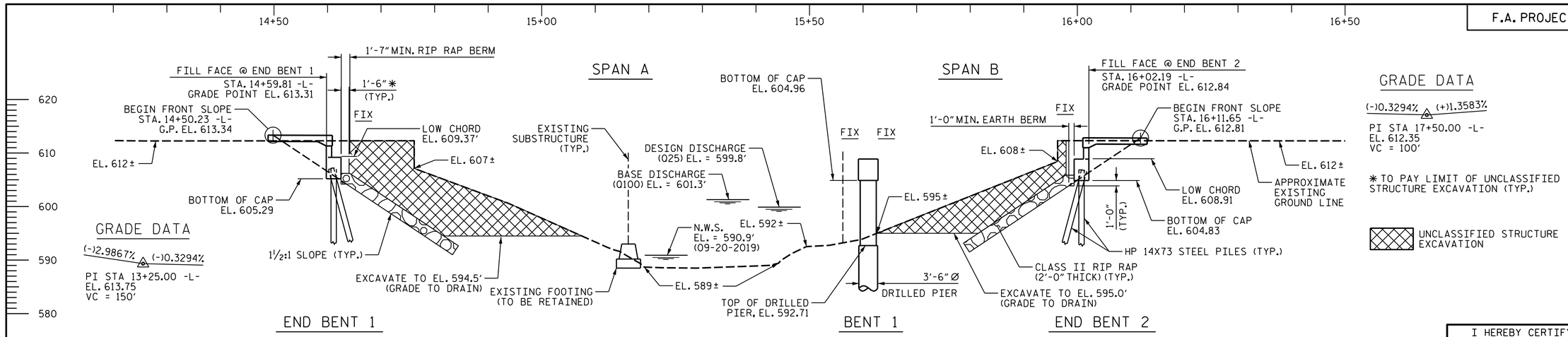
This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

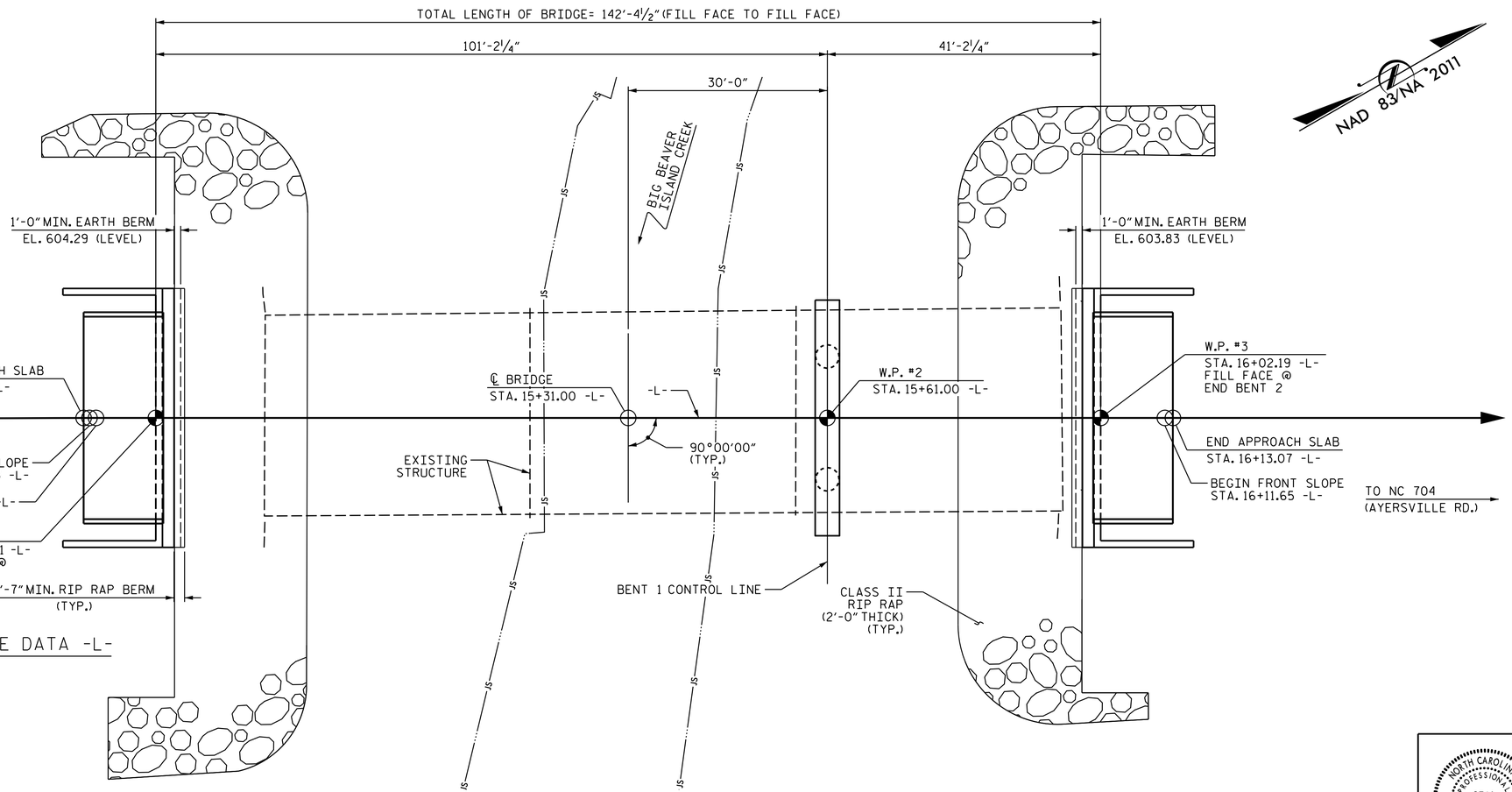
The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

F.A. PROJECT NO. BRZ-1169(003)



SECTION ALONG -L-

I HEREBY CERTIFY THESE PLANS
ARE THE AS-BUILT PLANS



NAD 83/NA 2011

HORIZONTAL CURVE DATA -L-

PI STA 13+13.42 -L-
Δ = 1° 34' 27.4" (RT)
D = 0° 34' 22.6"
L = 274.76'
T = 137.39'
R = 10,000.00'

PLAN

(PILES ARE NOT SHOWN FOR CLARITY)

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE #780277

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1169
(ISLAND DR.) OVER BIG BEAVER
ISLAND CREEK BETWEEN
US 311 AND NC 704

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

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. E. MONDOLFI DATE: 02-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 02-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOHN M. ROBINSON
DocuSigned by: John M. Robinson
30-May-2025

WIL57077
c:\pwworking\hmm\rail_transit\wil57077\d0177213\401.001.B-5722_SMU.GD.S01-01.780277.dgn
5/28/2025
6:26:14 PM

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent 1, Piles 1-7	7	230	See Substructure Plans	20			385							
End Bent 2, Piles 1-5	5	180	See Substructure Plans	20			300							
TOTAL QUANTITY:														

$$* RDR = \frac{Factored\ Resistance\ +\ Factored\ Drag\ Load\ +\ Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent 1, Piles 1-7	230			0.6		
End Bent 2, Piles 1-5	180			0.6		

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
End Bent 1, Piles 1-7				7
End Bent 2, Piles 1-5				5
TOTAL QUANTITY:				12

SUMMARY OF DPT/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)		
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	DPT Test Pile Length FT	DPT Testing Quantity EACH
End Bent 1, Piles 1-7	25	MAYBE
End Bent 2, Piles 1-5	25	MAYBE
TOTAL QUANTITY:		

Pile Order Lengths for Concrete Piles	
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	Pile Order Length Basis* EST or DPT

* EST = Pile order lengths from estimated pile lengths; DPT = Pile order lengths based on Dynamic Pile Testing. For groups of end bents/bents with pile order lengths based on DPT testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the DPT.

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Number of Piers per Line	Factored Resistance per Pier KIPS	Required Drilled Pier Tip Elevation FT	Required Tip Resistance per Pier KSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier LIN FT	Drilled Pier Length* per Pier LIN FT	Drilled Pier Length Not In Soil* per Pier LIN FT	Drilled Pier Length In Soil* per Pier LIN FT	Permanent Steel Casing Required? YES	Permanent Steel Casing Tip Elevation (Elevation Not To Extend Casing Below) FT	Permanent Steel Casing Length** per Pier LIN FT
Bent 1, Piers 1-2	2	1035	574.00	80	585.70		18.7	14	4.7	MAYBE	588.70	4
TOTAL QUANTITY:							37.4	28	9.4			8

* Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "____ Dia. Drilled Piers" or "____ Dia. Drilled Piers Not in Soil" and "____ Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications. For bents with a not in soil pay item, drilled piers through air or water will be paid at the contract unit price for "__Dia. Drilled Piers in Soil."

** Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casing for ____ Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) EACH	Crosshole Sonic Logging (CSL) EACH	Thermal Integrity Profiler (TIP) EACH	Shaft Inspection Device (SID) EACH	Pile Integrity Test (PIT) EACH
Bent 1, Piers 1-2	MAYBE	MAYBE			
TOTAL QUANTITY:					

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31 -L-

SHEET 2 OF 3

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Stephen C. Crockett, #048207) on 12-4-2024.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, TIPs, CSL Testing, SID Inspections and PITs when necessary.

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER Justin W. Robinson
02-Apr-2025

SIGNATURE DATE

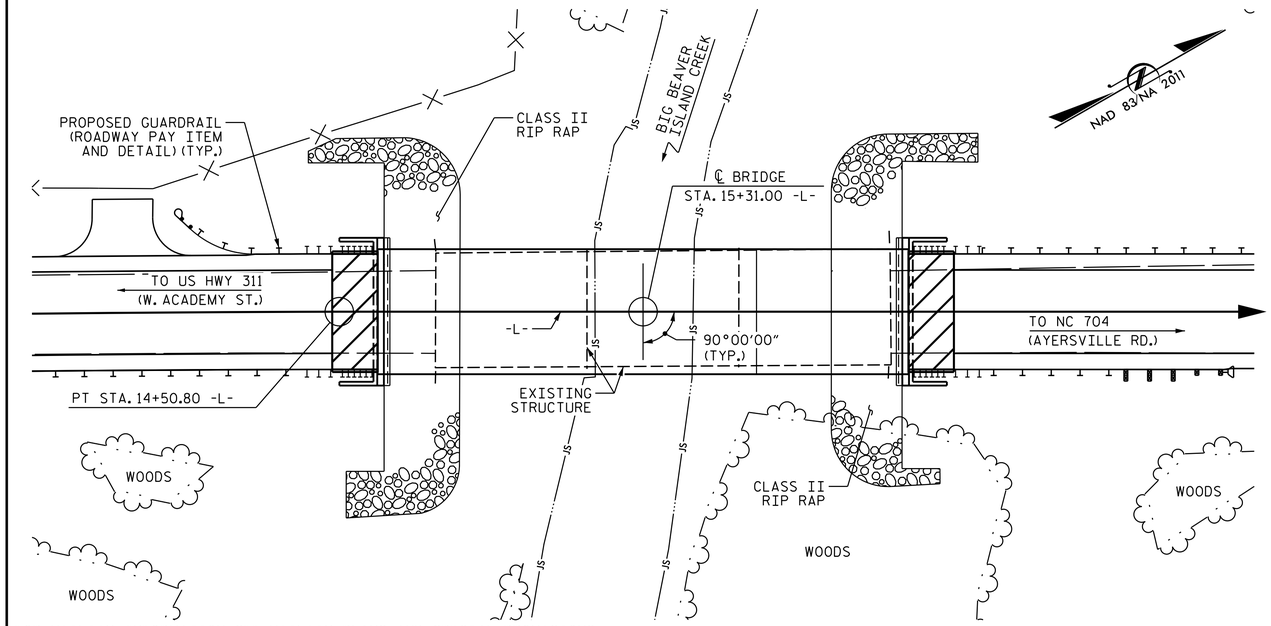
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S01-02
1			3			TOTAL SHEETS
2			4			26

BM#1: 60d NAIL IN 12"POPLAR; 79.25' RT STA. 11+85.23 -L- ELEV. = 614.75'



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FOR DRILLED PIERS, SEE SECTION 411 OF THE SPECIFICATIONS.

NOTES:

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.

HYDRAULIC DATA:	
DESIGN DISCHARGE	= 3,540 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YEAR
DESIGN HIGH WATER ELEVATION	= 599.8
DRAINAGE AREA	= 22.5 SQ. MI.
BASE DISCHARGE (Q 100)	= 4,930 CFS
BASE HIGH WATER ELEVATION	= 601.3
OVERTOPPING FLOOD DATA:	
OVERTOPPING DISCHARGE	= 24,000 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500± YEAR
OVERTOPPING FLOOD ELEVATION	= 612.5 *

* OT OCCURS AT SAG AT -L- STA. 17+19.5 ℄

NOTES CONT'D:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES SEE SHEET SN.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET 1 OF 3 SHALL BE EXCAVATED FOR A DISTANCE OF 40± FT RIGHT AND 49± FT LEFT 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 3 SPANS @ 40'-0"; 29'-2" CLEAR ROADWAY WIDTH AND AN ASPHALT WEARING SURFACE ON A PRESTRESSED CONCRETE CORED SLAB; REINFORCED CONCRETE END BENT CAP AND CAPPED PILE PIERS LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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 15+31.00 -L-."

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STATION 15+31.00 -L-	ASBESTOS ASSESSMENT	3'-6" Ø DRILLED PIERS IN SOIL	3'-6 Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CONCRETE WEARING SURFACE	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM
SUPERSTRUCTURE									4,274	4,486		LUMP SUM
END BENT 1											31.0	
BENT 1			9.4	28	8						25.7	
END BENT 2											30.6	
TOTAL	LUMP SUM	LUMP SUM	9.4	28	8	1	1	LUMP SUM	4,274	4,486	87.3	LUMP SUM

TOTAL BILL OF MATERIAL CONT'D

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 X 73 STEEL PILES		STEEL PILE POINTS	DYNAMIC PILE TESTING	TWO BAR METAL RAIL	1'-2" X 2'-10½" CONCRETE PARAPET *	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAMS	
	LBS.	LBS.	EA.	NO.	LIN. FT.	EA.	EA.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE								265.25	280.25			LUMP SUM	22	1540
END BENT 1	4,650		7	7	140	7				248	276			
BENT 1	7,660	1,351												
END BENT 2	4,534		5	5	100	5				212	236			
TOTAL	16,844	1,351	12	12	240	12	1	265.25	280.25	460	512	LUMP SUM	22	1540

* NOTE: 1'-2" X 2'-10½" CONCRETE PARAPET IS MAXIMUM HEIGHT OF PARAPET. ACTUAL HEIGHT OF CONCRETE PARAPET VARIES, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEET.

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.

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1169 (ISLAND DR.) OVER BIG BEAVER ISLAND CREEK BETWEEN US 311 AND NC 704

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JUSTIN M. ROBINSON
DocuSigned by: Justin M. Robinson
30-May-2025

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

WIL57077
c:\pwworking\hmm\rail_transit\wil57077\d0177213\401_005_B-5722_SMU_GD_S01-03_780277.dgn
5/28/2025
6:26:24 PM

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.035	--	1.75	0.272	1.26	100'	EL	49.25	0.489	1.34	100'	EL	4.925	0.80	0.272	1.04	100'	EL	49.25	
		HL-93 (OPERATING)	N/A		1.633	--	1.35	0.272	1.63	100'	EL	49.25	0.489	1.73	100'	EL	4.925	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.440	51.840	1.75	0.272	1.75	100'	EL	49.25	0.489	1.81	100'	EL	4.925	0.80	0.272	1.44	100'	EL	49.25	
		HS-20 (OPERATING)	36.000		2.271	81.756	1.35	0.272	2.27	100'	EL	49.25	0.489	2.35	100'	EL	4.925	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.413	46.079	1.4	0.272	5.19	100'	EL	49.25	0.489	5.59	100'	EL	4.925	0.80	0.272	3.41	100'	EL	49.25	
		SNGARBS2	20.000		2.473	49.452	1.4	0.272	3.76	100'	EL	49.25	0.489	3.91	100'	EL	4.925	0.80	0.272	2.47	100'	EL	49.25	
		SNAGRIS2	22.000		2.313	50.885	1.4	0.272	3.52	100'	EL	49.25	0.489	3.60	100'	EL	4.925	0.80	0.272	2.31	100'	EL	49.25	
		SNCOTTS3	27.250		1.696	46.228	1.4	0.272	2.58	100'	EL	49.25	0.489	2.78	100'	EL	4.925	0.80	0.272	1.70	100'	EL	49.25	
		SNAGGRS4	34.925		1.390	48.556	1.4	0.272	2.11	100'	EL	49.25	0.489	2.26	100'	EL	4.925	0.80	0.272	1.39	100'	EL	49.25	
		SNS5A	35.550		1.361	48.398	1.4	0.272	2.07	100'	EL	49.25	0.489	2.27	100'	EL	4.925	0.80	0.272	1.36	100'	EL	49.25	
		SNS6A	39.950		1.238	49.456	1.4	0.272	1.88	100'	EL	49.25	0.489	2.05	100'	EL	4.925	0.80	0.272	1.24	100'	EL	49.25	
		SNS7B	42.000		1.178	49.496	1.4	0.272	1.79	100'	EL	49.25	0.489	2.00	100'	EL	4.925	0.80	0.272	1.18	100'	EL	49.25	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.506	49.709	1.4	0.272	2.29	100'	EL	49.25	0.489	2.46	100'	EL	4.925	0.80	0.272	1.51	100'	EL	49.25	
		TNT4A	33.075		1.510	49.942	1.4	0.272	2.30	100'	EL	49.25	0.489	2.41	100'	EL	4.925	0.80	0.272	1.51	100'	EL	49.25	
		TNT6A	41.600		1.224	50.926	1.4	0.272	1.86	100'	EL	49.25	0.489	2.09	100'	EL	4.925	0.80	0.272	1.22	100'	EL	49.25	
		TNT7A	42.000		1.225	51.442	1.4	0.272	1.86	100'	EL	49.25	0.489	2.05	100'	EL	4.925	0.80	0.272	1.22	100'	EL	49.25	
		TNT7B	42.000		1.254	52.657	1.4	0.272	1.91	100'	EL	49.25	0.489	1.96	100'	EL	4.925	0.80	0.272	1.25	100'	EL	49.25	
		TNAGRIT4	43.000		1.203	51.711	1.4	0.272	1.83	100'	EL	49.25	0.489	1.91	100'	EL	4.925	0.80	0.272	1.20	100'	EL	49.25	
		TNAGT5A	45.000		1.139	51.236	1.4	0.272	1.73	100'	EL	49.25	0.489	1.87	100'	EL	4.925	0.80	0.272	1.14	100'	EL	49.25	
		TNAGT5B	45.000	3	1.129	50.805	1.4	0.272	1.72	100'	EL	49.25	0.489	1.82	100'	EL	4.925	0.80	0.272	1.13	100'	EL	49.25	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.129	61.213	1.3	0.272	2.87	100'	EL	49.25	0.489	3.06	100'	EL	4.925	0.80	0.272	2.13	100'	EL	49.25	
		EV3	43.000	4	1.403	60.325	1.3	0.272	1.89	100'	EL	49.25	0.489	2.06	100'	EL	4.925	0.80	0.272	1.40	100'	EL	49.25	

