J24–06 CONTINUOUS CONCRETE SLAB BRIDGE STANDARDS
GENERAL NOTES:

THE J24-06 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 24'-0 ROADWAY, 3 SPAN BRIDGES WITH LENGTHS OF 70'-0, 80'-0, 90'-0, 100'-0, 110'-0, 120'-0, 130'-0, 140'-0 AND 150'-0.

THESE BRIDGES MAY BE BUILT ON A 0', 15', 30' OR 45' SKEW. THESE PLANS SHOW THE BRIDGES SKewed IN ONE DIRECTION, BUT ALL DIMENSIONS AND DETAILS WILL BE THE SAME FOR THE OPPOSITE SKEW.

THese STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES. HOWEVER, THE FOLLOWING ADDITIONAL INFORMATION IS REQUIRED FOR USE ON PRIMARY ROUTES.

FOR DESIGNATED USE THE ENGINEER MAY NOT REQUIRE ALL SHEETS TO BE PROVIDED.

1. TITLE SHEET WITH ENGINEERING SEAL.
2. ISSUE SHEET OF EXCERPT FACING STRUCTURAL SHEETS.
3. BOTTOM OF ABUTMENT ELEVATIONS.
4. BOTTOM OF PILE CAP ELEVATIONS.
5. FOUNDATION DESIGN INFORMATION.
6. ELEVATION INFORMATION.
7. FOUNDATION LAYOUT IF NEEDED.
8. FRAME LAYOUT IF NEEDED.

THESE SHEETS ARE DESIGNED FOR 100 LOAD PLUS 205 PER SQ. FT. OF ROADWAY FOR FUTURE HEATING SURFACES, CENTRAL CRACK DISTRIBUTION OR RESTRICTED LOAD DESIGN BASED ON THE FIELD LOAD FOR INTEGRAL ABUTMENTS.

THE ABUTMENT DESIGN UTILIZED ON THESE BRIDGES REQUIRES THE USE OF THE FOLLOWING VARIOUS TYPES OF PILE FOOTINGS AS FOLLOWS:

· INTEGRAL ABUTMENTS: TIMBER PILES OR HP 10x42 PILES AT BRIDGE DESIGN MANUAL (BDM) PER IOWA DOT STANDARD SPECIFICATIONS. THE ELEVATION OF THE BOTTOM OF THE FOOTING SHALL BE SHOWN ON THE PLANS.

· NON-MONOLITHIC PIER CAP DETAILS ALL BRIDGES

· MONOLITHIC PIER CAP DETAILS ALL BRIDGES

· PILING DESIGN INFORMATION

IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THE KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NORMAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE REBAR USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS INCLUDE ALL REINFORCING STEEL WITH ENGLISH NOTATION. THE DIA. DIAMETER BAR`. ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION", THE "BAR DESIGNATION IS THE STRIPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

FOR PIECES SUBJECT TO SCOUR THE DESIGN BEARING SHALL BE OBTAINED BELOW SCOUR ELEVATION. SOURCES OF STEEL COLUMNS WILL BE REIFIED ON THE BRIDGE DESIGN MANUAL.

FOR MORE INFORMATION ON J24-06 SEE THE BRIDGE DESIGN MANUAL LOCATED ON THE IOWA DOT WEBSITE.
**J24-02-06**

**SUPERSTRUCTURE DETAILS**

**CONTINUOUS CONCRETE SLAB BRIDGES**

**November, 2006**

**STANDARD DESIGN - 70'-0 ROADWAY, 3 SPAN BRIDGES**

**NOVEMBER, 2006**

<table>
<thead>
<tr>
<th>ABUT. BRG.</th>
<th>ABUT. BRG.</th>
<th>PIER</th>
<th>PIER</th>
<th>ABUT. BRG.</th>
<th>ABUT. BRG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21'-0</td>
<td>28'-0</td>
<td>530</td>
<td>530</td>
<td>21'-0</td>
<td>28'-0</td>
</tr>
<tr>
<td>LINE A</td>
<td>LINE A</td>
<td>LINE B</td>
<td>LINE B</td>
<td>LINE C</td>
<td>LINE C</td>
</tr>
<tr>
<td>15'-0</td>
<td>19'-6</td>
<td>19'-6</td>
<td>19'-6</td>
<td>3'-3</td>
<td>3'-3</td>
</tr>
<tr>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>3'-9</td>
<td>3'-9</td>
</tr>
<tr>
<td>14'-0</td>
<td>19'-6</td>
<td>19'-6</td>
<td>19'-6</td>
<td>4'-0</td>
<td>4'-0</td>
</tr>
<tr>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>5'-4</td>
<td>5'-4</td>
</tr>
<tr>
<td>15'-0</td>
<td>17'-0</td>
<td>17'-0</td>
<td>17'-0</td>
<td>6'-0</td>
<td>6'-0</td>
</tr>
<tr>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>6'-0</td>
<td>6'-0</td>
</tr>
<tr>
<td>15'-0</td>
<td>17'-0</td>
<td>17'-0</td>
<td>17'-0</td>
<td>6'-0</td>
<td>6'-0</td>
</tr>
<tr>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>2'-3</td>
<td>6'-0</td>
<td>6'-0</td>
</tr>
</tbody>
</table>

**NOTE:**

- Longitudinal reinforcing steel is to be parallel to and 12" clear below top of slab. Longitudinal reinforcing steel is to be parallel to and 2" clear above bottom of slab. Reinforcing steel is to be securely wired in place and adequately supported on bents before concrete is placed. Location requirements shall apply for bay chairs.

- Post joint under roughened surfaces of slab.

