TIP PROJECT: B-3680

CONTRACT: C202231

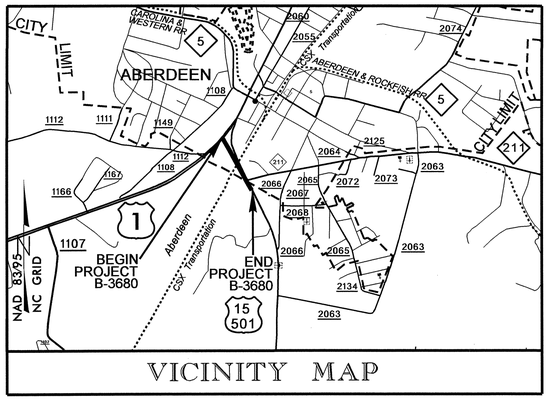
FILE: SFILES
DATE: SDATES STIMES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MOORE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3680		

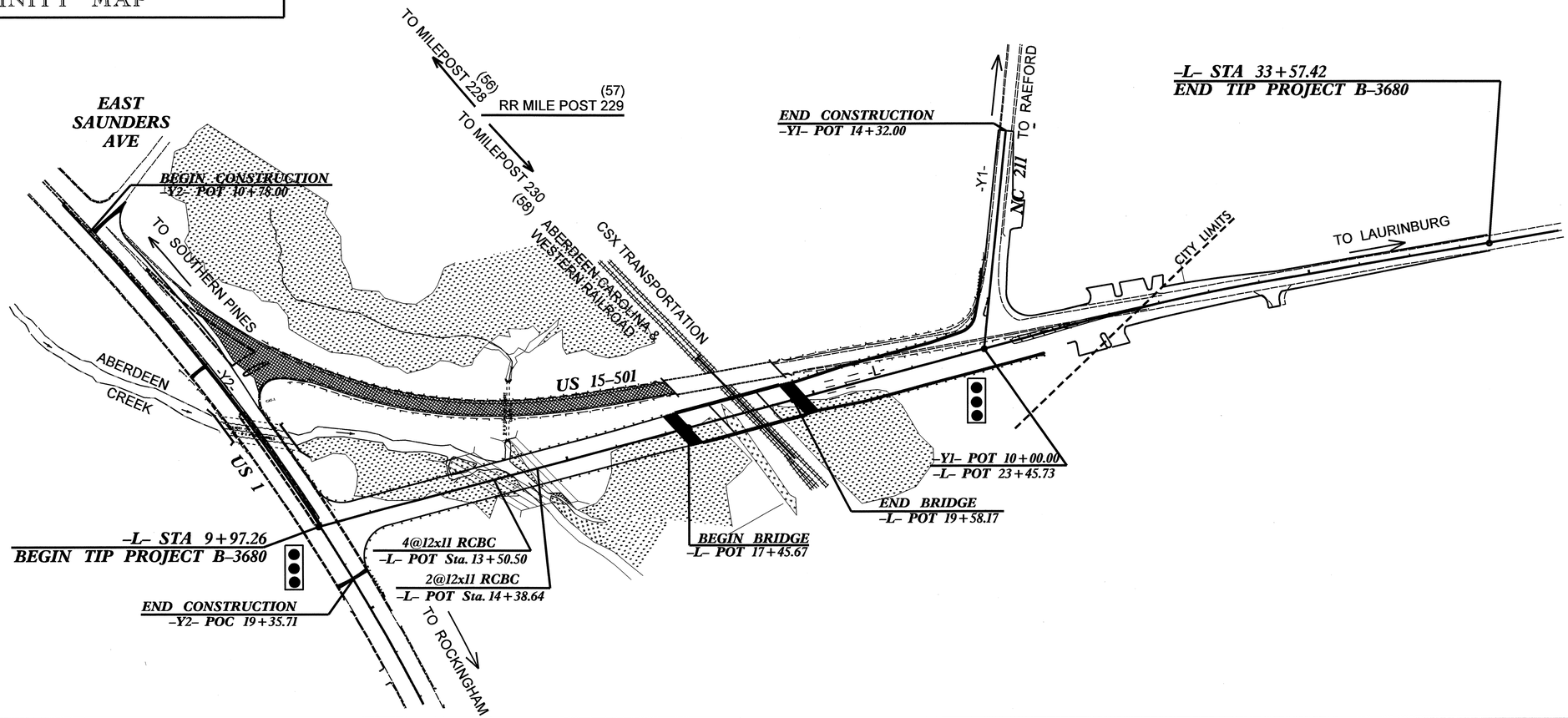
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33222.1.1	BRSTP-15(11)	P.E.
33222.2.1	BRSTP-15(11)	ROW & UTIL.
33222.3.1	BRSTP-15(25)	CONSTRUCTION



VICINITY MAP

LOCATION: US 15–501 BETWEEN US 1 AND NC 211

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNAL, STRUCTURE, & CULVERTS



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

URBAN ARTERIAL

ADT 2012	=	17,160
ADT 2032	=	23,560
DHV	=	10 %
D	=	55 %
T	=	11 % *
V	=	50 MPH

REGIONAL TIER

* (TTST 7 % + DUAL 4 %)

PROJECT LENGTH

LENGTH OF ROADWAY	=	0.407 MILES
LENGTH OF STRUCTURE	=	0.040 MILES
TOTAL LENGTH OF PROJECT	=	0.447 MILES

Prepared In the Office of:

DIVISON OF HIGHWAYS

1000 BIRCH RIDGE DR. RALEIGH, NC 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE:

AUGUST 21, 2012

O. R. AZIZI, PE
PROJECT ENGINEER

A. K. PASCHAL, PE
PROJECT DESIGN ENGINEER

STRUCTURE MANAGEMENT

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

F.A. PROJECT NO. : BRSTP-0015 (25)

FOR NOTES, SEE SHEET 4 OF 4.

17+00 17+50 18+00 18+50 19+00 19+50 20+00 20+50

+5.9200% -0.8800%

PI = 17+70.00 -L-
EL = 358.97'
VC = 600'

GRADE DATA

SPAN A SPAN B SPAN C

FILL FACE @ END BENT 1
STA. 17+45.67 -L-
GRADE PT. EL. 353.223

FILL FACE @ END BENT 2
STA. 19+58.17 -L-
GRADE PT. EL. 356.605

360 350 340 330 320 310

EXP. FIX. FIX. FIX. FIX. EXP.

1'-6" (TYP.)

4" SLOPE PROTECTION (TYP.)

TOP OF CRASHWALL EL. 331.167

℄ TRACK (ACWR)

℄ TRACK (CSX)

24'-4 1/8" MIN. VERT. CL.

1 1/2:1 SLOPE NORMAL TO CAP (TYP.)

1'-1" MIN. BERM (TYP.)

FILL

APPROX. NATURAL GROUND LINE

HP 12 X 53 STEEL PILES (TYP.)

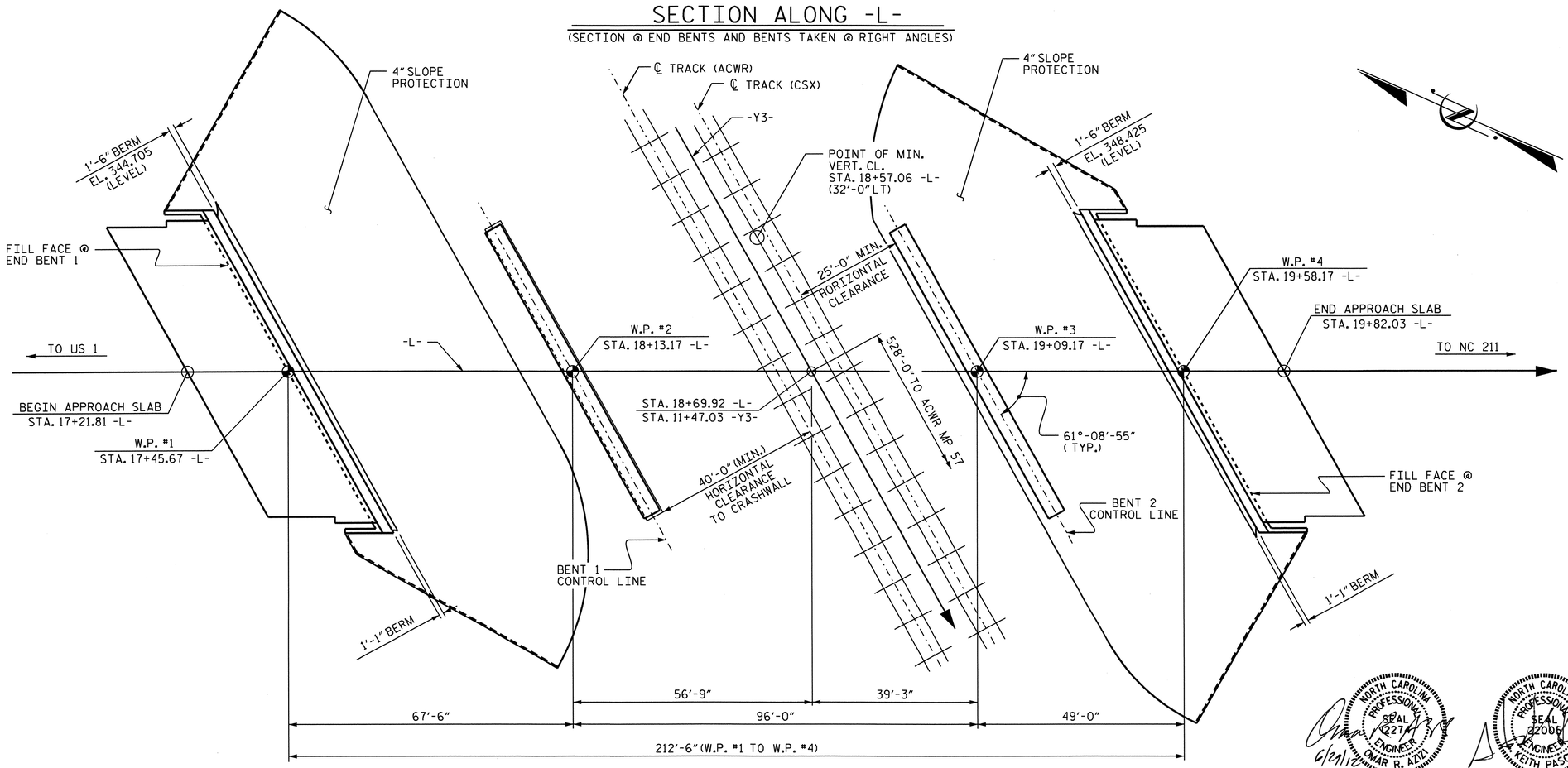
EL. 317.0 ± EL. 318.0 ± EL. 319.0 ± EL. 320.0 ± EL. 322.0 ± EL. 323.0 ± EL. 322.0 ± EL. 321.0 ± EL. 323.0 ± EL. 325.0 ± EL. 326.0 ±

PP 24 X 0.50 GALVANIZED STEEL PIPE PILES (TYP.)

END BENT 1 BENT 1 BENT 2 END BENT 2

SECTION ALONG -L-

(SECTION @ END BENTS AND BENTS TAKEN @ RIGHT ANGLES)



PLAN

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-
11+47.03 -Y3-

REPLACES BRIDGE NO. 2
CSX MP S 229.1 ACWR MP 56.9

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER
CSX AND ACW RR
ON US 15/501 BETWEEN
US 1 AND NC 211

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

NORTH CAROLINA PROFESSIONAL SEAL 22271 ENGINEER OMAR R. AZIZI
6/29/12

NORTH CAROLINA PROFESSIONAL SEAL 22066 ENGINEER A. KEITH PASCHAL
6/29/12

DRAWN BY : B.N.BARODAWALA DATE : 3-26-12
CHECKED BY : A. K. PASCHAL DATE : 4-2-12

29-JUN-2012 07:22
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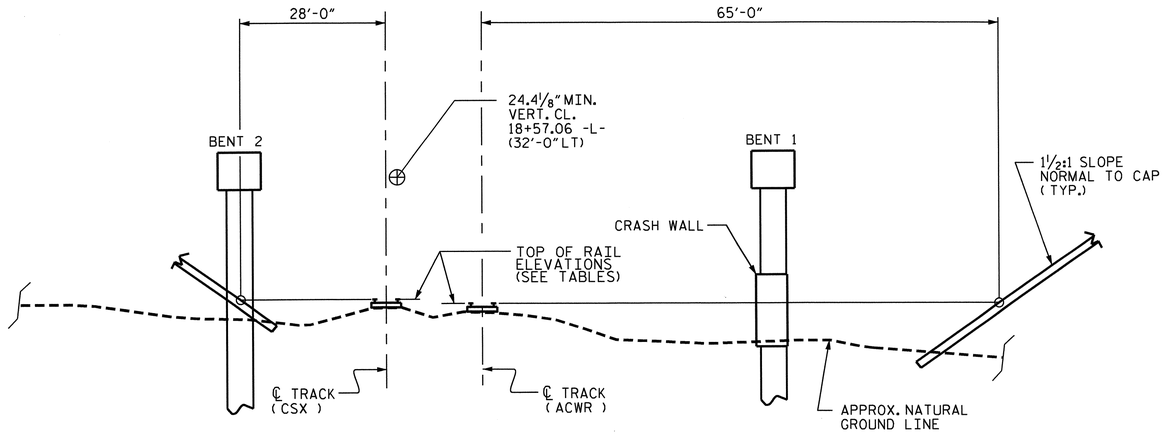
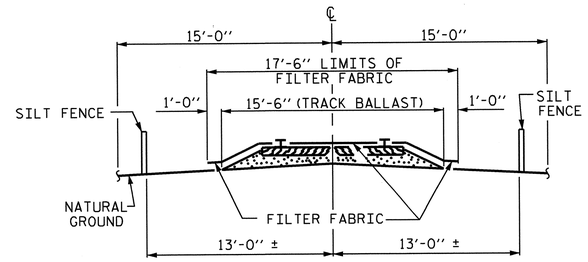
kpaschal

STR.#1



RAILROAD TYPICAL SECTION

(LOOKING IN DIRECTION OF INCREASING STATIONS ON RAILROAD)
(SPAN LENGTHS BASED ON THIS SECTION)



RAILROAD EROSION CONTROL DETAIL

NOTES

RAILROAD EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO PERFORMING ANY WORK IN THE RAILROAD RIGHT-OF-WAY.

ADDITIONAL EROSION CONTROL MEASURES FOR PROTECTION OF RAILROAD DITCHES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

NO SEPARATE PAYMENT WILL BE MADE FOR RAILROAD EROSION CONTROL MEASURES.

LIMITS OF SILT FENCE AND FILTER FABRIC PARALLEL TO RAILROAD SHALL EXTEND A MINIMUM OF 25'-0" OUTSIDE EDGE OF SUPERSTRUCTURE OR TOE OF SLOPE ON CONSTRUCTION. A GREATER LENGTH OF SILT FENCE OR GEOTEXTILE MAY BE REQUIRED IF SO DIRECTED BY THE ENGINEER.

GEOTEXTILE TO BE NAILED TO TIMBER RAIL TIES WITH PRIME SOURCE "GRIP CAP" OR EQUIVALENT. GEOTEXTILE ON SHOULDER TO BE SECURED AS DIRECTED BY THE ENGINEER AND RAILROAD.

CSX TRACK TOP OF RAIL ELEVATIONS

LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
10+71.89 -Y3-	325.101	10+71.86 -Y3-	325.115
11+38.14 -Y3-	324.957	11+39.11 -Y3-	324.949
12+07.27 -Y3-	324.905	12+07.30 -Y3-	324.930

ACWR TRACK TOP OF RAIL ELEVATIONS

LEFT RAIL		RIGHT RAIL	
STATION	ELEVATION	STATION	ELEVATION
10+71.45 -Y3-	324.482	10+71.87 -Y3-	324.399
11+41.48 -Y3-	324.233	11+41.54 -Y3-	324.153
12+07.42 -Y3-	324.057	12+06.18 -Y3-	324.042

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL
6/29/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-
11+47.03 -Y3-
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER CSX AND ACW RR ON US 15/501 BETWEEN US 1 AND NC 211

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

STR.#1

DRAWN BY : B.N.BARODAWALA DATE : 3-26-12
CHECKED BY : A. K. PASCHAL DATE : 4-2-12

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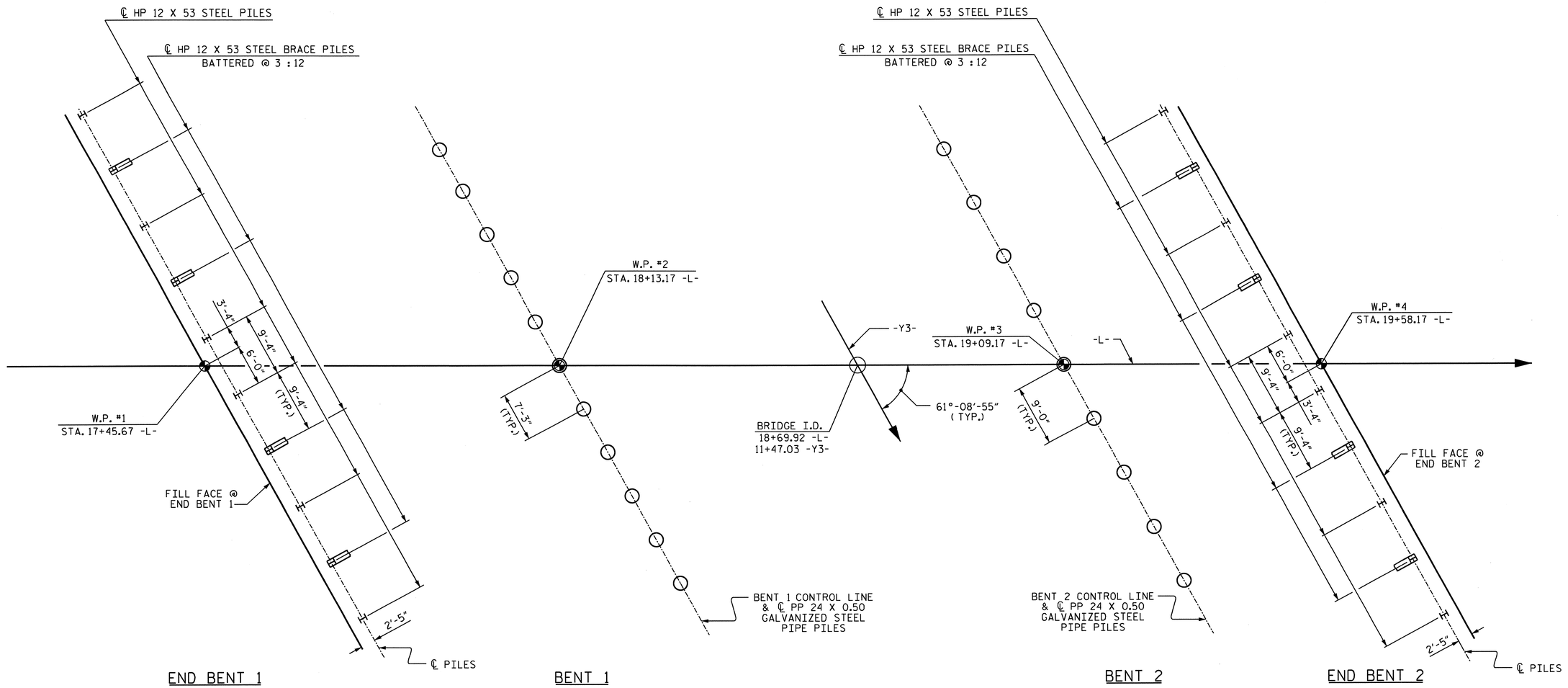
kpaschal



END BENT 1 BENT 1 BENT 2 END BENT 2

FOUNDATION LAYOUT

(DIMENSIONS LOCATING END BENT & BENT PILES ARE SHOWN TO CENTERLINE OF PILES)
(ALL PP 24 X 0.50 GALVANIZED PILES ARE VERTICAL.)

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 AND 95 TONS PER PILE, RESPECTIVELY.

PILES AT BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 260 AND 230 TONS PER PILE, RESPECTIVELY.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 185 AND 160 TONS PER PILE, RESPECTIVELY.

DRIVE PILES AT BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 430 AND 380 TONS PER PILE, RESPECTIVELY.

INSTALL PILES AT BENT 1 AND 2 TO A TIP ELEVATION NO HIGHER THAN 290 FT.

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

STEEL PIPE PILE CUTTING SHOES ARE REQUIRED FOR STEEL PILE PILES AT BENTS 1 AND 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 25 TO 45 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENTS 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 90 TO 110 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENTS 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT BENTS 1 AND 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PIPE PILE PLATES ARE NOT REQUIRED FOR THE PIPE PILES AT BENTS 1 AND 2.

UNDERCUT ORGANIC SOILS (MUCK) WITHIN LIMITS OF EMBANKMENT AND REPLACE WITH SELECT MATERIAL, SEE ROADWAY PLANS.

NORTH CAROLINA PROFESSIONAL SEAL 22006 ENGINEER A. KEITH PASCHAL
6/29/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-
11+47.03 -Y3-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
CSX AND ACW RR
ON US 15/501 BETWEEN
US 1 AND NC 211

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

STR. #1

DRAWN BY : B.N.BARODAWALA DATE : 3-26-12
CHECKED BY : A. K. PASCHAL DATE : 4-2-12

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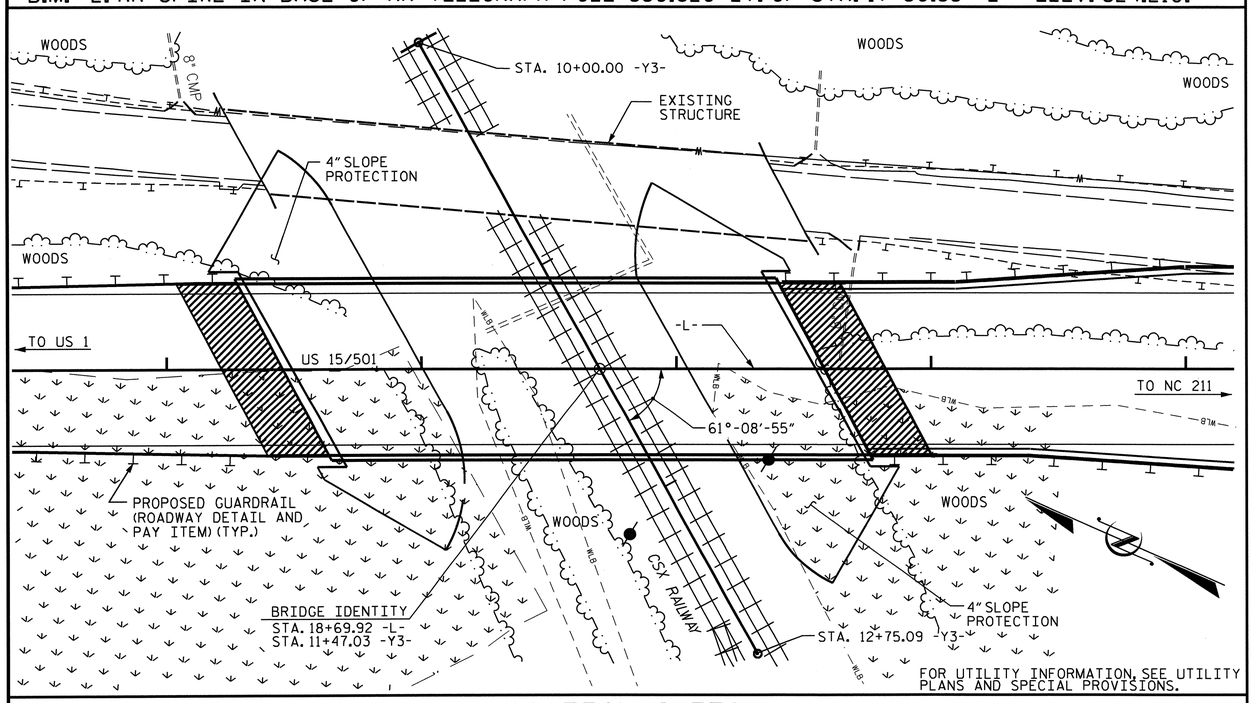
kpaschal

B.M. #2: RR SPIKE IN BASE OF RR TELEGRAPH POLE 330.620' LT. OF STA. 17+30.33 -L- ELEV. 324.210.



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 5 SPANS (2 @ 40', 2 @ 38' & 1 @ 60') REINFORCED CONCRETE DECK GIRDERS, REINFORCED CONCRETE POST AND BEAMS ON PILE FOOTINGS FOR INTERIOR BENTS AND REINFORCED CONCRETE CAP ON STEEL PILES FOR END BENTS WITH A CLEAR ROADWAY WIDTH OF 25'-10" AND LOCATED NORTHEAST FROM THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

FOR INTERIOR BENTS 1 & 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENTS SHEETS FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	HP 12 X 53 STEEL PILES		PP 24 X 0.50 GALVANIZED STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	72" CHAIN LINK FENCE	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	EA.	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			14968	16642		LUMP SUM		1447.11						461.83	416.00		LUMP SUM	LUMP SUM
END BENT 1					68.5		10437		10	800			10			842		
BENT 1		1			177.3		14262				11	935	11					
BENT 2		1			59.3		6690				9	720	9					
END BENT 2					63.0		8866		10	750			10			856		
TOTAL	LUMP SUM	2	14968	16642	368.1	LUMP SUM	40255	1447.11	20	1550	20	1655	40	461.83	416.00	1698	LUMP SUM	LUMP SUM

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-
11+47.03 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
CSX AND ACW RR
ON US 15/501 BETWEEN
US 1 AND NC 211

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL

6/29/12

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

STR. #1

DRAWN BY : B.N.BARODAWALA DATE : 3-26-12
CHECKED BY : A. K. PASCHAL DATE : 4-2-12

29-JUN-2012 06:52
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kpaschal

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	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)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.020	--	1.75	0.899	1.38	A	I	31.808	1.079	1.05	A	I	19.085	0.80	1.081	1.02	B	I	46.875	
		HL-93 (OPERATING)	N/A		1.363	--	1.35	0.899	1.78	A	I	31.808	1.079	1.36	A	I	19.085	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.254	45.162	1.75	0.899	1.76	A	I	31.808	1.079	1.25	A	I	19.085	0.80	0.830	1.40	B	I	46.875	
		HS-20 (OPERATING)	36.000		1.626	58.543	1.35	0.899	2.29	A	I	31.808	1.079	1.63	A	I	19.085	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.251	43.884	1.40	0.899	4.84	A	I	31.808	1.079	3.51	A	I	19.085	0.80	0.899	3.25	A	I	31.808	
		SNGARBS2	20.000		2.403	48.056	1.40	0.899	3.66	A	I	31.808	1.079	2.56	A	I	19.085	0.80	0.830	2.40	B	I	46.875	
		SNAGRIS2	22.000		2.251	49.533	1.40	0.899	3.49	A	I	31.808	1.079	2.41	A	I	19.085	0.80	0.830	2.25	B	I	46.875	
		SNCOTTS3	27.250		1.619	44.111	1.40	0.899	2.41	A	I	31.808	1.079	1.76	A	I	19.085	0.80	0.899	1.62	A	I	31.808	
		SNAGGRS4	34.925		1.35	47.137	1.40	0.899	2.03	A	I	31.808	1.079	1.51	A	I	19.085	0.80	0.830	1.35	B	I	46.875	
		SNS5A	35.550		1.321	46.975	1.40	0.899	1.99	A	I	31.808	1.079	1.55	A	I	19.085	0.80	0.830	1.32	B	I	46.875	
		SNS6A	39.950		1.203	48.060	1.40	0.899	1.83	A	I	31.808	1.079	1.44	A	I	19.085	0.80	0.830	1.20	B	I	46.875	
		SNS7B	42.000		1.145	48.102	1.40	0.899	1.75	A	I	31.808	1.079	1.44	A	I	19.085	0.80	0.830	1.15	B	I	46.875	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.464	48.321	1.40	0.899	2.24	A	I	31.808	1.079	1.69	A	I	19.085	0.80	0.830	1.46	B	I	46.875	
		TNT4A	33.075		1.468	48.561	1.40	0.899	2.25	A	I	31.808	1.079	1.63	A	I	19.085	0.80	0.830	1.47	B	I	46.875	
		TNT6A	41.600		1.192	49.575	1.40	0.899	1.85	A	I	31.808	1.079	1.59	A	I	19.085	0.80	0.830	1.19	B	I	46.875	
		TNT7A	42.000		1.193	50.107	1.40	0.899	1.86	A	I	31.808	1.079	1.51	A	I	19.085	0.80	0.830	1.19	B	I	46.875	
		TNT7B	42.000		1.223	51.364	1.40	0.899	1.94	A	I	31.808	1.079	1.39	A	I	19.085	0.80	0.830	1.22	B	I	46.875	
		TNAGRIT4	43.000		1.172	50.385	1.40	0.899	1.84	A	I	31.808	1.079	1.34	A	I	19.085	0.80	0.830	1.17	B	I	46.875	
		TNAGT5A	45.000		1.109	49.894	1.40	0.899	1.73	A	I	31.808	1.079	1.36	A	I	19.085	0.80	0.830	1.11	B	I	46.875	
		TNAGT5B	45.000	3	1.099	49.450	1.40	0.899	1.70	A	I	31.808	1.079	1.27	A	I	19.085	0.80	0.830	1.10	B	I	46.875	

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.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

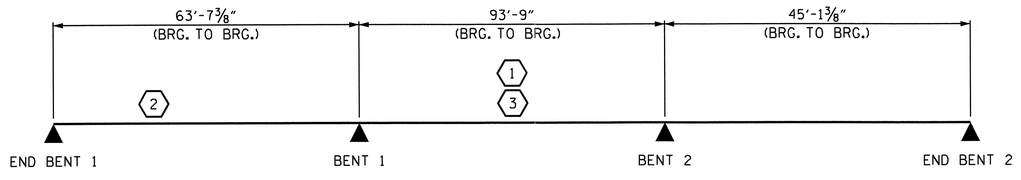
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. LRFR1

ASSEMBLED BY : T.L. AVERETTE DATE : 03/12
CHECKED BY : O. PUIGCERVER DATE : 03/12

DRAWN BY : MAA 1/08 REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08 REV. 10/1/11 MAA/GM

14-MAY-2012 11:30
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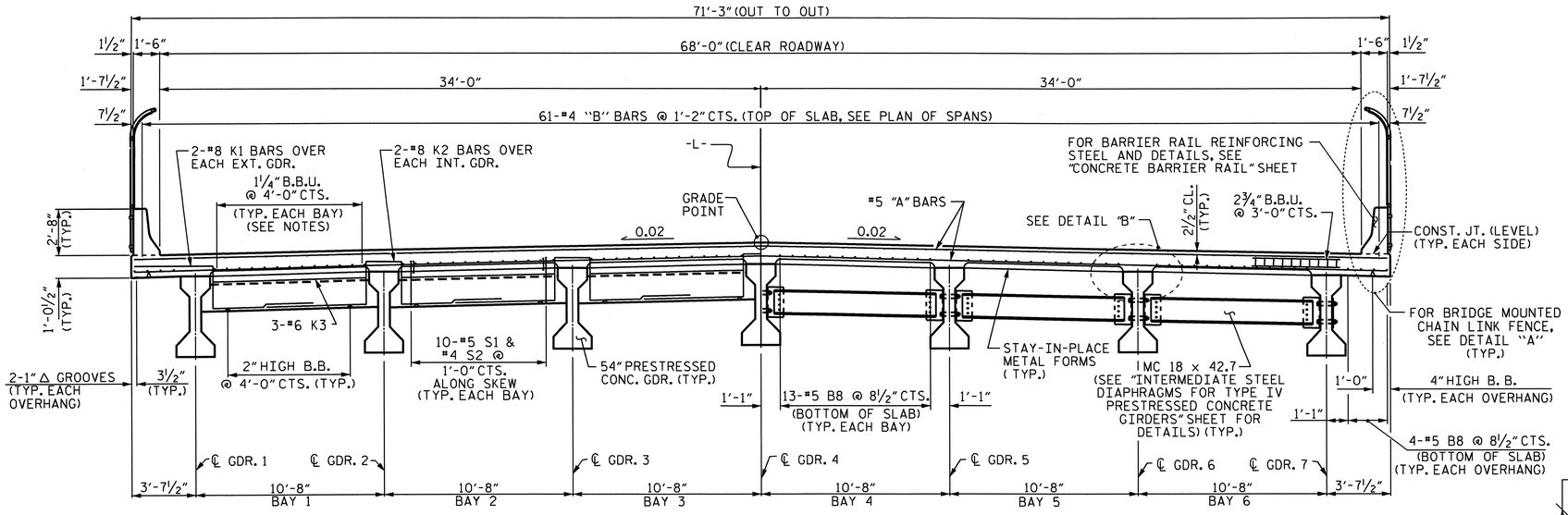
kpaschal

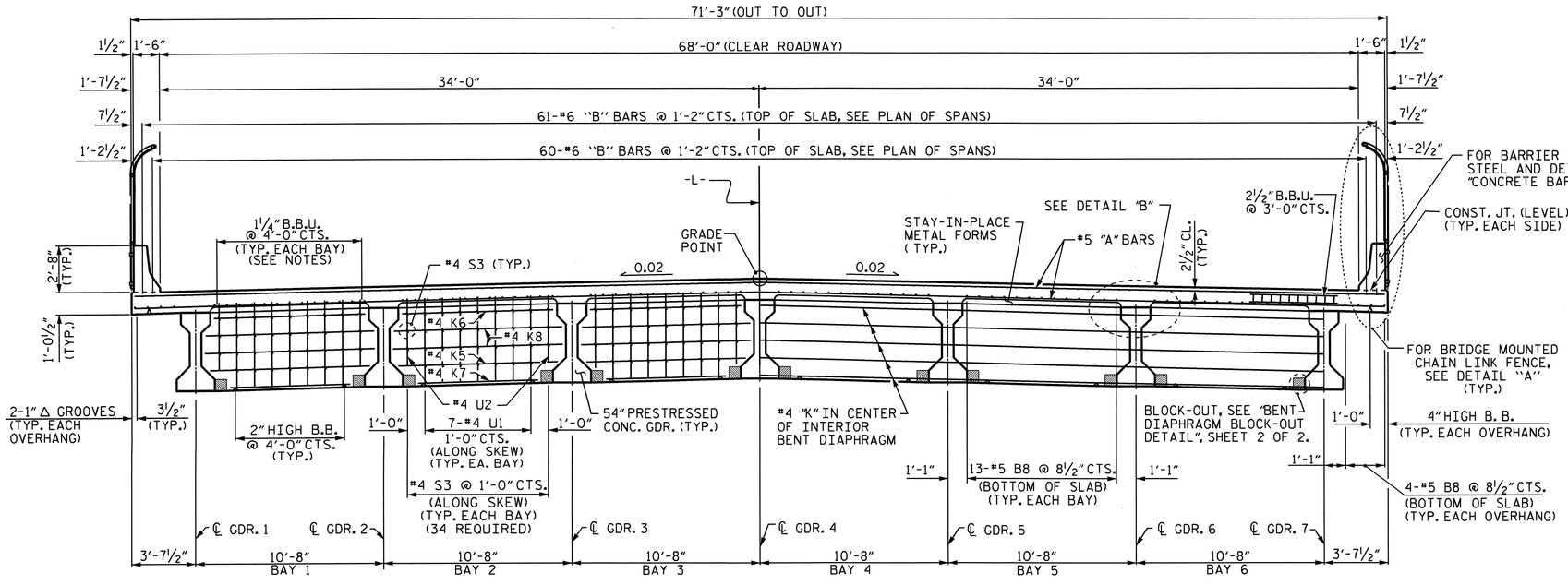


TYPICAL HALF SECTION

SHOWING END BENT DIAPHRAGMS

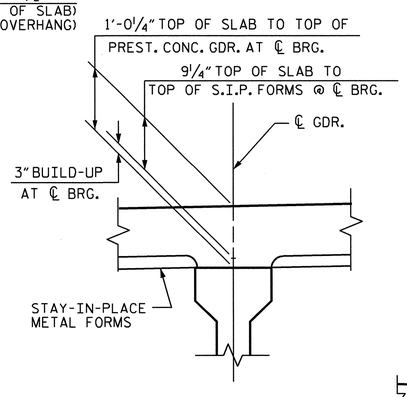
TYPICAL HALF SECTION

SHOWING INTERMEDIATE DIAPHRAGMS

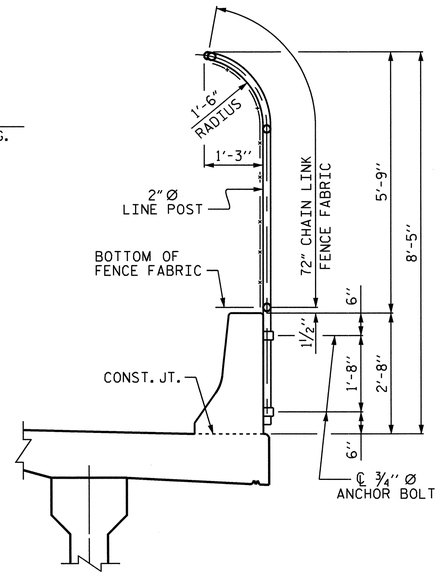


TYPICAL SECTION

SHOWING BENT DIAPHRAGMS



DETAIL "B"



DETAIL "A"

NOTES :

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

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

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

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

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : B. N. BARODAWALA DATE : 08-08-11
CHECKED BY : P. S. PARISI DATE : 10-28-11

29-JUN-2012 06:51
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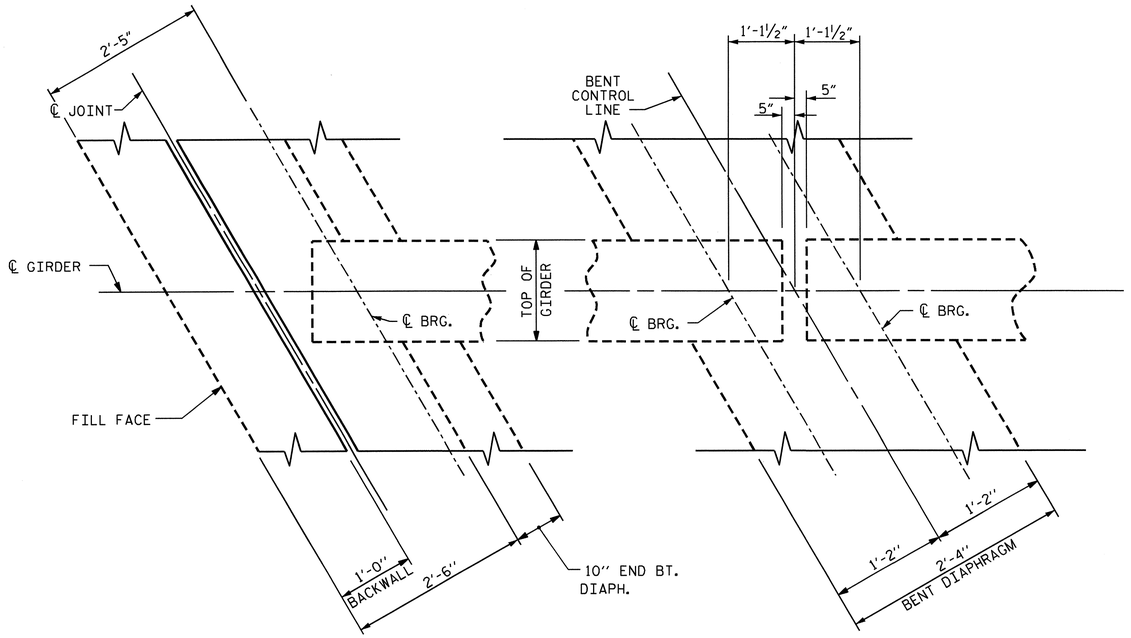
kpaschal

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

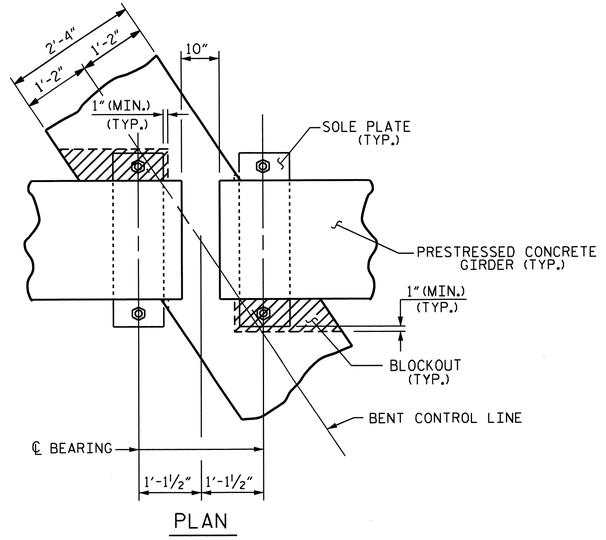
6/29/12



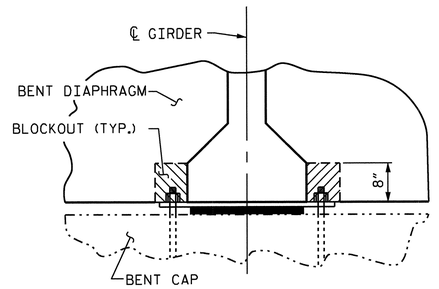
END BENT DIAPHRAGM

BENT DIAPHRAGM

PLAN

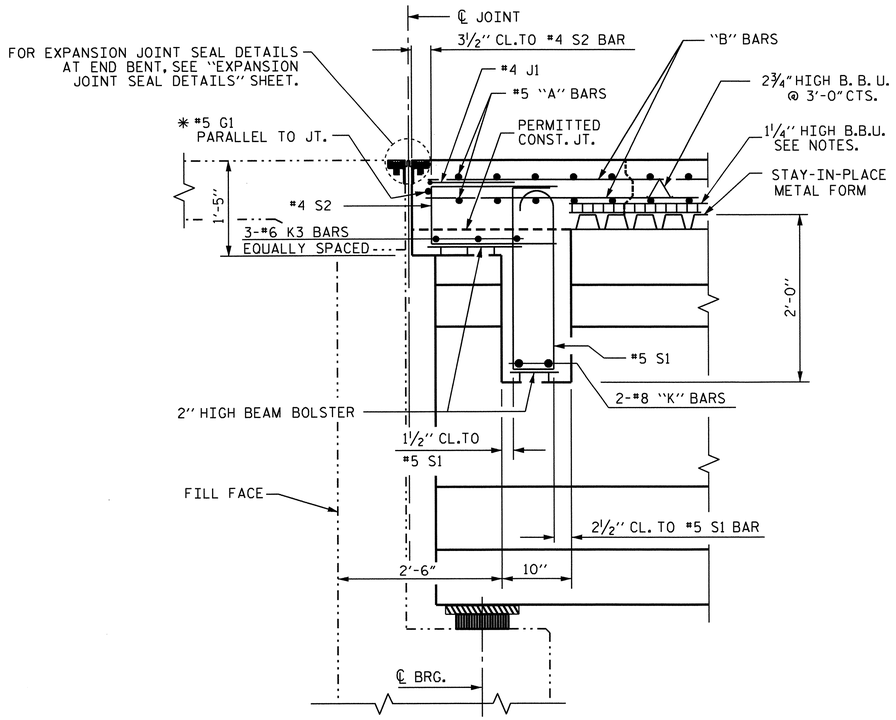


PLAN



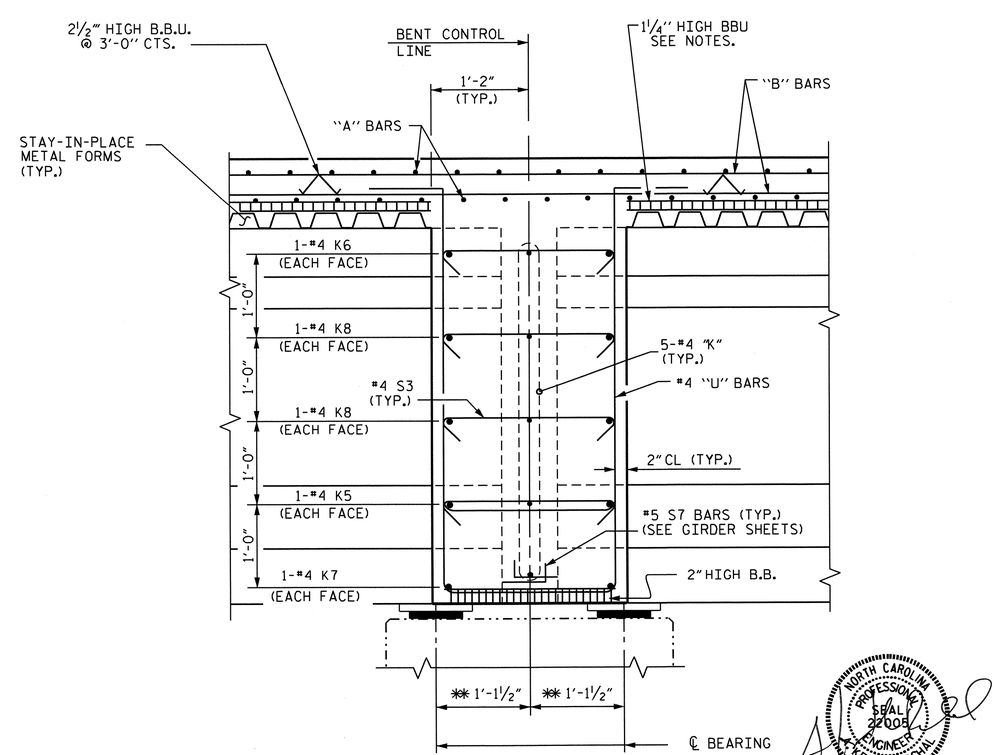
SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL



SECTION A-A

✱ #5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



SECTION B-B

✱✱ MEASURED ALONG GIRDER LINE

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : B. N. BARODAWALA DATE : 8-8-11
CHECKED BY : P. S. PARISI DATE : 10-28-11