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 * *
(4) EMERGENCY VEHICLE LOAD RATING * *
* * SEE CHART FOR VEHICLE TYPE
GIRDER LOCATION
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER

(1)
(2)
(3)
(4)

LRFR SUMMARY

FOR SPAN " _ "

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

DRAWN BY: J. T. WILLIAMS DATE: 11-2024
CHECKED BY: J. M. ROBINSON DATE: 11-2024
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 11-2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSHUA M. ROBINSON
02-Apr-2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR 100' BOX BEAM UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

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

STD. NO. 39LRFR1_90S_100L

WIL57077
R:\Structures\Plans\401_007_B-5722_SMU_LRFR_S01-04_780277.dgn
12/6/2024 11:22:30 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	2.98	--	1.75	0.262	5.48	B	EL	19.3	0.564	**2.98**	B	EL	**7.3**	0.80	0.262	5.32	B	EL	19.3	
		HL-93(Opr)	N/A	--	2.98	--	1.35	0.262	7.10	B	EL	19.3	0.564	3.90	B	EL	7.3	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	3.44	123.840	1.75	0.262	6.90	B	EL	19.3	0.564	**3.44**	B	EL	**7.3**	0.80	0.262	6.70	B	EL	19.3	
		HS-20(Opr)	36.000	--	4.50	162.000	1.35	0.262	8.95	B	EL	19.3	0.564	4.50	B	EL	7.3	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	8.97	121.095	1.4	0.262	15.85	B	EL	19.3	0.564	8.97	B	EL	7.3	0.80	0.262	12.31	B	EL	19.3	
		SNGARBS2	20.000	--	6.79	135.800	1.4	0.262	13.21	B	EL	19.3	0.564	6.79	B	EL	7.3	0.80	0.262	10.22	B	EL	19.3	
		SNAGRIS2	22.000	--	6.48	142.560	1.4	0.262	12.92	B	EL	19.3	0.564	6.48	B	EL	7.3	0.80	0.262	10.00	B	EL	19.3	
		SNCOTTS3	27.250	--	4.42	120.445	1.4	0.262	7.92	B	EL	19.3	0.564	4.42	B	EL	7.3	0.80	0.262	6.16	B	EL	19.3	
		SNAGGRS4	34.925	--	3.94	137.605	1.4	0.262	7.15	B	EL	19.3	0.564	3.94	B	EL	7.3	0.80	0.262	5.55	B	EL	19.3	
		SNS5A	35.550	--	4.15	147.533	1.4	0.262	6.95	B	EL	19.3	0.564	4.15	B	EL	7.3	0.80	0.262	5.40	B	EL	19.3	
		SNS6A	39.950	--	3.89	155.406	1.4	0.262	6.62	B	EL	19.3	0.564	3.89	B	EL	7.3	0.80	0.262	5.15	B	EL	19.3	
		SNS7B	42.000	--	3.99	167.580	1.4	0.262	6.32	B	EL	19.3	0.564	3.99	B	EL	7.3	0.80	0.262	4.91	B	EL	19.3	
	TTST	TNAGRIT3	33.000	--	4.67	154.110	1.4	0.262	8.15	B	EL	19.3	0.564	4.67	B	EL	7.3	0.80	0.262	6.33	B	EL	19.3	
		TNT4A	33.075	--	4.35	143.876	1.4	0.262	8.26	B	EL	19.3	0.564	4.35	B	EL	7.3	0.80	0.262	6.42	B	EL	19.3	
		TNT6A	41.600	--	4.23	175.968	1.4	0.262	7.01	B	EL	19.3	0.564	4.23	B	EL	7.3	0.80	0.262	5.45	B	EL	19.3	
		TNT7A	42.000	--	3.96	166.320	1.4	0.262	7.20	B	EL	19.3	0.564	3.96	B	EL	7.3	0.80	0.262	5.59	B	EL	19.3	
		TNT7B	42.000	--	3.79	159.180	1.4	0.262	7.33	B	EL	19.3	0.564	3.79	B	EL	7.3	0.80	0.262	5.70	B	EL	19.3	
		TNAGRIT4	43.000	--	3.69	158.670	1.4	0.262	7.16	B	EL	19.3	0.564	3.69	B	EL	7.3	0.80	0.262	5.56	B	EL	19.3	
		TNAGT5A	45.000	--	3.96	178.200	1.4	0.262	6.62	B	EL	19.3	0.564	3.96	B	EL	7.3	0.80	0.262	5.14	B	EL	19.3	
		TNAGT5B	45.000	3	3.47	156.150	1.4	0.262	6.43	B	EL	19.3	0.564	**3.47**	B	EL	**7.3**	0.80	0.262	5.00	B	EL	19.3	
EMERGENCY VEHICLE (EV)		EV2	28.750	--	5.02	144.325	1.3	0.262	9.83	B	EL	19.3	0.564	5.02	B	EL	7.3	0.80	0.262	7.21	B	EL	19.3	
		EV3	43.000	4	3.38	145.340	1.3	0.262	6.52	B	EL	19.3	0.564	3.38	B	EL	7.3	0.80	0.262	4.71	B	EL	19.3	

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 **
(4) EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

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

LRFR SUMMARY

SPAN B

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 40' BOX BEAM UNIT 90° SKEW (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			26

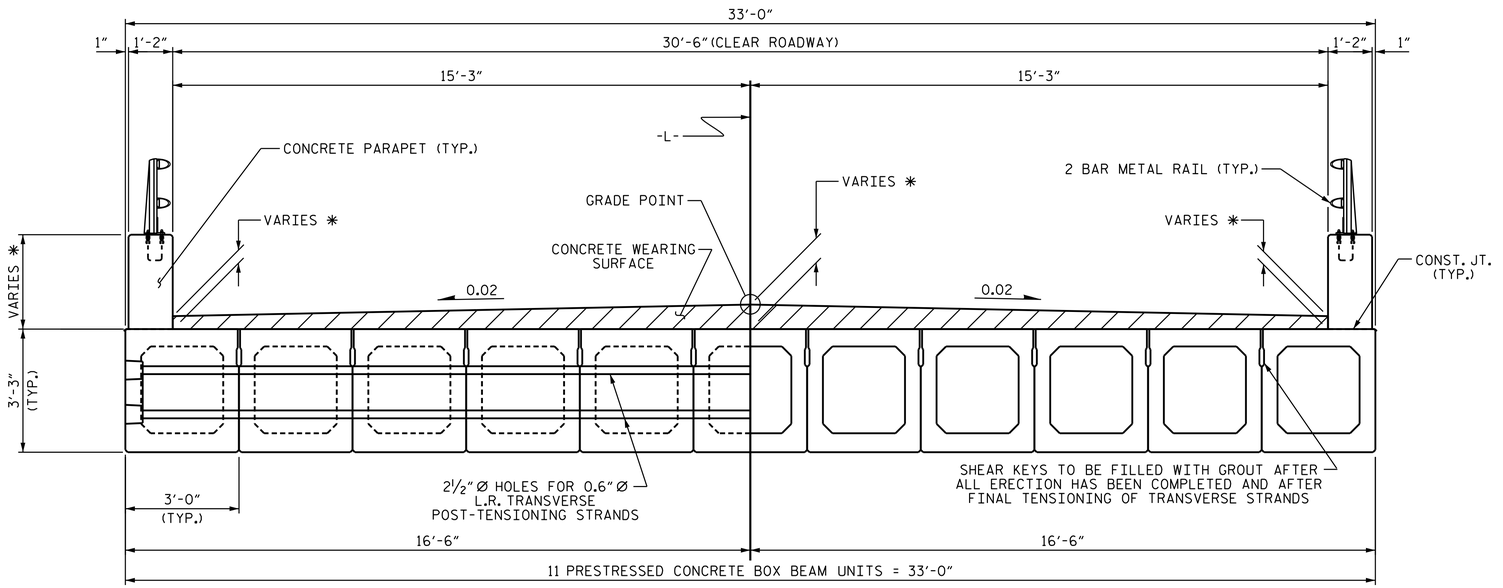
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JOSHUA M. ROBINSON
02-APR-2025

DRAWN BY: J. T. WILLIAMS DATE: 11-2024
CHECKED BY: J. M. ROBINSON DATE: 11-2024
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 11-2024

WI157077
R:\Structures\Plans\401_009_B-5722_SMU_LRFR_S01-05_780277.dgn
12/6/2024 11:22:46 AM



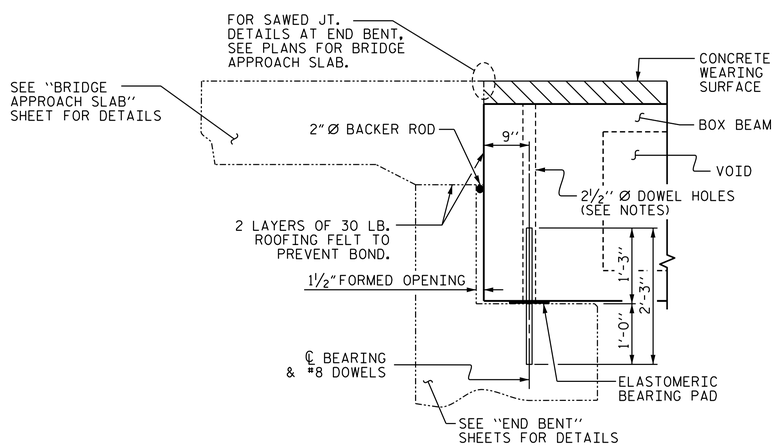
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

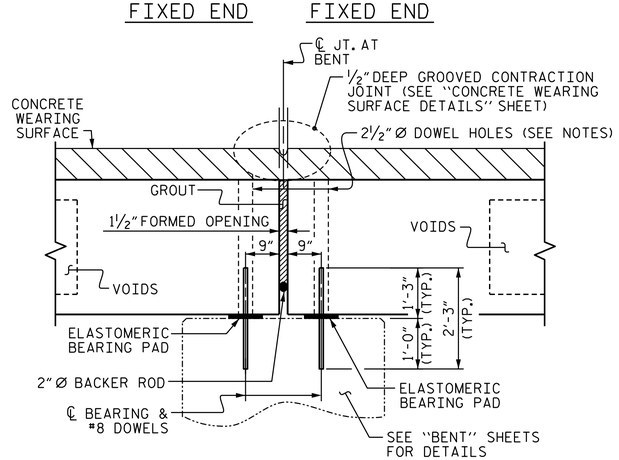
* - THE HEIGHT OF THE PARAPET AND CONCRETE WEARING SURFACE THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS AND CONCRETE WEARING SURFACE THICKNESS, SEE THE "CONCRETE PARAPET AND END POST DETAILS" AND "CONCRETE WEARING SURFACE DETAILS" SHEETS.

FIXED END

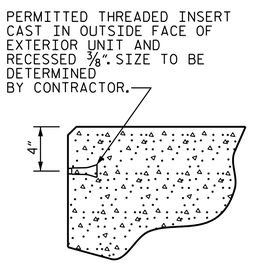


SECTION AT END BENT

FIXED END FIXED END



SECTION AT BENT NO. 1



THREADED INSERT DETAIL

NOTES

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

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

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

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5,500 PSI FOR SPAN A AND 4,000 PSI FOR SPAN B.

ALL REINFORCING STEEL IN VERTICAL CONCRETE PARAPET SHALL BE EPOXY COATED.

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

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			26

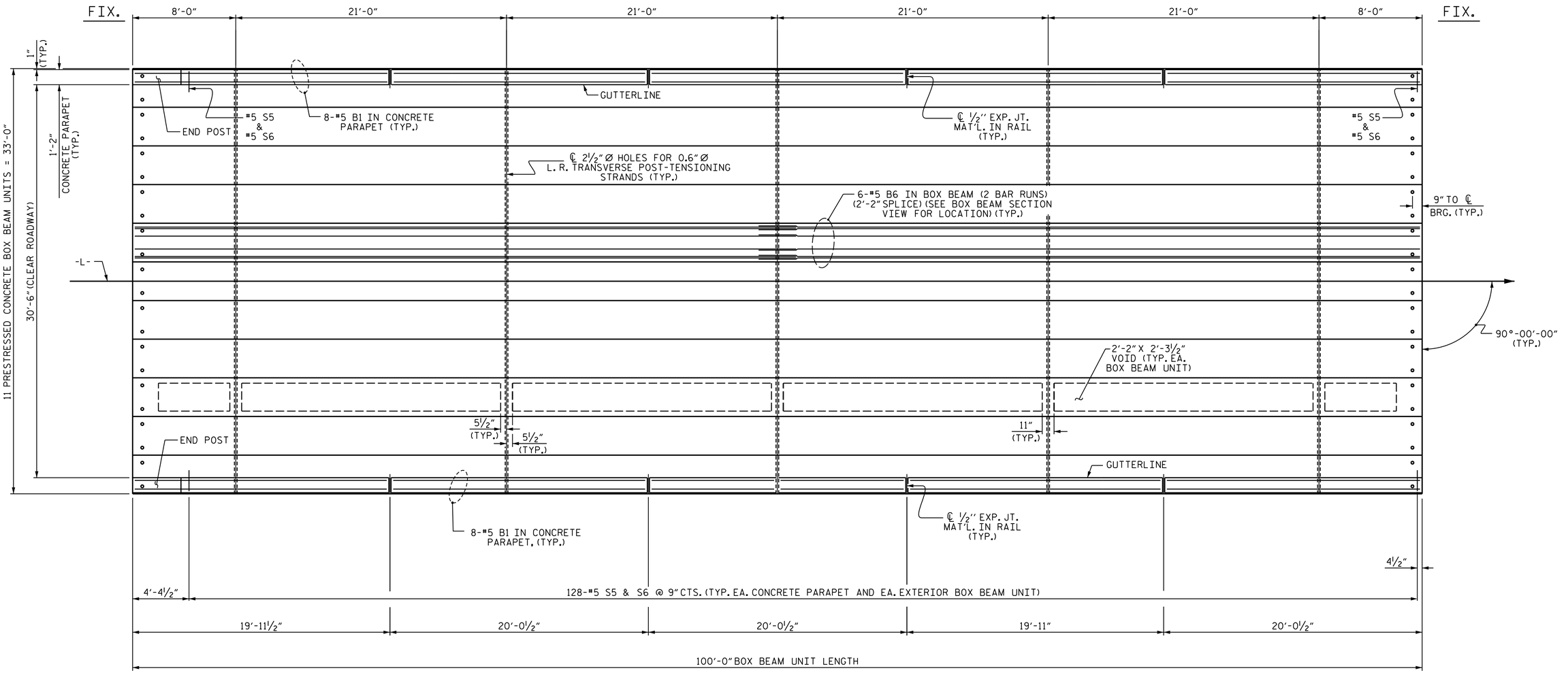
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

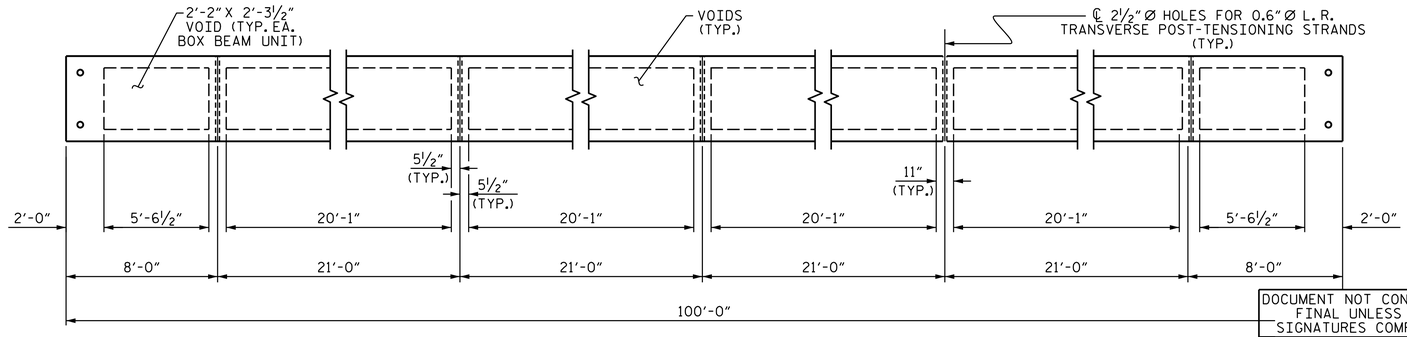
PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSHUA M. ROBINSON
02-Apr-2024

WIL57077
R:\Structures\Plans\401_011_B-5722_SMU_BB_S01-06_780277.dgn
12/6/2024 11:22:59 AM



PLAN OF SPAN A UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF 100' UNIT
30'-6" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			26

