Revision #217 of the Highway Standards, effective April 1, 2016, is now available on the department's website.

The revisions are as follows:

<table>
<thead>
<tr>
<th>Removed</th>
<th>Inserted</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Standards by Subject/Title January 1, 2015</td>
<td>Standards by Subject/Title April 1, 2016</td>
<td>Updated.</td>
</tr>
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<td>Division 200 Index January 1, 2015</td>
<td>Division 200 Index April 1, 2016</td>
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<tr>
<td>Division 300 Index January 1, 2015</td>
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<tr>
<td>Division 400 Index January 1, 2015</td>
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<tr>
<td>420401-11</td>
<td>420401-12</td>
<td>Revised pavement connector to be rigid only. Omitted wide flange beam terminal joint. Moved HMA pavement connector to new standard 420406. Renamed standard.</td>
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<tr>
<td></td>
<td></td>
<td>New standard for HMA pavement connector (formerly part of standard 420401).</td>
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<tr>
<td>420501-05</td>
<td>420501-06</td>
<td>Changed terminology from 'pavement fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>420601-05</td>
<td>420601-06</td>
<td>Changed terminology from 'pavement fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
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<tr>
<td>420701-02</td>
<td>420701-03</td>
<td>Changed terminology from 'pavement fabric' to 'welded wire reinforcement'. Renamed standard.</td>
</tr>
<tr>
<td>421001-02</td>
<td>421001-03</td>
<td>Revised general notes with respect to 30' (9 m) bar length</td>
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<table>
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<tr>
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<th>Remarks</th>
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<tr>
<td>542001-04</td>
<td>542001-05</td>
<td>Added note to omit restraint angles and tie plates for multiple end sections. Corrected typos.</td>
</tr>
<tr>
<td>542006-01</td>
<td></td>
<td>Deleted standard. Multiple round end sections will be covered by special provision.</td>
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<tr>
<td>542011</td>
<td>542011-01</td>
<td>Added note to omit restraint angles and tie plates for multiple end sections. Corrected typos.</td>
</tr>
<tr>
<td>542016</td>
<td></td>
<td>Deleted standard. Multiple elliptical end sections will be covered under by special provision.</td>
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<tr>
<td>542206-03</td>
<td>542206-04</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>542306-02</td>
<td>542306-03</td>
<td>Changed terminology from 'fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>542311-05</td>
<td>542311-06</td>
<td>Corrected typo.</td>
</tr>
<tr>
<td>542401-01</td>
<td>542401-02</td>
<td>Revised THICKNESS values in table.</td>
</tr>
<tr>
<td>542406-01</td>
<td>542406-02</td>
<td>Revised THICKNESS values in table.</td>
</tr>
<tr>
<td>542506-02</td>
<td>542506-03</td>
<td>Increased length of inlet box to provide clearance for top U-bolt.</td>
</tr>
<tr>
<td>Division 600 Index January 1, 2015</td>
<td>Division 600 Index April 1, 2016</td>
<td>Updated</td>
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<td>----------------------------------</td>
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<tr>
<td>601001-04</td>
<td>601001-05</td>
<td>Renamed standard. Omitted drainage mat option.</td>
</tr>
<tr>
<td>601101-01</td>
<td>601101-02</td>
<td>Renamed standard for consistency with standard specifications and other highway standards.</td>
</tr>
<tr>
<td>602406-06</td>
<td>602406-07</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>602411-04</td>
<td>602411-05</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
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<tr>
<td>602416-04</td>
<td>602416-05</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
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<tr>
<td>602421-04</td>
<td>602421-05</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
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<tr>
<td>602601-03</td>
<td>602601-04</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
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<td>604016-03</td>
<td>604016-04</td>
<td>Corrected dimension on Section A-A.</td>
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<td>60606-02</td>
<td>60606-03</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
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<tr>
<td>606101-04</td>
<td>606101-05</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>606201-02</td>
<td>606201-03</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>606306-03</td>
<td>606306-04</td>
<td>Changed terminology from 'pavement fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>Revised Item</td>
<td>Revised to</td>
<td>Details</td>
</tr>
<tr>
<td>--------------</td>
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<td>------------------------------------------------------------------------</td>
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<tr>
<td>606401-01</td>
<td>606401-02</td>
<td>Changed terminology from 'welded wire fabric' to 'welded wire reinforcement'.</td>
</tr>
<tr>
<td>631031-13</td>
<td>631031-14</td>
<td>Changed terminology from 'bridge approach pavement' to 'bridge approach slab'.</td>
</tr>
<tr>
<td>635001-01</td>
<td>635001-02</td>
<td>Added detail of reflector attached to post. Revised signature block.</td>
</tr>
<tr>
<td>635006-03</td>
<td>725001</td>
<td>Renumbered standard to 725001. Added object marker details. Moved guardrail / barrier wall / bridge rail reflectors detail to new standard 782006.</td>
</tr>
<tr>
<td>635011-02</td>
<td>782006</td>
<td>Renumbered standard to 782006. Added reflector spacing detail from standard 635006 (renumbered to 725001). Added object marker details.</td>
</tr>
</tbody>
</table>

**Division 700 Index**

<table>
<thead>
<tr>
<th>Old Index</th>
<th>New Index</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>701101-04</td>
<td>701101-05</td>
<td>Corrected typo in title.</td>
</tr>
<tr>
<td>701316-09</td>
<td>701316-10</td>
<td>Changed standard reference from 635011 to 782006 in note 2.</td>
</tr>
<tr>
<td>701321-14</td>
<td>701321-15</td>
<td>Changed standard reference from 635011 to 782006 in note 2.</td>
</tr>
<tr>
<td>701402-10</td>
<td>701402-11</td>
<td>Added reference to standards 704001 and 782006 in note 2.</td>
</tr>
<tr>
<td>701406-09</td>
<td>701406-10</td>
<td>Revised distance between work zone speed limit sign and worker for consistency with other standards.</td>
</tr>
</tbody>
</table>
701416-08  701416-09  Changed vertical panels from back-to-back to single-sided.

701422-07  701422-08  Added steady burn monodirectional lights to devices at work area.

701423-08  701423-09  Corrected reference to standard in note 4. Changed terminology to 'guardrail / barrier wall reflector.'

701426-07  701426-08  Added trailer option for attenuator symbol. Added note 4. Revised distance between work and lead truck. Revised general notes.

701427-03  701427-04  Added note 5. Revised distance between work and lead truck. Revised general notes.

701428  701428-01  Added trailer option for attenuator symbol.

701431-10  701431-11  Changed drum spacing at work area to 100' (30 m) centers only.

701446-06  701446-07  Revised note 1 to always require tangent.

701611  701611-01  Moved first reverse curve/turn sign to middle of tangent.

701701-09  701701-10  Corrected sign number for LEFT TURN LANE CLOSED AHEAD.

701801-05  701801-06  Omitted orange safety fence from standard as this is covered in the standard specifications.

701901-04  701901-05  Added dimensions to barricades. Revised note for post mounted signs. Revised cone details. Added width restriction sign.
<table>
<thead>
<tr>
<th>Code 1</th>
<th>Code 2</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>704001-07</td>
<td>704001-08</td>
<td>Revised optional chamfer on all edges to 1&quot; (25 mm). Changed standard reference from 635011 to 782006. Changed terminology from 'marker' to 'reflector'.</td>
</tr>
<tr>
<td>781001-03</td>
<td>781001-04</td>
<td>Revised LANE ENDS sign W4-2 to agree with MUTCD.</td>
</tr>
<tr>
<td>782001</td>
<td>782001-01</td>
<td>Removed word 'prismatic'. Revised title.</td>
</tr>
<tr>
<td>Division 800 Index</td>
<td>Division 800 Index</td>
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<tr>
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<tr>
<td>821001</td>
<td>821006</td>
<td>New standard.</td>
</tr>
<tr>
<td>825001-02</td>
<td>825001-03</td>
<td>Corrected connection at terminal block.</td>
</tr>
<tr>
<td>876001-03</td>
<td>876001-04</td>
<td>Revised sign numbers for consistency with current MUTCD.</td>
</tr>
<tr>
<td>877001-05</td>
<td>877001-06</td>
<td>Changed sign panel to 36&quot;x36&quot; (900 mm x 900 mm). Added option for blank-out sign. Added maximum weight of 100 lb. (45 kg) for sign panels or blank-out signs. Modified dimension to outer signal head.</td>
</tr>
<tr>
<td>877002-02</td>
<td>877001-03</td>
<td>Changed sign panel to 36&quot;x36&quot; (900 mm x 900 mm). Changed maximum weight to 100 lb. (45 lb.) for sign panel or blank-out sign.</td>
</tr>
<tr>
<td>877006-04</td>
<td>877006-05</td>
<td>Changed sign panel to 36&quot;x36&quot; (900 mm x 900 mm). Added option for blank-out sign. Added maximum weight of 100 lb. (45 kg) for sign panels or blank-out signs. Modified dimension to outer signal head.</td>
</tr>
</tbody>
</table>
Revised luminaire mast arm note. Changed sign panel to 36”x36” (900 mm x 900 mm). Added option for blank-out sign. Added maximum weight of 100 lb. (45 kg) for sign panel or blank-out sign. Modified dimension to outer signal head.

Revised luminaire mast arm note. Changed sign panel to 36”x36” (900 mm x 900 mm). Added option for blank-out sign. Added maximum weight of 100 lb. (45 kg) for sign panel or blank-out sign. Modified dimension to outer signal head.

Division 000 Index
January 1, 2015
Division 000 Index
April 1, 2016
Updated.

Division BLR Index
January 1, 2015
Division BLR Index
April 1, 2016
Updated.

If you have any questions pertaining to the Highway Standards, please contact the Policy and Procedures Section in the Bureau of Design and Environment at (217) 524-9311.

cc: Omer M. Osman
    Aaron A. Weatherholt
    John Baranzelli
HST-57985
### DIVISION 200  EARTHWORK, LANDSCAPING, and EROSION CONTROL

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<td>280001-07</td>
<td>Temporary Erosion Control Systems</td>
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<tr>
<td>285001-02</td>
<td>Fabric Formed Concrete Revetment Mats</td>
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### DIVISION 300 SUBGRADES, SUBBASES, and BASE COURSES

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<tr>
<td>353001-04</td>
<td>PCC Base Course with HMA Binder and Surface Courses</td>
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</table>
# Standards by Division

## DIVISION 400  SURFACE COURSES, PAVEMENTS, REHABILITATION, AND SHOULDERS

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<th>TITLE</th>
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<td>406001-06</td>
<td>Entrance Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)</td>
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<tr>
<td>406101-05</td>
<td>Exit Ramp Terminal (Flexible Ramp Pavement Adjacent to Flexible Mainline Pavement)</td>
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<tr>
<td>406201-01</td>
<td>Mailbox Turnout</td>
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<tr>
<td>420001-08</td>
<td>Pavement Joints</td>
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<tr>
<td>420101-05</td>
<td>24’ (7.2 m) Jointed PCC Pavement</td>
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<tr>
<td>420106-05</td>
<td>36’ (10.8 m) Jointed PCC Pavement</td>
</tr>
<tr>
<td>420111-03</td>
<td>PCC Pavement Roundouts</td>
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<tr>
<td>420201-09</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)</td>
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<tr>
<td>420206-10</td>
<td>Entrance Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
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<td>420301-06</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavt.)</td>
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<tr>
<td>420306-08</td>
<td>Exit Ramp Terminal (Jointed PCC Ramp Pavement Adjacent to CRC Mainline Pavement)</td>
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<tr>
<td>420401-12</td>
<td>Pavement Connector (PCC) for Bridge Approach Slab</td>
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<td>420406</td>
<td>Pavement Connector (HMA) for Bridge Approach Slab</td>
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<td>420501-06</td>
<td>PCC Pavement and PCC Base Course Adjacent to Railroad Grade Crossing</td>
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<td>420601-06</td>
<td>24’ (7.2 m) PCC Pavement</td>
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<tr>
<td>420701-03</td>
<td>Pavement Welded Wire Reinforcement</td>
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<tr>
<td>421001-03</td>
<td>Bar Reinforcement for CRC Pavement</td>
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<tr>
<td>421101-09</td>
<td>24’ (7.2 m) CRC Pavement (With Wide Flange Beam Terminal Joint)</td>
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<tr>
<td>421106-09</td>
<td>36’ (10.8 m) CRC Pavement (With Wide Flange Beam Terminal Joint)</td>
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<tr>
<td>421201-06</td>
<td>24’ (7.2 m) CRC Pavement (With Lug System)</td>
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<tr>
<td>421206-06</td>
<td>36’ (10.8 m) CRC Pavement (With Lug System)</td>
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<tr>
<td>424001-08</td>
<td>Perpendicular Curb Ramps for Sidewalks</td>
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<tr>
<td>424006-02</td>
<td>Diagonal Curb Ramps for Sidewalks</td>
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<tr>
<td>424011-02</td>
<td>Corner Parallel Curb Ramps for Sidewalks</td>
</tr>
<tr>
<td>424016-02</td>
<td>Mid-block Curb Ramps for Sidewalks</td>
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<tr>
<td>424021-03</td>
<td>Depressed Corner for Sidewalks</td>
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<tr>
<td>424026-01</td>
<td>Entrance / Alley Pedestrian Crossings</td>
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<td>424031-01</td>
<td>Median Pedestrian Crossings</td>
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<td>442101-07</td>
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<tr>
<td>442201-03</td>
<td>Class C and D Patches</td>
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<tr>
<td>482001-02</td>
<td>HMA Shoulder Adjacent to Flexible Pavement</td>
</tr>
</tbody>
</table>
482006-03  HMA Shoulder Adjacent to Rigid Pavement
482011-03  HMA Shoulder Strips/Shoulders With Resurfacing or Widening and Resurfacing Projects
483001-04  PCC Shoulder
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<tr>
<td>515001-03</td>
<td>Name Plate for Bridges</td>
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<td><strong>Culverts</strong></td>
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<tr>
<td>542001-05</td>
<td>Concrete End Sections for Pipe Culverts 15” (375 mm) thru 84” (2100 mm) Diameter</td>
</tr>
<tr>
<td>542011-01</td>
<td>Concrete End Sections for Elliptical Pipe Culverts 15” (375 mm) thru 72” (1800 mm) Equivalent Diameter</td>
</tr>
<tr>
<td>542201-02</td>
<td>Reinforced Concrete End Sections for Pipe Culverts, 15” (375 mm) thru 36” (900 mm) Diameter Skewed With Roadway</td>
</tr>
<tr>
<td>542206-04</td>
<td>Reinforced Concrete End Sections for Pipe Culverts, 42” (1050 mm) thru 60” (1500 mm) Diameter Skewed With Roadway</td>
</tr>
<tr>
<td>542301-03</td>
<td>Precast Reinforced Concrete Flared End Section</td>
</tr>
<tr>
<td>542306-03</td>
<td>Precast Reinforced Concrete Elliptical Flared End Section</td>
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<tr>
<td>542311-06</td>
<td>Traverseble Pipe Grate</td>
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<tr>
<td>542401-02</td>
<td>Metal End Section for Pipe Culverts</td>
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<tr>
<td>542406-02</td>
<td>Metal End Section for Pipe Arches</td>
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<tr>
<td>542501-02</td>
<td>Inlet Box Type 24 (600) A</td>
</tr>
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<td>542506-03</td>
<td>Inlet Box Type 24 (600) B</td>
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<td>542511-02</td>
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<td>542531-04</td>
<td>Inlet Box Type 24 (600) G</td>
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<tr>
<td>542536-03</td>
<td>Inlet Box Type 36 (900) A</td>
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<td>542541-02</td>
<td>Inlet Box Type 48 (1200) A</td>
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<tr>
<td>542546-01</td>
<td>Flush Inlet Box for Median</td>
</tr>
<tr>
<td>542601-03</td>
<td>Reinforced Concrete Pipe Elbow 24”, 30” or 36” (600 mm, 750 mm or 900 mm)</td>
</tr>
<tr>
<td>542606-02</td>
<td>Reinforced Concrete Pipe Tee</td>
</tr>
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# Standards by Division

## DIVISION 600  INCIDENTAL CONSTRUCTION

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<td>Concrete Headwall for Pipe Underdrain</td>
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<tr>
<td>602001-02</td>
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<td>602011-02</td>
<td>Catch Basin, Type C</td>
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<td>602016-02</td>
<td>Catch Basin, Type D</td>
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<tr>
<td>602101-02</td>
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<td>602106-01</td>
<td>Drainage Structures, Types 4, 5 &amp; 6</td>
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<td>Inlet, Type A</td>
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<td>Inlet, Type B</td>
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<td>602401-03</td>
<td>Manhole, Type A</td>
</tr>
<tr>
<td>602406-07</td>
<td>Manhole, Type A, 6’ (1.8 m) Diameter</td>
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<tr>
<td>602411-05</td>
<td>Manhole, Type A, 7’ (2.1 m) Diameter</td>
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<tr>
<td>602416-05</td>
<td>Manhole, Type A, 8’ (2.4 m) Diameter</td>
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<tr>
<td>602421-05</td>
<td>Manhole, Type A, 9’ (2.7 m) Diameter</td>
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<tr>
<td>602501-02</td>
<td>Valve Vault, Type A</td>
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<tr>
<td>602601-04</td>
<td>Precast Reinforced Concrete Flat Slab Top</td>
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<tr>
<td>602701-02</td>
<td>Manhole Steps</td>
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### Landscaping Items

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### Existing Improvement Items

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### Standard Symbols, Abbreviations and Patterns

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<td>Urban Combination Right</td>
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<td>Urban Left Turn Arrow</td>
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<tr>
<td>Urban Right Turn Arrow</td>
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<td>Urban Right Turn Only</td>
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<td>Urban Thru Only</td>
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<tr>
<td>Urban U-Turn</td>
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<td>Urban Combined U-Turn</td>
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<td>Rural Combination Right</td>
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<td>Rural Right Turn Arrow</td>
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<td>Control Box</td>
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<td>Crossing Gate</td>
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<td>Flashing Signal</td>
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<td>Railroad Cont, Mast Arm</td>
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### Removal Items

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<td>Hatch Pattern</td>
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### Right of Way Items

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<td>ROW Marker</td>
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<td>ROW Line</td>
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### RIGHT OF WAY ITEMS (contd.)

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<td>Access Control Line &amp; ROW</td>
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<td>Access Control Line &amp; ROW with Fence</td>
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<td>Excess ROW Line</td>
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### ROADWAY PLAN ITEMS

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<td>Concrete Barrier</td>
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<tr>
<td>Edge of Pavement</td>
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<tr>
<td>Bit Shoulders, Medians and C&amp;C Line</td>
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<td></td>
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<tr>
<td>Aggregate Shoulder</td>
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<tr>
<td>Sidewalks, Driveways</td>
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<td></td>
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<td>Guardrail</td>
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<td>Guardrail Post</td>
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<tr>
<td>Traffic Sign</td>
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<tr>
<td>Corrugated Median</td>
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<td>Impact Attenuator</td>
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<td>North Arrow with District Office (Half Size)</td>
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<td>Watch Line</td>
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<td>Slope Line</td>
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### ROADSIDE ITEMS

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<td>Begin Point</td>
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<td>Vert. Curve Data</td>
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<tr>
<td>Ditch Profile Left Side</td>
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<td>Ditch Profile Right Side</td>
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<td>Roadway Profile Line</td>
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<td>Storm Sewer Profile Left Side</td>
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### SIGNING ITEMS (contd.)

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<tr>
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<td>Barricade Type II</td>
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<td>Barricade With Edge Line</td>
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<td>Flashing Light Sign</td>
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<tr>
<td>Panels I</td>
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<td></td>
</tr>
<tr>
<td>Panels II</td>
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<tr>
<td>Direction of Traffic</td>
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<td>Sign Flap</td>
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### STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS

<table>
<thead>
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<th>Symbol</th>
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<td>EX</td>
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<tr>
<td>PR</td>
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**Sheet 6 of 8**
### SIGNING ITEMS (cont.)
- One Way Arrow Long R8-4-0L (Half Size)
- Two Way Arrow Long R8-4-0L (Half Size)
- Detour M4-10L (0D) (Half Size)
- Detour M4-10R (0D) (Half Size)
- One Way Left R6-L (Half Size)
- One Way Right R6-R (Half Size)
- Left Turn Lane R3-100L (Half Size)
- Keep Left R6-7L (Half Size)
- Keep Left R6-7L (Half Size)
- Keep Right R6-7R (Half Size)
- Keep Right R6-7R (Half Size)
- Stop Here On Red R10-6+L (Half Size)
- Stop Here On Red R10-6+R (Half Size)
- No Left Turn R3-2 (Half Size)
- No Right Turn R3-1 (Half Size)
- Road Closed R11-2 (Half Size)
- Road Closed Thru Traffic R11-2 (Half Size)

### STRUCTURES ITEMS
- Box Culvert Barrel
- Box Culvert Hoodwall
- Bridge Pier
- Bridge
- Retaining Wall
- Temporary Sheet Piling

### TRAFFIC ITEMS
- Cable Number
- Left Turn Green
- Left Turn Yellow
- Signal Backplate
- Signal Section 8" (200 mm)
- Signal Section 12" (300 mm)
- Walk/Don't Walk Letters
- Walk/Don't Walk Symbols

### TRAFFIC SIGNAL ITEMS
- Galv. Steel Conduit
- Underground Cable
- Detector Loop Line
- Detector Loop Large
- Detector Loop Small
- Detector Loop Quadruple

### STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS
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<td>Steel Mast Arm</td>
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<td>Veh. Detector Magnetic</td>
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<td>Conduit Splice</td>
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<tr>
<td>Controller</td>
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<td>Gulfbox Junction</td>
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<tr>
<td>Wood Pole</td>
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<tr>
<td>Temp. Signal Hood</td>
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</tr>
<tr>
<td>Handhole</td>
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</tr>
<tr>
<td>Double Handhole</td>
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<tr>
<td>Heavy Duty Handhole</td>
<td></td>
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<tr>
<td>Junction Box</td>
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<tr>
<td>Ped. Pushbutton Detector</td>
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<td>Ped. Signal Hood</td>
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<td>Signal Hood</td>
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<td>Signal Hood w/Backplate</td>
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<td>Signal Post</td>
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<tr>
<td>Oil Pipe</td>
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<tr>
<td>Sanitary Sewer</td>
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<tr>
<td>Telephone Cable</td>
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<td>Water Pipe</td>
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<td>Double Handhole</td>
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<td>Fire Hydrant</td>
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<tr>
<td>GuyWire or Decam Anchor</td>
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<tr>
<td>Handhole</td>
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<td>Heavy Duty Handhole</td>
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<td>Junction Box</td>
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<td>Light Pole</td>
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<td>Manhole</td>
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<td>Power Pole with Light</td>
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<td>Telephone Splice Box Above Ground</td>
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<td>Stump</td>
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<td>Orchard/Nursery Line</td>
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<td>Woods &amp; Bush Line</td>
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<td>Meters Edge</td>
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<td>Water Surface Indicator</td>
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<td>Water Point</td>
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<td>Disappearing Ditch</td>
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<td>Marsh</td>
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<table>
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<tr>
<th>STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS</th>
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Sheet 8 of 8
<table>
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<th>Dia. (mm)</th>
<th>Weight (kg/m)</th>
<th>Spacing, in. (mm)</th>
<th>Area of Steel per Foot (Meter), sq. in. (sq. mm)</th>
<th>Weight, kg/m</th>
<th>Spacing, in. (mm)</th>
<th>Area of Steel per Foot (Meter), sq. in. (sq. mm)</th>
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<tbody>
<tr>
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<td>17.92</td>
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**REINFORCEMENT BARS - ENGLISH (METRIC)**

**AREA OF STEEL PER FOOT (METER), sq. in. (sq. mm)**

<table>
<thead>
<tr>
<th>Dia. (mm)</th>
<th>Weight (kg/m)</th>
<th>Spacing, in. (mm)</th>
<th>Area of Steel per Foot (Meter), sq. in. (sq. mm)</th>
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### DECIMAL OF AN INCH AND OF A FOOT

<table>
<thead>
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<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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#### DECIMAL OF A FOOT

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### A = Fractions of Inch or Foot

### B = Inch Equivalents to Foot Fractions
DITCH CHECK FOR NARROW MEDIAN

VIEW OF NARROW MEDIAN

DITCH CHECK FOR WIDE MEDIAN

VIEW OF WIDE MEDIAN

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.
STEP 1

ATTACHING TWO SILT FILTER FENCES

STEP 2

ATTACHING TWO SILT FILTER FENCES

SILT FILTER J-HOOK PLACEMENT

GENERAL NOTES

The installation details and dimensions shown for perimeter erosion barriers shall also apply for inlet and pipe protection.

All dimensions are in inches (millimeters) unless otherwise shown.

SILT FILTER FENCE AS A PERIMETER EROSION BARRIER

TEMPORARY EROSION CONTROL SYSTEMS

STANDARD 280001-07
The performance of the basin will improve if put into a series.

The long dimension should be parallel with the direction of the flow. Accumulated silt shall be removed anytime the basins become 75% filled.

Outlet type as directed by Engineer.

Temporary ditches for cut & fill sections

TYPICAL CUT CROSS-SECTION

TYPICAL FILL CROSS-SECTION
TYPICAL FABRIC FORMED CONCRETE REVETMENT MAT LINED DITCH

INSTALLATION DETAILS
1. In placing inserts through fabric use care to avoid breaking drop stitches.
2. Indicates sequence of pour.

GENERAL NOTES
Dimensions given with minimum limits shall be adjusted for field conditions as directed by the Engineer.

Anchor walls on side slopes and at lap joints, as well as cut off walls, shall be installed in trenches.

Cut off walls shall be installed at the upstream and downstream ends.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE       REVISIONS
1-1-02       Revised second note.
1-1-08       Switched units to English (metric).

FABRIC FORMED CONCRETE REVETMENT MATS
STANDARD 285001-02
Provide drainage swale in shaded area.

Left edge of ramp when mainline is on tangent or curved to the right.

Left edge of ramp when mainline is curved left.

Right edge of ramp when mainline is on curve to the left, G%= (G% - 2 x S.E.% of mainline) / 100.

GENERAL NOTES

With a mainline horizontal curve to the left, keep the gore nose dimensions of Sections C-C and B-B as shown. From Section C-C to Section B-B, construct the ramp as a tangent section, and the gore nose at Section B-B shall be a variable width dependent on the radius of the mainline curve. Show a special cross-section on the plans for Section B-B.

When using grades expressed in %, the grade value shall be divided by 100 to obtain the required acceleration length.

When using a radius R1 less than the assumed mainline grade of 0.00%, verify the required acceleration length will be provided.

With a mainline horizontal curve to the right, keep the gore nose dimensions of Sections D-D, C-C, and B-B as shown, and the gore nose at Section B-B shall be constructed as a compound curve tying Section C-C.

Pavement in the ramp taper (hatched area) for a distance of 950' (290 m) shall be the same thickness as the mainline.

Provide drainage swale in shaded area.

End aggregate shoulder -

Edge lines of shoulders for ramp and mainline are to be projected to point of intersection.

Profile

Calculate G%

Calculate G%

Calculate G%

Right edge of ramp when mainline is on curve to the left, G%= (G% - 2 x S.E.% of mainline) / 100.

With a mainline horizontal curve to the right, keep the gore nose dimensions of Sections D-D, C-C, and B-B as shown, and the gore nose at Section B-B shall be constructed as a compound curve tying Section C-C.

All dimensions are in inches (millimeters) unless otherwise shown.
Projected the shoulder edge lines of the ramp and mainline to their intersection.

Pavement in the ramp taper (shaded area) for a distance of 400' (120 m) shall be the same thickness as the mainline.

Max. cross slope allowed is 6%
Min. cross slope allowed is 12%

Vertical offset range for ramp right edge when mainline is curved to the right

Max. cross slope allowed is 6%
Min. cross slope allowed is 5%

When mainline is on tangent or curved to the left, refer to Sheet 3 for vertical offsets using e = 8%.

Range of initial ramp grades when mainline is curved to the right and e < 8% for R = 210' (64 m).

Refer to Sheet 3 for GENERAL NOTES.
EXIT RAMP TERMINAL TO FLEXIBLE MAINLINE PAVEMENT

(FLEXIBLE RAMP PAVEMENT ADJACENT TO FLEXIBLE MAINLINE PAVEMENT)

STANDARD 406101-05

DETAILS FOR DRAINAGE IN NEUTRAL AREA

<table>
<thead>
<tr>
<th>Sections</th>
<th>Machine Curve</th>
<th>Machine Curve</th>
<th>Machine Curve</th>
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<td></td>
<td>Right</td>
<td>Left</td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>A</td>
<td>- 0.28</td>
<td>5.38 % ML x 12</td>
<td>5.38 % ML x 12</td>
<td>5.38 % ML x 350</td>
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<tr>
<td>B</td>
<td>- 1.0</td>
<td>5.38 % ML x 192</td>
<td>5.38 % ML x 192</td>
<td>5.38 % ML x 4900</td>
</tr>
<tr>
<td>C</td>
<td>- 2.0</td>
<td>5.38 % ML x 192</td>
<td>5.38 % ML x 192</td>
<td>5.38 % ML x 4900</td>
</tr>
<tr>
<td>D</td>
<td>- 30.4</td>
<td>- 30.4</td>
<td>- 30.4</td>
<td>- 30.4</td>
</tr>
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</table>

1. Vertical offset values are calculated and based on the right edge of mainline pavement at 0.0 % grade.
2. The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
3. S.E. = Super-elevation Rate

GENERAL NOTES

The initial ramp grade (G) is based on the line generated through the PI that is 305 ft. (92 m) past Section C-C and the point created by the vertical offset of Section D-D.

See plans for actual grades.

See Standard 482001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade value shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to R, construct the ramp as a 140 ft. (43 m) tangent section.

All dimensions are in inches (millimeters) unless otherwise shown.

EXIT RAMP TERMINAL PAVEMENT JOINED TO FLEXIBLE MAINLINE PAVEMENT

STANDARD 406101-05
MAILBOX TURNOUT

STANDARD 406201-01

GENERAL NOTES
Mailboxes shall be mounted such that the face of the mailbox is 6 (150) to 12 (300) from the edge of the turnout surfacing.

All dimensions are in inches (millimeters) unless otherwise shown.

DIMENSIONS - FT.

<table>
<thead>
<tr>
<th>Width of Shoulder</th>
<th>4-8</th>
<th>10+</th>
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<tbody>
<tr>
<td>Width of turnout (Y)</td>
<td>8(240)</td>
<td>32 (800)</td>
</tr>
<tr>
<td>L1</td>
<td>32 (800)</td>
<td>32 (800)</td>
</tr>
<tr>
<td>L2</td>
<td>20 (500)</td>
<td>20 (500)</td>
</tr>
</tbody>
</table>

MAILBOX ON NEARSIDE OF ENTRANCE

MAILBOX ON FARSIDE OF ENTRANCE
LONGITUDINAL SAWED JOINT

No. 6x30 (No. 19x750) Tie bars at 30 (750) cts. (shown on support pins)

Sheet steel of suitable thickness to form keyway as detailed or approved.

Sawed groove

Hot poured joint sealer

LONGITUDINAL KEYED JOINT

Type C metal joint or approved equal

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR FORMED IN PLACE OR MECHANICALLY INSERTED)

No. 6x30 (No. 19x750) Tie bars at 24 (600) cts.

LONGITUDINAL CONSTRUCTION JOINT

(TIE BAR GROUTED IN PLACE)

Preformed or drilled hole

First pour

Hot poured joint sealer

Second pour

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement only.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE

REVISIONS

Pavement joints

STANDARD 420001-08
**PAVEMENT JOINTS**

(transverse expansion joint)

*Expansion caps shall be installed on the exposed end of each dowel bar once the header has been removed and the joint filler material has been installed.*

**PAVEMENT JOINTS**

(transverse contraction joint)

Not poured joint sealer

Heat resistant closed cell plastic foam backer rod

**PAVEMENT JOINTS**

(SEALING DETAIL)

<table>
<thead>
<tr>
<th>DOWEL BAR TABLE</th>
</tr>
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<tbody>
<tr>
<td>PAVEMENT THICKNESS</td>
</tr>
<tr>
<td>-----------------</td>
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<tr>
<td>8 (200) or greater</td>
</tr>
<tr>
<td>7 (175) thru 7.99 (199)</td>
</tr>
<tr>
<td>Less than 7 (175)</td>
</tr>
</tbody>
</table>
**SECTION A-A**

(TYPICAL 2-LANE WITH SHOULDERS)

- **20'-6' (6.2 m) nominal**
- **24'-0' (7.2 m) nominal**

**TRANSVERSE CONSTRUCTION JOINT**

- Headed board drilled for bars
- Bar supports

**DETAIL OF ADDED REINFORCEMENT FOR PAVEMENT BLOCKS-OUTS**

- **Longitudinal sawed joint**
- **Transverse contraction joint**

**GENERAL NOTES**

See Standard 420001 for details of joints not shown.

---

**24' (7.2 m) JOINTED PCC PAVEMENT**

**STANDARD 420101-05**
SECTION A-A
(TYPICAL 5-LANE, 1-WAY WITH SHOULDERS)

**Casting outside limits placed at pavement mid-depth**

18' (4.5 m) dimension shall be adjusted to 12' (3.6 m) max. when placed adjacent to existing pcc pavement structure so that the joints are in prolongation.

Adjust the tie bar spacing to maintain a clearance of 6 (150) from dowel bars.

**Coating outside limits**

When the 12' (300) minimum cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

GENERAL NOTES
See Standard 420001 for details of joints not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

**Transverse construction joint**

- The 15' (4.5 m) dimension shall be adjusted to 12' (3.6 m) min. to 18' (4.5 m) max. when placed adjacent to existing pcc pavement structure so that the joints are in prolongation. Adjust the tie bar spacing to maintain a clearance of 6 (150) from dowel bars.

When 15' (4.5 m) dimension cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

**Coating outside limits**

When the 12' (300) minimum cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

GENERAL NOTES
See Standard 420001 for details of joints not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

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All dimensions are in inches (millimeters) unless otherwise shown.

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When 15' (4.5 m) dimension cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

GENERAL NOTES
See Standard 420001 for details of joints not shown.

All dimensions are in inches (millimeters) unless otherwise shown.
CAST IN PLACE DETAIL

ROUNDOUT FOR SQUARE FRAME & GRATE
AND MANHOLES

DETAIL OF REINFORCEMENT
FOR PAVEMENT ROUNDOUT

PCC PAVEMENT
ROUNDOUTS
STANDARD 420111-03
(Sheet 2 of 2)

Illinois Department of Transportation
PASSED
ENGINEER OF POLICY AND PROCEDURES
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED

January 1, 2011

No. 6 (19) bar placed at pavement midpoint

Drill and Grout No. 6 (19) Tie Bar 24 (600)

No. 6 (19) Inner loop reinfr.

No. 6 (19) Outer loop reinfr.

Prop. Class 5) concrete (higher strength concrete may be used if no detrimental shrinkage cracks occur

Sub-Rose

No. 6 (19) Support bar

Frame

Circular Joint

Structure

Type 1 or Type 5 Frame
and Grate may be used

PCC PAVEMENT
ROUNDOUTS

STANDARD 420111-03
(Sheet 2 of 2)
Pavement thickness and joint type in the ramp terminal, for a distance of 950' (290 m), shall be the same as in the mainline. Joints shall be in prolongation with mainline pavement joints.

**Plan**

- **Profile**
  - Longitudinal sawed joint on a longitudinal construction joint with No. 6 (No. 19) tie bars at 24 6000 cts, for a distance of 100' 120 mi beginning at the 24 6000 cts. Joint line is parallel to ramp baseline.
  - Longitudinal keyed joint without tie bars.
  - Longitudinal sawed joint on a longitudinal construction joint with No. 6 (No. 19) tie bars at 24 6000 cts.

**General Notes**

- The indicated "A" and "B" grades for the ramp terminal are based on an assumed mainline grade of 0.00%.
- See plans for actual grades.
- All pavement joints shall be detailed as shown on Standards 420001 and 483001.
- See Standard 483001 for ramp shoulder details.
- Between Sections A-A and B-B (shaded areas) provide a drainage swale and flush inlet to enhance drainage.
- When using grades expressed in %, the grade value shall be divided by 100 to obtain vertical offsets.
- When using radius R1 less then the minimum, verify the required acceleration length will be provided.

**Entrance Ramp Terminal**

- Jointed PCC Ramp Pavement Adjacent to Jointed PCC Mainline Pavement

**Standard** 420201-09

(All dimensions are in inches (millimeters) unless otherwise shown.)
GENERAL NOTES

The indicated "A" and "B" grades for the ramp terminal are based on an assumed mainline grade of 0.00%.

See plans for actual grades.

As pavement joints shall be detailed as shown on Standards 490001 and 483001.

See Standard 483001 for ramp shoulder details.

Between Sections B-B and B-B, construct the gore nose at Section C-C shall be a variable width dependent on the radius of the ovals on the plans for

See plans for actual grades.

All dimensions are in inches (millimeters)

With a mainline horizontal curve to the left, keep the gore nose dimensions at Sections C-C and D-D as shown. From Section C-C to Section B-B, construct the gore nose at Section C-C shall be a compound curve tying Section C-C.

With a mainline horizontal curve to the right, keep the gore nose dimensions at Sections B-B, C-C, and D-D as shown, and the edge of the ramp between Sections C-C and D-D is constructed as a compound curve tying Section C-C.

All dimensions are in inches unless otherwise shown.

The indicated "A" and "B" grades for the ramp terminal are based on an assumed mainline grade of 0.00%.

See plans for actual grades.

As pavement joints shall be detailed as shown on Standards 490001 and 483001.

See Standard 483001 for ramp shoulder details.

Between Sections B-B and B-B, construct the gore nose at Section C-C shall be a variable width dependent on the radius of the ovals on the plans for

See plans for actual grades.

All dimensions are in inches (millimeters)

With a mainline horizontal curve to the left, keep the gore nose dimensions at Sections C-C and D-D as shown. From Section C-C to Section B-B, construct the gore nose at Section C-C shall be a compound curve tying Section C-C.

With a mainline horizontal curve to the right, keep the gore nose dimensions at Sections B-B, C-C, and D-D as shown, and the edge of the ramp between Sections C-C and D-D is constructed as a compound curve tying Section C-C.

All dimensions are in inches unless otherwise shown.
When curved to the left, vertical offset range for ramp right edge when mainline is curved to the left

Vertical offset range for ramp right edge when mainline is curved to the right

Range of initial ramp grades when mainline is curved to the right and $e \leq 8\%$ for $R_1$.
**SECTION B-B**

**WHEN MAINLINE IS ON TANGENT OR CURVED TO THE RIGHT**

- **0.0% Slope**
- **1.5% and greater**
  - Mainline pvm.
  - Ramp pvm.
- **4 (100) Stabilized subbase**
- **Improved subgrade**

**SECTION C-B - C-B**

**WHEN MAINLINE IS CURVED TO THE LEFT**

- **0.0% Slope**
- **1.5% and greater**
  - Mainline pvm.
  - Ramp pvm.
- **4 (100) Stabilized subbase**
- **Improved subgrade**

**DETAIL A**

- **0.0% Slope**
- **1.5% and greater**
  - Mainline pvm.
  - Ramp pvm.
- **4 (100) Stabilized subbase**
- **Improved subgrade**

---

**EXIT RAMP TERMINAL**

- **JOINTED PCC MAINLINE PAVEMENT**
- **JOINTED PCC RAMP PAVEMENT**

**STANDARD 420301-06**

(Sheet 2 of 3)
**DETAILS FOR DRAINAGE IN NEUTRAL AREA**

**GENERAL NOTES**

The initial ramp grade \( G \) is based on the line generated through the PI that is 105' (32 m) past Section C-C and the point created by the vertical offset at Section D-D. See plans for actual grades.

All pavement joints shall be detailed as shown on Standards 420001 and 483001.

See Standard 483001 for ramp shoulder details.

In the neutral area, provide a swale and flush inlet to enhance drainage.

When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.

Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C to A, construct the ramp as a 141' (43 m) tangent section.

All dimensions are in inches (millimeters) unless otherwise shown.

**EXIT RAMP TERMINAL**

**UNJOINTED PCC RAMP PAVEMENT**

**ADJACENT TO JOINTED PCC MAINLINE PAVEMENT**

**Sheet 3 of 3**

**STANDARD 420301-06**
Project the shoulder edge lines of the ramp and mainline to their intersection.

Pavement and reinforcement in the ramp taper shall be the same as the mainline. Reinforcement shall be placed parallel and perpendicular to the mainline pavement.

Reinforcement placed parallel to and perpendicular to ramp baseline.