- Final Grade Line

- Form Camber Diagram

- This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

- Slab cross-sectional area for open rail: 2' x 5' = 10 sq ft.

- Placement for longitudinal reinforcement.

- Parabolic crown ordinates 2.0% slope.

- Half Section near Pier

- Half Section near Abutment

- Form Camber Diagram

- This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

- Slab cross-sectional area for open rail: 2' x 5' = 10 sq ft.

- Placement for longitudinal reinforcement.

- Parabolic crown ordinates 2.0% slope.

- Half Section near Pier

- Half Section near Abutment

- Form Camber Diagram

- This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

- Slab cross-sectional area for open rail: 2' x 5' = 10 sq ft.

- Placement for longitudinal reinforcement.

- Parabolic crown ordinates 2.0% slope.

- Half Section near Pier

- Half Section near Abutment

- Form Camber Diagram

- This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

- Slab cross-sectional area for open rail: 2' x 5' = 10 sq ft.

- Placement for longitudinal reinforcement.

- Parabolic crown ordinates 2.0% slope.

- Half Section near Pier

- Half Section near Abutment

- Form Camber Diagram

- This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

- Slab cross-sectional area for open rail: 2' x 5' = 10 sq ft.

- Placement for longitudinal reinforcement.

- Parabolic crown ordinates 2.0% slope.
SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 15401 SQ. FT.

HALF SECTION NEAR PIER
HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 15401 SQ. FT.

NOTE:
- Longitudinal reinforcing steel is to be parallel to and 2" clear below top of slab. Bottom longitudinal reinforcing steel is to be parallel to and 2" clear above bottom of slab. Reinforcing steel is to be securely wired in place and adequately supported on bay chairs before concrete is placed. Local requirements shall apply for bay chairs.

FORM CAMBER DIAGRAM

This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

— IOWADOT —

80'-0 BRIDGE
CONTINUOUS CONCRETE SLAB BRIDGES
NOVEMBER, 2006

SUPERSTRUCTURE DETAILS
80'-0 BRIDGE
J24-04-06
ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 80' BRIDGE

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing, horizontal back face top of slab, transverse, at rail pier cap, top longitudinal slab, hairpins, at abutment slab transverse ends, bottom slab transverse, bottom slab longitudinal top, at rail slab longitudinal top, at rail slab longitudinal bottom, at rail paving block lifting hoops wing, horizontal traffic face paving block lifting hoops, at rail</td>
<td>36,461</td>
</tr>
</tbody>
</table>

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

BENT BAR DETAILS

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 80' BRIDGE

SUPERSTRUCTURE DETAILS

CONTINUOUS CONCRETE SLAB BRIDGES

IOWA DOT

02-05-06

LATEST REVISION DATE
7'-6
24'-6

HALF SECTION NEAR PIER    HALF SECTION NEAR ABUTMENT
SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 34.29 SQ FT.

NOTE
1. LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 12" CLEAR BELOW TOP OF SLAB. BOTTOM LATERAL REINFORCING STEEL IS TO BE PARALLEL TO AND 12" CLEAR ABOVE BOTTOM OF SLAB. REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED. REINFORCEMENT REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.
2. POST JOINT UNDER ROUGHENED GROOVE (TYP.)
3. GROOVE = 5" ½" DOUBLE DRIP
4. POST JOINT UNDER ROUGHENED GROOVE (TYP.)
5. TOP OF SLAB
6. BOTTOM OF SLAB
7. 5J1 BARS @ 1'-0 CENTERS
8. 5d BARS @ 1'-0 CENTERS
9. 6c BARS @ 1'-0 CENTERS
10. UNLESS NOTED

PLACEMENT FOR LONGITUDINAL REINFORCEMENT
HALF SECTION NEAR PIER  
HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 7662.0 SQ FT.

NOTE:
TOP LONGITUDINAL REINFORCEMENT STEEL IS TO BE PLACED PARALLEL TO AND 3'-0 CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCEMENT STEEL IS TO BE PARALLEL TO AND 1'-0 CLEAR ABOVE BOTTOM OF SLAB. REINFORCEMENT STEEL IS TO BE SECURELY WIRE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED. LONGITUDINAL REQUIREMENTS SHALL APPLY FOR BAY CHAIRS.

PLACEMENT FOR LONGITUDINAL REINFORCEMENT
## Bill of Reinforcing Steel for Superstructure - 100' Bridge

### Location

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Lin. Ft.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBL L/60</td>
<td>I Beam 512</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 256</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 330</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 210</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 180</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 220</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 160</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 140</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 210</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 200</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 230</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 250</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 320</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 200</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 170</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 150</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 120</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 110</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
<tr>
<td>TBL L/60</td>
<td>I Beam 100</td>
<td>23'-0&quot;</td>
<td>169</td>
</tr>
</tbody>
</table>

### Bent Bar Details

- **FOR:**
  - 580, 512, 490, 470, 400, 380, 370, 360, 350, 340, 330, 320, 310, 300, 290, 280, 270, 260, 250, 240, 230, 220, 210, 200, 190, 180, 170, 160, 150, 140, 130, 120, 110, 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0

- **NI:**
  - 8e2, 5n3, 8e2, 5n3

### Superstructure Details

**Continuous Concrete Slab Bridges**

**November 2006**

**100'-0 Bridge**

---

*Includes 4 rings ofless steel, each and 2 temporary paving block; excludes rail concrete.*
**J24-06 110'-0 BRIDGE SUPERSTRUCTURE DETAILS**

**HALF SECTION NEAR PIER**

**HALF SECTION NEAR ABUTMENT**

**SLAB CROSS-SECTIONAL AREA**

**FOR OPEN RAIL = 444.5 SQ. FT.**

**SLAB CROSS-SECTIONAL AREA**

**FOR OPEN RAIL = 444.5 SQ. FT.**

**NOTE:**

- Top longitudinal reinforcing steel is to be parallel to and at least 1/2" clear of slab.
- Bottom longitudinal reinforcing steel is to be parallel to and at least 12" clear of slab.
- Reinforcing steel is to be securely fixed in place and adequately supported on bar chairs before concrete is placed.
- I-Beam requirements shall apply for bar chairs.

