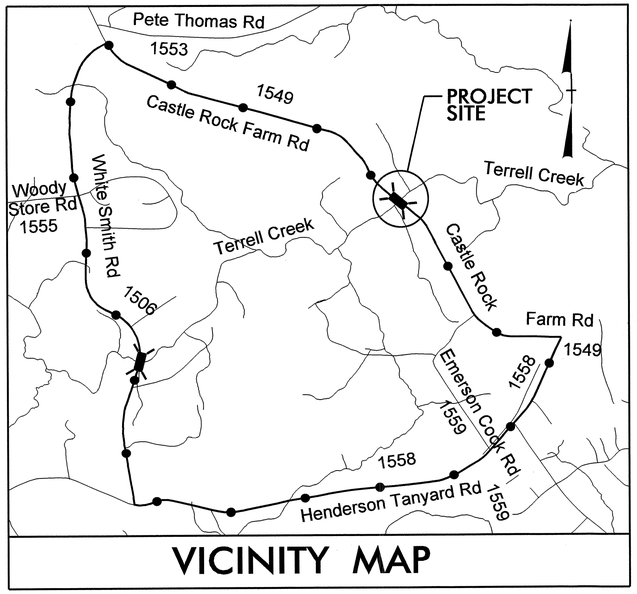
TIP PROJECT: B-4730

CONTRACT: C203258

STRUCTURE



VICINITY MAP

DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHATHAM COUNTY

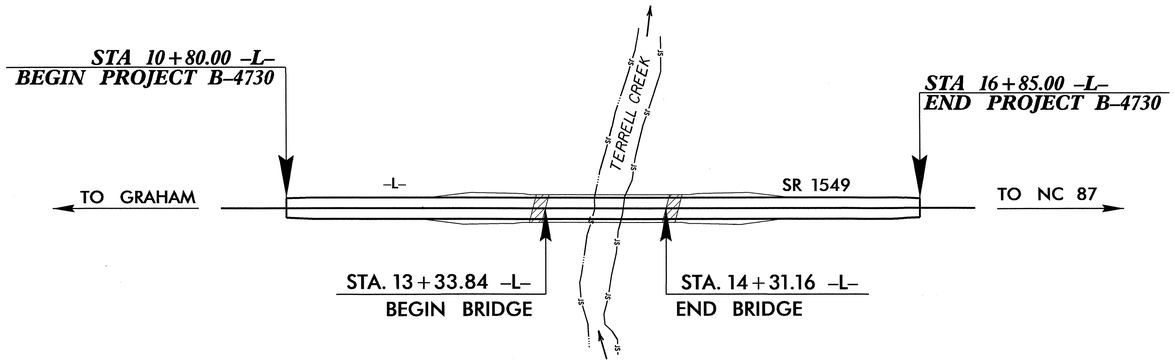
LOCATION: BRIDGE NO. 108 OVER TERRELL CREEK ON SR 1549

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4730		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
38503.1.1	BRZ-1549(6)	P.E.
38503.2.1	BRZ-1549(6)	UTIL. & R/W
38503.3.FD1	BRZ-1549(6)	CONST.

NAD 83



DESIGN DATA

ADT 2013 = 336
ADT 2033 = 576
DHV = 9 %
D = 65 %
T = 4 % *
V = 60 MPH
* (TTST =1% + DUAL 3%)
FUNC CLASS =
RURAL LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4730 = 0.097 MI
LENGTH STRUCTURE TIP PROJECT B-4730 = 0.018 MI
TOTAL LENGTH TIP PROJECT B-4730 = 0.115 MI

Prepared In the Office of:

DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

LETTING DATE :

NOVEMBER 19, 2013

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

T. H. FANG, 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. PROJ. NO. BRZ-1549(6)

GRADE DATA

P.I. STA. = 11+55.00 -L-
EL.= 473.27
V.C. = 150'

-1.5861% +0.6307%

13+50 14+00 14+50

FILL FACE @ END BENT 1
STA. 13+33.84 -L-
G.P. EL. 474.40

BEGIN FRONT SLOPE
STA. 13+22.88 -L-
G.P. EL. 474.97

1'-7" BERM NORMAL TO CAP
1'-0" MIN. EARTH BERM
FIX
EL. 473.0±
EL. 466.5±
EL. 466.0±
EL. 473.0±
LOW CHORD EL. 470.49
1'-0" (TYP.)
EXCAVATION LINE (TYP.)
1½:1 SLOPE NORMAL TO CAP

470
460
450

SPAN A

Q100 EL. 471.7
EXISTING STRUCTURE
DESIGN 025 EL. 469.3
NWS EL. 459.8 ON 11-17-11

EL. 465.5±
EL. 459.8±
EL. 458.8±
EL. 458.8±
EL. 459.3±
EL. 468.5±
EL. 466.8±

END BENT 1

SECTION ALONG -L-

SECTION TAKEN AT RIGHT ANGLE TO END BENTS

+0.6307% 3.5136%

GRADE DATA

P.I. STA. = 15+80.00 -L-
EL.= 475.95
V.C. = 190'

FILL FACE @ END BENT 2
STA. 14+31.16 -L-
G.P. EL. 475.01

3'-0" NORMAL TO CAP
FIX
EL. 473.2±
EL. 469.0±
LOW CHORD EL. 471.08
1½:1 SLOPE NORMAL TO CAP
℄ HP 14 X 73 STEEL PILE (TYP.)
EL. 474.0±
APPROXIMATE EXISTING GROUNDLINE

UNCLASSIFIED STRUCTURE EXCAVATION

END BENT 2

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

RIP RAP CLASS II
2:1
1'-7" BERM
1'-0" MIN. EARTH BERM
EL. 465.41 (LEVEL)
2:1

TERRELL CREEK

EXISTING STRUCTURE

BEGIN APPROCH SLAB
STA. 13+22.87-L-
BEGIN FRONT SLOPE
STA. 13+22.88 -L-
TO SR 1506
W.P. #1
STA. 13+33.84 -L-
FILL FACE @ END BENT 1

℄ BRIDGE
STA. 13+82.50 -L-
105°-00'-00" (TYP.)
-L-

FILL FACE @ END BENT 2
END APPROCH SLAB
STA. 14+42.13 -L-
TO SR 1559
W.P. #2
STA. 14+31.16 -L-

2:1

97'-3 15/16"

PLAN

PILES NOT SHOWN FOR CLARITY

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG 7/10/13

PROJECT NO. B-4730
CHATHAM COUNTY
STATION: 13+82.50 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 108

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER TERRELL CREEK ON SR 1549 (CASTLE ROCK FARM ROAD) BETWEEN SR 1506 AND SR 1559

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

DRAWN BY : R. P. PATEL DATE : 5-24-12
CHECKED BY : T. H. FANG DATE : 5-29-12

10-JUL-2013 12:59
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tjkirschbaum

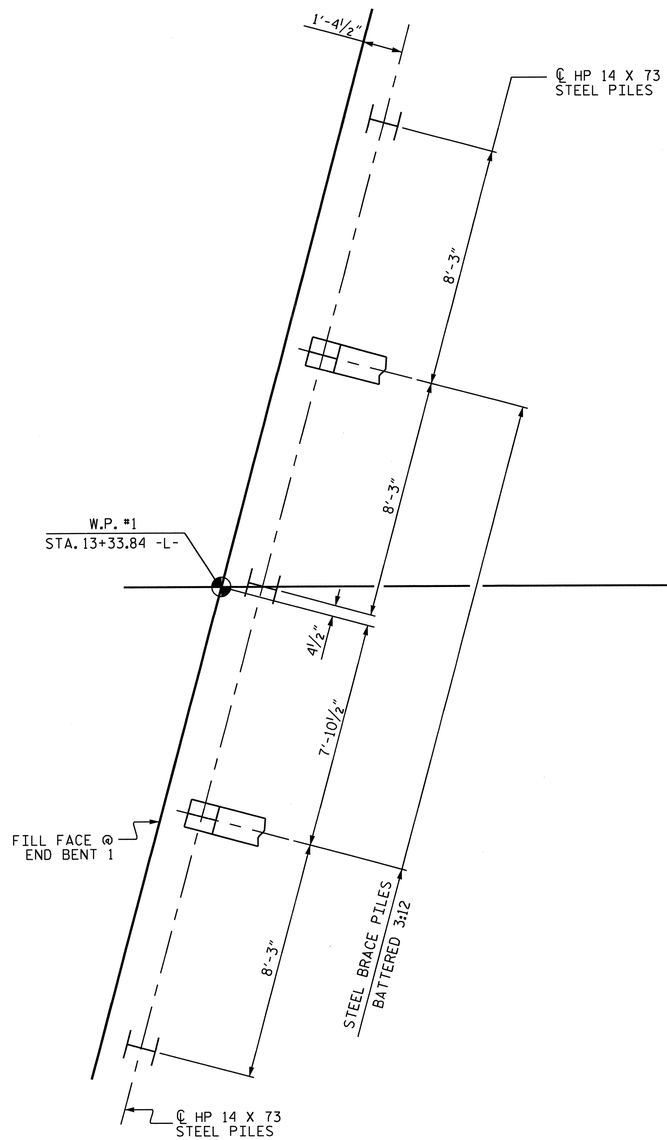
NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

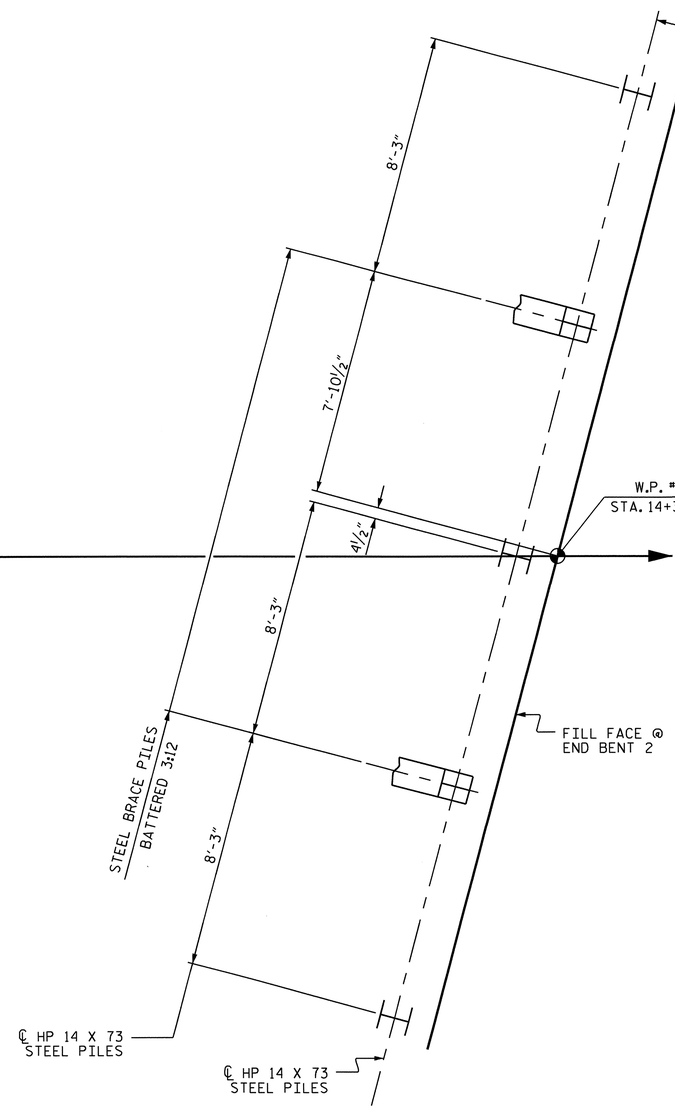
PILES AT END BENTS 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 135 TONS PER PILE.

DRIVE PILES AT END BENTS 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 225 TONS PER PILE.

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



END BENT 1



END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES.

