STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

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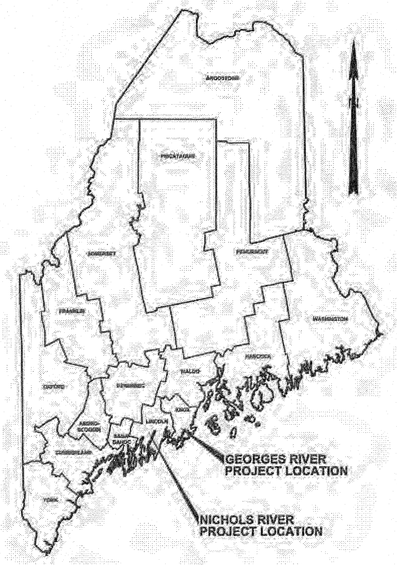
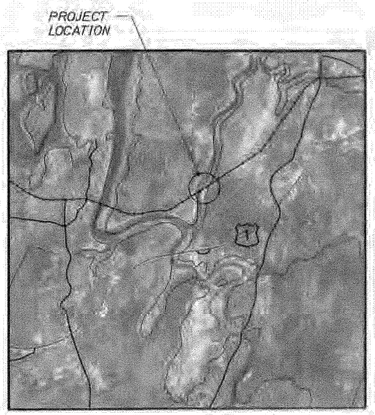
TOWN OF NEWCASTLE
LINCOLN COUNTY &
TOWNS OF WARREN-THOMASTON
KNOX COUNTY

NICHOLS RIVER BRIDGE #7655 &
GEORGES RIVER BRIDGE #7667

SUBSTRUCTURE IMPROVEMENTS PROJECT

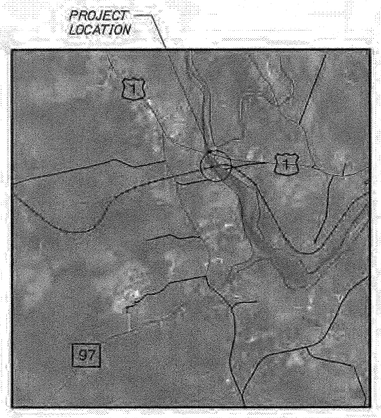
MAINEDOT WIN: 022920.00





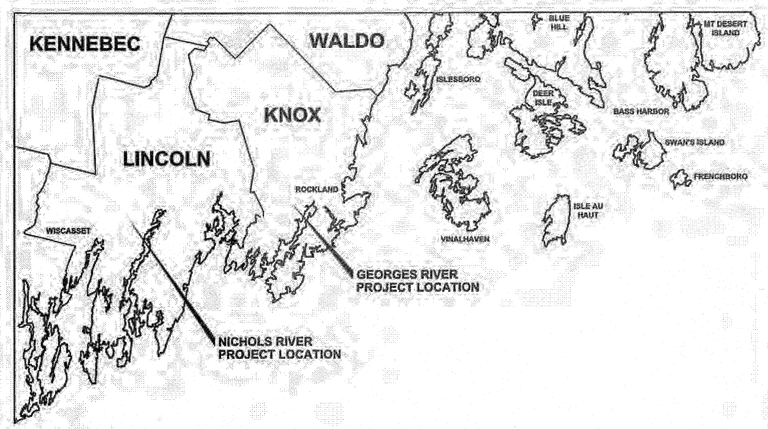
NICHOLS RIVER BRIDGE
LOCATION MAP

1/2 0 1/2
Scale in Miles



GEORGES RIVER BRIDGE
LOCATION MAP

1/2 0 1/2
Scale in Miles



WIN 022920.00

HNTB

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

APPROVED

COMMISSIONER: [signature] DATE 1-9-2020

CHIEF ENGINEER: [signature] DATE 1-9-2020

STATE OF MAINE CRAIG R. MORIN 10209 LICENSED PROFESSIONAL ENGINEER

SIGNATURE [signature] DATE 11/01/19

P.E. NUMBER 10209

PROJECT INFORMATION	
PROGRAM	MULTIMODAL
PROJECT MANAGER	MATE BENOIT, P.E.
DESIGNER	CRAIG R. MORIN, P.E.
CONSULTANT	HNTB CORPORATION
PROJECT RESIDENT	
CONTRACTOR	
PROJECT COMPLETION DATE	

NICHOLS RIVER AND GEORGES RIVER BRIDGES
SUBSTRUCTURE IMPROVEMENTS PROJECT

TITLE SHEET

SHEET NUMBER

G01

1 OF 8

Filename: 001_Title.dgn Division: Username: Date:11/1/2019

GENERAL NOTES

1. These notes contain general information and are not complete for construction purposes. Contractor shall verify information given here with specifications and other drawings and bring any conflicts to the Engineer's attention before beginning work.

2. All dimensions and details shall be verified by the Contractor prior to construction.

3. Contractor shall provide and maintain horizontal and vertical controls in the Maine state plane coordinate system.

4. The Contractor shall daily monitor all piers and abutments for movement in a manner approved by the Resident for the duration of work on each substructure unit. The Contractor shall establish benchmarks on each substructure unit prior to beginning repairs on that unit and shall keep a daily log of the movement of each substructure unit while work progresses on that unit. The log shall be available for review by the Resident. If at any time there is more than 1/2" of movement for a substructure unit, the Contractor shall stop work immediately and notify the Resident.

5. Project info referred to below may be accessed at the following MaineDOT web address: http://www.maine.gov/mdot/contractors/#projectbl

6. The existing bridge plans may be accessed at the MaineDOT web address. The plans are reproductions of the original drawings as prepared for the construction of the bridge. It is unlikely that the plans will show any construction field changes or any alterations which may have been made to the bridge during its life span.

7. Quantities included for pay items measured and paid for by Lump Sum are estimated quantities and are provided by MaineDOT for informational purposes only. Lump Sum pay items will be paid for at the Contract Bid amount, with no addition or reduction in payment to the Contractor if the actual final quantities are different from the MaineDOT provided estimated quantities, except as follows:

   a. If a Lump Sum pay item is eliminated, the requirements of Standard Specifications Section 109.2, Elimination of Items, will take precedence.

   b. If other Contract Documents specifically allow a change in payment for a Lump Sum pay item, those requirements will be followed.

   c. If a design change results in changes to estimated quantities for Lump Sum pay items, price adjustments will be made in accordance with Standard Specifications Section 109.7, Equitable Adjustments to Compensation.

