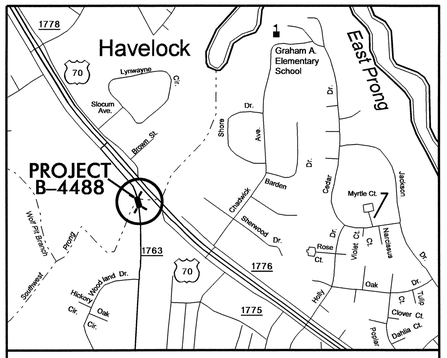
TIP PROJECT: B-4488

CONTRACT: C202845



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

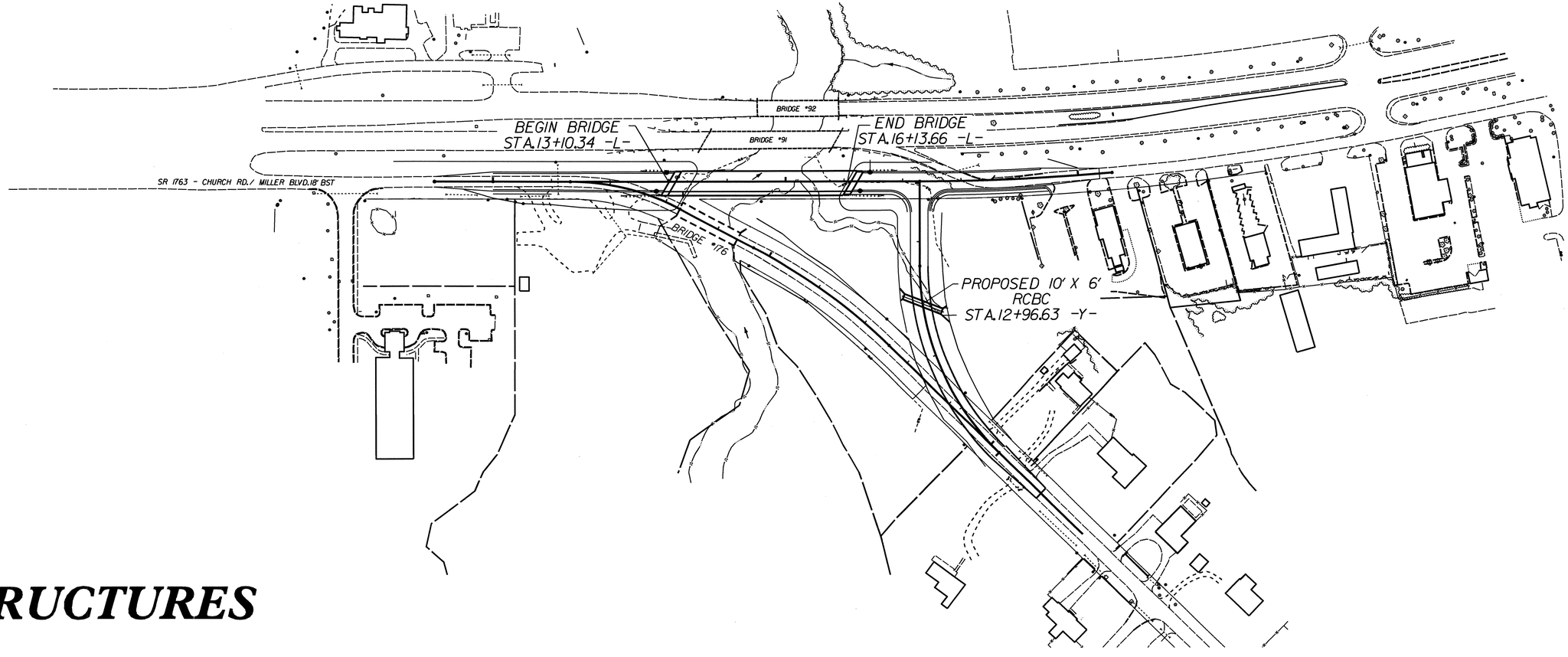
CRAVEN COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4488		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33725.1.1	BRSTP-1763(4)	PE
33725.3.1	BRSTP-1763(4)	CONST.

LOCATION: (SR 1763) CHURCH ROAD
BRIDGE # 176 OVER SLOCUM CREEK

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE



STRUCTURES

DESIGN DATA	
ADT 2010 =	1900
ADT 2035 =	2500
DHV =	10%
D =	60%
T =	6%
V = 35 MPH STATUTORY	
TTST = 1% DUAL =	2%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4488 = 0.49 MILES
LENGTH STRUCTURE TIP PROJECT B-4488 = 0.06 MILES
TOTAL LENGTH TIP PROJECT B-4488 = 0.55 MILES

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

2012 STANDARD SPECIFICATIONS

LETTING DATE:
AUGUST 21, 2012

B.C. HUNT, P.E.
PROJECT ENGINEER

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

STRUCTURES MANAGEMENT UNIT

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

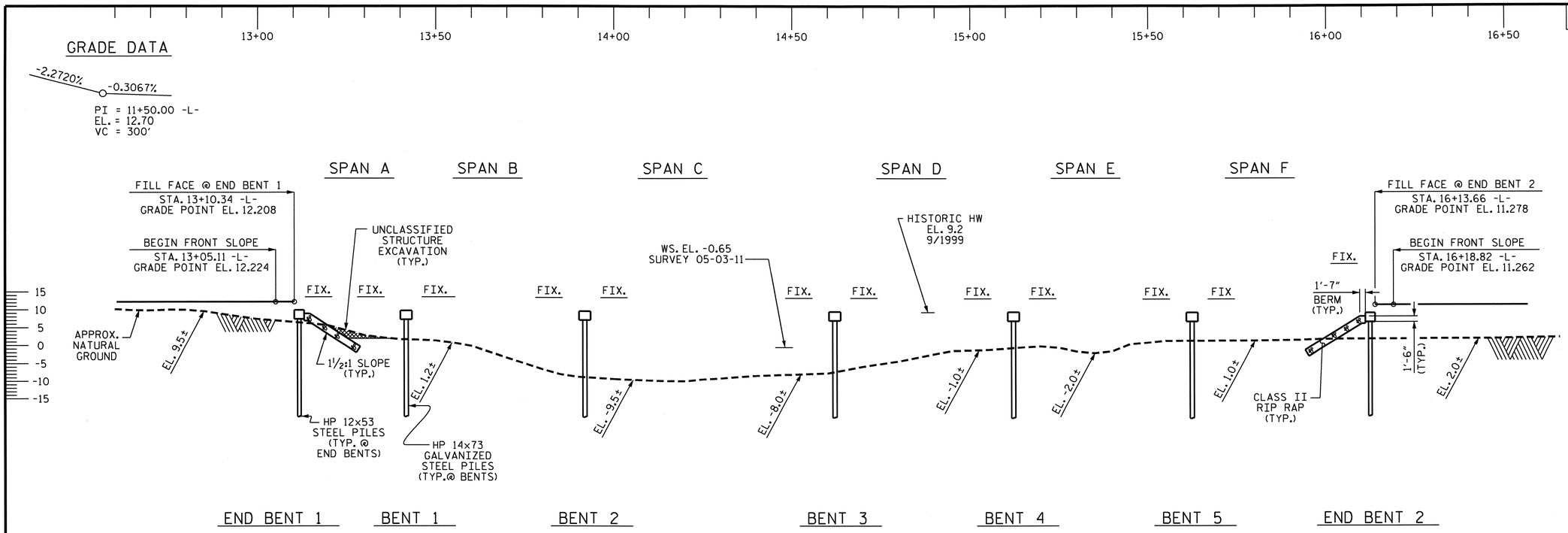
F.A. PROJ. NO.: BRSTP-1763(4)

GRADE DATA

-2.2720%

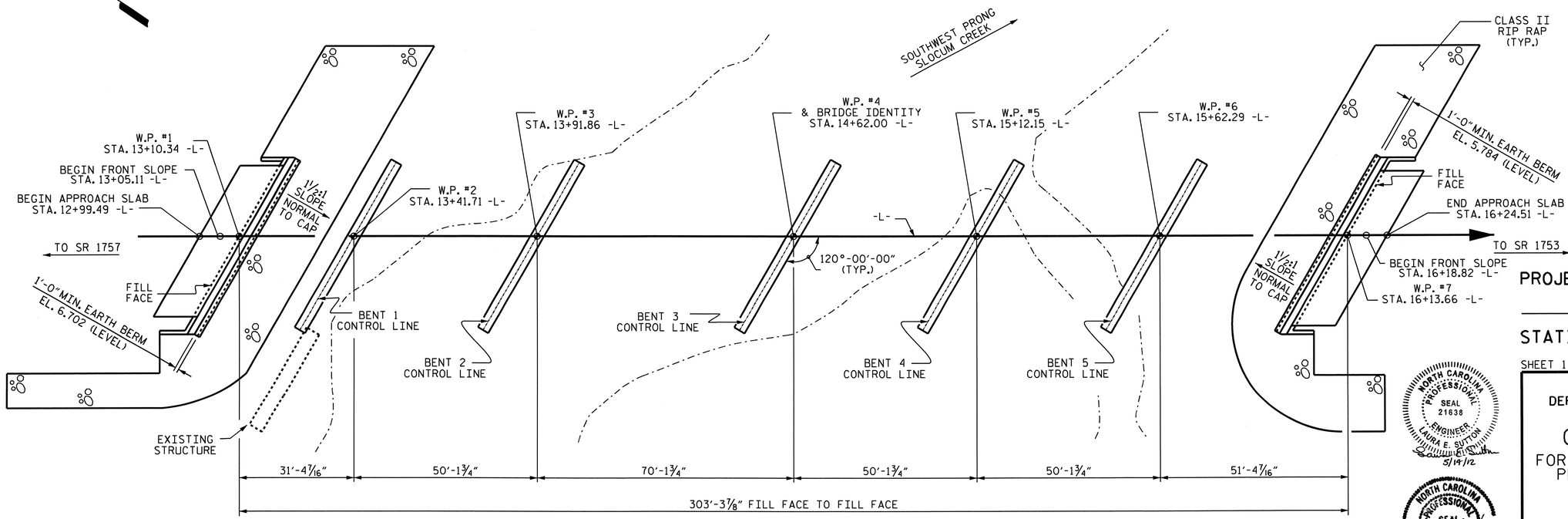
-0.3067%

PI = 11+50.00 -L-
EL. = 12.70
VC = 300'



SECTION ALONG -L-

SECTIONS @ END BENTS & BENTS TAKEN @ RIGHT ANGLES



PLAN

PLIES NOT SHOWN IN PLAN VIEW

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
5/14/12

NORTH CAROLINA PROFESSIONAL SEAL 14091 ENGINEER BUCK CHARLES HUNT
5/14/12

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 3 REPLACE BRIDGE NO. 176

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER SOUTHWEST PRONG SLOCUM CREEK ON SR 1763 (CHURCH RD./ MILL BLVD.) BETWEEN SR 1757 AND SR 1753

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

DRAWN BY : H.T. DIEU DATE : 9/21/11
CHECKED BY : D.E. HENNESSEE DATE : 10/05/11

14-MAY-2012 09:28
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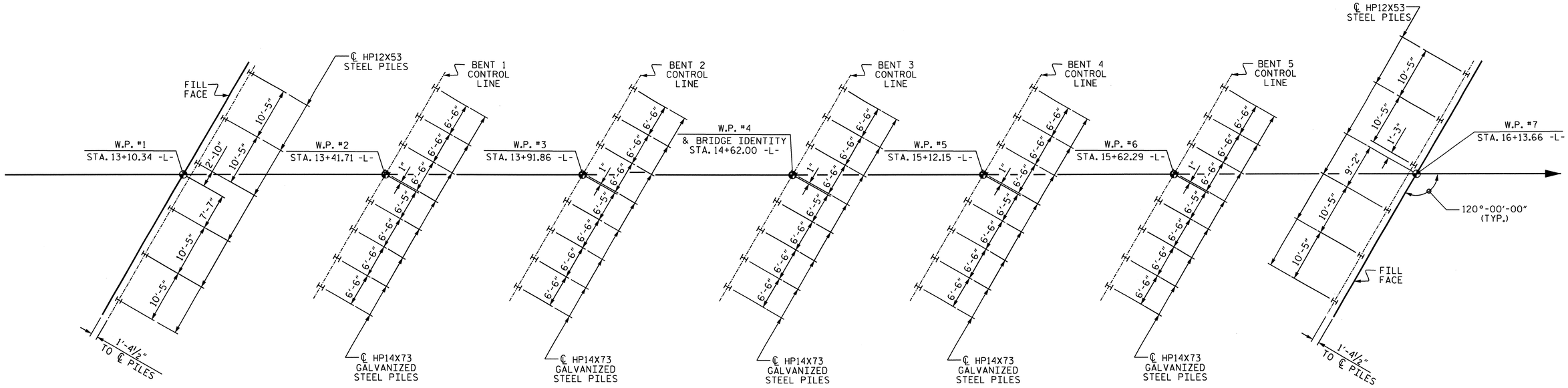
lsutton



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

PILES AT BENTS 1, 4, AND 5 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT BENTS 1, 4, AND 5 TO A REQUIRED DRIVING RESISTANCE OF 165 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

PILES AT BENTS 2 AND 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 130 TONS PER PILE.

DRIVE PILES AT BENTS 2 AND 3 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

INSTALL PILES AT BENTS 1, 2, 3, 4, AND 5 TO A TIP ELEVATION NO HIGHER THAN -38.0, -38.0, -36.0, -34.0, AND -34.0, RESPECTIVELY.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BENTS 1, 2, 3, 4, AND 5. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

SCOUR CRITICAL ELEVATION FOR BENTS 1, 2, 3, 4, & 5 IS ELEVATION -11.0, -13.5, -12.0, -10.0, AND -11.0, RESPECTIVELY. SCOUR CRITICAL ELEVATION IS USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 50 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 50 TO 75 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENTS 1, 2, 3, 4, AND 5. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING ARE REQUIRED AT BENTS 2 AND 4 AND END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

NORTH CAROLINA PROFESSIONAL SEAL 040091 ENGINEER BURT CHARLES HUNT
5/14/12

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER SOUTHWEST PRONG SLOCUM CREEK ON SR 1763 (CHURCH RD./ MILLER BLVD.) BETWEEN SR 1757 AND SR 1753

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

DRAWN BY : R. G. EMERSON DATE : 11/11
CHECKED BY : B.N. GRADY DATE : 12/30/11

14-MAY-2012 09:28
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STRUCTURE NOTES

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

NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (39'-1", 37'-7", AND 39'-0") WITH A 20' CLEAR ROADWAY AND A CONCRETE DECK GIRDER SUPERSTRUCTURE AND A SUBSTRUCTURE WITH FULL HEIGHT CONCRETE ABUTMENTS AND POST AND WEB CONCRETE BENTS, WITH A STEEL CRUTCH BENT AT BENT 2, AND LOCATED UPSTREAM FROM THE PROPOSED STRUCTURE SHALL BE REMOVED.

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCESAMPLES 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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 25 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.
FOR INTERIOR BENTS 1 - 5 ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEETS FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED. NO CRANES ARE PERMITTED TO BE PLACED ON SPAN C.

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

ALL BAR SUPPORTS USED IN THE PARAPET, SIDEWALK, LAMP PEDESTALS, AND BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

CLASS AA CONCRETE SHALL BE USED IN ALL BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

THE CONCRETE IN THE CAP OF THE END BENTS AND BENTS SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLAY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

THE 2 BAR METAL RAIL SHALL BE ANODIZED DARK BRONZE. PRIOR TO ANODIZING, THE CONTRACTOR SHALL PROVIDE A SAMPLE TO THE ENGINEER FOR COORDINATION WITH THE TOWN OF HAVELOCK TO ENSURE THE RAIL COLOR IS A CLOSE MATCH TO THE PROPOSED LAMP POST COLOR.

STRUCTURE TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	UNCLASSIFED STRUCTURE EXCAVATION	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	HP 12x53 STEEL PILES		HP 14x73 GALVANIZED STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 3'-3" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONC. CORED SLABS		3'-0" X 2'-0" PRESTRESSED CONC. CORED SLABS		ELECTRICAL CONDUIT SYSTEM
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	EACH	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE				36.5	LUMP SUM	2219							569.10	601.46			LUMP SUM	70	3220.00	14	980.00	LUMP SUM
END BENT 1				17.8		2642	6	390				3			310	345						
BENT 1				15.9		3084			8	640	8	4										
BENT 2		1		17.1		3297			8	640	8	4										
BENT 3				17.1		3297			8	640	8	4										
BENT 4		1		15.9		3084			8	640	8	4										
BENT 5				15.9		3084			8	640	8	4										
END BENT 2		1		17.8		2642	6	390				3			280	310						
TOTAL	LUMP SUM	3	LUMP SUM	154.0	LUMP SUM	23349	12	780	40	3200	40	26	569.10	601.46	590	655	LUMP SUM	70	3220.00	14	980.00	LUMP SUM

HYDRAULIC DATA

DESIGN DISCHARGE = 1700 c.f.s.
FREQUENCY OF DESIGN FLOOD = 25 YRS.
DESIGN HIGH WATER ELEVATION = 3.2
DRAINAGE AREA = 25.4 SQ. MI.
BASE DISCHARGE (Q100) = 2600 c.f.s.
BASE HIGH WATER ELEVATION = 4.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = -
FREQUENCY OF OVERTOPPING FLOOD = >500 YRS.
OVERTOPPING FLOOD ELEVATION = 11.2

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER SOUTHWEST PRONG SLOCUM CREEK ON SR 1763 (CHURCH RD./ MILLER BLVD.) BETWEEN SR 1757 AND SR1753

NORTH CAROLINA PROFESSIONAL SEAL 20091 ENGINEER BUCY CHARLES HUNT
5/14/12

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

DRAWN BY : B.C. HUNT DATE : 11/15/11
CHECKED BY : B.N. GRADY DATE : 12/30/11

14-MAY-2012 09:28
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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
							LIVELOAD FACTORS	MOMENT					SHEAR					MOMENT						
								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**	1.202	--	1.75	0.256	2.04	30'	EL	14.423	0.655	**1.20**	30'	EL	**1.442**	0.80	0.256	1.75	30'	EL	14.423	
		HL-93(Opr)	N/A	--	1.558	--	1.35	0.256	2.64	30'	EL	14.423	0.655	1.56	30'	EL	1.442	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	**2**	1.365	49.124	1.75	0.256	2.82	30'	EL	11.538	0.655	**1.36**	30'	EL	**1.442**	0.80	0.256	2.45	30'	EL	11.538	
		HS-20(Opr)	36.000	--	1.769	63.679	1.35	0.256	3.65	30'	EL	11.538	0.655	1.77	30'	EL	1.442	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.333	45.002	1.4	0.256	5.76	30'	EL	14.423	0.655	3.33	30'	EL	1.442	0.80	0.256	3.95	30'	EL	14.423	
		SNGARBS2	20.000	--	2.581	51.624	1.4	0.256	5.04	30'	EL	11.538	0.655	2.58	30'	EL	1.442	0.80	0.256	3.50	30'	EL	11.538	
		SNAGRIS2	22.000	--	2.487	54.723	1.4	0.256	5.13	30'	EL	11.538	0.655	2.49	30'	EL	1.442	0.80	0.256	3.56	30'	EL	11.538	
		SNCOTTS3	27.250	--	1.684	45.891	1.4	0.256	2.89	30'	EL	14.423	0.655	1.68	30'	EL	1.442	0.80	0.256	1.99	30'	EL	14.423	
		SNAGGRS4	34.925	--	1.551	54.185	1.4	0.256	2.79	30'	EL	14.423	0.655	1.55	30'	EL	1.442	0.80	0.256	1.91	30'	EL	14.423	
		SNS5A	35.550	--	1.645	58.469	1.4	0.256	2.7	30'	EL	14.423	0.655	1.64	30'	EL	1.442	0.80	0.256	1.85	30'	EL	14.423	
		SNS6A	39.950	--	1.547	61.791	1.4	0.256	2.55	30'	EL	14.423	0.655	1.55	30'	EL	1.442	0.80	0.256	1.75	30'	EL	14.423	
		SNS7B	42.000	--	1.578	66.285	1.4	0.256	2.48	30'	EL	14.423	0.655	1.58	30'	EL	1.442	0.80	0.256	1.70	30'	EL	14.423	
	TTST	TNAGRIT3	33.000	--	1.838	60.67	1.4	0.256	3.31	30'	EL	14.423	0.655	1.84	30'	EL	1.442	0.80	0.256	2.27	30'	EL	14.423	
		TNT4A	33.075	--	1.71	56.559	1.4	0.256	3.13	30'	EL	14.423	0.655	1.71	30'	EL	1.442	0.80	0.256	2.15	30'	EL	14.423	
		TNT6A	41.600	--	1.652	68.714	1.4	0.256	2.85	30'	EL	14.423	0.655	1.65	30'	EL	1.442	0.80	0.256	1.96	30'	EL	14.423	
		TNT7A	42.000	--	1.573	66.067	1.4	0.256	2.94	30'	EL	14.423	0.655	1.57	30'	EL	1.442	0.80	0.256	2.02	30'	EL	14.423	
		TNT7B	42.000	--	1.536	64.525	1.4	0.256	2.77	30'	EL	14.423	0.655	1.54	30'	EL	1.442	0.80	0.256	1.90	30'	EL	14.423	
		TNAGRIT4	43.000	--	1.486	63.9	1.4	0.256	2.87	30'	EL	14.423	0.655	1.49	30'	EL	1.442	0.80	0.256	1.97	30'	EL	14.423	
		TNAGT5A	45.000	--	1.594	71.736	1.4	0.256	2.79	30'	EL	14.423	0.655	1.59	30'	EL	1.442	0.80	0.256	1.92	30'	EL	14.423	
		TNAGT5B	45.000	**3**	1.399	62.946	1.4	0.256	2.68	30'	EL	11.538	0.655	**1.40**	30'	EL	**1.442**	0.80	0.256	1.85	30'	EL	11.538	

LOAD FACTORS:

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

NOTES:

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

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

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

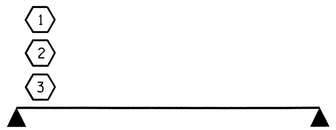
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPAN 'A'

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
30' CORED SLAB UNIT
60° SKEW & 120° SKEW
(NON-INTERSTATE TRAFFIC)

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

ASSEMBLED BY :	B.C. HUNT	DATE : 1/2012
CHECKED BY :	B.N. GRADY	DATE : 12/30/11
DRAWN BY : CVC	6/10	
CHECKED BY : DNS	6/10	

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCK CHARLES HUNT
5/14/12

14-MAY-2012 09:28
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lsutton

STD. NO. 21LRFR1_60&120S_30L

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**	1.35	--	1.75	0.25	1.74	50′	EL	24.423	0.656	**1.35**	50′	EL	**9.769**	0.80	0.25	1.59	50′	EL	24.423	
		HL-93(Opr)	N/A	--	1.75	--	1.35	0.25	2.25	50′	EL	24.423	0.656	1.75	50′	EL	9.769	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	**2**	1.586	57.108	1.75	0.25	2.15	50′	EL	24.423	0.656	**1.59**	50′	EL	**9.769**	0.80	0.25	1.97	50′	EL	24.423	
		HS-20(Opr)	36.000	--	2.056	74.028	1.35	0.25	2.79	50′	EL	24.423	0.656	2.06	50′	EL	9.769	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.009	54.117	1.4	0.25	5.47	50′	EL	24.423	0.656	4.31	50′	EL	9.769	0.80	0.25	4.01	50′	EL	24.423	
		SNGARBS2	20.000	--	3.168	63.352	1.4	0.25	4.32	50′	EL	24.423	0.656	3.19	50′	EL	9.769	0.80	0.25	3.17	50′	EL	24.423	
		SNAGRIS2	22.000	--	3.009	66.192	1.4	0.25	4.18	50′	EL	19.538	0.656	3.01	50′	EL	9.769	0.80	0.25	3.07	50′	EL	24.423	
		SNCOTTS3	27.250	--	2	54.493	1.4	0.25	2.73	50′	EL	24.423	0.656	2.16	50′	EL	9.769	0.80	0.25	2.00	50′	EL	24.423	
		SNAGGRS4	34.925	--	1.739	60.742	1.4	0.25	2.37	50′	EL	24.423	0.656	1.88	50′	EL	9.769	0.80	0.25	1.74	50′	EL	24.423	
		SNS5A	35.550	--	1.696	60.292	1.4	0.25	2.31	50′	EL	24.423	0.656	1.96	50′	EL	9.769	0.80	0.25	1.70	50′	EL	24.423	
		SNS6A	39.950	--	1.586	63.364	1.4	0.25	2.16	50′	EL	24.423	0.656	1.82	50′	EL	9.769	0.80	0.25	1.59	50′	EL	24.423	
		SNS7B	42.000	--	1.512	63.487	1.4	0.25	2.06	50′	EL	24.423	0.656	1.85	50′	EL	9.769	0.80	0.25	1.51	50′	EL	24.423	
	TTST	TNAGRIT3	33.000	--	1.943	64.127	1.4	0.25	2.65	50′	EL	24.423	0.656	2.14	50′	EL	9.769	0.80	0.25	1.94	50′	EL	24.423	
		TNT4A	33.075	--	1.96	64.837	1.4	0.25	2.67	50′	EL	24.423	0.656	2.04	50′	EL	9.769	0.80	0.25	1.96	50′	EL	24.423	
		TNT6A	41.600	--	1.633	67.938	1.4	0.25	2.23	50′	EL	24.423	0.656	2.00	50′	EL	9.769	0.80	0.25	1.63	50′	EL	24.423	
		TNT7A	42.000	--	1.658	69.634	1.4	0.25	2.26	50′	EL	24.423	0.656	1.86	50′	EL	9.769	0.80	0.25	1.66	50′	EL	24.423	
		TNT7B	42.000	--	1.728	72.595	1.4	0.25	2.36	50′	EL	24.423	0.656	1.76	50′	EL	9.769	0.80	0.25	1.73	50′	EL	24.423	
		TNAGRIT4	43.000	--	1.64	70.537	1.4	0.25	2.24	50′	EL	24.423	0.656	1.69	50′	EL	9.769	0.80	0.25	1.64	50′	EL	24.423	
		TNAGT5A	45.000	--	1.532	68.95	1.4	0.25	2.09	50′	EL	24.423	0.656	1.75	50′	EL	9.769	0.80	0.25	1.53	50′	EL	24.423	
		TNAGT5B	45.000	**3**	1.501	67.548	1.4	0.25	2.05	50′	EL	24.423	0.656	1.60	50′	EL	9.769	0.80	0.25	**1.50**	50′	EL	**24.423**	

LOAD FACTORS:

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

NOTES:

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

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

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

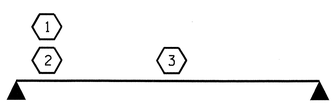
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPANS 'B, AND D THRU F'

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 50′ CORED SLAB UNIT 60° SKEW & 120° SKEW (NON-INTERSTATE TRAFFIC)

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

NORTH CAROLINA PROFESSIONAL SEAL 029091 ENGINEER BRUCE CHARLES HUNT

5/14/12

ASSEMBLED BY :	B.C. HUNT	DATE : 11/2011
CHECKED BY :	B.N. GRADY	DATE : 12/30/11
DRAWN BY : CVC	6/10	
CHECKED BY : DNS	6/10	

14-MAY-2012 09:28
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STD. NO. 21LRFR1_60&120S_50L

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**	1.06	--	1.75	0.248	1.14	70'	EL	34.423	0.655	**1.06**	70'	EL	**6.885**	0.80	0.248	1.11	70'	EL	34.423	
		HL-93(Opr)	N/A	--	1.374	--	1.35	0.248	1.48	70'	EL	34.423	0.655	1.37	70'	EL	6.885	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	**2**	1.32	47.508	1.75	0.248	1.48	70'	EL	34.423	0.655	**1.32**	70'	EL	**6.885**	0.80	0.248	1.44	70'	EL	34.423	
		HS-20(Opr)	36.000	--	1.711	61.585	1.35	0.248	1.91	70'	EL	34.423	0.655	1.71	70'	EL	6.885	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.204	43.258	1.4	0.248	4.12	70'	EL	34.423	0.655	3.9	70'	EL	6.885	0.80	0.248	3.20	70'	EL	34.423	
		SNGARBS2	20.000	--	2.403	48.063	1.4	0.248	3.09	70'	EL	34.423	0.655	2.78	70'	EL	6.885	0.80	0.248	2.40	70'	EL	34.423	
		SNAGRIS2	22.000	--	2.282	50.21	1.4	0.248	2.94	70'	EL	34.423	0.655	2.58	70'	EL	6.885	0.80	0.248	2.28	70'	EL	34.423	
		SNCOTTS3	27.250	--	1.595	43.463	1.4	0.248	2.05	70'	EL	34.423	0.655	1.95	70'	EL	6.885	0.80	0.248	1.59	70'	EL	34.423	
		SNAGGRS4	34.925	--	1.339	46.755	1.4	0.248	1.72	70'	EL	34.423	0.655	1.62	70'	EL	6.885	0.80	0.248	1.34	70'	EL	34.423	
		SNS5A	35.550	--	1.309	46.526	1.4	0.248	1.68	70'	EL	34.423	0.655	1.65	70'	EL	6.885	0.80	0.248	1.31	70'	EL	34.423	
		SNS6A	39.950	--	1.203	48.069	1.4	0.248	1.55	70'	EL	34.423	0.655	1.5	70'	EL	6.885	0.80	0.248	1.20	70'	EL	34.423	
		SNS7B	42.000	--	1.146	48.129	1.4	0.248	1.47	70'	EL	34.423	0.655	1.48	70'	EL	6.885	0.80	0.248	1.15	70'	EL	34.423	
	TTST	TNAGRIT3	33.000	--	1.468	48.444	1.4	0.248	1.89	70'	EL	34.423	0.655	1.79	70'	EL	6.885	0.80	0.248	1.47	70'	EL	34.423	
		TNT4A	33.075	--	1.475	48.79	1.4	0.248	1.9	70'	EL	34.423	0.655	1.74	70'	EL	6.885	0.80	0.248	1.48	70'	EL	34.423	
		TNT6A	41.600	--	1.208	50.272	1.4	0.248	1.55	70'	EL	34.423	0.655	1.58	70'	EL	6.885	0.80	0.248	1.21	70'	EL	34.423	
		TNT7A	42.000	--	1.216	51.061	1.4	0.248	1.56	70'	EL	34.423	0.655	1.55	70'	EL	6.885	0.80	0.248	1.22	70'	EL	34.423	
		TNT7B	42.000	--	1.261	52.955	1.4	0.248	1.62	70'	EL	34.423	0.655	1.44	70'	EL	6.885	0.80	0.248	1.26	70'	EL	34.423	
		TNAGRIT4	43.000	--	1.197	51.476	1.4	0.248	1.54	70'	EL	34.423	0.655	1.40	70'	EL	6.885	0.80	0.248	1.20	70'	EL	34.423	
		TNAGT5A	45.000	--	1.128	50.745	1.4	0.248	1.45	70'	EL	34.423	0.655	1.39	70'	EL	6.885	0.80	0.248	1.13	70'	EL	34.423	
		TNAGT5B	45.000	**3**	1.113	50.088	1.4	0.248	1.43	70'	EL	34.423	0.655	1.33	70'	EL	6.885	0.80	0.248	**1.11**	70'	EL	**34.423**	

LOAD FACTORS:

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

NOTES:

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

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

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

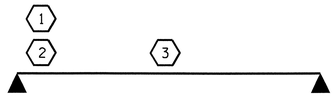
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPAN 'C'

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
70' CORED SLAB UNIT
60° SKEW & 120° SKEW
(NON-INTERSTATE TRAFFIC)

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

ASSEMBLED BY :	B.C. HUNT	DATE : 1/2012
CHECKED BY :	B.N. GRADY	DATE : 12/30/11
DRAWN BY : CVC	6/10	
CHECKED BY : DNS	6/10	

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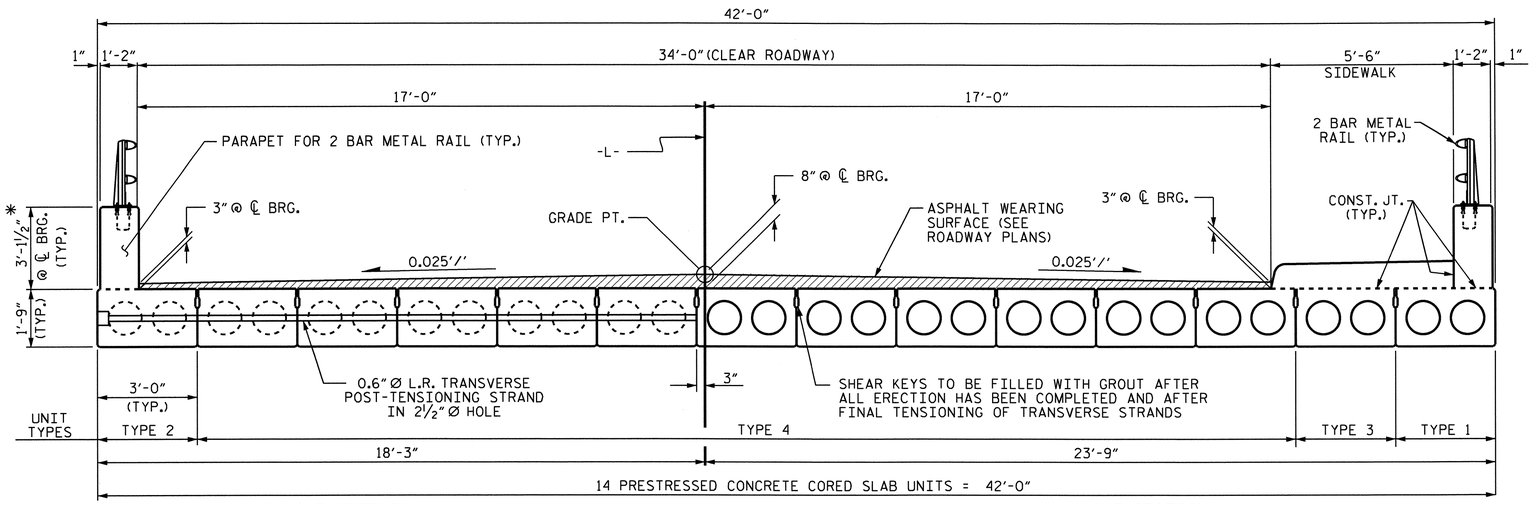
STD. NO. 24LRFR1_60&120S_70L

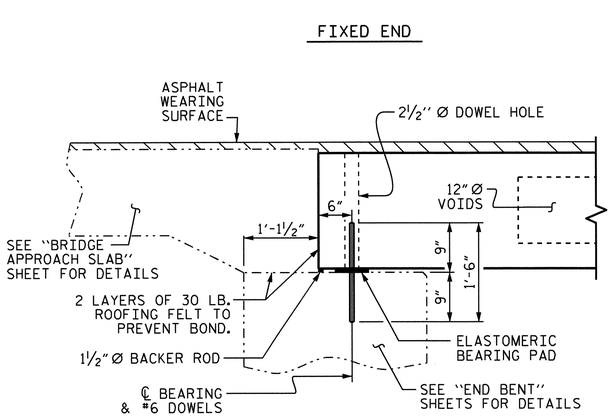


HALF SECTION AT INTERMEDIATE DIAPHRAGMS

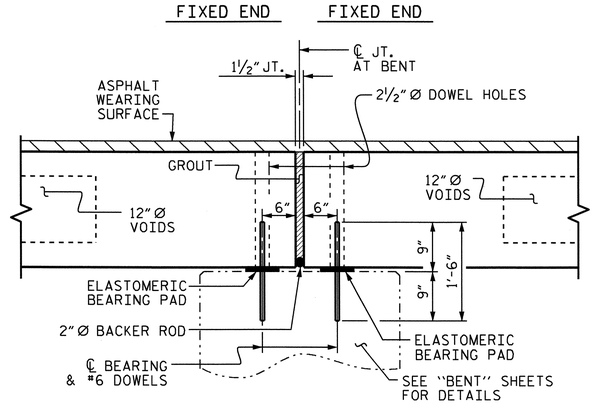
HALF SECTION THROUGH VOIDS

TYPICAL SECTION

* THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

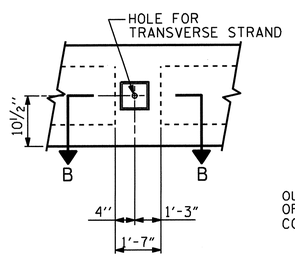


SECTION AT END BENT

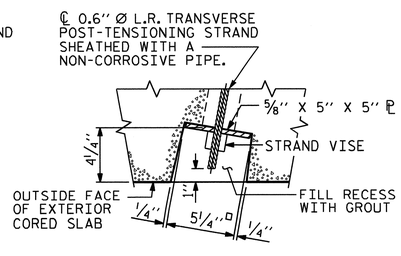


SECTION AT BENT 1

(BENTS 4 & 5 SIM.)

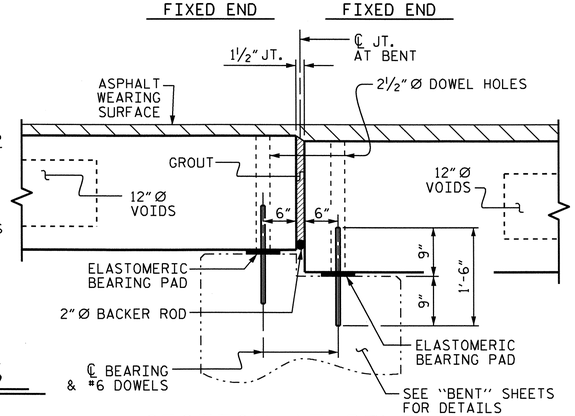


ELEVATION VIEW



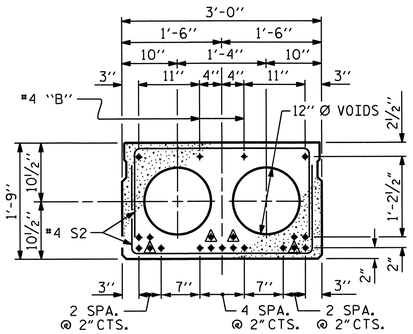
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



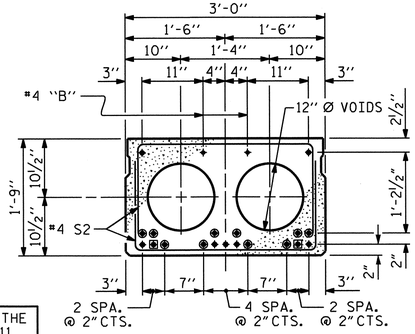
SECTION AT BENT 2

(BENT 3 SIM.)



INTERIOR SLAB SECTION TYPE 4 UNIT - 50'

(19 STRANDS REQUIRED)

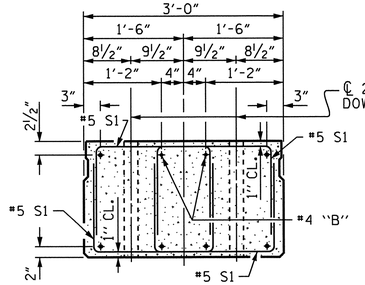


INTERIOR SLAB SECTION TYPE 4 UNIT - 30'

(9 STRANDS REQUIRED)

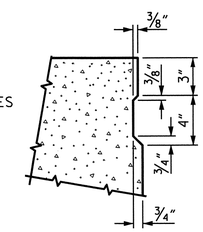
NOTE: FOR SECTION THRU THE SIDEWALK, SEE SHEET S-11

STRAND LAYOUT INTERIOR SLAB SECTIONS 0.6" Ø LOW RELAXATION



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



SHEAR KEY DETAIL

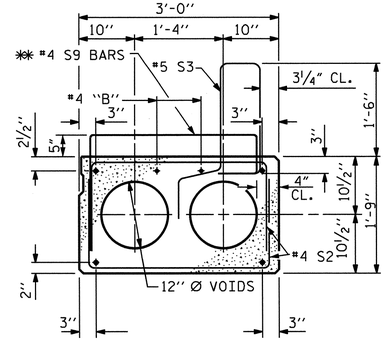
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

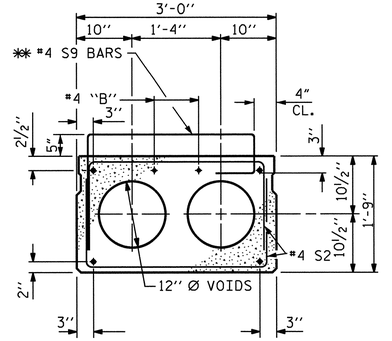
◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



EXTERIOR SLAB SECTION TYPE 1 UNIT

(FOR PRESTRESSED STRAND LAYOUT, SEE TYPE 4 INTERIOR SLAB SECTIONS.)
** #4 S9 BAR IN RIGHT EXTERIOR UNIT (TYPE 1) ONLY, OMIT FROM LEFT EXTERIOR UNIT (TYPE 2)



INTERIOR SLAB SECTION TYPE 3 UNIT

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTIONS.)

