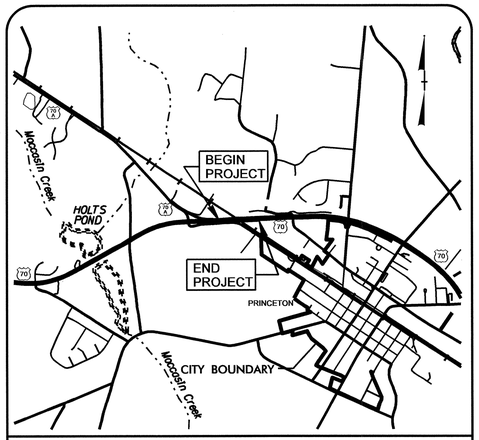
TIP PROJECT: B-4555

CONTRACT: C202822

STRUCTURES



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

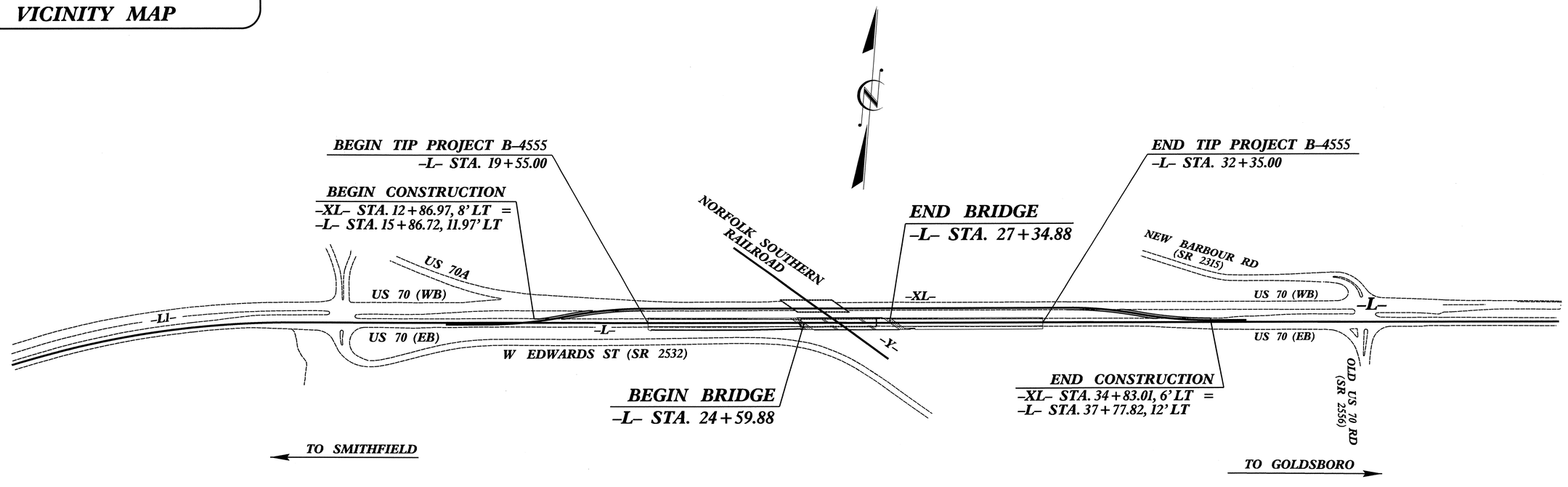
JOHNSTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4555		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33767.1.1	BRNHS-70(72)	P.E.
33767.2.1	BRNHS-70(72)	UTIL. & R/W
33767.3.1	BRNHS-70(72)	CONST.

LOCATION: BRIDGE NO. 97 ON US 70 (EAST) OVER NORFOLK SOUTHERN RAILROAD

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2009	=	35,000
ADT 2030	=	65,800
DHV	=	10 %
D	=	60 %
T	=	12 % *
V	=	60 MPH
CLASS	=	RURAL ARTERIAL

* TTST 5% + DUAL 7%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4555 = 0.19 MI

LENGTH STRUCTURE TIP PROJECT B-4555 = 0.05 MI

TOTAL LENGTH TIP PROJECT B-4555 = 0.24 MI

PLAN PREPARED IN THE OFFICE OF:

DIVISION OF HIGHWAYS
1000 BIRCH RIDGE DR., RALEIGH NC, 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE :

JUNE 19, 2012

J. M. BAILEY, P.E.
PROJECT ENGINEER

D. R. CALHOUN, P.E.
PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

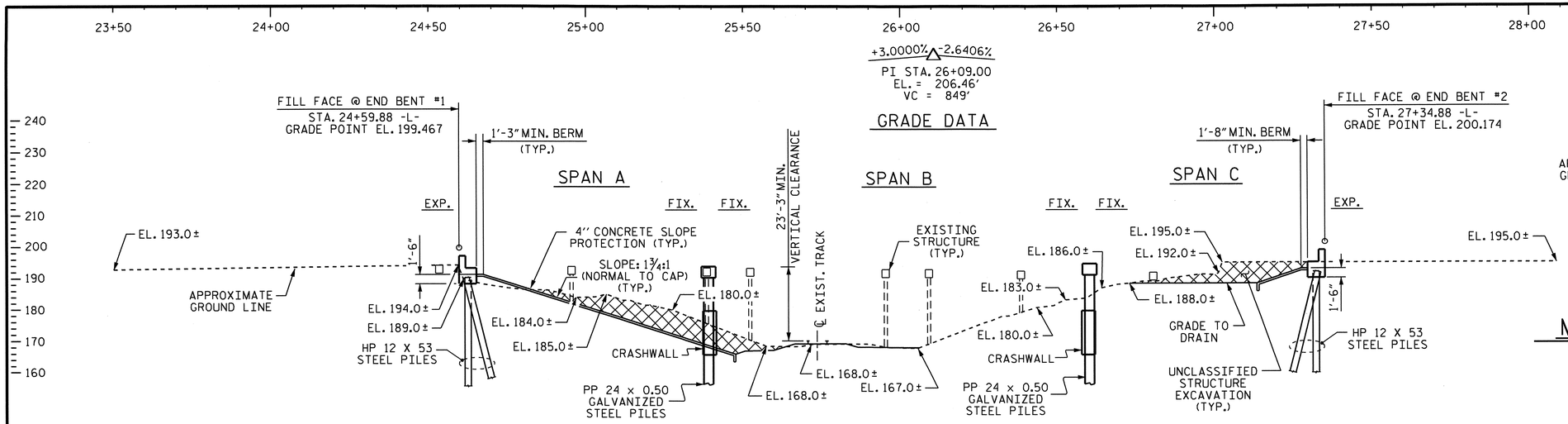
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

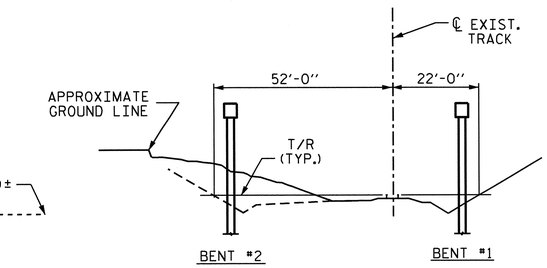
APPROVED
DIVISION ADMINISTRATOR DATE

F.A. PROJECT NO. : BRNHS-70(72)



SECTION ALONG -L-

SECTIONS @ BENTS AND END BENTS ARE @ RIGHT ANGLES



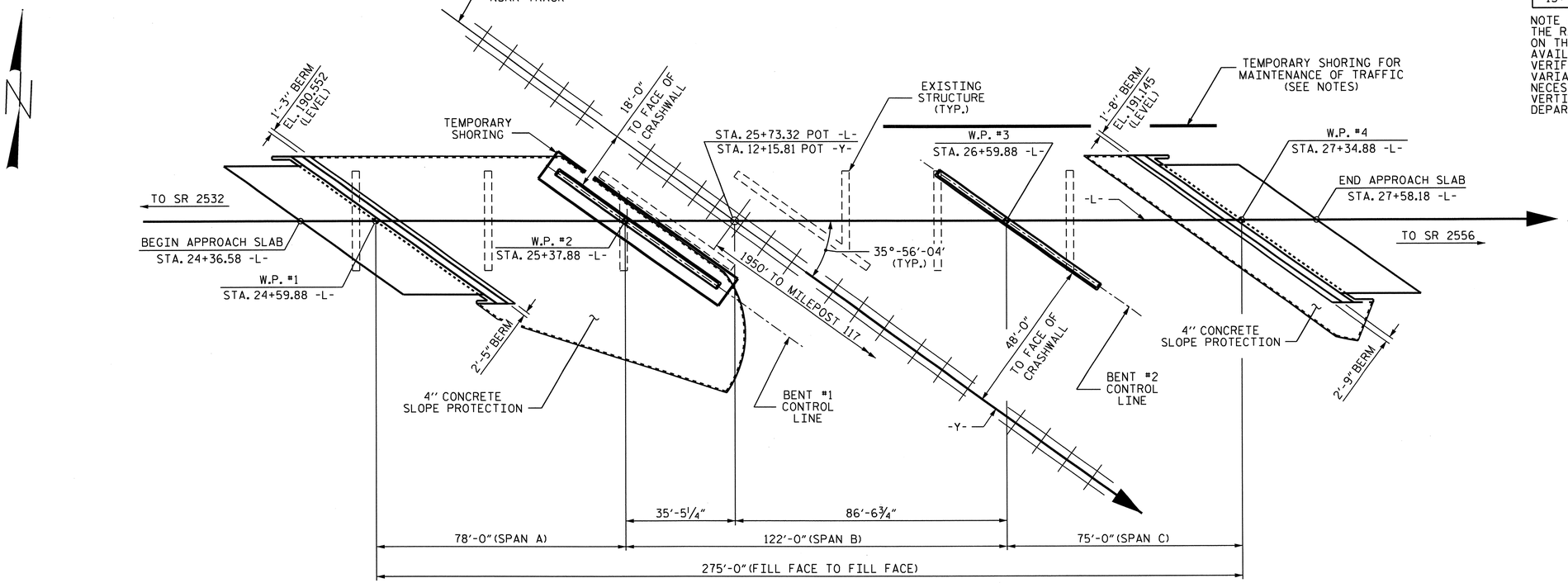
MINIMUM CLEARANCE - RAILROAD

(LOOKING AT STATION AHEAD ALONG RAILROAD)
SPAN LENGTH BASED ON THIS SECTION.

TOP OF RAIL ELEVATION

STATION -Y-	LT. RAIL ELEVATION	STATION -Y-	RT. RAIL ELEVATION
10+96.55	168.462	11+03.45	168.518
11+46.55	168.866	11+53.45	168.922
11+96.55	169.271	12+03.45	169.327
12+46.55	169.676	12+53.45	169.732
12+96.55	170.081	13+03.45	170.137
13+46.55	170.485	13+53.45	170.541

NOTE :
THE RAILROAD TRACK TOP 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.



PLAN

(FOR CLARITY, PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-
12+15.81 -Y-

MILE POST H-116.63
REPLACES BRIDGE NO. 97

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

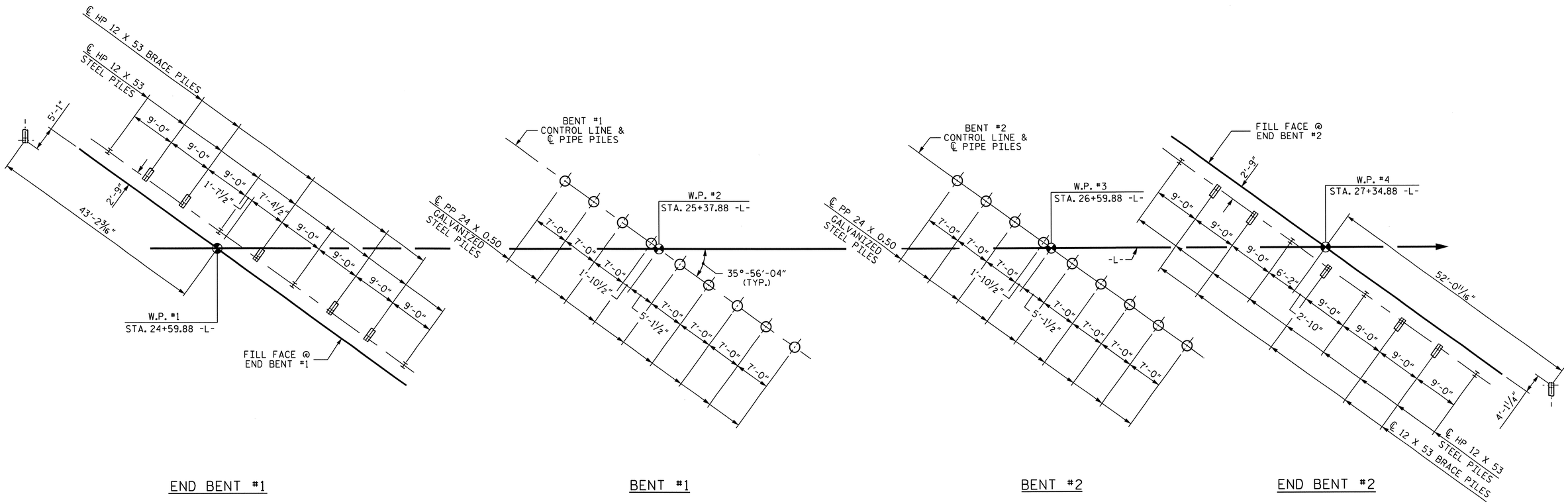
FOR BRIDGE ON US 70
OVER NORFOLK
SOUTHERN RAILROAD
BETWEEN SR 2532 & SR 2556

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6-4-12

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

DRAWN BY : A.S./N.O. TRAN DATE : 3/2012
CHECKED BY : D.R. CALHOUN DATE : 3/2012

04-JUN-2012 11:55
R:\Structures\Final Plans\B4555_sd_gd.dgn
asorsenginh



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

PILES AT BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 290 TONS PER PILE.

DRIVE PILES AT BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 390 TONS PER PILE.

INSTALL PILES AT BENTS 1 AND 2 TO A TIP ELEVATION NO HIGHER THAN 147 FT.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 28,000 FT-LBS TO 60,000 FT-LBS 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 PILES WITH THE PILE DRIVING ANALYZER (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 STEEL PIPE PILES AT BENT 1 OR BENT 2.

CONTRACTOR IS ADVISED THAT EXISTING BRIDGE FOUNDATION MAY CONFLICT WITH PROPOSED FOUNDATION. WHERE CONFLICTS OCCUR, THE EXISTING FOUNDATION MUST BE REMOVED PRIOR TO CONSTRUCTION.

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
5-24-12

PROJECT NO. B-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

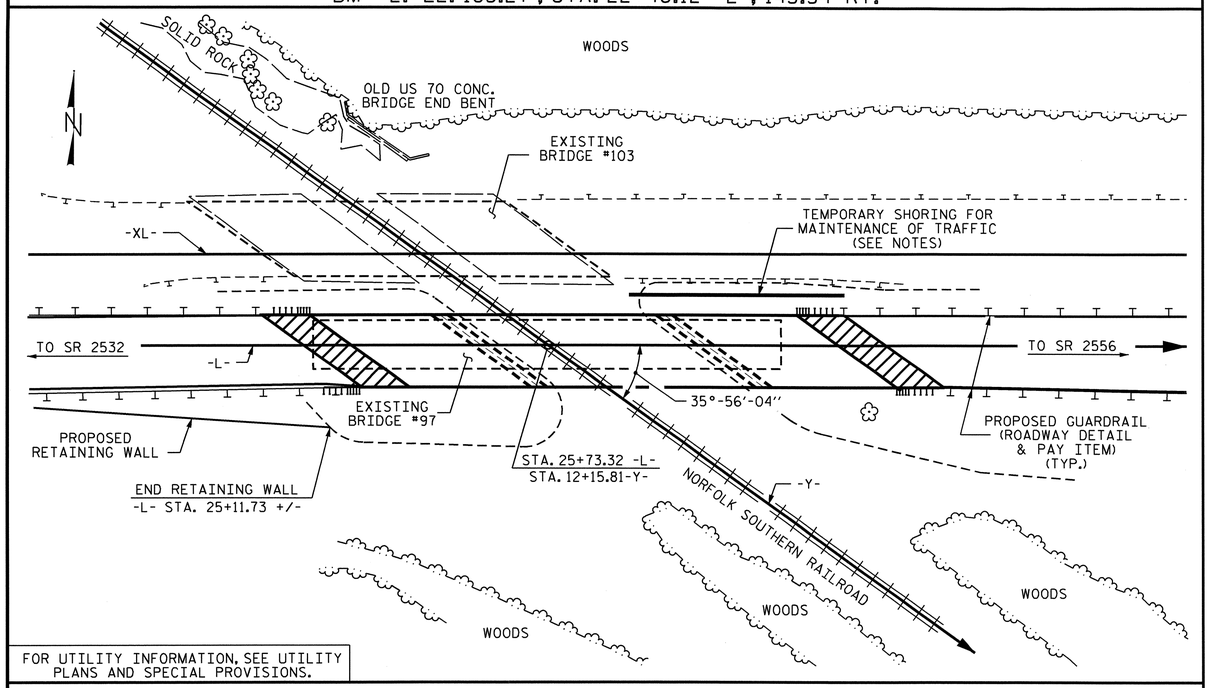
GENERAL DRAWING
FOR BRIDGE ON US 70
OVER NORFOLK
SOUTHERN RAILROAD
BETWEEN SR 2532 & SR 2556

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

DRAWN BY : A.S./H.B. SHAH DATE : 3/2012
CHECKED BY : D.R. CALHOUN DATE : 3/2012

24-APR-2012 14:52
R:\Structures\Final Plans\B4555_sd_gd.dgn
asor:senginh

BM #2: EL. 183.27', STA. 22+46.12 -L-, 143.54' RT.



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

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

THE EXISTING BRIDGE CONSISTING OF 7 SPANS (42'-6", 43'-1", 13'-8", 45'-10", 13'-8", 41'-3" AND 42'-6"), 26.3 FT. CLEAR ROADWAY AND 3.25" OF AWS WITH REINFORCED CONCRETE DECK GIRDERS ON REINFORCED CONCRETE END BENTS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.

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.

AFTER CONSTRUCTION OF CRASHWALL AT BENT 2, EXCAVATION AREA SHALL BE BACKFILLED AND STABILIZED AS DIRECTED BY THE ENGINEER.

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.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR INTERIOR BENTS NO. 1 & 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEETS FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR TEMPORARY RAILROAD SHORING, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL EXCAVATE TO BOTTOM OF CRASHWALL ELEVATION PRIOR TO DRIVING PILES FOR BENTS 1 AND 2.

TOTAL BILL OF MATERIAL

	TEMPORARY RAILROAD SHORING FOR BENT	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION FOR BENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS		HP 12 X 53 STEEL PILES		*PP 24 X 0.50 GALVANIZED STEEL PILES		CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	LIN. FT.	SQ. YARDS	LUMP SUM	LUMP SUM
SUPERSTRUCTURE						11194	11066				15	1324.05					586.93		LUMP SUM	LUMP SUM
END BENT 1					LUMP SUM			66.2		9429			10	500				570		
BENT 1	LUMP SUM		LUMP SUM	1				155.3		12440					9	585				
BENT 2			LUMP SUM	1				155.6		12374					9	630				
END BENT 2					LUMP SUM			66.0		9362			10	650				130		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	2	LUMP SUM	11194	11066	443.1	LUMP SUM	43605	15	1324.05	20	1150	18	1215	586.93	700	LUMP SUM	LUMP SUM

*FOR INTERIOR BENTS, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEETS FOR REQUIRED GALVANIZED LENGTHS.

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 70
OVER NORFOLK
SOUTHERN RAILROAD
BETWEEN SR 2532 & SR 2556

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
6-4-12

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

DRAWN BY : A.S./N.O. TRAN DATE : 3/2012
CHECKED BY : D.R. CALHOUN DATE : 3/2012

04-JUN-2012 11:56
R:\Structures\Final Plans\B4555_sd_gd.dgn
asorsenginh

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	1	1.01	--	1.75	0.668	1.42	A	EL	35.953	0.982	1.06	A	EL	21.572	0.80	0.712	1.01	B	EL	59.875	
		HL-93(Opr)	N/A	--	1.37	--	1.35	0.668	1.85	A	EL	35.953	0.982	1.37	A	EL	21.572	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.27	45.7	1.75	0.668	1.86	A	EL	35.953	0.982	1.27	A	EL	21.572	0.80	0.712	1.47	B	EL	59.875	
		HS-20(Opr)	36.000	--	1.65	59.3	1.35	0.668	2.41	A	EL	35.953	0.982	1.65	A	EL	21.572	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.57	48.1	1.40	0.668	5.24	A	EL	35.953	0.982	3.64	A	EL	21.572	0.80	0.712	3.57	B	EL	59.875	
		SNGARBS2	20.000	--	2.55	50.9	1.40	0.668	3.91	A	EL	35.953	0.982	2.63	A	EL	21.572	0.80	0.712	2.55	B	EL	59.875	
		SNAGRIS2	22.000	--	2.37	52.1	1.40	0.668	3.70	A	EL	35.953	0.982	2.46	A	EL	21.572	0.80	0.712	2.37	B	EL	59.875	
		SNCOTTS3	27.250	--	1.77	48.2	1.40	0.668	2.61	A	EL	35.953	0.982	1.82	A	EL	21.572	0.80	0.712	1.77	B	EL	59.875	
		SNAGGRS4	34.925	--	1.44	50.2	1.40	0.668	2.18	A	EL	35.953	0.982	1.54	A	EL	21.572	0.80	0.712	1.44	B	EL	59.875	
		SNS5A	35.550	--	1.41	50.0	1.40	0.668	2.13	A	EL	35.953	0.982	1.58	A	EL	21.572	0.80	0.712	1.41	B	EL	59.875	
		SNS6A	39.950	--	1.28	50.9	1.40	0.668	1.96	A	EL	35.953	0.982	1.45	A	EL	21.572	0.80	0.712	1.28	B	EL	59.875	
		SNS7B	42.000	--	1.21	50.9	1.40	0.668	1.86	A	EL	35.953	0.982	1.45	A	EL	21.572	0.80	0.712	1.21	B	EL	59.875	
	TTST	TNAGRIT3	33.000	--	1.55	51.1	1.40	0.668	2.39	A	EL	35.953	0.982	1.72	A	EL	21.572	0.80	0.712	1.55	B	EL	59.875	
		TNT4A	33.075	--	1.55	51.3	1.40	0.668	2.40	A	EL	35.953	0.982	1.66	A	EL	21.572	0.80	0.712	1.55	B	EL	59.875	
		TNT6A	41.600	--	1.25	52.1	1.40	0.668	1.96	A	EL	35.953	0.982	1.57	A	EL	21.572	0.80	0.712	1.25	B	EL	59.875	
		TNT7A	42.000	--	1.25	52.5	1.40	0.668	1.97	A	EL	35.953	0.982	1.54	A	EL	21.572	0.80	0.712	1.25	B	EL	59.875	
		TNT7B	42.000	--	1.28	53.5	1.40	0.668	2.04	A	EL	35.953	0.982	1.40	A	EL	21.572	0.80	0.712	1.28	B	EL	59.875	
		TNAGRIT4	43.000	--	1.23	52.8	1.40	0.668	1.94	A	EL	35.953	0.982	1.35	A	EL	21.572	0.80	0.712	1.23	B	EL	59.875	
		TNAGT5A	45.000	--	1.17	52.4	1.40	0.668	1.83	A	EL	35.953	0.982	1.36	A	EL	21.572	0.80	0.712	1.17	B	EL	59.875	
		TNAGT5B	45.000	3	1.16	52.0	1.40	0.668	1.81	A	EL	35.953	0.982	1.28	A	EL	21.572	0.80	0.712	1.16	B	EL	59.875	

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)

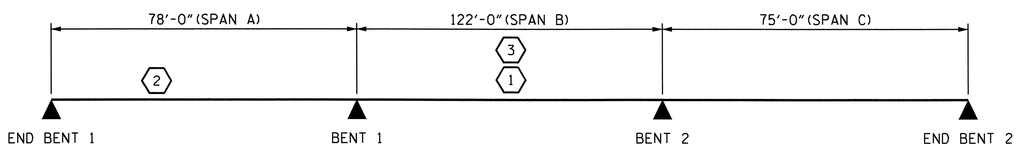
(2) DESIGN LOAD RATING (HS-20)

(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-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

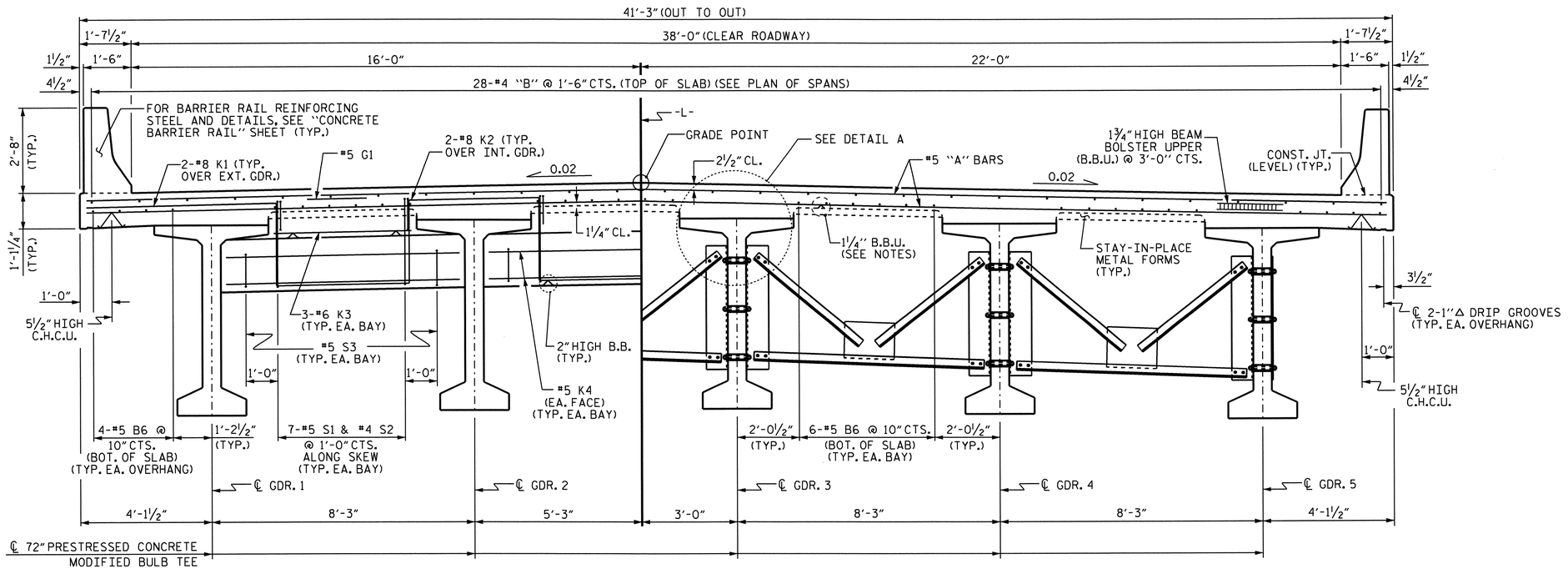
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-4
1			3			TOTAL SHEETS
2			4			37

STD. NO. LRFR1

ASSEMBLED BY : A.C. OUTLAW	DATE : 3/11		
CHECKED BY : M. K. TOM	DATE : 11/11		
DRAWN BY : MAA 1/08	REV. 11/12/08R MAA/GM		
CHECKED BY : GM/DI 2/08			

24-APR-2012 15:19
R:\Structures\Final Plans\B4555_SD_LRFR.dgn
asorsenginh

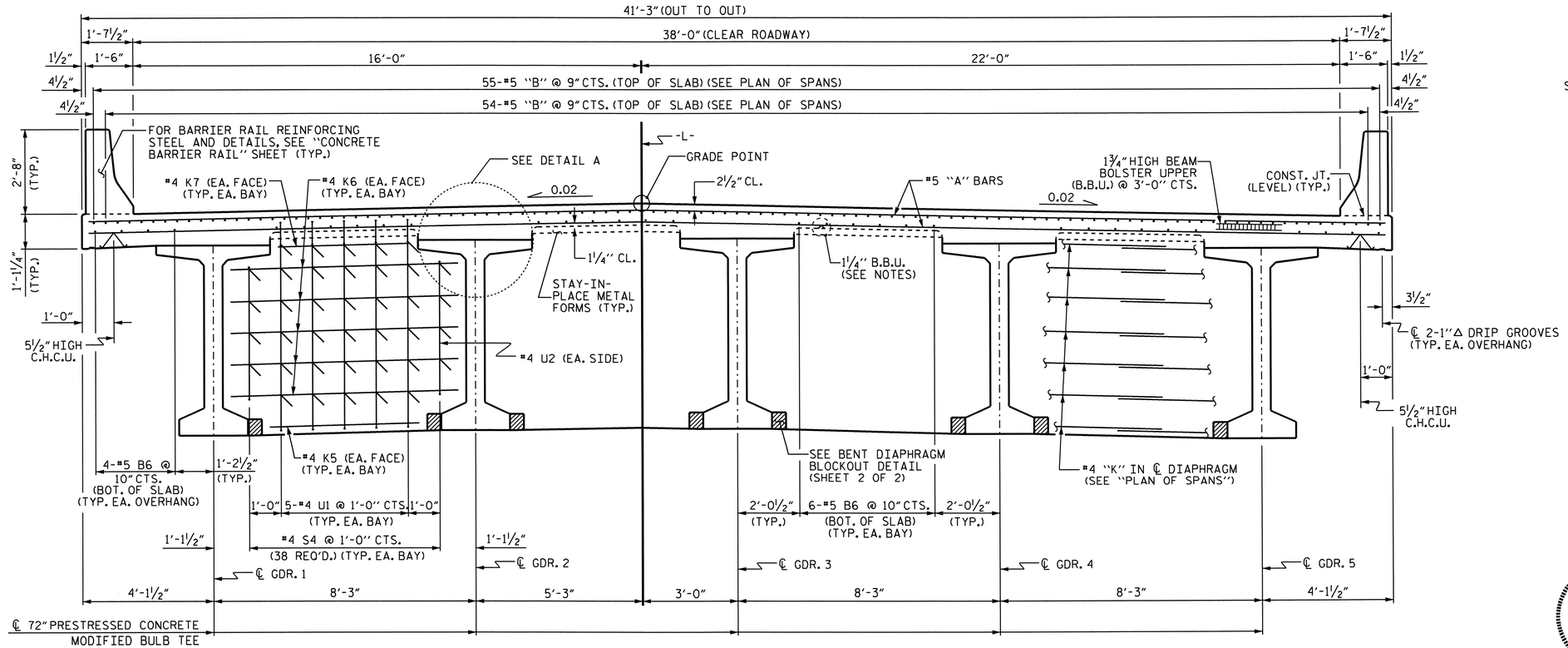


HALF TYPICAL SECTION

SHOWING END BENT DIAPHRAGMS

HALF TYPICAL SECTION

SHOWING INTERMEDIATE DIAPHRAGMS



TYPICAL SECTION

SHOWING BENT DIAPHRAGMS

NOTES

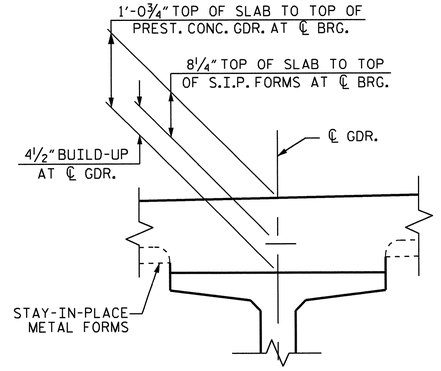
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE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

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

BARRIER RAIL IN A CONTINUOUS UNIT 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.

