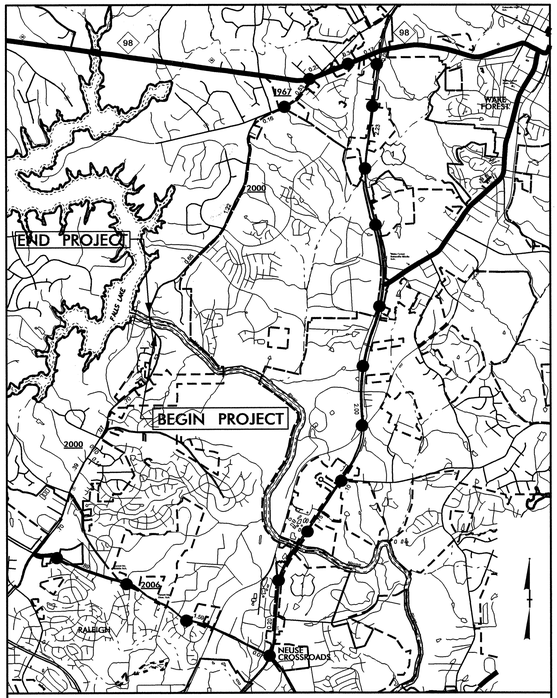
TIP PROJECT: B-4660

CONTRACT: C202580

STRUCTURES



VICINITY MAP

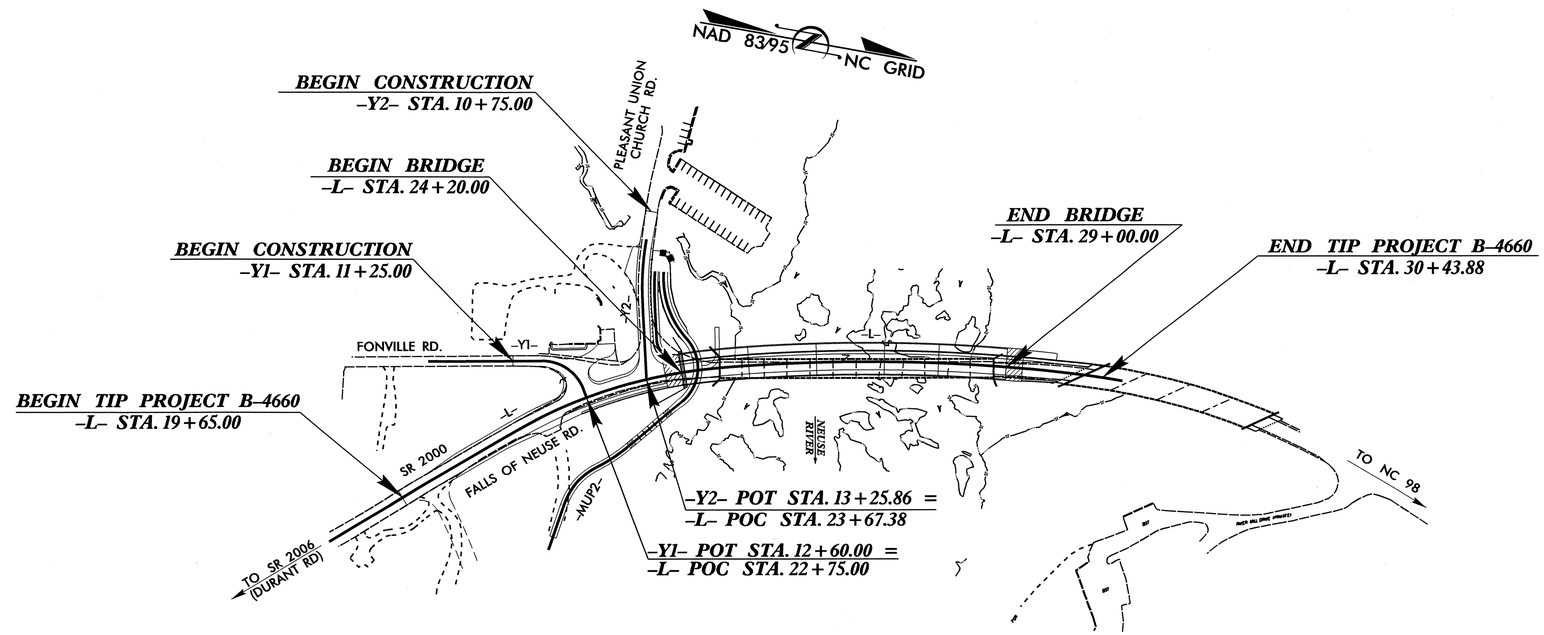
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4660		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33822.1.1	BRSTP-2000(4)	P.E.
33822.2.1	BRSTP-2000(4)	R/W & UTILITIES
33822.3.1	BRSTP-2000(4)	CONST.

LOCATION: BRIDGE NO. 19 OVER NEUSE RIVER ON SR 2000

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



DESIGN DATA

ADT 2010 = 13500
ADT 2030 = 15800
DHV = 10 %
D = 60 %
T = 3 % *
V = 45 MPH
* TTST 1% + DUAL 2%
FUNC CLASS: RURAL MAJOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4660 = 0.113 mi.
LENGTH STRUCTURE TIP PROJECT B-4660 = 0.091 mi.
TOTAL LENGTH TIP PROJECT B-4660 = 0.204 mi.

2006 STANDARD SPECIFICATIONS

LETTING DATE:
OCTOBER 18, 2011

Prepared in the Office of:
DEPARTMENT OF TRANSPORTATION
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

B. S. COX, P.E.
PROJECT ENGINEER

T. J. BEACH, P.E.
PROJECT DESIGN ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

F.A. PROJECT No. BRSTP-2000(4)

24+00 | SPAN "A" | 25+00 | SPAN "B" | 26+00 | SPAN "C"

FILL FACE @ END BENT No. 1
STA. 24+20.00 -L-
GRADE PT. EL. 216.451

EXP. FIX. FIX. FIX. FIX.

220
210
200
190

EL. 214.2±
APPROXIMATE NATURAL GROUND
1'-0" MIN. BERM
UNCLASSIFIED STRUCTURE EXCAVATION
EL. 213.9±
EL. 202.6±
EL. 201.4±
1'-6" MIN.
MSE WALL EXCAVATION SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS SPECIAL PROVISION
HP 12 X 53 STEEL PILES
1½:1 SLOPE NORMAL TO CAP
MSE RETAINING WALL #3, SEE SHEETS W-5 THRU W-7
PROPOSED MULTI-USE PATH
SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS FOR EXCAVATION
EL. 195.8±
EXISTING STRUCTURE (TYP.)
TOP OF DRILLED PIER EL. 197.611
EL. 192.9±
TOP OF TEMPORARY CAUSEWAY EL. 198.0
N.W.S. EL. 195.8 (2/1/05)
EL. 194.5±
TEMPORARY CAUSEWAY (TYP.)
EL. 193.5±
EL. 195.3±
TOP OF DRILLED PIER EL. 197.211
1½:1 SLOPE (TYP.)
EL. 192.2±

-5.700% -0.400%
PI = 22+50.00 -L-
EL = 217.03
VC = 420

END BENT No. 1 | BENT No. 1 | BENT No. 2

GRADE DATA -L-

HORIZONTAL CURVE DATA -L-

PI STA. = 23+10.24 -L-
Δ = 17°-50'-06.6" RT.
D = 8°-03'-30.5"
L = 221.32
T = 111.56
R = 711.00

PIS STA. = 24+60.61 -L-
Øs = 1°-07'-08.1"
Øs = 4°-01'-45.7"
Ls = 100.00
LT = 59.45
ST = 40.61

PI STA. = 27+47.09 -L-
Δ = 10°-08'-19.2" RT.
D = 2°-14'-17.2"
L = 453.00
T = 227.09
R = 2560.00

HALF SECTION ALONG ℄ SURVEY -L-

HYDROGRAPHIC DATA

DESIGN DISCHARGE	= 7600 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR
DESIGN HIGH WATER ELEVATION	= 202.5
DRAINAGE AREA	= 771 SQ. MI.
BASIC DISCHARGE (Q100)	= 11100 CFS
BASIC HIGH WATER ELEVATION	= 205.2

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 33000 CFS
FREQUENCY OF OVERTOPPING DISCHARGE	= 500+ YRS
OVERTOPPING FLOOD ELEVATION	= 215.2

NEUSE RIVER

PROPOSED MULTI-USE PATH (SEE ROADWAY PLANS)
20'-0" TOP WIDTH
TEMPORARY ACCESS ROAD
25'-0" TOP WIDTH
TEMPORARY CAUSEWAY (SEE NOTES)
4" CONCRETE SLOPE PROTECTION
EXISTING STRUCTURE (TYP.)
20'-0" TOP WIDTH
20'-0" TOP WIDTH
W.P. #2
CONTROL LINE @ BENT No. 1
STA. 25+20.00 -L-
W.P. #3
CONTROL LINE @ BENT No. 2
STA. 26+20.00 -L-
MSE RETAINING WALL #3, SEE SHEETS W-5 THRU W-7
W.P. #1
FILL FACE @ END BENT No. 1
STA. 24+20.00 -L-
BEGIN APPROACH SLAB
STA. 23+96.00 -L-
TO SR 2006
CS STA. 24+20.00 -L-
SC STA. 25+20.00 -L-
90°-00'-00" (TAN. TO CURVE)
90°-00'-00" (TAN. TO CURVE)
90°-00'-00" (TAN. TO CURVE)
5'-0"
5'-0"
5'-0"
100'-0" (ALONG ARC) (W.P. #3 TO W.P. #4
1'-0" MIN. BERM EL. 208.719 (LEVEL)
100'-0" (ALONG ARC)
100'-0" (ALONG ARC)
TOTAL BRIDGE LENGTH = 480'-0" (FILL FACE @ END BENT No. 1 TO FILL FACE @ END BENT No. 2)
℄ SURVEY -L-
SR 2000
(FALLS OF NEUSE RD.)

NC GRID NAD 83/95

HALF PLAN

(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 11268 ENGINEER BETSY S. COX — 8/23/11

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH — 8/24/11

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

SHEET 1 OF 5 REPLACES BRIDGE No. 19

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 2000 (FALLS OF NEUSE RD.) OVER THE NEUSE RIVER BETWEEN SR 2006 AND NC 98

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

DRAWN BY : T. BANKOVICH DATE : 6-2011
CHECKED BY : T.J. BEACH DATE : 6-2011

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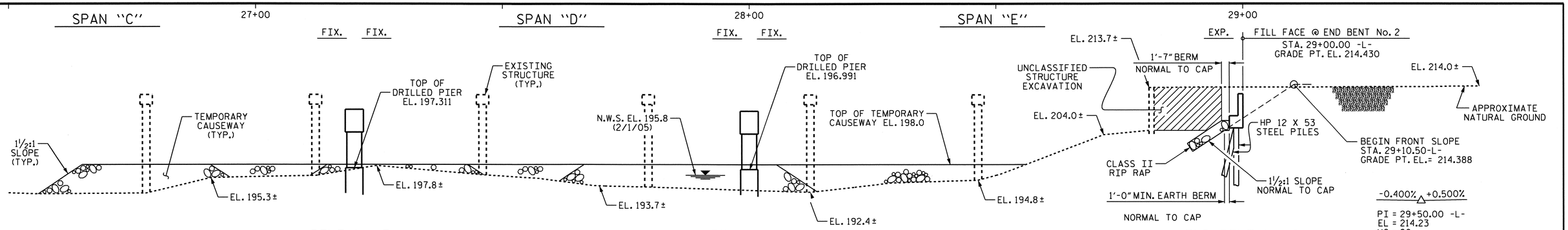
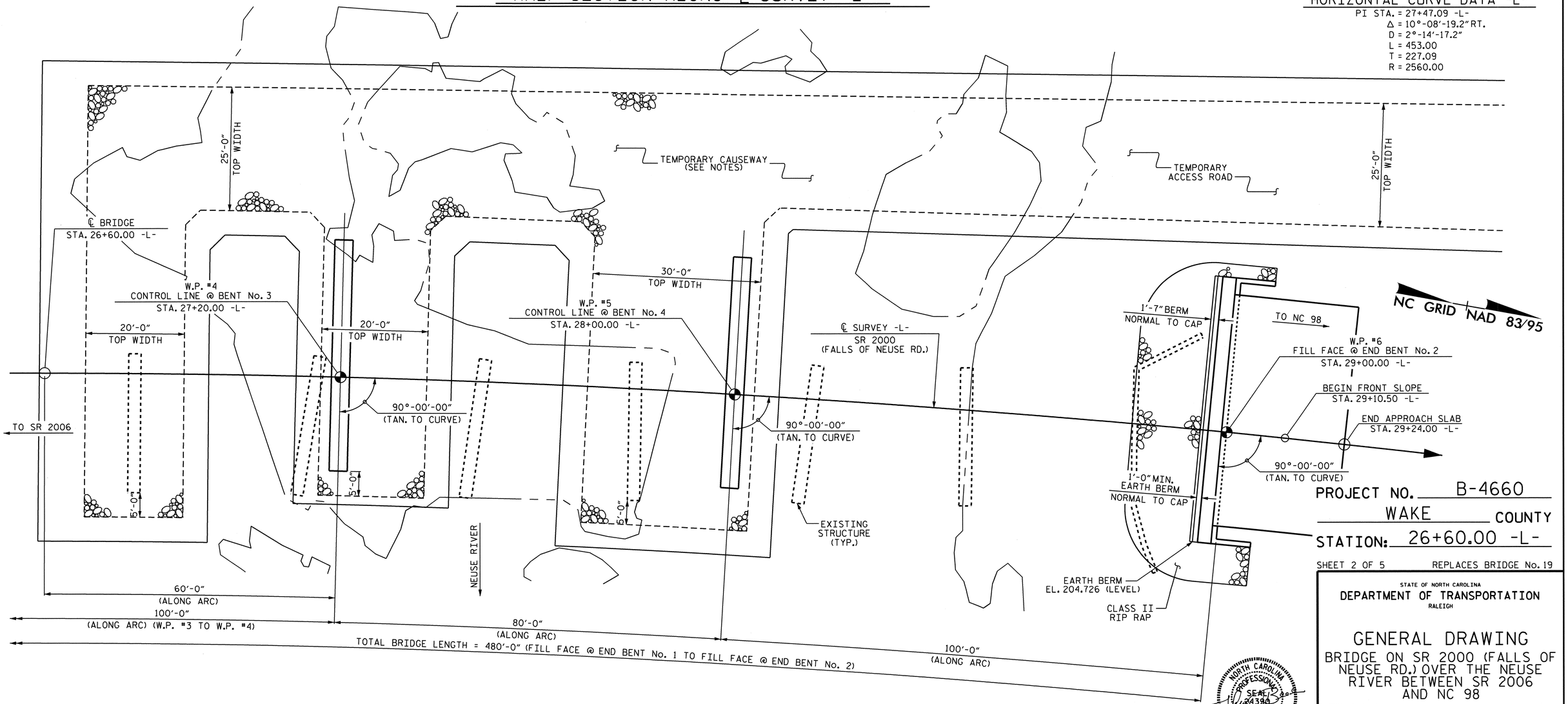


HALF SECTION ALONG ℄ SURVEY -L-

HORIZONTAL CURVE DATA -L-

PI STA. = 27+47.09 -L-
Δ = 10°-08'-19.2" RT.
D = 2°-14'-17.2"
L = 453.00
T = 227.09
R = 2560.00



HALF PLAN

(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

SHEET 2 OF 5 REPLACES BRIDGE No. 19

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 2000 (FALLS OF NEUSE RD.) OVER THE NEUSE RIVER BETWEEN SR 2006 AND NC 98

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

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

DRAWN BY : T. BANKOVICH DATE : 6-2011
CHECKED BY : T.J. BEACH DATE : 6-2011

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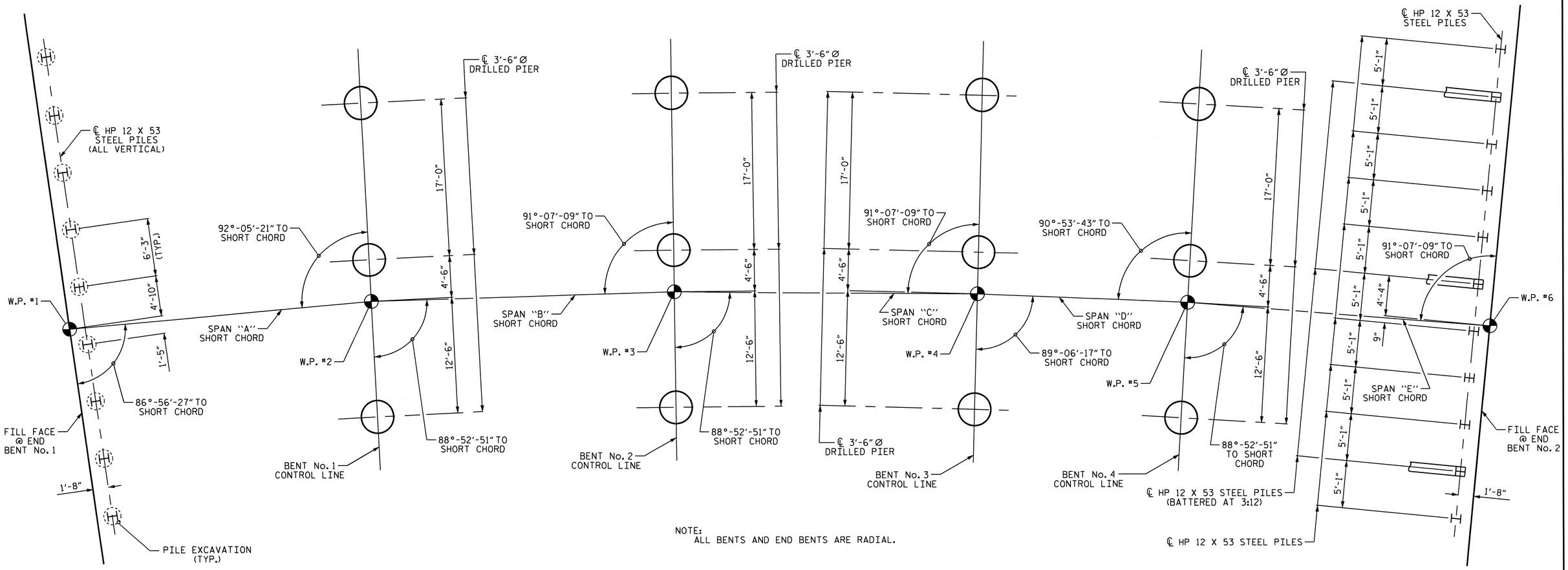

NOTE:
ALL BENTS AND END BENTS ARE RADIAL.

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF CAPS

NOTES:

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

DRILLED PIERS AT BENT No. 1 THROUGH BENT No. 4 ARE DESIGNED FOR A FACTORED RESISTANCE OF 600 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 140 TSF.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT No. 1 THROUGH BENT No. 4. DO NOT EXTEND CASING BELOW ELEVATION 185.0 (BENT No. 1), 189.9 (BENT No. 2), 195.2 (BENT No. 3), OR 189.5 (BENT No. 4) WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL DRILLED PIERS AT BENT No. 1 THROUGH BENT No. 4 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 178 FT. (BENT No. 1), 183 FT. (BENT No. 2), 188 FT. (BENT No. 3), OR 183 FT (BENT No. 4), SATISFY THE REQUIRED TIP RESISTANCE, AND HAVE A MINIMUM PENETRATION OF 7 FT. INTO ROCK AS DEFINED BY THE DRILLED PIERS PROVISION.

THE SCOUR CRITICAL ELEVATION FOR BENT No. 1 THROUGH BENT No. 4 IS ELEVATION 184.5 FT (BENT No. 1), 187.3 (BENT No. 2), 191.9 (BENT No. 3), AND 187.2 (BENT No. 4). SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CROSSHOLE SONIC LOGGING, SEE DRILLED PIER SPECIAL PROVISION.

FOR PILES, SEE SPECIAL PROVISIONS.

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

PILES AT END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.

PILE EXCAVATION IS REQUIRED TO INSTALL PILES AT END BENT No. 1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 195 FT. FOR PILE EXCAVATION, SEE PILES PROVISION.

DO NOT DRIVE PILES AT END BENT No. 1 AFTER PLACING PILES IN HOLES.

CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT No. 1 UP TO THE BOTTOM OF THE RETAINING WALL.

PERFORM STRUCTURE EXCAVATION FOR RETAINING WALL PRIOR TO PILE EXCAVATION FOR END BENT No. 1.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 5.

NORTH CAROLINA PROFESSIONAL SEAL 24380 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON SR 2000 (FALLS OF NEUSE RD.) OVER THE NEUSE RIVER BETWEEN SR 2006 AND NC 98

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

DRAWN BY : T. BANKOVICH DATE : 6-2011
CHECKED BY : T.J. BEACH DATE : 6-2011

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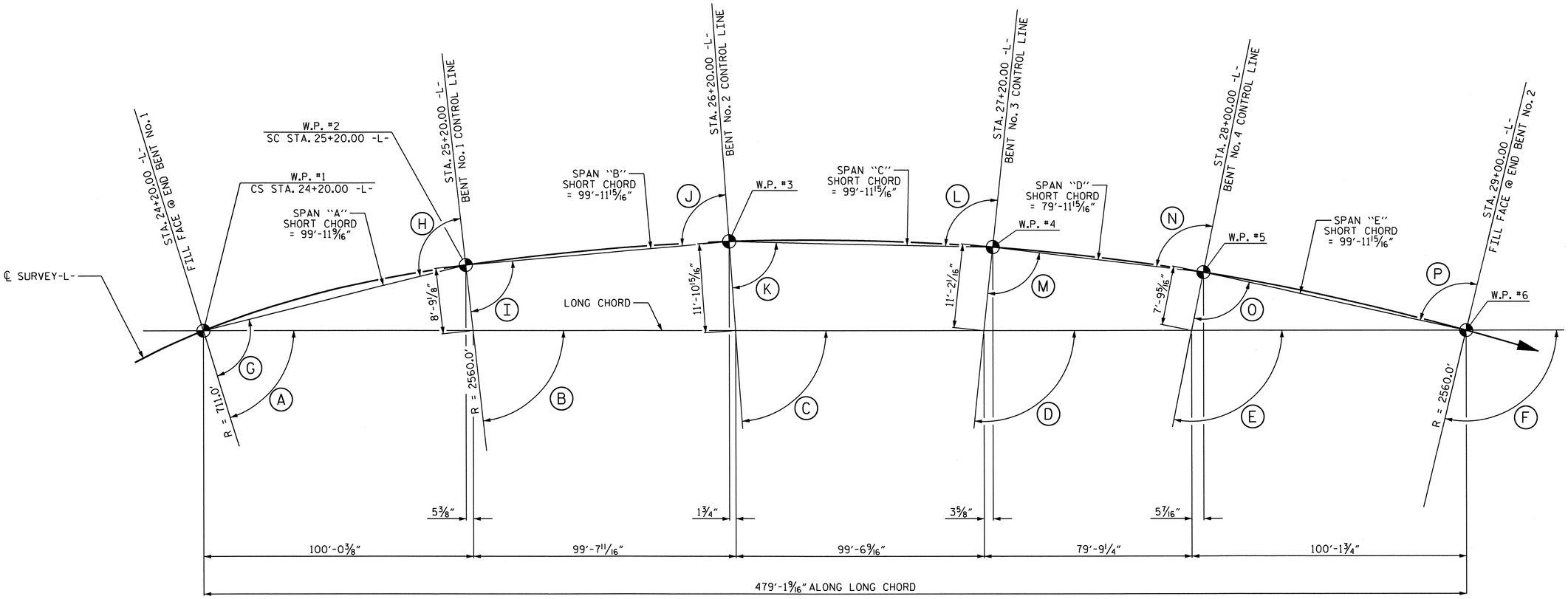

LONG CHORD LAYOUT

ALL BENTS & END BENTS ARE RADIAL TO ℄ SURVEY -L-

ANGLES

A	81°-55'-11"	I	88°-52'-51"
B	87°-04'-05"	J	91°-07'-09"
C	89°-18'-22"	K	88°-52'-51"
D	91°-32'-40"	L	91°-07'-09"
E	93°-20'-05"	M	89°-06'-17"
F	95°-34'-23"	N	90°-53'-43"
G	86°-56'-27"	O	88°-52'-51"
H	92°-05'-21"	P	91°-07'-09"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LONG CHORD LAYOUT

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

DRAWN BY : T. BANKOVICH DATE : 6-2011
CHECKED BY : T.J. BEACH DATE : 6-2011

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TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPOARY ACCESS	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION NOT IN SOIL	3'-6" Ø DRILLED PIER IN SOIL	3'-6" Ø DRILLED PIER NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	SID INSPECTION	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		HP 12 X 53 STEEL PILES		TWO BAR METAL RAIL	VERTICAL CONCRETE BARRIER RAIL	1'-2" X 2'-6" CONCRETE PARAPET
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.
SUPERSTRUCTURE										23,107	16,550					30	2,849.72			942.56	533.20	957.81
END BENT No. 1			45						LUMP SUM			30.8		5,727				9	135			
BENT No. 1				36.75	22.50	38.0						36.1		10,433	1,797							
BENT No. 2				20.55	22.20	22.0						36.1		9,760	1,463							
BENT No. 3				5.40	23.10	6.5						35.7		9,118	1,147							
BENT No. 4				21.00	21.00	22.5						35.7		9,669	1,404							
END BENT No. 2									LUMP SUM			37.2		6,440				11	165			
TOTAL	LUMP SUM	LUMP SUM	45	83.70	88.80	89.0	1	1	LUMP SUM	23,107	16,550	211.6	LUMP SUM	51,147	5,811	30	2,849.72	20	300	942.56	533.20	957.81

TOTAL BILL OF MATERIAL

	4" SLOPE PROTECTION	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	INSTALL 12-INCH D.I.R.J. WATER MAIN
	SQ. YDS.	TON	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE				LUMP SUM	LUMP SUM	
END BENT No. 1	19					
BENT No. 1						
BENT No. 2						
BENT No. 3						
BENT No. 4						
END BENT No. 2		140	155			
TOTAL	19	140	155	LUMP SUM	LUMP SUM	LUMP SUM

NOTES:

(CONTINUED FROM SHEET 3 OF 5)

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 33'-5", 2 SPANS @ 33'-4", 6 SPANS @ 33'-11", 2 SPANS @ 33'-7", AND 1 SPAN @ 33'-8" WITH A STEEL PLANK FLOOR AND ASPHALT WEARING SURFACE ON I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 24.3 FT. ON RUBBLE MASONRY ABUTMENTS WIDENED WITH REINFORCED CONCRETE, RUBBLE MASONRY INTERIOR PIERS WIDENED WITH STEEL AND REINFORCED CONCRETE COLUMNS AND FOOTINGS AND INTERIOR BENTS WITH REINFORCED CONCRETE COLUMNS AND FOOTINGS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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 MAY CHOOSE TO UTILIZE THE STANDARD OVERHANG FALSEWORK BRACING SYSTEM, SEE "STANDARD OVERHANG FALSEWORK" SHEETS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 60 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.

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

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

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

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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE" AT STATION 26+60.00 -L-.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGE DECKS, SEE SPECIAL PROVISIONS.

FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR VERTICAL CONCRETE BARRIER RAIL, SEE SPECIAL PROVISIONS.

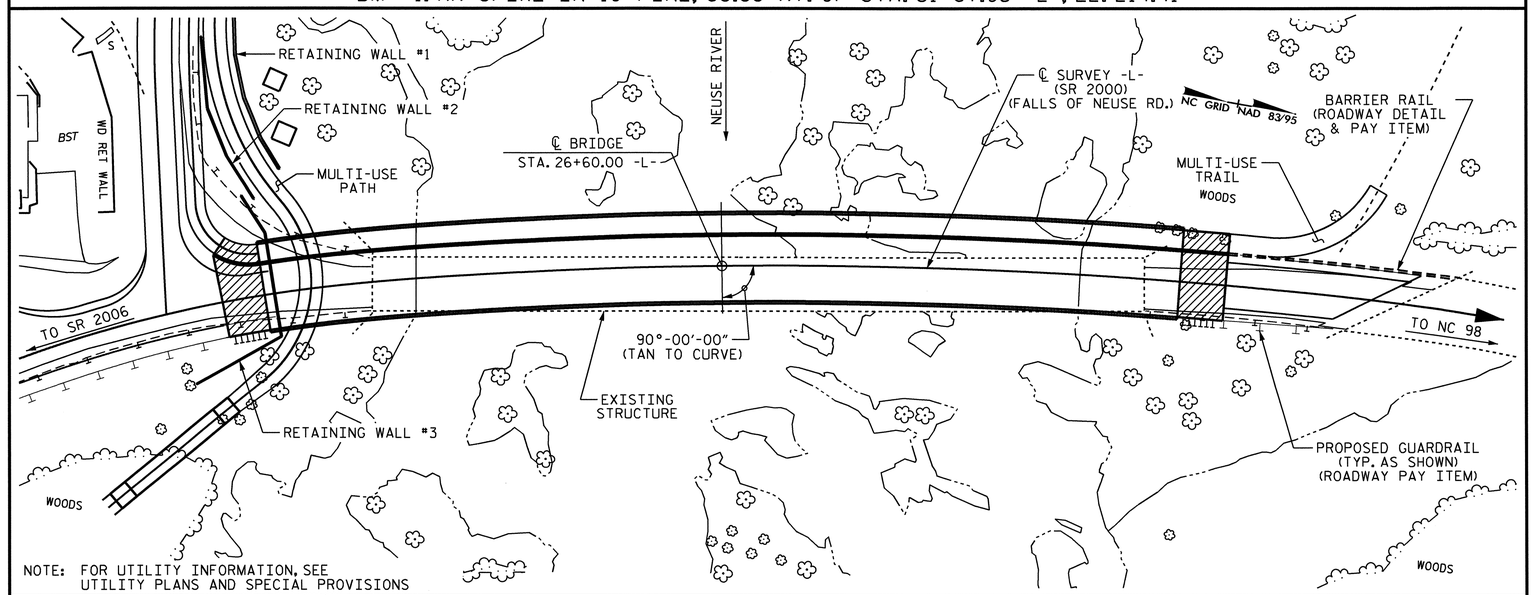
FOR INSTALLATION AND ATTACHMENT OF 12" WATER MAIN, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 26+60.00-L-.

THE CONTRACTOR SHALL NOT BEGIN INSTALLING THE SECOND TEMPORARY FILL CAUSEWAY IN THE NEUSE RIVER UNTIL REMOVAL OF THE FIRST TEMPORARY CAUSEWAY HAS BEGUN, ENSURING THAT THE TOTAL LENGTH OF CAUSEWAY ACROSS THE RIVER AT ANY ONE TIME IS LESS THAN OR EQUAL TO THE TOTAL LENGTH OF THE LONGEST CAUSEWAY.

CONTRACTOR SHALL PROVIDE A SYSTEM FOR CONTAINING THE RIP RAP USED IN THE TEMPORARY CAUSEWAY TO PREVENT THE CAUSEWAY RIP RAP FROM WASHING AWAY DUE TO HIGH WATER VOLUME RELEASES FROM FALLS LAKE. CONTAINMENT SYSTEM SHALL BE APPROVED BY THE ENGINEER AND CONFORM TO THE PLANS, SPECIAL PROVISIONS, AND ALL PERMITS.

BM #1: RR SPIKE IN 10" PINE, 68.88' RT. OF STA. 31+67.95 -L-, EL. 214.41



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

LOCATION SKETCH

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 2000 (FALLS OF NEUSE RD.) OVER THE NEUSE RIVER BETWEEN SR 2006 AND NC 98

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

DRAWN BY : TJB/TMG DATE : 6-2011
CHECKED BY : T.J. BEACH DATE : 6-2011

22-AUG-2011 15:00
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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
								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	1.086	--	1.75	0.723	1.97	A	EL	49.538	0.849	2.3	B	I	19.684	0.80	0.849	1.09	B	I	49.21	
		HL-93(Opr)	N/A	--	2.55	--	1.35	0.723	2.55	A	EL	49.538	0.849	2.98	B	I	19.684	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.511	54.396	1.75	0.723	2.71	A	EL	49.538	0.849	2.85	D	I	54.802	0.80	0.706	1.51	B	I	49.21	
		HS-20(Opr)	36.000	--	3.514	126.487	1.35	0.723	3.51	A	EL	49.538	0.849	3.69	D	I	54.802	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.581	48.345	1.4	0.723	8.04	A	EL	49.538	0.849	8.26	D	I	54.802	0.80	0.706	3.58	B	I	49.21	
		SNGARBS2	20.000	--	2.594	51.887	1.4	0.723	5.82	A	EL	49.538	0.849	5.94	D	I	54.802	0.80	0.706	2.59	B	I	49.21	
		SNAGRIS2	22.000	--	2.427	53.393	1.4	0.723	5.44	A	EL	49.538	0.849	5.54	D	I	54.802	0.80	0.706	2.43	B	I	49.21	
		SNCOTTS3	27.250	--	1.78	48.502	1.4	0.723	3.99	A	EL	49.538	0.849	4.13	D	I	54.802	0.80	0.706	1.78	B	I	49.21	
		SNAGGRS4	34.925	--	1.459	50.947	1.4	0.723	3.27	A	EL	49.538	0.849	3.47	D	I	54.802	0.80	0.706	1.46	B	I	49.21	
		SNS5A	35.550	--	1.428	50.781	1.4	0.723	3.2	A	EL	49.538	0.849	3.54	D	I	54.802	0.80	0.706	1.43	B	I	49.21	
		SNS6A	39.950	--	1.299	51.892	1.4	0.723	2.91	A	EL	49.538	0.849	3.25	D	I	54.802	0.80	0.706	1.30	B	I	49.21	
		SNS7B	42.000	--	1.237	51.934	1.4	0.723	2.77	A	EL	49.538	0.849	3.22	D	I	54.802	0.80	0.706	1.24	B	I	49.21	
	TTST	TNAGRIT3	33.000	--	1.581	52.158	1.4	0.723	3.55	A	EL	49.538	0.849	3.85	D	I	54.802	0.80	0.706	1.58	B	I	49.21	
		TNT4A	33.075	--	1.584	52.402	1.4	0.723	3.55	A	EL	49.538	0.849	3.74	D	I	54.802	0.80	0.706	1.58	B	I	49.21	
		TNT6A	41.600	--	1.285	53.436	1.4	0.723	2.88	A	EL	49.538	0.849	3.47	D	I	54.802	0.80	0.706	1.28	B	I	49.21	
		TNT7A	42.000	--	1.285	53.978	1.4	0.723	2.88	A	EL	49.538	0.849	3.4	D	I	54.802	0.80	0.706	1.29	B	I	49.21	
		TNT7B	42.000	--	1.316	55.254	1.4	0.723	2.95	A	EL	49.538	0.849	3.12	D	I	54.802	0.80	0.706	1.32	B	I	49.21	
		TNAGRIT4	43.000	--	1.262	54.26	1.4	0.723	2.83	A	EL	49.538	0.849	3.02	D	I	54.802	0.80	0.706	1.26	B	I	49.21	
		TNAGT5A	45.000	--	1.195	53.761	1.4	0.723	2.68	A	EL	49.538	0.849	3.03	D	I	54.802	0.80	0.706	1.19	B	I	49.21	
		TNAGT5B	45.000	3	1.185	53.309	1.4	0.723	2.66	A	EL	49.538	0.849	2.87	D	I	54.802	0.80	0.706	1.18	B	I	49.21	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1. FOR SPANS B & C PRESTRESSED GIRDER/LRFR PROGRAM REPORTS EQUAL RATINGS FOR ALL CATEGORIES.
2.
3.
4.

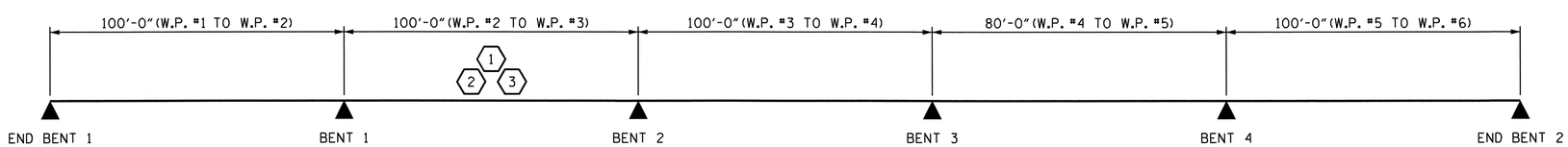
⬡ CONTROLLING LOAD RATING

1. DESIGN LOAD RATING (HL-93)
2. DESIGN LOAD RATING (HS-20)
3. LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00-L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J BEACH 8/29/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			66

STD. NO. LRFR1

ASSEMBLED BY : N. PIERCE DATE : 12-10	
CHECKED BY : T. GARRISON DATE : 12-10	
DRAWN BY : MAA 1/08	REV. 11/12/08R MAA/GM
CHECKED BY : GM/DI 2/08	

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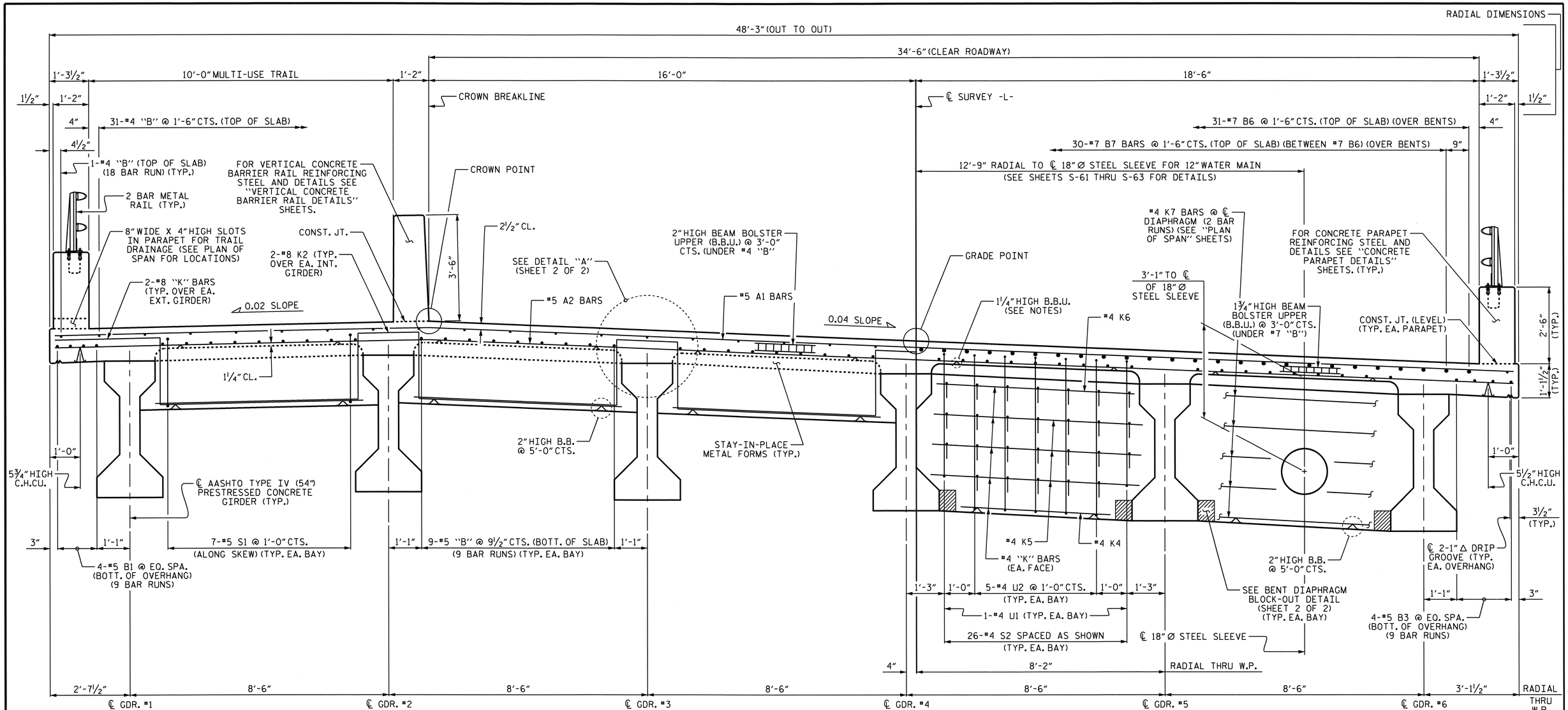


PART TYPICAL SECTION

(SHOWING END BENT DIAPHRAGMS)

PART TYPICAL SECTION

(SHOWING CONTINUOUS FOR LIVE LOAD DIAPHRAGMS)

NOTES:

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

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

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

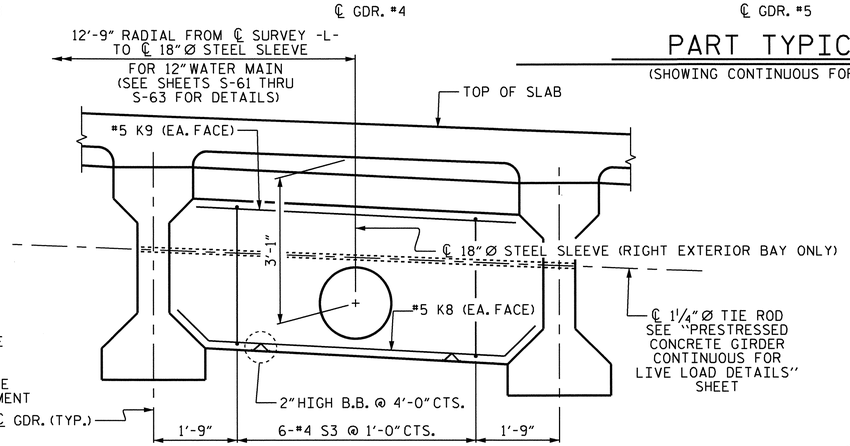
PARAPET AND VERTICAL CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

TEMPORARY STRUTS SHALL BE PLACED BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE DIAPHRAGMS, AND THE NUTS ON THE 1¼" DIA. TIE RODS SHALL BE FULLY TIGHTENED BEFORE THE DIAPHRAGMS ARE CAST. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED. THE TIE RODS SHALL BE RE-TIGHTENED AFTER THE STRUTS HAVE BEEN REMOVED.

CONCRETE IN INTERMEDIATE DIAPHRAGMS MAY BE CLASS A IN LIEU OF CLASS AA. PAYMENT SHALL BE MADE UNDER THE UNIT CONTRACT PRICE FOR REINFORCED CONCRETE DECK SLAB.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET, END POSTS AND VERTICAL CONCRETE BARRIER RAIL.

SEE SHEETS S-61 THRU S-63 FOR CONCRETE INSERTS IN BRIDGE DECK AND FOR LATERAL BRACING FOR 12" WATER MAIN ATTACHMENT AND INSTALLATION.



INTERMEDIATE DIAPHRAGM DETAIL

(TYP. EA. BAY)

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

23-AUG-2011 08:40
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PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

SHEET 1 OF 2

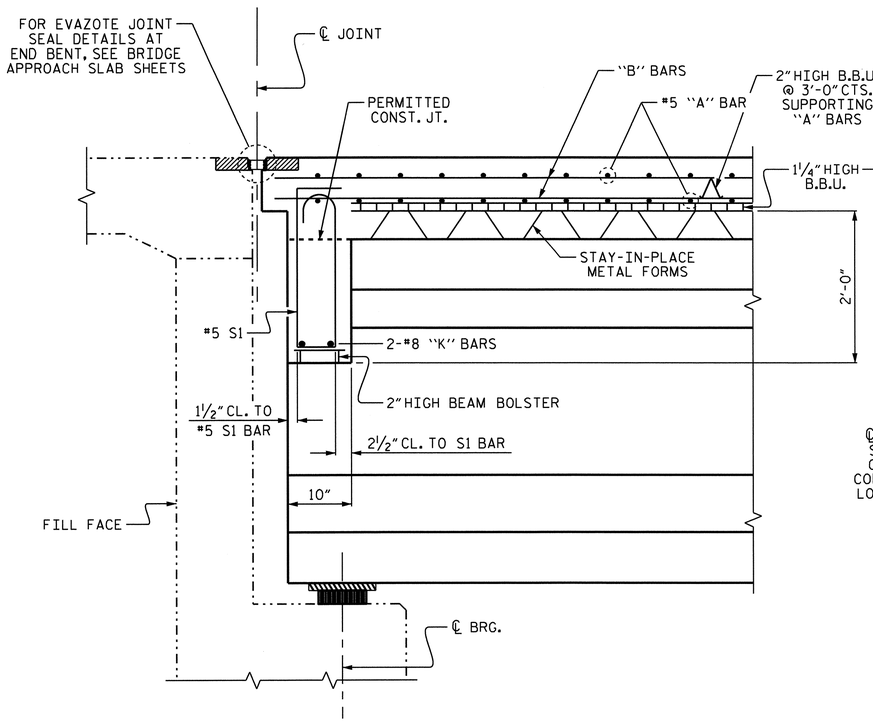
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

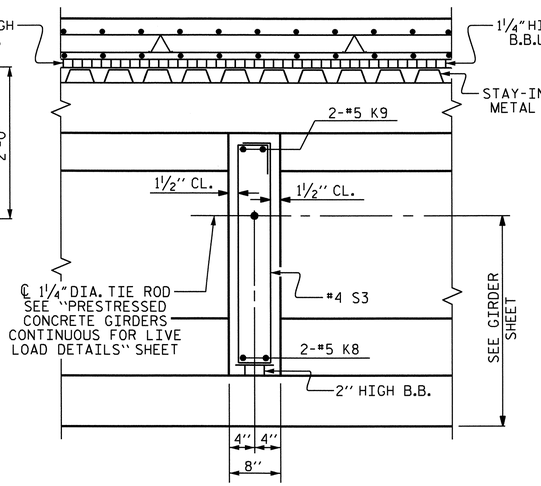
TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 24330 ENGINEER THEO J. BEACH 8/24/11

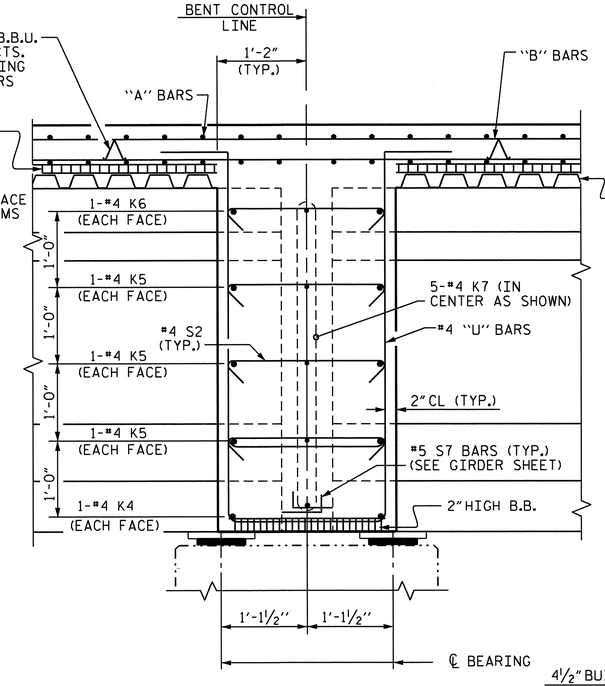
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			66



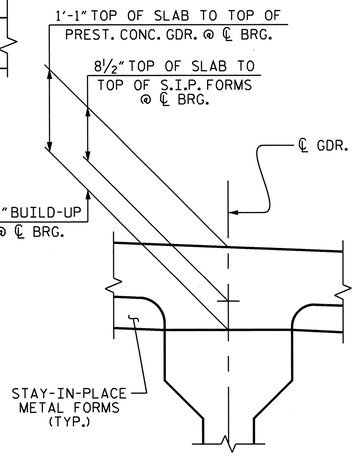
SECTION A-A



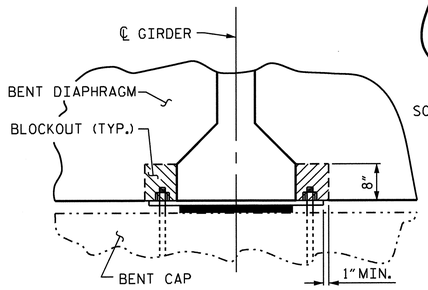
SECTION B-B



SECTION C-C



DETAIL "A"



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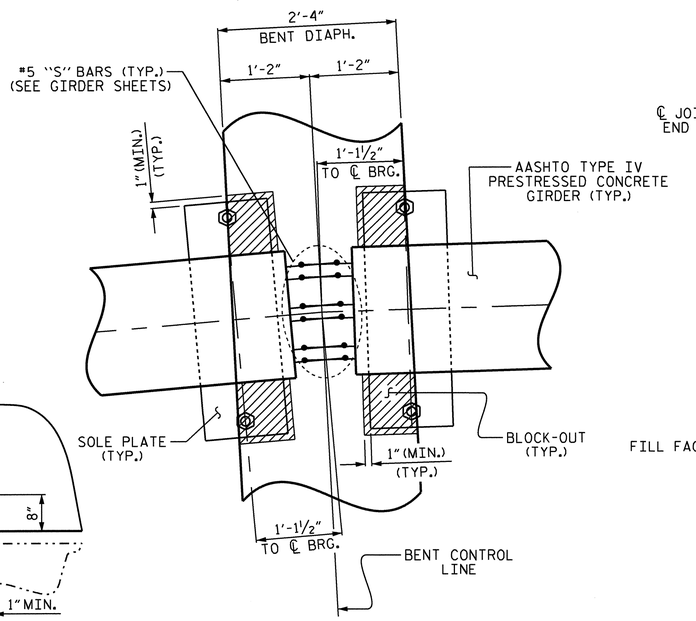
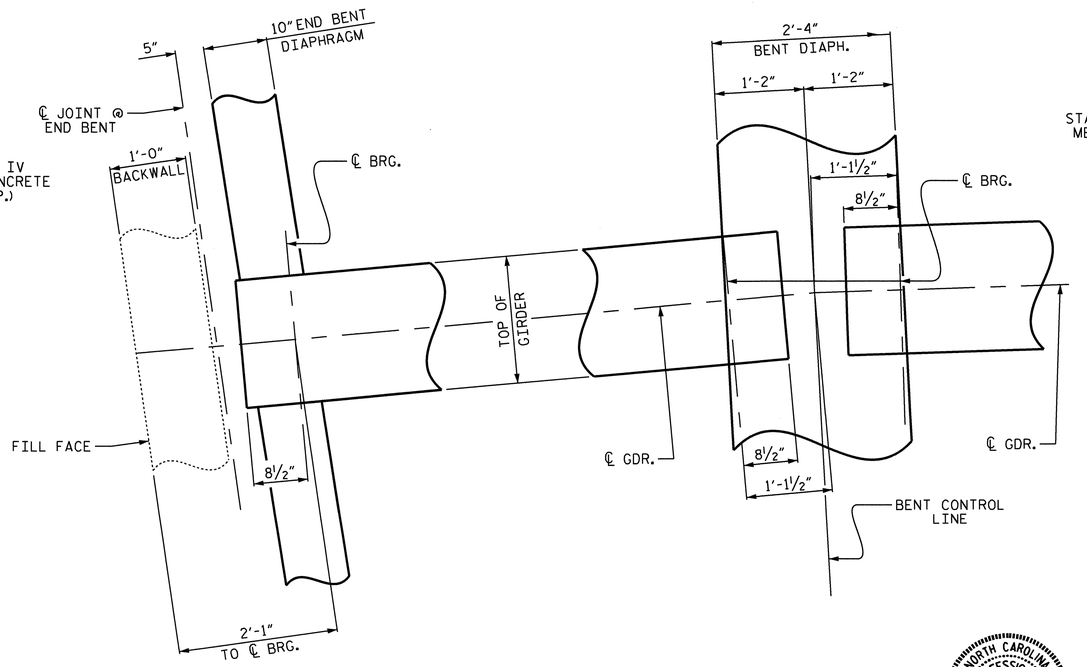


PLAN

BENT DIAPHRAGM BLOCK-OUT DETAIL



PLAN OF DIAPHRAGMS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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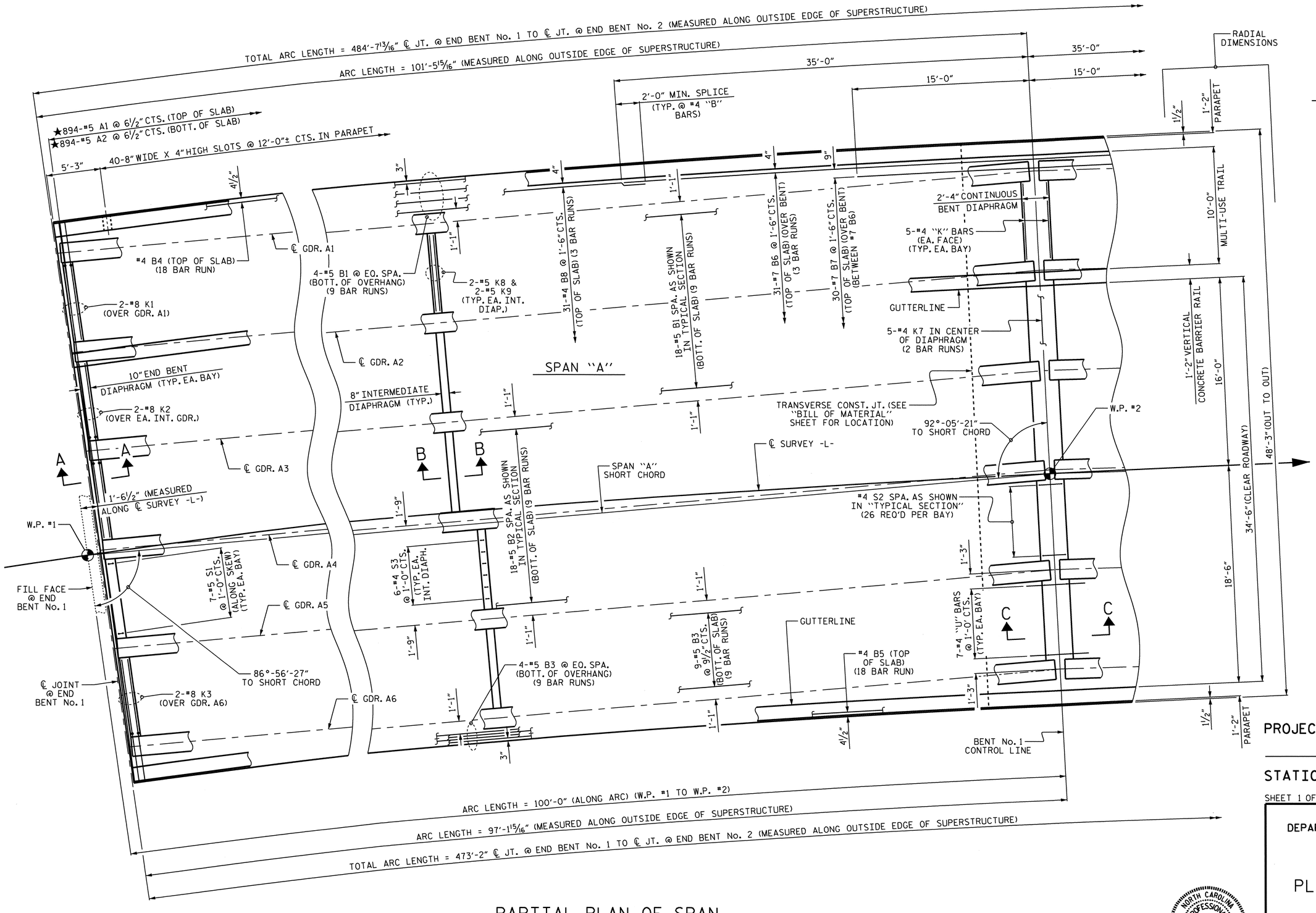

PARTIAL PLAN OF SPAN

NOTES:

FOR PARAPET REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEETS.

