STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0016

Janet T. Mills
GOVERNOR

Bruce A. Van Note
COMMISIONER

October 2, 2019
Subject: Ohio Street Bridge Replacement
State WIN: 018722.00
Location: **Bangor**
Amendment No. 1

Dear Sir/Ms.:

Please make the following changes to the Bid Documents:

In the Bid Book:

REMOVE pages 16 – 26, Proposal Schedule of Items, 11 pages, dated 9/11/2019, and **REPLACE** with the attached, revised Proposal Schedule of Items, 11 pages, dated 9/30/2019.

REMOVE pages 51 – 56, SPECIAL PROVISION – SECTION 104 – Utilities, 6 pages, dated September 12, 2019, and **REPLACE** with the attached, revised SPECIAL PROVISION – SECTION 104 – Utilities, 6 pages, dated September 18, 2019.

ADD the attached SPECIAL PROVISION – SECTION 502 – Fiber Reinforced Polymer Bridge Drains, 15 pages, dated September 20, 2019.

In the Plan Set:

On SHEET NUMBER 2 OF 73, ESTIMATED QUANTITIES, **ADD** the following item to the ESTIMATED QUANTITIES table: "502.77 FRP Bridge Drain –Type F 2 EA". Make this change in pen and ink.

On SHEET NUMBER 4 OF 73, GENERAL PLAN (1 OF 3), **REMOVE** "526.501" in both callouts for connecting the proposed concrete median barrier to the existing concrete median barrier (one callout is near station 113+45 and the other is near station 116+75), and **REPLACE** with "526.50". Make this change in pen and ink.

On SHEET NUMBER 16 OF 73, TYPICAL SECTIONS (1 OF 2), in the Proposed Bridge Section, **REMOVE** the callout "Standard Bridge Drain, Type A1 (Typ.)", and **REPLACE** with "FRP Bridge Drain, Type F (Typ.)". Make this change in pen and ink.

REMOVE SHEET NUMBER 65 of 73, MEDIAN BARRIER DETAILS, and **REPLACE** with the attached, revised SHEET NUMBER 65 of 73, MEDIAN BARRIER DETAILS.

REMOVE SHEET NUMBER 66 of 73, SINGLE SLOPE, SINGLE-FACED CONCRETE BARRIER DETAILS, and **REPLACE** with the attached, revised SHEET NUMBER 66 of 73, SINGLE SLOPE, SINGLE-FACED CONCRETE BARRIER DETAILS.

REMOVE SHEET NUMBER 67 of 73, SINGLE SLOPE, DOUBLE-FACED CONCRETE BARRIER DETAILS, and **REPLACE** with the attached, revised SHEET NUMBER 67 of 73, SINGLE SLOPE, DOUBLE-FACED CONCRETE BARRIER DETAILS.

The following questions have been received:

Question: F W Webb only offers 18.1' Ductile Iron Pipe. Will this footage be accepted?

Response: Yes, 18.1 ft long pipe would be accepted. If the Contractor chooses to use it then they will need to assure that the design/hanger spacing is adjusted to accommodate it.

Question: Plan sheet #40 - Pier Note #10 refers to a waterproofing membrane. Where is this membrane to be installed on the precast piers?

Response: The waterproofing membrane is centered on the joint between the base of the precast column and the top of the cast-in-place concrete footing. See Sheet 43 for the "Footing Connection Detail".

Consider these changes and information prior to submitting your bid on **October 9, 2019**.

Sincerely,

FOR

George M. A. Macdougall P.E.
Contracts & Specifications Engineer

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0010	201.23 REMOVING SINGLE TREE TOP ONLY	2.000 EA				
0020	201.24 REMOVING STUMP	1.000 EA				
0030	202.15 REMOVING MANHOLE OR CATCH BASIN	4.000 EA				
0040	202.19 REMOVING EXISTING BRIDGE	 LUMP SUM	 LUMP SUM			
0050	202.1913 REMOVE ABANDONED ASBESTOS-CONTAINING PIPE	380.000 LF				
0060	202.202 REMOVING PAVEMENT SURFACE	11,500.000 SY				
0070	203.20 COMMON EXCAVATION	2,000.000 CY				
0080	203.25 GRANULAR BORROW	1,600.000 CY				
0090	206.082 STRUCTURAL EARTH EXCAVATION - MAJOR STRUCTURES	2,150.000 CY				
0100	206.092 STRUCTURAL ROCK EXCAVATION - MAJOR STRUCTURES	26.000 CY				
0110	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	1,800.000 CY				
0120	403.2081 12.5 MM POLYMER MODIFIED HOT MIX ASPHALT	1,200.000 T				

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0130	403.209 HOT MIX ASPHALT 9.5 MM (SIDEWALKS, DRIVES, INCIDENTALS)	30.000 T				
0140	403.213 HOT MIX ASPHALT 12.5 MM BASE	340.000 T				
0150	403.2131 12.5 MM POLYMER MODIFIED HMA BASE	250.000 T				
0160	409.15 BITUMINOUS TACK COAT - APPLIED	770.000 G				
0170	502.219 STRUCTURAL CONCRETE, ABUTMENTS AND RETAINING WALLS	LUMP SUM	LUMP SUM			
0180	502.23 STRUCTURAL CONCRETE PIERS	111.000 CY				
0190	502.26 STRUCTURAL CONCRETE ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES	LUMP SUM	LUMP SUM			
0200	502.291 SAW CUT GROOVING	LUMP SUM	LUMP SUM			
0210	502.31 STRUCTURAL CONCRETE APPROACH SLABS	LUMP SUM	LUMP SUM			
0220	502.49 STRUCTURAL CONCRETE CURBS AND SIDEWALKS	LUMP SUM	LUMP SUM			
0225	502.77 FIBER REINFORCED POLYMER BRIDGE DRAIN - TYPE: F	2.000 EA				

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0230	503.12 REINFORCING STEEL, FABRICATED AND DELIVERED	71,700.000 LB				
0240	503.13 REINFORCING STEEL, PLACING	71,700.000 LB				
0250	503.26 STAINLESS STEEL REINFORCEMENT - FABRICATED & DELIVERED	109,000.000 LB				
0260	503.27 STAINLESS STEEL REINFORCEMENT - PLACING	109,000.000 LB				
0270	504.702 STRUCTURAL STEEL FABRICATED AND DELIVERED, WELDED	LUMP SUM	LUMP SUM			
0280	504.71 STRUCTURAL STEEL ERECTION	LUMP SUM	LUMP SUM			
0290	505.08 SHEAR CONNECTORS	LUMP SUM	LUMP SUM			
0300	506.9104 THERMAL SPRAY COATING - SHOP APPLIED	LUMP SUM	LUMP SUM			
0310	507.0821 STEEL BRIDGE RAILING, 3 BAR	LUMP SUM	LUMP SUM			
0320	507.0831 STEEL BRIDGE RAILING, 4 BAR	LUMP SUM	LUMP SUM			
0330	512.081 FRENCH DRAINS	LUMP SUM	LUMP SUM			
0340	514.06 CURING BOX FOR CONCRETE CYLINDERS	1.000 EA				

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0350	515.21 PROTECTIVE COATING FOR CONCRETE SURFACES	LUMP SUM	LUMP SUM	_____.____
0360	520.232 EXPANSION DEVICE - ASPHALTIC PLUG JOINT	91.000 LF	_____.____	_____.____
0370	523.52 BEARING INSTALLATION	21.000 EA	_____.____	_____.____
0380	523.5401 LAMINATED ELASTOMERIC BEARINGS, FIXED	7.000 EA	_____.____	_____.____
0390	523.5402 LAMINATED ELASTOMERIC BEARINGS, EXPANSION	14.000 EA	_____.____	_____.____
0400	524.301 TEMPORARY STRUCTURAL SUPPORT ABUTMENT 1	LUMP SUM	LUMP SUM	_____.____
0410	524.301 TEMPORARY STRUCTURAL SUPPORT ABUTMENT 2	LUMP SUM	LUMP SUM	_____.____
0420	524.301 TEMPORARY STRUCTURAL SUPPORT PIER	LUMP SUM	LUMP SUM	_____.____
0430	524.40 PROTECTIVE SHIELD	LUMP SUM	LUMP SUM	_____.____
0440	526.301 TEMPORARY CONCRETE BARRIER TYPE I	LUMP SUM	LUMP SUM	_____.____
0450	526.50 PRECAST CONCRETE BARRIER TYPE II	260.000 LF	_____.____	_____.____

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
0460	526.503 PRECAST CONCRETE PIER PROTECTION BARRIER SYSTEM	LUMP SUM	LUMP SUM	_____.____
0470	527.33 TRUCK MOUNTED ATTENUATOR	2.000 EA	_____.____	_____.____
0480	527.34 WORK ZONE CRASH CUSHIONS	2.000 UN	_____.____	_____.____
0490	534.7602 PRECAST PIER	LUMP SUM	LUMP SUM	_____.____
0500	603.159 12 INCH CULVERT PIPE OPTION III	46.000 LF	_____.____	_____.____
0510	604.072 CATCH BASIN TYPE A1-C	4.000 EA	_____.____	_____.____
0520	604.15 MANHOLE	1.000 EA	_____.____	_____.____
0530	604.18 ADJUSTING MANHOLE OR CATCH BASIN TO GRADE	6.000 EA	_____.____	_____.____
0540	605.09 6 INCH UNDERDRAIN TYPE B	500.000 LF	_____.____	_____.____
0550	606.1304 31” W-BM GR, MID-WAY SPLICE-OVER 15' RAD	187.500 LF	_____.____	_____.____
0560	606.1305 31” W-BM GR, MID-WAY SPLICE FLARED TERMINAL	3.000 EA	_____.____	_____.____
0570	606.1721 BRIDGE TRANSITION - TYPE 1	4.000 EA	_____.____	_____.____

