



# POLYVINYL CHLORIDE (PVC) SEWER PIPE MATERIAL INSTALLATION AND SPECIFICATIONS

### LOCATIONS FOR USE

*PVC sewer pipe may be used in residential developments as specified on approved subdivision improvement plans.*

### SCOPE

*This specification covers the requirements for trench excavation, pipe embedment, joining and installing pipe with accessories, backfill placement and installation testing in addition to the material requirements.*

### TERMINOLOGY

*The trench cross-section identifies the meaning and limits of the terminology used in this specification.*

### STORAGE AND HANDLING OF PVC PIPING MATERIALS

*The contractor shall store and handle all PVC piping material at the job site in accordance with UNI-B-5-77 specification of the UNI-BELL PLASTIC PIPE ASSOCIATION.*

### TRENCH CONSTRUCTION

*All trenches shall be excavated on the alignment and to the elevations as indicated on the approved drawings. Any field revisions shall not*

*be made without written approval of the City Engineer.*

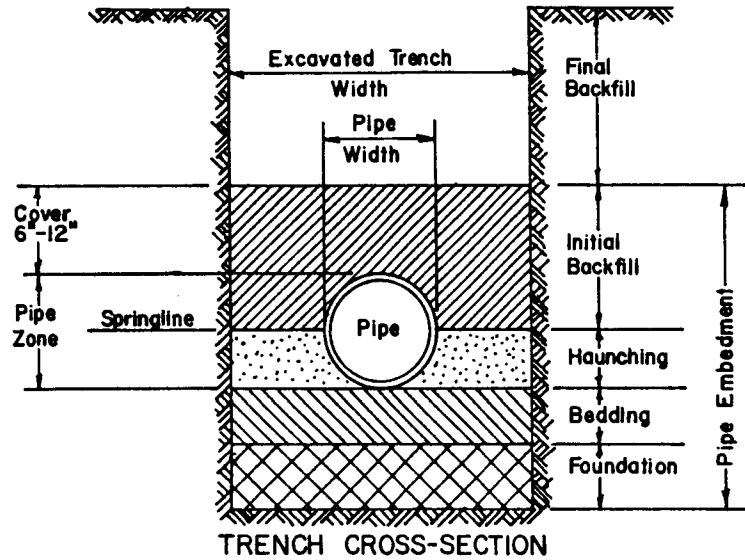
*Where work is near utility items the contractor shall notify the utility company 24 hours in advance of beginning any excavation.*

*The minimum trench width shall be as follows:*

Pipe Size (inches)	Trench Width (inches)
6	18
8	24
10	24
12	30
15	30

*Wider trenches may be used where unstable soil or depth requirements for working room or safety so require. In such a case, a subtrench shall be used having a width shown above as the minimum trench width.*

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NTC 11-19-93		CK. BY _____ DATE <u>7-77</u>	
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**TRENCH BOTTOM**

The soil surface at the trench bottom shall be free of any protrusions which may cause point loading on any portion of the pipe or pipe bell, and shall provide a firm, stable and uniform support for pipe.

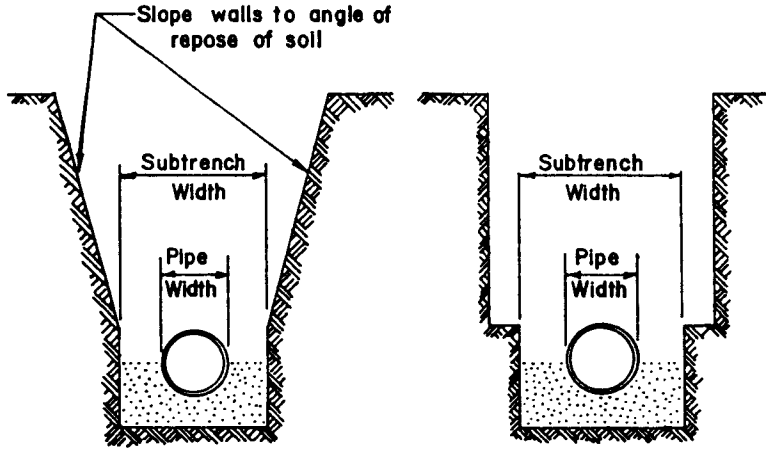
When an unstable trench bottom condition is encountered it must be stabilized. On city contracts, any special foundation work required shall be considered extra work subject to extra payment.

Over excavation shall be filled with an approved embedment material and compacted to a density equal to that of the native soil at no expense to the city.

Rocks, hard pan, cobbles, boulders or stones larger than 1 1/2" shall be removed from the trench bottom to permit a minimum bedding thickness of 6 inches under the pipe.