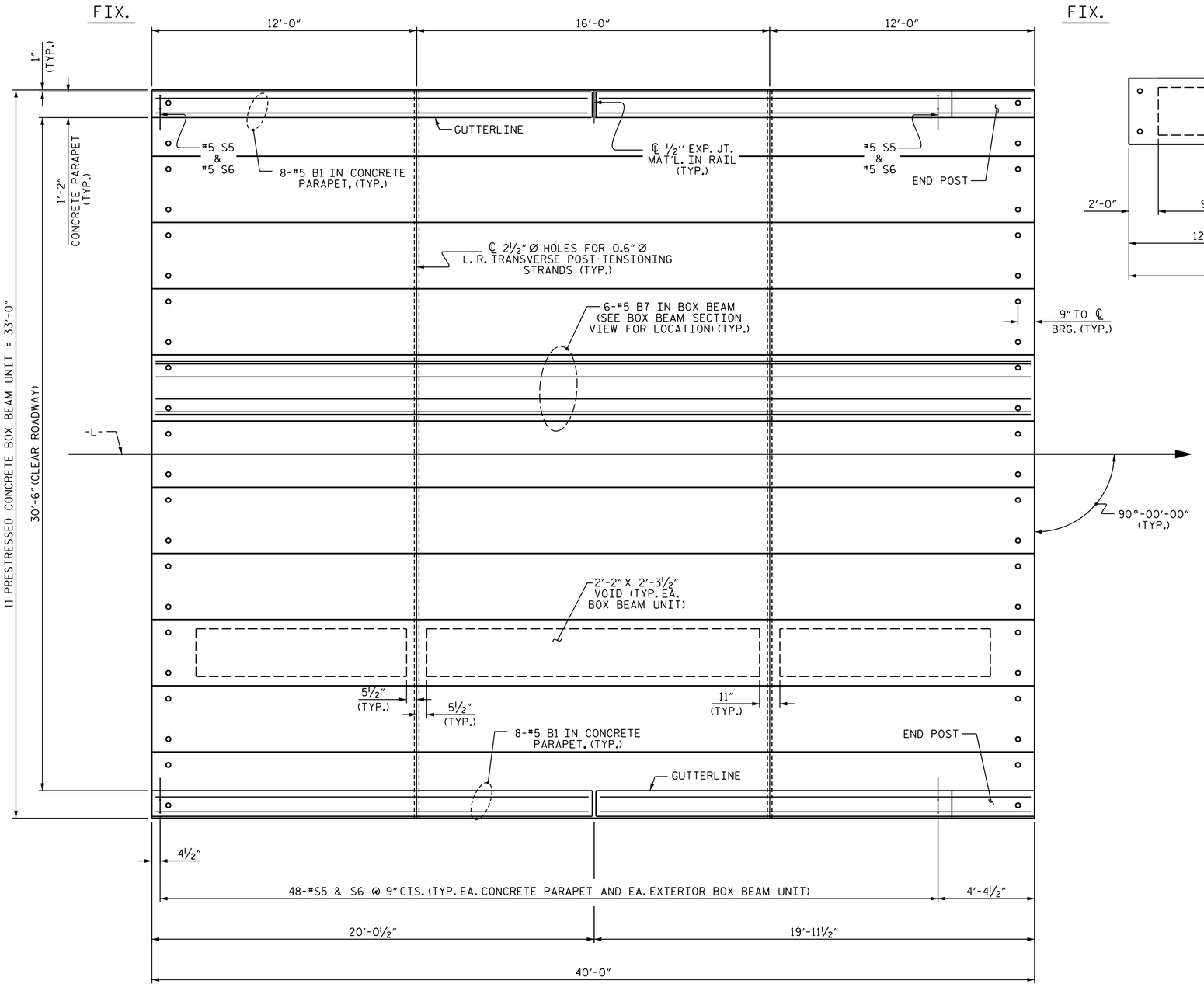
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

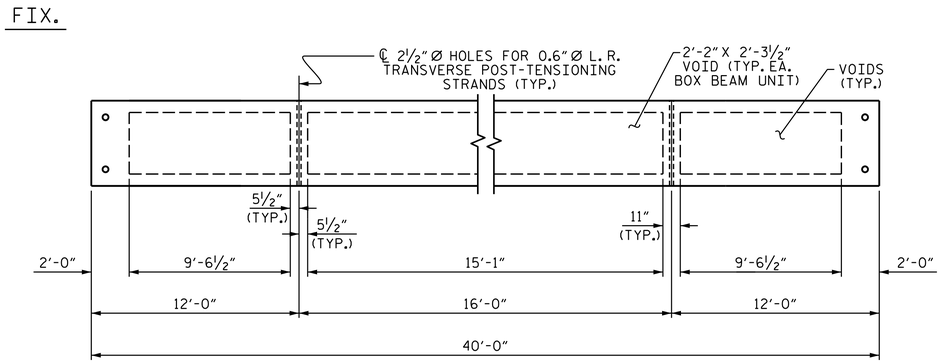
PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JASON M. ROBINSON
02-Apr-2024

W11570777
R:\Structures\Plans\401.013.B-5722.SMU.BB.S01-07.780277.dgn
12/6/2024 11:23:11 AM



PLAN OF SPAN B UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF 40' UNIT
30'-6" CLEAR ROADWAY
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			26

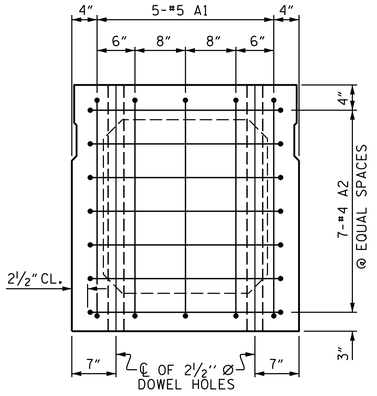
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

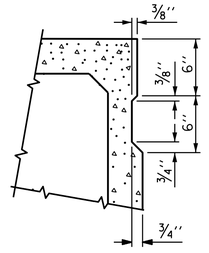
NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSHUA M. ROBINSON
02-APR-2024

W\L57077
R:\Structures\Plans\401_015_B-5722_SMU_BB_S01-08_780277.dgn
12/6/2024 11:23:22 AM



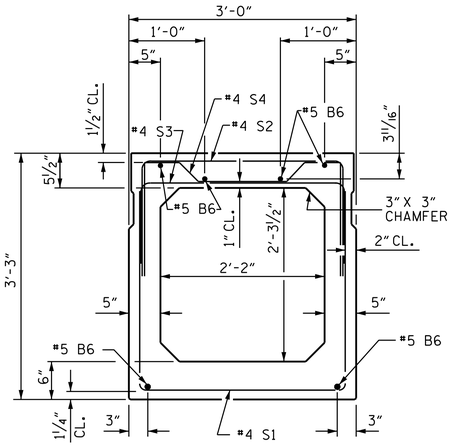
END ELEVATION

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



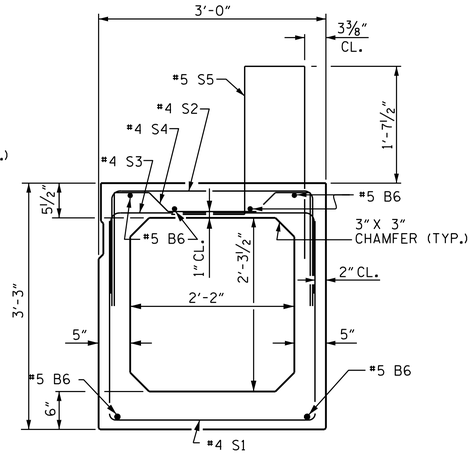
SHEAR KEY DETAIL

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



INTERIOR BOX BEAM SECTION

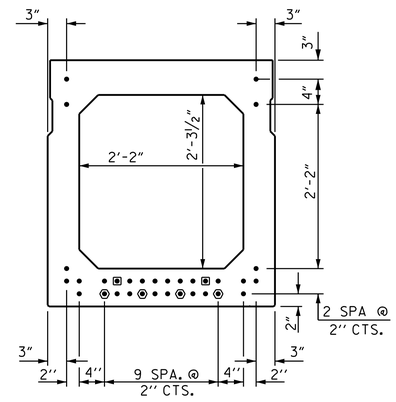
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(32 STRANDS REQUIRED)

(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

DEBONDING LEGEND

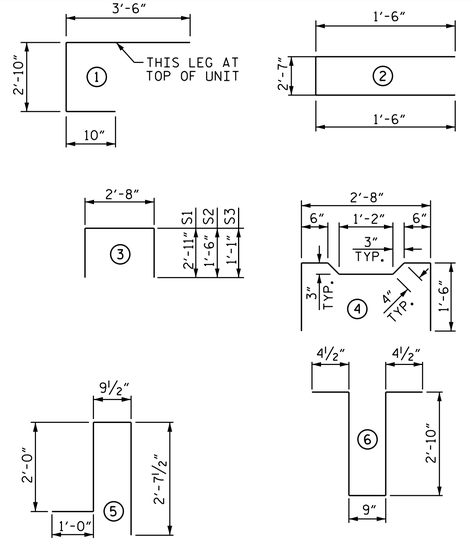
- ● FULLY BONDED STRANDS
- ◉ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⬢ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

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

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

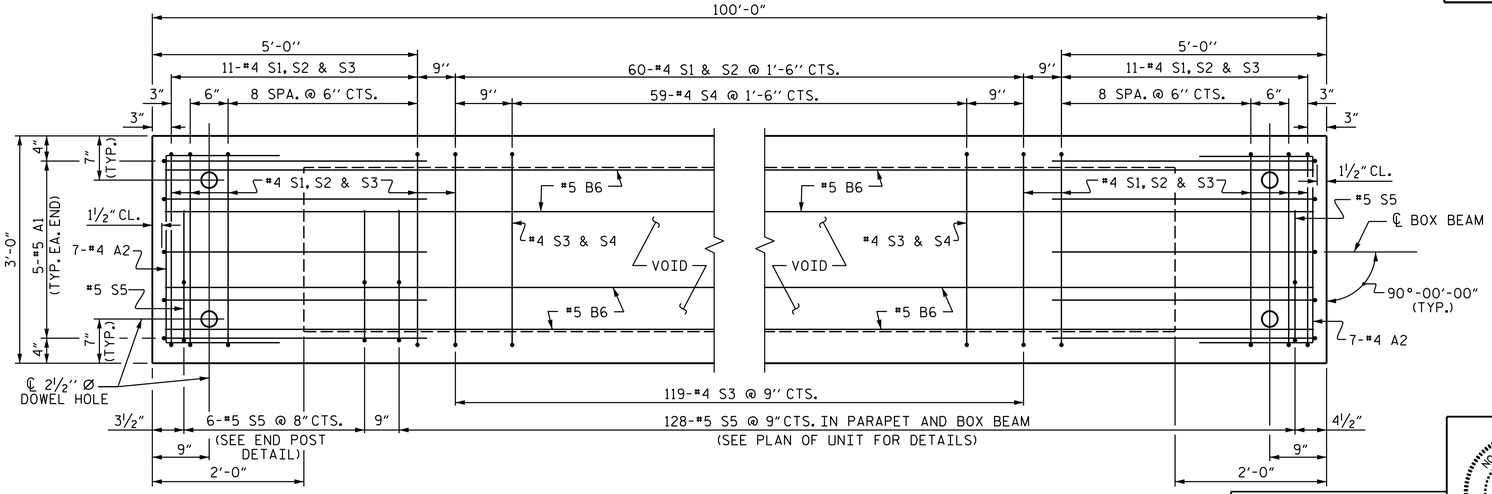
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	44	#4	2	5'-7"	164	5'-7"	164
B6	12	#5	STR	50'-11"	637	50'-11"	637
K1	15	#4	6	7'-2"	72	7'-2"	72
K2	10	#4	STR	2'-7"	17	2'-7"	17
S1	82	#4	3	8'-6"	466	8'-6"	466
S2	82	#4	3	5'-8"	311	5'-8"	311
S3	141	#4	3	4'-10"	455	4'-10"	455
S4	59	#4	4	5'-10"	230	5'-10"	230
✱ S5	134	#5	5	6'-5"	897	--	--
REINFORCING STEEL					2427 LBS.		2427 LBS.
✱ EPOXY COATED REINF. STEEL					897 LBS.		
7500 P.S.I. CONCRETE					19.6 CU. YDS.		19.4 CU. YDS.
0.6" Ø L.R. STRANDS					No. 32		No. 32



PLAN OF BOX BEAM

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
02-APR-2024

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 4 OF 6

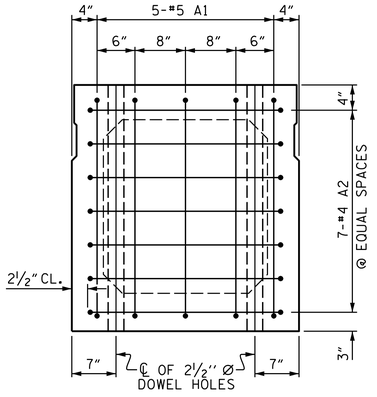
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM 100' UNIT

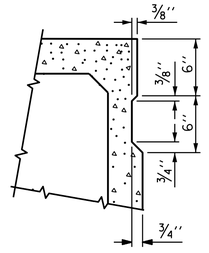
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			26

W1L57077
R:\Structures\Plans\401_017_B-5722_SMU_BB_S01-09_780277.dgn
12/6/2024
11:23:32 AM



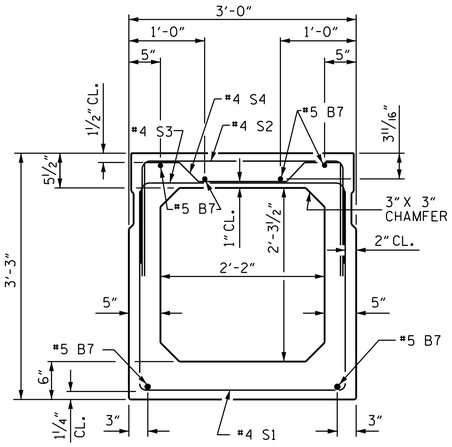
END ELEVATION

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



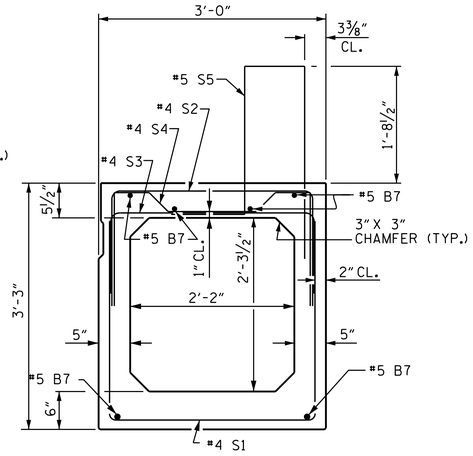
SHEAR KEY DETAIL

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



INTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

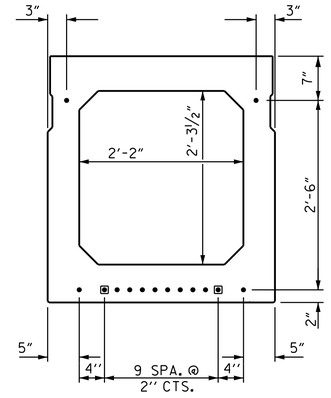


EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

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

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(14 STRANDS REQUIRED)

(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

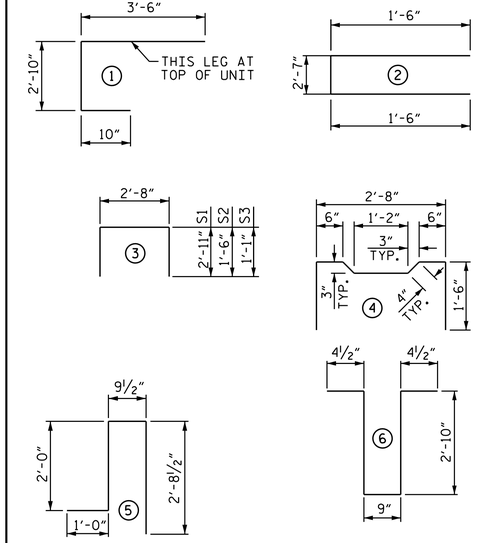
DEBONDING LEGEND

● FULLY BONDED STRANDS

◉ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

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

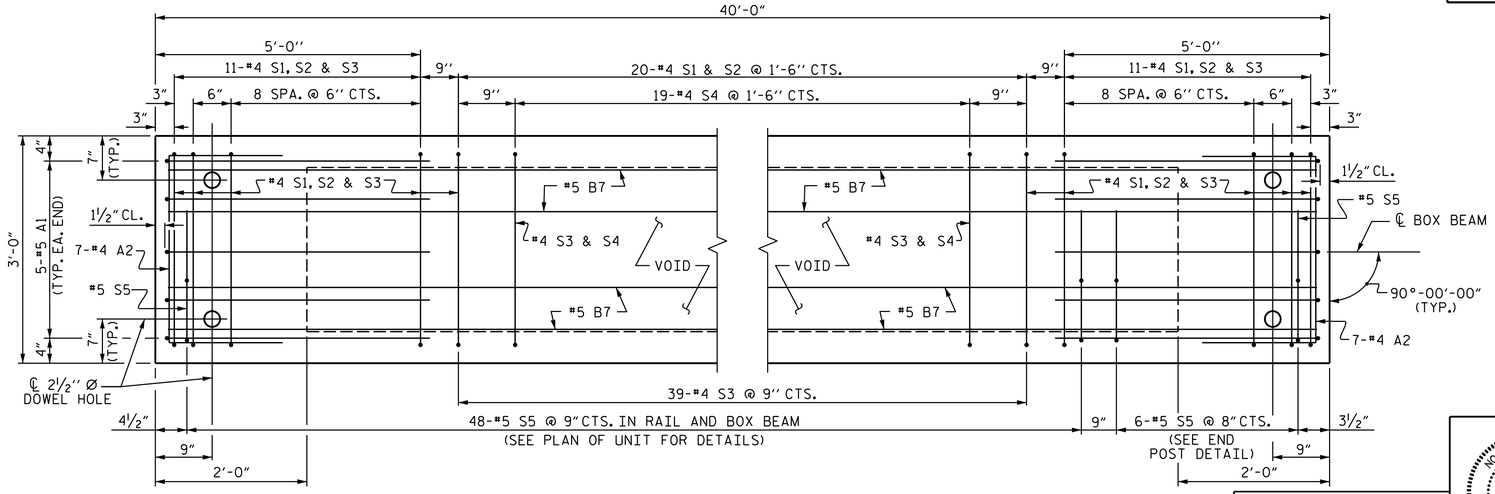
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	7'-2"	75	7'-2"	75
A2	26	#4	2	5'-7"	97	5'-7"	97
B7	6	#5	STR	39'-8"	248	39'-8"	248
K1	6	#4	6	7'-2"	29	7'-2"	29
K2	4	#4	STR	2'-7"	7	2'-7"	7
S1	42	#4	3	8'-6"	238	8'-6"	238
S2	42	#4	3	5'-8"	159	5'-8"	159
S3	61	#4	3	4'-10"	197	4'-10"	197
S4	19	#4	4	5'-10"	74	5'-10"	74
✱ S5	54	#5	5	6'-6"	362	--	--
REINFORCING STEEL					1124 LBS.		1124 LBS.
✱ EPOXY COATED REINF. STEEL					362 LBS.		
5000 P.S.I. CONCRETE					8.3 CU. YDS.		8.2 CU. YDS.
0.6" Ø L.R. STRANDS					No. 14		No. 14



PLAN OF BOX BEAM

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
02-Apr-2024

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 5 OF 6

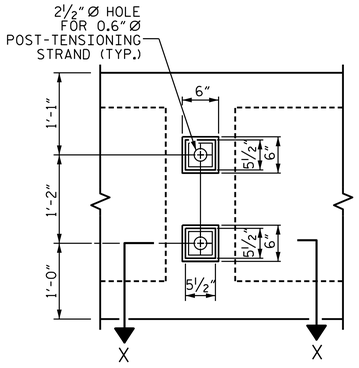
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

3'-0" X 3'-3" PRESTRESSED CONCRETE BOX BEAM 40' UNIT

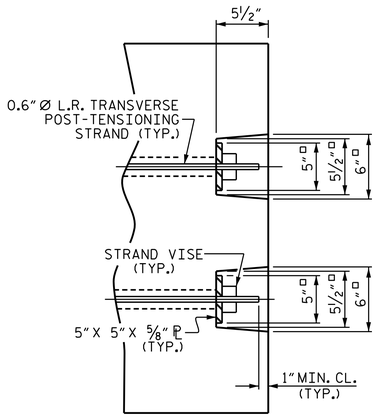
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			26