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0580	606.353 REFLECTORIZED FLEXIBLE GUARDRAIL MARKER	6.000 EA				
0590	606.52 MAILBOX REMOVE & RESET	1.000 EA				
0600	607.17 CHAIN LINK FENCE - 6 FOOT	60.000 LF				
0610	607.184 CHAIN LINK SNOW FENCE 3 FOOT	364.000 LF				
0620	607.24 REMOVE AND RESET FENCE	410.000 LF				
0630	608.26 CURB RAMP DETECTABLE WARNING FIELD	78.000 SF				
0640	609.11 VERTICAL CURB TYPE 1	610.000 LF				
0650	609.12 VERTICAL CURB TYPE 1 - CIRCULAR	68.000 LF				
0660	609.23 TERMINAL CURB TYPE 1	15.000 EA				
0670	610.08 PLAIN RIPRAP	560.000 CY				
0680	610.18 STONE DITCH PROTECTION	30.000 CY				
0690	615.07 LOAM	62.000 CY				
0700	618.13 SEEDING METHOD NUMBER 1	3.000 UN				

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0710	618.141 SEEDING METHOD NUMBER 3	3.000 UN				
0720	619.12 MULCH	5.000 UN				
0730	619.14 EROSION CONTROL MIX	29.000 CY				
0740	620.58 EROSION CONTROL GEOTEXTILE	560.000 SY				
0750	627.18 12 " SOLID WHITE PAVEMENT MARKING	1,700.000 LF				
0760	627.733 4" WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE	2,200.000 LF				
0770	627.744 6" WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE	6,900.000 LF				
0780	627.75 WHITE OR YELLOW PAVEMENT & CURB MARKING	500.000 SF				
0790	627.77 REMOVING PAVEMENT MARKINGS	4,200.000 SF				
0800	627.781 TEMPORARY 6 INCH PAINTED PAVEMENT MARKING LINE, WHITE OR YELLOW	18,900.000 LF				
0810	629.05 HAND LABOR, STRAIGHT TIME	20.000 HR				

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0820	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	20.000 HR				
0830	631.171 TRUCK - SMALL (INCLUDING OPERATOR)	20.000 HR				
0840	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	20.000 HR				
0850	631.21 ROAD BROOM (INCLUDING OPERATORS AND HAULER)	20.000 HR				
0860	631.22 FRONT END LOADER (INCLUDING OPERATOR)	20.000 HR				
0870	634.160 HIGHWAY LIGHTING	 LUMP SUM	 LUMP SUM			
0880	634.2042 LED LUMINARIES ,CREE	1.000 EA				
0890	639.18 FIELD OFFICE TYPE A	1.000 EA				
0900	643.72 TEMPORARY TRAFFIC SIGNAL WESTLAND ST	 LUMP SUM	 LUMP SUM			
0910	645.106 DEMOUNT REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	13.000 EA				
0920	645.108 DEMOUNT POLE	17.000 EA				

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0930	645.116 REINSTALL REGULATORY, WARNING, CONFIRMATION AND ROUTE MARKER ASSEMBLY SIGN	13.000 EA				
0940	645.118 REINSTALL POLE	11.000 EA				
0950	645.301 DEMOUNTABLE REFLECTORIZED DELINEATOR, SINGLE	5.000 EA				
0960	652.30 FLASHING ARROW BOARD	2.000 EA				
0970	652.312 TYPE III BARRICADE	28.000 EA				
0980	652.33 DRUM	50.000 EA				
0990	652.34 CONE	50.000 EA				
1000	652.35 CONSTRUCTION SIGNS	1,800.000 SF				
1010	652.361 MAINTENANCE OF TRAFFIC CONTROL DEVICES	LUMP SUM	LUMP SUM			
1020	652.38 FLAGGER	560.000 HR				
1030	652.381 TRAFFIC OFFICER	710.000 HR				
1040	652.41 PORTABLE CHANGEABLE MESSAGE SIGN	4.000 EA				

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars Cents	Bid Amount Dollars Cents
1050	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP SUM	LUMP SUM	_____.____
1060	659.10 MOBILIZATION	LUMP SUM	LUMP SUM	_____.____
1070	660.21 ON-THE-JOB TRAINING (BID)	1,000.000 HR	_____.____	_____.____
1080	822.305 WATER MAIN INSULATION AND JACKETING	180.000 LF	_____.____	_____.____
1090	822.3302 6" CLASS 52 CLDI WATERMAIN	15.000 LF	_____.____	_____.____
1100	822.36031 12" CLASS 52 CEMENT LINED DUCTILE IRON WATERMAIN	390.000 LF	_____.____	_____.____
1110	823.311 12 INCH GATE VALVE WITH BOX	1.000 EA	_____.____	_____.____
1120	823.33 6 INCH GATE VALVE WITH BOX	1.000 EA	_____.____	_____.____
1130	824.3010 HYDRANT ASSEMBLY	1.000 EA	_____.____	_____.____
1140	824.3015 REMOVE HYDRANT ASSEMBLY	1.000 EA	_____.____	_____.____
1150	825.321 1 INCH CORPORATION	2.000 EA	_____.____	_____.____
1160	825.331 1" CURB STOP ,BOX AND ROD	2.000 EA	_____.____	_____.____

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018722.00 **Project(s):** 018722.00

SECTION: 1 Project Items

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
1170	825.434 1" COPPER SERVICE	85.000 LF				
1180	827.33 TRENCH INSULATION	80.000 LF				
1190	830.14 WATER MAIN BRIDGE CROSSING INSTALL ONLY	LUMP SUM	LUMP SUM			
1200	830.15 WATER MAIN BRIDGE CROSSING HANGER SYSTEM	LUMP SUM	LUMP SUM			
1210	845.10 STRUCTURAL STEEL UTILITY SUPPORT	LUMP SUM	LUMP SUM			

Section: 1 **Total:**

Total Bid:

Town: **Bangor**
Project: **18722.00**
Date: **September 18, 2019**

SPECIAL PROVISIONS

SECTION 104
Utilities

UTILITY COORDINATION

The Contractor has primary responsibility for coordinating their work with utilities after contract award. The Contractor shall communicate directly with the utilities regarding any utility work necessary to maintain the Contractor's schedule and prevent project construction delays. The Contractor shall notify the resident of any issues.

THE CONTRACTOR SHALL PLAN AND CONDUCT WORK ACCORDINGLY.

MEETING

A Preconstruction Utility Conference, as defined in Subsection 104.4.6 of the Standard Specifications **is** required.

GENERAL INFORMATION

These Special Provisions outline the arrangements that have been made by the Department for utility and/or railroad work to be undertaken in conjunction with this project. The following list identifies all known utilities or railroads having facilities presently located within the limits of this project or intending to install facilities during project construction.

Utilities have been notified and will be furnished a project specification.

Overview:

Utility	Aerial	Underground
Bangor Sewer Department		X
Bangor Water District		X
Consolidated Communications		X
Emera Maine	X	
Northern Light Health	X	
First Light	X	
University of Maine System	X	
Charter Communications	X	
City of Bangor	X	

Town: **Bangor**
Project: **18722.00**
Date: **September 18, 2019**

Utility Contact Information		
Utility	**Contact Person**	**Contact Phone**
Bangor Sewer Department	Chip Swan	992-4513
Bangor Water District	Amanda Soucier	947-4516
Consolidated Communications	Brian Smith	712-8604
Emera Maine	Dave Perkins	941-6684
Northern Light Health	Walter Hilenski	973-5965
First Light	Michael Ellingwood	462-2759
University of Maine System	Corey Lavoie	949-4227
Charter Communications	Stephen Allen	478-1352
City of Bangor	John Cyr	992-4511

Temporary utility adjustments **are** anticipated. If any unexpected utility relocations become necessary, they shall be scheduled in accordance with Section 104 of the Standard Specifications and shall be performed by the appropriate utility company in conjunction with the work by the Contractor. Should the Contractor choose to have any poles temporarily relocated, all work shall be done at the Contractor's request and expense, with no additional cost or schedule impacts to the Department.

Unless otherwise specified, any underground utility facilities shown on the project plans represent approximate locations gathered from available information. The Department cannot certify the level of accuracy of this data. Underground facilities indicated on the topographic sheets (plan views) have been collected from historical records and/or on-site designations provided by the respective utility companies. Underground facilities indicated on the cross-sections have been carried over from the plan view data and may also include further approximations of the elevations (depths) based upon straight-line interpolation from the nearest manholes, gate valves, or test pits.

All adjustments are to be made by the respective utility/railroad unless otherwise specified herein.

Fire hydrants shall not be disturbed until all necessary work has been accomplished to provide proper fire protection.

All clearing and tree removal in areas where utilities are involved must be completed before the utilities are able to relocate their facilities.

It is the responsibility of the Contractor with the Utility Pole owner, to layout all of the proposed pole locations in the field prior to the start of utility relocations. Should any adjustments be needed, the Utility will document adjustments and inform the Department prior to utility relocations.

The Contractor shall provide the utilities access to the new pole locations. Construction of any spot cuts or fills in excess of 2 feet must be completed prior to utility relocations. The Contractor shall prepare a plan for how access and the spot cuts and fills will be accomplished and what the schedule will be for performing the work. This plan will be discussed at the pre-construction utility meeting.

***** Specific information regarding the line voltage can be requested from**** **Emera Maine*********

Utility working days are Monday through Friday. Times are estimated on the basis of a single crew for each utility. Any times and dates mentioned are **estimates only** and are dependent upon favorable weather, working conditions, and freedom from emergencies. The Contractor shall have no claim against the Department if they are exceeded.

AERIAL

Summary:

Utility	Pole Set	New Wires/ Cables	Trans. Wires/ Cables	Remove Poles	Estimated Working Days
Emera Maine	X	X		X	10
Northern Light Health			X		2
University of Maine System			X		2
Charter Communications			X		2
First Light	X		X	X	10
				Total:	**26**

Utility Specific Issues:

First Light
First Light will need to relocate their facilities temporarily to acquire a working distance from the bridge. This will require two temporary poles at station 26+00 Lt offset 60' and station 28+00 Lt offset 55'. These poles will be set by First Light. First light will transfer back to the new locations once the project has been completed at 25+70Lt offset 26' and at station 28+35Lt offset 26'. First Light will remove the temporary poles.

Charter Communications
Once First Light has completed their work Charter Communications will transfer their facilities to the temporary poles. The sequence of the traffic control plan will be discussed at the pre-construction meeting. The utility will need to transfer back to the two new locations at station 25+64 Lt and station 28+41Lt.

