**General Notes**

1. Bolt the thrie beam to all posts and blockouts. Drill or punch bolt holes in the beam if the post spacing is less than 6'-3".
2. Do not use steel posts and matched plastic blockouts in the steel thrie beam structural approach and the transition section of steel plate beam guard, class "A" installations.
3. Post bolts are 5/8" diameter ASTM A325 bolt. A post bolt requires a 5" diameter A325 I-shaped double reeseed or heavy hex and a 5/8" diameter A307 flat washer. Length of post bolt may vary.
4. All wood posts must be 6" x 8" and at least 7'-0" long.

**Bridge Railing Type**

- **Post Bolt Slot**
  - 5/8" x 2 3/4" (typ)
  - 4 holes (typ)
- **Post Bolt**
  - 5/8" x 2 3/4" (typ)

**Steel Thrie Beam Structure Approach**

- **Typical Locations of Thrie Beam and W-Beam Connections to Bridge**
- **Section A-A**
- **Front View**
- **Plan View**
- **Section Thru Thrie Beam Rail Element**

**State of Wisconsin Department of Transportation**

Approved: [Signature]

*Date*

[Stamp]

**S.D.D. 14 B 20-1a**

[Stamp]
GENERAL NOTES

1. The connections shown in the drawings are typical. Adjust the position of connections to fit the actual bridge and site dimensions. Bolts, nuts, washers shall conform to ASTM A325, A449 and galvanized per standard specifications.

2. Drilling of bolts through the parapet, bolts, nuts, washers, and repairing damaged concrete are incidental to the contract.

3. Bolts may be A325 bolts or A449 bolts. Bolt length and thread length are to allow for a tight connection between steel beam and steel beam connection plate, contract is to field. Heavy bolt length and thread length, one round washer required between bolt head and thi beam. One round washer required between bolt head and thi beam. One round washer required between bolt head and thi beam. One round washer required between bolt head and thi beam.

4. Bolts that extend through the parapet and out the back face require verifying bolt length and thread length. One round washer required between bolt head and thi beam. Tight connection between rigid barrier and steel parapet. Contractor is to field. bolts may be A325 bolts or A449 bolts. Bolt length and thread length are to allow for a tight connection between steel beam and steel beam connection plate, contract is to field. Heavy bolt length and thread length, one round washer required between bolt head and thi beam. One round washer required between bolt head and thi beam. One round washer required between bolt head and thi beam. One round washer required between bolt head and thi beam.

5. Damaged concrete from bolt installation. A hardened round steel washer that is 2 1/8" x 1/8" thick and one plate washer. Repairing any concrete damage is a matter of the contractor. Drilling of bolts through the parapet, bolts, nuts, washers, and repairing damaged concrete are incidental to the contract.

6. Be sure to drill holes through the parapet, then remove the blocks, and replace them with the new washers or plastic blockouts. Do not use steel posts and notched plastic blockouts in the steel thrie beam structure approach and transition section of steel plate beam guard, class "A" installation.

ENGINEER: ROADWAY STANDARDS DEVELOPMENT
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED:

8/31/2012
/S/ Jerry H. Zogg

SDD 14b20-b Steel Thrie Beam Structure Approach, Connection to Square End Parapets
GENERAL NOTES

These are typical connection details. Adjust the position of connections to existing bridges to fit the actual bridge and site dimensions.

1. Drilling bolt holes through the parapet, bolts, nuts, washers and repairing damaged concrete are incidental to the contract.

2. Bolts may be A325 bolts or A449 bolts. Bolt length and thread length are to allow for a tight connection between new barrier and thrie beam connection plate. Contractor is to field verify bolt length and thread length. One round washer required between bolt head and thrie beam terminal connector. Bolts may extend through the parapet and out the back face. Require a hardened round steel washer that is 2" O.D. x 1/4" thick and one plate washer. Repair any damaged concrete prior to bolt installation.

3. The recess for a W-beam connection, which exists on some parapets of this type, shall be filled with a treated timber blockout. Blockout size is 1'-6" x 2'-0" x 3".

4. W6 x 9 or W6 x 8 1/2 steel posts and notched plastic blockouts are acceptable alternatives for 6" x 6" wood post with wood or plastic blockouts. Use approved notched plastic blockouts with steel posts.

5. Bolt, nut and washers not required for this location when retrofitting an existing parapet and the hole is either above parapet or within 4 inches of the edge of parapet.

6. Do not use steel posts and notched plastic blockouts in the steel thrie beam structural approach and the transition section of steel plate steel guard, class "A" installations.

