ABUTMENT MASONRY PLATE MP1A

- MP1A LC IS FOR 1" BARS
- MP1A LLS IS NOT INCLUDE 1" BARS
- MP1A LLS IS FOR 1" BARS

ROCKER R1A

WT. = 224 LBS. (DOES NOT INCLUDE 1" BARS)

SOLE PLATE SPI

WT = 34 LBS.

SOLE PLATE SP2 & SP3

WT. = 146 LBS. (DOES NOT INCLUDE 1" BARS)

ROCKER R2A

WT. = 178 LBS.

ROCKER R3A

WT. = 259 LBS.

ABUTMENT MASONRY PLATE MP2A

WT. = 146 LBS. (DOES NOT INCLUDE 1" BARS)

ABUTMENT MASONRY PLATE MP3A

WT. = 34 LBS.

TYPICAL PINTLE DETAIL

BEARING NOTES:

The masonry plates MP1A, MP2A, and MP3A shall be galvanized after the 1" bars have been welded to the masonry plate. All masonry plates shall be galvanized, galvanizing shall be in accordance with Article 4152 of the standard specifications.

MASONRY PLATES MP1A, MP2A AND MP3A SHALL BE GALVANIZED AFTER THE 1" BARS HAVE BEEN WELDED TO THE MASONRY PLATE. ALL MASONRY PLATES SHALL BE GALVANIZED. GALVANIZING SHALL BE IN ACCORDANCE WITH ARTICLE 4152 OF THE STANDARD SPECIFICATIONS.

NOTES STRUCTURAL STEEL WEIGHT IS INCLUDED IN THE SUMMARY QUANTITIES SHEET.

DISTANCE FROM TOP OF SOLE PLATE TO BRIDGE SEAT

MAXIMUM REACTION

IN KB

ROCKERS

RA

RB

RC

Including 1/4" Neoprene sheet.

AFTER THE 1" BARS HAVE BEEN WELDED TO THE MASONRY PLATE.
Bearing Notes:

Castings R4 and R5 shall be nodular iron castings in accordance with Article 4100.06, of the Standard Specifications. Masonry plates MP4P and MP5P shall be either nodular iron castings in accordance with Article 4153.05 of the Standard Specifications or structural steel, complying with ASTM A673 Grade 50. Pins shall be in accordance with Article 4153.06 of the Standard Specifications, and ASTM A490. Anchor bolts shall be set in accordance with Article 2408.06, of the Standard Specifications.

Preparation of bearing area shall be in accordance with Article 4100.06, of the Standard Specifications. The bearing area shall be a single layer of a 1-inch neoprene sheet. The 1-inch neoprene sheets are to be 0.05, 0.06, or 0.07-inch thick. The bottom surface of the masonry plates on steel bearings, as soon as the surfacing process is done, the surfaces finished with an ANSI 125 finish shall be shop coated with an application of waterproof national lubricating grease. The No. 2 multipurpose grease, before the erection of the structural steel, the shop coated surfaces are to be wiped clean and a field coat of No. 3 grease is to be applied.

After masonry plates and rockers are in correct location, fill slotted holes around anchor bolts with a non-hardening cement or polymeric grout in accordance with Article 2405.03, of the Standard Specifications. All masonry plates, swedge anchor bolts, nuts, and washers shall be galvanized. Galvanizing shall be in accordance with Article 2405.03, of the Standard Specifications. The bottom surface of the masonry plates or steel bearings shall be a single layer of 0.1-inch neoprene sheet.

Masonry plates and rockers shall be in accordance with Article 4153.04, of the Standard Specifications. Plates and washers shall be ASTM A36, Grade 50. Pins shall be in accordance with Article 4153.02, of the Standard Specifications. Masonry plates MP4P and MP5P shall be either nodular iron castings in accordance with Article 4153.04, of the Standard Specifications.

Inter-structural steel joints shall be shop coated with a polymeric grout in accordance with Article 2408.03, of the Standard Specifications. The bedding layer shall be a single layer of 0.1-inch neoprene sheet.

Summary Quantities Sheet:

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
<th>Project Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masonry</td>
<td></td>
<td>1234</td>
</tr>
<tr>
<td>Steel</td>
<td></td>
<td>567</td>
</tr>
<tr>
<td>Anchor</td>
<td></td>
<td>ABC</td>
</tr>
<tr>
<td>Bolts</td>
<td></td>
<td>XYZ</td>
</tr>
</tbody>
</table>

Design Notes:

1. All masonry plates, swedge anchor bolts, nuts, and washers shall be galvanized. Galvanizing shall be in accordance with Article 2405.03, of the Standard Specifications.
2. Masonry plates and rockers shall be in accordance with Article 4153.04, of the Standard Specifications. Plates and washers shall be ASTM A36, Grade 50. Pins shall be in accordance with Article 4153.02, of the Standard Specifications. Masonry plates MP4P and MP5P shall be either nodular iron castings in accordance with Article 4153.04, of the Standard Specifications.
3. Inter-structural steel joints shall be shop coated with a polymeric grout in accordance with Article 2408.03, of the Standard Specifications. The bedding layer shall be a single layer of 0.1-inch neoprene sheet.

Sheet Numbers:

- Design Sheet No. 1009a
- Summary Quantities Sheet
- Inter-structural steel joints

Notes on the drawing:
- TYPICAL PINTLE DETAIL
- SOLE PLATE DETAIL
- ANCHOR BOLT DETAIL
- PIER MASONRY PLATE DETAIL

Drawings and specifications are provided for the construction of a bridge element. The details include masonry plate dimensions, bolt sizes, and other necessary components for structural integrity. The drawings are part of a larger engineering project to ensure proper installation and reinforcement in accordance with the standard specifications.
**BEARING NOTES:**

Castings S4 and S5 shall be nodular iron castings in accordance with Article 4100.03, H, of the Standard Specifications. Preparation of bearing area shall be in accordance with Article 2408.03, M, of the Standard Specifications. The bedding shall be a single layer of a non-premium sheet. The 1-inch Neoprene sheets are to be 50, 60, or 70 durometer hardness and shall be 1 inch greater in length and width than the bottom surface of the masonry plates or steel bearings. As soon as the surfacing process is done, the surfaces finished with an ANSI 125 finish shall be shop coated with an application of waterproof National Lubricating Grease Institute No.3 multipurpose grease. Just before the erection of the structural steel in the field, the shop coated surfaces are to be wiped clean and a field coat of NLGI No.3 grease is to be applied.

All masonry plates, shroud anchor bolts, nuts and washers shall be galvanized. Galvanizing shall be in accordance with Article 4153.04, of the Standard Specifications. The bedding of metal in a staggered pattern. Indentations may be either oval or round in shape.

**CAST STEEL:**

Cast steel shall be ASTM A709 Grade 36 (AASHTO M270 Grade `A`) steel. Plate washers shall be ASTM A709 Grade 36 (AASHTO M270 Grade `A`) steel.

**PLATE WASHERS:**

Plate washers shall be ASTM A709 Grade 36 (AASHTO M270 Grade `A`) steel.

**ANCHOR BOLTS:**

Anchor bolts shall be set in accordance with Article 2405.03, H, of the Standard Specifications. The top surface of the masonry plates or steel bearings shall be wiped clean and a field coat of NLGI No.3 grease is to be applied. All masonry plates, shroud anchor bolts, nuts and washers shall be galvanized. Galvanizing shall be in accordance with Article 4153.04, of the Standard Specifications. The bedding of metal in a staggered pattern. Indentations may be either oval or round in shape.

**DISTANCE FROM TOP OF SOLE PLATE TO BRIDGE SEAT:**

<table>
<thead>
<tr>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4</td>
<td>S5</td>
</tr>
<tr>
<td>475</td>
<td>650</td>
</tr>
</tbody>
</table>

**NOTES:**

Structural steel weight is included on the summary quantities sheet.
BEARING NOTES:

SURFACES MARKED "V" SHALL BE FINISHED AND 202.
MASONRY PLATES ARE TO BE SET ON A 1/4 INCH NEOPRENE SHEET.
THE 1/4 INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACE OF THE MASONRY PLATES OR STEEL BEARINGS.

CURVED SOLE PLATES, SOLE PLATES, ANCHOR BOLTS, AND MASONRY PLATES ARE A PART OF THE SUPERSTRUCTURE STRUCTURAL STEEL QUANTITY. COST OF NEOPRENE BEARING PADS AND 1/4 INCH NEOPRENE SHEETS SHALL BE CONSIDERED INCIDENTAL TO THE MAIN ITEM "STRUCTURAL STEEL".

The pintle plate, keeper bars, and masonry plates shall be galvanized, welding shall be completed prior to galvanizing. The surfaces of the pintle plate in contact with the curved sole plate and the laminated neoprene pads shall be free of projections due to galvanizing.

The surfaces of the pintle plate, keeper bars, and masonry plates shall comply with ASTM A709 Grade 50W and shall be painted in accordance with the standards specifications.

Anchors, bolts, and washers shall meet the requirements of 404.4.0.8.0., DUROMETER NEOPRENE.

THE PINTLE PLATES, KEEPER BARS, AND MASONRY PLATES SHALL BE GALVANIZED.

ANCHOR BOLTS, NUTS AND WASHERS SHALL MEET THE REQUIREMENTS OF I.M.`453.08.

MASONRY PLATES ARE TO BE SET ON A " INCH NEOPRENE SHEET.

AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACE OF THE MASONRY PLATES OR STEEL BEARINGS.

BEARING PADS AND " INCH NEOPRENE SHEETS SHALL BE CONSIDERED INCIDENTAL TO THE MAIN ITEM "STRUCTURAL STEEL".

CURVED SOLE PLATES SHALL COMPLY WITH ASTM A709 GRADE 50W AND SHALL BE PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

LAMINATED NEOPRENE SHEET CURVED SOLE { ASSEMBLY

PART ELEVATION

SECTION A-A

PLAN VIEW OF MASONRY AND SOLE PLATES FIXED PIER

MASONRY & CURVED SOLE & ASSEMBLY

PART ELEVATION

PLAN OF PINTLE PLATE

LAMINATED NEOPRENE PADS

CURVED SOLE & LAMINATED NEOPRENE PADS

DETAIL C

STRUCTURAL PLATE WEIGHT LBS.

1/4" PINTLES (SEE DETAIL)

PINTLE PLATE

KEEPER BAR

HOLE 1-1/2"

2" HOLES

BAR 1-1/2 x 1/2 x 1/2

CURVED SOLE 3/4 x 1/2 x 1/2

KEEPER BAR

RADIUS = 1'-8

WEIGHT LBS.

