Precast Reinforced Concrete Pedestrian Tunnel Standards

General Notes:
1. The reinforced concrete pedestrian tunnel sections are designed for HL-93 live load and earth fills of varying heights.
2. Vertical earth pressure, $E_V = 0.120$ kcf.
3. Horizontal earth pressure, $E_H = 0.060$ kcf max, $E_H = 0.030$ kcf.
4. Rebar dimensions are in $\text{in}$, and inches unless otherwise noted or shown.
5. These pedestrian tunnel standards label all reinforcing steel with English notation.
6. English reinforcing steel received may display the following "bar designation". The "bar designation" is the stamped impression on the reinforcing bars, and is equivalent to the bar diameter in millimeters.

<table>
<thead>
<tr>
<th>English Size</th>
<th>Bar Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

Precast Barrel Notes:
1. The precast concrete pedestrian tunnel sections are designed for Class 2 exposure conditions.
2. The clear distance from face of concrete to near edge or end of reinforcing bar shall be $1\frac{3}{4}$" min. and $2\frac{1}{2}$" max., unless otherwise noted or shown.
3. The reinforcement supplied for the precast concrete pedestrian tunnel sections shall be plain and/or deformed welded wire reinforcement (WWF) $F_y = 65$ ksi, and/or Grade 60 reinforcing steel in accordance with the Standard Specifications. The reinforcement areas are based on welded wire reinforcement. If reinforcing bars are substituted for welded wire reinforcement, the reinforcement areas shall be increased by 8%.
4. The barrel sections in these standards were designed with plain WWF, $F_y = 65$ ksi.
5. Vertical top bottom edge clearances:
6. This splice, if used, will be at the Contractor's expense.

<table>
<thead>
<tr>
<th>Bar Size Number</th>
<th>Minimum Splice Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Cast-In-Place Barrel and Headwall Notes:
1. The cast in place concrete pedestrian tunnel sections are designed for Class 1 exposure conditions.
2. All slab and floor reinforcing steel is to be supported at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications.
3. Floor of barrel, wall, and headwall apron shall receive a troweled finish meeting the requirements of Article 2511.03,B,2,B, of the Standard Specifications and meet the smoothness requirements of Article 2511.03,B,5,. Of the Standard Specifications. Sides of footing are to be troweled to smooth correct line and grade.
4. The permissible construction joint at the top of the walls may be lowered at the Contractor's option with Engineer's approval.
5. The reinforcing supplied for the cast-in-place barrel end sections and headwalls shall be Grade 60 reinforcement in accordance with the Standard Specifications. The design stresses are based on Grade 60 reinforcement.
6. The vertical bars in the walls may be spliced above the footing at the Contractor's option as follows:

<table>
<thead>
<tr>
<th>Bar Size Number</th>
<th>Minimum Splice Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Specify:
- Design:
  Construction:
  Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, current series, plus applicable General Supplemental Specifications, Developmental Supplemental Specifications, and Special Provisions.
- Design Stresses:
  Design stresses for the following materials are in accordance with the AASHTO LRFD Bridge Design Specifications, 8th Ed., Series of 2017.
  - Bar reinforcement in accordance with AASHTO LRFD Section 5.
  - Grade 60 reinforcing steel in accordance with AASHTO LRFD Section 5, Grade 60 Min. $F_y = 65$ ksi.

The following is a listing of approved bentonite waterproofing:
- Greenstreak Swellstop
- Henry Hydra-Flex
- Approved equal

Bentonite waterproofing shall be protected from exposure to moisture prior to concrete placement. Bentonite waterproofing that was swelled prior to concrete placement shall be replaced at no cost to the State.

Index for Precast Pedestrian Tunnel Standards:
- PPT G1-20: Index & General Notes
- PPT G2-20: Installation Notes
- PPT G3-20: Typical Tunnel Details
- PPT RCB-12-20: Tunnel Details 12'-0" Span
- PPT RCB-14-20: Tunnel Details 14'-0" Span
- PPT-FWH-0-12-20: Flared Wing Headwall Design Plan & Tables
- PPT-FWH-0-12-20: Flared Wing Headwall Apron Layout & Curtain Wall Details
- PPT-FWH-0-3-20: Flared Wing Headwall Layout & Cross Section Details
- PPT-FWH-0-4-20: Flared Wing Headwall Quantity Tabulations & Details
- PPT-SR 1-20: Safety Rail Details
- PPT-SA 2-20: Aesthetic Treatment General Notes
- PPT-A 1-20: Pedestrian Tunnel Textured Concrete
- PPT-RCB 14-20: Pedestrian Tunnel Textured Concrete
- PPT-RCB 12-20: Pedestrian Tunnel Textured Concrete
- PPT G3-20: Pedestrian Tunnel Textured Concrete
- PPT G2-20: Pedestrian Tunnel Textured Concrete
- PPT G1-20: Pedestrian Tunnel Textured Concrete
- PPT-AD 1-20: Pedestrian Tunnel Textured Concrete
- PPT-AD 2-20: Pedestrian Tunnel Textured Concrete
- PPT-AD 3-20: Pedestrian Tunnel Textured Concrete