14-MAY-2012 11:31
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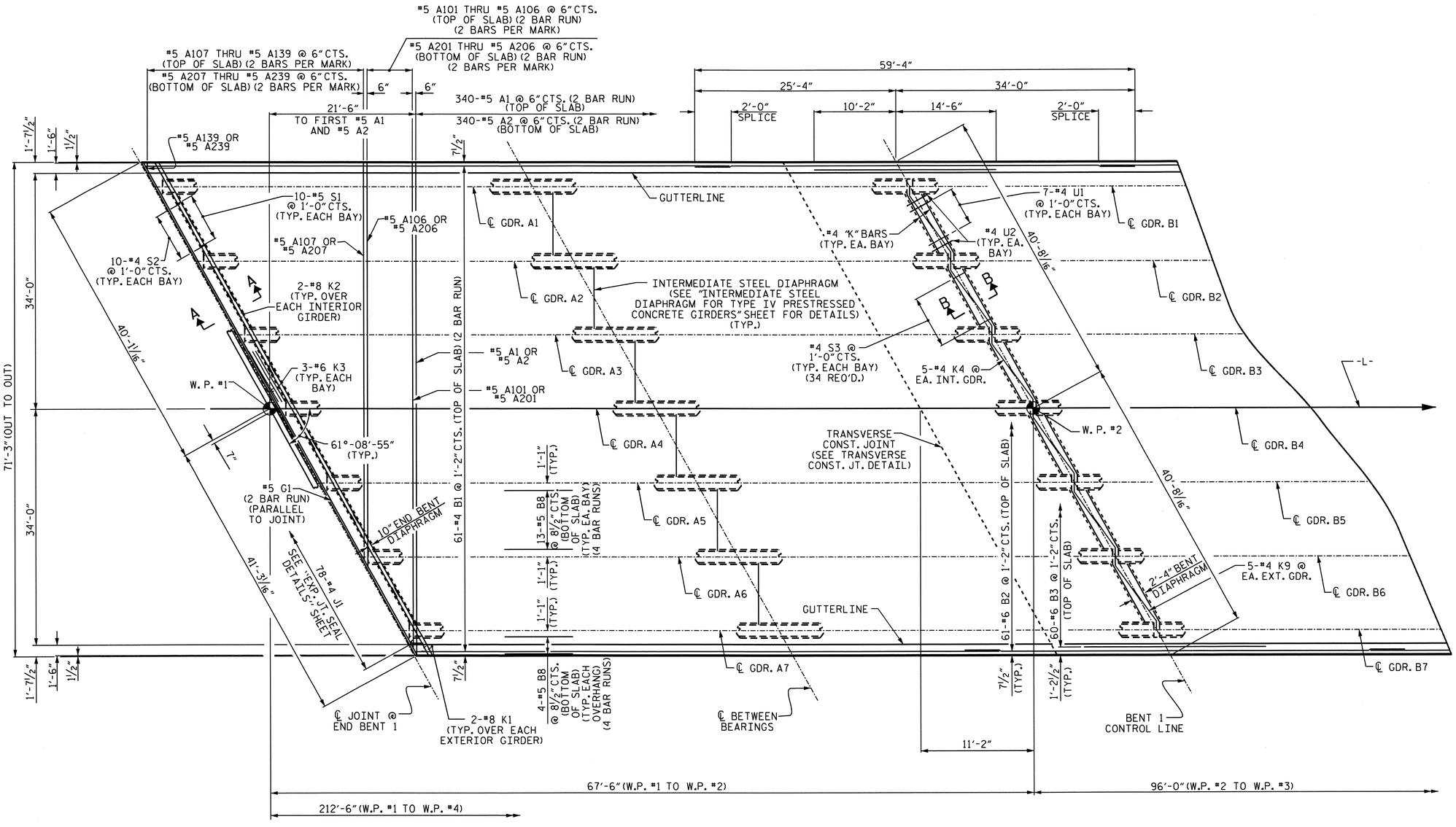
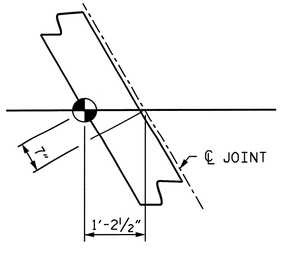
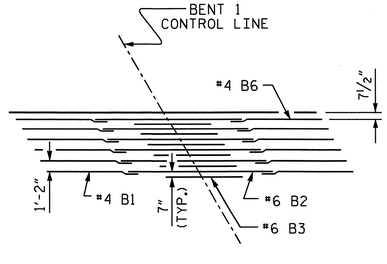
knaschal



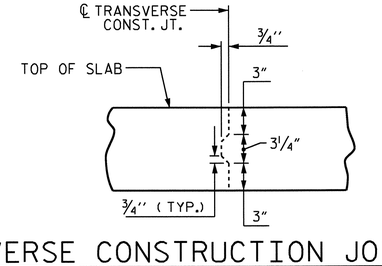
PLAN OF SPAN A



BACKWALL DETAIL



REINFORCING STEEL LAYOUT AT BENT 1



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : J. G. KHARVA DATE : 08/12/11
CHECKED BY : PEGGY PARISI DATE : 10/28/11

14-MAY-2012 11:30
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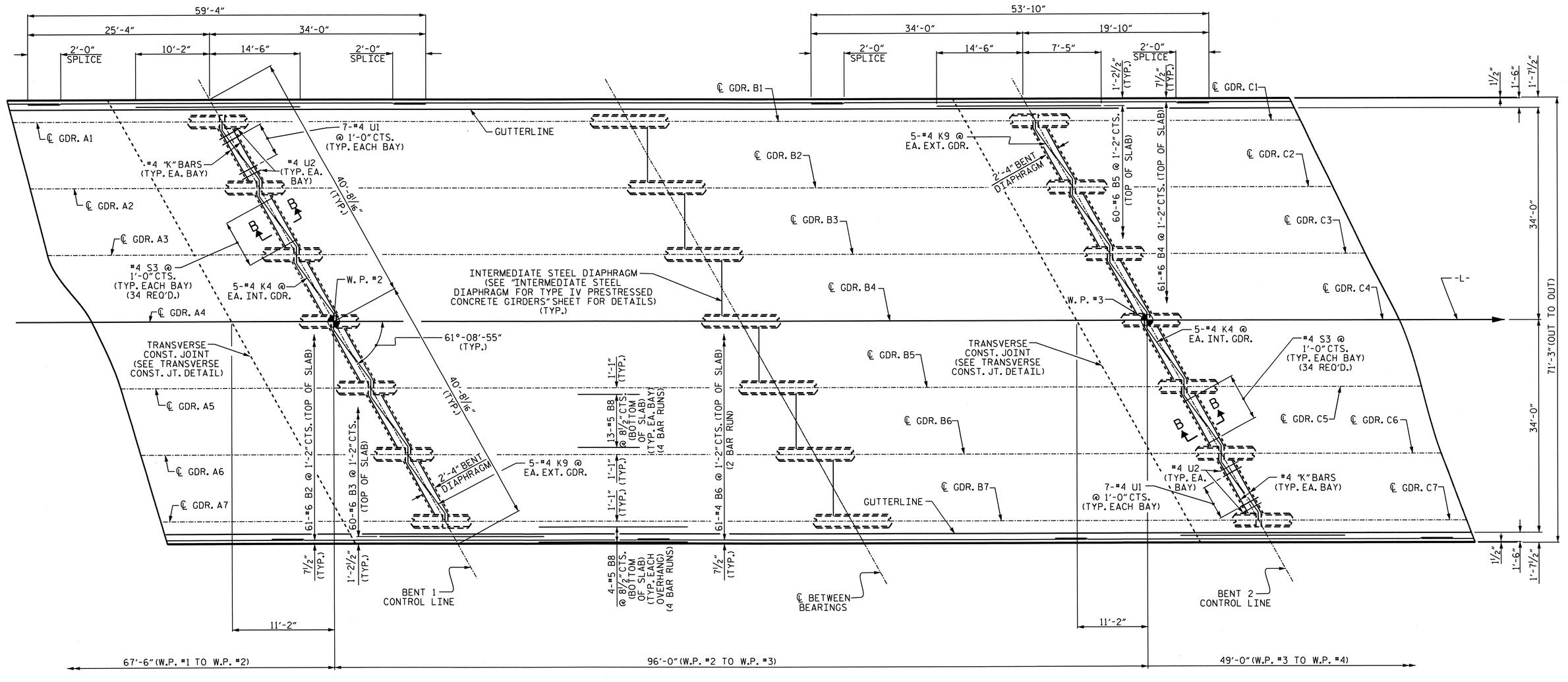
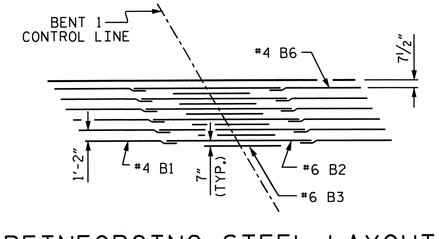
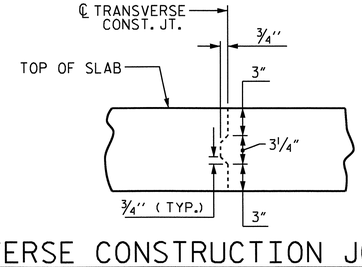
kpaschal



PLAN OF SPAN B

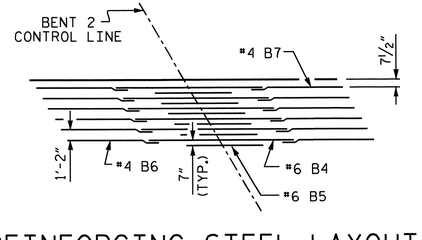


REINFORCING STEEL LAYOUT AT BENT 1



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



REINFORCING STEEL LAYOUT AT BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL
6/29/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : J. G. KHARVA DATE : 08/12/11
CHECKED BY : PEGGY PARISI DATE : 10/28/11

14-MAY-2012 11:30
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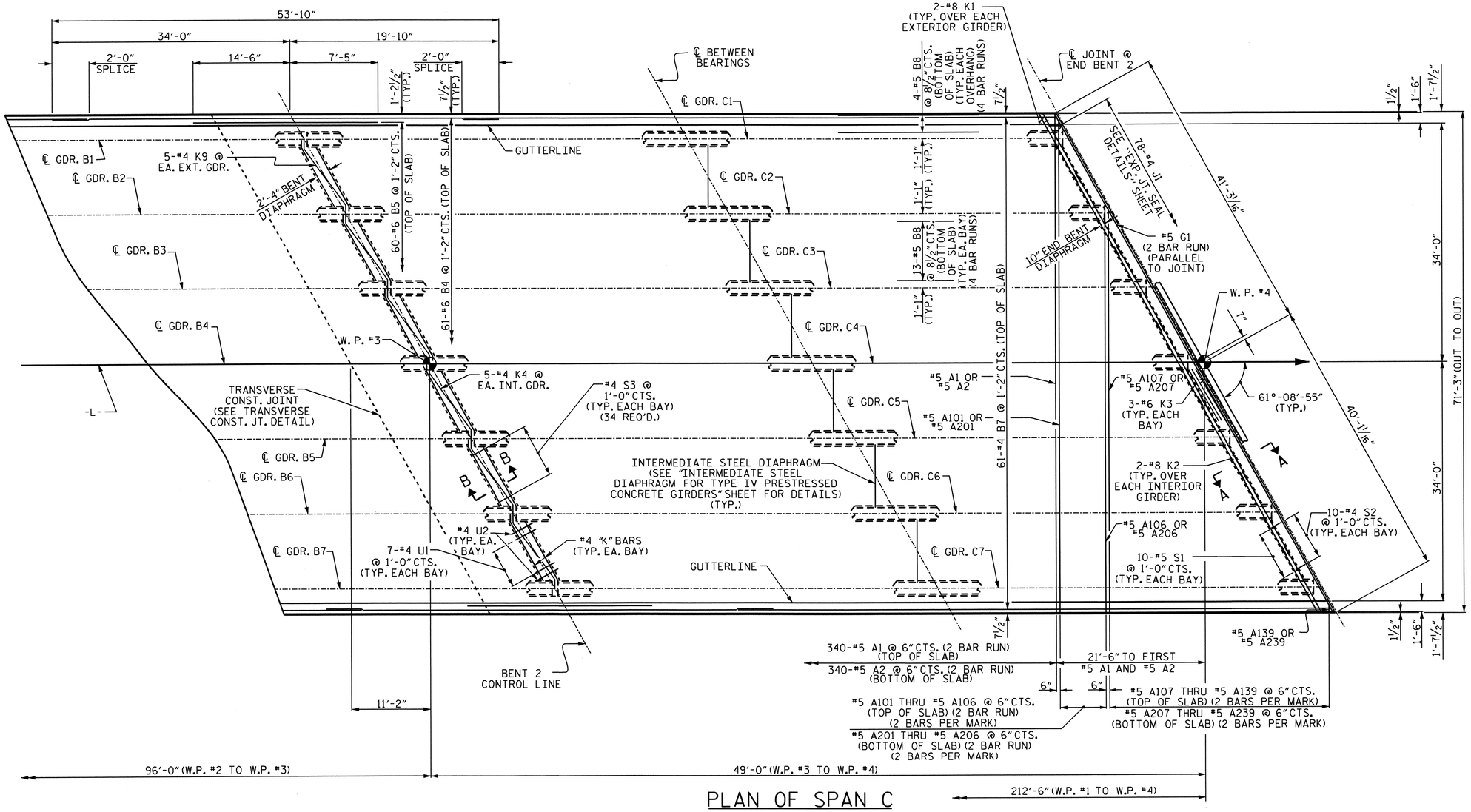
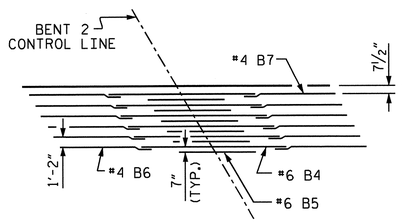
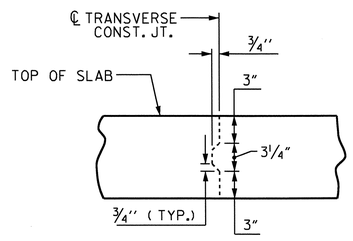


PLAN OF SPAN C

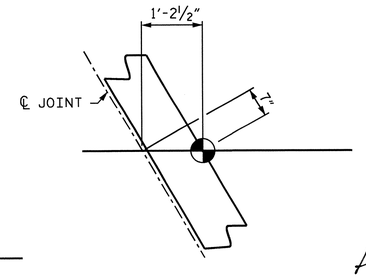


REINFORCING STEEL LAYOUT AT BENT 2

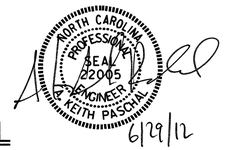


TRANSVERSE CONSTRUCTION JOINT DETAIL

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



BACKWALL DETAIL



PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : J. G. KHARVA DATE : 08/12/11
CHECKED BY : PEGGY PARISI DATE : 10/28/11

14-MAY-2012 11:30
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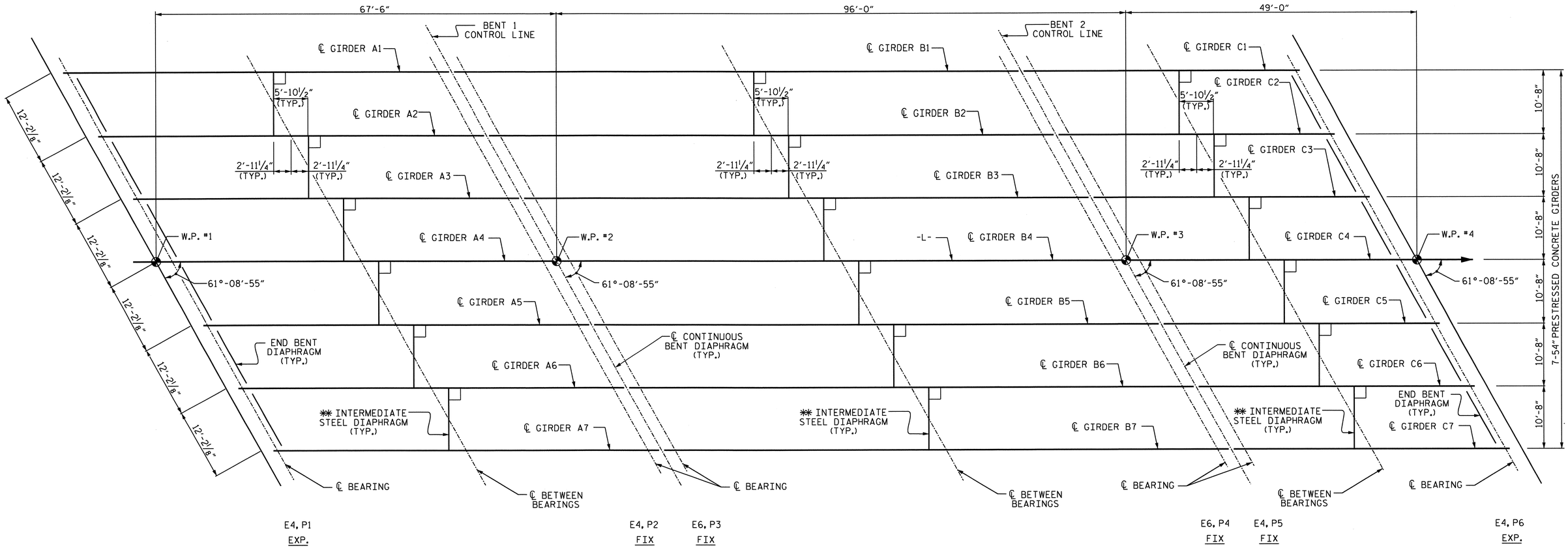
kpaschal



FRAMING PLAN

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

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 24005 ENGINEER A. KEITH PASCHAL
6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : J. G. KHARVA DATE : 08-15-11
CHECKED BY : PEGGY PARISI DATE : 10-28-11

14-MAY-2012 11:30
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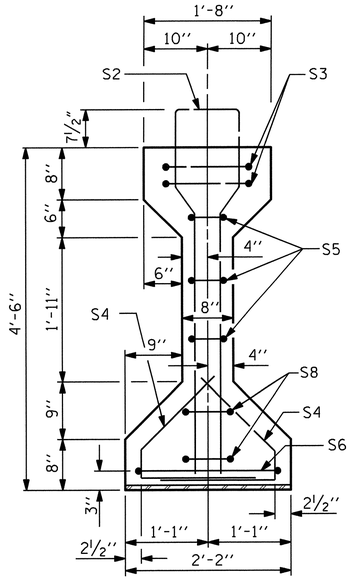
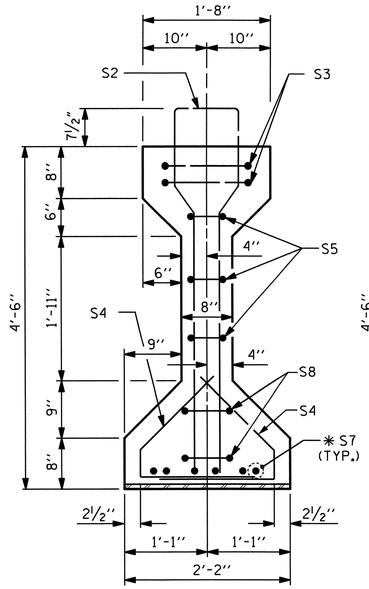
kpaschal

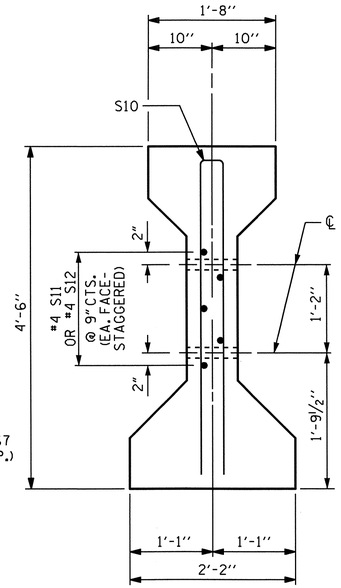
STR. #1



SECTION A-A



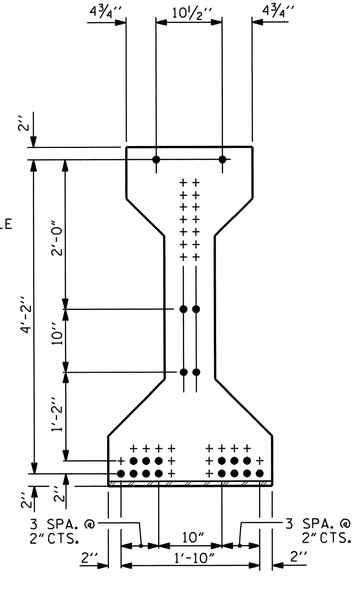
SECTION B-B



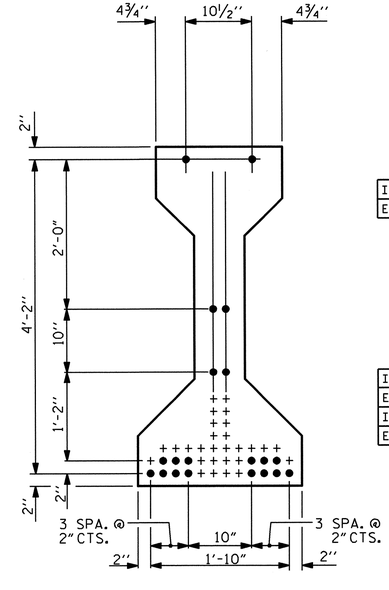
SECTION C-C

(S1 BARS NOT SHOWN)

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

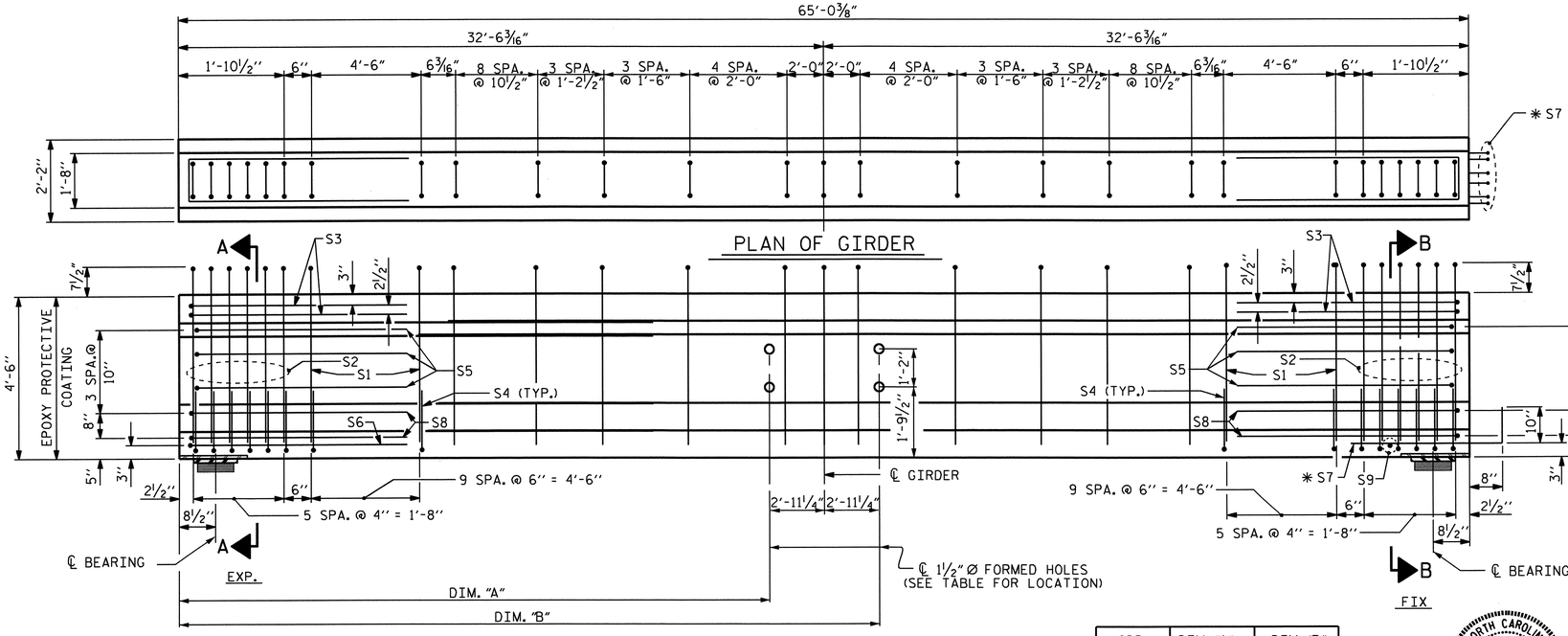


AT END OF GIRDER



AT ℄ OF GIRDER

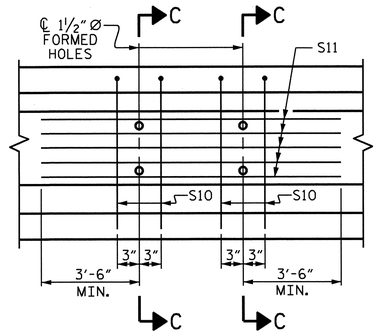
0.6" Ø LOW RELAXATION STRAND LAYOUT



ELEVATION OF GIRDER

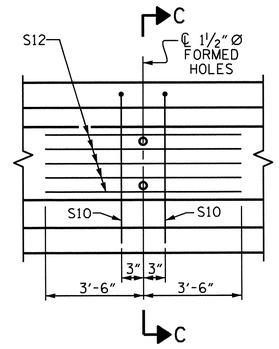
(SEE PARTIAL ELEVATION FOR S10, S11 AND S12 BARS)

GDR.	DIM. "A"	DIM. "B"
GDR. A1	——	35'-5⁷⁄₁₆"
GDR. A2 THRU GDR. A6	29'-6¹⁵⁄₁₆"	35'-5⁷⁄₁₆"
GDR. A7	29'-6¹⁵⁄₁₆"	——



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A2 THRU A6



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A1 & A7

ASSEMBLED BY : J. G. KHARVA	DATE : 8-15-11
CHECKED BY : PEGGY PARISI	DATE : 10-28-11
DRAWN BY : ELR 8/91	REV. 10/17/00R RWW/LES
CHECKED BY : GRP 8/91	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

14-MAY-2012 11:30
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kpaschal

0.6" Ø L. R. GRADE 270 STRANDS

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

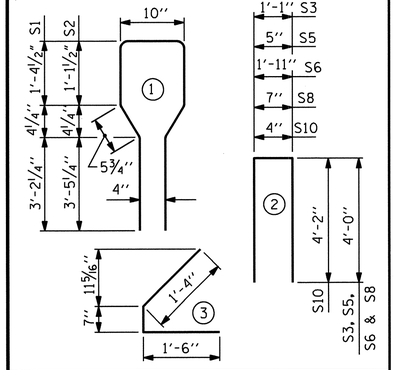
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
INTERIOR GDR.	S1	59	#4	1	10'-11"	430
EXTERIOR GDR.	S1	59	#4	1	10'-11"	430
	S2	12	#6	1	10'-11"	197
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	✱S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S11	5	#4	STR	12'-11"	43
EXTERIOR GDR.	S12	5	#4	STR	7'-0"	23

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	5,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
INTERIOR GIRDER	964	13.2	20
EXTERIOR GIRDER	926	13.2	20

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	65'-0⅜"	455.22'

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

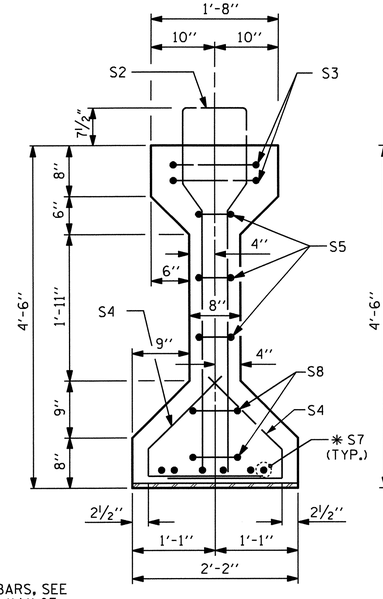
SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 22025 ENGINEER N. KEITH PASCHAL 6/29/12

REVISIONS						SHEET NO.
NO.		DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			38

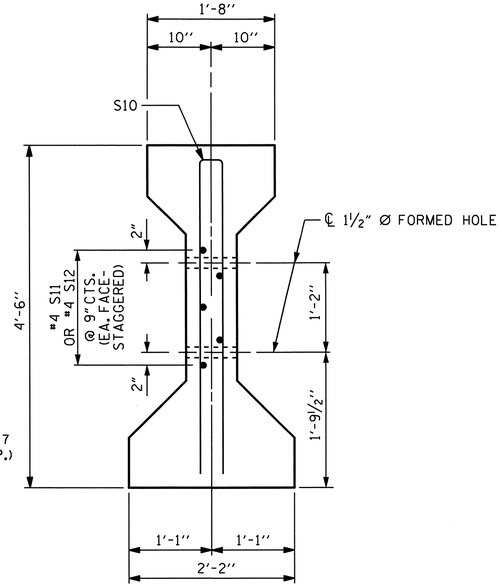
STR. #1

STD. NO. PCG6 (Sht. 1)



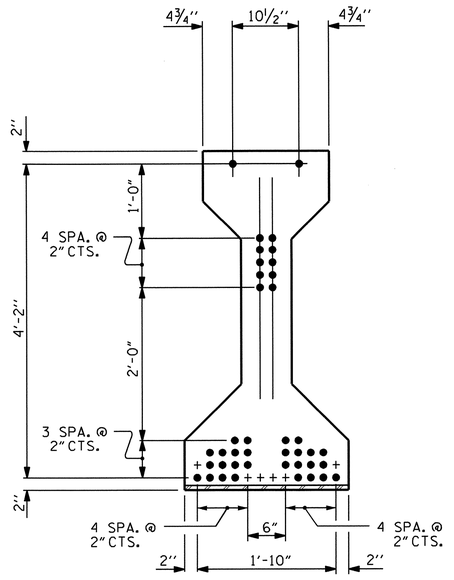
* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION B-B

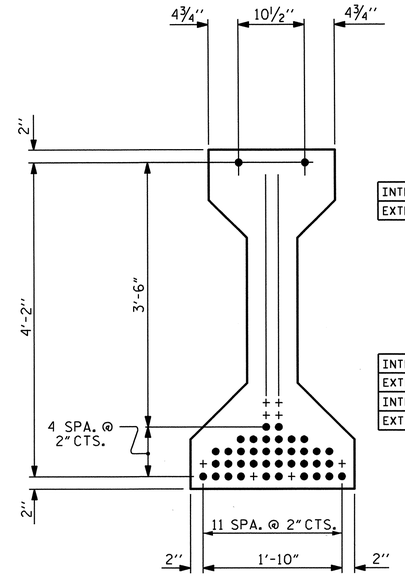


SECTION C-C

(S1 BARS NOT SHOWN)

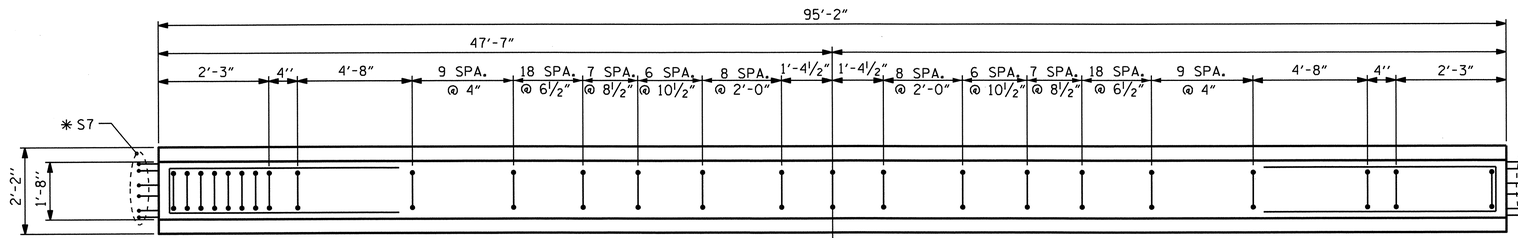


AT END OF GIRDER

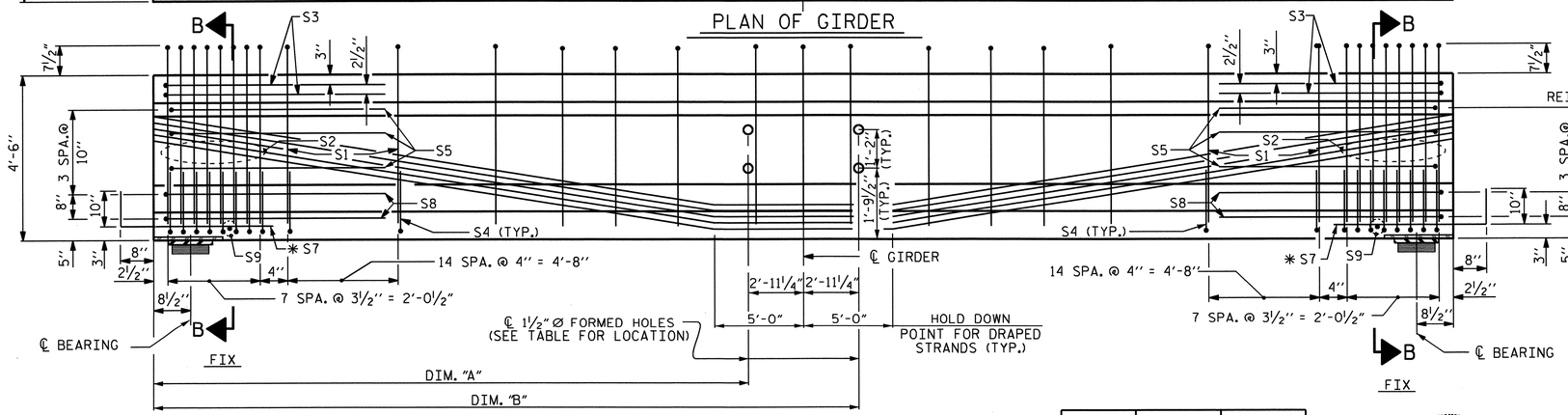


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



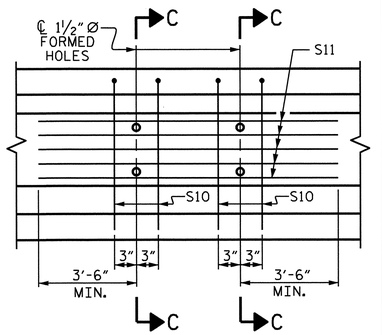
PLAN OF GIRDER



ELEVATION OF GIRDER

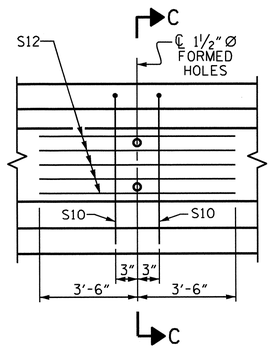
(SEE PARTIAL ELEVATION FOR S10, S11 AND S12 BARS)

GDR.	DIM. "A"	DIM. "B"
GDR. B1	——	50'-6¼"
GDR. B2 THRU GDR. B6	44'-7¾"	50'-6¼"
GDR. B7	44'-7¾"	——



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B2 THRU B6



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B1 & B7

0.6" Ø L. R. GRADE 270 STRANDS

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

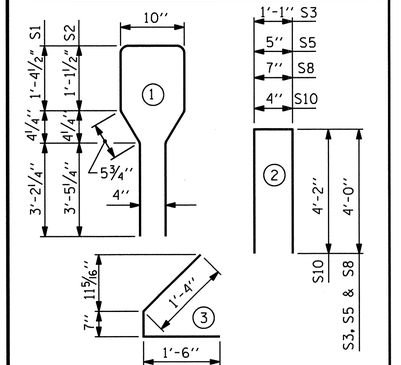
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
INTERIOR GDR.	S1	127	#4	1	10'-11"	926
EXTERIOR GDR.	S1	127	#4	1	10'-11"	926
	S2	16	#6	1	10'-11"	262
	S3	4	#4	2	9'-1"	24
	S4	92	#4	3	3'-5"	210
	S5	6	#4	2	8'-5"	34
	* S7	12	#5	STR	3'-8"	46
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S11	5	#4	STR	12'-11"	43
EXTERIOR GDR.	S12	5	#4	STR	7'-0"	23

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
INTERIOR GIRDER	1605	19.3	40
EXTERIOR GIRDER	1567	19.3	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	95'-2"	666.17'

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. PCG6 (Sht. 1)

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL

6/28/12

ASSEMBLED BY : J. G. KHARVA	DATE : 8-16-11
CHECKED BY : PEGGY PARISI	DATE : 10-28-11
DRAWN BY : ELR 8/91	REV. 10/17/00R RWW/LES
CHECKED BY : GRP 8/91	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

14-MAY-2012 11:30
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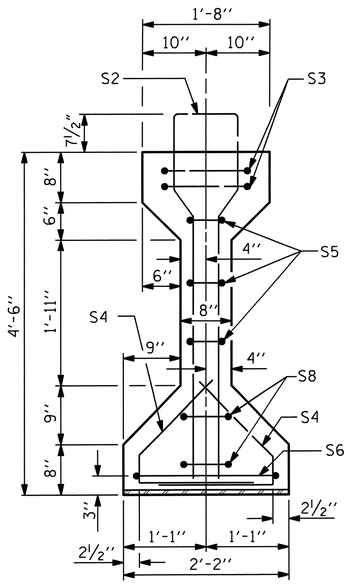
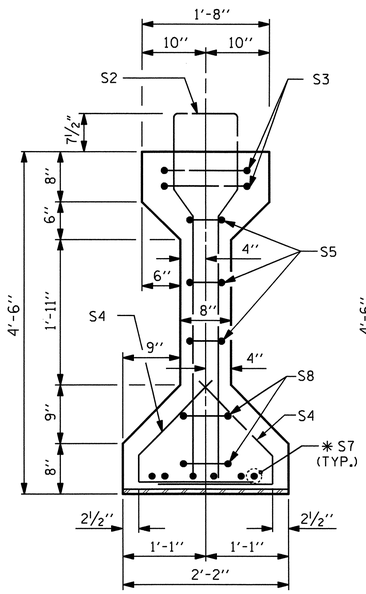
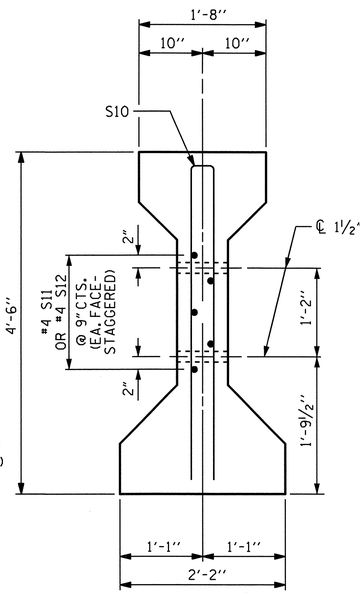
kpaschal



SECTION A-A



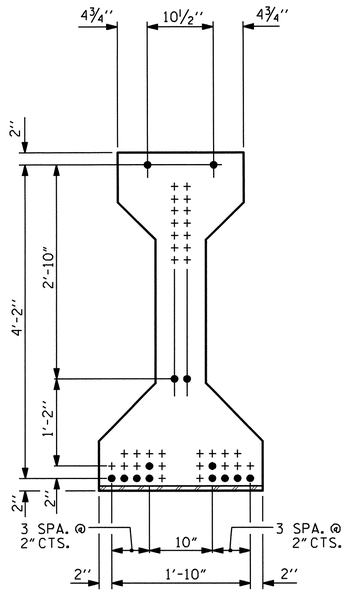
SECTION B-B



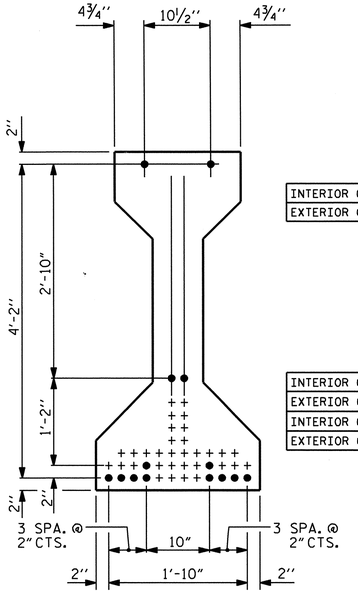
SECTION C-C

(S1 BARS NOT SHOWN)

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

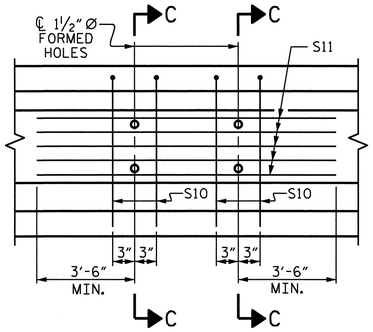


AT END OF GIRDER



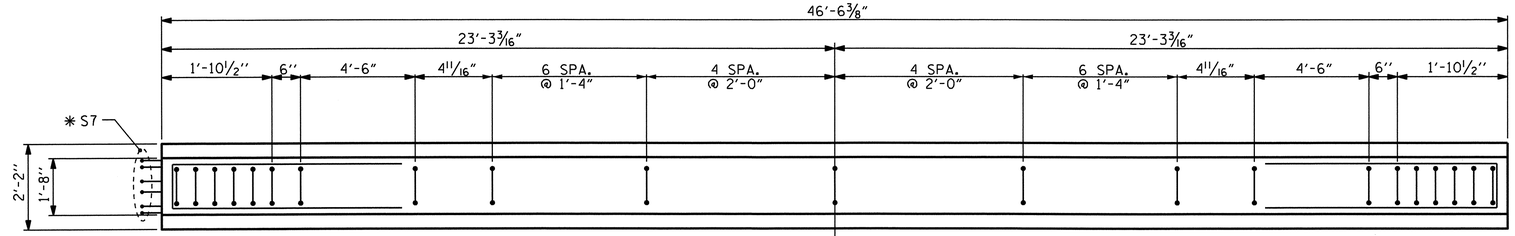
AT ℄ OF GIRDER

0.6'' Ø LOW RELAXATION STRAND LAYOUT

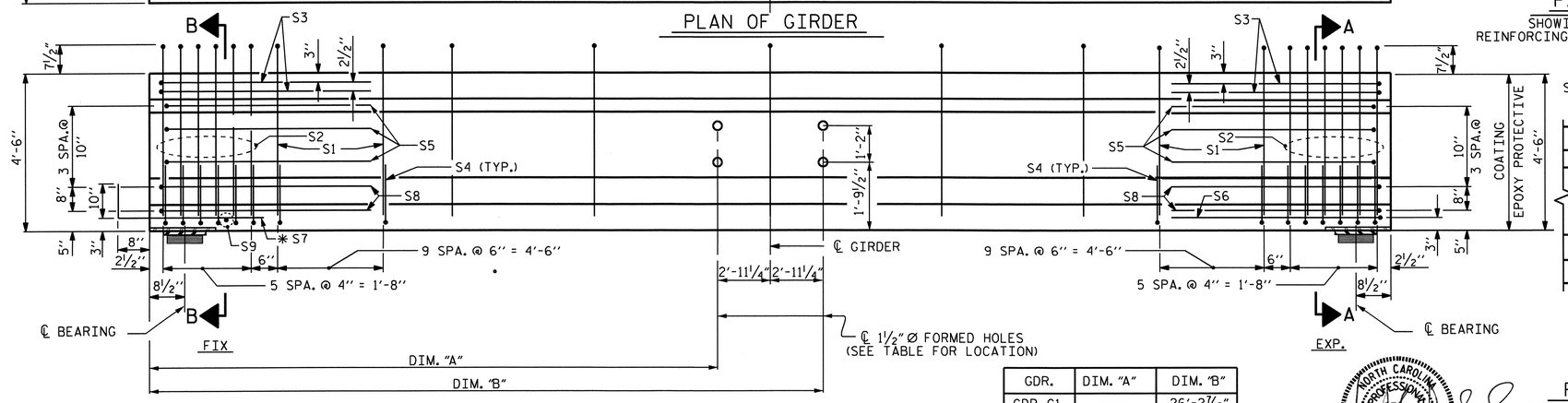


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. C2 THRU C6



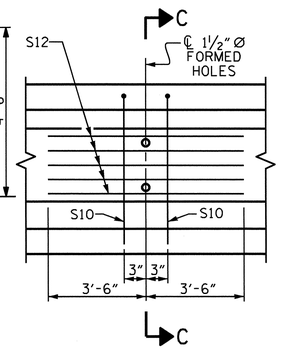
PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR S10, S11 AND S12 BARS)

GDR.	DIM. "A"	DIM. "B"
GDR. C1	——	26'-2 7/16"
GDR. C2 THRU GDR. C6	20'-3 15/16"	26'-2 7/16"
GDR. C7	20'-3 15/16"	——



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. C1 & C7

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

0.6" Ø L. R. GRADE 270 STRANDS

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

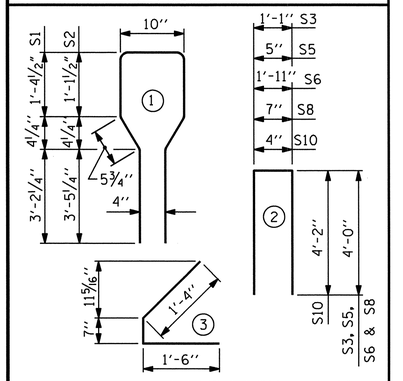
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
INTERIOR GDR.	S1	41	#4	1	10'-11''	299
EXTERIOR GDR.	S1	41	#4	1	10'-11''	299
	S2	12	#6	1	10'-11''	197
	S3	4	#4	2	9'-1''	24
	S4	64	#4	3	3'-5''	146
	S5	6	#4	2	8'-5''	34
	S6	1	#4	2	9'-11''	7
	* S7	6	#5	STR	3'-8''	23
	S8	4	#4	2	8'-7''	23
	S9	1	#3	STR	1'-10''	1
INTERIOR GDR.	S10	4	#5	2	8'-8''	36
EXTERIOR GDR.	S10	2	#5	2	8'-8''	18
INTERIOR GDR.	S11	5	#4	STR	12'-11''	43
EXTERIOR GDR.	S12	5	#4	STR	7'-0''	23

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	5,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
INTERIOR GIRDER	833	9.4	14
EXTERIOR GIRDER	795	9.4	14

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	46'-6⅜"	325.72'

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. PCG6 (Sht. 1)

ASSEMBLED BY : J. G. KHARVA	DATE : 8-16-11	
CHECKED BY : PEGGY PARISI	DATE : 10-28-11	
DRAWN BY : ELR 8/91	REV. 10/17/00R	RWW/LES
CHECKED BY : GRP 8/91	REV. 5/1/06R	TLA/GM
	REV. 10/1/11	MAA/GM

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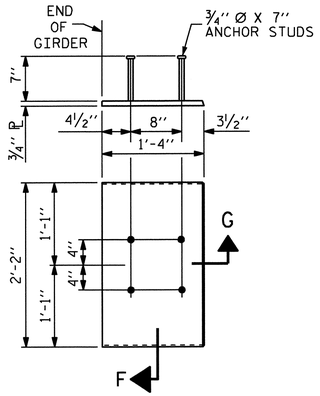
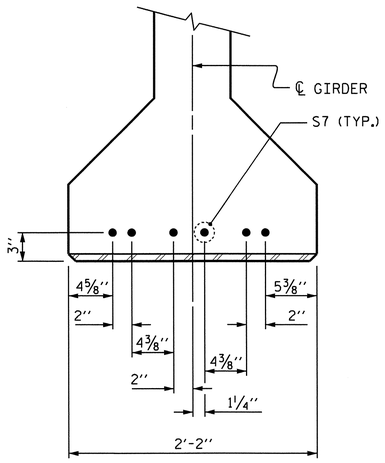
kpaschal



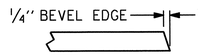
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)

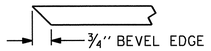


DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "G"



SECTION "F"

(SEE NOTES)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPANS A AND C AND 7000 PSI FOR SPAN B.