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

FOR INTERMEDIATE DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL A

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

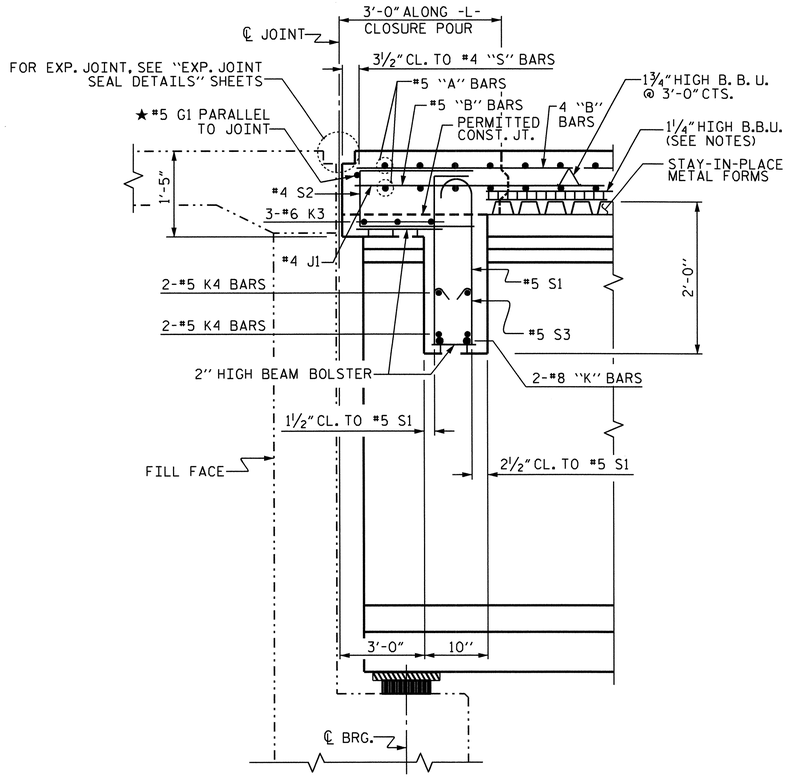
TYPICAL SECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
11-2012

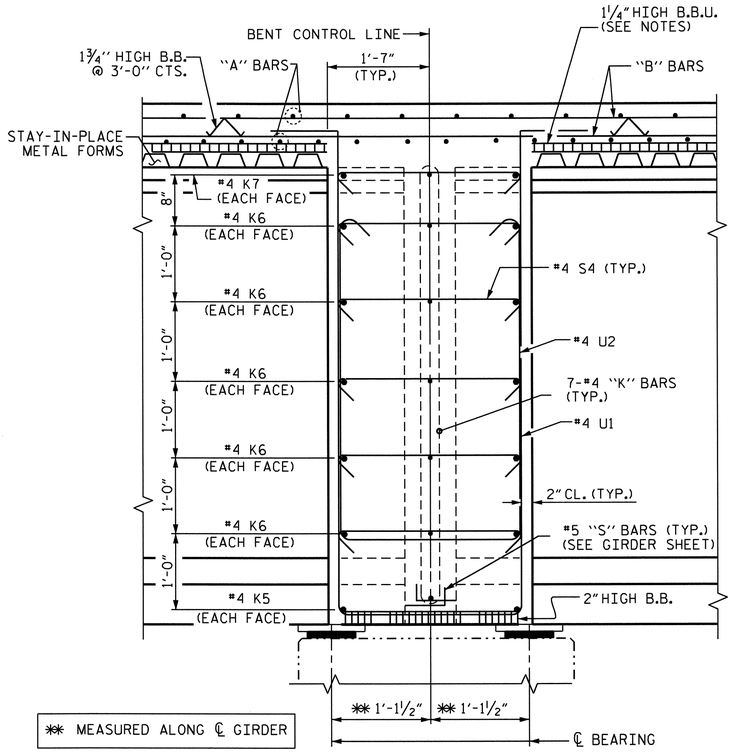
DRAWN BY : OT NGUYEN DATE : 4-7-11
CHECKED BY : A.C. OUTLAW DATE : 7-27-11

24-APR-2012 15:17
R:\Structures\Final Plans\B4555_SD_TS.dgn
asorsenginh



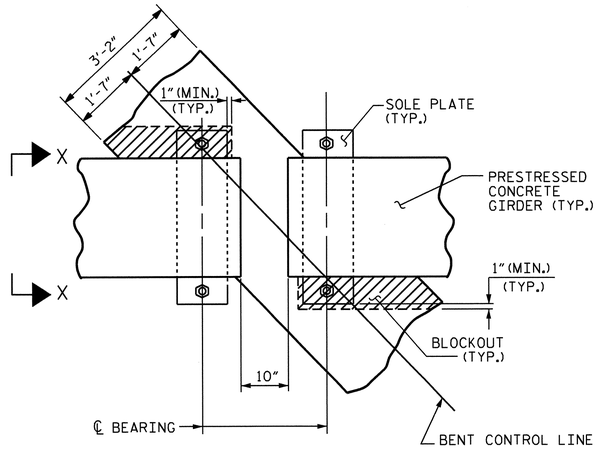
SECTION THRU END BENT DIAPHRAGM

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

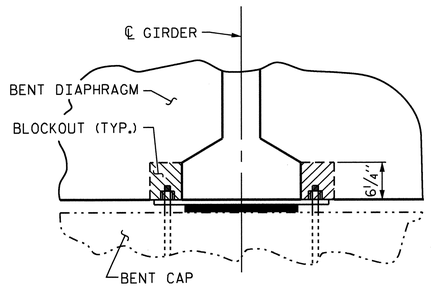


✱✱ MEASURED ALONG ℄ GIRDER

SECTION THRU BENT DIAPHRAGM

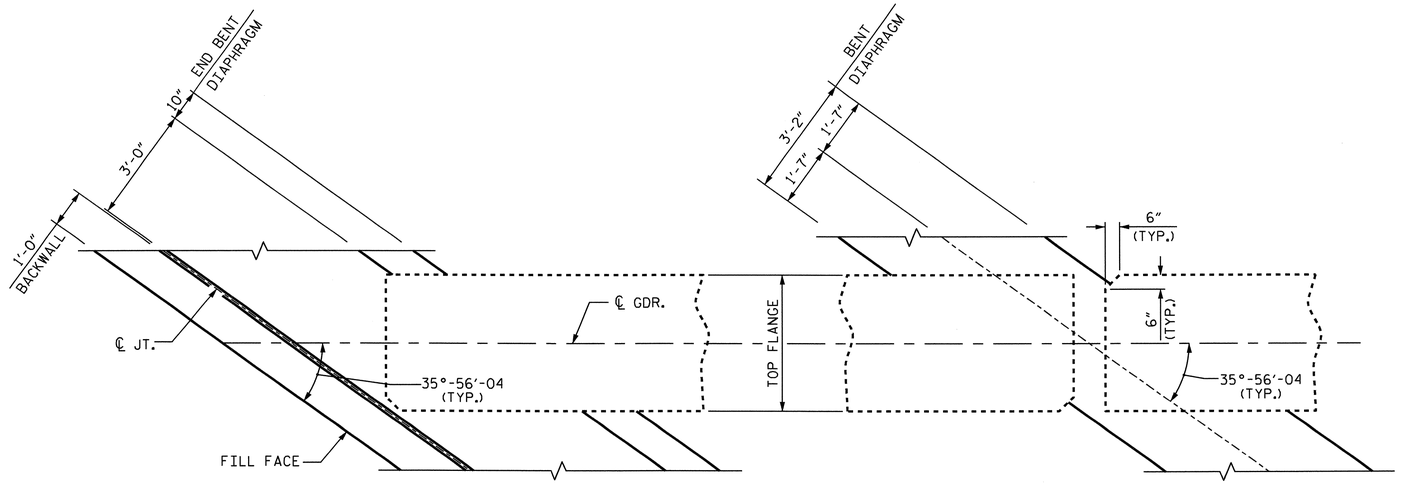


PLAN



SECTION X-X

BENT DIAPHRAGM BLOCKOUT DETAIL



END BENT DIAPHRAGM
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PLAN

BENT DIAPHRAGM

PROJECT NO. B-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

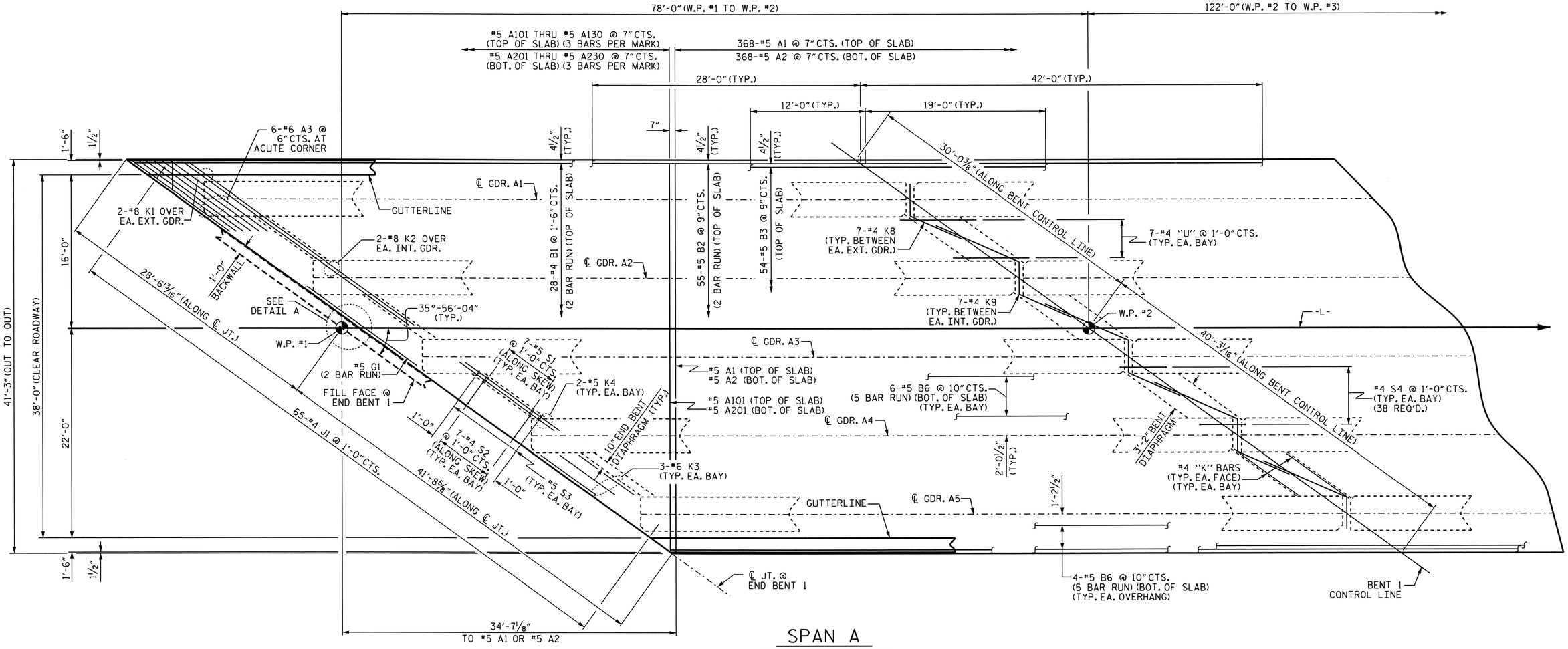
TYPICAL SECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			37

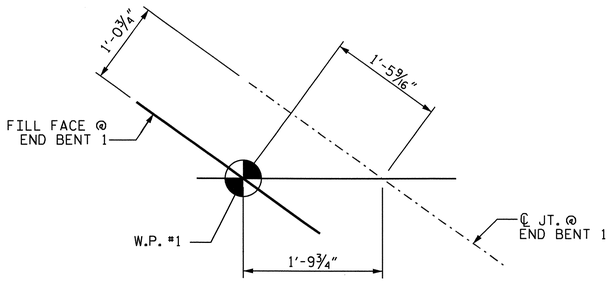
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALLOM
4-24-12

DRAWN BY : QT NGUYEN DATE : 4-7-11
CHECKED BY : A.C. OUTLAW DATE : 7-27-11

24-APR-2012 15:18
R:\Structures\Final Plans\B4555_SD_TS.dgn
asorsenginh



SPAN A



DETAIL A

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

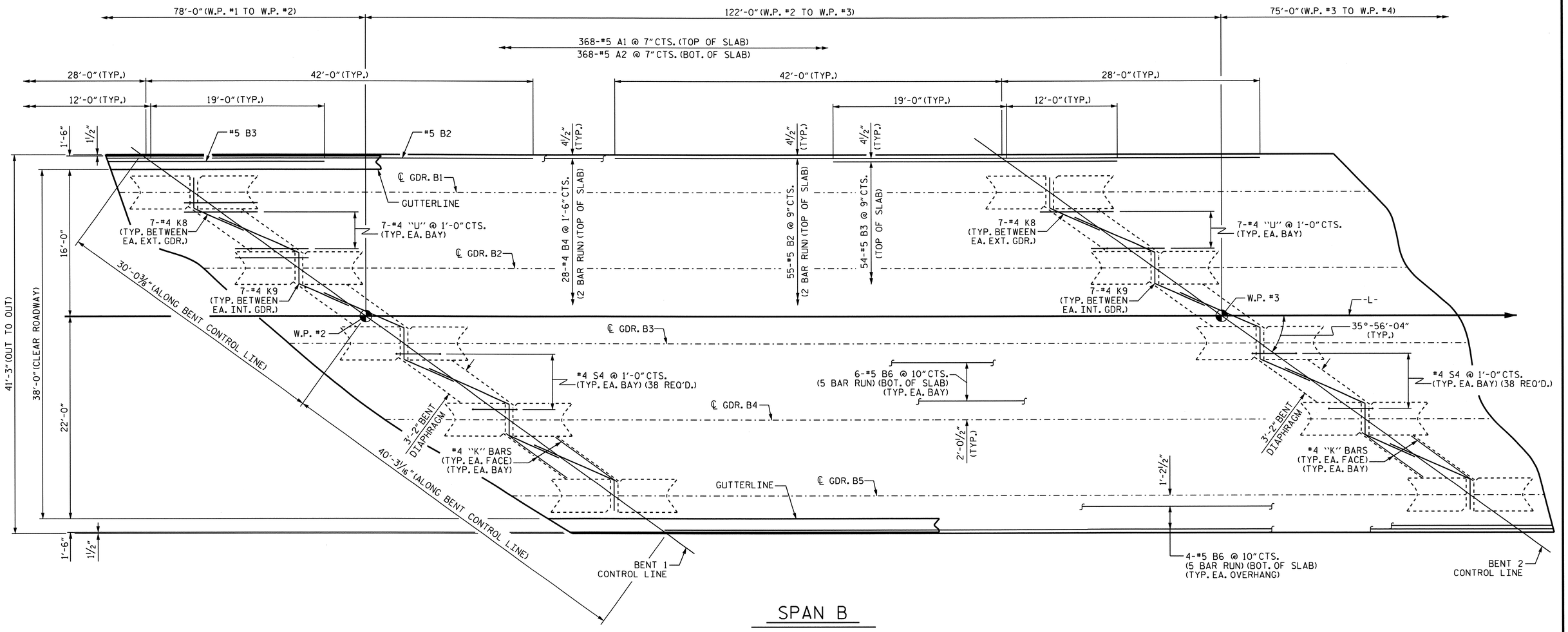
PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : OT NGUYEN DATE : 4-7-11
CHECKED BY : A.C. OUTLAW DATE : 7-28-11

24-APR-2012 14:53
R:\Structures\Final Plans\B4555_SD_S*.dgn
asorsenginh



SPAN B

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

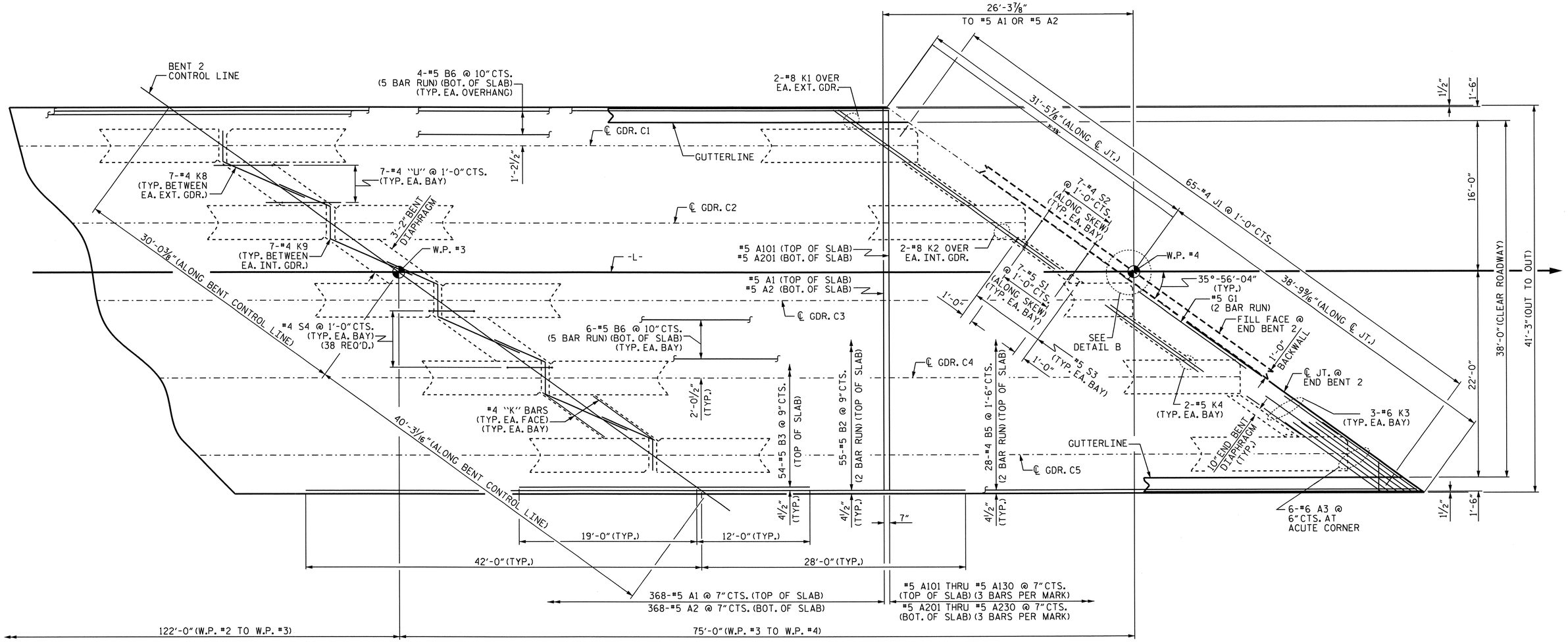
PLAN OF SPANS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			37

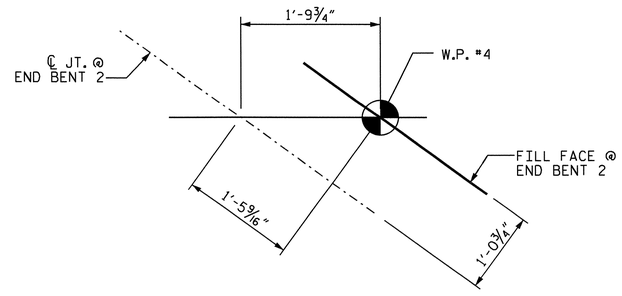
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

DRAWN BY : QT NGUYEN DATE : 4-7-11
CHECKED BY : A.C. OUTLAW DATE : 7-28-11

24-APR-2012 14:54
R:\Structures\Final Plans\B4555_SD_S*.dgn
asarsenginh



SPAN C



DETAIL B

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

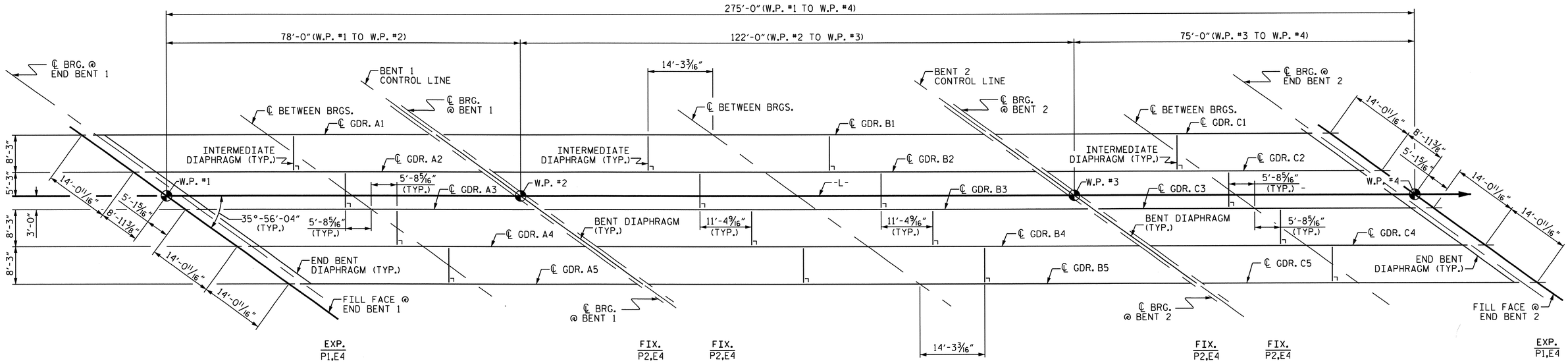
PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : QT NGUYEN DATE : 4-7-11
CHECKED BY : A.C. OUTLAW DATE : 7-28-11

24-APR-2012 14:54
R:\Structures\FinalPlans\B4555_SD_S*.dgn
asorsenginh



FRAMING PLAN

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

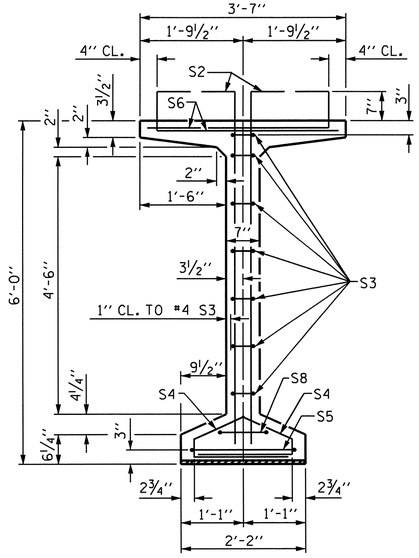
FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			37

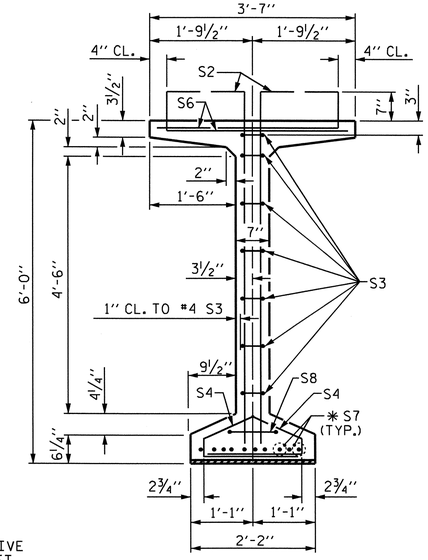
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS B. CALHOUN 4-24-12

DRAWN BY : QT NGUYEN DATE : 4-7-11
CHECKED BY : A.C. OUTLAW DATE : 7-28-11

24-APR-2012 15:21
R:\Structures\Final Plans\B4555_SD_FP.dgn
asorsenginh

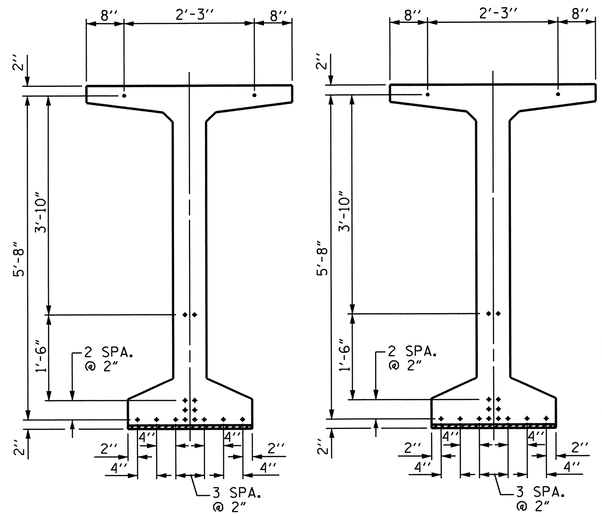


SECTION A-A



SECTION B-B

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



AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

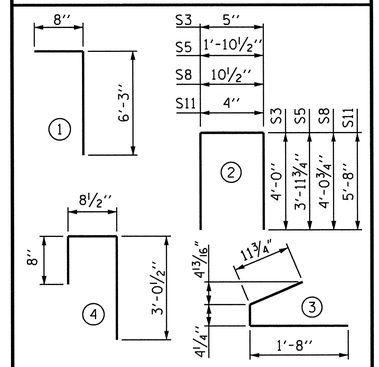
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR.

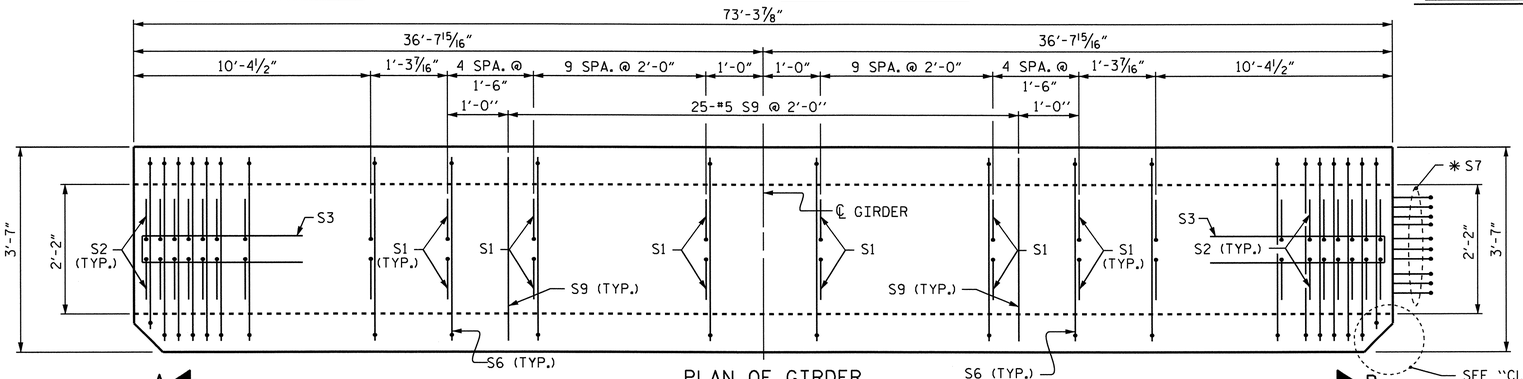
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	124	#4	1	6'-11"	573
	S2	24	#5	1	6'-11"	173
	S3	14	#4	2	8'-5"	79
	S4	92	#4	3	3'-0"	184
	S5	1	#5	2	9'-10"	10
	S6	148	#5	4	4'-5"	682
	✱S7	10	#5	STR	3'-8"	38
	S8	2	#5	2	9'-0"	19
	S9	25	#5	STR	3'-3"	85
	S10	1	#3	STR	1'-10"	1
EXTERIOR GDR.	S11	4	#5	2	11'-8"	49
INTERIOR GDR.	S11	8	#5	2	11'-8"	97
EXTERIOR GDR.	S12	8	#4	STR	8'-0"	43
INTERIOR GDR.	S13	8	#4	STR	19'-4"	103

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

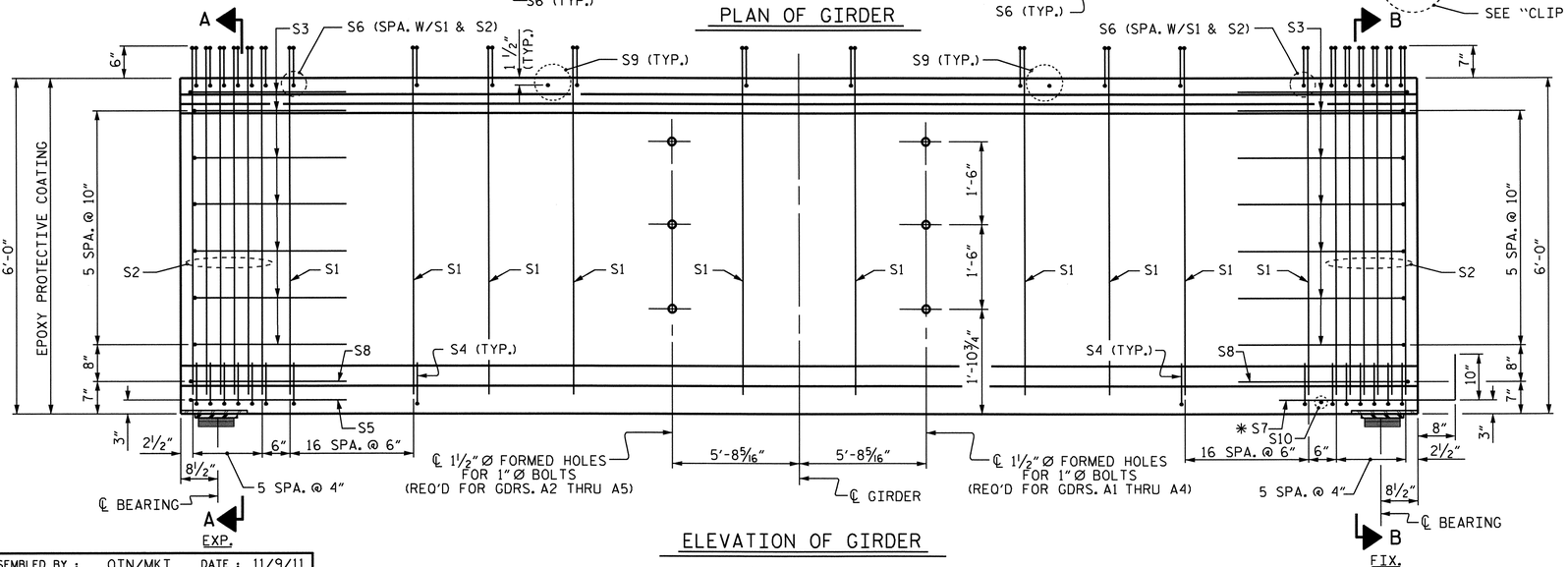
BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT



PLAN OF GIRDER

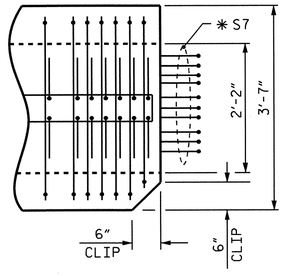


ELEVATION OF GIRDER

NOTE

FOR S11 THRU S13 BARS, SEE SHEET 4 OF 4.

BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY IN CLIP AREA.



