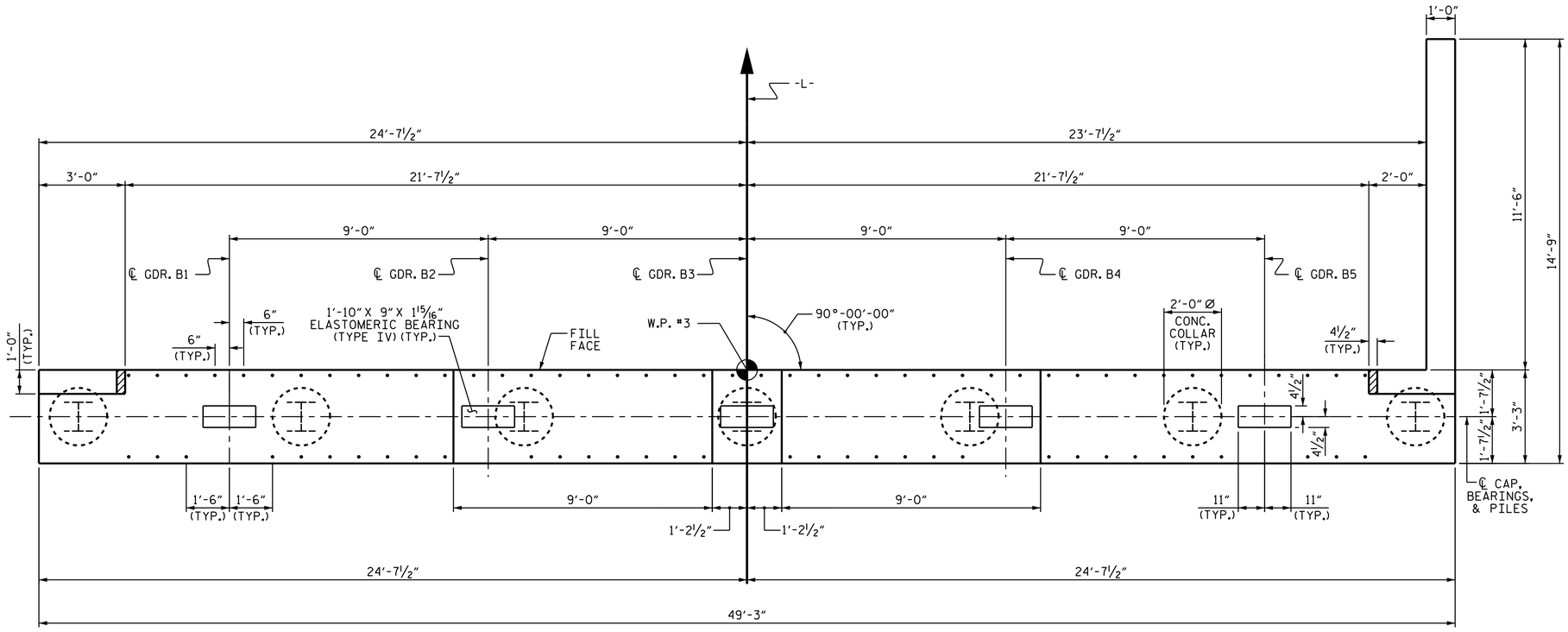
4/22/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

