H30SI-12 PRETENSIONED
PRESTRESSED CONCRETE
BEAM BRIDGE STANDARDS
EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

EXAMPLE NO. 1
Abutment No. 1

From Sheet H30SI-1-12

<table>
<thead>
<tr>
<th>Bar Diameter (inches)</th>
<th>English Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
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<tr>
<td>5</td>
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<tr>
<td>10</td>
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</tbody>
</table>

GENERAL NOTES:

The H30SI-12 Bridge Standards, if properly used, provide the structural plans necessary to construct single span 30' roadway precast prestressed concrete beam bridges with lengths of 46'-8, 55'-0, 67'-6, 80'-0, 90'-0, 105'-0, and 115'-0.

These bridges may be built on a 0°, 15° or 30° skew. These bridge plans show the bridges on the front sheet, but all dimensions and details will be the same for the opposite skew.

EXAMPLE NO. 2
From Sheet H30SI-2-12

Example No. 2

<table>
<thead>
<tr>
<th>Bar Diameter (inches)</th>
<th>English Size</th>
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</thead>
<tbody>
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<tr>
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<td>9</td>
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</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

GENERAL NOTES:

Because these bridge standards have been revised for LRFD based on 2012-completed Iowa State University Design for Earthquake Resistor Bridges, the designer will need to determine the construction control method, contract length, and driving target and give that information on the front sheet of the plans. Bridge design manual, data, notes, elastic, yield, and yield are appropriate for that purpose. The notes, as well as the bridge design manual, and design examples are available on the Iowa Department of Transportation, Office of Bridges and Structures website: http://www.iowadot.gov/bridge/index.html.

These standards can be used for bridges with or without epoxy coated reinforcing. Rebar lap lengths are based on the use of epoxy coated reinforcing. It may not be identified if non-coated bars are to be used. The designer will specify the appropriate design notation for any non-epoxy coated reinforcing.

It is recommended that the epoxy coated reinforcing option be used by it is anticipated that the bridge deck and/or the bridge approaches will be chemically treated for the removal of ice and snow.

If epoxy coated bars are used in the deck, then all bars used in the abutment footing and backwall and barrier rails shall be epoxy coated.

Concrete intermediate diaphragms shall be used for overpass bridges. The designer should adjust the concrete and reinforcing quantities accordingly.

DESIGN STRESSES:

Design stresses for the following materials are in accordance with AASHTO Life Design Specifications, Series of 2007. Design stresses for precast prestressed concrete are in accordance with LRFD AASHTO Section 6.4.1. Design stresses for concrete in accordance with AASHTO LRFD Section 5, f'c = 4.0 KSI. Design stresses for reinforcing steel are designated on the front sheet of the plans. Bridge Design Manual Section 6.2.6.1 Structural Resistance Levels 1-IV.
## REINFORCING BAR LIST

<table>
<thead>
<tr>
<th>Bar</th>
<th>Location</th>
<th>Size</th>
<th>Flat to Flat Length</th>
<th>Flat to Head Length</th>
<th>No.</th>
<th>Weight</th>
<th>Kg/M</th>
<th>Location</th>
<th>Flat to Flat Length</th>
<th>Flat to Head Length</th>
<th>No.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>6d2</td>
<td>Slab Transverse Tip &amp; Bottom</td>
<td>6d2</td>
<td>32&quot; - 40&quot;</td>
<td>35&quot; - 40&quot;</td>
<td>46</td>
<td>26.6</td>
<td>540</td>
<td>32&quot; - 40&quot;</td>
<td>35&quot; - 40&quot;</td>
<td>46</td>
<td>26.6</td>
<td>540</td>
</tr>
<tr>
<td>6d3</td>
<td>Slab Longitudinal Top &amp; Bottom</td>
<td>6d3</td>
<td>25&quot; - 40&quot;</td>
<td>26&quot; - 40&quot;</td>
<td>48</td>
<td>28</td>
<td>524</td>
<td>25&quot; - 40&quot;</td>
<td>26&quot; - 40&quot;</td>
<td>48</td>
<td>28</td>
<td>524</td>
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<tr>
<td>6d4</td>
<td>Abutment Horizontal, Longitudinal, T &amp; F</td>
<td>6d4</td>
<td>28&quot; - 40&quot;</td>
<td>30&quot; - 40&quot;</td>
<td>50</td>
<td>31.5</td>
<td>640</td>
<td>28&quot; - 40&quot;</td>
<td>30&quot; - 40&quot;</td>
<td>50</td>
<td>31.5</td>
<td>640</td>
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<tr>
<td>6d5</td>
<td>Abutment Horizontal, Longitudinal, E &amp; E</td>
<td>6d5</td>
<td>32&quot; - 40&quot;</td>
<td>34&quot; - 40&quot;</td>
<td>52</td>
<td>34.4</td>
<td>744</td>
<td>32&quot; - 40&quot;</td>
<td>34&quot; - 40&quot;</td>
<td>52</td>
<td>34.4</td>
<td>744</td>
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<tr>
<td>6d6</td>
<td>Abutment Horizontal, Longitudinal, End</td>
<td>6d6</td>
<td>40&quot; - 40&quot;</td>
<td>42&quot; - 40&quot;</td>
<td>54</td>
<td>44</td>
<td>1000</td>
<td>40&quot; - 40&quot;</td>
<td>42&quot; - 40&quot;</td>
<td>54</td>
<td>44</td>
<td>1000</td>
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<tr>
<td>6d7</td>
<td>Paving Horizontal</td>
<td>6d7</td>
<td>36&quot; - 40&quot;</td>
<td>38&quot; - 40&quot;</td>
<td>56</td>
<td>41</td>
<td>955</td>
<td>36&quot; - 40&quot;</td>
<td>38&quot; - 40&quot;</td>
<td>56</td>
<td>41</td>
<td>955</td>
</tr>
<tr>
<td>6d8</td>
<td>Abutment Vertical, Tip &amp; Bottom</td>
<td>6d8</td>
<td>24&quot; - 40&quot;</td>
<td>26&quot; - 40&quot;</td>
<td>58</td>
<td>44.1</td>
<td>1100</td>
<td>24&quot; - 40&quot;</td>
<td>26&quot; - 40&quot;</td>
<td>58</td>
<td>44.1</td>
<td>1100</td>
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<tr>
<td>6d9</td>
<td>Abutment Vertical, End</td>
<td>6d9</td>
<td>30&quot; - 40&quot;</td>
<td>32&quot; - 40&quot;</td>
<td>60</td>
<td>48</td>
<td>1168</td>
<td>30&quot; - 40&quot;</td>
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<td>62</td>
<td>50</td>
<td>1226</td>
<td>24&quot; - 40&quot;</td>
<td>26&quot; - 40&quot;</td>
<td>62</td>
<td>50</td>
<td>1226</td>
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<tr>
<td>6d11</td>
<td>Abutment Vertical, End</td>
<td>6d11</td>
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<td>32&quot; - 40&quot;</td>
<td>64</td>
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<td>1284</td>
<td>30&quot; - 40&quot;</td>
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<td>66</td>
<td>58</td>
<td>1342</td>
<td>24&quot; - 40&quot;</td>
<td>26&quot; - 40&quot;</td>
<td>66</td>
<td>58</td>
<td>1342</td>
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<tr>
<td>6d13</td>
<td>Abutment Vertical, End</td>
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<td>68</td>
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<td>30&quot; - 40&quot;</td>
<td>32&quot; - 40&quot;</td>
<td>68</td>
<td>62</td>
<td>1400</td>
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## BRIDGE LENGTH

