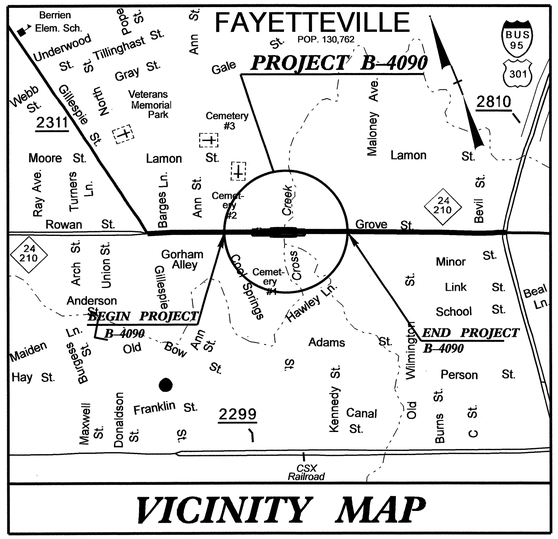
TIP PROJECT: B-4090

CONTRACT: C202724

STRUCTURES



STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

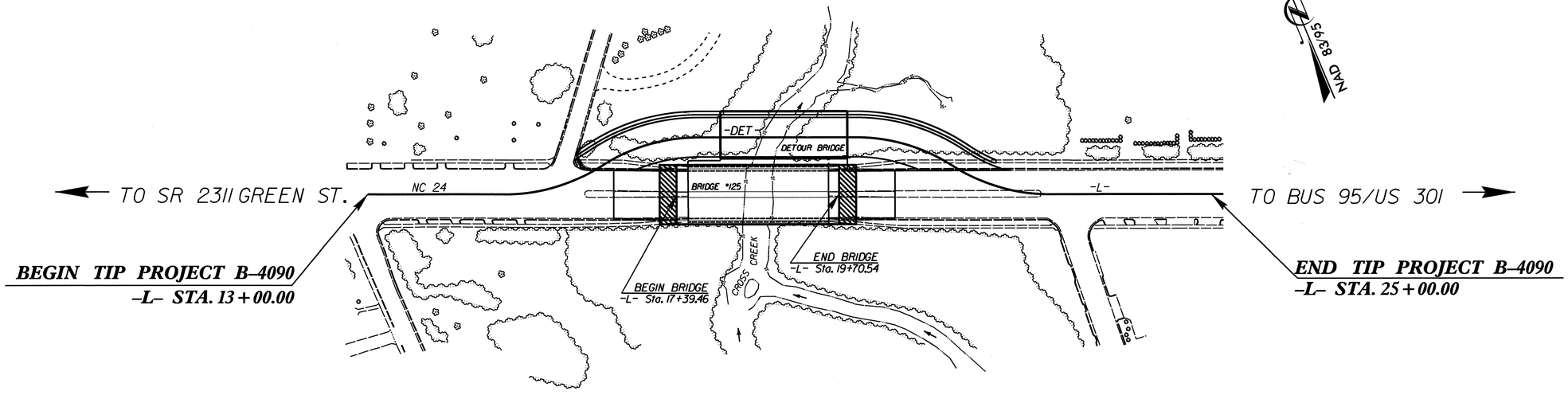
CUMBERLAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4090		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33448.1.1	BRSTP-0024(12)	P.E.
33448.3.1	BRSTP-0024(17)	UTIL. & R/W
33448.2.2	BRSTP-0024(50)	CONST.

LOCATION: BRIDGE No. 125 ON NC 24 (GROVE ST.) OVER CROSS CREEK IN FAYETTEVILLE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE, AND RETAINING WALLS



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2010 = 40,135
ADT 2030 = 63,700
DHV = 10 %
D = 60 %
T = 5 % *
V = 40 MPH

* TTST 2% DUAL 3%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4090 = 0.183 MI

LENGTH STRUCTURE TIP PROJECT B-4090 = 0.044 MI

TOTAL LENGTH TIP PROJECT B-4090 = 0.227 MI

Prepared In the Office of:

DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE :

January 17, 2012

J. C. FRYE, P.E.
PROJECT ENGINEER

T. H. FANG, P.E.
PROJECT DESIGN ENGINEER

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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

F.A. PROJECT NO. BRSTP-0024(50)

17+00
17+50
18+00
18+50
19+00
19+50
20+00
100
90
80
70
60
50
40
FILL FACE @ END BENT 1
STA. 17+39.46 -L-
GRADE PT. EL. 91.530
1'-0" MIN. EARTH BERM
(NORMAL TO CAP)
BEGIN FRONT SLOPE
STA. 17+29.14 -L-
EL. 91.485
EL. 90.0±
EL. 90.0±
EL. 81.0±
1'-6" (TYP.)
HP 12 X 53
STEEL PILES
(TYP.)
RIP RAP
CLASS II
(TYP.)
EXCAVATION
LINE EL. 70.0±
END BENT 1
(INTEGRAL)
SPAN A
GRADE DATA -L-
(+)0.5400%
(-)0.3350%
PI = 18+50.00
EL = 92.150'
VC = 300'
SPAN B
SPAN C
FIXED
FIXED
FIXED
FIXED
EXISTING
SUBSTRUCTURE
(TYP.)
50 YR WSE
EL. 62.4
100 YR WSE
EL. 64.1
N.W.S.
EL. 47.6
EL. 48.0±
EL. 48.0±
BENT 1
BENT 2
PP 24 X 0.625
GALVANIZED
(TYP.)
1'-0" MIN. BERM
(NORMAL TO CAP)
FILL FACE @ END BENT 2
STA. 19+70.54 -L-
GRADE PT. EL. 91.734
BEGIN FRONT SLOPE
STA. 19+80.89 -L-
EL. 91.706
APPROXIMATE
EXISTING
GROUND LINE
EL. 91.0±
EL. 91.0±
EL. 81.0±
EXCAVATION
LINE EL. 81.0±
1½:1 SLOPE
NORMAL TO CAP
(TYP.)
UNCLASSIFIED
STRUCTURE
EXCAVATION
END BENT 2
(INTEGRAL)
SECTION ALONG -L-
(SECTION @ RIGHT ANGLES TO END BENTS)
1'-0" MIN. EARTH BERM
EL. 81.773 (LEVEL) (TYP.)
* TEMPORARY
SHORING #1
1'-7" MIN.
BERM (TYP.)
1'-0" MIN. EARTH BERM
EL. 81.973 (LEVEL)
** RETAINING
WALL NO. 3
* TEMPORARY
SHORING #2
FILL FACE @
END BENT 1
EXISTING
SUBSTRUCTURE
(TYP.)
BENT 1
CONTROL LINE
BENT 2
CONTROL LINE
FILL FACE @
END BENT 2
℄ BRIDGE
STA. 18+55.00 -L-
W.P. #1
STA. 17+39.46-L-
W.P. #2
STA. 18+16.67 -L-
W.P. #3
STA. 18+93.33 -L-
W.P. #4
STA. 19+70.54 -L-
TO GILLESPIE ST.
1½:1
SLOPE
-L-
1½:1
SLOPE
TO BUS 95/US 301
90°-00'-00"
(TYP.)
END APPROACH SLAB
STA 19+94.71
BEGIN FRONT SLOPE
STA 19+80.89
BEGIN FRONT SLOPE
STA. 17+29.14-L-
BEGIN APPROACH SLAB
STA. 17+15.29-L-
RIP RAP
CLASS II
(TYP.)
CROSS CREEK
** RETAINING
WALL NO. 1
** RETAINING
WALL NO. 2
38'-4"
38'-4"
77'-2½"
76'-8"
77'-2½"
231'-1" (FILL FACE END BENT 1 TO FILL FACE END BENT 2)
PLAN
PILES NOT SHOWN FOR CLARITY

* TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC (SEE ROADWAY PLANS)

** FOR DETAILS AND QUANTITY OF RETAINING WALL, SEE "SOLIDER PILE RETAINING WALL" ON SHEETS NO. W-1 & W-2.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 3

REPLACE BRIDGE NO. 125

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER CROSS CREEK ON NC 24 (GROVE ST.) BETWEEN GILLESPIE ST. & BUS 95 / US 301

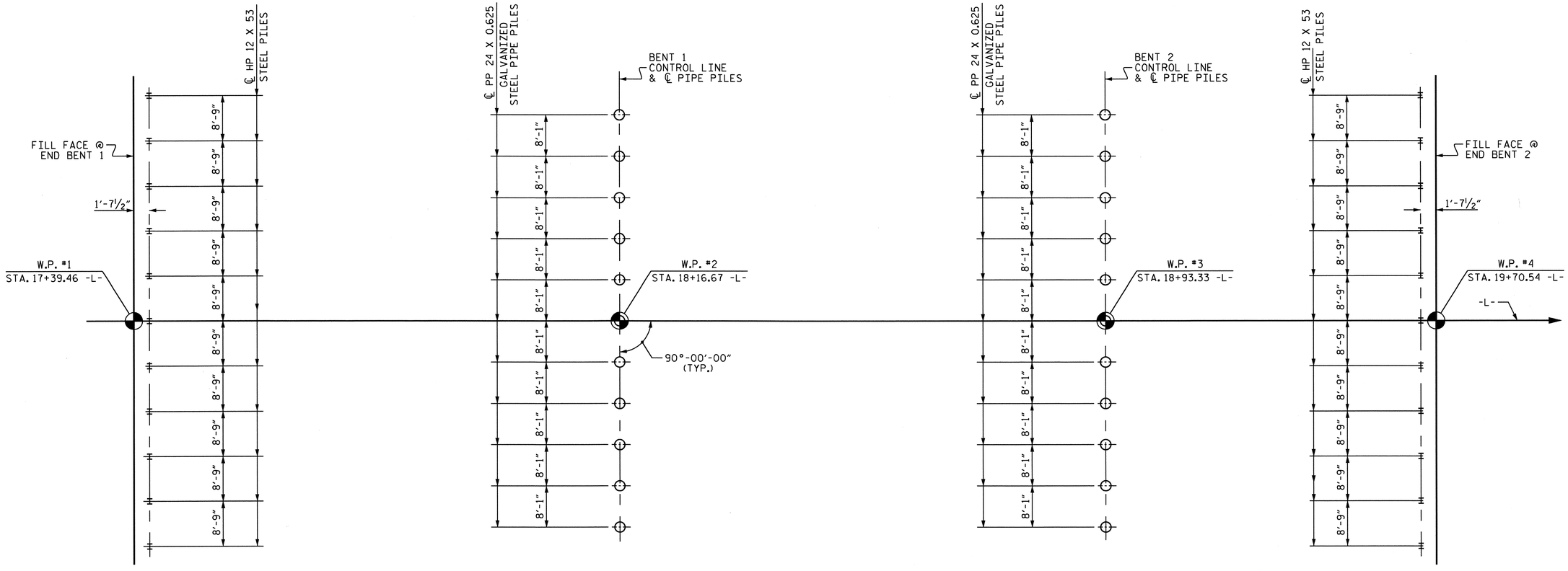
NORTH CAROLINA PROFESSIONAL SEAL 11915 ENGINEER JOHN FRYE 9/22/11

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG 9/21/11

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

DRAWN BY : K.H. COMPTON DATE : 3/11
CHECKED BY : B. MATHEW DATE : 4/11

21-SEP-2011 14:09
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_gd.dgn
tfang



END BENT 1
(INTEGRAL)

BENT 1

BENT 2

END BENT 2
(INTEGRAL)

FOUNDATION LAYOUT

ORIENT PILES AT END BENTS AS SHOWN.

NOTES

FOR PILES, SEE PROJECT SPECIAL PROVISIONS.

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

PILES AT BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 225 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 450 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

DRIVE PILES AT BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 490 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

INSTALL PILES AT BENTS 1 AND 2 TO TIP ELEVATIONS NO HIGHER THAN 25.0 FT AND 23.0 FT, RESPECTIVELY.

SCOUR CRITICAL ELEVATIONS FOR BENTS 1 AND 2 ARE ELEVATIONS 46.0 FT. AND 44.0 FT., RESPECTIVELY. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENTS 1 AND 2. FOR PILE DRIVING ANALYZER, SEE PILES PROJECT SPECIAL PROVISION.

GALVANIZED STEEL PILES ARE REQUIRED IN ACCORDANCE WITH THE PILES PROJECT SPECIAL PROVISION.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 80-125 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENTS 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROJECT SPECIAL PROVISION.

THE ENGINEER MAY REQUIRE REDRIVING PILES UP TO 48 HOURS AS SPECIFIED IN THE PILES PROJECT SPECIAL PROVISION.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG
9/21/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER CROSS CREEK ON NC 24 (GROVE ST.) BETWEEN GILLESPIE ST. & BUS 95 / US 301

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

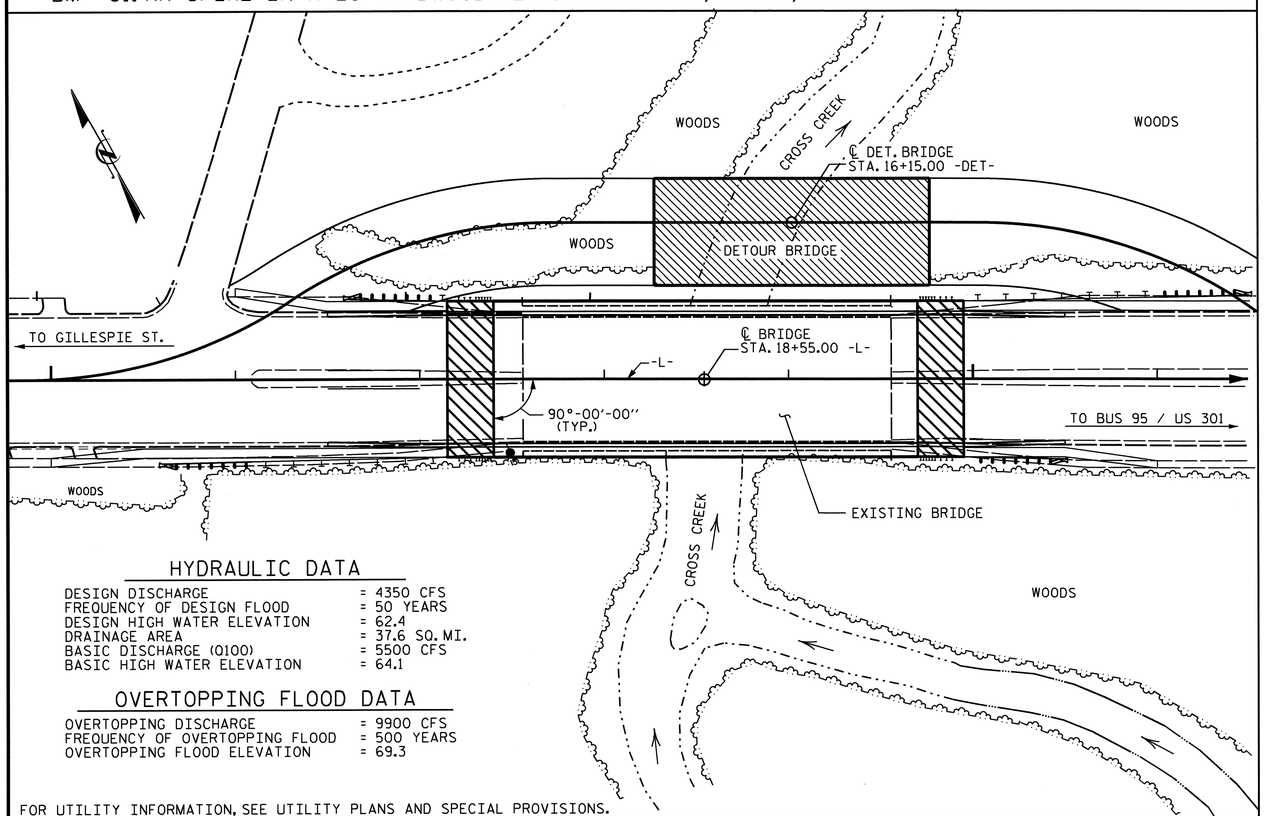
DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 4/11

20-SEP-2011 13:49
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_gd.dgn
qtnguyen

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMP. STRUCTURE	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	PDA ASSISTANCE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDER		HP 12 X 53 STEEL PILES		PP 24 X 0.625 GALVANIZED STEEL PILES		PILE REDRIVES	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	CLASSIC CONCRETE BRIDGE RAIL
	LUMP SUM	LUMP SUM	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	LIN. FT.
SUPERSTRUCTURE						20,181	16,345				27	2,047.5								LUMP SUM		462.17
END BENT 1								47.0		6,856			11	660			4	405	450			
BENT 1			1	1				48.6		6,939					11	825	11					
BENT 2			1	1				48.6		6,939					11	825	11					
END BENT 2								47.0		6,856			11	550			4	80	90			
TOTAL	LUMP SUM	LUMP SUM	2	2	LUMP SUM	20,181	16,345	191.2	LUMP SUM	27,590	27	2,047.5	22	1210	22	1650	30	485	540	LUMP SUM	LUMP SUM	462.17

BM #81: RR SPIKE IN A 20" HARDWOOD -L- STA. 18+03.00, 85' LT., EL. 90.62'



HYDRAULIC DATA

DESIGN DISCHARGE	= 4350 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 62.4
DRAINAGE AREA	= 37.6 SQ. MI.
BASIC DISCHARGE (Q100)	= 5500 CFS
BASIC HIGH WATER ELEVATION	= 64.1

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 9900 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500 YEARS
OVERTOPPING FLOOD ELEVATION	= 69.3

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL- 93 OR ALTERNATE LOADING.

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

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18,"EVALUATING SCOUR AT BRIDGES", MAY, 2001.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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.

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

THE EXISTING STRUCTURE CONSISTING OF 5 SPANS: 1 @ 40'-3", 3 @ 40'-3", 1 @ 40'-3"; 68'-0" CLEAR ROADWAY WIDTH AND A RC FLOOR ON I-BEAMS; END BENTS 1 & 2 AND INTERIOR BENTS 1 & 4 CONSISTING OF RC CAPS ON HP PILES. INTERIOR BENTS 2 & 3 CONSISTING OF RC COLUMNS ON RC FOOTINGS LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 60 FEET RIGHT AND LEFT SIDE AT END BENTS 1 AND 2 OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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.

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 18+55.00-L-."

FOR INTERIOR BENTS 1 AND 2 ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEET(S) FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STA. 18+55.00 -L- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CLASSIC CONCRETE BRIDGE RAIL, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGE DECKS, SEE SPECIAL PROVISIONS.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER HSIANG-FANG TANG
9/22/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER CROSS CREEK ON NC 24 (GROVE ST.) BETWEEN GILLESPIE ST. & BUS 95 / US 301

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

DRAWN BY : HARISH SHAH DATE : 01-14-11
CHECKED BY : B. MATHEW DATE : 4-13-11

22-SEP-2011 12:07
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_gd.dgn
tfang

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)	1.085	--	1.75	0.800	1.78	A	I	37.25	0.957	2.19	A	I	29.8	0.80	0.957	1.08	A	I	37.25	
		HL-93(Opr)	N/A	--	2.312	--	1.35	0.800	2.31	A	I	37.25	0.957	2.84	A	I	29.8	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	(2)	1.518	54.644	1.75	0.863	2.35	A	ER	37.25	0.957	2.71	A	I	29.8	0.80	0.8	1.52	A	I	37.25	
		HS-20(Opr)	36.000	--	3.050	109.805	1.35	0.863	3.05	A	ER	37.25	0.957	3.51	A	I	29.8	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.442	46.468	1.40	0.863	6.67	A	ER	37.25	0.957	7.58	A	I	29.8	0.80	0.8	3.44	A	I	37.25	
		SNGARBS2	20.000	--	2.558	51.167	1.40	0.863	4.96	A	ER	37.25	0.957	5.54	A	I	29.8	0.80	0.8	2.56	A	I	37.25	
		SNAGRIS2	22.000	--	2.420	53.239	1.40	0.863	4.69	A	ER	37.25	0.957	5.20	A	I	29.8	0.80	0.8	2.42	A	I	37.25	
		SNCOTTS3	27.250	--	1.713	46.671	1.40	0.863	3.32	A	ER	37.25	0.957	3.80	A	I	29.8	0.80	0.8	1.71	A	I	37.25	
		SNAGGRS4	34.925	--	1.429	49.896	1.40	0.863	2.77	A	ER	37.25	0.957	3.26	A	I	29.8	0.80	0.8	1.43	A	I	37.25	
		SNS5A	35.550	--	1.397	49.673	1.40	0.863	2.71	A	ER	37.25	0.957	3.35	A	I	29.8	0.80	0.8	1.40	A	I	37.25	
		SNS6A	39.950	--	1.281	51.172	1.40	0.863	2.48	A	ER	37.25	0.957	3.10	A	I	29.8	0.80	0.8	1.28	A	I	37.25	
		SNS7B	42.000	--	1.220	51.231	1.40	0.863	2.36	A	ER	37.25	0.957	3.11	A	I	29.8	0.80	0.8	1.22	A	I	37.25	
	TTST	TNAGRIT3	33.000	--	1.562	51.535	1.40	0.863	3.03	A	ER	37.25	0.957	3.66	A	I	29.8	0.80	0.8	1.56	A	I	37.25	
		TNT4A	33.075	--	1.568	51.87	1.40	0.863	3.04	A	ER	37.25	0.957	3.52	A	I	29.8	0.80	0.8	1.57	A	I	37.25	
		TNT6A	41.600	--	1.281	53.298	1.40	0.863	2.48	A	ER	37.25	0.957	3.43	A	I	29.8	0.80	0.8	1.28	A	I	37.25	
		TNT7A	42.000	--	1.287	54.056	1.40	0.863	2.49	A	ER	37.25	0.957	3.34	A	I	29.8	0.80	0.8	1.29	A	I	37.25	
		TNT7B	42.000	--	1.330	55.864	1.40	0.863	2.58	A	ER	37.25	0.957	2.99	A	I	29.8	0.80	0.8	1.33	A	I	37.25	
		TNAGRIT4	43.000	--	1.266	54.453	1.40	0.863	2.45	A	ER	37.25	0.957	2.88	A	I	29.8	0.80	0.8	1.27	A	I	37.25	
		TNAGT5A	45.000	--	1.194	53.752	1.40	0.863	2.31	A	ER	37.25	0.957	2.93	A	I	29.8	0.80	0.8	1.19	A	I	37.25	
		TNAGT5B	45.000	(3)	1.180	53.122	1.40	0.863	2.29	A	ER	37.25	0.957	2.73	A	I	29.8	0.80	0.8	1.18	A	I	37.25	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1. SPANS B AND C RATING ARE SIMILAR
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

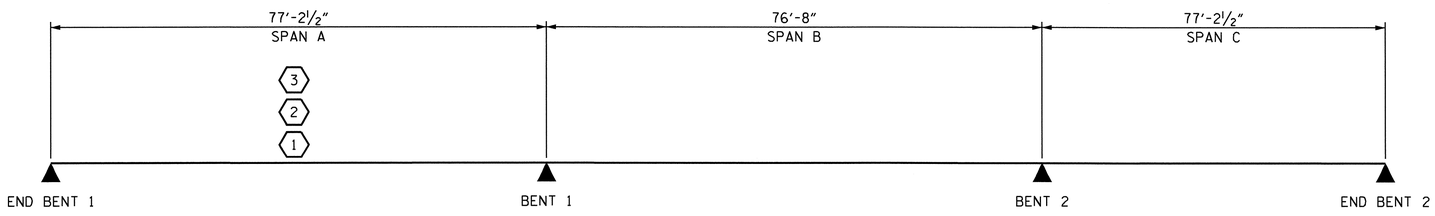
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSUNG FANG
8/9/11

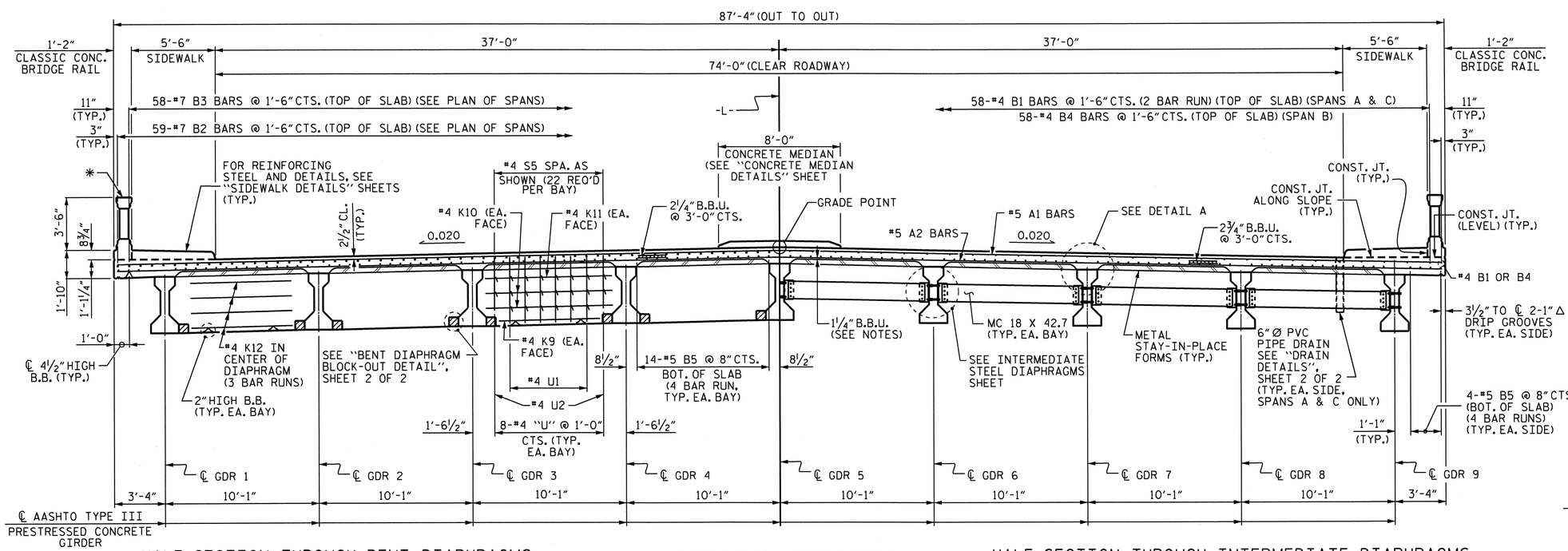
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			41

STD. NO. LRFR1

ASSEMBLED BY : RAMAN PATEL DATE : 07-29-11
CHECKED BY : E. I. OMILE DATE : 08-01-11

DRAWN BY : MAA 1/08 REV. 11/12/08R MAA/GM
CHECKED BY : GM/DI 2/08

09-AUG-2011 14:35
Y:\TIPProjects-B\B4090\Structures\Final Plans\B4090_sd_lrfr.dgn
OTNGUYEN

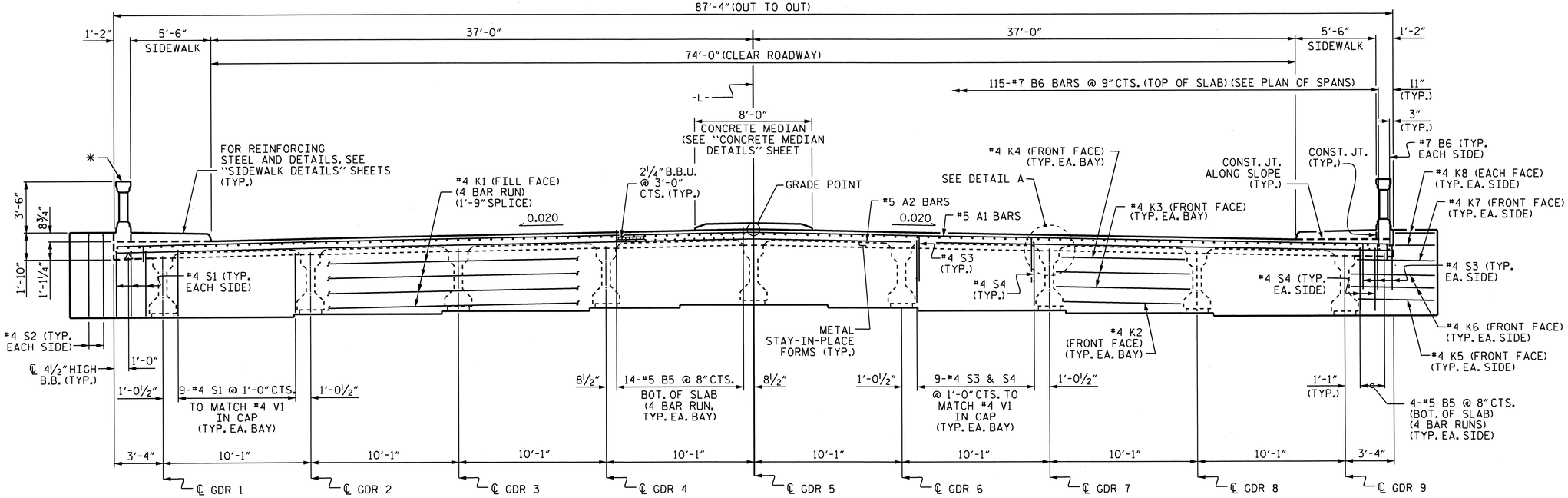


HALF-SECTION THROUGH BENT DIAPHRAGMS

HALF-SECTION THROUGH INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

✱ FOR CLASSIC BRIDGE RAIL REINFORCING STEEL AND DETAILS, SEE "CLASSIC CONCRETE BRIDGE RAIL WITH SIDEWALK" SHEETS.



TYPICAL SECTION

SECTION SHOWING ABUTMENT WALL @ END BENT

✱ FOR CLASSIC BRIDGE RAIL REINFORCING STEEL AND DETAILS, SEE "CLASSIC CONCRETE BRIDGE RAIL WITH SIDEWALK" SHEETS.

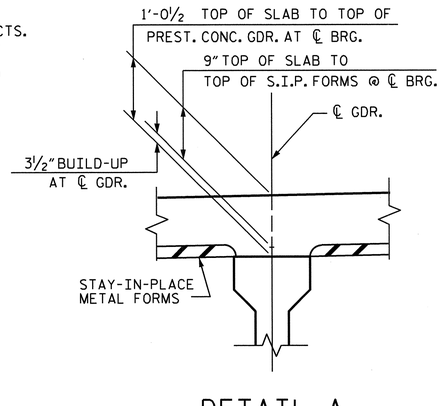
NOTES

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.

CLASSIC BRIDGE RAIL SIDEWALK AND MEDIAN 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 WING ELEVATIONS AND DETAILS, SEE "PLAN OF SPANS DETAILS" SHEETS.



DETAIL A

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG YANG 9/21/11

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

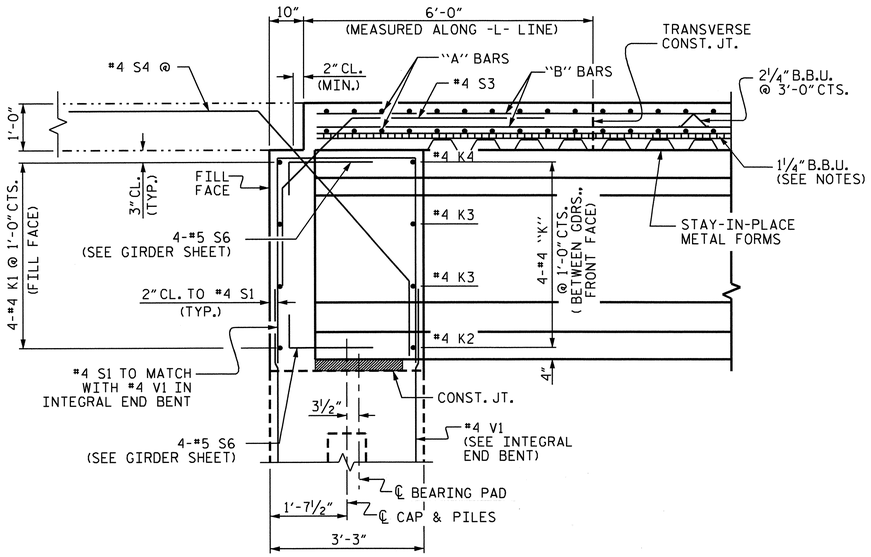
SUPERSTRUCTURE

TYPICAL SECTION

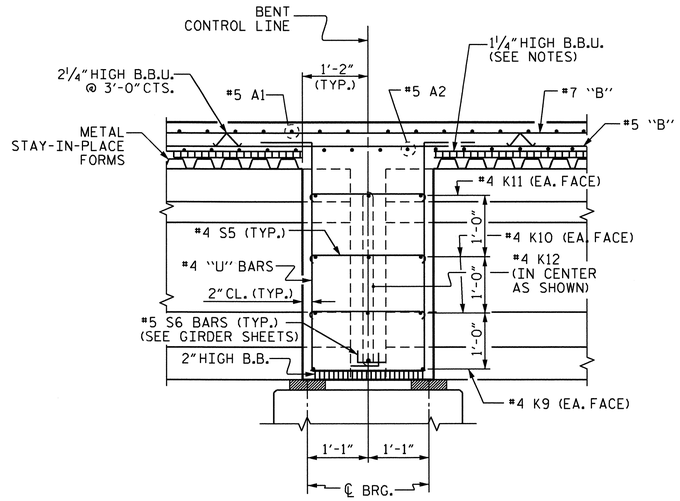
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

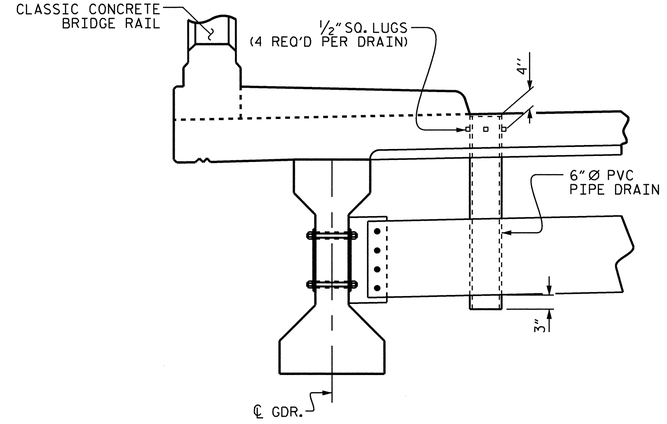
20-SEP-2011 13:49
Y:\TIPProjects-B\B4090\Structures\FinalPlans\b4090_sd_ts.dgn
qtnguyen



SECTION THROUGH INTEGRAL END BENT



SECTION THROUGH BENT DIAPHRAGM



DRAIN DETAILS

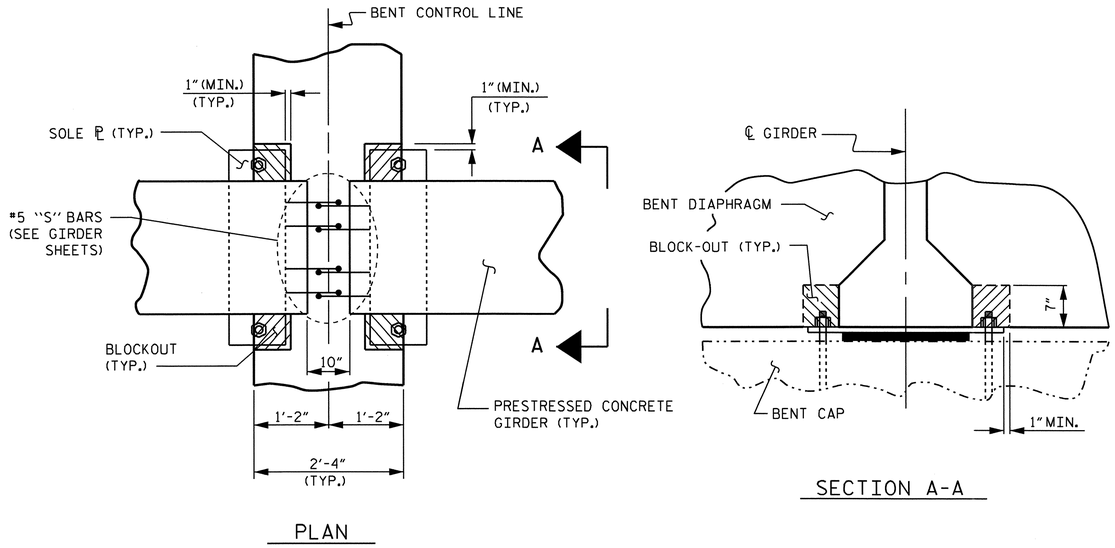
TOP OF FLOOR DRAIN TO BE SET ⅜" BELOW SURFACE OF SLAB.

