Appendix B: Example.

The example below discusses use of the plans provided. However, note that the plans do not represent a complete set of construction drawings and additional detail beyond that given in this example is required.

A simple span, steel girder bridge with length of 50 ft (from back to back of abutments), zero skew, and clear deck width of 34 ft is to be designed. The bridge will have concrete approach slabs. The bridge deck is 7.5” thick with an additional 1.5” integral wearing surface. The bridge construction centerline aligns with the center of the bridge.

Referring to Table 2, the following sheets are needed for a steel girder bridge design:

<table>
<thead>
<tr>
<th>Sheet Name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deck plan &amp; haunch detail</td>
<td>DECK 001</td>
</tr>
<tr>
<td>Abutment back wall</td>
<td>DECK 002</td>
</tr>
<tr>
<td>Approach slab</td>
<td>DECK 003</td>
</tr>
<tr>
<td>Barrier &amp; end walls</td>
<td>DECK 004</td>
</tr>
<tr>
<td>Bridge section</td>
<td>DECK 008</td>
</tr>
<tr>
<td>Erection diagram</td>
<td>STEEL 001</td>
</tr>
<tr>
<td>Shear reinforcement</td>
<td>STEEL 002</td>
</tr>
<tr>
<td>Deflection diagram</td>
<td>STEEL 004</td>
</tr>
<tr>
<td>Diaphragms</td>
<td>STEEL 003</td>
</tr>
<tr>
<td>Bearings</td>
<td>BRG 003</td>
</tr>
<tr>
<td>Expansion joint</td>
<td>EXPJT 001</td>
</tr>
</tbody>
</table>

See the attached Example sheets. Items highlighted in yellow are to be filled in with a specific value, while items in red are to be deleted. Numbers in boldface (1) refer to the label referenced on the example.

**DECK 001: Deck Plan**

Input:

L (bridge span length) = 50’ (1)
a (out-to-out bridge width) = 36’-6” (see beam dimension table, DECK 008) (3)
Angle of crossing = 90˚ (4)

Select:

Haunch detail for steel beams and deck plan corresponding to 90˚ angle of crossing.

Notes:

Remove reinforcement notes, deck plan, and haunch detail for bridge types other than steel (2)
Redraw deck plan corresponding to the left side diagram, with 90 degree angle of crossing. F (fascia depth) will vary along the beam length as with beam haunch, as determined by the screed values. (5)

**DECK 002: Abutment Backwall**

**Input:**

\[
D (\text{backwall width}) = \max(1'-8'', \text{bearing dimension} + \frac{1}{2} \text{of bearing width}). \quad \text{See BRG 003 for steel beam bearing dimensions} = \max(1'-8'', (14'' + 15''/2 = 21.5'')), \text{say 22''}. \quad (1)
\]

**Select:**

Abutment backwall for rolled steel beam and both back wall sections.

**Notes:**

Since span exceeds 25’ (see notes on DECK 002 and DECK 003 instructions), one backwall is chosen as a fixed type, while the other is chosen as an expansion type. Delete abutment backwall details for other bridge types. (2)

Bearing dimensions are obtained from BRG 003.

**DECK 003: Approach Slab**

**Input:**

\[
a (\text{out to out width}) = 36’-6” \quad (\text{see Beam Dimension Table, DECK 008}) \quad (1)
\]

Angle of crossing = 90’ (2)

**Select:**

Concrete approach slab plan and section.

**Notes:**

Delete HMA approach plan and section. (3)

The approach plan is to be redrawn to match a 90° angle of crossing.

**DECK 004: Barrier and End Wall**

**Input:**

\[
L_B (\text{barrier length}) = \text{distance between reference lines} = \text{bridge length} = 50’ \quad (1)
\]

**Select:**
The left side of the barrier plan, corresponding to 90° angle of crossing.

Notes:

The right side of the barrier plan is deleted, as is the end wall elevation corresponding to side by side box beams. (2)

Bearing dimensions are obtained from BRG 003.

**DECK 008: Bridge Section for Steel Beams**

**Input:**

- a (out-to-out bridge width) (1) = 36’-6"
- b (clear roadway width) (1) = 34’
- c (half of roadway clear width) (2) = 17’
- d (number of beam bays) (3) = 5
- e (beam spacing) (3) = 6’-3”
- f (bridge width center-to-center of edge beams) (3) =31’-3”
- g (beam size) (3) = W30x173
- h (center of edge beam to bridge fascia) (4) = 2’-7.5”

**Select:**

Beam span (say 50’), bridge width (34’ clear). (5)

**Notes:**

Based on a bridge span and width selection, the Beam Dimension Table (5) can be consulted to select an applicable beam size and beam spacing; variables a-h are specified in the selection table. Note that beam span on the Beam Dimension Table is measured center-to-center of bearings, which is: bridge span – 2 x (distance from back of abutments to center-to-center of bearings). The distance from the back of the abutment to the center of the bearing is approximately: [distance from back of abutment to end of girder] + [1/2 of bearing length + 1.5”] = [D – (D - 11.25” + 2.5”)] + [1/2(14”)+ 1.5”] = 17.25” (see Backwall Section DECK 002, and BRG 003; recall D = backwall width = 22”). Beam span is then 50’ – 2(17.25") = 47’-1.5”.

A conservative estimate of beam size would correspond to a 50’ beam span center-to-center of bearings; this assumption is used in this example.

**STEEL 001: Erection Diagram**

**Input:**

These values are obtained from the Beam Dimension Table on DECK 008.

- L (bridge span) = 50’ (1)
- Diaphragm spacing = 1 at midspan (S/2) = (47’-1.5”)/2 = 23’-6.75” (2)
d (number of beam bays) = 5  (3)
e (beam spacing) =  6’-3” (3)
f (bridge width center-to-center of fascia beams) = 31’-3” (3)
g (beam size) =  W30x173 (3)
X (center of bearing to reference line) = 17.25” (4)
A, B (distance from center of nearest beams to bridge construction centerline = 6’-3” (3)

Select:

Left side of diagram, corresponding to a 90° angle of crossing.

Notes:

Delete note for non-applicable diaphragm spacing (2) and right side of diagram (5). Erection plan should be redrawn to appropriately match the number of beams (6), 90° angle of crossing, and number of diaphragms (1) and placement.