-L-

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER TERRELL CREEK ON SR 1549 (CASTLE ROCK FARM ROAD) BETWEEN SR 1506 AND SR 1559

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG

7/10/13

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

DRAWN BY : R.P.PATEL DATE : 5-25-12
CHECKED BY : T. H. FANG DATE : 6-17-13

10-JUL-2013 12:59
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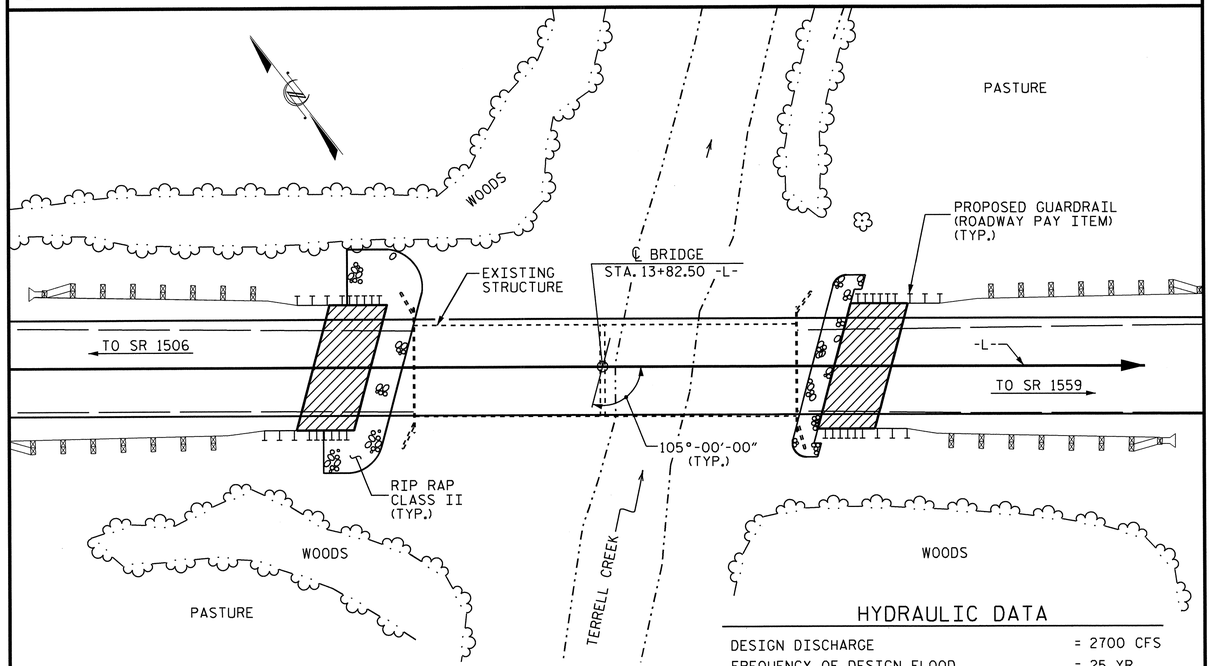
tjkirschbaum

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 14 X 73 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS	
	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EACH	LIN. FT.	TON	SQ. YD.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE									190			LUMP SUM	10	950
END BENT 1		LUMP SUM	28.0		4,461	5	75	5		75	85			
END BENT 2		LUMP SUM	28.0		4,461	5	75	5		10				
TOTAL	LUMP SUM	LUMP SUM	56.0	LUMP SUM	8,922	10	150	10	190	85	85	LUMP SUM	10	950

BM 1: RR SPIKE SET IN BASE OF 18" HICKORY TREE, -L- STA. 14+53.65, 63.59 FT. RIGHT, ELEV.= 471.40'



OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 5000 CFS
FREQUENCY OF OVERTOPPING FLOOD	= < 500 YR.
OVERTOPPING FLOOD ELEVATION	= 473.6

HYDRAULIC DATA

DESIGN DISCHARGE	= 2700 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 469.3
DRAINAGE AREA	= 14.6 SQ.MI.
BASE DISCHARGE (Q100)	= 3800 CFS
BASE HIGH WATER ELEVATION	= 471.7

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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 SHOULD BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

IN AS MUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 13+82.50 -L-".

THE EXISTING STRUCTURE CONSISTING OF 2 SPANS: 2 @ 40'-6", WITH A CLEAR ROADWAY WIDTH OF 19'-1" AND TIMBER DECK ON I-BEAMS WITH 3" AWS; SUBSTRUCTURE END BENTS 1 & 2 CONSISTING TIMBER CAP AND PILES, INTERIOR BENT CONSISTING OF TIMBER CAP AND PILES WITH CONCRETE ENCASEMENT AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

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

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. LEFT SIDE, 35 FT. RIGHT SIDE OF CENTERLINE ROADWAY AT END BENT 1 AND 20 FT. LEFT SIDE, 35 FT. RIGHT SIDE OF CENTERLINE ROADWAY AT END BENT 2 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 SPECIFICATION.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG
8/13/13

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER TERRELL CREEK ON SR 1549 (CASTLE ROCK FARM ROAD) BETWEEN SR 1506 AND SR 1559

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

DRAWN BY : S. B. WILLIAMS DATE : 6-29-12
CHECKED BY : P. K. NEWTON DATE : 10-12

13-AUG-2013 15:15
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tfang

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	1.335	--	1.75	0.268	1.52	A	EL	46.724	0.574	1.35	A	EL	9.345	0.80	0.268	**1.34**	A	EL	**46.724**	
		HL-93(Opr)	N/A	--	1.752	--	1.35	0.268	1.97	A	EL	46.724	0.574	1.75	A	EL	9.345	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.784	64.228	1.75	0.268	2.09	A	EL	46.724	0.574	**1.78**	A	EL	**9.345**	0.80	0.268	1.84	A	EL	46.724	
		HS-20(Opr)	36.000	--	2.313	83.258	1.35	0.268	2.71	A	EL	46.724	0.574	2.31	A	EL	9.345	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.320	58.323	1.4	0.268	6.14	A	EL	46.724	0.574	5.46	A	EL	9.345	0.80	0.268	4.32	A	EL	46.724	
		SNGARBS2	20.000	--	3.143	62.855	1.4	0.268	4.47	A	EL	46.724	0.574	3.83	A	EL	9.345	0.80	0.268	3.14	A	EL	46.724	
		SNAGRIS2	22.000	--	2.945	64.794	1.4	0.268	4.19	A	EL	46.724	0.574	3.54	A	EL	9.345	0.80	0.268	2.95	A	EL	46.724	
		SNCOTTS3	27.250	--	2.148	58.522	1.4	0.268	3.05	A	EL	46.724	0.574	2.72	A	EL	9.345	0.80	0.268	2.15	A	EL	46.724	
		SNAGGRS4	34.925	--	1.765	61.649	1.4	0.268	2.51	A	EL	46.724	0.574	2.22	A	EL	9.345	0.80	0.268	1.77	A	EL	46.724	
		SNS5A	35.550	--	1.728	61.435	1.4	0.268	2.46	A	EL	46.724	0.574	2.24	A	EL	9.345	0.80	0.268	1.73	A	EL	46.724	
		SNS6A	39.950	--	1.573	62.861	1.4	0.268	2.24	A	EL	46.724	0.574	2.03	A	EL	9.345	0.80	0.268	1.57	A	EL	46.724	
		SNS7B	42.000	--	1.498	62.916	1.4	0.268	2.13	A	EL	46.724	0.574	1.97	A	EL	9.345	0.80	0.268	1.50	A	EL	46.724	
	TTST	TNAGRIT3	33.000	--	1.915	63.203	1.4	0.268	2.72	A	EL	46.724	0.574	2.42	A	EL	9.345	0.80	0.268	1.92	A	EL	46.724	
		TNT4A	33.075	--	1.920	63.518	1.4	0.268	2.73	A	EL	46.724	0.574	2.37	A	EL	9.345	0.80	0.268	1.92	A	EL	46.724	
		TNT6A	41.600	--	1.559	64.849	1.4	0.268	2.22	A	EL	46.724	0.574	2.07	A	EL	9.345	0.80	0.268	1.56	A	EL	46.724	
		TNT7A	42.000	--	1.561	65.548	1.4	0.268	2.22	A	EL	46.724	0.574	2.04	A	EL	9.345	0.80	0.268	1.56	A	EL	46.724	
		TNT7B	42.000	--	1.600	67.198	1.4	0.268	2.28	A	EL	46.724	0.574	1.94	A	EL	9.345	0.80	0.268	1.60	A	EL	46.724	
		TNAGRIT4	43.000	--	1.533	65.913	1.4	0.268	2.18	A	EL	46.724	0.574	1.88	A	EL	9.345	0.80	0.268	1.53	A	EL	46.724	
		TNAGT5A	45.000	--	1.450	65.269	1.4	0.268	2.06	A	EL	46.724	0.574	1.85	A	EL	9.345	0.80	0.268	1.45	A	EL	46.724	
		TNAGT5B	45.000	3	1.437	64.685	1.4	0.268	2.04	A	EL	46.724	0.574	1.79	A	EL	9.345	0.80	0.268	**1.44**	A	EL	**46.724**	

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)

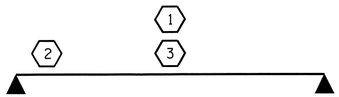
(2) DESIGN LOAD RATING (HS-20)

(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-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 95' BOX BEAM UNIT 105° SKEW
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSIANG FANG
7/10/13

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

ASSEMBLED BY :	R.P.PATEL	DATE :	5-25-12
CHECKED BY :	P. K. NEWTON	DATE :	10-12
DRAWN BY :	TMG II/II		
CHECKED BY :	AAC II/II		

10-JUL-2013 12:59
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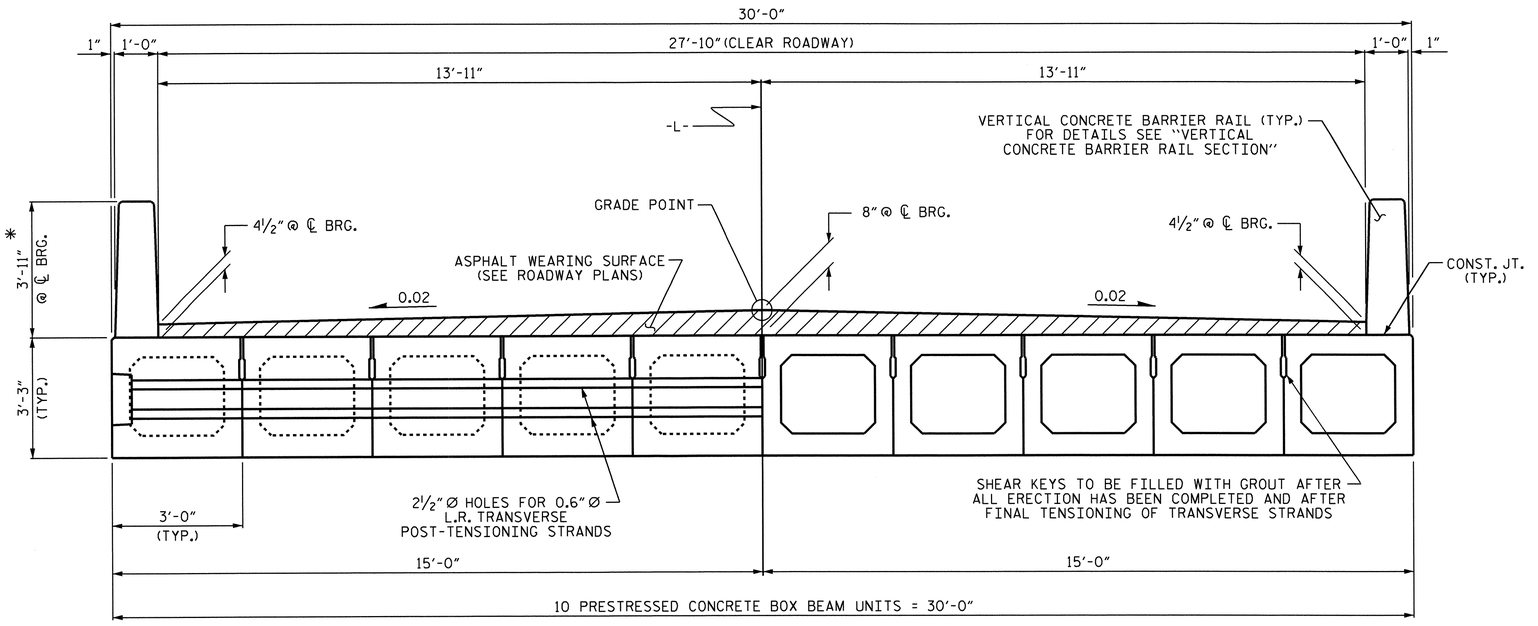
tjkirschbaum

STD. NO. 39LRFR1_75&105S_95L



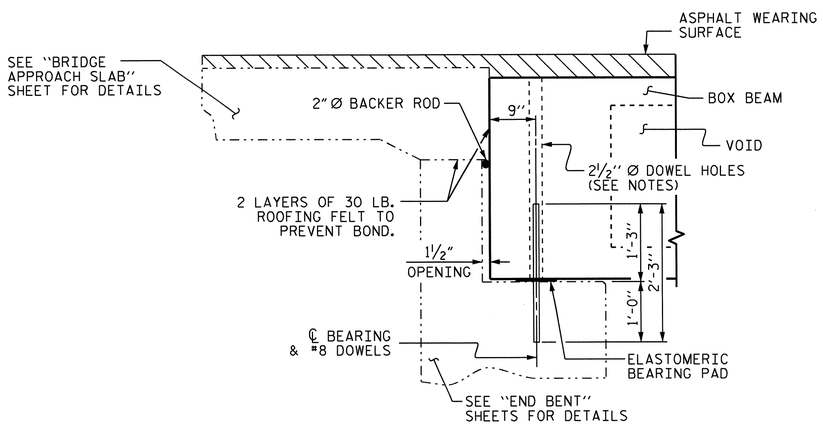
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

* THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

FIXED END



SECTION AT END BENT

NOTES

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

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5500 PSI.

