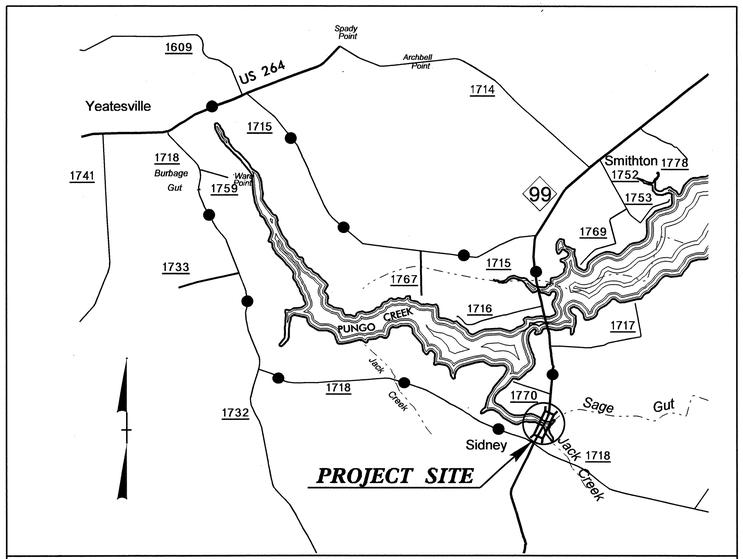
TIP PROJECT: B-4417

CONTRACT: C202376

STRUCTURE



VICINITY MAP

OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

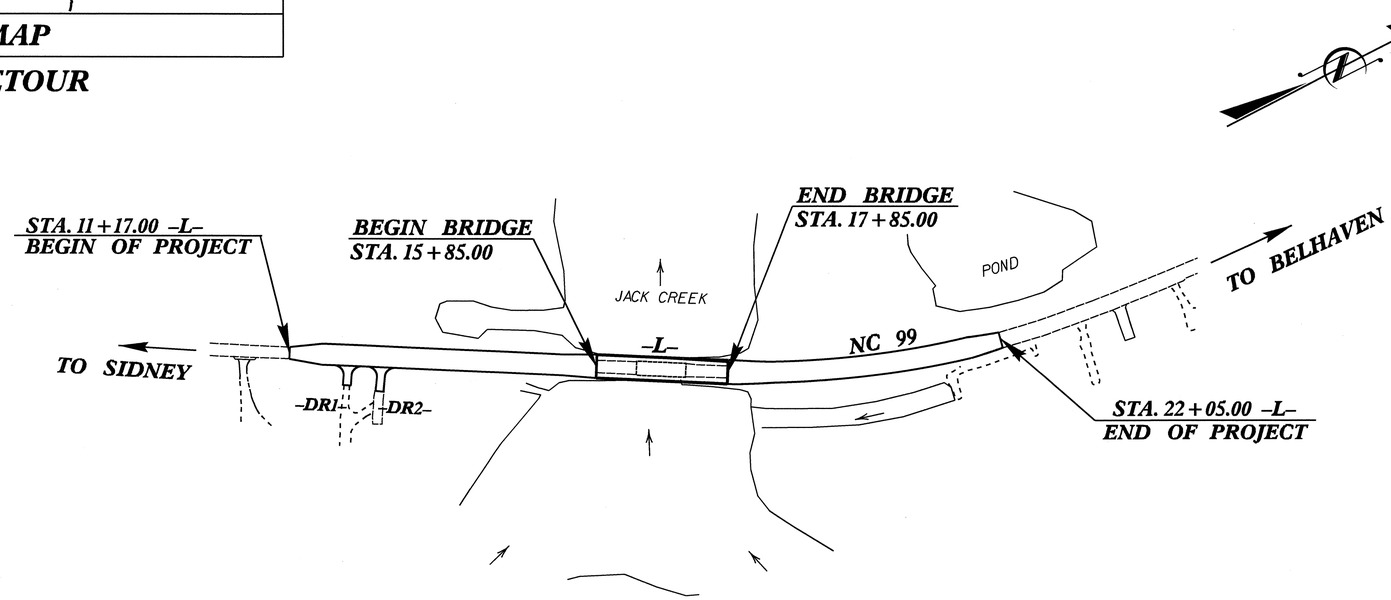
BEAUFORT COUNTY

LOCATION: BRIDGE NO. 59 OVER JACK CREEK ON NC 99

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4417		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33693.1.1	BRSTP-0099(4)	PE
33693.2.1	BRSTP-0099(4)	ROW & UTIL.
33693.3.1	BRSTP-0099(10)	CONST.



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2010 = 2,660
ADT 2030 = 4,200
DHV = 10 %
D = 60 %
T = 9 % *
V = 60 MPH
FUNC CLASS = RURAL MAJOR COLLECTOR
* (TTST 3% + DUAL 6%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4417 = 0.168 MI
LENGTH STRUCTURE TIP PROJECT B-4417 = 0.038 MI
TOTAL LENGTH TIP PROJECT B-4417 = 0.206 MI

Prepared In the Office of:

DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE :

MARCH 15, 2011

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

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

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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

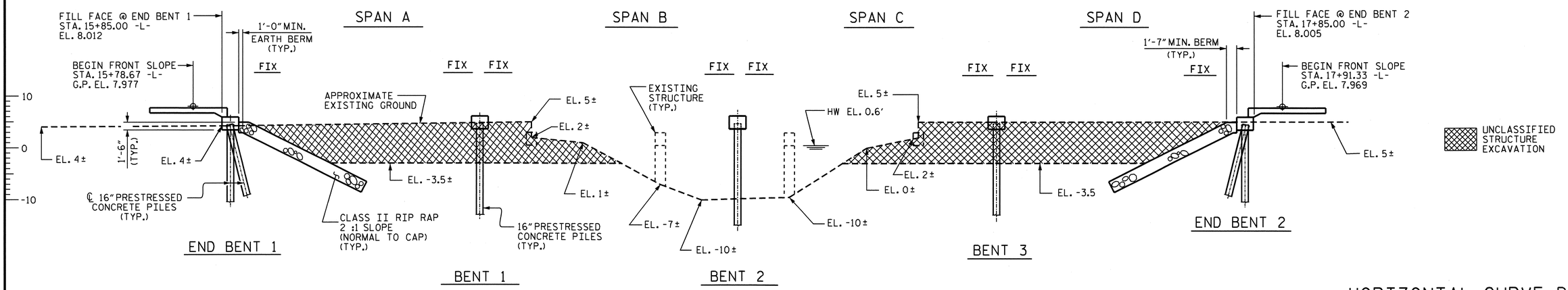
F.A. PROJECT NO. : BRSTP-0099 (10)

15+50 16+00 16+50 17+00 17+50 18+00

(+)0.6709% (-)0.6786%

PI = 16+85.00
EL = 8.70'
VC = 250'

GRADE DATA

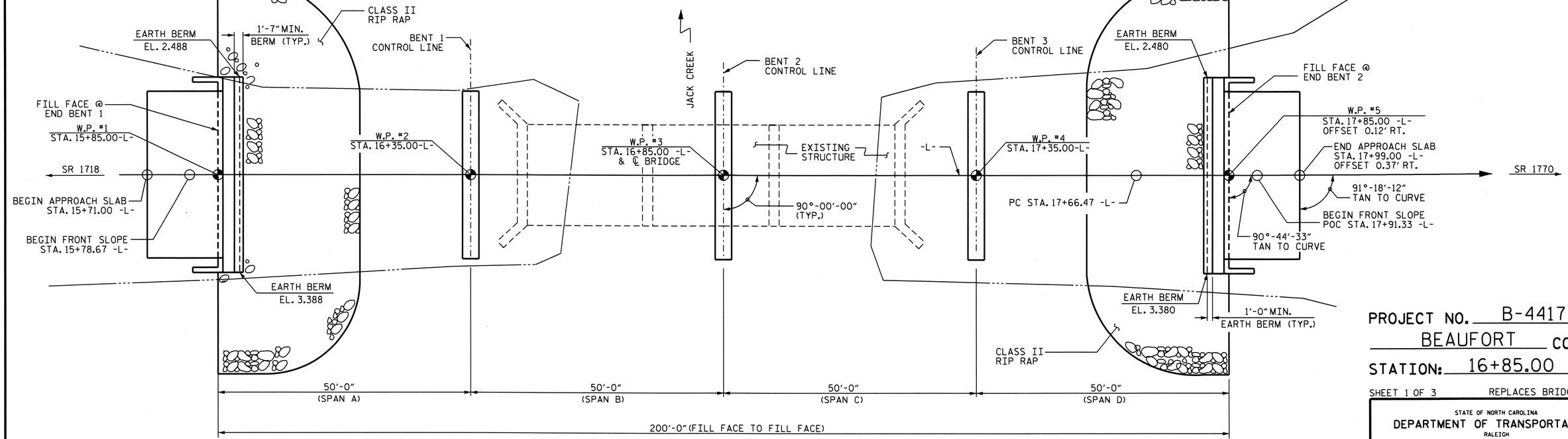


SECTION ALONG -L-

SECTION TAKEN AT RIGHT ANGLES TO BENTS AND END BENTS

HORIZONTAL CURVE DATA

P.I. STA. = 20+84.33 -L-
Δ = 25°-03'-49.3" (LT.)
D = 4°-00'-24"
L = 625.54'
T = 317.86'
R = 1430.00'



PLAN

PILES NOT SHOWN FOR CLARITY

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 59

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING BRIDGE ON NC 99 OVER JACK CREEK BETWEEN SR 1718 AND SR 1770

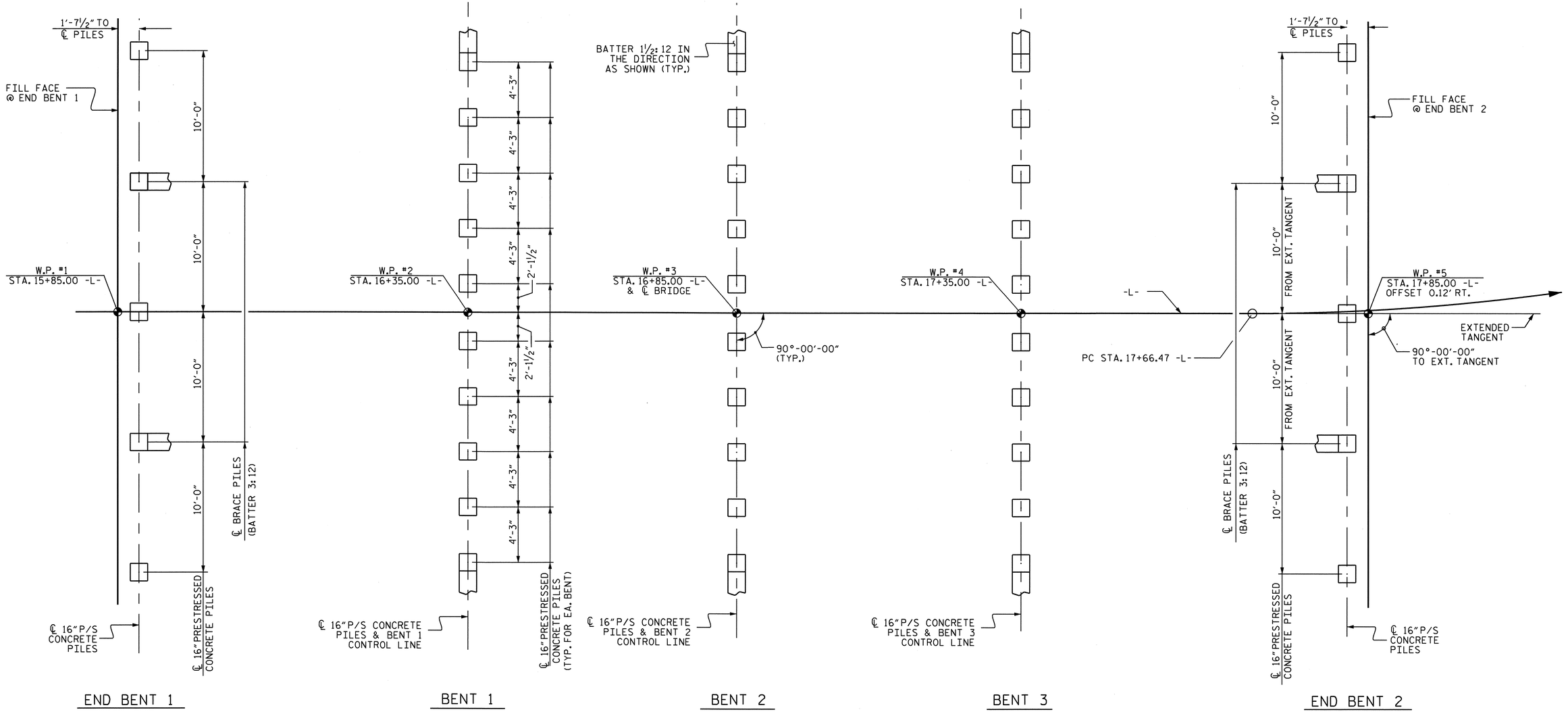
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : HARISH SHAH DATE : 10/09
CHECKED BY : RAMAN PATEL DATE : 10/09

NORTH CAROLINA PROFESSIONAL SEAL 11915 ENGINEER JOHN S. FRYE
1/18/11

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-MING FANG
1/18/2011

18-JAN-2011 11:09
K:\TIPProjects-B\B4417\Structures\B4417\Final plans\b4417_sd_gd.dgn
tfang



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE AND MEASURED ALONG CAP BOTTOM.
BRACE PILES AT END BENTS ARE BATTERED 3:12. BRACE PILES AT BENTS ARE BATTERED 1½:12

NOTES

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

PILES AT BENTS 1, 2 AND 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT BENTS 1, 2 AND 3 TO A REQUIRED DRIVING RESISTANCE OF 135 TONS, 145 TONS AND 155 TONS, RESPECTIVELY. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

INSTALL PILES AT BENTS 1, 2 AND 3 TO A TIP ELEVATION NO HIGHER THAN -40 FT.

THE SCOUR CRITICAL ELEVATION FOR BENTS 1, 2 AND 3 IS ELEVATION -18 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENT 1, BENT 2 OR BENT 3. FOR PILE DRIVING ANALYZER, SEE PILES PROVISION.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40,000 FT-LB PER BLOW TO 85,000 FT-LB PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1, BENTS 1, 2, 3 AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE REINFORCED BRIDGE APPROACH FILL, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENTS 1 AND 2.

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER YING HSIANG FANG
2/1/2011

PROJECT NO. B-4417
BEAUFORT COUNTY
STATION: 16+85.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON NC 99
OVER JACK CREEK
BETWEEN SR 1718 AND
SR 1770

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

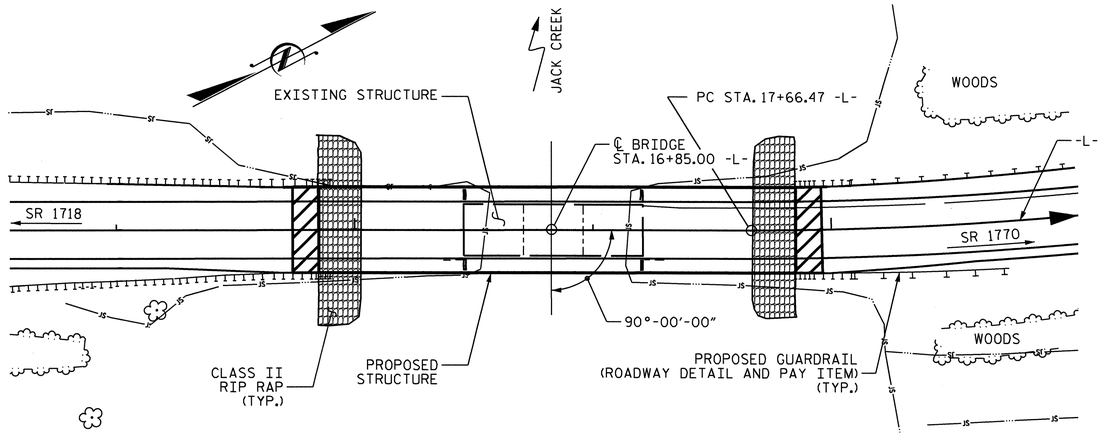
DRAWN BY : HARISH SHAH DATE : 10/09
CHECKED BY : RAMAN PATEL DATE : 10/09

01-FEB-2011 10:50
K:\TIPProjects-B\B4417\Structures\B4417\Finalplans\b4417_sd_gd.dgn
ttang

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	PDA ASSISTANCE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	16" PRESTRESSED CONC PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 2'-9" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLAB	
	LUMP SUM	EACH	EACH	LUMP SUM	CU.YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	TON	SQ. YD.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE											380.5	395.5				52	2565.88
END BENT 1					16.3		2750	5	350	5			200	220			
BENT 1					11.8		2428	10	750	10							
BENT 2					11.8		2428	10	750	10							
BENT 3					11.8		2428	10	700	10							
END BENT 2					16.3		2750	5	375	5			200	220			
TOTAL	LUMP SUM	2	2	LUMP SUM	68.0	LUMP SUM	12,784	40	2,925	40	380.5	395.5	400	440	LUMP SUM	52	2565.88

BM 165: 3.37' LEFT OF -BL- STA. 17+80.60, EL. 4.81



HYDRAULIC DATA

DESIGN DISCHARGE	= NA
FREQUENCY OF DESIGN FLOOD	= NA
DESIGN HIGH WATER ELEVATION	= NA
DRAINAGE AREA	= 5.9 sq. mi.
BASIC DISCHARGE (Q100)	= NA
BASIC HIGH WATER ELEVATION	= NA

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 8000 cfs
FREQUENCY OF OVERTOPPING FLOOD	= 100± yrs.
OVERTOPPING FLOOD ELEVATION	= EL. 5.5

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS; 1 @ 25'-3", 1 @ 25'-0" AND 1 @ 25'-3" OF REINFORCED CONCRETE FLOOR ON I-BEAMS WITH A CLEAR ROADWAY WIDTH 22.0 FT. ON REINFORCED CONCRETE CAPS ON TIMBER PILES LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 45 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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

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.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+85.00 -L-".

FOR SECURING OF VESSELS, SEE SPECIAL PROVISIONS.

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

THE CONCRETE IN THE PILE CAPS OF BENTS 1, 2 & 3 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

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.

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.