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.
PIER BEARING STIFFENER (SKewed WITh ALL DIAPHRAGMS PERPENDICULAR TO GIRDERS) ALL ABUTMENT BEARING STIFFENERS (0° SkEW OR BRIDGES WITH PIER DIAPHRAGMS PARALLEL TO E OF PIER) INTERMEDIATE DIAPHRAGM STIFFENER BOLTED ATTACHMENT TO FLANGES INTERMEDIATE DIAPHRAGM STIFFENER WELDED ATTACHMENT TO FLANGES PIER BEARING STIFFENER (0° SkEW OR BRIDGES WITH PIER DIAPHRAGMS PARALLEL TO E OF PIER) INTERMEDIATE DIAPHRAGM STIFFENER BOLTED ATTACHMENT TO FLANGES INTERMEDIATE DIAPHRAGM STIFFENER WELDED ATTACHMENT TO FLANGES
INTERMEDIATE DIAPHRAGM
BEAM COIL TIE LOCATIONS
(0° TO 7°30' SKEW)

NOTE:
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR
REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
ALL INTERMEDIATE DIAPHRAGM QUANTITIES FOR STRUCTURAL
CONCRETE AND EPOXY COATED REINFORCING STEEL ARE INCLUDED ON
THE SUMMARY QUANTITIES SHEET.
AT LOCATIONS UNDER LONGITUDINAL BRIDGE FLOOR CONSTRUCTION
JOINTS THE INTERMEDIATE CONCRETE DIAPHRAGM IS TO BE OMITTED.
DETAIL D
SECTION SHOWING INTERMEDIATE DIAPHRAGMS
AT EXTERIOR BAY OVER TRAVELED ROADWAY SPANS

NOTE: BOLTS AND WASHERS SHALL BE INSTALLED ONLY IN THE OUTSIDE BAYS OVER THE TRAVELED ROADWAY.

DETAIL E
SECTION SHOWING INTERMEDIATE DIAPHRAGMS
OVER TRAVELED ROADWAY SPANS

PART SECTION A-A
FOR BRIDGES SKEWED GREATER THAN 7°30'

SECTION SHOWING INTERMEDIATE DIAPHRAGMS
AT EXTERIOR BAY OVER NON-TRAVELED ROADWAY SPANS
AND WATERWAYS

DETAIL F
SECTION SHOWING INTERMEDIATE DIAPHRAGMS
AT EXTERIOR BAY OVER NON-TRAVELED ROADWAY SPANS
AND WATERWAYS

DETAIL G
SECTION SHOWING INTERMEDIATE DIAPHRAGMS
OVER TRAVELED ROADWAY SPANS

NOTES:
- "a" DIMENSION MUST BE EQUAL.
- W10x45 AND W14x38 SHALL BE INSTALLED ONLY IN THE OUTSIDE BAYS OVER THE TRAVELED ROADWAY.
ONE BEAM CONNECTION (DETAIL "D" AND/OR DETAIL "E")

ONE DETAIL "D" 1 - 8" x 1" x 1 1/2" 4 HOLES 1 1/2" SLOTTED HOLE @ 1 3/4" O.C.
ONE DETAIL "E" 1 - 8" x 1" x 1 1/2" 4 HOLES 1 1/2" SLOTTED HOLE @ 1 3/4" O.C.

DIAPHRAGM NUMBER OF CONNECTIONS

- 2 - [9" x 2"] DIAPHRAGMS WITH NUTS & WASHERS = 4.8 LBS.
- 1 - DETAIL "D" 1 - [9" x 1"] DIAPHRAGM @ 1 3/4" O.C.
- 1 - DETAIL "E" 1 - [9" x 1"] DIAPHRAGM @ 1 3/4" O.C.

DIAPHRAGM STRUCTURAL STEEL - TOTAL (LBS.):

- 1 - W14x38 = 38 LBS./FT.
- 1 - C15x33.9 = 33.9 LBS./FT.
- 1 - W18x50 = 50 LBS./FT.
- 4 - [6" x 1"] DIAPHRAGMS = 12.9 LBS.
- 2 - [6" x 1"] DIAPHRAGMS = 19.3 LBS.
- 4 - 1 1/2" HOLES IN 9" LEG = 4.0 LBS.
- 18 - [6" x 2"] DIAPHRAGMS = 19.5 LBS.

WEIGHT:

- 2 - 1 1/2" HOLES IN THE NON-TRAVELED ROADWAYS
- 2 - 1 1/2" HOLES IN THE TRAVELED ROADWAYS
- 1 - 6" x 1 1/2" SLOTTED HOLE @ 1 3/4" O.C.
- 2 - 1 1/2" HOLES IN THE WEB

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

QTY. BOX FOR THE TRAVELED ROADWAYS

QTY. BOX FOR THE NON-TRAVELED ROADWAYS

CHART OUTSIDE OF BORDER CONTAINS DIAPHRAGM LENGTHS

wegimate:

- 1 - W14x38 = 38 LBS./FT.
- 1 - C15x33.9 = 33.9 LBS./FT.
- 1 - W18x50 = 50 LBS./FT.
- 4 - [6" x 1"] DIAPHRAGMS = 12.9 LBS.
- 2 - [6" x 1"] DIAPHRAGMS = 19.3 LBS.
- 4 - 1 1/2" HOLES IN 9" LEG = 4.0 LBS.
- 18 - [6" x 2"] DIAPHRAGMS = 19.5 LBS.

WEIGHT:

- 2 - 1 1/2" HOLES IN THE NON-TRAVELED ROADWAYS
- 2 - 1 1/2" HOLES IN THE TRAVELED ROADWAYS
- 1 - 6" x 1 1/2" SLOTTED HOLE @ 1 3/4" O.C.
- 2 - 1 1/2" HOLES IN THE WEB

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

QTY. BOX FOR THE TRAVELED ROADWAYS

QTY. BOX FOR THE NON-TRAVELED ROADWAYS

CHART OUTSIDE OF BORDER CONTAINS DIAPHRAGM LENGTHS

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- 1 - W14x38 = 38 LBS./FT.
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- 18 - [6" x 2"] DIAPHRAGMS = 19.5 LBS.

WEIGHT:

- 2 - 1 1/2" HOLES IN THE NON-TRAVELED ROADWAYS
- 2 - 1 1/2" HOLES IN THE TRAVELED ROADWAYS
- 1 - 6" x 1 1/2" SLOTTED HOLE @ 1 3/4" O.C.
- 2 - 1 1/2" HOLES IN THE WEB

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

QTY. BOX FOR THE TRAVELED ROADWAYS

QTY. BOX FOR THE NON-TRAVELED ROADWAYS

CHART OUTSIDE OF BORDER CONTAINS DIAPHRAGM LENGTHS
**BULB TEE "E" BEAM INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL**

**ONE BEAM CONNECTION (DETAIL "F" AND/OR DETAIL "G")**

<table>
<thead>
<tr>
<th>NO. OF BEAM CONNECTIONS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 × 1 1/2&quot; H.S. BOLTS WITH NUTS &amp; WASHERS</td>
<td>21.2 LBS.</td>
</tr>
<tr>
<td>ONE DETAIL &quot;F&quot;</td>
<td>1 × SLOTTED HOLE IN 1 1/2&quot; LEG OF REY. E</td>
</tr>
<tr>
<td>ONE DETAIL &quot;G&quot;</td>
<td>1 × SLOTTED HOLE IN 1 1/2&quot; LEG OF REY. E</td>
</tr>
</tbody>
</table>

**ONE DIAPHRAGM**

<table>
<thead>
<tr>
<th>NUMBER OF DIAPHRAGMS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 × 1 1/2&quot; H.S. BOLTS WITH NUTS &amp; WASHERS</td>
<td>61.6 LBS.</td>
</tr>
<tr>
<td>10 × 2&quot; x 24&quot; MIDJOINT WITH NUTS &amp; WASHERS</td>
<td>111.3 LBS.</td>
</tr>
<tr>
<td>10 × 2&quot; x 24&quot; MIDJOINT WITH NUTS &amp; WASHERS</td>
<td>111.3 LBS.</td>
</tr>
<tr>
<td>4 × 1 1/2&quot; x 1 1/2&quot; H.S. BOLTS</td>
<td>22.3 LBS.</td>
</tr>
<tr>
<td>4 × 1 1/2&quot; x 1 1/2&quot; H.S. BOLTS</td>
<td>22.3 LBS.</td>
</tr>
</tbody>
</table>

**INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL - TOTAL (LBS.)**

<table>
<thead>
<tr>
<th>LENGTH OF MEMBER</th>
<th>NO. OF DIAPHRAGMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-0&quot; x 68</td>
<td>1</td>
</tr>
<tr>
<td>3'-0&quot; x 30</td>
<td>1</td>
</tr>
</tbody>
</table>

**BULB TEE "E" BEAM INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL**

**ONE BEAM CONNECTION (DETAIL "H" AND/OR DETAIL "I")**

<table>
<thead>
<tr>
<th>NO. OF BEAM CONNECTIONS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 × 1 1/2&quot; H.S. BOLTS WITH NUTS &amp; WASHERS</td>
<td>21.2 LBS.</td>
</tr>
</tbody>
</table>

**ONE DIAPHRAGM**

<table>
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<tbody>
<tr>
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</tr>
<tr>
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<td>22.3 LBS.</td>
</tr>
<tr>
<td>4 × 1 1/2&quot; x 1 1/2&quot; H.S. BOLTS</td>
<td>22.3 LBS.</td>
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</tbody>
</table>

**INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL - TOTAL (LBS.)**

<table>
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<tr>
<th>LENGTH OF MEMBER</th>
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<tbody>
<tr>
<td>3'-0&quot; x 68</td>
<td>1</td>
</tr>
<tr>
<td>3'-0&quot; x 30</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**NOTES:**

- WASHERS SHALL BE GALVANIZED.
- ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS AND BID FOR STRUCTURAL STEEL.
- SUBMITTED FOR APPROVAL.
- INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE ALL COSTS FOR FURNISHING AND INSTALLING STEEL LAYOUT AND DETAILS OF THE DIAPHRAGMS SHALL BE SHOWN IN THE SHOP DRAWINGS OF THE STEEL DIAPHRAGMS SHOWING.
- NO THICK CHEESE OR BENT "D" STEEL INTERMEDIATE DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS AND WASHERS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.
- UNTIL STAGE TWO OF THE BRIDGE FLOOR HAS BEEN PLACED.
- ALL BOLTS ARE TO BE TIGHTENED PRIOR TO PLACING BOLTS IN DIAPHRAGMS LOCATED UNDER LONGITUDINAL BRIDGE FLOOR CONSTRUCTION JOINTS SHALL NOT BE TIGHTENED THE 1½" HOLES FOR THE ½" H.S. BOLTS THREAD LENGTH OF 3" MIN. AND 4" MAX. AND SHALL MEET THE REQUIREMENTS OF ASTM A449.

**BEAM EXAMPLES ARE OUTSIDE OF BORDER SHEET.**

**INTERMEDIATE DIAPHRAGM BOLT HOLE LOCATIONS**

- 1 ½" Holes in 1 ½" Leg of REY. E and 1 ½" Holes in REY. E x 36

**BEAM COIL TIE LOCATIONS**

- FIXED PIER
- EXPANSION PIER

---

**DESIGN TEAM**

**IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION**

**PROJECT NUMBER**

**DESIGN SHEET NO.**

**FILE NO.**

**COUNT**

**PROJECT NUMBER**

**DESIGN SHEET NO.**

**FILE NO.**

**COUNT**

**DESIGN SHEET NO.**

**FILE NO.**

**COUNT**

**DESIGN SHEET NO.**

**FILE NO.**

**COUNT**

**DESIGN SHEET NO.**

**FILE NO.**

**COUNT**

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**QTY. BOX FOR THE TRAVELED ROADWAYS**

**DELETE NON-APPLICABLE SECTION C-C DETAIL.**

<table>
<thead>
<tr>
<th>QTY. BOX FOR THE NON-TRAVELED ROADWAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

**NOTES:**

- ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS AND WASHERS SHALL BE SUBMITTED FOR APPROVAL.
- ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE FOR STRUCTURAL STEEL.
- ALL 1 ½" HOLES FOR THE ½" H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.