Joint line is parallel to ramp baseline.

Neutral area (1.94 m) 6'-4" (without tie bars)

Longitudinal sawed joint or a longitudinal construction joint (undoweled) or optional transverse contraction joint.

Max. cross slope allowed is 4%  
Min. cross slope allowed is 1.5%  

Vertical offset range for ramp right edge when mainline is curved to the left

Vertical offset range for ramp right edge when mainline is on tangent

Min. cross slope allowed is 1.5%

Max. cross slope allowed is 1.5%

When mainline is on tangent or curved to the right

Right edge of the ramp = S.E.% of mainline

Max. cross slope allowed is 5%

Min. cross slope allowed is 1.5%

Vertical offset range for ramp right edge when mainline is curved to the right

Max. cross slope allowed is 1.5%

Min. cross slope allowed is 1.5%

Ramp baseline

When mainline is on tangent or curved to the right

When curved to the left

Vertical offset range for ramp right edge when mainline is curved to the left

Vertical offset range for ramp right edge when mainline is on tangent

Max. cross slope allowed is 4%

Min. cross slope allowed is 1.5%

Left edge of ramp = S.E.% of mainline

Max. cross slope allowed is 5%

Min. cross slope allowed is 1.5%

Vertical offset range for ramp right edge when mainline is curved to the right

Max. cross slope allowed is 1.5%

Min. cross slope allowed is 1.5%

Right edge of ramp = S.E.% of mainline

Max. cross slope allowed is 5%

Min. cross slope allowed is 1.5%

Vertical offset range for ramp right edge when mainline is curved to the right

Max. cross slope allowed is 1.5%

Min. cross slope allowed is 1.5%

Range of initial ramp grades when mainline is curved to the right and e = 8% for R

See Sheet 3 for vertical offsets using e = 8%

See Sheet 3 for GENERAL NOTES

PLAN

PROFILE

DATE

REVISIONS

EXIT RAMP TERMINAL
LINED PCC RAMP PAVEMENT
ADJACENT TO CRC MAINLINE PAVEMENT

STANDARD 420306-08
**DETAILS FOR DRAINAGE IN NEUTRAL AREA**

<table>
<thead>
<tr>
<th>Sections</th>
<th>Molding on Tangent</th>
<th>Molding Curved Right</th>
<th>Molding Curved Left</th>
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<td>5 3/32 M.L. x 192</td>
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<tr>
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<td>5 1/4</td>
<td>5 3/32 M.L. x 192</td>
<td>5 3/32 M.L. x 192</td>
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<tr>
<td>D</td>
<td>15/4</td>
<td>15/4</td>
<td>15/4</td>
</tr>
</tbody>
</table>

1. Vertical offset values are calculated and based on the right edge of mainline pavement at 0.2% grade.
2. The vertical offsets of these points are above the mainline pavement and lie on an upgrade in relationship to the mainline grade.
3. S.E. = Superelevation Rate

**GENERAL NOTES**

- See plans for actual grades.
- All pavement joints shall be detailed as shown on Standards 400001 and 483001.
- See Standard 483001 for ramp shoulder details.
- In the neutral area, provide a swale and flush inlet to enhance drainage.
- When using grades expressed in %, the grade values shall be divided by 100 to obtain vertical offsets.
- Where an exit ramp terminal is proposed adjacent to a mainline horizontal curve, construct the edge of the terminal by using offset widths, and for the terminal segment downstream from Section C-C, construct the ramp as a 141' (43 m) tangent section.
- All dimensions are in inches (millimeters) unless otherwise shown.
Bridge Approach Slab

For details, see Bridge Plans.

Improved subgrade, see roadway plans.

See plans for details of bridge approach slab, when required.

See Standard 420401 for reinforcement details not shown.

See Standard 421001 for reinforcement details not shown.

See Standard 610001 for shoulder inlet with curb when required.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

PAVEMENT CONNECTOR (PCC)

FOR BRIDGE APPROACH SLAB

STANDARD 420401-12
Plan:
(New or existing construction)

General Notes:
- \[ T \] for new or existing (HMA) or composite pavement.
- New or existing (HMA) for shoulder inlet with curb when required.
- See plans for details of bridge approach slab and approach footing.
- All dimensions are in inches (millimeters) unless otherwise shown.

Section A-A

Detail A

Pavement Connector (HMA) for Bridge Approach Slab

Standard 420406
No.7 (No.22) bars (typ.)

Section A-A

(for PCC base course with HMA surface)

Thickness some as adjacent pavement

6'-0" (1.83 m) min.

No.6 (No.19) Tie bars

6'-0" (1.83 m) min.

Improved subgrade

Section B-B

(for PCC pavement)

No.7 (No.22) bars (typ.)

Thickness some as adjacent pavement

6'-0" (1.83 m) min.

Improved subgrade

Welded wire reinforcement

Crossing

Tie

Transverse construction joint or transverse construction joint

Thickness of HMA surface

6'-0" (1.83 m) min.

Welded wire reinforcement

Transverse construction joint

6'-0" (1.83 m) min.

Tie

Transverse construction joint

Thickness some as adjacent pavement

6'-0" (1.83 m) min.

Welded wire reinforcement

Subbase (when used)

Tie

Transverse construction joint

Thickness some as adjacent pavement

6'-0" (1.83 m) min.

Welded wire reinforcement

Transverse construction joint

Tie

General Notes

See Standard 420001 for joint details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

PCC Pavement and PCC Base Course Adjacent to Railroad Grade Crossing

Standard 420501-06
SECTION A-A
(TYPICAL 2-LANE WITH SHOULDERS)

Longitudinal sawed joint

3 (75) cl. when \( t \leq 8 \) (200)
3/2 (90) cl. when \( t > 8 \) (200)

12'-0" (7.2 m)
18'-0" (5.5 m)

Slope 1.5%

Subbase

Welded wire reinforcement

No. 6x36 (No. 19x900)

12 Dowel bars at 12 (300) cts.
20'-0" (6.0 m) min. - 40'-0" (12.0 m) max.

40'-0" (12.0 m) Nominal

20'-0" (6.0 m) min. - 40'-0" (12.0 m) max.

Transverse contraction joint

No. 6 (No. 19) Tie bars at 30 (750) cts.

Welded wire reinforcement

GENERAL NOTES
See Standard 420001 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

PLAN

LONGITUDINAL SAWED JOINT

Welded Wire Reinforcement

LONGITUDINAL CONTRACTION JOINT

TRANSVERSE CONSTRUCTION JOINT

TRANVERSE CONTRACTION JOINT

Welded wire reinforcement

BAR SUPPORTS

No. 6x36 (No. 19x900)

The bars at 15 (375) cts.
**GENERAL NOTES**

- Pavement block-outs shall be at least 24 (600) from contraction joints.
- Welded wire reinforcement which is looped longitudinally shall have a minimum lap of 6 (150).
- Welded wire reinforcement may be positioned with the transverse wires on top or bottom of the longitudinal wires.

All dimensions are in inches (millimeters) unless otherwise shown.

**PAVEMENT WELDED WIRE REINFORCEMENT**

**STANDARD 420701-03**

**DETAIL OF ADDED REINFORCEMENT FOR PAVEMENT BLOCKS-OUTS**

- Longitudinal joint or edge of pavement
- Transverse contraction joint
- Reinforcement pay length
- Variable

Approximately 63 lbs./100 sq. ft. (3.07 kg/m²)

When clipped bar mats are used, each bar intersection shall be clipped with W1.7 (3.74) wire.

When the 12 (300) minimum cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

**TYPE B**

- When the 12 (300) minimum cannot be achieved, the transverse joints shall be extended to either the longitudinal joint or edge of pavement.

**TYPE A**

- Longitudinal keyway joint
- **Casting outside limits**
- 1 (25) Preformed expansion joint filler-full depth (typ.)
- Edge of pavement
- Place casting to grade and fill with full depth concrete after pavement has cured.

- Welded wire reinforcement when required to end approximately 6 (150) from joints.

**DETAIL OF ADDED REINFORCEMENT FOR PAVEMENT BLOCKS-OUTS**

- Longitudinal joint or edge of pavement
- Transverse contraction joint
- Reinforcement pay length
- Variable

Approximately 63 lbs./100 sq. ft. (3.07 kg/m²)

When clipped bar mats are used, each bar intersection shall be clipped with W1.7 (3.74) wire.

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**TYPE B**

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**TYPE A**

- Longitudinal keyway joint
- **Casting outside limits**
- 1 (25) Preformed expansion joint filler-full depth (typ.)
- Edge of pavement
- Place casting to grade and fill with full depth concrete after pavement has cured.

- Welded wire reinforcement when required to end approximately 6 (150) from joints.
**REMARKS**

**ENGLISH (inch) or** **METRIC (mm)**

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**GENERAL NOTES**

Except as noted or shown, the dimensions and notes specified for LAP DETAIL I and III are typical for LAP DETAIL II and III.

The **D** dimension and the distance from the end of the transverse bar to the edge of pavement may be increased by 1 (25) for slip form paving.

The minimum length of longitudinal bars shall be 30' (9 m) except as required to establish the lap arrangement selected.

All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

April 1, 2016

**REVISIONS**

11-08 Revised general notes

**BAR REINFORCEMENT**

FOR CRC PAVEMENT

STANDARD 421001-03

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

PASSED TO ENGINEER OF POLICY AND PROCEDURES

APPROVED TO ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

**DETAIL A**

**DETAIL II**

**DETAIL III**
Illinois Department of Transportation
PASSED
ENGINEER OF POLICY AND PROCEDURES
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
January 1, 1997
ISSUED  1-1-97

**Concrete Pad**

- 3.0 m
- 10'-0" (3.0 m)
- 24'-0" (7.2 m) long at 18 (450) cts.

**Reinforcement**

- 7-No. 4 (No. 13) Transverse bars
  - 9'-6" (2.85 m) long at 12 (300) cts.
- 24-No. 5 (No. 16) Longitudinal bars
  - 23'-6" (7.05 m) long at 18 (450) cts.

**Joint Details**

- Longitudinal sawed joint at 30 (750) cts.
- Transverse terminal joint in shoulder, both sides
- Transverse construction joint

**Joint Sealing**

- When pavement is extended lap reinforcing steel 36 (900) min. from the end of the nearest longitudinal bar lap (typ.).
- Dow Corning 1200. At the Contractor's option the joint may be sealed as shown in the optional groove detail.
- Silicone Highway Joint Sealant. The tape shall be Polyethylene Tape No. 40. The sealant shall be Dow Corning 888 whenever a wide flange beam terminal joint is used.

**General Notes**

- See Standard 420001 and 420401 for joint details not shown.
- See Standard 421001 for details of pavement reinforcement.

**Section A-A**

- Typical 2-Lane With Shoulders
- Standard 421101-09
- Continuous reinforced pcc pavement
- 12 Dowel bars at 12 (300) cts.
- When placed adjacent to existing pcc pavement
- Wide flange beam terminal joint
- Concrete pad slope
- 1.5%

**Section B-B**

- Transverse terminal joint
- Transverse construction joint
- 1.5%

**Plan**

- Plan View
- 24' (7.2 m)
- CRC Pavement
- With Wide Flange Beam Terminal Joint

**General Notes**

- Second components for the wide flange beam terminal joint shall be as follows:
  - The asphalt shall be Dow Carving 888 Silicone Highway Joint Sealing.
  - The joint seal shall be Polyethylene Tape No. 40. The primer, used on the metal only, shall be Dow Corning 1200. All the Contractor's option the joint may be sealed as shown in the optional groove detail.

- See Standard 420001 for details of pavement reinforcement.
- 24'-0" (7.2 m)
- 2014
- Corrected weld symbol on joint complete.
**WIDE FLANGE BEAM TERMINAL JOINT**

- **Material Required for One Wide Flange Beam Terminal Joint Complete**
  - Concrete, cu. yds. (m³): 3
  - Reinforcement Bars, lbs. (kg): 3710 (1655)
  - Concrete, cu. yds. (m³): 2455 (1115)

- **Structural Steel, lbs. (kg):**
  - W16 (W410): 20 (16.2)
  - W14 (W360): 3040 (1360)

- **Reinforcement Bars, lbs. (kg):**
  - No. 4 (No. 13): 11.1 (8.1)
  - No. 5 (No. 16): 3040 (1360)
  - No. 6 (No. 19): 2455 (1115)

- **Concrete, cu. yds. (m³):**
  - 3

**GROOVE DETAIL**

- Silicone joint sealer
- Hot poured joint sealer
- 2¾ (70) Wide polyethylene tape

**DETAIL AT BEAM**

- Bend top flange of beam
- Cut and remove sufficient material from web to obtain the required pavement cross slope
- Butter web and grind smooth the web and flange beam

**DETAIL OF CUTTING AND WELDING BEAM**

- Taper all exposed steel inner surface
- 3 (75) Preformed flexible foam or closed cell plastic expansion joint filler
- 10 mil (0.25) Polyethylene bond breaker on steel trowel finish

**OPTIONAL ADJUSTABLE CHAIR**

- Terminal joint beam
- 2 - ½ (13) dia. holes
- 2 - ½ (13) dia. holes
- 4 - ½ (13) dia. holes

**Pavement Thickness minus 4½ (115)

**End Plate**

- Expansion side
- 3/8 (5) Steel plates

**CRC PAVEMENT**

- 36' (10.8 m)

**标准 421006-09**

**Sheet 2 of 2**
**Transverse Terminal Joint**

**Section B-B**

- End of stabilized shoulder
- Transverse terminal joint

**Transverse Construction Joint**

- End of stabilized shoulder
- Transverse construction joint

**Continuous Reinforced PCC Pavement**

- 2 050 Transverse expansion joint
- 12 Dowel bars at 12 (300) cts. (or 12 dowel when placed adjacent to existing pcc pavement)

**Plan**

- Limit of lug system
- PCC shoulder
- Sleeper slab

**Section A-A**

- Typical 2-lane with shoulders
- Transverse construction joint

**General Notes**

- See Standard 43000 for details of pavement reinforcement.
- See Standards 42000 and 42040 for joint details not shown.
- All dimensions are in inches (millimeters) unless otherwise shown.

**Transverse Terminal Joint**

- Tie bars at 30 (1500) cts.

**Transverse Construction Joint**

- Tie bars at 30 (1500) cts.

**Concrete Pad**

- Concrete pad
- 24'-0" (7.2 m)

**Concrete Pad Slope**

- Concrete pad slope
- Slope 1.5%

**Concrete Pad Slope (Typical 2-lane with Shoulders)**

- Concrete pad slope and match pavement slope.
**MATERIALS REQUIRED FOR (1) ONE LUG SYSTEM**

(Excluding Pavement Concrete and Pavement Reinforcement)

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>132</td>
<td>No. 8</td>
<td>14'-0'' (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>No. 3</td>
<td>24'-9'' (7.43 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>132</td>
<td>No. 3</td>
<td>20'-0'' (6.10 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>28</td>
<td>No. 3</td>
<td>11'-9'' (3.58 m)</td>
<td></td>
</tr>
</tbody>
</table>

Concrete, cu. yds., m³:
- 64.0 (135)
- Concrete Pad, cu. yds., m³: 8372 (900)

Reinforcing Bars, lb., kg:
- 8372 (900)

Improved Subgrade, cu. yds., m³: 162 (150)

---

**SECTION AT LUG W**

- 4 (100) Stabilized subbase
- 6 ½ (165) cts.
- Bend in 500' to 4 ft.
- a bars at 6 ½ (165) cts.
- Bend in field to fit.

**SECTION AT LUG X**

- 4 ½ (125) cts.
- Bend in field to fit.
- a bars at 7 ½ (190) cts.
- Bend in field to fit.

**SECTION AT LUG Y**

- 10 mil (0.25) Polyethylene bond breaker
- Improved subgrade
- bond breaker
- 6 ½ (165) cts.
- Bend top portion in field

---

**Bar h**

- 23½x6
- 1.2' (0.36 m)
**Materials Required for (1) One LUG System (Excluding Pavement Concrete and Pavement Reinforcement)**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length (ft)</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. 8 (No. 25)</td>
<td>14'-0'' (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>No. 5 (No. 16)</td>
<td>36'-9'' (11.30 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>No. 5 (No. 16)</td>
<td>20'-0'' (6.10 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>No. 4 (No. 13)</td>
<td>11'-9'' (3.52 m)</td>
<td></td>
</tr>
</tbody>
</table>

- **Concrete, cu. yds. (m³):** 12,550 (1745)
- **Reinforcing Bars, lbs. (kg):** 216 (98)
- **Concrete Pad, sq. yds. (m²):** 208 (174)

**Section at LUG W**
- 60 a bars of 6½ (160) cts., Bend top portion in field as shown.
- 36' (10.65 m)

**Section at LUG X**
- Bend top portion in field as shown.
- 66 a bars of 6½ (160) cts., Bend top portion in field as shown.
- 35'-6'' (10.85 m)

**Section at LUG Y**
- 56 a bars of 6½ (160) cts., Bend top portion in field as shown.
- 35'-6'' (10.85 m)

**CRC Pavement**

---

**Standard 421206-06**

**Improved Subgrade, sq. yds. (m²):**
- 4 (100)

**Concrete Pad, sq. yds. (m²):**
- 3

**Reinforcing Bars, lbs. (kg):**
- 2

**Concrete, cu. yds. (m³):**
- 216 (161)

---

**Materials Required for (1) One LUG System (Excluding Pavement Concrete and Pavement Reinforcement)**

<table>
<thead>
<tr>
<th>Bar No.</th>
<th>Size</th>
<th>Length (ft)</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>No. 8 (No. 25)</td>
<td>14'-0'' (4.25 m)</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>No. 5 (No. 16)</td>
<td>36'-9'' (11.30 m)</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>No. 5 (No. 16)</td>
<td>20'-0'' (6.10 m)</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>No. 4 (No. 13)</td>
<td>11'-9'' (3.52 m)</td>
<td></td>
</tr>
</tbody>
</table>

- **Concrete, cu. yds. (m³):** 12,550 (1745)
- **Reinforcing Bars, lbs. (kg):** 216 (98)
- **Concrete Pad, sq. yds. (m²):** 208 (174)
PERPENDICULAR CURB RAMPS FOR SIDEWALKS

SECTION A-A

1. The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

SECTION B-B

2. The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

DETAIL A

Variable

Flashing on top of roadway curb and top of sidewalk

SIDE CURB DETAIL

DETAIL A

Variable

Flashing on top of roadway curb and top of sidewalk

SIDE CURB DETAIL

PERPENDICULAR CURB RAMPS FOR SIDEWALKS

See Sheet 2 for GENERAL NOTES.
RAMP IN LANDSCAPED AREA

SETBACK > 5'

SECTION C-C

1. Turning space not required for ramp slopes flatter than 1:20.
2. The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

RAMP IN PAVED AREA

SETBACK > 5'

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

Where the turning space is constrained on one side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5' (1.52 m).

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramps.

All dimensions are in inches (millimeters) unless otherwise shown.

PERPENDICULAR CURB RAMPS FOR SIDEWALKS

STANDARD 424001-08

(Sheet 2 of 2)
RAMP IN LANDSCAPED AREA

RAMP IN PAVED AREA

GENERAL NOTES

This Standard shall only be used for curb radii of 20 ft. (6.1 m) or greater.
Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5 ft. (1.5 m).

Where 1:50 maximum slope is shown, 1:64 is preferred.

All ramp lengths shall exceed 15 ft. (4.5 m). Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5 ft. (1.5 m).

This Standard shall only be used for curb radii of 20 ft. (6.1 m) or greater.

Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5 ft. (1.5 m).

Where 1:50 maximum slope is shown, 1:64 is preferred.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V: H).

See Standard 606001 for details of depressed curb adjacent to curb ramps.

All dimensions are in inches (millimeters) unless otherwise shown.
**GENERAL NOTES**

- All dimensions are in inches (millimeters) unless otherwise shown.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5' (1.52 m).
- Where 1:64 maximum slope is shown, 1:64 is preferred.

**SECTION A-A**

1. Upper landings not required for ramp slopes flatter than 1:64.
2. The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

**SECTION B-B**

- Depressed curb where required.
- Warning markings.
- Turning space.

**SIDE CURB DETAIL**

- Flush with top of sidewalk and top of roadway curb.

**CORNER PARALLEL CURB RAMP**

- Upper landings.
- Turning space.
- Ramp.

**CORNER PARALLEL CURB RAMPS FOR SIDEWALKS**

- Standard 424011-02

---

*Note: Details of depressed curb adjacent to curb ramp.*
PARALLEL MID-BLOCK CURB RAMP

SECTION A-A

1. Upper landing(s) not required for ramp slopes flatter than 1:40.
2. The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

SECTION B-B

SECTION C-C

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

Where the turning space is constrained on a side opposite a ramp, the minimum length of the turning space in the direction of the ramp-run shall be 5' (1.52 m).

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramps.

All dimensions are in inches (millimeters) unless otherwise shown.

SIDE CURB DETAIL

DETAIL A

MID-BLOCK CURB RAMPS FOR SIDEWALKS

STANDARD 424016-02
DEPRESSED CORNER

SECTION A-A

(1) Upper landing(s) not required for ramp slopes flatter than 1:20.
(2) The running slope of the curb ramp shall not require the ramp length to exceed 15' (4.5 m).

SECTION B-B

DEPRESSED CORNER

GENERAL NOTES

This standard shall only be used for curb radii of 6 ft (1.83 m) or greater.
All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
Where 1:50 maximum slope is shown, 1:64 is preferred.
See Standard 606001 for details of depressed curb adjacent to curb ramps.
All dimensions are in inches (millimeters) unless otherwise shown.

DEPRESSED CORNER FOR SIDEWALKS

STANDARD 424021-03
GENERAL NOTES

1 Detectable warning shall only be installed at entrances/alleys with permanent traffic control devices (e.g., stop signs, signals).
2 Where possible, maintain the grade of the sidewalk across the entrance/alley to avoid the need for ramps and upper landings.

STANDARD 424026-01

All dimensions are in inches (millimeters) unless otherwise shown.

Where 1:50 maximum slope is shown, 1:64 is preferred.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

SECTION A-A
1 Upper landing not required for ramp slopes flatter than 1:20.

SECTION B-B
- 6
- Ramp
- Upper landing
- Pedestrian crossing
- Entrance or alley
- Expansion joint
- Flange
- Variable
- Variable
- Variable
- Ramp
- Upper landing

DETAIL A
SIDE CURB DETAIL

ENTRANCE / ALLEY PEDESTRIAN CROSSING

DATE
1-1-12
REVISIONS
1-1-13

STANDARD 424026-01

ENTRANCE / ALLEY PEDESTRIAN CROSSINGS
**General Notes**

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

Where 1:50 maximum slope is shown, 1:64 is preferred.

See Standard 606001 for details of depressed curb adjacent to curb ramp.

All dimensions are in inches (millimeters) unless otherwise shown.
GENERAL NOTES

When patching two adjacent lanes in one operation, the longitudinal joint shall be a longitudinal sawed joint as detailed on Standard 442001; however, the groove may be either preformed or sawed.

All dimensions are in inches (millimeters) unless otherwise shown.

Class A Patches

<table>
<thead>
<tr>
<th>AREA</th>
<th>REINFORCEMENT BARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (min.)</td>
<td>B (min.)</td>
</tr>
<tr>
<td>No. 5</td>
<td>7/16&quot; (11.4 mm)</td>
</tr>
<tr>
<td>No. 6</td>
<td>5/32&quot; (1.6 mm)</td>
</tr>
<tr>
<td>No. 7</td>
<td>7/32&quot; (2.2 mm)</td>
</tr>
<tr>
<td>No. 22</td>
<td>1/8&quot; (3.2 mm)</td>
</tr>
<tr>
<td>Fabric</td>
<td>1/8&quot; (3.2 mm)</td>
</tr>
</tbody>
</table>

Switched units to English metric.

Revised General Notes.

CLASS A PATCHES

STANDARD 442001-04

(Sheet 1 of 2)
Edge of lane

No. 6 (No. 19) rebar tied to longitudinal rebar.

Transverse rebar will be tied to longitudinal rebar.

Transverse rebar will extend to outer longitudinal rebar while providing a minimum 3 (75) clearance from existing pavement edge.

Existing pavement edge

Subbase

Support chair

Patch

Existing point

Subbase

** * Every 3rd intersection must be tied.

** When the minimum clearance cannot be obtained with the transverse bar on top then the transverse bar shall be tied to the bottom of the longitudinal rebar.

*** Variables where S1 and S2 are 2 (65) min. and 12 (300) max. D1 = 2(S1) and D2 = 2(S2).
CLASS B PATCHES

GENERAL NOTES

The transverse joints for Class B patches shall align with joints or cracks in the adjacent lane whenever possible.

See Standard 420701 for details of pavement fabric.

All dimensions are in inches (millimeters) unless otherwise shown.

CENTRERLINE JOINT

Dowel Bar Table

<table>
<thead>
<tr>
<th>Pavement Thickness</th>
<th>Dowel Bar Diameter</th>
<th>Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (200) or greater</td>
<td>1/2 (13)</td>
<td>1 1/2 (41)</td>
</tr>
<tr>
<td>7 (180) thru 7.99 (199)</td>
<td>1/4 (32)</td>
<td>1 1/2 (41)</td>
</tr>
<tr>
<td>Less than 7 (180)</td>
<td>1/2 (25)</td>
<td>1 1/2 (41)</td>
</tr>
</tbody>
</table>

TRANSVERSE JOINT

The transverse joints for Class B patches shall align with joints or cracks in the adjacent lane whenever possible.

See Standard 420701 for details of pavement fabric.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

The transverse joints for Class B patches shall align with joints or cracks in the adjacent lane whenever possible.

See Standard 420701 for details of pavement fabric.

All dimensions are in inches (millimeters) unless otherwise shown.

CENTERLINE JOINT

Dowel Bar Table

<table>
<thead>
<tr>
<th>Pavement Thickness</th>
<th>Dowel Bar Diameter</th>
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<tbody>
<tr>
<td>8 (200) or greater</td>
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</tr>
<tr>
<td>7 (180) thru 7.99 (199)</td>
<td>1/4 (32)</td>
<td>1 1/2 (41)</td>
</tr>
<tr>
<td>Less than 7 (180)</td>
<td>1/2 (25)</td>
<td>1 1/2 (41)</td>
</tr>
</tbody>
</table>

TRANSVERSE JOINT

The transverse joints for Class B patches shall align with joints or cracks in the adjacent lane whenever possible.

See Standard 420701 for details of pavement fabric.

All dimensions are in inches (millimeters) unless otherwise shown.
METHOD I

(WITHOUT RESURFACING)

- 18 (450) Long dowel bars anchored into existing pavement at 12 (300) cts.
- Expansion Cap

METHOD II

(WITH RESURFACING)

- 2 (50) Joint filler
- 18 (450) Long dowel bars anchored into existing pavement at 12 (300) cts.

NOTE

* When re-establishing a transverse expansion joint on a two-lane, two-way road, reverse the orientation of the dowel bars with respect to traffic for one of the patches such that the joint will be continuous across both lanes.

CLASS B PATCHES

STANDARD 442101-07
**CLASS C**

- Existing longitudinal joint
- Angles not less than 60°

**SECTION A-A**
(Built in two operations)

**SECTION C-C**

**SECTION D-D**

**SECTION E-E**

## GENERAL NOTES

- Existing tie bars shall be either cut or removed. Marginal bars shall be cut.
- All dimensions are in inches (millimeters) unless otherwise shown.

**CLASS C and D PATCHES**

**STANDARD 442201-03**
SHOULDER FOR TANGENT PAVEMENT

When the superelevation rate of the pavement is between 0% and 4%, the shoulder shall be sloped at 4%. When the superelevation rate of the pavement exceeds 4%, the shoulder shall be sloped so that the algebraic difference between pavement and shoulder will not be greater than 8%.

SHOULDER FOR SUPERELEVATED PAVEMENT (OUTSIDE OF CURVE)

Slope shall be the same as the superelevation rate but not less than 4%.

SHOULDER FOR SUPERELEVATED PAVEMENT (INSIDE OF CURVE)

GENERAL NOTES

Except as noted or shown, the dimensions and notes specified for the shoulder of tangent pavement are typical for the shoulders of superelevated pavement.

All dimensions are in inches (millimeters) unless otherwise shown.

HMA SHOULDER ADJACENT TO FLEXIBLE PAVEMENT

STANDARD 482001-02
SHOULDER FOR TANGENT PAVEMENT

When the plans specify the shoulder to be stabilized full width, the HMA shall be extended to this line.

SHOULDER FOR SUPERELEVATED PAVEMENT

OUTSIDE OF CURVE

Slope shall be the same as the superelevation rate but not less than 4%.

SHOULDER FOR SUPERELEVATED PAVEMENT

INSIDE OF CURVE

Slope shall be the same as the superelevation rate but not less than 4%.

GENERAL NOTES

Except as noted or shown, the dimensions and notes specified for the shoulder of tangent pavement are typical for the shoulders of superelevated pavement.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.
HMA SHOULDER STRIP AND
AGGREGATE WEDGE WITH WIDENING
(Cross-section A)

HMA SHOULDER STRIP AND
AGGREGATE WEDGE WITH RESURFACING
(Cross-section B)

COLD MILLING AND/OR RESURFACING OF
EXISTING PAVEMENT WITH SHOULDER STRIPS
(Cross-section C)

COLD MILLING AND/OR RESURFACING OF
EXISTING PAVEMENT WITH SHOULDER STRIPS
(Cross-section D)

All dimensions are in inches (millimeters) unless otherwise shown.
HMA SHOULDER AND AGGREGATE
WEDGE WITH WIDENING
(Cross-section E)

HMA SHOULDER AND AGGREGATE
WEDGE WITH RESURFACING
(Cross-section G)

HMA AND AGGREGATE
SHOULders WITH WIDENING
(Cross-section F)

HMA AND AGGREGATE SHOULders
WITH RESURFACING
(Cross-section H)
SHOULDER FOR TANGENT PAVEMENT

- Shoulder width
- Paved width
- Edge of pavement
- Shoulder slope
- Subbase granular material, Type C

SHOULDER FOR SUPERELEVATED PAVEMENT

- Shoulder width
- Paved width
- Edge of pavement
- Shoulder slope
- Subbase granular material, Type C

NOTES

Note 1: Does not apply when subsurface drains are installed.

Note 2: When the subbase is not removed, this thickness will vary with the thickness of pavement, extended length of subbase, and the slope of pavement. When the thickness is less than 6 (150), the paved shoulder shall be sloped down at this line to provide a 6 (150) minimum thickness.

Note 3: When the subbase is not removed, this thickness shall be placed at 12 (300) cts. beginning 6 (150) from the edge of pavement.
FOR MULTI-SPAN CULVERTS

Unless otherwise noted on the plans, name plates are not required for structures less than 20' (6.1 m) in length.

FOR PARAPET AND END POST MOUNTED

Name plate is placed on the back side of 1/2 (150) rail.

9 - 9 (225) min. to 36 (900) max. Space to miss roll post.

Braze to diagonal about 5'-0" (1.5 m) above bridge deck.

FOR STEEL RAILS

Name plate is placed on the back side of 1/2 (150) rail.

FOR TRUSSES

Name plate is placed on the back side of 1/2 (150) rail.

Braze to diagonal about 5'-0" (1.5 m) above bridge deck.

FOR PARAPET

Name plate is placed on the back side of 1/2 (150) rail.

Braze to diagonal about 5'-0" (1.5 m) above bridge deck.

FOR PIERs ON FAIRWAYS

Name plate is placed on the back side of 1/2 (150) rail.

Braze to diagonal about 5'-0" (1.5 m) above bridge deck.

GENERAL NOTES

On one-way traffic structures, place name plate on right side of approach end. On two-way traffic structures, place name plate on right side of approach end while looking in the direction of increasing stationing.

All dimensions are in inches (millimeters) unless otherwise shown.

NAME PLATE FOR BRIDGES

STANDARD 515001-03
SEE DESIGN PLANS
FOR LETTERING

NOTE
Border and lettering:
Raised 1/8" (1/16"") square cut and not tapered.

Center of 1/4" (1/2"") dia. holes for bolts when required

SECTIONS A-A
LONGITUDINAL SECTION
(Showing bottom slab and backwall reinforcement)

SECTION B-B
(Showing backwall reinforcement only)
Pipe omitted for clarity.

SECTION D-D

REINFORCEMENT SCHEDULE

<table>
<thead>
<tr>
<th>Pipe Dia.</th>
<th>Bar Size</th>
<th>Bar Spacing</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>20</td>
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<td>12</td>
</tr>
<tr>
<td>46</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

LAP DIMENSION

- The Contractor may use lap splices for the sidewall reinforcement at the locations shown.

CONCRETE END SECTIONS FOR PIPE CULVERTS
15" (375 mm) THRU 84" (2100 mm) DIA.

STANDARD 542001-05
### Quantities

<table>
<thead>
<tr>
<th>Pipe No.</th>
<th>Concrete yd (m)</th>
<th>Reinforcement Without Lap (lbs)</th>
<th>Reinforcement With Lap (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Slope of End Section</td>
<td>Slope of End Section</td>
</tr>
<tr>
<td>15</td>
<td>1.6</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>18</td>
<td>2.6</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>21</td>
<td>3.6</td>
<td>4.6</td>
<td>4.6</td>
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<tr>
<td>24</td>
<td>4.6</td>
<td>5.6</td>
<td>5.6</td>
</tr>
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For cast-in-place construction, increase concrete volumes by approximately 12%.
ELEVATION

This dimension shall be increased by 1/8 (38) for CIP field construction.

Restrain angle with tie plate (typ.).

Grade between multiple end sections.

PLAN

PIV CULVERT END SECTION DIMENSIONS

<table>
<thead>
<tr>
<th>Equivalent Size CIP</th>
<th>Pipe Span</th>
<th>Pipe Rise</th>
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See Sheet 3 for GENERAL NOTES.
LONGITUDINAL SECTION

SECTION B-B

SECTION C-C

SECTION D-D

REINFORCEMENT SCHEDULE

CONCRETE END SECTIONS FOR ELLIPTICAL PIPE CULVERTS 15" (375 mm) THRU 72" (1800 mm) EQUIVALENT DIAMETER

STANDARD 542011-01
For cast-in-place construction, increase concrete volumes by approximately 13%.  

### Rebar Quantities

<table>
<thead>
<tr>
<th>Pipe</th>
<th>Concrete yd (m³)</th>
<th>Reinforcement Without Lap lbs (kg)</th>
<th>Reinforcement With Lap lbs (kg)</th>
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<td>I.D.</td>
<td>Slope of End Section</td>
<td>Slope of End Section</td>
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### General Notes

The number of segments shown in elevation is for example only. The length and number of precast sections required to construct the end section shall be determined by the Contractor.

See roadway plans for slope (V:H) and pipe inside diameter.

End section may be incline up to 5 degrees skewed with roadway.

2% x 2½” x 7½” 156 x 56 x 18 plate washers shall be provided under each nut required for the anchor rods. Holes in the ends for the culvert tie assembly may be drilled using core bits in lieu of formed holes.

See Standard 542311 for end sections having traversable pipe grate.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V/H).

All dimensions are in inches (millimeters) unless otherwise shown.
If the embankment slope above the headwall is flatter than 1:2, provide wings for a 1:2 slope.

1. Place 1-1/2 (40) cl. from bottom of headwall.
2. No. 5 (No. 16) h bars, at 12 (300) cts.
3. No. 4 (No. 13) v bars at 12 (300) cts.

* Slope 1:1 or 1:2

Slope is flatter than 1:2, provide wings for a 1:2 slope.

1. Pipe 15" (375 mm) thru 36" (900 mm) Dia.
2. Bent in field, two req. for each headwall.

GENERAL NOTES
Build tops of headwalls parallel to grade line.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

REINFORCED CONCRETE END SECTIONS
FOR PIPE CULVERTS
15" (375 mm) THRU 36" (900 mm) DIA.
SKEWED WITH ROADWAY

DATE
REVISIONS
2-2009
2-2009
1-1-07
 Entire sheet.
 Added h bars.
 Soft converted metric

STANDARD 542201-02
(Sheet 1 of 5)
### WINGS FOR 1\(\frac{1}{2}\) SLOPE

#### Dimensions for Concrete

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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
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#### Concrete End Sections

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#### Bars for End Sections

| n = 38     | 50             |

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### Reinforced Concrete End Sections

For Pipe Culverts

15" (375 mm) THRU 36" (900 mm) DIA.

Skewed with Roadway

Sheet 2 of 5

---

**Reinforced Concrete End Sections**

**For Pipe Culverts**

15" (375 mm) THRU 36" (900 mm) DIA.

Skewed with Roadway

**Standard 542201-02**
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**REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS**

15" (375 mm) THRU 36" (900 mm) DIA.

SKEWED WITH ROADWAY

STANDARD 542201-02
### WINGS FOR 1:2 SLOPE

#### DIMENSIONS FOR CONCRETE

| Skew Angle | Nominated Pipe Dia. | A | B | C | D | E | F | G | H | J | K | M | N | a |
|------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5°         | DS 30-2             | 15| 15| 15| 15| 15| 15| 15| 15| 15| 15| 15| 15| 15| 15|
| 10°        | DS 45-2             | 18| 18| 18| 18| 18| 18| 18| 18| 18| 18| 18| 18| 18| 18|
| 15°        | DS 36-2             | 22| 22| 22| 22| 22| 22| 22| 22| 22| 22| 22| 22| 22| 22|
| 25°        | DS 18-2             | 26| 26| 26| 26| 26| 26| 26| 26| 26| 26| 26| 26| 26| 26|
| 35°        | DS 12-2             | 30| 30| 30| 30| 30| 30| 30| 30| 30| 30| 30| 30| 30| 30|
| 40°        | DS 10-2             | 32| 32| 32| 32| 32| 32| 32| 32| 32| 32| 32| 32| 32| 32|

#### Concrete

<table>
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<th>Rein. Bars - 2 End Sections</th>
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#### Bars for 2 End Sections

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#### REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS

15" (375 mm) THRU 36" (900 mm) DIA. SKEWED WITH ROADWAY

STANDARD 542201-02
## WINGS FOR 1:2 SLOPE

| Skew Angle | Design No. | Nominal PipeDia. | A | B | C | D | E | F | G | H | J | K | M | N | a |
|------------|------------|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|            | DS 0-2     | 18               | 18 | 18 | 18 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
|            | DS 0-2     | 21               | 21 | 21 | 21 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
|            | DS 0-2     | 25               | 25 | 25 | 25 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
|            | DS 0-2     | 30               | 30 | 30 | 30 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
|            | DS 0-2     | 35               | 35 | 35 | 35 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
|            | DS 0-2     | 40               | 40 | 40 | 40 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
|            | DS 0-2     | 45               | 45 | 45 | 45 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
|            | DS 0-2     | 50               | 50 | 50 | 50 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
|            | DS 0-2     | 55               | 55 | 55 | 55 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
|            | DS 0-2     | 60               | 60 | 60 | 60 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 |
|            | DS 0-2     | 65               | 65 | 65 | 65 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
|            | DS 0-2     | 70               | 70 | 70 | 70 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
|            | DS 0-2     | 75               | 75 | 75 | 75 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
|            | DS 0-2     | 80               | 80 | 80 | 80 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 |
|            | DS 0-2     | 85               | 85 | 85 | 85 | 100| 100| 100| 100| 100| 100| 100| 100| 100| 100| 100|

# REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS

15" (375 mm) THRU 36" (900 mm) DIA. SKEWED WITH ROADWAY

STANDARD 54220-02
Provide wings for 1:2 slope.
If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:2 slope.

**GENERAL NOTES**

Build tops of headwalls parallel to grade line.
When lapping sheets of welded wire reinforcement, the overlap measured between the outermost cross wires of each reinforcement sheet shall not be less than 6 (150 mm).
All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
All dimensions are in inches (millimeters) unless otherwise shown.

**SECTION A-A**

Use two layers of welded wire reinforcement in back face of wingwalls.

**END VIEW**

Build tops of headwalls parallel to grade line.
When lapping sheets of welded wire reinforcement, the overlap measured between the outermost cross wires of each reinforcement sheet shall not be less than 6 (150 mm).
All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
All dimensions are in inches (millimeters) unless otherwise shown.

**PLAN**

Provide wings for 1:2 slope.
If the embankment slope above the headwall is flatter than 1:2, provide wings for 1:2 slope.