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

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 1 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIANG FANG

7/10/13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			16

ASSEMBLED BY : R. P. PATEL	DATE : 5-24-12
CHECKED BY : T. H. FANG	DATE : 5-29-12
DRAWN BY : DGE 8/11	
CHECKED BY : TMG 11/11	

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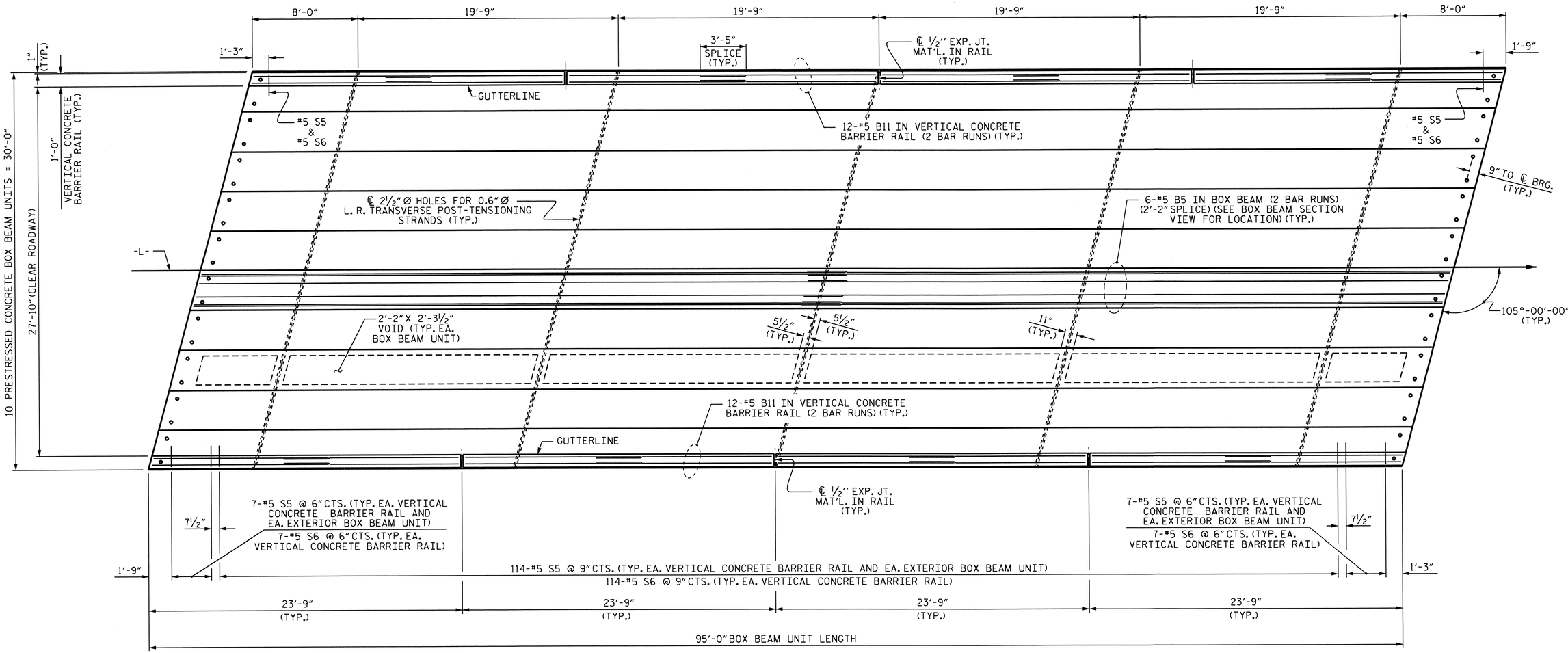
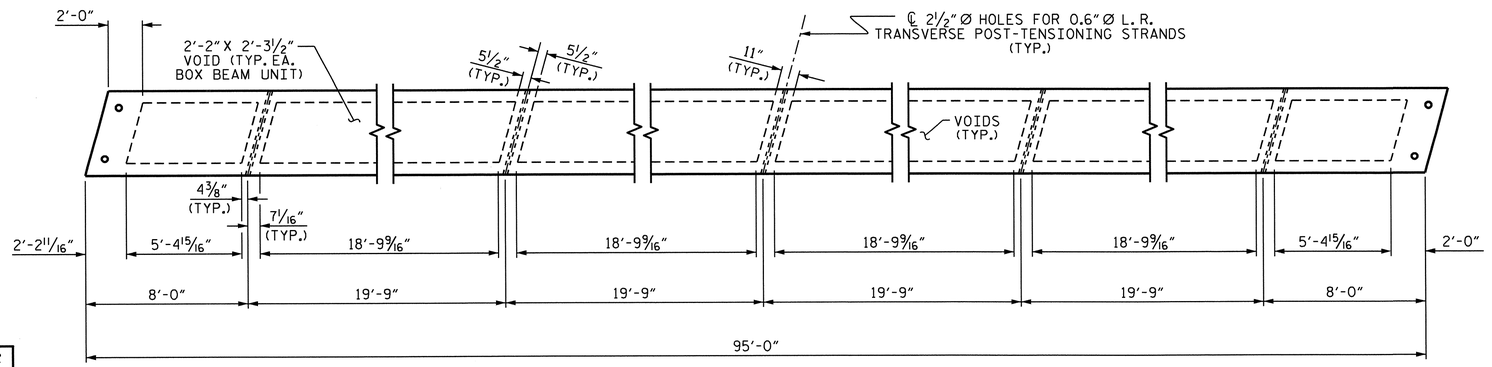
STD. NO. 39PCBB1_30

FIX.

FIX.



PLAN OF SPAN A



DIAPHRAGM AND VOID LAYOUT

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NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING MING FANG
7/10/13

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 95' UNIT 27'-10" CLEAR ROADWAY 105° SKEW

SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			16

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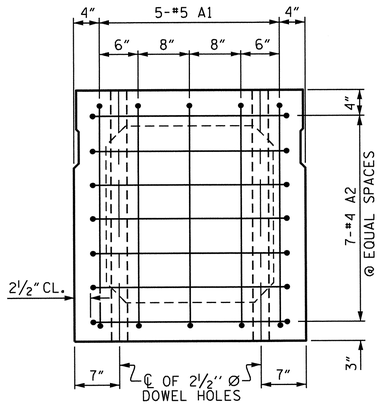
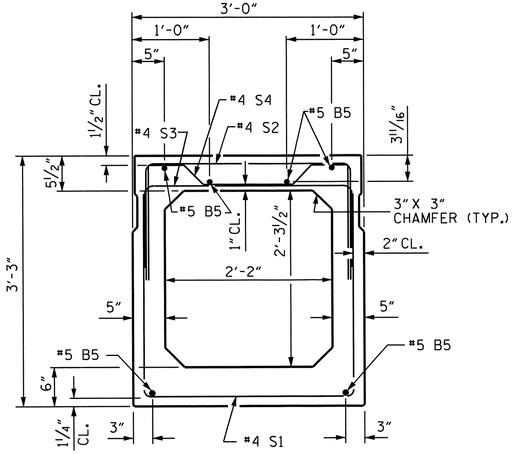


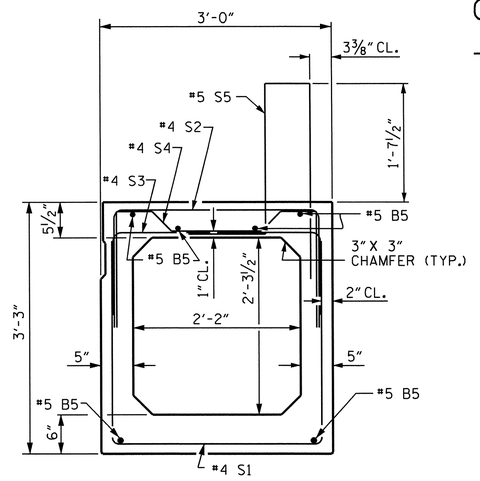
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



INTERIOR BOX BEAM SECTION

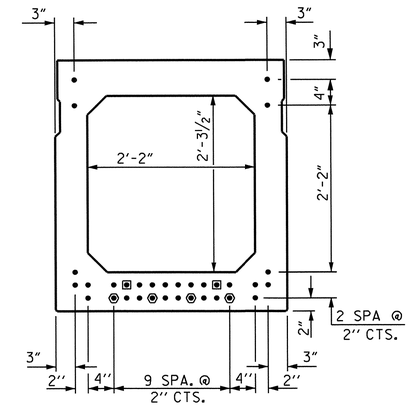
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

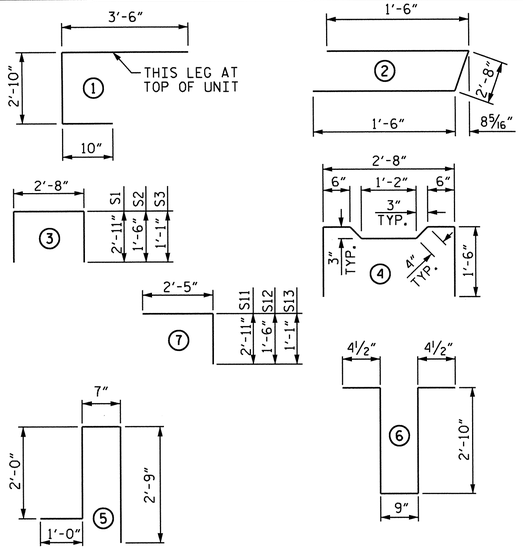
(32 STRANDS REQUIRED)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◉ STRANDS DEBONDED FOR 4'-0" FROM END OF BOX BEAM
- ⬢ STRANDS DEBONDED FOR 12'-0" FROM END OF BOX BEAM

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

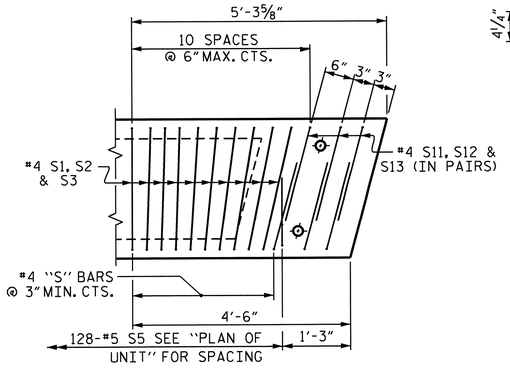
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

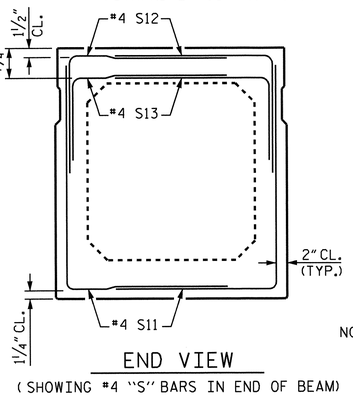
BILL OF MATERIAL FOR ONE BOX BEAM SECTION

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-8"	167	5'-8"	167
B5	12	#5	STR	48'-5"	606	48'-5"	606
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	77	#4	3	8'-6"	437	8'-6"	437
S2	77	#4	3	5'-8"	291	5'-8"	291
S3	133	#4	3	4'-10"	429	4'-10"	429
S4	56	#4	4	5'-10"	218	5'-10"	218
S11	12	#4	7	5'-4"	43	5'-4"	43
S12	12	#4	7	3'-11"	31	3'-11"	31
S13	12	#4	7	3'-6"	28	3'-6"	28
* S5	128	#5	5	6'-4"	846	--	--
REINFORCING STEEL				2414	LBS.	2414	LBS.
*EPOXY COATED REINF. STEEL				846	LBS.		
7500 P.S.I. CONCRETE				18.7	CU. YDS.	18.5	CU. YDS.
0.6" Ø L.R. STRANDS				No. 32		No. 32	



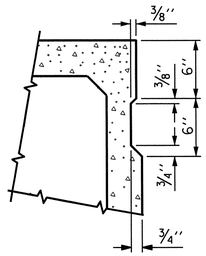
DETAIL "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. "B" BARS AND "A" BARS NOT SHOWN.



