City of Rapid City

Standard Details

for

Public Works Construction

2022 Edition
<table>
<thead>
<tr>
<th>CITY DETAIL NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 8A Water</strong></td>
<td></td>
</tr>
<tr>
<td>8A-1</td>
<td>Hydrant Setting Detail</td>
</tr>
<tr>
<td>8A-2</td>
<td>Fire Hydrant Protection Bollard Detail</td>
</tr>
<tr>
<td>8A-3</td>
<td>Trust Blocks</td>
</tr>
<tr>
<td><strong>Section 8B Corrosion Protection - Plastic Pipe Systems</strong></td>
<td></td>
</tr>
<tr>
<td>8B-901A</td>
<td>Vertical &amp; Horizontal Wire Thermite Weld Connections</td>
</tr>
<tr>
<td>8B-901B</td>
<td>Brazed Wire Connections</td>
</tr>
<tr>
<td>8B-902PRC</td>
<td>Plastic Pipeline Metallic Fitting Wire Connection &amp; Color Code</td>
</tr>
<tr>
<td>8B-903B</td>
<td>Pin Brazed Wire Connections</td>
</tr>
<tr>
<td>8B-903P</td>
<td>General Exothermic Weld &amp; Coating Procedures Thermite Weld Wire Connections</td>
</tr>
<tr>
<td>8B-911</td>
<td>Insulating Flange</td>
</tr>
<tr>
<td>8B-913</td>
<td>Insulating Unions And/Or Copper Service Insulators</td>
</tr>
<tr>
<td>8B-916A</td>
<td>Galvanic Anodes At Casings</td>
</tr>
<tr>
<td>8B-929S</td>
<td>Test Lead Splices</td>
</tr>
<tr>
<td>8B-937A</td>
<td>Flush-Mounted Test Station Standard Flush Types</td>
</tr>
<tr>
<td>8B-938</td>
<td>Typical Flush-Mounted Test Station Box Support</td>
</tr>
<tr>
<td>8B-940</td>
<td>Galvanic Anode Installation At Buried Metallic Fittings</td>
</tr>
<tr>
<td>8B-942</td>
<td>Flush-Mounted Test Station With Galvanic Anode (Galvanic Anode To Fitting)</td>
</tr>
<tr>
<td>8B-942FH</td>
<td>Flush-Type Test Stations At Hydrant Assemblies W/Plastic Stub</td>
</tr>
<tr>
<td>8B-943</td>
<td>Corrosion Protection For Flexible Metallic Couplings On Plastic Pipe</td>
</tr>
<tr>
<td>8B-943DIP</td>
<td>Corrosion Protection For Metallic Valves Or Fittings On Plastic Pipe</td>
</tr>
<tr>
<td>8B-944D</td>
<td>Galvanic Anode Installation At Hydrant Assemblies W/Ductile Stub</td>
</tr>
<tr>
<td>8B-944FO</td>
<td>Flush Test Station Or Tracer Wire Access Box Offset Locations</td>
</tr>
<tr>
<td>8B-944SS</td>
<td>Stainless Steel Tee For Plastic Pipe Stub To Fire Hydrant, Valves, Blow Off, ARV Fittings Or Secondary Plastic Piping</td>
</tr>
<tr>
<td>8B-944T</td>
<td>Galvanic Anode Installation At Hydrant Assemblies W/Plastic Stub</td>
</tr>
<tr>
<td>8B-945CS</td>
<td>Insulator &amp; Wire Connections To Customer Metallic Service Lines</td>
</tr>
<tr>
<td>8B-945PS</td>
<td>Tracer Wire For Customer Plastic Service Line</td>
</tr>
<tr>
<td>8B-947</td>
<td>Tracer Wire Detail</td>
</tr>
<tr>
<td>8B-947A</td>
<td>Tracer Wire Access Boxes At Casing With Anodes</td>
</tr>
<tr>
<td>8B-947B</td>
<td>Tracer Wire Access Boxes In Unprotected Location</td>
</tr>
<tr>
<td>8B-947E</td>
<td>Tracer Wire At New Pipeline Ends</td>
</tr>
<tr>
<td>8B-947F</td>
<td>Tracer Wire Access Boxes At Connection To Existing</td>
</tr>
<tr>
<td>8B-947M</td>
<td>Multiple Tracer Wires</td>
</tr>
<tr>
<td>8B-947PS</td>
<td>Tracer Wire At Plastic Service Line</td>
</tr>
<tr>
<td>8B-947S</td>
<td>Tracer Wire Splices</td>
</tr>
<tr>
<td>8B-947T1</td>
<td>Tracer Wire Continuity Test Procedures Battery Or Rectifier Potential Shift Method</td>
</tr>
<tr>
<td>8B-947T2</td>
<td>Tracer Wire Continuity Test Procedures Galvanic Anode Potential Shift Method</td>
</tr>
<tr>
<td>8B-949</td>
<td>Metallic Fitting GI&amp;s &amp; Mechanical Restraint Rings Bonding</td>
</tr>
<tr>
<td>8B-949M</td>
<td>Metallic Pipe Metallic Fitting GI&amp;s &amp; Mechanical Restraint Rings Bonding</td>
</tr>
<tr>
<td>8B-949P</td>
<td>Plastic Pipe Metallic Fitting GI&amp;s &amp; Mechanical Restraint Rings Bonding</td>
</tr>
<tr>
<td>8B-949R</td>
<td>Plastic Pipe Bell Solid Ring Restraint Harness Joint Bonding</td>
</tr>
<tr>
<td>8B-949S</td>
<td>Plastic Pipe Bell Split Ring Restraint Harness Joint Bonding</td>
</tr>
<tr>
<td>8B-949T</td>
<td>Plastic Pipe Metallic Glands/Restraint Rings Bonding, Anode &amp; Test Leads</td>
</tr>
<tr>
<td>8B-967</td>
<td>Petrolatum Tape Coating For Bare Metallic Couplings &amp; Fittings</td>
</tr>
</tbody>
</table>
# Standard Specifications for Public Works Construction 2022 Edition

## Standard Details

### CITY DETAIL NO. DESCRIPTION

#### Section 9 Sanitary Sewer

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-1</td>
<td>Standard Manhole Detail With Monolithic Base (48” &amp; 60”)</td>
</tr>
<tr>
<td>9-2</td>
<td>Standard Shallow Manhole Detail With Monolithic Base (48”, 60”, &amp; 72”)</td>
</tr>
<tr>
<td>9-3</td>
<td>Standard Drop Manhole Detail For Invert Changes Less Than 4’</td>
</tr>
<tr>
<td>9-4</td>
<td>Standard Drop Manhole Detail For Invert Changes More Than 4’</td>
</tr>
<tr>
<td>9-5</td>
<td>Termination Manhole</td>
</tr>
<tr>
<td>9-6</td>
<td>Connection to Existing Manhole</td>
</tr>
<tr>
<td>9-7</td>
<td>Manhole Adjustment &amp; Patch Detail PCC Pavement</td>
</tr>
<tr>
<td>9-8</td>
<td>Manhole Adjustment &amp; Patch Detail Asphalt Concrete Pavement</td>
</tr>
<tr>
<td>9-9</td>
<td>Sanitary Sewer Service Connection</td>
</tr>
<tr>
<td>9-10</td>
<td>Deep Sanitary Sewer Service Connection</td>
</tr>
<tr>
<td>9-11</td>
<td>Sanitary Sewer Service Cleanout Detail</td>
</tr>
<tr>
<td>9-12</td>
<td>Sanitary Sewer Service Double Cleanout Detail</td>
</tr>
<tr>
<td>9-13</td>
<td>Sanitary Sewer Cleanout In Travel Surface</td>
</tr>
</tbody>
</table>

#### Section 11 Utility Excavation & Backfill

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-1</td>
<td>Water &amp; Sewer Insulation Detail</td>
</tr>
<tr>
<td>11-2</td>
<td>Typical Trench Check Dam Detail For Water &amp; Sewer Mains</td>
</tr>
<tr>
<td>11-3</td>
<td>Trench Detail For PVC Water &amp; Sewer Mains</td>
</tr>
</tbody>
</table>

#### Section 18 Erosion, Sediment & Water Pollution Control

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-1</td>
<td>Surface Roughening</td>
</tr>
<tr>
<td>18-2a</td>
<td>Low Flow Silt Fence</td>
</tr>
<tr>
<td>18-2b</td>
<td>Low Flow Silt Fence</td>
</tr>
<tr>
<td>18-3a</td>
<td>High Flow Silt Fence</td>
</tr>
<tr>
<td>18-3b</td>
<td>High Flow Silt Fence</td>
</tr>
<tr>
<td>18-4</td>
<td>Silt Ditch</td>
</tr>
<tr>
<td>18-5</td>
<td>Sediment Control Wattle</td>
</tr>
<tr>
<td>18-6</td>
<td>Rolled Erosion Control Products</td>
</tr>
<tr>
<td>18-7</td>
<td>Sediment Control For Type S Inlets</td>
</tr>
<tr>
<td>18-8</td>
<td>Sediment Control At Type B Inlets</td>
</tr>
<tr>
<td>18-9</td>
<td>Corrugated Pipe &amp; Fabric Inlet Protection</td>
</tr>
<tr>
<td>18-10</td>
<td>Rock Construction Entrance</td>
</tr>
<tr>
<td>18-11</td>
<td>Temporary Vehicle Tracking Control With Wash Rack</td>
</tr>
<tr>
<td>18-12</td>
<td>Concrete Washout Area</td>
</tr>
<tr>
<td>18-13</td>
<td>Temporary Sediment Trap</td>
</tr>
<tr>
<td>18-14</td>
<td>Rock Check Dam</td>
</tr>
<tr>
<td>18-15</td>
<td>Temporary Slope Drain</td>
</tr>
<tr>
<td>18-16</td>
<td>Cut Interceptor Ditch</td>
</tr>
</tbody>
</table>

#### Section 40 Portland Cement Concrete Pavement

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-1a</td>
<td>PCC Pavement Transverse Construction Joints With Tie Bars or Dowel Bars</td>
</tr>
<tr>
<td>40-1b</td>
<td>PCC Pavement Transverse Construction Joints With Tie Bars or Dowel Bars</td>
</tr>
<tr>
<td>40-2</td>
<td>PCC Pavement Longitudinal Joint With Keyway Joint</td>
</tr>
<tr>
<td>40-3a</td>
<td>PCC Pavement Longitudinal Joints With Tie Bars</td>
</tr>
<tr>
<td>40-3b</td>
<td>PCC Pavement Longitudinal Joints With Tie Bars</td>
</tr>
<tr>
<td>40-4</td>
<td>PCC Pavement Longitudinal Construction Joints With Concrete Gutter or Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td>40-5</td>
<td>PCC Pavement Joint Details</td>
</tr>
<tr>
<td>40-6</td>
<td>PCC Pavement Dowel Bars</td>
</tr>
<tr>
<td>CITY DETAIL NO.</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Section 40 Portland Cement Concrete Pavement (Con’t)</strong></td>
<td></td>
</tr>
<tr>
<td>40-7a</td>
<td>Spall Repair</td>
</tr>
<tr>
<td>40-7b</td>
<td>Spall Repair</td>
</tr>
<tr>
<td>40-8</td>
<td>Concrete Paving Repair</td>
</tr>
<tr>
<td><strong>Section 41 Utility Trench Resurfacing</strong></td>
<td></td>
</tr>
<tr>
<td>41-1</td>
<td>Utility Trench Patch Detail</td>
</tr>
<tr>
<td>41-2</td>
<td>Geogrid/Fabric Utility Trench Patch Detail</td>
</tr>
<tr>
<td><strong>Section 54 Drainage Pipe Installation</strong></td>
<td></td>
</tr>
<tr>
<td>54-1</td>
<td>Trench Detail For RCP Storm Sewer Mains</td>
</tr>
<tr>
<td><strong>Section 60 Concrete Curb &amp; Gutter</strong></td>
<td></td>
</tr>
<tr>
<td>60-1a</td>
<td>PCC Fillet Section With Type B Curb &amp; Gutter and Drain Pan</td>
</tr>
<tr>
<td>60-1b</td>
<td>PCC Fillet Section With Type B Curb &amp; Gutter and Drain Pan</td>
</tr>
<tr>
<td>60-2a</td>
<td>Type B Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td>60-2b</td>
<td>Type BL Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td>60-2c</td>
<td>Type D Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td>60-2d</td>
<td>Type P Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td>60-3a</td>
<td>Residential Driveway Approach (Property Line Sidewalk)</td>
</tr>
<tr>
<td>60-3b</td>
<td>Residential Driveway Approach (Curbside Sidewalk)</td>
</tr>
<tr>
<td>60-3c</td>
<td>Residential Driveway Approach (Curbside Sidewalk)</td>
</tr>
<tr>
<td>60-4</td>
<td>6” Reinforced Driveway Approach &amp; Sidewalk</td>
</tr>
<tr>
<td>60-5</td>
<td>Driveway Profile Grade</td>
</tr>
<tr>
<td>60-6</td>
<td>Rural Street Section Standard Driveway Approach Pavement</td>
</tr>
<tr>
<td>60-7a</td>
<td>Joints in Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td>60-7b</td>
<td>Joints in Concrete Curb &amp; Gutter</td>
</tr>
<tr>
<td><strong>Section 61 Concrete Sidewalk, Curb Ramps &amp; Detectable Warning Surfaces</strong></td>
<td></td>
</tr>
<tr>
<td>61-1a</td>
<td>Sidewalks</td>
</tr>
<tr>
<td>61-1b</td>
<td>Sidewalks</td>
</tr>
<tr>
<td>61-2a</td>
<td>Type 1 Perpendicular Curb Ramp</td>
</tr>
<tr>
<td>61-2b</td>
<td>Type 1 Perpendicular Curb Ramp</td>
</tr>
<tr>
<td>61-2c</td>
<td>Type 1 Perpendicular Curb Ramp</td>
</tr>
<tr>
<td>61-3a</td>
<td>Type 2 Directional Curb Ramp</td>
</tr>
<tr>
<td>61-3b</td>
<td>Type 2 Directional Curb Ramp</td>
</tr>
<tr>
<td>61-3c</td>
<td>Type 2 Directional Curb Ramp</td>
</tr>
<tr>
<td>61-4a</td>
<td>Type 3 Parallel Curb Ramp</td>
</tr>
<tr>
<td>61-4b</td>
<td>Type 3 Parallel Curb Ramp</td>
</tr>
<tr>
<td>61-4c</td>
<td>Type 3 Parallel Curb Ramp</td>
</tr>
<tr>
<td>61-5a</td>
<td>Type “C” Retaining Wall</td>
</tr>
<tr>
<td>61-5b</td>
<td>Type “C” Retaining Wall</td>
</tr>
<tr>
<td>61-5c</td>
<td>Type “C” Retaining Wall</td>
</tr>
<tr>
<td>61-6a</td>
<td>Reinforced Concrete Sidewalk Adjacent To Type S Inlet</td>
</tr>
<tr>
<td>61-6b</td>
<td>Reinforced Concrete Sidewalk Adjacent To Type S Inlet</td>
</tr>
<tr>
<td>61-7</td>
<td>Sidewalk Bridge</td>
</tr>
</tbody>
</table>
### CITY DETAIL NO. DESCRIPTION

**Section 62 Drop Inlets**

<table>
<thead>
<tr>
<th>NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>62-1a</td>
<td>2’ x 3’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-1b</td>
<td>2’ x 3’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-2a</td>
<td>3’ x 4’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-2b</td>
<td>3’ x 4’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-3a</td>
<td>3’ x 5.5’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-3b</td>
<td>3’ x 5.5’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-4a</td>
<td>4’ x 4’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-4b</td>
<td>4’ x 4’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-5a</td>
<td>5.5’ x 3’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-5b</td>
<td>5.5’ x 3’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-6a</td>
<td>5.5’ x 5.5’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-6b</td>
<td>5.5’ x 5.5’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-7a</td>
<td>4’ x 3’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-7b</td>
<td>4’ x 3’ Type B Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-8a</td>
<td>3’ x 4’ Type C Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-8b</td>
<td>3’ x 4’ Type C Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-9a</td>
<td>4’ x 5’ Type C Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-9b</td>
<td>4’ x 5’ Type C Reinforced Concrete Drop Inlet</td>
</tr>
<tr>
<td>62-10a</td>
<td>Type L Median Drain For 6:1 Inslope</td>
</tr>
<tr>
<td>62-10b</td>
<td>Type L Median Drain For 6:1 Inslope</td>
</tr>
<tr>
<td>62-11a</td>
<td>Type L Median Drain For 4:1 Inslope</td>
</tr>
<tr>
<td>62-11b</td>
<td>Type L Median Drain For 4:1 Inslope</td>
</tr>
<tr>
<td>62-12a</td>
<td>Type M Median Drain</td>
</tr>
<tr>
<td>62-12b</td>
<td>Type M Median Drain</td>
</tr>
<tr>
<td>62-12c</td>
<td>Type M Median Drain</td>
</tr>
<tr>
<td>62-13a</td>
<td>4’ x 6’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-13b</td>
<td>4’ x 6’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-13c</td>
<td>4’ X 6’ Precast Concrete Type S Drop Inlet Lid</td>
</tr>
<tr>
<td>62-14a</td>
<td>4’ x 11’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-14b</td>
<td>4’ x 11’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-14c</td>
<td>4’ X 11’ Precast Concrete Type S Drop Inlet Lid</td>
</tr>
<tr>
<td>62-15a</td>
<td>7’ X 11’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-15b</td>
<td>7’ X 11’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-15c</td>
<td>7’ X 11’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-15d</td>
<td>7’ X 11’ Type S Drop Inlet Base</td>
</tr>
<tr>
<td>62-16a</td>
<td>Installation Details For Precast Concrete Type S Drop Inlet Lid</td>
</tr>
<tr>
<td>62-16b</td>
<td>Installation Details For Precast Concrete Type S Drop Inlet Lid</td>
</tr>
<tr>
<td>62-17a</td>
<td>Type B Frame &amp; Grate Assembly</td>
</tr>
<tr>
<td>62-17b</td>
<td>Installation of Type B Drop Inlet</td>
</tr>
<tr>
<td>62-18</td>
<td>Type C Frame &amp; Grate</td>
</tr>
<tr>
<td>62-19</td>
<td>Type E Frame &amp; Grate</td>
</tr>
</tbody>
</table>

**Section 63 Storm Sewer Junction Boxes & Manholes**

<table>
<thead>
<tr>
<th>NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>63-1</td>
<td>Precast Storm Sewer Manhole</td>
</tr>
<tr>
<td>63-2a</td>
<td>5’ x 5’ Junction Box</td>
</tr>
<tr>
<td>63-2b</td>
<td>5’ x 5’ Junction Box</td>
</tr>
<tr>
<td>63-2c</td>
<td>5’ x 5’ Junction Box</td>
</tr>
<tr>
<td>63-3a</td>
<td>6’ x 6’ Junction Box</td>
</tr>
<tr>
<td>63-3b</td>
<td>6’ x 6’ Junction Box</td>
</tr>
<tr>
<td>CITY DETAIL NO.</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Section 63 Storm Sewer Junction Boxes &amp; Manholes (Con't)</td>
<td></td>
</tr>
<tr>
<td>63-3c</td>
<td>6' x 6' Junction Box</td>
</tr>
<tr>
<td>63-4a</td>
<td>7' x 7' Junction Box</td>
</tr>
<tr>
<td>63-4b</td>
<td>7' x 7' Junction Box</td>
</tr>
<tr>
<td>63-4c</td>
<td>7' x 7' Junction Box</td>
</tr>
<tr>
<td>Section 64 Under-Drains</td>
<td></td>
</tr>
<tr>
<td>64-1</td>
<td>Pipe Under-Drain Details</td>
</tr>
<tr>
<td>64-2</td>
<td>Under-Drain Connection To Inlets</td>
</tr>
<tr>
<td>Section 74 Planting Trees, Shrubs &amp; Vines</td>
<td></td>
</tr>
<tr>
<td>74-1</td>
<td>B &amp; B or Potted Tree Planting</td>
</tr>
<tr>
<td>74-2a</td>
<td>B &amp; B or Potted Deciduous Tree Staking</td>
</tr>
<tr>
<td>74-2b</td>
<td>B &amp; B or Potted Coniferous Tree Staking</td>
</tr>
<tr>
<td>Section 90 Roadway Signs &amp; Delineators</td>
<td></td>
</tr>
<tr>
<td>90-1a</td>
<td>Sign Post Installation</td>
</tr>
<tr>
<td>90-1b</td>
<td>Sign Post in Concrete</td>
</tr>
<tr>
<td>90-2a</td>
<td>Street Name Signs</td>
</tr>
<tr>
<td>90-2b</td>
<td>Street Name Signs</td>
</tr>
<tr>
<td>91-1</td>
<td>Crosswalk</td>
</tr>
<tr>
<td>Section 93 Traffic Signals &amp; Roadway Lighting</td>
<td></td>
</tr>
<tr>
<td>93-1a</td>
<td>Electrical Junction Boxes Type 1 Through Type 4</td>
</tr>
<tr>
<td>93-1b</td>
<td>Electrical Junction Boxes Type 1 Through Type 4</td>
</tr>
<tr>
<td>93-2</td>
<td>Preformed Detector Loop</td>
</tr>
<tr>
<td>93-3a</td>
<td>Sawed-In Detector Loop</td>
</tr>
<tr>
<td>93-3b</td>
<td>Sawed-In Detector Loop Protection At Joint Or Crack In PCC Pavement</td>
</tr>
<tr>
<td>93-4</td>
<td>Conduit Installation</td>
</tr>
<tr>
<td>93-5</td>
<td>Tree Trimming For Roadway Lighting</td>
</tr>
<tr>
<td>93-6</td>
<td>Steel Roadway Luminaire Pole With Mast Arm(s)</td>
</tr>
<tr>
<td>93-7</td>
<td>Roadway Luminaire Pole Signals Banded To Luminaire Pole</td>
</tr>
<tr>
<td>93-8</td>
<td>Roadway Luminaire Pole Breakaway Transformer Base</td>
</tr>
<tr>
<td>93-9</td>
<td>Signal Pole Pedestal</td>
</tr>
<tr>
<td>93-10</td>
<td>Signal Pole With Mast Arm</td>
</tr>
<tr>
<td>93-11</td>
<td>Signal Pole With Mast Arm &amp; Luminaire Extension</td>
</tr>
<tr>
<td>93-12a</td>
<td>Pedestrian Push Button Pole</td>
</tr>
<tr>
<td>93-12b</td>
<td>Pedestrian Push Button Pole</td>
</tr>
<tr>
<td>93-13</td>
<td>Pole Footing</td>
</tr>
<tr>
<td>93-14</td>
<td>Controller Cabinet &amp; Footing</td>
</tr>
</tbody>
</table>
2'-6" Standard
7" Maximum to Avoid Conflict

Notes:
1. See Section 8B and associated details for cathodic protection and tracer wire.
2. 4 1/2" steamer nozzle shall face the highest order street. (eg. arterial, collector)

Hydrant Thrust Block Bearing Area

Drain Sump (1/3 cy)
Type I Bedding Material

8"x16"x4" Thick Concrete Pad

Mechanical Joints with Restraints
Type I Bedding to 6" Above Hydrant Drains
Tracer Wire Taped to Pipe, Per Standard Specifications

Cathodic Protection and Tracer Wire, See Details 8B

Mechanical Joints with Restraints
Type I Bedding to 6" Above Hydrant Drains
Tracer Wire Taped to Pipe, Per Standard Specifications

Poly Wrap and Tape, Per Standard Specifications

Fire Hydrant

Set Bury Line Flush with Finished Grade
Tracer Wire Access Box (TWAB) and Test Station, See Detail 8B-942FH

Set Top of Valve Box, Per Standard Specifications

Drop Lid Marked "WATER"

Set Bury Line Flush with Finished Grade
Tracer Wire Access Box (TWAB) and Test Station, See Detail 8B-942FH

Drain Sump (1/3 cy)
Type I Bedding Material

8"x16"x4" Thick Concrete Pad

Mechanical Joints with Restraints
Type I Bedding to 6" Above Hydrant Drains
Tracer Wire Taped to Pipe, Per Standard Specifications

Cathodic Protection and Tracer Wire, See Details 8B

Mechanical Joints with Restraints
Type I Bedding to 6" Above Hydrant Drains
Tracer Wire Taped to Pipe, Per Standard Specifications

Poly Wrap and Tape, Per Standard Specifications

Fire Hydrant

Set Bury Line Flush with Finished Grade
Tracer Wire Access Box (TWAB) and Test Station, See Detail 8B-942FH

Set Top of Valve Box, Per Standard Specifications

Drop Lid Marked "WATER"

Notes:
1. See Section 8B and associated details for cathodic protection and tracer wire.
2. 4 1/2" steamer nozzle shall face the highest order street. (eg. arterial, collector)
FIRE HYDRANT PROTECTION
BOLLARD DETAIL

Concrete, Steel Trowel Finish

Smooth Cut Ends of Pipe

6" Diameter by 1/4" Steel Pipe
ASTM A120 Steel Pipe, Schedule 40
Fill with M6 Concrete as Shown

Primer & Paint Yellow or Install Yellow Sleeve

Slope Concrete Away from Bollard

Provide Expansion Joint Material when Abutting to PCC Paving

Finished Grade

Post to be Set in M-6 Concrete as Shown

AC Pavement
PCC Pavement

3" Minimum Cover

4'-0"
3'-0"

N.T.S.