<table>
<thead>
<tr>
<th>Length</th>
<th>Style</th>
<th>Length</th>
<th>Style</th>
<th>Length</th>
<th>Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>40'</td>
<td></td>
<td>80'</td>
<td></td>
<td>120'</td>
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</tr>
</tbody>
</table>

## BENT BAR DETAILS

### 5d5
- **Steel Grade:** 5k1
- **Shape:** 8f3 & 8f4
- **Dimension:** 5pl & 5p2
- **Material:** 5k2
- **Profile:** 6p3
- **Type:** 5d8

**NOTES:** All dimensions are to the nearest 1/8" pin diameter.
PART LONGITUDINAL SECTION NEAR GUTTER

FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30SI-30-12.

NOTES:
1. PLACE 3½" PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEAMS AND ABUTMENTS.

ELEV. B

PART END VIEW AT ABUTMENT

PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.

ELEV. A

PLAN OF TEMPORARY PAVING BLOCK

NOTE: LINE PAVING BLOCK WITH TAR PAPER PRIOR TO PLACING THE TEMPORARY PAVING BLOCK.

SECTION B-B

LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES

DETAIL "C"

SPACING BLOCK NOT SHOWN

ELEV. A

ELEV. B

LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES

PLAN OF TEMPORARY PAVING BLOCK

NOTE: LINE PAVING BLOCK WITH TAR PAPER PRIOR TO PLACING THE TEMPORARY PAVING BLOCK.
SLAB LAYOUT

[Diagram of slab layout with dimensions and details]

GENERAL DATA

<table>
<thead>
<tr>
<th>Span Length (ft – abutment bgs.)</th>
<th>46'-6&quot;</th>
<th>55'-0&quot;</th>
<th>67'-6&quot;</th>
<th>80'-0&quot;</th>
<th>90'-0&quot;</th>
<th>100'-0&quot;</th>
<th>110'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Spaces for 6a1 Top Bars</td>
<td>2&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>No. of Spaces for 6a2 Top Bars</td>
<td>6&quot;</td>
<td>10&quot;</td>
<td>14&quot;</td>
<td>18&quot;</td>
<td>22&quot;</td>
<td>26&quot;</td>
<td>30&quot;</td>
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<tr>
<td>No. of Spaces for 6a1 Bottom Bars</td>
<td>1&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>No. of Spaces for 6a2 Bottom Bars</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Top of Slab to Abutment Top</td>
<td>2'-2&quot;</td>
<td>1'-7&quot;</td>
<td>2'-8&quot;</td>
<td>3'-3&quot;</td>
<td>3'-8&quot;</td>
<td>4'-3&quot;</td>
<td>4'-9&quot;</td>
</tr>
<tr>
<td>Top of Slab to Abutment Top (left ahead skew shown, right ahead skew similar)</td>
<td>2'-2&quot;</td>
<td>1'-7&quot;</td>
<td>2'-8&quot;</td>
<td>3'-3&quot;</td>
<td>3'-8&quot;</td>
<td>4'-3&quot;</td>
<td>4'-9&quot;</td>
</tr>
</tbody>
</table>

END OF SLAB REINFORCING

[Typical view of end of deck]

[Diagram of general data with dimensions and details]
### REINFORCING BAR LIST

<table>
<thead>
<tr>
<th>BAR</th>
<th>LOCATION</th>
<th>46’-8</th>
<th>55’-0</th>
<th>67’-6</th>
<th>80’-0</th>
<th>100’-0</th>
<th>110’-0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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### BRIDGE LENGTH