**STEEL 002: Shear Reinforcement**

Input:

\[ W \text{ (beam length)} = \text{beam span (ctc bearings)} + 2 \times (1/2 \text{ of bearing length} + 1.5”) = \text{beam span} + 2f = 47’-1.5” + 2(8.5”) = 48’-6.5” \text{ (see BRG 003 for beam length relationship to bearings)}.
\]

b (total length of region with studs) = beam length – 12” = 48’-6.5” – 12” = 47’-6.5” (1)
a (number of shear studs) = b/2’ spacing (round up) + 1 = 47’-6.5” / 2’ + 1 = 25 (1)
c (number of spacings of beam end holes) = 2 (3)
d (spacing of beam end holds) = 12” (3)
e (total length of end holes) = 2’ (3)
f (distance from beam end to center of bearing) = 8.5” (2)

Select:

Shear stud developer detail for 90° angle of crossing.

Notes:

Delete shear stud detail for angle of crossing < 90°. (5)
Applicable input parameter values are obtained from the accompanying Beam Dimension Table (4). Note some parameters (a, b, W) cannot be directly read from the table as beam span is given as 47’-1.5” in this example and does not correspond to an increment given. Thus these parameters were calculated as shown above.
Redraw beam elevation to correspond to actual diaphragm/stiffener number and placement and end holes.
STEEL 004: Deflection Diagram

Input:

a (number of ordinates) = 10 (1)
b (ordinate spacing) = beam span / 10 = 47’-1.5” / 10 = 4.71’
c (span of beam) = 47’-1.5” (1)

Select: --

Notes:

Ordinate location and camber values are read from the Ordinate Dimension and Theoretical Camber Tables. Note that these values are only applicable for the exact beam lengths given on the tables (2)

STEEL 003: Diaphragms

Input:

a (beam spacing) = 6’-3” (1)
b (number of spaces between holes) = 4 (2)
c (vertical hole spacing) = 3” (2)
d (total distance between fastener holes) = 12” (2)
e (diaphragm depth) = 18” (4)
θ (angle of crossing) = 90˚ (3)

Select:

It is assumed that either diaphragm detail is acceptable (channel or built-up alternate), so both are provided and left to the contractor to choose. (4)

Notes:

Parameters b, c, d, e are read from the Diaphragm Dimension Table. (6)
Section A-A should be redrawn to match the 90˚ angle of crossing specified.
Delete Top Flange Clip Detail, since angle of crossing is 90˚. (5)

BRG 003: Bearings

Input:

B (width of bearing pad) = 15” (1), (4)
D (sole plate width) =17” (1), (3), (4)
E (distance from retainer bolt to center of beam) = 10-3/4” (1)
G (length of bearing pad) = 14” (2), (4)
H (length of sole plate) = 15” (2), (3)
J (bearing pad thickness) = 2-3/8” (4)
s (number of shim plates) = 3 (4), (5)
n (number of interior elastomer layers) = 2 (4), (5)
t (interior elastomer layer thickness) = ¾” (4), (5)
L (height of side retainer) = 4-7/8” (5)
N (thickness of sole plate) = 2” (3)

Select:

Bearing type (expansion or fixed).

Notes:

Bearing pad parameters are read from the Bearing pad dimension table (6). Fixed and expansion bearing details are to be used for the corresponding back wall types.

**EXPJT 001: Expansion Joints**

Input:

The table in the Notes section (1) is project dependent and is to be filled out by the designer.

Select: --

Notes:

The designer must select an appropriate expansion joint type to accommodate the total bridge movement. These selections are not provided on this sheet.
PLAN OF BARRIER

(Angle of crossing 90°)

Aesthetic Parapet Tube

PLACE 2 ADDITIONAL EL04 BARS AT EACH RAILING POST AS SHOWN. ADJUST SPACING OF ADJACENT REINFORCEMENT IF NECESSARY.

DETAIL B

NOTES:

CS DENOTES EACH SIDE.
FS DENOTES FAR SIDE.
NS DENOTES NEAR SIDE.

SEE STANDARD PLAN 0-25 SERIES FOR ADDITIONAL RAILING DETAILS.
**DECK SECTION**
(Aesthetic Parapet Tube Railing Shown)

**DIMENSION TABLE**

<table>
<thead>
<tr>
<th>Beam Span (ft)</th>
<th>Out-Of-Out</th>
<th>Elbow Bend</th>
<th>&quot;C&quot;</th>
<th>Beam Spacing</th>
<th>Beam Size &quot;h&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>12'-0&quot;</td>
<td>15'-0&quot;</td>
<td>6</td>
<td>M20 x 65</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>30</td>
<td>12'-0&quot;</td>
<td>15'-0&quot;</td>
<td>6</td>
<td>M20 x 65</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>40</td>
<td>12'-0&quot;</td>
<td>15'-0&quot;</td>
<td>6</td>
<td>M20 x 65</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>50</td>
<td>12'-0&quot;</td>
<td>15'-0&quot;</td>
<td>6</td>
<td>M20 x 65</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>60</td>
<td>12'-0&quot;</td>
<td>15'-0&quot;</td>
<td>6</td>
<td>M20 x 65</td>
<td>2'-0&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**

- Deck cross-section is shown with bridge railing aesthetic parapet tube. Other railings are available. See MDOT Bridge Design Guide.
- The above note is for information only and should not be included on this sheet.

**FOR SUPERELEVATED SECTIONS REFER TO MDOT DESIGN GUIDES FOR DETERMINING THE CROSS SLOPE.**

**FOR INFORMATION ONLY:**

Deck cross-section is shown with bridge railing aesthetic parapet tube. Other railings are available. See MDOT Bridge Design Guide.

The above note is for information only and should not be included on this sheet.

**TYPICAL RAILING SECTION**
(Aesthetic Parapet Tube Railing Shown)

**SECTION AT END WALL**
(Tube Connection Area)

**SECTION AT END WALL**
(Full Concrete Area)
FOR INFORMATION ONLY:

- Field connections shall be bolted with 5/8" high-strength bolts, except as noted.
- Service beam reactions (Kips) shall be calculated based on the provided table.
- Structural steel shall conform to the AASHTO LRFD Bridge Design Specification HL-93 loading with the exception of the tandem portion of the HL-93 load definition.
- Structural steel shall be hot-dipped galvanized according to the standard specifications.

ALL HOLES SHALL BE 3/8" Ø FOR 5/8" Ø H.S. BOLTS.

FIELD CONNECTIONS SHALL BE BOLTED WITH 3/8" Ø HIGH STRENGTH BOLTS (EXCEPT AS NOTED).

DIAFRAGMS (EXCEPT CONNECTION PLATES).