**PLACEMENT FOR LONGITUDINAL REINFORCEMENT**

**STARING DESIGN 10'-0 ROADWAY, 3 SPAN BRIDGES**

**CONTINUOUS CONCRETE SLAB BRIDGES**

**SUPERSTRUCTURE DETAILS**

**NOVEMBER, 2006**
HALF SECTION NEAR PIER
HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 492.4 SQ.FT.

PLACEMENT FOR LONGITUDINAL REINFORCEMENT

5/1 BARS @ 1'-0 CENTERS
6c BARS @ 1'-0 CENTERS
5d BARS @ 1'-0 CENTERS

TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2'-3" CLEAR ABOVE BOTTOM OF SLAB. REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED.

NOTE:
- TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2'-3" CLEAR ABOVE BOTTOM OF SLAB.
- BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2'-3" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2'-3" CLEAR BELOW TOP OF SLAB.

SYMMETRICAL ABOUT | ROADWAY

SYMMETRICAL ABOUT | ROADWAY
HALF SECTION NEAR PIER  HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA FOR OPEN RAIL = 464.4 SQ. FT.

FORM CAMBER DIAGRAM

NOTE: TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND AT CLEAR DEPTH OF SLAB, BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND AT CLEAR DEPTH OF SLAB. REINFORCING STEEL IS TO BE SECURED IN PLACE AND REGULARLY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED. DETAILS REQUIREMENTS APPLY FOR BAR CHAIRS.
BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 130° BRIDGE

**ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 130° BRIDGE**

---

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

---

**IOWA DOT**

CONTINUOUS CONCRETE
SLAB BRIDGES

SUPERSTRUCTURE DETAILS
NOVEMBER, 2006

J24-15-06
HALF SECTION NEAR PIER  
HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 24'-6 SQ. FT.

PLACEMENT FOR LONGITUDINAL REINFORCEMENT

NOTE:
LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND AT CLEAR AGENT TO TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND AT CLEAR ABOVE BOTTOM OF SLAB. REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED IN BAR CHAIRS BEFORE CONCRETE IS PLACED. LAYOUT REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

FORM CAMBER DIAGRAM

THESE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE

I.W. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

SLAB BRIDGES
CONTINUOUS CONCRETE
SLAB BRIDGES
NOVEMBER, 2006

SUPERSTRUCTURE DETAILS
140'-0 BRIDGE
J24-16-06
HALF SECTION NEAR PIER  
HALF SECTION NEAR ABUTMENT  

SLAB CROSS-SECTIONAL AREA 
FOR OPEN RAIL = 5.42 SQ. FT.

PLACE FOR LONGITUDINAL REINFORCEMENT  

NOTE: TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2'-0 CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2'-0 CLEAR ABOVE BOTTOM OF SLAB. REINFORCING STEEL IS TO BE SECURELY WIDED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS. REINFORCING STEEL IS PLACED, LONGITUDINAL REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

FORM CAMBER DIAGRAM  
THIS DIAGRAM SHOWS THE FORM CAMBER REQUIRED TO COMPENSATE FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION OR FALSEWORK SETTLEMENT.

POSITION OF SLAB IMMEDIATELY AFTER FALSEWORK IS REMOVED

IOWA DOT  
STANDARD DESIGN = 24'-0 ROADWAY, 3 SPAN BRIDGES  
CONTINUOUS CONCRETE SLAB BRIDGES  
NOVEMBER, 2006  

SUPERSTRUCTURE DETAILS  
150'-0 BRIDGE  
J24-18-06
PIER NOTES

All monolithic pier cap reinforcing and concrete is included in superstructure estimate of quantities.

The minimum clear distance from the face of the concrete to the reinforcing bar is to be 2", unless otherwise noted.

The pier piles are to be driven to full penetration, if practical. Not to exceed piles 10 inches and 12 inches in size must be spaced 2'-6 or more, piles 14 inches in size must be spaced 2'-11 or more.

Number of piles is different than in the table for the bridge length, the number of 5h1 bars and other quantities need to be checked and adjusted as needed. Piles 10 inches and 12 inches in size must be spaced 2'-6 or more, and piles 14 inches in size must be spaced 2'-11 or more.

Maximum pile size at this spacing is 14 inches.

Maximum pile size at this spacing is 12 inches.

Strength I pier design load includes dynamic load allowance 35% and pier cap height is based on 45° skew. Use this pu for determining number of piles and pile length.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

CAP DETAILS

All continuous concrete slab bridges.

MONOLITHIC PIER CAP DETAILS

ALL BRIDGES

CONTINUOUS CONCRETE SLAB BRIDGES

NOVEMBER, 2006

J24-23-06

Sheet No.

11/07/2006

7:45:53 AM

REVIEWED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

7/29/2022
70'-0 & 80'-0 BRIDGES

90'-0 BRIDGE

100'-0 BRIDGES

HALF SECTION NEAR PIER
SHOWING STIRRUP SPACING AND NUMBER OF PILING
NOTE BOTTOM OF CAP ELEVATIONS WILL BE REQUIRED AT THE
E OF ROADWAY AND AT EACH EXTERIOR PILE.