<table>
<thead>
<tr>
<th></th>
<th>6’-0</th>
<th>8’-0</th>
<th>10’-0</th>
<th>12’-0</th>
<th>14’-0</th>
<th>16’-0</th>
<th>18’-0</th>
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<tbody>
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### BENT BAR DETAILS

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<tr>
<th></th>
<th>5p1</th>
<th>5p2</th>
<th>5p4</th>
<th>8f1</th>
<th>8f2</th>
<th>8f3</th>
<th>8f4</th>
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<tr>
<td></td>
<td>5d5</td>
<td>5d6</td>
<td>5d8</td>
<td>5k1</td>
<td>5n4</td>
<td>6p3</td>
<td>5r1</td>
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### CONCRETE PLACEMENT QUANTITIES

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<tr>
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<th>46’-8</th>
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<th>67’-6</th>
<th>80’-0</th>
<th>100’-0</th>
<th>110’-0</th>
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</thead>
<tbody>
<tr>
<td>DEBUG BARS</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<td>6</td>
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</tbody>
</table>

### ESTIMATED QUANTITIES

<table>
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<tr>
<th></th>
<th>46’-8</th>
<th>55’-0</th>
<th>67’-6</th>
<th>80’-0</th>
<th>100’-0</th>
<th>110’-0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
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</tbody>
</table>

### NOTE:

- All dimensions are out to out.
- D = Pin Diameter
- APRIL, 2012
**PART REAR ELEVATION AT ABUTMENT**

Notes: Barrier rail not shown, (shown for glass barrier rail)

**PART SECTION A-A**

Note: Shift 8g1 bars in F.F. as necessary to miss beams. Place 8g3 bars parallel to longit. steel.

**ABUTMENT PILE SPACING**

<table>
<thead>
<tr>
<th>Dimension or No.</th>
<th>A to C (Ft)</th>
<th>B to Pile (Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6'</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>9'</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

**NOTE:** The spiral at the top of each pile to be turned of pile bar by diameter. 3" pitch F.F. - L" x X" (shown for solid barrier rail).

**PART SECTION B-B**

**ABUTMENT PILE PLAN**

**ABUTMENT NOTES:**

*Minimum clear distance from face of concrete to near reinforcing bars 8" to be 3" unless otherwise noted or shown.

*ABUTMENT piles shall be driven to values shown in design plans. Place 5d2 bar at 1:6 slope to match traffic side of abutment wing face. (both sides)

*Barrier rail not shown in details. If rock is closer than 15' below abutment footing, special analysis may be required.

**LOADS**

<table>
<thead>
<tr>
<th>Strength 1 Design Load (Kips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
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</tbody>
</table>

**IOWA DOT**

Highway Division

Standard Design - 30' Roadway, Single Span Bridge

Pretensioned Prestressed Concrete Beam Bridges

April, 2012

Abutment Details

H3051-15-12

30" Sidewall A & B Beams
ABUTMENT NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO FACE REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

SHOWN FOR DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT BARRIER RAIL NOT SHOWN IN DETAILS.

ABUTMENT PILES SHALL BE DRIVEN TO VALUES OTHERWISE NOTED OR SHOWN.

TO LONGIT. STEEL.

TO MISS BEAMS. PLACE 8g3 BARS PARALLEL TO SHORTIT. STEEL.

NOTE: Pu, STRENGTH 1 DESIGN LOAD (KIPS)

NOTE:  SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c4 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

**NOTE: SEE OPEN RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.**

*NOTE: SEE BARRIER RAIL SHEET FOR DETAILS.*

REINFORCING BARS 5c3 AND 5c4 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.
PART LONGITUDINAL SECTION NEAR GUTTER

PART END VIEW AT ABUTMENT

PART PLAN

SECTION A-A

SECTION B-B

PLAN OF TEMPORARY PAVING BLOCK

NOTE:
LINE PAVING BLOCK WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES
GENERAL DATA

<table>
<thead>
<tr>
<th>SPAN LENGTH (E - E, ABUTMENT BRGS)</th>
<th>46'-0&quot;</th>
<th>55'-0&quot;</th>
<th>67'-0&quot;</th>
<th>80'-0&quot;</th>
<th>90'-0&quot;</th>
<th>100'-0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION OF EXTREME 6a1 TOP BAR FROM END OF SLAB</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>MIN. LAP</td>
<td>2'-2&quot;</td>
<td>2'-2&quot;</td>
<td>2'-2&quot;</td>
<td>2'-2&quot;</td>
<td>2'-2&quot;</td>
<td>2'-2&quot;</td>
</tr>
<tr>
<td>LOCATION OF EXTREME 6a1 BOTTOM BAR AT E, ABUTMENT BEARING</td>
<td>3'-8&quot;</td>
<td>4'-3&quot;</td>
<td>4'-9&quot;</td>
<td>5'-6&quot;</td>
<td>5'-6&quot;</td>
<td>5'-7&quot;</td>
</tr>
<tr>
<td>MIN. LAP</td>
<td>3'-8&quot;</td>
<td>3'-8&quot;</td>
<td>4'-4&quot;</td>
<td>4'-9&quot;</td>
<td>5'-6&quot;</td>
<td>5'-7&quot;</td>
</tr>
<tr>
<td>LOCATION OF EXTREME 5j1 TOP BAR AT E, ABUTMENT BEARING</td>
<td>3'-8&quot;</td>
<td>3'-8&quot;</td>
<td>4'-4&quot;</td>
<td>4'-9&quot;</td>
<td>5'-6&quot;</td>
<td>5'-7&quot;</td>
</tr>
<tr>
<td>VERTICAL CURVE</td>
<td>3'-8&quot;</td>
<td>3'-8&quot;</td>
<td>4'-4&quot;</td>
<td>4'-9&quot;</td>
<td>5'-6&quot;</td>
<td>5'-7&quot;</td>
</tr>
<tr>
<td>LOCATION OF EXTREME 5j1 BOTTOM BAR AT E, ABUTMENT BEARING</td>
<td>3'-8&quot;</td>
<td>3'-8&quot;</td>
<td>4'-4&quot;</td>
<td>4'-9&quot;</td>
<td>5'-6&quot;</td>
<td>5'-7&quot;</td>
</tr>
<tr>
<td>MIN. LAP</td>
<td>3'-8&quot;</td>
<td>3'-8&quot;</td>
<td>4'-4&quot;</td>
<td>4'-9&quot;</td>
<td>5'-6&quot;</td>
<td>5'-7&quot;</td>
</tr>
<tr>
<td>SERVICE L. L. ABUTMENT REACTION (C. L. + F. W. S. + IMPACT) LOADS</td>
<td>KIPS</td>
<td>343</td>
<td>343</td>
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<td>SERVICE L. L. ABUTMENT REACTION (M. M.) LOADS</td>
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</tr>
</tbody>
</table>