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

THE UPLIFT FORCE DUE TO DRAPED STRANDS IN SPAN B IS 25.75 KIPS.

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION	GIRDERS 1 & 7											GIRDER 2 THRU GIRDER 6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.026	0.049	0.068	0.079	0.083	0.079	0.068	0.049	0.026	0.0	0.0	0.026	0.049	0.068	0.079	0.083	0.079	0.068	0.049	0.026	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.012	0.024	0.032	0.038	0.040	0.038	0.032	0.024	0.012	0.0	0.0	0.014	0.027	0.036	0.043	0.045	0.043	0.036	0.027	0.014	0.0
FINAL CAMBER ↑	0.0	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0.0	0.0	1/8"	1/4"	3/8"	7/16"	7/16"	7/16"	3/8"	1/4"	1/8"	0.0

✱ INCLUDES FUTURE WEARING SURFACE

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

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION	GIRDERS 1 & 7											GIRDER 2 THRU GIRDER 6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.100	0.189	0.259	0.303	0.319	0.303	0.259	0.189	0.100	0.0	0.0	0.100	0.189	0.259	0.303	0.319	0.303	0.259	0.189	0.100	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.044	0.083	0.114	0.134	0.140	0.134	0.114	0.083	0.044	0.0	0.0	0.050	0.094	0.129	0.151	0.158	0.151	0.129	0.094	0.050	0.0
FINAL CAMBER ↑	0.0	11/16"	1 1/4"	1 3/4"	2 1/16"	2 1/8"	2 1/16"	1 3/4"	1 1/4"	11/16"	0.0	0.0	5/8"	1 1/8"	1 9/16"	1 13/16"	1 15/16"	1 13/16"	1 9/16"	1 1/8"	5/8"	0.0

✱ INCLUDES FUTURE WEARING SURFACE

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

DEAD LOAD DEFLECTION TABLE FOR SPAN C

0.6"Ø LOW RELAXATION	GIRDERS 1 & 7											GIRDER 2 THRU GIRDER 6										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.0	0.011	0.021	0.029	0.034	0.035	0.034	0.029	0.021	0.011	0.0	0.0	0.011	0.021	0.029	0.034	0.035	0.034	0.029	0.021	0.011	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.0	0.003	0.006	0.008	0.010	0.010	0.010	0.008	0.006	0.003	0.0	0.0	0.004	0.007	0.009	0.011	0.011	0.011	0.009	0.007	0.004	0.0
FINAL CAMBER ↑	0.0	1/8"	3/16"	1/4"	5/16"	5/16"	5/16"	1/4"	3/16"	1/8"	0.0	0.0	1/16"	3/16"	1/4"	1/4"	5/16"	1/4"	1/4"	3/16"	1/16"	0.0

✱ INCLUDES FUTURE WEARING SURFACE

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

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER K. KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			38

STR. #1

STD. NO. PCG9 (Sht. 3)

ASSEMBLED BY : J. C. KHARVA	DATE : 8-16-11
CHECKED BY : PEGGY PARISI	DATE : 10-28-11
DRAWN BY : ELR 11/91	REV. 7/10/01RR LES/RDR
CHECKED BY : GRP 11/91	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

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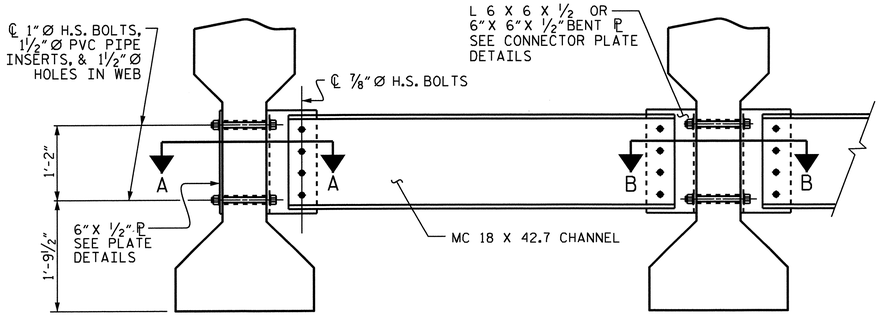
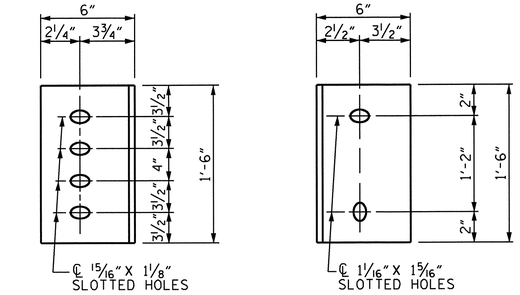
kpaschal



EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS

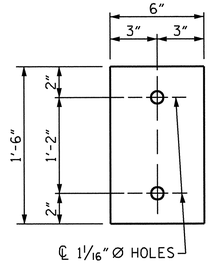
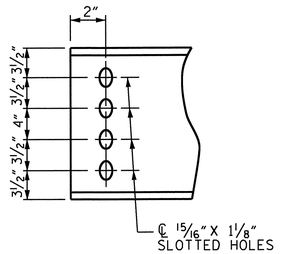
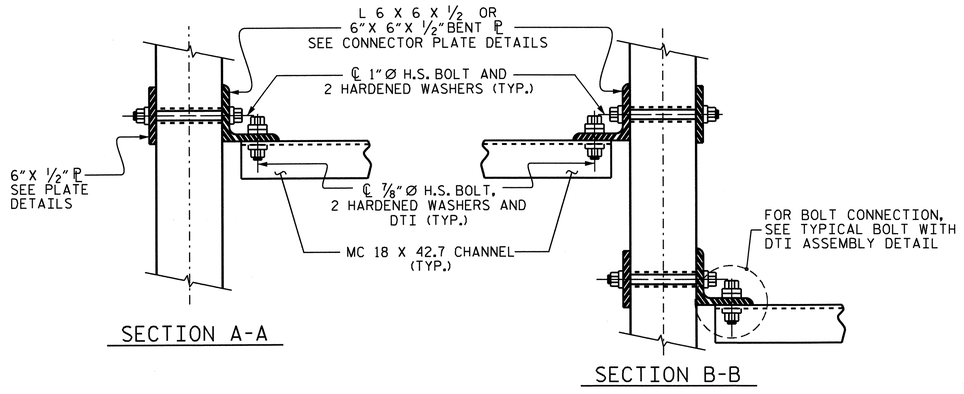


PLATE DETAILS

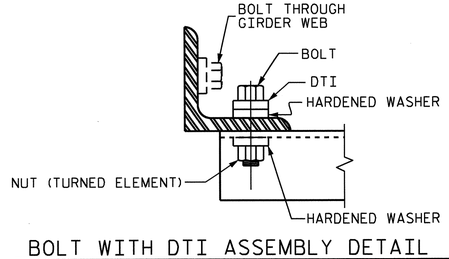


CHANNEL END



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

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

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

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

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

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. PCG10

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER TIMOTHY KEITH PASCHAL

6/29/12

ASSEMBLED BY : J. G. KHARVA	DATE : 8-17-11	ADDED 10/21/05	KMM/GM
CHECKED BY : PEGGY PARISI	DATE : 10-28-11	REV. 5/1/06RRR	KMM/GM
DRAWN BY : TLA 6/05		REV. 10/1/11	MAA/GM
CHECKED BY : VC 6/05			

14-MAY-2012 11:30
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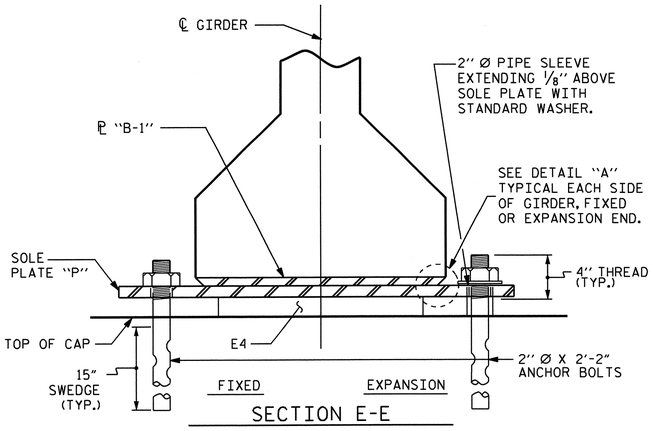
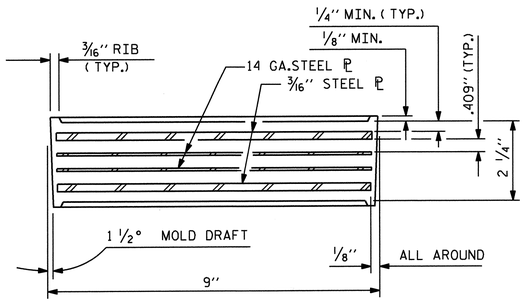
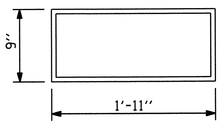
kpaschal



SECTION E-E



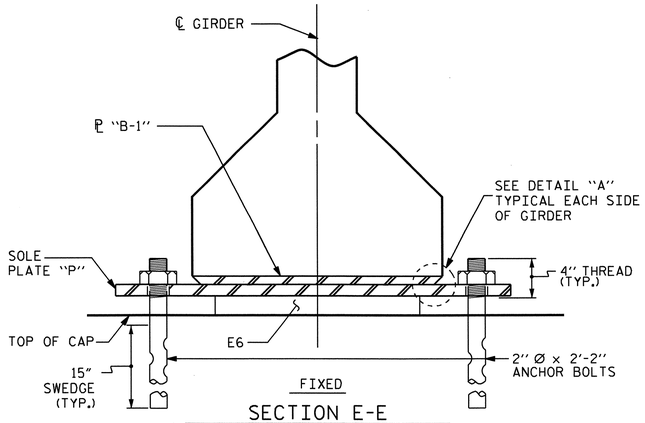
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (28 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



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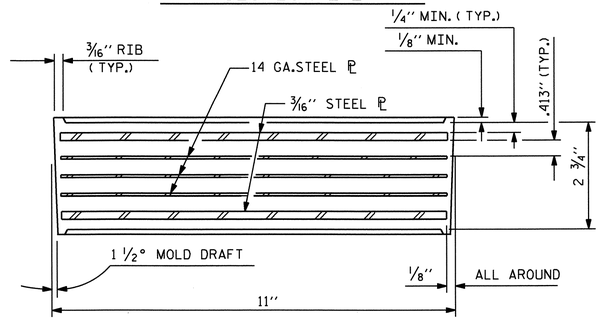
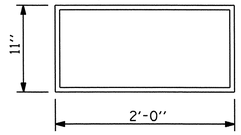


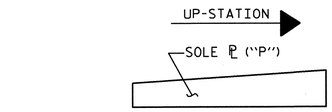
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E6 (14 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE VII



SOLE ℄ PLACEMENT DETAIL

NOTES

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

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

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

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

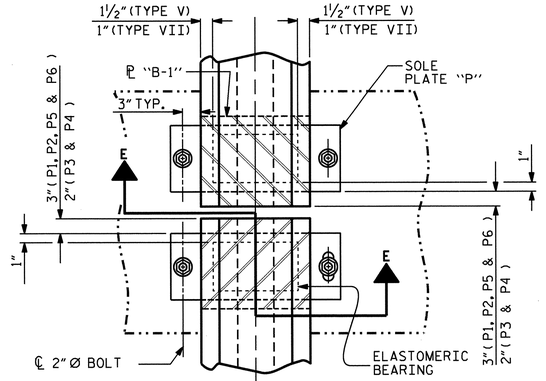
WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

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

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

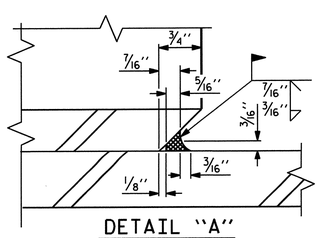
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36.

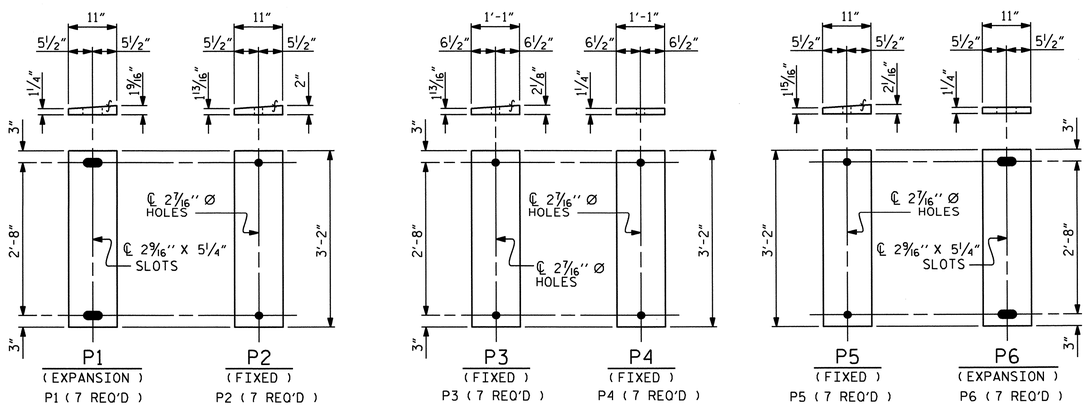


TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



DETAIL "A"



SOLE PLATE DETAILS ("P")

— LOAD RATINGS —	
	MAX.D.L.+ L.L.
TYPE V	180 K
TYPE VII	264 K

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. EB4

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

ASSEMBLED BY : J. G. KHARVA	DATE : 08-18-11	
CHECKED BY : PEGGY PARISI	DATE : 10-28-11	
DRAWN BY : EEM 2/97	REV. 10/17/00	RWW/LES
CHECKED BY : VAP 2/97	REV. 5/1/06	TLA/GM
	REV. 10/1/11	MAA/GM

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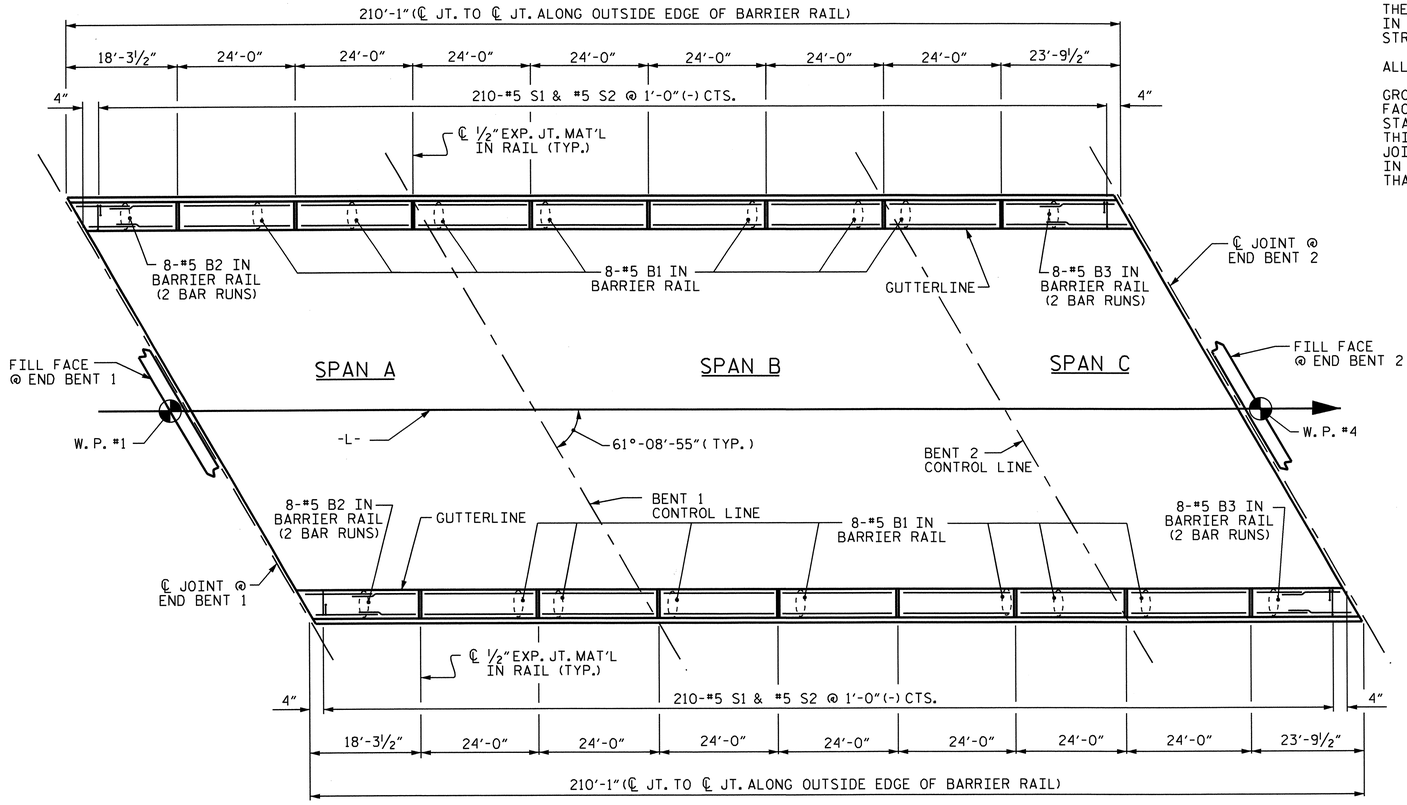
kpaschal



PLAN OF BARRIER RAIL

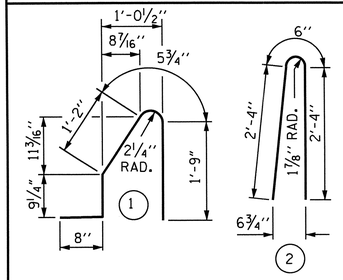
NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

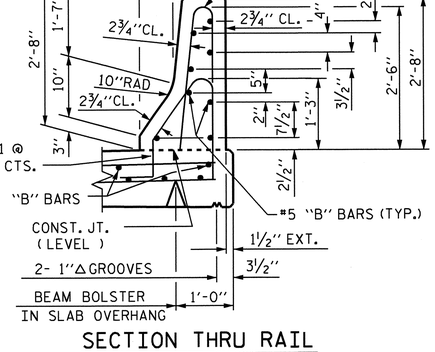
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

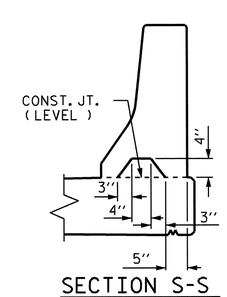
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	112	#5	STR	23'-7"	2755
✳ B2	32	#5	STR	11'-0"	367
✳ B3	32	#5	STR	13'-9"	459
✳ S1	420	#5	1	4'-10"	2117
✳ S2	420	#5	2	5'-2"	2263

✳ EPOXY COATED REINFORCING STEEL	7961 LBS.
CLASS AA CONCRETE	42.1 CU. YDS.
CONCRETE BARRIER RAIL	
SUPERSTRUCTURE	420.17 LIN. FT.
● APPROACH SLABS	41.66 LIN. FT.
TOTAL	461.83 LIN. FT.

● FOR EPOXY COATED REINFORCING STEEL AND CLASS AA CONCRETE IN THE BARRIER RAIL ON THE APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.

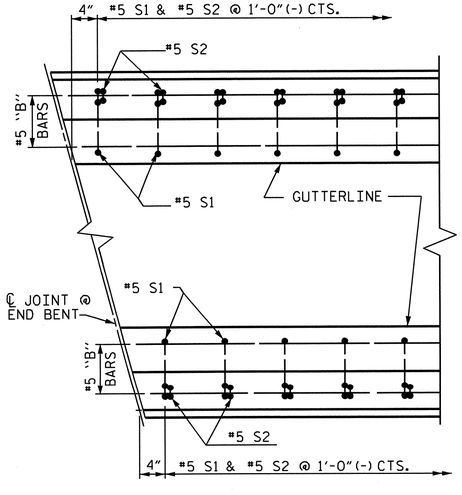


SECTION THRU RAIL

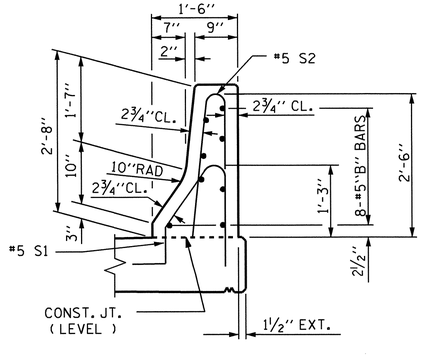


SECTION S-S

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

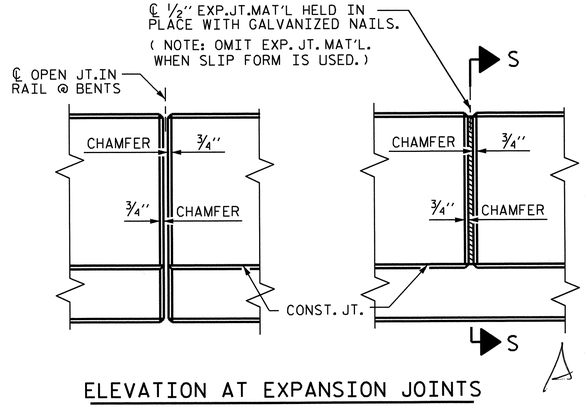


PLAN



END VIEW

END OF RAIL DETAILS



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 23008 ENGINEER KEITH PASCHAL
6/29/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			38

ASSEMBLED BY : J. G. KHARVA	DATE : 08-18-11		
CHECKED BY : PEGGY PARISI	DATE : 10-28-11		
DRAWN BY : ARB 5/87	REV. 5/7/03R	RWW/JTE	
CHECKED BY : SJD 9/87	REV. 5/1/06R	TLA/GM	
	REV. 10/1/11	MAA/GM	

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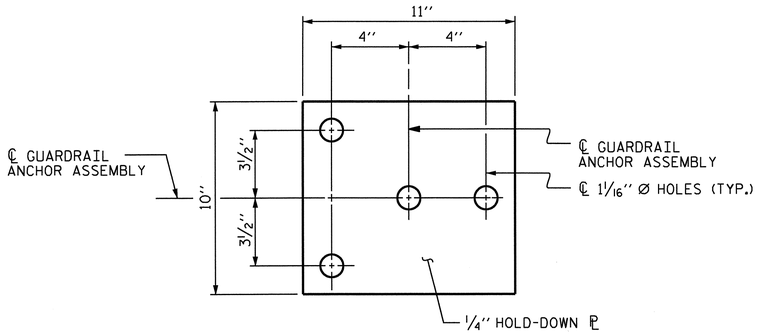
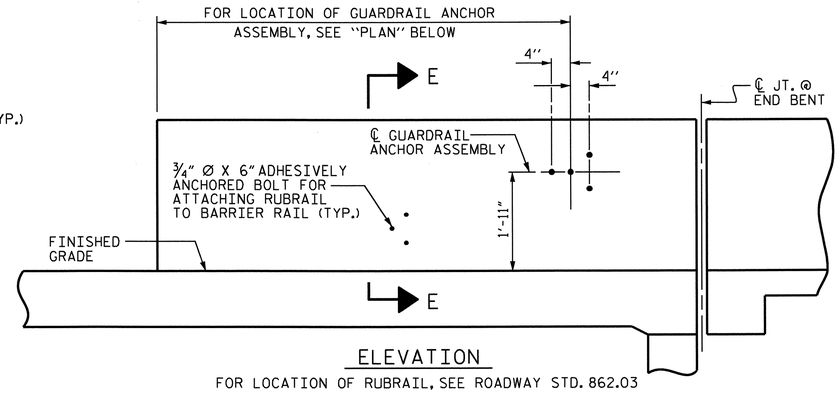
kpaschal

STR. #1 STD. NO. CBR1 (SHT 3)

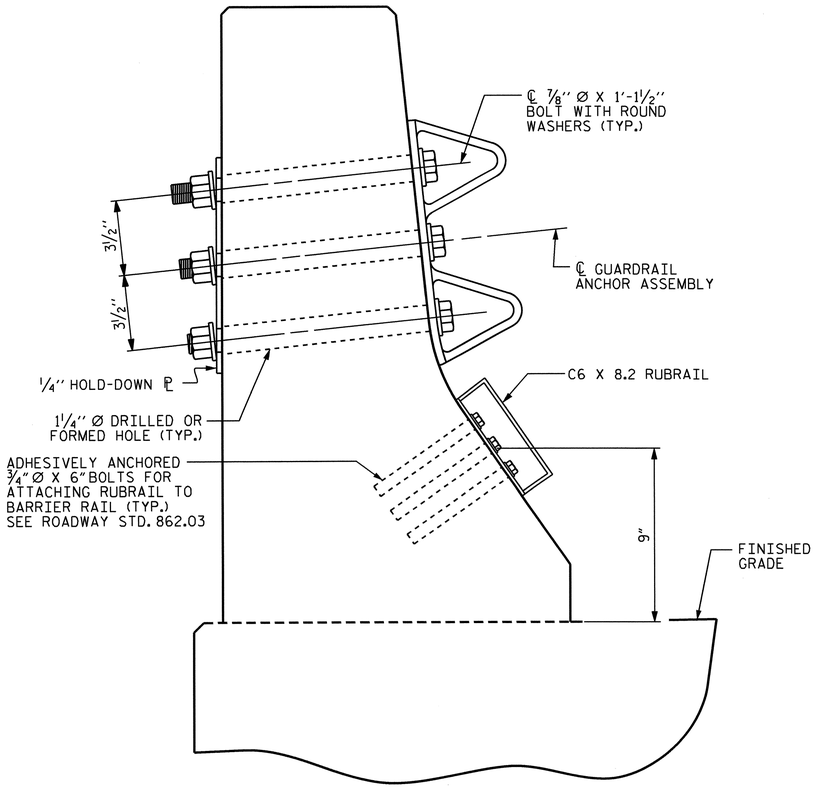


PLAN

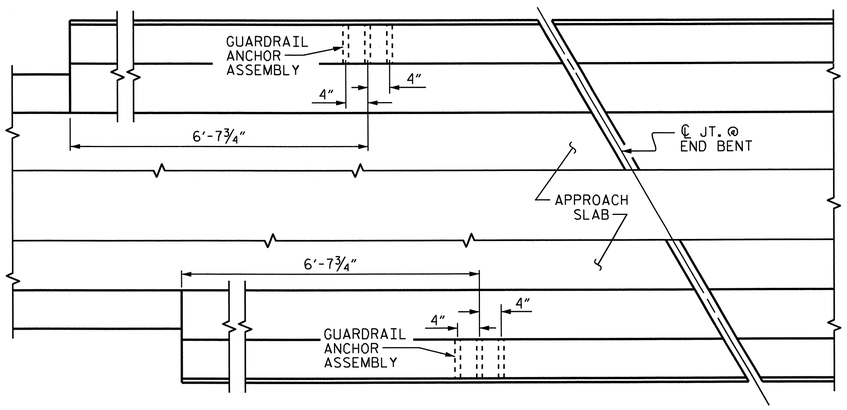


ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



SECTION E-E



PLAN

GUARDRAIL ANCHOR ASSEMBLY DETAILS

LOCATION OF ANCHORS FOR GUARDRAIL

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

NOTES

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

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

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

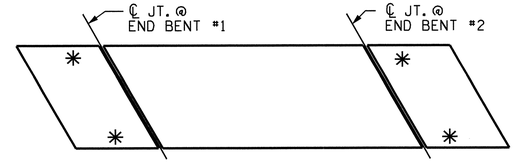
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

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

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4''Ø X 6''BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4''Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL E2008 ENGINEER KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			38

ASSEMBLED BY : J. G. KHARVA	DATE : 8-18-11
CHECKED BY : PEGGY PARISI	DATE : 10-28-11
DRAWN BY : TLA 5/06	ADDED 5/1/06RR KMM/GM
CHECKED BY : GM 5/06	REV. 10/1/11 MAA/GM

14-MAY-2012 11:30
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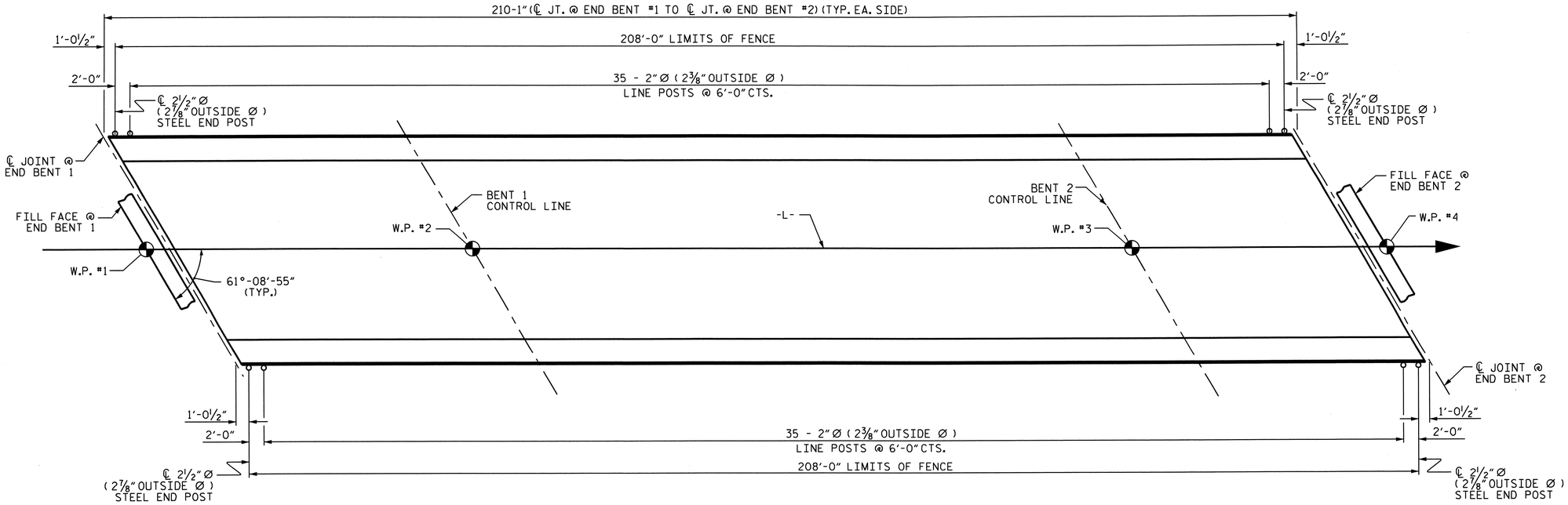
kpaschal

STR. #1 (SHT 3a) STD. NO. GRA2



PLAN OF FENCE POST SPACING

PAY LENGTH = 416.00 FEET

NOTES:

FOR 72" CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

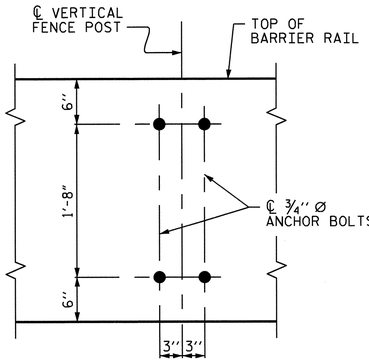
MATERIAL FOR ANCHOR BOLTS SHALL BE TYPE 304 STAINLESS STEEL WITH A MINIMUM 9000 PSI ULTIMATE STRENGTH. NUTS AND WASHERS SHALL BE TYPE 304 STAINLESS STEEL. ANCHOR BOLTS SHALL BE EMBEDDED AS PER ADHESIVE BONDING SYSTEM MANUFACTURER SPECIFICATIONS. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK NUTS, CLASS 2B THREADS.

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. LEVEL ONE FIELD TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE ¾" Ø BOLTS IS 12.0 KIPS.

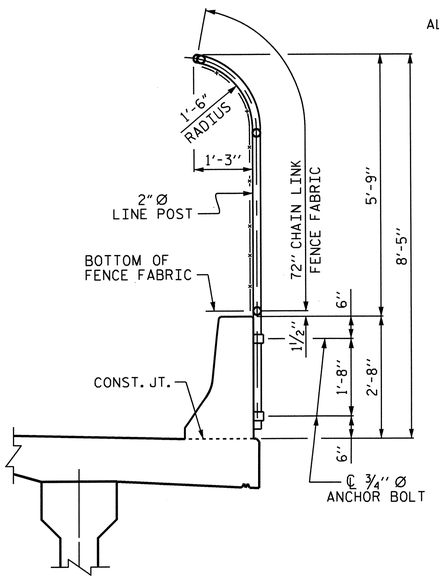
ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.

FENCE POST LOCATIONS SHALL BE SHIFTED, AS NECESSARY, TO MAINTAIN 12" MINIMUM DISTANCE FROM ANCHOR BOLT TO JOINTS IN BARRIER RAIL.

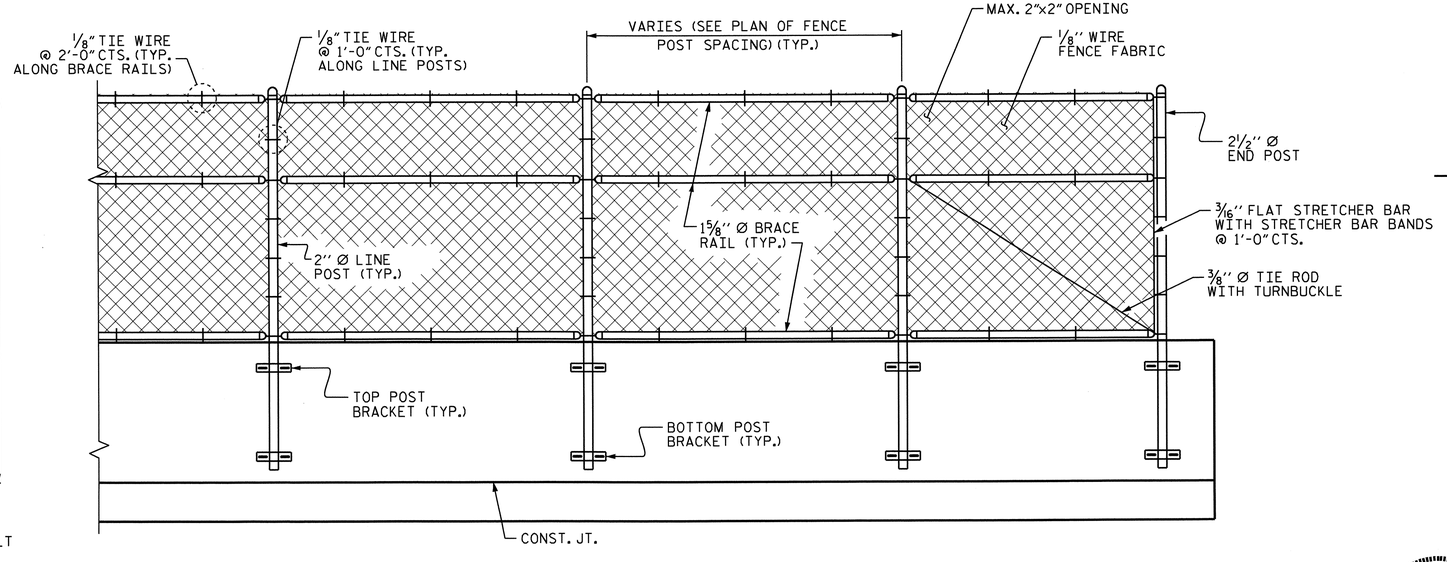
DIMENSIONS TAKEN ALONG OUTSIDE FACE OF BARRIER RAIL.



BOLT SETTING DETAIL



SECTION THRU FENCE



PARTIAL ELEVATION

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BRIDGE MOUNTED 72" CHAIN LINK FENCE

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/19/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : T.L. AVERETTE DATE : 11-29-11
CHECKED BY : PEGGY PARISI DATE : 12-01-11

14-MAY-2012 11:30
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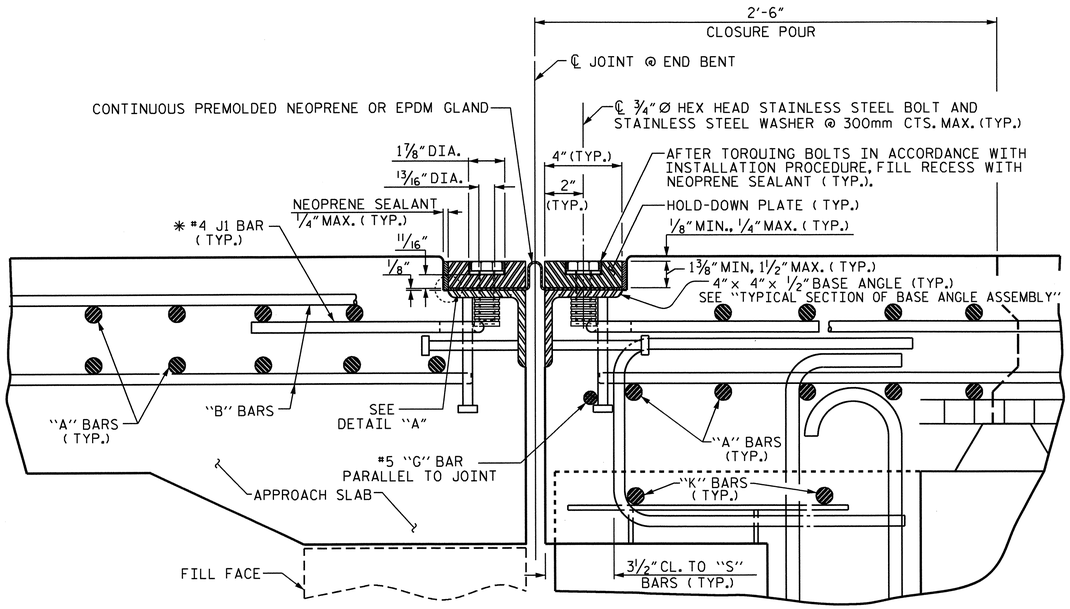
kpaschal



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

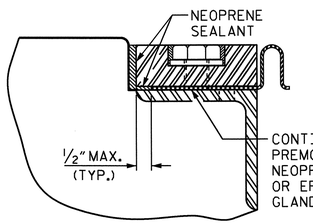
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

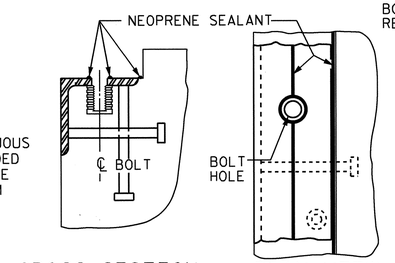
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE ¾" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X ½" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED ⅛" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TOROUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

GENERAL NOTES

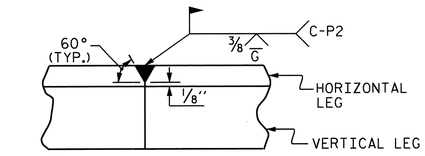
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MIN.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE " TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
7. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
9. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
10. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



DETAIL "A"

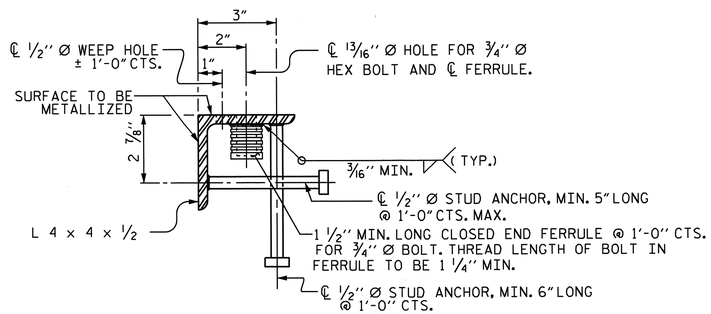


INSTALLATION SKETCH



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	61°-08'-55"	⅞"	1½"	1⅜"	1 3/16"
2	61°-08'-55"	⅞"	1½"	1⅜"	1 3/16"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

NORTH CAROLINA PROFESSIONAL SEAL 22006 ENGINEER KEITH PASCHAL
6/19/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. EJS1 (SHT 1)

ASSEMBLED BY : T.L. AVERETTE DATE : 3-14-12		
CHECKED BY : PEGGY PARISI DATE : 3-14-12		
DRAWN BY : REK 9/87	REV. 5/7/03R	RWW/JTE
CHECKED BY : CRK 10/87	REV. 5/1/06R	TLA/GM
	REV. 10/1/11	MAA/GM

14-MAY-2012 11:30
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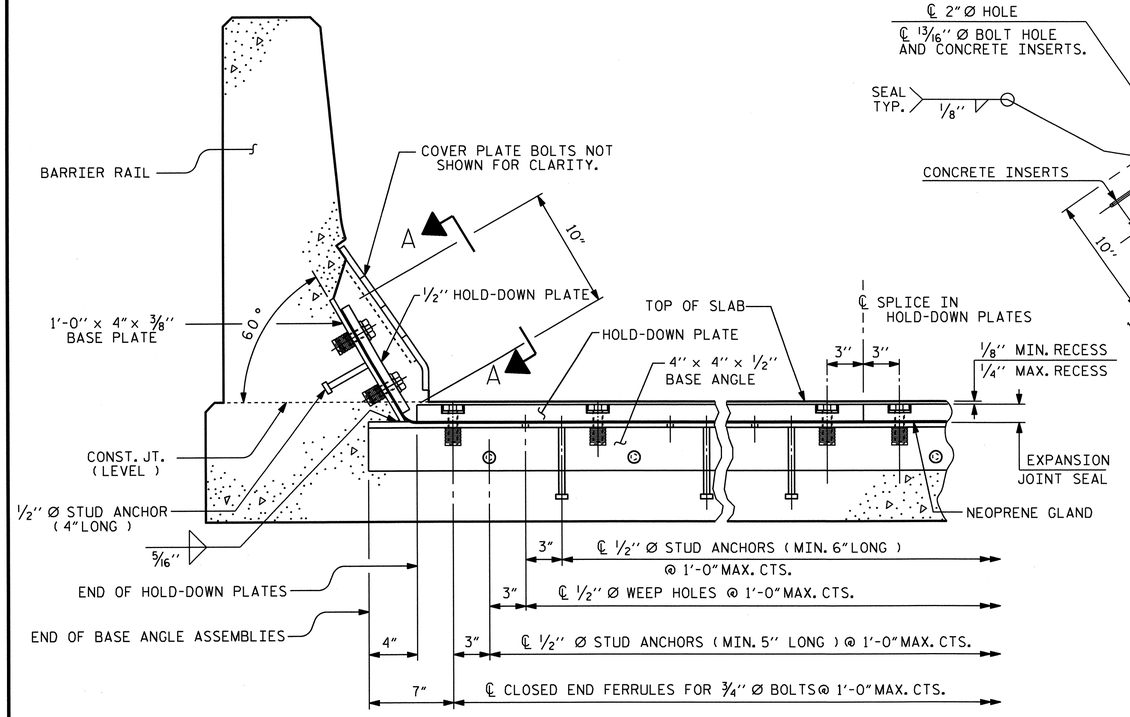
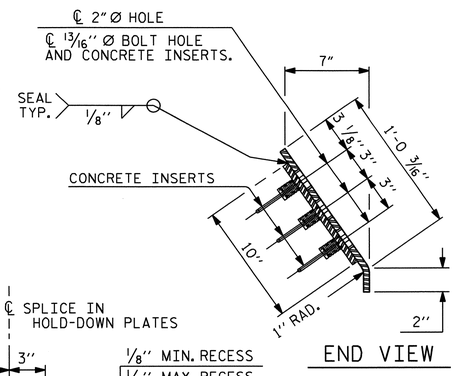
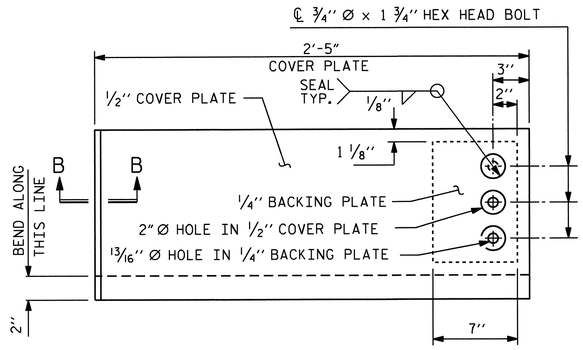
kpaschal