**GENERAL NOTES**

Build tops of headwalls parallel to grade line.
When lapping sheets of welded wire reinforcement, the overlap measured between the outermost cross wires of each reinforcement sheet shall not be less than 6 (150 mm).
All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
All dimensions are in inches (millimeters) unless otherwise shown.
## WINGS FOR 1:1 1/2 SLOPE

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Dimensions for Concrete</th>
<th>Concrete F. End Secs., 0.60 Y.D.</th>
<th>Reinforced Wire Reinforcement</th>
<th>Reinforced Concrete End Sections, 0.60 Y.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>5°</td>
<td>42</td>
<td>4</td>
<td>4</td>
<td>45°</td>
</tr>
<tr>
<td>10°</td>
<td>48</td>
<td>4</td>
<td>4</td>
<td>45°</td>
</tr>
<tr>
<td>15°</td>
<td>48</td>
<td>4</td>
<td>4</td>
<td>45°</td>
</tr>
<tr>
<td>20°</td>
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<td>4</td>
<td>45°</td>
</tr>
<tr>
<td>30°</td>
<td>48</td>
<td>4</td>
<td>4</td>
<td>45°</td>
</tr>
</tbody>
</table>

### Notes:
- **Concrete**: Engaged + Exposed Lengths
- **Reinforcement**: Engaged + Exposed Lengths

---

**REINFORCED CONCRETE END SECTIONS FOR PIPE CULVERTS**

42" (1050 mm) THRU 60" (1500 mm) DIA. SKEWED WITH ROADWAY

**STANDARD 542206-04**
<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete @ End Secs.</th>
<th>Reinforced Concrete End Sections</th>
</tr>
</thead>
<tbody>
<tr>
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<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>30°</td>
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<td>6&quot;</td>
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<td>10&quot;</td>
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<td>8&quot;</td>
<td>10&quot;</td>
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<td>8&quot;</td>
<td>10&quot;</td>
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</table>

**WINGS FOR 1:1 1/2 SLOPE**

**REINFORCED CONCRETE END SECTIONS**

**FOR PIPE CULVERTS**

42" (1050 mm) THRU 60" (1500 mm) DIA.

SKEWED WITH ROADWAY

STANDARD 542206-04

(Sheet 3 of 5)
## Dimensions for Concrete

### 5°

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete @ End Secs. (cu. ft.)</th>
<th>Rebel Wire Reinforcement @ End Secs. (sq. yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°</td>
<td>42°</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>48°</td>
<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1500</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1200</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
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### 10°

<table>
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<th>Dimensions for Concrete</th>
<th>Concrete @ End Secs. (cu. ft.)</th>
<th>Rebel Wire Reinforcement @ End Secs. (sq. yd.)</th>
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</thead>
<tbody>
<tr>
<td>10°</td>
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<td>1.52</td>
</tr>
<tr>
<td>48°</td>
<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1500</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1200</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
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### 15°

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<th>Concrete @ End Secs. (cu. ft.)</th>
<th>Rebel Wire Reinforcement @ End Secs. (sq. yd.)</th>
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</thead>
<tbody>
<tr>
<td>15°</td>
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<td>38-1/4&quot;</td>
<td>1.52</td>
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<tr>
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<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1500</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1200</td>
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<td>1.52</td>
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<tr>
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<td>1050</td>
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<td>38-1/4&quot;</td>
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### 20°

<table>
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<th>Concrete @ End Secs. (cu. ft.)</th>
<th>Rebel Wire Reinforcement @ End Secs. (sq. yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°</td>
<td>42°</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>48°</td>
<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>1500</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
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<td>1200</td>
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<td>38-1/4&quot;</td>
<td>1.52</td>
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<tr>
<td>60°</td>
<td>1050</td>
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<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
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</table>

### 25°

<table>
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<tr>
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<th>Concrete @ End Secs. (cu. ft.)</th>
<th>Rebel Wire Reinforcement @ End Secs. (sq. yd.)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>38-1/4&quot;</td>
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<tr>
<td>60°</td>
<td>1500</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
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<td>38-1/4&quot;</td>
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<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
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<td>60°</td>
<td>890</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
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</table>

### 30°

<table>
<thead>
<tr>
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<th>Dimensions for Concrete</th>
<th>Concrete @ End Secs. (cu. ft.)</th>
<th>Rebel Wire Reinforcement @ End Secs. (sq. yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30°</td>
<td>42°</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>48°</td>
<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
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<tr>
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<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
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<tr>
<td>60°</td>
<td>1200</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
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<td>1050</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
<tr>
<td>60°</td>
<td>890</td>
<td>6-0&quot;</td>
<td>38-1/4&quot;</td>
<td>1.52</td>
</tr>
</tbody>
</table>
### Wing Dimensions for Concrete

<table>
<thead>
<tr>
<th>Skew Angle</th>
<th>Nominal Pipe Dia.</th>
<th>Dimensions for Concrete</th>
<th>Concrete F End Secs.</th>
<th>Reinforced Wire F End Secs.</th>
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<tbody>
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<td>45°</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
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</tbody>
</table>
A flared section example is shown, with dimensions and annotations including:

**Section A-A**
- Slope ratios expressed vertically.
- Pipe diameters listed with corresponding wall thicknesses.
- Reinforcement lap lengths specified.

**Plan**
- Cross-sectional dimensions provided.
- Slope ratios noted.

**General Notes**
- Dimensions are in inches (millimeters) unless otherwise stated.

**Reinforcement Lap**
- Optional welded wire reinforcement details.

**End View**
- Illustration of end section with annotations.
LONGITUDINAL SECTION

VIEW A-A

VIEW A-A

SECTION B-B

SECTION D-D

DETAIL B

DETAIL B

PLAN VIEW

PLAN VIEW

GENERAL NOTES

This standard shall only be used on concrete end sections not skewed more than ± 15 degrees with roadway.

The minimum distance from the center of a hole to the free edge of a structural shape or plate shall be 1/8 (3mm) unless noted otherwise.

As dimensions are in inches millimeters unless otherwise shown.

HOLE DEPARTMENT OF TRANSPORTATION

TRAVERSABLE PIPE GRATE

STANDARD 542311-06

(Sheet 1 of 2)
### PIPE-GRATE SCHEDULE FOR PIPE CULVERT END SECTIONS

<table>
<thead>
<tr>
<th>Pipe</th>
<th>No. / Length</th>
<th>Int. Support</th>
<th>Total Length of Pipe</th>
<th>Int. Support</th>
<th>Total Length of Pipe</th>
<th>Int. Support</th>
<th>Total Length of Pipe</th>
</tr>
</thead>
<tbody>
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<td>27</td>
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<td>N/A</td>
<td>2 @ (2.62 m)</td>
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### PIPE-GRATE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

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<th>No. / Length</th>
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<th>Int. Support</th>
<th>Total Length of Pipe</th>
<th>Int. Support</th>
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<td>N/A</td>
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<td>2 @ (1.65 m)</td>
<td>N/A</td>
<td>2 @ (1.65 m)</td>
</tr>
<tr>
<td>50</td>
<td>N/A</td>
<td>N/A</td>
<td>2 @ (1.40 m)</td>
<td>N/A</td>
<td>2 @ (1.40 m)</td>
<td>N/A</td>
<td>2 @ (1.40 m)</td>
</tr>
<tr>
<td>60</td>
<td>N/A</td>
<td>N/A</td>
<td>2 @ (1.09 m)</td>
<td>N/A</td>
<td>2 @ (1.09 m)</td>
<td>N/A</td>
<td>2 @ (1.09 m)</td>
</tr>
<tr>
<td>70</td>
<td>N/A</td>
<td>N/A</td>
<td>2 @ (1.40 m)</td>
<td>N/A</td>
<td>2 @ (1.40 m)</td>
<td>N/A</td>
<td>2 @ (1.40 m)</td>
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<tr>
<td>80</td>
<td>N/A</td>
<td>N/A</td>
<td>2 @ (1.37 m)</td>
<td>N/A</td>
<td>2 @ (1.37 m)</td>
<td>N/A</td>
<td>2 @ (1.37 m)</td>
</tr>
<tr>
<td>90</td>
<td>N/A</td>
<td>N/A</td>
<td>2 @ (1.09 m)</td>
<td>N/A</td>
<td>2 @ (1.09 m)</td>
<td>N/A</td>
<td>2 @ (1.09 m)</td>
</tr>
</tbody>
</table>

### TRAVERSABLE PIPE GRATE

(Sheet 2 of 2)
**Notes**

1. Types 1 and 2 are for pipe with annular ends only.

2. Type 3 connection may be used for all pipe sizes and includes 12 (300) of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stub shall be either 2½ x 7/16 (38x11.1) or annular band of 3½ x 1/8 (89x31.7). The angles shall be attached by 2½ x 7/16 (38x11.1) rivets or bolts.

3. For 60 (1500) thru 84 (2250) sizes, reinforced metal band will be allowed.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**Metal End Section for Pipe Culverts**

**Standard 542401-02**

---

**Alternate Strap Connector (For Type 1 only)**

**Connections of End Sections**
### Notes

**For Type 1 and 2 connections**, only a dimple type coupling band shall be used. For pipes with annular ends, the dimple type coupling band shall be used.

**For Type 3 connection**, a dimple type coupling band shall be used. For pipes with annular ends, the dimple type coupling band shall be used.

**For Type 4 connection**, an annular type coupling band shall be used. For pipes having helical ends, only the dimple type coupling band shall be allowed.

### Sections

#### Type 1

- **For 1:13 (363x330) thru 26x20 (711x508)** only
- **See Note 2**

#### Type 2

- **For 1:13 (363x330) thru 26x20 (711x508)** only
- **See Note 2**

#### Type 3

- **See Note 2**

#### Type 4

- **See Note 2**

### Alternate Strap Connector

For **Type 1 only**

- **Threaded rod**
- **Connector section** (See Note 2)

### Metal End Sections

**For Pipe Arches**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-16</td>
<td>Revised 03/11/02 notes</td>
</tr>
</tbody>
</table>

**Standard 542406-02**
### Material required for one inlet box

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>10</td>
<td>No. 4</td>
<td>1-3’</td>
</tr>
<tr>
<td>w</td>
<td>10</td>
<td>No. 4</td>
<td>1-3’</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 4</td>
<td>1-3’</td>
</tr>
<tr>
<td>v1</td>
<td>4</td>
<td>No. 4</td>
<td>2’</td>
</tr>
<tr>
<td>v2</td>
<td>2</td>
<td>No. 4</td>
<td>2-8”</td>
</tr>
<tr>
<td>Steel Pipe</td>
<td>3” (89)</td>
<td>8-0”</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>1.05 m</td>
<td>3′-6 “</td>
<td></td>
</tr>
</tbody>
</table>

### Bars u & v1

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u</td>
<td>10</td>
<td>No. 4</td>
<td>2-3’</td>
</tr>
<tr>
<td>u1</td>
<td>6</td>
<td>No. 4</td>
<td>2-3’</td>
</tr>
<tr>
<td>u2</td>
<td>4</td>
<td>No. 4</td>
<td>2-3’</td>
</tr>
<tr>
<td>u3</td>
<td>2</td>
<td>No. 4</td>
<td>2-8”</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>3” (89)</td>
<td>8-0”</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>1.05 m</td>
<td>3′-6 “</td>
<td></td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>15 lbs (52.2 kg)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### GENERAL NOTES

- All slopes are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

---

**PLAN OF REINFORCEMENT**

Sketch showing location and direction of box in relation to median.
**Inlet Box**

**Type 24 (600) B**

**Standard 542506-03**

**Material Required for One Inlet Box**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>4</td>
<td>No. 4</td>
<td>(12'/6')</td>
</tr>
<tr>
<td>v</td>
<td>7</td>
<td>No. 4</td>
<td>(5'/3')</td>
</tr>
<tr>
<td>v</td>
<td>5</td>
<td>No. 4</td>
<td>(5'/3')</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>No. 4</td>
<td>(5'/8')</td>
</tr>
<tr>
<td>v</td>
<td>4</td>
<td>No. 4</td>
<td>(5'/8')</td>
</tr>
<tr>
<td>v</td>
<td>4</td>
<td>No. 4</td>
<td>(6'/8')</td>
</tr>
<tr>
<td>v</td>
<td>6</td>
<td>No. 4</td>
<td>(6'/8')</td>
</tr>
<tr>
<td>Concrete</td>
<td>cu. yds</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Reinf. Bars</td>
<td>lbs</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>kg</td>
<td>375</td>
<td></td>
</tr>
</tbody>
</table>

**General Notes**

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (Type 1).
- All dimensions are in inches (millimeters) unless otherwise shown.

**Plan**

- Traffic
- Median

**Plan of Reinforcement**

- Bars: u, u1 & u2

**Section A-A**

- Sketch showing location and direction of box in relation to median.

**Inlet Box**

- Increased length of inlet box to provide clearance for top u-bolt.

**Engineer of Design and Environment**

**Engineer of Policy and Procedures**

**Issue Date: 1-1-97**

**Revision: (300)**

**Illinois Department of Transportation**
TOP ANCHOR PLATE

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 24 (600) B

STANDARD 542506-03
SECTION A-A

PLAN

PLAN OF REINFORCEMENT

GENERAL NOTES

ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT V/H.

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS) UNLESS OTHERWISE SHOWN.

INLET BOX

TYPE 24 (600) C

STANDARD 542511-02

DATE
1-1-97

REVISIONS

1-1-09

1-1-07

ENGLISH (METRIC)

HEIGHT

INCHES (MILLIMETERS)

1000 (25)

800 (20)

600 (15)

500 (13)

400 (11)

300 (10)

250 (9)

12'-7" (3.83 m)

12'-2" (3.72 m)

11'-7" (3.53 m)

10'-7" (3.22 m)

9'-9" (2.97 m)

9'-10" (2.95 m)

9'-11" (2.97 m)

9'-12" (2.99 m)

9'-0" (2.74 m)

8'-11" (2.71 m)

8'-10" (2.60 m)

8'-9" (2.67 m)

8'-0" (2.44 m)

7'-11" (2.41 m)

7'-10" (2.37 m)

7'-0" (2.13 m)

6'-11" (2.12 m)

6'-10" (2.00 m)

6'-0" (1.83 m)

5'-11" (1.80 m)

5'-10" (1.75 m)

5'-9" (1.73 m)

5'-0" (1.52 m)

4'-11" (1.50 m)

4'-10" (1.47 m)

4'-9" (1.45 m)

4'-0" (1.22 m)

3'-11" (1.20 m)

3'-10" (1.18 m)

3'-9" (1.16 m)

3'-0" (1.11 m)

2'-11" (1.10 m)

2'-10" (1.08 m)

2'-9" (1.06 m)

2'-8" (1.04 m)

2'-7" (1.02 m)

2'-6" (1.00 m)

2'-5" (0.98 m)

2'-4" (0.96 m)

2'-3" (0.94 m)

2'-2" (0.92 m)

2'-1" (0.90 m)

2'-0" (0.88 m)

1'-11" (0.86 m)

1'-10" (0.84 m)

1'-9" (0.82 m)

1'-8" (0.80 m)

1'-7" (0.78 m)

1'-6" (0.76 m)

1'-5" (0.74 m)

1'-4" (0.72 m)

1'-3" (0.70 m)

1'-2" (0.68 m)

1'-1" (0.66 m)

1'-0" (0.64 m)

0'-11" (0.62 m)

0'-10" (0.60 m)

0'-9" (0.58 m)

0'-8" (0.56 m)

0'-7" (0.54 m)

0'-6" (0.52 m)

0'-5" (0.50 m)

0'-4" (0.48 m)

0'-3" (0.46 m)

0'-2" (0.44 m)

0'-1" (0.42 m)

0'-0" (0.40 m)

3'-4" (1.00 m)

3'-5" (1.05 m)

3'-6" (1.10 m)

3'-7" (1.15 m)

3'-8" (1.20 m)

3'-9" (1.25 m)

3'-10" (1.30 m)

3'-11" (1.35 m)

3'-0" (1.40 m)

2'-11" (1.15 m)

2'-10" (1.10 m)

2'-9" (1.05 m)

2'-8" (1.00 m)

2'-7" (0.95 m)

2'-6" (0.90 m)

2'-5" (0.85 m)

2'-4" (0.80 m)

2'-3" (0.75 m)

2'-2" (0.70 m)

2'-1" (0.65 m)

2'-0" (0.60 m)

1'-11" (0.85 m)

1'-10" (0.80 m)

1'-9" (0.75 m)

1'-8" (0.70 m)

1'-7" (0.65 m)

1'-6" (0.60 m)

1'-5" (0.55 m)

1'-4" (0.50 m)

1'-3" (0.45 m)

1'-2" (0.40 m)

1'-1" (0.35 m)

1'-0" (0.30 m)

0'-11" (0.35 m)

0'-10" (0.30 m)

0'-9" (0.25 m)

0'-8" (0.20 m)

0'-7" (0.15 m)

0'-6" (0.10 m)

0'-5" (0.05 m)

0'-4" (0.00 m)
TOP ANCHOR PLATE

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 24 (600) C

STANDARD 542511-02
TOP ANCHOR PLATE

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

INLET BOX
TYPE 24 (600) D

STANDARD 542516-03
<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty</th>
<th>Size</th>
<th>Length</th>
</tr>
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<tbody>
<tr>
<td>h</td>
<td>8</td>
<td>No. 6</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>h_1</td>
<td>2</td>
<td>No. 4</td>
<td>9'-0&quot;</td>
</tr>
<tr>
<td>L</td>
<td>6</td>
<td>No. 6</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>h_2</td>
<td>2</td>
<td>No. 4</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>V</td>
<td>6</td>
<td>No. 4</td>
<td>10'-0&quot;</td>
</tr>
<tr>
<td>V_1</td>
<td>6</td>
<td>No. 4</td>
<td>11'0&quot;</td>
</tr>
<tr>
<td>V_2</td>
<td>6</td>
<td>No. 4</td>
<td>12'-0&quot;</td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td>3'-5&quot;</td>
</tr>
</tbody>
</table>

**Concrete**

Reinforcement Bars

Galv. Steel Pipe

**GENERAL NOTES**

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

**INLET BOX**

**TYPE 24 (600) E**

**STANDARD 542521-02**
TOP ANCHOR PLATE

SECTION D-D

SECTION C-C

DETAIL AT BLOCKOUTS

Traffic

Sketch showing location and direction of box in relation to median.
TYPICAL STEEL GRATING

Material Required for One Inlet Box

<table>
<thead>
<tr>
<th>Bar</th>
<th>No. 13</th>
<th>No. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>u</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>u1</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>v</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>v1</td>
<td>6</td>
<td>37</td>
</tr>
<tr>
<td>v2</td>
<td>6</td>
<td>43</td>
</tr>
<tr>
<td>v3</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>Concrete</td>
<td>0.14 cu. m</td>
<td>0.14 cu. m</td>
</tr>
<tr>
<td>Rein. Bars</td>
<td>1.13</td>
<td>1.13</td>
</tr>
<tr>
<td>Grooving</td>
<td>0.04</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Concrete

See DETAIL B

SECTION B-B

TYPICAL CORNER OF STEEL GRATING FRAME

SECTION C-C

TYPICAL CAST GRATING

SECTION D-D

INLET BOX

TYPE 24 (600)

STANDARD 542526-03

(Sheet 2 of 2)
SECTION A-A

NOTE:
Culvert pipe may exit from the side(s) by changing
reinforcement bars in that area and in the headwall end of box.

Sketch showing location and direction of main
bearing bars in relation to % median
(showing exit from end)
**GENERAL NOTES**

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

**TECHNICAL DATA**

***Concrete***

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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<td>2.25 m</td>
</tr>
</tbody>
</table>

***Steel***

<table>
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<tr>
<th>Type</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galv. Steel Pipe</td>
<td>No. 4 (13)</td>
<td>5.18 m</td>
</tr>
</tbody>
</table>

**Bar Quantities**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>u</td>
<td>2</td>
<td>No. 13</td>
<td>5.15 m</td>
</tr>
</tbody>
</table>

**INLET BOX**

**TYPE 36 (900) A**

**STANDARD 542536-03**

**DATE**

**REVISIONS**

1-1-10

1-1-09

Corrected 3'-11" vertical dimension line in

English (metric).

Switched units to

General notes: Inlet box in relation to % of ditch.
INLET BOX
TYPE 36 (900) A

SECTION B-B

SECTION C-C

DETAIL AT BLOCKOUTS

TOP ANCHOR PLATE

END VIEW

INLET BOX

TYPE 36 (900) A

STANDARD 542536-03

(Sheet 2 of 2)
Plan showing the location and direction of the boxes in relation to the ditch.

General Notes:
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise stated.

Inlet Box
Type 48 (1200) A

Plan of Reinforcement

<table>
<thead>
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<th>Qty.</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h1</td>
<td>1</td>
<td>No. 4</td>
<td>14'-6&quot; (4.40 m)</td>
</tr>
<tr>
<td>h2</td>
<td>8</td>
<td>No. 4</td>
<td>13'-6&quot; (4.10 m)</td>
</tr>
<tr>
<td>h3</td>
<td>2</td>
<td>No. 4</td>
<td>5'-6&quot; (1.70 m)</td>
</tr>
<tr>
<td>L</td>
<td>6</td>
<td>No. 4</td>
<td>22</td>
</tr>
<tr>
<td>u1</td>
<td>7</td>
<td>No. 4</td>
<td>5'-6&quot; (1.70 m)</td>
</tr>
<tr>
<td>v1</td>
<td>8</td>
<td>No. 4</td>
<td>15-0 (3.80 m)</td>
</tr>
<tr>
<td>v2</td>
<td>15</td>
<td>No. 4</td>
<td>4'-8&quot; (1.40 m)</td>
</tr>
<tr>
<td>v3</td>
<td>10</td>
<td>No. 13</td>
<td>9'-9&quot; (2.97 m)</td>
</tr>
</tbody>
</table>

Concrete

<table>
<thead>
<tr>
<th>Material</th>
<th>Required for one inlet box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>34 cu. yds. (27 cu. m)</td>
</tr>
<tr>
<td>Rein. Bars</td>
<td>8 of 14x3/4 (147 lbs.)</td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>2 at 14'-3''' (4.35 m)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>34 cu. yds. (27 cu. m)</td>
<td></td>
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<tr>
<td>Rein. Bars</td>
<td>8 of 14x3/4 (147 lbs.)</td>
<td></td>
</tr>
<tr>
<td>Galv. Steel Pipe</td>
<td>2 at 14'-3''' (4.35 m)</td>
<td></td>
</tr>
</tbody>
</table>
Remove concrete along these lines. Clean reinforcement for either tied or welded laps of longitudinal and circumferential reinforcement.

For wire dia. W6 - W4 (10.72 - 4.88), length of weld shall be 10 (250) min.
For wire dia. W5.5 - W2.9 (6.73 - 4.88), length of weld shall be 15 (380) min.
For wire dia. W14 - W6 (10.72 - 7.01), length of weld shall be 20 (500) min.

Other wire dia. shall be tied per detail.

Grout with mortar. Mortar shall be flush with pipe. See DETAIL A for laps.

Degree of elbow = 2° (300)

Corrected pipe diameter (600 mm, 750 mm OR 900 mm)

All dimensions are in inches (millimeters) unless otherwise shown.
Inner cage-circumference reinforcement:
- For 36 (900) pipe riser, weld outer reinforcement cage of barrel to outer reinforcement cage of riser.

Other wire gauges shall be tied per detail.

For wire W5.5 thru W2.5 (6.655 thru 4.496), length of weld shall be 13 (330) min.
For wire W12 thru W2 (10.008 thru 7.188), length of weld shall be 20 (500) min.

Reinforcement is same as for 36 (900) riser.

Inner cage-circumference reinforcement:
- 0.01 sq. in./ft. (212 mm /m) (min.) longitudinal

End connection:
- Grout with mortar

36 (900), 42 (1050), 24 (600), 30 (750), 6' (1.8 m)

For 36 (900) pipe riser:
- Weld outer reinforcement cage of barrel to outer reinforcement cage of riser.
- For 24 (600) pipe riser, tie outer reinforcement cage of barrel to inner reinforcement cage of riser.

All dimensions are in inches (millimeters) unless otherwise shown.
Concrete headwall for pipe underdrains

**GENERAL NOTES**

An alternate paved invert meeting the approval of the Engineer may be substituted for that shown in side view.

All dimensions are in inches (millimeters) unless otherwise shown.

**SIDE VIEW**

- Optional handling hole
- 24 (600) long No. 4 (No. 13) reinf. bar

**RODENT SHIELD PLACEMENT**

- Rodent shield inserted 4'-6" (1300-1500) into pipe.
- Paved invert

**SECTION A-A**

- Rodent shield
- Back of headwall
- End of pipe

**DETAIL OF RODENT SHIELD**

- No. 4 (No. 13) reinf. bar

**FRONT VIEW**

**SIDE VIEW**

- Optional handling hole
- 24 (600) long No. 4 (No. 13) reinf. bar

**GENERAL NOTES**

An alternate paved invert meeting the approval of the Engineer may be substituted for that shown in side view.

All dimensions are in inches (millimeters) unless otherwise shown.

**SIDE VIEW**

- Optional handling hole
- 24 (600) long No. 4 (No. 13) reinf. bar

**RODENT SHIELD PLACEMENT**

- Rodent shield inserted 4'-6" (1300-1500) into pipe.
- Paved invert

**SECTION A-A**

- Rodent shield
- Back of headwall
- End of pipe

**DETAIL OF RODENT SHIELD**

- No. 4 (No. 13) reinf. bar
**MATERIALS FOR WALLS**

**ALTERNATE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MATERIAL</th>
<th>MIN. THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Concrete Masonry Unit</td>
<td>4'-0&quot; (1.2 m)</td>
</tr>
<tr>
<td></td>
<td>Brick Masonry</td>
<td>4'-0&quot; (1.2 m)</td>
</tr>
<tr>
<td></td>
<td>Precast Reinforced Concrete Section</td>
<td>4'-0&quot; (1.2 m)</td>
</tr>
<tr>
<td></td>
<td>Cast-in-place Concrete</td>
<td>4'-0&quot; (1.2 m)</td>
</tr>
</tbody>
</table>

**SMALL CATCH BASIN**

**ALTERNATE BOTTOM SLAB**

- For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).

**GENERAL NOTES**

- Bottom slabs shall be reinforced with a minimum of 0.20 sq. in./ft (420 sq. mm/m) in both directions with a maximum spacing of 12 (300).
- Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602001 for details of steps.

**Revised general notes.**

**DATE**

1-1-11

**REVISIONS**

- Added Outside to half trap note. Revised general notes.
- Changed pipe to 2 (50) R

**CATCH BASIN**

**TYPE A**

**STANDARD 602001-02**
Materials Required for One (1)

<table>
<thead>
<tr>
<th>Bar</th>
<th>Qty.</th>
<th>Size</th>
<th>Shape</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>1</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>3'-0&quot; (1.02 m)</td>
</tr>
<tr>
<td>h1</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>5'-9&quot; (1.72 m)</td>
</tr>
<tr>
<td>u</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>4'-0&quot; (1.20 m)</td>
</tr>
<tr>
<td>u1</td>
<td>14</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>6'-9&quot; (2.02 m)</td>
</tr>
<tr>
<td>x</td>
<td>16</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>6'-9&quot; (2.02 m)</td>
</tr>
<tr>
<td>x1</td>
<td>3</td>
<td>No. 4 (No. 13)</td>
<td></td>
<td>1'-11&quot; (0.58 m)</td>
</tr>
</tbody>
</table>

Concrete

Reinforcement bars

All bars shall be @ 12 (300) centers unless otherwise shown. Reinforcement bar clearance shall be 1/2 (140).

General Notes

See Standard 602006-04 for details of steps.

All dimensions are in inches (millimeters) unless otherwise shown.

Elevation

SECTION A-A

(Crating removed to show plan of baffles.)

Type B Catch Basin

Concrete

Reinforcement bars

2x8 (50x200)

15 (380) ctrs.

Flow

Note on the plans.

Unless otherwise shown.

Reinforcement bar clearance

Grating removed to show plan of baffles.
ALTERNATE MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>T</th>
<th>Material</th>
<th>Thickness (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Precast Reinforced Concrete Section</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Concrete Masonry Unit</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Cast-in-Place Concrete</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>Brick Masonry</td>
<td>24</td>
</tr>
</tbody>
</table>

ELEVATION

ALTERNATE BOTTOM SLAB

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.27 sq. in./ft. (570 sq. mm/m) in both directions with a maximum spacing of 9 in. (229 mm). Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

All dimensions are in inches unless otherwise shown.
MATERIALS FOR WALLS

<table>
<thead>
<tr>
<th>ALTERNATE MATERIALS FOR WALLS</th>
<th>D</th>
<th>C+</th>
<th>T (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>16 (400)</td>
<td>16 (400)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>16 (400)</td>
<td>16 (400)</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>16 (400)</td>
<td>16 (400)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>16 (400)</td>
<td>16 (400)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

* For precast reinforced concrete sections, dimension "C+" may vary from the dimension given by plus 6 (150) or minus 2 (50).
Type 20 frame & grate

Flow

10'-0" (3.05 m) max.
4'-0" (1.22 m) min.

Concrete barrier

Flow

Type 22 frames & grates

Flow

For locations & elevations see plans.

Type 21 frame & grate

Flow

Use mortar or sealer (typ).

For locations and elevations see plans.

GENERAL NOTES

These structures are for use with concrete barrier, double face, 32 (815) height (Standard 637001).

The reinforcement shown in the front elevation of the Type 2 is typical for both elevations of all types.

See Standard 602101 for details of steps.

Exposed edges shall be beveled 1/8 (19).

All dimensions are in inches (millimeters) unless otherwise shown.

DATE
REVISIONS
11-09
petitioned units to English (metric).
4-04
revised to fit F shape

DRAINAGE STRUCTURES
TYPES 1, 2 & 3

STANDARD 602101-02

(Sheet 1 of 2)
REINFORCED LID - TYPE 1 & 2

No. 4 (No. 13) Bar h

No. 3 (No. 10) Bar s

No. 6 (No. 19) Bar t

No. 5 (No. 16) Bar t

REINFORCED LID - TYPE 3

DRAINAGE STRUCTURES
TYPES 1, 2 & 3

STANDARD 602101-02
**GENERAL NOTES**

These structures are for use with concrete barrier, double face, 42 (1065) height (Standard 637006).

The reinforcement shown in the front elevation of the Type 5 is typical for both elevations of all types.

See Standard 602701 for details of steps.

Exposed edges shall be beveled 1/8 (19).

All dimensions are in inches (millimeters) unless otherwise shown.

**DRAINAGE STRUCTURES TYPES 4, 5 & 6**

(Sheet 1 of 2)
STANDARD 602106-01

TYPES 4, 5 & 6

DRAINAGE STRUCTURES

REINFORCED LID - TYPE 4 & 5

REINFORCED LID - TYPE 6

No. 4 (No. 13) Bar h
No. 3 (No. 10) Bar g
No. 6 (No. 19) Bar t
No. 5 (No. 18) Bar t1

No. 5 (No. 18) Bar t1
**PLAN**

Top of masonry

**ELEVATION**

Pipe to be laid on a minimum grade of 1%

- Concrete fill, 4%
- 24 (600) Diameter
- Concrete slab, 4

**ALTERNATE MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>Material</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brick Masonry</td>
<td>8</td>
</tr>
<tr>
<td>Cast-In-Place Concrete</td>
<td>6</td>
</tr>
<tr>
<td>Concrete Masonry Unit</td>
<td>5</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>2.75</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

Bottom slabs shall be reinforced with a minimum of 0.24 sq. in./ft. (510 sq. mm/m) in both directions with a maximum spacing of 10 (250).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

All dimensions are in inches (millimeters) unless otherwise shown.

**INLET - TYPE A**

STANDARD 602301-04
**MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>Alternate</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>8 (200)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

Bottom slabs shall be reinforced with a minimum of 0.20 sq. in./ft. (420 sq. mm/m) in both directions with a maximum spacing of 12 (300).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602601 for optional Precast Reinforced Concrete Flat Slab Top.

All dimensions are in inches (millimeters) unless otherwise shown.

**INLET – TYPE B**

**STANDARD 602306-03**
ELEVATION - ECCENTRIC

ELEVATION - CONCENTRIC

ALTERNATE BOTTOM SLAB

ALTERNATE MATERIALS FOR WELLS

<table>
<thead>
<tr>
<th>ALTERNATE MATERIALS FOR WELLS</th>
<th>D</th>
<th>C</th>
<th>T</th>
<th>MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Unit</td>
<td>4-0&quot; (102 mm)</td>
<td>5 (125 mm)</td>
<td>6 (150 mm)</td>
<td></td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>4-0&quot; (102 mm)</td>
<td>5 (125 mm)</td>
<td>6 (150 mm)</td>
<td></td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>4-0&quot; (102 mm)</td>
<td>5 (125 mm)</td>
<td>6 (150 mm)</td>
<td></td>
</tr>
<tr>
<td>Cast-in-place Concrete</td>
<td>4-0&quot; (102 mm)</td>
<td>5 (125 mm)</td>
<td>6 (150 mm)</td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES

Bottom slabs shall be reinforced with a minimum of 0.31 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 12 (300) in.

For precast reinforced concrete sections, the dimension "C" may vary from the dimension given to plus 6 (150).

Concrete Masonry Unit

All dimensions are in inches (millimeters) unless otherwise shown.

MANHOLE TYPE A

STANDARD 602401-03
**ELEVATION**
(with flat slab top only)

- **Bar C**

- Use mortar or sealer (typ.)

**ELEVATION**
(with flat slab top and riser)

- **Bar C**

**ALTERNATE BOTTOM SLABS**

**ALTERNATE JOINT CONFIGURATIONS**

**MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th>Alternative Materials for Walls</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Units</td>
<td>5</td>
</tr>
<tr>
<td>Precast Reinforced Concrete</td>
<td>4</td>
</tr>
<tr>
<td>Cast-In-Place Concrete</td>
<td>6</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.

Bottom slabs shall be reinforced with a minimum of 0.25 sq. in./ft. (610 sq. mm/m) in both directions with a maximum spacing of 13 (330).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.

**MANHOLE TYPE A**

**6' (1.8 m) DIAMETER**

**STANDARD 602406-07**
MANHOLE TYPE A
6' (1.8 m) DIAMETER
STANDARD 602406-07

PLAN
Showing Welded Wire Fabric Reinforcement

PLAN
Showing Rebar Reinforcement

<table>
<thead>
<tr>
<th>Diameter of opening</th>
<th>Thickness</th>
<th>Reinforcement</th>
<th>Bar Size</th>
<th>No. 6 (No. 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>8</td>
<td>326 sq. in./ft</td>
<td>No. 4</td>
<td>6' (1.8 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2424 sq. in/m2</td>
<td>No. 5</td>
<td>9'-0&quot; (2.74 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1736 sq. in/m2</td>
<td>No. 6</td>
<td>9'-0&quot; (2.74 m)</td>
</tr>
</tbody>
</table>

Sheets 2 of 2

USE MORTAR OR SEALER (TYPE)

DIAMETER 6' (1.8 M)
24" (600)
8" (200)
8" (200)

LENGTH/ DIAMETER
38
38

BAR C

DIAMETER 6' (1.8 M)
24" (600)
8" (200)
8" (200)

USE MORTAR OR SEALER (TYPE)

DIAMETER 6' (1.8 M)
24" (600)
8" (200)
8" (200)
ELEVATION

(With Flat Slab Top Only)

USE MORTAR OR SEALER HYDRO

Concrete Fill, 1.5% max.

ELEVATION

(With Flat Slab Top and Riser)

Reinforced cast-in-place concrete

GENERAL NOTES

Joint configuration and dimensions of Flat slab top shall match and fit the riser joint details.

Bottom slabs shall be reinforced with a minimum of 0.3 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 12 (300). Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.

ALTERNATE MATERIALS

<table>
<thead>
<tr>
<th>Material</th>
<th>T (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry Units</td>
<td>1200</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Sections</td>
<td>10000</td>
</tr>
<tr>
<td>Cast-in-place Concrete</td>
<td>6</td>
</tr>
</tbody>
</table>

ALTERNATE BOTTOM SLABS

For precast reinforced concrete sections, this dimension may vary from the dimension given to plus 6 (150).

Precast rein, conc. slab when the precast rein, conc. sections alternate is used.

MANHOLE TYPE A

7' (2.1 m) DIAMETER

(As per 1 of 21)

STANDARD 602411-05

Revised General Notes.

Increased maximum heights.
Table of Reinforcement Details:

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Reinforcement</th>
<th>Length</th>
<th>Radius</th>
<th>Top Mat **</th>
<th>Bottom Mat **</th>
</tr>
</thead>
<tbody>
<tr>
<td>7' (2.1m) DIAMETER</td>
<td><strong>No. 4</strong> (No. 13)</td>
<td>4'-0&quot; (1.22 m)</td>
<td>24 (600 mm)</td>
<td>6 (150)</td>
<td>6 (150)</td>
</tr>
<tr>
<td><strong>No. 4</strong> (No. 22)</td>
<td>6'-0&quot; (1.83 m)</td>
<td>12 (300 mm)</td>
<td>6 (150)</td>
<td>6 (150)</td>
<td></td>
</tr>
<tr>
<td><strong>No. 7</strong> (No. 25)</td>
<td>7'-6&quot; (2.30 m)</td>
<td>12 (300 mm)</td>
<td>6 (150)</td>
<td>6 (150)</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** A maximum of two layers of welded wire reinforcement may be used to satisfy the required "As" for each mat.

Typical Location for Lifting Device:

- Top & Bottom

Welded Wire Reinforcement:

- Typically placed at the top and bottom

---

**MANHOLE TYPE A**

7' (2.1 m) DIAMETER

STANDARD 602411-04

(Sheet 2 of 2)
**MANHOLE TYPE A**

8' (2.4 m) DIAMETER

**GENERAL NOTES**

Joint configuration and dimensions of flat slab top shall match and fit the riser joint details.

Bottom slabs shall be reinforced with a minimum of 0.34 sq. in./ft. (720 sq. mm/m) in both directions, with a maximum spacing of 11 (280).

Bottom slab may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602-70S for details of manhole steps.

All dimensions are in inches. In millimeters unless otherwise shown.

**ALTERNATE BOTTOM SLABS**

**ALTERNATE JOINT CONFIGURATIONS**

**ELEVATION**

With Flat Slab Top Only

Concrete fill, 1.25% max.

**ELEVATION**

With Flat Slab Top and Riser

Concrete fill

**ALTERNATE MATERIALS**

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete Sections</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Units</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Concrete Masonry Units</td>
<td>5 (125)</td>
</tr>
</tbody>
</table>

**DATE**

4-1-06

**REVISIONS**

4-1-16

8' (2.4 m) DIAMETER

**MANHOLE TYPE A**

8' (2.4 m) DIAMETER

**GENERAL NOTES**

Joint configuration and dimensions of flat slab top shall match and fit the riser joint details.

Bottom slabs shall be reinforced with a minimum of 0.34 sq. in./ft. (720 sq. mm/m) in both directions, with a maximum spacing of 11 (280).

Bottom slab may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602-70S for details of manhole steps.

All dimensions are in inches. In millimeters unless otherwise shown.

**ALTERNATE BOTTOM SLABS**

**ALTERNATE JOINT CONFIGURATIONS**

**ELEVATION**

With Flat Slab Top Only

Concrete fill, 1.25% max.

**ELEVATION**

With Flat Slab Top and Riser

Concrete fill

**ALTERNATE MATERIALS**

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precast Reinforced Concrete Sections</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Cast-in-Place Concrete</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Units</td>
<td>5 (125)</td>
</tr>
<tr>
<td>Concrete Masonry Units</td>
<td>5 (125)</td>
</tr>
</tbody>
</table>

**DATE**

4-1-06

**REVISIONS**

4-1-16
**MANHOLE TYPE A**

8’ (2.4 m) DIAMETER

**PLAN**

Showing Welded Wire Reinforcement

- Bar C top & bottom (See Table)
- Typical location for lifting device.

**SECTION B-B**

Use mortar or sealer (typ.)

- **9'-6" (2.89 m)**
- **Bar C**
- **No. 8 (No. 25) bars**
- **4'-0" (1.22 m)**
- **No. 7 (No. 22) bar**

**Diameter of opening**

<table>
<thead>
<tr>
<th>Reinforcement Bar Size</th>
<th>Reinforcement “As”-wall, each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4 (No. 13) bar C</td>
<td>1 (40) min. 24 (600) mm</td>
</tr>
<tr>
<td>No. 8 (No. 25) bar C</td>
<td>1 (40) min. 24 (600) mm</td>
</tr>
</tbody>
</table>

**Typical location**

Top mat typically placed at 12 (300)

- **15° (50) min.**

- **8 (200) min.**

**Bases**

- **Diameter**
- **8’ (2.4 m)**

**Standard**

**602416-05**

**ILLINOIS DEPARTMENT OF TRANSPORTATION**

**PASSED**

**ENGINEER OF POLICY AND PROCEDURES**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ISSUED 4-1-06**

**8’ (2.4 m) DIAMETER**

**MANHOLE TYPE A**

**STANDARD 602416-05**

**Plan**

Showing Welded Wire Reinforcement

- Bar C top & bottom (See Table)
- Top mat typically placed at 12 (300)

**Table**

<table>
<thead>
<tr>
<th>Diameter of opening</th>
<th>Reinforcement Bar Size</th>
<th>Reinforcement “As”-wall, each direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>8’ (2.4 m)</td>
<td>No. 4 (No. 13) bar C</td>
<td>1 (40) min. 24 (600) mm</td>
</tr>
<tr>
<td>8’ (2.4 m)</td>
<td>No. 8 (No. 25) bar C</td>
<td>1 (40) min. 24 (600) mm</td>
</tr>
</tbody>
</table>

**Typical location**

Bottom mat shown.