W1L57077
R:\Structures\Plans\401_019_B-5722_SMU_BB_S01-10_780277.dgn
12/6/2024
11:23:44 AM

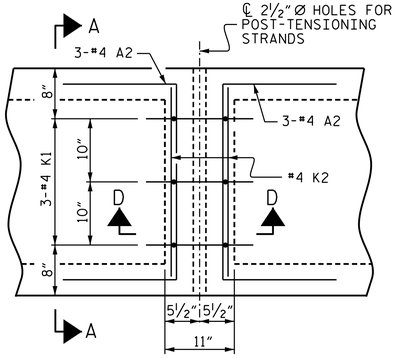


VIEW Y-Y

SHOWING ELEVATION VIEW OF GROUTED RECESS



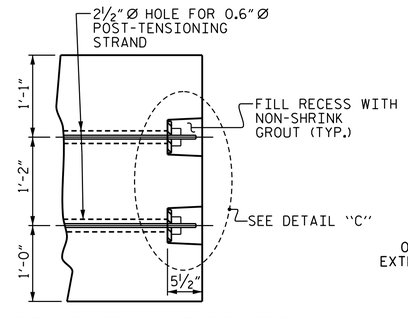
DETAIL "C"



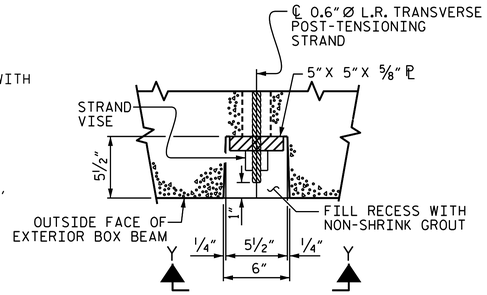
PLAN

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	100'-0"	200'-0"
	2	40'-0"	80'-0"
INTERIOR B.B.	9	100'-0"	900'-0"
	9	40'-0"	360'-0"
TOTAL	22	———	1540'-0"

DEAD LOAD DEFLECTION AND CAMBER		
	3'-0" x 3'-3"	
	0.6" Ø L.R. STRAND	
	SPAN "A"	SPAN "B"
CAMBER (BEAM ALONE IN PLACE)	1 13/16" ↑	7/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD	15/16" ↓	1/16" ↓
FINAL CAMBER	7/8" ↑	3/8" ↑



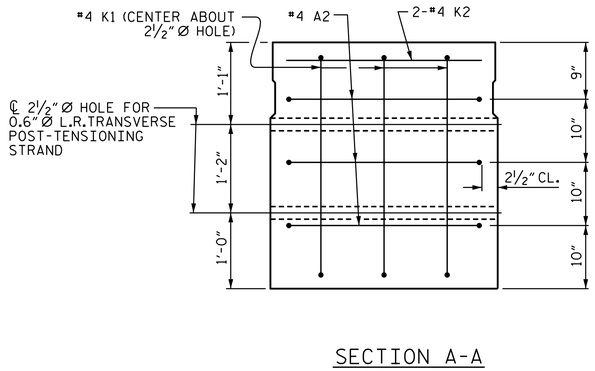
PART SECTION AT RECESS



SECTION X-X

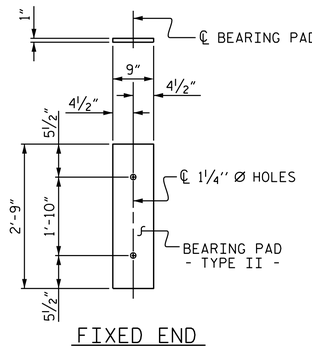
SHOWING PLAN VIEW OF GROUTED RECESS

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



SECTION A-A

VOIDS NOT SHOWN

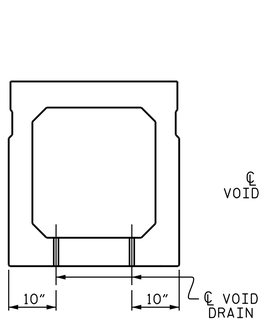


FIXED END

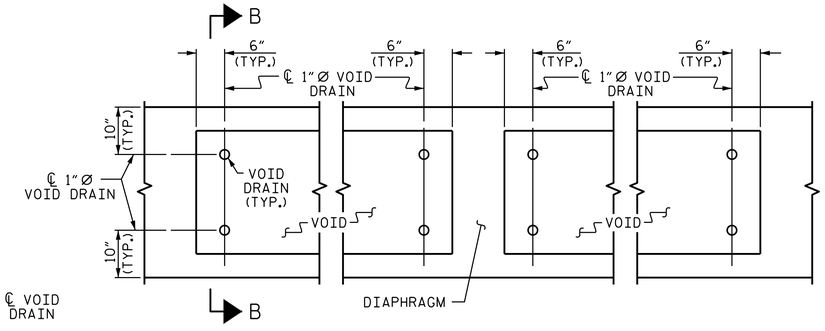
(TYPE II - 44 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.



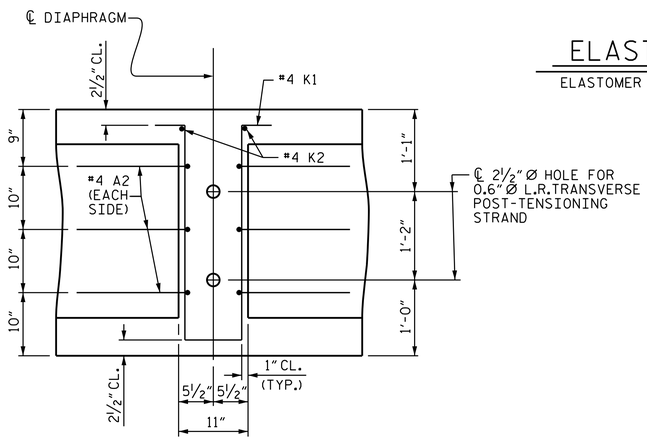
SECTION B-B



PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)



SECTION D-D

DOUBLE DIAPHRAGM DETAILS

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

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			26

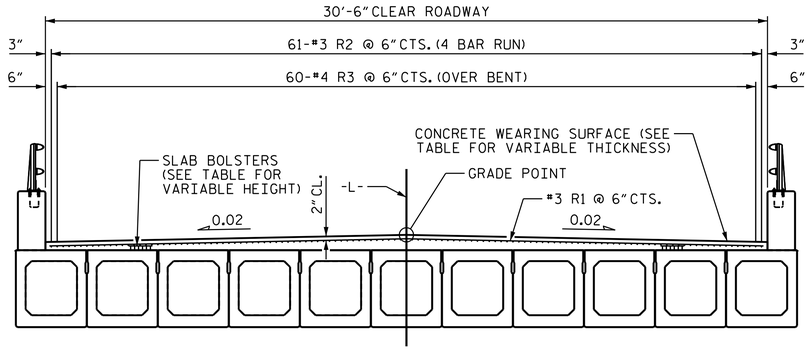
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSHUA M. ROBINSON
02-Apr-2024

WIL57077
R:\Structures\Plans\401_021_B-5722_SMU_BB_S01-11_780277.dgn
12/6/2024 11:23:55 AM



REINFORCING FOR CONCRETE WEARING SURFACE

NOTES:

PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE CONCRETE PARAPET. THE COST OF THE #3 & #4 BARS CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

ALL REINFORCING STEEL FOR THE CONCRETE WEARING SURFACE SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/8" IN DEPTH SHALL BE TOOLED IN THE TOP WEARING SURFACE AT INTERIOR BENTS WITH CONTINUOUS CONCRETE WEARING SURFACE IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS.

BILL OF MATERIAL

CONCRETE WEARING SURFACE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳R1	280	#3	STR	30'-2"	3176
✳R2	244	#3	STR	36'-2"	3318
✳R3	60	#4	STR	20'-0"	802

✳EPOXY COATED REINFORCING STEEL 7,296 LBS

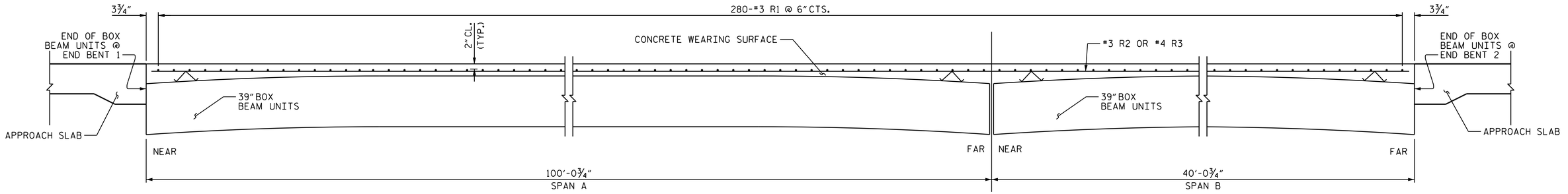
CONCRETE WEARING SURFACE 4,274 SQ.FT.

GROOVING BRIDGE FLOORS

APPROACH SLABS	633 SQ.FT.
CONCRETE WEARING SURFACE	3,853 SQ.FT.
TOTAL	4,486 SQ.FT.

SPLICE LENGTH CHART

BAR SIZE	EPOXY COATED
#3	1'-6"



SECTION THRU CONCRETE WEARING SURFACE

INCREASE STATIONING

CONCRETE WEARING SURFACE THICKNESS

SPAN	LOCATION	LT. GUTTERLINE	GRADE POINT	RT. GUTTERLINE
A	BEARING (NEAR)	4½"	8 3/16"	4½"
	@ MID-SPAN	3⅝"	7 5/16"	3⅝"
	BEARING (FAR)	4 9/16"	8¼"	4 9/16"
B	BEARING (NEAR)	4½"	8 3/16"	4½"
	@ MID-SPAN	4⅛"	7¾"	4⅛"
	BEARING (FAR)	4½"	8 3/16"	4½"

NOTE: CONCRETE WEARING SURFACE THICKNESS BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATION AND VARIES BETWEEN ℄ BEARING AND MID-SPAN.

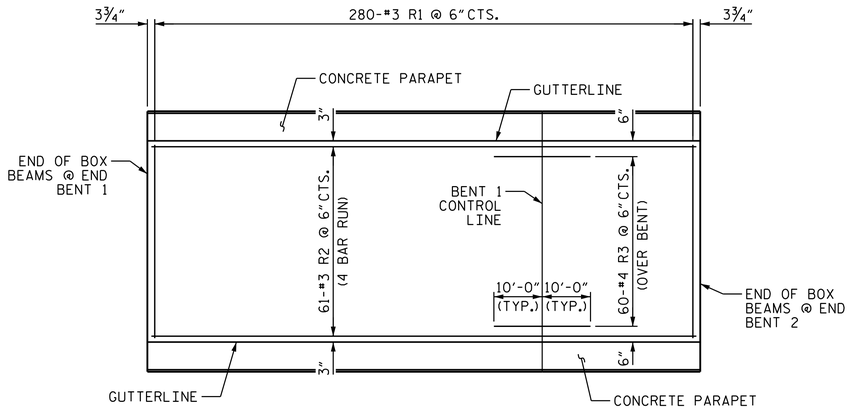
INCREASE STATIONING

BEAM OR SLAB BOLSTER HEIGHTS

SPAN	LOCATION	LT. GUTTERLINE	GRADE POINT	RT. GUTTERLINE
A	BEARING (NEAR)	1½"	5¼"	1½"
	MID-SPAN	¾" ✳✳	4½"	¾" ✳✳
	BEARING (FAR)	1½"	5¼"	1½"
B	BEARING (NEAR)	1½"	5¼"	1½"
	MID-SPAN	1"	4¾"	1"
	BEARING (FAR)	1½"	5¼"	1½"

✳✳USE SLAB BOLSTERS

NOTE: BEAM AND SLAB BOLSTER HEIGHTS BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATION AND VARY BETWEEN ℄ BEARING AND MID-SPAN.



PLAN

SHOWING CONTINUOUS CONCRETE OVERLAY OVER INTERIOR BENT

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE WEARING SURFACE DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

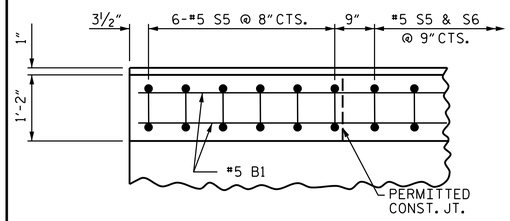
PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JOSHUA M. ROBINSON
02-APR-2024

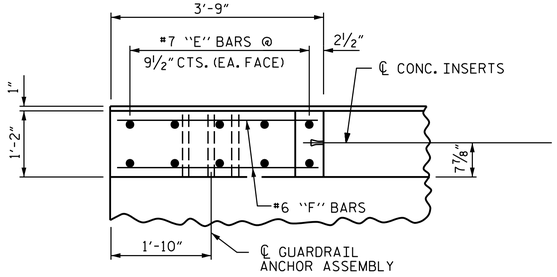
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

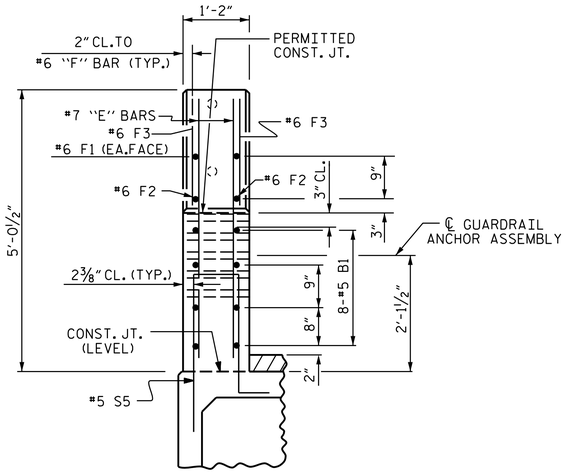
WIL57077
R:\Structures\Plans\401_023_B-5722_SMU_CWS_S01-12_780277.dgn
12/6/2024 11:24:07 AM



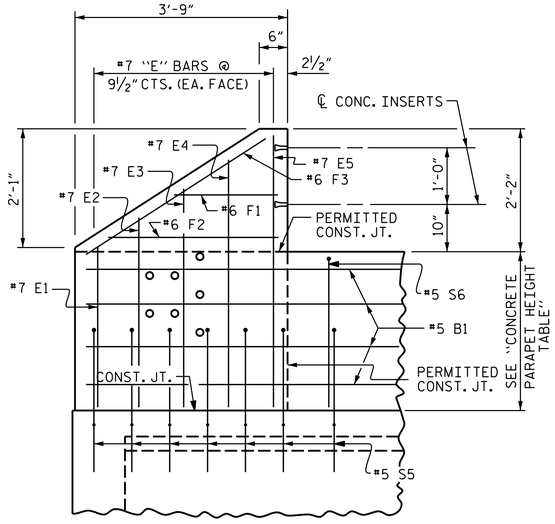
PLAN OF PARAPET



PLAN OF END POST

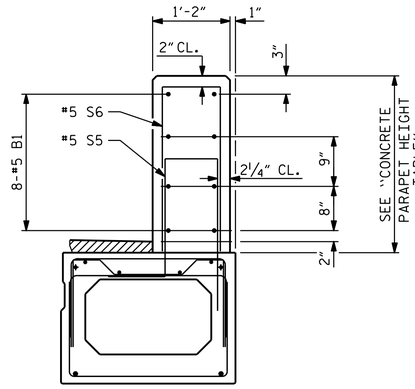


END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL



TWO BAR METAL RAIL PARAPET SECTION

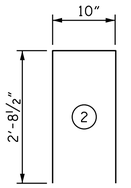
NOTES:

ALL REINFORCING STEEL IN PARAPETS AND END POSTS SHALL BE EPOXY COATED.

FOR DETAIL OF CONCRETE INSERT AND METAL RAIL ANCHOR ASSEMBLY, SEE "RAIL POST SPACINGS AND END OF RAIL DETAIL" SHEET.

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

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR 2 PARAPETS & 4 END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	112	#5	STR	19'-6"	2278
✳E1	8	#7	STR	2'-10"	46
✳E2	8	#7	STR	3'-4"	55
✳E3	8	#7	STR	3'-10"	63
✳E4	8	#7	STR	4'-4"	71
✳E5	8	#7	STR	4'-8"	76
✳F1	8	#6	STR	1'-10"	22
✳F2	8	#6	STR	3'-0"	36
✳F3	8	#6	STR	3'-7"	43
✳S6	352	#5	2	6'-3"	2295

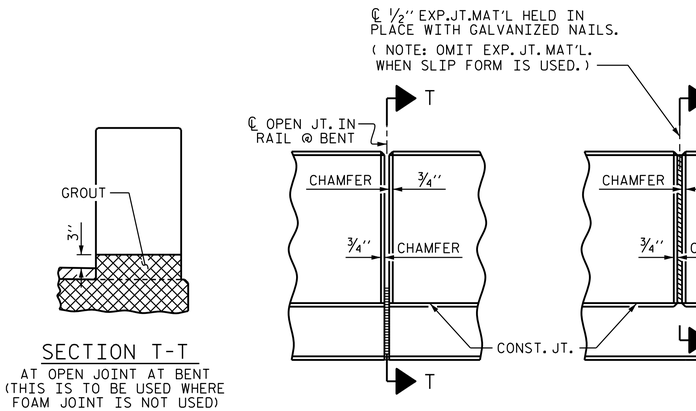
✳ EPOXY COATED REINFORCING STEEL	4,985 LBS.
CLASS AA CONCRETE	35.3 CU. YDS.
1'-2" X 2'-10½" CONCRETE PARAPET	280.25 LIN. FT.

INCREASE STATIONING ↓

CONCRETE PARAPET HEIGHT TABLE

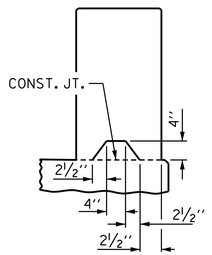
SPAN	LOCATION	LT. GUTTERLINE	RT. GUTTERLINE
A	BEARING (NEAR)	2'-10½"	2'-10½"
	@ MID-SPAN	2'-9⅝"	2'-9⅝"
	BEARING (FAR)	2'-10⁹⁄₁₆"	2'-10⁹⁄₁₆"
B	BEARING (NEAR)	2'-10½"	2'-10½"
	@ MID-SPAN	2'-10⅛"	2'-10⅛"
	BEARING (FAR)	2'-10½"	2'-10½"

NOTE: CONCRETE PARAPET HEIGHT BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATION AND VARIES BETWEEN ℄ BEARING AND MID-SPAN.



