

STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION



SPECIFICATIONS

Design: AASHTO Standard Specifications for Highway Bridges 1961 with Interim Specifications.

DESIGN LOADING

HS 20-44 (Modified for Interstate)

MATERIALS

Concrete:  
Barriers, Curbs, Sidewalks & Transition Barriers..... Class "LP"  
All Other..... Class "A"

Structural Steel:  
All Material (except as noted)..... ASTM A 709, Grade 50  
High Strength Bolts, Unless Noted Otherwise..... ASTM A 449  
Galvanized, ASTM 153  
Hex Nuts and Heavy Hex Nuts..... Galvanized, ASTM153

BASIC DESIGN STRESSES

Concrete..... f 'c = 4350 psi  
Structural Steel:  
ASTM A 709, Grade 50..... F y = 50,000 psi  
ASTM A 709, Grade 36..... F y = 36,000 psi  
ASTM A 325..... F μ = 120,000 psi

LIST OF DRAWINGS

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KENNEBEC & PENOBSCOT COUNTIES  
BRIDGE RAIL AND POST REPLACEMENT  
OVER  
INTERSTATE 95

PROJECT LENGTH - Less Than 0.10 mi. (Typ.)

BR# 5785 - TOWN FARM ROAD in SIDNEY

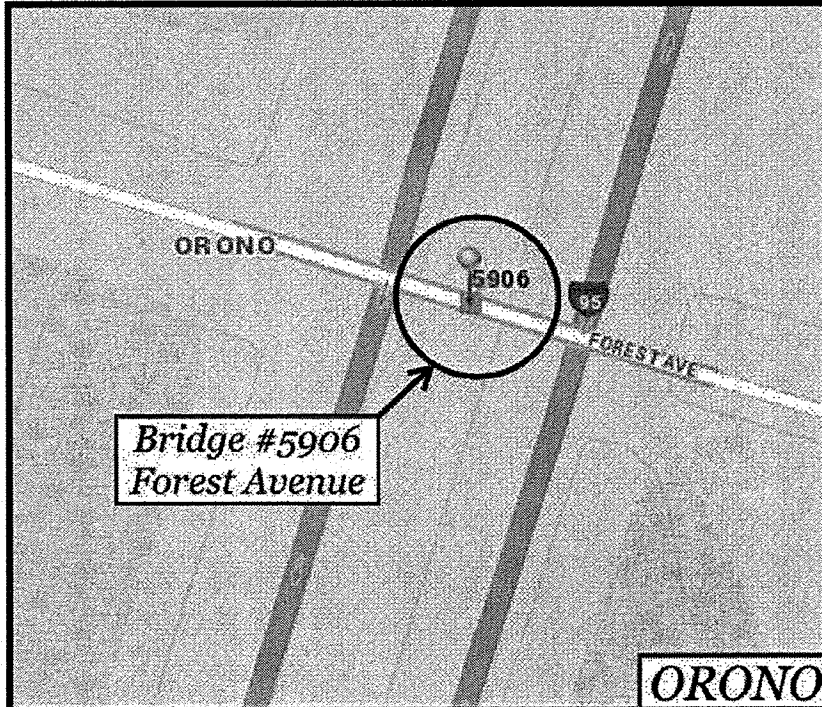
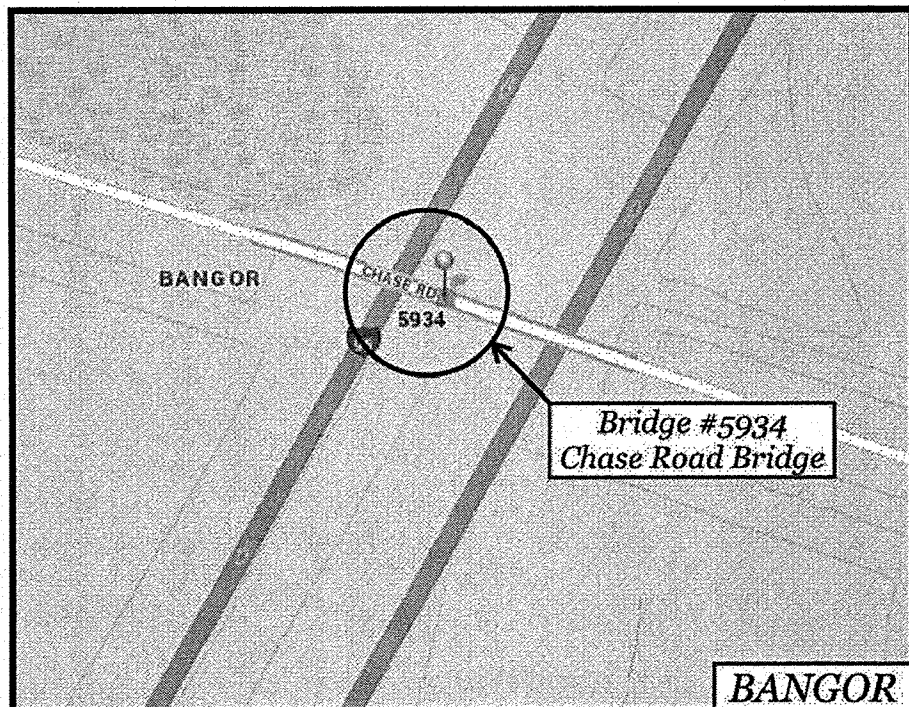
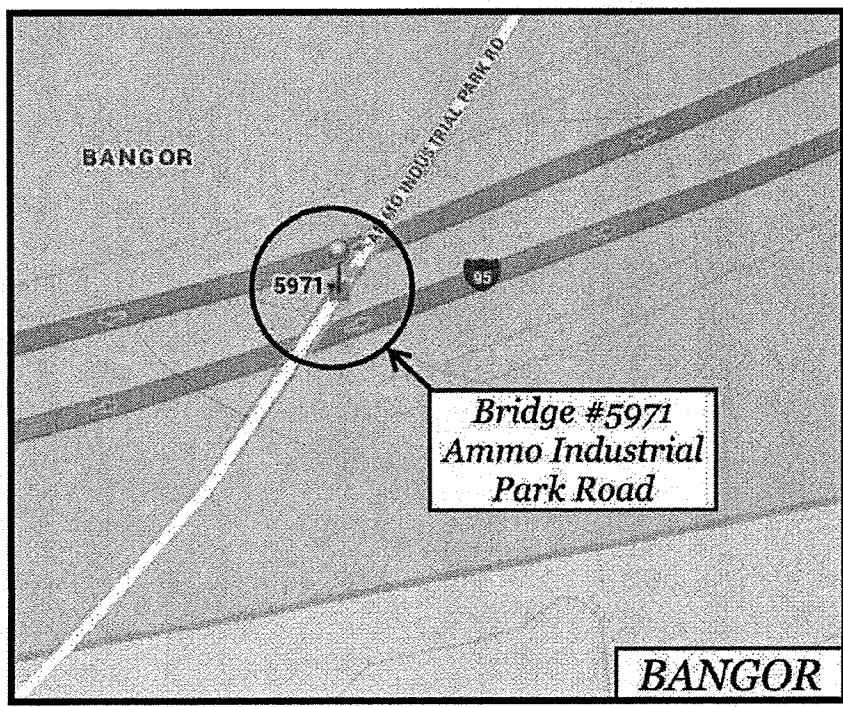
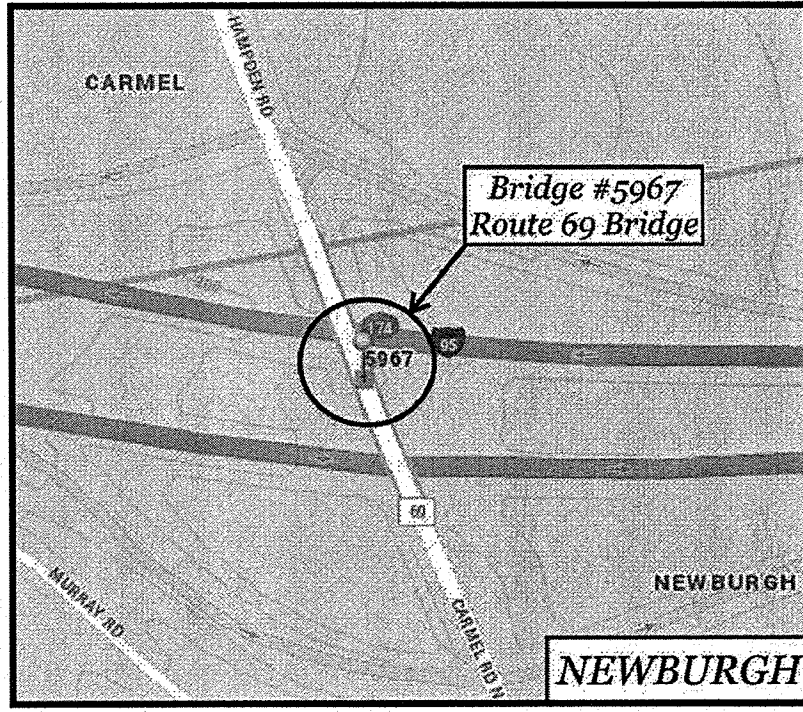
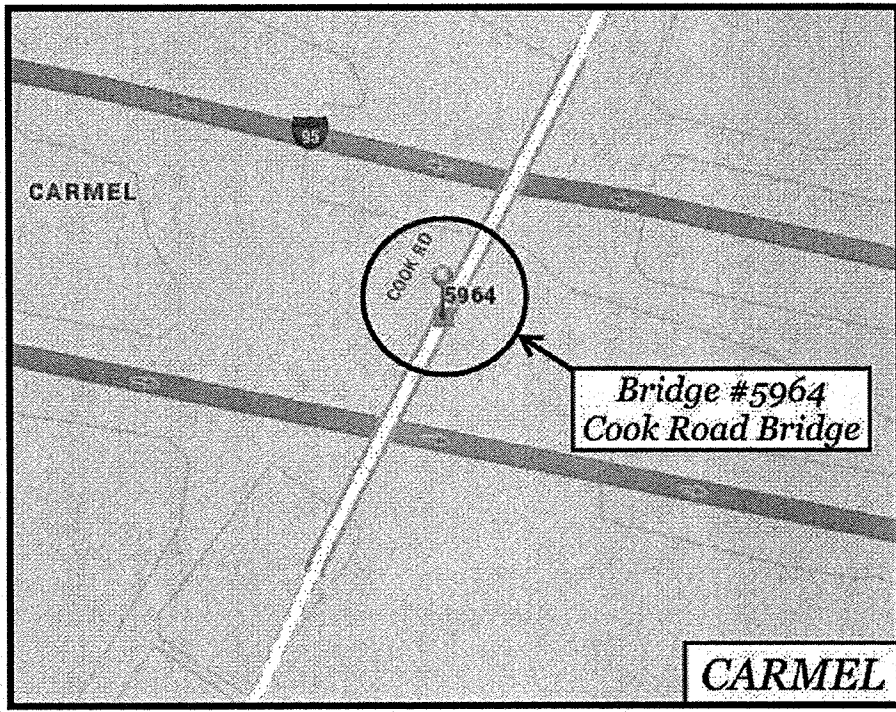
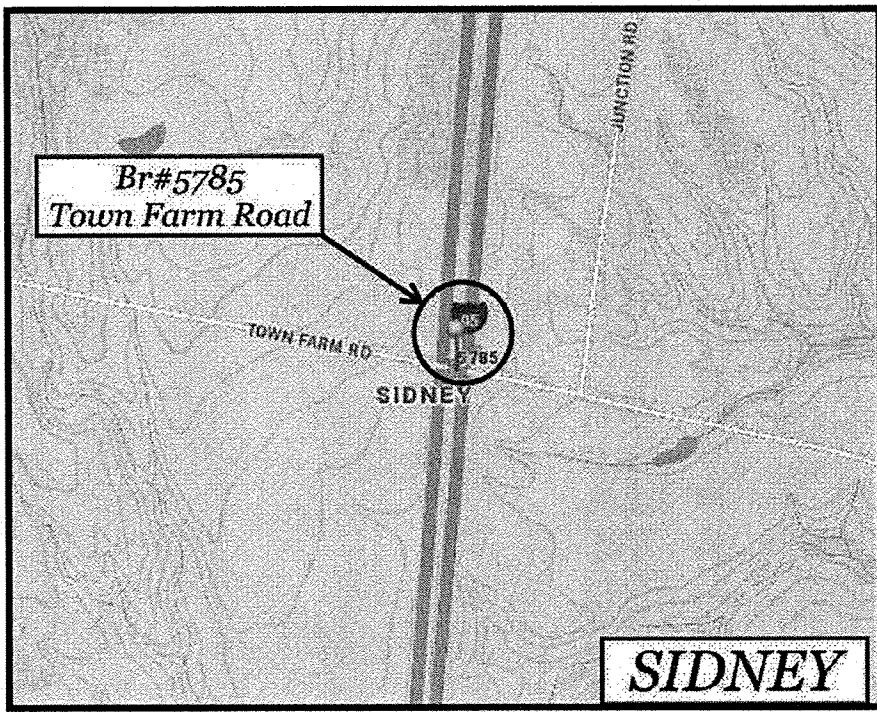
BR#5964 - COOK RD. in CARMEL

BR# 5967 - ROUTE 69 in NEWBURGH

BR#5934 - CHASE RD. in BANGOR

BR#5971 - AMMO INDUSTRIAL PARKWAY - BANGOR

BR#5906 - FOREST AVE. - ORONO



MAINTENANCE OF TRAFFIC

Maintain one 11'-0" minimum wide lane of alternating one - way traffic per MaineDOT Section 652 - Maintenance of Traffic specification.