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

Sec. - Sht. 8A-2
Notes:
1. Thrust blocks shall be a minimum of 6" wide at the fitting or one half the diameter of the pipe, whichever is greater.
2. Thrust blocks shall extend from the fitting to the undisturbed trench wall. Thrust block dimensions at the undisturbed wall shall be as per plans and shall meet the minimum bearing area as required by plans.
VERTICAL AND HORIZONTAL WIRE THERMITE WELD CONNECTIONS

Notes:
1. Copper adapter sleeve required for thermite welding of No. 2, No. 4, No. 10 and No. 12 AWG wires.
2. Welder and cartridge size varies according to surface shape, material, and horizontal or vertical surface. Consult welder manufacturer for recommended welder and cartridge.
3. For multiple wire connections to pipe, separate thermite weld connections by one pipe diameter minimum, 2'-0" maximum.
4. Wire connections to foreign pipelines shall be made by foreign pipeline representative.
5. Coat completed thermite weld connections with epoxy repair coating, thermite weld protector pad, or as owner specified.
6. Utilize insulated stranded copper wire only, size as specified. Color code wires according to wire color code, see 8B-902PRC.
7. Connect bond and test wires to metallic fittings prior to assembly, as required to allow connections to be made to level flat (horizontal type) surfaces on top of fittings.
8. Attach thermite weld to stud or weld base plate, if provided, or to dry side of joint if approved by pipe manufacturer.

N.T.S.

CITY OF RAPID CITY                                            PUBLIC WORKS DEPARTMENT
DATE: 8-19-22

VERTICAL AND HORIZONTAL WIRE THERMITE WELD CONNECTIONS
Notes:
1. Braze (silver-solder) copper wire electrical connection to copper, stainless steel, and thin wall steel (0.035" or less) piping or tubing.
2. Select a location to braze on fitting edge or lip, so as to not damage internal coatings, rubber lining, or gaskets.
3. Clean and prepare surface for brazing. Flux surface with a suitable type flux for material types being soldered in accordance with the silver solder manufacturer’s instructions.
4. Braze the sleeved copper wire with a suitable type silver brazing alloy for the materials being connected in accordance with braze material manufacturer’s directions.
5. Silver-solder wire to properly prepared and fluxed area in a manner so as to not leave cracks or crevices in the completed brazed connection. Visually inspect and tap with hammer to test adhesion.
6. Allow to cool and remove remaining flux with (stainless steel) wire brush and solvent clean (SSPC SP-1).
7. Only coat wire connections to copper and thin wall steel piping or tubing in specified thermite weld coating method. Stainless steel wire connections do not need to be coated.
8. Utilize insulated stranded copper wire only, size as specified.
Notes:
1. Thermite or pin braze weld to metallic pipe, fittings, and structures only.
2. Standard location for anode placement is on east side of north-south main and north side of east-west main. Actual placement location will vary based upon other utility conflicts.
3. Utilize insulated stranded copper wire only, size as specified.
4. Utilize purple tape to identify north (1 strip) or west (2 strips) wire direction and gray tape to identify south (1 strip) or east (2 strips) wire direction, as required.

Wire Color Code:
1. Pipeline test wires:
   Water - Blue
   High level - Dark Blue with 1 strip of Blue tape
   Low level - Light Blue with 1 strip of White tape
2. Unprotected pipeline (not cathodically protected - i.e. pump station side of metallic pipe) - Black
3. Anode leads - Black
4. Reference electrode wires - Yellow
5. Tracer wires on non-metallic pipe - Blue w/ 2 strips Black tape and strips of Purple or Gray tape per wire direction, see note above.
PIN BRAZING DIRECT TYPE WELD
Complete welds in accordance with pin brazing manufacturer’s instructions.

GENERAL PIN BRAZING AND COATING PROCEDURES

Step 1
File structure connection area (2"x2") to bare bright metal finish (white metal) and clean.

Step 2
Place specified type of terminal on end of insulated wire or in center of punched strap bond hole for direct type of pin brazing connections.

Step 3
Load gun by placing brazing pin and ceramic ferrule securely into front of gun. Adjust the pin holder legs as necessary to obtain the recommended pin brazing “lift height” with the gun resting firmly and flush on the structure surface.

Step 4
Attach the earth ground connection to a bright ground location on the structure, place the loaded pin brazing gun in the center of the strap bond punched hole or of the hole in the wire terminal and squeeze trigger until the brazing pin fuse burns into the ferrule. Hold gun firmly in place until brazing process is completed and the molten metal attached to the terminal and structure surface.

Step 5
Remove slag from connection, visually inspect and tap weld with hammer to test for soundness and adhesion. Measure joint bond resistance as specified. Replace all poorly formed, unsightly, porous, high resistant, or defective welds. Install additional bond wire or strap, if required.

Step 6
Clean and coat connection and exposed structure surface with specified coating system, apply in accordance with coating manufacturer’s recommendations.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

PIN BRAZED WIRE CONNECTIONS

DATE: 8-19-22
Sec. - Sht. 8B-903B
**THERMITE WELD**

Use cast iron charges for ductile iron and cast iron structures. Use steel charges for steel structures.

(similar size and type of conventional or electronic ignition type charges acceptable)

Complete welds in accordance with manufacturer’s instructions.

---

**Step 1**

File structure connection area (2"x2") to bare bright shiny metal & clean. All wire welds on pipe shall be a minimum of one pipe diameter apart up to a maximum of 2 feet separation distance.

**Step 2**

Strip insulation from wire. Attach copper sleeve (required on No. 2, No. 4, No. 10 and No. 12 AWG wire)

**Step 3**

Attach copper sleeve to wire with correct hammer die or crimp tool. Factory sleeves shall be angled and field made bonds shall have wire extend 1/4" past sleeve so wire is exposed to thermite weld.

**Step 4**

Place washer in bottom of mold and fill crucible w/powder or insert prepacked electronic canister charge, close lid, hold firmly w/opening away from operator, and ignite w/flint gun or electronic ignition starter.

**Step 5**

Remove slag from connection, visually inspect and tap weld with hammer to test for soundness and adhesion. Measure joint bond resistance as specified. Replace all poorly formed, unsightly, porous, high resistant, or defective welds. Install additional bond wire or strap if required.

**Step 6**

Clean and coat connection and exposed structure surface with coating materials, see note below. Apply in accordance with coating manufacturer’s recommendations.

6-a. Utilize 100-percent moisture tolerant epoxy repair coating for wire connections and for spot external coating repairs;

6-b. Utilize exothermic weld protector pad(s) to cover weld area and exposed wire at weld;

6-c. Repair fitting or structure coating damage with specified and approved coating repair materials for original coating type.

N.T.S.
Notes:
1. Above grade insulated flange installation shown. For buried or submerged insulating flange installations, do not install insulating washer on protected side of insulating flange.
2. Coat buried or submerged flange after assembly per specifications.
3. Insulated flanges in buried applications allowed only for pipe up to 36" diameter.
4. Test insulated flanges for electrical isolation. Test buried insulators both prior to and after burial.

N.T.S.
Notes:
1. "O" ring type insulating union shown. Other types (brass insulated curb ball valves, straight couplings, corporation ball valves, meter couplings, etc.) similar.
2. Insulating O-ring and nylon insulator bushing shall be molded and bonded to the union body by manufacturer.
3. Abovegrade iron pipe shall have galvanized or coated steel bodies. Unions in buried or corrosive areas shall be coated.
4. Copper service line insulators shall have brass union body with insulators formed and molded into brass body, Mueller or approved equal.
5. Stainless steel line insulators shall have stainless steel body with insulators formed and molded into stainless steel fitting body.
Notes:
1. Install number and size of prepackaged galvanic anodes specified directly to each end of metallic casing.
2. Install galvanic anode in native soil, a minimum of 1-foot below and 3-foot from end of metallic casing end.
3. Install cathodic protection test station per detail 8B-937, if called out within the project plans.
Notes:
1. Knot wires prior to making splice to minimize stress on splice.
2. Make wire splice connection with compression type connector in accordance with compression connector manufacturer recommendations or secure with split bolt and silver solder for test wires. Do not use butt splices or wire nuts. Complete all splices only in the presence of the engineer.
3. Wrap entire connection with two (2) layers of high voltage rubber tape and then wrap with two (2) layers of vinyl electrical tape and coat with sealer or encapsulate in epoxy splice kit. Extend a minimum of 1-inch onto intact wire insulation.
4. Test leads shall be completed per detail.
5. Test lead splice locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.
Notes:
1. Install plastic monitoring pipe or reference electrode only at test station locations indicated on test station location schedule or drawings. Install pipe marking signs next to test stations, if specified.
2. Utilize insulated stranded copper wire only, size as specified. Color code wires according to wire color code. See 8B-902PRC.
3. Locate test station in protected location directly over pipe unless offset required by specs or field conditions (in road, field, etc.). Offset to appurtenances, R.O.W., fence line or edge of roadway, if no protected location available over pipeline. Coordinate locations with engineer.
4. If test station and tracer wire access boxes at same location, see inset on 8B-943FH.
5. Test station locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.
Notes:
1. Test station type and number of test leads shall be as indicated on test station schedule or drawings. Utilize insulated stranded copper wire only, size as specified. Color code wires according to wire color code specified, See 8B-902PRC.
2. All wires shall be run without splices from the connection to the test station box. Terminate with ring tongue or lug-it type terminals and bundle wires together at 12-inch intervals with electrical tape or nylon cable ties.
3. Provide all wires with sufficient slack so that the terminal board may be extended a minimum of 18-inches above the top of the test box. Coil wires in test station. Loop wires both at bottom of test station and at pipe or structure to minimize damage during backfilling and/or future settlement.
GALVANIC ANODE INSTALLATION
AT BURIED METALLIC FITTINGS

Notes:
1. Minimum of two No. 12 AWG bond wires each for 12" and larger pipe. One bond wire for smaller pipe.
2. Provide type, number and size of anodes as specified. Minimum shall be one anode per fitting.

3'-0" MIN.

1'-0" MIN.

12" MAX

12"

Prepackaged Galvanic Anode, Typ.

Wire Connection with Wire Connection Coating, Typ.

No. 12 AWG Bond Wire(s) Typ., See 8B-949

Buried Metallic Appurtenance or Fitting

Plastic Pipe, Typ.

Provide 2" Min. Slack in Tracer Wire Between Ends of Fitting

No. 12 AWG Bond Wire(s) to Metallic Glands Typ. See 8B-949

Insulated Tracer Wire, Taped to Top of Pipe, Typ. 5' O.C. Max.

Warning Tape, if Specified

#12 AWG Stranded Copper Wire

ELEVATION

PLAN

Notes:
1. Minimum of two No. 12 AWG bond wires each for 12" and larger pipe. One bond wire for smaller pipe.
2. Provide type, number and size of anodes as specified. Minimum shall be one anode per fitting.
Notes:
1. Provide sufficient slack in test wires to allow terminal block to extend 18" out of test station. Coil wires in test station.
2. Install galvanic anode minimum 1'-0" below pipe invert elevation.
3. Install reference electrode or plastic monitoring pipe only at test stations indicated on test station location schedule.
4. Color code wires according to wire color code, see 8B-902PRC.
5. If test station and tracer wire access boxes at same location, see inset on 8B-942FH.
Notes:
1. Place test station in a protected location so as to not interfere with operation of valves or fire hydrant. Terminate fitting test wires, anode lead and tracer wires in test station and tracer wire access box, respectively, with min. 18" slack.
2. Install galvanic anode minimum 3'-0" from and 1'-0" below pipeline, fitting, or valve invert elevation. Install minimum number, type, and size of galvanic anodes specified.
Notes:
1. Minimum two each No. 12 AWG bonds each for 12" and larger pipe, one bond allowed for smaller pipe.
2. Provide type, number and size of anodes as specified. Minimum shall be one anode per fitting.
Notes:
1. Bond plastic pipe metallic glands or mechanical restraining rings to metallic valve or fitting body, see 8B-940 and 8B-949.
2. Provide type, number & size of anodes as specified. Minimum shall be one anode per fitting.

No. 12 AWG Stranded Insulated Copper Wire

Insulated Tracer Wire, Taped to Top of Pipe, Typ. 5' O.C. Max.

Tape, Typ.

Metallic Gland or Mechanical Restraining Ring, Typ.

No. 12 AWG Insulated Copper Pigtail Bond Wire, Typ.

Galvanic Anode, Typ.

Wire Connection Coating, Typ.

Metallic Fitting or Valve, Typ.

Wire Connection Coating, Typ.

Plastic Pipe, Typ.

Provide 2" Min. Slack in Tracer Wire Between Ends of Fitting

Plastic Pipe, Typ.

1'-0" MIN.

3'-0" MIN.
GALVANIC ANODE INSTALLATION AT HYDRANT ASSEMBLIES W/ DUCTILE STUB

Notes:
1. Install galvanic anode minimum 3'-0" from and 1'-0" below pipeline, fitting, or valve invert elevation.
2. Install minimum number, type, and size of galvanic anodes specified, minimum of two anodes to fire hydrant and one or more anode(s) per each metallic fitting. Number and size of anodes on mainline metallic tee will depend on mainline diameter.
Notes:
1. Offset behind curb and gutter for test station or tracer wire access box offset locations indicated on test station schedule or plan drawings. Install 1-inch conduit with test and tracer wires to offset test station and/or tracer access box locations as shown.
2. Color code wires according to wire color code, see 8B-902PRC.
3. Utilize insulated stranded copper wire only, size as specified.
4. If test station and tracer wire access box are called out at same location, refer to inset on 8B-942FH.
Notes:
1. Connect to stainless steel fittings with mechanical type connection or brazed silver solder type connection only. Locate so as to not damage rubber lining or gasket.
2. Install galvanic anode minimum 3'-0" from and 1'-0" below pipeline, fitting, or valve invert elevation. Install minimum number, type, and size of galvanic anodes specified. Minimum of one or more anode per metallic fitting. Number and size of anodes on metallic tee will depend on mainline diameter.

N.T.S.

Coated Valve Shown, Other Types of Metallic Fittings for Hydrants, Blow Off, Air Release Valve (ARV) or Secondary Piping Similar, See Series 8B-944 Details

Stainless Steel Type Connection, Typ., See 8B-901B

No.12 AWG Pigtail Bond Wires, Typ., See 8B-949

Insulated Tracer Wire, Typ.

Plastic Pipe Stub Piece Shown

Stainless Steel Tee or Fitting, Typ.

Coated Valve, Typ.

Joint Bond All Metallic Sections (with Bell and Spigot, Sleeved, Bolt Up, Flanged, Restraints, Etc., Type Connections Below Ground Level)

Plastic Water Main Shown

Galvanic Anode, Typ.

Coated Valve Shown, Other Types of Metallic Fittings for Hydrants, Blow Off, Air Release Valve (ARV) or Secondary Piping Similar, See Series 8B-944 Details

Stainless Steel Type Connection, Typ., See 8B-901B

No.12 AWG Pigtail Bond Wires, Typ., See 8B-949

Insulated Tracer Wire, Typ.

Plastic Pipe Stub Piece Shown

Stainless Steel Tee or Fitting, Typ.

Coated Valve, Typ.

Joint Bond All Metallic Sections (with Bell and Spigot, Sleeved, Bolt Up, Flanged, Restraints, Etc., Type Connections Below Ground Level)

Plastic Water Main Shown

Galvanic Anode, Typ.
Notes:
1. Install galvanic anode minimum 3'-0" from and 1'-0" below pipeline, fitting, or valve invert elevation.
2. Install minimum number, type, and size of galvanic anodes specified. Number and size of anodes on mainline metallic tee will depend on mainline diameter.

N.T.S.
Notes:
1. Install galvanic anodes to copper service line on both sides of insulated curb stop with a minimum of one on water main side and one on customer side.
2. Install insulated curb stop to existing copper service line at customer service connection as shown on the drawings and specified in section 8B.

GALVANIC ANODE, MINIMUM 17 OR 18 POUND

COPPER SERVICE LINE

BARE COPPER SERVICE LINE

HEAVY DUTY BRONZE GROUND CLAMP

PLASTIC WATER MAIN

HEAVY DUTY CAST BRONZE GROUND CLAMP

Notes:
1. Install galvanic anodes to copper service line on both sides of insulated curb stop with a minimum of one on water main side and one on customer side.
2. Install insulated curb stop to existing copper service line at customer service connection as shown on the drawings and specified in section 8B.

N.T.S.
Notes:
1. Install tracer wire access box in a protected location at row line adjacent to curb stop box so as to not interfere with operation of curb stop. Terminate tracer wire in access box with min. 18" slack.
2. Terminate tracer wire with an insulated splice kit and securely fastened to the plastic service line with tape as near as possible to the building foundation.
3. This tracer wire installation detail shall be used on plastic service lines for residential or commercial services.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 8B-945PS

TRACER WIRE FOR CUSTOMER PLASTIC SERVICE LINE
Notes:
1. Terminate tracer wire at tracer wire access boxes only located at specified distances, structures and end of each pipe run. Test tracer wire electrical continuity as specified prior to placement of curb and gutter or paving. Do not connect tracer wire directly to existing or new metallic pipe or fitting.
2. Locate tracer wire access boxes in protected locations directly over pipe unless offset required by plans or field conditions (in road, field, etc.). Offset to back of curb and gutter or hydrant if no protected location available over pipeline. Coordinate locations with engineer.
3. Tracer wire access box locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
DATE: 8-19-22
Sec. - Sht.
8B-947

TRACER WIRE DETAIL
Notes:

1. Install tracer wire access box at each end of casing. For flush boxes provide sufficient slack in wires to allow terminal block to extend min. 18" out of box. Coil wires in flush type access box.

2. Install type, number and size of prepackaged galvanic anodes to metallic casings, if indicated on test station/tracer wire access box location schedule or drawings.

3. Tracer wire access box locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.

N.T.S.
Notes:
1. Provide sufficient slack in tracer wires to allow terminal block to extend min. 18" out of box. Coil wires in access box.
2. Install 4 terminal (min.) terminal block tracer wire access box. Install pipe marking signs next to boxes as specified.
For Tracer Wire Access Box Installations, See 8B-942 or 8B-947 Series Details.

Provide Electrically Continuous Tracer Wire Between Test Stations or Tracer Wire Access Boxes, See 8B-947

Single Tracer Wire Access Box at End of All Tracer Wire and New Pipe Runs, Typ., in Protected Location See 8B-947B. If Co-Located with CP Test Station, See Inset on 8B-947FH.

If Existing Metallic Pipeline, See 8B-947F

New Pipeline, Typ.

Loop Tracer Wire to End of New Pipeline and Terminate in Tracer Wire Access Box Located in a Protected Location

Fire Hydrant, Typ.

Tracer Wire Loop, Typ.

Existing Pipeline, Typ.

Road Intersection, Typ.

Notes:
1. Terminate tracer wires abovegrade in a flush tracer wire access box located in a protected location at abovegrade structures to side of road. Coordinate location and type with engineer.
2. Loop tracer wire past access box to end of new pipeline run, double back to access box and terminate in box.
3. Single pipe shown, similar for multiple new pipelines.
4. Do not terminate tracer wire ends below grade or in valve boxes.
5. Test tracer wire electrical continuity prior to placement of curb and gutter paving.
6. Tracer wire access box locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.