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

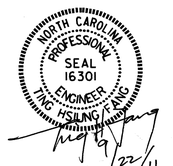
THE 6" Ø PVC PIPES AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY THE ENGINEER.

SEE PLAN OF SPANS FOR LOCATION OF 6" Ø PVC PIPE DRAINS.



BENT DIAPHRAGM BLOCKOUT DETAIL



PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

22-SEP-2011 08:25
K:\TIPProjects-B\B4090\Structures\FinalPlans\b4090_sd_ts.dgn
tfang

231'-1" (TOTAL BRIDGE LENGTH)

77'-2½" SPAN A

BENT 1 CONTROL LINE

28'-0" | 28'-0"

11'-6" | 11'-6"

6'-10"

W1

#7 B6 (TYP. EA. SIDE)

CLASSIC CONC. BRIDGE RAIL

#4 B1 (TYP. EA. SIDE)

2'-0" MIN. SPLICE (TYP.)

#7 B2 (TYP. EA. SIDE)

1'-2"

5'-6" SIDEWALK

SEE DETAIL "A"

11" (TYP.) | 3" (TYP.) | 3" (TYP.) | 11" (TYP.) | 1'-8" (TYP.) | 11" (TYP.) | 3" (TYP.)

SIDEWALK

℄ GDR. A1

GUTTERLINE

115-#7 B6 @ 9" CTS. (TOP OF SLAB)

58-#4 B1 @ 1'-6" CTS. (2 BAR RUN) (TOP OF SLAB)

57-#7 B2 @ 1'-6" CTS. (TOP OF SLAB)

58-#7 B3 @ 1'-6" CTS. (TOP OF SLAB)

1'-0½"

℄ GDR. A2

9-#4 S3 & S4 @ 1'-0" CTS. (TYP. EA. BAY)

#4 S5 @ 1'-0" CTS. (TYP. EA. BAY) (22 REQ'D. EA. BAY)

℄ GDR. A3

1'-0½"

TRANSVERSE CONST. JT.

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

10" BLOCKOUT

℄ GDR. A4

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

W.P. #1

W.P. #2

4-#4 K12 @ ℄ DIAPHRAGM (3 BAR RUN) (1'-9" SPLICE)

-L-

℄ GDR. A5

87'-4" (DECK WIDTH)

74'-0" (CLEAR ROADWAY)

85'-0" (BLOCKOUT)

37'-0"

37'-0"

4-#4 K1 (4 BAR RUN) (1'-9" SPLICE)

TRANSVERSE CONST. JT.

90°-00'-00" (TYP.)

2'-4" BENT DIAPHRAGM (TYP.)

℄ GDR. A6

8½" (TYP.)

14-#5 B5 @ 8" CTS. (BOTTOM OF SLAB) (2'-2" SPLICE) (4 BAR RUN) (TYP. EA. BAY)

PERMITTED CONST. JT.

FILL FACE @ END BENT 1

℄ GDR. A7

1'-0½"

8½" (TYP.)

1'-6½"

9-#4 S1 @ 1'-0" CTS. TO MATCH #4 V1 BARS IN CAP (TYP. EA. BAY)

8-#4 "U" @ 1'-0" CTS. (TYP. EA. BAY)

℄ GDR. A8

1'-0½"

1'-6½"

GUTTER LINE

5'-6" SIDEWALK

℄ GDR. A9

SIDEWALK

1'-1" (TYP.)

1'-2"

10'-6"

6-6" Ø PVC PIPE @ 12'-0" CTS. (TYP. EA. SIDE)

4-#5 B5 @ 8" CTS. (BOTTOM OF SLAB) (4 BAR RUN) (TYP. EA. SIDE)

6'-0" | 6'-0"

CLASSIC CONC. BRIDGE RAIL

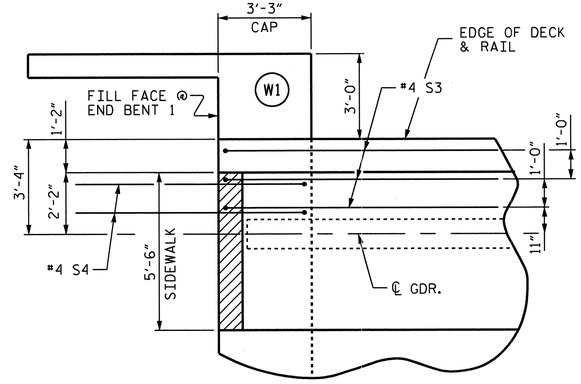
W2

1'-2¼"

500-#5 A1 @ 5½" CTS. (TOP OF SLAB) (2 BAR RUN)

500-#5 A2 @ 5½" CTS. (BOTTOM OF SLAB) (2 BAR RUN)

PLAN OF SPAN A



DETAIL "A"

S1 BARS NOT SHOWN FOR CLARITY.
WING WALL W1 SHOWN. OTHER WINGS SIMILAR.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG FANG
9/21/11

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

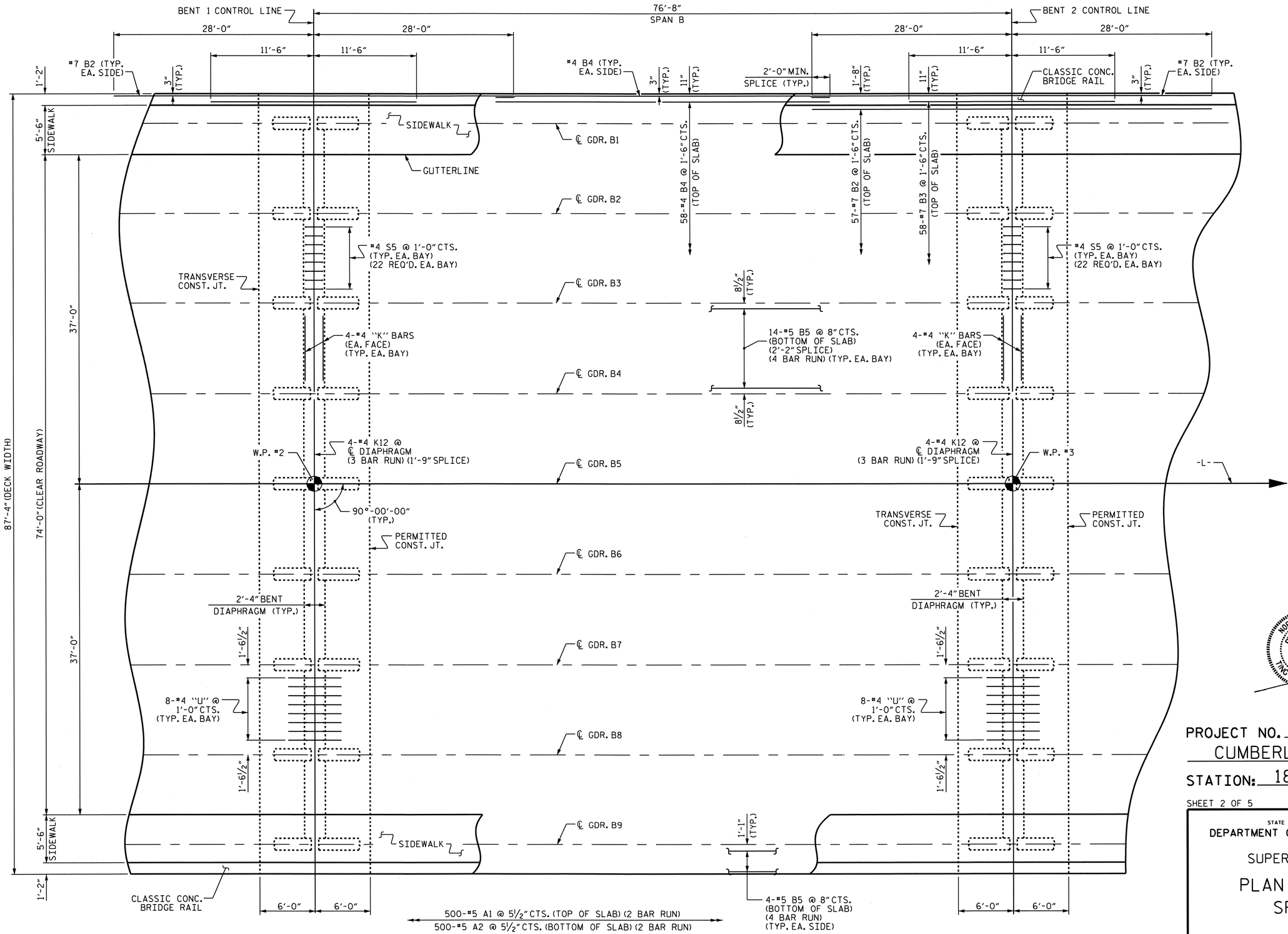
SUPERSTRUCTURE

PLAN OF SPAN
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

20-SEP-2011 13:49
Y:\TIPProjects-B\B4090\Structures\FinalPlans\b4090_sd_s*.dgn
qtnguyen



PLAN OF SPAN B

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\Final Plans\b4090_sd_s*.dgn
OTNGUYEN

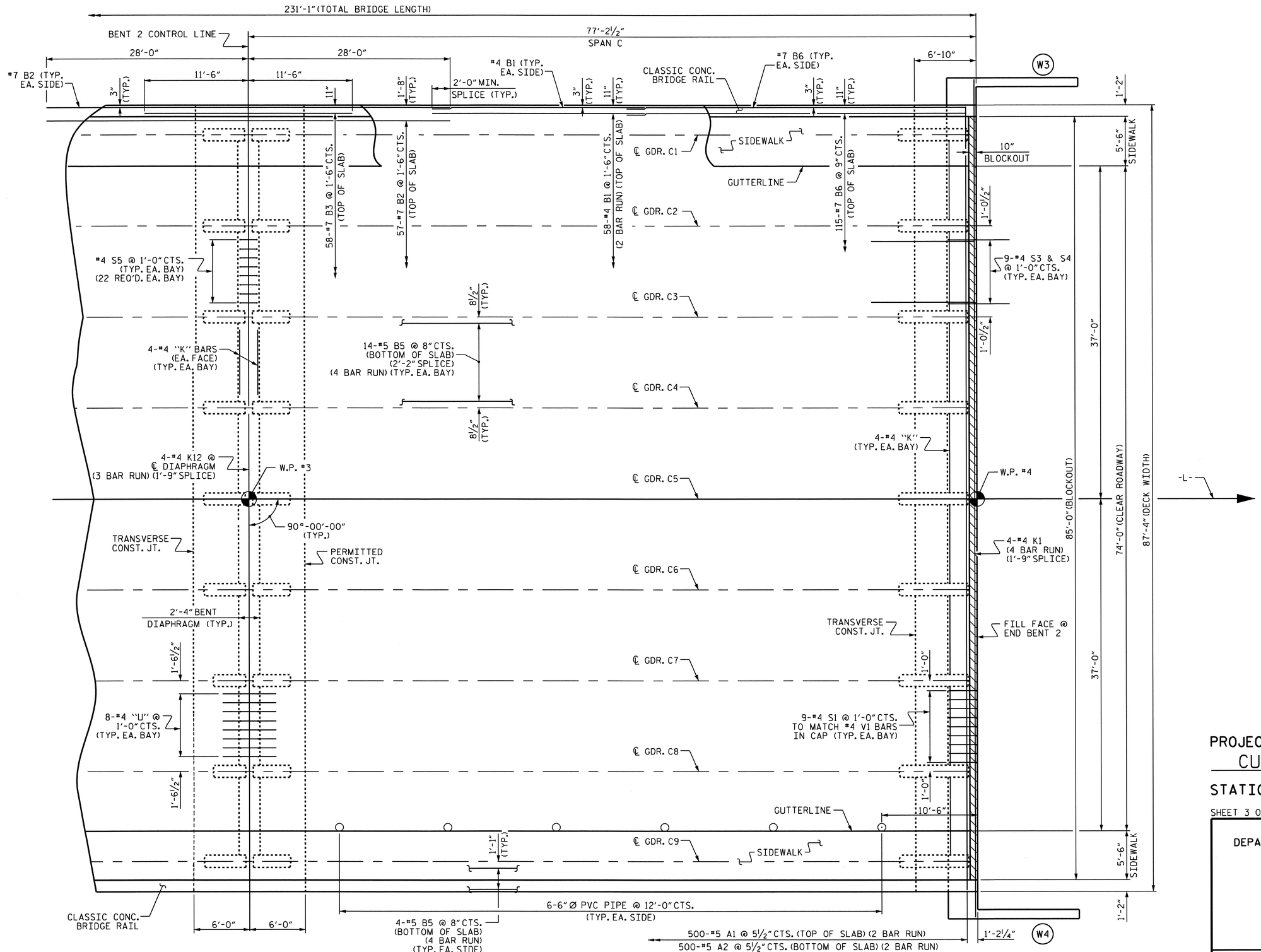
NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG LIANG
8/9/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			41



PLAN OF SPAN C

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\b4090_sd_s*.dgn
OTNGUYEN

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER
8/9/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

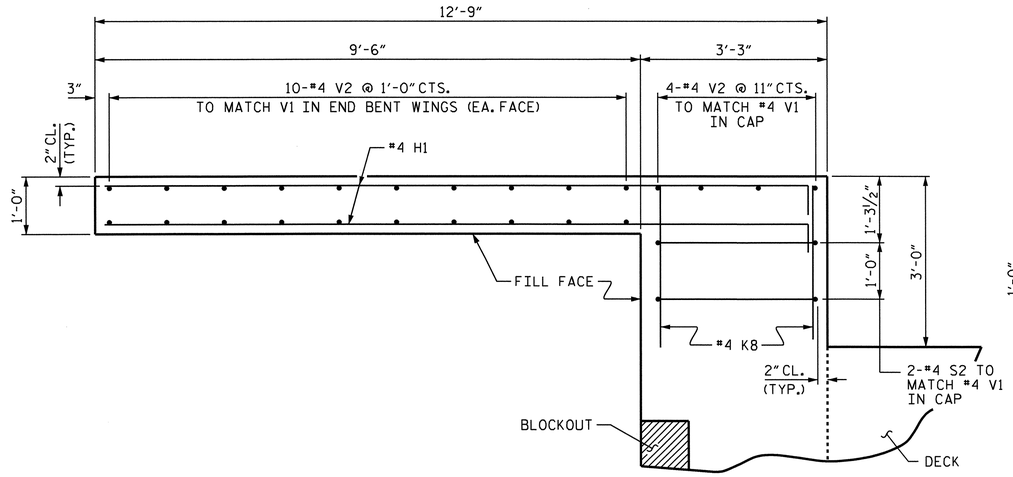
SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

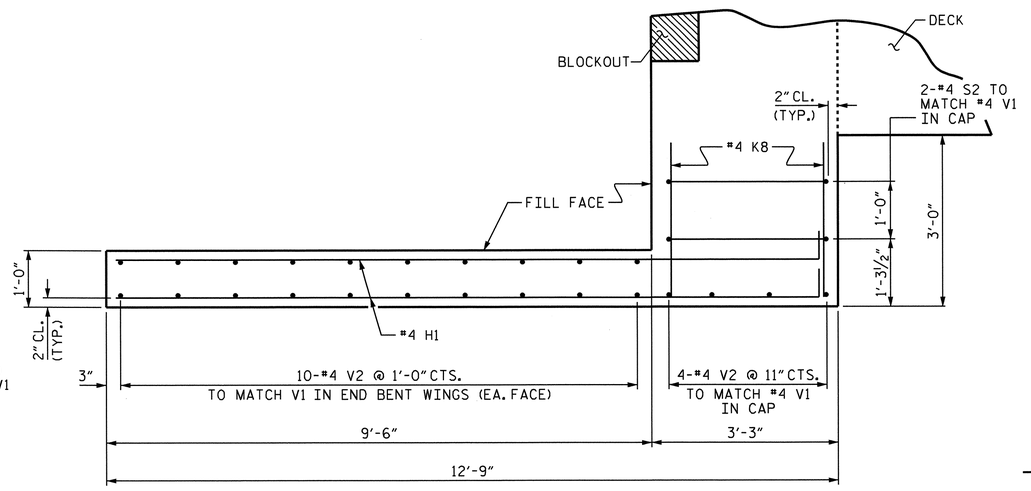
SUPERSTRUCTURE

PLAN OF SPAN C

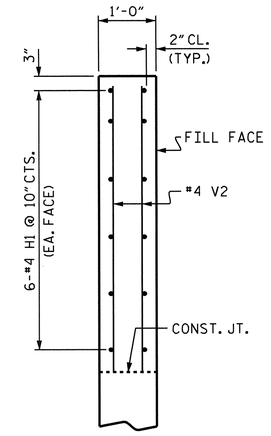
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			41



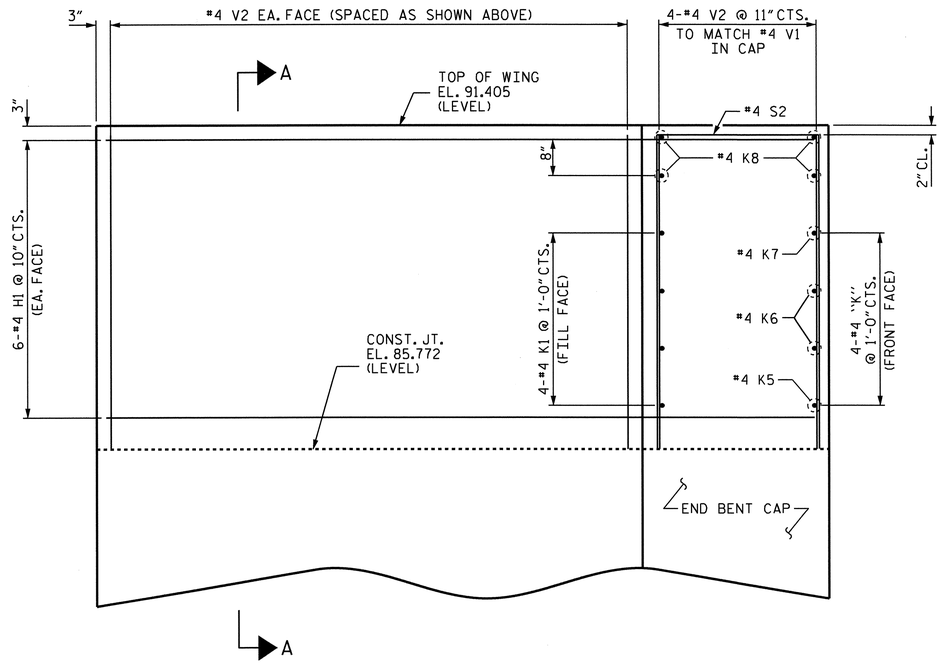
PLAN OF WING (W1)



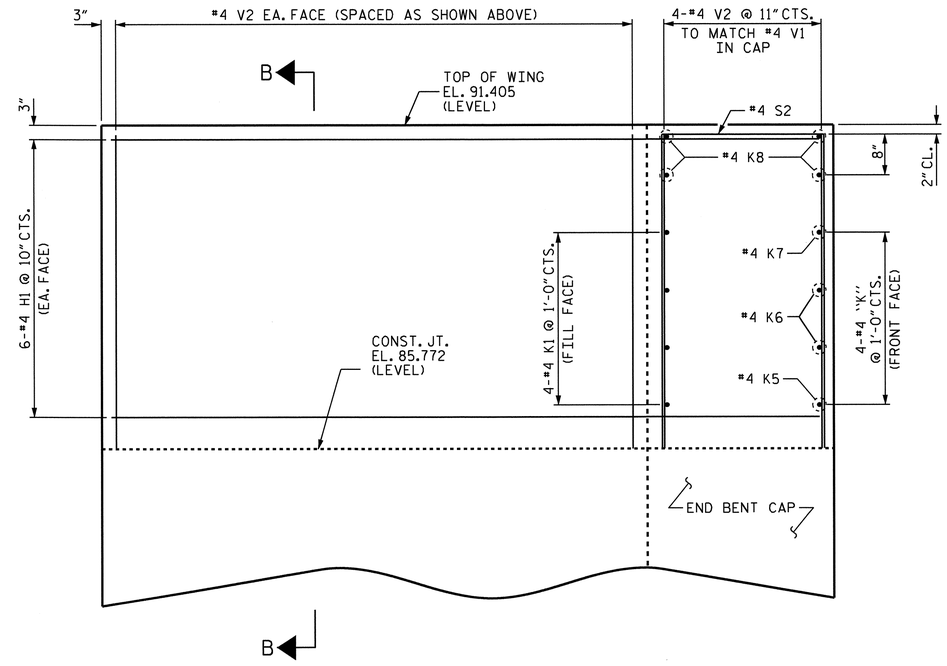
PLAN OF WING (W2)



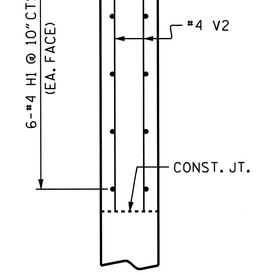
SECTION A-A



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION B-B

ABUTMENT WINGS

FOR END BENT REINFORCING STEEL AND DETAILS, SEE "SUBSTRUCTURE END BENTS 1 & 2" SHEETS.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSING FANG
8/9/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

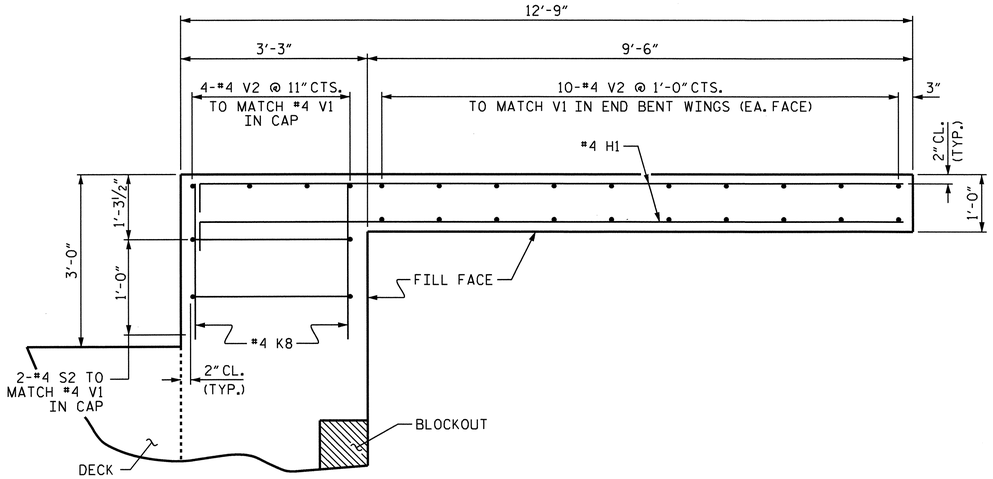
SUPERSTRUCTURE

PLAN OF SPAN DETAILS

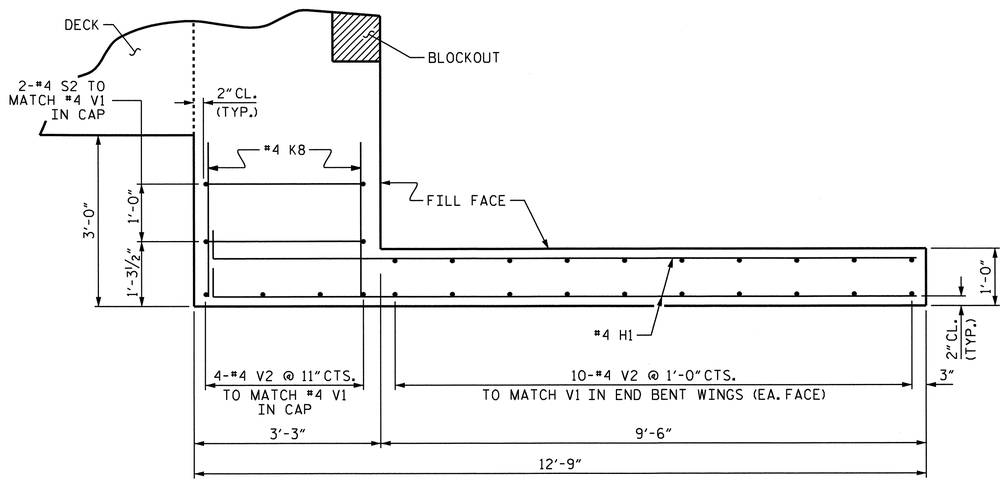
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

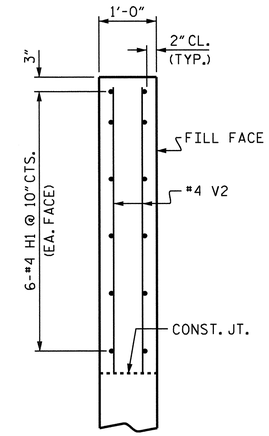
09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\b4090_sd_s*.dgn
OTNGUYEN



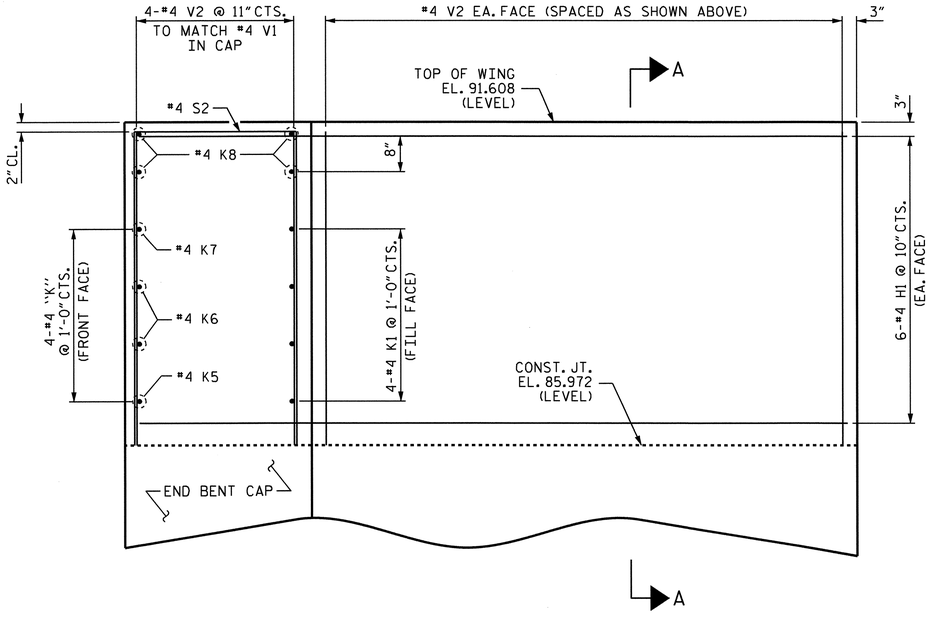
PLAN OF WING (W3)



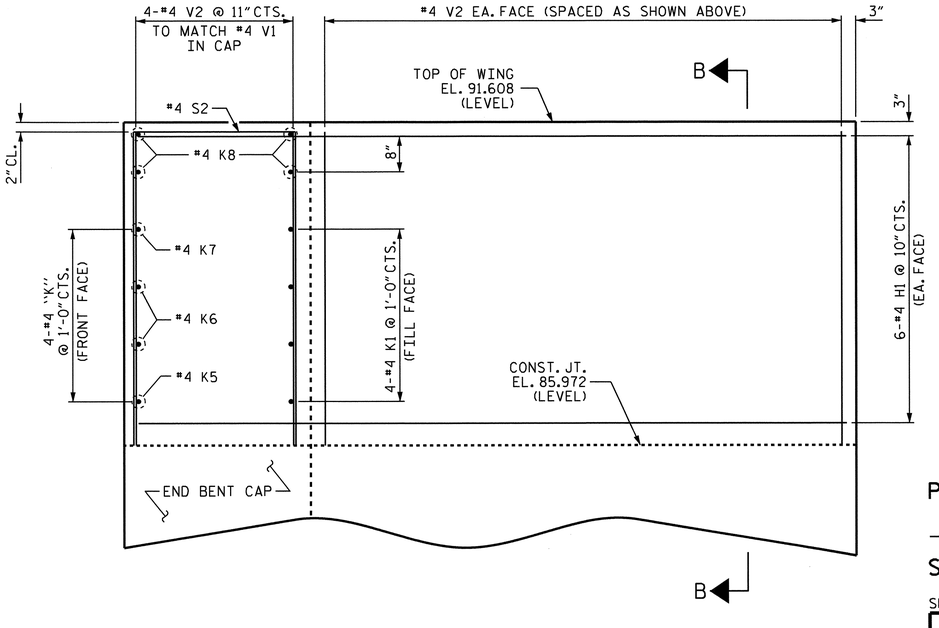
PLAN OF WING (W4)



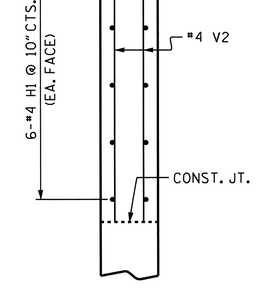
SECTION A-A



ELEVATION OF WING (W3)



ELEVATION OF WING (W4)



SECTION B-B

ABUTMENT WINGS

FOR END BENT REINFORCING STEEL AND DETAILS,
SEE "SUBSTRUCTURE END BENTS 1 & 2" SHEETS.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER JING HSIUNG KANG
8/9/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

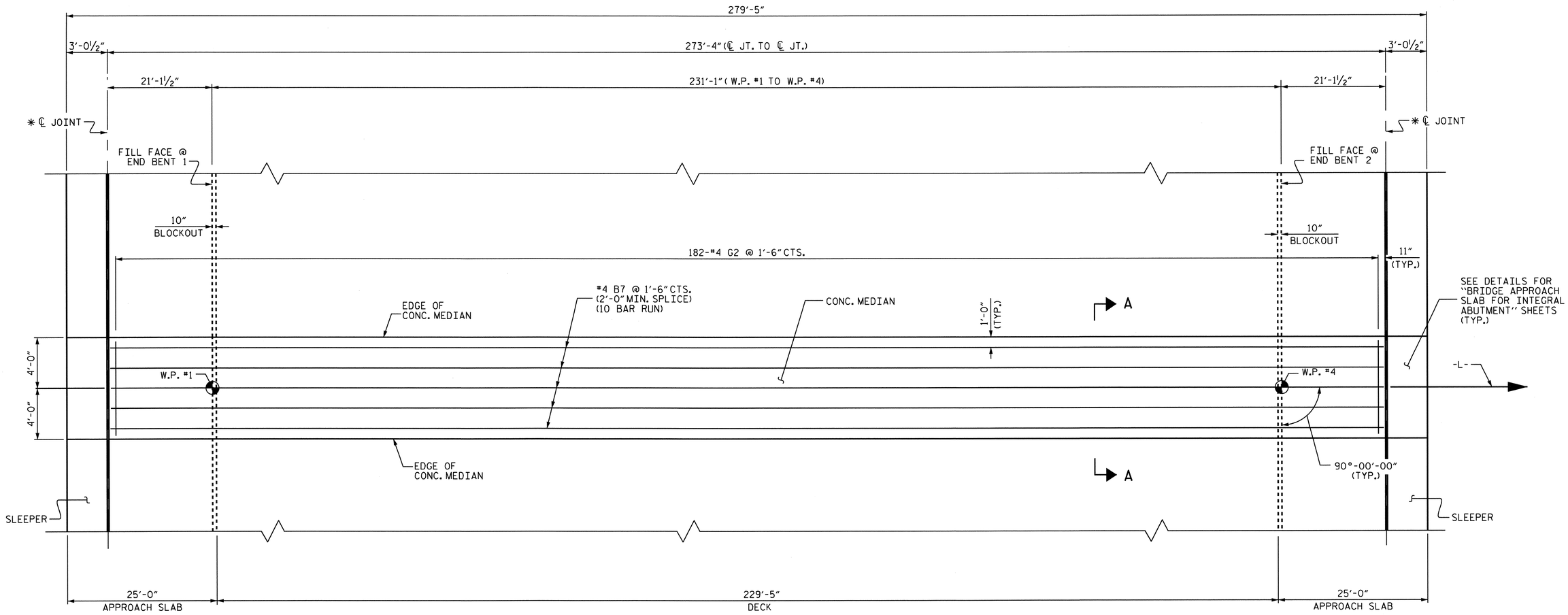
SUPERSTRUCTURE

PLAN OF SPAN DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

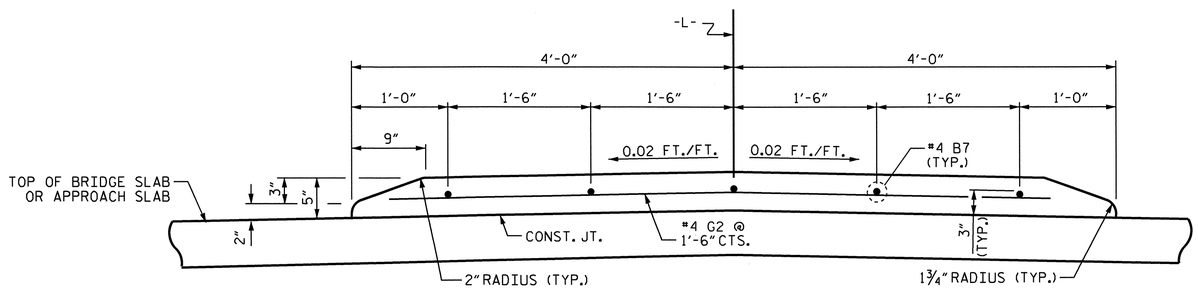
09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\b4090_sd_s*.dgn
OTNGUYEN



PLAN

* FOR EVAZOTE JOINT DETAILS IN APPROACH SLAB, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" DETAILS

ALL REINFORCING STEEL IN THE CONCRETE MEDIAN SHALL BE EPOXY COATED.



SECTION A-A

FOR CONCRETE MEDIAN ON SLEEPER SLABS, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEETS.

SEE NOTES ON "SIDEWALK DETAILS" SHEET.