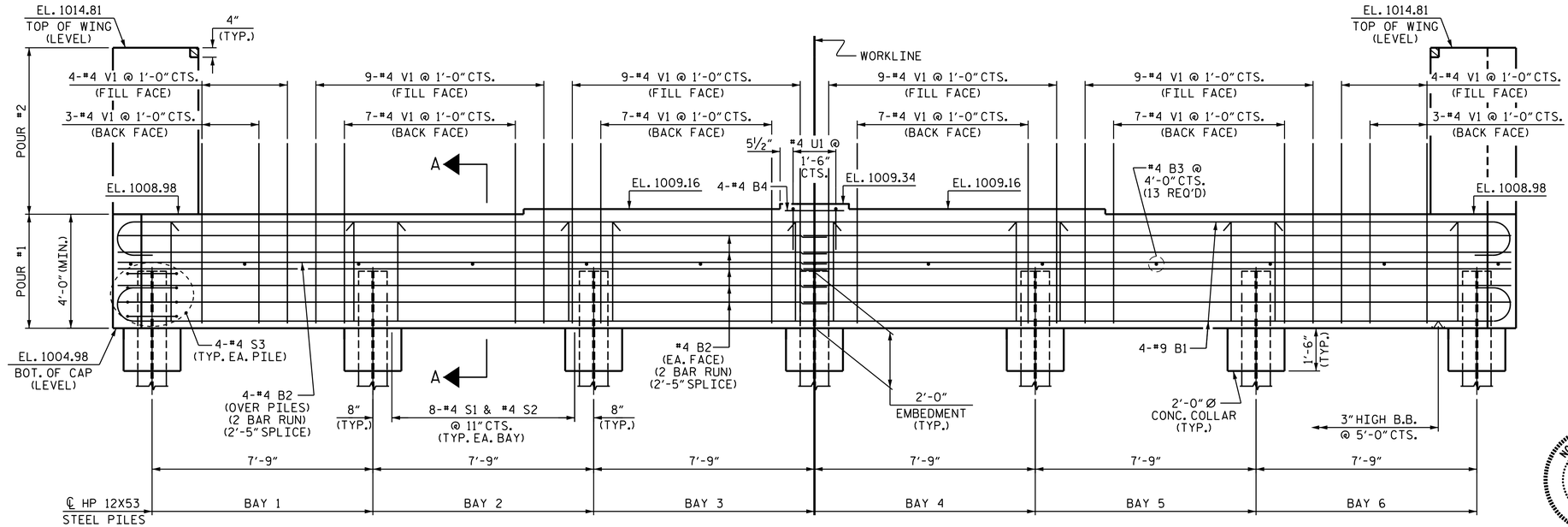
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			26

DRAWN BY : J. K. BOWLES DATE : 10/22/15
CHECKED BY : N. D'AIUTO DATE : 11/18/15
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 11/18/15

20-APR-2016 09:26
R:\Structures\Plans\B-4766_SD_B*_01.dgn
vpatel



PLAN



ELEVATION

NOTES

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

THE CONCRTE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYERI P. KIM

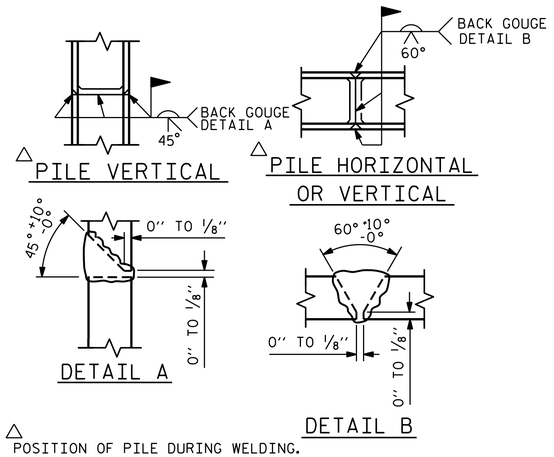
DocuSigned by: Hyeri Kim 07A78571E44145F...
4/27/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			26

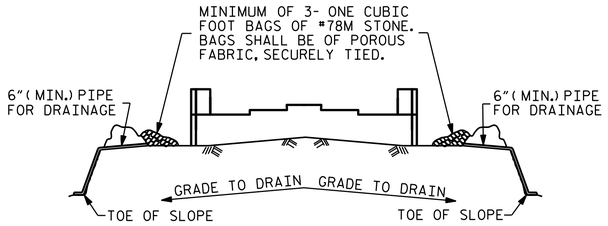
DRAWN BY : J. K. BOWLES DATE : 10/14/15
CHECKED BY : N. D'AIUTO DATE : 11/16/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 1/26/16

27-APR-2016 12:00
R:\Structures\Plans\B-4766_SD_E*_01.dgn
vpatel



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



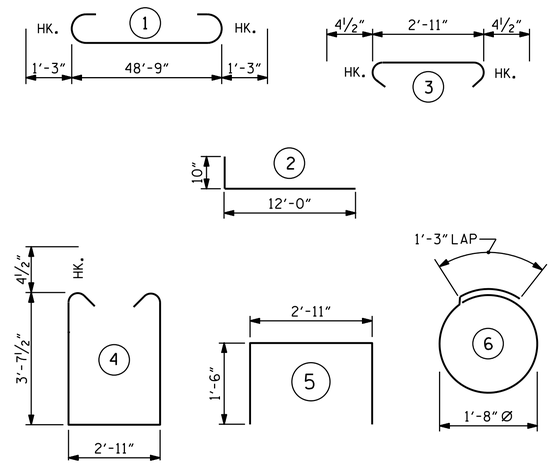
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



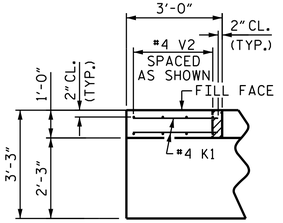
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