★#5 "A" BARS ARE TO BE PLACED RADIALLY AT 6½" CTS. MEASURED ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE AND TAPERED TO 6 5/16" ALONG RIGHT OUTSIDE EDGE OF SUPERSTRUCTURE.

FOR VERTICAL CONCRETE BARRIER RAIL REINFORCING STEEL, SEE "VERTICAL CONCRETE BARRIER RAIL" SHEETS.

FOR SECTION VIEW OF DIAPHRAGMS, SEE "TYPICAL SECTION" SHEET 2 OF 2.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "A"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24380 ENGINEER NEO J. BEACH 8/24/11

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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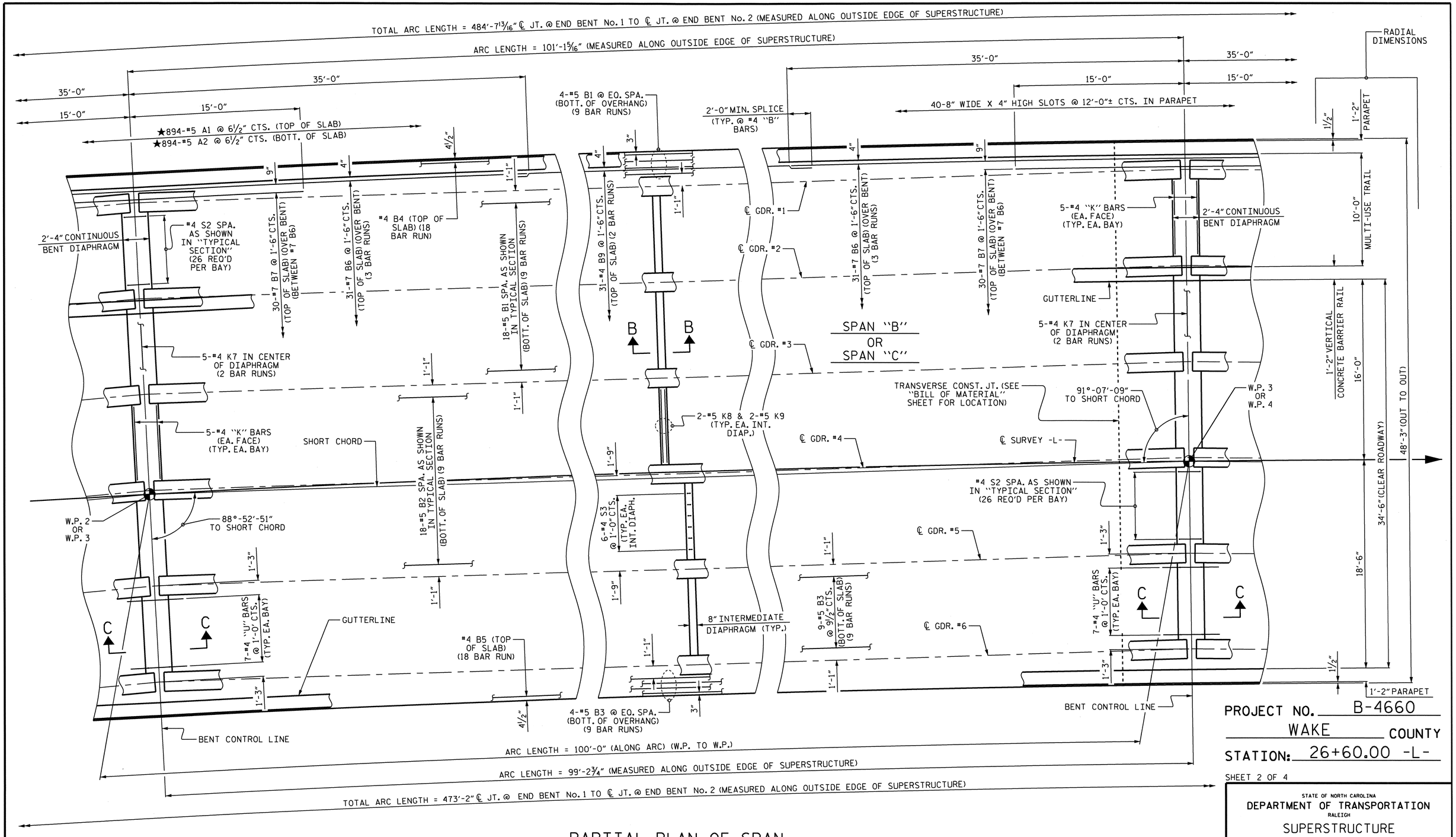

PARTIAL PLAN OF SPAN

FOR NOTES SEE SHEET 1 OF 4

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "B" OR "C"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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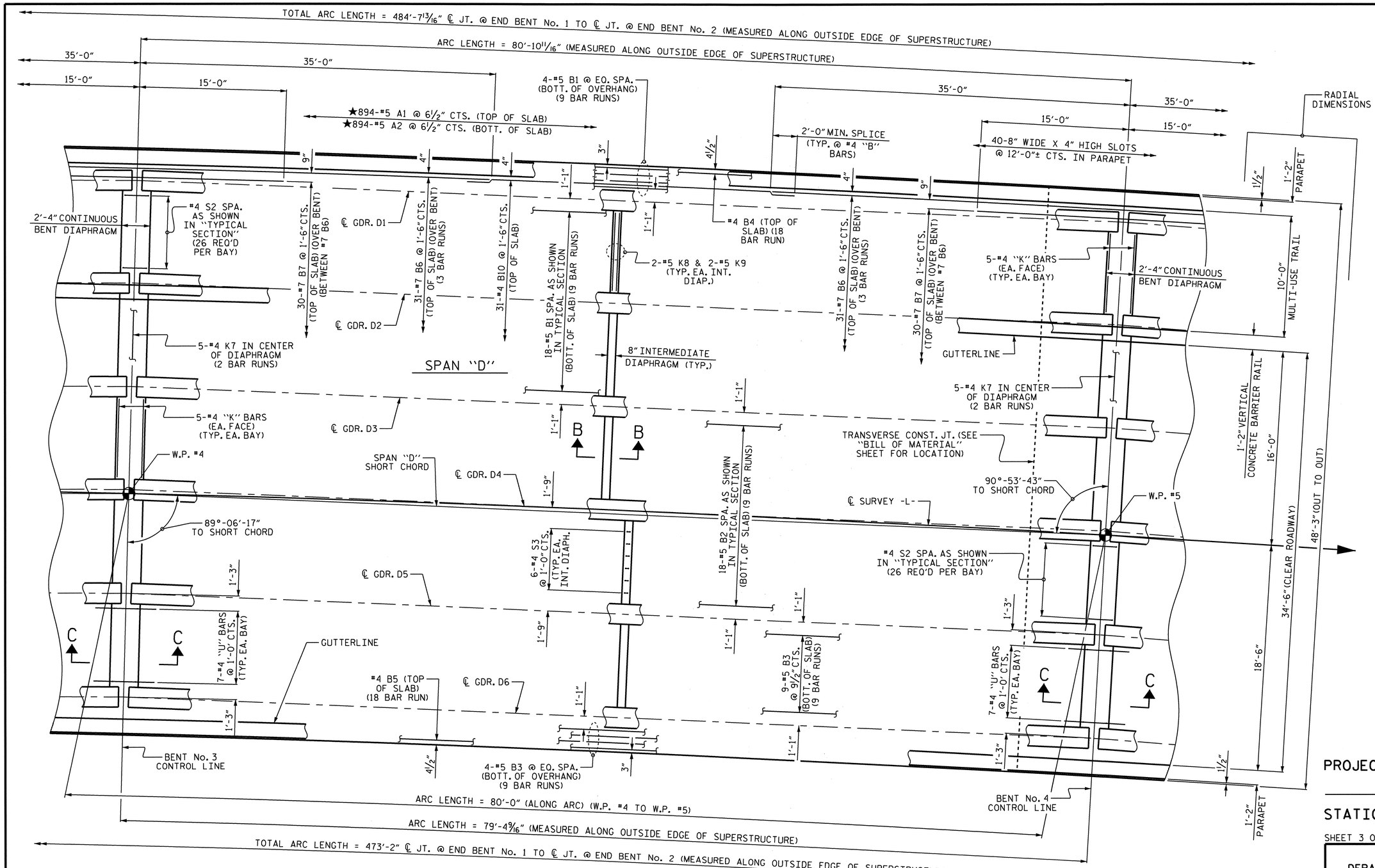

PARTIAL PLAN OF SPAN

FOR NOTES SEE SHEET 1 OF 4

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "D"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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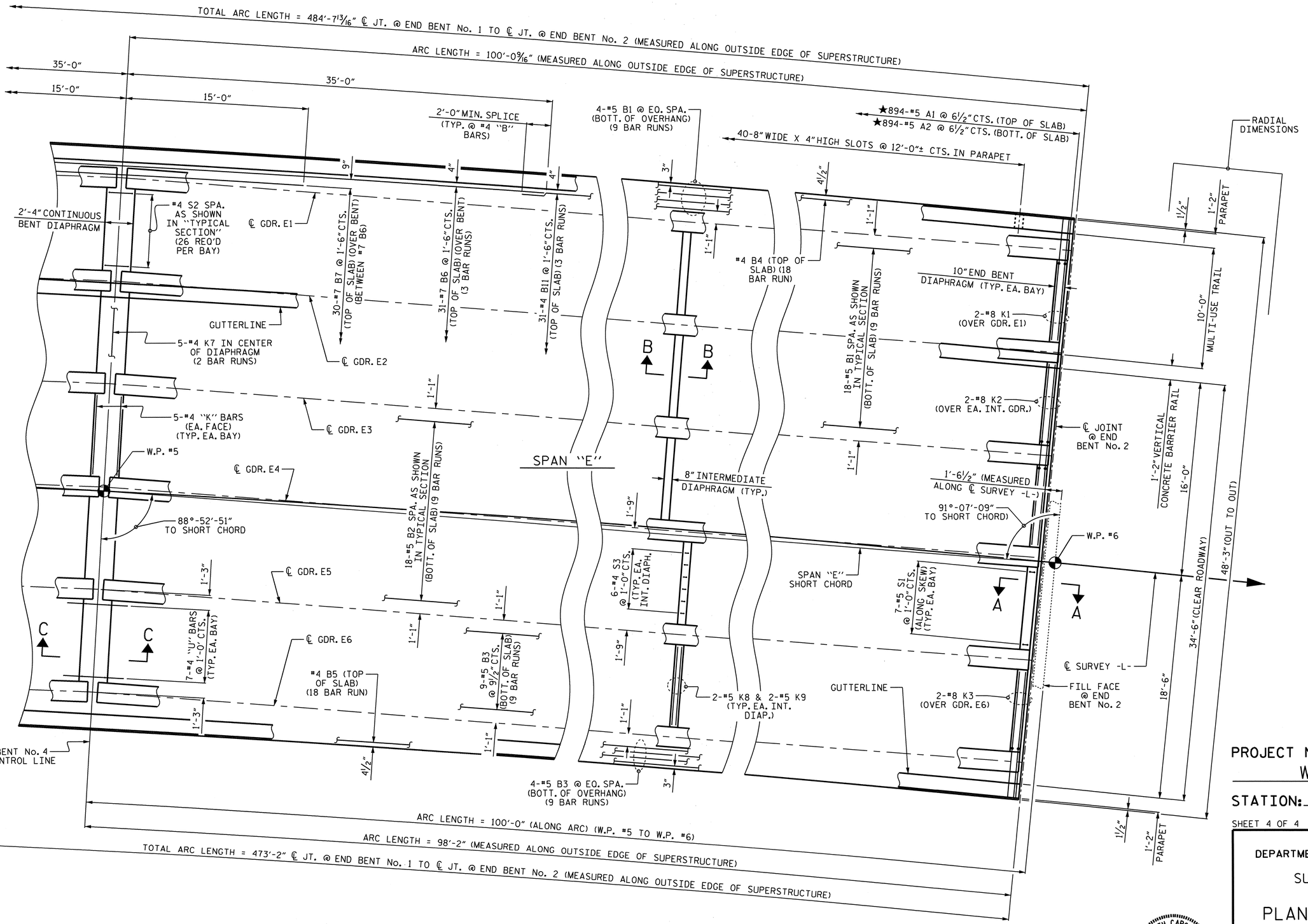

PARTIAL PLAN OF SPAN

FOR NOTES SEE SHEET 1 OF 4

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "E"

NORTH CAROLINA PROFESSIONAL SEAL 26390 ENGINEER HEIDI J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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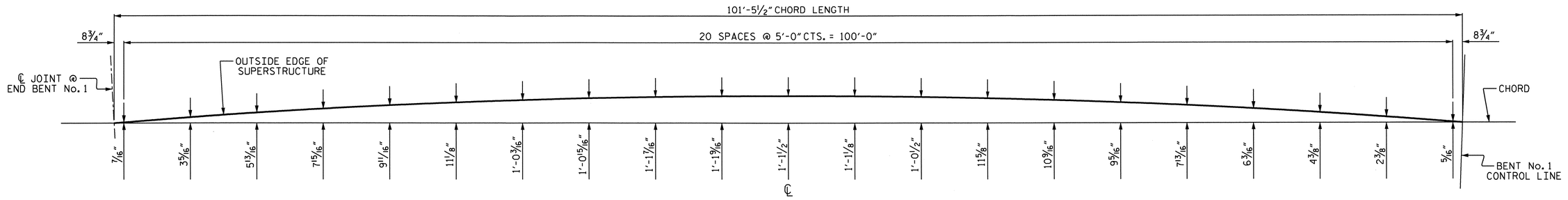
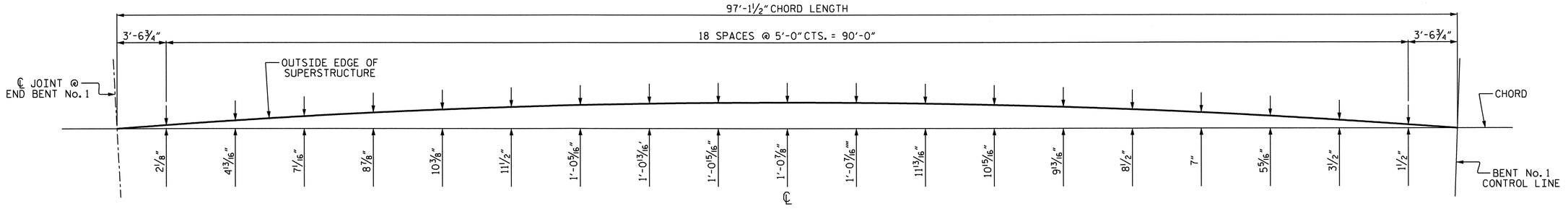


SPAN "A" OUTSIDE LEFT OVERHANG ARC OFFSETS



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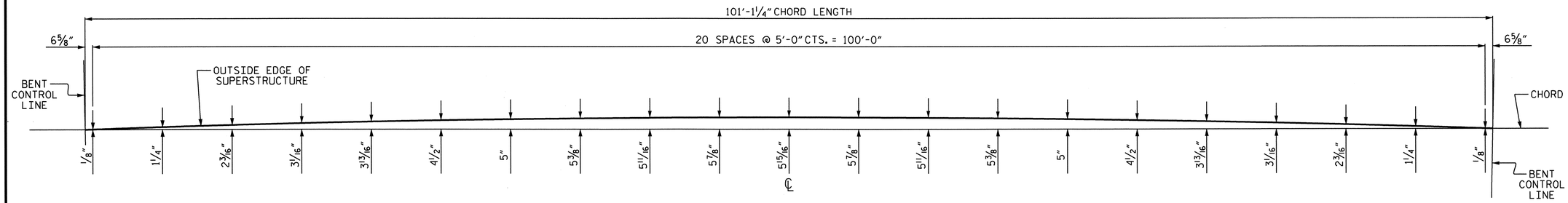
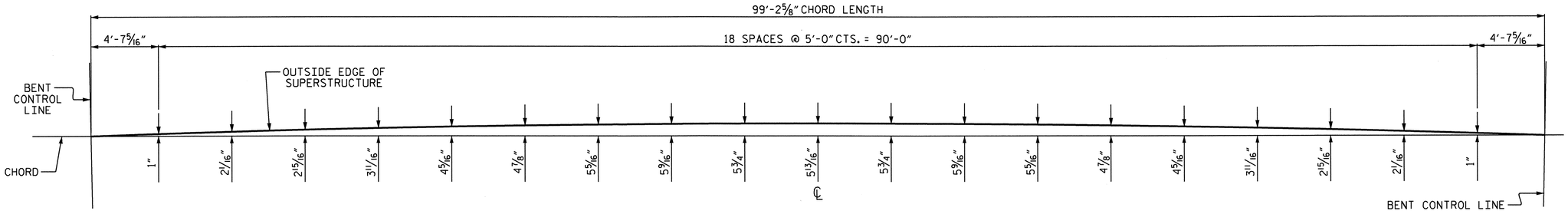


SPAN "B" OR "C" OUTSIDE LEFT OVERHANG ARC OFFSETS



SPAN "B" OR "C" OUTSIDE RIGHT OVERHANG ARC OFFSETS

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

08-JUL-2011 13:06
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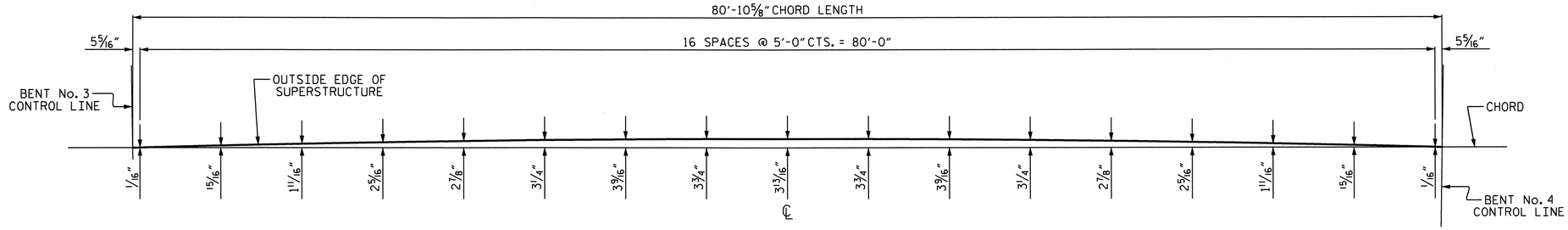

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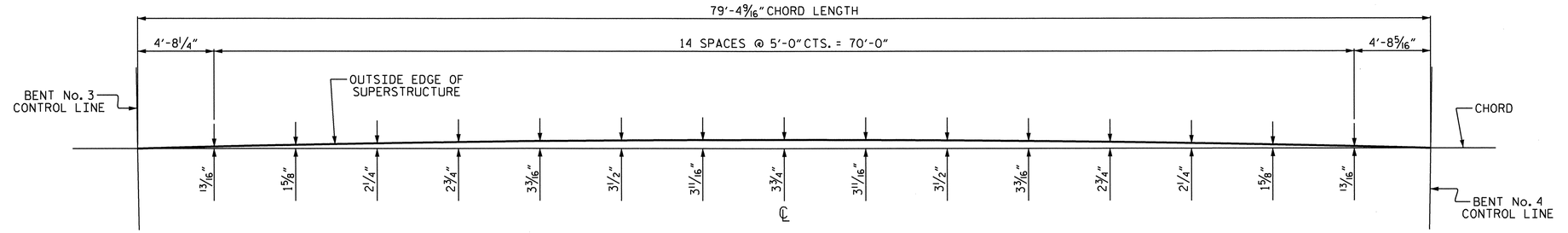

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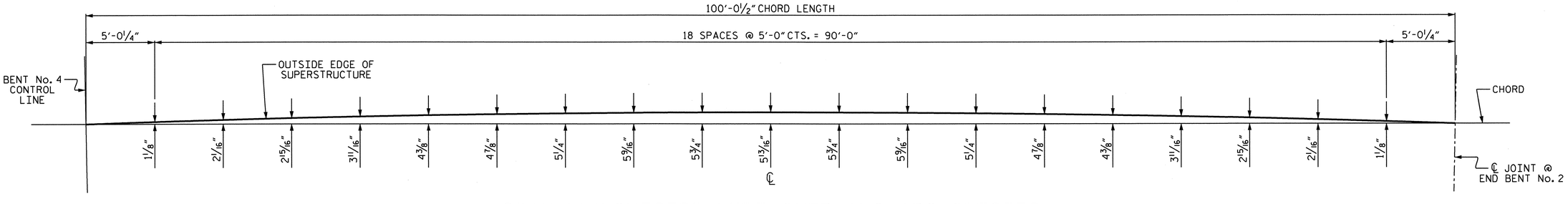

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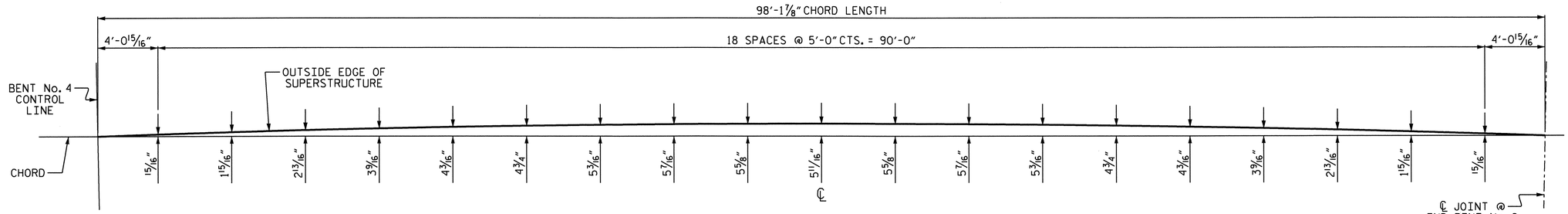

SPAN "E" OUTSIDE RIGHT OVERHANG ARC OFFSETS

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 6/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

08-JUL-2011 13:05
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dely

SPAN "A"

PARTIAL GIRDER LAYOUT

ANGLES

A	86°-57'-06"	G	92°-06'-00"
B	86°-56'-54"	H	92°-05'-47"
C	86°-56'-41"	I	92°-05'-34"
D	86°-56'-27"	J	92°-05'-21"
E	86°-56'-14"	K	92°-05'-08"
F	86°-56'-00"	L	92°-04'-54"

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

GIRDER LAYOUT

NORTH CAROLINA PROFESSIONAL SEAL 23390 ENGINEER THEO J. BEACH 8/29/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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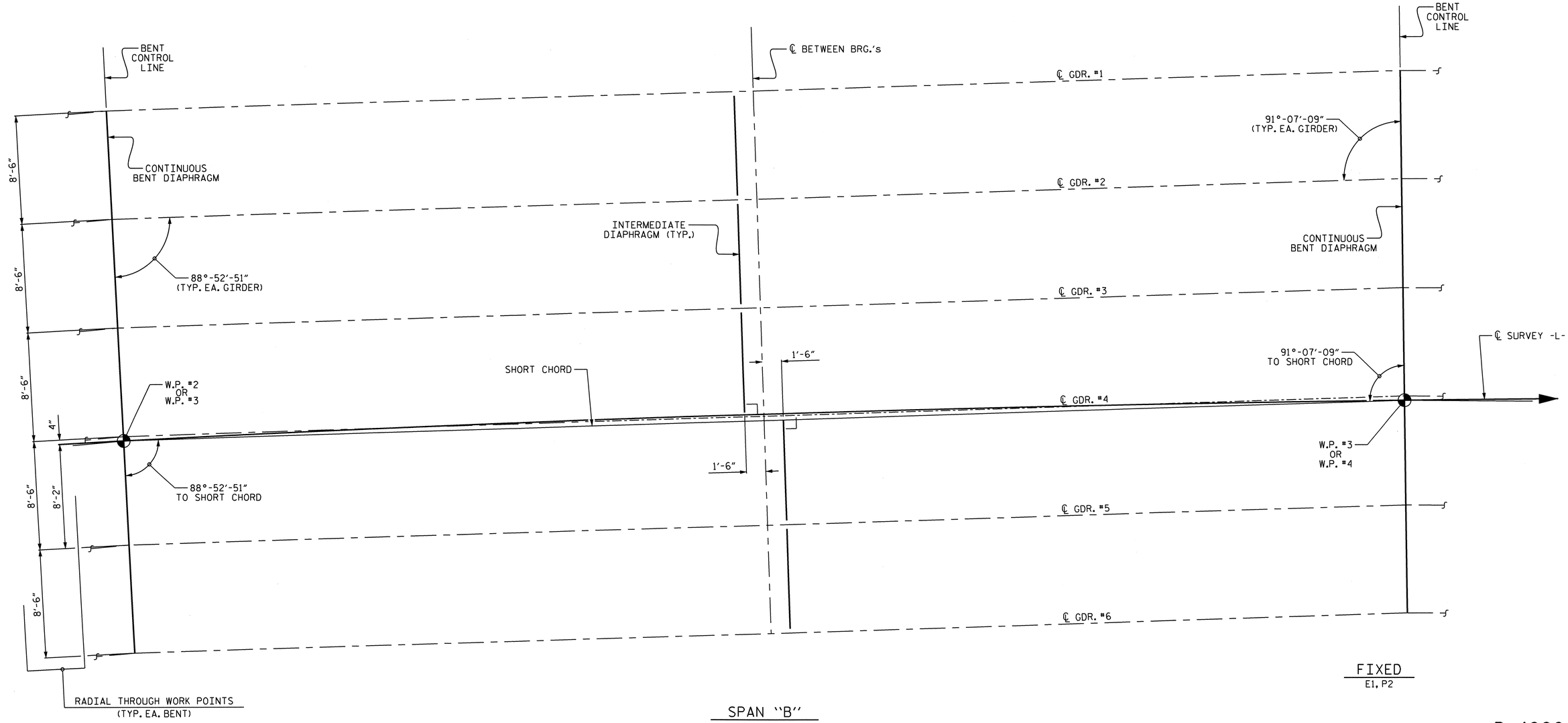

SPAN "B"
OR
SPAN "C"

PARTIAL GIRDER LAYOUT

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER LAYOUT

NORTH CAROLINA PROFESSIONAL SEAL 24330 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

08-JUL-2011 13:04
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PARTIAL GIRDER LAYOUT

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER LAYOUT

NORTH CAROLINA PROFESSIONAL SEAL 24690 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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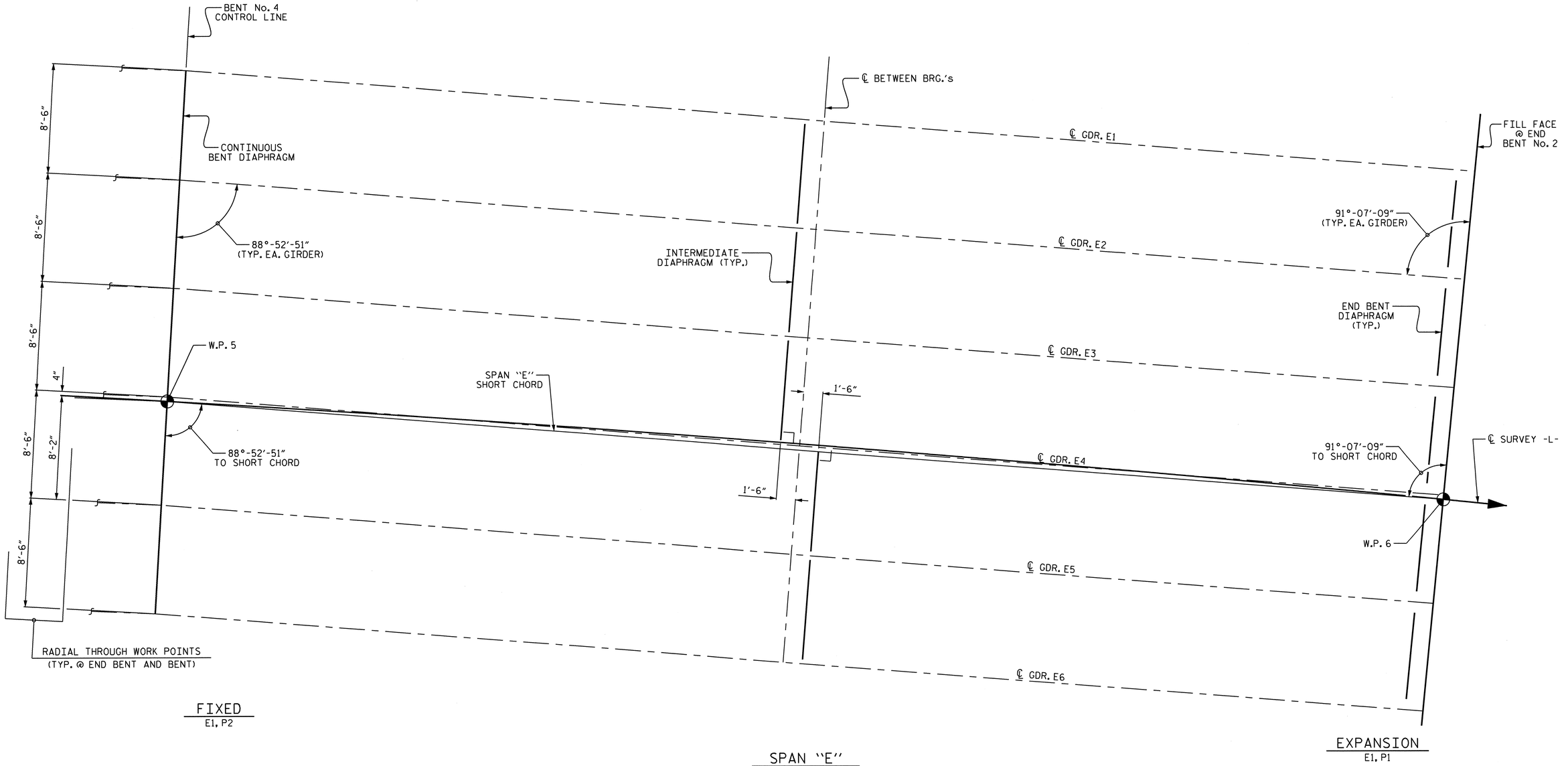

SPAN "E"

PARTIAL GIRDER LAYOUT

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER LAYOUT

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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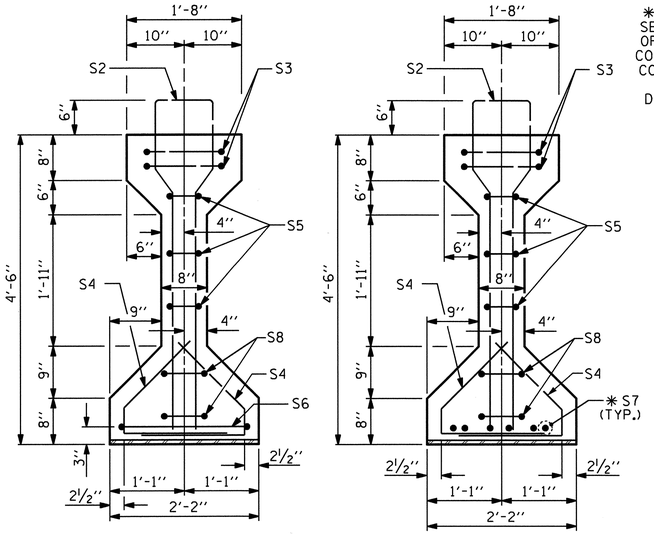
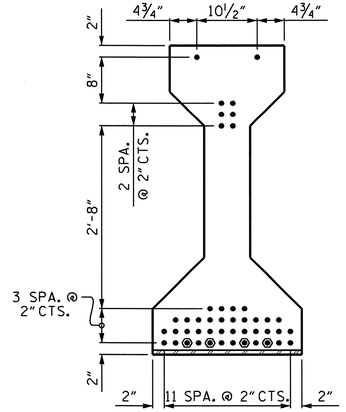


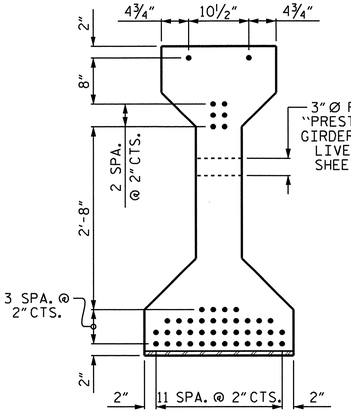
SECTION A-A

SECTION B-B

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



AT END OF GIRDER



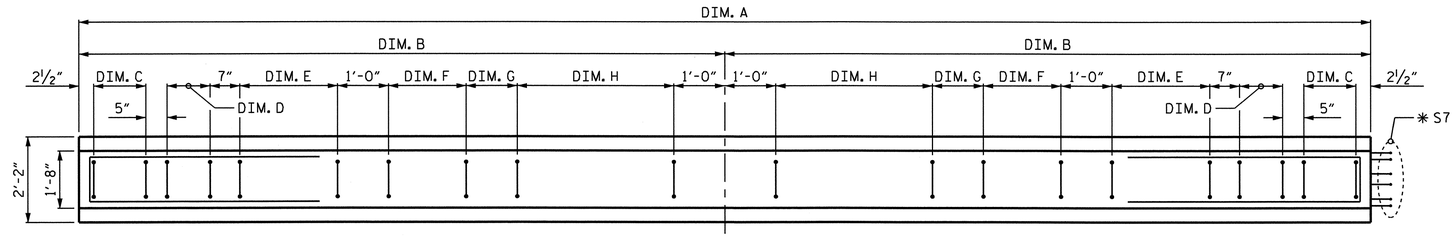
AT ℄ OF GIRDER

A1, A2, & A3
A4, A5, & A6
A1, A2, A3, & A4
A5 & A6
A1, A2, A3, & A4
A5 & A6

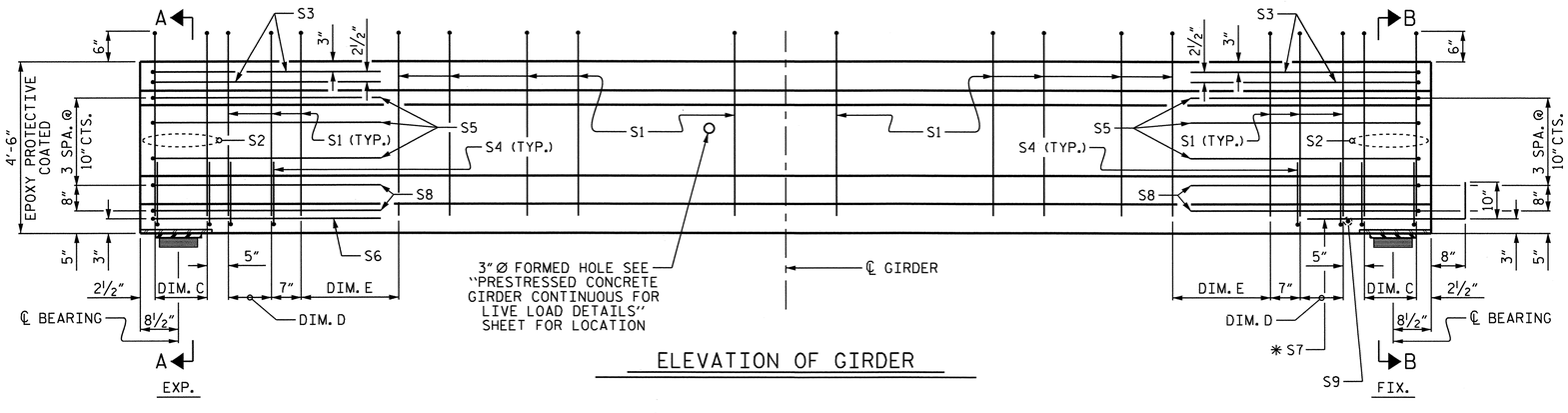
0.6" Ø LOW RELAXATION STRAND LAYOUT

(46 STRANDS REQUIRED)

- ● FULLY BONDED STRAND
- ◉ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



PLAN OF GIRDER



ELEVATION OF GIRDER

GIRDER TABLE

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F	DIM. G	DIM. H
A1	100'-5 7/8"	50'-2 15/16"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	1'-1 7/16"	9 SPA. @ 2'-0"CTS.
A2	99'-8 3/4"	49'-10 3/8"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	8 7/8"	9 SPA. @ 2'-0"CTS.
A3	98'-11 5/8"	49'-5 13/16"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	4 5/16"	9 SPA. @ 2'-0"CTS.
A4	98'-2 3/8"	49'-1 1/16"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	11 11/16"	9 SPA. @ 2'-0"CTS.
A5	97'-5 1/4"	48'-8 5/8"	14 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	11 1/8"	9 SPA. @ 2'-0"CTS.
A6	96'-8 1/8"	48'-4 1/16"	14 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	6 5/16"	9 SPA. @ 2'-0"CTS.

0.6" Ø L.R. GRADE 270 STANDS

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

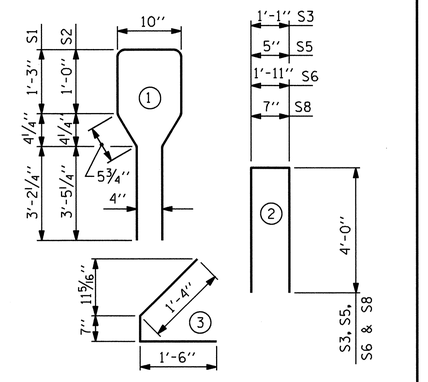
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	98	#4	1	10'-8"	698
S1	96	#4	1	10'-8"	684
S2	32	#6	1	10'-8"	513
S2	30	#6	1	10'-8"	481
S3	4	#4	2	9'-1"	24
S4	112	#4	3	3'-5"	256
S4	108	#4	3	3'-5"	246
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱ S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL (LB.)	9000 PSI CONCRETE (C.Y.)	0.6" Ø L.R. STRANDS (NO.)
GDR. A1	1579	20.4	46
GDR. A2	1579	20.2	46
GDR. A3	1579	20.1	46
GDR. A4	1565	19.9	46
GDR. A5	1523	19.8	46
GDR. A6	1523	19.6	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
A1	100'-5 7/8"	100.49'
A2	99'-8 3/4"	99.73'
A3	98'-11 5/8"	98.97'
A4	98'-2 3/8"	98.20'
A5	97'-5 1/4"	97.44'
A6	96'-8 1/8"	96.68'
TOTAL		591.51'

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN "A"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			66

STD. NO. PCG6

ASSEMBLED BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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

REV. 7/17/98 RWW/LES
REV. 10/17/00R RWW/LES
REV. 5/1/06R TLA/GM

08-JUL-2011 13:02
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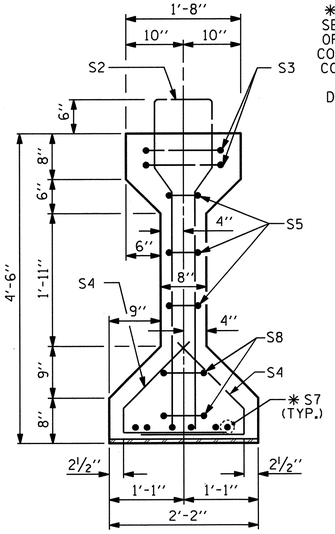
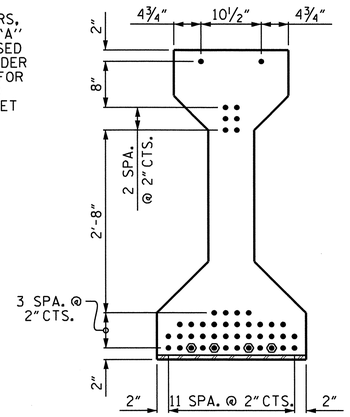
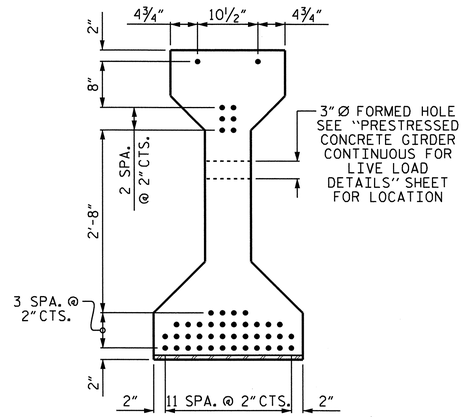


✱FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION B-B



AT END OF GIRDER



AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT

(46 STRANDS REQUIRED)

- ● FULLY BONDED STRAND
- ⬣ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9000 PSI CONCRETE	0.6"Ø L.R. STRANDS
	LB.	C.Y.	NO.
GDR. B1 OR C1	1595	20.3	46
GDR. B2 OR C2	1595	20.3	46
GDR. B3 OR C3	1595	20.2	46
GDR. B4 OR C4	1595	20.1	46
GDR. B5 OR C5	1553	20.1	46
GDR. B6 OR C6	1553	20.0	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
B1 OR C1	100'-2"	200.33'
B2 OR C2	99'-10"	199.67'
B3 OR C3	99'-6"	199.00'
B4 OR C4	99'-2⅛"	198.35'
B5 OR C5	98'-10⅛"	197.69'
B6 OR C6	98'-6⅛"	197.02'
TOTAL		1192.06'

0.6" Ø L.R. GRADE 270 STANDS

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

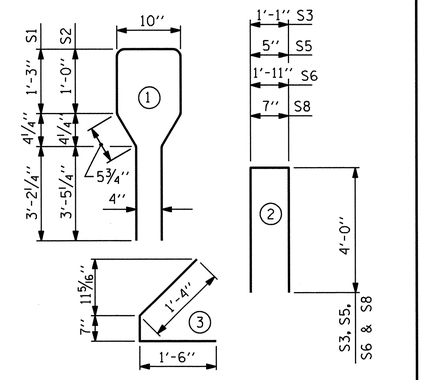
REINFORCING STEEL FOR ONE GIRDER

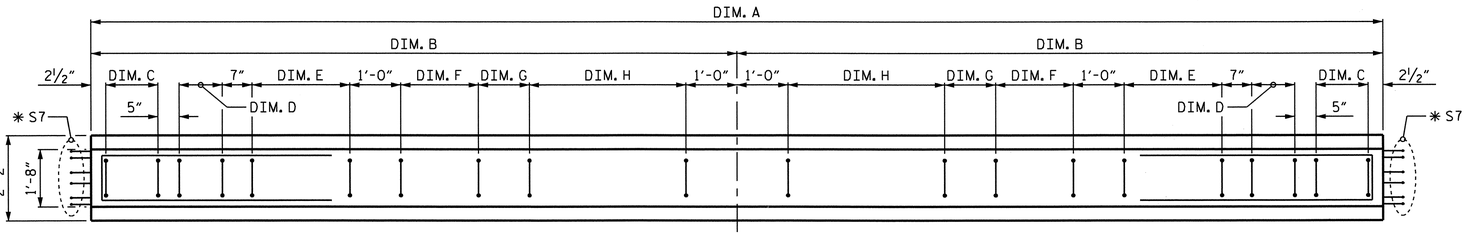
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1, B2, B3, B4, C1, C2, C3, & C4	S1	98	#4	1	10'-8"	698
B5, B6, C5, & C6	S2	32	#6	1	10'-8"	513
	S2	30	#6	1	10'-8"	481
	S3	4	#4	2	9'-1"	24
B1, B2, B3, B4, C1, C2, C3, & C4	S4	112	#4	3	3'-5"	256
B5, B6, C5, & C6	S4	108	#4	3	3'-5"	246
	S5	6	#4	2	8'-5"	34
	✱ S7	12	#5	STR	3'-8"	46
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1

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

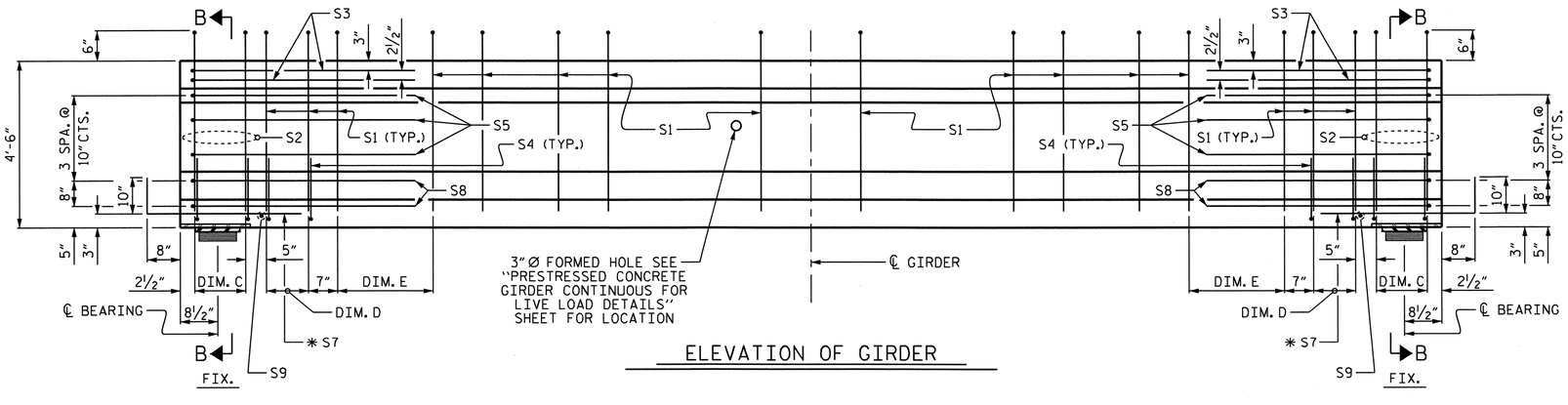
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT





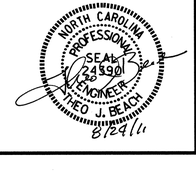
PLAN OF GIRDER



ELEVATION OF GIRDER

GIRDER TABLE

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F	DIM. G	DIM. H
B1 & C1	100'-2"	50'-1"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	11½"	9 SPA. @ 2'-0"CTS.
B2 & C2	99'-10"	49'-11"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	9½"	9 SPA. @ 2'-0"CTS.
B3 & C3	99'-6"	49'-9"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	7½"	9 SPA. @ 2'-0"CTS.
B4 & C4	99'-2⅛"	49'-7/16"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	5 9/16"	9 SPA. @ 2'-0"CTS.
B5 & C5	98'-10⅛"	49'-5/16"	14 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	7 9/16"	9 SPA. @ 2'-0"CTS.
B6 & C6	98'-6⅛"	49'-3/16"	14 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	5 9/16"	9 SPA. @ 2'-0"CTS.



PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD

SPAN "B" OR "C"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			66

ASSEMBLED BY : T. BANKOVICH	DATE : 3-2010	
CHECKED BY : D.G. ELY	DATE : 2-2011	
DRAWN BY : ELR 8/91	REV. 7/17/98	RWW/LES
CHECKED BY : GRP 8/91	REV. 10/17/00R	RWW/LES
	REV. 5/1/06R	TLA/GM

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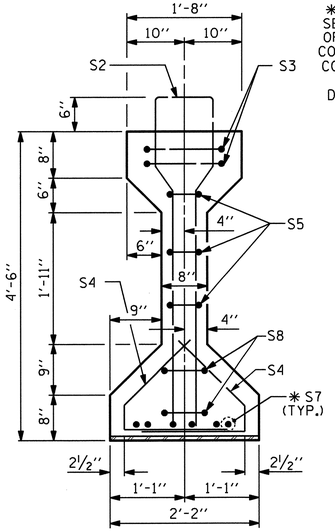
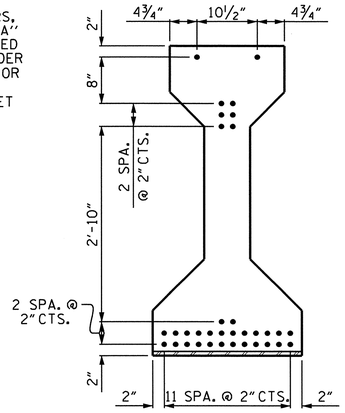
STD. NO. PCG6

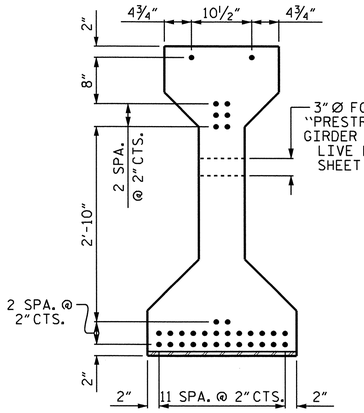


SECTION B-B

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



AT END OF GIRDER



AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(34 STRANDS REQUIRED)

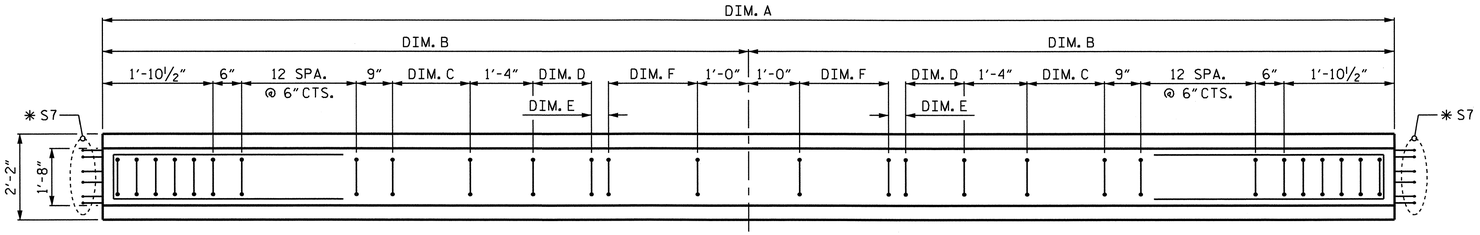
● FULLY BONDED STRAND

QUANTITIES FOR ONE GIRDER

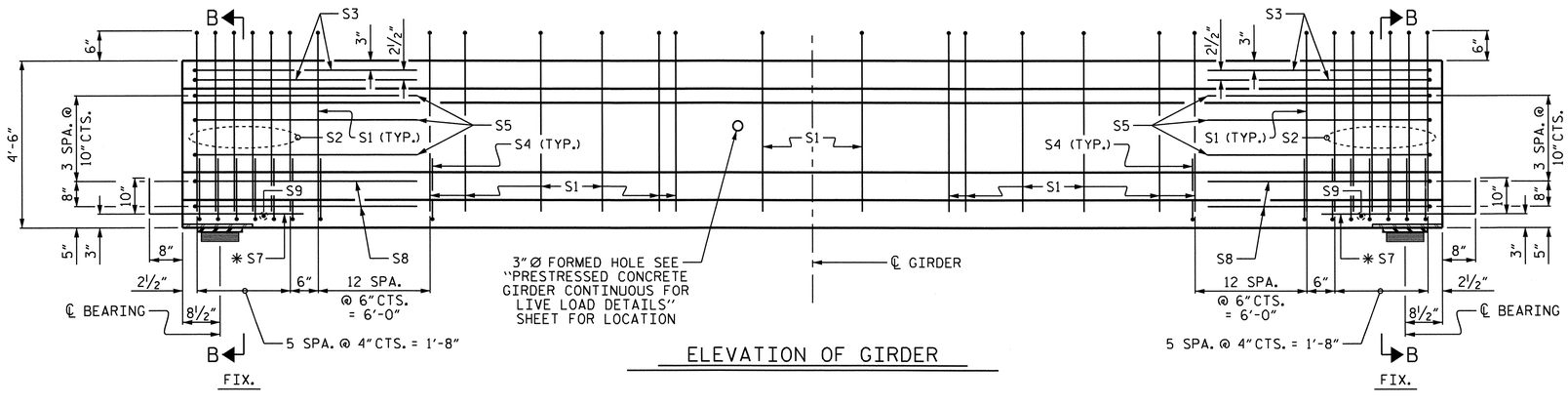
	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	NO.
GDR. D1 OR D2	1020	16.2	34
GDR. D3 OR D4	1020	16.1	34
GDR. D5 OR D6	1020	16.0	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
D1	79'-11⅝"	79.97'
D2	79'-8½"	79.71'
D3	79'-5¼"	79.44'
D4	79'-2⅛"	79.18'
D5	78'-10⅞"	78.91'
D6	78'-7¾"	78.65'
TOTAL		475.86'



PLAN OF GIRDER



ELEVATION OF GIRDER

GIRDER TABLE

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F
D1	79'-11⅝"	39'-11¹³⁄₁₆"	10 SPA. @ 9"CTS.	4 SPA. @ 1'-4"CTS.	1'-8⅝"	7 SPA. @ 2'-0"CTS.
D2	79'-8½"	39'-10¼"	10 SPA. @ 9"CTS.	4 SPA. @ 1'-4"CTS.	1'-6¾"	7 SPA. @ 2'-0"CTS.
D3	79'-5¼"	39'-8⅝"	10 SPA. @ 9"CTS.	4 SPA. @ 1'-4"CTS.	1'-5⅛"	7 SPA. @ 2'-0"CTS.
D4	79'-2⅛"	39'-7¹⁄₁₆"	9 SPA. @ 9"CTS.	5 SPA. @ 1'-4"CTS.	8⁹⁄₁₆"	7 SPA. @ 2'-0"CTS.
D5	78'-10⅞"	39'-5⁷⁄₁₆"	9 SPA. @ 9"CTS.	5 SPA. @ 1'-4"CTS.	6¹⁵⁄₁₆"	7 SPA. @ 2'-0"CTS.
D6	78'-7¾"	39'-3⅞"	9 SPA. @ 9"CTS.	5 SPA. @ 1'-4"CTS.	5⅜"	7 SPA. @ 2'-0"CTS.

