

TIP NO: B-5014E

CONTRACT: DA00216

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

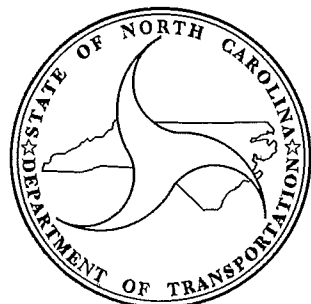
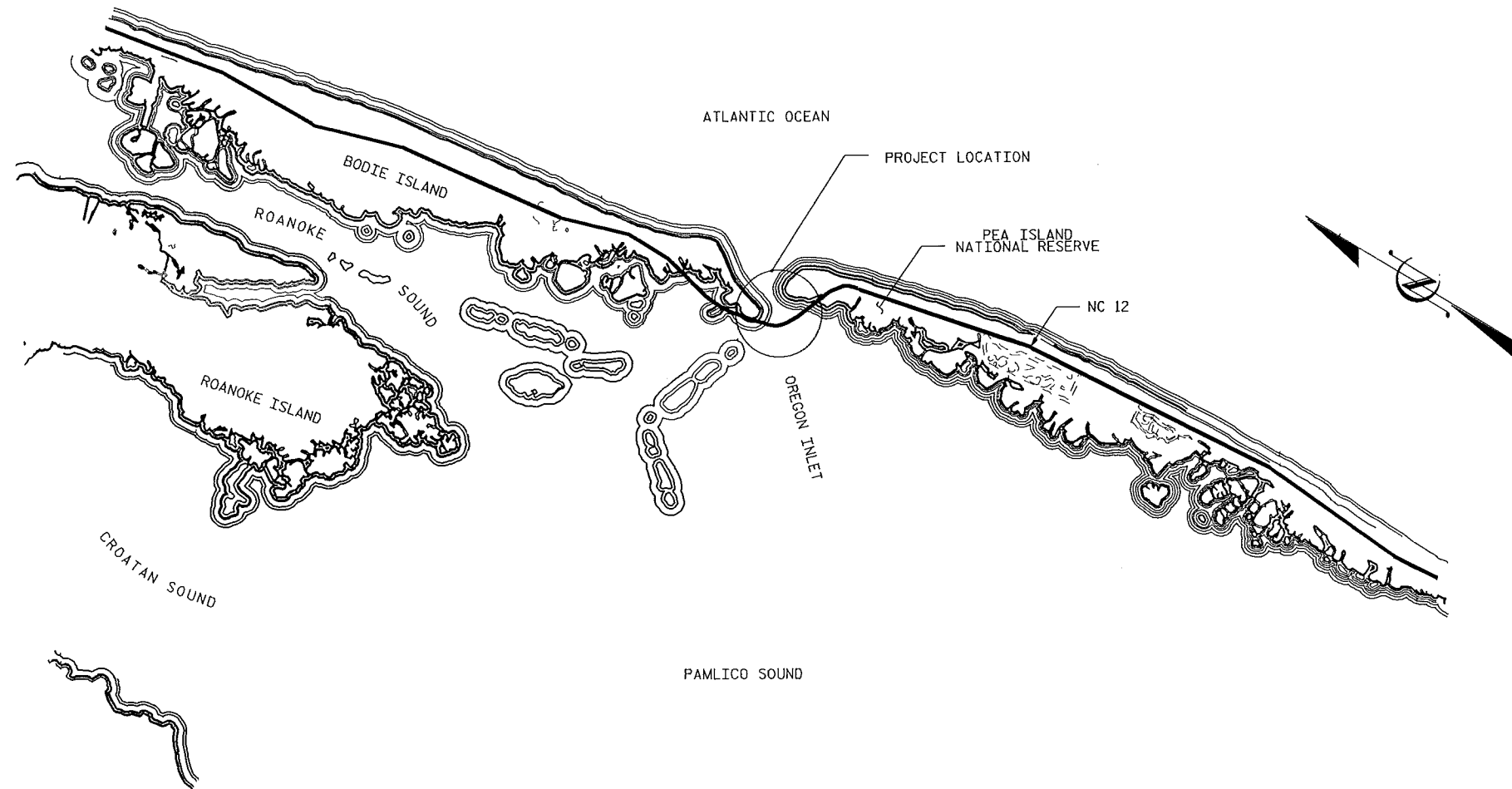
DARE COUNTY



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5014E	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41470.1.1	B-5014E	P.E.	
41470.3.6	B-5014E	CONST.	

LOCATION: DARE COUNTY:
BRIDGE #11 ON NC 12

TYPE OF WORK: BRIDGE PRESERVATION - CRUTCH BENT REPAIRS AT BENT 108 - 114.



DESIGN DATA	
DARE COUNTY	
#11 ADT 2010	= 3700

PROJECT LENGTH	
DARE COUNTY	
#11	= 2.44 MILES

Prepared in the Office of:
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
 STRUCTURES MANAGEMENT UNIT - PRESERVATION & REPAIR GROUP
 1000 BIRCH RIDGE DR, RALEIGH, N.C. 27610

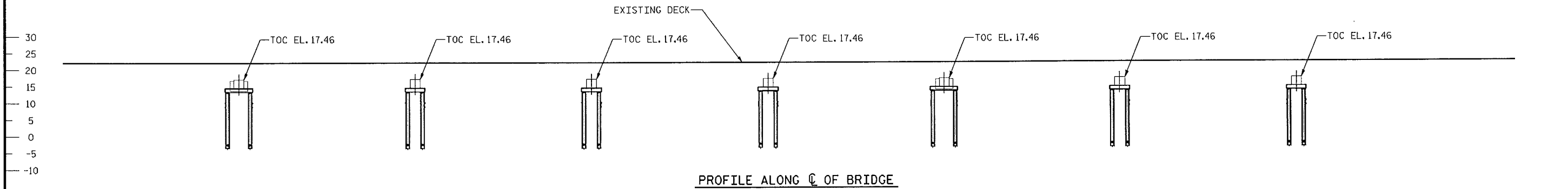
TIMOTHY M. SHERRILL, P.E.
 PROJECT ENGINEER