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

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

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING BRIDGE ON NC 99 OVER JACK CREEK BETWEEN SR 1718 AND SR 1770

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

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG 1/18/11

DRAWN BY : HARISH SHAH DATE : 10/09
CHECKED BY : W. F. PARKER DATE : 12/10

18-JAN-2011 09:14
K:\TIPProjects-B\B4417\Structures\B4417\Final plans\b4417_sd_gd.dgn
ttfang

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE CORED SLAB UNITS

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
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.064	--	1.75	0.277	1.16	B	EL	24.438	0.527	1.46	B	EL	9.775	0.80	0.277	1.06	B	EL	24.438	
		HL-93 (OPERATING)	N/A	--	1.502	--	1.35	0.277	1.50	B	EL	24.438	0.527	1.89	B	EL	9.775	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	(2)	1.319	47.47	1.75	0.277	1.44	B	EL	24.438	0.527	1.72	B	EL	9.775	0.80	0.277	1.32	B	EL	24.438	
		HS-20 (OPERATING)	36.000	--	1.862	67.036	1.35	0.277	1.86	B	EL	24.438	0.527	2.23	B	EL	9.775	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	2.682	36.202	1.40	0.277	3.65	B	EL	24.438	0.527	4.67	B	EL	9.775	0.80	0.277	2.68	B	EL	24.438	
		SNGARBS2	20.000	--	2.119	42.375	1.40	0.277	2.89	B	EL	24.438	0.527	3.45	B	EL	9.775	0.80	0.277	2.12	B	EL	24.438	
		SNAGRIS2	22.000	--	2.061	45.352	1.40	0.277	2.80	B	EL	19.55	0.527	3.26	B	EL	9.775	0.80	0.277	2.06	B	EL	24.438	
		SNCOTTS3	27.250	--	1.338	36.453	1.40	0.277	1.82	B	EL	24.438	0.527	2.34	B	EL	9.775	0.80	0.277	1.34	B	EL	24.438	
		SNAGGRS4	34.925	--	1.163	40.631	1.40	0.277	1.58	B	EL	24.438	0.527	2.04	B	EL	9.775	0.80	0.277	1.16	B	EL	24.438	
		SNS5A	35.550	--	1.134	40.33	1.40	0.277	1.54	B	EL	24.438	0.527	2.12	B	EL	9.775	0.80	0.277	1.13	B	EL	24.438	
		SNS6A	39.950	--	1.061	42.383	1.40	0.277	1.44	B	EL	24.438	0.527	1.97	B	EL	9.775	0.80	0.277	1.06	B	EL	24.438	
		SNS7B	42.000	--	1.011	42.465	1.40	0.277	1.38	B	EL	24.438	0.527	2.00	B	EL	9.775	0.80	0.277	1.01	B	EL	24.438	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.30	42.893	1.40	0.277	1.77	B	EL	24.438	0.527	2.32	B	EL	9.775	0.80	0.277	1.30	B	EL	24.438	
		TNT4A	33.075	--	1.311	43.367	1.40	0.277	1.79	B	EL	24.438	0.527	2.21	B	EL	9.775	0.80	0.277	1.31	B	EL	24.438	
		TNT6A	41.600	--	1.092	45.44	1.40	0.277	1.49	B	EL	24.438	0.527	2.17	B	EL	9.775	0.80	0.277	1.09	B	EL	24.438	
		TNT7A	42.000	--	1.109	46.573	1.40	0.277	1.51	B	EL	24.438	0.527	2.01	B	EL	9.775	0.80	0.277	1.11	B	EL	24.438	
		TNT7B	42.000	--	1.156	48.554	1.40	0.277	1.57	B	EL	24.438	0.527	1.91	B	EL	9.775	0.80	0.277	1.16	B	EL	24.438	
		TNAGRIT4	43.000	--	1.097	47.177	1.40	0.277	1.49	B	EL	24.438	0.527	1.83	B	EL	9.775	0.80	0.277	1.10	B	EL	24.438	
		TNAGT5A	45.000	--	1.025	46.116	1.40	0.277	1.40	B	EL	24.438	0.527	1.89	B	EL	9.775	0.80	0.277	1.02	B	EL	24.438	
		TNAGT5B	45.000	(3)	1.004	45.18	1.40	0.277	1.37	B	EL	24.438	0.527	1.74	B	EL	9.775	0.80	0.277	1.00	B	EL	24.438	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1. SPANS B AND C ARE THE SAME.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

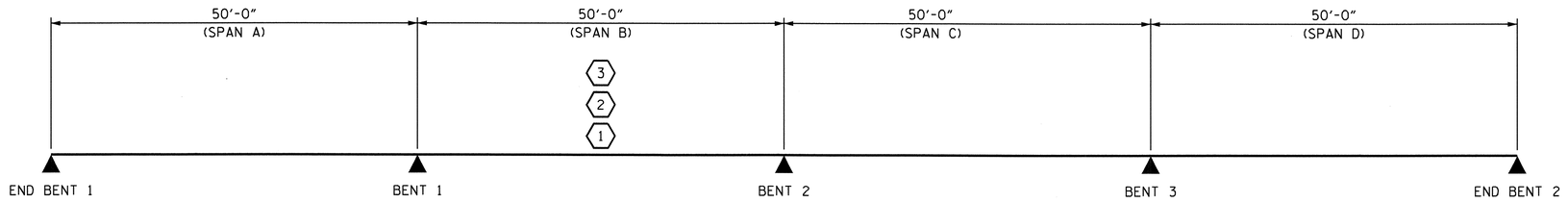
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

NORTH CAROLINA PROFESSIONAL SEAL 026445 ENGINEER KOREY NEWTON

1/12/2011

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

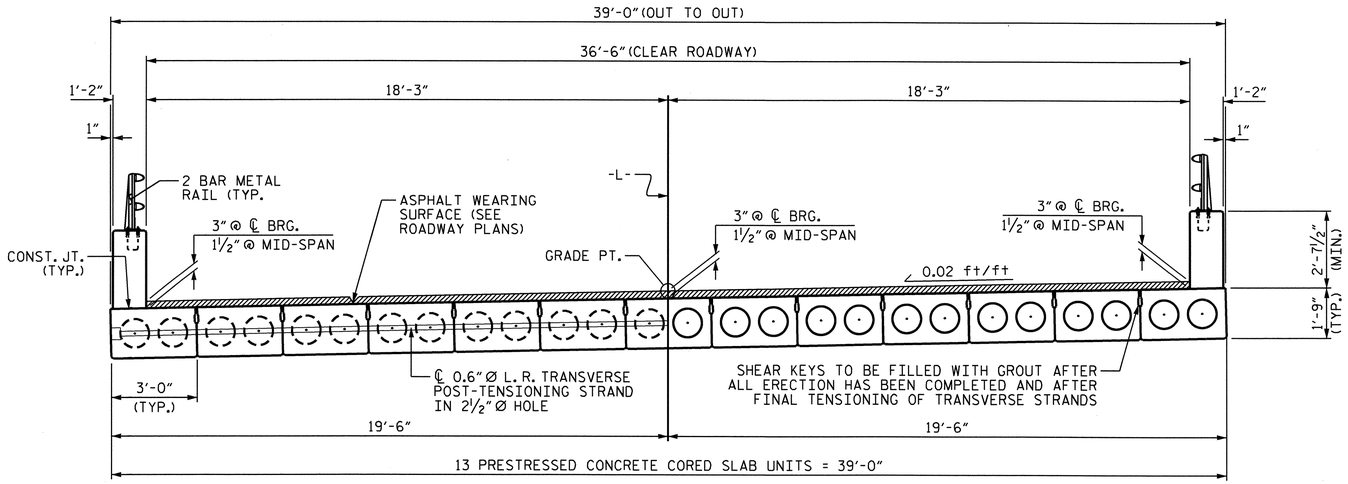
LRFR SUMMARY FOR PRESTRESSED CONCRETE CORED SLAB UNITS
(NON-INTERSTATE TRAFFIC)

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

STD. NO. LRFR1

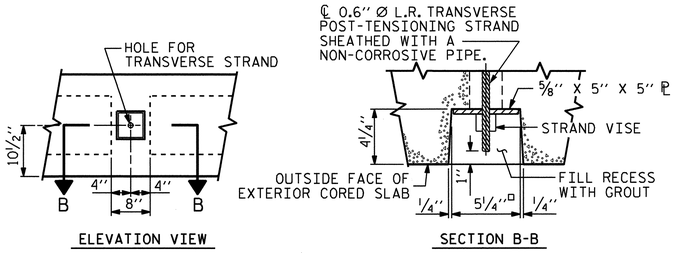
ASSEMBLED BY : R. P. PATEL	DATE : 3/18/10
CHECKED BY : P. K. NEWTON	DATE : 3/18/10
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	

12-JAN-2011 09:50
B:\B4417\Structures\B4417\Finalplans\b4417_sd_lrfr.dgn
kpnewton

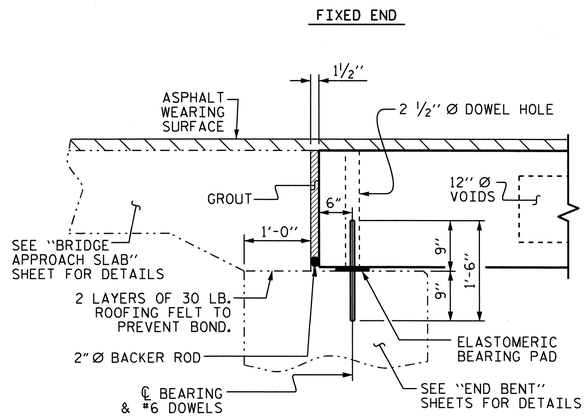


TYPICAL SECTION

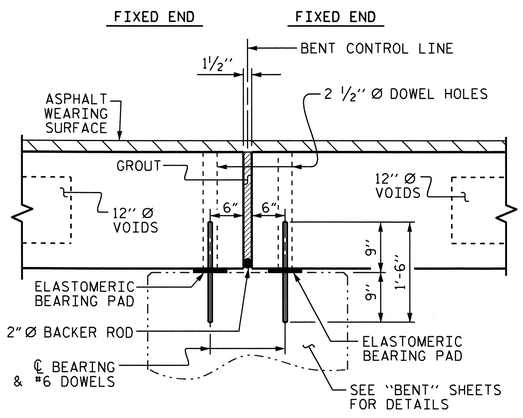
THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.



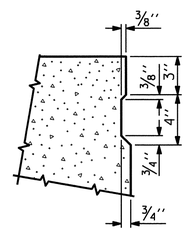
GROUTED RECESS AT END OF POST-TENSIONED STRAND•CORED SLABS



SECTION AT END BENT

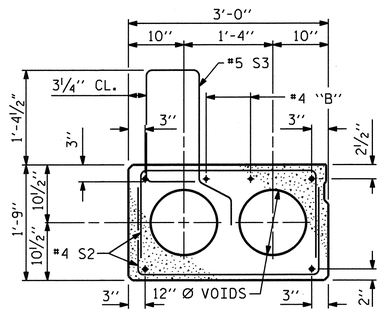


SECTION AT BENT



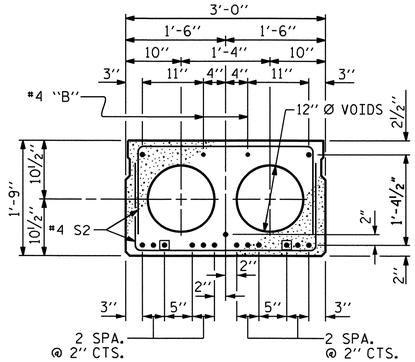
SHEAR KEY DETAIL

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



EXTERIOR SLAB SECTION

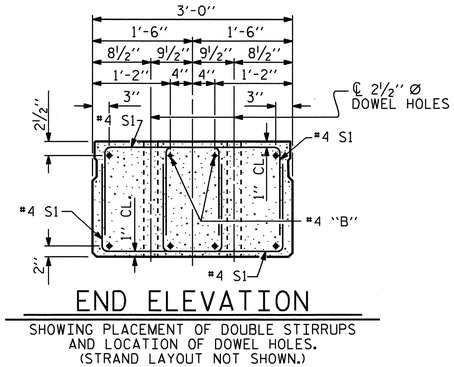
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION

(15 STRANDS, 2 SHEATHED)

0.6" Ø LOW RELAXATION STRAND LAYOUT



END ELEVATION

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

▣ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 3'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

NORTH CAROLINA PROFESSIONAL SEAL 29445 ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

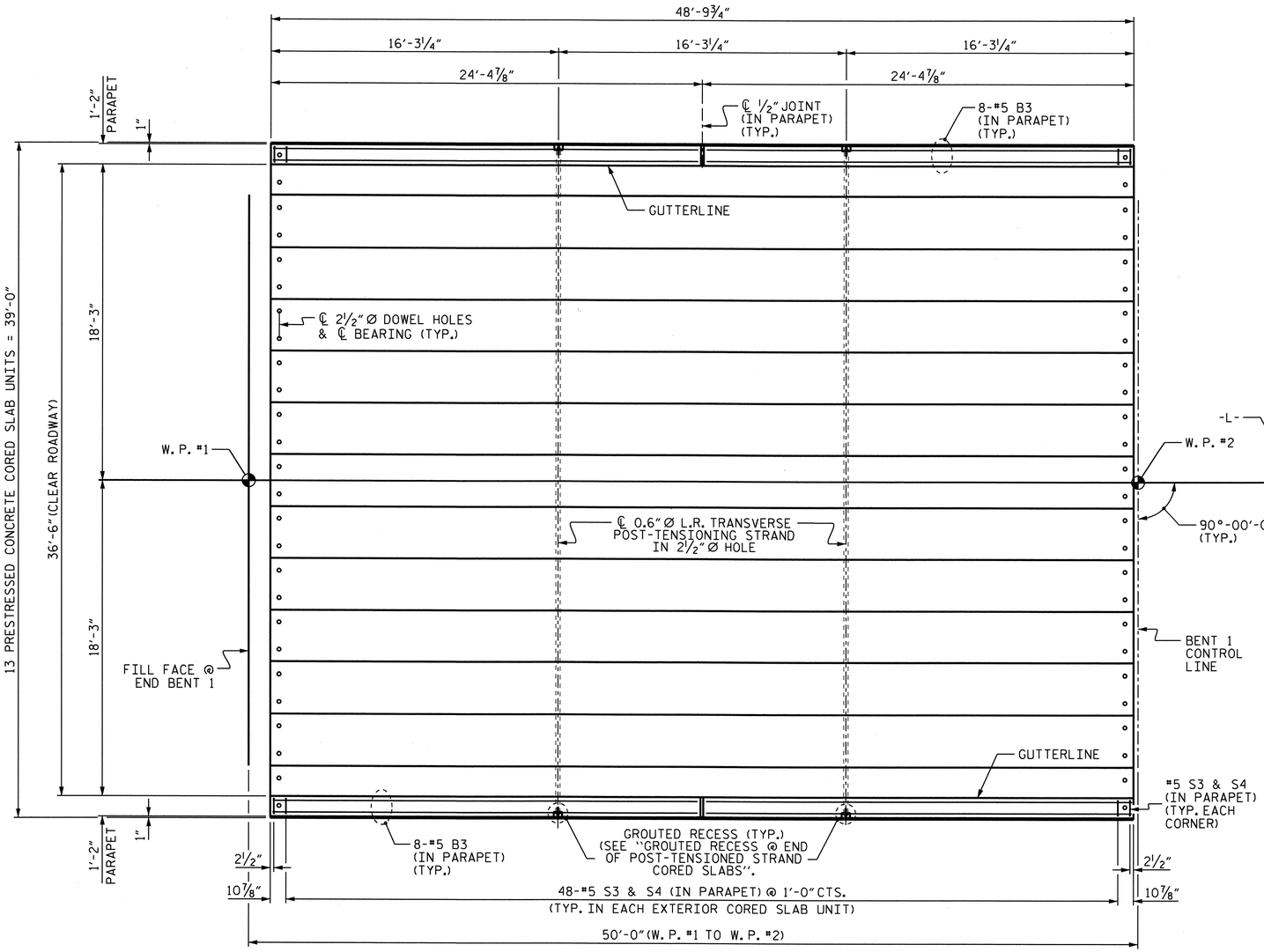
STANDARD

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

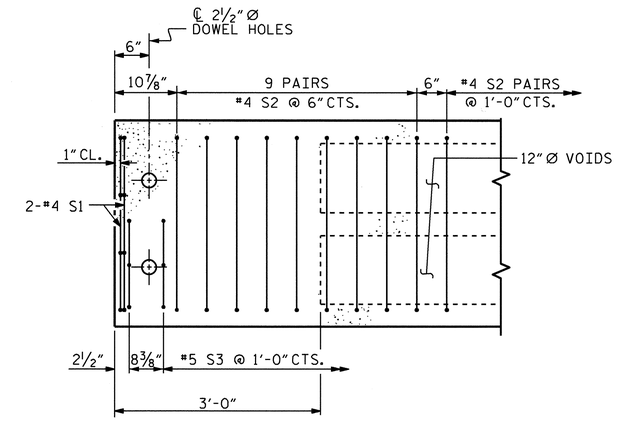
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : P. K. NEWTON DATE : 4/5/10
CHECKED BY : RAMAN PATEL DATE : 4/15/10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_cs.dgn
khcompton



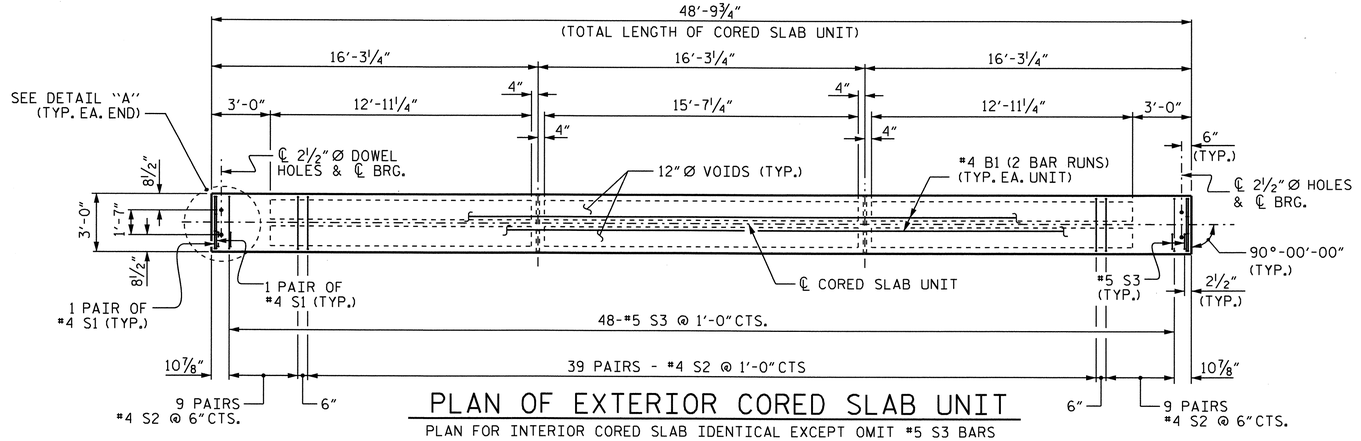
PLAN OF SPAN A



DETAIL "A"

PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



PLAN OF EXTERIOR CORED SLAB UNIT

PLAN FOR INTERIOR CORED SLAB IDENTICAL EXCEPT OMIT #5 S3 BARS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

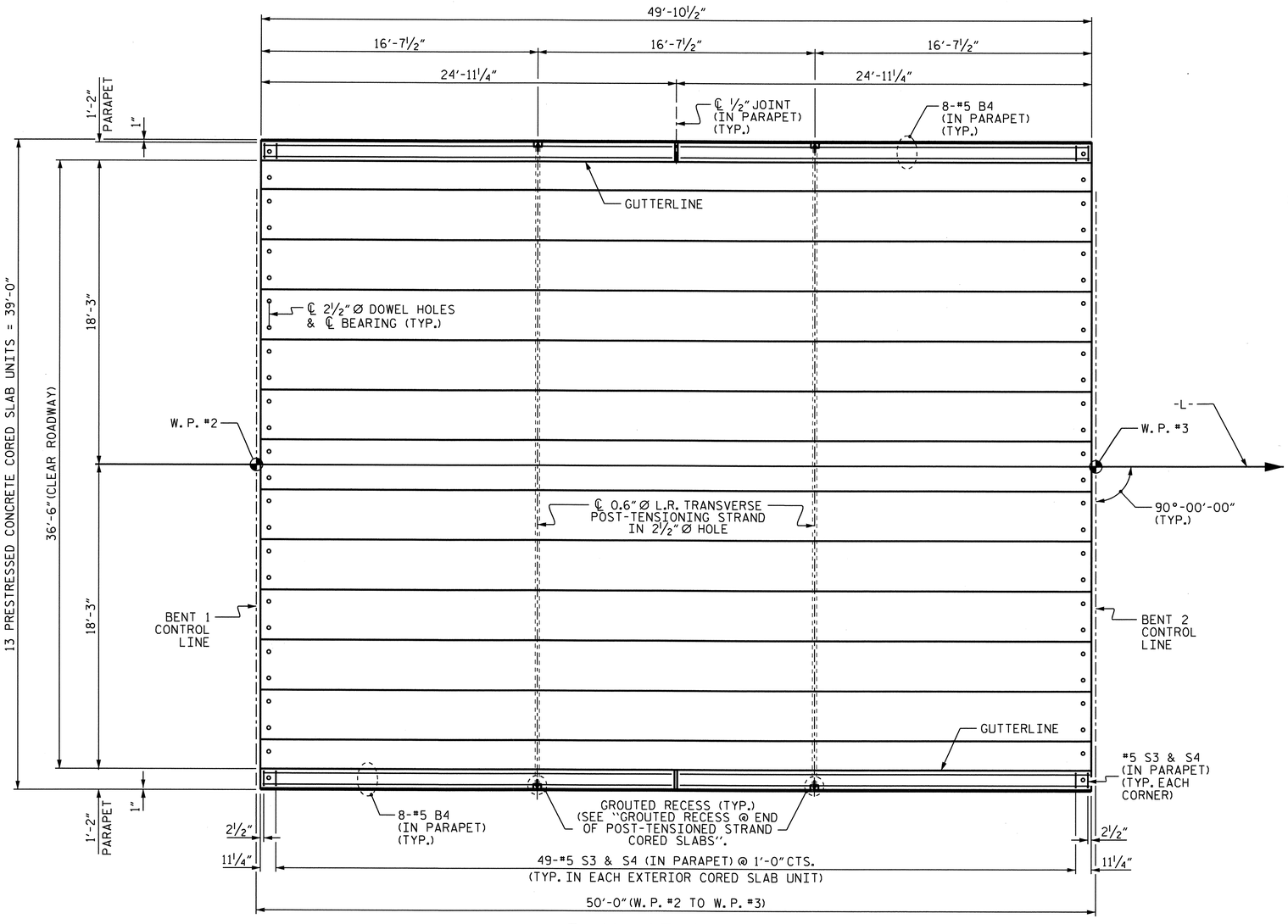
PLAN OF SPAN

SPAN A

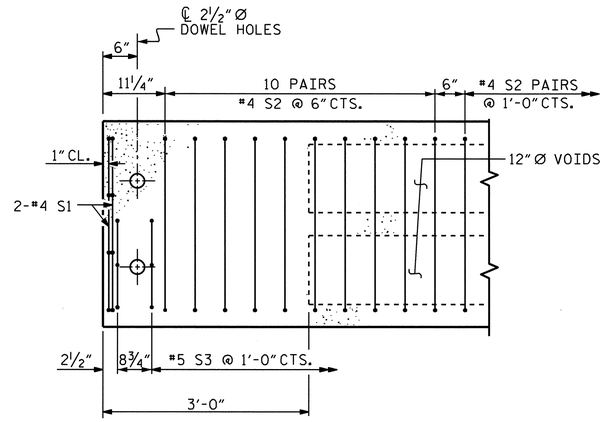
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : P. K. NEWTON DATE : 4/5/10
CHECKED BY : RAMAN PATEL DATE : 4/15/10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_cs.dgn
khcompton