END VIEW

(SHOWING #4 "S" BARS IN END OF BEAM)

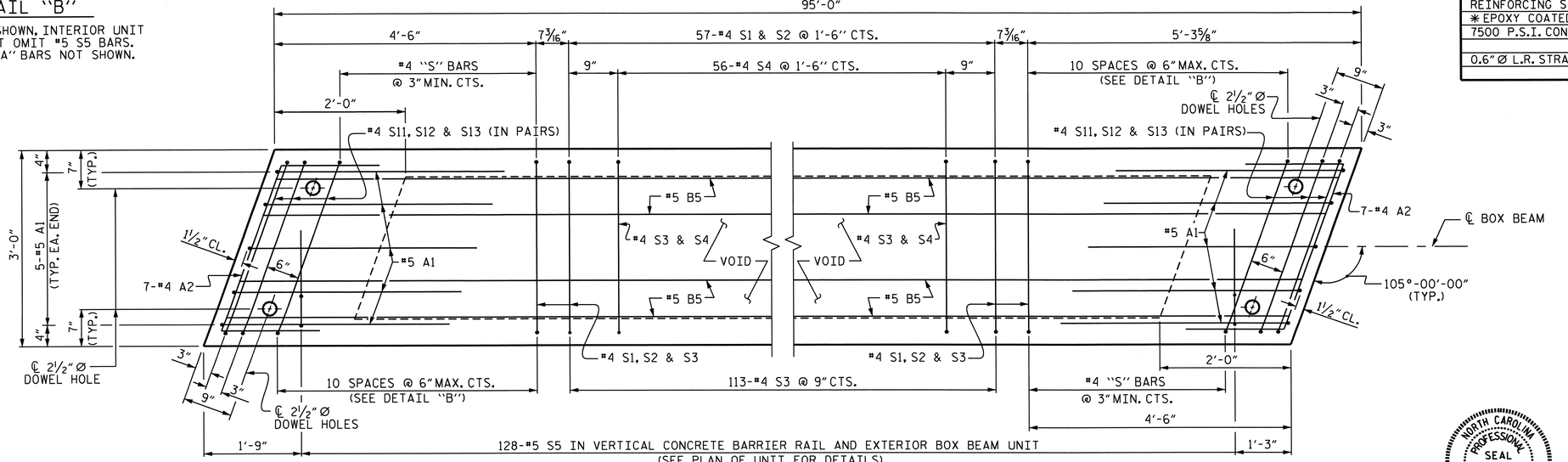


SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

GRADE 270 STRANDS

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



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF UNIT. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS.

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PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER HSIONG TENG TING

7/10/13

REVISIONS						SHEET NO.
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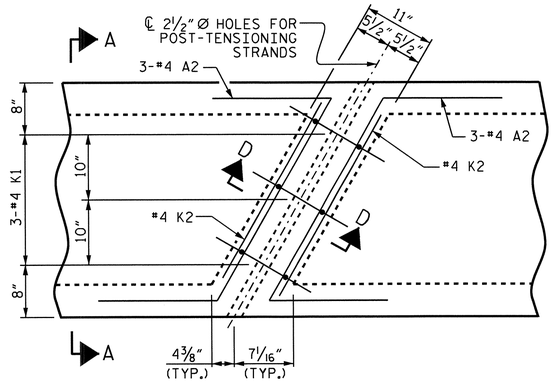
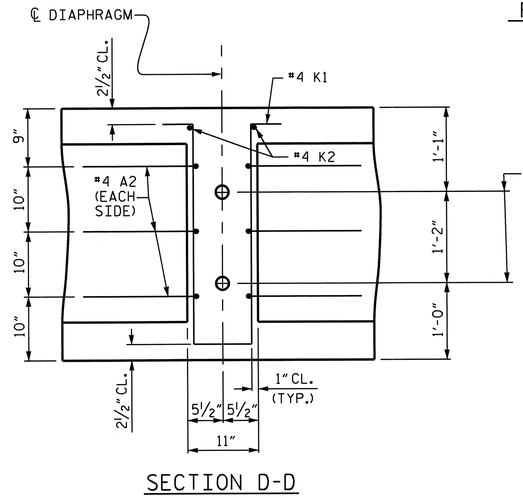
2			4			16

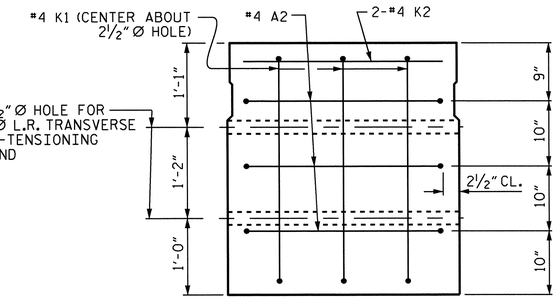
STD. NO. 39PCBB6_105S_95L



PLAN



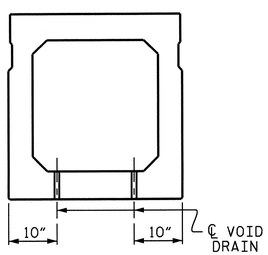
SECTION D-D



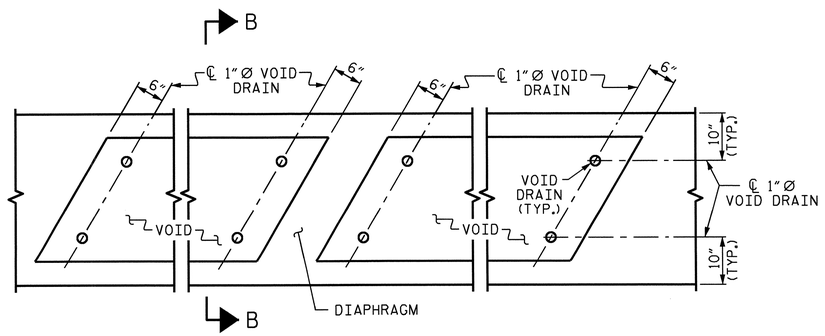
SECTION A-A
VOIDS NOT SHOWN

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2½" Ø HOLES.



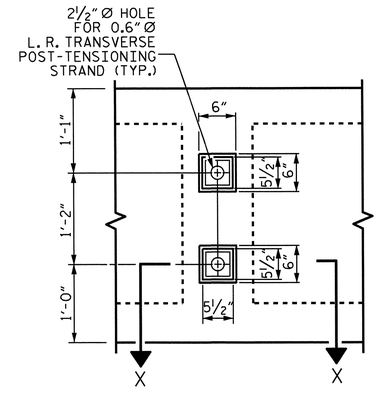
SECTION B-B



PART PLAN

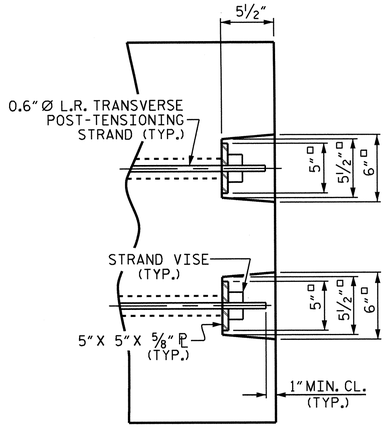
VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

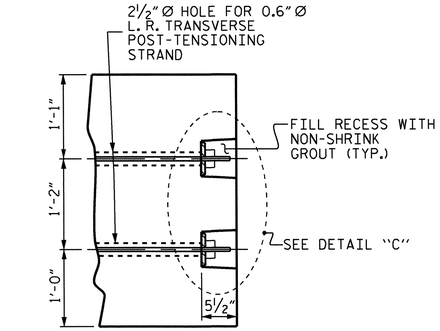


VIEW Y-Y

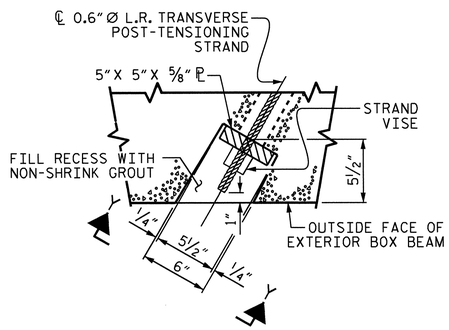
SHOWING ELEVATION VIEW OF GROUTED RECESS



DETAIL "C"



PART SECTION AT RECESS



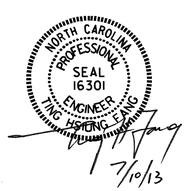
SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 3'-3"
95' BOX BEAM UNIT (NC & SE)	0.6" Ø L.R. STRAND
CAMBER (BEAM ALONE IN PLACE)	3½" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	1" ↓
FINAL CAMBER	2½" ↑

** INCLUDES FUTURE WEARING SURFACE



PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			16

ASSEMBLED BY : R. P. PATEL	DATE : 5-24-12
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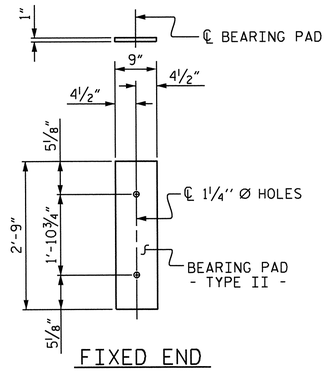


FIXED END

(TYPE II - 20 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

BOX BEAM UNITS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	95'-0"	190'-0"
INTERIOR B.B.	8	95'-0"	760'-0"
TOTAL	10	———	950'-0"

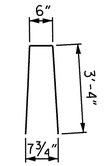
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	95' UNIT				
✳B11	192	#5	STR	13'-6"	2703
✳S6	256	#5	1	7'-2"	1914
✳EPOXY COATED REINFORCING STEEL			LBS.		4617
CLASS AA CONCRETE			CU.YDS.		25.5
TOTAL VERTICAL CONCRETE BARRIER RAIL			LIN.FT.		190.00

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

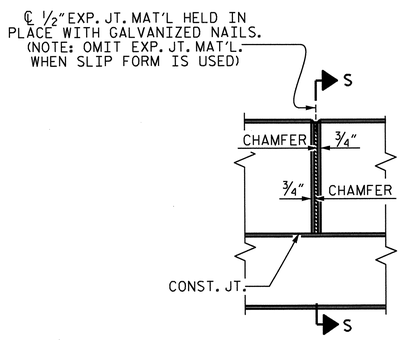
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
95' UNITS	2"	3'-8½"