2012 STANDARD SPECIFICATIONS

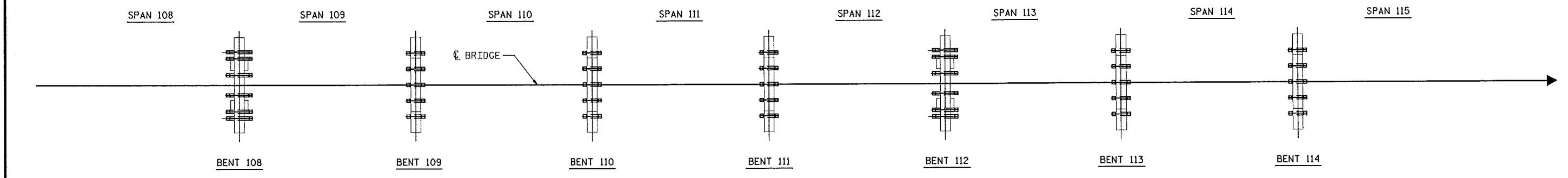
LETTING DATE:
 NOVEMBER 19, 2014

W. MATTHEW CLARKE, P.E.
 PROJECT DESIGN ENGINEER

9-19-2014



PROFILE ALONG C OF BRIDGE



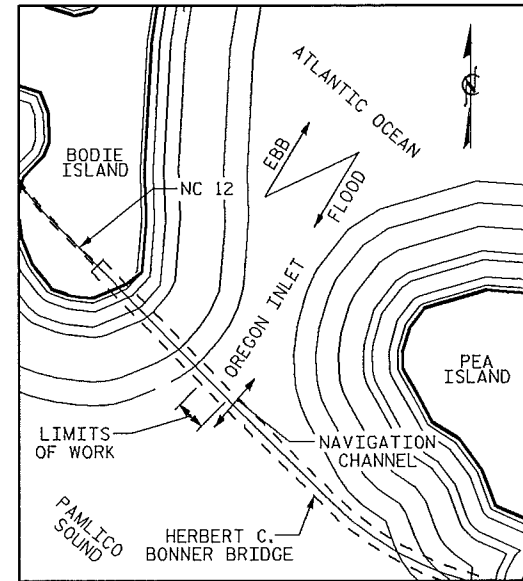
PARTIAL PLAN OF BRIDGE

NOTES

- ASSUMED LIVE LOAD = H15-S12(44).
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- PARTIAL REMOVAL OF THE EXISTING CRUTCH BENTS TO 17'-0" BELOW BOTTOM OF CONCRETE CAP AT BENTS 108 THROUGH 114 SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER.
- BOLT HOLES IN H-PILES AND SPLICE PLATES SHALL BE OVERSIZED TO ACCOMMODATE GALVANIZED COATING. THE HOLE DIAMETER SHALL BE SPECIFIED ON THE SHOP DRAWINGS.
- VENT HOLES FOR GALVANIZED MEMBERS SHALL BE SPECIFIED ON THE SHOP DRAWINGS PRIOR TO FABRICATION.
- WELDING OF TEMPORARY MEMBERS FOR SUPPORT DURING CONSTRUCTION IS NOT ALLOWED WITHOUT APPROVAL BY THE ENGINEER. TEMPORARY BOLTED CONNECTIONS MUST BE SHOWN ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.
- THE CONTRACTOR SHALL SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 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.
- FOR SECURING OF VESSELS, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR WORK IN, OVER OR NEAR NAVIGABLE WATERS, SEE SPECIAL PROVISIONS.
- FOR TEMPORARY TRAFFIC CONTROL, SEE SPECIAL PROVISIONS.
- FOR PARTIAL REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.
- SUBMIT WORK PLAN FOR REVIEW AND APPROVAL FOR ALL OPERATIONS RELATED TO CRUTCH BENT CONSTRUCTION, INCLUDING BUT NOT LIMITED TO: PARTIAL REMOVAL OF EXISTING CRUTCH BENT, PLACEMENT OF FORMWORK AND FALSEWORK, AND CRUTCH BENT ERECTION.

— TOTAL BILL OF MATERIAL —

	MOBILIZATION	TEMPORARY TRAFFIC CONTROL	PARTIAL REMOVAL OF EXISTING STRUCTURE	STRUCTURAL STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	APPROX. LBS.
BENT 108				17,300
BENT 109				13,900
BENT 110				13,900
BENT 111				13,900
BENT 112				17,300
BENT 113				13,900
BENT 114				13,900
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	104,100



LOCATION SKETCH

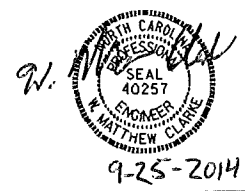
I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS

PROJECT NO. B-5014E
DARE COUNTY

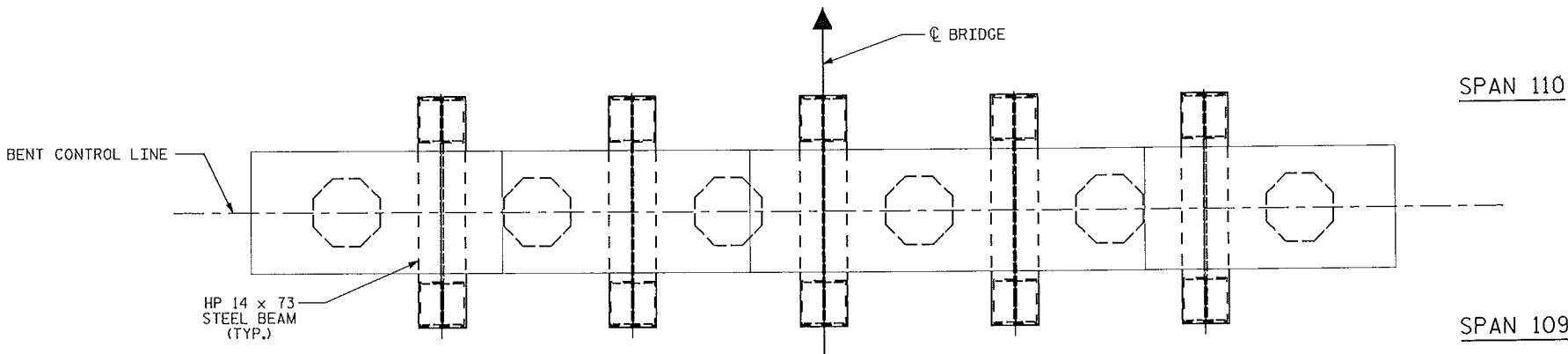
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BENTS 108 THROUGH 114