PROJECT LOCATION	Six bridges over I-95 in Sidney, Carmel, Newburgh, Bangor and Orono Sidney - Bridge #5785 - Lat./Long. 44°29'44.8" N 69°42'16.8" W Carmel - Bridge #5964 - Lat./Long. 44°46'42.1" N 69°03'42.4" W Newburgh - Bridge #5967 - Lat./Long. 44°45.7" N 68°58'29.6" W Bangor - Bridge #5971 - Lat./Long. 44°46'50.5" N 68°49'03.2" W Bangor - Bridge #5934 - Lat./Long. 44°50.46" N 68°43'50.2" W Orono - Bridge #5906 - Lat./Long. 44°53'22.6" N 68°41'36.2" W
PROGRAM AREA	Bridge Maintenance
OUTLINE OF WORK	Replace existing Bridge Rail with new Steel tube and Thrie Beam system.

WIN 022413.00 & 023618.00

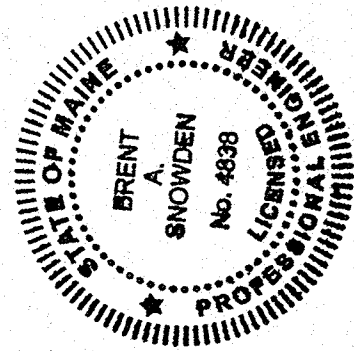
023618.00

MAINE DOT REGIONS 2 & 4  
Bridge Rail Replacement

SHEET NUMBER

1

OF 4



SIGNATURE: B. Snowden  
P.E. NUMBER: 4839  
DATE: 4-6-2017

PROJECT INFORMATION	PROGRAM	DESIGNER	CONSULTANT	CONTRACTOR	PROJECT COMPLETION DATE
Bridge & Structure Maintenance	B. Snowden	B. Snowden			

STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION

APPROVED

DATE

COMMISSIONER

CHIEF ENGINEER

4/11/17

4-11-17

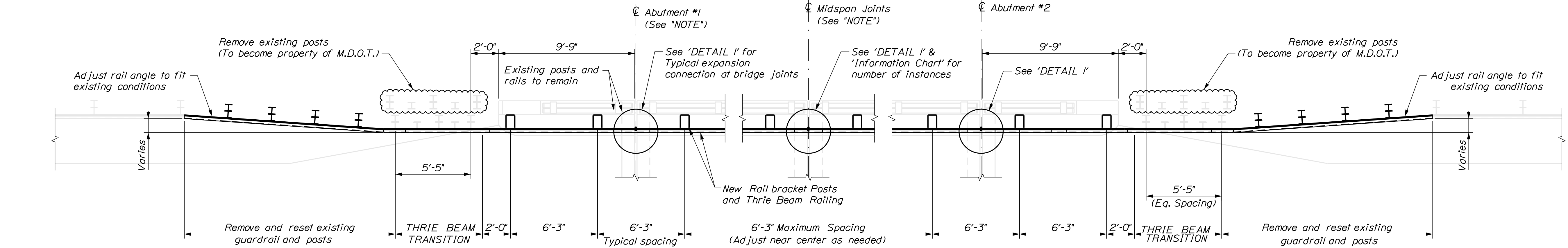


Date:4/10/2017

Username: Gerald.Libby

Division: BRIDGE

Filename: ... \002\_Btypical - Combined.dgn

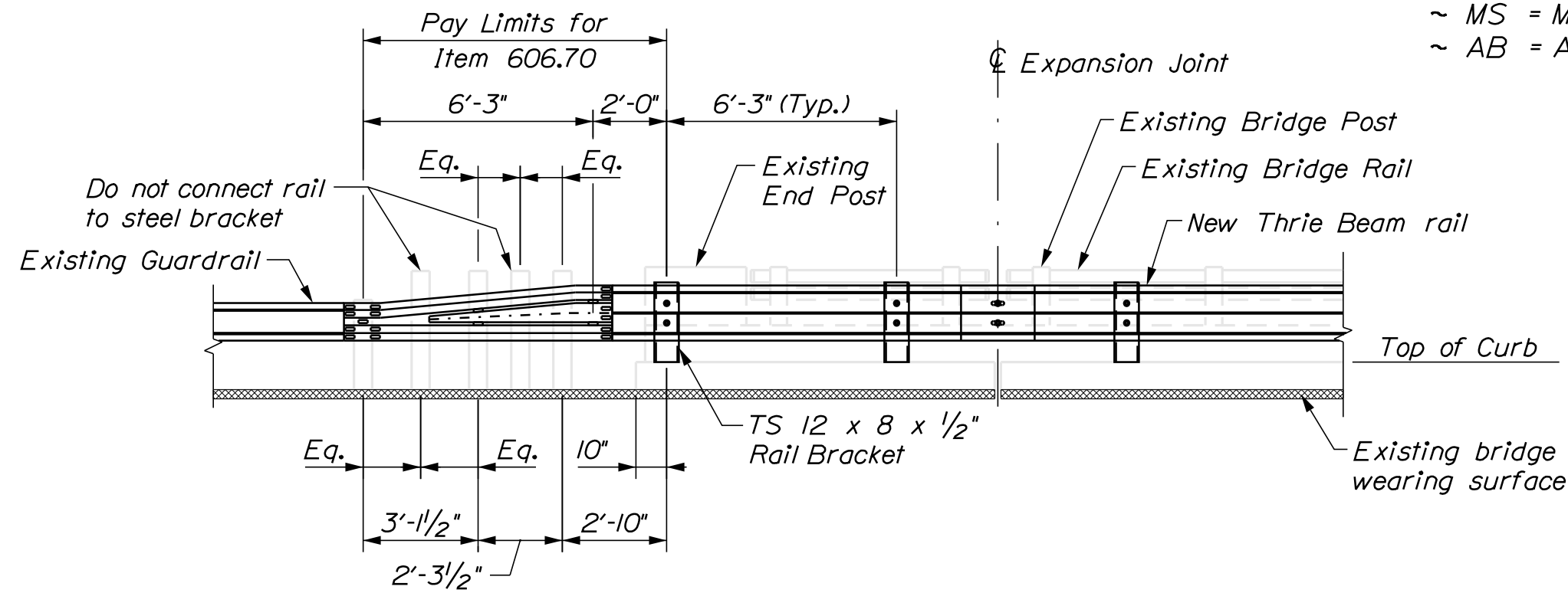


### BRIDGE RAIL LAYOUT

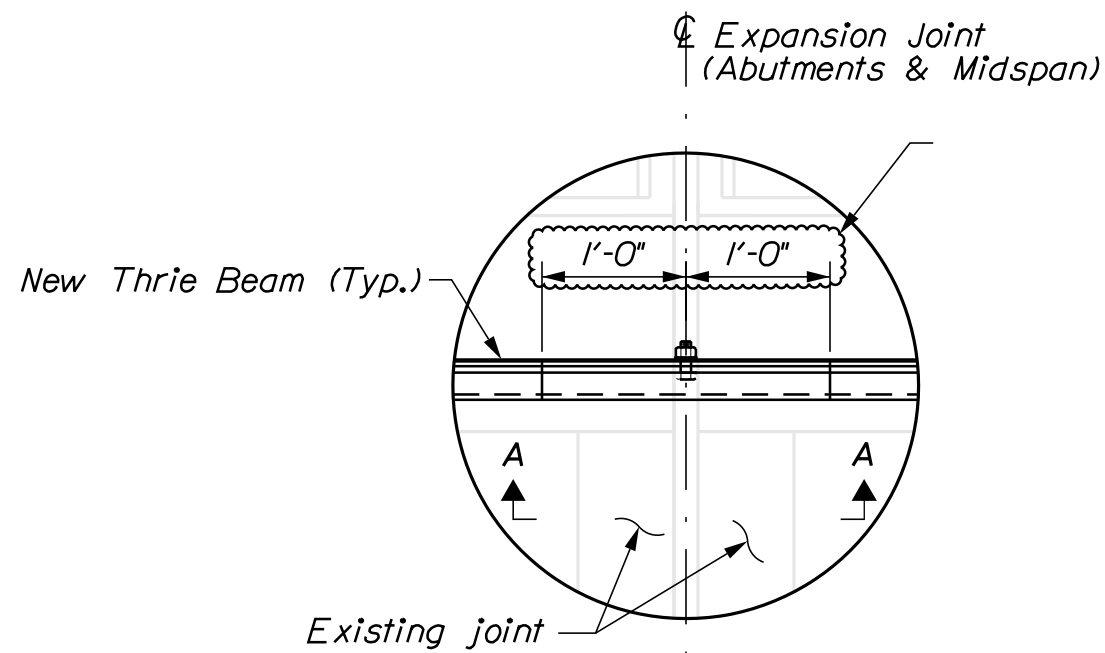
NOTE:  
Refer to 'BRIDGE INFORMATION CHART' for bridge skew, number and location of joints, parapet height and width, and bridge length.

