CHAPTER 3.12
SUBSURFACE DRAIN PIPE

Sections:

3.12.005 GENERAL. Buried drain pipe with open joints or perforated pipe shall be provided for the drains in the locations shown on the Drawings. The Contractor shall furnish and lay the drain pipe.

3.12.010 MATERIAL. Drain pipe may be perforated PVC pipe (ASTM D-1784), perforated or non-perforated concrete sewer pipe. Corrugated polyethylene piping per ASTM F-405-77a may also be used if installed with direct burial laser grade control equipment.

A. Non-perforated pipe shall be extra-strength non-reinforced concrete pipe. The pipe may be furnished with either bell-and-spigot or tongue-and-groove joints. Laying lengths of the pipe shall not exceed four (4) feet. To insure open joints between lengths of pipe, spacer lugs approximately one-eighth (1/8) inch high located on the one-third (1/3) or one-forth (1/4) points around the perimeter shall be provided at each joint between lengths of drain pipe. The lugs may be cast on one end of the pipe during manufacture and similar to the details shown on the Drawings, or may be gasket-type lugs of plastic, metal, or other suitable material cemented to the pipe by the Contractor and approved by the City Engineer.

B. Perforated pipe shall be PVC, extra-strength non-reinforced concrete pipe (ASTM-C 14) or reinforced concrete pipe (ASTM-C-76). All of which shall have one-forth (1/4) inch diameter perforations or as approved by the City Engineer. Concrete pipe may be furnished with bell-and-spigot or tongue-and-groove joints. Laying lengths of pipe shall not exceed five (5) feet.

3.12.015 PIPE LAYING. Gravel backfill shall be placed under and over the pipe to the minimum depth as shown on the Drawings. The pipe shall be laid carefully on the gravel in a workmanlike manner and to the lines and grades shown on the Drawings or established by the City Engineer. The joints for unperforated pipe shall be covered with asphalt-saturated felt strips placed to extend over the upper half of the circumference of the pipe and to not less than four and one half (4½) inches in each direction from the joint.

A. The maximum allowable departure from grade shall not exceed ten (10) percent of the inside diameter of the drain pipe, and in no case shall the departure exceed 0.1 foot. Where departures occur, the rate of return to established grade shall not exceed two (2) percent of the pipe diameter per joint of pipe. The maximum allowable departure from alignment shall not exceed twenty (20) percent of the inside diameter of the drain pipe, with a rate of return to the established line not to exceed five (5) percent per joint of pipe.

B. The finished bed for all pipe shall be made smooth, including removal of material under the bell, so that the full length of pipe will be evenly and uniformly supported. The pipe shall be laid and completed with adjacent ends closely abutted and with the bell ends upgrade. Where necessary, as determined by the City Engineer, mechanical means shall be used to hold the pipe in place. Any pipe which is broken, cracked, or otherwise unsuitable, as determined by the City Engineer, shall be removed and replaced at the Contractor's expense. The water level in the trench area where the pipe is being laid shall be held to a minimum. During placement of the pipe, the water level in the trench shall not exceed fifty (50) percent of the diameter of the pipe above the invert of the pipe. Water may be removed by permitting the water in the trench to flow down the previously installed drain pipe, provided that a screen cover is kept continuously in place over the exposed end of the pipe at all times, except when additional pipe is actually being placed. The screen used for this purpose shall be approved by the City Engineer and shall have maximum mesh openings of one-eighth (1/8) inch. The pipe shall not be covered with backfill until it has been inspected and approved by the City Engineer. Unless otherwise approved by the City Engineer, the pipe shall not be

covered with backfill except in the presence of a duly authorized City Inspector. After approval, the trench shall be backfilled as prescribed in Chapter 3.06.

C. The Contractor shall keep the pipe drain and manholes free from deposits of mud, sand, gravel, or other foreign matter and in good working condition until the construction is complete and accepted. Upon completion of the drain, if a clear and unobstructed view of the whole bore of the pipe cannot be obtained between manholes by use of a light or sun reflector, a device approved by the City Engineer, having a diameter one (1) inch less than the drain tile to be tested, shall be pulled through the drain between manholes. Any obstruction found in the drain shall be removed by the Contractor without cost to the City. Any methods used by the Contractor to remove deposits of mud, sand, gravel, or other foreign matter from the drains, such as use of water or air pressure, shall be subject to the approval of the Engineer.