CLIP DETAIL

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	5000 PSI CONCRETE	0.6" Ø L.R. STANDS
	LB.	C.Y.	No.
GDR. A1 & A5	1936	15.7	16
GDR. A2 THRU A4	2044	15.7	16

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
5	73'-3⅞"	366.61'

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN A

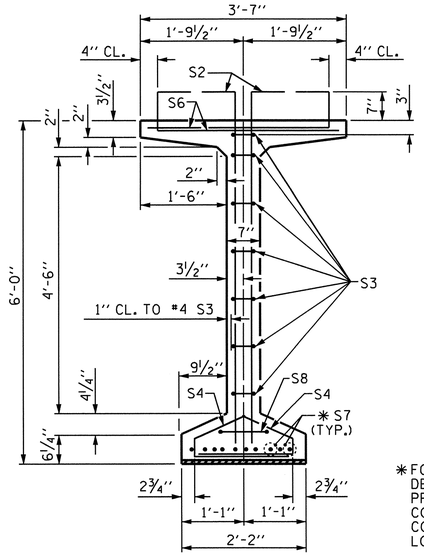
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

ASSEMBLED BY :	QTN/MKT	DATE :	11/9/11
CHECKED BY :	A.C. OUTLAW	DATE :	8/2/11
DRAWN BY :	EEM 2/6/97	REV. 10/17/00	RWW/LES
CHECKED BY :	VAP 2/6/97	REV. 5/1/06R	TLA/GM
		REV. 10/1/11	MAA/GM

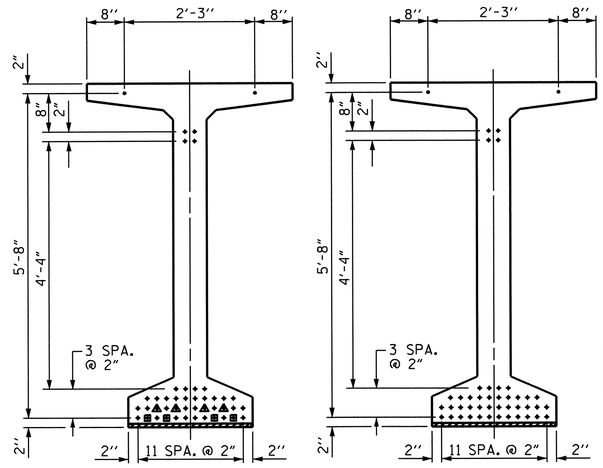
24-APR-2012 14:55
R:\Structures\Final Plans\B4555_SD_G*.dgn
asorsenginn

STD. NO. PCG8 (Sht. 1)



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

SECTION B-B



AT END OF GIRDER — AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

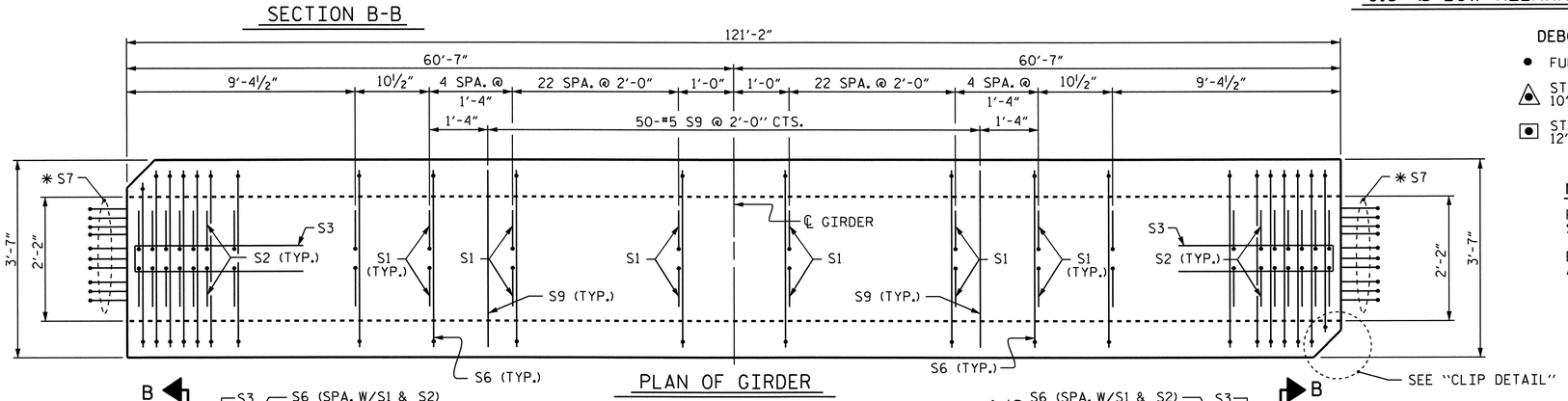
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

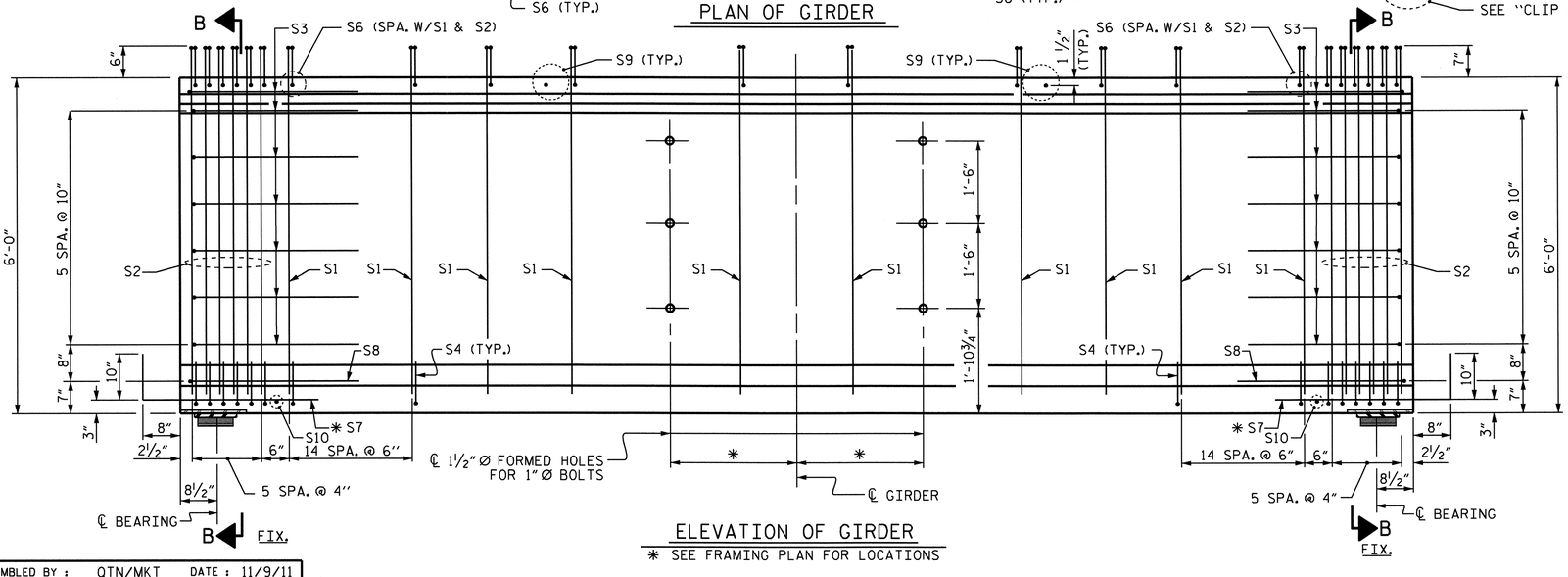
NOTE

FOR S11 THRU S13 BARS, SEE SHEET 4 OF 4.

BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY IN CLIP AREA.

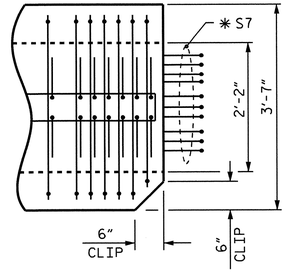


PLAN OF GIRDER



ELEVATION OF GIRDER

✱ SEE FRAMING PLAN FOR LOCATIONS



CLIP DETAIL

0.6" Ø L. R. GRADE 270 STRANDS

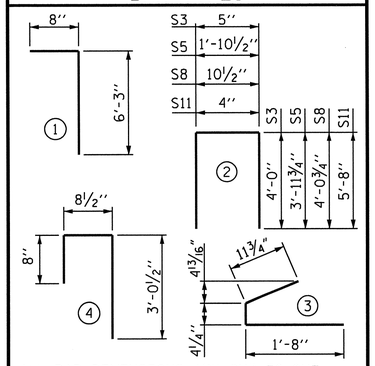
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	168	#4	1	6'-11"	776
	S2	24	#5	1	6'-11"	173
	S3	14	#4	2	8'-5"	79
	S4	84	#4	3	3'-0"	168
	S5	1	#5	2	9'-10"	10
	S6	192	#5	4	4'-5"	884
	✱S7	20	#5	STR	3'-8"	76
	S8	2	#5	2	9'-0"	19
	S9	50	#5	STR	3'-3"	169
	S10	2	#3	STR	1'-10"	1
EXTERIOR GDR.	S11	8	#5	2	11'-8"	97
INTERIOR GDR.	S11	16	#5	2	11'-8"	195
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	19'-4"	207

✱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	9000 PSI CONCRETE	0.6" Ø L.R. STANDS
	LB.	C.Y.	No.
GDR. B1 & B5	2538	26.0	44
GDR. B2 THRU B4	2757	26.0	44

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	121'-2"	605.83'

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B

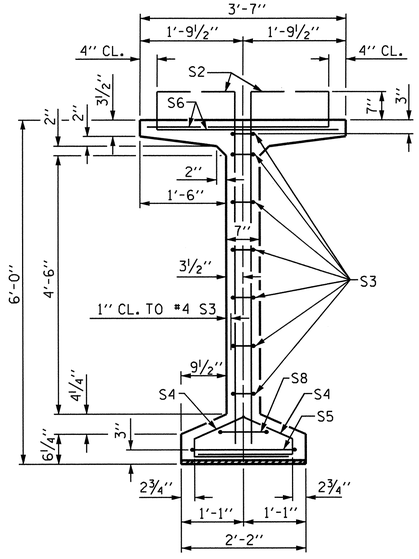
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS B. CALDWELL
4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			37

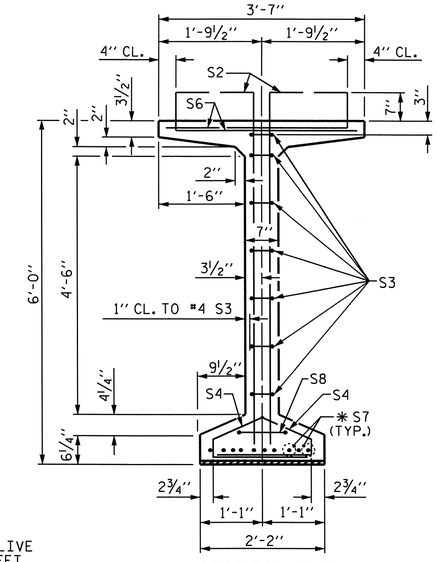
ASSEMBLED BY :	OTN/MKT	DATE :	11/9/11
CHECKED BY :	A.C. OUTLAW	DATE :	8/2/11
DRAWN BY : EEM 2/6/97	REV. 10/17/00		RWW/LES
CHECKED BY : VAP 2/6/97	REV. 5/1/06R		TLA/GM
	REV. 10/1/11		MAA/GM

24-APR-2012 14:56
R:\Structures\Final Plans\B4555_SD_C*.dgn
asorsenginn

STD. NO. PCG8 (Sht. 1)

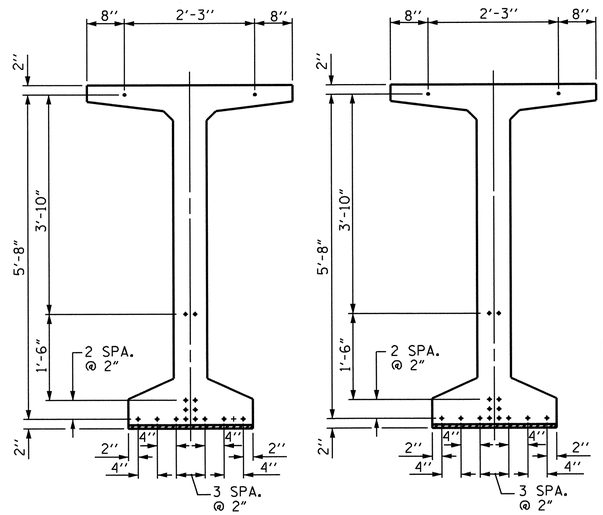


SECTION A-A

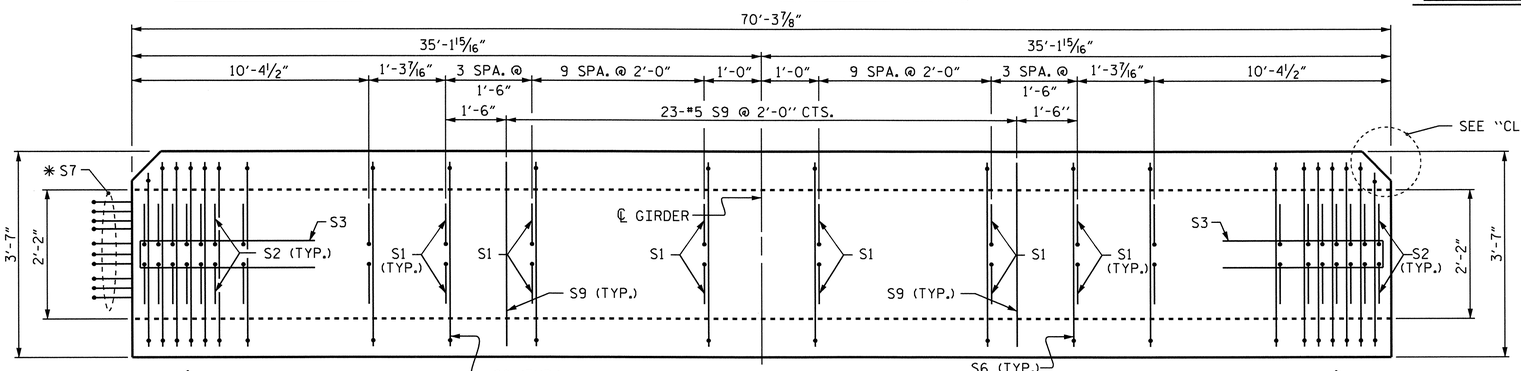


SECTION B-B

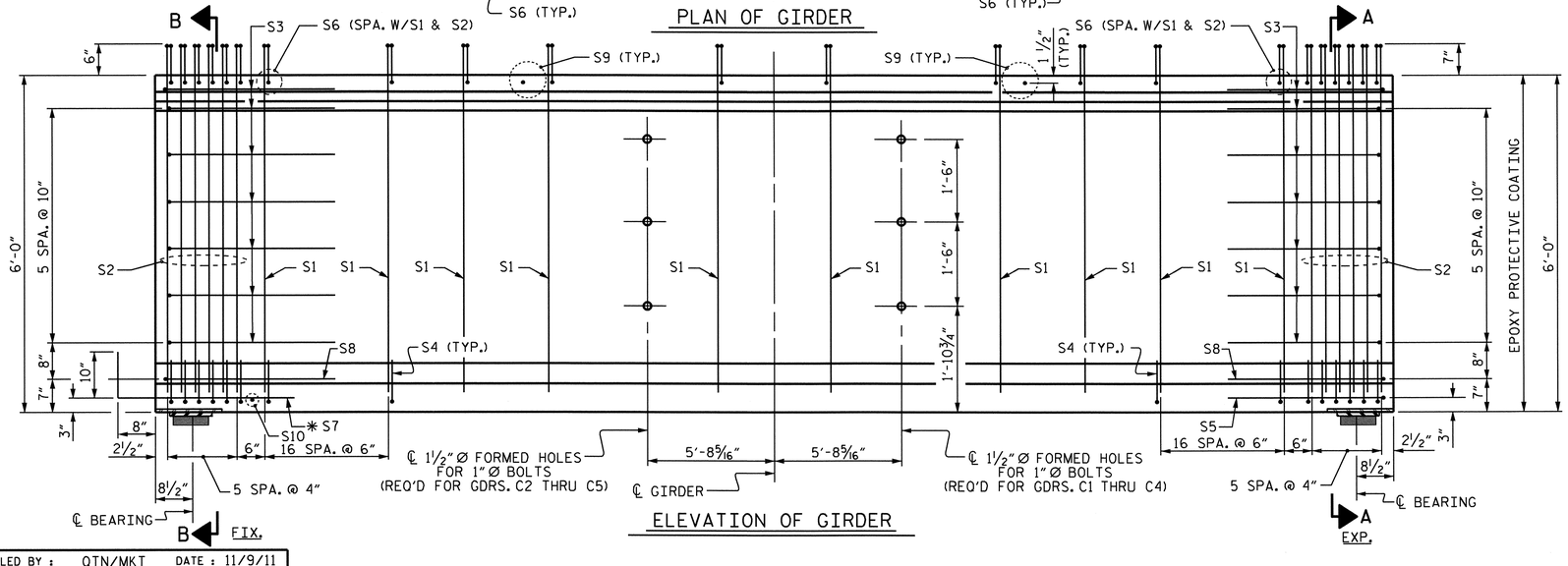
✱FOR S7 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

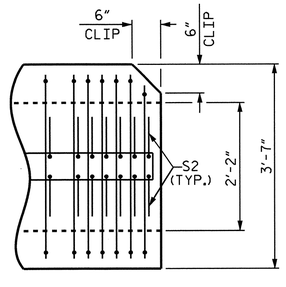


ELEVATION OF GIRDER

NOTE

FOR S11 THRU S13 BARS, SEE SHEET 4 OF 4.

BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY IN CLIP AREA.



CLIP DETAIL

0.6" Ø L. R. GRADE 270 STRANDS

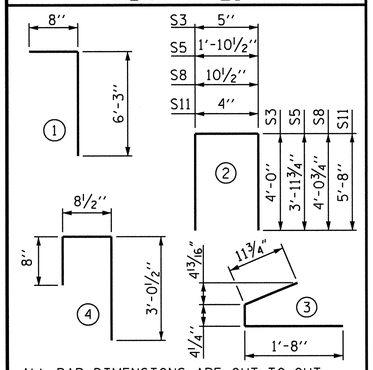
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	120	#4	1	6'-11"	554
	S2	24	#5	1	6'-11"	173
	S3	14	#4	2	8'-5"	79
	S4	92	#4	3	3'-0"	184
	S5	1	#5	2	9'-10"	10
	S6	144	#5	4	4'-5"	663
	✱S7	10	#5	STR	3'-8"	38
	S8	2	#5	2	9'-0"	19
	S9	23	#5	STR	3'-3"	78
	S10	1	#3	STR	1'-10"	1
EXTERIOR GDR.	S11	4	#5	2	11'-8"	49
INTERIOR GDR.	S11	8	#5	2	11'-8"	97
EXTERIOR GDR.	S12	8	#4	STR	8'-0"	43
INTERIOR GDR.	S13	8	#4	STR	19'-4"	103

✱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	5000 PSI CONCRETE	0.6" Ø L.R. STANDS
	LB.	C.Y.	No.
GDR. C1 & C5	1891	15.1	16
GDR. C2 THRU C4	1999	15.1	16

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	70'-3⅞"	351.61'

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN C

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN 4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			37

ASSEMBLED BY :	QTN/MKT	DATE :	11/9/11
CHECKED BY :	A.C. OUTLAW	DATE :	8/2/11
DRAWN BY : EEM 2/6/97	REV. 10/17/00		RWW/LES
CHECKED BY : VAP 2/6/97	REV. 5/1/06R		TLA/GM
	REV. 10/1/11		MAA/GM

24-APR-2012 14:56
h:\Structures\FinalPlans\B4555_SD_C*.dgn
asorsenghnh

STD. NO. PCG8 (Sht. 1)

DEAD LOAD DEFLECTION TABLE

SPAN A

0.6"Ø LOW RELAXATION	GIRDERS 1 & 5											GIRDERS 2 THRU 4										
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	0.022	0.042	0.058	0.068	0.071	0.068	0.058	0.042	0.022	0	0	0.022	0.042	0.058	0.068	0.071	0.068	0.058	0.042	0.022	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.009	0.017	0.024	0.028	0.029	0.028	0.024	0.017	0.009	0	0	0.009	0.016	0.022	0.026	0.028	0.026	0.022	0.016	0.009	0
FINAL CAMBER ↑	0	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0	0	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0

SPAN B

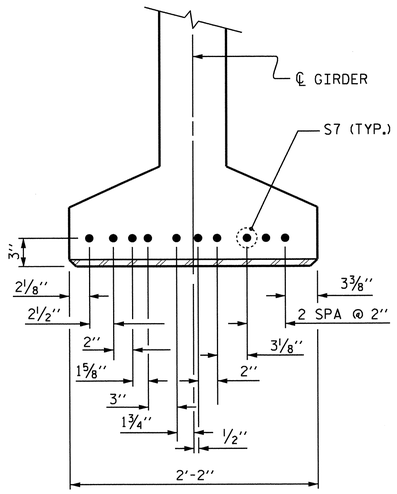
0.6"Ø LOW RELAXATION	GIRDERS 1 & 5											GIRDERS 2 THRU 4										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0	0.130	0.246	0.336	0.394	0.413	0.394	0.336	0.246	0.130	0	0	0.130	0.246	0.336	0.394	0.413	0.394	0.336	0.246	0.130	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.053	0.100	0.137	0.161	0.169	0.161	0.137	0.100	0.053	0	0	0.050	0.095	0.130	0.152	0.160	0.152	0.130	0.095	0.050	0
FINAL CAMBER ↑	0	15/16"	1 3/4"	2 3/8"	2 13/16"	2 15/16"	2 13/16"	2 3/8"	1 3/4"	15/16"	0	0	15/16"	1 13/16"	2 1/2"	2 7/8"	3 1/16"	2 7/8"	2 1/2"	1 13/16"	15/16"	0

SPAN C

0.6"Ø LOW RELAXATION	GIRDERS 1 & 5											GIRDERS 2 THRU 4										
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	0.021	0.040	0.055	0.065	0.068	0.065	0.055	0.040	0.021	0	0	0.021	0.040	0.055	0.065	0.068	0.065	0.055	0.040	0.021	0
✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0	0.008	0.015	0.020	0.023	0.025	0.023	0.020	0.015	0.008	0	0	0.007	0.014	0.019	0.022	0.023	0.022	0.019	0.014	0.007	0
FINAL CAMBER ↑	0	3/16"	5/16"	7/16"	1/2"	1/2"	1/2"	7/16"	5/16"	3/16"	0	0	3/16"	5/16"	7/16"	1/2"	9/16"	1/2"	7/16"	5/16"	3/16"	0

✱ INCLUDES FUTURE WEARING SURFACE

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



DETAIL "C"

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 SPAN A AND SPAN C, AND 7200 PSI FOR SPAN B.

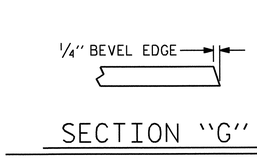
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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

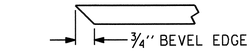
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

A 2" X 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 72" MODIFIED BULB TEES ONLY.

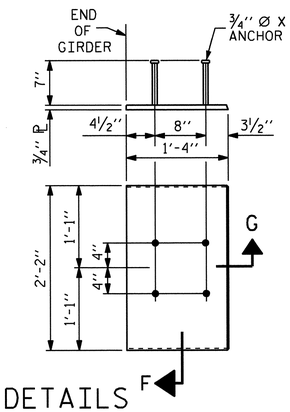
THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



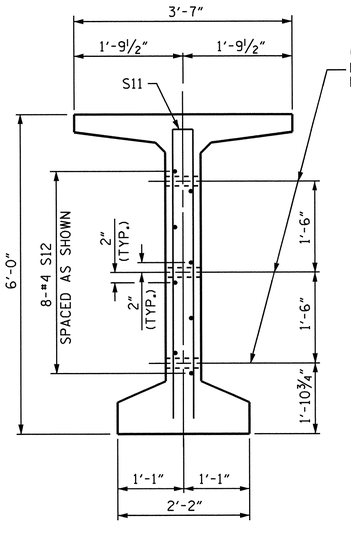
SECTION "G"



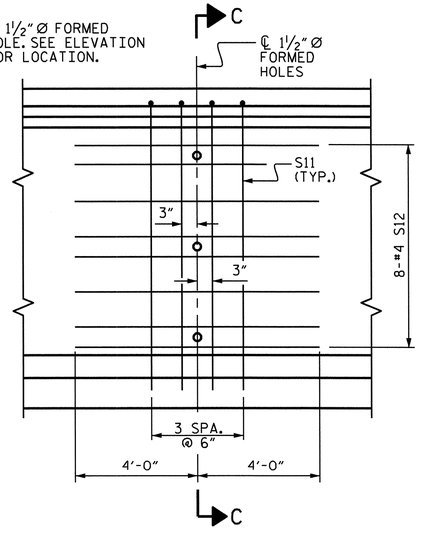
SECTION "F"
(SEE NOTES)



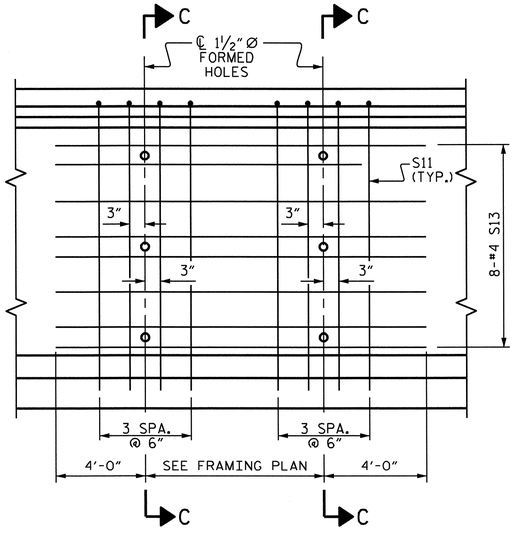
EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEES
(2 REQ'D PER GIRDER)



SECTION C-C
(S1, S6 AND S9 BARS NOT SHOWN)



EXTERIOR GIRDERS



INTERIOR GIRDERS

PARTIAL ELEVATION OF 1 1/2" Ø FORMED HOLES

PROJECT NO. B-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

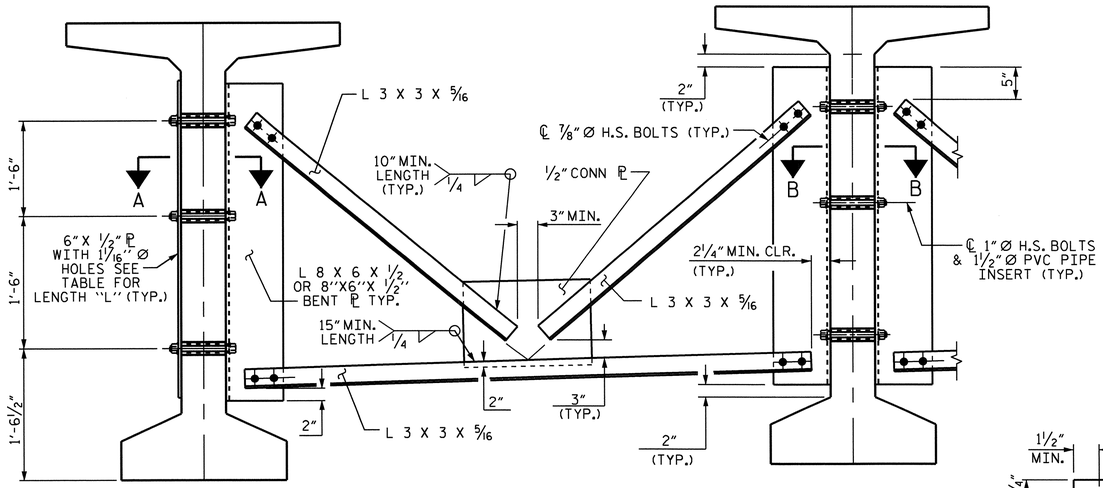
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			37

STD. NO. PCG9

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

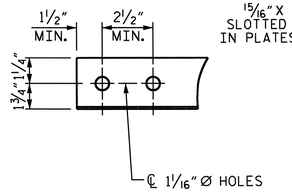
ASSEMBLED BY : QT NGUYEN	DATE : 4-11-11
CHECKED BY : A.C. OUTLAW	DATE : 8-2-11
DRAWN BY : ELR 11/91	REV. 7/10/01RR LES/RDR
CHECKED BY : GRP 11/91	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

24-APR-2012 14:57
R:\Structures\Final Plans\B4555_SD_G*.dgn
asorsenginh



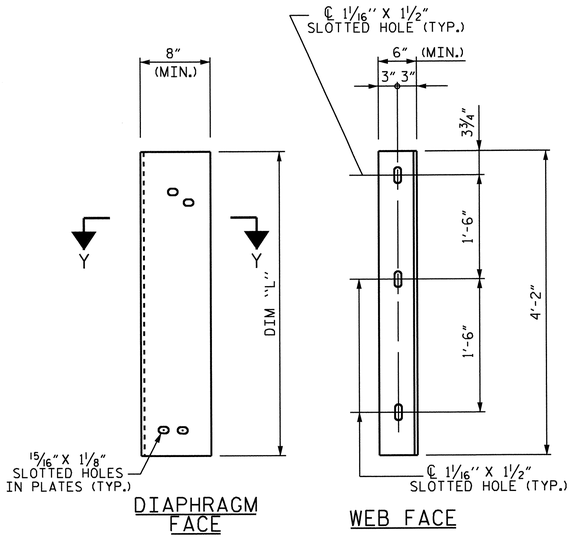
PART SECTION AT INTERMEDIATE DIAPHRAGM

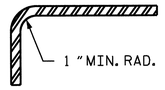
(63" BULB TEE OR 72" BULB TEE GIRDER SHOWN)



ANGLE END

(L 3 X 3 X 5/16)





SECTION Y-Y

CONNECTOR PLATE 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 ANGLE 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 1/4 TURN.

THE PLATES, BENT PLATES, 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.

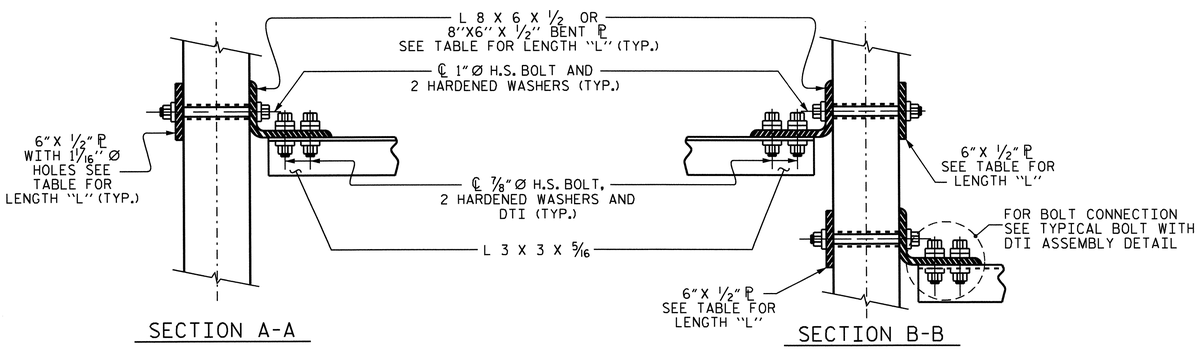
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.

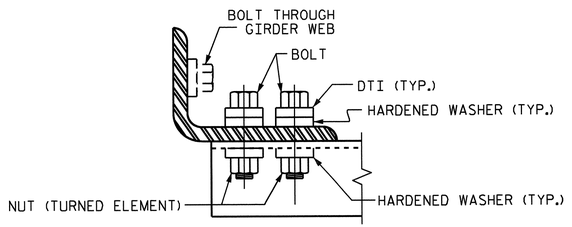
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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



SECTION A-A

SECTION B-B



BOLT WITH DTI ASSEMBLY DETAIL

CONNECTION DETAILS

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 63" & 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

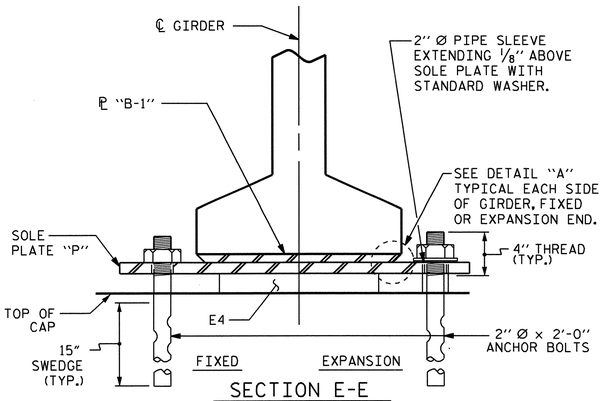
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			37

STD. NO. PCG11

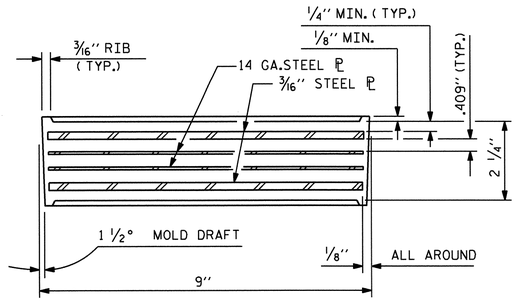
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

ASSEMBLED BY : O. T. NGUYEN	DATE : 4-8-11
CHECKED BY : A. C. OUTLAW	DATE : 8-2-11
DRAWN BY : RWW 11/09	ADDED 11/23/09R
CHECKED BY : GM 11/09	REV. 10/1/11 MAA/GM

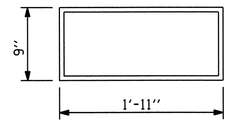
24-APR-2012 14:57
R:\Structures\FinalPlans\B4555_SD_G*.dgn
asorsenglnh



SECTION E-E



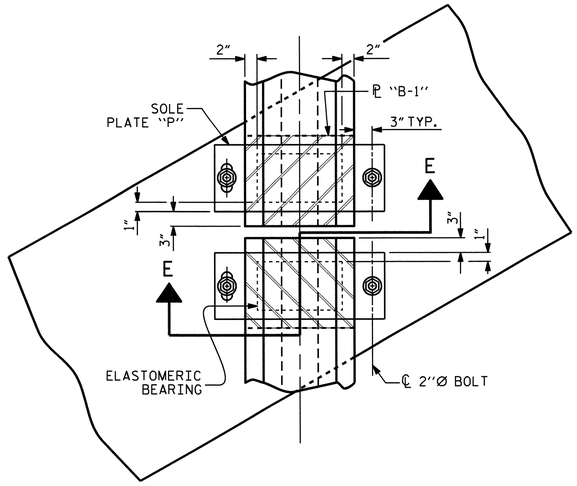
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (30 REQ'D)

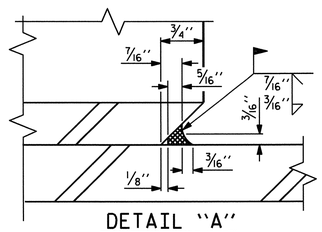
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

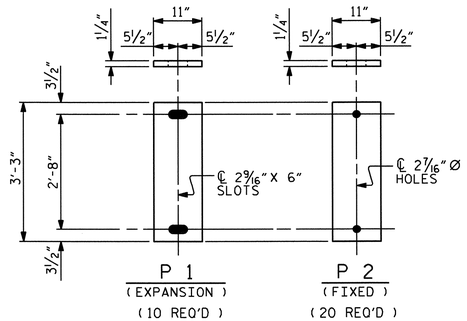


TYPICAL HALF-PLAN (EXPANSION)

TYPICAL HALF-PLAN (FIXED)



DETAIL "A"



SOLE PLATE DETAILS ("P")

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.

