

SECTION 4 - TESTING

1. GENERAL

Upon completion of construction the Contractor shall remove all sand, dirt, brick and other foreign materials from the sewers and shall conduct his own inspection to locate any defects and determine when the sewers are ready for testing and final inspection by the Engineer and the Engineering Department. All apparent defects shall be corrected by the Contractor before testing or final inspection is requested.

No sewer line shall be allowed to discharge into the existing sewage system until said line is free of foreign materials and obvious defects have been corrected. New lines, then, must remain disconnected from the existing system by actual physical separations, by plugs of type approved by the Engineering Department, or by other means approved by the Engineering Department.

Testing of the system before final inspection by the Engineering Department shall consist of visual observation and leakage tests conducted by the Developer and observed by the Engineering Department. The Engineering Department will not conduct a final inspection until receiving written notification from the Developer that the construction is complete in accordance with approved Drawings and Specifications. This notification shall include a report of the results of the visual observation and leakage tests.

2. PIPELINE TESTING

Pressure sewers installed as part of this project shall be tested for leakage as described herein. The tests shall be run on the collector mains and all services installed as part of this project. The primary test shall be hydrostatic pressure test which shall, if necessary, be supplemented by a leakage measurement test. The Contractor and/or Developer shall furnish all labor, tools, and equipment and materials for making the test. In the event that the test results are unsatisfactory, the Contractor shall correct the defect(s) and repeat the test until satisfactory results are obtained. Test shall be made in the presence of the Engineering Department.

All test equipment shall be in first class working order for use in any tests. Pressure gauges used for pressure and leakage tests shall be good quality gauges, accurate to within 2 1/2% of full scale, range to 200 psi (300 psi where specified test pressure exceeds 175 psi), 2 inch (minimum) diameter, 5 point graduations. Water meter for leakage tests shall be standard 5/8 x 3/4 water meter meeting requirements of AWWA C 700 for cold water meters-displacement type.

Pressure gauge and water meter shall be subject to such tests for proof of accuracy as the Engineering Department may require.

Pipeline Pressure Test

Each section of pipeline, including services, shall be subjected to a pressure test. The section to be tested shall be valved off after having been filled with clean water and all entrapped air expelled. If valves are not available at high points, Contractor shall make

the necessary taps to allow entrapped air to be expelled. Such taps shall be plugged after testing has been satisfactorily completed.

After the line section has been filled with water and entrapped air expelled, a positive displacement test pump shall be used to pump clean water into the pipeline section and pump up to a test pressure of 75 psi. The test pump shall then be valved off from the system and the pressure shall be observed over a period of at least one hour.

A drop in pressure of 5 psi or more during the one hour test period shall indicate test failure.

The Contractor shall correct the problem(s) and repeat the test as necessary until the pipeline section passes the pressure test.

Should the Contractor be unable to obtain satisfactory results in the pressure test, a leakage test must be satisfactorily performed or the pipeline section shall not be accepted.

Pipeline Leakage Test

A leakage test must be performed on any pipeline section failing the pressure test described above. Such test shall be performed as a supplementary test after the Contractor has utilized all reasonable methods to find and correct the cause of the pressure test failure.

The test shall be performed utilizing a water line tap (corporation stop) or other tap as approved by the Engineer and a standard water meter to measure line leakage. Leakage test shall be run at system operating pressure plus 25 psi for a period of 24 hours, maximum, 2 hours, minimum, with actual time as designated by Engineer to allow practical observation of leakage.

Leakage during the designated test period shall not exceed that tabulated below. Leakage is defined as the amount of water which must be supplied to the test section to maintain the specified test pressure after the initial filling of the line with water.

ALLOWABLE LEAKAGE PER 1000 FEET OF PIPELINE

(Gallons per 2 hours)

Line Size, <u>Inches</u>	Test Pressure, psi			
	<u>25</u>	<u>50</u>	<u>75</u>	<u>100</u>
1-1/4	0.05	0.07	0.09	0.10
1-1/2	0.06	0.08	0.10	0.12
2	0.08	0.11	0.14	0.16
2-1/2	0.10	0.14	0.17	0.20
3	0.12	0.17	0.21	0.24
4	0.16	0.23	0.28	0.32

The following formula shall be used for computing allowable leakage:

$$Q = \frac{L D P}{125,000}$$

Where: Q is allowable leakage, gallons per hour

L is length of pipe tested, feet

D is diameter of pipe tested, inches

P is average pressure during leakage test,
pounds per square inch gauge.

All visible leaks are to be repaired regardless of the amount of leakage.

3. TESTING OF VALVES

Upon completion of the work, the Contractor/Developer shall operate all buried valves in the presence of the Engineering Department Representative to verify proper operation of each valve.

4. TESTING OF GRINDER PUMPS

Upon completion of the work, the Contractor/Developer shall operate and test all grinder pumps in the presence of the Engineering Department Representative to verify proper operation and performance of each pump station. This test shall include operating all valves, measuring amp draw for pumps, and checking all controls.