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 120° SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL 14096 ENGINEER BUCKY CHARLES HUNT

5/14/12

DRAWN BY : B.C. HUNT DATE : 8/2011
CHECKED BY : T.R. PETERSON DATE : 9/2011

14-MAY-2012 09:28
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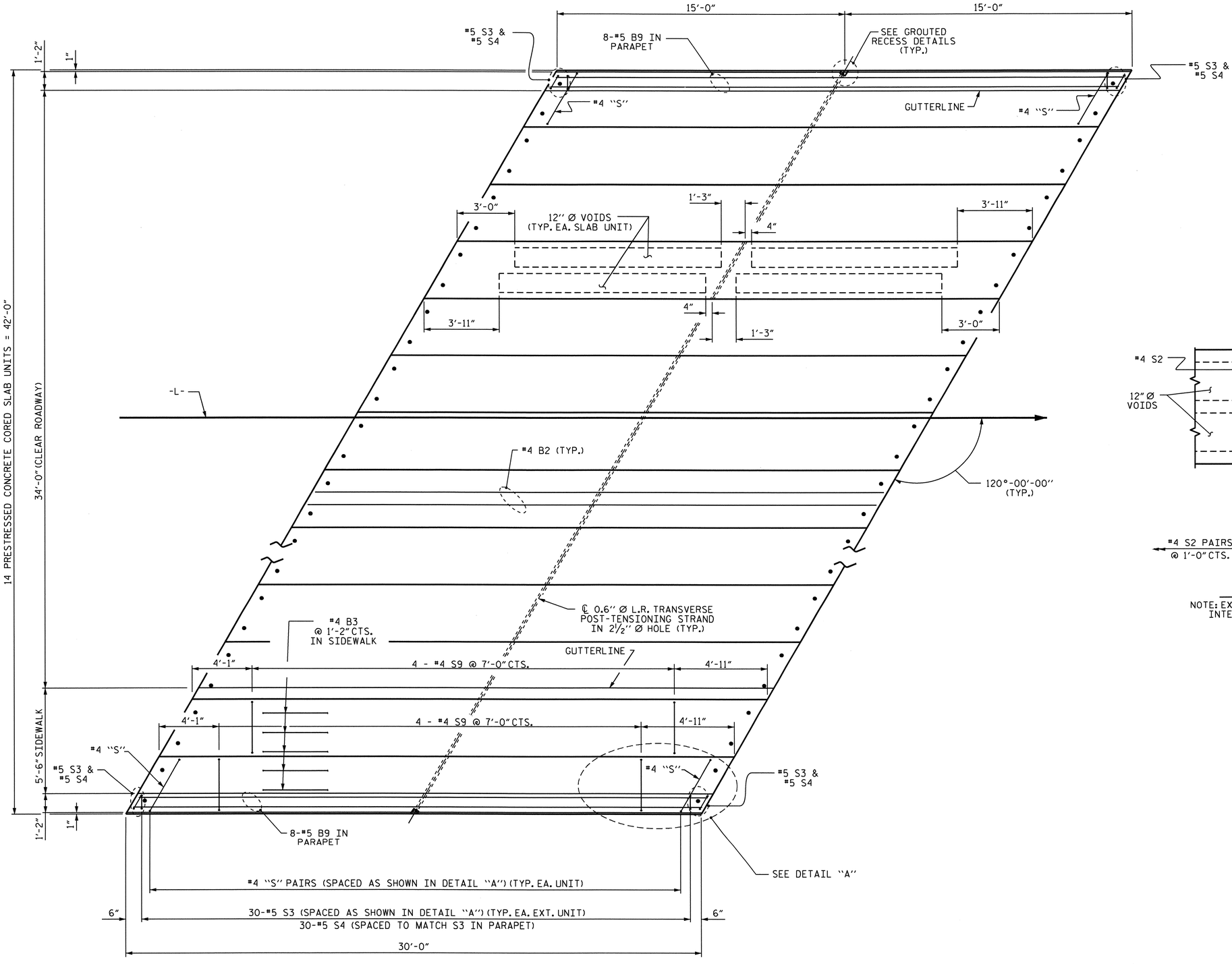
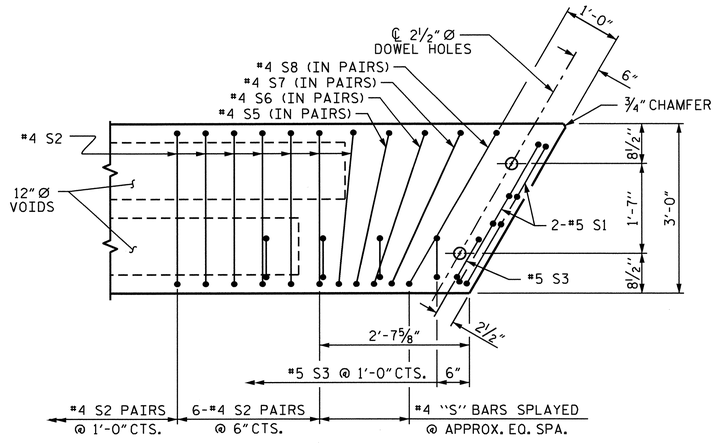


PLAN OF UNIT

SPAN A



DETAIL "A"

NOTE: EXTERIOR TYPE 1 UNIT SHOWN (TYPE 2 UNIT SIMILAR)
INTERIOR UNITS SIMILAR EXCEPT OMIT #5 S3 BARS.
(#4 S9 NOT SHOWN FOR CLARITY)

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 30' UNIT 34'-0" CLEAR ROADWAY 120° SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL 030004 ENGINEER BUCKY CHARLES HUNT

5/14/12

DRAWN BY : B.C. HUNT DATE : 1/2012
CHECKED BY : M.K. BEARD DATE : 1/2012

14-MAY-2012 09:28
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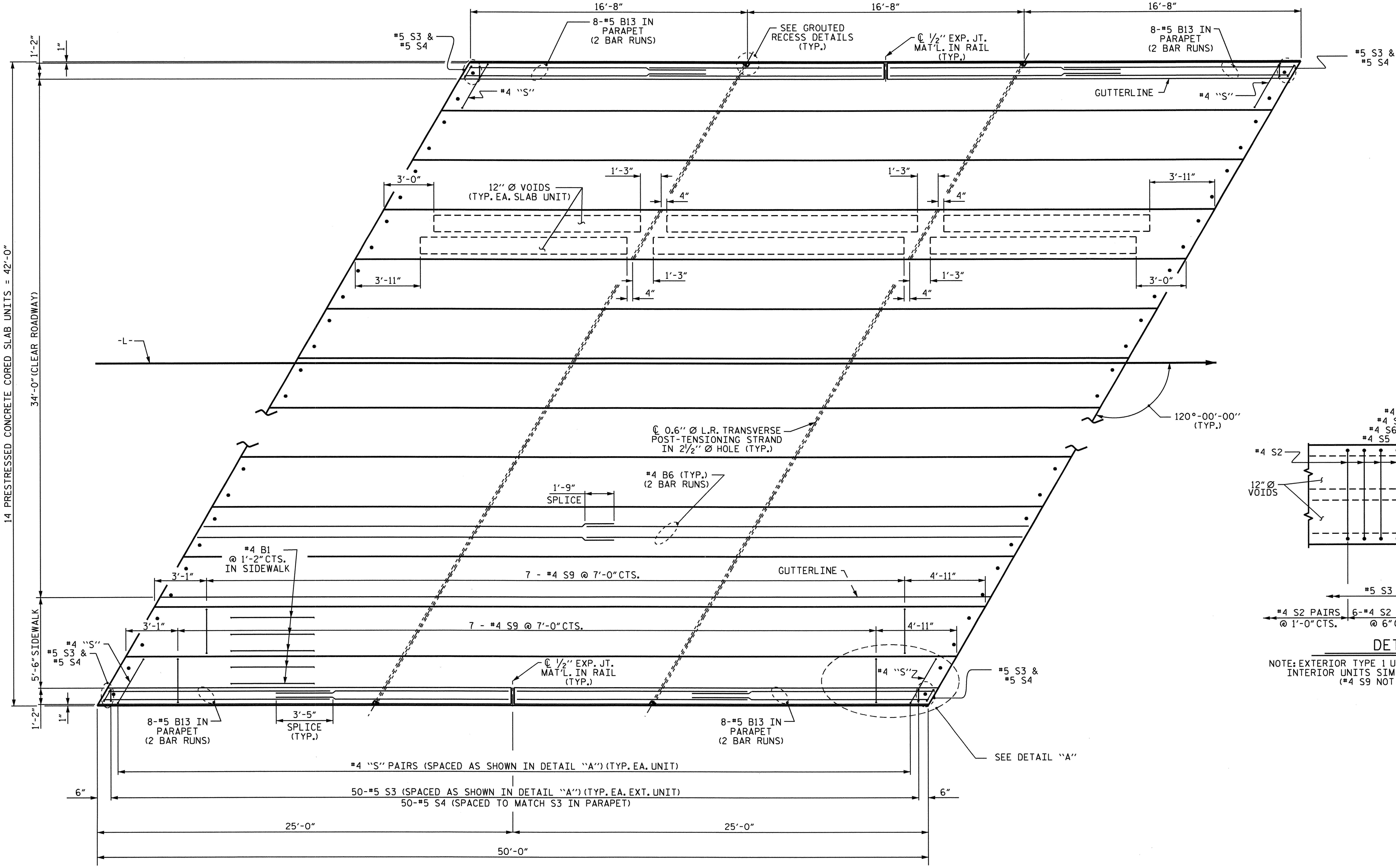
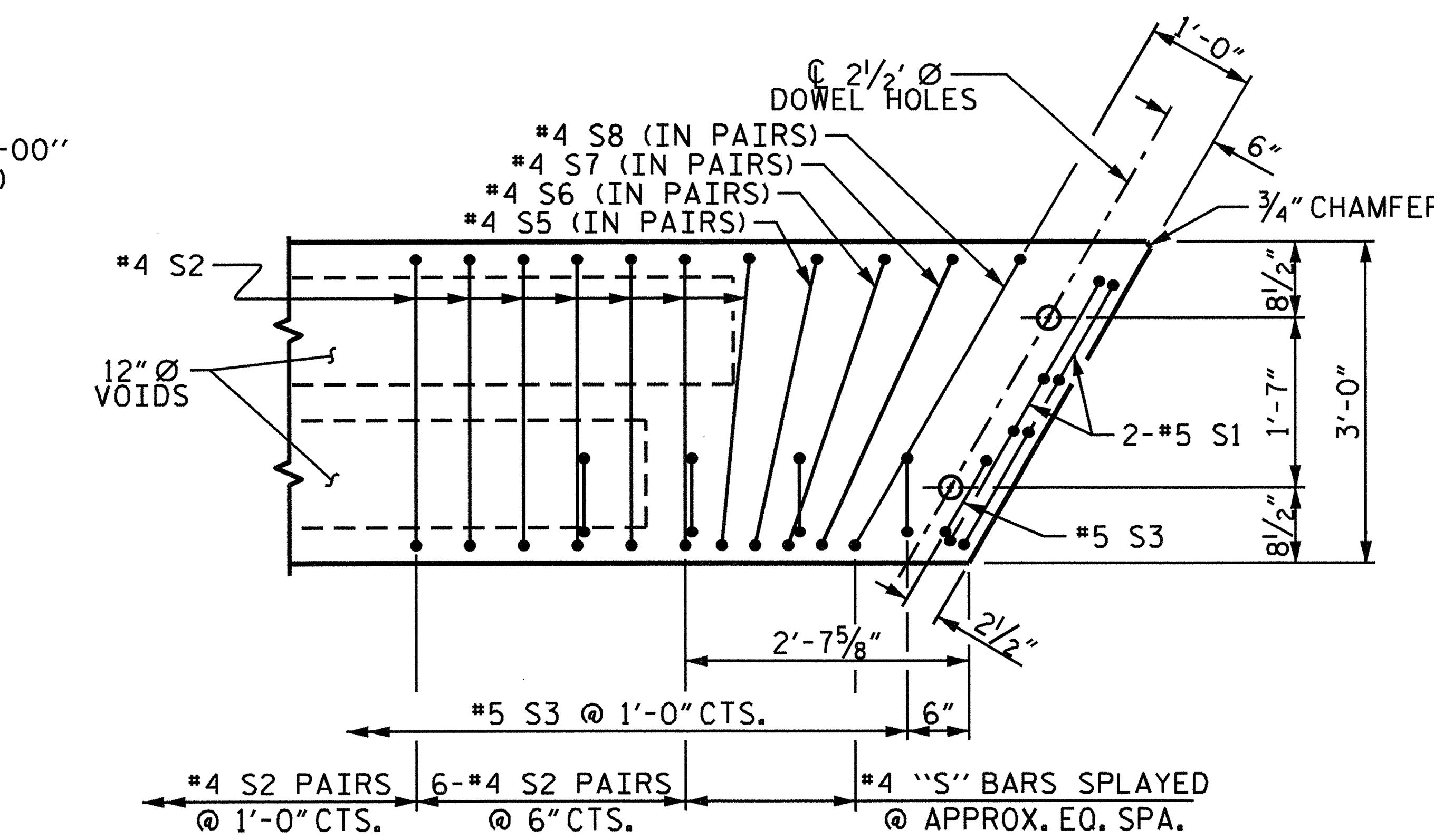


PLAN OF UNIT

SPANS B,D,E, & F



DETAIL "A"

NOTE: EXTERIOR TYPE 1 UNIT SHOWN (TYPE 2 UNIT SIMILAR)
INTERIOR UNITS SIMILAR EXCEPT OMIT #5 S3 BARS.
(#4 S9 NOT SHOWN FOR CLARITY)

PROJECT NO. B-4488

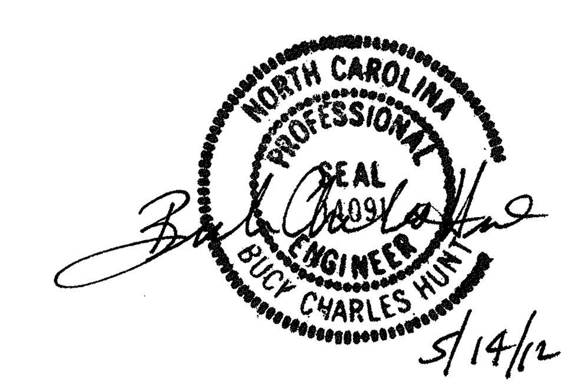
CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 50' UNIT
34'-0" CLEAR
ROADWAY
120° SKEW



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

DRAWN BY : B.C. HUNT DATE : 8/2011
CHECKED BY : T.R. PETERSON DATE : 9/2011

14-MAY-2012 09:28
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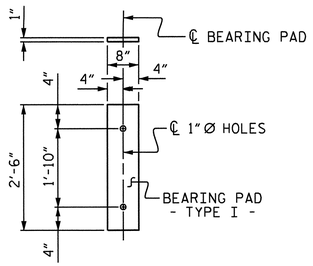


FIXED END
(TYPE I - 140 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

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

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 1'-9"
50' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2½" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¼" ↓
FINAL CAMBER	2¼" ↑

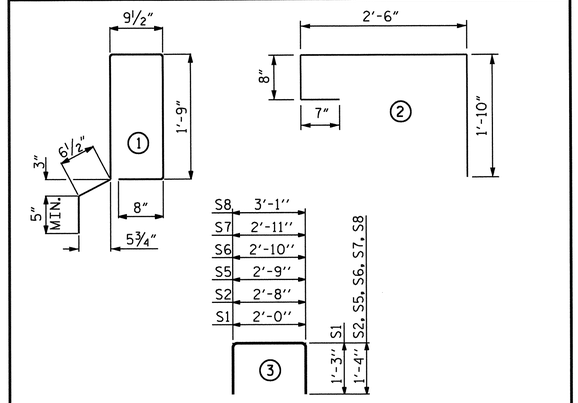
** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 1'-9"
25', 30' & 35' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	½" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	⅛" ↓
FINAL CAMBER	⅜" ↑

** INCLUDES FUTURE WEARING SURFACE

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
34'-0" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS:	PARAPET HEIGHT
	@ MID-SPAN	@ MID-SPAN
	NORMAL CROWN SECTION	
30' UNITS	2⅝"	3'-1⅛"
50' UNITS	¾"	2'-11¼"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

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 CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

ALL REINFORCING STEEL IN THE PARAPETS AND SIDEWALK SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

BILL OF MATERIAL FOR ONE 50' CORED SLAB UNIT

				EXTERIOR UNIT TYPE 1		EXTERIOR UNIT TYPE 2		INTERIOR UNIT TYPE 3		INTERIOR UNIT TYPE 4	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B6	4	#4	STR	25'-8"	69	25'-8"	69	25'-8"	69	25'-8"	69
S1	8	#5	3	4'-6"	38	4'-6"	38	4'-6"	38	4'-6"	38
S2	102	#4	3	5'-4"	363	5'-4"	363	5'-4"	363	5'-4"	363
* S3	52	#5	1	5'-11"	321	5'-11"	321				
S5	4	#4	3	5'-5"	14	5'-5"	14	5'-5"	14	5'-5"	14
S6	4	#4	3	5'-6"	15	5'-6"	15	5'-6"	15	5'-6"	15
S7	4	#4	3	5'-7"	15	5'-7"	15	5'-7"	15	5'-7"	15
S8	4	#4	3	5'-9"	15	5'-9"	15	5'-9"	15	5'-9"	15
* S9	7	#4	2	5'-7"	26			5'-7"	26		
REINFORCING STEEL LBS.					529		529		529		529
* EPOXY COATED REINFORCING STEEL LBS.					347		321		26		
6500 P.S.I. CONCRETE CU. YDS.					7.3		7.3		7.3		7.3
0.6" Ø L.R. STRANDS No.					19		19		19		19

BILL OF MATERIAL FOR ONE 30' CORED SLAB UNIT

				EXTERIOR UNIT TYPE 1		EXTERIOR UNIT TYPE 2		INTERIOR UNIT TYPE 3		INTERIOR UNIT TYPE 4	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B2	2	#4	STR	29'-7"	40	29'-7"	40	29'-7"	40	29'-7"	40
S1	8	#5	3	4'-6"	38	4'-6"	38	4'-6"	38	4'-6"	38
S2	62	#4	3	5'-4"	221	5'-4"	221	5'-4"	221	5'-4"	221
* S3	32	#5	1	5'-11"	197	5'-11"	197				
S5	4	#4	3	5'-5"	14	5'-5"	14	5'-5"	14	5'-5"	14
S6	4	#4	3	5'-6"	15	5'-6"	15	5'-6"	15	5'-6"	15
S7	4	#4	3	5'-7"	15	5'-7"	15	5'-7"	15	5'-7"	15
S8	4	#4	3	5'-9"	15	5'-9"	15	5'-9"	15	5'-9"	15
* S9	4	#4	2	5'-7"	15			5'-7"	15		
REINFORCING STEEL LBS.					358		358		358		358
* EPOXY COATED REINFORCING STEEL LBS.					212		197		15		
5000 P.S.I. CONCRETE CU. YDS.					4.5		4.5		4.5		4.5
0.6" Ø L.R. STRANDS No.					9		9		9		9

CONCRETE RELEASE STRENGTH	
UNIT	PSI
30' UNITS	4000
50' UNITS	4900

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
50' UNIT			
EXTERIOR TYPE 1	4	50'-0"	200'-0"
EXTERIOR TYPE 2	4	50'-0"	200'-0"
INTERIOR TYPE 3	4	50'-0"	200'-0"
INTERIOR TYPE 4	44	50'-0"	2200'-0"
TOTAL	56		2800'-0"

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
30' UNIT			
EXTERIOR TYPE 1	1	30'-0"	30'-0"
EXTERIOR TYPE 2	1	30'-0"	30'-0"
INTERIOR TYPE 3	1	30'-0"	30'-0"
INTERIOR TYPE 4	11	30'-0"	330'-0"
TOTAL	14		420'-0"

ASSEMBLED BY : B.C. HUNT DATE : 8/2011
CHECKED BY : T.R. PETERSON DATE : 9/2011

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PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

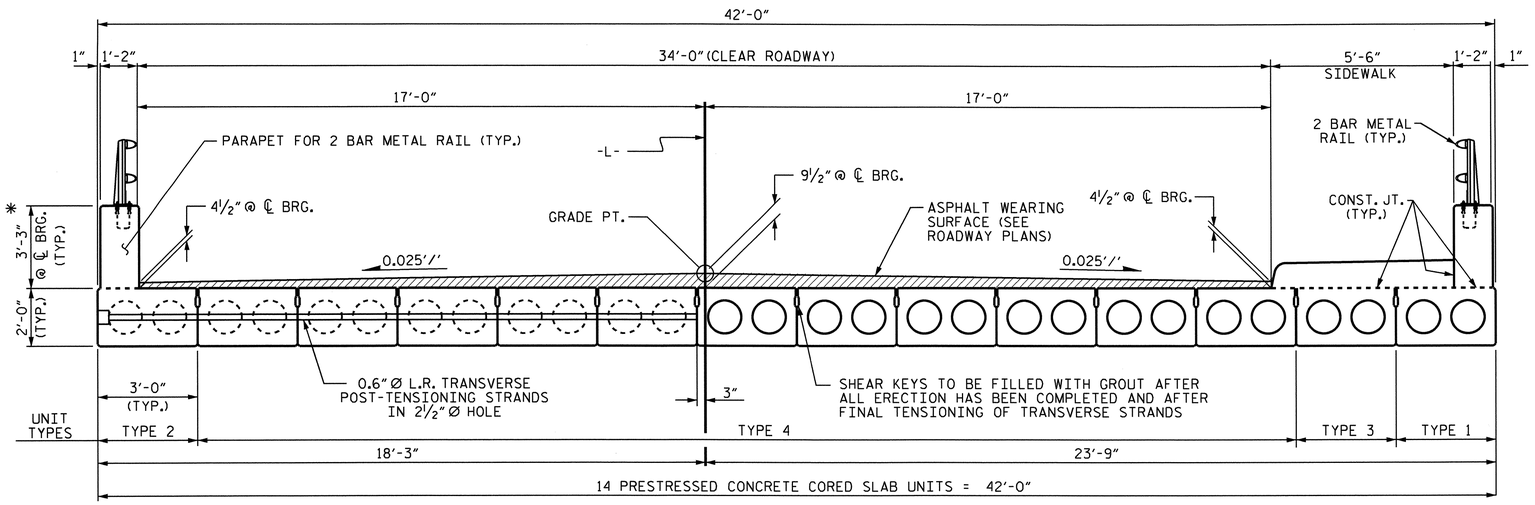
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 120° SKEW

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCK CHARLES HUNT
5/14/12

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

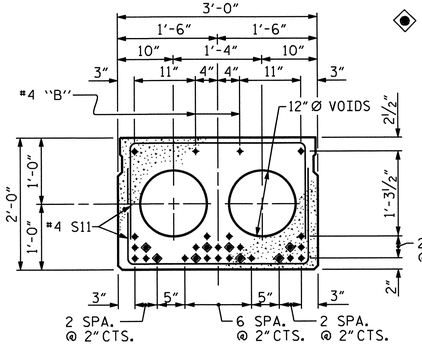


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

* THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

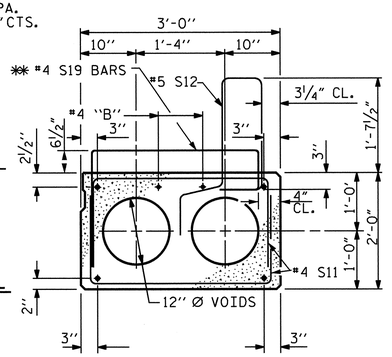


INTERIOR SLAB SECTION
TYPE 4 UNIT - 70'
(28 STRANDS REQUIRED)

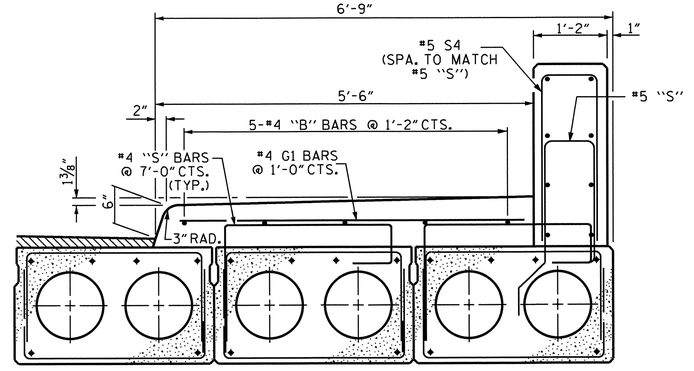
◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

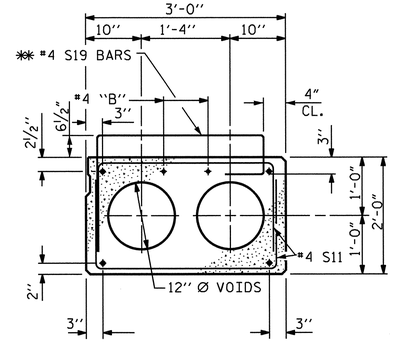
STRAND LAYOUT
INTERIOR SLAB SECTIONS
0.6'' Ø LOW RELAXATION



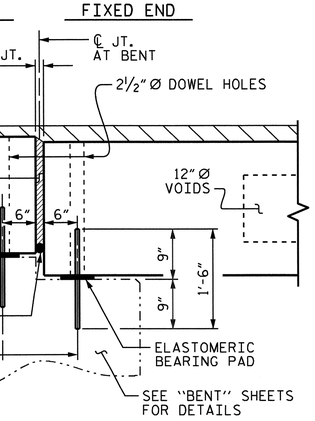
EXTERIOR SLAB SECTION TYPE 1 UNIT
(FOR PRESTRESSED STRAND LAYOUT, SEE TYPE 4 INTERIOR SLAB SECTION.)
** #4 S19 BAR IN RIGHT EXTERIOR UNIT (TYPE 1) ONLY, OMIT FROM LEFT EXTERIOR UNIT (TYPE 2)



SECTION THROUGH SIDEWALK
2'-0" UNITS SHOWN, 1'-9" UNITS SIMILAR

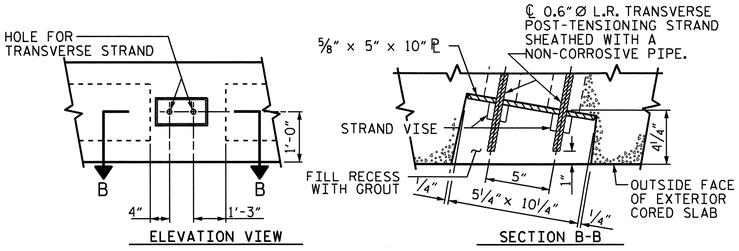


INTERIOR SLAB SECTION TYPE 3 UNIT
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

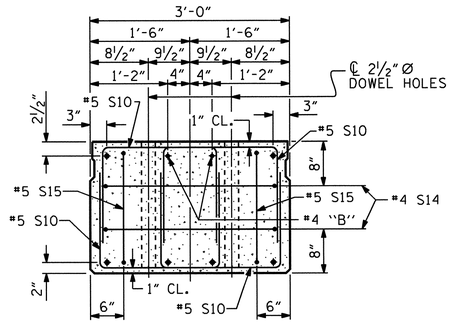


SECTION AT BENT 2

(BENT 3 SIM.)

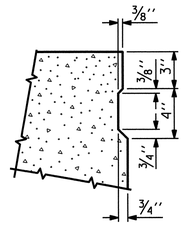


GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS



END ELEVATION

SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT 120° SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL 040091 ENGINEER BUCKY CHARLES HUNT
5/14/12

DRAWN BY : B.C. HUNT DATE : 1/2012
CHECKED BY : M.K. BEARD DATE : 1/2012

14-MAY-2012 09:28
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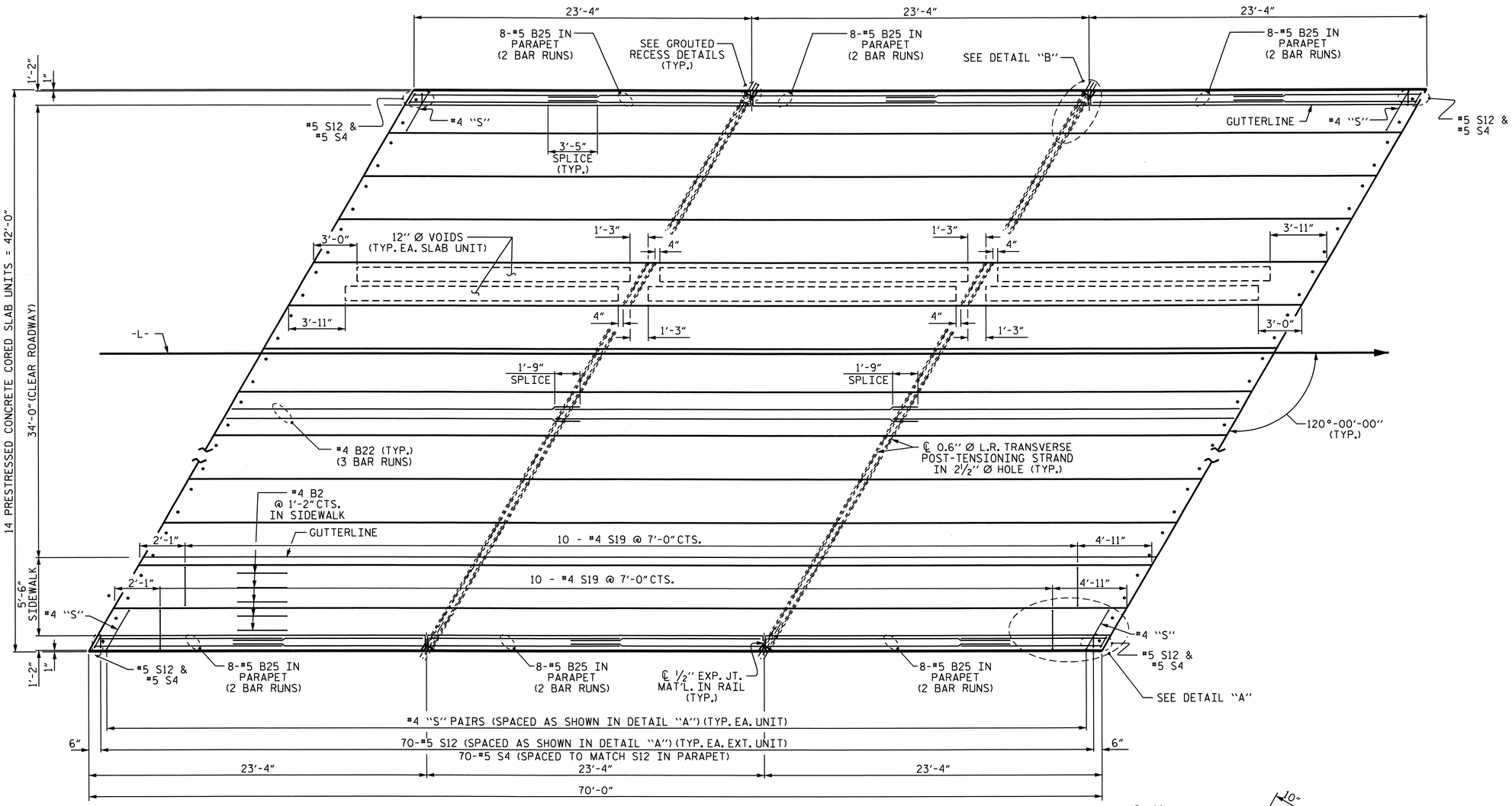
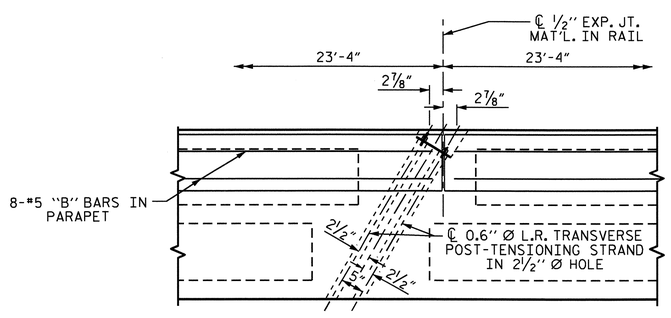
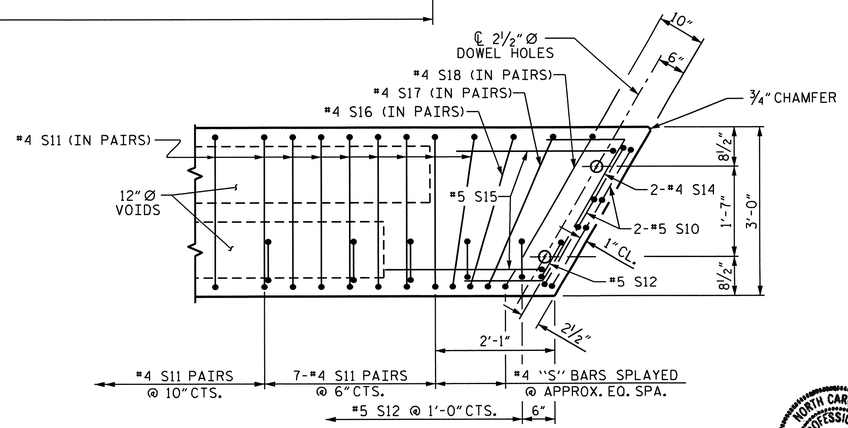


PLAN OF UNIT
SPAN C



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



DETAIL "A"

NOTE: EXTERIOR TYPE 1 UNIT SHOWN (TYPE 2 UNIT SIMILAR)
INTERIOR UNITS SIMILAR EXCEPT OMIT #5 S12 BARS.
(#4 S19 NOT SHOWN FOR CLARITY)

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 70' UNIT 34'-0" CLEAR ROADWAY 120° SKEW

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER DUCK CHARLES HUNT
5/14/12

DRAWN BY :	B.C. HUNT	DATE :	1/2012
CHECKED BY :	M.K. BEARD	DATE :	1/2012

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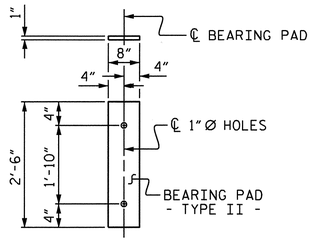


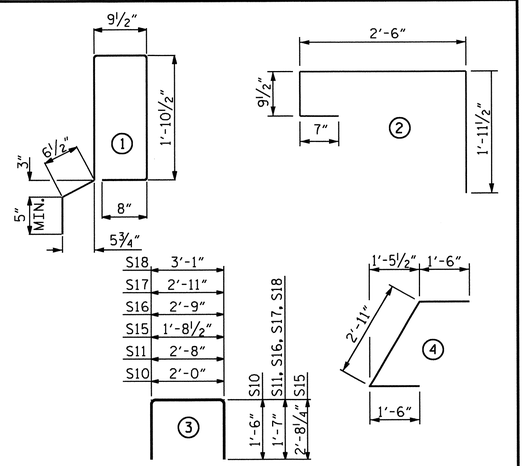
FIXED END
(TYPE II - 28 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	4 5/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1 3/16" ↓
FINAL CAMBER	3 1/2" ↑

** INCLUDES FUTURE WEARING SURFACE

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	PARAPET HEIGHT @ MID-SPAN
70' UNITS	1"	2'-11½"

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR TYPE 1	1	70'-0"	70'-0"
EXTERIOR TYPE 2	1	70'-0"	70'-0"
INTERIOR TYPE 3	1	70'-0"	70'-0"
INTERIOR TYPE 4	11	70'-0"	770'-0"
TOTAL	14		980'-0"

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 CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN PARAPETS AND SIDEWALK SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

CONCRETE RELEASE STRENGTH	
UNIT	PSI
70' UNITS	5500

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				EXTERIOR UNIT TYPE 1		EXTERIOR UNIT TYPE 2		INTERIOR UNIT TYPE 3		INTERIOR UNIT TYPE 4	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98	24'-6"	98	24'-6"	98
S10	8	#5	3	5'-0"	42	5'-0"	42	5'-0"	42	5'-0"	42
S11	170	#4	3	5'-10"	662	5'-10"	662	5'-10"	662	5'-10"	662
*S12	72	#5	1	6'-2"	463	6'-2"	463				
S14	4	#4	4	5'-11"	16	5'-11"	16	5'-11"	16	5'-11"	16
S15	4	#5	3	7'-1"	30	7'-1"	30	7'-1"	30	7'-1"	30
S16	4	#4	3	5'-11"	16	5'-11"	16	5'-11"	16	5'-11"	16
S17	4	#4	3	6'-1"	16	6'-1"	16	6'-1"	16	6'-1"	16
S18	4	#4	3	6'-3"	17	6'-3"	17	6'-3"	17	6'-3"	17
*S19	10	#4	2	5'-10"	39			5'-10"	39		
REINFORCING STEEL LBS.					897		897		897		897
*EPOXY COATED REINFORCING STEEL LBS.					502		463		39		
7000 P.S.I. CONCRETE CU. YDS.					12.0		12.0		12.0		12.0
0.6" Ø L.R. STRANDS No.					28		28		28		28

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT

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

ASSEMBLED BY : B.C. HUNT DATE : 1/2012
CHECKED BY : M.K. BEARD DATE : 1/2012

14-MAY-2012 09:28
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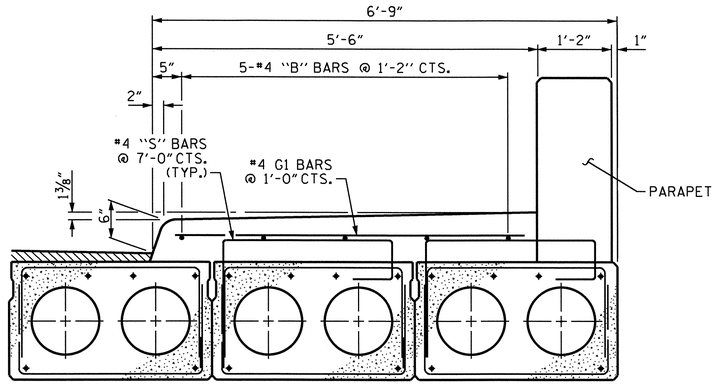
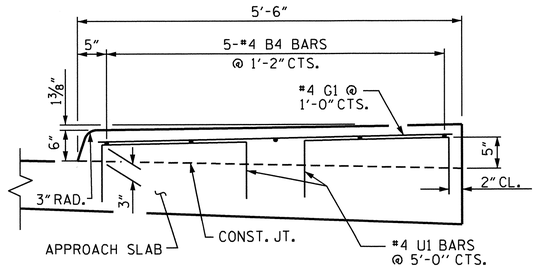
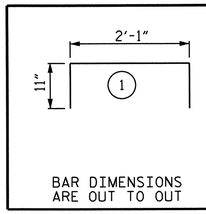
lsutton



SECTION THROUGH SIDEWALK
ON CORED SLABS



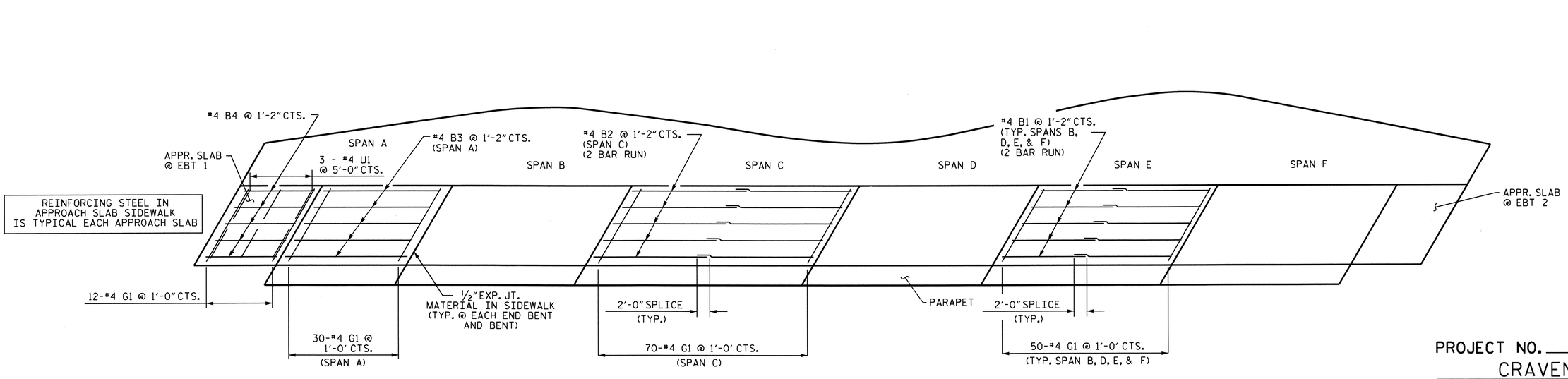
SECTION THRU SIDEWALK
ON APPROACH SLABS



BAR DIMENSIONS
ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	40	#4	STR	25'-10"	690
✳B2	10	#4	STR	35'-10"	239
✳B3	5	#4	STR	29'-6"	99
✳B4	10	#4	STR	11'-8"	78
✳G1	324	#4	STR	5'-0"	1082
✳U1	12	#4	1	3'-11"	31
✳EPOXY COATED REINFORCING STEEL				LBS.	2219
CLASS AA CONCRETE				CU.YDS.	36.5