SLAB LAYOUT

(LEFT HAND SIDE SHOWN, RIGHT HAND SIDE SIMILAR)
**Beam Notes:**

These beams are designed for ASHHTO HL-93 live loads as defined in Section 2086 of the Highway Design Series of 2007. All RC beams are to be designed in accordance with the AASHTO specifications. The design stresses for the following materials are to be used:

- **Concrete:**
  - Minimum concrete (f'c) at 28 days shall be 7,000 psi.
  - Concrete in accordance with Section 5.

- **Reinforcing Steel:**
  - Grade 270 low relaxation strand.
  - Conforming to ASTM A416, Grade 60.

The beam data includes the following:

- **Total Initial Prestress:**
  - 3.86 kips
  - 10.8 kips

- **Deflections:**
  - At release, 1.35 in.
  - Due to the combined effect of creep and shrinkage.

- **Design Stresses:**
  - For elastic shortening, creep and shrinkage.

**Specifications:**

- Construction Standards Specifications of the Iowa Department of Transportation, current series, with current applicable special provisions and supplemental specifications.
- Design AASHTO/LRFD, Series of 2007, with minor modifications.

**Beam Details:**

- **A Beam Details**
  - **A Beam Data**
  - **Reinforcing Bar List**
  - **Beam Notes**

**Notations:**

- All dimensions are subject to change.
- Bars are to be painted.
- Coils are to be painted.
- All reinforcing shown in-place bending may be necessary.
- Deflections at mid-span due to weight of slab and diaphragm.
- Deflections due to the combined effect of creep and shrinkage.

**Notations:**

- Deflections at mid-span due to weight of slab and diaphragm.
- Deflections due to the combined effect of creep and shrinkage.

**Material Specifications:**

- **Concrete:**
  - Minimum concrete f'c at 28 days shall be 7,000 psi.
  - Concrete in accordance with Section 5.

- **Reinforcing Steel:**
  - Grade 270 low relaxation strand.
  - Conforming to ASTM A416, Grade 60.

- **Design Stresses:**
  - For elastic shortening, creep and shrinkage.

**Specifications:**

- Construction Standards Specifications of the Iowa Department of Transportation, current series, with current applicable special provisions and supplemental specifications.
- Design AASHTO/LRFD, Series of 2007, with minor modifications.
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT BEAM AND END OF BEAM.

BEAM A46

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

A55

"A" BEAM CROSS SECTION

\[ \begin{align*}
A &= 311.5 \text{ in}^2 \\
I &= 34,082 \text{ in} \cdot \text{lb} \\
Y &= 14.05 \text{ in}
\end{align*} \]

SYMMETRICAL ABOUT C

NOTE: DECORATED STRANDS

STRAIGHT STRANDS

DELECTED STRANDS

EPOXY COATED BARS

CONCRETE BEAM BRIDGES

PRETENSIONED PRESTRESSED

APRIL, 2012

Highway Division

Standard Design - 30' Roadway, Single Span Bridge

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

A46-A55 BEAM DETAILS H30S1-22-12
B BEAM DATA

<table>
<thead>
<tr>
<th>LASH</th>
<th>LOAD</th>
<th>VOL</th>
<th>LOAD</th>
<th>DEFLECTION (in)</th>
<th>LENGTH</th>
<th>MATERIAL</th>
<th>WEIGHT (Tons)</th>
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<tbody>
<tr>
<td>276</td>
<td>674</td>
<td>584</td>
<td>122</td>
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<td>11</td>
<td>Epoxy</td>
<td>4.58</td>
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<tr>
<td>276</td>
<td>674</td>
<td>584</td>
<td>122</td>
<td>0.28</td>
<td>2</td>
<td>Steel</td>
<td>4.58</td>
</tr>
</tbody>
</table>

BEAM NOTES:
- These beams are designed for AASHTO HL-93 live loads as per Iowa DOT Bridge Specifications.
- All PPC beams shall use high performance concrete in accordance with the latest specifications.
- Prestressing strands shall conform to ASTM A416 Grade 1570.
- Lifting loops shall be 10" minimum from the beam end and finished as per materials noted.
- Design stresses for the following materials are to be as detailed on other design sheets.

DESIGN STRESSES:
- Prestressing steel in accordance with Section 5, f's = 270,000 psi.
- Concrete in accordance with Section 5, minimum f'c = 6,000 psi, minimum f'c at release shall be 5,500 psi.
- All beams are to be increased in length to compensate for elastic shortening, creep and shrinkage.