Northern Light Health
Once Charter Communications has completed their work Northern Light Health will transfer their facilities to the temporary poles. The sequence of the traffic control plan will be discussed at the pre-construction meeting. The utility will need to transfer back to the two new locations at station 25+64 Lt and station 28+41Lt

University of Maine System
Once Northern Light Health has completed their work University of Maine System will transfer their facilities to the temporary poles. The sequence of the traffic control plan will be discussed at the pre-construction meeting. The utility will need to transfer back to the two new locations at station 25+64 Lt and station 28+41Lt.

Emera Maine
Emera Maine will Remove their facilities form the project limits and will dead head their facilities at 24+14 Lt offset 26' and 29+92Lt offset 26' Poles will be removed at station. 24+16Lt and station 29+90Lt. A new service pole will be set at station 28+66.2 Rt offset 38.2'. The service pole will be energized from the pole at station 29+90Lt.When project has completed Emera Maine will replace poles at 25+70Lt offset 26' and at station 28+35Lt offset 26'

City of Bangor
The City of Bangor has an abandoned fire alarm system wire within the project limits. The City will cut and remove the fire alarm wire and will not be reinstalling.

Pole List:

Existing Pole #	Existing Station	Left/ Right		Existing Offset	Proposed Station	Left/ Right		Proposed Offset	Comments
		LT	RT			LT	RT		
258772	25+64.0	X		26.3’					Remove
258752	28+41.5	X		26.6’					Remove
					26+00	X		60.0’	Temp Pole/ First Light
					28+00	X		55.0’	Temp Pole/First light
					25+70	X		26’	New Pole Permanent
					28+35	X		26’	New Pole Permanent
258627	29+03.2		X	27.0’					Remove Service
					28+66.2		X	38.2’	New Service

Note**
The utilities will need a to develop a plan and submit it to MDOT Resident for the utility work taking place over the interstate corridor for approval. The utilities will need to schedule this work with the Contractor for this project.

SUBSURFACE

Summary:

Utility	Summary of Work	Estimated Working Days
Bangor Sewer Department	Lower manholes and adjust to finish grade	5
Bangor Water District	Water line relocation by Contractor	0
Consolidated Communications	Demolition existing conduit system by Contractor	0
Abandoned Gas Line	Demolition by Contractor	0
	Total:	**5**

Utility Specific Issues:

Bangor Sewer Department

Bangor Sewer Department has 5 manholes within the project limits to lower and adjust to finish grade. Their estimated time is 5 working days. There is an existing sewer line at station 25+79. It is the responsibility of the Contractor to protect the sewer line form any damage during the construction of the project.

Bangor Water District

Bangor Water District has entered into an agreement with the State to upgrade their drinking water system. The 12-inch water line will be attached to the bridge. Work also includes approach work. Also, there will be a water hydrant removed and new hydrant will be installed. There is an existing water main within the project limits. It is the responsibility of the Contractor to protect the water line from any damage during construction. There are multiple locations that are close to the constriction limits. Details of the work are located within the plan and specs supplied in the bid book.

Consolidated Communications

Consolidated Communications has two abandoned asbestos conduits attached to the bridge deck. The utility has entered into an agreement with the State to have the Contractor to wreck the conduits out with the demolition of the bridge. The Contractor will be responsible for the disposal of the conduit system. The conduit shall be removed within the limits of excavation of the bridge. This will be paid by the utility under Item 202.1913

****Note****

There is an abandoned gas line main attached to the bridge. The owner of the gas line is unknown it is the responsibility of the Contractor to take necessary safety steps to demo the gas line with the bridge. The gas line shall be plugged at excavation limits. Gas line demo is incidental to item 202.19.

MAINTAINING UTILITY LOCATION MARKINGS

The Contractor will be responsible for maintaining the buried utility location markings following the initial locating by the appropriate utility or their designated representative.

UTILITY SIGNING

Any utility working within the construction limits of this project shall ensure that the traveling public is adequately protected at all times. All work areas shall be signed, lighted, and traffic flaggers employed as determined by field conditions. All traffic controls shall be in accordance with the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, as issued by the Federal Highway Administration.

Bangor
Ohio Street Bridge
WIN 018722.00
September 20, 2019

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(Fiber Reinforced Polymer Bridge Drains)

Description

This work shall consist of design, fabrication and delivery of bridge drains using FRP (Fiber Reinforced Polymer) composite materials in accordance with the plans and this specification.

Applicable Standards and References

The design and construction of FRP composite bridge drain components shall be in accordance with this Methods Specification and the relevant requirements of the following standards and specifications, unless otherwise stipulated in this specification. Standards and specifications specifically cited in the body of the specification establish requirements that shall have precedence over all others. Should the requirements in any reference conflict with those in another, the reference highest on the list shall govern. It is the Design-Builder's responsibility to obtain clarification of any unresolved ambiguity prior to proceeding with the design or construction.

Specifications

Work shall be done in general accordance with the following specifications:

a. AASHTO LRFD Guide Specifications for Design of Concrete-Filled FRP Tubes for Flexural and Axial Members, 2012.
b. American Composites Manufacturing Association, ACMA Code of Standard Practice, First Edition, 2011.
c. ISO/IEC Guide 58, Calibration and Testing Laboratory Accreditation Systems - General Requirements for Operation and Recognition.
d. ISO/IEC 17025 General Requirements for the Competence of testing and Calibration Laboratories.
e. NBS Voluntary Product Standard PS15-69. Custom Contact-Mold Reinforced Polyester Chemical-Resistant Process Equipment. The Society of the Plastics Industry, Inc., 355 Lexington Ave., N.Y., N.Y. 10017

2.3 Standards

A.) ASTM D 2584. *Standard Test Method for Ignition Loss of Cured Reinforced Resins.* American Society for Testing and Materials, West Conshohocken, PA.

B.) ASTM D 3039. *Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials.* American Society for Testing and Materials, West Conshohocken, PA.

C.) ASTM D 3171. *Standard Test Methods for Constituent Content of Composite Materials.* American Society for Testing and Materials, West Conshohocken, PA.

D.) ASTM D 4385. *Standard Practice for Classifying Visual Defects in Thermosetting Reinforced Plastic Pultruded Products.* American Society for Testing and Materials, West Conshohocken, PA.

E.) ASTM D 570. *Test Method for Water Absorption of Plastics.* American Society for Testing and Materials, West Conshohocken, PA.

F.) ASTM E 1356. *Standard Test Method for Assignment of the Glass Transition Temperatures by Differential Scanning Calorimetry.* American Society for Testing and Materials, West Conshohocken, PA.

G.) ASTM E 1640. *Standard Test Method for Assignment of the Glass Transition Temperature by Dynamic Mechanical Analysis.* American Society for Testing and Materials, West Conshohocken, PA.

H.) ASTM C 582. Standard Specification for Contact-Mold Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment. American Society for Testing and Materials, West Conshohocken, PA.

Material

Materials shall conform to the following requirements:

1. FRP composite drain and pipe material shall meet the requirements of Appendix A.

2. All material and workmanship will meet or exceed the requirements of ASTM.

Construction Requirements

FRP Drain Manufacturers

The FRP bridge drains shall be supplied by one of the following companies:

1. Kenway Corporation
2. FRP Bridge Drain Pipe-Westfall Company
3. ACO USA

The above suppliers have been pre-certified by providing materials samples that have been tested in accordance with Appendix A. Other suppliers/manufacturers may become certified if FRP bridge drain samples are tested in accordance with the requirements in Appendix A along with the meeting the following requirements.

All manufactures or fabricators of FRP bridge drain systems/components are required to have a minimum of 3 years of experience in providing FRP composite structural grade products to the general market. Manufacturers need to provide documentation that personnel involved in manufacture/fabrication hold and maintain American Composites Manufactures Association (ACMA) certifications in a minimum of two of the following disciplines; 1) Open Molding, 2) Corrosion, 3) Vacuum Infusion, 4) Closed Molding and that the Manufacturer/Fabricator have an ISO 9001:(current year) or other independent certification to ensure that the Manufacturer's process has been independently audited for conformance.

Design Guide for FRP Composite Scupper Bodies/Drain Inlets

General

The bridge shall use a size F offset FRP composite scupper (36 inch long x 12 inch wide x 10 diameter downspout) See Appendix B for additional details. The bottom of the downspout shall extend a minimum of 12 inches below the bottom of the beams. For bridge decks with integral concrete wearing surface, the drain pan depth shall be reduced to provide adequate concrete cover.

Deck/interface drain holes.

For bridge decks with pavement and waterproofing membrane, drain holes are required on both sides of the scupper to capture moisture at the interface between the top of the deck and bottom of the asphalt pavement. Three holes one half inch in diameter spaced at 6 inches on center and three and one quarter inches on center below the top of the grate, or pavement thickness, shall be placed on both sides of the scupper. If the holes are created after the molding process by punching, drilling or other mechanical means the holes shall be sealed using a compatible epoxy compound.

Grates

Grates shall be bicycle friendly and designed for HL-93 Live Load unless otherwise specified. Any gaps in grates shall have a maximum clear width of two inches. The minimum clear opening size in any grating shall be 1 1/8” by 1 1/8“. Grates shall be stainless steel (ASTM A995) or FRP specifically designed and meeting the HL-93 Live Load requirements.

- Steel grating shall be commercial heavy - duty grating with 1 1/2" x 5/16" bearing bars spaced at 2 3/8” and 3/8" diameter cross bars spaced at 2”. The grating shall be centered in the drain top. The bearing bars shall run parallel to traffic.

- FRP grating if used shall provide an opening area at least 75% of steel grating noted above. FRP gratings that do not meet this requirement are not acceptable and shall not be used.

Grates shall be designed so that they can be removed by mechanical means. Fasteners for grates shall be stainless. Where selected grates require orientation to flow, the grates will have orienting features included as required, i.e. for orders of paired drains one drain would have left hand orientation and the other right hand orientation.

Grate Frames
Grate frames may be either integrated FRP composite or of galvanized steel construction attached to the scupper/inlet body in a matter consistent with the physical design parameters.

Anchoring provisions
Scupper/inlet anchoring shall be bonded to the grate framing in a manner that provides a load path into the concrete decking. Anchor details to be specified as part of the shop drawings for the bridge drains and be a non-corrosive material.