BAR TYPE

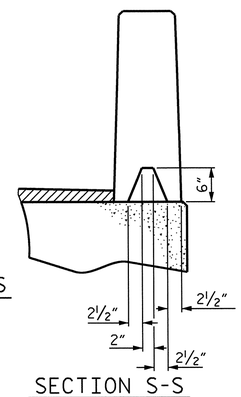


①

BAR DIMENSIONS ARE OUT TO OUT



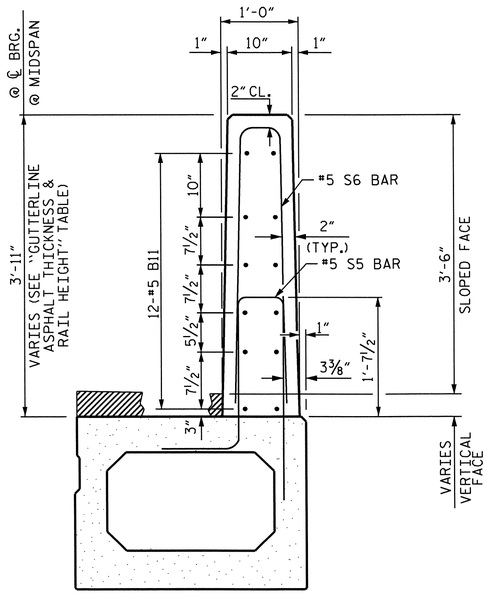
ELEVATION AT EXPANSION JOINTS



SECTION S-S

AT DAM IN OPEN JOINT

(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



SECTION THRU RAIL

VERTICAL CONCRETE BARRIER RAIL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSIUNG FANG

7/10/13

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3'-0" X 3'-3"
PRESTRESSED CONCRETE
BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			16

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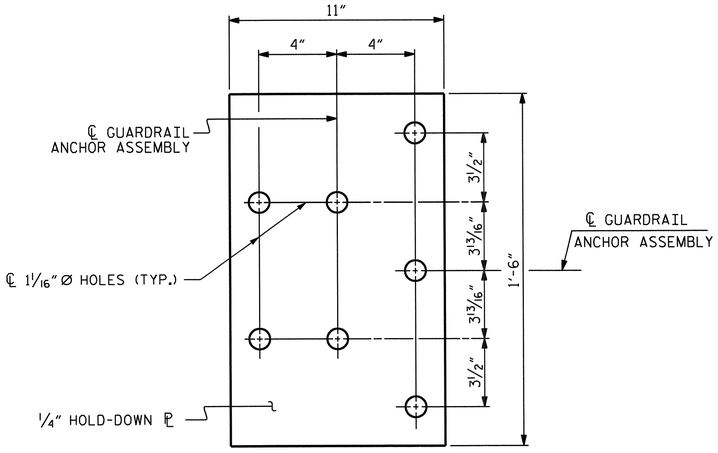
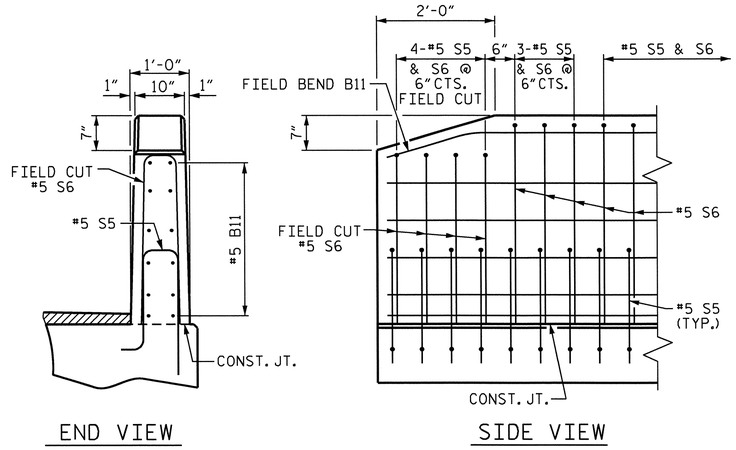


PLAN



END VIEW

SIDE VIEW

END OF BARRIER RAIL DETAILS

END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES

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

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

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

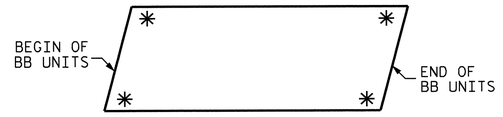
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

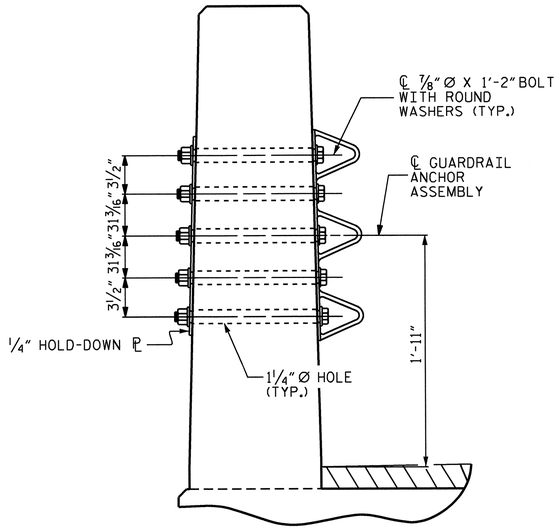
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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

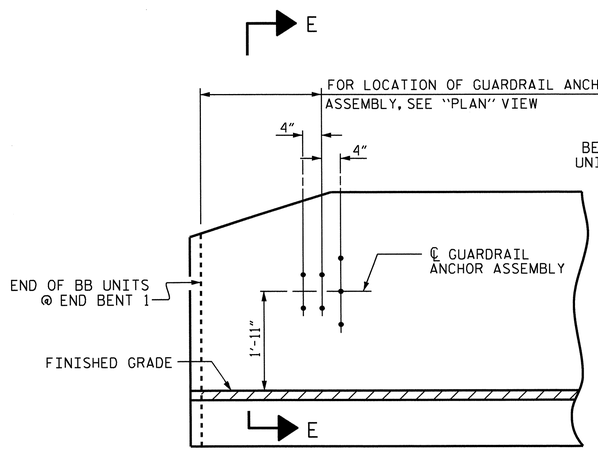


SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY



SECTION E-E



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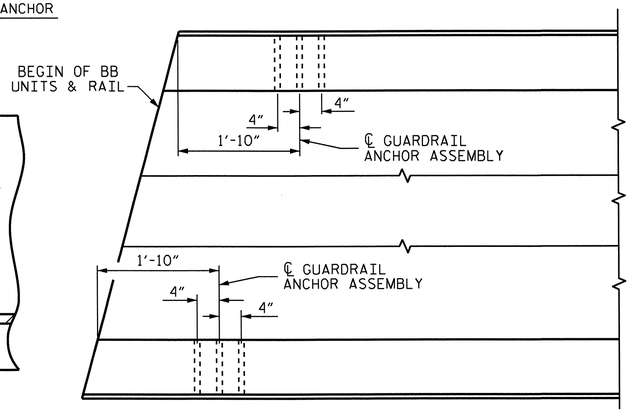

PLAN

GUARDRAIL ANCHOR ASSEMBLY DETAILS

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER YING HSIUNG TANG

7/10/13

ASSEMBLED BY : R. P. PATEL	DATE : 5/25/12
CHECKED BY : P. K. NEWTON	DATE : 10-12
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	REV. 10/1/11 MAA/GM
	REV. 12/5/11 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			16

STD. NO. GRA3

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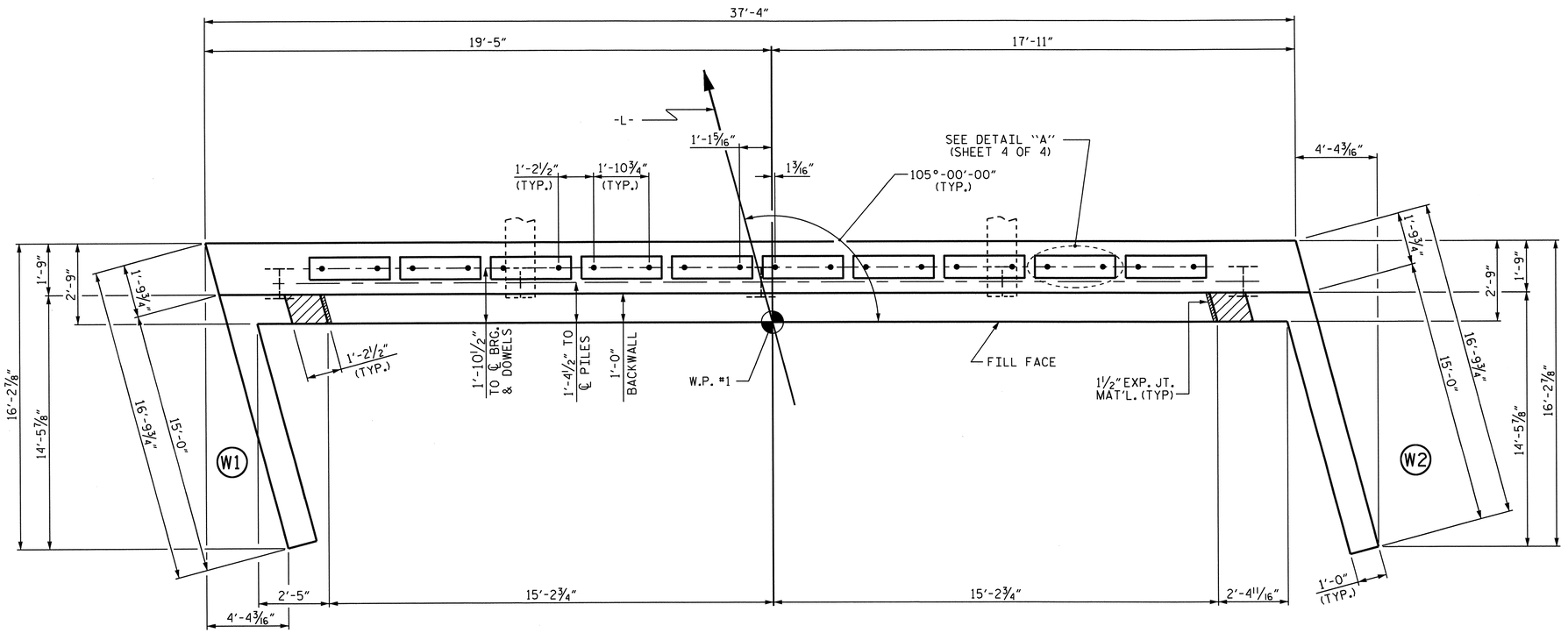
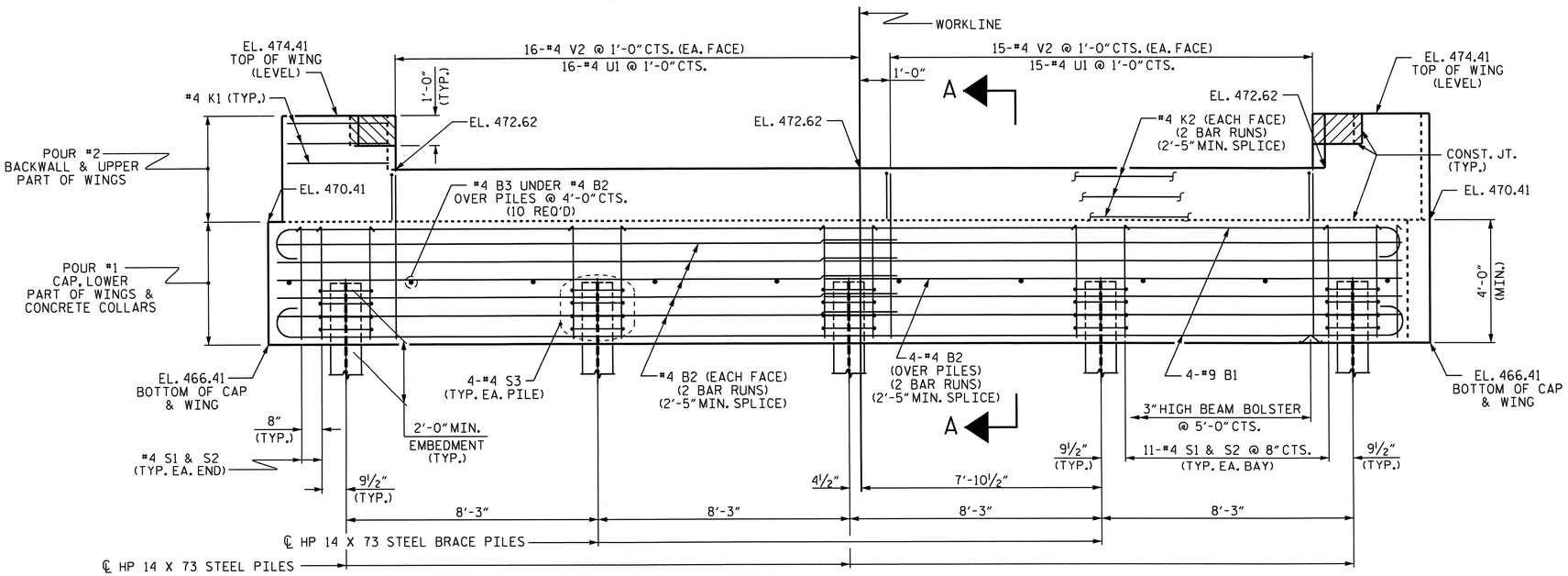
tjkirschbaum