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS

— LOAD RATINGS —	
	MAX.D.L.+ L.L.
TYPE V	259 K

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

ASSEMBLED BY : QT NGUYEN	DATE : 4-11-11
CHECKED BY : A.C. OUTLAW	DATE : 7-29-11
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

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALLOUM
12-21-12

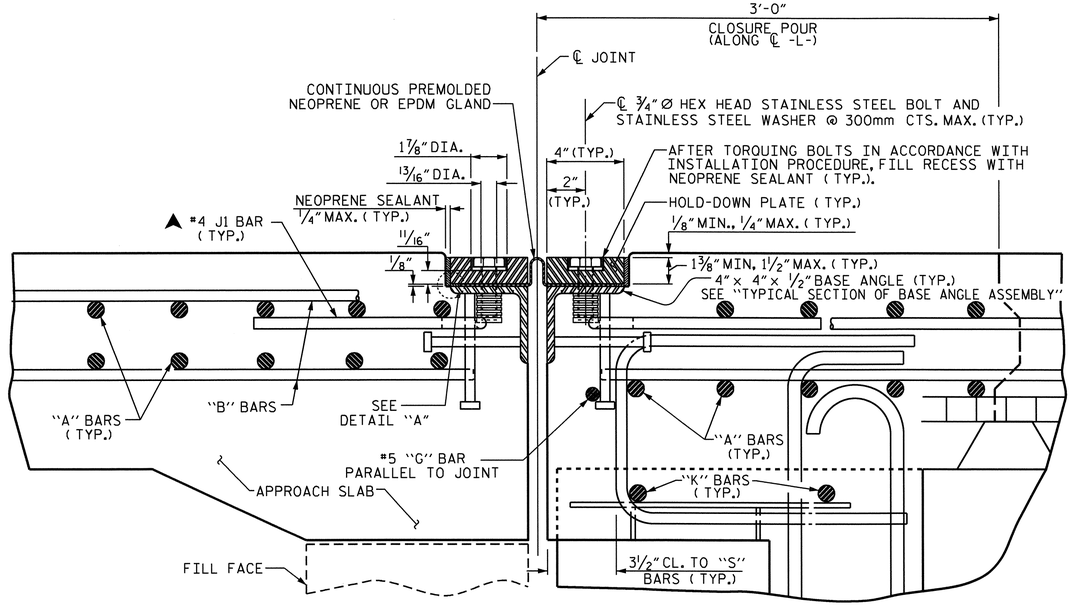
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			37

STD. NO. EB4 (SHT 1)

24-APR-2012 17:11
R:\Structures\Final Plans\B4555_SD_BG.dgn
asorsenginh

MOVEMENT AND SETTING AT EXPANSION JOINT					
END BENT	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	35°-56'-04"	1 1/8"	1 1/2"	1 3/8"	1 1/8"
2	35°-56'-04"	1 1/8"	1 1/2"	1 3/8"	1 1/8"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY.
JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

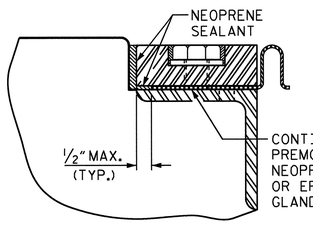
▲ THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

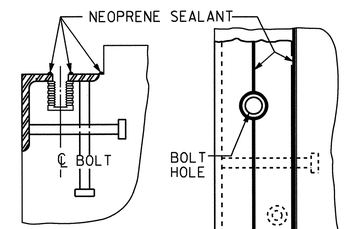
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" 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 1/2" 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 1/8" 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. THE TORQUE WRENCH SHALL BE CALIBRATED IN ACCORDANCE WITH SECTION 440-10 (D) OF THE STANDARD SPECIFICATIONS. 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 TORQUING, 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 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

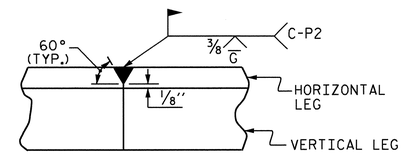


DETAIL "A"

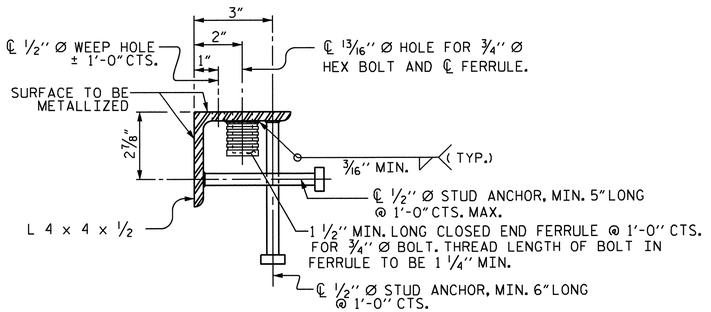


CROSS SECTION PLAN VIEW

INSTALLATION SKETCH



DETAIL- FIELD WELD SPLICE OF BASE ANGLE



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. B-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

EXPANSION JOINT SEAL DETAILS

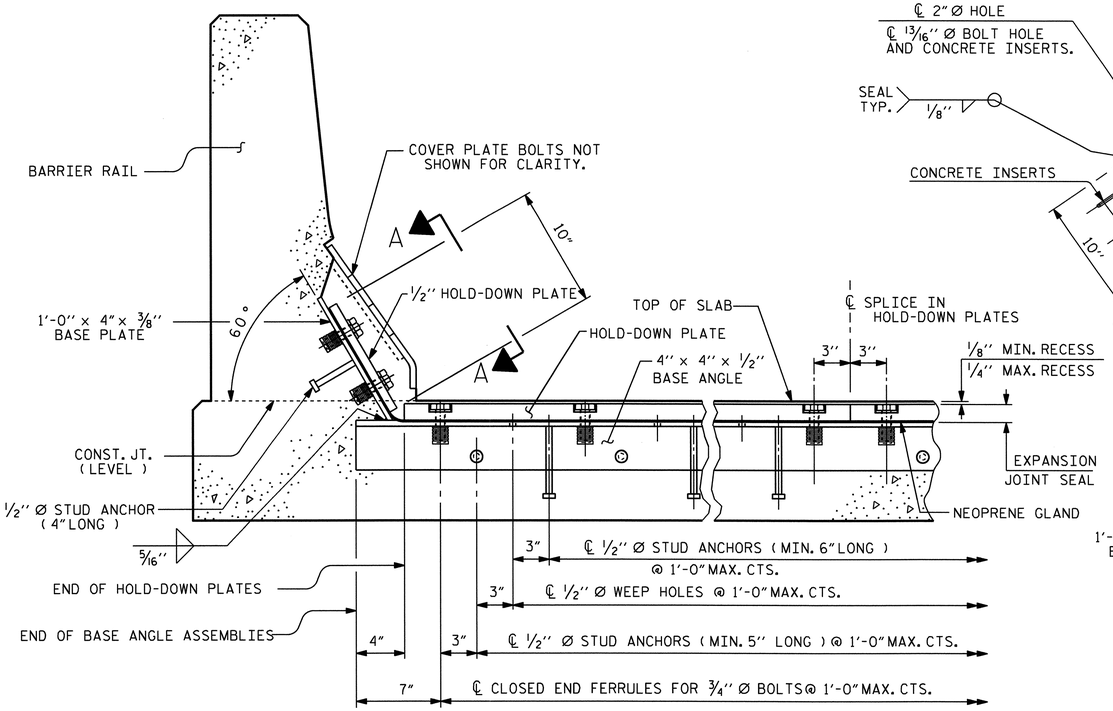
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			37

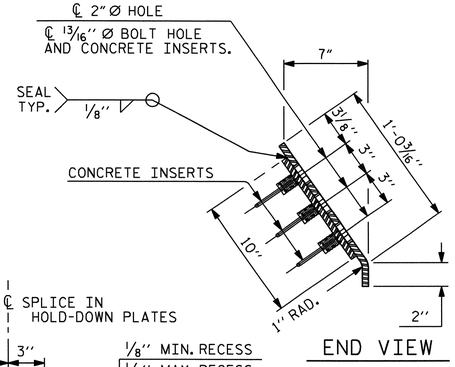
ASSEMBLED BY : OT NGUYEN	DATE : 4-12-11	
CHECKED BY : A.C. OUTLAW	DATE : 7-29-11	
DRAWN BY : REK 9/87	REV. 5/7/03R	RWW/JTE
CHECKED BY : CRK 10/87	REV. 5/1/06R	TLA/GM
	REV. 10/1/11	MAA/GM

24-APR-2012 14:59
R:\Structures\Final Plans\B4555_SD_JS.dgn
asorsenginh

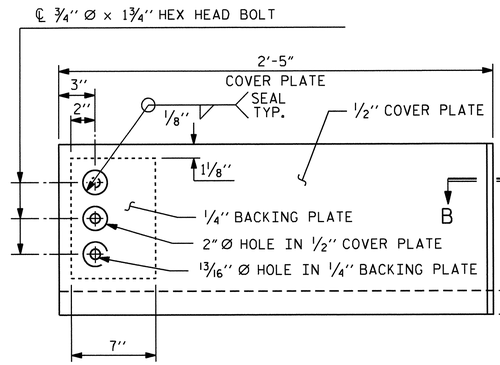
STD. NO. EJS1 (SHT 2)



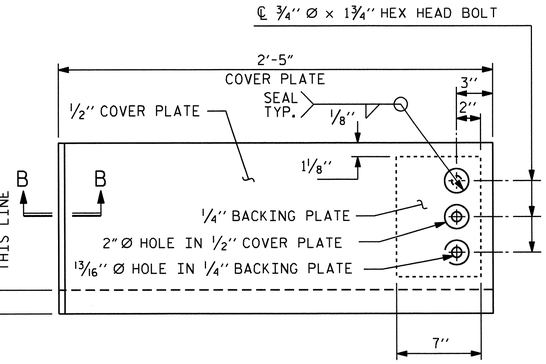
SECTION THRU RAIL NORMAL TO JOINT



END VIEW

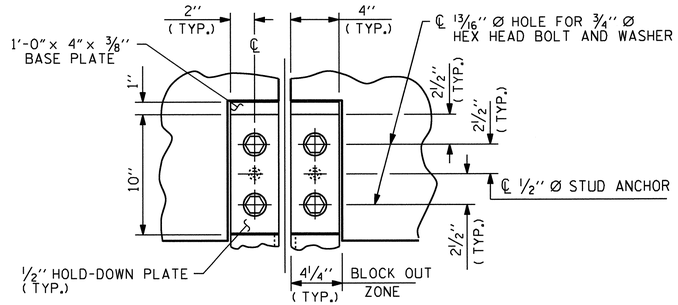


TYPE I - ELEVATION VIEW

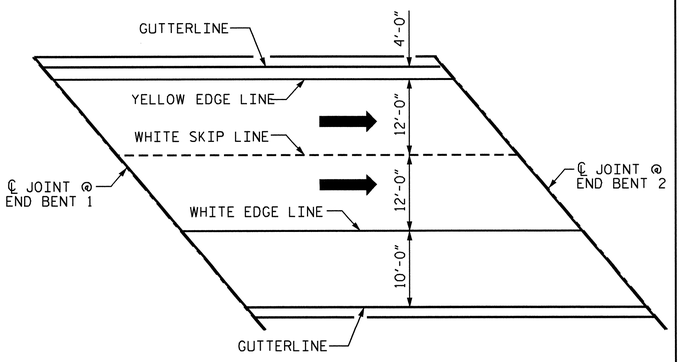


TYPE II - ELEVATION VIEW

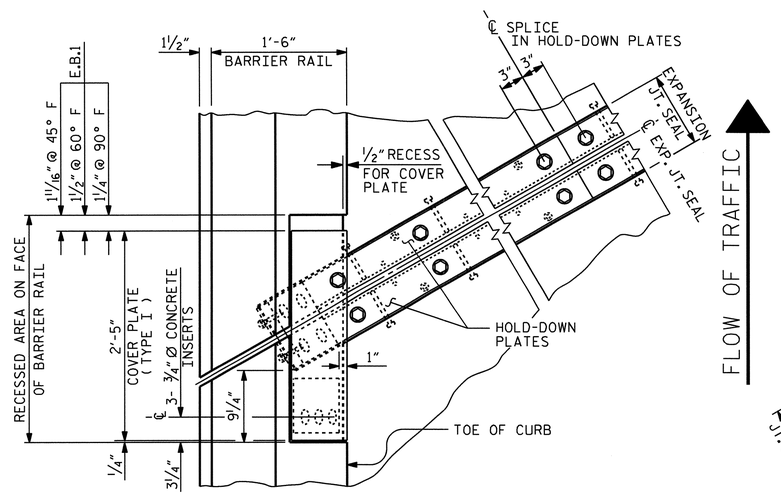
COVER PLATE DETAILS

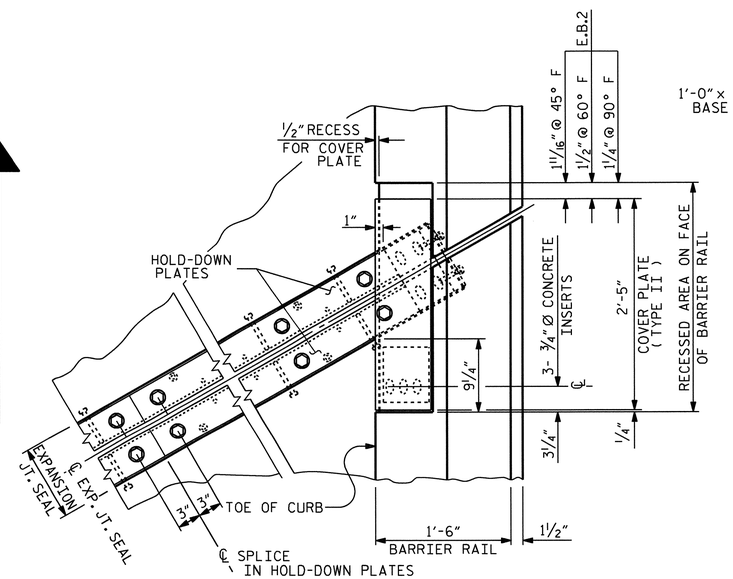


SECTION A - A

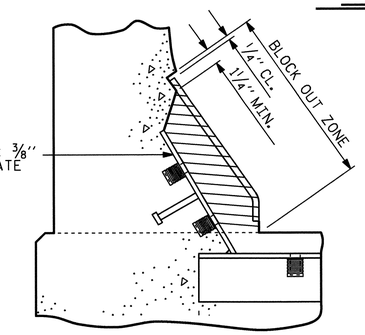


PAVEMENT MARKING ALIGNMENT



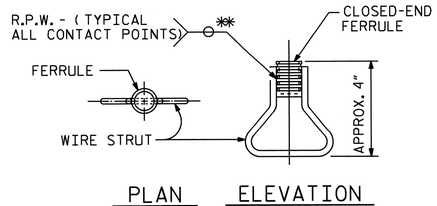


PLAN OF EXPANSION JOINT SEAL



BLOCK OUT DETAIL

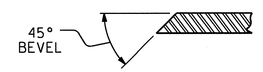
SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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



SECTION B - B

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. OUTLAW
4-24-12

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

ASSEMBLED BY : O. T. NGUYEN	DATE : 4-12-11
CHECKED BY : A. C. OUTLAW	DATE : 7-29-11
DRAWN BY : REK 9/87	REV. 10/17/00 RWW/LES
CHECKED BY : CRK 10/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			37

24-APR-2012 14:58
R:\Structures\Final Plans\B4555_SD_JS.dgn
asorsenginh

STD. NO. EJS2 SHT 3b

NOTES

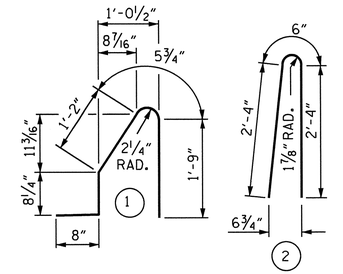
BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

VERTICAL GROOVED CONTRACTION JOINTS, 1/2" 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. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

QUANTITIES FOR BARRIER RAIL ON APPROACH SLAB ARE INCLUDED ON BRIDGE APPROACH SLAB SHEETS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

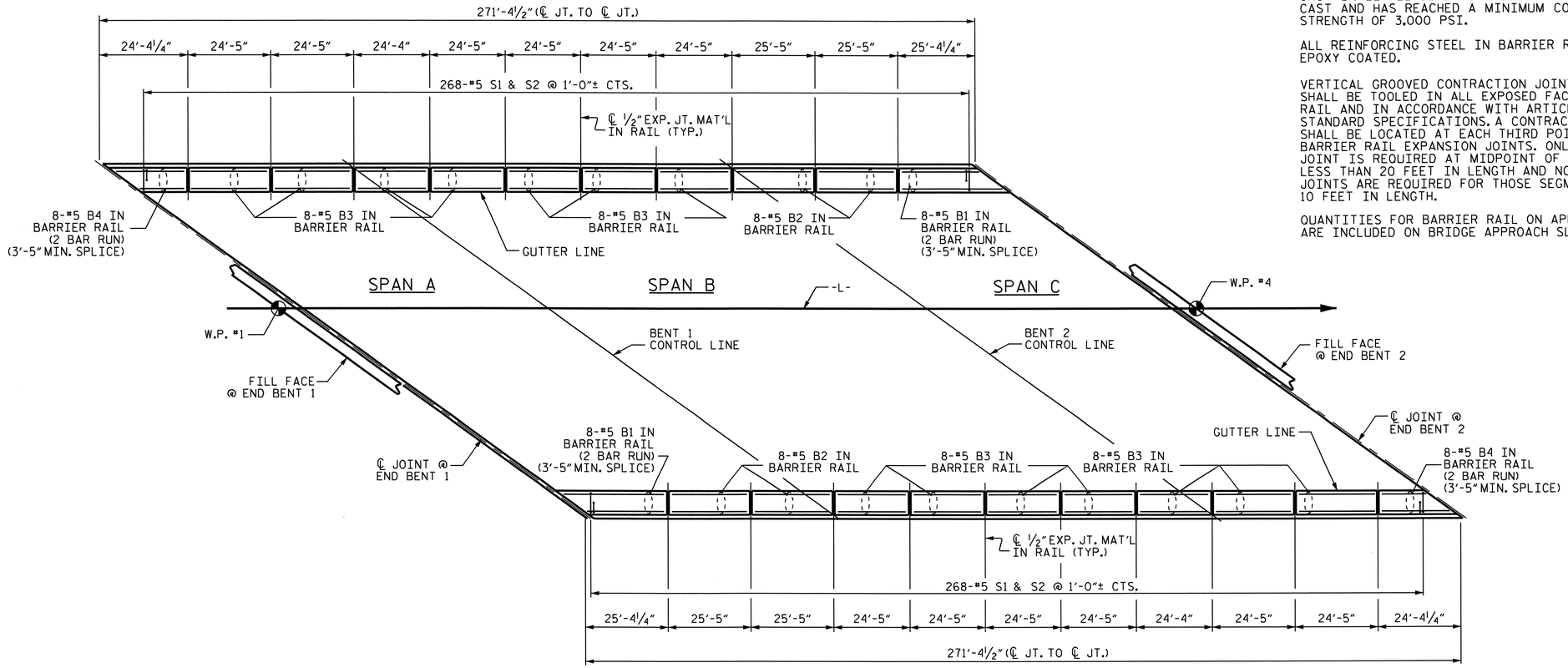
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	32	#5	STR	15'-0"	501
✱B2	32	#5	STR	25'-0"	834
✱B3	112	#5	STR	23'-11"	2794
✱B4	32	#5	STR	14'-0"	467
✱S1	536	#5	1	4'-9"	2655
✱S2	536	#5	2	5'-2"	2888
✱S3	12	#5	STR	3'-4"	42

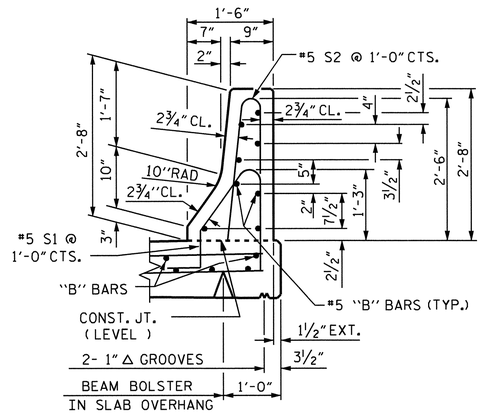
✱EPOXY COATED REINFORCING STEEL	10.181	LBS.
CLASS AA CONCRETE	54.4	CU. YDS.
▲CONCRETE BARRIER RAIL	586.93	LIN. FT.

▲ INCLUDES BARRIER RAIL ON APPROACH SLABS.

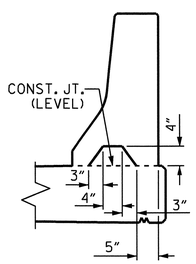


PLAN OF BARRIER RAIL

FOR REINFORCING STEEL DETAILS AT ENDS OF BARRIER RAIL SEE "END OF RAIL DETAILS" SHEET 2 OF 2.

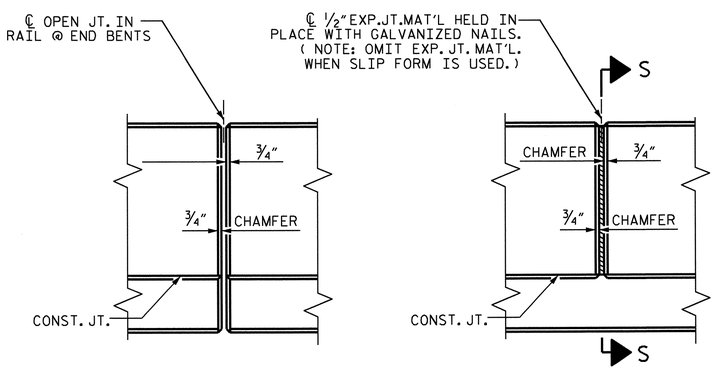


SECTION THRU RAIL



SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

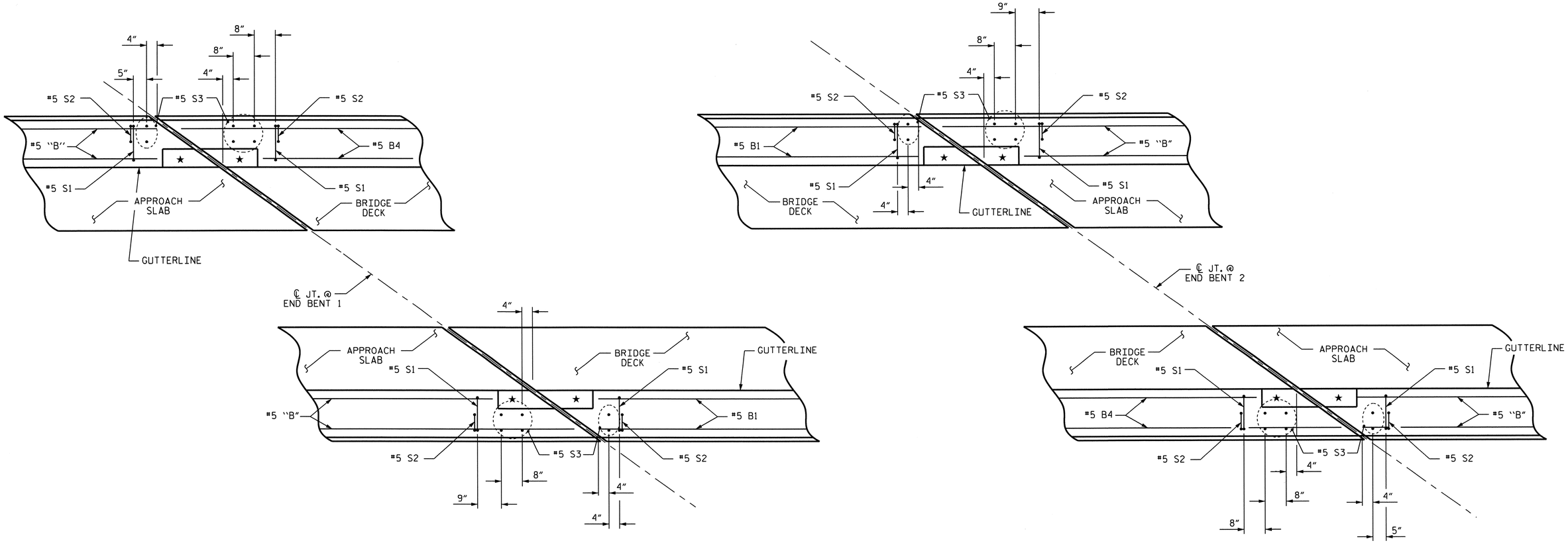
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			37

STD. NO. CBR1

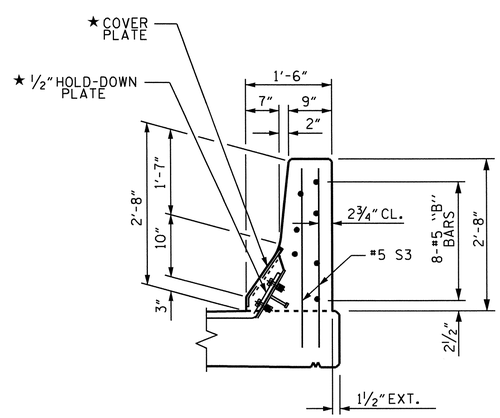
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

ASSEMBLED BY :	D. G. ELY	DATE :	03/2011
CHECKED BY :	D. R. CALHOUN	DATE :	03/2012
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

24-APR-2012 15:01
R:\Structures\Final Plans\B4555_SD_BR.dgn
asorsenginh



END OF RAIL DETAILS



END VIEW

★ FOR RECESS DETAILS SEE "EXPANSION JOINT SEAL DETAILS" SHEET 2 OF 2.

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

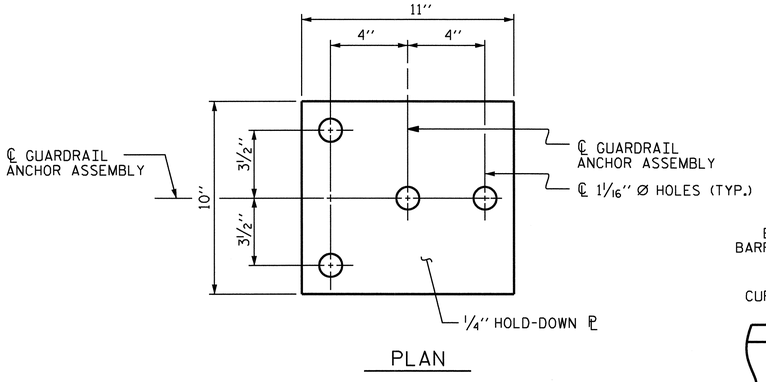
CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			37

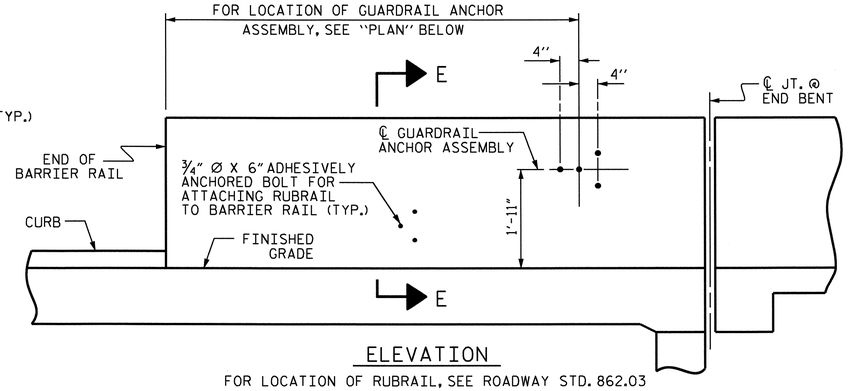
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

DRAWN BY : D. G. ELY DATE : 3/2012
CHECKED BY : D. R. CALHOUN DATE : 3/2012

24-APR-2012 15:01
R:\Structures\Final Plans\B4555_SD_BR.dgn
asorsenginh

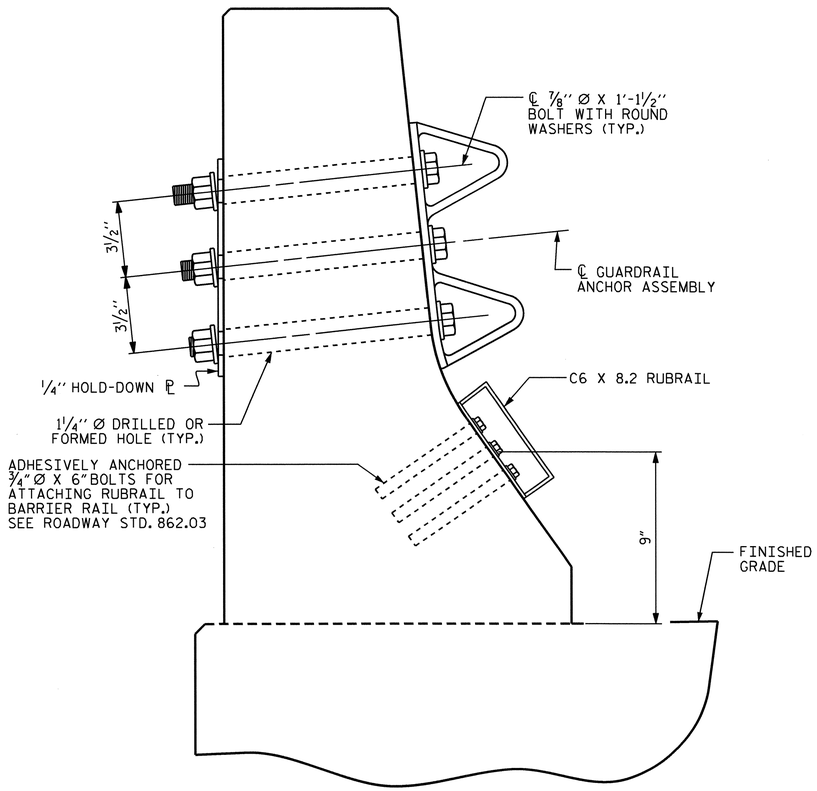


PLAN



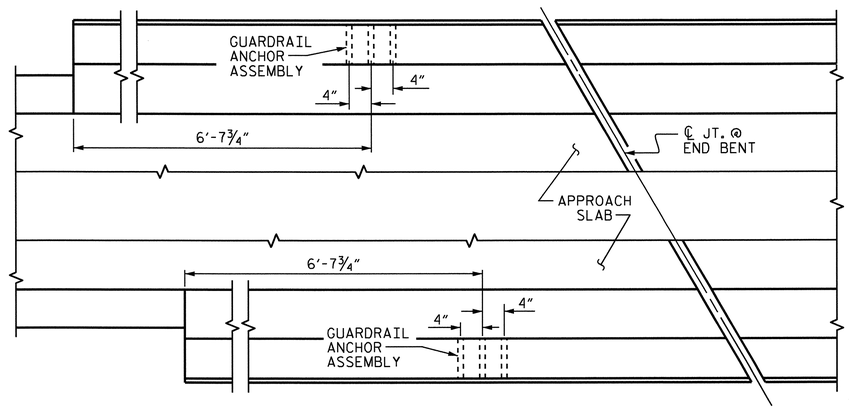
ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

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.)

