09/08/99

PROJECT: BR–0113

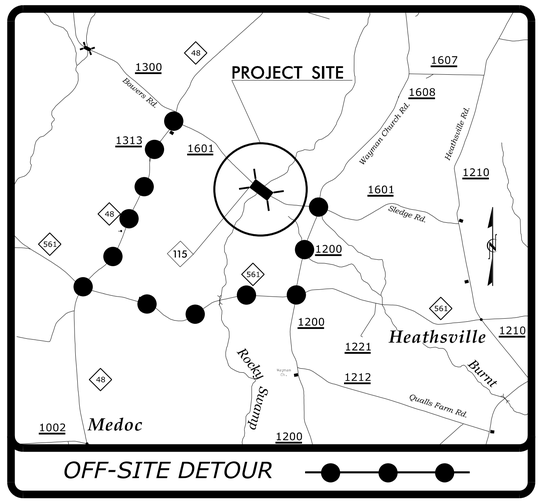
CONTRACT: C204531

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HALIFAX COUNTY

LOCATION: BRIDGE NO. 410115 OVER ROCKY SWAMP ON SR 1601 (SLEDGE RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR–0113		

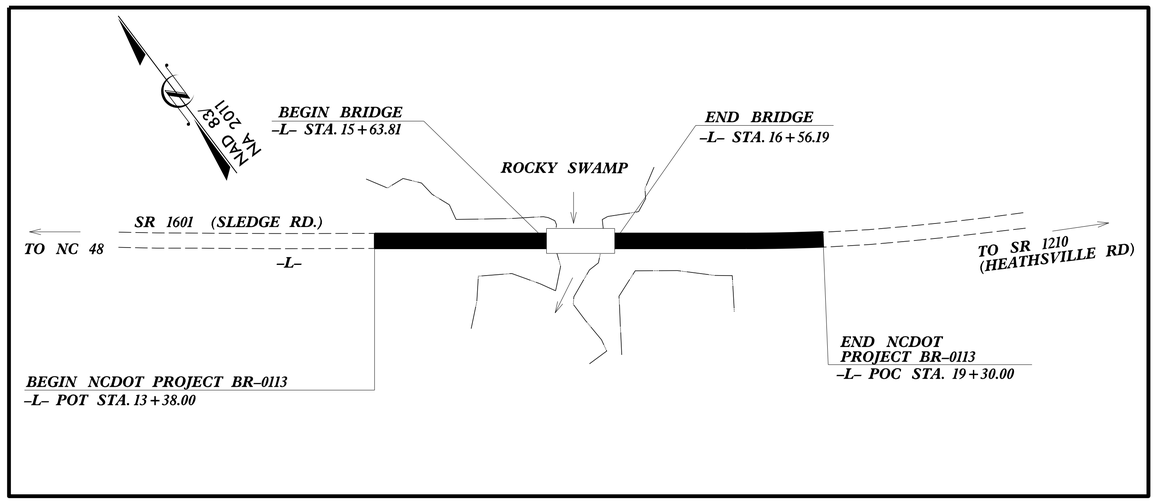
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48822.1.1		PE
48822.2.1		ROW, UTIL.
48822.3.1	2020001	CONST.

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F–0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION

BRIDGE #410115

STRUCTURE PLANS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2019 = 340

T = 6 % *
V = 55 MPH

* (TTST = 3% + DUAL = 3%)
FUNC CLASS = RURAL LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BR–0113 =	0.095 MILES
LENGTH STRUCTURE PROJECT BR–0113 =	0.017 MILES
TOTAL LENGTH PROJECT BR–0113 =	0.112 MILES

NCDOT CONTACT: DAVID STUTTS, PE
PROJECT ENGINEER – PEF/PROGRAM MGT.

Prepared for:
DIVISION OF HIGHWAYS STRUCTURES MANAGMENT UNIT
1000 BIRCH RIDGE DRIVE RALEIGH NC, 27610

2018 STANDARD SPECIFICATIONS

LETTING DATE:
JANUARY 19, 2021

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

JOHN A. DILWORTH, PE
PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

11/18/2020
12:56:53 PM
P:\2019\9106.01_BR-0113\Structures\DGN\BR0113_SMU_TSH.dgn

F.A. PROJ. No: 2020001

15+25 15+50 15+75 16+00 16+25 16+50 16+75 17+00 17+25

190 180 170 160 150

PI = 14+15.00
EL = 184.36
VC = 153'
(-)1.7296% (+)0.3000%

GRADE DATA -L-

SPAN "A" SPAN "B"

FILL FACE @ END BENT 1
STA. 15+63.81 -L-
GRADE POINT EL. = 184.81

BEGIN FRONT SLOPE
STA. 15+57.90 -L-
GRADE POINT EL. = 184.79

1'-7" MIN. BERM (TYP.)

1½:1 SLOPE (TYP.)

EL. = 184.0±

FIXED

UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)

FIXED FIXED

EXISTING SUBSTRUCTURE (TYP.)

100 YR. EL. = 182.1

W.S.E. 177.7 2/07/2019

NWS EL. = 178.5

25 YR. EL. =181.2

1'-6" TO LIMITS OF UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)

EL. = 184.0±

FIXED

FILL FACE @ END BENT 2
STA. 16+56.19 -L-
GRADE POINT EL. = 185.08

BEGIN FRONT SLOPE
STA. 16+62.10 -L-
GRADE POINT EL. = 185.10

APPROXIMATE NATURAL GROUND LINE

EL. = 184.0±

2'-0" (TYP.)

3'-6" (TYP.)

HP 12x53 VERTICAL STEEL PILES

CLASS II RIP RAP W/GEOTEXTILE (TYP.)

EL. = 178.0±

EL. = 177.0±

RETAIN EXIST. TIMBER ABUTMENT. CUT OFF AT EL. 178.30

EXCAVATE TO EL. 178.30 GRADE TO DRAIN

HP 14x73 VERTICAL GALVANIZED STEEL PILES

EL. = 166.0±

EL. = 165.0±

EL. = 175.0±

EXCAVATE TO EL. 178.30 GRADE TO DRAIN

RETAIN EXIST. TIMBER ABUTMENT. CUT OFF AT EL. 178.30

HP 12x53 VERTICAL STEEL PILES

END BENT 1 BENT 1 END BENT 2

SECTION ALONG -L-

NAD 83

ROCK PLATING SEE ROADWAY PLANS

CLASS II RIP RAP (2'-0" THICK) W/GEOTEXTILE

1'-7" BERM EL. 180.37 (LEVEL)

ROCKY SWAMP

BENT 1 CONTROL LINE

W.P. #2
STA. 16+00.00 -L-

BRIDGE IDENTITY
STA. 16+10.00 -L-

1'-7" BERM EL. 180.64 (LEVEL)

ROCK PLATING SEE ROADWAY PLANS

CLASS II RIP RAP (2'-0" THICK) W/GEOTEXTILE

EXISTING SUBSTRUCTURE (TYP.)

W.P. #1
STA. 15+63.81 -L-

W.P. #3
STA. 16+56.19 -L-

BEGIN APPROACH SLAB
STA. 15+52.94 -L-

END APPROACH SLAB
STA. 16+67.06 -L-

TO NC 48

SR 1601

-L-

TO SR 1210

BEGIN FRONT SLOPE
STA. 15+57.90 -L-

BEGIN FRONT SLOPE
STA. 16+62.10 -L-

FILL FACE @ END BENT 1

FILL FACE @ END BENT 2

90°-00'-00" (TYP.)

10'-0"

46'-2¼"

36'-2¼"

56'-2¼"

FILL FACE @ END BENT 1 TO FILL FACE @ END BENT 2 TOTAL BRIDGE LENGTH = 92'-4½"

PLAN

(PILES NOT SHOWN IN PLAN VIEW)

HYDRAULIC DATA

DESIGN DISCHARGE	= 1500 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 181.2
DRAINAGE AREA	= 8.18 SQ. MI.
BASE DISCHARGE (Q100)	= 2100 C.F.S.
BASE HIGH WATER ELEVATION	= 182.1

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 4100± C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 184.6 *

* OT OCCURS @ CENTER -L- STA 14+68.9 ±, EL. = 184.6

LOW CHORD ELEVATIONS

	ELEVATION @ ℄ BRG.
END BENT 1	182.45
END BENT 2	182.72

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE #115

DRAWN BY : J. PENDERGRAFT DATE : 6-19
CHECKED BY : J. DILWORTH DATE : 8-19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

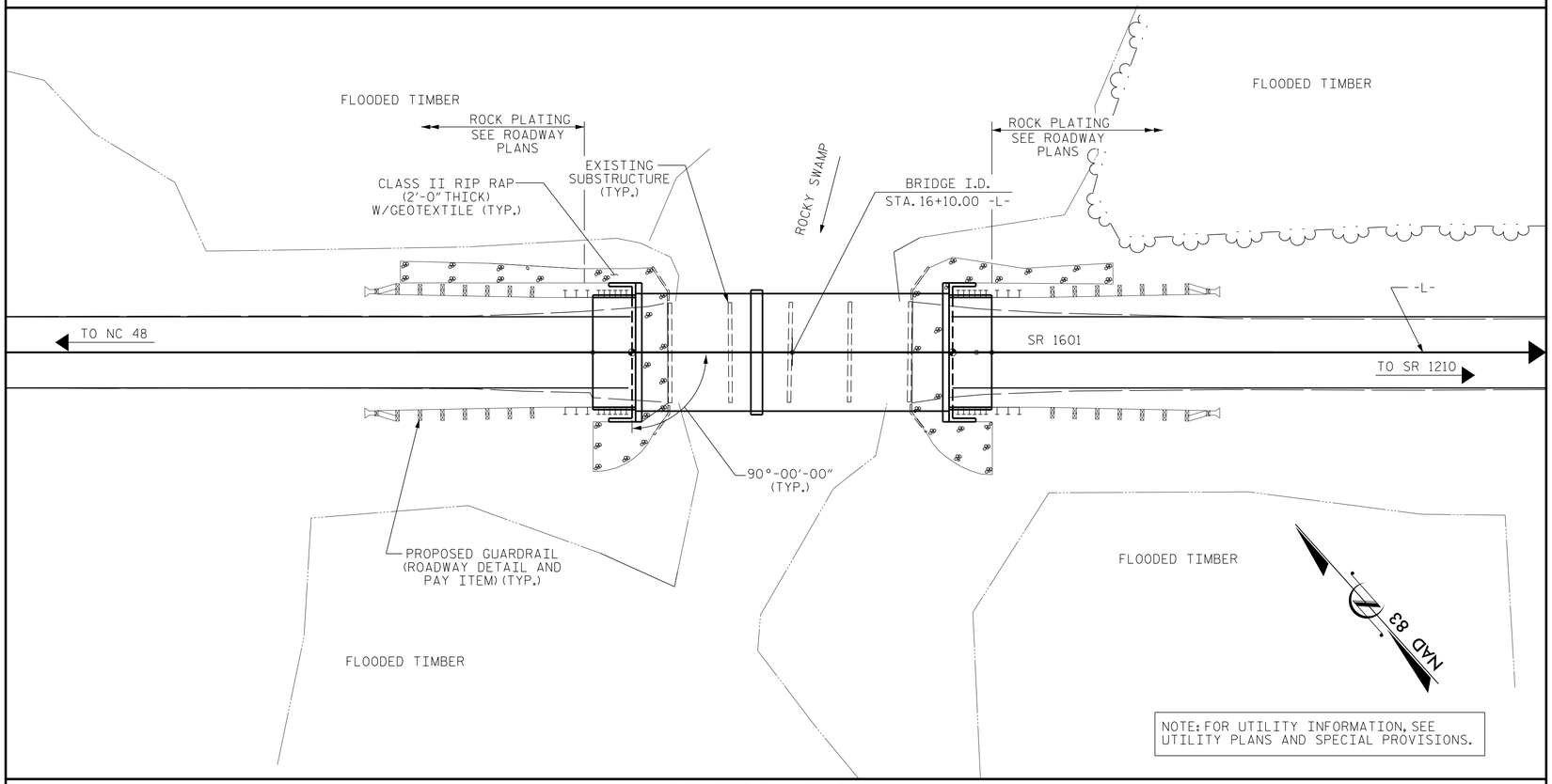
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON SR 1601 OVER ROCKY SWAMP BETWEEN NC 48 AND SR 1210

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

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_GD.dgn
1/7/2020 9:21:38 AM

BM-1 (BL STATION 10+31.01 48.72' LEFT 18 IN. OAK) (31.59' LT. OF STA. 15+37.05 -L-).; EL. 179.46 N 927952, E 2349583



NOTE: 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 SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 25 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 EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 17'-7"; 1 SPAN @ 16'-6"; 1 SPAN @ 16'-9", AND 1 SPAN @ 17'-5" WITH A CLEAR ROADWAY WITDTH OF 28'-0" AND HAVING A SUPERSTRUCTURE CONSISTING OF REINFORCED CONCRETE FLOOR ON TIMBER JOISTS AND A SUBSTRUCTURE OF TIMBER END BENT AND BENT CAPS ON TIMBER PILES WITH A STEEL CRUTCH BENT SHALL BE REMOVED. THE EXISTING STRUCTURE IS CURRENTLY POSTED FOR 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 DIFFERENCE BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT AND BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST-IN -PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COSTMTO THE CONTRACTOR.

FOR INTERIOR BENT No. 1, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEET FOR REQUIRED GALVANIZED LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZED STEEL PILES.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+10.00 -L-."