ELEVATION AT BENT 1

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)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JOSEPH M. ROBINSON
02-APR-2024

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 1 OF 5

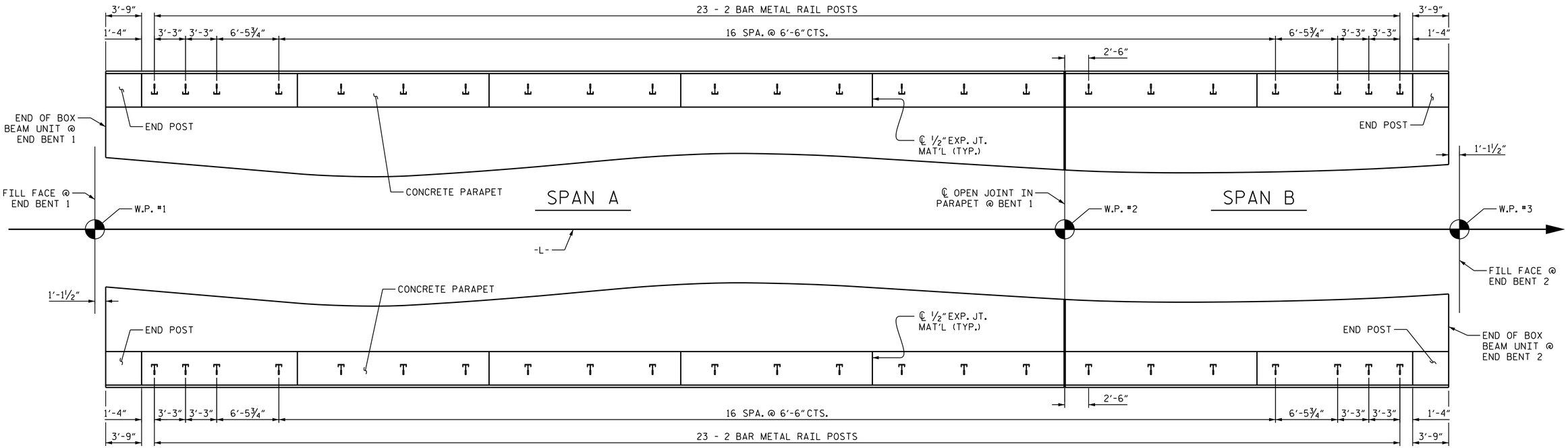
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CONCRETE PARAPET AND END POST DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			26

DRAWN BY:	R. L. DICKE	DATE: 02-2022
CHECKED BY:	J. M. ROBINSON	DATE: 03-2022
DESIGN ENGINEER OF RECORD:	J. M. ROBINSON	DATE: 03-2022

W1L57077
R:\Structures\Plans\401_025_B-5722_SMU_2MR_S01-13_780277.dgn
12/6/2024 11:24:19 AM



PLAN OF RAIL POST SPACINGS

RAIL POSTS ARE LOCATED FROM THE FACE OF END POSTS, EDGE OF BOX BEAMS AND THE CENTERLINE OF EXPANSION JOINTS.

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

1'-2" X 2'-10½" CONCRETE PARAPET AND RAIL POST SPACINGS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

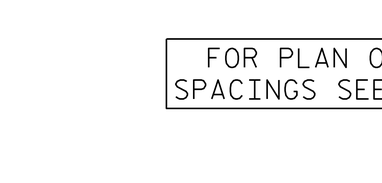
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JOSEPH M. ROBINSON

02-XDF-2024

W1L57077
R:\Structures\Plans\401_027_B-5722_SMU_2MR_S01-14_780277.dgn
12/6/2024
11:24:30 AM

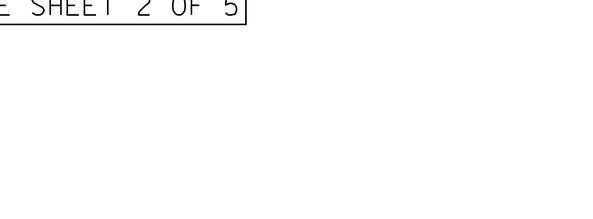
FOR PLAN OF RAIL POST SPACINGS SEE SHEET 2 OF 5

ELEVATION

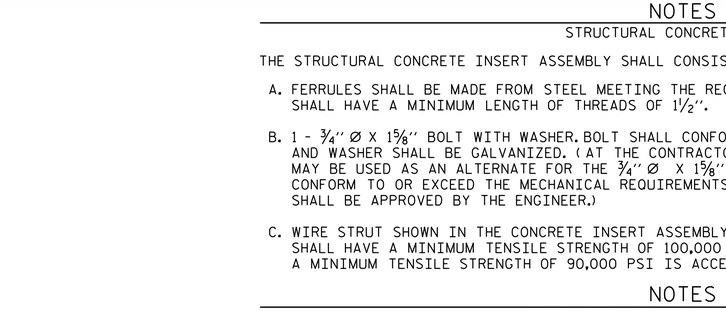


TOP VIEW

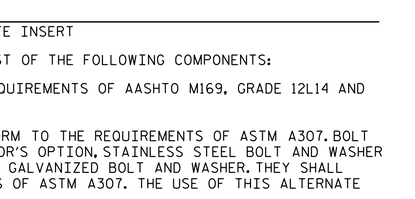
END VIEW (FIX AND EXP.)



SECTION H-H (FIX)



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½''.

B. 1 - ¾'' Ø X 1⅝'' BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾'' Ø X 1⅝'' GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7⁄16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½'' PLATES SHALL CONFORM TO ASTM A36 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾'' STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾''Ø X 1⅝'' BOLT WITH 2'' O.D. WASHER IN PLACE. THE ¾''Ø X 1⅝'' BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾'' STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½'' PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾'' Ø X 1⅝'' BOLT SHALL APPLY TO THE ¾''Ø X 6 ½'' BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			26

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

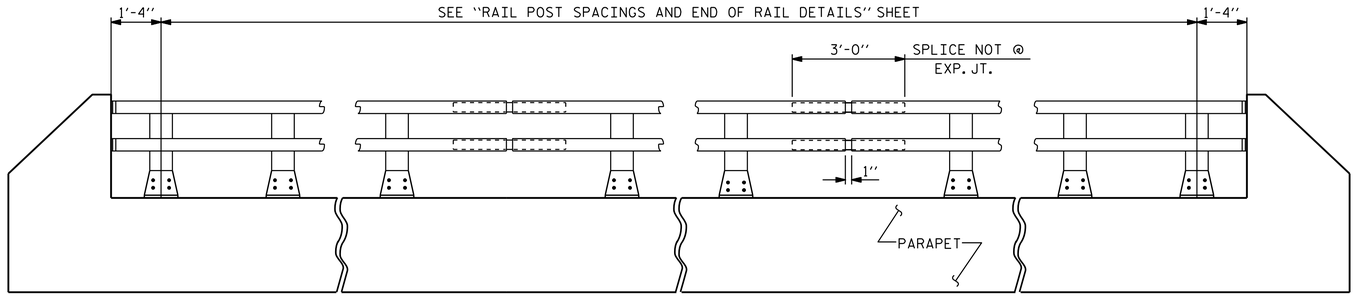
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

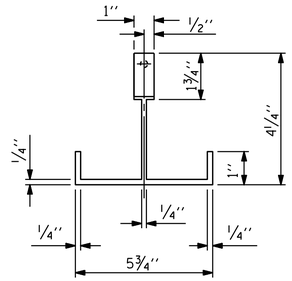
NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
02-Apr-2024

WIL57077
R:\Structures\Plans\401_029_B-5722_SMU_2MR_S01-15_780277.dgn
12/6/2024
11:24:41 AM

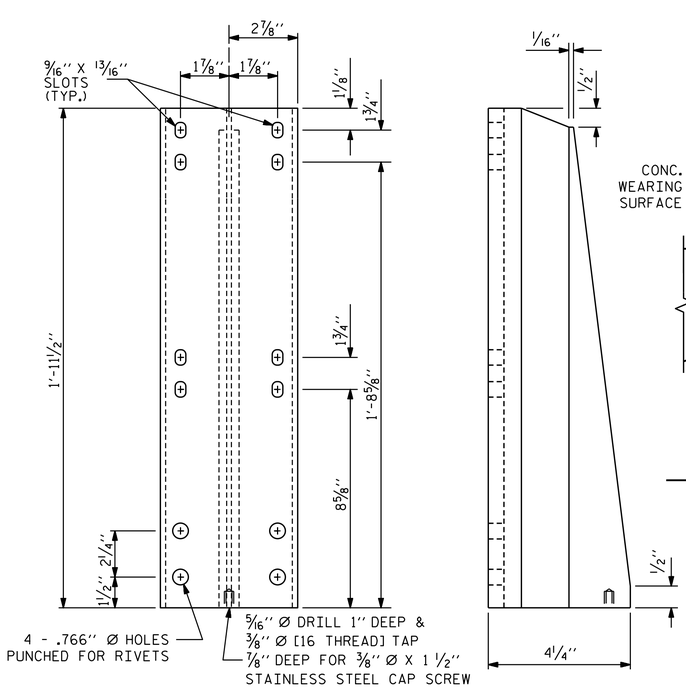


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 3 OF 5.

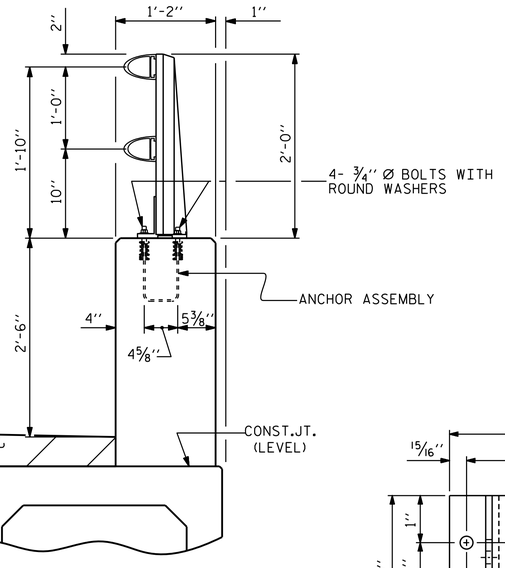


PLAN

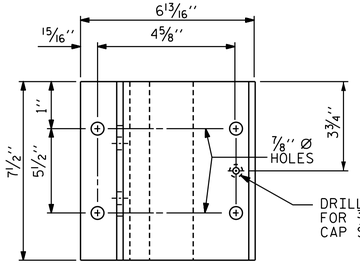


FRONT ELEVATION — SIDE ELEVATION

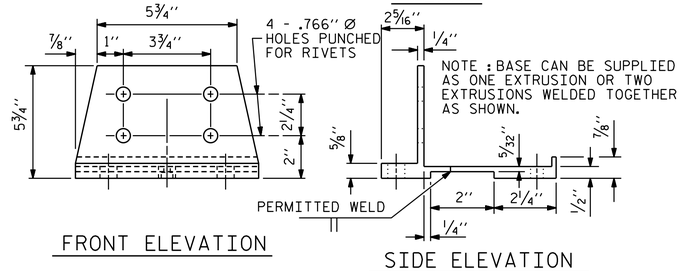
DETAILS OF POST



SECTION THRU PARAPET AND RAIL

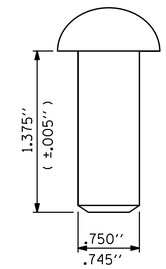


PLAN



FRONT ELEVATION — SIDE ELEVATION

POST BASE DETAILS



RIVET D

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFDBRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER ''2 BAR METAL RAIL ALTERNATE''. ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE SHEET 3 OF 5.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 265.25 LIN. FT.

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			26

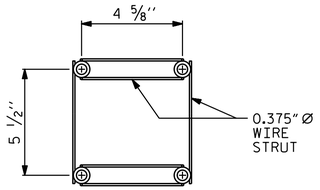
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

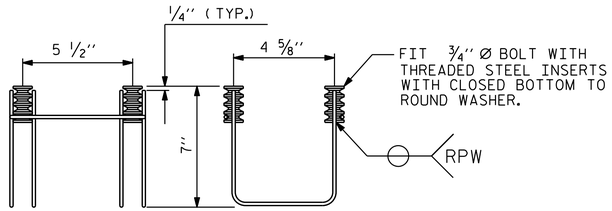
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOHN M. ROBINSON
02-APR-2024

W11.57077
R:\Structures\Plans\401_031_B-5722_SMU_2MR_S01-16_780277.dgn
12/6/2024
11:24:53 AM



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(46 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS 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.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

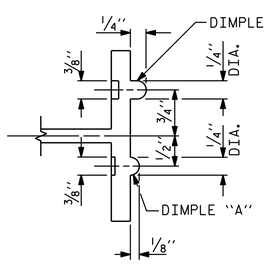
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A123.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

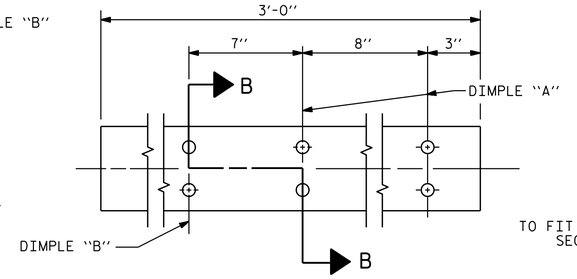
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4'' Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

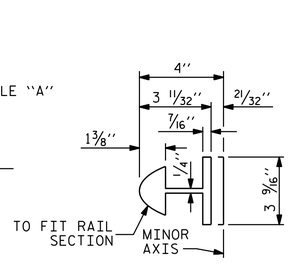
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



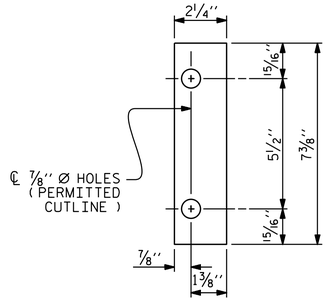
SECTION B - B



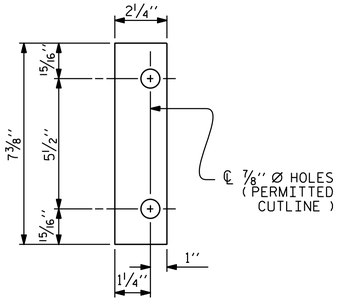
EXPANSION BAR DETAILS



BAR SECTION



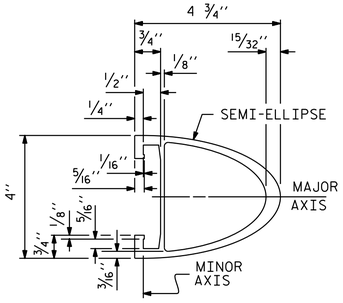
FRONT PLATE



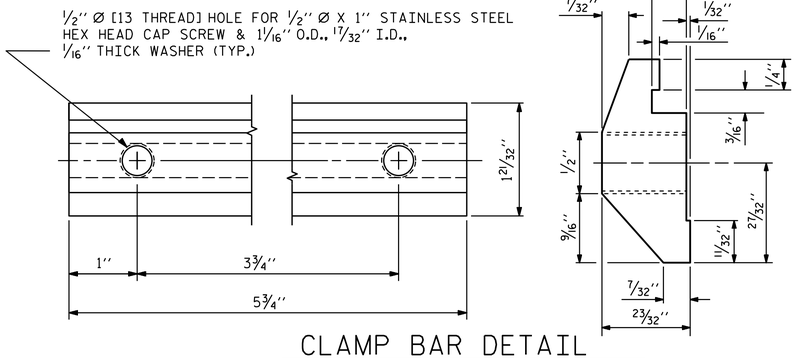
REAR PLATE

SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

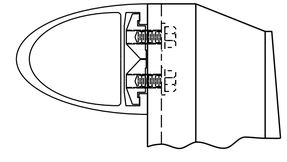


RAIL SECTION

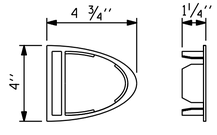


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			26

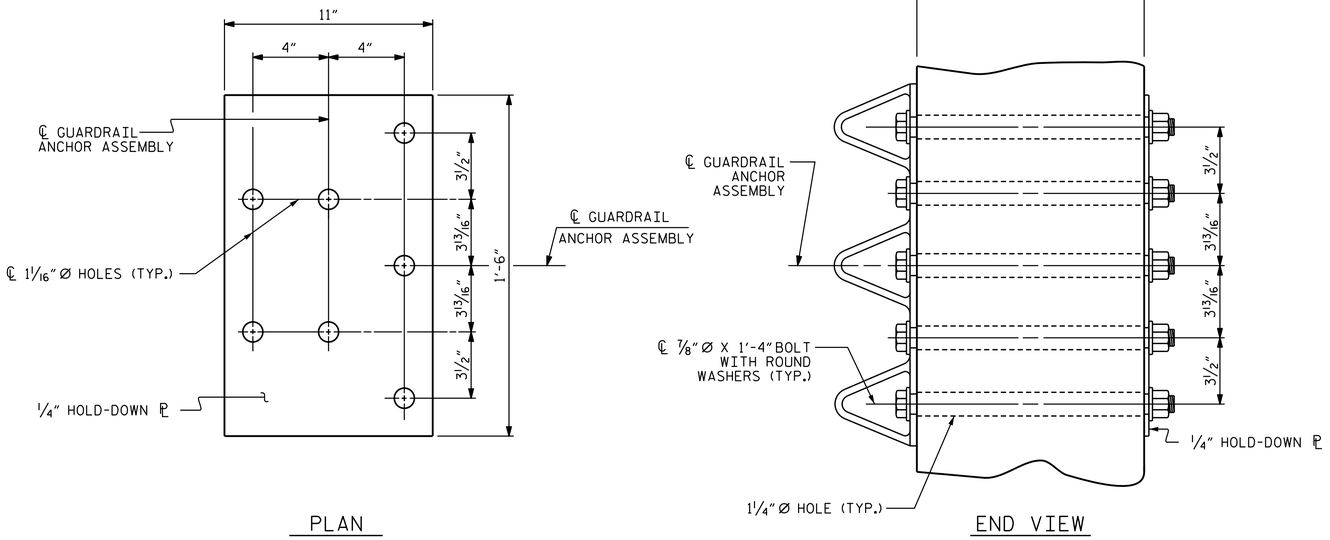
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JOSHUA M. ROBINSON
02-APR-2024

W:\L57077 R:\Structures\Plans\401_033_B-5722_SMU_2HR_S01-17_780277.dgn 12/6/2024 11:25:03 AM



GUARDRAIL ANCHOR ASSEMBLY DETAILS

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.