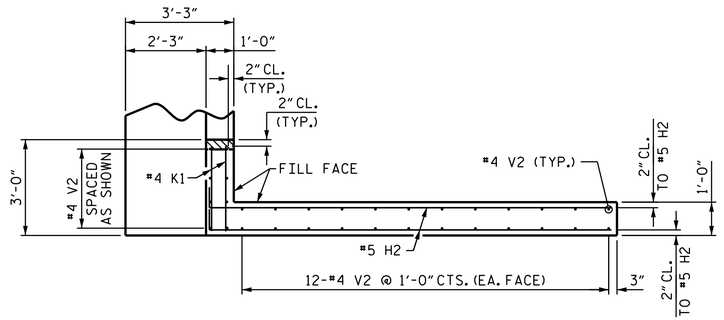
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	51'-3"	1394
B2	28	#4	STR	25'-8"	480
B3	13	#4	STR	2'-11"	25
B4	4	#4	STR	2'-1"	6
H2	40	#5	2	12'-10"	535
K1	24	#4	STR	2'-8"	43
S1	48	#4	4	10'-11"	350
S2	48	#4	3	3'-8"	118
S3	28	#4	6	6'-6"	122
U1	2	#4	5	5'-11"	8
V1	78	#4	STR	6'-3"	326
V2	40	#4	STR	9'-6"	254

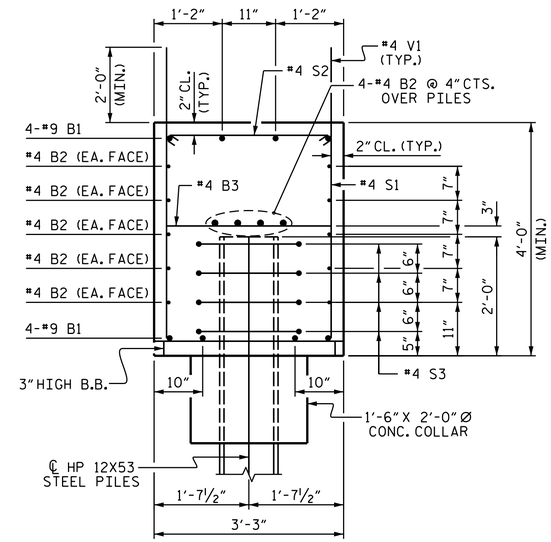
REINFORCING STEEL	LBS.	3,661
CLASS A CONCRETE		
POUR #1 - CAP, LOWER WINGS, & CONC. COLLARS	C.Y.	27.3
POUR #2 - UPPER PART OF WINGS	C.Y.	3.6
TOTAL	C.Y.	30.9
HP 12X53 STEEL PILES		
NO. 7	LIN. FT.	200