0.6" Ø L.R. GRADE 270 STANDS

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

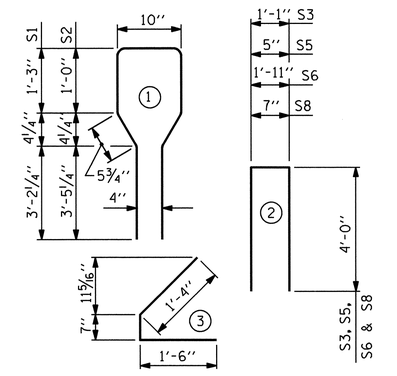
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	74	#4	1	10'-8"	527
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	76	#4	3	3'-5"	173
S5	6	#4	2	8'-5"	34
* S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT



PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN "D"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER NEO J. BEACH
8/24/11

ASSEMBLED BY : T. BANKOVICH	DATE : 3-2010	
CHECKED BY : D.G. ELY	DATE : 1-2011	
DRAWN BY : ELR 8/91	REV. 7/17/98	RWW/LES
CHECKED BY : GRP 8/91	REV. 10/17/00R	RWW/LES
	REV. 5/1/06R	TLA/GM

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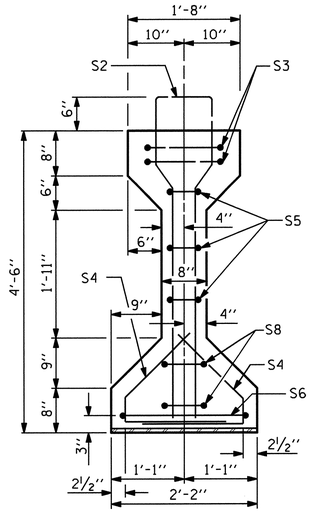
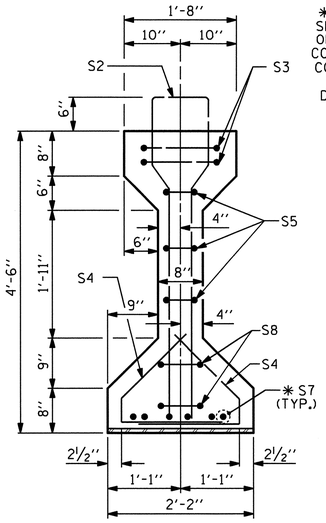
STD. NO. PCG6

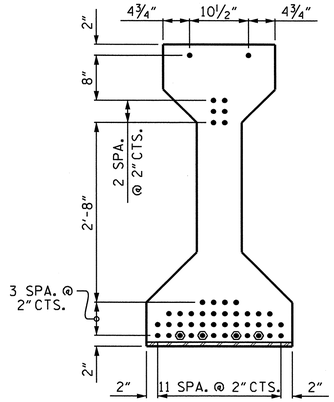


SECTION A-A

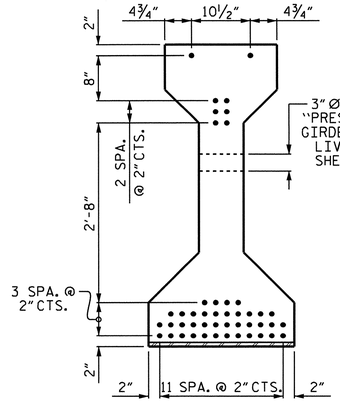


SECTION B-B

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



AT END OF GIRDER

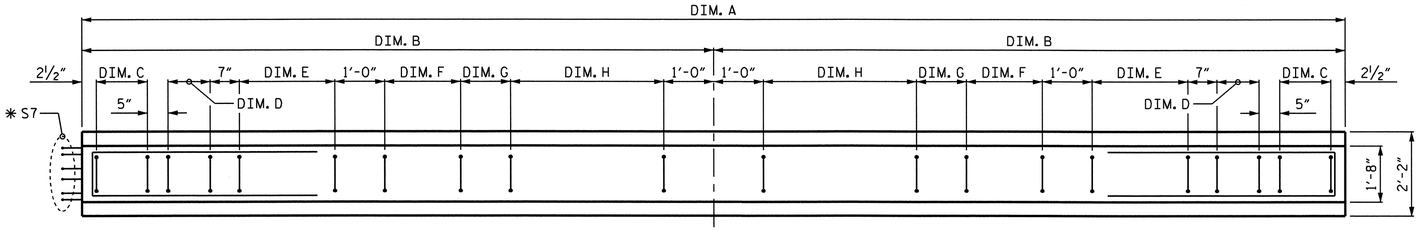


AT ℄ OF GIRDER

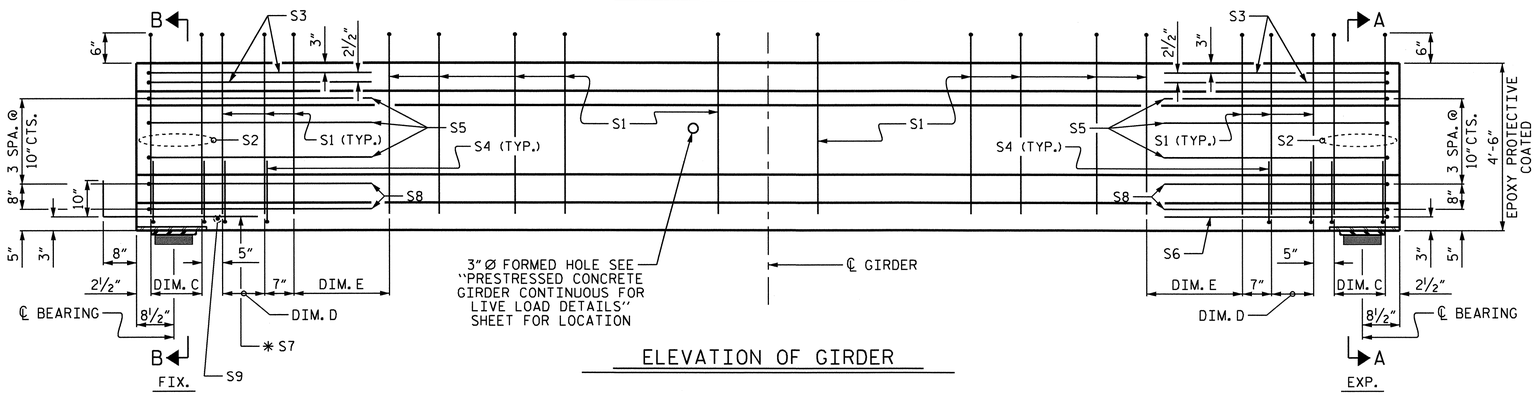
0.6"Ø LOW RELAXATION STRAND LAYOUT

(46 STRANDS REQUIRED)

- ● FULLY BONDED STRAND
- ◉ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



PLAN OF GIRDER



ELEVATION OF GIRDER

GIRDER TABLE

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F	DIM. G	DIM. H
E1	99'-2½"	49'-7¼"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	9 SPA. @ 1'-0"CTS.	5¾"	9 SPA. @ 2'-0"CTS.
E2	98'-10½"	49'-5¼"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	1'-3¾"	9 SPA. @ 2'-0"CTS.
E3	98'-6½"	49'-3¼"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	1'-1¾"	9 SPA. @ 2'-0"CTS.
E4	98'-2⅝"	49'-1 5/16"	15 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	11 13/16"	9 SPA. @ 2'-0"CTS.
E5	97'-10⅝"	48'-11 5/16"	14 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	1'-1 13/16"	9 SPA. @ 2'-0"CTS.
E6	97'-6⅝"	48'-9 5/16"	14 SPA. @ 4"CTS.	11 SPA. @ 5"CTS.	16 SPA. @ 7"CTS.	8 SPA. @ 1'-0"CTS.	11 13/16"	9 SPA. @ 2'-0"CTS.

0.6" Ø L.R. GRADE 270 STANDS

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

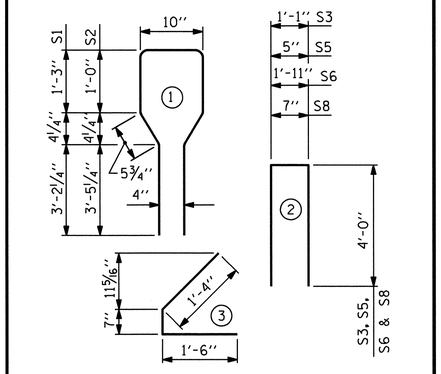
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
E1	S1	98	#4	1	10'-8"	698
E2, E3, E4, E5, & E6	S1	96	#4	1	10'-8"	684
E1, E2, E3, & E4	S2	32	#6	1	10'-8"	513
E5 & E6	S2	30	#6	1	10'-8"	481
	S3	4	#4	2	9'-1"	24
E1, E2, E3, & E4	S4	112	#4	3	3'-5"	256
E5 & E6	S4	108	#4	3	3'-5"	246
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	✱ S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS NO.
GDR. E1	1579	20.1	46
GDR. E2	1565	20.1	46
GDR. E3	1565	20.0	46
GDR. E4	1565	19.9	46
GDR. E5	1523	19.9	46
GDR. E6	1523	19.8	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
E1	99'-2½"	99.21'
E2	98'-10½"	98.88'
E3	98'-6½"	98.54'
E4	98'-2⅝"	98.22'
E5	97'-10⅝"	97.89'
E6	97'-6⅝"	97.55'
TOTAL		590.29'

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN "E"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			66

STD. NO. PCG6

ASSEMBLED BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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

REV. 7/17/98 RWW/LES
REV. 10/17/00R RWW/LES
REV. 5/1/06R TLA/GM

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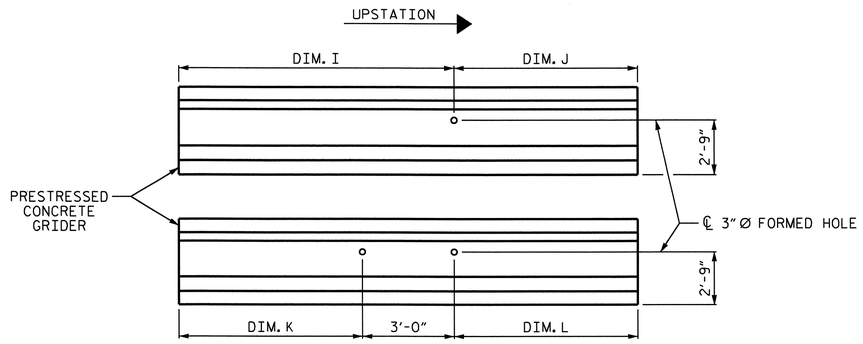
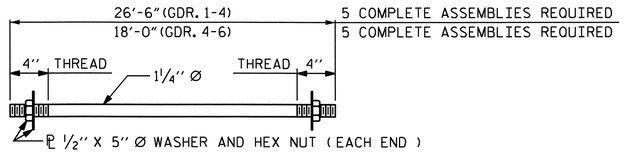
TIE ROD PLACEMENT TABLE

GIRDER	DIM. I	DIM. J	DIM. K	DIM. L
GDR. A1	48′-11½″	51′-6⅜″	———	———
GDR. A2	48′-6⅛″	51′-2⅝″	———	———
GDR. A3	48′-0 11/16″	50′-10 15/16″	———	———
GDR. A4	———	———	47′-7 3/16″	47′-7 3/16″
GDR. A5	50′-1¾″	47′-3½″	———	———
GDR. A6	49′-8 5/16″	46′-11 13/16″	———	———
GDR. B1 & C1	48′-7″	51′-7″	———	———
GDR. B2 & C2	48′-5″	51′-5″	———	———
GDR. B3 & C3	48′-3 1/16″	51′-2 15/16″	———	———
GDR. B4 & C4	———	———	48′-1 1/16″	48′-1 1/16″
GDR. B5 & C5	50′-11 1/16″	47′-11 1/16″	———	———
GDR. B6 & C6	50′-9 1/16″	47′-9 1/16″	———	———
GDR. D1	38′-5 13/16″	41′-5 13/16″	———	———
GDR. D2	38′-4¼″	41′-4¼″	———	———
GDR. D3	38′-2⅝″	41′-2⅝″	———	———
GDR. D4	———	———	38′-1 1/16″	38′-1 1/16″
GDR. D5	40′-11 7/16″	37′-11 7/16″	———	———
GDR. D6	40′-9⅞″	37′-9⅞″	———	———
GDR. E1	48′-1¼″	51′-1¼″	———	———
GDR. E2	47′-11¼″	50′-11¼″	———	———
GDR. E3	47′-9¼″	50′-9¼″	———	———
GDR. E4	———	———	47′-7 5/16″	47′-7 5/16″
GDR. E5	50′-5 5/16″	47′-5 5/16″	———	———
GDR. E6	50′-3 5/16″	47′-3 5/16″	———	———



ELEVATION

TIE ROD PLACEMENT DETAIL



1¼″ Ø TIE ROD ASSEMBLY

NOTES:

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

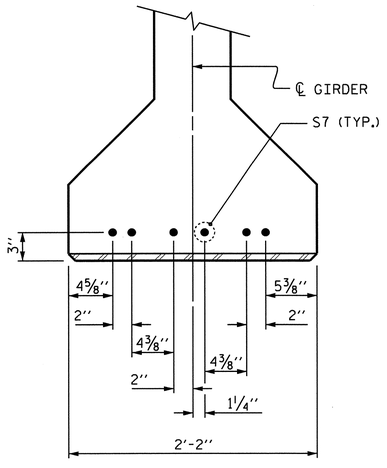
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6900 PSI.

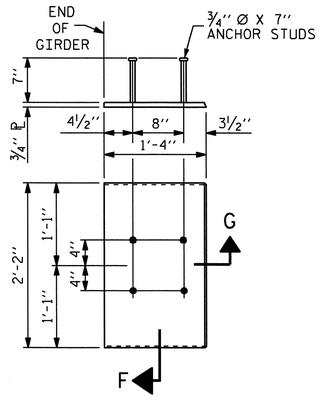
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

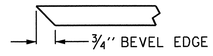
FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.



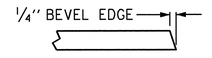
DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS)



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



SECTION "F"
(SEE NOTES)



SECTION "G"

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

ASSEMBLED BY : T. BANKOVICH	DATE : 3-2010
CHECKED BY : D.G. ELY	DATE : 2-2011
DRAWN BY : ELR 11/91	REV. 10/17/00 RWW/LES
CHECKED BY : GRP 11/91	REV. 7/10/01RR LES/RDR
	REV. 5/1/06 TLA/GM

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STD. NO. PCG11

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN "A"

0.6" Ø LOW RELAXATION	GIRDER A1											GIRDER A2, A3, A4, & A5											GIRDER A6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.105	0.198	0.272	0.318	0.334	0.318	0.272	0.198	0.105	0	0	0.104	0.197	0.270	0.316	0.332	0.316	0.270	0.197	0.104	0	0	0.102	0.192	0.263	0.308	0.324	0.308	0.263	0.192	0.102	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.048	0.091	0.125	0.146	0.154	0.146	0.125	0.091	0.048	0	0	0.052	0.098	0.134	0.157	0.164	0.157	0.134	0.098	0.052	0	0	0.041	0.077	0.106	0.124	0.130	0.124	0.106	0.077	0.041	0
FINAL CAMBER ↑	0	11/16"	1 5/16"	1 3/4"	2 1/16"	2 3/16"	2 1/16"	1 3/4"	1 5/16"	11/16"	0	0	5/8"	1 3/16"	1 5/8"	1 15/16"	2"	1 15/16"	1 5/8"	1 3/16"	5/8"	0	0	3/4"	1 3/8"	1 7/8"	2 3/16"	2 5/16"	2 3/16"	1 7/8"	1 3/8"	3/4"	0

SPAN "B" & "C"

0.6" Ø LOW RELAXATION	GIRDER B1 & C1											GIRDER B2, B3, B4, B5, C2, C3, C4, & C5											GIRDER B6 & C6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.105	0.198	0.271	0.317	0.333	0.317	0.271	0.198	0.105	0	0	0.104	0.197	0.270	0.316	0.332	0.316	0.270	0.197	0.104	0	0	0.103	0.195	0.267	0.313	0.329	0.313	0.267	0.195	0.103	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.048	0.090	0.123	0.145	0.152	0.145	0.123	0.090	0.048	0	0	0.052	0.098	0.134	0.157	0.165	0.157	0.134	0.098	0.052	0	0	0.044	0.083	0.114	0.134	0.140	0.134	0.114	0.083	0.044	0
FINAL CAMBER ↑	0	11/16"	1 5/16"	1 3/4"	2 1/16"	2 3/16"	2 1/16"	1 3/4"	1 5/16"	11/16"	0	0	5/8"	1 3/16"	1 5/8"	1 15/16"	2"	1 15/16"	1 5/8"	1 3/16"	5/8"	0	0	11/16"	1 3/8"	1 13/16"	2 3/16"	2 1/4"	2 3/16"	1 13/16"	1 3/8"	11/16"	0

SPAN "D"

0.6" Ø LOW RELAXATION	GIRDER D1											GIRDER D2, D3, D4, & D5											GIRDER D6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.045	0.086	0.118	0.138	0.145	0.138	0.118	0.086	0.045	0	0	0.045	0.086	0.117	0.138	0.144	0.138	0.117	0.086	0.045	0	0	0.045	0.085	0.116	0.136	0.143	0.136	0.116	0.085	0.045	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.019	0.036	0.050	0.058	0.061	0.058	0.050	0.036	0.019	0	0	0.021	0.040	0.054	0.064	0.067	0.064	0.054	0.040	0.021	0	0	0.018	0.034	0.046	0.054	0.056	0.054	0.046	0.034	0.018	0
FINAL CAMBER ↑	0	5/16"	5/8"	13/16"	15/16"	1"	15/16"	13/16"	5/8"	5/16"	0	0	5/16"	9/16"	3/4"	7/8"	15/16"	7/8"	3/4"	9/16"	5/16"	0	0	5/16"	5/8"	13/16"	1"	1 1/16"	1"	13/16"	5/8"	5/16"	0

SPAN "E"

0.6" Ø LOW RELAXATION	GIRDER E1											GIRDER E2, E3, E4, & E5											GIRDER E6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.104	0.196	0.269	0.315	0.331	0.315	0.269	0.196	0.104	0	0	0.104	0.196	0.268	0.314	0.330	0.314	0.268	0.196	0.104	0	0	0.102	0.194	0.265	0.311	0.326	0.311	0.265	0.194	0.102	0
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.046	0.087	0.119	0.139	0.146	0.139	0.119	0.087	0.046	0	0	0.050	0.094	0.129	0.151	0.159	0.151	0.129	0.094	0.050	0	0	0.042	0.080	0.110	0.129	0.135	0.129	0.110	0.080	0.042	0
FINAL CAMBER ↑	0	11/16"	1 5/16"	1 13/16"	2 1/8"	2 1/4"	2 1/8"	1 13/16"	1 5/16"	11/16"	0	0	5/8"	1 1/4"	1 11/16"	1 15/16"	2 1/16"	1 15/16"	1 11/16"	1 1/4"	5/8"	0	0	3/4"	1 3/8"	1 7/8"	2 3/16"	2 5/16"	2 3/16"	1 7/8"	1 3/8"	3/4"	0

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

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

NORTH CAROLINA PROFESSIONAL SEAL 24590 ENGINEER ALFRED J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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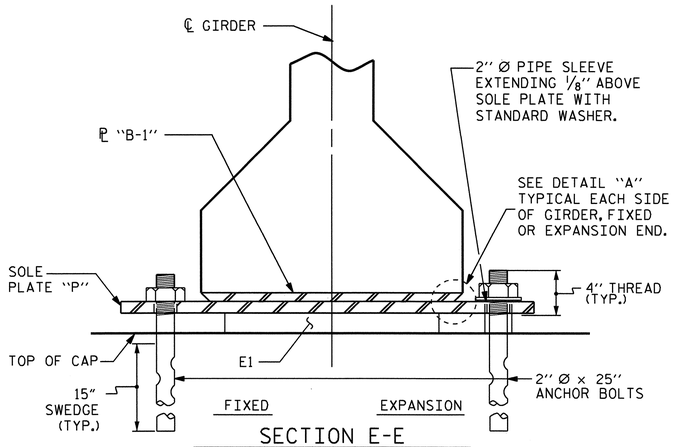
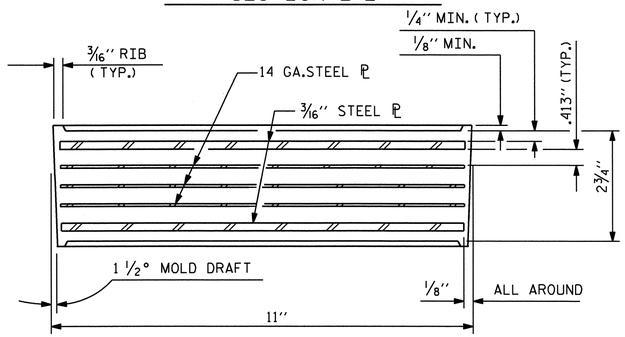
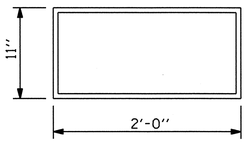


SECTION E-E



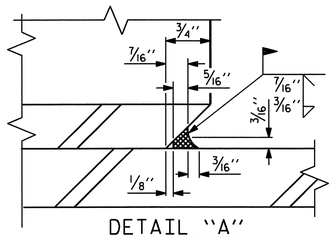
TYPICAL SECTION OF ELASTOMERIC BEARINGS



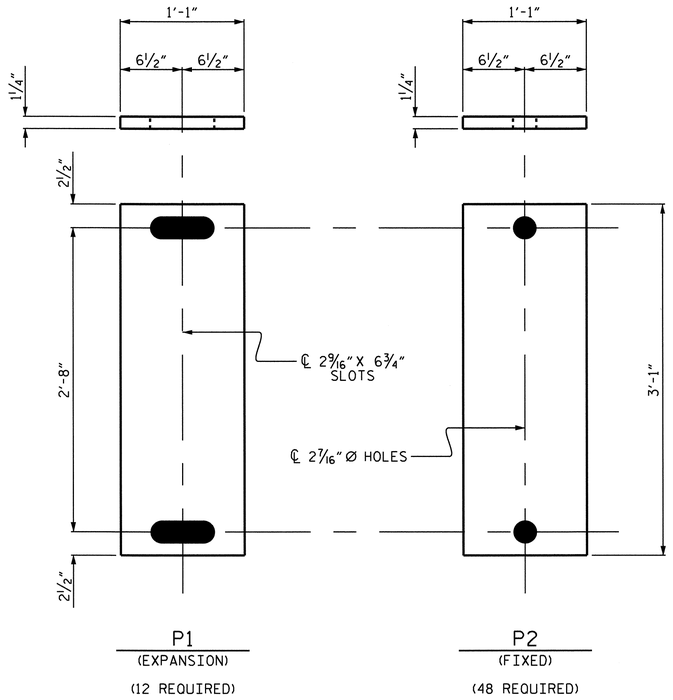
E1 (60 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

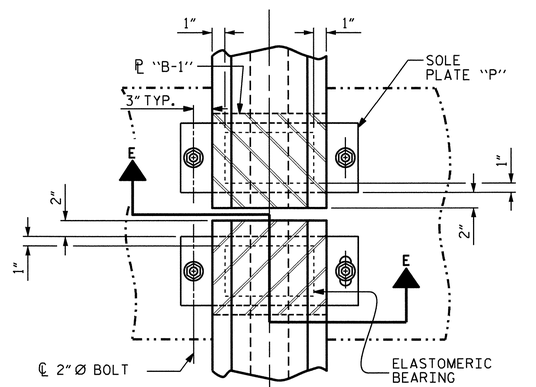
TYPE VII



DETAIL "A"



SOLE PLATE DETAILS ("P")



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)

NOTES

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

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

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

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

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

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

— LOAD RATINGS —	
	MAX.D.L.+L.L.
TYPE VII	264 K

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

ASSEMBLED BY : T. BANKOVICH		DATE : 3-2010
CHECKED BY : D.G. ELY		DATE : 2-2011
DRAWN BY : EEM 2/97	REV. 8/16/99	RWW/LES
CHECKED BY : VAP 2/97	REV. 10/17/00	RWW/LES
	REV. 5/1/06	TLA/GM

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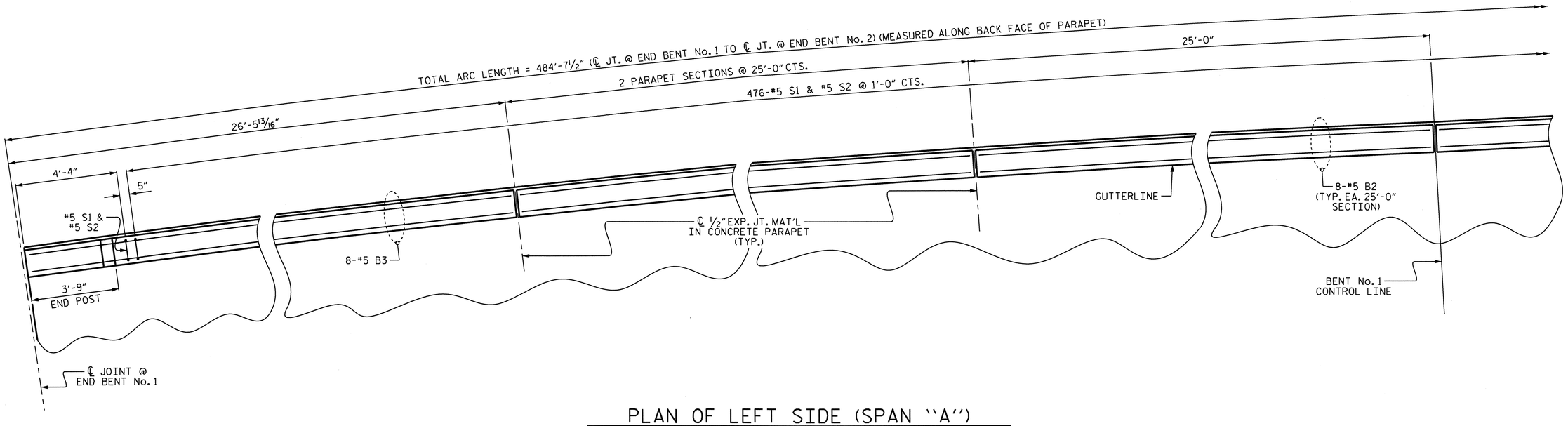
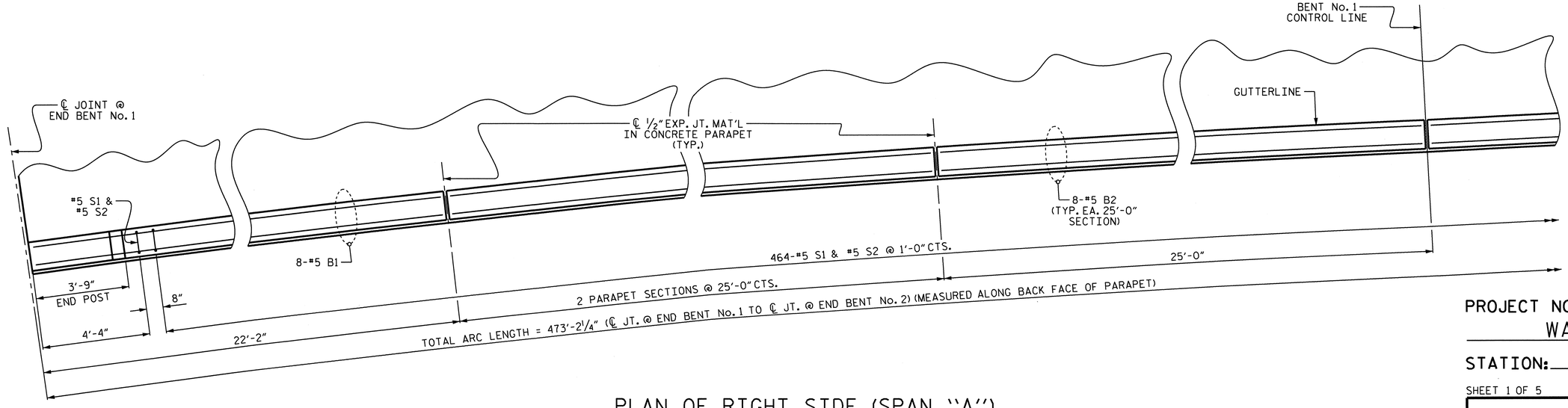
STD. NO. EB4



PLAN OF LEFT SIDE (SPAN "A")

FOR DRAINAGE SLOT LOCATIONS, SEE "PLAN OF SPANS"



PLAN OF RIGHT SIDE (SPAN "A")

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS

SPAN "A"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
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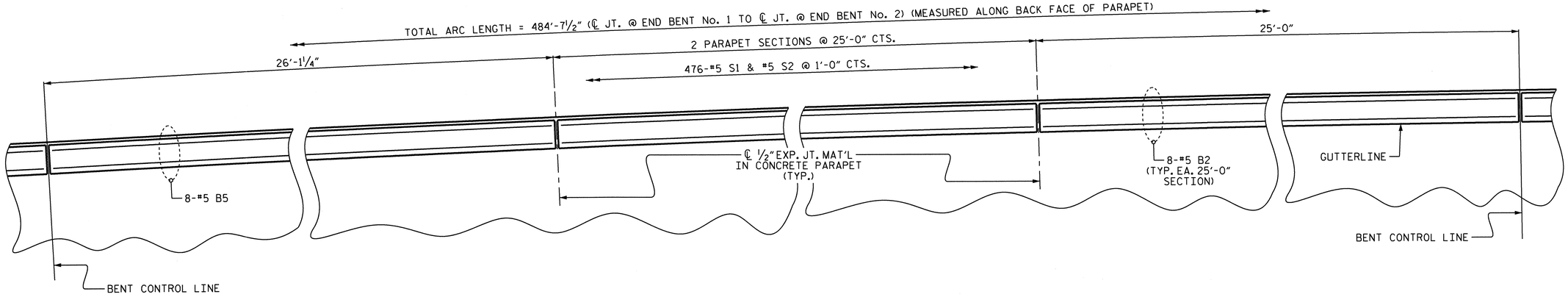
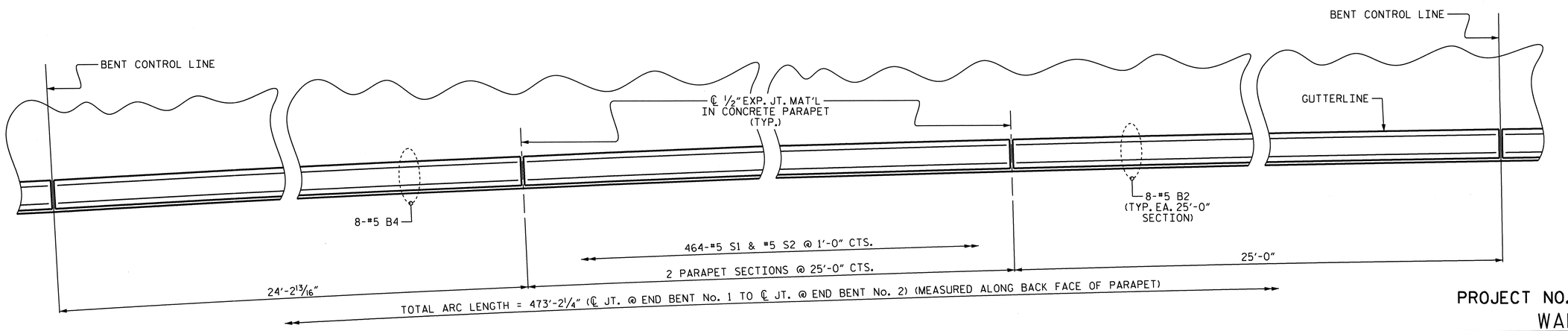


PLAN OF LEFT SIDE (SPAN "B" OR "C")

FOR DRAINAGE SLOT LOCATIONS, SEE "PLAN OF SPANS"



PLAN OF RIGHT SIDE (SPAN "B" OR "C")

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS

SPAN "B" OR "C"

NORTH CAROLINA PROFESSIONAL SEAL 23390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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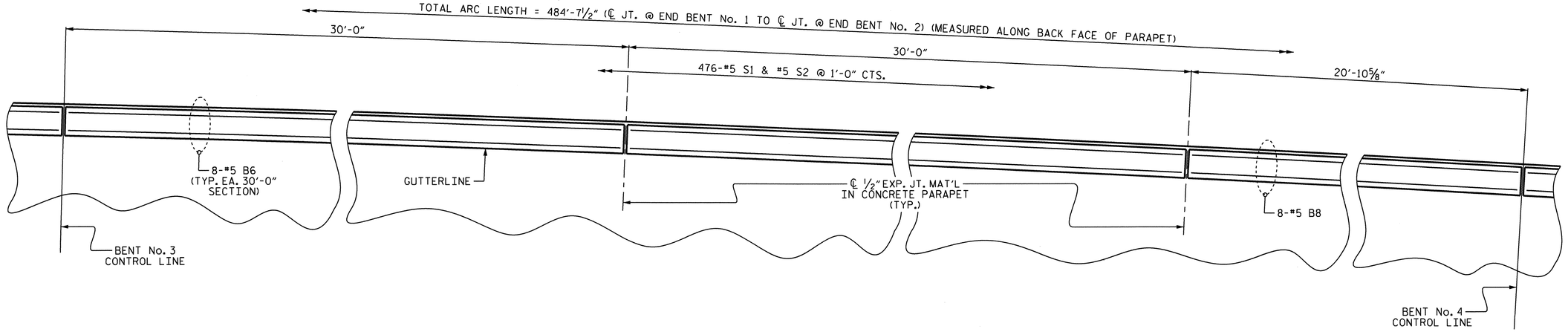
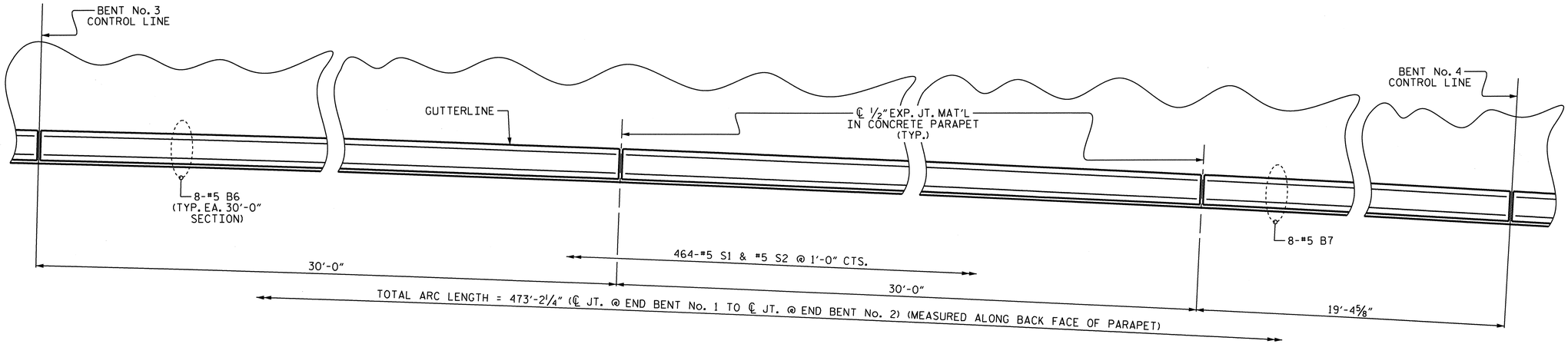


PLAN OF LEFT SIDE (SPAN "D")

FOR DRAINAGE SLOT LOCATIONS, SEE "PLAN OF SPANS"



PLAN OF RIGHT SIDE (SPAN "D")

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS
SPAN "D"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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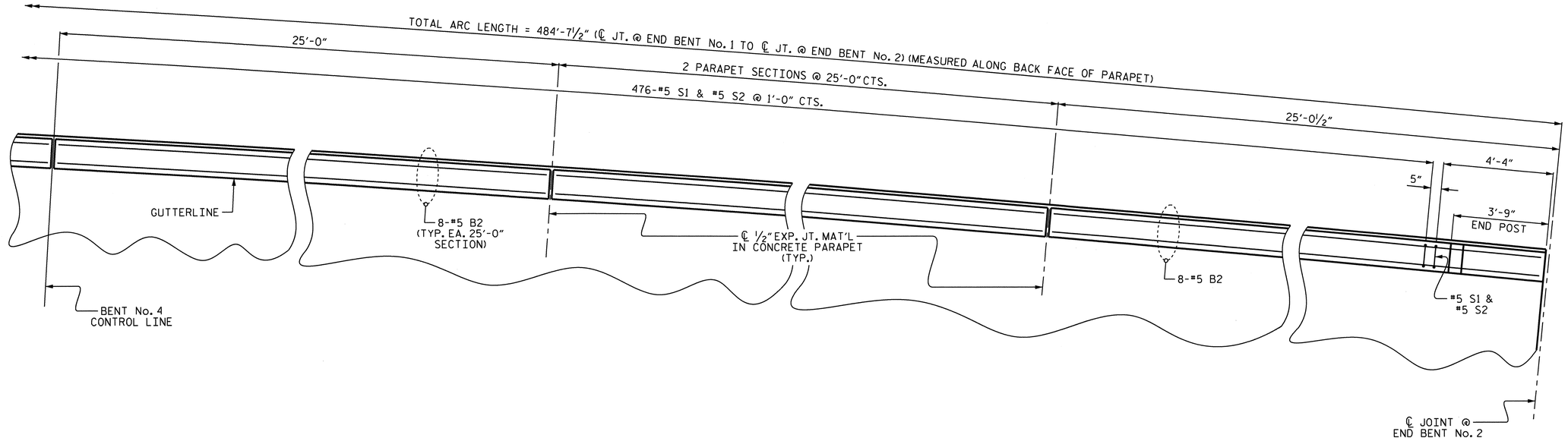
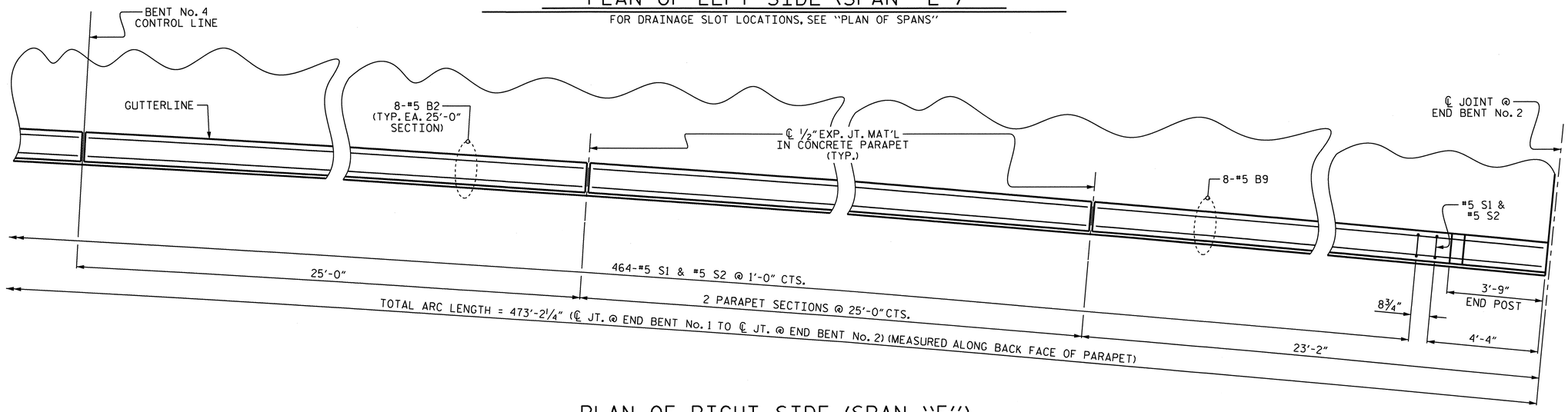


PLAN OF LEFT SIDE (SPAN "E")

FOR DRAINAGE SLOT LOCATIONS, SEE "PLAN OF SPANS"



PLAN OF RIGHT SIDE (SPAN "E")

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS
SPAN "E"

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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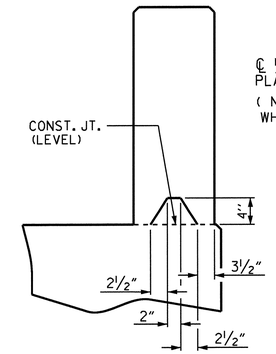
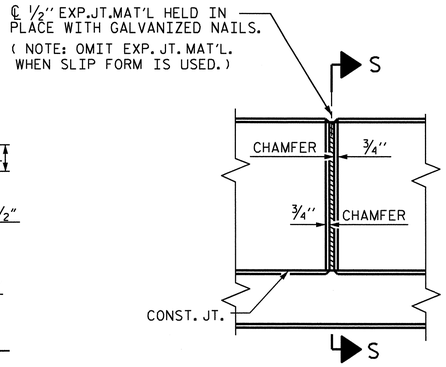


SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

PARAPET DETAILS

NOTES:

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

ALL REINFORCING STEEL IN PARAPET AND END POSTS SHALL BE EPOXY COATED.

THE #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

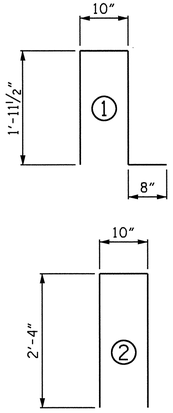
THE JOINTS IN THE DECK AT THE END BENTS SHALL BE SAWED PRIOR TO CASTING OF THE PARAPET.

THE #5 S3 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. LEVEL TWO FIELD TESTING IS REQUIRED AND THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THEN 10 FT. IN LENGTH.

FOR DETAILS AND LOCATION OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEETS.

BAR TYPE



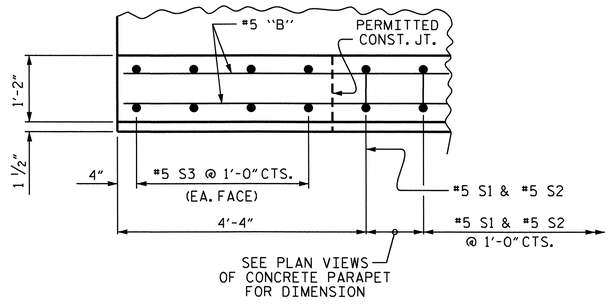
ALL BAR DIMENSIONS
ARE OUT TO OUT

BILL OF MATERIAL

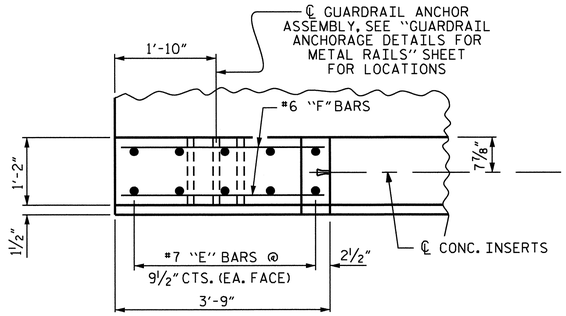
PARAPET AND END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	8	#5	STR	21'-9"	181
✱ B2	200	#5	STR	24'-7"	5128
✱ B3	8	#5	STR	26'-0"	217
✱ B4	16	#5	STR	23'-10"	398
✱ B5	16	#5	STR	25'-8"	428
✱ B6	32	#5	STR	29'-7"	987
✱ B7	8	#5	STR	19'-0"	159
✱ B8	8	#5	STR	20'-6"	171
✱ B9	8	#5	STR	22'-9"	190
✱ E1	8	#7	STR	2'-5"	40
✱ E2	8	#7	STR	2'-11"	48
✱ E3	8	#7	STR	3'-5"	56
✱ E4	8	#7	STR	3'-11"	64
✱ E5	8	#7	STR	4'-4"	71
✱ F1	8	#6	STR	1'-10"	22
✱ F2	8	#6	STR	3'-0"	36
✱ F3	8	#6	STR	3'-8"	44
✱ S1	944	#5	1	5'-5"	5333
✱ S2	944	#5	2	5'-6"	5415
✱ S3	32	#5	STR	3'-0"	100
✱ EPOXY COATED REINF. STEEL					19088 LBS.
CLASS AA CONCRETE					104.3 C.Y.
1'-2" X 2'-6" CONCRETE PARAPET					957.81 L.F.

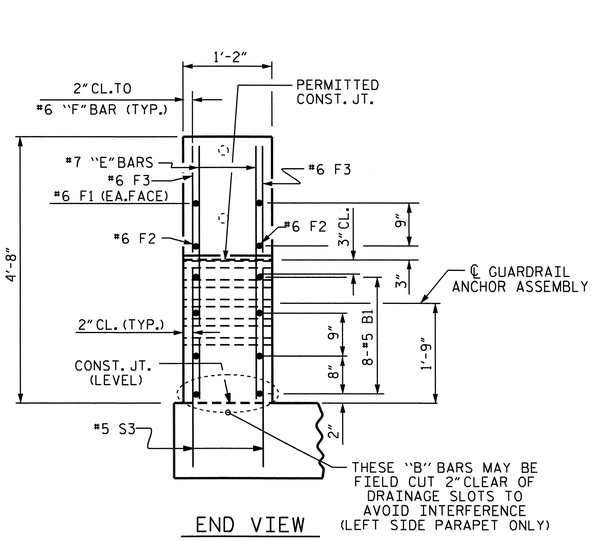
✱ THESE BARS ARE EPOXY COATED



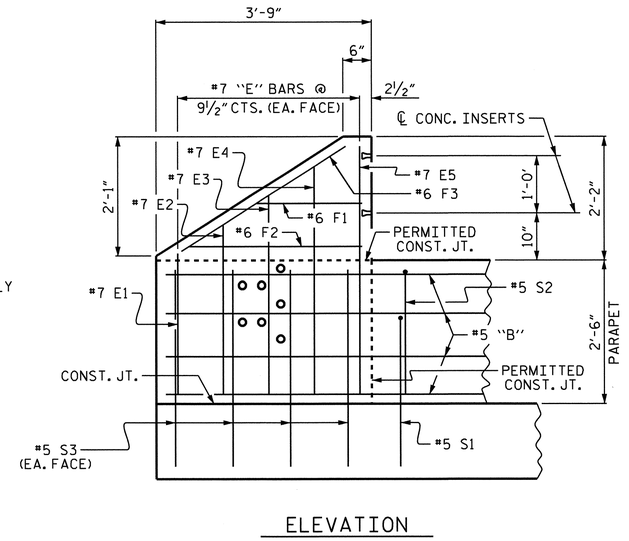
PLAN OF PARAPET



PLAN OF END POST



END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR

NORTH CAROLINA PROFESSIONAL SEAL 21380 ENGINEER THEO J. BEACH 3/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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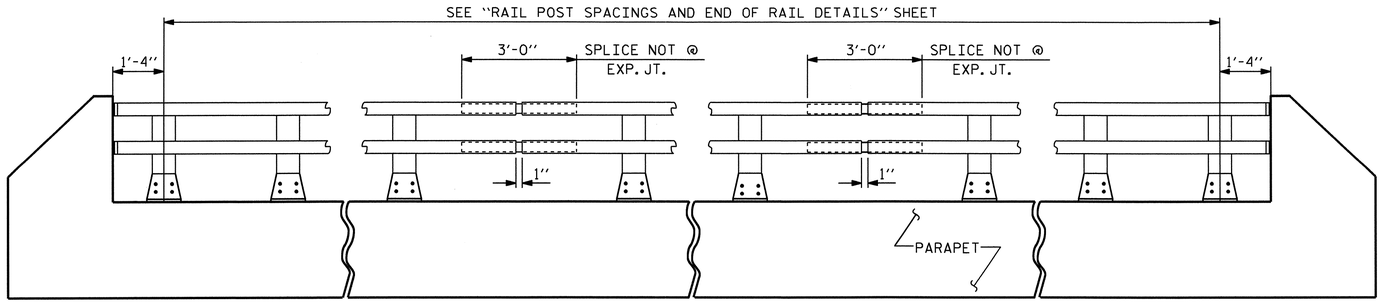
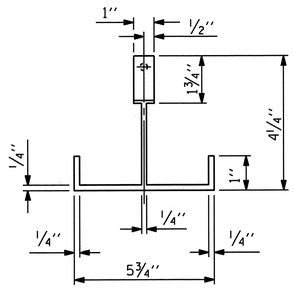
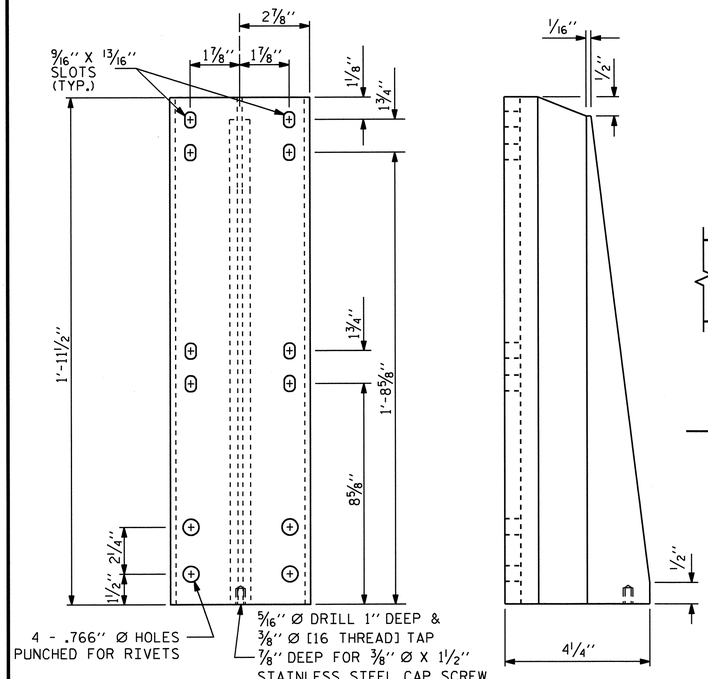


ELEVATION

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



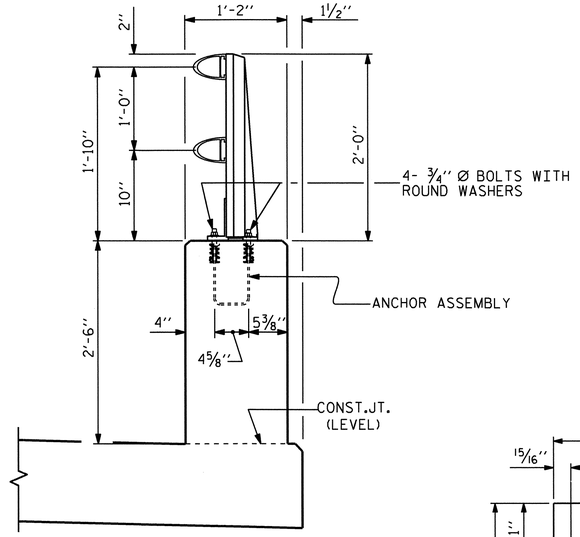
PLAN



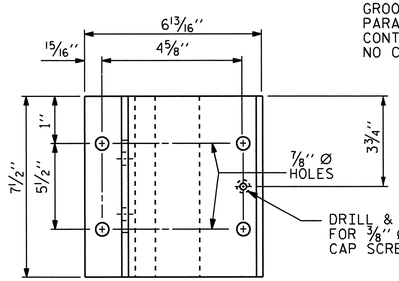
FRONT ELEVATION

SIDE ELEVATION

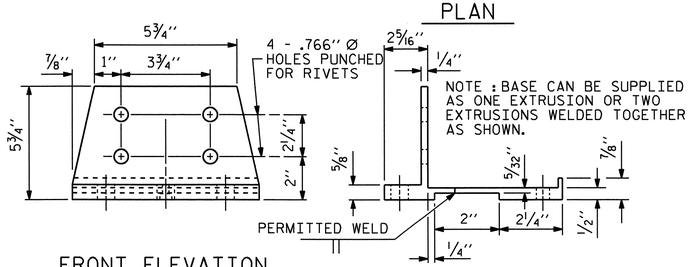
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



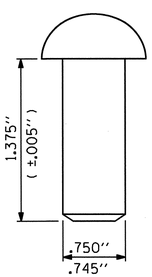
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

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.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

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 END POST 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 IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 942.56 LIN. FT.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

ASSEMBLED BY : T. BANKOVICH	DATE : 3-2010
CHECKED BY : D.G. ELY	DATE : 2-2011

DRAWN BY : EEM 6/94	REV. 10/17/00 LES/RDR
CHECKED BY : RGW 6/94	REV. 5/7/03R RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			66

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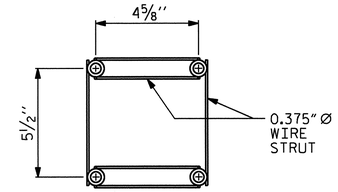
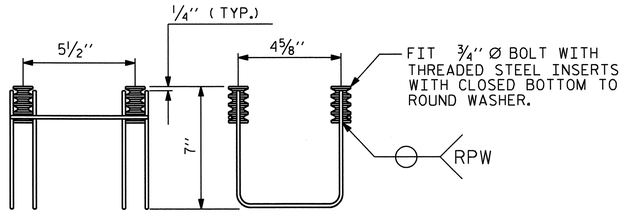
STD. NO. BMR3



PLAN



SIDE VIEW ELEVATION

MINIMUM LENGTH OF THREADS IN INSERT (FERRULE): 1¾''

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(158 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 ¾'' FERRULES.