SPECIFICATIONS:
- Design and details are to be as detailed in the latest specifications.
NOTES: ENDINGS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT 6, END TO END OF BEAM.

BAR 4b5, 9" @ 4'-6"
BAR 1'-6" @ 6'-9"
BAR 2'-10" @ 1'-2"
BAR 4b1, 3c1, 3d @ 3'-0"}

BEAM B67

NOTE: BARS 3d AND 4b5 ARE TO BE PLACED IN PAIRS.
NOTE: DIMENSIONS AT END OF BEAM.
NOTE: EPOXY COATED BARS

DEFLECTED STRANDS BE PLACED IN PAIRS.
NOTE: DIMENSIONS AT END OF BEAM.
NOTE: EPOXY COATED BARS
LIFTING LOPS

COIL TIE DETAIL

REINFORCING BAR LIST

**Deflection at mid-span due to weight of slab and diaphragm.**

**Deflections due to the combined effect of creep due to weight of slab and shrinkage of slab.**

**Total beam deflection at 1/3 of span, B due to weight of slab and shrinkage of slab.**

**Total initial prestress is based on 28°F, 0.5% of 270,000 psi and as a ratio.**

DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM.

DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

DESIGN STRESSES:

- Steel:
  - Prestressing steel in accordance with Section 5, f's = 270,000 psi.

- Concrete:
  - Minimum f'c (at 28 days) shall be 6,000 psi.
  - Minimum f'c at release shall be 5,000 psi.

SPECIFICATIONS:

- Construction:
  - Standard Specifications of the Iowa Department of Transportation, current series, with current applicable special provisions and supplemental specifications.

- Design:

BEAM NOTES:

- These beams are designed for AASHTO HL-93 live loads as with an allowance of 20 lb. per square foot of roadway for future wearing surface.

- All PPC beams shall use high performance concrete with a minimum of 6,000 psi.

- Top of beams are to be struck off level and finished as per materials.
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT E BEAM AND END OF BEAM.

---

*NOTE: BARS 6b5 AND 2 BARS EPOXY COATED BARS TO BE PLACED IN PAIRS.*

---

DEFLECTED STRANDS KEEP IN PAIRS.

---

"C" BEAM CROSS SECTION

- $A = 564.5 \text{ in}^2$
- $t = 20.23 \text{ in}$
- $b = 665 \text{ in}$

---

STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

APRIL, 2012

Highway Division

C80 BEAM DETAILS H30SI-26-12
THE TOP AND BOTTOM DEFLICTED STRANDS OF BEAMS END THROUGH DIAPHRAGMS ARE TO BE CUT WITH A-3 PROJECTIONS AND SHOT HOLE UP OR DOWN AS SHOWN. THE REMAINING STRANDS ARE TO BE CUT WITH A-3 PROJECTIONS.

ALL PRESTRESSING STRANDS SHALL BE CUT OFF REASONABLY Flush WITH THE CONCRETE.

DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGMS.

DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSES.

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DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGH
REINFORCING STEEL - ONE END SECTION

- 5c10, 5c7, 5c8, 5c9, 5c6, 5c5 - VARIES 23
- 6c1 & 6c4 - VARIES 6
- 6c3, 6c2, 6c1 - VARIES 6

CONCRETE PLACEMENT SUMMARY

<table>
<thead>
<tr>
<th>SECTION</th>
<th>TOTAL</th>
<th>BAR</th>
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<th>WEIGHT (LBS.)</th>
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<td>BARRIER RAIL</td>
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<td>6c2</td>
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<td>25</td>
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<td></td>
<td></td>
<td>6c2</td>
<td>2'-7</td>
<td>81</td>
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</tbody>
</table>

BENT BAR DETAILS

- 6c1 & 6c4
- 5c5-5c10

NOTE: ALL DIMENSIONS ARE OUT TO OUT.

Highway Division

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

APRIL, 2012

BARRIER RAIL DETAILS

H2051-32-12
REINFORCING STEEL-TWO BARRIER RAILS

NOTE: THESE REINFORCING BARS TO BE USED ON ALL SKews:

BENT BAR DETAILS

NOTES:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

CONCRETE PLACEMENT SUMMARY

STANDARD SECTION

CONCRETE BARRIER RAIL QUANTITIES

IOWA DOT
Highway Division

Bar Details

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
APRIL 2012

Standard Design - 30' Roadway, Single Span Bridge

Sheet 3 of 3

10/14/2015   1:41:07 PM
W:\Highway\Bridge\Standards\Bridges\H30SI-12.dgn    H30SI-33-12   11x17_pdf.pltcfg
**Table of Open Rail Dimensions and Numbers**

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<th>25&quot;</th>
<th>30&quot;</th>
<th>35&quot;</th>
<th>40&quot;</th>
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</table>

**Open Rail Notes:**
- Construction joint between top of wing and rail is roughened concrete.
- Minimum clear distance from face of concrete to nearest reinforcing bar is to be 2" unless otherwise noted or shown.
- Cost of the joint sealer and bond breaker shall be considered incidental to other construction.
- All open rail reinforcing steel is to be included with the superstructure reinforcing steel.
- The cast-in-place open rail shall use Class C mix. Class D concrete is not permitted.
- Top of the open rail is to be parallel to theoretical grade.
- Open rail joint details:
  - Joint sealer and bond breaker shall be considered incidental to other construction.
  - Minimum lap distance from face of concrete to nearest reinforcing bar is to be 2" unless otherwise noted or shown.
CONCRETE PLACEMENT SUMMARY

