

VIII CROSSINGS

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CROSSINGS

STANDARD SPECIFICATIONS

ROADWAY CROSSINGS

Where the pipeline crosses State roadways, it shall be encased in a pipe of larger diameter, as detailed below, and the crossing shall be as nearly perpendicular to the roadway as physically possible. This pipeline shall be installed by the method of boring or jacking beneath the road surface. However, open cut shall be permitted up to a point near the shoulders of the roadway in accordance with Department of Highways regulations.

At the Contractor's option, he may petition the Colorado Department of Transportation for permission to open cut a highway. If approved, a written special permit shall be obtained from CDOT by the Contractor, and the approved permit shall be filed with the City before making any open cut. Repair of any open cut made shall conform with regulations of CDOT and applicable portions of the Excavation and Backfill and these specifications and typical drawings.

The Contractor will be required to protect the public during construction with proper signs and warning signals day and night, as necessary, in conformance with CDOT regulations. The Contractor shall at all times during construction assume full responsibility for any and all damage and injury to the roadway, users of the roadway, abutting land owners, CDOT property and personnel, and any other persons or property when such damage or injury is caused in any manner by the operation of the contractor during this construction.

All work on state highways shall be carried out under the general supervision of CDOT and shall be coordinated with the activities of the department to cause the least possible inconvenience.

The disturbed portion of state right-of-way shall be restored to its original condition and seeded according to the provisions of CDOT.

If a portion of the pipeline is to be installed across county or City roads, encasing pipe shall be installed from shoulder to shoulder. When crossing gravel or unpaved roads with main lines, open cut may be permitted providing the county and/or City is consulted and the method of crossing approved in writing. Where paved roads are crossed with main lines, encasing pipe shall be installed under the paved portion by boring or jacking. Open cut will be permitted only when conditions are such that the crossing cannot be made by boring or jacking. Open cuts will be permitted to the shoulders of paved roadways.

Particular care shall be exercised during construction and cleanup operations to prevent undue damage to graveled and paved surfaces. No water shall be used in boring, and no tunneling shall be permitted. The roads shall be repaired and restored as nearly as possible to their original condition.

All road crossings shall be backfilled as called for on the typical drawings and in the Excavation and Backfill Specifications. A smooth-riding surface equal to the original surface shall be placed by the Contractor. Materials for the repair shall be furnished by the Contractor and shall be approved by the City.

STREAM AND DITCH CROSSINGS

Crossings under irrigation canals and ditches shall be made in accordance with the regulations of the affected Irrigation Company. Where possible, crossings shall be made by boring or jacking. Boring equipment and construction methods shall be approved by the city prior to commencing construction. If it is not possible to bore or jack, the Contractor shall obtain written permission from the Irrigation Company to make an open cut. Backfill and compaction of the open cut shall comply with the Irrigation Company requirements or applicable portions of the City’s standard specifications, whichever is more stringent.

Crossings under streams shall be encased. Crossings under ditches are not required to be encased. Minimum cover under streams and ditches shall be sixty (60) inches to the top of the encasing pipe and main pipe, respectively.

Stream crossings shall be made by open cut unless otherwise required by the City. Encasement shall not normally be required, but depth of bury shall be eight (8) feet to the top of the pipe.

ENCASING PIPE

Encasing pipe shall be steel of the size and minimum wall thickness enumerated below:

| <u>Carrier Pipe</u> | <u>Steel Encasing Pipe</u> | <u>Wall Thickness (Inches)</u> |
|---------------------|----------------------------|--------------------------------|
| 1 1/2 inches | 4 inches | 0.135 (10 gauge) |
| 2 inches | 6 inches | 0.135 (10 gauge) |
| 3 inches | 8 inches | 0.1875 (3/16") |
| 4 inches | 10 inches | 0.1875 (3/16") |
| 6 inches | 12 inches | 0.1875 (3/16") |
| 8 inches | 16 inches | 0.25 (1/4") |
| 10 inches | 18 inches | 0.25 (1/4") |
| 12 inches | 20 inches | 0.3125 (5/16") |

OVERHEAD INSULATED CROSSINGS

Crossings over canals, large ditches, and arroyos may be made when all the following requirements are met and with the approval of the City:

1. Having adequate depth on each bank to furnish sixty (60) inches of cover over the pipeline
2. Having adequate depth in the canal, ditch, etc., so that high water level will not endanger the pipeline (usually eighteen (18) inches above high water)
3. Having a span not to exceed the limits of the casing pipe (if approved by the appropriate authorities, suspension from bridges is permitted)
4. Providing adequate and proper insulation of the pipeline and support of the pipeline within the casing.

Pipe insulation will comply with one of the following:

1. Factory-fabricated insulated pipe systems consisting of PVC plastic carrier pipe of the same class as the pipeline leading to the crossing, polyurethane foam insulation and PVC plastic outer jacket. Joints shall be gasketed bell and spigot. The exterior of the system shall be wrapped with a weatherproof layer to protect the PVC from degradation from UV light. Factory-insulated piping systems shall be as manufactured by Ricwil, Inc., PO Box 151, Brecksville, OH 44141, and have a minimum R value of 11.
2. Fiberglass insulation shall be as manufactured by Certaineed Corporation, Valley Forge, PA, or equal. The insulation shall be snap-on fiberglass with factory-applied all-service jacket with minimum thickness of six (6) inches. Wooden “donuts” shall be prepared with the same O.D. as the pipe plus insulation, and shall be installed at each end and at three (3) foot intervals along each joint of pipe.
3. Isocyanurate insulation prefabricated with a hole in the center of sufficient diameter to accept the carrier pipe and of sufficient thickness to a minimum R value of 24. Such insulation shall be secured according to manufacturer’s recommendations. Alternately, the space between the carrier and encasing pipe may be filled with an isocyanurate spray if the Contractor can demonstrate that the spray can be applied to provide a uniform R value of 24 or more.

The encasing pipe shall extend a minimum of five (5) feet into the ground on each side of the crossing. Ends of the encasing pipe shall be sealed with a wooden “donut” and plastic wrap.

Unless otherwise authorized by the City, encasing pipe shall be steel meeting the following minimum standards, depending on the required thickness of the insulation. Half-inch weep holes shall be cut into the bottom of the encasing pipe at two (2) foot intervals as shown on the typical drawing.

| <u>Carrier Pipe</u> <u>(inches)</u> | <u>Encasing Pipe Wall Thickness</u> <u>(inches)</u> | <u>Span</u> <u>(inches)</u> | <u>(feet)</u> |
|--|--|--------------------------------|---------------|
| 2 | 10 | 1/4 | 47 |
| 3 | 10 | 1/4 | 47 |
| 4 | 12 | 1/4 | 49 |
| 6 | 14 | 1/4 | 49 |
| 8 | 16 | 1/4 | 50 |
| 10 | 18 | 1/4 | 51 |
| 12 | 20 | 1/4 | 52 |