8B-947E

TRACER WIRE AT NEW PIPELINE ENDS
Notes:
1. Install galvanic anode to metallic fitting at connection to existing metallic pipeline (if metallic pipe not already cathodically protected with an impressed current cathodic protection system).
2. If tracer wire connected to existing metallic pipeline, loop tracer wires abovegrade and terminate in tracer wire access box. See 8B-947 series details.
3. Tracer wire access box locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.
Notes:
1. Terminate tracer wires abovegrade in tracer wire access boxes located at abovegrade structures with tracer wire from each pipe direction (up to 4 tracer wires possible). Do not terminate wire ends below grade or in valve boxes.
2. If 3 or 4 tracer wires, terminate tracer wires in one tracer wire access box. Terminate north and west tracer wires on top terminals and east and south tracer wires on bottom terminals of tracer wire terminal board.
3. If two tracer wire access boxes are used in lieu of one (only with engineer approval), terminate the north and south tracer wires in one access box and the east and west tracer wires in the other access box.
4. Use this detail for parallel water mains at intersecting streets. The detail above is mirrored to other side of street. Wiring is exactly the same with the exception of tracer wire direction identification tape.
5. Test tracer wire electrical continuity prior to placement of curb and gutter and before paving.
6. Tracer wire access box locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

MUL'TIPLE TRACER WIRES
Notes:
1. Place tracer wire access box in a protected location at row line or adjacent to valve box so as to not interfere with operation of valve. Terminate tracer wires in access box with min. 18” slack.
2. Tracer wire for service line shall not be connected to the main line tracer wire. Terminate tracer wire with an insulated splice kit and securely fastened to the plastic service line with tape as near as possible to the main line fitting.
3. This tracer wire installation detail shall be used on plastic service lines, i.e. Fire lines, residential or commercial plastic water service, etc.
4. Tracer wire on private service may not be present. If tracer wire is present, bring to surface in tracer wire access box. If no private tracer wire exists, extend new tracer wire from tracer wire access box to end of excavation and terminate with DBR/Y-6 splice kit, or approved equal.
5. Tracer wire access box locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.

N.T.S.
Notes:
1. Allowed for tracer wire type splices only. Tracer wire only required for non-metallic pipe type installations. Knot wires prior to making splice to minimize stress on splice.
2. For copper wire splices only. Strip wires and make wire splice connection with electrical spring (wire nut) type connectors. Insert the connector into the gel filled tube to the end past the locking fingers to hold the connector securely in place, align wires and then shut and lock the insulator tube top lid cover into place. Complete splices and insulate in accordance with connector manufacturer’s recommendations.
3. Complete all splices only in the presence of the engineer.
4. In-line splice locations shall be documented by the contractor in the red-line, as-constructed plans by station/offset or survey coordinates consistent with project horizontal datum. Location provided shall be within 0.5 feet of true location.

N.T.S.
**TRACER WIRE CONTINUITY TEST PROCEDURES**

1. Conduct on and off potential measurements at Test Location No. 1 with temporary ground and connection to a battery or temporary rectifier at same end. Then conduct an on and off potential test measurement at far end (Test Box Location No. 2). Test is similar to testing with galvanic anode but provides a larger voltage difference.

2. The measured potentials should change near to the same as the voltage of the battery (approximately 12 to 13 volts) or temporary rectifier DC voltage output at both Test Locations 1 and 2.

3. If both test point measured voltages are the same, this indicates the tracer wire for the span tested is continuous.

4. If there is no potential change (off to on) at the test end (Location No. 2, Test B), but there is at the temporary ground end (Test Location No. 1, Test A), this indicates that the tracer wire may either not be electrically continuous with one or more breaks or electrically-shorted to another structure.

5. If no potential change, verify by testing from opposite direction. Utilize other test methods to confirm.

6. If a fully-charged 12-volt battery is the source and measured potentials are less than 10 volts at either end of the test, the tracer wire is shorting to a fitting or other metallic structure. Refer to specifications for information regarding locating areas of wire insulation damage or wire breaks.
TRACER WIRE CONTINUITY VERIFICATION WITH GALVANIC ANODE POTENTIAL SHIFT TEST PROCEDURE:

1. Conduct on and off potential measurements at Tracer Wire Access Box No. 1 with bond wire to cathodic protection source at same end. Then conduct on and off potential tests at far end (Tracer Box Location No. 2). Potential should shift the same amount at far end (Location No. 2), when temporarily connected and disconnected from cathodic protection source at Tracer Wire Box Location No. 1, if tracer wire is continuous and not shorted to other structures.

2. For example: if the off potential of the tracer wire is -0.24 volts and the anode or cathodically protected fire hydrant potential is -1.1 volt, then when the tracer wire is temporarily connected to the cathodically protected structure, the tracer wire potential changes to -1.0 volts at Tracer Wire Access Box Location No. 1 and -0.95 at Tracer Wire Access Box Location No. 2. That indicates that the tracer wire between Locations No. 1 and No. 2 is continuous. If the on potential at Test Location No. 2 does not change it indicates the tracer wire may not be electrically continuous with one or more breaks. If there is only a slight change, say from -0.200 to -0.233 volts, that indicates that either the tracer wire may be broke or electrically shorted to another structure. If insignificant potential change, verify by testing from opposite direction. Utilize other test methods to confirm.
1. Bond metallic or plastic pipe metallic glands to metallic fitting body. Complete pigtail wire connections to glands before assembly.
2. Bond metallic mechanical restraint rings to metallic fitting body.
3. Minimum of two (2) bonds each for 12" and larger pipe. One (1) bond for pipe smaller than 12".

Notes:
No. 12 AWG Stranded Insulated Copper Pigtail Wire with Sleeves to Top or Side of Gland, No. of Bonds per Specifications, Length as Required to Provide Min. 1" Slack

Additional Wire to Anode, Test Station, CP System, or Metallic Pipe, as Required

Wire Connection, Typ.

Metallic Pipe, Typ.

Gland Anchor Wedge, Typ.

Metallic Gland or Mechanical Restraining Ring

Metallic Fitting or Valve Body, Typ.

PLAN

No. 12 AWG Pigtail Wire to Gland, Typ.

No. 2 or No. 4 AWG Bond Wire with No. 12 Pigtail Wire to Metallic Pipe, Typ. of 2

Notes:
1. Bond metallic mechanical restraint rings to metallic fitting body. Complete pigtail wire connections to glands before assembly.
2. Minimum of two (2) bonds each for 12" and larger pipe. One (1) bond for smaller pipe.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

METALLIC PIPE METALLIC FITTING GLANDS AND MECHANICAL RESTRAINT RINGS BONDING

DATE: 8-19-22
Sec. - Sht.
8B-949M
1. Bond plastic pipe metallic glands to metallic fitting body. Complete pigtail wire connections to glands before assembly.
2. Minimum of two No. 12 AWG pigtail bonds each for 12" and larger pipe. Minimum of one bond for pipe smaller than 12".
3. Number, size and type of galvanic anodes required per specifications.

Notes:

No. 12 AWG Stranded Insulated Copper Pigtail Wire with Sleeves to Top or Side of Gland, No. of Bonds per Specifications, Length as Required to Provide Min. 1" Slack

Additional Wire to Test Station, Anode or Another Metallic Fitting, as Required

Gland Anchor Wedge, Typ.

Plastic Pipe

Metallic Gland or Mechanical Restraining Ring

Multiple Fittings Allowed to be Bonded Together on Plastic Pipe with Minimum Two (2) No. 12 AWG Insulated Bond Wires, if Next Metallic Fitting within Five Feet (5') Maximum Separation Distance.
Notes:
1. Solid ring type restraints shown with minimum of two pigtail bond wires for 12-inch and larger pipe. Single pigtail bond wire allowed for pipe 10-inch and smaller. Split ring restraints may only be used if approved by engineer and will require additional pigtail bond wires, See 8B-9495.
2. Number, size and type of galvanic anodes required for single fitting per specifications.
3. Prior to assembly, locate wire connection for No. 12 AWG bond wires to flat area on side of coupling bolt pattern restraint harness ring.
4. Maximum of two wires under any one connection location per specifications.
PLASTIC PIPE BELL SPLIT RING
RERAINT HARNESS JOINT BONDING

Notes:
1. Split ring type restraints shown with minimum of four (two pigtail and two cross bond wires for 12-inch and larger pipe. Two pigtail cross bond pigtail wires allowed for 10-inch and smaller pipe). Split ring restraints may only be used if approved by engineer. For solid ring pigtail bond wires, see 8B-949R.
2. Number, size and type of galvanic anodes required for single fitting per specifications.
3. Prior to assembly, locate thermite weld or pin brazed type wire connection for No. 12 AWG bond wires to flat area on side of coupling bolt pattern restraint harness ring.
4. Maximum of two wires under any one connection location per specifications.
Notes:
1. Bond metallic mechanical restraint rings to metallic fitting body. Complete pigtail wire connections to glands before assembly.
2. Minimum two No. 12 AWG pigtail bond wires each side of fitting for 12" and larger fitting. One bond wire each side for pipe smaller than 12" diameter.
Notes:
1. Provide and install primer, mastic filler, tape, and outer wrap as recommended by tape manufacturer for each fitting type and environment.
2. Clean and roughen fitting surface with wire brush and apply petrolatum primer layer, mastic filler, petrolatum tape, and plastic outer wrap per petrolatum tape manufacturer’s directions.
3. Joint bond wires, anode & test leads (not shown) shall be coated with epoxy repair coating and then encased under petrolatum tape coating.
4. Primer and mastic filler shall provide smooth transition at all edges and step-downs and fill all voids.
5. Petrolatum tape coating shall completely encase bare metallic fitting & extend a minimum 4" onto coated metallic or plastic pipe surfaces.
6. Four layer system with protective wrap for buried conditions and three layer system for abovegrade applications.
7. Corrosion protection is shown for flexible coupling joint type. Protection of other bare metallic fitting types similar.

N.T.S.

CITY OF RAPID CITY                                               PUBLIC WORKS DEPARTMENT

PETROLATUM TAPE COATING FOR BARE METALLIC COUPLINGS AND FITTINGS

DATE:  8-19-22
Sec. - Sht.
8B-967
Notes:
1. PC'S & PT'S are to be within the manhole.
2. All inverts to be U-shaped channel equal to pipe ID and shall be constructed with sweeps.
3. Manhole pipe connector shall be Per Standard Specifications.
4. A 2' cone height is allowed for manhole depths that are less than 6.0' from the finished surface to the invert elevation.
5. Alternate designs for 60" manholes shall be approved by the Engineer.
6. Standard manhole shall be used for installations with manhole depths that are 5.5' or greater.
Openings Opposite of Outlet Pipe

Manhole Depth, Per Standard Specifications, See Notes 4 and 5

1" Per ft

Chimney Seal, Per Standard Specifications

Minimum 1'-0"

Standard Cover Slab, Per Standard Specifications

External Joint Seal, Per Standard Specifications when Required by Plans

U-shaped Channel Depth Equal to Outlet Pipe ID 1:10 to Vertical, TYP

1', TYP

4" Minimum Type 1 Bedding Material

Notes:
1. PC's & PT's are to be within the manhole.
2. All inverts to be U-shaped channel equal to pipe ID and shall be constructed with sweeps.
3. Manhole pipe connector shall be Per Standard Specifications.
4. Standard shallow manhole shall be used for installations with manhole depths less than 5.5'.
5. The use of shallow manholes require prior approval by the Public Works Director.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

STANDARD SHALLOW MANHOLE DETAIL
WITH MONOLITHIC BASE (48", 60" & 72")

DATE: 8-19-22
Sec. - Sht. 9-2
STANDARD DROP MANHOLE DETAIL
FOR INVERT CHANGES LESS THAN 4'

Less Than 4'
Minimum 1' Below Pipe Penetration

8" to 12"

45° Wye
DxDxD

Clean Out Leg

U-shaped Channel Depth Equal to Pipe ID 1:10 to Vertical, TYP

Invert Elevation, Per Plans

Extend Sewer Pipe and Cut Off Top Half of Pipe

1" Per ft

Type 1 Bedding to 3" Above Clean Out Leg Pipe

Low Strength Concrete to the Springline of the Cleanout Leg

45° Elbow

Low Strength Concrete to Be Placed on Undisturbed Soil but at a Minimum 1' Below Pipe Invert

4" Minimum Type 1 Bedding Material

Invert Elevation, Per Plans

Invert Elevation, Per Plans

Manhole Channel Shall Have a Continuous Slope Through the Manhole

Note:
The use of drop manholes requires prior approval by the Public Works Director.

DATE: 8-19-22

N.T.S.
STANDARD DROP MANHOLE DETAIL
FOR INVERT CHANGES OF 4' OR MORE

Note:
The use of drop manholes requires prior approval by the Public Works Director.

DATE: 8-19-22
N.T.S.
CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
Sec. - Sht. 9-4
Slope Manhole Invert so that Any Flow Entering Manhole Will Flow into Pipe Penetration, U-shaped Channel Requirements Are Not Required for Termination Manholes

Neoprene O-ring Type Gasket or Equal

Precast Concrete Manhole with Eccentric Cone

External Joint Seal, Per Standard Specifications when Required by Plans

2" or 4" Adjusting Rings, TYP

Chimney Seal Per Standard Specifications

Adjusting Rings Per Standard Specifications

Surface

Casting & Ring Per Standard Specifications

Opening Opposite of Outlet Pipe

Manhole Depth, Per Standard Specifications

4" Minimum Type 1 Bedding Material

Note:

Manhole pipe connector shall be Per Standard Specifications.

N.T.S.

TERMINATION MANHOLE
Notes:
1. The connection to an existing manhole requires prior approval by the Public Works Director.
2. Straight through manhole shown. Other configurations shall be constructed in the same manner.
3. The wall of the existing manhole base shall be cored and a boot-type connection utilized.
4. The manhole bench and newly constructed invert shall be reconstructed Per Standard Specification and Detail.
Notes:
1. Depending on location, cross-slope of street, height adjustment requirements, etc. The Engineer reserves the right to require a larger cut to assure that all transitions and tolerances as Per Standard Specifications will be met.
2. Blocks for shimming Per Standard Specifications.
3. 1/4" maximum surface deviation in 10 feet.
4. Patch Material - Patch material shall match the existing pavement material. (e.g. PCC pavement shall be patched with PCC and existing asphalt pavement with asphalt). See Detail for asphalt concrete pavement.
5. PCC Pavement Patch Minimum Depths - 6" PCC pavement minimum or match existing, whichever is greater.
6. Install 3/4"x18" smooth dowel around perimeter of patch for PCC pavements less than 7". Install 1"x18" smooth dowel around perimeter patch for 7" to less than 8" PCC pavements. Install 1 1/4"x 18" smooth dowel around perimeter of patch for PCC pavements greater than 8".

Controlled Low Strength Material (Flowable Fill), Per Standard Specifications
Internal Chimney Seal, Per Standard Specifications
Finish Surface Must Meet Specification Using 10' Straight Edge
Finish Sawcut Location
Match Longitudinal & Transverse Slope
See Note
Manhole Casting to be Set, Per Standard Specifications
Dowel Bars, Per Note, Spaced 18" OC
Street
Centerline
Notes:
1. Depending on location, cross-slope of street, height adjustment requirements, etc., the Engineer reserves the right to require a larger cut to assure that all transitions and tolerances as per Standard Specifications will be met.
2. Blocks for shimming per Standard Specifications.
3. 1/4" maximum surface deviation in 10 feet.
4. Patch Material - Patch material shall match the existing pavement material. (e.g., PCC pavement shall be patched with PCC and existing asphalt pavement with asphalt). See Detail for asphalt concrete pavement.
5. Asphalt Concrete Pavement Patch Minimum Depth - 5" minimum or match existing pavement depth whichever is greater. 2 lifts or more required. Granular material shall be 6" in depth or match existing, whichever is greater.
SANITARY SEWER
SERVICE CONNECTION

8" or 10" Sewer Main
Wye, Per Standard Specifications and Plans

Sewer Service Line

Street Elbow (Rotated Horizontal and Vertical)

2% MIN Slope

Trench Wall

2% MIN Slope

Sewer Service Line

Street Elbow (Rotated Vertical)

12" and Larger Sewer Main

Tee, Per Standard Specifications and Plans

Note:
1. All fittings shall be gasketed.
2. Service lines shown on this detail shall be 4" or 6".

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht. 9-9
DEEP SANITARY SERVICE CONNECTION

Wye or Tee, Per Standard Specifications

Sewer Main

45° Bend

Sewer Service Line

2% MIN Slope

Slope Per Plans

Service Line Location

Invert of Connecting Pipe Shall Not Dip Below Centerline of Main.

Pipe Bedding

Sewer Service Line

Note:
1. All fittings shall be gasketed.
2. Service lines shown on this detail shall be 4" or 6".

Low Strength Concrete to be Placed on Undisturbed Soil to Support the Wye and 45° Elbow

N.T.S.

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

Sec. - Sht. 9-10
SANITARY SEWER SERVICE
CLEANOUT DETAIL

Notes:
1. All fittings shall be gasketed.
2. Cleanouts shall be the same diameter (D) as service line.
3. Cleanouts shall be installed at all changes in horizontal alignment of greater than 45 degrees and at distances not to exceed 75 feet for 4 inch diameter pipe and 100 feet for 6 inch diameter pipe.
4. Cleanouts shall be installed when the summation of the horizontal degree of change in a service line exceeds 135 degrees.
5. Service lines shown on this detail shall be 4" or 6".

ELEVATION

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

SANITARY SEWER SERVICE
CLEANOUT DETAIL

DATE: 8-19-22
Sec. - Sht.
9-11
Notes:
1. All fittings shall be gasketed.
2. Cleanouts shall be the same diameter (D) as service line.
3. Cleanouts shall be installed at all changes in horizontal alignment of greater than 45 degrees and at distances not to exceed 75' for 4" diameter pipe and 100' for 6" diameter pipe.
4. Cleanouts shall be installed when the summation of the horizontal degree of change in a service line exceeds 135 degrees.
5. Service lines shown on this detail shall be 4" or 6".

N.T.S.
Note:
1. This detail shall be used when sanitary sewer service cleanouts are located in concrete or asphalt surfaced areas, or as shown in plans.
Note:
1. The use of insulation requires prior approval by the Public Works Director.

Water mains 20 inch diameter and larger - insulation not required for 5 foot bury depths.
Note:
Check dam installation locations shall be as indicated on the plans. However during construction, check dam installation locations may be moved due to field conditions. The check dam shall extend from the bottom of the excavation through the bedding material to the “Normal Backfill” and shall extend completely to each trench sidewall. Do not construct check dam around pipe joint.
In some circumstances, larger foundation material may be necessary and in these cases Type 4 Foundation Material or Stabilization Rock may be used per Standard Specifications, Section 112. If Type 4 Foundation Material or Stabilization Rock is used, then a minimum 6 inches of Type 3 Foundation Material shall be placed directly above the material and prior to the placement of the Type 1 Bedding Material.
Notes:
1. Where practical, surface roughening will be done on slopes 3:1 and steeper and on slopes deemed necessary by the Engineer.
2. The equipment used for surface roughening will be equipped with tracks that are capable of creating ridges in the soil that are perpendicular to the slope. The final condition of the surface roughening will be approved by the Engineer.
3. Measurement for surface roughening will be to the nearest tenth of an acre.
4. All costs associated with surface roughening including labor, equipment, and materials will be incidental to the contract unit price per acre for "Surface Roughening".

N.T.S.

CITY OF RAPID CITY                                               PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

SURFACE ROUGHENING
MANUAL LOW FLOW SILT FENCE INSTALLATION

1. EXCAVATE TRENCH
2. DRIVE STEEL T FENCE POSTS
3. ATTACH 26" WOVEN WIRE FENCE TO POSTS
4. ATTACH SILT FENCE FABRIC
5. BACKFILL TRENCH AND WHEEL COMPACT SOIL

Fabric for Silt Fence Will Be 36" Minimum Width
Fabric that Overlaps the Top of Fence Will Be Placed Between the Posts and the Woven Wire Fence

Silt Fence Length and Width May Be Adjusted Due to a Larger Pipe, Multiple Pipe, or Other Circumstances During Construction as Determined by the Engineer

Post Spacing Will Be 3' for These Types of Applications of Silt Fence, All Other Components of the Silt Fence Will Be the Same as Shown Above

Elevation at These Locations Will Be, at a Minimum, Higher than the Top of the Silt Fence Fabric at its Lowest Elevation

Low Flow Silt Fence

DATE: 8-19-22

LOW FLOW SILT FENCE
If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen material (such as rock), then a row of 30 to 40 pound sandbags butted end to end will be provided on top of the extra length of silt fence fabric to prevent underflow.

N.T.S.
1 EXCAVATE TRENCH

2 DRIVE STEEL T FENCE POSTS

3 ATTACH SILT FENCE FABRIC

4 BACKFILL TRENCH AND WHEEL COMPACT SOIL

Fabric for Silt Fence Will Be 36" Minimum Width

Attach Silt Fence Fabric with a Total of 4 Plastic or Wire Ties Per Post, Three Ties Will Be Used at the Top and 1 Tie Will Be Approximately at Mid-point of the Post

Silt Fence Fabric

8" Staples Will Be Placed at Each Post to Secure the Silt Fence Fabric to the Bottom of the Trench

Steel T Fence Post

Plastic or Wire Ties

Elevation at These Locations Will Be, at a Minimum, Higher than the Top of the Silt Fence Fabric at its Lowest Elevation

Silt Fence Length and Width May Be Adjusted Due to a Larger Pipe, Multiple Pipe, or Other Circumstances During Construction as Determined by the Engineer

Post Spacing Will Be 3' for These Types of Applications of Silt Fence, All Other Components of the Silt Fence Will Be the Same as Shown Above

N.T.S.
Note:
If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen material (such as rock), then a row of 30 to 40 pound sandbags butted end to end will be provided on top of the extra length of silt fence fabric to prevent underflow.