B. 4 - ¾'' Ø X 2½'' 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 ¾'' Ø X 2½'' 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.

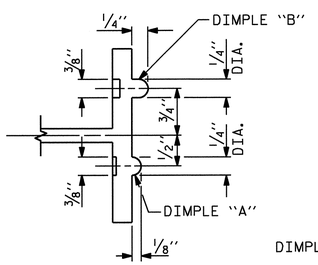
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

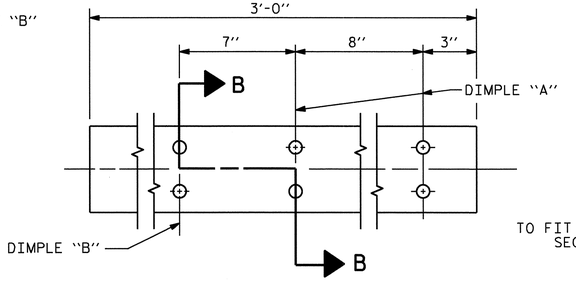
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

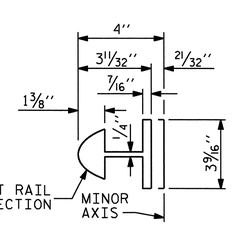
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾"Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

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.



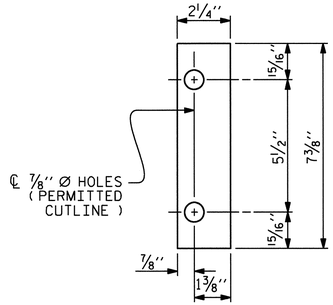
SECTION B - B



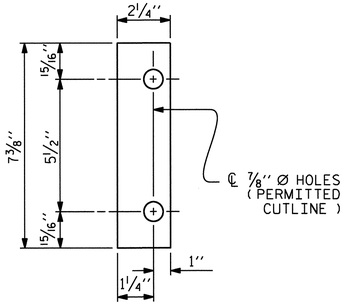


BAR SECTION

EXPANSION BAR DETAILS



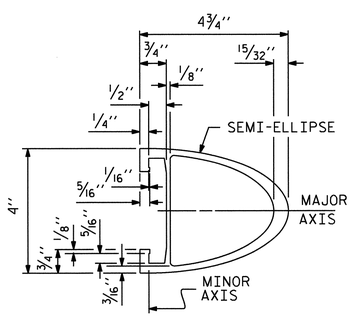
FRONT PLATE



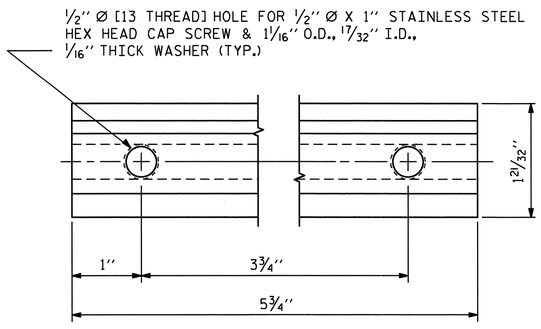
REAR PLATE

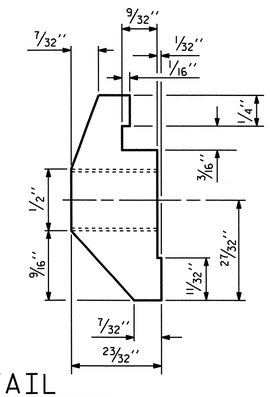
SHIM DETAILS

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



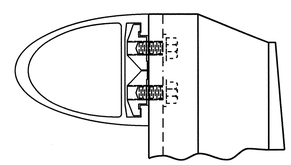
RAIL SECTION



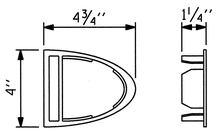


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			66

STD. NO. BMR4

ASSEMBLED BY : T. BANKOVICH		DATE : 3-2010
CHECKED BY : D.G. ELY		DATE : 2-2011
DRAWN BY : EEM 6/94	REV. 2/6/97	EEM/RGW
CHECKED BY : RGW 6/94	REV. 8/16/99	MAB/LES
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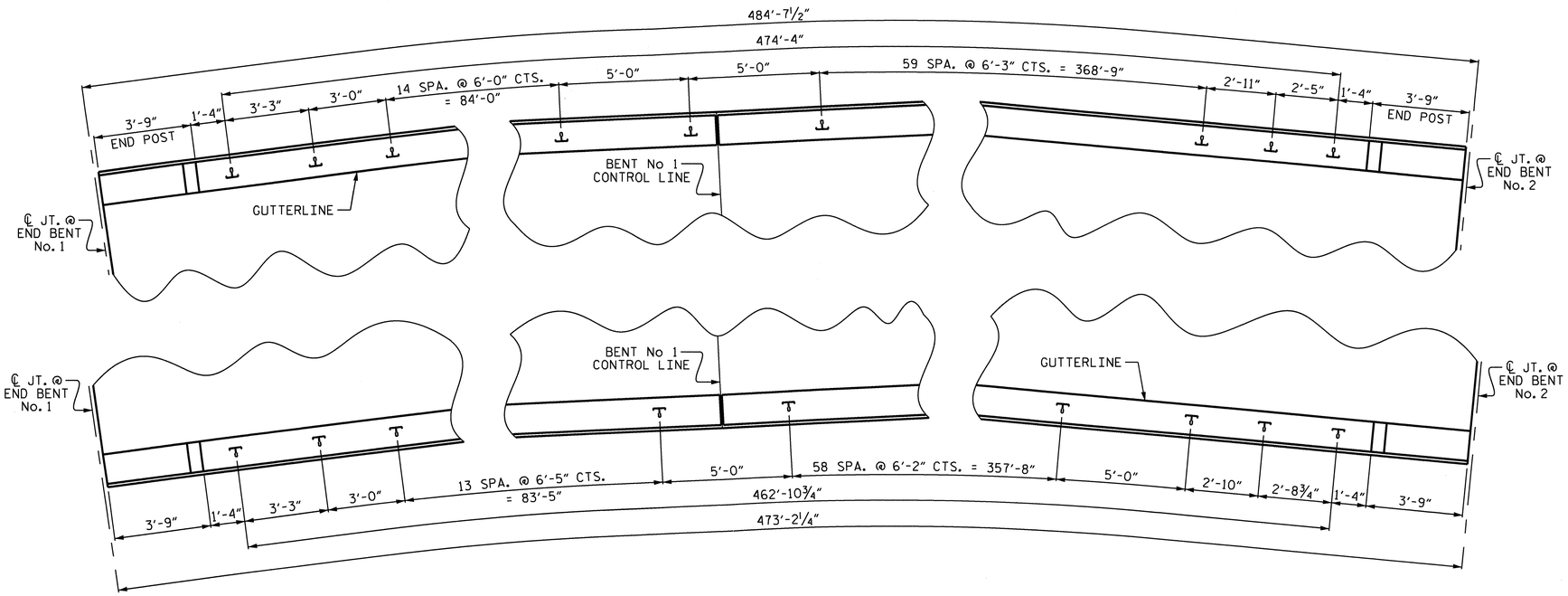


PLAN OF RAIL POST SPACING

DIMENSIONS ARE MEASURED ALONG THE ARC AT THE BACK FACE OF PARAPET

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).

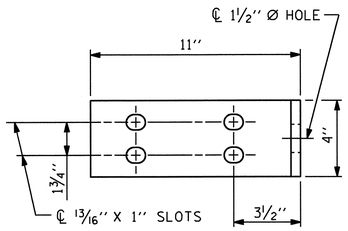
E. ½"Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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 6½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



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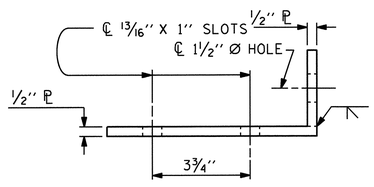
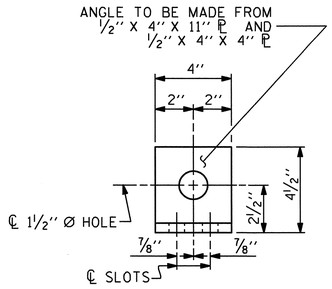
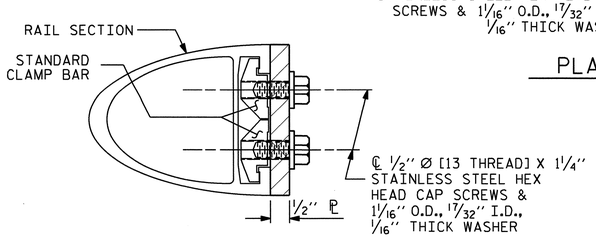


TOP VIEW



END VIEW



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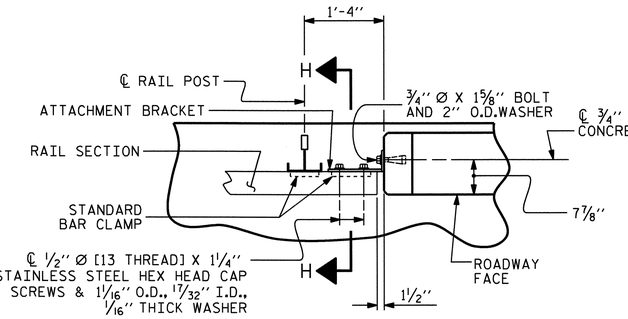
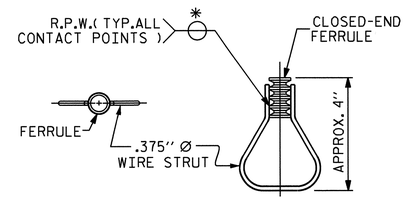


PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

DETAILS FOR ATTACHING METAL RAIL TO END POST

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACINGS

ASSEMBLED BY : T. BANKOVICH	DATE : 3-2010				
CHECKED BY : D.G. ELY	DATE : 2-2011				
DRAWN BY : FCJ 1/88	REV. 10/17/00	LES/RDR			
CHECKED BY : CRK 3/89	REV. 5/7/03	RWW/JTE			
	REV. 5/1/06	TLA/GM			

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

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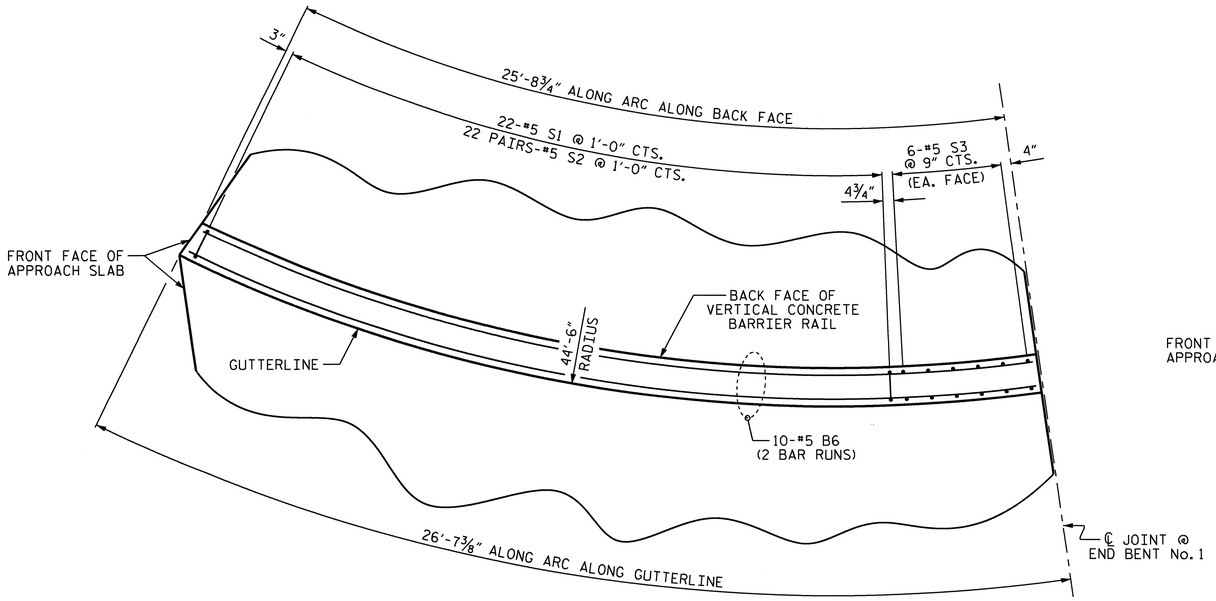
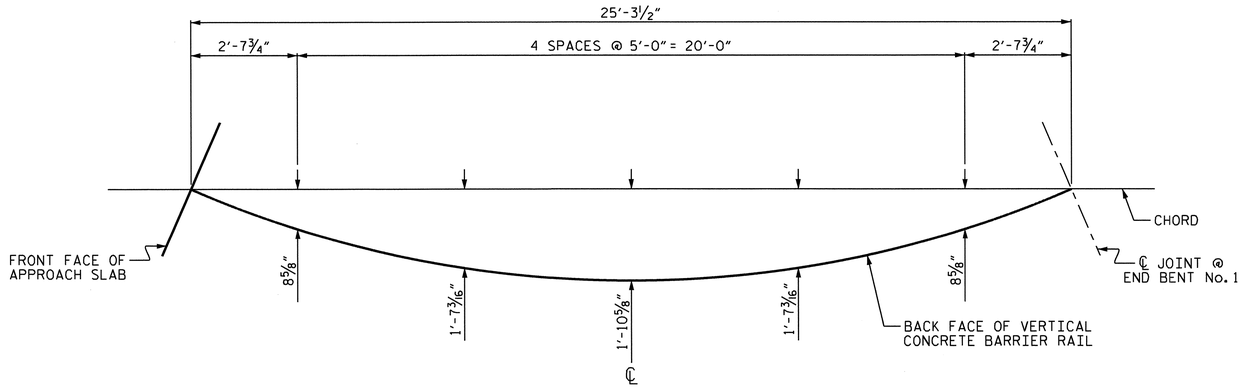


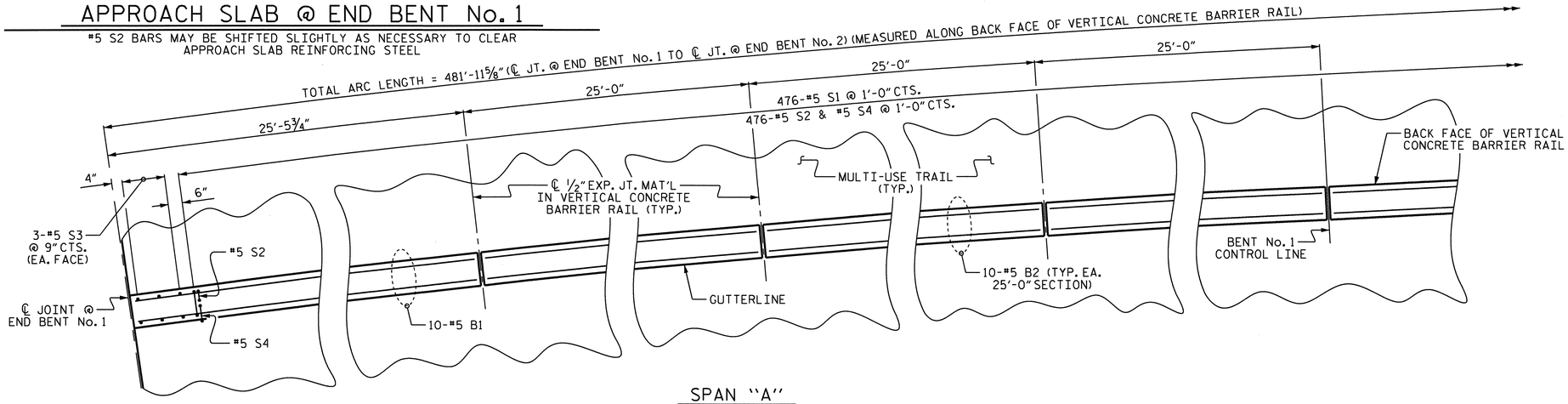
APPROACH SLAB @ END BENT No. 1

#5 S2 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR APPROACH SLAB REINFORCING STEEL



BACK FACE OF VERTICAL CONCRETE BARRIER RAIL

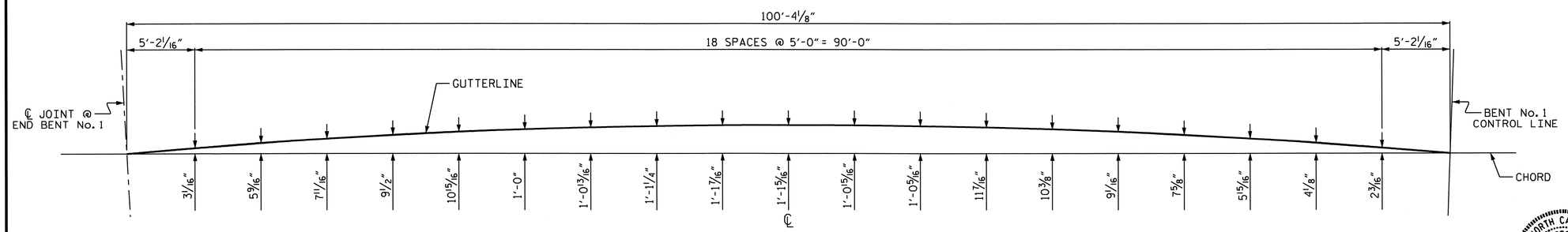
VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB @ END BENT No. 1



SPAN "A"

PARTIAL PLAN OF VERTICAL CONCRETE BARRIER RAIL

DIMENSIONS ARE MEASURED ALONG THE ARC AT THE BACK FACE OF VERTICAL CONCRETE BARRIER RAIL



SPAN "A" GUTTERLINE ARC OFFSETS

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : TJB/TMG DATE : 7-2011
CHECKED BY : D.G. ELY DATE : 7-2011

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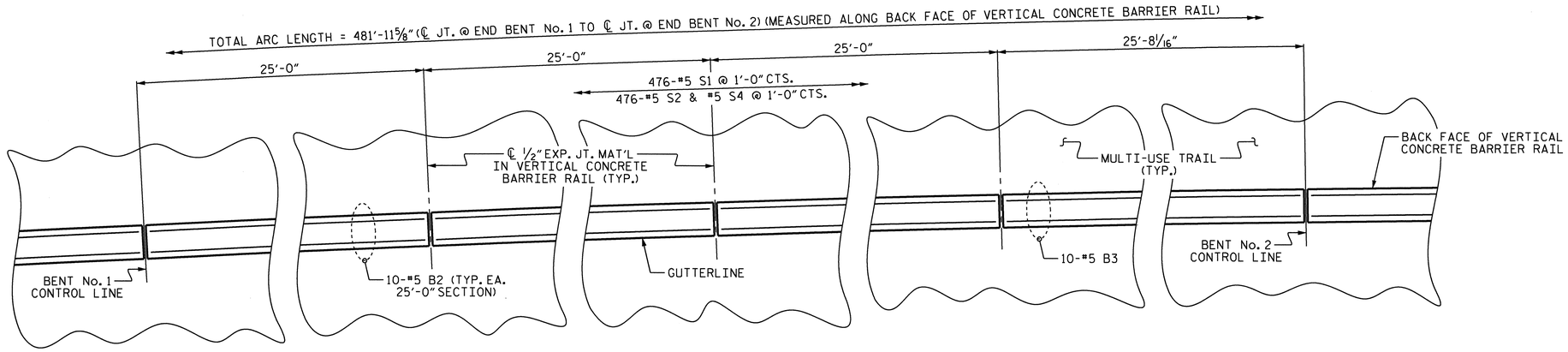

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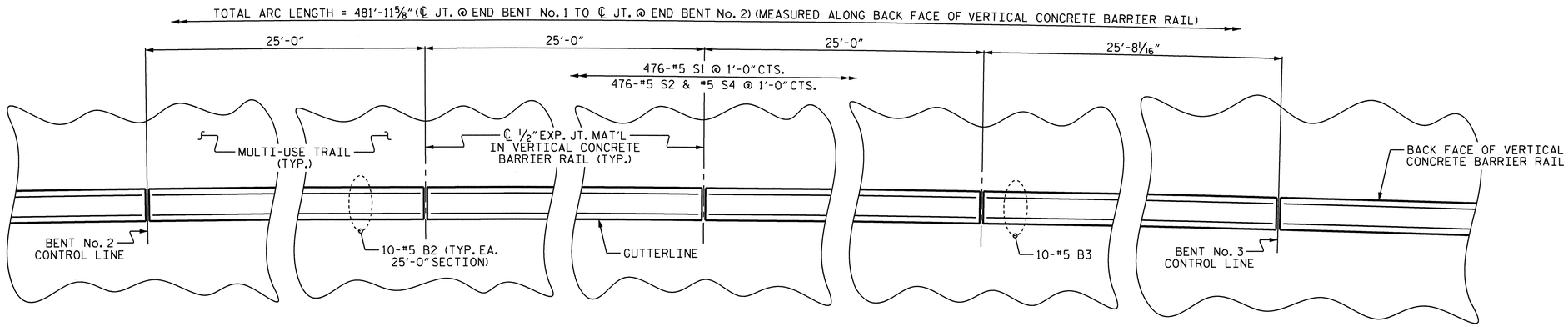
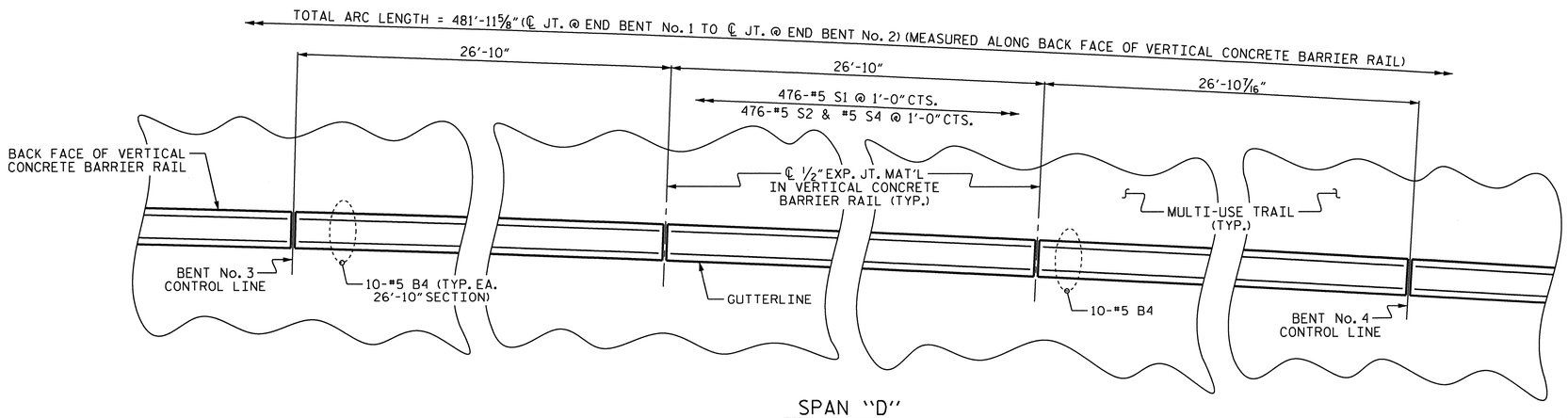


SPAN "C"



SPAN "D"

PARTIAL PLAN OF VERTICAL CONCRETE BARRIER RAIL

DIMENSIONS ARE MEASURED ALONG THE ARC AT THE BACK FACE OF VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 28390 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 12-2010
CHECKED BY : D.G. ELY DATE : 2-2011

08-JUL-2011 12:55
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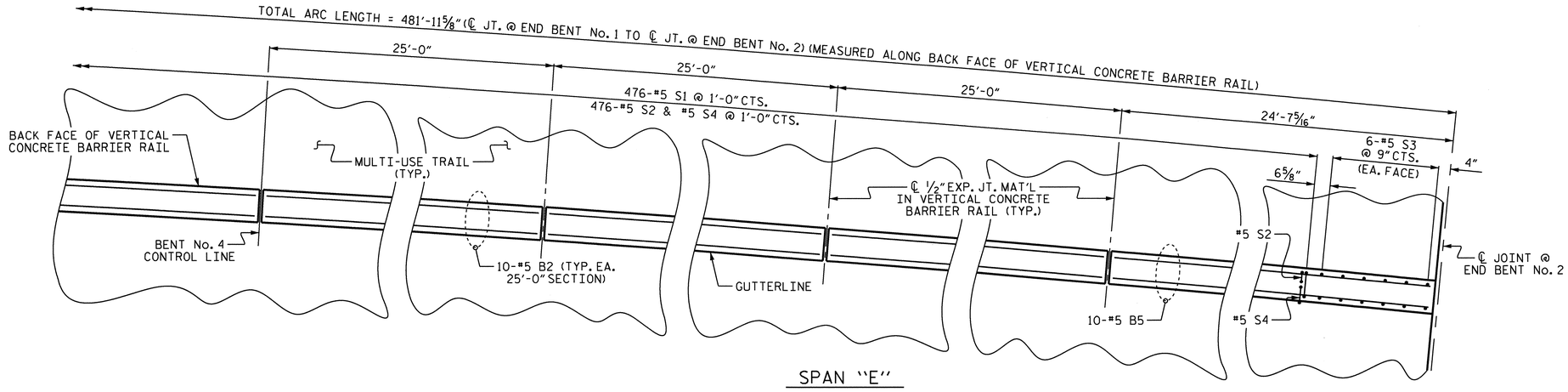
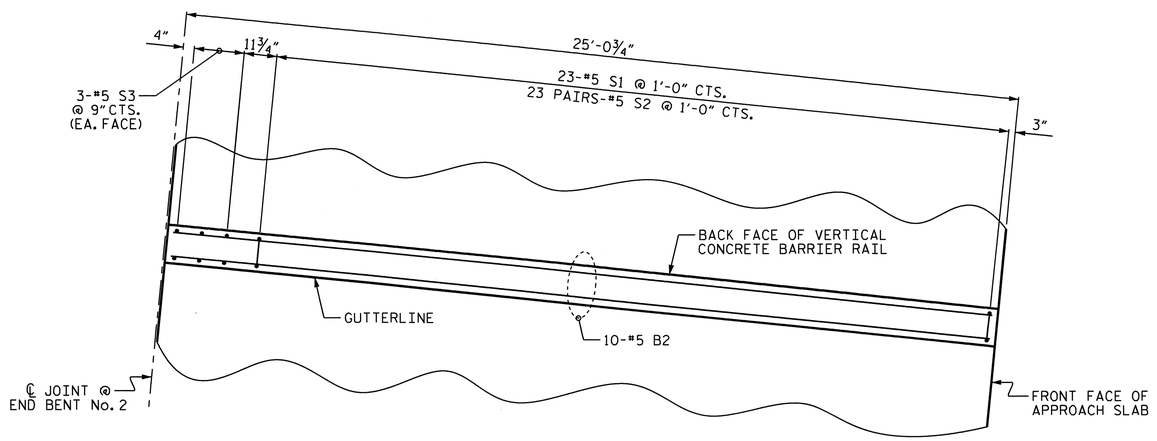


SPAN "E"

PARTIAL PLAN OF VERTICAL CONCRETE BARRIER RAIL

DIMENSIONS ARE MEASURED ALONG THE ARC AT THE BACK FACE OF VERTICAL CONCRETE BARRIER RAIL



APPROACH SLAB @ END BENT No. 2

#5 S2 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR APPROACH SLAB REINFORCING STEEL

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 12-2010
CHECKED BY : D.G. ELY DATE : 2-2011

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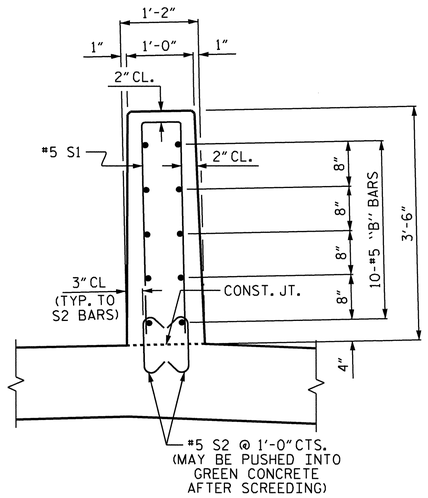
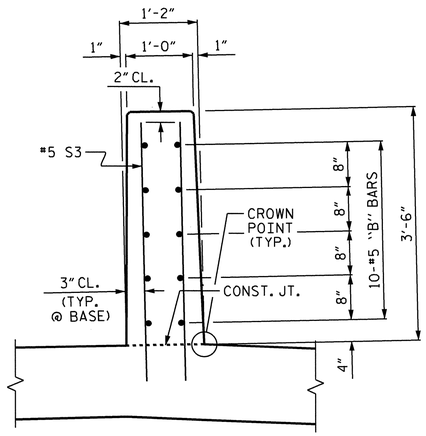


SECTION THRU RAIL



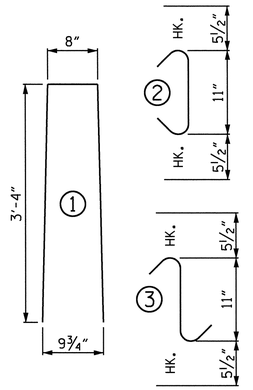
END VIEW

BARRIER RAIL DETAILS

VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLABS

GUARDRAIL ATTACHMENTS REQUIRED BUT NOT SHOWN.
SEE "GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL" SHEET.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	10	#5	STR	24'-11"	260
* B2	130	#5	STR	24'-7"	3333
* B3	20	#5	STR	25'-3"	527
* B4	30	#5	STR	26'-5"	827
* B5	10	#5	STR	24'-2"	252
* B6	20	#5	STR	15'-7"	325
* S1	521	#5	1	7'-4"	3985
* S2	566	#5	2	1'-10"	1082
* S3	36	#5	STR	4'-0"	150
* S4	476	#5	3	1'-10"	910

* EPOXY COATED REINFORCING STEEL	11,651 LBS.
CLASS AA CONCRETE	75.0 C.Y.
VERTICAL CONCRETE BARRIER RAIL	533.20 LIN. FT.

NOTES

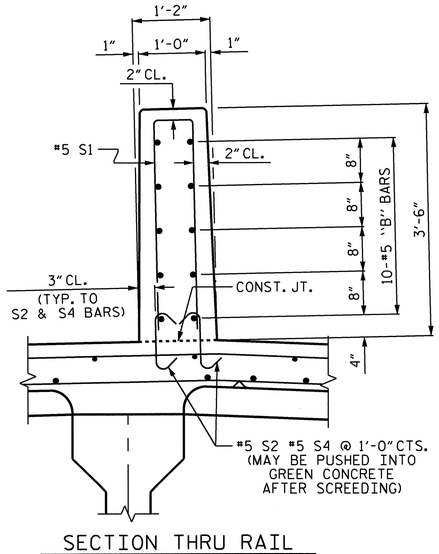
THE VERTICAL CONCRETE BARRRIER IN THE CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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

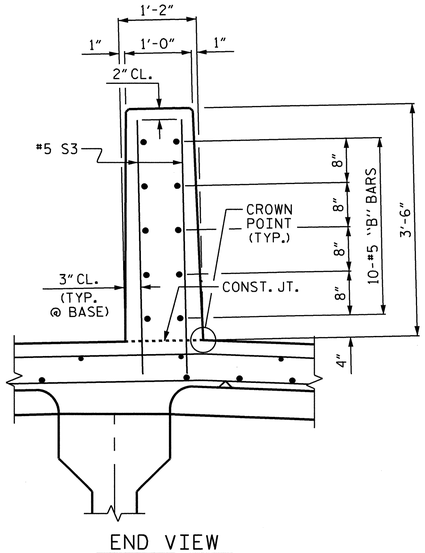
ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.

THE #5 S3 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. LEVEL TWO FIELD TESTING IS REQUIRED AND THE YIELD LOAD FOR THE #5 S3 BARS IS 18.9 KIPS. FOR ADHESIVELY ANCHORED BOLTS AND DOWELS, SEE SPECIAL PROVISIONS.

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



SECTION THRU RAIL



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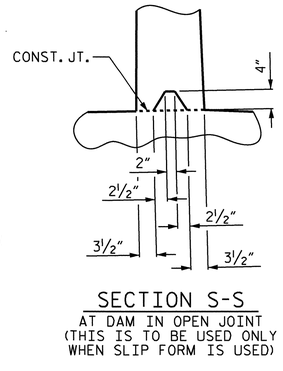
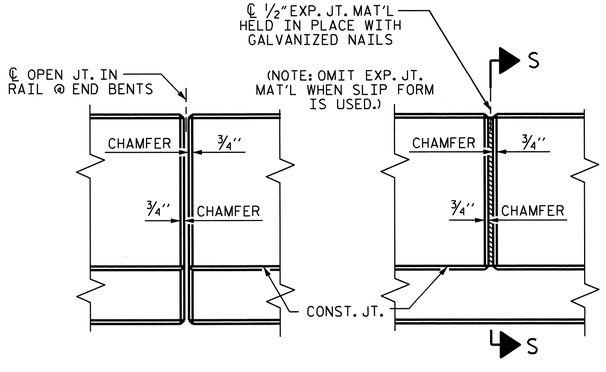


SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

VERTICAL CONCRETE BARRIER RAIL ON BRIDGE DECK

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 030390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : TJB/TMG DATE : 7-2011
CHECKED BY : D.G. ELY DATE : 7-2011

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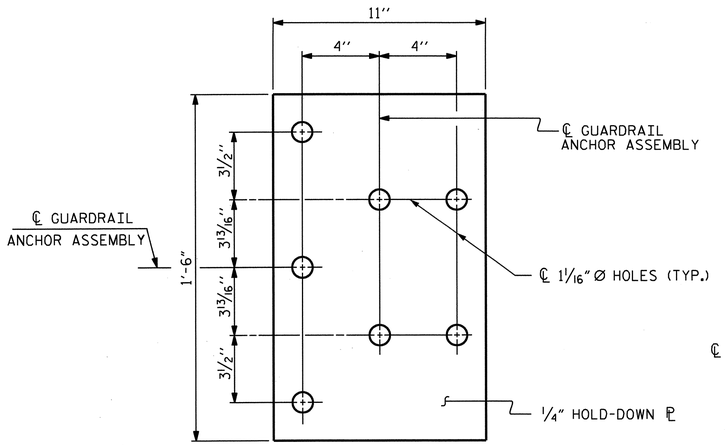
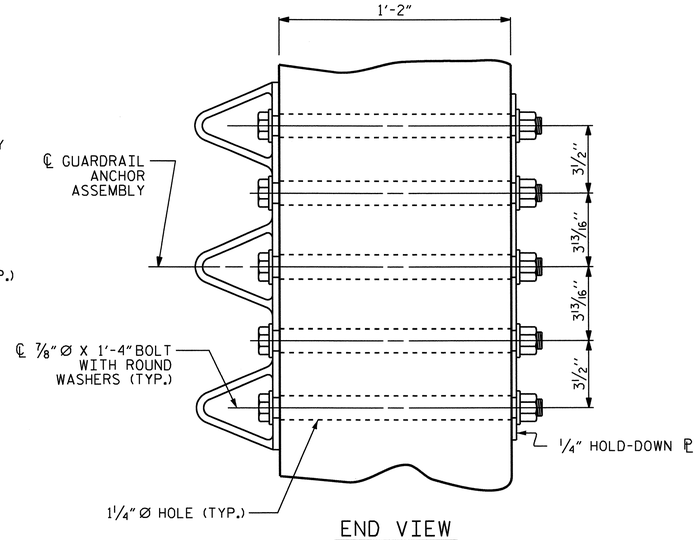


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 7 - ⅞'' 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.

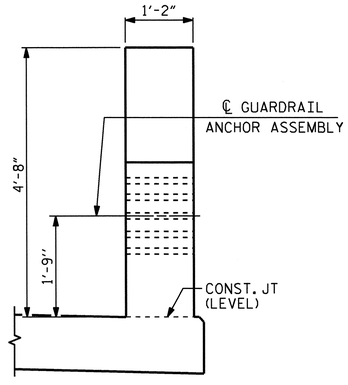
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞'' Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

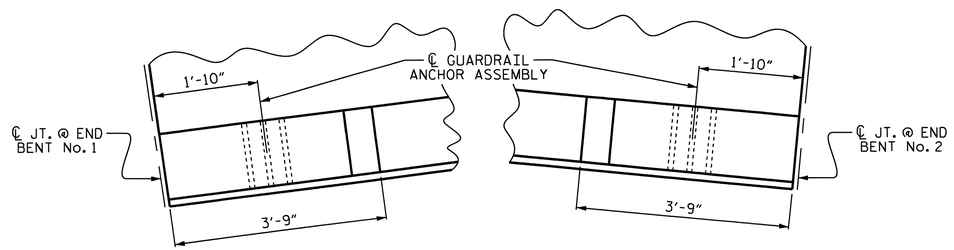
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

THE 1¼'' 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.

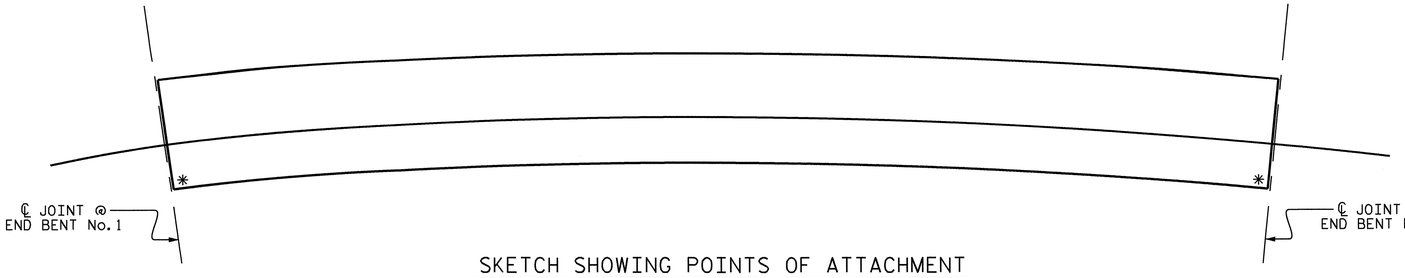


END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST



SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			66

STD. NO. BMR8

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

ASSEMBLED BY : T. BANKOVICH		DATE : 3-2010
CHECKED BY : D.G. ELY		DATE : 2-2011
DRAWN BY : EEM 6/94	REV. 10/17/00	RWW/LES
CHECKED BY : RGW 6/94	REV. 5/1/03	RWW/JTE
	REV. 5/1/06	TLA/GM

08-JUL-2011 12:53
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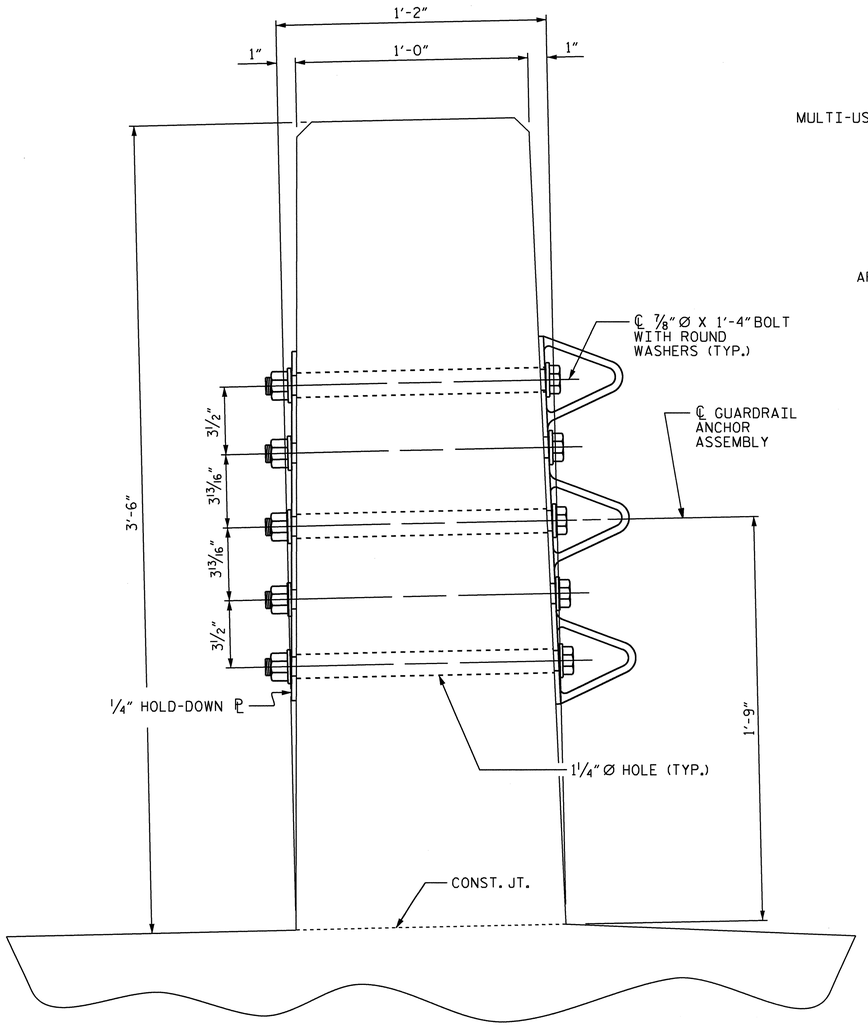
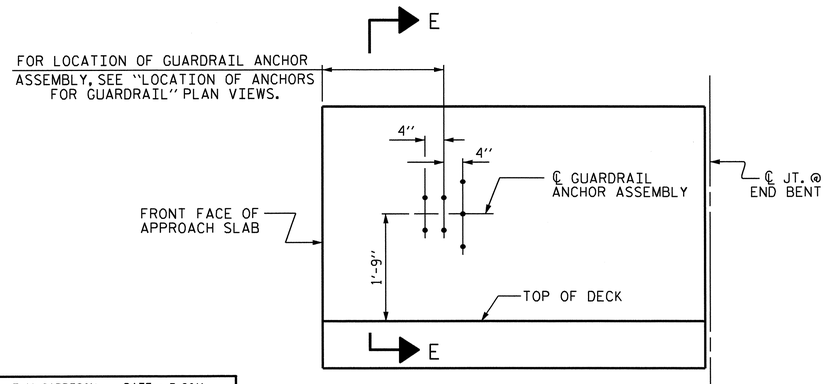


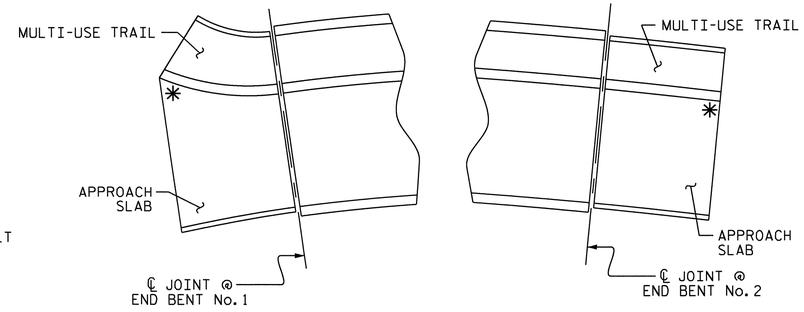
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



ELEVATION

END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

NOTES

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

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

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

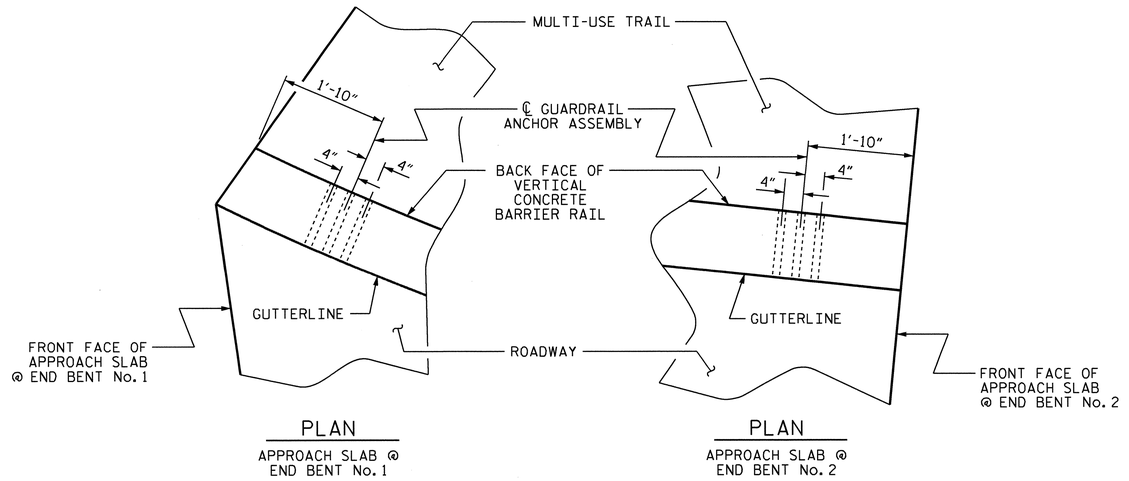
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL 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.



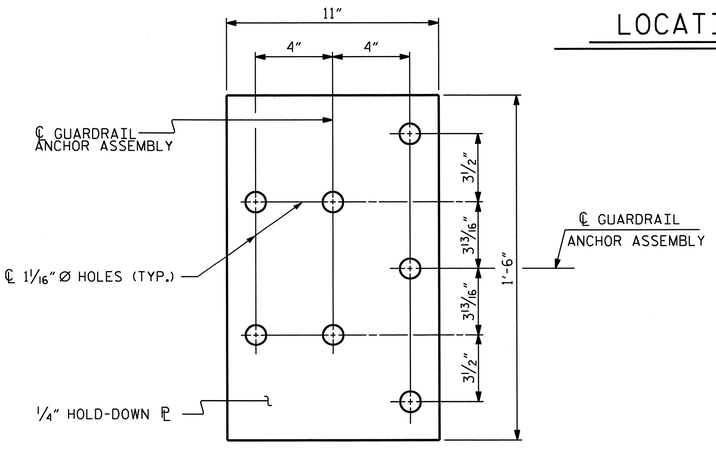
PLAN

APPROACH SLAB @ END BENT No. 1

PLAN

APPROACH SLAB @ END BENT No. 2

LOCATION OF ANCHORS FOR GUARDRAIL



PLAN

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

ASSEMBLED BY : T. M. GARRISON	DATE : 7-2011
CHECKED BY : D.G. ELY	DATE : 7-2011
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	

12-JUL-2011 10:23
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tgarrison

STD. NO. GRA3

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND SIDEWALK		APPROACH SLABS		PARAPET AND SIDEWALK
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2′-0″	1′-9″	2′-0″	1′-9″	2′-9″
#5	2′-6″	2′-2″	2′-6″	2′-2″	3′-5″
#6	3′-0″	2′-7″	3′-10″	2′-7″	4′-4″
#7	5′-3″	3′-6″			
#8	6′-10″	4′-7″			

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	152.0	———	———
POUR #2	174.8	———	———
POUR #3	174.8	———	———
POUR #4	143.4	———	———
POUR #5	185.2	———	———
TOTAL **	830.2	76,070	80,818

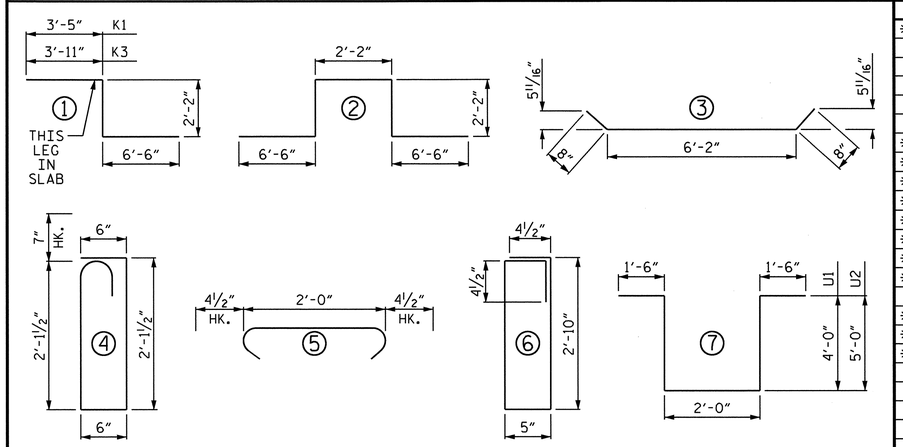
** QUANTITIES FOR PARAPETS & BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,550 SQ. FT.
BRIDGE DECK ★	15,000 SQ. FT.
TOTAL	16,550 SQ. FT.

★ GROOVING NOT REQUIRED ON MULTI-USE TRAIL

BAR TYPES



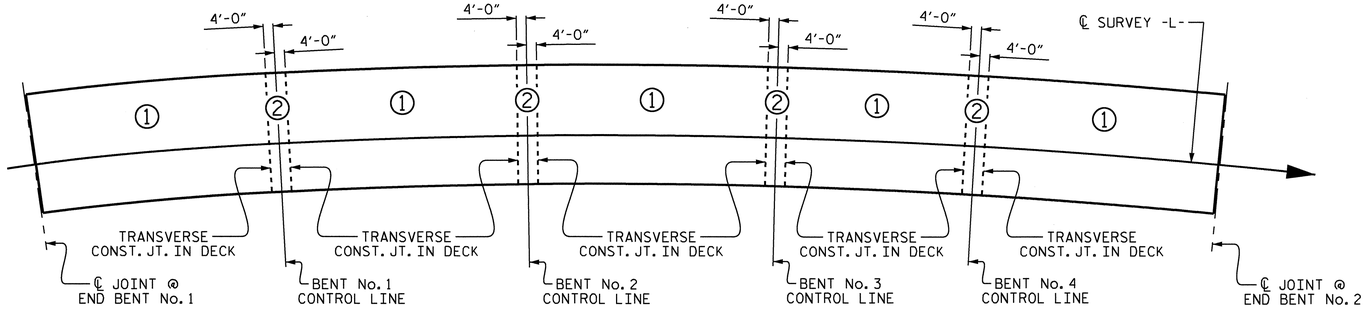
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	894	#5	STR	47′-11″	44680
A2	894	#5	STR	47′-11″	44680
B1	198	#5	STR	55′-9″	11513
B2	162	#5	STR	55′-3″	9335
B3	117	#5	STR	54′-9″	6681
* B4	18	#4	STR	28′-10″	347
* B5	18	#4	STR	28′-3″	340
* B6	372	#7	STR	26′-10″	20403
* B7	120	#7	STR	30′-0″	7358
* B8	93	#4	STR	24′-2″	1501
* B9	124	#4	STR	18′-7″	1539
* B10	31	#4	STR	14′-11″	309
* B11	93	#4	STR	23′-8″	1470
* K1	4	#8	1	12′-1″	129
* K2	16	#8	2	19′-6″	833
* K3	4	#8	1	12′-7″	134
K4	40	#4	STR	4′-11″	131
K5	120	#4	STR	6′-10″	548
K6	40	#4	STR	6′-6″	174
K7	40	#4	STR	22′-4″	597
K8	50	#5	3	7′-6″	391
K9	50	#5	STR	6′-6″	339
* S1	70	#5	4	5′-10″	426
S2	520	#4	5	2′-9″	955
S3	150	#4	6	7′-3″	726
* U1	40	#4	7	13′-0″	347
* U2	100	#4	7	15′-0″	1002

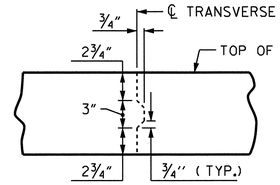
REINFORCING STEEL	76,070 LBS.
* EPOXY COATED REINFORCING STEEL	80,818 LBS.