8. All work shall be done in accordance with the Maine Department of Transportation's Best Management Practices for Erosion Control & Sediment Control, February 2008.

9. The Contractor is responsible for any damage caused to the existing bridges as a result of any construction activities. Due to the advanced deterioration of some substructure locations resulting in loose and unstable granite stones, the Contractor may decide to use rock coring instead of hammer drilling when installing anchor rods. The Contractor is responsible for modifying the embedment depth shown on the plans to follow the grout Manufacturer's recommended embedment depth for this method of installation.

SPECIFICATIONS AND CODES

1. These drawings form part of the contract documents. Refer to the project specifications for additional requirements.

2. State of Maine, Department of Transportation, Standard Specifications, November 2014. Including all supplemental specifications and special provisions.

3. Codes and other references
   A. AREMA, Manual for Railway Engineering, 2017 edition
   B. AASHTO LRFD specifications, 8th edition, 2017 with interims
   C. AWS, D1.5, "Bridge Welding Code", 2015 edition

STRUCTURAL STEEL AND MISCELLANEOUS STEEL FABRICATIONS

1. Steel shapes and plates shall be ASTM A709, Grade 36 typical, ASTM A709 Grade 50 where noted.

2. All bolts shall conform to ASTM F3125, Grade A325 and be hot-dip galvanized in accordance with ASTM A153. Set anchor bolts by template only. Nuts shall be A563, Grade DH and be hot-dip galvanized in accordance with ASTM A153.

3. All miscellaneous steel shall be hot-dip galvanized. Galvanize items after fabrication. Stress relieve bends before galvanizing. Galvanizing damaged accidentally or due to field welding shall be repaired in accordance with A780.

4. Welding Electrodes: E70XX, Low Hydrogen

5. All welding shall be in accordance with the requirements of the structural welding code, D1.5 and D3.6, of the American Welding Society (AWS).

LEGEND:

℄	Baseline
ℙ	Plate
℄	Centerline
ϕ	Diameter

ABBREVIATIONS:

EA	Each
EL	Elevation In Feet
K (KIP)	1000 Pounds
LBS	Pounds
LF	Linear Feet
MAX	Maximum
MIN.	Minimum
NA	Not Applicable/Available
NTS	Not To Scale
OC	On Center
PSF	Pounds Per Square Foot
R	Radius
REF	Reference
SCHD.	Schedule
SF	Square Feet
TYP.	Typical
UON	Unless Otherwise Noted

ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
504.8120	Structural Steel Repair (119,000 LB)	1	LS
523.52	Bearing Installation	2	EA
523.5307	Repair Fixed Bearing	10	EA
523.5308	Repair Expansion Bearing	12	EA
523.5402	Laminated Elastomeric Bearings, Expansion	2	EA
525.26	Repointing Granite Masonry	4550	SF
629.05	Hand Labor, Straight Time	40	HR
631.173	Rail Operated Truck - Large (Including Operator)	40	HR
631.36	Foreperson	40	HR
639.20	Field Office, Type C	1	EA
656.75	Temporary Soil Erosion and Water Pollution Control	1	LS
659.10	Mobilization	1	LS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN 022920.00

7667 & 7655

		BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED	J. Yallones	P. Bishop	10\19
CHECKED-REVIEWED	C. Morin		10\19
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