N.T.S.
Notes:
1. Silt shall be removed when silt ditch is one-half full.
2. Ditch shall be reconstructed when damaged by equipment or covered by fill.
Notes:
1. At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.
2. At ditch installations, Point A must be higher than Point B to ensure that water flows over the wattle and not around the ends.
3. The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side, see Detail B.
4. The stakes shall be 1"x2" or 2"x2" wood stakes, the stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3’ to 4’ or per manufacturer spacing.
5. Where installing running lengths of wattles, the contractor shall butt the second wattle tightly against the first and shall not overlap the ends, see Detail C.
6. The Contractor and Engineer will inspect the erosion control wattles in accordance with the permit the Contractor will remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
DATE: 8-19-22
Sec. - Sht. 18-5

SEDIMENT CONTROL WATTLE
Notes:
1. Prior to placement of the rolled erosion control products, the areas shall be properly prepared, shaped, seeded, and fertilized.
2. Rolled erosion control products shall be unrolled in the direction of the flow of water when placed in ditches and on slopes. The up-slope end of the rolled erosion control product shall be anchored in a trench a minimum of 6" wide by 6" deep. There shall be at least a 6" overlap wherever one roll of rolled erosion control product ends and another begins, with the up-slope rolled erosion control product placed on top of the downslope erosion control blanket.
3. The rolled erosion control products shall be stapled according to the manufacturer's installation recommendations.
4. After the placement of the rolled erosion control products, the contractor shall fine grade along all edges of the blanket to maintain a uniform slope adjacent to the blanket and level any low spots which might prevent uniform and unrestricted flow to side drainage directly onto the erosion control blanket.
5. All slopes greater than 3:1 shall receive at a minimum erosion control blanket.
Notes:
1. The type of sediment control device shown is for illustrative purposes only.
2. The type of sediment control device used shall be one of the types as specified in the plans.
3. The sediment control device shall be placed at the drop inlets according to the manufacturer's installation instructions.
4. The sediment control device shall be secured so that it remains in the inlet opening.
5. The sediment control at inlet for Type S reinforced concrete drop inlet shall be placed at locations stated in the plans or at locations determined by the Engineer.
6. The Contractor will maintain the sediment control device by removing the device, removing accumulated sediment, and resetting the device. The removed sediment will be placed at a location away from the drop inlet where the sediment will not be washed back into the drop inlet or other storm sewer system.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

SEDIMENT CONTROL FOR TYPE S INLETS

Sec. - Sht. 18-7
DATE: 8-19-22
Notes:
1. The grate and curb and gutter shown are for illustrative purposes only.
2. The sediment control at inlet with frame and grate shall be placed at locations stated in the plans or at locations determined by the Engineer.
4. The filter fabric shall be placed in the inlet opening prior to placing the grate. Approximately 18" of excess filter fabric shall be wrapped around the 2"x4" and stapled securely to the 2"x4" after the grate has been placed.
5. The Contractor shall maintain the sediment control device by removing the accumulated sediment and replacing torn or damaged fabric with new fabric. The removed sediment will be placed at a location away from the drop inlet where the sediment will not be washed back into the drop inlet or storm sewer system.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 18-8

SEDIMENT CONTROL AT TYPE B INLETS
Notes:
1. This method of inlet protection is applicable at curb inlets where ponding in front of the structure is not likely to cause inconvenience or damage to adjacent structures in unprotected areas.
2. Clean out as necessary to prevent blockage of runoff conveyance.

N.T.S.

CORRUGATED PIPE AND FABRIC INLET PROTECTION
Notes:
1. All rock to be removed upon completion of construction.
2. Sediment control measures shall be maintained at all times.
3. Public roadway to be kept clean and free of mud, dirt and debris at all times.
4. Woven reinforcement fabric shall comply with Section 18, per Standard Specifications.
5. 2"-3" Aggregate shall be per Standard Specifications, Section 18.
Notes:
1. All rock to be removed upon completion of construction.
2. Sediment control measures shall be maintained at all times.
3. Public roadway to be kept clean and free of mud, dirt and debris at all times.
4. Woven reinforcement fabric shall comply with Section 18, per Standard Specifications.
5. 2”-3” Aggregate shall be per Standard Specifications, Section 18.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 18-11

TEMPORARY VEHICLE TRACKING CONTROL WITH WASH RACK
Notes:
1. Concrete washout area shall be installed prior to any concrete placement on site. The concrete washout area must be self-contained and not connected to any storm water outlet of the site.
2. The concrete washout area shall be sized as necessary to adequately contain the concrete washout from the project. The concrete washout area shall be maintained during the entire project.
3. At the end of construction, all concrete shall be removed from the site and disposed of at an approved waste site.
4. When the concrete washout area is removed, the disturbed area shall be restored to original grade, seeded and mulched or otherwise stabilized as approved by the Engineer.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht.
18-12

CONCRETE WASHOUT AREA
A temporary ponding area, formed by constructing an earthen embankment with a rock-covered outlet across a drainage swale, or by excavation of a depression below original grade, relative elevations should contain all runoff within the trap area.
The Ditch Section Shown is Only for Illustrative purpose

SECTION A-A

SECTION B-B

SECTIONAL VIEW

Note:
The elevation of Point A and Point B will be the same. The distance L is the distance required such that Point A and Point B are at the same elevation.

N.T.S. ROCK CHECK DAM

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 8-19-22 Sec. - Sht. 18-14
Notes:
1. Temporary slope drains will be placed at locations stated in the plans or at locations deemed necessary by the Engineer.
2. The extra length of berm shown in the left side of the plan view illustrates an extension of the berm to alleviate erosion of the cut or fill slope. The length and locations of the berms will be approved by the Engineer.
3. The corrugated polyethylene pipe will be secured in place by wrapping 16 Ga. wire around the pipe and steel T fence posts multiple times as necessary and will be approved by the Engineer.
4. The quantity of Class A riprap will be determined by the Engineer, however, the minimum quantity allowed is 1 cubic yard.
Notes:
1. The Contractor and Engineer will inspect the interceptor ditch in accordance with the storm water permit. The Contractor will maintain the interceptor ditch by removing accumulated sediment once it has reached a depth of 1'.
2. The non-erodible material used will be an erosion control blanket or a 2" thickness of shot rock, base course, or gravel cushion material.
3. The Engineer will determine when or if the interceptor ditch will be removed.
New PCC Pavement

PLAN VIEW

PCC PAVEMENT TRANSVERSE CONSTRUCTION
JOINTS WITH TIE BARS OR DOWEL BARS

Note:
Transverse joints shall match existing joints in adjacent lanes of paving.

N.T.S.
**DETAIL A**
TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS

Notes:
1. The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.
2. The tie bars will be embedded a minimum depth of 9" into the in place PCC pavement and anchored with an epoxy resin adhesive.
3. No. 8 epoxy coated deformed tie bars shall be used in 7" to 7 1/2" thick PCC pavement, No. 9 epoxy coated deformed tie bars will be used in 8" to 10" thick PCC pavement and No. 10 epoxy coated deformed tie bars will be used in 10 1/2" thick and greater PCC pavement. The tie bar spacing will be 18" center to center and will be a minimum of 3" and a maximum of 9" from the pavement edges.

**DETAIL B**
TRANSVERSE CONSTRUCTION JOINT WITH DOWEL BARS

Notes:
1. The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.
2. The plain round dowel bars will be embedded a minimum depth of 9" into the in place PCC pavement and anchored with an epoxy resin adhesive.
3. The epoxy coated plain round dowel bar size, number, and spacing will be the same as detailed on the corresponding dowel bar assembly, see Detail 40-6. The epoxy coated plain round dowel bars will be a minimum of 3" and a maximum of 6" from the pavement edges.
Notes:
1. When concrete pavement is formed and a keyway is provided, a metal recess strip will be used. When concrete pavement is slip formed, a metal recess strip is not required.
2. The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on the current project.
SAWED LONGITUDINAL JOINT WITH TIE BARS
(Poured Monolithically)

Notes:
1. Tie bar spacing shall be 48" center to center and shall be supported so the tie bar remains in place as detailed during paving operations.
2. The first saw cut to control cracking will be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer is necessary.

T=Pavement Thickness

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS

Note:
The No. 5 epoxy coated tie bars shall be embedded a minimum of 9" into the in place PCC pavement and anchored with an epoxy resin adhesive. Tie bar spacing shall be 30" center to center when no keyway is present.
LONGITUDINAL CONSTRUCTION JOINT WITH KEYWAY AND TIE BARS

Notes:
1. When concrete pavement is formed and a keyway is provided, a metal recess strip will be used. When concrete pavement is slip formed, a metal recess strip is not required.
2. The term “In Place PCC Pavement” in the above drawing indicates that the in place PCC pavement was placed on the current project.
3. The epoxy coated deformed tie bars will be spaced in accordance with the following table:
   a. The tie bars will be placed a minimum of 15" from the transverse contraction joints.
   b. The required number of tie bars as shown in the tables will be uniformly spaced. Bar spacing for monolithically poured pavement shall be a maximum space of 48" center to center as shown in table above. Bar spacing adjacent to existing PCC pavement shall be a maximum space of 30" center to center as shown in table above. The maximum tie bar spacing will apply to tie bars within each panel.

<table>
<thead>
<tr>
<th>Transverse Contraction Joint Spacing</th>
<th>Number of Tie Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5' to 10'</td>
<td>2</td>
</tr>
<tr>
<td>10.5' to 14'</td>
<td>3</td>
</tr>
<tr>
<td>14.5' to 18'</td>
<td>4</td>
</tr>
<tr>
<td>18.5' to 22'</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transverse Contraction Joint Spacing</th>
<th>Number of Tie Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>5' to 7'</td>
<td>2</td>
</tr>
<tr>
<td>7.5' to 9.5'</td>
<td>3</td>
</tr>
<tr>
<td>10' to 12'</td>
<td>4</td>
</tr>
<tr>
<td>12.5' to 14.5'</td>
<td>5</td>
</tr>
<tr>
<td>15' to 17'</td>
<td>6</td>
</tr>
<tr>
<td>17.5' to 19.5'</td>
<td>7</td>
</tr>
<tr>
<td>20' to 22'</td>
<td>8</td>
</tr>
</tbody>
</table>

DATE: 8-19-22

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS

Sec. - Sht.
40-3b
LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS  
(Individually Formed)

Concrete Gutter or  
Concrete Curb  
and Gutter

PCC Pavement

Sawed Joint Filled  
With Hot Poured  
Elastic Joint Sealer

Alternate Keyway

In Place Gutter or  
Curb and Gutter

Notes:
1. No. 5 epoxy coated deformed tie bars will be spaced 48" center to center. The keyway may be formed in either the curb and  
gutter (alternate keyway shown above) or the PCC pavement. No. 5 epoxy coated deformed tie bars will be placed 30" center to  
center if a keyway is not installed.
2. The tie bars will be placed a minimum of 15" from existing transverse contraction joints.
3. The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip  
will be used. When concrete pavement is slip formed, a metal recess strip is not required.
4. The transverse contraction joints in the concrete gutter or concrete curb and gutter will match each mainline PCC pavement  
transverse contraction joint.
5. The term “In Place Gutter or Curb and Gutter” in the above drawing indicates that the in place concrete gutter or concrete curb  
and gutter was placed on the current project.

POURED MONOLITHICALLY

Concrete Gutter or  
Concrete Curb  
and Gutter

PCC Pavement

No. 5 Epoxy Coated Deformed Tie Bars

Line of Fracture

Notes:
1. The mainline curb and gutter may be placed monolithically with the PCC pavement or as required by plan note if the mainline  
lane width is less than or equal to 12'.
2. No. 5 epoxy coated deformed tie bars will be spaced 48" center to center.
3. The tie bars will be placed a minimum of 15" from existing transverse contraction joints.
4. The gutter or curb and gutter will be sawed transversely at each mainline transverse contraction joint. The transverse  
contraction joints in the gutter or curb and gutter will be sawed and sealed same as the transverse contraction joints in the  
PCC pavement.
5. The slope of the gutter will be the slope designated for the type of gutter or curb and gutter to be constructed. The bottom  
slope of the gutter or curb and gutter will be constructed at the same slope as the mainline concrete pavement.

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.
40-4
LONGITUDINAL CONSTRUCTION JOINT

SAWED LONGITUDINAL JOINT

Notes:
1. The term “In Place PCC Pavement” in the above drawing indicates that the pavement was placed on the current project or was placed on a previous project and is being tied to on the current project.
2. The first cut to control cracking for a sawed longitudinal joint shall be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide for the installation of the hot poured elastic joint sealer is necessary.
3. The first cut to control cracking for a sawed transverse joint shall be a minimum of 1/4 the thickness of the pavement.
4. Transverse construction joints shall only be made at planned joint locations. Mid panel transverse construction joints shall not be constructed.
5. All hot pour elastic joint sealer material spilled on the surface of the concrete pavement shall be removed as soon as the material has cooled. The extent of the removal shall be to the satisfaction of the Engineer. All costs for removal of spilled joint sealer shall be borne by the Contractor.

N.T.S.

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.
40-5

PCC PAVEMENT JOINT DETAILS
Notes:
1. Longitudinal joint tie bars will be placed a minimum of 15" from the transverse contraction joints.
2. Centerline of individual dowel bars will be parallel to top of subgrade +/- 1/8" in 18" and to all other dowel bars in the assembly by +/- 1/16" in 18".
3. Centerline of individual dowel bars will be parallel to the centerline of the roadway to +/- 1/2" in 18".
4. The transverse contraction joints shall be sawed perpendicular to the centerline of the roadway and the dowel bars shall be centered on the sawed joint +/- 1".
5. Supporting devices as shown on this sheet, or equivalent as approved by the Engineer, will be used to maintain proper horizontal and vertical alignment of the dowel bars.

N.T.S.
Spalls Requiring Multiple Milling Passes Shall Extend into Sound Concrete on All Sides

Distance Between Multiple Spalls Shall Be Greater than 3'

Existing Joints, TYP

1 1/2" Depth Initial Saw Cut, TYP

1 1/2" Depth Saw Cut Around Perimeter, Overall Width Shall Be as Needed to Control Edge Chipping

2 1/2" Minimum Milled Depth

Existing Joint

12" Minimum Milled Width

2 1/2" Minimum Milled Width

Existing Joint

Spall Removal Area

DATE: 8-19-22

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

SPALL REPAIR
Notes:
1. Spall quantities shown in the plans are approximate and are based on field measurements at the time of plans preparation. Spall repairs shall be marked in the field by the engineer and may vary from the plans based on field conditions.
2. Spalls will be marked out to the nearest whole foot. Removal is to extend 6 inches beyond the spall on transverse joints. Minimum length of removal shall be 3’. Joints containing spalls closer than 4’ shall have the removal limits combined. Multiple milling passes may be required in areas where existing spalls are too wide to remove in one pass.
3. Spall repair areas shall be removed thru the use of a vertical edge milling machine. The milled width shall be a minimum of 12” and shall have a uniform depth of 2.5” over the area to be removed. An initial saw cut will be required around the perimeter of the removal area. The saw cut shall be a minimum of 1.5” depth to control edge chipping beyond the area to be repaired.
4. Prior to the placement of concrete the surface of the milled area shall be sand blasted to remove any additional unsound concrete and free latances. Compressed air shall then be used for the final cleaning of the surface. After final cleaning of the spall a bonding mortar shall be mixed and applied to all existing concrete surfaces (horizontal and vertical) to receive the spall fill material. The bonding mortar shall consist of the following proportions: 2 parts portland cement to 1 part sand. The portland cement and sand shall be mixed with enough water to form a thick creamy consistency. The Contractor may propose to utilize other commercially available bonding agents thru the submittal process.
5. The surface temperature shall be 40 degrees and rising prior to the placement of the bonding agent and concrete fill material. The concrete fill material shall be consolidated by the use of a small spud vibrator.
6. The final finishing procedure is to paint a sand-cement grout, the same grout used for the bonding mortar, at the edges of the repair to impede delamination of the patch. This ensures that a high percentage of cementitious material is available to glue the edges of the patch material to the existing concrete, helping to prevent the infiltration of moisture that can lead to delamination if water at the interface freezes in cold weather. The final surface shall be a broomed finish.
7. Joints shall be sawed to match existing joints and shall be sawed to the depth of the spall material plus 0.25”. The sawed joint shall be sealed using hot tar.
8. Linseed oil cure shall be applied at a rate of 1 gallon per 75 SF. The repair areas shall be covered for 48 hours following the application of cure. Cold weather concreting procedures shall be followed during the 48 hour covering period, as needed.
9. Fill material for the spall areas shall be a commercially supplied redi-mix concrete conforming to the following proportions:
   - Cement: 750 lbs
   - Course agg: 1330 lbs
   - Fine agg: 1330 lbs
   - Air: 4.5% to 7.5%
   - Slump: 1” to 4”
   - Max w/c ratio: 0.42
   - Water reducer: As Needed
10. Course aggregate shall be 3/8 chip rock. Fly ash will not be allowed. A concrete mix design shall be submitted for acceptance prior to use on the project.
11. Payment for the spall repair will be by the square foot (SF) of repair. Payment shall include all work required to mill and remove existing, saw cutting to control edge chipping, final saw cutting, sealing, concrete placement and all associated items.
12. Processes and procedures for spall repair within this detail are from the National Concrete Pavement Technology Centers guide for partial depth repair of concrete pavements dated April 2012.
Steel Bars for Transverse Joints

- Drilled epoxy coated plain round dowel bar 12" center to center. (See chart for size.)
- Drilled epoxy coated deformed tie bar 18" center to center. (See chart for size.)
- DBA Dowel Basket Assembly (See chart for size.)

Steel Bars for Longitudinal Joints

- No. 5 x 30" epoxy coated deformed tie bars. Placed in monolithic pavement centered on joint - spaced 48" center to center.
- No. 5 x 24" epoxy coated deformed tie bars. Drilled and epoxied 9" minimum depth into existing concrete - spaced 30" center to center.

Steel Bars for Curb and Gutter and Concrete Fillets

- No. 5 x 24" epoxy coated deformed tie bars. Drilled and epoxied 9" minimum depth into existing curb and gutter.
- No. 5 x 24" epoxy coated smooth dowel bars. Drilled and epoxied 9" minimum depth into existing curb and gutter.
- No. 5 x 30" epoxy coated deformed tie bars. Placed in monolithic pavement centered on joint - spaced 48" center to center.
- No. 5 x 24" epoxy coated deformed tie bars. Drilled and epoxied 9" minimum depth into existing concrete - spaced 30" center to center.
- No. 4 x 24" epoxy rebar. Drilled and epoxy 9" minimum depth into existing concrete. See Section 60 details for spacing.

PCC Pavement Repair Areas, Full Depth

- Half panel repair, transverse. Only half panels will be allowed. See detail.
- Full panel repair.
- Multiple full panels. Dowel basket assemblies shall be used for new transverse joints.
- Half panel repair, longitudinal. Only half panels will be allowed.

PCC Pavement Spall Repair Areas, Partial Depth

- Spall repair areas. See detail.
- Curb and Gutter and Concrete Fillet
  - See Section 60 details.

Notes:

1. Concrete shall be sawed full depth. Final removal limits are shown. A second saw cut is required for all concrete removals.
2. Joints, both transverse and longitudinal, shall be constructed to match existing joints unless directed by the Engineer.
3. Joints shall be sawed and sealed as per details.

N.T.S.
Notes:
1. All saw cuts to be full depth.
2. Patch material shall match the existing pavement material (eg. PCC pavement shall be patched with PCC and existing asphalt pavement with asphalt.
3. For asphalt patches base course & asphalt concrete thickness to match existing but in no case will be less than 6” base & 5” asphalt concrete. The existing vertical asphalt face shall be tacked.
4. For PCC pavement patches - see Section 40 details.
5. PCC pavement removals shall be per Section 40 details.
6. Trenches are shown to diagram patching requirements and at a minimum meet the minimum trench width table below. Trenches shall be constructed to meet OSHA requirements.
7. Pavement removal between first and second saw cut shall be removed at time of patching.

| TABLE 11-1 MINIMUM TRENCH WIDTH TABLE |
| Pipe Diameter | Minimum Width |
| <8 in. | 24” |
| 8in. - 12in. | 30” |
| 14in. - 18in. | 36” |
| 20in. - 21in. | 42” |
| 24in. - 36in. | 1.25 (Pipe O.D.) Plus 12in. |
| >36in. | Per Plans |

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

UTILITY TRENCH PATCH DETAIL

N.T.S.
Notes:
1. All saw cuts to be full depth.
2. Patch material shall match the existing pavement material (e.g., PCC pavement shall be patched with PCC and existing asphalt pavement with asphalt.
3. For asphalt patches base course & asphalt concrete thickness to match existing but in no case will be less than 6" base & 5" asphalt concrete. The existing vertical asphalt face shall be tacked.
4. For PCC pavement patches - see Section 40 details.
5. PCC pavement removals shall be per Section 40 details.
6. Trenches are shown to diagram patching requirements and at a minimum meet the minimum trench width table below. Trenches shall be constructed to meet OSHA requirements.
7. Pavement removal between first and second saw cut shall be removed at time of patching.

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Minimum Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;8 in.</td>
<td>24&quot;</td>
</tr>
<tr>
<td>8in. - 12in.</td>
<td>30&quot;</td>
</tr>
<tr>
<td>14in. - 18in.</td>
<td>36&quot;</td>
</tr>
<tr>
<td>20in. - 21in.</td>
<td>42&quot;</td>
</tr>
<tr>
<td>24in. - 36in.</td>
<td>1.25 (Pipe O.D.) Plus 12in.</td>
</tr>
<tr>
<td>&gt;36in.</td>
<td>Per Plans</td>
</tr>
</tbody>
</table>

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
GEOGRID/FABRIC UTILITY TRENCH PATCH DETAIL

DATE: 8-19-22
Sec. - Sht. 41-2
In some circumstances, larger foundation material may be necessary and in these cases Type 4 foundation material or stabilization rock maybe used per Standard Specifications, Section 112. If Type 4 foundation material or stabilization rock is used, then a minimum 6" of Type 3 foundation material shall be placed directly above the material and prior to the placement of the granular material.

Granular material shall be per Standard Specifications, Section 112. Bedding thickness below the pipe in inches shall be the outer pipe diameter (OD) in inches divided by 24 (OD/24) and no less than 3". Bedding beneath the pipe shall be in contact with the pipe for a distance no less than 1/3 the outer diameter (OD/3). The bedding shall extend the full width of the trench. Compaction above the bedding shall be per Standard Specifications, Section 11.

N.T.S.

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.

54-1
1. See plans for flow line configurations or as directed by the Public Works Director.

2. If a curb ramp is constructed adjacent to a PCC fillet section, the curb will need to be modified. Refer to the corresponding curb ramp standard plate or other special details in the plans for modification of the PCC fillet section.