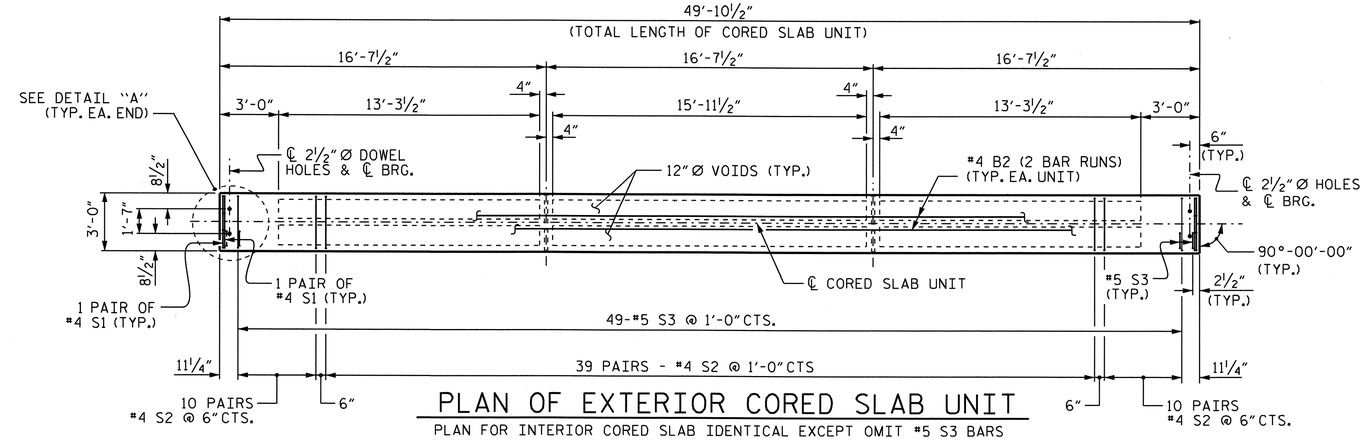
PLAN OF SPAN B



DETAIL "A"

PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



PLAN OF EXTERIOR CORED SLAB UNIT

PLAN FOR INTERIOR CORED SLAB IDENTICAL EXCEPT OMIT #5 S3 BARS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

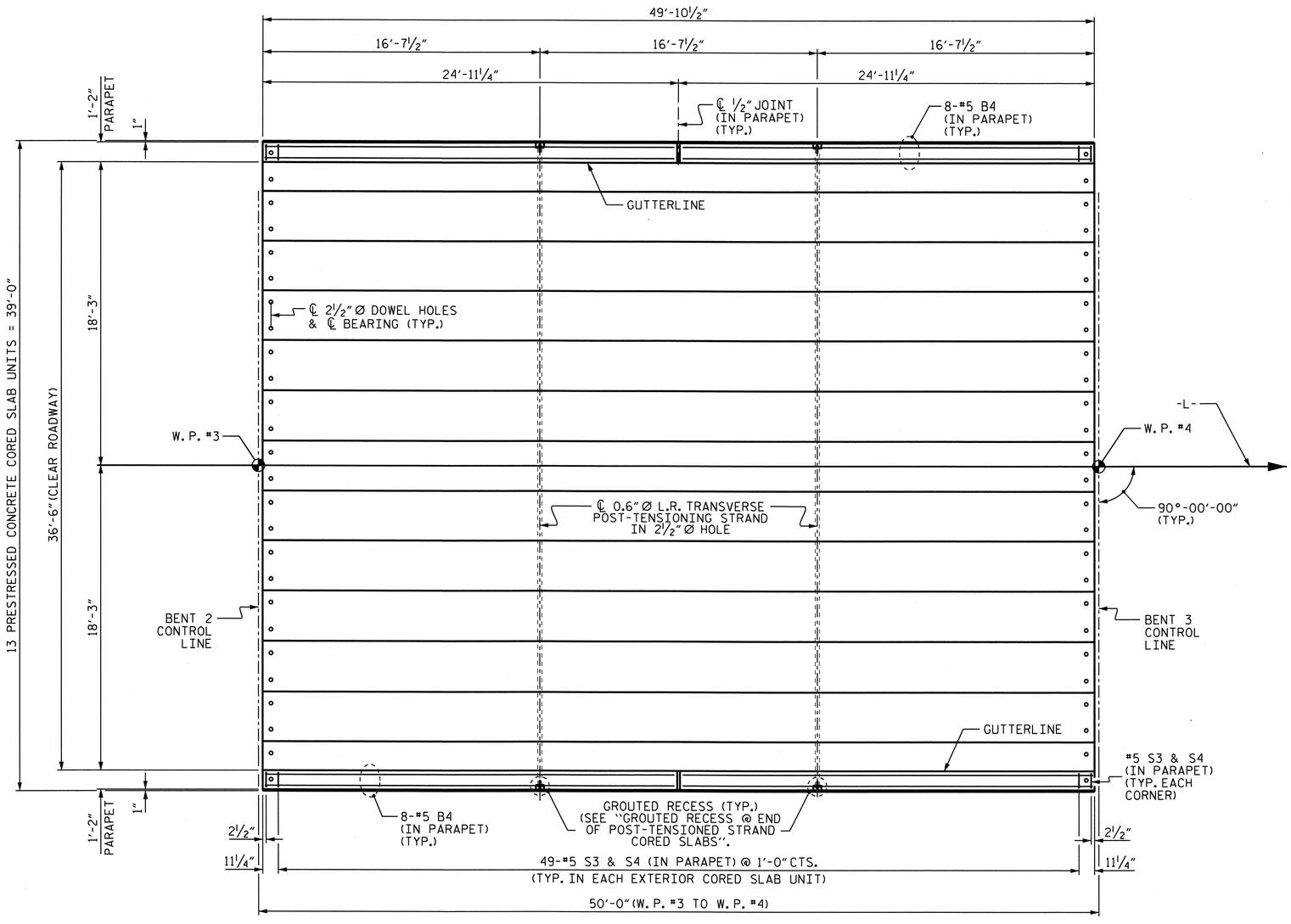
PLAN OF SPAN

SPAN B

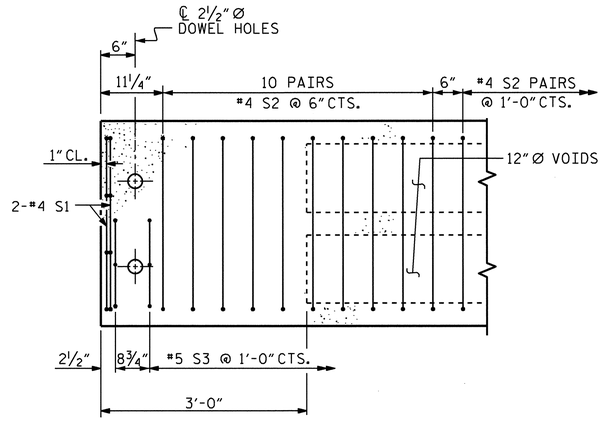
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : P. K. NEWTON DATE : 4/5/10
CHECKED BY : RAMAN PATEL DATE : 4/15/10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Finalplans\b4417_sd_cs.dgn
khcompton



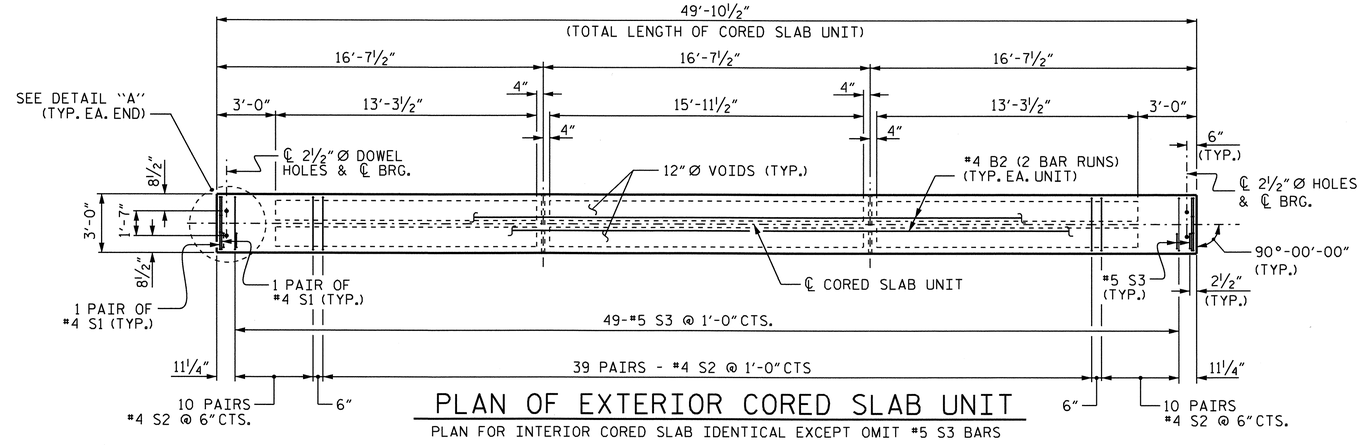
PLAN OF SPAN C



DETAIL "A"

PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



PLAN OF EXTERIOR CORED SLAB UNIT

PLAN FOR INTERIOR CORED SLAB IDENTICAL EXCEPT OMIT #5 S3 BARS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

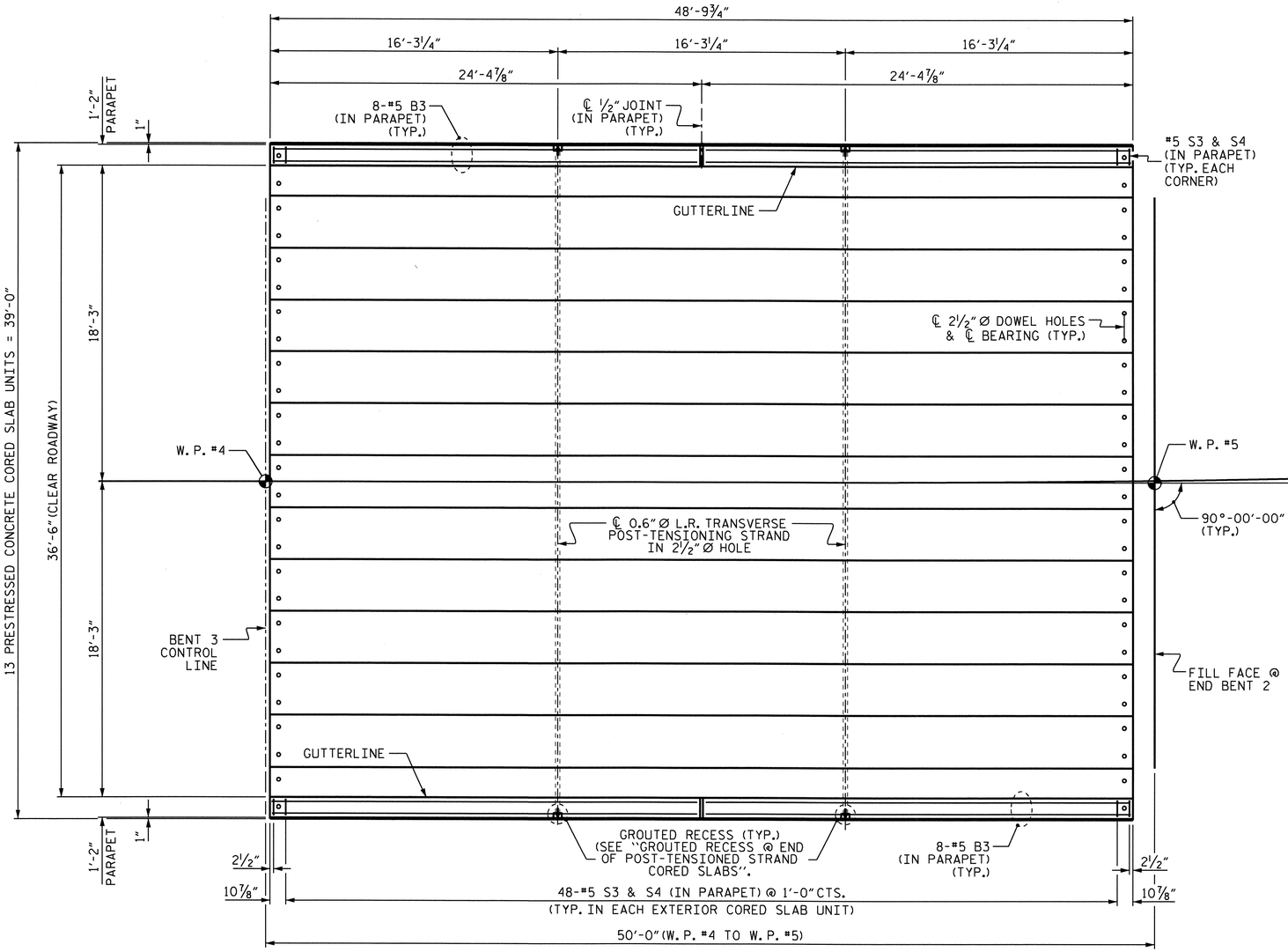
PLAN OF SPAN

SPAN C

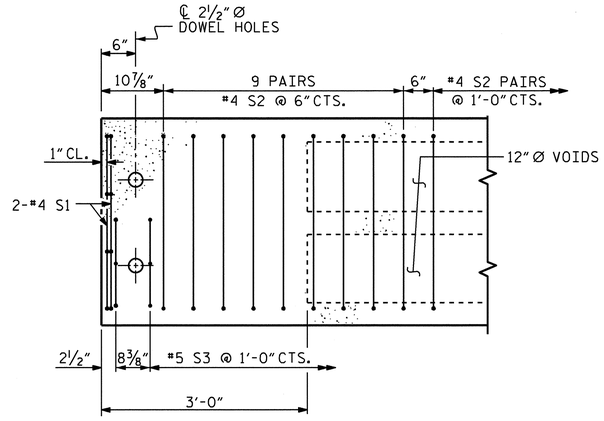
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : P. K. NEWTON DATE : 4/5/10
CHECKED BY : RAMAN PATEL DATE : 4/15/10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_cs.dgn
khcompton



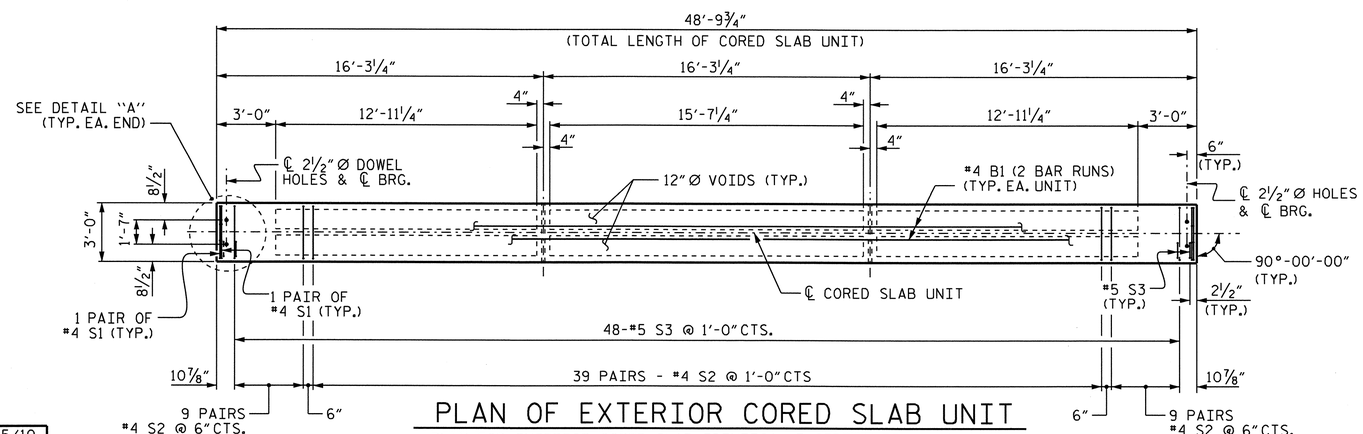
PLAN OF SPAN D



DETAIL "A"

PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.



PLAN OF EXTERIOR CORED SLAB UNIT

PLAN FOR INTERIOR CORED SLAB IDENTICAL EXCEPT OMIT #5 S3 BARS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

SPAN D

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : P. K. NEWTON DATE : 4/5/10
CHECKED BY : RAMAN PATEL DATE : 4/15/10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Finalplans\b4417_sd_cs.dgn
khcompton

DEAD LOAD DEFLECTION AND CAMBER

	SPANS A & D	SPANS B & C
CAMBER (SLAB ALONE IN PLACE)	1 7/8" ↑	1 15/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/4" ↓	5/16" ↓
FINAL CAMBER	1 5/8" ↑	1 5/8" ↑

** INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED

SPAN A

UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	48'-9 3/4"	97'-7 1/2"
INTERIOR	11	48'-9 3/4"	536'-11 1/4"
TOTAL	13	48'-9 3/4"	634'-6 3/4"

SPAN B

UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	49'-10 1/2"	99'-9"
INTERIOR	11	49'-10 1/2"	548'-7 1/2"
TOTAL	13	49'-10 1/2"	648'-4 1/2"

SPAN C

UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	49'-10 1/2"	99'-9"
INTERIOR	11	49'-10 1/2"	548'-7 1/2"
TOTAL	13	49'-10 1/2"	648'-4 1/2"

SPAN D

UNIT TYPE	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	48'-9 3/4"	97'-7 1/2"
INTERIOR	11	48'-9 3/4"	536'-11 1/4"
TOTAL	13	48'-9 3/4"	634'-6 3/4"

TOTAL CORED SLAB UNITS NO. 52 2565.88 LIN. FT.