FOR FIBER OPTIC CONDUIT SYSTEM, SEE SPECIAL PROVISIONS.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 55 TONS PER PILE.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 118 TONS PER PILE.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 71 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

INSTALL PILES AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 142.0.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 163.0. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND f_y = 60ksi.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 GALVANIZED STEEL PILES	HP 12 X 53 STEEL PILES		HP 14x73 GALVANIZED STEEL PILES		PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS		FIBER OPTIC CONDUIT SYSTEM
	LUMP SUM	LUMP SUM	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EA.	EA.	NO.	LIN. FT.	NO.	LIN. FT.	EA.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	No.	LIN. FT.	LIN. FT.
SUPERSTRUCTURE															180.5			LUMP SUM	22	990.00	176.25
END BENT 1					21.6		2636	7		7	350			4		120	100				
BENT 1					10.7		2136		8			8	520	4							
END BENT 2					21.6		2636	7		7	385			4		115	95				
TOTAL	LUMP SUM	LUMP SUM	1	LUMP SUM	53.9	LUMP SUM	7408	14	8	14	735	8	520	12	180.5	235	195	LUMP SUM	22	990.00	176.25

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-

SHEET 2 OF 2

ENGINEER OF RECORD
4/29/2020
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
Docusigned by: John Arthur Dilworth
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON SR 1601
OVER ROCKY SWAMP
BETWEEN NC 48 AND SR 1210

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

DRAWN BY : J. PENDERGRAFT DATE : 6-19
CHECKED BY : J. DILWORTH DATE : 8-19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_GD.dgn
1/7/2020 9:24:26 AM

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	1.032	--	1.75	0.28	1.36	35'	EL	17	0.561	1.03	35'	EL	1.7	0.80	0.28	1.05	35'	EL	17	
		HL-93(Opr)	N/A	--	1.338	--	1.35	0.28	1.77	35'	EL	17	0.561	1.34	35'	EL	1.7	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.189	42.810	1.75	0.28	1.79	35'	EL	13.6	0.561	1.19	35'	EL	1.7	0.80	0.28	1.39	35'	EL	17	
		HS-20(Opr)	36.000	--	1.542	55.494	1.35	0.28	2.32	35'	EL	13.6	0.561	1.54	35'	EL	1.7	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.400	32.402	1.4	0.28	3.89	35'	EL	17	0.561	3.06	35'	EL	1.7	0.80	0.28	2.40	35'	EL	17	
		SNGARBS2	20.000	--	2.052	41.044	1.4	0.28	3.29	35'	EL	13.6	0.561	2.32	35'	EL	1.7	0.80	0.28	2.05	35'	EL	13.6	
		SNAGRIS2	22.000	--	2.053	45.174	1.4	0.28	3.26	35'	EL	13.6	0.561	2.21	35'	EL	1.7	0.80	0.28	2.05	35'	EL	13.6	
		SNCOTTS3	27.250	--	1.202	32.744	1.4	0.28	1.95	35'	EL	17	0.561	1.54	35'	EL	1.7	0.80	0.28	1.20	35'	EL	17	
		SNAGGRS4	34.925	--	1.111	38.816	1.4	0.28	1.8	35'	EL	17	0.561	1.38	35'	EL	1.7	0.80	0.28	1.11	35'	EL	17	
		SNS5A	35.550	--	1.079	38.354	1.4	0.28	1.75	35'	EL	17	0.561	1.46	35'	EL	1.7	0.80	0.28	1.08	35'	EL	17	
		SNS6A	39.950	--	1.041	41.601	1.4	0.28	1.69	35'	EL	17	0.561	1.37	35'	EL	1.7	0.80	0.28	1.04	35'	EL	17	
		SNS7B	42.000	3	1.000	41.734	1.4	0.28	1.61	35'	EL	17	0.561	1.4	35'	EL	1.7	0.80	0.28	1.00	35'	EL	17	
	TTST	TNAGRIT3	33.000	--	1.286	42.439	1.4	0.28	2.08	35'	EL	17	0.561	1.6	35'	EL	1.7	0.80	0.28	1.29	35'	EL	17	
		TNT4A	33.075	--	1.285	42.512	1.4	0.28	2.08	35'	EL	17	0.561	1.51	35'	EL	1.7	0.80	0.28	1.29	35'	EL	17	
		TNT6A	41.600	--	1.126	46.84	1.4	0.28	1.82	35'	EL	17	0.561	1.48	35'	EL	1.7	0.80	0.28	1.13	35'	EL	17	
		TNT7A	42.000	--	1.163	48.833	1.4	0.28	1.89	35'	EL	17	0.561	1.37	35'	EL	1.7	0.80	0.28	1.16	35'	EL	17	
		TNT7B	42.000	--	1.144	48.061	1.4	0.28	1.85	35'	EL	17	0.561	1.33	35'	EL	1.7	0.80	0.28	1.14	35'	EL	17	
		TNAGRIT4	43.000	--	1.158	49.810	1.4	0.28	1.86	35'	EL	13.6	0.561	1.28	35'	EL	1.7	0.80	0.28	1.16	35'	EL	17	
		TNAGT5A	45.000	--	1.068	48.071	1.4	0.28	1.73	35'	EL	17	0.561	1.35	35'	EL	1.7	0.80	0.28	1.07	35'	EL	17	
		TNAGT5B	45.000	--	1.031	46.373	1.4	0.28	1.67	35'	EL	17	0.561	1.21	35'	EL	1.7	0.80	0.28	1.03	35'	EL	17	

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)

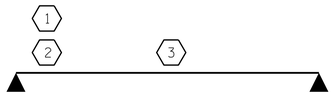
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPAN 'A'

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 35' CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

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

ASSEMBLED BY : J. PENDERGRAFT DATE : 3-19
CHECKED BY : J. DILWORTH DATE : 8-19

DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 21LRFR1_90S_35L

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_LR.dgn
10/22/2019 9:22:13 AM

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	1.055	--	1.75	0.275	1.23	55′	EL	27	0.523	1.23	55′	EL	5.4	0.80	0.275	1.05	55′	EL	27	
		HL-93(Opr)	N/A	--	1.591	--	1.35	0.275	1.59	55′	EL	27	0.523	1.59	55′	EL	5.4	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.322	47.585	1.75	0.275	1.54	55′	EL	27	0.523	1.47	55′	EL	5.4	0.80	0.275	1.32	55′	EL	27	
		HS-20(Opr)	36.000	--	1.9	68.396	1.35	0.275	1.99	55′	EL	27	0.523	1.9	55′	EL	5.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.776	37.476	1.4	0.275	4.04	55′	EL	27	0.523	4.17	55′	EL	5.4	0.80	0.275	2.78	55′	EL	27	
		SNGARBS2	20.000	--	2.155	43.095	1.4	0.275	3.14	55′	EL	27	0.523	3.02	55′	EL	5.4	0.80	0.275	2.15	55′	EL	27	
		SNAGRIS2	22.000	--	2.079	45.734	1.4	0.275	3.03	55′	EL	27	0.523	2.83	55′	EL	5.4	0.80	0.275	2.08	55′	EL	27	
		SNCOTTS3	27.250	--	1.384	37.708	1.4	0.275	2.01	55′	EL	27	0.523	2.09	55′	EL	5.4	0.80	0.275	1.38	55′	EL	27	
		SNAGGRS4	34.925	--	1.189	41.527	1.4	0.275	1.73	55′	EL	27	0.523	1.77	55′	EL	5.4	0.80	0.275	1.19	55′	EL	27	
		SNS5A	35.550	--	1.16	41.255	1.4	0.275	1.69	55′	EL	27	0.523	1.82	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		SNS6A	39.950	--	1.079	43.102	1.4	0.275	1.57	55′	EL	27	0.523	1.68	55′	EL	5.4	0.80	0.275	1.08	55′	EL	27	
		SNS7B	42.000	--	1.028	43.175	1.4	0.275	1.5	55′	EL	27	0.523	1.67	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
	TTST	TNAGRIT3	33.000	--	1.32	43.556	1.4	0.275	1.92	55′	EL	27	0.523	1.98	55′	EL	5.4	0.80	0.275	1.32	55′	EL	27	
		TNT4A	33.075	--	1.33	43.979	1.4	0.275	1.94	55′	EL	27	0.523	1.91	55′	EL	5.4	0.80	0.275	1.33	55′	EL	27	
		TNT6A	41.600	--	1.101	45.811	1.4	0.275	1.6	55′	EL	27	0.523	1.83	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNT7A	42.000	--	1.114	46.804	1.4	0.275	1.62	55′	EL	27	0.523	1.71	55′	EL	5.4	0.80	0.275	1.11	55′	EL	27	
		TNT7B	42.000	--	1.163	48.848	1.4	0.275	1.69	55′	EL	27	0.523	1.62	55′	EL	5.4	0.80	0.275	1.16	55′	EL	27	
		TNAGRIT4	43.000	--	1.101	47.33	1.4	0.275	1.6	55′	EL	27	0.523	1.56	55′	EL	5.4	0.80	0.275	1.10	55′	EL	27	
		TNAGT5A	45.000	--	1.031	46.405	1.4	0.275	1.5	55′	EL	27	0.523	1.58	55′	EL	5.4	0.80	0.275	1.03	55′	EL	27	
		TNAGT5B	45.000	3	1.013	45.582	1.4	0.275	1.47	55′	EL	27	0.523	1.48	55′	EL	5.4	0.80	0.275	1.01	55′	EL	27	

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)

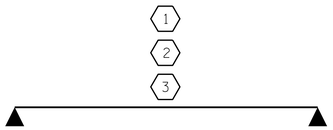
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

FOR SPAN 'B'

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 55′ CORED SLAB UNIT 90° SKEW (NON-INTERSTATE TRAFFIC)

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

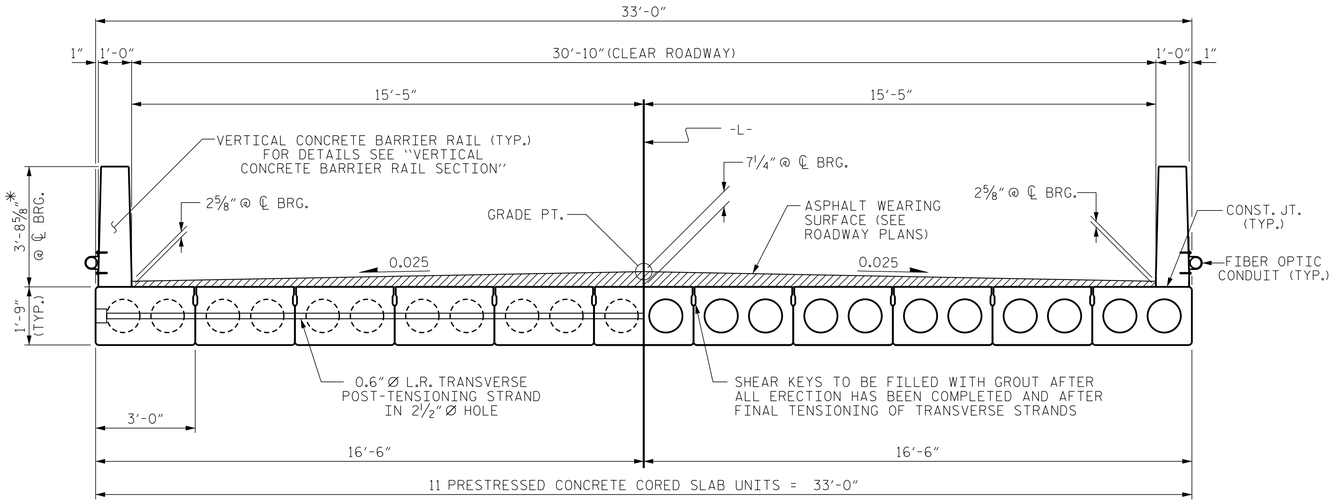
ASSEMBLED BY : J. PENDERGRAFT DATE : 3-19
CHECKED BY : J. DILWORTH DATE : 8-19

DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 21LRFR1_90S_55L

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_LR.dgn
10/2/2019 9:22:49 AM



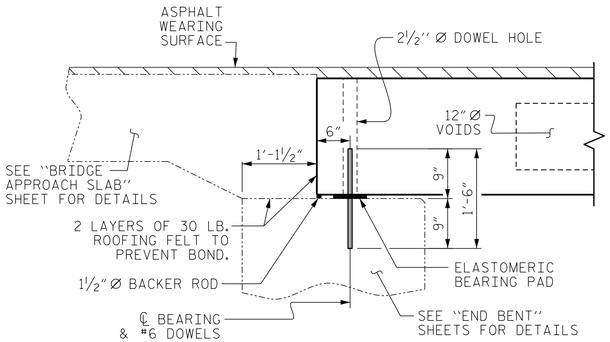
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

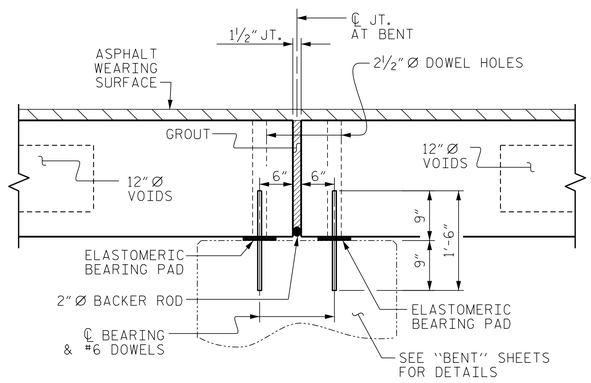
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE ''VERTICAL CONCRETE BARRIER RAIL SECTION'' DETAIL.