PLAN OF SIDEWALK

GROOVED CONTRACTION JOINTS ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(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 IS REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCKY CHARLES HUNT
5/14/12

DRAWN BY : B. C. HUNT DATE : 8/2011
CHECKED BY : T.R. PETERSON DATE : 9/2011

14-MAY-2012 09:28
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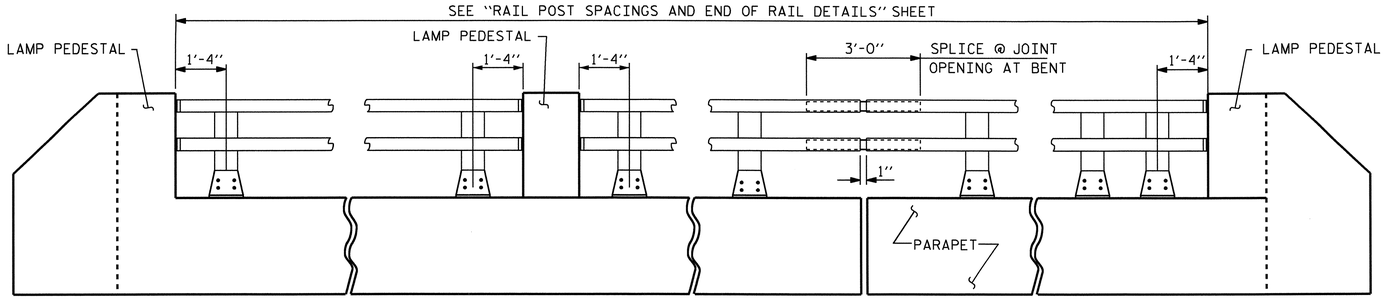
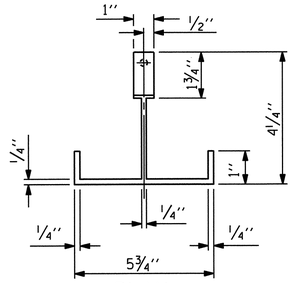
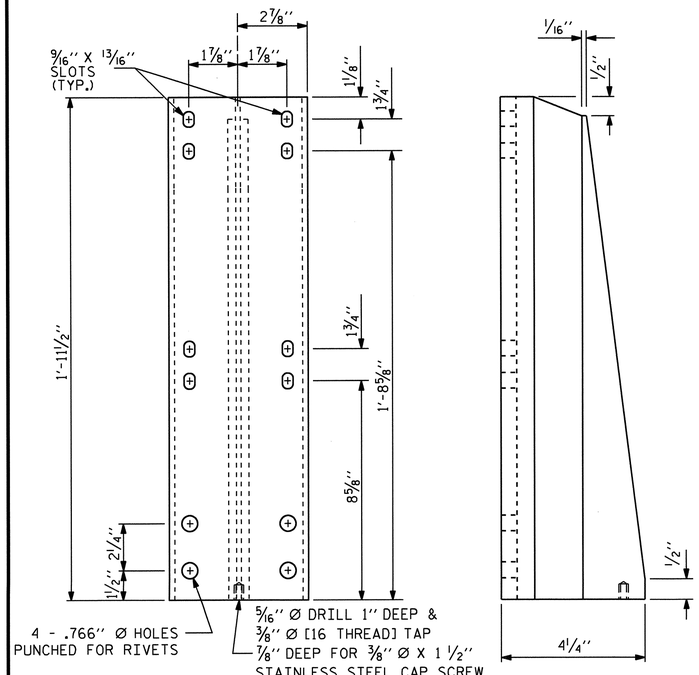


ELEVATION

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

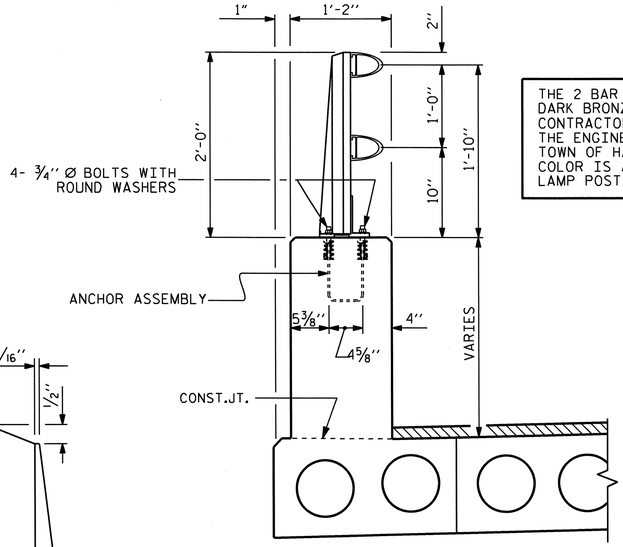


PLAN



FRONT ELEVATION SIDE ELEVATION

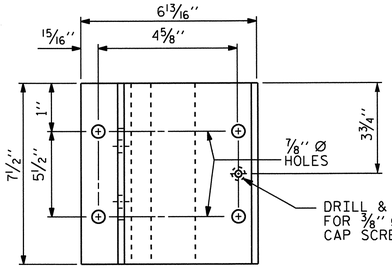
DETAILS OF POST



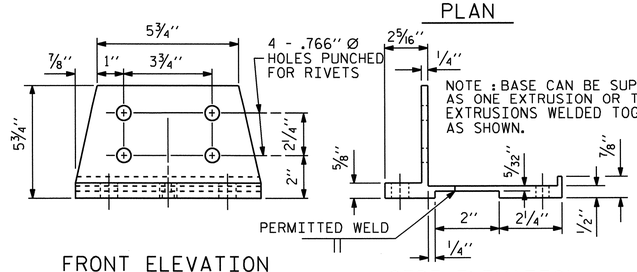
SECTION THRU PARAPET AND RAIL

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR EXCEPT WITH SIDEWALK

THE 2 BAR METAL RAIL SHALL BE ANODIZED DARK BRONZE. PRIOR TO ANODIZING, THE CONTRACTOR SHALL PROVIDE A SAMPLE TO THE ENGINEER FOR COORDINATION WITH THE TOWN OF HAVELOCK TO ENSURE THE RAIL COLOR IS A CLOSE MATCH TO THE PROPOSED LAMP POST COLOR.

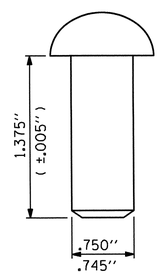


PLAN



FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE LAMP PEDESTAL DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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

PAY LENGTH = 569.10 LIN. FT.

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

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

ASSEMBLED BY : B.C. HUNT		DATE : 8/2011	
CHECKED BY : T.R. PETERSON		DATE : 9/2011	
DRAWN BY : EEM 6/94	REV. 5/7/03R		RWW/JTE
CHECKED BY : RGW 6/94	REV. 5/1/06		TLA/GM
	REV. 10/1/11		MAA/GM

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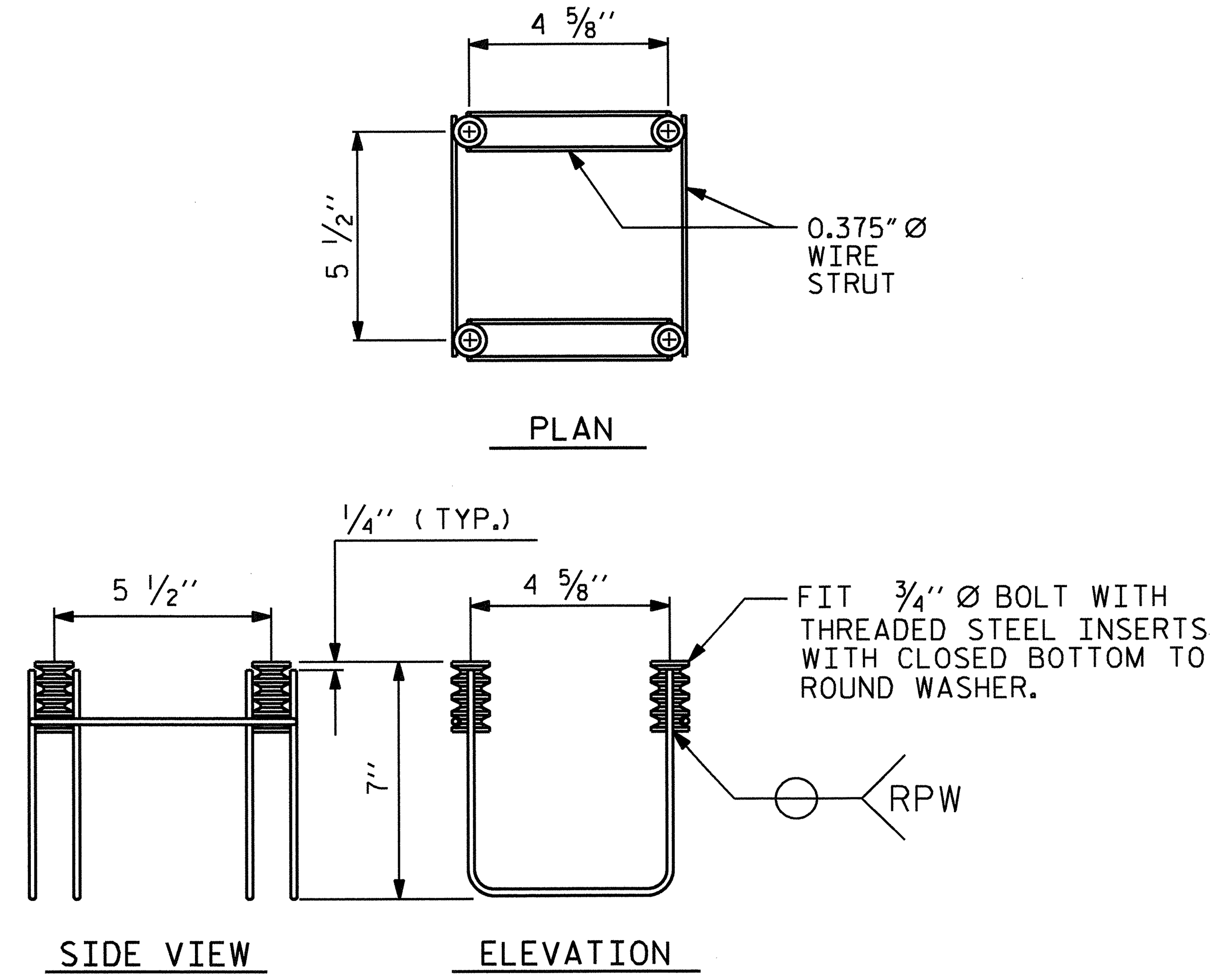
STD. NO. BMR3



4-BOLT METAL RAIL ANCHOR ASSEMBLY

(110 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.

B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

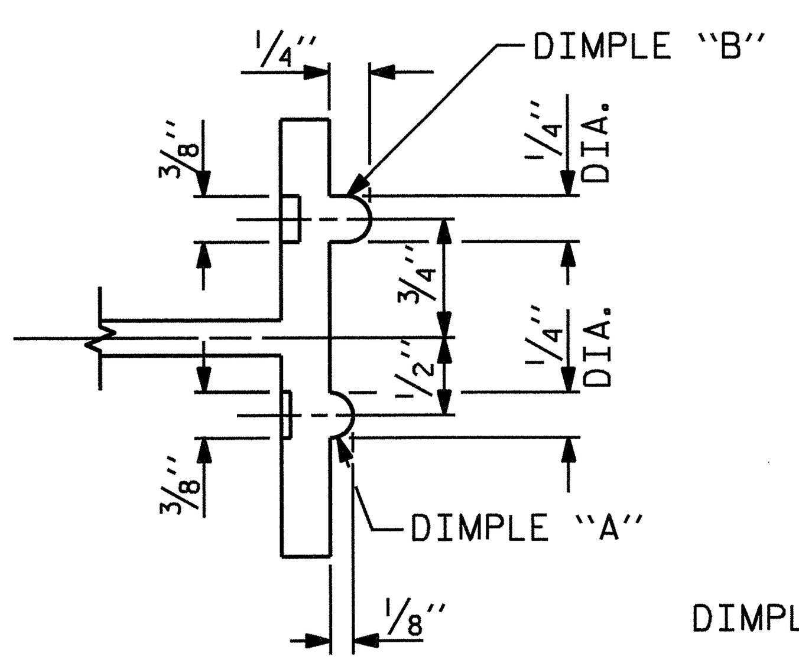
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

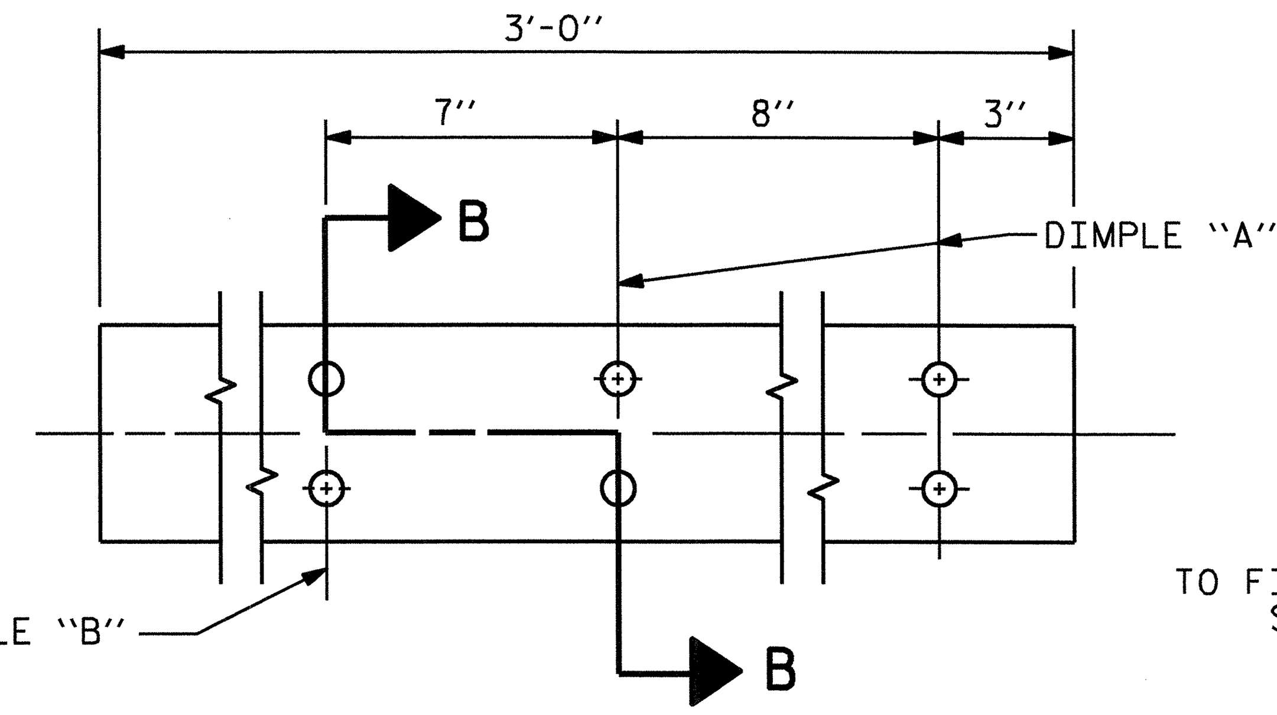
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

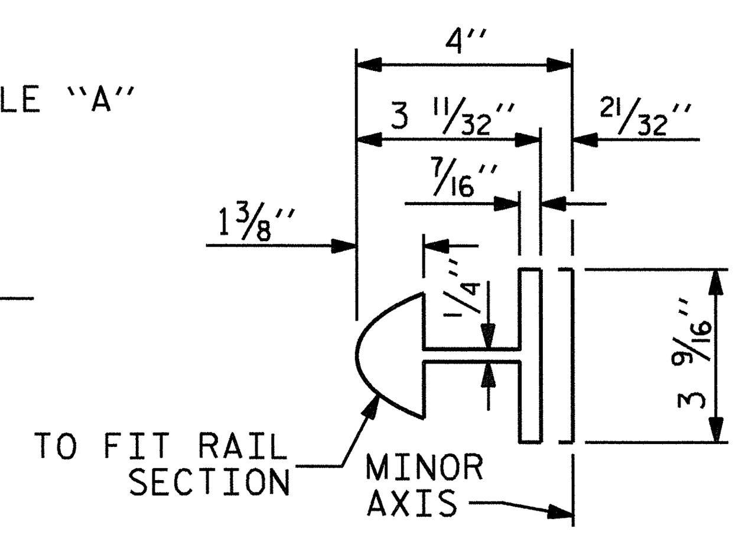
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



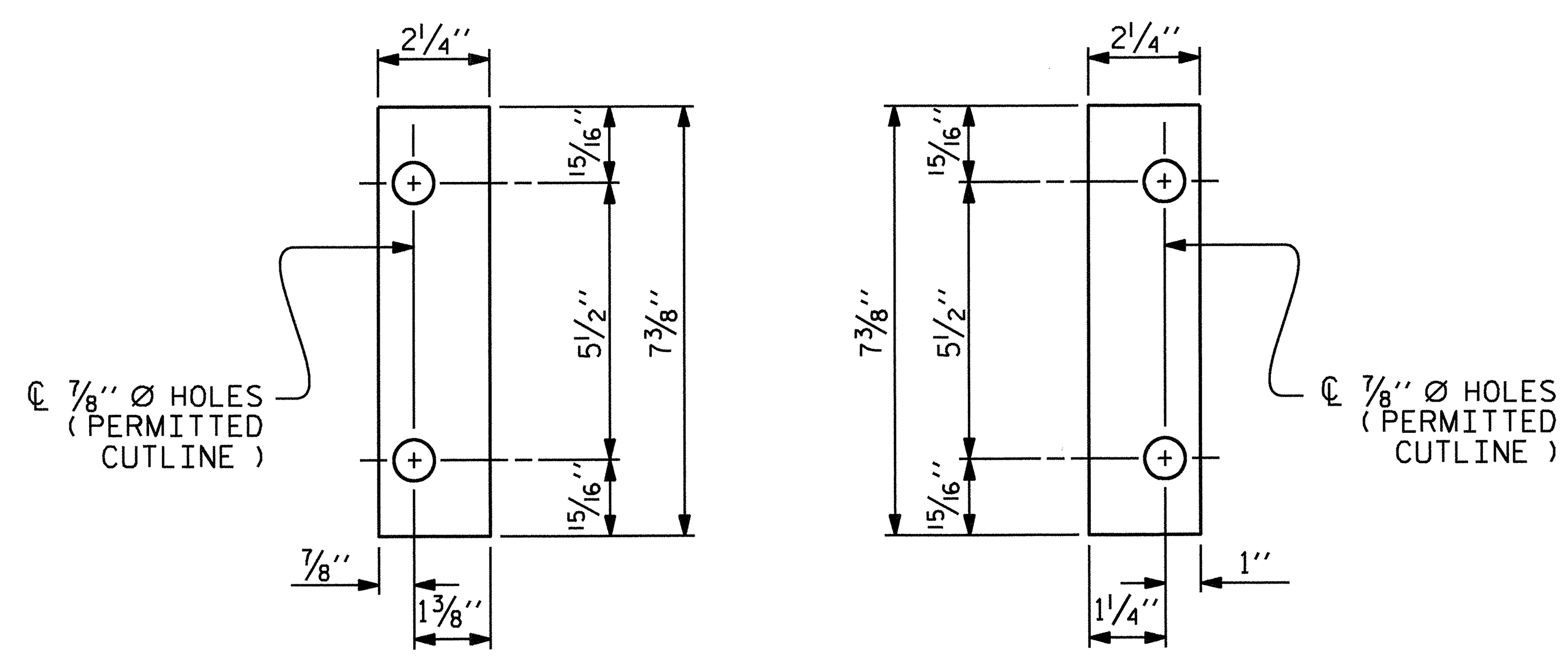
SECTION B - B



EXPANSION BAR DETAILS

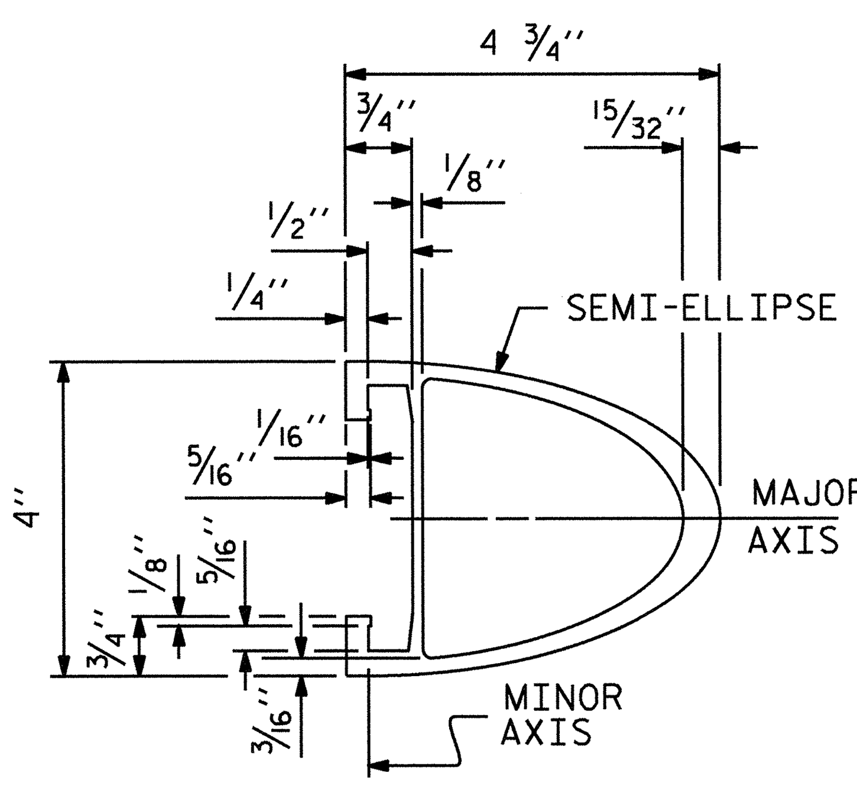


BAR SECTION

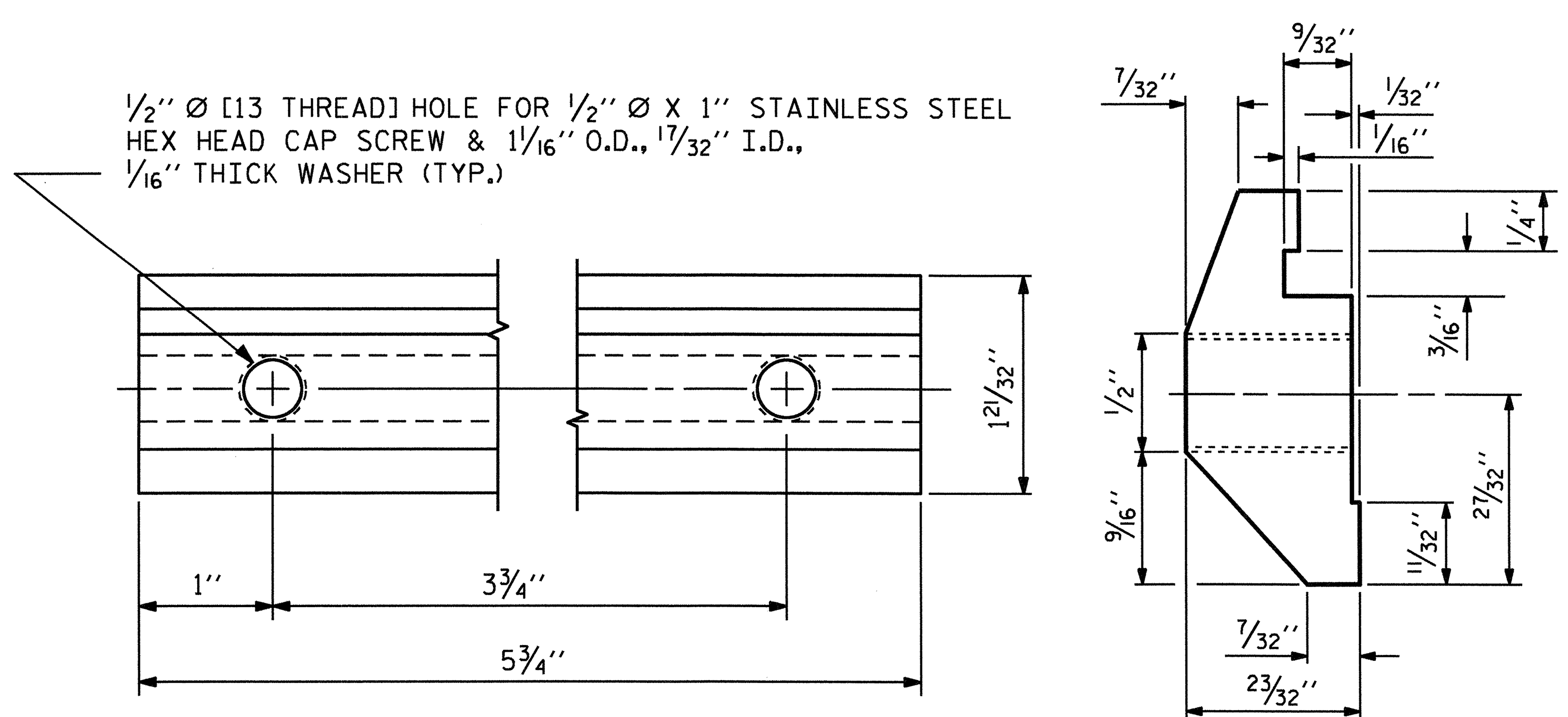


SHIM DETAILS

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

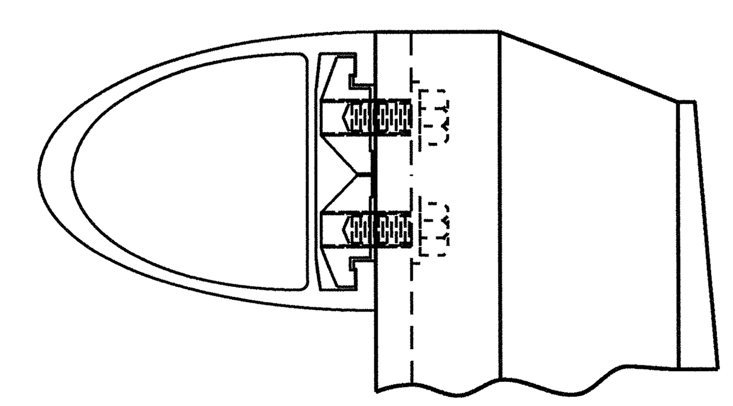


RAIL SECTION

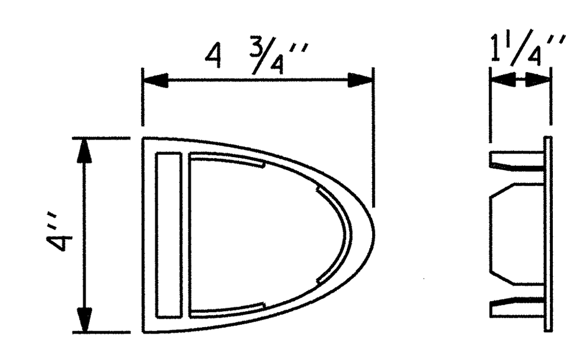


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

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

5/14/12

ASSEMBLED BY : B.C. HUNT		DATE : 8/2011
CHECKED BY : T.R. PETERSON		DATE : 9/2011
DRAWN BY : EEM 6/94	REV. 8/16/99	MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R	KMM/GM
	REV. 10/1/11	MAA/GM

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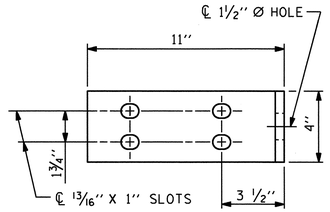
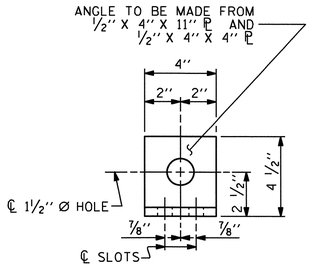
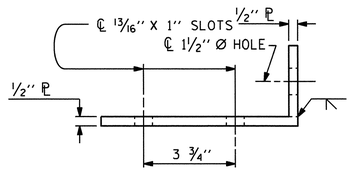


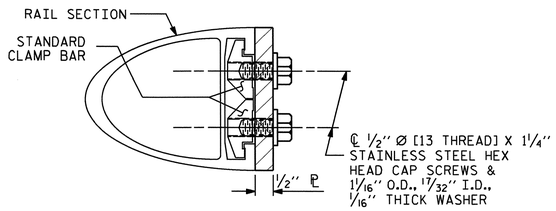
ELEVATION



END VIEW (FIX AND EXP.)



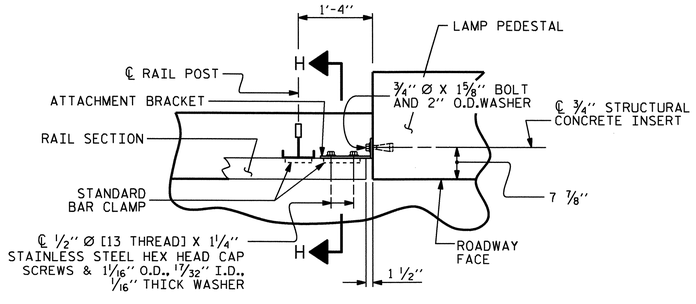
TOP VIEW



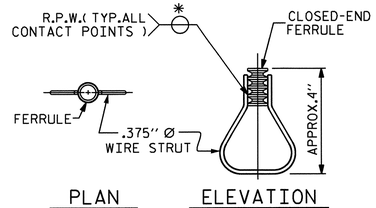
SECTION H-H (FIX)

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST



PLAN - RAIL AND LAMP PEDESTAL



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½''.

B. 1 - ¾'' Ø X 1⅝'' BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾'' Ø X 1⅝'' GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½'' PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾'' STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾''Ø X 1⅝'' BOLT WITH 2'' O.D. WASHER IN PLACE. THE ¾''Ø X 1⅝'' BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾'' STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½'' PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾'' Ø X 1⅝'' BOLT SHALL APPLY TO THE ¾''Ø X 6 ½'' BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

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

NORTH CAROLINA PROFESSIONAL SEAL 14004 ENGINEER BRUCE CHARLES HUNT
5/14/12

ASSEMBLED BY : B.C. HUNT	DATE : 8/2011		
CHECKED BY : T.R. PETERSON	DATE : 9/2011		
DRAWN BY : FCJ 1/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : CRK 3/89	REV. 5/1/06	TLA/GM	
	REV. 10/1/11	MAA/GM	

14-MAY-2012 09:28
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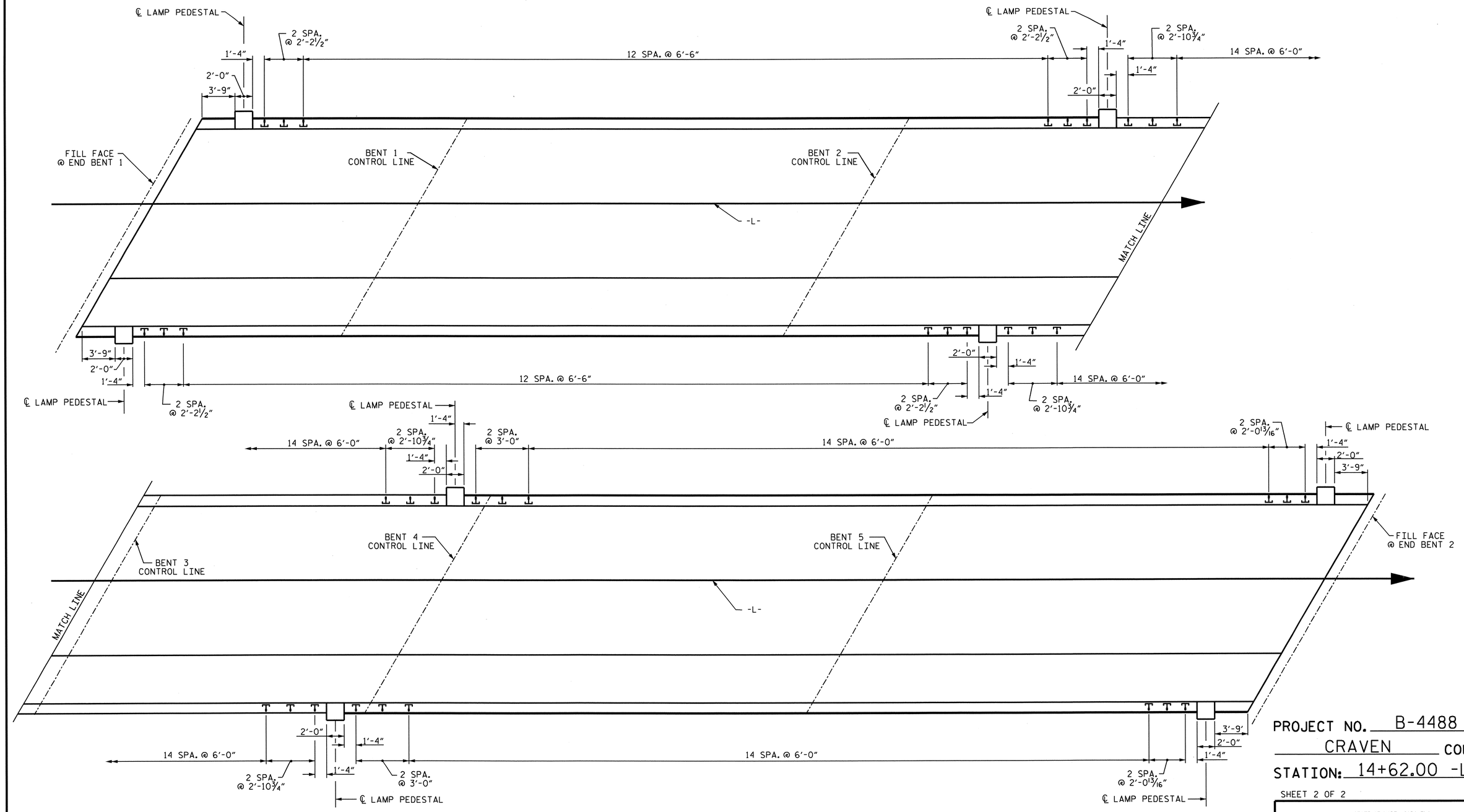
STD. NO. BMR2



PLAN OF RAIL POST SPACING

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RAIL POST SPACINGS AND END OF RAIL DETAILS

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

NORTH CAROLINA PROFESSIONAL SEAL 14091 ENGINEER BILLY CHARLES HUNT

3/14/12

DRAWN BY : B.C. HUNT DATE : 3/2012
CHECKED BY : J.P. ADAMS DATE : 3/2012

14-MAY-2012 09:28
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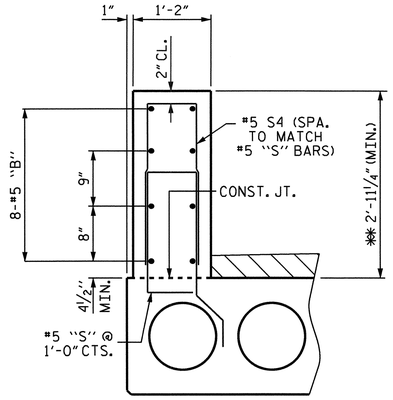
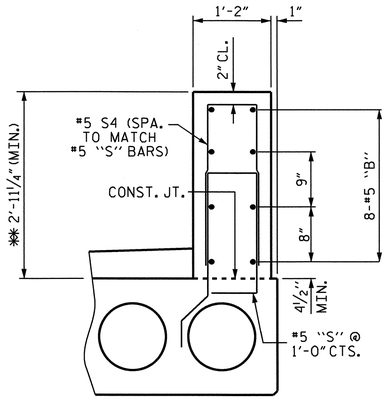
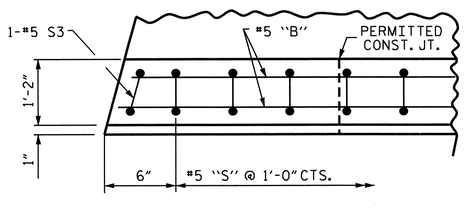


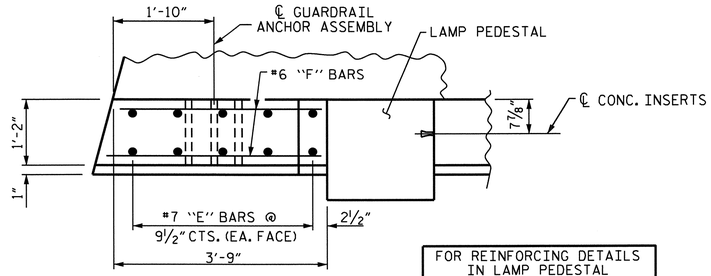
SECTION THRU PARAPET



SECTION THRU PARAPET
(SIDEWALK SIDE)



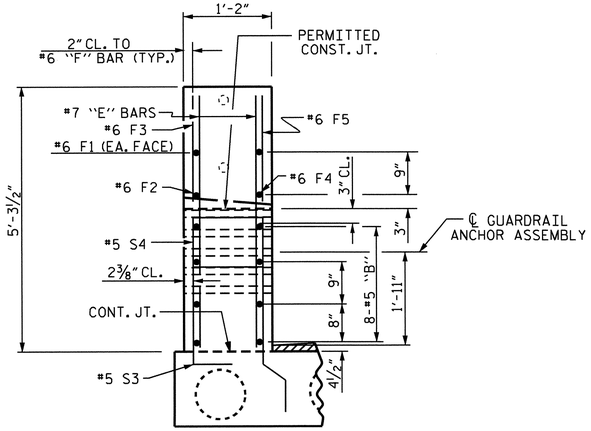
PLAN OF PARAPET



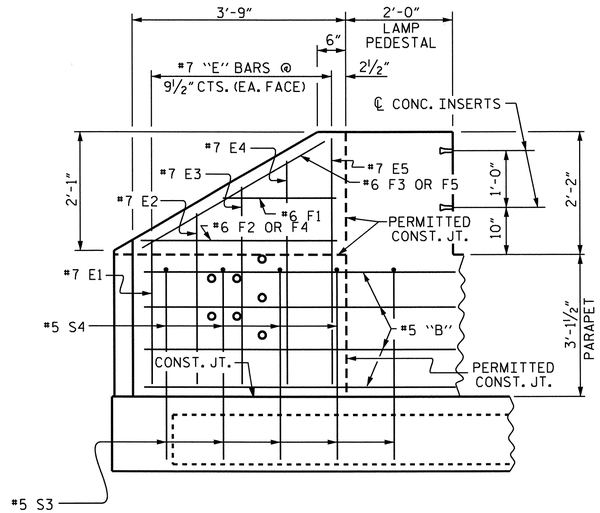
FOR REINFORCING DETAILS IN LAMP PEDESTAL SEE SHEET 2 OF 2.

FOR CONDUIT DETAILS, SEE SHEET S-38.