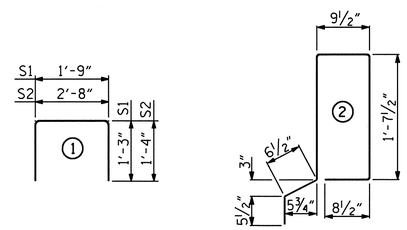
GRADE 270 STRANDS

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

SPLICE LENGTH CHART

BAR SIZE	SPLICE LENGTH
#4	1'-9"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

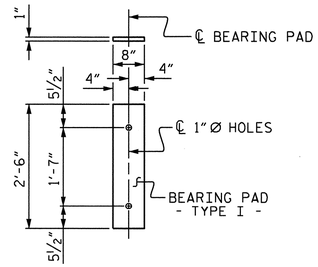
BILL OF MATERIAL FOR ONE CORED SLAB SECTION

SPANS A & D

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B1	4	#4	STR	25'-2"	67	25'-2"	67
S1	8	#4	1	4'-3"	23	4'-3"	23
S2	114	#4	1	5'-4"	406	5'-4"	406
*S3	50	#5	2	5'-9"	300		
REINFORCING STEEL					496 LBS.		496 LBS.
*EPOXY COATED REINFORCING STEEL					300 LBS.		
5000 P.S.I. CONCRETE					7.0 CU. YDS.		7.0 CU. YDS.
0.6" Ø L.R. STRANDS					No. 15		

SPANS B & C

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B2	4	#4	STR	25'-8"	69	25'-8"	69
S1	8	#4	1	4'-3"	23	4'-3"	23
S2	118	#4	1	5'-4"	420	5'-4"	420
*S3	51	#5	2	5'-9"	306		
REINFORCING STEEL					512 LBS.		512 LBS.
*EPOXY COATED REINFORCING STEEL					306 LBS.		
5000 P.S.I. CONCRETE					7.1 CU. YDS.		7.1 CU. YDS.
0.6" Ø L.R. STRANDS					No. 15		



FIXED END
(TYPE I - 104 REQ'D)

ELASTOMERIC BEARING DETAILS

NOTES

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

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

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

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH GROUT.

THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH. AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI.

ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

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

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE STRANDS SHALL BE 0.6" Ø AND TENSIONED TO 43,950 POUNDS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

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

NORTH CAROLINA PROFESSIONAL SEAL 029643 ENGINEER KOREY NEWTON

1/18/2011

PROJECT NO. B-4417
BEAUFORT COUNTY
STATION: 16+85.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

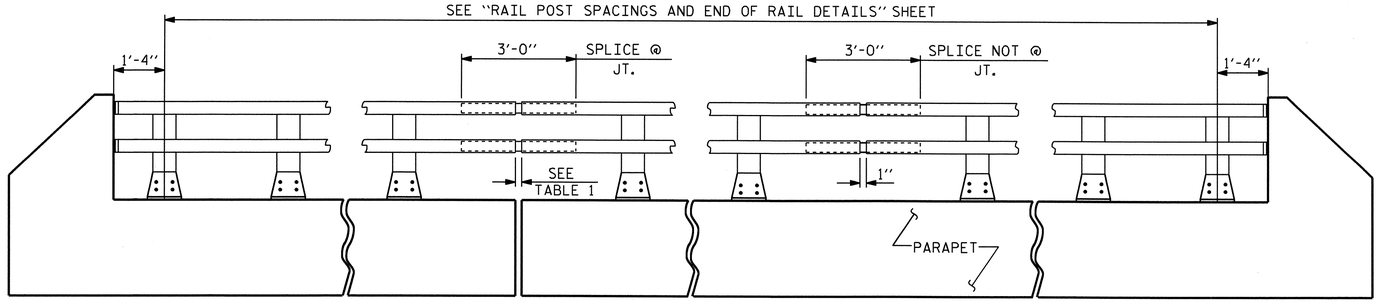
3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			27

STD. NO. PCS3

ASSEMBLED BY : P. K. NEWTON	DATE : 3/30/10	
CHECKED BY : RAMAN PATEL	DATE : 4-15-10	
DRAWN BY : WJH 4/89	REV. 7/10/01	RWW/LES
CHECKED BY : FCJ 5/89	REV. 5/7/03RRR	RWW/JTE
	REV. 5/1/06R	TLA/GM

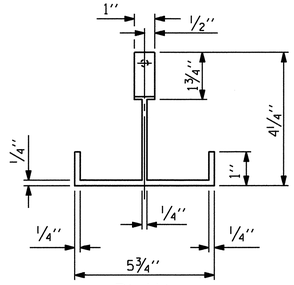
12-JAN-2011 10:01
B:\B4417\Structures\B4417\Final plans\b4417_sd_cs.dgn
kpnewton



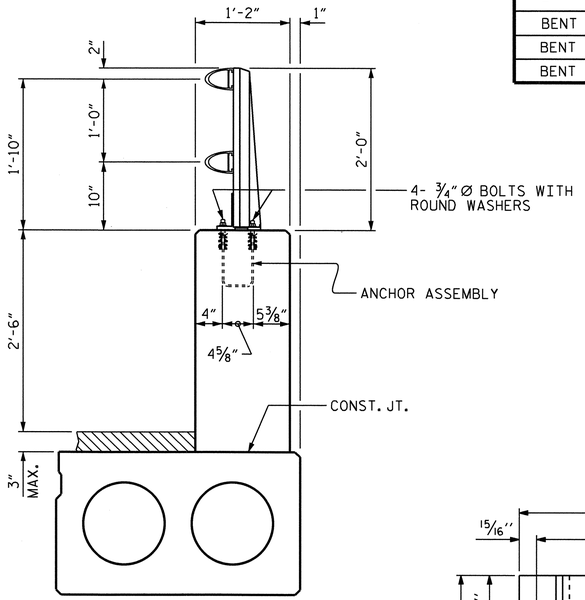
ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS".

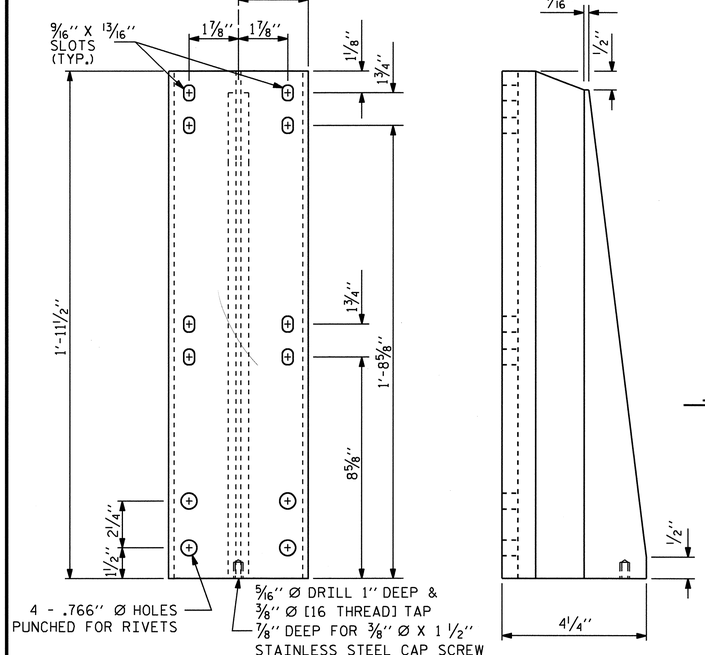
TABLE 1	
℄ JT. @	RAIL OPENING
BENT 1	1½"
BENT 2	1½"
BENT 3	1½"



PLAN



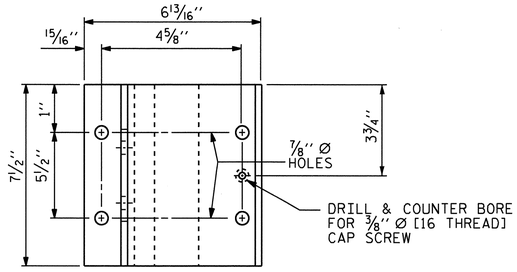
SECTION THRU PARAPET AND RAIL



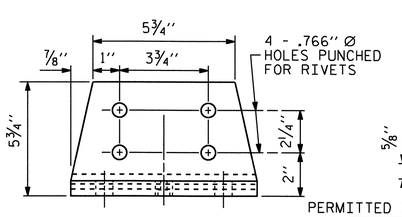
FRONT ELEVATION

SIDE ELEVATION

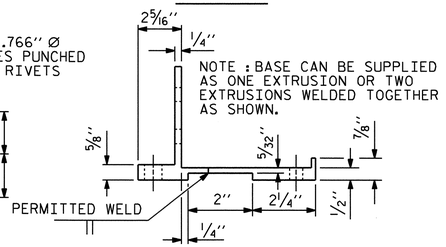
DETAILS OF POST



PLAN

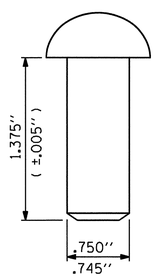


FRONT ELEVATION



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.

PAY LENGTH = 380.5 LIN. FT.

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

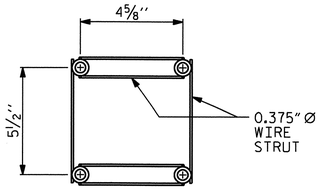
2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			27

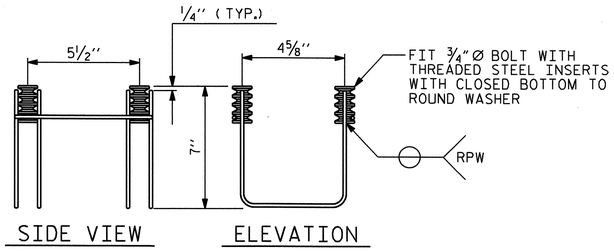
ASSEMBLED BY : P. K. NEWTON		DATE : 3/26/10
CHECKED BY : R. P. PATEL		DATE : 4/15/10
DRAWN BY : EEM 6/94	REV. 10/17/00	LES/RDR
CHECKED BY : RGW 6/94	REV. 5/7/03R	RWW/JTE
	REV. 5/1/06	TLA/GM

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Finalplans\b4417_sd_2bmr.dgn
khcompton

STD. NO. BMR3



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(66 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.

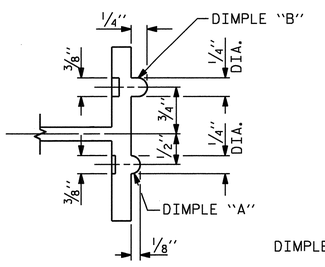
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

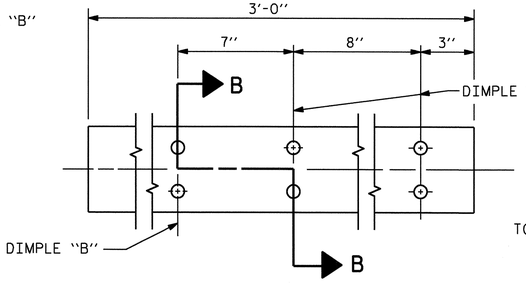
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

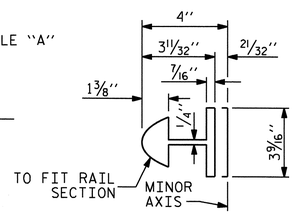
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

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.



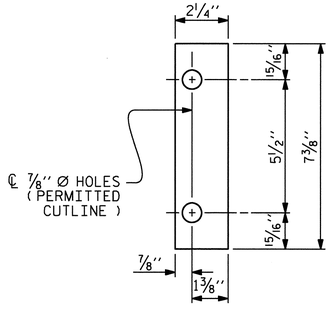
SECTION B - B



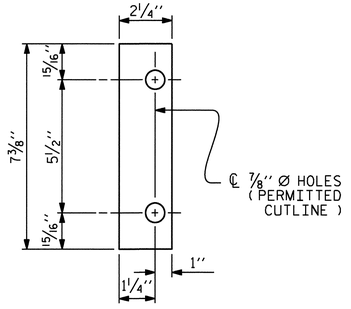


BAR SECTION

EXPANSION BAR DETAILS



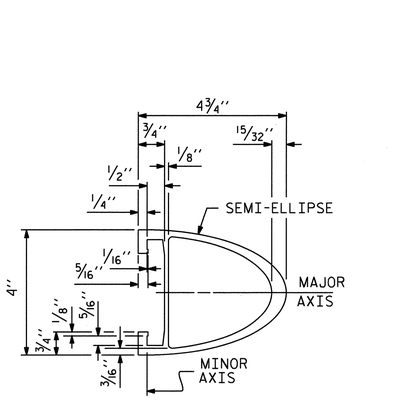
FRONT PLATE



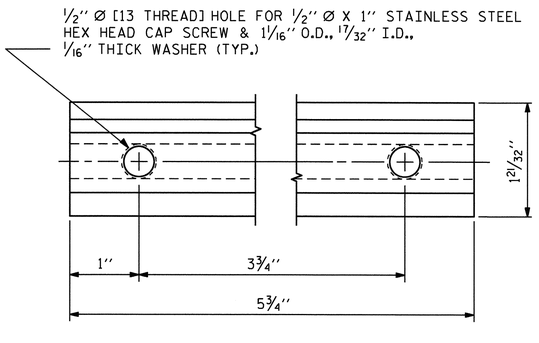
REAR PLATE

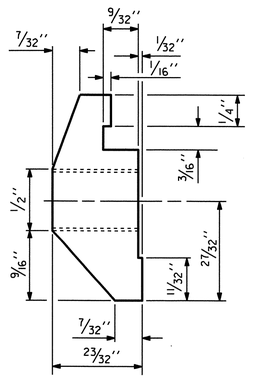
SHIM DETAILS

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



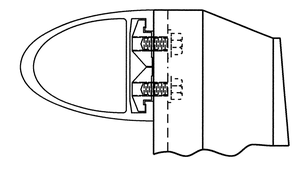
RAIL SECTION



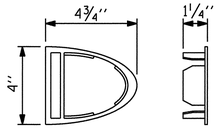


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

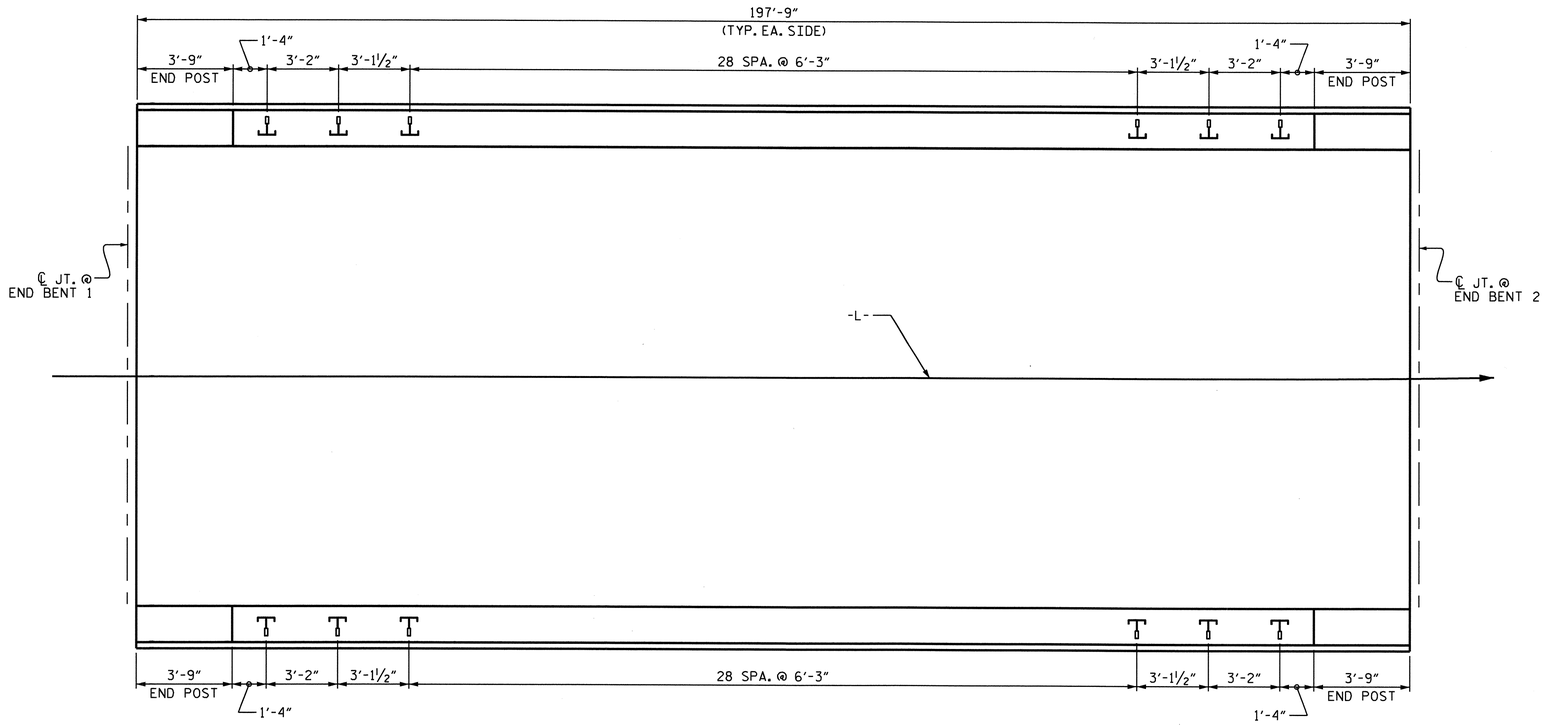
2 BAR METAL RAIL

ASSEMBLED BY : P. K. NEWTON		DATE : 3/26/10			
CHECKED BY : R. P. PATEL		DATE : 4/15/10			
DRAWN BY : EEM 6/94	REV. 2/6/97	EEM/RGW			
CHECKED BY : RGW 6/94	REV. 8/16/99	MAB/LES			
	REV. 5/1/06R	KMM/GM			

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			27

STD. NO. BMR4

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Finalplans\b4417_sd_2bmr.dgn
khcampton



PLAN OF RAIL POST SPACINGS

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

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

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

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

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

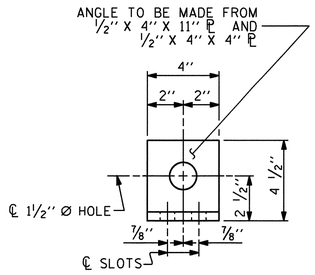
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

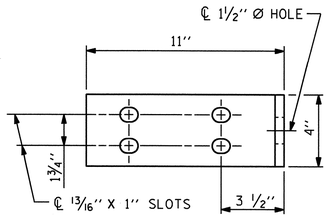
THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

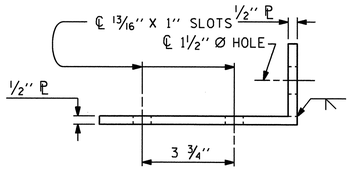
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE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



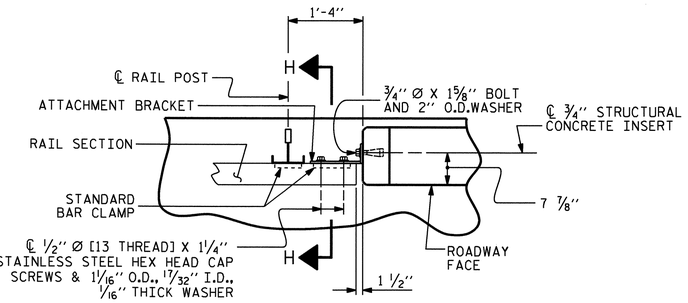
END VIEW



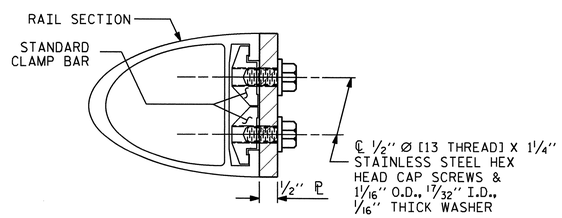
ELEVATION



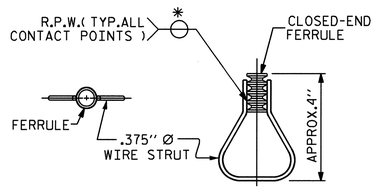
TOP VIEW



PLAN - RAIL AND END POST



SECTION H-H



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER P. KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS
FOR TWO BAR METAL RAILS

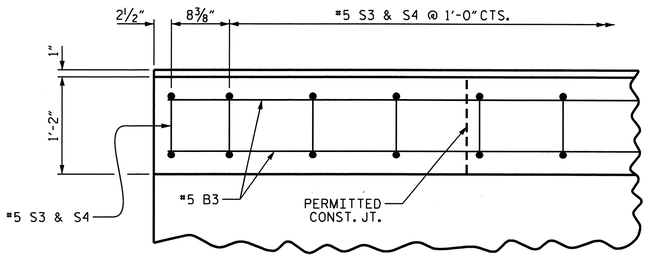
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			27

ASSEMBLED BY : P. K. NEWTON	DATE : 3/26/10	
CHECKED BY : R. P. PATEL	DATE : 4/15/10	
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