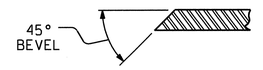
SECTION THRU RAIL NORMAL TO JOINT



END VIEW

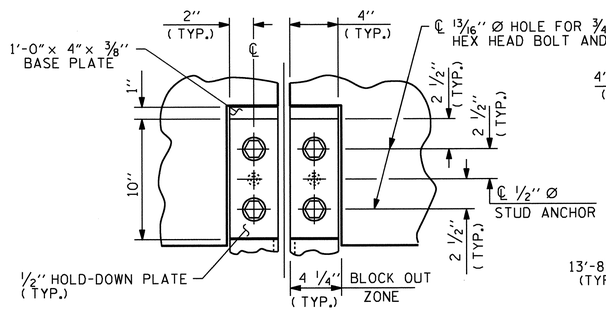


TYPE II - ELEVATION VIEW

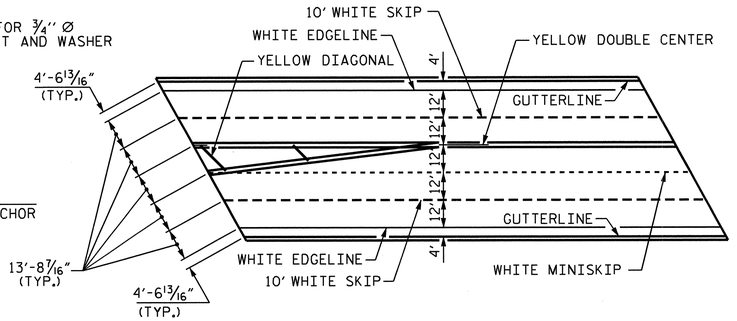


SECTION B - B

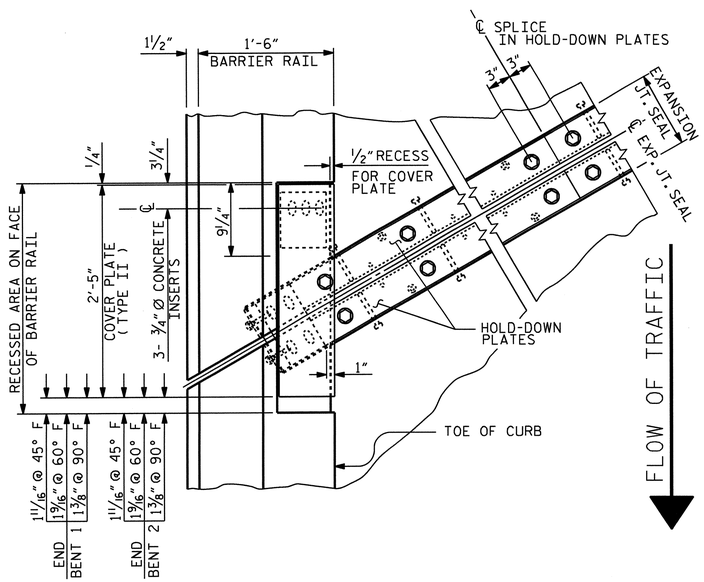
COVER PLATE DETAILS

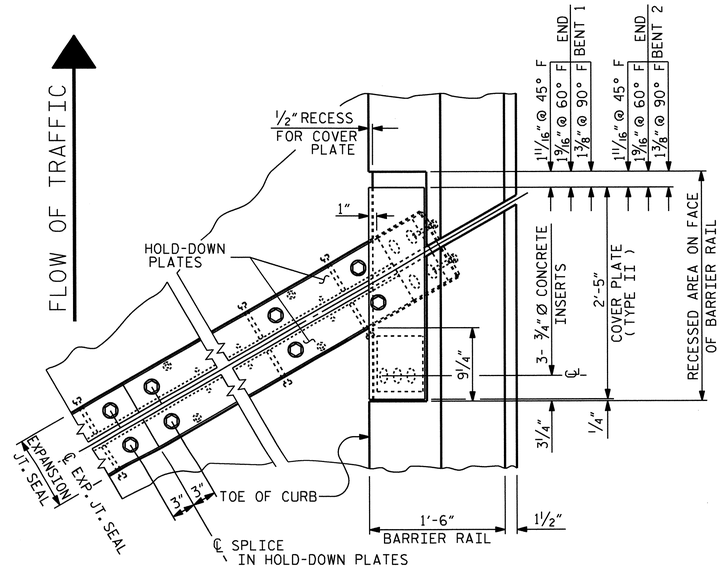


SECTION A - A

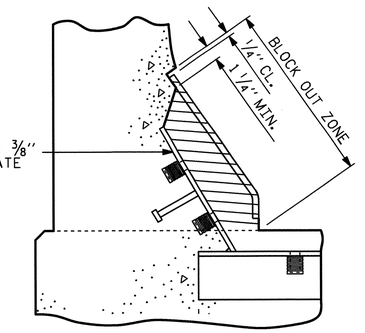


PAVEMENT MARKING ALIGNMENT



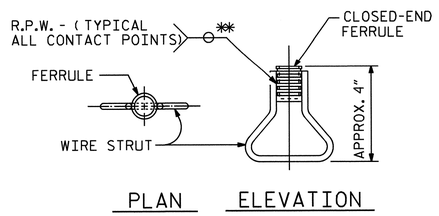


PLAN OF EXPANSION JOINT SEAL



BLOCK OUT DETAIL

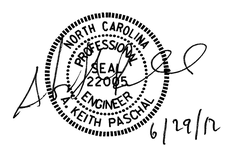
SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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



PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. EJS2 SHT 3

ASSEMBLED BY : T.L. AVERETTE	DATE : 3-14-12		
CHECKED BY : PEGGY PARISI	DATE : 3-14-12		
DRAWN BY : REK 9/87	REV. 10/17/00	RWW/LES	
CHECKED BY : CRK 10/87	REV. 5/1/06	TLA/GM	
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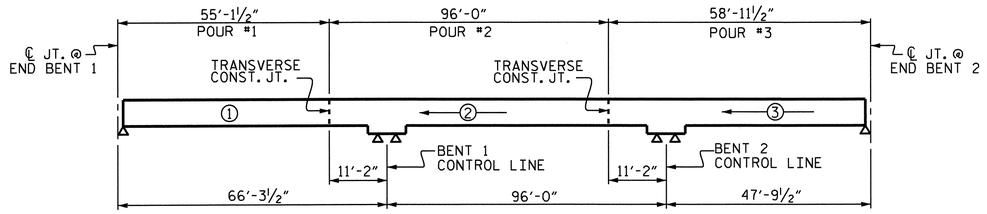
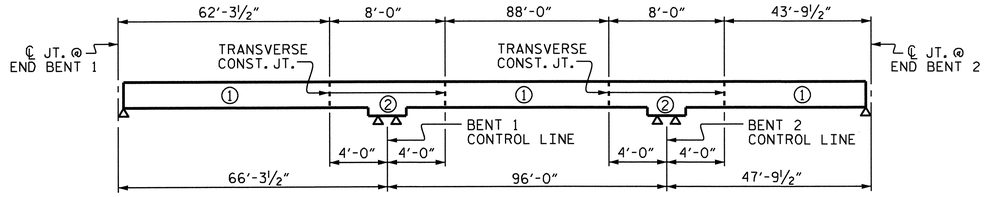
kpaschal

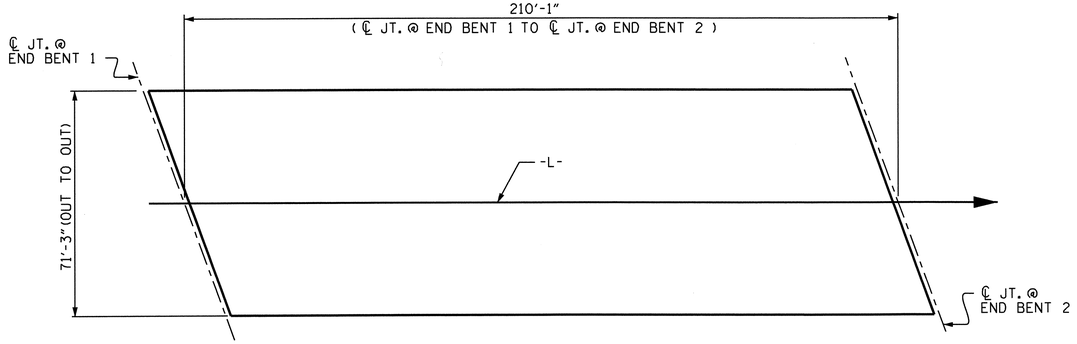


POURING SEQUENCE



OPTIONAL POURING SEQUENCE

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



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 14,968)

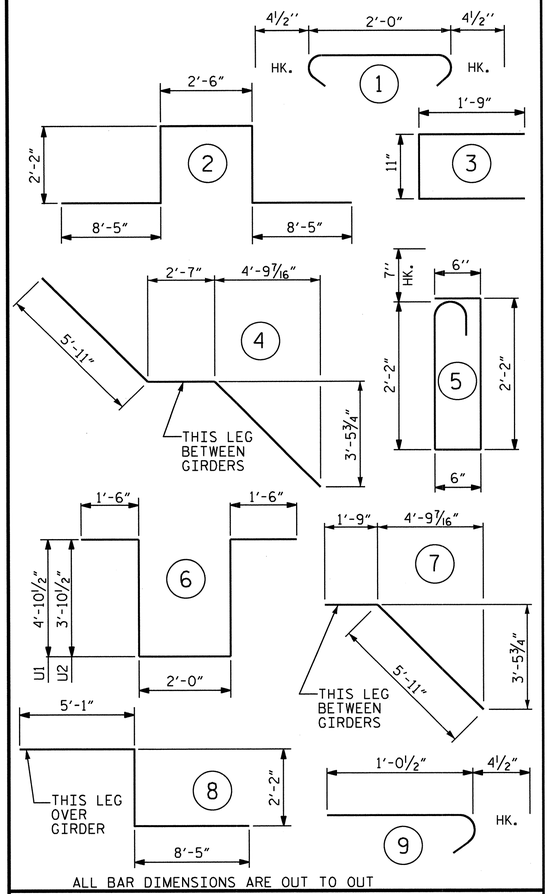
REINFORCING STEEL BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	680	5	STR	36'-9"	26065
A2	680	5	STR	36'-7"	25946
✱A101	8	5	STR	35'-10"	299
✱A102	8	5	STR	35'-0"	292
✱A103	8	5	STR	34'-0"	284
✱A104	8	5	STR	33'-2"	277
✱A105	8	5	STR	32'-3"	269
✱A106	8	5	STR	31'-3"	261
✱A107	4	5	STR	58'-2"	243
✱A108	4	5	STR	56'-5"	235
✱A109	4	5	STR	54'-7"	228
✱A110	4	5	STR	52'-9"	220
✱A111	4	5	STR	51'-0"	213
✱A112	4	5	STR	49'-2"	205
✱A113	4	5	STR	47'-4"	197
✱A114	4	5	STR	45'-6"	190
✱A115	4	5	STR	43'-8"	182
✱A116	4	5	STR	41'-11"	175
✱A117	4	5	STR	40'-1"	167
✱A118	4	5	STR	38'-3"	160
✱A119	4	5	STR	36'-5"	152
✱A120	4	5	STR	34'-7"	144
✱A121	4	5	STR	32'-10"	137
✱A122	4	5	STR	31'-0"	129
✱A123	4	5	STR	29'-2"	122
✱A124	4	5	STR	27'-4"	114
✱A125	4	5	STR	25'-7"	107
✱A126	4	5	STR	23'-9"	99
✱A127	4	5	STR	21'-11"	91
✱A128	4	5	STR	20'-1"	84
✱A129	4	5	STR	18'-3"	76
✱A130	4	5	STR	16'-6"	69
✱A131	4	5	STR	14'-8"	61
✱A132	4	5	STR	12'-10"	54
✱A133	4	5	STR	11'-0"	46
✱A134	4	5	STR	9'-3"	39
✱A135	4	5	STR	7'-5"	31
✱A136	4	5	STR	5'-7"	23
✱A137	4	5	STR	3'-9"	16
✱A138	4	5	STR	2'-0"	8
✱A139	4	5	STR	1'-1"	5
A201	8	5	STR	36'-2"	302
A202	8	5	STR	35'-3"	294
A203	8	5	STR	34'-4"	286
A204	8	5	STR	33'-5"	279
A205	8	5	STR	32'-6"	271
A206	8	5	STR	31'-7"	264
A207	4	5	STR	59'-2"	247
A208	4	5	STR	57'-4"	239
A209	4	5	STR	55'-6"	232
A210	4	5	STR	53'-9"	224
A211	4	5	STR	51'-11"	217
A212	4	5	STR	50'-1"	209
A213	4	5	STR	48'-3"	201
A214	4	5	STR	46'-5"	194
A215	4	5	STR	44'-8"	186
A216	4	5	STR	42'-10"	179
A217	4	5	STR	41'-0"	171
A218	4	5	STR	39'-2"	163
A219	4	5	STR	37'-4"	156
A220	4	5	STR	35'-7"	148
A221	4	5	STR	33'-9"	141
A222	4	5	STR	31'-11"	133
A223	4	5	STR	30'-1"	126
A224	4	5	STR	28'-4"	118
A225	4	5	STR	26'-6"	111
A226	4	5	STR	24'-8"	103
A227	4	5	STR	22'-10"	95
A228	4	5	STR	21'-1"	88
A229	4	5	STR	19'-3"	80
A230	4	5	STR	17'-5"	73
A231	4	5	STR	15'-7"	65
A232	4	5	STR	13'-9"	57
A233	4	5	STR	12'-0"	50
A234	4	5	STR	10'-2"	42
A235	4	5	STR	8'-4"	35
A236	4	5	STR	6'-6"	27
A237	4	5	STR	4'-8"	19
A238	4	5	STR	2'-11"	12
A239	4	5	STR	1'-1"	5
✱B1	122	4	STR	22'-5"	1827
✱B2	61	6	STR	59'-4"	5436
✱B3	60	6	STR	24'-8"	2223
✱B4	61	6	STR	53'-10"	4932
✱B5	60	6	STR	21'-11"	1975
✱B6	122	4	STR	17'-0"	1385
✱B7	61	4	STR	29'-9"	1212
B8	344	5	STR	54'-1"	19405
✱G1	4	5	STR	41'-9"	174
✱J1	156	4	9	1'-5"	148
✱K1	8	8	8	15'-8"	335
✱K2	20	8	2	23'-8"	1264
✱K3	36	6	STR	9'-10"	532
K4	50	4	4	14'-5"	482
K5	24	4	STR	10'-3"	164
K6	24	4	STR	9'-10"	158
K7	24	4	STR	8'-7"	138
K8	48	4	STR	11'-0"	353
K9	20	4	7	7'-8"	102
✱S1	120	5	5	5'-11"	741
✱S2	120	4	3	4'-5"	354
S3	408	4	1	2'-9"	749
U1	84	4	6	14'-9"	828
U2	24	4	6	12'-9"	204

REINFORCING STEEL LBS. 54371

✱ EPOXY COATED REINFORCING STEEL LBS. 54307

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	136.0	54371	54307
POUR 2	254.9		
POUR 3	172.7		
TOTALS✱✱	563.6	54371	54307

✱✱QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

GROOVING BRIDGE FLOORS

BRIDGE DECK	13559	SQ.FT.
APPROACH SLABS	3083	SQ.FT.
TOTAL	16642	SQ.FT.

NORTH CAROLINA PROFESSIONAL SEAL 22001 ENGINEER KEITH PASCHAL

6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

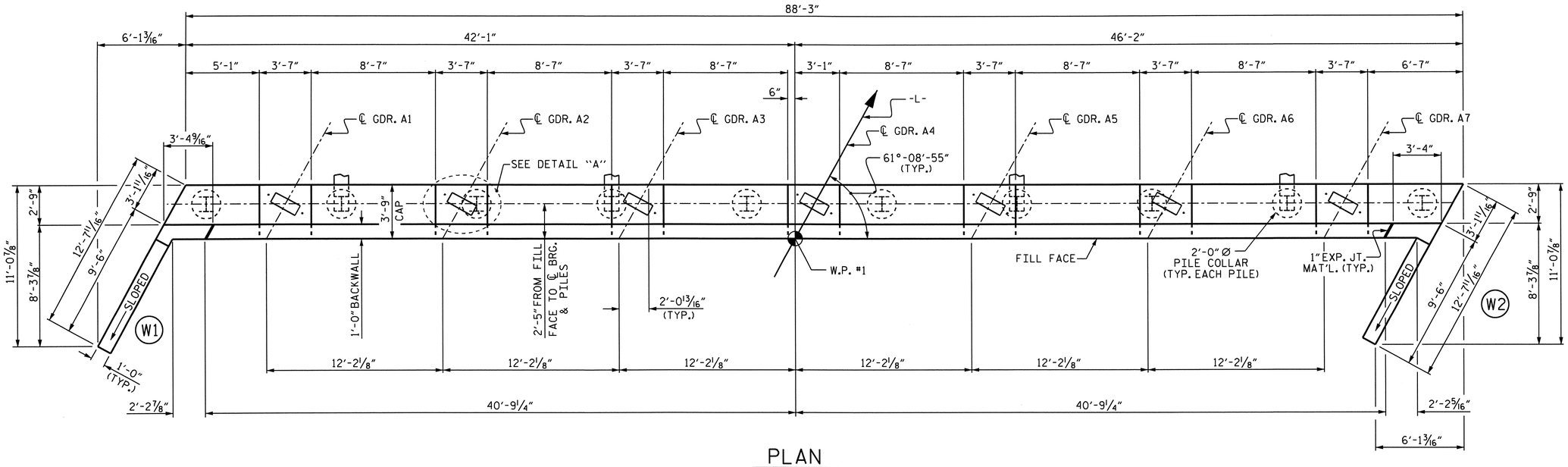
STANDARD
SUPERSTRUCTURE BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. BOM2

ASSEMBLED BY : J. G. KHARVA	DATE : 08-18-11
CHECKED BY : PEGGY PARISI	DATE : 10-28-11
DRAWN BY : JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

14-MAY-2012 11:30
R:\Structures\FinalPlans\str1_bridge\B3680_sd_bm_01.dgn
kpaschal



NOTES

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

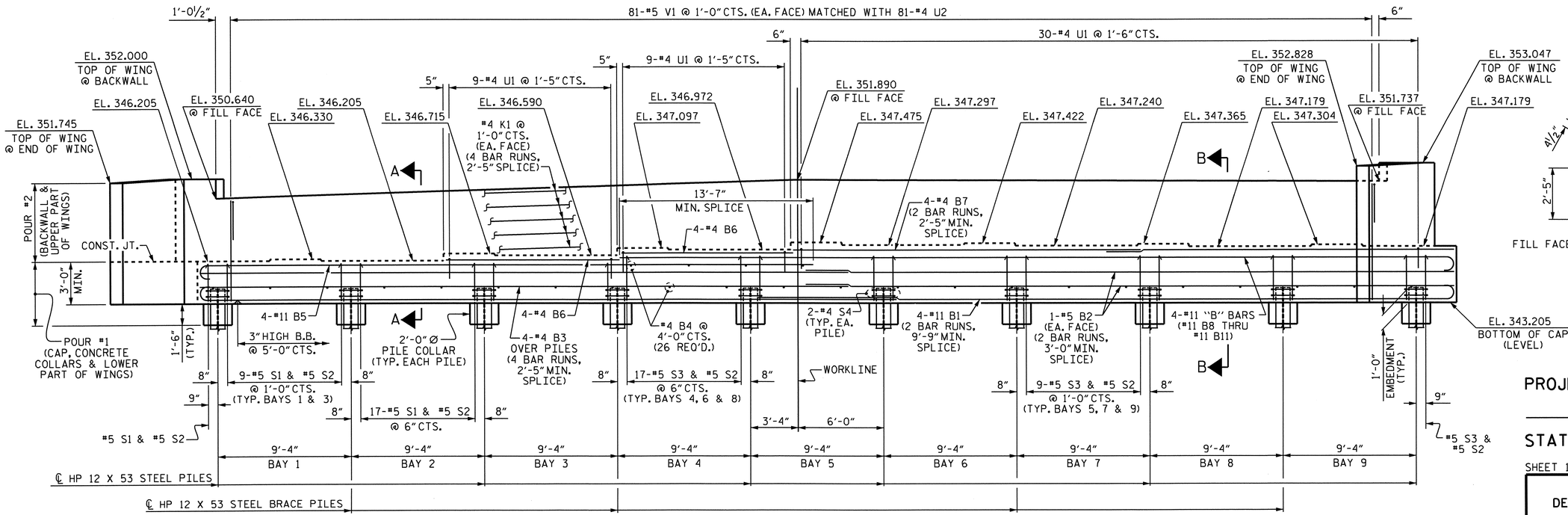
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

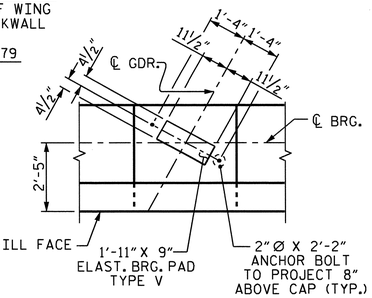
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

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

PLAN



ELEVATION



DETAIL "A"

TYP. EA. GDR.

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 22008 ENGINEER KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : T.L. AVERETTE DATE : 11-09-11
CHECKED BY : O. PUIGCERVER DATE : 3-21-12

29-JUN-2012 06:50
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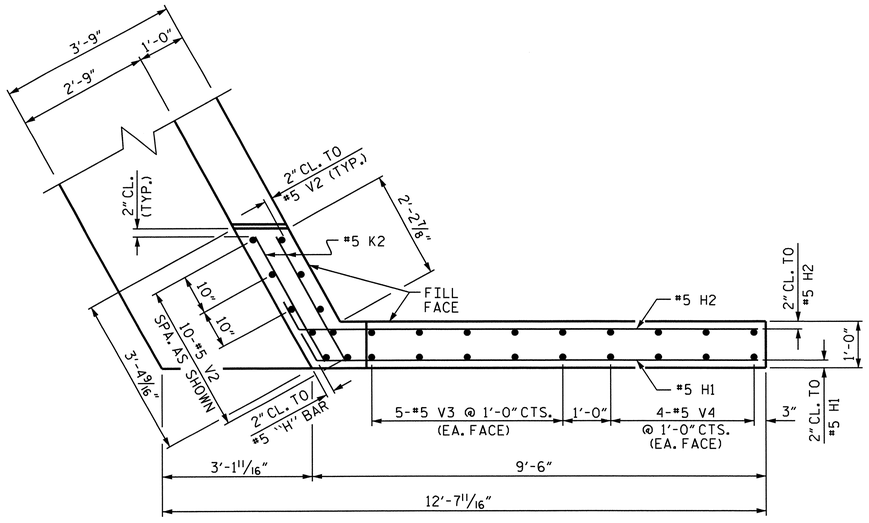
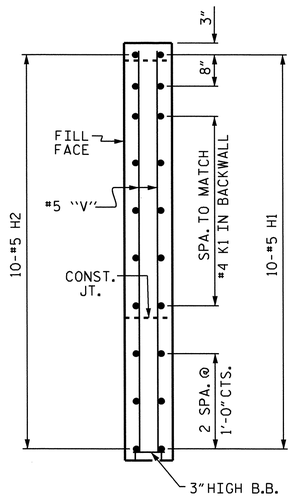
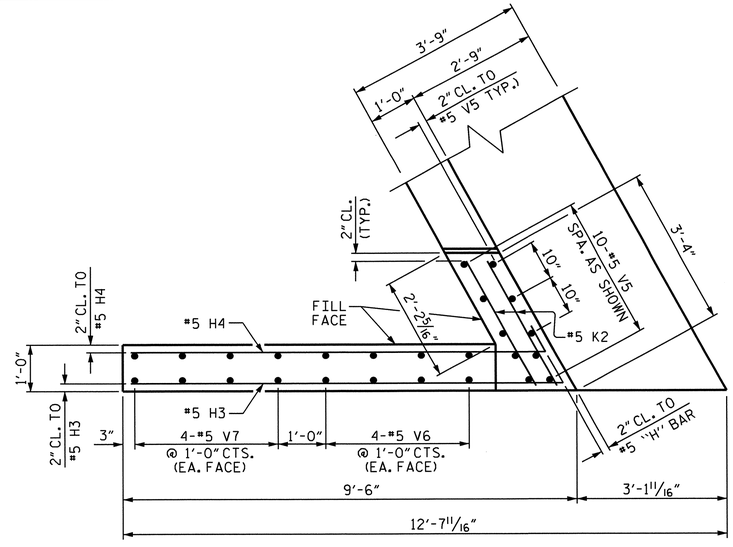
kpaschal



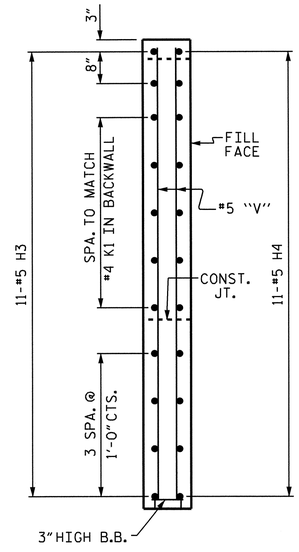
PLAN OF LEFT WING (W1)



SECTION X-X



PLAN OF RIGHT WING (W2)



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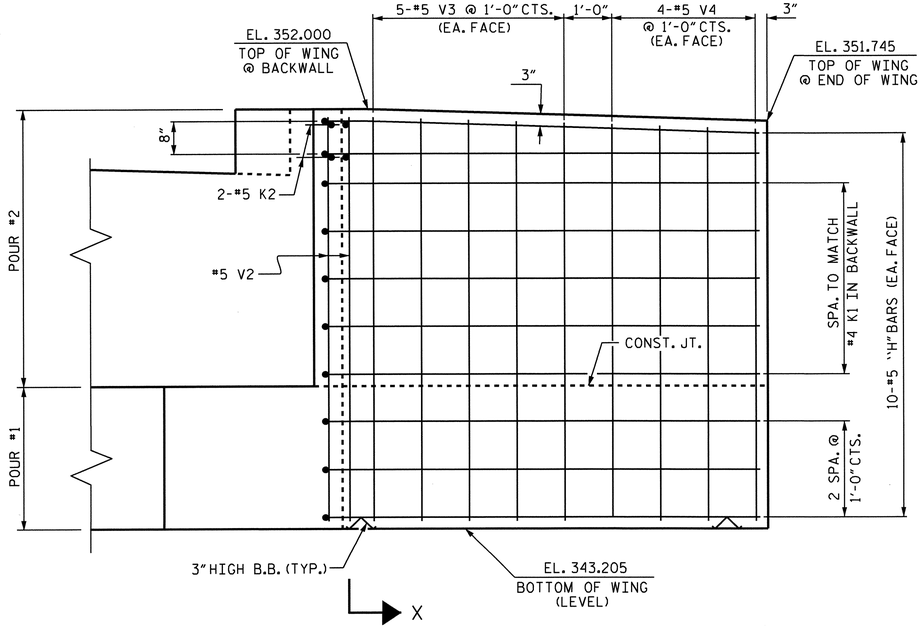
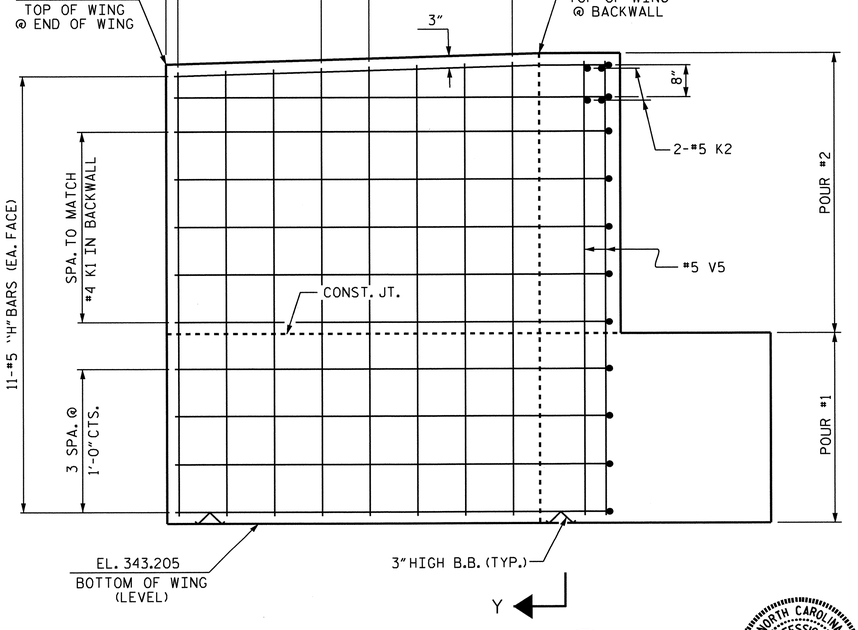


ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : T.L. AVERETTE DATE : 11-14-11
CHECKED BY : O. PUIGCERVER DATE : 3-21-12

14-MAY-2012 11:30
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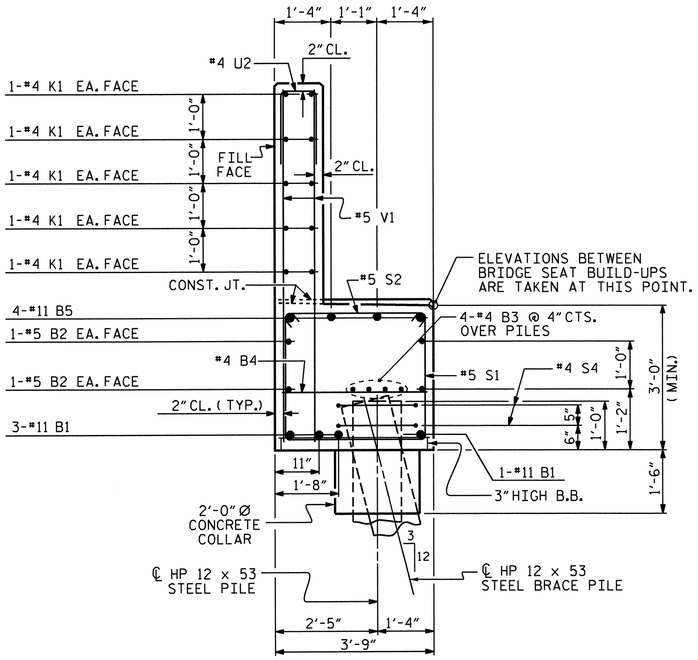
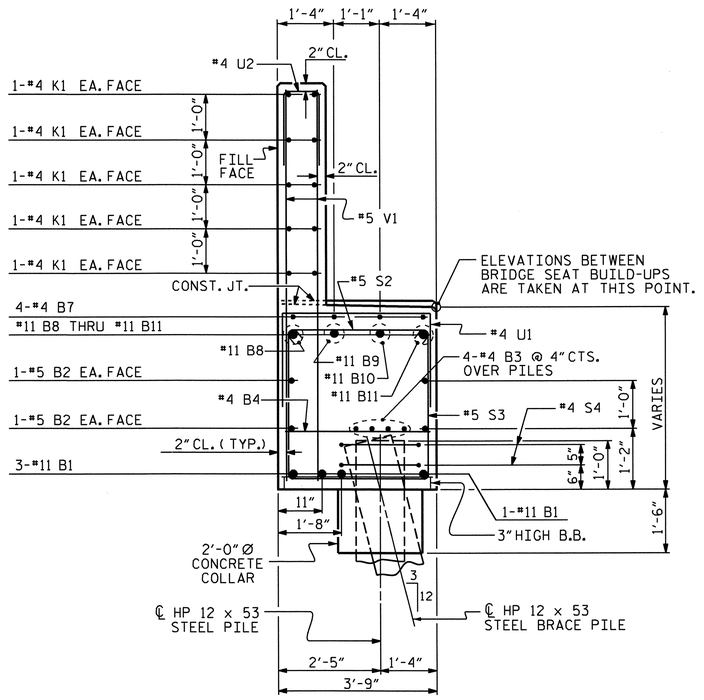
kpaschal

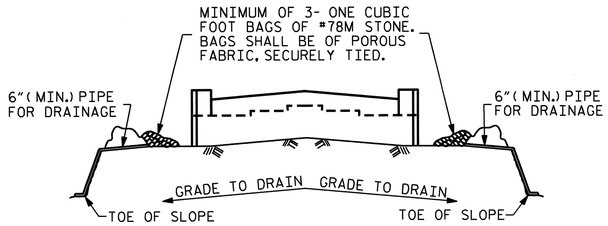
STR. #1



SECTION A-A



SECTION B-B

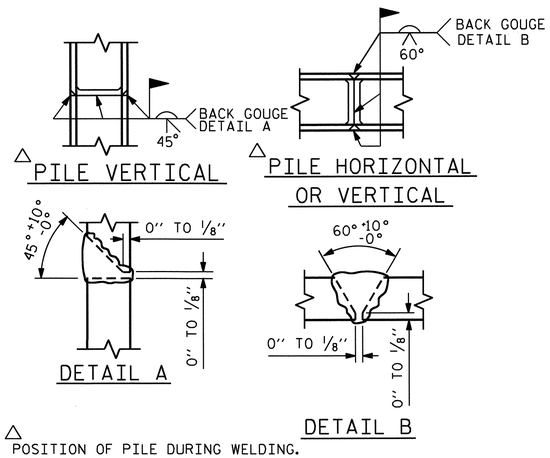


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

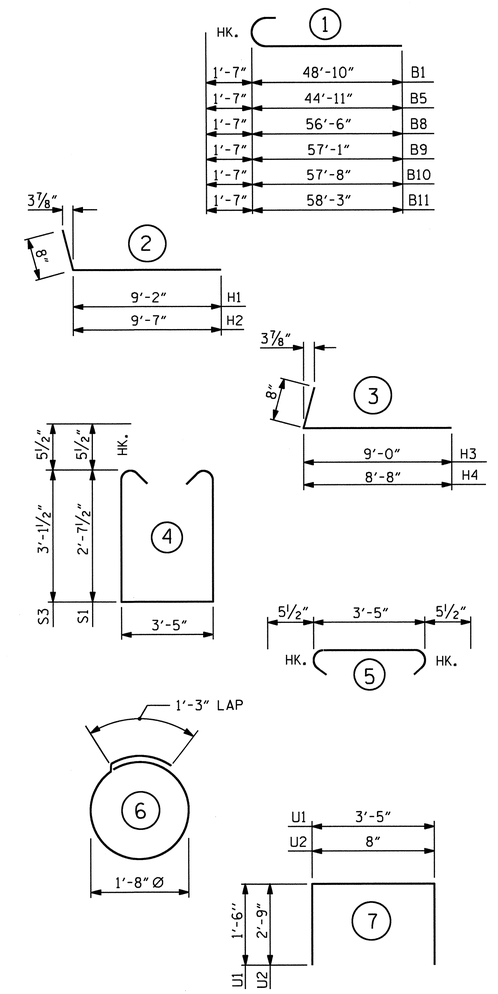
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	11	1	50'-5"	2143
B2	8	5	STR	45'-6"	380
B3	16	4	STR	23'-10"	255
B4	26	4	STR	3'-5"	59
B5	4	11	1	46'-6"	988
B6	8	4	STR	12'-2"	65
B7	8	4	STR	24'-5"	130
B8	1	11	1	58'-1"	309
B9	1	11	1	58'-8"	312
B10	1	11	1	59'-3"	315
B11	1	11	1	59'-10"	318
H1	10	5	2	9'-10"	103
H2	10	5	2	10'-3"	107
H3	11	5	3	9'-8"	111
H4	11	5	3	9'-4"	107
K1	40	4	STR	23'-10"	637
K2	8	5	STR	2'-11"	24
S1	36	5	4	9'-7"	360
S2	115	5	5	4'-4"	520
S3	79	5	4	10'-7"	872
S4	20	4	6	6'-6"	87
U1	48	4	7	6'-5"	206
U2	81	4	7	6'-2"	334
V1	162	5	STR	7'-1"	1197
V2	10	5	STR	8'-5"	88
V3	10	5	STR	8'-4"	87
V4	8	5	STR	8'-2"	68
V5	10	5	STR	9'-6"	99
V6	8	5	STR	9'-5"	79
V7	8	5	STR	9'-3"	77

REINFORCING STEEL LBS. 10437

CLASS "A" CONCRETE BREAKDOWN

POUR #1

CAP, CONCRETE COLLARS & LOWER PART OF WINGS 49.6 C.Y.

POUR #2

BACKWALL & UPPER PART OF WINGS 18.9 C.Y.

CLASS "A" CONCRETE TOTAL 68.5 C.Y.

HP 12 x 53 STEEL PILES

NO. 10 LIN. FT. 800

STEEL PILE POINTS 10 EA.

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			38

STR. #1

DRAWN BY : T.L. AVERETTE DATE : 11-14-11
CHECKED BY : O. PUIGCERVER DATE : 3-21-12

14-MAY-2012 11:30
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kpaschal

NOTES

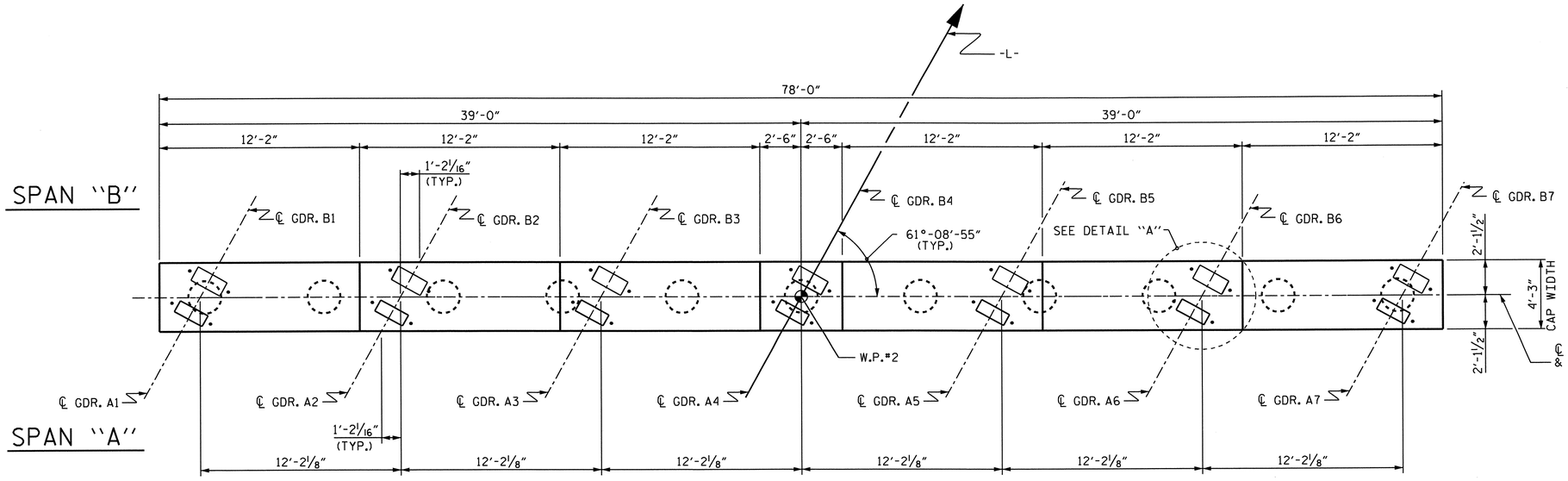
STIRRUPS AND 'U' BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

SHEAR CONNECTORS TO BE WELDED INTO PLACE AFTER PILES ARE IN PLACE.

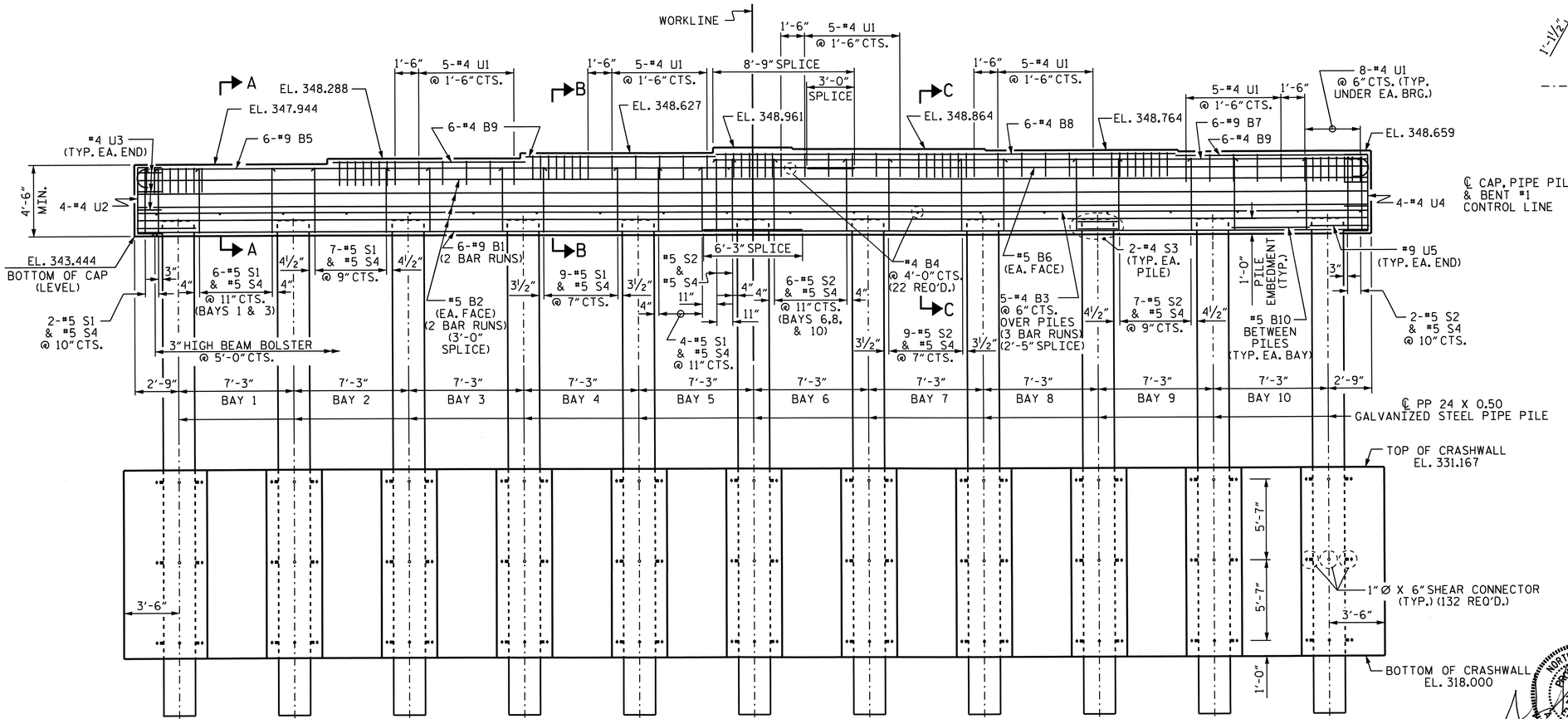
GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 45 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

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

CONCRETE DISPLACED BY THE FILLED 24" STEEL PIPE PILES HAS BEEN DEDUCTED FROM THE QUANTITY OF CLASS "A" CONCRETE FOR THE BENT CAP AND THE CRASHWALL.