---

**CHART OUTSIDE OF BORDER CONTAINS DIAPHRAGM LENGTHS**

**NOTE:** STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.
DETAIL D

SECTION SHOWING INTERMEDIATE DIAPHRAGMS AT EXTERIOR BAY OVER TRAVELED ROADWAY SPANS

NOTE: W24x68 AND W14x38 SHALL BE INSTALLED ONLY IN THE OUTSIDE BAY SPANS OVER THE TRAVELED ROADWAY.

NOTE:  W24x68 AND W14x38 SHALL BE INSTALLED ONLY IN THE OUTSIDE BAY SPANS OVER THE TRAVELED ROADWAY.

DETAIL F

SECTION SHOWING INTERMEDIATE DIAPHRAGMS AT EXTERIOR BAY OVER NON-TRAVELED ROADWAY SPANS AND WATERWAYS

SECTION SHOWING INTERMEDIATE DIAPHRAGM FOR BRIDGES SKEWED LESS THAN OR EQUAL TO 7°30'.

SECTION SHOWING INTERMEDIATE DIAPHRAGM FOR BRIDGES SKEWED GREATER THAN 7°30'.
ABUTMENT BEARING NOTES:

The sliding surface of the bronze { shall be lubricated in accordance with Article 4190.03, of the Standard Specifications, and the bronze metal shall be cast bronze in accordance with Article 4190.03, of the Standard Specifications.

The bronze { shall be finished ANSI`125.

The sliding surface of the bronze { shall be lubricated in accordance with Article 4190.03, of the Standard Specifications, and the bronze metal shall be cast bronze in accordance with Article 4190.03, of the Standard Specifications.

The bronze { shall be finished ANSI`125.

MASONRY { / BRONZE BEARING ASSEMBLY

MASONRY { / BRONZE BEARING ASSEMBLY

MASONRY { / BRONZE BEARING ASSEMBLY

PLAN OF MASONRY { AND BRONZE {
ABUTMENT BEARING NOTES:

The sliding surface of the bronze PINTLE PLATE shall be lubricated in accordance with Article 4190.03. MASONRY PLATES will be cast bronze in accordance with Article 4190.02. MASONRY PLATES shall be treated with the same finishing and surfacing required for the BRONZE PLATES.

The MASONRY PLATE and MASONRY PLATE shall be galvanized. The MASONRY PLATE and MASONRY PLATE shall be fitted up with the MASONRY PLATE in contact with the BRONZE PLATE. The SLIDING SURFACE of the BRONZE PLATE shall be lubricated in accordance with Article 4190.03. The BRONZE METAL shall be finished ANSI 125.

The SUPERSTRUCTURE STRUCTURAL STEEL QUANTITY shall include allowance for cost of BRONZE PLATES. COST OF NEOPRENE SHEETS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL. UNIT PRICE BID FOR STRUCTURAL STEEL QUANTITY. UNIT PRICE BID FOR MASONRY PLATES OR STEEL BEARINGS.

Note: STRUCTURAL STEEL WEIGHT DOES NOT INCLUDE CURVED SOLE PLATE AND C & D PPCB BRIDGES. SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACE OF THE MASONRY PLATES OR STEEL BEARINGS.

MASONRY PINTLE PLATE AND BRONZE PLATE ASSEMBLY

DESIGN NOTE:
1. TOTAL VERTICAL LOAD (DC + DW + LL + IM) AT SERVICE LIMIT.
2. BEARINGS AS DESIGNED WILL ALLOW UP TO 1.5 INCHES OF MOVEMENT EACH WAY.
3. DESIGN LOADS ON TOP EDGES OF BRONZE PLATES SHALL BE BEVELED 1°.
4. TOP EDGES OF BRONZE PLATE SHALL BE LUBRICATED IN ACCORDANCE WITH ARTICLE 4190.03, OF THE STANDARD SPECIFICATIONS. THE SUPERSTRUCTURE STRUCTURAL STEEL QUANTITY SHALL INCLUDE ALLOWANCE FOR COST OF BRONZE PLATES.
5. COST OF NEOPRENE SHEETS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL. UNIT PRICE BID FOR STRUCTURAL STEEL QUANTITY. UNIT PRICE BID FOR MASONRY PLATES OR STEEL BEARINGS.

PREFERRED PRESTRESSED CONCRETE BEAMS:

1. THE 1 INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH THICKER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACE OF THE MASONRY PLATES OR STEEL BEARINGS.

DESIGN TEAM:

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN TEAM: [Design Team Name]

SUMMARY QUANTITIES SHEET.
NOTE: STRUCTURAL STEEL WEIGHT DOES NOT INCLUDE CURVED SOLE PLATE.

STEEL BEARINGS - C & D PPCB BRIDGES

STANDARD SHEET 4541A
COUNT: [Count]
PROJECT NUMBER: [Project Number]
SHEET NUMBER: [Sheet Number]
DESIGN TEAM:

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COUNT: [Count]
PROJECT NUMBER: [Project Number]
SHEET NUMBER: [Sheet Number]
DESIGN TEAM:

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DESIGN TEAM:

FILE NO.: [File No.]
COUNT: [Count]
PROJECT NUMBER: [Project Number]
SHEET NUMBER: [Sheet Number]
DESIGN TEAM:
ABUTMENT BEARING NOTES:

The sliding surface of the bronze plate shall be lubricated in accordance with Article 4190.03, of the Standard Specifications. The bronze metal shall be cast bronze. The surface of the bronze plate shall be finished ANSI 125.

PINTLE PLATE DETAILS:

- The pintle plate shall be set in forms when beams are cast and the bottom surface of the pintle plate shall be flat and true.
- The surface of the pintle plate in contact with the structural steel shall be smooth and free of projections due to welding.
- The pintle plate and masonry plate shall be fitted up and the bottom surface of the masonry plate shall be flat and true.

MASONRY PLATE DETAILS:

- The masonry plate shall be 1 inch greater in length and width than the bottom surface of the masonry plate of steel beams.
- The sliding surface of the masonry plate shall be lubricated in accordance with Article 4190.03, of the Standard Specifications.

BRONZE BEARING PLATE DETAILS:

- Top edges of the bronze plate shall be beveled.
- The sliding surface of the bronze plate shall be lubricated in accordance with Article 4190.03, of the Standard Specifications.

DESIGN NOTE:

1. Total vertical design load for all 4 (BTB, BTC, BTD & BTE beams)
2. Load shall be divided among the four beams.
3. Total design load shall not exceed 300 kips.

PLAN OF MASONRY PLATE AND BRONZE PLATE:

- Masonry plate shall be set on a 1½ inch neoprene sheet.
- The masonry plate shall be 1 inch greater in length and width than the bottom surface of the masonry plate of steel beams.
- The masonry plate shall be flat and true.
ABUTMENT BEARING NOTES:

- Surfaces marked "V" shall be finished ANSI 250.
- Pintle plates are part of the superstructure structural steel quantity.
- Cost of laminated sole plates is to be included in the cost bid for pretensioned prestressed concrete beams.
- Cost of neoprene bearing pads shall be considered incidental to the bid item for pretensioned prestressed concrete beams.
- The sole plates and pintle plates shall be galvanized, all welding shall be completed prior to galvanizing. The surface of the pintle plate in contact with the laminated neoprene pads shall be free of projections due to the galvanizing. Sole plates are to be set in forms when beams are cast and the bottom of beams formed out as shown to exclude concrete. Sole plates shall comply with one of the following:
  - ASTM A36 Grade B
  - ASTM A514 Grade B

LAMINATED NEOPRENE PAD / CURVED SOLE & ASSEMBLY

ABUTMENT BEARING (A & B BEAMS)

SECTION A-A

PLAN OF PINTLE PLATE

1. Pintle plates, see detail
2. 1½" x 0'-9 bar
3. 7" x 0'-11 bar
4. 1½" x 0'-11 bar

ALLOWABLE PINTLE THICKNESS

<table>
<thead>
<tr>
<th>ALLOWABLE PINTLE THICKNESS</th>
<th>MAXIMUM VERTICAL LOAD, k</th>
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NEOPRENE BEARING PADS.

LAMINATED NEOPRENE PAD

1. 1½" x 0'-9 stud
2. 1½" x 0'-11 stud
3. 7" x 1'-0 stud

SUMMARY QUANTITIES SHEET.

TOTAL WEIGHS:

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<tr>
<th>WEIGHT</th>
<th>LBS.</th>
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<td>220</td>
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<td>220</td>
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</tr>
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</table>

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.
ABUTMENT BEARING NOTES:

- Surfaces marked "V" shall be finished ANSI 250.
- Surfaces marked "H" shall be finished ASTM A709 Grade HPS 70W or ASTM A514 Grade B.
- Surfaces marked "K" shall be finished ASTM A1011.
- Plated steel to be galvanized.

NEOPRENE BEARING PADS:

- Neoprene pads to be of 50 Durometer Neoprene material for neoprene pads to be of 50 Durometer Neoprene material.

ALLOWABLE PINTLE PLATE THICKNESS:

<table>
<thead>
<tr>
<th>ALLOWABLE THICKNESS</th>
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</table>

VARIABLE DIMENSIONS:

- 1½ x 1½ x 12" STUDS
- 1½ x 1½ x 6 STUDS
- 1½ x 6 STUDS
- 1½ x 12" STUDS
- 1½ x 6" STUDS

STANDARDS:

- ASME A1011
- ASTM A709 Grade HPS 70W
- ASTM A514 Grade B

COST OF NEOPRENE BEARING PADS SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE STRUCTURAL STEEL.

THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PADS SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

THE SOLE PLATES ARE TO BE SET IN FORMS WHEN BEAMS ARE CAST AND THE BOTTOM OF BEAMS FORMED OUT AS SHOWN TO EXCLUDE CONCRETE.

THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PADS SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

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Abutment Bearing Notes:

Surface marked "V" shall be finished ANSI `250.

Pintle plates are a part of the superstructure structural steel quantity.

Cost of anchored curved sole plates is to be included in the price bid.

Cost of neoprene bearing pads shall be considered incidental to the bid item for pre-tensioned, pre-stressed concrete beams.

The sole plates and pintle plates shall be galvanized. All holding shall be completed prior to galvanizing. The surface of the pintle plate in contact with the laminated neoprene pads shall be free of projections due to the galvanizing.

Pintle plates are to be set in forms when beams are cast and the bottom of beams formed but as soon as strand to expose concrete.

Pintle plates shall comply with one of the following:

- ASTM AASHTO Grade E
- ASTM A514 GRADE B

Correlation 04-14 - Added Weight Table & Titles/Description to Agree with Summary Quantities Sheet. Added Note Referring to Summary Quantities Sheet.
PART ELEVATION (LOOKING 1)  

SECTION A-A

SECTION B-B

PLAN VIEW OF MASONRY & PINTLE PLATE

FIXED PIER BEARING NOTES:
- SUPPORT MASONRY 10 FEET OFF PIER AXES FOR PRESTRESSED CONCRETE BEAMS.
- MASONRY PLATE IS TO BE SET ON A NEOPRENE SHEET.
- PINTLE PLATES AND MASONRY PLATES ARE A PART OF THE SUPERSTRUCTURE.