Cross and Longitudinal Slope Compensation
The scupper/inlet designs shall provide a means to match the grate to the deck angles while maintaining the downspout in a plumb orientation. If purchased in pairs one left handed version will be required for each right handed version. This may be achieved when a down spout portion is bonded to the scupper body, through the frame attachment to the scupper body.

FRP Composite Drain Sections
Bridge deck downspouts, bridge drain deck extensions, elbows and pipe for under drains shall be constructed using a circular cross section; however other cross sections are allowed with approval of the Fabrication Engineer. Drain sections shall comply with the material requirements set forth in Appendix A and maintain wall thickness of no less than 1/4 inch.

FRP Composite Deck Drain Extensions.
Down spout drain extensions shall be integrated and bonded directly to the scupper bodies.

Transitions through Connections and Components.
All transitions and joints to be manufactured through the use of smooth radius molds. Miter joint and edged transitions are not allowed. All internal joint connections are to be smooth and continuous.

Pigmented FRP Composite Drain Components
Pipes, fittings, bodies and all FRP composite drain system components shall be pigmented through the wall. The color used shall match the color of the metallized steel beams. Paint, gel-coat or any other exterior coating shall not be accepted.

Joint Connections
Joints may be welded using manufacturer recommended adhesives in accordance to the adhesive manufacturer's application procedures. Adhesives must be compatible with the FRP resins, applied in a way that ensures complete bonding and liquid tight sealing of the resins, and be compatible with the environmental conditions such as temperature, freeze thaw conditions, and wet alkaline environments.

Shop Drawings/Inspection

Drawings The Contractor shall prepare shop detail, erection and other necessary working drawings in accordance with Section 105.7 - Working Drawings. Drawings shall include dimensions and tolerances necessary for manufacture and installation, all hardware, orienting features, anchor details, fastener details, gasket details, cross and longitudinal matching features, joint details, transition details, material lay-up/composition

Quality Control/Quality Assurance: Within 30 calendar days the Contractor shall submit to the Department a Quality Control Quality Assurance (QCQA) Plan for fabrication of the HCB's. Fabrication of HCB's shall not commence until the QCQA Plan has been reviewed and approved by the Department.

Notice of Beginning Work The Contractor shall give the Fabrication Engineer a minimum of two weeks notice before the beginning of work. No work shall be performed before the Fabrication Engineer has been notified. Before beginning work, a pre-fabrication meeting may be held at the discretion of the Fabrication Engineer or, if requested, by the Contractor.

The Contractor shall advise the Fabrication Engineer of the production schedule and any changes to it. If the Contractor suspends work on a project, the Fabrication Engineer will require 48 hours notice prior to the resumption of work.

Inspection Quality Control (Q.C.) is the responsibility of the Contractor. The Quality Control Inspector (Q.C.I.) shall inspect all aspects of the work and shall supervise all nondestructive examination (NDE). The Q.C.I. shall record measurements and test results in a clear and legible manner. The Q.C.I. shall reject materials and workmanship that do not meet contract requirements. The Contractor may perform NDE in addition to the minimum required. The results of all measurements and testing shall be made available to the Quality Assurance Inspector (Q.A.I.).

Quality Assurance (Q.A.) is the prerogative of the Fabrication Engineer. The Q.A.I. will ensure that the Q.C. Department is performing properly, verify documentation, periodically inspect workmanship and witness NDE. Q.A. testing deemed necessary by the Fabrication Engineer in addition to the minimum testing requirements shall be scheduled to minimize interference with the production schedule.

Inspector's Authority The Q.A.I. will have the authority to reject material or workmanship that does not meet the contract requirements. The acceptance of material or workmanship by the Q.A.I. will not prevent subsequent rejection, if found unacceptable.

Rejections Rejected material and workmanship shall be corrected or replaced by the Contractor.

Bill of Materials The Contractor shall provide the Fabrication Engineer with copies of all bills of materials used in the fabrication of the FRP bridge drains.

Packaging, Storage and Shipping of Components
FRP drains shall be stored and handled in accordance with the manufacturer's recommendation. The drains shall be stored above the ground not be allowed to come into contact with seawater, mud, grease, dirt or other deleterious materials that may be present on the job site.

Installation
The Contractor shall install the FRP drains in accordance to the manufacturer's installation procedures and in accordance to the Contractor's installation drawings. FRP bridge drains will be accurately placed at the locations shown on the Plans or as authorized by the Resident. Adequate means shall be provided for securely holding the drains in place during placement of concrete. Any damaged drain shall be repaired or replaced at the Resident’s discretion and at no additional cost to the Department.

Method of Measurement
FRP Bridge Drains will be measured by the number of units, for fabrication and delivery. Installation for the drains will be incidental to the Structural Concrete Superstructure item.

Basis of Payment
FRP Bridge Drains will be paid for at the contract unit price. Such payment will include compensation for the fabrication and delivery of the drains in accordance with this specification.

Payment will be under:

Pay Item		Pay Unit
502.77	FRP Bridge Drain –Type F	Each

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(Fiber Reinforced Polymer Bridge Drains)

APPENDIX A

A.1 Scope
This section specifies the material composition, properties, test requirements and reports that shall be submitted and approved prior to and after product certification of each FRP composite drain component type, e.g. scupper body or pipe component. The manufacturer is responsible for testing using an approved independent lab per section A.5.3. Once certified the approved product may be manufactured with only internal testing provided the manufacturing process and laminate composition do not change. Changes to process and or composition do require additional testing and product certification. The manufacturer shall report the individual test results per section A.5.3. If the strength is less than the required properties certification will not be granted.

A.2 Material/Laminate Composition

A.2.1 Fibers
Fiber sizings and coupling agents shall be compatible with the resin system used to impregnate them.

A.2.2 Matrix Resins
Commercial grades of vinyl ester and epoxy resin systems are permitted provided the finished product meets the material property requirements before and after durability conditioning as set forth in Section A. Styrene is permitted to be added to the polymer resin during processing. Added styrene shall be less than 10 percent by mass of the polymer resin. The amount of styrene, as a mass percentage of the polymer resin, added during processing shall be reported per Section A.5.3.

A.2.3 Fillers and Additives
Commercial grade inorganic fillers such as kaolin clay, calcium carbonate, and alumina tri-hydrate shall not exceed 20 percent by mass of the polymer resin constituent. Commercial grade additives and process-aids, such as release agents, low profile shrink additives, initiators, promoters, hardeners, catalysts, pigments, fire-retardants, and ultra-violet inhibitors are permitted and depend on the processing method. Shrink additives, if used, shall be less than 20 percent by mass of the polymer resin. Commercial grade inorganic or organic non-woven surfacing mats or veils are permitted.

A.2.4 Fiber Content
Fiber content shall be measured by ASTM D 3171 or ASTM D 2584. Fiber content shall be high enough to meet the mechanical property requirements of the FRP system laminate. The manufacturer shall report the fiber content of the end product by volume or by mass in accordance to the method used. If fiber content is not provided by the manufacturer, then the manufacturer shall provide material data sheets with the weight per unit area of the fiber reinforcement used to manufacture the part.

A.2.5 Glass Transition Temperature
The characteristic value of the glass transition temperature of the composite system, determined in accordance with ASTM E1640, shall be at least 40 degrees Fahrenheit higher than the maximum design temperature, $T_{MaxDesign}$, defined in section 3.12.2.2 of the AASHTO LRFD Guide Specifications for Design of Concrete-Filled FRP Tubes for Flexural and Axial Members, 2012. FRP drain systems may not be used in environments with a service temperature higher than the glass transition temperature of the resin used for their manufacturing.

A.2.6 Longitudinal and Transverse Coefficients of Thermal Expansion (CTE)
The coefficient of Thermal Expansion (CTE) of the tube may vary in the longitudinal and circumferential directions of the component depending on the laminate architecture and type of fibers and resins.

A.3 Mechanical Properties

A.3.1 Tensile Properties
The tensile strength, tensile modulus of elasticity, and ultimate tensile strain shall be determined for both the axial and hoop directions of the tubular components or in transverse and longitudinal directions of inlet bodies, see Section A.5.1 Test Samples. The tensile strength as reported by the manufacturer for product certification shall be measured according to ASTM Test Method D 3039, or other tension test method designed to determine tensile properties of composite laminates at the approved frequency and number of specimens as specified in section A.5.

A.3.4 Compressive Properties
The compressive strength and ultimate compressive strain shall be determined for the longitudinal directions of the tube laminate. The compressive strength and ultimate compressive strains shall be derived from specimens tested in accordance with ASTM Test Method D 6641, or other approved compression test method designed to determine compressive properties of the composite.

A.4 Durability Properties
Material properties shall retain 85% of their baseline values for the material properties listed in Section 2.3 after conditioning for all the durability tests listed below. Durability test methods are adopted from AASHTO Guide Specifications for Design of Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements.

Durability property testing is only required for initial product certification and not required for subsequent production orders. The testing is the responsibility of the manufacturer and shall be conducted by an approved independent testing lab per section A.5.2.

A.4.1 Moisture Absorption
Samples will be immersed in distilled water having a temperature of 100 +/-3 degrees Fahrenheit and tested after 1,000 hours of exposure.

A.4.2 Resistance to Alkaline Environment
Samples will be immersed in a saturated solution of calcium hydroxide (pH-11) at ambient temperature of 73 +/-3 degrees Fahrenheit for 1,000 hours prior to testing. The pH level will be monitored and the solution will be maintained as needed.

A.4.3 Alternating Ultraviolet Light and Condensation Humidity
Samples will be conditioned in an apparatus under Cycle I-UV exposure condition according to ASTM G154 Standard Practice. Samples will be tested within two hours after removal from the apparatus.

A.4.4 Freeze-Thaw
Samples will be exposed to 100 repeated cycles of freezing and thawing in an apparatus meeting the requirements of ASTM C666.

A.5 Sampling, Testing & Results.

A.5.1 Test Samples.
The manufacturer is responsible for testing and may use samples in accordance to the test methods and needs of test equipment available. Test coupons may be cut from manufactured products or prepared using identical processes e.g. wet lay-up, vacuum infusion, etc. in a flat sheet, or witness plate, in which test coupons may be cut. Approval of the Fabrication Engineer shall be required for acceptance of test specimens produced by a different manufacturing method. Samples derived from special coupon test sheets shall be taken interior to edge sections 1.5x the width of the required coupon width. Samples shall be prepared from samples oriented with the directions illustrated in figures 1 and 2 for scupper body and drain pipes. For samples from filament wound pipes, samples shall be constructed over polygon mandrels allowing for flat panels to be removed for test purposes. Each test shall use a quantity of three samples. See Tables A.5.4 for tests, material requirements and sample breakdown.