PLAN OF END POST



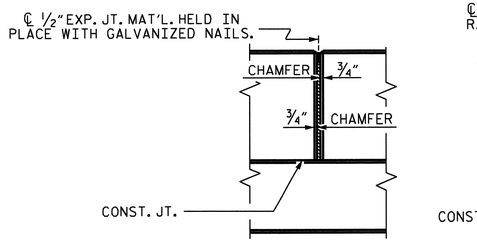
END VIEW



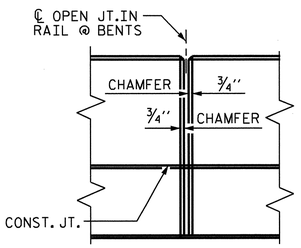
ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

** THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.



ELEVATION AT EXPANSION JOINTS



ELEVATION AT BENTS

PARAPET DETAILS

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

END POSTS, LAMP PEDESTALS AND PARAPET DETAILS

FOR TWO BAR METAL RAIL

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCK CHARLES HUNT

5/14/12

DRAWN BY : B. C. HUNT DATE : 8/2011
CHECKED BY : T.R. PETERSON DATE : 9/2011

14-MAY-2012 09:28
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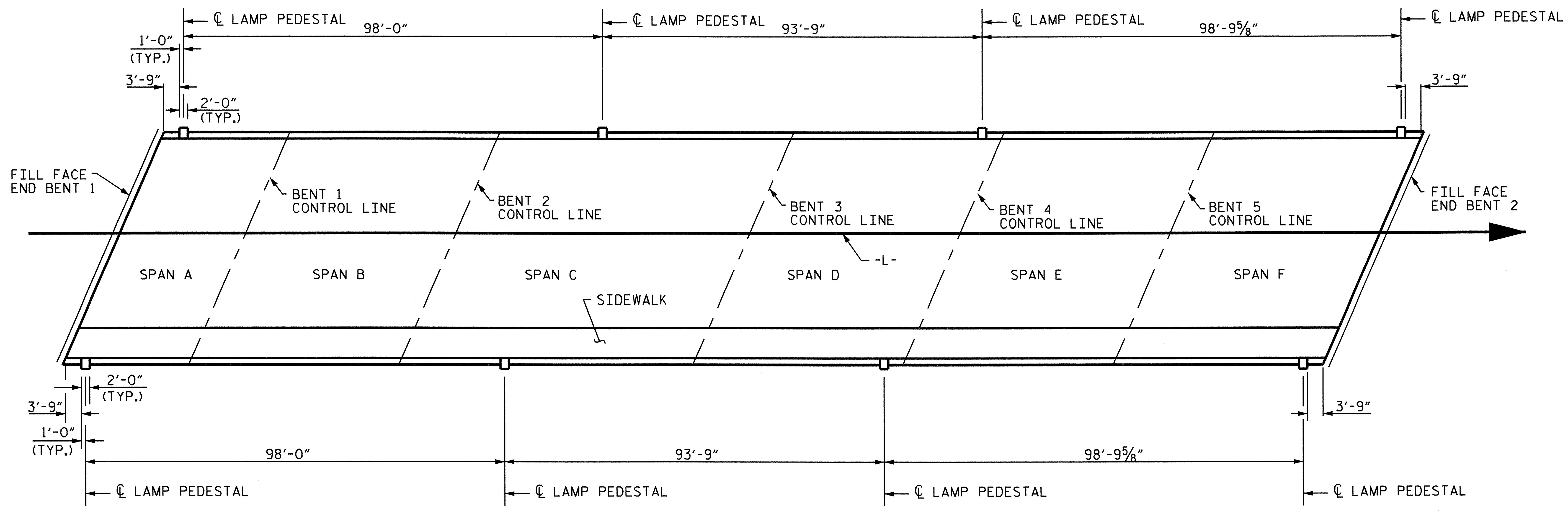
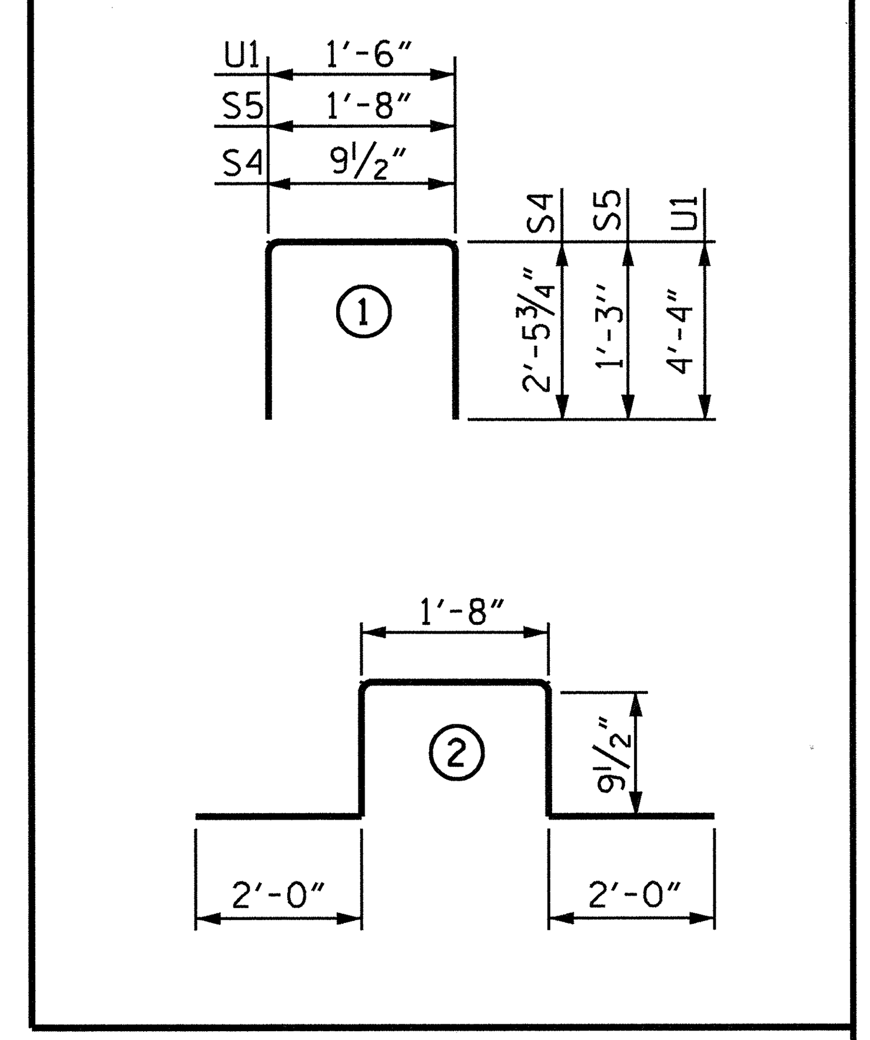
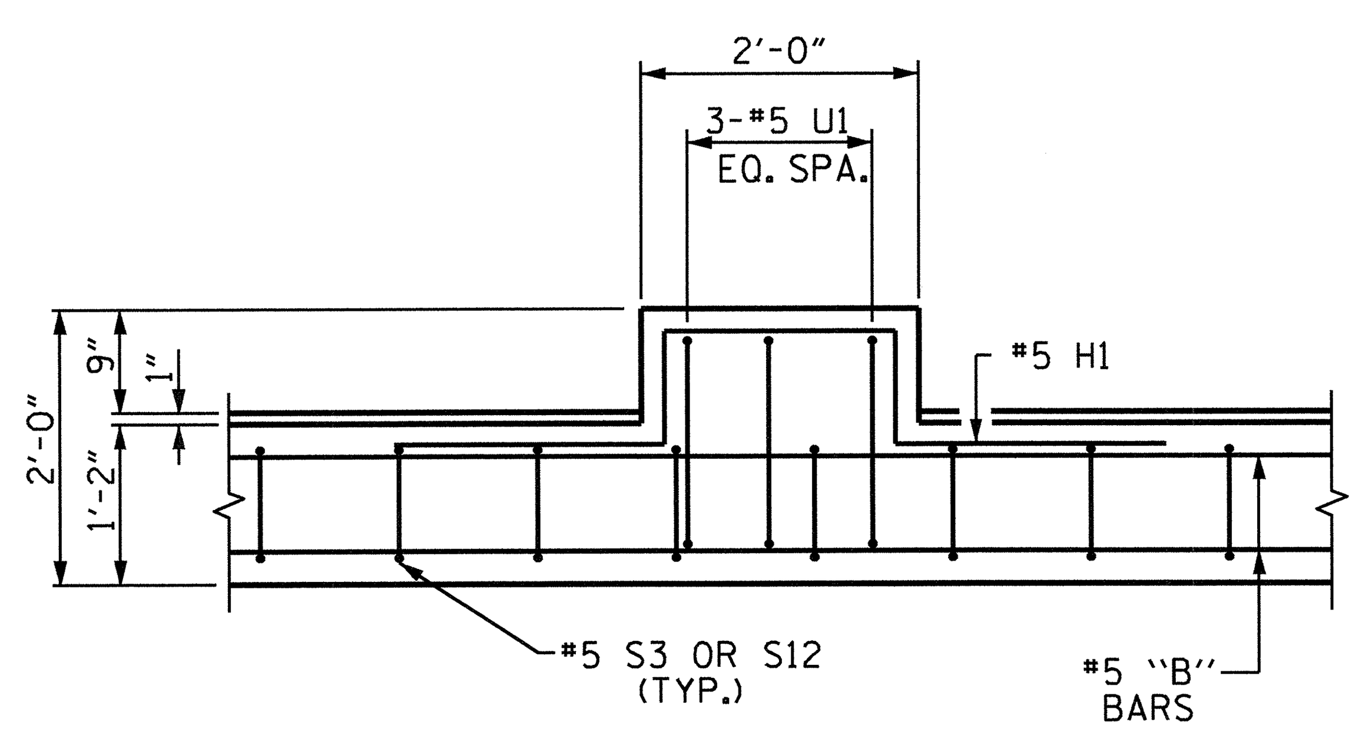


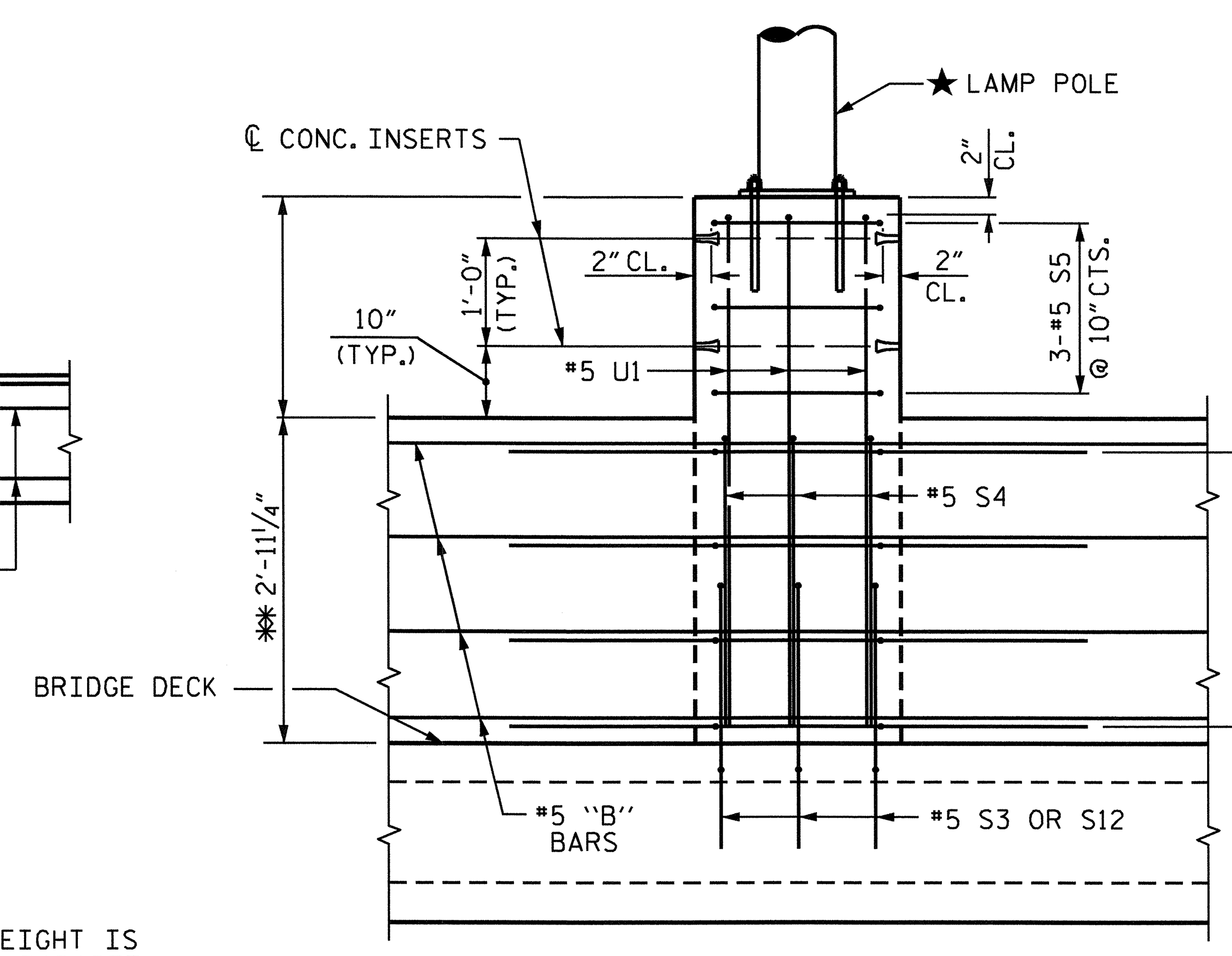
LAMP PEDESTAL LAYOUT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
BILL OF MATERIAL FOR 2 PARAPETS, 8 LAMP PEDESTALS, & 4 END POSTS					
∗B9	16	#5	STR	29'-6"	492
∗B13	256	#5	STR	14'-3"	3805
∗B25	96	#5	STR	13'-3"	1327
∗E1	8	#7	STR	2'-9"	45
∗E2	8	#7	STR	3'-3"	53
∗E3	8	#7	STR	3'-9"	61
∗E4	8	#7	STR	4'-3"	69
∗E5	8	#7	STR	4'-7"	75
∗F1	8	#6	STR	2'-1"	25
∗F2	4	#6	STR	3'-4"	20
∗F3	4	#6	STR	3'-10"	23
∗F4	4	#6	STR	4'-0"	24
∗F5	4	#6	STR	4'-6"	27
∗H1	32	#5	2	7'-3"	242
∗S4	624	#5	1	5'-9"	3742
∗S5	48	#5	1	4'-2"	209
∗U1	24	#5	1	10'-2"	254
∗EPOXY COATED REINFORCING STEEL				LBS.	10493
CLASS AA CONCRETE				CU.YDS.	83.8
1'-2" X 3'-3" CONCRETE PARAPET					601.46 LIN.FT.



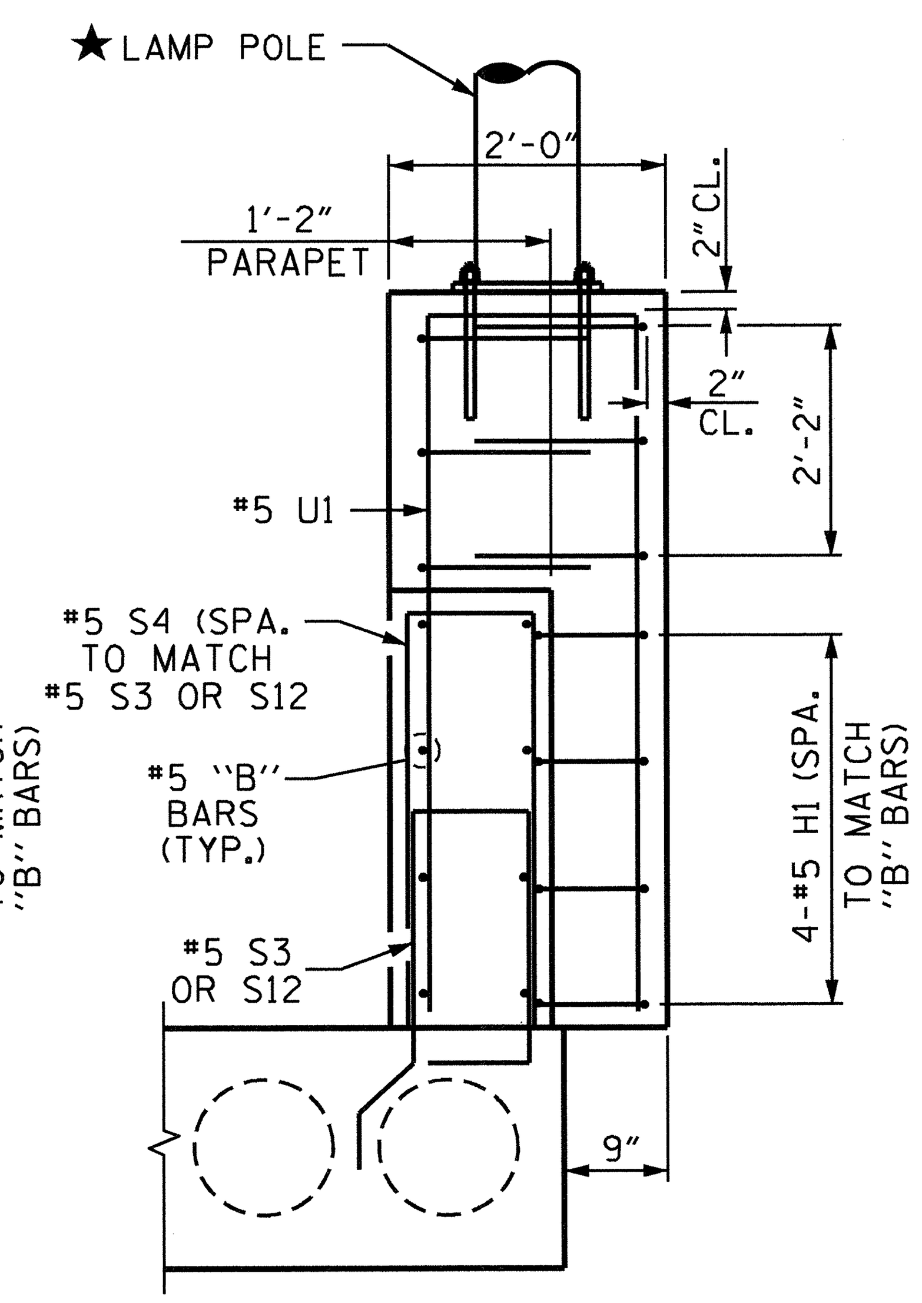


PLAN THRU PARAPET

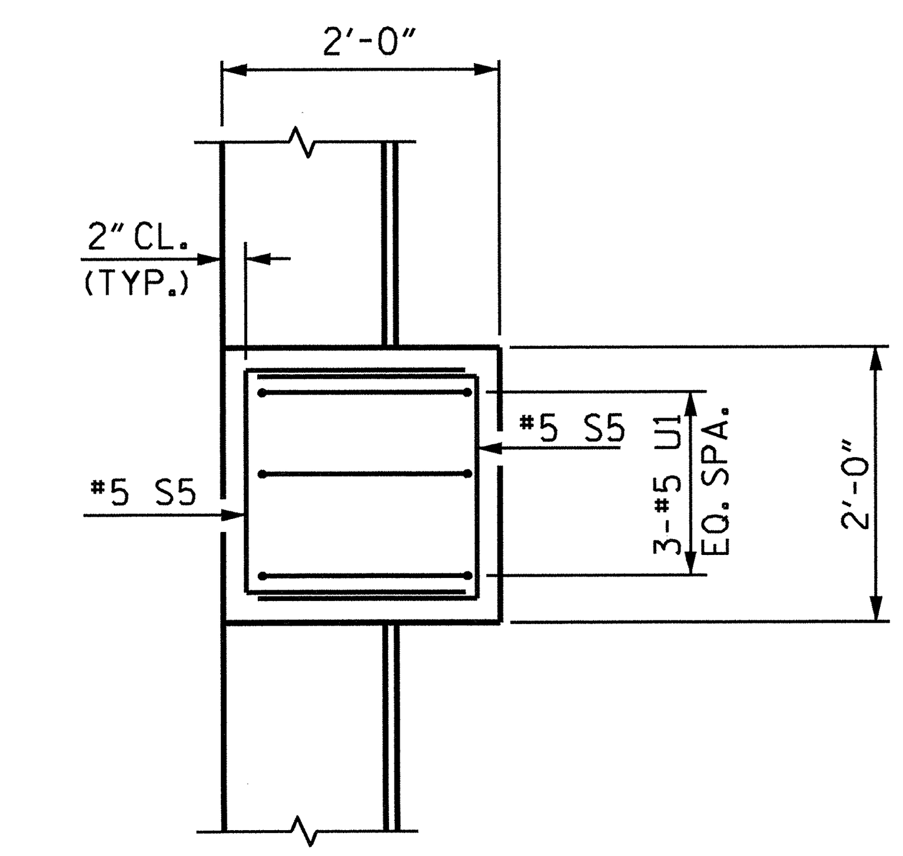


✱✱ THE MINIMUM PARAPET HEIGHT IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

ELEVATION
(FRONT VIEW)



ELEVATION
(RIGHT VIEW)



PLAN ABOVE PARAPET

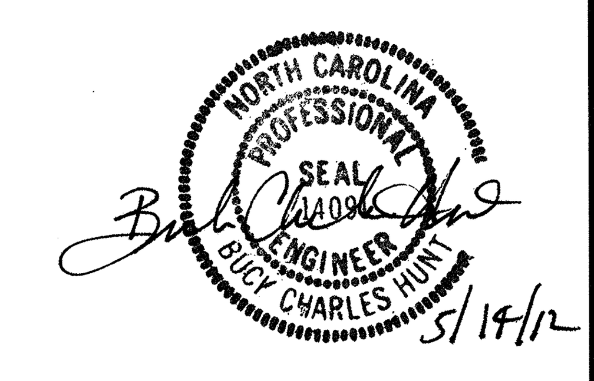
LAMP PEDESTAL DETAILS
(★ LAMP POLE & ANCHORAGE TO BE PROVIDED BY OTHERS.)

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
END POSTS, LAMP PEDESTALS AND PARAPET DETAILS
FOR TWO BAR METAL RAIL



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

SHEET NO. S-20
TOTAL SHEETS 41

DRAWN BY : B.C. HUNT DATE : 3/2012
CHECKED BY : J.P. ADAMS DATE : 3/2012

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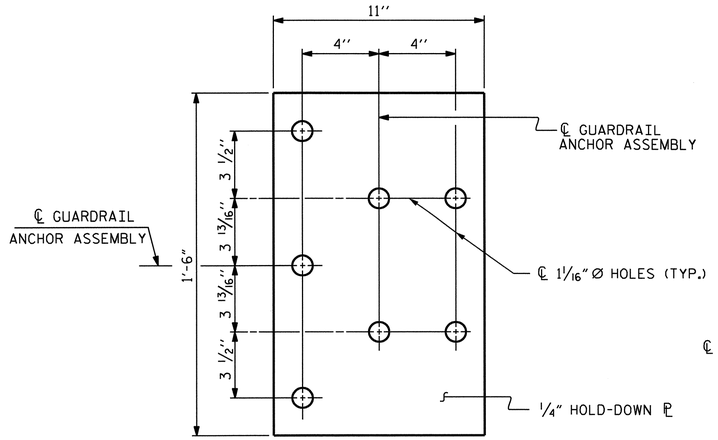
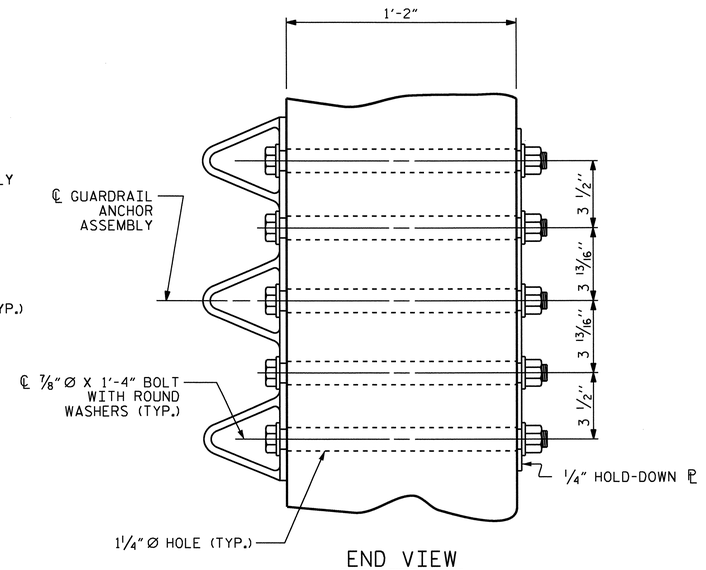


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES (FOR METAL RAILS)

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.

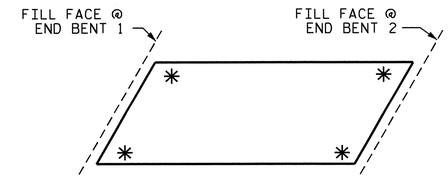
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

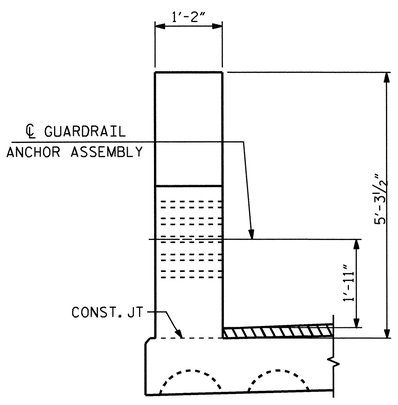
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

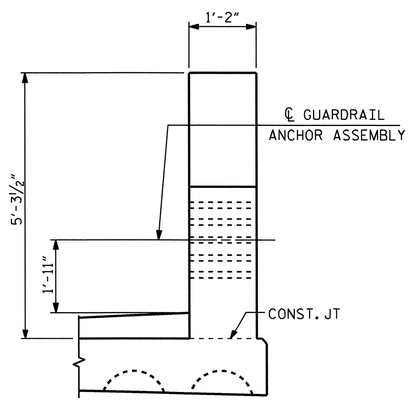


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

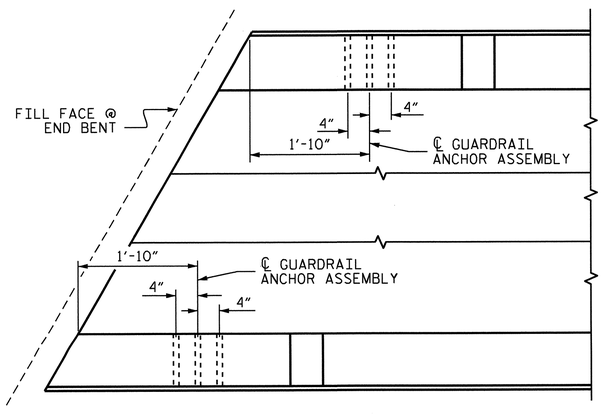


END VIEW
(TWO BAR METAL RAIL)



END VIEW
(SIDEWALK)

LOCATION OF GUARDRAIL ANCHOR AT END POST



PLAN

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS & VERTICAL CONCRETE BARRIER RAIL

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

STD. NO. GRA3

ASSEMBLED BY : B.C. HUNT	DATE : 8/2011
CHECKED BY : T.R. PETERSON	DATE : 9/2011
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	REV. 10/1/11 MAA/GM
	REV. 12/5/11 MAA/GM

14-MAY-2012 09:27
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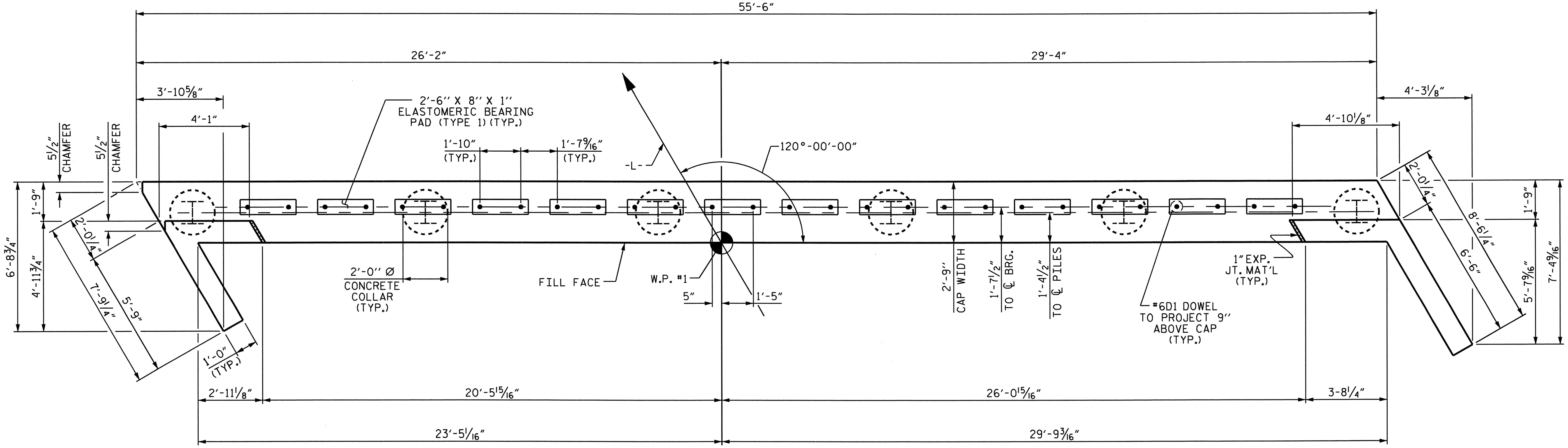
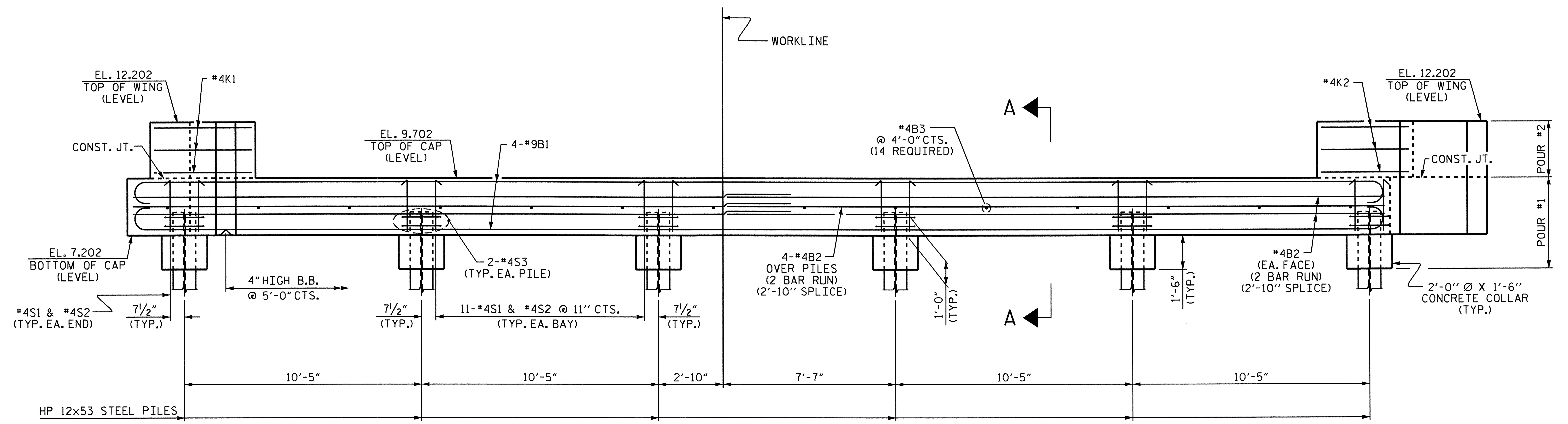
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22609 BUCY CHARLES HUNT
5/14/12

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

DRAWN BY : B. L. GREEN DATE : 11/1/11
CHECKED BY : J. P. ADAMS DATE : 11/9/11

14-MAY-2012 09:27
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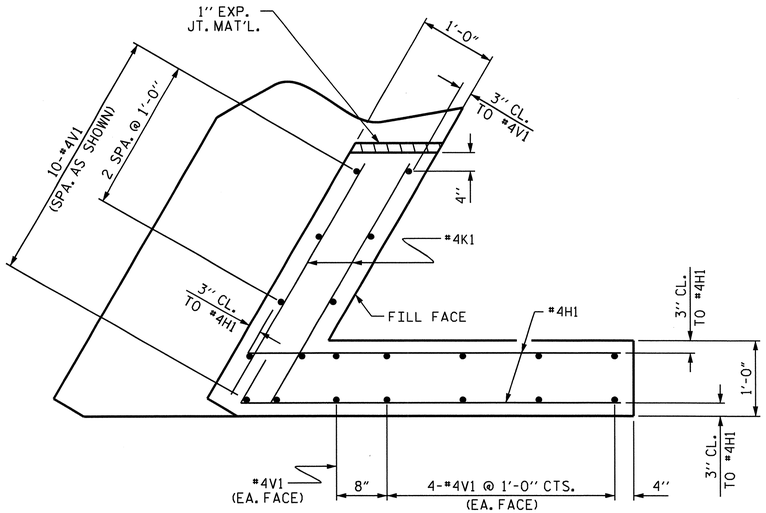
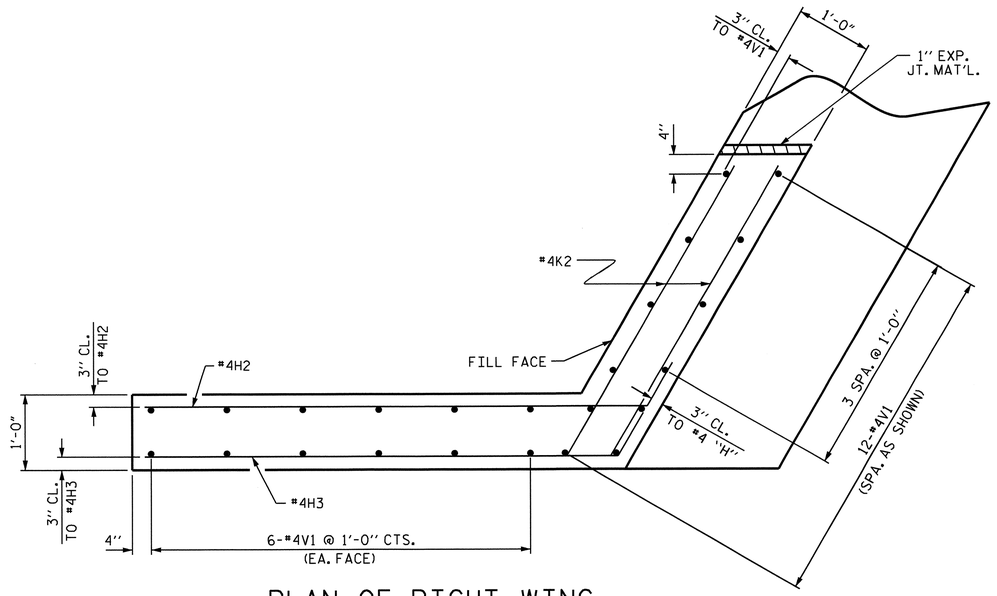
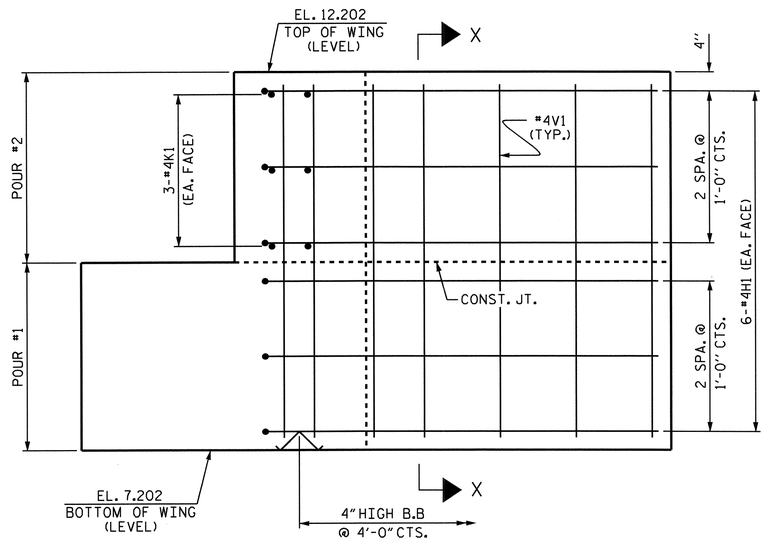


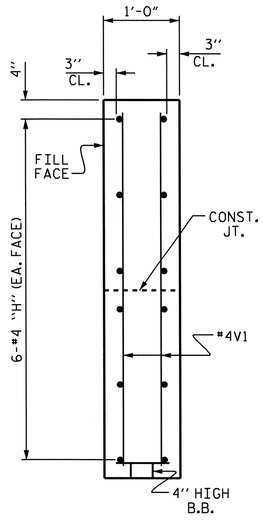
PLAN OF LEFT WING



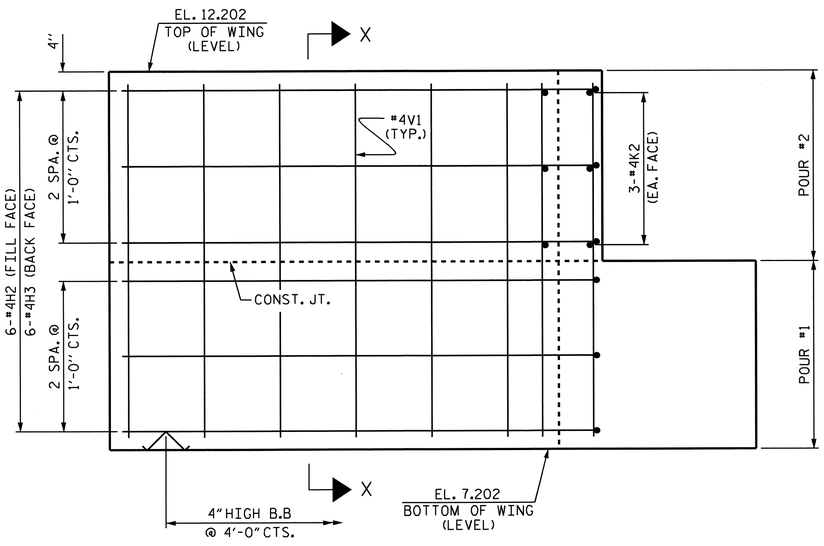
PLAN OF RIGHT WING



ELEVATION OF LEFT WING



SECTION X-X



ELEVATION OF RIGHT WING

DRAWN BY : B. L. GREEN DATE : 11/1/11
CHECKED BY : J. P. ADAMS DATE : 11/9/11

14-MAY-2012 09:27
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PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

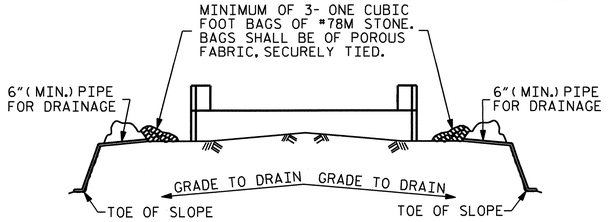
SUBSTRUCTURE

END BENT 1

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER STEVE CHARLES HUNT

5/14/12

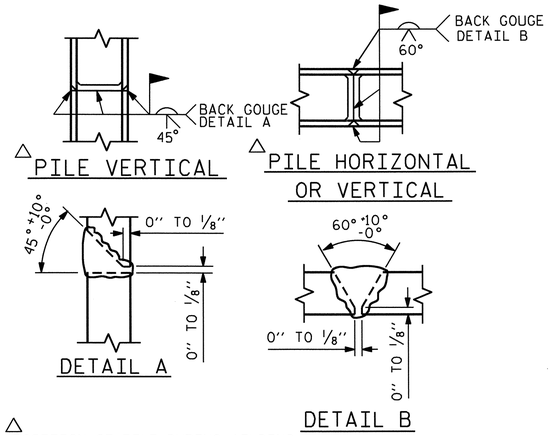


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

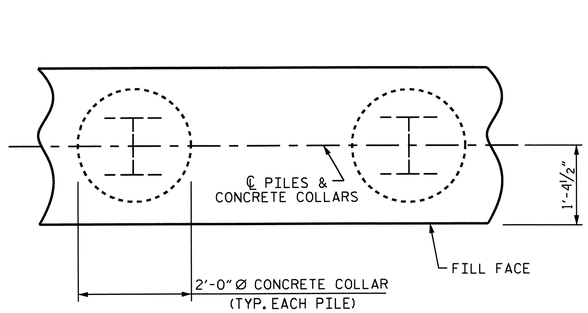
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

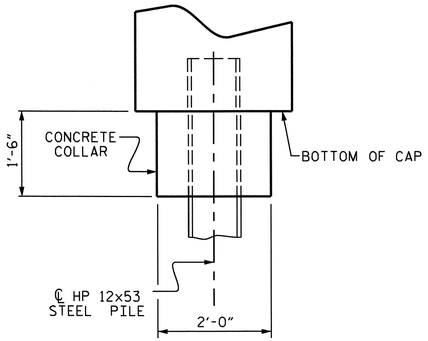
TEMPORARY DRAINAGE AT END BENT



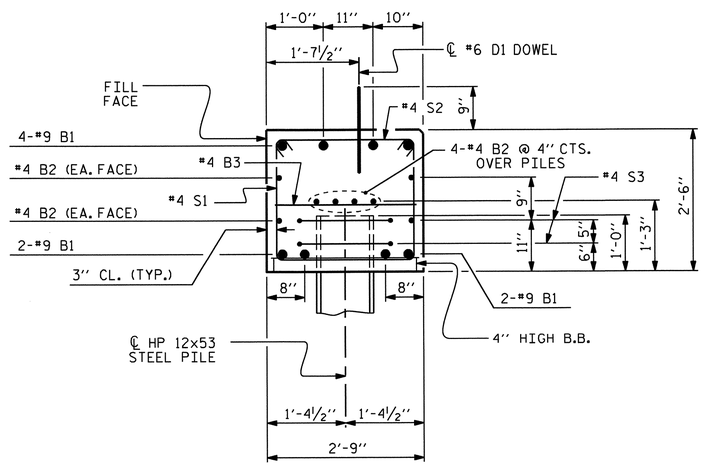
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS





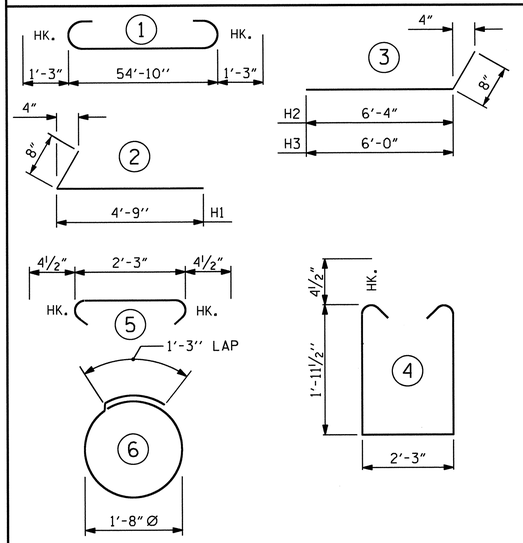
CORROSION PROTECTION FOR STEEL PILES DETAIL



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	8	#9	1	57'-4"	1559
✱B2	16	#4	STR	28'-11"	309
✱B3	14	#4	STR	2'-3"	21
✱D1	28	#6	STR	1'-6"	63
✱H1	12	#4	2	5'-5"	43
✱H2	6	#4	3	7'-0"	28
✱H3	6	#4	3	6'-8"	27
✱K1	6	#4	STR	3'-6"	14
✱K2	6	#4	STR	4'-3"	17
✱S1	57	#4	4	6'-11"	263
✱S2	57	#4	5	3'-0"	114
✱S3	12	#4	6	6'-6"	52
✱V1	44	#4	STR	4'-6"	132

✱ EPOXY COATED REINFORCING STEEL LBS. 2642

CLASS AA CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 16.1 C.Y.