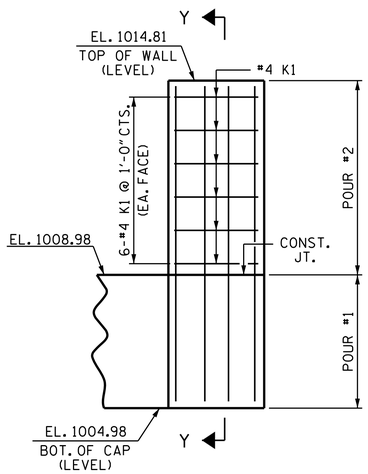
PLAN OF LEFT WALL



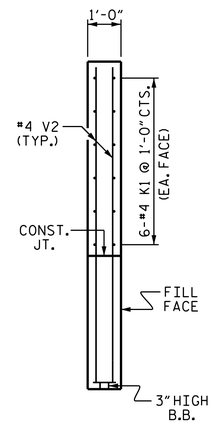
PLAN OF RIGHT WING



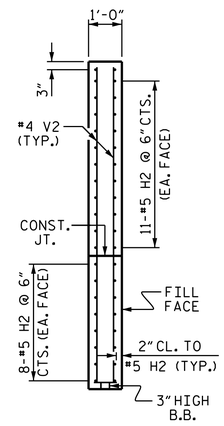
SECTION A-A



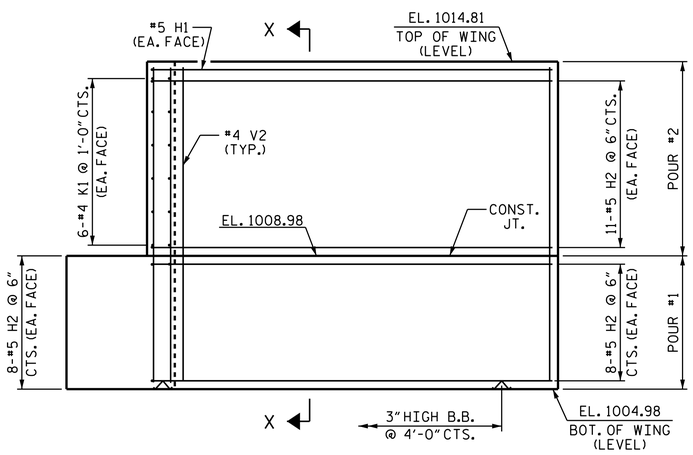
ELEVATION OF LEFT WALL



SECTION Y-Y



SECTION X-X



ELEVATION OF RIGHT WING

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 28950 ENGINEER HYER P. KIM

DocuSigned by: Hyer Kim 07A78571E44145F...

4/27/2016

DRAWN BY :	J. K. BOWLES	DATE : 10/14/15
CHECKED BY :	N. D'AIUTO	DATE : 11/16/15
DESIGN ENGINEER OF RECORD:	H. P. KIM	DATE : 1/26/16

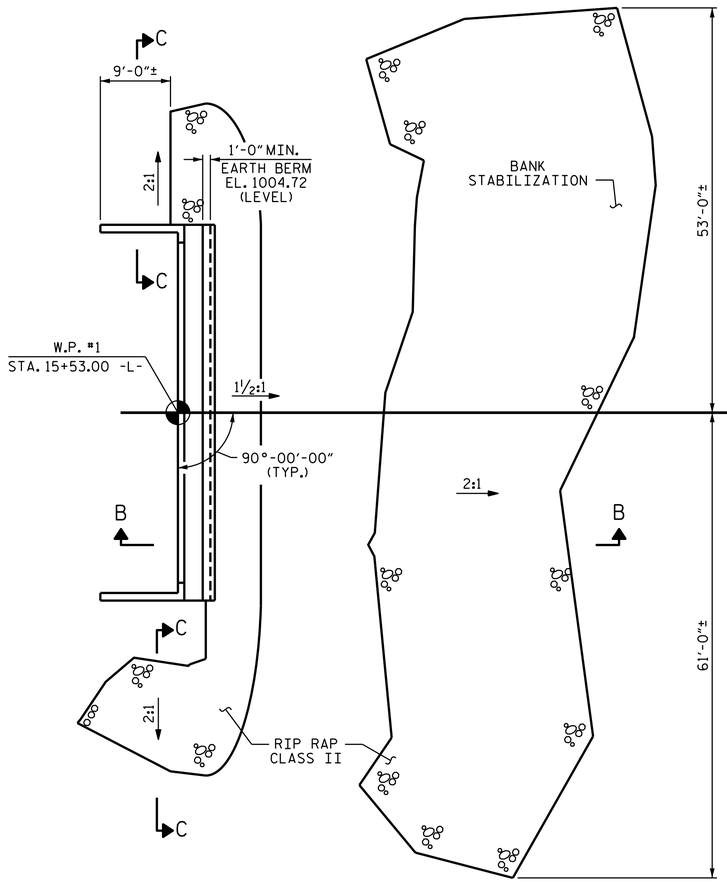
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			26

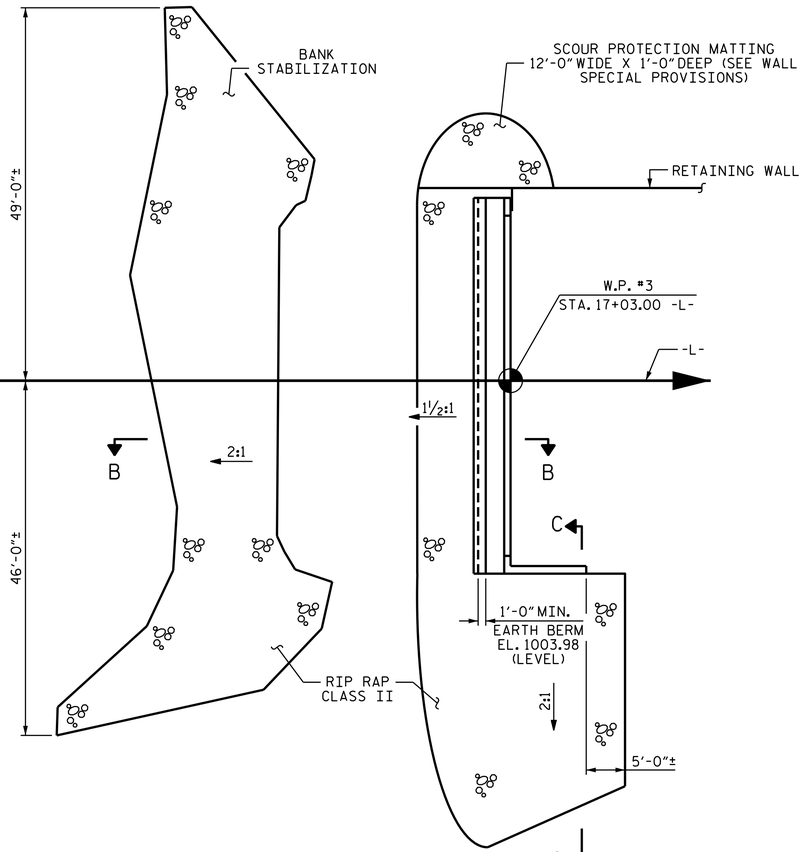
27-APR-2016 12:39
R:\Structures\Plans\B-4766_SD_E*_01.dgn
vpatel