BRIDGE INFORMATION CHART							
BRIDGE #	TOWN	SKEW	* EXP. JNTS	LOCATION	PARAPET HT.	PARAPET WTH.	LENGTH
5785	SIDNEY	6°20'	5	3-MS, 2-AB	1'-0"	1'-0"	303'-0"
5906	ORONO	0°	4	4-MS	1'-6"	1'-0"	289'-9"
5934	BANGOR	78° 45'	4	4-MS	1'-6"	1'-0"	295'-1"
5964	CARMEL	15° 50'	5	5-MS	1'-6"	1'-11/2"	380'-0"
5967	NEWBURGH	27° 46'	6	4-MS, 2-AB	1'-6"	1'-11/2"	432'-0"
5971	BANGOR	36° 28' 48"	4	2-MS, 2-AB	1'-6"	1'-0"	351'-0"

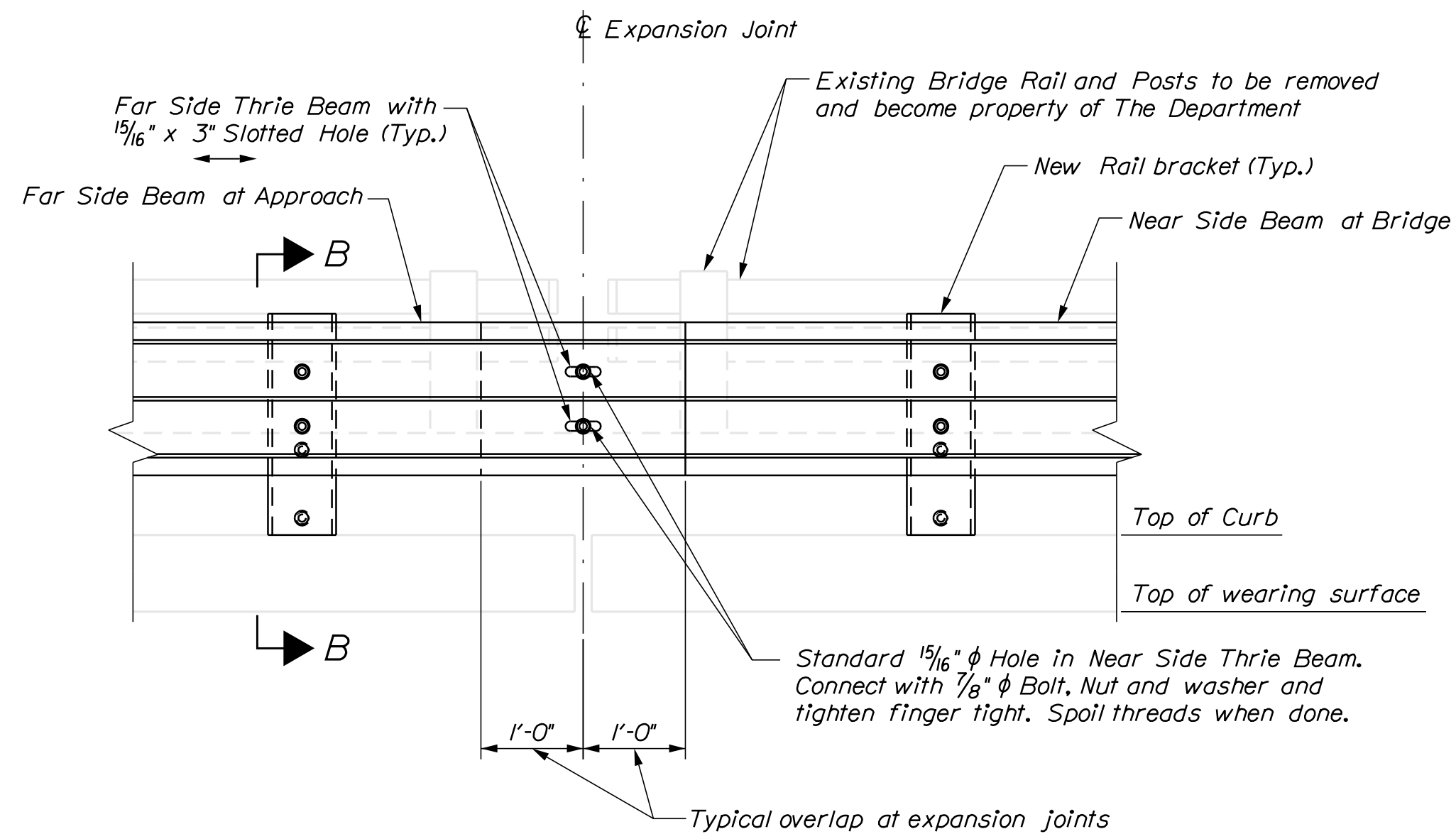
Note:  
~ MS = Midspan  
~ AB = Abutments