<table>
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<tr>
<th>ONE ABUTMENT WING</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1.8</td>
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</tbody>
</table>

| TOTAL (CU. YDS.) | 1.8        |

**NOTE:** REINFORCING STEEL QUANTITY AND CONCRETE QUANTITY ARE TO BE ADDED TO THE SUPERSTRUCTURE QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

**NOTE:**

REINFORCING STEEL QUANTITY AND CONCRETE QUANTITY ARE TO BE ADDED TO THE SUPERSTRUCTURE QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.
ABUTMENT WING - ELEVATION VIEW

SECTION B-B

NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

CONCRETE PLACEMENT SUMMARY

<table>
<thead>
<tr>
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<th>LOCATION</th>
<th>SHAPE</th>
<th>NO.</th>
<th>LENGTH</th>
<th>WEIGHT</th>
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<tbody>
<tr>
<td>5h1</td>
<td>HORIZONTAL BACK FACE</td>
<td>9</td>
<td>6'-9</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>5h3</td>
<td>HORIZONTAL TRAFFIC FACE</td>
<td>9</td>
<td>6'-9</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>5h4</td>
<td>VERTICAL BOTH FACES</td>
<td>86</td>
<td>6'-8</td>
<td>215</td>
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</tbody>
</table>

TOTAL (LBS.) | 241

TOTAL (CU. YDS.) | 2.1

NOTE:
REINFORCING STEEL QUANTITY AND CONCRETE QUANTITY ARE TO BE ADDED TO THE SUPERSTRUCTURE QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

REINFORCING BAR LIST - ONE ABUT. WING

<table>
<thead>
<tr>
<th>BAR</th>
<th>LOCATION</th>
<th>SHAPE</th>
<th>NO.</th>
<th>LENGTH</th>
<th>WEIGHT</th>
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</thead>
<tbody>
<tr>
<td>6c3</td>
<td>5 EQUAL SPACES</td>
<td>6'-6</td>
<td>5s1</td>
<td>BARS</td>
<td>6'-6</td>
</tr>
</tbody>
</table>

| HORIZONTAL BACK FACE | 1'-11 | MIN. | 241 |
| HORIZONTAL TRAFFIC FACE | 9 | 3'-10 | 2'-0 | 3'-10 | 7" |

NOTE:
REINFORCING BARS 6c3, 6c4, 5s1-10, 6d2 & 4t1 ARE ADDED TO THE SUPERSTRUCTURE QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.
CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED

ABUTMENT WING - ELEVATION VIEW

VIEW A-A

SECTION B-B

REINFORCING BAR LIST - ONE ABUT. WING

<table>
<thead>
<tr>
<th>BARS</th>
<th>LOCATION</th>
<th>SHAPE</th>
<th>NO.</th>
<th>LENGTH</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>5h1</td>
<td>Horizontal Back Face</td>
<td>9</td>
<td>6'-0</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>5h3</td>
<td>Horizontal Traffic Face</td>
<td>9</td>
<td>6'-0</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>5h4</td>
<td>Vertical Both Faces</td>
<td>86</td>
<td>7'-0</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL (LBS.) 254

NOTES:
- All dimensions are out to out.
- D = Pin Diameter.

REINFORCING STEEL QUANTITY AND CONCRETE QUANTITY ARE TO BE ADDED TO THE SUPERSTRUCTURE QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

CONCRETE PLACEMENT SUMMARY

<table>
<thead>
<tr>
<th>ONE ABUTMENT WING</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>2.3</td>
</tr>
<tr>
<td>Total CU. FLD.</td>
<td>2.3</td>
</tr>
</tbody>
</table>

NOTE:
- Reinforcing steel quantity and concrete quantity are to be added to the superstructure quantities shown elsewhere in these plans.

Highway Division

STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
APRIL, 2012

WING DETAILS H30SI-39-12
SITUATION PLAN

TOE OF SLOPE

REFER TO SITUATION PLAN FOR NORTH ARROW.

SUBDRAIN

OUTLET DETAILS

6" corrugated metal pipe outlet, or 4½ corrugated double-walled PE or PVC pipe outlet with an appropriate coupling, if metal pipe is used. The pipes should be coupled in one of the two following ways:

1. In the inside fit reducer coupling, or the male end of the coupling should be inserted a minimum of 6" into pipe.

2. Insert 1'-0 of the 4½ subdrain into the 6½ metal outlet pipe, then fully seal the entire opening with grout.

OUTLET DETAILS

OUTLET DETAILS

NOTE:

SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE RELEVANT TO THIS STRUCTURE.

GUARD DETAILS

REMOVABLE RODENT TUBING

( IF REQUIRED )

SLOPE PROTECTION

SHEET H30-83-06

SHEET H30-82-06 OR

SEE DETAILS ON

SUBDRAIN OUTLET

TYPICAL SECTION

SEE DETAILS ON

SUBDRAIN DETAILS

H30SI-40-12

BERM SLOPE

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

Pretensioned Prestressed Concrete Beam Bridges

April, 2012

Highway Division

SUBDRAIN DETAILS H30S1-40-12

Materials I.M. 443.01

Guards. See removable rodent guard details. See details on sheet H300-43-06.

Drilled holes for attachment.

Top view

Front view

Subdrain outlet

See details on sheet H300-44-06 or sheet H300-45-06.

Protection layout 0° skew

Protection layout skewed

Subdrain outlet

Subdrain outlet

Subdrain outlet

Subdrain outlet

4½ perforated subdrain (polyethylene corrugated tubing)

Drilled holes for attachment.