110'-0 & 120'-0 BRIDGES

130'-0, 140'-0 & 150'-0 BRIDGES

TYPICAL CAP SECTION

TYPICAL HOOP SPACING

NOTE: BOTTOM OF CAP ELEVATIONS WILL BE REQUIRED AT THE
E OF ROADWAY AND AT EACH EXTERIOR PILE.

SLAB BRIDGES
CONTINUOUS CONCRETE
MONOLITHIC PIER CAP DETAILS
ALL BRIDGES

STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES

NOVEMBER, 2006

08-2002

RE REVISIONS

REVISED 08-2002: UPDATED BRIDGE ENGINEER SIGNATURE.

REVISIONS DATES
APPROVED BY BRIDGE ENGINEER

REVISED 12-08: REVISED PILES REQUIRED FOR 110'-0 BRIDGE.

REVISIONS 2022: UPDATED BRIDGE ENGINEER SIGNATURE.

LS ONTEGRAL, MONOLITHIC, NO INTERIOR ENGAGE.
BILL OF REINFORCING STEEL - ONE PIER

ESTIMATED QUANTITIES - ONE PIER

TYPICAL NUMBERS OF PILES AND SPACINGS AND FACTORED PIER LOADS

PIER NOTES:

The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted or shown.

The piles are to be driven to full penetration or to a bearing value less than the pile bearing required for each grade length as shown on this sheet, additional driving capacity may be required through scoured layers. Refer to General Plan Notes for additional information.

The concrete quantities are based on the use of Type 3 filigree, if Type 1 filigree is used the concrete quantities may be reduced to account for the concrete displaced by the filigree.

All reinforcing steel is to be Grade 60.

Pile loading was designed for 1/35 dead with an allowance for 20 ksi soil future bearing surface.

IOWA DOT

STANDARD DESIGN IOWA HIGHWAY 3 SHALLOW BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006

NON-MONOLITHIC PIER CAP DETAILS ALL BRIDGES

J24-26-06 SHEET 2 OF 2
70'-0, 80'-0, & 90'-0 BRIDGES

100'-0 & 110'-0 BRIDGES

120'-0 & 130'-0 BRIDGES

140'-0 & 150'-0 BRIDGES

PILE PLAN - 0° SKEW
WOOD PILING

ABUTMENT NOTES:

- The concrete and reinforcing steel for the wings is included with the superstructure.
- Details on this sheet are to be used only when abutments are placed on timber piles.
- The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted on sheet.
- Timber piles shall be driven to full penetration if practicable. But in no case to a bearing value less than shown in the design plans.
- All reinforcing steel is to be grade 60.
- Abutment piling was designed for LRFD loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

ABUTMENT DETAILS
0° SKEW - TIMBER PILING
J24-27-06
ABUTMENT NOTES:

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

DETAIL A

ABUTMENT NOTES:

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

DETAIL A

ABUTMENT NOTES:

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
PILE PLAN - 30° SKEW
WOOD PILING

60'-0 & 70'-0 BRIDGES

90'-0 & 100'-0 BRIDGES

110'-0 & 120'-0 BRIDGES

130'-0 BRIDGE

140'-0 BRIDGE

150'-0 BRIDGE

REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

LATEST REVISION DATE
APPROVED BY BRIDGE ENGINEER

NOVEMBER, 2006

CONTINUOUS CONCRETE
SLAB BRIDGES

30° SKEW - TIMBER PILING  J24-30-06
ABUTMENT NOTES:

The concrete and reinforcing steel for the wings is included with the superstructure.

Details on this sheet are to be used only when abutments are placed on timber piles.

The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted on the plans.

Timber piles shall be driven to full penetration if practicable but in no case to a bearing value less than shown in design plans. Timber piles shall not be driven to more than 180 tons. All reinforcing steel is to be Grade 60.

The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted on the plans.

Joint construction is required at each exterior pile. The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted on the plans. Timber piles shall be driven to full penetration if practicable but in no case to a bearing value less than shown in design plans. Timber piles shall not be driven to more than 180 tons. All reinforcing steel is to be Grade 60.

The concrete and reinforcing steel for the wings is included with the superstructure.

Details on this sheet are to be used only when abutments are placed on timber piles. The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted on the plans.

Timber piles shall be driven to full penetration if practicable but in no case to a bearing value less than shown in design plans. Timber piles shall not be driven to more than 180 tons. All reinforcing steel is to be Grade 60.

The minimum clear distance from the face of the concrete to the nearest reinforcing bar is to be 2 inches unless otherwise noted on the plans. Timber piles shall be driven to full penetration if practicable but in no case to a bearing value less than shown in design plans. Timber piles shall not be driven to more than 180 tons. All reinforcing steel is to be Grade 60. Abutment piling was designed for HL-93 loading with an allowance for 20 lbs per sq. ft. future wearing surface.

NOTE: REINFORCING 6T2 DOWELS BACK FACE OF FOOTING.

2' @ 6 ST @ ABOUT 4'-0 CTRS.

6T1 DOWELS, 6T2 DOWELS IN SLAB.

24’-0 DIAGONALS IN SLAB.

6T1, 6T2 DOWELS FRONT FACE OF FOOTING & = 32’-6".

6E3, 6E4, AND 8E ARE INCLUDED WITH SUPERSTRUCTURE QUANTITIES.

24’-0 BEVELED KEYWAYS.

8R2, 8S2, 5S2.

3" CL.

TO HOLD SPIRAL SPACERS PUNCHED TO HOLD SPIRAL.