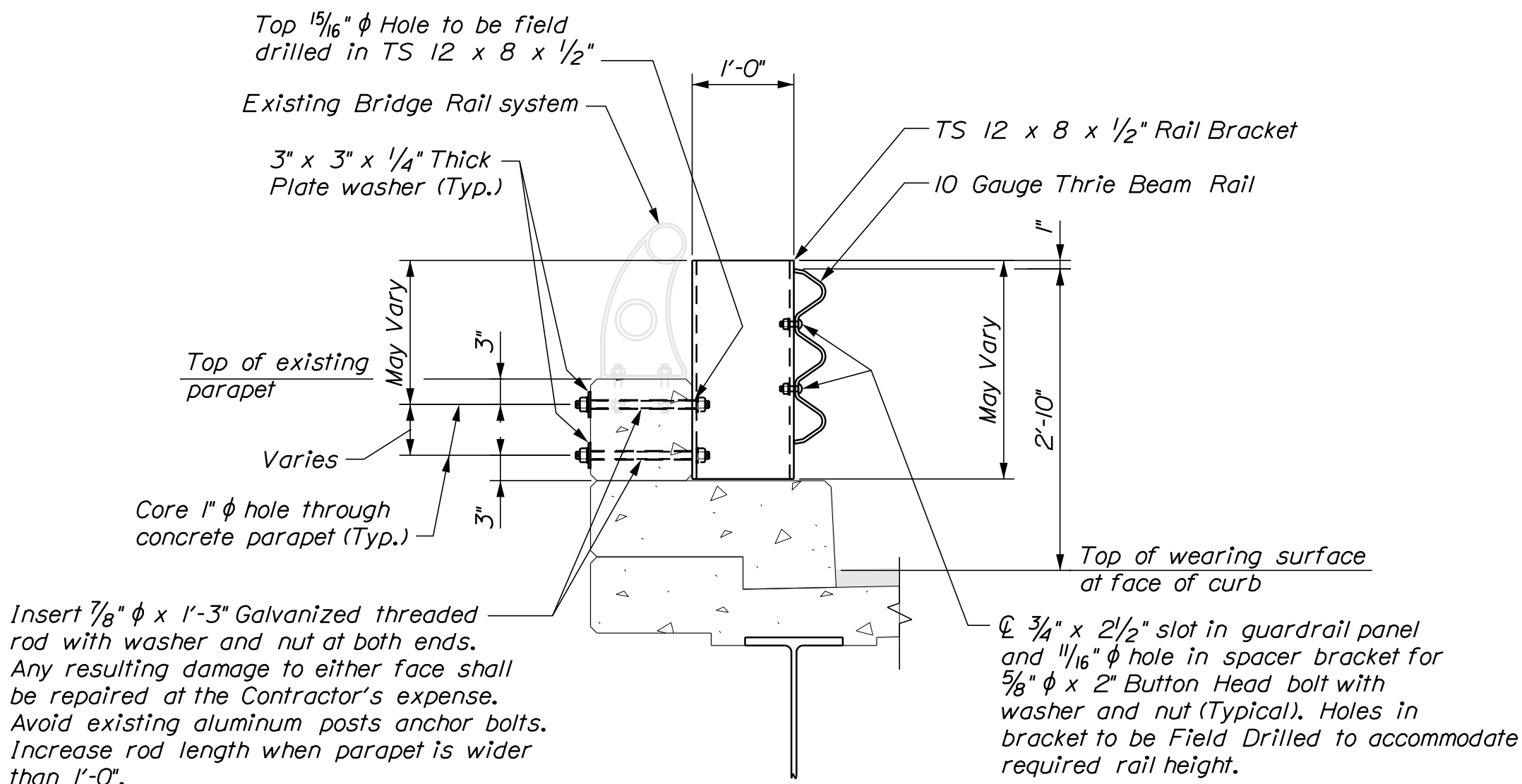
### THRIE BEAM ELEVATION AT CURB



### DETAIL 'I'



### SECTION A - A



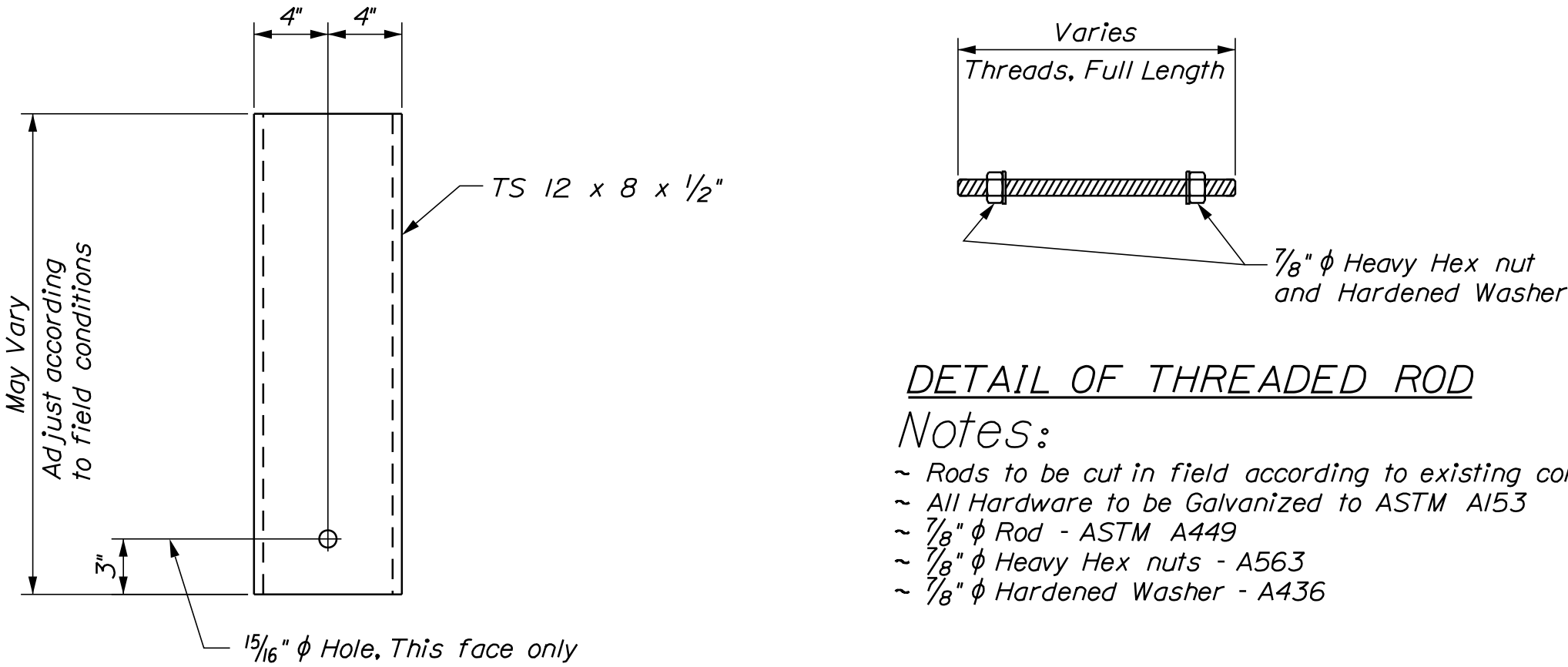
### SECTION B - B

Note:  
~ All Hardware to be Galvanized

### CONSTRUCTION NOTES:

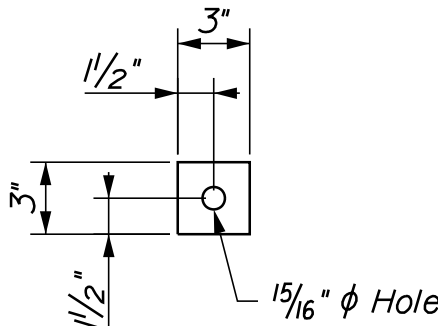
- Additional holes in the Thrie Beam and Type 3 Guardrail panels may be made by drilling, punching or any other method that produces a neat, clean hole of the desired size. Burning of holes will not be allowed. Paint the cut ends of the cut panels and all new holes with an approved CRC cold galvanized. All labor, materials and incidentals needed to complete guardrail modifications shall be considered incidental to guardrail pay items.
- The Contractor shall verify all field dimensions required for fabrication of expansion joints and guardrail items.
- Modifications to new or existing Type 3B Guardrail shall include adding holes as required for conformance to standard details and providing panels of 10 gage thickness. These modifications shall be incidental to Item 606.70 - Transition Section Thrie Beam.
- Threaded rod shall be ASTM A449 or Equal.
- Hardware for threaded rod connections shall be:
  - ~ ASTM A563 for 7/8" Heavy Hex nuts
  - ~ ASTM A436 for 7/8" Hardened washers
  - ~ ASTM A36 for 3" x 3" Plate washers
- All associated hardware, including bolts, threaded rods, washers, nuts and plates shall be Hot Dipped Galvanized after fabrication. Galvanizing shall conform to the requirements of ASTM A153.
- Holes through existing concrete parapet walls for 7/8" threaded rods are to be cored. No drilling of holes will be permitted. Existing reinforcing steel within rail posts shall be located prior to coring by the engineer using a Pacometer.
- Once installation of Thrie Beam is complete, upset threads of all 7/8" rods on each end and paint with CRC cold galvanized.
- All labor, equipment and material necessary to install the Thrie Beam Guardrail shall be incidental to Item 606.73.
- Drilling and anchoring of new anchor bolts for the Thrie Beam rail installation on the bridge shall be done in accordance with Special Provision Section 606 - Thrie Beam - Single Rail Bridge Mounted.
- All existing Bridge Rail shall be removed after installation of new Thrie Beam guardrail and become property of the Maine Department of Transportation. All removed Bridge Rail and posts shall be delivered to MaineDOT Maintenance Camp, 991 Fuller Road, Carmel, ME, per Item 202.134 - Removing Existing Railing (Retained by Department)
- All materials and listed pay item quantities, including lump sum quantities are provided by MaineDOT for informational purposes only.

STATE OF MAINE DEPARTMENT OF TRANSPORTATION				BRIDGE RAIL REPLACEMENT				BRIDGE NO. - SEE TITLE SHEET			
DATE				SIGNATURE				P.E. NUMBER			
4/10/2017				G. LIBBY				WIN			
B. SNOWDEN				B. SNOWDEN				022413.00 & 023618.00			
DESIGN-DETAILED				DESIGN-DETAILED				REVISIONS 1			
CHECKED-REVIEWED				CHECKED-REVIEWED				REVISIONS 2			
DESIGN-DETAILED				DESIGN-DETAILED				REVISIONS 3			
REVISIONS 1				REVISIONS 1				REVISIONS 4			
REVISIONS 2				REVISIONS 2				FIELD CHANGES			
REVISIONS 3				REVISIONS 3				DATE			
REVISIONS 4				REVISIONS 4				DATE			
FIELD CHANGES				FIELD CHANGES				DATE			
MAINE DOT REGION 2 & 4				KENNEBEC & PENOBSCOOT				PLANS, ELEVATIONS and DETAILS			
6 Bridges over I-95				SIDNEY, CARMEL, NEWBURGH, BANGOR and ORONO				SHEET NUMBER			
2				2				OF 4			