- **6 (150) min.**

- **5 (250) min.**

- **5 (250) min.**

**Typical placement**

Top & bottom bars top & bottom

- **No. 7 (No. 22) bar**
- **No. 8 (No. 25)**

**Typical**

April 1,

2016
**MANHOLE TYPE A**

**9' (2.7 m) DIAMETER**

**ELEVATION**

(With Flat Slab Top Only)

- **Top of masonry:**
  - 24 in. (600 mm)
  - Concrete fill, 1% max.
- **Steps:**
  - Spaced at 12 (300) to 16 (400) cts.
  - Reinforced in-place concrete
- **Alternates:**
  - Sand cushion

**ELEVATION**

(With Flat Slab Top and Riser)

- **Top of masonry:**
  - 24 in. (600 mm)
  - Concrete fill, 1% max.
- **Riser:**
  - 9 in. (225 mm)
  - Flat slab top
- **Concrete Masonry Units:**
  - Bar C
  - Min. 2 (50)
- **Concrete Sections:**
  - Precast reinforced concrete sections
  - Min. 2 (50)
- **Cast-in-Place Concrete:**
  - Min. 2 (50)
- **Use mortar or sealer (typ.)**

**ALTERNATE BOTTOM SLABS**

- **Concrete Masonry Units:**
  - Use mortar or sealer (typ.)
- **Concrete Sections:**
  - Precast reinforced concrete sections
  - Min. 2 (50)
- **Cast-in-Place Concrete:**
  - Min. 2 (50)

**GENERAL NOTES**

Joint configuration and dimensions of flat slab top shall match and fit the riser joint details.

- Bottom slab shall be reinforced with a minimum of 0.21 sq. ft./ft. (130 sq. mm/m) in both directions with a minimum spacing of 10 (250).
- Bottom slab may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.
- See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.

**REVISIONS**

- **April 1, 2016**
  - Changed terminology to "reinforced in-place concrete".
  - Increased maximum heights.
  - Changed terminology to "welded wire reinforcement".

**MANHOLE TYPE A**

**9' (2.7 m) DIAMETER**

**ALTERNATE JOINT CONFIGURATIONS**

- **Concrete Masonry Units:**
  - Use mortar or sealer (typ.)
- **Concrete Sections:**
  - Precast reinforced concrete sections
  - Min. 2 (50)
- **Cast-in-Place Concrete:**
  - Min. 2 (50)

**DATE**

- **April 1, 2016**
  - Changed terminology to "reinforced in-place concrete".
  - Increased maximum heights.
  - Changed terminology to "welded wire reinforcement".

**STANDARD 602421-05**

(Sheet 1 of 2)
### TABLE: Diameter of opening, Reinforcement, Bar Size, and Radius

<table>
<thead>
<tr>
<th>Diameter opening</th>
<th>Reinforcement</th>
<th>Bar Size</th>
<th>No. 4 (No. 13)</th>
<th>Length</th>
<th>Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>9' (2.7 m)</td>
<td>Bottom mat</td>
<td>No. 8 (No. 25)</td>
<td>9'-6&quot; (3.20 m)</td>
<td>10'-8&quot; (3.20 m)</td>
<td></td>
</tr>
<tr>
<td>9 (2.7 m)</td>
<td>Bottom mat</td>
<td>No. 8 (No. 25)</td>
<td>9'-6&quot; (3.20 m)</td>
<td>10'-8&quot; (3.20 m)</td>
<td></td>
</tr>
<tr>
<td><strong>10'-8&quot; (3.20 m)</strong></td>
<td>Top mat</td>
<td>No. 4 (No. 13)</td>
<td>14'-2&quot; (4.30 m)</td>
<td>14'-2&quot; (4.30 m)</td>
<td></td>
</tr>
<tr>
<td><strong>14'-2&quot; (4.30 m)</strong></td>
<td>Top mat</td>
<td>No. 4 (No. 13)</td>
<td>14'-2&quot; (4.30 m)</td>
<td>14'-2&quot; (4.30 m)</td>
<td></td>
</tr>
</tbody>
</table>

A maximum of two layers of welded wire reinforcement may be used to satisfy the required "AS" for each mat.

**PLAN**

**Showing Rebar Reinforcement**

**PLAN**

**Showing Welded Wire Reinforcement**

**SECTION B-B**

**MANHOLE TYPE A**

**9' (2.7 m) DIAMETER**

**STANDARD 602421-05**
The cone of the valve vault shall be constructed as shown above only when there is interference with underground conditions and those conditions cannot be altered.

**ALTERNATE METHODS**

**ELEVATION**

**ALTERNATE MATERIALS FOR WALLS**

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>C *</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Masonry</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Brick Masonry</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Precast Reinforced Concrete Section</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
<tr>
<td>Cast-In-Place Concrete</td>
<td>4'-0&quot; (1.2 m)</td>
<td>30 (750)</td>
<td>6 (150)</td>
</tr>
</tbody>
</table>

* For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).

**DIAMETER OF WATER MAIN**

<table>
<thead>
<tr>
<th>Diameter of Water Main</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (200) and under</td>
<td>4'-0&quot; (1.2 m)</td>
</tr>
<tr>
<td>10 (250) and over</td>
<td>5'-0&quot; (1.5 m)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

Bottom slab shall be reinforced with a minimum of 0.31 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 3 (75).

Bottom slab may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be specified.

See Standard 602601 for optional Precast Reinforced Concrete Flat Top Slab.

All dimensions are in inches (millimeters) unless otherwise shown.
CAST IRON STEPS

MANHOLE STEPS

All dimensions are in inches (millimeters) unless otherwise shown.

PLAN VIEW

SECTION A-A

ELEVATION VIEW

STANDARD 602701-02

(Sheet 1 of 2)
MANHOLE STEPS

STANDARD 602701-02

(People of Illinois Department of Transportation)

PLAN VIEW

SECTION A-A

ELEVATION VIEW

10 (250)

V/3 (13) Reinforcement bar

Inside face of structure

2 (50)

2 (100)

(75) min.

3 (150)

(13) min.
CAST FRAME

SECTION C-C

SECTION D-D

CAST CLOSED LID

ADA COMPLIANT

CAST OPEN LID

As dimensions are in (inches/millimeters) unless otherwise shown.

FRAME AND LIDS

TYPE 1

STANDARD 604001-04
CAST FRAME

SECTION B-B

CAST GRATE

SECTION C-C

ALTERNATE CURB BOX

SECTION D-D

SECTION E-E

FRAME AND GRATE

TYPE 3

STANDARD 604006-05

All dimensions are in inches (millimeters) unless otherwise shown.
Illinois Department of Transportation

PASSED
ENGINEER OF POLICY AND PROCEDURES
APPROVED

DATE
JANUARY 1, 1997

ISSUED 1-1-97

REVISIONS

FRAME AND GRATE
TYPE 3V

CAST FRAME

SECTION A-A

CAST GRATE

SECTION B-B

ALTERNATE CURB BOX

SECTION C-C

SECTION D-D

SECTION E-E

VANE DETAIL

Switched units to English (metric).

Revised dimensions of frame and alternate curb box.

Curb box adjustable from 5/8 (15) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-97</td>
<td>Revised dimensions of frame and alternate curb box.</td>
</tr>
<tr>
<td>1-1-09</td>
<td>Switched units to English (metric).</td>
</tr>
</tbody>
</table>

STANDARD 604011-05
CAST FRAME

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE
TYPE 4

STANDARD 604016-03
CAST FRAME

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CAST GRATE

All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE

TYPE 6

STANDARD 604026-03
CAST GRATE

SECTION A-A

All dimensions are in inches (millimeters) unless otherwise shown.

GRATE TYPE 8

STANDARD 604036-03
SECTION A-A

SECTION B-B

SECTION C-C

CAST FRAME

CAST GRATE

All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE

TYPE 9

DATE  REVISIONS
1-1-97  (4 4 5) R
1-1-97  (3 0 5)
1-1-97  12
1-1-97  (584)
1-1-97  23
1-1-97  (254)
1-1-97  10
1-1-97  (4 4)
1-1-97  12
1-1-97  (51)
1-1-97  2
1-1-97  (4 4)
1-1-97  12
1-1-97  (51)
1-1-97  2
1-1-97  (29)
1-1-97  1* (typ.)
1-1-97  (578)
1-1-97  22* (typ.)
1-1-97  11 …
1-1-97  (289)
1-1-97  1 1 …
1-1-97  (95)
1-1-97  3* (44)
1-1-97  1‡
1-1-97  (29)
1-1-97  1 "
1-1-97  (22)
1-1-97  1 "
1-1-97  (29)
1-1-97  1†
1-1-97  (44)
1-1-97  1‡

SECTION D-D

= 6' (159) max. (typ.)

CAST GRATE

= 2 1/4 (19) min. (typ.)

TYPE 9 FRAME AND GRATE

STANDARD 604041-03

English (metric).
Switched units to
frame.

Revised dimensions of
frame.
CAST FRAME

CAST GRATE

ALTERNATE CURB BOX

SECTION B-B

SECTION C-C

SECTION D-D

SECTION E-E

FRAME AND GRATE

TYPE 11

STANDARD 604051-04

DATE
REVISIONS
1-1-97
1-1-97
January 1, 2015
January 1, 2015

All dimensions are in inches (millimeters) unless otherwise shown.

English (metric).

Switched units to English (metric).

Revised dimensions of frame and alternate curb box.

NOTE: Dimensions and tolerances are subject to change without notice.
All dimensions are in inches (millimeters) unless otherwise shown.

Switched units to English (metric).

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Alternate curb box.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.

Revised dimensions of frame and alternate curb box.

Curb box adjustable ~ (10) Dia. hole and †x5 (16x140) from 4 (115) to 9 (225).

All dimensions are in inches (millimeters) unless otherwise shown.
Illinois Department of Transportation

PASSED
ENGINEER OF POLICY AND PROCEDURES
APPROVED
ENGINEER OF DESIGN AND ENVIRONMENT

1-1-97

January 1, 2015

DATE

SECTION A-A

CAST FRAME

SECTION B-B

SECTION C-C

CAST GRATE

SECTION D-D

FRAME AND GRATE

TYPE 12

STANDARD 604061-03

All dimensions are in inches (millimeters) unless otherwise shown.

1-1-09

Revised dimensions of frame and grate.

1-1-15

Switched units to English (metric).
NOTE:
Warp sloping face of curbs in a distance of 5' (1.5 m) to the cross section shown at the frame.

No. 6 x 16 (No. 20 x 900) re-bar required when X \( \geq 5 \) (125) or more

\( X = 5 \) (125) or more

Re-bar required when

\( X \geq \frac{1}{2} \) (25)

\( D \)ia. 28 (711)

No. 6 x 36 (No. 20 x 900) re-bar required when

\( X \geq \frac{1}{2} \) (25)

\( D \)ia. 30 (762)

Slope pavement or gutter edge 12% at inlet.

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

SECTION Z-Z

SECTION Y-Y

CAST FRAME
(GRAY IRON)

CAST LID

CASE I

CASE II

DETAIL E

NOTE:

All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND LID

TYPE 15

STANDARD 604066-02

DATE
1-1-97

REVISED
2009

REVISIONS
1-1-97
2009

11-09
Switched units to English Metric.

+1-04
Removed weights.
SECTION A-A

PLAN

CAST FRAME

SECTION B-B

CAST FRAME

SECTION C-C

CAST GRATE

SECTION D-D

CAST GRATE

All dimensions are in inches (mm) unless otherwise shown.

FRAME AND GRATE

TYPE 20

STANDARD 604071-05
CAST FRAME

Three 1 1/2 x 2 (66 x 51) gal, hex. head bolt & nut with gal. washer.

CAST GRATE

1/4 (13) Dia. stainless steel bolts with washers, through counter bored holes or slots, four pieces each grate.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE: 1-1-97
REVISIONS: 2009

FRAMES AND GRATES
TYPE 22
STANDARD 604081-04
Details of the frame and grate with dimensions and specifications included in the image. The frame and grate are indicated as STANDARD 604086-03, TYPE 23. Dimensions are provided in both inches and millimeters, with notes on the drawing for specific details. The sections A-A and B-B illustrate the frame and grate's layout and components.
PLAN - FRAME

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

DETAIL A

DETAIL B

See DETAIL A

See DETAIL B

All dimensions are in inches (millimeters) unless otherwise shown.

FRAME AND GRATE

TYPE 24

STANDARD 604091-03

DATE

REVISIONS

1-1-09

Revised dimensions of frame.

1-1-09

Figures updated to English.

1-1-09

English text added.

1-1-09

English text added.

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### DEPRESSED CURB ADJACENT TO CURB RAMP ACCESSIBLE TO THE DISABLED

**General Notes**

- The bottom slope of construction curb and gutter constructed adjacent to a curb ramp and be the same slope as the subgrade or 6% when subgrade is omitted.

- *t* Thickness of pavement.

- Longitudinal joint tie bars shall be No. 4 (No. 13) or 24 (600) centers in accordance with details for longitudinal construction joint shown on Standard 420001.

- A minimum clearance of 2 (50) between the ends of the tie bar and the back of the curb shall be maintained.

- The dowel bars shown in contraction joints will only be required for monolithic construction.

- See Standard 606001 for details of corner islands.

All dimensions are in inches (millimeters) unless otherwise shown.

### TABLE OF DIMENSIONS

#### BARRIER CURB

<table>
<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-21</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>10</td>
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<tr>
<td>28-23</td>
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<td>28-26</td>
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<td>28-30</td>
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#### MOUNTABLE CURB

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<thead>
<tr>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
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</thead>
<tbody>
<tr>
<td>30-30</td>
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<td>30-36</td>
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<td>9</td>
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<td>30-45</td>
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<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
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<td>30-60</td>
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<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>R1</th>
<th>R2</th>
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<tr>
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<td>30-85</td>
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<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

### CONCRETE CURB TYPE B AND COMBINATION CURB AND GUTTER

**Standard 606001-06**

- See Standard 606001 for details of corner islands.

- All dimensions are in inches (millimeters) unless otherwise shown.

**Note:** The bottom slope of construction curb and gutter constructed adjacent to a curb ramp and be the same slope as the subgrade or 6% when subgrade is omitted.

* t Thickness of pavement.

- Longitudinal joint tie bars shall be No. 4 (No. 13) or 24 (600) centers in accordance with details for longitudinal construction joint shown on Standard 420001.

- A minimum clearance of 2 (50) between the ends of the tie bar and the back of the curb shall be maintained.

- The dowel bars shown in contraction joints will only be required for monolithic construction.

- See Standard 606001 for details of corner islands.

- All dimensions are in inches (millimeters) unless otherwise shown.
**CONCRETE CURB TYPE B**

**ADJACENT TO FLEXIBLE PAVEMENT**

1. Form with 1/2 (13) thick steel模板.
2. Saw 2 (50) deep at 4 to 24 hours, and seal.
3. Insert 3/4 (20) thick preformed joint filler full depth and width.

**CONCRETE CURB AND GUTTER**

**STANDARD 606001-06**
GENERAL NOTES

The bars shall be No. 6, 19G, 21 ft. on 24 in. (600 mm) centers unless otherwise shown.

Gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

If the average grade of pavement for the distance from Section A-A to D-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

All dimensions are in inches (millimeters) unless otherwise shown.

QUANTITIES

For Section A-A to C-C and curtain walls:

2.38 cu. yds. (1.82 m³) concrete for 9 (225) pavement.

3/4 cu. yds. (0.6 m³) concrete for 10 (250) pavement.

For Section F-F:

0.069 cu. yd. (0.05 m³) concrete per ft. (m)

For Section G-G:

2.41 cu. yds. (1.84 m³) concrete for 10 (250) pavement.

2.38 cu. yds. (1.82 m³) concrete for 9 (225) pavement.

OUTLETS FOR CONCRETE CURB AND GUTTER

TYPE B-6.24 (B-15.60)

STANDARD 606006-03
OUTLETS FOR CONCRETE CURB AND GUTTER
TYPE B-6.24 (B-15.60)

Quantities:
2.07 cu. yds. (1.60 m³) concrete for 9 (225) pav't.
2.07 cu. yds. (1.61 m³) concrete for 10 (250) pav't.

All dimensions are in inches (millimeters) unless otherwise shown.

Tie bars

2.01 cu. yds. (1.54 m³) concrete for 10 (250) pav't.
1.98 cu. yds. (1.51 m³) concrete for 9 (225) pav't.

GRATE AND COVER TYPE 2B

GRATE TYPE A
No. 4 (No. 13) rebar placed at mid-depth (one each side of casting
placed full depth & width.

Flow line

with HMA shoulders
or at 25' (7.6 m) cts.

See plans
Shoulder
Rolled

1x18 (25x450) dowel bar

Preformed expansion joint

expansion gap
8" (200)

Expansion Joint

SECTION D-D

Preformed expansion joint

expansion gap
8" (200)

Expansion Joint

SECTION D-D

Edge of
paved shoulder

Drainage
casting

Expansion
gutter

Contraction joints

SECTION A-A

SECTION B-B

SECTION C-C

INLET

QUANTITY OF CONCRETE
Section A-A to C-C
0.33 cu yd, 0.271 m³

All dimensions are in inches (millimeters) unless otherwise shown.

DATE
1-1-09

REVISIONS

English units of D-6

4-1-16

changed terminology to

4-1-16

welded wire reinforcement.

Switched units to

English units of D-6

changed terminology to

Rolled edge

Rounded

Shld.

edge Rolled

(150)

6

6’

(180)

6’

6"

(450)

18

18

6"

(450)

18

6"

(450)

18

6"

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18

6"

(450)
INLET, OUTLET & ENTRANCE

TYPE A GUTTER
STANDARD 606101-05

Joint
Contraction
dowel bars

1x18 (25x450)

(1.8 m)
6'0"

(1.2 m)
4'0"

Flow line

shoulder
paved
Edge of
45°
30°

Section (A-A to B-B) + (C-C to D-D) = 1.79 cu. yd. (1.37 m³).
Section B-B to C-C = 0.20 cu. yd./ft. (0.50 m³/m).

All Other Entrances:
Section (A-A to B-B) + (C-C to D-D) = 2.26 cu. yd. (1.73 m³).
Section B-B to C-C = 0.25 cu. yd./ft. (0.62 m³/m).

Commercial Entrances:
QUANTITIES OF CONCRETE

NOTE:
Welded wire reinforcement shall be installed at mid-depth from Section A-A to D-D.

58 lbs./100 sq. ft. (2.83 kg/m²)
at mid-depth from Section A-A to D-D.
Welded wire reinforcement shall be installed
for all other entrances and 6 (150)
for commercial entrances and 6 (150)
for all others.

SECTIONS A-A & D-D

SECTIONS B-B & C-C

2016
ENGINEER OF POLICY AND PROCEDURES
APPROVED: 2016
ISSUED: 1-1-97

Illinois Department of Transportation
PASSED: 2016
The gutter outlet shall be tied to the pavement in accordance with details for long-fused construction joint shown on Standard 420000.

Tie bars shall be No. 6 (19) at 24 (600) centers unless otherwise shown.

If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

All dimensions are in inches (millimeters) unless otherwise shown.

Table:

<table>
<thead>
<tr>
<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete - cu. yd. (m)</td>
<td>2.5</td>
<td>3.3</td>
</tr>
<tr>
<td>Cast Iron Grate - Ea.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Pipe Drain - Dia. in. (mm)</td>
<td>375</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>450</td>
<td>18</td>
</tr>
</tbody>
</table>

unless otherwise shown.
NOTE
A 1% increase in grade shall be increased 6 ft. (1.8 m) for each 1% increase in grade.

1/1/07

1/1/09

English (metric).

Switched units to

Materials:

Concrete - cu. yd. (m³)

Cast Iron Grate - Ea.

Cast Iron Cover - Ea.

Pipe Drain - Dia. in. (mm)

QUANTITIES

<table>
<thead>
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<th>Material</th>
<th>Single</th>
<th>Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
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<td>4.33</td>
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<tr>
<td>Cast Iron Grate</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cast Iron Cover</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pipe Drain</td>
<td>3.31</td>
<td>4.41</td>
</tr>
</tbody>
</table>

GENERAL NOTES

The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joints shown on Standard 420001. All dimensions are in inches unless otherwise shown.

OUTLETS TYPE 2

FOR TYPE A GUTTER

STANDARD 606111-03
GENERAL NOTES

Tie bars shall be No. 6 (No. 19) at 24 (600) centers unless otherwise shown.

Gutter, gutter inlet, gutter outlet and gutter entrance shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

Two 1-1/4 x 18 (32 x 450) dowel bars shall be installed in all joints when the gutter is constructed adjacent to flexible pavement.

All dimensions are in inches (millimeters) unless otherwise shown.

QUANTITY OF CONCRETE
Section A-A to C-C
0.64 cu. yd. (0.49 m³)

Section C-C to B-B+ to A-A = 0.44 cu. yd. (0.34 m³)

Section B-B to B-B = 0.076 cu. yd./ft. (0.19 m³/m)

QUANTITY OF CONCRETE

SECTION B-B

SECTION C-C

SECTION A-A

SECTION A-A to C-C

INLET

OUTLET

ENTRANCE

TYPE B GUTTER

TYPE B GUTTER

INLET, OUTLET & ENTRANCE

STANDARD 606201-03

(Sheet 1 of 2)
NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

QUANTITY OF CONCRETE
Section 4-A to 5-A and curtain wall to begin here.
Section 5-A: 1.9 cu yd (1.45 m³) concrete.
Section 5-A to E-E and curtain wall 3 cu yd (2.3 m³) concrete.

NOTE
If the average grade of pavement for the distance 4-A exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

QUANTITY OF CONCRETE
Section 4-A to 5-A and curtain wall to begin here.
Section 5-A: 1.9 cu yd (1.45 m³) concrete.
Section 5-A to E-E and curtain wall 3 cu yd (2.3 m³) concrete.

NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

QUANTITY OF CONCRETE
Section 4-A to 5-A and curtain wall to begin here.
Section 5-A: 1.9 cu yd (1.45 m³) concrete.
Section 5-A to E-E and curtain wall 3 cu yd (2.3 m³) concrete.

NOTE
If the average grade of pavement for the distance 4-A exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

QUANTITY OF CONCRETE
Section 4-A to 5-A and curtain wall to begin here.
Section 5-A: 1.9 cu yd (1.45 m³) concrete.
Section 5-A to E-E and curtain wall 3 cu yd (2.3 m³) concrete.

NOTE
If the average grade of pavement for the distance A-D exceeds 2%, this distance shall be increased 6' (1.8 m) for each 1% increase in grade.

QUANTITY OF CONCRETE
Section 4-A to 5-A and curtain wall to begin here.
Section 5-A: 1.9 cu yd (1.45 m³) concrete.
Section 5-A to E-E and curtain wall 3 cu yd (2.3 m³) concrete.
The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

Tie bars shall be No. 6 (No. 19) at 24 (600) centers unless otherwise shown.

If the average grade of the pavement for the distance A-D exceeds 2%, this distance shall be increased 6'-0" (1.8 m) for each 1% increase in grade.

All dimensions are in inches (millimeters) unless otherwise shown.
OUTLETS TYPE 2 FOR TYPE B GUTTER

GENERAL NOTES

1. If the average grade of pavement for the distance A-E exceeds 2 percent, the distance shall be increased 6 ft. (1.8 m) for each 1 percent increase in grade.

2. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

3. The gutter outlet shall be followed by the pavement.

4. The gutter outlet shall be followed by the pavement.

5. All dimensions are in inches (millimeters)

6. Unless otherwise shown.

7. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

8. All dimensions are in inches (millimeters)

9. The gutter outlet shall be followed by the pavement.

10. The gutter outlet shall be followed by the pavement.

11. Unless otherwise shown.

12. All dimensions are in inches (millimeters)

13. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

14. All dimensions are in inches (millimeters)

15. The gutter outlet shall be followed by the pavement.

16. The gutter outlet shall be followed by the pavement.

17. Unless otherwise shown.

18. All dimensions are in inches (millimeters)

19. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

20. All dimensions are in inches (millimeters)

21. The gutter outlet shall be followed by the pavement.

22. The gutter outlet shall be followed by the pavement.

23. Unless otherwise shown.

24. All dimensions are in inches (millimeters)

25. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

26. All dimensions are in inches (millimeters)

27. The gutter outlet shall be followed by the pavement.

28. The gutter outlet shall be followed by the pavement.

29. Unless otherwise shown.

30. All dimensions are in inches (millimeters)

31. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

32. All dimensions are in inches (millimeters)

33. The gutter outlet shall be followed by the pavement.

34. The gutter outlet shall be followed by the pavement.

35. Unless otherwise shown.

36. All dimensions are in inches (millimeters)

37. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

38. All dimensions are in inches (millimeters)

39. The gutter outlet shall be followed by the pavement.

40. The gutter outlet shall be followed by the pavement.

41. Unless otherwise shown.

42. All dimensions are in inches (millimeters)

43. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

44. All dimensions are in inches (millimeters)

45. The gutter outlet shall be followed by the pavement.

46. The gutter outlet shall be followed by the pavement.

47. Unless otherwise shown.

48. All dimensions are in inches (millimeters)

49. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

50. All dimensions are in inches (millimeters)

51. The gutter outlet shall be followed by the pavement.

52. The gutter outlet shall be followed by the pavement.

53. Unless otherwise shown.

54. All dimensions are in inches (millimeters)

55. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

56. All dimensions are in inches (millimeters)

57. The gutter outlet shall be followed by the pavement.

58. The gutter outlet shall be followed by the pavement.

59. Unless otherwise shown.

60. All dimensions are in inches (millimeters)

61. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

62. All dimensions are in inches (millimeters)

63. The gutter outlet shall be followed by the pavement.

64. The gutter outlet shall be followed by the pavement.

65. Unless otherwise shown.

66. All dimensions are in inches (millimeters)

67. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

68. All dimensions are in inches (millimeters)

69. The gutter outlet shall be followed by the pavement.

70. The gutter outlet shall be followed by the pavement.

71. Unless otherwise shown.

72. All dimensions are in inches (millimeters)

73. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

74. All dimensions are in inches (millimeters)

75. The gutter outlet shall be followed by the pavement.

76. The gutter outlet shall be followed by the pavement.

77. Unless otherwise shown.

78. All dimensions are in inches (millimeters)

79. The gutter outlet shall be tied to the pavement in accordance with details for longitudinal construction joint shown on Standard 420001.

80. All dimensions are in inches (millimeters)

81. The gutter outlet shall be followed by the pavement.
**PC CONCRETE ISLANDS AND MEDIAN**

**GENERAL NOTES**

- PEJF = Preformed expansion joint filler.
- PEJF = Preformed expansion joint filler. Median layout and radii shall be as shown on the plans.
- Keyed longitudinal construction joints shall be constructed without tie bars.
- Noses 1 and 2 shall be ramped unless noted otherwise on the plans. See sheet 2 for lengths.
- The blockouts B for the islands shall be extended so that the termination will line up with pre-passed or existing pavement joint.
- See Standard 420001 and 606001 for details not shown.
- \( t \) = t for full cross section of the curb, gutter and median surface.
- X X PCC base course plus HMA thickness.
- Keyed longitudinal construction joints shall be extended without tie bars.
- \( X \) = PCC base course plus HMA thickness.
- All dimensions are in inches (millimeters) unless otherwise shown.

**SECTION D-D**

- Face of curb
- Face of mountable curb
- Coarse aggregate fill to subgrade
- Slope to drain
- See DETAIL I

**SECTION E-E**

- Face of curb
- Grooves
- Face of mountable curb
- Coarse aggregate fill to subgrade
- Slope to drain
- See DETAIL I

**DETIAL I**

- Typical detail when corner angle is less than 90° and for other corners with radius greater than 24 (600).
- Corner angle
- Grooves
- Face of curb

**DETIAL II**

- Typical detail when corner angle is less than 90° and for other corners with radius greater than 24 (600).
- Corner angle
- Grooves
- Face of curb

**TYPICAL PLAN OF CORNER ISLANDS**

- See DETAIL II for details of ramped noses

**TYPICAL PLANS OF CORNER ISLANDS**

- See DETAIL II for details of ramped noses

**LARGE ISLAND**

- See DETAIL I

**INTERMEDIATE ISLAND**

- See DETAIL I

**SMALL ISLAND**

- See DETAIL I

**STANDARD 606301-04**

**(Sheet 1 of 2)**
Median layout and radii shall be as shown on the plans.

Keyed longitudinal construction joints shall be constructed without tie bars.

* PEJF = Preformed expansion joint filler.

** Welded wire reinforcement required for medians built contiguous to reinforced PCC pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**GENERAL NOTES**

PEJF = Preformed expansion joint filler.

Median layout and radii shall be as shown on the plans.

Keyed longitudinal construction joints shall be constructed without tie bars.

* PEJF = Preformed expansion joint filler.

** Welded wire reinforcement required for medians built contiguous to reinforced pcc pavement only.

See Standards 420001 and 420701 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**CORRUGATED PC CONCRETE MEDIAN**

**STANDARD 060306-04**

---

**DATE** | **REVISIONS**
---|---
April 1, 2016 | Changed terminology to welded wire reinforcement.
April 1, 2016 | Changed terminology to welded wire reinforcement.
April 9, 2009 | Deleted unit 46.
April 9, 2009 | Deleted unit 46.

---

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**
**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ENGINEER OF POLICY AND PROCEDURES**

---

**TABLE FOR PAVED DITCH TYPE A**

<table>
<thead>
<tr>
<th>Type</th>
<th>Flow Area (sq. ft.)</th>
<th>Conc. Area (sq. yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-10</td>
<td>6 (150)</td>
<td>18</td>
</tr>
<tr>
<td>A-20</td>
<td>(220) 10.95 (6.95)</td>
<td>16</td>
</tr>
<tr>
<td>A-30</td>
<td>(300) 24.6 (13.6)</td>
<td>20</td>
</tr>
<tr>
<td>A-40</td>
<td>(400) 34.8 (18.6)</td>
<td>24</td>
</tr>
<tr>
<td>A-50</td>
<td>(500) 46 (23.6)</td>
<td>28</td>
</tr>
<tr>
<td>A-60</td>
<td>(600) 58 (28.6)</td>
<td>32</td>
</tr>
</tbody>
</table>

**TABLE FOR PAVED DITCH TYPE B**

<table>
<thead>
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<th>Type</th>
<th>Flow Area (sq. ft.)</th>
<th>Conc. Area (sq. yd.)</th>
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</thead>
<tbody>
<tr>
<td>B-15</td>
<td>9 (150)</td>
<td>18</td>
</tr>
<tr>
<td>B-20</td>
<td>(220) 15.6 (7.6)</td>
<td>16</td>
</tr>
<tr>
<td>B-30</td>
<td>(300) 22.8 (12.8)</td>
<td>20</td>
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<tr>
<td>B-40</td>
<td>(400) 29 (14.8)</td>
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<tr>
<td>B-50</td>
<td>(500) 35.2 (17.8)</td>
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<tr>
<td>B-60</td>
<td>(600) 41.4 (20.8)</td>
<td>32</td>
</tr>
</tbody>
</table>

---

**GENERAL NOTES**

- All slopes are expressed as vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

---

**LOCATION AND LIMITS OF PAVED DITCH**

---

**PAVED DITCH**

**STANDARD 606401-02**
**WITH CURB**

**SHOULDER INLET**

**INLET BOX**

**REQUIRED MATERIAL**

**TYPE F**

<table>
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<th>Qty.</th>
<th>Size</th>
<th>Length</th>
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<tr>
<td>u3</td>
<td>6</td>
<td>No. 4</td>
<td>9'-1''</td>
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<tr>
<td>u4</td>
<td>3</td>
<td>No. 4</td>
<td>9'-1''</td>
</tr>
<tr>
<td>u5</td>
<td>4</td>
<td>No. 4</td>
<td>9'-1''</td>
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<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td>5-1/2''</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>No. 4</td>
<td>9'-1''</td>
<td></td>
</tr>
<tr>
<td>Grating</td>
<td>No. 4</td>
<td>9'-1''</td>
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**TYPE E**

<table>
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<td>No. 4</td>
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<td>No. 4</td>
<td>9'-1''</td>
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<tr>
<td>u5</td>
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<td>9'-1''</td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td>5-1/2''</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>No. 4</td>
<td>9'-1''</td>
<td></td>
</tr>
<tr>
<td>Grating</td>
<td>No. 4</td>
<td>9'-1''</td>
<td></td>
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</table>

**TYPE G**

<table>
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<th>Qty.</th>
<th>Size</th>
<th>Length</th>
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</thead>
<tbody>
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<td>No. 4</td>
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<td>9'-1''</td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td>5-1/2''</td>
</tr>
<tr>
<td>Reinforcement bars</td>
<td>No. 4</td>
<td>9'-1''</td>
<td></td>
</tr>
<tr>
<td>Grating</td>
<td>No. 4</td>
<td>9'-1''</td>
<td></td>
</tr>
</tbody>
</table>

**SECTIONS**

**SECTION D-D**

**SECTION C-C**

**DETAIL OF CAST GRATE**

Type C requires 1 grate
Type E requires 2 grates
Type F requires 3 grates

**SECTION E-E**

**DETAIL OF CAST FRAME**

(Type F shown)

**SECTION F-F**

27 (690) Type G, 4'-0'' (1220 mm) Type E or 6'-0'' (1820 mm) Type F

ILLINOIS DEPARTMENT OF TRANSPORTATION

ISSUED 1-1-97

STANDARD 610001-06

ENGINEER OF POLICY AND PROCEDURES

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

January 1, 2010

SHOULDERR INLET
WITH CURB

(Sheet 2 of 2)
Rail element splice

6'-3" (1.905 m) Typical post spacing

When "S" is less than 3 and the distance from the back of post to back of box is less than 24 (610), the post shall be steel and the embedment shall be 16" (406).

**SECTION A-A**

- When "S" is less than 3 and the distance from the back of post to back of box is less than 24 (610), the post shall be steel and the embedment shall be 16" (406).

**SECTION B-B**

- When connecting Type D guardrail to an impact attenuator, adjust this dimension to 31" (787) over a distance of 25'-0" (762) from point of connection.

Traffic guardrail

Steel plate beam guardrail with bolt slots at 31/2 (953) centers.

**GENERAL NOTES**

- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters).

**STEEL PLATE BEAM GUARDRAIL**

**STANDARD 630001-10**

(Sheet 1 of 4)
**STEEL PLATE BEAM GUARDRAIL**

**STEEL POST CONSTRUCTION**

- Post bolt with std. hex nut
- Std. flat washer
- Hex nut
- Post bolt with 16d nails toe-nailed to post
- Sawn timber blockout
- Rough sawn timber post
- Bolt not to extend more than 1/4 (6) post

**WOOD POST CONSTRUCTION**

- Wood (W6x8.5 (W150x12.75) or W6x9 (W150x13.5)
- Steel post
- Std. flat washer
- Hex bolt
- 16d nails
- Sawn timber blockout
- Rough sawn timber post
- Bolt not to extend more than 1/4 (6) post

**STEEL POST DETAILS**

- Post bolt with std. hex nut
- Steel post
- Steel post with 16d nails
- Sawn timber blockout
- Rough sawn timber post
- Bolt not to extend more than 1/4 (6) post

**WOOD BLOCK-OUT AND POST OR SPLICE BOLT & NUT**

- Wood block-out
- Post or splice bolt & nut
GUARDRAIL

STEEL PLATE BEAM STANDARD 630001-10

NOTE
Anchor plate T shall be used to attach cable assembly to guardrail when required on traffic barrier terminals.

NOTE
When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a washer or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

Externally threaded studs protruding from the surface of the concrete will not be permitted.
**GUARDRAIL PLACED BEHIND CURB**

Note: 'D' shall not exceed 6 (152) for design speeds greater than 45 mph.

**FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED**

**ELEVATION**

**PLAN**

**CABLE ASSEMBLY**

- 1 0.241 double nuts or locknuts and 1/4 13 washer
- 3/16 (5.1 mm) galvanized cable
- Standard Swage Fitting

Tighten to 40,000 lbs. (18,100 kg) min. breaking strength.
# Illinois Department of Transportation

**PASSED**

**ENGINEER OF POLICY AND PROCEDURES**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ISSUED 1-1-97**

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**General Notes**

- Except as noted, dimensions and notes specified for cases II, III, and IV are the same as specified for case I.
- For details of guardrail elements not shown, see Section 630101-09.
- All threaded rods shall be installed with heavy hex nuts and standard washers.
- All dimensions are in inches (millimeters) unless otherwise shown.

## Plate Dimensions

<table>
<thead>
<tr>
<th>PLATE</th>
<th>Type</th>
<th>Dia.</th>
<th>Hole</th>
<th>Thich-</th>
<th>Height</th>
<th>Width</th>
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<tr>
<td>G</td>
<td>9</td>
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<td>1&quot;</td>
<td>1/4&quot;</td>
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<td></td>
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<tr>
<td>J</td>
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<td>K</td>
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</tbody>
</table>

---

**Guardsrail Mounted on Existing Culverts**

**Sheet 1 of 2**

---

**Cross Section**

**Condition H > 18 (450)**

- Raised Headwall Mounted on Top Headwall

**Cross Section**

**Condition H < 18 (450) & H+T ≥ 20 (510)**

- Case I
- Mounted on Raised Headwall

---

**Elevation**

**Case II**

- Mounted on Top Headwall with Square Tip

---

**Guardrail Mounted on Existing Culverts**

**Standard 630101-09**

---

**Date**

- 1-1-09

**Revisions**

- Switched units to English short title, added English short title to heading.
- Switched units to English short title, added English short title to heading.
- Switched units to English short title, added English short title to heading.
GUARDRAIL MOUNTED ON EXISTING CULVERTS

CASE III
MOUNTED ON HEADWALL
WITH CURVED OR DEMOLISHED TIP

CASE IV
MOUNTED ON SLAB

SECTION B-B

SECTION C-C

CROSS SECTION

ELEVATION

FULL PEN.
LONG-SPAN GUARDRAIL OVER CULVERT

GENERAL NOTES
See Standard 630001 for details of guardrail not shown.
All dimensions are in inches (millimeters) unless otherwise shown.

Pay limits of LONG-SPAN GUARDRAIL OVER CULVERT

Steel posts
CRT wood posts

ELEVATION

PLAN

FRONT

SIDE

SECTION A-A

CRT WOOD POST
**PCC/HMA STABILIZATION AT STEEL PLATE BEAM GUARDRAIL**

**RESURFACING**

Existing standard shoulder paved width

Proposed HMA stabilization 36 (900) & var.

New grade line of shoulder

Proposed HMA shoulder surface

Variable width

Variable slope

Proposed PCC/HMA penetration into shoulder surface

Hole backfilled with earth or aggregate and capped with an HMA mixture or grout.

**NEW CONSTRUCTION**

Proposed PCC/HMA shoulder width

Proposed PCC/HMA penetration into shoulder surface

Hole backfilled with earth or aggregate and capped with an HMA mixture or grout.

**GENERAL NOTES**

See Standard 462001, 483005, or 483001 for details not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

**DRAWING LEGEND**

- T: Pressed steel plate
- HMA: Hot mix asphalt
- PCC: Portland cement concrete
- VAR: Variable

**DATE**

- 2009: Revised unit to English units
- 2009: Revised reference to bituminous mixture or grout

**STANDARD 630201-06**
SHOULDER WIDENING TRANSITION FOR TANGENT TERMINAL

GENERAL NOTES

50:1 Taper required so the guardrail head will not encroach on the shoulder.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

SECTION A-A

(Notch Head omitted for clarity)

SHOULDER WIDENING FOR TYPE 1 (SPECIAL) GUARDRAIL TERMINALS

STANDARD 630301-06
GUARDRAIL TERMINALS
TYPE 1 (SPECIAL)

SHOULDER WIDENING FOR
STANDARD 630301-06

(Sheet 2 of 2)

FOR FLARED TERMINAL

SHOULDER WIDENING TRANSITION
FOR FLARED TERMINAL

Impacts have been omitted for clarity.