GEORGES RIVER AND NICHOLS RIVER
BRIDGES

GENERAL NOTES AND
ESTIMATED QUANTITIES

SHEET NUMBER

G02

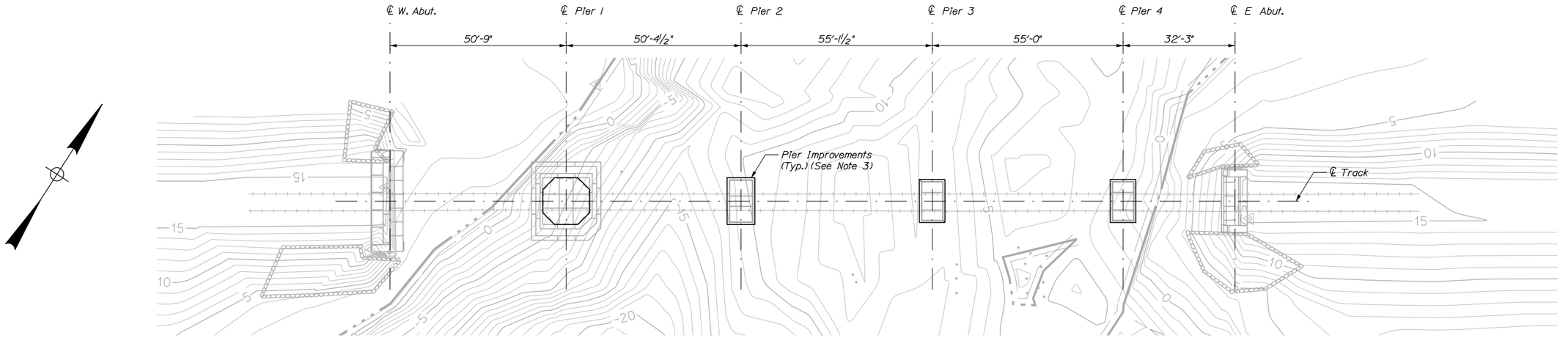
2 OF 8

HNTB

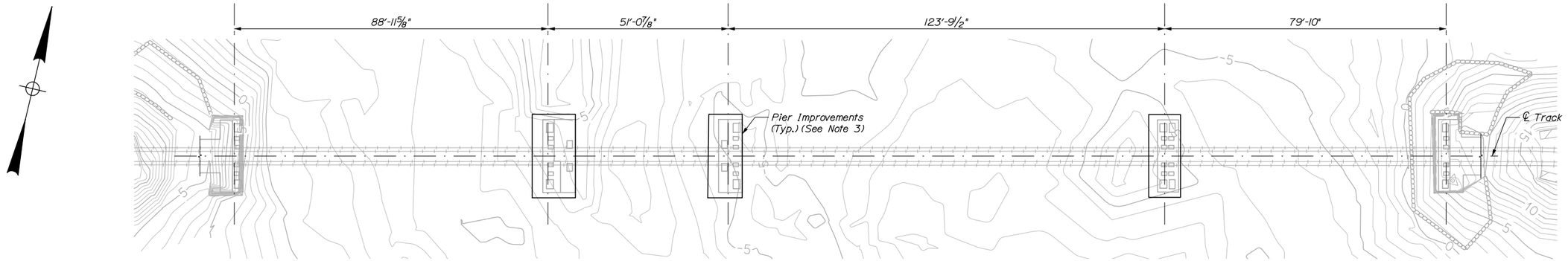
Date:1/22/2020

Username:

Filename: 002_General Notes & Estimated Quantities.dgn
Division:



NICHOLS RIVER PLAN VIEW



GEORGES RIVER PLAN VIEW

NOTES:

1. ℄ Track, ℄ Piers and ℄ Bearings shown are approximate.
2. North arrow is shown for clarity and is approximate.
3. Pier improvements shall consist of steel channels attached horizontally to the perimeter of each stone course. See Sheets S02 - S04.
4. Contours shown reference NAVD 88 Vertical Datum.

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STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN
022920.00

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SIGNATURE

P.E. NUMBER

DATE

	BY	DATE
PROJ. MANAGER	J. Yallones	
DESIGN-DETAILED	P. Bishop	10\19
CHECKED-REVIEWED	C. Morin	10\19
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

GEORGES RIVER AND NICHOLS RIVER
BRIDGES

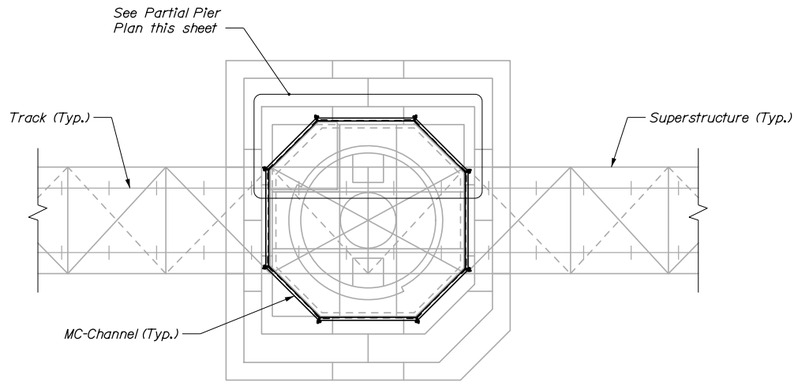
PLAN VIEWS

SHEET NUMBER

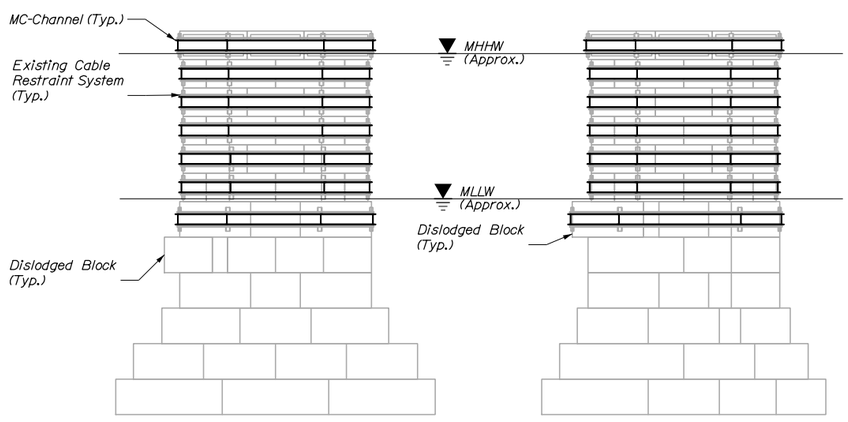
S01

3 OF 8

Filename: 003_Plan View - Combined.dgn Division: Username: Date:11/1/2019

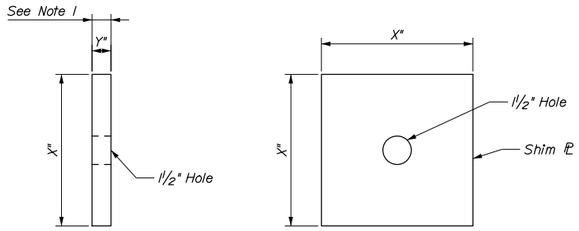


PIER I PLAN
3/16" = 1'-0"



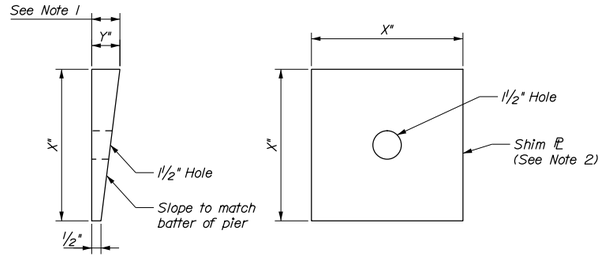
PIER I SIDE ELEVATION
3/16" = 1'-0"

PIER I FRONT ELEVATION
3/16" = 1'-0"