POUR #2 UPPER PART OF WINGS 1.7 C.Y.

TOTAL CLASS AA CONCRETE 17.8 C.Y.

HP 12x53 STEEL PILES
NO: 6 LIN. FT.= 390

PILE REDRIVES 3 EA.

ASSEMBLED BY : B. L. GREEN DATE : 11/1/11
CHECKED BY : J. P. ADAMS DATE : 11/9/11

DRAWN BY : DGE 12/09
CHECKED BY : MKT 01/10

14-MAY-2012 09:27
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lsutton

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

SHEET 3 OF 3

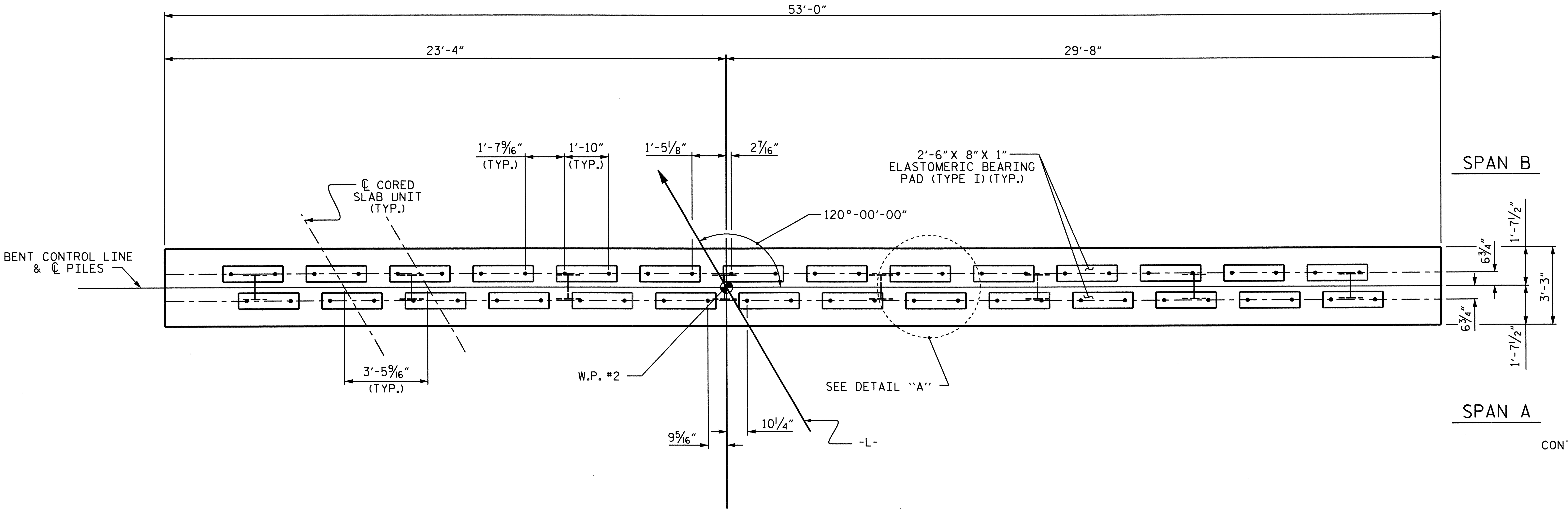
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

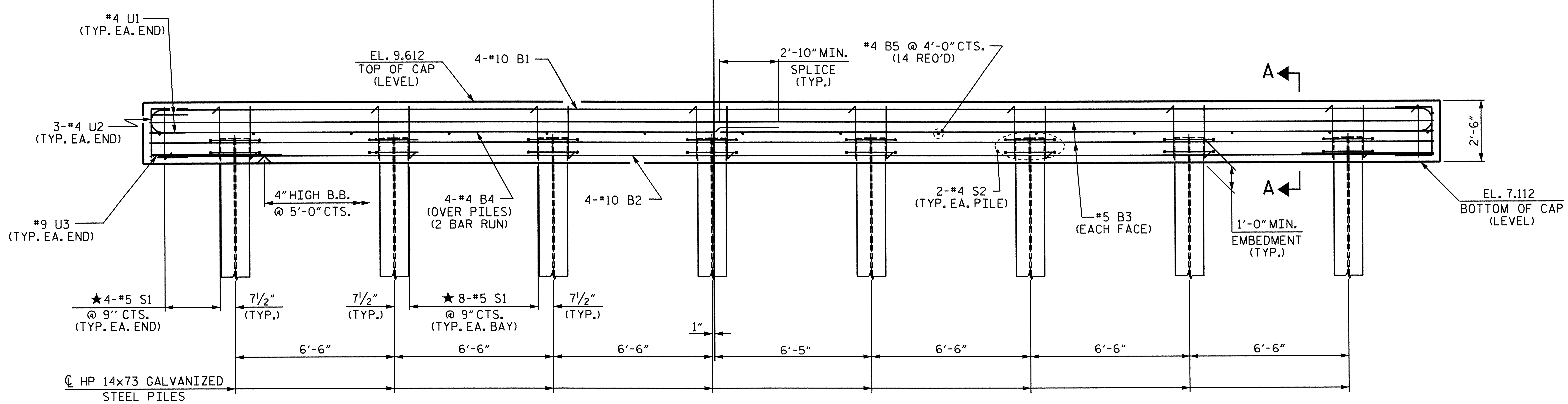
END BENT 1

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

NORTH CAROLINA PROFESSIONAL SEAL 24091 ENGINEER BUCK CHARLES HUNT
5/14/12



PLAN



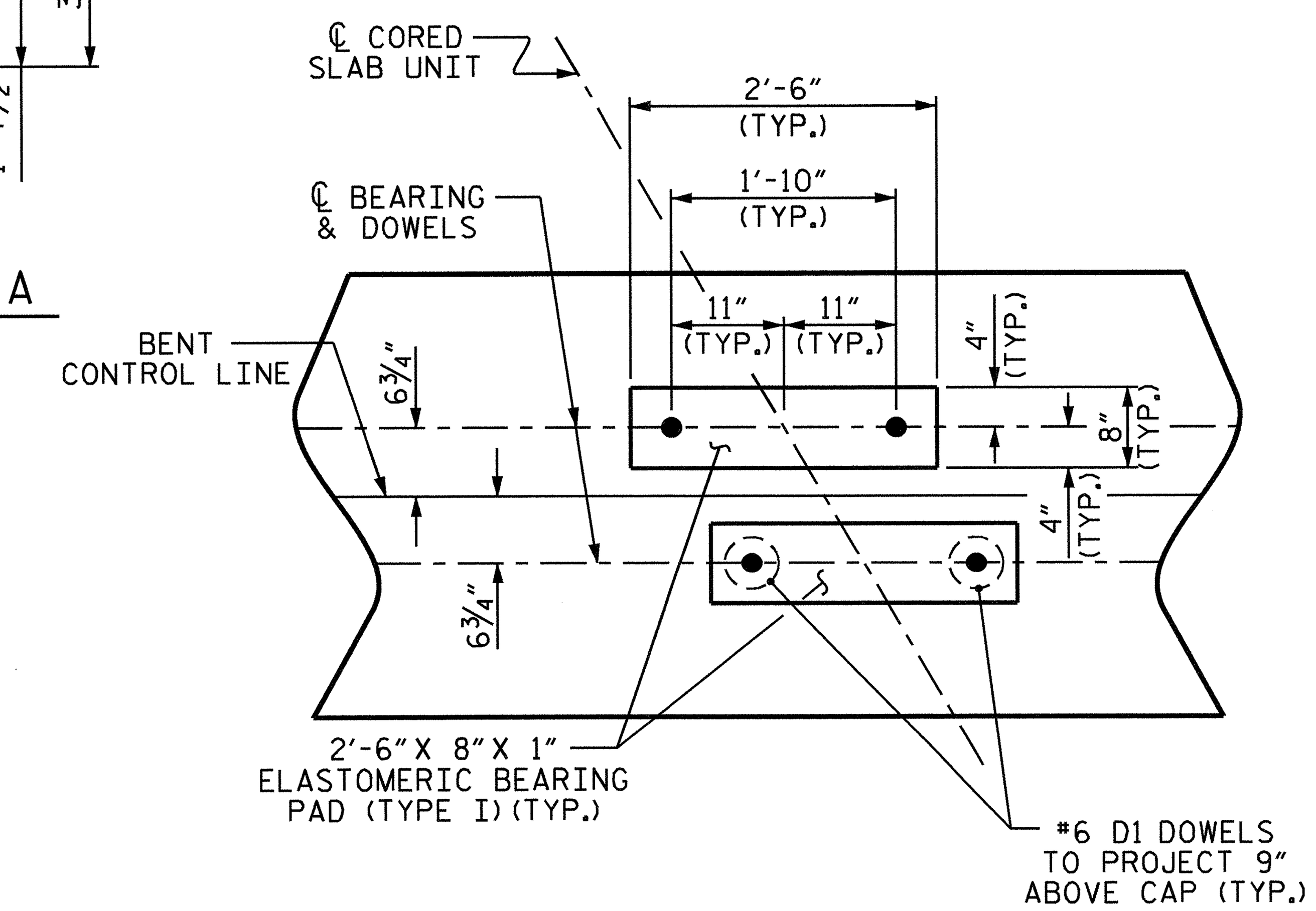
ELEVATION

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 30 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



DETAIL "A"

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL BUCY CHARLES HUNT 5/14/12

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

14-MAY-2012 09:27
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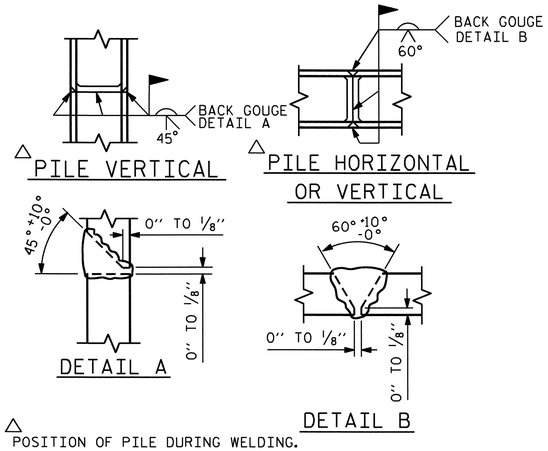
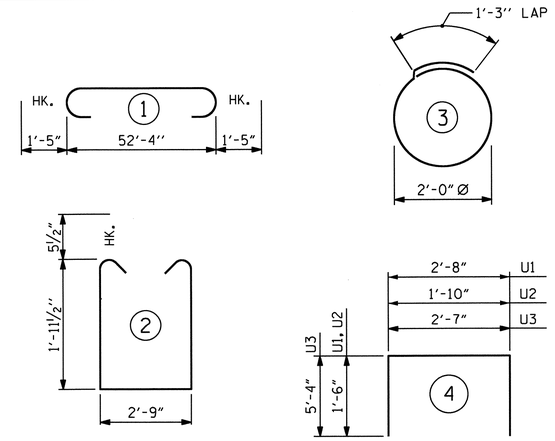


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



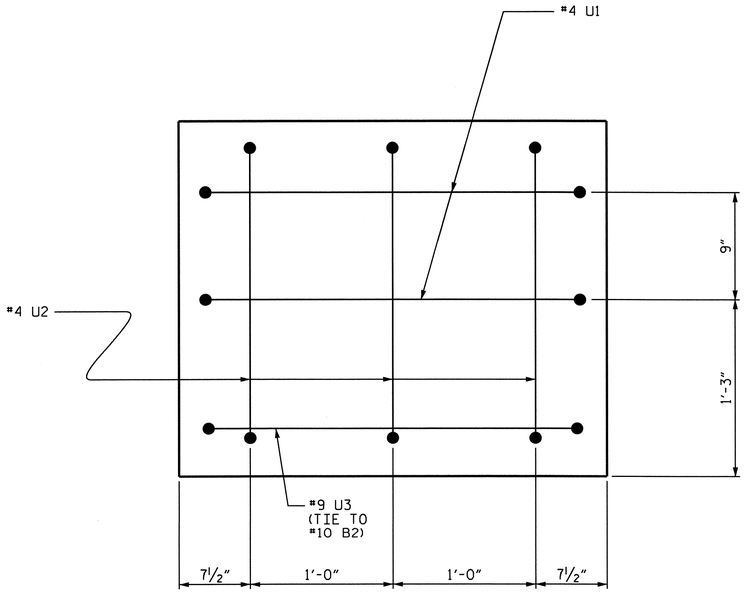
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

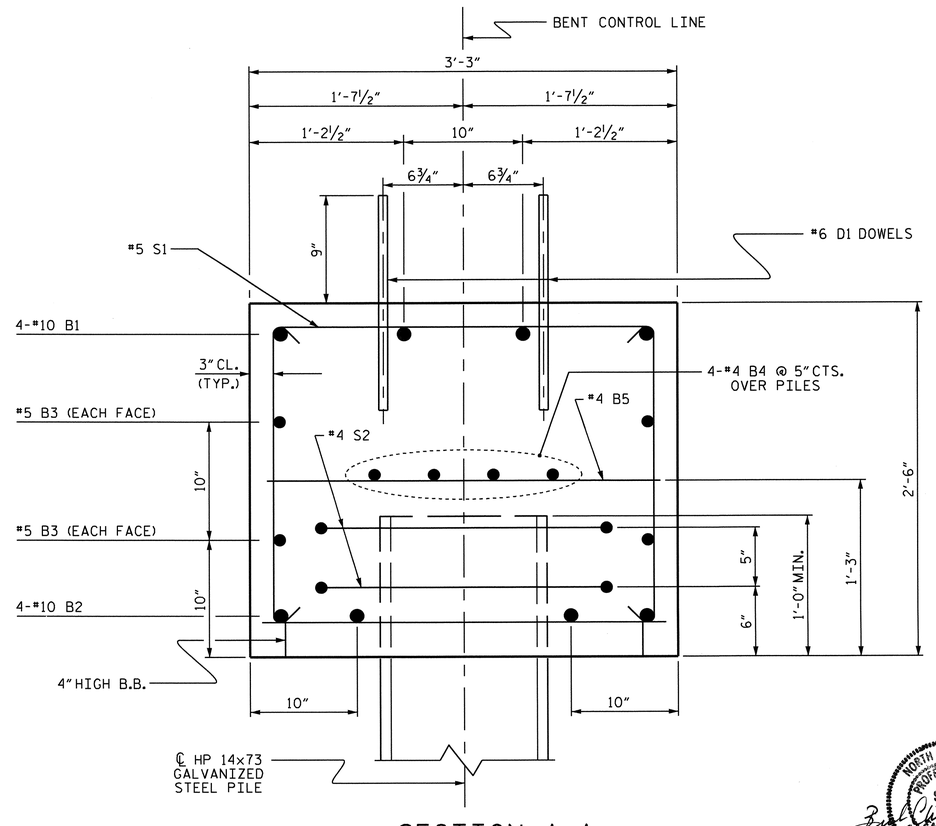
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	4	#10	1	55'-2"	950
✳ B2	4	#10	STR	52'-6"	904
✳ B3	4	#5	STR	52'-6"	219
✳ B4	8	#4	STR	27'-8"	148
✳ B5	14	#4	STR	2'-9"	26
✳ D1	56	#6	STR	1'-6"	126
✳ S1	64	#5	2	7'-7"	506
✳ S2	16	#4	3	7'-7"	81
✳ U1	4	#4	4	5'-8"	15
✳ U2	6	#4	4	4'-10"	19
✳ U3	2	#9	4	13'-3"	90

✳ EPOXY COATED REINFORCING STEEL	LBS.	3084
TOTAL CLASS AA CONCRETE	C.Y.	15.9
HP 14x73 GALVANIZED STEEL PILES NO. 8	LIN. FT.	640
STEEL PILE POINTS	EA.	8
PILE REDRIVES	EA.	4



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-A

NORTH CAROLINA PROFESSIONAL SEAL 11961 ENGINEER BUCKY CHARLES HUNT
5/14/12

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

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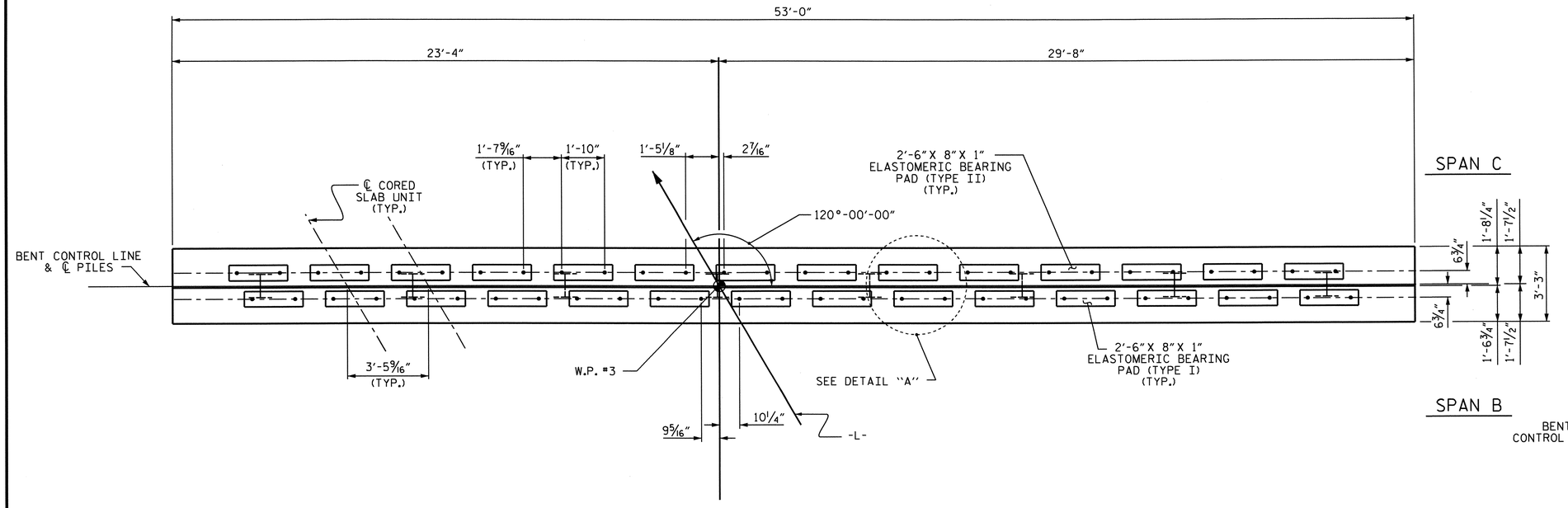
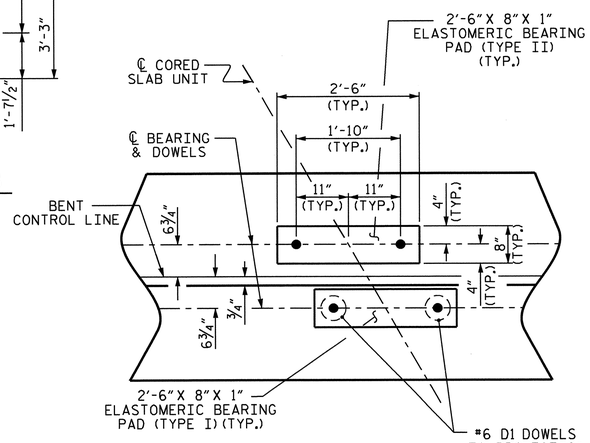
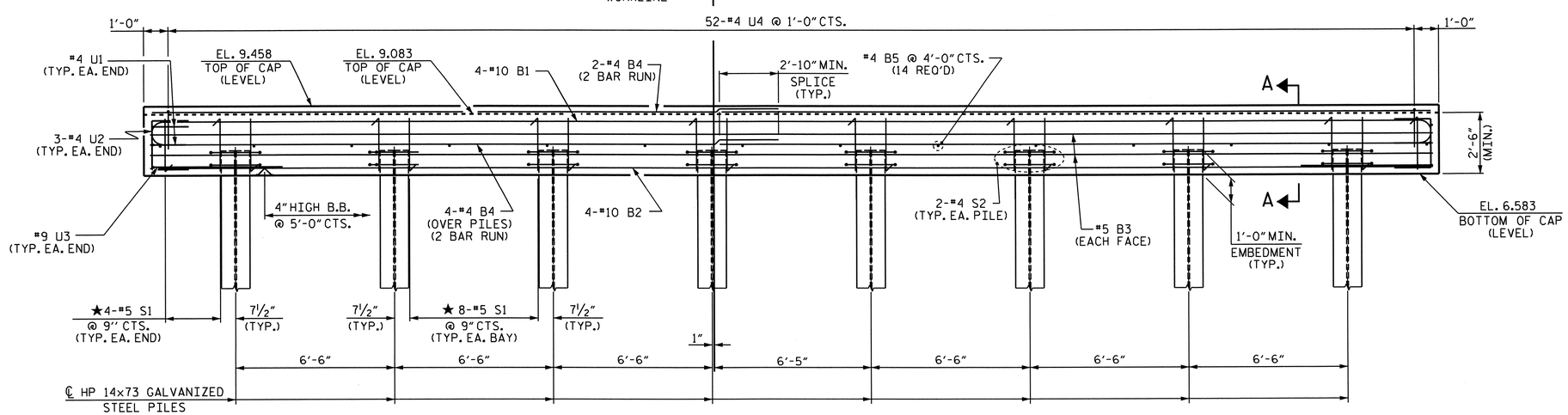


PLAN



DETAIL "A"



ELEVATION

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

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

NORTH CAROLINA PROFESSIONAL SEAL 040961 ENGINEER BILLY CHARLES HUNT

5/14/12

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

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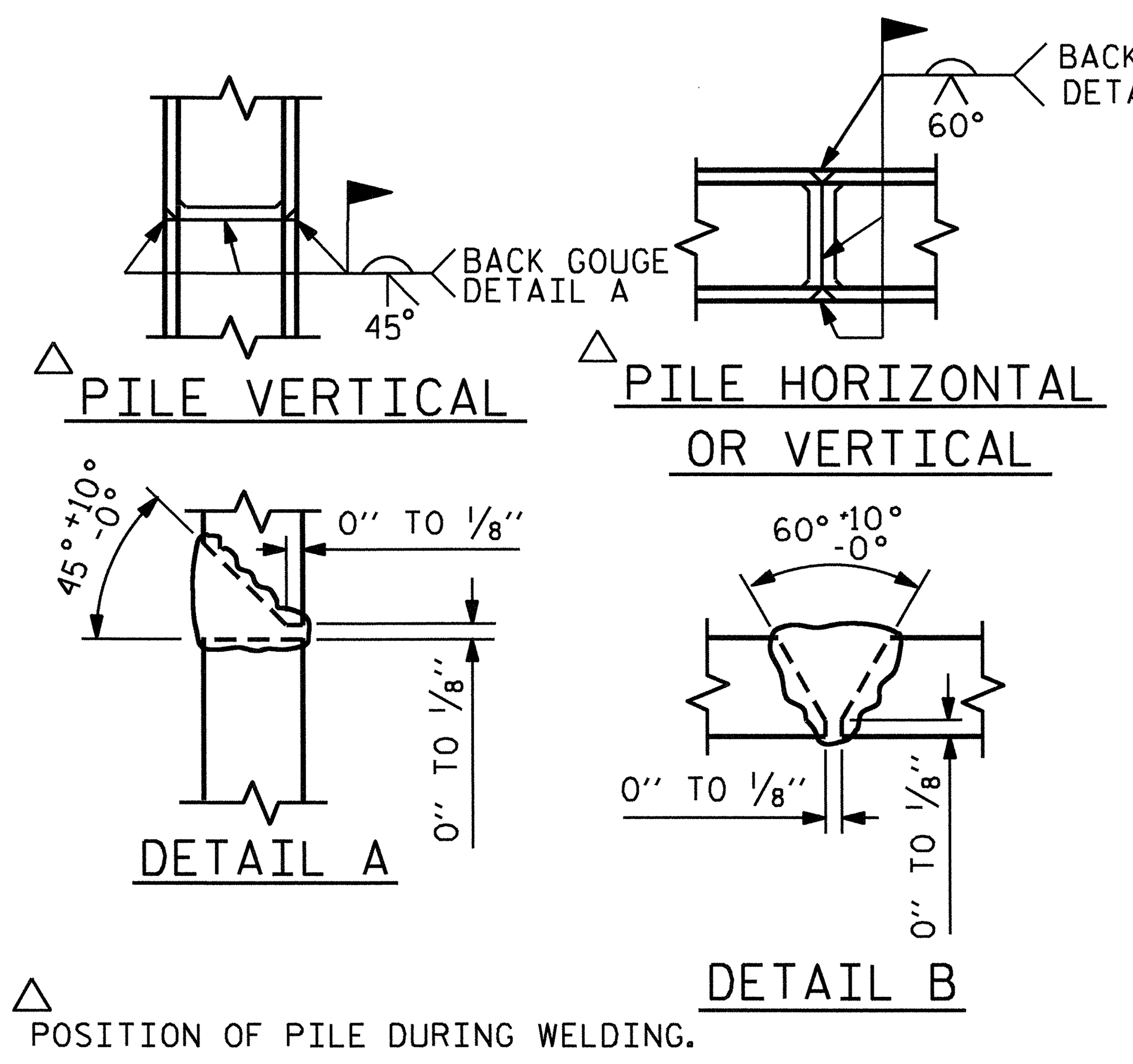
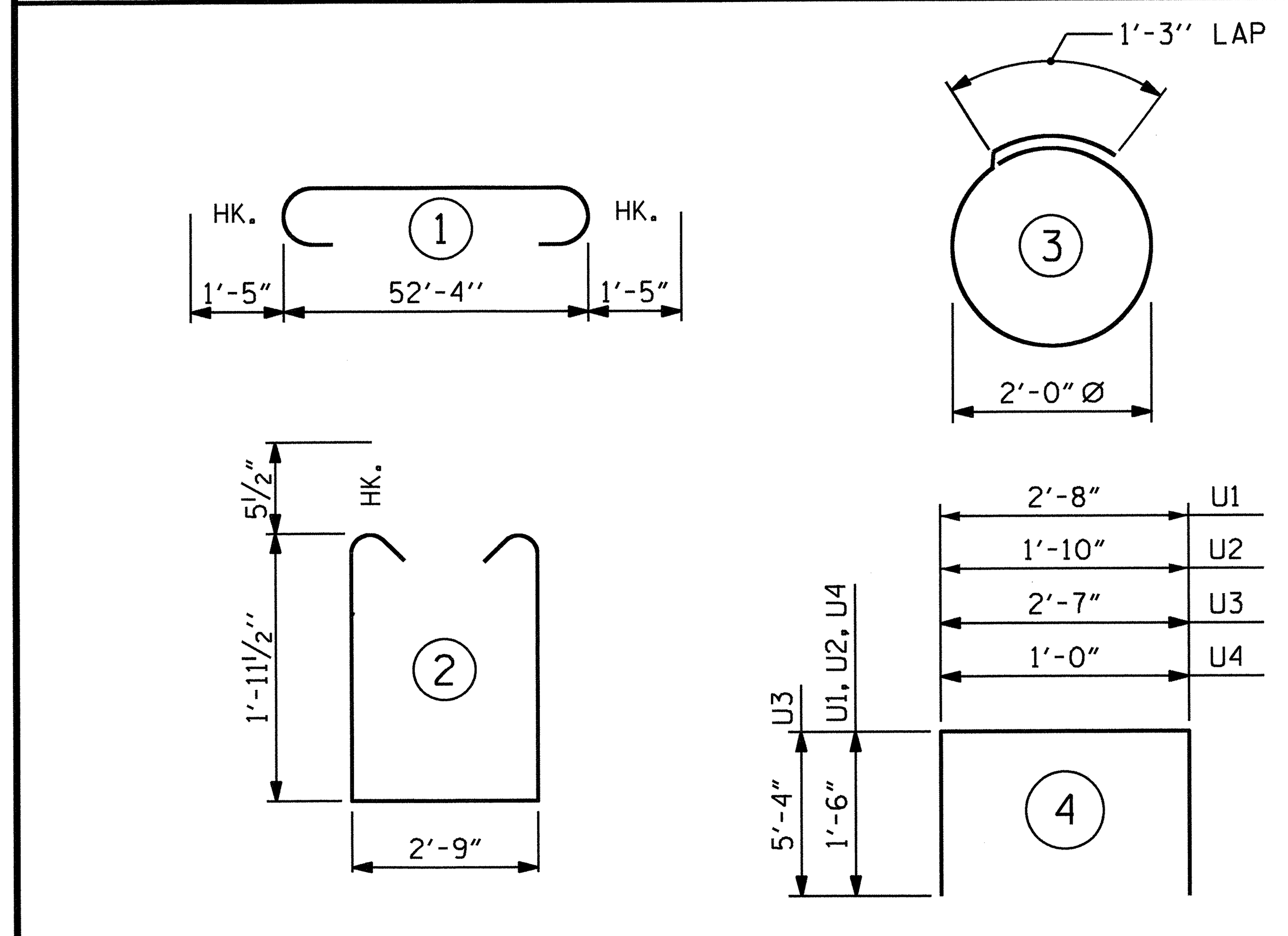
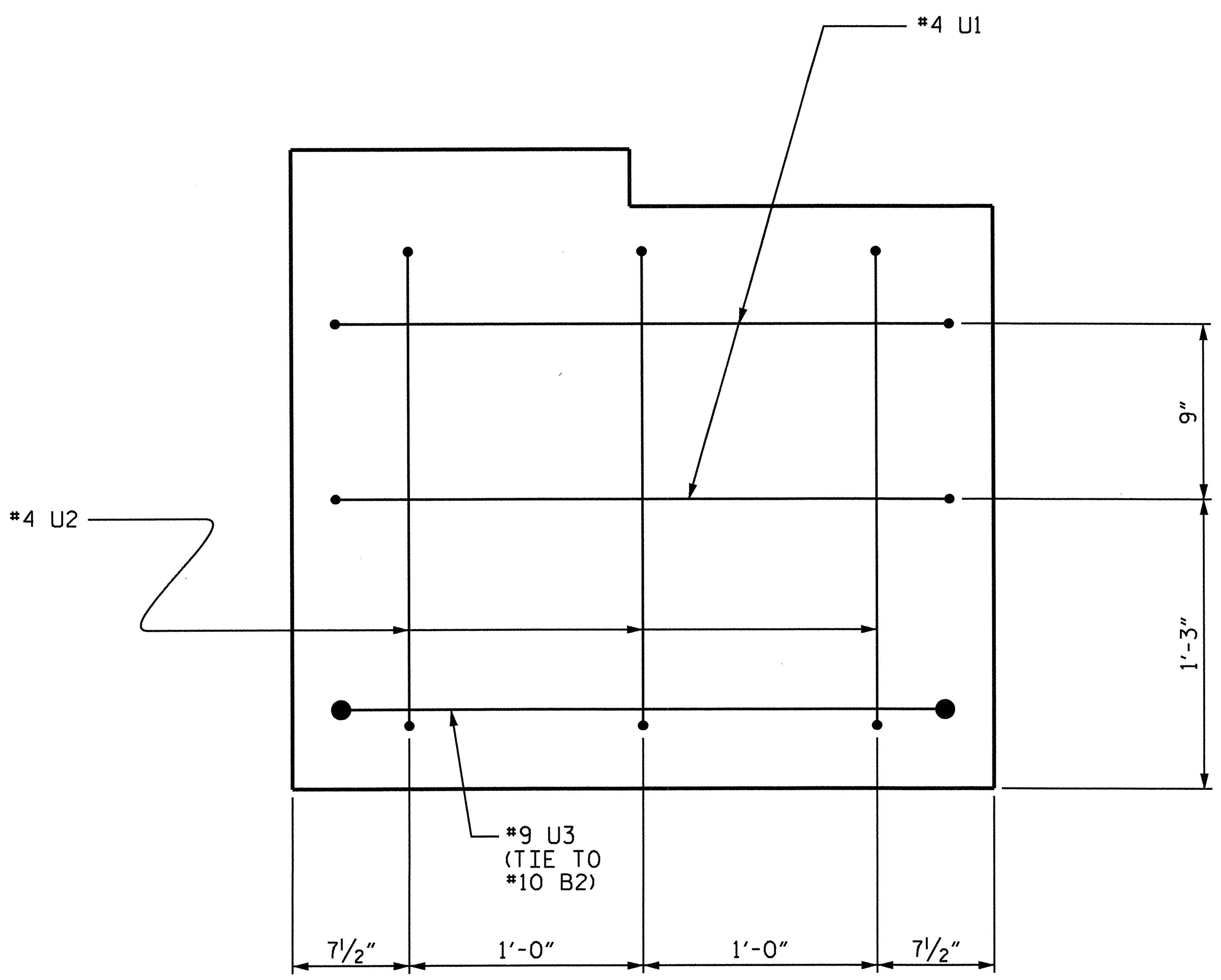


PILE SPLICE DETAILS

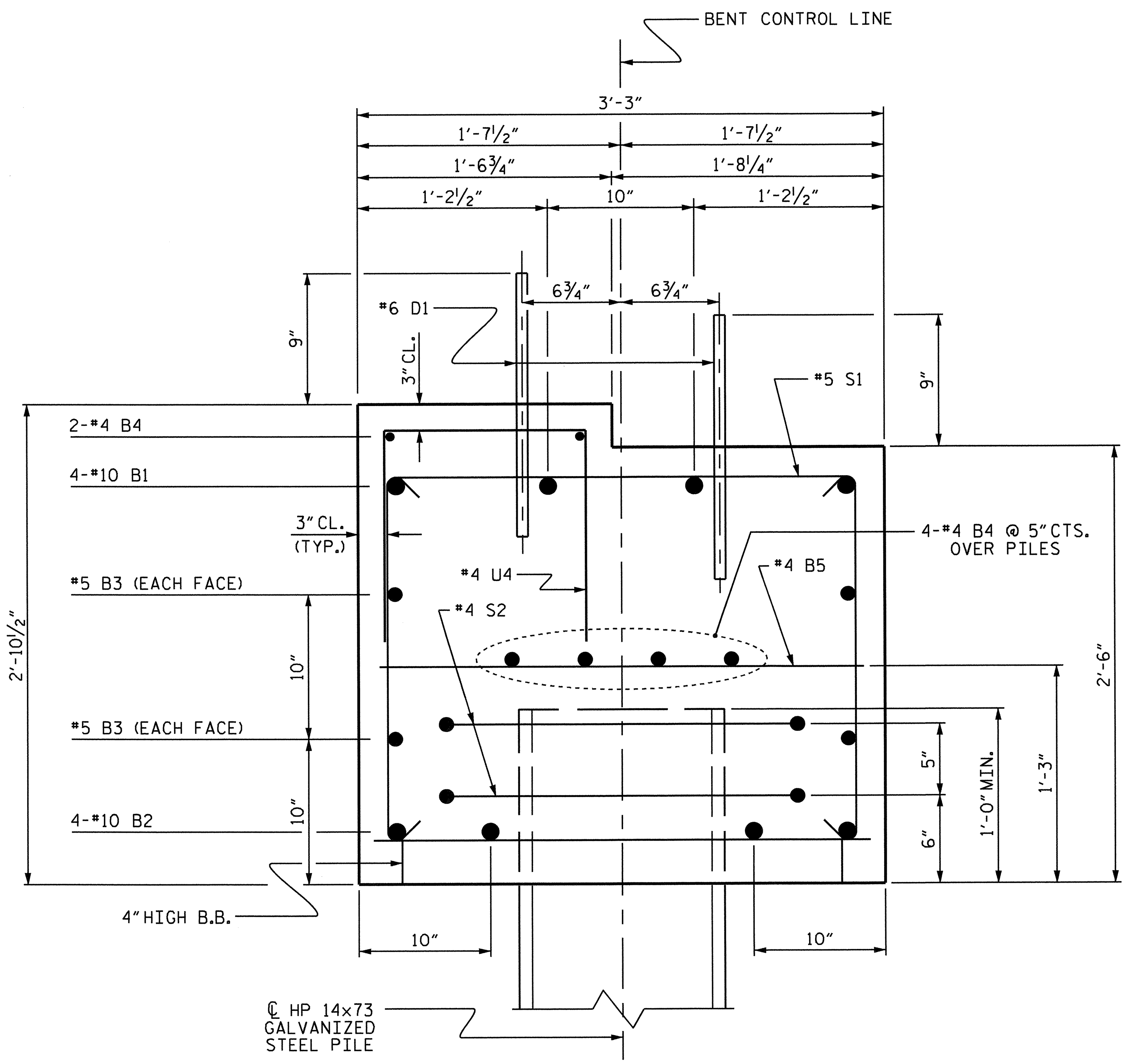


BILL OF MATERIAL					
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	4	#10	1	55'-2''	950
* B2	4	#10	STR	52'-6''	904
* B3	4	#5	STR	52'-6''	219
* B4	12	#4	STR	27'-8''	222
* B5	14	#4	STR	2'-9''	26
* D1	56	#6	STR	1'-6''	126
* S1	64	#5	2	7'-7''	506
* S2	16	#4	3	7'-7''	81
* U1	4	#4	4	5'-8''	15
* U2	6	#4	4	4'-10''	19
* U3	2	#9	4	13'-3''	90
* U4	52	#4	4	4'-0''	139
* EPOXY COATED REINFORCING STEEL				LBS.	3297
TOTAL CLASS AA CONCRETE				C.Y.	17.1
HP 14x73 GALVANIZED STEEL PILES NO. 8				LIN. FT.	640
STEEL PILE POINTS				EA.	8
PILE REDRIVES				EA.	4
PDA TESTING				EA.	1



END OF CAP VIEW

(SIMILAR BOTH ENDS)