SPIRAL AT TOP OF EACH PILE, 7 TURNS OF NO BAR, 21" DIAMETER, 2" PITCH WITH 3 - 1/2" X 4" SPACERS PUNCHED TO MILD SPIRAL.

SPIRAL AT TOP OF EACH PILE, 7 TURNS OF 42 BAR, 21" DIAMETER, 2" PITCH WITH 3 - 1/2" X 4" SPACERS PUNCHED TO MILD SPIRAL.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THEREFORE BOTTOM OF FOOTING ELEVATIONS WILL BE RECALCULATED AT EACH EXTENSION PILE.

ABUTMENT AT GUTTERLINE

SECTION NORMAL TO ABUTMENT AT Q

SECTION NORMAL TO ABUTMENT AT GUTTERLINE

REAR ELEVATION

SPIRAL AT TOP OF EACH PILE, 7 TURNS OF NO BAR, 21" DIAMETER, 2" PITCH WITH 3 - 1/2" X 4" SPACERS PUNCHED TO MILD SPIRAL.

SPIRAL AT TOP OF EACH PILE, 7 TURNS OF 42 BAR, 21" DIAMETER, 2" PITCH WITH 3 - 1/2" X 4" SPACERS PUNCHED TO MILD SPIRAL.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THEREFORE BOTTOM OF FOOTING ELEVATIONS WILL BE RECALCULATED AT EACH EXTENSION PILE.

ABUTMENT AT GUTTERLINE

SECTION NORMAL TO ABUTMENT AT Q

SECTION NORMAL TO ABUTMENT AT GUTTERLINE

REAR ELEVATION
WOOD PILING

PILE PLAN - 45° SKEW

70'-0, 80'-0, & 90'-0 BRIDGES

100'-0 & 110'-0 BRIDGES

120'-0 & 130'-0 BRIDGES

45° SKEW - TIMBER PILING

ABUTMENT DETAILS

NUMBER OF PILES AND ABUTMENT DESIGN LOADS

<table>
<thead>
<tr>
<th>BRIDGE LENGTH</th>
<th>70'-0</th>
<th>80'-0</th>
<th>90'-0</th>
<th>100'-0</th>
<th>110'-0</th>
<th>120'-0</th>
<th>130'-0</th>
<th>140'-0</th>
<th>150'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>PILING - NUMBER</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>CONNECTION LENGTH - FEET</td>
<td>379</td>
<td>401</td>
<td>421</td>
<td>448</td>
<td>474</td>
<td>474</td>
<td>504</td>
<td>504</td>
<td>532</td>
</tr>
</tbody>
</table>

NOTE: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

INCLUDES DYNAMIC LOAD ALLOWANCE

SLAB BRIDGES

CONTINUOUS CONCRETE

NOVEMBER, 2006

J24-32-06
### Bill of Reinforcing Steel - One Abutment - 0° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>INDIAN</th>
<th>ELEVATION</th>
<th>NO.</th>
<th>PT.TYPE</th>
<th>DIA</th>
<th>LENGTH</th>
<th>NO.</th>
<th>PKG</th>
<th>QTY</th>
<th>GR.</th>
<th>FLOOR</th>
<th>DESIGN</th>
<th>FINISH</th>
<th>MEDIAN</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>TOTAL SPACERS LOCAL 0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REINFORCING STEEL - TOTAL WEIGHT** |

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>NO.</th>
<th>Weight</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>0° Skew</td>
<td>1388</td>
<td>8.9</td>
<td>8</td>
</tr>
<tr>
<td>0° Skew</td>
<td>1348</td>
<td>8.6</td>
<td>9</td>
</tr>
<tr>
<td>0° Skew</td>
<td>1334</td>
<td>10.0</td>
<td>8</td>
</tr>
<tr>
<td>0° Skew</td>
<td>1303</td>
<td>1312</td>
<td>1348</td>
</tr>
</tbody>
</table>

---

### Bill of Reinforcing Steel - One Abutment - 15° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>INDIAN</th>
<th>ELEVATION</th>
<th>NO.</th>
<th>PT.TYPE</th>
<th>DIA</th>
<th>LENGTH</th>
<th>NO.</th>
<th>PKG</th>
<th>QTY</th>
<th>GR.</th>
<th>FLOOR</th>
<th>DESIGN</th>
<th>FINISH</th>
<th>MEDIAN</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>TOTAL SPACERS LOCAL 0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REINFORCING STEEL - TOTAL WEIGHT** |

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>NO.</th>
<th>Weight</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>15° Skew</td>
<td>1277</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>15° Skew</td>
<td>1277</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>15° Skew</td>
<td>1277</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>15° Skew</td>
<td>1277</td>
<td>12.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

### Bill of Reinforcing Steel - One Abutment - 30° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>INDIAN</th>
<th>ELEVATION</th>
<th>NO.</th>
<th>PT.TYPE</th>
<th>DIA</th>
<th>LENGTH</th>
<th>NO.</th>
<th>PKG</th>
<th>QTY</th>
<th>GR.</th>
<th>FLOOR</th>
<th>DESIGN</th>
<th>FINISH</th>
<th>MEDIAN</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>TOTAL SPACERS LOCAL 0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REINFORCING STEEL - TOTAL WEIGHT** |

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>NO.</th>
<th>Weight</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° Skew</td>
<td>1233</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>30° Skew</td>
<td>1233</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>30° Skew</td>
<td>1233</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>30° Skew</td>
<td>1233</td>
<td>12.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