SHEAR DEVELOPERS SHALL BE 5/8" DIAMETER STUDS.

ALL STRUCTURAL STEEL SHALL BE HOT-DIPPED GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS.

FOR INFORMATION ONLY:

- Field connections shall be bolted with 3/8" high-strength bolts, except as noted.
- Service beam reactions (Kips) shall be calculated based on the provided table.
- Structural steel shall conform to the AASHTO LRFD Bridge Design Specification HL-93 loading with the exception of the tandem portion of the HL-93 load definition.
- Structural steel shall be hot-dipped galvanized according to the standard specifications.

FIELD CONNECTIONS SHALL BE BOLTED WITH 3/8" Ø HIGH STRENGTH BOLTS (EXCEPT AS NOTED).

DIAFRAGMS (EXCEPT CONNECTION PLATES).

SHEAR DEVELOPERS SHALL BE 5/8" DIAMETER STUDS.

ALL STRUCTURAL STEEL SHALL BE HOT-DIPPED GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS.

FOR INFORMATION ONLY:

- Field connections shall be bolted with 3/8" high-strength bolts, except as noted.
- Service beam reactions (Kips) shall be calculated based on the provided table.
- Structural steel shall conform to the AASHTO LRFD Bridge Design Specification HL-93 loading with the exception of the tandem portion of the HL-93 load definition.
- Structural steel shall be hot-dipped galvanized according to the standard specifications.

FIELD CONNECTIONS SHALL BE BOLTED WITH 3/8" Ø HIGH STRENGTH BOLTS (EXCEPT AS NOTED).

DIAFRAGMS (EXCEPT CONNECTION PLATES).

SHEAR DEVELOPERS SHALL BE 5/8" DIAMETER STUDS.

ALL STRUCTURAL STEEL SHALL BE HOT-DIPPED GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS.

FOR INFORMATION ONLY:

- Field connections shall be bolted with 3/8" high-strength bolts, except as noted.
- Service beam reactions (Kips) shall be calculated based on the provided table.
- Structural steel shall conform to the AASHTO LRFD Bridge Design Specification HL-93 loading with the exception of the tandem portion of the HL-93 load definition.
- Structural steel shall be hot-dipped galvanized according to the standard specifications.

FIELD CONNECTIONS SHALL BE BOLTED WITH 3/8" Ø HIGH STRENGTH BOLTS (EXCEPT AS NOTED).

DIAFRAGMS (EXCEPT CONNECTION PLATES).

SHEAR DEVELOPERS SHALL BE 5/8" DIAMETER STUDS.

ALL STRUCTURAL STEEL SHALL BE HOT-DIPPED GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS.
INTERMEDIATE DIAPHRAGM D1 ELEVATION

SECTION A-A

DIAPHRAGM DIMENSION TABLE

<table>
<thead>
<tr>
<th>BEAM TYPE</th>
<th>4&quot;</th>
<th>3&quot;</th>
<th>2&quot;</th>
<th>1&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>W36 x 170</td>
<td>24&quot;</td>
<td>18&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>W30 x 173</td>
<td>24&quot;</td>
<td>18&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>W24 x 117</td>
<td>24&quot;</td>
<td>18&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>W21 x 93</td>
<td>24&quot;</td>
<td>18&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

NOTE 1: STOP WELD ± 3" SHORT OF CORNER CLIPS

NOTE 2: WRAP WELD AROUND OUTSIDE EDGE

TOP FLANGE CLIP DETAIL

ALTERNATE DETAIL

STIFFENER DETAIL @ CROSSFRAME

NOTE 3: TIGHT FIT (TYP)

NEXT PAGE

1046
**THEORETICAL CAMBER TABLE**

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>Beam Span</th>
<th>1-0</th>
<th>1-1</th>
<th>1-2</th>
<th>1-3</th>
<th>1-4</th>
<th>1-5</th>
<th>1-6</th>
<th>1-7</th>
<th>1-8</th>
<th>1-9</th>
<th>1-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>W36 x 170</td>
<td>10</td>
<td>0.30</td>
<td>0.17</td>
<td>0.15</td>
<td>0.08</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>W30 x 173</td>
<td>10</td>
<td>0.56</td>
<td>0.33</td>
<td>0.28</td>
<td>0.15</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>W24 x 117</td>
<td>10</td>
<td>0.76</td>
<td>0.45</td>
<td>0.39</td>
<td>0.20</td>
<td>0.15</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>W21 x 93</td>
<td>10</td>
<td>0.90</td>
<td>0.52</td>
<td>0.46</td>
<td>0.24</td>
<td>0.25</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>W21 x 93</td>
<td>10</td>
<td>0.90</td>
<td>0.52</td>
<td>0.46</td>
<td>0.24</td>
<td>0.25</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* Camber table values only account for beam deflection due to beam self weight, deck & haunch weight, deflections and barriers. Adjustments to the values shall be made to account for the roadway profile.
EXPANSION BEARING

ELASTOMERIC BEARING DETAILS

SOLE PLATE DETAILS

ELASTOMERIC BEARING DETAILS

BEARING ASSEMBLY DIMENSIONS

ANCHOR BOLT DETAIL

ANCHOR BOLT DETAIL

ANCHOR BOLT DETAIL

ELEVATION

SIDE VIEW

SIDE VIEW

PLAN

SIDE VIEW

Dowel Detail

FOR INFORMATION ONLY:

ANCHOR BOLTS SHALL BE INSTALLED AFTER BEAMS ARE ERECTED IN PLACE.

ANCHOR BOLTS SHALL CONFORM TO SECTION 908.15.

TO MDOT STANDARD SPECIFICATION 707.03.C.16.

ANCHOR BOLT LENGTHS SHOWN ARE MINIMUM. BOLTS LONGER THAN THAT SHOWN MAY BE FURNISHED.

STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF GALVANIZED IN ACCORDANCE WITH AASHTO M 111, FOR POSITION DOWELS FOR PRECAST BEAMS.

Use non-deformed steel rods in accordance with AASHTO M 270 Grade 36 and with the designation of all prevent holes sized in accordance with H-P-016. These holes for side plates and other bearing components shall meet the requirements of Section 707.04.15.

The above notes are for information only and should not be included on this sheet.

The above notes are for information only and should not be included on this sheet.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

SOLE PLATES ARE TO BE BEVELED WHEN THE CALCULATED BEVEL IS GREATER THAN 0.5%.