ESTIMATED QUANTITIES

BRIDGE @ STA. 16+28.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	115	125
BANK STABILIZATION NEAR END BENT 1	350	385
TOTAL END BENT 1	**465**	**510**
BANK STABILIZATION NEAR END BENT 2	200	220
END BENT 2	190	210
TOTAL END BENT 2	**390**	**430**
GRAND TOTAL	**855**	**940**

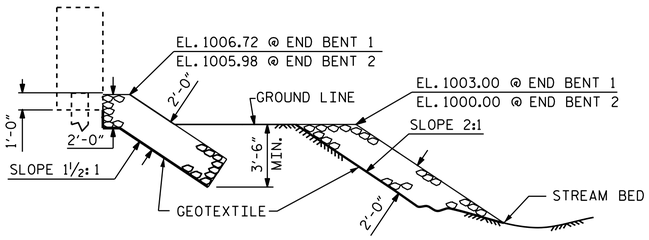


INTEGRAL
END BENT 1

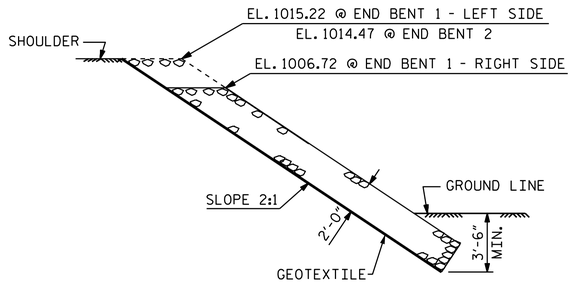


INTEGRAL
END BENT 2

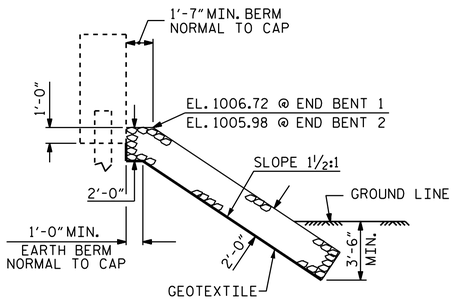
PLAN



SECTION B-B



SECTION C-C



℄ SECTION
BERM RIP RAPPED

PROJECT NO. B-4766
IREDELL COUNTY
STATION: 16+28.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