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

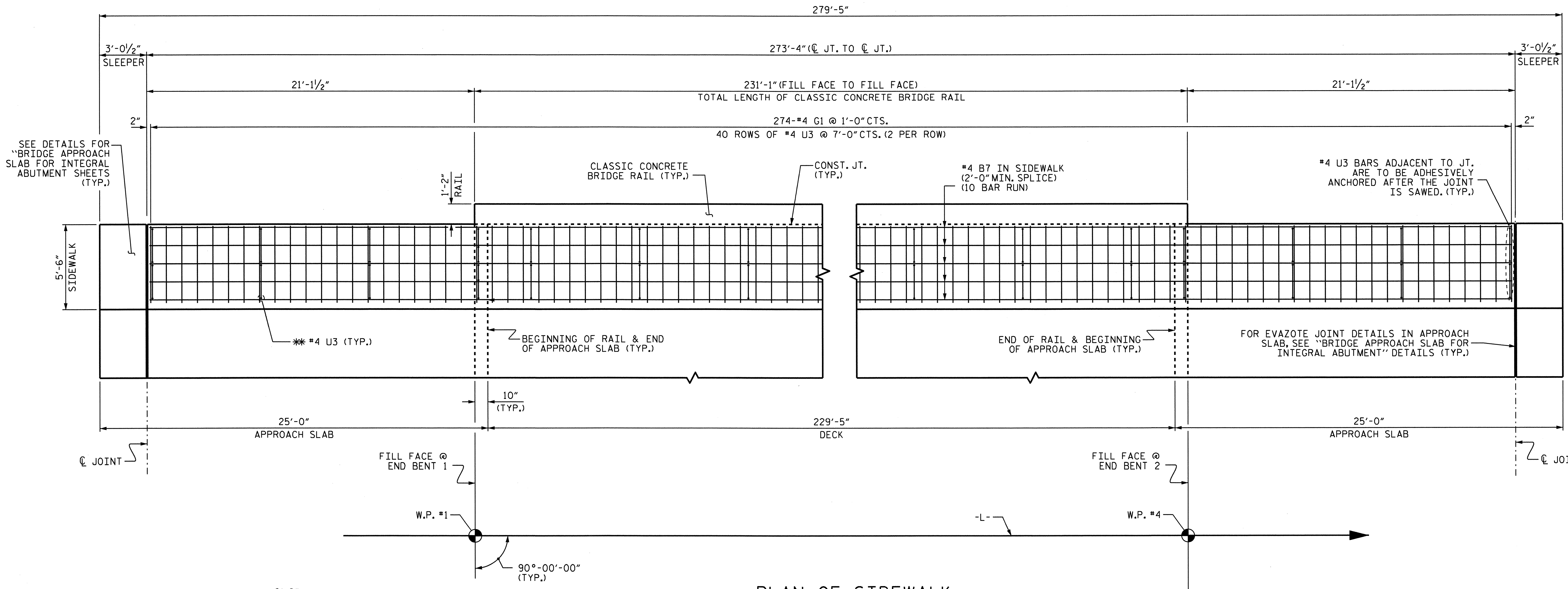
CONCRETE MEDIAN DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG FANG
8/9/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			41

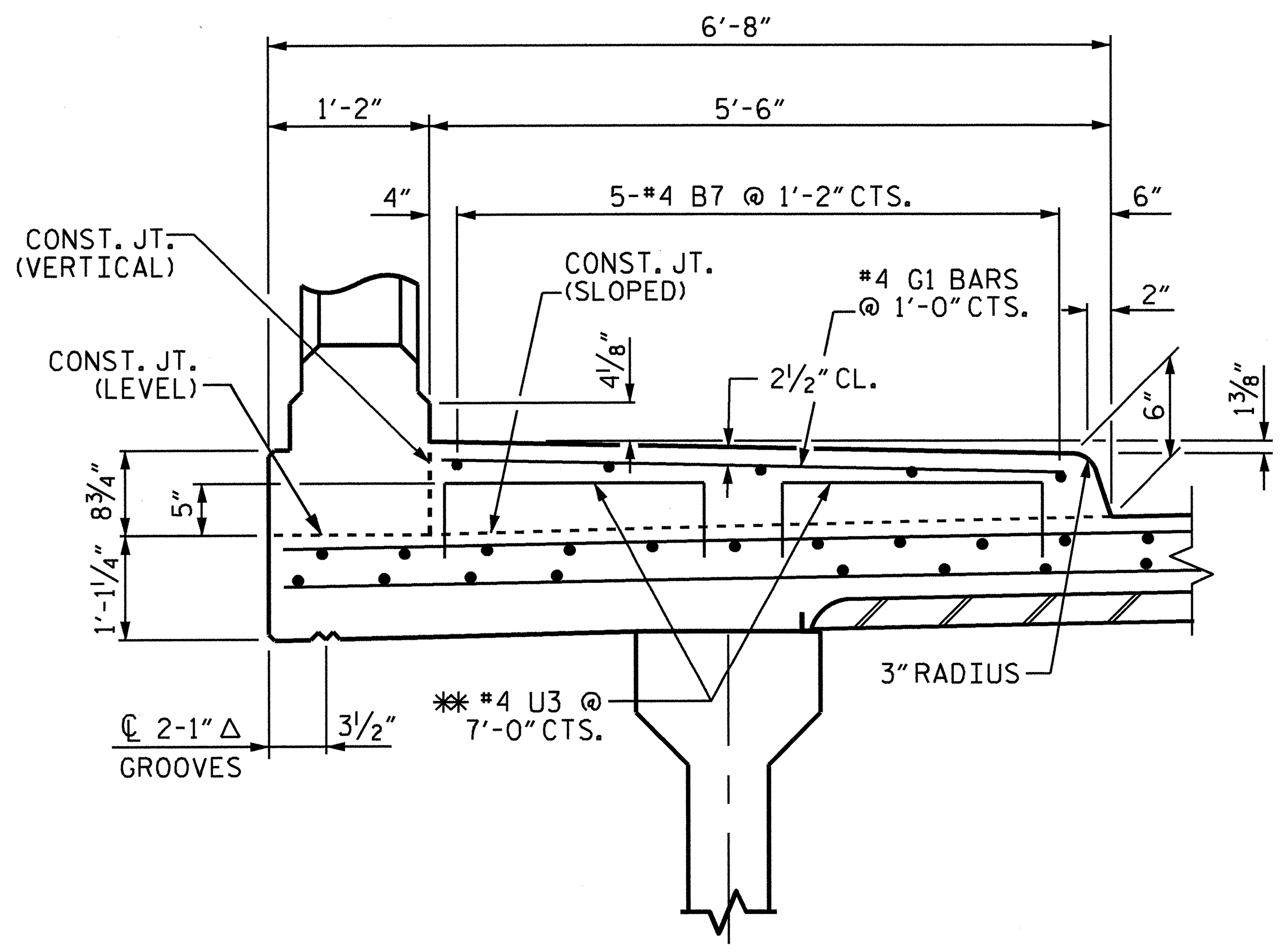
DRAWN BY : OT NGUYEN DATE : 7/27/11
CHECKED BY : T. H. FANG DATE : 7/28/11

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\Final Plans\B4090_SD_MD.dgn
OTNGUYEN



PLAN OF SIDEWALK

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR



SECTION THRU SIDEWALK

FOR SECTION AND DETAILS ON SLEEPER SLABS SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET.

NOTES:

THE JOINTS IN THE APPROACH SLABS SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK & CONCRETE MEDIAN.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK & CONCRETE MEDIAN IN ACCORDANCE WITH ARTICLE B25-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR SIDEWALK COVER PLATE DETAILS, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEETS.

FOR SIDEWALK AND CONCRETE MEDIAN DETAILS ON SLEEPER SLABS, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEETS.

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

✱✱ THE #4 U3 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER DECK OR APPROACH SLAB HAS BEEN SCREEDED OFF, EXCEPT AS NOTED.

SIDEWALKS AND CONCRETE MEDIAN ON THE BRIDGE EXTENDING TO THE EXPANSION JOINT IN THE APPROACH SLABS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL AND PAID FOR AS PART OF THE REINFORCED CONCRETE DECK PAY ITEM. SIDEWALKS ON THE SLEEPER SLAB ONLY ARE INCLUDED IN THE APPROACH SLAB BILL OF MATERIAL AND PAID FOR AS PART OF THE BRIDGE APPROACH SLABS PAY ITEM.

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

ALL REINFORCING STEEL IN THE SIDEWALKS AND MEDIAN SHALL BE EPOXY COATED.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 16301 TING HSUNG FANG
9/21/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

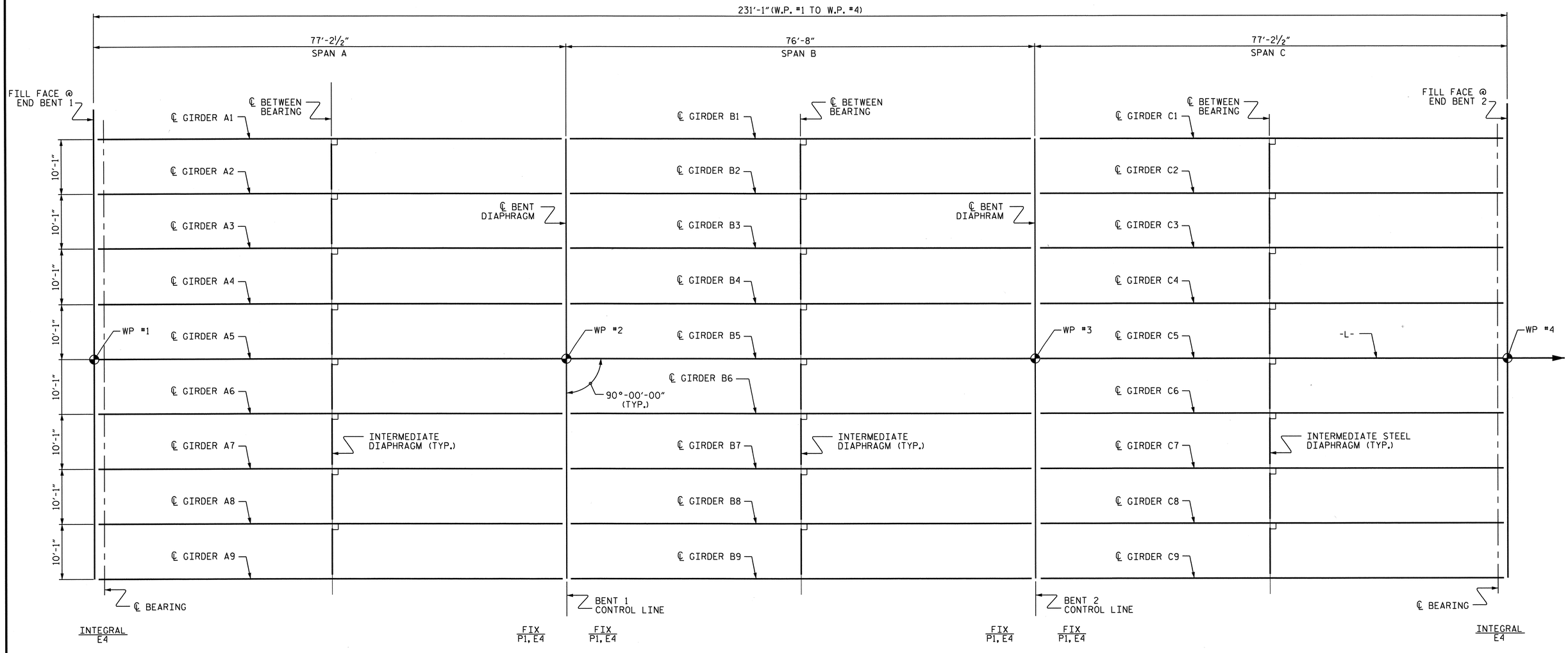
SUPERSTRUCTURE

SIDEWALK DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K. H. COMPTON DATE : 2/11
CHECKED BY : O. T. NGUYEN DATE : 7/11

20-SEP-2011 13:49
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_sw.dgn
qtnguyen



FRAMING PLAN

DEAD LOAD DEFLECTION TABLE

0.6" Ø LOW RELAXATION	SPANS A, B & C																					
	GIRDERS 1 & 9											GIRDERS 2 - 8										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	1.223	2.314	3.169	3.711	3.897	3.711	3.169	2.314	1.223	0	0	1.223	2.314	3.169	3.711	3.897	3.711	3.169	2.314	1.223	0
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.413	0.782	1.071	1.254	1.317	1.254	1.071	0.782	0.413	0	0	0.468	0.885	1.211	1.419	1.490	1.419	1.211	0.885	0.469	0
FINAL CAMBER ↑	0	13/16"	1 9/16"	2 1/8"	2 7/16"	2 9/16"	2 7/16"	2 1/8"	1 9/16"	13/16"	0	0	3/4"	1 7/16"	1 15/16"	2 5/16"	2 7/16"	2 5/16"	1 15/16"	1 7/16"	3/4"	0

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

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

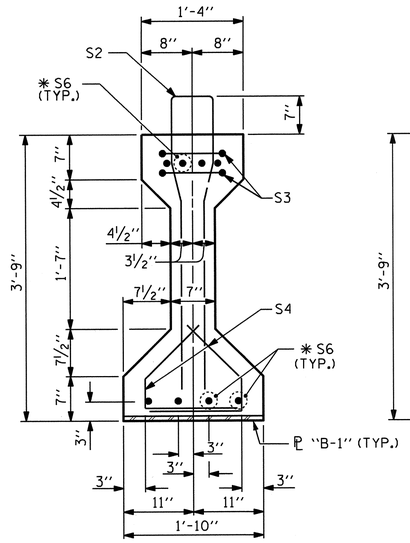
FRAMING PLAN & DEAD LOAD DEFLECTIONS

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER YING HSIANG FANG
9/22/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			41

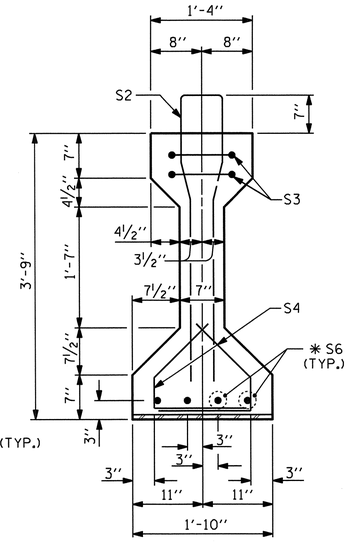
DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : J.H. CARDEN DATE : 3/11

22-SEP-2011 10:36
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_fpdd.dgn
tfang

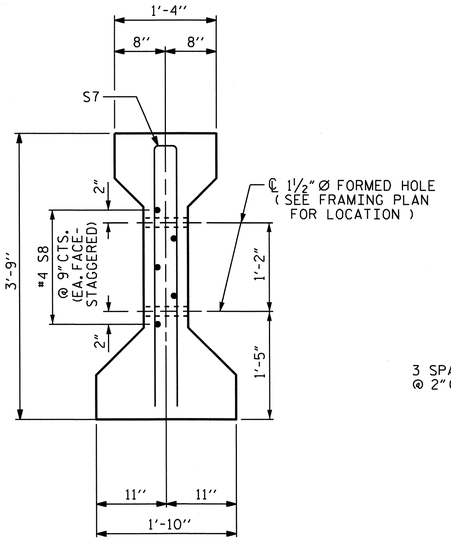


SECTION A-A

(FOR EMBEDDED ℄ "B-1" DETAILS SEE SHEET 3 OF 3)

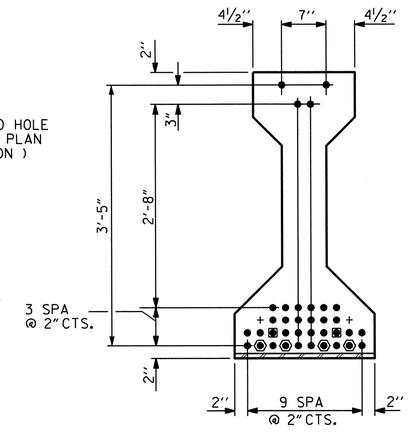


SECTION B-B

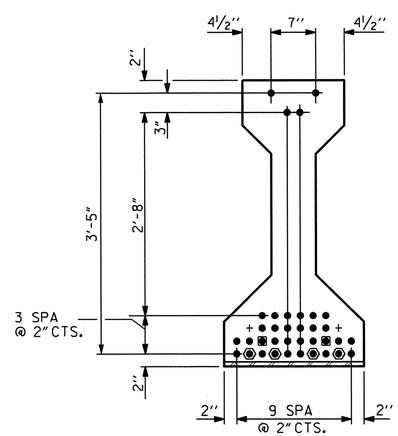


SECTION C-C

(S1 BARS NOT SHOWN)



AT END OF GIRDER



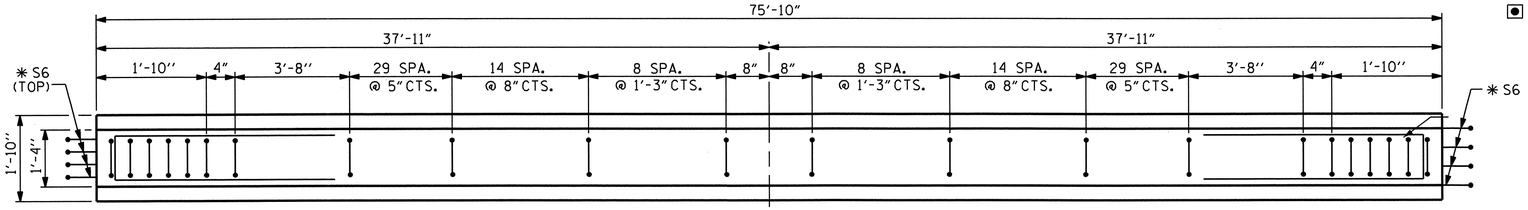
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(36 STRANDS, ALL STRAIGHT, 6 DEBONDED STRANDS)

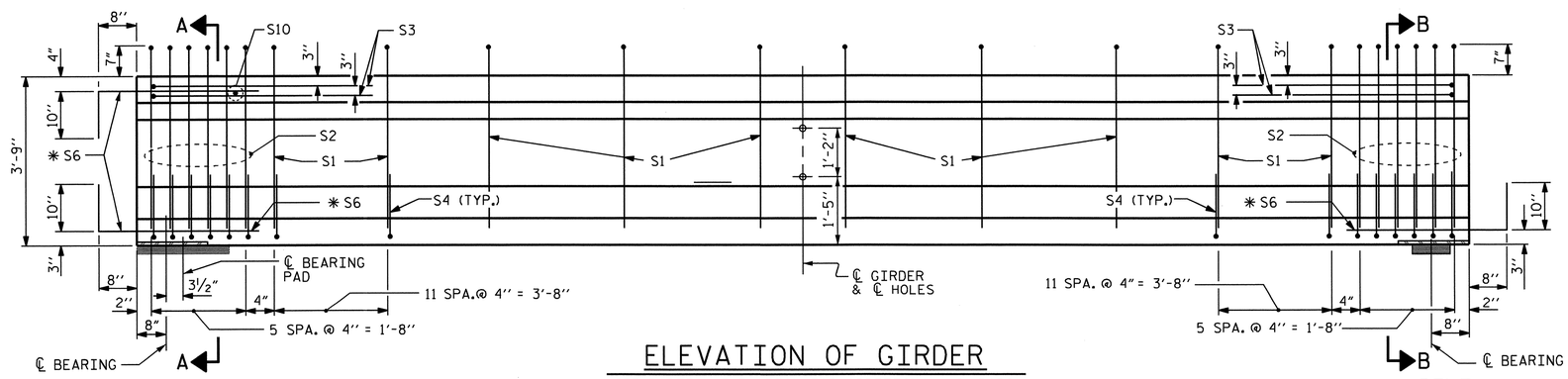
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⬢ STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER
- ◉ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER



PLAN OF GIRDER

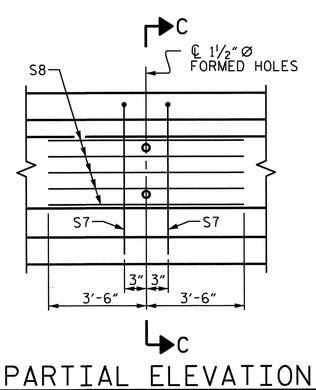
INTEGRAL END BENT



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
SPAN A SHOWN, SPAN C SIMILIAR

BENT



PARTIAL ELEVATION

0.6" Ø L. R. GRADE 270 STRANDS

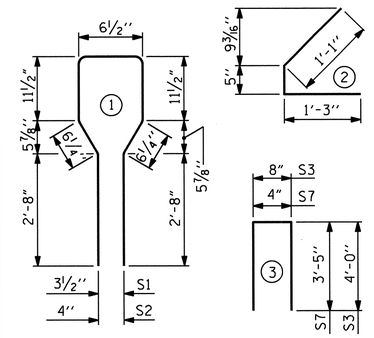
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	126	#4	1	8'-10"	743
S2	12	#6	1	8'-10"	159
S3	4	#4	3	8'-8"	23
S4	72	#4	2	2'-9"	132
✱S6	12	#5	STR	3'-8"	46
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S10	1	#3	STR	1'-0"	1

✱S6 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	9500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	1,142	10.9	36

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	9	75'-10"	682.50'
SPAN C	9	75'-10"	682.50'

FOR PRESTRESSED GIRDER NOTES, SEE SHEET 2 OF 3.

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD FOR SPAN A & C

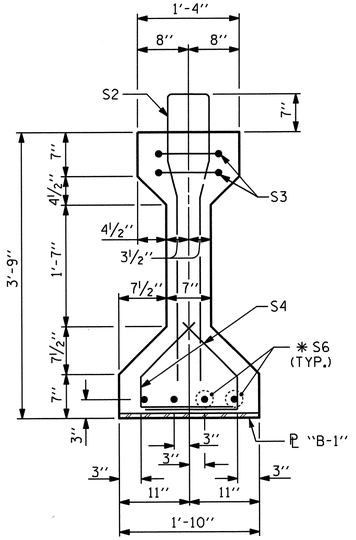
NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG 9/2/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY : K.H. COMPTON	DATE : 2/11
CHECKED BY : J.H. CARDEN	DATE : 3/11
DRAWN BY : ELR 8/91	REV. 7/17/98 RWW/LES
CHECKED BY : GRP 8/91	REV. 10/17/00R RWW/LES
	REV. 5/1/06 TLA/GM

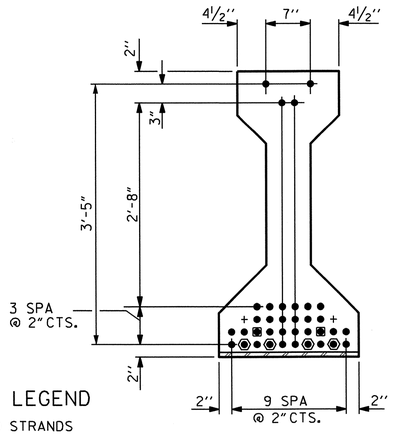
22-SEP-2011 11:31
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_g.dgn
tfang

STD. NO. PCG5

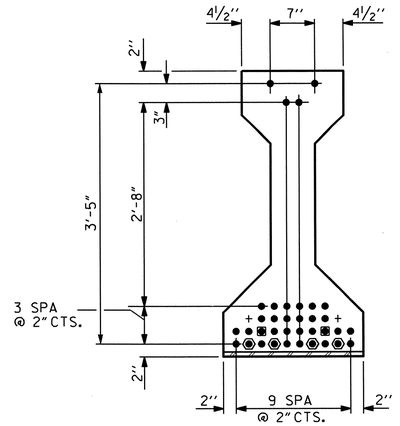


SECTION B-B

(FOR EMBEDDED ℄ "B-1" DETAILS SEE SHEET 3 OF 3)



AT END OF GIRDER



AT ℄ OF GIRDER

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⬣ STRANDS DEBONDED FOR 18'-0" FROM END OF GIRDER
- ▣ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(36 STRANDS, ALL STRAIGHT, 6 DEBONDED STRANDS)

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. 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 7600 PSI.

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 4500.

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".

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

0.6" Ø L. R. GRADE 270 STRANDS

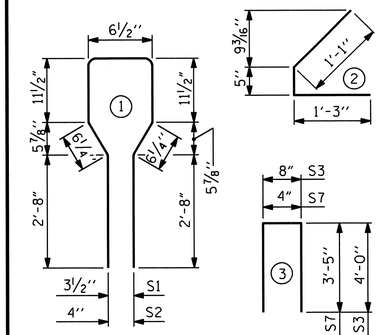
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	126	#4	1	8'-10"	743
S2	12	#6	1	8'-10"	159
S3	4	#4	3	8'-8"	23
S4	72	#4	2	2'-9"	132
✱S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23

✱S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES



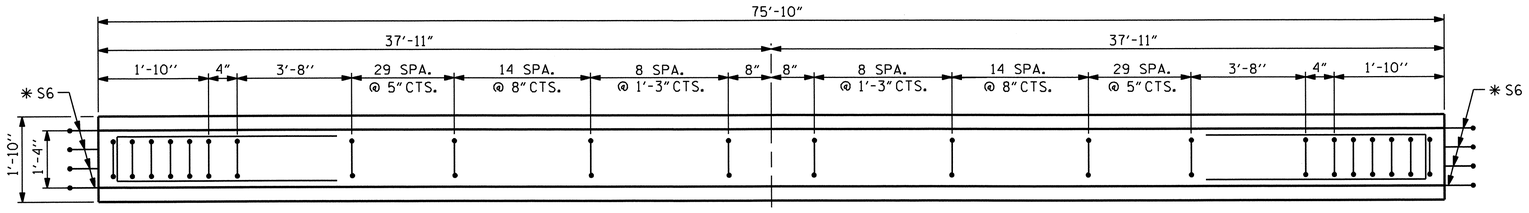
ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

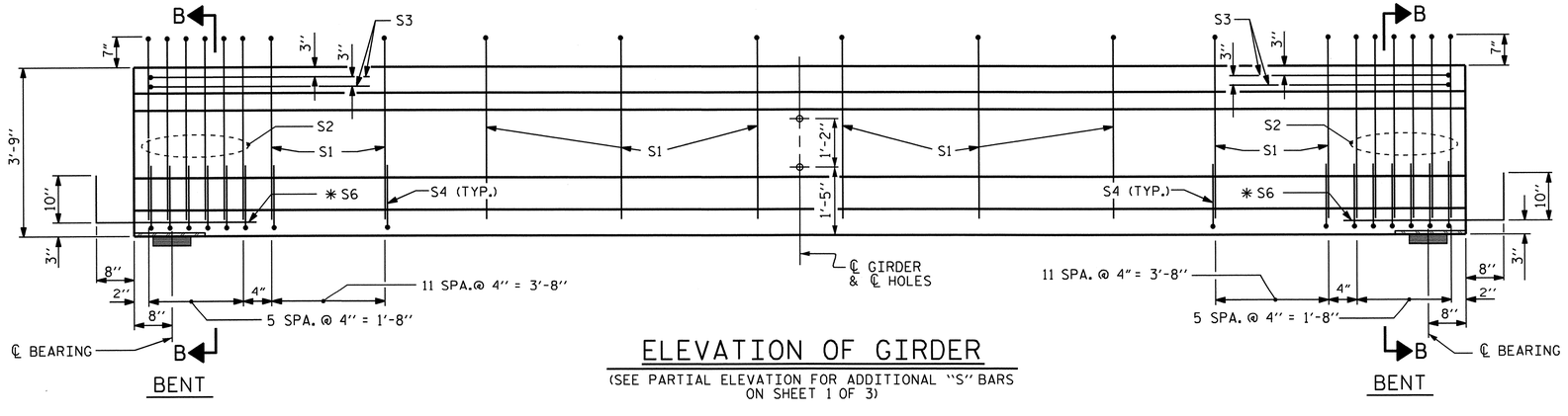
	REINFORCING STEEL	9500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	1,127	10.9	36

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
9	75'-10"	682.50'



PLAN OF GIRDER



BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS ON SHEET 1 OF 3)

BENT

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER YING HSIANG FANG
9/22/11

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 2 OF 3

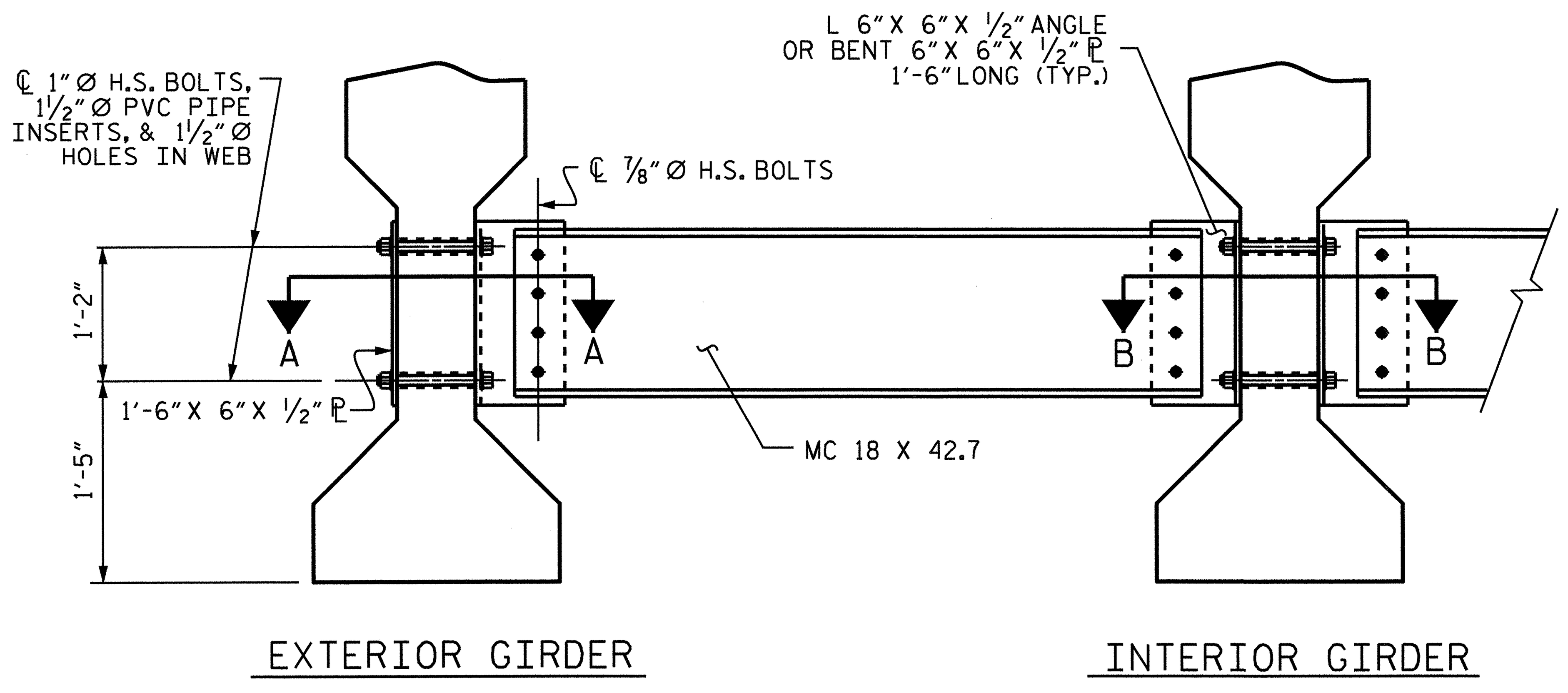
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
AASHTO TYPE III
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
FOR SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY : K.H. COMPTON	DATE : 2/11	
CHECKED BY : J.H. CARDEN	DATE : 3/11	
DRAWN BY : ELR 8/91	REV. 7/17/98 RWW/LES	
CHECKED BY : GRP 8/91	REV. 10/17/00R RWW/LES	
	REV. 5/1/06 TLA/GM	

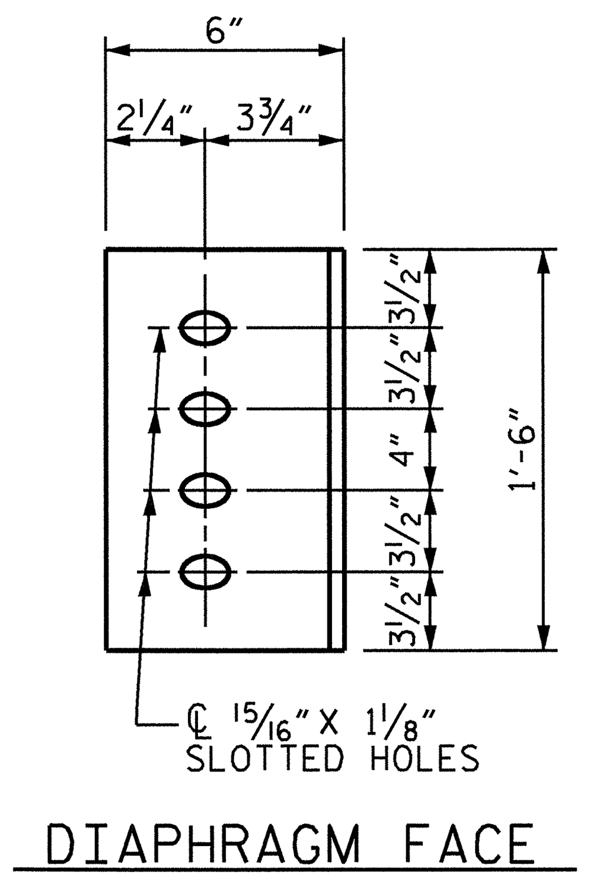
22-SEP-2011 11:31
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_g.dgn
tfang

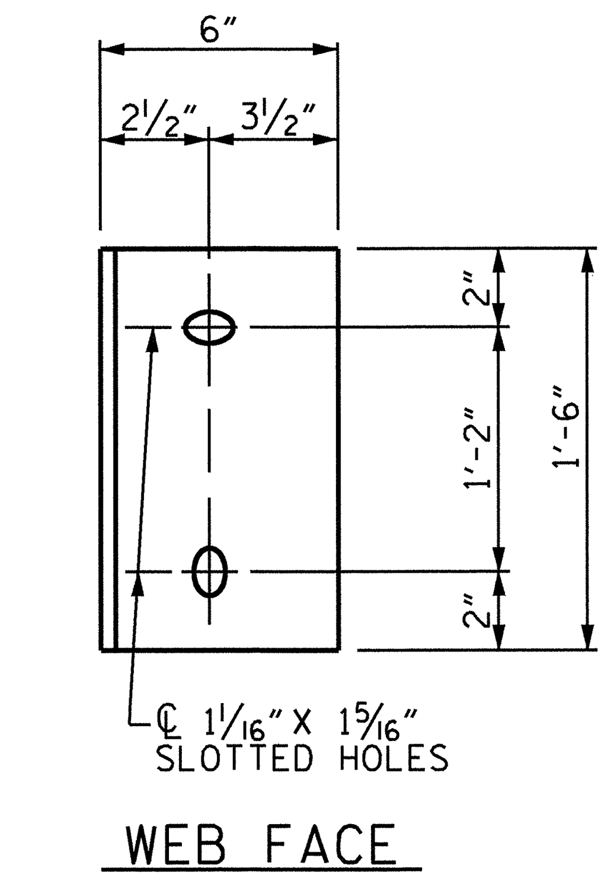
STD. NO. PCG5



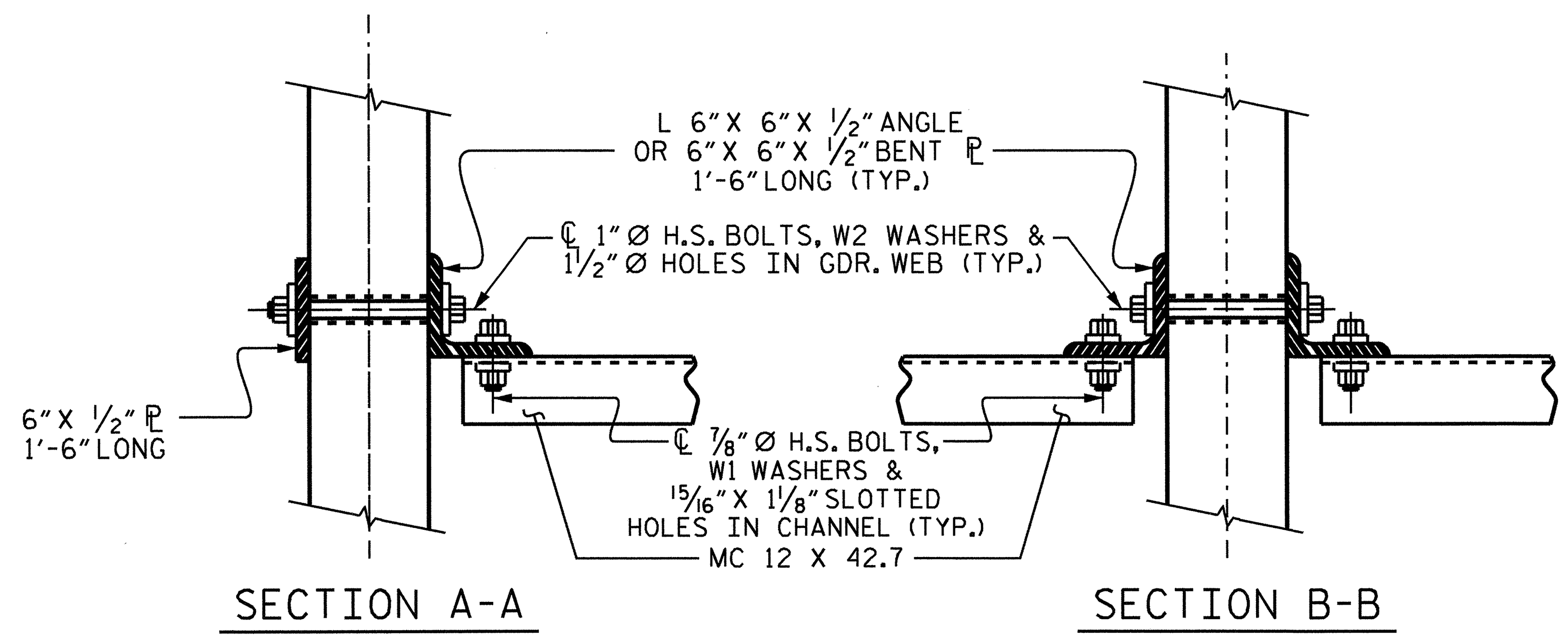
PART SECTION AT INTERMEDIATE DIAPHRAGM

(TYPICAL FOR EACH BAY)





CONNECTOR PLATE DETAILS



CONNECTION DETAILS

FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "FRAMING PLAN" SHEET.