SECTION B-B

Impact Head omitted for clarity.

Slopes:

- Edge of pavement:
  - 2013
  - 30° (632) or flatter

- Edge of shoulder:
  - 2013
  - 22'-6'' (7.0 m) min.
  - 25'-0'' (7.5 m) min.
  - 25'-0'' (7.5 m)

- Top of tube:
  - 2012
  - 2'-0'' (610)

Pay limits of other type:

- 1:4 desirable

Pay limits of other type:

- 5'-0'' (1.5 m) use 1:3 max.
  - (if fill height exceeds 5'-0'' (1.5 m))

Pay limits of other type:

- 12'-6'' (3.8 m)

- 10'-0'' (3.0 m)

- 5'-0'' (1.5 m)

Pay limits of other type:

- 5'-0'' (1.5 m)

Pay limits of other type:

- 37'-6'' (11.4 m) min. length of need

Pay limits of other type:

- 12'-6'' (3.8 m)

- 10'-0'' (3.0 m)

Pay limits of other type:

- 35'-0'' (10.0 m) min.

Pay limits of other type:

- 100'-0'' (30.0 m) desirable

Pay limits of other type:

- 2'-0'' (610) (Impact Head omitted for clarity.)

Pay limits of other type:

- 5'-0'' (1.5 m) use 1:3 max.

Pay limits of other type:

- 30 (762) to 4'-0'' (1.2 m) Variable

Pay limits of other type:

- or flatter

Pay limits of other type:

- Slope 1:10

Pay limits of other type:

- 37'-6'' (11.4 m) min. length of need

Pay limits of other type:

- 12'-6'' (3.8 m)

Pay limits of other type:

- 10'-0'' (3.0 m)

Pay limits of other type:

- 5'-0'' (1.5 m)

Pay limits of other type:

- 35'-0'' (10.0 m) min.

Pay limits of other type:

- 100'-0'' (30.0 m) desirable

Pay limits of other type:

- 2'-0'' (610) (Impact Head omitted for clarity.)

Pay limits of other type:

- 30 (762) to 4'-0'' (1.2 m) Variable

Pay limits of other type:

- or flatter

Pay limits of other type:

- Slope 1:10

Pay limits of other type:

- 37'-6'' (11.4 m) min. length of need

Pay limits of other type:

- 12'-6'' (3.8 m)

Pay limits of other type:

- 10'-0'' (3.0 m)

Pay limits of other type:

- 5'-0'' (1.5 m)

Pay limits of other type:

- 35'-0'' (10.0 m) min.

Pay limits of other type:

- 100'-0'' (30.0 m) desirable

Pay limits of other type:

- 2'-0'' (610) (Impact Head omitted for clarity.)

Pay limits of other type:

- 30 (762) to 4'-0'' (1.2 m) Variable

Pay limits of other type:

- or flatter

Pay limits of other type:

- Slope 1:10

Pay limits of other type:

- 37'-6'' (11.4 m) min. length of need

Pay limits of other type:

- 12'-6'' (3.8 m)

Pay limits of other type:

- 10'-0'' (3.0 m)

Pay limits of other type:

- 5'-0'' (1.5 m)

Pay limits of other type:

- 35'-0'' (10.0 m) min.
TRAFFIC BARRIER
TERMINAL, TYPE 1B

STANDARD 631006-08

GENERAL NOTES
See standard 630001 for details of guardrail not shown.

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER
TERMINAL, TYPE 1B

STANDARD 631006-08
**Illinois Department of Transportation**

**PASSED**

**ENGINEER OF PRODUCIBILITY**

**APPROVED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ISSUED**

January 1, 1997

---

**TRAFFIC BARRIER TERMINAL TYPE 2 (1 each)**

**GUARDRAIL TYPE A or TYPE B**

Pay limits of STEEL PLATE BEAM for all types

This post required for all types

Revised dimensions for post

Corrected metric dimension

See Standard 630001 for details of guardrail not shown.

The bearing plate K shall be held in position by two eight penny nails driven into the post and bent over the top of the plate.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**GENERAL NOTES**

---

**TRAFFIC BARRIER TERMINAL, TYPE 2**

**STANDARD 631011-09**
**PLATE WASHER D**

- Tack weld
- 

**PLATE E**

- 1½ (127) Dia. steel rod
- ¼ (19) Dia. hole

**PLATE G**

- 1½ (127) Dia. holes
- Bevel to conform with the taper of the parapet or wingwall in the field.

**WEDGE M**

**GENERAL NOTES**

- Install plate washer D so the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate G after the 1 (M24) dia. bolts are in place.
- When an expansion joint exists below the connector, bolts shall be provided with a locknut or double nuts and shall be tightened only to a point that will allow plate G to be free to move.

See Standard 630001 for details of guardrail not otherwise shown.

All dimensions are in inches (millimeters) unless otherwise shown.
Detailed engineering specifications for traffic barrier terminal type 6, including materials, dimensions, and assembly instructions. The diagram illustrates the components such as parapet or wingwall, concrete parapet, steel bearing plate, and steel post. GENERAL NOTES section provides additional details and instructions for the installation and use of the traffic barrier system.
TRAFFIC BARRIER
TERMINAL, TYPE 6

STANDARD 631031-14

April 1, 2016

(Shed 2 of 3)

OTHER CONCRETE STRUCTURE

Concrete structure

24 (610) min. all posts

ELEVATION

Wood Blockout

Steel post

Approach curb, see PLAN for details.

Five 3/4 in. (20) anchor bolts secured with sheeted collars and five standard washers. After tightening, cut the anchor bolts flush with the nuts, and damage the nuts to prevent them from loosening.

Royfeins of TRAFFIC BARRIER TERMINAL TYPE 6 (3 each)

Transition section (see detail) included in TRAFFIC BARRIER TERMINAL TYPE 6

See Standard 630000

Single section of w-beam

Single section of thrie beam

One set inside the other

Two sections of thrie beam

One set inside the other

Pay limits of TRAFFIC BARRIER TERMINAL TYPE 6 (4 each)

Pay limits of other type

Pay limits of other type

See Standard 630001

9'-4" (2.86 m)

6 spaces at 1'-6" (476)

Concrete

Thrie beam

Steel post

W6x9.0 (W150x13.5)

1:10 or flatter

11 spaces at 3'-1" (953)

Slope 1:2 (max.)

1:2 (max.)

Other concrete structure

April 1, 2016

Nut to prevent them from loosening.

After tightening, cut the anchor bolts flush with the nuts, and damage the washers. After tightening, cut the anchor bolts flush with the nuts, and damage the washers.

Flange (W150x13.5)

Screw (M20) or flatter
**Traffic Barrier Terminal, Type 6A**

**Plan**
- Transition section (see detail)
- Included in Traffic Barrier Terminal Type 6

**Elevation**
- 24 (600) min. of posts
- Wood Blockout
- Steel post
- 96x5.0 (450x1.2) mm

**Section A-A**
- Wood Blockout
- 96x5.0 (450x1.2) mm

**Section B-B**
- Wood Blockout

**General Notes**
- This standard shows attachment to curb mounted bridge rail. Attachment to side mounted bridge rail is similar.
- See Standard 630001 for details of guardrail not shown.
- Thrie beam rail shall be bolted to block-out at all posts.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).
- All dimensions are in inches (millimeters) unless otherwise shown.

**Pay Items of Traffic Barrier Terminal, Type 6A**
- 3'-9" (1145) max.
- 34'-4" (10.48 m)
- 11 spaces at 3'-1" (953)
- 9'-4" (2.86 m)
- 6 spaces at 1'-6" (476)

**Pay Limits of Traffic Barrier Terminal Type 6A (1 each)**
- Single section of thrie beam
- Two sections of thrie beam
- Modified thrie beam and shoe
- Single section of W-beam
- Thrie beam rail shall be bolted to block-out at all posts.

**Bridge Rail**
- Face of bridge rail
- Modified thrie beam and shoe

**General Information**
- Illinois Department of Transportation
- January 1, 2003
- Revised: January 1, 2013
Section C-C

Guardrail connection plate assembly

- Bolt *2x5 (22x127)
- ** Bolt *2x2 (22x51)

Thrie beam and shoe

Finished surface

Posts 1-11 Wood Blockout Detail

Post 12 Wood Blockout Detail

(modified Thrie beam end shoe detail)

TRANSITION SECTION

Traffic barrier

Terminal, Type 6A

Standard 631032-08

Sheet 2 of 3
GUARDRAIL CONNECTION PLATE ASSEMBLY DETAILS

VIEW D-D

- Transition plate:
  - 6 x 10 x 824
  - 3 holes: 32⁄3 x 38
  - Slotted holes
  - 4 holes: 19 x 38

- Vertical leg of angle:
  - 17 x 6

- Mount for opposite end:
  - Transition plate:
    - 6 x 10 x 824
    - 3 holes: 32⁄3 x 38
    - Slotted holes
    - 4 holes: 19 x 38

- For Curb Mounted Rail:
  - Bolt cap
  - By others

- For Side Mounted Rail:
  - Bolt cap
  - By others

- Connection Angles:
  - Install angles for rail caps using 3⁄4 inch washers and self-locking nuts or nuts and jam nuts, to be provided by others.

DEPARTURE END VIEW

SECTION E-E

- 2 x 1 (25) holes in vert. leg of angle

LEGEND

- 4 x 4 (25) holes

- For 3⁄4 inch bolts and nuts

- Drill and tap 3 holes for 3⁄4 inch bolts.

- Dimensions

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<thead>
<tr>
<th>Dimensions</th>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td>For Curb</td>
<td>83⁄5</td>
<td>1(\frac{1}{2})</td>
</tr>
<tr>
<td>For Side</td>
<td>93⁄5</td>
<td>1(\frac{1}{2})</td>
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</tbody>
</table>

TRAFFIC BARRIER TERMINAL, TYPE 6A

STANDARD 631032-08

(Sheet 3 of 5)
See details of Wood Blockouts A, B, C, & D.

With standard washers, After tightening, cut the anchor bolts flush with the nuts and damage the nuts to prevent them from loosening.

* Five \( \frac{3}{8} \) (M20) anchor bolts secured with chemical adhesive.

* Two sections of thrie beam

* Concrete structure

* Thrie beam rail shall be bolted to block-out at all attachment to concrete structure.

* All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.

* All dimensions are in inches (millimeters) unless otherwise shown.

See Standard 630001 for details of guardrail not shown.

Thrie beam rail shall be bolted to block-out at all posts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.

All dimensions are in inches (millimeters) unless otherwise shown.
TRAFFIC BARRIER TERMINAL TYPE I1

1. Place between the rail element and Plate D.

2. Slotted holes for Tack weld.
Delineators shall be placed 24' (7.3 m) from break point on all interchange ramps and wherever pavement super-elevation exceeds 6% and wherever pavement on all interchange ramps 24' (600 m) from break point, delineators shall be placed.

Type C metal post

4' (900 mm)

3' (600 mm)

Top of post

Grade of superelevation exceeds 6% and wherever pavement on all interchange ramps.

Delineators shall be placed on tangent sections of main line and on curves.

Provide when double reflector unit is required.

Plan - two-way roadways

SECTIONAL VIEW

Curb section

Pavement

Grade of pavement edge

Top of post

24' (7.3 m) max.

24' (600 m) min.

Pavement

Curb section

PLAN - DUAL HIGHWAYS

Two sided reflector unit on the outside of hazardous curves.

Two sided reflector unit on the outside of hazardous curves.

General notes

Delineators on tangent sections of main line roadways shall be placed at 400' (120 m) spacing. Delineators on ramps and acceleration and deceleration lanes shall be placed at a maximum spacing of 100' (30 m).

Refer to Standard 720011 for details of metal post.

Double reflector units shall be used on the outside of all acceleration and deceleration lanes. Single reflector units shall be used on ramps. Delineators shall be used on outside of all curved sections of ramps.

All dimensions are in inches (millimeters) unless otherwise shown.
NOTES

V + W shall not exceed 39 (990). When V exceeds 15 (380), W shall be shortened correspondingly.

T shall not exceed 19 (450) when U exceeds 33 (840). When T exceeds 19 (450), the impervious material shall be removed and the standard anchor shall be used.

Timber blocks shall be nailed to each wood post on the concave side of curve for curves having a radius of less than 600 feet.

GENERAL NOTES

The Engineer will determine the stability of the impervious material for anchoring.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise stated.

Table of Typical Footings for Post and Anchor:

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<thead>
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<th>Item</th>
<th>Size</th>
<th>Note</th>
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<tbody>
<tr>
<td>Post</td>
<td>4x4x6'0&quot;</td>
<td>nailed to post</td>
</tr>
<tr>
<td>Block</td>
<td>(100x150x1.83)</td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td>2x12x18</td>
<td></td>
</tr>
<tr>
<td>Spacer</td>
<td>(50x150)</td>
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</tr>
<tr>
<td>Rail</td>
<td>(150x150x150)</td>
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<tr>
<td>Rail</td>
<td>(50x150x150)</td>
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<tr>
<td>Rail</td>
<td>(50x150x150)</td>
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</tr>
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</table>

View X-X

POST ANCHOR

INTERMEDIATE ANCHOR

DEAD END ANCHOR
END ANCHOR
ARRANGEMENT

INTERMEDIATE ANCHOR
ARRANGEMENT

DEAD END ANCHOR
ARRANGEMENT

TYPICAL STEEL MATERIALS

<table>
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<tr>
<th>Item</th>
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<th>Side Brace</th>
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<td>6x200x600</td>
<td>L 102x76x9.5</td>
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<tr>
<td>Size</td>
<td>G</td>
<td>6x200x600</td>
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</tbody>
</table>

VIEW Y-Y
The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.

See standard 836006 for light pole foundation details where required in concrete barrier.

All dimensions are in inches (millimeters) unless otherwise shown.

**TYPICAL CROSS-SECTION**

**NEW MONOLITHIC PCC BASE**

- This dimension shall be 10 (250) minimum when the barrier is confined by earth.

**NEW OR EXISTING BIT-/PCC BASE WITH OVERLAY CONFINEMENT**

**EXISTING PCC BASE WITH LONGITUDINAL JOINT**

**ANCHORING METHODS**

**VARIABLE CROSS-SECTION**

- When this dimension exceeds 12 (300), the barrier may be cast in two pours. No. 6 x 12 (No. 19 x 300) tie bars at 30 (760) centers, or a suitable keyway, shall be used between the pours.

**GENERAL NOTES**

- The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.

- See standard 836006 for light pole foundation details where required in concrete barrier.

- All dimensions are in inches (millimeters) unless otherwise shown.

**CONCRETE BARRIER, DOUBLE FACE, 32 in. (815 mm) HEIGHT**

**STANDARD 637001-05**
CONCRETE BARRIER,
DOUBLE FACE,
32 in. (815 mm) HEIGHT

EXPANSION JOINT

CONSTRUCTION JOINT

PLAN AT LIGHTING FOUNDATION

ELEVATION AT LIGHTING FOUNDATION

Double Face, Concrete Barrier, Standard 637001-05
The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.

See standard 836011 for light pole foundation details where required in concrete barrier.

All dimensions are in inches (millimeters) unless otherwise shown.
CONCRETE BARRIER,
DOUBLE FACE,
42 in. (1065 mm) HEIGHT

ELEVATION AT LIGHTING FOUNDATION

PLAN AT LIGHTING FOUNDATION

EXPANSION JOINT

CONSTRUCTION JOINT
Expansion Joint

No. 4 (No. 13) Bar 18 (450) long (typ.)

Concrete glare screen

Bend in field screen

Concrete barrier

EXPANSION J O I N T

ELEVATION

Typical Application at Median Obstructions

SECTION A-A

Typical Application at Median Obstructions

CONCRETE GLARE SCREEN

All dimensions are in inches (millimeters) unless otherwise shown.

DATE
1-1-09
1-1-04

REVISIONS
Switched units to English Metric
Revised for F shape barrier

CONCRETE
GLARE SCREEN
STANDARD 638101-02
Each alternate pair of panels shall have a textured surface finish as shown, and shall be alternated with pairs having a smooth finish. The intersection of every two panels having the same finish shall point toward the road as shown.

Finished grade (typ.)

Top of wall

Finished grade

36,000 psi minimum compression of base of wall

36,000 psi minimum compression of base of wall

ELEVATION

SECTION A-A

GENERAL NOTES

Loading for 80 mph (130 km/h) wind with 30% gust factor, normal to wall.

ALLOWABLE STRESSES:

Concrete:

\[ f_{c} = 3,000 \text{ psi} = 20,700 \text{ kPa} \]

Prestressing Steel:

\[ f_{p} = 270,000 \text{ psi} = 1890 \text{ kN/m}^2 \]

Reinforcing Steel:

\[ f_{y} = 40,000 \text{ psi} = 276 \text{ kN/m}^2 \]

Structural Steel:

\[ f_{s} = 50,000 \text{ psi} = 345 \text{ kN/m}^2 \]

Minimum allowable soil bearing pressure:

\[ 36 \text{ ksf} = 1295 \text{ kPa} \]

All dimensions are in inches (millimeters) unless otherwise shown.
No. 4 (No. 13) bars shall be alternated above and below prestressing strands.

NOTE
Each prestressing strand shall be stressed to 16,000 lbs. (71.2 kN)

NOTE
Pitch may vary from 1 (25) min. to 1 2 (50) max.

NOTE
T - thickness of form liner used to obtain surface finish.

ELEVATION
SECTION E-E (for panels with smooth surface finish)

SECTION E-E (for panels with textured surface finish)

SECTION C-C

TEXTURED SURFACE FINISH DETAIL

SIGHT SCREEN PRECAST PRESTRESSED CONCRETE PANEL WALL

<table>
<thead>
<tr>
<th>Nominal Panel Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>8'-0&quot; x 9'-0&quot;</td>
<td>6</td>
<td>12</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot; x 11'-0&quot;</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot; x 13'-0&quot;</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>8'-0&quot; x 15'-0&quot;</td>
<td>1.5</td>
<td>3</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

CONCRETE PANEL WALL
PRECAST PRESTRESSED
STANDARD 639001-02

STANDARD 639001-02

SHIELD 639001-02
Terminal pull post on pull posts
Dome type caps on line posts
Loop type caps on line posts

Tops of all footings shall be rounded
Ties at all footings shall be rounded

DETAIL A
Brace rail 1† (41) O.D.

DETAIL B
Cable tension buckle

DETAIL C
Truss rod

8'-0" (2.43 m) & 10' (3.05 m) FENCES

ELEVATION - 6' (1.83 m) FENCE
(Looking toward highway)

- Fence fabric shall be tied to all line posts, tension cable and brace rails with 9 guage (5/32") wire ties at 12 (300) cts.

HEIGHT
FENCE SECTION (O.D.)
POST ELEVATION - 6' (1.83 m) FENCE
POST ELEVATION - 8' (2.43 m) & 10' (3.05 m) FENCES

GENERAL NOTES

Chain Link Fence
Sight Screen

STANDARD 640001-01
**DETAIL B**  
(Showing typical method of attaching middle brace rail to post.)

- 4 (102) Post
- 1½ (43) Brace rail
- Malleable iron or pressed steel clamps

**DETAIL OF FABRIC**  
(Looking from highway)

- 5/8 x 1 (99 x 27) mesh
- 9 ga. (0.15) Galvanized steel wire or aluminum-coated steel wire.
- 2½ (64) Wide, 9 ga. (0.36) Galvanized steel strips.

**SECTION A-A**  
(Showing method of fastening tension cable and fabric to post and rail.)

- 12 ga. x 1.3 (68 x 25) Stretcher bar
- Stretch bar bands at 12 (300) cts.
- 2½ (64) Wide, 10 (250) Galvanized steel strips.

**PROTECTIVE ELECTRICAL GROUND**

- No. 6 stranded bare copper wire
- 12 ga. (6.35) copper clad steel rod
- 3½ (90) Dia. x 6 (150) in.
- 9 ga. (0.15) Galvanized or aluminum-coated steel wire 3½ (90) x 6 (150) diamond mesh. Exposed ends of steel strips shall be bent over the chain link fabric.

**DETAIL C**  
(Looking toward highway)

- 9 ga. (0.15) Galvanized or aluminum-coated steel wire 3½ (90) x 6 (150) diamond mesh. Exposed ends of steel strips shall be bent over the chain link fabric.

**PLAN**

- 3½ (90) Dia. x 6 (150) in.
- 9 ga. (0.15) Galvanized steel tie wire or approved steel tie wire or approved
- 9 ga. (0.36) Galvanized or aluminum-coated steel wire

**FENCE INSTALLATION ON SLOPES**

- 12 ga. (3.6) min. x 3½ (131) bond
- 1½ (43) Brace rail
- Malleable iron or pressed steel clamps

**DETAIL A**

- 4 (102) Post
- 3½ (90) Dia. x 6 (150) in. copper clad steel rod
- 12 ga. (6.35) copper clad steel rod

**SIGHT SCREEN**  
CHAIN LINK FENCE
DETAIL A

- 3x4 (75x100) Rails (nominal dim.)
- Cedar pickets
- Spacing (typ.) 7'-4" (2.2 m)

DETAIL B

- Fence height (75 | 50)
- Distance (typ.) 3 | 2

SECTION B-B

- Pickets vertical with grade
- Rails parallel to grade
- Vertical posts

GENERAL NOTES

Loading is based on 80 mph (130 km/h) with a gust factor. Minimum allowable soil pressure = 1,250 psf (120 kPa).

All dimensions are in inches (millimeters) unless otherwise shown.
**PLAN**  (Facing highway)

- 3x4 (75x100) Rails (nominal dim.)
- Post (Facing highway)
- 1x4 (25x100) rough sawn or surfaced wood planks (nominal dim.)

**ELEVATION**

- Fence height
  - 6'-0" (1.8 m)
  - 8'-0" (2.4 m)
  - 10'-0" (3.0 m)
  - 14'-0" (4.3 m)

**Details**

- **DETAIL A**
  - Vertical posts
  - Install planks vertical to grade
  - Slope rails parallel to grade

- **DETAIL B**
  - 1/2 (M12) bolt with 24" (600) plate washers under nut and split head, 1/2 (15) dia. holes in beams.
  - Min. 1 nail per plank.
  - Nails at max. 3 (75) cts. per plank.
  - Min. 1 nail per plank.

**GENERAL NOTES**

Loading was based on 80 mph (130 km/h) with 30% gust factor. Minimum allowable soil pressure = 125 psf (120 kPa). All dimensions are in inches (millimeters) unless otherwise shown.

**REFERENCE**

- Section B-B to Detail B.
- Deleted DN Symbol.
pavement
Edge of shoulder

(300) 12
(175) 7

Varies (400) 16

(300) 12 (400) 16

Varies

pavement
Edge of shoulder

Varies

pavement
Edge of shoulder

Varies

pavement
Edge of shoulder

Varies

pavement
Edge of shoulder

Varies

Rumble strips

Exit ramp

Gore

Entrance ramp

Gore

TYPICAL APPLICATION AT AN INTERCHANGE

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE

HALF PLAN

GENERAL NOTES

On Portland cement concrete shoulders, no shoulder rumble strip shall be located closer than
6 (150) to a transverse joint.

Shoulder rumble strip shall be located closer than
6 (150) to a transverse joint.

Omit shoulder rumble strips across structures.

All dimensions are in inches (millimeters) unless otherwise shown.
**TYPICAL APPLICATION AT AN INTERSECTION OR ENTRANCE**

- Rumble strip over 48' (14.6 m) span
- Edge of pavement
- Edge of paved shoulder
- Shoulder

**GENERAL NOTES**

- Shoulder rumble strips are for structures and at mailbox turnouts.
- All dimensions are in inches (millimeters) unless otherwise shown.

**PLAN**

- See Section A-A.

**SECTION A-A**

**SECTION B-B**

**SHOULDER RUMBLE STRIPS, 8 in.**

**STANDARD 642006**
**Impact Attenuators**

**Sand Module**

**Standard 643001-02**

**Gore Installation**

*Traffic approaches on both sides*

(Test Level 2 array shown)

**Roadside Installation**

*Traffic approaches on one side*

(Test Level 2 array shown)

**Test Level 2 Array**

*For design speed less than or equal to 45 mph*

*Numbers inside sand modules indicate sand weight in pounds*

**Test Level 3 Array**

*For design speed greater than 45 mph*

*Numbers inside sand modules indicate sand weight in pounds*

**General Notes**

All dimensions are in inches (millimeters) unless otherwise shown.

- **January 1, 2013**
- **November 1, 2014**
- **January 1, 2014**
- **Issued 1-1-97**

**PASSED**

**Engineer of Policy and Procedures**

**Engineer of Design and Environment**

**Approved**
**CHAIN LINK FENCE**

**STANDARD 664001-02**

- **0.0747 (2) Thick**
- **0.1345 (3.5) Thick**

**Roll Formed Section of Terminal & Gate Post**

- **Stretcher Bar to Post**
- **Method of Fastening Stretcher Bar to Post**
- **Method of TYING Fabric to Tension Wires**

**Chain Link Fence Standard 664001-02**

- **Lock Loops**
- **Top Tension Wire**
- **Bottom Tension Wire**
- **Fabric to be woven into the lock loops for the entire length of post.**

**GATE POSTS**

- **Pipe Type A**
- **Pipe Type B**
- **Pipe Type C**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.90 (48.3)</td>
<td>Pipe Type A</td>
<td>2.375 (60.3)</td>
<td>5.43 (3.65)</td>
</tr>
<tr>
<td>B</td>
<td>1.90 (48.3)</td>
<td>Pipe Type B</td>
<td>2.375 (60.3)</td>
<td>5.43 (3.65)</td>
</tr>
<tr>
<td>C</td>
<td>1.90 (48.3)</td>
<td>Pipe Type C</td>
<td>2.375 (60.3)</td>
<td>5.43 (3.65)</td>
</tr>
</tbody>
</table>

**TERMINAL POST**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
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<th>Weight per ft.</th>
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<td>5.43 (3.65)</td>
</tr>
<tr>
<td>C</td>
<td>1.90 (48.3)</td>
<td>Pipe Type C</td>
<td>2.375 (60.3)</td>
<td>5.43 (3.65)</td>
</tr>
</tbody>
</table>

**HORIZONTAL BRACES**

- **Pipe Type A**
- **Pipe Type B**
- **Pipe Type C**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.66 (42.2)</td>
<td>Pipe Type A</td>
<td>1.66 (42.2)</td>
<td>2.26 (3.36)</td>
</tr>
<tr>
<td>B</td>
<td>1.66 (42.2)</td>
<td>Pipe Type B</td>
<td>1.66 (42.2)</td>
<td>2.26 (3.36)</td>
</tr>
<tr>
<td>C</td>
<td>1.66 (42.2)</td>
<td>Pipe Type C</td>
<td>1.66 (42.2)</td>
<td>2.26 (3.36)</td>
</tr>
</tbody>
</table>

**ROLL FORMED Section of Brace**

- **Pipe Type A**
- **Pipe Type B**
- **Pipe Type C**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.90 (48.3)</td>
<td>Pipe Type A</td>
<td>1.90 (48.3)</td>
<td>2.72 (3.38)</td>
</tr>
<tr>
<td>B</td>
<td>1.90 (48.3)</td>
<td>Pipe Type B</td>
<td>1.90 (48.3)</td>
<td>2.72 (3.38)</td>
</tr>
<tr>
<td>C</td>
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<td>Pipe Type C</td>
<td>1.90 (48.3)</td>
<td>2.72 (3.38)</td>
</tr>
</tbody>
</table>

**GATE FRAMES**

- **Pipe Type A**
- **Pipe Type B**
- **Pipe Type C**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
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<td>Pipe Type B</td>
<td>1.66 (42.2)</td>
<td>2.26 (3.36)</td>
</tr>
<tr>
<td>C</td>
<td>1.66 (42.2)</td>
<td>Pipe Type C</td>
<td>1.66 (42.2)</td>
<td>2.26 (3.36)</td>
</tr>
</tbody>
</table>

**SECTION OF BRACE**

- **Roll Formed**
- **Square Tubing**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
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<tbody>
<tr>
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<td>Pipe Type B</td>
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<td>2.72 (3.38)</td>
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<tr>
<td>C</td>
<td>1.90 (48.3)</td>
<td>Pipe Type C</td>
<td>1.90 (48.3)</td>
<td>2.72 (3.38)</td>
</tr>
</tbody>
</table>

**METHOD OF TYING FABRIC TO TENSION WIRES**

- **Knucked selvage**
- **Barbed or knucked selvage**

**METHOD OF FASTENING STRETCHER BAR TO POST**

<table>
<thead>
<tr>
<th>Type</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.90 (48.3)</td>
<td>Pipe Type A</td>
<td>1.90 (48.3)</td>
</tr>
<tr>
<td>B</td>
<td>1.90 (48.3)</td>
<td>Pipe Type B</td>
<td>1.90 (48.3)</td>
</tr>
<tr>
<td>C</td>
<td>1.90 (48.3)</td>
<td>Pipe Type C</td>
<td>1.90 (48.3)</td>
</tr>
</tbody>
</table>

**GATE POSTS**

- **Type**
- **Size (O.D.)**
- **Section**
- **Weight per ft.**
- **Weight per kg/m**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (O.D.)</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
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<tr>
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<td>Pipe Type A</td>
<td>1.90 (48.3)</td>
<td>2.72 (3.38)</td>
</tr>
<tr>
<td>B</td>
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<td>Pipe Type B</td>
<td>1.90 (48.3)</td>
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</tr>
<tr>
<td>C</td>
<td>1.90 (48.3)</td>
<td>Pipe Type C</td>
<td>1.90 (48.3)</td>
<td>2.72 (3.38)</td>
</tr>
</tbody>
</table>

**Gate Opening**

- **Single**
- **Double**

<table>
<thead>
<tr>
<th>Size (O.D.)</th>
<th>Section</th>
<th>Weight per ft.</th>
<th>Weight per kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (1.2)</td>
<td>Pipe Type A</td>
<td>2.72 (3.38)</td>
<td>5.43 (3.65)</td>
</tr>
<tr>
<td>Over 4 (1.2) to 8 (2.5)</td>
<td>Pipe Type B</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 8 (2.5) to 16 (5.0)</td>
<td>Pipe Type C</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 16 (5.0) to 24 (7.4)</td>
<td>Pipe Type A</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 24 (7.4) to 36 (11)</td>
<td>Pipe Type B</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 36 (11) to 48 (15)</td>
<td>Pipe Type C</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 48 (15) to 60 (18)</td>
<td>Pipe Type A</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 60 (18) to 80 (24)</td>
<td>Pipe Type B</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 80 (24) to 100 (30)</td>
<td>Pipe Type C</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 100 (30) to 120 (36)</td>
<td>Pipe Type A</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 120 (36) to 140 (40)</td>
<td>Pipe Type B</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 140 (40) to 160 (42)</td>
<td>Pipe Type C</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 160 (42) to 200 (50)</td>
<td>Pipe Type A</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 200 (50) to 250 (60)</td>
<td>Pipe Type B</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
<tr>
<td>Over 250 (60) to 350 (80)</td>
<td>Pipe Type C</td>
<td>2.875 (73.0)</td>
<td>6.1 (8.60)</td>
</tr>
</tbody>
</table>

*For 3½” x 3½” (89.0 x 89.0) roll formed section as detailed may be used as gate posts for single gate up to 6' (1.8 m) and double gate up to 12' (3.6 m).
**CHAIN LINK FENCE**

**STANDARD 664001-02**

**INSTALLATION ON SLOPES**

- When fence line has a change in direction of 15° or more, a terminal post shall be placed as shown above.
- Where angle is less than 15° and existing conditions require a terminal post, they shall be placed as directed by the Engineer.

**INSTALLATION AT CORNERS**

- The chain link fabric shall be replaced by barbed wire (4 strands at 12 (300) maximum centers) between the double posts shown on DETAIL A when shown on the plans.

**INSTALLATION OVER STREAM**

- When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.

**DETIAL A**

- Post not centered in concrete.
- 36" (900) for 4' (1.2 m) fence.
- 3'-6" (1.0 m) for over 4' (1.2 m) fence.

**COUNTERPOISE GROUND (ALTERNATE)**

**INSTALLATION AT HEADWALL**

- When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.

**PROTECTIVE ELECTRICAL GROUNDS**

- The chain link fabric shall be replaced by barbed wire (4 strands at 12 (300) maximum centers) between the double posts shown on DETAIL A when shown on the plans.

**INSTALLATION AROUND HEADWALL**

- Post not centered in concrete.
Gate frame padlocking provisions for Gate latch with Gate post steel rod (typ.) dia. galvanized Truss rod - … (10)

Gate post Brace (300) 12
(50) 2

Concrete Gate opening (typ.) 6'-6" (1.98 m) (685) 27
(50) 2

min. (typ.) 12 (300) Dia.

Gate frame on gates over 12' (3.66 m) long, and 2-braces spaced Center brace on gates 7' (2.13 m) to Center brace on gates 7' (2.13 m) to 19' (5.8 m) long, and 2-braces spaced 19' (5.8 m) long, and 2-braces spaced on gates over 19' (5.8 m) long on gates over 19' (5.8 m) long Plunger rod and latch with provisions for padlocking Plunger rod and latch with provisions for padlocking

Woven wire fence using metal posts

SINGLE GATE

DOUBLE GATE

PULL POST

LINE POST

CORNER OR END POST

NOTES

Bordered wires shall be tied to each post. Top and bottom wires of woven fence shall be tied to each post. To every other wire between, alternating on successive posts.

Bordered wires and line wires of woven fence shall be be fastened to the corner, end, pull, and gate posts by wrapping the wires around the post and tying back on itself with not less than 3 twists tightly wrapped.

GENERAL NOTES

Pull posts shall be placed at the locations determined by the Engineer. They shall be placed at 660' (200 m) intervals between posts to which the ends of the fabric and barbed wires are fastened, or midway between such posts when the distance is less than 1320' (400 m) and greater than 660' (200 m).

Bracing for gate posts shall be the same type used for end posts.

The clearance between the bottom fence wire and the ground may be up to 3 (15) for a maximum distance of 8' (2.4 m) when uneven ground is encountered.

All dimensions are in inches (millimeters) unless otherwise shown.

EVD

DATE

REVISIONS

5/1/09

Corrected units to English metric.

11/1/02

Sheet 1 of 4

STANDARD 665001-02
FENCE USING WOOD POSTS

**SINGLE OR DOUBLE GATE**

- Gate post
- Line post
- Brace post
- Brace wire
- Wood post
- Wood block

**PULL POST**

- Pull post
- Ground line
- Wood block

**LINE POST**

- Woven wire fence
- Line post
- Barbed wire
- Brace wire
- Wood post
- Wood block

**CORNER OR END POST**

- Brace post
- Brace wire
- Wood post
- Wood block

**NOTES**

- Barbed wires shall be stapled to each post. Top and bottom wire of woven fence shall be stapled to each post. Staple every other wire between, alternating on successive posts.
- Metal line posts may be used in lieu of wood line posts.

**SECTION X-X**

Woven wire fence standard 665001-02

- Fence shall be overlapped for a distance of 5'-0" (1.5 m) - Wood brace
- Not less than 3 twists tightly wrapped

- Pull post
- Not more than 3 twists tightly wrapped
- Brace post
- Brace wire
- Corner or end post

- Brace wires attached to posts on 3 sides.

- One bay of bracing for run of fence less than 100'-0" (30 m) to corner, end or gate post.
- Three bays of bracing for run of fence 300'-0" (92 m) or more to corner or gate or pull post.
- Three bays of bracing for run of fence 300'-0" (92 m) or more to corner, end or gate or pull post.

Illinois Department of Transportation
PASSED
ENGINEER OF POLICY AND PROCEDURES
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
January 1, 2009
ISSUED 1-1-97
### Metal Items

#### Gate Frames

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 1.66 (42.2) O.D.</td>
<td>2.27 (4.04)</td>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>3.21 (4.91)</td>
</tr>
<tr>
<td>Type B: Pipe 1.66 (42.2) O.D.</td>
<td>2.04 (3.32)</td>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>3.01 (4.81)</td>
</tr>
<tr>
<td>Type C: Pipe 1.66 (42.2) O.D.</td>
<td>1.82 (2.71)</td>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>2.82 (4.35)</td>
</tr>
</tbody>
</table>

#### Corner, End or Pull Posts

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 1.66 (42.2) O.D.</td>
<td>5.55 (8.61)</td>
<td>Type A: Pipe 1.315 (33.4) O.D.</td>
<td>3.65 (5.43)</td>
</tr>
<tr>
<td>Type B: Pipe 1.66 (42.2) O.D.</td>
<td>5.03 (7.75)</td>
<td>Type B: Pipe 1.315 (33.4) O.D.</td>
<td>3.11 (4.63)</td>
</tr>
<tr>
<td>Type C: Pipe 1.66 (42.2) O.D.</td>
<td>4.51 (6.82)</td>
<td>Type C: Pipe 1.315 (33.4) O.D.</td>
<td>2.67 (4.00)</td>
</tr>
</tbody>
</table>

#### Line Posts

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
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<th>lbs./ft. (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>5.79 (8.80)</td>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>3.19 (4.75)</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>5.07 (7.70)</td>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>2.87 (4.30)</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>4.35 (6.51)</td>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>2.61 (3.91)</td>
</tr>
</tbody>
</table>

#### Hinges

<table>
<thead>
<tr>
<th>Section</th>
<th>lbs./ft. (kg/m)</th>
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</tr>
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<tbody>
<tr>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>3.01 (4.81)</td>
<td>Type A: Pipe 2.375 (60.3) O.D.</td>
<td>2.27 (3.47)</td>
</tr>
<tr>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>2.78 (4.20)</td>
<td>Type B: Pipe 2.375 (60.3) O.D.</td>
<td>2.04 (3.20)</td>
</tr>
<tr>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>2.50 (3.80)</td>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>1.77 (2.70)</td>
</tr>
</tbody>
</table>

### Wood Items

#### Gate Posts

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<td>1.77 (2.70)</td>
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</table>

#### Hinges and Line Posts

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<td>1.77 (2.70)</td>
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</tbody>
</table>

#### Blocks

<table>
<thead>
<tr>
<th>Section</th>
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<tr>
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<td>2.50 (3.80)</td>
<td>Type C: Pipe 2.375 (60.3) O.D.</td>
<td>1.77 (2.70)</td>
</tr>
</tbody>
</table>

### Woven Wire Fence

```
<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>Pipe</td>
<td>2.375 (60.3) O.D.</td>
</tr>
<tr>
<td>Type B</td>
<td>Pipe</td>
<td>2.375 (60.3) O.D.</td>
</tr>
<tr>
<td>Type C</td>
<td>Pipe</td>
<td>2.375 (60.3) O.D.</td>
</tr>
<tr>
<td>Angle</td>
<td>Tubing</td>
<td>2.875 (73.0) O.D.</td>
</tr>
<tr>
<td>Angle</td>
<td>Structural shapes</td>
<td>3 (76.2) Sq.</td>
</tr>
<tr>
<td>Angle</td>
<td>Structural shapes</td>
<td>3 (76.2) Sq.</td>
</tr>
<tr>
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<td>Structural shapes</td>
<td>3 (76.2) Sq.</td>
</tr>
</tbody>
</table>
```
FOOTING FOR POSTS

WHEN ROCK LEDGE IS ENCOUNTERED

ALTERNATE DETAILS FOR FASTENING

WOOD BRACE TO WOOD POST

INSTALLATION AT CORNERS

WHERE A FENCE LINE HAS A CHANGE IN DIRECTION OF 15° OR MORE, A CORNER POST WITH BRACING AS REQUIRED SHALL BE PLACED AS SHOWN ABOVE. WHERE ANGLE IS LESS THAN 15° AND EXISTING CONDITIONS REQUIRE A CORNER POST, THEY SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

INSTALLATION OVER STREAM

NOTE
WHERE A FENCE LINE HAS A CHANGE IN SLOPE OF 15° OR MORE, A CORNER POST WITH BRACING AS REQUIRED SHALL BE PLACED AS SHOWN ABOVE. WHERE ANGLE IS LESS THAN 15°, THE POSTS MAY BE USED.

INSTALLATION ON SLOPES

NOTE
WHERE GRADE LINE HAS A CHANGE IN SLOPE OF 15° OR MORE, A CORNER POST WITH BRACING AS REQUIRED SHALL BE PLACED AS SHOWN ABOVE. WHERE ANGLE IS LESS THAN 15°, THE POSTS MAY BE USED.

INSTALLATION AROUND HEADWALL

NOTE
WHERE THE WIDTH OF THE CULVERT MAKES IT NECESSARY TO ANCHOR A POST TO THE TOP OF THE CULVERT, A CAST IRON SHOE OR OTHER DEVICE APPROVED BY THE ENGINEER SHALL BE USED.
All dimensions are in inches (millimeters) unless otherwise shown.