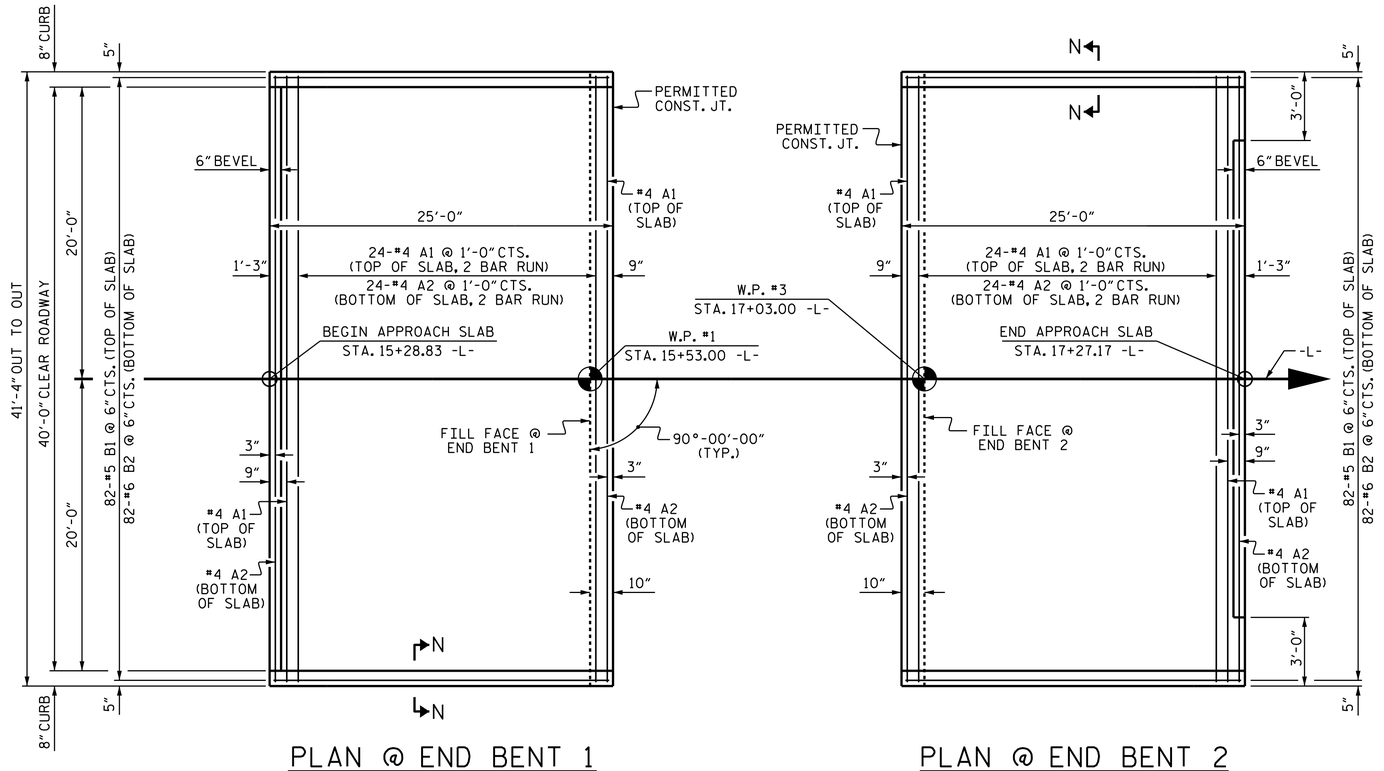
NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL
DocuSigned by: vipul a patel 1C157DE15D464AA...
4/21/2016

DRAWN BY : N. D'AIUTO DATE : 8/26/15
CHECKED BY : J. K .BOWLES DATE : 9/15/15
DESIGN ENGINEER OF RECORD: H. P. KIM DATE : 9/15/15

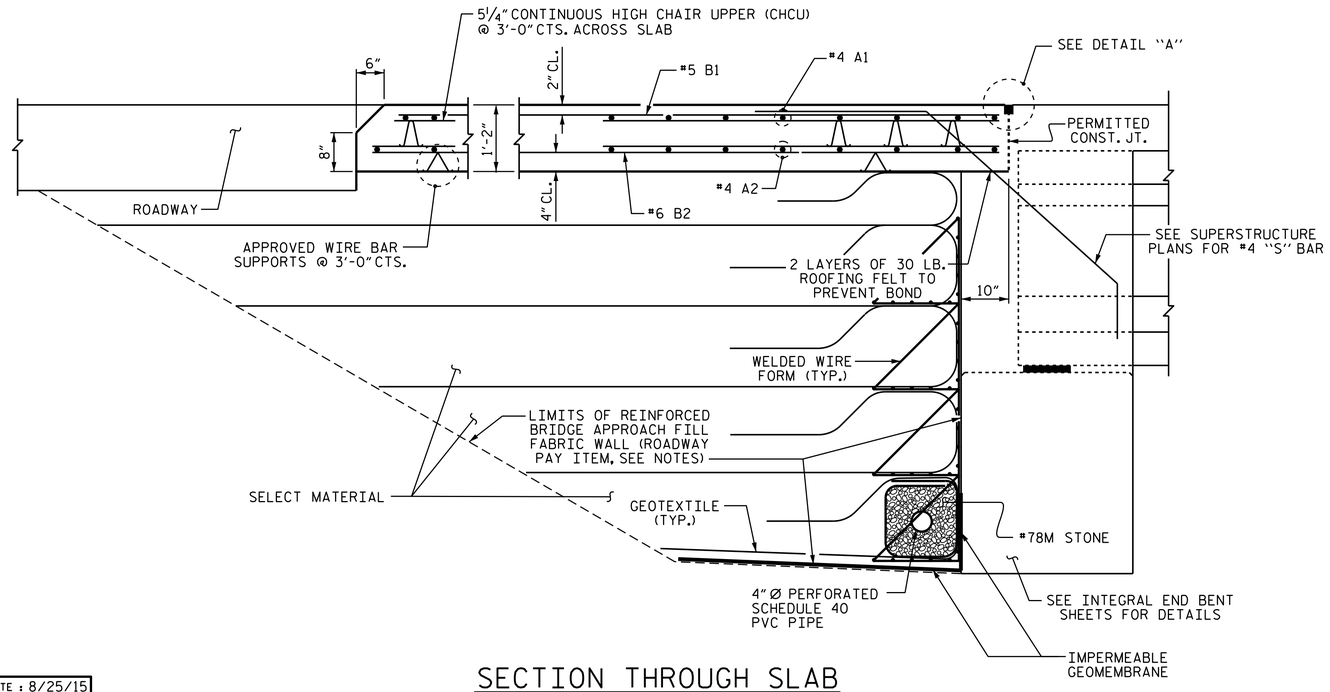
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			26