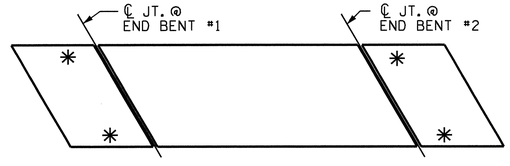
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

ASSEMBLED BY : OT NGUYEN	DATE : 4-12-11
CHECKED BY : A.C. OUTLAW	DATE : 7-29-11
DRAWN BY : TLA 5/06	ADDED 5/1/06RR KMM/GM
CHECKED BY : GM 5/06	REV. 10/1/11 MAA/GM

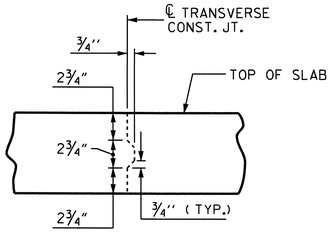
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
3-24-12

24-APR-2012 15:20
R:\Structures\Final Plans\B4555_SD_GR.dgn
asorsenginh

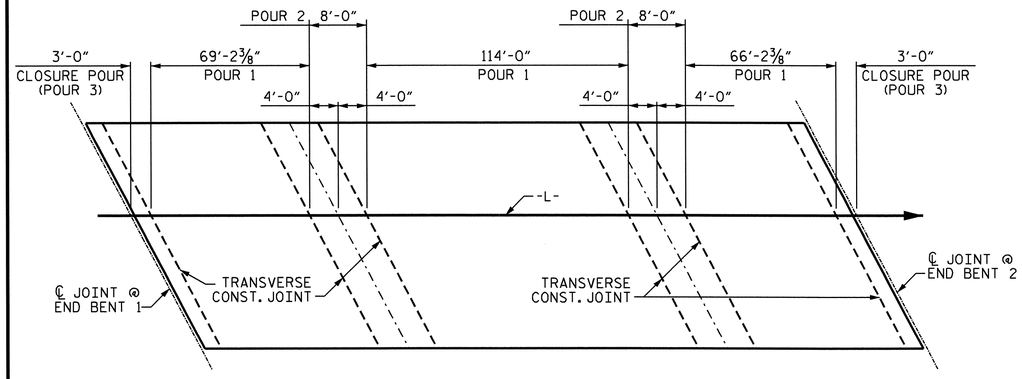
(SHT 3a) STD. NO. GRA2

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"			



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



OPTIONAL POURING SEQUENCE

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

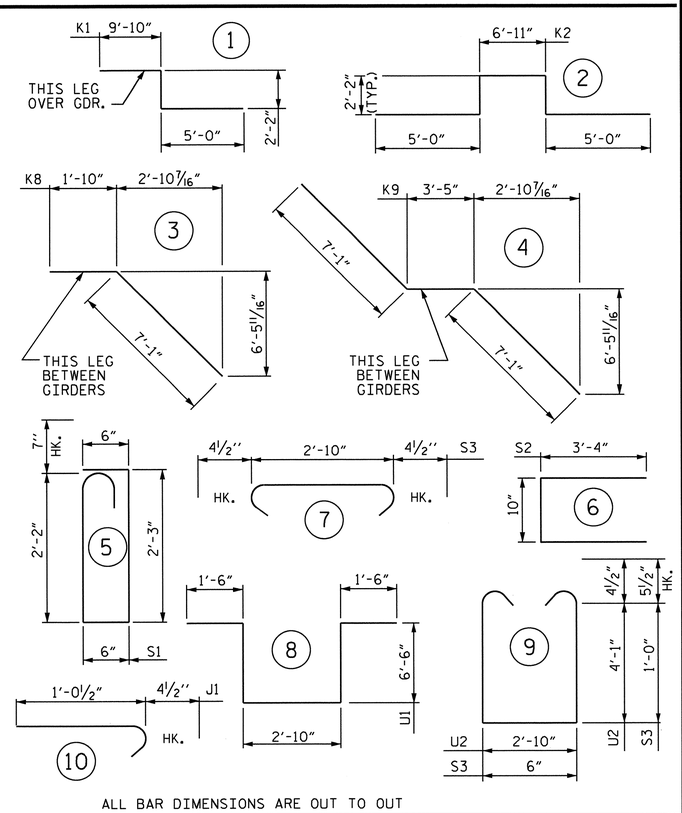
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	368	#5	STR	40'-11"	15705	A213	6	#5	STR	24'-7"	154
A2	368	#5	STR	40'-11"	15705	A214	6	#5	STR	23'-4"	146
✳ A3	12	#6	STR	12'-6"	225	A215	6	#5	STR	22'-1"	138
						A216	6	#5	STR	20'-9"	130
✳ A101	6	#5	STR	39'-10"	249	A217	6	#5	STR	19'-6"	122
✳ A102	6	#5	STR	38'-7"	241	A218	6	#5	STR	18'-3"	114
✳ A103	6	#5	STR	37'-4"	234	A219	6	#5	STR	17'-0"	106
✳ A104	6	#5	STR	36'-1"	226	A220	6	#5	STR	15'-9"	99
✳ A105	6	#5	STR	34'-9"	217	A221	6	#5	STR	14'-5"	90
✳ A106	6	#5	STR	33'-6"	210	A222	6	#5	STR	13'-2"	82
✳ A107	6	#5	STR	32'-3"	202	A223	6	#5	STR	11'-11"	75
✳ A108	6	#5	STR	31'-0"	194	A224	6	#5	STR	10'-8"	67
✳ A109	6	#5	STR	29'-9"	186	A225	6	#5	STR	9'-4"	58
✳ A110	6	#5	STR	28'-5"	178	A226	6	#5	STR	8'-1"	51
✳ A111	6	#5	STR	27'-2"	170	A227	6	#5	STR	6'-10"	43
✳ A112	6	#5	STR	25'-11"	162	A228	6	#5	STR	5'-7"	35
✳ A113	6	#5	STR	24'-7"	154	A229	6	#5	STR	4'-4"	27
✳ A114	6	#5	STR	23'-4"	146	A230	6	#5	STR	3'-0"	19
✳ A115	6	#5	STR	22'-1"	138						
✳ A116	6	#5	STR	20'-9"	130	✳ B1	56	#4	STR	26'-0"	973
✳ A117	6	#5	STR	19'-6"	122	✳ B2	220	#5	STR	36'-3"	8318
✳ A118	6	#5	STR	18'-3"	114	✳ B3	108	#5	STR	31'-0"	3492
✳ A119	6	#5	STR	17'-0"	106	✳ B4	56	#4	STR	21'-0"	786
✳ A120	6	#5	STR	15'-9"	99	✳ B5	56	#4	STR	24'-6"	917
✳ A121	6	#5	STR	14'-5"	90	B6	160	#5	STR	55'-11"	9331
✳ A122	6	#5	STR	13'-2"	82						
✳ A123	6	#5	STR	11'-11"	75	✳ G1	4	#5	STR	36'-2"	151
✳ A124	6	#5	STR	10'-8"	67						
✳ A125	6	#5	STR	9'-4"	58	✳ J1	130	#4	10	1'-5"	123
✳ A126	6	#5	STR	8'-1"	51						
✳ A127	6	#5	STR	6'-10"	43	✳ K1	8	#8	1	17'-0"	363
✳ A128	6	#5	STR	5'-7"	35	✳ K2	12	#8	2	21'-3"	681
✳ A129	6	#5	STR	4'-4"	27	✳ K3	24	#6	STR	7'-2"	258
✳ A130	6	#5	STR	3'-0"	19	K4	32	#4	STR	12'-2"	260
						K5	16	#4	STR	7'-7"	81
A201	6	#5	STR	39'-10"	249	K6	80	#4	STR	12'-4"	659
A202	6	#5	STR	38'-7"	241	K7	16	#4	STR	7'-4"	78
A203	6	#5	STR	37'-4"	234	K8	28	#4	3	8'-11"	167
A204	6	#5	STR	36'-1"	226	K9	42	#4	4	17'-7"	493
A205	6	#5	STR	34'-9"	217						
A206	6	#5	STR	33'-6"	210	✳ S1	56	#5	5	6'-0"	350
A207	6	#5	STR	32'-3"	202	✳ S2	56	#4	6	7'-6"	281
A208	6	#5	STR	31'-0"	194	✳ S3	16	#5	9	3'-5"	57
A209	6	#5	STR	29'-9"	186	S4	304	#4	7	3'-7"	728
A210	6	#5	STR	28'-5"	178						
A211	6	#5	STR	27'-2"	170	U1	40	#4	8	18'-10"	503
A212	6	#5	STR	25'-11"	162	U2	16	#4	9	11'-9"	126

✳ DENOTES EPOXY COATED REINFORCING STEEL

REINFORCING STEEL =	32,156 LBS
✳ EPOXY COATED REINF. STEEL =	36,705 LBS

BAR TYPES

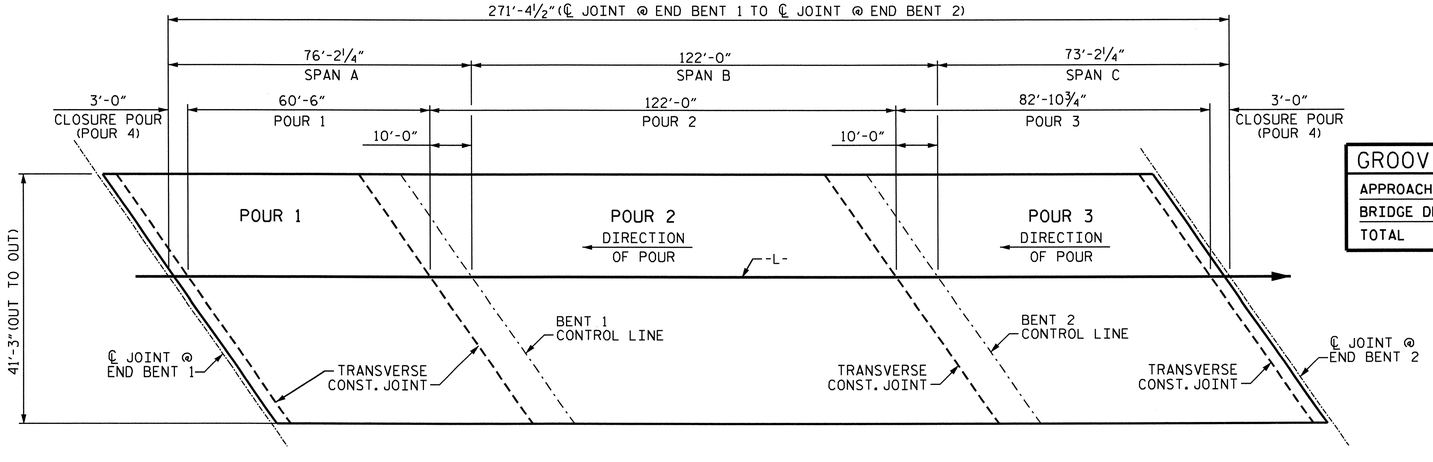


ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

SPANS A, B, & C	CLASS AA CONCRETE	REINFORCING STEEL	✳ EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	79.8		
POUR 2	156.3		
POUR 3	102.6		
POUR 4	13.0		
TOTAL	351.7	32,156	36,705

DOES NOT INCLUDE QUANTITIES FOR BARRIER RAIL



POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(SQ. FT. =11,194)

GROOVING BRIDGE FLOORS		
APPROACH SLABS	1,634	SQ.FT.
BRIDGE DECK	9,432	SQ.FT.
TOTAL	11,066	SQ.FT.

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

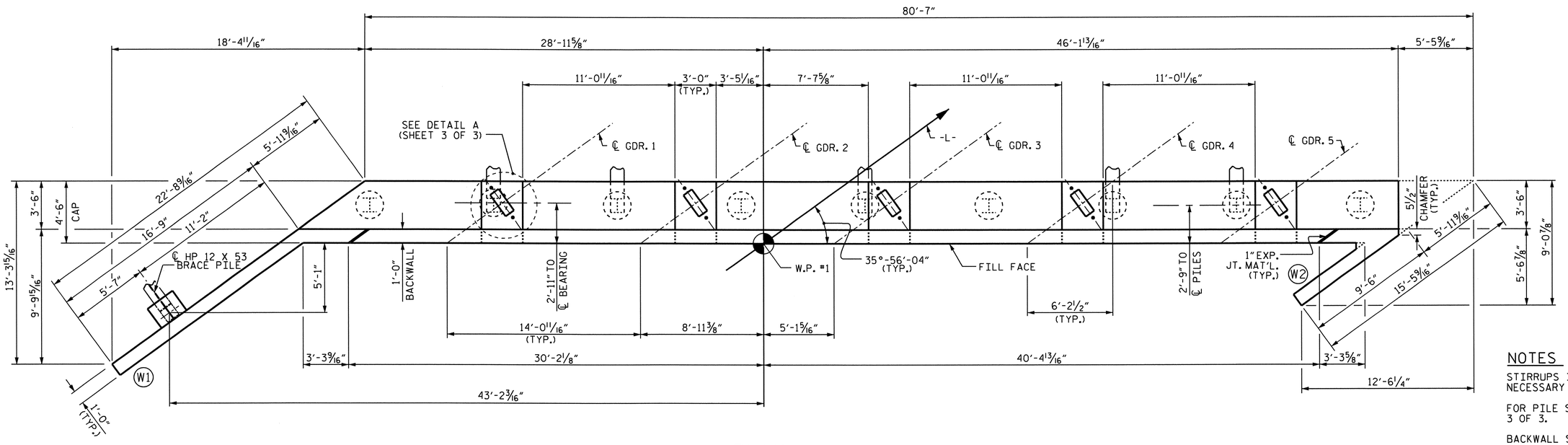
SUPERSTRUCTURE BILL OF MATERIAL

ASSEMBLED BY : OT NGUYEN	DATE : 4-12-11
CHECKED BY : A.C. OUTLAW	DATE : 8-3-11
DRAWN BY : JMB 5/87	REV. 6/1/94 EEM/GRP
CHECKED BY : SJD 9/87	REV. 8/16/99 RWW/LES
	REV. 5/1/06 TLA/GM

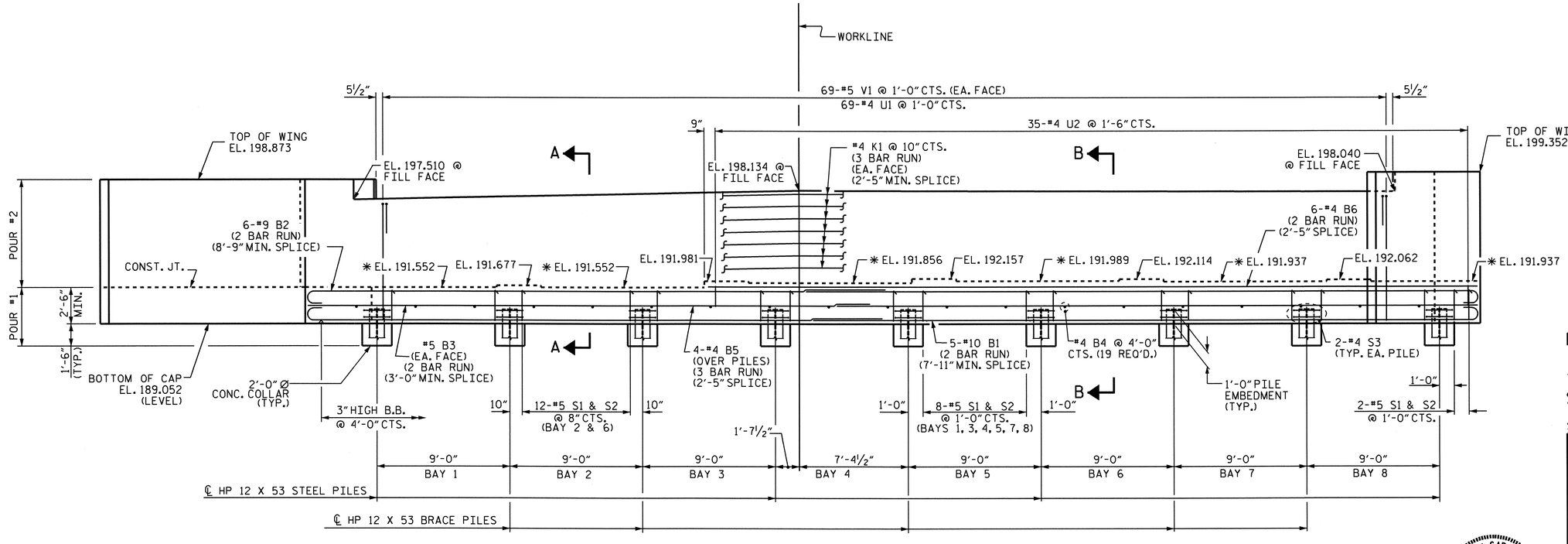
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			37

STD. NO. BOM2

24-APR-2012 15:02
R:\Structures\Final Plans\B4555_SD_BM.dgn
asorsenginh



PLAN



ELEVATION

WING PILE NOT SHOWN FOR CLARITY

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE SHEET 3 OF 3.

NOTES

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

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDENCE ITH 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-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

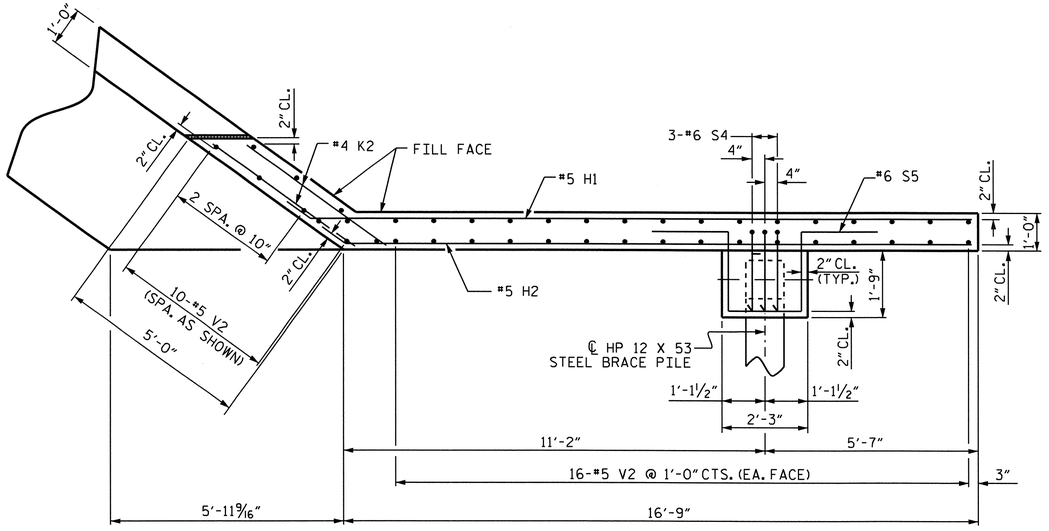
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			37

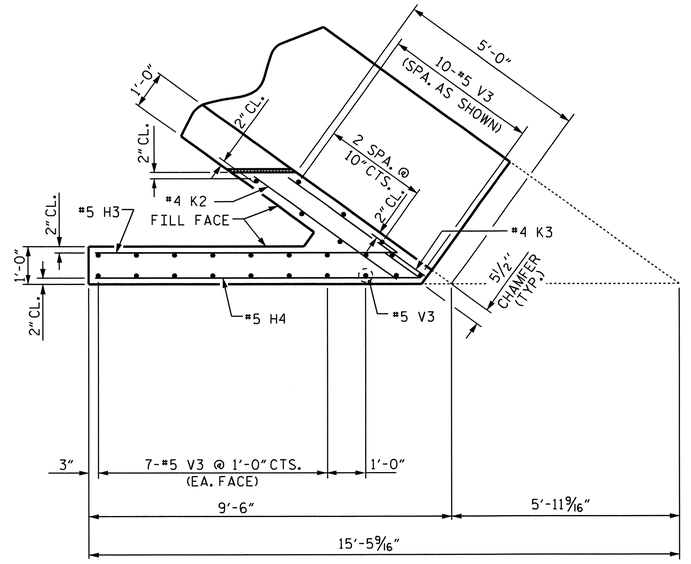
DRAWN BY : HS/MKT DATE : 4/14/11
CHECKED BY : O.T. NGUYEN DATE : 7/6/11

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

24-APR-2012 15:03
R:\Structures\Final Plans\b-4555-01_eb.dgn
asorsenginh

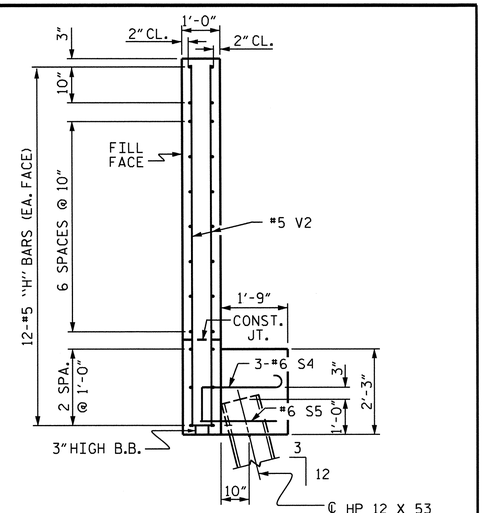


PLAN OF WING (W1)

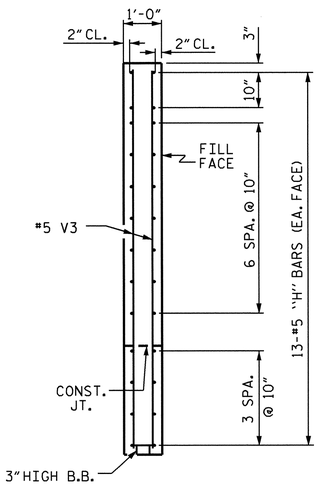


PLAN OF WING (W2)

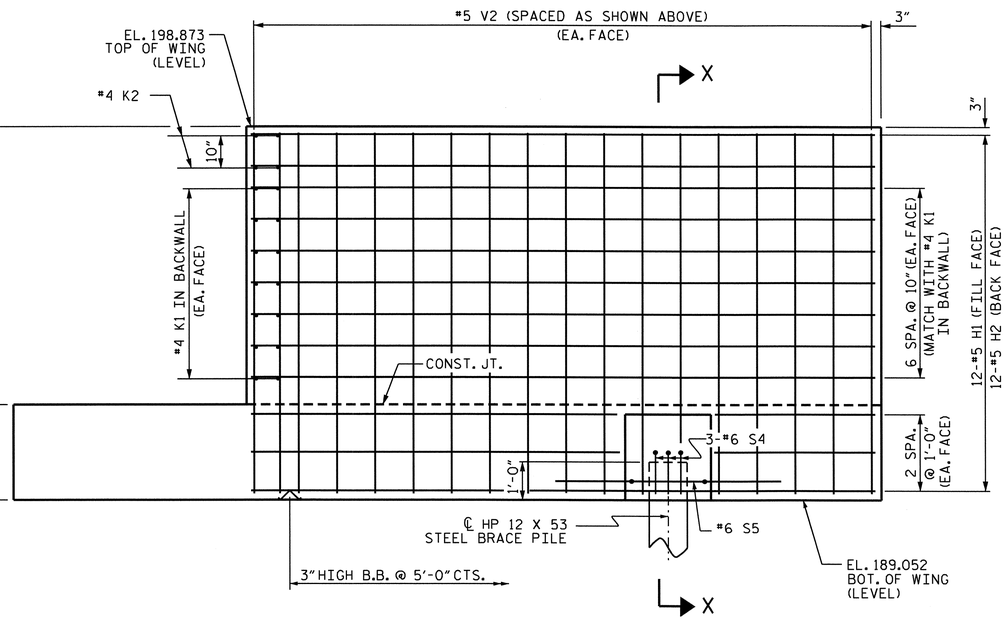
#4 K2 & #4 K3 FIELD CUT AS NECESSARY TO GIVE 2" MIN. CLEARANCE FROM CHAMFER.



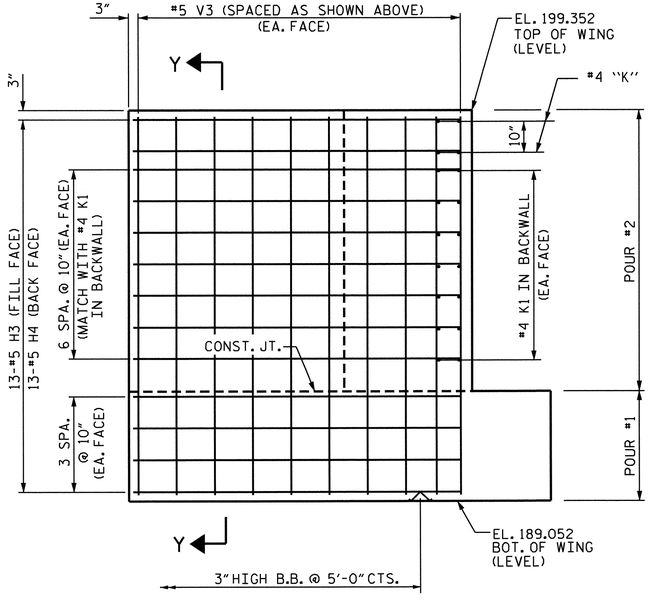
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

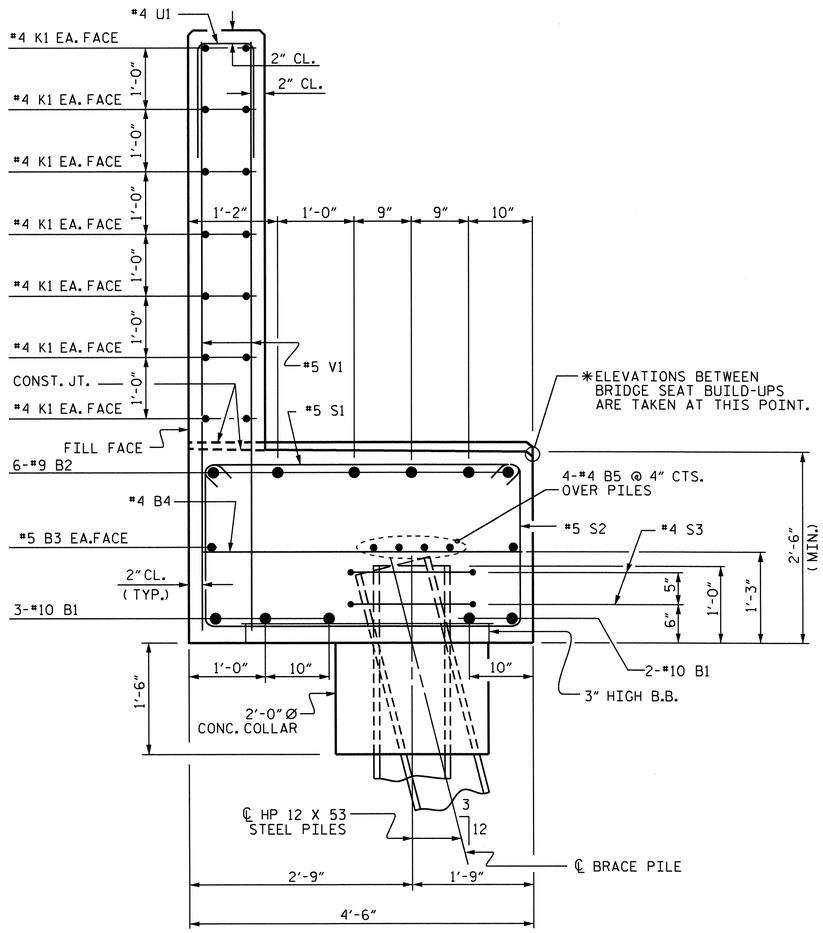
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			37

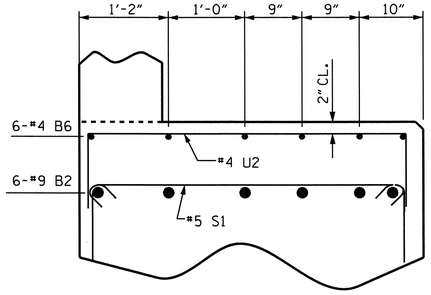
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
24-24-12

DRAWN BY : HARISH SHAH DATE : 04-15-11
CHECKED BY : O.T. NGUYEN DATE : 07-06-11

24-APR-2012 15:04
R:\Structures\Final Plans\b-4555-01_eb.dgn
asarsenginh



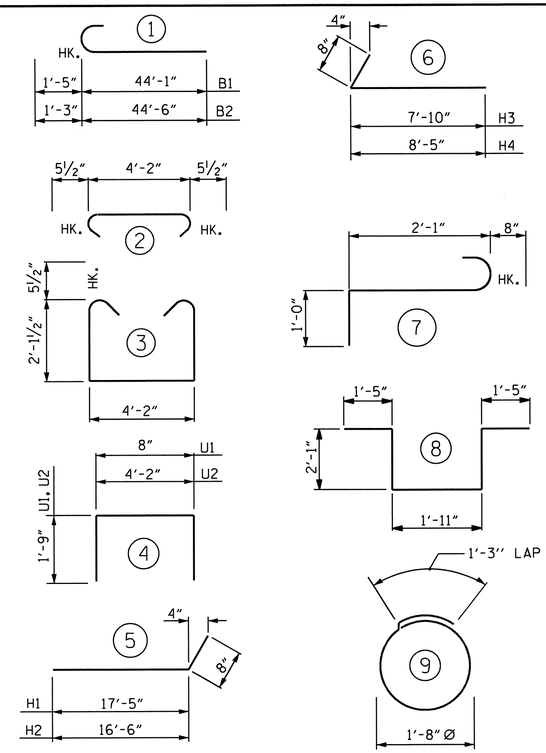
SECTION A-A



PARTIAL SECTION B-B

#5 V1 BARS NOT SHOWN FOR CLARITY.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	45'-6"	1958
B2	12	#9	1	45'-9"	1867
B3	4	#5	STR	41'-8"	174
B4	19	#4	STR	4'-2"	53
B5	12	#4	STR	28'-5"	228
B6	12	#4	STR	27'-4"	219
H1	12	#5	5	18'-1"	226
H2	12	#5	5	17'-2"	215
H3	13	#5	6	8'-6"	115
H4	13	#5	6	9'-1"	123
K1	42	#4	STR	28'-5"	797
K2	6	#4	STR	4'-5"	18
K3	2	#4	STR	4'-1"	5
S1	74	#5	2	5'-1"	392
S2	74	#5	3	9'-4"	720
S3	18	#4	9	6'-6"	78
S4	3	#6	7	3'-9"	17
S5	1	#6	8	8'-11"	13
U1	69	#4	4	4'-2"	192
U2	35	#4	4	7'-8"	179
V1	138	#5	STR	8'-1"	1163
V2	42	#5	STR	9'-6"	416
V3	25	#5	STR	10'-0"	261

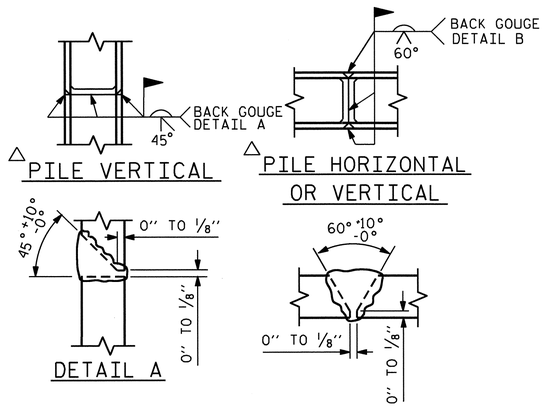
REINFORCING STEEL 9,429 LBS

CLASS A CONCRETE

POUR 1 (CAP & LOWER WINGS & COLLARS)	42.9 C.Y.
POUR 2 (BACKWALL & UPPER WINGS)	23.3 C.Y.
TOTAL	66.2 C.Y.

