### ROAD APPROACH CULVERT END TREATMENT

#### QUANTITIES (FOR ESTIMATING ONLY)

<table>
<thead>
<tr>
<th>DIA. A</th>
<th>RCP</th>
<th>H PIPE LENGTH</th>
<th>&quot;64 1/2&quot; x 4 1/8&quot; FERRULE LOOP INSERT (EACH)</th>
<th>LENGTH 2 1/2&quot; DIA. SCHEDULE 40 GALV. PIPE</th>
<th>DIMENSIONS (FT.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15'</td>
<td>4.75'</td>
<td>~</td>
<td>~</td>
<td>~</td>
<td>B</td>
</tr>
<tr>
<td>18'</td>
<td>6.5'</td>
<td>~</td>
<td>~</td>
<td>~</td>
<td>0.69</td>
</tr>
<tr>
<td>24'</td>
<td>10.0'</td>
<td>10</td>
<td>12.5'</td>
<td>0.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

#### METRIC QUANTITIES (FOR ESTIMATING ONLY)

<table>
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<tr>
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<th>LENGTH 2 1/2&quot; DIA. SCHEDULE 40 GALV. PIPE</th>
<th>DIMENSIONS (mm)</th>
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</thead>
<tbody>
<tr>
<td>375</td>
<td>1448</td>
<td>~</td>
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<tr>
<td>450</td>
<td>1981</td>
<td>~</td>
<td>~</td>
<td>~</td>
<td>210</td>
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<tr>
<td>600</td>
<td>3048</td>
<td>10</td>
<td>3800</td>
<td>152</td>
<td>610</td>
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</tbody>
</table>

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**PLAN VIEW**

**SECTION A-A**

**END VIEW**

**VIEW OF INSERTS**

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**NOTE:**

Paint all non-galvanized parts, per Section 710.

Units shown in brackets () are metric and are in millimeters (mm) unless other units are shown.

**DETAILED DRAWING**

REFERENCE: DWG. NO. 603-12

SECTION 603.710, 711

**RCP ROAD APPROACH CULVERT END TREATMENT (RACET)**

EFFECTIVE: SEPTEMBER 2014

**MONTANA DEPARTMENT OF TRANSPORTATION**
NOTE:
PAINT ALL EXPOSED METAL PARTS WITH ONE COAT OF ZINC RICH PAINT AND TWO COATS OF ALUMINUM PAINT PER SECTION 710.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
### Quantities

<table>
<thead>
<tr>
<th>Metric Quantities</th>
<th>English Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pipe</strong>: 4&quot; to 8&quot; DIA</td>
<td><strong>Granular Bedding</strong>: 6&quot;, 150MM UNCOMPACTED SAND MATERIAL</td>
</tr>
<tr>
<td>Diameter (in.)</td>
<td>Diameter (mm)</td>
</tr>
<tr>
<td>12&quot;</td>
<td>305</td>
</tr>
<tr>
<td>18&quot;</td>
<td>457</td>
</tr>
<tr>
<td>24&quot;</td>
<td>609</td>
</tr>
<tr>
<td>30&quot;</td>
<td>762</td>
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<tr>
<td>36&quot;</td>
<td>914</td>
</tr>
<tr>
<td>48&quot;</td>
<td>1219</td>
</tr>
</tbody>
</table>

*Based on RC & Wall Pipe.*

### Notes

1. Trench Backfill: Place per standard specification 403.10.3.4. Granular Bedding may be substituted at no additional cost.
2. Bedding material: Directly underneath the pipe shall be left uncompacted to facilitate the installation of the pipe. Compacted granular bedding by proof rolling with a vibratory compactor in 3 inch (200) lifts or by using a method approved by the project manager.
3. Sand cushion: Use grade 5 material per table 1001 in standard specification 403.10.3. The sand material shall be left uncompacted to facilitate the installation of the pipe. Include the sand material in the cost of the granular bedding.

### Units Shown

Units shown in parentheses if any metric and are in millimeters. Family unless others units are shown.
SECTION A-A

CONNECTION DETAILS

TYPICAL FIELD CAST CONCRETE BEND

UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.
**ADAPTER RING - THE BOLT DETAIL**

**NOTES:**
- PART NUMBER 1051-4 FOR USE WITH ADJUSTABLE BOLT ONLY. ALL OTHERS AS SHOWN.
- BOLTS PAINTED WITH ZINC CHROMATE IRON OXIDE
- PAINT STANDARD ROLLED THREADS ON ALL BOLTS
- RSSD MAY BE HOT BENT
- FOR 18" TUBE USE 43-54 FT.EYE BOLT TIE
- FOR 24" TIE USE 60-66 FT.EYE BOLT TIE

**ADJUSTABLE EYE BOLT TIE**

**SECTION A-B**

**PLAN VIEW**

**PIPE SLEEVE**

**CONTRACTOR TO DRILL 1/8" DIA. HOLE FOR ADJUSTABLE EYE BOLT TIE**

**24" (610) CTX ADAPTER RING**

**NOTES:**
- PRODUCED PER ASTM C61
- GLS REINFORCING, TYPE S CEMENT

**PART NO.** 1051-4
**PIPE SIZE** 5"
**WALL THICK.** 0.25 "
**PVC** 09-1000
**INS. THREAD** 3/4" LH 11/32"
**AXIS A** 5/8"
**AXIS B** 0.000

**PART NO.** 1051-5
**PIPE SIZE** 5"
**WALL THICK.** 0.3125"
**PVC** 09-1000
**INS. THREAD** 3/4" LH 11/32"
**AXIS A** 5/8"
**AXIS B** 0.000