20-APR-2016 09:26
R:\Structures\Plans\B4766_SD_RR_01.dgn
vpatel



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THROUGH SLAB

@ END BENT 1

NOTES

THE APPROACH SLAB MAY BE CAST MONOLITHICALLY WITH THE END BENT DIAPHRAGM AND THE END SECTION OF THE BRIDGE DECK NEAR THE INTEGRAL END BENT.

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

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

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

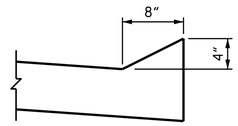
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

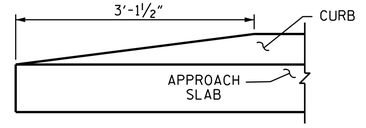
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	52	#4	STR	21'-6"	747
A2	52	#4	STR	21'-5"	744
✱ B1	82	#5	STR	24'-2"	2067
B2	82	#6	STR	24'-8"	3038
REINFORCING STEEL				LBS.	3,782
✱ EPOXY COATED REINFORCING STEEL				LBS.	2,814
CLASS AA CONCRETE				C.Y.	44.7

SPLICE CHART

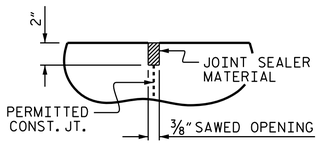
#4 A1	2'-0"
#4 A2	1'-9"



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER



DETAIL "A"

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

4/21/2016

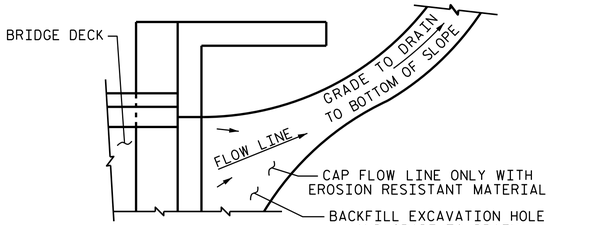
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			26

ASSEMBLED BY : N. D'AIUTO	DATE : 8/25/15		
CHECKED BY : J. K. BOWLES	DATE : 9/15/15		
DRAWN BY : TLA 10/05	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 12/21/11	MAA/GM	
	REV. 6/13	MAA/GM	