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

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

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

ASSEMBLED BY : R.P.PATEL	DATE : 5-25-12		
CHECKED BY : P. K. NEWTON	DATE : 9-12		
DRAWN BY : WJH	12/11		
CHECKED BY : AAC	12/11		

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tfang

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING-HSIUNG FANG
9/11/13

PROJECT NO. B-4730
CHATHAM COUNTY
STATION: 13+82.50 -L-

SHEET 1 OF 4

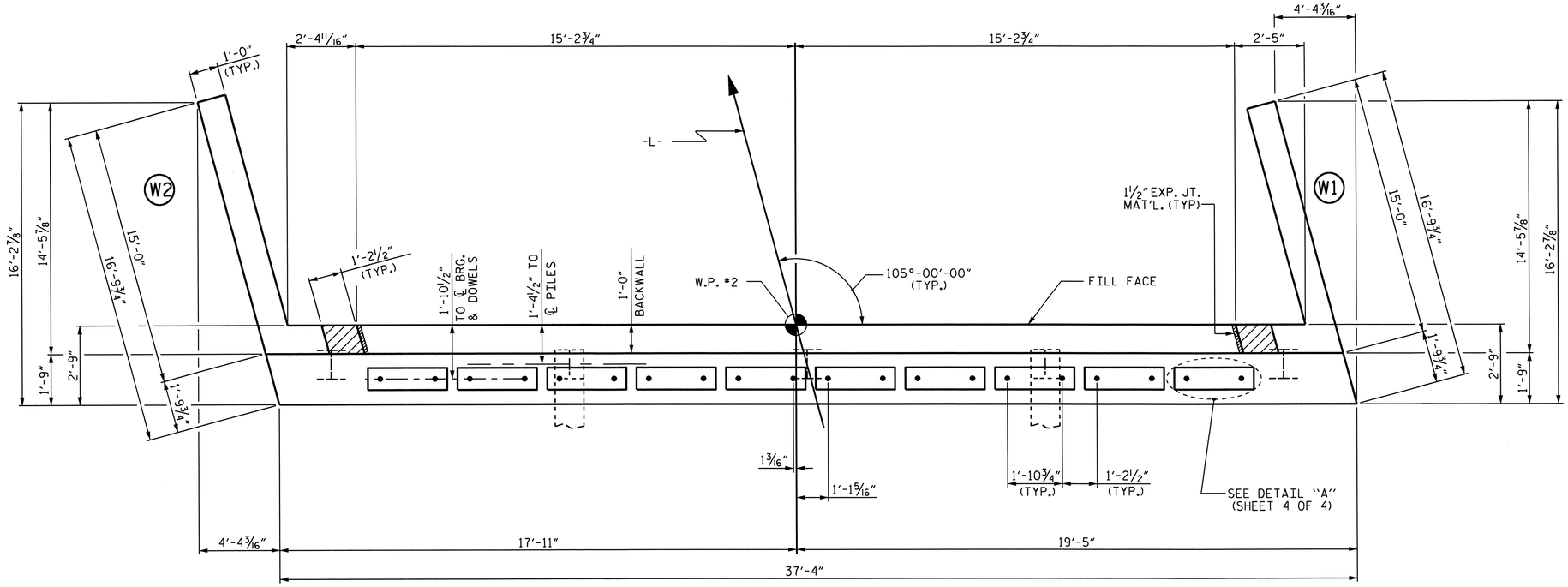
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			16

STD. NO. EB_30_105S_39BB



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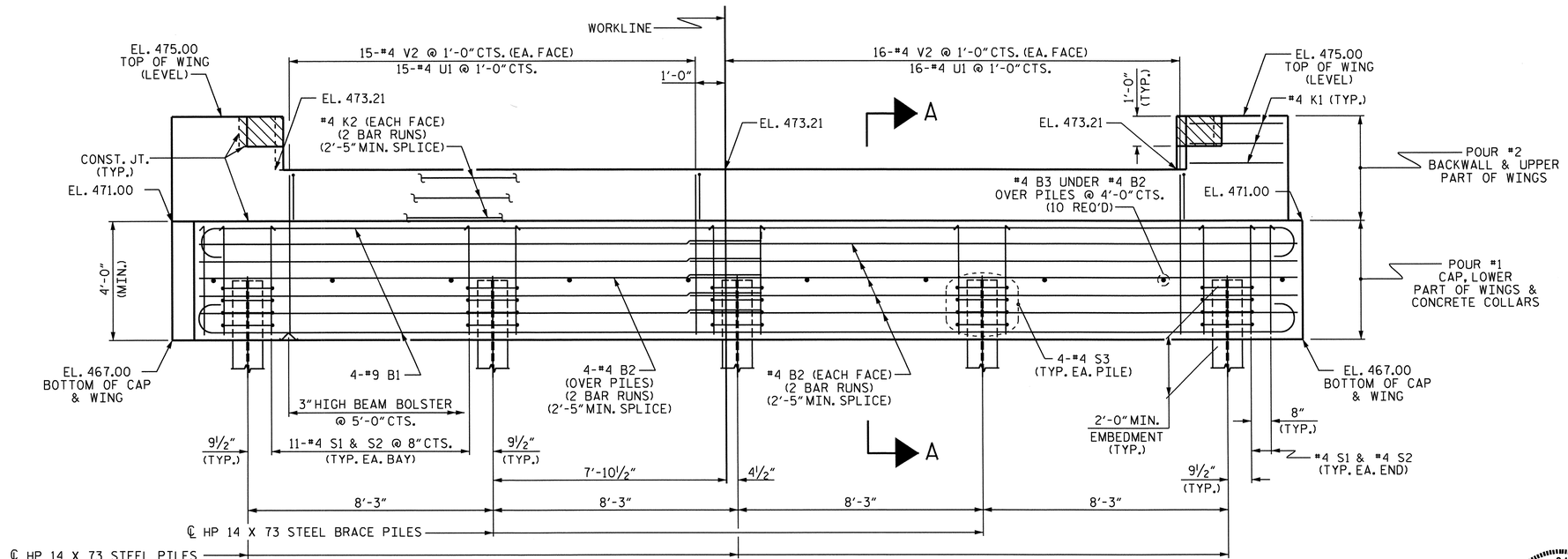

ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 4 OF 4.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

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FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

ASSEMBLED BY : R.P.PATEL	DATE : 5-25-12
CHECKED BY : P. K. NEWTON	DATE : 9-12
DRAWN BY : WJH 12/11	
CHECKED BY : AAC 12/11	

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSING FANG
7/10/13

PROJECT NO. B-4730
CHATHAM COUNTY
STATION: 13+82.50 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			16

STD. NO. EB_30_105S_39BB

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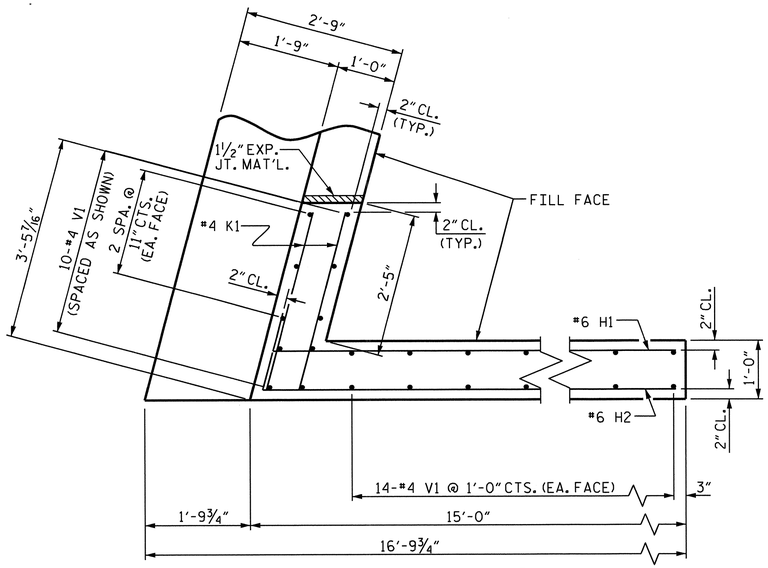
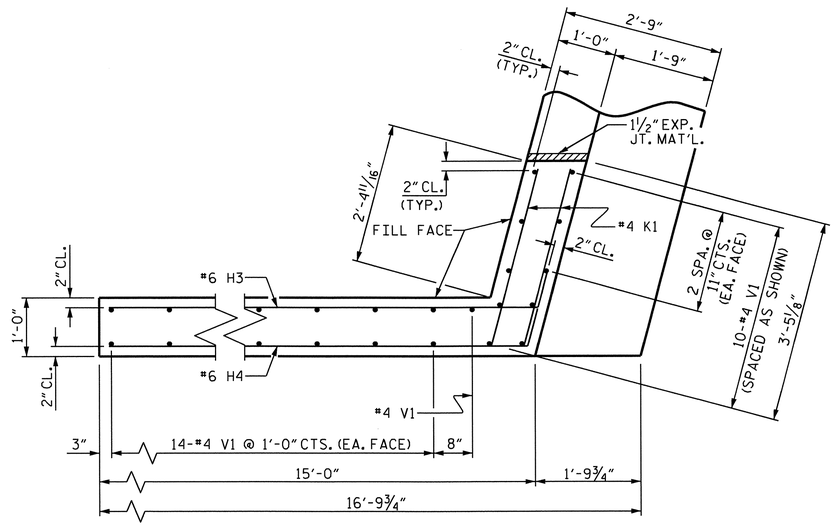
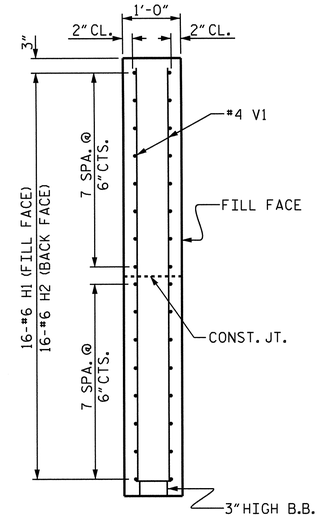
tjkirschbaum



PLAN OF WING (W1)



PLAN OF WING (W2)