ELASTOMERIC BEARINGS FOR BEAM SPANS 20' AND 30' ARE PLAIN PADS WITH NO SHIMS PLATES.

REQUIRED IN THE DESIGN OF THE ELASTOMERIC BEARING PADS.

FOR SINGLE SPAN STRUCTURES 25'-0" OR LESS IN LENGTH, ALLOWANCE FOR EXPANSION IS NOT

NEEDED IN THE DESIGN OF THE ELASTOMERIC BEARING PADS.
THE EXPANSION JOINT DEVICE SHALL BE OF A TYPE THAT INCLUDES A CONTINUOUS NEOPRENE SEAL ACROSS THE DECK. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR HAS THE OPTION OF USING ANY OF THE DEVICES LISTED BELOW:

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>MANUFACTURER</th>
</tr>
</thead>
<tbody>
<tr>
<td>WABO STRIP SEAL - TYPE M</td>
<td>WATSON-BOWMAN &amp; ACME, INC.</td>
</tr>
<tr>
<td>WABO STRIP SEAL - TYPE A</td>
<td>WATSON-BOWMAN &amp; ACME, INC.</td>
</tr>
<tr>
<td>STEELFLEX-SS2</td>
<td>D.S. BROWN</td>
</tr>
<tr>
<td>STEELFLEX-SSCM</td>
<td>D.S. BROWN</td>
</tr>
<tr>
<td>ONFLEX 40 55</td>
<td>STRUCTURAL RUBBER PRODUCTS CO.</td>
</tr>
<tr>
<td>ONFLEX 40 SSA</td>
<td>STRUCTURAL RUBBER PRODUCTS CO.</td>
</tr>
</tbody>
</table>

THE MODEL OF THE JOINT TYPE SELECTED SHALL BE SUITABLE TO ACCOMMODATE THE TOTAL MOVEMENT NOTED ON THE PLANS.

FABRICATION AND INSTALLATION

HANDLE SHIPPING BOLTS PRIOR TO PLACEMENT OF CONCRETE.

THE EXPANSION JOINT SHALL BE SHOP FABRICATED TO CONFORM TO THE CONTOUR OF THE BRIDGE DECK, BARRIERS, ETC. IT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATIONS SUBJECT TO NOTES HEREIN AND THE APPROVAL OF THE ENGINEER.

THE DECK REINFORCING STEEL TO STEEL FRAME ANCHORS TO MAXIMUM EXTENT PRACTICABLE WITHOUT DAMAGING GALVANIZED OR EPOXY COATINGS.

THE TOP OF THE EXPANSION JOINT DEVICE SHALL BE SET AT -3" BELOW THE CONCRETE SLAB (PAVEMENT).

THE STEEL ANCHORAGE FOR STRIP SEAL GLANDS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SUBSECTION 707.03C.17 OF THE STANDARD SPECIFICATIONS.

THE AREA OF THE STEEL ANCHORAGE AND SEALING GLAND WHICH WILL BE IN CONTACT WITH A SEALANT, OR LUBRICANT-ADHESIVE SHALL BE CLEANED WITH TOLUENE OR OTHER APPROVED SOLVENT.

IN THE EVENT THAT SPLICING IS REQUIRED OF THE SEALING GLAND, IT SHALL BE SPLICED BY AN APPROVED METHOD SUCH AS COLD VULCANIZATION BY A TRAINED REPRESENTATIVE OF THE MANUFACTURER.

DETAILS AT CURBS OR BARRIERS

THE DETAILS ON THIS SHEET SHOW AN APPROVED MEANS OF TERMINATING THE EXPANSION JOINT DEVICE AT CURBS OR BARRIERS. VARIATIONS OR ALTERNATIVE SCHEMES WILL BE CONSIDERED AND MAY BE USED IF APPROVED BY THE ENGINEER.

MATERIALS

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE EXPANSION JOINT AND THE TERMINAL ASSEMBLIES AT THE CURBS, SIDEWALKS, OR BARRIERS IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE.

FOR INFORMATION ONLY:

EXPANSION JOINTS ARE NOT REQUIRED WHEN LENGTH OF BRIDGE CONTRIBUTING TO EXPANSION AT AN ABUTMENT IS LESS THAN 50 FEET FOR CONCRETE BEAM BRIDGES AND LESS THAN 25 FEET FOR ROLLED STEEL BRIDGES.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.
APPENDIX L. RECOMMENDED BRIDGE PLANS

The following sheets are given here in PDF format. However, they are available from MDOT in high-resolution Microstation and Autocad form for use.
DECK SUPERSTRUCTURE DETAILS

<table>
<thead>
<tr>
<th>NO.</th>
<th>DESCRIPTION</th>
<th>AUTH</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ANGLE OF CROSSING**
- Angle of crossing less than 70°
- Angle of crossing between 70°-90°
- Angle of crossing 90° or greater

**DECK FASCIA**
- TYP
- (Longitudinal)

**REINFORCEMENT**
- (Transverse)

**SPAN LENGTH (L)**
- 2'-7" lap (typ: EA05 bars)
- EA04 bars (top & bottom: steel beams)
- EA03 bars @ 10" max spa (side by side box beams)
- EA02 bars @ 6" (side by side box beams)
- ED06 bars (top) & EA06 bars (bottom) @ 8" (steel beams)
- ED05 bars (top) & EA05 bars (bottom) @ 9" (spread box beams)
- ED05 bars (top) & EA05 bars (bottom) @ 7" (bulb tee beams)
- ED05 bars (top) & EA05 bars (bottom) @ 9" (spread box beams)
- ED05 bars (top) & EA05 bars (bottom) @ 7" (bulb tee beams)
- EA04 bars @ 6" (side by side box beams)

**RAILING SPA**
- 8" (9" deck)

**PARAPET SPA**
- 6" (6" deck)

**HAUNCH**
- 2" min ½" bevel

**CONCRETE SPREAD BOX BEAMS & BULB TEE BEAMS**
- For information only:

---

**FOR INFORMATION ONLY:**
- Excessive
- Haunch becomes greater than 12"
- Seat (typ) 6" Pav' (5" for side by side box beam only)