SIDE VIEW FRONT VIEW

SQUARE PLATE



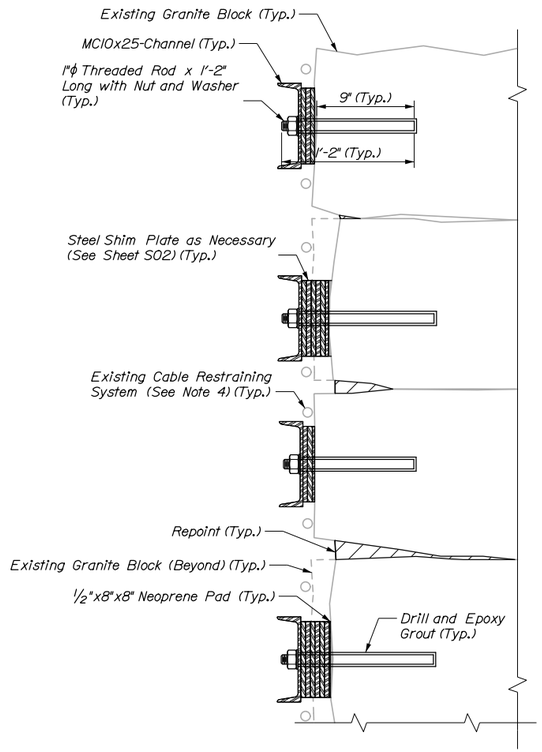
$$Y" = \tfrac{1}{2}" + \frac{1}{\text{Pier Batter Slope}} * X"$$

SIDE VIEW FRONT VIEW

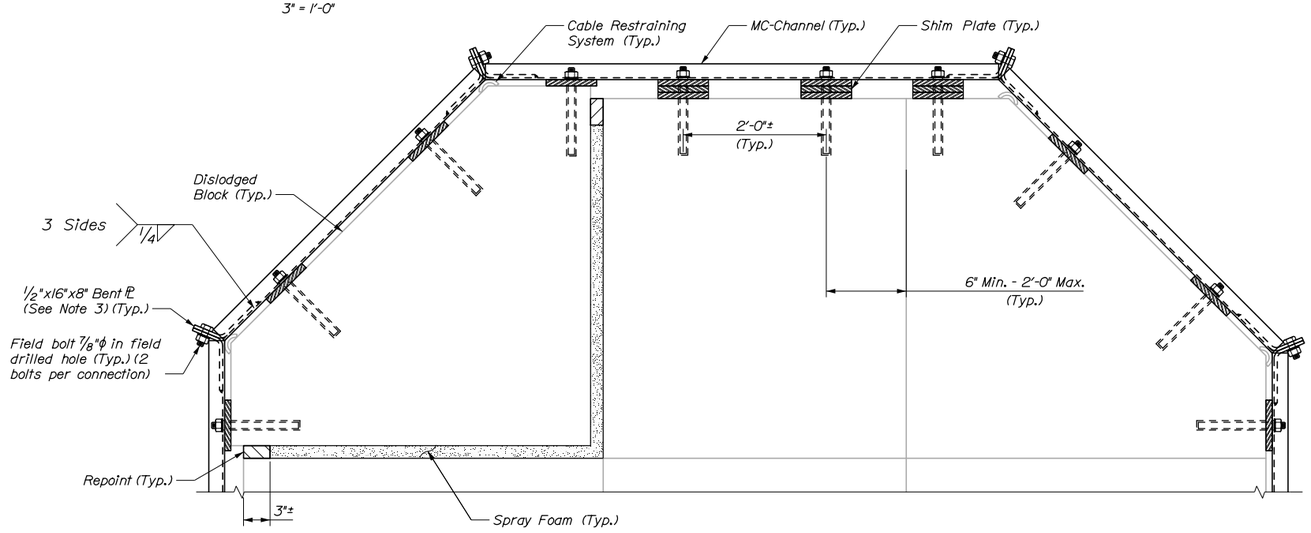
BEVELED PLATE

* Shim Plates dimensions to be determined based on field measurements of existing cable restraining system, otherwise assumed 8" by 8" square.

SHIM PLATES
3" = 1'-0"



ANCHORING DETAIL
(Blocks Shown Schematically)
1½" = 1'-0"



PARTIAL PIER PLAN
(Block Course Shown Schematically)
1" = 1'-0"

NOTES:

1. Shim plates shall be available in ½" or 1" and beveled thickness.
2. See Anchor Table on Sheet S03 for number of anchors per stone.
3. Contractor to determine angle of bent plate based on field conditions of substructure unit.
4. Existing Cable Restraining System not located at every course. Shim plates to be adjusted accordingly.

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STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN 022920.00

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	BY	DATE
DESIGN-DETAILED	J. Yaklones	10\19
CHECKED-REVIEWED	C. Morin	10\19
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

PROJ. MANAGER

SIGNATURE

P.E. NUMBER

DATE

GEORGES RIVER AND NICHOLS RIVER BRIDGES

NICHOLS RIVER SUBSTRUCTURE DETAILS I

SHEET NUMBER

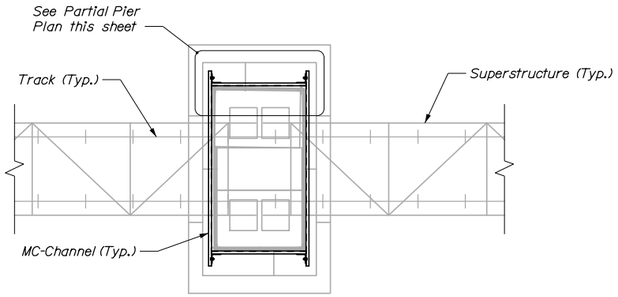
S02

4 OF 8

Date:11/1/2019

Username:

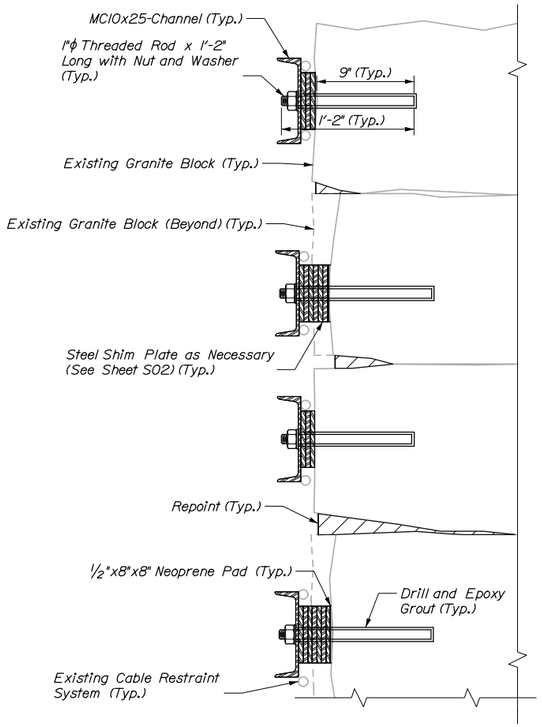
Filename: 004_Nichols River Substructure Repairs -Drawing.dgn