* THESE BARS ARE EPOXY COATED



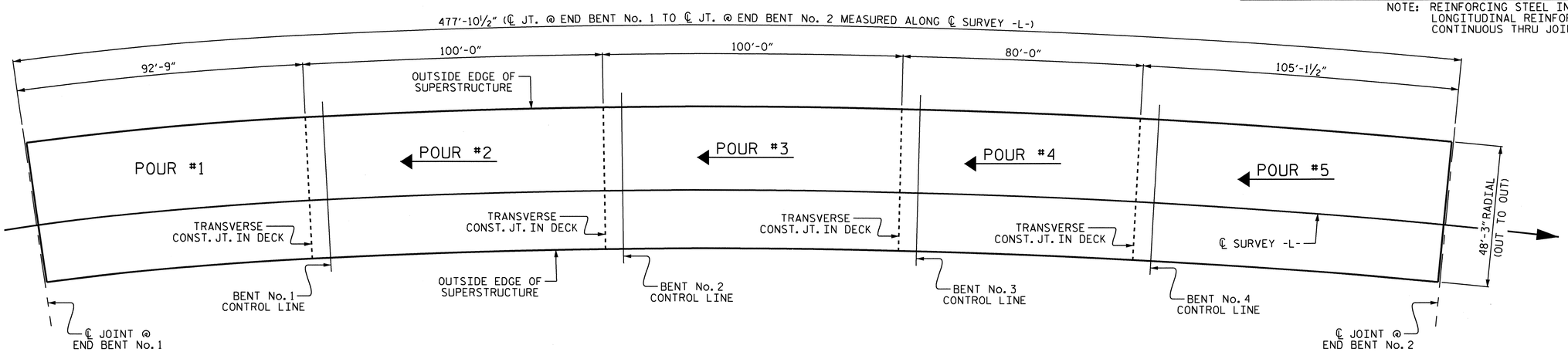
OPTIONAL DECK POURING DETAIL

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



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB & POURING SEQUENCE (SQ. FT. = 23,107)

NOTE: POUR LENGTHS ARE MEASURED ALONG THE ℄ SURVEY -L-

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

DRAWN BY : T. BANKOVICH DATE : 3-2010
CHECKED BY : D.G. ELY DATE : 1-2011

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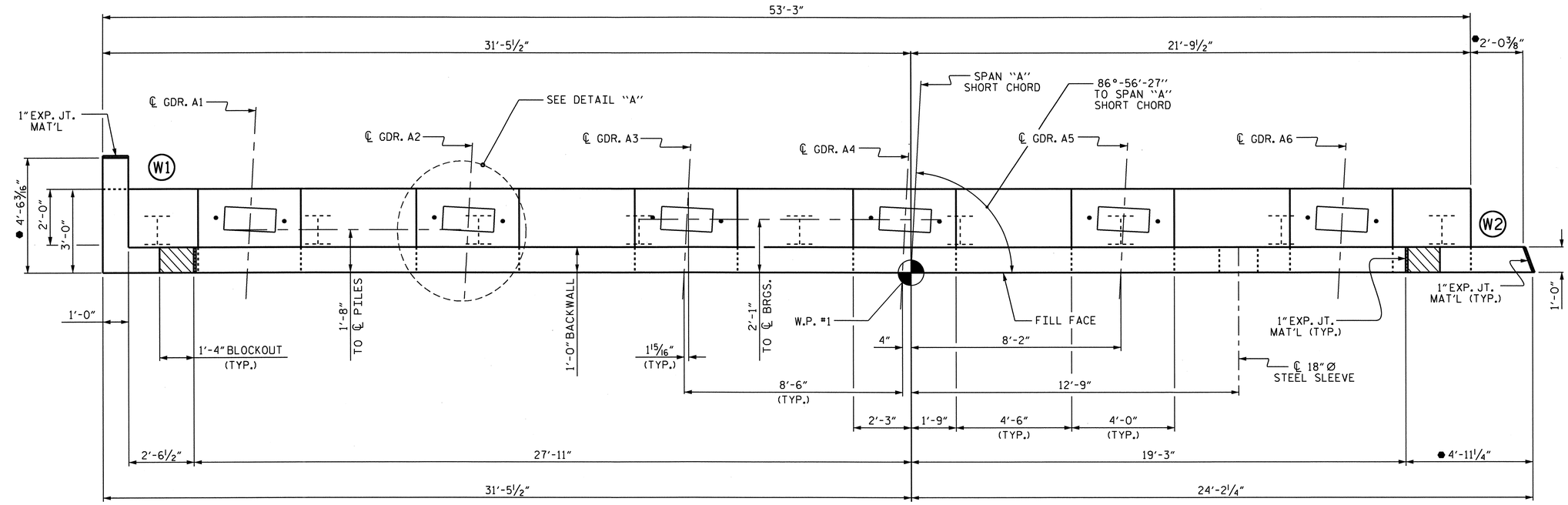
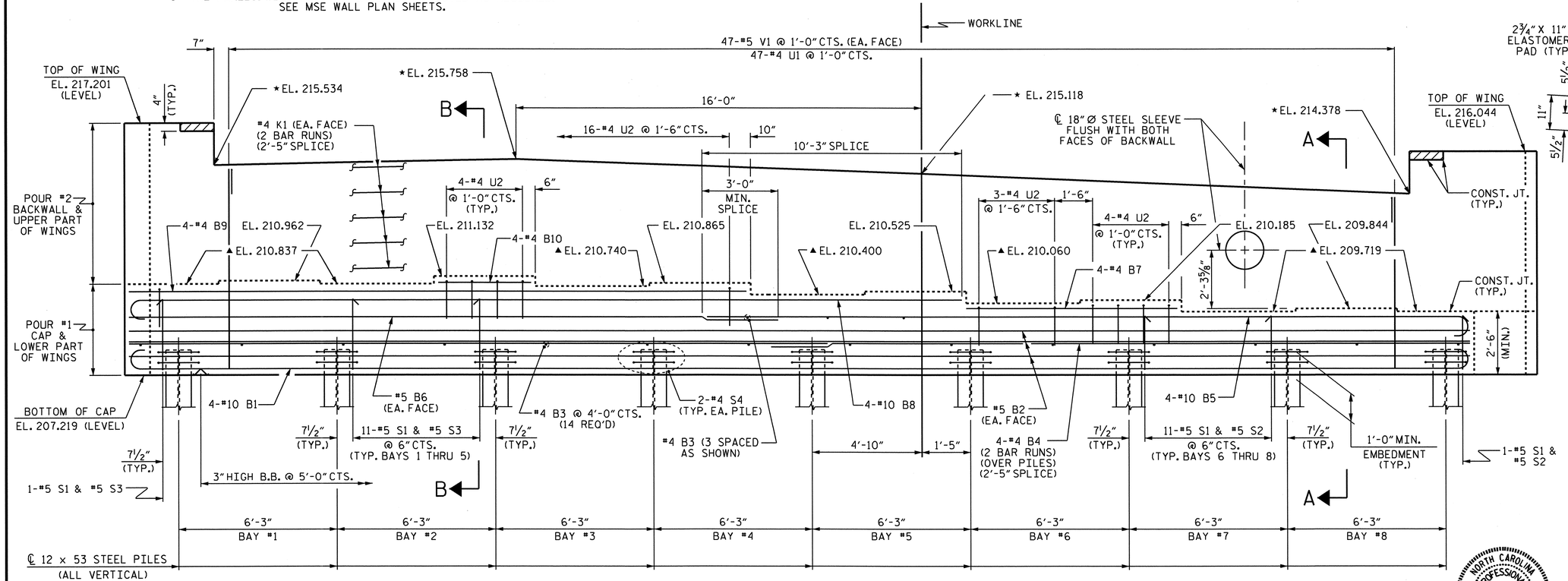
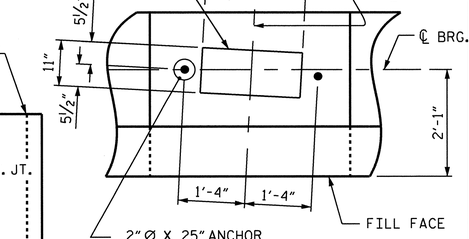


● WING LENGTH BASED ON AN ASSUMED MSE WALL PRECAST PANEL THICKNESS OF 8" AND COPING NOT EXTENDING DOWN BACK OF THE PANELS. WING LENGTHS SHALL BE ADJUSTED AS REQUIRED. SEE MSE WALL PLAN SHEETS.

PLAN



ELEVATION



DETAIL "A"

(TYP. EA. GIRDER)

NOTES:

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

★ THIS ELEVATION TAKEN AT FILL FACE OF BACKWALL.

TIE BACKS ARE REQUIRED ON END BENT No. 1. SEE "TIE BACK DETAIL" SHEET 3 OF 3. FOR SOIL REINFORCEMENT DETAIL/BACKWALL CONNECTION, SEE MSE WALL PLANS.

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

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

REINFORCING STEEL IN BACKWALL SHALL BE FIELD BENT AS NECESSARY FOR INSTALLATION OF THE 18" Ø STEEL SLEEVE.

THE DIMENSIONS AND DETAILS SHOWN FOR THE STEEL PIPE SLEEVE ARE FOR THE CONTRACTOR'S BENEFIT IN PLACING THE SLEEVE AND SHOULD NOT BE CONSTRUED TO BE AN APPROVAL FOR THE ATTACHMENT OF THE UTILITY TO THE STRUCTURE.

SEE SPECIAL PROVISION FOR INSTALLATION OF 12-INCH WATER MAIN.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : M. L. BROWN DATE : 02/11
CHECKED BY : T.N. CARROLL DATE : 04/11

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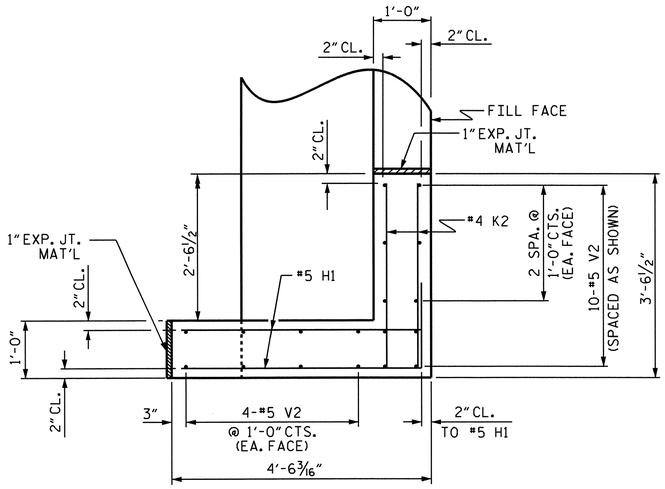
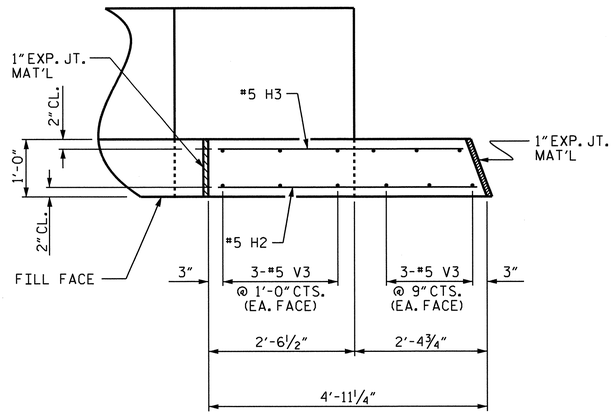
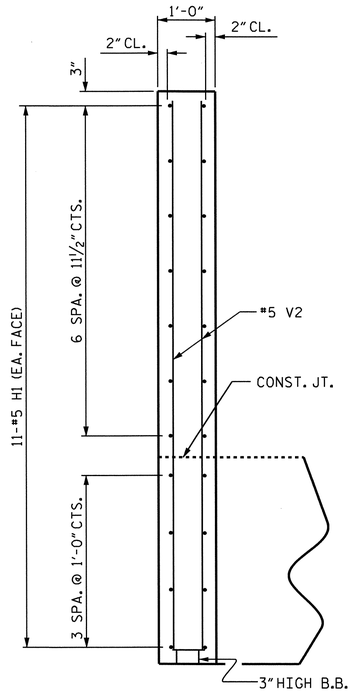


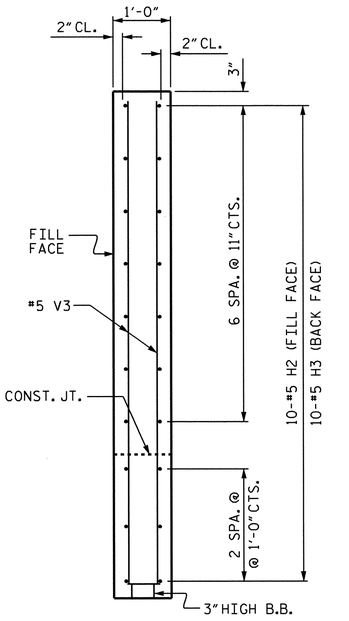
PLAN OF WING (W1)



PLAN OF WING (W2)



SECTION X-X



SECTION Y-Y

ELEVATION OF WING (W1)

ELEVATION OF WING (W2)

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

DRAWN BY : M.L. BROWN DATE : 02/11
CHECKED BY : T.N. CARROLL DATE : 02/11

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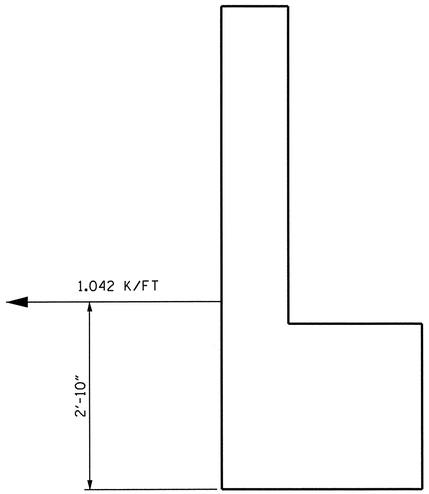
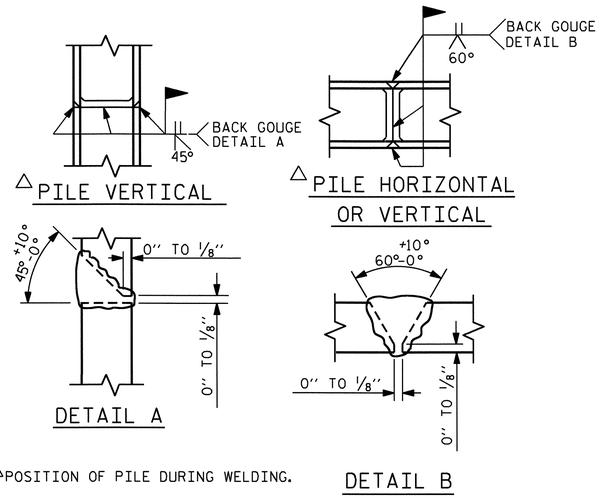


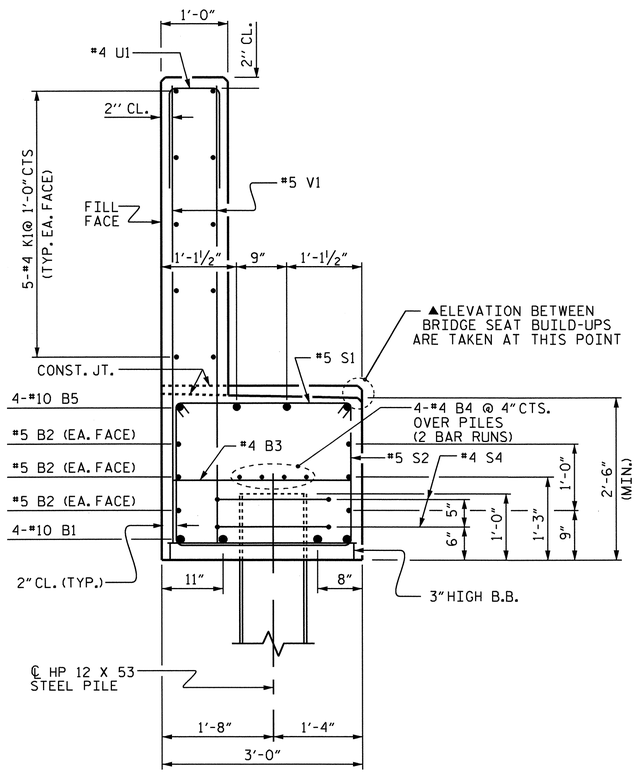
TIE BACK DETAILS

(DETAIL SHOWING TIE BACK RESTRAINT FOR END BENT No. 1)

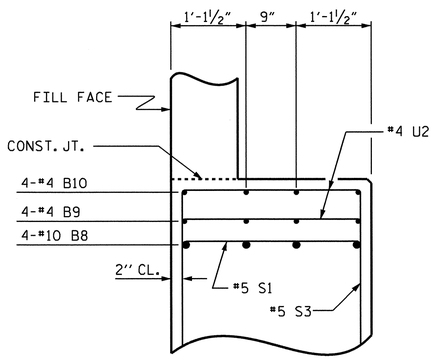


△POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

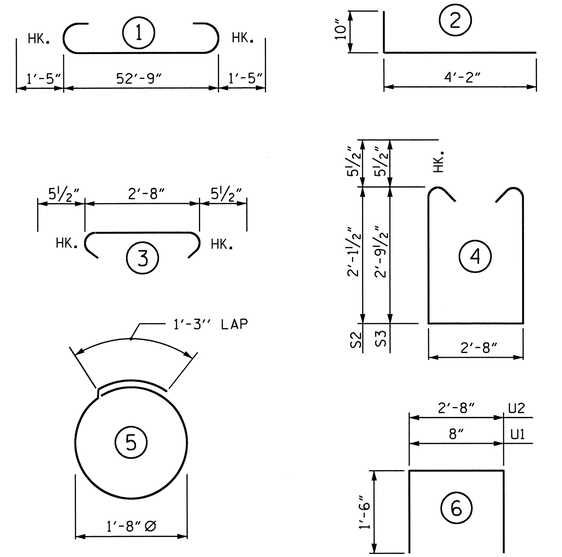


SECTION A-A



PARTIAL SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

END BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	55'-7"	957
B2	6	#5	STR	52'-11"	331
B3	17	#4	STR	2'-8"	30
B4	8	#4	STR	27'-8"	148
B5	4	#10	7	31'-8"	545
B6	2	#5	STR	25'-8"	54
B7	4	#4	STR	8'-4"	22
B8	4	#10	7	34'-3"	590
B9	4	#4	STR	24'-4"	65
B10	4	#4	STR	3'-8"	10
H1	22	#5	2	5'-0"	115
H2	10	#5	STR	4'-6"	47
H3	10	#5	STR	4'-3"	44
K1	20	#4	STR	27'-8"	370
K2	4	#4	STR	3'-2"	8
S1	90	#5	3	3'-7"	336
S2	34	#5	4	7'-10"	278
S3	56	#5	4	9'-2"	535
S4	18	#4	5	6'-6"	78
U1	47	#4	6	3'-8"	115
U2	27	#4	6	5'-8"	102
V1	94	#5	STR	6'-9"	662
V2	18	#5	STR	9'-7"	180
V3	12	#5	STR	8'-5"	105

REINFORCING STEEL 5727 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP & LOWER PART OF WINGS 19.6 C.Y.

POUR #2 BACKWALL & UPPER PART OF WINGS 11.2 C.Y.

TOTAL CLASS A CONCRETE 30.8 C.Y.

HP 12 X 53 STEEL PILES
NO. = 9 LIN. FT. = 135

PILE EXCAVATION
NOT IN SOIL = 45 LIN. FT.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 24330 ENGINEER THEO J. BEACH 6/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : M.L. BROWN DATE : 02/11
CHECKED BY : T.N. CARROLL DATE : 04/11

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NOTES:

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

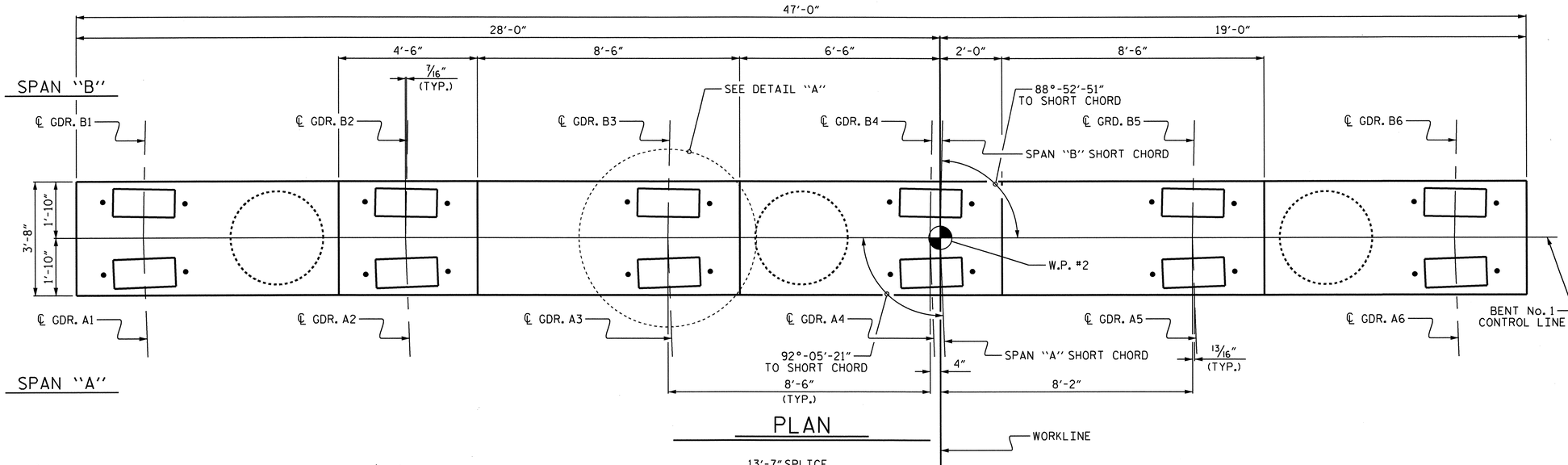
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

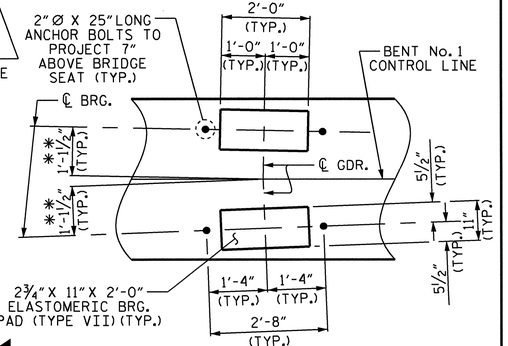
FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

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

FOR PERMANENT STEEL CASING, SEE SPECIAL PROVISION FOR DRILLED PIERS.

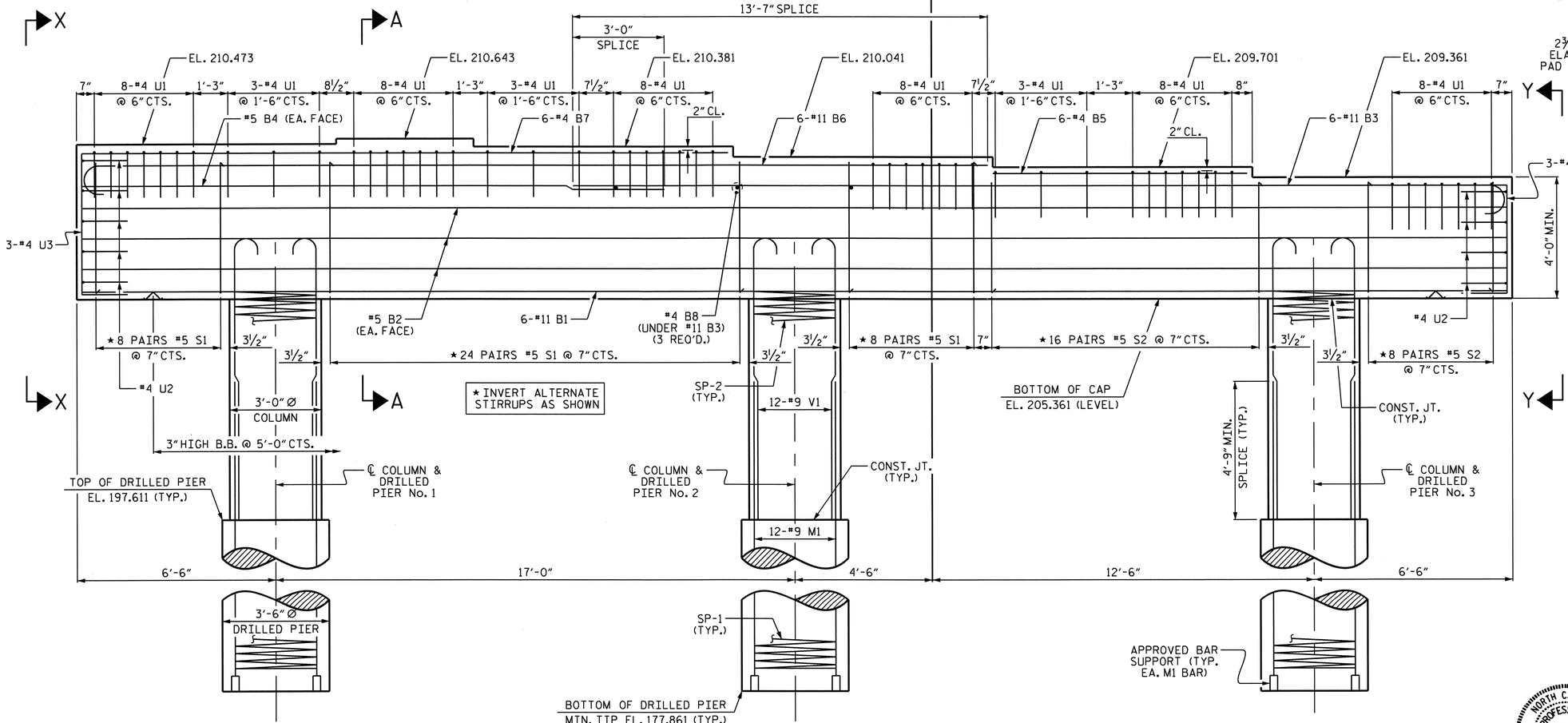


PLAN



DETAIL "A"

** MEASURED ALONG ℄ GIRDER (TYP. EA. GIRDER)



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 10-2010
CHECKED BY : T.L. CLELLAND DATE : 11-2010

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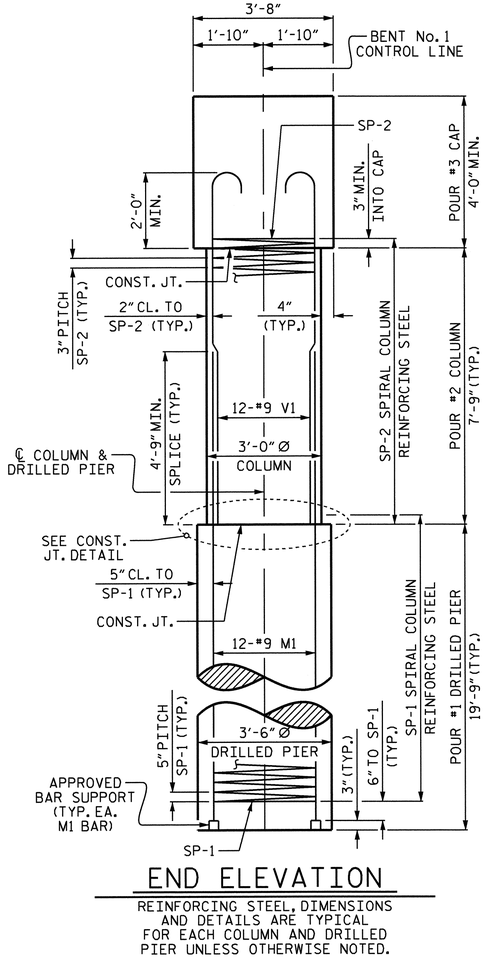
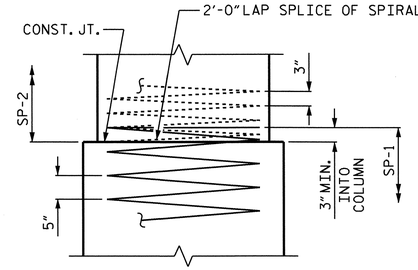
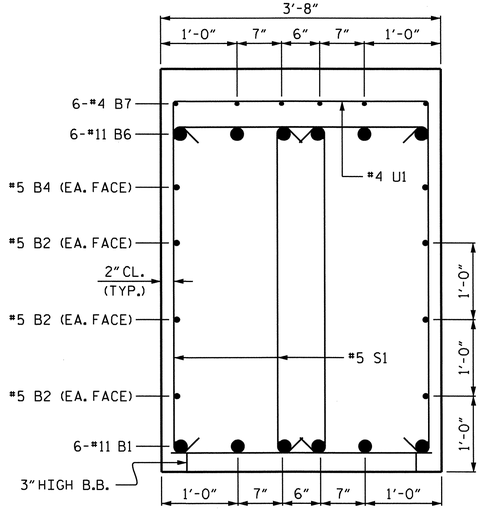


END ELEVATION

REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER UNLESS OTHERWISE NOTED.

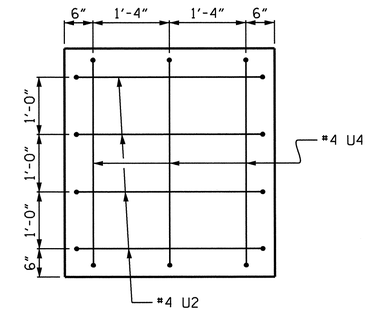


CONSTRUCTION JOINT DETAIL



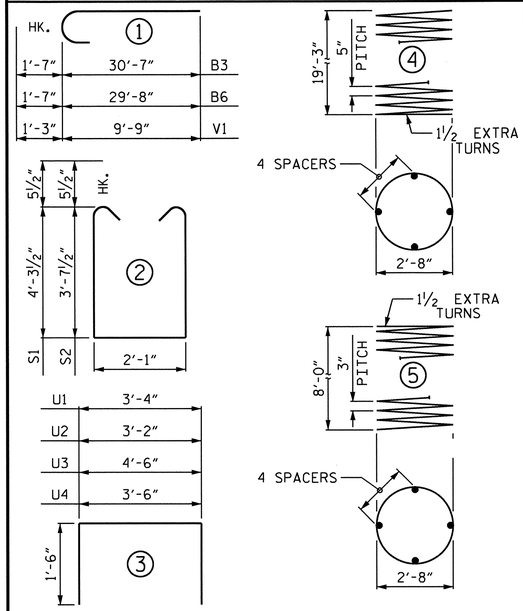
SECTION A-A

SECTION X-X



SECTION Y-Y

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT No. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	STR	46'-8"	1488
B2	6	#5	STR	46'-8"	292
B3	6	#11	1	32'-2"	1025
B4	2	#5	STR	19'-1"	40
B5	6	#4	STR	8'-4"	33
B6	6	#11	1	31'-3"	996
B7	6	#4	STR	21'-2"	85
B8	3	#4	STR	3'-4"	7
M1	36	#9	STR	27'-3"	3335
S1	80	#5	2	11'-7"	967
S2	48	#5	2	10'-3"	513
U1	57	#4	3	6'-4"	241
U2	9	#4	3	6'-2"	37
U3	3	#4	3	7'-6"	15
U4	3	#4	3	6'-6"	13
V1	36	#9	1	11'-0"	1346

REINFORCING STEEL 10,433 LBS.

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP-1	3	*	4	394'-10"	1235
SP-2	3	**	5	280'-6"	562

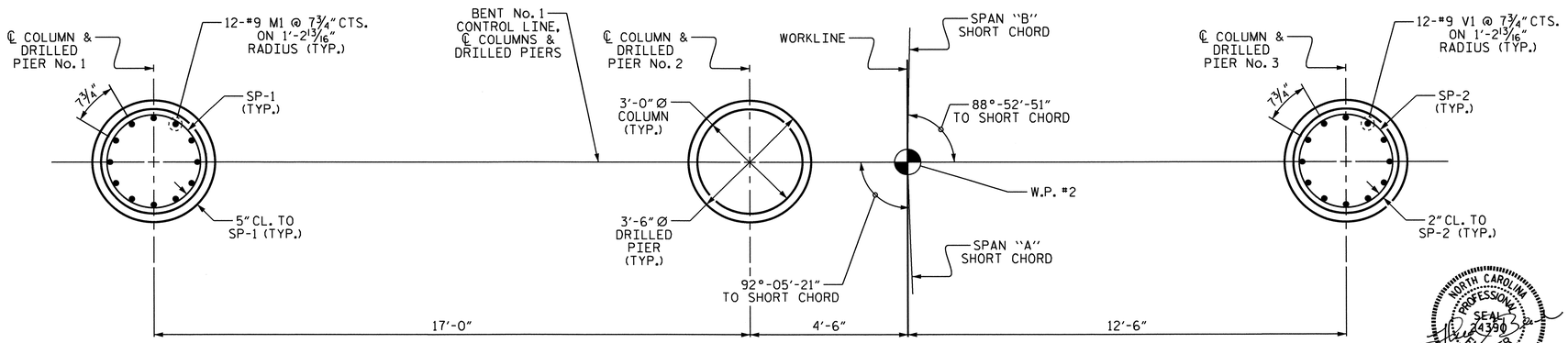
SPIRAL COLUMN REINFORCING STEEL 1,797 LBS.

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

**THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE	
POUR #2 (COLUMNS)	6.1 C.Y.
POUR #3 (CAP)	30.0 C.Y.
TOTAL	36.1 C.Y.

DRILLED PIERS:	
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	21.1 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL	22.50 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL	36.75 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	38.0 LIN. FT.
CSL TUBES	267.00 LIN. FT.



PLAN OF DRILLED PIERS & COLUMNS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

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

SHEET NO. S-45

TOTAL SHEETS 66

DRAWN BY : T. BANKOVICH DATE : 10-2010
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23-AUG-2011 11:37
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NOTES:

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

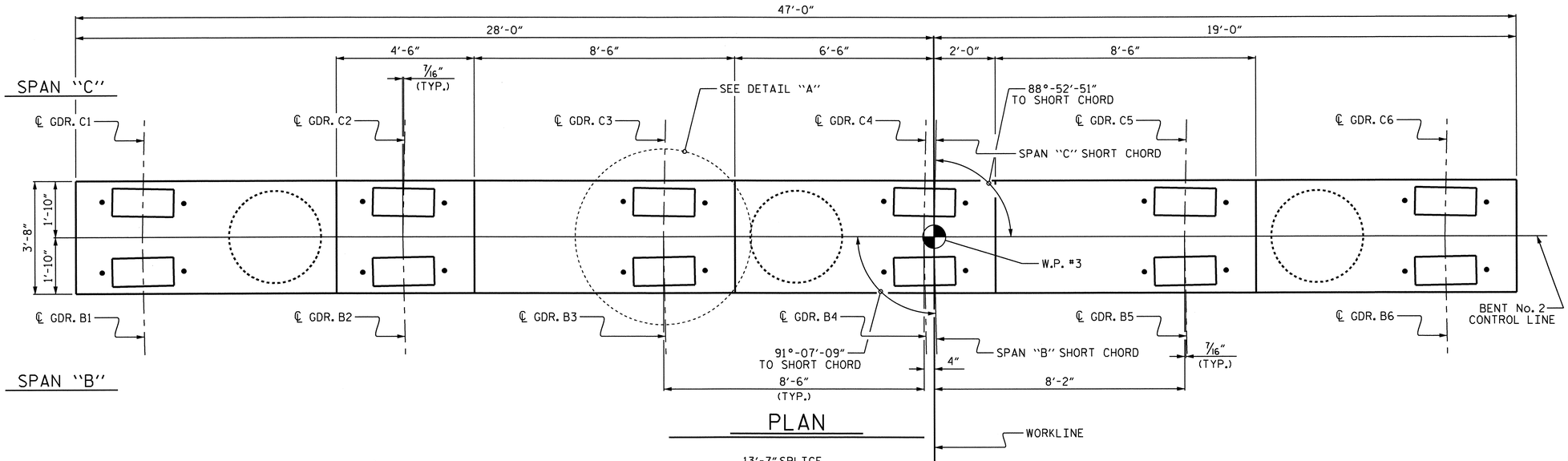
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

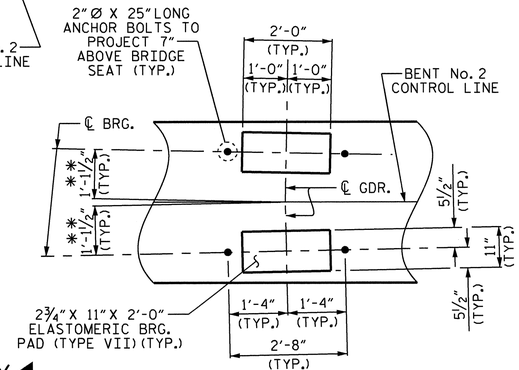
FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

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

FOR PERMANENT STEEL CASING, SEE SPECIAL PROVISION FOR DRILLED PIERS.

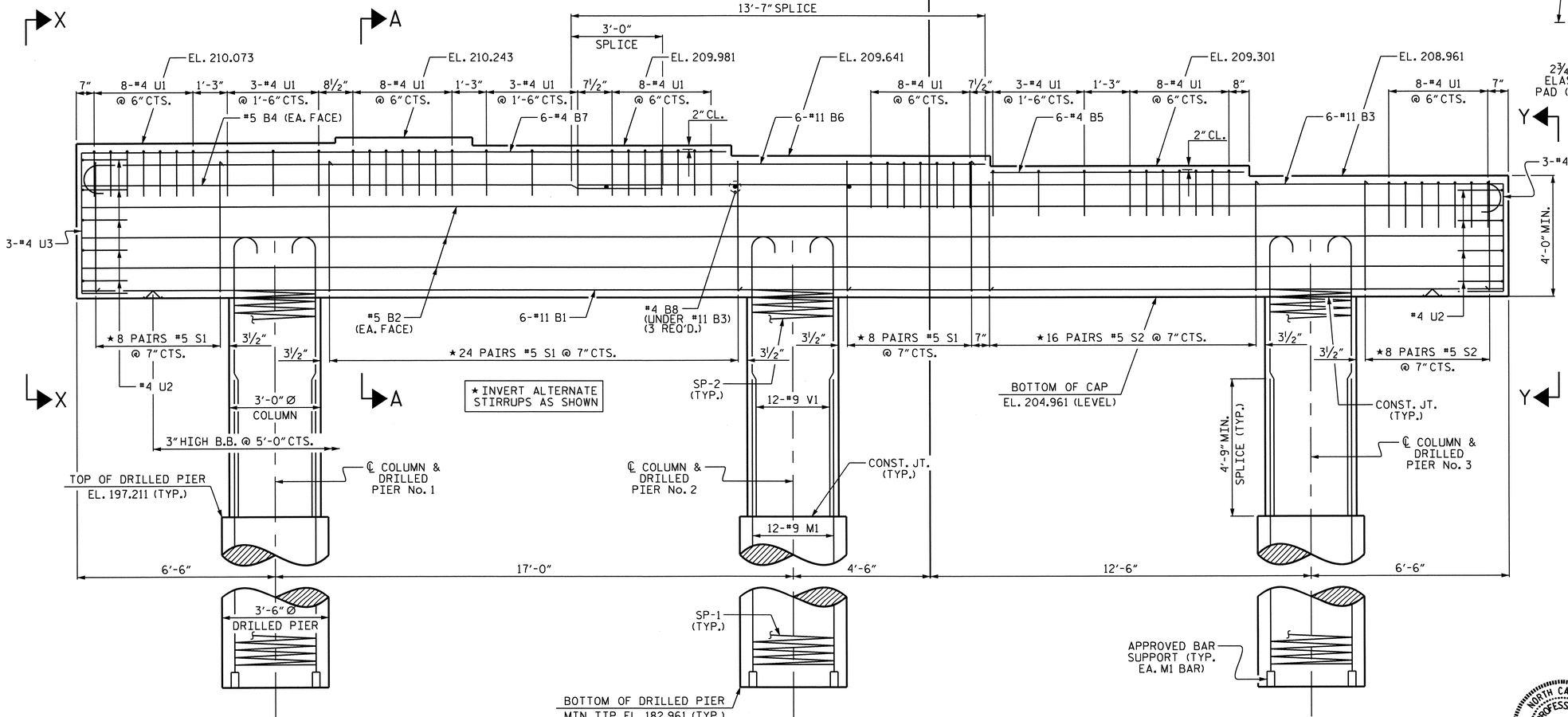


PLAN



DETAIL "A"

** MEASURED ALONG ℄ GIRDER (TYP. EA. GIRDER)



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

DRAWN BY : T. BANKOVICH DATE : 10-2010
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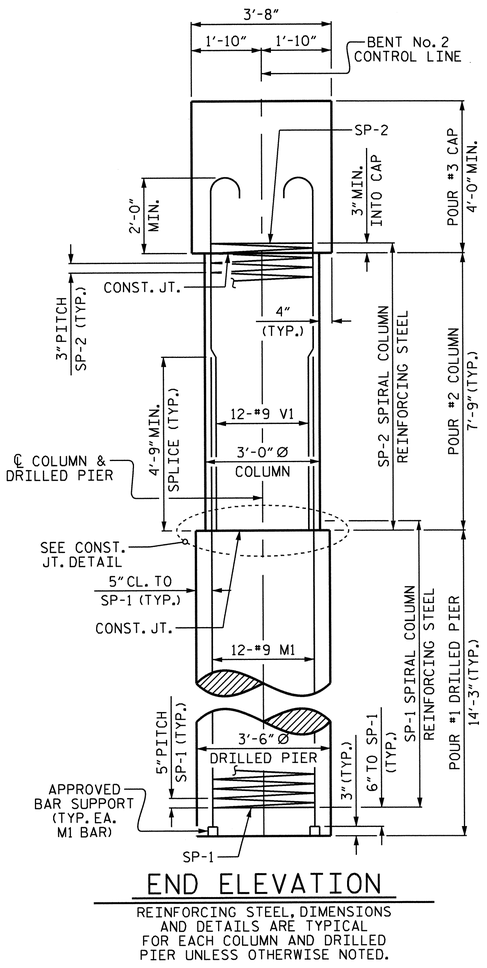
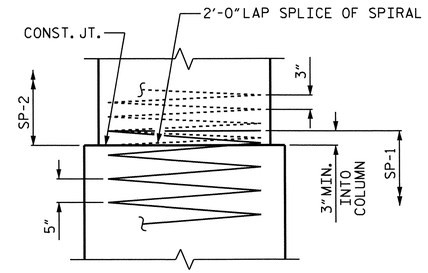


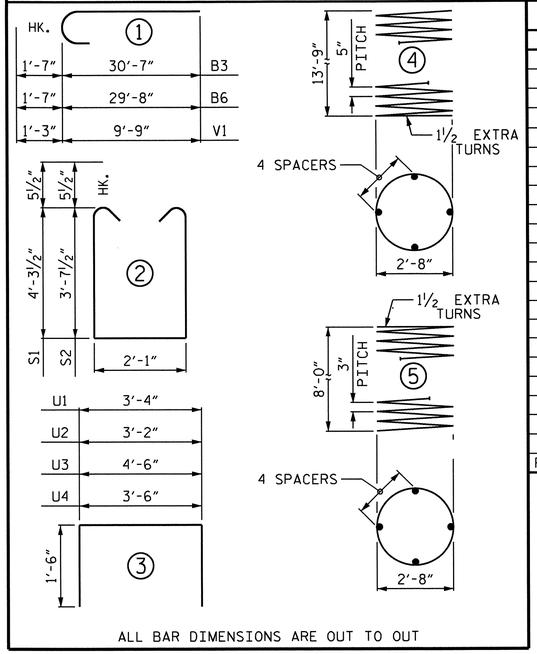
END ELEVATION

REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER UNLESS OTHERWISE NOTED.



CONSTRUCTION JOINT DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	STR	46'-8"	1488
B2	6	#5	STR	46'-8"	292
B3	6	#11	1	32'-2"	1025
B4	2	#5	STR	19'-1"	40
B5	6	#4	STR	8'-4"	33
B6	6	#11	1	31'-3"	996
B7	6	#4	STR	21'-2"	85
B8	3	#4	STR	3'-4"	7
M1	36	#9	STR	21'-9"	2662
S1	80	#5	2	11'-7"	967
S2	48	#5	2	10'-3"	513
U1	57	#4	3	6'-4"	241
U2	9	#4	3	6'-2"	37
U3	3	#4	3	7'-6"	15
U4	3	#4	3	6'-6"	13
V1	36	#9	1	11'-0"	1346
REINFORCING STEEL					9,760 LBS.

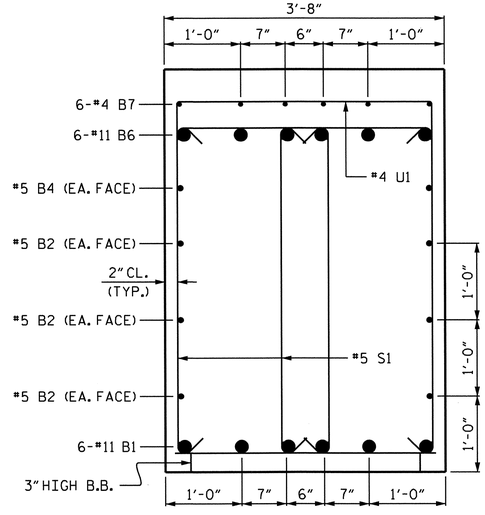
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP-1	3	*	4	287'-11"	901
SP-2	3	**	5	280'-6"	562
SPIRAL COLUMN REINFORCING STEEL					1,463 LBS.

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

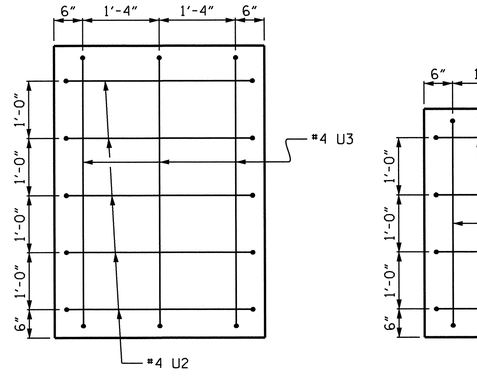
**THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE	
POUR #2 (COLUMNS)	6.1 C.Y.
POUR #3 (CAP)	30.0 C.Y.
TOTAL	36.1 C.Y.

DRILLED PIERS:	
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	15.2 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL	22.20 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL	20.55 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	22.0 LIN. FT.
CSL TUBES	201 LIN. FT.

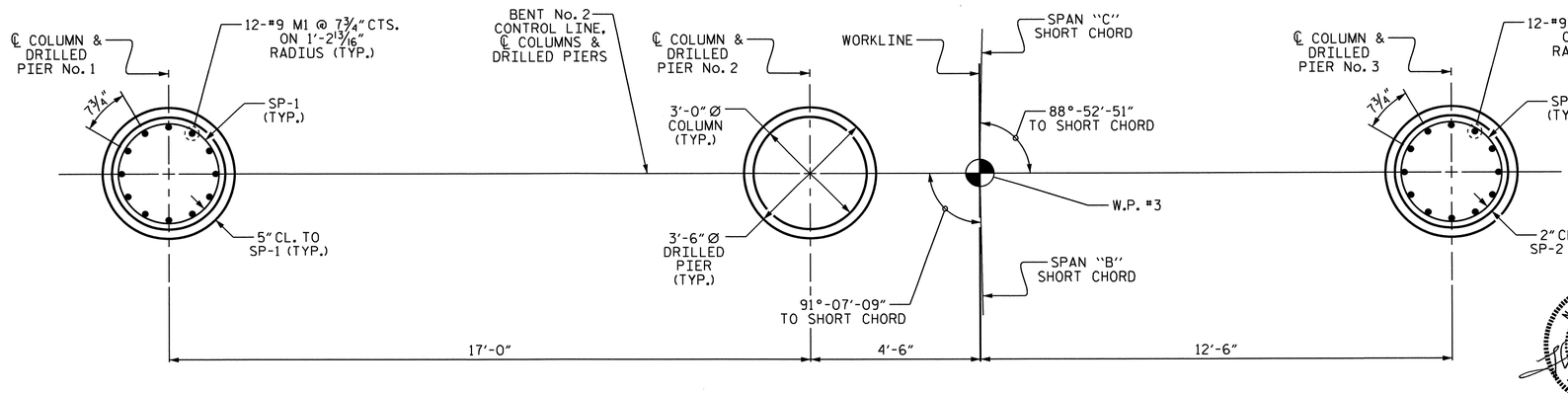


SECTION A-A



SECTION X-X

SECTION Y-Y



PLAN OF DRILLED PIERS & COLUMNS

NORTH CAROLINA PROFESSIONAL SEAL 24396 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 2

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

SHEET NO. S-47

TOTAL SHEETS 66

DRAWN BY : T. BANKOVICH DATE : 10-2010
CHECKED BY : T.L. CLELLAND DATE : 11-2010

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NOTES:

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

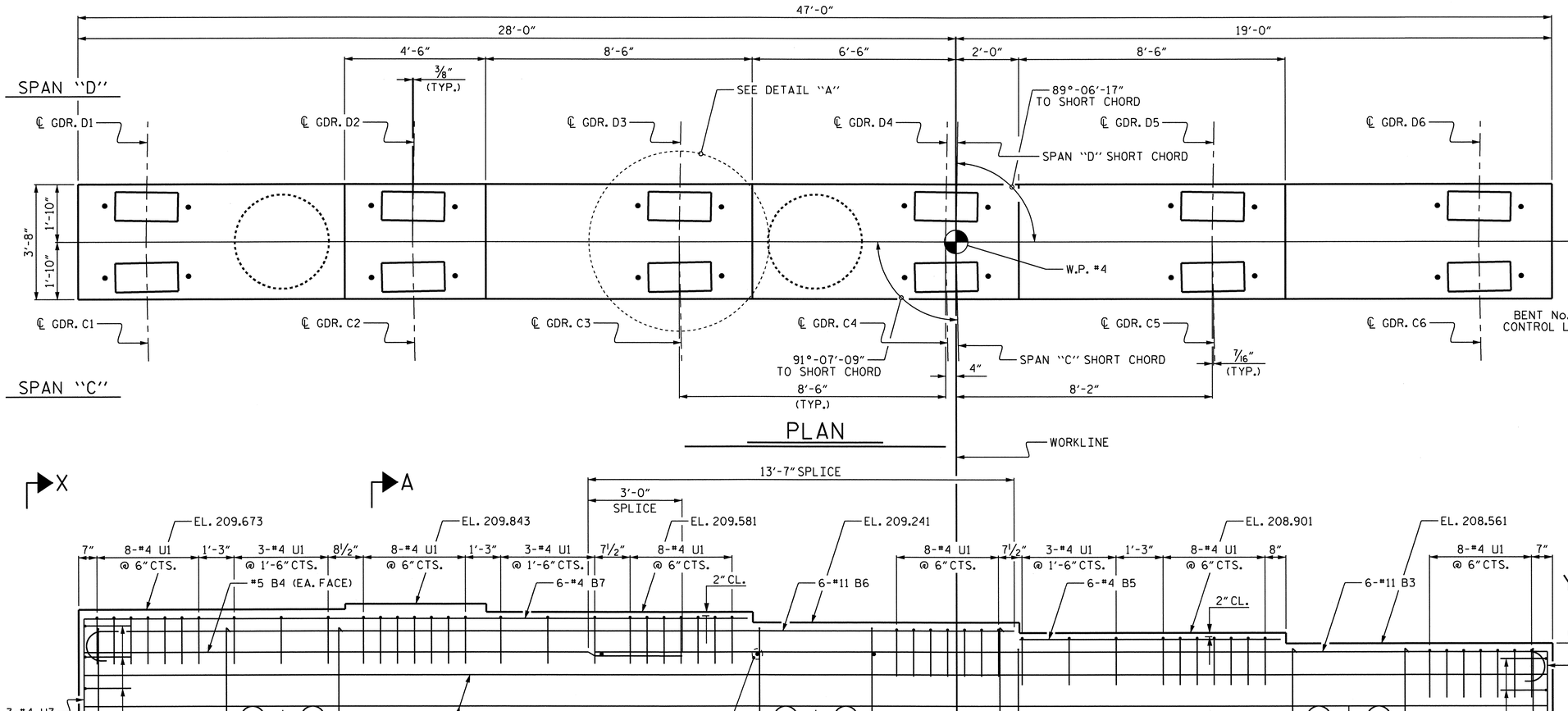
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

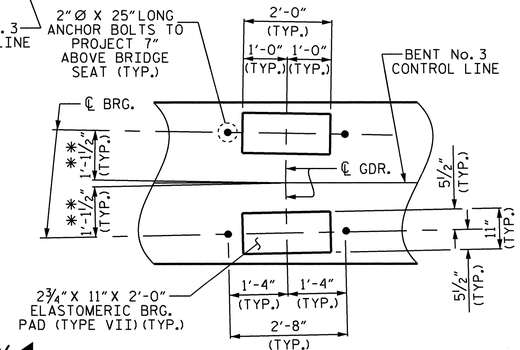
HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

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

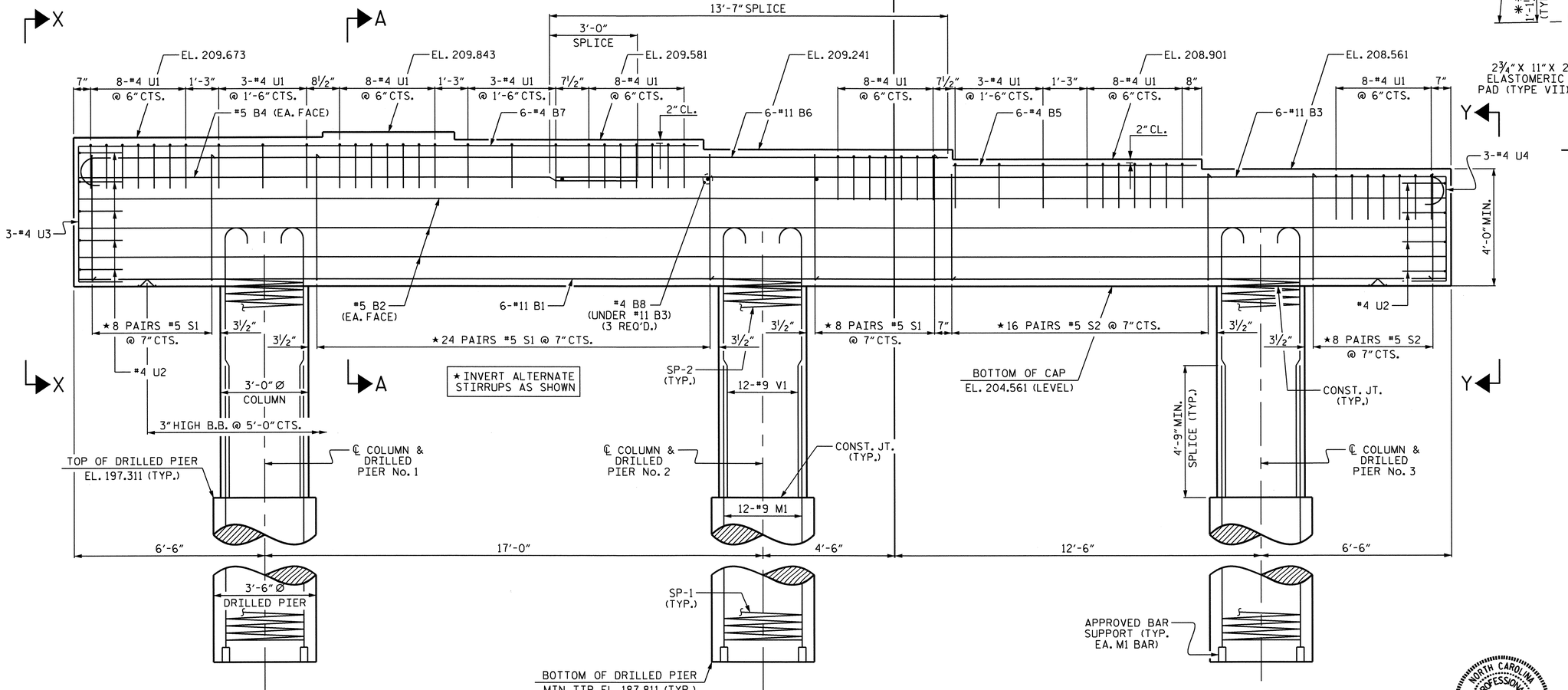
FOR PERMANENT STEEL CASING, SEE SPECIAL PROVISION FOR DRILLED PIERS.