FIXED END

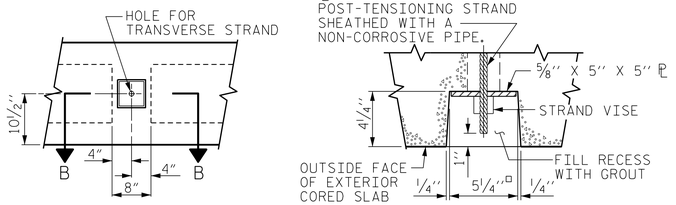


SECTION AT END BENT

FIXED END FIXED END



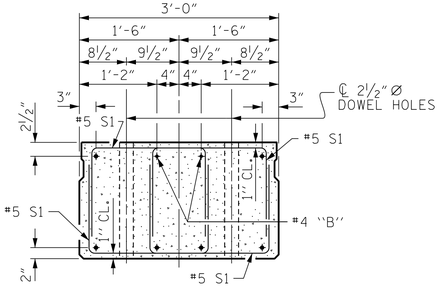
SECTION AT BENT



ELEVATION VIEW

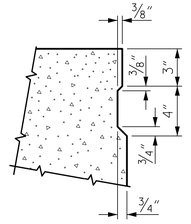
SECTION B-B

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



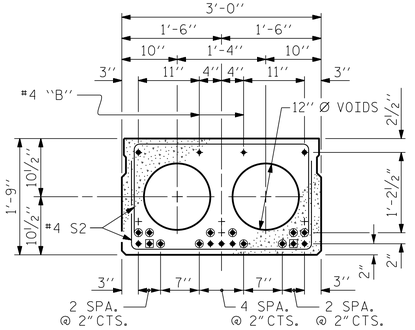
END ELEVATION

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



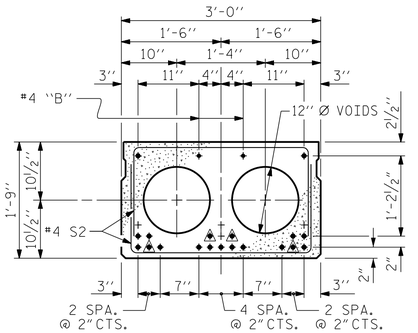
SHEAR KEY DETAIL

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



INTERIOR SLAB SECTION (35′ UNIT)

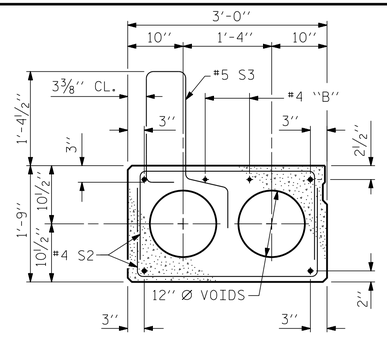
(9 STRANDS REQUIRED)



INTERIOR SLAB SECTION (55′ UNIT)

(19 STRANDS REQUIRED)

0.6″ Ø LOW RELAXATION STRAND LAYOUT



EXT. SLAB SECTION

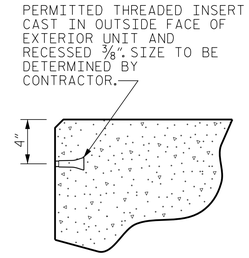
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6′-0″FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2′-0″FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



THREADED INSERT DETAIL

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

SHEET 1 OF 5

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3′-0″ X 1′-9″ PRESTRESSED CONCRETE CORED SLAB UNIT 90° SKEW

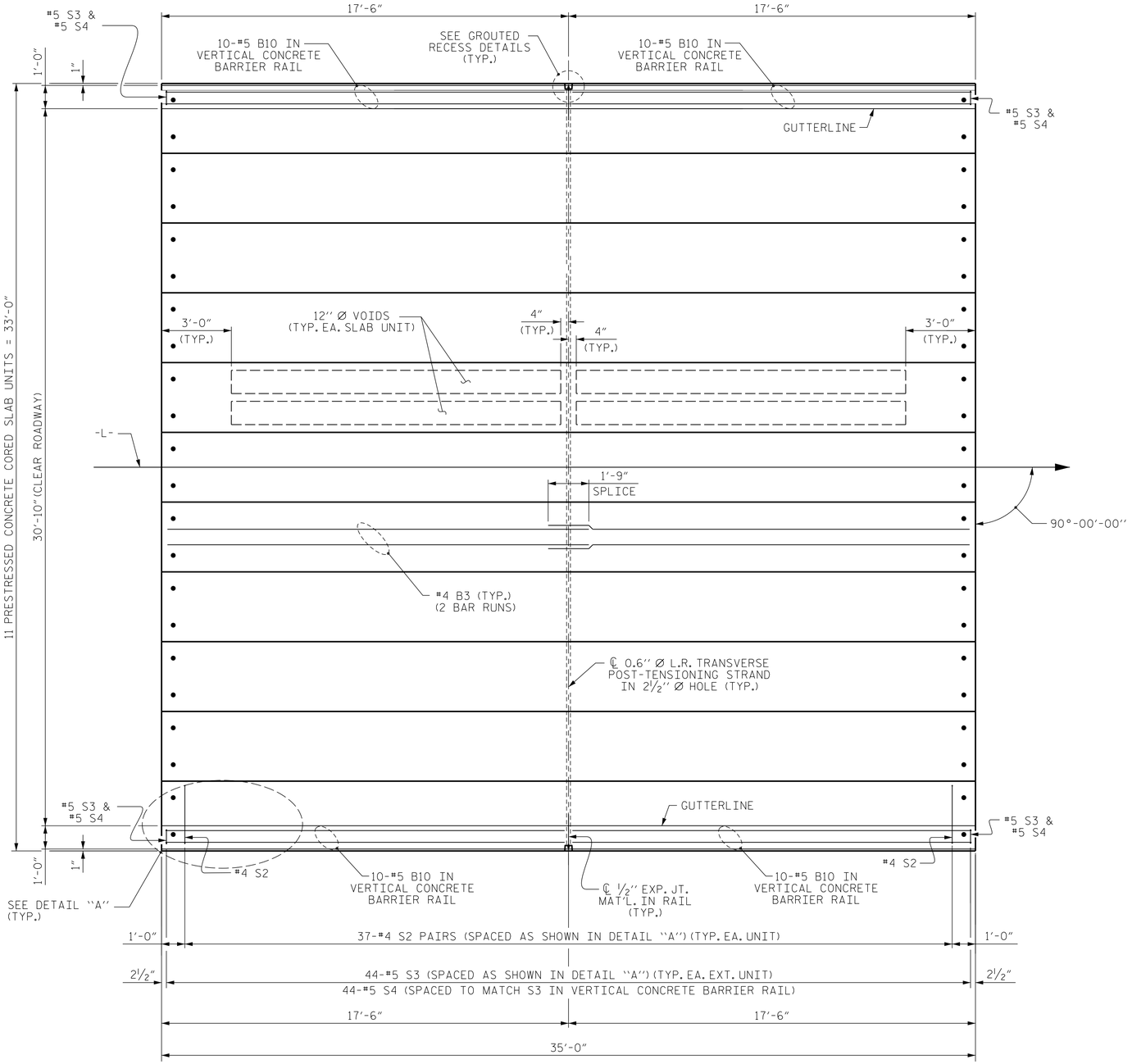
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			18

STD. NO. 21″PCS2_33_90S

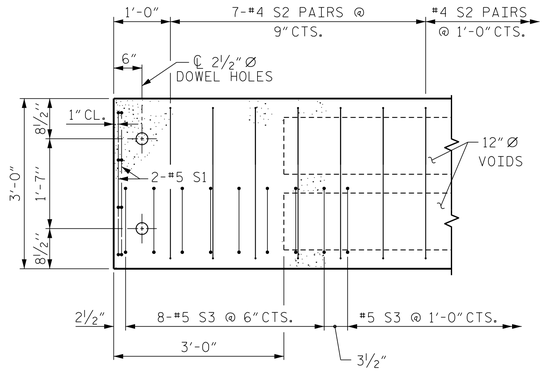
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19		
CHECKED BY : J. DILWORTH	DATE : 8-19		
DRAWN BY : DGE 5/09	REV. 9/14	MAA/TMG	
CHECKED BY : BCH 6/09			

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SWU_TS.dgn
10/2/2019 8:24:07 AM



PLAN OF UNIT



DETAIL ″A″

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-

SHEET 2 OF 5

ASSEMBLED BY : J. PENDERGRAFT	DATE :	3-19	
CHECKED BY : J. DILWORTH	DATE :	8-19	
DRAWN BY : DGE	3/09	REV. 12/5/11	MAA/AAC
CHECKED BY : BCH	3/09	REV. 8/14	MAA/TMG

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD
4/29/2020
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
Docusigned by: John Arthur Dilworth

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

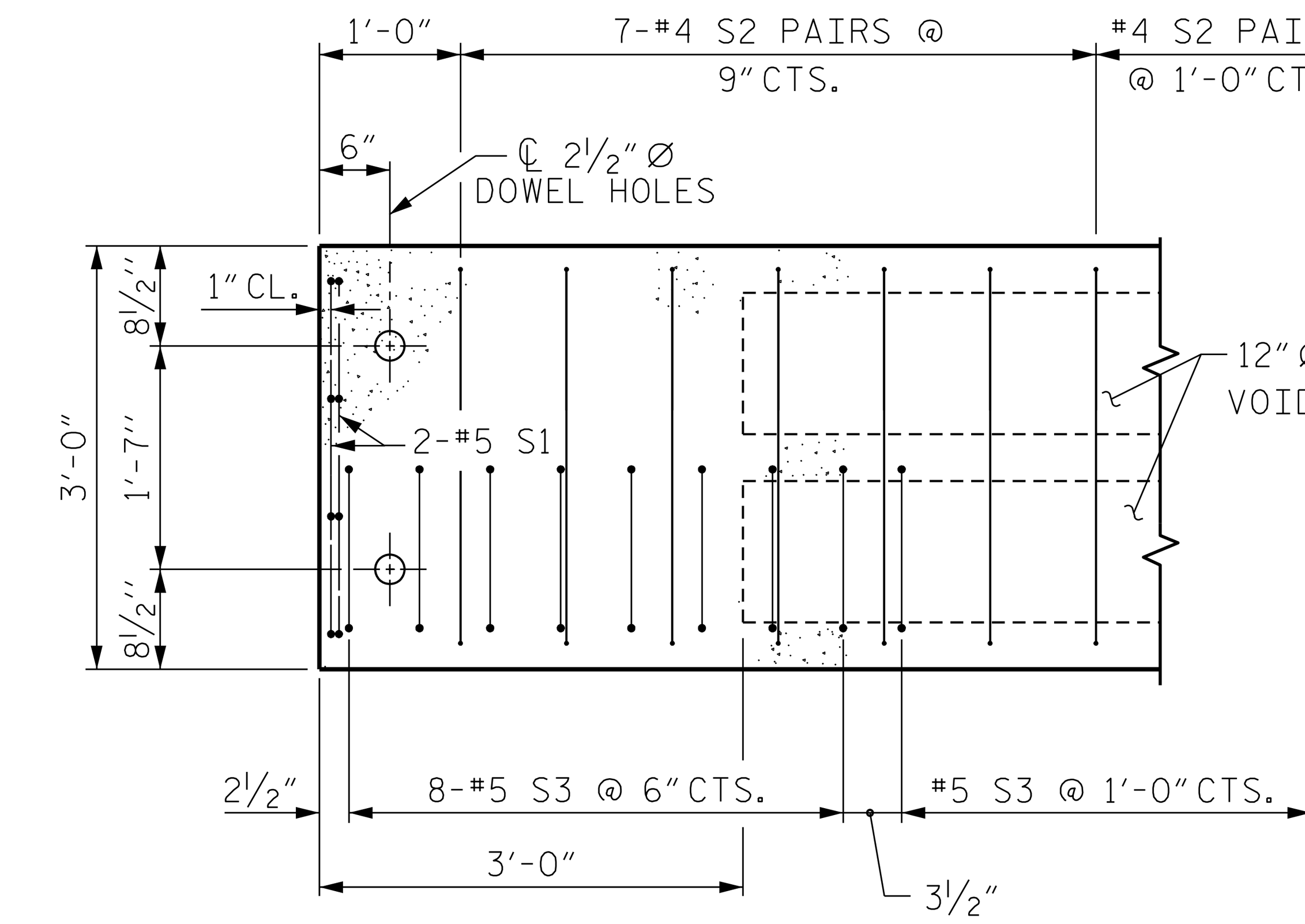
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 35′ UNIT 30′-10″ CLEAR ROADWAY 90° SKEW SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			18