DETAIL OF THREADED ROD

Notes:  
~ Rods to be cut in field according to existing conditions  
~ All Hardware to be Galvanized to ASTM A153  
~ 7/8" φ Rod - ASTM A449  
~ 7/8" φ Heavy Hex nuts - A563  
~ 7/8" φ Hardened Washer - A436



DETAIL OF PLATE WASHER

Note:  
~ Galvanize to ASTM A153

PARTS SCHEDULE for BR*5785 (SIDNEY)			
QUANTITY	DESCRIPTION	LENGTH	REMARKS
106	TS 12 x 8 x 1/2"	*Varies	Guard Rail Brackets - ASTM A500, Galvanized
220	7/8" φ Threaded Rod	*Varies	Thread, Full Length - ASTM A449, Galvanized
880	7/8" φ Heavy Hex nut	NA	ASTM A563, Galvanized
880	7/8" φ Hardened Washer	NA	ASTM A436, Galvanized
880	3" x 3" x 1/4" Plate Washer	NA	ASTM A36, Galvanized
20	7/8" φ Button Head Bolts	1 3/4"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized
220	5/8" φ Button Head Bolts	2"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized

Notes:  
1) All hardware and materials shall be Galvanized to ASTM A153.  
2) Guard Rail Brackets and Threaded Rods to be cut in field to match existing conditions.

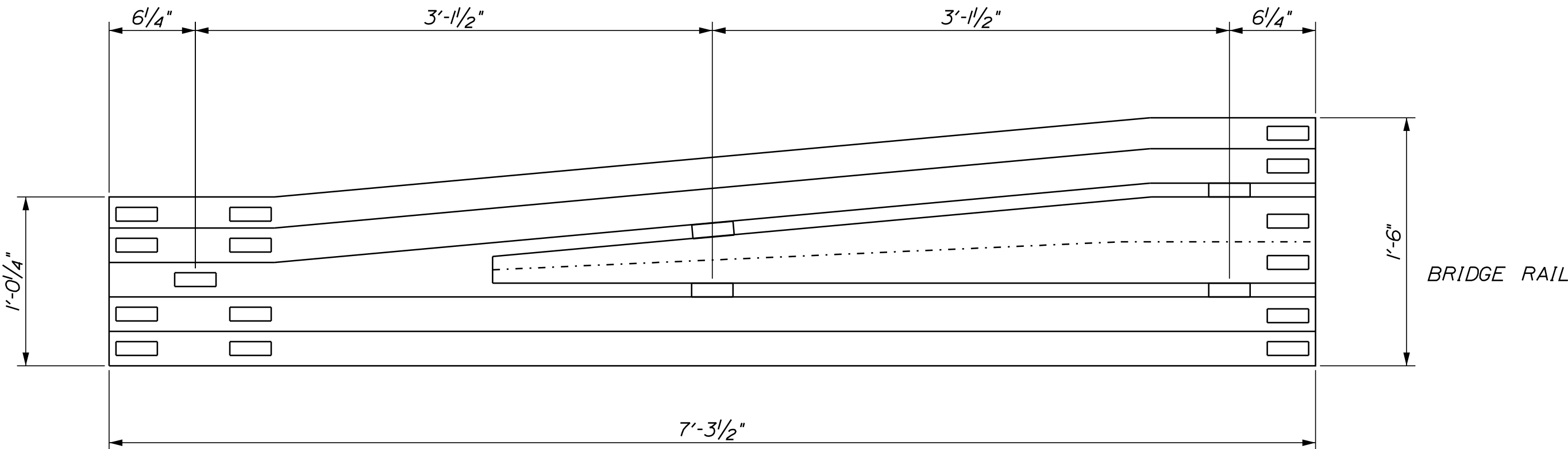
PARTS SCHEDULE for BR*5964 (CARMEL)			
QUANTITY	DESCRIPTION	LENGTH	REMARKS
130	TS 12 x 8 x 1/2"	*Varies	Guard Rail Brackets - ASTM A500, Galvanized
260	7/8" φ Threaded Rod	*Varies	Thread, Full Length - ASTM A449, Galvanized
520	7/8" φ Heavy Hex nut	NA	ASTM A563, Galvanized
520	7/8" φ Hardened Washer	NA	ASTM A436, Galvanized
260	3" x 3" x 1/4" Plate Washer	NA	ASTM A36, Galvanized
20	7/8" φ A325 Bolt	1 3/4"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized
260	5/8" φ Button Head Bolts	2"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized

Notes:  
1) All hardware and materials shall be Galvanized to ASTM A153.  
2) Guard Rail Brackets and Threaded Rods to be cut in field to match existing conditions.

PARTS SCHEDULE for BR*5967 (NEWBURGH)			
QUANTITY	DESCRIPTION	LENGTH	REMARKS
148	TS 12 x 8 x 1/2"	*Varies	Guard Rail Brackets - ASTM A500, Galvanized
296	7/8" φ Threaded Rod	*Varies	Thread, Full Length - ASTM A449, Galvanized
592	7/8" φ Heavy Hex nut	NA	ASTM A563, Galvanized
592	7/8" φ Hardened Washer	NA	ASTM A436, Galvanized
296	3" x 3" x 1/4" Plate Washer	NA	ASTM A36, Galvanized
24	7/8" φ A325 Bolt	1 3/4"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized
296	5/8" φ Button Head Bolts	2"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized

Notes:  
1) All hardware and materials shall be Galvanized to ASTM A153.  
2) Guard Rail Brackets and Threaded Rods to be cut in field to match existing conditions.

APPROACH RAIL



THRIE BEAM TRANSITION

NOTE:  
All quantities below are estimated from existing plans. Actual dimensions and quantities shall be determined from field verifications (Typical).

PARTS SCHEDULE for BR*5971 (BANGOR)			
QUANTITY	DESCRIPTION	LENGTH	REMARKS
120	TS 12 x 8 x 1/2"	*Varies	Guard Rail Brackets - ASTM A500, Galvanized
240	7/8" φ Threaded Rod	*Varies	Thread, Full Length - ASTM A449, Galvanized
480	7/8" φ Heavy Hex nut	NA	ASTM A563, Galvanized
480	7/8" φ Hardened Washer	NA	ASTM A436, Galvanized
240	3" x 3" x 1/4" Plate Washer	NA	ASTM A36, Galvanized
16	7/8" φ A325 Bolt	1 3/4"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized
240	5/8" φ Button Head Bolts	2"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized

Notes:  
1) All hardware and materials shall be Galvanized to ASTM A153.  
2) Guard Rail Brackets and Threaded Rods to be cut in field to match existing conditions.

