

Volume 2, Chapter 9 - Culverts

Users' Guidance:

If a UDFCD *Section* number in this chapter is **skipped**:

It was adopted as is; please refer to that *Section* in the **corresponding UDFCD Manual**, Volume, Chapter and *Section*.

If a UDFCD *Section* number in this chapter is **amended** or a new COFC *Section* in this **Chapter is added**:

It is **listed below**; please refer to it in **this document**.

If a UDFCD *Section* in this chapter is **deleted** then it was **not** adopted by the City of Fort Collins; The deleted UDFCD *Section* number will be **identified as deleted in the text below**.

- (1) *Section 3.5.3* is amended to read as follows:

3.5.3 Culvert Diameter

(a) The diameter of pipe that will meet the headwater requirements must be determined after the invert elevations have been assumed, using the design computation forms (e.g., Figure CU-8), the capacity charts (e.g., Figure CU-7), and the nomographs.

(b) To help prevent plugging of small diameter pipes, the minimum allowable culvert diameter is fifteen (15) inches for round pipe. The minimum inside dimension will be no less than twelve (12) inches for elliptical and arch pipe. .

- (2) *Section 3.5.5* is amended to read as follows:

3.5.5 Culvert Materials

All culvert design and construction must comply with the same material and construction requirements as those specified in Volume 1, Chapter 6, Section 4.5, "Storm Sewer System Construction Standards", of this Manual and with the approved City Water Utilities Standard Construction Specifications.

- (3) *Section 8.3* is amended to read as follows:

8.3 Grate Specifications

(a) Where a structure presents a safety hazard such as when a siphon, a significant drop in elevation adjacent to a sidewalk or road, a long pipe with one or more manholes, or at pipes near playgrounds, parks and residential areas, a grate may be required. For most culverts through embankments and crossing streets, grates will not be required. The grate open area must be at least four times the open area of the pipe.

(b) When called for, grates must meet the following requirements:

1. Grating must be constructed of smooth steel bars with a minimum diameter of five eighths of an inch. Reinforcing bars shall not be used.
2. Welded connections must be a quarter inch thick at the minimum.

3. Spacing between bars must normally be five (5) inch unless site conditions are prohibitive.
 4. All exposed steel must be galvanized in accordance with AASHTO M 111.
 5. Welded joints must be galvanized with a rust preventive paint.
 6. Grates must be secured to the headwall or end section by removable devices such as bolts or hinges to allow maintenance access, prevent vandalism, and prohibit entrance by children.
 7. Locks for hinged grates will be provided by the City.
 8. Trash racks must be set at angles that are no steeper than three to one (3:1 H:V).
- (4) *Photograph CU-6* is deleted in its entirety