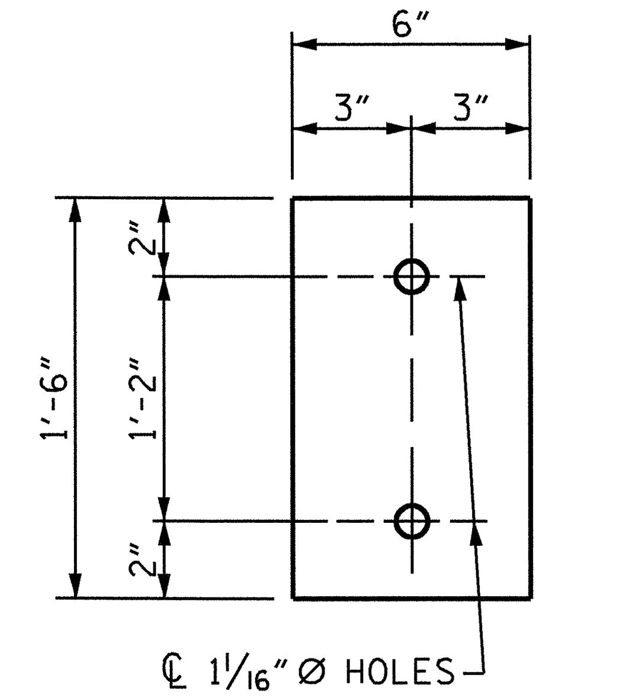
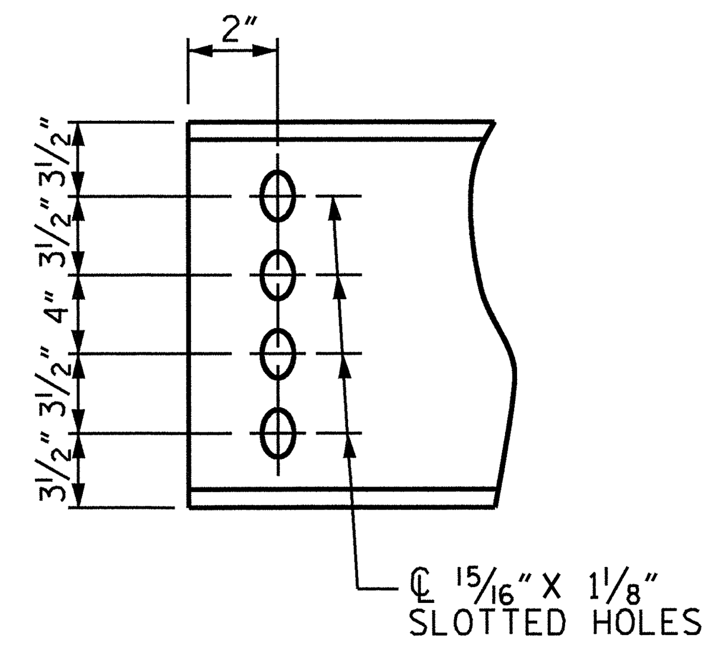
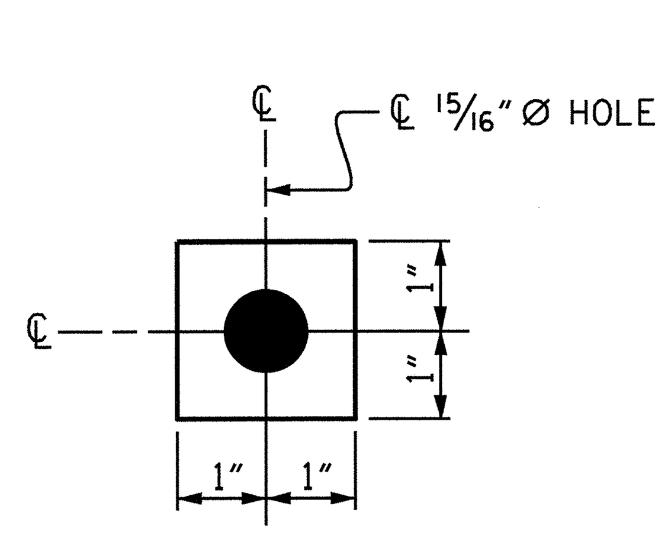
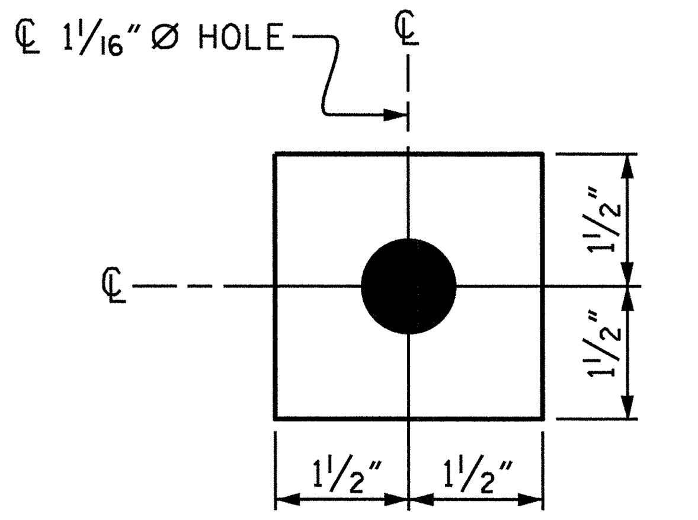


PLATE DETAILS



CHANNEL END





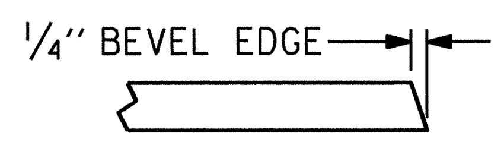
W1: ℙ 7⁄16"X 2"X 2"

USE WITH ⅞"Ø HVY. HEX NUTS & DIRECT TENSION INDICATOR WASHERS AT DIAPHRAGM CHANNEL TO CONNECTOR PLATE CONNECTIONS

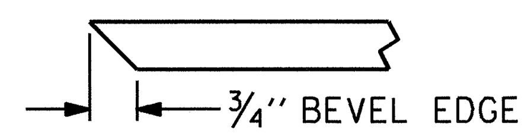
W2: ℙ 7⁄16"X 3"X 3"

USE WITH 1"Ø HVY. HEX NUTS AT CONNECTOR PLATE TO GIRDER CONNECTIONS

WASHER DETAILS

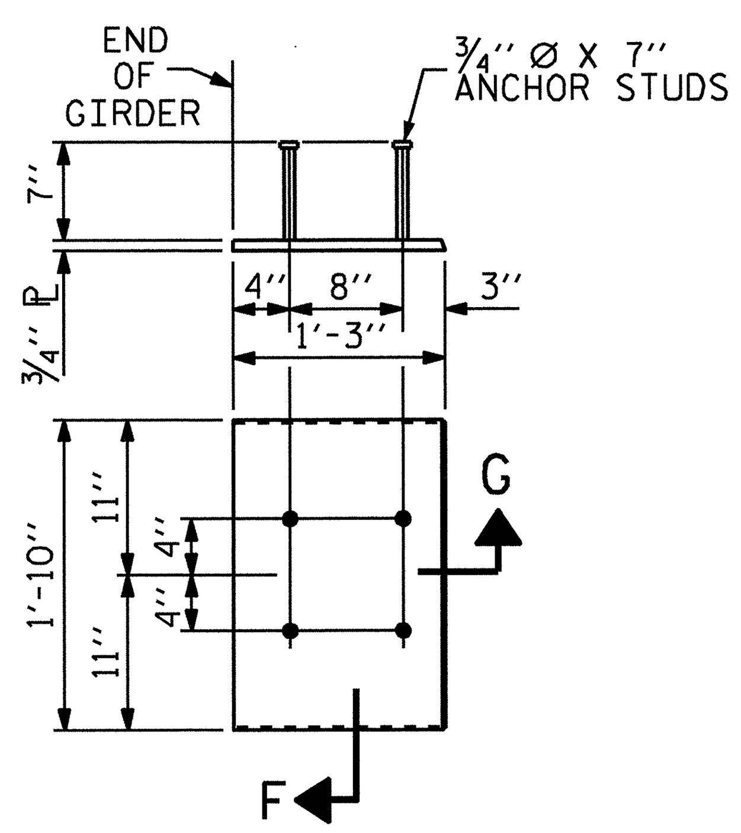


SECTION "G"



SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS

(2 REQ'D PER GIRDER)

STRUCTURAL STEEL NOTES

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

TENSION ON THE AASHTO M164 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

TENSION ON THE AASHTO M164 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, ANGLES, AND PLATE WASHERS 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 PROVISIONS AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

USE A MINIMUM 7⁄16" THICK PLATE WASHER WITH STANDARD HOLES UNDER EACH BOLT HEAD AND NUT. THE PLATE WASHERS SHALL HAVE SUFFICIENT SIZE TO COVER THE HOLES AFTER INSTALLATION. HARDENED WASHERS AND DIRECT TENSION INDICATORS ARE TO BE USED IN CONJUNCTION WITH THE PLATE WASHERS IN THE CHANNEL MEMBER CONNECTION.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF 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.

CONTRACTOR SHALL 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, TEMPORARY STRUTS SHALL BE PLACED BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED. ALL AASHTO M164 H.S. BOLTS SHALL BE FULLY TIGHTENED AFTER THE STRUTS HAVE BEEN REMOVED.

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

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

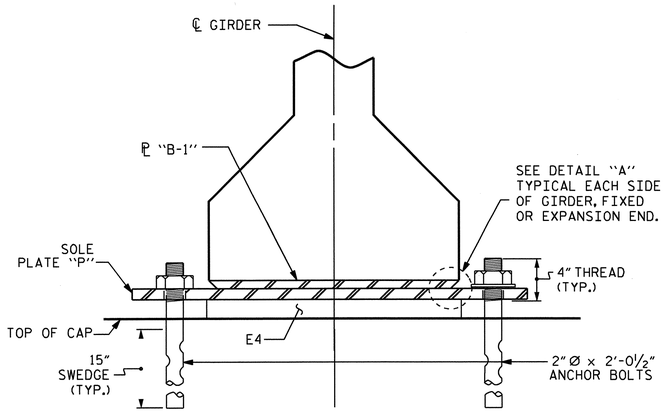
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-17
1			3					TOTAL SHEETS
2			4					41

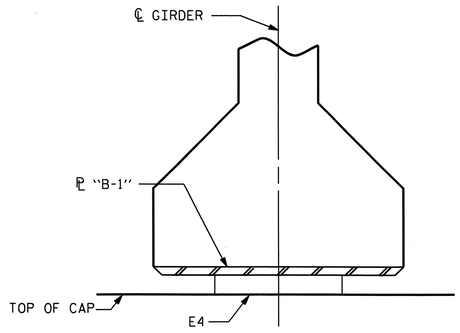
STD. NO. PCG12

ASSEMBLED BY : K.H. COMPTON	DATE : 2/11		
CHECKED BY : J.H. CARDEN	DATE : 3/11		
DRAWN BY : TLA 6/05	ADDED 10/21/05		
CHECKED BY : VC 6/05	REV. 5/1/06R	KMM/GM	

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_g.dgn
OTNGUYEN



SECTION E-E
(AT BENTS)



SECTION F-F
(AT INTEGRAL END BENT)

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

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

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

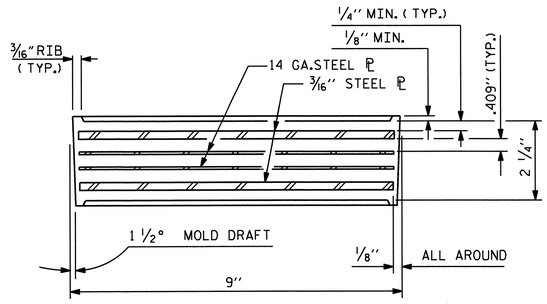
WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, AND NUTS SHOULD BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

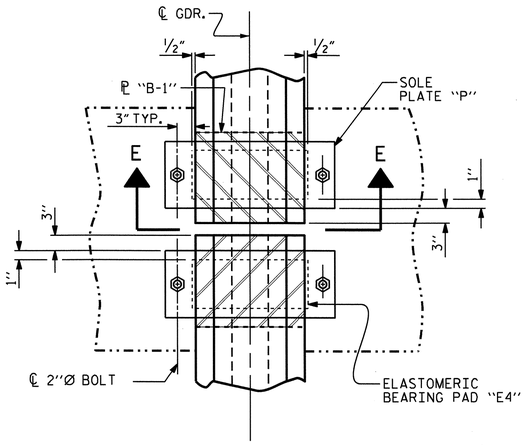
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

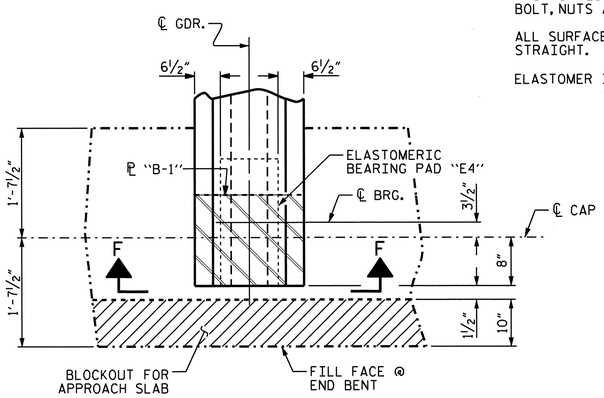
ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.



TYPICAL SECTION OF ELASTOMERIC BEARINGS

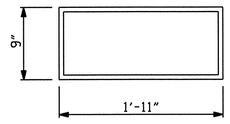


PLAN VIEW @ BENT



TYPICAL PLAN @ END BENT
(INTEGRAL)

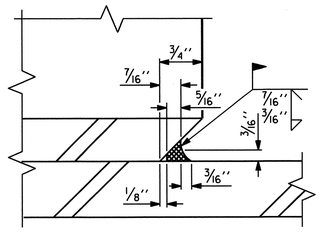
— LOAD RATINGS —	
	MAX.D.L.+L.L.
TYPE V	180 K



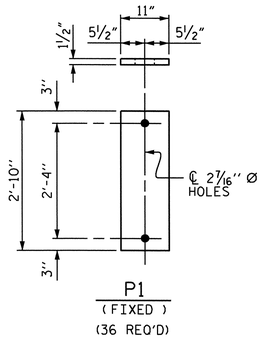
E4 (54 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



DETAIL "A"



P1
(FIXED)
(36 REQ'D)

SOLE PLATE DETAILS ("P")

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELASTOMERIC BEARING DETAILS

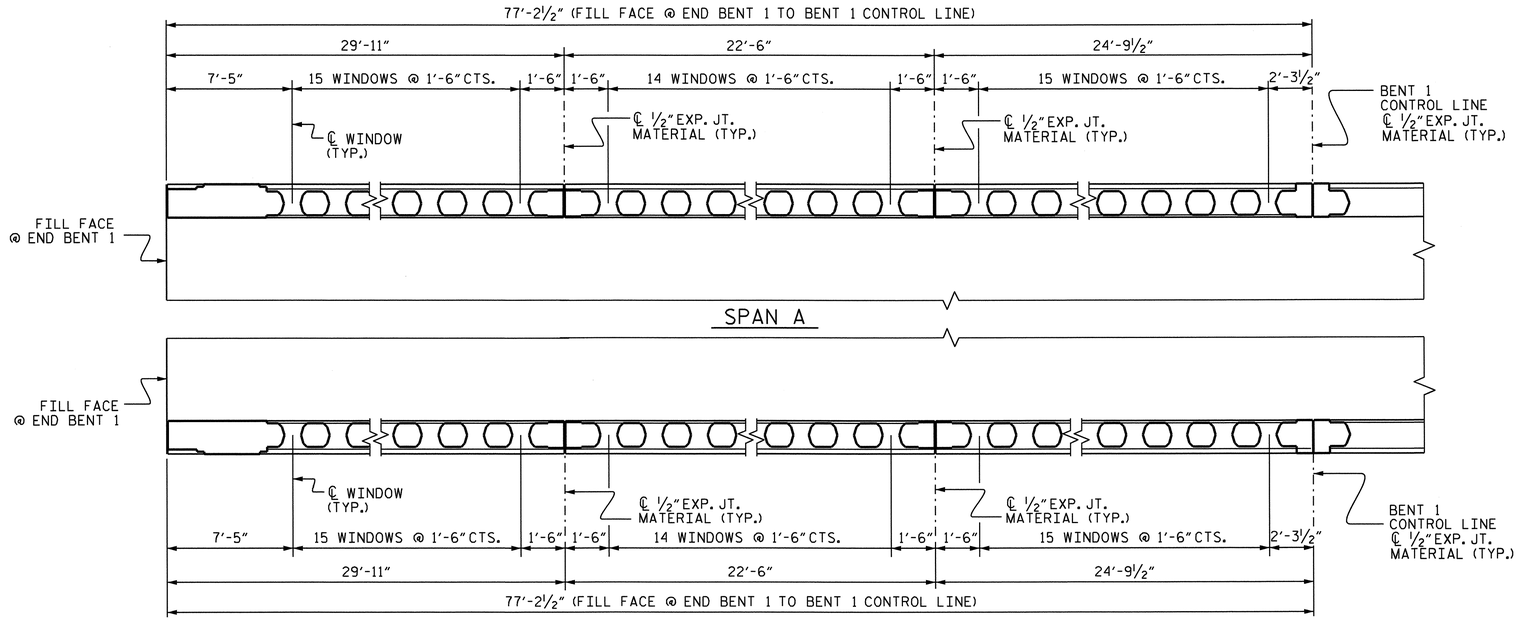
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			41

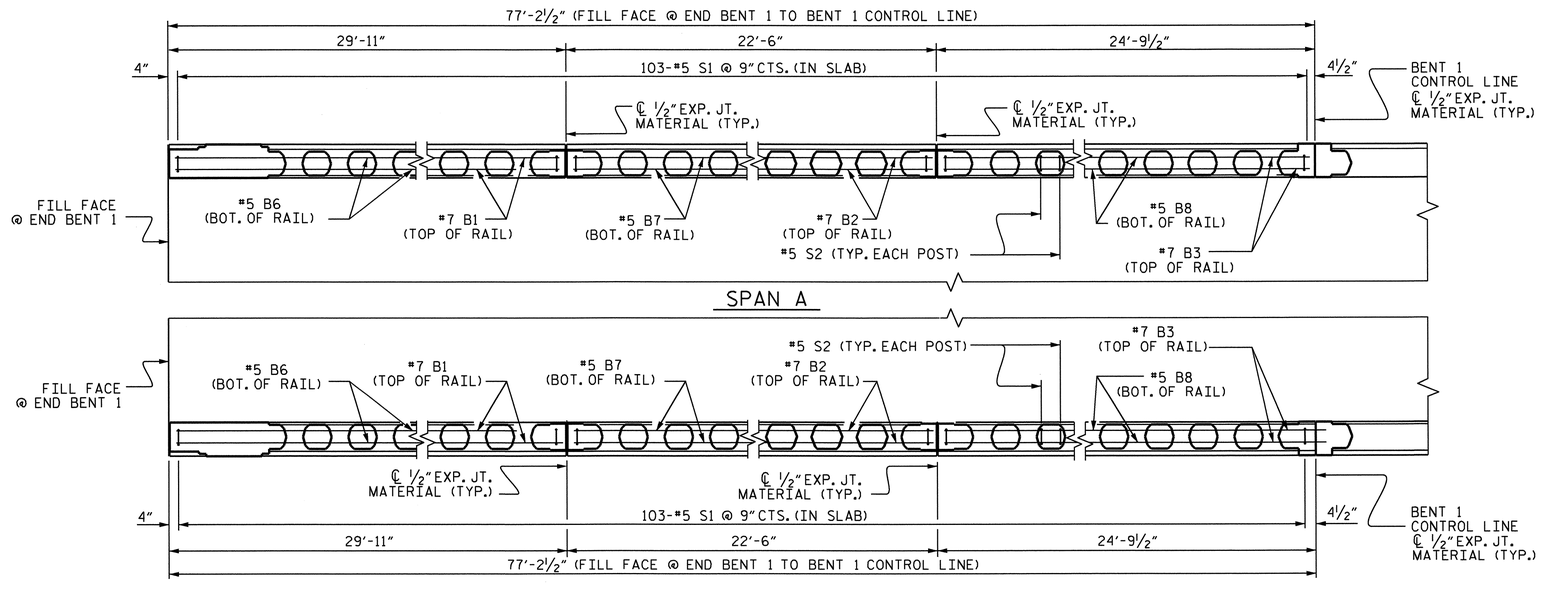
STD. NO. EB4 (SHT 1)

ASSEMBLED BY : K.H. COMPTON	DATE : 2/11		
CHECKED BY : J.H. CARDEN	DATE : 3/11		
DRAWN BY : EEM 2/97	REV. 8/16/99	RWW/LES	
CHECKED BY : VAP 2/97	REV. 10/17/00	RWW/LES	
	REV. 5/1/06	TLA/GM	

21-SEP-2011 14:16
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_bg.dgn
ttfang



RAIL POST SPACING



REINFORCING STEEL PLACEMENT

FOR PLACEMENT OF S2 BARS IN PILASTERS & POSTS SEE SHEET 4 OF 6.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSUING FANG
8/9/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 1 OF 6

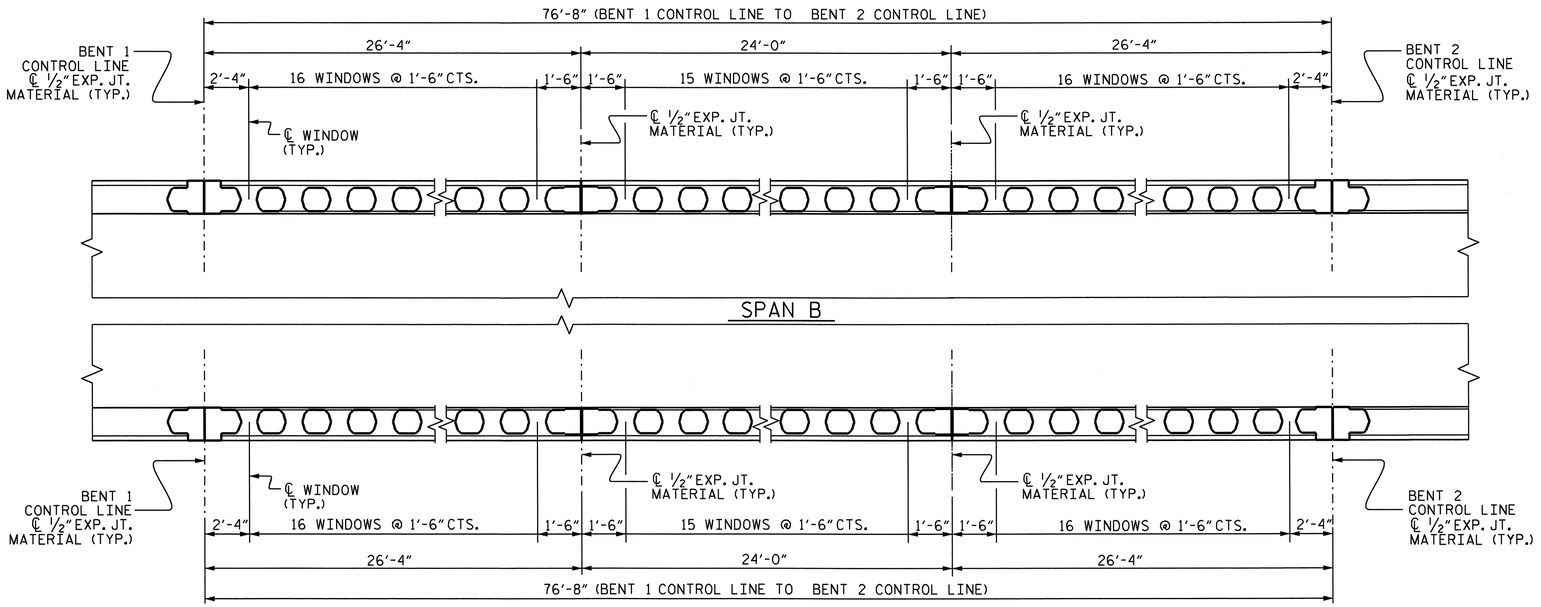
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CLASSIC CONCRETE BRIDGE RAIL SPAN A

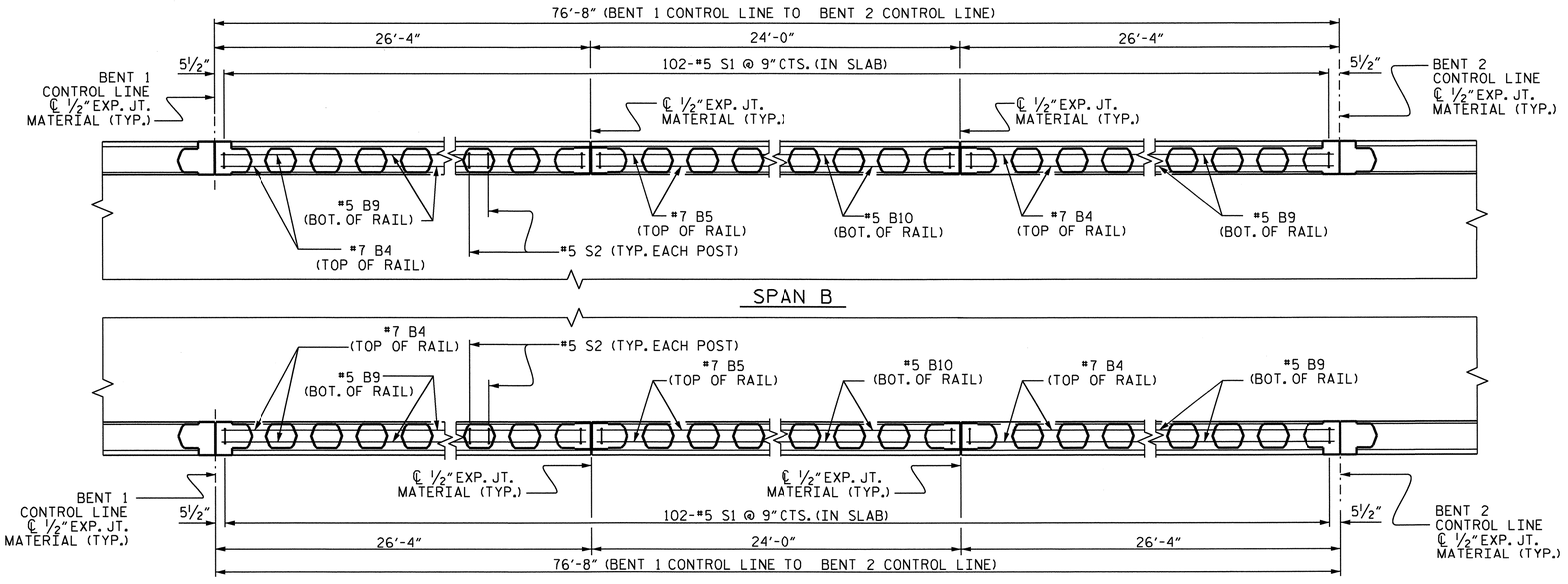
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 5/11
CHECKED BY : J.H. CARDEN DATE : 5/11

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_txbr.dgn
OTNGUYEN



RAIL POST SPACING



REINFORCING STEEL PLACEMENT

FOR PLACEMENT OF S2 BARS IN PILASTERS & POSTS SEE SHEET 4 OF 6.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER HSIUNG TING CHANG
8/9/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 2 OF 6

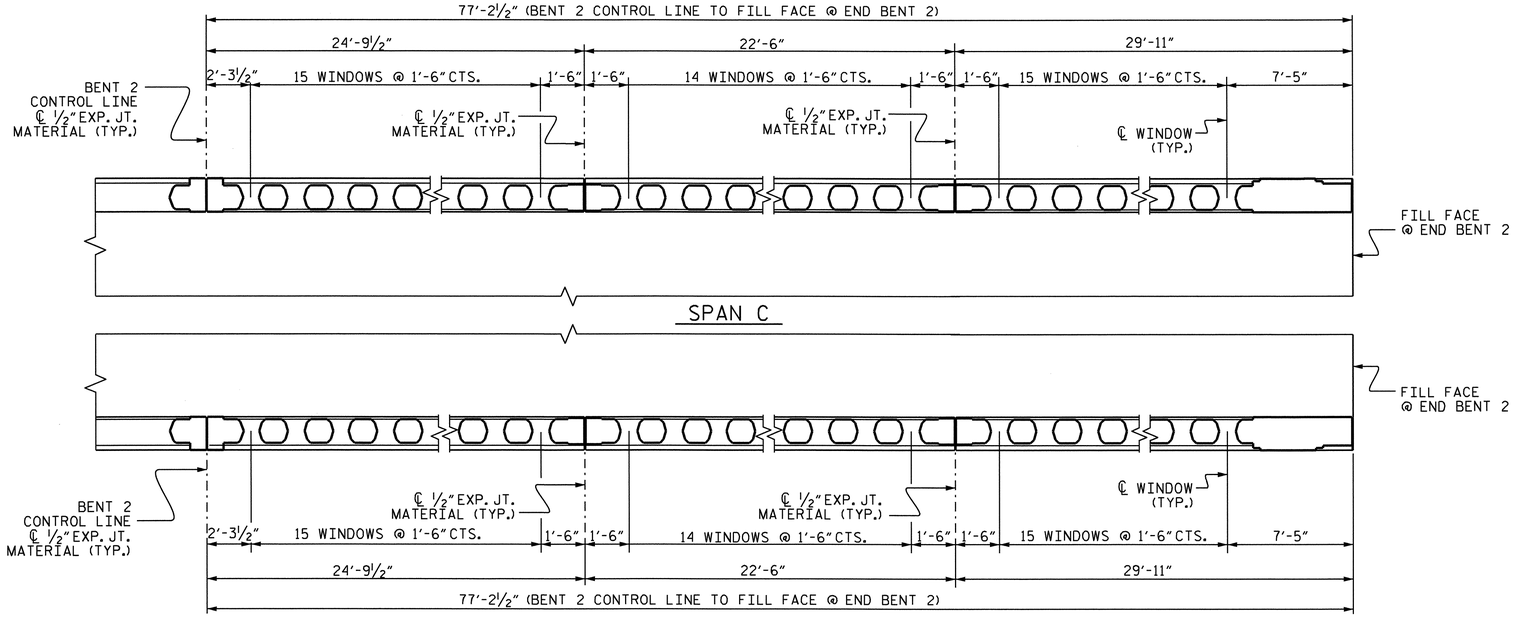
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CLASSIC CONCRETE BRIDGE RAIL SPAN B

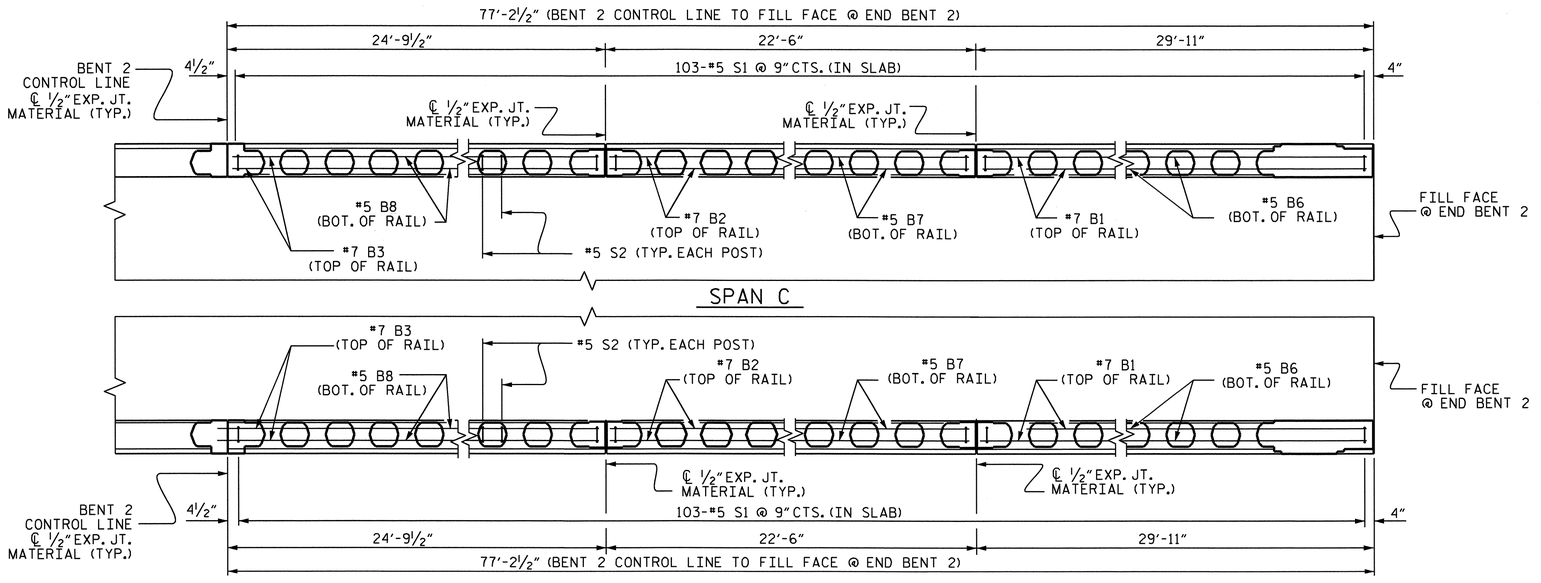
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 5/11
CHECKED BY : J.H. CARDEN DATE : 5/11

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_txbr.dgn
OTNGUYEN



RAIL POST SPACING



REINFORCING STEEL PLACEMENT

FOR PLACEMENT OF S2 BARS IN PILASTERS & POSTS SEE SHEET 4 OF 6.