---

**PLACE FORMS**
- Metal stay in 3" for form removal
- Slope as required

---

**LINE A**
- See railing in end block
- EL040707 spa @ 8" (9" deck)

---

**HAUNCH DETAIL**
- Concrete spread box beams & bulb tee beams

---

**STEEL BEAMS**
- For information only:

---

**C L R**
- 3" required to maintain minimum slab thickness at curb beam flange + ½" + amount of fascia beam drop

---

**LINE B**
- Required to maintain minimum slab thickness at curb beam flange + ½" + amount of fascia beam drop

---

**HAUNCH DETAIL**
- Concrete spread box beams & bulb tee beams

---

**H A U N C H**
- 1" min ½" bevel

---

**T H I C K N E S S**
- Thickness at curb line.
- Fascia beam drop required to maintain minimum slab thickness at curb beam flange + ½" + amount of fascia beam drop

---

**HAUNCH DETAIL**
- Concrete spread box beams & bulb tee beams

---

**STEEL BEAMS**
- For information only:

---

**C L R**
- 3" required to maintain minimum slab thickness at curb beam flange + ½" + amount of fascia beam drop

---

**LINE A**
- See railing in end block
- EL040707 spa @ 8" (9" deck)

---

**HAUNCH DETAIL**
- Concrete spread box beams & bulb tee beams

---

**STEEL BEAMS**
- For information only:

---

**C L R**
- 3" required to maintain minimum slab thickness at curb beam flange + ½" + amount of fascia beam drop

---

**LINE A**
- See railing in end block
- EL040707 spa @ 8" (9" deck)

---

**HAUNCH DETAIL**
- Concrete spread box beams & bulb tee beams

---

**STEEL BEAMS**
- For information only:
TYPICAL ABUTMENT BACKWALL - SPREAD BOX BEAM

TYPICAL ABUTMENT BACKWALL - BULB TEE BEAM

FOR INFORMATION ONLY:
- THE BACKWALL THICKNESS SHOWN IS THE THICKNESS OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.NORTH SIDE
- THE SLOPE OF THE TOP OF DECK MUST BE 1'-0" MINIMAL TO DATE
- THE BEARINGS ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:
- IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.
- IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.
- IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.
- IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.
- IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.
NOTES:

ADJUST SPACING OF ADJACENT REINFORCEMENT IF NECESSARY.

PLACE 2 ADDITIONAL EL04 BARS AT EACH RAILING POST AS SHOWN. ADJUST SPACING OF ADJACENT REINFORCEMENT IF NECESSARY.

* OMIT LAP FOR SPANS 40'-0" OR UNDER

(AESTHETIC PARAPET TUBE)

(ANGLE OF CROSSING LESS THAN 90°)

SPREAD BOX BEAM, BULB T BEAM, ROLLED STEEL BEAM

SIDE BY SIDE BOX BEAM

CONC BOX BEAM

LAP W/EL06 BARS IN BOX BEAM

LAP W/EL04 BARS

SEE DETAIL B

SEE DETAIL B

EL061101

3 SPA @ 8" = 4'-8"

6" = 2'-0"

3 SPA @ 6"

8" = 2'-0"

5'-4"

2'-8"

1'-8"

8'-0"

1'-0"

2'-8"

5'-4"
**DECK SECTION**

**DIMENSION TABLE**

FOR INFORMATION ONLY:

The above note is for information only and should not be included on this sheet.

NOTES:

The above note is for information only and should not be included on this sheet.

**DESIGN UNIT:**

No Scale

**DATE:**

05/09/18

**AUTH:**

No Scale

**FILE:**

Deck_BT_002.dgn

**DESCRIPTION**

Partial Deck Section

**SUPERSTRUCTURE DETAILS**

No Scale
**DECK SECTION**

FOR INFORMATION ONLY:

- Deck crosses sections shown with dotted lines. The dotted lines are intended to show other sections that are not shown in this sheet.

FOR INFORMATION ONLY:

- Notes are for information only and should not be requisitioned on the sheet.

**DIMENSION TABLE**

<table>
<thead>
<tr>
<th>Beam Span (FT)</th>
<th>Beam Width (IN)</th>
<th>Beam Depth (IN)</th>
<th>Beam Rebar (IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>15 x 15</td>
<td>15 x 15</td>
<td>15 x 15</td>
</tr>
<tr>
<td>30</td>
<td>15 x 15</td>
<td>15 x 15</td>
<td>15 x 15</td>
</tr>
<tr>
<td>40</td>
<td>15 x 15</td>
<td>15 x 15</td>
<td>15 x 15</td>
</tr>
<tr>
<td>50</td>
<td>15 x 15</td>
<td>15 x 15</td>
<td>15 x 15</td>
</tr>
<tr>
<td>60</td>
<td>15 x 15</td>
<td>15 x 15</td>
<td>15 x 15</td>
</tr>
</tbody>
</table>

**NOTES:**

- For specific dimensions not shown, refer to the design guide for determining the cross section.
PRESTRESSED CONCRETE SPREAD BOX BEAMS

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE: )

LIFTING DEVICES SHALL BE REMOVED AFTER BEAMS ARE ERECTED. REMOVAL IS INCLUDED IN THE BID ITEM "PREST CONC BOX BEAM, ERECT, XX INCH"

PRESTRESSING STRAND LOOPS (TYP)

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED IN THE BID ITEM "PREST CONC BOX BEAM, FURN, XX INCH"

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE ESTIMATED BEAM CAMBER AT RELEASE IS XX". THIS CAMBER IS DUE TO PRESTRESS AND DEAD LOAD OF THE BEAM PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

PRESSTRESSING STRAND SHALL BE 0.6" NOMINAL DIAMETER MEETING THE REQUIREMENTS OF AASHTO M203 (ASTM A416), EPOXY COATED.

STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36.

CONCRETE MODELS FOR HANGER STAYS SHALL BE OF APPROVED TYPE MODIFIED STAY LENGTHS, HANGER CLEARANCES AND SPACING SHALL BE PROVIDED ON DRAWINGS. STAY LENGTHS SHALL BE DEFINED ON DRAWINGS. STAY LENGTHS SHALL BE DEFINED ON DRAWINGS. STAY LENGTHS SHALL BE DEFINED ON DRAWINGS.