Index & General Notes
Installation Notes:

1. Precast concrete box culvert sections shall be laid with the groove end of each section up-grade, and the sections shall be tightly joined. Concrete ties to be used only to hold box sections together, not for pulling sections tight. Joint openings between sections should be as tight as practicable and limited to a maximum of 3/8 inch openings. A pipe puller or ratchet style lead binder shall be used to achieve the required joint opening.

2. The joints shall be sealed with a flexible water tight 1 inch butyl rope gasket as per AASHTO M 493-09. Butyl rope gasket shall be installed in accordance with the recommendations of the manufacturer and as shown in the "Typical Joint Detail" on sheet PPT G3-20. Butyl rope gasket shall extend around the walls, floor and slab of the precast barrel joints. All joints shall be trimmed clean on the inside after sealing.

3. Homing pressure shall be applied to barrels during installation to compress the butyl rope gasket. Homing pressure shall be held for a sufficient period of time to allow for maximum compression of the joint. Method of applying the homing pressure shall not damage the barrel and shall be approved by the Engineer. Ties shall not be used to apply homing pressure. Ties shall be snug tight prior to release of the homing pressure.

4. During backfilling the compaction adjacent to the bottom corner radii or chamfer shall be accomplished with a mechanical hand compactor.

5. Waterproof membrane shall be applied to the outside face of the transverse construction joints in the slab and walls. Waterproof membrane shall be 1 1/2 inch wide and be centered on the joint. Waterproof membrane shall be installed with a manufacturer’s approved adhesive in accordance with the manufacturer’s recommendations. The following is a listing of approved waterproof membrane:
   a. W.R. Meadows Mel-Rol
   b. Grace Construction Products Bituthene 3000

6. Precast barrels shall be tied to the cast-in-place barrel end sections with 5/8 dowels and bentonite waterstop in precast keyway. Dowels shall be set around the entire periphery of the barrel at 18" maximum center to center spacing. Dowels shall be centered in the precast barrel slab, wall and floor. Dowels shall be set in drilled holes. Holes shall be 20" deep. Dowels shall be set with a polymer grout system in accordance with Article 2301.010.E of the Standard Specifications. Set dowels in accordance with grout manufacturer’s recommendations.
Notes:

1. Culvert ties are to be 1" I.D. rods. See “Tie Bolt Connection Detail” this sheet.
2. Top corner haunch size shall be 12" vertical, 12" horizontal on all box sizes.
3. Longitudinal reinforcement denoted as A6S & A6S must be placed in slab, floor, and walls and must be 0.06 in²/ft².
4. Optional squared corners with 1/2" to 2" chamfer.
5. Material and construction of bonded PCC overlay shall meet the requirements of Article 2310 of the Standard Specifications. Seal coat bond breaker shall not be used.
6. C joints shall be located at all precast barrel floor joints. Saw cuts for C joints shall be full depth of the concrete overlay and extend as close as practical to the precast barrel wall without damaging the wall. See Standard Road Plan PV-101 for C joint details.