### Bill of Reinforcing Steel - One Abutment - 45° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>INDIAN</th>
<th>ELEVATION</th>
<th>NO.</th>
<th>PT.TYPE</th>
<th>DIA</th>
<th>LENGTH</th>
<th>NO.</th>
<th>PKG</th>
<th>QTY</th>
<th>GR.</th>
<th>FLOOR</th>
<th>DESIGN</th>
<th>FINISH</th>
<th>MEDIAN</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>FOOTING TO SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>NO.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>TOTAL SPACERS LOCAL 0.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REINFORCING STEEL - TOTAL WEIGHT** |

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>NO.</th>
<th>Weight</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>45° Skew</td>
<td>1241</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>45° Skew</td>
<td>1241</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>45° Skew</td>
<td>1241</td>
<td>12.0</td>
<td>0.0</td>
</tr>
<tr>
<td>45° Skew</td>
<td>1241</td>
<td>12.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### Estimated Quantities - One Abutment - 0° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>QUANTITY</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1388</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1348</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1334</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1303</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>10.0</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>9.0</td>
<td>9</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>8.6</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>8.9</td>
<td>8</td>
</tr>
</tbody>
</table>

---

### Estimated Quantities - One Abutment - 15° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>QUANTITY</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1277</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1277</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1277</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1277</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

### Estimated Quantities - One Abutment - 30° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>QUANTITY</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1233</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1233</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1233</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1233</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

### Estimated Quantities - One Abutment - 45° Skew

<table>
<thead>
<tr>
<th>WORK DESCRIPTION</th>
<th>LOCATION</th>
<th>QUANTITY</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1241</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1241</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1241</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>1241</td>
<td>12.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>ABUTMENT FOOTING</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

### Bent Bar Details

![Bent Bar Details Diagram]

**Notes**: Dimensions are O.D. to O.D. 0.020<sub>p</sub> in diameter.
PILE PLAN - 0° SKEW STEEL PILING

ABUTMENT NOTES:

ALL PILING Ø 10" REINFORCED CONCRETE PILING.
THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12', ABUTMENT FOUNDATIONS SPECIAL ANALYSIS MAY BE REQUIRED.

THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR BOTTOM OF SLAB AT RAIL.

ABUTMENT DESIGN LOADS SHALL BE DETERMINED IN ACCORDANCE WITH THE SUPERSTRUCTURE REQUIREMENTS.

REAR ELEVATION

SECTION NORMAL TO ABUTMENT AT 0° SKEW STEEL PILING

REAR ELEVATION

SECTION NORMAL TO ABUTMENT AT GUTTERLINE

NUMBER OF PILES AND ABUTMENT DESIGN LOADS

<table>
<thead>
<tr>
<th>BRIDGE LENGTH</th>
<th>10'-0</th>
<th>20'-0</th>
<th>30'-0</th>
<th>40'-0</th>
<th>50'-0</th>
<th>60'-0</th>
<th>70'-0</th>
<th>80'-0</th>
<th>90'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>PILING</td>
<td>5</td>
<td>6 ²</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>NUMBER OF PILES</td>
<td>23 SPS @ 1'-0 = 23'-0, 24-6t1 F.F.</td>
<td>24-6e3 HAIRPINS IN SLAB &amp; 24-6t2 B.F. DOWELS &amp; 6D DOWELS, 2-8&quot; &amp; 6&quot; OPEN DIAGONALS IN SLAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLAB BRIDGES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| NOTE: HORIZONTAL LOAD ALLOWANCE NOT INCLUDED IN ABUTMENT DESIGN LOADS. THIS IS THE VALUE USED IN THE FIELD FOR DRIVING PILES.

DETAIL A

ABUTMENT DETAILS

0° SKEW - STEEL PILING

J24-34-06

IOWA DOT

STANDARD DESIGN - 0° SKEW ROADWAY, 3 SPAN BRIDGES

CONTINUOUS CONCRETE SLAB BRIDGES

NOVEMBER, 2006
ABUTMENT NOTES:

ALL PILES HP 10x42.

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12' FROM THE FACE OF THE CONCRETE TO NEAR THE BOTTOM OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR THE BOTTOM OF FOOTING IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTES:

WING REINFORCING AND RAIL NOT SHOWN.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

ABUTMENT NOTES:

ALL PILES HP 10x42.

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12' FROM THE FACE OF THE CONCRETE TO NEAR THE BOTTOM OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR THE BOTTOM OF FOOTING IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.

NOTE: THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.

ALL REINFORCING STEEL IS TO BE SPACED 60.

ABUTMENT PILING IS DESIGNED FOR LRFD LOADS WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THE TOP OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.

NOTE: ALL REINFORCING STEEL IS TO BE GRADE 60.
ABUTMENT NOTES:

ALL PILING IS HP 10x42.

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES, IF ROCK IS ENCOUNTERED CLOSER THAN 12' FROM THE FACE OF THE CONCRETE TO NEAR ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE IN DESIGN PLANS.

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

ALL REINFORCING STEEL IS TO BE GRADE 60.

ABUTMENT PILING HAS DESIGNED FOR HI-10 LOADING WITH AN ALLOWANCE FOR 20 LB./SQ. FT. FUTURE WEARING SURFACE.
PILE PLAN - 45° SKEW
STEEL PILING

NOTE: ALL PILING HP 10x42

NUMBER OF PILES AND ABUTMENT DESIGN LOADS

<table>
<thead>
<tr>
<th>PILING</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

NOTE: ALL PILES ARE TO BE ORIENTED WITH WEBS PERPENDICULAR TO THE E OF THE ROADWAY AS SHOWN.