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



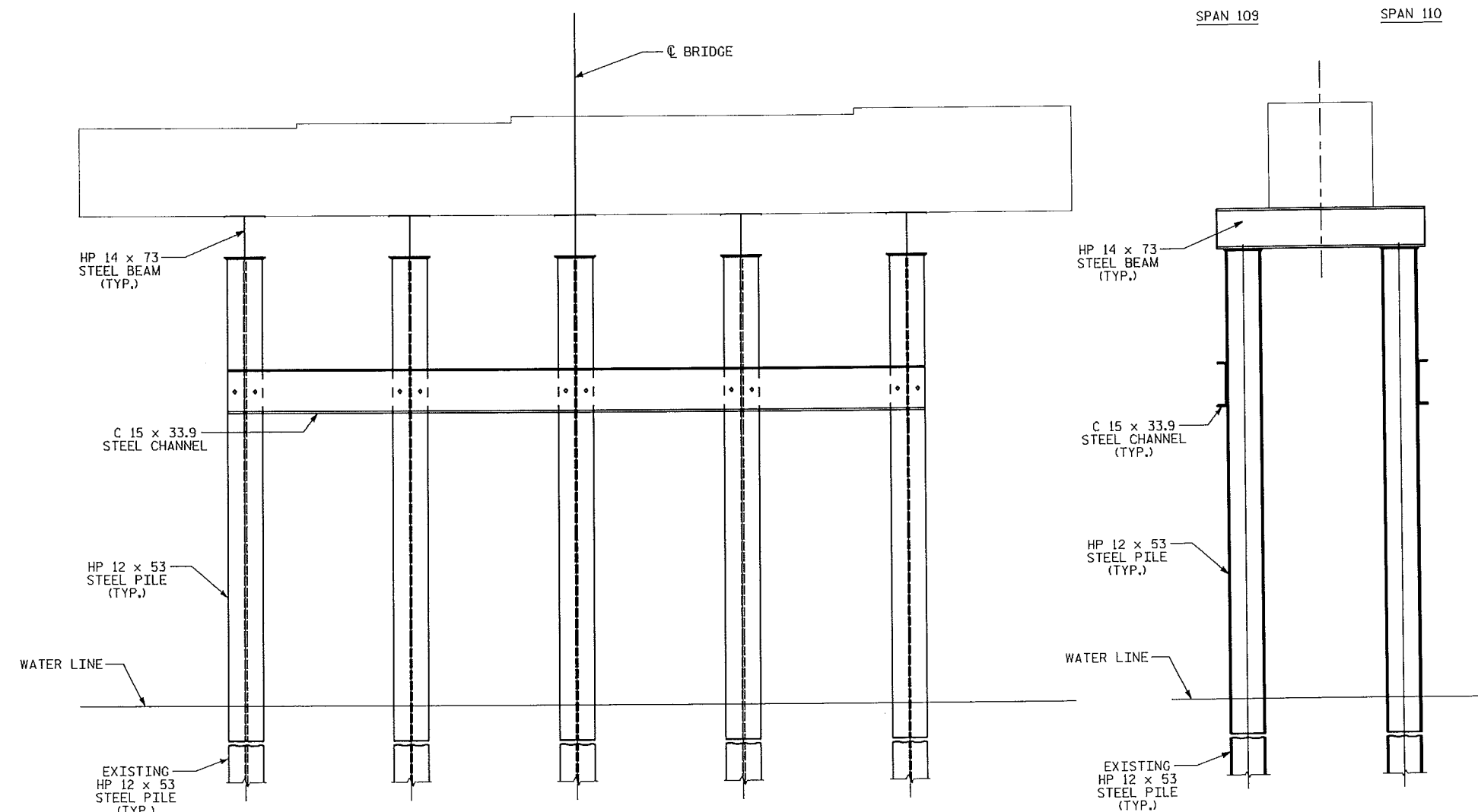
DRAWN BY : M.A. ALLEN / M.A. LEE DATE : 9/2014
 CHECKED BY : W.M. CLARKE DATE : 9/2014
 DESIGN ENGINEER OF RECORD : W.M. CLARKE DATE : 9/2014



PLAN - BENT 109

NOTES

- STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.
- TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- GALVANIZE ALL PILES, BEAMS, CHANNELS, PLATES, HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- USE AN ASTM F436 HARDENED WASHER OR DTI OVER STANDARD HOLES, UNDER EACH NUT OR BOLT.
- USE A 5/16" MIN. PLATE WASHER OVER SLOTTED HOLES IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.



ELEVATION - BENT 109

BENT 109 SHOWN - BENT 110, 111, 113, AND 114 SIMILAR (CONCRETE PILES NOT SHOWN FOR CLARITY)

ELEVATION - CRUTCH BENTS

BILL OF MATERIAL AT ONE BENT				
MEMBER TYPE	*APPROXIMATE LENGTH	NO. REQ'D	TOTAL LENGTH	WEIGHT (LBS.)
HP 14x73	6'-0"	5	30'-0"	2,190
HP 12x53	15'-9 1/2"	10	157'-11"	8,370
C 15x33.9	21'-0"	2	42'-0"	1,424
PLATES, BOLTS & ETC.				1,916
TOTAL WEIGHT				13,900 LBS.

*CONTRACTOR TO VERIFY DIMENSIONS PRIOR TO FABRICATION.

PROJECT NO. B-5014E
DARE COUNTY

SHEET 1 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

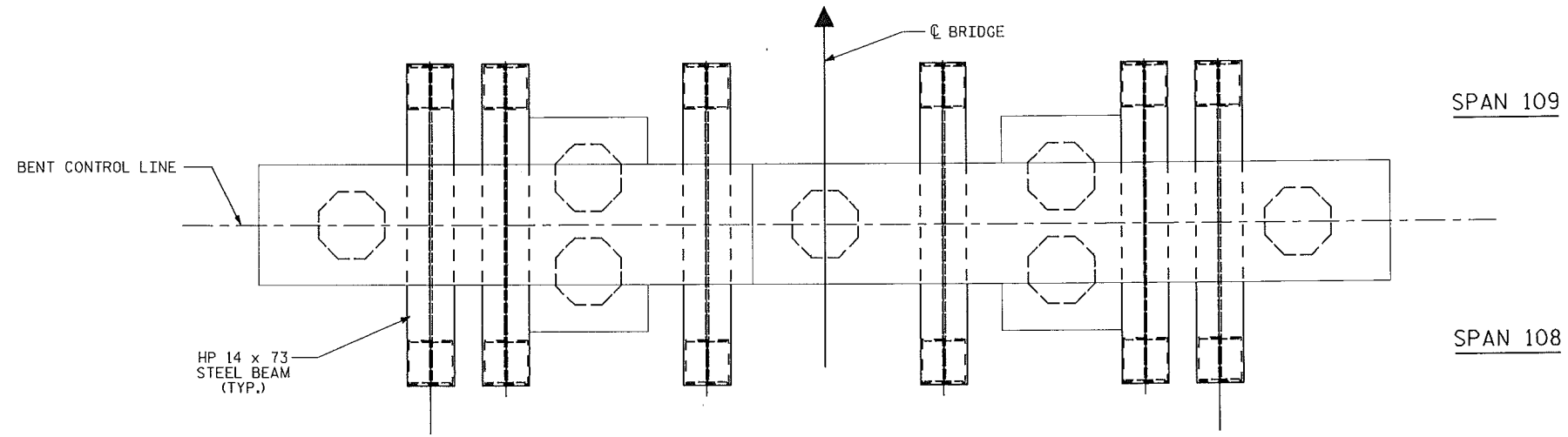
CRUTCH BENTS AT
 BENTS 109, 110, 111,
 113, & 114