Precast Standard Design - Walkways and Trails

Precast Reinforced Concrete Pedestrian Tunnel

August, 2020
### Variable Dimensions and Quantities for 12’ Span Barrel Sections

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-12</td>
<td>3</td>
<td>3.0</td>
<td>2.6</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>0.74</td>
<td>0.74</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.0</td>
<td>2.6</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>0.74</td>
<td>0.74</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>0.24</td>
</tr>
<tr>
<td>1-14</td>
<td>3</td>
<td>3.0</td>
<td>3.0</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>0.93</td>
<td>0.93</td>
<td>1.23</td>
<td>1.23</td>
<td>1.23</td>
<td>1.23</td>
<td>1.23</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.0</td>
<td>3.0</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>0.93</td>
<td>0.93</td>
<td>1.23</td>
<td>1.23</td>
<td>1.23</td>
<td>1.23</td>
<td>1.23</td>
<td>0.29</td>
</tr>
<tr>
<td>1-14</td>
<td>3</td>
<td>3.0</td>
<td>3.0</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>0.89</td>
<td>0.89</td>
<td>1.22</td>
<td>1.22</td>
<td>1.22</td>
<td>1.22</td>
<td>1.22</td>
<td>0.29</td>
</tr>
</tbody>
</table>

**Reinforcement Requirements**

- **As1**: Longitudinal reinforcement denoted as As1 and As2 must be placed in slab, floor, and walls and must be 0.06 in²/ft minimum.
- **As2**: All reinforcement lengths and areas are minimum requirements. If reinforcing bars are substituted for welded wire reinforcing, dimension "M" and/or length of the As7/As8 reinforcement shall be adjusted to ensure adequate lap length is provided.
- **As3**: Permissible 1" Chamfer and dimension "M" shall be intentionally roughened surface.
- **As4**: As4 reinforcement shall be placed in slab, floor, and walls and must be 0.06 in²/ft minimum.
- **As5**: Reinforcement pieces may be increased if needed to maintain clear cover.
- **As6**: Reinforcement may be increased if needed to maintain clear cover.
- **As7**: Bent Bar Details
- **As8**: Weight of sections assumes a density of 150 pcf and squared area. Pin diameter may be increased if needed to maintain clear cover.

### Notes:

1. Longitudinal reinforcement denoted as As5 and As6 must be placed in slab, floor, and walls and must be 0.06 in²/ft minimum.
2. All reinforcement lengths and areas are minimum requirements.
3. If reinforcing bars are substituted for welded wire reinforcement, dimension "M" and/or length of the As7/As8 reinforcement shall be adjusted to ensure adequate lap length is provided.
4. Weight of sections assumes a density of 150 pcf and squared area.
5. See Sheets PPT-RCB G1-20 and PPT-RCB G3-20 for additional information and notes.
Variable Dimensions and Quantities for 14' Span Barrel Sections

<table>
<thead>
<tr>
<th>Size</th>
<th>Class</th>
<th>Fc (ksi)</th>
<th>Fy (ksi)</th>
<th>E (GPa)</th>
<th>A (in²)</th>
<th>B (in)</th>
<th>C (in)</th>
<th>Area (in²/ft)</th>
<th>Length</th>
<th>M</th>
<th>Weight (lb/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>30</td>
<td>60</td>
<td>30</td>
<td>10</td>
<td>10</td>
<td>0.80</td>
<td>20-100</td>
<td>3.71</td>
<td>1.20</td>
<td>14.40</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>6.0</td>
<td>6.0</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>1.33</td>
<td>20-27</td>
<td>3.55</td>
<td>1.65</td>
<td>16.60</td>
</tr>
</tbody>
</table>

Notes:
1. Longitudinal reinforcement denoted as As5 and As6 must be placed in slab, floor, and walls and must be 0.06 in²/ft minimum.
2. All reinforcement lengths and areas are minimum requirements.
3. If reinforcing bars are substituted for welded wire reinforcing, dimension "M" and/or length of the As7/As8 reinforcement shall be adjusted to ensure adequate lap length is provided.
4. Weight of sections assumes a density of 150 pci and squared corners.
5. See Sheets PPT-RCB G1-20 and PPT-RCB G2-20 for additional information and notes.
Notes:
1. See Sheet PPT G1-20 for General Information, Specifications, and Design Stresses.
2. See Sheets PPT-FWH 0-2-20 & PPT-FWH 0-3-20 for location of certain dimensions fabricated.
Notes:
1. Bar spacing and positions shown are similar for all sizes of headwall in this standard.
2. For dimension table see Sheet PPT-FWH 0-1-20.
Headwall Notes:
2. This headwall is based on a 3:1 slope normal to centerline of roadway.
3. The sides of the apron are to be formed to ensure correct line and grade.
4. All slab and apron reinforcing steel is to be supported by bar chairs at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications.
5. Clear distance from face of concrete to rear reinforcing bar is to be 2" unless otherwise noted or shown. Clearance to the bottom ends of vertical bars shall be 3 inches.
6. Concrete quantities are estimated from back of parapet.
7. Horizontal bars "b" & "c" are estimated to extend 2'-5" beyond back of parapet (into end of barrel). Longitudinal bars "d" and "e" are estimated to project into end section of barrel a minimum of 2'-5" beyond back of parapet. The "length" column reflects total number of feet necessary to meet these requirements.
8. Dimensions are in feet and inches unless otherwise noted or shown.