EXPANSION PIER BEARING NOTES:
- PIN TIM Plates are a part of the superstructure. Structural steel quantity.
- Cost of neoprene sheets shall be included in the price bid for prestressed concrete beams.

NOTE: CONCRETE IS TO BE EXCLUDED FROM UNDER THE BEARINGS.

STRUCTURAL STEEL

EXPANSION PIER DIAPHRAGM

EXPANSION PIER

PINTLE PLATE

LAMINATED NEOPRENE PAD

MASONRY PADS TO BE OF 50, 60, OR 70 DUROMETER HARDNESS.

NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS.

NOTE: STRUCTURAL STEEL WEIGHT IS TO BE INCLUDED IN THE PRICE BID FOR PRESTRESSED PRESTRESSED CONCRETE BEAMS.

EXPANSION PIER DIAPHRAGM

EXPANSION PIER

PINTLE PLATE

LAMINATED NEOPRENE PAD

MASONRY PADS TO BE OF 50, 60, OR 70 DUROMETER HARDNESS.

NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS.

NOTE: STRUCTURAL STEEL WEIGHT IS TO BE INCLUDED IN THE PRICE BID FOR PRESTRESSED PRESTRESSED CONCRETE BEAMS.
**Design Stresses:**

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**Reinforcing Bar List**

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**Beam Details**

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**Specifications**

- Design stresses for the following materials are to be in accordance with AASHTO-LRFD load specifications.
- Reinforcing steel in accordance with section 5, Grace 100, AASHTO-LRFD.
- Prestressing steel in accordance with section 5, #400 491.

**Lifting Loop Detail**

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<th>Loop Type</th>
<th>Description</th>
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<tr>
<td>Lifting 02</td>
<td>Loop Type 2</td>
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</table>

**Typical At Both Beam Ends**

**Strand Projection At Beam Ends When Embedded In Concrete End Diaphragms**

**Design Details**

- Beam lengths and exact location of coil ties to be as detailed on specific design sheet.

**Beams**

- Beams are to be designed for ultimate loads as indicated in above table with an allowance of 20 kips square foot of roadway for future loading.

**Prestressing Strands**

- All prestressing strands are to be structural grade.

**Prestressing Steel**

- All prestressing strands shall conform to ASTM A416 in accordance with AASHTO-LRFD.

**Concrete Details**

- Minimum f'ci at release shall be 6,000 psi.
- Total prestress held down force shall be 7,000 kips, minimum prestress release shall be 6,000 kips.

**Steel Details**

- All steel to be designed in accordance with the standard specifications.

**Applications**

- Beams to be designed for ultimate loads as indicated in above table with an allowance of 20 kips square foot of roadway for future loading.

**Sealing Beam Ends**

- Sealing of beam ends shall be as per standard specifications and instructions.

**Specifications**

- Design stresses for the following materials are to be in accordance with AASHTO-LRFD load specifications.
- Reinforcing steel in accordance with section 5, Grace 100, AASHTO-LRFD.
- Prestressing steel in accordance with section 5, #400 491.

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**Design Details**

- Beam lengths and exact location of coil ties to be as detailed on specific design sheet.

**Beams**

- Beams are to be designed for ultimate loads as indicated in above table with an allowance of 20 kips square foot of roadway for future loading.

**Prestressing Strands**

- All prestressing strands are to be structural grade.

**Prestressing Steel**

- All prestressing strands shall conform to ASTM A416 in accordance with AASHTO-LRFD.

**Concrete Details**

- Minimum f'ci at release shall be 6,000 psi.
- Total prestress held down force shall be 7,000 kips, minimum prestress release shall be 6,000 kips.

**Steel Details**

- All steel to be designed in accordance with the standard specifications.

**Applications**

- Beams to be designed for ultimate loads as indicated in above table with an allowance of 20 kips square foot of roadway for future loading.

**Sealing Beam Ends**

- Sealing of beam ends shall be as per standard specifications and instructions.
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT Beam AND END OF Beam.

SYMMETRICAL ABOUT ζ

NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.

~  EPOXY COATED BARS

*  KEEP DEFLECTED STRANDS

SYMMETRICAL ABOUT ζ

SYMMETRICAL ABOUT ζ

SYMMETRICAL ABOUT ζ

SYMMETRICAL ABOUT ζ

SYMMETRICAL ABOUT ζ

A30-A46 BEAM DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN TEAM
A BEAMS - LRFD DESIGN

STANDARD SHEET NO.
COUNT
PROJECT NUMBER

SHEET NUMBER

COUNT


COUNTY

DESIGN SHEET NO.

FILE NO.

PROJECT NUMBER

SHEET NUMBER

NOTE: STRANDS 2M ARE TO BE PLACED IN PAIR.
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT CENTER OF BEAM AND END OF BEAM.

SYMMETRICAL ABOUT E

BEAM A50

SYMMETRICAL ABOUT E

BEAM A55

A50-A55 BEAM DETAILS

NOTE: BARS 4b5 AND 3d ARE TO BE PLACED IN PAIRS.

NOTE: DIMENSIONS AT END OF BEAM

S Y M M E T R I C A L  A B O U T E

A50

A55

EPOXY COATED BARS

DEFLECTED STRANDS

STRAIGHT STRANDS

DEFLECTED STRANDS

COUNTY

DESIGN TEAM

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO.

FILE NO.

PROJECT NUMBER

SHEET NUMBER

STANDARD SHEET 4602

COUNT

PROJECT NUMBER

SHEET NUMBER

A BEAMS - LRFD DESIGN

NOTE: BARS 4b1, 3c1, 3d ARE TO BE PLACED IN PAIRS.
B34 - Beam Details

B34 Beam Cross Section

Beam Dimensions:
- x = 52,000 in.²
- f = 17.06 in.
- A = 382.5 in.²

CROSS SECTION

"B" BEAM

NOTE: STRAIGHT STRANDS

DEFLECTED STRANDS

NOTE: BARS 3c ARE TO

BE PLACED IN PAIRS.

~ DIMENSIONS AT END OF BEAM

~~ EPOXY COATED BARS

COUNTY

DESIGN SHEET NO. 9

FILE NO.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

PROJECT NUMBER

SHEET NUMBER

DESIGN TEAM
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT BOTH END OF BEAM.

- **B55**
  - Dimensions: Same as B59
  - BEAMS - LRFD DESIGN

- **B59**
  - Dimensions: Same as B55

- **B63**
  - Dimensions: Same as B59

- **B67**
  - Dimensions: Same as B55

**NOTE:** BARS 3a AND 4a ARE TO BE PLACED IN PAIRS.
-  Deflected Strands
-  Bars 4a2
-  Bars 4a2
-  Bars 4a2

**COUNTY DESIGN SHEET NO.**

**FILE NO.**

**PROJECT NUMBER**

**SHEET NUMBER**

**DESIGN TEAM**

**IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION**

**B55-B67 BEAM DETAILS**

**EPOXY COATED BARS**

**DIMENSIONS AT END OF BEAM**

**SYMMETRICAL ABOUT x**

**DEFLECTED STRANDS**

**~**
LIFTING LOOP DETAIL

COIL TIE DETAIL

SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM SPECIFICATIONS:

CONSTRUCTION: STANDARDS SPECIFICATIONS OF THE JOINT DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.S.A.R.T. SERIES, SERIES OF 2009, WITH CURRENT MODIFICATIONS.

BEAM NOTES:

- ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR BEARING PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE TOP STRANDS OF BEAMS C30 THROUGH C32 ARE TO BE CUT WITH 0.01 PROJECTIONS. THE BOTTOM STRANDS OF BEAMS C30 THROUGH C32 ARE TO BE CUT WITH 0.003 PROJECTIONS.

- NO. OF STRANDS ARE TO BE CUT WITH 0.003 PROJECTIONS. AT THE BEAM ENDS, BOTTOM STRANDS SHALL BE CUT OFF SO READILY FLOWM. THE CONCRETE.

- BEAM PROJECTIONS AND SHOP BENT UP OR DOWN. THE TOP STRANDS OF BEAMS C30 THROUGH C32 ARE TO BE CUT WITH 0.01 PROJECTIONS. THE BOTTOM STRANDS OF BEAMS C30 THROUGH C32 ARE TO BE CUT WITH 0.003 PROJECTIONS.

- BEAM PROJECTIONS AND SHOP BENT UP OR DOWN. THE TOP STRANDS OF BEAMS C30 THROUGH C32 ARE TO BE CUT WITH 0.01 PROJECTIONS. THE BOTTOM STRANDS OF BEAMS C30 THROUGH C32 ARE TO BE CUT WITH 0.003 PROJECTIONS.

- TOTAL INITIAL TENSION TO BE BASED ON TENSILE TENSILE STRENGTH X 90 % X 90 %. THE MINIMUM INITIAL TENSION TO BE 0.60 TON/IN. FOR DIFFERENT BEAMS AND DIAPHRAGMS, DEFECTIONS WILL BE DIRECTLY PROPORTIONAL.

- DEFLECTIONS DUE TO SLAB AND STEEL DIAPHRAGM. THE DEFLECTIONS SHOWN ARE A BALS OF BEAMS C30 THROUGH C32 ON THE BUILDING DIAPHRAGM AND THE ONE CONCRETE DIAPHRAGM (4 x 1) ON THE BUILDING DIAPHRAGM, C30 THROUGH C32, FOR DIFFERENT BEAMS AND DIAPHRAGMS. DEFECTIONS WILL BE DIRECTLY PROPORTIONAL.

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**C30-C46 Beam Details**

**Beam C30**
- Dimensions: 6' x 6' x 1'
- Bar: 4a2
- Notations:
  - Symmetrical about E
  - Synmetrical about ε

**Beam C34**
- Dimensions: 6' x 6' x 1'
- Bar: 4a2
- Notations:
  - Symmetrical about E
  - Synmetrical about ε

**Beam C38**
- Dimensions: 6' x 6' x 1'
- Bar: 4a2
- Notations:
  - Symmetrical about E
  - Synmetrical about ε

**Beam C42**
- Dimensions: 6' x 6' x 1'
- Bar: 4a2
- Notations:
  - Symmetrical about E
  - Synmetrical about ε

**Beam C46**
- Dimensions: 6' x 6' x 1'
- Bar: 4a2
- Notations:
  - Symmetrical about E
  - Synmetrical about ε

**Notes:**
- Bars 3d are to be placed in pairs.
- Keep dimensions at end of beam.
- Epoxy coated bars.
- Dimensions at end of beam.
- Keep bars 3d placed in pairs.
**C50-C67 BEAM DETAILS**

**C50 BEAM**
- **Dimensions at End of Beam**
- **Epoxy Coated Bars**

**C55 BEAM**
- **Dimensions at End of Beam**
- **Epoxy Coated Bars**

**C59 BEAM**
- **Dimensions at End of Beam**
- **Epoxy Coated Bars**

**C63 BEAM**
- **Dimensions at End of Beam**
- **Epoxy Coated Bars**

**C67 BEAM**
- **Dimensions at End of Beam**
- **Epoxy Coated Bars**

**Notes:**
- Bars 3d are to be placed in pairs.
- Dimensions at end of beam.
- Hot rolled, 116,354 in²
- Y = 20.23 in
- A = 564.5 in²
- b = ~

**Cross Section:**
- Dimensions: 20.23 in²
- Area: 564.5 in²
- Width: ~

**Design Team:**
- ID: [Design Team]
- Contact: [Contact Information]

**Incorporating Design Standards:**
- Highway Bridge Standards
- Design Code:

**File Information:**
- Date: 04/26/2011
- Time: 3:00:18 PM

**Department Information:**
- Iowa Department of Transportation - Highway Division
- Project Number
- Sheet Number
- Design Sheet No.
- Design No.
- File No.
NOTE: Dimensions for the location of the deflected strands are at a beam and end of beam.