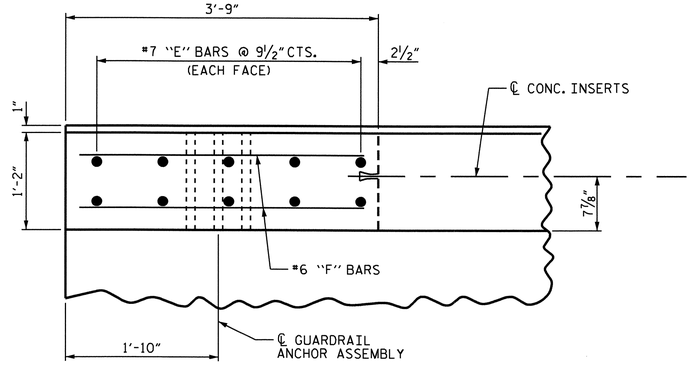
DETAILS FOR ATTACHING METAL RAIL TO END POST

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_2bmr.dgn
khcompton

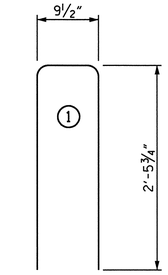
STD. NO. BMR2



PLAN OF PARAPET



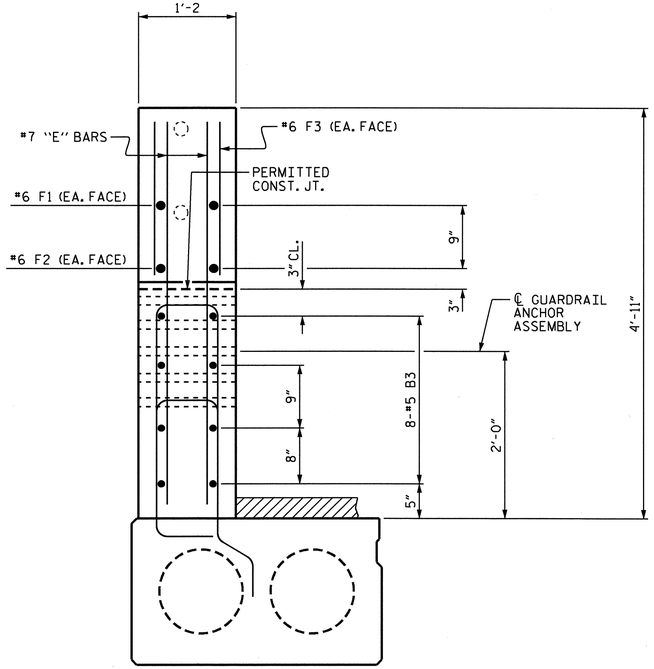
PLAN OF END POST

BAR TYPE	BILL OF MATERIAL				
	2 PARAPETS AND 4 END POSTS				
	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
	✱B3	64	#5	STR	24'-0"	1602
	✱B4	64	#5	STR	24'-7"	1641
	✱E1	8	#7	STR	2'-8"	44
	✱E2	8	#7	STR	3'-2"	52
	✱E3	8	#7	STR	3'-8"	60
	✱E4	8	#7	STR	4'-2"	68
	✱E5	8	#7	STR	4'-7"	75
	✱F1	8	#6	STR	1'-9"	21
	✱F2	8	#6	STR	2'-11"	35
	✱F3	8	#6	STR	3'-6"	42
	✱S4	404	#5	1	5'-9"	2423
	✱EPOXY COATED REINFORCING STEEL			LBS.		6063
	CLASS AA CONCRETE			CU. YDS.		46.8
	1'-2"X 2'-9" CONCRETE PARAPET			LIN. FT.		395.5

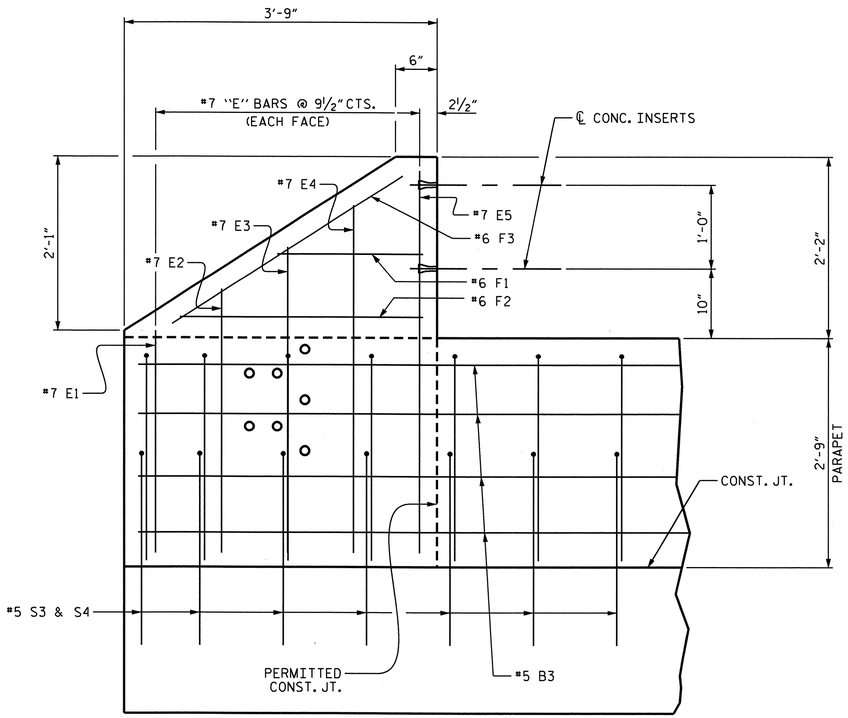
ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

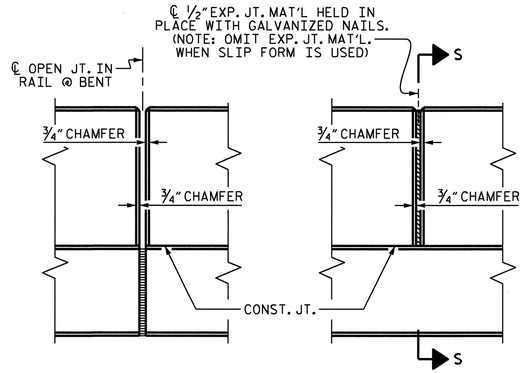
THE REINFORCING STEEL & CONCRETE IN THE END POSTS IS INCLUDED IN THE UNIT PRICE BID FOR THE CONCRETE PARAPET.



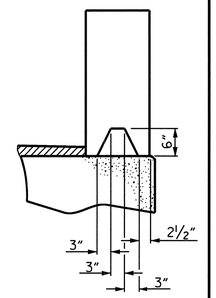
END VIEW



ELEVATION

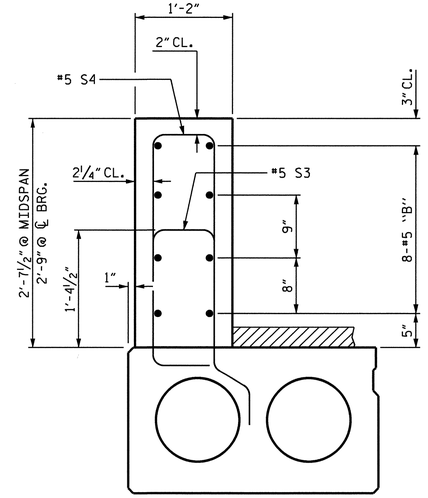


ELEVATION AT EXPANSION JOINTS



SECTION S-S

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



TWO BAR METAL
RAIL PARAPET SECTION

NORTH CAROLINA PROFESSIONAL SEAL 26948 ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

1'-2" X 2'-9" CONCRETE PARAPET AND END POST

PARAPET AND END POST FOR TWO BAR METAL RAIL

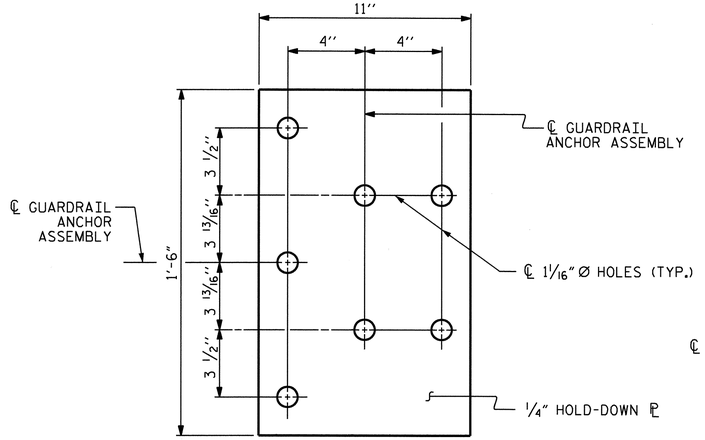
END BENT 1 SHOWN, END BENT 2 SIMILAR.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			27

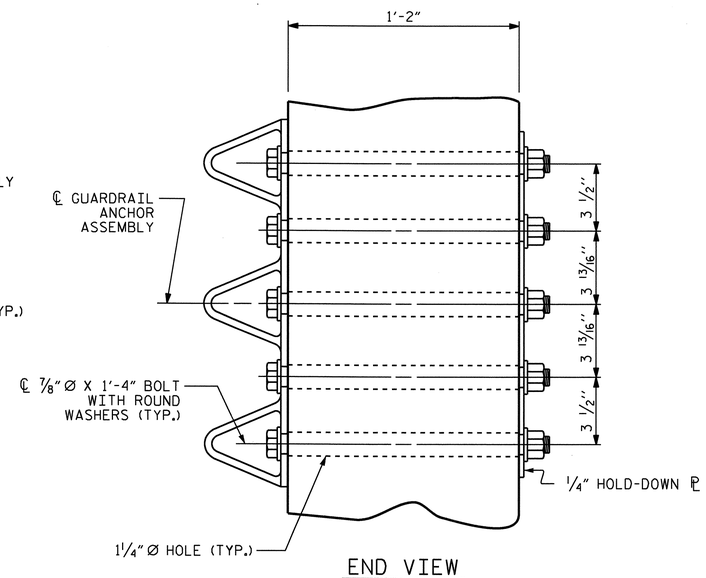
DRAWN BY : P. K. NEWTON DATE : 3/25/10
CHECKED BY : RAMAN PATEL DATE : 4/15/10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_2bmr.dgn
khcompton

NC005



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

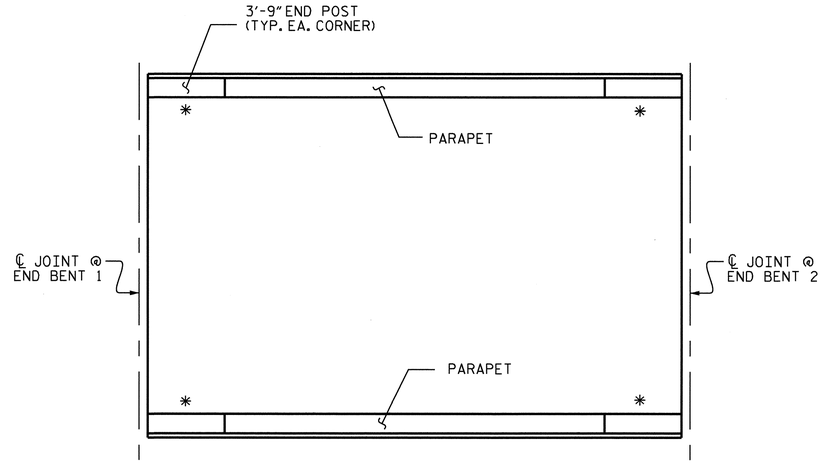
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8'' Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

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

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

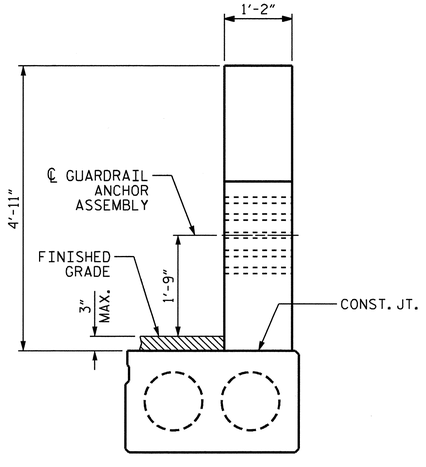
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

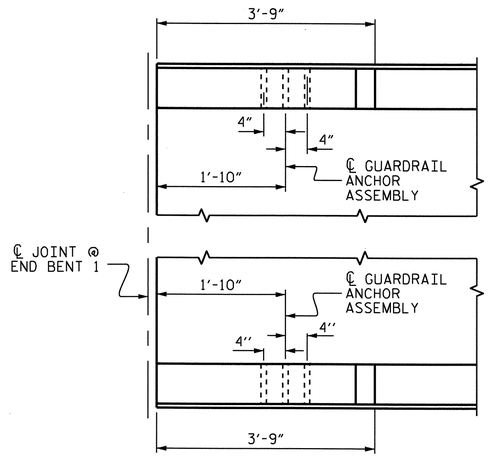


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

END BENT 1 SHOWN, END BENT 2 SIMILAR

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER P. K. NEWTON

12/6/2010

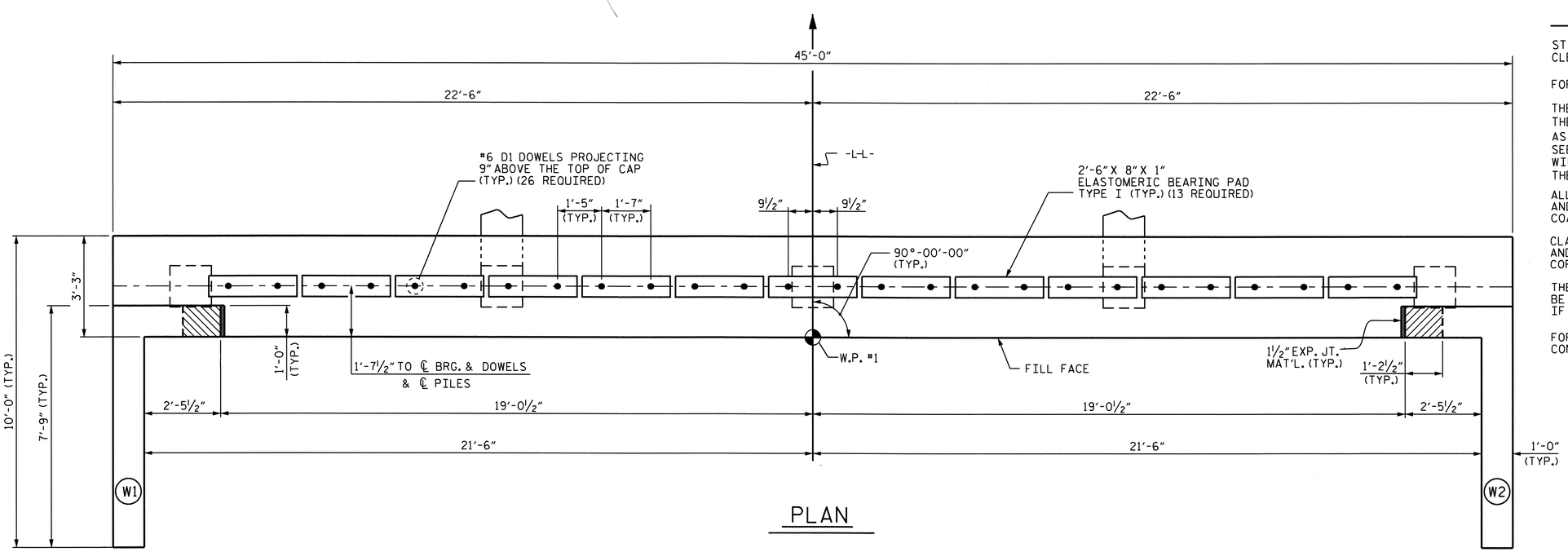
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE DETAILS FOR 2 BAR METAL RAIL

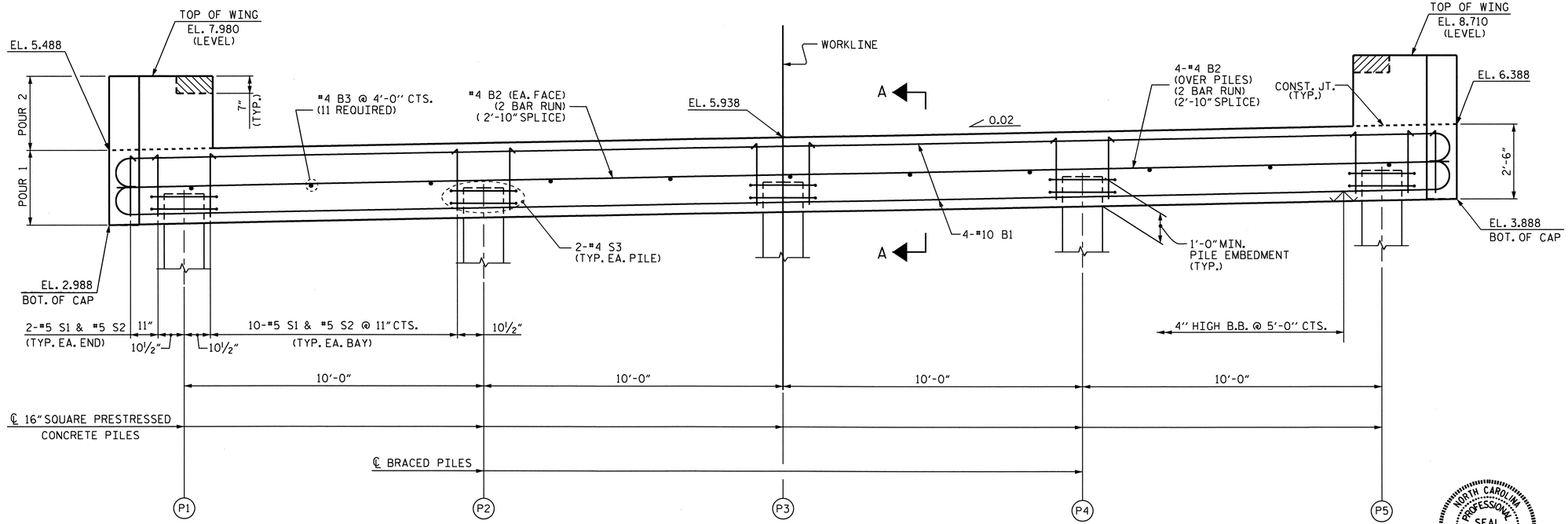
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			27

ASSEMBLED BY : P. K. NEWTON	DATE : 3/26/10	
CHECKED BY : R. P. PATEL	DATE : 4/15/10	
DRAWN BY : EEM 6/94	REV. 10/17/00	RWW/LES
CHECKED BY : RGW 6/94	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_2bmr.dgn
khcompton



PLAN



ELEVATION

NOTES

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

FOR TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

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.

ALL BAR SUPPORTS USED IN THE END BENT CAP AND WINGS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

CLASS AA CONCRETE SHALL BE USED IN END BENT CAP AND WINGS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBTOR.

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.

FOR 16" PRESTRESSED CONCRETE PILES, SEE 16" PRESTRESSED CONCRETE PILE SHEET.