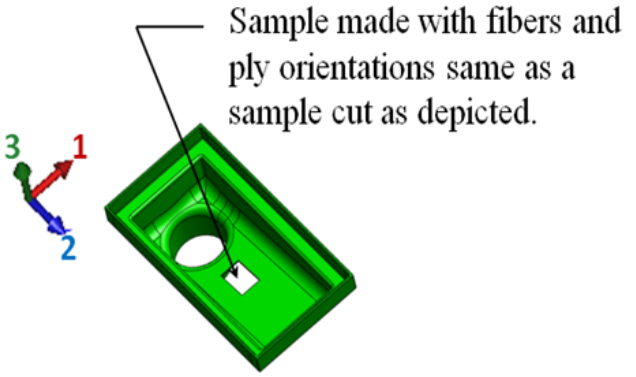


Figure 1.) Scupper Body Sample Orientations.

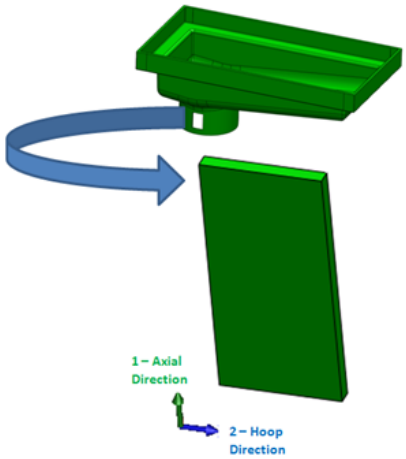


Figure 2.) Drain Pipe Sample Orientations.

A.5.2 Test Lab Requirements.
All testing of FRP material properties is being conducting in accordance to specified standards. Internal or external testing is to be conducted through laboratory facilities in accordance to ISO/IEC Guide 58, *Calibration and Testing Laboratory Accreditation Systems - General Requirements for Operation and Recognition* and ISO/IEC 17025 *General Requirements for the Competence of testing and Calibration Laboratories* as related by AASHTO document R18 "Recommended Practice for Establishing and Implementing a Quality System for Construction Materials Testing Laboratories."

A.5.3 Production Validation (PV) Testing.
Certification of materials used in FRP drain products must undergo PV testing of the specified material properties before and after environmental conditioning as set forth in Section A.5.4 by an independent lab. PV tests may be conducted internally by the manufacturer for development but are not acceptable for certification. Reported values for the material composition is be recorded and reported by the manufacturer, no independent audit is required.

A.5.4 Production Validation Sample Quantities, Minimum Material Properties and Reported Values
The following data shall be reported for material certification. Note that the tables shown use orientations related to FRP scupper or inlet bodies as set forth in Figure 1 of Section A.5.1. When evaluating tubular sections, orientation direction 2 as shown in Figure 2 of Section A.5.1 shall be substituted for orientation direction 3. The required number of samples have been reduced from ASTM requirements.

Table A.5.4.a PV reported material composition data. (Recorded by the manufacturer during the manufacturing process)

Section No.	Characteristic	Applicable Test Standard	Number of Samples	Tolerance	Reported
A.2.2	Styrene, mass percentage of polymer resin	per tolerance	N/A	10% max	
A.2.3	Inorganic fillers, mass percentage of polymer resin.	per tolerance	N/A	20% max	
	Shrink additives, mass percentage of polymer resin.	per tolerance	N/A	20% max	
A.2.4	Fiber Content	ASTM D3171 or ASTM D2584	3	Sufficient to meet mechanical properties	
A.2.5	Glass Transition Temperature	ASTM E1640	3	> Max Design Temperature	

Table A.5.4.b PV Reported Baseline Mechanical Properties

(Conducted by an independent laboratory. Samples as Manufactured w/o additional conditioning per Section A.3)

						Independent Lab Reported Values			
Section No.	Direction	Characteristic	Applicable Test Standard	No. of Samples	Minumum Allowable Values	Sample 1	Sample 2	Sample 3	Avg Value
A.3.1	1	Tensile Strength	ASTM D3039	3	10000 (psi)				
		Tensile Modulas of Elasticity			800000 (psi)				
		Ultimate Tensile Strain			0.003 in/ in				
	2	Tensile Strength		3	10000 (psi)				
		Tensile Modulas of Elasticity			800000 (psi)				
		Ultimate Tensile Strain			0.003 in/ in				
A.3.4	1	Compressive Strength	ASTM D6641	3	22000 (psi)				
		Ultimate Compressive Strain			0.003 in/ in				
	3	Compressive Strength		3	22000 (psi)				
		Ultimate Compressive Strain			0.003 in/ in				

Table A.5.4c PV Reported Mechanical Properties after 1000 hr. Moisture Immersion Condidtioning per Section A.4.1

(Conducted by an independent laboratory)

						Independent Lab Reported Values			
Section No.	Direction	Characteristic	Applicable Test Standard	No. of Samples	Minumum Allowable Values	Sample 1	Sample 2	Sample 3	Avg Value
A.3.1	1	Tensile Strength	ASTM D3039	3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
	2	Tensile Strength		3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
A.3.4	1	Compressive Strength	ASTM D6641	3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				
	3	Compressive Strength		3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				

Table A.5.4d PV Reported Mechanical Properties after 1000 hr. of Alkaline Environment Conditioning per Section A.4.2

(Conducted by an independent laboratory)

						Independent Lab Reported Values			
Section No.	Direction	Characteristic	Applicable Test Standard	No. of Samples	Minumum Allowable Values	Sample 1	Sample 2	Sample 3	Avg Value
A.3.1	1	Tensile Strength	ASTM D3039	3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
	2	Tensile Strength		3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
A.3.4	1	Compressive Strength	ASTM D6641	3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				
	3	Compressive Strength		3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				

Table A.5.4e PV Reported Mechanical Properties after UV Light Conditioning per Section A.4.3 (ASTM G154).

(Conducted by an independent laboratory)

						Independent Lab Reported Values			
Section No.	Direction	Characteristic	Applicable Test Standard	No. of Samples	Minumum Allowable Values	Sample 1	Sample 2	Sample 3	Avg Value
A.3.1	1	Tensile Strength	ASTM D3039	3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
	2	Tensile Strength		3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
A.3.4	1	Compressive Strength	ASTM D6641	3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				
	3	Compressive Strength		3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				

Table A.5.4f PV Reported Mechanical Properties after 100 Freeze-Thaw Cycle Conditioning per Section A.4.4 (ASTM C666).

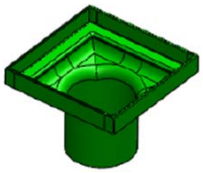
(Conducted by an independent laboratory)

						Independent Lab Reported Values			
Section No.	Direction	Characteristic	Applicable Test Standard	No. of Samples	Minumum Allowable Values	Sample 1	Sample 2	Sample 3	Avg Value
A.3.1	1	Tensile Strength	ASTM D3039	3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
	2	Tensile Strength		3	8500 (psi)				
		Tensile Modulas of Elasticity			680000 (psi)				
		Ultimate Tensile Strain			0.0025 in/in				
A.3.4	1	Compressive Strength	ASTM D6641	3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				
	3	Compressive Strength		3	18700 (psi)				
		Ultimate Compressive Strain			0.0025 in/in				

SPECIAL PROVISION
SECTION 502
STRUCTURAL CONCRETE
(Fiber Reinforced Polymer Bridge Drains)

APPENDIX B

Standard Details



Bridge Drain – Symmetric Inlet

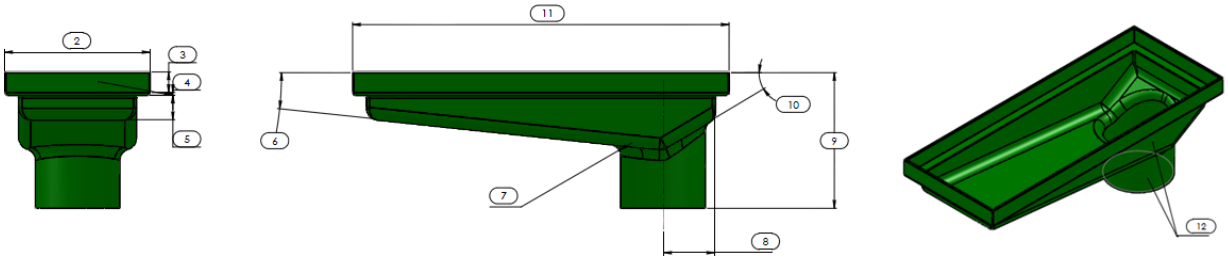
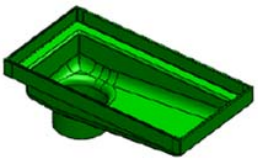


Table B1 Preferred Symmetric FRP Composite Inlet Bodies

	Size Designation	A	B	C		
	Size Dimensions (Grate Length x Width, Down Spout Diameter)	12x12xØ8	14x14xØ10	18x18xØ12		
Dimension		Nominal Dimensions			Nominal Design Tolerance	Manufacturing Tolerance
Number	Name					
1	Down Spout Inner Diameter	8"	10"	12"	min	+/- 0.015"
2	Grate Frame Width	12"	14"	18"	+/- 1"	+/- 0.025"
3	Grate Frame Height	As required to contain grate and recessed from deck surface				
4	Grate Frame Flange & Wall Thickness	0.25"	0.25"	0.25"	min	+/- 0.025"
5	Scupper Toe Depth	4"	4"	4"	+1"/-0"	+/- 0.1"
6	Scupper Toe Slope	1:10	1:10	1:10	min	+ 1 degree
7	Scupper Body Radii	2"	2"	2"	min	+0.1"
8	Down Spout Position to Heel	6"	6"	6"	+/- 0.5"	
9	Height	18"	18"	18"	Open	+/- 0.25"
10	Scupper Heel Slope	1:10	1:10	1:10	min	+0.1"
11	Grate Frame Length	12"	14"	18"	+/- 1"	+/- 0.025"
12	Scupper and Down Spout Wall Thickness	0.25"	0.25"	0.25"	min	+0.015"