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 3 OF 6

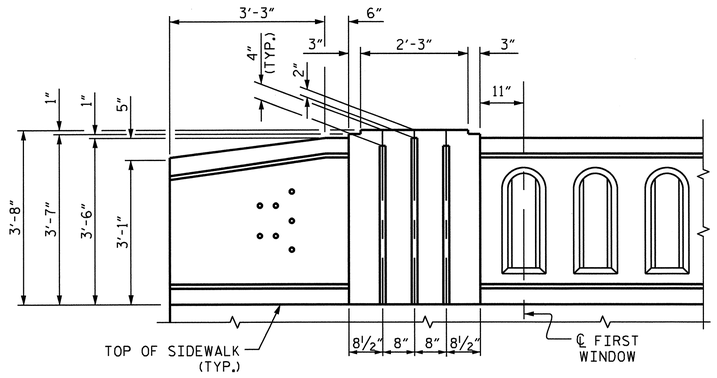
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CLASSIC CONCRETE BRIDGE RAIL SPAN C

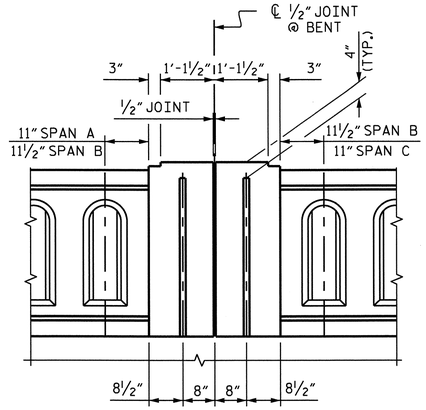
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 5/11
CHECKED BY : J.H. CARDEN DATE : 5/11

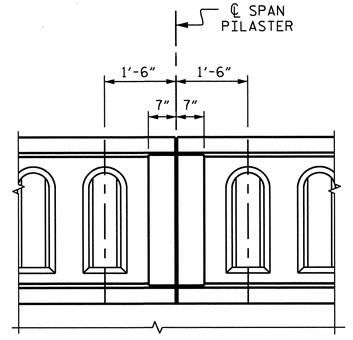
09-AUG-2011 13:56
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_txbr.dgn
OTNGUYEN



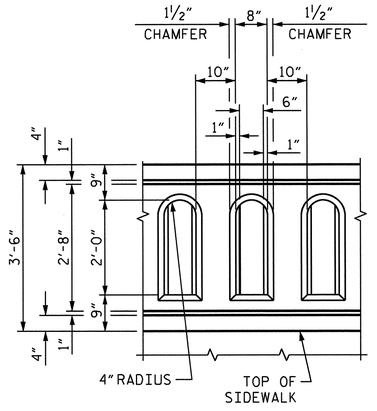
LEFT INTERIOR ELEVATION



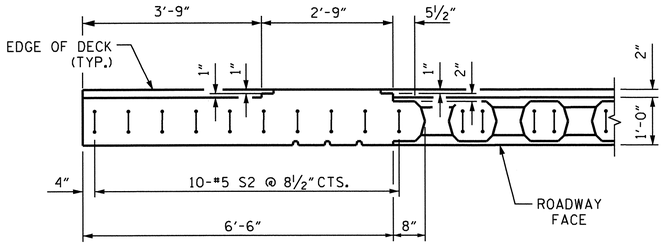
LEFT INTERIOR ELEVATION



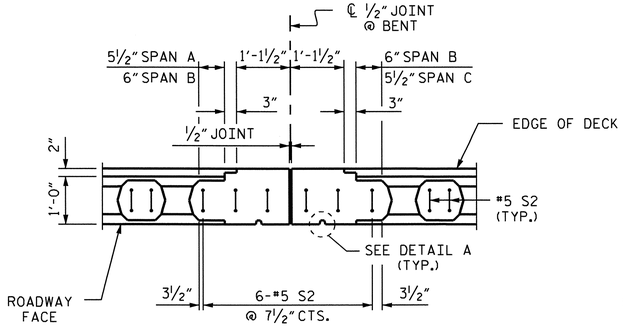
LEFT INTERIOR ELEVATION



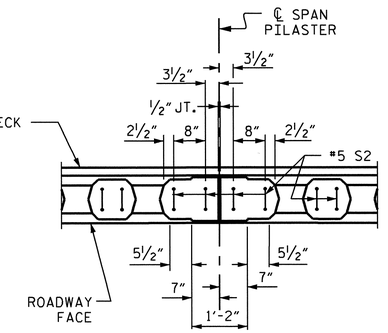
ELEVATION



LEFT SIDE PLAN
(LEFT SHOWN, RIGHT SIMILIAR)

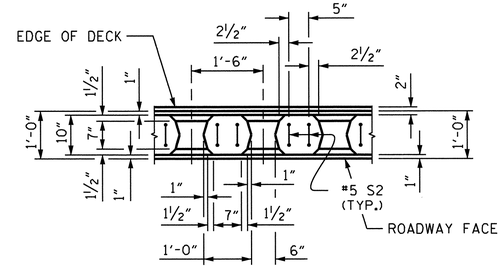


LEFT SIDE PLAN
(LEFT SHOWN, RIGHT SIMILIAR)



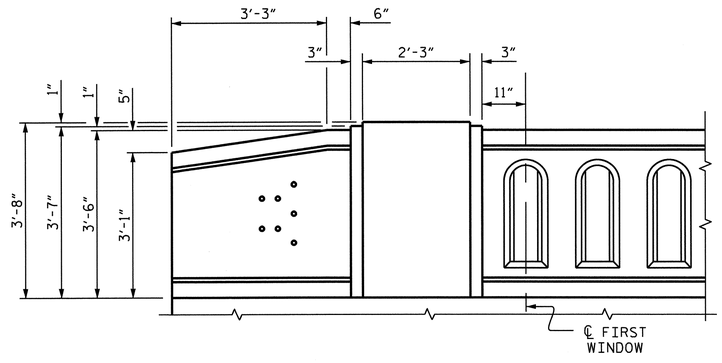
PLAN

SPAN PILASTER



PLAN

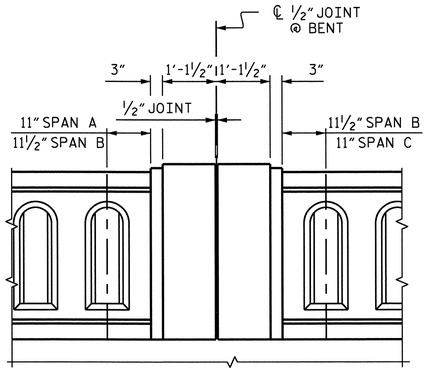
WINDOW DETAIL



RIGHT EXTERIOR ELEVATION

END BENT PILASTER

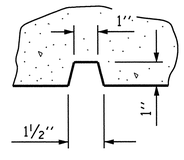
(END BENT 1 SHOWN, END BENT 2 SIM. BUT OPPOSITE)



RIGHT EXTERIOR ELEVATION

BENT PILASTER

(BENT 1 SHOWN, BENT 2 SIMILIAR)



DETAIL A

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CLASSIC CONCRETE BRIDGE RAIL WITH SIDEWALK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			41

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER JING HSIUNG FANG

8/9/11

DRAWN BY : K.H. COMPTON DATE : 5/11
CHECKED BY : J.H. CARDEN DATE : 5/11

09-AUG-2011 13:31
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_txbr.dgn
OTNGUYEN

NOTES :

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

ALL REINFORCING STEEL IN CLASSIC CONCRETE BRIDGE RAIL SHALL BE EPOXY COATED.

PROVIDE A CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

FOR CLASSIC CONCRETE BRIDGE RAIL, SEE SPECIAL PROVISIONS.

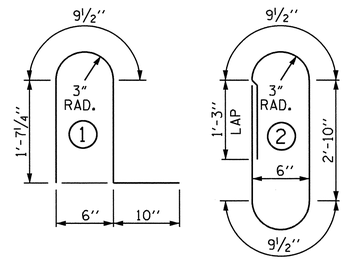
BILL OF MATERIAL

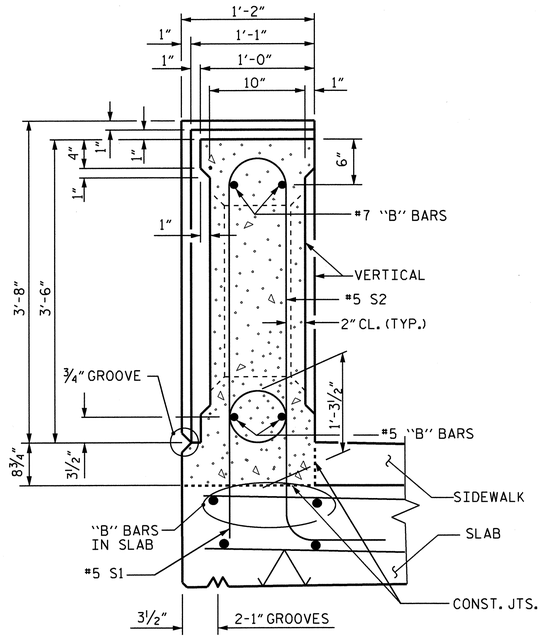
RAILS & PILASTERS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	8	#7	STR	29′-6″	482
✳ B2	8	#7	STR	22′-1″	361
✳ B3	8	#7	STR	24′-5″	399
✳ B4	8	#7	STR	25′-11″	424
✳ B5	4	#7	STR	23′-7″	193
✳ B6	8	#5	STR	29′-6″	246
✳ B7	8	#5	STR	22′-1″	184
✳ B8	8	#5	STR	24′-5″	204
✳ B9	8	#5	STR	25′-11″	216
✳ B10	4	#5	STR	23′-7″	98
✳ S1	616	#5	1	4′-10″	3105
✳ S2	616	#5	2	8′-6″	5461

✳ EPOXY COATED REINFORCING STEEL	11,373 LBS.
CLASS AA CONCRETE	59.9 C.Y.
CLASSIC CONCRETE BRIDGE RAIL	462.17 LIN. FT.

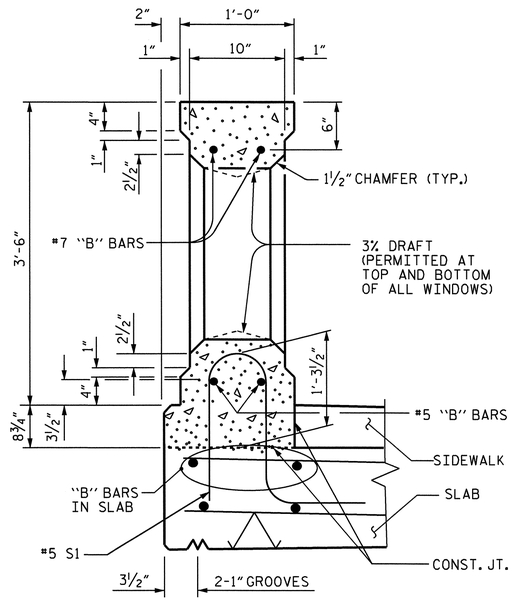
BAR TYPES



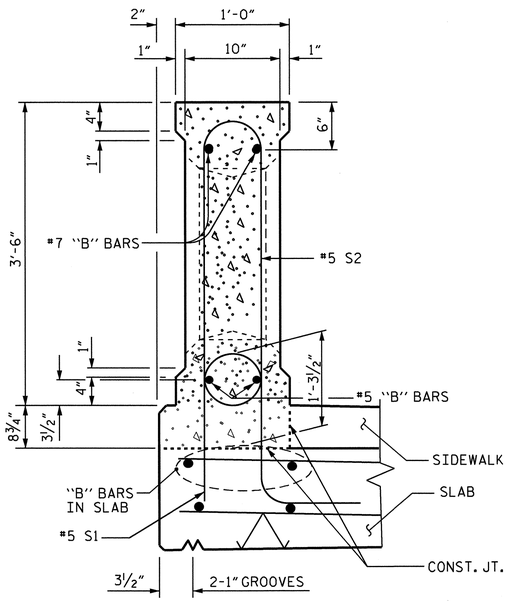


SECTION THRU PILASTER

(AT END BENTS & BENTS)



SECTION THRU WINDOW OF RAIL



SECTION THRU POST

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CLASSIC CONCRETE BRIDGE RAIL

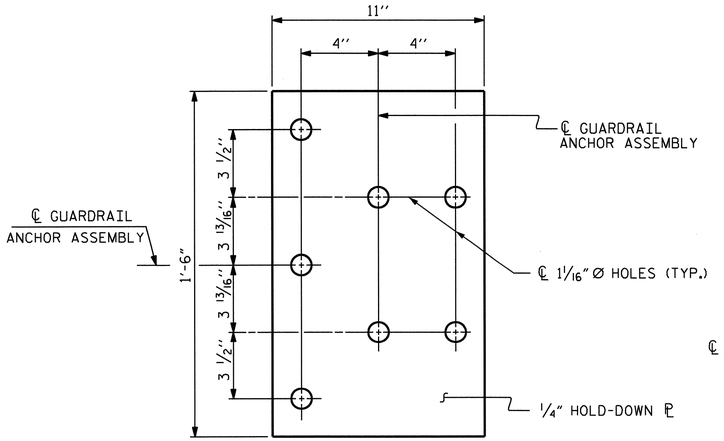
NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG LANG

9/21/11

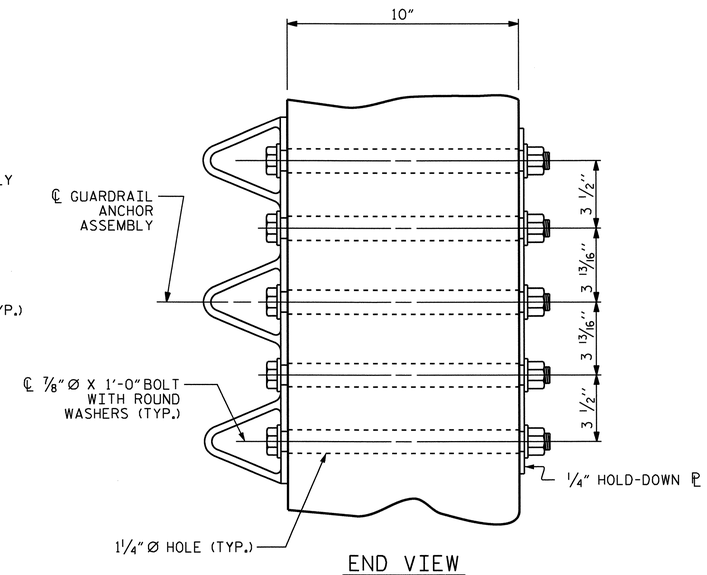
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 5/11
CHECKED BY : J.H. CARDEN DATE : 5/11

20-SEP-2011 13:49
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_txbr.dgn
qtnguyen



PLAN



END VIEW

NOTES

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

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

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

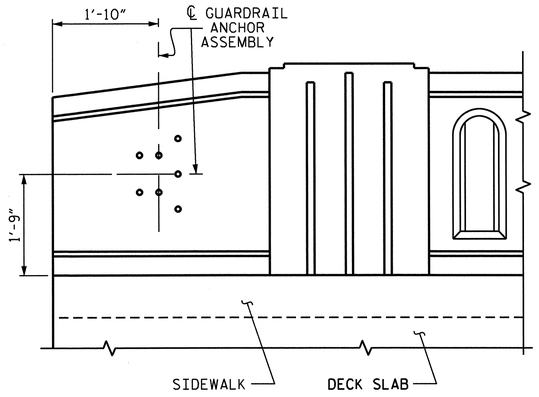
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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

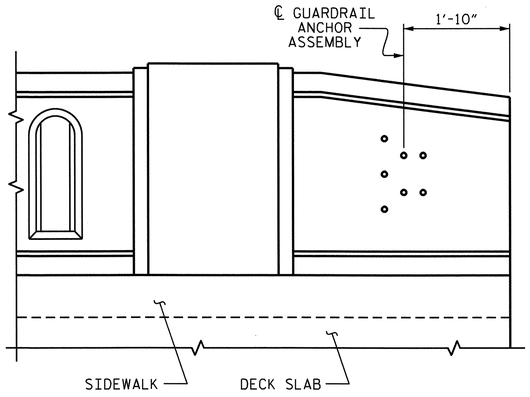
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

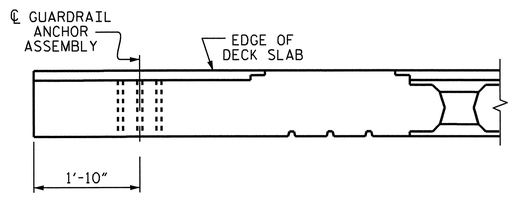
GUARDRAIL ANCHOR ASSEMBLY DETAILS



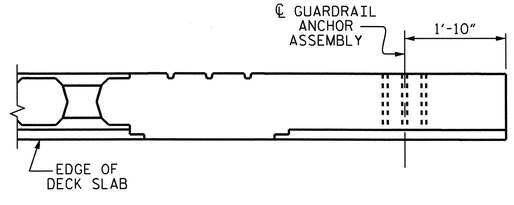
INTERIOR ELEVATION AT END BENT 1



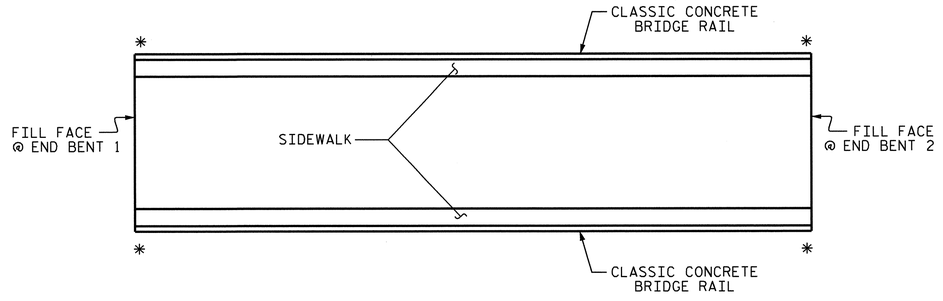
EXTERIOR ELEVATION AT END BENT 2



PLAN AT END BENT 1

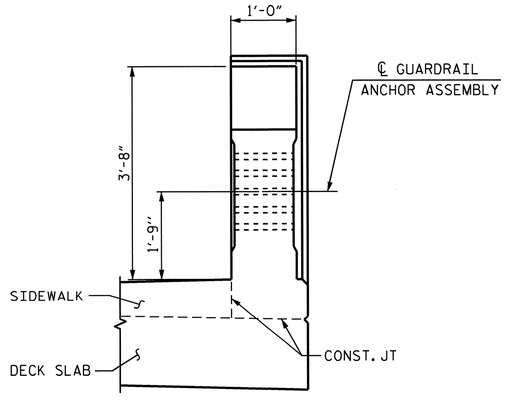


PLAN AT END BENT 2



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG LANG

8/9/11

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GUARDRAIL ANCHORAGE DETAILS

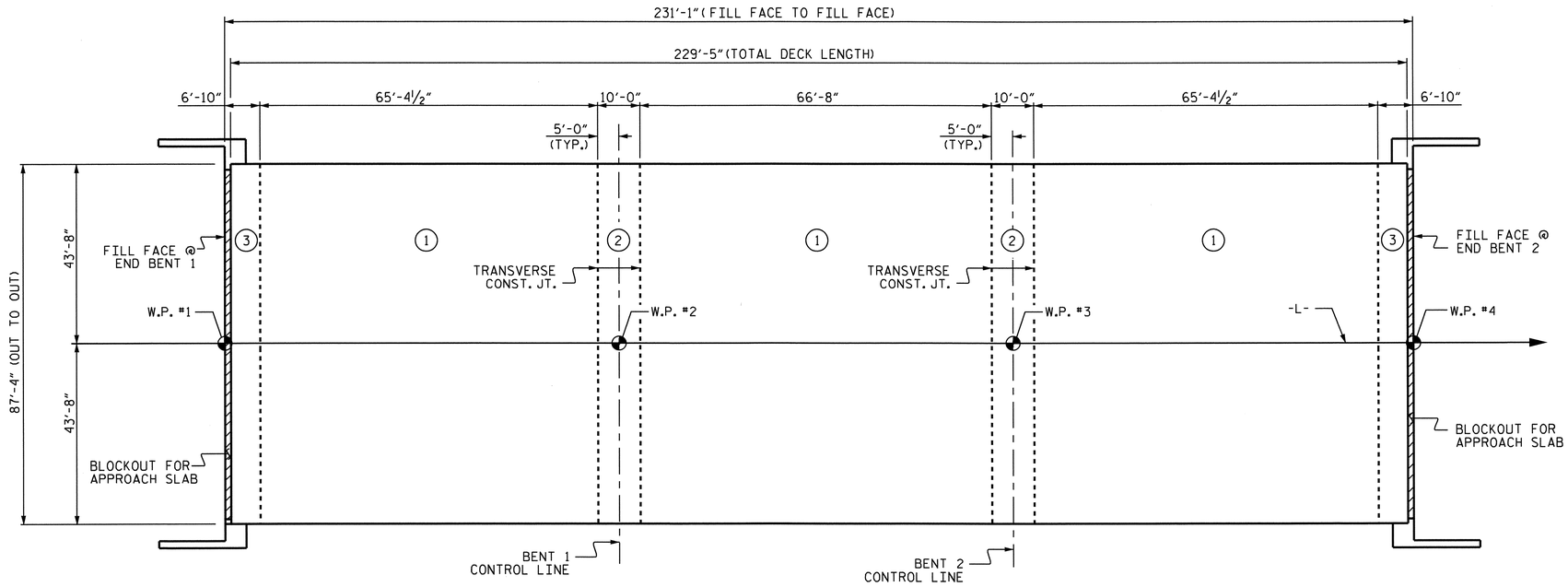
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			41

STD. NO. BMR8

LOCATION OF GUARDRAIL ANCHOR AT END POST

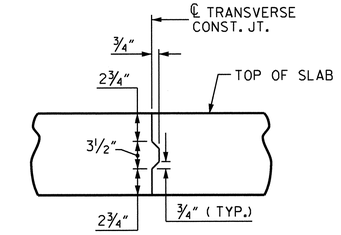
ASSEMBLED BY : K.H. COMPTON	DATE : 5/11	
CHECKED BY : J.H. CARDEN	DATE : 5/11	
DRAWN BY : EEM 6/94	REV. 10/17/00	RWW/LES
CHECKED BY : RGW 6/94	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

09-AUG-2011 13:30
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_txbr.dgn
OTNGUYEN



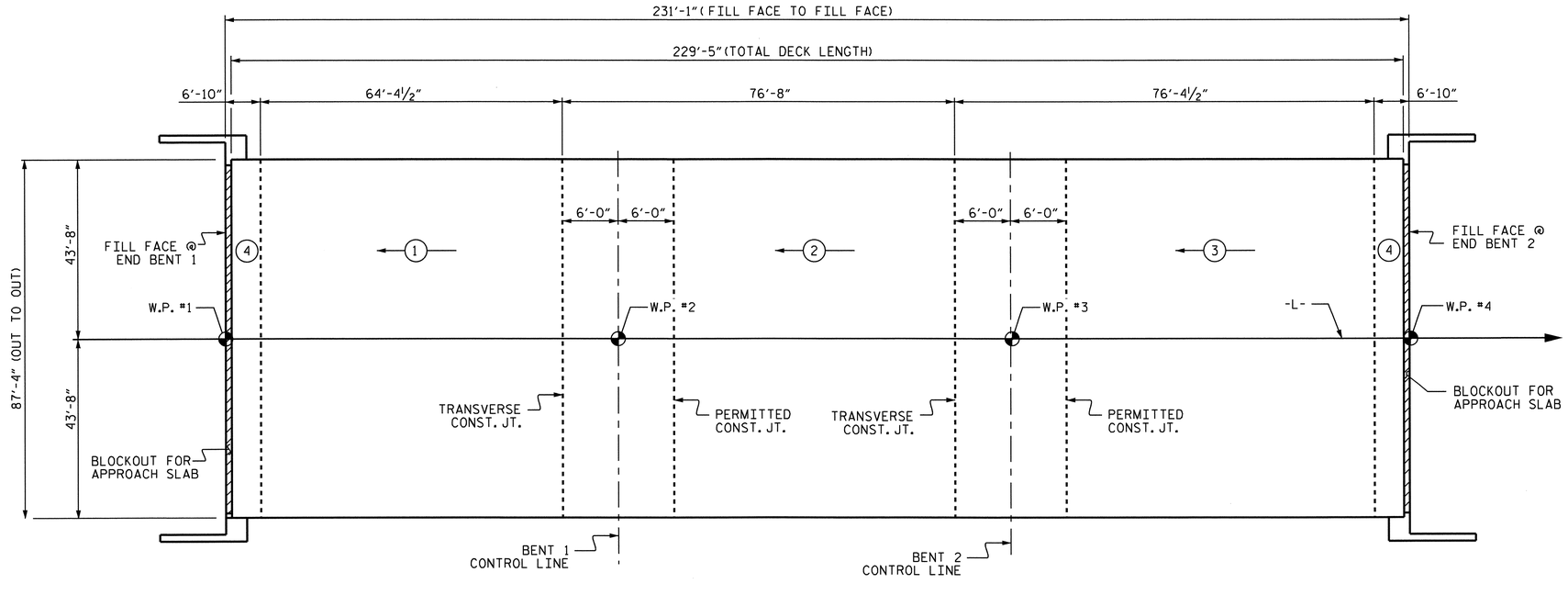
OPTIONAL POURING SEQUENCE

POURS 2 CANNOT BE STARTED UNTIL BOTH ADJACENT POURS 1 REACH A MINIMUM OF 3000 PSI.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



POURING SEQUENCE

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

NOTE: THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE.

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

ASSEMBLED BY : K.H. COMPTON	DATE : 2/11		
CHECKED BY : J.H. CARDEN	DATE : 3/11		
DRAWN BY : JMB 5/87	REV. 6/1/94	EEM/GRP	
CHECKED BY : SJD 9/87	REV. 8/16/99	RWW/LES	
	REV. 5/1/06	TLA/GM	

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

POUR SEQUENCE

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSIANG FANG
8/9/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			41

STD. NO. BOM1

09-AUG-2011 13:30
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_bm.dgn
OTNGUYEN

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"			

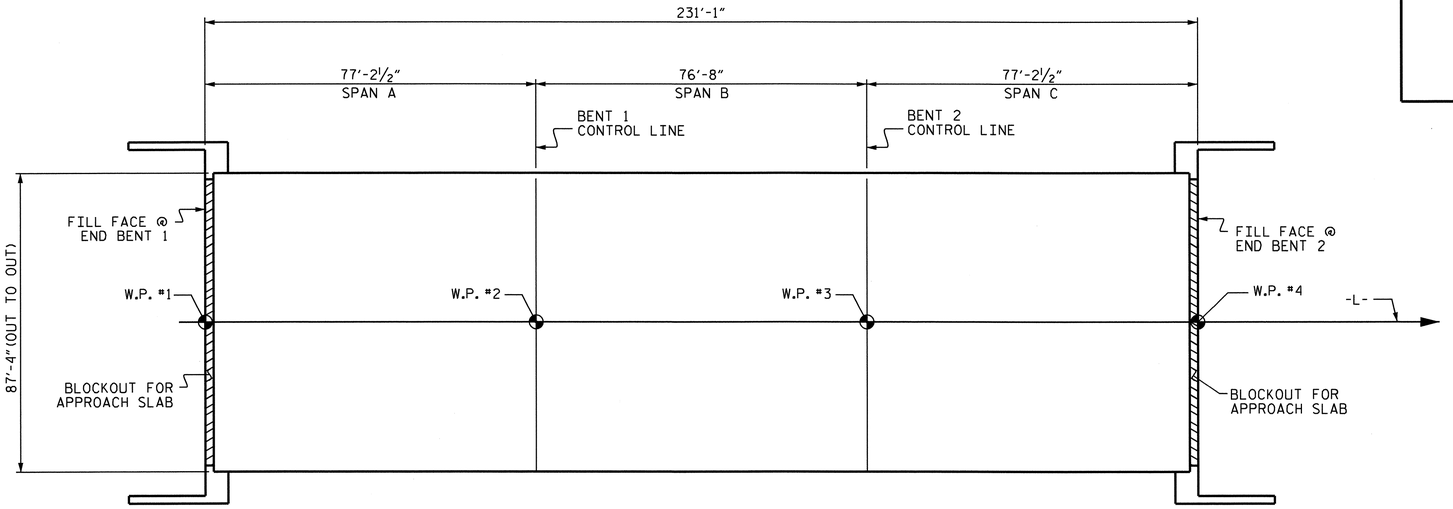
GROOVING BRIDGE FLOORS

APPROACH SLABS	2,580	SQ.FT.
BRIDGE DECK	13,765	SQ.FT.
TOTAL	16,345	SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

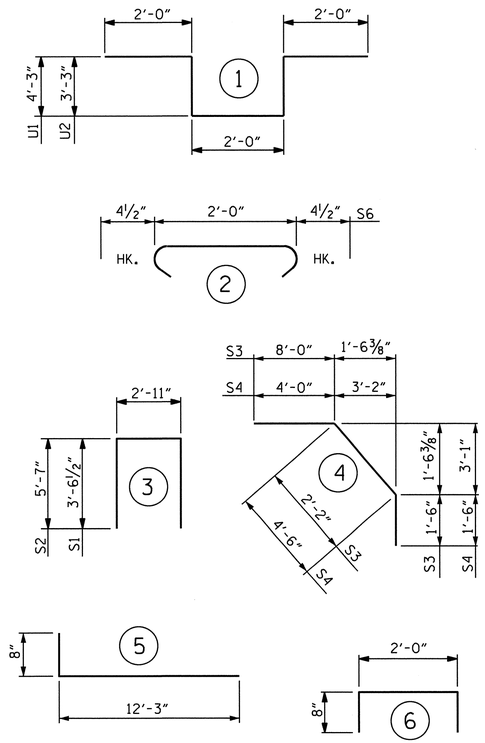
	CLASS AA CONCRETE (CU. YD.)					REINFORCING STEEL (LBS)	✱EPOXY COATED REINFORCING STEEL (LBS)
POUR NO.	#1	#2	#3	#4	TOTAL		
DECK	189.7	261.5	260.7	144.1	856.0	80,586	86,754
SIDEWALK					34.1		✱✱
CONC. MEDIAN					31.8		✱✱
TOTALS ✱✱					921.9	80,586	86,754

✱✱ QUANTITIES INCLUDED WITH SPAN TOTALS



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 20,181)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	1000	#5	STR	44'-9"	46674
A2	1000	#5	STR	44'-7"	46500
✱B1	240	#4	STR	19'-5"	3113
✱B2	118	#7	STR	56'-0"	13507
✱B3	116	#7	STR	23'-0"	5453
✱B4	60	#4	STR	24'-8"	989
B5	480	#5	STR	58'-11"	29496
✱B6	234	#7	STR	15'-8"	7493
✱B7	150	#4	STR	29'-2"	2923
✱G1	548	#4	STR	5'-2"	1891
✱G2	182	#4	STR	7'-0"	851
H1	48	#4	5	12'-11"	414
K1	32	#4	STR	24'-7"	525
K2	16	#4	STR	7'-11"	85
K3	32	#4	STR	9'-2"	196
K4	16	#4	STR	8'-5"	90
K5	4	#4	STR	5'-1"	14
K6	8	#4	STR	5'-8"	30
K7	4	#4	STR	5'-4"	14
K8	16	#4	STR	2'-8"	29
K9	32	#4	STR	6'-9"	144
K10	64	#4	STR	9'-1"	388
K11	32	#4	STR	8'-4"	178
K12	24	#4	STR	28'-2"	452
S1	156	#4	3	10'-0"	1042
S2	8	#4	3	14'-1"	75
✱S3	156	#4	4	11'-8"	1216
✱S4	152	#4	4	10'-0"	1015
S5	352	#4	2	2'-9"	647
✱U1	96	#4	1	14'-6"	930
✱U2	32	#4	1	12'-6"	267
✱U3	160	#4	6	3'-4"	356
V2	96	#4	STR	5'-4"	342

REINFORCING STEEL = 80,586 LBS

✱EPOXY COATED REINF. STEEL = 86,754 LBS

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG

9/21/11

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			41

STD. NO. BOM1

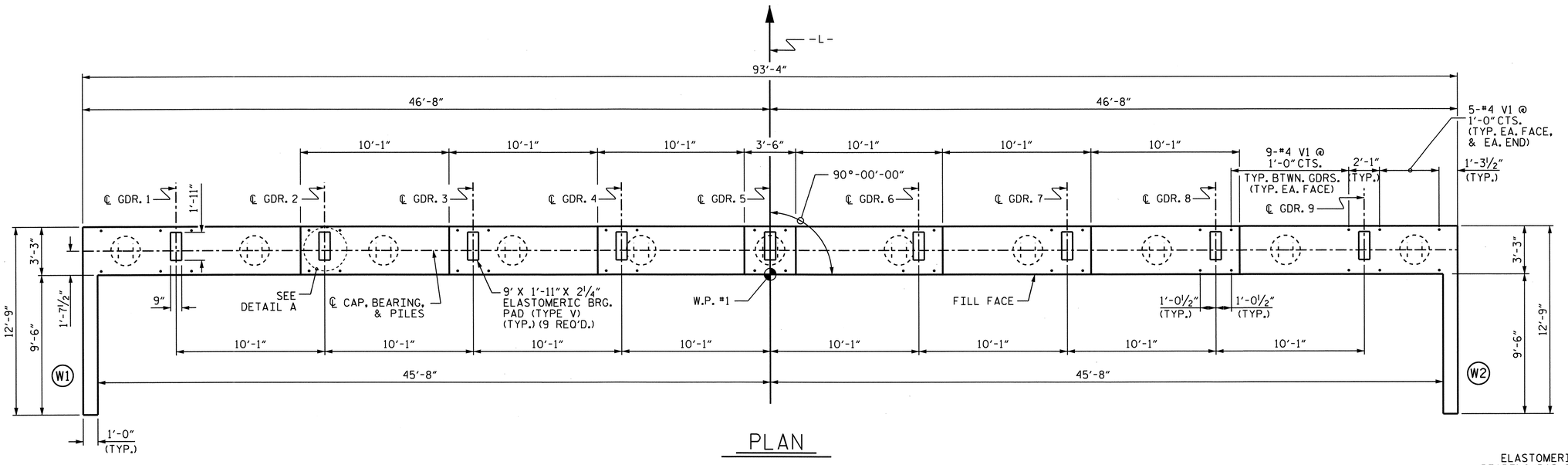
ASSEMBLED BY : K.H. COMPTON	DATE : 2/11		
CHECKED BY : J.H. CARDEN	DATE : 3/11		
DRAWN BY : JMB 5/87	REV. 6/1/94	EEM/GRP	
CHECKED BY : SJD 9/87	REV. 8/16/99	RWW/LES	
	REV. 5/1/06	TLA/GM	

21-SEP-2011 15:36
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_bm.dgn
tfang

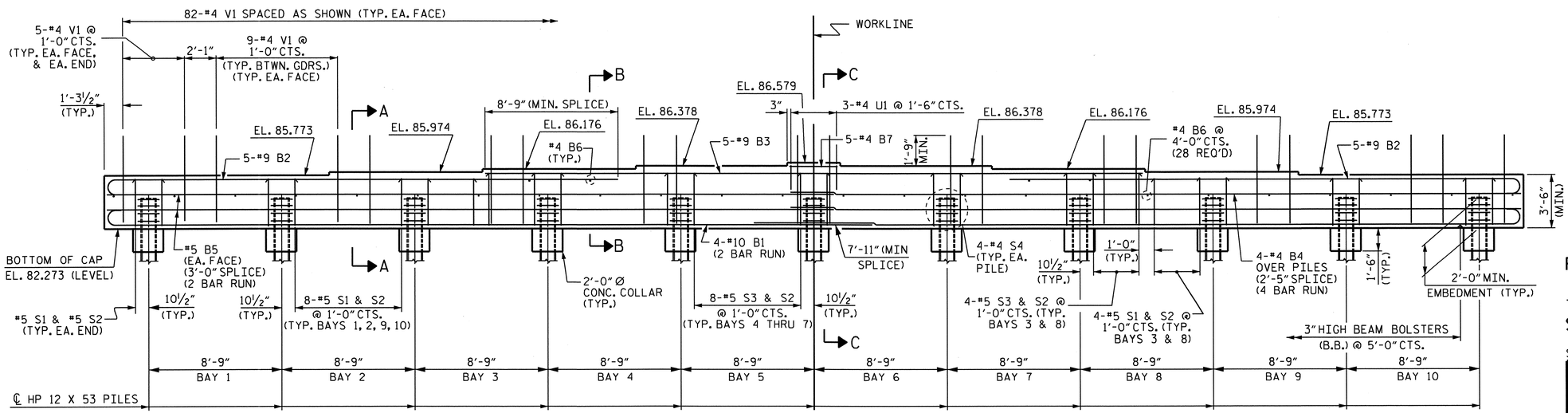
NOTES:

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

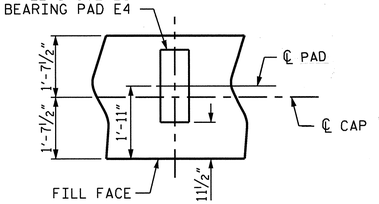
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4"DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