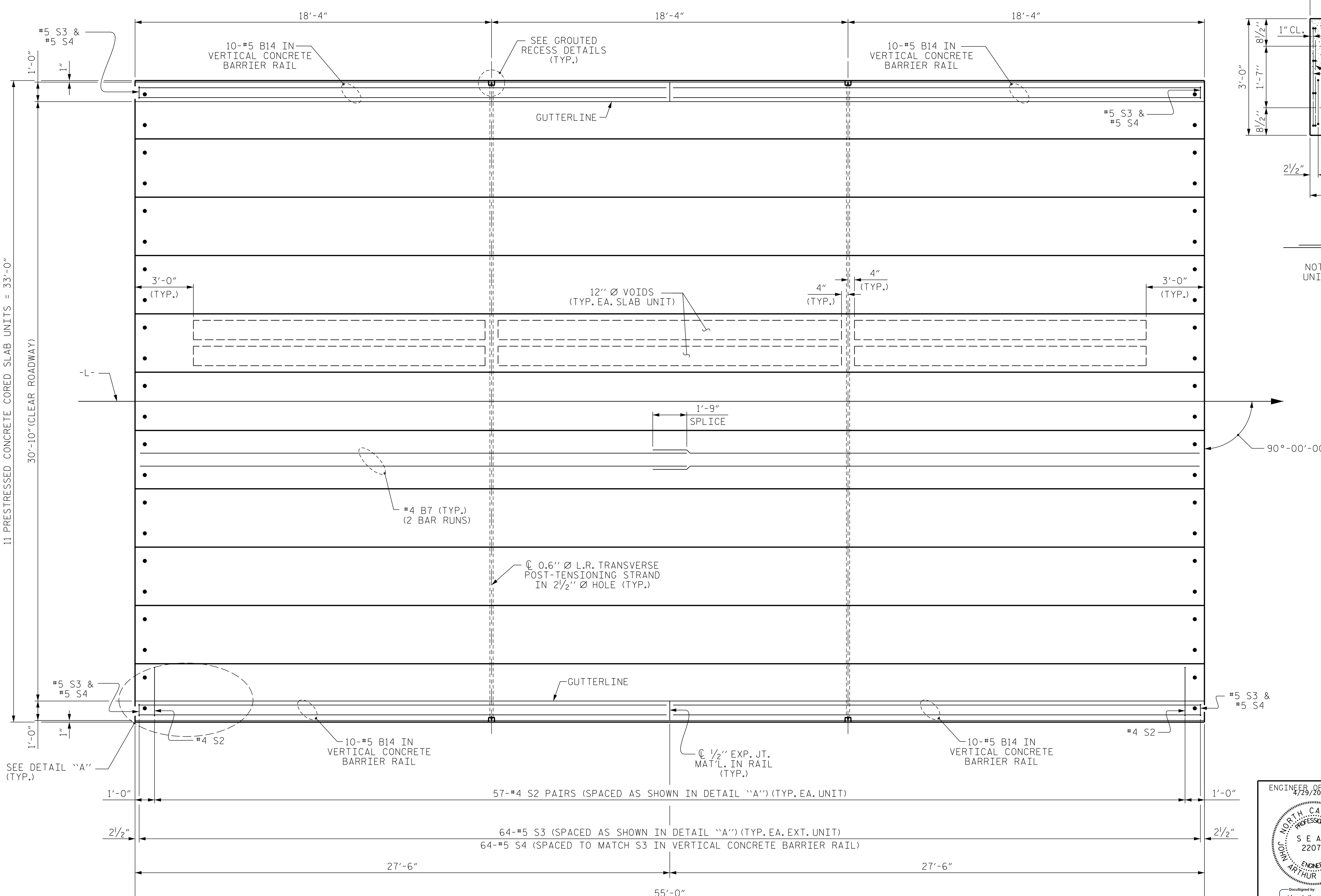
STD. NO. 21″PCS_33_90S_35L

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_PS.dgn
10/2/2019 9:17:03 AM



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.



PLAN OF UNIT

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-
SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 55' UNIT
30'-10" CLEAR ROADWAY
90° SKEW
SPAN B

ENGINEER OF RECORD 4/29/2020
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22072 JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

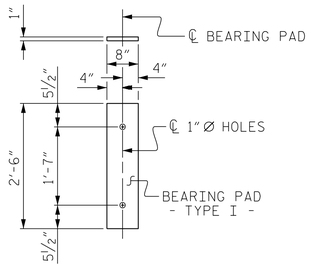
REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-7
1			3				TOTAL SHEETS 18
2			4				

STD. NO. 21" PCS_33_90S_55L

ASSEMBLED BY : J. PENDERGRAFT	DATE :	3-19
CHECKED BY : J. DILWORTH	DATE :	8-19

DRAWN BY : DGE 3/09	REV. 12/5/11	MAA/AAC
CHECKED BY : BCH 3/09	REV. 8/14	MAA/TMG

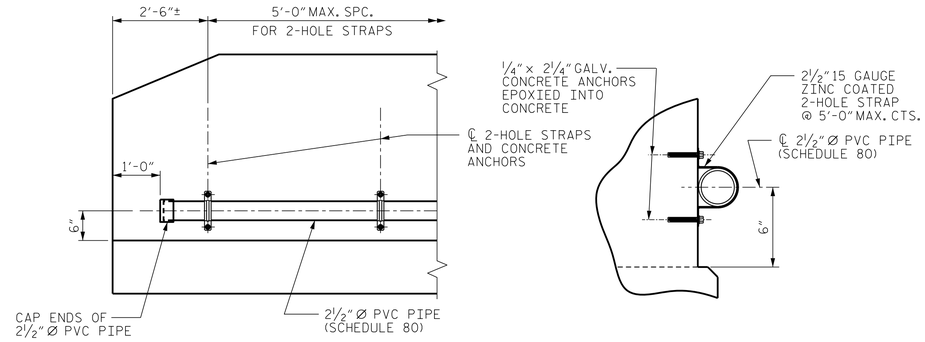
P:\2019\19106.01 BR-0113\Structures\DGN\BR0113_SMU_PS.dgn
10/2/2019 9:17:59 AM



FIXED END
(TYPE I - 44 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.



ELEVATION SECTION

FIBER OPTIC CONDUIT SYSTEM DETAILS

2½"Ø SCHEDULE 80 PVC PIPE ATTACHED TO THE BACK OF BOTH RAILS FOR FUTURE FIBER OPTIC CABLE.

FIBER OPTIC CONDUIT SYSTEM	176.25 LIN. FT.

NOTES

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

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

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

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

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

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

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

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

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, 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 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.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

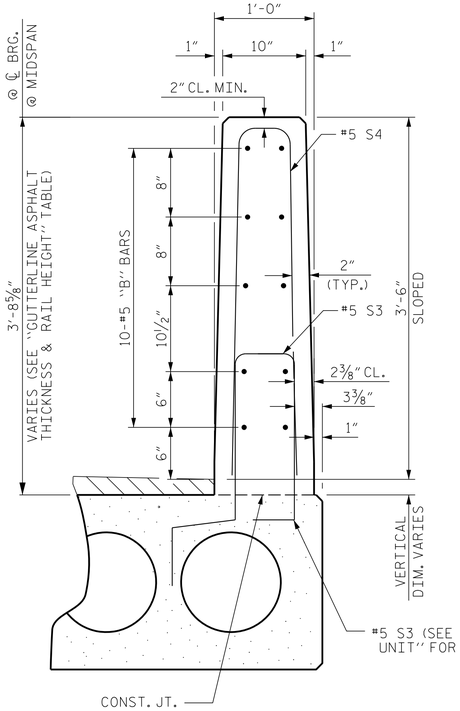
THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

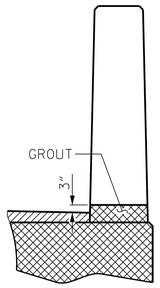
FOR FIBER OPTIC CONDUIT SYSTEM, SEE SPECIAL PROVISIONS.

CONCRETE RELEASE STRENGTH	
UNIT	PSI
35' UNITS	4000
55' UNITS	4900

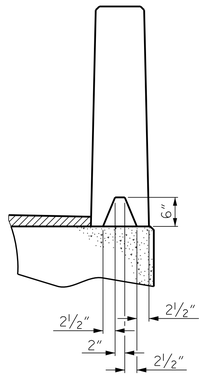
GRADE 270 STRANDS	
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



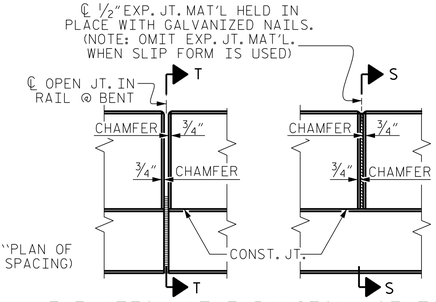
VERTICAL CONCRETE BARRIER RAIL SECTION



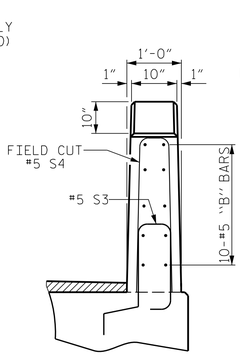
SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



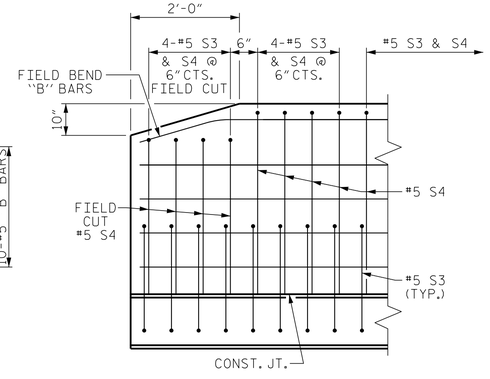
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-

SHEET 4 OF 5

ENGINEER OF RECORD
4/29/2020
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY : J. PENDERGRAFT DATE : 3-19
CHECKED BY : J. DILWORTH DATE : 8-19
DRAWN BY : DGE 5/09
CHECKED BY : BCH 6/09
REV. 5/18 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 21"PCS3_33_90S

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SWU_CS.dgn
10/2/2019 8:39:24 AM

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
35' UNIT			
EXTERIOR C.S.	2	35'-0"	70'-0"
INTERIOR C.S.	9	35'-0"	315'-0"
TOTAL	11		385'-0"

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	35' UNIT					
✳B10	40	40	#5	STR	17'-1"	713
✳ S4	88	88	#5	2	7'-2"	658
✳EPOXY COATED REINFORCING STEEL				LBS.		1371
CLASS AA CONCRETE				CU.YDS.		9.0
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN.FT.		70.25

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
35' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1/4"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/8"
FINAL CAMBER	1/8"

** INCLUDES FUTURE WEARING SURFACE

BILL OF MATERIAL FOR ONE 35' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B3	4	#4	STR	18'-3"	49	18'-3"	49
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	74	#4	3	5'-4"	264	5'-4"	264
✳ S3	44	#5	1	5'-7"	256		
REINFORCING STEEL			LBS.		348		348
✳EPOXY COATED REINFORCING STEEL			LBS.		256		
5000 P.S.I. CONCRETE			CU. YDS.		5.1		5.1
0.6" Ø L.R. STRANDS			No.		9		9

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
55' UNIT			
EXTERIOR C.S.	2	55'-0"	110'-0"
INTERIOR C.S.	9	55'-0"	495'-0"
TOTAL	11		605'-0"

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	55' UNIT					
✳B14	40	40	#5	STR	27'-1"	1130
✳ S4	128	128	#5	2	7'-2"	957
✳EPOXY COATED REINFORCING STEEL				LBS.		2087
CLASS AA CONCRETE				CU.YDS.		14.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN.FT.		110.25

DEAD LOAD DEFLECTION AND CAMBER

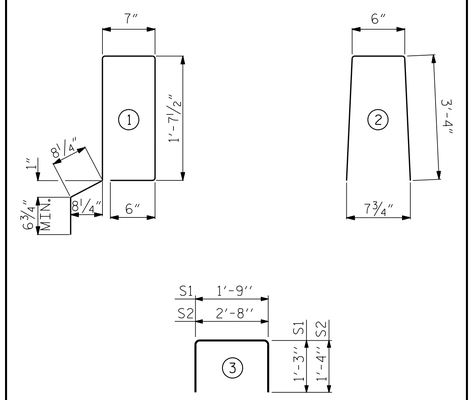
	3'-0" x 1'-9"
55' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 1/2"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/8"
FINAL CAMBER	1 1/8"

** INCLUDES FUTURE WEARING SURFACE

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	114	#4	3	5'-4"	406	5'-4"	406
✳ S3	64	#5	1	5'-7"	373		
REINFORCING STEEL			LBS.		516		516
✳EPOXY COATED REINFORCING STEEL			LBS.		373		
6500 P.S.I. CONCRETE			CU. YDS.		7.8		7.8
0.6" Ø L.R. STRANDS			No.		19		19

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
35' UNITS	2 1/2"	3'-8 1/2"
55' UNITS	1 1/2"	3'-7 1/2"

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

SHEET 5 OF 5

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-9

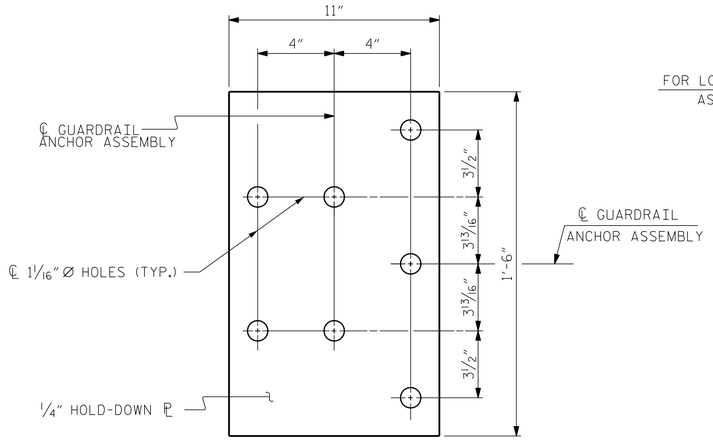
TOTAL SHEETS 18

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19
CHECKED BY : J. DILWORTH	DATE : 8-19
DRAWN BY : DGE 5/09	REV. 8/14 MAA/TMG
CHECKED BY : BCH 6/09	

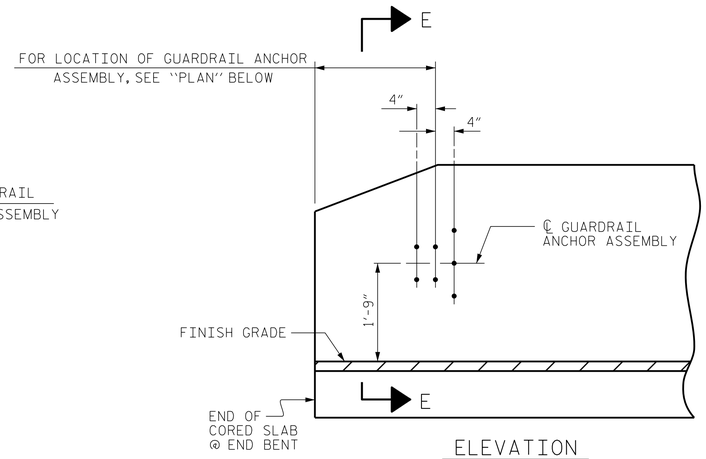
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 21"BOM INFO_33_90S

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_CS.dgn
10/22/2019 8:42:36 AM



PLAN



ELEVATION

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.)