Reinforcing for One Headwall 0° Skew

<table>
<thead>
<tr>
<th>Location</th>
<th>Shape</th>
<th>Bars</th>
<th>Steel</th>
<th>Concrete</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fence Anchor (Galv.)</td>
<td>5fa</td>
<td>2</td>
<td>56</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Wingwall, B. F. S.</td>
<td>4b1</td>
<td>4</td>
<td>9</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Wingwall, B. F. H.</td>
<td>4b2</td>
<td>20</td>
<td>Var.</td>
<td>10'-5&quot; to 30'-4&quot;</td>
<td>2 Each</td>
</tr>
<tr>
<td>Wingwall, F. F. S.</td>
<td>4b3</td>
<td>3</td>
<td>25</td>
<td>10'-6&quot; to 25'-6&quot;</td>
<td>30'-3&quot; to 30'-3&quot;</td>
</tr>
<tr>
<td>Wingwall, F. F. H.</td>
<td>4b4</td>
<td>2</td>
<td>7</td>
<td>12</td>
<td>2 Each</td>
</tr>
<tr>
<td>Wingwall, F. V.</td>
<td>4b5</td>
<td>7 Var.</td>
<td>2'-10&quot; to 21'-0&quot;</td>
<td>30'-4&quot; to 21'-0&quot;</td>
<td>16 Var.</td>
</tr>
<tr>
<td>Wingwall, B. F.</td>
<td>4c1</td>
<td>2</td>
<td>7</td>
<td>12</td>
<td>2 Each</td>
</tr>
<tr>
<td>Wingwall, F. S.</td>
<td>4c2</td>
<td>20</td>
<td>Var.</td>
<td>10'-5&quot; to 10'-5&quot;</td>
<td>10'-5&quot; to 10'-5&quot;</td>
</tr>
<tr>
<td>Wingwall, F. H.</td>
<td>4c3</td>
<td>3</td>
<td>25</td>
<td>10'-6&quot; to 25'-6&quot;</td>
<td>30'-3&quot; to 30'-3&quot;</td>
</tr>
</tbody>
</table>

Notes:
- Weight of bars over 40'-0" long includes an allowance of 2'-5" for lap.
- Lengths shown for bars over 40'-0" long do not include lap.
- Includes top of wingwall quantities.

Precast Standard Design - Walkways and Trails
Precast Reinforced Concrete Pedestrian Tunnel
August, 2020

Flared Wing Headwalls
0° Skew

PPT-FW
0-4-20
Partial End View of Parapet and Headwall

Elevation View of Wingwall

<table>
<thead>
<tr>
<th>Safety Rail Dimension Table</th>
<th>Hole Diameter</th>
<th>Hole Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headwall</td>
<td>Top Height</td>
<td>Top Width</td>
</tr>
<tr>
<td>4' x 10'</td>
<td>3'-11&quot;</td>
<td>12'-6&quot;</td>
</tr>
<tr>
<td>5' x 11'</td>
<td>3'-6&quot;</td>
<td>12'-6&quot;</td>
</tr>
<tr>
<td>6' x 11'</td>
<td>3'-6&quot;</td>
<td>12'-6&quot;</td>
</tr>
</tbody>
</table>

Notes:
1. Total linear feet quantity of "Steel Pipe Pedestrian Handrail" provided on the "Estimated Quantities Table" in the design plans.
2. Post bases to be installed, centered on top of wingwalls and parapet and spaced as shown.
3. See Sheet PPT-FWH 0-1-20 for Dimension P.
4. See Sheet PPT-FWH 0-3-20 for Dimensions F & S.
Pedestrian Hand Rail Notes:

1. The steel pipe pedestrian handrail is to be bid on a linear foot basis measured end to end of rail. The price bid for "Steel Pipe Pedestrian Handrail" shall be full compensation for furnishing all material, including anchor bolts and shims, and all of the equipment and labor required to erect the rail in accordance with these Plans and Specifications.