**PART NO.** 1051-7
**PIPE SIZE** 5"
**WALL THICK.** 0.1875"
**PVC** 09-1000
**INS. THREAD** 3/4" LH 11/32"
**AXIS A** 5/8"
**AXIS B** 0.000

**PART NO.** 1051-W
**PIPE SIZE** 5"
**WALL THICK.** 0.250"
**PVC** 09-1000
**INS. THREAD** 3/4" LH 11/32"
**AXIS A** 5/8"
**AXIS B** 0.000

**PART NO.** 1051-6
**PIPE SIZE** 5"
**WALL THICK.** 0.250"
**PVC** 09-1000
**INS. THREAD** 3/4" LH 11/32"
**AXIS A** 5/8"
**AXIS B** 0.000

**PART NO.** 1051-8
**PIPE SIZE** 5"
**WALL THICK.** 0.250"
**PVC** 09-1000
**INS. THREAD** 3/4" LH 11/32"
**AXIS A** 5/8"
**AXIS B** 0.000
NOTES:

1. Corrugation may be either annular or helical. Bend on elbow (10') is as shown unless otherwise specified in the plans or by the Project Manager.

2. The cost of SS-1 Fog Seal is included in the cost of Plant Mix Surfacing.

* Included with roadway quantities.
TRANVERSE CONTRACTION JOINT (15' [4.5 m] O.C.)

17" (430) LONG X 1 1/4" (32) DIA. SMOOTH EPOXY-COATED DOWELS SPACED AT 12" (300) CENTERS

17" (430) LONG X 1 1/4" (32) DIA. SMOOTH EPOXY-COATED DOWELS SPACED AT 12" (300) CENTERS

15° SLOPE

8" (200) PCCP

TYPICAL BOTH ENDS
REINFORCING STEEL FOR INLET
BACKFILL RETAINER & PCCP SLAB

DETAIL A
SAWED TRANSVERSE OR LONGITUDINAL
JOINT WITH HOT Poured SEALANT

BACKER ROD

1/8" (33)

3/4" (19)

1 5/8" (41)

1/4" (6)

1/4" (6)

2" (50)

SEALANT MATERIAL

SEE DETAIL A

11 ~ M4 (M3) L BAR CONNECTORS
1" - 4" (400) X 1" - 4" (400)
APPROX. 1" - 4" (400) CENTERS

8" (200)

REFERENCE DWG. NO.
STANDARD SPEC.
SECTION 603

VEHICULAR UNDERPASS
PCCP TRANSVERSE JOINT & BACKFILL RETAINER DETAILS

UNITS SHOWN IN BRACKETS () ARE METRIC AND ARE IN MILLIMETERS (mm)
UNLESS OTHER UNITS ARE SHOWN.

MDT MONTANA DEPARTMENT OF TRANSPORTATION

EFFECTIVE: SEPTEMBER 2014
## Dimensions

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<tr>
<th>SPAN</th>
<th>RISE</th>
<th>EQUIL.</th>
<th>$\phi$</th>
<th>$\psi$</th>
<th>$\delta$</th>
<th>AREA</th>
<th>$\text{DEK}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6'-1&quot;</td>
<td>4'-1&quot;</td>
<td>5'-5&quot;</td>
<td>2.2</td>
<td>2.2</td>
<td>4.3</td>
<td>5.7</td>
<td>1</td>
</tr>
<tr>
<td>7'-3&quot;</td>
<td>5'-1&quot;</td>
<td>5'-9&quot;</td>
<td>2.7</td>
<td>3.2</td>
<td>6.3</td>
<td>7.9</td>
<td>1.5</td>
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<tr>
<td>8'-11&quot;</td>
<td>6'-1&quot;</td>
<td>6'-15&quot;</td>
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<td>4.9</td>
<td>7.4</td>
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<td>10'-3&quot;</td>
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<td>8.3</td>
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<td>12'-5&quot;</td>
<td>8'-11&quot;</td>
<td>9'-3&quot;</td>
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<td>6.3</td>
<td>8.7</td>
<td>11.0</td>
<td>3.9</td>
</tr>
</tbody>
</table>

## Notes

1. Devel. to Top of Corner Plate.
2. Pipe Ends are Square Intended to Capture of First and Full Length of End unless otherwise indicated.
3. Tabled Values Based on Nominal Pipe Dimensions. All Dimensions Subject to Tolerance Requirements of Section 7.10.

## Metric Dimensions

<table>
<thead>
<tr>
<th>SPAN (m)</th>
<th>RISE (m)</th>
<th>$\phi$</th>
<th>$\psi$</th>
<th>$\delta$</th>
<th>AREA (m$^2$)</th>
<th>$\text{DEK}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.950</td>
<td>1.450</td>
<td>0.640</td>
<td>0.640</td>
<td>0.640</td>
<td>1.920</td>
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<tr>
<td>2.400</td>
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<tr>
<td>2.850</td>
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<td>0.800</td>
<td>0.800</td>
<td>0.800</td>
<td>2.820</td>
<td>0.800</td>
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<tr>
<td>3.300</td>
<td>2.700</td>
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<td>0.880</td>
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<td>0.880</td>
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<tr>
<td>3.750</td>
<td>3.150</td>
<td>0.950</td>
<td>0.950</td>
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<td>3.820</td>
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## Concrete Cutoff Wall

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<thead>
<tr>
<th>SPAN (m)</th>
<th>RISE (m)</th>
<th>$\phi$</th>
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