PIER 4 PLAN

3/16" = 1'-0"

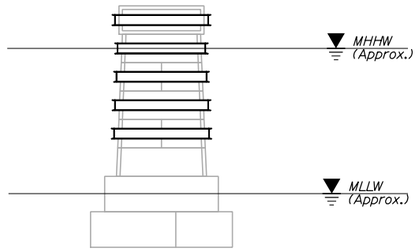
ANCHOR TABLE	
Stone Width	Number of Anchors
0'-0" - 1'-6"	0
1'-6" - 3'-6"	1
3'-6" - 5'-6"	2
5'-6" - 7'-6"	3
7'-6" - 9'-6"	4
9'-6" - 11'-6"	5



ANCHORING DETAIL

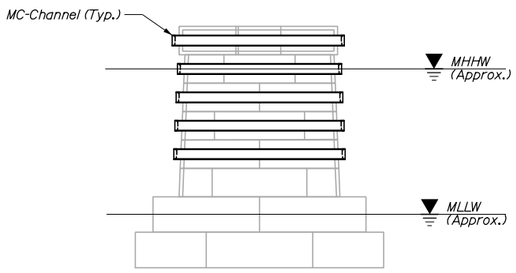
(Blocks Shown Schematically)

1 1/2" = 1'-0"



PIER 4 SIDE ELEVATION

3/16" = 1'-0"



PIER 4 FRONT ELEVATION

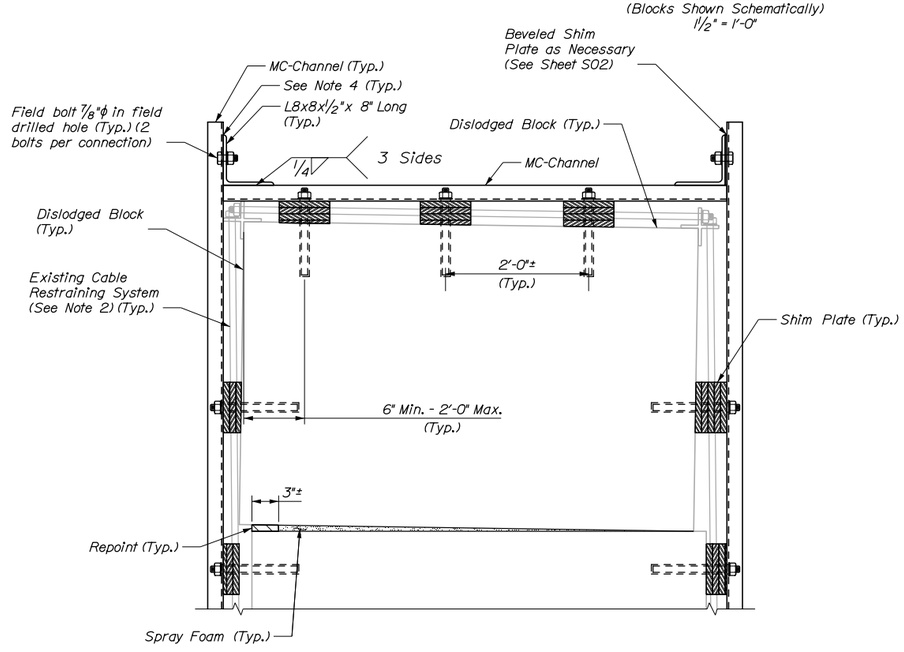
3/16" = 1'-0"

NOTES:

1. Pier 4 shown, Piers 2 & 3 similar.

2. Existing Cable Restraining System not located at every course. Shim plates to be adjusted accordingly.

3. Account for tolerance by either providing shims between angle and channels or providing extra shims between face of pier and channels.



PARTIAL PIER PLAN

(Block Course Shown Schematically)

1" = 1'-0"

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STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN 022920.00

7667 & 7655

PROJ. MANAGER			
DESIGN-DETAILED	J. Yatlones	P. Bishop	10\19
CHECKED-REVIEWED	C. Morin		
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

GEORGES RIVER AND NICHOLS RIVER BRIDGES

NICHOLS RIVER SUBSTRUCTURE DETAILS II

SHEET NUMBER

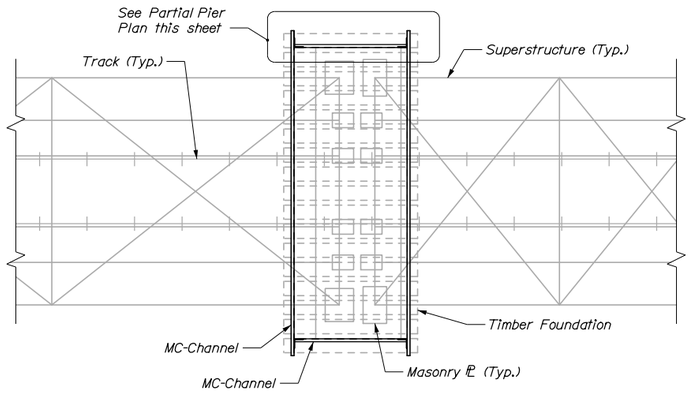
S03

5 OF 8

Date:11/1/2019

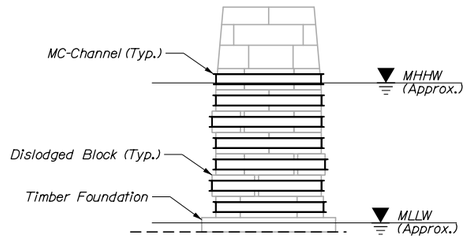
Username:

Filename: 005_Nichols River Substructure Repairs IIDrawing4.dgn



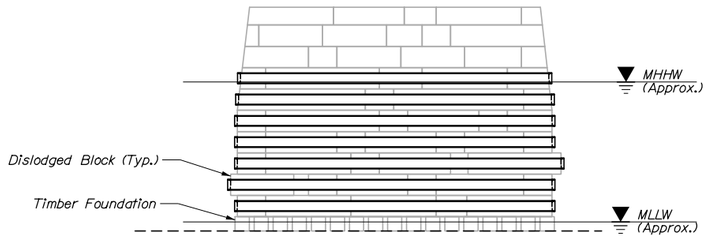
PIER 3 PLAN

3/16" = 1'-0"



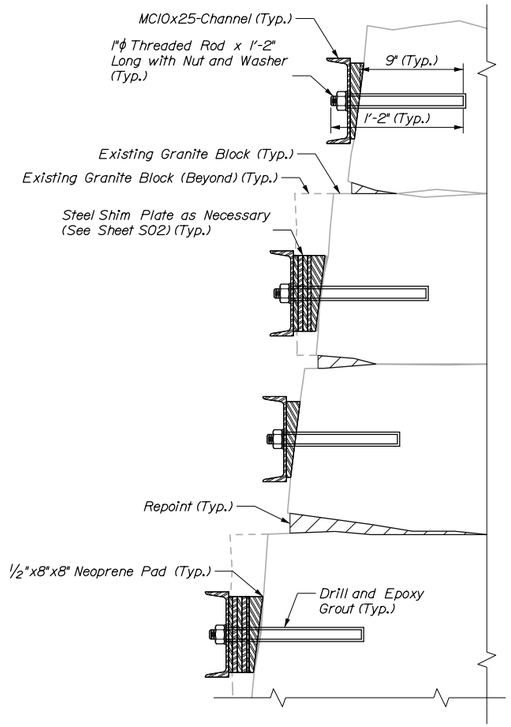
PIER 3 SIDE ELEVATION

3/16" = 1'-0"



PIER 3 FRONT ELEVATION

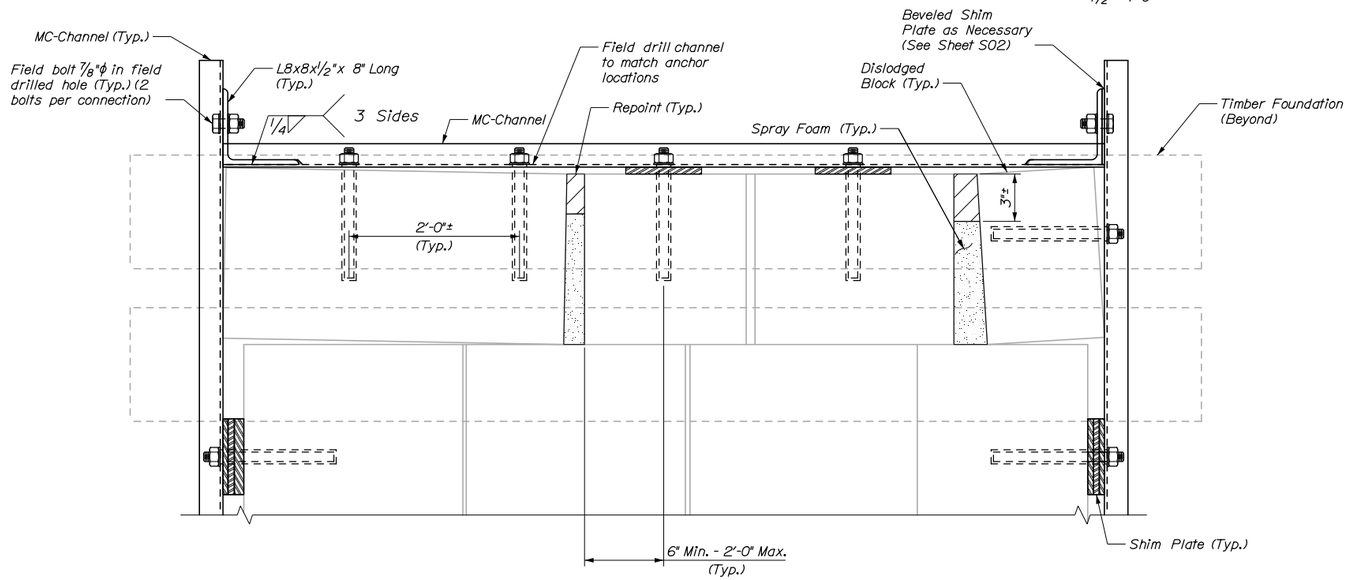
3/16" = 1'-0"



ANCHORING DETAIL

(Blocks Shown Schematically)

1 1/2" = 1'-0"



PARTIAL PIER PLAN

(Block Course Shown Schematically)

1 1/2" = 1'-0"

NOTES:

1. Pier 3 shown. Piers 1 and 2 similar.

2. Account for tolerance by either providing shims between angle and channels or providing extra shims between face of pier and channels.

3. See Anchor Table on Sheet S03 for number of anchors per stone.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN 022920.00

7667 & 7655

PROJ. MANAGER			
DESIGN-DETAILED	J. Yiatanes	10\19	
CHECKED-REVIEWED	C. Morin	10\19	
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