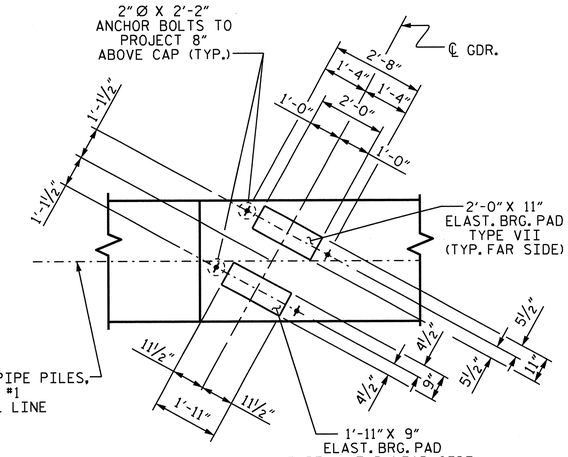


PLAN



ELEVATION

FOR REINFORCEMENT STEEL IN CRASHWALL, SEE SHEET 2 OF 3



DETAIL "A"

TYP. EA. GDR.
(PIPE PILE NOT SHOWN)

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			38

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL

6/29/12

DRAWN BY : B.N.BARODAWALA DATE : 3-5-12
CHECKED BY : O. PUIGCERVER DATE : 3-30-12

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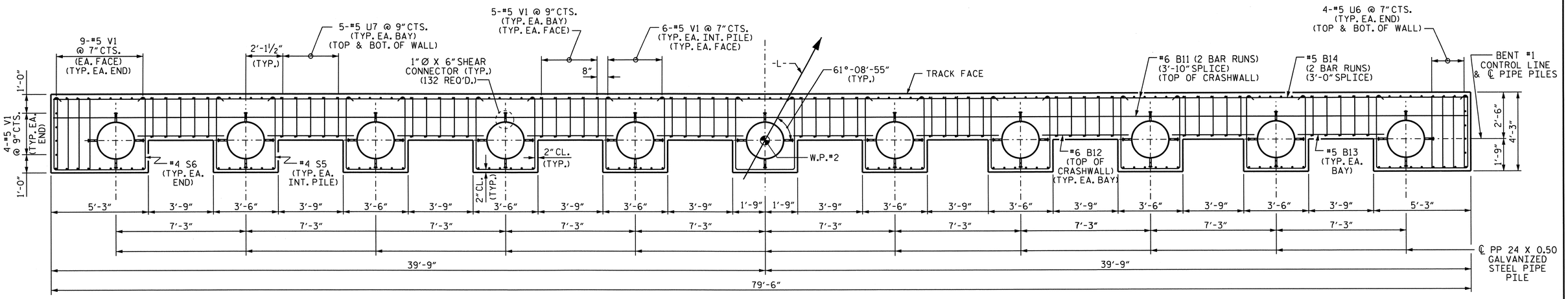
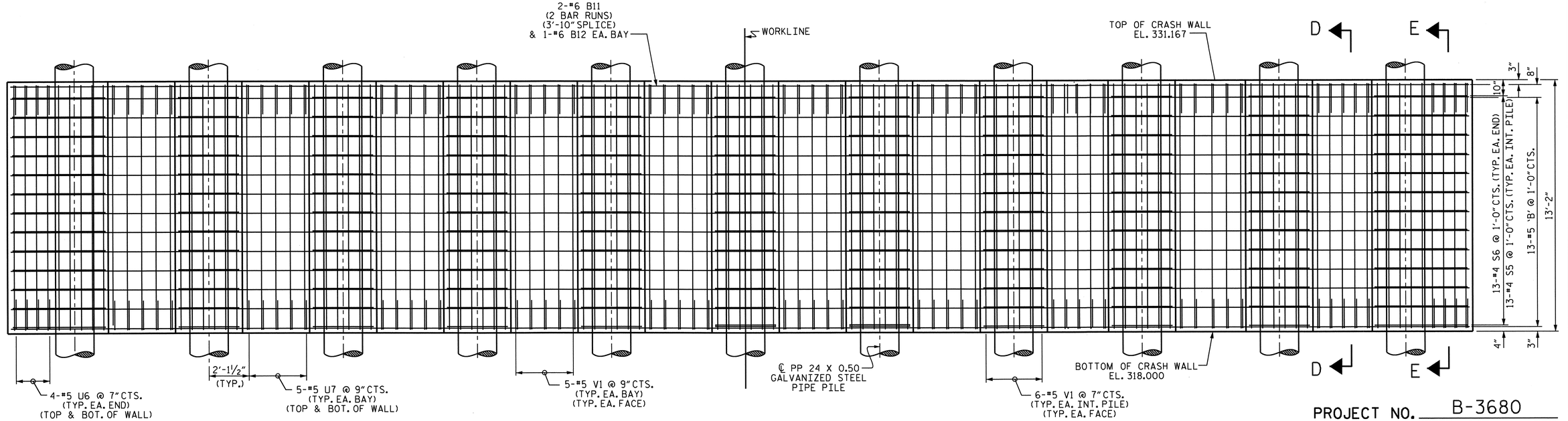
kpaschal



PLAN OF CRASHWALL



ELEVATION OF CRASHWALL

(SHEAR CONNECTORS NOT SHOWN FOR CLARITY)

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			38

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL
6/19/12

DRAWN BY : B.N.BARODAWALA DATE : 3-5-12
CHECKED BY : O. PUIGCERVER DATE : 3-30-12

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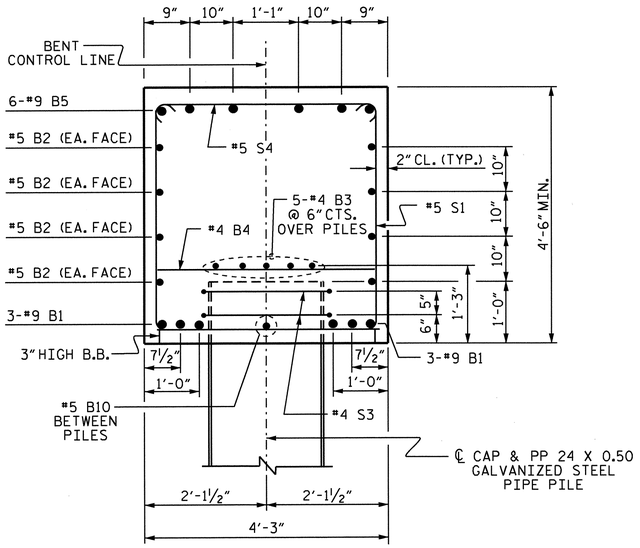
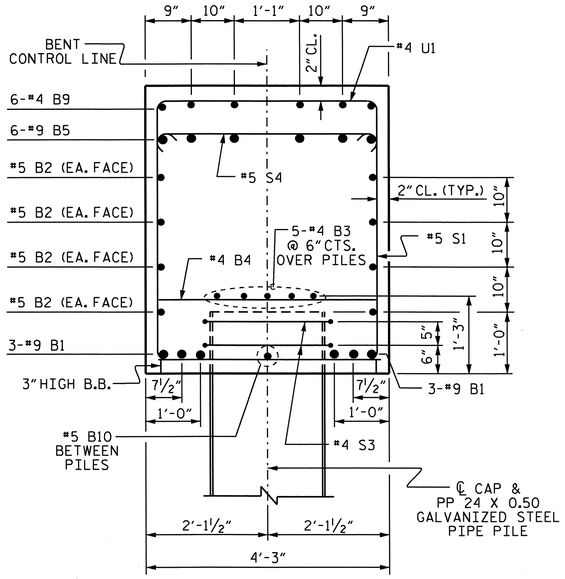
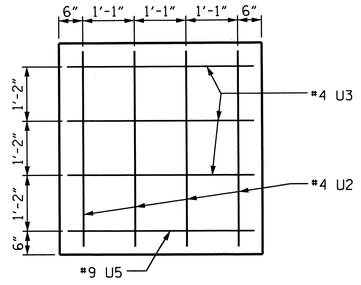
kpaschal



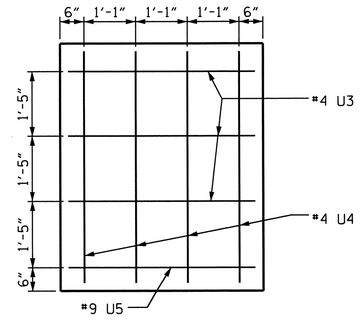
SECTION A-A



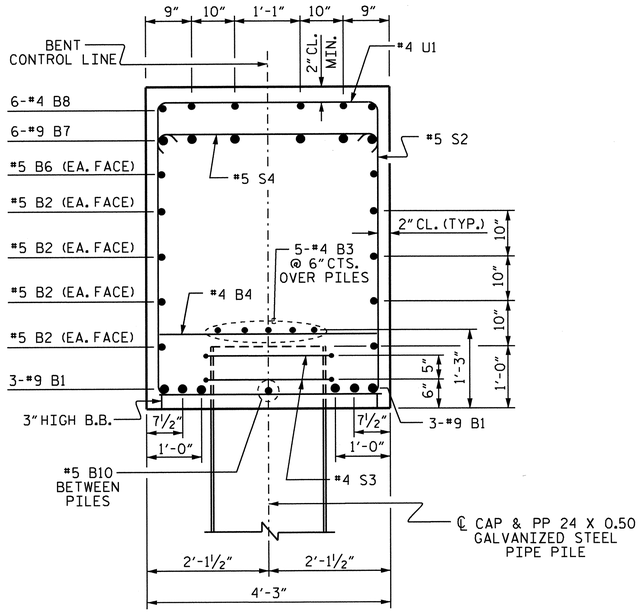
SECTION B-B



LEFT END VIEW



RIGHT END VIEW



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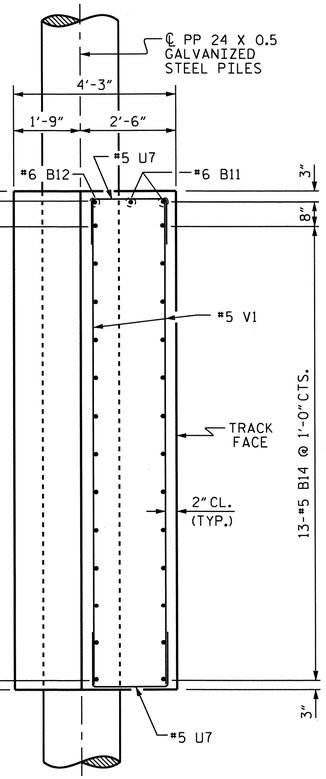

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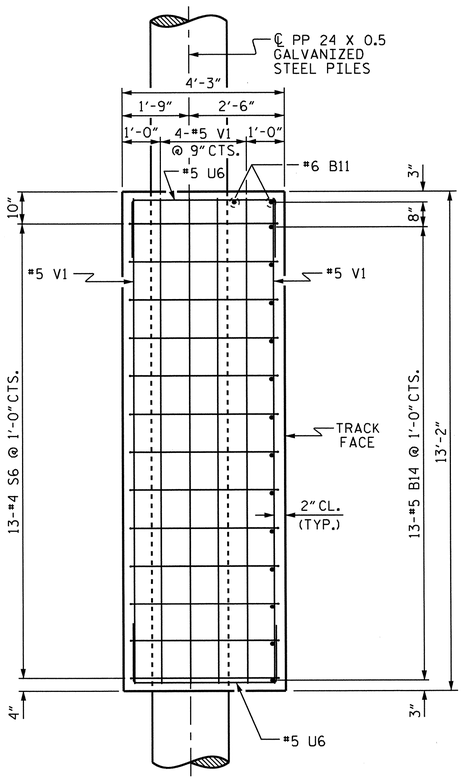
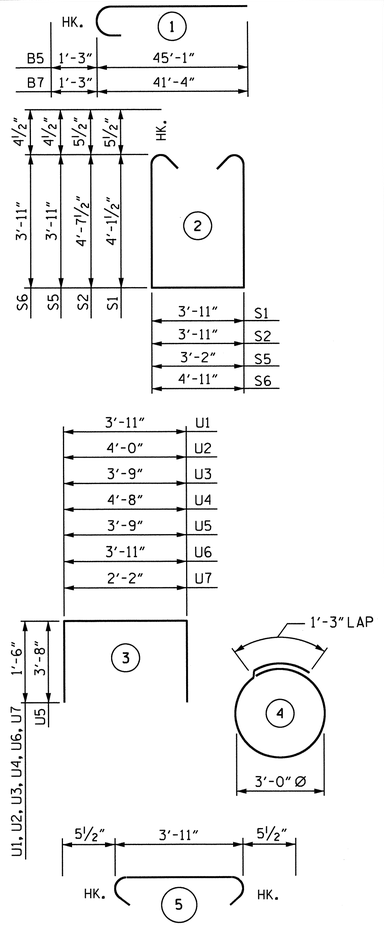


SECTION E-E

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	STR	42'-0"	1714
B2	16	#5	STR	40'-4"	673
B3	15	#4	STR	27'-6"	276
B4	22	#4	STR	3'-11"	58
B5	6	#9	1	46'-4"	945
B6	2	#5	STR	35'-7"	74
B7	6	#9	1	42'-7"	869
B8	6	#4	STR	29'-0"	116
B9	18	#4	STR	12'-2"	146
B10	10	#5	STR	4'-11"	51
B11	4	#6	STR	41'-6"	249
B12	10	#6	STR	4'-11"	74
B13	130	#5	STR	4'-11"	667
B14	26	#5	STR	41'-1"	1114
S1	34	#5	2	13'-1"	464
S2	38	#5	2	14'-1"	558
S3	22	#4	4	10'-8"	157
S4	72	#5	5	4'-10"	363
S5	117	#4	2	11'-9"	918
S6	26	#4	2	13'-6"	234
U1	81	#4	3	6'-11"	374
U2	4	#4	3	7'-0"	19
U3	6	#4	3	6'-9"	27
U4	4	#4	3	7'-8"	20
U5	2	#9	3	11'-1"	75
U6	16	#5	3	6'-11"	115
U7	100	#5	3	5'-2"	539
V1	252	#5	STR	12'-10"	3373

REINFORCING STEEL 14262 LBS.

CLASS "A" CONCRETE
CAP 61.4 C.Y.
CRASHWALL 115.9 C.Y.
TOTAL 177.3 C.Y.

PP 24 X 0.50 GALVANIZED STEEL PILES
NO. = 11 935 LIN. FT.

PDA TESTING EA. 1

STEEL PILE POINTS EA. 11

DRAWN BY : B.N.BARODAWALA DATE : 3-5-12
CHECKED BY : O. PUIGCERVER DATE : 3-30-12

14-MAY-2012 11:30
R:\Structures\FinalPlans\str1_bridge\B3680_SD_B_01.dgn
kpaschal

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #1

NORTH CAROLINA PROFESSIONAL SEAL 22004 ENGINEER KEITH PASCHAL
6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			38

STR. #1

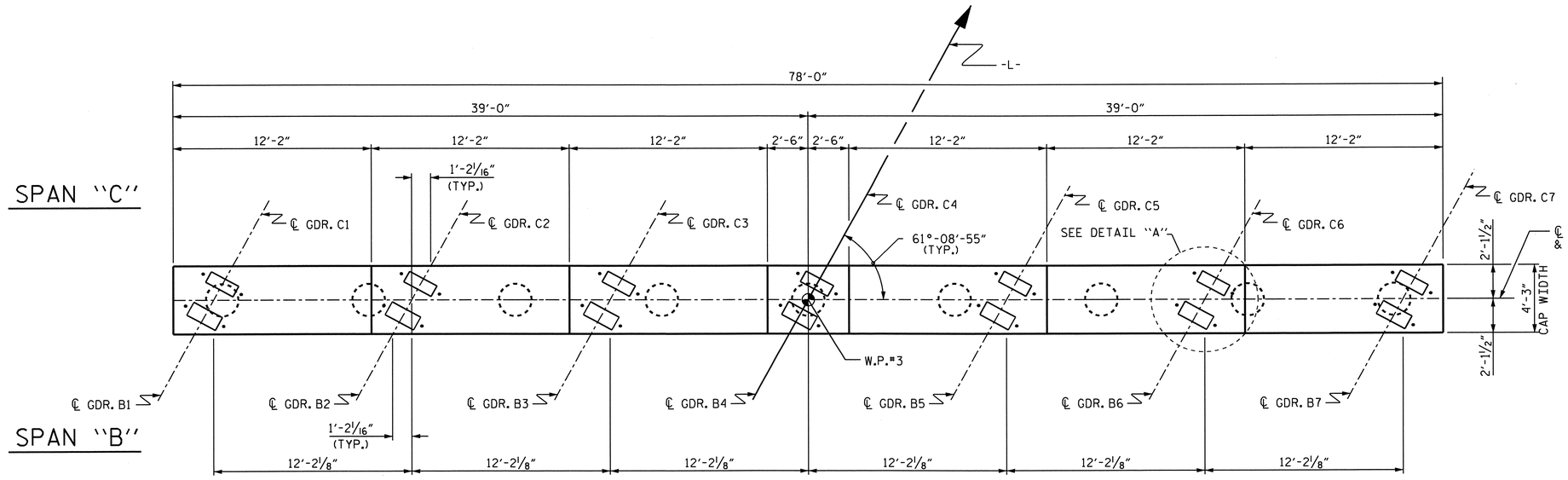
NOTES

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

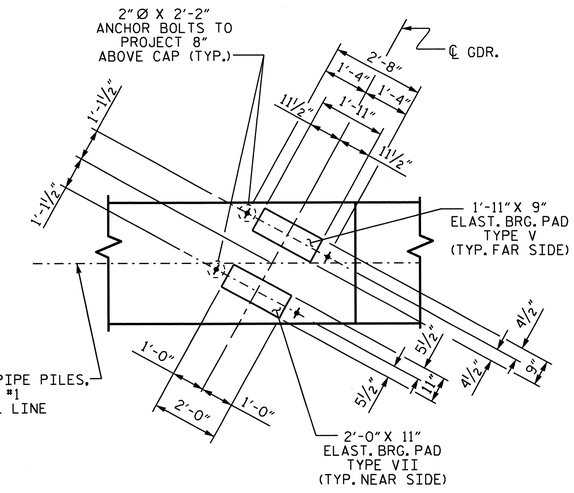
GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 45 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

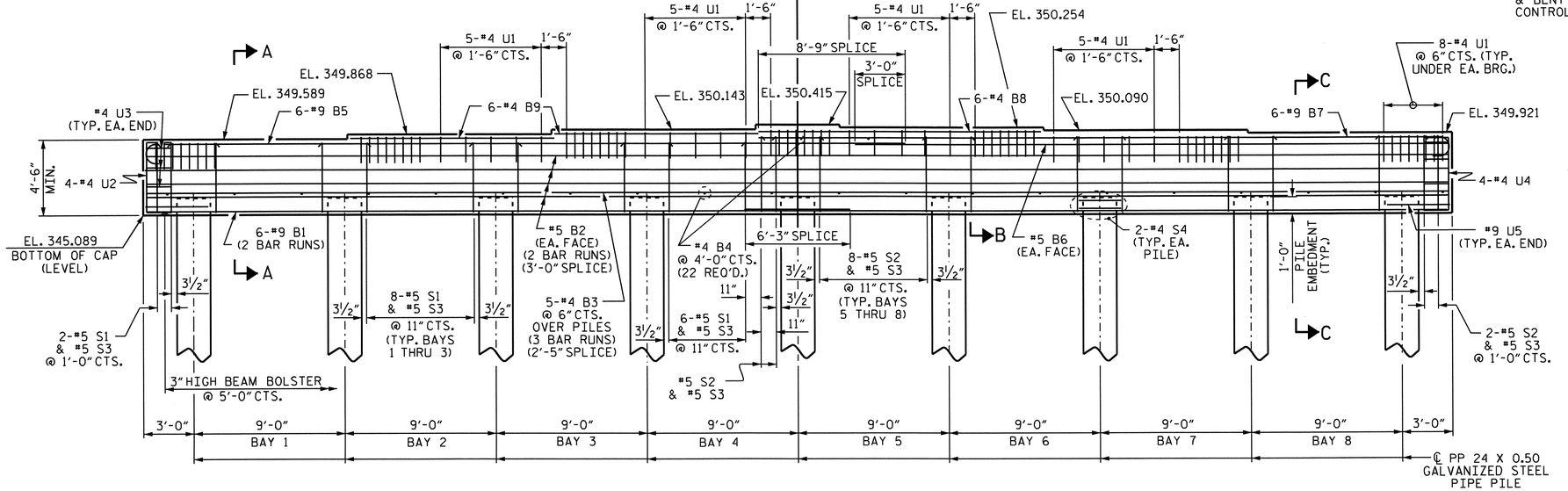
FOR REINFORCING STEEL IN PIPE PILES, SEE "24" STEEL PIPE PILE" SHEET.

CONCRETE DISPLACED BY THE FILLED 24" STEEL PIPE PILES HAS BEEN DEDUCTED FROM THE QUANTITY OF CLASS "A" CONCRETE FOR THE BENT CAP.



PLAN





ELEVATION

DETAIL "A"

TYP. EA. GDR.
(PIPE PILE NOT SHOWN)

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT #2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			38

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/28/12

DRAWN BY : B.N.BARODAWALA DATE : 3-5-12
CHECKED BY : O. PUIGCERVER DATE : 3-30-12

14-MAY-2012 11:29
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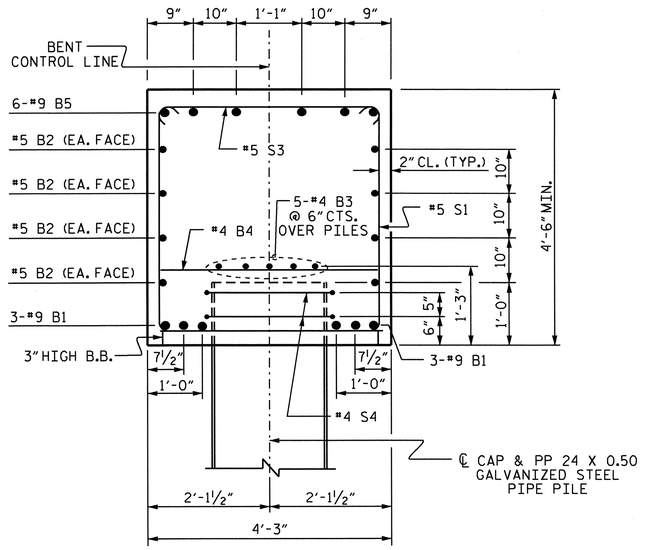
kpaschal



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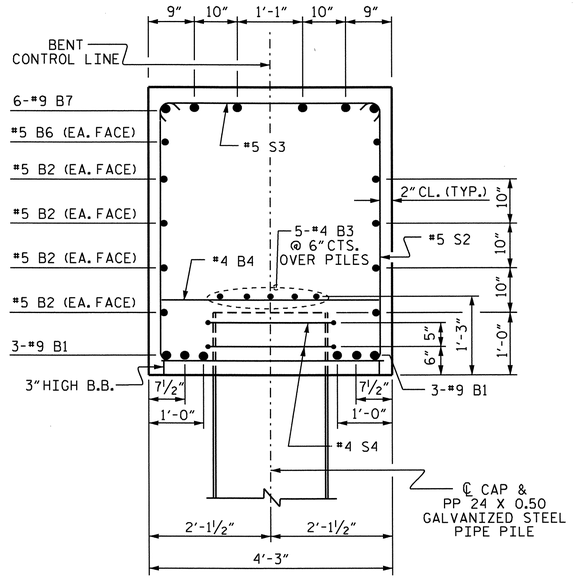

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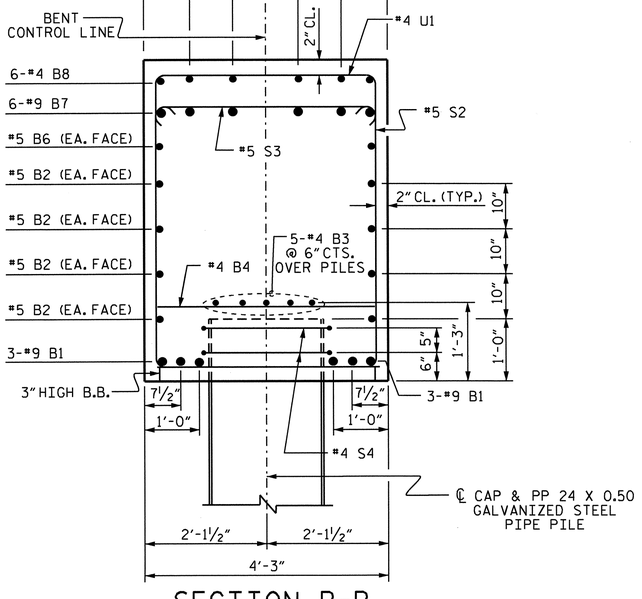

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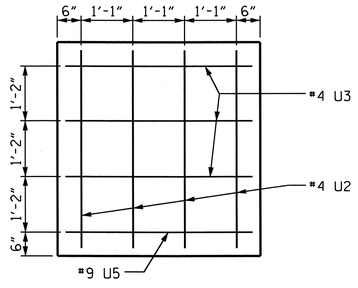
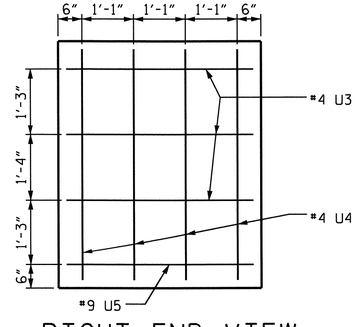
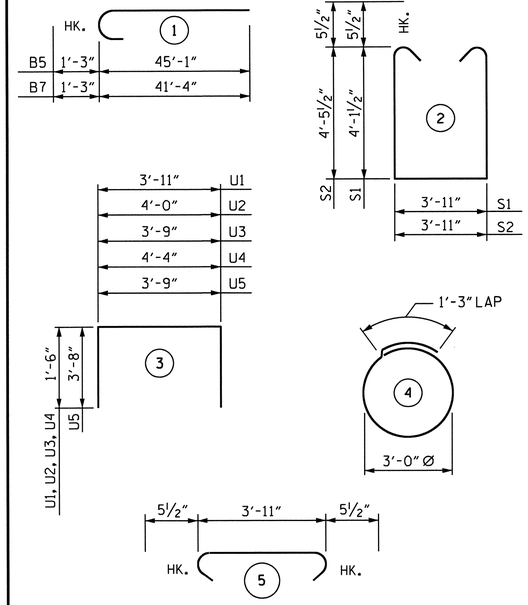


LEFT END VIEW



RIGHT END VIEW

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	STR	42'-0"	1714
B2	16	#5	STR	40'-4"	673
B3	15	#4	STR	27'-6"	276
B4	22	#4	STR	3'-11"	58
B5	6	#9	1	46'-4"	945
B6	2	#5	STR	35'-7"	74
B7	6	#9	1	42'-7"	869
B8	6	#4	STR	16'-10"	67
B9	12	#4	STR	12'-2"	98
S1	32	#5	2	13'-1"	437
S2	36	#5	2	13'-9"	516
S3	68	#5	5	4'-10"	343
S4	18	#4	4	10'-8"	128
U1	76	#4	3	6'-11"	351
U2	4	#4	3	7'-0"	19
U3	6	#4	3	6'-9"	27
U4	4	#4	3	7'-4"	20
U5	2	#9	3	11'-1"	75

REINFORCING STEEL		6690 LBS.
CLASS "A" CONCRETE CAP	59.3	C.Y.
TOTAL	59.3	C.Y.
PP 24 X 0.50 GALVANIZED STEEL PILES NO. 9	720	LIN. FT.
PDA TESTING	EA.	1
STEEL PILE POINTS	EA.	9

DRAWN BY : B.N.BARODAWALA DATE : 3-5-12
CHECKED BY : O. PUIGCERVER DATE : 3-30-12

14-MAY-2012 11:30
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kpaschal

NORTH CAROLINA PROFESSIONAL SEAL 22006 ENGINEER K. KEITH PASCHAL
7/9/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

SHEET 2 OF 2

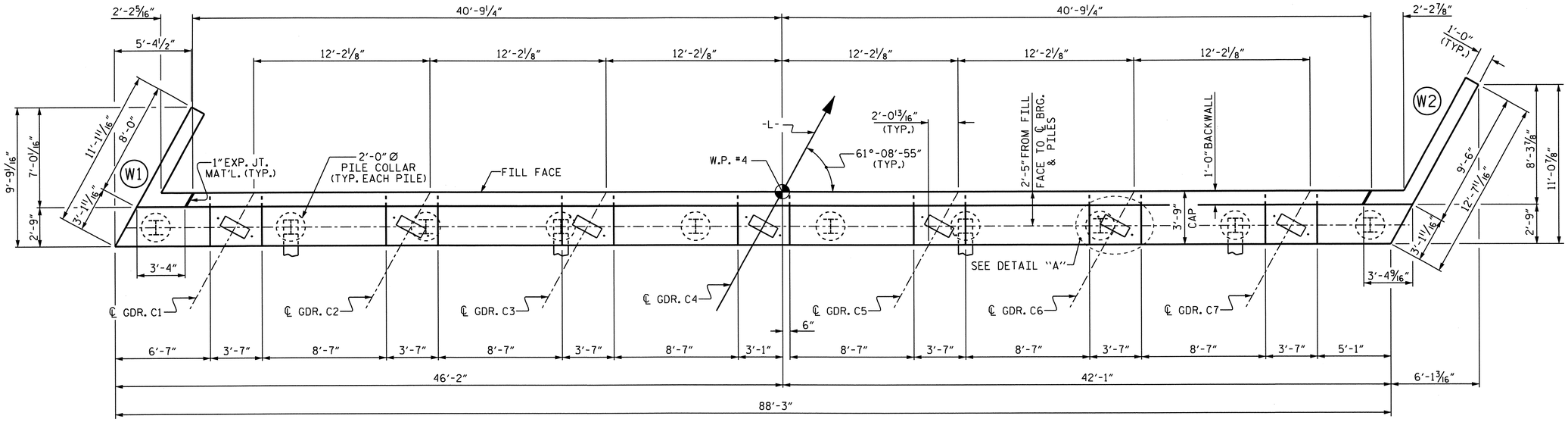
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

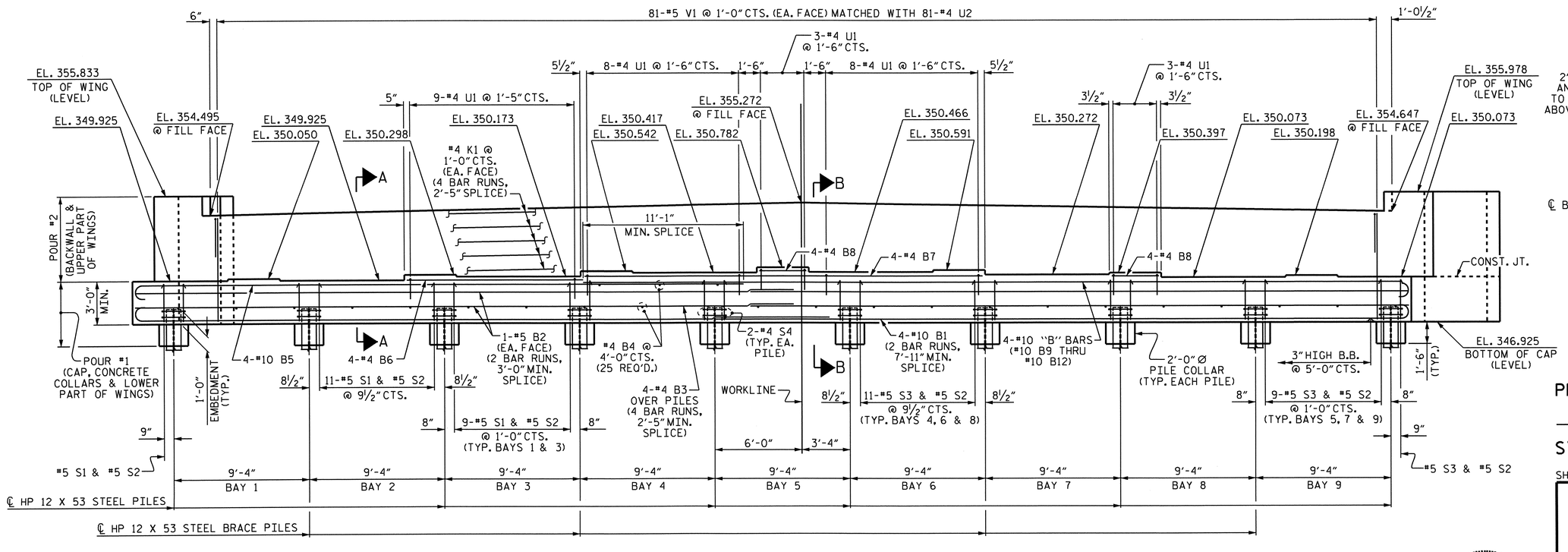
BENT #2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			38

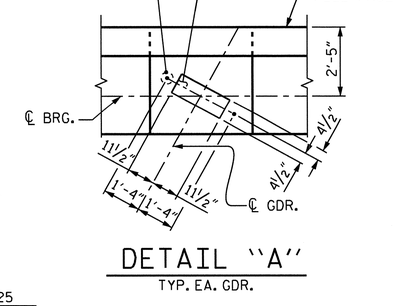
STR. #1



PLAN



ELEVATION



DETAIL "A"

TYP. EA. GDR.

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

THE 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.

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 22008 ENGINEER A. KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : T.L. AVERETTE DATE : 11-15-11
CHECKED BY : O. PUIGCERVER DATE : 3-22-12

29-JUN-2012 06:50
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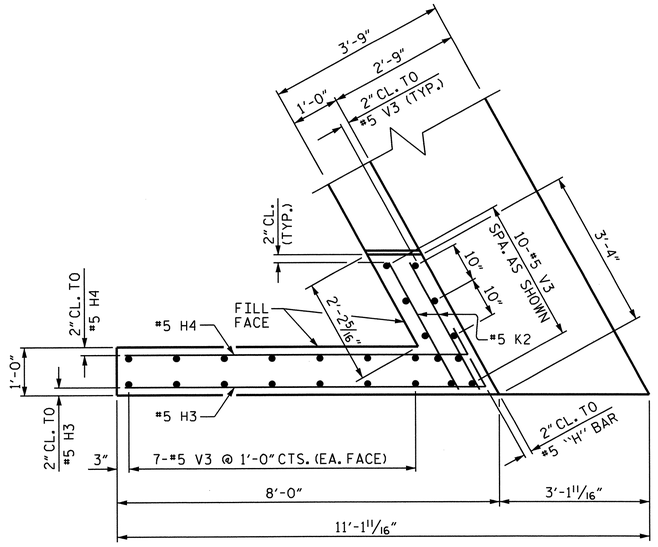
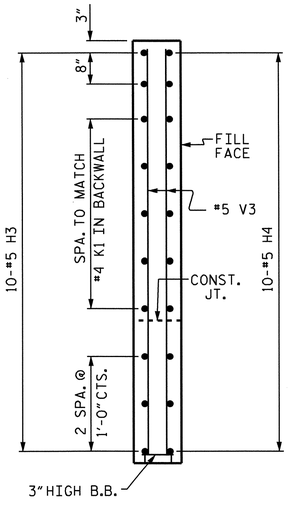
kpaschal

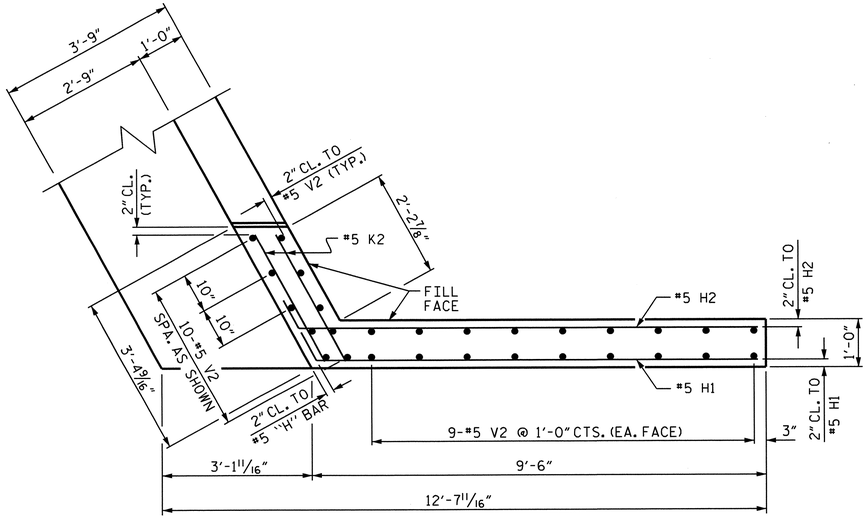
STR. #1



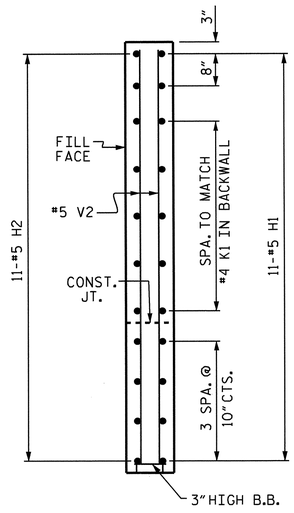
PLAN OF LEFT WING (W1)



SECTION Y-Y



PLAN OF RIGHT WING (W2)



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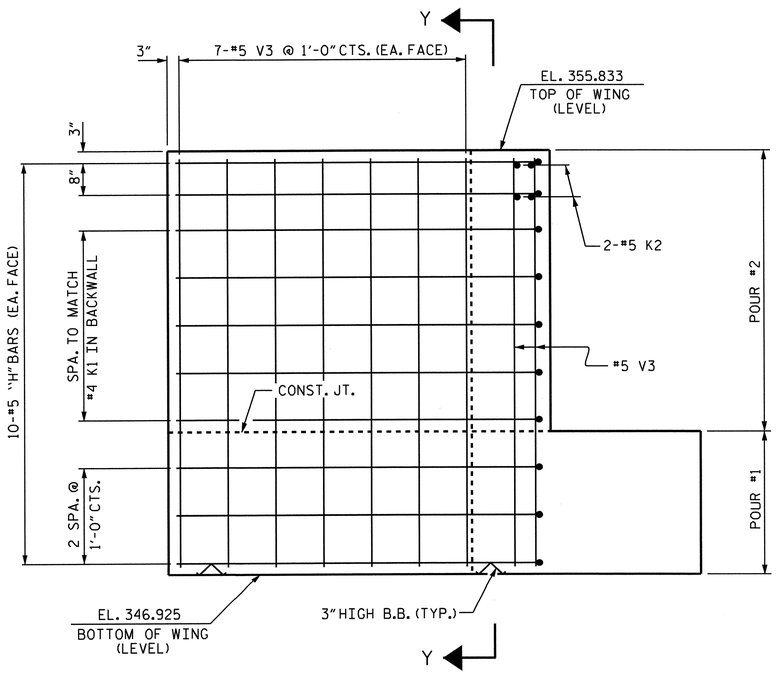
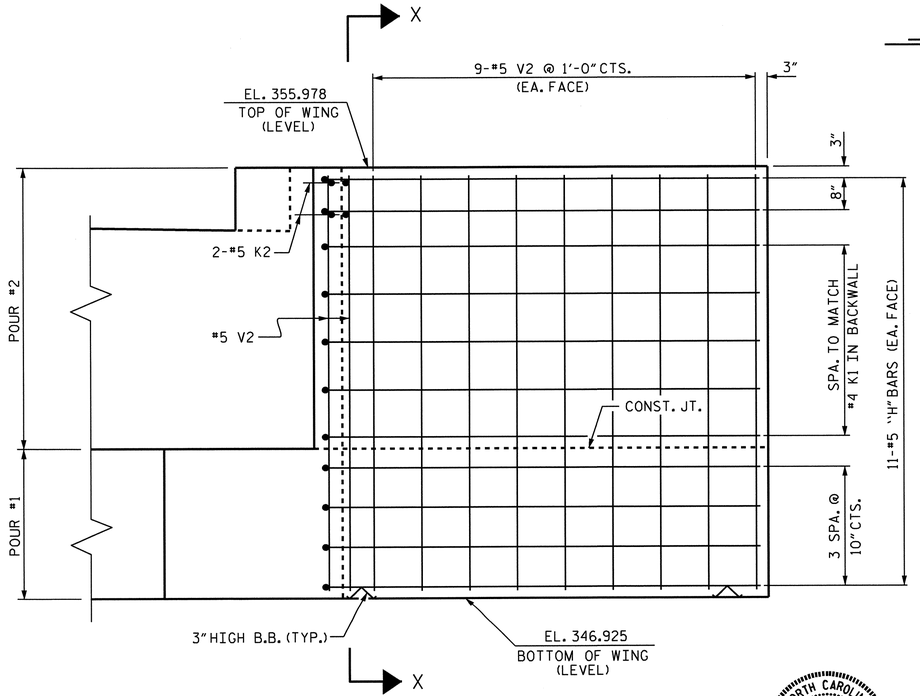


ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

NORTH CAROLINA PROFESSIONAL SEAL 22008 ENGINEER K. KEITH PASCHAL

6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -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-33
1			3			TOTAL SHEETS
2			4			S-38

DRAWN BY : T.L. AVERETTE DATE : 11-15-11
CHECKED BY : O. PUIGCERVER DATE : 3-22-12

14-MAY-2012 11:30
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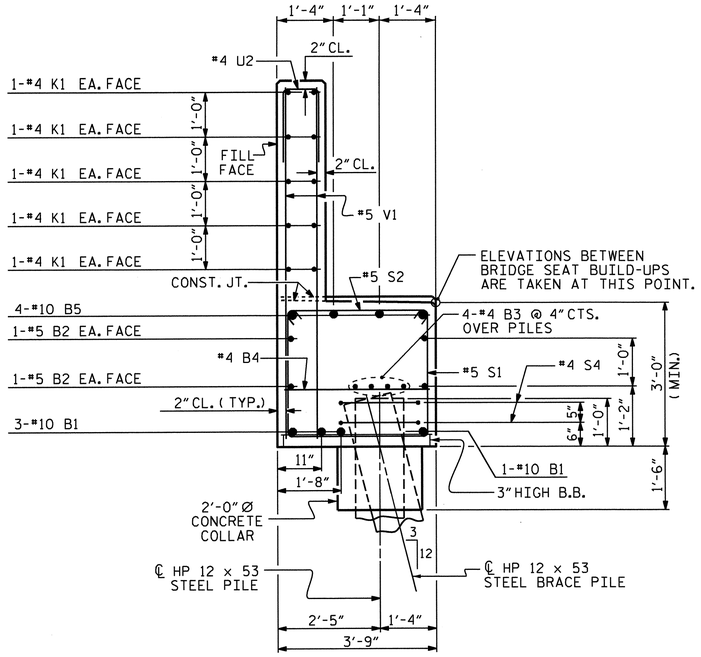
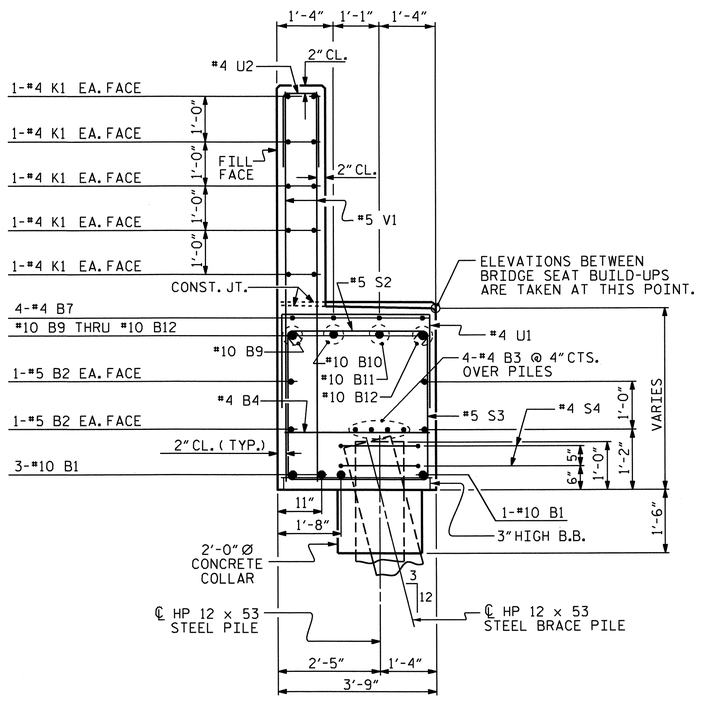
kpaschal

STR. #1



SECTION A-A



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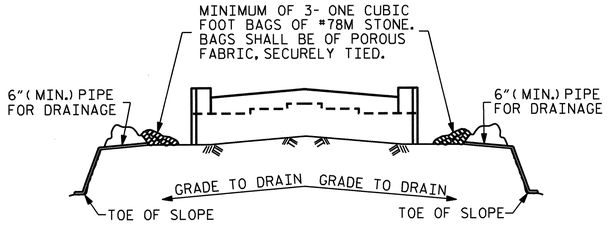
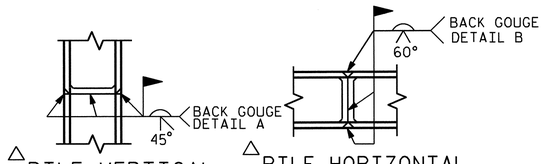


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

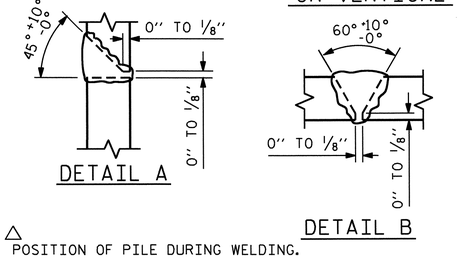
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



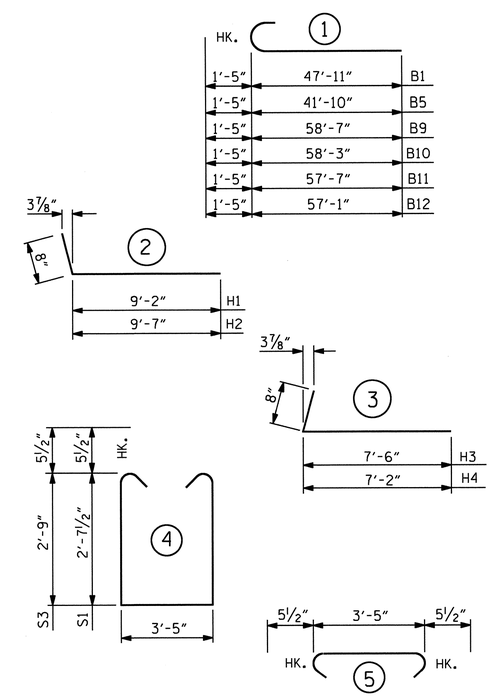
DETAIL A

DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
END BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	49'-4"	1698
B2	8	5	STR	45'-6"	380
B3	16	4	STR	23'-10"	255
B4	25	4	STR	3'-5"	57
B5	4	10	1	43'-3"	744
B6	4	4	STR	12'-2"	33
B7	4	4	STR	27'-7"	74
B8	8	4	STR	3'-3"	17
B9	1	10	1	60'-0"	258
B10	1	10	1	59'-8"	257
B11	1	10	1	59'-0"	254
B12	1	10	1	58'-6"	252
H1	11	5	2	9'-10"	113
H2	11	5	2	10'-3"	118
H3	10	5	3	8'-2"	85
H4	10	5	3	7'-10"	82
K1	40	4	STR	23'-10"	637
K2	8	5	STR	2'-11"	24
S1	30	5	4	9'-7"	300
S2	91	5	5	4'-4"	411
S3	61	5	4	9'-10"	626
S4	20	4	6	6'-6"	87
U1	31	4	7	6'-5"	133
U2	81	4	7	5'-2"	280
V1	162	5	STR	7'-3"	1225
V2	28	5	STR	8'-8"	253
V3	24	5	STR	8'-6"	213

REINFORCING STEEL LBS. 8866

CLASS "A" CONCRETE BREAKDOWN

POUR #1
CAP, CONCRETE COLLARS & LOWER PART OF WINGS 44.1 C.Y.

POUR #2
BACKWALL & UPPER PART OF WINGS 18.9 C.Y.

CLASS "A" CONCRETE TOTAL 63.0 C.Y.

HP 12 x 53 STEEL PILES
NO. 10 LIN. FT. 750

STEEL PILE POINTS 10 EA.

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -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-34
1			3			TOTAL SHEETS
2			4			38

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL
6/29/12

DRAWN BY : T.L. AVERETTE DATE : 11-14-11
CHECKED BY : O. PUIGCERVER DATE : 3-22-12

14-MAY-2012 11:30
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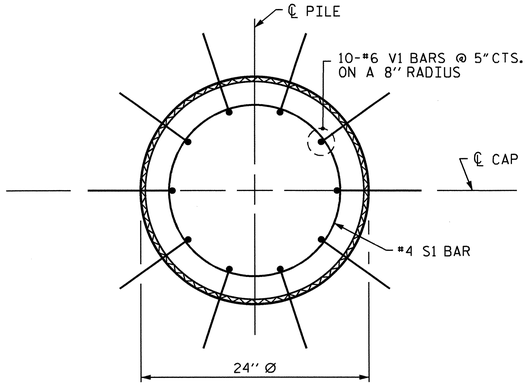
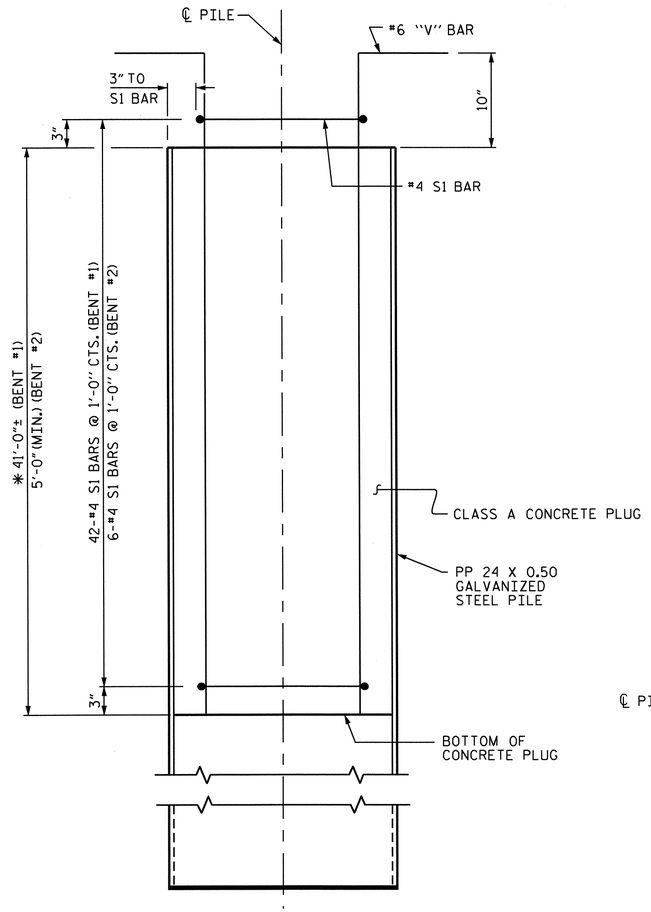
kpaschal

STR. #1



PLAN

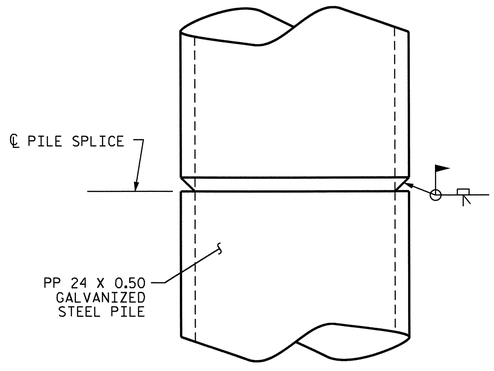


ELEVATION

PP 24 X 0.50 GALVANIZED STEEL PILE

(OPEN END)

(SHEAR CONNECTORS FOR BENT #1 NOT SHOWN)



PIPE PILE SPLICE DETAIL

NOTES

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

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

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

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

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

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

THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 24 X 0.50 GALVANIZED STEEL PILES.