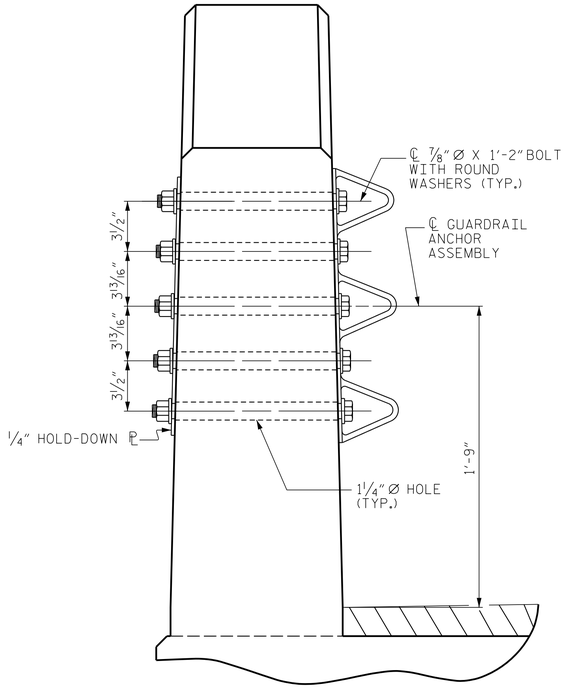
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

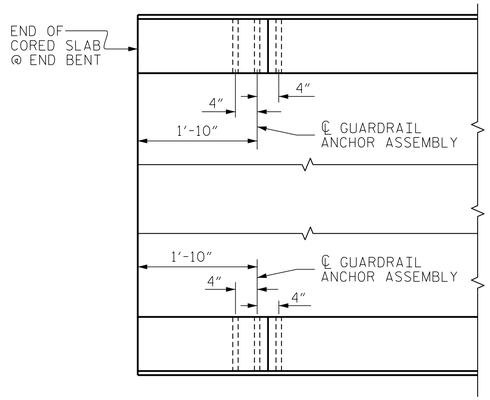
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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.



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

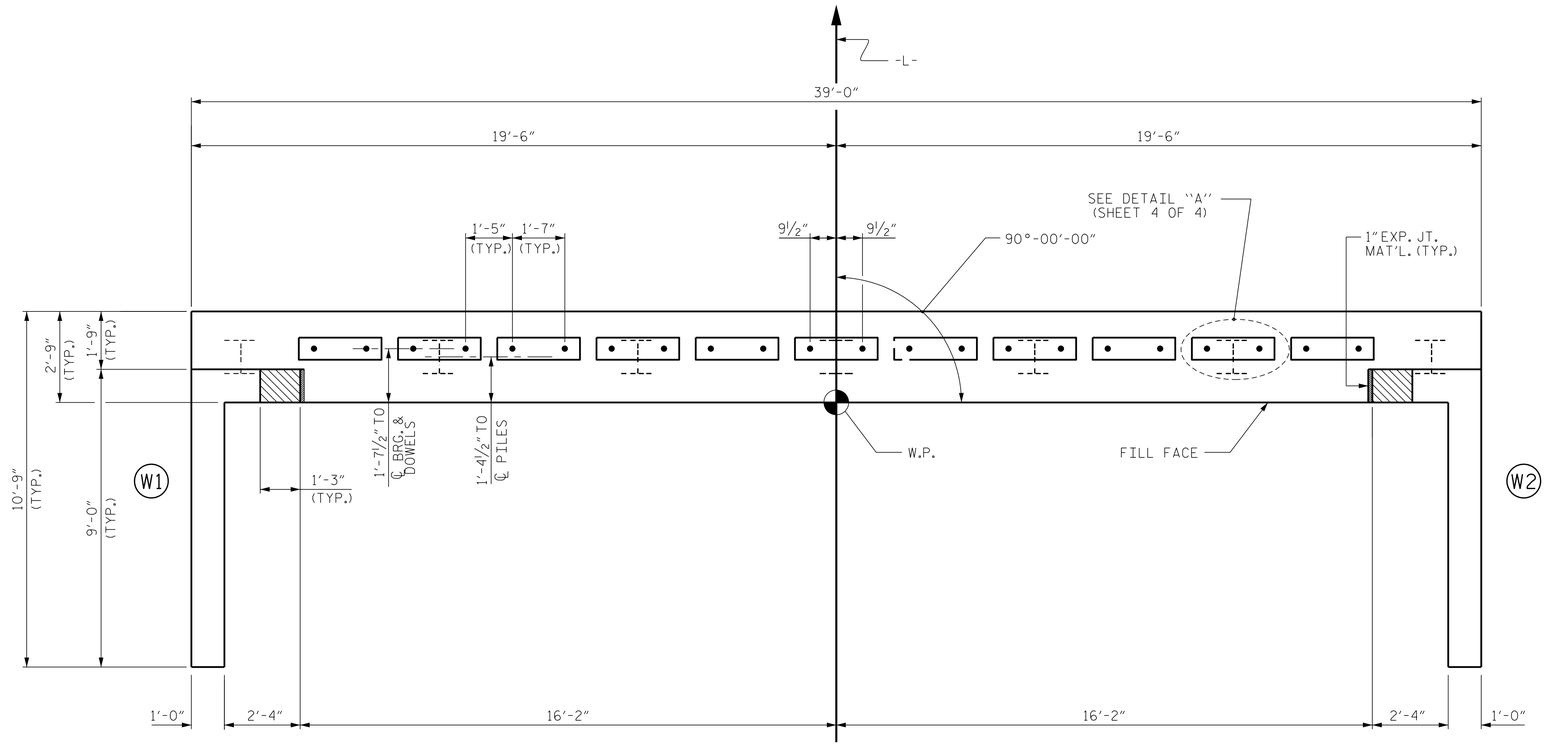
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

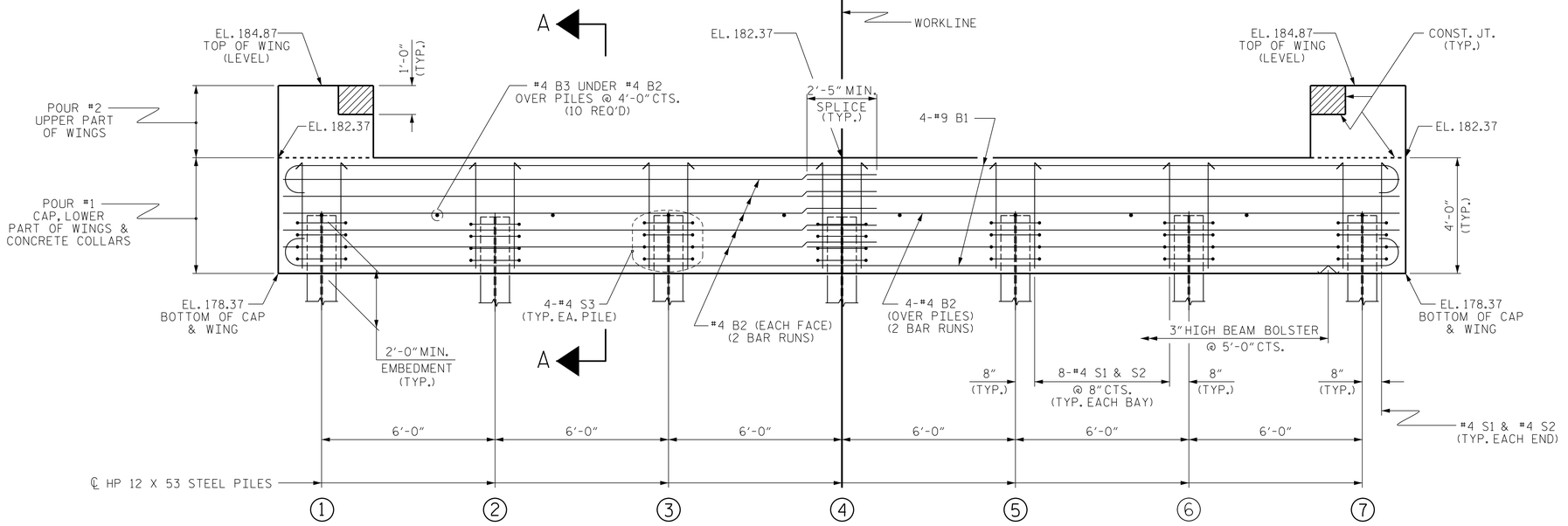
ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19		
CHECKED BY : J. DILWORTH	DATE : 8-19		
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMC	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_GR.dgn
10/21/2019 9:14:20 AM

(SHT 1) STD. NO. GRA3



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.

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-

SHEET 1 OF 4

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19
CHECKED BY : J. DILWORTH	DATE : 8-19
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY : AAC 12/11	

ENGINEER OF RECORD
4/29/2020
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

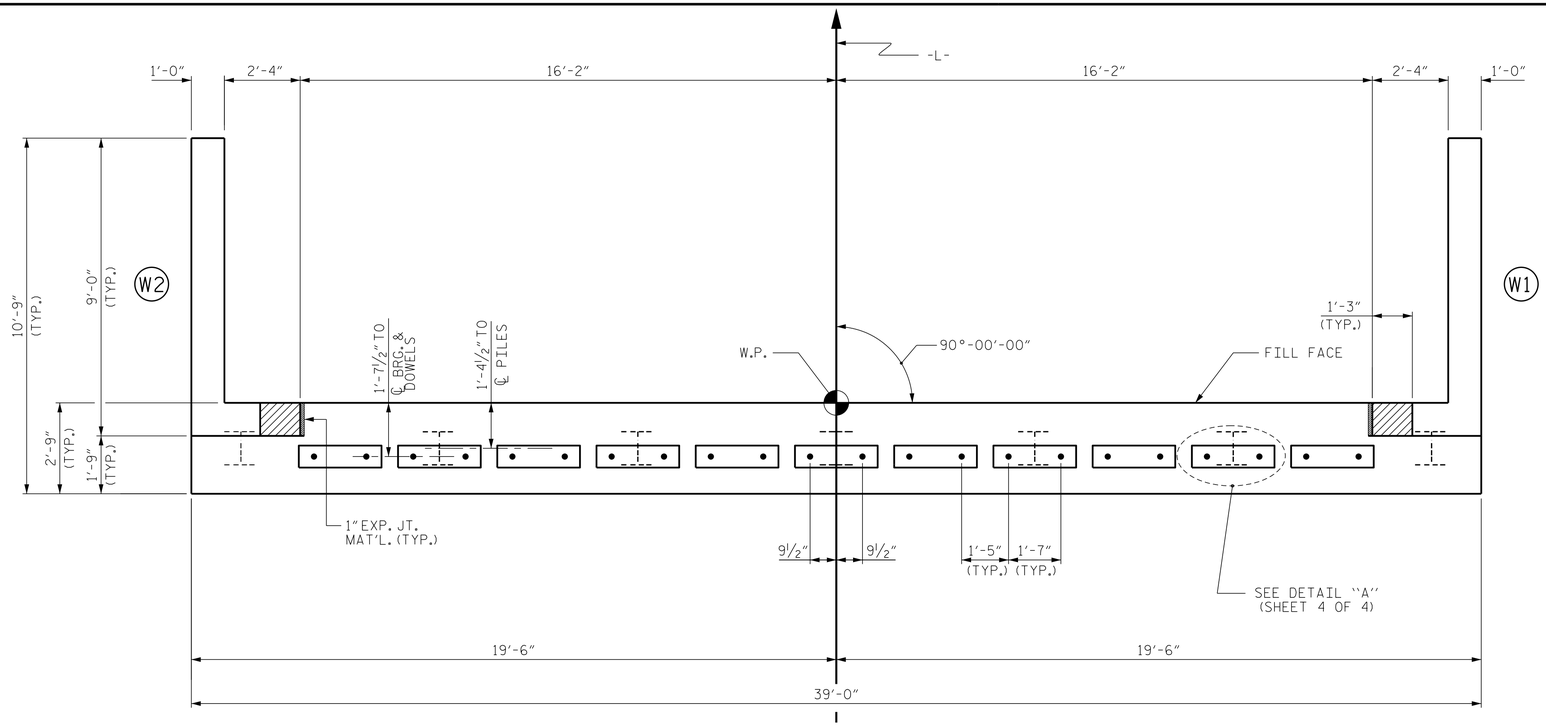
SUBSTRUCTURE

END BENT No. 1

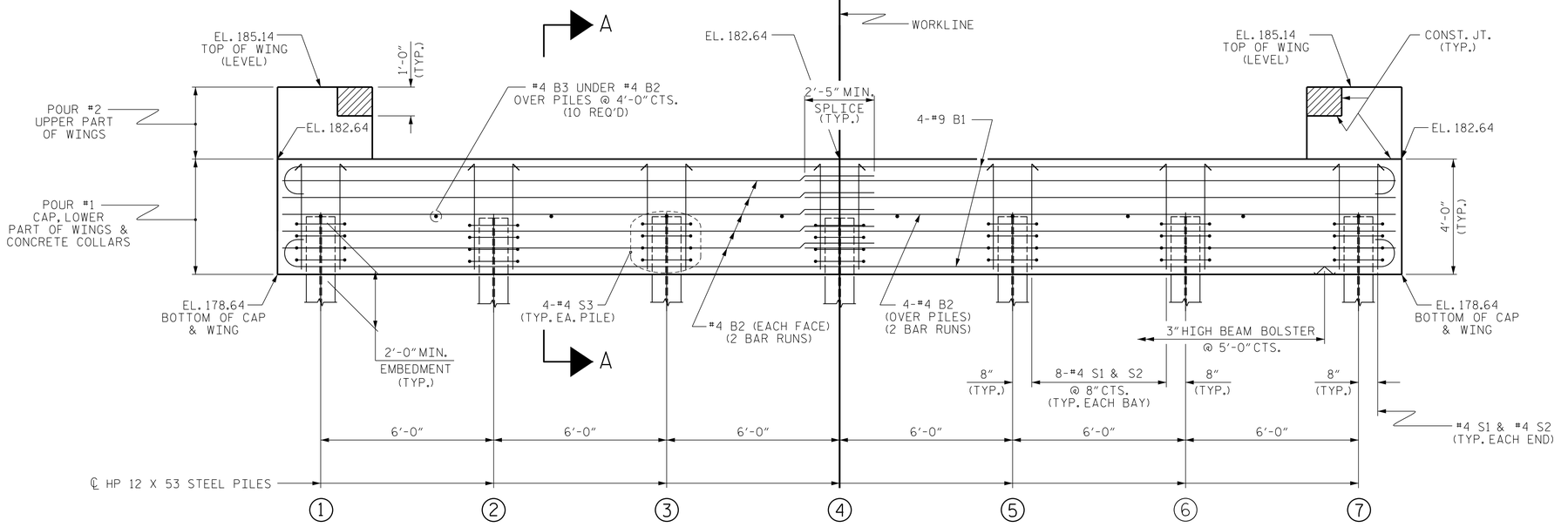
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			18

STD. NO. EB_33_90S4

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_EBT.dgn
10/2/2019 9:36:10 AM



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.