DETAIL "A"

**MEASURED ALONG ℄ GIRDER (TYP. EA. GIRDER)



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

NORTH CAROLINA PROFESSIONAL SEAL 24380 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 10-2010
CHECKED BY : T.L. CLELLAND DATE : 11-2010

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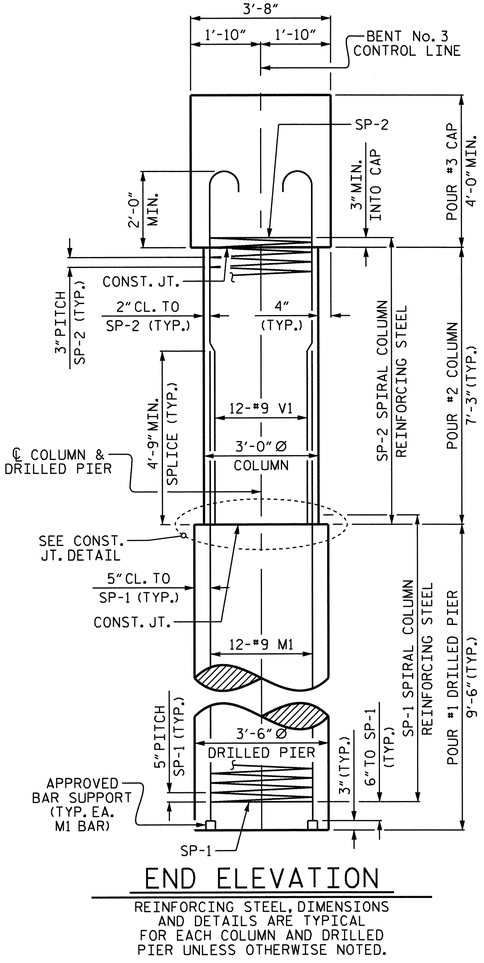
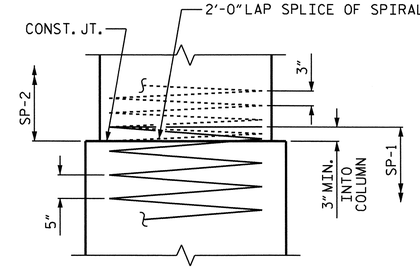
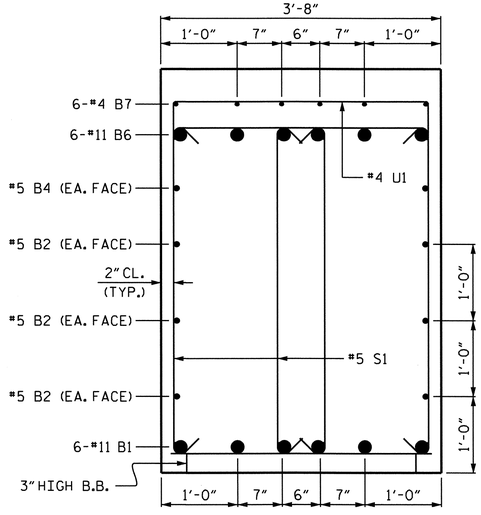


END ELEVATION

REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER UNLESS OTHERWISE NOTED.

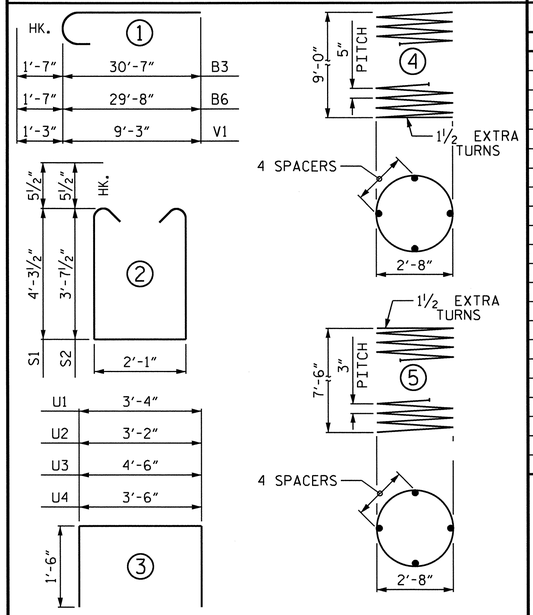


CONSTRUCTION JOINT DETAIL



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT No. 3

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	STR	46'-8"	1488
B2	6	#5	STR	46'-8"	292
B3	6	#11	1	32'-2"	1025
B4	2	#5	STR	19'-1"	40
B5	6	#4	STR	8'-4"	33
B6	6	#11	1	31'-3"	996
B7	6	#4	STR	21'-2"	85
B8	3	#4	STR	3'-4"	7
M1	36	#9	STR	17'-0"	2081
S1	80	#5	2	11'-7"	967
S2	48	#5	2	10'-3"	513
U1	57	#4	3	6'-4"	241
U2	9	#4	3	6'-2"	37
U3	3	#4	3	7'-6"	15
U4	3	#4	3	6'-6"	13
V1	36	#9	1	10'-6"	1285

REINFORCING STEEL 9,118 LBS.

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP-1	3	*	4	197'-5"	618
SP-2	3	**	5	264'-0"	529

SPIRAL COLUMN REINFORCING STEEL 1,147 LBS.

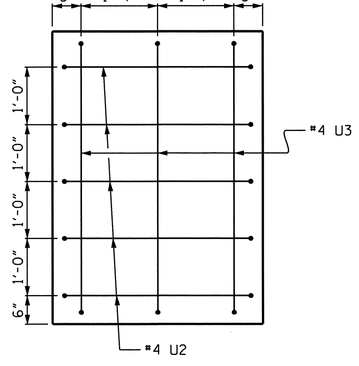
*THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

**THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

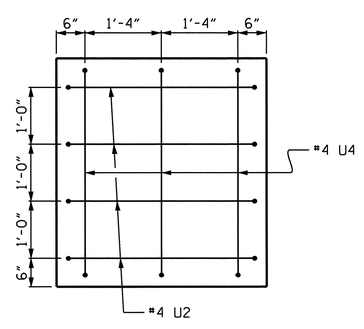
CLASS A CONCRETE	
POUR #2 (COLUMNS)	5.7 C.Y.
POUR #3 (CAP)	30.0 C.Y.
TOTAL	35.7 C.Y.

DRILLED PIERS:

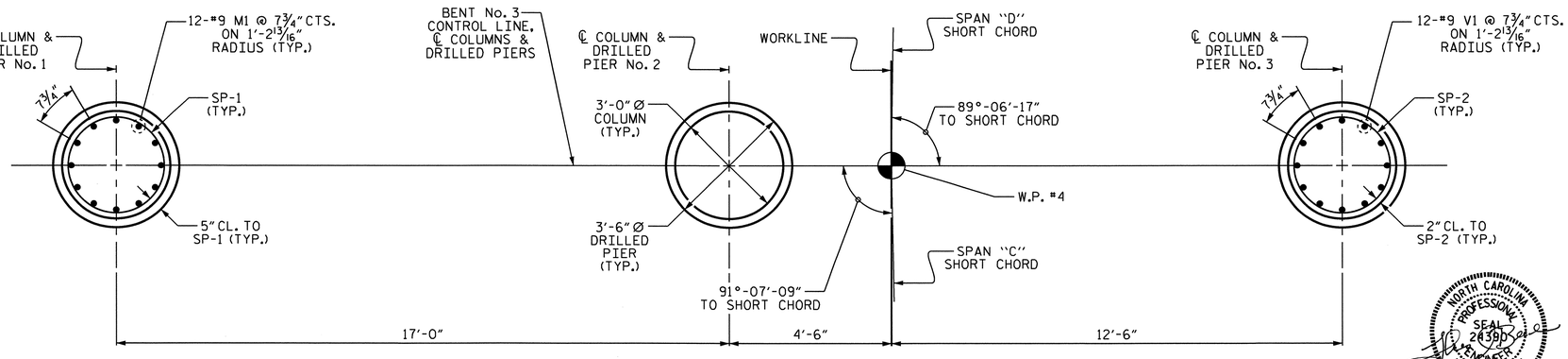
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	10.2 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL	23.10 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL	5.40 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	6.5 LIN. FT.
CSL TUBES	144.00 LIN. FT.



SECTION X-X



SECTION Y-Y



PLAN OF DRILLED PIERS & COLUMNS

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 3

NORTH CAROLINA PROFESSIONAL SEAL 29390 ENGINEER THEO J. BEACH 8/24/11

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

SHEET NO. S-49

TOTAL SHEETS 66

DRAWN BY : T. BANKOVICH DATE : 10-2010
CHECKED BY : T.L. CLELLAND DATE : 11-2010

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NOTES:

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

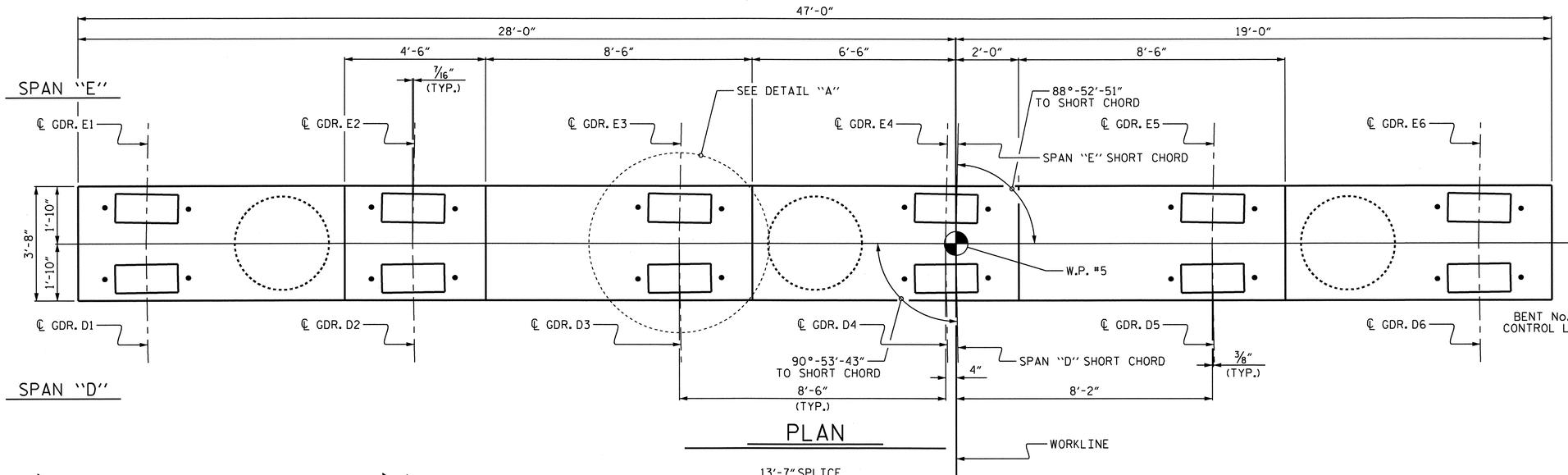
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

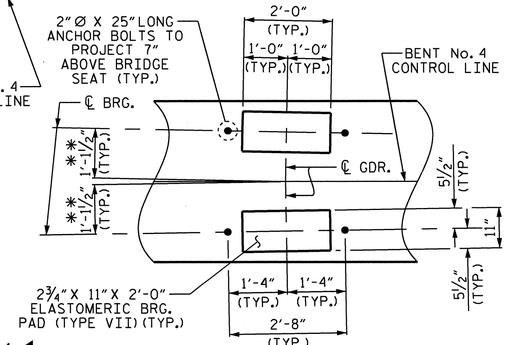
FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

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

FOR PERMANENT STEEL CASING, SEE SPECIAL PROVISION FOR DRILLED PIERS.

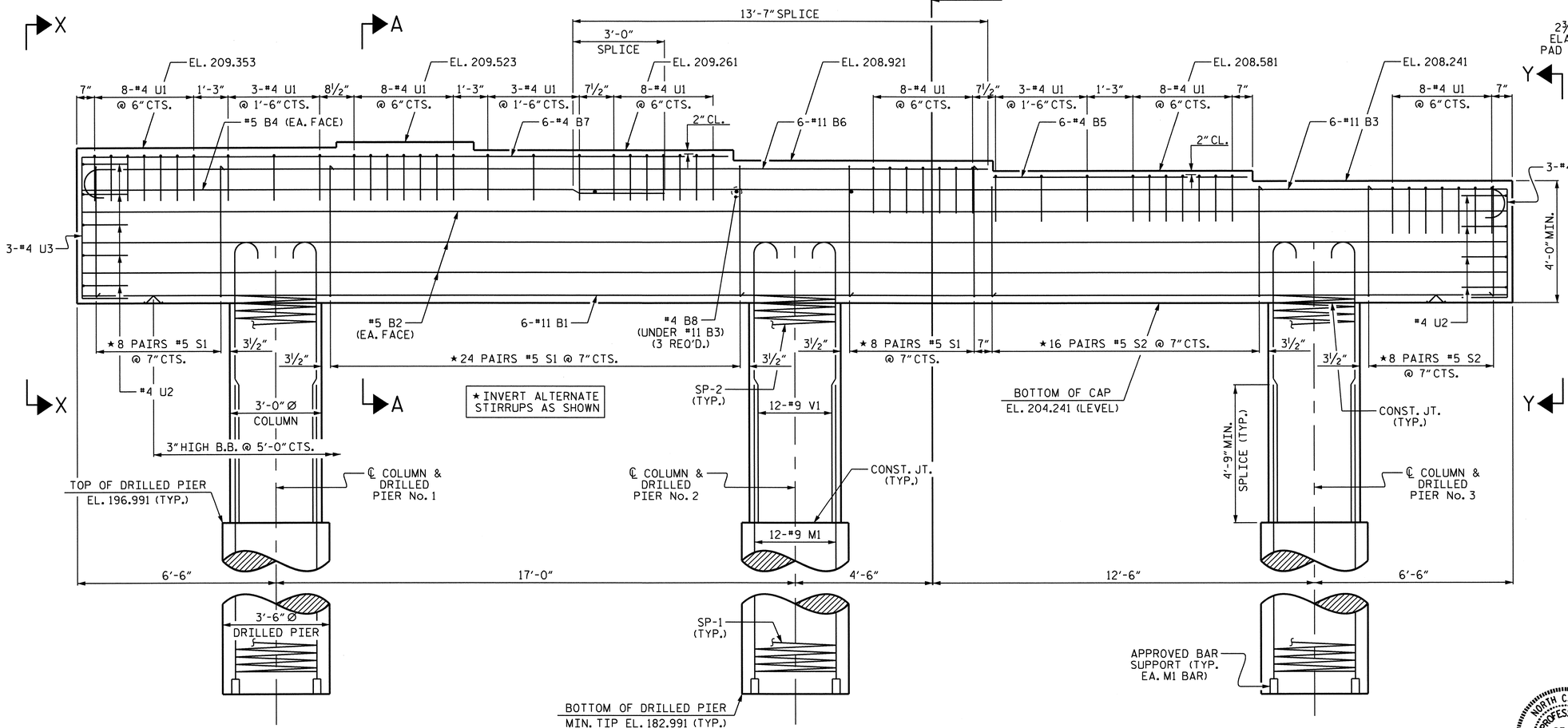


PLAN



DETAIL "A"

** MEASURED ALONG ℄ GIRDER (TYP. EA. GIRDER)



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

NORTH CAROLINA PROFESSIONAL SEAL 24890 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 10-2010
CHECKED BY : T.L. CLELLAND DATE : 11-2010

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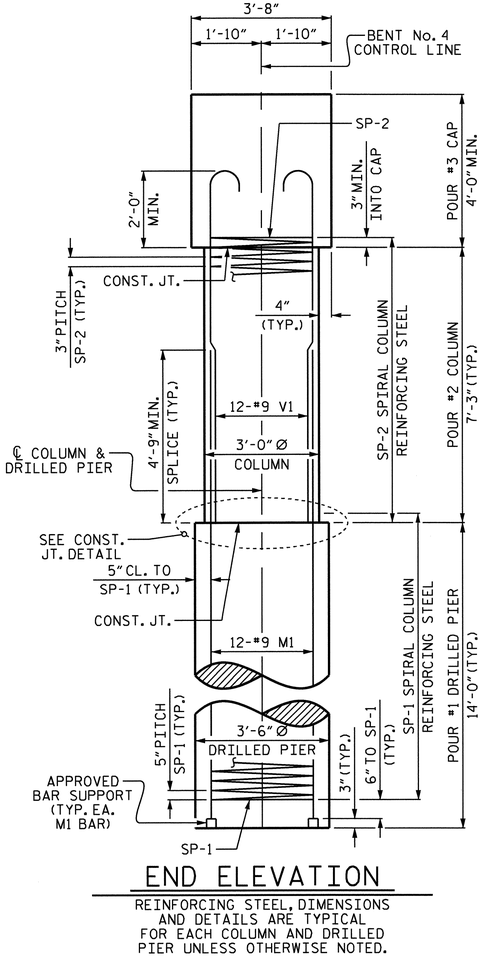
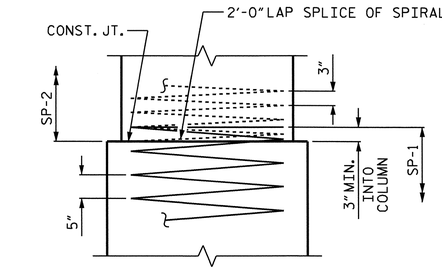
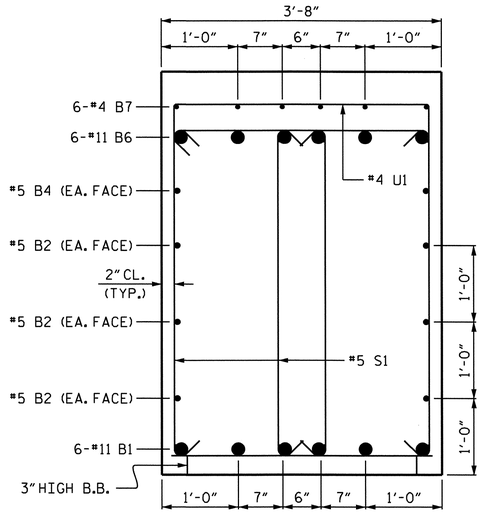


END ELEVATION

REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER UNLESS OTHERWISE NOTED.

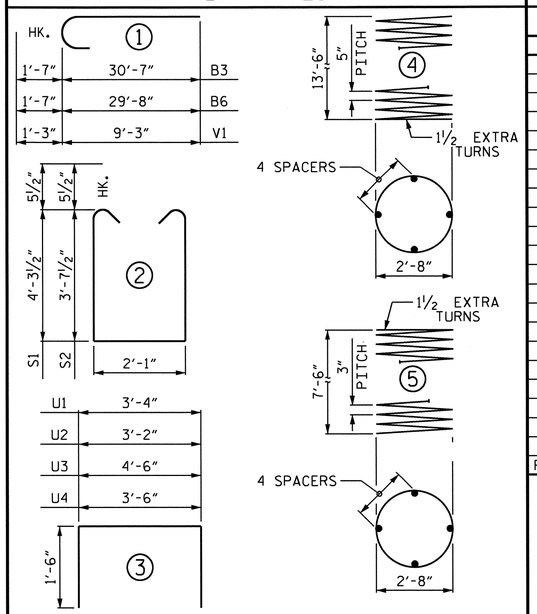


CONSTRUCTION JOINT DETAIL



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT No. 4

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	STR	46'-8"	1488
B2	6	#5	STR	46'-8"	292
B3	6	#11	1	32'-2"	1025
B4	2	#5	STR	19'-1"	40
B5	6	#4	STR	8'-4"	33
B6	6	#11	1	31'-3"	996
B7	6	#4	STR	21'-2"	85
B8	3	#4	STR	3'-4"	7
M1	36	#9	STR	21'-6"	2632
S1	80	#5	2	11'-7"	967
S2	48	#5	2	10'-3"	513
U1	57	#4	3	6'-4"	241
U2	9	#4	3	6'-2"	37
U3	3	#4	3	7'-6"	15
U4	3	#4	3	6'-6"	13
V1	36	#9	1	10'-6"	1285

REINFORCING STEEL 9,669 LBS.

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
SP-1	3	*	4	279'-8"	875
SP-2	3	**	5	264'-0"	529

SPIRAL COLUMN REINFORCING STEEL 1,404 LBS.

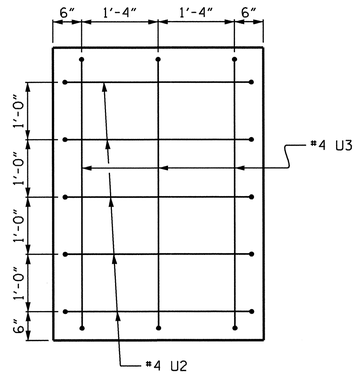
*THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

**THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

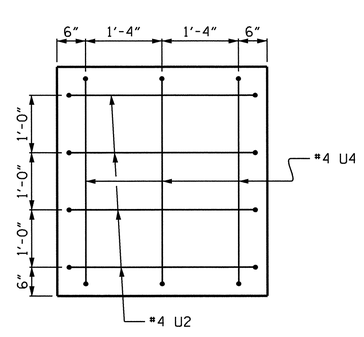
CLASS A CONCRETE	
POUR #2 (COLUMNS)	5.7 C.Y.
POUR #3 (CAP)	30.0 C.Y.
TOTAL	35.7 C.Y.

DRILLED PIERS:

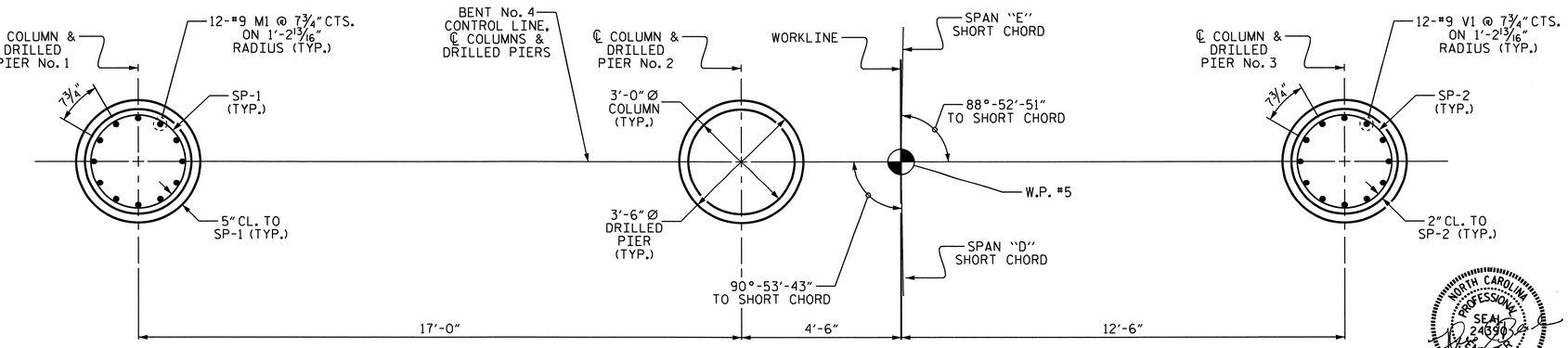
DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	15.0 C.Y.
3'-6" Ø DRILLED PIER NOT IN SOIL	21.00 LIN. FT.
3'-6" Ø DRILLED PIER IN SOIL	21.00 LIN. FT.
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	22.5 LIN. FT.
CSL TUBES	198.00 LIN. FT.



SECTION X-X



SECTION Y-Y



PLAN OF DRILLED PIERS & COLUMNS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 5/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 4

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

SHEET NO. S-51

TOTAL SHEETS 606

DRAWN BY : T. BANKOVICH DATE : 10-2010
CHECKED BY : T.L. CLELLAND DATE : 11-2010

23-AUG-2011 11:35
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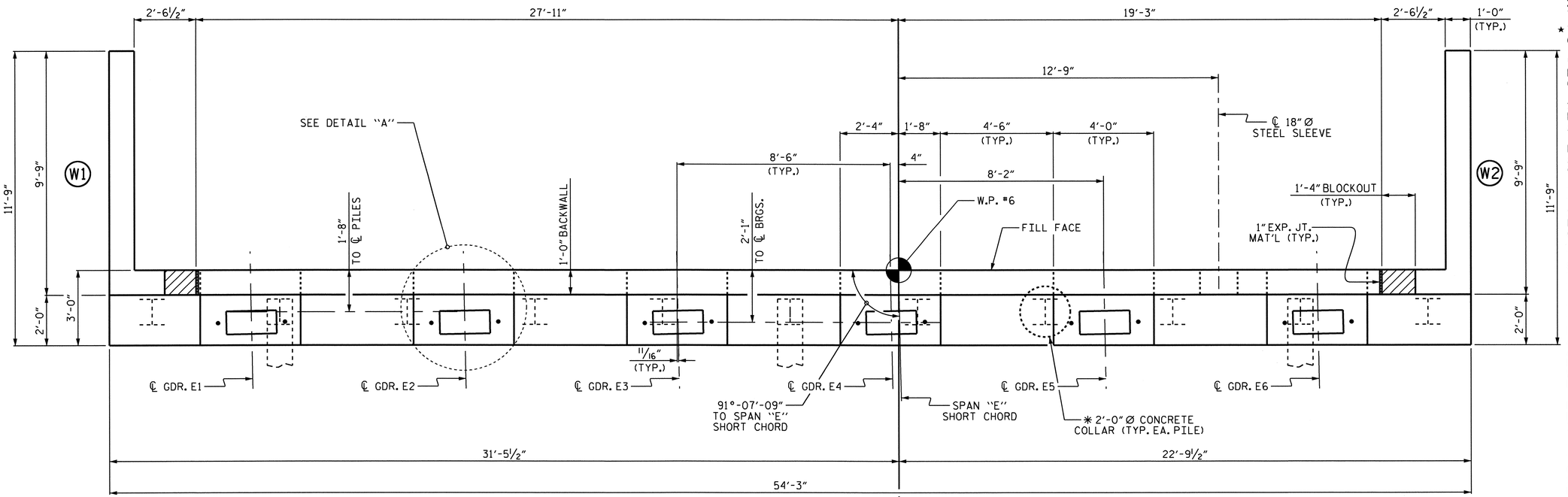
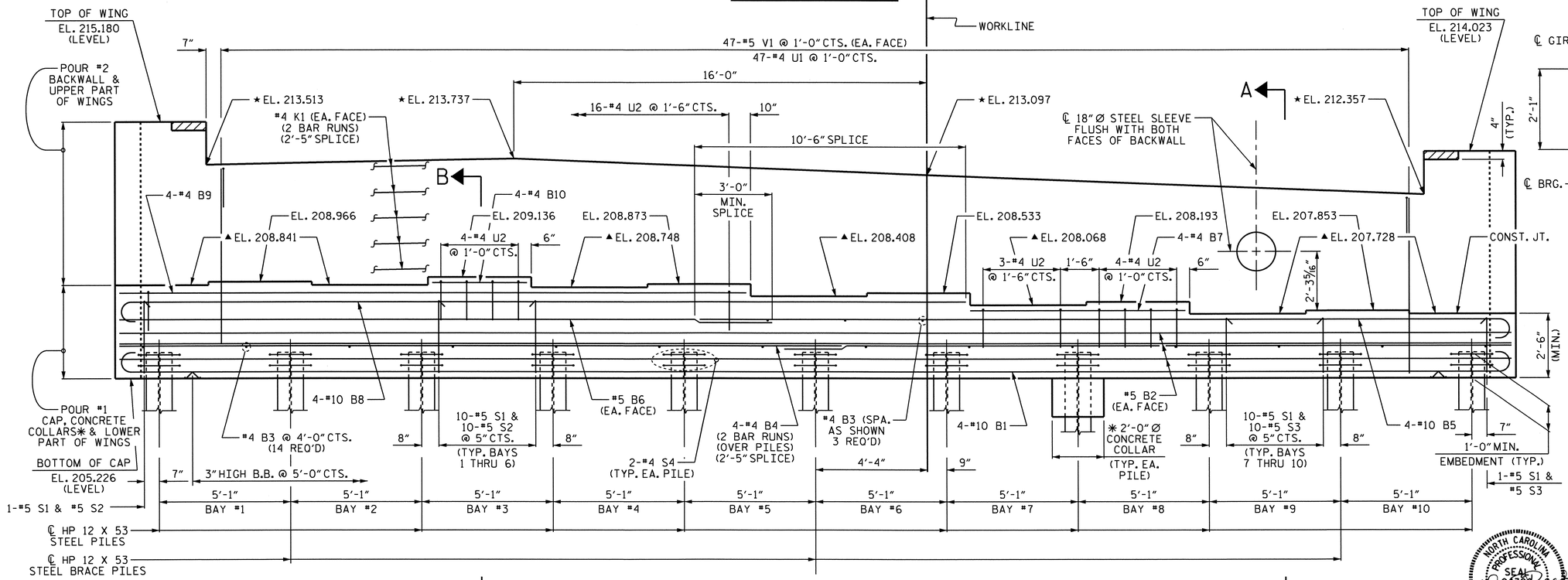
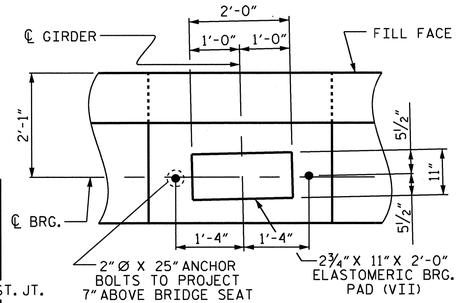


PLAN



ELEVATION

✱ ADDITIONAL CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN & ELEVATION VIEWS FOR CLARITY. SEE SECTION A-A FOR DETAILS, SHEET 3 OF 3.



DETAIL "A"

(TYP. EA. GIRDER)

NOTES:

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

★ THIS ELEVATION TAKEN AT FILL FACE OF BACKWALL.

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

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

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

REINFORCING STEEL IN BACKWALL SHALL BE FIELD BENT AS NECESSARY FOR INSTALLATION OF THE 18"Ø STEEL SLEEVE.

THE DIMENSIONS AND DETAILS SHOWN FOR THE STEEL PIPE SLEEVE ARE FOR THE CONTRACTOR'S BENEFIT IN PLACING THE SLEEVE AND SHOULD NOT BE CONSTRUED TO BE AN APPROVAL FOR THE ATTACHMENT OF THE UTILITY TO THE STRUCTURE.

SEE SPECIAL PROVISION FOR INSTALLATION OF 12-INCH WATER MAIN.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 7-2010
CHECKED BY : M.L. BROWN DATE : 7-2010

23-AUG-2011 11:34
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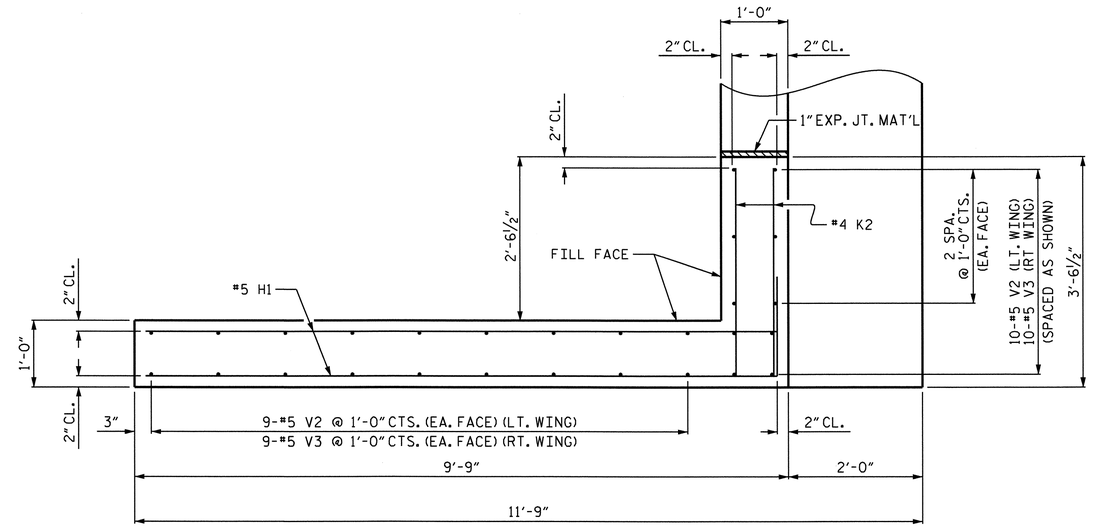
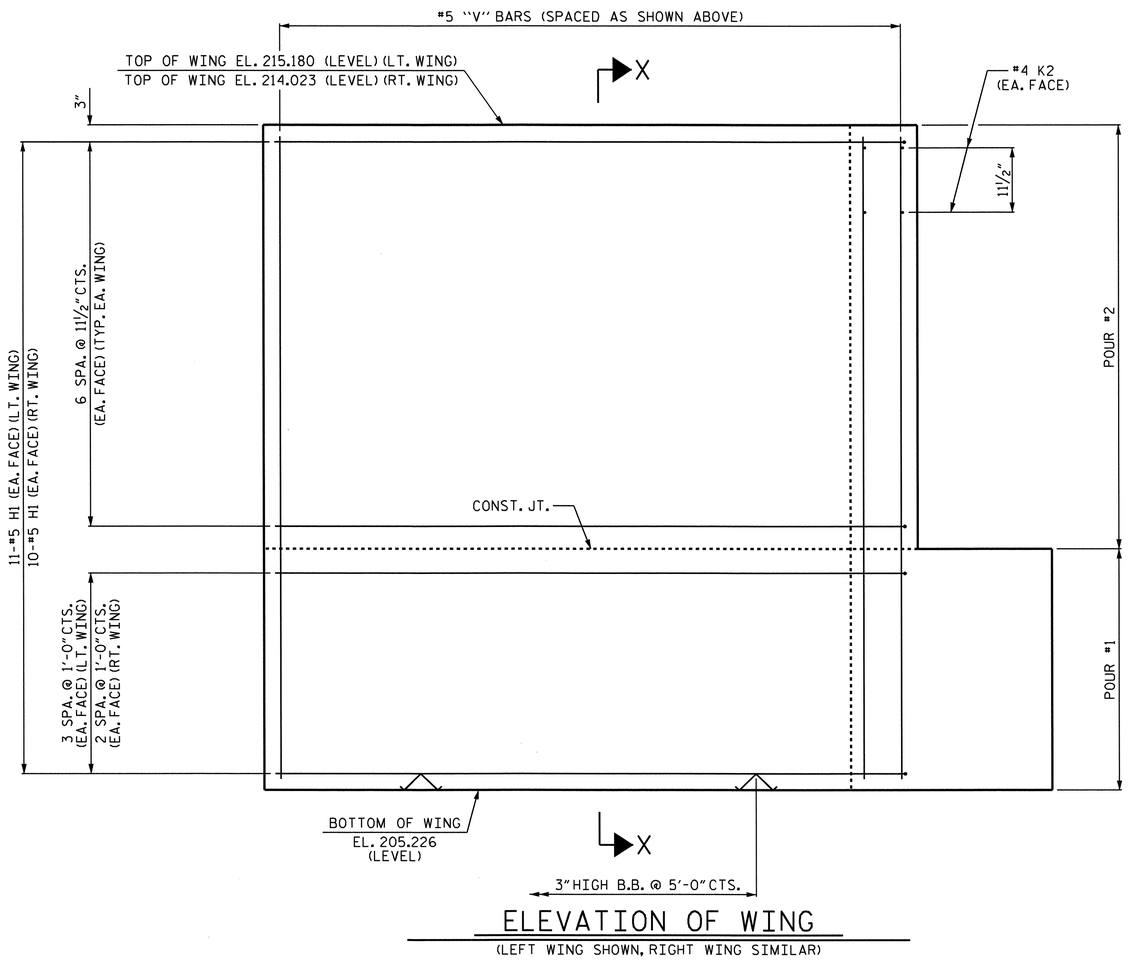


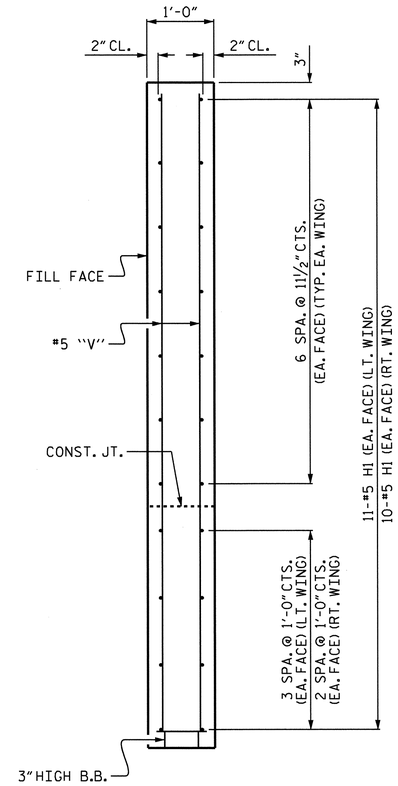
PLAN OF WING

(LEFT WING SHOWN, RIGHT WING SIMILAR)



ELEVATION OF WING

(LEFT WING SHOWN, RIGHT WING SIMILAR)



SECTION X-X

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/29/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 7-2010
CHECKED BY : M.L. BROWN DATE : 7-2010

08-JUL-2011 12:45
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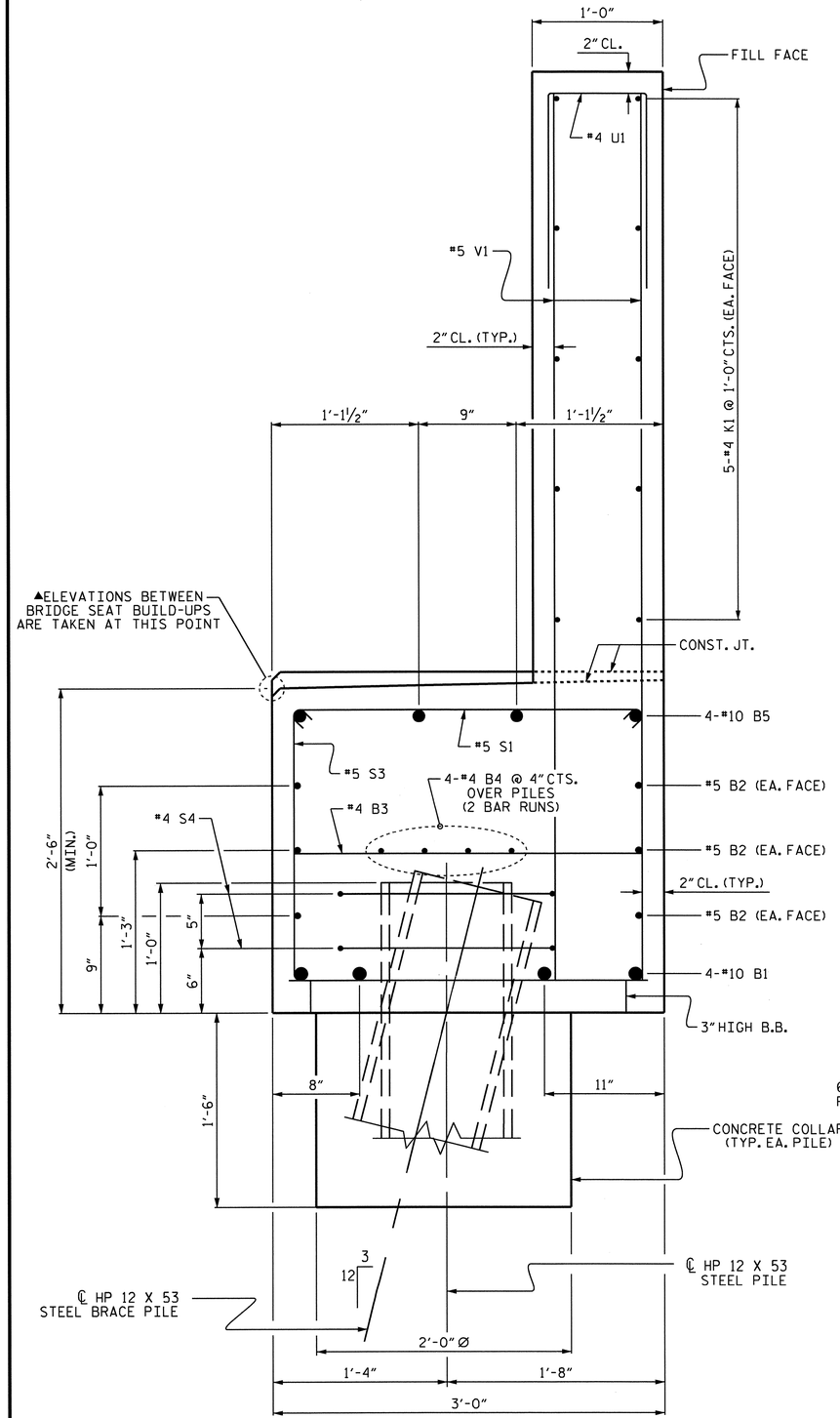
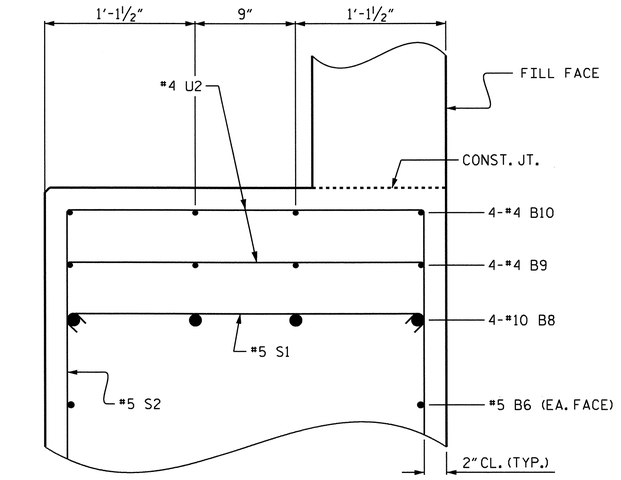
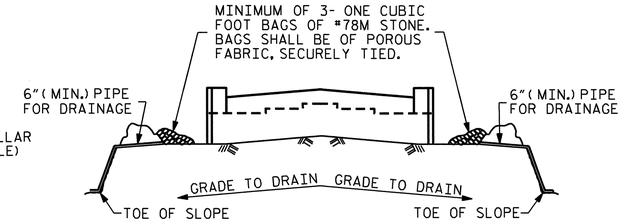


SECTION A-A



PARTIAL SECTION B-B



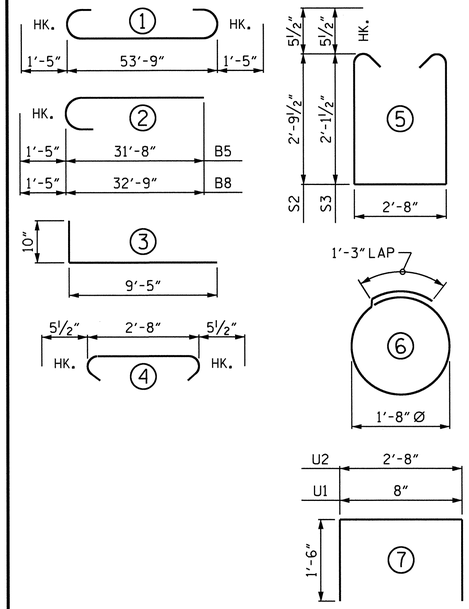
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

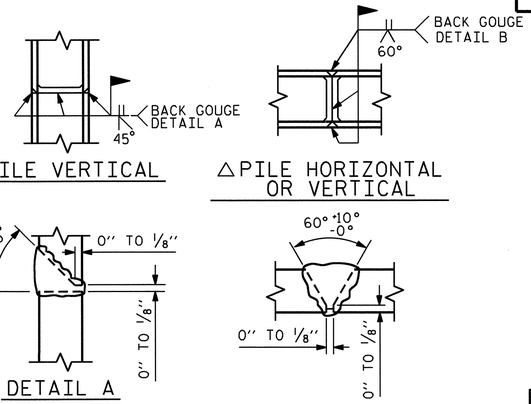
BILL OF MATERIAL

END BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	56'-7"	974
B2	6	#5	STR	53'-11"	337
B3	17	#4	STR	2'-8"	30
B4	8	#4	STR	28'-2"	151
B5	4	#10	2	33'-1"	569
B6	2	#5	STR	25'-3"	53
B7	4	#4	STR	8'-4"	22
B8	4	#10	2	34'-2"	588
B9	4	#4	STR	24'-2"	65
B10	4	#4	STR	3'-4"	9
H1	42	#5	3	10'-3"	449
K1	20	#4	STR	28'-2"	376
K2	8	#4	STR	3'-2"	17
S1	102	#5	4	3'-7"	381
S2	61	#5	5	9'-2"	583
S3	41	#5	5	7'-10"	335
S4	22	#4	6	6'-6"	96
U1	47	#4	7	3'-8"	115
U2	27	#4	7	5'-8"	102
V1	94	#5	STR	6'-9"	662
V2	28	#5	STR	9'-7"	280
V3	28	#5	STR	8'-5"	246
REINFORCING STEEL					6440 LBS.

CLASS A CONCRETE	
POUR #1 (CAP, CONCRETE COLLARS & LOWER WING)	23.2 C.Y.
POUR #2 (BACKWALL & UPPER WING)	14.0 C.Y.
TOTAL	37.2 C.Y.

HP 12 X 53 STEEL PILES
NO. = 11 — 165 LIN. FT.



PILE SPLICE DETAILS

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			66

NORTH CAROLINA PROFESSIONAL SEAL 24090 ENGINEER THEO J. BEACH 8/24/11

DRAWN BY : T. BANKOVICH DATE : 7-2010
CHECKED BY : M.L. BROWN DATE : 7-2010

08-JUL-2011 12:44
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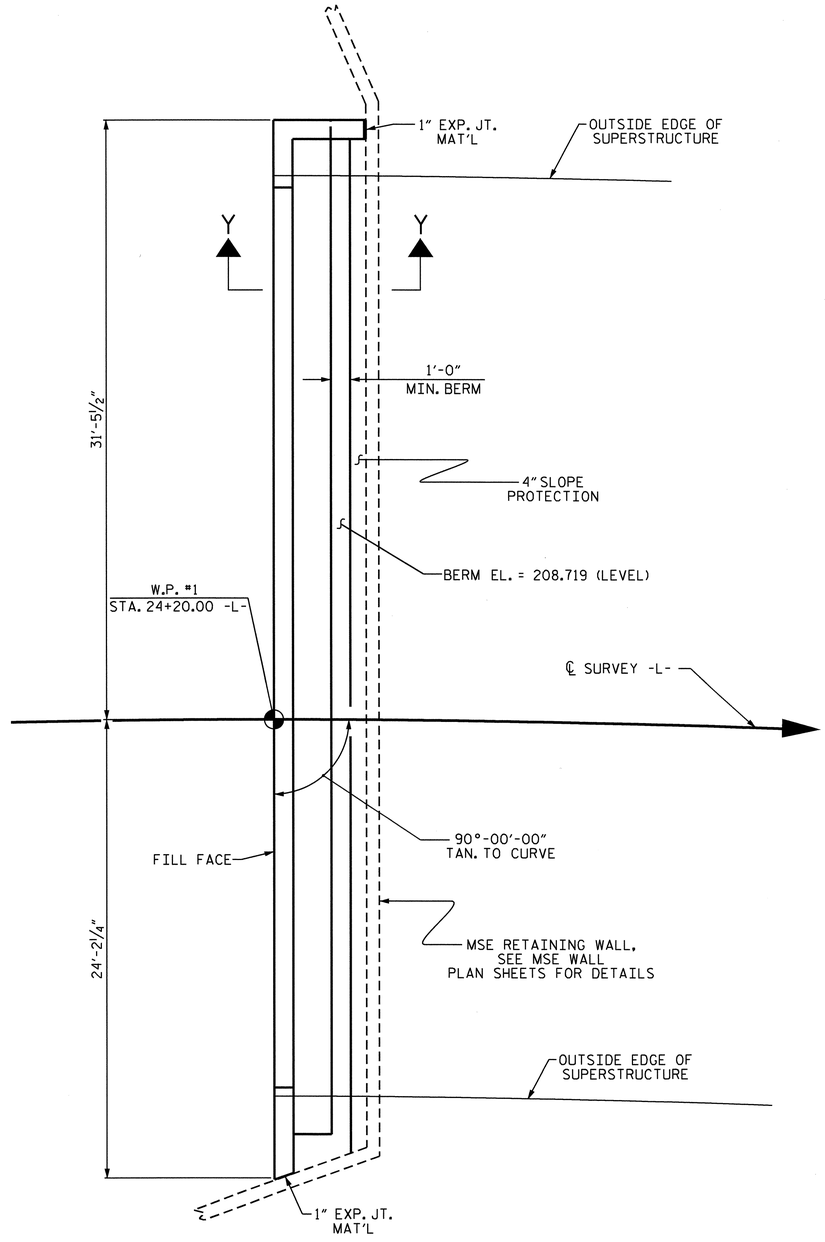
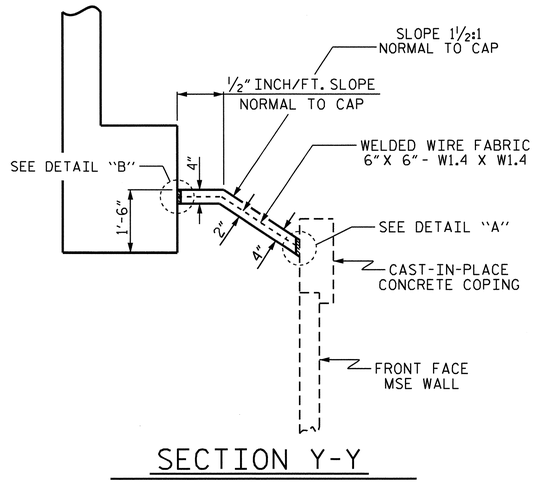
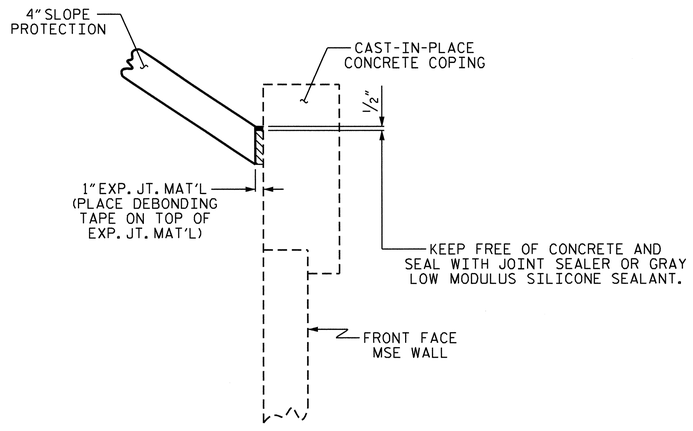


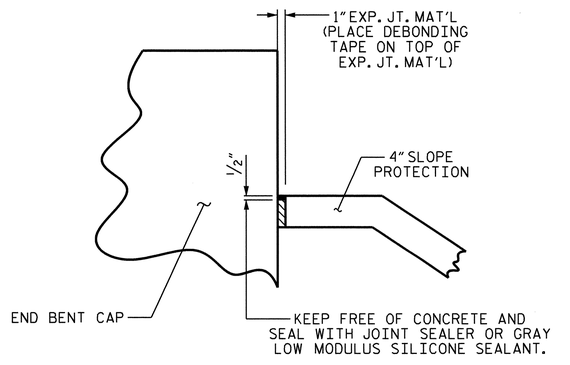
PLAN AT END BENT No. 1



SECTION Y-Y



DETAIL "A"



DETAIL "B"

GENERAL NOTES

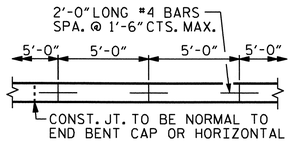
SLOPE PROTECTION SHALL BE PLACED AT END BENT No. 1 OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION

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

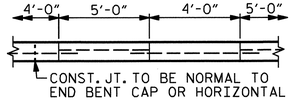
BRIDGE @ STA. 26+60.00 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT No. 1	19	34

* QUANTITY SHOWN IS BASED ON 5' POURS.