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
P1	4.038
P2	4.238
P3	4.438
P4	4.638
P5	4.838

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

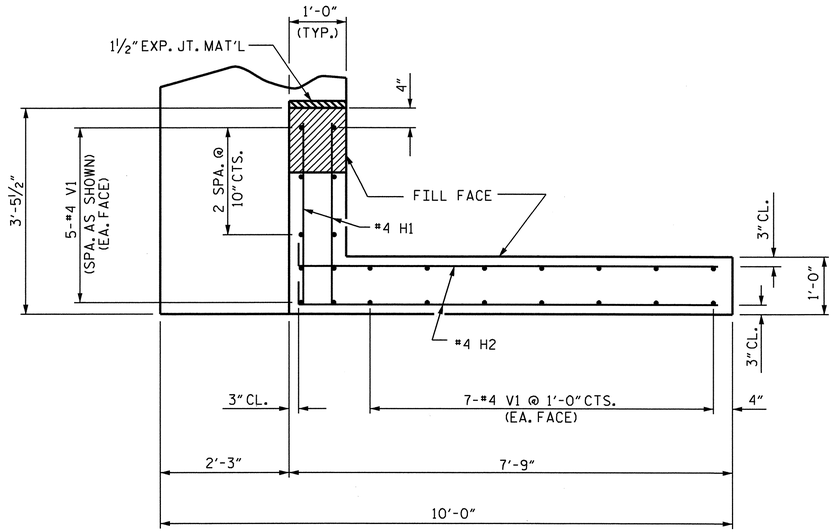
NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN R. PATEL

1-18-11

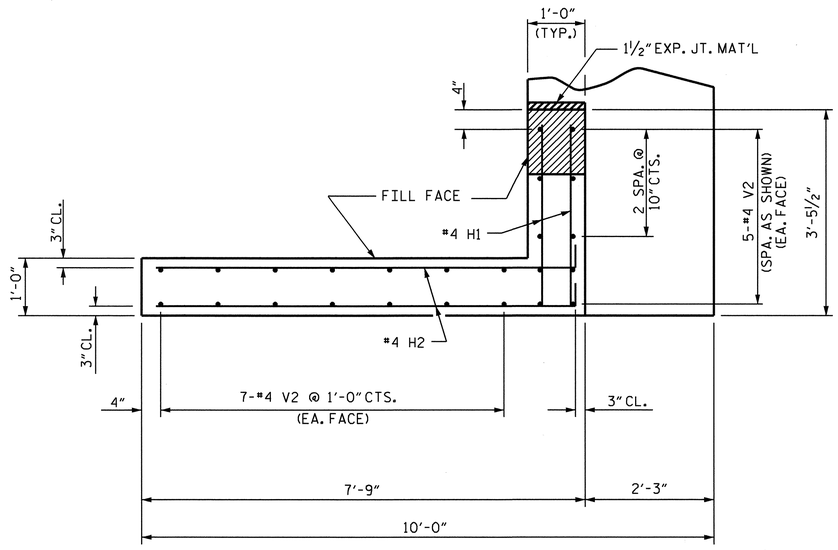
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : R. P. PATEL DATE : 3-4-09
CHECKED BY : E. I. OMILE DATE : 10-8-10

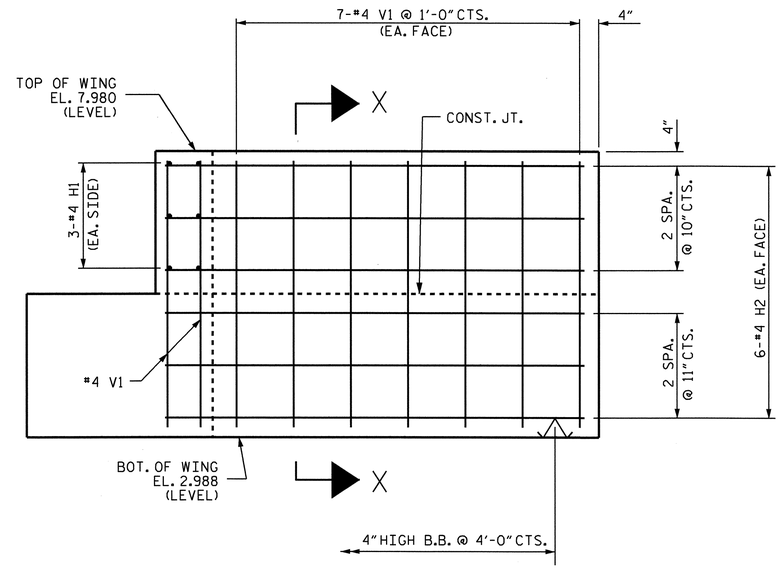
14-JAN-2011 15:45
K:\TIPProjects-B\B4417\Structures\B4417\Final plans\b4417_sd_e*.dgn
tfang



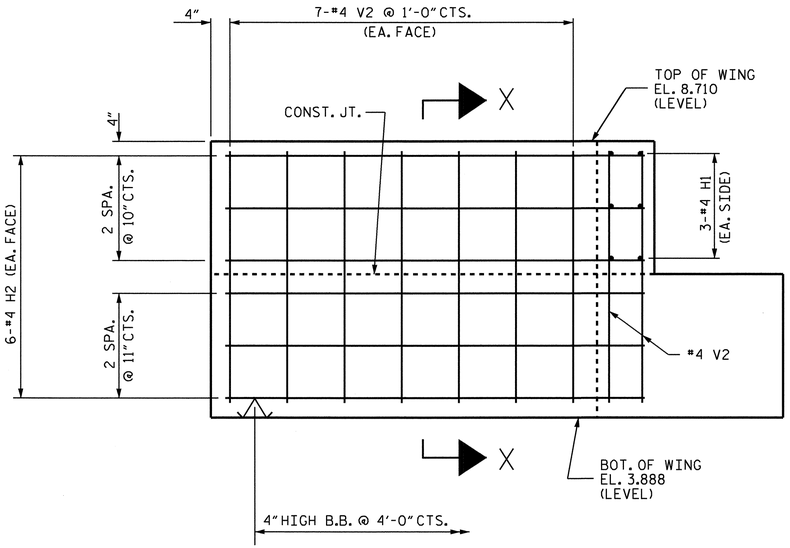
PLAN OF WING (W1)



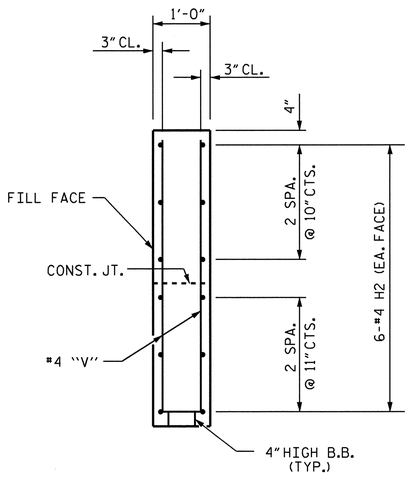
PLAN OF WING (W2)



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

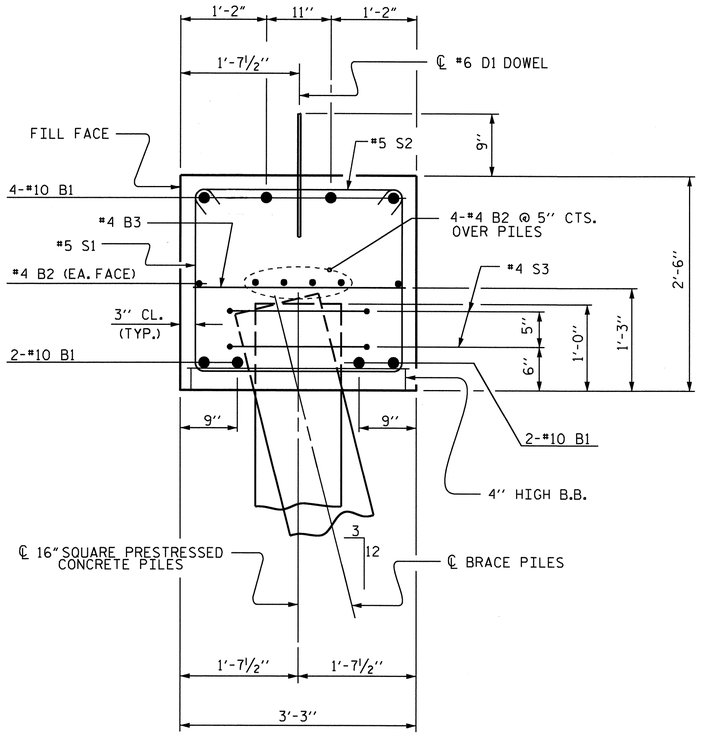
NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN P. PATEL

1-18-11

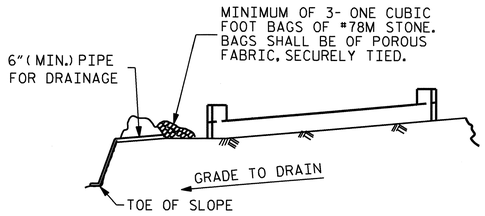
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : R. P. PATEL DATE : 3-4-09
CHECKED BY : E. I. OMILE DATE : 10-8-10

14-JAN-2011 15:52
K:\TIPProjects-B\B4417\Structures\B4417\Finalplans\b4417_sd_e*.dgn
ttfang



SECTION A-A



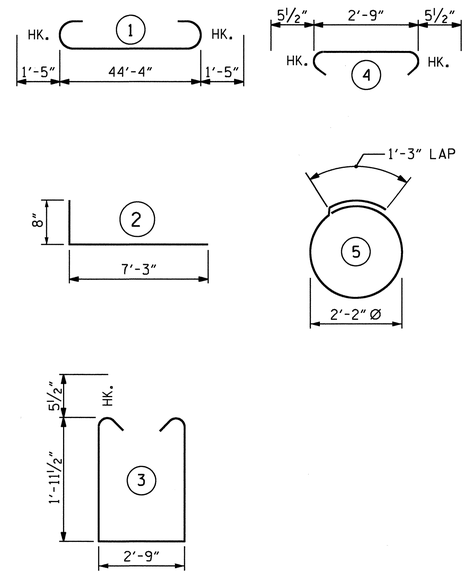
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	8	#10	1	47'-2"	1624
✳B2	12	#4	STR	23'-6"	188
✳B3	11	#4	STR	2'-9"	20
✳D1	26	#6	STR	1'-6"	59
✳H1	12	#4	STR	2'-11"	23
✳H2	24	#4	2	7'-11"	127
✳S1	44	#5	3	7'-7"	348
✳S2	44	#5	4	3'-8"	168
✳S3	10	#4	5	8'-1"	54
✳V1	24	#4	STR	4'-5"	71
✳V2	24	#4	STR	4'-3"	68

✳EPOXY COATED REINFORCING STEEL 2750 LBS.

CLASS AA CONCRETE BREAKDOWN:

POUR #1 (CONCRETE CAP, LOWER WINGS)	14.5 C.Y.
POUR #2 (UPPER WINGS)	1.8 C.Y.
TOTAL CLASS AA CONCRETE	16.3 C.Y.

16" PRESTRESSED CONCRETE PILES

NO. 5	350 LIN. FT.
PILE REDRIVES	5 EA.

CONCRETE DISPLACED BY 16" P/S PILES HAS BEEN DEDUCTED FROM CONCRETE TOTAL

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			27

NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN P. PATEL
12-6-10

DRAWN BY : R. P. PATEL DATE : 3-4-09
CHECKED BY : E. I. OMILE DATE : 10-8-10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Finalplans\b4417_sd_e*.dgn
khcompton

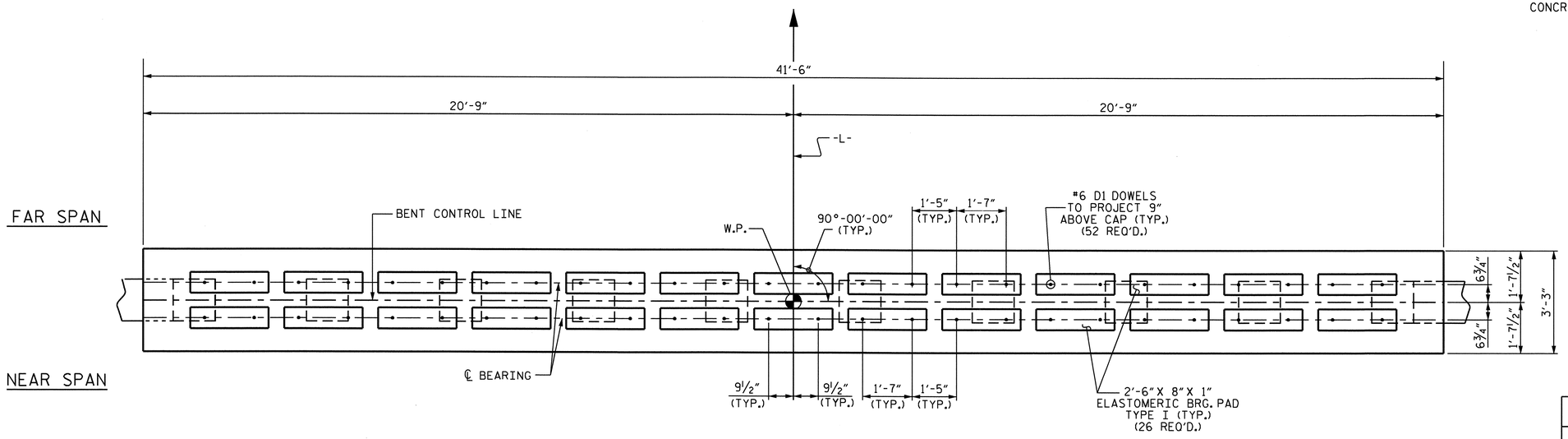
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #6 D1 DOWELS.

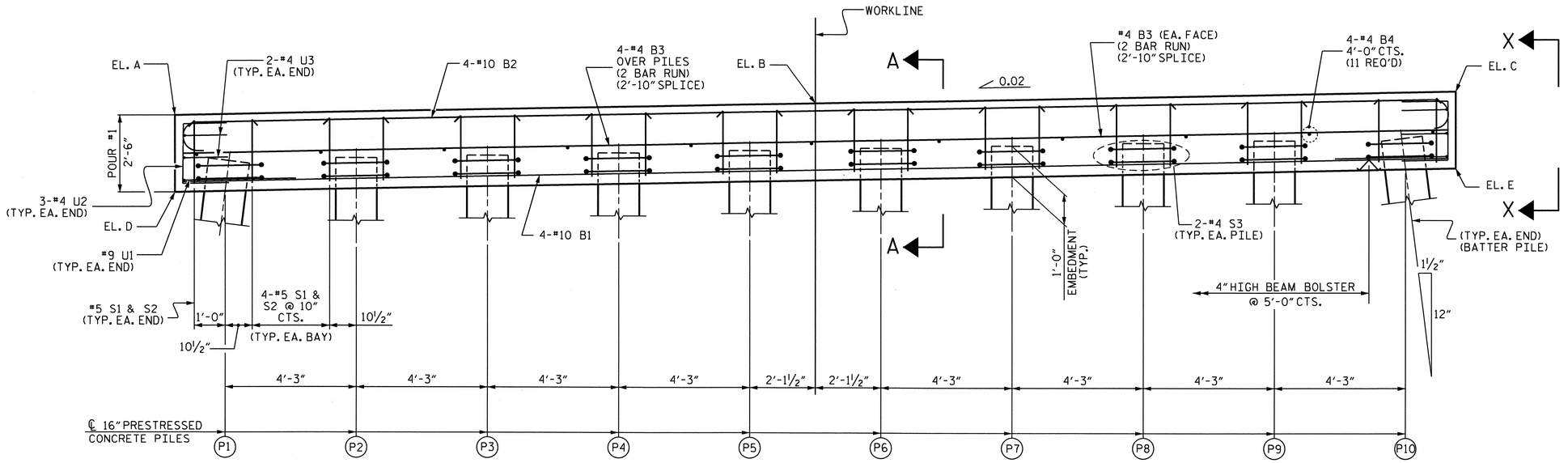
FOR 16" PRESTRESSED CONCRETE PILES, SEE 16" PRESTRESSED CONCRETE PILE SHEET.

ELEVATIONS @ TOP OF PILES			
	BENT 1	BENT 2	BENT 3
P1	4.247	4.312	4.243
P2	4.332	4.397	4.328
P3	4.417	4.482	4.413
P4	4.502	4.567	4.498
P5	4.587	4.652	4.583
P6	4.672	4.737	4.668
P7	4.757	4.822	4.753
P8	4.842	4.907	4.838
P9	4.927	4.992	4.923
P10	5.012	5.077	5.008

CAP ELEVATIONS			
ELEV. PT.	BENT 1	BENT 2	BENT 3
"A"	5.713	5.780	5.710
"B"	6.128	6.195	6.124
"C"	6.543	6.610	6.539
"D"	3.213	3.280	3.210
"E"	4.043	4.110	4.040



PLAN



ELEVATION

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

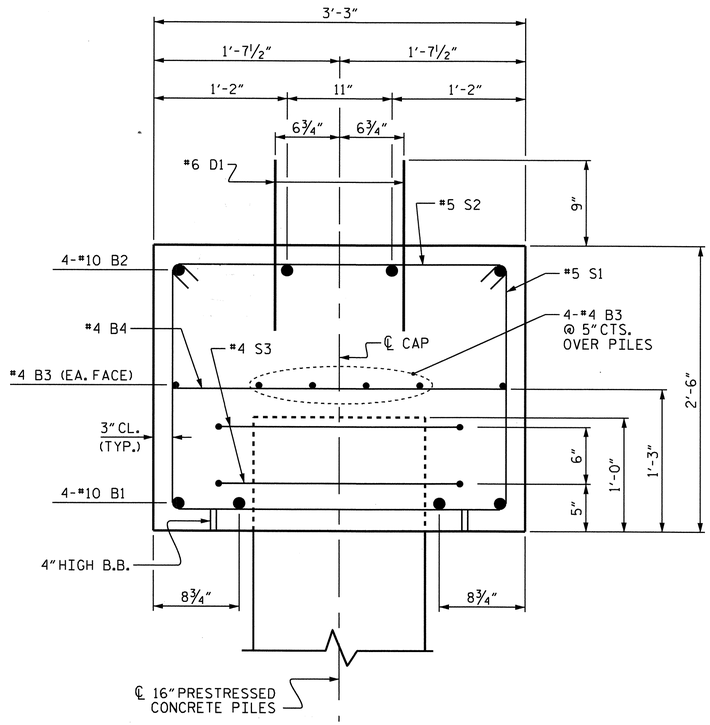
BENTS 1, 2 & 3

NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN P. PATEL
1-18-11

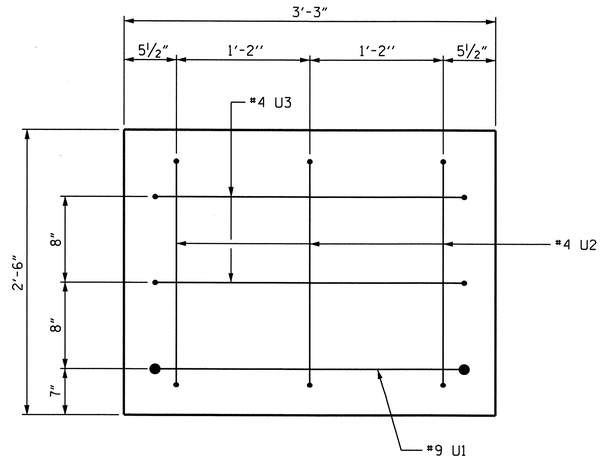
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : RAMAN PATEL DATE : 4-16-10
CHECKED BY : E. I. OMILE DATE : 10-8-10

14-JAN-2011 15:01
K:\TIPProjects-B\B4417\Structures\B4417\Final plans\B4417_sd_B*.dgn
ttfang



SECTION A-A



SECTION X-X

BILL OF MATERIAL

FOR ONE BENT (3 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	4	#10	STR	41'-0"	706
✱B2	4	#10	1	43'-10"	754
✱B3	12	#4	STR	21'-11"	176
✱B4	11	#4	STR	2'-9"	20
✱D1	52	#6	STR	1'-6"	117
✱S1	38	#5	2	7'-7"	301
✱S2	38	#5	3	3'-8"	145
✱S3	20	#4	4	8'-1"	108
✱U1	2	#9	5	9'-11"	67
✱U2	6	#4	5	4'-10"	19
✱U3	4	#4	5	5'-7"	15

✱EPOXY COATED
REINFORCING STEEL = 2428 LBS

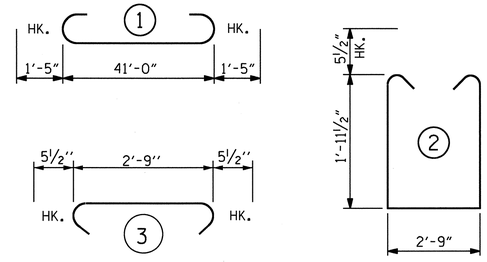
CLASS AA CONCRETE BREAKDOWN
POUR #1 (CAP) C.Y. 11.8
TOTAL CLASS AA CONCRETE C.Y. 11.8

16" SQUARE PRESTRESSED CONCRETE PILES

	NO.	LIN. FT.	PILE REDRIVES
BENT 1	10	750	10
BENT 2	10	750	10
BENT 3	10	700	10

CONCRETE DISPLACED BY 16"P/S PILES
HAS BEEN DEDUCTED FROM CONCRETE TOTAL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-4417
BEAUFORT COUNTY
STATION: 16+85.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