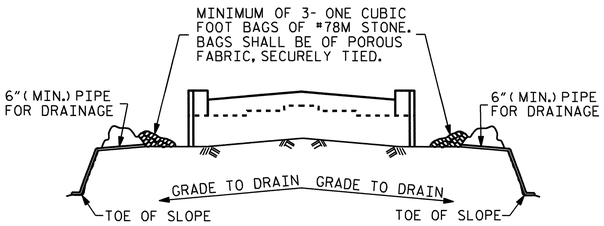
HP 12 X 53 STEEL PILES

NUMBER = 10 LIN. FT. = 500



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

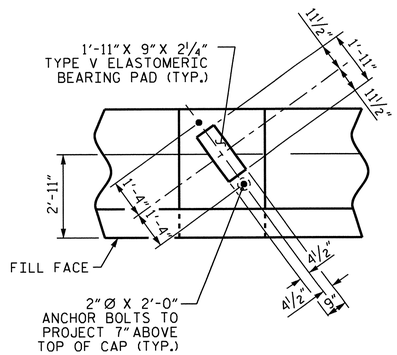


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



DETAIL A

(TYP. EA. GDR.)

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

DRAWN BY : HARISH SHAH DATE : 04-26-11
CHECKED BY : Q.T. NGUYEN DATE : 07-06-11

24-APR-2012 15:04
R:\Structures\Final Plans\b-4555-01_eb.dgn
asorsenginh

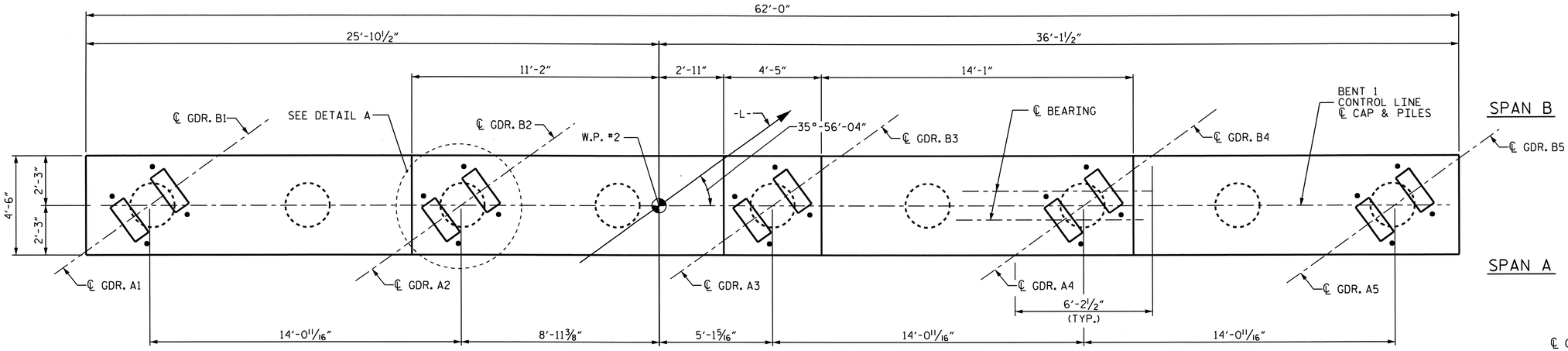
NOTE

STIRRUPS & U1 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

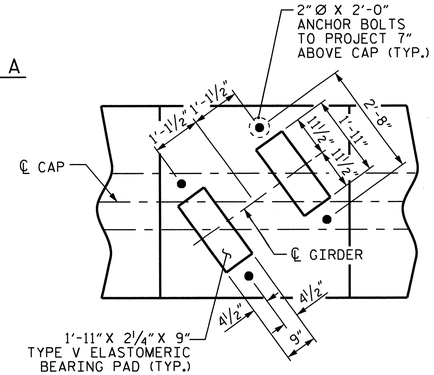
FOR VIEW X-X, SEE SHEET 4 OF 4.

GALVANIZE THE TOP 43 FEET OF EACH INTERIOR BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

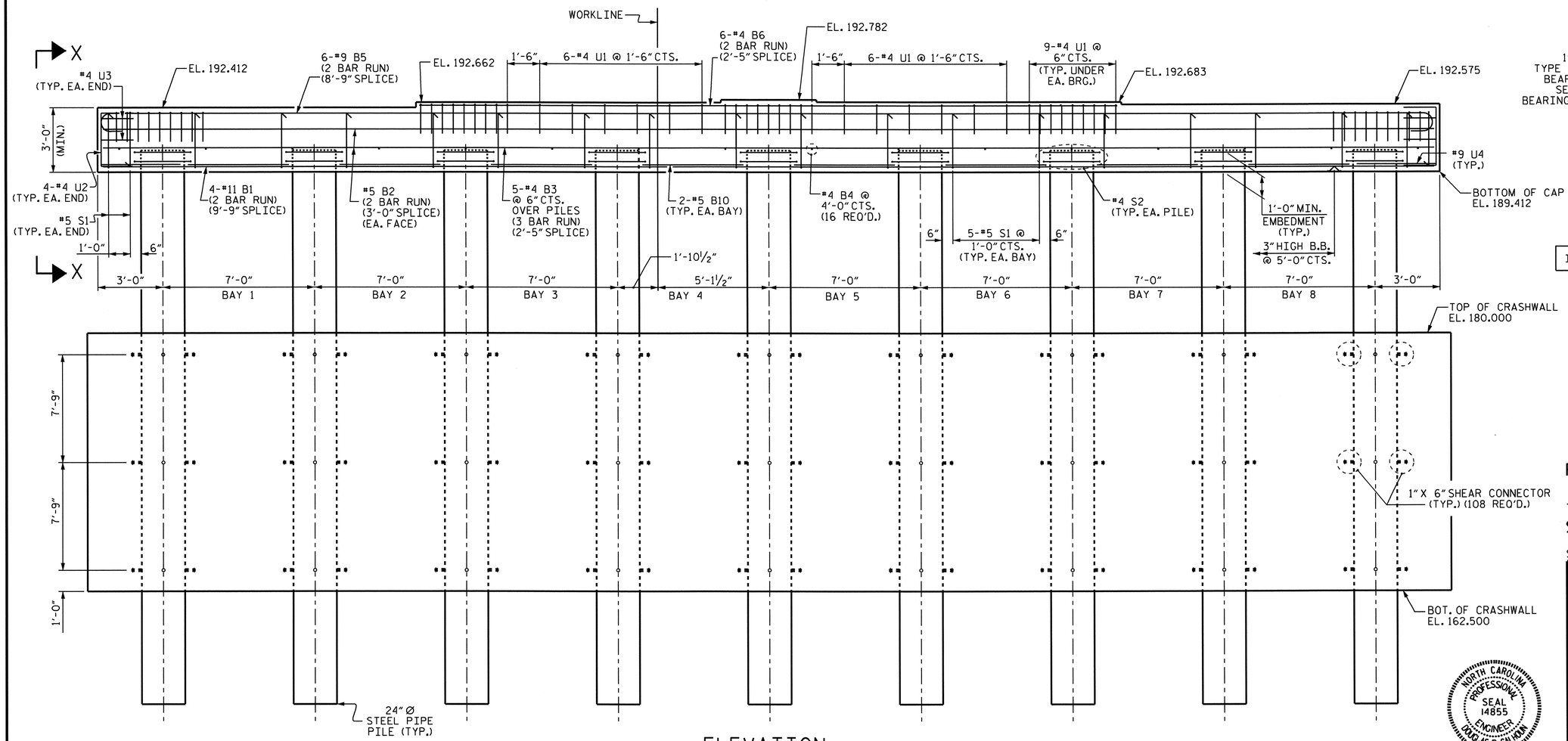


PLAN

CRASHWALL NOT SHOWN FOR CLARITY



DETAIL A



INVERT ALTERNATE STIRRUPS

ELEVATION

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
A-24-12

DRAWN BY : QT NGUYEN DATE : 9-19-11
CHECKED BY : W.F. PARKER DATE : 10-11

24-APR-2012 15:07
R:\Structures\Final Plans\B4555_SD_B*.dgn
asorsenglmh

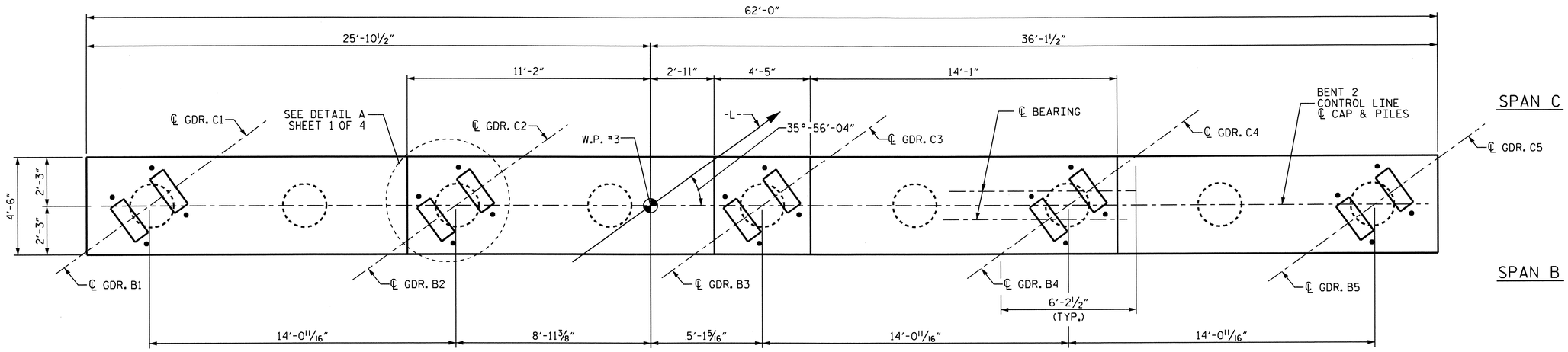
NC80S

NOTE

STIRRUPS & U1 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

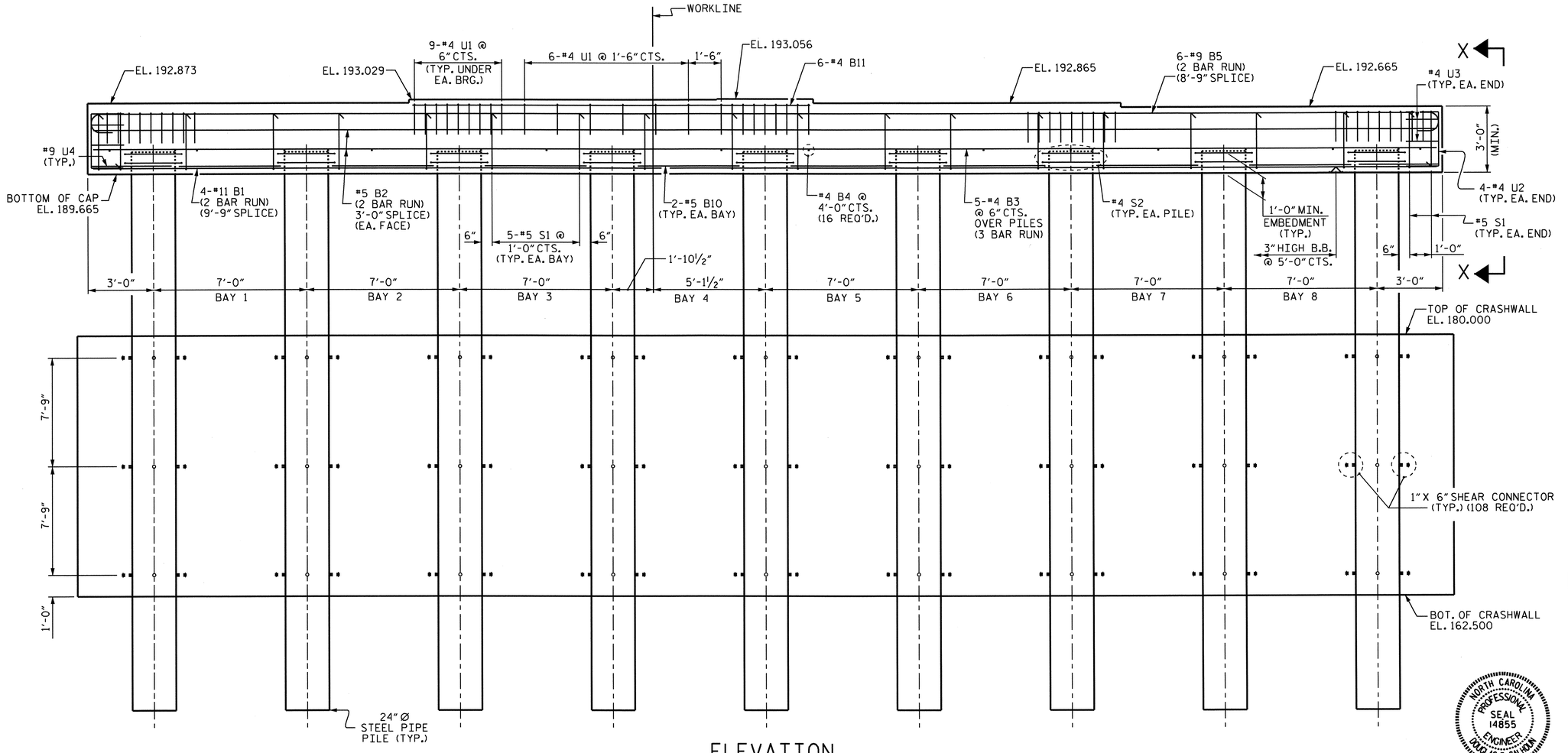
FOR VIEW X-X, SEE SHEET 4 OF 4.

GALVANIZE THE TOP 43 FEET OF EACH INTERIOR BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



PLAN

CRASHWALL NOT SHOWN FOR CLARITY



ELEVATION

INVERT ALTERNATE STIRRUPS

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

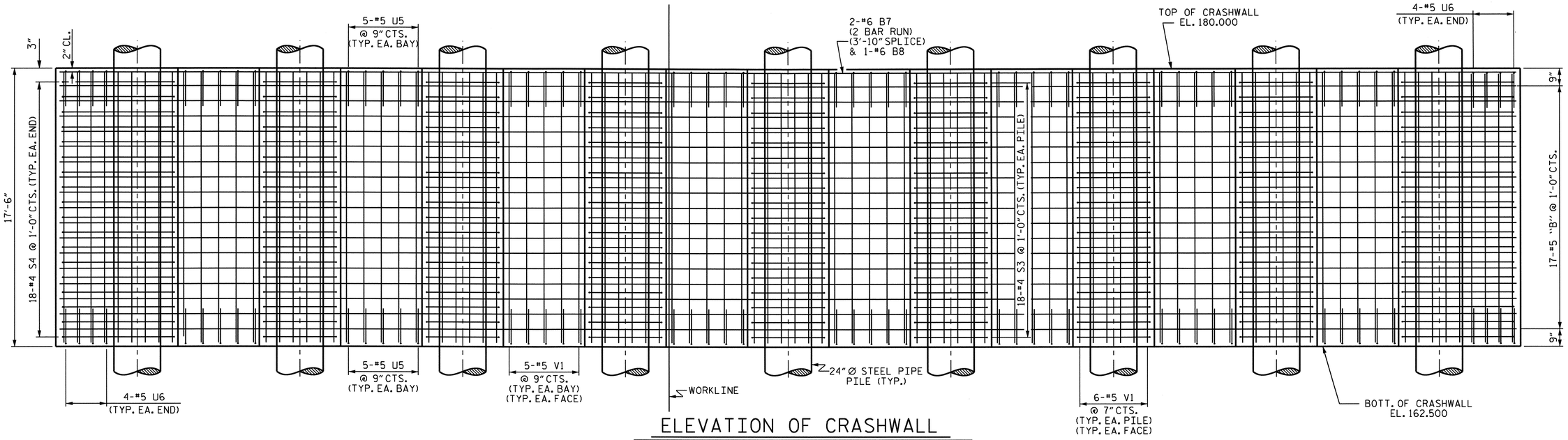
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS B. CALHOUN
8-4-12

DRAWN BY : QT NGUYEN DATE : 9-19-11
CHECKED BY : W.F. PARKER DATE : 10-11

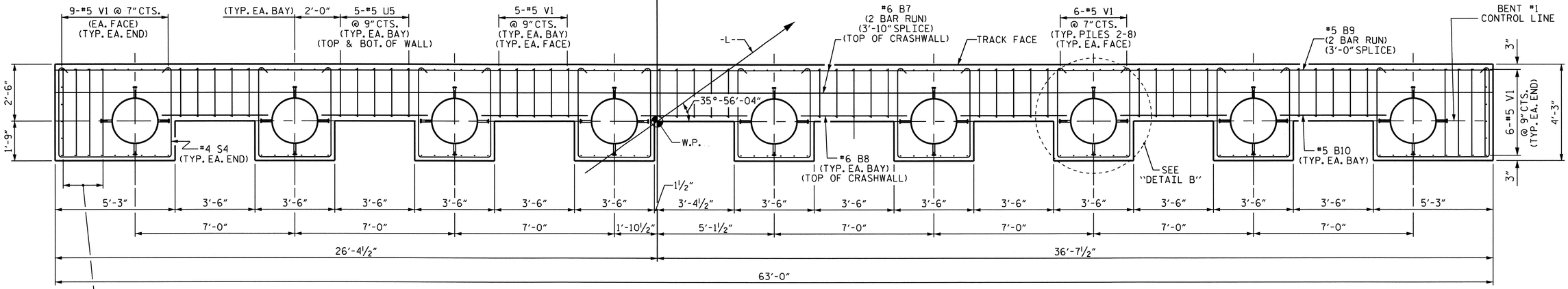
04-JUN-2012 11:57
R:\Structures\Final Plans\B4555_SD_B*.dgn
asorsenginh

NCDOT

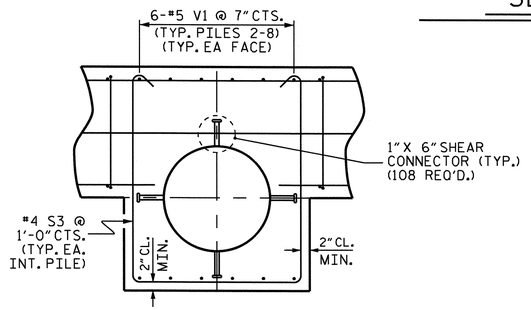


ELEVATION OF CRASHWALL

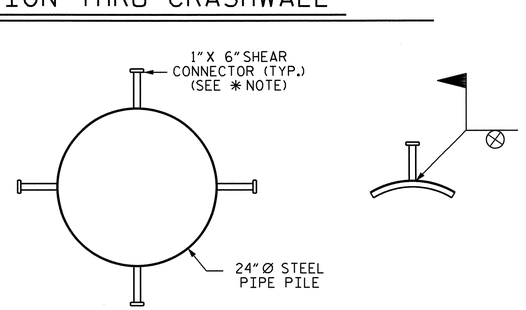
(SHEAR CONNECTORS NOT SHOWN FOR CLARITY)



SECTION THRU CRASHWALL



DETAIL B



SHEAR STUD DETAIL

* NOTE: SHEAR STUDS ARE TO BE FIELD WELDED AFTER INSTALLTION OF PIPE PILES.

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS B. CALVERT
6-4-12

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

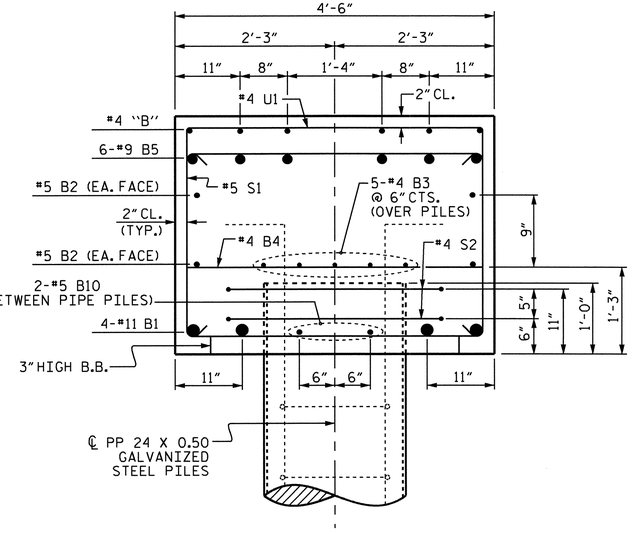
BENTS 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : QTN/MKT DATE : 11-15-11
CHECKED BY : W.F. PARKER DATE : 10-11

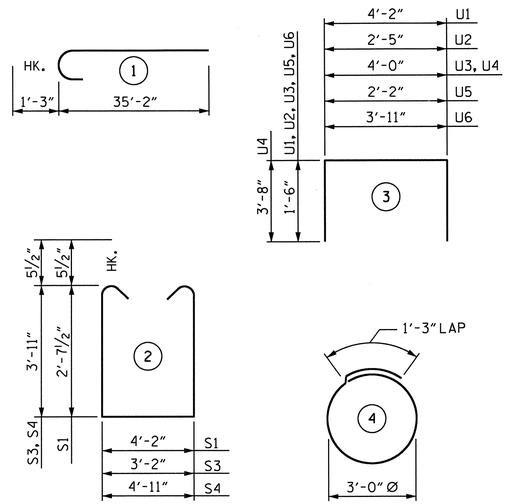
04-JUN-2012 11:58
R:\Structures\FinalPlans\B4555_SD_B*.dgn
asorsenginh

NCDOT



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	STR	35'-8"	1516
B2	8	#5	STR	32'-4"	270
B3	15	#4	STR	22'-2"	222
B4	16	#4	STR	4'-2"	45
B5	12	#9	1	36'-5"	1486
B6	12	#4	STR	17'-4"	139
B7	4	#6	STR	33'-3"	200
B8	8	#6	STR	4'-8"	56
B9	34	#5	STR	32'-10"	1164
B10	152	#5	STR	4'-8"	740
S1	44	#5	2	10'-4"	474
S2	18	#4	4	10'-8"	128
S3	126	#4	2	11'-11"	1003
S4	36	#4	2	13'-8"	329
U1	57	#4	3	7'-2"	273
U2	8	#4	3	5'-5"	29
U3	4	#4	3	7'-0"	19
U4	2	#9	3	11'-4"	77
U5	80	#5	3	5'-2"	431
U6	16	#5	3	6'-11"	115
V1	208	#5	STR	17'-2"	3724

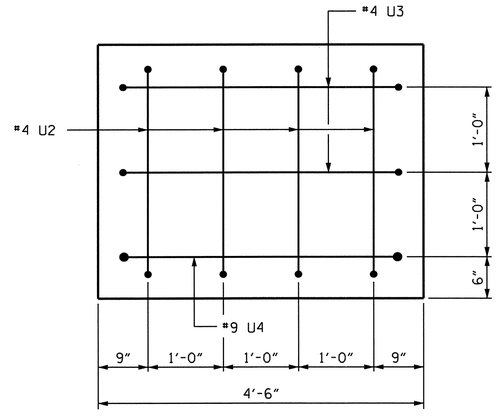
REINFORCING STEEL	12,440	LBS.
CLASS A CONCRETE		
CAP	31.8	C.Y.
CRASHWALL	123.5	C.Y.
TOTAL	155.3	C.Y.
PP 24 X 0.50 GALVANIZED STEEL PILES		
NO. = 9	585	LIN. FT.
PDA TESTING	EA.	1

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	STR	35'-8"	1516
B2	8	#5	STR	32'-4"	270
B3	15	#4	STR	22'-2"	222
B4	16	#4	STR	4'-2"	45
B5	12	#9	1	36'-5"	1486
B7	4	#6	STR	33'-3"	200
B8	8	#6	STR	4'-8"	56
B9	34	#5	STR	32'-10"	1164
B10	152	#5	STR	4'-8"	740
B11	6	#4	STR	18'-2"	73
S1	44	#5	2	10'-4"	474
S2	18	#4	4	10'-8"	128
S3	126	#4	2	11'-11"	1003
S4	36	#4	2	13'-8"	329
U1	57	#4	3	7'-2"	273
U2	8	#4	3	5'-5"	29
U3	4	#4	3	7'-0"	19
U4	2	#9	3	11'-4"	77
U5	80	#5	3	5'-2"	431
U6	16	#5	3	6'-11"	115
V1	208	#5	STR	17'-2"	3724

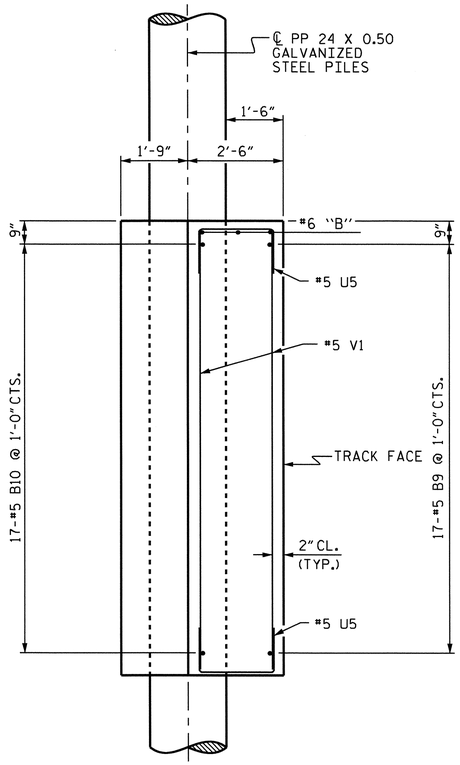
REINFORCING STEEL	12,374	LBS.
CLASS A CONCRETE		
CAP	32.1	C.Y.
CRASHWALL	123.5	C.Y.
TOTAL	155.6	C.Y.
24 X 0.50 GALVANIZED STEEL PILES		
NO. = 9	630	LIN. FT.
PDA TESTING	EA.	1

NOTE: CONCRETE DISPLACED BY PIPE PILES HAS BEEN DEDUCTED

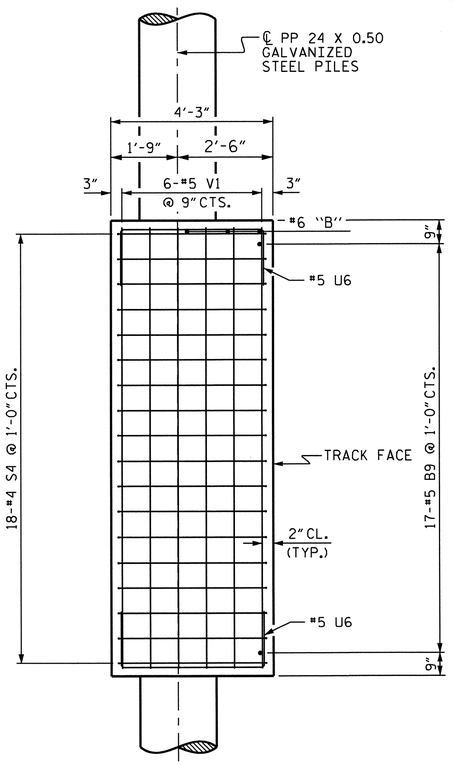


VIEW X-X

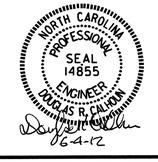
(TYP. BOTH ENDS)



SECTION THRU WALL



END VIEW OF WALL



PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

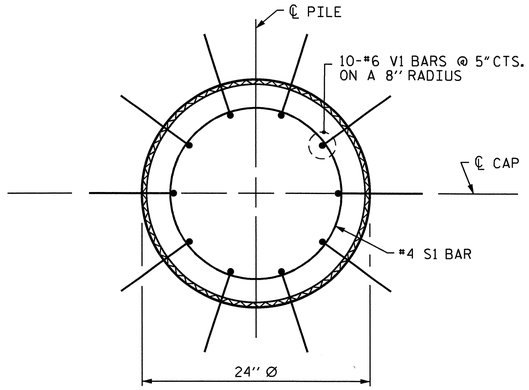
BENTS 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			37

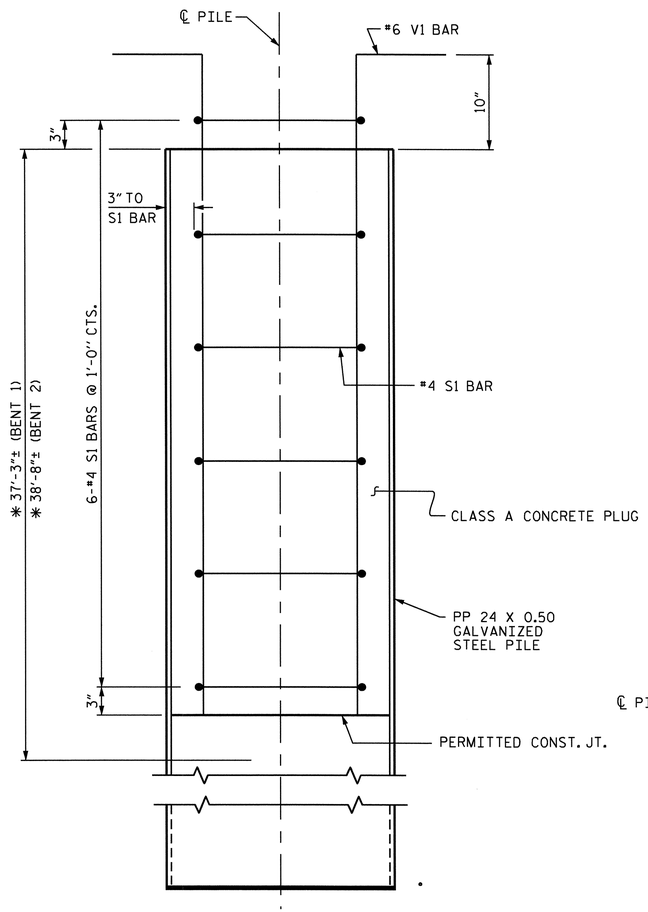
DRAWN BY : QTN/MKT DATE : 11-15-11

CHECKED BY : W.F. PARKER DATE : 10-11

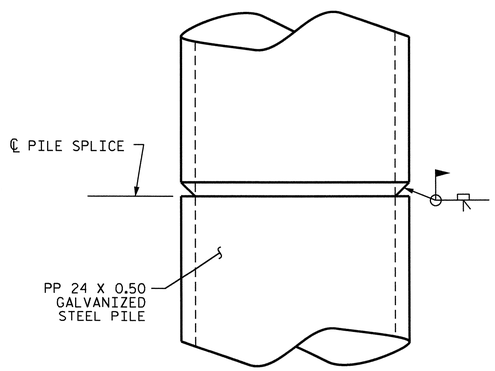
04-JUN-2012 11:59
R:\Structures\Final Plans\B4555_SD_B*.dgn
asorsenginh



PLAN



ELEVATION



PIPE PILE SPLICE DETAIL

PP 24 X 0.50 GALVANIZED STEEL PILE

(OPEN OR CLOSED END)

NOTES

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

GALVANIZE UPPER PORTION OF STEEL PIPE PILES AS INDICATED ON THE BENT PLANS IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. GALVANIZING PIPE PILE PLATES IS NOT REQUIRED.

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.

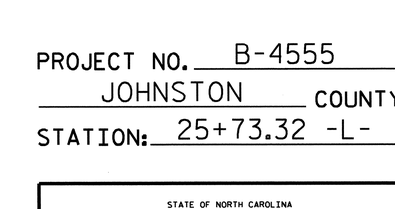
* CONCRETE PLUG CONCRETE QUANTITY IS ESTIMATED ON PILE LENGTH MINUS 75% OF PILE EMBEDMENT. IT IS ESTIMATED THAT THERE WILL BE A 25% SOIL DRAW DOWN DURING PILE DRIVING. QUANTITIES PER PILE MAY VARY.