DRAINAGE MARKERS

SECTION A-A

SECTION B-B

FRONT ELEVATION

DRAINAGE MARKERS

STANDARD 667001-01
Tablet constructed in rock ledge or concrete.

**TYPE I**

**ALUMINUM TABLET**

- Magnet when required
- Magnet required: 3/4 ' (10 mm), 1/4 " (6 mm) thick

Use cement and water or approved chemical adhesive to seal marker tablet in rock ledge, concrete pavement or structure. Hole shall be 1/2 " (13 mm) in diameter.

**DETAIL A**

- Ground surface
- Use DETAIL A

**PRECAST MARKER TYPE II**

- Walls: 12" (300 mm) min. in dist. 1, 2, 3, & 4
- Walls: 36" (900 mm) min. in dist. 5, 6, 7, 8, & 9

- Core: 6" (150 mm) dia.
- Core: Solid concrete
- Core: No. 3 (No. 10) bars to be 30" (750 mm) for 36" (900 mm) min. & 3'-6" (1.1 m) for 4'-0" (1.2 m) min.

**CAST-IN-PLACE MARKER**

- Core: 13/4 (40 mm) dia.
- Core: No. 3 (No. 10) bars
- Core: Min. 12" (300 mm)

- Ground surface
- Use DETAIL A

**SURVEY MARKERS**

- English (metric)

**PERMANENT**

- All dimensions are in inches (millimeters) unless otherwise shown.

- Switched units to English (metric)
See DETAIL A

Ground surface

Concrete

ELEVATION

All dimensions are in inches (millimeters) unless otherwise shown.

U.S. GEOLOGICAL SURVEY AND NATIONAL GEODETIC SURVEY
BENCHMARKS resetting method

STANDARD 668001-01
TYPICAL APPLICATIONS

- Landscaping work
- Utility work
- Fencing contracts and maintenance
- Cleaning culverts

GENERAL NOTES

This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clear zone in any one hour, traffic control shall be according to Standard 701006.

All dimensions are in inches (millimeters) unless otherwise shown.

OFF-RD OPERATIONS, 2L, 2W, MORE THAN 15' (4.5 m) AWAY

DATE | REVISIONS
--- | ---
1-1-97 | APPROVED
1-1-05 | ENGINEER OF OPERATIONS
1-1-09 | ENGINEER OF DESIGN AND ENVIRONMENT
1-1-09 | Issued
TYPICAL APPLICATIONS
- Utility operations
- Culvert extensions
- Side slope changes
- Guardian installation and maintenance
- Delineator installation
- Landscaping operations
- Shoulder repair
- Sign installation and maintenance

SYMBOLS
- Work area
- Sign
- Cone, drum or barricade

GENERAL NOTES
This Standard is used where any vehicles, equipment, workers or their activities will encroach in the area 15' (4.5 m) to 24' (600 mm) from the edge of pavement.

Calculate L as follows:

\[ L = \begin{cases} \frac{W \times S}{2} & \text{if } 45 \text{ mph (70 km/h)} \\ \frac{W \times S^2}{40} & \text{if } 45 \text{ mph (80 km/h)} \end{cases} \]

L = 0.65(W)(S)
in feet (meters).

\( L = \) Width of offset
\( W = \) Normal posted speed
\( S = \) Speed limit

For contract construction projects:
- For maintenance and utility projects:

When the work operation exceeds one hour, cones, drums or barricades shall be placed at 15' (4.5 m) centers for L/3 distances, and at 30' (9 m) centers through the remainder of the work area.

FORMULAS

\[ L = \begin{cases} \frac{W \times S}{2} & \text{if } 45 \text{ mph (70 km/h)} \\ \frac{W \times S^2}{40} & \text{if } 45 \text{ mph (80 km/h)} \end{cases} \]

\( L = 0.65(W)(S) \)
in feet (meters).

Dimensions are in inches (millimeters) unless otherwise shown.

OFF-RD OPERATIONS, 2L, 2W, 15' (4.5 m) TO 24' (600 mm)
FROM PAVEMENT EDGE

STANDARD 701006-05
GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

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When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

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When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign when required

TYPICAL APPLICATIONS

Shoulder work, utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require or influence on intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 70110.

All dimensions are in inches (millimeters) unless otherwise shown.
TYPICAL APPLICATIONS

Utility operations
Culvert extensions
Side slope changes
Guardrail installation and maintenance
Delineator installation
Landscaping operations
Shoulder repair
Sign installation and maintenance

SYMBOLS

Work area
b Sign
O Cone, drum or barricade

FORMULAS

Calculate L as follows:

\[ L = \frac{W \cdot S}{60} \]

FOR DESIGNS IN MILES, USE

\[ L = \frac{W \cdot S}{90} \]

GENERAL NOTES

This Standard is used where any vehicles, equipment, workers or their activities will encroach in the area 15' (4.5 m) to 24" (600 mm) from the edge of pavement.

Calculate L as follows:

SPEED LIMIT

Calculate L as follows:

\[ L = \frac{W \cdot S}{60} \]

FOR DESIGNS IN MILES, USE

\[ L = \frac{W \cdot S}{90} \]

All dimensions are in inches (millimeters) unless otherwise shown.

FORMULAS

Calculate L as follows:

\[ L = \frac{W \cdot S}{60} \]

FOR DESIGNS IN MILES, USE

\[ L = \frac{W \cdot S}{90} \]

All dimensions are in inches (millimeters) unless otherwise shown.

FORMULAS

Calculate L as follows:

\[ L = \frac{W \cdot S}{60} \]

FOR DESIGNS IN MILES, USE

\[ L = \frac{W \cdot S}{90} \]

All dimensions are in inches (millimeters) unless otherwise shown.
TYPICAL APPLICATIONS
- Landscaping work
- Utility work
- Fencing contracts

GENERAL NOTES

This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clear zone in any one hour, traffic control shall be according to Standard 701106.

This Standard also applies to work performed in the median more than 15' (4.5 m) from either pavement.

All dimensions are in inches (millimeters) unless otherwise shown.
For contract projects and utility operations, where work areas exceed 2000' (600 m), additional warning signs, flaggers, and taper shall be placed as shown.

Additional cones may be placed at 50' (15 m) centers. When drums or barricades are used, the interval between devices may be doubled.

Cone, drum or barricade

Flagger with traffic control sign

TYPICAL APPLICATIONS

Isolated patching
Utility operations
Storm sewer
Culverts
Cable placement

SYMBOLS

GENERAL NOTES

This standard is used where at any time, any vehicles, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) outside the edge of pavement for daylight operation.

When the distance between successive work areas exceeds 2000' (600 m), additional warning signs, flaggers, and taper shall be placed as shown.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W,
DAY ONLY,
FOR SPEEDS ≥ 45 MPH

STANDARD 701201-04
Illinois Department of Transportation
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED 1-1-11

TYPICAL APPLICATIONS

FOR SPEEDS ≥ 45 MPH
LANE CLOSURE, 2L, 2W,
NIGHT ONLY.

GENERAL NOTES

For contract projects and utility operations, installation of drainage structure will encroach in the area between the center line and a line 24 (600) from the edge of pavement for nighttime operation.

TYPICAL APPLICATIONS

Symbol

- Flagger with traffic control sign
- Flagger or crew with traffic control sign
- Barricade or drum
- Barricade or drum with flashing light
- Barricade or drum with steady burning light

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) from the edge of pavement for nighttime operation.

Switched units to English (metric).

FOR SPEEDS > 45 MPH
NIGHT ONLY,
LANE CLOSURE, 2L, 2W,
STANDARD 701206-03

SYMBOLS
For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period of less than 15 minutes.

Vehicle with dual flashers or flashing amber dome light operating.

For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period of less than 60 minutes.

Vehicle with dual flashers or flashing amber dome light operating.

For any operation that is more than 24 (600) outside the edge of the pavement for a period of less than 60 minutes.

Vehicle with dual flashers or flashing amber dome light operating.

For any operation that encroaches in the area between the centerline and a line 24 (600) outside the edge of the pavement for a period in excess of 15 minutes but less than 60 minutes.

Vehicle with dual flashers or flashing amber dome light operating.

TYPICAL APPLICATIONS
- Cleaning up debris on pavement
- Utility operations
- Field survey

SYMBOLS
- Work area
- Sign on portable or permanent support
- Flagger with traffic control sign

SIGN SPACING
- Posted Speed
- Sign Spacing: 45, 100 (150 m); 50-45, 150 (100 m); 200 (60 m)

STANDARD 701301-04
TYPICAL APPLICATIONS
- Bituminous resurfacing
- Milling operations
- Utility operations
- Shoulder operations

SYMBOLS
- Work area
- Sign on portable or permanent support
- Flagger with traffic control sign

GENERAL NOTES
This Standard is used where at any time, any vehicles, equipment, workers or their activities require an intermittent or continuous moving operation on the pavement where the average speed of movement is greater than 1 mph (2 km/h) and less than 4 mph (6 km/h).

When the operation does not exceed 60 minutes, traffic control may be according to Standard 701306-03.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W, SLOW MOVING OPERATIONS DAY ONLY, FOR SPEEDS > 45 MPH

STANDARD 701306-03
TYPICAL APPLICATIONS
- Landscaping work
- Lithified work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Crack paving

SYMBOLS
- Arrow board (Hazard Mode only)
- Truck with headlights, emergency flashers and flashing amber lights
- (visible from all directions)
- Blank (450x450) min. orange flag
  (use when guide wheel is used)
- Truck mounted attenuator

GENERAL NOTES
This Standard is used where any vehicle, equipment, workers or their activities will require a continuous moving operation where the average speed is greater than 3 mph (5 km/h).

For shoulder operations not encompassing on the pavement, use Standard 701311.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE
REVISIONS
- 01-01-00
- 01-01-09

STANDARD 701311-03
LANE CLOSURE 2L, 2W MOVING OPERATIONS—DAY ONLY
For contract construction projects

- **W20-I103(0)-48**
- **W20-4(0)-48**
- **W13-1(0)-2424**
- **W3-3(0)-48**
- **R10-6A-2430**

For maintenance projects

- **W20-1(0)-48**
- **W20-I102(O)-48**
- **W13-1(0)-2424**
- **W3-3(0)-48**
- **R10-6A-2430**

**SYMBOLS**

- **Road area**
- **Sign**
- **Traffic signal**
- **Detector loop**
- **Type III barricade with flashing lights**
- **Drum with steady burning light**
- **Temporary rumble strip (when specified)**
- **Crystal bidirectional guardrail/barrier reflector**
- **Double vertical panel (see detail)**

**LANE CLOSURE, 2L, 2W, BRIDGE REPAIR, FOR SPEEDS > 45 MPH**

**STANDARD 701316-10**
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED 1-1-97

FOR SPEEDS > 45 MPH
BRIDGE REPAIR,
LANE CLOSURE, 2L, 2W,
STANDARD 701316-10

DETECTOR LOOPS

TEMPORARY PAVEMENT MARKING

VERTICAL PANELS
(Post mounted, one each side)

GENERAL NOTES
This Standard is used where, at any time any vehicle, equipment, workers or their activities will encroach on one lane of a bridge and traffic signals are required.

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701201 or 701206.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W,
BRIDGE REPAIR,
FOR SPEEDS > 45 MPH
STANDARD 701316-10

TRAFFIC SIGNAL SEQUENCE

<table>
<thead>
<tr>
<th>PHASE</th>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND OR WESTBOUND</th>
<th>SOUTHBOUND OR EASTBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>G</td>
<td>Y</td>
<td>R</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>R</td>
<td>G</td>
<td>Y</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>Y</td>
<td>R</td>
<td>G</td>
</tr>
<tr>
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<td>R</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>G</td>
<td>R</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>R</td>
<td>G</td>
<td>Y</td>
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</table>

ADVISORY SPEED LIMIT

<table>
<thead>
<tr>
<th>NORMAL POSTED SPEED</th>
<th>ADVISORY SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
</tr>
<tr>
<td>40 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>15 - 30 mph</td>
<td>30 mph</td>
</tr>
</tbody>
</table>

This Standard is used where, at any time any vehicle, equipment, workers or their activities will encroach on one lane of a bridge and traffic signals are required.

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701201 or 701206.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W,
BRIDGE REPAIR,
FOR SPEEDS > 45 MPH
STANDARD 701316-10
**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**ISSUED 1-1-97**

---

**TRAFFIC SIGNAL SEQUENCE**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>INTERVAL</th>
<th>EASTBOUND</th>
<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
<th>WESTBOUND</th>
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</tr>
<tr>
<td>C</td>
<td>3</td>
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<tr>
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<td>R</td>
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<td>E</td>
<td>5</td>
<td>Y</td>
<td>R</td>
<td>R</td>
<td>G</td>
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**ADVISORY SPEED LIMIT**

<table>
<thead>
<tr>
<th>RANGE</th>
<th>POSTED SPEED</th>
<th>ADVISORY SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 45 mph</td>
<td>40 mph</td>
<td>40 mph</td>
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<tr>
<td>40 mph</td>
<td>35 mph</td>
<td>35 mph</td>
</tr>
<tr>
<td>35 - 30 mph</td>
<td>30 mph</td>
<td>30 mph</td>
</tr>
</tbody>
</table>

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**TEMPORARY CONCRETE BARRIER**

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mph and above</td>
<td>1:2</td>
</tr>
<tr>
<td>Below 40 mph</td>
<td>1:4</td>
</tr>
</tbody>
</table>

---

**GENERAL NOTES**

This Standard is used where, at any time, any vehicle, equipment, workers, or their activities will encroach on one lane of a bridge. Traffic signals and a positive barrier are required.

Traffic signals shall be operational only when traffic controls are in place. When traffic signals are not in operation, flaggers shall be used and traffic control shall conform to Standard 701201 or Standard 701206.

Temporary concrete barrier shall be according to Standard 704001.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

All dimensions are in inches (millimeters) unless otherwise shown.

---

**LANE CLOSURE, 2L, 2W, BRIDGE REPAIR WITH BARRIER**

Sheet 2 of 2

**STANDARD 701321-15**
SYMBOLS

- Work area
- Active Work area
- Sign
- Barricades, drums, or vertical panels
- Flagger with traffic control sign

1. Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but in no case to exceed the length of 1/2 day's normal operation or 2 miles (3200 m) whichever is less.

2. Signs are not required if distance between work operations is less than 2000' (600 m) unless restricted sight distance exists.

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the pavement during widening operations.

Two flaggers are required for each separate operation.

All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W,
PAVEMENT WIDENING,
FOR SPEEDS > 45 MPH

STANDARD 701326-04
**DOUBLE YELLOW REFLECTORIZED PAVEMENT MARKING - CENTERLINE**

- 50' (15 m) centers
- Vertical panels at

**WHITE REFLECTORIZED PAVEMENT MARKING - EDGE LINE**

- 100' (30 m)
- 1000' (300 m) max.
- 500' (150 m) min.

**W20-I-103(0)-48**

**W20-1(0)-48**

**FOR PROJECTS AND UTILITY MAINTENANCE**

- For speeds 30 mph or less.

**W1-3L(0)-48**

**W13-1(0)-2424**

**OR**

**W1-4L(0)-48**

**W13-1(0)-2424**

**CULVERT CONSTRUCTION**

**BRIDGE CONSTRUCTION**

**WORK AREA**

- TYPICAL APPLICATIONS
  - Bridge construction
  - Culvert construction

**SYMBOLS**

- Sign
- Barricade or drum with monodirectional steady burning light
- Double vertical panel
- Type III barricade

**GENERAL NOTES**

This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of both lanes and a temporary run-around is constructed.

Barricades or drums at 50' (15 m) centers shall be used in lieu of vertical panels on the detour where they are to be placed on new or existing pavement.

Where the tangent distance on the temporary run-around exceeds 600' (180 m), crystal delineators of 50' (15 m) centers may be substituted for the vertical panels, or the spacing between vertical panels may be increased to 100' (30 m) within the limits of the tangent.

**LANE CLOSURE, 2L, 2W, WITH RUN-AROUND, FOR SPEEDS ≥ 45 MPH**

**STANDARD 701331-04**

**DATE**

- 1-11: Changed vertical panel to double vertical panel.

**REVISIONS**

- 1-09: Corrected sign No.'s.

- 1-11: Switched units to English metric.

- 1-10: Corrected sign No.'s.
This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the centerline and a line 24' (600 m) outside the edge of the pavement.

Two flaggers shall be required for each separate lane closure. The flagger shall be a minimum of 200' (60 m) and a maximum of 1/2 day's operation beyond the flagger sign. When the distance between successive open patches exceeds 500' (150 m), additional flaggers, warning signs, and tapers shall be placed as shown.

Barricades/drums shall be placed at intervals not greater than 100' (30 m) or cones shall be placed at intervals not greater than 50' (15 m) centers throughout the work zone. When the spacing between open holes is greater than 50' (15 m), two barricades/drums shall be placed in front of each open hole and one on the backside close to the centerline. When the open hole is greater than 10' (3 m) parallel to the centerline, one barricade/drum shall be placed in each hole. For large holes, barricades/drums shall be placed at 50' (15 m) centers.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

SYMBOLS

Patches

- Sign
- Flagger with traffic control sign
- Barricade or drum
- Cone, barricade or drum

TYPICAL APPLICATIONS

Patching

W20-4(0)-48 or W20-I103(0)-48

Barricades or drums

50' (15 m) centers.

1/2 mile (800 m) maximum

1000' (300 m) maximum

500' (150 m) minimum

500' (150 m) minimum

1000' (300 m) maximum

GENERAL NOTES

LANE CLOSURE, 2L, 2W,
WORK AREAS IN SERIES,
FOR SPEEDS ≥ 45 MPH

STANDARD 701336-06

ROAD AHEAD

CONSTRUCTION

ROAD AHEAD

ROAD AHEAD

ROAD AHEAD

ROAD AHEAD

ROAD AHEAD

ROAD AHEAD
**GENERAL NOTES**

This standard is used wherever at any time a lane is closed on a freeway/expressway. When the left lane is closed, LEFT LANE CLOSED signs shall be substituted for the RIGHT LANE CLOSED signs.

The first two signs and the message board are stationary.

The last four signs and arrow board shall be moved as necessary to maintain the required distance from the start of the lane closure taper(s).

All dimensions are in inches (millimeters) unless otherwise shown.

**SYMBOLS**

- Arrow board
- Portable changeable message sign
- Sign
- Type II barricades, drums, or vertical barricades with multi-directional flashing light

1. The Road Construction Ahead sign shall be located 3 to 5 miles in advance of the project limits.
2. The message and size of the Work Zone Public Information Sign shall be as specified by the Department.
3. The message board shall be used to display status of lanes within the project. The primary messages shall be:
   - "Right Lane Closed" / "x Miles Ahead"
   - "Left Lane Closed" / "x Miles Ahead"
   - "All Lanes Open"
4. Three, Type II barricades, drums, or vertical barricades at 50' (15 m) centers.
5. This sign shall be used when 2 lanes are closed.
6. This sign shall be omitted when median width is less than 10' (3 m).
7. This sign shall only be used if the existing speed limit is greater than 65 mph.

**APPROACH TO LANE CLOSURE, FREEWAY/EXPRESSWAY**

**STANDARD 701400-08**
**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction Indicator barricade with steady burn monodirectional light
- Type II barricade, drum, or vertical barricade with steady burn monodirectional light
- Flagger with traffic control sign

1. Reflecto-ized temporary pavement marking tape shall be placed throughout the taper and for 300' (90 m) alongside the work area when the closure time is greater than fourteen days. The edge line shall be white for right lane closure and yellow for left lane closure.

2. Work Zone speed limit signs and Type II barricades shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity. Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates placement of the sign array within 500' (150 m) of the end Work Zone Speed Limit Sign.

**GENERAL NOTES**

This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24 (600) of the edge of pavement.

This Standard must always be used in combination with Standard 701400.

This Standard also applies when work is being performed in the left lane, under these conditions, the setup would be a mirror image to what is shown.

A check barricade shall be placed in the middle of the closed lane and at the shoulder at 1000' (300 m) centers.

As dimensions are in inches (millimeters) unless otherwise shown.

**LANE CLOSURE, FREEWAY / EXPRESSWAY**

**STANDARD 701401-09**
TYPICAL APPLICATIONS

- Pavement patch
- Bituminous resurfacing
- Utility operations
- Arrow board
- Worker
- Work area
- Sign
- Direction indicator barricade
- Cone, drum or barricade
- Flagger with traffic control sign

SYMBOLS

- Work zone speed limit signs and FLAGER signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity.
- Work Zone Speed Limit 55 Photo Enforced sign shall be omitted when the work area dictates placement of the sign array within 500' (150 m) of the End Work Zone Speed Limit sign.

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the lane adjacent to the shoulder, or on the shoulder within 24' (600 m) of the edge of pavement for daylight operations.

This Standard must always be used in combination with Standard 701401.

This Standard also applies when work is being performed in the left lane, under these conditions, the set up would be a mirror image to what is shown.

All dimensions are in inches (millimeters) unless otherwise shown.
APPLICATION NO. 1
Application No. 1 depicts a modified entrance ramp. This method shall be utilized whenever existing entrance ramps cannot be retained due to the close proximity of the work zone. The entrance location may be shifted, with the approval of the Engineer, to perform work in the entrance area. Application No. 2 shall be put into effect as soon as possible.

APPLICATION NO. 2
Application No. 2 depicts a shortening of the normal entrance ramp. This method shall be used whenever the existing geometrics can be retained. Consideration should be given to the entering motorists line of sight, through, between, or over the delineation devices.

GENERAL NOTES
This Standard is used where, at any time any vehicle, equipment, workers or their activities require a lane closure in close proximity of an exit or entrance ramp. This Standard also applies to the exit ramp and supplements other traffic control standards for lane closures.

These applications also apply when work is being performed in the left lanes and the ramps enter and exit on the left, under these conditions, the Exit sign arrow and the Side Road symbol sign shall be changed.

Lanes may be utilized during daylight operations, or onehalf the spacing of drums/barricades.

Use of these APPLICATION NO. 1 and APPLICATION NO. 2 shall be limited to five days per location.

When work does not exceed five days, pavement marking tape may be omitted.

All dimensions are in inches (millimeters) unless otherwise shown.
APPLICATION NO. 3
Application No. 3 depicts a modified exit ramp. The channelizing devices shall provide a clearly defined path for the exiting motorists. The minimum dimensions shown shall be increased as soon as the progress of the work will permit. The open portion of the ramp may be shifted, with the approval of the Engineer, to perform work in stages on the area adjacent to the ramp exit. Application No. 4 shall be put into effect as soon as possible.

APPLICATION NO. 4
Application No. 4 depicts an extension of the normal exit ramp. This method shall be used whenever existing geometrics can be retained. Consideration should be given to the exiting motorists' line of sight through, between or over the delineation devices.

LANE CLOSURE, MULTILANE,
AT ENTRANCE OR EXIT RAMP,
FOR SPEEDS > 45 MPH

STANDARD 701411-09
This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of two adjacent lanes and a temporary crossover is provided by making use of one lane of pavement normally used by opposing traffic and concrete barrier is used to separate the opposing traffic.

This Standard must always be used in combination with Standard 704000.

All barricades, drums, and vertical panels shall be 50 ft. (15 m) in centers.

Temporary concrete barrier shall be according to Standard 704000.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

- Arrow board
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type II barricade with steady burn monodirectional light
- Drum with steady burn monodirectional light
- Vertical Panel
- Type III barricade with flashing lights
- Temporary concrete barrier

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require the closure of two adjacent lanes and a temporary crossover is provided by making use of one lane of pavement normally used by opposing traffic and concrete barrier is used to separate the opposing traffic.

This Standard must always be used in combination with Standard 704000.

All barricades, drums, and vertical panels shall be 50 ft. (15 m) in centers.

Temporary concrete barrier shall be according to Standard 704000.

All dimensions are in inches (millimeters) unless otherwise shown.
**GENERAL NOTES**

This standard is used where at any time any vehicle, equipment, workers or their activities will approach on the pavement or on the shoulder within 24 (600) of the edge of pavement for daylight operation exceeding one day and where temporary concrete barrier is utilized.

When work is being performed in the left lane, the set up would be a mirror image to what is shown.

Calculate L as follows:

\[ L = \frac{W}{S} \]

English (Metric)

**FORMULAS**

- Normal posted speed

<table>
<thead>
<tr>
<th>POSTED SPEED LIMIT</th>
<th>WORK ZONE SPEED LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 mph (60 km/h)</td>
<td>45 mph (60 km/h)</td>
</tr>
</tbody>
</table>

**SYMBOLS**

- Arrow board
- Work area
- Sign
- Direction indicator barricade with steady burn monodirectional light
- Type III barricades, drums, or vertical barricades with steady burn monodirectional light
- Temporary concrete barrier
- Monodirectional guardrail/barrier wall reflector
- Impact attenuator
- Type III barricades, drums, or vertical barricades with monodirectional flashing light

**LANE CLOSURE, MULTILANE, WITH BARRIER, FOR SPEEDS > 45 MPH TO 55 MPH**

**STANDARD 701423-09**
NOTE: When a shoulder does not exist or is narrow, use Detail C.

**DETAIL A**

- Flaggers are required when workers are on the pavement.
- For striping operations, see sign arrow detail on this standard.
- For stationary operations which are on the roadway or shoulder, greater than 15 minutes and up to 1 hour.
- The distance between the work and the lead truck may vary according to terrain or paint/crack sealing drying time.

**SYMBOLS**

- Arrow board
- Work area
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- Sign

**DETAIL B**

- This Standard is used where any vehicle, equipment, workers or their activities will require: 1) stationary operations up to 1 hour or 2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).
- This Standard is also applicable when work is being performed in the left lane or on the median shoulder. Under these conditions, KEEP LEFT signs and arrow board indications shall be directed to the right.
- As dimensions are in inches unless otherwise shown.

**TYPICAL APPLICATIONS**

- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Roadometer measurements
- Debris cleanup
- Crock patching
- Arrow board
- Work area
- Truck with flashing amber light
- Flagger with traffic control sign
- Sign

**GENERAL NOTES**

- Corr. KEEP LEFT sign no. regarding vehicle spacing.
- Added general note.
- Added trailer option for attenuator symbol. Added note 4. Revised gen. notes.
-标志性符号

**LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS > 45 MPH**

**STANDARD 701426-08**
**General Notes**

This Standard is used where any vehicle, equipment, workers or their activities will require:
- 1) stationary operations up to 1 hour, or
- 2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median or shoulder. Under these conditions, "KEEP RIGHT" signs shall be substituted for "KEEP LEFT" signs and arrow board indications shall be directed to the right.

All dimensions are in inches (millimeters) unless otherwise shown.

**Typical Applications**

- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Pavement marking
- Utility work
- Landscaping work

**Symbols**

- Arrow board
- Work area
- Truck with flashing amber light
- Truck/trailer mounted attenuator
- Flagger with traffic control sign
- Sign

**TYPICAL APPLICATIONS**

- Landscaping work
- Utility work
- Pavement marking
- Weed spraying
- Pavement marking
- Utility work
- Landscaping work

**GENERAL NOTES**

This Standard is used where any vehicle, equipment, workers or their activities will require:
- 1) stationary operations up to 1 hour, or
- 2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median or shoulder. Under these conditions, "KEEP RIGHT" signs shall be substituted for "KEEP LEFT" signs and arrow board indications shall be directed to the right.

All dimensions are in inches (millimeters) unless otherwise shown.
CASE I
CASE I depicts the setup of delineating devices for a single outside lane closure. Devices in lane closure taper shall be in place as shown for the setup prior to the setup for the second lane closure.

CASE II
CASE II depicts the setup of delineating devices for a two lane closure. The single lane closure device setup as depicted in CASE I shall be performed prior to the setup for the second lane closure.

GENERAL NOTES
This Standard is used for setup and removal of lane closures on freeways/expressways having ADT greater than 25,000.

Trucks with arrow boards and truck-mounted attenuator symbols shall be in place as shown for the setup and removal of the lane closure taper(s) and the first 100' (30 m) of channelizing devices in the taper(s).

This Standard is also applicable when work is being performed in the left lane or on the median shoulder. Under these conditions arrow board indications shall be directed to the right.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLOG
- Arrow board
- Truck with flashing amber light
- Truck/Trailer mounted attenuator

TRAFFIC CONTROL
SETUP AND REMOVAL
FREEWAY/EXPRESSWAY
STANDARD 701428-01
The length of the tangent section shall be:

<table>
<thead>
<tr>
<th>Duration of Closure</th>
<th>Length of Tangent Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 14 Days</td>
<td>1000' (300 m)</td>
</tr>
<tr>
<td>≥ 14 Days</td>
<td>2000' (600 m)</td>
</tr>
</tbody>
</table>

Symbols:
- Arrow board
- Worker
- Sign
- Reflective temporary pavement marking tape shall be placed throughout the taper and for 200' (60 m) along-side the work area when the closure time is greater than fourteen days. The edge line shall be white for right lane closures and yellow for left lane closures.
- Work zone speed limit signs and "FLASHER" signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity.
- This Standard is used where at any time any vehicle, equipment, workers or their activities will encroach on two lanes of a freeway/expressway.

General Notes:
- This Standard must always be used in combination with Standard 701400.
- This Standard also applies when work is being performed in the left lanes. Under these conditions, the set up would be a mirror image to what is shown.
- Check barricades shall be placed in the middle of the closed lanes at 1000' (300 m) centers. All dimensions are in inches (millimeters) unless otherwise shown.
PARTIAL EXIT RAMP CLOSURE

1:20 taper from edge of ramp to edge of work zone

Drums at 25' (7.6 m) cts.

SYMBOLS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sign</td>
</tr>
<tr>
<td>2</td>
<td>Type III barricade</td>
</tr>
<tr>
<td>3</td>
<td>Drum with steady burning light</td>
</tr>
<tr>
<td></td>
<td>Work area</td>
</tr>
<tr>
<td></td>
<td>Flagger with traffic control sign</td>
</tr>
</tbody>
</table>

Drums at 25' (7.6 m) cts.

All dimensions are in inches (millimeters) unless otherwise shown.

FREEWAY / EXPRESSWAY

PARTIAL EXIT RAMP CLOSURE

STANDARD 701456-03
I

Illinois Department of Transportation

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED ISSUED 1-1-97

APPROVED January 1, 2011

4

3

2

1

max. 100' (30 m)

R11-2

min. 100' (30 m)

W20-I103(0)-48

Or

W20-1(0)-48

W20-4(0)-48

Type I or Type II barricades

W20-3(0)-48

Type III barricades

W20-I103(0)-48

or

W20-I(0)-48

W20-7(0)-48

For approved sideroad closures.

For moving operations.

For moving operations.

SIGN SPACING

Posted Speed Sign Spacing

<table>
<thead>
<tr>
<th>Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>500' (150 m)</td>
</tr>
<tr>
<td>60</td>
<td>350' (100 m)</td>
</tr>
<tr>
<td>50</td>
<td>200' (60 m)</td>
</tr>
</tbody>
</table>

Work area

Cone, drum or barricade (not required for moving operations)

Sign on portable or permanent support

Flagger with traffic control sign

Barricade or drum with flashing light

Type III barricade with flashing lights

SYMBOLS

Refer to SIGN SPACING TABLE for distances.

For approved sideroad closures.

Cone, drums or barricades of 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the intervals between devices may be doubling.

Cone, drums or barricades at 20' (6 m) centers.

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an urban area.

All dimensions are in inches (millimeters) unless otherwise shown.

URBAN LANE CLOSURE,
2L, 2W, UNDIVIDED

STANDARD 701501-06
**CASE I**

(Signs required for both directions)

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph (70 km/h).
3. Required if work exceeds 500' (164 m) or 1 block.
4. Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 15 m (50') centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
5. For approved barricade closures.
6. Cones, drums or barricades at 20' (6 m) centers in taper.
7. Use flagger sign only when flagger is present.

### SIGN SPACING

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;45 mph</td>
<td>200' (60 m)</td>
</tr>
<tr>
<td>50-45 mph</td>
<td>300' (100 m)</td>
</tr>
<tr>
<td>45-60 mph</td>
<td>400' (125 m)</td>
</tr>
<tr>
<td>&gt;60 mph</td>
<td>500' (160 m)</td>
</tr>
</tbody>
</table>

### SYMBOLS

- **Road work**
- **Type III Barricade at 15 m (50') centers.**
- **Type II Barricade at 15 m (50') centers.**
- **Type I Barricade at 15 m (50') centers.**
- **Flagger with traffic control sign.**
- **Cone, drum or barricade.**
- **Sign on portable or permanent support.**

### GENERAL NOTES

This Standard is used to close one lane of an urban, two lane, two way roadway with a bidirectional turn lane.

Case I applies when no workers are present. When workers are present, two lanes shall be closed and traffic control shall be according to Standard T0901.

Calculate L as follows:

\[
L = \frac{0.65}{S} \times W
\]

where:
- \(L\) = lane offset
- \(S\) = normal posted speed (mph)
- \(W\) = width of offset

All dimensions are in inches (millimeters) unless otherwise shown.

### URBAN LANE CLOSURE

**STANDARD 701502-06**

2L, 2W, WITH BIDIRECTIONAL LEFT TURN LANE
**SYMBOLS**

- Arrow board
- Cone, drum or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Type III barricade with flashing lights
- Flagger with traffic control sign.

### FORMULAS

**L = 0.65 (W)(S)**

where:
- **L** is the length of the offset in feet (meters).
- **W** is the width of the offset in feet (meters).
- **S** is the normal posted speed in mph (km/h).

### GENERAL NOTES

- This Standard is used where at any time, day or night, any vehicle, equipment, workers, or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in urban areas.
- Calculate **L** as follows:
- **L = 0.65 (W)(S)**

### SIGN SPACING

<table>
<thead>
<tr>
<th>Speed</th>
<th>Normal Spacing</th>
<th>English (Metric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;45</td>
<td>500’ (150 m)</td>
<td></td>
</tr>
<tr>
<td>50-45</td>
<td>350’ (100 m)</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>200’ (60 m)</td>
<td></td>
</tr>
</tbody>
</table>

**SPEED LIMIT**

- 40 mph (60 km/h) or below
- 45 mph (70 km/h) and greater

**SYMBOLS**

- **W** = 20’ (6 m)
- **L** = 0.65 (W)(S)

**NOTES**

- **L** = length of offset in feet (meters).
- **W** = width of offset in feet (meters).
- **S** = normal posted speed in mph (km/h).

**SYMBOLS**

- Arrow board
- Cone, drum or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Type III barricade with flashing lights
- Flagger with traffic control sign.

**URBAN LANE CLOSURE, MULTILANE, 1W OR 2W WITH NONTRAVERSABLE MEDIAN**

**STANDARD 701601-09**

**DATE**

- 1-1-13

**REVISIONS**

- 5-24

**DRAWING REFERENCES**

- W20-7(0)-48
- W20-7R(0)-48
- W20-7L(0)-48
- W20-5L(0)-48
- W20-5R(0)-48

**NOTES**

- All dimensions are in inches (millimeters) unless otherwise shown.
**GENERAL NOTES**

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an urban area.

If the work operation is performed between 6:00 AM and 9:00 p.m, and does not exceed 15 min., traffic protection shall be as shown for Standard 701602.

Refer to the SIGN SPACING TABLE for distances.

Calculate L as follows:

\[
L = \frac{W(S)}{65} \text{in feet (meters).}
\]

where:
- \( W \) = Width of offset
- \( S \) = Normal posted speed

Refer to SIGN SPACING TABLE for distances.

**SYMBOLS**

- **Arrow board**
- **Work area**
- **Barricade or drum with steady burning directional light**
- **Flagger with traffic control sign**
- **Cone, drum or barricade** (Cone centers in taper)
- **Sign on portable or permanent support**
- **Type III Barricade**

**CASE I**

1. Refer to SIGN SPACING TABLE for distances.
2. Required for speeds > 40 mph (60 km/h).
3. Required if work exceeds 500' (164 m) or 1 block, repeat every 1 mile (1.6 km).
4. Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
5. For approved sideroad closures.
6. Cones, drums or barricades at 20' (6 m) centers in taper.
7. Use flagger sign only when flagger is present.

**URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE**

**STANDARD 701602-07**

**DATE**

1-1-13

**REVISIONS**

1-1-14
URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE

CASE II

For maintenance and utility projects
For construction projects

Type III Barricade

W-6-3R(0)-6030 (above barricade on both sides)
CASE III

URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE

STANDARD 701602-07
**GENERAL NOTES**

This Standard is used where at any time, day or night, any vehicle, equipment, workers, or their activities encroach on the pavement requiring the closure of one traffic lane in an urban area.

Calculate L as follows:

**FORMULAS**

- **SPEED LIMIT**
  - English: \( W \times S \)
  - Metric: \( L \times S \)
  - \( L = \frac{W}{50} \) for speeds \( \geq 40 \text{ mph} \) or \( \geq 65 \text{ km/h} \),
  - \( L = \frac{W}{75} \) for speeds \( < 40 \text{ mph} \) or \( < 65 \text{ km/h} \).

- Additional cones may be placed at 50' (15 m) centers, when drums or Type 1 or Type 2 barricades are used, the interval between devices may be doubled.

- Cones, drums, or barricades at 20' (6 m) centers in taper.

Refer to SIGN SPACING TABLE for distances.

**SYMBOLS**

- **Arrow board**
- **Drum, cone, or barricade**
- **Sign on portable or permanent support**
- **Barricade or drum with flashing light**
- **Flagger with traffic control sign**

**REVISIONS**

- **DATE**
  - 1-1-14 Renewed standard. Renamed workers sign.
  - 1-1-15 Number to agree with current MUTCD.

- **STANDARD**
  - 701606-10
### GENERAL NOTES

- This standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of more than one traffic lane in an urban area.
- Calculate L as follows:

**FORMULAS**

- **SPEED LIMIT**
  - **English**
    - 40 mph (64 km/h) or less: \( L = \frac{W S}{150} \)
    - 45 mph (75 km/h) or greater: \( L = \frac{W S}{200} \)
  - **Metric**
    - 40 km/h (64 km/h) or less: \( L = \frac{W S}{150} \)
    - 60 km/h (75 km/h) or greater: \( L = \frac{W S}{200} \)
- For approved sideroad closures,
  - Cones at 30\(^\circ\) 6 ft centers or 25\(^\circ\) 3 ft centers. Additional cones may be placed at 50\(^\circ\) 3 ft centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
  - Cones, drums or barricades of 20\(^\circ\) 6 ft centers in town.
  - Repeat every 1 mile (1.6 km).

### SIGN SPACING

- **Posted Speed**
  - Low: 30 mph (48 km/h) or less
  - S: 40-45 mph (64-72 km/h)
  - High: 50 mph (80 km/h) or greater

**TABLE for distances**

<table>
<thead>
<tr>
<th>Posted Speed</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>300’ (90 m)</td>
</tr>
<tr>
<td>S</td>
<td>250’ (75 m)</td>
</tr>
<tr>
<td>High</td>
<td>200’ (60 m)</td>
</tr>
</tbody>
</table>

**SYMBOLS**

- **Arrow board**
- **Cone, drum or barricade**
- **Sign on portable or permanent support**
- **Work area**
- **Barricade or drum with flashing lights**
- **Type III barricade with flashing lights**
- **Flagger with traffic control sign.**

- **Type III barricade**
  - With flashing lights
    - (Above barricade)

**URBAN HALF ROAD CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN**

**STANDARD 701611-01**
**English (Metric)**

- L = 60 ft (15 m)
- WS = 2

**FORMULAS**

\[ L = 0.65(W)(S) \]

- Width of offset = Normal posted speed
- mph (km/h)

**GENERAL NOTES**

- This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in an urban area.

Calculate \( L \) as follows:

\[ L = \begin{cases} 500' \text{ (150 m)} & \text{for speeds } \leq 40 \text{ mph (64 km/h)} \\ 350' \text{ (100 m)} & \text{for speeds } 40 < \text{speed} \leq 55 \text{ mph (88 km/h)} \\ 200' \text{ (60 m)} & \text{for speeds } > 55 \text{ mph (88 km/h)} \end{cases} \]

- Work area
- Cone, drum or barricade
- Sign on portable or permanent support
- Arrow board
- Barricade or drum with flashing light
- Flagger with traffic control sign

**SYMBOLS**

- Cone, drum or barricade
- Sign on portable or permanent support
- Arrow board
- Barricade or drum with flashing light
- Flagger with traffic control sign

**MULTILANE INTERSECTION**

- URBAN LANE CLOSURE
- CONSTRUCTION
- ROAD AHEAD
- WORK
- TURN LANE CLOSED
- LEFT
- RIGHT
- ROAD AHEAD
- CONSTRUCTION
- ROAD AHEAD
- WORK

**ROAD AHEAD**

- Road ahead for contract projects

- Kahnehka Sign number

**STANDARD 701701-10**
GENERAL NOTES

This Standard is used where, at any time, pedestrian traffic must be rerouted due to work being performed.