PIPE PILE PLATES ARE NOT REQUIRED.

* CONCRETE PLUG CONCRETE QUANTITY FOR BENT #1 IS ESTIMATED ON PILE LENGTH MINUS 75% OF PILE EMBEDMENT. IT IS ESTIMATED THAT THERE WILL BE A 25% SOIL DRAW DOWN DURING PILE DRIVING. QUANTITIES PER PILE MAY VARY.

BILL OF MATERIAL FOR ONE PP 24 X 0.50 GALVANIZED STEEL PILE

BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	42	#4	1	6'-0"	168
V2	10	#6	2	42'-9"	642
REINFORCING STEEL =					810 lbs

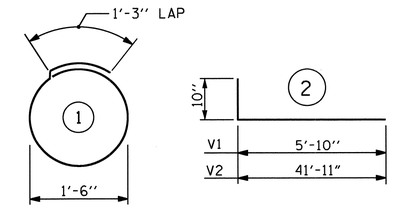
CLASS A CONCRETE
41'-0" PLUG 4.4 CY

BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	6	#4	1	6'-0"	24
V1	10	#6	2	6'-8"	100
REINFORCING STEEL =					124 lbs

CLASS A CONCRETE
5'-0" MINIMUM PLUG 0.5 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

24" STEEL PIPE PILE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			38

STR. #1 STD. NO. SPP4

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

ASSEMBLED BY : B.N.BARODAWALA	DATE : 3-5-12
CHECKED BY : O. PUIGCERVER	DATE : 3-30-12
DRAWN BY : TLA 8/05	ADDED 10/1/05
CHECKED BY : GM 9/05	REV. 5/1/06R MAA/KMM
	REV. 10/1/11 MAA/GM

14-MAY-2012 11:29
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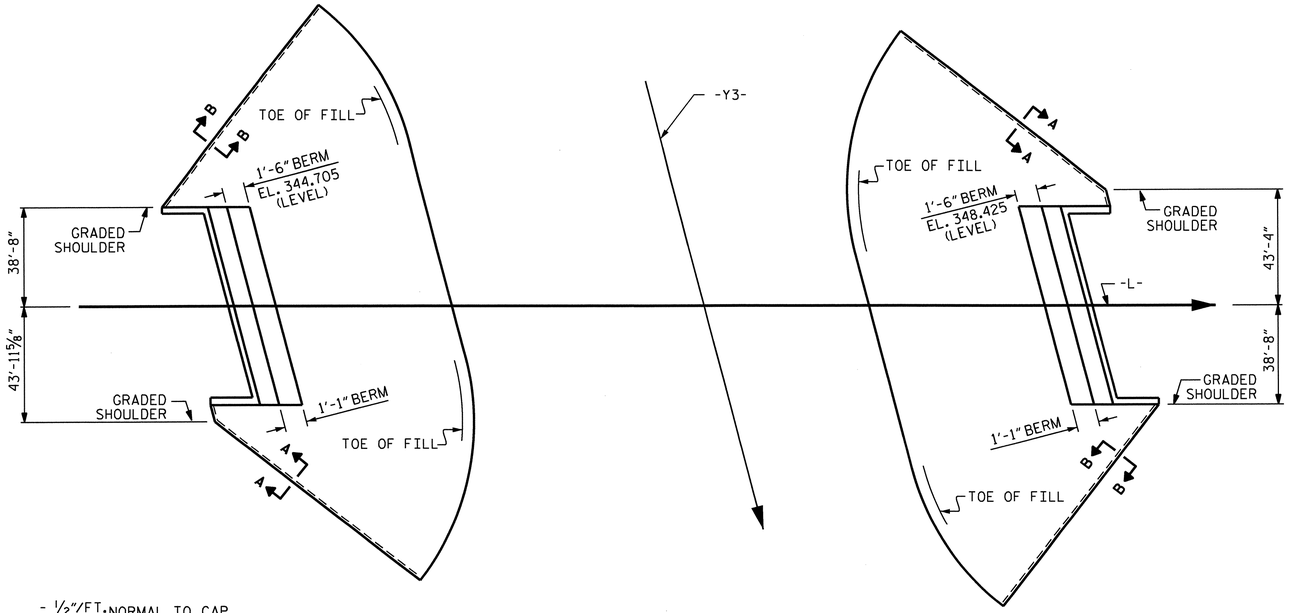
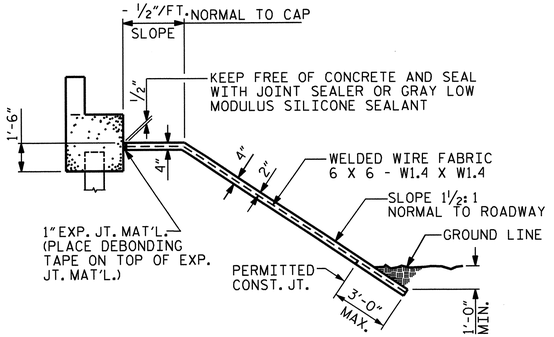
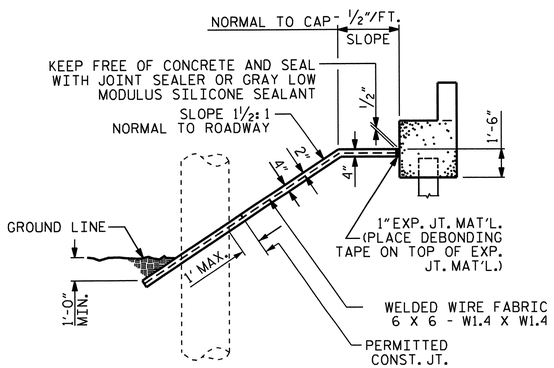
kpaschal

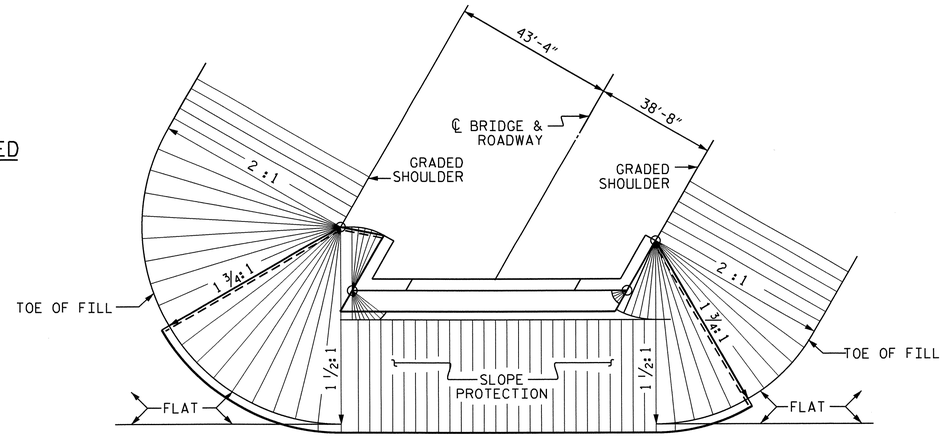




SECTION ALONG ℄ ROADWAY WHEN DITCH IS NOT PROVIDED



SECTION ALONG ℄ ROADWAY WHEN SHOULDER PIER



PLAN - END BENT WITH SWEPT BACK WINGS - SKEWED

(1 ½:1 SLOPE)
(END BENT #2 SHOWN)

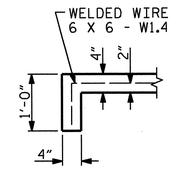
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

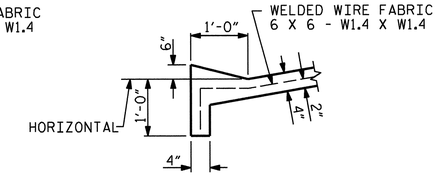
SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION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

BRIDGE @ STA. 18+69.92 -L-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	842	1684
END BENT 2	856	1712

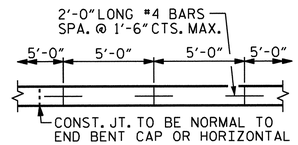
* QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION A-A

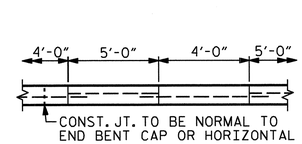


SECTION B-B



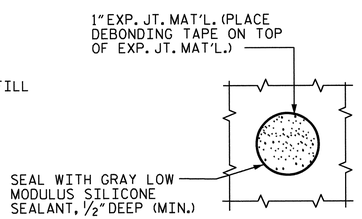
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL



PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN

PROJECT NO. B-3680
MOORE COUNTY
STATION: 18+69.92 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

ASSEMBLED BY : B. L. GREEN DATE : 8-30-11		
CHECKED BY : T. L. AVERETTE DATE : 3-26-12		
DRAWN BY : ELR 5/92	REV. 7/10/01	LES/RDR
CHECKED BY : GRP 6/92	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			38

29-JUN-2012 07:20
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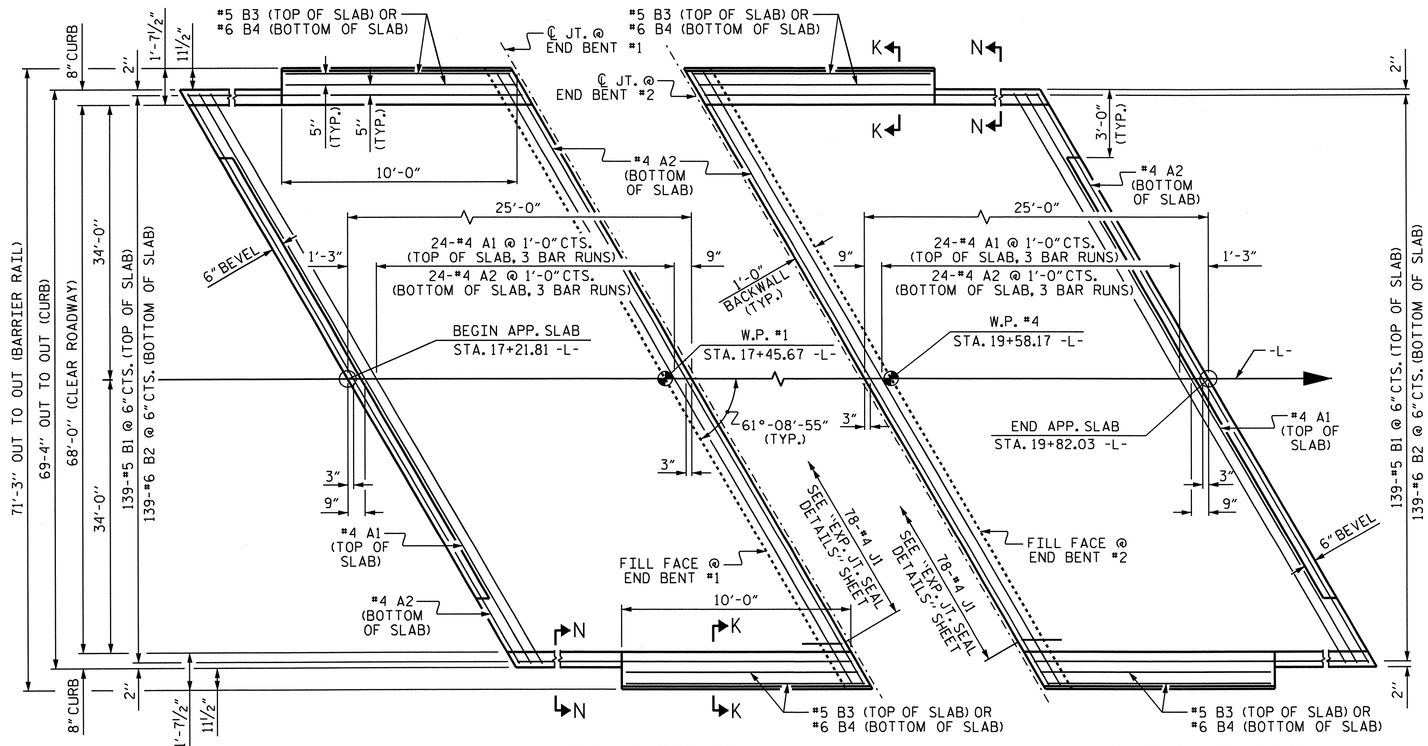
kpaschal

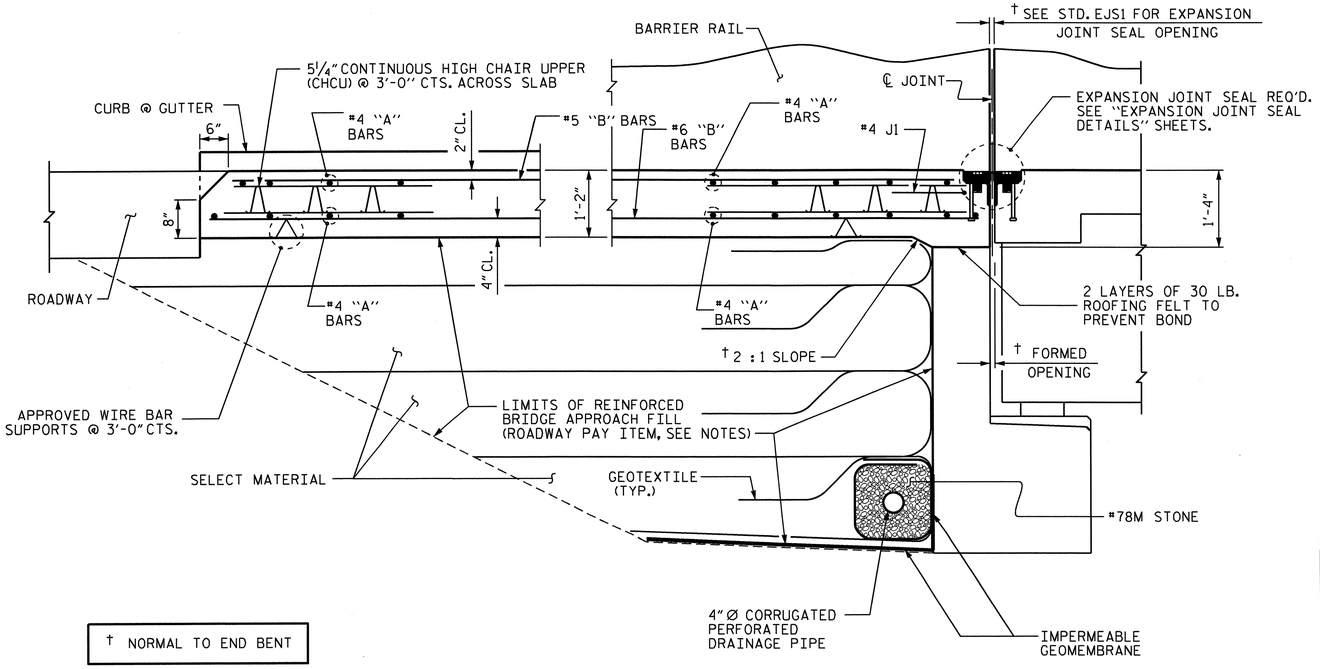
STR. #1 STD. NO. SP1 (SHT 5)



PLAN @ END BENT 1

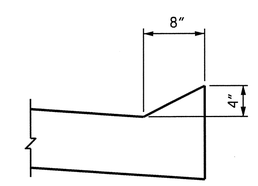
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

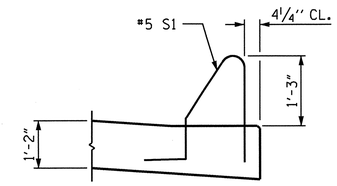


† NORMAL TO END BENT

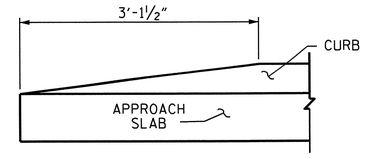
SECTION THRU SLAB



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

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

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

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

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

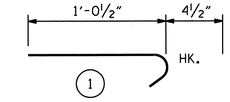
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	75	#4	STR	28'-5"	1424
A2	78	#4	STR	28'-3"	1472
* B1	139	#5	STR	23'-8"	3431
B2	139	#6	STR	24'-7"	5132
* B3	4	#5	STR	9'-8"	40
B4	4	#6	STR	9'-8"	58
* J1	78	#4	1	1'-5"	74
REINFORCING STEEL **				LBS.	6662
* EPOXY COATED REINFORCING STEEL				** LBS.	4969
CLASS AA CONCRETE **				C. Y.	76.1

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			38

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL

6/29/12

STR #1

STD. NO. BAS2 (SHT 4a)

ASSEMBLED BY : B. L. GREEN	DATE : 12/12/11	
CHECKED BY : T. L. AVERETTE	DATE : 3/21/12	
DRAWN BY : EEM 3/95	REV. 5/7/03R	RWW/JTE
CHECKED BY : VAP 3/95	REV. 5/1/06RR	KMM/GM
	REV. 10/1/11	MAA/GM

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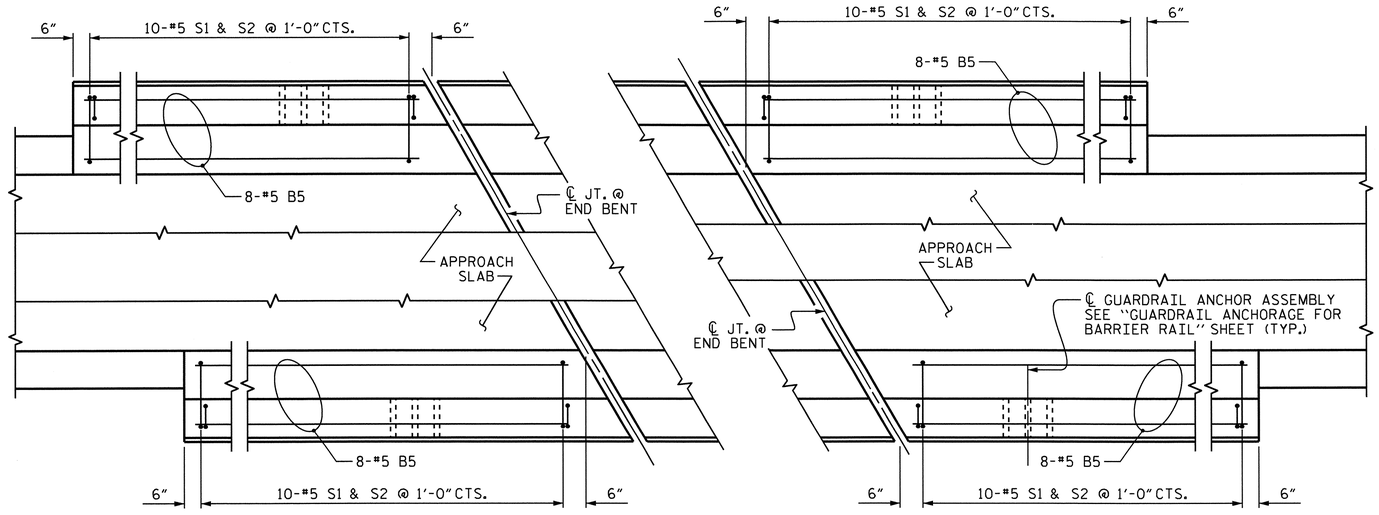
kpaschal



END BENT #1 END BENT #2

PLAN OF BARRIER RAIL

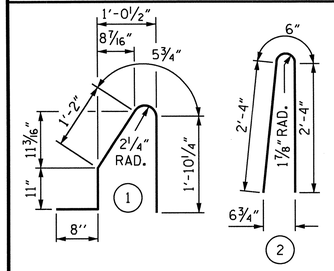
NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

BAR TYPES

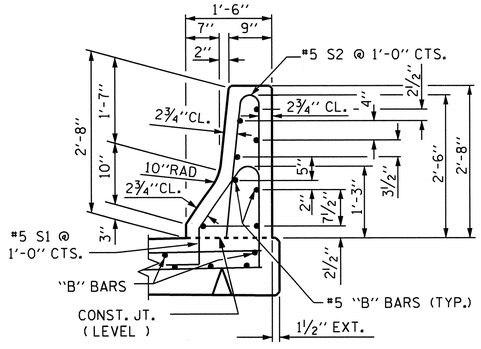


ALL BAR DIMENSIONS ARE OUT TO OUT

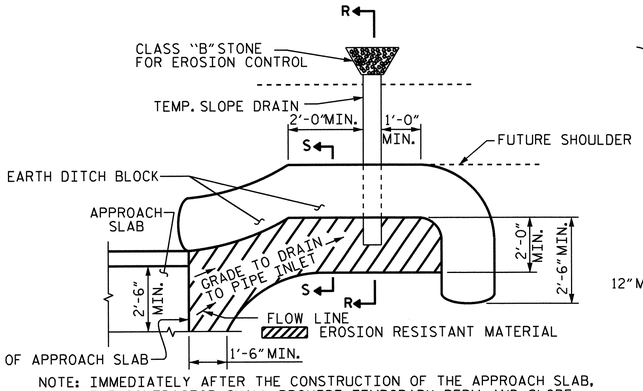
BILL OF MATERIAL

BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B5	32	#5	STR	9'-8"	323
✳S1	40	#5	1	5'-1"	212
✳S2	40	#5	2	5'-2"	216
✳EPOXY COATED REINFORCING STEEL				LBS.	751
CLASS AA CONCRETE				C.Y.	4.2
CONCRETE BARRIER RAIL				41.66	LIN. FT.

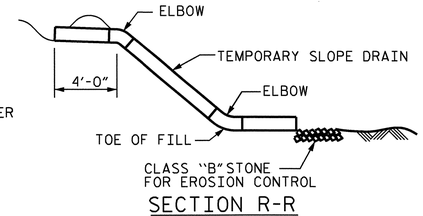


SECTION THRU RAIL

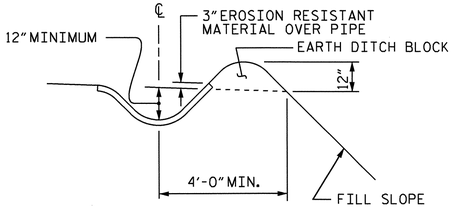


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



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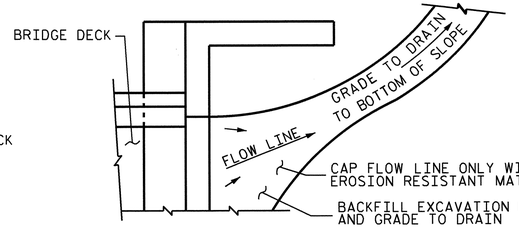

NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. B-3680

MOORE COUNTY

STATION: 18+69.92 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

ASSEMBLED BY : B. L. GREEN	DATE : 12/12/11
CHECKED BY : T. L. AVERETTE	DATE : 3/21/12

DRAWN BY : FCJ	11/88	REV. 5/7/03	RWW/JTE
CHECKED BY : ARB	11/88	REV. 5/1/06RRR	MAA/KMM
		REV. 10/1/11	MAA/GM

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

NORTH CAROLINA PROFESSIONAL SEAL 22008 ENGINEER KEITH PASCHAL
6/29/12

STR. #1 STD. NO. BAS4 (SHT 3a)

14-MAY-2012 11:29
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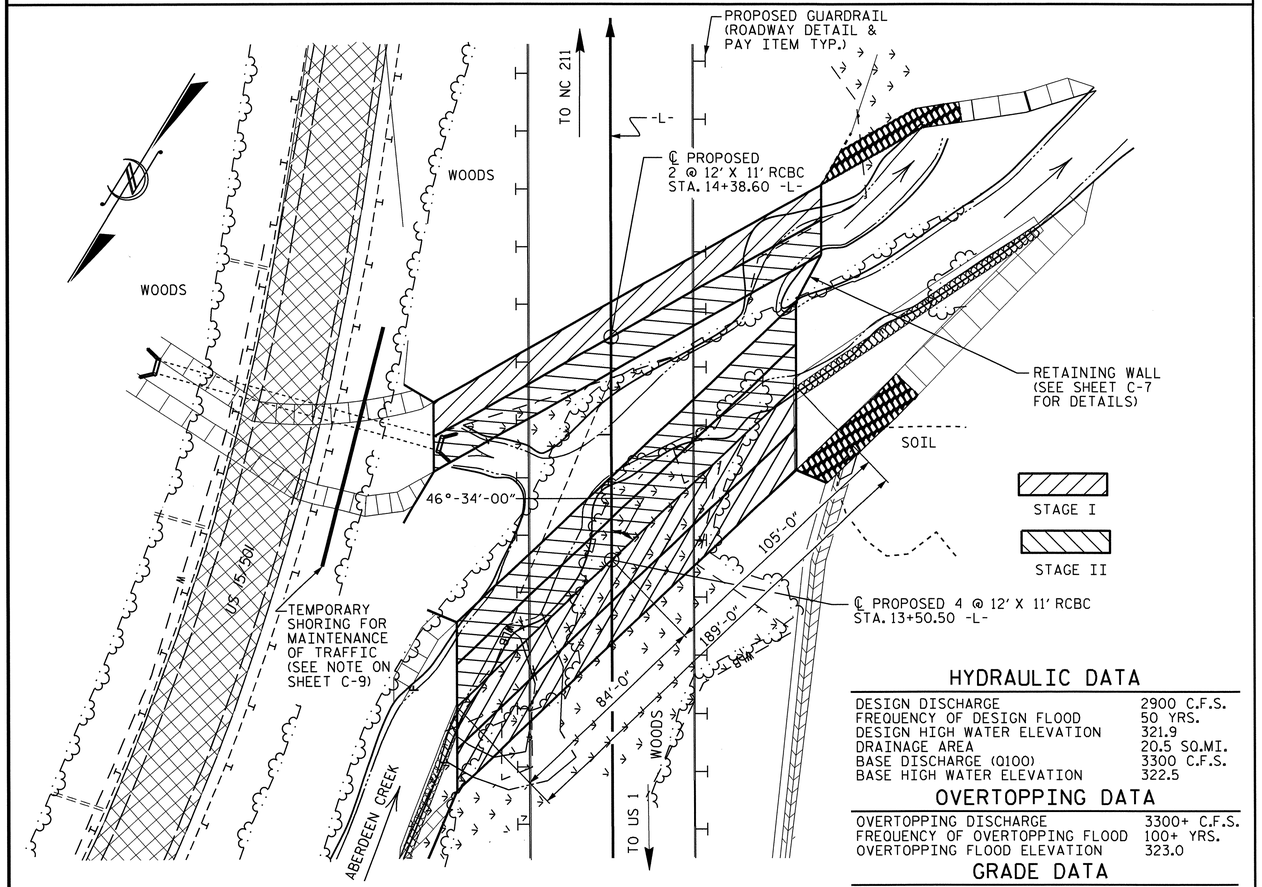
kpaschal

B.M. #2 - RR SPIKE IN BASE OF RR TELEGRAPH POLE; -BL- STA. 17+70.00 226'RT EL. 324.21



FOR UTILITY INFORMATION,
SEE UTILITY PLAN AND SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	2900 C.F.S.
FREQUENCY OF DESIGN FLOOD	50 YRS.
DESIGN HIGH WATER ELEVATION	321.9
DRAINAGE AREA	20.5 SQ.MI.
BASE DISCHARGE (Q100)	3300 C.F.S.
BASE HIGH WATER ELEVATION	322.5

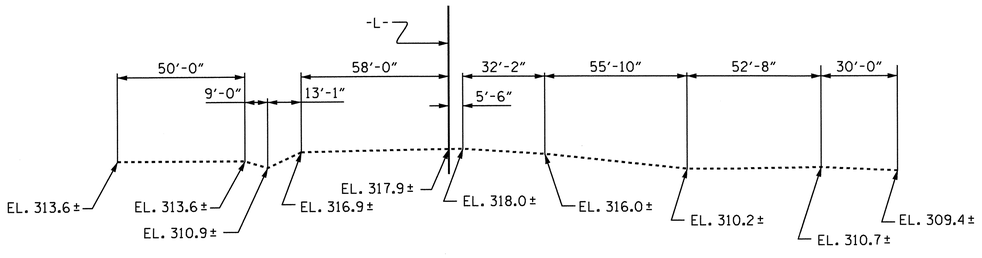
OVERTOPPING DATA

OVERTOPPING DISCHARGE	3300+ C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	100+ YRS.
OVERTOPPING FLOOD ELEVATION	323.0

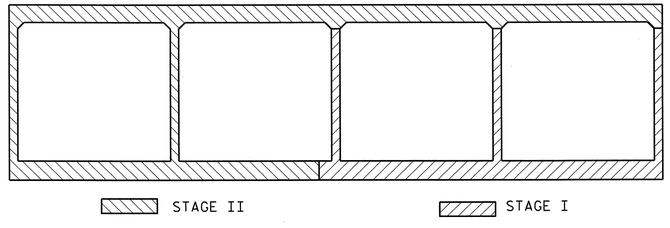
GRADE DATA

GRADE PT. EL. @ STA. 13+50.50 -L-	334.62
BED EL. @ STA. 13+50.50 -L-	310.97
ROADWAY SLOPES	2:1

LOCATION SKETCH



PROFILE ALONG ℄ CULVERT



CONSTRUCTION SEQUENCE

(LOOKING DOWNSTREAM)

STAGE I QUANTITIES

CLASS "A" CONCRETE			
BARREL	2.319 C.Y./FT.	438.3	C.Y.
WINGS ETC.		54.3	C.Y.
SILLS		2.5	C.Y.
TOTAL		495.1	C.Y.
REINFORCING STEEL			
BARREL		77312	LBS.
WINGS ETC.		5671	LBS.
TOTAL		82983	LBS.
FOUNDATION COND. MAT'L.		390	TONS

STAGE II QUANTITIES

CLASS "A" CONCRETE			
BARREL	4.699 C.Y./FT.	888.1	C.Y.
WING ETC.		20.3	C.Y.
RETAINING WALL ETC.		17.8	C.Y.
TOTAL		926.2	C.Y.
REINFORCING STEEL			
BARREL		128642	LBS.
WING ETC.		771	LBS.
RETAINING WALL ETC.		3415	LBS.
TOTAL		132828	LBS.
FOUNDATION COND. MAT'L.		354	TONS

TOTAL STRUCTURE QUANTITIES (STAGE I & STAGE II)

CLASS A CONCRETE			
BARREL @	7.018 CY/FT	1326.4	C.Y.
WINGS, SILLS ETC.		77.1	C.Y.
RETAINING WALL ETC.		17.8	C.Y.
TOTAL		1421.3	C.Y.
REINFORCING STEEL			
BARREL		205954	LBS.
WINGS ETC.		6442	LBS.
RETAINING WALL ETC.		3415	LBS.
TOTAL		215811	LBS.
FOUNDATION COND. MAT'L.		744	TONS
CULVERT EXCAVATION ----------		LUMP SUM	

NOTES

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

DESIGN FILL----------16.00'

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

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

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

(STAGE I)

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS, COUNTERFORT AND WINGS FULL HEIGHT.

(STAGE II)

1. WING FOOTING, RETAINING WALL FOOTING AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS, ENTIRE ROOF SLAB, HEADWALLS AND WING FULL HEIGHT.
3. THE REMAINING PORTION OF RETAINING WALL AND COUNTERFORT.

NOTE: STAGE II SHALL NOT BE STARTED UNTIL STAGE I FOR THE DOUBLE BARREL CULVERT @ STA. 14+38.60 -L- IS COMPLETE.

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

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

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

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

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

F.A. PROJECT NO. BRSTP-0015 (25)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 22711 ENGINEER OMAR R. AZIZI 6/29/12

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL 6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 13+50.50 -L-

SHEET 1 OF 8 CULVERT NO. 260

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

QUADRUPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

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

STR. #2 STD. NO. CB32A

ASSEMBLED BY : B.N.BARODAWALA DATE : 2-10-12
CHECKED BY : NEIL RUFFIN DATE : 3-1-12
DRAWN BY : B. WYNN/D.DONOVAN DATE : SEPT. 1990
CHECKED BY : A.R.BISSETTE DATE : OCT. 90

SPECIAL
STANDARD

ADDED 10-1-90

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	2.54	--	1.75	2.60	1	EXTERIOR WALL	0.93	2.54	1	EXTERIOR WALL	11.05	
		HL-93 (OPERATING)	N/A		3.29	--	1.35	3.36	1	EXTERIOR WALL	0.93	3.29	1	EXTERIOR WALL	11.05	
		HS-20 (INVENTORY)	36.000	2	2.53	91.25	1.75	2.83	1	EXTERIOR WALL	0.93	2.53	1	EXTERIOR WALL	11.05	
		HS-20 (OPERATING)	36.000		3.29	118.28	1.35	3.67	1	EXTERIOR WALL	0.93	3.29	1	EXTERIOR WALL	11.05	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.29	44.37	1.40	4.02	1	EXTERIOR WALL	0.93	3.29	1	EXTERIOR WALL	11.05	
		SNGARBS2	20.000		3.23	64.55	1.40	3.93	1	EXTERIOR WALL	0.93	3.23	1	EXTERIOR WALL	11.05	
		SNAGRIS2	22.000		3.23	70.98	1.40	3.93	1	EXTERIOR WALL	0.93	3.23	1	EXTERIOR WALL	11.05	
		SNCOTTS3	27.250		3.22	87.80	1.40	3.23	1	EXTERIOR WALL	0.93	3.22	1	EXTERIOR WALL	11.05	
		SNAGGRS4	34.925		3.16	110.52	1.40	3.17	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
		SNS5A	35.550	3	3.12	110.82	1.40	3.12	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
		SNS6A	39.950		3.12	124.54	1.40	3.12	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
		SNS7B	42.000		3.12	130.93	1.40	3.12	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.22	106.25	1.40	3.50	1	EXTERIOR WALL	0.93	3.22	1	EXTERIOR WALL	11.05	
		TNT4A	33.075		3.22	106.53	1.40	3.43	1	EXTERIOR WALL	0.93	3.22	1	EXTERIOR WALL	11.05	
		TNT6A	41.600		3.21	133.74	1.40	3.33	1	EXTERIOR WALL	0.93	3.21	1	EXTERIOR WALL	11.05	
		TNT7A	42.000		3.16	132.81	1.40	3.46	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
		TNT7B	42.000		3.22	135.28	1.40	3.26	1	EXTERIOR WALL	0.93	3.22	1	EXTERIOR WALL	11.05	
		TNAGRIT4	43.000		3.16	135.97	1.40	3.26	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
		TNAGT5A	45.000		3.16	142.29	1.40	3.30	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	
		TNAGT5B	45.000		3.16	142.14	1.40	3.23	1	EXTERIOR WALL	0.93	3.16	1	EXTERIOR WALL	11.05	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

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

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.
2.
3.
4.

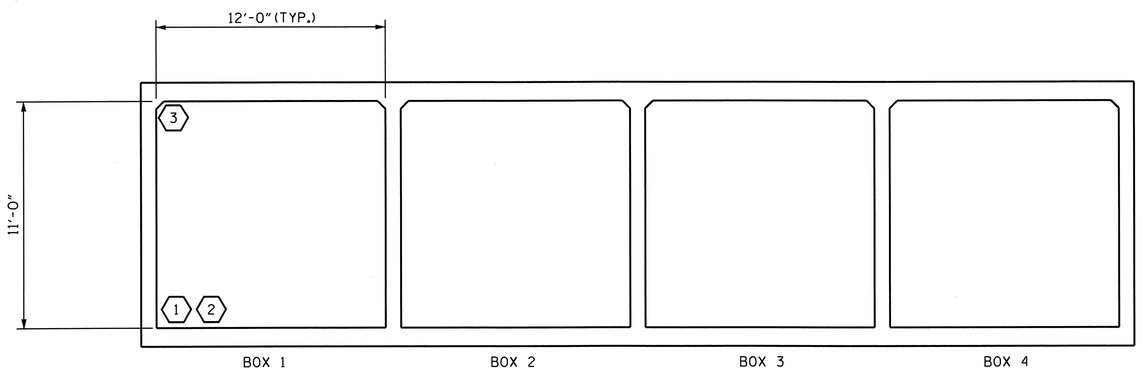
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

ASSEMBLED BY : B.N.BARODAWALA DATE : 3-26-12
CHECKED BY : J. E. LAZAROVICH DATE : 3-28-12

DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11

REV. 10/1/11 MAA/GM

29-JUN-2012 06:48
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kpaschal

NORTH CAROLINA PROFESSIONAL SEAL 22008 ENGINEER KEITH PASCHAL

6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 13+50.50 -L-

SHEET 2 OF 8

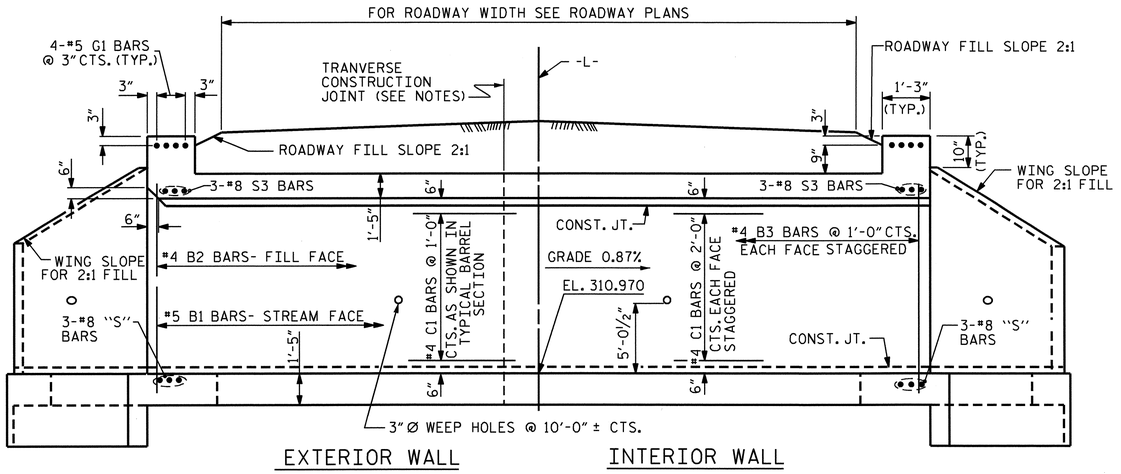
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

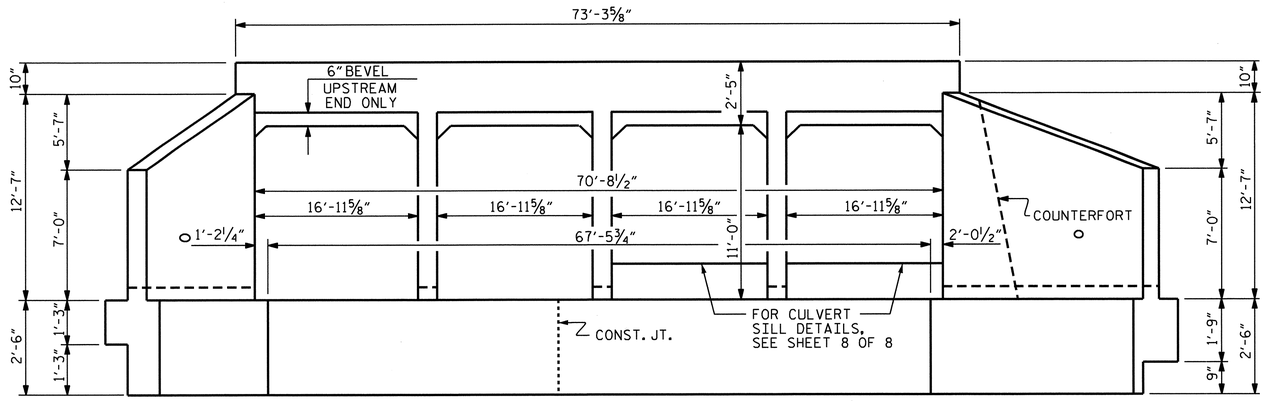
LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

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

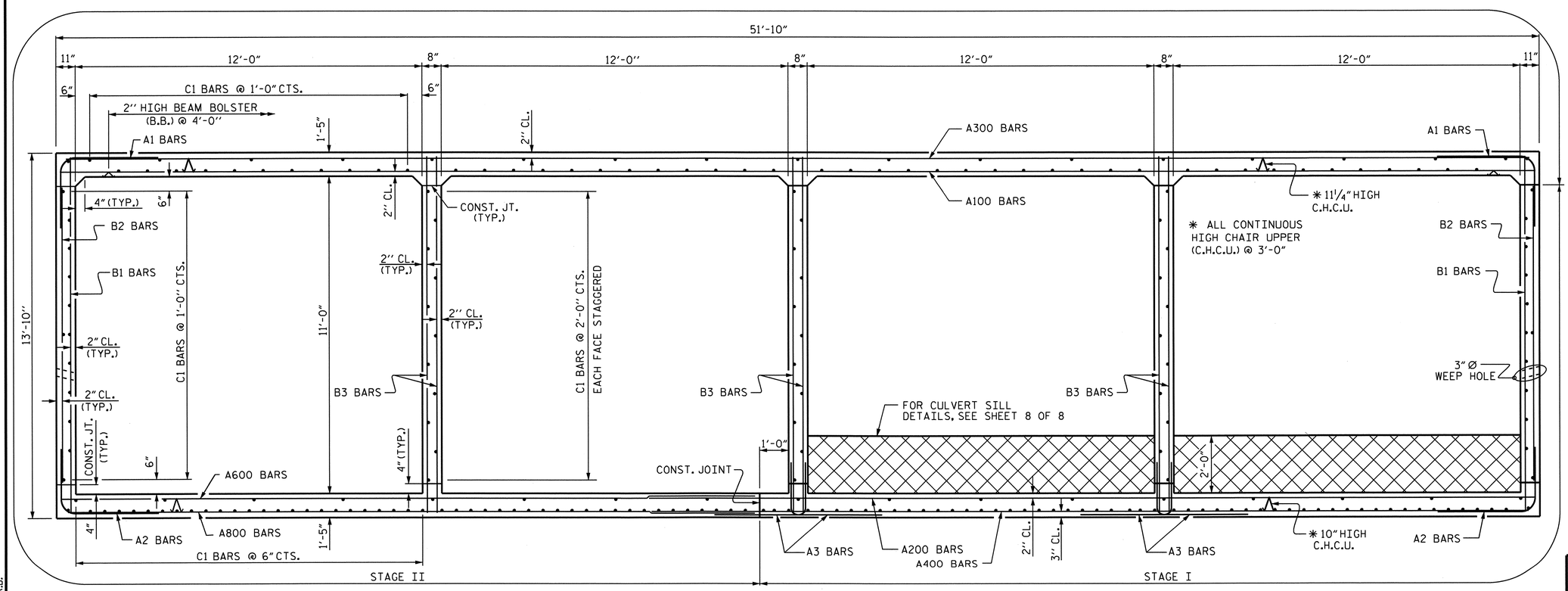
STR. #2 STD. NO. LRFR5



CULVERT SECTION NORMAL TO ROADWAY



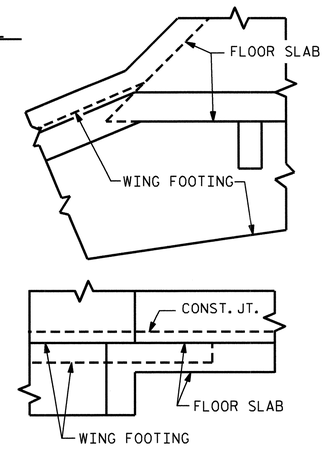
INLET END ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

(LOOKING DOWNSTREAM)

THERE ARE 239 C1 BARS IN SECTION OF BARREL.
(96 IN STAGE I, 143 IN STAGE II)



DETAIL

CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING

PROJECT NO. B-3680

MOORE COUNTY

STATION: 13+50.50 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD QUADRUPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER K. KEITH PASCHAL

6/29/12

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

STR. #2 STD. NO CB54

ASSEMBLED BY : B.N.BARODAWALA	DATE : 2-10-12	SPECIAL
CHECKED BY : NEIL RUFFIN	DATE : 3-1-12	
DRAWN BY : R.D. UNDERWOOD	DATE : APR. 1972	STANDARD
CHECKED BY : H.A. JUDEH	DATE : APR. 1972	

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REDRAWN BY B.M.M. NOV. 1990 ; BY A.R.B.

14-MAY-2012 11:29
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kpaschal

#6 A601 TO #6 A616 @ 7½" CTS. (2 BARS PER MARK) (TOP OF FLOOR SLAB)

#7 A801 TO #7 A818 @ 6½" CTS. (2 BARS PER MARK) (BOT. OF FLOOR SLAB)

7½"

6½"

#6 A600 BARS @ 7½" CTS. - TOP OF FLOOR SLAB

#7 A800 BARS @ 6½" CTS. - BOT. OF FLOOR SLAB

7½" #6 A617 TO #6 A634 @ 7½" CTS. (2 BARS PER MARK) (TOP OF FLOOR SLAB)

#7 A801 TO #7 A821 @ 6½" CTS. (2 BARS PER MARK) (BOT. OF FLOOR SLAB)

6½"

#4 B2 BARS @ 6½" CTS.-FILL FACE
#5 B1 BARS @ 9½" CTS.-STREAM FACE

#7 A2 BARS @ 6½" CTS. CORNER BARS
EXTERIOR WALL (SEE BARREL SECTION)

FOR RETAINING WALL DETAILS, SEE SHEET 7 OF 8

SEE DETAIL "A"

-L-

W2

#4 B3 BARS @ 1'-0" CTS.
(INTERIOR WALL OF STAGE II) EACH FACE STAGGERED

A600 OR A800
A617 OR A801

1'-0"

2" CL.

3-#8 S2 BARS @ 5" CTS. TOP OF FLOOR SLAB

1'-0"

A601 OR A801
A600 OR A800

2" CL.