150'-0 BRIDGE

NOTE: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

INCLUDS DYNAMIC LOAD ALLOWANCE

NOTES

REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

NOVEMBER, 2006

STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES
CONTINUOUS CONCRETE
SLAB BRIDGES
### Bill of Reinforcing Steel - One Abutment - 0° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Weight</th>
<th>No.</th>
<th>30'</th>
<th>45'</th>
<th>60'</th>
<th>60' Force</th>
<th>30' Force</th>
<th>45' Force</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bill of Reinforcing Steel - One Abutment - 15° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Weight</th>
<th>No.</th>
<th>30°</th>
<th>45°</th>
<th>60°</th>
<th>60° Force</th>
<th>30° Force</th>
<th>45° Force</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bill of Reinforcing Steel - One Abutment - 30° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Weight</th>
<th>No.</th>
<th>30°</th>
<th>45°</th>
<th>60°</th>
<th>60° Force</th>
<th>30° Force</th>
<th>45° Force</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bill of Reinforcing Steel - One Abutment - 45° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Weight</th>
<th>No.</th>
<th>30°</th>
<th>45°</th>
<th>60°</th>
<th>60° Force</th>
<th>30° Force</th>
<th>45° Force</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Estimated Quantities - One Abut. - 0° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Quantity</th>
<th>Description</th>
<th>Units</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Structural Concrete (Bridge)</td>
<td>C.Y.</td>
<td>1305</td>
</tr>
</tbody>
</table>

### Estimated Quantities - One Abut. - 15° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Quantity</th>
<th>Description</th>
<th>Units</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Structural Concrete (Bridge)</td>
<td>C.Y.</td>
<td>1367</td>
</tr>
</tbody>
</table>

### Estimated Quantities - One Abut. - 30° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Quantity</th>
<th>Description</th>
<th>Units</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Structural Concrete (Bridge)</td>
<td>C.Y.</td>
<td>1425</td>
</tr>
</tbody>
</table>

### Estimated Quantities - One Abut. - 45° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Quantity</th>
<th>Description</th>
<th>Units</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Structural Concrete (Bridge)</td>
<td>C.Y.</td>
<td>1307</td>
</tr>
</tbody>
</table>

### Bent Bar Details

<table>
<thead>
<tr>
<th>No.</th>
<th>Diameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5s1</td>
<td>2'-6</td>
<td>5si &amp; 5s2</td>
</tr>
<tr>
<td>8r2</td>
<td>1'-6</td>
<td></td>
</tr>
<tr>
<td>6t2</td>
<td>1'-0</td>
<td></td>
</tr>
</tbody>
</table>

### Structural Concrete

- **Location**: Structural Concrete (Bridge)
- **Units**: C.Y.
- **Weight**: 1305

### Steel Piling

- **Location**: Structural Concrete (Bridge)
- **Units**: C.Y.
- **Weight**: 1367

### Steel Piling

- **Location**: Structural Concrete (Bridge)
- **Units**: C.Y.
- **Weight**: 1307
# TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

<table>
<thead>
<tr>
<th>Section</th>
<th>Dimension</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2'-7&quot;</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1'-0</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>3'-0</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1'-3</td>
<td></td>
</tr>
</tbody>
</table>

## ELEVATION OF OPEN RAIL LAYOUT

- **NOTING AREA INDICATES AREA OF BOND BREAKING COATING**

## END POST DETAIL

- **2-4j3 TIES EACH END OF RAIL PANEL (TYP.)**

## INTERIOR POST DETAIL

- **6j1 (TYP.)**

## PART PLAN VIEW

- **JOINT SEALER ON TOP AND SIDES**

## PART ELEVATION VIEW

- **BOND BREAKING COATING**

## SECTION A-A

- **6j1 (TYP.)**

## SECTION B-B

- **4j2 TIES**

## SECTION C-C

- **3 SPA. @ 3"**

## PART SECTION D-D

- **6j1 (TYP.)**

---

**REVISED 12-08 - CHANGED END SECTION SHAPE AND REINFORCEMENT. RAIL DEPTH CHANGED TO 1'-8.**

**REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5 x 1).**

7/29/2022 7:46:19 AM

---

**CONTINUOUS CONCRETE SLAB BRIDGES**

**NOVEMBER, 2006**

**OPEN RAIL DETAILS**

**(TL-4) J24-40-06**
OUTLET DETAILS

MIN. DRILLED HOLES FOR ATTACHMENT PIN

GUARD DETAILS

REMOVABLE RODENT GUARD DETAILS

TOP VIEW
FRONT VIEW

TYPICAL SECTION OF SUBDRAIN OUTLET

OUTLET DETAILS

SUBDRAIN OUTLET
SUBDRAIN TO BE SLOPED DOWNWARD FROM THE TOE OF ROADWAY AND UNDERNEATH THE SLOPE PROTECTION AND OUTLET AS INDICATED.