PRESTRESSING STRANDS SHALL BE GIVEN AN INITIAL PRESTRESS AS FOLLOWS:

NOTES:
- THE TOP SURFACE OF THE BEAMS SHALL BE CEMENTitous UNDERPINNING.
- THE ESTIMATED SCOUR AT RELEASE IS XX". THE CHANGE IS DUE TO PRESTRESSING AND REMOVAL OF THE BID ITEM "PREST CONC BOX BEAM, ERECT, XX INCH"
- THE SCOUR AT RELEASE IS XX". THE CHANGE IS DUE TO PRESTRESSING AND REMOVAL OF THE BID ITEM "PREST CONC BOX BEAM, ERECT, XX INCH"
- THE SCOUR AT RELEASE IS XX". THE CHANGE IS DUE TO PRESTRESSING AND REMOVAL OF THE BID ITEM "PREST CONC BOX BEAM, ERECT, XX INCH"
- THE SCOUR AT RELEASE IS XX". THE CHANGE IS DUE TO PRESTRESSING AND REMOVAL OF THE BID ITEM "PREST CONC BOX BEAM, ERECT, XX INCH"

THE ESTIMATED SCOUR AT RELEASE IS XX". THE CHANGE IS DUE TO PRESTRESSING AND REMOVAL OF THE BID ITEM "PREST CONC BOX BEAM, ERECT, XX INCH"

THE DESIGN OF THESE STRUCTURES IS BASED ON 1.2 TIMES THE CURRENT LOAD FACTOR. THE EXCEPTION IS THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION (É BRG-É BRG)

THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION (É BRG-É BRG) IS INCLUDED.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

ITEMS CAST INTO STRUCTURAL PRECAST CONCRETE TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

ITEMS CAST INTO THE BEAMS TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

ITEMS CAST INTO THE BEAMS TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

INSERTS (COIL OR FERRULE) MUST BE ELECTROPLATE GALVANIZED IN ACCORDANCE WITH ASTM B633, SERVICE CONDITION 4. INSERTS SHALL BE CAST WITH THE BEAMS. FIELD INSTALLATION OF INSERTS IS NOT ALLOWED.

FIELD DRILLING SHALL BE ALLOWED FOR SIGN SUPPORT ANCHORS ONLY. LOCATION OF ANCHORS SHALL BE AS DETAILED ON THE FINAL DESIGN DRAWINGS.

TRAFFIC & SAFETY SIGN SUPPORT SPECIAL DETAILS. ANY DAMAGE TO THE BEAMS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE ENGINEER.

ADHESIVE ANCHORS SHALL USE A NON-SHRINK GROUT (WHICH IS CEMENTIOUS) LISTED IN MDOT'S QUALIFIED PRODUCTS LIST.

BOLT AND SCREW INSERTS IS NOT ALLOWED.

ACCORDANCE WITH ASTM B633, SERVICE CONDITION 4. INSERTS SHALL BE CAST WITH THE BEAMS. FIELD INSTALLATION OF INSERTS IS NOT ALLOWED.

BURKE, TYPE CT-2 OR TYPE CX-4; OR EQUAL. INSERTS (COIL OR FERRULE) MUST BE ELECTROPLATE GALVANIZED IN ACCORDANCE WITH ASTM B633, SERVICE CONDITION 4. INSERTS SHALL BE CAST WITH THE BEAMS. FIELD INSTALLATION OF INSERTS IS NOT ALLOWED.

CONCRETE INSERTS FOR BACKWALLS SHALL BE 1" DIAMETER (AT EXPANSION ABUTMENT) & ¾" DIAMETER (AT FIXED ABUTMENT). ALL BEAMS SHALL HAVE 15" CLEARANCE OF THE END OF THE BOX BEAM PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

THE ESTIMATED SCOUR AT RELEASE IS XX". THE CHANGE IS DUE TO PRESTRESS AND DEAD LOAD OF THE BEAM PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.
Prestressed Beam Details

File: prest_SBB_002.dgn

Section A-A

Plan of Slab Ties

Beam Dimensions

For Information Only:

The above notes and values for information only and shall not be included on the final drawing.

Plan of Slab Ties

90° Cross Section

Plan of Slab Ties

Skewed Cross Section

Section Thru End Block

Plan of Beam Showing 90° Crossing

Plan of Beam Showing Skewed Crossing

Section A-A

Plan of Beam Showing 90° Cross Section

Plan of Beam Showing Skewed Cross Section
17" X 36" OR 21" X 36" BEAM

21" X 48" BEAM

27" X 48" OR 33" X 48" BEAM

39" X 48" OR 48" X 48" BEAM

NOTES:
- STRAND INFORMATION.
- SEE DEBONDING TABLE ON DWG "SBB 004" FOR STRAND PROVISION.

17" OR 21" EMBED (21")
10" EMBED (17")
1'-2" M IN LAP (21")
10" M IN LAP (17")
17" X 36" OR 21" X 36"

Prepared for: [Name]
Prepared: [Date]
Checked: [Name]
Checked: [Date]

File: [Name of file]
File: [Extension]
File: [Version]
File: [Type]
### Strand/Debonding Layout Table

<table>
<thead>
<tr>
<th>Beam Span (ft)</th>
<th>Beam Dimensions</th>
<th>1st Layer</th>
<th>1st Layer</th>
<th>2nd Layer</th>
<th>2nd Layer</th>
<th>Total No. of Strands</th>
<th>No. of Debonding Lengths (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>21</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>9</td>
<td>6/4</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>10</td>
<td>6/4</td>
</tr>
<tr>
<td>50</td>
<td>21</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>12</td>
<td>6/4</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>9</td>
<td>6/4</td>
</tr>
<tr>
<td>10</td>
<td>21</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>12</td>
<td>6/4</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>20</td>
<td>6/4</td>
</tr>
<tr>
<td>10</td>
<td>50</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>20</td>
<td>6/4</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>20</td>
<td>6/4</td>
</tr>
</tbody>
</table>

**Notes:**
- The above notes are for information only and should not be included on the final design drawings.

---

**Plan & Elevation Diagrams:**
- **Insert Detail @ Beam End (Expansion Abutment):**
- **Insert Detail @ Beam End (Fixed Abutment):**

---

**FOR INFORMATION ONLY:**
- *PLACE SPREAD BOX BEAM BACKWALL INSERTS AT 5" OR 7" UP FROM BOTTOM OF BEAM TO AVOID INTERFERENCE WITH STRANDS. (5" FOR 21" BEAMS) (7" FOR >21" BEAMS)*
- **PLACE SPREAD BOX BEAM BACKWALL INSERTS AT 3" OR 5" DOWN FROM TOP OF BEAM TO AVOID INTERFERENCE WITH STRANDS. (3" FOR 21" BEAMS) (5" FOR >21" BEAMS)**

---

**Section Details:**
- Corner Blocking Detail
- Beam End Details
39" X 48" BEAM (INTERIOR)

39" X 48" BEAM (FASCIA)

NOTES:
- See debonding table on DWG "SSBB 005" for strand information.
- Cut strand (if required) (TYP) "EA" bar or cut strand (slab tie) ED04 bar.
- Ed05 bars @ 12" max.
- 3 9" EA06 bars.
- 6 EQ SPA - EA04 bars or 3" (ty)
- 3 EQ SPA - EA04 bars or".
- = 8 "
- 4 SPA @ 2 "
- 2 " = 6 "
- 3 SPA @ 2 "
- 9 " omit shear key.
- EA04 bars.
- Ed04 bars.
POST-TENSIONING DETAIL

NOTE: Stress pockets, anchor plates, and tendon couplers shall be as required for the post-tensioning system provided. Use for 33" & 39" deep beams.