3-#8 S2 BARS @ 5" CTS. TOP OF FLOOR SLAB

70'-8½"
(INSIDE FACES EXTERIOR WALLS)

50'-0" (INSIDE FACES EXTERIOR WALL)

α

#4 C1 BARS (7 BAR RUNS) (SEE BARREL SECTION)

46°-34'-00"

CONST. JOINT

1'-0"

45°-00'-00" (TYP.)

℄ CULVERT

STAGE II

STAGE I

STA 13+50.50 -L-

1'-0"

189-#4 A3 & #4 B3 BARS @ 1'-0" CTS.
EA. FACE STAGGERED
(INTERIOR WALLS OF STAGE I)

FOR CULVERT SILL DETAILS SEE SHEET 8 OF 8

3-#8 S1 BARS @ 5" CTS. TOP OF FLOOR SLAB

3-#8 S1 BARS @ 5" CTS. TOP OF FLOOR SLAB

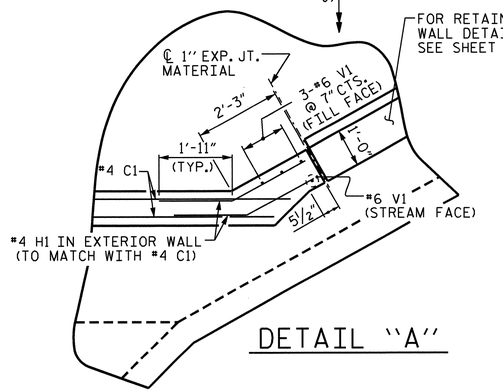
A201 OR A401
A200 OR A400

TRANVERSE CONSTRUCTION JOINT (SEE NOTES)

A200 OR A400
A201 OR A401

W1

W2



DETAIL "A"

*5 B1 BARS @ 9½" CTS.-STREAM FACE
*4 B2 BARS @ 6½" CTS.-FILL FACE

*7 A2 BARS @ 6½" CTS. CORNER BARS
EXTERIOR WALL (SEE BARREL SECTION)

#6 A201 TO #6 A224 BARS @ 7½" CTS. (2 BARS PER MARK) (TOP OF FLOOR SLAB)

7½"

#6 A200 BARS @ 7½" CTS.- TOP OF FLOOR SLAB

7½"

#6 A201 TO #6 A221 BARS @ 7½" CTS. (2 BARS PER MARK) (TOP OF FLOOR SLAB)

#7 A401 TO #7 A427 BARS @ 6½" CTS. (2 BARS PER MARK) (BOT. OF FLOOR SLAB)

6½"

#7 A400 BARS @ 6½" CTS.- BOT. OF FLOOR SLAB

6½"

#7 A401 TO #7 A424 BARS @ 6½" CTS. (2 BARS PER MARK) (BOT. OF FLOOR SLAB)

84'-0"

105'-0"

LENGTH OF CULVERT = 189'-0"

PLAN - FLOOR SLAB

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL

6/29/12

ASSEMBLED BY : B.N.BARODAWALA DATE : 2-10-12
CHECKED BY : NEIL RUFFIN DATE : 3-1-12

14-MAY-2012 12:04
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kpaschal

PROJECT NO. B-3680
MOORE COUNTY
STATION: 13+50.50 -L-

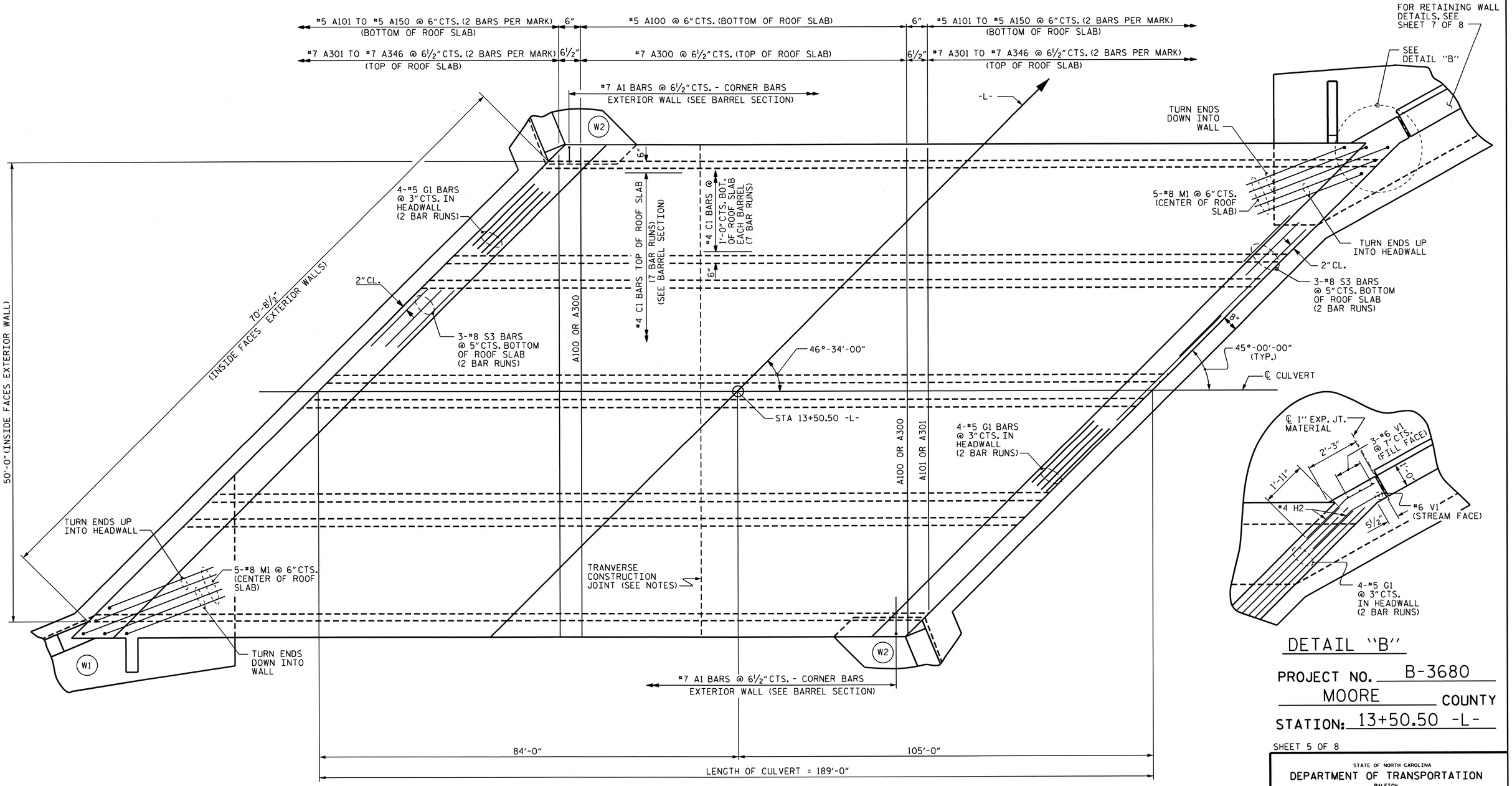
SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

QUADRUPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

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

STR. #2



DETAIL "B"

PLAN - ROOF SLAB

PROJECT NO. B-3680

MOORE COUNTY

STATION: 13+50.50 -L-

SHEET 5 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

QUADRUPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			14

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 27005 ENGINEER KEITH PASCHAL

6/29/12

ASSEMBLED BY : B.N.BARODAWALA DATE : 2-10-12
CHECKED BY : NEIL RUFFIN DATE : 3-1-12

14-MAY-2012 12:04
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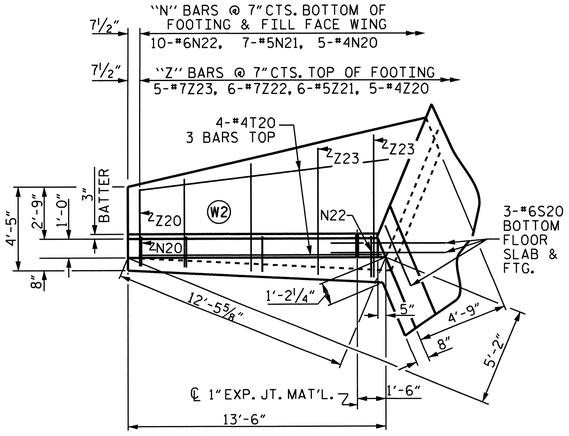
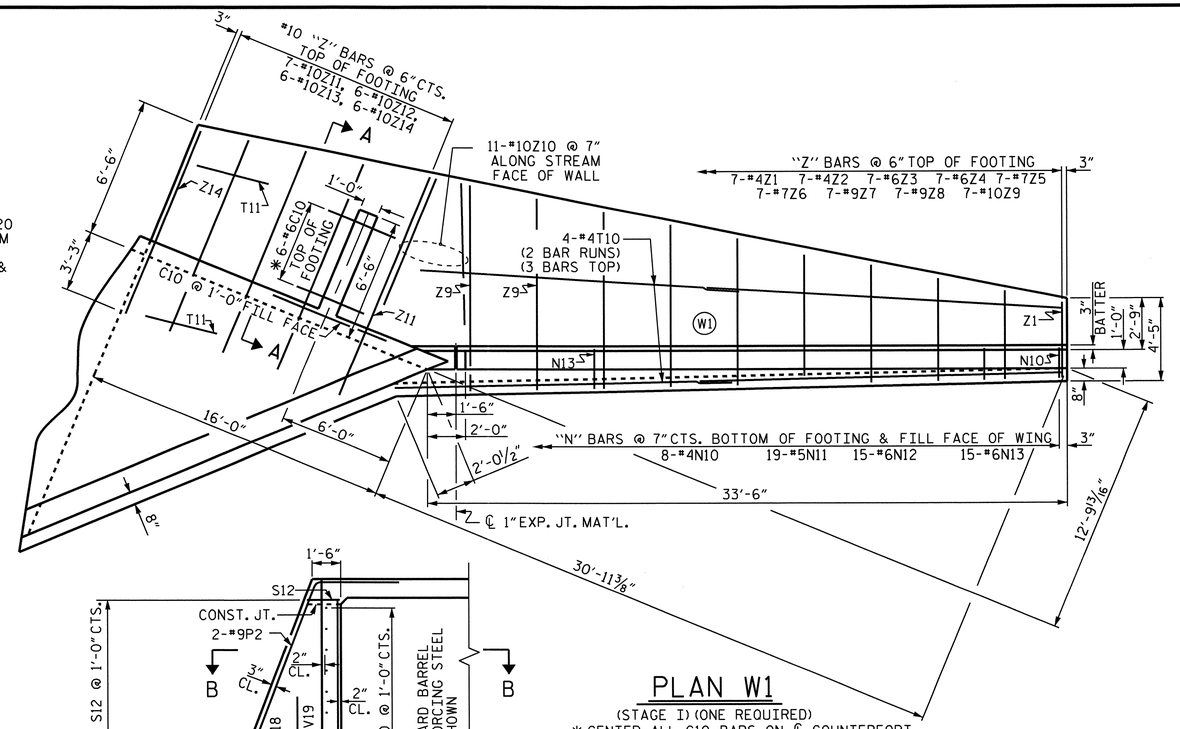
kpaschal



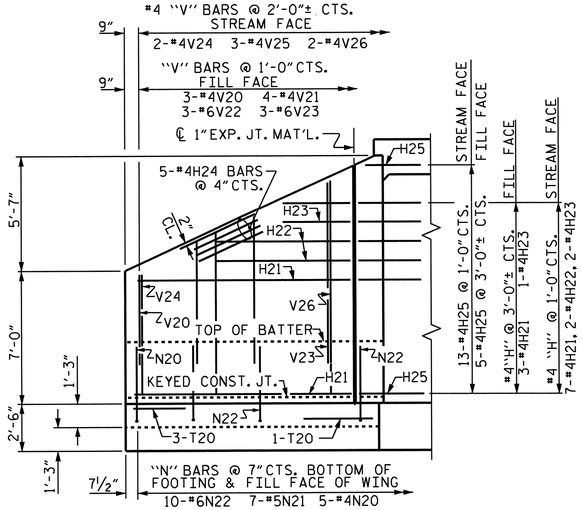
PLAN W2

(STAGE I & STAGE II)
(ONE REQUIRED PER STAGE)

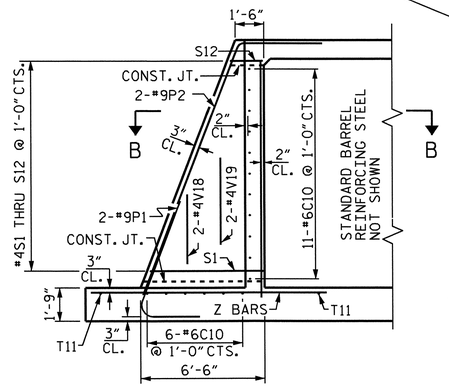


PLAN W1

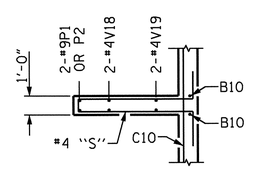
(STAGE I) (ONE REQUIRED)
* CENTER ALL C10 BARS ON ℄ COUNTERFORT



ELEVATION W2

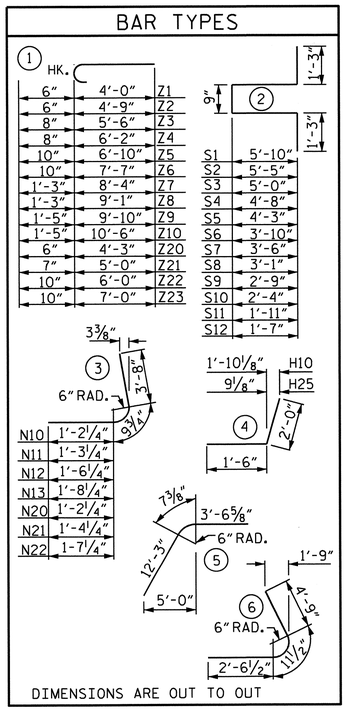


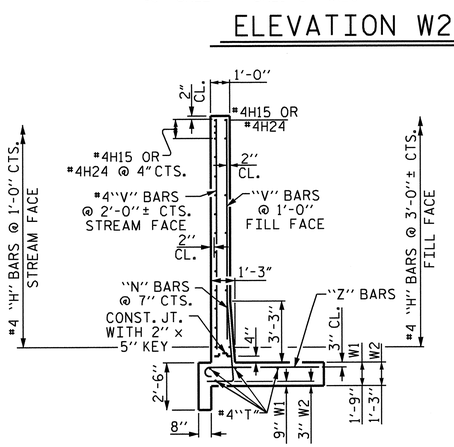
SECTION A-A



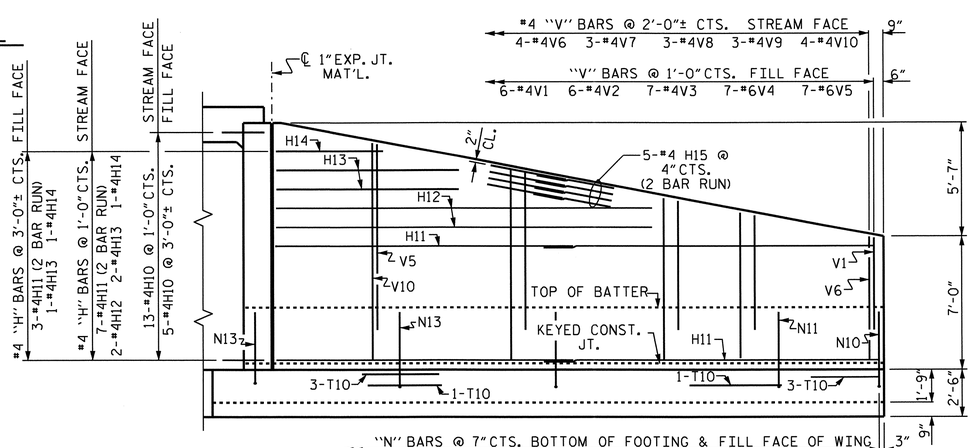
SECTION B-B

BAR TYPES





TYPICAL WING SECTION



ELEVATION W1

BILL OF MATERIAL

STAGE I (W1 & W2)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B10	2	4	STR.	13'-0"	17
C10	17	6	STR.	12'-0"	306
H10	18	4	4	3'-6"	42
H11	20	4	STR.	16'-6"	220
H12	2	4	STR.	22'-0"	29
H13	3	4	STR.	11'-0"	22
H14	2	4	STR.	6'-0"	8
H15	10	4	STR.	16'-6"	110
N10	8	4	3	5'-8"	30
N11	19	5	3	5'-9"	114
N12	15	6	3	6'-0"	135
N13	15	6	3	6'-2"	139
P1	2	9	6	8'-3"	56
P2	2	9	5	16'-5"	112
S1	1	4	2	14'-11"	10
S2	1	4	2	14'-1"	9
S3	1	4	2	13'-3"	9
S4	1	4	2	12'-7"	8
S5	1	4	2	11'-9"	8
S6	1	4	2	10'-11"	7
S7	1	4	2	10'-3"	7
S8	1	4	2	9'-5"	6
S9	1	4	2	8'-9"	6
S10	1	4	2	7'-11"	5
S11	1	4	2	7'-1"	5
S12	1	4	2	6'-5"	4
T10	8	4	STR.	17'-9"	95
T11	2	4	STR.	16'-0"	21
V1	6	4	STR.	5'-9"	23
V2	6	4	STR.	7'-0"	28
V3	7	4	STR.	8'-0"	37
V4	7	6	STR.	9'-9"	103
V5	7	6	STR.	11'-0"	116
V6	4	4	STR.	6'-9"	18
V7	3	4	STR.	8'-3"	17
V8	3	4	STR.	9'-3"	19
V9	3	4	STR.	10'-3"	21
V10	4	4	STR.	11'-6"	31
V18	2	4	STR.	6'-0"	8
V19	2	4	STR.	11'-6"	15
Z1	7	4	1	4'-6"	21
Z2	7	4	1	5'-3"	25
Z3	7	6	1	6'-2"	65
Z4	7	6	1	6'-10"	72
Z5	7	7	1	7'-8"	110
Z6	7	7	1	8'-5"	120
Z7	7	9	1	9'-7"	228
Z8	7	9	1	10'-4"	246
Z9	7	10	1	11'-3"	339
Z10	11	10	1	11'-11"	564
Z11	7	10	STR.	11'-6"	346
Z12	6	10	STR.	10'-9"	278
Z13	6	10	STR.	10'-3"	265
Z14	6	10	STR.	9'-6"	245

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H21	10	4	STR.	11'-7"	77
H22	2	4	STR.	8'-1"	11
H23	3	4	STR.	3'-7"	7
H24	5	4	STR.	12'-2"	41
H25	18	4	4	3'-6"	42
N20	5	4	3	5'-8"	19
N21	7	5	3	5-10"	43
N22	10	6	3	6'-1"	91
S20	3	6	STR.	6'-0"	27
T20	4	4	STR.	13'-6"	36
V20	3	4	STR.	5'-9"	12
V21	4	4	STR.	7'-3"	19
V22	3	6	STR.	9'-6"	43
V23	3	6	STR.	11'-0"	50
V24	2	4	STR.	6'-0"	8
V25	3	4	STR.	8'-0"	16
V26	2	4	STR.	10'-6"	14
Z20	5	4	1	4'-9"	16
Z21	6	5	1	5'-7"	35
Z22	6	7	1	6'-10"	84
Z23	5	7	1	7'-10"	80

REINFORCING STEEL 5671 LBS.
FOR 2 WINGS (STAGE I)

CLASS "A" CONCRETE (STAGE I)
2 WINGS 48.5 C.Y.
COUNTERFORT 1.4 C.Y.
PART END CURTAIN WALLS 4.4 C.Y.
TOTAL 54.3 C.Y.

STAGE II (W2)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H21	10	4	STR.	11'-7"	77
H22	2	4	STR.	8'-1"	11
H23	3	4	STR.	3'-7"	7
H24	5	4	STR.	12'-2"	41
H25	18	4	4	3'-6"	42
N20	5	4	3	5'-8"	19
N21	7	5	3	5-10"	43
N22	10	6	3	6'-1"	91
S20	3	6	STR.	6'-0"	27
T20	4	4	STR.	13'-6"	36
V20	3	4	STR.	5'-9"	12
V21	4	4	STR.	7'-3"	19
V22	3	6	STR.	9'-6"	43
V23	3	6	STR.	11'-0"	50
V24	2	4	STR.	6'-0"	8
V25	3	4	STR.	8'-0"	16
V26	2	4	STR.	10'-6"	14
Z20	5	4	1	4'-9"	16
Z21	6	5	1	5'-7"	35
Z22	6	7	1	6'-10"	84
Z23	5	7	1	7'-10"	80

REINFORCING STEEL 771 LBS.
FOR 1 WING (STAGE II)

CLASS "A" CONCRETE (STAGE II)
1 WING 9.7 C.Y.
2 HEADWALLS & PART END CURTAIN WALLS 10.6 C.Y.
TOTAL 20.3 C.Y.

PROJECT NO. B-3680
MOORE COUNTY
STATION: 13+50.50 -L-

SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR MULTIPLE BOX CULVERT

SKEW 45° SLOPE 2:1

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL
6/14/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			14

STR. #2

DRAWN BY : B.N.BARODAWALA DATE : 2-10-12
CHECKED BY : NEIL RUFFIN DATE : 3-1-12

14-MAY-2012 11:29
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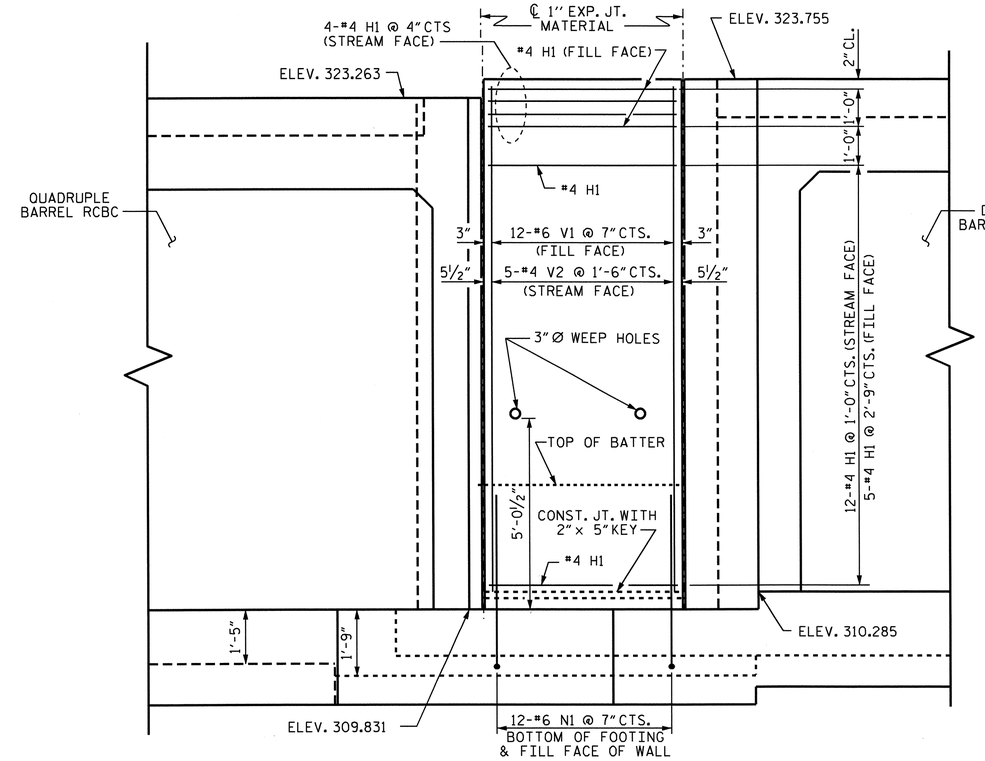
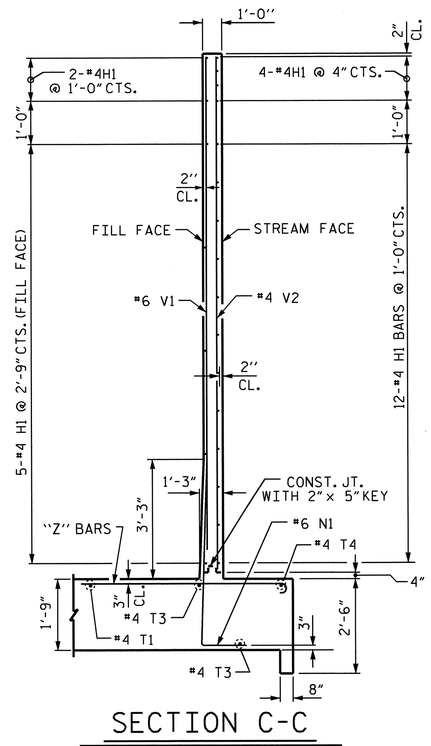
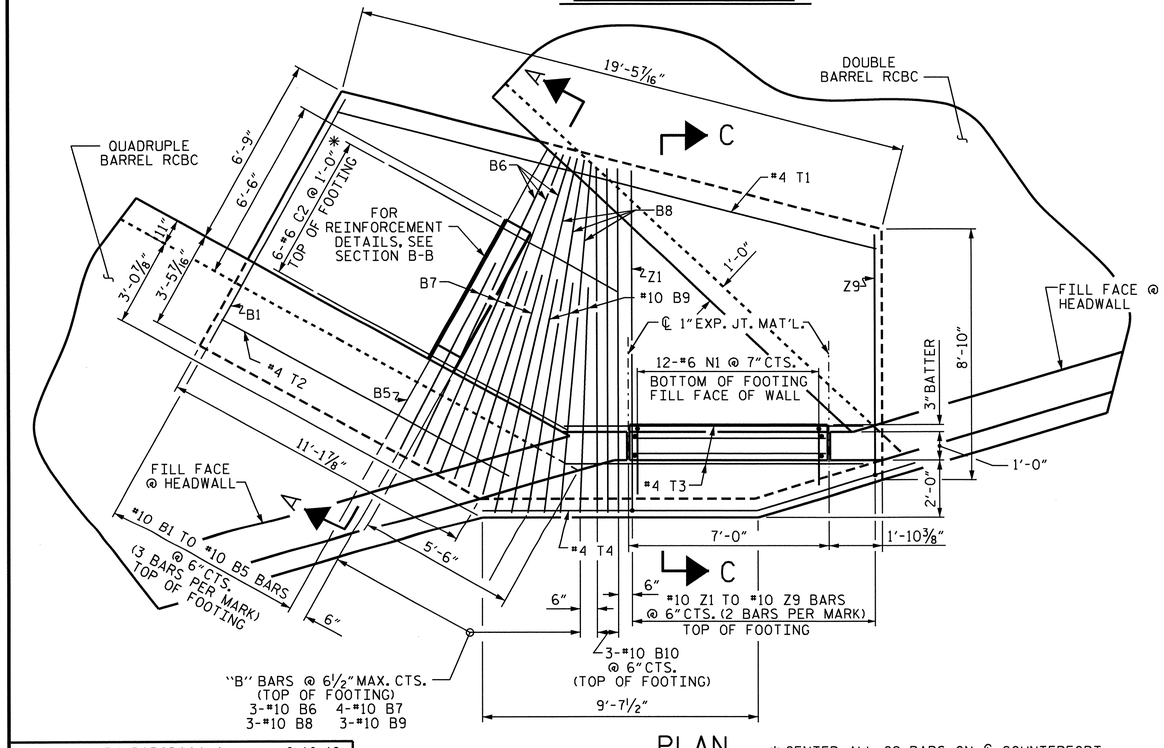
kpaschal



ELEVATION

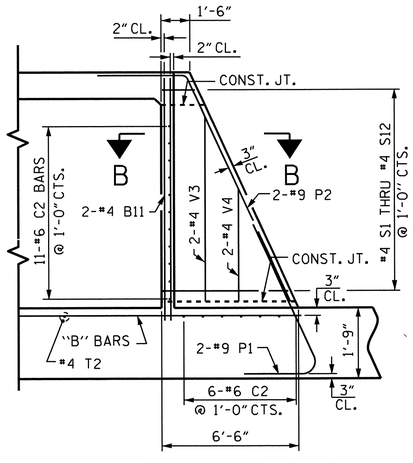


SECTION C-C



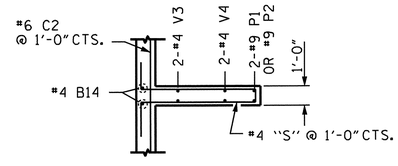
PLAN

* CENTER ALL C2 BARS ON ℄ COUNTERFORT
FIELD BEND #4 T4 BAR AS NECESSARY



SECTION A-A

STANDARD REINFORCING STEEL IN BARREL NOT SHOWN



SECTION B-B

BILL OF MATERIAL

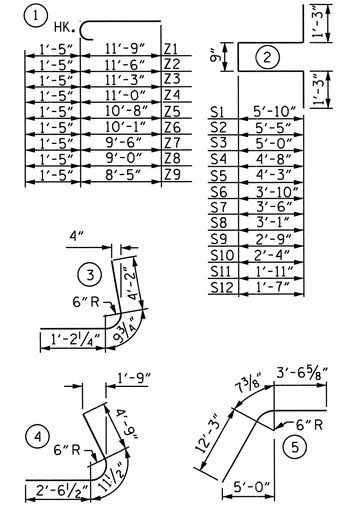
RETAINING WALL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	3	10	STR.	9'-9"	126
B2	3	10	STR.	10'-1"	130
B3	3	10	STR.	10'-6"	136
B4	3	10	STR.	10'-11"	141
B5	3	10	STR.	11'-3"	145
B6	3	10	STR.	11'-8"	151
B7	4	10	STR.	7'-8"	132
B8	3	10	STR.	12'-4"	159
B9	3	10	STR.	8'-4"	108
B10	3	10	STR.	12'-0"	155
B11	2	4	STR.	13'-0"	17
C2	17	6	STR.	12'-0"	306
H1	23	4	STR.	6'-7"	101
N1	12	6	3	6'-2"	111
P1	2	9	4	8'-3"	56
P2	2	9	5	16'-5"	112
S1	1	4	2	14'-11"	10
S2	1	4	2	14'-1"	9
S3	1	4	2	13'-3"	9
S4	1	4	2	12'-7"	8
S5	1	4	2	11'-9"	8
S6	1	4	2	10'-11"	7
S7	1	4	2	10'-3"	7
S8	1	4	2	9'-5"	6
S9	1	4	2	8'-9"	6
S10	1	4	2	7'-11"	5
S11	1	4	2	7'-1"	5
S12	1	4	2	6'-5"	4
T1	1	4	STR.	19'-6"	13
T2	1	4	STR.	11'-10"	8
T3	2	4	STR.	10'-9"	14
T4	1	4	STR.	14'-5"	10
V1	12	6	STR.	12'-3"	221
V2	5	4	STR.	13'-3"	44
V3	2	4	STR.	11'-6"	15
V4	2	4	STR.	6'-0"	8
Z1	2	10	1	13'-2"	113
Z2	2	10	1	12'-11"	111
Z3	2	10	1	12'-8"	109
Z4	2	10	1	12'-5"	107
Z5	2	10	1	12'-1"	104
Z6	2	10	1	11'-6"	99
Z7	2	10	1	10'-11"	94
Z8	2	10	1	10'-5"	90
Z9	2	10	1	9'-10"	85

REINFORCING STEEL 3415 LBS.

CLASS "A" CONCRETE
COUNTERFORT 1.4 C.Y.
RETAINING WALL 16.4 C.Y.
TOTAL 17.8 C.Y.

BAR TYPES



DIMENSIONS ARE OUT TO OUT

PROJECT NO. B-3680
MOORE COUNTY
STATION: 13+50.50 -L-

SHEET 7 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL (STAGE II)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			14

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 23006 ENGINEER KEITH PASCHAL

6/29/12

DRAWN BY : B.N.BARODAWALA DATE : 2-10-12
CHECKED BY : NEIL RUFFIN DATE : 3-1-12

14-MAY-2012 12:04
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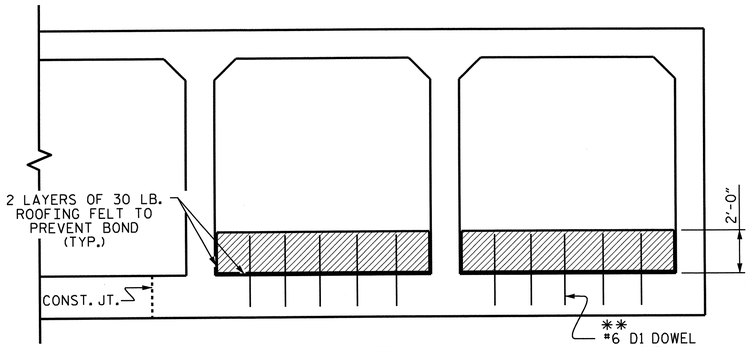
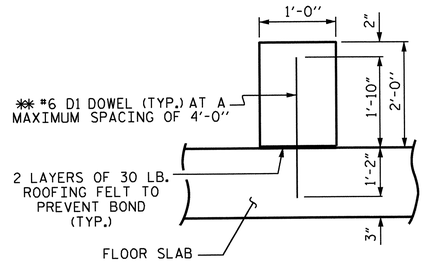
kpaschal



ELEVATION

(LOOKING DOWNSTREAM) (STAGE I)



SECTION THROUGH SILL

CULVERT SILL DETAILS

FOR PLAN VIEW SHOWING SILL LOCATIONS, SEE SHEET 4 OF 8.
(STAGE I)

** DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	349	#7	1	10'-1"	7193
A2	349	#7	1	7'-8"	5469
A3	756	#4	1	5'-4"	2693
A200	252	#6	STR	31'-1"	11765
A201	4	#6	STR	30'-1"	181
A202	4	#6	STR	28'-10"	173
A203	4	#6	STR	27'-7"	166
A204	4	#6	STR	26'-4"	158
A205	4	#6	STR	25'-1"	151
A206	4	#6	STR	23'-10"	143
A207	4	#6	STR	22'-7"	136
A208	4	#6	STR	21'-4"	128
A209	4	#6	STR	20'-1"	121
A210	4	#6	STR	18'-10"	113
A211	4	#6	STR	17'-7"	106
A212	4	#6	STR	16'-4"	98
A213	4	#6	STR	15'-1"	91
A214	4	#6	STR	13'-10"	83
A215	4	#6	STR	12'-7"	76
A216	4	#6	STR	11'-4"	68
A217	4	#6	STR	10'-1"	61
A218	4	#6	STR	8'-10"	53
A219	4	#6	STR	7'-7"	46
A220	4	#6	STR	6'-4"	38
A221	4	#6	STR	5'-1"	31
A222	2	#6	STR	3'-10"	12
A223	2	#6	STR	2'-7"	8
A224	2	#6	STR	1'-4"	4
A400	290	#7	STR	31'-0"	18376
A401	4	#7	STR	30'-4"	248
A402	4	#7	STR	29'-3"	239
A403	4	#7	STR	28'-2"	230
A404	4	#7	STR	27'-1"	221
A405	4	#7	STR	26'-0"	213
A406	4	#7	STR	24'-11"	204
A407	4	#7	STR	23'-10"	195
A408	4	#7	STR	22'-9"	186
A409	4	#7	STR	21'-8"	177
A410	4	#7	STR	20'-7"	168
A411	4	#7	STR	19'-6"	159
A412	4	#7	STR	18'-5"	151
A413	4	#7	STR	17'-4"	142
A414	4	#7	STR	16'-3"	133
A415	4	#7	STR	15'-2"	124
A416	4	#7	STR	14'-1"	115
A417	4	#7	STR	13'-0"	106
A418	4	#7	STR	11'-11"	97
A419	4	#7	STR	10'-10"	89
A420	4	#7	STR	9'-9"	80
A421	4	#7	STR	8'-8"	71
A422	4	#7	STR	7'-7"	62
A423	4	#7	STR	6'-6"	53
A424	4	#7	STR	5'-5"	44
A425	2	#7	STR	4'-4"	18
A426	2	#7	STR	3'-3"	13
A427	2	#7	STR	2'-2"	9
B1	239	#5	STR	13'-4"	3324
B2	349	#4	STR	10'-4"	2409
B3	756	#4	STR	13'-4"	6733
C1	672	#4	STR	28'-7"	12831
D1	10	#6	STR	3'-0"	45
S1	6	#8	STR	42'-7"	682
REINFORCING STEEL					77312 LBS.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A300	252	#7	STR	51'-6"	26527
A301	4	#7	STR	50'-11"	416
A302	4	#7	STR	49'-10"	407
A303	4	#7	STR	48'-9"	399
A304	4	#7	STR	47'-8"	390
A305	4	#7	STR	46'-7"	381
A306	4	#7	STR	45'-6"	372
A307	4	#7	STR	44'-5"	363
A308	4	#7	STR	43'-4"	354
A309	4	#7	STR	42'-3"	345
A310	4	#7	STR	41'-2"	337
A311	4	#7	STR	40'-1"	328
A312	4	#7	STR	39'-0"	319
A313	4	#7	STR	37'-11"	310
A314	4	#7	STR	36'-10"	301
A315	4	#7	STR	35'-9"	292
A316	4	#7	STR	34'-8"	283
A317	4	#7	STR	33'-7"	275
A318	4	#7	STR	32'-6"	266
A319	4	#7	STR	31'-5"	257
A320	4	#7	STR	30'-4"	248
A321	4	#7	STR	29'-3"	239
A322	4	#7	STR	28'-2"	230
A323	4	#7	STR	27'-1"	221
A324	4	#7	STR	26'-0"	213
A325	4	#7	STR	24'-11"	204
A326	4	#7	STR	23'-10"	195
A327	4	#7	STR	22'-9"	186
A328	4	#7	STR	21'-8"	177
A329	4	#7	STR	20'-7"	168
A330	4	#7	STR	19'-6"	159
A331	4	#7	STR	18'-5"	151
A332	4	#7	STR	17'-4"	142
A333	4	#7	STR	16'-3"	133
A334	4	#7	STR	15'-2"	124
A335	4	#7	STR	14'-1"	115
A336	4	#7	STR	13'-0"	106
A337	4	#7	STR	11'-11"	97
A338	4	#7	STR	10'-10"	89
A339	4	#7	STR	9'-9"	80
A340	4	#7	STR	8'-8"	71
A341	4	#7	STR	7'-7"	62
A342	4	#7	STR	6'-6"	53
A343	4	#7	STR	5'-5"	44
A344	4	#7	STR	4'-4"	35
A345	4	#7	STR	3'-3"	27
A346	4	#7	STR	2'-2"	18

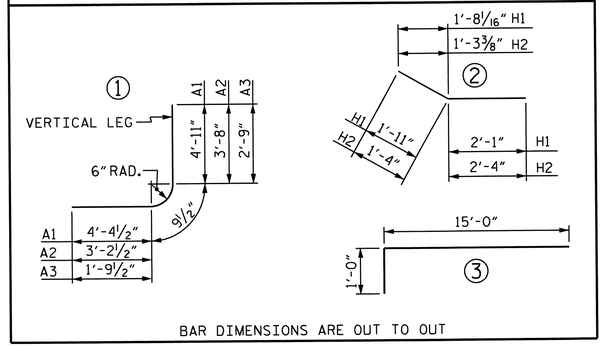
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A600	263	#6	STR	24'-3"	9579
A601	2	#6	STR	23'-6"	71
A602	2	#6	STR	22'-3"	67
A603	2	#6	STR	21'-0"	63
A604	2	#6	STR	19'-9"	59
A605	2	#6	STR	18'-6"	56
A606	2	#6	STR	17'-3"	52
A607	2	#6	STR	16'-0"	48
A608	2	#6	STR	14'-9"	44
A609	2	#6	STR	13'-6"	41
A610	2	#6	STR	12'-3"	37
A611	2	#6	STR	11'-0"	33
A612	2	#6	STR	9'-9"	29
A613	2	#6	STR	8'-6"	26
A614	2	#6	STR	7'-3"	22
A615	2	#6	STR	6'-0"	18
A616	2	#6	STR	4'-9"	14
A617	2	#6	STR	23'-0"	69
A618	2	#6	STR	21'-9"	65
A619	2	#6	STR	20'-6"	62
A620	2	#6	STR	19'-3"	58
A621	2	#6	STR	18'-0"	54
A622	2	#6	STR	16'-9"	50
A623	2	#6	STR	15'-6"	47
A624	2	#6	STR	14'-3"	43
A625	2	#6	STR	13'-0"	39
A626	2	#6	STR	11'-9"	35
A627	2	#6	STR	10'-6"	32
A628	2	#6	STR	9'-3"	28
A629	2	#6	STR	8'-0"	24
A630	2	#6	STR	6'-9"	20
A631	2	#6	STR	5'-6"	17
A632	2	#6	STR	4'-3"	13
A633	2	#6	STR	3'-0"	9
A634	2	#6	STR	1'-9"	5
A800	304	#7	STR	24'-3"	15068
A801	4	#7	STR	23'-3"	190

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A802	4	#7	STR	22'-2"	181
A803	4	#7	STR	21'-1"	172
A804	4	#7	STR	20'-0"	164
A805	4	#7	STR	18'-11"	155
A806	4	#7	STR	17'-10"	146
A807	4	#7	STR	16'-9"	137
A808	4	#7	STR	15'-8"	128
A809	4	#7	STR	14'-7"	119
A810	4	#7	STR	13'-6"	110
A811	4	#7	STR	12'-5"	102
A812	4	#7	STR	11'-4"	93
A813	4	#7	STR	10'-3"	84
A814	4	#7	STR	9'-2"	75
A815	4	#7	STR	8'-1"	66
A816	4	#7	STR	7'-0"	57
A817	4	#7	STR	5'-11"	48
A818	4	#7	STR	4'-10"	40
A819	2	#7	STR	3'-9"	15
A820	2	#7	STR	2'-8"	11
A821	2	#7	STR	1'-7"	6
B1	239	#5	STR	13'-4"	3324
B2	349	#4	STR	10'-4"	2409
B3	378	#4	STR	13'-4"	3367
C1	1001	#4	STR	28'-7"	19113
H1	14	#4	2	4'-0"	37
H2	2	#4	2	3'-8"	5
G1	16	#5	STR	37'-11"	633
M1	10	#8	3	16'-0"	427
S2	6	#8	STR	34'-3"	549
S3	12	#8	STR	38'-5"	1231
V1	4	#6	STR	14'-4"	86
REINFORCING STEEL					128642 LBS.

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200, A600	#6	3'-10"
A400, A800	#7	3'-9"
B1	#5	2'-2"
B3	#4	1'-9"
C1	#4	1'-11"
G1	#5	3'-0"
S1, S2, S3	#8	4'-0"

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. B-3680

MOORE COUNTY

STATION: 13+50.50 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

QUADRUPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

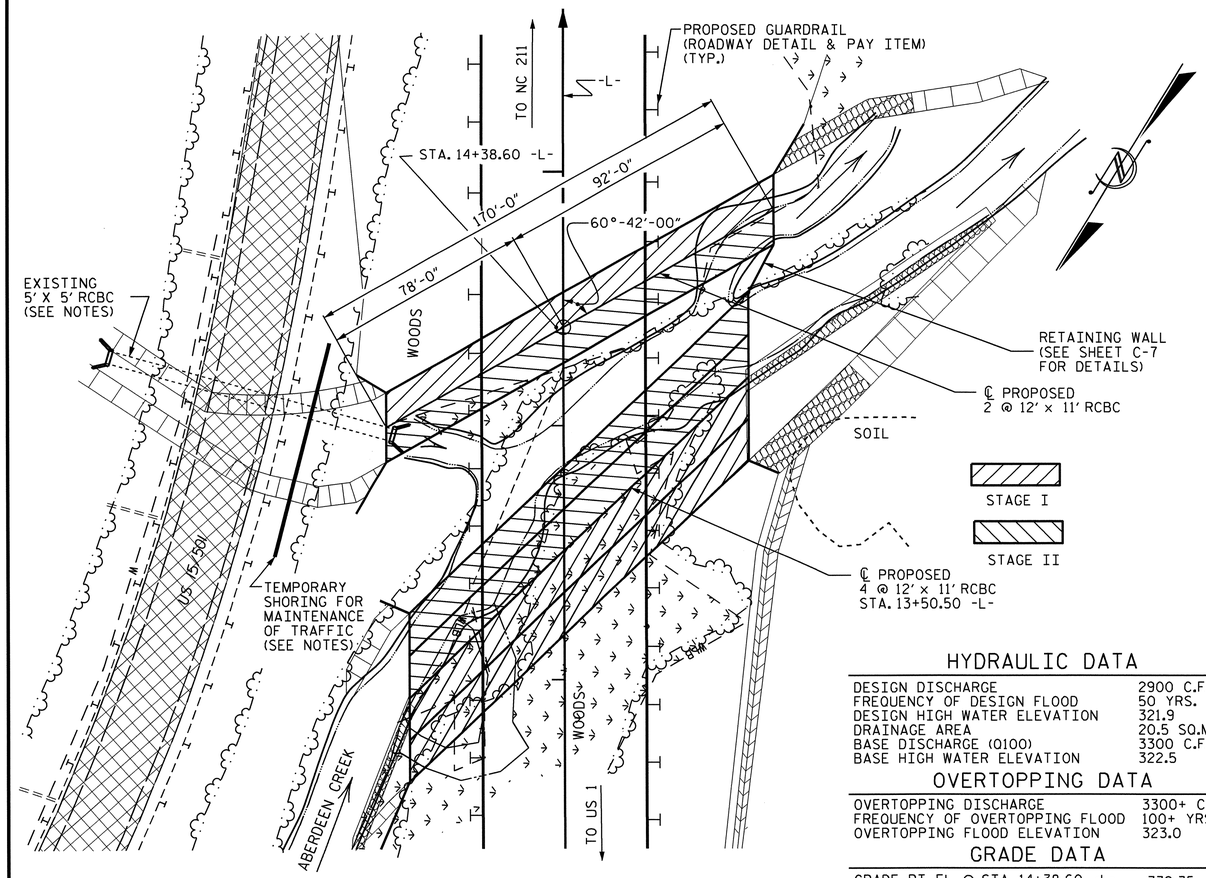
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			14

STR. #2

DRAWN BY : B.N.BARODAWALA DATE : 2-10-12
CHECKED BY : NEIL RUFFIN DATE : 3-1-12

14-MAY-2012 11:29
R:\Structures\Final Plans\str2_quad_rcbc\B-3680_SD_CU_02.dgn
kpaschal

B.M. #2 - RR SPIKE IN BASE OF RR TELEGRAPH POLE; -BL- STA. 17+70.00 226'RT EL. 324.21



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	2900 C.F.S.
FREQUENCY OF DESIGN FLOOD	50 YRS.
DESIGN HIGH WATER ELEVATION	321.9
DRAINAGE AREA	20.5 SQ.MI.
BASE DISCHARGE (Q100)	3300 C.F.S.
BASE HIGH WATER ELEVATION	322.5

OVERTOPPING DATA

OVERTOPPING DISCHARGE	3300+ C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	100+ YRS.
OVERTOPPING FLOOD ELEVATION	323.0

GRADE DATA

GRADE PT. EL. @ STA. 14+38.60 -L-	339.35
BED EL. @ STA. 14+38.60 -L-	311.01
ROADWAY SLOPES	2:1

LOCATION SKETCH

STAGE I QUANTITIES

CLASS A CONCRETE

BARREL @ 1.564	CY/FT	265.9	C.Y.
WINGS ETC.		29.8	C.Y.
TOTAL		295.7	C.Y.