BY | DATE

SIGNATURE

P.E. NUMBER

DATE

GEORGES RIVER AND NICHOLS RIVER BRIDGES

GEORGES RIVER SUBSTRUCTURE DETAILS

SHEET NUMBER

S04

6 OF 8

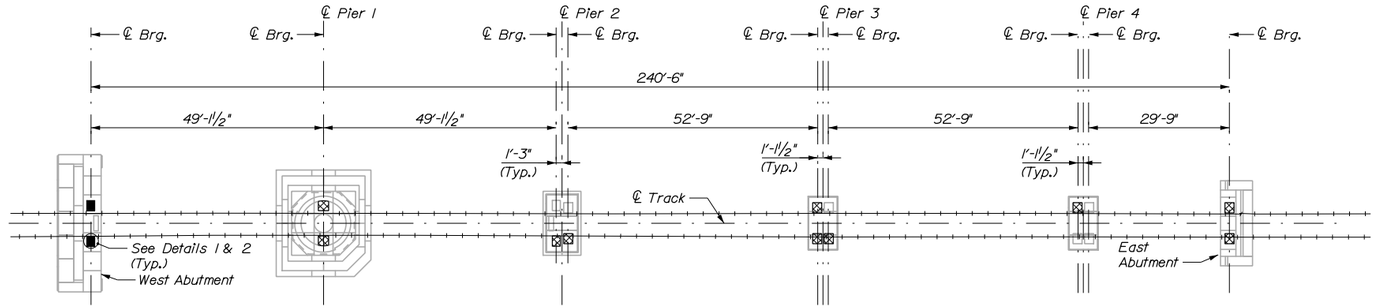
HNTB

Date:11/1/2019

Username:

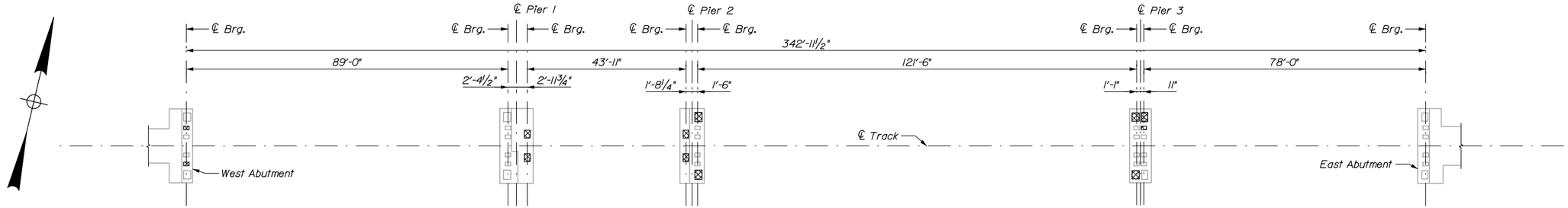
Filename: 006_Georges River Substructure Repairs.dgn

Division:



PLAN - NICHOLS RIVER

1/16" = 1'-0"



PLAN - GEORGES RIVER

1/16" = 1'-0"

LEGEND

- Bearing Replacement
- Bearing Clean, Recoat, and Shim

NOTES:

1. ℄ track, ℄ piers and ℄ bearings shown are approximate.
2. Bearings indicated for clean, recoat, and shim are based on most recent inspection report. Additional bearings may be included as needed.
3. North arrow is shown for clarity and is approximate.

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STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN 022920.00

7667 & 7655

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	J. Yalones	10\19
CHECKED-REVIEWED	C. Morin	10\19
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

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DATE

GEORGES RIVER AND NICHOLS RIVER BRIDGES

BEARING DETAILS I

SHEET NUMBER

S05

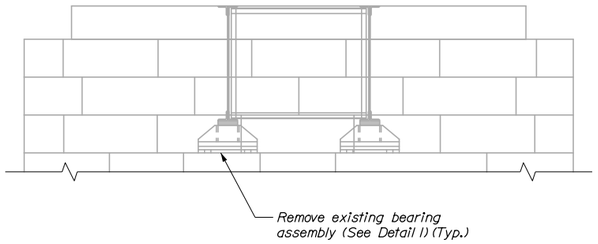
7 OF 8

Username:

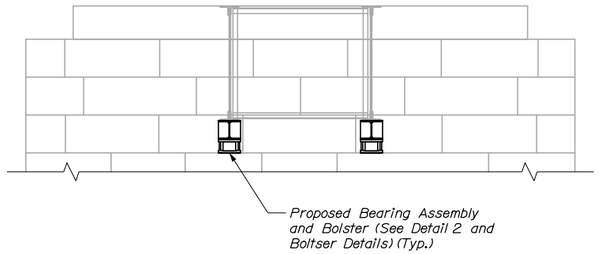
Date:11/1/2019

Division:

Filename: 007_Bearing Details I.dgn



BEARING REMOVAL ELEVATION
1/4" = 1'-0"



BEARING INSTALLATION ELEVATION
1/4" = 1'-0"

BEARING NOTES:

1. Elastomer shall be 100% polychloroprene (neoprene) with durometer hardness of 50.

2. Masonry plates, sole plates and shear blocks shall meet the requirements of ASTM A709, Grade 36. Anchor rods shall meet the requirements of ASTM F1554, Grade 105 and shall be swedged on the embedded portion of the rod. Washers shall be AASHTO F436 and nuts shall be AASHTO A563.

3. Vulcanizing of the elastomer to the masonry plate, shall be done during the primary mold process. The sole plate shall not be vulcanized or bonded in any way to the elastomer

4. Upset the threads on the anchor rods after assembly of the bearing.

5. Bearings shall be covered during shipping and at any time prior to installation that the bearings may be exposed to sunlight.

6. All bearings shall be marked prior to shipping. The marks shall include the bearing location on the bridge, and a direction arrow that points up-station. All marks shall be permanent and shall be visible after the bearing is installed.

7. Bearing pads were designed using "Method A", and shall be subsequently tested in accordance with the specifications.

8. The bearings may be replaced when the ambient air temperature is within the range of 30°F and 90°F. If the ambient air temperature is outside this range, the bearings shall be reset as directed by the Resident.

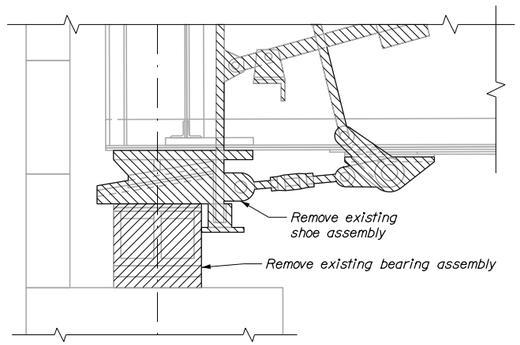
9. Masonry plates sole plates, and bolsters shall be galvanized in accordance with Section 506. Anchor rods, washers, nuts and shear blocks shall be galvanized to ASTM A153 or ASTM B695, Class 50, Type I.