2. The material for tube rails, posts and splice tubes shall be standard and extra strong steel pipe meeting the requirements of ASTM A53, Type E or S, Grade B. Base plates and shims shall meet the requirements of ASTM A36. Panels and end sections shall be galvanized, after fabrication, in accordance with the requirements of ASTM A123.

3. Ends of rail sections are to be sawed or milled. All cut ends are to be true, smooth, and free of burrs or ragged edges.

4. No painting will be required.

5. The stud concrete anchors shall be galvanized and have a minimum pull out strength of 8000 pounds based on 4000 PSI concrete.

6. Rail is to be centered along the edge of wingwalls and parapets.

7. Posts shall be set plumb.

Post Base Plate and Shim Details

Note: Pipe handrail assembly to be galvanized after fabrication. Drilled-in drain holes, to facilitate the hot dip galvanizing process, shall be indicated on the shop drawings.

Pedestrian Handrail Details

End Rail Details

Rail Joint Detail

Pipe Handrail Details

Rail Post Shim (Galvanized)

Extra Strong Pipe for Posts

Steel Pipe Post

Drill in Place Stud Concrete Anchors,

Galvanized Steel

for Wingwall

or Parapet

(shallow)

Centerline Rail Joint

Pedestrian Tunnel  
Precast Reinforced Concrete  
Highway Division

Precast Standard Design - Walkways and Trails

Safety Rail Details  
PPT-SR 2-20

Precast Reinforced Concrete  
Pedestrian Tunnel  
August, 2020
General Notes for Textured Concrete Form Liners:

1. See individual design sheets for specific notes and details describing the features which incorporate textured concrete. Work performed to create textured concrete shall be in accordance with the Standard Specifications for next work and the following:

2. Form the textured concrete surface using a form liner system made of high-strength urethane elastomer, plastic or flexible foam materials capable of withstanding anticipated concrete pressures without leakage or causing physical defects. Form liners shall easily attach to forms and be removable without causing concrete surface damage. If recommended by the form liner manufacturer, use structural backers to prevent deformation of the liner during loading of the forms. The liners shall be designed to form surfaces conforming to the design intent including the shape, lines and dimensions shown in the plans and to avoid visible pattern repeats. Match pattern features at form liner joints to minimize pattern repeats and make the formed concrete surface appear uniform and continuous without visible seams and form marks. When joints are unavoidable, make joints along main features of the pattern in accordance with Manufacturer's recommendations.

3. Form liner edges following curves are to be cut cleanly and parallel to the curve. Use adequate blocking, sealing and other means in order to maintain the appropriate depth and character of texture at cut edges of liners and to prevent mortar leakage.

4. During loading of forms with concrete, take extra care to adequately vibrate concrete in order to maintain all intended features of the form liner in the final surface and to prevent voids. Following removal of forms, finish minor defects to blend with the balance of the surface texture. The completed surface shall be free of blisters, surface voids and conspicuous form marks to the satisfaction of the Engineer. The Contractor shall correct, at his own cost, any surface defects.

5. Verify that release agents used are compatible with form liner material, and are non-staining. Apply release agent in accordance with the form liner manufacturer's recommendations.

6. If used, form ties shall be made of non-corrosive materials when necessary to achieve the desired shape and lines of the surface. Form ties and accessories in stone pattern mortar joints and at high points of finished wall.

7. If heating forms during cold weather construction, take special care to avoid damaging form liners. Overheating can warp or melt some form liner materials.

8. Stop formwork using techniques in accordance with liner manufacturer's recommendations after the concrete has achieved the strengths and cure times required by the plans and applicable Standards. Remove surplus concrete in stone pattern mortar joints and at high points of finished wall.

9. All costs associated with concrete texturing and form liners are to be included in the bid item "Structural Concrete (RCB Culvert)".

Anti-Graffiti Coating Notes:

1. Anti-graffiti surface preparation and application shall be in accordance with the "Special Provisions for Anti-Graffiti Coating" and materials used shall be an approved type in accordance with Materials IM 493.23. Color shall be clean. Anti-graffiti coating must be compatible with other concrete coatings used on the project in accordance with the manufacturer's recommendations.

2. Anti-graffiti coating shall be applied to all interior surfaces of the pedestrian tunnel except the walking surface, and all exposed vertical surfaces of the headwalls including the parapets. Anti-graffiti coating is not required on the top horizontal surfaces of the parapets. Anti-graffiti coating shall be included in the bid item "Anti-Graffiti Coating" and is paid for on a square yard basis.