3. All reinforcing bar shall be tied and chaired. If rebar splices are utilized No. 4 rebar shall be lapped a minimum of 12".

4. Chairs shall be epoxy coated.

5. All rebar shall be ASTM A615 grade 60, epoxy coated per ASTM A775, per Standard Specifications, Sections 57 and 123. All rebar shall have a minimum of 2" of clear cover.

6. Minimum depth of granular material placed under pans and fillets shall be 4".

7. Class M6 concrete will be used in construction of the fillets.

8. The concrete curb will be monolithic with the concrete fillet. No separate payment for this curb will be made as the curb is considered a part of the fillet.

9. Joints will be constructed at 10' intervals except when fillets are constructed adjacent to PCC pavement or as directed by the Engineer. If there is adjacent PCC pavement the joints will be extended from edge of pavement through the fillet section. Joints shall be placed perpendicular to the back of curb and perpendicular to the edge of fillet and intersect at a point 2.67' from the back of curb.

10. A longitudinal construction joint with keyway and without tie bars will be used when concrete fillet sections are constructed adjacent to concrete pavement unless shown otherwise in the plans.
Notes:
1. The flow line may be included with PCC pavement when adjacent surfacing is PCC pavement.
2. The contraction joints will be spaced a maximum 12'. When the length of the valley gutter is 12' to 24' there will be a joint at the midpoint of the length. The joint to control cracking will be a minimum of 1/4 the thickness of the pavement.
3. All hot poured elastic joint sealer material spilled on the surface of the concrete pavement will be removed as soon as the material has cooled. The extent of removal of material will be as per the Public Works Director. All costs for removal of the spilled joint sealer material will be borne by the Contractor.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 60-1b

PCC FILLET SECTION WITH TYPE B CURB AND GUTTER AND DRAIN PAN
TYPE B CONCRETE CURB AND GUTTER

Notes:
1. T1 is equal to pavement thickness, in no case shall T1 be less than 6".
2. All design elevations are top of curb elevations unless otherwise indicated on the plans.
3. A 1/2-inch preformed expansion joint filler will be placed transversely in the curb and gutter as per Detail 60-7a.
4. Transverse contraction joints shall be placed in the curb and gutter at 10’ maximum intervals. Curb joints adjacent to PCC pavement shall match PCC pavement joints and shall be sawed and sealed the same as the mainline PCC pavement joints.
5. No. 5 smooth epoxy coated bars and installed as per Detail 60-7b.
6. Road subgrade cross slope shall continue to a point one foot behind the curb and gutter section. Minimum depth of granular material placed under curb and gutter shall be 4”.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 60-2a
**TYPE BL CONCRETE CURB AND GUTTER**

<table>
<thead>
<tr>
<th>Type</th>
<th>( T_1 ) (Inches)</th>
<th>( T_2 ) (Inches)</th>
<th>Cu. Yd. Per Lin. Ft.</th>
<th>Lin. Ft. Per Cu. Yd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL66</td>
<td>6</td>
<td>6( \frac{3}{4} )</td>
<td>0.063</td>
<td>15.9</td>
</tr>
<tr>
<td>BL67</td>
<td>7</td>
<td>7( \frac{3}{4} )</td>
<td>0.071</td>
<td>14.1</td>
</tr>
<tr>
<td>BL68</td>
<td>8</td>
<td>8( \frac{3}{4} )</td>
<td>0.080</td>
<td>12.5</td>
</tr>
<tr>
<td>BL68.5</td>
<td>8.5</td>
<td>9( \frac{3}{4} )</td>
<td>0.084</td>
<td>11.9</td>
</tr>
<tr>
<td>BL69</td>
<td>9</td>
<td>9( \frac{3}{4} )</td>
<td>0.088</td>
<td>11.4</td>
</tr>
<tr>
<td>BL69.5</td>
<td>9.5</td>
<td>10( \frac{3}{4} )</td>
<td>0.092</td>
<td>10.9</td>
</tr>
<tr>
<td>BL610</td>
<td>10</td>
<td>10( \frac{3}{4} )</td>
<td>0.096</td>
<td>10.4</td>
</tr>
<tr>
<td>BL610.5</td>
<td>10.5</td>
<td>11( \frac{3}{4} )</td>
<td>0.100</td>
<td>10.0</td>
</tr>
<tr>
<td>BL611</td>
<td>11</td>
<td>11( \frac{3}{4} )</td>
<td>0.104</td>
<td>9.6</td>
</tr>
<tr>
<td>BL611.5</td>
<td>11.5</td>
<td>12( \frac{3}{4} )</td>
<td>0.108</td>
<td>9.3</td>
</tr>
<tr>
<td>BL612</td>
<td>12</td>
<td>12( \frac{3}{4} )</td>
<td>0.112</td>
<td>8.9</td>
</tr>
</tbody>
</table>

**Notes:**
1. \( T_1 \) is equal to pavement thickness, in no case shall \( T_1 \) be less than 6".
2. All design elevations are top of curb elevations unless otherwise indicated on the plans.
3. A 1/2-inch preformed expansion joint filler will be placed transversely in the curb and gutter as per Detail 60-7a.
4. Transverse contraction joints shall be placed in the curb and gutter at 10' maximum intervals. Curb joints adjacent to PCC pavement shall match PCC pavement joints and shall be sawed and sealed the same as the mainline PCC pavement joints.
5. Dowels when required shall be No. 5 smooth epoxy coated bars and installed as per Detail 60-7b.
6. Road subgrade cross slope shall continue to a point one foot behind the curb and gutter section. Minimum depth of granular material placed under curb and gutter shall be 4".

N.T.S.

CITY OF RAPID CITY                                      PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.  60-2b
### TYPE D CONCRETE CURB AND GUTTER

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D46</td>
<td>6</td>
<td>5/8</td>
<td>0.056</td>
<td>18.0</td>
</tr>
<tr>
<td>D47</td>
<td>7</td>
<td>6/8</td>
<td>0.064</td>
<td>15.7</td>
</tr>
<tr>
<td>D48</td>
<td>8</td>
<td>7/8</td>
<td>0.072</td>
<td>13.9</td>
</tr>
<tr>
<td>D48.5</td>
<td>8.5</td>
<td>7 1/8</td>
<td>0.076</td>
<td>13.1</td>
</tr>
<tr>
<td>D49</td>
<td>9</td>
<td>8/8</td>
<td>0.080</td>
<td>12.5</td>
</tr>
<tr>
<td>D49.5</td>
<td>9.5</td>
<td>8 3/8</td>
<td>0.084</td>
<td>11.9</td>
</tr>
<tr>
<td>D410</td>
<td>10</td>
<td>9 11/32</td>
<td>0.088</td>
<td>11.3</td>
</tr>
<tr>
<td>D410.5</td>
<td>10.5</td>
<td>9 7/8</td>
<td>0.093</td>
<td>10.8</td>
</tr>
<tr>
<td>D411</td>
<td>11</td>
<td>10/8</td>
<td>0.097</td>
<td>10.3</td>
</tr>
<tr>
<td>D411.5</td>
<td>11.5</td>
<td>10 3/8</td>
<td>0.101</td>
<td>9.9</td>
</tr>
<tr>
<td>D412</td>
<td>12</td>
<td>11/8</td>
<td>0.105</td>
<td>9.5</td>
</tr>
</tbody>
</table>

**Notes:**
1. $T_1$ is equal to pavement thickness, in no case shall $T_1$ be less than 6”.
2. All design elevations are top of curb elevations unless otherwise indicated on the plans.
3. A 1/2-inch preformed expansion joint filler will be placed transversely in the curb and gutter as per Detail 60-7a.
4. Transverse contraction joints shall be placed in the curb and gutter at 10' maximum intervals. Curb joints adjacent to PCC pavement shall match PCC pavement joints and shall be sawed and sealed the same as the mainline PCC pavement joints.
5. Dowels when required shall be No. 5 smooth epoxy coated bars and installed as per Detail 60-7b.
6. Road subgrade cross slope shall continue to a point one foot behind the curb and gutter section. Minimum depth of granular material placed under curb and gutter shall be 4”.

**N.T.S.**
**Curb Joints**

1. **Adjacent to AC Pavement**
   
   Joints shall be placed at both sides of the Type P concrete gutter. If Type P concrete gutter is greater than 10' additional joints shall be placed in the Type P concrete gutter as shown on the plans or as directed by the Engineer. Type P concrete gutter installed against previously placed concrete curb and gutter shall have expansion joint filler placed as per Detail 60-7a. If Type P concrete gutter is placed at the same time as the adjacent curb and gutter joints shall be contraction joints.

2. **Adjacent to PCC Pavement**

   Curb joints adjacent to PCC pavement shall match PCC pavement joints and shall be sawed and sealed the same as the mainline PCC pavement joints.

**Notes:**

1. $T_1$ is equal to pavement thickness, in no case shall $T_1$ be less than 6".
2. All design elevations are top of curb elevations unless otherwise indicated on the plans.
3. A 1/2-inch preformed expansion joint filler will be placed transversely in the curb and gutter as per Detail 60-7a.
4. Transverse contraction joints shall be placed in the curb and gutter at 10' maximum intervals. Curb joints adjacent to PCC pavement shall match PCC pavement joints and shall be sawed and sealed the same as the mainline PCC pavement joints.
5. Dowels when required shall be No. 5 smooth epoxy coated bars and installed as per Detail 60-7b.
6. Road subgrade cross slope shall continue to a point one foot behind the curb and gutter section. Minimum depth of granular material placed under curb and gutter shall be 4".
MINIMUM ELEVATION OF THIS POINT WILL BE AT THE SAME ELEVATION AS THE THEORETICAL TOP OF MAINLINE CURB ELEVATION

PLAN VIEW

Notes:
1. Driveway widths shall be per Rapid City Infrastructure Design Criteria Manual.
2. Contraction joints in the PCC approach pavement shall be a minimum of 1/4 the thickness of the approach pavement. Additional contraction joints not shown in the Plan View will be spaced as follows:
   a. Joints shall be equally spaced across the driveway. Driveways up to 36' in width shall have a maximum joint spacing of 12'.
   b. Driveways greater than 36' in width and up to 40' in width shall have 4 equally spaced joints.
3. All costs for furnishing and placing the PCC approach pavement and constructing the expansion and contraction joints including labor, equipment, excavation, and materials including the earthen backfill will be incidental to the contract unit price per square yard for the corresponding PCC Approach Pavement contract item.
4. The sidewalk width through the full width of the driveway opening shall be 5' wide minimum.

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

RESIDENTIAL DRIVEWAY APPROACH (PROPERTY LINE SIDEWALK)

DATE: 8-19-22

Sec. - Sh: 60-3a
Sidewalks to be constructed adjacent to the curb shall be a minimum of 5' in width for lane, place and local roads and a minimum of 6' for all other roads. The cross slope of the sidewalk is designed at 1.5% and will not be steeper than 2% unless specified otherwise in the plans.

** The slope of the driveway approach pavement in these areas will match the slope of the concrete curb transition and the length will not be longer than 15'. The slope is designed at 7.5% and will not be steeper than 8.3% unless specified otherwise in the plans.

N.T.S.

RESIDENTIAL DRIVEWAY APPROACH (CURBSIDE SIDEWALK)
Notes:
1. Driveway widths shall be per Rapid City Infrastructure Design Criteria Manual.
2. Detail C shall be used unless otherwise shown in the plans and specifications or as directed by the Engineer.
3. Contraction joints in the driveway approach pavement shall be a minimum of 1/4" the thickness of the approach pavement.
   Additional contraction joints not shown in the Plan View will be spaced as follows:
   a. Joints shall be equally spaced across the driveway. Driveways up to 36' in width shall have a maximum joint spacing of 12'.
   b. Driveways greater than 36' in width and up to 40' in width shall have 4 equally spaced joints.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

RESIDENTIAL DRIVEWAY APPROACH
(CURBSIDE SIDEWALK)

DATE: 8-19-22
Sec. - Sht. 60-3c
Notes:
1. Minimum depth of granular material placed under reinforced driveway approach shall be 4".
2. When removing existing curb & gutter for new approach construction, an expansion joint shall be constructed. (See detail 60-7b)
3. Reinforced driveway and sidewalk shall be placed at all alley entrances and at driveways into property which is multi-family, commercial, light industrial and heavy industrial.
4. No. 4 rebar shall be placed as per detail and tied together. 2" clearance shall be maintained between bottom of concrete and rebar.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

6" REINFORCED DRIVEWAY APPROACH AND SIDEWALK

DATE: 8-19-22
Sec. - Sht. 60-4
DRIVEWAY PROFILE GRADE

PROPERTY LINE SIDEWALK

- Positive Drainage Towards Street
- Elevation Equal to Theoretical Top Back of Curb
- Dashed Line = 2% Slope from Theoretical TBC to Property Line
- S=2% Max
- S=12% Max
- S=16% Max
- S=2% Min
- S=2% Min
- S=2% Max

CURB SIDE SIDEWALK

- Positive Drainage Towards Street
- Elevation Equal to Theoretical Top Back of Curb
- Dashed Line = 2% Slope from Back of Curb
- S=2% Max
- S=12% Max
- S=16% Max
- S=2% Min
- S=2% Min
- S=2% Max

DATE: 8-19-22

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

STATE: SD
CITY: RAPID CITY

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

Sec. - Sh. 60-5
Notes:
1. Maximum grade of the approach in the right-of-way shall not exceed 12%.
2. Culverts shall be sized by property owner to assure proper drainage, minimum culvert size shall be 15”.
3. Construct approach so as not to direct drainage onto the roadway.
4. Construct approach perpendicular to the street or road.
5. The hard surface improvements on driveways must at the street or curb line, and either extend to the garage or parking slab or a minimum of 50’.

N.T.S.
JOINTS IN CONCRETE
CURB & GUTTER

SECTIONAL VIEW
Curb and Gutter Placed Monolithic with Adjacent Mainline PCC Pavement

SECTION A-A
Low Modulus Silicone Sealant
1/8" to 1/4"
Sawed Joint Filled with Hot Poured Elastic Joint Sealer

SECTION B-B
Hot Poured Elastic Joint Sealer
1/8" to 1/4"

SECTION C-C
Low Modulus Silicone Sealant
1/8" to 1/4"

SECTION D-D
Low Modulus Silicone Sealant
1/2" Preformed Expansion Joint Filler

The silicone sealant will be placed such that it completely seals the joint and is bonded to the sides of the clean joint as approved by the Public Works Director.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

JOINTS IN CONCRETE
CURB & GUTTER
Notes:
1. For illustrative reason, only the Type B curb and gutter is shown.
2. A 1/2-inch preformed expansion joint filler will be placed transversely in the curb and gutter at the following locations:
   a. At both ends of intersection radii curb and gutter, and transition points where curb and gutter is not parallel to the project centerline.
   b. At each junction between new curb and gutter and existing curb and gutter. Existing curb and gutter includes curb and gutter previously placed on the same project.
3. Transverse contraction joints shall be placed in the curb and gutter at 10' maximum intervals. Curb joints adjacent to PCC pavement shall match PCC pavement joints and shall be sawed and sealed the same as the mainline PCC pavement joints. Curb joints adjacent to curbside sidewalk shall match the sidewalk joints.
4. When concrete curb and gutter is not placed monolithically with the mainline PCC pavement or when the adjacent mainline surfacing is not PCC concrete, the transverse contraction joints in the concrete curb and gutter will be 11/2 inches deep if formed in the fresh concrete using a suitable grooving tool. If a saw is used to cut the contraction joints, then the depth of the joint will be at least 1/4 the thickness of the concrete and the joint will be sealed in accordance with the details shown above.
5. Curb and gutter contraction joints adjacent to asphalt pavement shall not be sealed. Expansion joints in curb and gutter adjacent to asphalt pavement shall be sealed in accordance with the details shown above.
Notes:
1. The PCC sidewalk will be constructed in accordance per Standard Specifications, Section 61.
2. The cross slope of the sidewalk is designed at 1.5% and the maximum slope allowed is 2% unless specified otherwise in the plans.
3. An expansion joint in the PCC sidewalk will consist of a 1/2-inch thick preformed expansion joint filler material placed full depth and width of the PCC sidewalk. The maximum length between expansion joints in the PCC sidewalk is 100'.
4. For curb ramps with detectable warning surfaces see Details 61-2, 61-3, 61-4.
5. Sidewalks adjacent to driveways shall be 5' wide minimum through the entire width of the driveway opening.
6. Tooled or sawed joints spaced to match sidewalk width. Curb side sidewalk joints to match curb and gutter joints where possible.

N.T.S.
Seal Joint with Hot Poured Elastic Joint Sealer or Low Modulus Silicone

*PCC Sidewalk
Granular Cushion Material

*PCC Sidewalk
Granular Cushion Material

Seal Joint with Hot Poured Elastic Joint Sealer or Low Modulus Silicone

1/2"

1/2" Preformed Expansion Joint Filler

AC Pavement
Granular Cushion Material

Building or Other Rigid Structure

Seal Joint with Hot Poured Elastic Joint Sealer or Low Modulus Silicone

1/2"

1/2"

PCC Sidewalk
Granular Cushion Material

Double Thickness of 1/2" Preformed Expansion Joint Filler or as Per Plans

Granular Cushion Material

Double Thickness

1/2" Preformed Expansion Joint Filler

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

SIDEWALKS

Sec. - Sht. 61-1b
**PLAN VIEW** (With Curb Transition)

- Turning Space is 5'x5' Unless Stated Otherwise in the Plans, See Detail E
- Top of Curb Ramp (TCR)
- Back of Curb Ramp Opening
- Back of Curb at Ramp (BCR) Opening

**DETAIL E** ISOMETRIC VIEW

- 1/2" Preformed Expansion Joint Filler Sealed with Low Modulus Silicone Sealant or Hot Poured Elastic Joint Sealer
- The Edge of Curb and Gutter Concrete Adjacent to Detectable Warning Surface Will Be Straight on Curb Radii 25' and Greater, Radii Less than 25' Adjacent Curb and Gutter May Be Curved
- Variable Height Curb Top Elevation Matches Top of Sidewalk Elevation
- 6" Wide Variable Height Curb (VHC) Extended to TCR
- Detectable Warning Surface Per Plans
- Back of Curb at Ramp (BCR) Opening
- Turn of Curb Ramp (TCR)

**PLAN VIEW** (Without Curb Transition) N.T.S.

- 1/2" Preformed Expansion Joint Filler Sealed with Low Modulus Silicone Sealant or Hot Poured Elastic Joint Sealer
- No. 4 Rebar 1'-6" Length Drilled and Epoxied, TYP
- Rebar Placed at Center of Concrete Slab, TYP

Note:
Curb ramp style as per plans or as directed by the Engineer.

CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht. 61-2a

TYPE 1 PERPENDICULAR CURB RAMP
Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% and will not exceed 15’ in length unless stated otherwise in the plans.

The curb ramp length may be computed based on the intersection of a continuous 1.5% theoretical slope from theoretical top of curb (TTOC) with the curb ramp using a continuous 7.5% curb ramp slope. The elevation of point top of curb ramp (TCR) will always be higher than the elevation of point TTOC unless specified otherwise in the plans.

The cross slope of the ramp will not be steeper than 2%. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

** The slope in the turning space will not be steeper than 2% in any direction of pedestrian travel. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

*** The curb transition will be a minimum of 6’ long, a maximum of 10’ long, and the curb transition slope will not be steeper than 10% unless stated otherwise in the plans. The ramp flare adjacent to the curb transition shall not be steeper than 10%. The curb transition length will be adjusted as necessary to meet slope and length requirements based on field geometrics.
Notes:
1. For illustrative purpose only, PCC fillet sections are shown in the drawings. The curb ramp depicted on this standard plate may be used with a PCC fillet section or curb and gutter.
2. For illustrative purpose only, the curb ramp location is shown at the center of a PCC fillet section. The curb ramp will be placed at the location stated in the plans.
3. Care will be taken to ensure a uniform grade on the curb ramp, free of sags and short grade changes.
4. Surface texture of the curb ramp will be obtained by brooming transverse to the slope of the curb ramp.
5. Joints will be sawed or tooled into the concrete adjacent to the detectable warnings to alleviate possible corner cracking.
6. Care will be taken to ensure that the surface of the detectable warning surface is clean and maintains a uniform color.
7. There will be no separate payment for curb ramps. The curb ramp will be measured and paid for at the contract unit price per square foot for the corresponding concrete sidewalk contract item. The square foot area of concrete beneath the detectable warnings will be included in the measured and paid for quantity of sidewalk.
8. If rebar is placed in the turning space as depicted in detail E, the cost of the materials, labor, and equipment to furnish and install the rebar will be incidental to the contract unit price per square foot for the corresponding concrete sidewalk contract item.
9. The curb transitions and ramp opening will be measured and paid for at the contract unit price per foot for the corresponding curb and gutter contract item when curb and gutter is used. The curb transitions and ramp opening will be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section contract item when a PCC fillet section is used.
10. Detectable warning surface will be measured to the nearest square foot. All costs for furnishing and installing the detectable warning surface including labor, equipment, materials, and incidentals will be paid for at the contract unit price per square foot for "Detectable Warning".

ISOMETRIC VIEW
(Without Curb Transition)
The slope within the transition area will not be steeper than 5%. The concrete within the transition will be placed monolithic with the curb and gutter or fillet section concrete. The concrete thickness within the transition will be the same as the curb and gutter or fillet section concrete thickness.

The curb transition will be a minimum of 6' long, a maximum of 10' long, and the curb transition slope will not be steeper than 10% unless stated otherwise in the plans. The curb transition length will be adjusted as necessary to meet slope and length requirements based on field geometrics.

If Greater than 5', Detectable Warnings Will Be Placed per Detail D

Turning Space is 5'x5' Unless Stated Otherwise in the Plans, See Detail E, Sheet 2 of 3

### PLAN VIEW
(With 6'+ Curb Transition)

- **The slope within the transition area will not be steeper than 5%. The concrete within the transition will be placed monolithic with the curb and gutter or fillet section concrete. The concrete thickness within the transition will be the same as the curb and gutter or fillet section concrete thickness.**

- **The curb transition will be a minimum of 6' long, a maximum of 10' long, and the curb transition slope will not be steeper than 10% unless stated otherwise in the plans. The curb transition length will be adjusted as necessary to meet slope and length requirements based on field geometrics.**

### ALTERNATE DETECTABLE WARNING PANEL

- **This Shaded Area Is a Transition**
- **Ramp Slope Ends Along this Line**
- **1/2" Preformed Expansion Joint Filler**

---

**CITY OF RAPID CITY**
**PUBLIC WORKS DEPARTMENT**

**DATE: 8-19-22**

**TYPE 2 DIRECTIONAL CURB RAMP**

**Sec. - Shit. 61-3a**
Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% and will not exceed 15' in length unless stated otherwise in the plans.