PARTS SCHEDULE for BR*5934 (BANGOR)			
QUANTITY	DESCRIPTION	LENGTH	REMARKS
98	TS 12 x 8 x 1/2"	*Varies	Guard Rail Brackets - ASTM A500, Galvanized
196	7/8" φ Threaded Rod	*Varies	Thread, Full Length - ASTM A449, Galvanized
392	7/8" φ Heavy Hex nut	NA	ASTM A563, Galvanized
392	7/8" φ Hardened Washer	NA	ASTM A436, Galvanized
196	3" x 3" x 1/4" Plate Washer	NA	ASTM A36, Galvanized
16	7/8" φ A325 Bolt	1 3/4"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized
196	5/8" φ Button Head Bolts	2"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized

Notes:  
1) All hardware and materials shall be Galvanized to ASTM A153.  
2) Guard Rail Brackets and Threaded Rods to be cut in field to match existing conditions.

PARTS SCHEDULE for BR*5906 (ORONO)			
QUANTITY	DESCRIPTION	LENGTH	REMARKS
94	TS 12 x 8 x 1/2"	*Varies	Guard Rail Brackets - ASTM A500, Galvanized
188	7/8" φ Threaded Rod	*Varies	Thread, Full Length - ASTM A449, Galvanized
376	7/8" φ Heavy Hex nut	NA	ASTM A563, Galvanized
376	7/8" φ Hardened Washer	NA	ASTM A436, Galvanized
188	3" x 3" x 1/4" Plate Washer	NA	ASTM A36, Galvanized
16	7/8" φ A325 Bolt	1 3/4"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized
188	5/8" φ Button Head Bolts	2"	1 - Hex Nut (A563) and 1 - Hardened Washer (A436), Galvanized

Notes:  
1) All hardware and materials shall be Galvanized to ASTM A153.  
2) Guard Rail Brackets and Threaded Rods to be cut in field to match existing conditions.

STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION  
BRIDGE RAIL REPLACEMENT  
WIN  
022413.00 & 023618.00  
BRIDGE NO. - SEE TITLE SHEET  
PLANS

MAINE DOT REGION 2 & 4  
6 Bridges over I-95  
KENNEBEC & PENOBSCOT  
SIDNEY, CARMEL, NEWBURGH, BANGOR and ORONO  
DETAILS and PARTS SCHEDULES

SHEET NUMBER  
3  
OF 4

ESTIMATED QUANTITIES for BR*5785 (SIDNEY)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
202.134	Removing Existing Railing (Retained by Department)	1	LS
606.73	Guardrail Thrie Beam, Single Rail - Bridge Mounted	670	LF
606.70	Thrie Beam Transition	4	EA
606.366	Guardrail Removed and Reset	100	LF
629.05	Hand Labor, Straight Time	10	HR
652.39	Work Zone Traffic Control	1	LS
659.10	Mobilization	1	LS

ESTIMATED QUANTITIES for BR*5964 (CARMEL)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
202.134	Removing Existing Railing (Retained by Department)	1	LS
606.73	Guardrail Thrie Beam, Single Rail - Bridge Mounted	830	LF
606.70	Thrie Beam Transition	4	EA
606.366	Guardrail Removed and Reset	100	LF
629.05	Hand Labor, Straight Time	10	HR
652.39	Work Zone Traffic Control	1	LS
659.10	Mobilization	1	LS

ESTIMATED QUANTITIES for BR*5967 (NEWBURGH)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
202.134	Removing Existing Railing (Retained by Department)	1	LS
606.73	Guardrail Thrie Beam, Single Rail - Bridge Mounted	940	LF
606.70	Thrie Beam Transition	4	EA
606.366	Guardrail Removed and Reset	100	LF
629.05	Hand Labor, Straight Time	10	HR
652.39	Work Zone Traffic Control	1	LS
659.10	Mobilization	1	LS

ESTIMATED QUANTITIES for BR*5971 (BANGOR)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
202.134	Removing Existing Railing (Retained by Department)	1	LS
606.73	Guardrail Thrie Beam, Single Rail - Bridge Mounted	740	LF
606.70	Thrie Beam Transition	4	EA
606.366	Guardrail Removed and Reset	100	LF
629.05	Hand Labor, Straight Time	10	HR
652.39	Work Zone Traffic Control	1	LS
659.10	Mobilization	1	LS

ESTIMATED QUANTITIES for BR*5934 (BANGOR)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
202.134	Removing Existing Railing (Retained by Department)	1	LS
606.73	Guardrail Thrie Beam, Single Rail - Bridge Mounted	620	LF
606.70	Thrie Beam Transition	4	EA
606.366	Guardrail Removed and Reset	100	LF
629.05	Hand Labor, Straight Time	10	HR
652.39	Work Zone Traffic Control	1	LS
659.10	Mobilization	1	LS

ESTIMATED QUANTITIES for BR*5906 (ORONO)			
ITEM NO.	DESCRIPTION	QUANTITY	UNIT
202.134	Removing Existing Railing (Retained by Department)	1	LS
606.73	Guardrail Thrie Beam, Single Rail - Bridge Mounted	600	LF
606.70	Thrie Beam Transition	4	EA
606.366	Guardrail Removed and Reset	100	LF
629.05	Hand Labor, Straight Time	10	HR
652.39	Work Zone Traffic Control	1	LS
659.10	Mobilization	1	LS

**NOTES:**

1) All materials and listed pay item quantities, including lump sum quantities, are provided by MaineDOT for informational purposes only.

2) All quantities are estimated from existing plans. Dimensions and actual quantities shall be determined from field verifications.

STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION  
BRIDGE RAIL REPLACEMENT

BRIDGE NO. 022413.00 & 023618.00  
WIN

PLANS

MAINE DOT REGION 2 & 4  
6 Bridges over I-95  
SIDNEY, CARMEL, NEWBURGH, BANGOR and ORONO

KENNEBEC & PENOBSCOT

ESTIMATED QUANTITIES

SHEET NUMBER

4

OF 4

PROJ. MANAGER  
DESIGN-DETAILED  
DESIGN-REVIEWED  
DESIGN-DETAILED  
DESIGN-DETAILED  
REVISIONS 1  
REVISIONS 2  
REVISIONS 3  
REVISIONS 4  
FIELD CHANGES

BY  
G. LIBBY

DATE  
Apr 2017

SIGNATURE

P.E. NUMBER

DATE