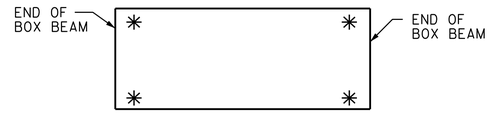
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

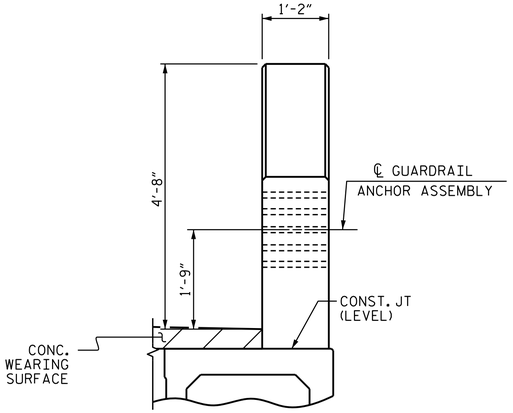
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

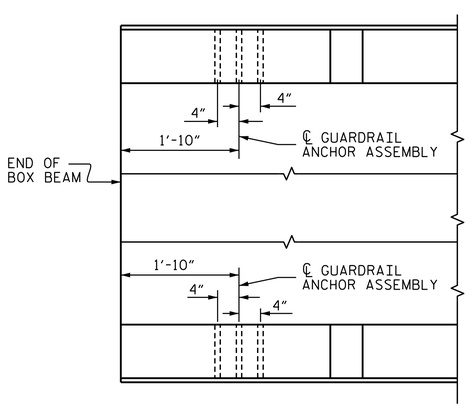
THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ LOCATION OF GUARDRAIL ATTACHMENT





LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

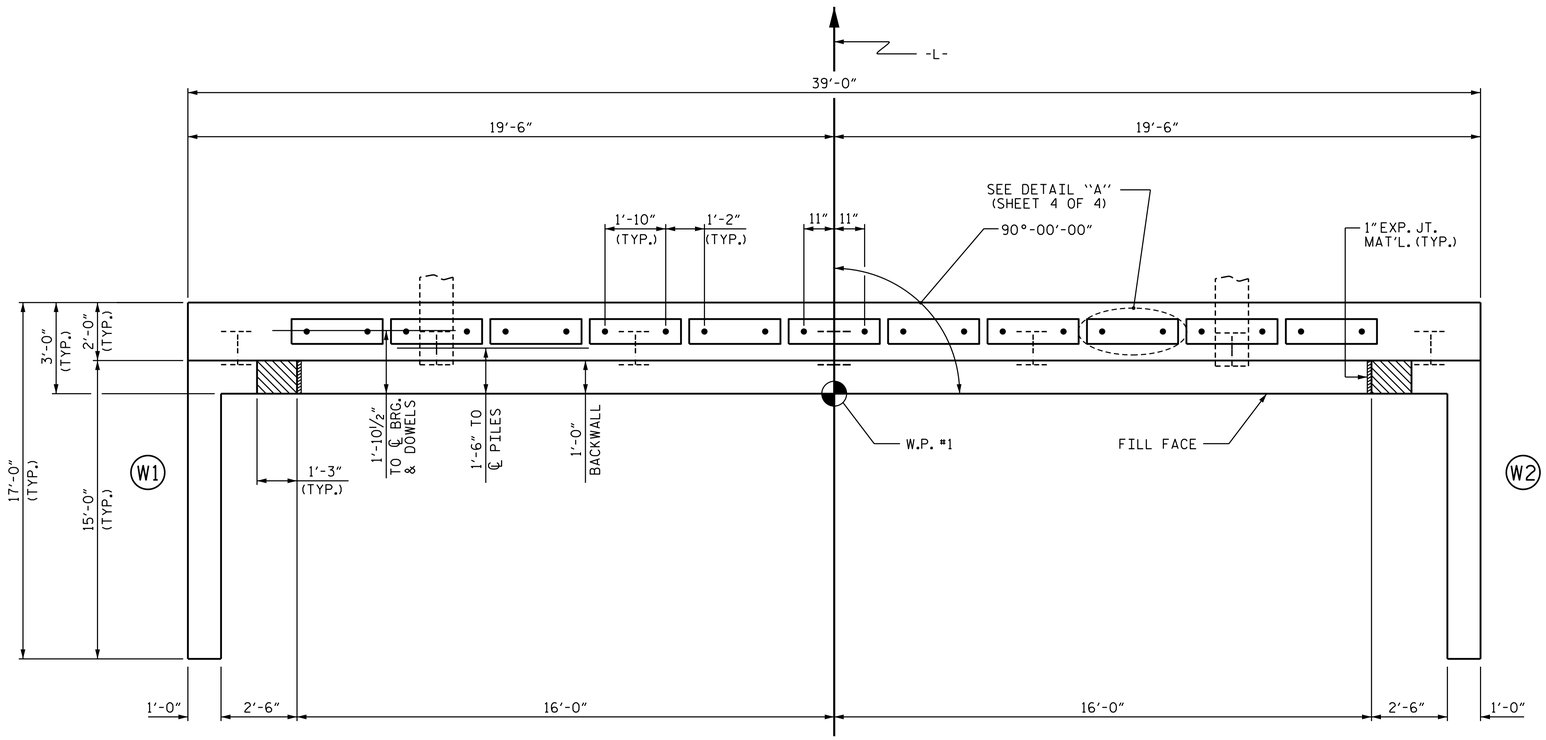
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

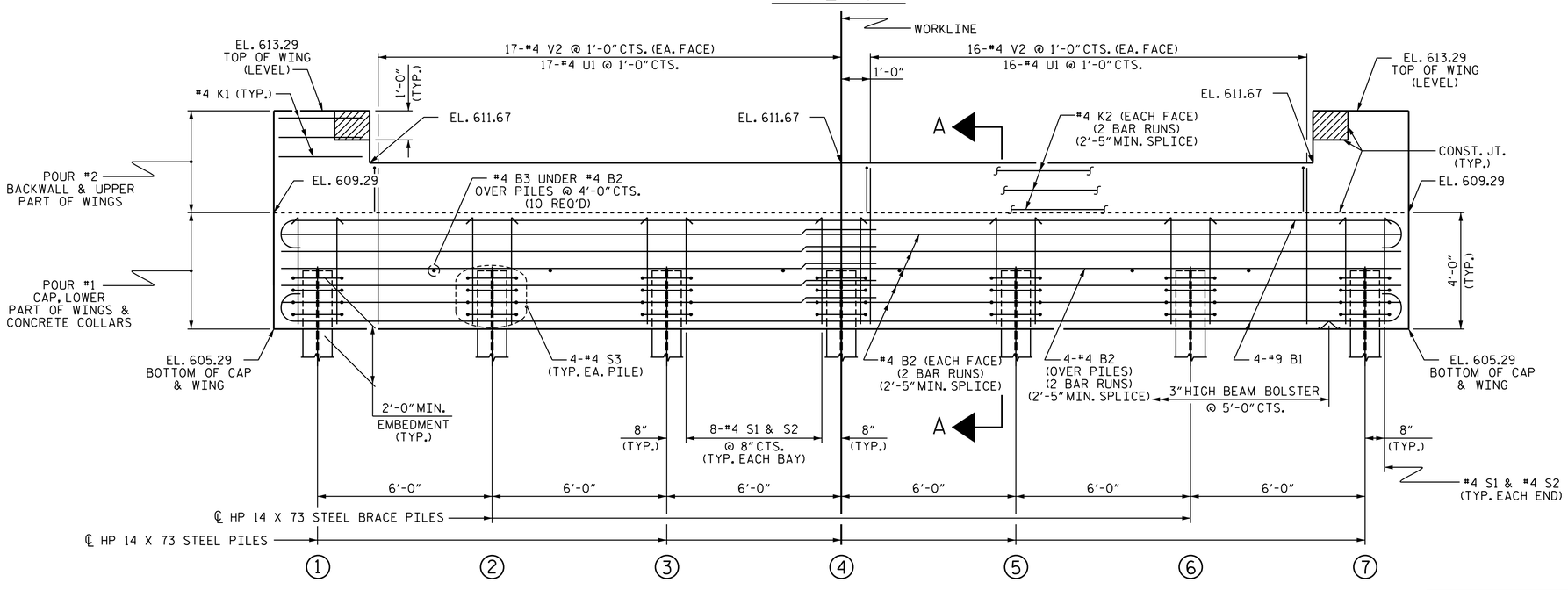
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
02-APR-2024



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 CONCRETE PARAPET 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. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			26

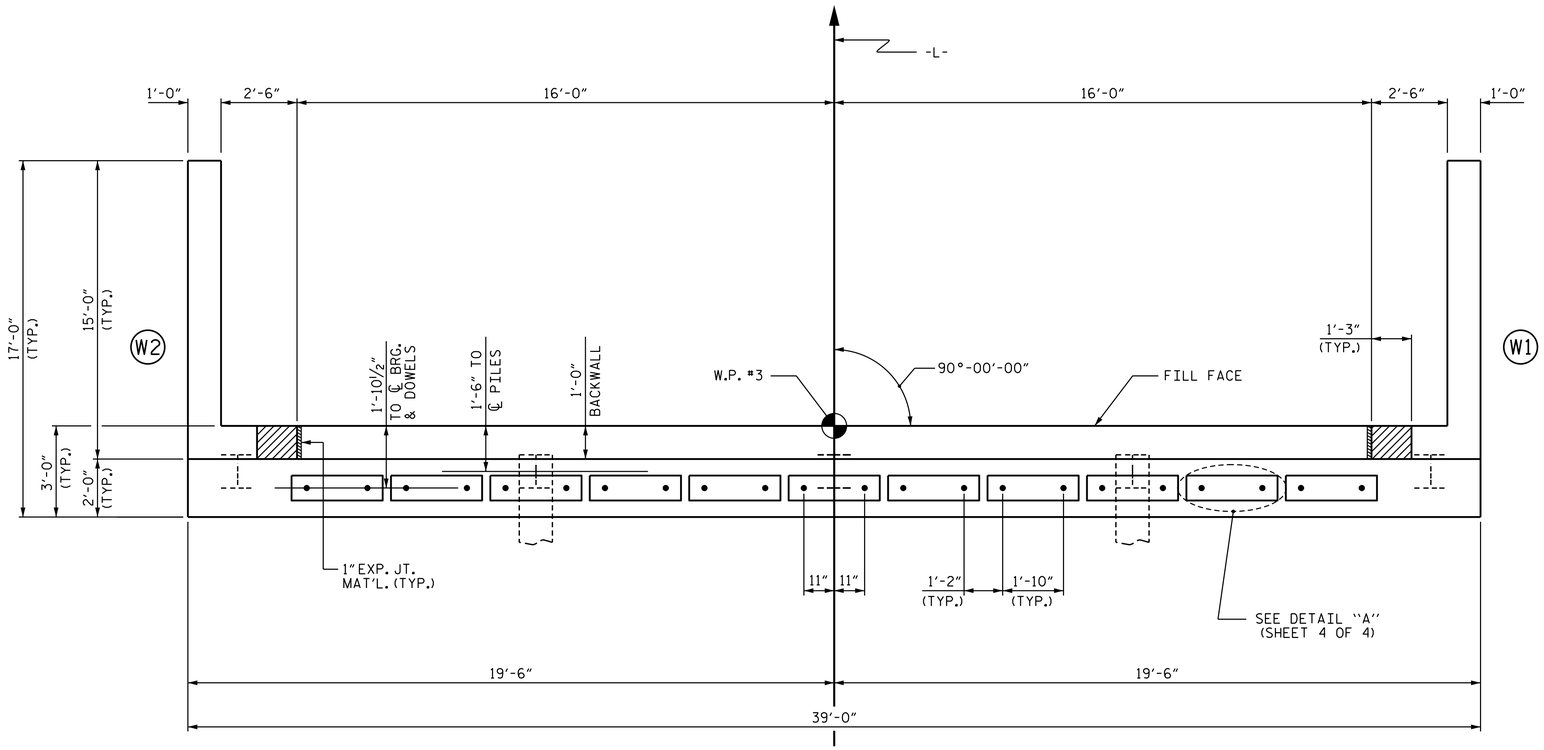
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

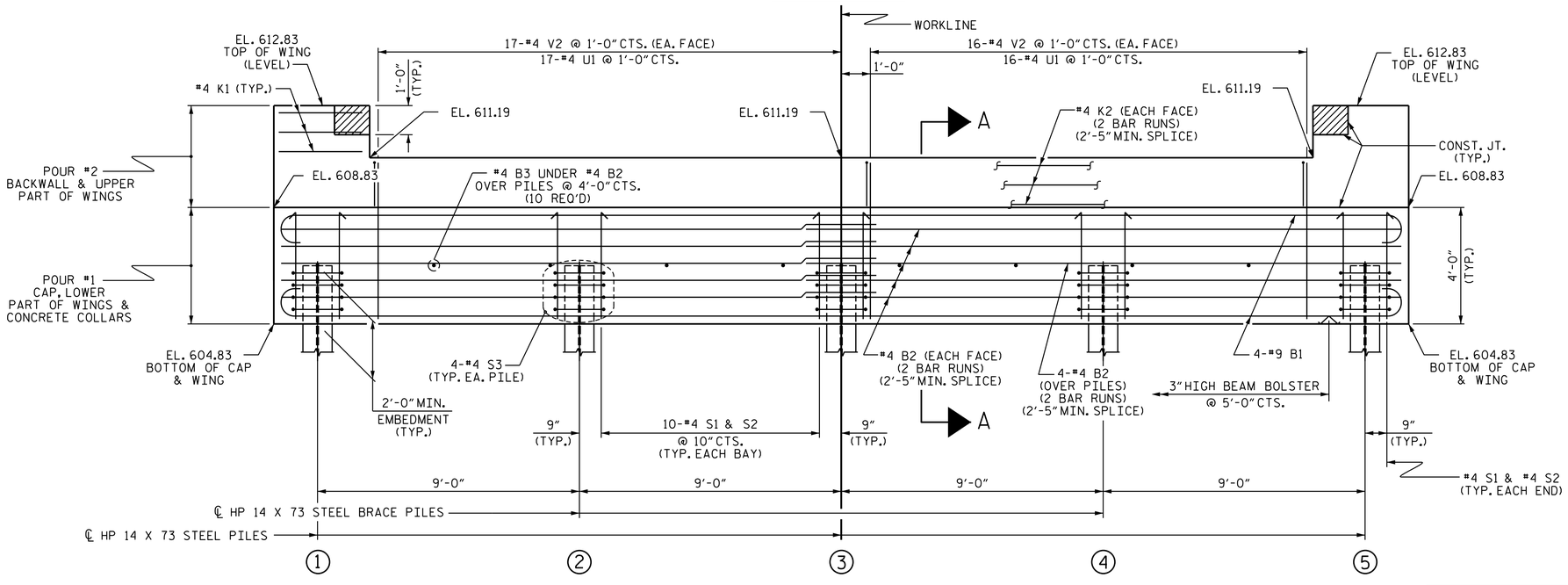
PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
02-APR-2024

WI.57077
R:\Structures\Plans\401_037_B-5722_SMU_EB_S01-19_780277.dgn
12/6/2024 11:25:24 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 CONCRETE PARAPET 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. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			26

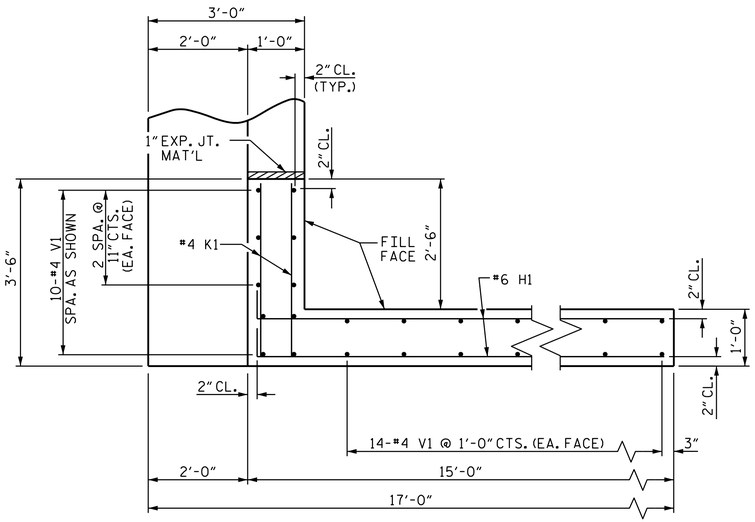
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

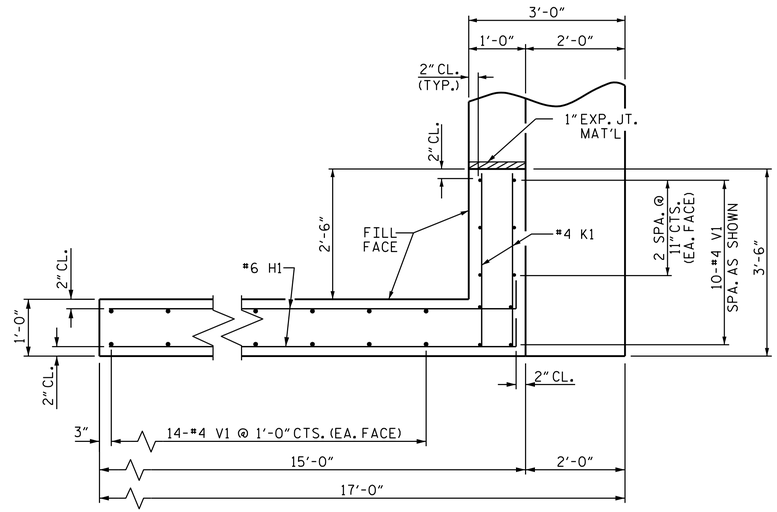
PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSHUA M. ROBINSON
02-APR-2024

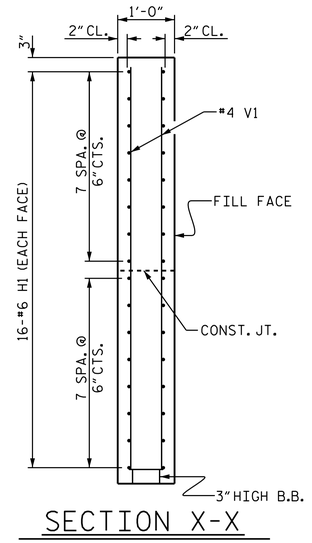
W1L57077
R:\Structures\Plans\401_039_B-5722_SMU_EB_S01-20_780277.dgn
12/6/2024 11:25:33 AM



PLAN OF WING (W1)



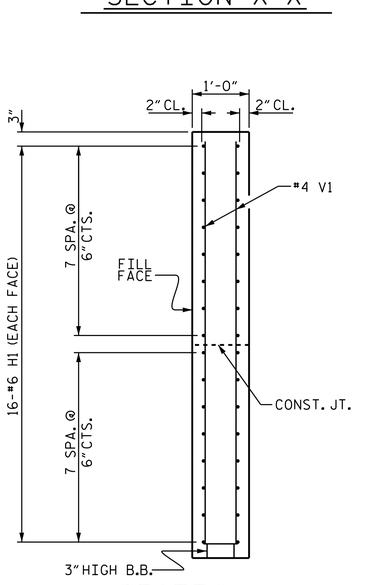
PLAN OF WING (W2)



SECTION X-X

ELEVATION OF WING (W1)

ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			26

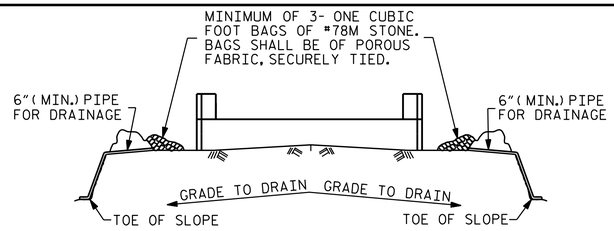
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JAMES M. ROBINSON 02-APR-2024

WIL57077
R:\Structures\Plans\401_041_B-5722_SMU_EB_S01-21_780277.dgn
12/6/2024 11:25:43 AM

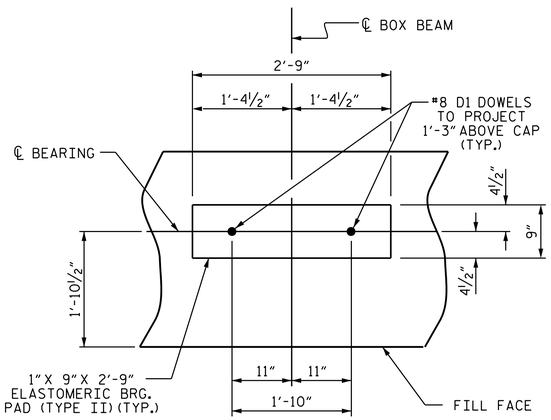


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

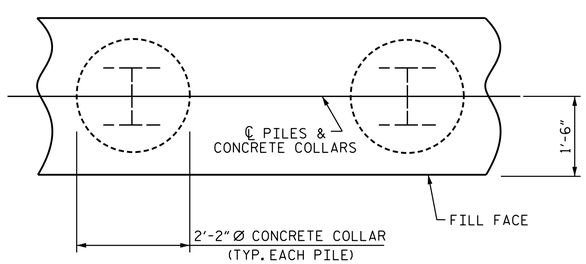
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

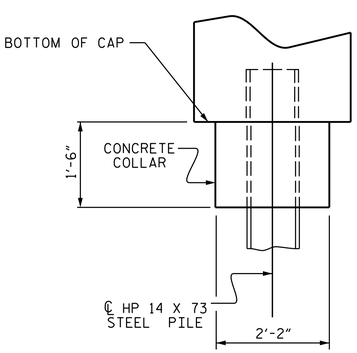


DETAIL "A"

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



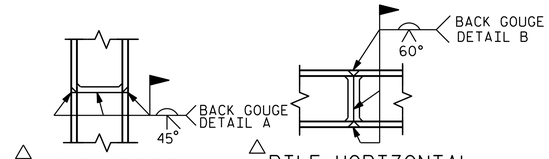
PLAN



ELEVATION

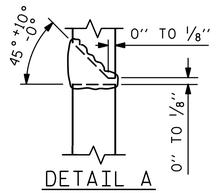
CORROSION PROTECTION FOR STEEL PILES DETAIL

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

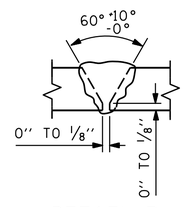


△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



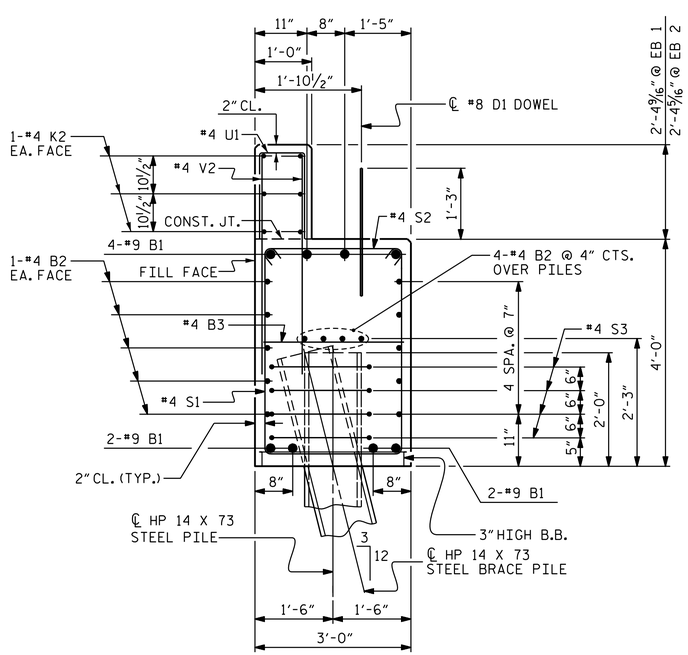
DETAIL A



DETAIL B

△ POSITION OF PILE DURING WELDING.

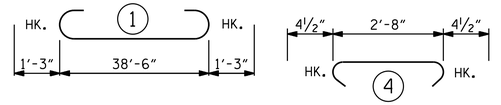
PILE SPLICE DETAILS

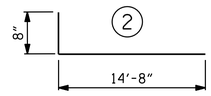


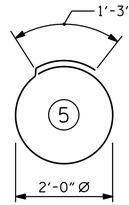
SECTION A-A

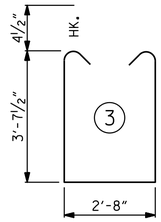
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

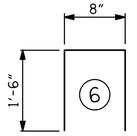
BAR TYPES











ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR END BENT 1

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'-8"	18
D1	22	#8	STR	2'-3"	132
H1	64	#6	2	15'-4"	1474
K1	12	#4	STR	3'-1"	25
K2	12	#4	STR	20'-7"	165
S1	50	#4	3	10'-8"	356
S2	50	#4	4	3'-5"	114
S3	28	#4	5	7'-7"	142
U1	33	#4	6	3'-8"	81
V1	76	#4	STR	7'-8"	389
V2	66	#4	STR	5'-9"	254

REINFORCING STEEL 4650 LBS.

CLASS A CONCRETE BREAKDOWN END BENT 1		
POUR #1	CAP, LOWER PART OF WINGS & COLLARS	23.0 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	8.0 C.Y.
TOTAL CLASS A CONCRETE		31.0 C.Y.

FOR END BENT 2

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'-8"	18
D1	22	#8	STR	2'-3"	132
H1	64	#6	2	15'-4"	1474
K1	12	#4	STR	3'-1"	25
K2	12	#4	STR	20'-7"	165
S1	42	#4	3	10'-8"	299
S2	42	#4	4	3'-5"	96
S3	20	#4	5	7'-7"	101
U1	33	#4	6	3'-8"	81
V1	76	#4	STR	7'-8"	389
V2	66	#4	STR	5'-9"	254

REINFORCING STEEL 4534 LBS.

CLASS A CONCRETE BREAKDOWN END BENT 2		
POUR #1	CAP, LOWER PART OF WINGS & COLLARS	22.6 C.Y.
POUR #2	BACKWALL & UPPER PART OF WINGS	8.0 C.Y.
TOTAL CLASS A CONCRETE		30.6 C.Y.

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			26

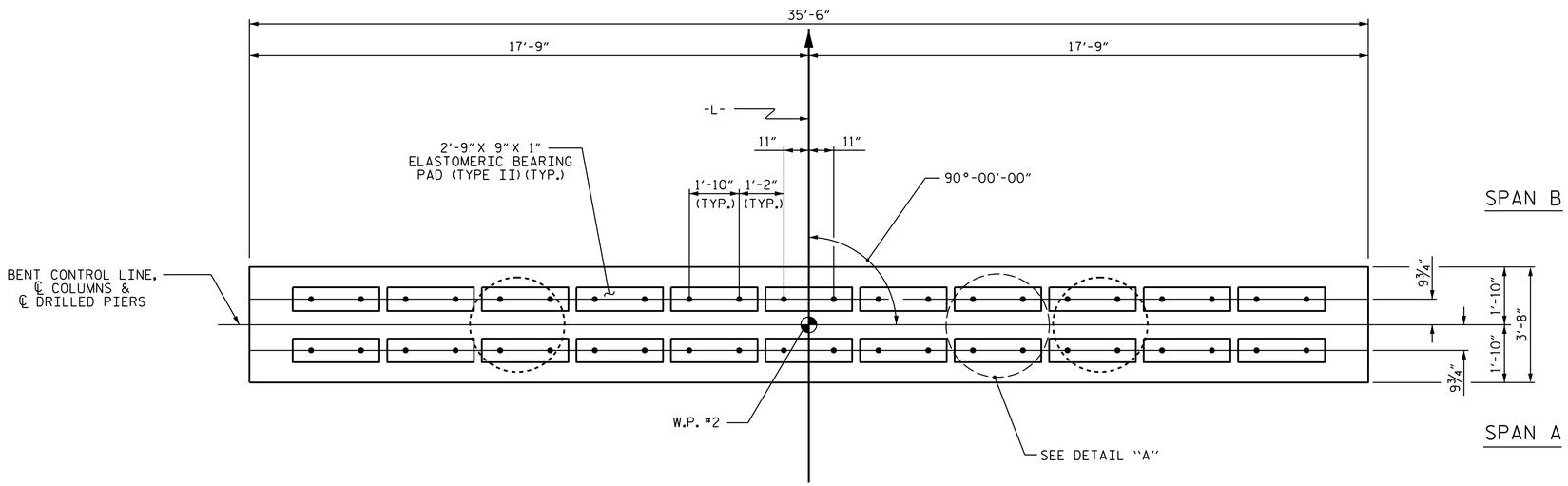
DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

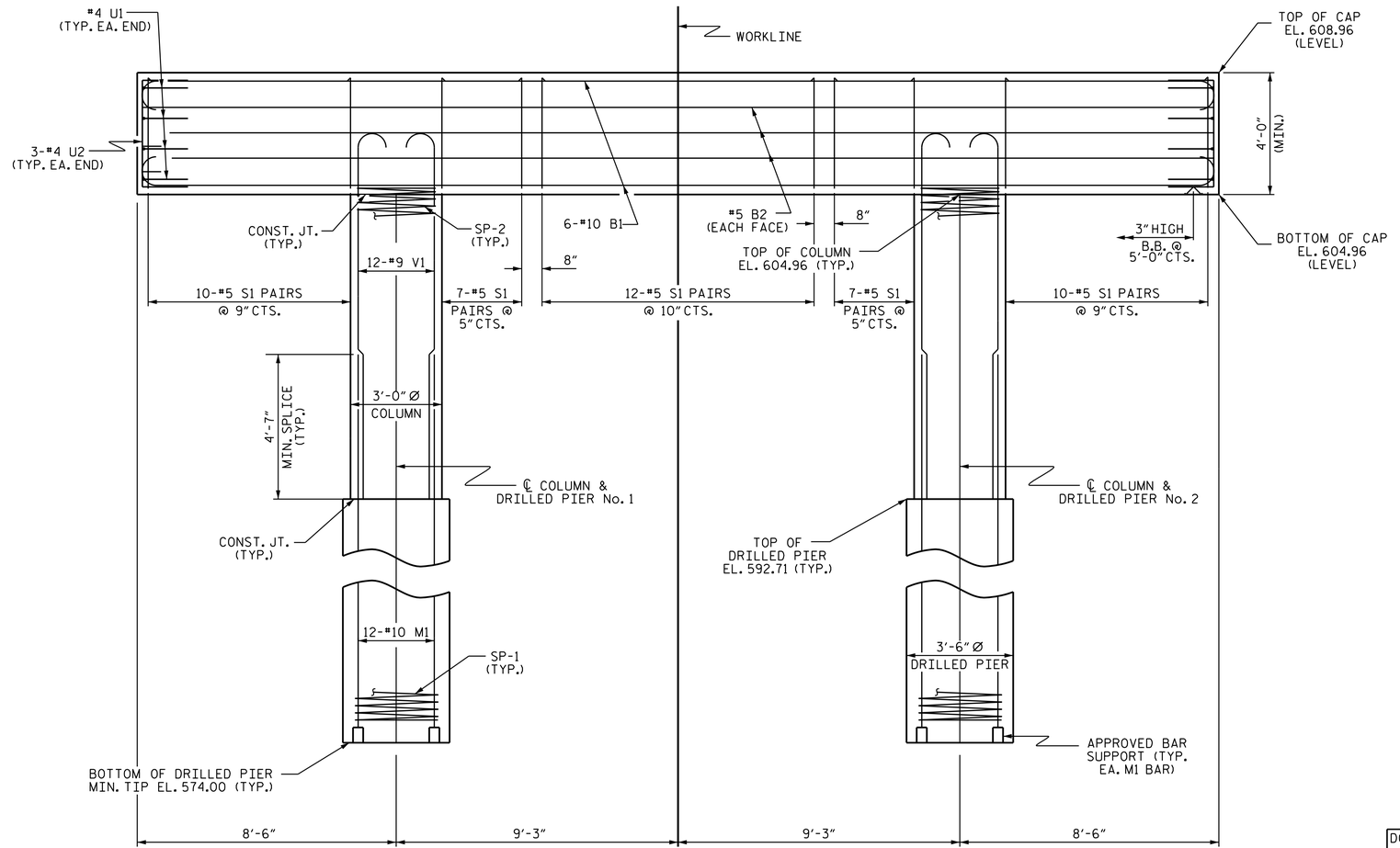
PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039313 JOZ-APT-MAC-ROBINSON

W/L57077
R:\Structures\Plans\401_043_B-5722_SMU_EB_S01-22_780277.dgn
12/6/2024 11:25:52 AM



PLAN



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

NOTES

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

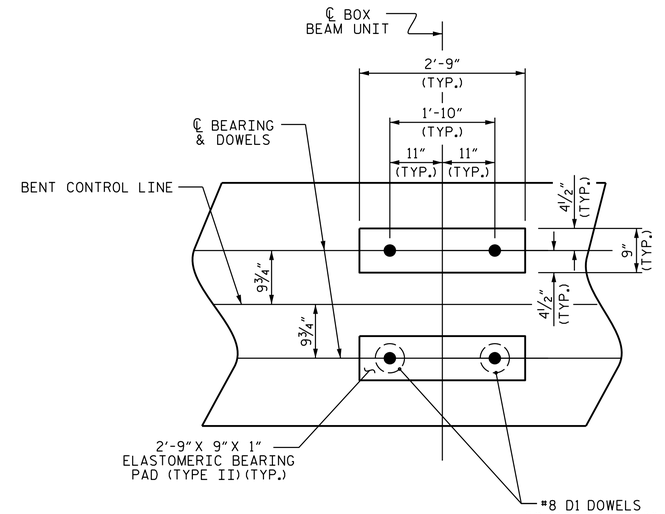
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			26

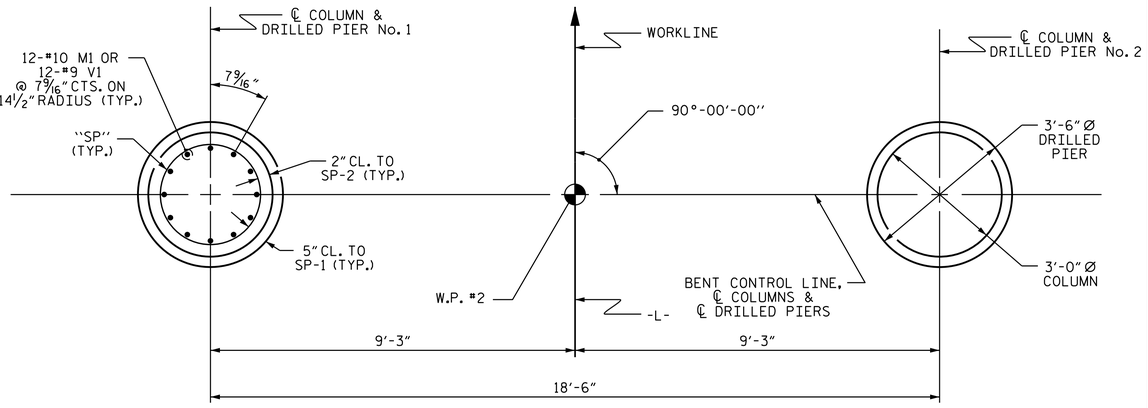
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

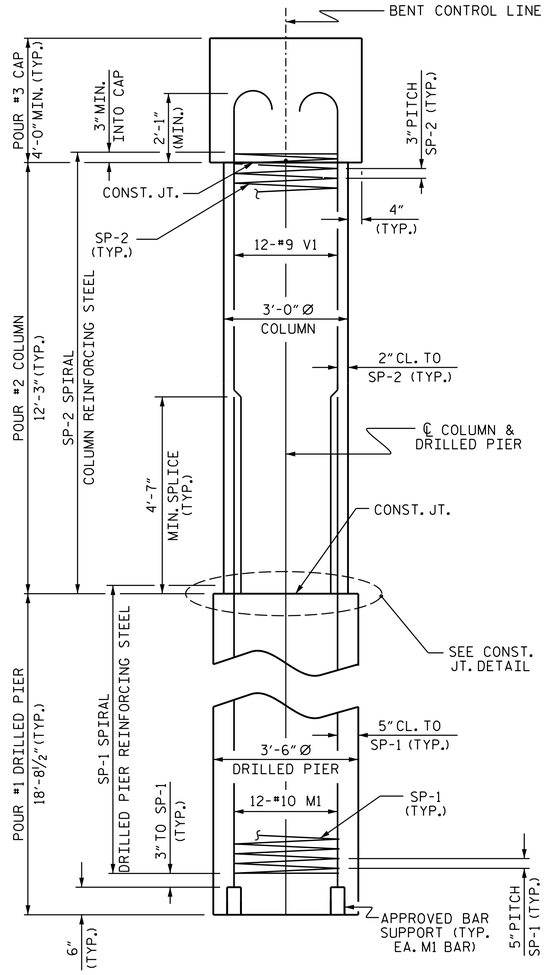
NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
Signed by: JOSEPH M. ROBINSON
02-Apr-2024

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

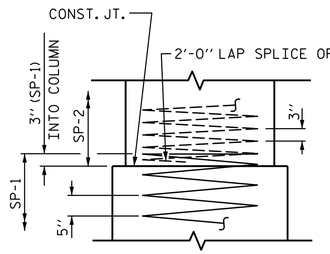
WIL57077
R:\Structures\Plans\401_045_B-5722_SMU_B1_S01-23_780277.dgn
12/6/2024 11:26:02 AM



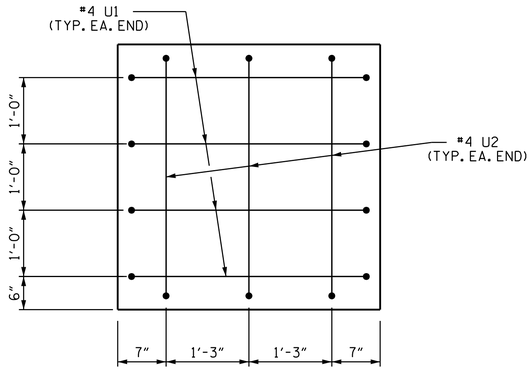
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