Abutment face

Soil slope

Top of slope

Subdrain outlet

Subdrain outlet

Subdrain outlet

Subdrain outlet

NOTE:

See Abutment Backfill Details Sheet for details not shown on this sheet which are relevant to this structure.
SUBDRAIN NOTES:

See WOS-40-12 and "General Elevation Data" sheets for details of placing all subdrains and subdrain outlets required for this structure.

The bridge contractor is to install subdrains behind the abutment. The subdrains shall be of 3-in diameter and meet the requirements of Section 6.9 of the current Iowa State Standard Specifications. The subdrain outlet shall consist of a 9'-0 length of pipe with a removable rodent guard.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berm. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

The cost of furnishing and placing subdrain (including excavation, granular backfill, porous backfill, and subdrain outlet) is to be included in the price and for structural concrete bridges, no extra payment will be made.

MACADAM STONE WING ARMORING NOTES:

Macadam stone shall be placed along the face of the wing and wing protection. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underlayed with engineering fabric.

The bridge berm slope shall be compacted and shaped as shown on these plans, the situation plan, and as directed by the engineer. The berm slope shall be firm when the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with 4196.01, B, 3, of the standard specifications. Engineering fabric is placed in the top face of the footings. This is typical at each corner of the bridge, unless otherwise noted in the plans. Engineering fabric shall be underlaid with engineering fabric.

Pavement and paving shall be placed in accordance with 4196.01, B, 3, of the standard specifications. Engineering fabric is placed in the top face of the footings. This is typical at each corner of the bridge, unless otherwise noted in the plans. Engineering fabric shall be underlaid with engineering fabric.

Payment for the bridge armorings will be based per square yard. Cost will include engineering fabric, macadam stone, excavation, shaping, and compaction to dimensions shown in these plans. This item shall be "Structural Wing Armoring - Macadam Stone".
**SUBDRAIN NOTES:**

See H30SI-40-12 and "General Elevation Data" sheets for details of placing all subdrains and subdrain outlets required for this structure.

The bridge contractor is to install subdrains around the abutment. The subdrains shall be 6 inches in diameter and meet the requirements of Section 4143.01 of the Current I.O.T. Standard Specification. The subdrain outlet shall consist of a 6-foot length of pipe with a removable rodent guard.

The subdrain outlet of the proposed subdrains is based on the proposed grading layout of bridge berm. The subdrains shown are for estimating only required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

The cost of furnishing and placing subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price and for structural concrete bridges, no extra payment will be made.

**MACADAM STONE WING ARMORING NOTES:**

Macadam stone shall be placed along the line of the wing and wing extension. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underlayed with engineering fabric.

The bridge berm slope shall be compacted and finished as shown in these plans. The engineer's instruction is to be followed to the engineer's specification. The berm slope shall be firm and the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with 4196.01, B, 3, of the standard specification. Engineering fabric is laid just before the macadam stones are placed.

The macadam stone shall be compacted and finished as shown in these plans, the engineer's instruction is to be followed and will provide uniform depth and density and provide uniform surface appearance.

Payments for the bridge wing armor shall be made by

Square yard. Cost will include engineering fabric, macadam stone excavation, shaping, and compacting to dimensions shown in these plans. No item shall be "wing armor - macadam stone."

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**TO VIEW OF WING ARMORING WITH WING EXTENSION**

**SECTION A-A**

**PROFILE VIEW OF WING ARMORING WITH WING EXTENSION**

(Shown for integral abutment with wing extensions)
ABUTMENT BACKFILL PROCESS:
The base of the excavation subsurface behind the abutment is to be graded with a
4% slope away from the abutment footing and a 2% cross slope in the direction of
the subdrain outlet. This excavation shaping is to be done prior to beginning
installation of the geotextile and backfill material.

After the subdrain has been installed the geotextile fabric shall be installed in
accordance with the details shown in the fabric detail to be installed in the base of the excavation and extend vertically of the subdrain
backwall, abutment wing walls, and excavation face to a height that will be
approximately 1 to 2 feet higher than the height of the porous backfill
placement shown in the (Granular Backfill Details) on this sheet.

The strips of the fabric placed shall overlap approximately 1 foot and shall
be pinned in place. The fabric shall be attached to the abutment by using lath
folded in the fabric and secured to the concrete with welded wire nails.

When the fabric is in place, the subdrain shall be installed directly on the
fabric at the toe of the near excavation slope. A slot will need to be cut in
the fabric at the point where the subdrain exits the fabric near the end of
the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with granular backfill, surface flooding,
and vibratory compaction. The granular backfill material shall have 20% or less
passing the #200 sieve. The ashed concrete sand the granular backfill shall
be placed in individual lifts, surface floated, and compacted with vibratory
compactor to ensure full consolidation, limit the loose lifts to no more
than 2 feet of thickness.

Start surface flooding for each sand lift at the high point of the subdrain and
progress to the low point where the subdrain exits the fabric, to ensure
uniform surface flooding, water running full in a 2-inch diameter hose should
be sprayed in successive 6 to 8 inch increments for 5 minutes within each
increment.

Lift placement, flooding, and compaction shall proceed until the required full
thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, granular backfill,
and geotextile fabric furnished by the bridge authorities shall be
included in the contract and paid for as a structural concrete.