This Standard must be used in conjunction with other Traffic Control & Protection Standards when roadway traffic is affected.

Temporary facilities shall be detectable and accessible.

The temporary pedestrian facilities shall be provided on the same side of the closed facilities whenever possible.

The SIDEWALK CLOSED / USE OTHER SIDE sign shall be positioned as shown in "ROAD CLOSED TO ALL TRAFFIC" to each end of the closure, where the closure occurs at a corner, the signs shall be erected on the corner across the street from the closure. The SIDEWALK CLOSED signs shall be placed at the nearest crosswalk or intersection to each end of the closure.

Type II barricades and R11-2-4830 signs shall be provided on the same side of the closure.

The temporary pedestrian facilities shall be detectable and accessible.

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Type II barricades and R11-2-4830 signs shall be provided on the same side of the closed facilities whenever possible.

The temporary pedestrian facilities shall be detectable and accessible.
Reflectorized striping may be omitted on the back side of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on an NCHRP 350 temporary sign support directly in front of the barricade.

Reflectorized striping shall appear on both sides of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the signs may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.
**F SHAPE DESIGN**

---

**SECTION C-C**

- **s1 bar**
  - No. 4 (No. 13) h2 bar
  - No. 5 (No. 16) h1 bar
  - No. 6 (No. 19) s2 bars

- **h1 bar**
  - No. 5 (No. 16) h1 bar
  - No. 6 (No. 19) s2 bars

- **h2 bars**
  - No. 4 (No. 13) h2 bar
  - No. 6 (No. 19) s2 bars

**ELEVATION**

- Reinforcement
  - s1 bar
  - No. 4 (No. 13) h2 bar

**SECTION B-B**

- **ANCHORING DETAIL**
  - Same pin as on sheet 1

---

**TEMPORARY CONCRETE BARRIER**

- **STANDARD 704001-08**
Sign panel 36 (900) wide or less

Sign panel 36 (900) wide or less

Sign panel over 36 (900) wide

W OOD O R T ELESCOPING

ST EEL POSTS

SUPPORTING CHANNEL DETAILS

SUPPORTING CHANNEL DETAILS

ROUTE MARKER ASSEMBLY

SECTION MODULUS

<table>
<thead>
<tr>
<th>Material</th>
<th>Axis A</th>
<th>Axis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0.250 in² (1819 mm²)</td>
<td>0.365 in² (3720 mm²)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.250 in² (1248 mm²)</td>
<td>0.365 in² (5162 mm²)</td>
</tr>
</tbody>
</table>

STANDARD 720001-01

SIGN PANEL

MOUNTING DETAILS

DATE

REVISIONS

1-1-09

Switched under 46

Section modulus

English (metric)

Switched units to


B R E A K A W A Y S T E E L

TUBING POSTS

(All sign panel sizes)

All dimensions are in inches (millimeters)

unless otherwise shown.
TYPICAL INSTALLATIONS

Signs in any area shall be erected to a uniform height above the edge of the pavement.

POST SPACING FOR NON-FREEWAY SIGN PANELS

GROUND MOUNT SIGN POSITIONING

All dimensions are in inches (millimeters) unless otherwise shown.
### METAL POSTS FOR SIGNS, MARKERS & DELINEATORS

**GENERAL NOTES**

Dimensions shown for cross sections are minimum.

- All holes are 3/16" dia.

- Steel - 1.12 lbs./ft. (1.67 kg/m)

- All dimensions are in inches (millimeters) unless otherwise shown.

#### TYPE A

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Steel (in²/mm²)</th>
<th>lbs/ft</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ring A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>0.60</td>
<td>0.36</td>
<td>0.095</td>
<td>2.00</td>
<td>0.90</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.45</td>
<td>0.28</td>
<td>0.070</td>
<td>1.50</td>
<td>0.65</td>
</tr>
</tbody>
</table>

#### TYPE B

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Steel (in²/mm²)</th>
<th>lbs/ft</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ring A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>0.85</td>
<td>0.51</td>
<td>0.137</td>
<td>3.26</td>
<td>1.45</td>
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<tr>
<td>Aluminum</td>
<td>0.65</td>
<td>0.41</td>
<td>0.110</td>
<td>2.20</td>
<td>1.00</td>
</tr>
</tbody>
</table>

#### TYPE C

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Steel (in²/mm²)</th>
<th>lbs/ft</th>
<th>kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ring A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>1.25</td>
<td>0.73</td>
<td>0.210</td>
<td>5.38</td>
<td>2.50</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.95</td>
<td>0.58</td>
<td>0.170</td>
<td>4.28</td>
<td>1.90</td>
</tr>
</tbody>
</table>

**SECTION D-D**

- Min. 55 holes spaced at 1/2" cts.

**SECTION E-E**

- Steel - 1.12 lbs./ft. (1.67 kg/m)

- Taper optional

**MARKERS & DELINEATORS**

- Switched units to English metric.

- Metal Posts for Signs, 720011-01

**DATE**

- 1-1-97

**REVISED**

- Standard 2350-w
TYPICAL SIGN STYLES

<table>
<thead>
<tr>
<th>SIGN STYLE</th>
<th>DIMENSIONS</th>
<th>LETTER SIZE</th>
<th>BORDER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UC/LC PRIMARY</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>12/2</td>
<td>6/4</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>15/3</td>
<td>8/6</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>18/4</td>
<td>8/6</td>
<td>4</td>
</tr>
<tr>
<td>D</td>
<td>20/5</td>
<td>8/6</td>
<td>4</td>
</tr>
</tbody>
</table>

* Supplemented Messages

SUPPORTING CHANNELS

MOUNTING LOCATION

GENERAL NOTES

- All signs shall have a white reflectorized legend and border on a green reflectorized background.
- The sign panels shall be mounted as shown on Standard 720001 or as specified in the plans.
- All dimensions are in inches (millimeters) unless otherwise shown.

MAST ARM MOUNTED STREET NAME SIGNS

STANDARD 720016-03

DATE REVISIONS
1-1-97 Suppressed Table and lettering to upper/lower case per current MUTCD
1-1-97 Revised Table and Eponix artwork

Illinois Department of Transportation
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
1-1-97
January 1, 2012
ENGINEER OF OPERATIONS
2012
January 1, 2012

Arlington Drive
2500 S

Shady Grove Rd

Pleasant St

Burton Drive

Locust St

Locust St

N 5th Ave

E Main St

Arlington Drive
FACE OF SIGN PANEL

6 (150) PANEL

TYPE B SIGN PANEL

TYPE C SIGN PANEL

SECTION A-A

SECTION B-B

SECTION C-C

SIGN MOLDING

EXTRUDED ALUMINUM TYPE

SIGN PANELS

STANDARD 720021-02

DATE

REVISIONS

1-1-09

Switched units to English metric.

1-1-03

Revised stainless steel clip design, and

minor changes.

1-1-00

Added aluminum clip.

All dimensions are in inches (millimeters)

unless otherwise shown.
TERMINAL MARKER DETAILS

**Case I**
- **Type 1 or Type 4**
- Reflective area of 288 sq. in. (0.18 m²)
- From the outer edge of the terminal end, with a minimum of 1 (25) of the length of the terminal end, with a minimum reflective area of 288 sq. in. (0.18 m²).

**Case II**
- **Type 2**
- Reflective area of 72 sq. in. (0.04 m²)
- From the outer edge of the terminal end, with a minimum of 1 (25) of the length of the terminal end, with a minimum reflective area of 72 sq. in. (0.04 m²).

**General Notes**
- All dimensions are in inches (millimeters) unless otherwise shown.
- See detail on Standard 729001 for mounting markers to posts.
- All dimensions are in inches (millimeters) unless otherwise shown.
- The width and height (a, b) of the terminal marker shall be within approximately 1 (25) of the length of the terminal end, with a minimum reflective area of 288 sq. in. (0.18 m²).

**Type 3**
- **Object Marker Details**
- Color: Black / Yellow reflextorized
- Alternating black and yellow stripes.
- Yellow for Type 1.
- Yellow for Type 2, Type 3, Type 4.

**Type 4**
- **General Notes**
- See detail on Standard 729001 for mounting markers to posts.
GROUND MOUNT DETAIL

PAVEMENT MOUNT DETAIL

SPlice DETAIL

GENERAL NOTES

All bolts 3/8-16 (M10) hex head zinc or cadmium plated.

All dimensions are in inches (millimeters) unless otherwise shown.

TELESCOPING STEEL

SIGN SUPPORT

STANDARD 728001-01

DATE | REVISIONS
--- | ---
1-1-07 | Switched units to English system.
1-1-09 | New Standard. Used to be part of Standard 728006.
For diamond shaped sign with side S as shown, use required post size for a sign with $W = 0.7S$ and $D = 1.4S$.

**GENERAL NOTES**

- **DESIGN:** Current AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

- **LOADING:** For 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

- **SOIL PRESSURE:** Minimum allowable soil pressure of 1.25 tsf (120 kPa).

- **APPLICATIONS OF TYPES A & B METAL POSTS (FOR SIGNS & MARKERS):**

- **STANDARD 729001-01**

---

**APPLICATIONS OF TYPES A & B METAL POSTS**

<table>
<thead>
<tr>
<th>NO.</th>
<th>DAY</th>
<th>IN</th>
<th>H</th>
<th>W</th>
<th>SIGN WIDTH</th>
<th>NO. AND TYPE OF POST FOR SIGN WIDTH (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12</td>
<td>12</td>
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<td>24</td>
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<td>24</td>
<td>24</td>
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<td>A</td>
</tr>
<tr>
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<td>36</td>
<td>36</td>
<td>36</td>
<td>36</td>
<td>A</td>
</tr>
</tbody>
</table>

**NOTE:** Minimum of 2 bolts per post required.
Washer shim. Additional washers shall be used to level the base when necessary.

Plan

Letters I, D, and H are 2 (50) series D raised.

Section A-A

Plan

Anchor Bolt Detail

Post Assembly Detail

All dimensions are in inches (millimeters) unless otherwise shown.

BASE FOR TELESCOPING STEEL SIGN SUPPORT

STANDARD 731001-01
Pavement Markings at Railroad-Highway Grade Crossing

**2 Lane**

- **White Edge of Pavement**
- **Yellow Edge of Pavement**
- **White Edge of Pavement**

**Multi Lane**

- **As specified**
- **As specified**
- **As specified**
- **As specified**
- **As specified**

**Notes**

The transverse spread of the "X" may vary according to lane width.

On multilane roads, the stop lines shall extend across all approach lanes and separate RR symbols shall be placed adjacent to each other in each lane.

When the pavement marking symbol is used, a portion of the symbol shall be located directly adjacent to the advance warning sign (W10-1) as placed by Table 2C-4, Condition B of the MUTCD.

All dimensions are in inches (millimeters) unless otherwise shown.
TYPICAL PAVEMENT MARKINGS

The space between adjacent letters or numerals should be approximately 3 (75) for 6’ (1.8 m) legend and 4 (100) for 8’ (2.4 m) legend.

LETTER AND ARROW GRID SCALE

TYPICAL PAVEMENT MARKINGS

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

2015

ENGINEER OF DESIGN AND ENVIRONMENT

APPROVED

2015

ENGINEER OF OPERATIONS

APPROVED

January 1,

1-1-97

STANDARD 780001-05

ISSUED

(Sheet 2 of 3)
**TYPICAL PAVEMENT MARKINGS**

**WORD AND ARROW LAYOUT**

**LANE-REDUCTION ARROW**
Right lane-reduction arrow shown. Use mirror image for left lane.

**SHARED LANE SYMBOL**

**WRONG WAY ARROW**

**INTERNATIONAL SYMBOL OF ACCESSIBILITY**

**BIKE SYMBOL**
Arrow is optional.

**STANDARD 780001-05**

* Illinois Department of Transportation
* 2015
* 1-1-97

**ENGINEER OF DESIGN AND ENVIRONMENT**

**ENGINEER OF OPERATIONS**

* APPROVED
* ISSUED

* Sheet 3 of 3
TWO-LANE / TWO-WAY

LANE REDUCTION TRANSITION

TWO-WAY LEFT TURN

FREEWAY EXIT RAMP

MULTI-LANE UNDIVIDED

MULTI-LANE DIVIDED

RURAL LEFT TURN

TYPICAL APPLICATIONS

RAISED REFLECTIVE PAVEMENT MARKERS

STANDARD 781001-04
CORNER ISLAND

Reflectors at 40' (12.2 m) centers
Reflectors at 20' (6.1 m) centers

FACE OF CURB

MEDIAN ISLAND

Reflectors at 24 (600) centers
Reflectors at 10' (3.0 m) centers

SECTION A-A

(Crystal curb reflector, typical for corner islands)

Curb reflectors shall be monodirectional and oriented with the reflective face toward approaching traffic.

All dimensions are in inches (millimeters) unless otherwise shown.

GENERAL NOTES

Curb reflectors shall be monodirectional and oriented with the reflective face toward approaching traffic.

All dimensions are in inches (millimeters) unless otherwise shown.

CURB REFLECTORS

STANDARD 782001-01
**REFLECTOR TYPE A**

*Monodirectional shown*

- Metal rivet
- Adhesive weep slots or holes equally spaced on both sides

**REFLECTOR TYPE B**

*Bidirectional shown*

- Brass or plastic rivet
- Adhesive weep slots or holes equally spaced on both sides

All dimensions are in inches (millimeters) unless otherwise shown.
Reflective area, may be rectangular or slight trapezoid.

Minimum area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

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- 3 in. (89 mm) max.
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Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

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Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.

Reflective area. May be rectangular or slight trapezoid.

Minimum total area of base:
- 3 in. (89 mm) max.
- 2 in. (64 mm) min.

Variable spacing, holes or slots each side, variable spacing.

3 m/s adhesive weep base. 7.0 sq. in. (4,516 mm²)

Minimum total area of base.

Cross section may be "T" or "L" shaped and may have side supports at ends.
After 400 ft. (122 m), transition to normal delineator spacing shown in Standard 635001, and continue as required.

For the pavement approaching the bridge.

Bidirectional silver/silver should be used in lieu of monodirectional silver on both sides of two-lane bridges where the pavement is less than 24 ft. (610) wider than the pavement approaching the bridge.
**TYPE A**

- 1 (25) Galvanized steel conduit, if required
- 1/4 (32) Galvanized conduit
- Ground clamp
- Ground rod
- No. 6, 2/C copper wire
- Weatherproof enclosure (NEMA4X)
- Service cables

**TYPE B**

- Circuit breaker 150 amperes in weatherproof enclosure (NEMA4X)
- 1/4 (32) Galvanized conduit
- Ground clamp
- Ground rod
- No. 6, 2/C copper wire
- Weatherproof enclosure (NEMA4X)
- Service cables

**TYPE C**

- Circuit breaker 150 amperes
- 1/4 (32) Galvanized conduit
- Ground clamp
- Ground rod
- No. 6, 2/C copper wire
- Weatherproof enclosure (NEMA4X)
- Service cables

**ALTERNATE INSTALLATION**

- Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation)
- Ground stud for neutral connection
- Service cables
- Offset weatherproof fitting
- Circuit breaker

---

**INSTALLATION DETAILS**

**ELECTRICAL SERVICE**

**STANDARD 805001-01**

**DATE**

**REVISIONS**

- 1-1-02
- 1-1-09

**SUMMARY**

- All dimensions are in inches (millimeters) unless otherwise shown.
- Switched units to English (metric).
INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

JUNCTED ABUTMENT WITH PARAPET ON APPROACH PAVEMENT

GENERAL NOTES

The barrel in the expansion fitting shall be fully embedded in the concrete on the side of the expansion joint, one half the length of the deflection fitting shall be embedded in the concrete on the other side of the expansion joint.

The Contractor shall install combination expansion deflection fittings at all bridge expansion joints. With the approval of the Engineer, the Contractor may substitute two 12 x 12 x 6 (300 x 300 x 150) mm stainless steel junction boxes attached to back of wall and connected with liquidtight flexible nonmetallic conduit for all expansion joints.

The Contractor shall install combination expansion deflection fittings at all bridge expansion joints.

With the approval of the Engineer, the Contractor may substitute two 12 x 12 x 6 (300 x 300 x 150) mm stainless steel junction boxes attached to back of wall and connected with liquidtight flexible nonmetallic conduit for all expansion joints.

All dimensions are in inches (millimeters) unless otherwise shown.
Parapet ending on bridge deck.

ELEVATION

Jointed abutment with

Stainless steel conduit box
12 x 12 x 6
2' (300 x 300 x 150)

Stainless steel conduit box
12 x 12 x 6
3' (300 x 300 x 150)

Expansion joint.

10' x 2 (3 m x 50)
Stainless steel conduit with bushing.

2 (50) liquidtight
flexible nonmetallic
conduit, 6' (1.83 m)
max. length.

2 (50) PVC conduit
embedded in structure.

VIEW B-B

Raceway embedded

Bridge.

2 (50) liquidtight
flexible nonmetallic
conduit, 6' (1.83 m)
max. length.

Stainless steel conduit box
12 x 12 x 6
2' (300 x 300 x 150)

Jointed abutment with

Parapet ending on bridge deck.

2 (50) PVC conduit
embedded in structure.
Flush hinge

Conduit

Handhole  Rem. weights

French drain

ELEVATION

PORTLAND CEMENT CONCRETE

Conduit

Steel hooks

Galvanized

conduit bells

Nonmetallic

~

ELEVATION

COMPOSITE CONCRETE

French drain

ELEVATION

Conduit

Steel hooks

Galvanized

Net conduit bells

Nonmetallic

~

All dimensions are in inches (millimeters) unless otherwise shown.
Bridge deck.

Beam (steel shown)

Underpass luminaire mounted to pier or abutment wall.

Luminaire numbering decal bracket (typ).

Concrete pier or abutment wall (typ).

SECTION A-A

Stainless steel conduit box 6 x 6 x 4 (150 x 150 x 100) min.

1 (25) conduit clamped to pier (typ).

Luminaire numbering decal bracket (typ).

Concrete pier or abutment wall.

CENTER PIER DETAIL

Stainless steel conduit box 6 x 6 x 4 (150 x 150 x 100) min.

Beam (typ).

Underpass luminaire mounted to pier (typ).

Luminaire numbering decal bracket (typ).

Pier.

ELEVATION

Top of bracket shall be mounted no higher than bottom of luminaire.

Concrete pier or abutment wall.

TOP VIEW

Luminaire numbering decal bracket. See mounting detail (typ).

Concrete pier or abutment wall.

TO ELEVATION

(120) min. from top of wall or pier.

Beam (steel shown)

Underpass luminaire mounted to pier or abutment wall (typ).

Concrete pier or abutment wall (typ).

Luminaire numbering decal bracket. See mounting detail (typ).

Direction of traffic.

LUMINAIRE NUMBERING DECAL BRACKET MOUNTING DETAIL

Conduit clamp as needed (typ).

1 (25) conduit, 3 (127) min. from bridge parapet above.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE

REVISIONS

STANDARD 821001

ILLINOIS DEPARTMENT OF TRANSPORTATION

PASSED

APPROVED

ISSUED

ENGINEER OF DESIGN AND ENVIRONMENT

ENGINEER OF PRELIMINARY ENGINEERING

NEW STANDARD.

STANDARD 821001

April 1, 2016

April 1, 2016

(7 6 0)

3 0

(25)

(25)

(50)

2

(5 1 0)

2 0

(150)

6

(100)

4

DECAL BRACKET.

LUMINAIRE NUMBERING

WALL MOUNT

UNDERRPASS LIGHTING

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.

CONDUIT BEAM CLAMP

CONDUIT CLAMP

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.


**STANDARD 821006**

**NEW STANDARD**

**SUSPENDED UNDERPASS LIGHTING**

- Luminaire hanger assembly, four per luminaire required. See detail.
- Underpass luminaire suspended from bridge deck (typ.).
- 1 (25) conduit mounted to top of pier or abutment wall.
- Luminaire numbering decal bracket. See mounting detail (typ.).
- Concrete pier or abutment wall.
- Stainless steel conduit shall be used beneath any opening in the bridge deck.
- Rigid conduit may be used in lieu of flexible conduit.
- Stainless steel conduit shall be used beneath any openings in the bridge deck.
- Branched circuits to luminaires shown routed from underground. Branched circuits may also be routed from bridge parapet above.
- All dimensions are in inches (millimeters) unless otherwise shown.

**GENERAL NOTES**

Underpass luminaires shall be centered between beams unless otherwise directed by the Engineer.

Optics of underpass luminaires shall be increased 1 (25) above the bottom of the beams with no parts of the luminaire or attached conduit below the beams.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branched circuits to luminaires shown routed from underground. Branched circuits may also be routed from bridge parapet above.

All dimensions are in inches (millimeters) unless otherwise shown.
ELEVATION AT POLE BASE
WITH CONCRETE FOUNDATION

- Conductor splice
- Surge arrester
- Breakaway fuse holder with fuses
- Conductor splice
- Light pole handhole with ground lug
- Grounding nut
- Bare No. 6 wire
- Green equipment grounding conductor
- Conductor splice
- Concrete foundation
- Raceway with branch circuit conductors
- Raceway with branch circuit conductors
- Breakaway couplings
- Transformer base
- Grounding nut
- Ground rod clamp
- Bare No. 6 wire

ELEVATION AT POLE BASE
WITH METAL FOUNDATION

- Conductor splice
- Surge arrester
- Breakaway fuse holder with fuses
- Conductor splice
- Light pole handhole with ground lug
- Grounding nut
- Bare No. 6 wire
- Green equipment grounding conductor
- Conductor splice
- Metal foundation
- Raceway with branch circuit conductors
- Raceway with branch circuit conductors
- Breakaway couplings
- Transformer base
- Grounding nut
- Ground rod clamp
- Bare No. 6 wire

GENERAL NOTES
Wiring for twin luminaire installation shown. Omit one fuse holder and one surge arrester with connections for single luminaire installation.

- All conductors originating in pole shall be No. 10 unless noted otherwise.
- Conductors extended into light poles shall be of a length sufficient for splices to be withdrawn 18 (450) out of pole handhole.
- Any voids in the foundation shall be filled with fine aggregate.
- See Standard 836001 for Light Pole Foundation and ground rod.

All dimensions are in inches (millimeters) unless otherwise shown.
Service disconnect switch. 2-pole, 60 amp*, fused at 60 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

GFCI duplex receptacle.

Surge arrester.

CJG fuse receptacles.

Single-pole, single-throw switch.

Incandescent luminaire, enclosed and gasketed with 100 watt lamp.

Service disconnect switch - 2-pole, 3-wire, 60 amp*, fused at 60 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.

Terminal block sized for conductors as shown on plans.

Size larger as needed.

Photocell with integral surge arrester.

HAND-OFF-AUTO selector switch.

Protocol with integral surge arrester.

100 amp, electrically held contactor.

15 amp, 3-pole circuit breaker.

20 amp, 2-pole circuit breaker (two spares required but not shown).

Surge arrester.

Controller enclosure, minimum dimensions: 30H x 20W x 14D.

Controller enclosure, 25' (7.5 m) wood service pole.

Controller enclosure, 25' (7.5 m) wood service pole.

Controller enclosure, 25' (7.5 m) wood service pole.

Controller enclosure, 25' (7.5 m) wood service pole.

Controller enclosure, 25' (7.5 m) wood service pole.

Controller enclosure, 25' (7.5 m) wood service pole.
ELECTRIC SERVICE INSTALLATION

- Size larger as needed.
- As directed by Utility Company.

Controller enclosure, minimum dimensions:

500 x 300 x 160

(160 x 500 x 355)

Branch lighting circuits in unit duct(s).

GENERAL NOTES

Provide (twelve) (305 x 225 x 25) watertight pouch mounted inside controller door with as-built plans and schematics.

Provide engraved nameplate on front of enclosure reading "LIGHTING".

Enclosure shall be mounted to pole with pole-bands and lag-bolts.

All dimensions are in inches (millimeters) unless otherwise shown.

WORK PERMITTED

- Handed Standards, Modified
- Service disconnect and controller

LIGHTING CONTROLLER
POLE MOUNTED, 480V

STANDARD 825006-02

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ILLUMINATING

Illinois Department of Transportation

PASSED
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED 1-1-10

January 1,

ENGINEER OF PRELIMINARY ENGINEERING

DATE

REVISIONS

Photocell.

Controller enclosure, minimum dimensions: 304 x 219 x 160 * (120 x 86 x 63)
Insulated mounting brackets.

Controller enclosure, minimum dimensions: 304 x 219 x 160 *

(120 x 86 x 63)

Service conductors in rigid steel conduit, sized as required.

Flexible iron conduit clamps of 9" (23 cm) intervals.

Water meter, as needed.

Service disconnect switch.

Service disconnect switch — 2-pole, 240/480 V, 1-phase, 60 amp, 3-wire, overhead service.

240/480 V, 1-phase, 3-wire, overhead service.

Feeder conductors, sized as required.

To service pole,

Feeder conductors in rigid steel conduit, sized as required.

Controller enclosure.

Controller enclosure, minimum dimensions: 304 x 219 x 160 * (120 x 86 x 63)

Conduit hub.

Service disconnect switch.

Conduit hub.

Service disconnect switch.

Service disconnect switch.

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Service disconnect switch.
**Electric Service Installation**

- 240/480 V, 1-phase, 3-wire, overhead service.
- 25' (7.5 m) wood service pole.
- Service conductors in rigid steel conduit, sized as required.
- Ground line.
- 4/6 bare copper wire.

**Foundation (Plan)**

- Concrete foundation.
- Controller enclosure, minimum dimensions.
- 120/240V secondary, single-phase, 60Hz.
- Transformer - 1KVA*, 480V primary, 120/240V secondary, single-phase, 60Hz.
- Feeder conductors, sized as required.
- Earth rod in access well.

**Detai**

- Ground rod in access well.
- Controller enclosure, insulated mounting board.

**Lighting Controller**

- 100 amp*, 2-pole circuit breaker.
- 15 amp, 2-pole circuit breaker.
- Ground rod in access well.
- 15 amp, 2-pole circuit breaker.
- Service disconnect switch - 2-pole, 200 amp, 3-wire, 250 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- Surge arrester.
- 100 amp*, electrically held contactor.

**Control Schematic**

- Inconelloy lamp, enclosed and gasketted with 100 watt lamp.
- 15 amp, 1-pole circuit breaker.
- 20 amp, 2-pole circuit breaker.
- Additional wiring window as required.
- Neutral bar.
- Equipment ground bar.

**Notes**

- Size larger as needed.

---

**Lighting Controller**

**Base Mounted, 480V**

**Standard 825026-03**

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**Illinois Department of Transportation**

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**APPROVED**

**ENGINEER OF PRELIMINARY ENGINEERING**

**ISSUED 1-1-10**

---
120/240 V, Phase, 3-wire, overhead service.

25' 4/0 mi Road service pole.

Service conductors in rigid steel conduit, sized as required.

Metallic iron conduit clamps at 9' 12 1/2 mi intervals.

Water meter required.

Conduit hub.

Service disconnect switch.

5/8 (13) Sch. 40 PVC conduit.

Ground line.

No. 6 bare copper wire.

3 (125) Sch. 40 PVC wiring window.

LIGHTING CONTROLLER, 240V

NAVIGATION OBSTRUCTION

LIGHTING CONTROLLER

(Work not shown)
*Size larger as needed.*

**Control Schematic**

1. Photocell with integral surge arrester for roadway lighting.
2. Photocell with integral surge arrester for navigation lighting.
3. HAND-OFF-AUTO selector switch.
4. 100 amp, electrically held contactor.
5. 60 amp, electrically held contactor.
6. 15 amp, 1-pole circuit breaker.
7. 20 amp, 2-pole circuit breaker (two spares required but not shown).
8. 20 amp, single-pole circuit breaker (two shown, quantity as required).
10. GFCI duplex receptacle.
12. Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
13. Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
14. 60 amp, 2-pole circuit breaker.
15. 30 amp, 2-pole circuit breaker.
16. Terminal block sized for conductors as shown on plans.

---

**Equipment**

- Controller enclosure, minimum dimensions: 59H x 44W x 26D
- Insulated mounting board
- Service conductors
- Feeder conductors, sized as required.
- Neutral bar
- Ground rod in access well
- Grounded bar in controller enclosure, (1500 x 1120 x 660)

**Terminal Blocks**

- 30 amp, 2-pole circuit breaker (two spares required but not shown).
- 30 amp, 2-pole circuit breaker.
- 60 amp, electrically held contactor.
- 100 amp, electrically held contactor.
- HAND-OFF-AUTO selector switch.
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
- GFCI duplex receptacle.
- Single-pole, single-throw switch.
- Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- Service disconnect switch - 2-pole, 3-wire, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- 100 amp, electrically held contactor.
- 20 amp, 2-pole circuit breaker (two spares required but not shown).
- 20 amp, single-pole circuit breaker (two shown, quantity as required).
- Surge arrester.
ELECTRIC SERVICE INSTALLATION

* Size larger as needed.
** Or as directed by Utility Company.
*** When cold sequencing is required, provide a meter disconnect switch as directed by Utility Company.

240/480 V, 1-phase, 3-wire, overhead service.

25' (7.5 m) Wood service pole.

Service conductors — In rigid steel conduit, sized as required.

Weatherhead.

Grounding and anchor, as needed.

Wallhollow iron conduit clamps at 3' (0.9 m) intervals.

Slotted ventilator in underside of cover overhang.

Concrete foundation.

ANCHOR ROD

Ground rod.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Meter (when required).

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.

Controller enclosure.

Parshall Pocket.

Engraved name plate.

12 x 9 x 1

Concrete pocket mounted inside door with as-built drawings and schematics.

Controller enclosure.

5/8 (16) dia. anchor rod.

1 (25) 45° Chamfer.

Concrete foundation.

Additional wiring window as needed.

Weatherhead, anchor rod.

Ground line.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.

Controller enclosure.

Parshall Pocket.

Engraved name plate.

12 x 9 x 1

Concrete pocket mounted inside door with as-built drawings and schematics.

Controller enclosure.

5/8 (16) dia. anchor rod.

1 (25) 45° Chamfer.

Concrete foundation.

Additional wiring window as needed.

Weatherhead, anchor rod.

Ground line.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.

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Concrete pocket mounted inside door with as-built drawings and schematics.

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5/8 (16) dia. anchor rod.

1 (25) 45° Chamfer.

Concrete foundation.

Additional wiring window as needed.

Weatherhead, anchor rod.

Ground line.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.

Controller enclosure.

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Engraved name plate.

12 x 9 x 1

Concrete pocket mounted inside door with as-built drawings and schematics.

Controller enclosure.

5/8 (16) dia. anchor rod.

1 (25) 45° Chamfer.

Concrete foundation.

Additional wiring window as needed.

Weatherhead, anchor rod.

Ground line.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.

Controller enclosure.

Parshall Pocket.

Engraved name plate.

12 x 9 x 1

Concrete pocket mounted inside door with as-built drawings and schematics.

Controller enclosure.

5/8 (16) dia. anchor rod.

1 (25) 45° Chamfer.

Concrete foundation.

Additional wiring window as needed.

Weatherhead, anchor rod.

Ground line.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.

Controller enclosure.

Parshall Pocket.

Engraved name plate.

12 x 9 x 1

Concrete pocket mounted inside door with as-built drawings and schematics.

Controller enclosure.

5/8 (16) dia. anchor rod.

1 (25) 45° Chamfer.

Concrete foundation.

Additional wiring window as needed.

Weatherhead, anchor rod.

Ground line.

Feeder conductors in rigid conduit to lighting controller.

No. 6 bare copper wire.

Connect hub.

Conduit hub.

Service disconnect switch.

5/8 (16) dia. 45° Chamfer.

1 (25) 45° Chamfer.

Concrete foundation.

To service pole.

To service pole.

Lighting controller.
CONTROL SCHEMATIC

1. Photoset with integral surge arrester for roadway lighting.
2. Photoset with integral surge arrester for navigation lighting.
3. HAND-OFF-AUTO selector switch.
4. 100 amp, electrically held contactor.
5. 60 amp, electrically held contactor.
6. 15 amp, 3-pole circuit breaker.
7. 20 amp, 3-pole circuit breaker (two spares required but not shown).
8. 20 amp, single-pole circuit breaker (two shown, quantity as required).
10. GFCI duplex receptacle.
12. Incandescent luminaire, enclosed and gasketted with 100 watt lamp.
13. Service disconnect switch - 2-pole, 30 amp, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
14. 60 amp, 2-pole circuit breaker.
15. 30 amp, 2-pole circuit breaker.
16. Transformer - 1 KVA, 480V primary, 120/240V secondary, single phase, 60 Hz.
17. 15 amp, 3-pole circuit breaker.
18. Terminal block sized for conductors as shown on plans.

* Size larger as needed.

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-12

ENGINEER OF PRELIMINARY ENGINEERING

STANDARD 826006-01

LIGHTING CONTROLLER, 480V

NAVIGATION OBSTRUCTION (Sheet 2 of 2)

HAND-OFF-AUTO selector switch.
100 amp, electrically held contactor.
60 amp, electrically held contactor.
15 amp, 3-pole circuit breaker.
20 amp, 3-pole circuit breaker (two spares required but not shown).
20 amp, single-pole circuit breaker (two shown, quantity as required).
Surge arrester.
GFCI duplex receptacle.
Single-pole, single-throw switch.
Incandescent luminaire, enclosed and gasketted with 100 watt lamp.
Service disconnect switch - 2-pole, 30 amp, 100 amp, fused at 100 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
60 amp, 2-pole circuit breaker.
30 amp, 2-pole circuit breaker.
Transformer - 1 KVA, 480V primary, 120/240V secondary, single phase, 60 Hz.
15 amp, 3-pole circuit breaker.
Terminal block sized for conductors as shown on plans.

* Size larger as needed.
MOUNTING HEIGHT | MINIMUM SHAFT DIAMETER | MINIMUM WALL THICKNESS
--- | --- | ---
35' (10.7 m) or less | 0.25 (6) | 0.25 (6)
Greater than 35' (10.7 m) to 45' (13.7 m) | 0.312 (8) | 0.25 (6)
Greater than 45' (13.7 m) to 50' (15.2 m) | 0.307 (8) | 0.25 (6)

**GENERAL NOTES**

See Standard 836000 for Light Pole Foundation and grounding electrode.

See Standard 720000 for pole identification banding to poles.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plates directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

**DATE** | **REVISIONS**
--- | ---
[ ] | [ ]
[ ] | [ ]
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**LIGHT POLE ALUMINUM MAST ARM**

STANDARD 830001-03 (Sheet 1 of 2)
**HANDHOLE / IDENTIFICATION**

**ORIENTATION DETAIL**

**SECTION A-A**

*Drawings not shown*

**HANDHOLE DETAIL**

- Hex nut with washer. Washer shall cover entire slot (typ.)
- Nut covers required but not shown
- Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire
- Concrete foundation, barrier or retaining wall

**ELEVATION AT CONCRETE FOUNDATION, METAL FOUNDATION OR RETAINING WALL**

1. Omit leveling nuts when breakaway devices are required

**ELEVATION AT BRIDGE PARAPET**

**POLE BASE DETAILS**

**LIGHT POLE ALUMINUM MAST ARM**
DAVIT LIGHT POLE

Single or twin mounts.

* Unless directed otherwise by the Engineer.

SECTION A-A

Davit arm lengths:
- 15'-0" (4.57 m) max. for single.
- 17'-0" (5.18 m) max. for double.

See tenon detail.

SEE PATTERN DETAIL.

Factory installed internal dampener.

SECTION B-B

Flat washer and lock washer.

Light pole shaft.

Flange identification bonded to pole. See orientation detail.

See pole base and handhole detail.

POLE BASE

MOUNTING HEIGHT | BOLT CIRCLE DIAMETER
--- | ---
35' (10.7 m) or More | 1-1/2 (38 mm)
Greater than 35' (10.7 m) to 40' (12.2 m) | 1 (32 mm)
GREATER THAN 40' (12.2 m) | 1-1/8 (29 mm)

POLE LOWER SHAFT

MOUNTING HEIGHT | LOWER SHFT LENGTH | WROUGHT SHFT DIAMETER | WROUGHT WALL THICKNESS
--- | --- | --- | ---
35' (10.7 m) | 6 tapered | 2000 to 114 | 0.25 | 6
40' (12.2 m) | 10 tapered | 2500 to 150 | 0.25 | 6
45' (13.7 m) | 10 tapered | 2500 to 150 | 0.25 | 6
50' (15.2 m) | 10 tapered | 2500 to 150 | 0.25 | 8

♭ Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.

♭ 5" max. for unloaded pole, 12" max. for loaded pole.

GENERAL NOTES

See Standard 830006 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification band to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

Provide rodent entry.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE REVISIONS
1-1-15  Added pole mounted on bridge parapet. Modified attachment of screen.
1-1-14  Revised note on...
1-1-12  Issued

LIGHT POLE

ALUMINUM DAVIT ARM

(See pattern detail)

STANDARD 830006-03
**Handhole / Identification Orientation Detail**

- **Traffic Flow**
  - Pole on ground mounted foundation.
  - Pole on barrier wall, retaining wall or parapet.
  - Pole on median barrier wall.
  - Pole on road shoulder.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.

**Handhole Detail**

- **Handhole Cover**
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.

**Section A-A** (Sheet not shown)

- **Traffic Flow**
  - Pole on ground mounted foundation.
  - Pole on barrier wall, retaining wall or parapet.

**Elevation at Concrete Foundation, Metal Foundation or Retaining Wall**

- **Handhole and Cover**
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.

**Detail A**

- **Traffic Flow**
  - Pole on ground mounted foundation.
  - Pole on barrier wall, retaining wall or parapet.
  - Pole on bridge parapet.

**Light Pole Aluminum Davit Arm**

- **Specifications**
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.
  - 4 x 8 (100 x 200) min. Isolation washer.

**Bridge Parapet Pole Base Details**

- **Traffic Flow**
  - Pole on ground mounted foundation.
  - Pole on barrier wall, retaining wall or parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.
  - Pole on bridge parapet.

**Elevation at Bridge Parapet**

- **Handhole and Cover**
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.
  - Hex nut with washer, washer and cover.

**Standard 830006-03**
LIGHT POLE

STEEL MAST ARM

(Single or twin mount)

Pole cap secured to pole with three 3/8 x 16 set screws.

Light pole shafts.

Pole Identification bonded to pole. See orientation detail.

See pole base and handhole detail.

**MOUNTING HEIGHT** | **MINIMUM DIAMETER** | **MINIMUM WALL THICKNESS**
--- | --- | ---
35' (10.7 m) or less | 10 tapered to 4 (250 to 100) | 15 gauge
Greater than 35' (10.7 m) to 50' (15.2 m) | 10 tapered to 4 (250 to 100) | 7 gauge
Greater than 50' (15.2 m) to 60' (18.3 m) | 10 tapered to 4 (250 to 100) | 5 gauge

**BASE PLATE**

**MOUNTING HEIGHT** | **BOLT CIRCLE DIAMETER** | **BASE PLATE THICKNESS**
--- | --- | ---
35' (10.7 m) or less | 1 1/2 (250) | 1 (125)
Greater than 35' (10.7 m) to 50' (15.2 m) | 1 1/4 (380) | 1 1/2 (400)
Greater than 50' (15.2 m) to 60' (18.3 m) | 1 3/4 (400) | 1 3/4 (400)

**GENERAL NOTES**

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 820008 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.
General Notes:

- See Standard 830016 for Light Pole Foundation and grounding electrode.
- Provide breakaway devices where required.
- Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.
- Use Standard 836001 for Light Pole Foundation and grounding electrode.
- All dimensions are in inches (millimeters) unless otherwise shown.

Steel Davit Arm:

- Davit arm length: 15'-0" (4.57 m) max. for single, 12'-0" (3.66 m) max. for double.

Light Pole:

- Pole identification banded to pole. See orientation detail.
- Pole base and handhole detail. See pole base and handhole detail.

Davit Light Pole:

- Single or twin mount.
- Unless directed otherwise by the Engineer.