Bridge Drain-Offset Scupper

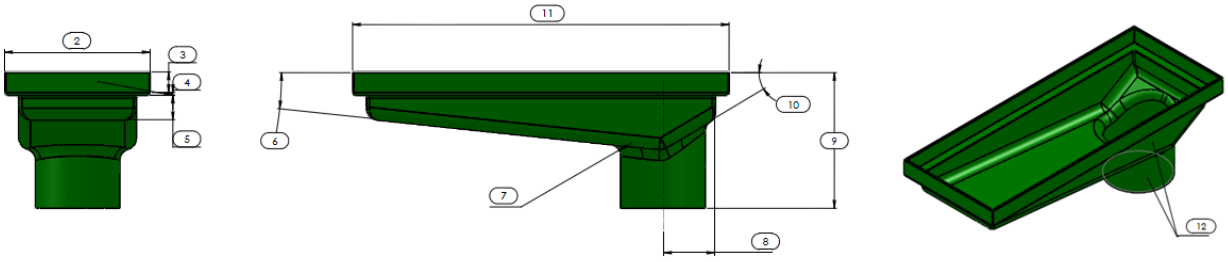
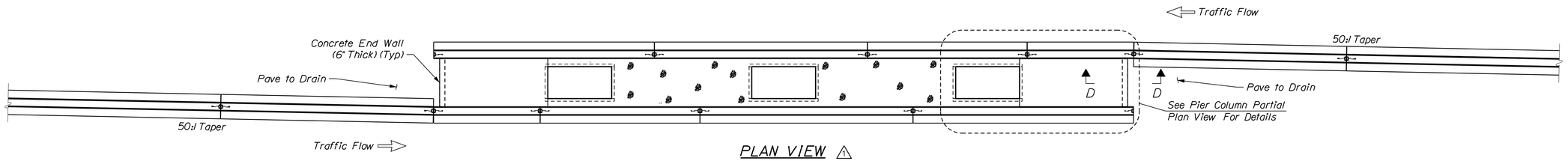
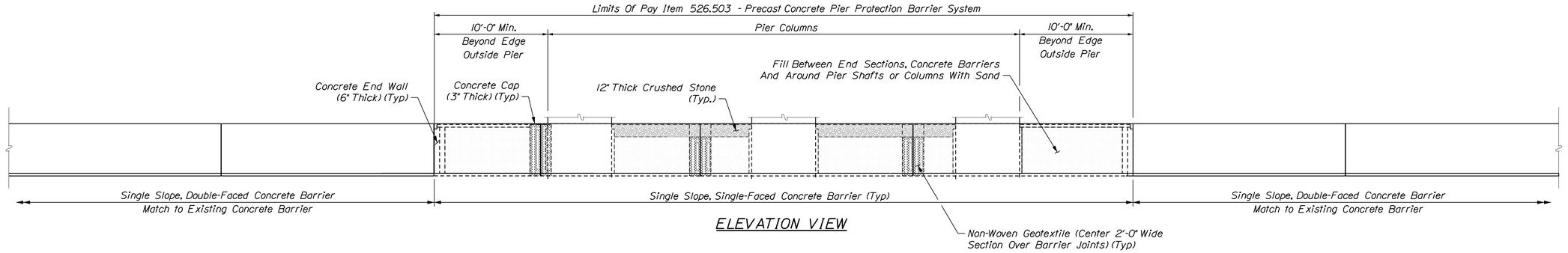


Table B2 Preferred Offset FRP Composite Scupper Bodies

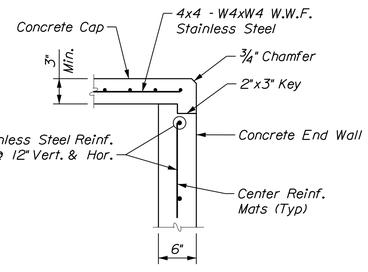
	Size Designation	D	E	F	G		
	Size Dimensions (Grate Length x Width, Down Spout Diameter)	24x12xØ8	30x12xØ10	36x12xØ10	42x12xØ12		
Dimension Number	Dimension Name	Nominal Dimensions				Nominal Design Tolerance	Manufacturing Tolerance
1	Down Spout Inner Diameter	8"	10"	10"	12"	min	+/- 0.015"
2	Grate Frame Width	12"	12"	12"	12"	+ 2"/-0"	+/- 0.025"
3	Grate Frame Height	As required to contain grate and recessed from deck surface					
4	Grate Frame Flange & Wall Thickness	0.25"	0.25"	0.25"	0.25"	min	+/- 0.025"
5	Scupper Toe Depth	4"	4"	4"	4"	+1"/-0"	+/- 0.1"
6	Scupper Toe Slope	1:10	1:10	1:10	1:10	min	+ 1 degree
7	Scupper Body Radii	2"	2"	2"	2"	min	+0.1"
8	Down Spout Position to Heel	6"	6"	6"	6"	+/- 0.5"	
9	Height	13.5"	16"	18"	18"	Open	+/- 0.25"
10	Scupper Heel Slope	1:10	1:10	1:10	1:10	min	+0.1"
11	Grate Frame Length	24"	30"	36"	42"	+ 2"/-0"	+/- 0.025"
12	Scupper and Down Spout Wall Thickness	0.25"	0.25"	0.25"	0.25"	min	+0.015"



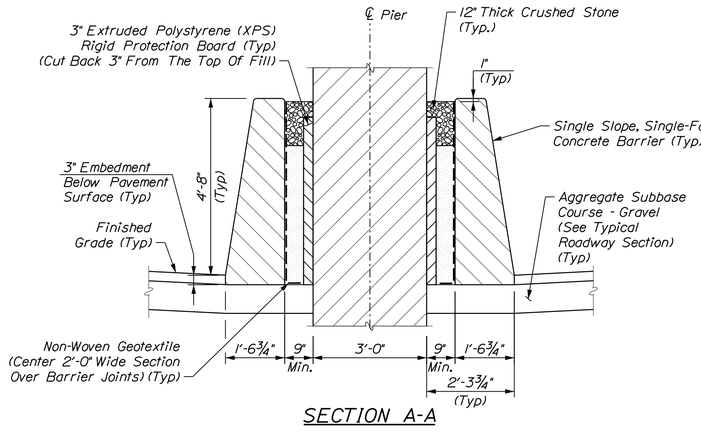
PLAN VIEW ⚠1



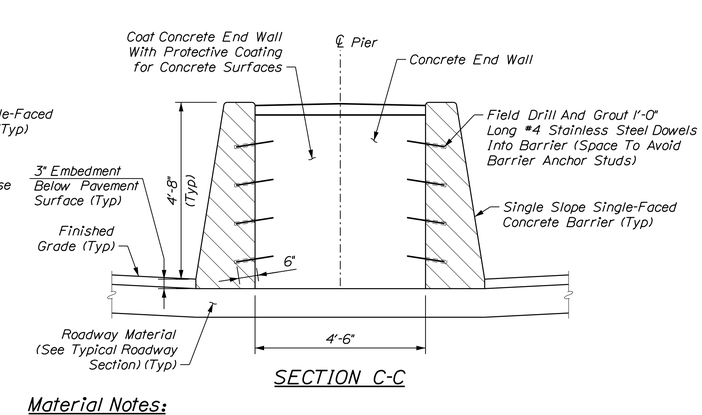
ELEVATION VIEW



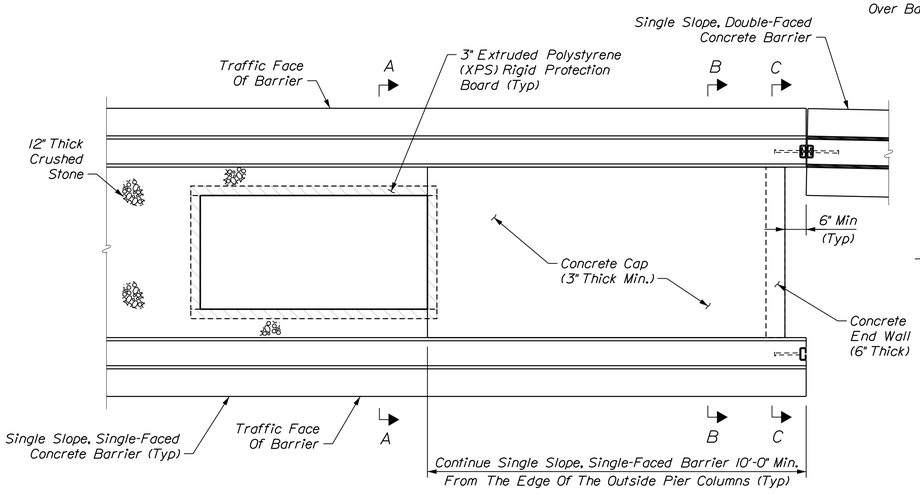
SECTION D-D



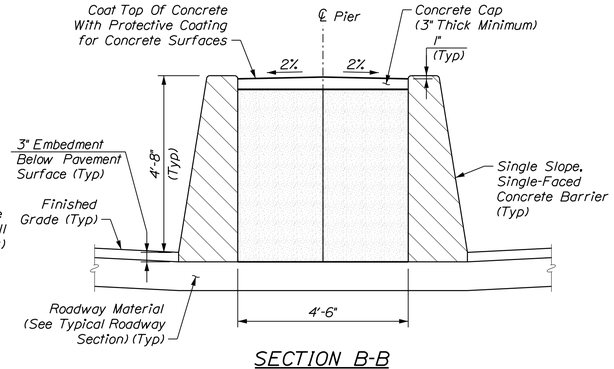
SECTION A-A



SECTION C-C



PIER COLUMN PARTIAL PLAN VIEW ⚠



SECTION B-B

Material Notes:

1. The precast concrete barriers shall be Class LP concrete.
2. All reinforcing steel shall be stainless steel.
3. ⚠1 I-Beams and Structural Tubes shall be ASTM A36 or A572 galvanized after fabrication.
4. Crushed Stone shall meet the requirements of Section 703.13.
5. Sand shall meet the requirements of Section 703.05.
6. ⚠1 Each barrier unit shall include one S 3x7.5.