SECTION A-A

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCY CHARLES HUNT
5/14/12

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

14-MAY-2012 09:27
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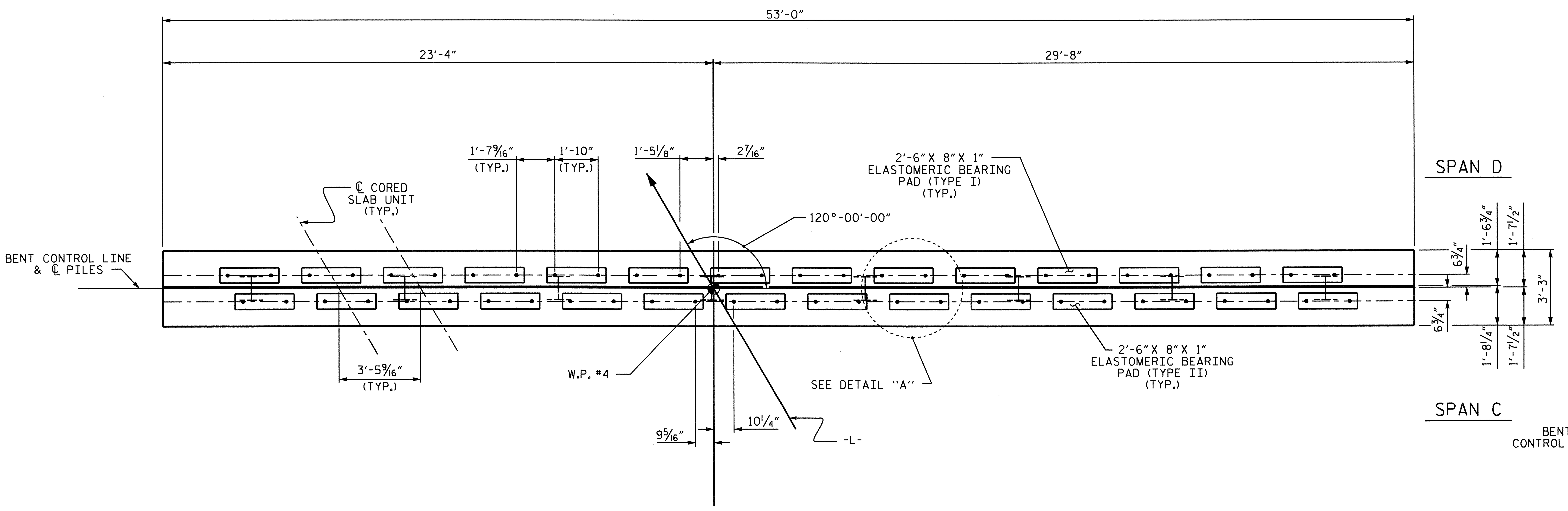
NOTES

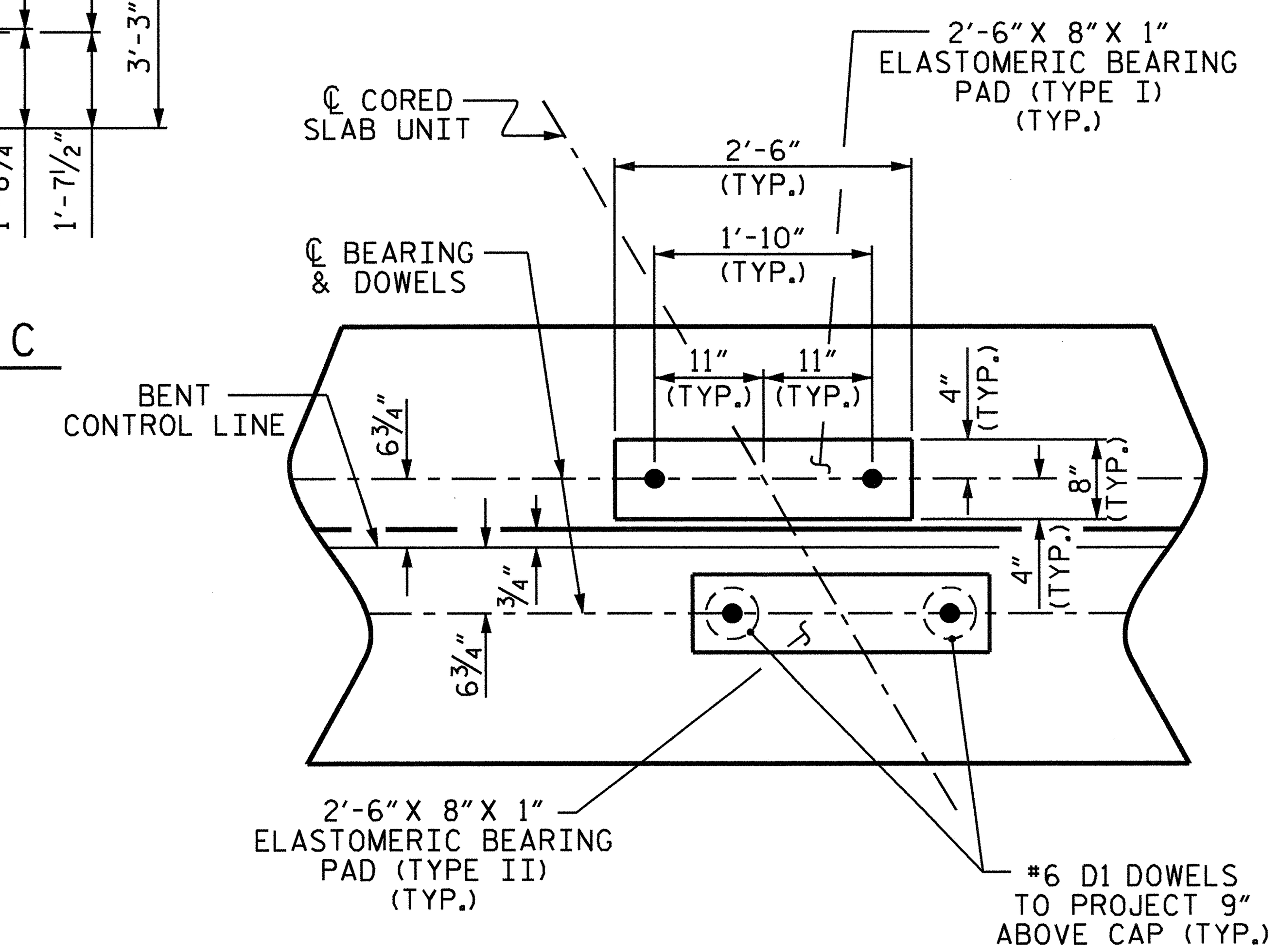
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

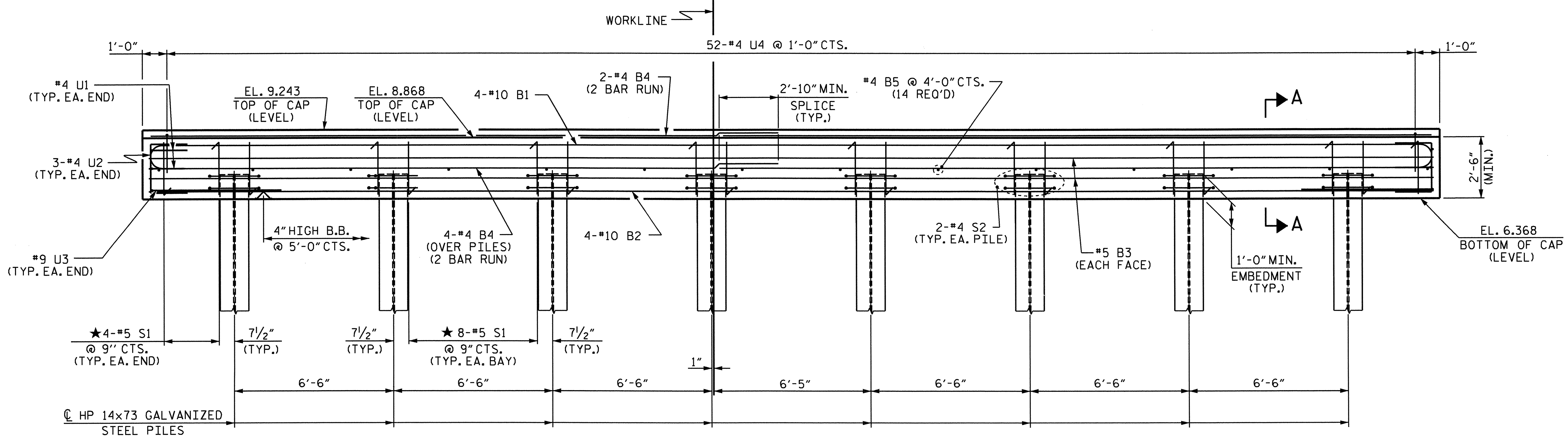
GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 40 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



PLAN



DETAIL "A"



ELEVATION

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 3

NORTH CAROLINA PROFESSIONAL SEAL 14094 ENGINEER BUCY CHARLES HUNT

5/14/12

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

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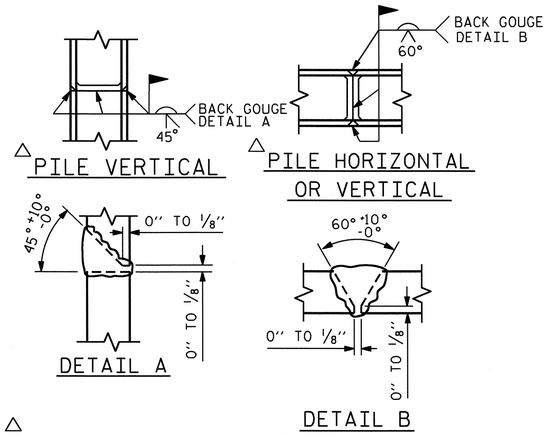
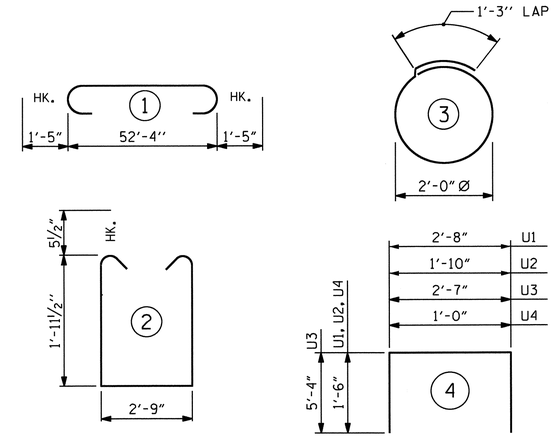


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



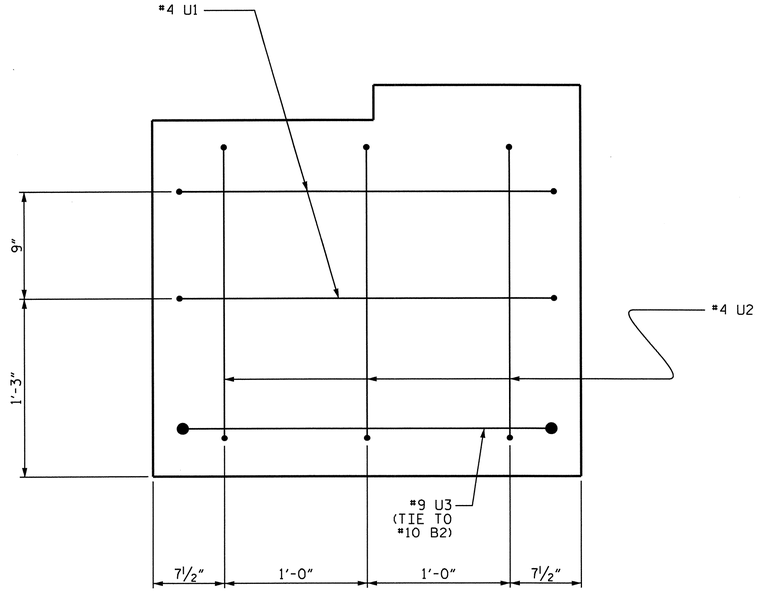
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 3

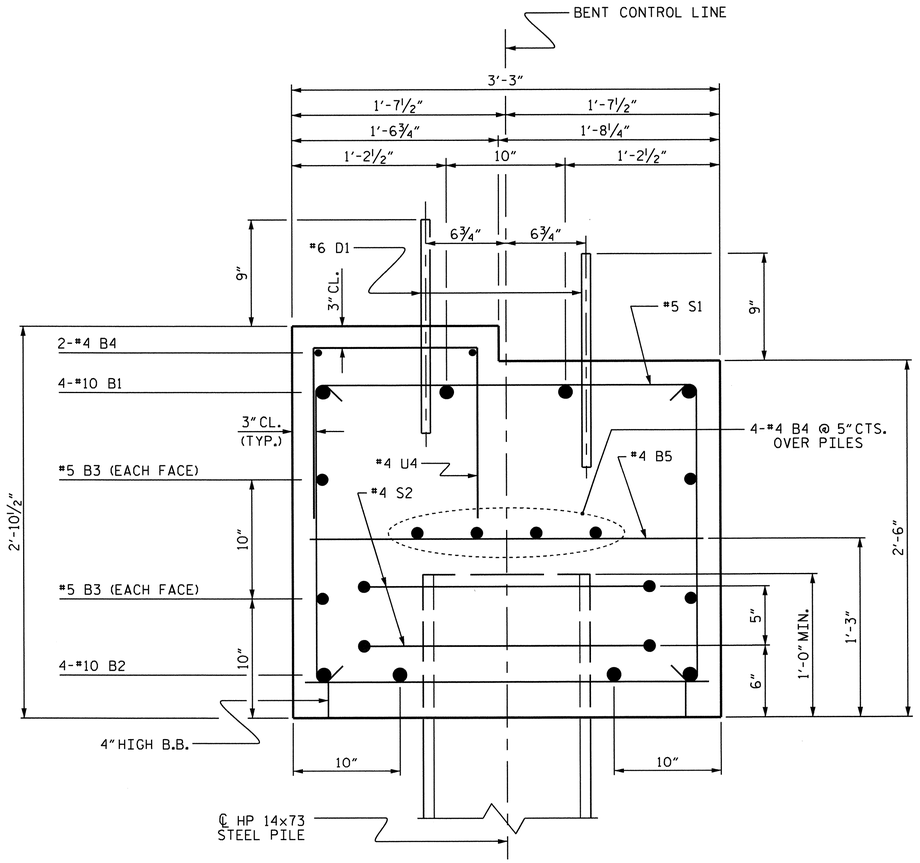
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	4	#10	1	55'-2"	950
* B2	4	#10	STR	52'-6"	904
* B3	4	#5	STR	52'-6"	219
* B4	12	#4	STR	27'-8"	222
* B5	14	#4	STR	2'-9"	26
* D1	56	#6	STR	1'-6"	126
* S1	64	#5	2	7'-7"	506
* S2	16	#4	3	7'-7"	81
* U1	4	#4	4	5'-8"	15
* U2	6	#4	4	4'-10"	19
* U3	2	#9	4	13'-3"	90
* U4	52	#4	4	4'-0"	139

* EPOXY COATED REINFORCING STEEL	LBS.	3297
TOTAL CLASS AA CONCRETE	C.Y.	17.1
HP 14x73 GALVANIZED STEEL PILES NO. 8	LIN. FT.	640
STEEL PILE POINTS	EA.	8
PILE REDRIVES	EA.	4



END OF CAP VIEW

(SIMILAR BOTH ENDS)



SECTION A-A

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 3

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

14-MAY-2012 09:27
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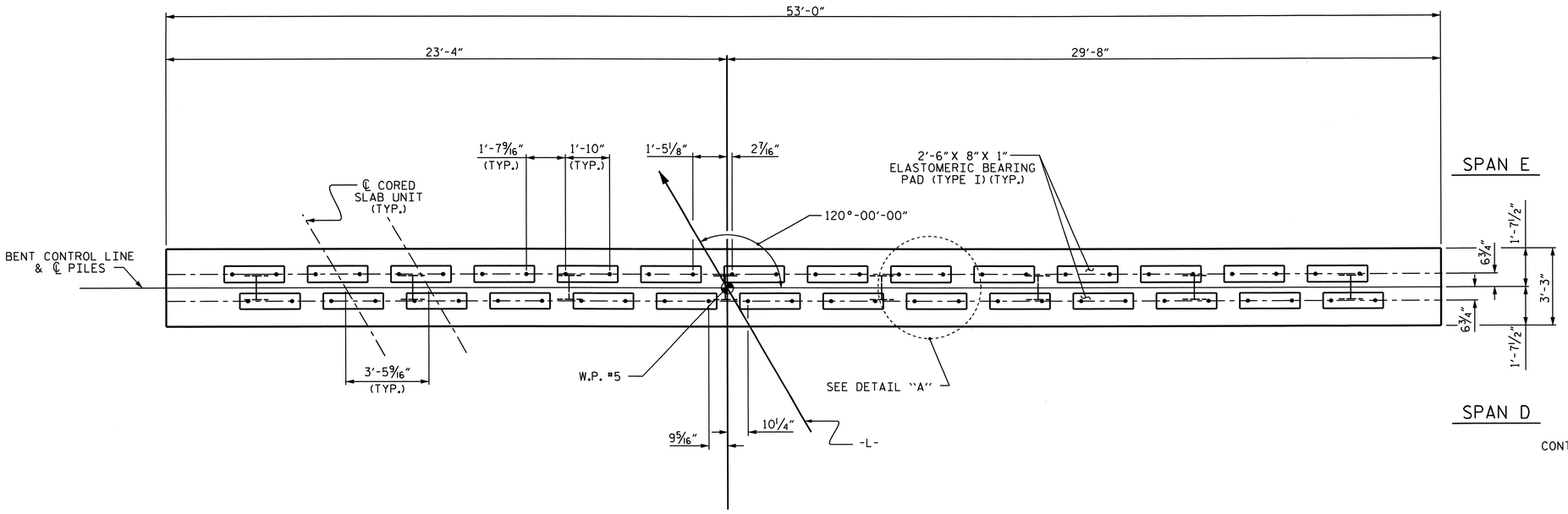
NOTES

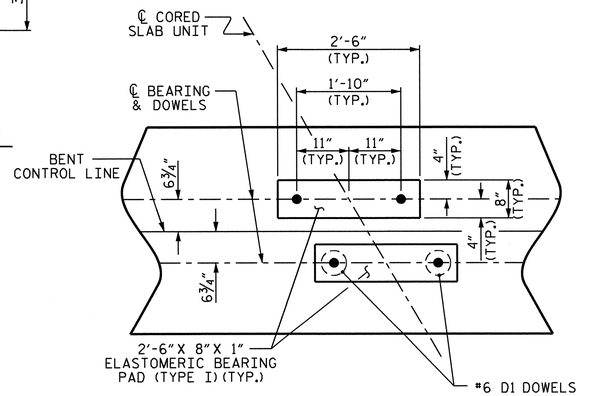
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

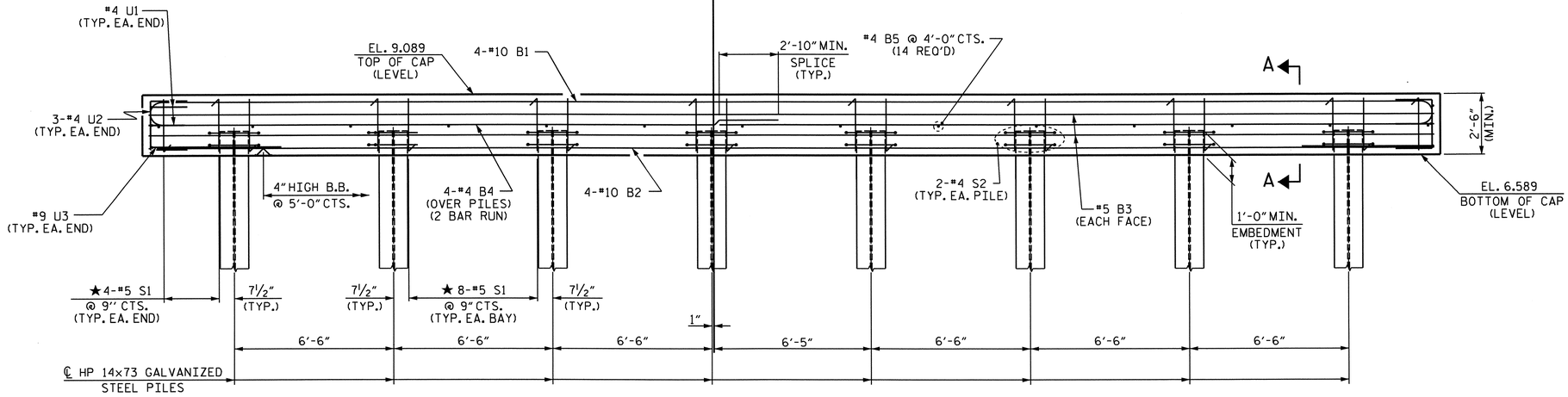
GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 30 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



PLAN



DETAIL "A"



ELEVATION

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 4

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

NORTH CAROLINA PROFESSIONAL SEAL 4109 ENGINEER BUCK CHARLES HUNT

5/14/12

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

14-MAY-2012 09:27
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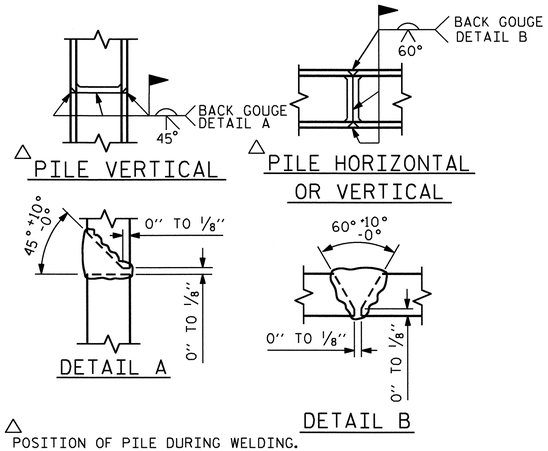
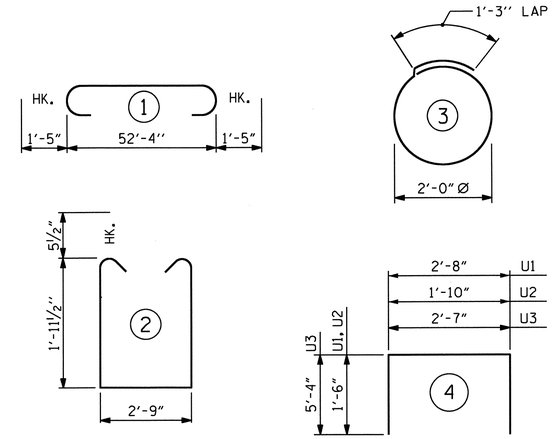


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



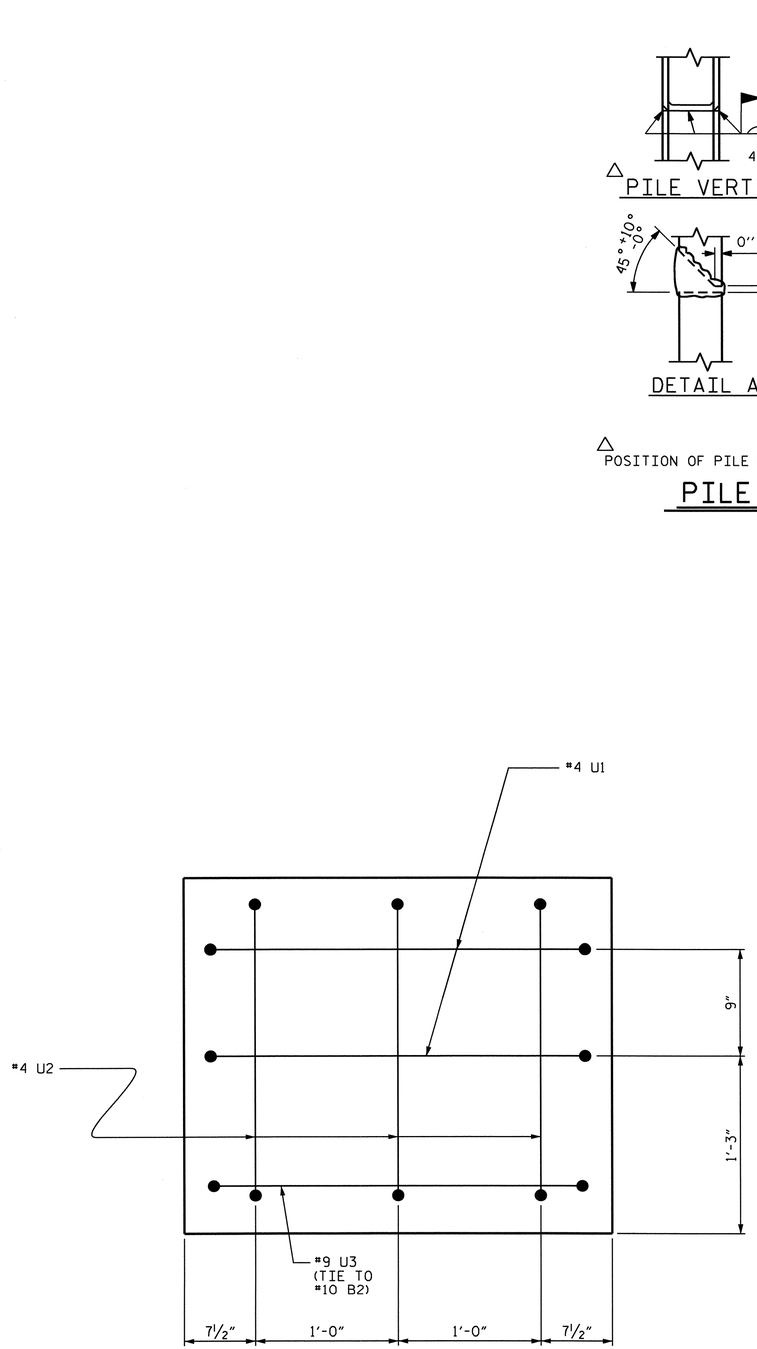
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 4

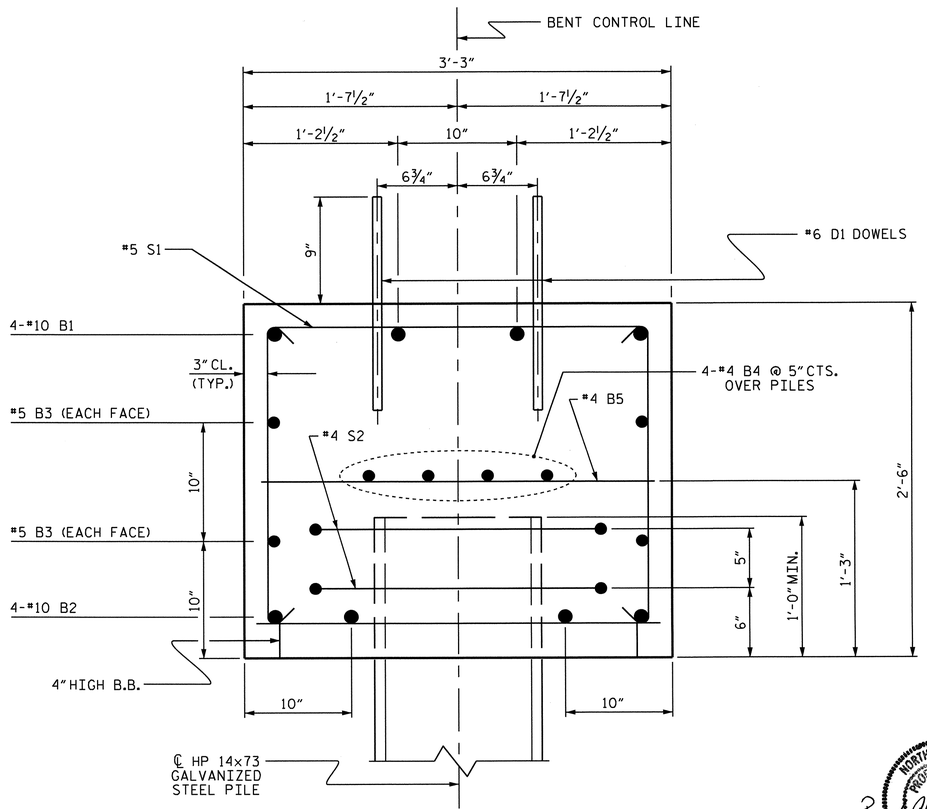
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	4	#10	1	55'-2"	950
✱ B2	4	#10	STR	52'-6"	904
✱ B3	4	#5	STR	52'-6"	219
✱ B4	8	#4	STR	27'-8"	148
✱ B5	14	#4	STR	2'-9"	26
✱ D1	56	#6	STR	1'-6"	126
✱ S1	64	#5	2	7'-7"	506
✱ S2	16	#4	3	7'-7"	81
✱ U1	4	#4	4	5'-8"	15
✱ U2	6	#4	4	4'-10"	19
✱ U3	2	#9	4	13'-3"	90

✱ EPOXY COATED REINFORCING STEEL	LBS.	3084
TOTAL CLASS AA CONCRETE	C.Y.	15.9
HP 14x73 GALVANIZED STEEL PILES NO. 8	LIN. FT.	640
STEEL PILE POINTS	EA.	8
PILE REDRIVES	EA.	4
PDA TESTING	EA.	1



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-A

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 4

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

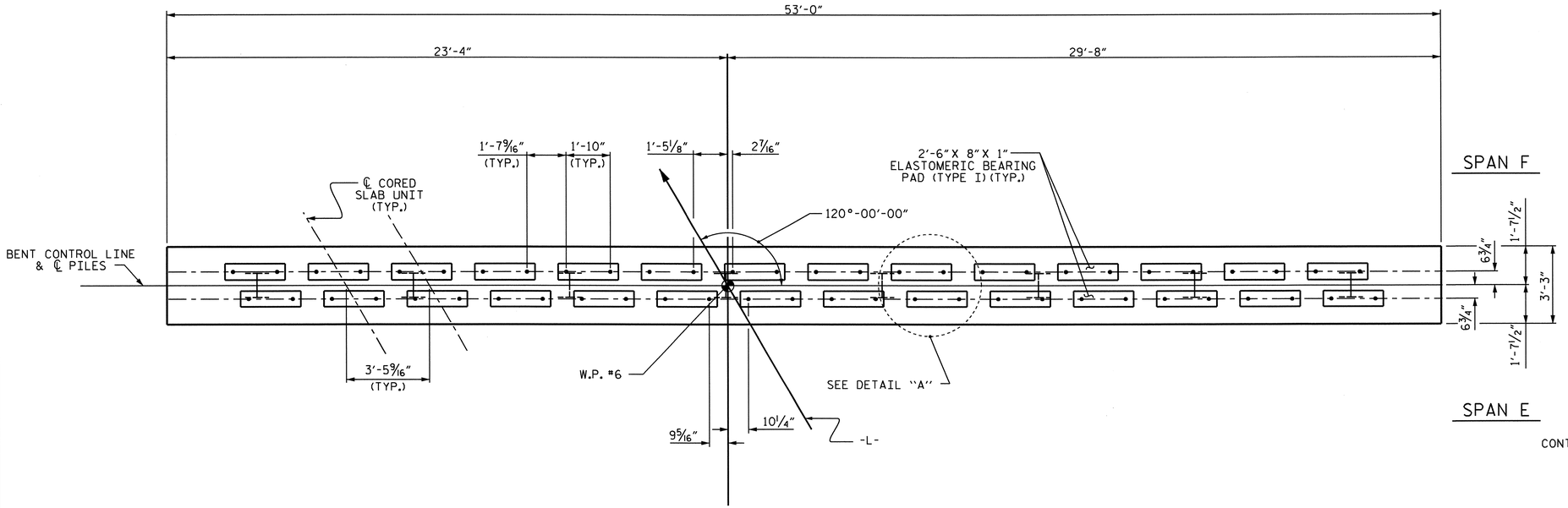
14-MAY-2012 09:27
R:\Structures\Plans\str1\B4488_SD_B*_01.dgn
lsutton

NOTES

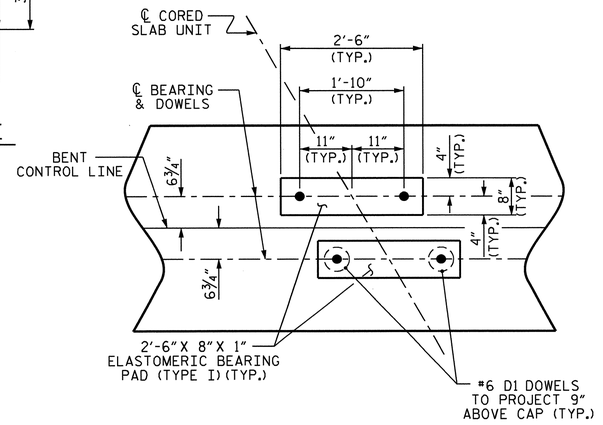
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

★ INVERT ALTERNATE STIRRUPS.

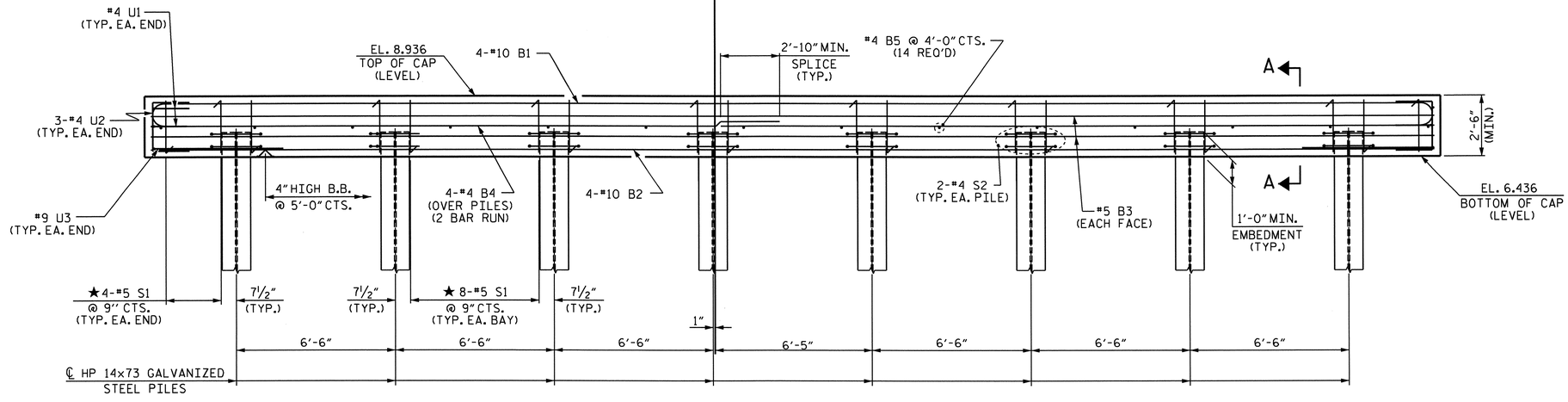
GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 30 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



PLAN



DETAIL "A"



ELEVATION

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 5

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER DAVID CHARLES HUNT

5/14/12

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

14-MAY-2012 09:27
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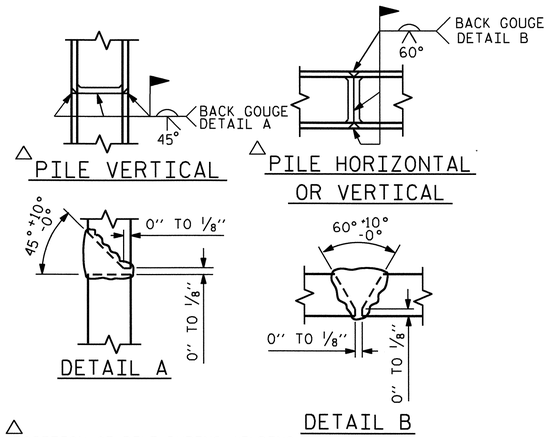
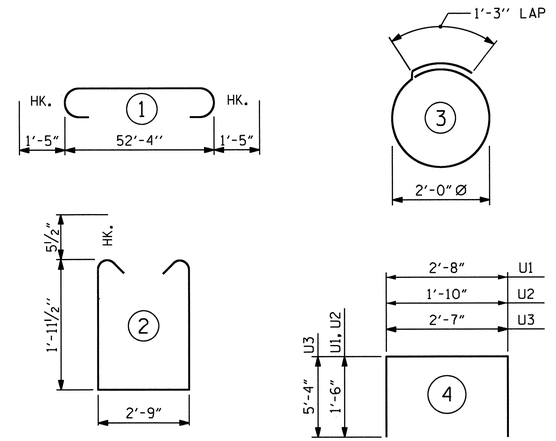
lsutton



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



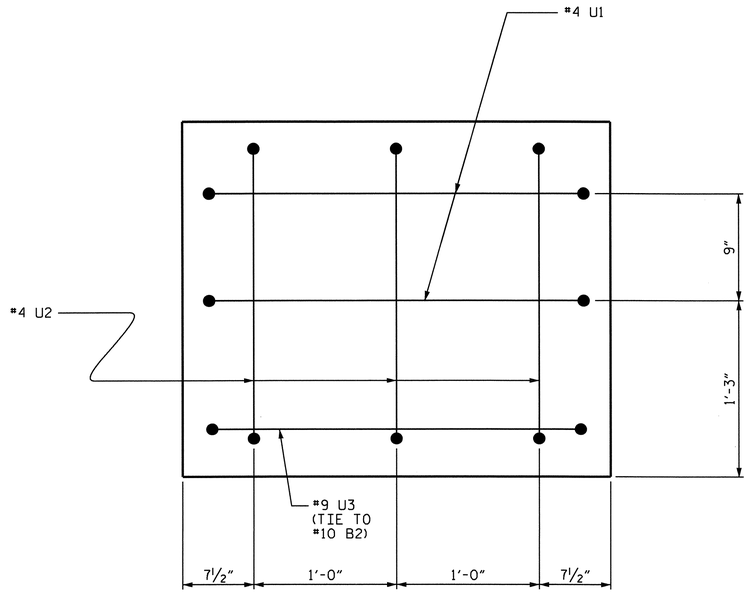
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 5

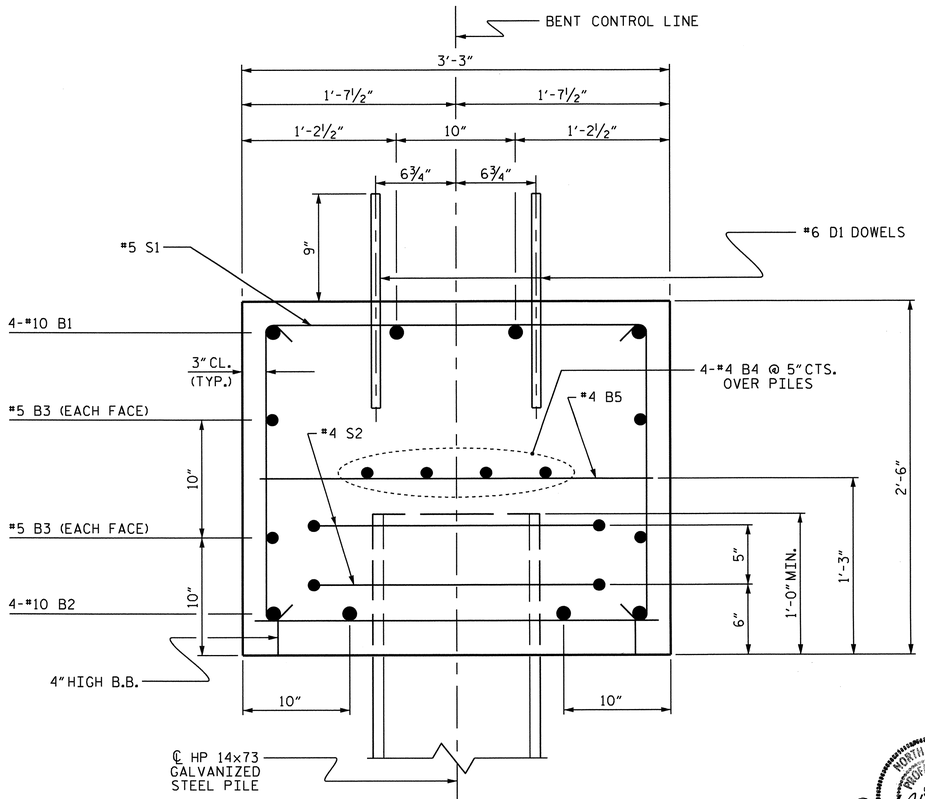
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	4	#10	1	55'-2"	950
* B2	4	#10	STR	52'-6"	904
* B3	4	#5	STR	52'-6"	219
* B4	8	#4	STR	27'-8"	148
* B5	14	#4	STR	2'-9"	26
* D1	56	#6	STR	1'-6"	126
* S1	64	#5	2	7'-7"	506
* S2	16	#4	3	7'-7"	81
* U1	4	#4	4	5'-8"	15
* U2	6	#4	4	4'-10"	19
* U3	2	#9	4	13'-3"	90

