

# WATER AGENCIES' STANDARDS

## Design Guidelines for Water and Sewer Facilities

### SECTION 12.4 RAILROAD and FREEWAY CROSSINGS

#### 12.4.1 PURPOSE

This section provides guidelines for the use, location and design of open trench railroad and freeway crossings. Refer to Section 12.2 for trenchless construction alternatives.

#### 12.4.2 STANDARD TERMS AND DEFINITIONS

Wherever technical terms or pronouns occur in these guidelines or in related documents, the intent and meaning shall be interpreted as described in Standard Terms and Definitions.

Open Trench: The method used to install pipe material under the ground. Open trench refers to the physical excavation of earthen material for the placement of pipe materials.

#### 12.4.3 GUIDELINE

It is the responsibility of the user of these documents to make reference to and/or utilize industry standards not otherwise directly referenced within this document. The Engineer of Work (Engineer) may not deviate from the criteria presented in this section without prior written approval of the agency's representative.

##### A. Permits

Trenching within Utility Rights-of-Way including freeways and railroad crossings require approved permits prior to installation of any pipe. Each agency's application process for applying for a permit differs to some degree. Caltrans has a set process that will allow permits for perpendicular freeway crossings depending upon the critical nature of the work to be done. However, in most cases Caltrans will not allow longitudinal crossings or parallel utilities within their Right-of-Way. The engineer should verify what process is required depending on agency. Refer to Section 4.7, Other Agency Permits for contact information for the various agencies.

Crossings referenced in this section refer to construction within new freeway or railroad crossings and within existing infrastructure. If there is no existing infrastructure present the easiest method of construction and the most cost efficient is to open trench.

##### B. Design Criteria

Pipeline installation within utility Right-of-Way is much easier than jacking or boring under existing infrastructure but still has some complications. New piping must be installed along with other utilities including storm drain structures and electrical. Open trenching must be coordinated with this work to ensure that there will be adequate spacing to install piping around the proposed new utilities, railroad tracks and roadways.

For pipe sizes 24 inches and greater, the pipe shall be cement mortar lined and coated steel pipe. Pipe thickness shall be  $\frac{1}{4}$  inch thicker than the minimum required design pipe thickness. The inside diameter shall be a minimum of 6 inches greater than the design pipe diameter. Steel reinforcement shall be calculated to prevent cracking and to give sufficient strength to the concrete to withstand accidental damage due to future excavations. All joints shall be welded. Welding inside and

outside of pipe shall be required for larger diameter steel pipe. The horizontal alignment of the pipe crossing shall be straight with no bends or deflections edge to edge of the right-of-way being traversed. The pipe vertical alignment shall be designed so that there will be no high or low points within the right-of-way.

**C. Appurtenances**

No appurtenances shall be located within the right-of-way. Valves and access manholes shall be located at each side of the right-of-way. In addition to these requirements, construction must meet all local regulations and standards.

**D. Materials**

Pipe material shall be mortar lined and coated steel pipe. If the Agency requires a steel casing to be used in addition to the carrier pipe, the casing pipe shall be coated and lined with epoxy paint. All steel casing or carrier pipe shall be cathodically protected. All pipe must conform to the appropriate Agency's Approved Materials List.

END OF SECTION