SITUATION PLAN

PROTECTION LAYOUT 0° SKEW
PROTECTION LAYOUT SKewed

REFERENCES

J24-42-06

SUBDRAIN DETAILS

7/29/2022   7:46:22 AM
bkloss
pw:\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards Development \V8i\Bridges\J_Standards\J24-06.dgn   J24-42-06   11x17_pdf.pltcfg
MIN.
NOMINAL
2
2
3'-0 MAX.
MIN.
4
6
6
EDGING DETAILS
4" x 6" TREATED TIMBER
SURFACE OF TREATED TIMBER.
VERTICALLY TO 1" BELOW TOP
OR REBAR. DRIVE PIN OR REBAR
| 1/2 HOLES FOR 1/2 x 1'-6 STEEL PIN

SUBDRAIN NOTES:
THE BRIDGE BERM FORESLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON
THE MACADAM STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY
MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM DEPTH AND DENSITY AND
PROVIDE UNIFORM SURFACE APPEARANCE.
FORESLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE
ARE PLACED.
WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE
THESE PLANS, THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM
ARMORING AS SHOWN ON THESE PLANS.
COSTS OF ALL MATERIAL AND LABOR TO CONSTRUCT THE WING
TO THE BID ITEM "STRUCTURAL CONCRETE (BRIDGE)" AND SHALL INCLUDE
PAYMENT FOR THE BRIDGE WING ARMORING SHALL BE INCIDENTAL
MACADAM STONE WING ARMORING NOTES:
MACADAM STONE SHALL BE PLACED ALONG THE LINE OF THE WING AND ARMATURE
FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE
NOTED ON THESE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE
UNDERLayed WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3,
OF THE STANDARD SPECIFICATIONS.
THE BRIDGE BERM FURNITURE SHALL BE COMPACTED AND SHAPED AS SHOWN ON
THESE PLANS. THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM
FURNITURE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE
ARE PLACED.
THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3,
OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS
REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, IN ACCORDANCE
WITH SECTION 4161 OF THE STANDARD SPECIFICATIONS.
THE MACADAM STONE SHALL BE IN ACCORDANCE WITH ARTICLE 4122.02, OF THE
MACADAM STONE SHALL BE PLACED AT THESE LOCATIONS SHOWN ON THE PLANS.
THE MACADAM STONE SHALL BE UNDERLayed WITH ENGINEERING FABRIC IN
ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.
THE MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING WALL AND
ABUTMENT FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE
NOTED ON THESE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE
UNDERLayed WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3,
OF THE STANDARD SPECIFICATIONS.
THE MACADAM STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY
MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM DEPTH AND DENSITY AND
PROVIDE UNIFORM SURFACE APPEARANCE.
PAYMENT FOR THE BRIDGE WING ARMORING SHALL BE INCIDENTAL
TO THE COST OF ALL MATERIAL AND LABOR TO CONSTRUCT THE WING
ARMORING AS SHOWN ON THESE PLANS.
ABUTMENT BACKFILL PROCESS:

The base of the excavation subgrade before 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 subgrade outlet. This grading is to be done prior to beginning installation of the geotextile and backfill material.

After the subgrade has been shaped, 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 vertically up the subgrade and abutment wing walls and excavation face to a height that will be approximately 1 ft. 6 in. above the height of the finished backfill placement shown as in the "Backfill Details" of this sheet, the strips of the fabric placed shall overlap approximately 1 ft. and shall be pinned in place, the fabric shall be attached to the abutment by using latex filled 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 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 floodable backfill, surface flooding, and vibratory compaction, the floodable backfill material shall be in accordance with the standard specifications, the floodable 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 floodable backfill lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric, to ensure surface flooding, water running full in a 9-in. diameter pipe should be spaced at an adequate distance to allow adequate time for subdrain installation for 5 minutes within each increment.

Floodable backfill limit placement, placement, and compaction shall complete until the required full thickness of the finished backfill has been completed.

Water required for flooding, subdrain, porous backfill, floodable backfill, and geotextile fabric placed at the subdrain abutments shall not be measured separately for payment.

The cost of water required for flooding, subdrain, porous backfill, floodable backfill, and geotextile fabric placed at the subdrain abutments shall be included in the contract unit price bid for structural concrete.
ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BENEATH 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 MATERIALS.


POROUS BACKFILL IS THEN PLACED AND LEVELLED. NO COMPACTSATION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIALS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTORS. A FLOODABLE BACKFILL CONSTRUCTION LIMITS THE FABRIC TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL 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 RUNNIN PULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 5 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTING SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

WATER REQUIRED FOR FLOODING, SUBDRAIN, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC Furnished at the Bridge Abutments SHall NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAIN, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC Furnished at the Bridge Abutments SHall NOT BE MEASURED SEPARATELY FOR PAYMENT.

NOTES:

SUBDRAIN SHALL SLOPE DOWARDS 2% FROM APPROACH ROADWAY WHEN OUTLETING BOTH SIDES OF THE ABUTMENT.

SUBDRAIN SHALL SLOPE DOWARDS 2% FROM MID-HIGH WHEN OUTLETING AT ONE END OF THE ABUTMENT.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE AVS 3 "BE" OF THE STANDARD SPECIFICATIONS. THE EXCAVATION FABRIC LIMITS THE FABRIC TO NO MORE THAN 2 FEET IN LENGTH. HOLES EXPOSED WITHIN OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.

THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE AVS 3 "BE" OF THE STANDARD SPECIFICATIONS. THE EXCAVATION FABRIC LIMITS THE FABRIC TO NO MORE THAN 2 FEET IN LENGTH. HOLES EXPOSED WITHIN OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.

THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE AVS 3 "BE" OF THE STANDARD SPECIFICATIONS. THE EXCAVATION FABRIC LIMITS THE FABRIC TO NO MORE THAN 2 FEET IN LENGTH. HOLES EXPOSED WITHIN OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.

THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE AVS 3 "BE" OF THE STANDARD SPECIFICATIONS. THE EXCAVATION FABRIC LIMITS THE FABRIC TO NO MORE THAN 2 FEET IN LENGTH. HOLES EXPOSED WITHIN OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.

THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE AVS 3 "BE" OF THE STANDARD SPECIFICATIONS. THE EXCAVATION FABRIC LIMITS THE FABRIC TO NO MORE THAN 2 FEET IN LENGTH. HOLES EXPOSED WITHIN OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.