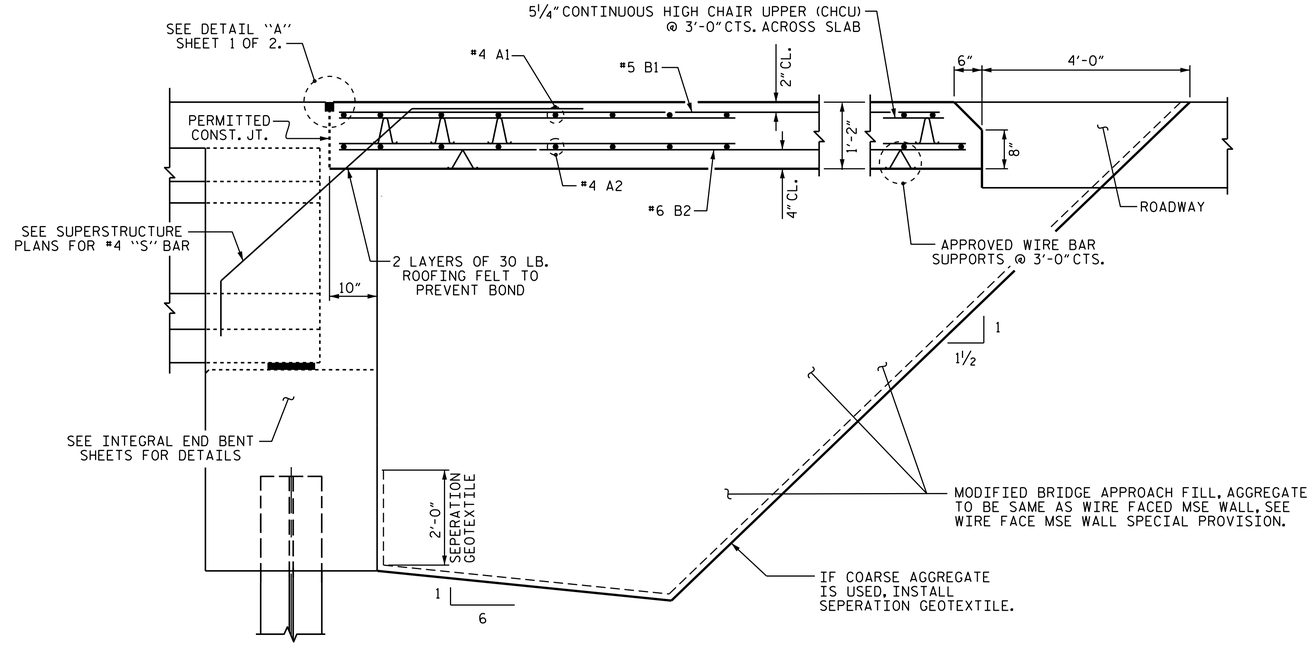
20-APR-2016 09:26
R:\Structures\Plans\B4766_SD_AS_01.dgn
vpatel

STD. NO. BAS5



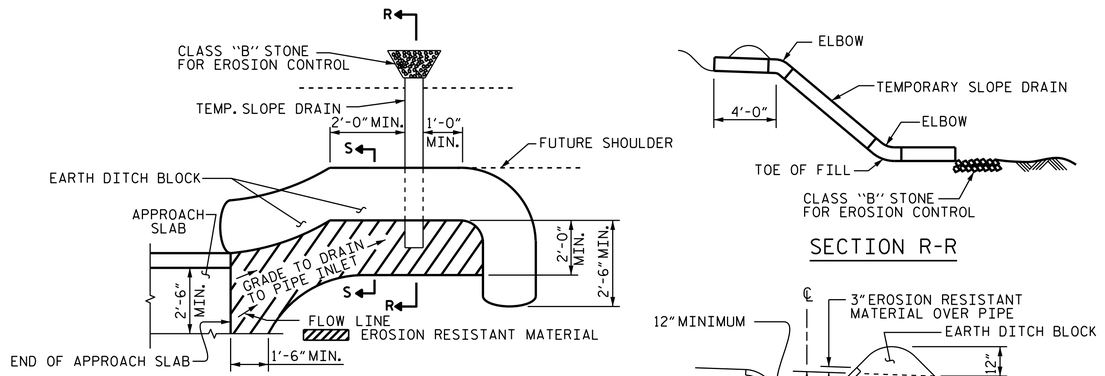
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



SECTION THROUGH SLAB

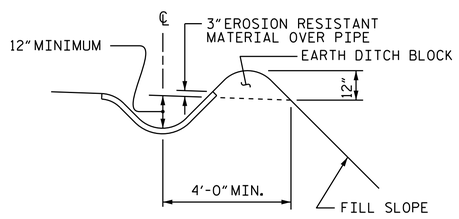
@ END BENT 2



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)

ASSEMBLED BY :	N. D'AIUTO	DATE :	8/25/15
CHECKED BY :	J. K. BOWLES	DATE :	9/15/15
DRAWN BY : FCJ	11/88	REV. 10/17/00	RWW/LES
CHECKED BY : ARB	11/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06RR	MAA/KMM

20-APR-2016 09:26
R:\Structures\Plans\B4766_SD_AS_01.dgn
vpatel

PROJECT NO. B-4766

IREDELL COUNTY

STATION: 16+28.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 23371 ENGINEER VIPUL A. PATEL

DocuSigned by: vipul a patel 1C157DE15D464AA...

4/21/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

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 2012 "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.

REV. 6-16-95 EEM (c) RGW REV. 5-7-03 RWW (c) JTE REV. 10-1-11 MAA (c) GM
REV. 8-16-99 RWW (c) LES REV. 5-1-06 TLA (c) GM

09-FEB-2012 10:06
R:\Structures\Plans\BD_5110P_SD_AS.dgn
jpadams

ENGLISH

JANUARY, 1990

STD. NO. SN