* EPOXY COATED REINFORCING STEEL	LBS.	3084
TOTAL CLASS AA CONCRETE	C.Y.	15.9
HP 14x73 GALVANIZED STEEL PILES NO. 8	LIN. FT.	640
STEEL PILE POINTS	EA.	8
PILE REDRIVES	EA.	4



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-L

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCKY CHARLES HUNT
5/14/12

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 5

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

DRAWN BY : B. L. GREEN DATE : 11/4/11
CHECKED BY : M. K. BEARD DATE : 11/8/11

14-MAY-2012 09:27
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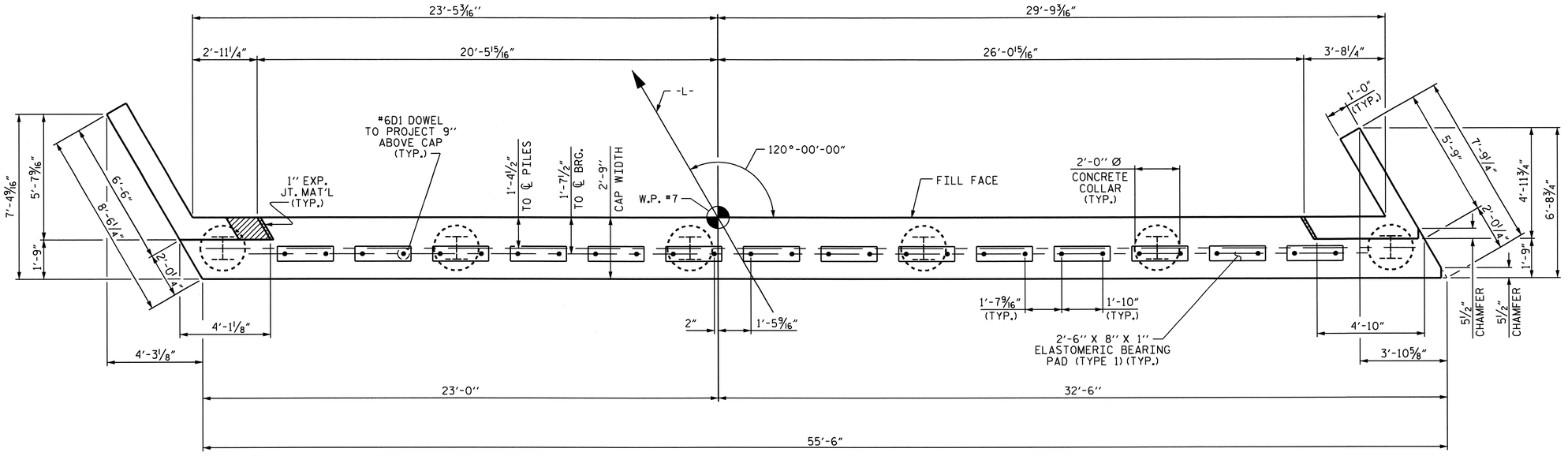
lsutton

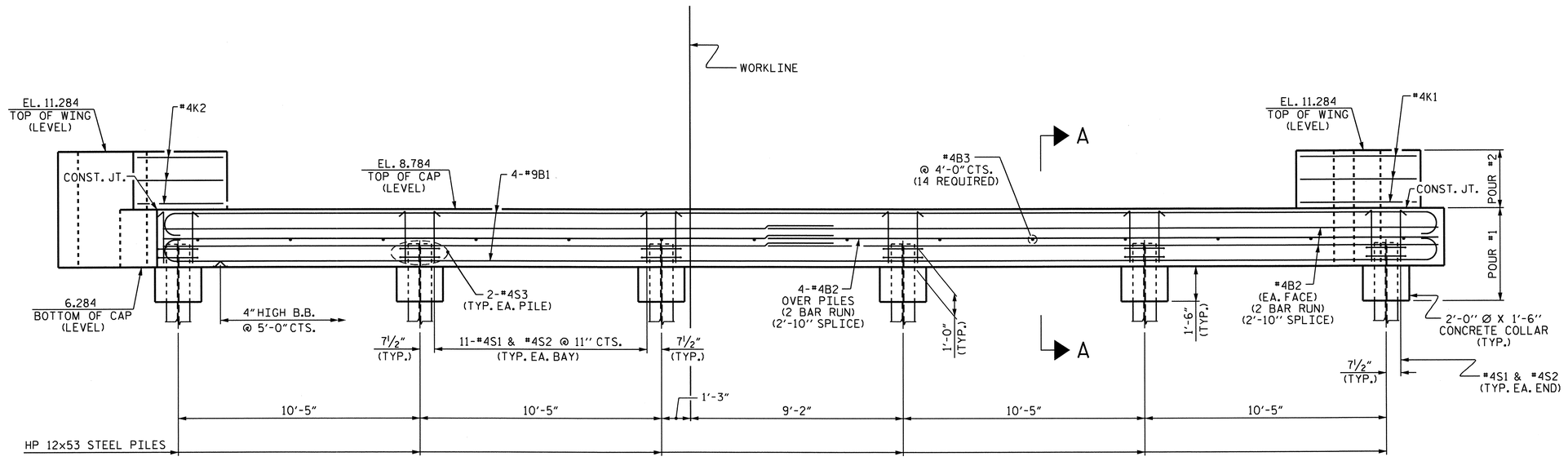
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER RUCKY CHARLES HUNT

5/14/12

DRAWN BY : B. L. GREEN DATE : 11/1/11
CHECKED BY : J. P. ADAMS DATE : 11/9/11

14-MAY-2012 09:27
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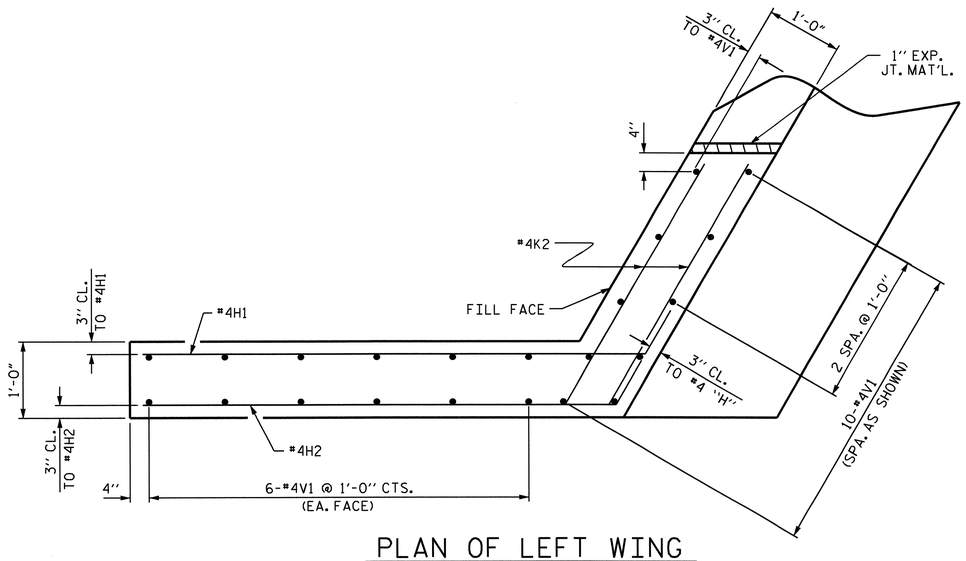
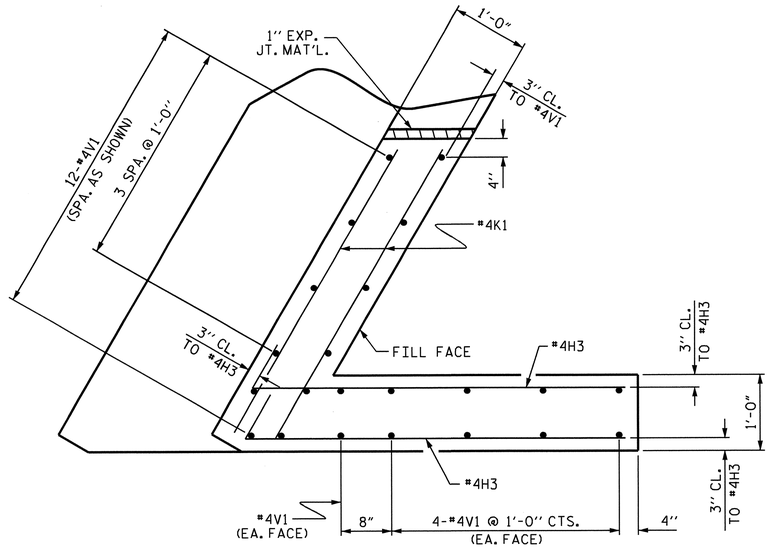
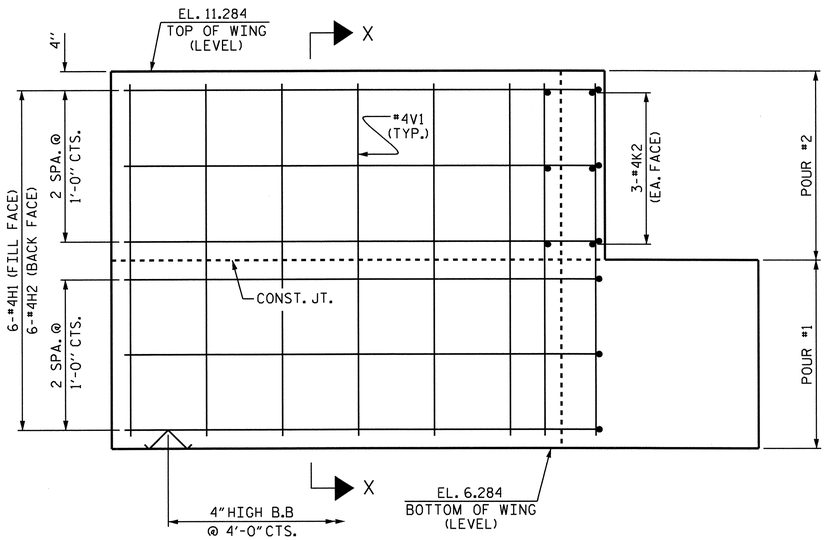
lsutton



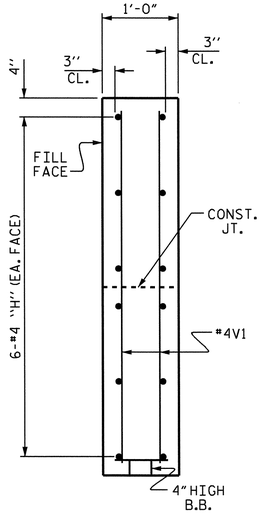
PLAN OF LEFT WING



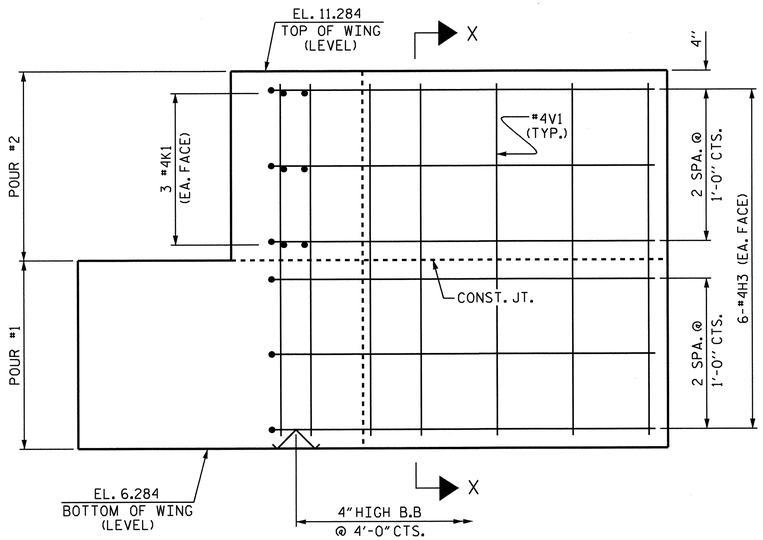
PLAN OF RIGHT WING



ELEVATION OF LEFT WING



SECTION X-X



ELEVATION OF RIGHT WING

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

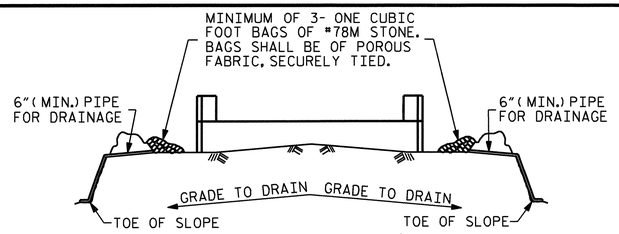
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			41

NORTH CAROLINA PROFESSIONAL SEAL 040961 ENGINEER BUCK CHARLES HUNT

5/14/12

DRAWN BY : B. L. GREEN DATE : 11/1/11
CHECKED BY : J. P. ADAMS DATE : 11/9/11

14-MAY-2012 09:27
R:\Structures\Plans\str1\B4488_SD_E*_01.dgn
lsutton

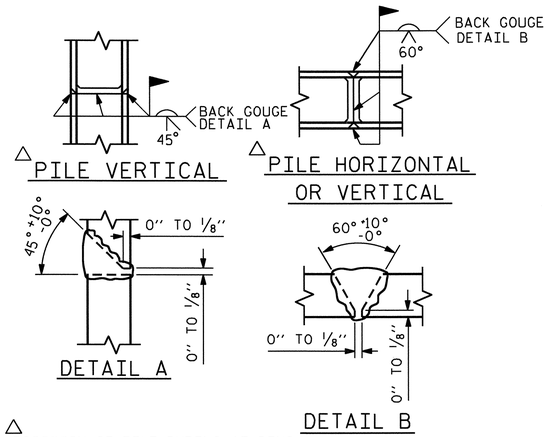


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

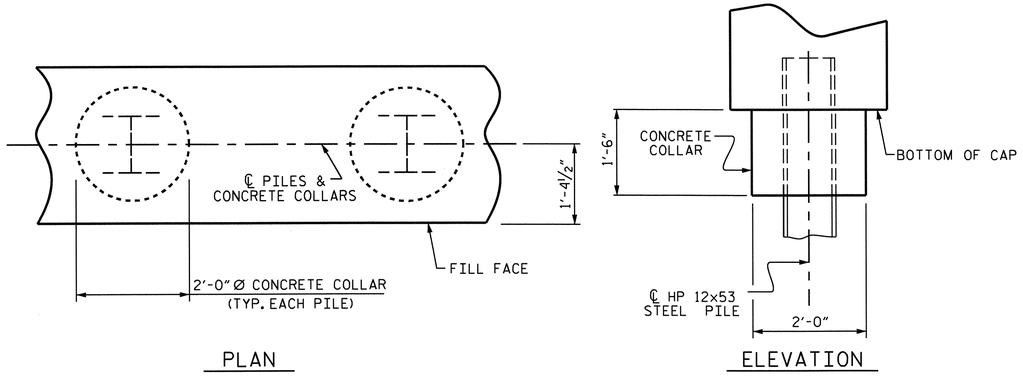
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

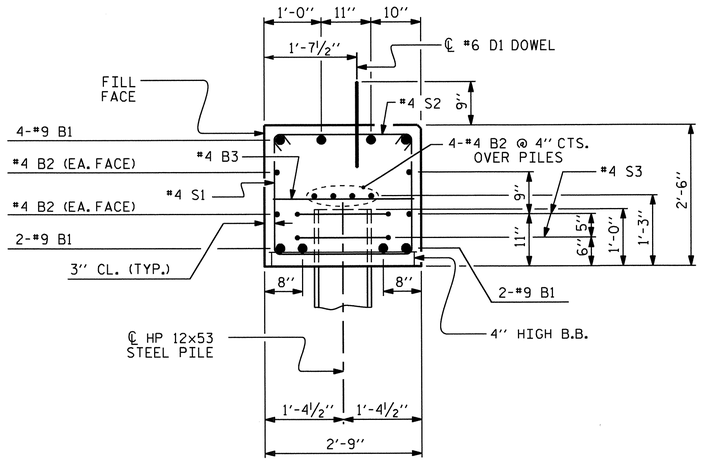


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



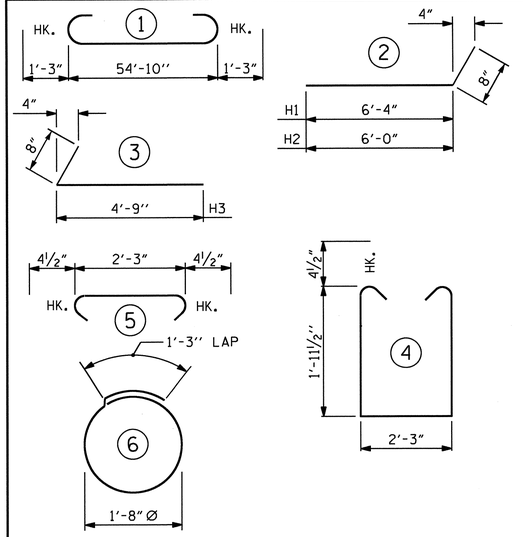
CORROSION PROTECTION FOR STEEL PILES DETAIL



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	8	#9	1	57'-4"	1559
✱ B2	16	#4	STR	28'-11"	309
✱ B3	14	#4	STR	2'-3"	21
✱ D1	28	#6	STR	1'-6"	63
✱ H1	6	#4	2	7'-0"	28
✱ H2	6	#4	2	6'-8"	27
✱ H3	12	#4	3	5'-5"	43
✱ K1	6	#4	STR	4'-3"	17
✱ K2	6	#4	STR	3'-6"	14
✱ S1	57	#4	4	6'-11"	263
✱ S2	57	#4	5	3'-0"	114
✱ S3	12	#4	6	6'-6"	52
✱ V1	44	#4	STR	4'-6"	132

✱ EPOXY COATED REINFORCING STEEL LBS. 2642

CLASS AA CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 16.1 C.Y.

POUR #2 UPPER PART OF WINGS 1.7 C.Y.

TOTAL CLASS AA CONCRETE 17.8 C.Y.

HP 12x53 STEEL PILES
NO: 6 LIN. FT.= 390

PILE REDRIVES 3 EA.

PDA TESTING 1 EA.

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

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

ASSEMBLED BY : B. L. GREEN	DATE : 11/1/11
CHECKED BY : J. P. ADAMS	DATE : 11/9/11
DRAWN BY : DGE 12/09	
CHECKED BY : MKT 01/10	

14-MAY-2012 09:27
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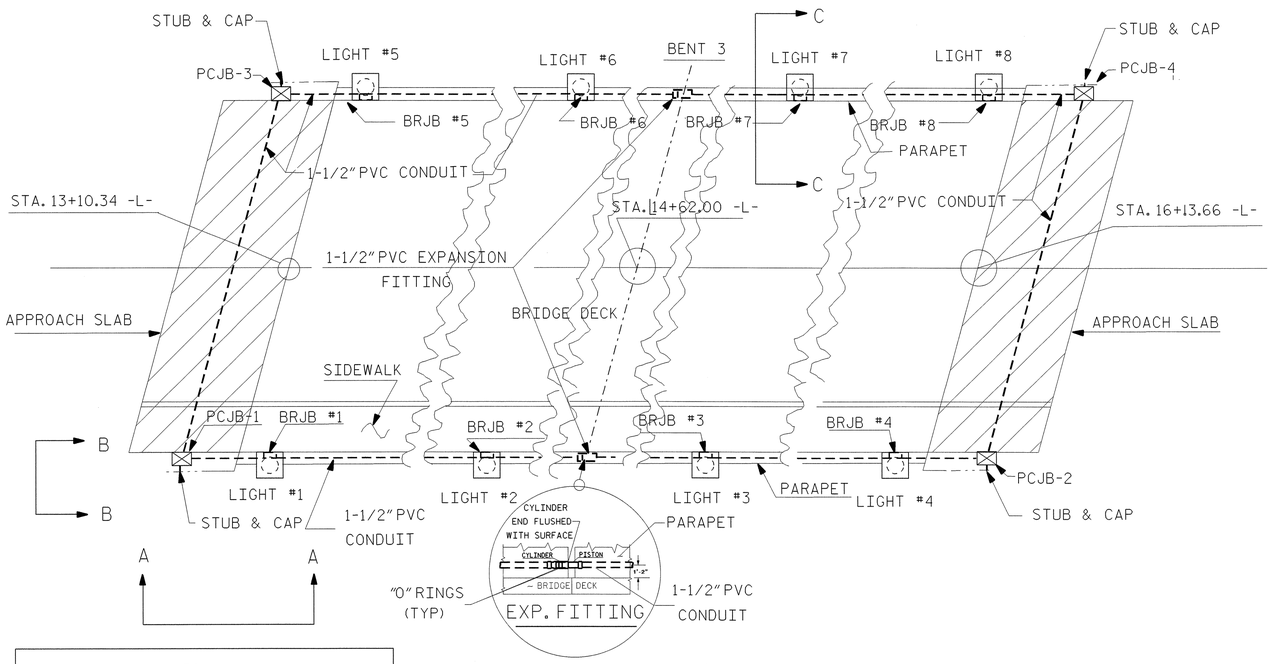
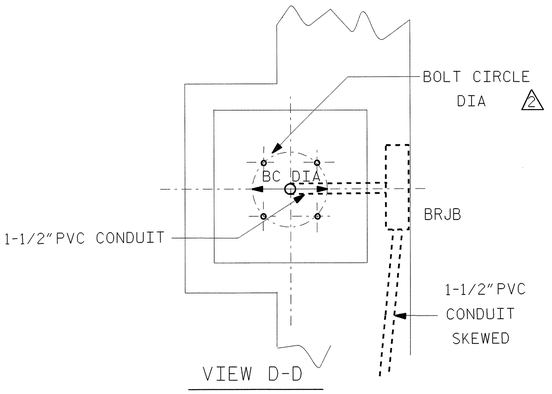
PROJECT REFERENCE NO.	SHEET NO.
B-4488	ECS_E-1

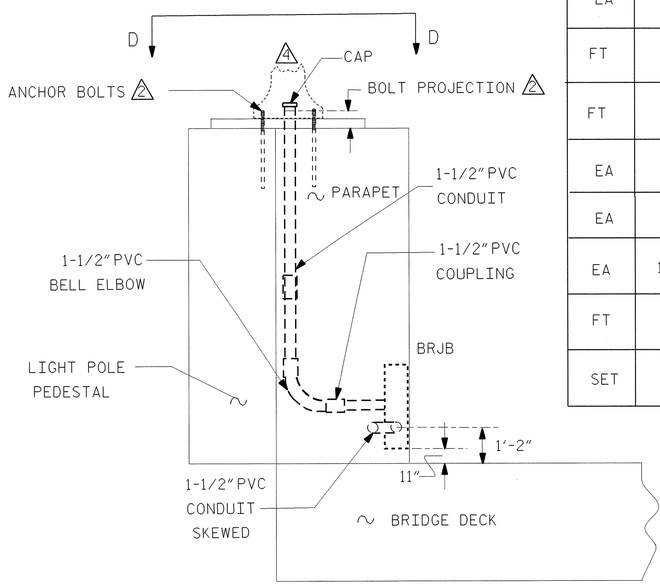
USE FOR ELECTRICAL CONDUIT SYSTEM ONLY



CONDUIT LAYOUT ⚠1



VIEW D-D



VIEW C-C

ESTIMATED BILL OF MATERIALS		
UNIT	ITEM	QNTY
EA	PCJB: 12"X11"X18" POLYMER CONCRETE JUNCTION BOX	4
EA	BRJB : 12"X12"X4" CAST IRON FLUSH MOUNT JUNCTION BOX	8
EA	PVC TO RGC CONDUIT 1-1/2" ADAPTER	4
EA	1-1/2" RGC CLOSE NIPPLE	4
EA	GALVANIZED IRON 1-1/2" LL CONDUIT BODY WITH COVER & GASKET	2
EA	GALVANIZED IRON 1-1/2" LR CONDUIT BODY WITH COVER & GASKET	2
EA	1-1/2" ERICKSON COUPLING	4
FT	1-1/2" RGC CONDUIT	24
FT	1-1/2" PVC CONDUIT	850
EA	1-1/2" PVC 90° BELL ELBOW	20
EA	1-1/2" PVC COUPLING	20
EA	1-1/2" PVC EXPANSION FITTINGS	2
FT	PULL LINE	1000
SET	POLE MANUFACTURER'S ANCHOR BOLT SET WITH 2 WASHERS & 2 NUTS PER BOLT	8

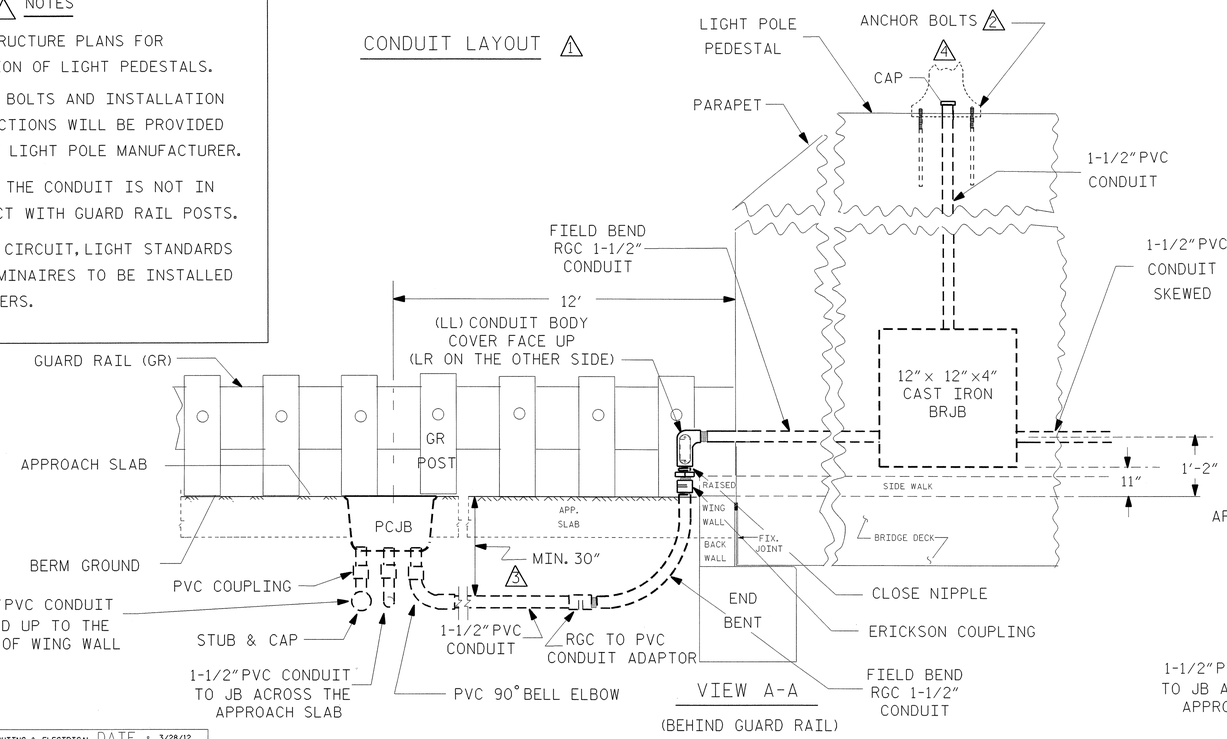
⚠ NOTES

⚠1 SEE STRUCTURE PLANS FOR LOCATION OF LIGHT PEDESTALS.

⚠2 ANCHOR BOLTS AND INSTALLATION INSTRUCTIONS WILL BE PROVIDED BY THE LIGHT POLE MANUFACTURER.

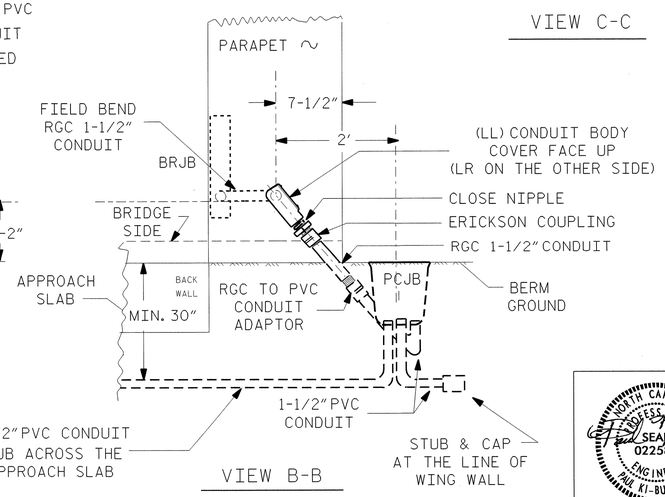
⚠3 ENSURE THE CONDUIT IS NOT IN CONFLICT WITH GUARD RAIL POSTS.

⚠4 FEEDER CIRCUIT, LIGHT STANDARDS AND LUMINAIRES TO BE INSTALLED BY OTHERS.



VIEW A-A

(BEHIND GUARD RAIL)



VIEW B-B

PROJECT NO. B-4488

CRAVEN COUNTY

14+62.00

SHEET 1 OF 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE 176 OVER SLOCUM CREEK ON 1763 BETWEEN SR 1757 AND SR 1753

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022582 PUI-KI-RUM CHAN 3-30-2012

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

DRAWN BY : SKS LIGHTING & ELECTRICAL DATE : 3/28/12

CHECKED BY : _____ DATE : _____

30-MAR-2012 10:06
sksaha RD214523

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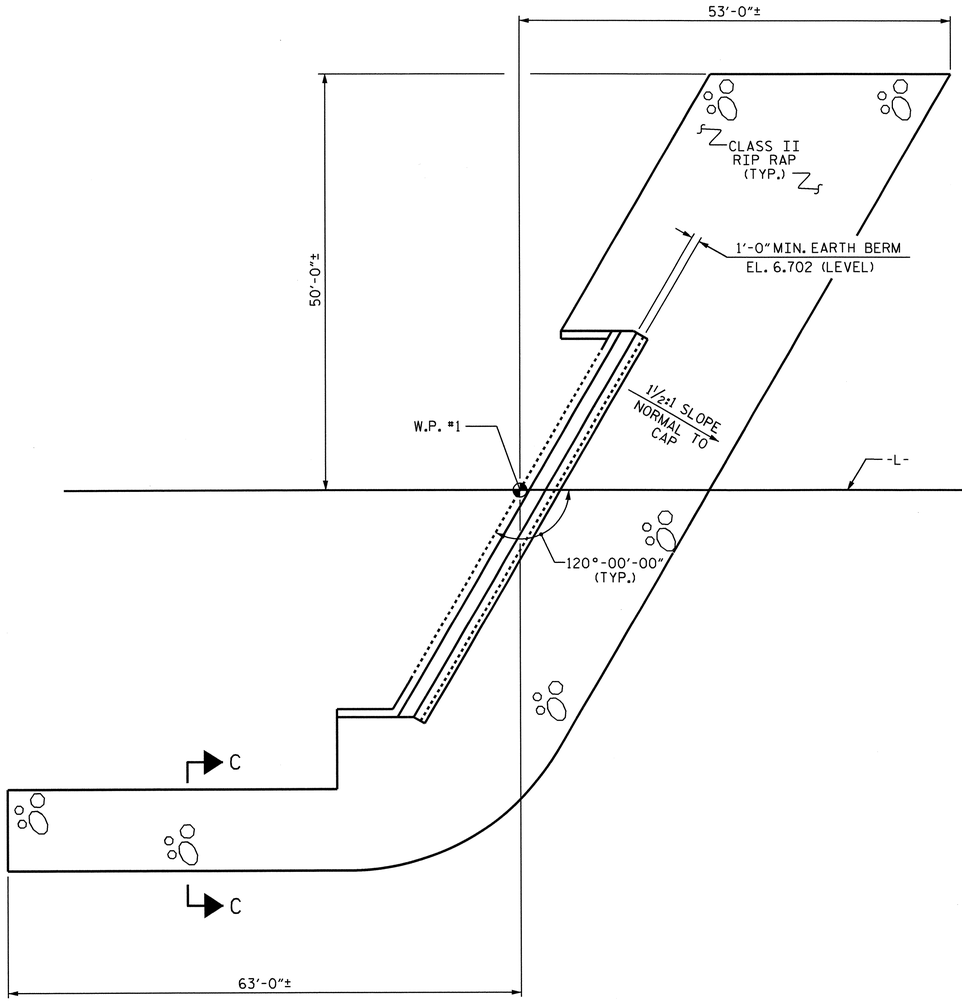
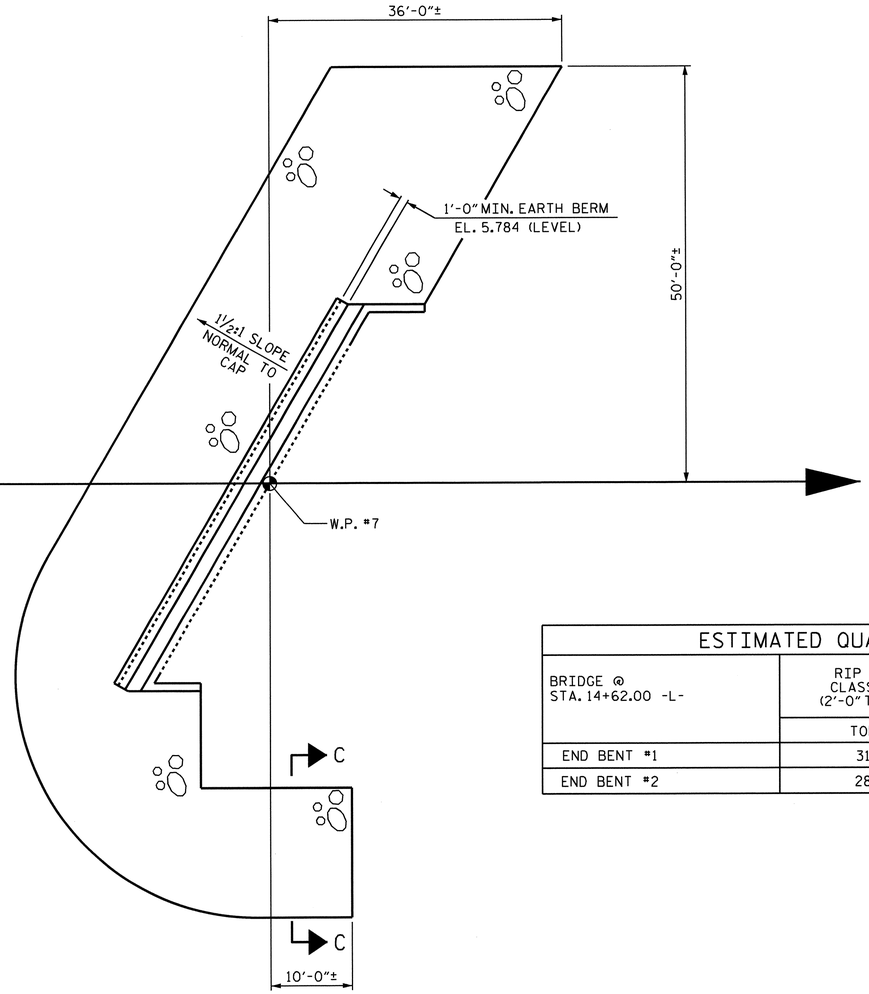


END BENT #1

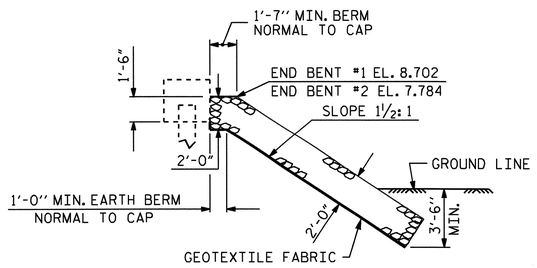


END BENT #2

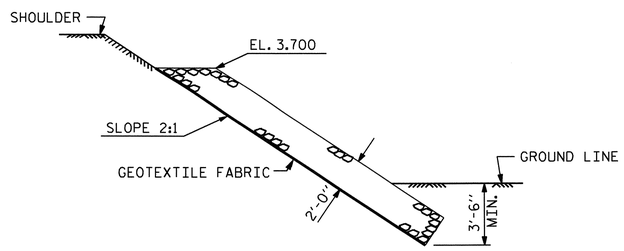
ESTIMATED QUANTITIES

BRIDGE @ STA. 14+62.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT #1	310	345
END BENT #2	280	310

PLAN OF RIP RAP



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-4488
CRAVEN COUNTY
STATION: 14+62.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RIP RAP DETAILS

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

ASSEMBLED BY: R. G. EMERSON	DATE: 10/11	
CHECKED BY : J.P. ADAMS	DATE : 11/9/11	
DRAWN BY : REK 1/84	REV. 5/1/06R	TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11	MAA/GM
	REV. 12/21/11	MAA/GM

14-MAY-2012 09:27
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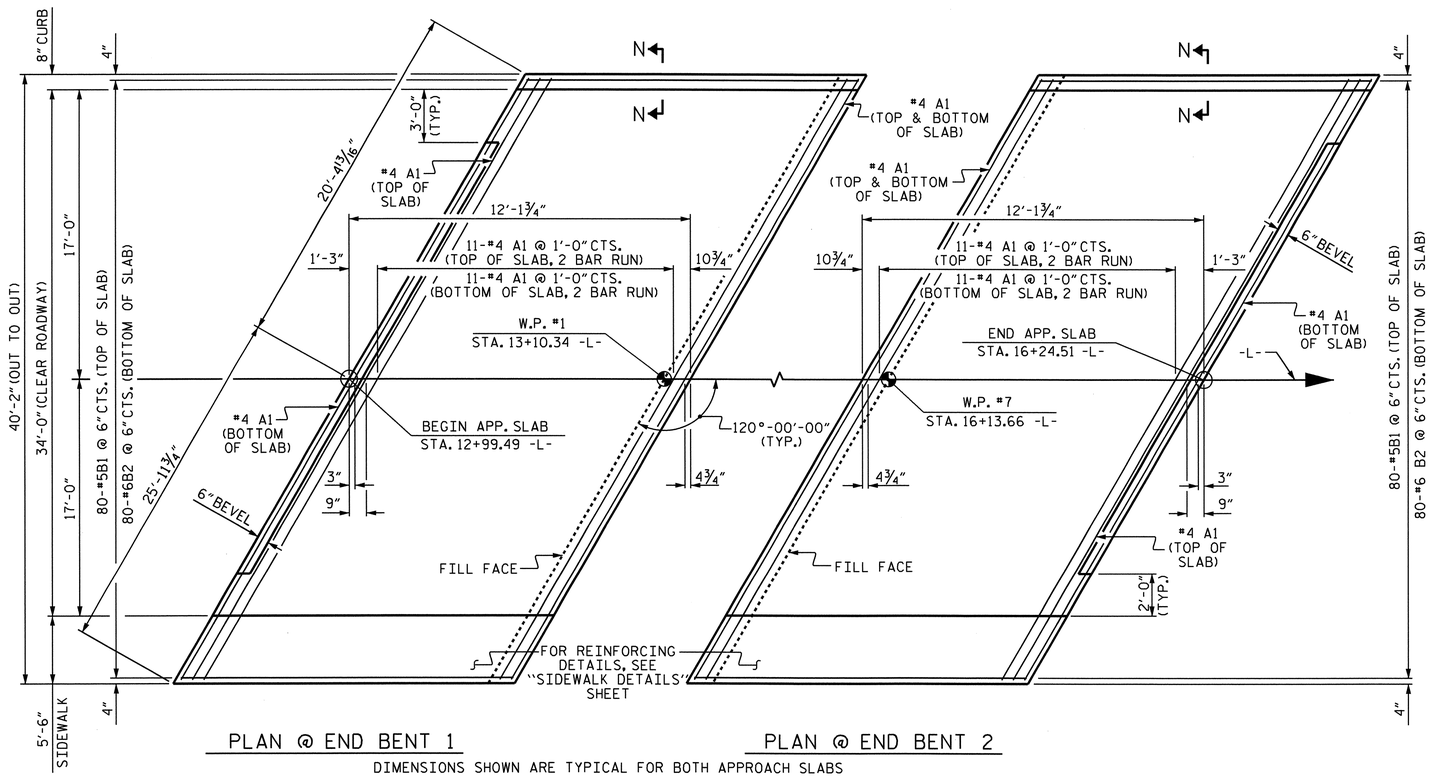
lsutton

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER BUCK CHARLES HUNT
5/14/12

STD. NO. RR1 (Sht 3)



PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 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.