REINFORCING STEEL

BARREL	38239	LBS.
WINGS ETC.	2166	LBS.
TOTAL	40405	LBS.

FOUNDATION COND. MAT'L. 200 TONS

STAGE II QUANTITIES

CLASS A CONCRETE

BARREL @ 2.617	CY/FT	444.9	C.Y.
WING ETC.		22.3	C.Y.
TOTAL		467.2	C.Y.

REINFORCING STEEL

BARREL	50347	LBS.
WING ETC.	1379	LBS.
TOTAL	51726	LBS.

FOUNDATION COND. MAT'L. 168 TONS

TOTAL STRUCTURE QUANTITIES (STAGE I & STAGE II)

CLASS A CONCRETE

BARREL @ 4.181	CY/FT	710.8	C.Y.
WINGS ETC.		52.1	C.Y.
TOTAL		762.9	C.Y.

REINFORCING STEEL

BARREL	88586	LBS.
WINGS ETC.	3545	LBS.
TOTAL	92131	LBS.

FOUNDATION COND. MAT'L.	368	TONS
CULVERT EXCAVATION	----------	LUMP SUM
REMOVAL OF EXISTING STRUCTURE @ STA. 14+38.60 -L-		LUMP SUM

F.A. PROJECT NO. BRSTP-0015(25)

NOTES

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

DESIGN FILL----------19.00'

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

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

CONCRETE IN CULVERTS, TO BE POURED IN THE FOLLOWING ORDER:
(STAGE I)
1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.

2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT.

(STAGE II)
1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.

2. THE REMAINING PORTIONS OF THE WALLS, ENTIRE ROOF SLAB, HEADWALLS AND WING FULL HEIGHT.

NOTE: STAGE II SHALL NOT BE STARTED UNTIL STAGE I FOR THE QUADRUPLE BARREL CULVERT @ STA. 13+50.50 -L- IS COMPLETE.

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

THE EXISTING SINGLE 5' X 5' RCBC LOCATED APPROXIMATELY 130 FT. UPSTREAM FROM THE PROPOSED DOUBLE 12' X 11' RCBC SHALL BE REMOVED.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET AND RETAINING WALL SHEET C-7.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

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

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

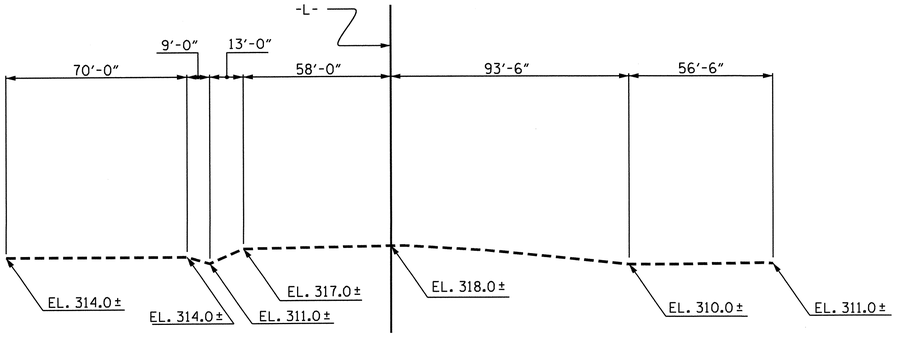
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

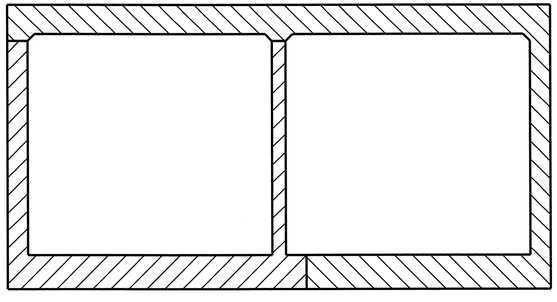
FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

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

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



PROFILE ALONG ℄ CULVERT



CONSTRUCTION SEQUENCE

(LOOKING DOWNSTREAM)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-3680

MOORE COUNTY

STATION: 14+38.60 -L-

SHEET 1 OF 6 CULVERT NO.: C-261

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS
2			4			14

STR. #3 STD. NO. CB32A

ASSEMBLED BY : B.N.BARODAWALA DATE : 1-23-12
CHECKED BY : NEIL RUFFIN DATE : 2-17-12 — SPECIAL

DRAWN BY : B. WYNN/D.DONOVAN DATE : SEPT. 1990
CHECKED BY : A.R.BISSETTE DATE : OCT. 90 — STANDARD

ADDED 10-1-90

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.19	--	1.75	1.19	1	BOT. CORNER WALL	11.93	1.48	1	TOP SLAB	11.37	
		HL-93 (OPERATING)	N/A		1.55	--	1.35	1.55	1	BOT. CORNER WALL	11.93	1.91	1	TOP SLAB	11.37	
		HS-20 (INVENTORY)	36.000	2	1.20	43.34	1.75	1.20	1	BOT. CORNER WALL	11.93	1.48	1	TOP SLAB	11.37	
		HS-20 (OPERATING)	36.000		1.56	56.18	1.35	1.56	1	BOT. CORNER WALL	11.93	1.91	1	TOP SLAB	11.37	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.55	20.89	1.40	1.55	1	BOT. CORNER WALL	11.93	4.05	1	EXTERIOR WALL	11.00	
		SNGARBS2	20.000		1.52	30.38	1.40	1.52	1	BOT. CORNER WALL	11.93	2.98	1	TOP SLAB	11.37	
		SNAGRIS2	22.000		1.52	33.41	1.40	1.52	1	BOT. CORNER WALL	11.93	2.67	1	TOP SLAB	11.37	
		SNCOTTS3	27.250		1.48	40.27	1.40	1.48	1	BOT. CORNER WALL	11.93	2.08	1	TOP SLAB	11.37	
		SNAGGRS4	34.925		1.48	51.61	1.40	1.48	1	BOT. CORNER WALL	11.93	1.75	1	TOP SLAB	11.37	
		SNS5A	35.550		1.46	52.07	1.40	1.46	1	BOT. CORNER WALL	11.93	1.79	1	TOP SLAB	11.37	
		SNS6A	39.950	3	1.45	57.99	1.40	1.45	1	BOT. CORNER WALL	11.93	1.66	1	TOP SLAB	11.37	
		SNS7B	42.000		1.45	60.97	1.40	1.45	1	BOT. CORNER WALL	11.93	1.62	1	TOP SLAB	11.37	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.48	48.77	1.40	1.48	1	BOT. CORNER WALL	11.93	2.02	1	TOP SLAB	11.37	
		TNT4A	33.075		1.49	49.32	1.40	1.49	1	BOT. CORNER WALL	11.93	2.08	1	TOP SLAB	11.37	
		TNT6A	41.600		1.46	60.93	1.40	1.46	1	BOT. CORNER WALL	11.93	1.87	1	TOP SLAB	11.37	
		TNT7A	42.000		1.46	61.51	1.40	1.46	1	BOT. CORNER WALL	11.93	1.85	1	TOP SLAB	11.37	
		TNT7B	42.000		1.48	62.07	1.40	1.48	1	BOT. CORNER WALL	11.93	1.87	1	TOP SLAB	11.37	
		TNAGRIT4	43.000		1.48	63.54	1.40	1.48	1	BOT. CORNER WALL	11.93	1.72	1	TOP SLAB	11.37	
		TNAGT5A	45.000		1.46	65.91	1.40	1.46	1	BOT. CORNER WALL	11.93	1.62	1	TOP SLAB	11.37	
		TNAGT5B	45.000		1.45	65.32	1.40	1.45	1	BOT. CORNER WALL	11.93	1.49	1	TOP SLAB	11.37	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

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

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.
2.
3.
4.

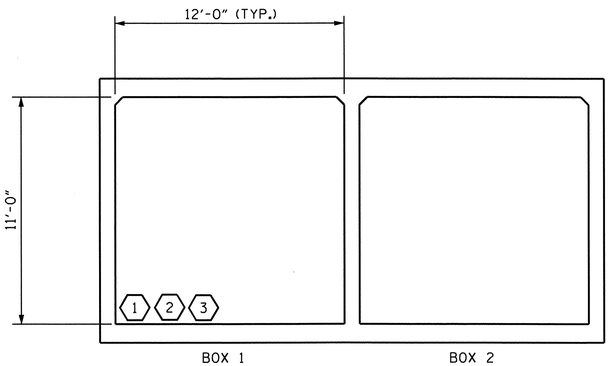
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

ASSEMBLED BY : B.N.BARODAWALA DATE : 3-26-12
CHECKED BY : J. E. LAZAROVICH DATE : 3-28-12

DRAWN BY : WMC	7/11	REV. 10/1/11	MAA/GM
CHECKED BY : GM	7/11		

29-JUN-2012 06:46
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kpaschal

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

PROJECT NO. B-3680

MOORE COUNTY

STATION: 14+38.60 -L-

SHEET 2 OF 6

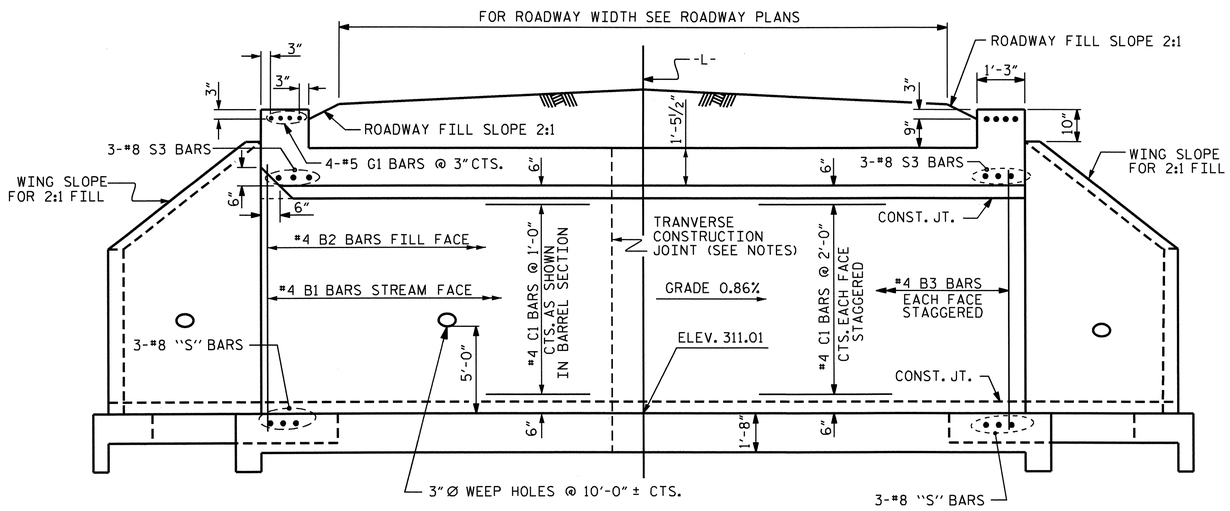
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

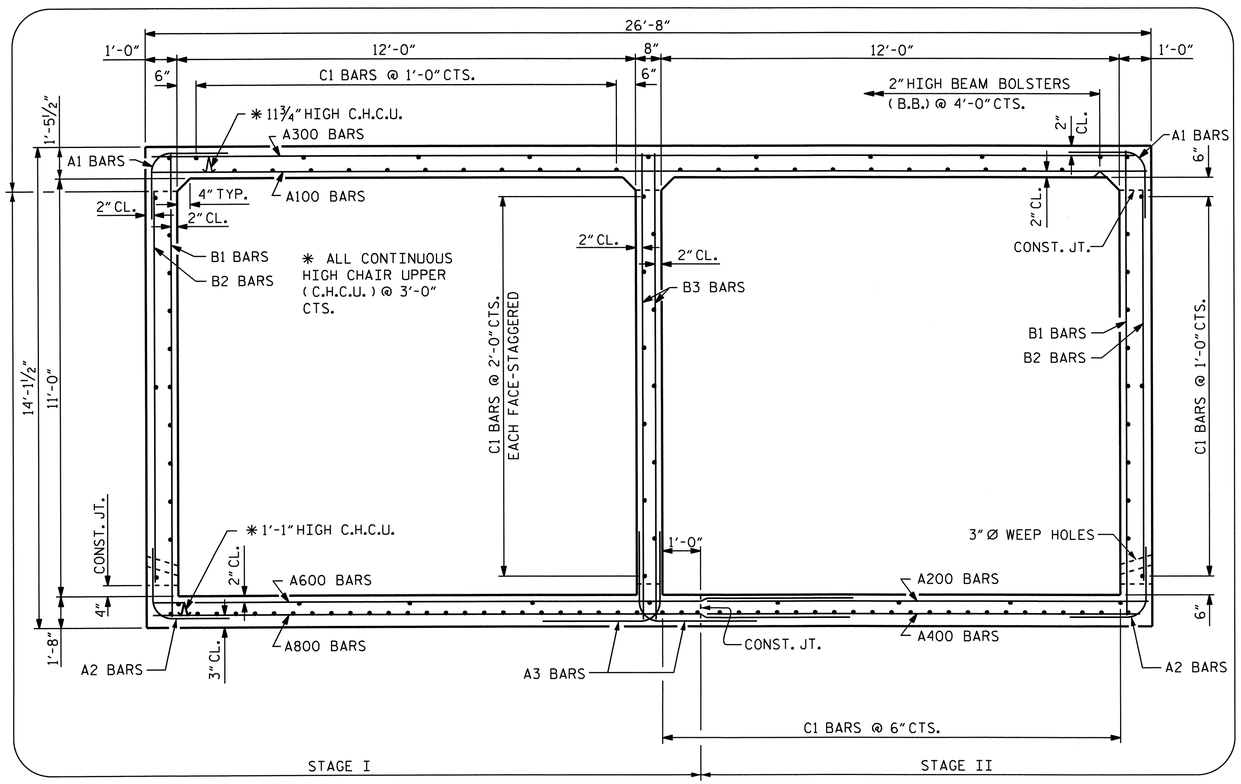
LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			14

STR. #3 STD. NO. LRFR5

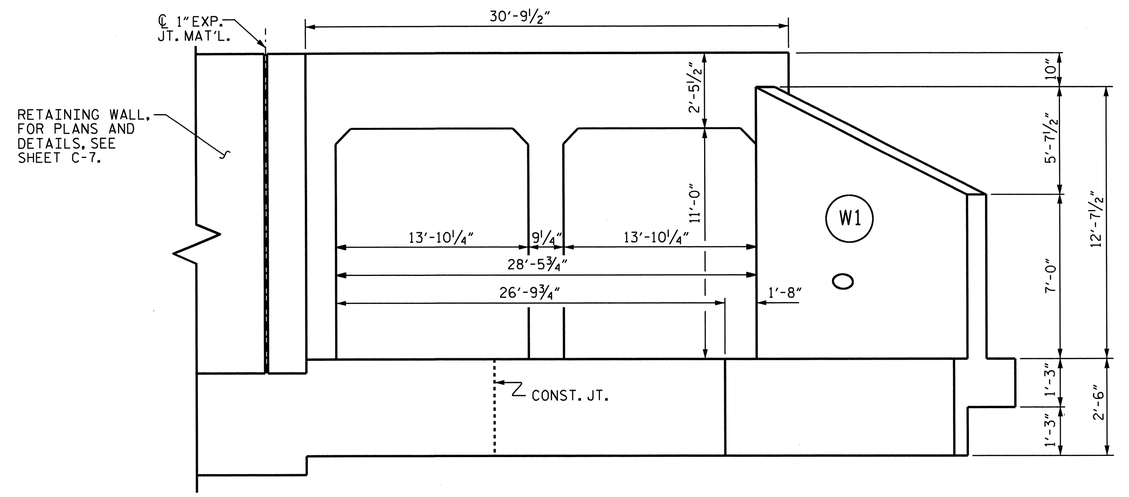


CULVERT SECTION NORMAL TO ROADWAY

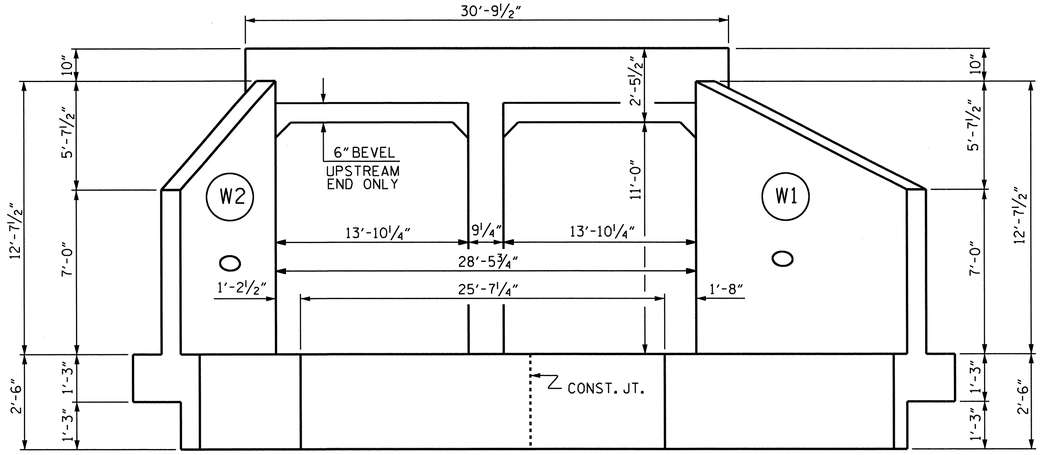


RIGHT ANGLE SECTION OF BARREL

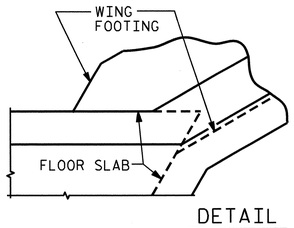
(LOOKING DOWNSTREAM)
THERE ARE 127 C1 BARS IN SECTION OF BARREL.
(56 IN STAGE I, 71 IN STAGE II)



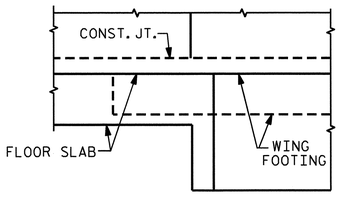
END ELEVATION NORMAL TO SKEW @ OUTLET



END ELEVATION NORMAL TO SKEW @ INLET



DETAIL



CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING

NORTH CAROLINA PROFESSIONAL SEAL 20068 ENGINEER KEITH PASCHAL

6/29/12

PROJECT NO. B-3680
MOORE COUNTY
STATION: 14+38.60 -L-
SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BARREL STANDARD
DOUBLE 12 FT. X 11 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11
1			3			TOTAL SHEETS
2			4			14

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REDRAWN 10-1-90 BY P. DONOVAN CHECKED BY ARB

ASSEMBLED BY : B.N.BARODAWALA DATE : 1-23-12		SPECIAL
CHECKED BY : NEIL RUFFIN DATE : 2-17-12		
DRAWN BY : JERRY HARRIS DATE : JUNE 1971		STANDARD
CHECKED BY : JOEL JOHNSON DATE : JULY 1971		

29-JUN-2012 06:44
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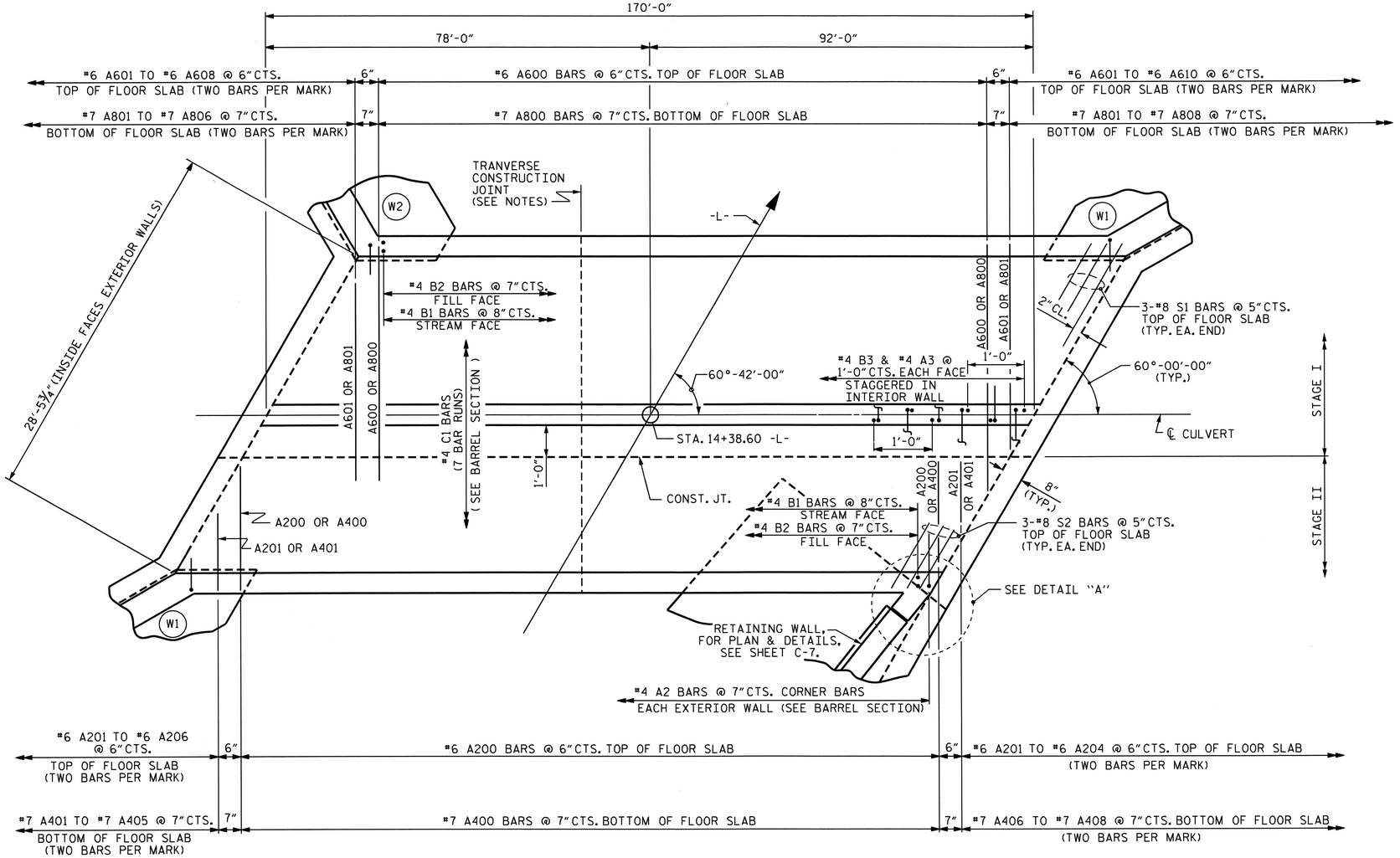
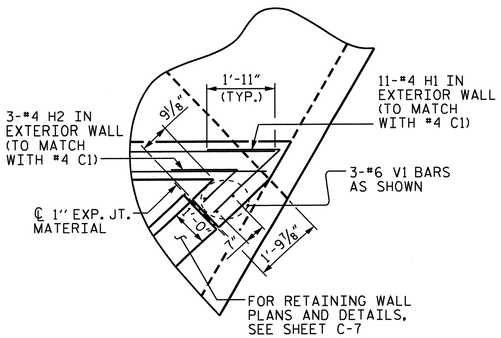
kpaschal

STR. #3 STD. NO. CB32

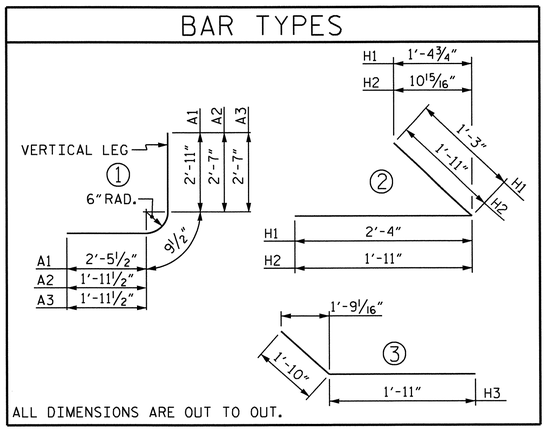




DETAIL "A"

PLAN - FLOOR SLAB

BAR TYPES



ALL DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE II

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
A1	291	#4	1	6'-2"	1199
A2	291	#4	1	5'-4"	1037
A100	265	#5	STR	26'-4"	7278
A101	4	#5	STR	24'-8"	103
A102	4	#5	STR	22'-7"	94
A103	4	#5	STR	20'-7"	86
A104	4	#5	STR	18'-7"	78
A105	4	#5	STR	16'-7"	69
A106	4	#5	STR	14'-6"	60
A107	4	#5	STR	12'-6"	52
A108	4	#5	STR	10'-6"	44
A109	4	#5	STR	8'-6"	35
A110	4	#5	STR	6'-6"	27
A111	4	#5	STR	4'-5"	18
A112	4	#5	STR	2'-5"	10
A200	326	#6	STR	11'-8"	5713
A201	4	#6	STR	10'-3"	62
A202	4	#6	STR	8'-6"	51
A203	4	#6	STR	6'-9"	41
A204	4	#6	STR	5'-0"	30
A205	2	#6	STR	3'-4"	10
A206	2	#6	STR	1'-7"	5
A300	309	#6	STR	26'-4"	12222
A301	4	#6	STR	24'-11"	150
A302	4	#6	STR	23'-2"	139
A303	4	#6	STR	21'-6"	129
A304	4	#6	STR	19'-9"	119
A305	4	#6	STR	18'-0"	108
A306	4	#6	STR	16'-3"	98
A307	4	#6	STR	14'-6"	87
A308	4	#6	STR	12'-10"	77
A309	4	#6	STR	11'-1"	67
A310	4	#6	STR	9'-4"	56
A311	4	#6	STR	7'-7"	46
A312	4	#6	STR	5'-10"	35
A313	4	#6	STR	4'-2"	25
A314	4	#6	STR	2'-5"	15
A400	279	#7	STR	11'-8"	6653
A401	2	#7	STR	10'-5"	43
A402	2	#7	STR	8'-4"	34
A403	2	#7	STR	6'-4"	26
A404	2	#7	STR	4'-4"	18
A405	2	#7	STR	2'-4"	10
A406	2	#7	STR	10'-1"	41
A407	2	#7	STR	8'-1"	33
A408	2	#7	STR	6'-1"	25
B1	255	#4	STR	13'-7"	2314
B2	291	#4	STR	10'-4"	2009
C1	497	#4	STR	25'-11"	8604
G1	8	#5	STR	30'-4"	253
H1	11	#4	2	4'-3"	31
H2	3	#4	2	3'-2"	6
H3	2	#4	3	3'-9"	5
S2	6	#8	STR	13'-5"	215
S3	6	#8	STR	30'-4"	486
V1	3	#6	STR	14'-7"	66

REINFORCING STEEL 50347 LBS.

STAGE I

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
A1	291	#4	1	6'-2"	1199
A2	291	#4	1	5'-4"	1037
A3	340	#4	1	5'-4"	1211
A600	318	#6	STR	18'-6"	8836
A601	4	#6	STR	17'-2"	103
A602	4	#6	STR	15'-5"	93
A603	4	#6	STR	13'-8"	82
A604	4	#6	STR	11'-11"	72
A605	4	#6	STR	10'-3"	62
A606	4	#6	STR	8'-6"	51
A607	4	#6	STR	6'-9"	41
A608	4	#6	STR	5'-0"	30
A609	2	#6	STR	3'-3"	10
A610	2	#6	STR	1'-6"	5
A800	273	#7	STR	18'-5"	10277
A801	4	#7	STR	16'-8"	136
A802	4	#7	STR	14'-8"	120
A803	4	#7	STR	12'-8"	104
A804	4	#7	STR	10'-8"	87
A805	4	#7	STR	8'-7"	70
A806	4	#7	STR	6'-7"	54
A807	2	#7	STR	4'-7"	19
A808	2	#7	STR	2'-7"	11
B1	255	#4	STR	13'-7"	2314
B2	291	#4	STR	10'-4"	2009
B3	340	#4	STR	13'-7"	3085
C1	392	#4	STR	25'-11"	6786
S1	6	#8	STR	20'-11"	335

REINFORCING STEEL 38239 LBS.

SPLICE LENGTH CHART

BAR	SIZE	LENGTH
A200, A600	#6	3'-10"
A400, A800	#7	3'-9"
B1, B3	#4	1'-9"
C1	#4	1'-11"
S1, S2	#8	4'-0"

PROJECT NO. B-3680

MOORE COUNTY

STATION: 14+38.60 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 12 FT.X 11 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER A. KEITH PASCHAL

6/29/12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12
1			3			TOTAL SHEETS
2			4			14

STR. #3

DRAWN BY : B.N.BARODAWALA DATE : 1-23-12
CHECKED BY : NEIL RUFFIN DATE : 2-17-12

14-MAY-2012 11:29
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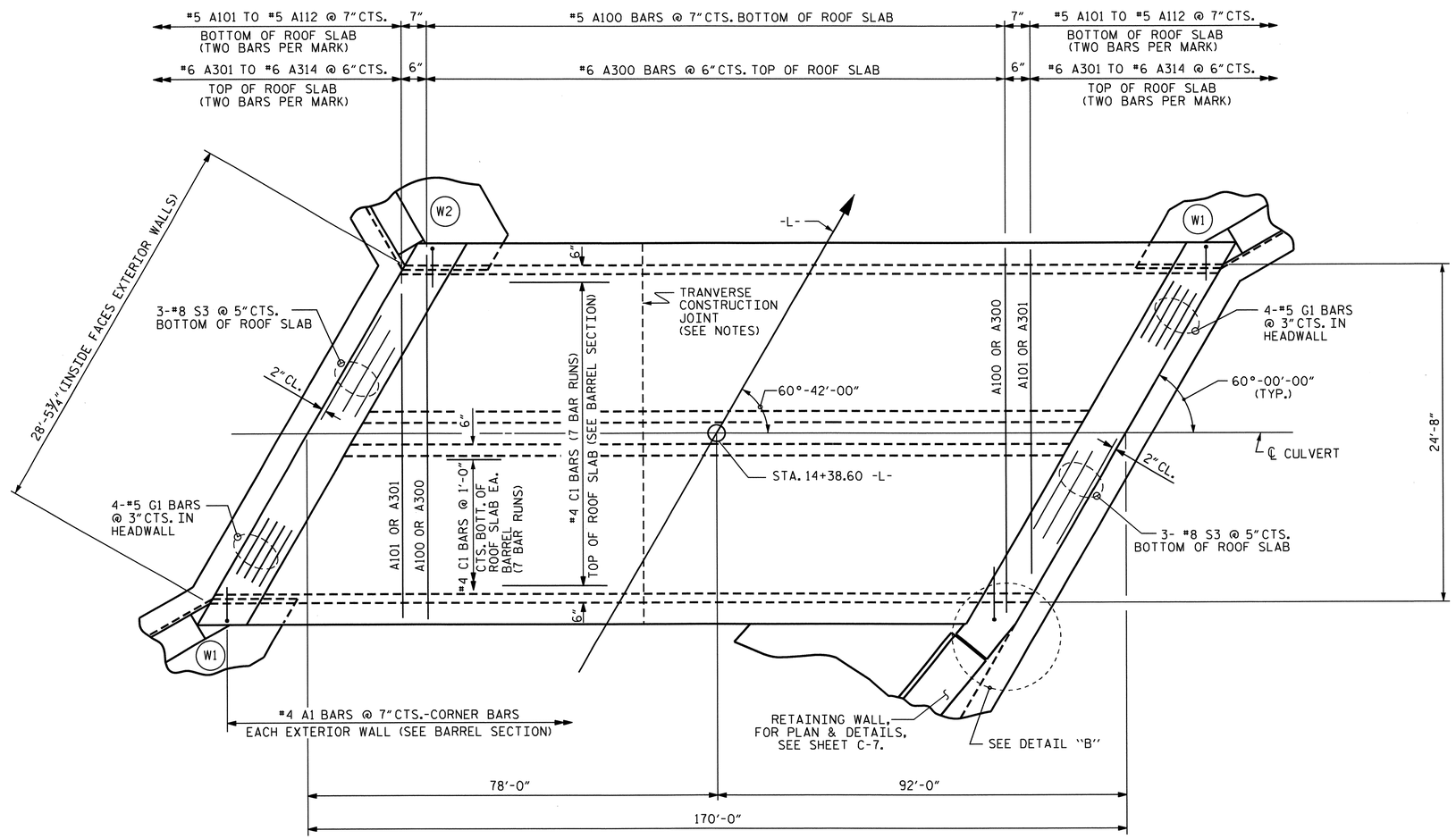
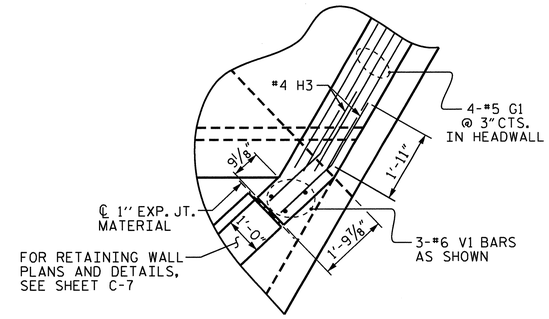
kpaschal



PLAN - ROOF SLAB



DETAIL "B"

PROJECT NO. B-3680

MOORE COUNTY

STATION: 14+38.60 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 12 FT.X 11 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13
1			3			TOTAL SHEETS
2			4			14

NORTH CAROLINA PROFESSIONAL SEAL 22005 ENGINEER KEITH PASCHAL

6/29/12

STR. #3

DRAWN BY : B.N.BARODAWALA DATE : 1-23-12
CHECKED BY : NEIL RUFFIN DATE : 2-17-12

29-JUN-2012 06:43
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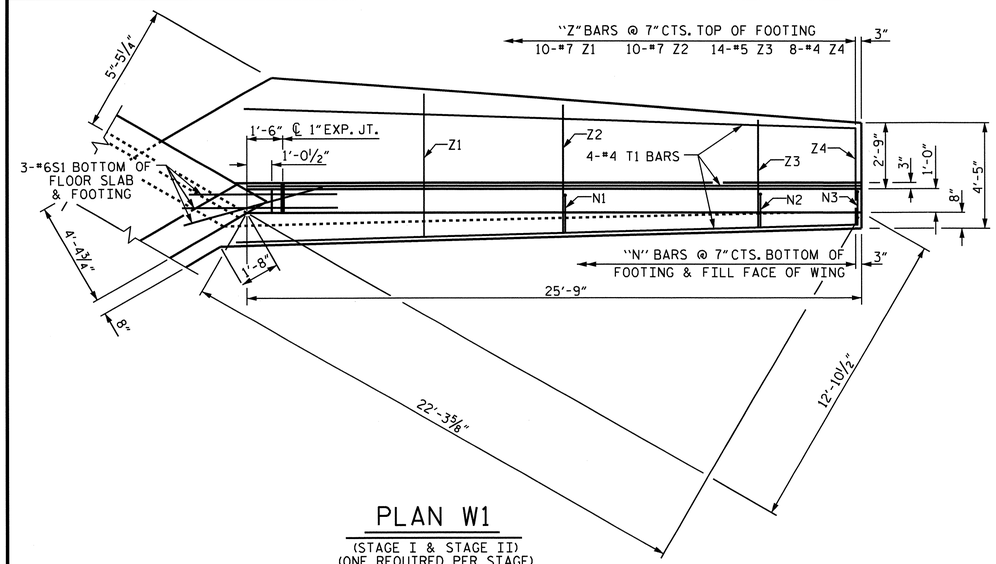
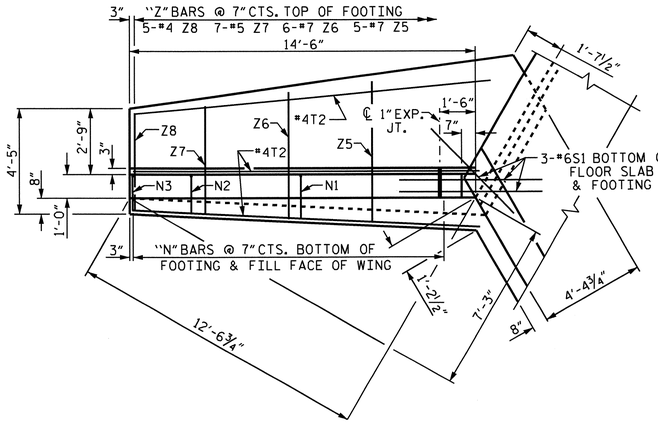
kpaschal



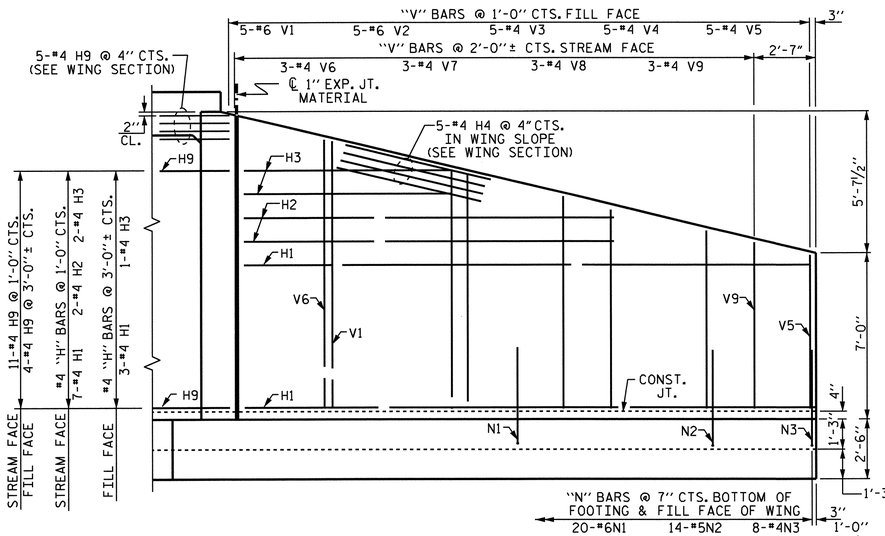
PLAN W1

(STAGE I & STAGE II)
(ONE REQUIRED PER STAGE)



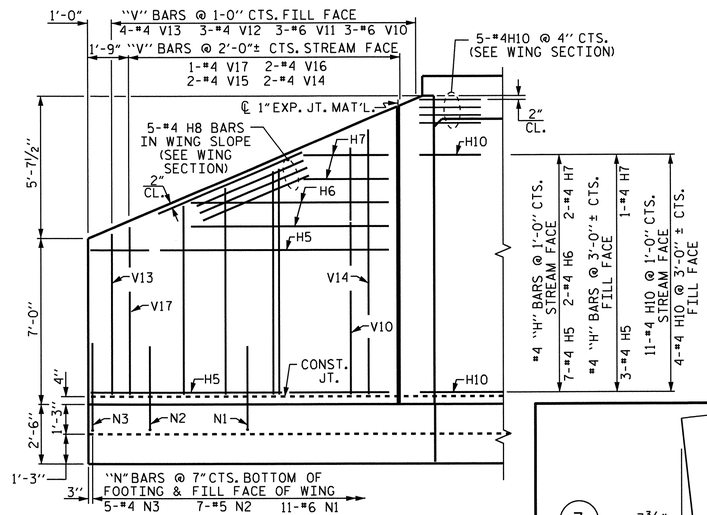
PLAN W2

(STAGE I)
(ONE REQUIRED)



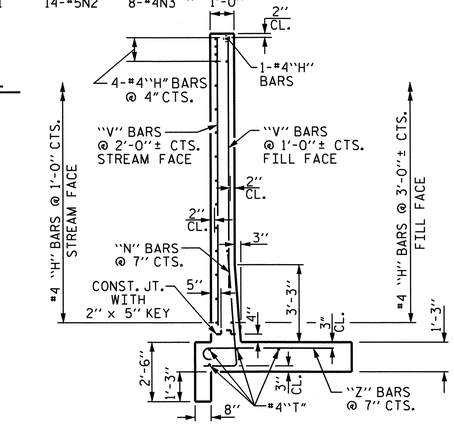
ELEVATION W1

(STAGE I & STAGE II)
(ONE REQUIRED PER STAGE)



ELEVATION W2

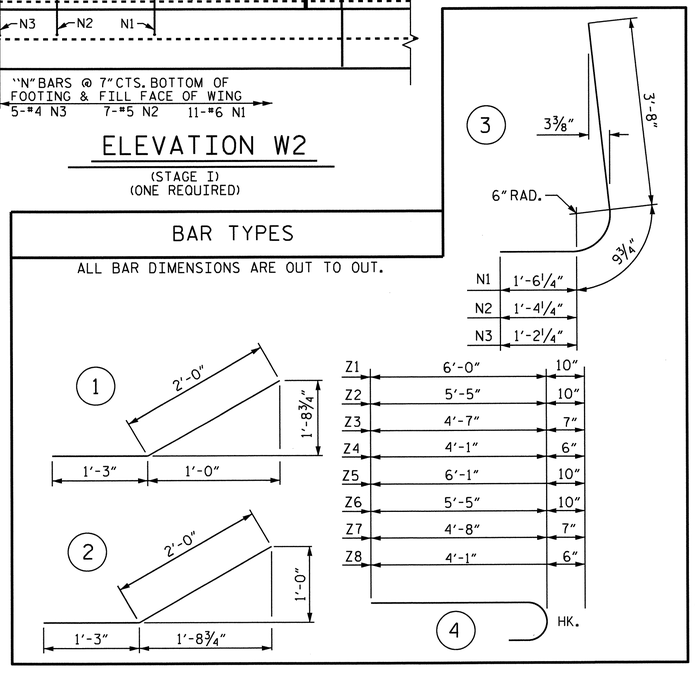
(STAGE I)
(ONE REQUIRED)



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

STAGE II (W1)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	10	#4	STR	23'-11"	160
H2	2	#4	STR	17'-2"	23
H3	3	#4	STR	8'-5"	17
H4	5	#4	STR	23'-5"	78
H9	20	#4	2	3'-3"	43
N1	20	#6	3	6'-0"	180
N2	14	#5	3	5'-10"	85
N3	8	#4	3	5'-8"	30
S1	3	#6	STR	6'-0"	27
T1	4	#4	STR	25'-9"	69
V1	5	#6	STR	11'-0"	83
V2	5	#6	STR	10'-0"	75
V3	5	#4	STR	8'-0"	27
V4	5	#4	STR	6'-9"	23
V5	5	#4	STR	5'-9"	19
V6	3	#4	STR	11'-0"	22
V7	3	#4	STR	9'-9"	20
V8	3	#4	STR	8'-3"	17
V9	3	#4	STR	6'-9"	14
Z1	10	#7	4	6'-10"	140
Z2	10	#7	4	6'-3"	128
Z3	14	#5	4	5'-2"	75
Z4	8	#4	4	4'-7"	24

REINFORCING STEEL 1379 LBS

CLASS "A" CONCRETE
1 WING 17.9 CY
2 HEADWALLS AND PART END CURTAIN WALLS 4.4 CY
TOTAL 22.3 CY

STAGE I (W1 & W2)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	10	#4	STR	23'-11"	160
H2	2	#4	STR	17'-2"	23
H3	3	#4	STR	8'-5"	17
H4	5	#4	STR	23'-5"	78
H5	10	#4	STR	12'-7"	84
H6	2	#4	STR	8'-10"	12
H7	3	#4	STR	4'-1"	8
H8	5	#4	STR	13'-2"	44
H9	20	#4	2	3'-3"	43
H10	20	#4	1	3'-3"	43
N1	31	#6	3	6'-0"	279
N2	21	#5	3	5'-10"	128
N3	13	#4	3	5'-8"	49
S1	6	#6	STR	6'-0"	54
T1	4	#4	STR	25'-9"	69
T2	4	#4	STR	14'-6"	39
V1	5	#6	STR	11'-0"	83
V2	5	#6	STR	10'-0"	75
V3	5	#4	STR	8'-0"	27
V4	5	#4	STR	6'-9"	23
V5	5	#4	STR	5'-9"	19
V6	3	#4	STR	11'-0"	22
V7	3	#4	STR	9'-9"	20
V8	3	#4	STR	8'-3"	17
V9	3	#4	STR	6'-9"	14
V10	3	#6	STR	11'-0"	50
V11	3	#6	STR	9'-9"	44
V12	3	#4	STR	7'-3"	15
V13	4	#4	STR	5'-9"	15
V14	2	#4	STR	11'-3"	15
V15	2	#4	STR	9'-6"	13
V16	2	#4	STR	8'-0"	11
V17	1	#4	STR	7'-0"	5
Z1	10	#7	4	6'-10"	140
Z2	10	#7	4	6'-3"	128
Z3	14	#5	4	5'-2"	75
Z4	8	#4	4	4'-7"	24
Z5	5	#7	4	6'-11"	71
Z6	6	#7	4	6'-3"	77
Z7	7	#5	4	5'-3"	38
Z8	5	#4	4	4'-7"	15

REINFORCING STEEL 2166 LBS

CLASS "A" CONCRETE
2 WINGS 28.0 CY
PART END CURTAIN WALLS 1.8 CY
TOTAL 29.8 CY

PROJECT NO. B-3680
MOORE COUNTY
STATION: 14+38.60 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT SLOPE 2:1

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

STR. #3

ASSEMBLED BY : B.N.BARODAWALA DATE : 1-23-12
CHECKED BY : NEIL RUFFIN DATE : 2-17-12
DRAWN BY : DAN PLATICA DATE : 12/2004
CHECKED BY : M. K. BEARD DATE : 12/2004

NORTH CAROLINA PROFESSIONAL SEAL 22008 ENGINEER ALI KEITH PASCHAL

6/29/12

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kpaschal

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

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

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