PLAN



ELEVATION



DETAIL A

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

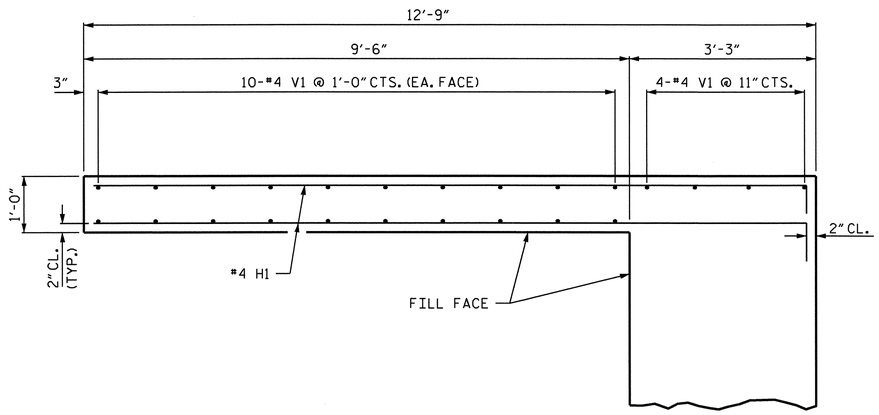
END BENT 1
(INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			41

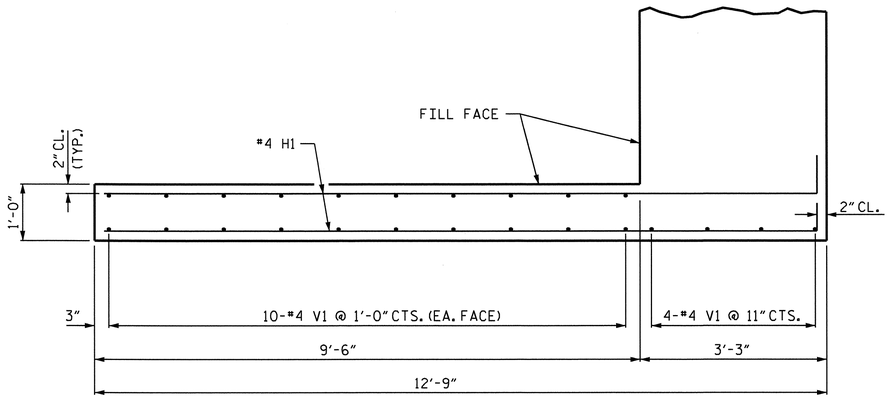
NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSIUNG FANG
9/21/11

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

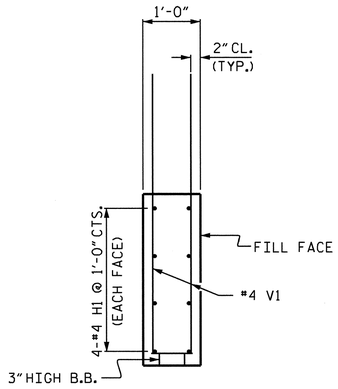
21-SEP-2011 10:16
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_E*.dgn
ttfang



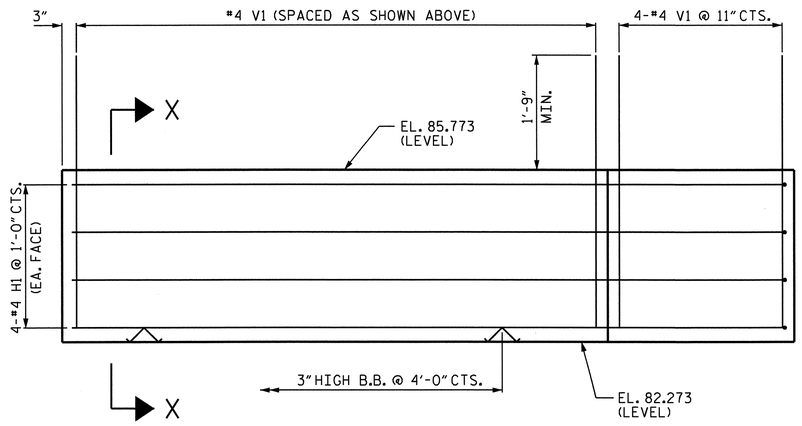
PLAN OF WING (W1)



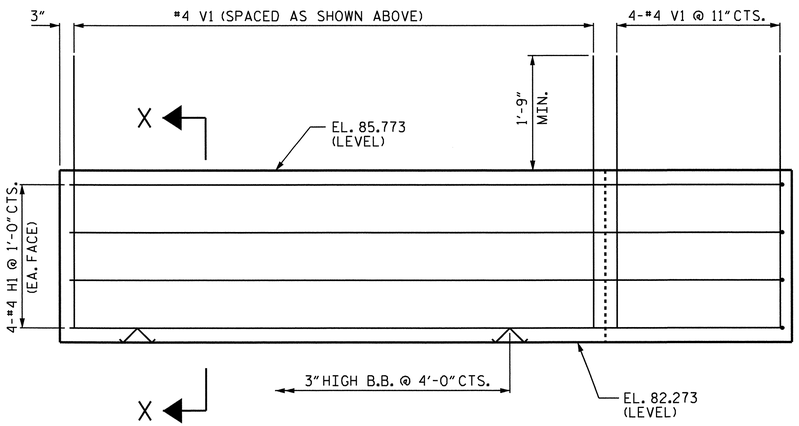
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

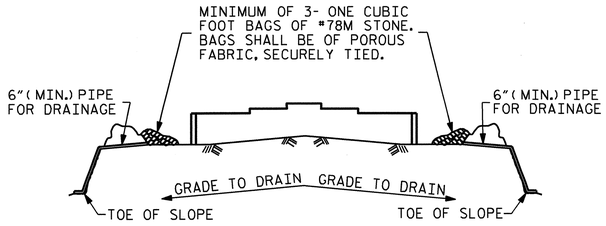
SUBSTRUCTURE

END BENT 1
(INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

09-AUG-2011 13:30
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_E*.dgn
OTNGUYEN

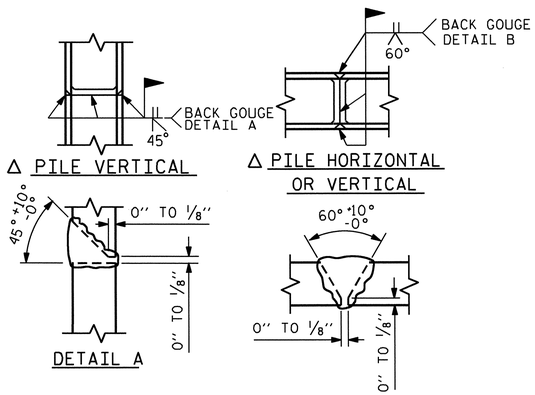


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

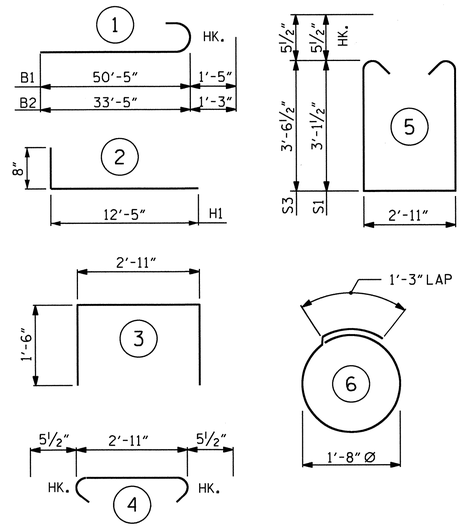
TEMPORARY DRAINAGE AT END BENT



Δ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	51'-10"	1784
B2	10	#9	1	34'-8"	1179
B3	5	#9	STR	43'-6"	740
B4	16	#4	STR	25'-1"	268
B5	8	#5	STR	48'-0"	401
B6	28	#4	STR	2'-11"	55
B7	5	#4	STR	3'-2"	11
H1	16	#4	2	13'-1"	140
S1	42	#5	5	10'-1"	442
S2	82	#5	4	3'-10"	328
S3	40	#5	5	10'-11"	455
S4	44	#4	6	6'-6"	191
U1	3	#4	3	5'-11"	12
V1	212	#4	STR	6'-0"	850

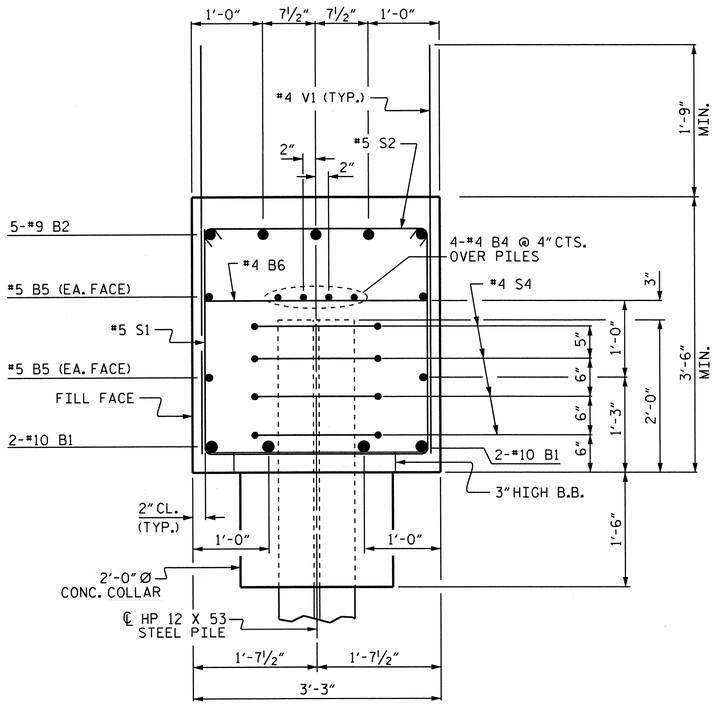
REINFORCING STEEL LBS. 6,856

CLASS A CONCRETE BREAKDOWN :

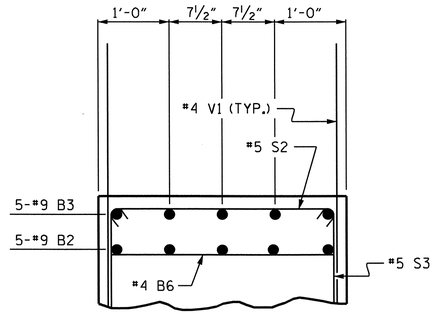
POUR #1 - CAP, COLLARS, & LOWER WINGS C.Y. 47.0

HP 12 x 53 STEEL PILES NO. = 11 LIN. FT. 660

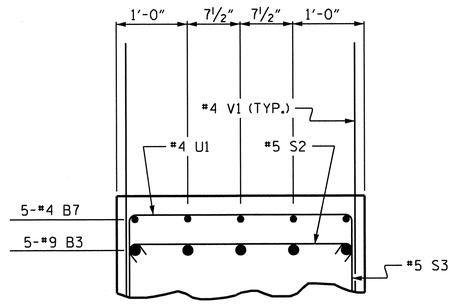
PILE REDRIVES EA. 4



SECTION A-A



PARTIAL SECTION B-B



PARTIAL SECTION C-C

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (INTEGRAL)

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSILING FANG

8/9/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11

CHECKED BY : B. MATHEW DATE : 2/11

09-AUG-2011 14:27
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_E*.dgn
OTNGUYEN

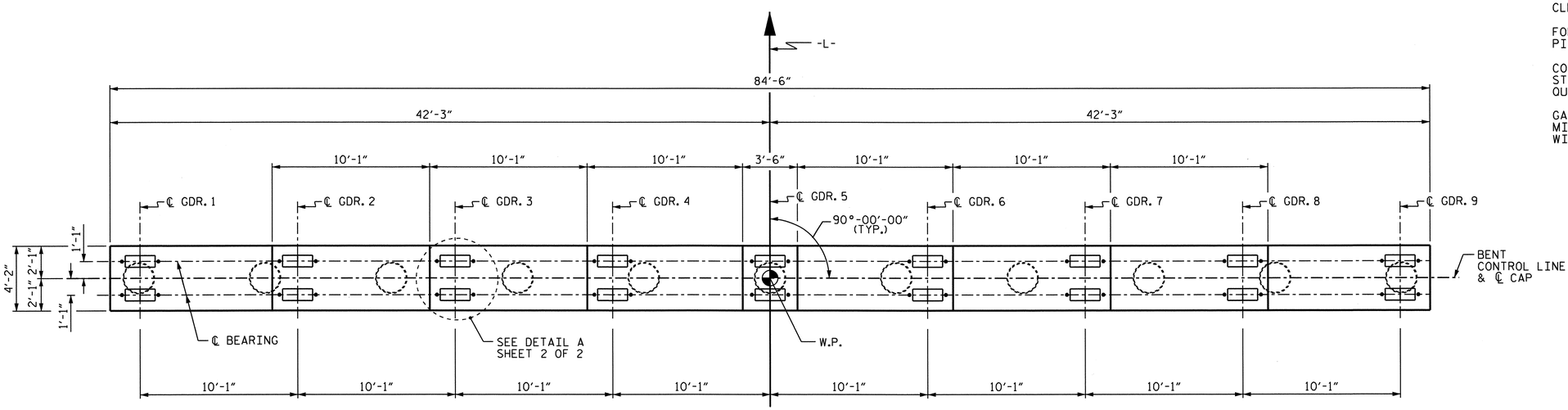
NOTES:

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

FOR REINFORCING STEEL IN PILE, SEE "24" STEEL PIPE PILE " SHEET.

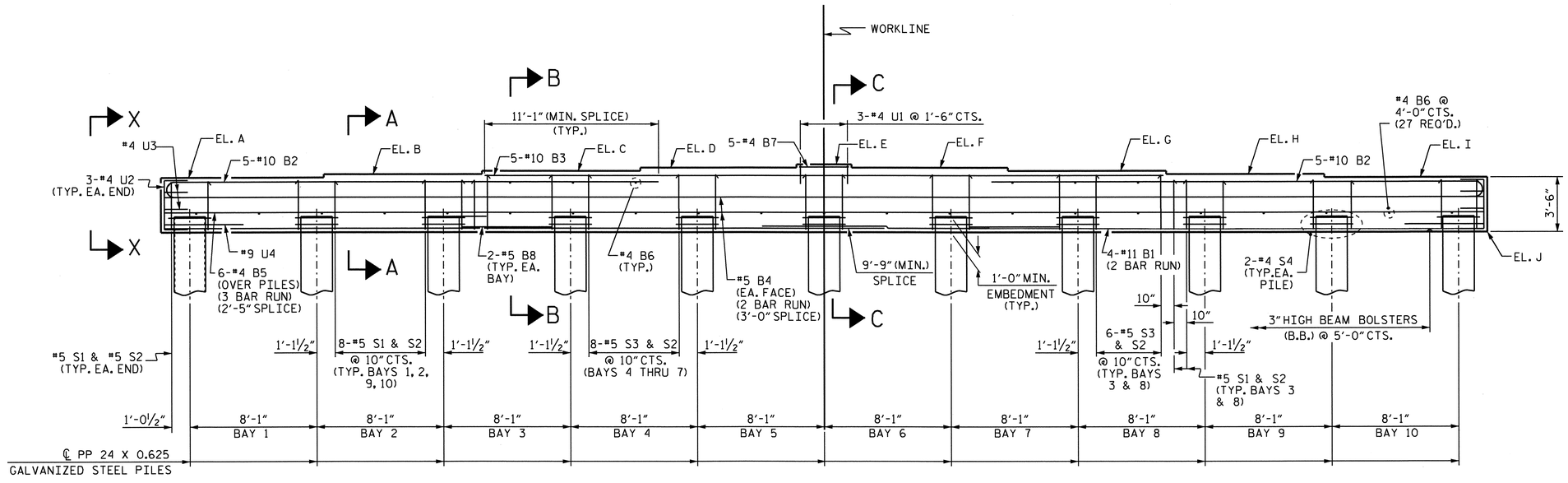
CONCRETE DISPLACED BY PP 24 X 0.625 GALVANIZED STEEL PILES HAS BEEN DEDUCTED FROM THE CONCRETE QUANTITY.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 47 FEET. GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



PLAN

SEAT ELEVATION		
ELEVATION	BENT 1	BENT 2
A	85.859	85.928
B	86.060	86.130
C	86.262	86.331
D	86.464	86.533
E	86.665	86.735
F	86.464	86.533
G	86.262	86.331
H	86.060	86.130
I	85.859	85.928
J	82.359	82.428



ELEVATION

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG
9/21/11

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

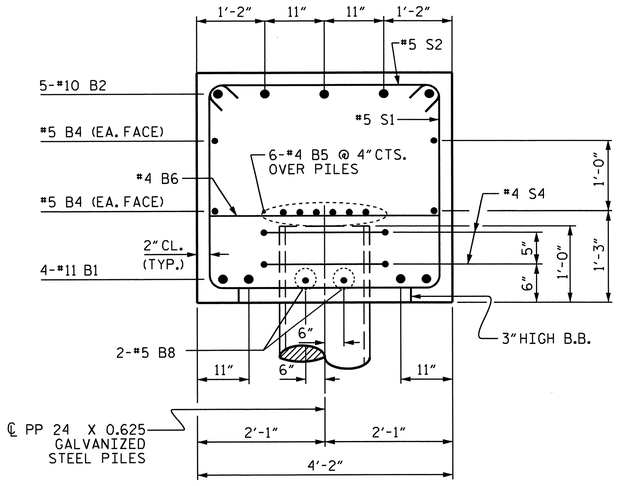
SUBSTRUCTURE

BENTS 1 & 2

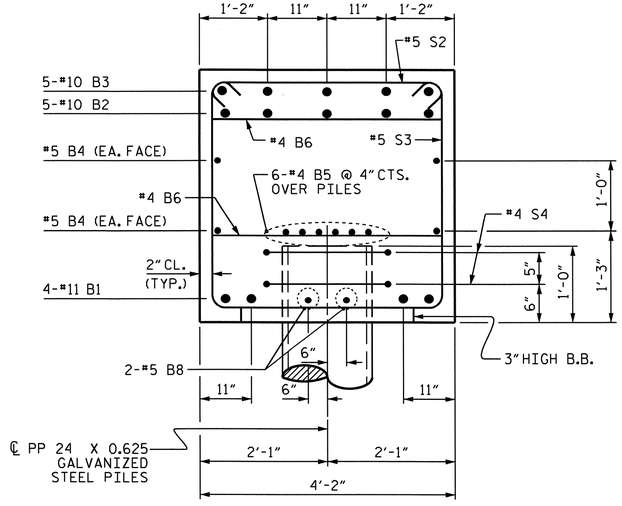
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

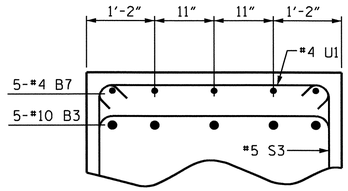
21-SEP-2011 12:11
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_B*.dgn
ttang



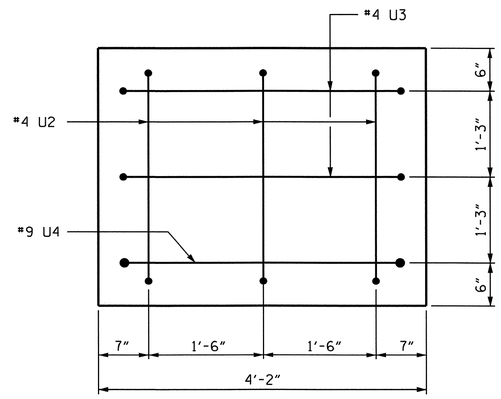
SECTION A-A



SECTION B-B

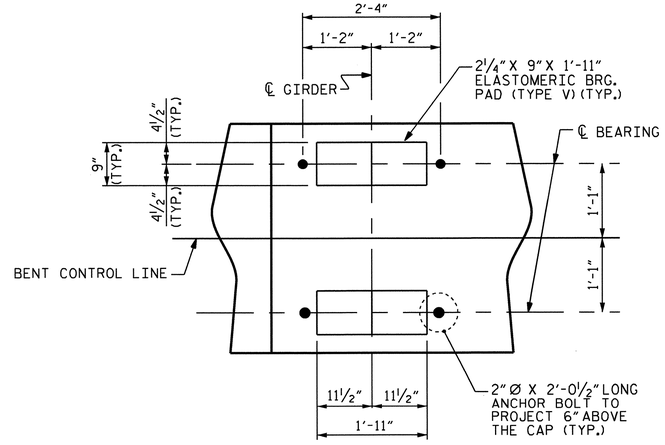


PARTIAL SECTION C-C



VIEW X-X

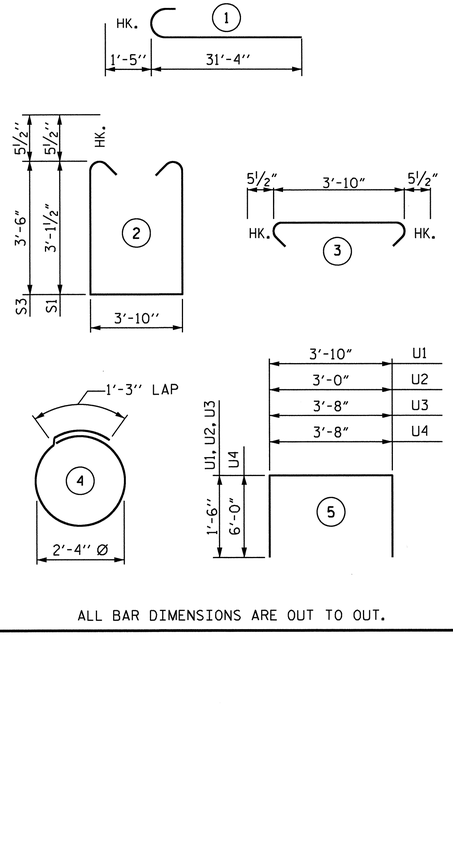
(TYP. BOTH ENDS)



DETAIL A

(TYP. EA. GIRDER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	STR	47'-0"	1998
B2	10	#10	1	32'-9"	1409
B3	5	#10	STR	43'-6"	936
B4	8	#5	STR	43'-6"	363
B5	18	#4	STR	30'-0"	361
B6	27	#4	STR	3'-10"	69
B7	5	#4	STR	3'-2"	11
B8	20	#5	STR	5'-10"	122
S1	38	#5	2	11'-0"	436
S2	82	#5	3	4'-9"	406
S3	44	#5	2	11'-9"	539
S4	22	#4	4	8'-7"	126
U1	3	#4	5	6'-10"	14
U2	6	#4	5	6'-0"	24
U3	4	#4	5	6'-8"	18
U4	2	#9	5	15'-8"	107

REINFORCING STEEL	6,939	LBS.
CLASS A CONCRETE CAP	48.6	C.Y.
PP 24 x 0.625 GALVANIZED STEEL PILES NO. = 11	825	LIN. FT.
PILE REDRIVES	EA.	11
PDA TESTING	EA.	1
PDA ASSISTANCE	EA.	1

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-WEI TANG

9/22/11

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			41

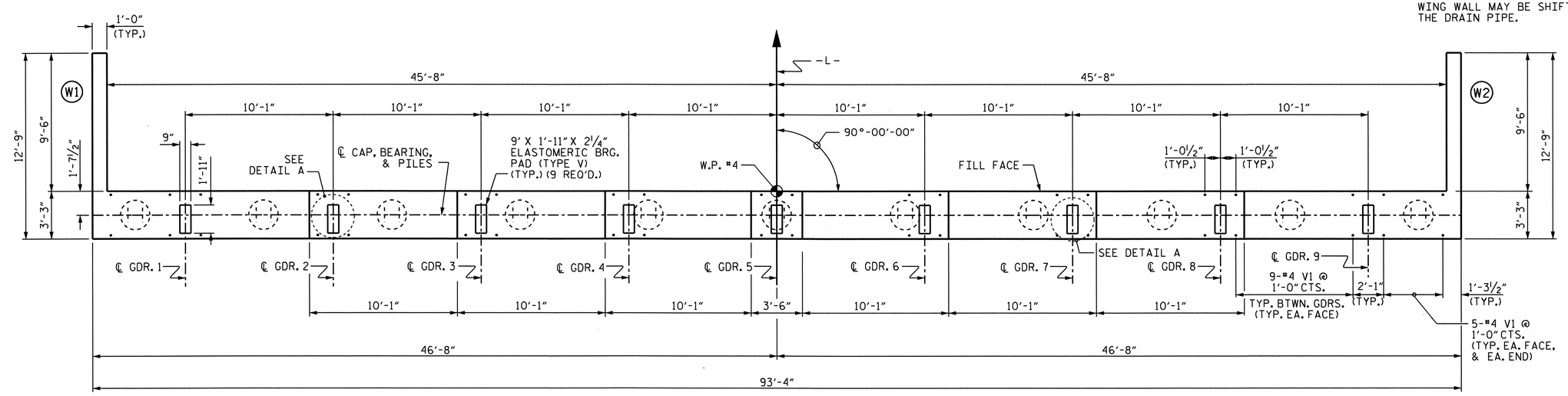
DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

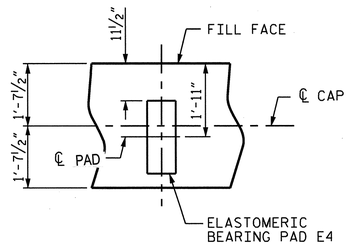
22-SEP-2011 11:12
K:\TIPProjects-B\B4090\Structures\Final Plans\B4090_SD_B*.dgn
tfang

NOTES:

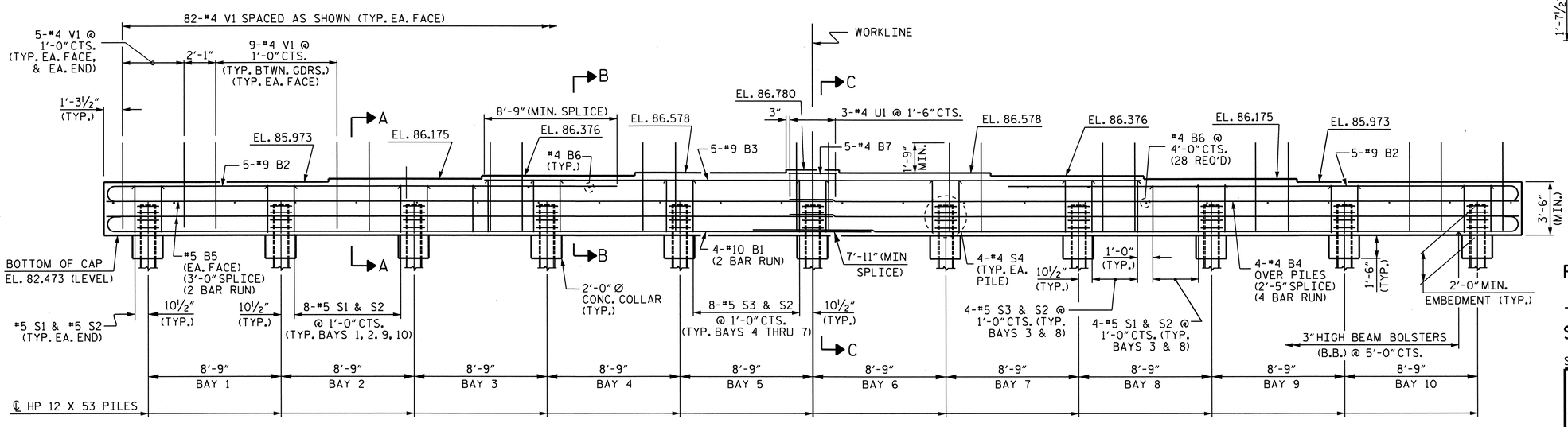
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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





DETAIL A



ELEVATION

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG
9/21/11

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

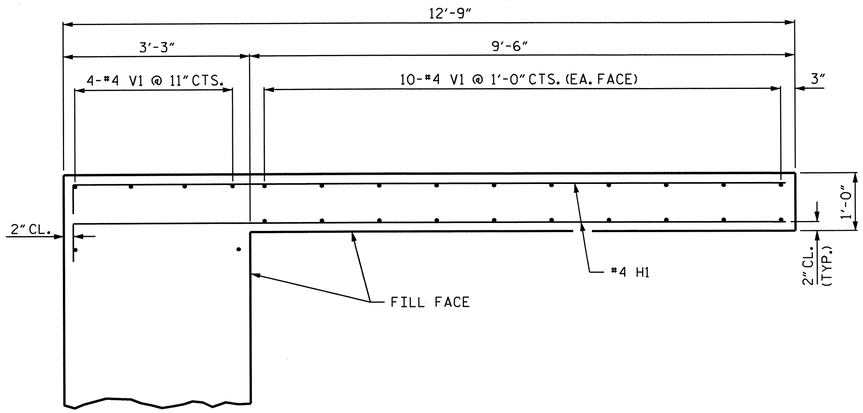
SUBSTRUCTURE

END BENT 2 (INTEGRAL)

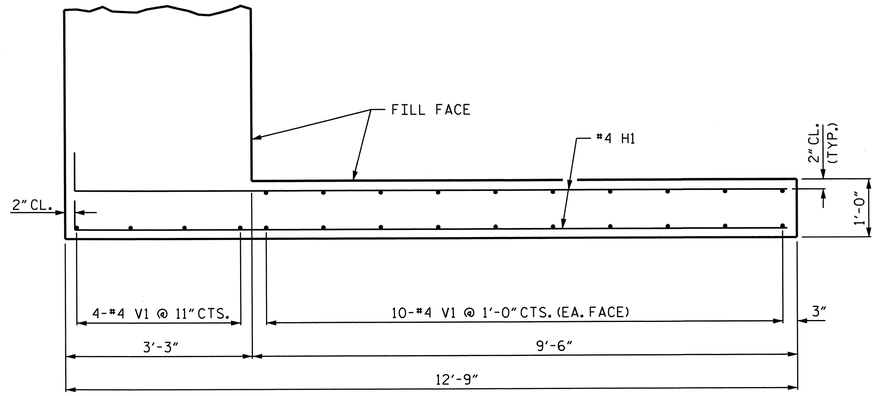
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

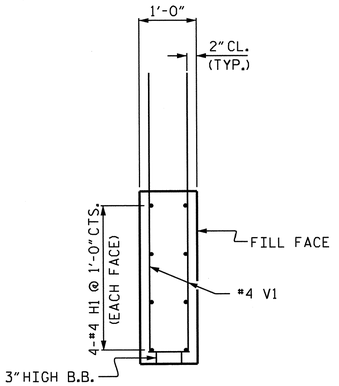
21-SEP-2011 10:32
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_E*.dgn
ttfang



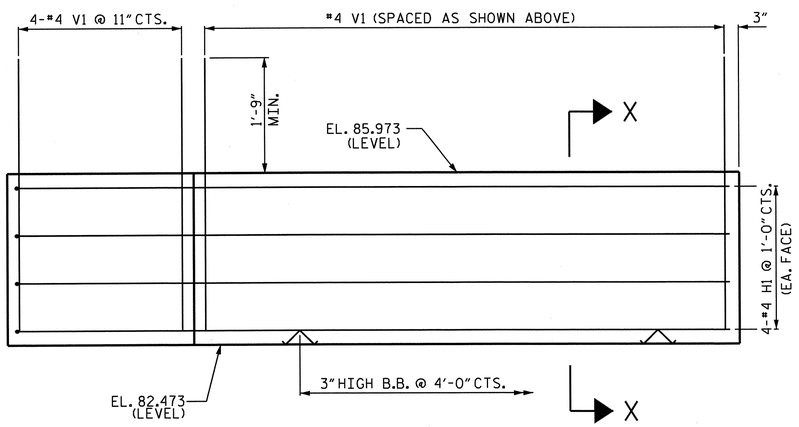
PLAN OF WING (W1)



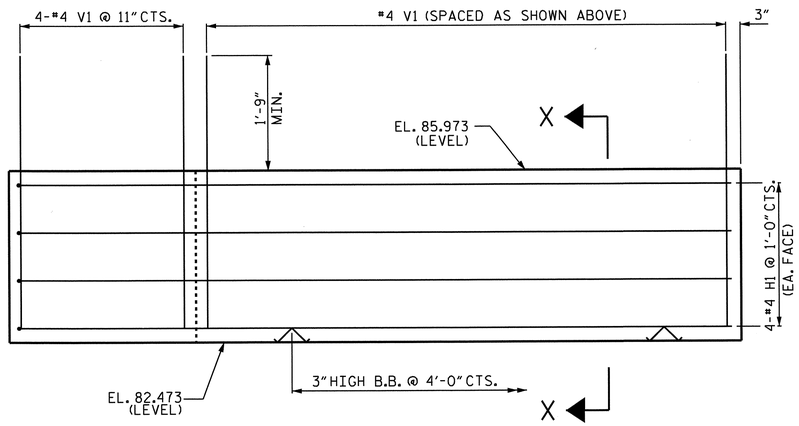
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
(INTEGRAL)

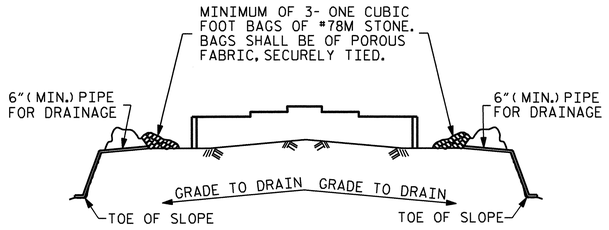
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			41

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER HSIUNG TING FANG

9/22/11

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

21-SEP-2011 10:38
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_E*.dgn
tfang

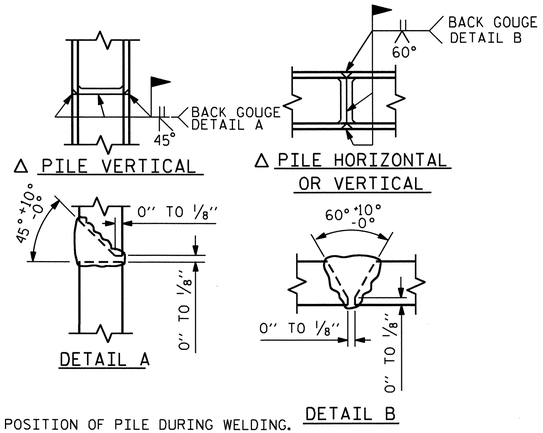


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

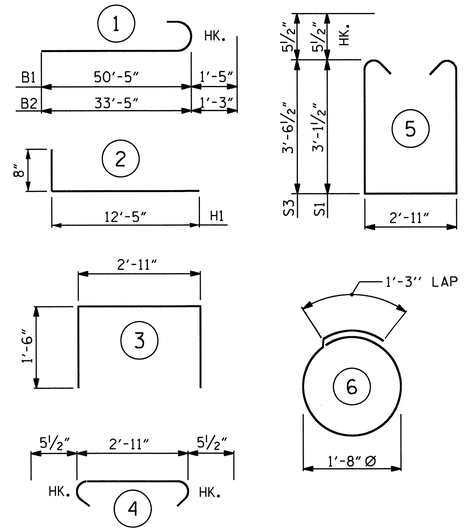
TEMPORARY DRAINAGE AT END BENT



Δ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	51'-10"	1784
B2	10	#9	1	34'-8"	1179
B3	5	#9	STR	43'-6"	740
B4	16	#4	STR	25'-1"	268
B5	8	#5	STR	48'-0"	401
B6	28	#4	STR	2'-11"	55
B7	5	#4	STR	3'-2"	11
H1	16	#4	2	13'-1"	140
S1	42	#5	5	10'-1"	442
S2	82	#5	4	3'-10"	328
S3	40	#5	5	10'-11"	455
S4	44	#4	6	6'-6"	191
U1	3	#4	3	5'-11"	12
V1	212	#4	STR	6'-0"	850