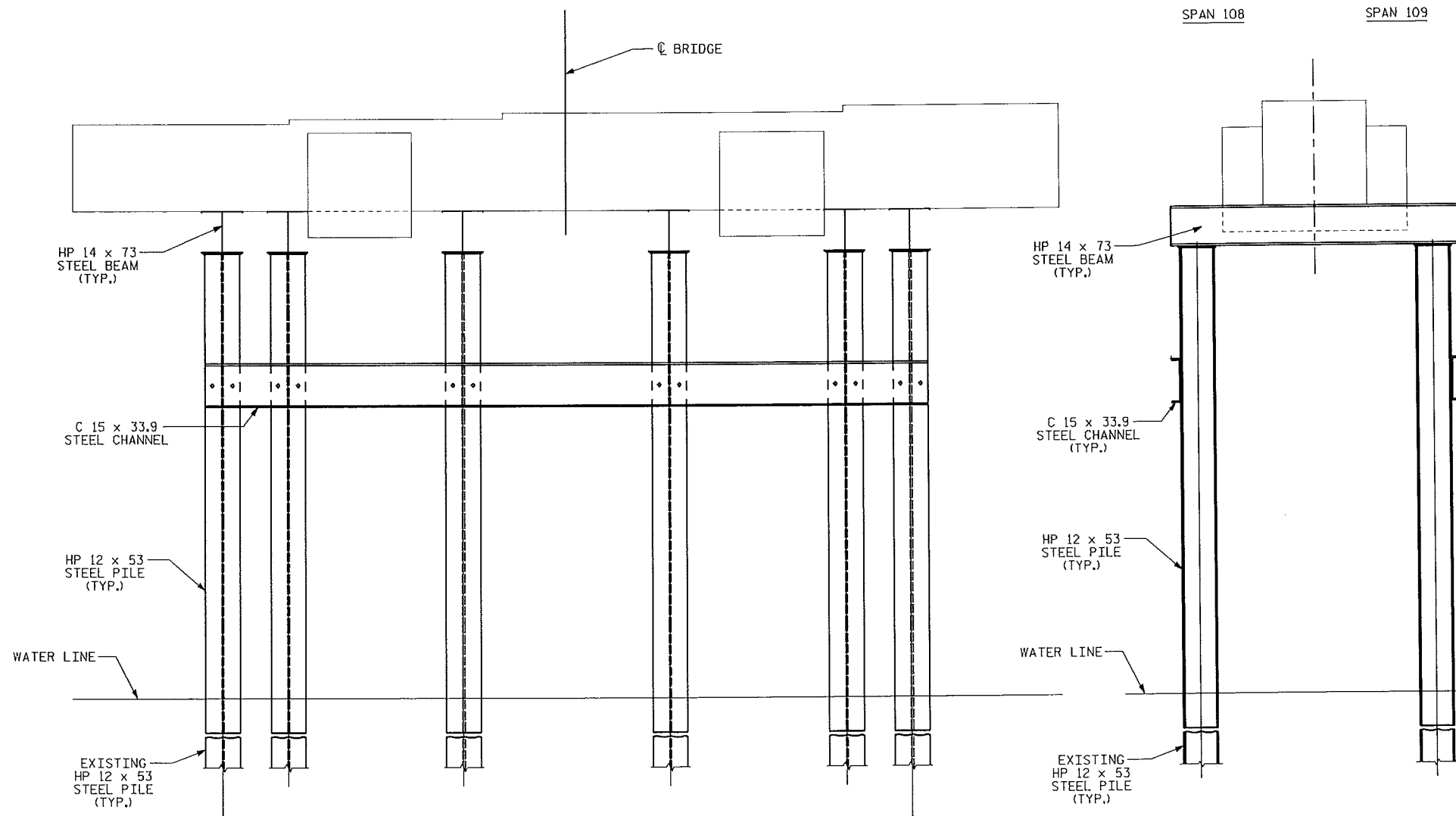
9-19-2014

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



PLAN - BENT 108



ELEVATION - BENT 108
BENT 108 SHOWN - BENT 112 SIMILAR
(CONCRETE PILES NOT SHOWN FOR CLARITY)

ELEVATION - CRUTCH BENTS

NOTES

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

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

GALVANIZE ALL PILES, BEAMS, CHANNELS, PLATES, HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER OR DTI OVER STANDARD HOLES, UNDER EACH NUT OR BOLT.

USE A 5/16" MIN. PLATE WASHER OVER SLOTTED HOLES IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

BILL OF MATERIAL AT ONE BENT				
MEMBER TYPE	*APPROXIMATE LENGTH	NO. REQ'D	TOTAL LENGTH	WEIGHT (LBS.)
HP 14x73	8'-0"	6	48'-0"	3,504
HP 12x53	15'-9 1/2"	12	189'-6"	10,044
C 15x33.9	21'-0"	2	42'-0"	1,424
PLATES, BOLTS & ETC.				2,328
TOTAL WEIGHT				17,300 LBS.

*CONTRACTOR TO VERIFY DIMENSIONS PRIOR TO FABRICATION.