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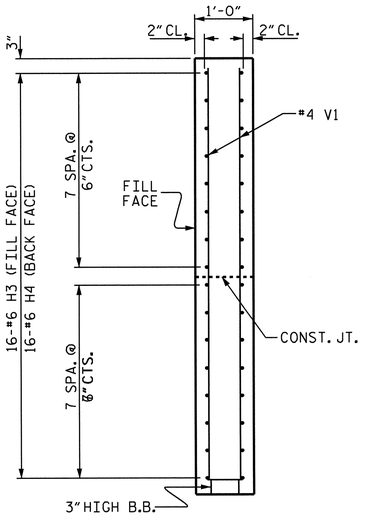
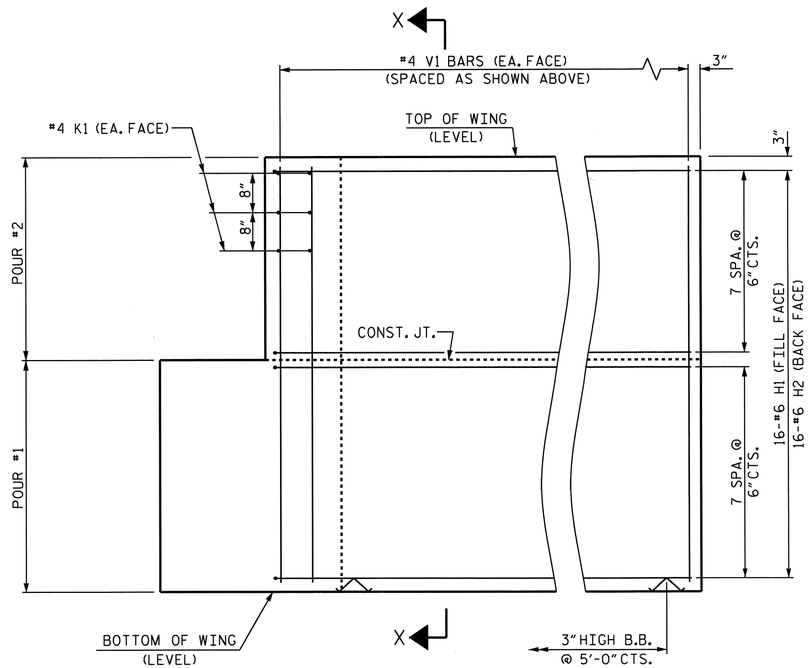
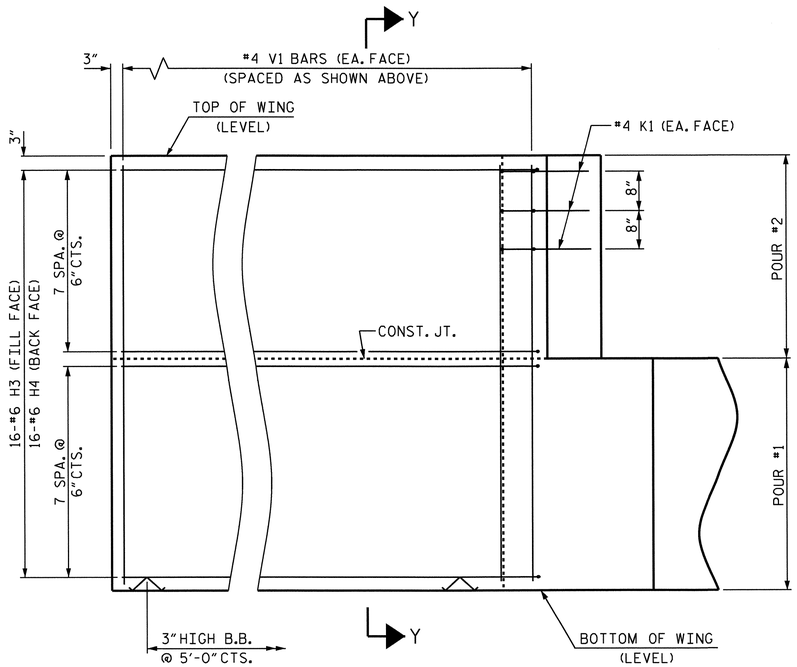


SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			16

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG

7/10/13

ASSEMBLED BY : R.P.PATEL	DATE : 5-24-12
CHECKED BY : P. K. NEWTON	DATE : 9-12
DRAWN BY : WJH 12/11	
CHECKED BY : AAC 12/11	

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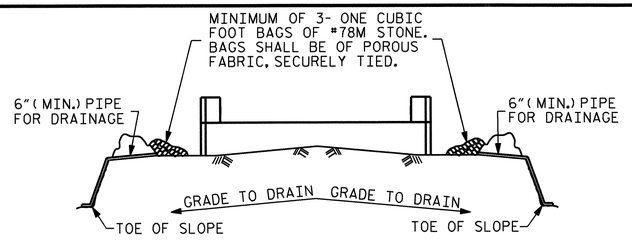
STD. NO. EB_30_105S4_39BB

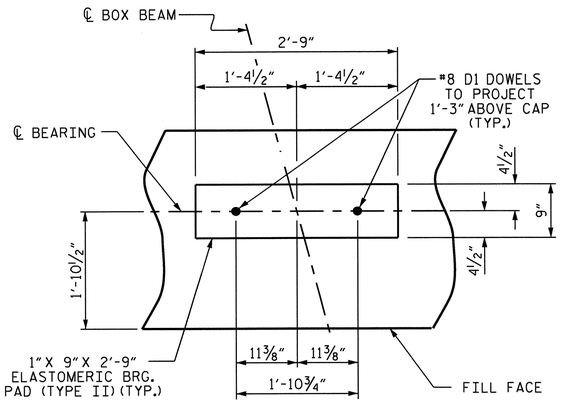


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

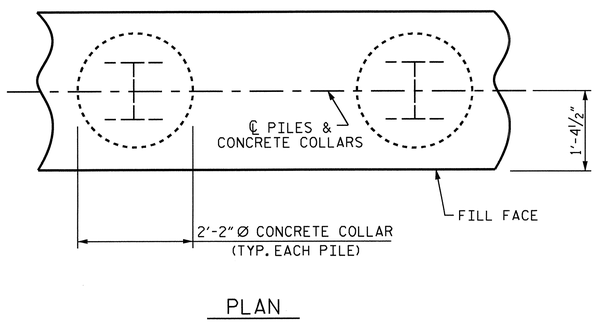
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

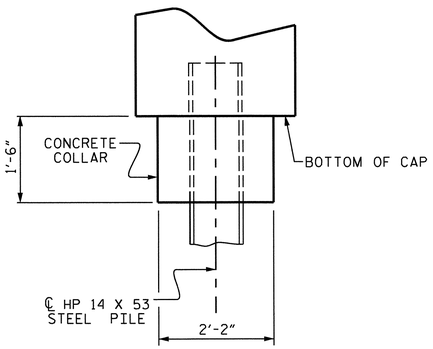


DETAIL "A"

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



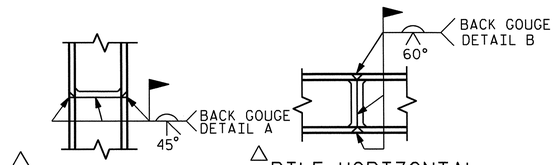
PLAN



ELEVATION

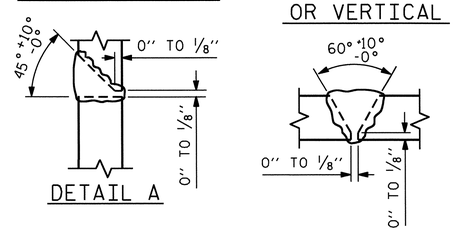
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)



△ PILE VERTICAL

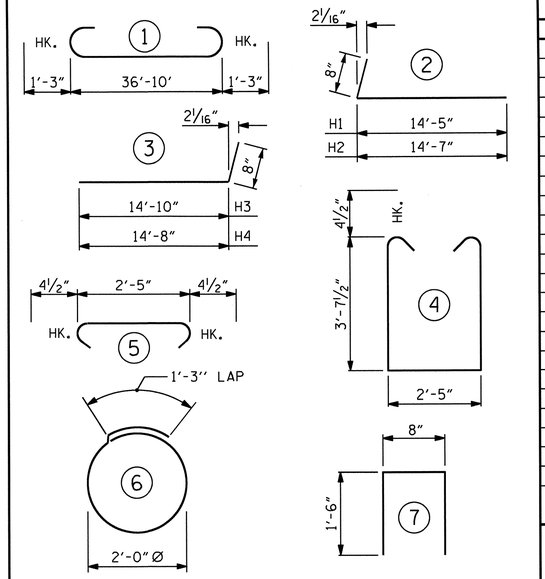
△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT 1	END BENT 2
HP 14 X 53 STEEL PILES	HP 14 X 53 STEEL PILES
NO: 5 LIN. FT.= 75	NO: 5 LIN. FT.= 75
HP 14 X 53 STEEL PILE POINTS	HP 14 X 53 STEEL PILE POINTS
NO: 5 EACH	NO: 5 EACH

BILL OF MATERIAL FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	39'-4"	1070
B2	28	#4	STR	19'-9"	369
B3	10	#4	STR	2'-5"	16
D1	20	#8	STR	2'-3"	120
H1	16	#6	2	15'-1"	362
H2	16	#6	2	15'-3"	366
H3	16	#6	3	15'-6"	372
H4	16	#6	3	15'-4"	368
K1	12	#4	STR	3'-1"	25
K2	12	#4	STR	19'-9"	158
S1	48	#4	4	10'-5"	334
S2	48	#4	5	3'-2"	102
S3	20	#4	6	7'-7"	101
U1	31	#4	7	3'-8"	76
V1	77	#4	STR	7'-8"	394
V2	62	#4	STR	5'-10"	242

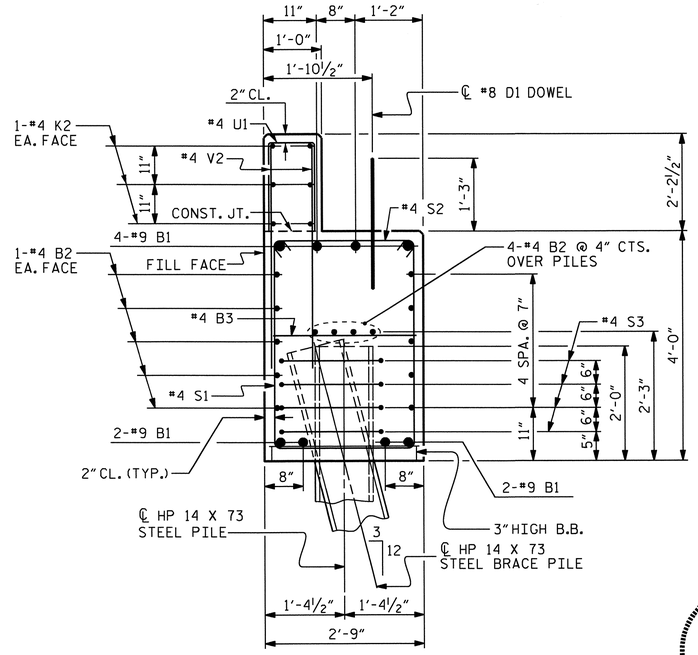
REINFORCING STEEL (FOR ONE END BENT) 4461 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 20.3 C.Y.

POUR #2 BACKWALL & UPPER PART OF WINGS 7.7 C.Y.

TOTAL CLASS A CONCRETE 28.0 C.Y.