ENGINEER
ROADWAY STANDARDS DEVELOPMENT
DEPARTMENT OF TRANSPORTATION
STATE OF WISCONSIN
APPROVED
DATE
FHWA
8/31/2012
/S/ Jerry H. Zogg
S.D.D. 14 B 20-11c
S.D.D. 14 B 20-c
Steel Thrie Beam Structure Approach, Connection to Vertical Faced Parapets

W BEAM CONNECTION TO VERTICAL FACE PARAPET
(USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

SECTION E-E

THRIE BEAM CONNECTION TO VERTICAL FACED PARAPETS

SECTION D-D
GENERAL NOTES

1. THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSITION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.

2. BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A325, A449, AND GALVANIZED PER STANDARD SPECIFICATIONS.

3. DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS AND WASHERS ARE ACCEPTABLE ALTERNATIVES FOR 6" X 8" WOOD POSTS OR PREDOMINANTLY WOOD OR PLASTIC BLOCKOUTS. USE APPROVED NOTCHED PLASTIC BLOCKOUTS WITH STEEL POSTS.

4. DO NOT USE STEEL POSTS AND NOTCHED PLASTIC BLOCKOUTS IN THE STEEL THRIE BEAM STRUCTURAL APPROACH AND THE TRANSITION SECTION OF STEEL PLATE BEAM GUARD, CLASS "A" INSTALLATIONS.

WIRE BEAM CONNECTION TO PARAPETS WITH SLOPED ENDS

(USE ONLY AT TRAFFIC EXIT END OF ONE WAY BRIDGE)

SECTION F-F

DRILL HOLE LOCATION AND PATTERN FOR THRIE BEAM CONNECTION

SDD 14b20-d Steel Thrie Beam Structure Approach, Connection to Sloped End Parapets
GENERAL NOTES

BOLTS, PLATES, NUTS AND WASHERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325 AND BE GALVANIZED IN ACCORDANCE WITH ASTM A153.

1. DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.

2. VARY THIS DIMENSION DEPENDING ON ABUTMENT TYPE, CHAINWALL DETAILS, AND ANGLE OF SKEW. PLACE THE FIRST WOOD POST OFF THE BRIDGE SO CLOSE AS FEASIBLE TO THE STEEL END POST.
**GENERAL NOTES**

COVER PLATE PANELS ARE 3/16" THICK.

ALL STIFFENERS ARE 1/4" THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

FOR GALvanized REQUIREMENTS, SEE SECTION 614 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

SHALL BE WELDED AS FOLLOWS:

STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:

- SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND 1/4" FILLER WELD BY 1' LONG SPACED AT 2" ON INTERNAL SIDES.

STIFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:

- 1/4" FILLER WELD BY 2" LONG SPACED AT 2'.

**WELDING INSTRUCTION**

(VIEWED FROM BACK SIDE OF PLATE)

**PLATE AND STIFFENER IDENTIFICATION**

(VIEWED FROM BACK SIDE OF PLATE)

**CONNECTOR PLATE DIMENSION**

(PER ASSEMBLY)

<table>
<thead>
<tr>
<th>PLATE</th>
<th>QUANTITY</th>
<th>SHAPE</th>
<th>SIZE (IN. X B X C X D)</th>
<th>THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1</td>
<td>1/8&quot;</td>
<td>20&quot; x 20&quot; x 20&quot; x 20&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>P2</td>
<td>2</td>
<td>1/8&quot;</td>
<td>20&quot; x 20&quot; x 20&quot; x 20&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>P3</td>
<td>4</td>
<td>1/8&quot;</td>
<td>20&quot; x 20&quot; x 20&quot; x 20&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S1</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S2</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S3</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S4</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S5</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S6</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S7</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S8</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S9</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S10</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>S11</td>
<td>4</td>
<td>1/8&quot;</td>
<td>10&quot; x 10&quot; x 10&quot; x 10&quot;</td>
<td>3/16&quot;</td>
</tr>
</tbody>
</table>

**STEEL THRIE BEAM STRUCTURE APPROACH**
GENERAL NOTES

CONSTRUCT PER STANDARD SPECIFICATION 614.

CONNECTOR PLATE, DRILLING HOLES THROUGH PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.

1. BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREAD LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM TERMINAL CONNECTOR. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 0.020 X 0.020 INCH THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
References:

- Standard Spec 614
- FDM 11-45-2
- FDM 11-45-1
- AASHTO Roadside Design Guide
- NCHRP Report 350 Test 3-21 of the Thrie Beam Transition to Wisconsin Type “M” Tubular Steel Bridge Rail, January 2003
- MwRSF report TRP-03-47-95

Bid items associated with this drawing:

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.0105</td>
<td>Concrete Barrier Single-Faced 32-Inch</td>
<td>LF</td>
</tr>
<tr>
<td>603.0205</td>
<td>Concrete Barrier Double-Faced 32-Inch</td>
<td>LF</td>
</tr>
<tr>
<td>603.1000</td>
<td>Concrete Barrier (type)</td>
<td>LF</td>
</tr>
<tr>
<td>614.0200</td>
<td>Steel Thrie Beam Structure Approach</td>
<td>LF</td>
</tr>
<tr>
<td>614.0230</td>
<td>Steel Thrie Beam</td>
<td>LF</td>
</tr>
<tr>
<td>614.0250</td>
<td>Steel Thrie Beam Structure Approach Temporary</td>
<td>LF</td>
</tr>
<tr>
<td>614.0300</td>
<td>Steel Plate Beam Guard (class)</td>
<td>LF</td>
</tr>
<tr>
<td>614.0360</td>
<td>Steel Plate Beam Guard Temporary</td>
<td>LF</td>
</tr>
<tr>
<td>614.0370</td>
<td>Steel Plate Beam Guard Energy Absorbing Terminal</td>
<td>EACH</td>
</tr>
<tr>
<td>614.0380</td>
<td>Steel Plate Beam Guard Energy Absorbing Terminal Temporary</td>
<td>EACH</td>
</tr>
<tr>
<td>614.0390</td>
<td>Steel Plate Beam Guard Short Radius Terminal</td>
<td>EACH</td>
</tr>
<tr>
<td>614.0395</td>
<td>Guardrail Mow Strip (material)</td>
<td>SY</td>
</tr>
<tr>
<td>614.0400</td>
<td>Adjusting Steel Plate Beam Guard</td>
<td>LF</td>
</tr>
<tr>
<td>614.0920</td>
<td>Salvaged Rail</td>
<td>LF</td>
</tr>
<tr>
<td>614.0925</td>
<td>Salvaged Guardrail End Treatments</td>
<td>EACH</td>
</tr>
<tr>
<td>614.0930</td>
<td>Salvaged (component)</td>
<td>EACH</td>
</tr>
<tr>
<td>614.0950</td>
<td>Replacing Guardrail Posts and Blocks</td>
<td>EACH</td>
</tr>
<tr>
<td>614.0951</td>
<td>Replacing Guardrail Rail and Hardware</td>
<td>LF</td>
</tr>
<tr>
<td>690.0150</td>
<td>Sawing Asphalt</td>
<td>LF</td>
</tr>
<tr>
<td>690.0250</td>
<td>Sawing Concrete</td>
<td>LF</td>
</tr>
</tbody>
</table>

Standardized Special Provisions associated with this drawing:

<table>
<thead>
<tr>
<th>STSP NUMBER</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td></td>
</tr>
</tbody>
</table>

Other SDDs associated with this drawing:

- SDD 14B11 Concrete Barrier (Double Faced)
- SDD 14B15 Steel Plate Beam Guard, Class “A”, Installation & Elements, Mow Strip Detail
- SDD 14B22 Concrete Barrier, Single-Faced (With Anchorage)
- SDD 14B24 Steel Plate Beam Guard Energy Absorbing Terminal
- SDD 14B32 Concrete Barrier Single Slope
- SDD 14B33 Thrie Beam Anchorages
- SDD 14B34 Short Concrete Barrier Sections (Use for runs of less than 40')
- SDD 14B41 Roadside Retaining Wall Barrier

Design Notes:

Projects with PSE due August 2011 or later are required to install MGS beam guard (MGS) for new beam guard installations. Some exceptions allowing the installation of new non-MGS beam guard may be granted by Bureau of Project Development (BPD). A few of these exceptions require minimum documentation (e.g. there is no short radius version of MGS designer would need to install non-MGS beam guard). Other exceptions require more documentation and discussion with Bureau of Project Development. Projects on the NHS or subject to FHWA oversight are to review the use of MGS with FHWA.

Consider surface runoff from a structure when installing thrie beam structural approach. Excessive run-off will scour beam guard posts in the structural approach affecting the performance of the system. Include
appropriate protection for these areas by providing concrete surface drains. Avoid removing of post to accommodate drainage structures.
It may be necessary to increase post length to accommodate steeper slopes.
Do not install curb and gutter in front of Steel Thrie Beam Structure Approach when installing concrete barrier single slope anchor.

Contact Person:
Erik Emerson (608) 266-2842