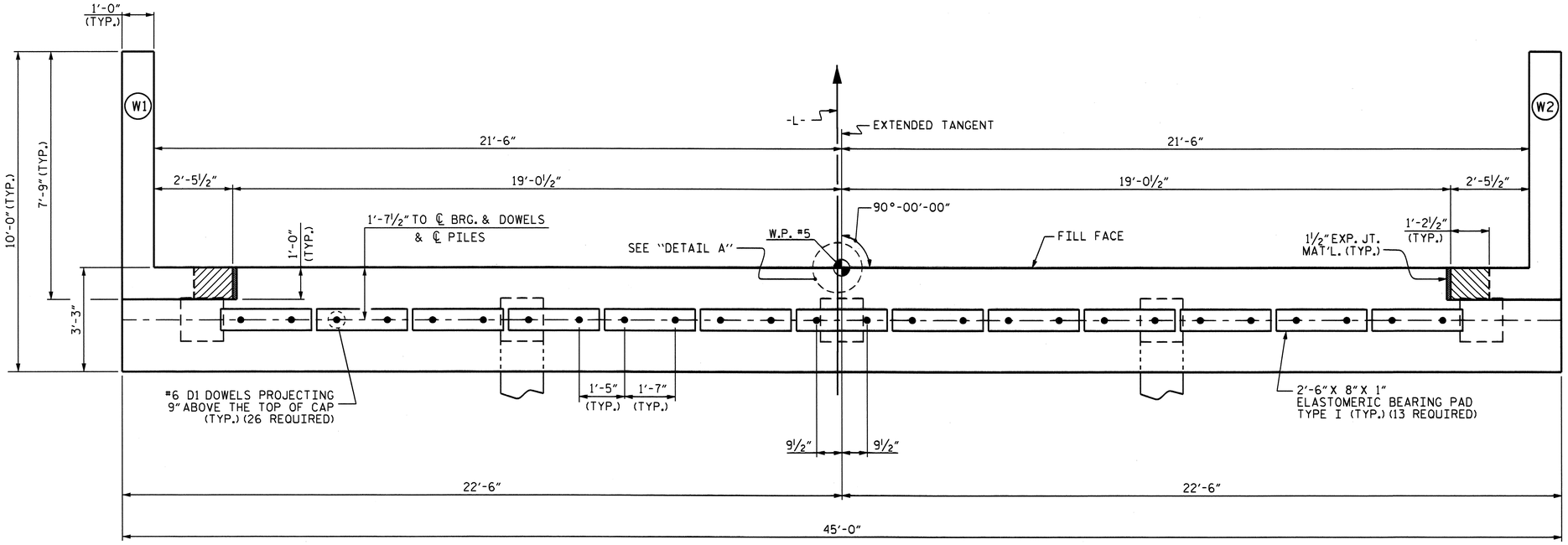
BENTS 1, 2 & 3

NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN P. PATEL
12-6-10

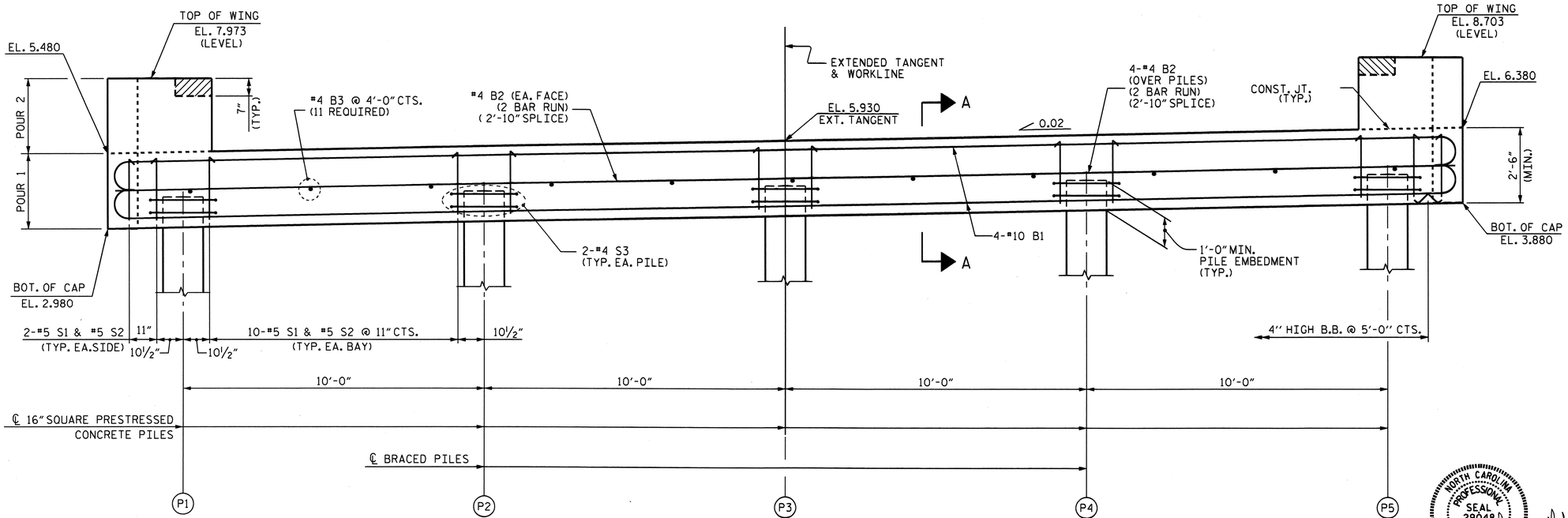
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : RAMAN PATEL DATE : 4-16-10
CHECKED BY : E. I. OMILE DATE : 10-8-10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\B4417_sd_B*.dgn
khcompton



PLAN



ELEVATION

NOTES

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

FOR TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

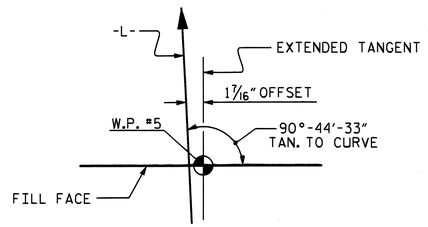
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

ALL BAR SUPPORTS USED IN THE END BENT CAP AND WINGS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

CLASS AA CONCRETE SHALL BE USED IN END BENT CAP AND WINGS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBTOR.

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.

FOR 16" PRESTRESSED CONCRETE PILES, SEE 16" PRESTRESSED CONCRETE PILE SHEET.



DETAIL A

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
P1	4.030
P2	4.230
P3	4.430
P4	4.630
P5	4.830

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

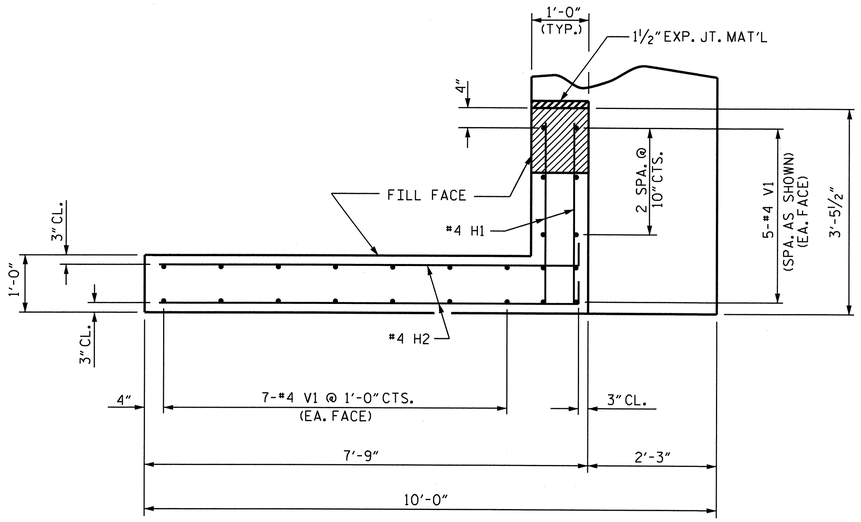
END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN P. PATEL
1-18-11

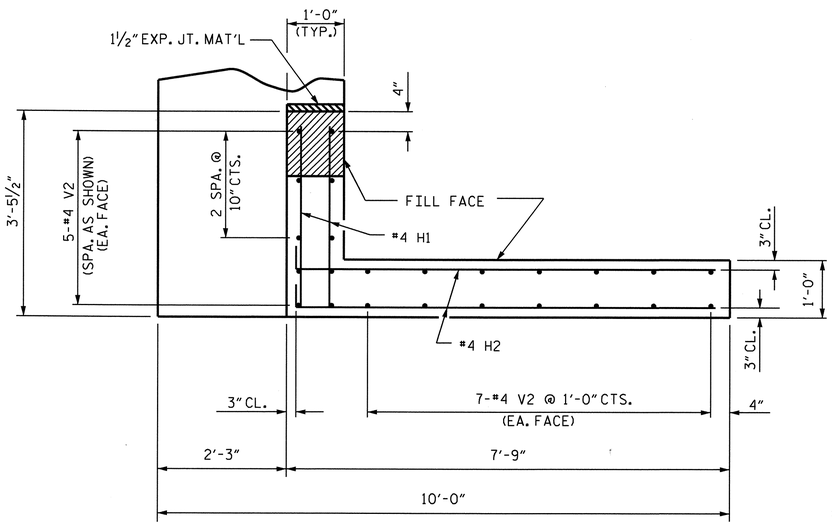
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : R. P. PATEL DATE : 3-4-09
CHECKED BY : E. I. OMILE DATE : 10-8-10

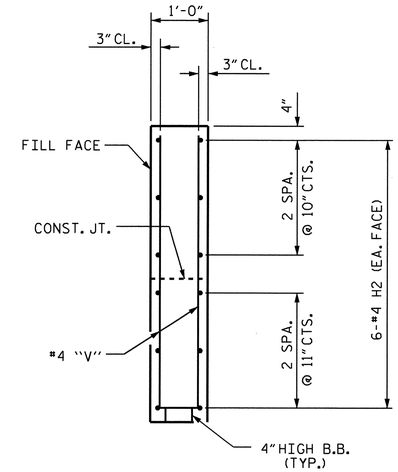
18-JAN-2011 11:10
K:\TIPProjects-B\B4417\Structures\B4417\Finalplans\b4417_sd_e*.dgn
tfang



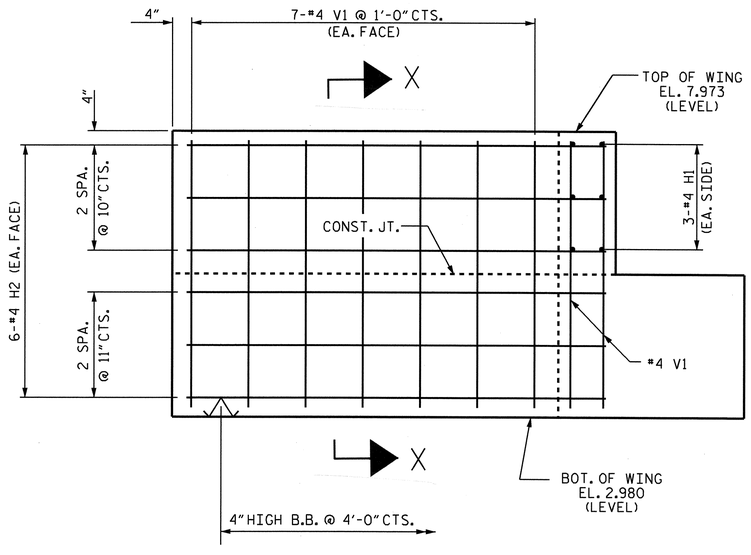
PLAN OF WING (W1)



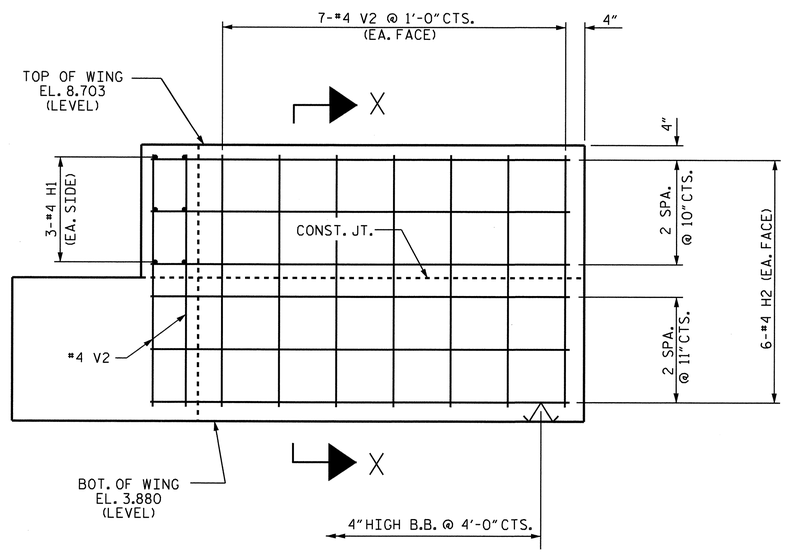
PLAN OF WING (W2)



SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAMAN P. PATEL

12-6-10

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

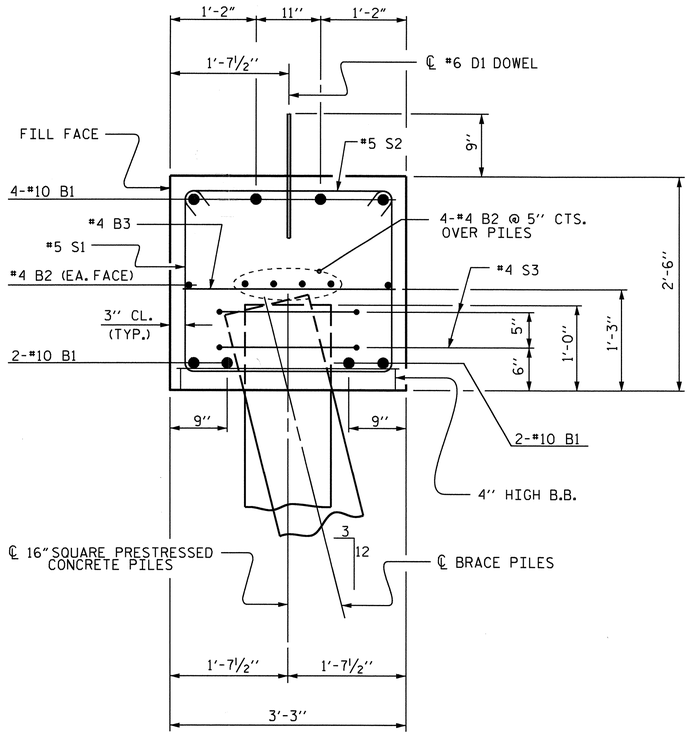
SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			27

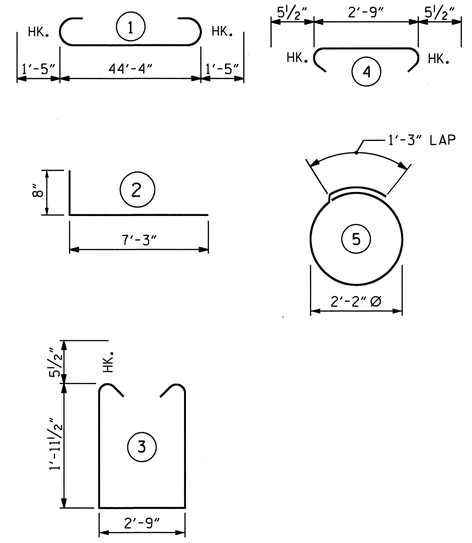
DRAWN BY : R. P. PATEL DATE : 3-4-09
CHECKED BY : E. I. OMILE DATE : 10-8-10

06-DEC-2010 13:22
Z:\Structures\B4417\Final plans\b4417_sd_e*.dgn
RPPATEL



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	8	#10	1	47'-2"	1624
✱B2	12	#4	STR	23'-6"	188
✱B3	11	#4	STR	2'-9"	20
✱D1	26	#6	STR	1'-6"	59
✱H1	12	#4	STR	2'-11"	23
✱H2	24	#4	2	7'-11"	127
✱S1	44	#5	3	7'-7"	348
✱S2	44	#5	4	3'-8"	168
✱S3	10	#4	5	8'-1"	54
✱V1	24	#4	STR	4'-5"	71
✱V2	24	#4	STR	4'-3"	68

✱EPOXY COATED REINFORCING STEEL 2750 LBS.

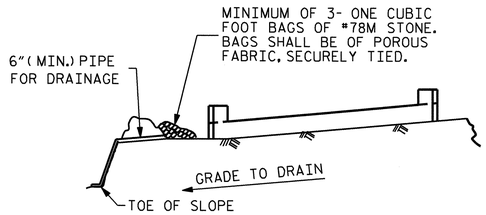
CLASS AA CONCRETE BREAKDOWN:

POUR #1 (CONCRETE CAP, CAP, LOWER WINGS) 14.5 C.Y.
POUR #2 (UPPER WINGS) 1.8 C.Y.
TOTAL CLASS AA CONCRETE: 16.3 C.Y.

16" PRESTRESSED CONCRETE PILES:

NO. 5 375 LIN. FT.
PILE REDRIVES 5 EA.