PROJECT NO. B-5014E
DARE COUNTY

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HALEIGH

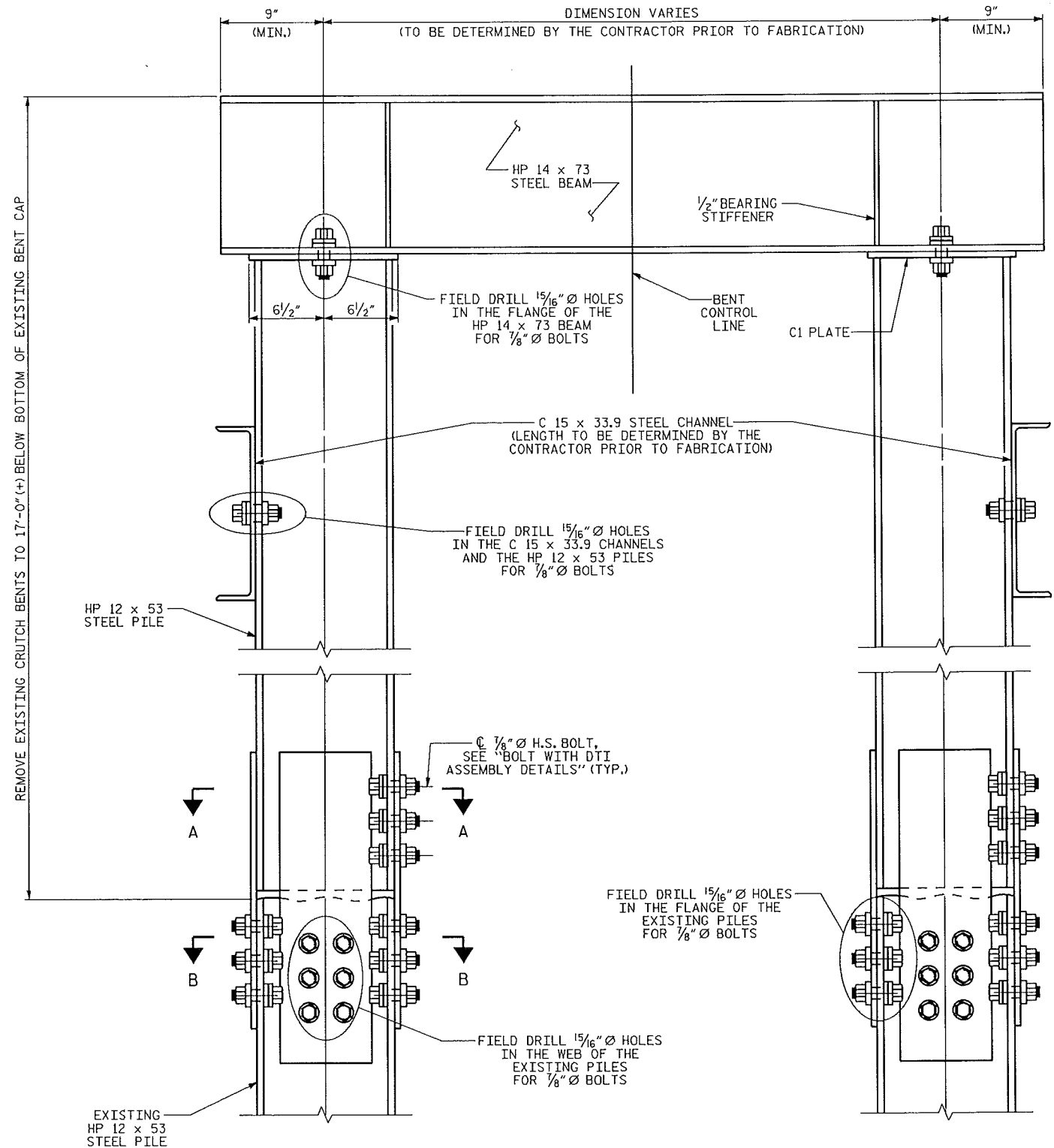
CRUTCH BENTS AT
BENTS 108 & 112



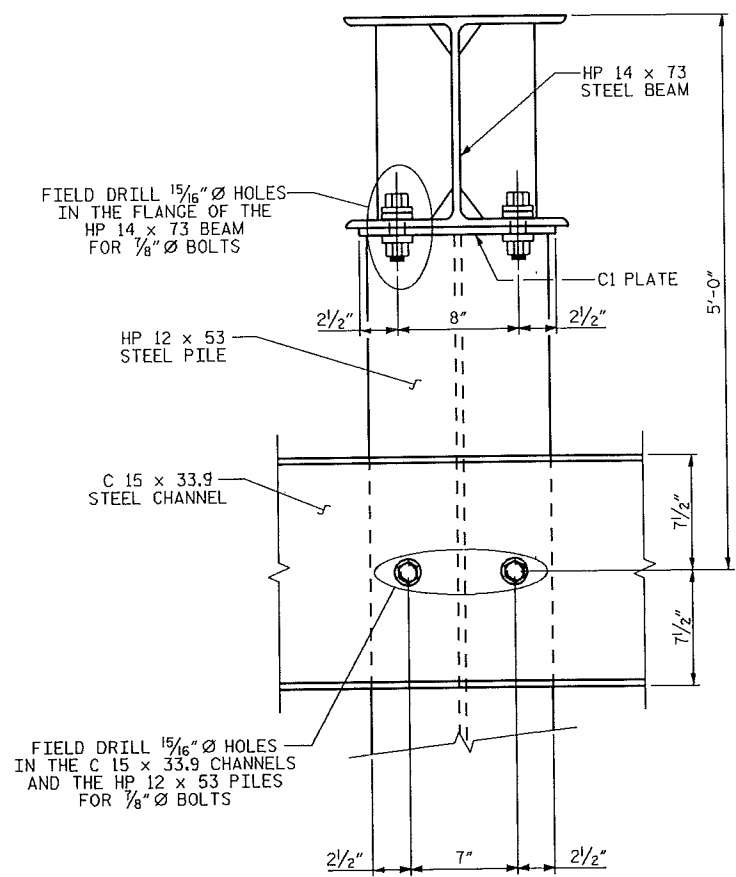
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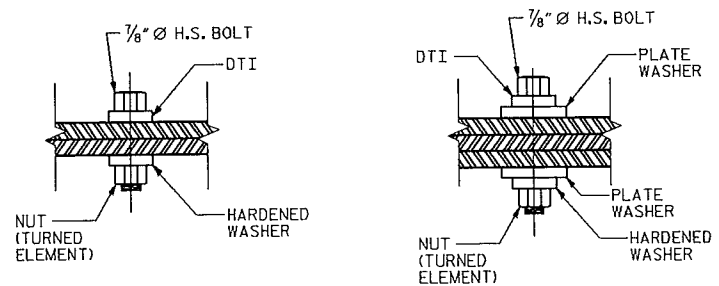
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2			4			7



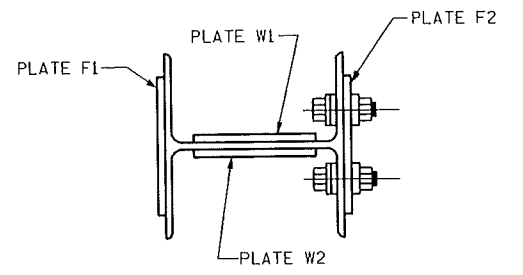
TYPICAL CRUTCH BENT ELEVATION



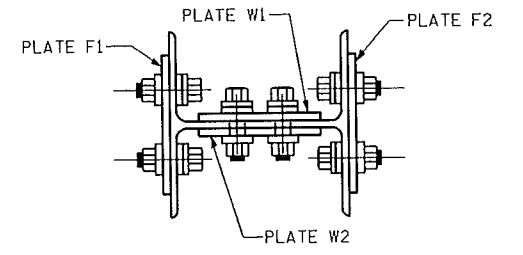
PARTIAL END ELEVATION



BOLT WITH DTI ASSEMBLY DETAILS



SECTION A-A (TYP.)



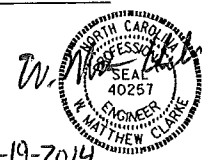
SECTION B-B (TYP.)

PROJECT NO. B-5014E
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SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