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-

SHEET 2 OF 4

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19
CHECKED BY : J. DILWORTH	DATE : 8-19
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY : AAC 12/11	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD
4/29/2020
NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
DocuSigned by: John Arthur Dilworth
ETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

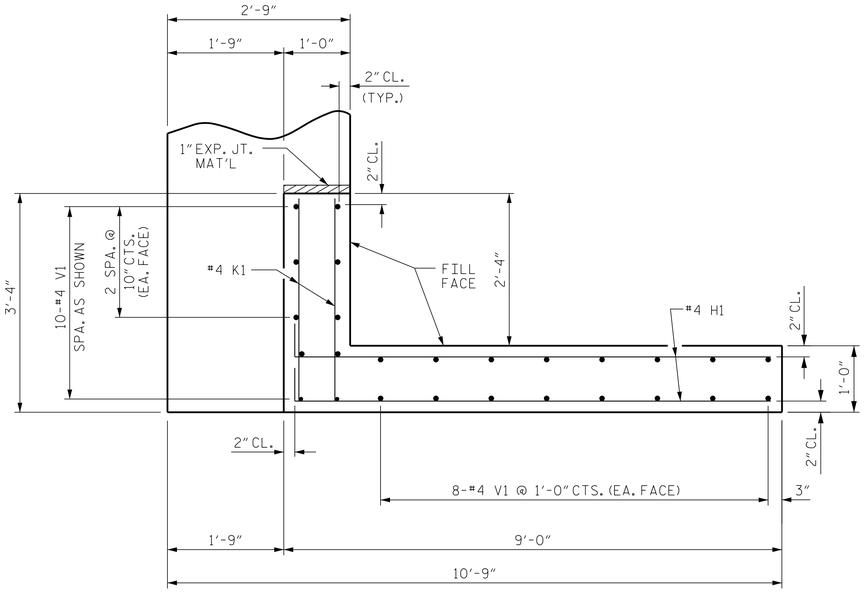
SUBSTRUCTURE

END BENT No. 2

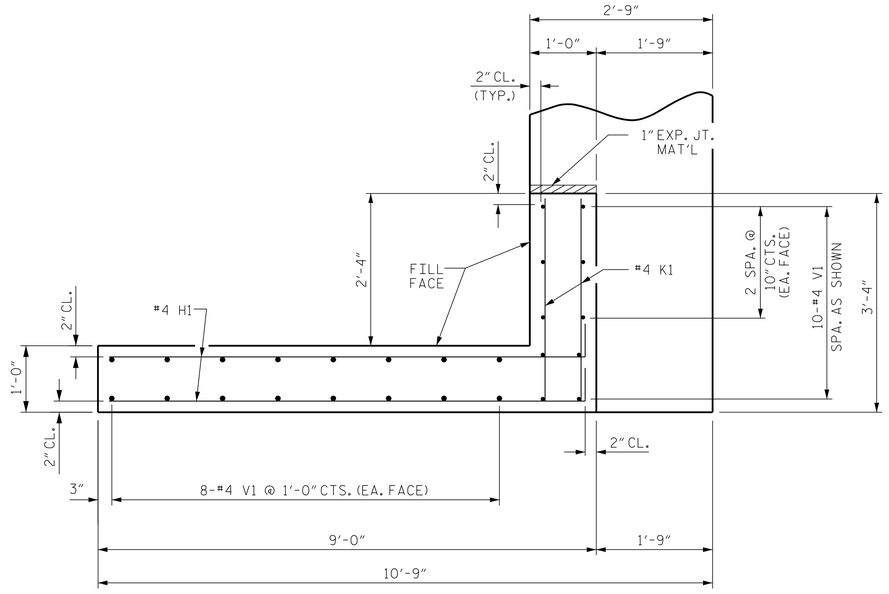
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			18

STD. NO. EB_33_90S4

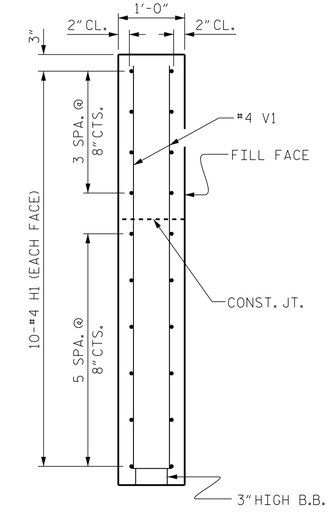
P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_EBT.dgn
10/2/2019 9:30:48 AM



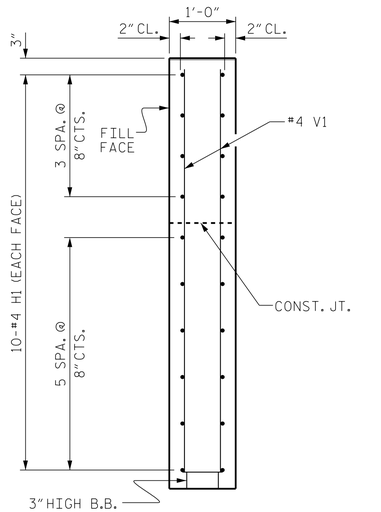
PLAN OF WING (W1)



PLAN OF WING (W2)

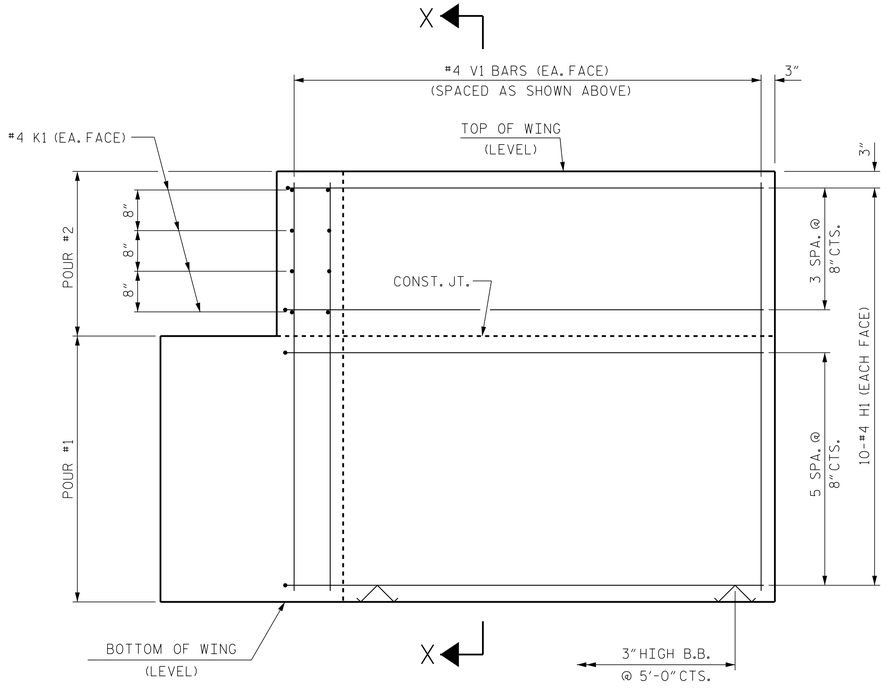


SECTION X-X

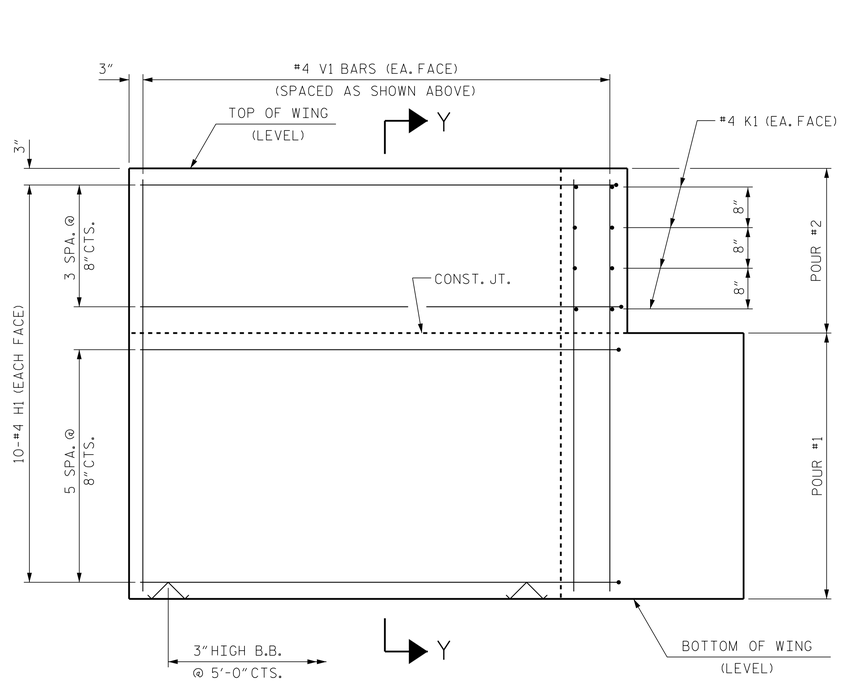


SECTION Y-Y

X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19		
CHECKED BY : J. DILWORTH	DATE : 8-19		
DRAWN BY : WJH 12/11		REV. 4/15	MAA/TMG
CHECKED BY : AAC 12/11			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

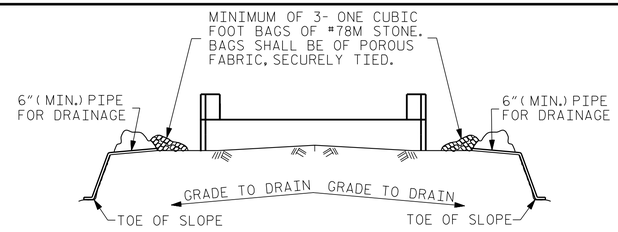
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			18

PROJECT NO. BR-0113
HALIFAX COUNTY
STATION: 16+10.00 -L-

SHEET 3 OF 4

STD. NO. EB_33_90S4

P:\2019\191060.1_BR-0113\Structures\DGN\BR0113_SMU_EBT.dgn
10/2/2019 9:31:28 AM

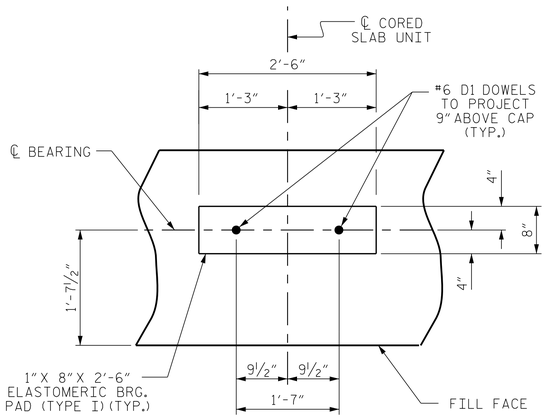


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

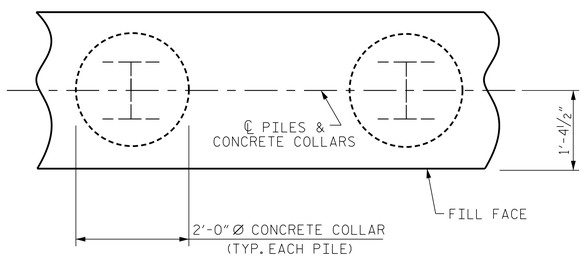
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

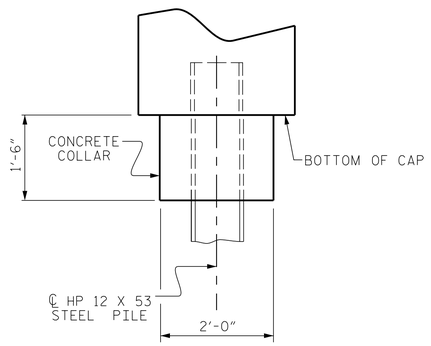


DETAIL "A"