10. The Contractor shall field verify the distance from the granite masonry abutment to the bottom of girder and shall adjust the depth of the web of the bolster shown on the Plans prior to fabricating the bolster. The Contractor shall field verify the geometry of the bolt pattern connecting the existing girder to the existing bearing shoe assembly and shall adjust the spacing of the bolt holes on the proposed bolster as necessary to align with the bolt pattern in the existing girder.

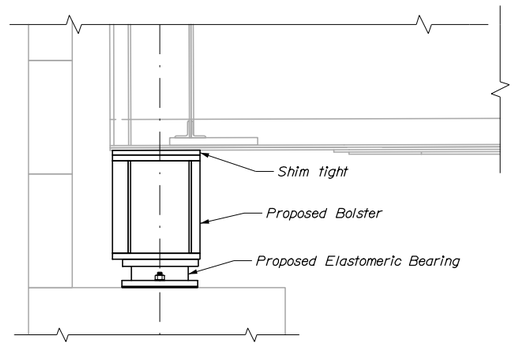
11. The existing girders for Span 1 and Span 2 of Nichols River Bridge were designed as a moveable swinging span, therefore the Abutment 1 end bearings are designed as non-contact under dead load. It is not necessary to jack or lift the superstructure to remove the existing Abutment 1 bearings.

12. During bearing installation, the Contractor shall provide shim plates between the bottom flange of the girder and the top flange of the bolster to shim the bearing and bolster assembly into contact.

13. The "Bearing Design Load" for each bearing as noted in the table below is the total load for the Service 1 load combination, without impact but with the inclusion of rocking.

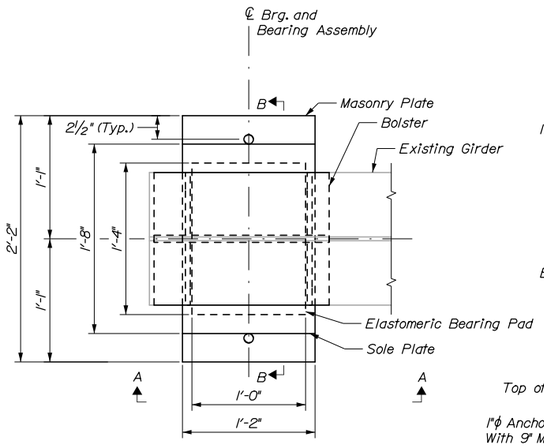


DETAIL 1
3/4" = 1'-0"

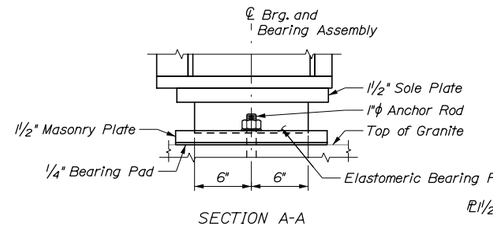


DETAIL 2
3/4" = 1'-0"

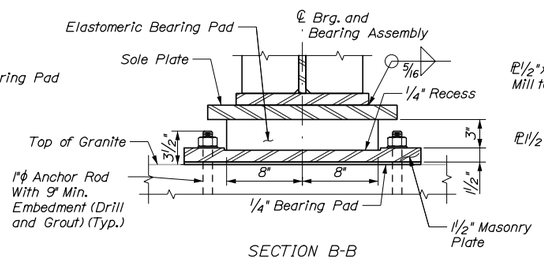
BEARING DESIGN CRITERIA	
Criteria	Abutment 1
Unfactored Dead Load (kips)	18.7
Unfactored Live Load (kips)	118.5
Max. Longitudinal Displ. (in.)	0.47



PLAN

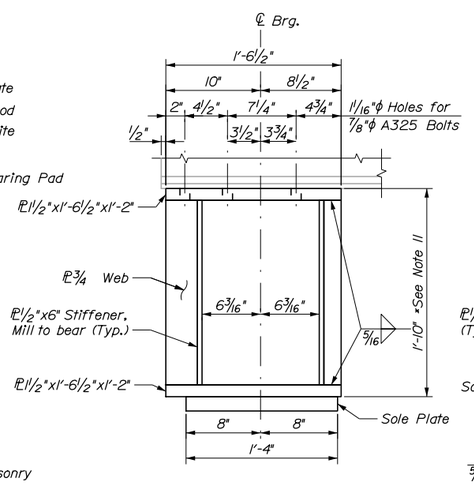


SECTION A-A

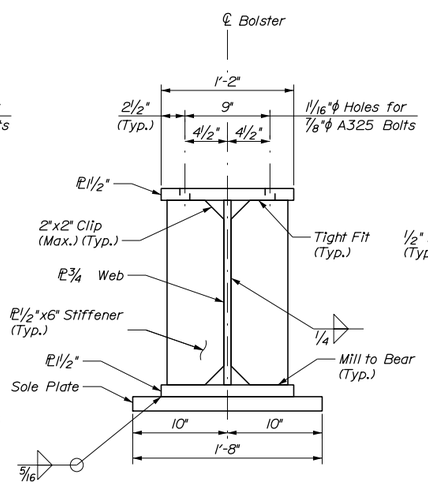


SECTION B-B

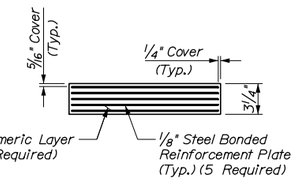
EXPANSION BEARING ASSEMBLY
(2 REQUIRED)



BOLSTER ELEVATION
1½" = 1'-0"



BOLSTER SECTION
1½" = 1'-0"



ELASTOMERIC BEARING PAD

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN
022920.00

7667 & 7655

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	J. Yallones	10\19
CHECKED-REVIEWED	C. Morin	10\19
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

GEORGES RIVER AND NICHOLS RIVER BRIDGES

BEARING DETAILS II

SHEET NUMBER

S06

8 OF 8

HNTB

Username:

Date:11/1/2019

Division:

Filename: 008_Bearing Details II.dgn