NOTE:
SUBDRAIN SMALL SLOPE DOWNSTREAM FROM APPROACH ROADWAY WHEN OUTLETING BOTH SIDES OF THE ABUTMENT.
SUBDRAIN SMALL SLOPE DOWNSTREAM FROM HIGH END WHEN OUTLETING AT THE END OF THE ABUTMENT.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 410, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING
PRACTICE IS LIFTED THE LIFTS SHALL BE A MINIMUM OF 1 FOOT IN LENGTH SINGLE POUR OF UP TO 2% SLOPE LIFT ON TOP OF STYLE FOR CONTINUITY.

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PRACTICE IS LIFTED THE LIFTS SHALL BE A MINIMUM OF 1 FOOT IN LENGTH SINGLE POUR OF UP TO 2% SLOPE LIFT ON TOP OF STYLE FOR CONTINUITY.
ABUTMENT BACKFILL PROCESS:

The base of the excavation subgrade behind the abutment is to be graded to an 8" slope away from the abutment footing and a 20° cross slope in the direction of the subdrain outlet; this excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subdrain has been installed, the geotextile fabric shall be installed in accordance with the details shown, the fabric or fabric to be installed in the base of the excavation. The subdrain outlet shall be at the rear of the backwall, abutment, and wall, and excavation face to a height that will be approximately 3 to 4 feet higher than the height of the porous backfill placement shown on the "gravel detail" on this sheet; the strips of the fabric placed shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lap and wrapped to the concrete with shallow concrete nails, the fabric placed against the excavation face shall be pinned.

When the fabric is in place, the subdrain shall be installed directly on the fabric at its top of the rear excavation slope, a slot will need to be cut in the fabric at the point where the subdrain exits the fabric near the rear of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with granular backfill, surface flooding, and vibratory compaction. The granular backfill material shall have a gradation less than the maximum size of concrete during. The granular backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction; to ensure full consolidation, the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each sand lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch diameter hose should be sprayed in successively greater amounts for 5 minutes within each increment.

Lift placement, flooding, and compaction shall proceed until the required full thickness of the backfill section has been completed.

Water required for flooding, subdrains, porous backfill, granular backfill, and geotextile fabric furnished at the abutment footings will not be measured separately for payment.

The cost of water required for flooding, subdrains, porous backfill, granular backfill, and geotextile fabric furnished at the abutment footings will be included in the contract unit price bid for structural concrete.

NOTE: Subdrain slope downward 2% from approach roadway when outlying both sides of the abutment.

The geotextile fabric shall be in accordance with Article 4196.01, B, 6 of the Standard Specifications. If the engineering analysis is revised, the limits shall be a minimum of one foot in length single-ply synthetic uphill slope lap piece on top and stapled for continuity.

NOTE: See subdrain details sheet for details not shown on this sheet which are pertinent to this structure.
ABUTMENT BACKFILL PROCESS:
The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footings and a 2% cross slope in the direction of the subdrain outlet. This excavation should be done prior to beginning installation of the geotextile and backfill material.

After the surface has been graded, the geotextile fabric shall be installed in accordance with the details shown. The fabric in question is to be installed in the same of the excavation and extended (especially of the abutment backfill area) along the excavation face to a height that shall be approximately 1/2 to 2 feet higher than the height of the porous backfill placement as shown in the 'gravel backfill details' on this sheet. The strips of the fabric placed shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lathe folded into the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned.

When the fabric is in place, the subdrain shall be installed directly on the fabric at the elevation of the subdrain outlet. A subdrain will need to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with granular backfill, surface flooding, and vibratory compaction. The granular backfill material shall have 4% or less passing the #200 sieve (I.E. washed concrete sand). The granular backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation. Lifts 1 to 2 feet thick are more to be done at a time. This compaction shall be done at the end of the subdrain outlet.

Start surface flooding for each sand lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch diameter hole should be sprayed in successive efforts to saturate the sand layer and inch increment.

Lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, and geotextile fabric placed at the abutment abutments shall be included in the contract unit price bid for structural concrete.

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Tom Wuesthoff, Project Engineer

Highway Division

Standard Design - 30' Roadway, Single Span Bridge
Pretensioned Prestressed Concrete Beam Bridges
April 2012

ABUTMENT BACKFILL DETAILS
NOTE: Porous backfill will be placed against face of abutment footings and wings. Dimensions vary due to subdrain slope.

NOTE: See subdrain details sheet for details not shown on this sheet which are pertinent to this structure.
ABUTMENT BACKFILL PROCESS:

The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the subdrain outlet. This excavation subgrade is to be done prior to beginning installation of the geotextile and backfill material.

After the subgrade has been formed, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavation and extended, especially of the abutment backfill, to abutment wing walls, and excavation face to a height that will be approximately 2 ft. more than the height of the porous backfill placement as shown in the geotextile fabric details on this sheet.

The fabric placed adjacent to the foot of the abutment shall be pinned in place. The fabric shall be attached to the abutment by using latex in the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned. 

When the fabric is in place, the subdrain shall be installed directly on the fabric. At the toe of the rear excavation slope, a dry wall shall be placed to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled; no compaction is required.

The remaining work involves backfilling with granular backfill, surface flooding, and vibratory compaction. The granular backfill material shall have 4% or less passing the No. 200 sieve, (average concrete sand). The granular backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation. Limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each sand lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch diamter hole shall be sprayed in successive effort to ensure consolidation for 5 minutes within each increment.

When the abutment backfill is complete, the fabric is placed against the excavation face to the top of the subdrain and extended, especially of the abutment backfill. Any voids shall be filled with granular backfill and vibratory compaction. The fabric placed against the excavation face shall be pinned. 

The cost of water required for flooding, subdrains, porous backfill, granular backfill, and geotextile fabric furnished at this abutment shall not be included in the contract unit price bid for structural concrete.

NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM HIGH END WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

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