APPROACH SLAB GROOVING IS NOT REQUIRED.

FOR SIDEWALK DETAILS ON THE APPROACH SLABS, SEE THE SHEET ENTITLED "SIDEWALK DETAILS". THE QUANTITY OF CONCRETE AND REINFORCING STEEL IN THE SIDEWALKS IS INCLUDED IN AND SHALL BE PAID FOR AS "CLASS AA CONCRETE" AND "EPOXY COATED REINFORCING STEEL".

BILL OF MATERIAL

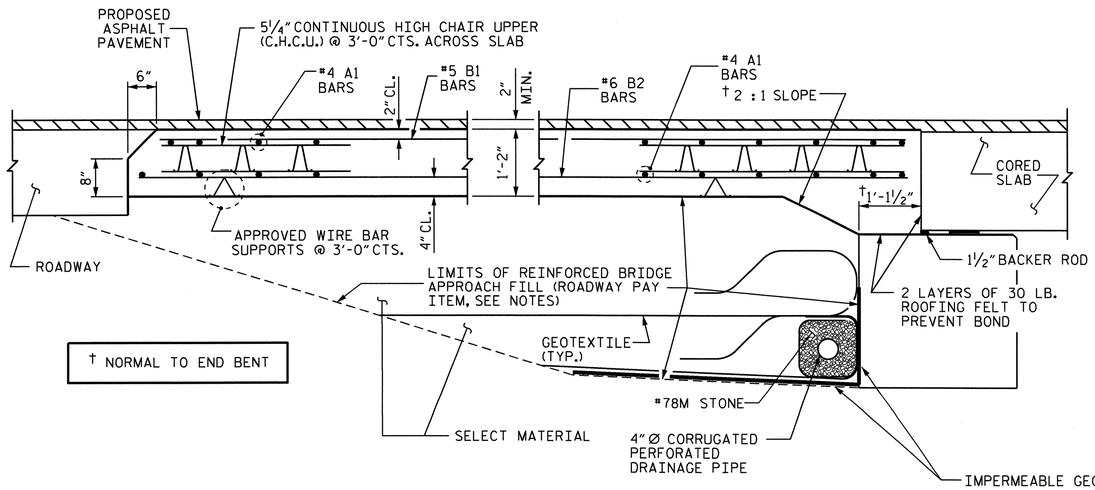
APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	52	#4	STR	24'-1"	837
✱B1	80	#5	STR	11'-2"	932
✱B2	80	#6	STR	11'-8"	1402
✱EPOXY COATED REINFORCING STEEL			LBS.		3171
CLASS AA CONCRETE			C.Y.		23.4

APPROACH SLAB AT EB 2

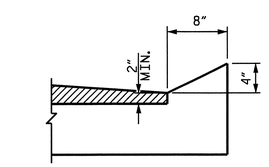
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	52	#4	STR	24'-1"	837
✱B1	80	#5	STR	11'-2"	932
✱B2	80	#6	STR	11'-8"	1402
✱EPOXY COATED REINFORCING STEEL			LBS.		3171
CLASS AA CONCRETE			C.Y.		23.4

SPLICE CHART	
#4	2'-0"

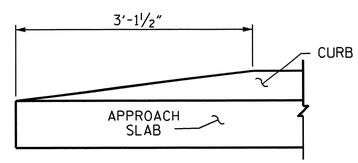


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB

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

ASSEMBLED BY: R. G. EMERSON		DATE: 10/11
CHECKED BY: J. P. ADAMS		DATE: 11/11
DRAWN BY : FCJ 6/87	REV. 5/1/06RR	KMM/GM
CHECKED BY : EGA 6/87	REV. 10/1/11	MAA/GM
	REV. 12/21/11	MAA/GM

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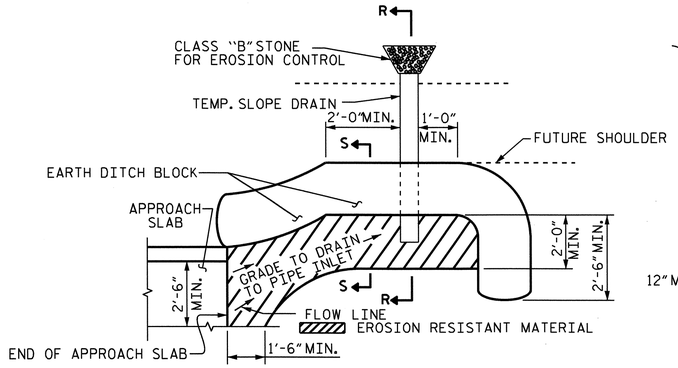
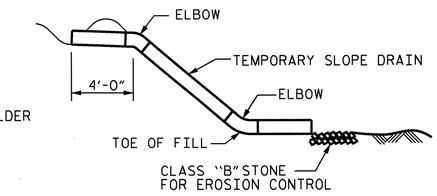
STD. NO. BAS3 (SHT 1b)

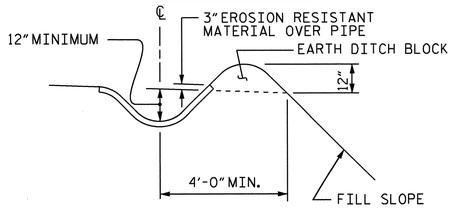


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



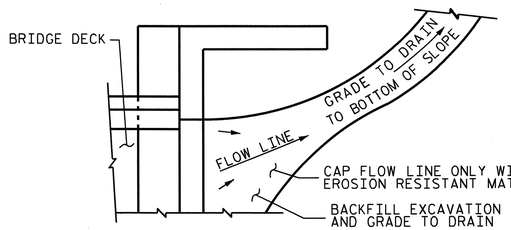
SECTION R-R



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

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 14+62.00 -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-41
1			3			TOTAL SHEETS
2			4			41

NORTH CAROLINA PROFESSIONAL SEAL 10061 ENGINEER BUCK CHARLES HUNT

5/14/12

ASSEMBLED BY: R. G. EMERSON		DATE: 10/11	
CHECKED BY: J. P. ADAMS		DATE: 11/11	
DRAWN BY : FCJ	11/88	REV. 5/7/03	RWW/JTE
CHECKED BY : ARB	11/88	REV. 5/1/06RRR	MAA/KMM
		REV. 10/1/11	MAA/GM

14-MAY-2012 09:27
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STD. NO. BAS4 (SHT 2b)

04-APR-2012 07:51
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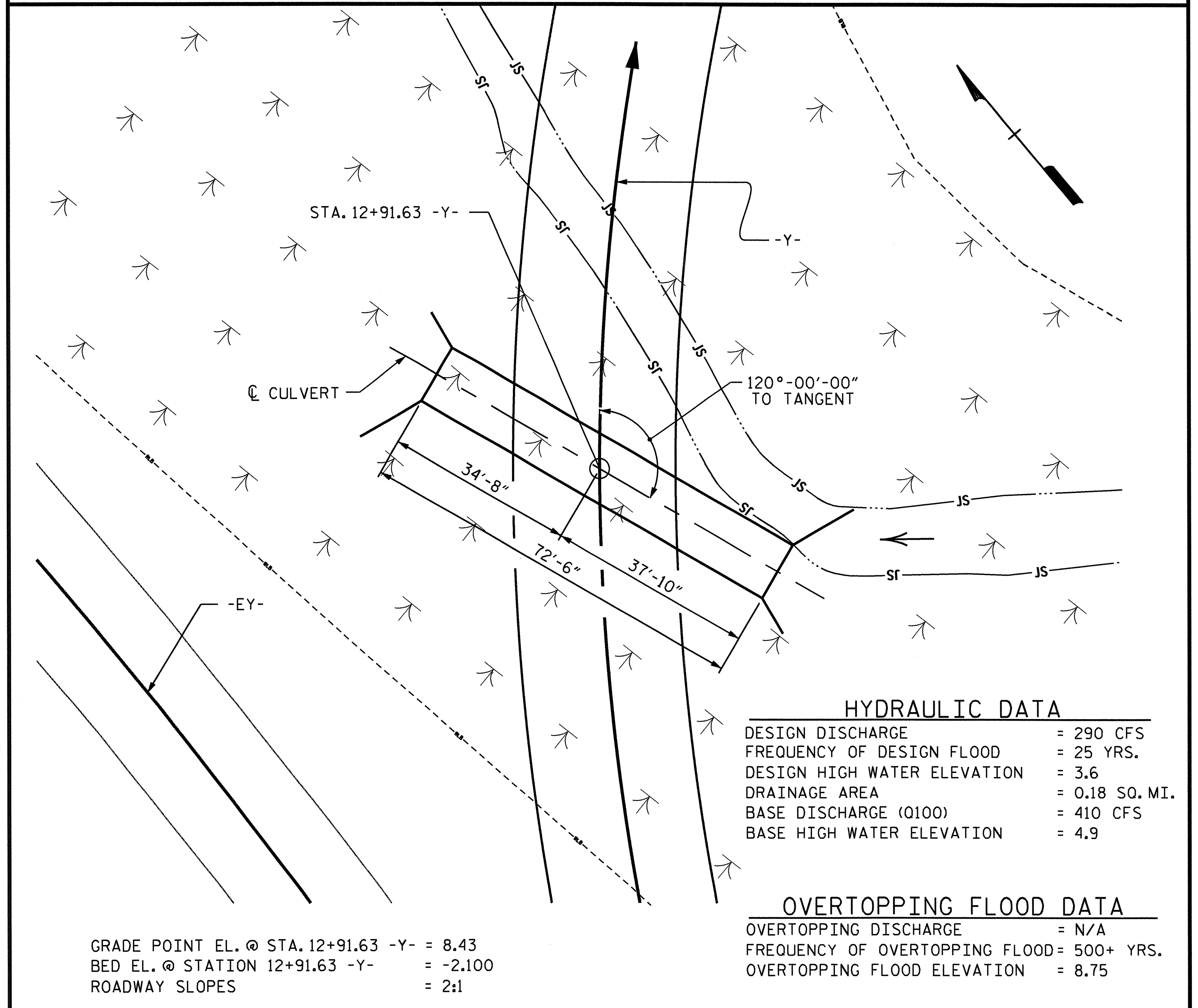
lsutton

F.A. PROJECT NO. BRSTP-1763(4)

BM: CONTROL POINT #100 106.60' LEFT OF STA. 14+02.28 -L-, EL. 11.78



HYDRAULIC DATA

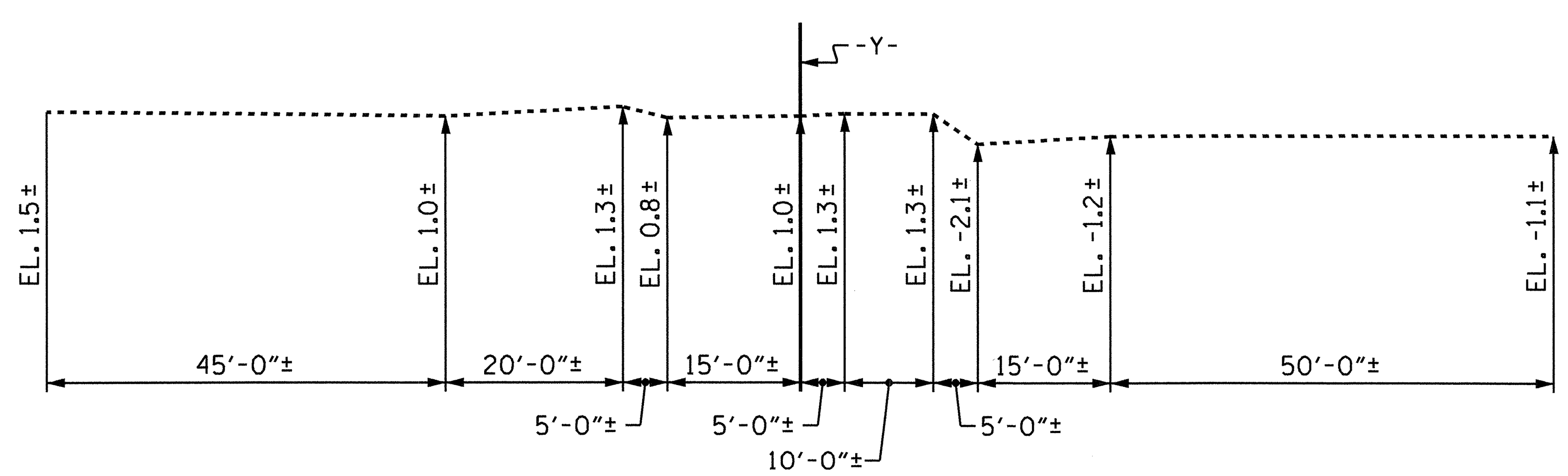
DESIGN DISCHARGE	= 290 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 3.6
DRAINAGE AREA	= 0.18 SQ. MI.
BASE DISCHARGE (Q100)	= 410 CFS
BASE HIGH WATER ELEVATION	= 4.9

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= N/A
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 8.75

GRADE POINT EL. @ STA. 12+91.63 -Y-	= 8.43
BED EL. @ STATION 12+91.63 -Y-	= -2.100
ROADWAY SLOPES	= 2:1

LOCATION SKETCH



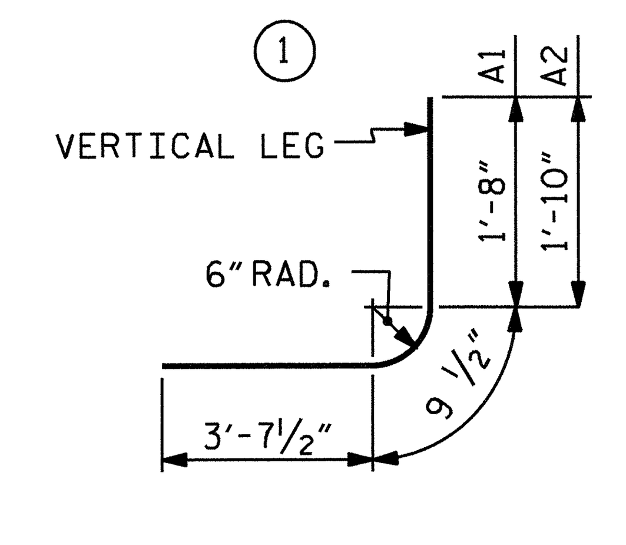
PROFILE ALONG ℄ CULVERT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	310	#4	1	6'-1"	1260
* A2	310	#4	1	6'-3"	1294
* A100	155	#5	STR	10'-11"	1765
* A101	6	#5	STR	8'-8"	54
* A102	6	#5	STR	6'-6"	41
* A103	6	#5	STR	4'-4"	27
* A104	6	#5	STR	2'-2"	14
* A200	172	#5	STR	10'-11"	1958
* A201	6	#5	STR	8'-10"	55
* A202	6	#5	STR	6'-11"	43
* A203	6	#5	STR	4'-11"	31
* A204	6	#5	STR	3'-0"	19
* B1	142	#4	STR	6'-10"	648
* B2	310	#4	STR	5'-4"	1104
* C1	114	#4	STR	25'-8"	1955
* G1	4	#4	STR	12'-8"	34
* S2	12	#8	STR	12'-8"	406

* EPOXY COATED REINF. STEEL = 10708 LBS

BAR TYPE



DIMENSIONS ARE OUT TO OUT.

SPLICE CHART

BAR	SIZE	SPLICE LENGTH
C1	#4	2'-4"

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE

BARREL @ 0.878 CY/FT	63.7	C.Y.
WINGS ETC.	16.9	C.Y.
TOTAL	80.6	C.Y.

EPOXY COATED REINFORCING STEEL

BARREL	10708	LBS.
WINGS ETC.	926	LBS.
TOTAL	11634	LBS.

FOUNDATION COND. MAT'L.	80	TONS
CULVERT EXCAVATION	LUMP SUM	

NOTES

ASSUMED LIVE LOAD ----------HL 93 OR ALTERNATE LOADING.

MAX. DESIGN FILL-----------------4.91 FT.

MIN. DESIGN FILL-----------------4.21 FT.

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

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

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

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

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

THIS BARREL STANDARD TO BE USED ONLY ON CULVERT ON 120° SKEW AND TO BE USED WITH STANDARD WING SHEET WITH THE SAME SKEW AND VERTICAL CLEARANCE.

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

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

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

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.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

ALL REINFORCING STEEL SHALL BE EPOXY COATED.

ALL BAR SUPPORTS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 12+91.63 -Y-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD

SINGLE 10 FT. X 6 FT. CONCRETE BOX CULVERT 120° SKEW

AUGUST 1989

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19098 BUCY CHARLES HUNT

4/4/12

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

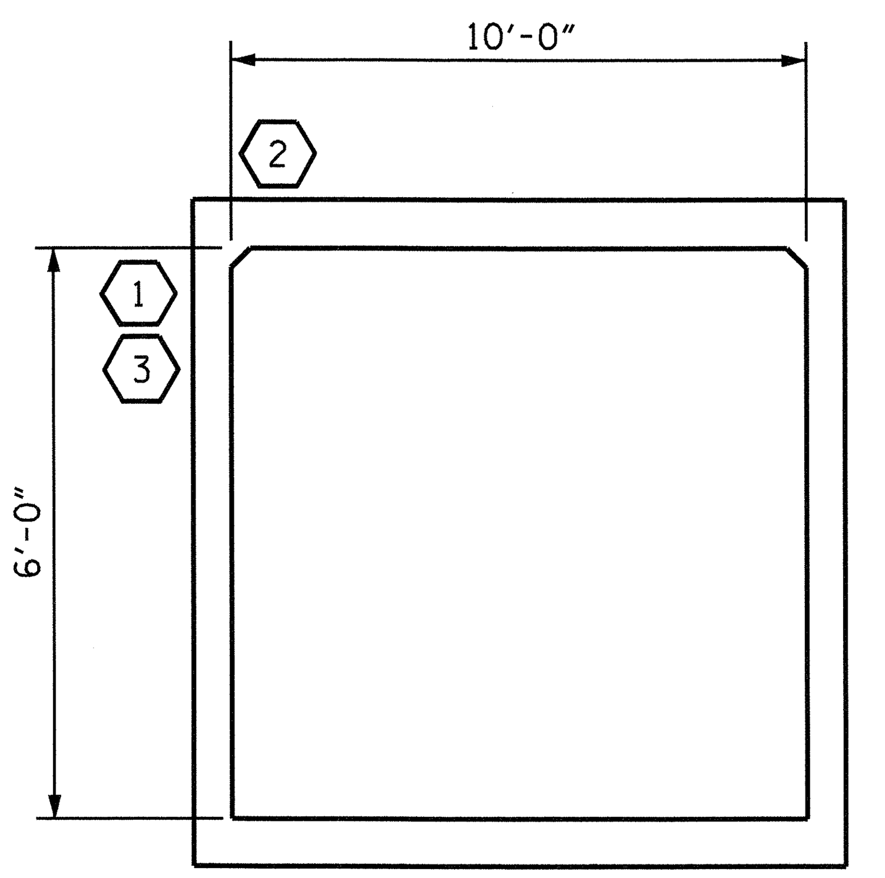
ASSEMBLED BY : B.N. GRADY	DATE : 1/3/12	SPECIAL	
CHECKED BY : B.C. HUNT	DATE : 1/2012		
DRAWN BY : B.M. MEYERS	DATE : AUG. 1989	STANDARD	
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989		

REVISED 11-13-91 BY E.L.R. CHECKED BY G.R.P.
ADDED 8-22-89

STD. NO. CB331A

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	MOMENT: RATING FACTOR	MOMENT: BOX NO.	MOMENT: ELEMENT TYPE	MOMENT: DISTANCE FROM LEFT END OF ELEMENT (ft)	SHEAR: RATING FACTOR	SHEAR: BOX NO.	SHEAR: ELEMENT TYPE	SHEAR: DISTANCE FROM LEFT END OF ELEMENT (ft)	COMMENT NUMBER
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.02	--	1.75	1.02	1	TOP CORNER WALL	0.50	1.07	1	BOTTOM SLAB	9.82	
		HL-93 (OPERATING)	N/A		1.33	--	1.35	1.33	1	TOP CORNER WALL	0.50	1.39	1	BOTTOM SLAB	9.82	
		HS-20 (INVENTORY)	36.000	(2)	1.28	46.12	1.75	1.28	1	TOP SLAB	5.33	1.31	1	TOP SLAB	0.81	
		HS-20 (OPERATING)	36.000		1.66	59.79	1.35	1.66	1	TOP SLAB	5.33	1.70	1	TOP SLAB	0.81	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.33	31.51	1.40	2.33	1	TOP SLAB	5.33	2.39	1	TOP SLAB	0.81	
		SNGARBS2	20.000		2.18	43.59	1.40	2.18	1	TOP SLAB	5.33	2.24	1	TOP SLAB	0.81	
		SNAGRIS2	22.000		2.33	51.34	1.40	2.33	1	TOP SLAB	5.33	2.39	1	TOP SLAB	0.81	
		SNCOTTS3	27.250	(3)	1.28	34.82	1.40	1.28	1	TOP CORNER WALL	0.50	1.34	1	BOTTOM SLAB	9.82	
		SNAGGRS4	34.925		1.45	50.68	1.40	1.56	1	TOP CORNER WALL	0.50	1.45	1	BOTTOM SLAB	0.84	
		SNS5A	35.550		1.45	51.59	1.40	1.48	1	TOP CORNER WALL	0.50	1.45	1	BOTTOM SLAB	0.84	
		SNS6A	39.950		1.45	57.73	1.40	1.48	1	TOP CORNER WALL	0.50	1.45	1	BOTTOM SLAB	0.84	
		SNS7B	42.000		1.45	60.70	1.40	1.48	1	TOP CORNER WALL	0.50	1.45	1	BOTTOM SLAB	0.84	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.27	74.76	1.40	2.33	1	TOP SLAB	5.33	2.27	1	BOTTOM SLAB	0.84	
		TNT4A	33.075		1.52	50.29	1.40	1.52	1	TOP CORNER WALL	0.50	1.60	1	BOTTOM SLAB	0.84	
		TNT6A	41.600		1.42	58.91	1.40	1.48	1	TOP CORNER WALL	0.50	1.42	1	BOTTOM SLAB	9.82	
		TNT7A	42.000		1.52	63.87	1.40	1.52	1	TOP CORNER WALL	0.50	1.53	1	BOTTOM SLAB	9.82	
		TNT7B	42.000		1.45	60.95	1.40	1.49	1	TOP CORNER WALL	0.50	1.45	1	BOTTOM SLAB	9.82	
		TNAGRIT4	43.000		1.45	62.46	1.40	1.45	1	TOP CORNER WALL	0.50	1.53	1	BOTTOM SLAB	0.84	
		TNAGT5A	45.000		1.49	66.86	1.40	1.49	1	TOP CORNER WALL	0.50	1.56	1	BOTTOM SLAB	0.84	
		TNAGT5B	45.000		1.52	68.43	1.40	1.52	1	TOP CORNER WALL	0.50	1.60	1	BOTTOM SLAB	0.84	



LRFR SUMMARY

(LOOKING DOWNSTREAM)

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

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

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING ✱✱

✱✱ SEE CHART FOR VEHICLE TYPE

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 12+91.63 -Y-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL BUCY CHARLES HUNT

4/5/12

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

STD. NO. LRFR5

ASSEMBLED BY : B.C. HUNT	DATE : 1/2012	
CHECKED BY : B.N. GRADY	DATE : 1/19/2012	
DRAWN BY : WMC 7/11	REV. 10/1/11	MAA/GM
CHECKED BY : GM 7/11		

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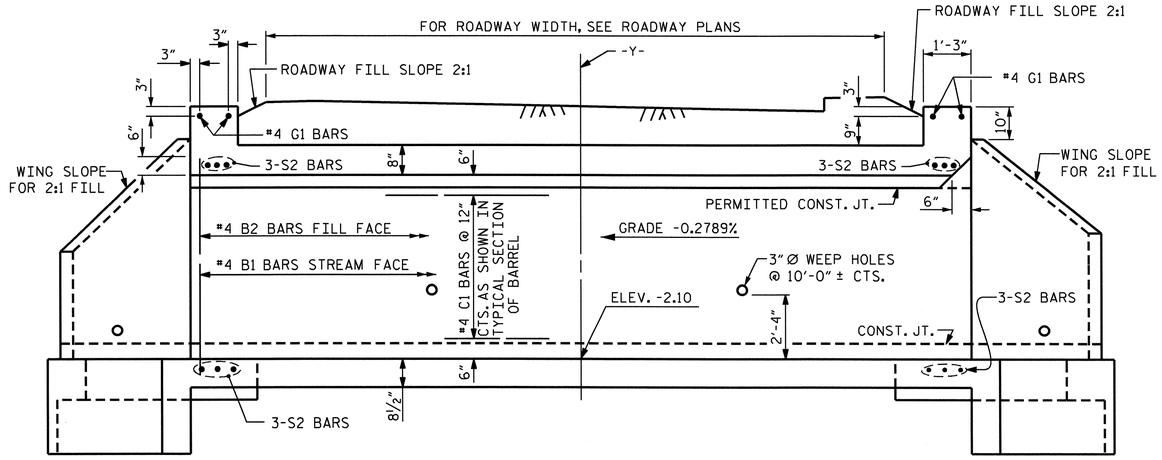
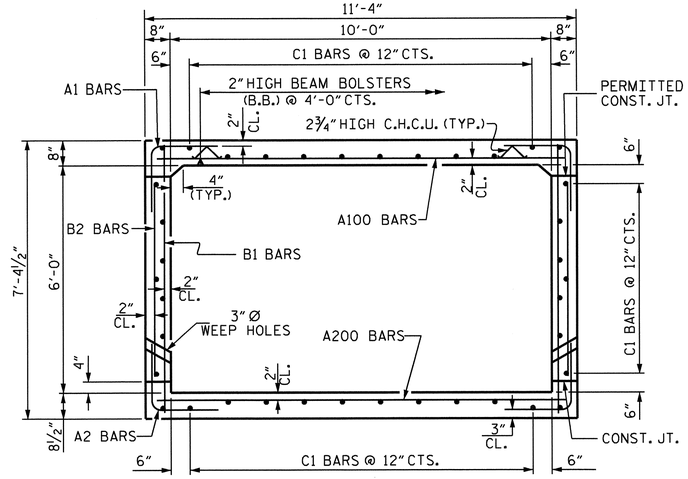
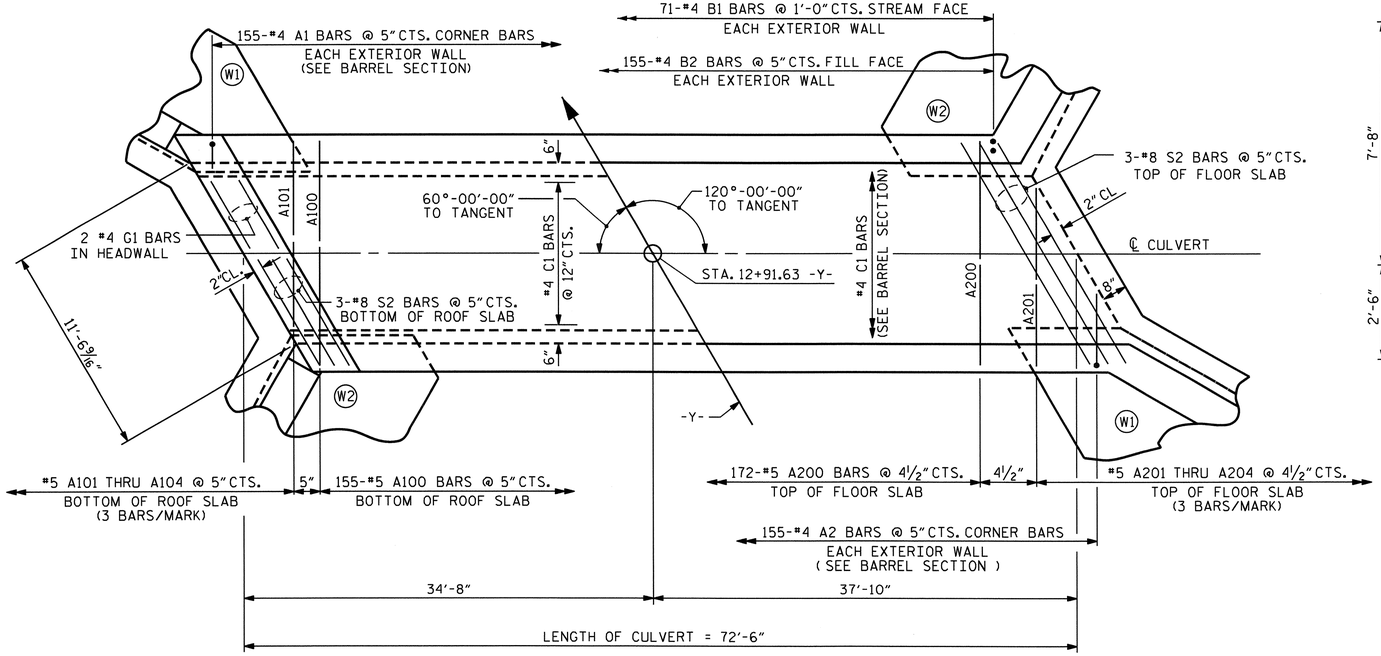


CULVERT SECTION NORMAL TO ROADWAY

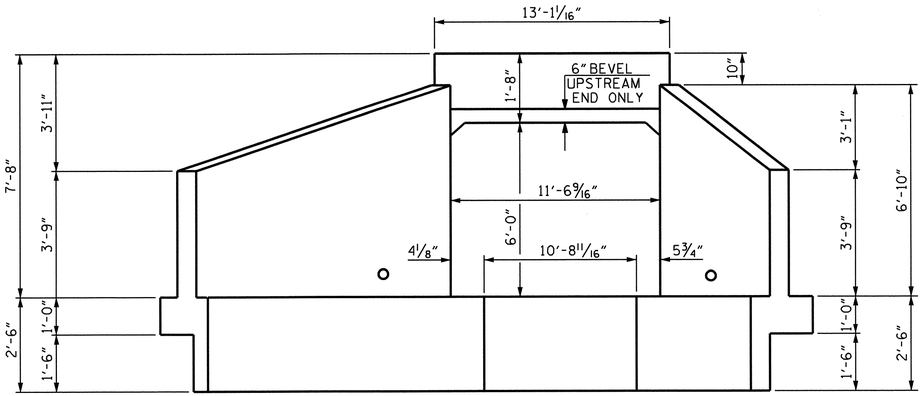


RIGHT ANGLE SECTION OF BARREL

THERE ARE 38 "C" BARS IN SECTION OF BARREL



PART PLAN - ROOF SLAB PART PLAN - FLOOR SLAB



END ELEVATION NORMAL TO SKEW

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 12+91.63 -Y-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD

SINGLE 10 FT. X 6 FT. CONCRETE BOX CULVERT 120° SKEW

1971

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

NORTH CAROLINA PROFESSIONAL SEAL 24091 ENGINEER BRUCE CHARLES HUNT

4/5/12

STD. NO. CB331

ASSEMBLED BY : B.N. GRADY	DATE : 1/3/12	SPECIAL
CHECKED BY : B.C. HUNT	DATE : 1/2012	
DRAWN BY : J.W. ROUSE	DATE : SEPT. 1989	STANDARD
CHECKED BY : A.R. BISSETTE	DATE : AUG. 1989	

REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
REVISED 8-22-89 BY A.R.B. CHECKED BY C.R.K.
REDRAWN 8-22-89
REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.

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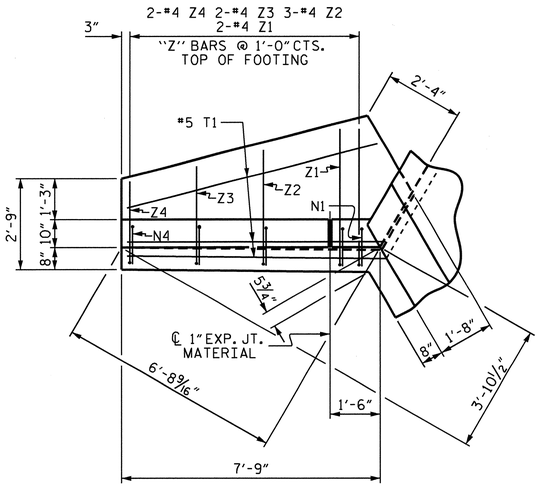
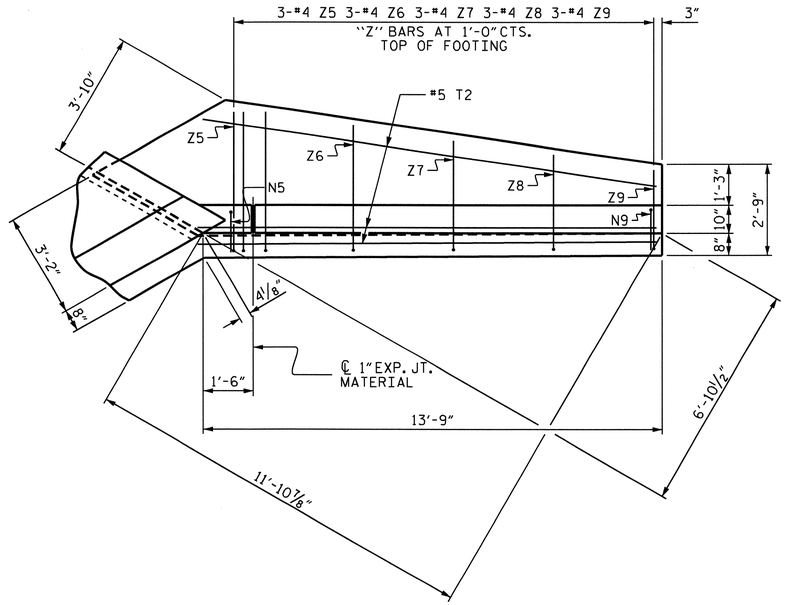


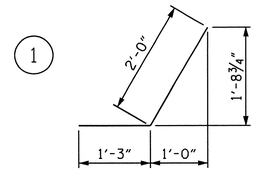
PLAN W2

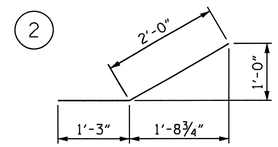


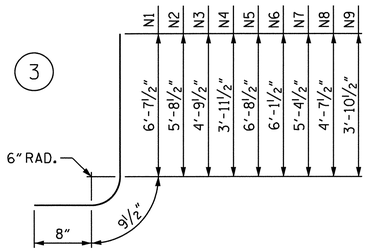
PLAN W1

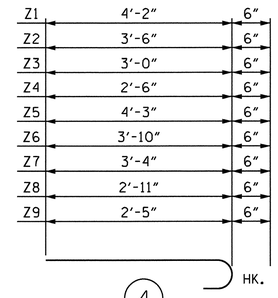
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.







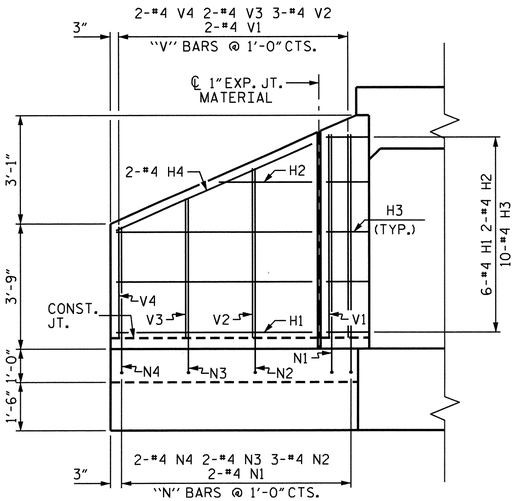


BILL OF MATERIAL

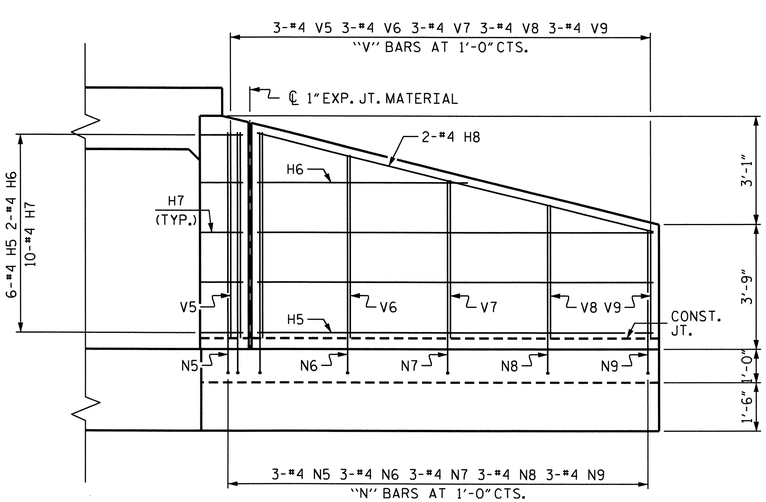
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳H1	12	#4	STR	5'-10"	47
✳H2	4	#4	STR	2'-9"	7
✳H3	20	#4	1	3'-3"	43
✳H4	4	#4	STR	6'-5"	17
✳H5	12	#4	STR	11'-10"	95
✳H6	4	#4	STR	6'-3"	17
✳H7	20	#4	2	3'-3"	43
✳H8	4	#4	STR	12'-2"	33
✳N1	4	#4	3	8'-1"	22
✳N2	6	#4	3	7'-2"	29
✳N3	4	#4	3	6'-3"	17
✳N4	4	#4	3	5'-5"	14
✳N5	6	#4	3	8'-2"	33
✳N6	6	#4	3	7'-7"	30
✳N7	6	#4	3	6'-10"	27
✳N8	6	#4	3	6'-1"	24
✳N9	6	#4	3	5'-4"	21
✳T1	6	#5	STR	7'-9"	48
✳T2	6	#5	STR	13'-9"	86
✳V1	4	#4	STR	6'-1"	16
✳V2	6	#4	STR	5'-1"	20
✳V3	4	#4	STR	4'-2"	11
✳V4	4	#4	STR	3'-4"	9
✳V5	6	#4	STR	6'-2"	25
✳V6	6	#4	STR	5'-6"	22
✳V7	6	#4	STR	4'-9"	19
✳V8	6	#4	STR	4'-0"	16
✳V9	6	#4	STR	3'-3"	13
✳Z1	4	#4	4	4'-8"	12
✳Z2	6	#4	4	4'-0"	16
✳Z3	4	#4	4	3'-6"	9
✳Z4	4	#4	4	3'-0"	8
✳Z5	6	#4	4	4'-9"	19
✳Z6	6	#4	4	4'-4"	17
✳Z7	6	#4	4	3'-10"	15
✳Z8	6	#4	4	3'-5"	14
✳Z9	6	#4	4	2'-11"	12

✳EPOXY COATED REINFORCING STEEL FOR 4 WINGS 926 LBS

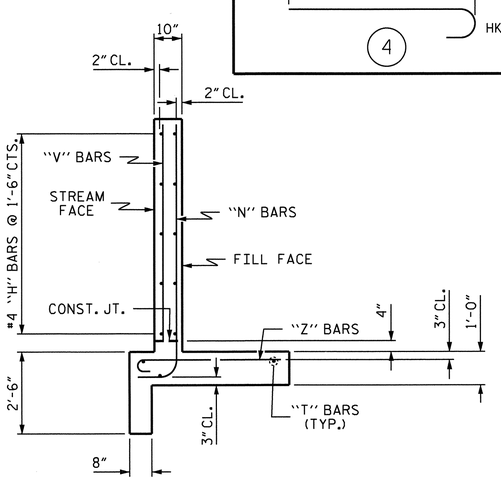
CLASS A CONCRETE
- 4 WINGS 14.4 CY
- 2 HEADWALLS 1.2 CY
- 2 END CURTAIN WALLS 1.3 CY
- TOTAL 16.9 CY



ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

PROJECT NO. B-4488

CRAVEN COUNTY

STATION: 12+91.63 -Y-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 6'-0" SLOPE = 2:1
60° OR 120° SKEW

ASSEMBLED BY : B.N. GRADY	DATE : 1/3/12
CHECKED BY : B.C. HUNT	DATE : 1/2012
DRAWN BY : CCJ 11/99	
CHECKED BY : RWW 03/00	

NORTH CAROLINA PROFESSIONAL SEAL 14008 ENGINEER BRICE CHARLES HUNT

4/6/12

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

STD. NO. CW6006

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 EEN @ RGW REV. 5-7-03 RWW @ JTE
REV. 8-16-99 RWW @ LES REV. 5-1-06 TLA @ GN

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