NOTE: Bars nos. and nos. are to be placed in pairs.

- Deflected strands
- Keep
- Dimensions at end of beam
- Epoxy coated bars

Beam C71

Beam C75

Beam C80

C71-C80 Beam Details

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN TEAM: C BEAMS - LIND DESIGN
STANDARD SHEET: 4623
COUNT: PROJECT NUMBER: SHEET NUMBER:

BEAM CROSS SECTION

NOTE: DIMENSIONS AT ENDS OF BEAM

COUNTY DESIGN SHEET NO. OF DESIGN NO.
FILE NO.

DESIGN TEAM
COUNT
PROJECT NUMBER

FILE NO.

C71-C80 BEAM DETAILS
### Beam Design Specifications

- **Design Stresses:**
  - Design stresses for the reinforcing materials are to be in accordance with ACI 318-05 specifications.
  - Pre-stressing steel is in accordance with Section 5, Appendix E, concrete in accordance with Section 5, Fpa = 5000 psi.

- **Beam Notes:**
  - If the steel pre-stressing option is allowed and used, all rules must be in the area to accommodate the steel pre-stressing attachments as detailed on the steel pre-stressing data sheet.
  - All PPC beams shall use high performance concrete in accordance with ACI 318-05, Section 5.6.

### Reinforcing Bar List

<table>
<thead>
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### Beam Details

- The contractor shall assure the lateral stability of the beams and guide rails during handling, transporting, and erection by providing temporary spacing as noted.
- If the precast panel option is allowed and used for the beam, the eccentricity and slab placement shall be minimized to avoid any shear connection. The beam shall be check-placed with the top surface of the beam and slab placed as detailed. The beam shall be check-placed with the top surface of the beam and slab placed as detailed.
NOTE: Dimensions for the location of the deflected strands are at each beam and end of beam.

SYMMETRICAL ABOUT |
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT E. BEAM AND END OF BEAM.

D100

D105

D100 & D105 BEAM DETAILS

D BEAMS - LRFD DESIGN

AREA: 438.75 in²

Y = 24.37 in

CROSS SECTION

*D* BEAM CROSS SECTION

NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT E. BEAM AND END OF BEAM.
**BTC Beam Details**

**BTC Beam Data**

<table>
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<th><strong>BTC Beam</strong></th>
<th><strong>Concrete Strength</strong></th>
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**Design Stresses**

The design stresses for the following materials are to be in accordance with the American Institute of Steel Construction (AISC) specifications for Highway Bridges, Series of 2007, Sections 5, Grade 60. Concrete is in accordance with Section 3.6.

**Prestressing Steel**

Prestressing steel in accordance with Section 3.6.

**Lifting Loops**

Lifting loops shall carry a capacity of 2500 lbs.

**Specifications**

Concrete:

Concrete shall be of the specified strength and shall conform to the American Society for Testing and Materials (ASTM) specifications for concrete.

**Reinforcing Bar List**

The reinforcing bar list includes the required bars for each section of the beam. The bars are listed by their type, diameter, and quantity.

**Design Team**

Design team information.

**File Info**

File information: W:\Highway\Bridge\Standards\Bridges\EnglishBeams.dgn   4700   11x17_pdf.pltcfg

**Beam Notes**

- These beams are designed for axial live loads as indicated by the design.
- Prestressing steel shall be Grade 416 high performance concrete (HPC) in accordance with the standard specifications.
- Additional bars may be required to support the superstructure.
- The contractor shall assure the lateral stability of the beam during handling and transportation.
- The beam shall be set in forms when the beam is cast and formed out below the diaphragm attachments as detailed on the steel diaphragm detail sheet.

**Tabular Data**

- The table includes the concrete and steel properties for each beam section.
- The table also shows the prestressed forces for each section.

**Diagram**

The diagram shows the layout of the beam with lifting loops, bending moments, and other relevant details.
STANDARD SHEET 4701

BTC30 BEAM DETAILS

1'-1" = 1'-1" 3 @ 4" 3 @ 9 = 2'-3 2 @ 1'-0 = 2'-0 2 @ 1'-3 = 2'-6 9 9 2 @ 1'-6 = 3'-0; 4c1

BULB TEE "C" BEAM - 30'-0 SPAN

STRAIGHT

END TO END OF BEAM

END OF BEAM

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM

PROPERTY

BEAM SECTION

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS AND 6b3 BARS

TOP VIEW

BEAM SECTION PROPERTIES

BTC BEAM CROSS SECTION

SECTION A-A (ALTERNATE)

SECTION A-A

SECTION B-B

SECTION C-C
STANDARD SHEET 4703
BULB TEE "C" BEAM - 40'-0 SPAN

BTC40 BEAM DETAILS

SECTION A-A
LOCATION OF FOUR BARS IN LIEU OF 5a1 BARS
SEC Elephant Coated Bars

SECTION B-B

SECTION C-C
LOCATION OF FOUR
BARS IN LIEU OF 5a1 AND
STRANDS IF USED
LOCATION OF FOUR
BARS IN LIEU OF 5a2
AND 6b4 BARS

BTC40 BEAM CROSS SECTION

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN
AT BOTH ENDS OF THE BEAM

TOP VIEW

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A
(Alternate)
SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4700.

SECTION B-B

SECTION C-C

BEAM SECTION PROPERTIES

AREA = 691.8 in²
2 = 2074 ksi
2 = 1180 ksi

COUNTY DESIGN SHEET NO. OF DESIGN NO. FILE NO.
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION PROJECT NUMBER SHEET NUMBER
DESIGN TEAM

REVISED 08 -09 - ADDED STRANDS TO SECTIONS A -A, B -B, & C -C.
STANDARD SHEET 4705

BULB TEE "C" BEAM - 50'-0 SPAN

BTC50 BEAM DETAILS

4 @ 9 = 3'-0
4 @ 1'-0 = 4'-0
3 @ 1'-3 = 3'-9
9
9
6 @ 1'-6 = 9'-0; 4c1
2'-2 TYP.

BTC50

SYMMETRICAL ABOUT |
STANDARD SHEET 4706

BTC55 BEAM DETAILS

SECTION A-A

LOCATION OF FOUR STRANDS IN LIEU OF 5a1 BARS

SECTION A-A (ALTERNATE)

SECTION B-B

LOCATION OF FOUR STRANDS IN LIEU OF 5a1 AND 5a2 BARS

SECTION C-C

BTC BEAM CROSSECTION

BTC55 BEAM DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
STANDARD SHEET 4707

BTC60 BEAM DETAILS

4 @ 9 = 3'-0
5 @ 1'-0 = 5'-0
5 @ 1'-3 = 6'-3
9

7 @ 1'-6 = 10'-6; 4c1

BTC60

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A (ALTERNATE)

SECTION B-B

SECTION C-C

BTC60 BEAM CROSS SECTION
STANDARD SHEET 4711

BTC80 BEAM DETAILS

BULB TEE "C" BEAM - 80'-0 SPAN

6 @ 9 = 4'-6
9 @ 1'-0 = 9'-0
5 @ 1'-3 = 6'-3

SYMMETRICAL ABOUT |

<table>
<thead>
<tr>
<th>4h1</th>
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<th>4d1</th>
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81'-4 END TO END OF BEAM
80'-0 | TO | OF BEARINGS

<table>
<thead>
<tr>
<th>4e1</th>
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</thead>
</table>

BTC80

8'-0

2

10 @ 1'-6 = 15'-0;  4c1
2'-2 TYP.

11 @ 1'-6 = 16'-6;  5b1, 4c1, 4d1

END OF BEAM

DIMENSIONS AT
STRAINS

STRAINS

STRAIGHT

BEARING

BEARING

SEC. A-A

SEC. B-B

SEC. C-C

BTC80 BEAM DETAILS

COUNTY DESIGN SHEET NO.

FILE NO.

PROJECT NUMBER

SHEET NUMBER

DESIGN TEAM

SECTION BTC BEAM CROSS

PROPERTIES

BEAM SECTION

LOCATION OF FOUR FLANGE (TYP.)

TOP VIEW

LOCATION OF FOUR FLANGE (TYP.)

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4700.

LOCATION OF FOUR FLANGE (TYP.)

SECTION A-A

SECTION B-B

SECTION C-C

EPOXY COATED BARS

TYP.

TYP.

TYP. 2

TYP. 2

5a1 BARS

LOCATION OF FOUR STRANDS IF USED

LOCATION OF FOUR STRANDS IF USED

IN LIEU OF 5a1 AND STRANDS IF USED

LOCATION OF FOUR STRANDS IF USED

5a2 BARS

5a2 BARS

IN LIEU OF 5a1 AND STRANDS IF USED

IN LIEU OF 5a1 AND STRANDS IF USED

LOCATION OF FOUR STRANDS IF USED

LOCATION OF FOUR STRANDS IF USED

IN LIEU OF 5a1 AND STRANDS IF USED

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LOCATION OF FOUR STRANDS IF USED

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IN LIEU OF 5a1 AND STRANDS IF USED

IN LIEU OF 5a1 AND STRANDS IF USED

LOCATION OF FOUR STRANDS IF USED

LOCATION OF FOUR STRANDS IF USED

IN LIEU OF 5a1 AND STRANDS IF USED

IN LIEU OF 5a1 AND STRANDS IF USED
BTC90 BEAM DETAILS

SECTION A-A

SECTION B-B

SECTION C-C

BTC90 BEAM CROSS SECTION

BEAM SECTION PROPERTIES

TOP VIEW

TOP FLANGE LONGITUDINAL BAR LAYOUT

STANDARD SHEET 4713

BULB TEE "C" BEAM - 90'-0 SPAN

BTC90

COUNT

PROJECT NUMBER

DESIGN TEAM

DESIGN SHEET NO.

FILE NO.

COUNTY DESIGN SHEET NO.

OF

OF

AREA = 0.844 $in^2$

$2_\sigma_{max} = 2074 $ psi

3.2 $ = 4.10_\sigma_{max}$

SECTION A-A

ALTERNATE

SECTION B-B

STANDARD SHEET 4713

ISOA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
STANDARD SHEET 4714
BULB TEE "C" BEAM - 95'-0 SPAN

BTC95 BEAM DETAILS

96'-4 END TO END OF BEAM
95'-0 | TO | OF BEARINGS

PROPERTIES
BEAM SECTION

SECTION C-C

AREA = 601.8 in²
W = 207.4 in³
C x 115.3 in

TOP FLANGE LONGITUDINAL BAR LAYOUT

LOCATION OF FOUR STRANDS @ END OF BEAM
- LINES OF 5b1 AND 4c1, 4d1

1'-4 = 1'-4
6 @ 2 in
2'-6

~ EPOXY COATED BARS
TYP. 2
1" CL.