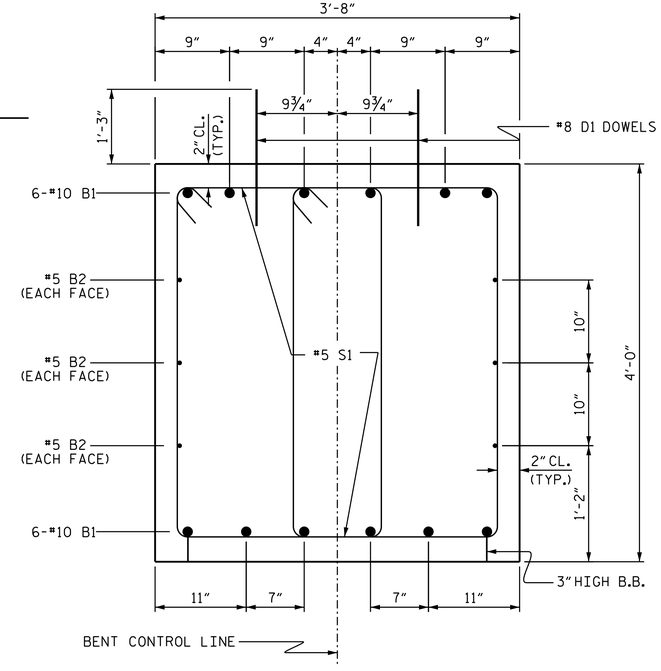


CONSTRUCTION JOINT DETAIL



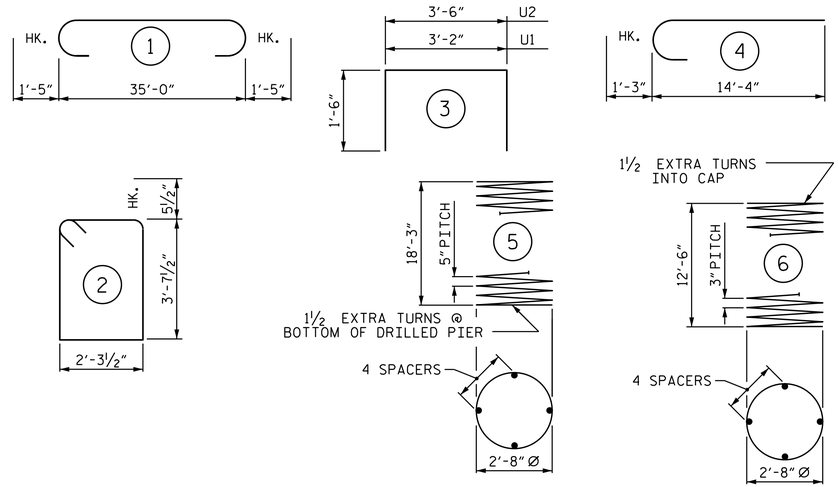
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#10	1	37'-10"	1954
B2	6	#5	STR	35'-2"	220
D1	44	#8	STR	2'-3"	264
M1	24	#10	STR	25'-10"	2668
S1	92	#5	2	12'-9"	1223
U1	8	#4	3	6'-2"	33
U2	6	#4	3	6'-6"	26
V1	24	#9	4	15'-7"	1272

REINFORCING STEEL (FOR ONE BENT) 7660 LBS.

SP-1	2	*	5	374'-3"	781
SP-2	2	**	6	427'-0"	570

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 1351 LBS.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	6.4 C.Y.
POUR #3 (CAP)	19.3 C.Y.
TOTAL CLASS A CONCRETE	25.7 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	13.3 C.Y.

PROJECT NO. B-5722

ROCKINGHAM COUNTY

STATION: 15+31.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

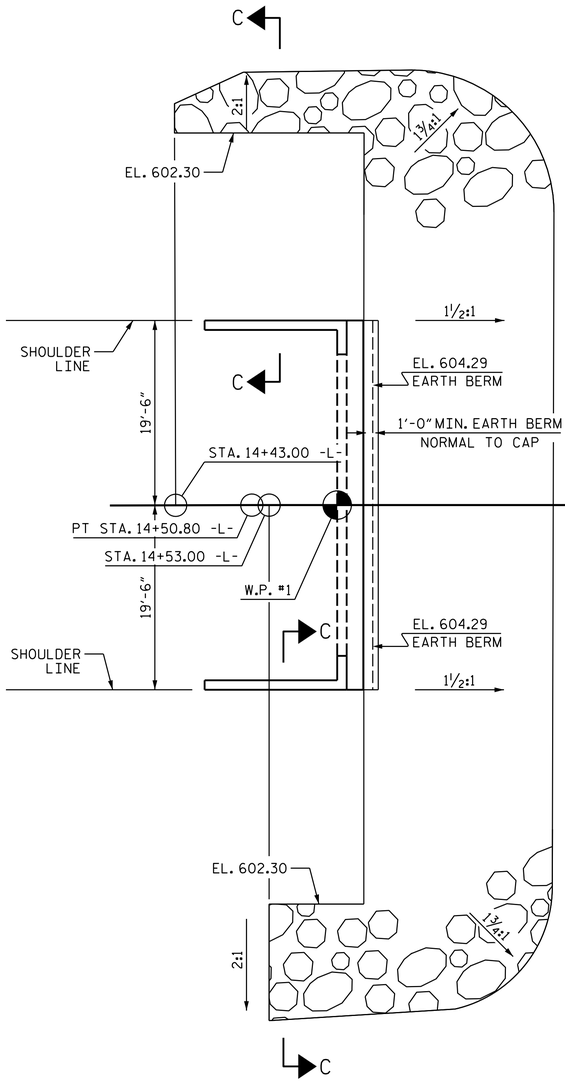
NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSHUA M. ROBINSON
02-APR-2024

WI L57077
R:\Structures\Plans\401.047_B-5722_SMU_B1_S01-24_780277.dgn
12/6/2024 11:26:11 AM

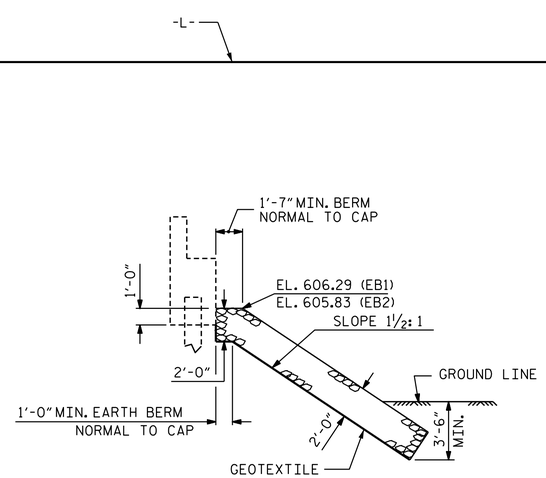
NOTES:

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

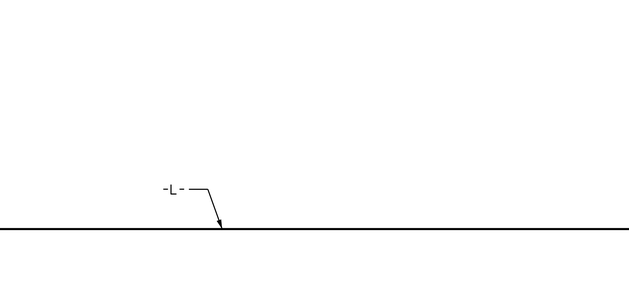
ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+31.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	248	276
END BENT 2	212	236



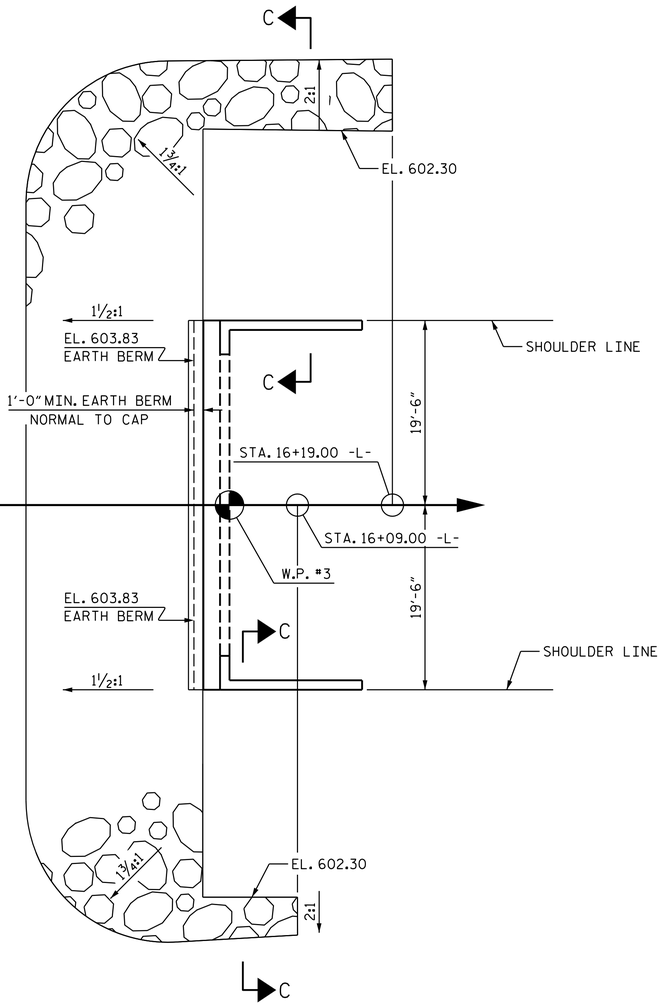
END BENT 1



℄ SECTION
BERM RIP RAPPED



SECTION C-C



END BENT 2

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			26

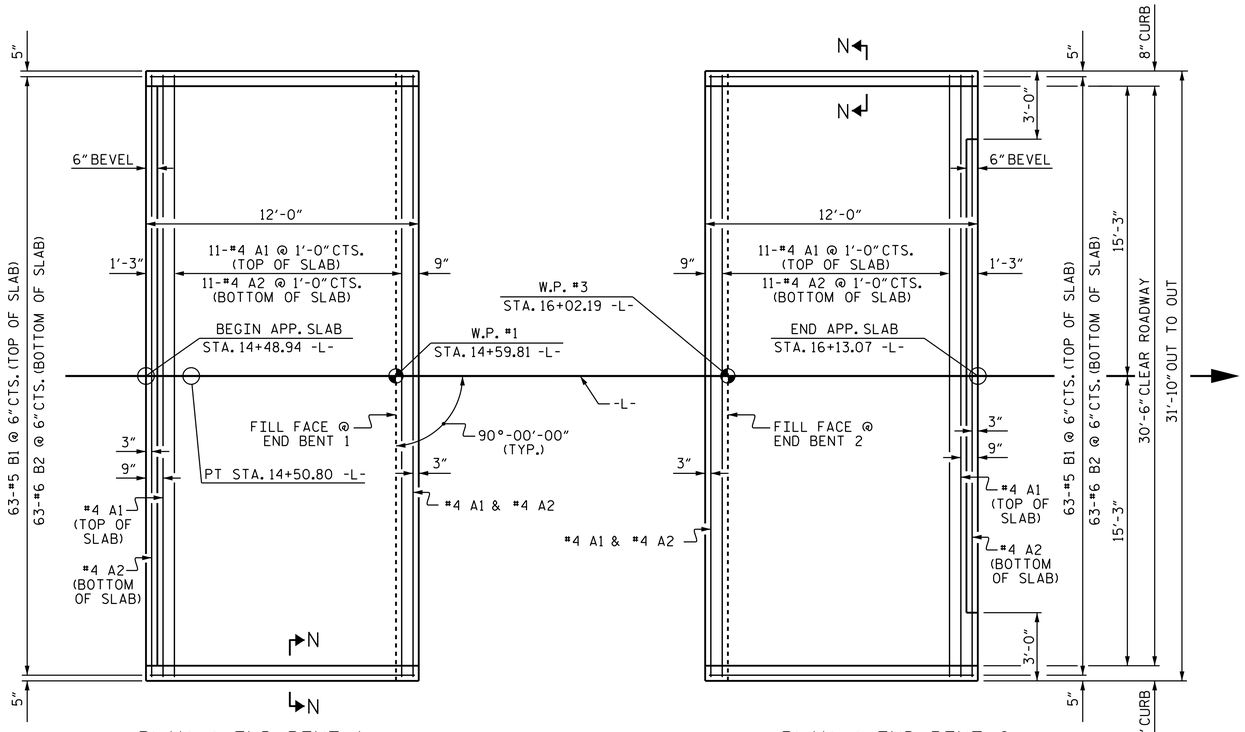
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JEFFREY M. ROBINSON
02-APR-2024

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

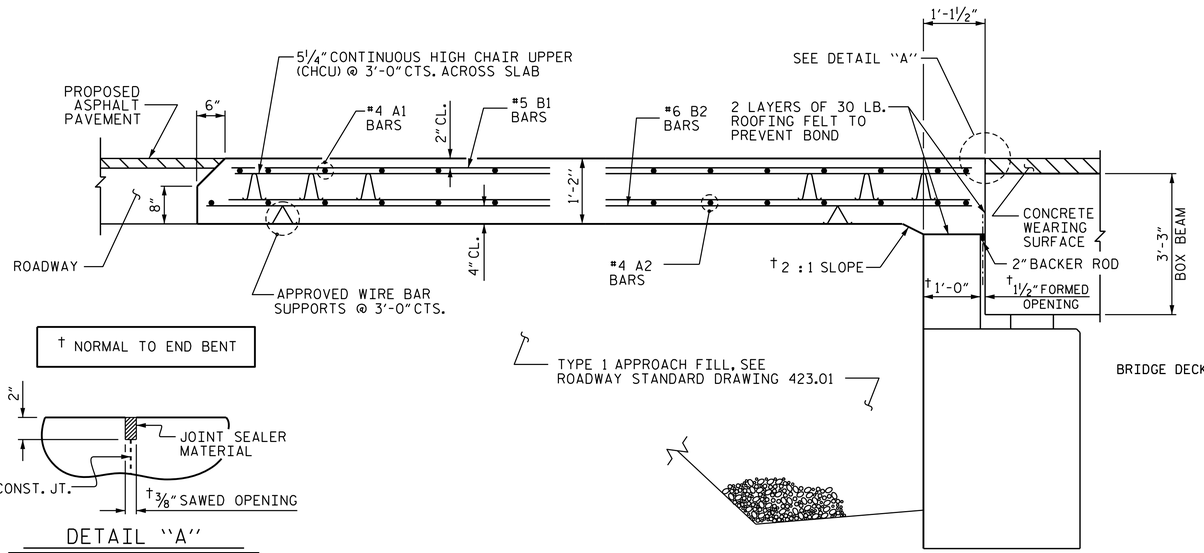
WIL57077
R:\Structures\Plans\401_049_B-5722_SMU_RR_S01-25_780277.dgn
12/6/2024
11:26:25 AM



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
EDGES OF APPROACH SLAB AT END BENT 1 ARE TO BE CONSTRUCTED PARALLEL TO THE TANGENT SECTION OF -L-



† NORMAL TO END BENT

DETAIL "A"

NOTE: THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

APPROACH SLABS SHALL BE POURED AFTER CONCRETE WEARING SURFACE IS POURED.

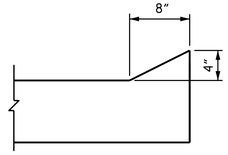
BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	13	#4	STR	31'-6"	274
A2	13	#4	STR	31'-6"	274
✱B1	63	#5	STR	11'-2"	734
B2	63	#6	STR	11'-8"	1104
REINFORCING STEEL				LBS.	1378
✱EPOXY COATED REINFORCING STEEL				LBS.	1008
CLASS AA CONCRETE				C.Y.	16.8

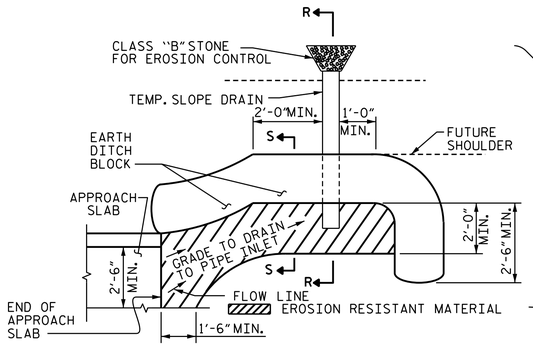
APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	13	#4	STR	31'-6"	274
A2	13	#4	STR	31'-6"	274
✱B1	63	#5	STR	11'-2"	734
B2	63	#6	STR	11'-8"	1104
REINFORCING STEEL				LBS.	1378
✱EPOXY COATED REINFORCING STEEL				LBS.	1008
CLASS AA CONCRETE				C.Y.	16.8



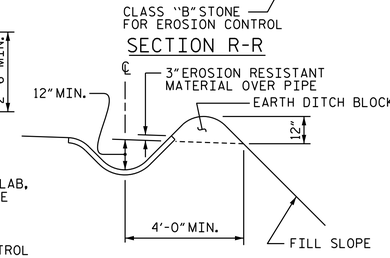
SECTION N-N

CURB DETAILS



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW

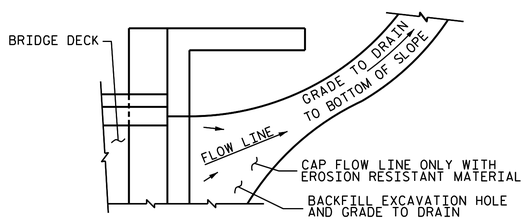


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS 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 SL...

TEMPORARY DRAINAGE DETAIL

PROJECT NO. B-5722
ROCKINGHAM COUNTY
STATION: 15+31.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT

DRAWN BY: R. L. DICKE DATE: 02-2022
CHECKED BY: J. M. ROBINSON DATE: 03-2022
DESIGN ENGINEER OF RECORD: J. M. ROBINSON DATE: 03-2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
(919) 552-2253
www.mottmac.com
LICENSE NO. F-0669

NORTH CAROLINA PROFESSIONAL SEAL 039313 ENGINEER JOSEPH M. ROBINSON
02-MAR-2022

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

SHEET NO. S-26
TOTAL SHEETS 26

WBS 57077
R:\Structures\Plans\401_051_B-5722_SMU_AS_S01-26_780277.dgn
12/6/2024 11:26:43 AM

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
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 2024 "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 $\frac{3}{4}$" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$" 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 $\frac{1}{4}$" 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 $\frac{7}{8}$" ∅ SHEAR STUDS FOR THE $\frac{3}{4}$" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$" ∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$" ∅ STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$" ∅ STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$"∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ 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 $\frac{5}{16}$" 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 $\frac{1}{16}$" 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.