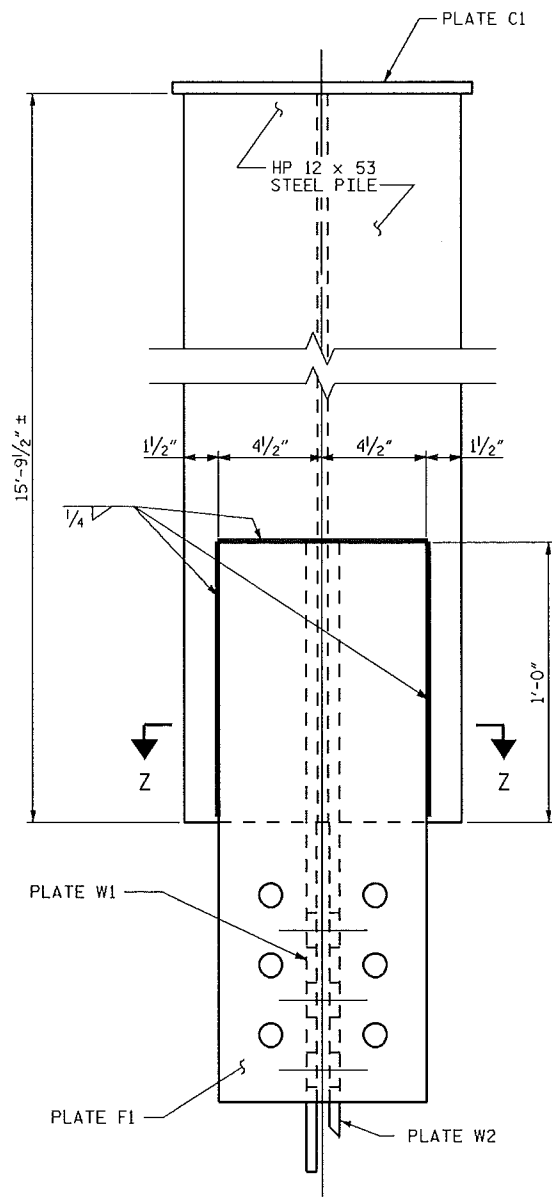
CRUTCH BENT
DETAILS
AT BENTS 108 - 114



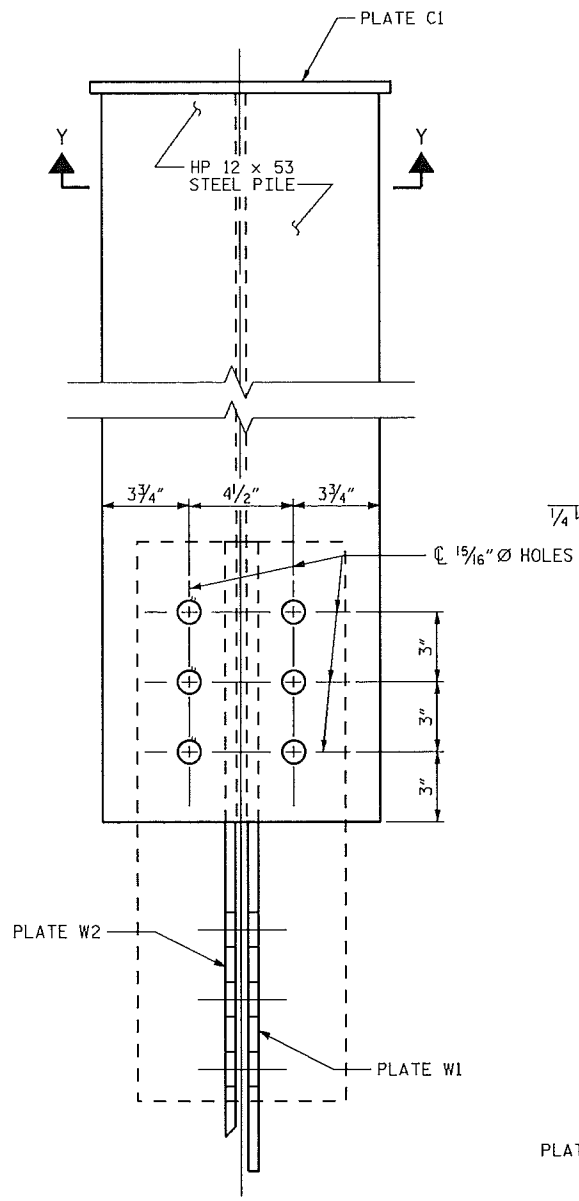
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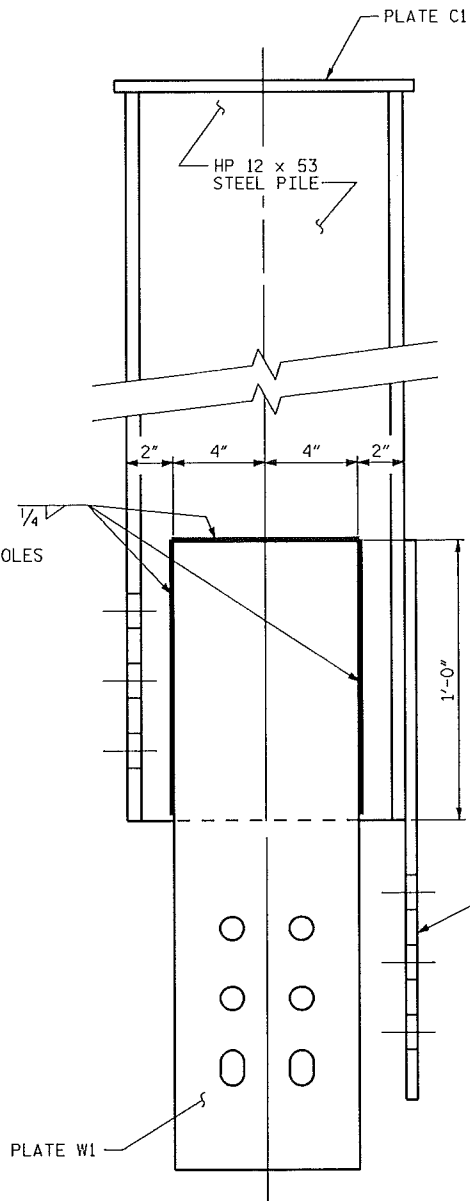
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NO.	BY	DATE	NO.	BY	DATE	S-4
1			3			TOTAL SHEETS
2			4			7



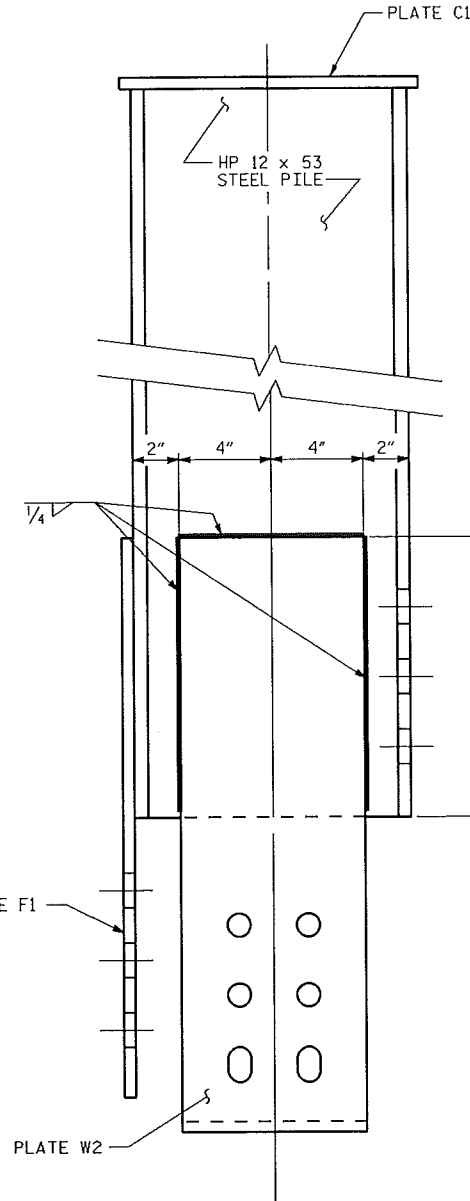
ELEVATION AT PLATE F1



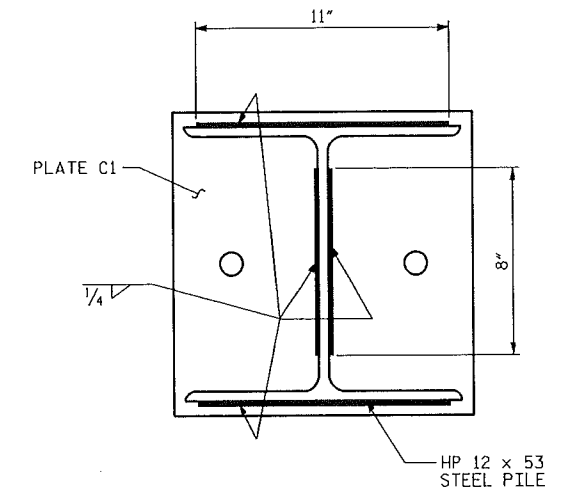
ELEVATION AT PLATE F2
(PLATE F2 TO BE BOLTED IN FIELD)