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

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
65'-0" PILE PLUG 4.0 CY
70'-0" PILE PLUG 4.1 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

24" STEEL PIPE PILE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

STD. NO. SPP4

ASSEMBLED BY : OT NGUYEN DATE : 9-19-11	
CHECKED BY : W.F. PARKER DATE : 10-11	
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

24-APR-2012 15:08
R:\Structures\Final Plans\B4555_SD_B*.dgn
asorsenginh

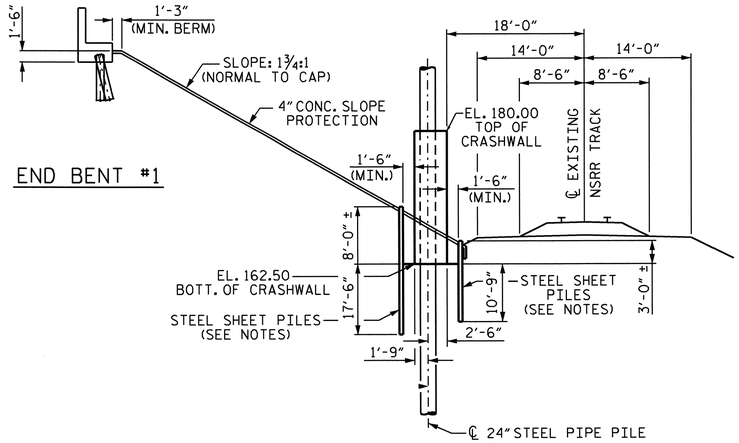
NOTES

FOR TEMPORARY RAILROAD SHORING, SEE SPECIAL PROVISIONS.

ALL SHEET PILES HAVE A MINIMUM SECTION MODULUS OF 31.0 in³ PER FOOT OF WALL AND SHALL CONFORM TO ASTM A328 WITH A MINIMUM YIELD STRENGTH OF 39 KSI.

STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

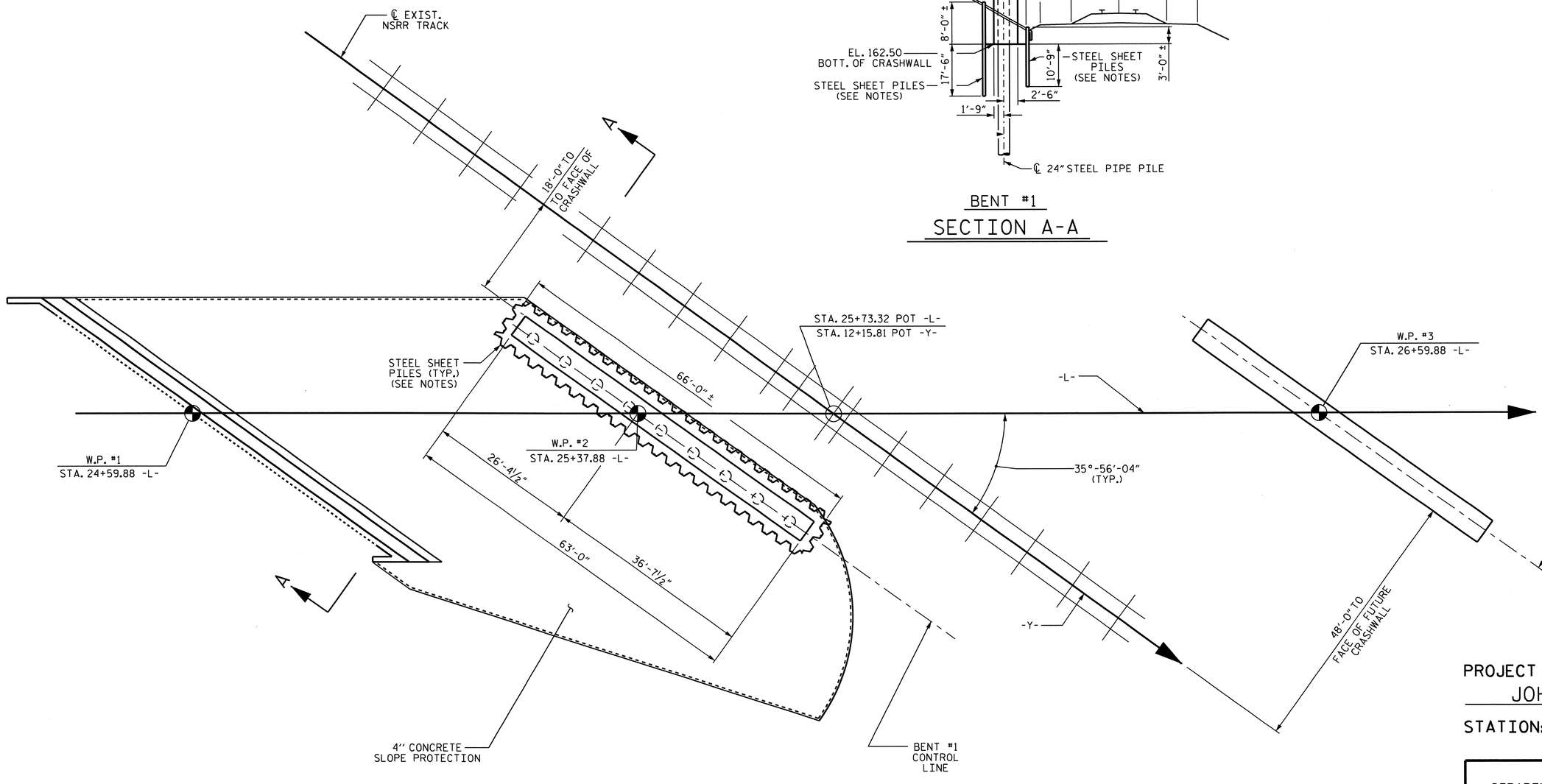
THE CONTRACTOR SHALL INSTALL APPROPRIATE SAFETY FENCING AROUND THE PROPOSED EXCAVATION AREA. SAFETY FENCING SHALL REMAIN IN PLACE UNTIL THE REMOVAL OF THE STEEL SHEET PILES.



END BENT #1

BENT #1

SECTION A-A



PLAN

SHOWING RELATIONSHIP OF SHORING TO RAILROAD
(CAP NOT SHOWN FOR CLARITY)

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

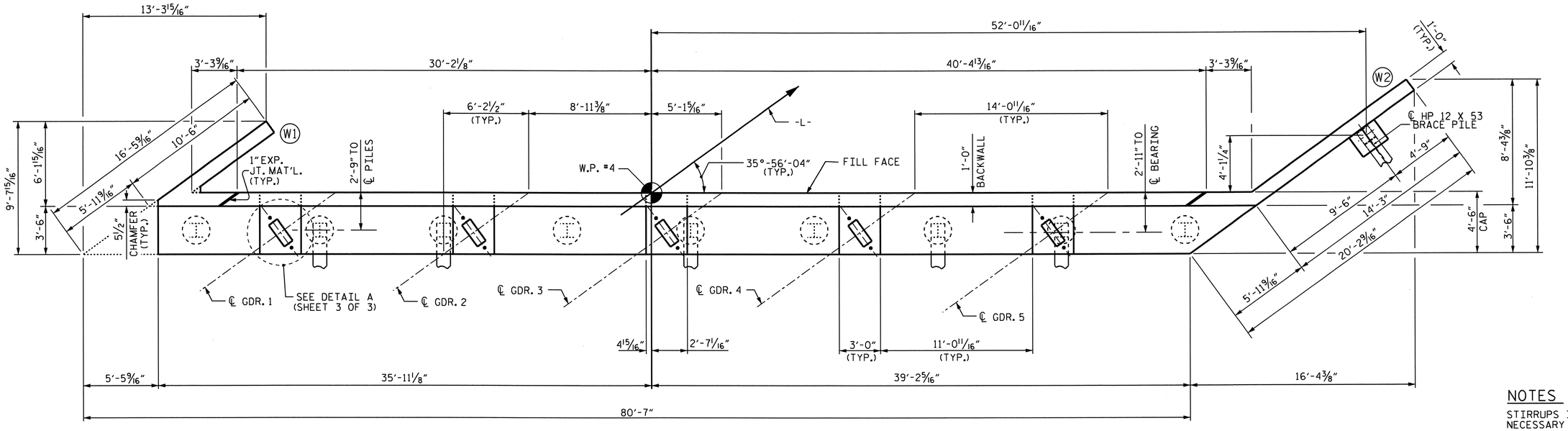
BENT 1 TEMPORARY SHORING

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

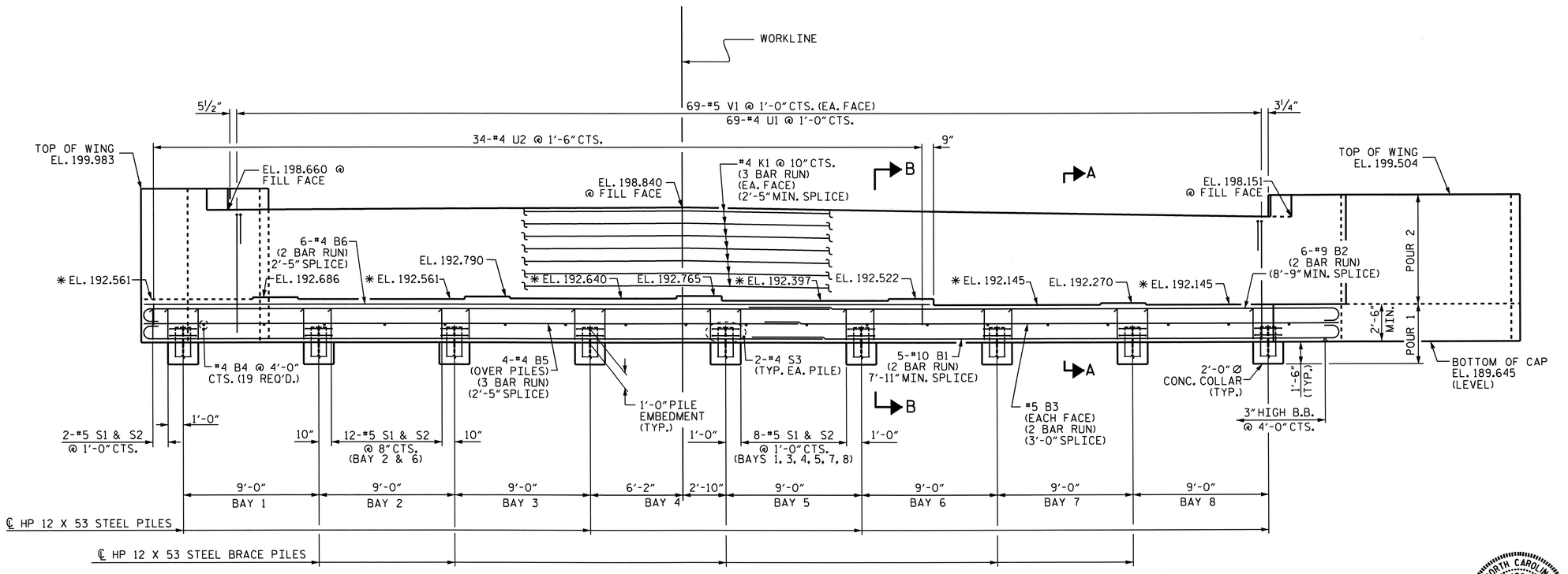
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3(
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : K. P. SEDAI DATE : 3/23/12
CHECKED BY : W. S. ARAFAT DATE : 3/23/12

24-APR-2012 15:08
R:\Structures\Final Plans\B4555_SD_B*.dgn
asorsenglnh



PLAN



ELEVATION

WING PILE NOT SHOWN FOR CLARITY

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE SHEET 3 OF 3.

NOTES

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

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDENCE ITH 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-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

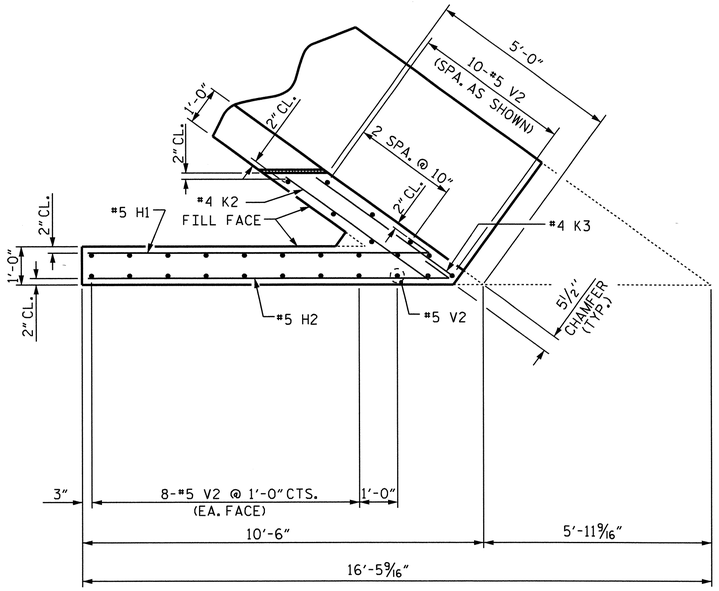
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			37

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
04-24-12

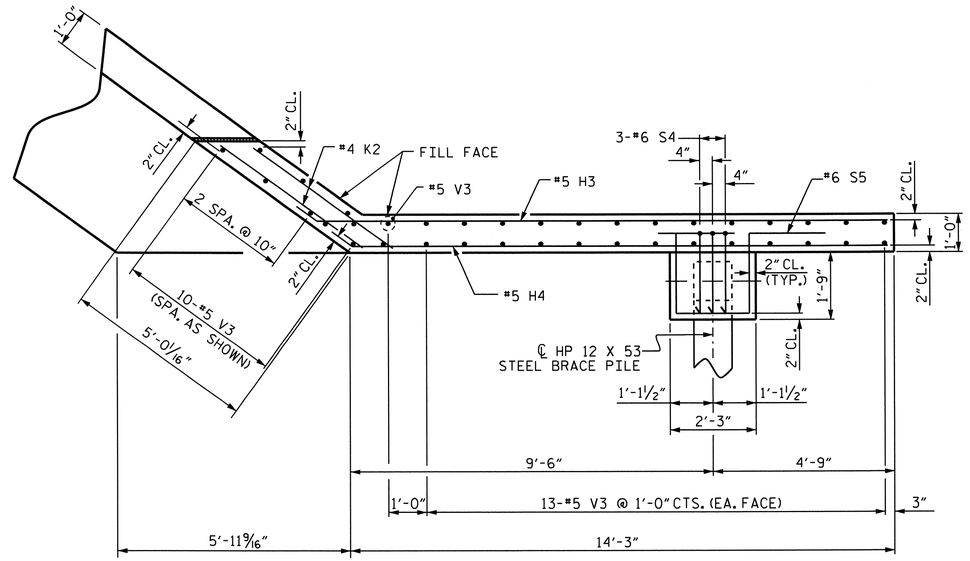
DRAWN BY : HARISH SHAH DATE : 04-14-11
CHECKED BY : O.T. NGUYEN DATE : 07-06-11

24-APR-2012 15:05
R:\Structures\Final Plans\b-4555-01_eb.dgn
asarsenglnh

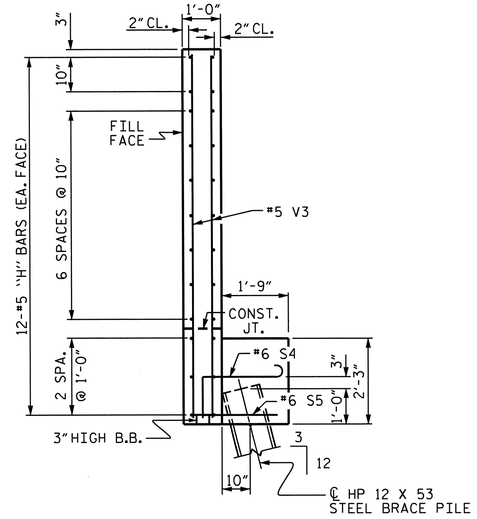


PLAN OF WING (W1)

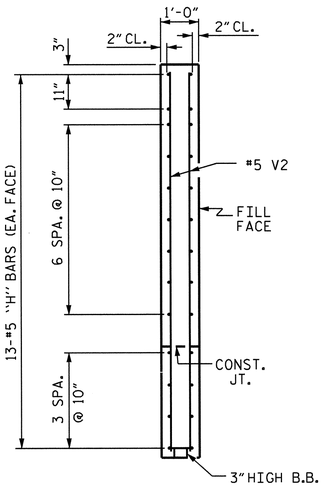
#4 K2 & #4 K3 FIELD CUT AS NECESSARY TO GIVE 2" MIN. CLEARENCE FROM CHAMFER.



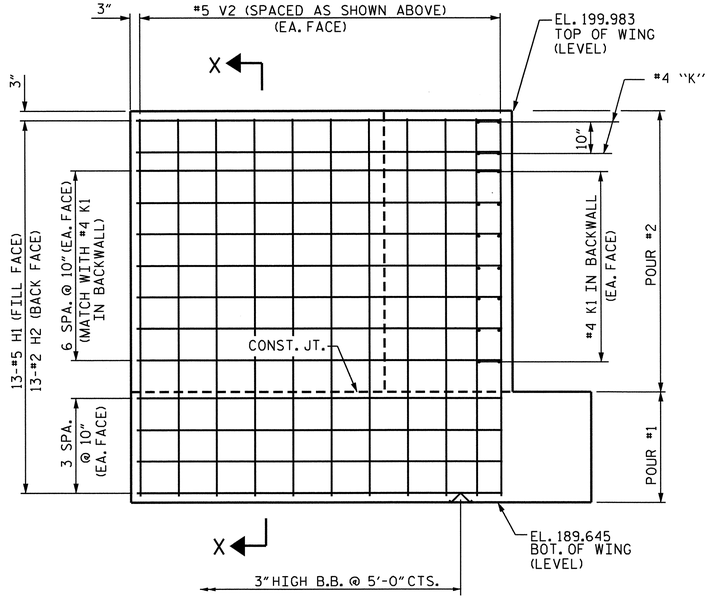
PLAN OF WING (W2)



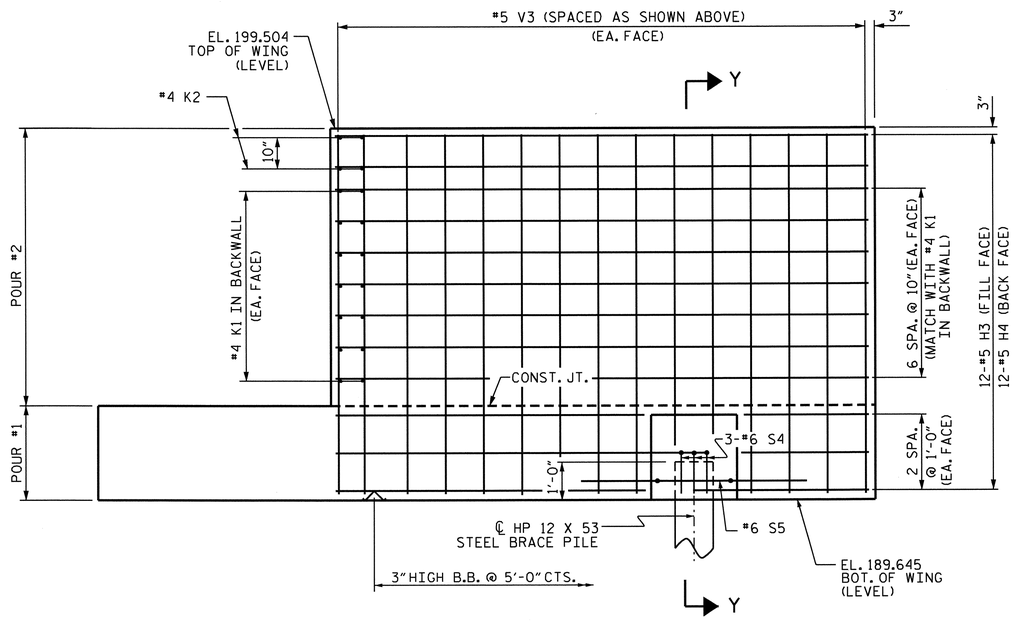
SECTION Y-Y



SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

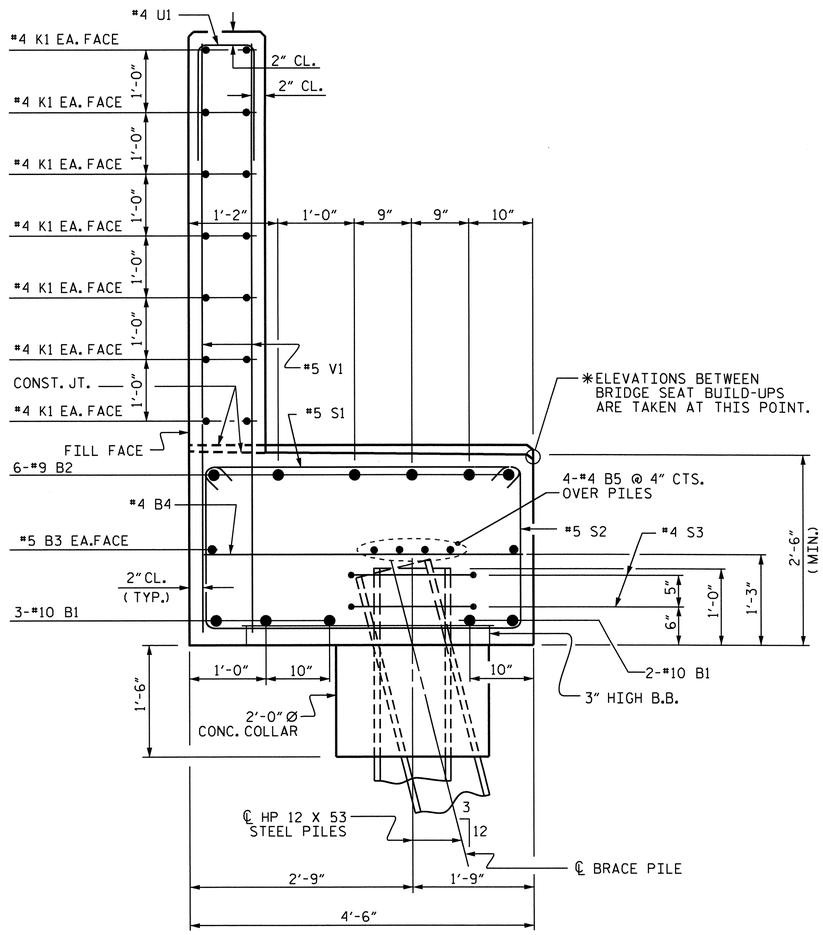
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			37

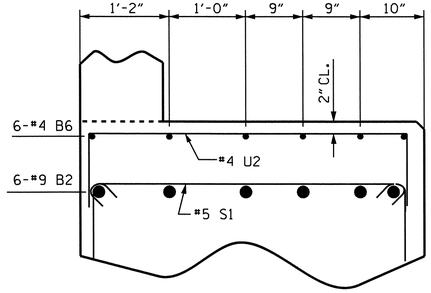
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALLEN
4-24-12

DRAWN BY : HARISH SHAH DATE : 04-15-11
CHECKED BY : O.T. NGUYEN DATE : 07-06-11

24-APR-2012 15:05
R:\Structures\Final Plans\b-4555-01_eb.dgn
asorsenginn



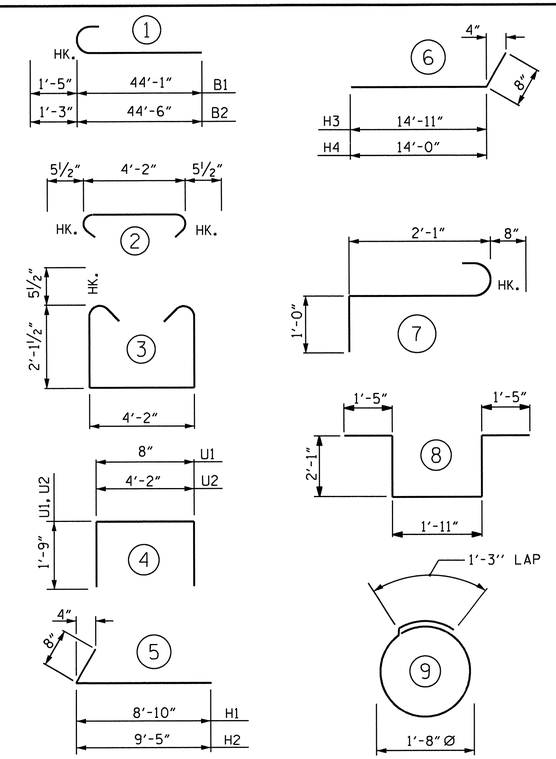
SECTION A-A



PARTIAL SECTION B-B

#5 V1 BARS NOT SHOWN FOR CLARITY.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	1	45'-6"	1958
B2	12	#9	1	45'-9"	1867
B3	4	#5	STR	41'-8"	174
B4	19	#4	STR	4'-2"	53
B5	12	#4	STR	28'-5"	228
B6	12	#4	STR	25'-10"	207
H1	13	#5	5	9'-6"	129
H2	13	#5	5	10'-1"	137
H3	12	#5	6	15'-7"	195
H4	12	#5	6	14'-8"	184
K1	42	#4	STR	28'-5"	797
K2	6	#4	STR	4'-5"	18
K3	2	#4	STR	4'-1"	5
S1	74	#5	2	5'-1"	392
S2	74	#5	3	9'-4"	720
S3	18	#4	9	6'-6"	78
S4	3	#6	7	3'-9"	17
S5	1	#6	8	8'-11"	13
U1	69	#4	4	4'-2"	192
U2	34	#4	4	7'-8"	174
V1	138	#5	STR	8'-2"	1175
V2	27	#5	STR	10'-0"	282
V3	37	#5	STR	9'-6"	367

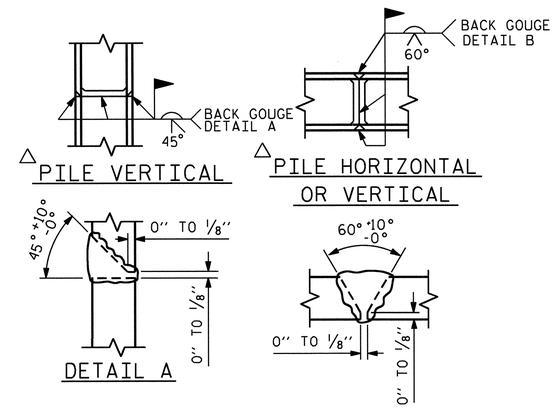
REINFORCING STEEL 9,362 LBS

CLASS A CONCRETE

POUR 1 (CAP & LOWER WINGS & COLLARS)	42.9 C.Y.
POUR 2 (BACKWALL & UPPER WINGS)	23.1 C.Y.
TOTAL	66.0 C.Y.

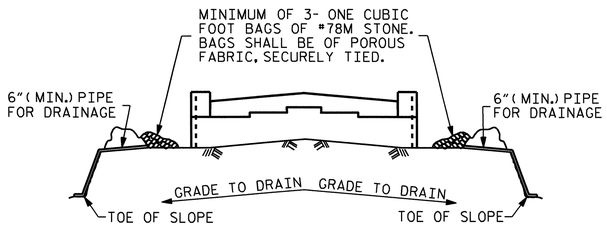
HP 12 X 53 STEEL PILES

NUMBER = 10 LIN. FT. = 650



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

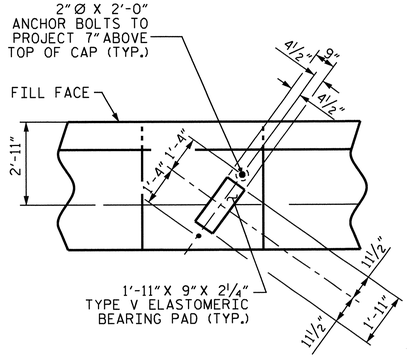


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



DETAIL A

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -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			37

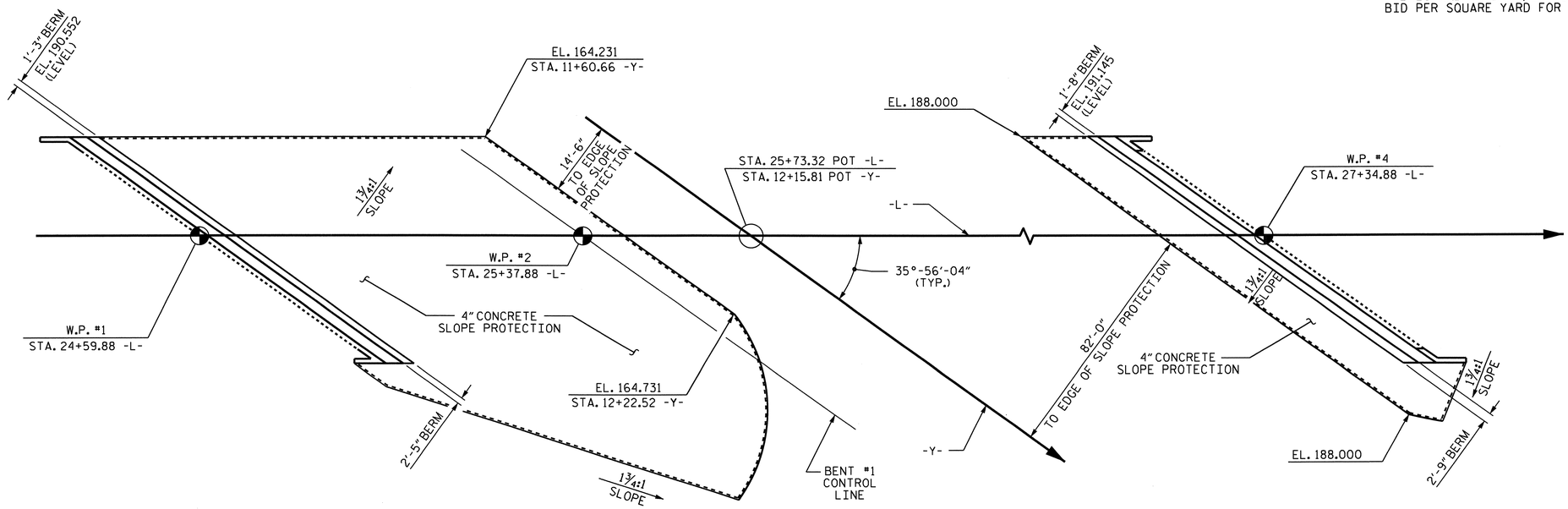
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

DRAWN BY : HARISH SHAH DATE : 04-26-11
CHECKED BY : O.T. NGUYEN DATE : 07-06-11

24-APR-2012 15:06
R:\Structures\Final Plans\b-4555-01_eb.dgn
asorsenginh

NOTES

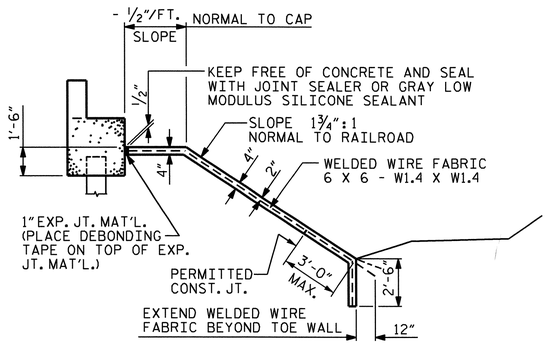
SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION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



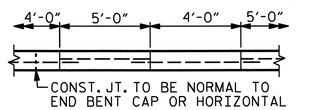
PLAN

BRIDGE @ STA. 25+73.32 -L-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	570	1026
END BENT 2	130	234

* QUANTITY SHOWN IS BASED ON 5' POURS.