Notes:

1. Barrier layout shown is for protection of piers, shafts or other structures located in the median. For barrier details see Single Slope, Single-Faced Concrete Barrier Details on Sheet 66.
2. The Single Slope, Single-Faced Concrete Barrier shall extend a minimum of 10'-0" beyond the edge of outside pier columns.
3. Except as otherwise shown, free draining material, sand, shall be placed behind the concrete barrier for the full depth. Flowable fill shall not be placed behind the barrier.
4. Single Slope, Double-Faced Concrete Barrier will be paid for under pay item 526.50 - Precast Concrete Barrier Type 11.
5. Single Slope, Single-Faced Concrete Barrier, sand fill, stone fill, XPS rigid protection board, non-woven geotextile, concrete cap, concrete end wall, and all incidentals required to construct the pier protection will be paid for under item 526.503-Precast Concrete Pier Protection Barrier System.
6. ⚠1 Slots in Structural Tubes shall be cut with mechanically guided means to a smooth, uniform surface meeting a surface roughness of 25 μ or better (ANSI 846.1).

McFarland Johnson

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1872(200)

WIN 018722.00

BRIDGE NO. 5790

BRIDGE PLANS

	BY	DATE
PROJ. MANAGER	M. PARLIN	
DESIGN-DETAILED	T. AGUILAR	07-19
CHECKED-REVIEWED	B. COLBURN	07-19
DESIGN2-DETAILED2	T. MCAULIFFE	
DESIGN3-DETAILED3		
REVISIONS 1	CONNECTION DETAILS ⚠1	9/27/19
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

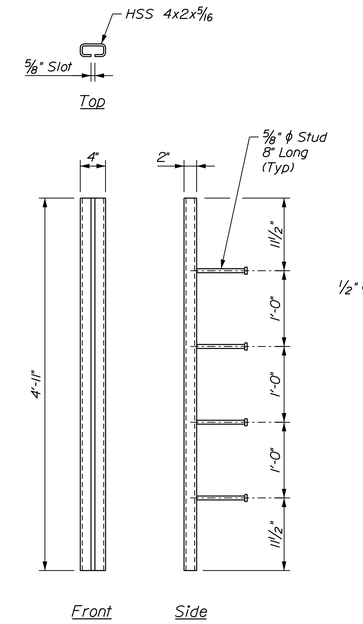
DATE

OHIO STREET BRIDGE
INTERSTATE 95
PENOBSCOT COUNTY
BANGOR

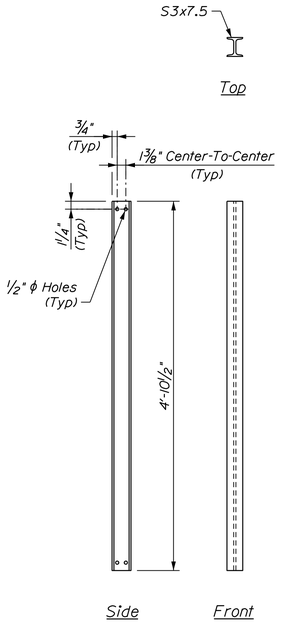
MEDIAN BARRIER DETAILS

SHEET NUMBER
65
OF 73

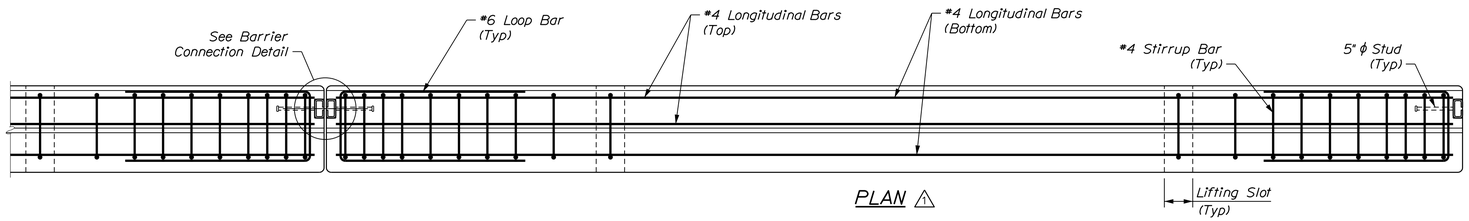
Filename: ...\065_Median_Barrier_Details.dgn Division: Username: Date:9/27/2019



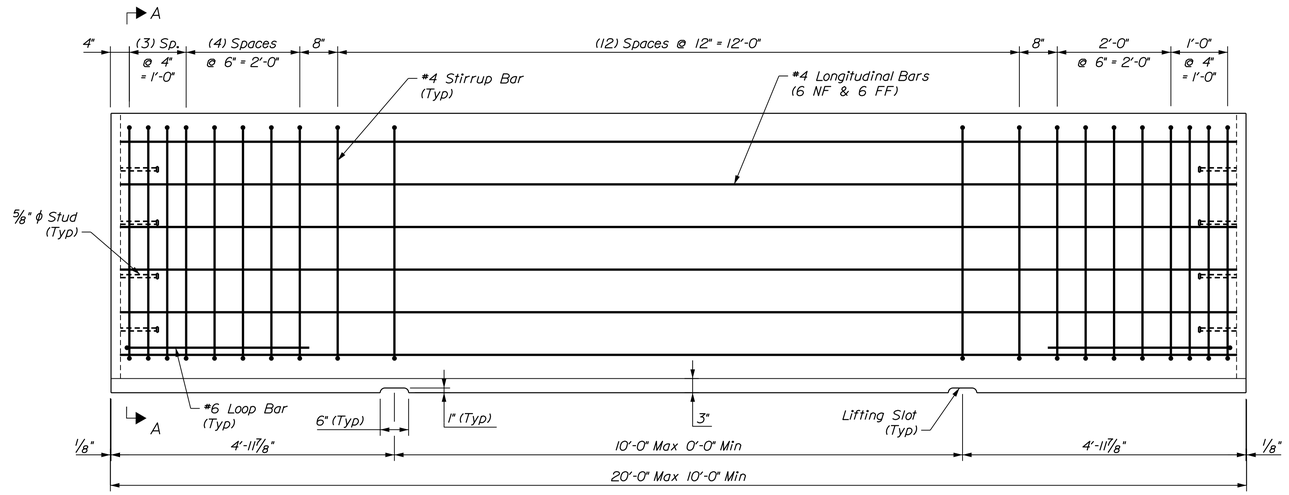
STRUCTURAL SECTION DETAILS ⚠



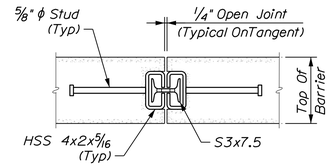
I-BEAM DETAILS ⚠



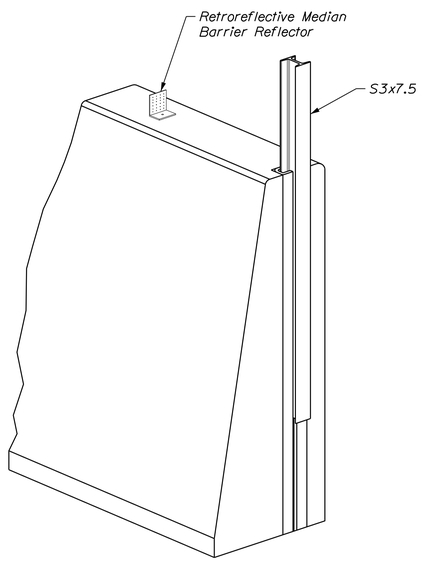
PLAN ⚠



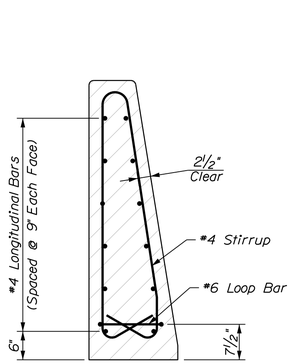
ELEVATION ⚠



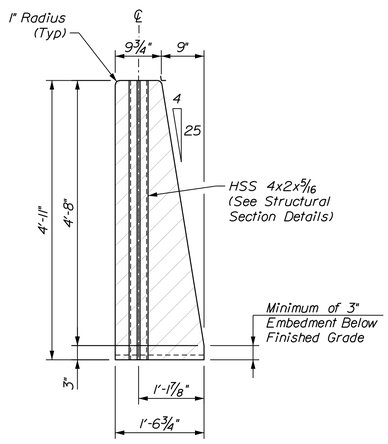
BARRIER CONNECTION DETAIL ⚠



PERSPECTIVE VIEW ⚠



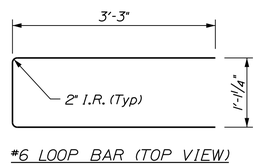
SECTION A-A
REINFORCEMENT)



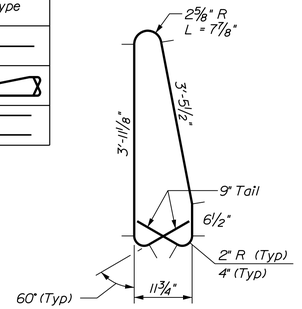
END VIEW (MASONRY) ⚠

CONCRETE BARRIER REINFORCING SCHEDULE *

Description	Size	No.	Unbent Length	Type
Longitudinal (Each Face)	#4	12	19'-8"	
Stirrups	#4	29	10'-9"	
Loop Bar	#6	2	7'-3 1/2"	



#6 LOOP BAR (TOP VIEW)



#4 STIRRUP BAR

* - Quantities Based On 20'-0" Barrier Length.

Reinforcing bar dimensions were developed based on stainless steel reinforcing. No other types of reinforcing bar shall be substituted in lieu of stainless steel reinforcing bar.