NOTE: Use for 17", 21" & 27" deep beams.

NOTE: Sealed washer face of beam after grouting.

NOTE: Grout tube (1/2" Ø pipe) should be cut off after grouting.

NOTE: Post-tensioning detail as required for the post-tensioning system provided.

NOTE: Stress pockets, anchor plates, and tendon couplers shall be as required for the post-tensioning system provided. Use for 33" & 39" deep beams.

NOTE: Sealed washer face of beam after grouting.

NOTE: Grout tube (1/2" Ø pipe) should be cut off after grouting.

NOTE: Post-tensioning detail as required for the post-tensioning system provided.

NOTE: Stress pockets, anchor plates, and tendon couplers shall be as required for the post-tensioning system provided. Use for 33" & 39" deep beams.

NOTE: Sealed washer face of beam after grouting.

NOTE: Grout tube (1/2" Ø pipe) should be cut off after grouting.

NOTE: Post-tensioning detail as required for the post-tensioning system provided.

NOTE: Stress pockets, anchor plates, and tendon couplers shall be as required for the post-tensioning system provided. Use for 33" & 39" deep beams.

NOTE: Sealed washer face of beam after grouting.

NOTE: Grout tube (1/2" Ø pipe) should be cut off after grouting.

NOTE: Post-tensioning detail as required for the post-tensioning system provided.

NOTE: Stress pockets, anchor plates, and tendon couplers shall be as required for the post-tensioning system provided. Use for 33" & 39" deep beams.

NOTE: Sealed washer face of beam after grouting.

NOTE: Grout tube (1/2" Ø pipe) should be cut off after grouting.

NOTE: Post-tensioning detail as required for the post-tensioning system provided.

NOTE: Stress pockets, anchor plates, and tendon couplers shall be as required for the post-tensioning system provided. Use for 33" & 39" deep beams.

NOTE: Sealed washer face of beam after grouting.

NOTE: Grout tube (1/2" Ø pipe) should be cut off after grouting.

NOTE: Post-tensioning detail as required for the post-tensioning system provided.
### Dimension Table

<table>
<thead>
<tr>
<th>Beam Section</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>0`</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>42</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>48</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>54</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>60</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
</tbody>
</table>

*NOTE: All dimensioning shown is for information only and angles may not be included on the final design drawings.*

---

### Strand/Debonding Layout Table

<table>
<thead>
<tr>
<th>Beam Span (in)</th>
<th>Beam Dimensions</th>
<th>1st Layer @ Front Bottom</th>
<th>2nd Layer @ Front Bottom</th>
<th>3rd Layer @ Front Bottom</th>
<th>4th Layer @ Front Bottom</th>
<th>Extra No. of Strands</th>
<th>No. of Draped Strands - Height at Midspan</th>
<th>Beam at Midspan</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>42</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>48</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>54</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>60</td>
<td>0'</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
</tbody>
</table>

*NOTE: ** measured from bottom of beam.*

---

### Intermediate Diaphragm

- **D1** Elevation
- **Section A-A**

---

### Connection Detail

**Concrete Insert Details**

- Concrete inserts are to be cast in place as shown above.
- Use of reinforcing steel is optional.
- Slab thickness and angles are to be specified on the final design drawings.
FOR INFORMATION ONLY:

The design of these structures is based on the AASHTO LRFD Bridge Design Specifications. The design is intended to meet the performance standards outlined in these specifications. The design does not exceed the limits of safety provided by the AASHTO LRFD Bridge Design Specifications.

NOTES:

1. Field connections shall be bolted with 3/8" high-strength bolts, except as noted.
2. All holes shall be 7/8" for 3/8" bolts.
3. Structural steel shall conform to AASHTO M270, Grade 50, and shall be hot-dipped galvanized according to the standard specifications.
4. Structural steel shall conform to AWS D1.1, Grade 50, and shall be hot-dipped galvanized according to the standard specifications.
BEAM DIMENSION TABLE

<table>
<thead>
<tr>
<th>Beam Span</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>r</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>13</td>
<td>20</td>
<td>1/8</td>
<td>1/2</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>30'</td>
<td>16</td>
<td>35</td>
<td>1/8</td>
<td>1/2</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>40'</td>
<td>19</td>
<td>50</td>
<td>1/8</td>
<td>1/2</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>50'</td>
<td>22</td>
<td>65</td>
<td>1/8</td>
<td>1/2</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

* For 60' span
** For 30', 40' or 50' spans
*** For 40' span

SHEAR STUD DEVELOPER DETAILS

** INCREASE LENGTH OF STUD AS NEEDED TO MAINTAIN SECTION FOR 40' SPANS (TYP)

DETAIL OF STUD

NOTE: SHEAR STUD DEVELOPER DETAILS ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS.

PLAN

Section

TOP OF PLATE

BEAM ELEVATION

*** FOR 30', 40' OR 50' SPANS

*** FOR 60' SPAN
CAMBER DIAGRAM

ORDINATE DIMENSION TABLE

<table>
<thead>
<tr>
<th>Beam Span</th>
<th>Theoretical Camber</th>
<th>Beam Weight</th>
<th>Deck &amp; Haunch Weight</th>
<th>Diaphragms</th>
<th>Beam Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THEORETICAL CAMBER TABLE *

<table>
<thead>
<tr>
<th>Beam Span</th>
<th>Theoretical Camber</th>
<th>Beam Weight</th>
<th>Deck &amp; Haunch Weight</th>
<th>Diaphragms</th>
<th>Beam Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* CAMBER TABLE VALUES ONLY ACCOUNT FOR BEAM DEFLECTION DUE TO SELF-WEIGHT, DECK & HAUNCH WEIGHT, DIAPHRAGMS AND BARRIERS. ADJUSTMENTS TO THE VALUES SHALL BE MADE TO ACCOUNT FOR THE ROADWAY PROFILE.
**PRESTRESSED BOX BEAM BEARING DETAILS**

**FILE:** prest_SBB_005.dgn

**SECTION A-A**

**PLAN OF SOLE PLATE**

**PLAN OF ELASTOMERIC PAD**

**SECTION C-C**

**FOR INFORMATION ONLY:**

Electrical drawings for beam spans 20' and 30' are shown. These are not intended to be included on the final design drawings.