5a2 BARS
IN LIEU OF 5a1 AND STRANDS IF USED
LOCATION OF FOUR FLANGE (TYP.)
OF BEAM
BEAM SECTION PROPERTIES
BTC BEAM CROSS SECTION

BTC95 BEAM DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

COUNTY DESIGN SHEET NO.
OF
FILE NO.

PROJECT NUMBER
SHEET NUMBER
DESIGN TEAM

SECTION A-A

SECTION A-A (ALTERNATE)
SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4700.

LOCATION OF FOUR STRANDS @ END OF BEAM
- LINES OF 5b1 AND 4c1, 4d1

2'-2 MIN.

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM
STANDARD SHEET 4716

BULB TEE "C" BEAM - 105'-0 SPAN

BTC105 BEAM DETAILS

BEARING

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A (ALTERNATE)

SECTION B-B

SECTION C-C

BTC105 BEAM DETAILS

SECTION A-A

BEAM SECTION PROPERTIES

BTC105 BEAM CROSS

SECTION
STANDARD SHEET 4718
BULB TEE "C" BEAM - 115'-0 SPAN

BTC115 BEAM DETAILS

SECTION A-A
(Alternating)

SECTION B-B

SECTION C-C

BTC115 BEAM DETAILS
THE STANDARD SPECIFICATIONS.

BEAM DESIGN:

- 5% nominal hang, grade 270 strand, and grade 60 reinforcing steel.
- Concrete grade: 3000 psi.

STATIC LOADS:

- Live load: 20 kips.
- Dead load: 50 kips.
- Wheel load: 15 kips.

SPANS:

- 20'-6" span with a 5% overhang.
- 20'-0" span with a 5% overhang.

REINFORCING STEEL:

- Three 1" diameter bars on the top flange.
- Three 1" diameter bars on the bottom flange.

STRENGTH:

- Ultimate strength: 270 ksi.
- Modulus of elasticity: 20,000 psi.

PRESTRESSING STEEL:

- Grade 270 strand.
- Minimum breaking strength: 160 kips.

ELASTIC DEFLECTIONS:

- Maximum deflection: 1/360 of the span.
- Minimum deflection: 1/600 of the span.

BEAM NOTES:

- Beams are designed for normal live loads and are to be reinforced with grade 270 strand.
- All beams are to be shop bent as shown.

BEAM INSTALLATION:

- Beams are to be set in place with the top flange flush with the concrete.
- The bottom flange is to be level with the concrete.

CONCRETE:

- Concrete grade: 3000 psi.
- Minimum slump: 2-3 inches.

SEALING:

- Seal all cut ends of the beam with a suitable sealer.
- Seal all exposed concrete.

ANCHORAGE:

- Anchorages are to be installed in accordance with the standard specifications.
- Anchorages are to be shop bent as shown.

OVERHANG:

- Maximum overhang: 1/12 of the span.
- Minimum overhang: 1/24 of the span.

BEARING SHEETS:

- Bearing sheets are to be installed in accordance with the standard specifications.
- Bearing sheets are to be shop bent as shown.

THE CONTRACTOR SHALL ASSURE THE LATERAL STABILITY OF THE BEAMS.

THE CONTRACTOR SHALL ASSURE THE LEVELING OF THE BEAMS.
STANDARD SHEET 4731
BULB TEE "D" BEAM - 50'-0 SPAN

SYMMETRICAL ABOUT C

50'-0 TO C OF BEARINGS
A END TO END OF BEAM

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A (ALTERNATE)
SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4730.

BEAM SECTION PROPERTIES
BTD BEAM CROSS SECTION

LOCATION OF FOUR STRANDS IF USED IN LANE OF 5b1 AND 4c1 BARS

AREA = 740.0 in²
γ = 25,634 lb
I = 209,664 in⁴

LOCATION OF FOUR STRANDS IF USED IN LANE OF 5a1 AND 5a2 BARS

LOCATION OF FOUR STRANDS IF USED IN LANE OF 5b1, 4c1, 4d1

BTD50 BEAM DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
COUNTY DESIGN SHEET NO. OF DESIGN NO. FILE NO.
PROJECT NUMBER SHEET NUMBER
DESIGN TEAM

RÉVISION 08-09 - ADDED STRANDS TO SECTIONS A-A, B-B, & C-C.

EPOXY COATED BARS

~6b3 BARS IN LIEU OF 5a1 STRANDS IF USED
LOCATION OF FOUR STRANDS IF USED IN LANE OF 5b1

FLANGE (TYP.)
TOP VIEW

TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.
THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

LOCATION OF FOUR STRANDS IF USED IN LANE OF 5b1, 4c1, 4d1

1'-1 3 @ 4
1'-11 6 @ 11
1'-1 3 @ 4
1'-11 6 @ 11
BTD75 BEAM DETAILS

SECTION A-A
(ALTERNATE)

LOCATION OF FOUR STRANDS IF USED IN END OF 504'
BARS

AA EPOXY COATED BARS

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN END OF 504'
AND 1020 BARS

SECTION C-C

THE TOP FLANGE BEAM CORNERS ARE TO BE
CHAMFERED 2" AS SHOWN
AT BOTH ENDS OF THE BEAM.

CORNERS ARE TO BE
THE TOP FLANGE BEAM
2" TO TOP
2" TOP
1" CL.
MIN.

TYP. 2
1" CL.
MIN.

~`6b3
BARS
IN LIEU OF 5a1
STRANDS IF USED
LOCATION OF FOUR
FLANGE (TYP.)
OF BEAM
TOP VIEW
TOP FLANGE LONGITUDINAL BAR LAYOUT

AREA = 748.8 in²
σ = 2564 psi
E = 205,000 MPa

BTD75 BEAM CROSS SECTION

BEAM SECTION PROPERTIES

STANDARD SHEET 4730.
SEE ALTERNATE BAR NOTE ON
STANDARD SHEET 4730.

LOCATION OF FOUR
STRANDS IF USED
IN END OF 504'
BARS

AA EPOXY COATED BARS

SECTION A-A

THE TOP FLANGE BEAM CORNERS ARE TO BE
CHAMFERED 2" AS SHOWN
AT BOTH ENDS OF THE BEAM.

CORNERS ARE TO BE
THE TOP FLANGE BEAM
2" TO TOP
2" TOP
1" CL.
MIN.

TYP. 2
1" CL.
MIN.

~`6b3
BARS
IN LIEU OF 5a1
STRANDS IF USED
LOCATION OF FOUR
FLANGE (TYP.)
OF BEAM
TOP VIEW
TOP FLANGE LONGITUDINAL BAR LAYOUT

AREA = 748.8 in²
σ = 2564 psi
E = 205,000 MPa

BTD75 BEAM CROSS SECTION

BEAM SECTION PROPERTIES

STANDARD SHEET 4730.
SEE ALTERNATE BAR NOTE ON
STANDARD SHEET 4730.

LOCATION OF FOUR
STRANDS IF USED
IN END OF 504'
BARS

AA EPOXY COATED BARS

SECTION A-A

THE TOP FLANGE BEAM CORNERS ARE TO BE
CHAMFERED 2" AS SHOWN
AT BOTH ENDS OF THE BEAM.

CORNERS ARE TO BE
THE TOP FLANGE BEAM
2" TO TOP
2" TOP
1" CL.
MIN.

TYP. 2
1" CL.
MIN.

~`6b3
BARS
IN LIEU OF 5a1
STRANDS IF USED
LOCATION OF FOUR
FLANGE (TYP.)
OF BEAM
TOP VIEW
TOP FLANGE LONGITUDINAL BAR LAYOUT

AREA = 748.8 in²
σ = 2564 psi
E = 205,000 MPa

BTD75 BEAM CROSS SECTION

BEAM SECTION PROPERTIES

STANDARD SHEET 4730.
SEE ALTERNATE BAR NOTE ON
STANDARD SHEET 4730.
BTD80 BEAM DETAILS

LOCATION OF FOUR STRANDS IF USED IN END OF 5b1 AND 5a2 BARS

LOCATION OF FOUR STRANDS IF USED IN END OF 5b1 AND 5a2 BARS

AREA = 740.8 in²
f = 25,664 ksi
I = 219,960 in⁴

BEAM SECTION PROPERTIES

BTD BEAM CROSS SECTION

TOP VIEW

TOP FLANGE LONGITUDINAL BAR LAYOUT

TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

THE TOP FLANGE BEAM LONGITUDINAL BARS ARE TO BE EPOXY COATED BARS IN LIEU OF 5a1 AND 5a2 BARS.

SECTION A-A

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4720.

SECTION B-B

SECTION C-C
BTD115 BEAM DETAILS

STANDARD SHEET 4744

BULB TEE "D" BEAM - 115'-0 SPAN

END OF BEAM

STANDARD SHEET 4740

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4730.

TOP FLANGE LONGITUDINAL BAR LAYOUT

LOCATION OF FOUR STRANDS IF USED IN END OF 5b1 AND 4c1 BARS

LOCATION OF FOUR STRANDS IF USED IN END OF 5b1 AND 4c1 BARS

AAA EPOXY COATED BARS

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4730.

SECTION A-A

SECTION B-B

SECTION C-C

BTD115 BEAM CROSS SECTION

BEAM SECTION PROPERTIES

AREA = 746.8 in²
S = 25643 in
I = 203,066 in⁴

REVIEWED 10-07 - 5b2 BAR DELETED. 5b1 BAR LENGTHENED TO EXTEND 5 INCHES ABOVE BEAM TOP.

COUNTY DESIGN SHEET NO.

FILE NO.

DESIGN TEAM

FILE NO.

DESIGN TEAM

COUNTY DESIGN SHEET NO.

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DESIGN TEAM

FILE NO.
**LIFTING LOOP DETAIL**

**LIFTING LOOP AND OVERHANG TABLE**

<table>
<thead>
<tr>
<th>Beam</th>
<th>Lifting Loops</th>
<th># of Strands</th>
<th>Loop</th>
<th>Beam ( Narrative)</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**COIL TIE DETAIL**

Alternate Bar Notes:

- ALTERNATE BARS SHOWN IN BOTH DETAIL SHEETS MAY BE USED IN LIEU OF REINFORCING BARS SHOWN IN BAR SHEETS, NO ADDITIONAL PAYMENT SHALL BE MADE FOR USE OF ALTERNATE BARS.