Note: See sheet 65 for notes.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1872(200)

WIN 018722.00

BRIDGE NO. 5790

BRIDGE PLANS

PROJ. MANAGER	M. PARLIN		
DESIGN-DETAILED	T. AGUILAR		
CHECKED-REVIEWED	B. COLBURN	T. MCAULIFFE	07-19
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1	CONNECTION DETAILS	M. PARLIN	9/27/19
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

OHIO STREET BRIDGE
INTERSTATE 95
PENOBSCOT COUNTY
BANGOR

SINGLE SLOPE, SINGLE-FACED CONCRETE BARRIER DETAILS

SHEET NUMBER

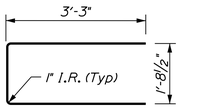
66

OF 73

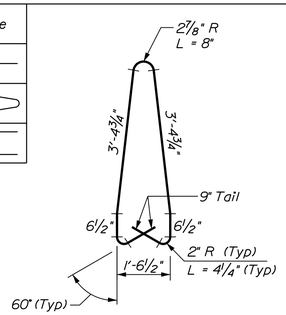
McFarland Johnson

Filename: ...\066_Single_Slope_Single-Faced_Barrier_Details.dgn Username: Date:9/27/2019

CONCRETE BARRIER REINFORCING SCHEDULE *				
Description	Size	No.	Unbent Length	Type
Longitudinal (Each Face)	#4	12	19'-7"	
Stirrups	#4	29	10'-9"	
Loop Bar	#6	2	8'-2½"	



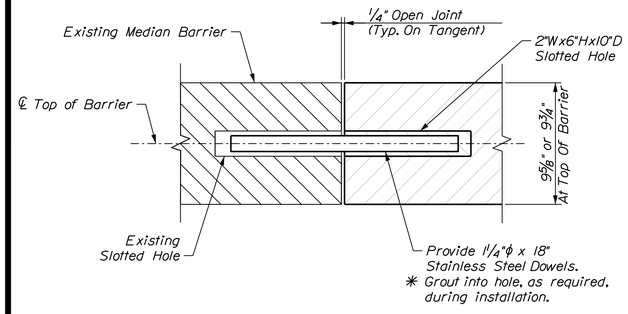
#6 LOOP BAR (TOP VIEW)



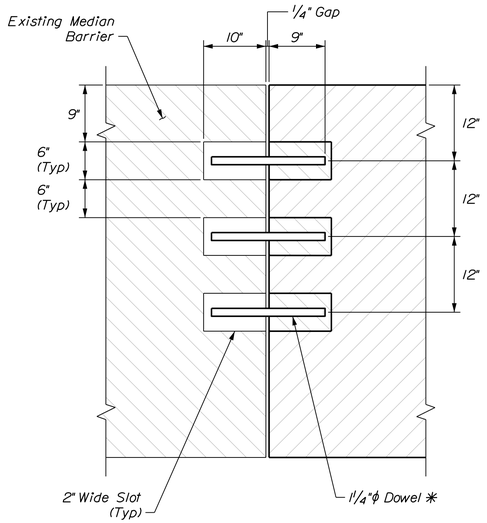
#4 STIRRUP BAR

* - Quantities Based On 20'-0" Barrier Length.

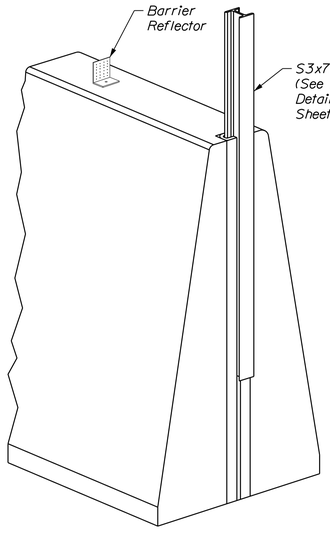
Reinforcing bar dimensions were developed based on stainless steel reinforcing. No other types of reinforcing bar shall be substituted in lieu of stainless steel reinforcing bar.



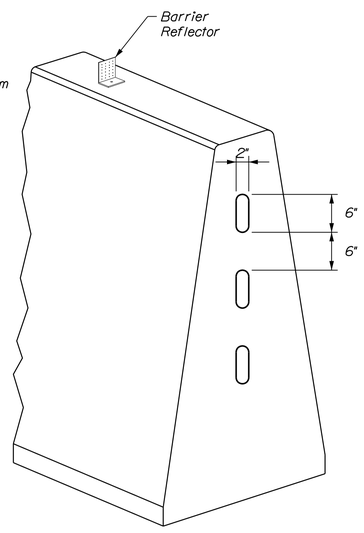
SECTION B-B



SECTION C-C

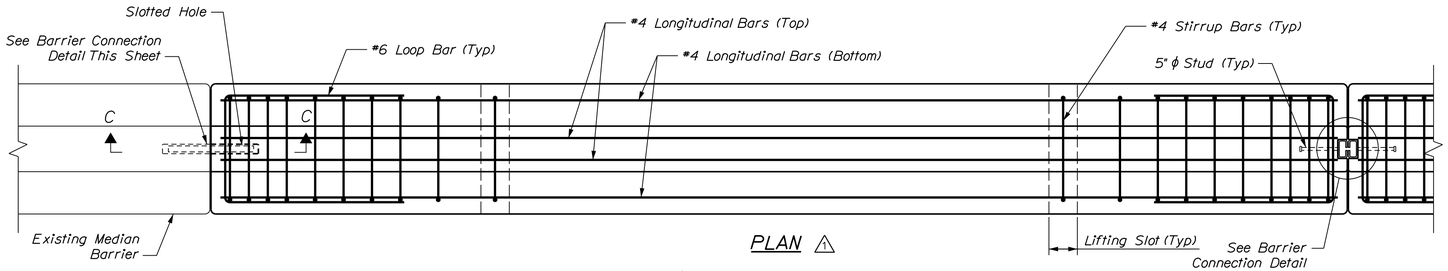


PERSPECTIVE VIEW ⚠

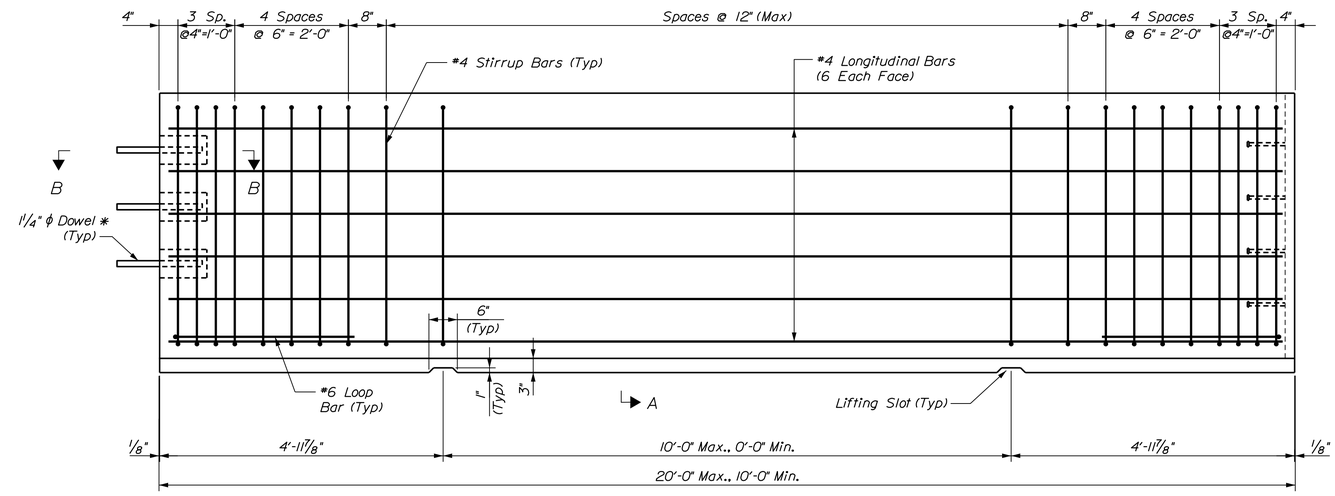


PERSPECTIVE VIEW
(Slotted End At Interface With Existing Barrier)

BARRIER CONNECTION DETAILS



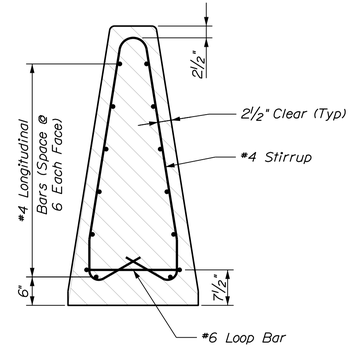
PLAN ⚠



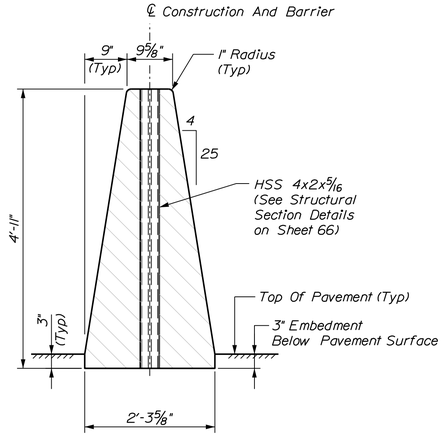
ELEVATION ⚠

SPACING OF REFLECTORS	
Radius Of Horizontal Curve	℄ To ℄ Distance Between Reflectors
Less Than 2000'	115'
2000' To 3000'	130'
3000' To 5000'	160'
Over 5000'	200'
Tangent Area	200'

TABLE 1



SECTION A-A (REINFORCEMENT)



END VIEW (MASONRY) ⚠

Note: See sheet 65 for notes.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1872(200)

WIN 018722.00

BRIDGE NO. 5790

BRIDGE PLANS

PROJ. MANAGER	M. PARLIN			
DESIGN-DETAILED	T. AGUILAR	D. DeMAGLO	07-19	SIGNATURE
CHECKED-REVIEWED	B. COLBURN	T. MCAULIFFE	07-19	
DESIGN-DETAILED2				P.E. NUMBER
DESIGN-DETAILED3				
REVISIONS 1	CONNECTION DETAILS ⚠		9/27/19	DATE
REVISIONS 2				
REVISIONS 3				
REVISIONS 4				
FIELD CHANGES				

OHIO STREET BRIDGE
INTERSTATE 95
BANGOR PENOBSCOT COUNTY

SINGLE SLOPE, DOUBLE-FACED CONCRETE BARRIER DETAILS

SHEET NUMBER
67
OF 73

McFarland Johnson

Date:9/27/2019
Username:
Filename: ...\067_Single_Slope_Double-Faced_Barrier_Details.dgn