Base Plate:

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Bolt Circle Diameter</th>
<th>Base Plate Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>35' (9.1 m) or less</td>
<td>1 1/8&quot; (28)</td>
<td>1/2&quot; (12)</td>
</tr>
<tr>
<td>Greater than 35' (10.7 m) to 50' (15.2 m)</td>
<td>1 1/4&quot; (32)</td>
<td>1 1/2&quot; (12)</td>
</tr>
<tr>
<td>Greater than 50' (15.2 m) to 60' (18.3 m)</td>
<td>1 1/2&quot; (32)</td>
<td>1 1/4&quot; (12)</td>
</tr>
</tbody>
</table>

Pole Lower Shaft:

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Lower Shaft Length</th>
<th>Minimum Shaft Diameter</th>
<th>Minimum Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>30' (9.1 m)</td>
<td>27'-4&quot; (8.4 m)</td>
<td>8 tapered to 6</td>
<td>7 gauge</td>
</tr>
<tr>
<td>35' (10.7 m)</td>
<td>26'-1&quot; (7.9 m)</td>
<td>8 tapered to 6</td>
<td>7 gauge</td>
</tr>
<tr>
<td>40' (12.2 m)</td>
<td>31'-1&quot; (9.5 m)</td>
<td>10 tapered to 6</td>
<td>7 gauge</td>
</tr>
<tr>
<td>45' (13.7 m)</td>
<td>36'-1&quot; (11.0 m)</td>
<td>10 tapered to 6</td>
<td>7 gauge</td>
</tr>
<tr>
<td>50' (15.2 m)</td>
<td>41'-1&quot; (12.5 m)</td>
<td>10 tapered to 6</td>
<td>7 gauge</td>
</tr>
</tbody>
</table>

1. Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
2. 3° max. for unloaded pole, 1.5° max. for loaded pole.
Traffic flow

Pole on median barrier wall.

Traffic flow

Pole on ground mounted foundation.

Traffic flow

Pole on barrier wall, retaining wall or parapet.

Traffic flow

Pole Identification.

Traffic flow

Pole

Davit arm.

Handhole.

Traffic flow

Pole Identification.

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MOUNTING DETAILS

43' - 44' (13.1 m - 13.4 m) mounting height unless noted otherwise on plans.

LIGHT POLE WITH
CIRCUIT ROUTED
UNDERGROUND

LIGHTING CIRCUIT
AT SERVICE/CONTROLLER
See standard 825001 for service instruction.

MOUNTING BRACKET DETAILS

SIDE VIEW

FACING VIEW

TWIN
SINGLE

GENERAL NOTES
See plans for wire and unit duct sizes and pole locations not shown.

Provide guy wires with strain insulators and anchors, as needed.

All dimensions are in inches (millimeters) unless otherwise shown.

STANDARD 830026

TEMPORARY ROADWAY LIGHTING
**LIGHT TOWER**

- Unless directed otherwise by the Engineer.

**GENERAL NOTES**

See Standard 835001 for High Mast Tower Foundation and grounding electrode.

All dimensions are in inches (millimeters) unless otherwise shown.

**DATE**

1-1-15

**REVISIONS**

1-1-15

New Standard.

**STANDARD 835001-01**
**Light Pole Foundation**

- **Length above foundation shall be adjusted to accommodate breakaway devices furnished by the contractor for a specific installation.**
- **Anchors shall be 15 (381) dia. and 30 (762) min. dia. with 12 (305) I.D. with 15 (381) bolt circle.**
- **Anchors shall be 12 (305) I.D. with 15 (381) bolt circle.**
- **Anchors shall be 9 (230) I.D. with 11 (279) bolt circle.**
- **Anchors shall be 6 (150) dia. fully threaded stud anchor rod.**
- **Anchors shall be 3 (75) Min. concrete cover.**
- **Top of wiring window shall be flush with top of foundation.**
- **Flats to be installed when required. See ring plate detail.**
- **3 (75) Min. concrete cover.**
- **Anchor rod shall extend through nut 1 (25) for foundation behind barrier or guardrail use self-locking nut and flat washer. Do not use lock washer.**
- **Ring Plate Detail when rock is encountered.**

**Concrete Foundation**

- **24 (610) min. dia. with 15 (381) bolt circle.**
- **30 (762) min. dia. with 15 (381) or 17 (430) bolt circle.**

**Metal Foundation**

- **5 (125) I.D. Schedule 40 P.V.C. window, fill with fine aggregate.**
- **Provide dirt as needed to meet 5 (125) dia. short fill around foundation top. Grade dirt level with bottom of top plate.**
- **Wiring window location identification marks shall be notched in side of plate or stamped on top.**
- **Length above foundation shall be adjusted to accommodate breakaway devices furnished by the contractor for a specific installation.**

**General Notes**

- All foundations are designed to be located on slopes not exceeding 2:1 where soils have an unconfined compressive strength of at least 1.0 TFS. The Contractor shall verify the soil strength during bidding for concrete foundations or by monitoring installation resistance of metal foundations and notify the Engineer if other conditions are encountered.
- When rock is encountered the foundation depth may be reduced below 1 (250) for every 1 (250) of embedment in rock. The minimum foundation depth shall be 4 (106) min. with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.
- Anchor rods shall be increased in diameter as needed for 50 (1270) min. mounting height or above. The Contractor shall match the breakaway device size or slotted hole size in the pole base plate to accommodate larger rod sizes.
- Transformer bases shall not be used on metal foundations.

**Dimensions**

- All dimensions are in inches (millimeters)
- All foundations are designed to be located on slopes not exceeding 2:1 where soils have an unconfined compressive strength of at least 1.0 TFS. The Contractor shall verify the soil strength during bidding for concrete foundations or by monitoring installation resistance of metal foundations and notify the Engineer if other conditions are encountered.

**Materials**

- **Concrete strength grades 1 (25) dia. fully threaded stud anchor rod.**
- **Anchors shall be 15 (381) Min. concrete cover.**
- **Anchors shall be 12 (305) dia. fully threaded stud anchor rod.**
- **Anchors shall be 9 (230) dia. fully threaded stud anchor rod.**
- **Anchors shall be 6 (150) dia. fully threaded stud anchor rod.**

**Wiring Window**

- **Wiring window location identification marks shall be notched in side of plate or stamped on top.**
- **Provide dirt as needed to meet 5 (125) dia. short fill around foundation top. Grade dirt level with bottom of top plate.**

**Light Pole Foundation Setback**

- For multilamp luminaires, setback shall be at least 20 (510) min. on edge of pavement. Poles shall be located 5 (125) min. behind guardrail or other protective barriers, or as directed by the Engineer.

**Concrete Foundation**

- **24 (610) min. dia. with 15 (381) bolt circle.**
- **30 (762) min. dia. with 15 (381) or 17 (430) bolt circle.**

**Metal Foundation**

- **5 (125) I.D. Schedule 40 P.V.C. window, fill with fine aggregate.**
- **Provide dirt as needed to meet 5 (125) dia. short fill around foundation top. Grade dirt level with bottom of top plate.**
- **Wiring window location identification marks shall be notched in side of plate or stamped on top.**

**General Notes**

- All foundations are designed to be located on slopes not exceeding 2:1 where soils have an unconfined compressive strength of at least 1.0 TFS. The Contractor shall verify the soil strength during bidding for concrete foundations or by monitoring installation resistance of metal foundations and notify the Engineer if other conditions are encountered.
- When rock is encountered the foundation depth may be reduced below 1 (250) for every 1 (250) of embedment in rock. The minimum foundation depth shall be 4 (106) min. with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.
- Anchor rods shall be increased in diameter as needed for 50 (1270) min. mounting height or above. The Contractor shall match the breakaway device size or slotted hole size in the pole base plate to accommodate larger rod sizes.
- Transformer bases shall not be used on metal foundations.

**Dimensions**

- All dimensions are in inches (millimeters)

---

**Table: Pole Foundation Details**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Length</th>
<th>Depth</th>
<th>Shaft Depth (See Table)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 x 15 x 1'</td>
<td>3</td>
<td>3</td>
<td>15 x 15 x 1'</td>
</tr>
<tr>
<td>12 x 12 x 1</td>
<td>3</td>
<td>3</td>
<td>12 x 12 x 1</td>
</tr>
<tr>
<td>300 x 300 x 25</td>
<td>3</td>
<td>3</td>
<td>300 x 300 x 25</td>
</tr>
</tbody>
</table>

---

**Table: Ring Plate Details**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Length</th>
<th>Depth</th>
<th>Shaft Depth (See Table)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 x 15 x 1'</td>
<td>3</td>
<td>3</td>
<td>15 x 15 x 1'</td>
</tr>
<tr>
<td>12 x 12 x 1</td>
<td>3</td>
<td>3</td>
<td>12 x 12 x 1</td>
</tr>
<tr>
<td>300 x 300 x 25</td>
<td>3</td>
<td>3</td>
<td>300 x 300 x 25</td>
</tr>
</tbody>
</table>
GENERAL NOTES

See standard 637006 for barrier wall details.

Provide 3 (75) mm separation between all conduits.

When rock is encountered, the foundation depth may be reduced 6 (150) mm for every 12 (300) mm of embedment in rock. The minimum foundation depth shall be 30 (760) mm with cut anchor rods 6 (150) mm above bottom of excavated hole. See ring plate detail.

All dimensions are in inches (millimeters) unless otherwise shown.
**Esta página del documento con texto extraído**

**Illinois Department of Transportation**

**PASSED**

**ENGINEER OF DESIGN AND ENVIRONMENT**

**APPROVED**

**DATE**

**REVISIONS**

**ISSUED 1-1-10**

**January 1,**

**ENGINEER OF PRELIMINARY ENGINEERING**

---

- **Electrode conductor.**
- **No. 4 bare copper grounding electrode conductor.**
- **1 (25) chamfer anchor rod cage.**
- **Work pad in.**
- **9 (230) (125) 5 (150) 6 (150) pitch, (typ.)**
- **No. 4 (No. 13) spiral, V-bars. See Section A-A.**

**Foundation Elevation**

- **No. 4 (No. 13) spiral, 6 (150) pitch, (typ.)**
- **5 (25), 36 (95) sweep Sch. 40 PVC wiring window, 2 (150) min. projection above foundation.**
- **Two insertion 9/16 x 10" (1.6 x 3.1) connected threaded grounding electrodes in 1/2 (38) Sch. 40 PVC sleeve.**

---

**SHAFT LENGTH TABLE**

<table>
<thead>
<tr>
<th>SOIL CONSISTENCY</th>
<th><em>Qu in lbs/ft.</em></th>
<th>80'</th>
<th>120'</th>
<th>160'</th>
<th>200'</th>
<th>240'</th>
<th>280'</th>
<th>320'</th>
<th>360'</th>
<th>400'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft</td>
<td>&lt; 0.5 (50)</td>
<td>20-6</td>
<td>21-6</td>
<td>22-6</td>
<td>23-6</td>
<td>24-6</td>
<td>25-6</td>
<td>26-6</td>
<td>27-6</td>
<td>28-6</td>
</tr>
<tr>
<td>Medium</td>
<td>0.5 to 1 (100)</td>
<td>17-6</td>
<td>18-6</td>
<td>19-6</td>
<td>20-6</td>
<td>21-6</td>
<td>22-6</td>
<td>23-6</td>
<td>24-6</td>
<td>25-6</td>
</tr>
<tr>
<td>Stiff</td>
<td>1 to 2 (200)</td>
<td>14-6</td>
<td>15-6</td>
<td>16-6</td>
<td>17-6</td>
<td>18-6</td>
<td>19-6</td>
<td>20-6</td>
<td>21-6</td>
<td>22-6</td>
</tr>
<tr>
<td>Very Stiff</td>
<td>2 to 4 (400)</td>
<td>11-6</td>
<td>12-6</td>
<td>13-6</td>
<td>14-6</td>
<td>15-6</td>
<td>16-6</td>
<td>17-6</td>
<td>18-6</td>
<td>19-6</td>
</tr>
<tr>
<td>Hard</td>
<td>3 to 6 (600)</td>
<td>8-6</td>
<td>9-6</td>
<td>10-6</td>
<td>11-6</td>
<td>12-6</td>
<td>13-6</td>
<td>14-6</td>
<td>15-6</td>
<td>16-6</td>
</tr>
</tbody>
</table>

**Foundation LIGHT TOWER**

- **SECTION A-A**
  - See Rod and Reinforcement Table.
- **Shaft length (125) cover.**
- **No. 11 (No. 36) V-bars evenly spaced.**
- **Anchor rods evenly spaced.**

---

**LIGHT TOWER FOUNDATION**

- **See Sheet 2 for GENERAL NOTES.**
- **SHAFT LENGTH TABLE**
- **ELEVATION**
- **SECTION A-A**
  - See Rod and Reinforcement Table.

---

**STANDARD 837001-04**

---

**DATE**

**REVISIONS**

1-1-15

- **Revised diameter of grd. foundation.**
- **Added 6'-8" min. anchor rod embedment in.**
- **Electrode sleeve.**

---

**See Sheet 2 for GENERAL NOTES.**

---

**LIGHT TOWER FOUNDATION**

(Sheet 1 of 2)
see Detail A

See Detail B

SECTION B-B

GENERAL NOTES

The shaft length is based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

All foundation reinforcement steel shall be epoxy coated.

The cost of reinforcement shall be included in the cost of the foundation.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Coordinate the rod circle diameter of the tower with the diameter of the anchor rod cage.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an accessible well when there is a conflict in using the method shown.

All dimensions are in inches (millimeters) unless otherwise shown.

LIGHT TOWER
FOUNDATION

STANDARD 837001-04

(Sheet 2 of 21)
BREAKAWAY COUPLINGS
ON CONCRETE FOUNDATION
(Provide pole base skirt around screen when required)

BREAKAWAY COUPLINGS
ON METAL FOUNDATION
(Provide pole base skirt around screen when required)

GENERAL NOTES
See Light pole Standard for details not shown.
Use largest transformer base bolt circle possible.
Transformer bases shall not be installed on metal foundations.
Washers on top of pole base shall cover the entire bolt slot.
See Standard 836001 for Light Pole Foundation.
All dimensions are in inches (millimeters) unless otherwise shown.
Coordinated phase

MAJOR STREET

Coordinated phase

NEMA EIGHT PHASE DUAL RING
ACTUATED CONFIGURATION

LEGEND

ventricular phase no. x
Pedestrian phase no. x
Right turn overlaps where;

NEMA National Electrical Manufacturers Association

STANDARD PHASE DESIGNATION DIAGRAM (NEMA)
CR1 and CR2 are 120VAC 3PDT Relays.

Supervision Fail is Preempt No. 1, causing traffic signal controller to implement all-red flash following track clearance phase.

Railroad Preempt is Preempt No. 2, causing traffic signal controller to implement railroad preemption routine following 1 second delay.

Preempt No. 1 and Preempt No. 2 shall have priority over all other preempts. The railroad preemption routine shall abbreviate each and all active pedestrian phases by immediately entering into the associated vehicle yellow change interval.

Railroad Preempt is Preempt No. 2, causing traffic signal controller to implement railroad preemption routine following 1 second delay.

Preempt No. 1 and Preempt No. 2 shall have priority over all other preempts. The railroad preemption routine shall abbreviate each and all active pedestrian phases by immediately entering into the associated vehicle yellow change interval.
SINGLE LINE BLOCK DIAGRAM

**UPS CABINET**
- Inverter/Charger
- Power Transfer Relay
- Batteries

**TRAFFIC SIGNAL (NEMA) CABINET**
- Manual Bypass Switch
- Traffic Signal Equip.

---

Note: The power transfer relay may be internal to the inverter/charger.
**BONDING A HANDHOLE COVER & FRAME**

- Equipment grounding conductor to controller double handhole.
- No. 6 AWG equipment grounding conductor (green).
- Heavy-duty compression terminal typical.
- Access cover.

**GROUNDING AN EXISTING HANDHOLE COVER & FRAME**

- Heavy-duty compression terminal typical.
- 3/8" x 10' (13 x 31) stainless steel bolt with split lock washer and two washers. Anti-corrosion compound shall be applied to the assembly.

**GROUNDING A MAST ARM POLE/POST**

- Heavy-duty compression terminal typical with stainless steel nut. Anti-corrosion compound shall be applied to the assembly.
- 3/8" x 10' (19 x 3.0 m) copper clad grounding electrode.

---

**TRAFFIC SIGNAL GROUNDING & BONDING**

**DETAIL "A"**

- Stainless steel bolt, nut, and two washers. Anti-corrosion compound shall be applied to the assembly.

**DETAIL "B"**

- Cable hooks.
- See Detail "A".
- See Detail "B".

---

**HEAVY-DUTY COMPRESSION TERMINAL**

- 3/8" (10 mm) O.D.

**HEAVY-DUTY GROUND ROD CLAMP**

- All dimensions are in inches (millimeters) unless otherwise shown.
**PEDESTRIAN ONE PUSH BUTTON POST**

- Cap
- Steel bolts (M8) dia. Stainless
- Gasket
- Post
- Coupling 3 (75)
- Grade line
- Finished reducer
- Conduit
- Concrete

**PEDESTRIAN TWO PUSH BUTTON POST**

- Cap
- Steel bolts (M8) dia. Stainless
- Gasket
- Post
- Coupling 3 (75)
- Grade line
- Finished reducer
- Conduit
- Concrete

*36 (914) preferred

---

**TYPICAL ONE BUTTON**

**TYPICAL TWO BUTTONS**

**TOP VIEW**

**TOP VIEW**

**TOP VIEW**

**TOP VIEW**

---

**PEDESTRIAN PUSH BUTTON POST**

**STANDARD 876001-04**
Mast arm length as specified on the plans

This signal head only for poles 30' (9.14 m) and longer.

Removable cap

- Removable cap

- Sign panel or blankout sign 100 lb (45 kg) max.

- Sign panel or blankout sign 100 lb (45 kg) max.

- Sign panel or blankout sign 100 lb (45 kg) max.

Pole height oncoming traffic located opposite with frame and cover 4x8 (100x200) Handhole opposite handhole Ground lug (4 required) Bolt covers (4 required)

**General Notes**

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 lb (36 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m). Other dimensions are in inches unless otherwise shown.

**Steel Mast Arm Assembly and Pole 16' Through 55'**

**Standard 877001-06**

**DATE**

**REVISIONS**

- Changed sign panel to 36x36.
- Added max. weight of 100 lb.
- Modified dim. to outer signal.
- Changed 22 sq. ft. to 18 sq. ft.
- Added max. weight of 100 lb.

**Steel Mast Arm Details**

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Bolt Circle</th>
<th>Anchor Rod Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>16' thru 20' (4.87 m thru 6.10 m)</td>
<td>16 (450)</td>
<td>16 x 5'</td>
</tr>
<tr>
<td>20' thru 30' (6.71 m thru 9.14 m)</td>
<td>18 (450)</td>
<td>16 x 5'</td>
</tr>
<tr>
<td>30' thru 60' (9.75 m thru 12.20 m)</td>
<td>18 (450)</td>
<td>18 x 7'</td>
</tr>
<tr>
<td>40' thru 90' (12.80 m thru 36.00 m)</td>
<td>21 (535)</td>
<td>21 x 7'</td>
</tr>
</tbody>
</table>
Mast arm length as specified on the plans.

Four spaces at 12' (3.6 m) typ., 8' (2.4 m) (min.)

Highest point of pavement

This signal head only for arms 60' (18.3 m) and longer.

20 sq. ft. (0.26 sq. m) max. sign panel or
blankout sign

100 lb (45 kg) max.

Each signal head shall weigh 80 lbs. (36 kg) and
are shown for minimum design loading purposes only.

Signal heads, sign panels, and other attachments
have a projected area of 14.7 sq. ft. (1.37 sq. m).

Leveling nut (typ.)

Bolt circle (6 required)

Bolt covers (6 required)

4x8 (100x200) Handhole

Removable pole cap

Future use

Mast arm length

Bolt circle

Anchor rod size

<table>
<thead>
<tr>
<th>MAST ARM LENGTH</th>
<th>BOLT CIRCLE</th>
<th>ANCHOR ROD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>56' thru 64'</td>
<td>24</td>
<td>1\frac{1}{2} x 7&quot;</td>
</tr>
<tr>
<td>(17.1 m thru 19.8 m)</td>
<td>(610)</td>
<td>(44 x 220) mm</td>
</tr>
<tr>
<td>65' thru 75'</td>
<td>27</td>
<td>2 x 7'-6&quot;</td>
</tr>
<tr>
<td>(19.8 m thru 22.9 m)</td>
<td>(686)</td>
<td>(51 x 230) mm</td>
</tr>
</tbody>
</table>

GENERAL NOTES

Signal heads, sign panels, and other attachments,
are shown for minimum design loading purposes only.
Each signal head shall weigh 80 lbs. (36 kg) and
have a projected area of 14.7 sq. ft. (1.37 sq. m).

All dimensions are in inches (millimeters)
unless otherwise shown.

STEEL MAST ARM
ASSEMBLY AND POLE
56' THROUGH 75'

STANDARD 877002-03

DATE | REVISIONS
--- | ---
1-1-12 | 4-1-16
1-1-08 | Changed sign panel to

Changed 2.5'x8' sign panel to
4 x 20 sq. ft. (1.16 sq. m)

J4 x 20 sq. ft. (1.16 sq. m)

Increased sign panel to

4 x 20 sq. ft. (1.16 sq. m)

4 x 20 sq. ft. (1.16 sq. m)
This signal head only for arms 36' (10.97 m) and longer.

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 90 lb (40.6 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m).

Mast Arm Length | Bolt Circle | Anchor Rod Size
--- | --- | ---
16' thru 20' (4.87 m thru 6.10 m) | 16 (450) | 1/2" x 3" (13 x 75 m)
20' thru 30' (6.10 m thru 9.14 m) | 16 (450) | 1/2" x 3" (13 x 75 m)
30' thru 55' (9.14 m thru 16.80 m) | 21 (570) | 2 x 7'-6" (1.2 x 2.40 m)

Removable pole cap

Bolt covers (4 required)

Stainless steel mesh

General Notes
Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 90 lb (40.6 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m).

All dimensions are in inches (millimeters) unless otherwise shown.
FOUNDATION DETAILS

CONCRETE

STANDARD 878001-10

Foundation detail.

TYPE A
FOR GROUND MOUNTED
CONTROLLER CABINET
AND UPS BATTERY CABINET

TYPE C
FOR GROUND MOUNTED
CONTROLLER CABINET

TYPE D
FOR GROUND MOUNTED
CONTROLLER CABINET

All dimensions are in inches (millimeters) unless otherwise shown.
These foundation depths are for sites which have cohesive soils (clayey silt, sandy silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Qu) > 1.0 tsf (100 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

For standard and combination mast arm assemblies, foundation depths for standard dual mast arms with the longest arm length up to and including 55’ (16.8 m) shall be increased by 1’ (0.3 m) of that shown in the table, based on the longer of the two arms.

<table>
<thead>
<tr>
<th>Mast Arm Length</th>
<th>Foundation Depth *</th>
<th>Foundation Diameter</th>
<th>Spiral Diameter</th>
<th>Quantity of Rebars</th>
<th>Size of Rebars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30’ (9.1 m)</td>
<td>10'-0&quot; (3.0 m)</td>
<td>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
<td>6 (19)</td>
</tr>
<tr>
<td>Greater than or equal to 30’ (9.1 m) and less than 40’ (12.2 m)</td>
<td>13'-6&quot; (4.1 m)</td>
<td>30 (750)</td>
<td>24 (600)</td>
<td>8</td>
<td>6 (19)</td>
</tr>
<tr>
<td>Greater than or equal to 40’ (12.2 m) and less than 50’ (15.2 m)</td>
<td>17'-0&quot; (5.2 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 50’ (15.2 m) and up to 55’ (16.8 m)</td>
<td>19'-0&quot; (5.8 m)</td>
<td>36 (900)</td>
<td>30 (750)</td>
<td>12</td>
<td>7 (22)</td>
</tr>
<tr>
<td>Greater than or equal to 55’ (16.8 m) and less than 65’ (19.8 m)</td>
<td>21'-0&quot; (6.4 m)</td>
<td>42 (1060)</td>
<td>36 (900)</td>
<td>16</td>
<td>8 (25)</td>
</tr>
<tr>
<td>Greater than or equal to 65’ (19.8 m) and up to 75’ (22.9 m)</td>
<td>25'-0&quot; (7.6 m)</td>
<td>42 (1060)</td>
<td>36 (900)</td>
<td>16</td>
<td>8 (25)</td>
</tr>
</tbody>
</table>

* for standard and combination mast arm assemblies, foundation depths for sites which have cohesive soils (clayey silt, sandy silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Qu) > 1.25 tsf (125 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

No. 6 bare copper wire
540#@ 8 (19) steel mesh
1½ (40) Bevel
9 (225) Formed to below grade line
3½ (89) Conduct
2½ (63) Conduit
No. 6 (No. 13) spiral with 6 (150) pitch
Three loops min. top and bottom, loops shall be spaced 2 (50) apart.
STEEL MAST ARM MOUNTING

POST MOUNTED TRAFFIC SIGNAL HEAD
POST MOUNTED PEDESTRIAN SIGNAL HEAD
POST MOUNTED PEDESTRIAN SIGNAL HEAD
ONE WAY
TWO WAY

TRAFFIC SIGNAL HEAD
POST MOUNTED

TRAFFIC SIGNAL HEAD
BRACKET MOUNTED
ONE WAY
TWO WAY

TRAFFIC SIGNAL HEAD
BRACKET MOUNTED

TRAFFIC SIGNAL HEAD
BRACKET MOUNTED

TRAFFIC SIGNAL HEAD
BRACKET MOUNTED

STEEL MAST ARM MOUNTING

Terminal compartment

Pole plate with stainless steel bands

Pole plate with stainless steel bands

Pole plate with stainless steel bands

Pole plate with stainless steel bands

Terminal compartment

STANDARD 880006-01

TRAFFIC SIGNAL MOUNTING DETAILS
Insert conduit and fill with approved sealer.

Drill hole through pavement. Insert conduit and fill with approved sealer.

Approved sealer

Grade

Curb and gutter

Handhole, junction box, signal base, or controller base

Sawed slot for detector loop

2% min. slope toward handhole

Detector loop lead-in

Approved sealer

Detector loop installation

PCC Pavement

Asphalt Pavement

Pavement joint

Slot

NOTE

Loop wire shall follow saw cut to bottom, forming slack section at joint.

Dimensions are in inches (millimeters) unless otherwise shown.

All dimensions are in inches (millimeters) unless otherwise shown.

Switched units to English (metric) Standard 886001.

Standard 886001-01
SHORT LOOP

FOR POINT DETECTION

LONG LOOP

FOR PRESENCE DETECTION

MULTIPLE LOOP IN SERIES

QUADRUPOLE LOOP

FOR PRESENCE DETECTION

FOR DETECTION LOOPS

QUADRUPOLE LOOP

SLOT PLAN

WIRING DIAGRAM

TYPICAL LAYOUTS

FOR DETECTION LOOPS

STANDARD 886006-01

All dimensions are in inches (millimeters) unless otherwise shown.
**PLAN OF PAVEMENT**

- **TRANSVERSE CONTRACTION JOINT**
  - Sawed groove
  - Dowel bar assembly
  - Sawed joint
  - Dowel bars at 18 (450) cts.

- **TRANSVERSE CONSTRUCTION JOINT**
  - Dowel bar assembly
  - Dowel bars at 18 (450) Long
  - Hot poured joint sealer

**DOWEL BAR TABLE**

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS</th>
<th>DOWEL BAR DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (200) or greater</td>
<td>1 1/8 (32)</td>
</tr>
<tr>
<td>4 (100) thru 7.99 (199)</td>
<td>7/8 (32)</td>
</tr>
<tr>
<td>Less than 7 (175)</td>
<td>1 1/16 (17)</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- Skewed joints shall be used when specified by Special Provisions.
- Dowel bars are only required for pavements having a design traffic factor of 3.0 or greater.
- Skewed joints are cut separately.
- This portion of saw cut not required when base course and surface are not required when base course and surface are cut separately.
- Bituminous surface 4 (100) (Typ.)
- Stabilized base course 10 (250) (Typ.)

**PORTLAND CEMENT CONCRETE PAVEMENT (NONREINFORCED)**

**CROSS SECTION OF PAVEMENT**

- Longitudinal sawed joint
- Skewed joint
- Dowel bar assembly
- Dowel bars at 18 (450) Long
- Hot poured joint sealer

**STANDARD B.L.R.14-11**
Two-Lane, Two-Way Traffic, Rural Operations Exceeding One Daylight Period

Type III barricades to be width of pavement only. Reflective striping shall appear on both sides of barricades, barricades shall be positioned so that vehicles slope downward toward the side on which traffic is to pass.

Although not shown, advance warning signs with minimum dimensions of 36x36 (900x900) and black legends on orange reflective backgrounds shall be utilized where needed.

This case is for use on rural local roads where the local authority considers traffic protection to be appropriate for the specific job conditions.

All dimensions are in inches unless otherwise shown.
ROAD AHEAD WORK AHEAD MOWING

DATE
REVISIONS

Illinois Department of Transportation
ENGINEER OF DESIGN AND ENVIRONMENT
APPROVED
ISSUED
1-1-97
APPROVED
ENGINEER OF LOCAL ROADS AND STREETS

GENERAL NOTES
Maintenance operations shall be confined to one traffic lane, leaving the opposite lane open to traffic, at least 1000 (300 m) of both traffic lanes shall be available for traffic movement between work areas at intervals not greater than 1000 (300 m).

When operations are on the pavement and stationary or moving at a speed less than 4 mph (6 km/h), use of road work ahead sign and one appropriate sign, shall be installed in each direction between the ROADS AHEAD sign and the work area.

The minimum distance between this sign and the work area shall be a minimum of 400 (120 m) but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less.

The distance between the two signs shall be approximately 400 (120 m).

All signs are to be removed at completion of the day's operation.

Any unattended obstacles, excavations, or pavement drop off greater than 3 (75) in the work area shall be protected by Type I or Type II barricades with flashing lights.

Longitudinal dimensions may be adjusted slightly to fit field conditions.

All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have block legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions, unless otherwise shown.

TYPICAL APPLICATIONS
WORKING
SPREADING APPROPRIATE ASPHALT
MAINTENANCE DELAYED REPAIRING
CRACK FILLING
SHOULDER REPAIR
CLEANING DITCHES

SYMBOLS
Work area
Sign with 18x18 (450x450) min. orange flag attached.

TWO-LANE, TWO-WAY TRAFFIC
RURAL OPERATIONS
DAY OPERATIONS ONLY

DATE
REVISIONS
1-1-09
Switched units to English units, Moved
one General Note.

TRAFFIC CONTROL DEVICES-
DAY LABOR MAINTENANCE

STANDARD B.L.R. 18-6
When rail element is placed adjacent to a finished surface, use timber wedge 'N' between the concrete and plate 'G'.

1 3/8" Dia. channel bolt with lock nut furnished in place by the Contractor.

1 (M25) Dia. anchor bolt with locknut placed under head and nut.

Splice bolts with washer and lock nut (w/self drilling or expanding anchors).

(102) 4" Thick soil plate 'J' on these 4 posts only.

4 1/2" (110) Dia. flat head bolts with std. hex nut

Plate 'R-1' and 'R-2' furnished in place by the Contractor.

Plate 'R-3' placed between plate 'E' and rail element.

Only type and rail element allowed in this project.

Plate 'G' placed between plate 'E' and rail element.

When rail element is placed adjacent to a finished surface, use timber wedge 'N' between the concrete and plate 'G'.

Plate 'E' placed between plates 'D' and rail element.

Splice bolts with washer under nut.

Splice bolts with washer under nut.

Post bolt with plate washer 'F' placed under head and nut.

Finished ground line

Traffic Barrier Terminal Type 5R

Plate 'R-3' at face of the parapet. Install plate washer 'D' so that the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate 'R-2' after the 1 (25) bolts are in place.

Terminated Rub Rail

Transition height of barrier terminal up to height of guardrail over length of barrier terminal.

See Alternate soil plate connection

ELEVATION-TRAFFIC BARRIER TERMINAL TYPE 5R

GENERAL NOTES

See Standard B.L.R. 20-7 for details of guardrail not shown.

Model the face of the guardrail flush with the face of the parapet. Install plate washer 'D' so that the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate 'R-2' after the 1 (25) bolts are in place.

When an expansion joint exists below the connector, bolts shall be provided with locknut or double nut and shall be tightened only to a point that will allow plate 'G' to be free to move.

All dimensions are in inches (millimeters) unless otherwise shown.

TRAFFIC BARRIER TERMINAL-TYPE 5R

STANDARD B.L.R. 20-7

(Sheet 1 of 2)
**General Notes**

Type III Barricades and W20-3(O)-36 signs shall be positioned as shown in "Road Closed To All Traffic" detail in Highway Standard 10190.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness, one light shall be installed above the barricades and the other above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), the advance sign shall be placed at the intersection. When the distance between the barricade and the intersection is between 2000' (600 m) and 2500' (750 m), an additional sign shall be placed on the intersection. The additional sign shall give the distance to the barricade in miles or fractions of a mile.

All dimensions are in inches (millimeters) unless otherwise shown.

**Symbols**

- **Work area**
- **Type III Barricade**
- **Sign with 18x18 (450x450) min. orange flag attached**

**Typical Application of Traffic Control Devices for Construction on Rural Local Highways**

Standard B.L.R. 21-8
**SHOULDER WIDENING TRANSITION**

- Pay limits of other type
- Pay limits of Traffic Barrier Terminal Type 1 (1 ea.)
- See table of offsets

**WOOD BREAKAWAY POSTS**

- Tubular Steel Foundations
- Wood Breakaway Posts

**GENERAL NOTES**

- See Standard B.L.R. 23-4 for details of guardrail not shown.
- Posts at location 1 & 2 shall be wood breakaway posts. Posts other than 1 & 2 may be either standard wood posts or steel posts, at the option of the Contractor. If standard wood posts are used, one post shall be located midway between and in line of posts 1 & 2. The offset (Y) for this post shall be 12 (300).
- A two-piece assembly may be substituted for the one-piece nose shown above.
- The bearing plate K shall be held in position by (2) #10 (5 x 100) bolts.
- Other type
- Posts at location 1 & 2 shall be wood breakaway posts. Posts other than 1 & 2 may be either standard wood posts or steel posts, at the option of the Contractor. If standard wood posts are used, one post shall be located midway between and in line of posts 1 & 2. The offset (Y) for this post shall be 12 (300).
- A two-piece assembly may be substituted for the one-piece nose shown above.
- The bearing plate K shall be held in position by (2) #10 (5 x 100) bolts driven into the post and bent over the top of the tube.
- When this terminal is used with Standard 630001, the guardrail shall transition down to the height of the terminal prior to post 8.
- All slope ratios are expressed as units of vertical displacement to units of horizontal displacement.
- All dimensions are in inches (millimeters) unless otherwise shown.

**TRAFFIC BARRIER TERMINAL TYPE 1**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-09</td>
<td>Revised barrier terminal height and wood breakaway post.</td>
</tr>
</tbody>
</table>

**OFFSETS TO FACE OF RAIL**

<table>
<thead>
<tr>
<th>Post</th>
<th>X ft (m)</th>
<th>Y ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>3</td>
<td>0.24</td>
<td>0.24</td>
</tr>
<tr>
<td>4</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>5</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>6</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>7</td>
<td>1.79</td>
<td>1.79</td>
</tr>
<tr>
<td>8</td>
<td>2.79</td>
<td>2.79</td>
</tr>
</tbody>
</table>
Mailboxes shall be located such that the face of the mailbox is a 6 (150) to 12 (300) minimum of 24 (600) from the edge of the turnout surfacing.

All dimensions are in inches (millimeters) unless otherwise shown.

**GENERAL NOTES**
TYPE 1A BARRICADE
FOR NON–NHS ROUTES
STANDARD B.L.R. 25–1

All dimensions are in inches (millimeters) unless otherwise shown.
STANDARD B.L.R. 26-3

29" (731mm) HEIGHT

GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

Steel plate beam guardrail

6'-3" (1.905 m) Typical post spacing

Concrete structure

Steel block-outs only

After this post has been located, drill holes in concrete for block-out attachments.

<table>
<thead>
<tr>
<th>TYPE A</th>
<th>6'-3&quot; (1.905 m) Typical post spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE B</td>
<td>37&quot; (953) Block-out spacing</td>
</tr>
<tr>
<td>TYPE C</td>
<td>37&quot; (953) Block-out spacing</td>
</tr>
<tr>
<td>TYPE D</td>
<td>Double steel plate beam guardrail</td>
</tr>
</tbody>
</table>

Steel plate beam guardrail

6'-3" (1.905 m) Typical post spacing

Concrete structure

Steel block-outs only

After this post has been located, drill holes in concrete for block-out attachments.

ELEVATION

SECTION A-A

SECTION C-C

SECTION B-B

PLAN

Section A-A

Section C-C

Section B-B

General Notes
STEEL POST CONSTRUCTION

STEEL BLOCK-OUT DETAIL

NOTE
Plate A shall be placed between rail element and block-out or non-splice mounting points only when steel block-outs are used.

WOOD POST CONSTRUCTION

STEEL PLATE BEAM GUARDRAIL
29" (731mm) HEIGHT

PLATE A
NOTE

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

Externally threaded studs protruding from the surface of the concrete will not be permitted.

When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a washer or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

NOTE

Anchor plate T shall be used to attach cable assembly to guardrail when required on traffic barrier terminals.

Slotted hole $\frac{1}{2}'' (19x64)$ for $\frac{1}{4}$ (10m) splice bolts

Neutral axis

Rail element

Placed standard end shoe between splice plate and rail element

SPICE PLATE

Class A rail element

$\frac{7}{8}'' (20)\text{ Dia. holes}$

$\frac{3}{4}'' (19x64)$ Slotted hole

Slotted hole $\frac{1}{2}'' (19x64)$ for $\frac{1}{4}$ (10m) splice bolts

ANCHOR PLATE T DETAILS

$\frac{1}{4}'' (19x23)\text{ Slots}$ for $\frac{1}{4}$ (10m) splice bolts

$\frac{1}{2}'' (13)$ Steel plate

$\frac{1}{2}'' (13)$ Steel plate

NOTE

When end shoe is attached to a bridge parapet which has an expansion joint, the bolts shall be provided with a washer or double nut and shall be tightened only to a point that will allow guardrail movement.

The standard end shoe shall be attached to the concrete with pre-drilled or self-drilling anchor bolts. The anchor cone shall be set flush with the surface of the concrete.

Externally threaded studs protruding from the surface of the concrete will not be permitted.
**GUARDRAIL PLACED BEHIND CURB**

If it is necessary for D to be more than 12'-0" (3.0 m) or less than 10'-0" (3.0 m) curb and gutter Type M-2 (M-5) curb and gutter (Std. 606001) shall be used in front of and in advance of the guardrail.

If D = O desirable to 12' (3.0 m)maximum.

### STEEL POST DETAILS

- **Wood Block-Out and Steel Post Details**
- **Footings for Post When Impervious Material is Encountered**
- **Cable Assembly**
- **Steel Plate Beam Guardrail**
- **Wood Block-Out and Steel Post Details**

### Elevation

- **Plan**
- **Finish ground line**
- **Aggregate base fill (CA 11)**
- **Drilled Hole**
- **Ledge**
- **Note:** Ledge line is top of rock ledge or hard slag fill.

### Table

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### Notes

- **Steel Post**
- **Wood Post**
- **1/4" double nuts or locknuts and washers.**
- **Tighten to taut tension.**
- **Swage connected.**
- **Galvanized cable.**

**STEEL PLATE BEAM GUARDRAIL**

**29" (731mm) HEIGHT**

**STANDARD B.L.R. 26-3**

(Sheet 4 of 4)
**TERMINAL TYPE 5A**

**TYPE 5A - STEEL BRIDGE RAIL**

**PLATE G**

- Install plate washer D so the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate G after the 1 (M24) dia. bolts are in place.

- Place bolt with plate washer D placed between plate G and rail element, 6-32" (0.26) mill long wood or steel post.

- Plate G placed between plate E and rail element.

**PLATE WASHER D**

- Post bolt with plate washer D placed between plate E and rail element.

**PLATE WASHER F**

- Plate G placed between plate E and rail element.

**PLATE WASHER D**

- Post bolt with plate washer D placed between plate E and rail element.

**GENERAL NOTES**

- See Standard B.L.R. 26 for details of guardrail not shown.

- Place plate washer D so the 1 (25) projection fills the remainder of the slotted holes in the 1 (25) end plate on plate G after the 1 (M24) dia. bolts are in place.

- When an expansion joint exists below the connector, bolts shall be provided with a locknut or double nuts and shall be tightened only to a point that will allow plate G to be free to move.

- The face of the guardrail shall be installed flush with the face of the bridge rail.

- When this terminal is used with Standard 630001, the guardrail shall transition down to the height of the terminal.

- All dimensions are in inches (millimeters) unless otherwise shown.

- Switched units to English (metric).