SECTION A-A

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

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TUNG HSIANG LANG

7/10/13

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENTS 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			16

ASSEMBLED BY : R.P.PATEL	DATE : 5-25-12
CHECKED BY : P. K. NEWTON	DATE : 9-12
DRAWN BY : WJH 12/11	
CHECKED BY : AAC 12/11	

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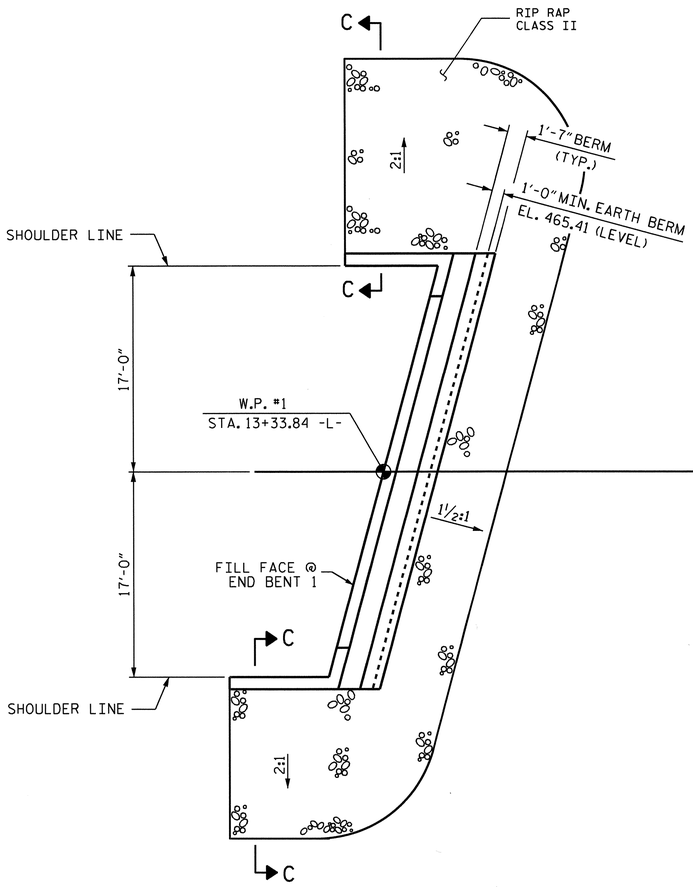
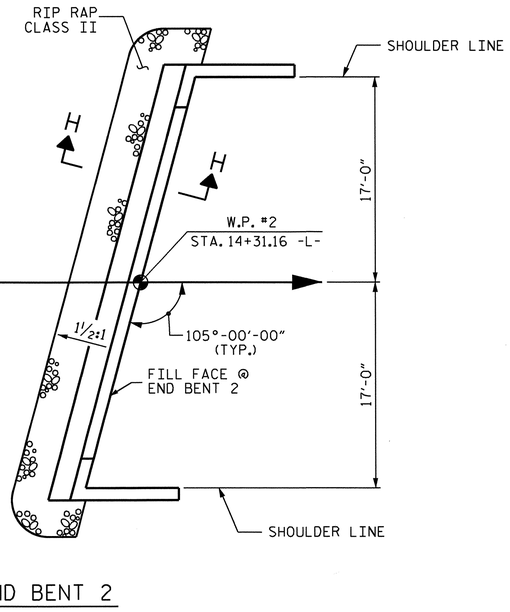
tjkirschbaum

STD. NO. EB_30_105S4_39BB

ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+82.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	75	85
END BENT 2	10	0

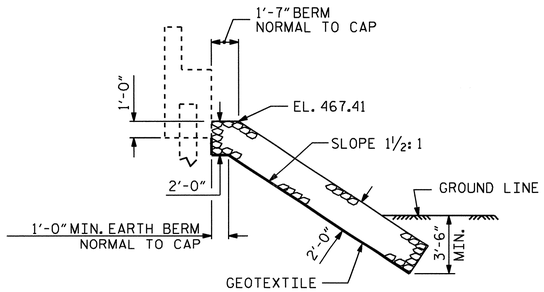


END BENT 1



END BENT 2

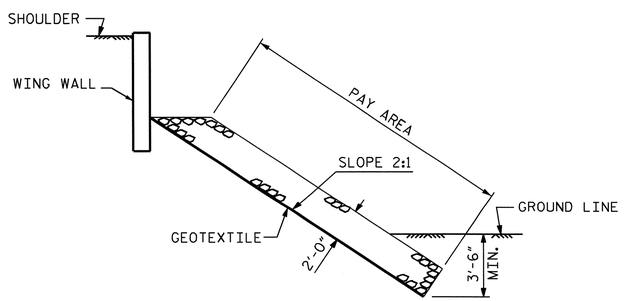
PLAN OF RIP RAP



℄ SECTION

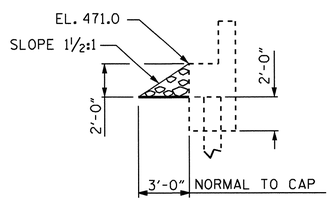
BERM RIP RAPPED

AT END BENT 1



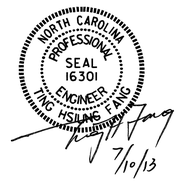
SECTION C-C

AT END BENT 1



SECTION H-H

AT END BENT 2



PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

ASSEMBLED BY : R.P.PATEL	DATE : 5-24-12
CHECKED BY : P. K. NEWTON	DATE : 10-12
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			16

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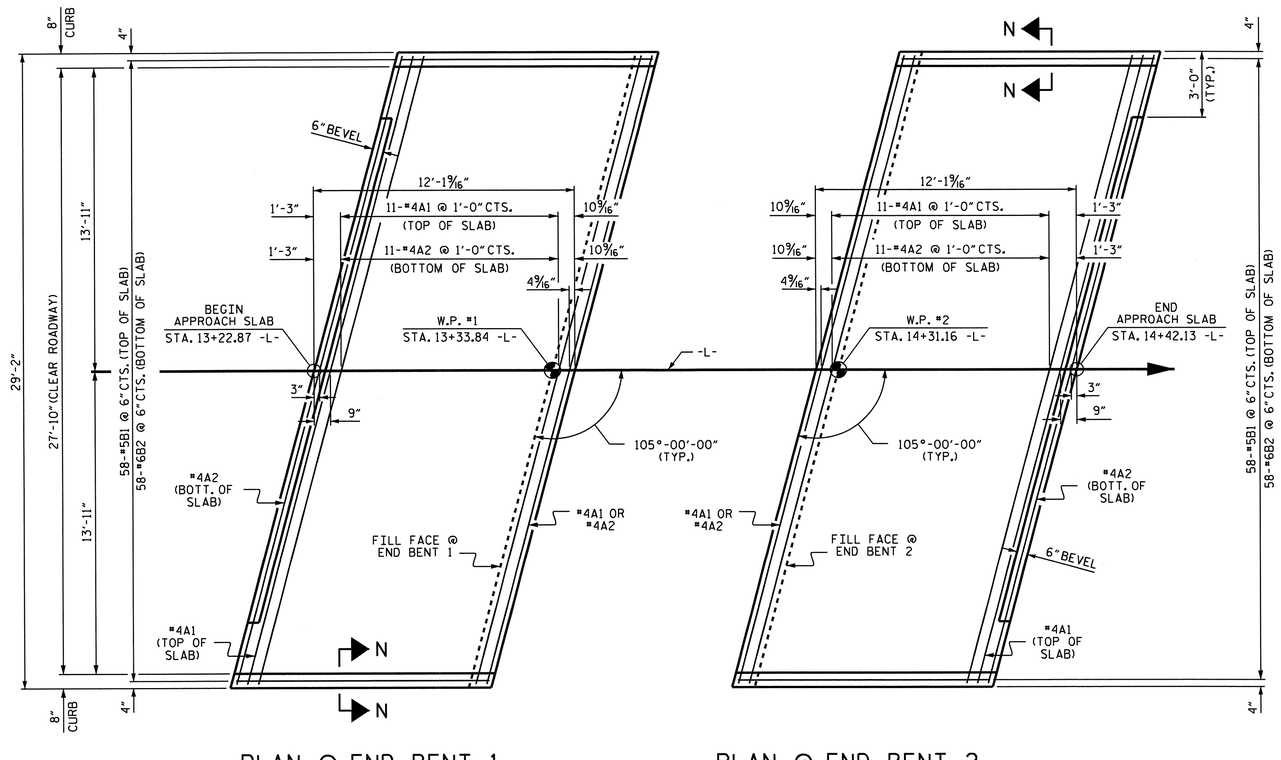
tjkirschbaum

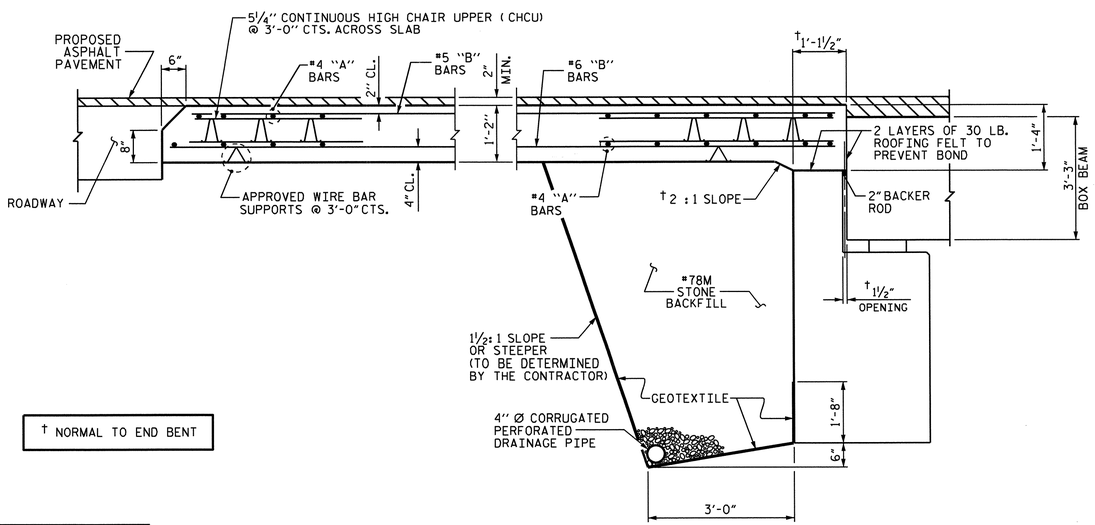
STD. NO. RR1



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

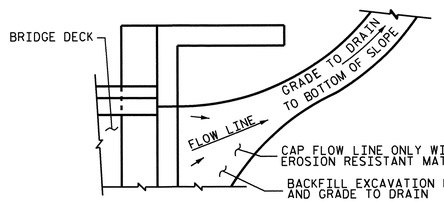
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

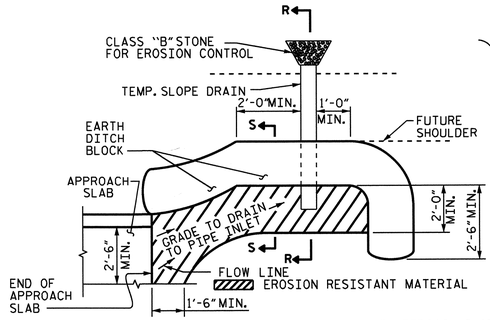
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



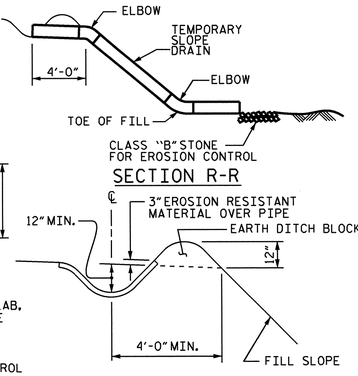
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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.

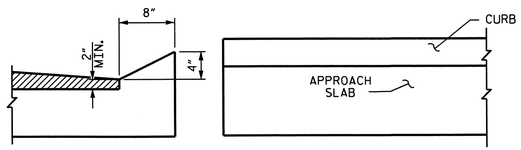
PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

END OF CURB WITH SHOULDER BERM GUTTER

CURB DETAILS

BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	29'-10"	259
A2	13	#4	STR	29'-10"	259
* B1	58	#5	STR	11'-1"	670
B2	58	#6	STR	11'-7"	1009
REINFORCING STEEL				LBS.	1268
* EPOXY COATED REINFORCING STEEL				LBS.	929
CLASS AA CONCRETE				C. Y.	15.6

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	29'-10"	259
A2	13	#4	STR	29'-10"	259
* B1	58	#5	STR	11'-1"	670
B2	58	#6	STR	11'-7"	1009
REINFORCING STEEL				LBS.	1268
* EPOXY COATED REINFORCING STEEL				LBS.	929
CLASS AA CONCRETE				C. Y.	15.6

SPLICE LENGTHS

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

PROJECT NO. B-4730

CHATHAM COUNTY

STATION: 13+82.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT (SUB-REGIONAL TIER) 105° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER
7/10/13

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

ASSEMBLED BY : R.P.PATEL	DATE : 5-25-12	
CHECKED BY : P. K. NEWTON	DATE : 10-12	
DRAWN BY : MAA 11/11		
CHECKED BY : AAC 11/11		

10-JUL-2013 12:55
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tjkirschbaum

STD. NO. BAS_BB_30_105S

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 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM @ RGW REV. 5-7-03 RWW @ JTE REV. 10-1-11 MAA @ GW
REV. 8-16-99 RWW @ LES REV. 5-1-06 TLA @ GW