CONCRETE DISPLACED BY 16" P/S PILES HAS BEEN DEDUCTED FROM CONCRETE TOTAL



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

NORTH CAROLINA PROFESSIONAL SEAL 29048 ENGINEER RAJAN P. PATEL
12-6-10

PROJECT NO. B-4417
BEAUFORT COUNTY
STATION: 16+85.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

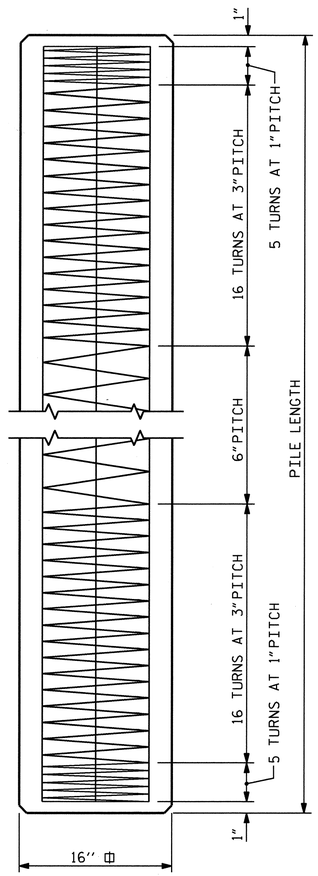
SUBSTRUCTURE

END BENT 2

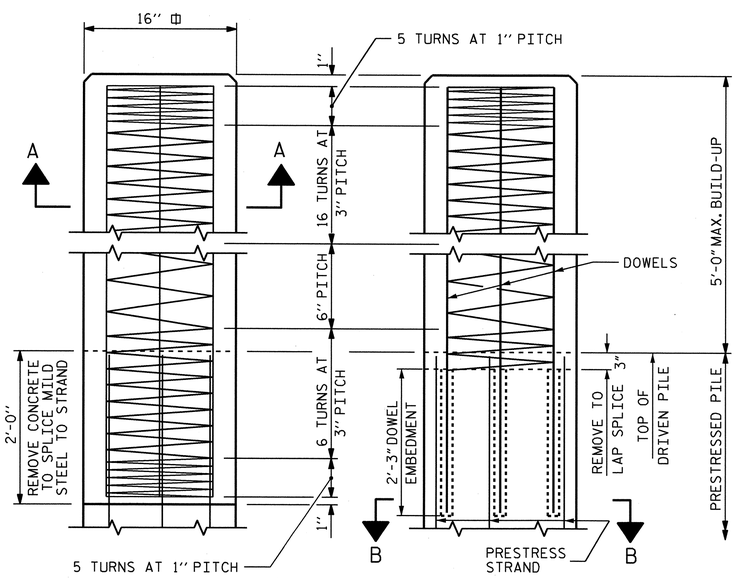
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : R. P. PATEL DATE : 3-4-09
CHECKED BY : E. I. OMILE DATE : 10-8-10

06-DEC-2010 12:59
B:\B4417\Structures\B4417\Final plans\b4417_sd_e*.dgn
khcompton

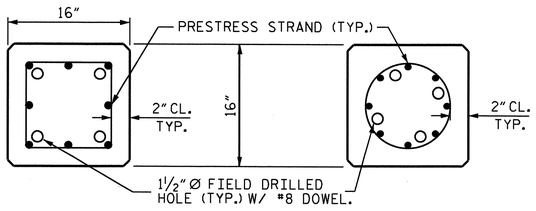


ELEVATION



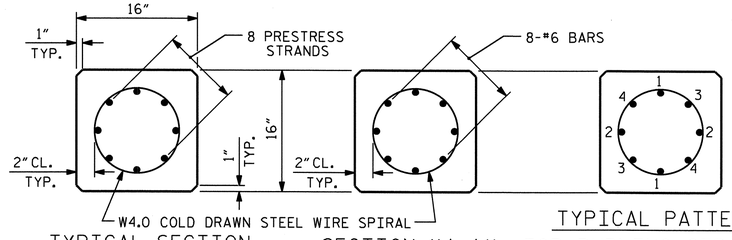
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



SECTION "B-B"

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)

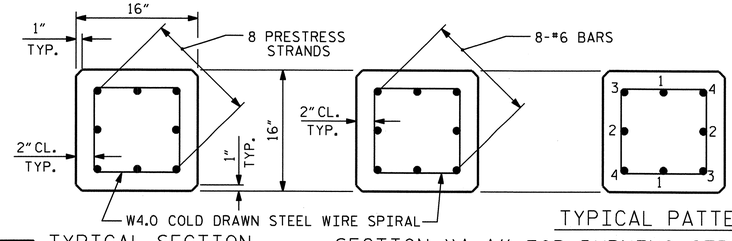


TYPICAL SECTION

SECTION "A-A"

TYPICAL PATTERN FOR BURNING STRANDS

½" OR 0.6"Ø GRADE 270 L.R. PRESTRESS STRANDS

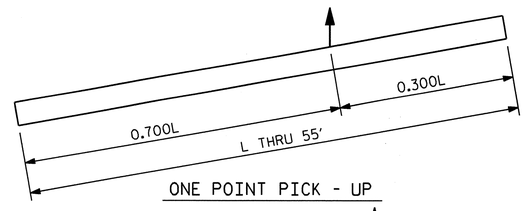


TYPICAL SECTION

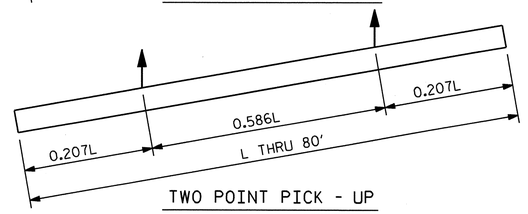
SECTION "A-A"

TYPICAL PATTERN FOR BURNING STRANDS

½" OR 0.6"Ø GRADE 270 L.R. PRESTRESS STRANDS



ONE POINT PICK - UP



TWO POINT PICK - UP

PICK - UP POINTS

QUANTITIES FOR ONE 16" PRESTRESSED PILE						
	CONCRETE	PILE WT.	ONE POINT PICK-UP		TWO POINT PICK-UP	
LENGTH	CU. YDS.	TONS	0.300L	0.700L	0.207L	0.586L
25'-0"	1.63	3.31	7'-6"	17'-6"	5'-2"	14'-8"
30'-0"	1.96	3.97	9'-0"	21'-0"	6'-2½"	17'-7"
35'-0"	2.29	4.63	10'-6"	24'-6"	7'-3"	20'-6"
40'-0"	2.61	5.29	12'-0"	28'-0"	8'-3½"	23'-5"
45'-0"	2.94	5.95	13'-6"	31'-6"	9'-4"	26'-4"
50'-0"	3.27	6.61	15'-0"	35'-0"	10'-4"	29'-4"
55'-0"	3.59	7.28	16'-6"	38'-6"	11'-4½"	32'-3"
60'-0"	3.92	7.94			12'-5"	35'-2"
65'-0"	4.25	8.60			13'-5½"	38'-1"
70'-0"	4.57	9.26			14'-6"	41'-0"
75'-0"	4.90	9.92			15'-6½"	43'-11"
80'-0"	5.23	10.58			16'-7"	46'-10"

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½"	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6"	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½" OR 0.6" STRANDS MAY BE USED IN EITHER STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

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

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 3-3 AND 4-4, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

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

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

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

FOR PRESTRESSED CONCRETE MEMBERS, SEE PROJECT SPECIAL PROVISIONS.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR, SEE STANDARD SPECIFICATIONS.

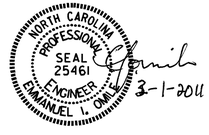
THE CONCRETE IN THE PRESTRESSED CONCRETE PILES IN BENTS 1, 2 & 3 SHALL CONTAIN SILICA FUME.

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

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

16" PRESTRESSED CONCRETE PILE

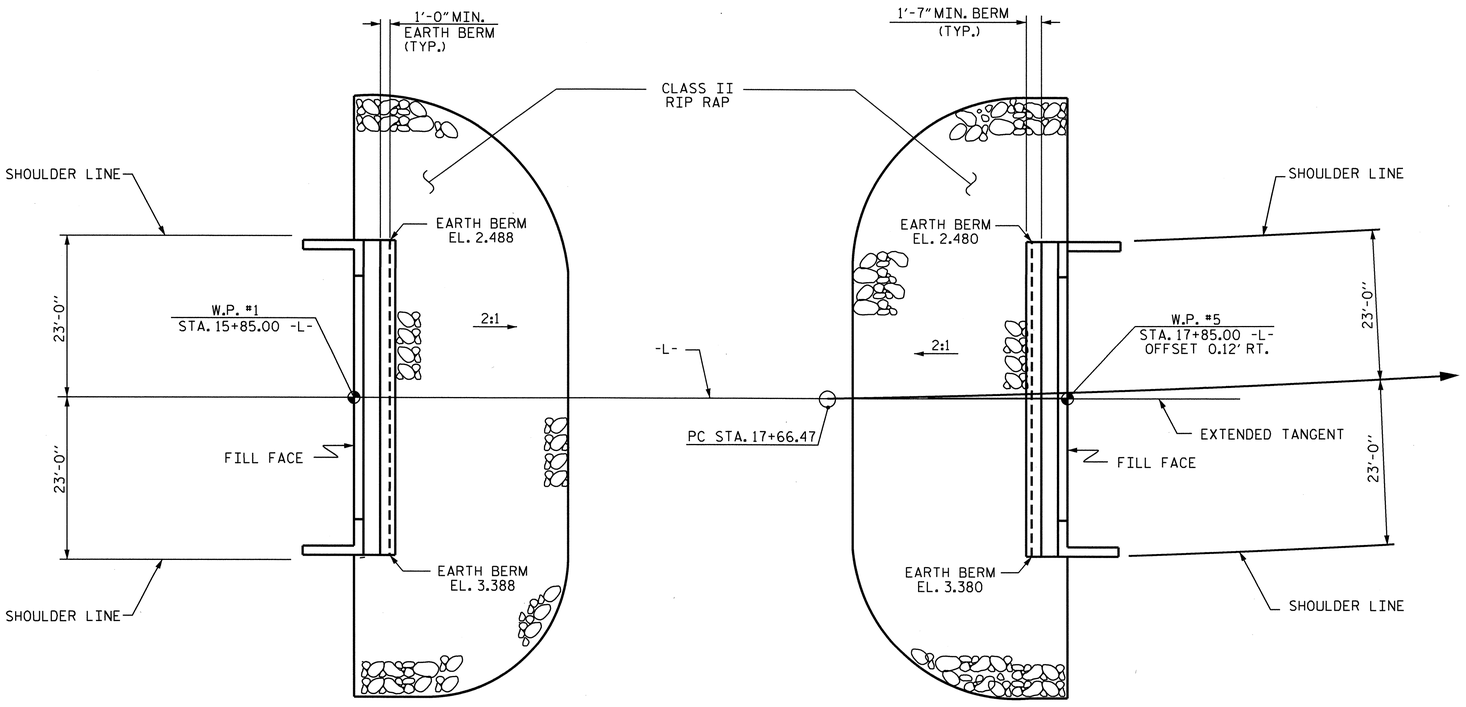
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			27

STD. NO. PCP2

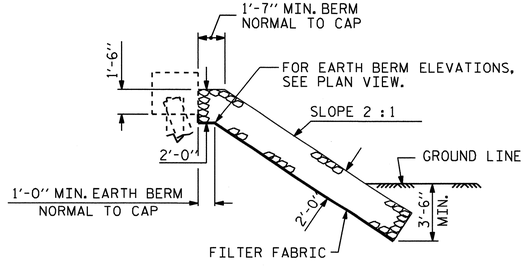
ASSEMBLED BY : RAMAN PATEL	DATE : 10-06-10	
CHECKED BY : E. I. OMILE	DATE : 10-08-10	
DRAWN BY : RH 9/98	REV. 8/16/99RR	RWW/LES
CHECKED BY : LES 10/98	REV. 5/1/06R	TLA/GM
	REV. 11/30/10	WMC/GM

01-MAR-2011 15:17
K:\TIPProjects-B\B4417\Structures\B4417\Finalplans\b4417_sd_e*.dgn
ttfang

ESTIMATED QUANTITIES		
BRIDGE @ STA 16+85.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	200	220
END BENT 2	200	220



PLAN



℄ SECTION
BERM RIP RAPPED

PROJECT NO. B-4417
BEAUFORT COUNTY
STATION: 16+85.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 22945 ENGINEER KOREY NEWTON

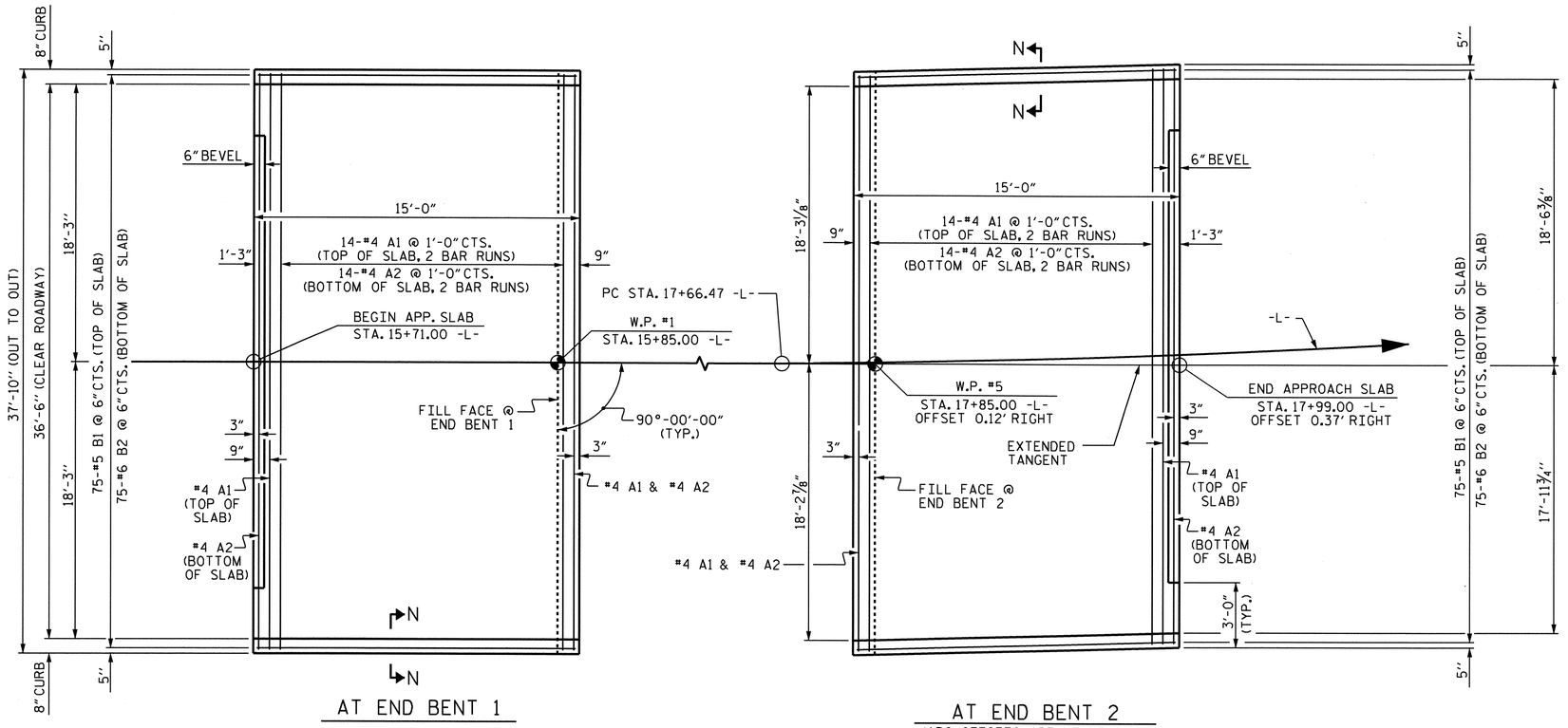
1/12/2011

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			27

ASSEMBLED BY : Z. H. BROWN	DATE : 5/21/09	
CHECKED BY : P. K. NEWTON	DATE : 7/21/09	
DRAWN BY : FCJ 2/88	REV. 8/16/99	RWW/LES
CHECKED BY : ARB 8/88	REV. 10/17/00	RWW/LES
	REV. 5/1/06	TLA/GM

12-JAN-2011 09:50
B:\B4417\Structures\B4417\Final plans\B-4417_sd_rr.dgn
kpnewton

STD. NO. RR2



PLAN OF APPROACH SLAB

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

BILL OF MATERIAL

AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	32	#4	STR	19'-9"	422
A2	32	#4	STR	19'-9"	422
✱B1	75	#5	STR	14'-0"	1095
B2	75	#6	STR	14'-6"	1633
REINFORCING STEEL				LBS.	2055
✱EPOXY COATED REINFORCING STEEL				LBS.	1517
CLASS AA CONCRETE				C.Y.	23.3

AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	32	#4	STR	19'-9"	422
A2	32	#4	STR	19'-9"	422
✱B1	75	#5	STR	14'-0"	1095
B2	75	#6	STR	14'-6"	1633
REINFORCING STEEL				LBS.	2055
✱EPOXY COATED REINFORCING STEEL				LBS.	1517
CLASS AA CONCRETE				C.Y.	23.3

NOTES

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

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

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

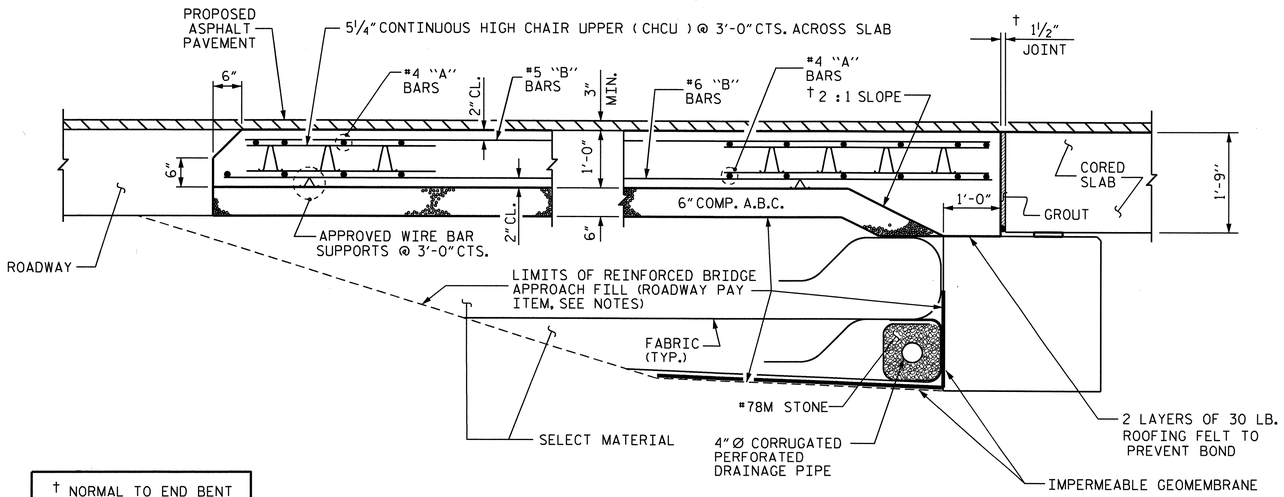
THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

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.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE CORED SLAB UNIT" SHEETS.

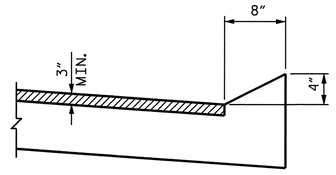
THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

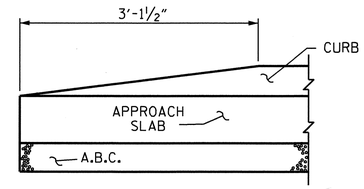


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER KOREY NEWTON

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

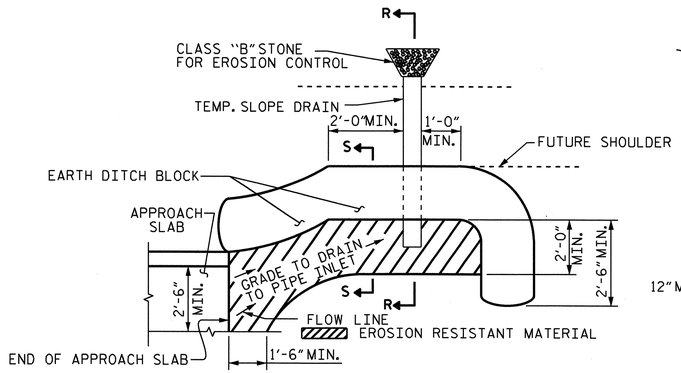
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			27

ASSEMBLED BY : Z. H. BROWN		DATE : 5/26/09	
CHECKED BY : P. K. NEWTON		DATE : 7/21/09	
DRAWN BY : FCJ 6/87	REV. 7/10/01	LES/RDR	
CHECKED BY : EGA 6/87	REV. 5/7/03R	RWW/JTE	
	REV. 5/1/06R	KMM/GM	

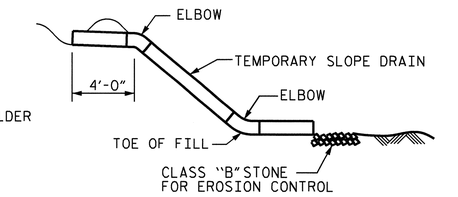
06-DEC-2010 12:58
B:\B4417\Structures\B4417\Final plans\B-4417_sd_as.dgn
khcompton

STD. NO. BAS7 (SHT 1)

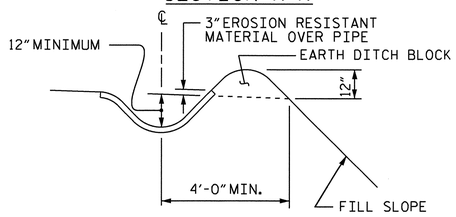


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



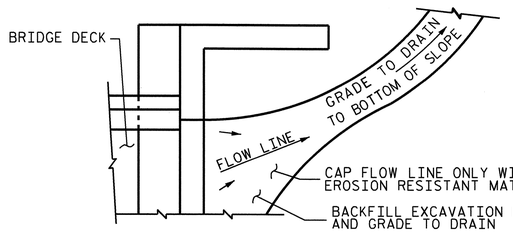
SECTION R-R



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

ASSEMBLED BY : Z. H. BROWN		DATE : 5/26/09	
CHECKED BY : P. K. NEWTON		DATE : 7/21/09	
DRAWN BY : FCJ 11/88	REV. 10/17/00	RWW/LES	
CHECKED BY : ARB 11/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06R	MAA/KMM	

NORTH CAROLINA PROFESSIONAL SEAL P. K. NEWTON ENGINEER

12/6/2010

PROJECT NO. B-4417

BEAUFORT COUNTY

STATION: 16+85.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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

STD. NO. BAS10

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 ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (W) RGW REV. 5-7-03 RWW (W) JTE
REV. 8-16-99 RWW (W) LES REV. 5-1-06 TLA (W) GW

30-NOV-2006 15:26
S:\Share\Structures Standards\Standards english 2006\sn_06.std
rblissette