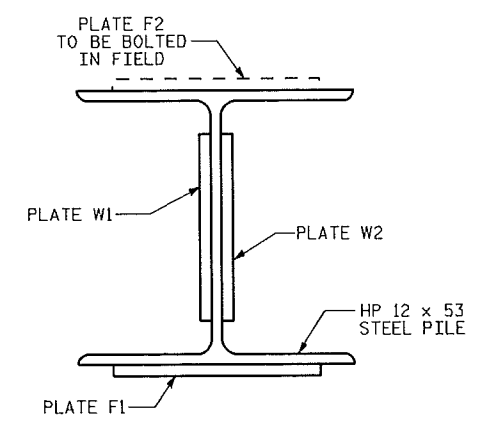
ELEVATION AT PLATE W1
(HOLES AND SLOTS IN PLATE W1 & W2 SHALL BE PRECISELY ALIGNED WHEN WELDED TO PILES)



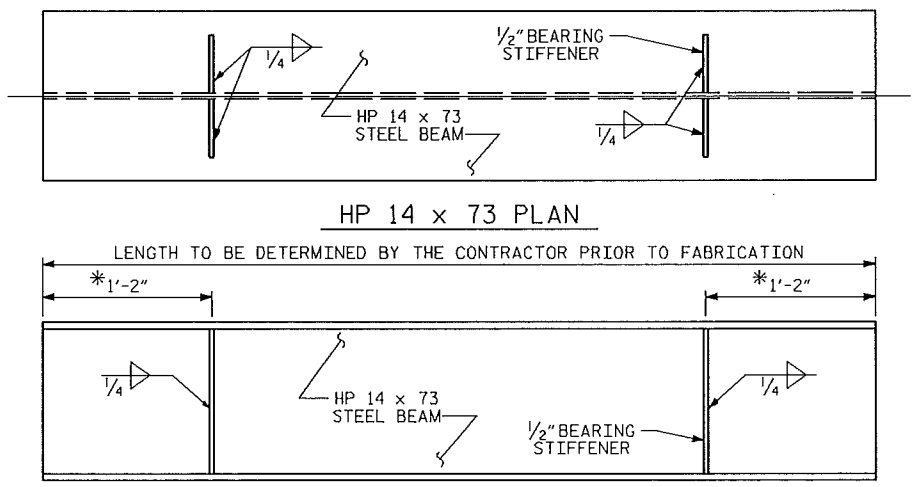
ELEVATION AT PLATE W2
(HOLES AND SLOTS IN PLATE W1 & W2 SHALL BE PRECISELY ALIGNED WHEN WELDED TO PILES)



SECTION Y-Y

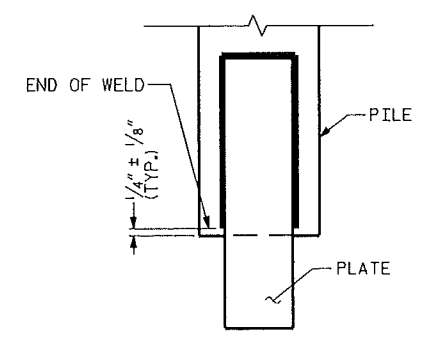


SECTION Z-Z

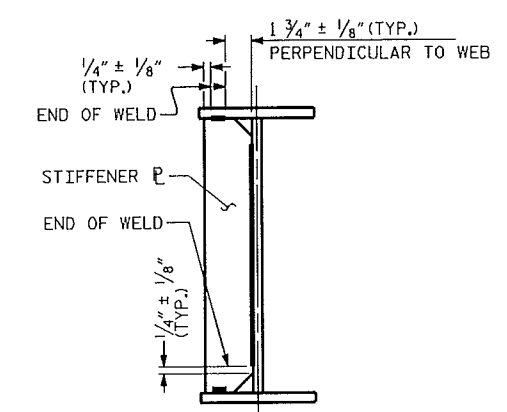


HP 14 x 73 ELEVATION

PILE ELEVATIONS



TYPICAL PLATE TO PILE CONNECTION



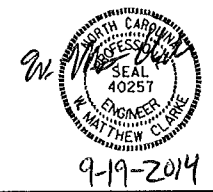
TYPICAL STIFFENER PLATE CONNECTIONS

WELD TERMINATION DETAILS

PROJECT NO. B-5014E
DARE COUNTY

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CRUTCH BENT
DETAILS
AT BENTS 108 - 114



9-19-2014

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* BEARING STIFFENER SHOULD LINE UP WITH EDGE OF PILE.

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5	
1			3			TOTAL SHEETS	7
2			4				