The elevation of point TCR will always be higher than the elevation of point TTOC unless specified otherwise in the plans. The curb ramp length dimension as shown in the plans will be adjusted as necessary to meet all slope and length requirements based on field geometrics.

The cross slope of the ramp will not be steeper than 2%. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

The slope in the turning space will not be steeper than 2% in any direction of pedestrian travel. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

N.T.S.
Notes:
1. The curb ramp depicted on this Standard Detail may be used with a PCC fillet section or curb and gutter. The curb ramp will be placed at the location stated in the plans.
2. Surface texture of the curb ramp will be obtained by coarse brooming transverse to the slope of the curb ramp.
3. The normal gutter line profile will be maintained through the area of the ramp opening.
4. Joints will be sawed or tooled into the concrete adjacent to the detectable warnings to alleviate possible corner cracking.
5. Care will be taken to ensure that the surface of the detectable warnings are clean and maintains a uniform color.
6. The detectable warnings will be cut as necessary to fit the plan specified limits of the detectable warnings. Cost for cutting the detectable warnings will be incidental to the corresponding detectable warning contract item.
7. There will be no separate payment for curb ramps. The curb ramp will be measured and paid for at the contract unit price per square foot for the corresponding concrete sidewalk contract item. The square foot area of concrete beneath the detectable warnings will be included in the measured and paid for quantity of sidewalk.
8. If rebar is placed in the Turning Space as depicted in DETAIL E, the cost of the materials, labor, and equipment to furnish and install the rebar will be incidental to the contract unit price per square foot for the corresponding concrete sidewalk contract item.
9. The curb transitions and ramp opening will be measured and paid for at the contract unit price per foot for the corresponding curb and gutter contract item when curb and gutter is used. The curb transitions and ramp opening will be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section contract item when a PCC fillet section is used.
10. All costs for furnishing and installing the transition area at the base of the curb ramp will be incidental to the contract unit price per square foot for the corresponding curb and gutter contract item when curb and gutter is used and will be incidental to the contract unit price per square yard for the corresponding PCC fillet section contract item when a PCC fillet section is used.
11. The detectable warning surface will be measured to the nearest square foot. All costs for furnishing and installing the detectable warning surface including labor, equipment, materials, and incidentals will be paid for at the contract unit price per square foot for “Detectable Warning”.

ISOMETRIC VIEW
(Without Curb Transition)
PLAN VIEW
(With Curved Curb and Gutter)

PLAN VIEW
(With Straight Curb and Gutter)

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

N.T.S.

TYPE 3 PARALLEL CURB RAMP

Sec. - Sht.
61-4a
The curb transition slope will match the curb ramp slope. Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% at any location of the curb ramp and will not exceed 15' in length unless stated otherwise in the plans. The curb transitions and curb ramp lengths will be adjusted as necessary to meet all slope and length requirements based on field geometrics.

The cross slope of the ramp will not be steeper than 2% and the ramp width is 5' unless stated otherwise in the plans.

Plans are designed using a 1.5% cross slope for the ramp unless stated otherwise in the plans.

The curb height will be 6'' unless stated otherwise in the plans.

The curb transition slope will match the curb ramp slope. Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% at any location of the curb ramp and will not exceed 15' in length unless stated otherwise in the plans. The curb transitions and curb ramp lengths will be adjusted as necessary to meet all slope and length requirements based on field geometrics.

The cross slope of the ramp will not be steeper than 2% and the ramp width is 5' unless stated otherwise in the plans.

Plans are designed using a 1.5% cross slope for the ramp unless stated otherwise in the plans.

The curb height will be 6'' unless stated otherwise in the plans.

The curb transition slope will match the curb ramp slope. Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% at any location of the curb ramp and will not exceed 15' in length unless stated otherwise in the plans. The curb transitions and curb ramp lengths will be adjusted as necessary to meet all slope and length requirements based on field geometrics.

The cross slope of the ramp will not be steeper than 2% and the ramp width is 5' unless stated otherwise in the plans.

Plans are designed using a 1.5% cross slope for the ramp unless stated otherwise in the plans.

The curb height will be 6'' unless stated otherwise in the plans.
Notes:
1. For illustrative purpose only, a PCC fillet section is shown in one of the drawings. The curb ramp depicted on this standard plate may be used with a PCC fillet section or with curb and gutter.
2. The curb ramp will be placed at the location stated in the plans.
3. Sidewalk adjacent to the curb ramp will be as shown in the plans.
4. Care will be taken to ensure a uniform grade on the curb ramp, free of sags and short grade changes.
5. Surface texture of the curb ramp will be obtained by coarse brooming transverse to the slope of the curb ramp.
6. The normal gutter line profile will be maintained through the area of the ramp opening.
7. Joints will be sawed or tooled into the concrete adjacent to the detectable warnings to alleviate possible corner cracking.
8. Care will be taken to ensure that the surface of the detectable warnings are clean and maintains a uniform color.
9. The detectable warnings will be cut as necessary to fit the plan specified limits of the detectable warnings. Cost for cutting the detectable warnings will be incidental to the corresponding detectable warning contract item.
10. There will be no separate payment for curb ramps. The curb ramp will be measured and paid for at the contract unit price per square foot for the corresponding concrete sidewalk contract item. The square foot area of the detectable warnings and the curb along the short radius will be included in the measured and paid for quantity of sidewalk.
11. The curb transitions and ramp opening will be measured and paid for at the contract unit price per foot for the corresponding curb and gutter contract item when curb and gutter is used. The curb transitions and ramp opening will be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section contract item when a PCC fillet section is used.
12. Detectable warning surface will be measured to the nearest square foot. All costs for furnishing and installing the detectable warning surface including labor, equipment, materials, and incidentals will be paid for at the contract unit price per square foot for "Detectable Warning".

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

TYPE 3 PARALLEL CURB RAMP

Sec. - Sht. 61-4c
**Type "C" Retaining Wall**

**Plan View**

- **New Driveway**
- **Type "C" Retaining Wall**
- **Sidewalk**
- **Clean Rock, 6" Minimum, Type 1 Bedding**
- **3/4" Chamfer**
- **No. 4 Bent Rebar Spaced 9" OC**
- **No. 4 Rebar Spaced 15" OC**
- **Class 2 Nonwoven Separator Fabric**
- **Joints See Notes**
- **3/4" Chamfer**
- **No. 4 Bent Rebar Spaced 9" OC**
- **No. 4 Rebar Spaced 15" OC**
- **Class 2 Nonwoven Separator Fabric**

**Sections**

**Section A-A**

- **W=Variable Width**
- **5' Minimum**
- **6"**
- **3/4" Chamfer**
- **Clean Rock, 6" Minimum, Type 1 Bedding**
- **Class 2 Nonwoven Separator Fabric**
- **No. 4 Bent Rebar Spaced 9" OC**
- **No. 4 Rebar Spaced 15" OC**
- **See Detail A Page 61-1b**
- **1/4" Per ft**

- **2" Cushion, TYP**
- **4" Underdrain**

**Section B-B**

- **W=5'**
- **6"**
- **3/4" Chamfer**
- **Clean Rock, 6" Minimum, Type 1 Bedding**
- **Class 2 Nonwoven Separator Fabric**
- **No. 4 Bent Rebar Spaced 9" OC**
- **No. 4 Rebar Spaced 15" OC**
- **See Detail A Sheet 61-1b**

- **2" Cushion, TYP**
- **4" Underdrain**

**Section C-C**

- **Type C Concrete Retaining Wall**
- **3:1 MAX Taper**
- **1/2" Preformed Expansion Joint Filler**
- **6" Minimum Sidewalk**
- **6" Minimum Sidewalk**
- **4" MIN**

**Notes**

- **N.T.S.**
TYPE "C" RETAINING WALL

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht. 61-5b
Notes:
1. The Type C concrete retaining wall will be placed as per detailed plans.
2. The sidewalk width of the Type C concrete retaining wall will not be narrower than 5'. See plans for specified width.
3. A 2-inch thickness of cushion material will be placed and compacted beneath the Type C retaining wall. The cushion material will conform to the Standard Specifications, Section 117.
4. All concrete will be class M6 and conform to the Standard Specifications, Section 56.
5. All reinforcing steel will be epoxy coated and will conform to ASTM A615, grade 60. The smooth bar may conform to ASTM A615, grade 40. The epoxy coating will conform to ASTM A775.
6. All steel shall be placed 2" from the back and bottom of the retaining wall and slab.
7. The top horizontal bar shall be placed 3" from the top of wall.
8. For variable height walls, the top horizontal bar will be placed parallel to the top of the wall.
9. Horizontal bars shall be overlapped a minimum of 12" at each splice.
10. A 3/4-inch chamfer will be provided on all exposed retaining wall edges.
11. The maximum expansion joint spacing will be 90' and the maximum contraction joint spacing will be 30' or as detailed in the plans. The contraction and expansion joints will be placed to match curb joints or sidewalk.
12. The exposed retaining wall surfaces will receive a rubbed finish in accordance with the Standard Specifications, Section 55, unless otherwise specified in the plans. The exposed surface of the retaining wall footing, when used as a sidewalk, will receive a broom finish.

Note:
All reinforcement steel shall be No. 4 rebar epoxy coated. No splices shall be allowed for transverse bars.
REINFORCED CONCRETE SIDEWALK ADJACENT TO PRECAST CONCRETE TYPE S DROP INLET LID

PLAN VIEW
(Curbside Reinforced Concrete Sidewalk)

PLAN VIEW
(Reinforced Concrete Sidewalk With Boulevard)

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

Sec. - Sht. 61-6a
REINFORCED CONCRETE SIDEWALK ADJACENT TO PRECAST CONCRETE TYPE S DROP INLET LID

**Notes:**

1. The precast concrete Type S lids shown are 4'x11' for illustrative purpose.
2. The cross slope of the sidewalk and precast concrete Type S drop inlet lid will be as specified elsewhere in the plans, but no greater than 2% across the pedestrian access route.
3. All rebar shall be ASTM A615 grade 60, epoxy coated per ASTM A775 and conform with the Standard Specifications, Section 57 and 123.
4. When lapping of reinforcing steel is necessary, the No. 3 rebar will be lapped 12".
5. The reinforced concrete sidewalk will conform to the requirements of the Standard Specifications, Section 61.
6. Reinforced concrete sidewalk adjacent to precast concrete Type S drop inlets shall be incidental to the contract unit price for "Sidewalk".

DATE: 8-19-22

CITY OF RAPID CITY                                    PUBLIC WORKS DEPARTMENT

REINFORCED CONCRETE SIDEWALK ADJACENT TO PRECAST CONCRETE TYPE S DROP INLET LID
CITY OF RAPID CITY                                               PUBLIC WORKS DEPARTMENT

SIDEWALK BRIDGE

DATE: 8-19-22
Sec. - Sht. 61-7
**Specifications:**

**Notes:**
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 18” entering perpendicular on the 2’ wide side and shall not exceed 24” (24” for R.C. arch pipe) on the 3’ wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12” with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 1 1/2” clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10’.

**ESTIMATED QUANTITIES**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Constant Quantity</th>
<th>Variable Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class M6 Concrete</td>
<td>Cu. Yd.</td>
<td>0.26</td>
<td>0.22H</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>Lb.</td>
<td>83.03</td>
<td>28.97H</td>
</tr>
<tr>
<td>Frame and Grate Assembly</td>
<td>Each</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**DROP INLETS FOR 12’’ TO 24’’ DIAMETER PIPE**

**PIPE DISPLACEMENT REDUCTIONS**

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>15</td>
<td>2 1/4</td>
<td>0.04</td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>R.C. Arch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
</tr>
<tr>
<td>24</td>
<td>3 1/2</td>
<td>0.09</td>
</tr>
</tbody>
</table>

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.
62-1a

2’ x 3’ TYPE B
REINFORCED CONCRETE DROP INLET
2' x 3' TYPE B
REINFORCED CONCRETE DROP INLET

Note:
All dimensions are out to out of bars.
DROP INLETS FOR 12" TO 36" DIAMETER PIPE

Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 24" (24" for R. C. arch pipe) on the 3' wide side and shall not exceed 36" (30" for R.C. arch pipe) on the 4' wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12" with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 2 1/2" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

3' x 4' TYPE B
REINFORCED CONCRETE DROP INLET

DATE: 8-19-22
Sec. - Sht. 62-2a
3' x 4' TYPE B
REINFORCED CONCRETE DROP INLET

Note:
All dimensions are out to out of bars.

**REINFORCING SCHEDULE**

<table>
<thead>
<tr>
<th>Mk.</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67H</td>
<td>4</td>
<td>10'-0&quot;</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>7</td>
<td>4</td>
<td>7'-6&quot;</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>7</td>
<td>4</td>
<td>6'-6&quot;</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>28</td>
<td>4</td>
<td>H + 9&quot;</td>
<td>517</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>28</td>
<td>4</td>
<td>2'-3&quot;</td>
<td>519</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>2</td>
<td>4</td>
<td>7'-0&quot;</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

Note: All dimensions are out to out of bars.

**DETAIL "X"**

**SECTION A - A**

**SECTION B - B**

**N.T.S.**
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 24" (24" for R. C. arch pipe) on the 3' wide side and shall not exceed 54" (42" for R.C. arch pipe) on the 5.5' wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars and e bars shall be lapped 12" with the c and b bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 2" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 62-3a

3' x 5.5' TYPE B
REINFORCED CONCRETE DROP INLET
REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk.</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67H</td>
<td>4</td>
<td>11'-6&quot;</td>
<td>17</td>
</tr>
<tr>
<td>b</td>
<td>8</td>
<td>4</td>
<td>9'-0&quot;</td>
<td>17</td>
</tr>
<tr>
<td>c</td>
<td>8</td>
<td>4</td>
<td>6'-6&quot;</td>
<td>17</td>
</tr>
<tr>
<td>d</td>
<td>8</td>
<td>4</td>
<td>H + 9&quot;</td>
<td>S17</td>
</tr>
<tr>
<td>e</td>
<td>8</td>
<td>4</td>
<td>H + 18&quot;</td>
<td>S17</td>
</tr>
<tr>
<td>f</td>
<td>8</td>
<td>4</td>
<td>2'-3&quot;</td>
<td>S19</td>
</tr>
<tr>
<td>g</td>
<td>2</td>
<td>4</td>
<td>7'-0&quot;</td>
<td>S19</td>
</tr>
</tbody>
</table>

Bending Details

- Maximum "H" is 10'-0"
- Maximum "H + 9" is 10'-0"
- Maximum "H + 18" is 10'-0"

Note:
- All dimensions are out to out of bars.

SECTION A - A

SECTION B - B

DETAIL "X"

DETAIL "Y"

3' x 5.5' TYPE B
REINFORCED CONCRETE DROP INLET

DATE: 8-19-22

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
Specifications:

Notes:
1. Design Live Load: H-L-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 36" (30" for R. C. arch pipe) on the 4' wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars and e bars shall be lapped 12" with the c and b bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 1 1/2" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.

N.T.S.
4' x 4' TYPE B
REINFORCED CONCRETE DROP INLET
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 54" (42" for R.C. arch pipe) on the 5.5' wide side and shall not exceed 24" (24" for R.C. arch pipe) on the 3' wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars and e bars shall be lapped 12" with the c and b bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 2" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.

DROPN INLETS FOR 12" TO 54" DIAMETER PIPE

PIPE DISPLACEMENT REDUCTIONS

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>15</td>
<td>2 1/4</td>
<td>0.04</td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>30</td>
<td>3 1/2</td>
<td>0.14</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>0.20</td>
</tr>
<tr>
<td>42</td>
<td>4 1/2</td>
<td>0.26</td>
</tr>
<tr>
<td>48</td>
<td>5</td>
<td>0.34</td>
</tr>
<tr>
<td>54</td>
<td>5 1/2</td>
<td>0.43</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>0.50</td>
</tr>
</tbody>
</table>

5.5' x 3' TYPE B
REINFORCED CONCRETE DROP INLET

N.T.S.
5.5' x 3' TYPE B
REINFORCED CONCRETE DROP INLET

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>No.</th>
<th>Size (in)</th>
<th>Length (ft)</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67H</td>
<td>11'-6''</td>
<td>17</td>
<td>Str.</td>
</tr>
<tr>
<td>b</td>
<td>8</td>
<td>9'-0''</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>8</td>
<td>6'-6''</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>16</td>
<td>H-2''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>16</td>
<td>H+24''</td>
<td>S17</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>16</td>
<td>3'-6''</td>
<td>S19</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>2</td>
<td>7'-0''</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

Note:
All dimensions are out to out of bars.

DATE: 8-19-22

CITY OF RAPID CITY                                               PUBLIC WORKS DEPARTMENT
Sec. - Sht. 62-5b
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 54" (42" for R. C. arch pipe) of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The c bars shall be lapped 12" with the b bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 2 1/2" clear cover on all reinforcing steel unless otherwise noted.
8. Apply a thin layer of grout between the inlet walls and the cover to ensure uniform bearing.
9. The dimension of H is in feet. Maximum H is 10'.

N.T.S.

5.5' x 5.5' TYPE B
REINFORCED CONCRETE DROP INLET
5.5' x 5.5' TYPE B
REINFORCED CONCRETE DROP INLET
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 24" (24" for R.C. arch pipe) on the 3' wide side and shall not exceed 36" (30" for R.C. arch pipe) on the 4' wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars and e bars shall be lapped 12" with the c and b bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 1 1/2" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.

DATE: 8-19-22

4' x 3' TYPE B
REINFORCED CONCRETE DROP INLET
REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67''H</td>
<td>4</td>
<td>10'-0''</td>
<td>17</td>
</tr>
<tr>
<td>b</td>
<td>7</td>
<td>4</td>
<td>7'-6''</td>
<td>17</td>
</tr>
<tr>
<td>c</td>
<td>9</td>
<td>4</td>
<td>6'-6''</td>
<td>17</td>
</tr>
<tr>
<td>d</td>
<td>18</td>
<td>4</td>
<td>H-2''</td>
<td>Str.</td>
</tr>
<tr>
<td>e</td>
<td>14</td>
<td>4</td>
<td>H + 15''</td>
<td>S17</td>
</tr>
<tr>
<td>f</td>
<td>14</td>
<td>4</td>
<td>2'-6''</td>
<td>S19</td>
</tr>
<tr>
<td>g</td>
<td>2</td>
<td>4</td>
<td>6'-9''</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: All dimensions are out to out of bars.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.
62-7b

4' x 3' TYPE B
REINFORCED CONCRETE DROP INLET
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 24" (24" for R. C. arch pipe) on the 3’ wide side and shall not exceed 36" (30” for R.C. arch pipe) on the 4’ wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12” with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 2 1/2” clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10 feet.

N.T.S.

3' x 4' TYPE C
REINFORCED CONCRETE DROP INLET
**REINFORCING SCHEDULE**

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67H</td>
<td>4</td>
<td>10' - 0''</td>
<td>17</td>
</tr>
<tr>
<td>b</td>
<td>7</td>
<td>5</td>
<td>7' - 3''</td>
<td>17</td>
</tr>
<tr>
<td>c</td>
<td>10</td>
<td>4</td>
<td>6' - 3''</td>
<td>17</td>
</tr>
<tr>
<td>d</td>
<td>34</td>
<td>4</td>
<td>H - 2''</td>
<td>2.67H</td>
</tr>
</tbody>
</table>

Note:
All dimensions are out to out of bars.

---

**N.T.S.**

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht. 62-8b

**3' x 4' TYPE C**

**REINFORCED CONCRETE DROP INLET**

---

**SEC. - SHT.**

62-8b
**Specifications:**

**Notes:**
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Inlet may be precast. If precast inlet is used, and details differ from that shown, the precast inlet shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners and must fit between the inside face of walls.
5. Maximum R.C. pipe diameter shall not exceed 36" (30" for R. C. arch pipe) on the 4' wide side of the drop inlet and shall not exceed 48" (36" for R. C. arch pipe) on the 5' wide side of the drop inlet.
6. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12" with the b and c bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
7. Use minimum 2 1/4" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.

**DATE: 8-19-22**

**N.T.S.**
REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk.</th>
<th>No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67H</td>
<td>4</td>
<td>12' - 0''</td>
<td>17</td>
</tr>
<tr>
<td>b</td>
<td>9</td>
<td>4</td>
<td>8' - 6''</td>
<td>17</td>
</tr>
<tr>
<td>c</td>
<td>9</td>
<td>4</td>
<td>7' - 6''</td>
<td>17</td>
</tr>
<tr>
<td>d</td>
<td>36</td>
<td>4</td>
<td>H+ 9''</td>
<td>S17</td>
</tr>
<tr>
<td>e</td>
<td>36</td>
<td>4</td>
<td>2' - 3''</td>
<td>S19</td>
</tr>
<tr>
<td>f</td>
<td>2</td>
<td>4</td>
<td>9' - 0''</td>
<td>17</td>
</tr>
</tbody>
</table>

Note: All dimensions are to the center of bars.

4' x 5' TYPE C
REINFORCED CONCRETE DROP INLET
Specifications:

Notes:
1. The dimension H is in feet.
3. Cut and bend reinforcing steel during construction as necessary to accommodate pipe outlet. All reinforcing steel shall conform to ASTM A615 grade 60.
4. All Concrete shall be Class M6.
5. All angles shall conform to ASTM A36. Tubes shall conform to ASTM A500 grade B.
6. All exposed edges shall be chamfered 3/4".
7. Use 1 1/2" clear cover on all reinforcing steel except as shown.
8. After welding is complete, galvanize the frame and grate assembly in accordance with AASHTO M111 (ASTM A123). For information only, the estimated weight of the frame and grate assembly is 338 pounds.
9. Type L Median Drain shall be paid for at the contract unit price per each, which shall be full compensation for furnishing all materials and labor including casting, concrete collars for pipe connections, and necessary excavation and backfill required to construct one complete drain.
9. The location and size of pipe outlet from the drain shall be as noted on plan sheets. All pipes entering the structure shall leave a minimum 3" wall on each side of the pipe penetration.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

TYPE L MEDIAN DRAIN
FOR 6:1 INSLOPE
**TYPE L MEDIAN DRAIN FOR 6:1 INSLOPE**

*Note: All dimensions are out to out of bars.*

**REINFORCING SCHEDULE**

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>6</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>a1</td>
<td>2</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>a2</td>
<td>2</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>a3</td>
<td>2</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>a4</td>
<td>2</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>a5</td>
<td>2</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>a6</td>
<td>6</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>c</td>
<td>19</td>
<td>4</td>
<td>Str.</td>
</tr>
<tr>
<td>d</td>
<td>2</td>
<td>4</td>
<td>Str.</td>
</tr>
</tbody>
</table>

Maximum H is 4' - 0''

Station and Offset, Referred to in Plans, See Detail Sheet A

This point is intersection of inslope and ditch bottom. Elevation is equal to ditch flow line elevation at location noted on plans.