**REINFORCING BAR LIST**

<table>
<thead>
<tr>
<th>Beam</th>
<th>6b4</th>
<th>5b1</th>
<th>6b3</th>
<th>5b2</th>
<th>5p1</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**BEAM NOTES:**

- All beams designed for AASHTO live loads as indicated in applicable table with an allowance of 20 lb for each inch of live load deflection at the center of the beam.
- All beams shall use high-performance concrete in accordance with the standard specifications. All beams shall be cast with minimum 270 ksi prestressing steel.
- Release is located in the items beam data table above, four 3/8 inch diameter strands at not more than 20 lb each may be used in lieu of bars sub and 502 in the top flange.
**LIFTING LOOP AND OVERHANG TABLE**

**BEAMS**

<table>
<thead>
<tr>
<th>BEAMS</th>
<th>LENGTH</th>
<th>No. of Strands</th>
</tr>
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<tbody>
<tr>
<td>NO.</td>
<td>LENGTH</td>
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<tr>
<td>12</td>
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<td>24</td>
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<td>48</td>
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</table>

**SPECIAL**

<table>
<thead>
<tr>
<th>BEAMS</th>
<th>LENGTH</th>
<th>No. of Strands</th>
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<tbody>
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<td>NO.</td>
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</table>

**LIFTING LOOP DETAIL**

1. **LIFTING LOOP DETAIL**
   - **DIMENSIONS:**
     - Lifting Loop Height: 12" (305 mm)
     - Lifting Loop Diameter: 6" (152 mm)
     - Lifting Loop Spacing: 7'-8" (234 mm)
     - Lifting Loop Length: 4'-0" (1.22 m)

2. **COIL TIE DETAIL**
   - **COIL TIES:**
     - AA 5b1 and 6b3 bars to be epoxy coated
     - # 630 and 8b4 bars to be used in pairs

3. **REINFORCING BAR LIST**
   - Bar Sizes: 5b1, 6b3

**BTB BEAM DATA**

- **BEAM NOTES:**
  - **BEAM NOTES:**
    - All bars at the ends of beams at stud locations shall be cut off at a distance of 15% of the beam span from the face of the beam. Minimum concrete cover shall be provided at the ends of the beams. Minimum concrete cover shall be provided at the ends of the beams.
    - All bars at the ends of beams at stud locations shall be cut off at a distance of 15% of the beam span from the face of the beam. Minimum concrete cover shall be provided at the ends of the beams. Minimum concrete cover shall be provided at the ends of the beams.

- **ALTERNATE BAR NOTES:**
  - All bars at the ends of beams at stud locations shall be cut off at a distance of 15% of the beam span from the face of the beam. Minimum concrete cover shall be provided at the ends of the beams. Minimum concrete cover shall be provided at the ends of the beams.
STANDARD SHEET 4751

BTB30 BEAM DETAILS

BULB TEE "B" BEAM - 30'-0 SPAN

1 @ 9 = 1'-6
2 @ 1'-3 = 2'-6
3 @ 1'-6 = 4'-6

S Y M M E T R I C A L ABOUT | BEARING

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5A1 BARS

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5A1 BARS

SECTION C-C

TOP VIEW

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

BEAM SECTION PROPERTIES

AREA = 637.4 in²
FLEXURAL MODULUS = 4,790千 kips/in²

IN LIEU OF 5A1 BARS
STRANDS IF USED
LOCATION OF FOUR

TYP. 2 1" CL.

TYP. 2 1" CL.

(LATERNATE)
STANDARD SHEET 4752

BULB TEE "B" BEAM - 35'-0 SPAN

BTB35 BEAM DETAILS

1 @ 9 = 1'-6
2 @ 1'-0 = 2'-0
2 @ 1'-3 = 2'-6
9

4 @ 1'-6 = 6'-0; 4c1

SYMMETRICAL ABOUT |

2-6b3
2-6b4
4c1
4h1
5b1
4d1

36'-4 END TO END OF BEAM
35'-0 | TO | OF BEARINGS

SECTION A-A

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5@1 BARS

(A) EPOXY COATED BARS

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5@1 BARS

(A) EPOXY COATED BARS

SECTION C-C

END OF BEAM

TOP FLANGE LONGITUDINAL BAR LAYOUT

BEAM SECTION PROPERTIES

AREA = 6347 in²

1.5 x 12 in. x 7 in.

PROPERTIES

BEAM SECTION

SECTION C-C

4c1
4h1
4d1

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

END OF BEAM

TOP VIEW

2@5b1, 2@4c1, 2@4d1

TOTAL 4h1 BARS

2@5b2

(A) EPOXY COATED BARS

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5@1 BARS

END OF BEAM

TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

COUNTY DESIGN SHEET NO.
OF DESIGN NO.
FILE NO.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

BEARING

SECTION A-A

2
5
4c1
4d1

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

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(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

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(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)

MIN. 1" CL.

(TYP. 2)
STANDARD SHEET 4754

BTB45 BEAM DETAILS

BULB TEE "B" BEAM - 45'-0 SPAN

2 @ 9 = 1'-6
3 @ 1'-0 = 3'-0
4 @ 1'-3 = 5'-0
9
9
5 @ 1'-6 = 7'-6; 4c1

SYMMETRICAL ABOUT |

4h1
5b1
4d1

46'-4 END TO END OF BEAM

45'-0 | TO | OF BEARINGS

BTB45

8
4

2'-2 TYP.

6 @ 1'-6 = 9'-0; 5b1, 4c1, 4d1

SECTION A-A
LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION A-A (ALTERNATE)
SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4750.

SECTION B-B

SECTION C-C

BEAM SECTION PROPERTIES

A = 631.7 in²
y = 17.14 in.
º = 99,980` in·lb

TOP FLANGE LONGITUDINAL BAR LAYOUT

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

IN LIEU OF 5a1 BARS STRANDS IF USED LOCATION OF FOUR

SECTION B-B

END OF BEAM

END OF BEAM

6 LINES

END OF BEAM

2'-2 MIN.

MIN. 1" CL.

MIN. 1" CL.

MIN. 1" CL.

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM

END OF BEAM

TOP VIEW

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION B-B

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION B-B
STANDARD SHEET 4755
BULB TEE "B" BEAM - 50'-0 SPAN

4 @ 9 = 3'-0
4 @ 1'-0 = 4'-0
4 @ 1'-3 = 5'-0
9
9
5 @ 1'-6 = 7'-6; 4c1
2'-2 TYP.

SYMMETRICAL ABOUT |
| | |
4h1
5b1
5c1
5d1

51'-4 END TO END OF BEAM
50'-0 | TO | OF BEARINGS

BTB50

8
4

8 @ 6 = 4'-0

SECTION A-A
LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS
AS EPOXY COATED BARS

SECTION A-A (ALTERNATE)
SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4750.

SECTION B-B
LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION C-C

BEAM SECTION PROPERTIES

BTB BEAM CROSS SECTION

**STANDARD SHEET 4757**

**BULB TEE "B" BEAM - 60'-0 SPAN**

**BTB60 BEAM DETAILS**

### STRAIGHT STRANDS

- 6 @ 1'-3 = 7'-6
- 6 @ 1'-6 = 9'-0
- 4 @ 9 = 3'-0
- 5 @ 1'-0 = 5'-0

### DEFLECTED STRANDS

- 9 @ 2 = 1'-8
- 4

~ END OF BEAM

**DEFLATED STRANDS**

- END OF BEAM

**DIMENSIONS AT ENGLISH BEAMS.DGN - 4757 - THIS SHEET IS ISSUED 02-08.**

**COUNTY DESIGN SHEET NO.**

**FILE NO.**

**IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION**

**PROJECT NUMBER**

**SHEET NUMBER**

**DESIGN TEAM**

**SECTION**

**BTB BEAM CROSS-SECTION A-A**

<table>
<thead>
<tr>
<th>FLANGE (TYP.)</th>
<th>PANELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP VIEW</td>
<td>END OF BEAM</td>
</tr>
</tbody>
</table>

**SECTION B-B**

<table>
<thead>
<tr>
<th>PANELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-2</td>
</tr>
</tbody>
</table>

**SECTION C-C**

<table>
<thead>
<tr>
<th>PANELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-5</td>
</tr>
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</table>

**BEAM SECTION PROPERTIES**

<table>
<thead>
<tr>
<th>AREA</th>
<th>Moment of Inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>631.7 in²</td>
<td></td>
</tr>
</tbody>
</table>

**FLANGE (TYP.)**

- Top Flange Beam 2" Top
- Chamfered 2" as shown
- Corners are to be finished

**LOCATION OF FOUR IN LIEU OF 5a1 BARS**

- 1" CL. MIN.

**BEARING**

- Epoxy coated bars

**3-LOCUS TRANSITIONS**

**SUBJECT TO CHANGE. NOT FOR CONSTRUCTION.**

**DESIGNER:**

**REVIEWER:**

**APPROVER:**
STANDARD SHEET 4758

BULB TEE "B" BEAM - 65'-0 SPAN

6 @ 1'-0 = 6'-0
6 @ 1'-3 = 7'-6
66'-4 END TO END OF BEAM
65'-0 | TO | OF BEARINGS

2 @ 2
4 @ 2 = 1'-8
4

STRANDS

DEFORMED

DIMENSIONS AT 5b1, 4c1, 4d1

BULLB TEE "B" BEAM - 75'-0 SPAN

STANDARD SHEET 4760

D E F L E C T I O N
S T R A I G H T

76'-4 END TO END OF BEAM
75'-0 | TO | OF BEARINGS
BTB75

6 @ 1'-0 = 6'-0
6 @ 1'-3 = 7'-6
9 @ 1'-6 = 13'-6;  4c1

BEAM SECTION PROPERTIES

SECTION A-A

SECTION A-A (ALTERNATE)

SECTION B-B

SECTION C-C

DRAG REASONS - FIX - FILL - BOOKMARK - SETUP
COUNTY
DESIGN SHEET NO.

FILE NO.
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
PROJECT NUMBER
SHEET NUMBER
DESIGN TEAM

SECTION C-C

BEAM SECTION PROPERTIES

TOP VIEW

THE TOP FLANGE BAR CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

TOP FLANGE LONGITUDINAL BAR LAYOUT

END OF BEAM

END OF BEAM

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

END OF BEAM

END OF BEAM

FLANGED (TYP.)

TOP VIEW

END OF BEAM

END OF BEAM

END OF BEAM
STANDARD SHEET 4761

BTB80 BEAM DETAILS

BULB TEE "B" BEAM - 80'-0 SPAN

2 @ 2
2 @ 2
13 @ 2 = 2'-2

DEFLECTED STRANDS
DEFLECTED STRANDS

D E F L E C T E D
S T R A I G H T
S T R A I G H T

8'-0
7 @ 9 = 5'-3
7 @ 1'-0 = 7'-0
6 @ 1'-3 = 7'-6

END OF BEAM
DIMENSIONS AT 5b1, 4c1, 4d1

BEAM SECTION PROPERTIES

TOP VIEW

SECTION A-A (ALTERNATE)
SECTION A-A
SECTION B-B
SECTION C-C

BTB80 BEAM CROSS
SECTION

TOP FLANGE LONGITUDINAL BAR LAYOUT
BTB95 BEAM DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

SECTION A-A

LOCATION OF FOUR STRANDS IF USED IN LUG OF 5a1 AND 5b1 BARS

LOCATION OF FOUR STRANDS IF USED IN LUG OF 5a1 AND 5b1 BARS

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4764.

SECTION B-B

SECTION C-C

BEAM SECTION PROPERTIES

AREA = 631.7 in²
P = 12,414 kips
I = 49,456 in⁴

BTB BEAM CROSS SECTION

TOP VIEW

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

TOP FLANGE LONGITUDINAL BAR LAYOUT

MIN. 1" CL.