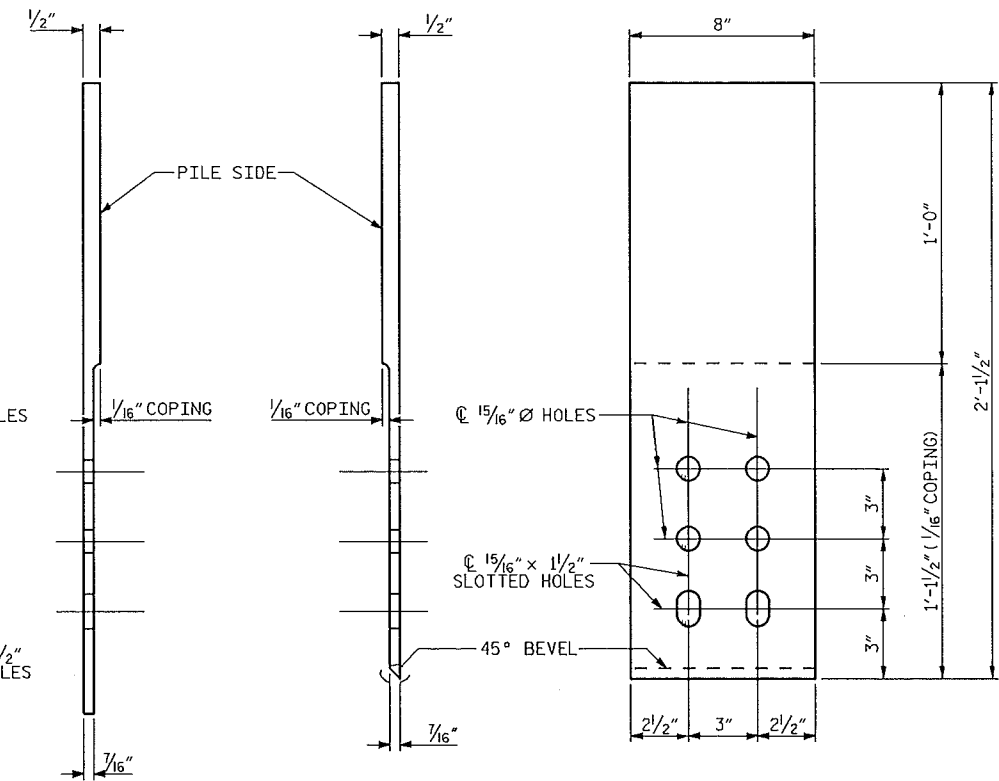
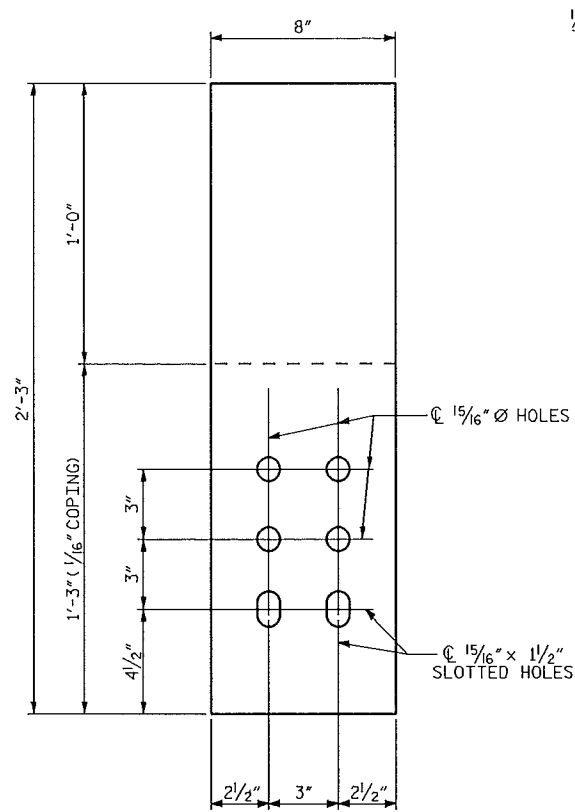
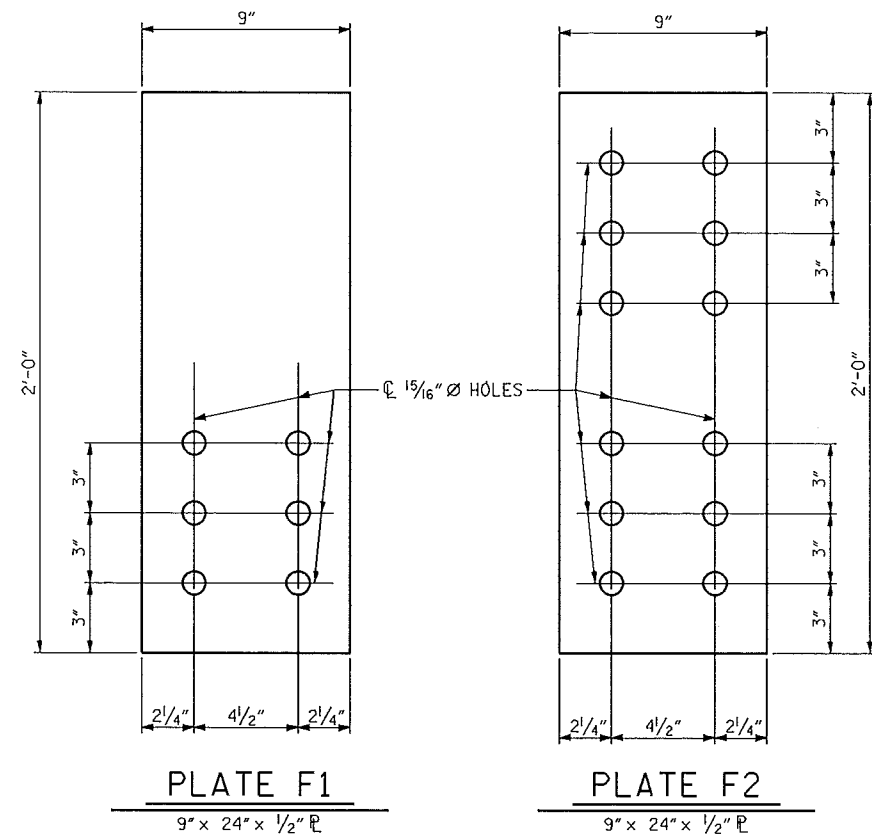


PLATE W1
8" x 27" x 1/2" P

PLATE W2
8" x 25 1/2" x 1/2" P

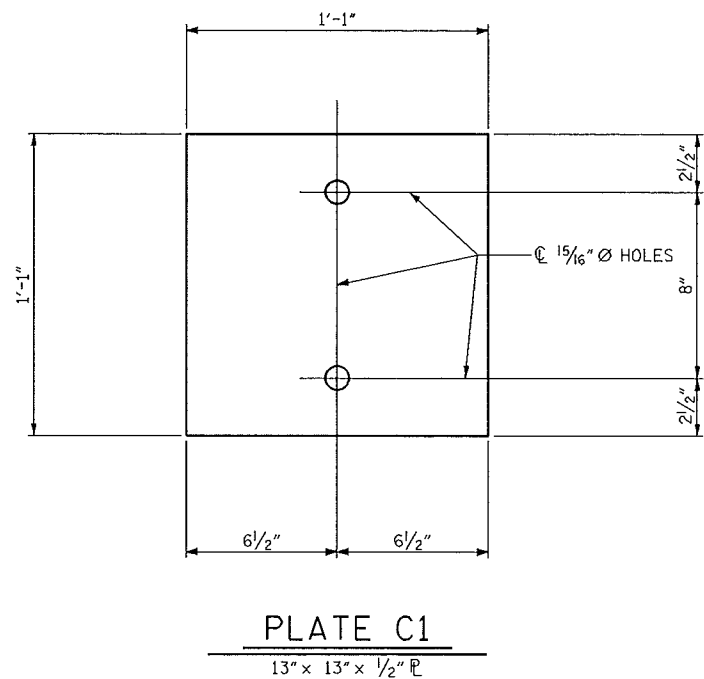
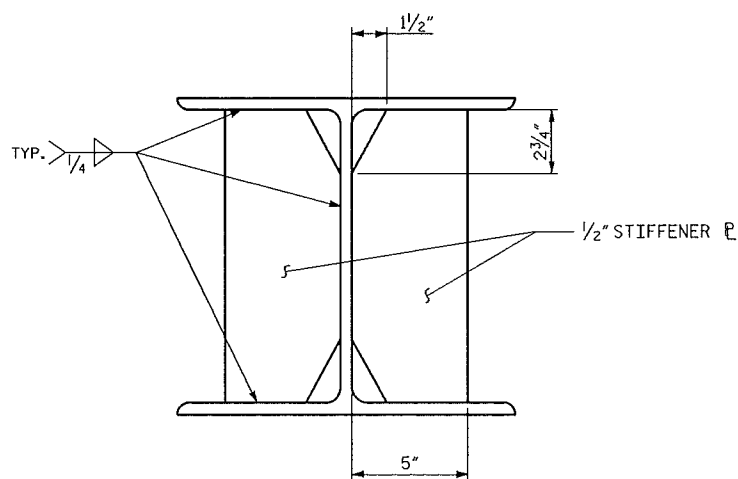


PLATE C1
13" x 13" x 1/2" P



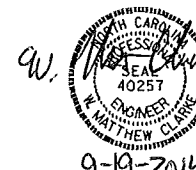
STIFFENER PLATE

PROJECT NO. B-5014E
DARE COUNTY

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CRUTCH BENT
DETAILS
AT BENTS 108 - 114



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

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

SPECIAL NOTES:

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

ENGLISH

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