**SECTION A - A**

- 3'' x 3'' x 3/8'' x 4' - 6''
- 3'' x 3'' x 1/4'' x 2'' - 11 1/2''

**SECTION B - B**

- 3'' x 3'' x 3/8'' x 4' - 6''
- 3 1/2'' x 3 1/2'' x 1/4'' x 2' - 11 1/2''

**SECTION C - C**

- HSS 3'' x 3'' x 3/8'' x 4' - 6''
- 3'' x 3'' x 1/4'' x 2'' - 11 1/2''

**SECTION D - D**

- HSS 3'' x 3'' x 3/8'' x 4' - 6''
- 3 1/2'' x 3 1/2'' x 1/4'' x 2' - 11 1/2''

**DATE:** 8-19-22  
**CITY OF RAPID CITY PUBLIC WORKS DEPARTMENT DATE:** 8-19-22  
**Sec. - Sht. 62-10b**
Specifications:

Notes:
1. The dimension H is in feet.
3. Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E., prior SDDOT approval, and shop plans to the Public Works Director for approval.
4. Cut and bend reinforcing steel during construction as necessary to accommodate pipe outlet. All reinforcing steel shall conform to ASTM A615 grade 60.
5. All Concrete shall be Class M6.
6. All angles shall conform to ASTM A36. Tubes shall conform to ASTM A500 grade B.
7. All exposed edges shall be chamfered 3/4".
8. Use 1 1/2" clear cover on all reinforcing steel except as shown.
9. After welding is complete, galvanize the frame and grate assembly in accordance with AASHTO M111 (ASTM A123). For information only, the estimated weight of the frame and grate assembly is 338 pounds.
10. Type L Median Drain shall be paid for at the contract unit price per each, which shall be full compensation for furnishing all materials and labor including casting, concrete collars for pipe connections, and necessary excavation and backfill required to construct one complete drain.
11. The location and size of pipe outlet from the drain shall be as noted on plan sheets. All pipes entering the structure shall leave a minimum 3" wall on each side of the pipe penetration.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 62-11a

TYPE L MEDIAN DRAIN
FOR 4:1 INSLOPE

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Constant Quantity</th>
<th>Variable Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class M6 Concrete</td>
<td>Cu.Yd.</td>
<td>0.35</td>
<td>0.24 H</td>
</tr>
<tr>
<td>Reinforcing Steel†</td>
<td>Lb.</td>
<td>87.51</td>
<td>12.02 H</td>
</tr>
<tr>
<td>Type L Frame and Grate Assembly</td>
<td>Each</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIPE DISPLACEMENT REDUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (Inches)</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>R.C. Arch. R.C.P.</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>24</td>
</tr>
</tbody>
</table>
TYPE L MEDIAN DRAIN FOR 4:1 INSLOPE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>6</td>
<td>4</td>
<td>H + 2'' Str.</td>
</tr>
<tr>
<td>a1</td>
<td>2</td>
<td>4</td>
<td>H + 5'' Str.</td>
</tr>
<tr>
<td>a2</td>
<td>2</td>
<td>4</td>
<td>H + 7'' Str.</td>
</tr>
<tr>
<td>a3</td>
<td>2</td>
<td>4</td>
<td>H + 9'' Str.</td>
</tr>
<tr>
<td>a4</td>
<td>6</td>
<td>4</td>
<td>H + 11'' Str.</td>
</tr>
<tr>
<td>b</td>
<td>18</td>
<td>4</td>
<td>3'' - 3'' Str.</td>
</tr>
<tr>
<td>c</td>
<td>16</td>
<td>4</td>
<td>3'' - 3'' Str.</td>
</tr>
<tr>
<td>d</td>
<td>2</td>
<td>4</td>
<td>1'' - 0'' Str.</td>
</tr>
</tbody>
</table>

Note: All dimensions are out to out of bars.

Maximum H is 4' - 0''

Weld #3 x 0' - 10'' Rebar to Angle

Station and Offset, Referred to in Plans, See Detail Sheet A

This point is the intersection of inslope and ditch bottom. Elevation is equal to ditch flow line elevation at location noted on plans.

N.T.S.
Specifications:

Notes:
2. Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12" with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.
3. Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E., prior SDDOT approval, and shop plans to the Public Works Director for approval.
4. Median drain shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering median drain must fit between the inside face of walls and shall not enter through the corners.
5. Structural steel for angles and plates shall conform to ASTM A36. Structural steel for rectangular HSS shall conform to ASTM A500 grade B. For informational purpose, the approximate weight of the frame is 104 pounds and the approximate weight of the grate is 254 pounds.
6. Maximum R.C. pipe diameter shall not exceed 30" (18" R. C. arch pipe) on the 3'-6" wide side and shall not exceed 42" (36" for R. C. arch pipe) on the 5'-6" wide side of the median drain.
7. The dimension of H is in feet. Maximum H is 4'.

Estimated Quantities

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>CONSTANT QUANTITY</th>
<th>VARIABLE QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class M6 Concrete</td>
<td>Cu. Yd.</td>
<td>0.59</td>
<td>0.30H</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>Lb.</td>
<td>72.01</td>
<td>33.87H</td>
</tr>
<tr>
<td>Type M Frame and Grate Assembly</td>
<td>Each</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 62-12a
REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2.67H</td>
<td>4</td>
<td>10' - 0&quot;</td>
<td>Type 17</td>
</tr>
<tr>
<td>b</td>
<td>5</td>
<td>5</td>
<td>7' - 6&quot;</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>8</td>
<td>4</td>
<td>5' - 9&quot;</td>
<td></td>
</tr>
<tr>
<td>d1</td>
<td>14</td>
<td>4</td>
<td>H + 3&quot;</td>
<td>Str.</td>
</tr>
<tr>
<td>d2</td>
<td>8</td>
<td>4</td>
<td>H</td>
<td>Str.</td>
</tr>
</tbody>
</table>

Note:
All dimensions are out to out of bars.

N.T.S.

CITY OF RAPID CITY  
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.  
62-12b

TYPE M MEDIAN DRAIN
TYPE M MEDIAN DRAIN
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Base is intended for use with a Precast Concrete Type S Drop Inlet Lid, Standard Detail 62-13c. Base may be precast. If precast base used, and details differ from that shown, the precast base shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 36" (30" for R.C. arch pipe) entering perpendicular on the 4' wide side and shall not exceed 54" (48" for R.C. arch pipe) entering perpendicular on the 6' wide side of the Drop Inlet. Pipes entering the structure at an angle shall leave a minimum 3" wall on each side of the pipe penetration on the 4' wide side, and shall leave a minimum 4 1/2" wall on each side of the pipe penetration on the 6' wide side.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through the inlet wall.
7. Use 1" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 8'.
9. All costs associated with furnishing and installing the precast concrete Type S drop inlet lid and base including the Type S manhole frame and lid, shims, inserts, dowels and concrete collars for pipe connections shall be included in the contract unit price per each for "4' x 6' Concrete Type S Drop Inlet".

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht. 62-13a

4' X 6' TYPE S DROP INLET BASE
PIPE DISPLACEMENT REDUCTIONS

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>15</td>
<td>2 1/4</td>
<td>0.04</td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>30</td>
<td>3 1/2</td>
<td>0.14</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>0.20</td>
</tr>
<tr>
<td>42</td>
<td>4 1/2</td>
<td>0.26</td>
</tr>
<tr>
<td>48</td>
<td>5</td>
<td>0.34</td>
</tr>
<tr>
<td>54</td>
<td>5 1/2</td>
<td>0.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R.C. Arch</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>36</td>
</tr>
<tr>
<td>42</td>
</tr>
<tr>
<td>48</td>
</tr>
</tbody>
</table>

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>14</td>
<td>5</td>
<td>9' - 6&quot;</td>
<td>17</td>
</tr>
<tr>
<td>b</td>
<td>10</td>
<td>5</td>
<td>11' - 6&quot;</td>
<td>17</td>
</tr>
<tr>
<td>c</td>
<td>2H</td>
<td>4</td>
<td>5' - 6&quot;</td>
<td>17</td>
</tr>
<tr>
<td>d</td>
<td>2H</td>
<td>4</td>
<td>7' - 6&quot;</td>
<td>17</td>
</tr>
<tr>
<td>e</td>
<td>44</td>
<td>4</td>
<td>H - 2'</td>
<td>Str.</td>
</tr>
</tbody>
</table>

Note:
All dimensions are out to out of bars.

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Constant Quantity</th>
<th>Variable Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class M6 Concrete</td>
<td>Cu.Yd.</td>
<td>0.97</td>
<td>0.41H</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>Lb.</td>
<td>253.77</td>
<td>46.76H</td>
</tr>
</tbody>
</table>

SECTION A - A

F.L. Elev. 9"

SECTION B - B

Floor Elevation, See Plans

Top of Wall Elevation, See Plans

N.T.S.

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
Sec. - Sht. 62-13b
Notes:
1. The Precast Concrete Type S Drop Inlet Lid and the shims shall be on the current approved list available through proper channels from the SDDOT Office of Bridge Design. To qualify for addition to the approved list, submit a checked design, done by South Dakota Registered Professional Engineers, and shop plans to the Office of Bridge Design for approval. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
2. Design Live Load shall be HL-93.
3. Concrete mix shall be as per fabricators design, however, minimum compressive strength shall not be less than 4500 psi. Type II Cement is required.
4. The Type S Manhole Frame and Lid shall conform to AASHTO M105, Class 30.
5. Structural Steel shall conform to ASTM A36. The 3/4" diameter Headed Type A Steel Studs shall conform to Section 7 of the current edition of AWS D1.1 Structural Steel Welding Code.
6. The 3/4" diameter Concrete Inserts shall be galvanized or made of a corrosion resistant material. Provide 3/4" diameter x 1" - 6" long dowels conforming to ASTM A615, grade 60 threaded to fit inserts with each lid.
7. All costs associated with furnishing and installing the Precast Concrete Type S Drop Inlet lid and base including the Type S manhole frame, shims, inserts, and dowels shall be included in the contract unit price per each for "4' x 6' Concrete Type S Drop Inlet".

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht.
62-13c

4' X 6' PRECAST CONCRETE TYPE S DROP INLET LID
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Base is intended for use with a Precast Concrete Type S Drop Inlet Lid, Standard Detail 62-14c. Base may be precast. If precast base used, and details differ from that shown, the precast base shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 36" (30" for R.C. arch pipe) entering perpendicular on the 4' wide side. Pipes entering the structure at an angle shall leave a minimum 3" wall on each side of the pipe penetration on the 4' wide side, and shall leave a minimum 4 1/2" wall on each side of the pipe penetration on the 6' wide side.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through the inlet wall.
7. Use 1" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 8'.
9. All costs associated with furnishing and installing the precast concrete Type S drop inlet lid and base including the type S manhole frame and lid, shims, inserts, dowels and concrete collars for pipe connections shall be included in the contract unit price per each for "4' x 11' Concrete Type S Drop Inlet".

N.T.S.
PIPE DISPLACEMENT REDUCTIONS

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>15</td>
<td>2 1/4</td>
<td>0.04</td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>30</td>
<td>3 1/2</td>
<td>0.14</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>0.20</td>
</tr>
<tr>
<td>42</td>
<td>4 1/2</td>
<td>0.26</td>
</tr>
<tr>
<td>48</td>
<td>5</td>
<td>0.34</td>
</tr>
<tr>
<td>54</td>
<td>5 1/2</td>
<td>0.43</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>0.52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R.C. Arch</th>
<th>18</th>
<th>2 1/2</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>3 1/2</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>4</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>4 1/2</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>4 1/2</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>5</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>5 1/2</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>6</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>7</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>84</td>
<td>8</td>
<td>0.93</td>
</tr>
</tbody>
</table>

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>24</td>
<td>5</td>
<td>9' - 6&quot; 17</td>
</tr>
<tr>
<td>b</td>
<td>10</td>
<td>5</td>
<td>10' - 6&quot; 17</td>
</tr>
<tr>
<td>c</td>
<td>2H</td>
<td>4</td>
<td>5' - 6&quot; 17</td>
</tr>
<tr>
<td>d</td>
<td>2H</td>
<td>4</td>
<td>12' - 6&quot; 17</td>
</tr>
<tr>
<td>e</td>
<td>64</td>
<td>4</td>
<td>H - 2&quot; Str.</td>
</tr>
</tbody>
</table>

Bending Details

- 11' - 8"
- 4" - 8"
- 11' - 10"
- 4" - 10"

Note: All dimensions are out to out of bars.

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Constant Quantity</th>
<th>Variable Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class M6 Concrete</td>
<td>Cu. Yd.</td>
<td>1.67</td>
<td>0.59H</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>Lb.</td>
<td>402.77</td>
<td>66.80H</td>
</tr>
</tbody>
</table>

ESTIMATED QUANTITIES

SECTION A - A

- a - 23 Spaces @ 6" = 11'-6"
- b - 9 Spaces @ 6" = 4'-6"

SECTION B - B

- 1" CI, TYP
- 3' - 0"
- 5' - 0"
- 3" - 0"

- Floor Elevation, See Plans

- Top of Wall Elevation, See Plans

- a - 23 Spaces @ 6" = 11'-6"
- b - 9 Spaces @ 6" = 4'-6"

N.T.S.
Notes:
1. The Precast Concrete Type S Drop Inlet Lid shall be manufactured by a precast facility that is approved to supply precast structures to the SDDOT. Shims shall be on the SDDOT approved products list.
2. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
3. Design Live Load shall be HL - 93.
4. Concrete mix shall be as per fabricator's design, however, minimum compressive strength shall not be less than 4500 psi. Type II Cement is required.
5. The Type S Manhole Frame and Lid shall conform to AASHTO M105, Class 30.
6. Structural Steel shall conform to ASTM A36. The 3/4" diameter Headed Type A Steel Studs shall conform to Section 7 of the current edition of AWS D1.1 Structural Steel Welding Code.
7. The 3/4" diameter Concrete Inserts shall be galvanized or made of a corrosion resistant material. Provide 3/4" diameter x 1' - 6" long dowels conforming to ASTM A615, grade 60 threaded to fit Inserts with each lid.
8. All costs associated with furnishing and installing the precast concrete Type S drop inlet lid and base including the Type S manhole frame, shims, inserts, dowels and concrete collars for pipe connections shall be included in the contract unit price per each for "4' x 11' Concrete Type S Drop inlet".

N.T.S.
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Base is intended for use with a Precast Concrete Type S Drop Inlet Lid, Standard Detail 62-14c. Base may be precast. If precast base used, and details differ from that shown, the precast base shall receive prior approval by the City.
3. To qualify for alternate design approval, submit: prior SDDOT approval, checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C. pipe diameter shall not exceed 66" (54" for R.C. arch pipe) on the 7' wide side of the Drop Inlet. Pipes entering the structure at an angle shall leave a minimum 3" wall on each side of the pipe penetration on the 7' wide side, and shall leave a minimum 4½" wall on each side of the pipe penetration on the 11' wide side.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through the inlet wall.
7. Use 1" clear cover on all reinforcing steel unless otherwise noted.
8. The dimension of H is in feet. Maximum H is 10'.
9. All costs associated with furnishing and installing the precast concrete Type S drop inlet lid and base including the type S manhole frame and lid, shims, inserts, dowels and concrete collars for pipe connections shall be included in the contract unit price per each for "7' x 11' Concrete Type S Drop Inlet".

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

7' X 11' TYPE S DROP INLET BASE
7' X 11' TYPE S DROP INLET BASE

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
Sec. - Sht. 62-15b
7' X 11' TYPE S DROP INLET BASE
REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>19 + 4H</td>
<td>11'-9&quot;</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>15 + 2H</td>
<td>7'-9&quot;</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>c1</td>
<td>2 + 2H</td>
<td>11'-10&quot;</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>c2</td>
<td>11</td>
<td>2'-10&quot;</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>g1</td>
<td>23</td>
<td>5</td>
<td>7'-9&quot;</td>
<td>Str.</td>
</tr>
<tr>
<td>h</td>
<td>46</td>
<td>5</td>
<td>H + 5&quot;</td>
<td>Str.</td>
</tr>
<tr>
<td>k</td>
<td>40</td>
<td>5</td>
<td>H + 5&quot;</td>
<td>Str.</td>
</tr>
<tr>
<td>q1</td>
<td>23</td>
<td>5</td>
<td>8'-6&quot;</td>
<td>17A</td>
</tr>
</tbody>
</table>

Note: All dimensions are out to out of bars

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Constant Quantity</th>
<th>Variable Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class M6 Concrete</td>
<td>Cu.Yd.</td>
<td>3.65</td>
<td>0.83H</td>
</tr>
<tr>
<td>Rebar</td>
<td>Lb.</td>
<td>1266</td>
<td>147.26H</td>
</tr>
</tbody>
</table>

PIPE DISPLACEMENT REDUCTIONS

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>15</td>
<td>2 1/2</td>
<td>0.04</td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.06</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.11</td>
</tr>
<tr>
<td>30</td>
<td>3 1/2</td>
<td>0.16</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>0.23</td>
</tr>
<tr>
<td>42</td>
<td>4 1/2</td>
<td>0.31</td>
</tr>
<tr>
<td>48</td>
<td>5</td>
<td>0.40</td>
</tr>
<tr>
<td>54</td>
<td>5 1/2</td>
<td>0.50</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>0.61</td>
</tr>
<tr>
<td>72</td>
<td>7</td>
<td>0.82</td>
</tr>
<tr>
<td>84</td>
<td>8</td>
<td>1.09</td>
</tr>
</tbody>
</table>

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 62-15d

7' X 11' TYPE S DROP INLET BASE
INSTALLATION DETAILS FOR
PRECAST CONCRETE TYPE S DROP INLET LID

CONCRETE GUTTER DETAIL

- Edge of Concrete Gutter: 1'-4"
- Pavement:
  - 2 - No. 5 Bar Installed Full Length of Inlet and Through the 3' Transition Area

GROUTING DETAIL

- Sidewalk as Shown Elsewhere in Plans
- Grout gap with same type of material as that used to connect the pipes to the drop inlets.

Other details include:
- Precast or Cast-in-Place Type S Reinforced Concrete Drop Inlet Base
- Precast Concrete Type S Drop Inlet Lid
- 3/4" Ø x 1' - 6" Long Dowels, TYP
- Backer Rod
- Dowel
- Sawcut and remove or shim as necessary to match top of lid to finish elevation. The type of shims provided shall be on the SDDOT approved products list.

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

INSTALLATION DETAILS FOR
PRECAST CONCRETE TYPE S DROP INLET LID

N.T.S.
(Sides and Back, Adjacent to Sidewalk)
Notes:
1. Dowels shall be used to anchor the precast concrete Type S drop inlet lid to the concrete gutter. See Standard Detail 62-16a or 60-7b as applicable.
2. If there is sidewalk adjacent, dowels shall be used to anchor the precast concrete Type S drop inlet lid to the sidewalk. If there is sidewalk adjacent to the drop inlet, the precast lid shall match the finish elevations and cross slopes of the sidewalk.
3. The sidewalk shall be steel reinforced when the sidewalk adjoins the precast lid. Refer to Standard Detail 61-6a and 61-6b for reinforced concrete sidewalk details.
Note:
Total weight of the assembly shall be 490 Lbs. minimum and the curb box shall be adjustable 6" to 9".

N.T.S.
Note:
Top of grate elevation shall be 0.04' below theoretical elevation of gutter.
Note: The total weight of the frame and grate shall be 850 pounds minimum.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 62-18

TYPE C FRAME AND GRATE
Notes:
The total weight of frame and grate shall be 810 pounds minimum. The Type E frame and grate is used typically with valley gutter.
For Type D Drop Inlets Only:
Use precast drop inlet collar with 2° Chamfer on L sides only.

Notes:
1. All reinforcing steel shall conform to ASTM A615, grade 60.
2. The 1/2" diameter bar shall lap 6" +/- and shall be centered in the concrete.
PRECAST STORM SEWER MANHOLE

Manhole Lid, Per Standard Specifications

Adjusting Rings as Necessary, See Section 9

Finished Grade

Grade

27"

12" Min.