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



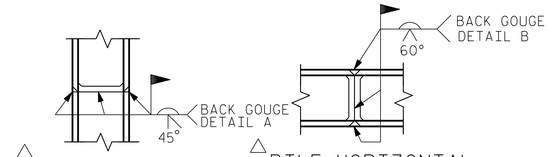
PLAN



ELEVATION

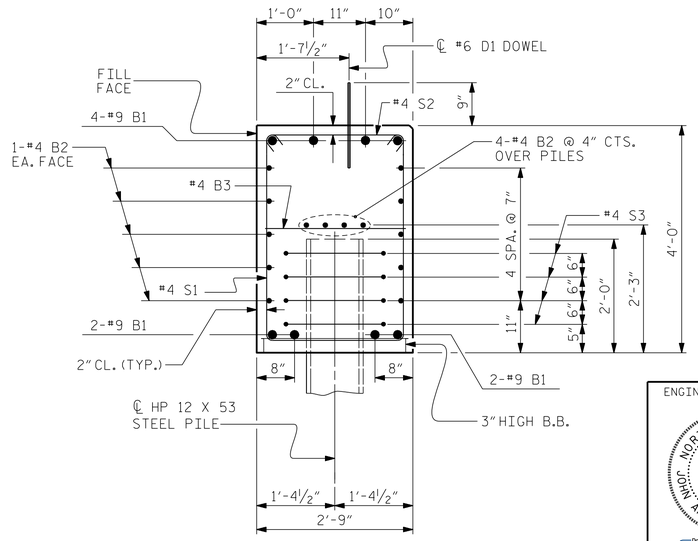
CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

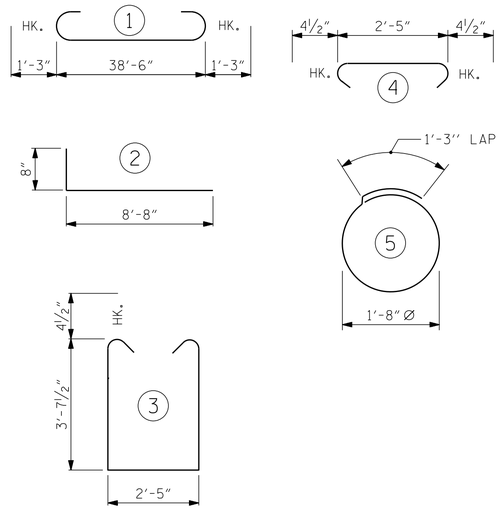


SECTION A-A

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES NO: 7 LIN. FT. = 350	HP 12 X 53 STEEL PILES NO: 7 LIN. FT. = 385
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7
PILE REDRIVES NO: 4	PILE REDRIVES NO: 4

BILL OF MATERIAL

FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-0"	1115
B2	28	#4	STR	20'-7"	385
B3	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	50	#4	3	10'-5"	348
S2	50	#4	4	3'-2"	106
S3	28	#4	5	6'-6"	122
V1	52	#4	STR	6'-2"	214

REINFORCING STEEL (FOR ONE END BENT) 2636 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 19.5 C.Y.

POUR #2 UPPER PART OF WINGS 2.1 C.Y.

TOTAL CLASS A CONCRETE 21.6 C.Y.

ENGINEER OF RECORD 4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth 62138223000C4...

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

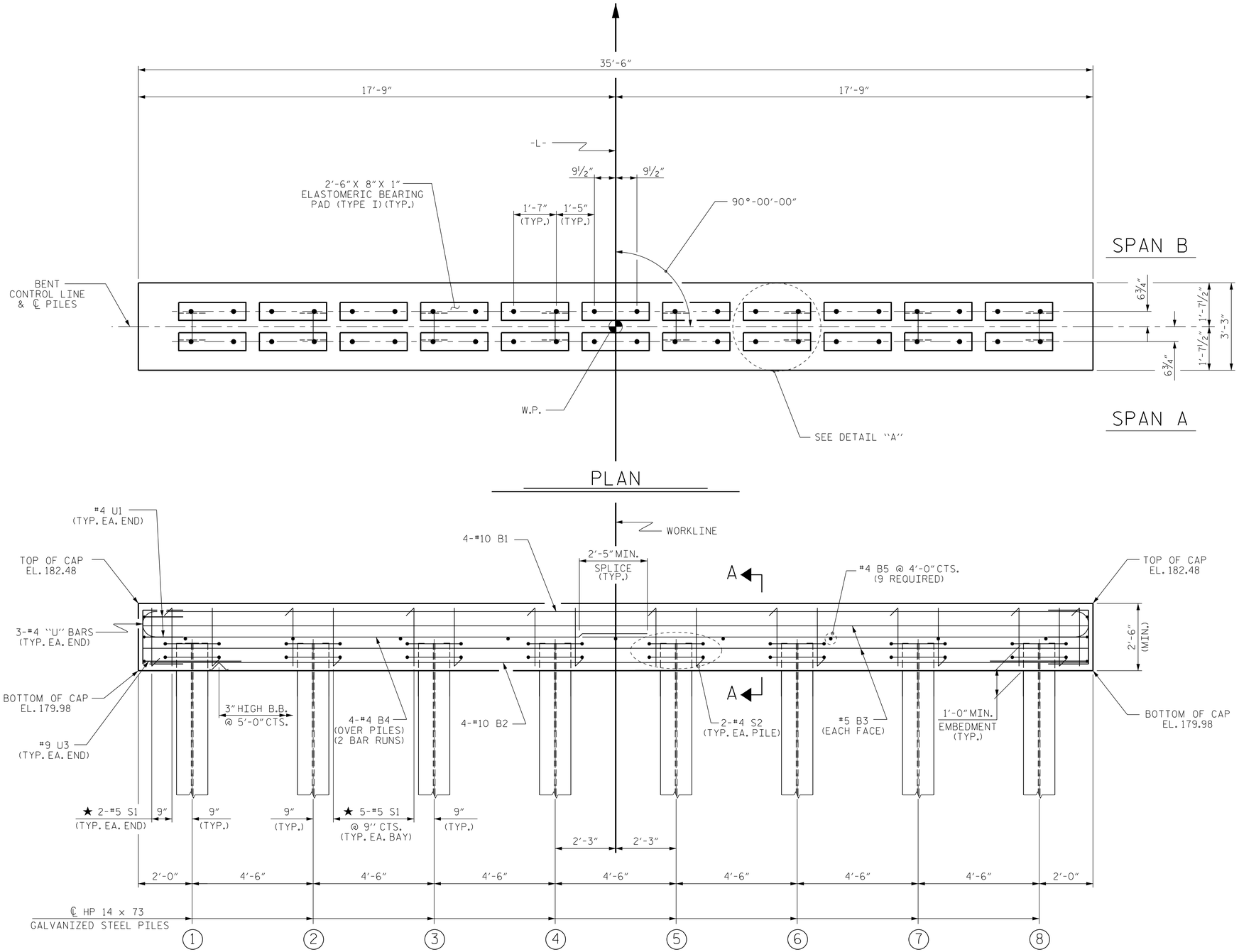
SHEET 4 OF 4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			18

STD. NO. EB_33_90S4

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19	
CHECKED BY : J. DILWORTH	DATE : 8-19	
DRAWN BY : WJH 12/11	REV. 4/17	MAA/THC
CHECKED BY : AAC 12/11		

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_EBT.dgn
10/2/2019 8:56:29 AM



ELEVATION

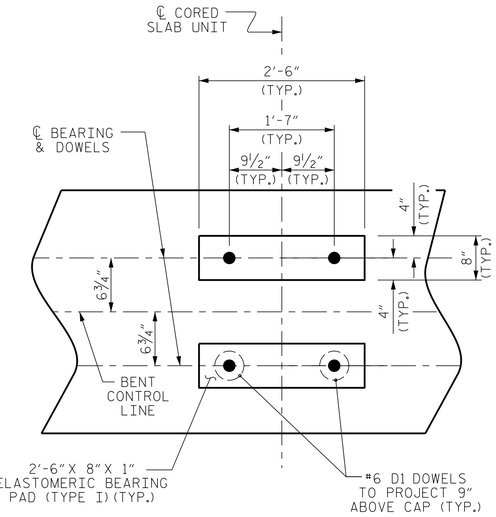
FOR SECTION A-A, SEE SHEET 2 OF 2

NOTES

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

★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 28 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

SHEET 1 OF 2

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY : J. PENDERGRAFT DATE : 3-19
CHECKED BY : J. DILWORTH DATE : 8-19

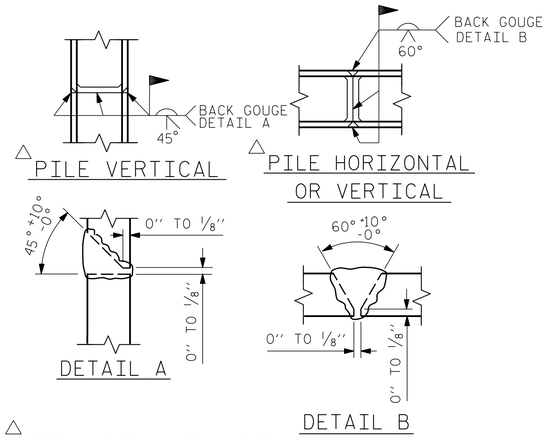
DRAWN BY : DGE 05/10
CHECKED BY : MKT 05/10

REV. 6/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. 14"HP_BT_33_90S_<60'

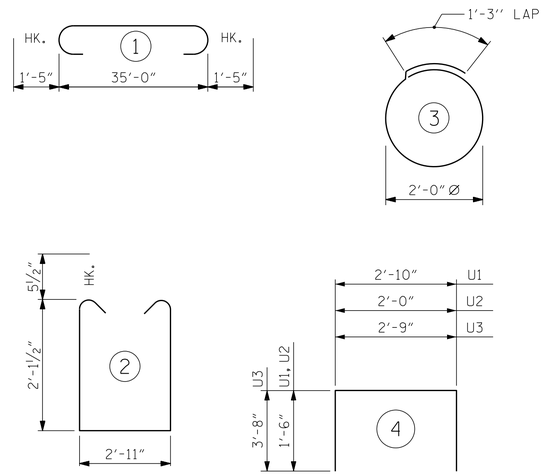
P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_BT.dgn
10/2/2019 8:59:07 AM



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	37'-10"	651
B2	4	#10	STR	35'-2"	605
B3	4	#5	STR	35'-2"	147
B4	8	#4	STR	18'-10"	101
B5	9	#4	STR	2'-11"	18
D1	44	#6	STR	1'-6"	99
S1	39	#5	2	8'-1"	329
S2	16	#4	3	7'-7"	81
U1	4	#4	4	5'-10"	16
U2	6	#4	4	5'-0"	20
U3	2	#9	4	10'-1"	69

REINFORCING STEEL (FOR ONE BENT) 2136 LBS

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

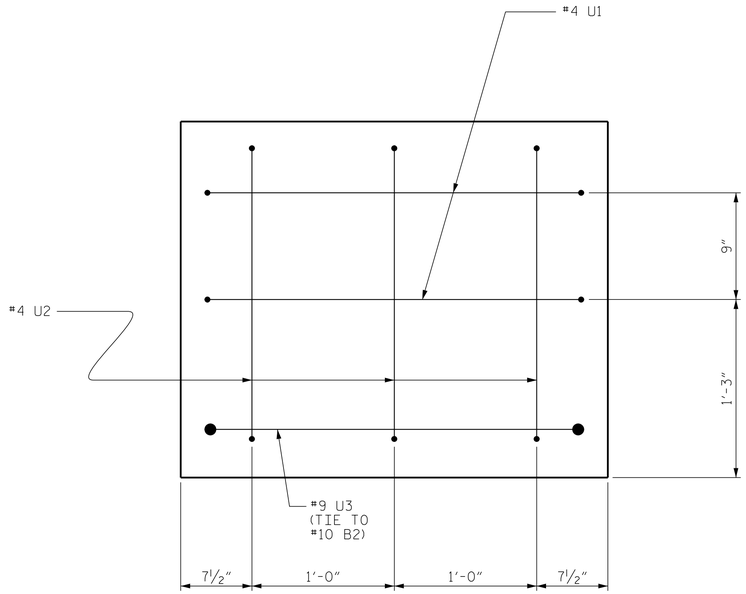
TOTAL CLASS A CONCRETE 10.7 C.Y.

HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)

No. 8 LIN. FT. 520

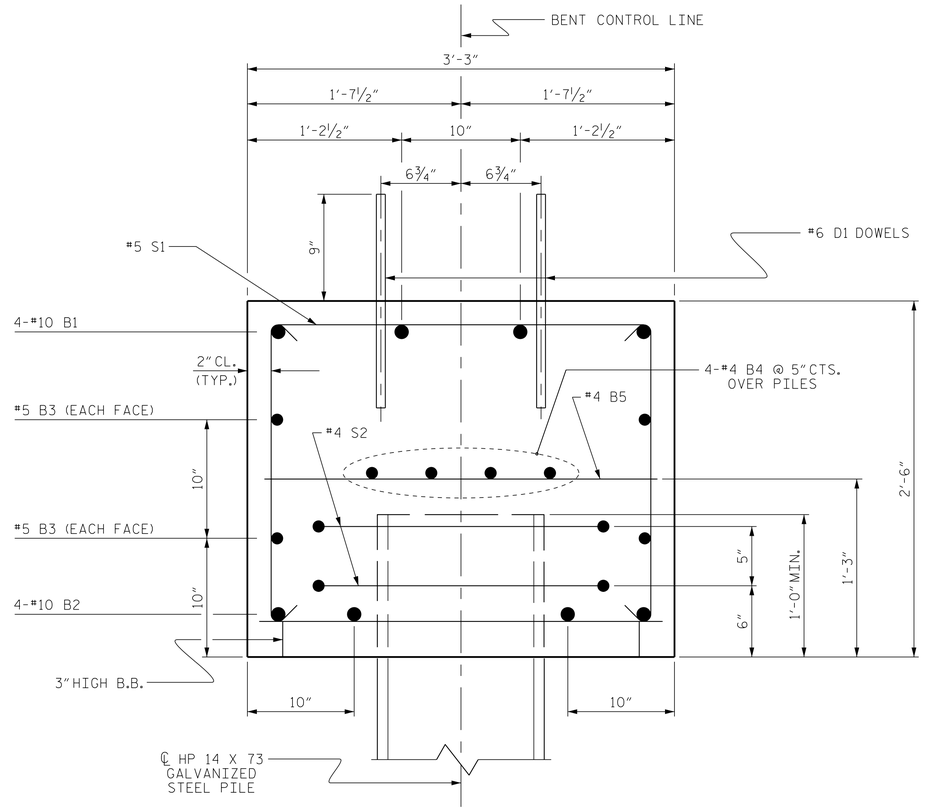
PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT) NO: 8

PILE REDRIVES NO: 4



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-A

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

SHEET 2 OF 2

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

WETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

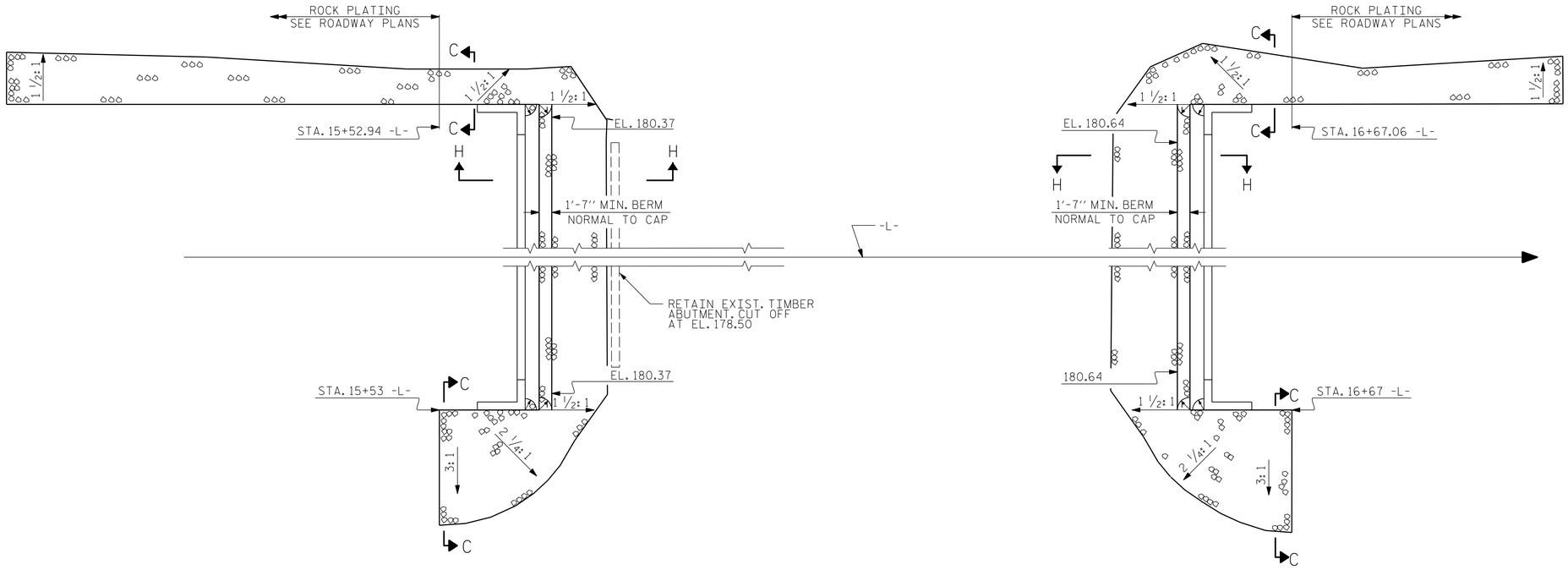
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			18

ASSEMBLED BY : J. PENDERGRAFT	DATE : 3-19	
CHECKED BY : J. DILWORTH	DATE : 8-19	
DRAWN BY : DGE 05/10	REV. 6/17	MAA/THC
CHECKED BY : MKT 05/10		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_BT.dgn
10/2/2019 9:01:26 AM

STD. NO. 14"HP_BT_33_90S_<60'

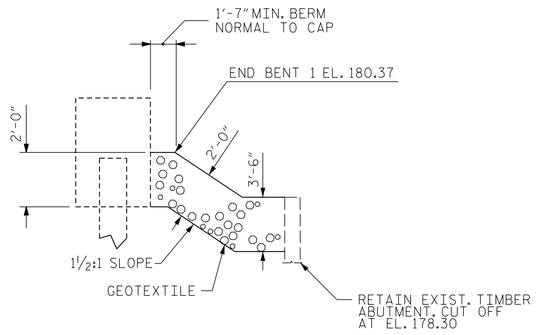


@ END BENT 1

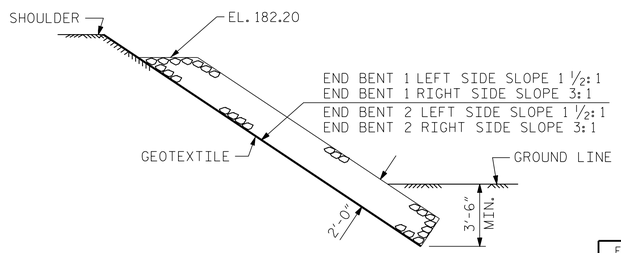
@ END BENT 2

PLAN OF RIP RAP

ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+10.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	120	100
END BENT 2	115	95



SECTION H-H



SECTION C-C

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

DocuSigned by: John Arthur Dilworth

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

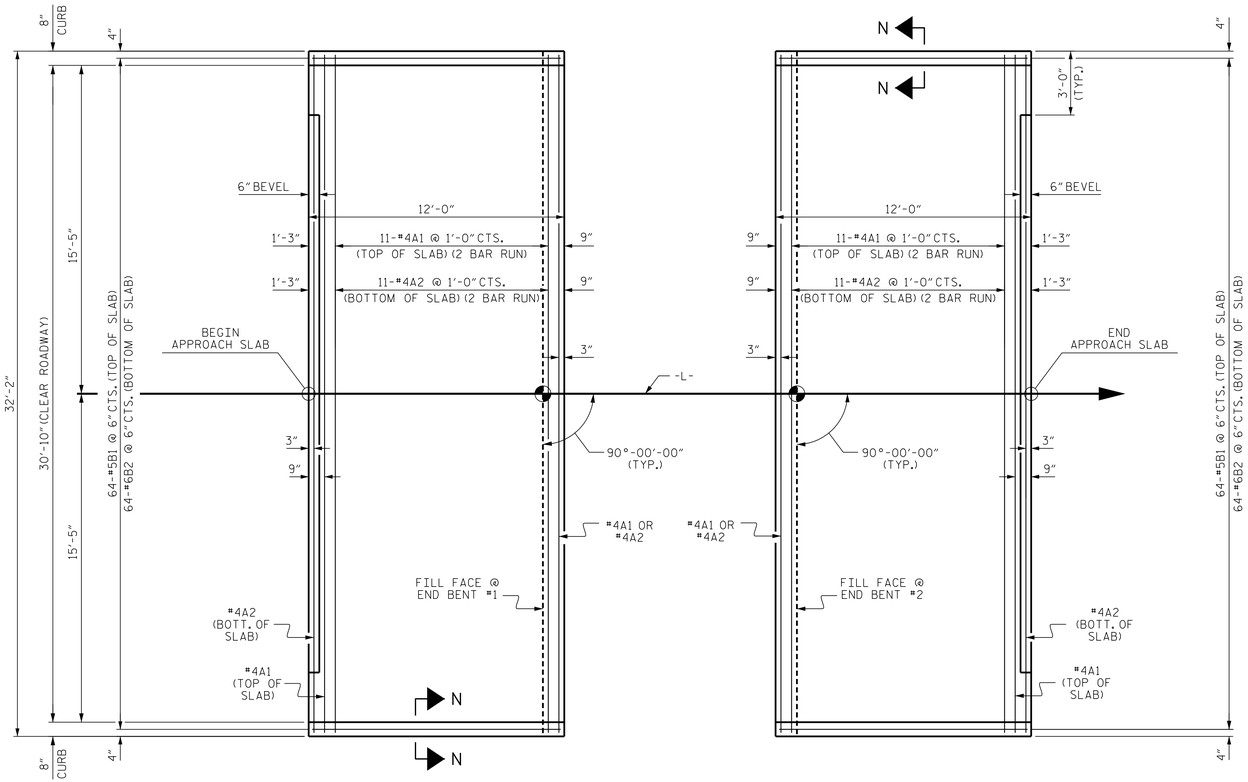
RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			18

DRAWN BY : A. KLINK DATE : 5-19
CHECKED BY : J. DILWORTH DATE : 8-19

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_RR.dgn
10/28/2019 10:09:31 AM



PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

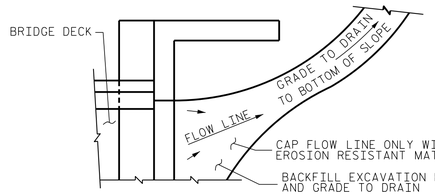
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL 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.

BILL OF MATERIAL

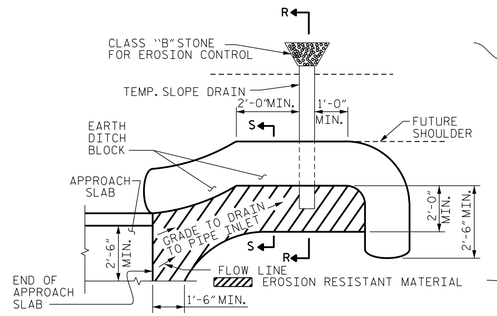
APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C. Y.	18.4

APPROACH SLAB AT EB #2

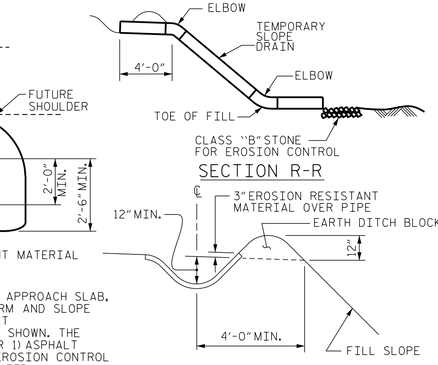
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-11"	294
A2	26	#4	STR	16'-9"	291
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1412
✱ EPOXY COATED REINFORCING STEEL				LBS.	1039
CLASS AA CONCRETE				C. Y.	18.4

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.

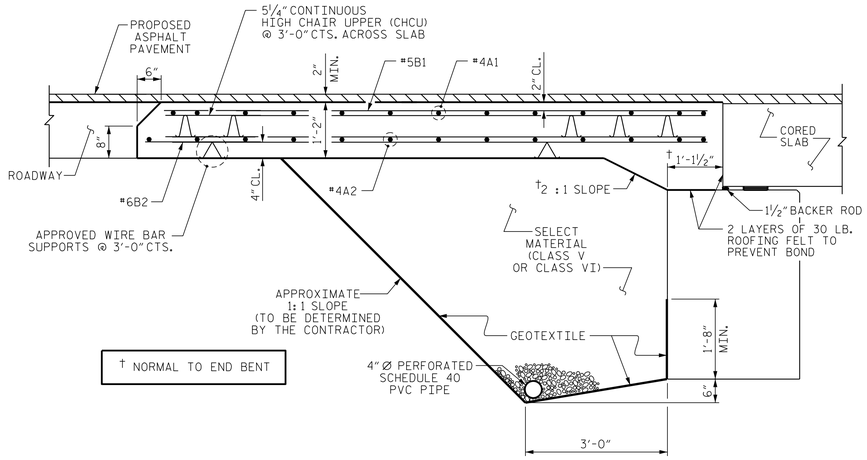
PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

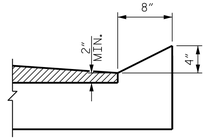
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N

CURB DETAILS

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

PROJECT NO. BR-0113

HALIFAX COUNTY

STATION: 16+10.00 -L-

ENGINEER OF RECORD
4/29/2020

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

Docusigned by: John Arthur Dilworth 62138226922B438

ETHERILL ENGINEERING

1223 Jones Franklin Rd.
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
LICENSE NO. F-0377

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 90° SKEW

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

STD. NO. BAS_33_90S

ASSEMBLED BY : J. PENDERGRAFT DATE : 3-19
CHECKED BY : J. DILWORTH DATE : 8-19
DRAWN BY : SHS/MAA 5-09
CHECKED BY : BCH 5-09
REV. 12-17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P:\2019\19106.01_BR-0113\Structures\DGN\BR0113_SMU_AS.dgn
10/2/2019 9:12:24 AM

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 2018 "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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" 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 (/) GM
REV. 8-16-99 RWW (/) LES REV. 5-1-06 TLA (/) GM REV. 12-17 MAA (/) THC

10/2/2019
9:25:22 AM
P:\2019\19106.01 BR-0113\Structures\DGN\BR0113_SMU_TSH.dgn