**LONGITUDINAL SECTION**

**Filter Fabric Jacket Required**

Min. 3" 0.0255

**TONGUE & GROOVE**

Min. Joint 0.010 SQ. IN. PER FOOT

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**REVISION**

Joint 0.010

---

**SCHEDULE OF BELL REINFORCEMENT**

**Detail of Bell & Spigot Concrete Pipe Joint Using Round or Profile Rubber Gasket**

<table>
<thead>
<tr>
<th>Nominal</th>
<th>30&quot;</th>
<th>36&quot;</th>
<th>42&quot;</th>
<th>54&quot;</th>
<th>72&quot;</th>
<th>90&quot;</th>
<th>84&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td></td>
<td></td>
<td></td>
<td>0.33</td>
<td>0.23</td>
<td>0.35</td>
<td>0.30</td>
</tr>
<tr>
<td>Max.</td>
<td></td>
<td></td>
<td></td>
<td>0.28</td>
<td>0.26</td>
<td>0.37</td>
<td>0.40</td>
</tr>
</tbody>
</table>

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**CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS**

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**CONCRETE COLLAR FOR JOINING MAINLINE PIPE AND STUB PIPE**

---

**MISCELLANEOUS DRAINAGE DETAILS**
**Concrete Gutter and Drains at Retaining Walls**

- Minimum distance: As required to comply with safety criteria.
- Shoulder line
- Edge of pavement
- Not steeper than 1:4
- L = length of transition
- Ditch offset
- Sidewalk
- Not steeper than 1:4
- Shoulder line
- Not steeper than 1:4

**Variable Front Slope**
- Normal slope
- Variable front slope if necessary to be beyond normal top of slope and minimum pitch width by moving out back slope.

**Section CC**
- Reinforced Concrete Top
-（Top required when inlet, manhole or junction box riser is used.）
- Reinforced Concrete Top
-（Top required when inlet, manhole or junction box riser is used.）
- Reinforced Concrete Top
-（Top required when inlet, manhole or junction box riser is used.）

**Sidewalk**
- 2. L = 10! Ditch Offset (maximum L = 100')
- Use larger value of either:
- 1. 1:1 1/2 slopes
- 2. Top of rail
- See table above.

**Method for Determining the Length of Special Pipe Required Under Railroads**

- See detail
- Joists
- Use larger value of either:
- 1. 1:1 1/2 slopes
- 2. Top of rail
- See table above.

**Guard at Pipe Ends**

- Steel plate
- PVC pipe sleeve
- Grate (lbs.)
- Reinforcing steel (miscellaneous)

**Miscellaneous Drainage Details**
CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS

OUTSIDE WALLS-SINGLE, DOUBLE, TRIPLES, & QUADRUPLE BOXES

INTERIOR WALLS-DOUBLE & TRIPLE BOXES INTERMEDIATE WALLS-QUADRUPLE BOXES

STRAIGHT ENDWALL

NOTE: The computerized printout for reinforcing steel does not include the additional lengths needed for extension and overlaps or connections to the horizontal reinforcement in the interior area of double, triple and quadruple existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for constructing the tie-in.

For concrete box culvert details, see Index No. 290.
**PLAN**

**INLET IN TOP OF BOX CULVERT**

**INLET TYPE B GRATE**

_Culvert Wall_

- **4"**
- **1'-7"**
- **4'-2"**

**Culvert Wall**

**PLAN**

**INLET TYPE A GRATE**

_Culvert Wall_

- **4'-4"**
- **4'-3"**

**addition Concrete**

_required Only When Normal Slab Thickness Is Less Than 10"._

See Index 230 For Grate Detail

**SECTION B B**

**SECTION CC**

**Note:** Extra base is required when cross box culverts are located on facilities subject to high speed traffic (>45 mph) or high traffic volumes (>250 AADT) and the cover is within the range specified in the notation above.

**ASPHALTIC CONCRETE BASE**

_The coarse aggregate shall be placed in 6 inch lifts and compacted sufficiently as to be firm and unyielding. The coarse aggregate shall be gravel or stone meeting the requirements of Section 901-2 or 901-3 respectively. The gradation shall meet Section 901-6, Grades 4, 467, 5, 56, or 57 unless restricted in the plans. The filter fabric shall be Type D.3 (See Index No. 200). The cost of furnishing and installing the course aggregate and filter fabric shall be included in the cost of the Box Culvert._

**FRIABLE BASE**

_The course aggregate shall be placed in 6 inch lifts and compacted sufficiently as to be firm and unyielding. The coarse aggregate shall be gravel or stone meeting the requirements of Section 901-2 or 901-3 respectively. The gradation shall meet Section 901-6, Grades 4, 467, 5, 56, or 57 unless restricted in the plans. The filter fabric shall be Type D.3 (See Index No. 200). The cost of furnishing and installing the course aggregate and filter fabric shall be included in the cost of the Box Culvert._

**EXTRA BASE FOR CROSS BOX CULVERTS UNDER FLEXIBLE PAVEMENT**

**Inlet in Top of Box Culvert**

**Note:**
1. Cost of Steel Grating to be included in cost of Box Culvert.
2. All steel shall be 1/4" clear.