- **SOLE PLATE:** Tilt sole plate as required when the calculated bevel exceeds 1%.
- **SOLE PLATE TILT:** Tilt sole plate as required when the calculated bevel exceeds 1%.
- **POSITION DOWELS:** Position dowels shall be hot-dip galvanized according to AASHTO M 232.
- **BRG-É BRG:** The above notes are for information only and should not be included on the final design drawings.

**NOTES:**

- Check out concrete as an alternative bearing.
- Note that these designs are not intended to be included on the final design drawings.

**SPREAD BOX BEAM BEARING DIMENSION TABLE**

<table>
<thead>
<tr>
<th>Beam Span (in. total Elastomeric Pad)</th>
<th>x</th>
<th>L</th>
<th>d</th>
<th>n</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>2&quot;</td>
<td>7&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>2&quot;</td>
<td>8&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>70</td>
<td>2&quot;</td>
<td>9&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>80</td>
<td>2&quot;</td>
<td>10&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>90</td>
<td>2&quot;</td>
<td>11&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>2&quot;</td>
<td>12&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

This table is for information only and should not be included on the final design drawings.

**SIDE BY SIDE BOX BEAM BEARING DIMENSION TABLE**

<table>
<thead>
<tr>
<th>Beam Span (in. total Elastomeric Pad)</th>
<th>x</th>
<th>L</th>
<th>d</th>
<th>n</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>2&quot;</td>
<td>7&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>2&quot;</td>
<td>8&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>70</td>
<td>2&quot;</td>
<td>9&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>80</td>
<td>2&quot;</td>
<td>10&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>90</td>
<td>2&quot;</td>
<td>11&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>2&quot;</td>
<td>12&quot;</td>
<td>1&quot;</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

This table is for information only and should not be included on the final design drawings.
**PRESTRESSED BULB-TEE BEARING DETAILS**

**NOTE:**
- Elastomeric pads are included in payment for prestressed concrete beams.
- Elastomeric pads are required in all beam ends.
- The table is for information only and should not be included on the final design drawings.

---

**PLAN OF SOLE PLATE**

**PLAN OF ELASTOMERIC PAD**

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

---

**DIMENSION TABLE**

<table>
<thead>
<tr>
<th>Beam Span</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2'-0&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>20</td>
<td>2'-1&quot;</td>
<td>5'-6&quot;</td>
</tr>
<tr>
<td>30</td>
<td>2'-2&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>40</td>
<td>2'-3&quot;</td>
<td>6'-6&quot;</td>
</tr>
</tbody>
</table>

---

**NOTES:**
- Steel for sole plates and other bearing components shall meet the requirements of AASHTO M 207. This sheet is revised in all beam ends.
FOR INFORMATION ONLY:
EXPANSION BEARINGS SHOWN FOR BEAM SPANS 20' AND 30' ARE PLAIN PADS WITH NO SHIMS PLATES.
ELASTOMERIC BEARINGS FOR BEAM SPANS 20' AND 30' ARE PLAIN PADS WITH NO SHIMS PLATES.
PLATES ARE TO BE BEVELED WHEN THE CALCULATED BEVEL IS GREATER THAN 0.5%.
THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE SHEET.
**PLAN AT FLUSH MOUNT PARAPET RAILING**

**SECTION A-A**

**SECTION B-B**

**NOTES:**

**JOINT TYPES**

The expansion joint details shall be of a type that includes a continuous rubber element extending over the bridge deck. The manufacturer's specifications shall include the minimums and maximums of movement allowed by the details as shown and the approved allowable shear due to vehicular loads and the expansion joint details.

**MANUFACTURER**

- **Hard Stop Seal - Type M**
- **Hard Stop Seal - Type A**
- **Steel Stop**
  - Manufacturer: D. Brown
- **Steel Grease Seal**
  - Manufacturer: Structural Plastics Products Co.
- **Steel Grease Seal**
  - Manufacturer: Structural Plastics Products Co.

The manufacturer of the joint type selected shall be approved to accommodate the total movement noted on the plans. Complete working drawings of all details of fabrication of the expansion joint device shall be submitted. The details shall be fabricated and installed in accordance with the approved installation details. The models of the joint type selected shall be of a type that includes a continuous rubber element extending over the bridge deck. The manufacturer shall be responsible for the expansion joint device and the terminal assemblies at the curbs, sidewalks, etc. It shall be installed in accordance with manufacturer's recommendations subject to notes herein and the applicable standards.

**INSTALLATION AND FABRICATION**

The expansion joint shall be designed to accommodate the full movement noted on the plans. The expansion joint shall be designed to conform to the contour of the bridge deck. The expansion joint shall be fabricated in accordance with the approved installation details and be inspected by the project engineer and the architect of the owner.

The details and drawings shall be submitted to the city engineering department for review and approval. The expansion joint device shall be of a type that includes a continuous rubber element extending over the bridge deck. The manufacturer shall be responsible for the expansion joint device and the terminal assemblies at the curbs, sidewalks, etc. It shall be installed in accordance with the approved installation details.

**DEVICES FOR WHICH A SET OF STANDARD INSTALLATION DETAILS HAS BEEN APPROVED**

- **EXPANSION JOINT DEVICE**
  - **Onflex 40 SSA**
    - Manufacturer: Structural Rubber Products Co.
  - **Onflex 40 SS**
    - Manufacturer: Structural Rubber Products Co.
  - **Steelflex-SSCM**
    - Manufacturer: D.S. Brown
  - **Steelflex-SSA2**
    - Manufacturer: D.S. Brown
  - **Wabo Strip Seal - Type A**
  - **Wabo Strip Seal - Type M**

**FABRICATION AND INSTALLATION**

The expansion joint shall be designed to accommodate the full movement noted on the plans. The expansion joint shall be designed to conform to the contour of the bridge deck. The expansion joint shall be fabricated in accordance with the approved installation details and be inspected by the project engineer and the architect of the owner.

**NOTES:**

- **PLAN AT FLUSH MOUNT PARAPET RAILING**
- **SECTION A-A**
- **SECTION B-B**