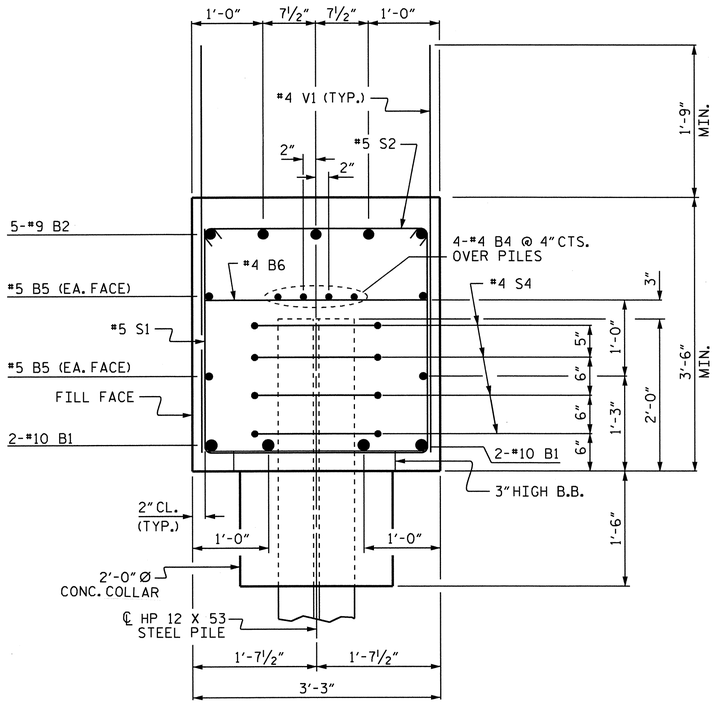
REINFORCING STEEL LBS. 6,856

CLASS A CONCRETE BREAKDOWN :

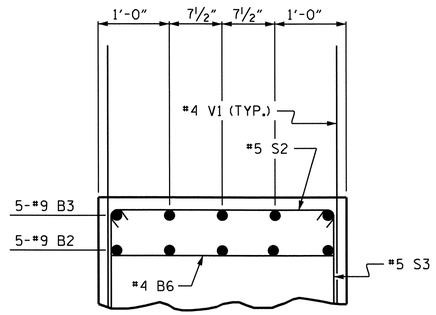
POUR #1 - CAP, COLLARS, & LOWER WINGS C.Y. 47.0

HP 12 x 53 STEEL PILES NO. = 11 LIN. FT. 550

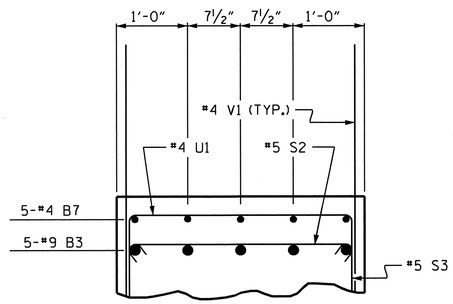
PILE REDRIVES EA. 4



SECTION A-A



PARTIAL SECTION B-B



PARTIAL SECTION C-C

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

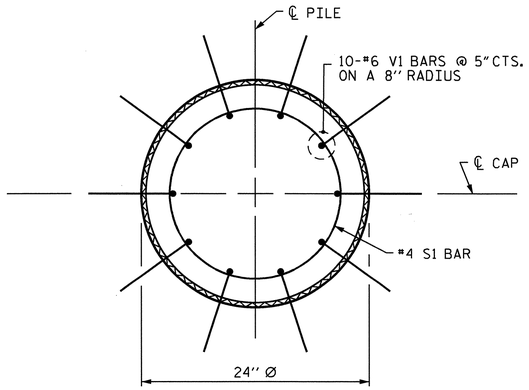
END BENT 2 (INTEGRAL)

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER YING-HSING TANG 8/9/11

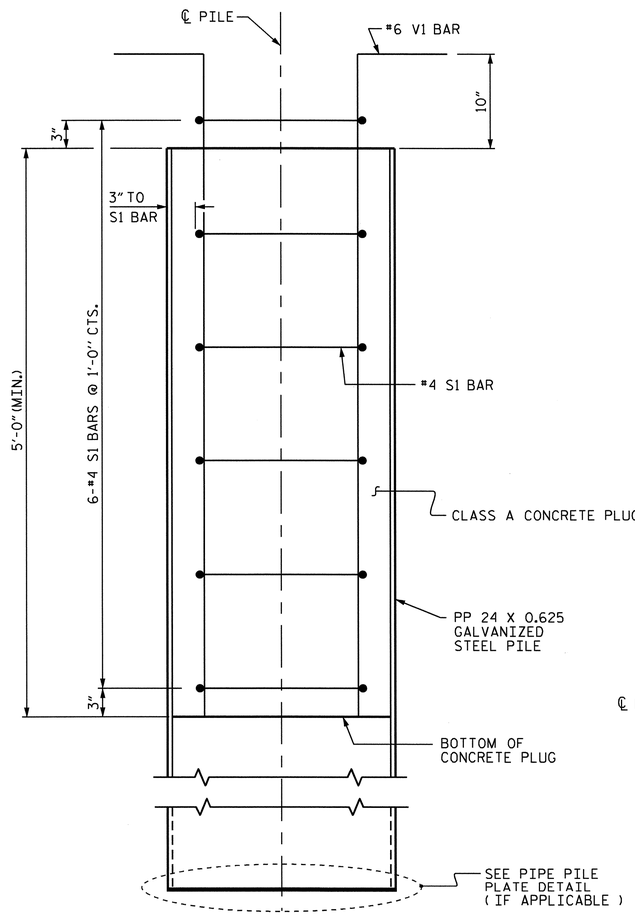
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : K.H. COMPTON DATE : 2/11
CHECKED BY : B. MATHEW DATE : 2/11

09-AUG-2011 14:27
Y:\TIPProjects-B\B4090\Structures\Final Plans\B4090_SD_E*.dgn
OTNGUYEN



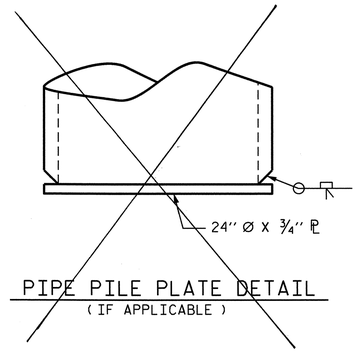
PLAN



ELEVATION

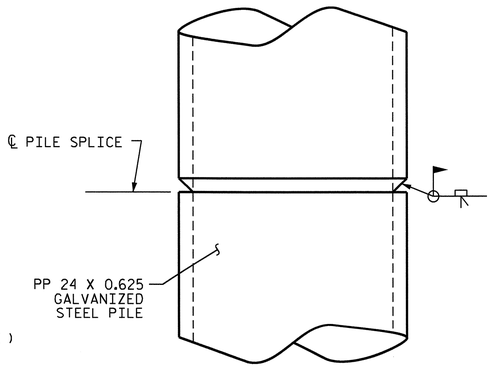
PP 24 X 0.625 GALVANIZED STEEL PILE

(OPEN OR CLOSED END)



PIPE PILE PLATE DETAIL

(IF APPLICABLE)



PIPE PILE SPLICE DETAIL

NOTES

PIPE PILES SHALL BE IN ACCORDANCE WITH SECTION 1084 OF THE STANDARD SPECIFICATIONS.

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS UNLESS METALLIZING IS REQUIRED. GALVANIZING OR METALLIZING PIPE PILE PLATES IS NOT REQUIRED.

PIPE PILE PLATES, IF REQUIRED, SHALL BE IN ACCORDANCE WITH SECTION 450 OF THE STANDARD SPECIFICATIONS.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR CLOSED END PIPE PILES, REMOVE ALL SOIL AND WATER FROM INSIDE THE PILES JUST PRIOR TO PLACING REINFORCING STEEL AND CONCRETE FOR THE CONCRETE PLUG.

FOR OPEN END PIPE PILES, REMOVE ENOUGH SOIL AND WATER FROM INSIDE THE PILES TO CONSTRUCT THE CONCRETE PLUG WITHOUT FOULING THE CONCRETE.

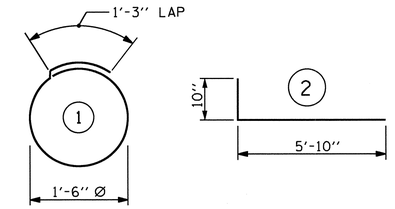
FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 24 X 0.625 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE PP 24 X 0.625 GALVANIZED STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	6	#4	1	6'-0"	24
V1	10	#6	2	6'-8"	100
REINFORCING STEEL =				124	lbs
CLASS A CONCRETE					
5'-0" MINIMUM PLUG					0.6 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

24" STEEL PIPE PILE

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER HSIANG FANG

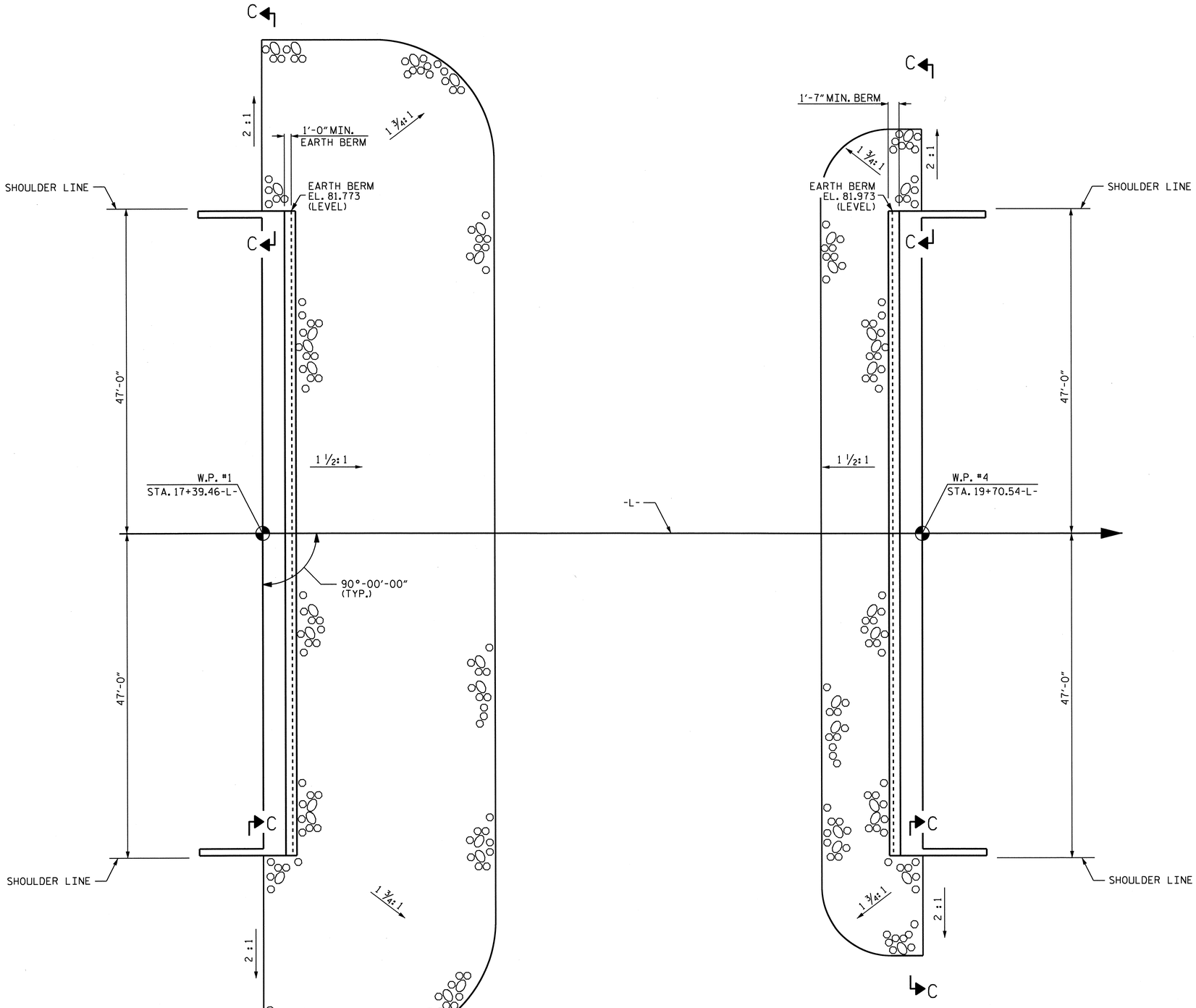
8/9/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			41

STD. NO. SPP4

ASSEMBLED BY : K. H. COMPTON DATE : 2/11	
CHECKED BY : B. MATHEW DATE : 2/11	
DRAWN BY : TLA 8/05	ADDED 10/1/05
CHECKED BY : GM 9/05	REV. 5/1/06R MAA/KMM

09-AUG-2011 13:30
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_SD_B*.dgn
OTNGUYEN

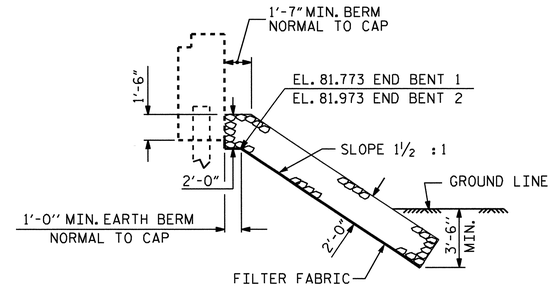


END BENT 1

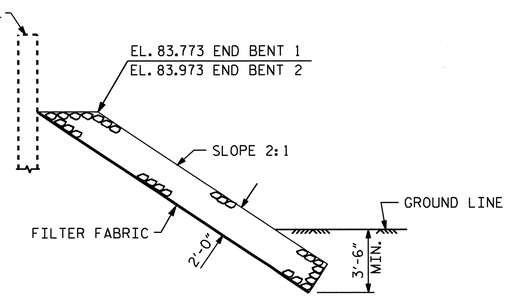
END BENT 2

PLAN

ESTIMATED QUANTITIES		
BRIDGE @ STA. 18+55.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	405	450
END BENT 2	80	90
TOTAL	485	540



℄ SECTION



℄ SECTION C-C

BERM RIP RAPPED

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG FANG
9/21/11

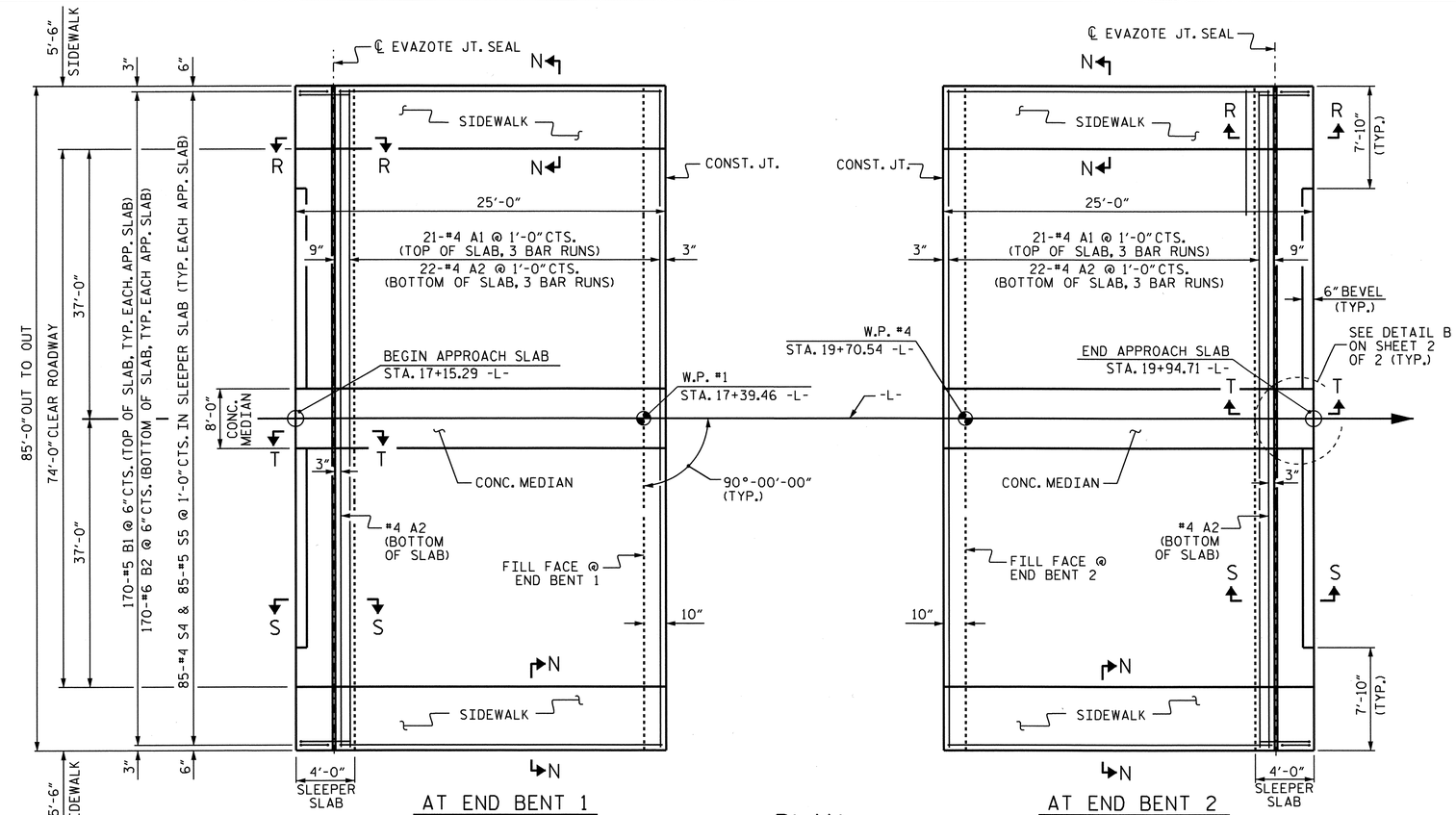
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			41

SKEW 90°

STD. NO. RR2

DRAWN BY : K.H. COMPTON DATE : 3/11
CHECKED BY : T. H. FANG DATE : 7/13/11

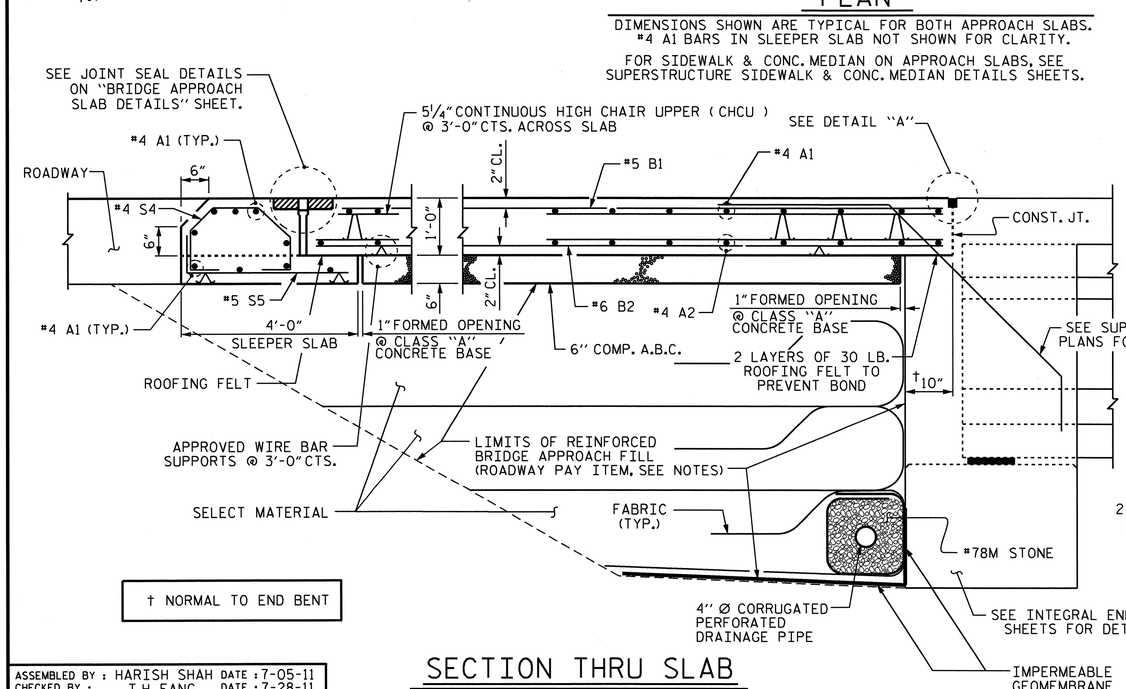
21-SEP-2011 14:02
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_rr.dgn
tfang



PLAN

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.
#4 A1 BARS IN SLEEPER SLAB NOT SHOWN FOR CLARITY.

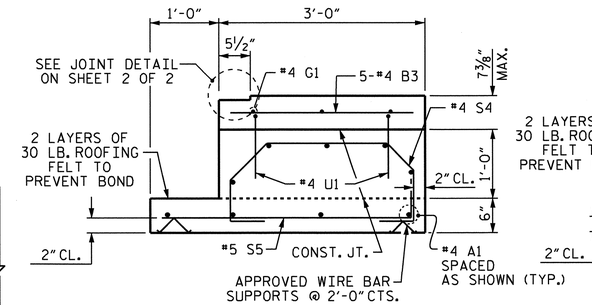
FOR SIDEWALK & CONC. MEDIAN ON APPROACH SLABS, SEE SUPERSTRUCTURE SIDEWALK & CONC. MEDIAN DETAILS SHEETS.



† NORMAL TO END BENT

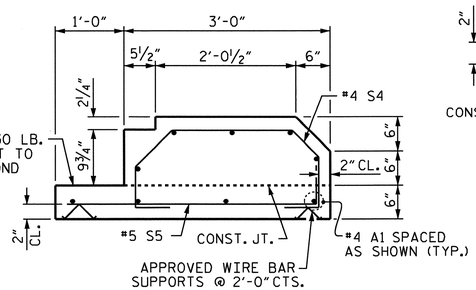
SECTION THRU SLAB

CONCRETE MEDIAN NOT SHOWN FOR CLARITY.



SECTION R-R

SHOWING SIDEWALK ON SLEEPER SLAB

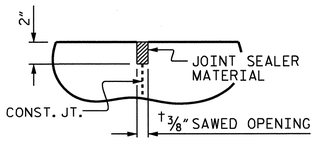


SECTION S-S

SHOWING SLEEPER SLAB

SECTION T-T

SHOWING CONCRETE MEDIAN ON SLEEPER SLAB



DETAIL "A"

NOTES

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

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

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

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

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

THE VERTICAL JOINT ON THE RIGHT AND LEFT SIDE OF THE APPROACH SLAB AT THE ENDS OF THE EVAZOTE JOINT SHALL BE FILLED WITH SILICONE OR OTHER APPROVED MATERIAL IN ORDER TO PREVENT BACKFILL FROM ENTERING THE JOINT OPENING.

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 TYPE SL LOW MODULUS SILICONE SEALANT.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

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

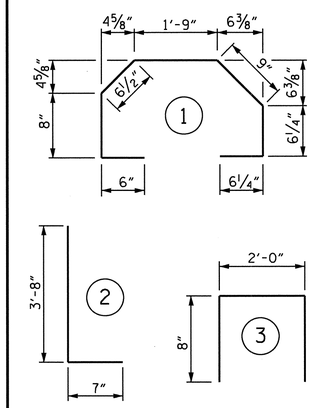
FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	90	#4	STR	29'-7"	1779
A2	69	#4	STR	29'-5"	1356
* B1	170	#5	STR	21'-1"	3738
B2	170	#6	STR	21'-7"	5511
* B3	15	#4	STR	2'-8"	27
* G1	6	#4	STR	5'-0"	20
* G2	3	#4	STR	7'-0"	14
* S4	85	#4	1	5'-3"	298
S5	85	#5	2	4'-3"	377
* U1	8	#4	3	3'-4"	18
REINFORCING STEEL				LBS.	7244
* EPOXY COATED REINFORCING STEEL				LBS.	5894
CLASS AA CONCRETE					
POUR #1 - SLEEPER SLAB				C. Y.	6.3
POUR #2 - SLAB				C. Y.	73.3
POUR #3 - SIDEWALK & CONC. MEDIAN				C. Y.	1.0
TOTAL				C. Y.	80.6

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE CHART

BAR	SIZE	SPLICE
* A1	#4	2'-0"
A2	#4	1'-9"

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH SIDEWALK

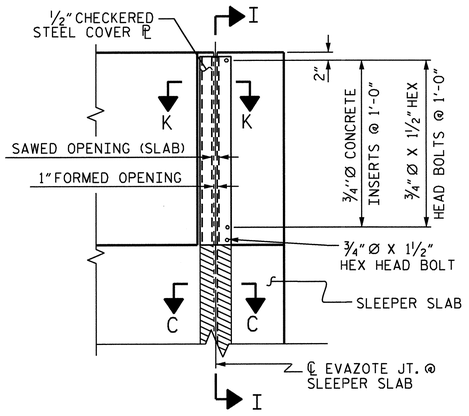
NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSIUNG FANG
9/21/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			41

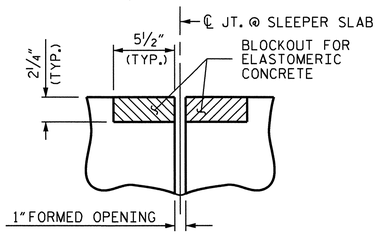
ASSEMBLED BY : HARISH SHAH DATE : 7-05-11
CHECKED BY : T.H. FANG DATE : 7-28-11
DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06
ADDED 5/1/06R KMM/GM

21-SEP-2011 11:30
K:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_as.dgn
tfang

STD. NO. BAS11 (SHT 4)



PLAN VIEW OF EVAZOTE JOINT SEAL @ SLEEPER SLAB FOR SIDEWALK

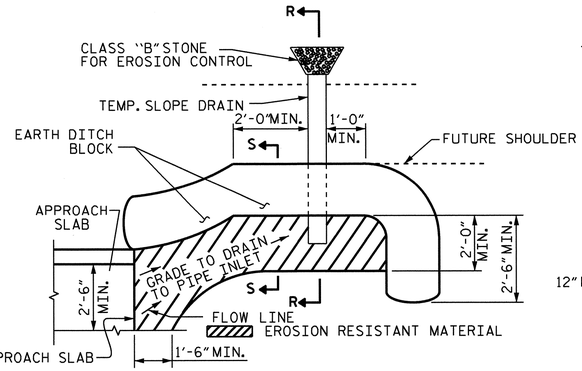


SECTION C-C

EVAZOTE JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

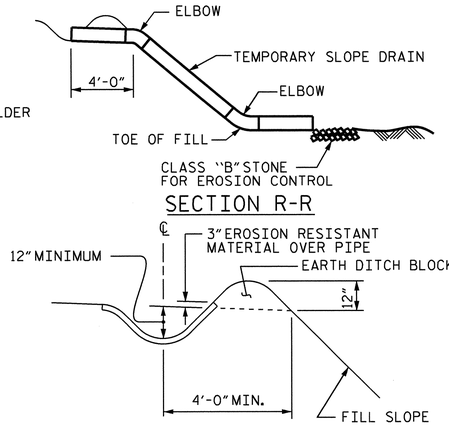
ELASTOMERIC CONCRETE	
END BENT	ELASTOMERIC CONCRETE * (CU. FT.)
1	12.72
2	12.72
TOTAL	25.44

* 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

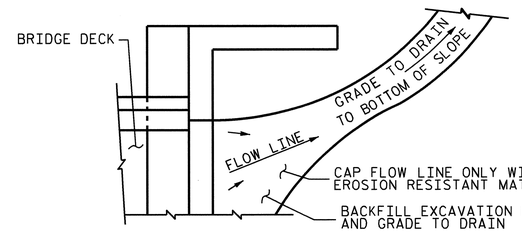


SECTION R-R

SECTION S-S

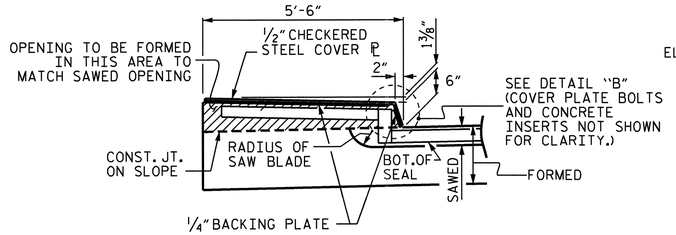
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

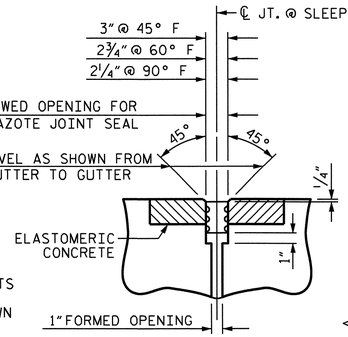


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

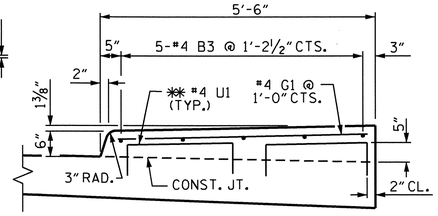


SECTION I-I

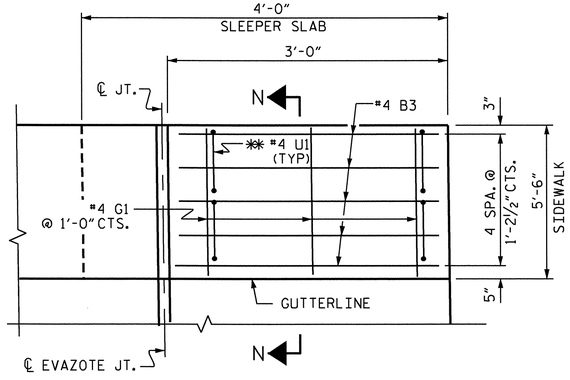


SECTION C-C

EVAZOTE JOINT SEAL
(EXPANSION)

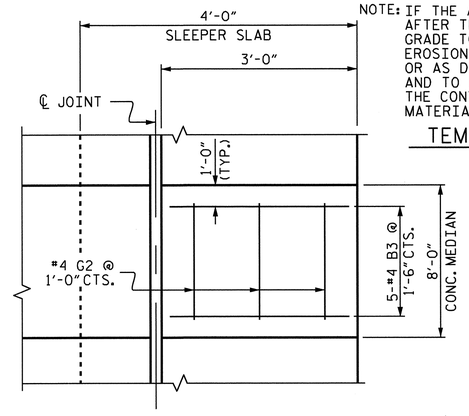


SECTION N-N



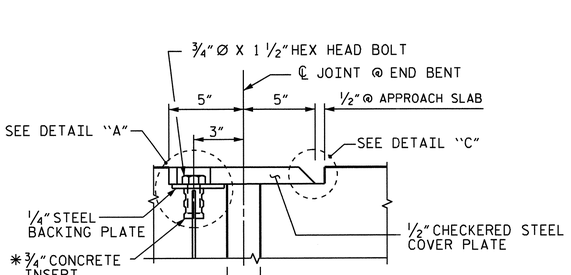
PLAN

** #4 U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLEEPER SLAB HAS BEEN SCREEDED OFF.



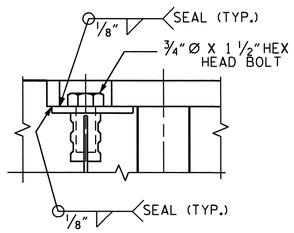
DETAIL B

FOR SECTION THRU CONCRETE MEDIAN, SEE "CONCRETE MEDIAN" SHEET.

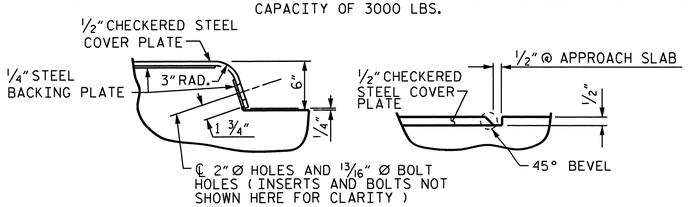


SECTION K-K

*THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.



DETAIL "A"



DETAIL "B"

DETAIL "C"

JOINT SEAL DETAILS @ SLEEPER SLAB

COVER PLATE NOTES

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTOR'S OPTION, THESE SURFACES MAY BE METALLIZED TO A MINIMUM THICKNESS OF 6 MILS. SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THE 3/4" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EVAZOTE JOINT SEALS".

ASSEMBLED BY : HARISH SHAH		DATE : 7-05-11	
CHECKED BY : T.H. FANG		DATE : 7-28-11	
DRAWN BY : FCJ	11/88	REV. 10/17/00	RWW/LES
CHECKED BY : ARB	11/88	REV. 5/7/03	RWW/JTE
		REV. 5/21/06R	MAA/KMM

09-AUG-2011 13:30
Y:\TIPProjects-B\B4090\Structures\FinalPlans\B4090_sd_as.dgn
OTNGUYEN

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			41

STD. NO. BAS10 (SHT 12)

OVERHANG BRACKET CALCULATION INSTRUCTIONS

AASHTO SHAPES - TYPES III, IV, V, AND VI

1. RECORD KNOWN INFORMATION ON "BRIDGE OVERHANG BRACKET SUMMARY" ON SHEET 2
2. CALCULATE THE MAXIMUM SCREED LOAD PER BRACKET (SLPB) WITH AN ESTIMATED R = 1.5. SLPB = R X W. ROUND VALUE UP TO NEAREST SLPB VALUE INDICATED ON APPROPRIATE TABLE 1-1, 1-2, 1-3, OR 1-4.
3. WITH THE ESTIMATED SLPB, OVERHANG SLAB THICKNESS, "K" VALUE, AND 45° HANGER SAFE WORKING LOAD (SWL), ENTER THE APPROPRIATE TABLE 1-1, 1-2, 1-3, OR 1-4 (BASED ON OVERHANG DIMENSION) AND DETERMINE THE BRACKET SPACING, S.
4. CALCULATE S/D1 AND S/D2, ROUNDING UP TO NEAREST VALUE IN TABLE 2. ENTER TABLE 2 AND DETERMINE R VALUE.
5. CALCULATE REVISED SLPB. ROUND VALUE UP TO NEAREST SLPB VALUE INDICATED ON APPROPRIATE TABLE 1-1, 1-2, 1-3, OR 1-4.
6. WITH THE REVISED SLPB, OVERHANG SLAB THICKNESS, "K" VALUE AND 45 HANGER SAFE WORKING LOAD (SWL), ENTER THE APPROPRIATE TABLE 1-1, 1-2, 1-3 OR 1-4 (BASED ON OVERHANG DIMENSION) AND DETERMINE REVISED BRACKET SPACING, S.
7. CONTINUE ITERATIONS OF STEPS 4-6 UNTIL THE REVISED BRACKET SPACING, S, IS THE SAME AS THE PREVIOUS S VALUE.
8. CHECK LUMBER JOIST SPACING: WITH BRACKET SPACING VALUE, S, ROUND THIS VALUE UP TO THE NEAREST VALUE OF ALLOWABLE SPAN LENGTH OF JOIST OF TABLE 3. USING THIS VALUE, ALONG WITH THE AVERAGE OVERHANG SLAB THICKNESS AND THE LUMBER JOIST SIZE, DETERMINE JOIST SPACING FROM TABLE 3. IF NECESSARY, ADJUST LUMBER JOIST SIZE AND/OR JOIST SPACING TO MEET ALLOWABLE SPAN LENGTH OF JOIST.
9. CONVERSELY, IF THE DESIRED JOIST SPACING IS KNOWN, USE THIS ALONG WITH THE AVERAGE OVERHANG SLAB THICKNESS AND THE LUMBER JOIST SIZE TO DETERMINE IF ALLOWABLE SPAN LENGTH OF JOIST IS GREATER THAN THE BRACKET SPACING, S. IF NECESSARY, ADJUST LUMBER JOIST SIZE TO MEET REQUIREMENTS OF ALLOWABLE SPAN LENGTH OF JOIST AND JOIST SPACING.
10. RECORD REMAINING INFORMATION ON "BRIDGE OVERHANG BRACKET SUMMARY" FORM.
11. SUBMIT FORM AND CALCULATIONS FOR REVIEW AND APPROVAL.