IN LUG OF 5a1 AND 5b1 BARS

5a1 BARS IN LIEU OF 5a1 AND STRANDS IF USED

LOCATION OF FOUR 5b1 BARS IN LIEU OF 5a1 AND STRANDS IF USED

MIN. 1" CL.

(1) CL.

(2) CL.

5a2 BARS IN LIEU OF 5a1 AND STRANDS IF USED

LOCATION OF FOUR 5b1 BARS IN LIEU OF 5a1 AND STRANDS IF USED

MIN. 1" CL.

LOCATION OF FOUR 5b1 BARS IN LIEU OF 5a1 AND STRANDS IF USED

MIN. 1" CL.

MIN. 1" CL.

MIN. 1" CL.

MIN. 1" CL.

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MIN. 1" CL.
Design Stresses:
- Design stresses for the following materials are to be in accordance with standard sizes and design specifications for highway bridges, series of 2001, reinforcing steel in accordance with Section 5, Grade 60.
- Prestressing steel in accordance with Section 5, Grade 270.

Specifications:
- Construction: Standard specifications of the Iowa Department of Transportation – Highway Division.
- Prestressing in accordance with Section 5, Grade 270.

Alternate Bar Notes:
- Alternate bars in bent bar details may be used in lieu of reinforcing bars shown in bar lists. No additional payment shall be made for use of alternate bars.

Reinforcing Bar List:
- All bars shown in bent bar details are to be epoxy coated.
- Additional bars may be used for use of alternate bars.

Bent Bar Details:
- Bent bars are detailed as shown below.
- Bars may be used for use of alternate bars.

BTB Beam Data:
- Beams are designed for 88% live loads as indicated in the beam table with an allowance of 20% for future loading.
- Beam tables include high performance concrete in accordance with standard specifications.
- Lifting loops shall be placed at the ends of beams.
- Concrete shall be at least 28 days old for construction.
- Steel shall be Grade 270.
- Bars shall be epoxy coated.

Beam Notes:
- These beams are designed for aesthetic live loads as indicated in the beam table with an allowance of 20% for future loading.
- All beams shall be designed for high performance concrete in accordance with the standard specifications.
- Lifting loops shall be placed at the ends of beams.
- Concrete shall be at least 28 days old for construction.
- Steel shall be Grade 270.
### BTE Beam Data

| Beam No. | No. of Diaphragms | Concrete Strength | f'c (psi) | f'ci (psi) | Max. Deflection | Time to Relaxation | Load Factor | Residual Force
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>T105</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>2383</td>
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<td>4500</td>
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<td>3600</td>
<td>2213</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
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<tr>
<td>T115</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>2042</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
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<td>T120</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>1788</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
</tr>
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<td>T125</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>1617</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
</tr>
<tr>
<td>T130</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>1361</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
</tr>
<tr>
<td>T135</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>1276</td>
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<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>1021</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
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<td>T145</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>936</td>
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<td>10.0</td>
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<td>T150</td>
<td>3</td>
<td>4500</td>
<td>4400</td>
<td>3600</td>
<td>851</td>
<td>21.8</td>
<td>20.5</td>
<td>10.0</td>
</tr>
</tbody>
</table>

### Design Stresses:

Design stresses for the following materials are to be in accordance with the latest lift using design specifications for highway bridges, series of 2007, reinforcing steel in accordance with Section 5, Grade 60, concrete in accordance with Section 5, Grade 70.

### Specifications:

Construction standards specifications of the Iowa Department of Transportation, current series, with current applicable special provisions and supplemental specifications.

Design details, lift, series of 2007, with minor modifications.

### Beam Notes:

- All beams shall be increased in length to compensate for relaxation strands. Minimum breaking strength is 58.6 kips.
- All prestressing strands except lifting loop strands shall be 3/8" nominal diameter normal steel area = 0.8582 sq. ft. and grade 70.
- Reliability of all prestressed beams shall be 1.37.
- Tops of beams are to be struck off level and finished as per materials in accordance with IFC570.
- All beams are to be increased in length to compensate for relaxation strands. Minimum breaking strength is 58.6 kips.

### Temporary Bracing:

Providing temporary bracing as needed.

### Diaphragm Attachments:

Diaphragm attachments as detailed on the steel diaphragm for elastic shortening, creep and shrinkage.

### Roughened Surface:

Roughened for a distance of 10" from the beam end.

### Bridge Engineer Approval:

Time is approved by the bridge engineer.

### Old Slab Concrete:

Old slab concrete is to be at least 28 days old before the floor is placed unless a shorter curing period is approved by the bridge engineer.

### Future Wearing Surface:

Concrete in accordance with Section 5.

###Hole Placement:

Holes must be cast in the web to accommodate the steel diaphragm attachments as detailed on the steel diaphragm data sheet. If sole plate is required for bearing, sole plate is to be set in place. Bearings are to be placed under the beam for support. If sole plate is to be used, the sole plate is to be supported on the beam end. Concrete placement must be done with care to avoid damage to the concrete surface.

### Steel Diaphragm:

Steel diaphragm weights, deflections will be directly proportional to the centerline for BTE125 to BTE150. For different slab and diaphragms, the deflections due to the combined effect of slab and shrinkage of slab, diaphragm weight, and deflections due to creep due to slab and shrinkage of slab, diaphragm weight, and deflections due to creep due to slab and shrinkage of slab.

### Relaxed and Applied:

Relaxed and applied stress is 3000 psi for simple span and 3500 psi for continuous bridge.
LIFTING LOOP AND OVERHANG TABLE

<table>
<thead>
<tr>
<th>BEAM</th>
<th>NO. of Strands in Loop</th>
<th>D (in. of Coverage of Loop)</th>
<th>Lifting Loops to be Placed on Overhang of Beam</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTE150</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE145</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE135</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE120</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE105</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
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<tr>
<td>BTE75</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE65</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE55</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE45</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
<tr>
<td>BTE35</td>
<td>2</td>
<td>3, 5, 8</td>
<td>x</td>
</tr>
</tbody>
</table>

* Lifting loops shall be epoxy coated.

** All bars shown in bent bar details may be used in lieu of reinforcing bars shown in bar list. No additional payment shall be made for use of alternate bars.

BENT BAR DETAILS

- STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE ENDS DIAPHRAGMS

- COIL TIE DETAIL

- ALTERNATE BAR NOTES:
  - Alternate bars shown in bent bar details may be used in lieu of reinforcing bars shown in bar list. No additional payment shall be made for use of alternate bars.
BTE65 BEAM DETAILS

STANDARD SHEET 4772

BULB TEE "E" BEAM - 65'-0 SPAN

4 @ 9 = 3'-0
4 @ 1'-0 = 4'-0
2 @ 1'-3 = 2'-6

SYMMETRICAL ABOUT |

BTE65

COUNTY DESIGN SHEET NO. 4772 - THIS SHEET IS ISSUED 02-08.
REVISED 08-09 - ADDED STRANDS TO SECTIONS A-A, B-B, & C-C.

BEAM SECTION PROPERTIES

AREA = 807.4 1/2
Iy = 28,760 in
J = 402,760 1/4

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4770.

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

TOP FLANGE LONGITUDINAL BAR LAYOUT

TOP VIEW

BTE65 BEAM CROSS SECTION

BTE BEAM CROSS SECTION

SECTION A-A

SECTION B-B

SECTION C-C

TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

TOP FLANGE BEAM BAR LAYOUT

2'-2 MIN.

LOCATION OF FOUR BARS IN LIEU OF 5a1 STRANDS IF USED

LOCATION OF FOUR BARS IN LIEU OF 5a1 STRANDS IF USED

2'-10" CL.

2" CL.

2'-2" CL.

2" TOP

4" FLANGE TYP.

2'-2" TOP

2" TOP

2" TOP
BTE70 BEAM DETAILS

STANDARD SHEET 4770

BULB TEE "E" BEAM - 70'-0 SPAN

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4770.

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

LOCATION OF FOUR STRANDS IF USED IN LIEU OF 5a1 BARS

SECTION B-B

SECTION C-C

BEAM SECTION PROPERTIES

BTE BEAM CROSS SECTION

AREA = 807.4 in²
\( f_y = 29,700 \) psi
\( f_y = 402,760 \) psi

FLANGE (TYP.) OF BEAM

TOP VIEW

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.


4H1 5B1 4C1 4D1

1'-3 = 5'-0

4 @ 9 = 3'-0

9

4 @ 1'-0 = 4'-0
BTE85 BEAM DETAILS

STANDARD SHEET 4776

BULB TEE "E" BEAM - 85'-0 SPAN

4 @ 9 = 3'-0
6 @ 1'-0 = 6'-0
6 @ 1'-3 = 7'-6

8'-0 E TO E OF BEARINGS
86'-4 END TO END OF BEAM

COUNTY DESIGN SHEET NO.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

TYP. 2 ~ epoxy coated bars

TOP FLANGE LONGITUDINAL BAR LAYOUT

SECTION A-A (ALTERNATE) SEE ALTERNATE BAR NOTE ON STANDARD SHEET 4770 (SHEET 2A)

LOCATION OF FOUR STRANDS IF USED IN LAYERS OF 5@1 AND 5@2 STRANDS

END OF BEAM

TOP VIEW

BEAM SECTION PROPERTIES

AREA = 807.4 in²
\( \gamma = 28,700 \text{ lb/ft} \)
\( \gamma = 422,790 \text{ in} \cdot \text{lb/in} \)

SYMMETRICAL ABOUT A

SECTION A-A

SECTION B-B

SECTION C-C

BTE BEAM CROSS SECTION
BTE90 BEAM DETAILS

STANDARD SHEET 4777
BULB TEE "E" BEAM - 90'-0 SPAN

13 @ 2 = 2'-2

4 @ 9 = 3'-0

6 @ 1'-0 = 6'-0

8 @ 1'-3 = 10'-0

91'-4 END TO END OF BEAM

90'-0 TO OF BEARINGS

BTE90

COUNTY DESIGN SHEET NO.

701-6

5'-3

6'-0

1'-1

3'-8

6

5

10

R = 8

TYP. 2

EPOXY COATED BARS

4d1

4c1

4e1

4h1

4h1

4d1

5b1

5b2

1¡ CL.

1¡ CL.

1¡ CL.

1¡ CL.

BEAM SECTION PROPERTIES

AREA = 807.4 in²

I = 20.75 in

S = 422,790 in⁴

THE TOP FLANGE BEAM CORNERS ARE TO BE CHAMFERED 2" AS SHOWN AT BOTH ENDS OF THE BEAM.

TOP VIEW

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARDS SHEET 4770 (SHEET 2).
BTE105 BEAM DETAILS

STANDARD SHEET 4780

BULB TEE "E" BEAM - 105'-0 SPAN

STRENGTHS

DEFLECTED STRAIGHT

BTE105 | TO | OF BEARINGS
106'-4 END TO END OF BEAM

105'-0 = 9'-0
8 @ 1'-3 = 10'-0
14 @ 1'-6 = 21'-0; 4c1
3
2

DIMENSIONS AT END OF BEAM
5b1, 4c1, 4d1
15 @ 1'-6 = 22'-6; 5b1, 4c1, 4d1

SECTION A-A (ALTERNATE)

SEE ALTERNATE BAR NOTE ON STANDARDS SHEET 4770 (SHEET 2).