Variable

Variable

Gasket, Per Plans or Standard Specifications

6'-0"

27"

Variable

N.T.S.
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. The dimension of H is in feet. Maximum H is 8'.
3. The design of the junction box is based on a minimum fill over the junction box of 2' and maximum fill over the junction box of 5'.
4. Junction box may be precast. If precast junction box is used, and details differ from shown, the precast junction box shall receive prior approval by the City. To qualify for alternate design approval, submit: a checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
5. All pipes entering junction box must fit between the inside face of walls and shall not enter through the corners.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through junction box wall.
7. Use 1" clear cover on all reinforcing steel unless otherwise noted.
## REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Mk. No.</th>
<th>Size</th>
<th>Length</th>
<th>Type</th>
<th>Bending Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
<td>6</td>
<td>9' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k3</td>
<td>48</td>
<td>8' - 6''</td>
<td>17</td>
<td>1'-9&quot; Type 17A</td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>52</td>
<td>4' - 0''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>8</td>
<td>4' - 3''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>two</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k4</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>52</td>
<td>4' - 0''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>8</td>
<td>4' - 3''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>three</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k5</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>52</td>
<td>4' - 0''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>8</td>
<td>3' - 6''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>four</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k6</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>60</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>12</td>
<td>3' - 6''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>five</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k7</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>60</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>12</td>
<td>3' - 6''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>six</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k8</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>60</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>12</td>
<td>3' - 6''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>seven</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k9</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>60</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>12</td>
<td>3' - 6''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>eight</td>
<td>1</td>
<td>6' - 0''</td>
<td>T3</td>
<td></td>
</tr>
<tr>
<td>k10</td>
<td>48</td>
<td>4' - 9''</td>
<td>17A</td>
<td></td>
</tr>
<tr>
<td>m1</td>
<td>18</td>
<td>6' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>n1</td>
<td>18</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>60</td>
<td>5' - 9''</td>
<td>Str.</td>
<td></td>
</tr>
<tr>
<td>q1</td>
<td>12</td>
<td>3' - 6''</td>
<td>17A</td>
<td></td>
</tr>
</tbody>
</table>

### LEGEND FOR PLACING RE-STEEL
- **T. B. S.** - Top of Bottom Slab
- **B. B. S.** - Bottom of Bottom Slab

**Type 17**
- Locate in center of top slab with 3'' clearance at manhole opening. All dimensions are out to out of bars.

### 5' x 5' JUNCTION BOX

- **N.T.S.**
- **SEC. A - A**

---

**CITY OF RAPID CITY**

**PUBLIC WORKS DEPARTMENT**

**DATE:** 8-19-22

**N.T.S.**

**Sec. - Sht. 63-2b**
LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
O. F. W. - Outside Face of Wall
I. F. W. - Inside Face of Wall

5' x 5' JUNCTION BOX

DATE: 8-19-22

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
Sec. - Sht. 63-2c
Specifications:

Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. The dimension of H is in feet. Maximum H is 8'.
3. The design of the junction box is based on a minimum fill over the junction box of 2' and maximum fill over the junction box of 5'.
4. Junction box may be precast. If precast junction box is used, and details differ from shown, the precast junction box shall receive prior approval by the City. To qualify for alternate design approval, submit: a checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
5. All pipes entering junction box must fit between the inside face of walls and shall not enter through the corners.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through junction box wall.
7. Use 1’ clear cover on all reinforcing steel unless otherwise noted.

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
<th>Reinforcing Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2 1/4</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>3 1/2</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>4 1/2</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>5</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>5 1/2</td>
<td>0.43</td>
<td></td>
</tr>
</tbody>
</table>

*Quantity shown includes reduction for a 24’ diameter manhole opening.

6' x 6' JUNCTION BOX
6' x 6' JUNCTION BOX

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
O. F. W. - Outside Face of Wall
I. F. W. - Inside Face of Wall

N.T.S.
### Specifications:

### Notes:
1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. The dimension of H is in feet. Maximum H is 8’.
3. The design of the junction box is based on a minimum fill over the junction box of 2’ and maximum fill over the junction box of 5’.
4. Junction box may be precast. If precast junction box is used, and details differ from shown, the precast junction box shall receive prior approval by the City. To qualify for alternate design approval, submit: a checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
5. All pipes entering junction box must fit between the inside face of walls and shall not enter through the corners.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through junction box wall.
7. Use 1” clear cover on all reinforcing steel unless otherwise noted.

### PIPE DISPLACEMENT REDUCTIONS

<table>
<thead>
<tr>
<th>Diameter (Inches)</th>
<th>Wall T (Inches)</th>
<th>Class M6 Concrete (Cu. Yd.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>15</td>
<td>2 1/4</td>
<td>0.04</td>
</tr>
<tr>
<td>18</td>
<td>2 1/2</td>
<td>0.05</td>
</tr>
<tr>
<td>24</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>30</td>
<td>3 1/2</td>
<td>0.14</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>0.20</td>
</tr>
<tr>
<td>42</td>
<td>4 1/2</td>
<td>0.26</td>
</tr>
<tr>
<td>48</td>
<td>5</td>
<td>0.34</td>
</tr>
<tr>
<td>54</td>
<td>5 1/2</td>
<td>0.43</td>
</tr>
</tbody>
</table>

### ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Class M6 Concrete</th>
<th>Reinforcing Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT</td>
<td>Cu. Yd.</td>
<td>Lb.</td>
</tr>
<tr>
<td>H = 4’ - 0’</td>
<td>7.09</td>
<td>1506</td>
</tr>
<tr>
<td>H = 4’ - 6’</td>
<td>7.42</td>
<td>1521</td>
</tr>
<tr>
<td>H = 5’ - 0’</td>
<td>7.75</td>
<td>1622</td>
</tr>
<tr>
<td>H = 5’ - 6’</td>
<td>8.08</td>
<td>1657</td>
</tr>
<tr>
<td>H = 6’ - 0’</td>
<td>8.40</td>
<td>1692</td>
</tr>
<tr>
<td>H = 6’ - 6’</td>
<td>8.73</td>
<td>1773</td>
</tr>
<tr>
<td>H = 7’ - 0’</td>
<td>9.06</td>
<td>1808</td>
</tr>
<tr>
<td>H = 7’ - 6’</td>
<td>9.39</td>
<td>1843</td>
</tr>
<tr>
<td>H = 8’ - 0’</td>
<td>9.71</td>
<td>1924</td>
</tr>
</tbody>
</table>

*Quantity shown includes reduction for a 24-inch diameter manhole opening.

---

**CITY OF RAPID CITY**  
**PUBLIC WORKS DEPARTMENT**  

**DATE:** 8-19-22  
**Sec. - Sht.** 63-4a  

**7' x 7' JUNCTION BOX**
**7' x 7' JUNCTION BOX**

**PLAN VIEW**
- **24" Ø manhole opening**
- **Optional Construction Joint**
- **Construction Joint**
- **Junction Box**

**ELEVATION VIEW**
- **Junction Box**

**LEGEND FOR PLACING RE-STEEL**
- **T. T. S.** - Top of Top Slab
- **B. T. S.** - Bottom of Top Slab
- **O. F. W.** - Outside Face of Wall
- **I. F. W.** - Inside Face of Wall

**H = 4' - 0'', 5' - 6'', and 7' - 0''**
- **n3 ~ 12 Sp. @ 6'' = 6' - 0'', TYP**
- **h ~ 9 Sp. @ 9'' = 6' - 9'', TYP**
- **k ~ 14 Sp. @ 6'' = 7' - 0'', TYP**
- **p3 ~ 6 Sp. @ 12'' = 6' - 0'', TYP**

**H = 5'' - 0'', 6'' - 6'', and 7'' - 0''**
- **q1 @ 12''**

**DATE: 8-19-22**
**Note:**
Drainage fabric material to totally enclose under drain pipe trench backfill material and pipe. Provide 12" minimum overlap on top and 12" minimum overlap end-to-end.

**UNDER-DRAIN**  
**NEW CURB & GUTTER**

- Under-drain Pipe Trench
- Backfill Material, Per Standard Specifications, See Section 112
- 4" To 6" Under-drain Pipe Centered in Trench
- 12" Minimum
- Class 2 Separation Fabric, Per Standard Specifications, See Section 202
- Base Course
- 4" To 6" Under-drain Pipe Centered in Trench
- Under Drain Pipe Trench
- Backfill Material, Per Standard Specifications, See Section 112

**UNDER-DRAIN**  
**EXISTING CURB & GUTTER**

N.T.S.

**PIECE UNDER-DRAIN DETAILS**

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
DATE: 8-19-22
Sec. - Sht. 64-1
Note:
Underdrain connection into inlet shall be made watertight using non-shrink grout or approved equal.
(Typical All Connections)
Notes:

1. Plant shall be set plumb and centered in planting hole, and placed on firm soil to prevent settling.

2. All wire caging and burlap and twine (or nursery pot) shall be cut back from root ball and removed from planting hole before backfilling. Spread out or prune girdling, circling or matted roots and loosen the outside soil of the root ball to facilitate root penetration into surrounding soil.

3. Planting hole shall be backfilled with existing soil and approved amended soil mix, if necessary, in at least two lifts, heel tamping and watering in between to remove air pockets.

4. See details 74-2a and 74-2b for additional details.
Notes:
1. Guying materials: 3/4" or greater tree tie webbing or 1/4" or greater nylon rope.

2. Tree Straps: Min. 1" Wide heavy duty canvas with a steel grommet in each end to secure webbing or rope. Webbing or rope shall not be directly wrapped around the tree. Lengths of garden hose shall not be used.

3. Deciduous trees under three (3) inches caliper shall be staked with two (2) "T" posts. Deciduous trees three (3) inches caliper and larger shall be staked with three (3) "T" posts.
Notes:

1. Guying materials: 3/4" or greater tree tie webbing or 1/4" or greater nylon rope.

2. Tree Straps: Min. 1" Wide heavy duty canvas with a steel grommet in each end to secure webbing or rope. Webbing or rope shall not be directly wrapped around the tree. Lengths of garden hose shall not be used.

3. Coniferous trees under eight (8) foot in height shall be staked with two (2) "T" posts. Coniferous trees eight (8) feet and larger shall be staked with three (3) "T" posts.
Notes:
1. All posts shall be galvanized in accordance with ASTM A653.
2. All hardware shall be galvanized in accordance with ASTM A153.
3. All nuts shall be nylon insert lock nuts.

Installation Procedure:
1. Drive anchor post and sleeve to within approximately 1 1/2" above ground level.
2. Insert sign post into anchor to a minimum depth of 9" below ground level.
3. Place corner bolts and flat washers through top holes in anchor post. Remove dirt from around the post as necessary to allow room for bolts.
4. Place a flat washer and nut on each bolt.
5. Tighten nuts and tamp earth around base post firmly.
6. For signs over 48" wide, two posts are required.

Note:
The top of anchor post shall not extend more than 4" maximum above the chordline within a 60" chord.
Notes:
1. All posts shall be galvanized in accordance with ASTM A653.
2. All hardware shall be galvanized in accordance with ASTM A153.
3. All nuts shall be nylon insert lock nuts.

Installation Procedure:
1. Drive anchor post and sleeve to within approximately 1 1/2" above ground level.
2. Insert sign post into anchor to a minimum depth of 9" below ground level.
3. Place corner bolts and flat washers through top holes in anchor post. Remove dirt from around the post as necessary to allow room for bolts.
4. Place a flat washer & nut on each bolt. Tighten nuts and tamp earth around base post firmly.
5. For signs over 48" wide, two posts are required.
6. If underground utilities interfere with the installation, sign post thru a sleeve as detailed a surface mount slip base such as manufactured by Kleen Break Model 425 or approved equal. This installation requires prior approval from the Traffic Engineer.

* Minimum embedment length shall be 3'-0".

Note:
The top of anchor post shall not extend more than 4" maximum above the chordline within a 60" chord.
Colors:
1. Legend - White
2. Background - Green

STREET NAME SIGNS

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht.
90-2a
Street Name Signs - Legends:
Street name signs are required at all street intersections, or locations where the name of the street changes. Uniformity in their design is important in the understanding of these signs by motorists.

The following set of guidelines shall be used when designing the legend of street name signs:
1. The name of the street shall be used in full, while all prefixes and suffixes shall be abbreviated.
2. Mixed case lettering shall be used.
3. Directions (north, northeast, east, etc.) shall be abbreviated without using a period, if direction is the street name it shall not be abbreviated (e.g., East Boulevard).
4. Suffixes (street, place, court, avenue, etc.) shall be abbreviated without using a period.
5. Numbered streets shall be identified with numbers (e.g., 5th St, not Fifth St).
6. All parts of the street name must appear on the same street name sign.
7. Street name signs shall be 9" high with 6" letters, except as outlined in number 11 below.
8. Minimum sign width is 24".
9. Private streets shall have a "P" installed on the street name sign. This letter shall be 3" high, located to the right of the street name legend and separated from the legend by at least 2". Alternatively the letter "P" of the same dimensions may be installed at other locations on the sign post as directed by the Traffic Engineer.
10. Street name signs shall be installed and visible to all directions of traffic; i.e., back to back signs.
11. Dimensions for overhead mounted signs shall be as per current edition of the MUTCD; i.e., signs mounted on signal mast arms.
12. Specific questions on these details shall be directed to the City Traffic Engineer.
Stop Bar

Install Stripes to Miss Tire Tracks Where Possible

HIGH VISIBILITY CROSSWALK

*The minimum width measured between the lines shall be 6' or crosswalk width shall match adjacent sidewalk or path width, whichever is greater.

**STOP BAR**

**INSTALL STRIPES TO MISS TIRE TRACKS**

**HIGH VISIBILITY CROSSWALK**

N.T.S.

Note:
1. Center crosswalk on ramp.
2. Crosswalk to be paint or tape, per plans.
TOP VIEW (Cover)

** Appropriate Logo

TOP VIEW (Box)

Lifting Eye

ISOMETRIC VIEW (Box and Cover)

* Skid Resistant Surface

C 1" 2"

2" Minimum

12" Minimum

Clean Rock or Type 1 Bedding

Portland Cement Concrete or Asphalt Concrete

Clean Rock or Type 1 Bedding

PORTLAND CEMENT CONCRETE

SIDE VIEW

(Electrical Junction Box Installation Details)

(Buried No. 4 steel reinforcing bar not shown.)

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

ELECTRICAL JUNCTION BOXES
TYPE 1 THROUGH TYPE 4

DATE: 8-19-22
Sec. - Sht. 93-1a
<table>
<thead>
<tr>
<th><strong>ELECTRICAL JUNCTION BOX</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>1</td>
<td>Open Bottom with Gasket</td>
</tr>
<tr>
<td>2</td>
<td>Open Bottom with Gasket</td>
</tr>
<tr>
<td>3</td>
<td>Open Bottom with Gasket</td>
</tr>
<tr>
<td>3A</td>
<td>Open Bottom with Gasket</td>
</tr>
<tr>
<td>4</td>
<td>Open Bottom with Gasket</td>
</tr>
</tbody>
</table>

**Notes:**

1. The cover will be gasketed with a minimum of two stainless steel bolts and washers.
2. The cover will have a lifting eye.
3. The surface of the cover will have a minimum wet and dry coefficient of friction value of 0.5 as determined by ASTM F609.
4. The cover of the junction box will have the appropriate logo in one inch size letters and will be recessed. When the junction box contains cables or wires for a traffic signal then the logo will be “Signal”. When the junction box contains lighting conductors then the logo shall be “Lighting”.
5. Two piece covers will be used for Type 4 junction boxes.
6. The electrical junction boxes will comply with the American National Standards Institute (ANSI)/Society of Cable Telecommunications Engineers (SCTE) 77 2007 Specification for Underground Enclosure Integrity. The loading requirement for all the electrical junction boxes will be Tier 22 of ANSI/SCTE 77 2007.
7. The electrical junction boxes will be UL listed.
8. For junction boxes located outside of pavement, a No. 4 steel reinforcing bar with a minimum length of 18” will be buried adjacent to the long side of the junction box. All costs associated with furnishing and placing the steel reinforcing bar will be incidental to the contract unit price per each for “Junction Box”.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

ELECTRICAL JUNCTION BOXES
TYPE 1 THROUGH TYPE 4

DATE: 8-19-22
Sec. - Sht. 93-1b
Notes:
1. See Specifications Section 93.2.Q for detector loops.
2. Payment for lead-ins is incidental to the contract unit price per each for "Detector Loop".

Electrical Junction Box, See Electrical Junction Box Details

PREFORMED DETECTOR LOOP
SAWED-IN DETECTOR LOOP

Notes:
1. See Specifications Section 93.2.R for detector loops.
2. Payment for lead-ins is incidental to the contract unit price per each for "Detector Loop".

Lead-in through Shoulder Detail

Lead-in through Curb and Gutter Detail

SAWED SLOTS LAYOUT

SAWED SLOT SECTION VIEW

WIRING DIAGRAM

LEAD-IN THROUGH SHOULDER DETAIL

LEAD-IN THROUGH CURB AND GUTTER DETAIL
Note:
All costs for constructing the sawed-in detector loop protection including labor, equipment, and materials shall be incidental to the contract unit price per each for Sawed-In Detector Loop.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 93-3b
Note:
The Buried Cable Marker shall be plastic, approximately 6" wide, and shall be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker shall have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating the presence of a buried electric circuit below shall be printed in a contrasting color on the cable marker. The Buried Cable Marker shall be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker shall be incidental to the contract unit price per foot for the bid item used for the conduit.
Notes:
1. Tree Trimming shall be done in accordance with proper tree trimming practices. The underside of each branch to be removed shall have a groove sawed through the bark (1/2" minimum depth) before any sawing is started on the top side of the branch.
2. Tree trimming shall be applied around each light source installed within the limits of the project.
3. The tree trimming limits as shown on this sheet represents the minimum amount of trimming required. Additional tree trimming required shall be as directed by the Engineer.
4. All foliage and branches shall be removed from the limits defined below by the Completion Date of the project.
5. Costs for Tree Trimming for Roadway Lighting shall be incidental to the various contract bid items.
Notes:
1. Single Tube, Truss, or Davit types of mast arms are all acceptable, but only one type shall be provided for each contract. The mixing of different types is not permitted without special approval by the Traffic Engineer.
2. Luminaire poles shall be designed to support a 36" x 36" Warning sign banded to the pole as shown.

N.T.S.
Notes:
Backplates shall be installed on all signal heads. For clarity the signal heads are shown on this detail with backplates removed so that the mounting hardware is visible.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
ROADWAY LUMINAIRE POLE
(SIGNALS BANDED TO LUMINAIRE POLE)

DATE: 8-19-22
Sec. - Sht.
93-7
Notes:
1. Base details are provided for example only and are not intended to be a complete design.
2. Fused connectors shall be breakaway type.
3. Hardware connecting the pole to the base shall be installed in accordance with the manufacturer's recommendation.
4. Hardware connecting the base to the footing shall be installed in accordance with the manufacturer's recommendation. The Contractor shall install leveling devices in accordance with the manufacturer's recommendation if shimming is necessary to install the light poles plumb and level. The washers and shims shall be installed around the anchor bolts.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

ROADWAY LUMINAIRE POLE
BREAKAWAY TRANSFORMER BASE

DATE: 8-19-22
Sec. - Sht. 93-8
Note:
1. Base details are provided for example only and are not intended to be a complete design.
2. Pedestrian push buttons installed on signal poles shall be in compliance with details 93-12a and 93-12b and MUTCD dimensions and clearances.
Notes:
1. Some of the signal heads are shown with backplates removed so that the mounting hardware is visible.
2. The signal height allowances shown above are based on a horizontal distance greater than 53’ between the signals and stop line. For horizontal distance of 53’ and less between the signals and the stop line, the height allowances shall be as specified in Section 4D.15 of the MUTCD.
3. Pedestrian push buttons installed on signal poles shall be in compliance with details 93-12a and 93-12b and MUTCD dimensions and clearances.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22
Sec. - Sht. 93-10

SIGNAL POLE (WITH MAST ARM)
Notes:
1. Some of the signal heads are shown with backplates removed so that the mounting hardware is visible.
2. The signal height allowances shown above are based on a horizontal distance greater than 53' between the signals and stop line. For horizontal distance of 53' and less between the signals and the stop line, the height allowances shall be as specified in Section 4D.15 of the MUTCD.
3. Pedestrian push buttons installed on signal poles shall be in compliance with details 93-12a and 93-12b and MUTCD dimensions and clearances.

N.T.S.
Notes:
1. The pedestrian push button pole shall be as specified in the plans.
2. The Contractor shall install either the round or the square concrete footing. For informational purpose, the quantity of concrete for one footing is 0.14 cubic yards for the round footing and 0.17 cubic yards for the square footing.
3. The concrete for the footing shall be Class M6 concrete.
4. All costs for furnishing and installing the pedestrian push button pole including labor, equipment, and materials including the concrete footing, pole, cap, and the conduit in the footing shall be incidental to the contract unit price per each for "Pedestrian Push Button Pole".

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT
DATE: 8-19-22
Sec. - Sht.
93-12a

PEDESTRIAN PUSH BUTTON POLE
Notes:

1. Pedestrian Push Button Location and Orientation Requirements:
   A. Within 10’ from the front face of curb.
   B. Where two push buttons are provided, the push buttons shall have at least 10’ of separation from each other.
   C. If two curb ramps are used, the push button shall be within 5’ of the backside of the crosswalk.
   D. The push button shall be mounted adjacent to a clear ground space (within 10” maximum reach). The clear ground space will be at least 30” x 48” and will slope no more than 50:1 (2%) in any direction. The push button will be centered on either side of the clear ground space (either the 30” or 48” side). The 30” x 48” clear ground space shall not touch the detectable warning panel.
   E. The push button shall face the edge of roadway.
   F. The push button face shall be parallel to the crosswalk being used.

2. The push button poles will not interfere with the minimum clear width of the Pedestrian Access Route.

N.T.S.
Notes:
1. Circular ties may be used in lieu of the spiral ties. The No. 3 ties shall be spaced 12" apart except for the top two which shall be spaced 6" apart. The ties shall be lapped 18" and the laps shall be staggered around the cage.
2. Spiral ties shall have 1-1/2 extra turns at each end.
3. See Section 93 of the Specifications for footing materials.
4. Conduits and bushings may project 2 1/2" to 6" above footing for fixed base poles but shall not project above the slip plane or fracture plane for breakaway poles.
5. Conduits shall be sealed water-tight during all phases of construction until poles are in place.
6. The anchor rods shall fit inside the reinforcing steel cage. If the anchor rods designed by the Pole Manufacturer do not fit, contact the Engineer for footing redesign. No additional payment will be made for the redesigned footing.
7. Costs of conduit and conduit bushings shown on footing detail shall be incidental to the footing bid item(s).
8. The pole shall not be installed until the concrete has attained design strength (4000 psi).
9. The contour of the area surrounding the breakaway pole shall be flat, though not necessarily level for a distance of 5' in all directions. The Contractor may be required to provide finish grading at some breakaway pole locations.
**Notes:**

1. The concrete pad shall conform to the base of the controller and battery backup cabinets to the satisfaction of the Engineer.

2. Conduits shall be sealed water-tight until the conductor cables are installed.

3. If the controller and battery backup concrete pad and footing is not located within or adjacent to an existing sidewalk, the Contractor shall provide a concrete access pad as directed by the Engineer.

4. Anchor bolts and related hardware shall conform to the controller and battery backup cabinets manufacturer’s specifications.

5. A continuous bead of silicone rubber caulk shall provide a weather-tight seal between the concrete pad or footing, and the cabinet or base.

6. Minimum clear cover for reinforcing steel is shown above unless otherwise noted.

N.T.S.

CITY OF RAPID CITY
PUBLIC WORKS DEPARTMENT

DATE: 8-19-22

Sec. - Sht.
93-14

CONTROLLER CABINET AND FOOTING