TABLE 1-1 (FOR USE ON **UP TO 2'-0" OVERHANG (L)** & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (T) (in)	BRACKET (K) DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
		BRACKET SPACING									
10	30				2'-1"	2'-7"	3'-2"	3'-8"	4'-2"	5'-9"	4000
		3'-6"	4'-0"	4'-5"	4'-9"	5'-1"	5'-3"	5'-5"	5'-7"	6'-7"	6000
	40				2'-1"	2'-7"	3'-2"	3'-8"	4'-2"	5'-9"	4000
		3'-6"	4'-0"	4'-5"	4'-9"	5'-1"	5'-3"	5'-5"	5'-7"	6'-7"	6000
	50				2'-1"	2'-7"	3'-2"	3'-8"	4'-2"	5'-9"	4000
		3'-6"	4'-0"	4'-5"	4'-9"	5'-1"	5'-3"	5'-5"	5'-7"	6'-7"	6000
12	30					2'-4"	2'-10"	3'-4"	3'-9"	5'-2"	4000
		3'-2"	3'-7"	4'-1"	4'-7"	5'-0"	5'-2"	5'-4"	5'-7"	6'-5"	6000
	40					2'-4"	2'-10"	3'-4"	3'-9"	5'-2"	4000
		3'-2"	3'-7"	4'-1"	4'-7"	5'-0"	5'-2"	5'-4"	5'-7"	6'-5"	6000
	50					2'-4"	2'-10"	3'-4"	3'-9"	5'-2"	4000
		3'-2"	3'-7"	4'-1"	4'-7"	5'-0"	5'-2"	5'-4"	5'-7"	6'-5"	6000
14	30					2'-2"	2'-7"	3'-0"	3'-5"	4'-9"	4000
		2'-10"	3'-4"	3'-9"	4'-2"	4'-7"	5'-0"	5'-4"	5'-7"	6'-4"	6000
	40					2'-2"	2'-7"	3'-0"	3'-5"	4'-9"	4000
		2'-10"	3'-4"	3'-9"	4'-2"	4'-7"	5'-0"	5'-4"	5'-7"	6'-4"	6000
	50					2'-2"	2'-7"	3'-0"	3'-5"	4'-9"	4000
		2'-10"	3'-4"	3'-9"	4'-2"	4'-7"	5'-0"	5'-4"	5'-7"	6'-4"	6000
16	30					2'-0"	2'-4"	2'-9"	3'-2"	4'-4"	4000
		2'-8"	3'-0"	3'-5"	3'-10"	4'-3"	4'-7"	5'-0"	5'-5"	6'-3"	6000
	40					2'-0"	2'-4"	2'-9"	3'-2"	4'-4"	4000
		2'-8"	3'-0"	3'-5"	3'-10"	4'-3"	4'-7"	5'-0"	5'-5"	6'-3"	6000
	50					2'-0"	2'-4"	2'-9"	3'-2"	4'-4"	4000
		2'-8"	3'-0"	3'-5"	3'-10"	4'-3"	4'-7"	5'-0"	5'-5"	6'-3"	6000

TABLE 1-2 (FOR USE ON **OVER 2'-0" TO 2'-6" OVERHANG (L)** & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (T) (in)	BRACKET (K) DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
		BRACKET SPACING									
10	30					2'-4"	2'-9"	3'-3"	3'-8"	5'-1"	4000
		3'-1"	3'-6"	4'-0"	4'-5"	4'-11"	5'-3"	5'-5"	5'-7"	6'-7"	6000
	40					2'-4"	2'-9"	3'-3"	3'-8"	5'-1"	4000
		3'-1"	3'-6"	4'-0"	4'-5"	4'-11"	5'-3"	5'-5"	5'-7"	6'-7"	6000
	50					2'-4"	2'-9"	3'-3"	3'-8"	5'-1"	4000
		3'-1"	3'-6"	4'-0"	4'-5"	4'-11"	5'-3"	5'-5"	5'-7"	6'-7"	6000
12	30					2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000
		2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	4'-10"	5'-3"	5'-7"	6'-5"	6000
	40					2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000
		2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	4'-10"	5'-3"	5'-7"	6'-5"	6000
	50					2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000
		2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	4'-10"	5'-3"	5'-7"	6'-5"	6000
14	30						2'-3"	2'-7"	3'-0"	4'-1"	4000
		2'-6"	2'-10"	3'-3"	3'-7"	4'-0"	4'-4"	4'-9"	5'-1"	6'-3"	6000
	40						2'-3"	2'-7"	3'-0"	4'-1"	4000
		2'-6"	2'-10"	3'-3"	3'-7"	4'-0"	4'-4"	4'-9"	5'-1"	6'-3"	6000
	50						2'-3"	2'-7"	3'-0"	4'-1"	4000
		2'-6"	2'-10"	3'-3"	3'-7"	4'-0"	4'-4"	4'-9"	5'-1"	6'-3"	6000
16	30						2'-1"	2'-5"	2'-9"	3'-9"	4000
		2'-3"	2'-7"	2'-11"	3'-4"	3'-8"	4'-0"	4'-4"	4'-8"	5'-8"	6000
	40						2'-1"	2'-5"	2'-9"	3'-9"	4000
		2'-3"	2'-7"	2'-11"	3'-4"	3'-8"	4'-0"	4'-4"	4'-8"	5'-8"	6000
	50						2'-1"	2'-5"	2'-9"	3'-9"	4000
		2'-3"	2'-7"	2'-11"	3'-4"	3'-8"	4'-0"	4'-4"	4'-8"	5'-8"	6000

TABLE 1-3 (FOR USE ON **OVER 2'-6" TO 3'-0" OVERHANG (L)** & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (T) (in)	BRACKET (K) DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
		BRACKET SPACING									
10	30					2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000
						4'-5"	4'-10"	5'-3"	5'-7"	6'-7"	6000
	40					2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000
		2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	4'-10"	5'-3"	5'-7"	6'-7"	6000
	50					2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000
		2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	4'-10"	5'-3"	5'-7"	6'-7"	6000
12	30						2'-2"	2'-7"	2'-11"	4'-0"	4000
						3'-11"	4'-3"	4'-8"	5'-0"	6'-1"	6000
	40						2'-2"	2'-7"	2'-11"	4'-0"	4000
		2'-5"	2'-10"	3'-2"	3'-6"	3'-11"	4'-3"	4'-8"	5'-0"	6'-1"	6000
	50						2'-2"	2'-7"	2'-11"	4'-0"	4000
		2'-5"	2'-10"	3'-2"	3'-6"	3'-11"	4'-3"	4'-8"	5'-0"	6'-1"	6000
14	30						2'-0"	2'-4"	2'-8"	3'-8"	4000
					3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	5'-6"	6000
	40						2'-0"	2'-4"	2'-8"	3'-8"	4000
		2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	5'-6"	6000
	50						2'-0"	2'-4"	2'-8"	3'-8"	4000
		2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	5'-6"	6000
16	30						2'-1"	2'-5"	3'-4"	4000	
					2'-11"	3'-2"	3'-6"	3'-10"	4'-1"	5'-0"	6000
	40						2'-1"	2'-5"	3'-4"	4000	
		2'-0"	2'-4"	2'-7"	2'-11"	3'-2"	3'-6"	3'-10"	4'-1"	5'-0"	6000
	50						2'-1"	2'-5"	3'-4"	4000	
		2'-0"	2'-4"	2'-7"	2'-11"	3'-2"	3'-6"	3'-10"	4'-1"	5'-0"	6000

TABLE 1-4 (FOR USE ON **OVER 3'-0" TO 3'-6" OVERHANG (L)** & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (T) (in)	BRACKET (K) DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
		BRACKET SPACING									
10	30						2'-1"	2'-5"	2'-9"	3'-10"	4000
						2'-3"	2'-11"	3'-7"	4'-3"	5'-9"	6000
	40						2'-1"	2'-5"	2'-9"	3'-10"	4000
				2'-4"	3'-0"	3'-7"	4'-1"	4'-5"	4'-9"	5'-9"	6000
	50						2'-1"	2'-5"	2'-9"	3'-10"	4000
		2'-4"	2'-8"	3'-0"	3'-4"	3'-8"	4'-1"	4'-5"	4'-9"	5'-9"	6000
12	30							2'-2"	2'-6"	3'-5"	4000
						2'-1"	2'-8"	3'-4"	3'-11"	5'-2"	6000
	40							2'-2"	2'-6"	3'-5"	4000
				2'-2"	2'-9"	3'-4"	3'-7"	3'-11"	4'-3"	5'-2"	6000
	50							2'-2"	2'-6"	3'-5"	4000
		2'-1"	2'-4"	2'-8"	3'-0"	3'-4"	3'-7"	3'-11"	4'-3"	5'-2"	6000
14	30								2'-3"	3'-1"	4000
						2'-0"	2'-6"	3'-1"	3'-8"	4'-8"	6000
	40								2'-3"	3'-1"	4000
				2'-0"	2'-7"	3'-0"	3'-3"	3'-6"	3'-10"	4'-8"	6000
	50								2'-3"	3'-1"	4000
			2'-2"	2'-5"	2'-8"	3'-0"	3'-3"	3'-6"	3'-10"	4'-8"	6000
16	30								2'-0"	2'-9"	4000
							2'-4"	2'-10"	3'-5"	4'-3"	6000
	40								2'-0"	2'-9"	4000
					2'-5"	2'-8"	2'-11"	3'-3"	3'-6"	4'-3"	6000
	50								2'-0"	2'-9"	4000
				2'-2"	2'-5"	2'-8"	2'-11"	3'-3"	3'-6"	4'-3"	6000

DEFINITIONS

SLPB = SCREED LOAD PER BRACKET (R x W)
R = SCREED LOAD FACTOR, OBTAINED FROM TABLE 2
W = WHEEL LOAD
S = BRACKET SPACING
T = AVERAGE SLAB THICKNESS
SWL = SAFE WORKING LOAD
K = DIMENSION DEFINED ON "BRIDGE OVERHANG BRACKET SUMMARY" ON SHEET 2
L = OVERHANG MEASURED FROM EDGE OF TOP FLANGE TO EDGE OF SUPERSTRUCTURE

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD OVERHANG FALSEWORK AASHTO TYPES III, IV, V, AND VI

NORTH CAROLINA PROFESSIONAL SEAL 18788 ENGINEER CHARNG-CHUAN VICTOR CHAO

Charng-Chuan victor Chao
8-8-2011

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			41

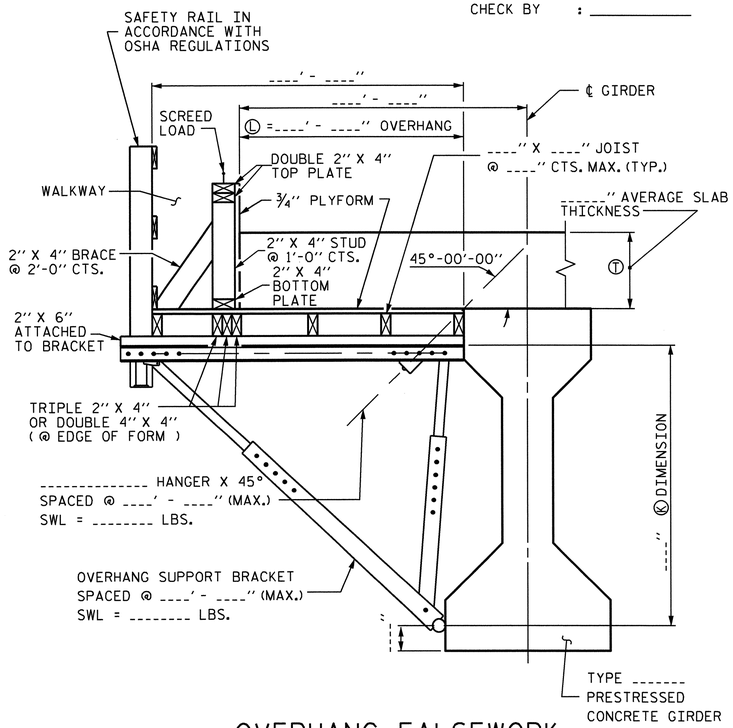
ASSEMBLED BY:	DATE:
CHECKED BY:	DATE:
DRAWN BY: R. WRIGHT 06/04	REV.
CHECKED BY: C. V. CHAO 06/04	

08-AUG-2011 11:32
C:\OLDFILESD\wdlr\victor\OverhangFalsework\TIEBAR&STRUT\B-4090_TYPE_III\B4090newOverHangSheets.dgn
vchao

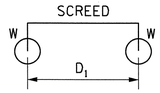
BRIDGE OVERHANG BRACKET SUMMARY

TOTAL SCREED WEIGHT = _____ LBS.
NUMBER OF SCREED WHEELS = _____
SCREED WHEEL LOAD (W) = _____LBS.
SCREED LOAD PER BRACKET = _____ LBS.

PROJECT No. : _____
COUNTY : _____
STATION : _____
DESCRIPTION : _____
_____
DATE : _____
DESIGN BY : _____
CHECK BY : _____

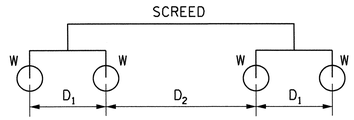


OVERHANG FALSEWORK



4-WHEEL MACHINE

4 WHEEL MACHINE	
S/D1	R
<= 1.0	1.00
1.1	1.09
1.2	1.17
1.3	1.23
1.4	1.29
1.5	1.33
1.6	1.38
1.7	1.41
1.8	1.44
1.9	1.47
2.0	1.50
2.2	1.55
2.4	1.58
2.6	1.62
2.8	1.64
3.0	1.67
3.5	1.71
4.0	1.75



8-WHEEL MACHINE

TABLE 2: SCREED LOAD FACTOR "R"

		THE SCREED LOAD FACTOR R (FOR 8 WHEEL MACHINE)																		
		S/D2																		
S/D1		<= 1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.2	2.4	2.6	2.8	3.0	3.5	4.0
	<= 1.0	1.00	1.09	1.17	1.23	1.29	1.33	1.38	1.41	1.44	1.47	1.50	1.55	1.58	1.62	1.64	1.67	1.71	1.75
	1.1	1.09	1.18	1.26	1.32	1.38	1.42	1.47	1.50	1.54	1.56	1.59	1.64	1.67	1.71	1.73	1.76	1.81	1.84
	1.2	1.17	1.26	1.33	1.40	1.45	1.50	1.54	1.58	1.61	1.64	1.67	1.71	1.75	1.78	1.81	1.83	1.88	1.92
	1.3	1.23	1.32	1.40	1.46	1.52	1.56	1.61	1.64	1.68	1.70	1.73	1.78	1.81	1.85	1.87	1.90	1.95	1.98
	1.4	1.29	1.38	1.45	1.52	1.57	1.62	1.66	1.70	1.73	1.76	1.79	1.83	1.87	1.90	1.93	1.95	2.00	2.07
	1.5	1.33	1.42	1.50	1.56	1.62	1.67	1.71	1.75	1.78	1.81	1.83	1.88	1.92	1.95	1.98	2.00	2.10	2.17
	1.6	1.38	1.47	1.54	1.61	1.66	1.71	1.75	1.79	1.82	1.85	1.88	1.92	1.96	1.99	2.04	2.08	2.18	2.25
	1.7	1.41	1.50	1.58	1.64	1.70	1.75	1.79	1.82	1.86	1.89	1.91	1.96	2.00	2.05	2.11	2.16	2.25	2.32
	1.8	1.44	1.54	1.61	1.68	1.73	1.78	1.82	1.86	1.89	1.92	1.94	1.99	2.06	2.12	2.17	2.22	2.32	2.39
	1.9	1.47	1.56	1.64	1.70	1.76	1.81	1.85	1.89	1.92	1.95	1.97	2.04	2.11	2.18	2.23	2.28	2.38	2.45
	2.0	1.50	1.59	1.67	1.73	1.79	1.83	1.88	1.91	1.94	1.97	2.00	2.09	2.17	2.23	2.29	2.33	2.43	2.50
	2.2	1.55	1.64	1.71	1.78	1.83	1.88	1.92	1.96	1.99	2.04	2.09	2.18	2.26	2.32	2.38	2.42	2.52	2.59
	2.4	1.58	1.67	1.75	1.81	1.87	1.92	1.96	2.00	2.06	2.11	2.17	2.26	2.33	2.40	2.45	2.50	2.60	2.67
	2.6	1.62	1.71	1.78	1.85	1.90	1.95	1.99	2.05	2.12	2.18	2.23	2.32	2.40	2.46	2.52	2.56	2.66	2.73
	2.8	1.64	1.73	1.81	1.87	1.93	1.98	2.04	2.11	2.17	2.23	2.29	2.38	2.45	2.52	2.57	2.62	2.71	2.79
	3.0	1.67	1.76	1.83	1.90	1.95	2.00	2.08	2.16	2.22	2.28	2.33	2.42	2.50	2.56	2.62	2.67	2.76	2.83
	3.5	1.71	1.81	1.88	1.95	2.00	2.10	2.18	2.25	2.32	2.38	2.43	2.52	2.60	2.66	2.71	2.76	2.86	2.93
	4.0	1.75	1.84	1.92	1.98	2.07	2.17	2.25	2.32	2.39	2.45	2.50	2.59	2.67	2.73	2.79	2.83	2.93	3.00

NOTES

DESIGN INCLUDES CONSTRUCTION LIVE LOAD 20 PSF ON THE AREA SUPPORTED AND 75 PLF AT THE OUTSIDE DECK OF OVERHANGS.

REQUIRED MINIMUM DIAGONAL LEG CAPACITY: 3600 LB WORKING LOAD

THE CONTRACTOR HAS THE OPTION OF SUBMITTING HIS OWN DESIGN FOR OVERHANG FALSEWORK IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

SUBMITTALS UTILIZING THE INSTRUCTIONS AND PROCEDURES DESCRIBED ON SHEET 1 OF 3 SHALL BE IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE SPECIFICATIONS AND SPECIAL PROVISIONS, EXCEPT THAT CALCULATIONS FOR OVERHANG FALSEWORK NEED NOT BE SEALED BY A REGISTERED ENGINEER.

FOR OVERHANG FALSEWORK BRACING DESIGN, SEE SHEET 3 OF 3.

TABLE 3: ALLOWABLE SPAN LENGTH OF JOISTS AND JOIST SPACINGS

AVG. SLAB THICKNESS Ⓣ (IN)	LUMBER JOIST SIZE (IN X IN)	JOIST SPACINGS			
		15 IN	12 IN	10 IN	8 IN
		THE ALLOWABLE SPAN LENGTH OF JOISTS			
10	2 X 4	———	4' - 6"	4' - 9"	5' - 0"
	4 X 4	5' - 9"	6' - 3"	6' - 6"	6' - 7"
12	2 X 4	———	4' - 3"	4' - 9"	5' - 0"
	4 X 4	5' - 3"	6' - 0"	6' - 3"	6' - 5"
14	2 X 4	———	4' - 0"	4' - 6"	5' - 0"
	4 X 4	———	5' - 6"	6' - 0"	6' - 4"
16	2 X 4	———	4' - 0"	4' - 3"	4' - 9"
	4 X 4	———	5' - 3"	5' - 9"	6' - 3"

PROJECT NO. B-4090
CUMBERLAND COUNTY
STATION: 18+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD OVERHANG FALSEWORK AASHTO TYPES III, IV, V, AND VI

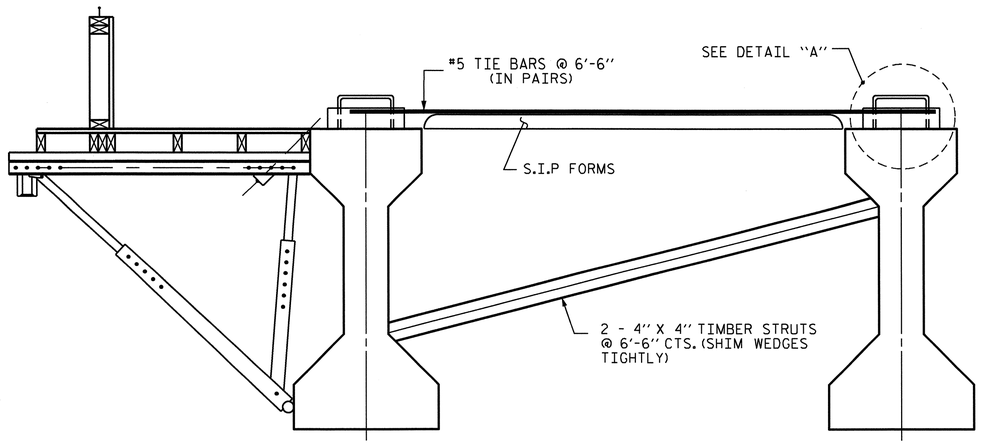
NORTH CAROLINA PROFESSIONAL SEAL 18788 ENGINEER CHIANG-CHUAN VICTOR CHAO

Chiang-Chuan Victor Chao
8-8-2011

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			41

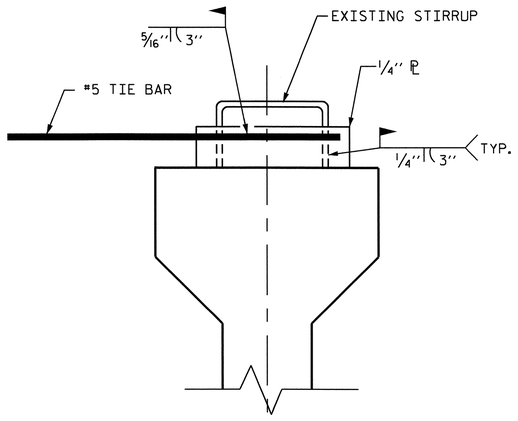
ASSEMBLED BY:	DATE:
CHECKED BY:	DATE:
DRAWN BY: R. WRIGHT 06/04	REV.
CHECKED BY: C. V. CHAO 06/04	

08-AUG-2011 11:33
C:\OLDFILESD\wdlr\victor\OverhangFalsework\TIEBAR&STRUT\B-4090_TYPE_III\B4090newOverHangSheets.dgn
vchao



EXTERIOR GIRDER INTERIOR GIRDER

DETAIL OF REQUIRED OVERHANG FALSEWORK BRACING SYSTEM



DETAIL "A"

NOTES:

EACH #5 TIE BAR SHALL BE WELDED TO ONE STIRRUP LOOP AS SHOWN IN DETAIL "A". #5 TIE BARS SHALL BE WELDED TO TWO ADJACENT STIRRUPS OF THE EXTERIOR GIRDER AND THE ADJACENT INTERIOR GIRDER BETWEEN PERMANENT DIAPHRAGMS. WELD STEEL PLATES IN BETWEEN THE TIE BARS AND THE STIRRUP LOOP. WELDING TWO TIE BARS TO THE SAME STIRRUP LOOP SHALL NOT BE PERMITTED.

MAXIMUM SPACING BETWEEN THE BRACING (TIE BARS-TIMBER STRUT) IS 6'-6" CTS. #5 TIE BARS SHALL BE LOCATED OVER A TIMBER STRUT.

INSTALL TIE BARS AND TIMBER STRUTS PRIOR TO PLACEMENT OF CONCRETE OR SCREED WEIGHT ONTO THE OVERHANG FALSEWORK.

PROJECT NO. B-4090

CUMBERLAND COUNTY

STATION: 18+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD OVERHANG FALSEWORK AASHTO TYPES III, IV, V, AND VI

NORTH CAROLINA PROFESSIONAL SEAL 18788 ENGINEER CHANG-CHUAN VICTOR CHAO

Chang-Chuan Victor Chao
8-8-2011

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

DRAWN BY: R. WRIGHT 06/04 DATE :
CHECKED BY: C. V. CHAO 06/04 DATE :

08-AUG-2011 11:33
C:\OLDFILESD\wdlr\victor\OverhangFalsework\TIEBAR&STRUT\B-4090_TYPE_III\B4090newOverHangSheets.dgn
vchao

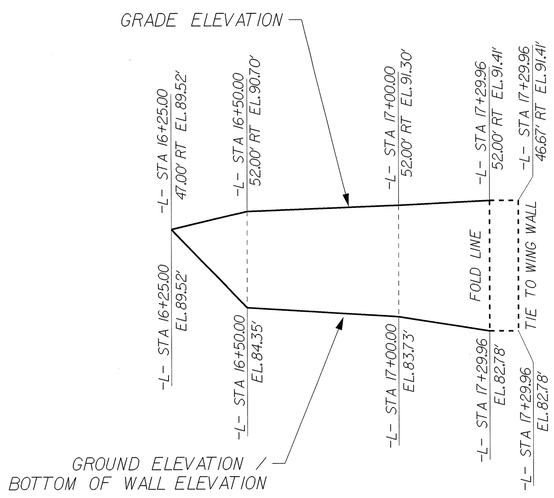
GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 30943 ENGINEER THEIN TUN ZAN

SIGNATURE 9/14/11 DATE

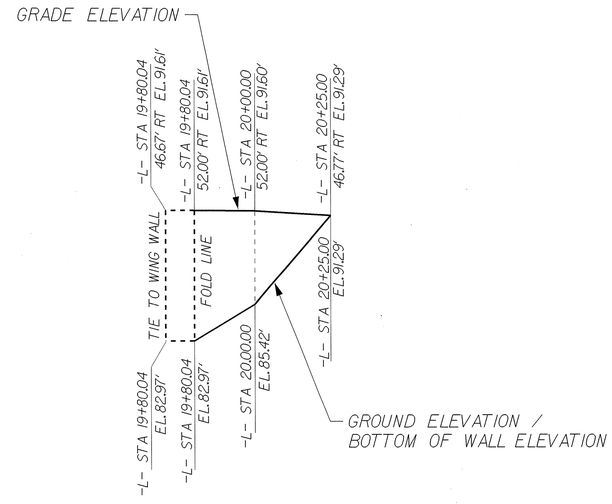
ENGINEER

SIGNATURE DATE



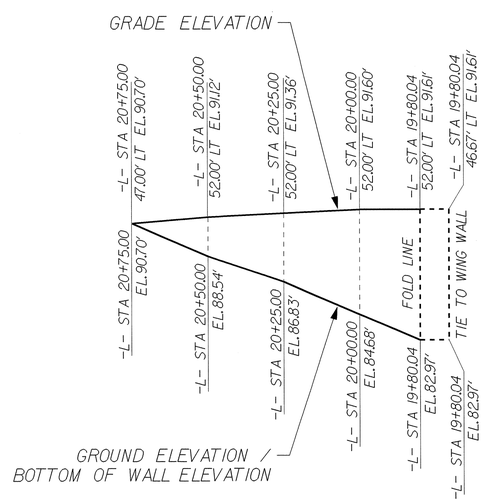
RETAINING WALL NO.1
ELEVATION

N.T.S



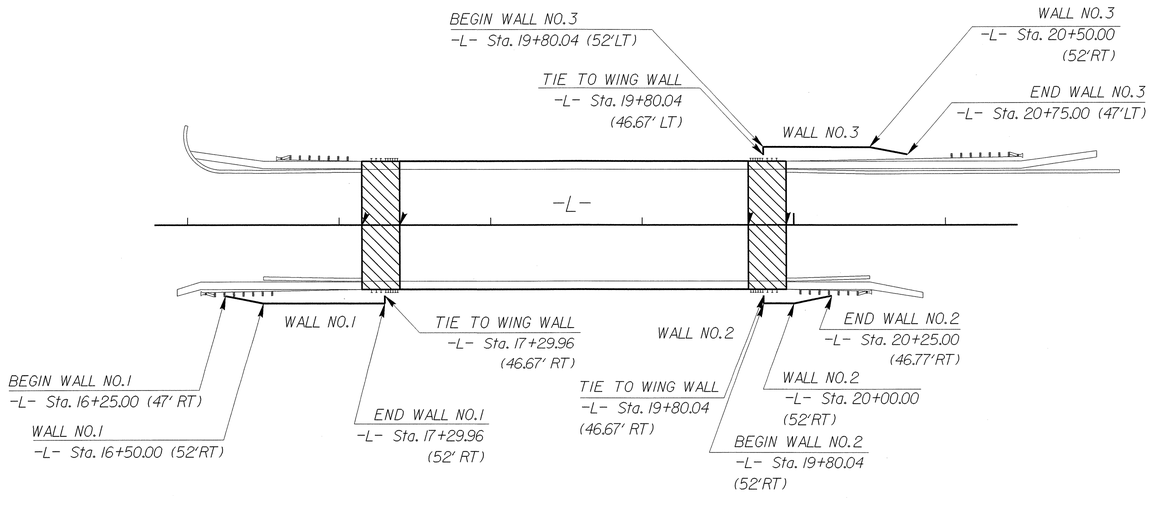
RETAINING WALL NO.2
ELEVATION

N.T.S



RETAINING WALL NO.3
ELEVATION

N.T.S



RETAINING WALLS PLAN VIEW

N.T.S

TOTAL BILL OF MATERIAL		
WALL NO.1	SOLDIER PILE RETAINING WALL	775 SQ.FT.
WALL NO.2	SOLDIER PILE RETAINING WALL	300 SQ.FT.
WALL NO.3	SOLDIER PILE RETAINING WALL	520 SQ.FT.

PREPARED BY: THEIN T. ZAN	DATE: 08/2011
REVIEWED BY: JAMES R. BATTS	DATE: 08/2011

PROJECT NO.: 33488.1.1 (B-4090)

CUMBERLAND ***COUNTY***

STATION: VARIES

SHEET 1 OF 2

GEOTECHNICAL ENGINEERING UNIT

☒ ***EASTERN REGIONAL OFFICE***

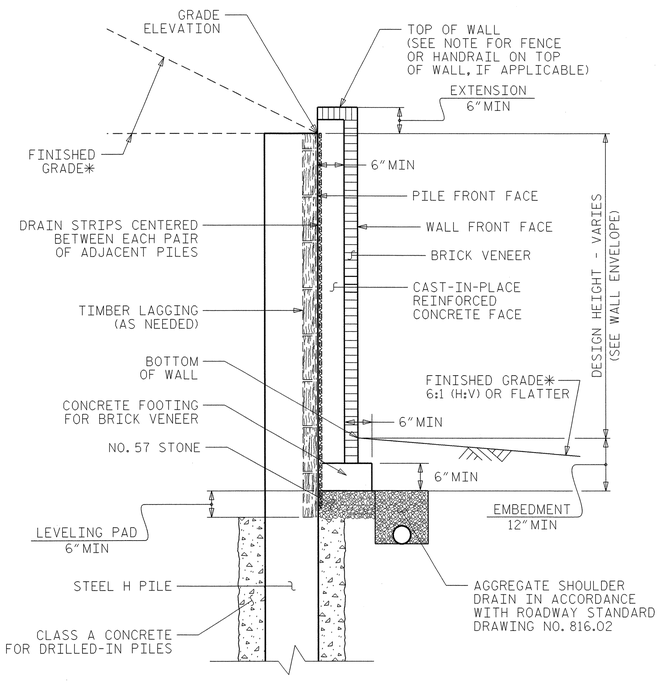
☐ ***WESTERN REGIONAL OFFICE***

☐ ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

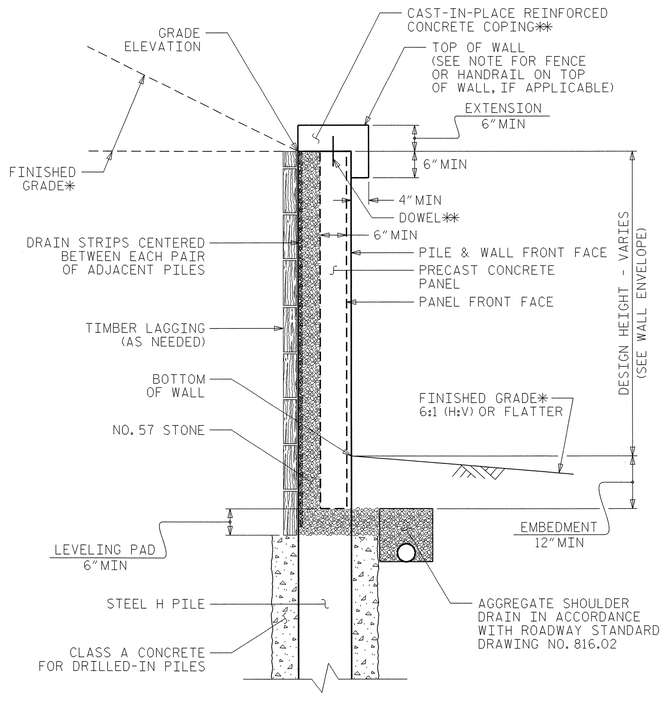
SOLDIER PILE RETAINING WALLS PLAN AND ELEVATION

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



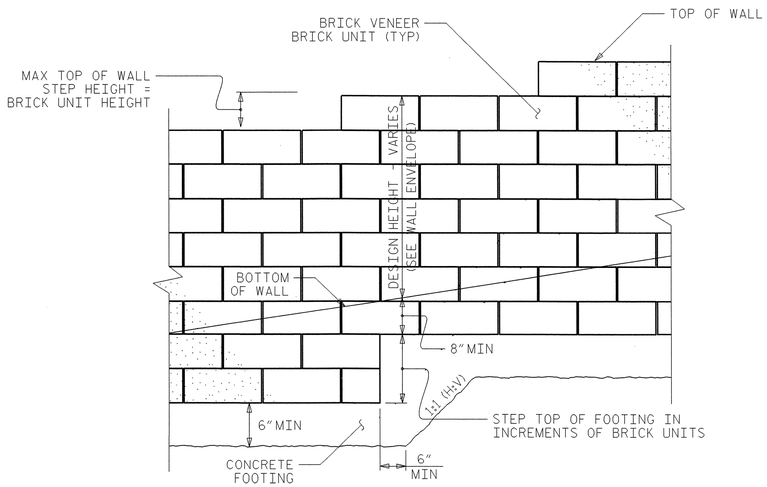
WALL NO. 1 TYPICAL SECTION
SOLDIER PILE WALL WITH CAST-IN-PLACE FACE WTIH BRICK VENEER

*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.



WALL NO. 2 & NO. 3 TYPICAL SECTION
SOLDIER PILE WALL WITH PRECAST PANEL

*SEE ROADWAY PLANS FOR FINISHED GRADE AND DITCH DETAILS.
**AT THE CONTRACTOR'S OPTION, EXTEND COPING DOWN BACK OF PANELS A MINIMUM OF 6" IN LIEU OF USING DOWELS.



BRICK VENEER TYPICAL STEPPING

NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE DRIVEN PILES FOR RETAINING WALL NO. 1, NO. 2 AND NO. 3.

USE A SOLDIER PILE RETAINING WALL WITH A CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 1.

USE A SOLDIER PILE RETAINING WALL WITH PRECAST CONCRETE PANELS FOR RETAINING WALL NO. 2 AND NO. 3.

PAINT PILES GRAY FOR RETAINING WALL NO. 2 AND NO. 3.

A BRICK VENEER IS REQUIRED FOR RETAINING WALL NO. 1 AS SHOWN. SUBMIT BRICK SAMPLES FOR APPROVAL BEFORE BEGINNING SOLDIER PILE WALL CONSTRUCTION.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NO. 1, NO. 2 AND NO. 3, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE ACCEPTED.

DESIGN RETAINING WALL NO. 1, NO. 2 AND NO. 3 FOR WALL HEIGHTS EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN RETAINING WALL NO. 1, NO. 2 AND NO. 3 FOR THE FOLLOWING:
1) MINIMUM DESIGN LIFE = 75 YEARS
2) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF

DESIGN RETAINING WALL NO. 1, NO. 2 AND NO. 3 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

TEMPORARY SHORING MAY BE REQUIRED FOR RETAINING WALL NO. 1, NO. 2 AND NO. 3, IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE OR TRAFFIC CONTROL PLANS.

USE EXPANSION JOINT MATERIAL BETWEEN THE END OF WALLS AND BRIDGE WINGS. USE FILTER FABRIC ALONG THE HEIGHT OF WALL WHERE FILL IS BEING PLACED AND THE WALL TIES TO THE BRIDGE WINGS.

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 30943 ENGINEER THEIN TUN TAN	
SIGNATURE 9/16/11 DATE	SIGNATURE DATE

PREPARED BY: THEIN T. ZAN	DATE: 08/2011
REVIEWED BY: JAMES R. BATTS	DATE: 08/2011

GEOTECHNICAL ENGINEERING UNIT

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PROJECT NO.: 33488.1.1 (B-4090)
CUMBERLAND *COUNTY*
STATION: VARIES
SHEET 2 OF 2

RETAINING WALL NO. 1, 2 & 3 SOLDIER PILE RETAINING WALL NOTES AND DETAILS

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

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

30-NOV-2006 19:26
S:\Share\Structures Standards\Standards english 2006\sn_05.std
rbissette