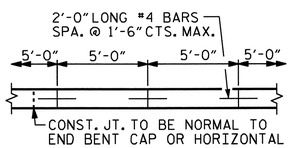


SECTION ALONG ℄ ROADWAY WHEN FILL CATCHES IN DITCH



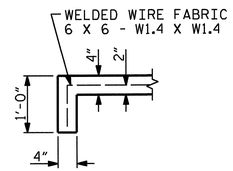
POUR A 4'-0'' STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

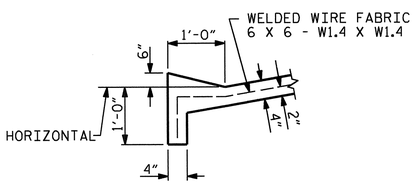


STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



SECTION A-A



SECTION B-B

PROJECT NO. B-4555
JOHNSTON COUNTY
STATION: 25+73.32 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

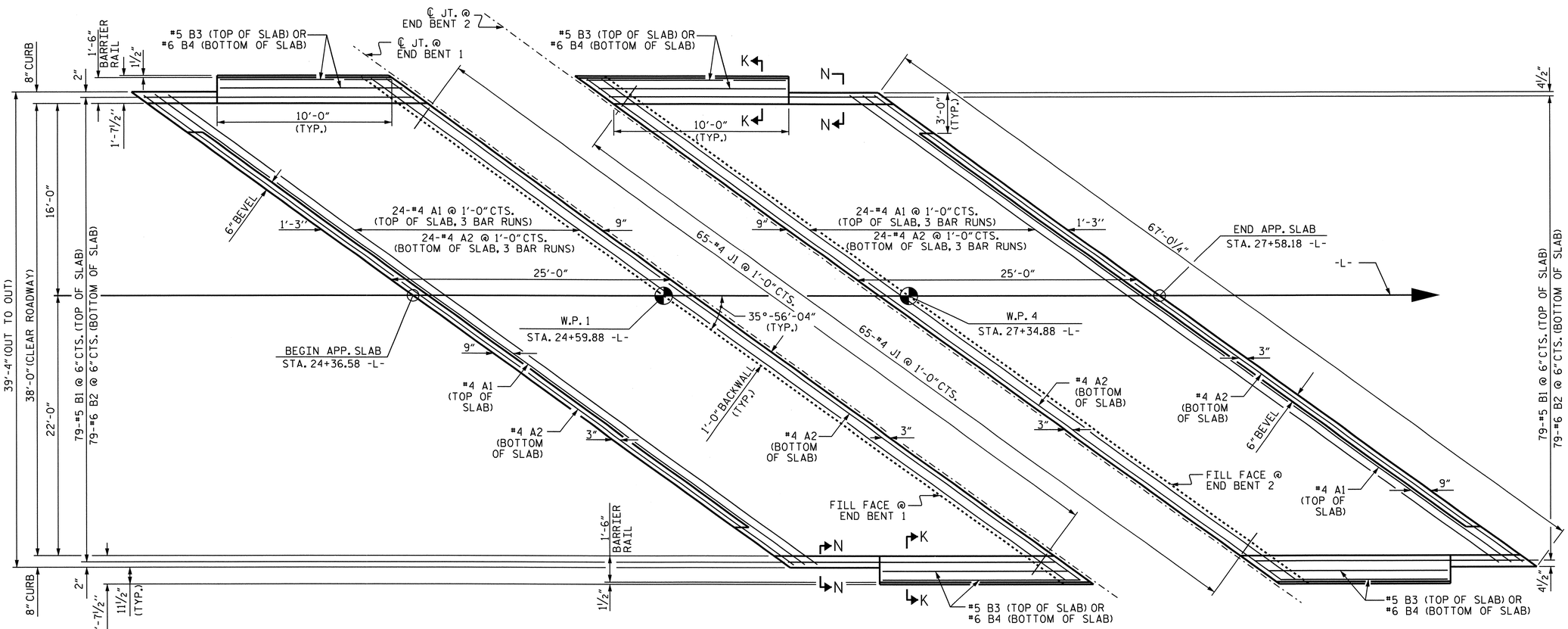
SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			37

ASSEMBLED BY : DGE/H. SHAH	DATE : 3/2012
CHECKED BY : DRC/W.F. PARKER	DATE : 3/2012
DRAWN BY : ELR 5/92	REV. 5/1/06 TLA/GM
CHECKED BY : GRP 6/92	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

24-APR-2012 15:10
R:\Structures\FinalPlans\b-4555-01_sp.dgn
asorsenginh

STD. NO. SP1 (SHT 2)

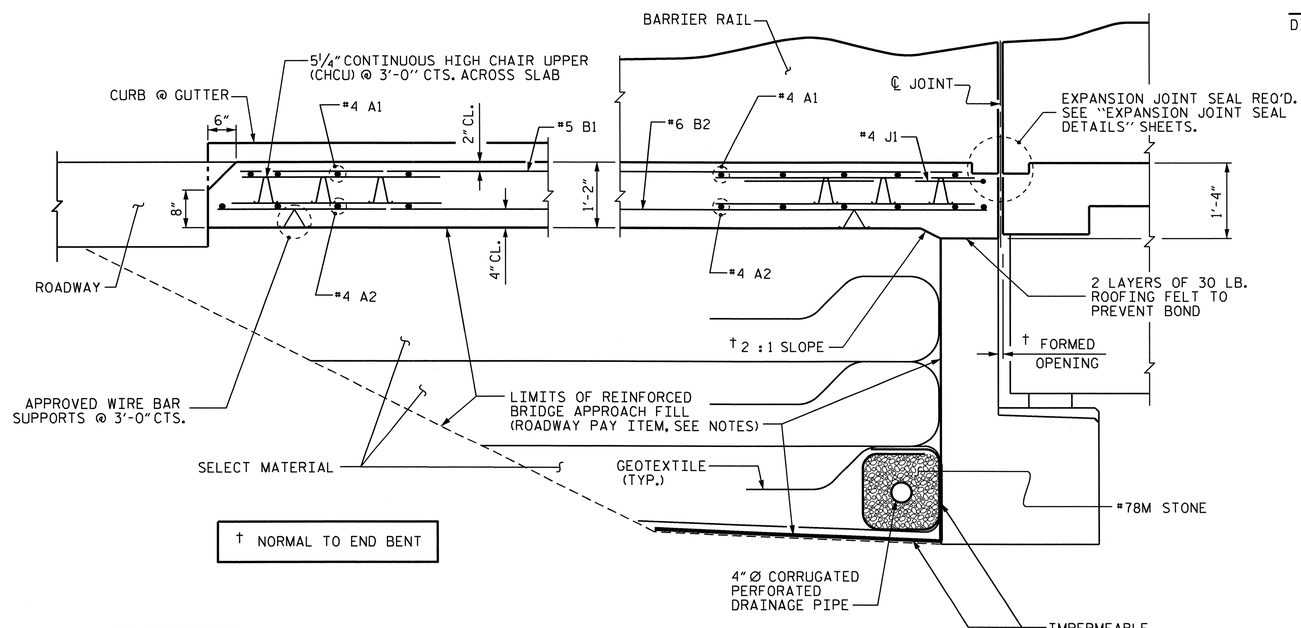


AT END BENT 1

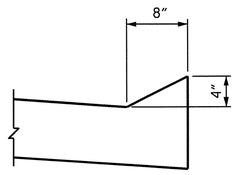
AT END BENT 2

PLAN

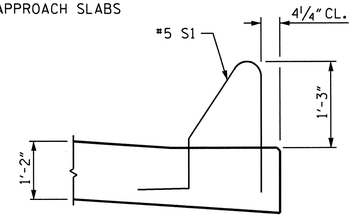
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



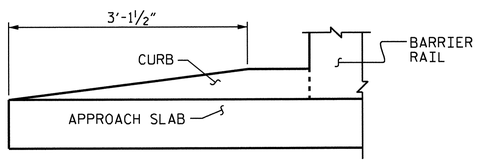
SECTION THRU SLAB



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

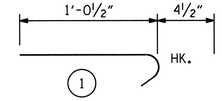
CURB DETAILS

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	75	#4	STR	24'-6"	1227
A2	78	#4	STR	24'-4"	1268
* B1	79	#5	STR	23'-4"	1923
B2	79	#6	STR	24'-5''	2897
* B3	4	#5	STR	9'-9"	41
B4	4	#6	STR	9'-9"	59
* J1	65	#4	1	1'-5"	62
REINFORCING STEEL				LBS.	4224
* EPOXY COATED REINFORCING STEEL				LBS.	3253
CLASS AA CONCRETE				C. Y.	43.7

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

QUANTITIES FOR BARRIER RAIL NOT INCLUDED.

SPLICE CHART

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

NOTES

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

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

THE CONCRETE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE CONCRETE BARRIER RAIL QUANTITY FOR THE SUPERSTRUCTURE. FOR QUANTITIES AND DETAILS, SEE SHEET 2 OF 2.

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

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
4-24-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			37

ASSEMBLED BY : HARISH SHAH	DATE : 04-28-11	
CHECKED BY : W.F. PARKER	DATE : 10/11	
DRAWN BY : EEM 3/95	REV. 5/1/06RR	KMM/GM
CHECKED BY : VAP 3/95	REV. 10/1/11	MAA/GM
	REV. 12/21/11	MAA/GM

24-APR-2012 16:59
R:\Structures\Final Plans\b-4555-01_as.dgn
asorsenginh

STD. NO. BAS1 (SHT 4a)

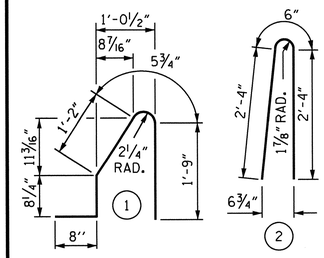
NOTES

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

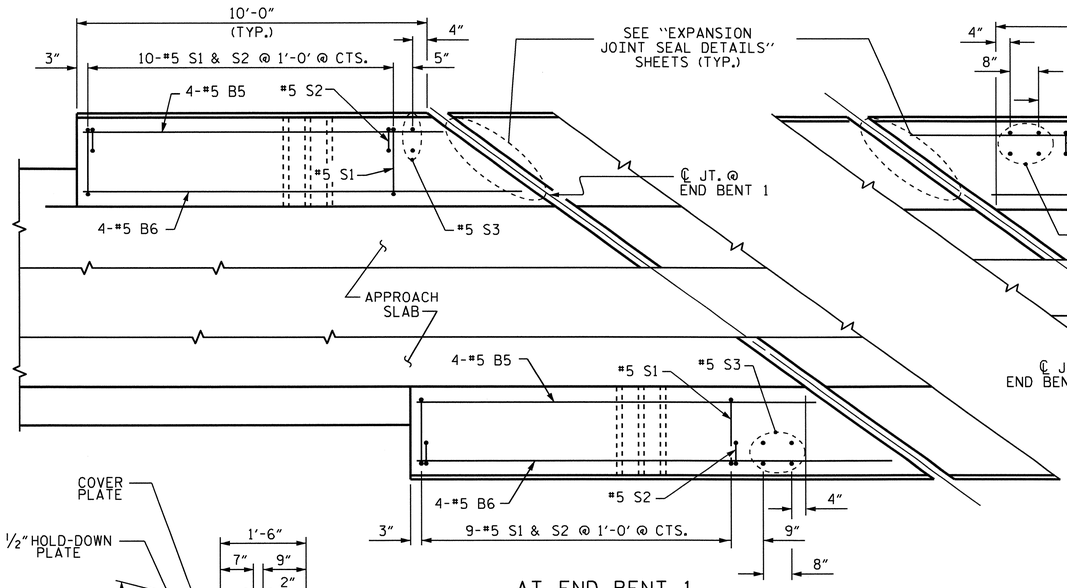
BILL OF MATERIAL

BARRIER RAIL ONLY

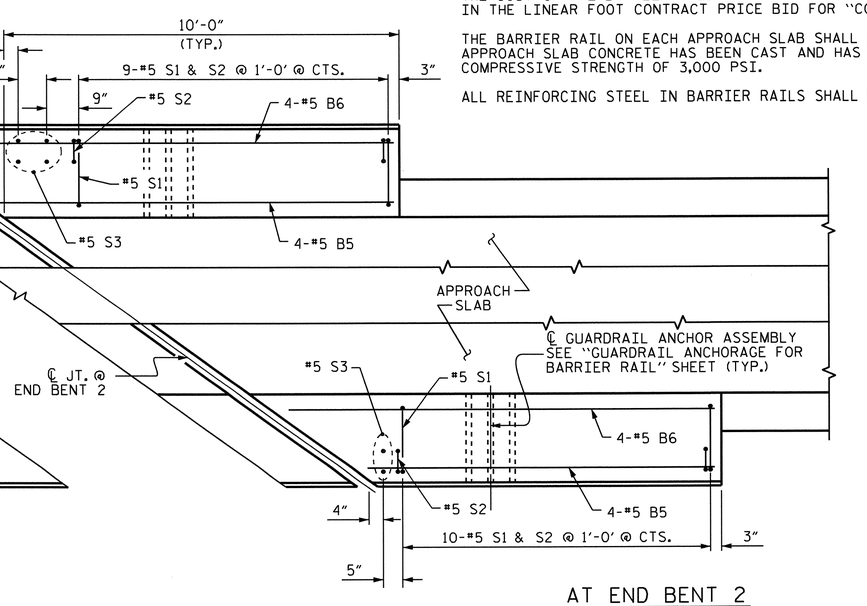
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B5	16	#5	STR	9'-8"	161
✱B6	16	#5	STR	11'-0"	184
✱S1	38	#5	1	4'-9"	188
✱S2	38	#5	2	5'-2"	205
✱S3	12	#5	STR	3'-4"	42

✱EPOXY COATED REINFORCING STEEL	LBS.	780
CLASS AA CONCRETE	C. Y.	4.4
CONCRETE BARRIER RAIL		44.14 LIN. FT.

PAYMENT FOR CONCRETE BARRIER RAIL TO BE INCLUDED IN THE LINEAR FT. QUANTITY ON "CONCRETE BARRIER RAIL" SHEET.



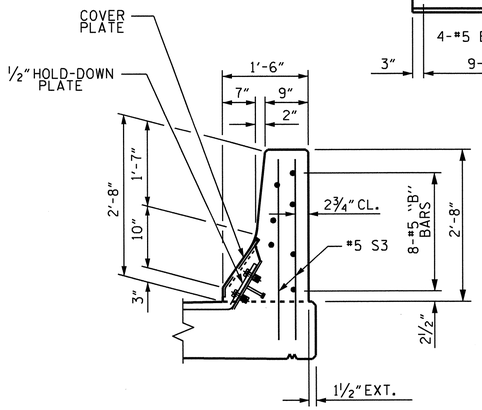
AT END BENT 1



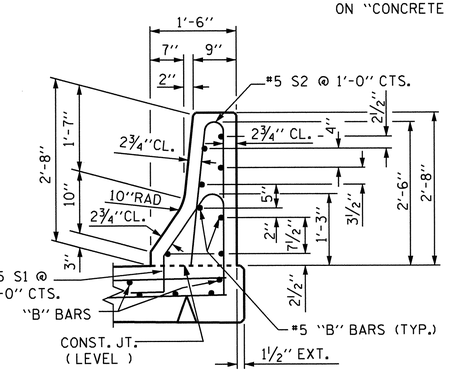
AT END BENT 2

PLAN OF BARRIER RAIL

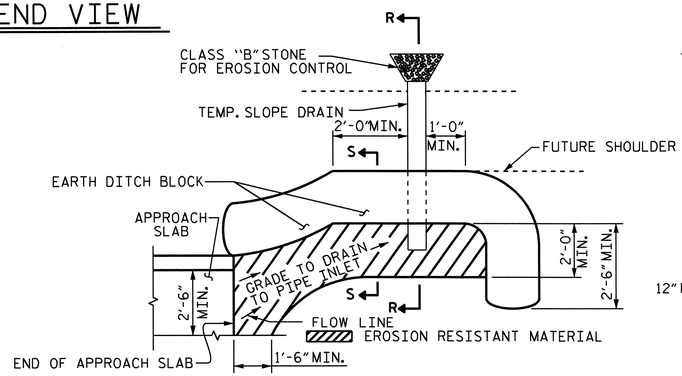
FOR EXPANSION JOINT SEAL, SEE "EXPANSION JOINT SEAL DETAILS" SHEET



END VIEW

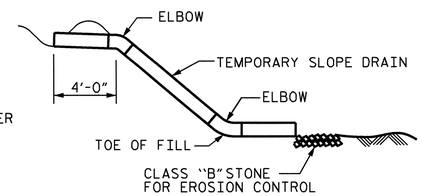


SECTION THRU RAIL

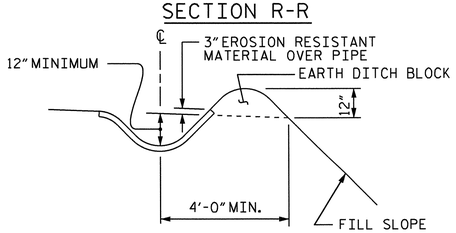


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

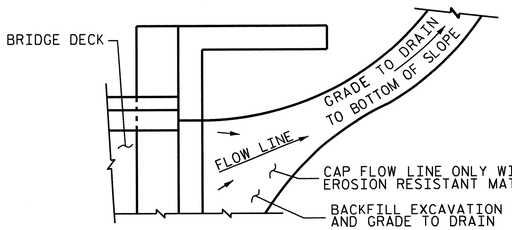
PLAN VIEW



SECTION R-R



SECTION S-S



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)

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN 4-24-12

PROJECT NO. B-4555

JOHNSTON COUNTY

STATION: 25+73.32 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

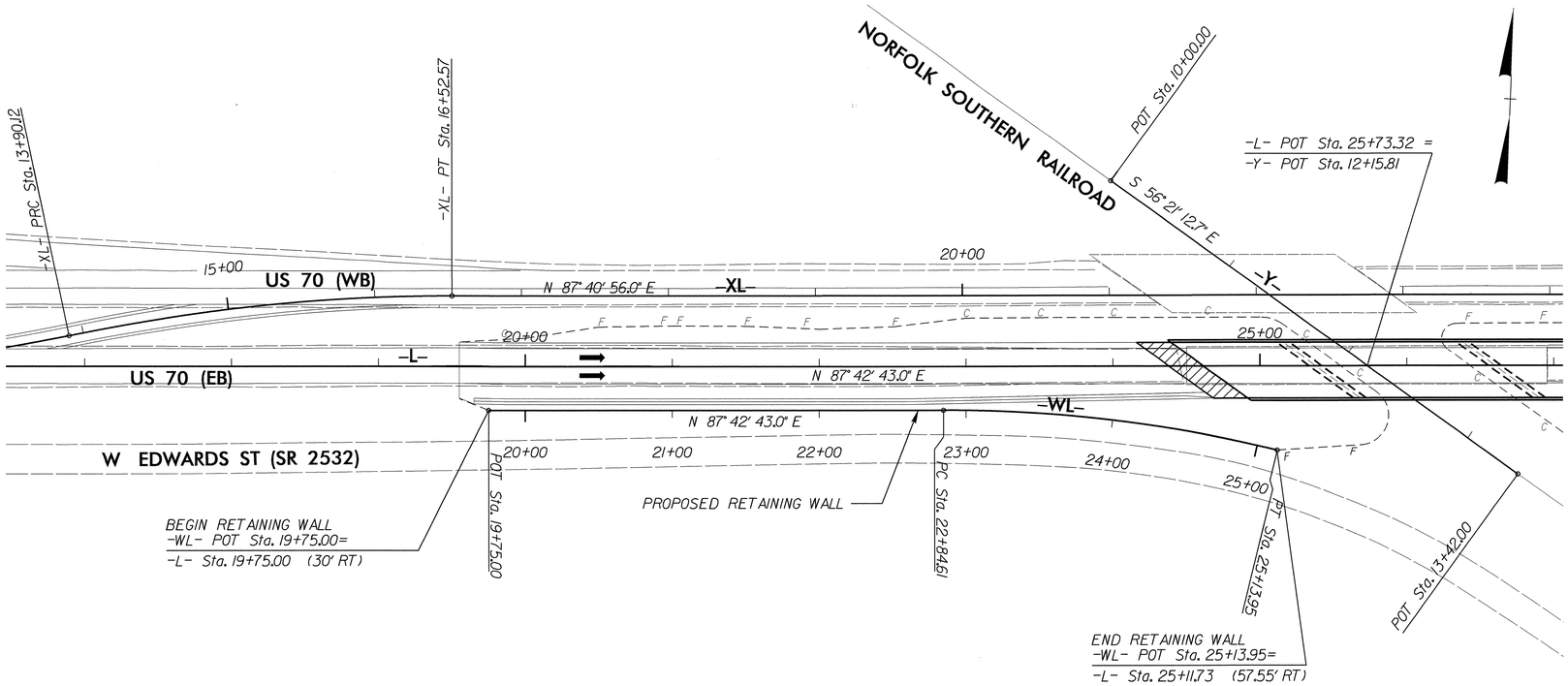
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			37

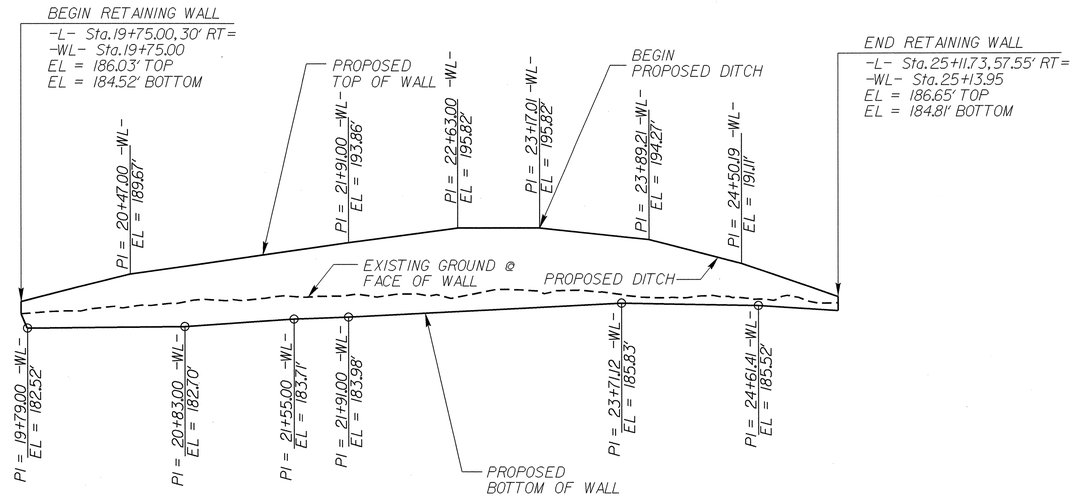
STD. NO. BAS4(SHT 3a)

ASSEMBLED BY : HARISH SHAH		DATE : 04-29-11	
CHECKED BY : W.F. PARKER		DATE : 10/11	
DRAWN BY : FCJ 11/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : ARB 11/88	REV. 5/1/06RRR	MAA/KMM	
	REV. 10/1/11	MAA/GM	

24-APR-2012 15:12
R:\Structures\Final Plans\b-4555-01_as.dgn
asorsenginh

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE SIGNATURE 2/13/12 DATE	SIGNATURE DATE





MSE RETAINING WALL NO. 1	
ESTIMATED QUANTITY	4,300 SQ. FT.

PREPARED BY: D. TEAGUE	DATE: 2/12
REVIEWED BY: E. WILLIAMS	DATE: 2/12

PROJECT NO.: B-4555 (33767.1.1)

JOHNSTON ***COUNTY***

STATION: 19+75.00 -L- TO 25+11.73 -L-

SHEET 1 OF 3

GEOTECHNICAL ENGINEERING UNIT

☐ ***EASTERN REGIONAL OFFICE***

☐ ***WESTERN REGIONAL OFFICE***

☒ ***CONTRACT OFFICE***

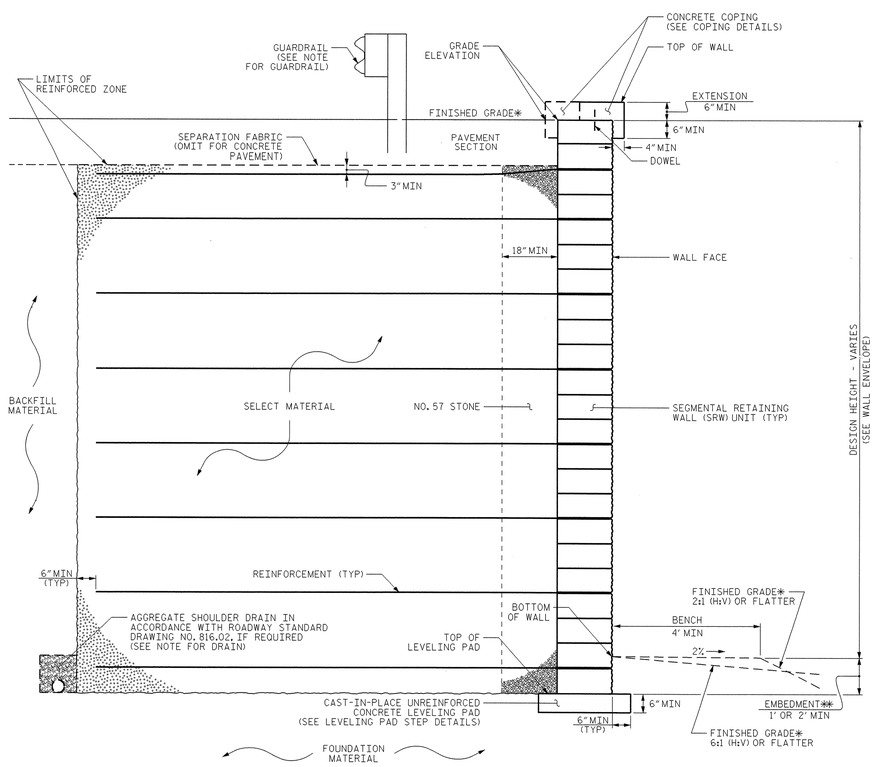
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RETAINING WALL #1
MSE WALL
WALL LAYOUT

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

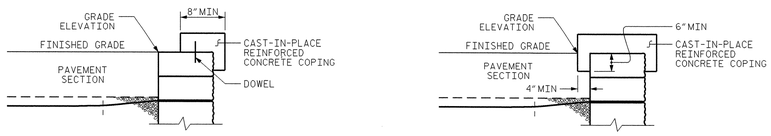
GEC248236 2/13/2012 B4555_GEO_RWALL_Plan Sheet_Layout dteague GEC-Oce860-34bond

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L TEAGUE SIGNATURE 2/13/12 DATE	SIGNATURE DATE



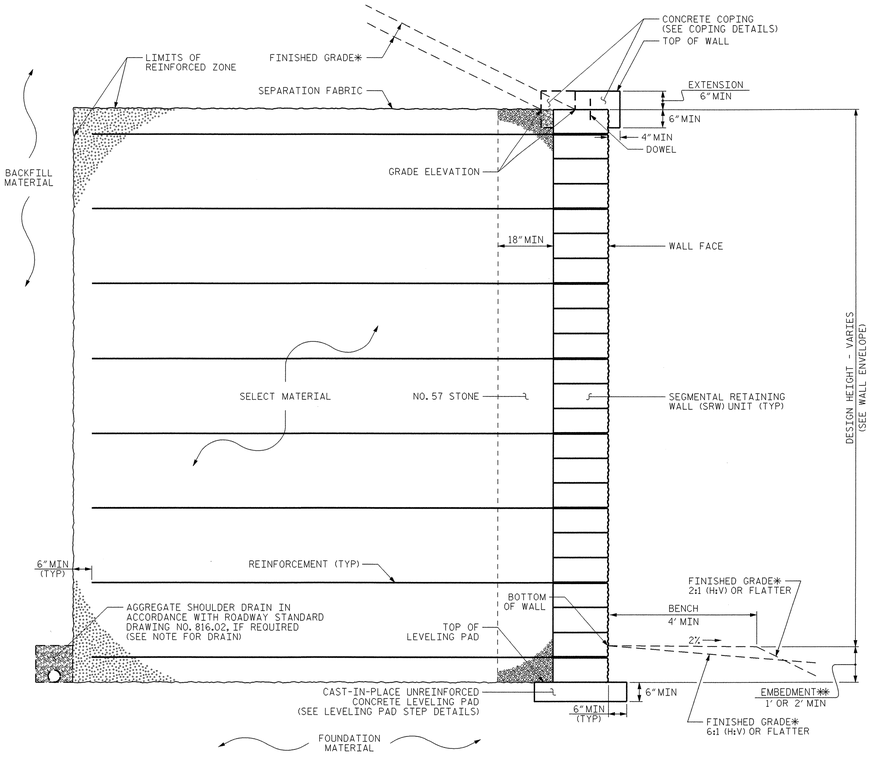
MSE WALL WITH SRW UNITS TYPICAL SECTION STATION 19+75 -WL- TO 23+17.01 -WL-

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



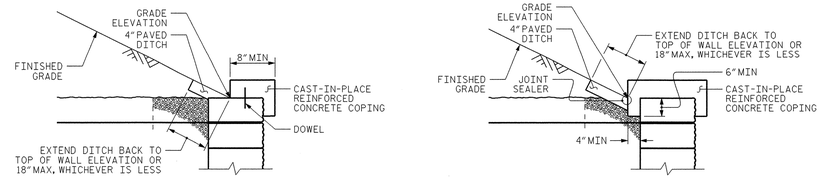
COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO SRW UNITS WITH DOWELS OR EXTEND COPING DOWN BACK OF SRW UNITS.



MSE WALL WITH SRW UNITS TYPICAL SECTION STATION 23+17.01 -WL- TO 25+13.95 -WL-

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



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO SRW UNITS WITH DOWELS OR EXTEND COPING DOWN BACK OF SRW UNITS.

PROJECT NO.: B-4555 (33767.1.1)

JOHNSTON ***COUNTY***

STATION: 19+75.00 -L- TO 25+15.19 -L-

SHEET 2 OF 3

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STD CELL Wall_MSE_Panels_Surcharge_GR

RETAINING WALL #1
MSE WALL
TYPICAL SECTION

DATE: 8-18-09

SHEET NO. WJ-2
TOTAL SHEETS 3

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 027869 ENGINEER DAVID L. TEAGUE SIGNATURE 2/13/12 DATE	SIGNATURE DATE

NOTES

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

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

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

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO 1.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1.

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

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 75 YEARS
3) MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL = 3000 LB/SF
4) AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (gamma) PCF	FRICTION ANGLE (phi) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	125	34	0

* SEE MSE RETAINING WALL PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

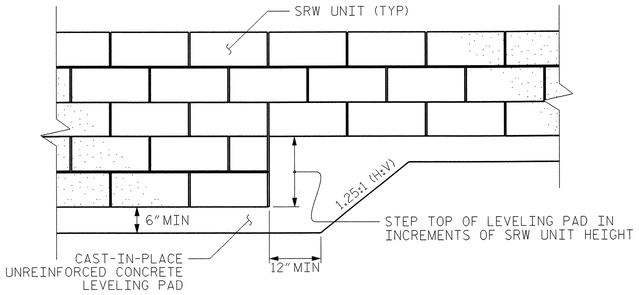
MATERIAL TYPE	UNIT WEIGHT (gamma) PCF	FRICTION ANGLE (phi) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	100

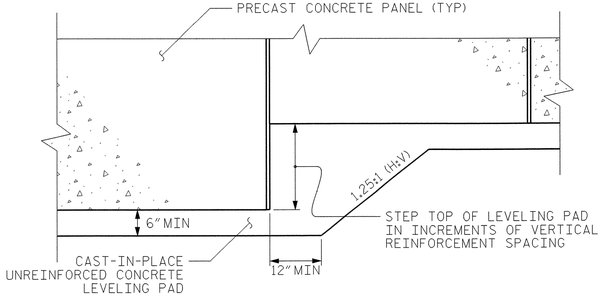
DESIGN RETAINING WALL NO. 1 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 1.

THE MINIMUM REINFORCEMENT LENGTH SHALL BE 1.25 TIMES THE HEIGHT OF THE WALL TO SATISFY GLOBAL STABILITY.

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





LEVELING PAD STEP DETAILS

PROJECT NO.: B-4555 (33767.1.1)
JOHNSTON ***COUNTY***
STATION: 19+75 -L- TO 25+15.19 -L-
SHEET 3 OF 3

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STD CELL Wall_MSE_Notes_LevelingPad

RETAINING WALL #1
MSE WALL NOTES &
LEVELING PAD
STEP DETAILS
DATE: 8-18-09

SHEET NO. W-3
TOTAL SHEETS 3

GEC248236 2/13/2012 B4555_GEO_RWALL_Plan Sheet_Notes dteague GEC-Oce860-34bond

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

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

30-NOV-2006 15:26
SivShare\Structures Standards\Standards english 2006\sn_05.std
rblissette