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			66

ASSEMBLED BY : S. B. WILLIAMS	DATE : 5-11	
CHECKED BY : M. L. BROWN	DATE : 5-11	
DRAWN BY : ELR 5/92	REV. 7/10/01	LES/RDR
CHECKED BY : GRP 6/92	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

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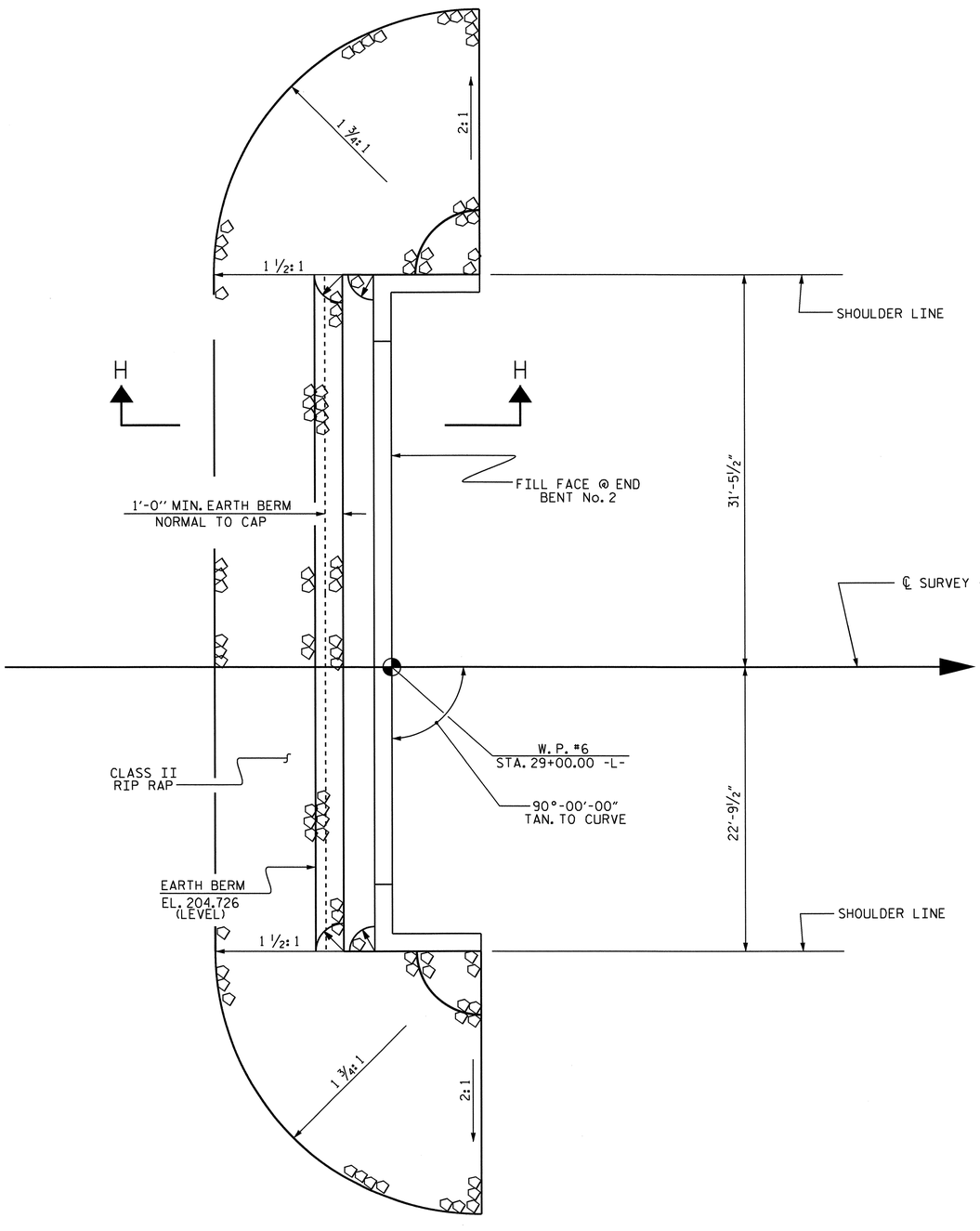
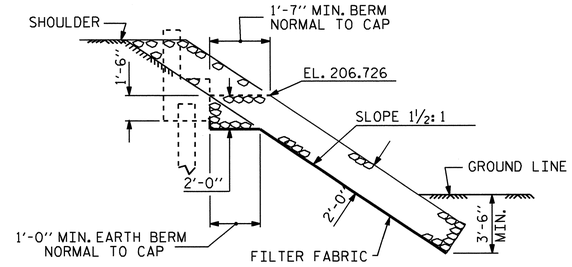
STD. NO. SP1 (SHT 4)

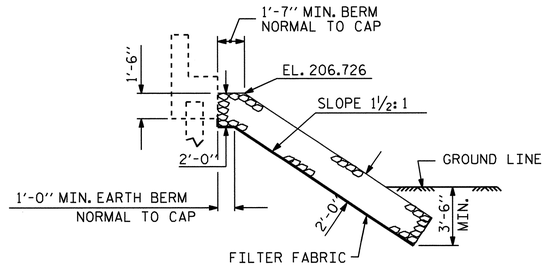


PLAN OF RIP RAP @ END BENT No. 2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 26+60.00 -L-	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT No. 2	140	155



SECTION H-H



℄ SECTION
BERM RIP RAPPED

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 24196 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			60

ASSEMBLED BY : S. B. WILLIAMS	DATE : 5-11	
CHECKED BY : M. L. BROWN	DATE : 5-11	
DRAWN BY : FCJ 2/88	REV. 8/16/99	RWW/LES
CHECKED BY : ARB 8/88	REV. 10/17/00	RWW/LES
	REV. 5/1/06R	TLA/GM

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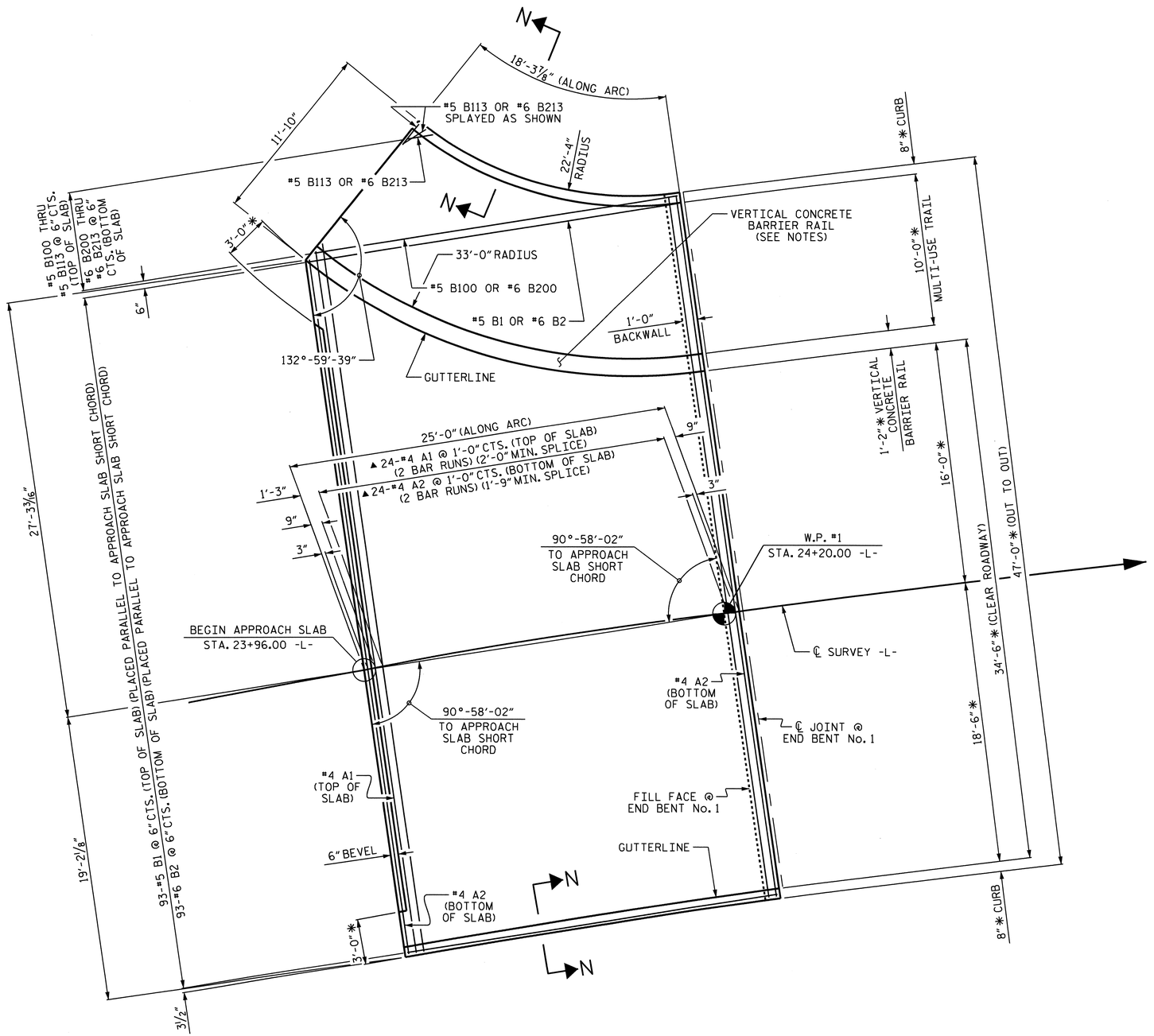
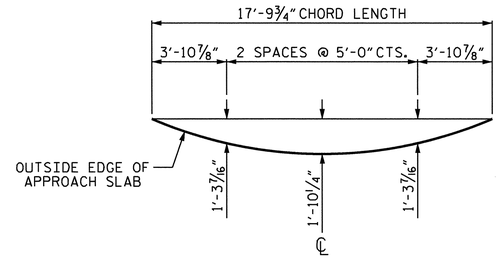
SKEW 90°

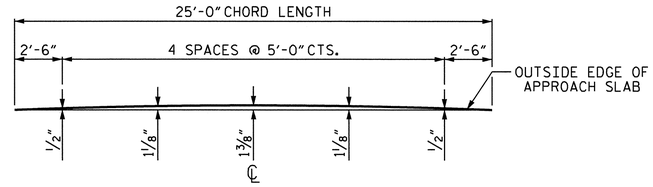
STD. NO. RR2



PLAN @ END BENT No. 1

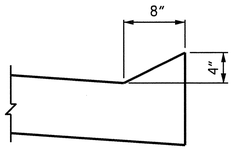


LEFT SIDE

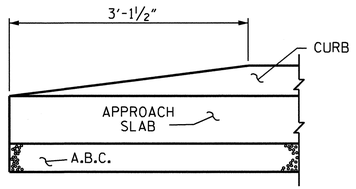


RIGHT SIDE

ARC OFFSETS @ END BENT No. 1



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES:

* MEASURED RADIALLY

▲ "A" BARS ARE SPACED ALONG APPROACH SLAB SHORT CHORD AND PLACED PARALLEL TO FILL FACE.

FOR REINFORCING STEEL IN APPROACH SLAB AND VERTICAL CONCRETE BARRIER RAIL AND FOR VERTICAL CONCRETE BARRIER RAIL PAY ITEMS AND DETAILS SEE "VERTICAL CONCRETE BARRIER RAIL" SHEETS.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB AND ARC OFFSETS

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH 8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-57
1			3			TOTAL SHEETS
2			4			606

DRAWN BY : T. BANKOVICH DATE : 1-2011
CHECKED BY : T.J. BEACH DATE : 2-2011

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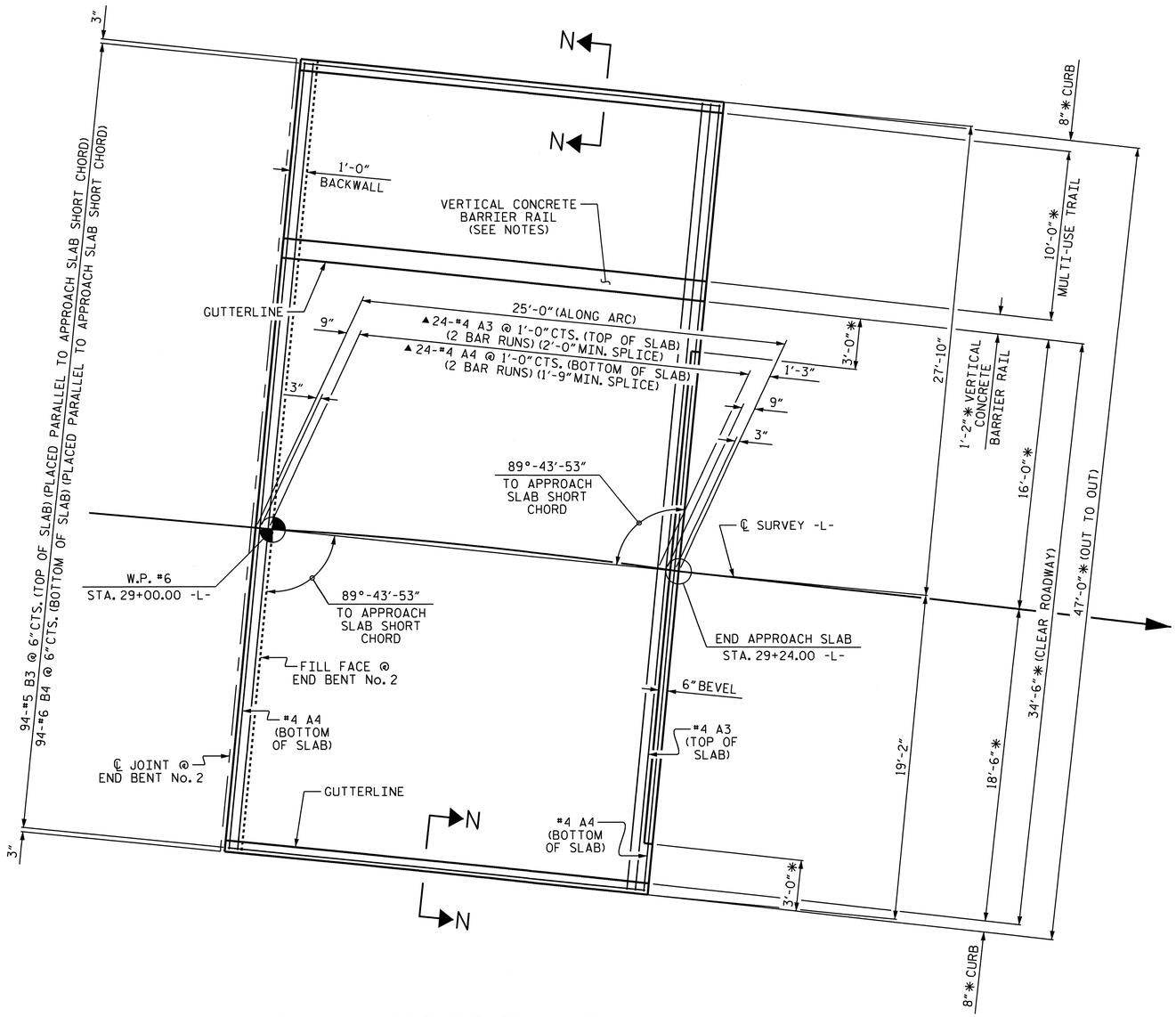
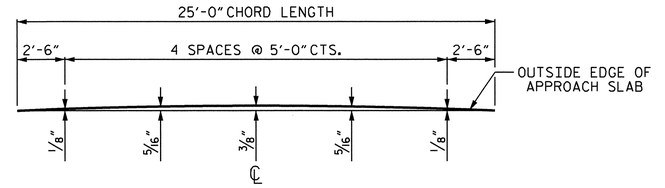
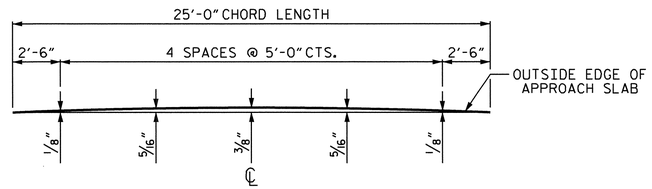


PLAN @ END BENT No. 2

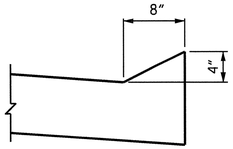


LEFT SIDE

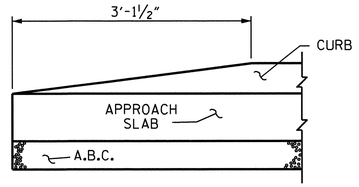


RIGHT SIDE

ARC OFFSETS @ END BENT No. 2



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES:

* MEASURED RADIALLY

▲ "A" BARS ARE SPACED ALONG APPROACH SLAB SHORT CHORD AND PLACED PARALLEL TO FILL FACE.

FOR REINFORCING STEEL IN APPROACH SLAB AND VERTICAL CONCRETE BARRIER RAIL AND FOR VERTICAL CONCRETE BARRIER RAIL PAY ITEMS AND DETAILS SEE "VERTICAL CONCRETE BARRIER RAIL" SHEETS.

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB AND ARC OFFSETS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-58
1			3			TOTAL SHEETS
2			4			66

DRAWN BY : T. BANKOVICH DATE : 1-2011
CHECKED BY : T.J. BEACH DATE : 2-2011

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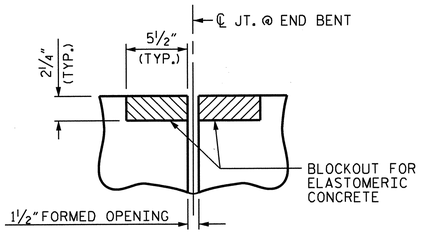
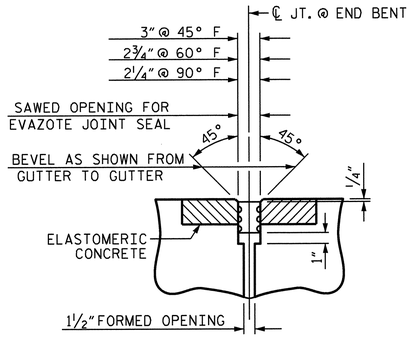


SECTION C-C

EVAZOTE JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)

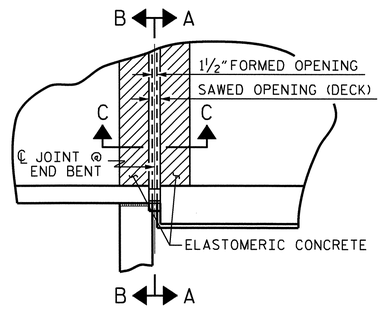


SECTION C-C

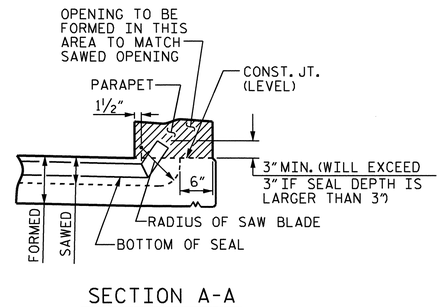
EVAZOTE JOINT SEAL
(EXPANSION)

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	7.9
2	7.9
TOTAL	15.8

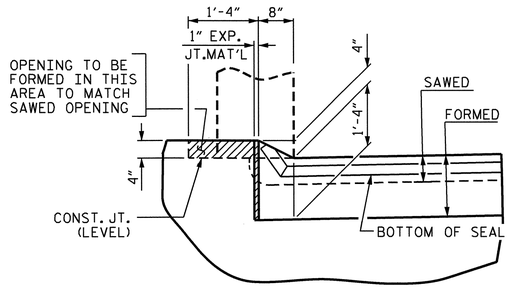
* BASED ON THE MINIMUM BLOCKOUT SHOWN.



PLAN



SECTION A-A

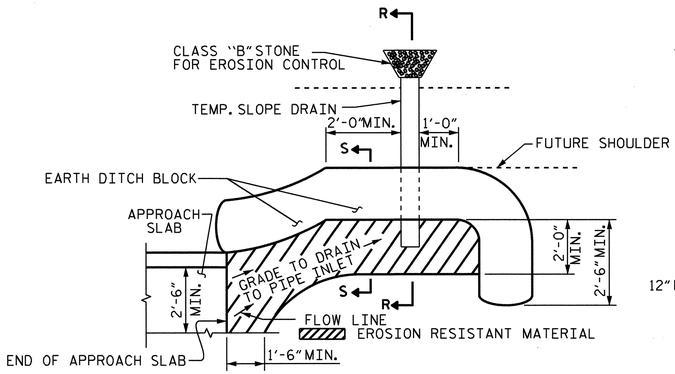


SECTION B-B

JOINT SEAL DETAILS @ END BENT

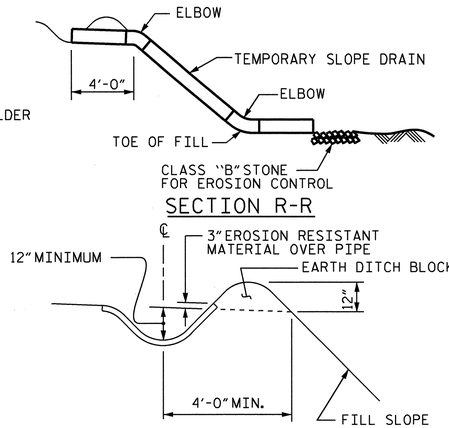
EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE VERTICAL CONCRETE BARRIER RAIL AND THE CONCRETE PARAPETS.



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

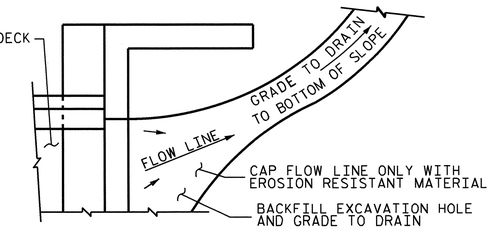


SECTION R-R

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-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH
SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-59
1			3			TOTAL SHEETS
2			4			66

STD. NO. BAS10

NORTH CAROLINA PROFESSIONAL SEAL 24390 ENGINEER THEO J. BEACH
8/24/11

ASSEMBLED BY : T. BANKOVICH		DATE : 1-2011	
CHECKED BY : T.J. BEACH		DATE : 2-2011	
DRAWN BY : FCJ	11/88	REV. 10/17/00	RWW/LES
CHECKED BY : ARB	11/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06RR	MAA/KMM

08-JUL-2011 12:40
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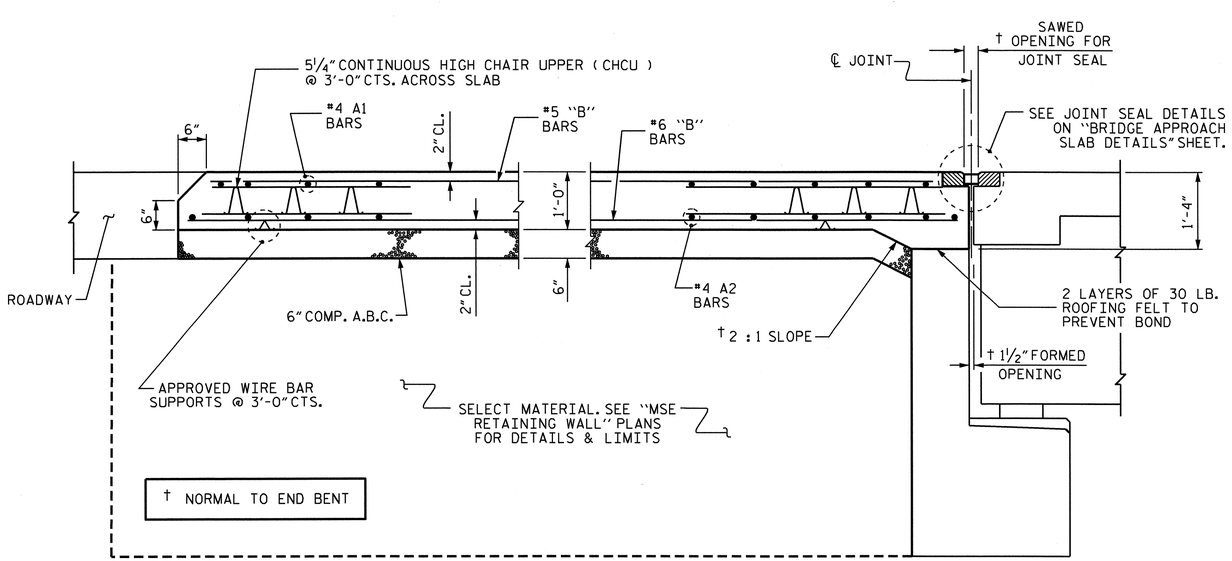
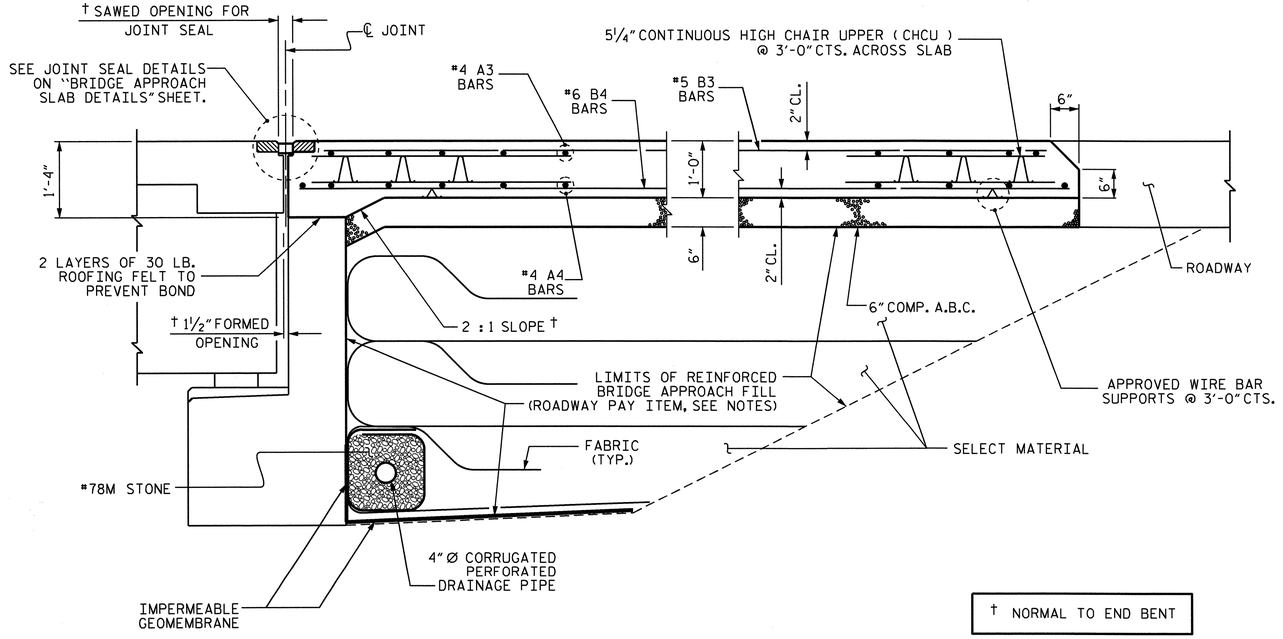
dely



SECTION THRU SLAB @ END BENT No. 1



SECTION THRU SLAB @ END BENT No. 2

BILL OF MATERIAL					
APPROACH SLAB @ END BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	50	#4	STR	27'-6"	919
A2	52	#4	STR	27'-4"	949
✱ B1	86	#5	STR	23'-8"	2123
B2	86	#6	STR	24'-8"	3186
✱ B100	1	#5	STR	24'-7"	26
✱ B101	1	#5	STR	24'-1"	25
✱ B102	1	#5	STR	23'-7"	25
✱ B103	1	#5	STR	23'-1"	24
✱ B104	1	#5	STR	22'-8"	24
✱ B105	1	#5	STR	22'-2"	23
✱ B106	1	#5	STR	21'-8"	23
✱ B107	1	#5	STR	21'-2"	22
✱ B108	1	#5	STR	16'-9"	17
✱ B109	1	#5	STR	14'-3"	15
✱ B110	1	#5	STR	12'-4"	13
✱ B111	1	#5	STR	10'-8"	11
✱ B112	1	#5	STR	9'-1"	9
✱ B113	1	#5	STR	7'-8"	8
✱ B114	1	#5	STR	6'-4"	7
✱ B115	1	#5	STR	5'-1"	5
✱ B116	1	#5	STR	3'-11"	4
✱ B117	1	#5	STR	2'-10"	3
✱ B118	3	#5	STR	1'-8"	5
B200	1	#6	STR	24'-7"	37
B201	1	#6	STR	24'-1"	36
B202	1	#6	STR	23'-7"	35
B203	1	#6	STR	23'-1"	35
B204	1	#6	STR	22'-8"	34
B205	1	#6	STR	22'-2"	33
B206	1	#6	STR	21'-8"	33
B207	1	#6	STR	21'-2"	32
B208	1	#6	STR	16'-9"	25
B209	1	#6	STR	14'-3"	21
B210	1	#6	STR	12'-4"	19
B211	1	#6	STR	10'-8"	16
B212	1	#6	STR	9'-1"	14
B213	1	#6	STR	7'-8"	12
B214	1	#6	STR	6'-4"	10
B215	1	#6	STR	5'-1"	8
B216	1	#6	STR	3'-11"	6
B217	1	#6	STR	2'-10"	4
B218	3	#6	STR	1'-8"	8
REINFORCING STEEL					4,553 LBS.
✱ EPOXY COATED REINFORCING STEEL					3,331 LBS.
CLASS AA CONCRETE					45.9 C.Y.

BILL OF MATERIAL					
APPROACH SLAB @ END BENT No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A3	50	#4	STR	24'-4"	813
A4	52	#4	STR	24'-3"	842
✱ B3	94	#5	STR	23'-8"	2320
B4	94	#6	STR	24'-8"	3483
REINFORCING STEEL					4,325 LBS.
✱ EPOXY COATED REINFORCING STEEL					3,133 LBS.
CLASS AA CONCRETE					44.4 C.Y.

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL AT END BENT No. 2 INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

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

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

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

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

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 3 7/16".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

FOR ADDITIONAL REINFORCING STEEL IN APPROACH SLAB THAT EXTENDS INTO VERTICAL CONCRETE BARRIER RAIL, SEE SUPERSTRUCTURE "VERTICAL CONCRETE BARRIER RAIL" SHEETS.

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL SEAL 24330 ENGINEER THEO J. BEACH
8/24/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-60
1			3			TOTAL SHEETS
2			4			066

STD. NO. BAS4

ASSEMBLED BY : TJB/TMG		DATE : 7-2011	
CHECKED BY : T.J. BEACH/BSC		DATE : 7-2011	
DRAWN BY : EEM 3/95	REV. 7/10/01	LES/RDR	
CHECKED BY : VAP 3/95	REV. 5/7/03R	RWW/JTE	
	REV. 5/1/06R	KMM/GM	

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tgarrison

8/17/99

REVISIONS

⚠1 7/21/11 REVISED WATER ALIGNMENT

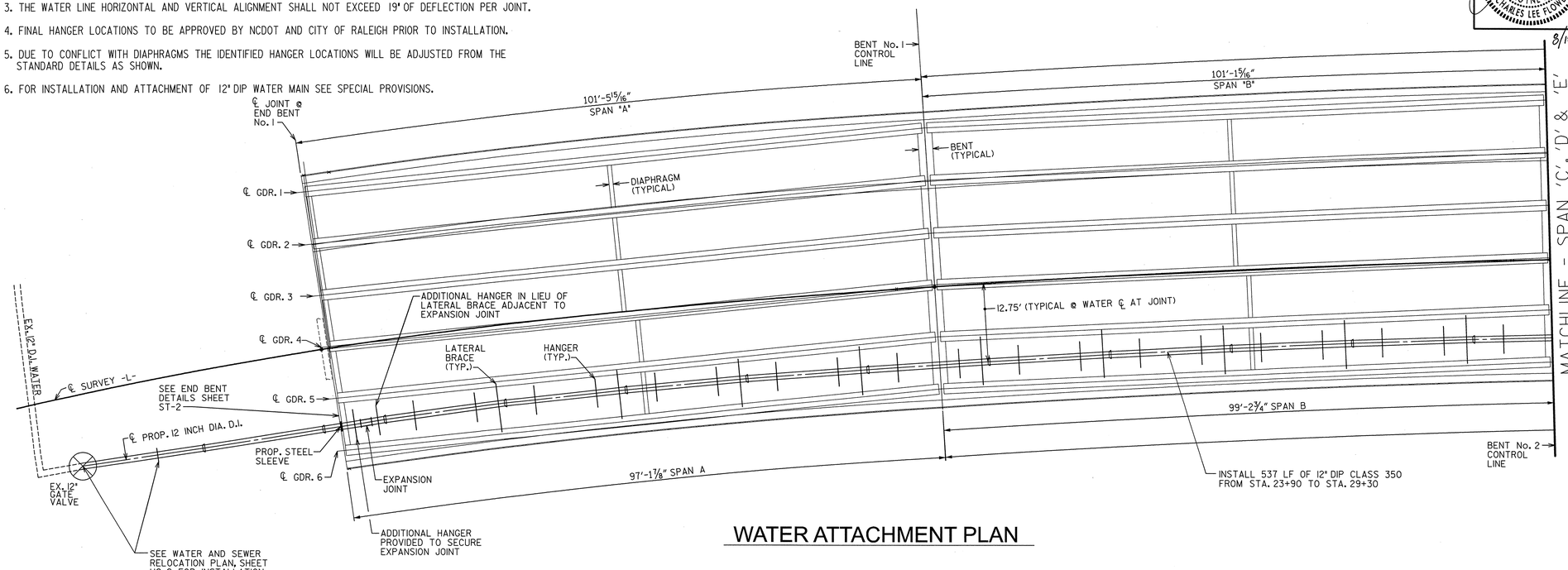
⚠2 8/5/11 REVISED AS A STRUCTURE SHEET

$$$$SYSTIME$$$$

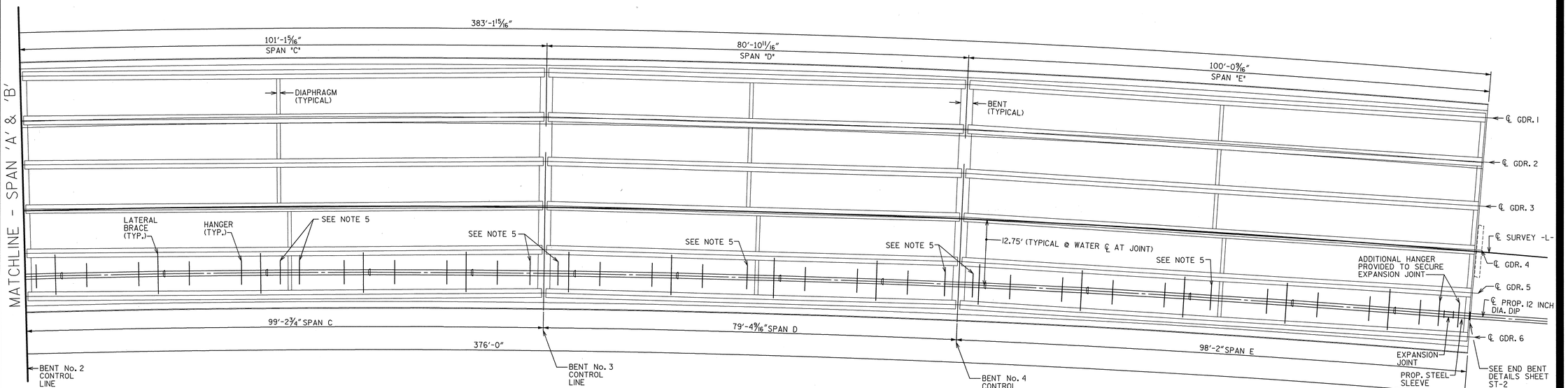
$$$$DGN$$$$

WATER ATTACHMENT NOTES

1. THE PROPOSED WATER ALIGNMENT IS TO BE PARALLEL TO THE CENTERLINE OF SURVEY - L - AT EACH BELL JOINT.
2. THE CONTRACTOR IS RESPONSIBLE TO LAYOUT THE PROPOSED PIPE ALIGNMENT TO LOCATE THE FINAL DECK INSERT LOCATIONS, DIAPHRAGM PENETRATIONS AND BENT PENETRATIONS.
3. THE WATER LINE HORIZONTAL AND VERTICAL ALIGNMENT SHALL NOT EXCEED 19° OF DEFLECTION PER JOINT.
4. FINAL HANGER LOCATIONS TO BE APPROVED BY NCDOT AND CITY OF RALEIGH PRIOR TO INSTALLATION.
5. DUE TO CONFLICT WITH DIAPHRAGMS THE IDENTIFIED HANGER LOCATIONS WILL BE ADJUSTED FROM THE STANDARD DETAILS AS SHOWN.
6. FOR INSTALLATION AND ATTACHMENT OF 12" DIP WATER MAIN SEE SPECIAL PROVISIONS.



WATER ATTACHMENT PLAN



WATER ATTACHMENT PLAN

GRAPHIC SCALES

10 5 0 10 20

NORTH CAROLINA PROFESSIONAL SEAL 12300 ENGINEER CHARLES LEE FLOWE

8/10/2011

PROJECT REFERENCE NO.	SHEET NO.
B-4660	ST-1

KCI ASSOCIATES OF N.C.

CIVIL ENGINEERS
ENVIRONMENTAL - CEI
LAND SURVEYING
SUBSURFACE UTILITY ENGINEERING

SUITE 220, LANDMARK CENTER II,
4601 SIX FORKS ROAD
RALEIGH, NORTH CAROLINA 27609
(919) 783-9214
WWW.KCI.COM

SHEET NO.	TOTAL SHEETS
S-61	66

PROJECT REFERENCE NO. B-4660 | SHEET NO. ST-2

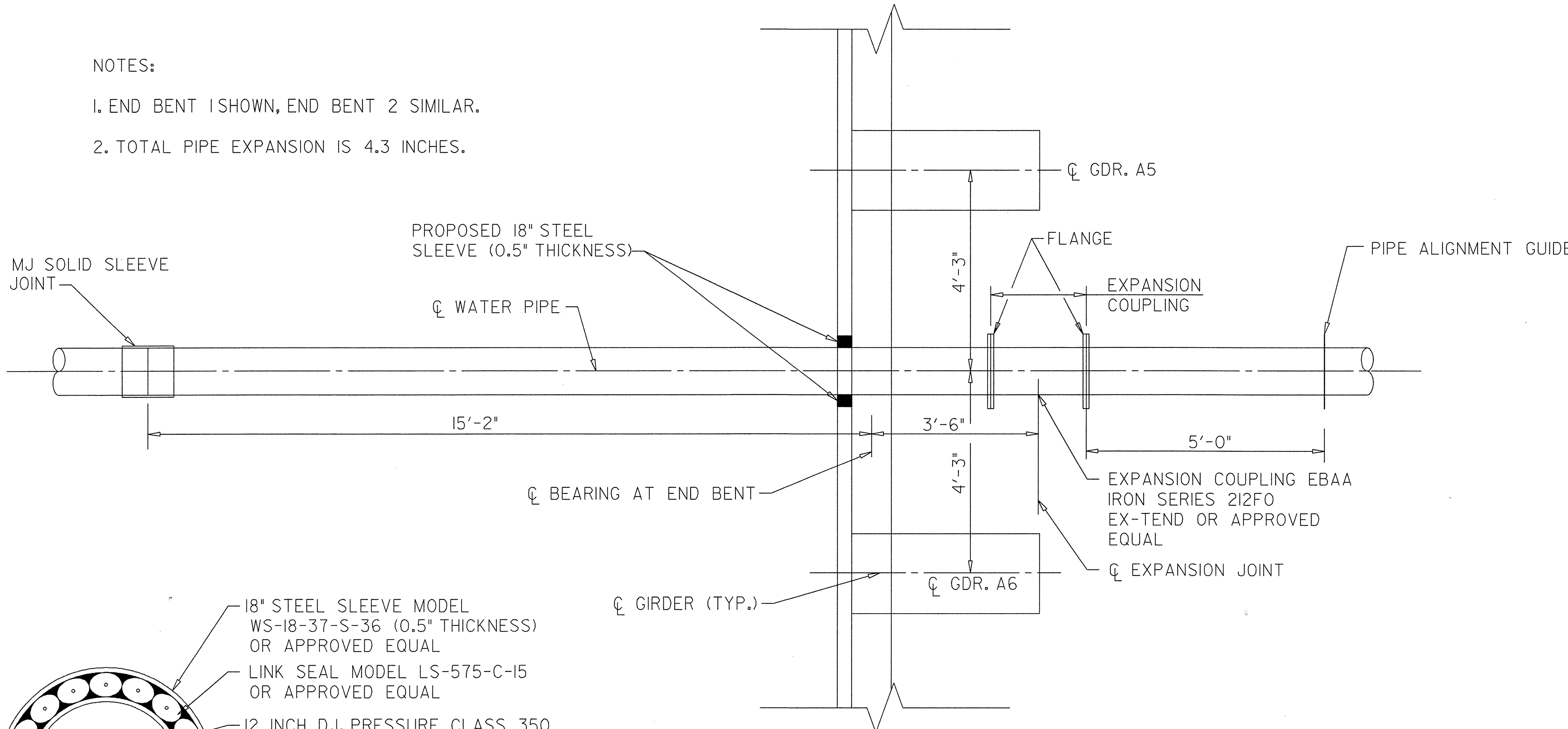
KCI ASSOCIATES OF N.C.
CIVIL ENGINEERS
ENVIRONMENTAL - CEI
LAND SURVEYING
SUBSURFACE UTILITY ENGINEERING
SUITE 220, LANDMARK CENTER II, 4601 SIX FORKS ROAD
RALEIGH, NORTH CAROLINA 27609
(919) 783-9214
WWW.KCI.COM

NORTH CAROLINA PROFESSIONAL SEAL 12300 ENGINEER CHARLES LEE FLOWE
8/10/2011

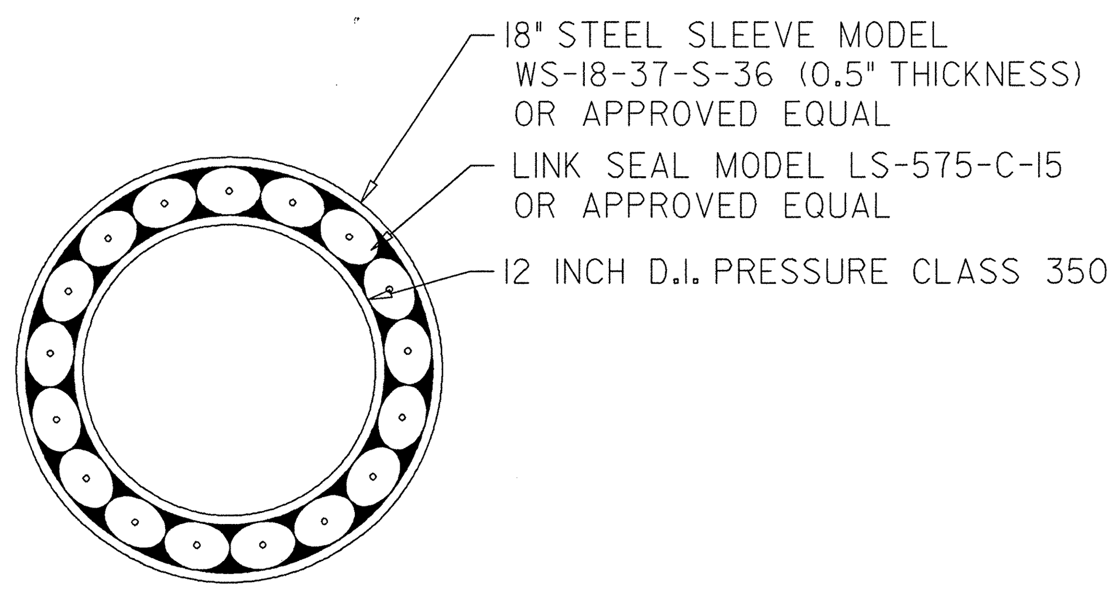
NOTES:

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

2. TOTAL PIPE EXPANSION IS 4.3 INCHES.



PIPE SLEEVE PLAN
SCALE: 1/2" = 1'-0"

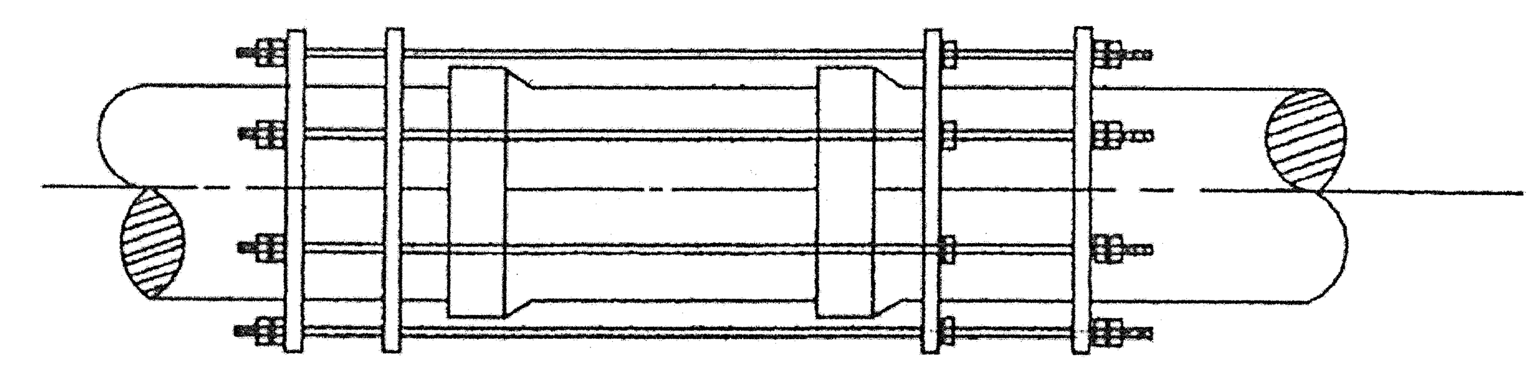


PIPE AND SLEEVE SECTION
SCALE: 11/2" = 1'-0"

BILL OF MATERIALS FOR 12" WATER MAIN STA. 23+90.00 TO STA. 29+30.00

ITEM NO.	QTY.	UNITS	ITEM DESCRIPTION
1	2	EA	EXPANSION COUPLING
2	2	EA	END BENT 18" Ø STEEL SLEEVE
3	5	EA	INTERMEDIATE DIAPHRAGM 18" Ø SEEL SLEEVE
4	4	EA	BENT DIAPHRAGM 18" Ø STEEL SLEEVE
5	54	EA	HANGER ASSEMBLY FOR 12" WATER PIPE
6	23	EA	LATERAL BRACE ASSEMBLY
7	108	EA	BRIDGE DECK INSERTS
8	537	LF	12" DIP RESTRAINED JOINT CLASS 350 (D.I.P.R.J.)

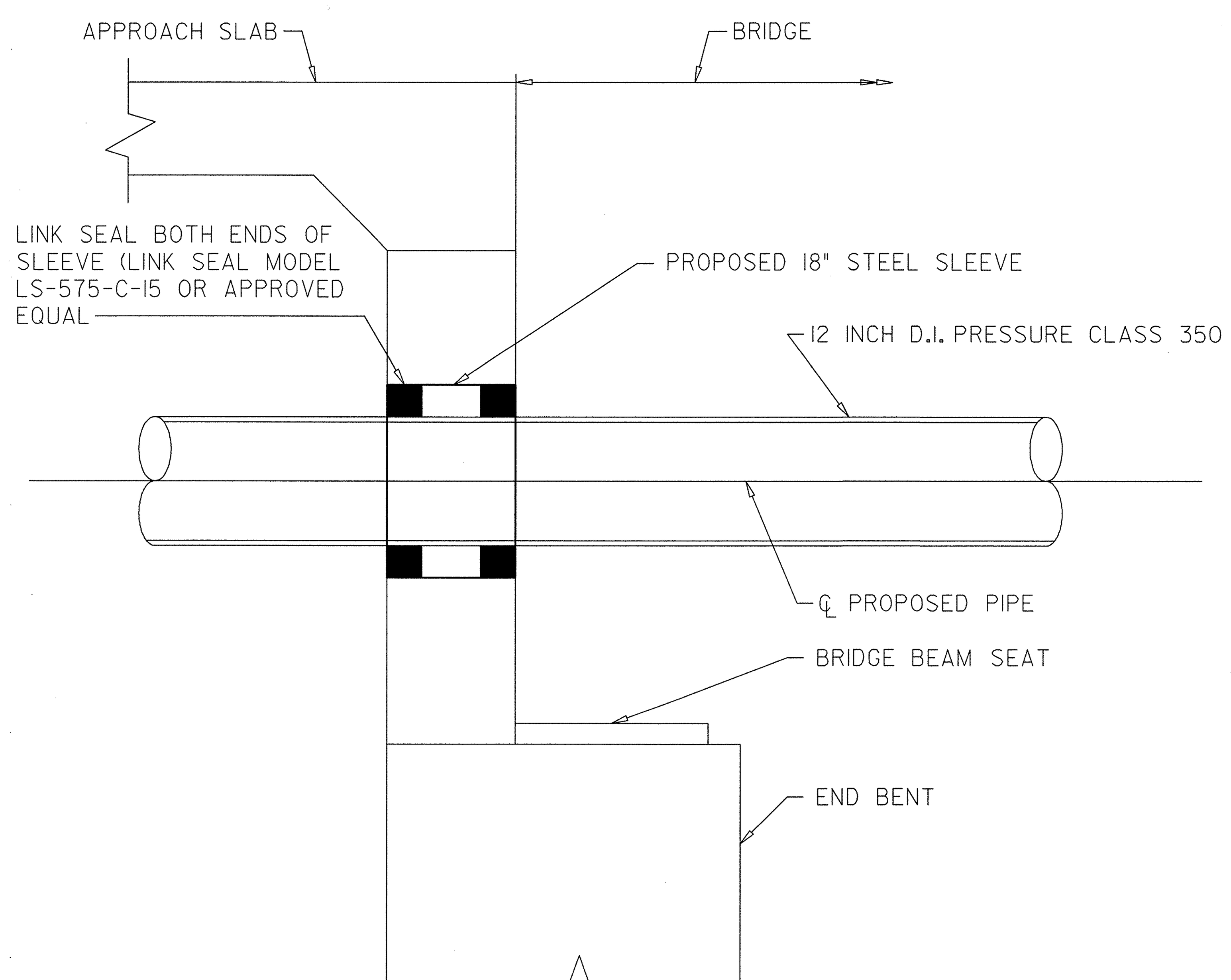
THESE QUANTITIES ARE ESTIMATED QUANTITIES ONLY



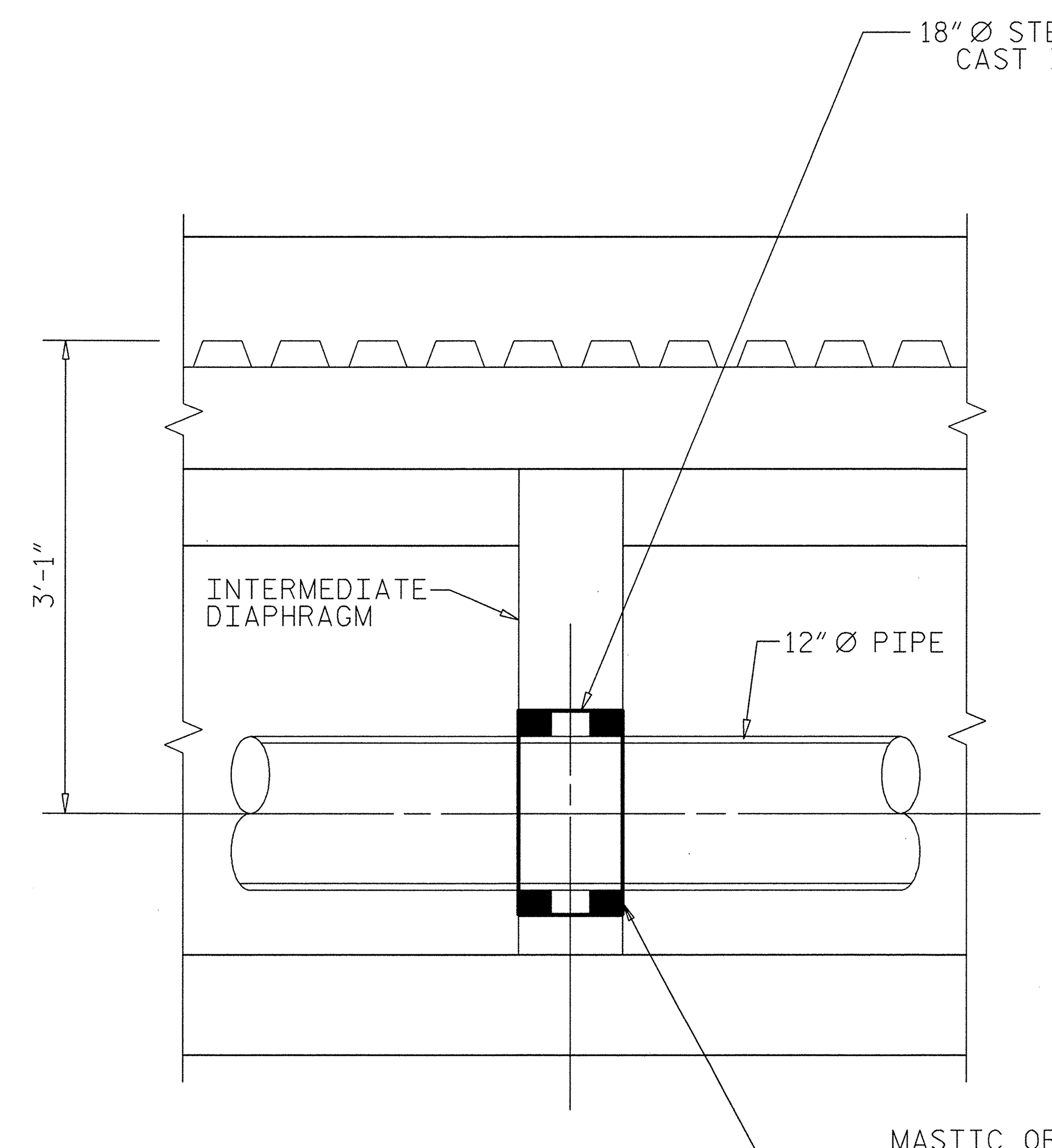
EXPANSION COUPLING DETAIL

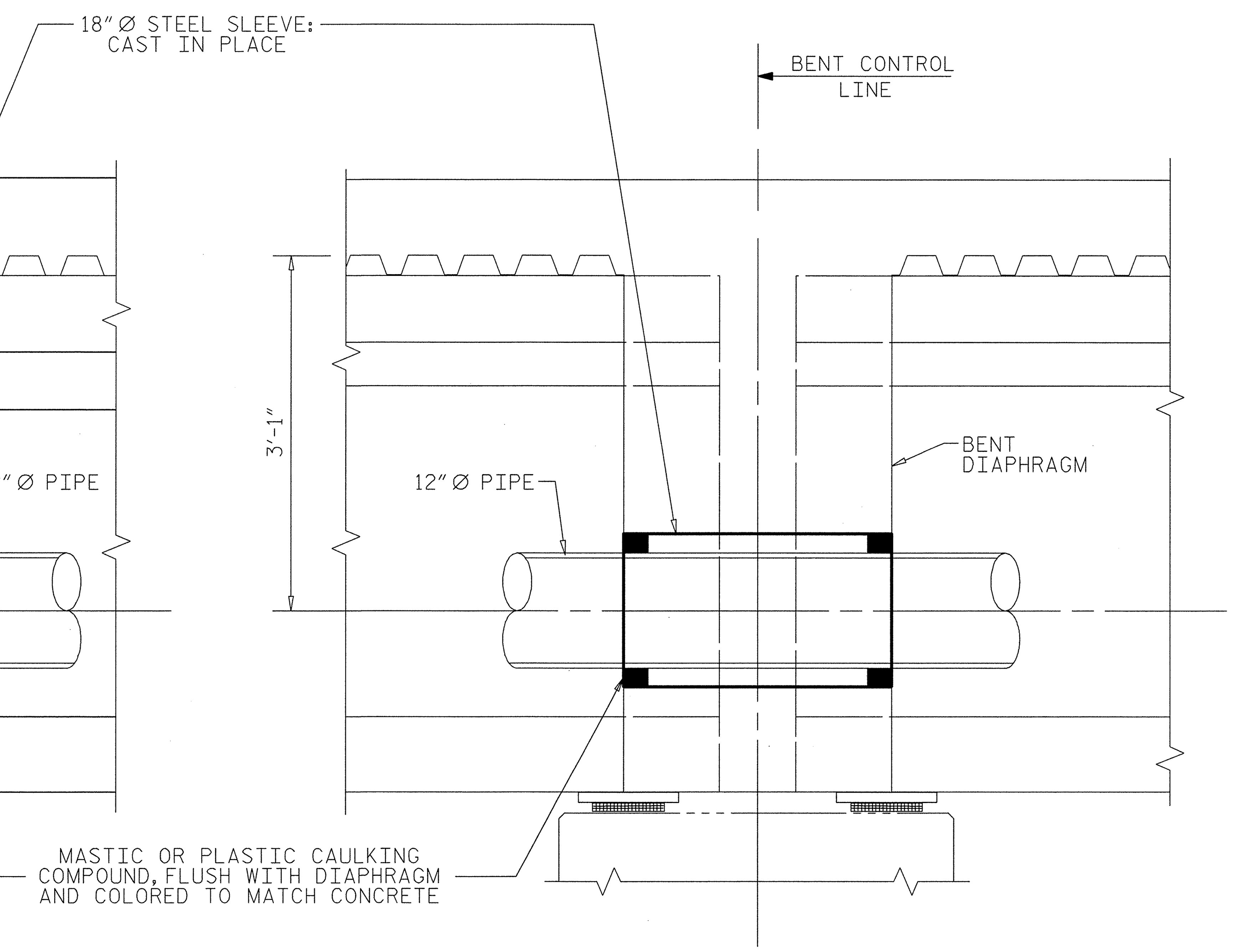
NOT TO SCALE

2 REQUIRED - 10" OF EXPANSION MIN. EACH



END BENT SECTION
SCALE: 1" = 1'-0"





DETAIL OF PIPE
THRU INTERMEDIATE DIAPHRAGM
SCALE: 1" = 1'-0"

DETAIL OF PIPE
THRU BENT DIAPHRAGM
SCALE: 1" = 1'-0"

(SEE WATER ATTACHMENT PLAN FOR HORIZONTAL LOCATION)

REVISIONS
1 7/21/11 DRAFTING AND NOTE REVISIONS
2 8/5/11 REVISED AS A STRUCTURE SHEET

8/17/99

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$DGN$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
B-4660	ST-3

NORTH CAROLINA PROFESSIONAL SEAL 12300 ENGINEER CHARLES LEE FLOWE

8/10/2011

KCI ASSOCIATES OF N.C.