Tunnel Concrete Coating Notes:

1. All interior surfaces of the pedestrian tunnel except the walking surface, to the limits of the front face of parapets, shall be finished with a 100% acrylic, vapor permeable masonry coating. The coating used shall be certified to allow water vapor transmission in accordance with ASTM E96 or ASTM D1655.

2. The 100% acrylic, vapor permeable masonry coating shall be one of the following listed products:
   - A. TK Products Tri-sheen Acrylic
   - B. Sherwin Williams A-100
   - C. Chemico Inc. Thorsheen
   - D. Edison Coatings Aqyr-X 200
   - E. Approved others, submit product information to the Iowa DOT, Bridges and Structures Bureau, Ames, IA 50010. Do not order materials prior to receiving approval for use on the project.

3. Prior to concrete coating application, prepare surfaces in accordance with the "Developmental Specifications for Concrete Surface Preparation and Testing Prior to Coating Application". Apply 100% acrylic, vapor permeable masonry coating in accordance with the "Developmental Specifications for Structural Concrete Coating".

4. One color of concrete coating is to be used on the pedestrian tunnel. The color shall be white matching SAF AMG-STD-595 color number 2747A (semigloss). Submit product specifications and color samples in accordance with the "Developmental Specifications for Structural Concrete Coating".

5. No coating overspray or other contamination shall be allowed on the floor surface of the pedestrian tunnel, on the adjacent parapets, headwalls, or on the approach pavement. Take special care to avoid contamination of adjacent surfaces.

6. All costs associated with surface preparation and application of 100% acrylic, vapor permeable masonry coating are to be included in the bid item "Structural Concrete Coating".
Textured Concrete Notes:

1. This work consists of applying textured finishes on all designated concrete surfaces of the pedestrian tunnel headwalls shown in this plan. See "General Notes for Textured Concrete Form Liners" on Sheet PPT-AD 1-20 for more information regarding the use of form liners. The textured concrete mockup panel must be reviewed and approved by the Engineer before beginning production concrete work that includes texture.

2. The form liner used to produce the texture shown in the plan details shall produce a textured effect of a realistic, random dry-stacked stone masonry surface having stones of varying size and shape. Individual stone dimensions shall be between 3 and 42 inches. Maximum depth of texture shall be between 1½ and 2½ inches.

3. Obtain texture form liner materials from one of the following manufacturers:
   A. Custom Rock International (Pattern Nos. 1203, 1208)
   B. Fitzgerald Formliners (Pattern No. 17911)
   C. Architectural Polymers (Pattern No. 921)
   D. Other Manufacturers and patterns submitted to and approved by the Iowa Department of Transportation, Bridges and Structures Bureau.

4. The pedestrian tunnel headwall surfaces as designated in the plans shall also receive concrete rustication. See "General Notes for Concrete Rustication" on Sheet PPT-AD 1-20 for more information regarding approved techniques and methods of concrete rustication.

Texture Mockup Panel Notes:

1. Prior to beginning any production concrete work that includes texture, a textured concrete mockup panel must be reviewed and approved by the Engineer.

2. Construct a 3-foot high, by 6-inch wide (Min.), by 3-foot long mockup panel in accordance with the Standard Specifications and these plans. See mockup details on this design sheet.

3. Cast the mockup panel(s) on site, using the same forming methods, procedures, form liners, and concrete mixtures as are proposed for the production work. Textured face shall be vertical during the casting process. A single mat of No. 5 reinforcing bars in two directions shall be centered within the panel. If the mockup panel is rejected, construct a new mockup panel as directed by the Engineer.

4. All costs associated with the textured concrete mockup panel(s) shall be included in the price bid for "Structural Concrete (RCB Culvert)". Construction of mockup panels shall also receive concrete rustication. See "Concrete Rustication" on Sheet PPT-AD 1-20 for more information regarding approved techniques and methods of concrete rustication.

5. The pedestrian tunnel headwall surfaces as designated in the plans shall also receive concrete rustication. See "General Notes for Concrete Rustication" on Sheet PPT-AD 1-20 for more information regarding approved techniques and methods of concrete rustication.

6. Prior to beginning any production concrete work that includes rustication, a textured concrete mockup panel must be reviewed and approved by the Engineer. The textured concrete mockup panel must be reviewed and approved by the Engineer before beginning production concrete work that includes texture.