

C. Installation of Water and Sewer Pipework

This section covers installation of gravity and pressure pipework. Excavation and backfilling shall be in accordance with the preceding, applicable sections and all local, State and Federal safety regulations.

1. General

- a. All pipe, fittings, and valves shall be carefully handled at all times to prevent damage to the pipe or other installations on the job site.
- b. At times when pipe installation is not in progress, the open ends of the pipe shall be closed by approved means and shall remain closed until construction on that particular section is resumed, eliminating the possibility of any flow obstructions getting into the pipe.
- c. All joints shall be wiped free of all dirt, sand and foreign material and the pipe shall be carefully examined for defects before installation.
- d. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe.
- e. Deviations from the piping location, line and grade indicated on the approved construction plans shall not be made without the prior approval of the City Manager or his designee. **All fittings to be meg-a-lug, and all push-on joints to be restrain at 40 lf.**

2. Pipe Laying Procedures

a. Gravity Flow Piping

Gravity flow piping shall be installed to the line and grade indicated on the construction drawings. Before lowering the pipe into the ditch, the bottom of the ditch should be graded so that when the pipe rests on the ditch bottom, it will have a uniform bearing for its entire length. Bell holes shall be dug for bell placement. The pipe shall be carefully examined for defects and the inside cleaned. After placing the pipe in the ditch, the ends shall be wiped free from all dirt, sand, and foreign material. The joints shall then be made in accordance with the recommendations of the pipe manufacturer.

Installation of pipe shall proceed in an upstream direction with bells facing in the direction of laying. All pipe reaches will be inspected for straightness. No bows or dips, either horizontally or vertically, will be accepted. A full circle of light must be readily seen when looking from one end of a pipe through to the other end.

b. Pressure Piping

Pressure piping shall be installed in strict accordance with the manufacturer's printed instructions. Before lowering the pipe into the trench, the bottom of the trench shall be graded so that when the pipe rests on the trench bottom, it will have a uniform bearing for its entire length. The pipe shall be carefully examined for defects and the inside cleaned. After placing the pipe in the trench, the ends shall be wiped free from all dirt, sand, and foreign material. The joints shall be made in accordance with the recommendations of the pipe manufacturer.

Suitable concrete reaction or thrust blocks shall be applied on all lines (except those having screwed or flanged joints), at all tees, plugs, caps, and bends deflecting 22 ½ degrees or more, or movement shall be prevented by attaching metal rods or straps. Unless otherwise directed, the pipe shall be laid with bell ends facing in the direction of laying. Whenever it is necessary to deflect the pipe from a straight line, either in the vertical or horizontal plane, to avoid obstruction, to plumb

stems, or where long radius curves are permitted, the degree of deflection shall be as recommended by the manufacturer of the pipe.

The minimum cover pipe will be 30 inches unless otherwise approved. The depth of cover shall be measured from the established street grades or the surface of the permanent improvement to the top of the barrel of the pipe. At street intersections or where the new pipe lines cross existing underground lines at the approximate same depth as the new line, the cover shall be increased and the new line laid below existing lines or structures. Where the existing lines or structures are of sufficient depth, than the new lines, when laid, will have six inches of separating earth between them and other pipe or structure and 30 inches cover, the new lines may be laid above the existing line.

c. Sub-Surface Explorations

Whenever necessary to determine the location of existing pipes, valves, or other underground structures, the Contractor shall examine all available records and shall make all explorations and excavations for such purpose. Where the locations of existing utilities are furnished by the Owner, they should be considered approximate only. The Contractor is responsible for locating and protecting all existing utilities whether shown on the drawings or not shown.

d. Protecting Underground and Surface Structures

Temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the program of the work shall be furnished by the Contractor.

e. Construction Equipment

Mechanical equipment may be used for trenching and excavating; however, in places where the operation of same will cause damage to trees, shrubbery, pavements or existing structures, above or below ground, hand methods shall be employed. Where a main is installed along paved streets, only rubber-tired equipment will be allowed for excavation and backfilling; the use of bulldozers or

equipment on tracks will not be permitted. The Contractor will be responsible for any damage done to paved streets or lawns. Either air hammers and/or concrete saws should be used for cutting concrete pavement.

f. Unsuitable Conditions

No pipe shall be laid or manholes placed in water or unsuitable soils conditions. Unsuitable soil, as determined by the Engineer of record, shall be removed or replaced with an approval material.

g. Trench Water

At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

h. Setting Valves and Boxes

(1) Valves and Fittings

Gate valves and pipe fittings shall be set and jointed to new pipe in the manner heretofore specified for cleaning, laying and jointing pipe.

(2) Valve Boxes

Cast-iron valve boxes shall be firmly supported and maintained, centered and plumb, over the wrench nut of the gate valve and box cover flush with the surface of the finished pavement or at such other level as may be directed.

i. Cutting Pipe

Cutting of pipe for inserting fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe.

j. Dewatering

The Contractor shall provide all necessary pumps to dewater the site properly, shall provide all labor and materials required to keep an open excavation dewatered during construction; and shall provide all necessary sheeting, bulkheads, drains, etc., so that construction

operations may be performed under dry conditions. Discharge from pumps must be led to natural drainage channels, to drains, or to stormsewers. Pump discharge quality and method shall conform to FDEP standards.

k. Service Pipe

Service pipe shall have a minimum depth of 30 inches at all highway crossings and 18 inches elsewhere. The requirements for trenching and backfilling shall apply. Removal of pavement or sidewalk will not be permitted for water service lines. They may be installed by jacking, boring, or pushing under sidewalks.

l. Casing

Steel casing shall be installed by either jacking or boring at the option of the Contractor. Any section damaged by the installation shall be removed from the casing leaving both ends free from splits or other rough edges, which might damage the carrier pipe. All state highway crossings shall require steel casing and have appropriate FDOT permits. All county road crossings shall have the appropriate county permits. All piping in side casings shall be installed using casing spacers and end seals. Within the city limits the contractor shall obtain all required permits and provide copies of the permits to the Public Works Director before work begins.

3. Anchorage of Bends, Tees, and Plugs

a. Thrust Backing Placement

Reaction or thrust backing shall be placed on all pipe lines two inches in diameter or larger at all tees, plugs, caps and at bends deflecting 22-1/2 degrees or more, or movement shall be prevented by attaching metal rods or straps. **All fittings to have meg-a-lug.**

b. Materials for Thrust Backing

Reaction or thrust backing shall be of concrete that has a 28-day compressive strength of not less than 2,000 psi. Reaction backing will be placed in accordance with the details on the construction plans.

Backing shall be placed between solid ground and the fitting to be anchored. Building paper (30# felt) shall be placed between the pipe fitting and the concrete to aid in accessibility for repairs. The backing shall, unless otherwise directed, be so placed that the pipe and fitting joints will be accessible for repairs. No extra payment will be made for this material, but shall be included in the unit price bid for the various sizes of pipe.