CIVIL ENGINEERS
ENVIRONMENTAL - CEI
LAND SURVEYING
SUBSURFACE UTILITY ENGINEERING

SUITE 220, LANDMARK CENTER II,
4601 SIX FORKS ROAD
RALEIGH, NORTH CAROLINA 27609
(919) 783-9214
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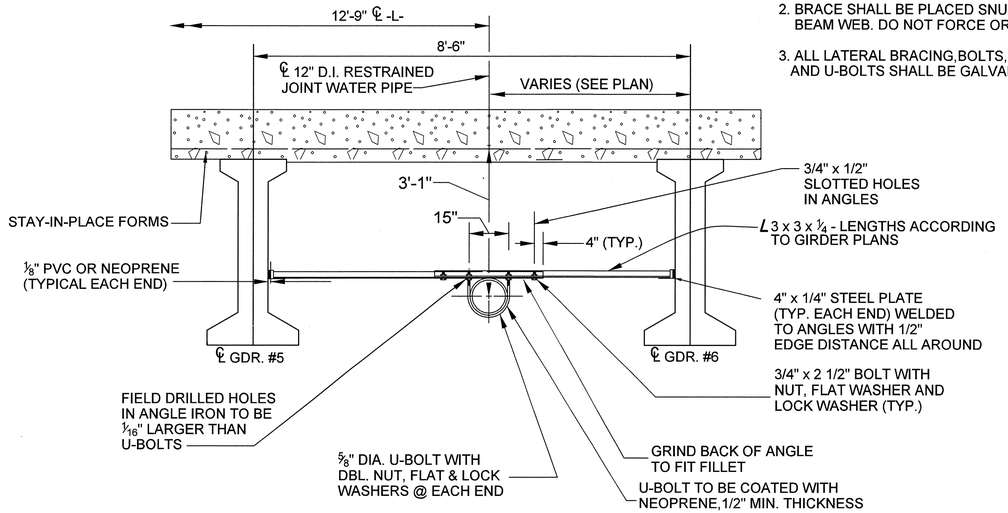
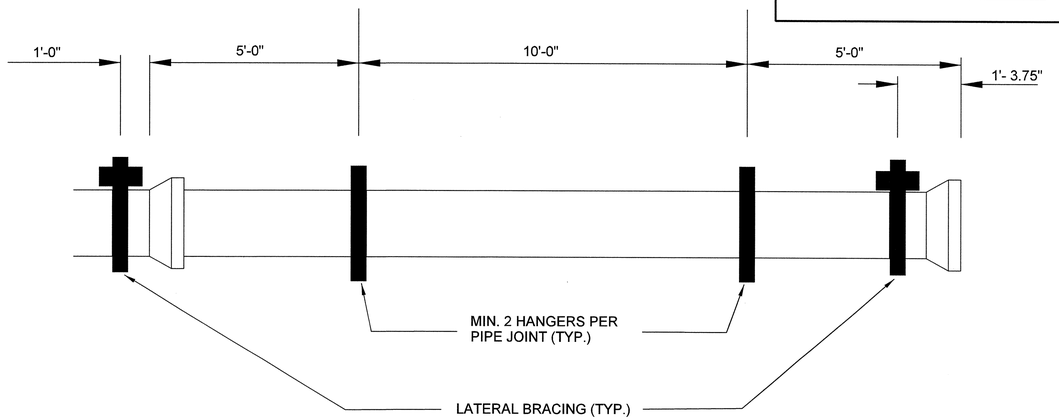
NOTE:
1. LATERIAL BRACING IS REQUIRED 1'-0" BACK OF ALL JOINTS.
2. BRACE SHALL BE PLACED SNUG AGAINST BEAM WEB. DO NOT FORCE OR JACK.
3. ALL LATERAL BRACING,BOLTS, NUTS, WASHERS AND U-BOLTS SHALL BE GALVANIZED.



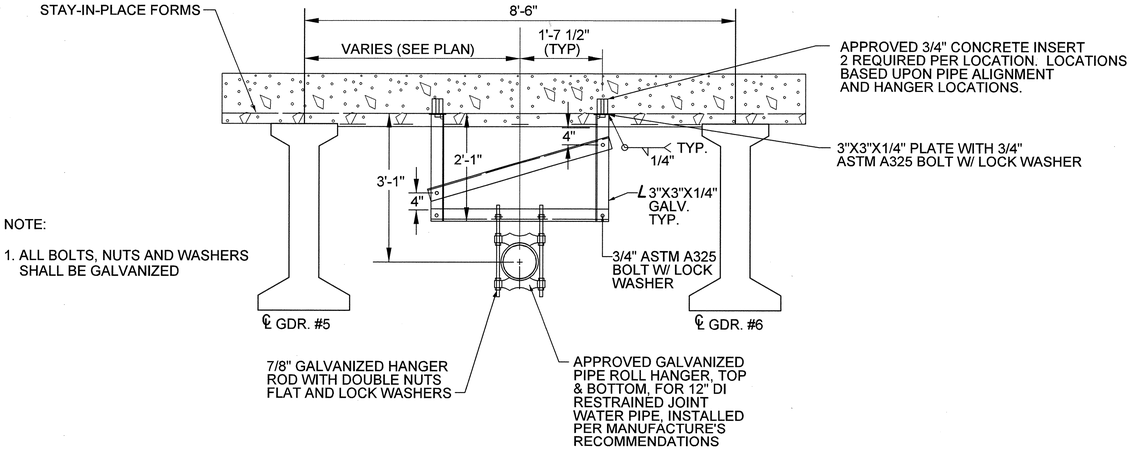
LATERAL BRACE ASSEMBLY DETAIL

N.T.S.



WATER MAIN SUPPORT LOCATION DETAIL

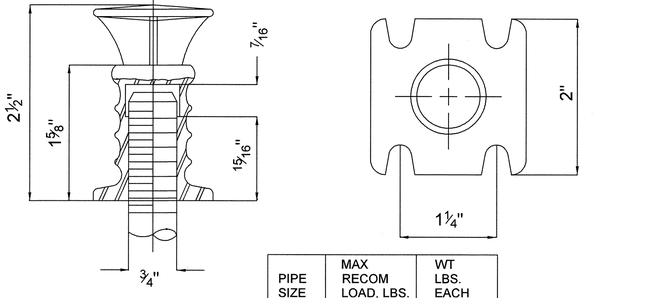
N.T.S.



NOTE:
1. ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED

HANGER ASSEMBLY FOR 12" WATER PIPE

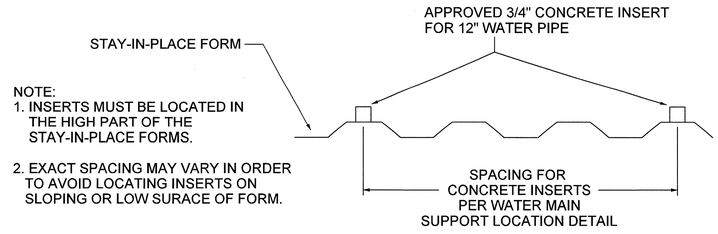
N.T.S.



PIPE SIZE	MAX RECOM LOAD, LBS.	WT LBS. EACH
12"	2500	0.64

SCREW CONCRETE INSERT DETAIL

N.T.S.



NOTE:
1. INSERTS MUST BE LOCATED IN THE HIGH PART OF THE STAY-IN-PLACE FORMS.
2. EXACT SPACING MAY VARY IN ORDER TO AVOID LOCATING INSERTS ON SLOPING OR LOW SURACE OF FORM.

BRIDGE DECK INSERT LOCATION DETAILS

N.T.S.

SHEET NO.
S-63
TOTAL SHEETS
66

REVISIONS
1 7/21/11 DETAIL REVISIONS
2 8/5/11 REVISED AS A STRUCTURE SHEET

8/17/99

$SYSTIME$ DGN

OVERHANG BRACKET CALCULATION INSTRUCTIONS

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

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

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

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

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

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

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

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

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

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

DEFINITIONS

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

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD OVERHANG FALSEWORK

AASHTO TYPES
III, IV, V, AND VI

NORTH CAROLINA PROFESSIONAL SEAL 18788 ENGINEER CHANG-CHUAN VICTOR CHAO
Chang-Chuan Victor Chao
5-5-2011

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-64
1			3			TOTAL SHEETS
2			4			66

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

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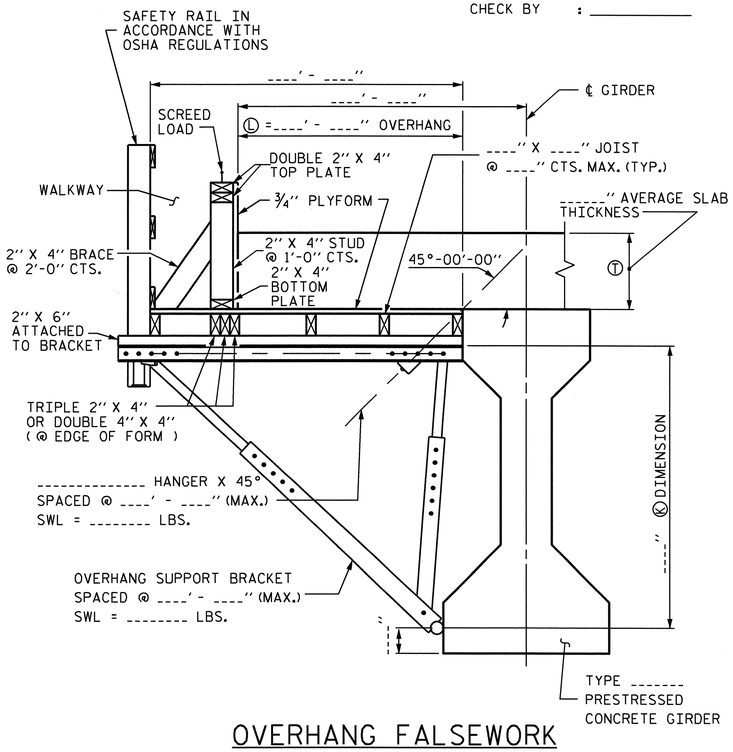
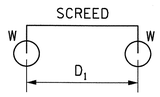
BRIDGE OVERHANG BRACKET SUMMARY

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

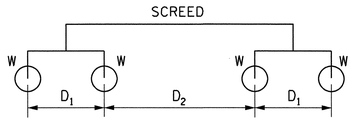
PROJECT No. : _____
COUNTY : _____
STATION : _____
DESCRIPTION : _____
_____
DATE : _____
DESIGN BY : _____
CHECK BY : _____



OVERHANG FALSEWORK



4-WHEEL MACHINE



8-WHEEL MACHINE

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

TABLE 2: SCREED LOAD FACTOR "R"

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

NOTES

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

REQUIRED MINIMUM DIAGONAL LEG CAPACITY: 3600 LB WORKING LOAD

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

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

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

TABLE 3: ALLOWABLE SPAN LENGTH OF JOISTS AND JOIST SPACINGS

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

PROJECT NO. B-4660
WAKE COUNTY
STATION: 26+60.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD OVERHANG FALSEWORK

AASHTO TYPES
III, IV, V, AND VI

NORTH CAROLINA PROFESSIONAL SEAL 18788 ENGINEER CHARNG-CHUAN VICTOR CHAO

Charng-Chuan Victor Chao
5-5-2011

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-65
1			3			TOTAL SHEETS
2			4			66

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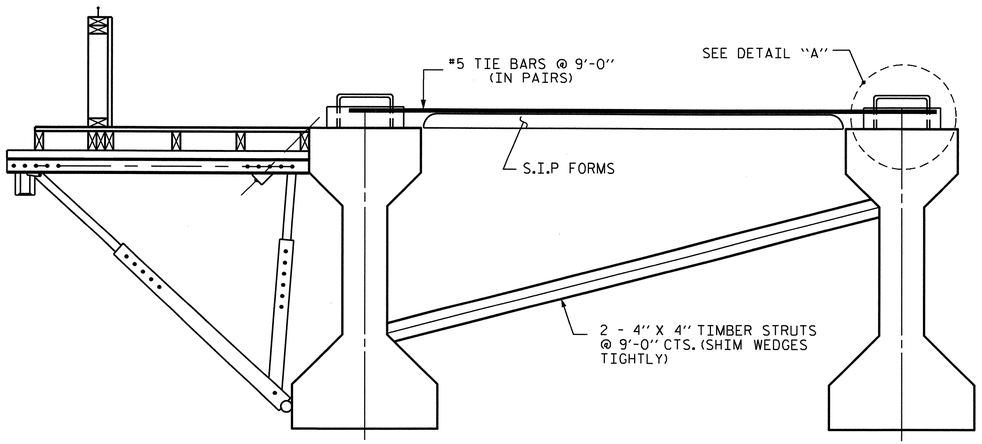
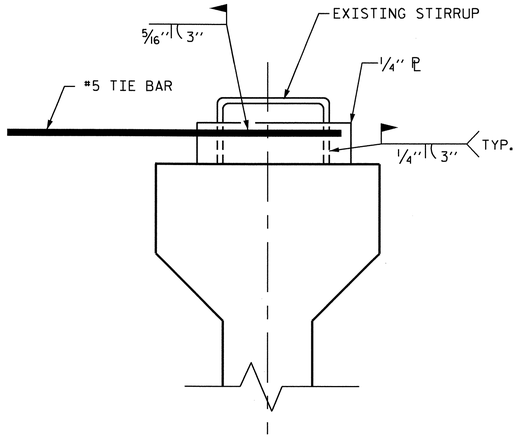


EXTERIOR GIRDER INTERIOR GIRDER

DETAIL OF REQUIRED OVERHANG FALSEWORK BRACING SYSTEM



DETAIL "A"

NOTES:

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

MAXIMUM SPACING BETWEEN THE BRACING (TIE BARS-TIMBER STRUT) IS 9'-0" CTS. #5 TIE BARS SHALL BE LOCATED OVER A TIMBER STRUT.

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

PROJECT NO. B-4660

WAKE COUNTY

STATION: 26+60.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD OVERHANG FALSEWORK

AASHTO TYPES
III, IV, V, AND VI

NORTH CAROLINA PROFESSIONAL SEAL 18788 ENGINEER CHANG-CHUAN VICTOR CHAO

Chang-Chuan Victor Chao
5-5-2011

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

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

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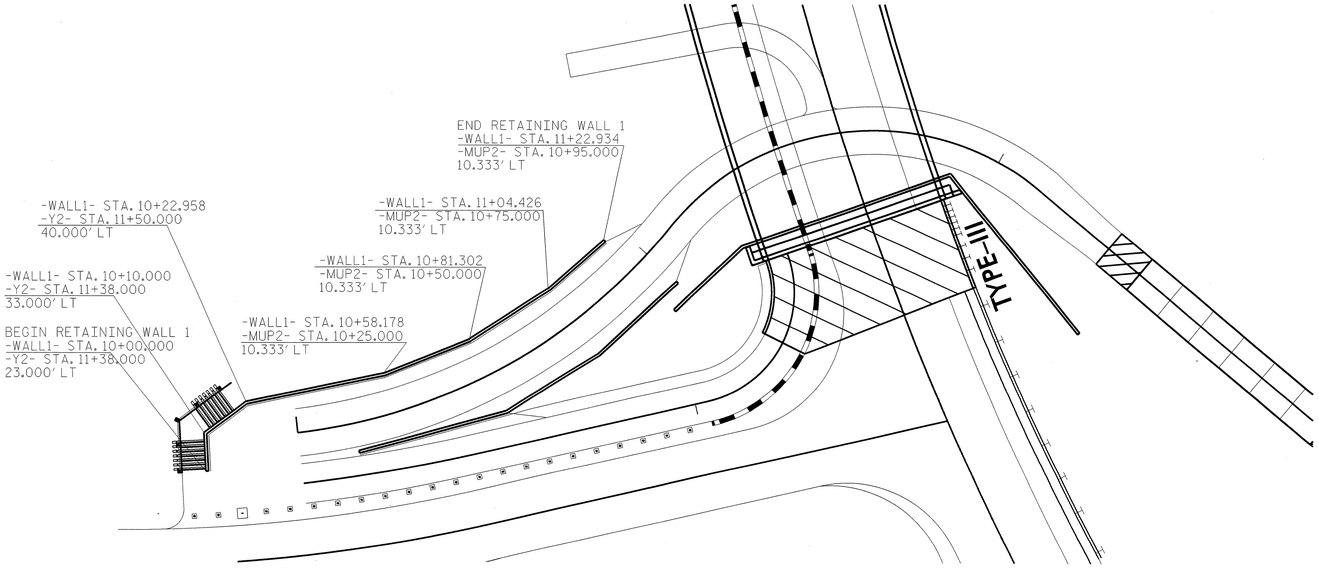
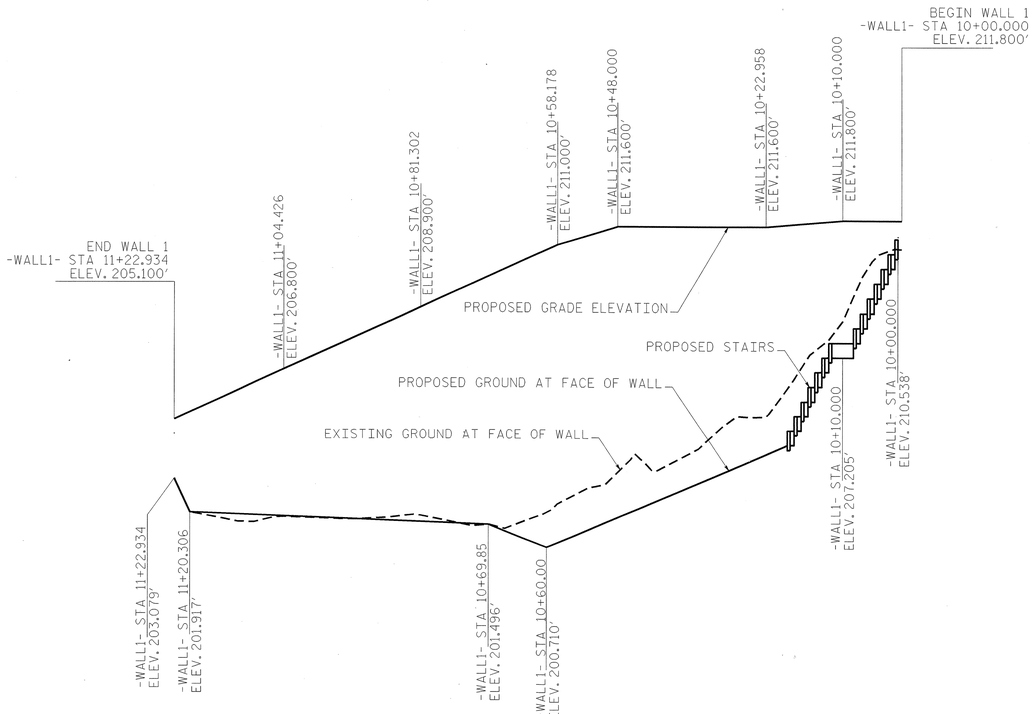
vchao





PREPARED BY: D. TEAGUE	DATE: 5/11
REVIEWED BY: E. WILLIAMS	DATE: 5/11

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

NOTES:

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

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 1. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL UNITS FOR RETAINING WALL NO. 1.

WHEN USING AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL UNITS FOR RETAINING WALL NO. 1, FREEZE-THAW DURABLE SRW UNITS ARE REQUIRED IN ACCORDANCE WITH THE MSE RETAINING WALLS PROVISION.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1.

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

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

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) MINIMUM DESIGN LIFE = 75 YEARS
2) MAXIMUM FACTORED RESISTANCE = 2500 PSF
3) AGGREGATE PARAMETERS:

STANDARD SIZE NO. (IN ACCORDANCE WITH SECTION 1005 OF THE STANDARD SPECIFICATIONS)	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
1S, 2S, 2MS AND 4S (FINE AGGREGATE)	125	34	0
5, 57, 57M, 6M, 67 AND 78M (COARSE AGGREGATE)	110	38	0

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	0

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

PAY ITEMS
MSE RETAINING WALLS.....900 SQ. FT.

PROJECT NO.: B-4660 (33822.1.1)

WAKE ***COUNTY***

STATION: 10+00.00 -WALL1- TO

SHEET 1 OF 2 11+22.934 -WALL1-

GEOTECHNICAL ENGINEERING UNIT

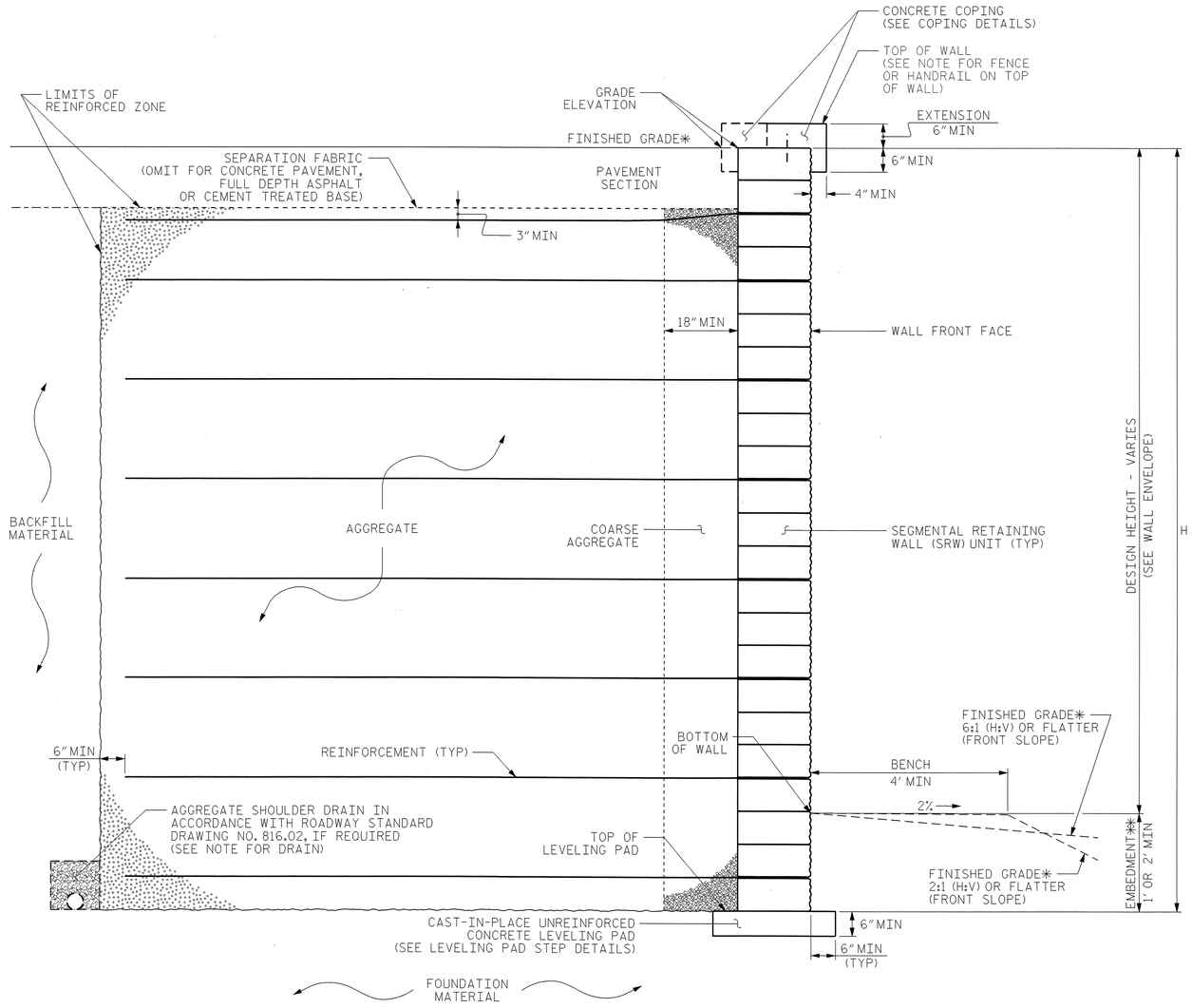
☐ ***EASTERN REGIONAL OFFICE***
☐ ***WESTERN REGIONAL OFFICE***
☒ ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #1

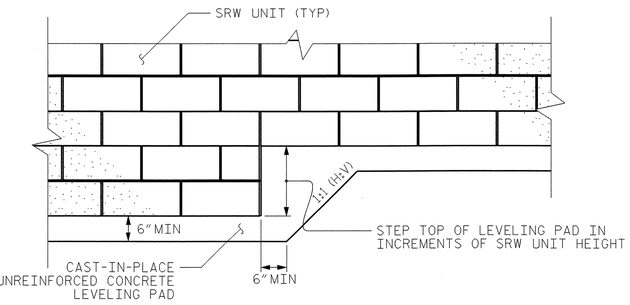
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-1
1			3			TOTAL SHEETS
2			4			17

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE Dal L. Teague 6/2/11	
SIGNATURE DATE	SIGNATURE DATE

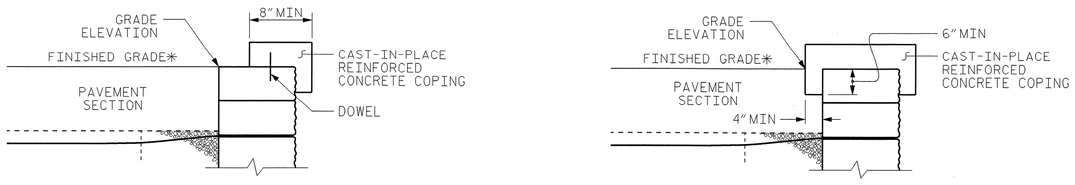


MSE WALL WITH SRW UNITS - TYPICAL SECTION

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



SEGMENTAL RETAINING WALL (SRW) UNITS



COPING DETAILS

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

PREPARED BY: D. TEAGUE	DATE: 5/11
REVIEWED BY: E. WILLIAMS	DATE: 5/11

PROJECT NO.: B-4660 (33822.1.1)

WAKE ***COUNTY***

STATION: 10+00.00 -WALL1- TO 11+22.934 -WALL1-

SHEET 2 OF 2

GEOTECHNICAL ENGINEERING UNIT

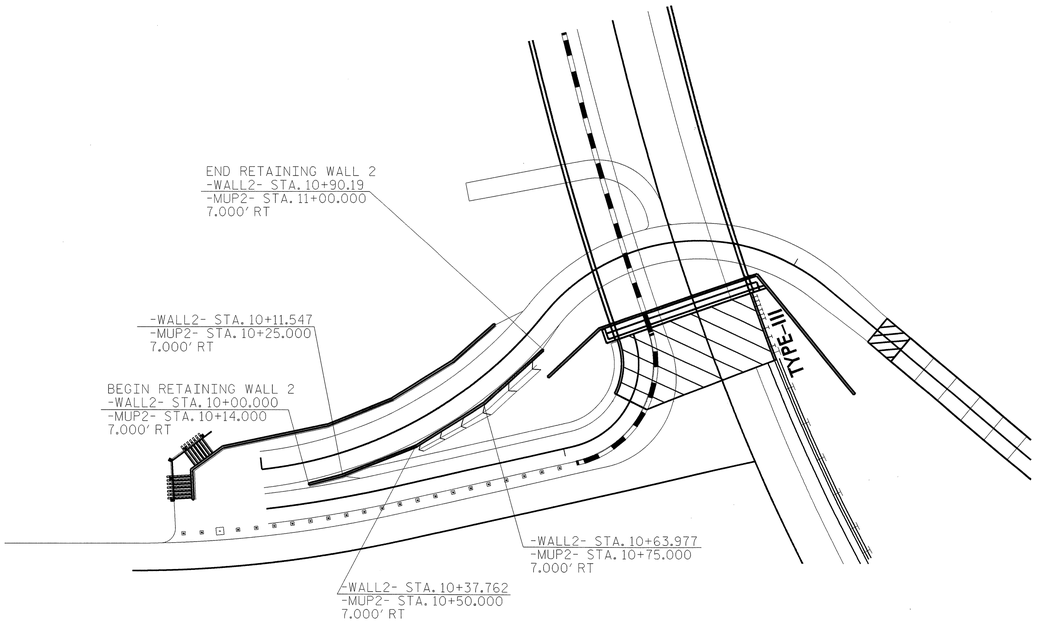
☐ ***EASTERN REGIONAL OFFICE***
☐ ***WESTERN REGIONAL OFFICE***
☒ ***CONTRACT OFFICE***

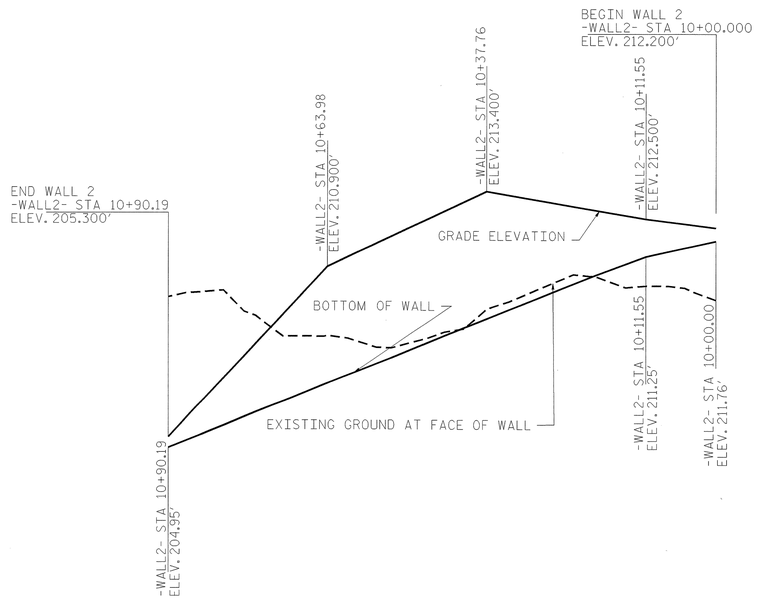
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-2
1			3			TOTAL SHEETS
2			4			7

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE — D L. Teague 6/2/11	
SIGNATURE DATE	SIGNATURE DATE





NOTES:

FOR SEGMENTAL GRAVITY RETAINING WALLS, SEE SEGMENTAL GRAVITY RETAINING WALLS PROVISION.

FREEZE-THAW DURABLE SRW UNITS ARE REQUIRED IN ACCORDANCE WITH THE SEGMENTAL GRAVITY RETAINING WALLS PROVISION.

A DRAIN PIPE IS NOT REQUIRED FOR RETAINING WALL NO. 2.

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

DESIGN RETAINING WALL NO. 2 FOR WALL HEIGHTS EQUAL TO THE DESIGN HEIGHT PLUS DEPTH TO TOP OF FOOTING (DIFFERENCE BETWEEN GRADE ELEVATION AND TOP OF FOOTING ELEVATION).

DESIGN RETAINING WALL NO. 2 FOR THE FOLLOWING:
1) MINIMUM DESIGN LIFE = 75 YEARS
2) MAXIMUM FACTORED RESISTANCE = 2000 PSF
3) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DO NOT PLACE NO. 57 STONE FOR FOOTINGS FOR RETAINING WALL NO. 2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

PAY ITEMS
SEGMENTAL GRAVITY RETAINING WALLS.....250 SQ. FT.

PREPARED BY: D. TEAGUE	DATE: 5/11
REVIEWED BY: E. WILLIAMS	DATE: 5/11

PROJECT NO.: B-4660 (33822.1.1)

WAKE ***COUNTY***

STATION: 10+00.00 -WALL2- TO 10+90.19 -WALL2-

SHEET 1 OF 2

GEOTECHNICAL ENGINEERING UNIT

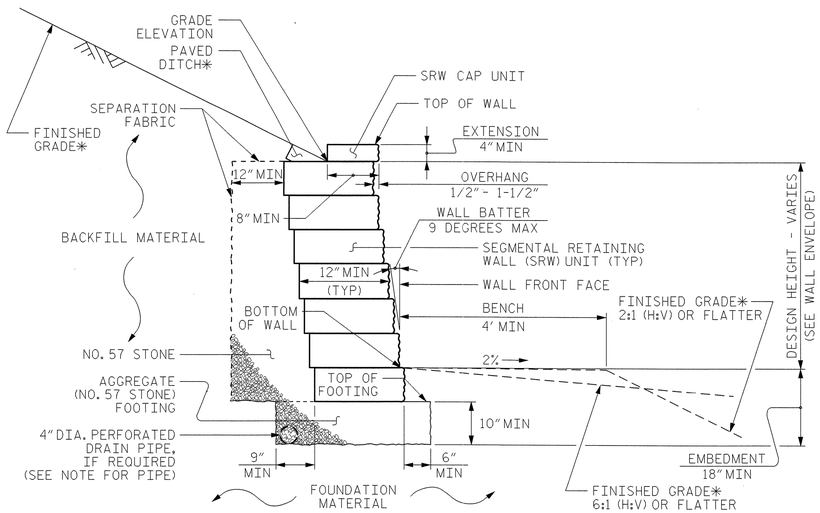
☐ ***EASTERN REGIONAL OFFICE***
☐ ***WESTERN REGIONAL OFFICE***
☒ ***CONTRACT OFFICE***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #2

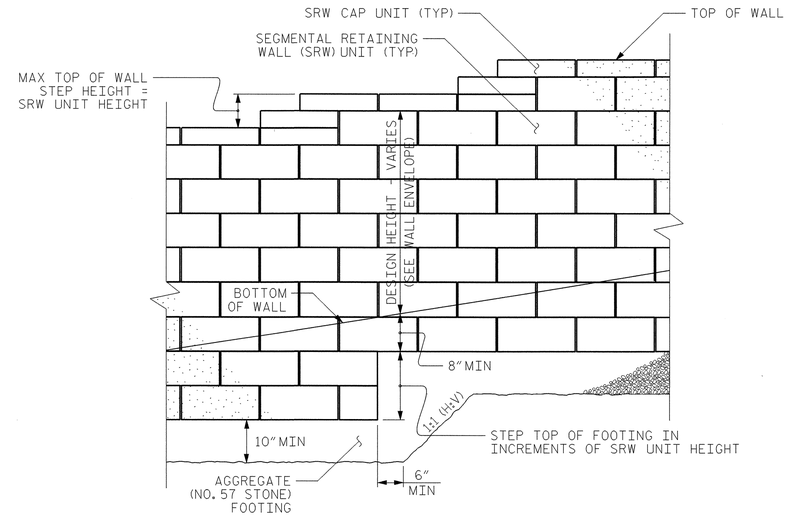
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-3
1			3			TOTAL SHEETS
2			4			7

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L TEAGUE — D. L. Teague 6/2/11	
SIGNATURE DATE	SIGNATURE DATE



SEGMENTAL GRAVITY WALL - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



SEGMENTAL GRAVITY WALL - TYPICAL ELEVATION

PREPARED BY: D. TEAGUE	DATE: 5/11
REVIEWED BY: E. WILLIAMS	DATE: 5/11

PROJECT NO.: B-4660 (33822.1.1)

WAKE **COUNTY**

STATION: 10+00.00 -WALL2- TO 10+90.19 -WALL2-

SHEET 2 OF 2

GEOTECHNICAL ENGINEERING UNIT

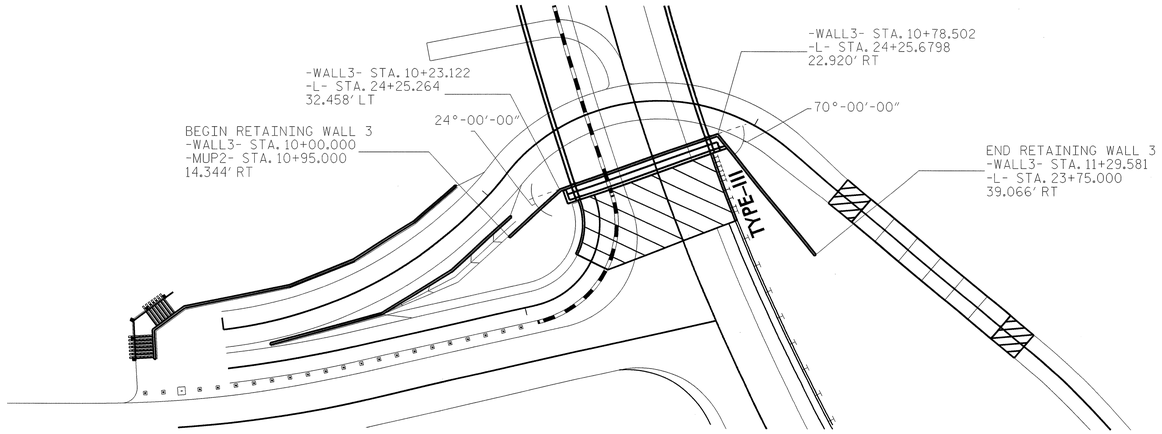
☐ *EASTERN REGIONAL OFFICE*
☐ *WESTERN REGIONAL OFFICE*
☒ *CONTRACT OFFICE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

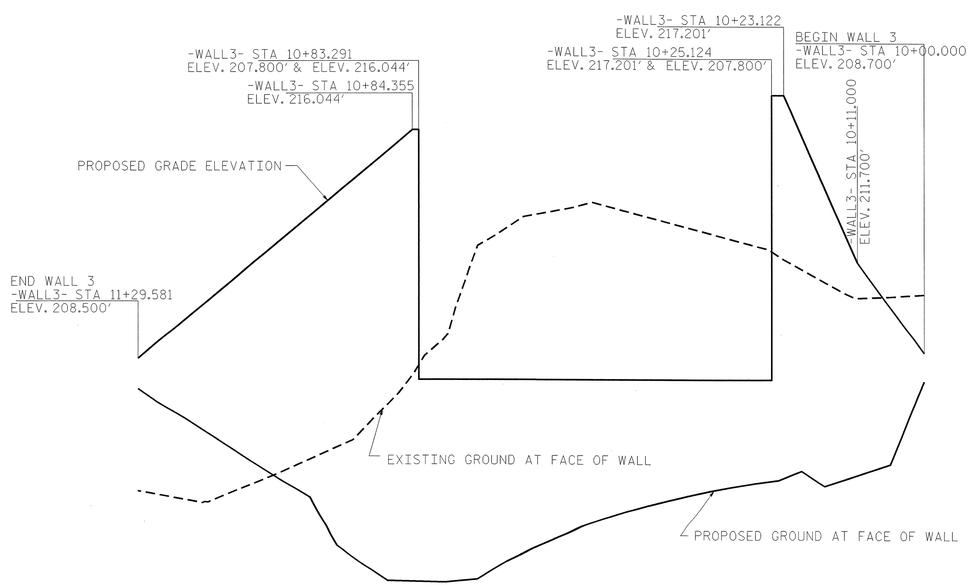
RETAINING WALL #2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-4
1			3			TOTAL SHEETS
2			4			7

GEC248236 6/2/2011 B4660_GEO_RWALL_Wall 2 dteague GEC-Oce860-34bond



RETAINING WALL PLAN VIEW



RETAINING WALL ENVELOPE - FRONT FACE
NOT TO SCALE

PREPARED BY: D. TEAGUE	DATE: 5/11
REVIEWED BY: E. WILLIAMS	DATE: 5/11

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE

SIGNATURE 7/7/11 DATE

ENGINEER

SIGNATURE DATE

NOTES:

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

USE COARSE AGGREGATE IN THE REINFORCED ZONE FOR RETAINING WALL NO. 3.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS FOR RETAINING WALL NO. 3.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 3.

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

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

DESIGN RETAINING WALL NO. 3 FOR THE FOLLOWING:
1) MINIMUM DESIGN LIFE = 100 YEARS
2) MAXIMUM FACTORED RESISTANCE = 3000 PSF
3) AGGREGATE PARAMETERS:

STANDARD SIZE NO. (IN ACCORDANCE WITH SECTION 1005 OF THE STANDARD SPECIFICATIONS)	UNIT WEIGHT (PCF	FRICTION ANGLE DEGREES	COHESION (c)
5, 57, 57M, 6M, 67 AND 78M (COARSE AGGREGATE)	110	38	0

4) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 3 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

FOUNDATIONS FOR END BENT NO. 1 LOCATED AT STATION 24+20.00 -L- WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 3. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 3 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

FOR LEVELING PAD STEP DETAILS SEE WALL NO. 1 PLANS SHEET 2.

DESIGN REINFORCEMENT CONNECTED TO THE END BENT CAPS FOR THE LOADING SHOWN AND CAST THE REINFORCEMENT CONNECTION HARDWARE INTO THE CAP BACKWALL FOR END BENT NO. 1 LOCATED AT STATION 24+20.00 -L-. MAINTAIN A MINIMUM CLEARANCE OF 3" BETWEEN THE HARDWARE AND REINFORCING STEEL IN THE CAP.

PAY ITEMS
MSE RETAINING WALLS.....900 SQ. FT.

PROJECT NO.: B-4660 (33822.1.1)

WAKE ***COUNTY***

STATION: 10+00.00 -WALL3- TO

SHEET 1 OF 3 11+29.58 -WALL3-

GEOTECHNICAL ENGINEERING UNIT

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

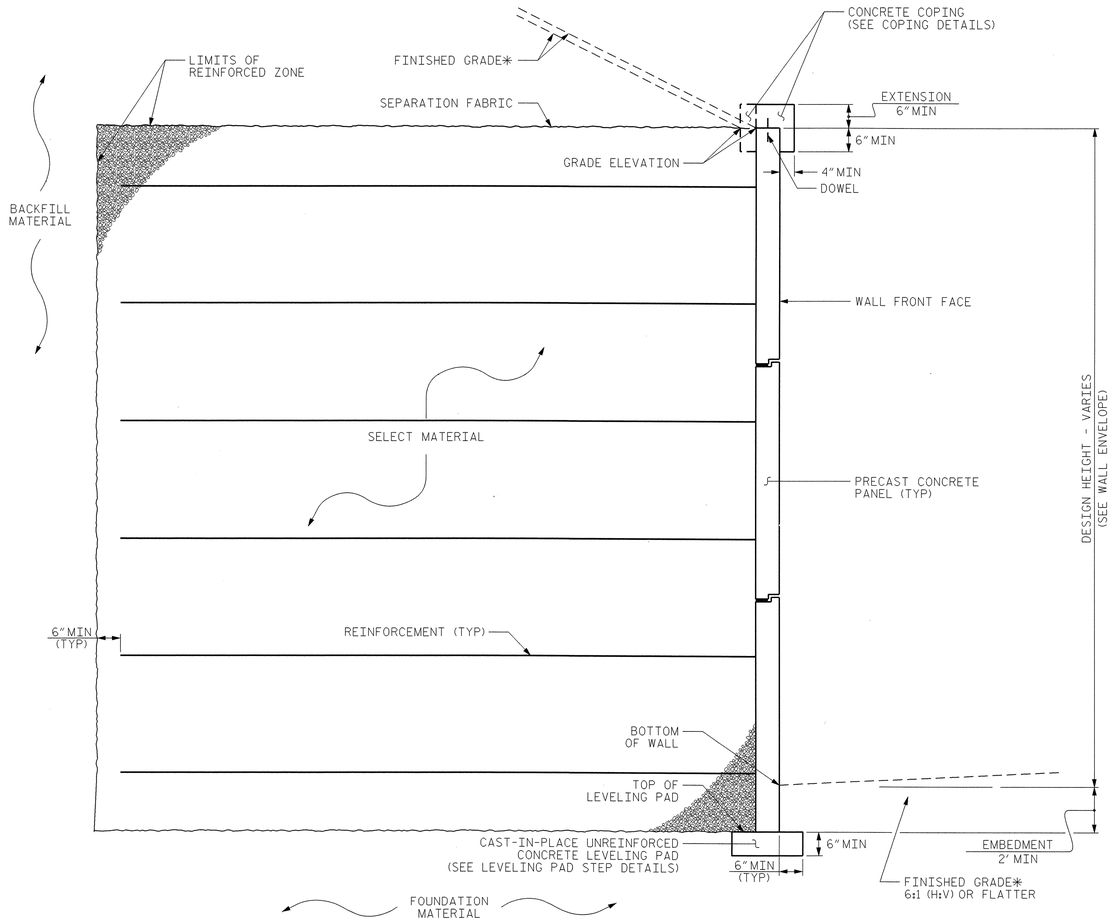
RETAINING WALL #3

REVISIONS

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

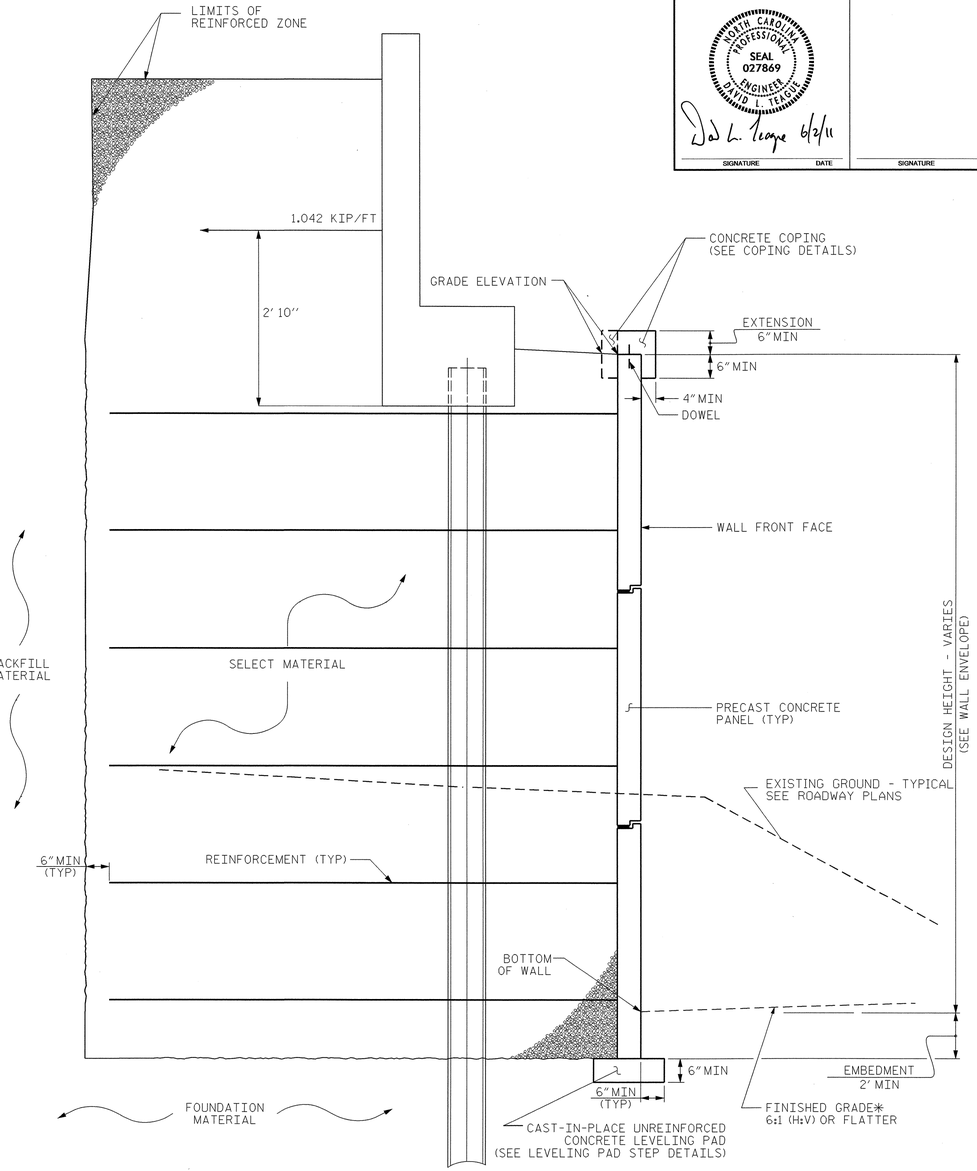
SHEET NO. W-5
TOTAL SHEETS 7

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L TEAGUE — D.L. Teague 6/2/11	
SIGNATURE DATE	SIGNATURE DATE



MSE WALL WITH PRECAST PANELS TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



MSE WALL WITH PRECAST PANELS TYPICAL SECTION AT BRIDGE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PREPARED BY: D. TEAGUE	DATE: 5/11		
REVIEWED BY: E. WILLIAMS	DATE: 5/11		

PROJECT NO.: B-4660 (33822.1.1)

WAKE ***COUNTY***

STATION: 10+00.00 -WALL3- TO 11+29.58 -WALL3-

SHEET 2 OF 3

GEOTECHNICAL ENGINEERING UNIT

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

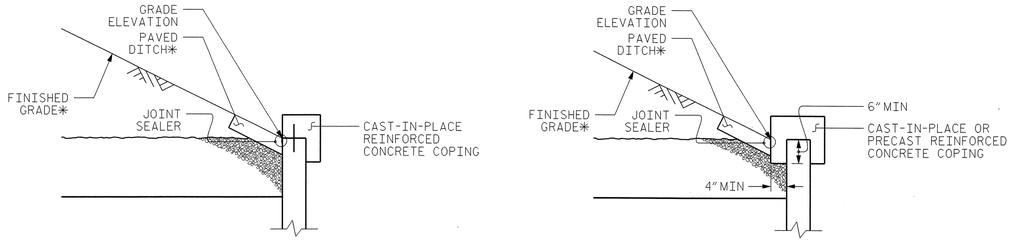
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-6
1			3			TOTAL SHEETS
2			4			7

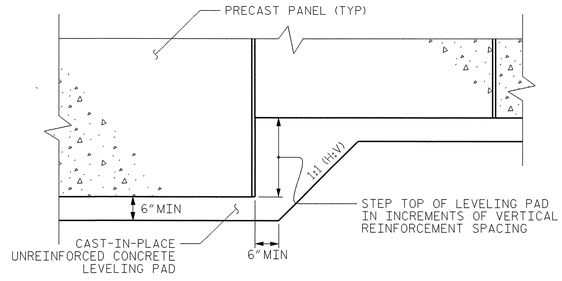
GEC248236 6/2/2011 B4660_GEO_RWALL_Wall03 dteague GEC-Oce860-34bond

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE — D.L. Teague 6/2/11	
SIGNATURE DATE	SIGNATURE DATE



COPING DETAILS

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



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PREPARED BY: D. TEAGUE	DATE: 5/11
REVIEWED BY: E. WILLIAMS	DATE: 5/11

PROJECT NO.: B-4660 (33822.1.1)

WAKE ***COUNTY***

STATION: 10+00.00 -WALL3- TO 11+29.58 -WALL3-

SHEET 3 OF 3

GEOTECHNICAL ENGINEERING UNIT

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-7
1			3			TOTAL SHEETS
2			4			7

GEC248236 6/2/2011 B4660_GEO_RWALL_Wall03 dteague GEC-Oce860-34bond

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8"Ø SHEAR STUDS FOR THE 3/4"Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8"Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4"Ø STUDS BASED ON THE RATIO OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

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