**EMBEDMENT MATERIALS**

All PVC pipe shall be installed with embedment materials meeting UNI-B-5-77 specifications for either Class II or Class III. Class II coarse grained soils, containing less than 5 per cent fines, shall be compacted by saturation or vibration. Class III coarse grained soils which contain between 5 and 12 per cent fines shall be compacted by either hand or mechanical tamping, saturation, or vibration, whichever method meets the required density.



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**Class III coarse grained soils containing more than 12 per cent fines shall be compacted by hand or mechanical tamping. When tamping methods are used backfill shall be placed in 4" to 6" lifts.**

**When compacting by saturation, care shall be taken to prevent flotation of the pipe. saturation shall not be used during freezing weather. Erosion of trench wall at the pipe sides and bottom of trench shall be prevented during jetting.**

**In using compaction equipment, avoid contact with the pipe and do not compact directly over the pipe until sufficient backfill has been placed over the pipe to avoid damage to the pipe.**

#### **BEDDING**

**Bedding shall be used to bring the trench bottom to grade and shall provide uniform support under the pipe. Blocking shall not be used. Bell holes at each joint shall be provided to permit joint assembly while providing uniform pipe support.**

#### **HAUNCHING**

**THE MOST IMPORTANT FACTOR AFFECTING THE PIPE PERFORMANCE AND DEFLECTION IS THE PLACEMENT OF THE HAUNCHING MATERIAL. The haunching material shall be placed and consolidated avoiding both vertical and lateral displacement of the pipe from proper alignment.**

#### **INITIAL BACKFILL**

**Little or no tamping of the initial backfill directly over the top of the pipe to a point 6"**

**above the pipe shall be permitted. Final backfill shall be compacted to an approved density equal to adjoining soil materials.**

#### **LAYING PROCEDURE**

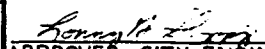
**Each pipe length shall be clean and free of damage. Pipe bells shall be laid on the upstream end. Trenches shall be dewatered. Whenever pipe laying is interrupted and on overnight work stoppage the open ends shall be temporarily plugged to prevent entrance of water, mud or other foreign matter.**

**No curved alignments shall be used.**

#### **JOINING PIPE**

**Shorter than standard pipe lengths may be used with field cuts made with hand or mechanical saws or pipe cutters. Ends shall be cut square and perpendicular to the pipe axis. Edges shall be beveled. Spigots shall be marked with a wax crayon for proper length of assembly. After the joint is made the bell hole shall be filled with bedding or haunching material. The joints shall be assembled in accordance with the recommendations of the manufacturer of the pipe.**



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**PIPE AT MANHOLES**

All manhole connections shall be made in accordance with the details shown on Sanitary Sewer Manhole Details drawings number \_\_\_\_\_ and \_\_\_\_\_

**LATERAL CONNECTIONS**

Fittings shall be used for all building laterals on new construction. Taps into existing PVC lines shall be made using a gasketed fitting in conjunction with a gasketed saddle wye or with a repair sleeve or tie with all stainless steel clamps. Saddles mounted on the pipe with solvent cement or gaskets shall be secured by stainless steel clamps. Holes for a saddle shall be made with a mechanical hole cutter.

On new lines the contractor may use fittings which are prefabricated using pipe sections, molded saddles and PVC solvent cement, provided the solvent cement used in fabrication has cured at least 24 hours prior to installation.

Cementing metered connections without a molded fitting is prohibited.

Each property shall be served by a separate lateral connection to the main sewer. A joint riser shall be prohibited.

All caps or lateral plugs shall be installed in a manner to prevent leakage and to allow testing.

**FINAL BACKFILL**

The final backfill material must not contain boulders, foreign clumps of dirt or rubble. In all paved areas (under new pavement plus 24 inches each side, under proposed driveway aprons and sidewalk) special backfill shall be placed with approved compaction. In lawn or open areas, free

of proposed improvements, the excavated material of acceptable nature may be used as backfill.

All PVC pipe must have 30 inches of cover before a whole load may be allowed. The cover must be 48 inches before hydrohammer or impactor types of compactors may be used over the pipe. The use of such compactors shall require that the embedment was placed to at least 85% of Standard Proctor Density.

**ACCEPTANCE TESTS**

All projects shall be tested upon completion. Sewers which contain mud or other dirt may require cleaning with a sewer cleaning ball or high velocity jet before testing.

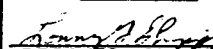
Visual test: Sewer lines shall be free of debris and obstructions.

Leakage Test: Location for leakage testing shall be selected by engineer after work is completed and lateral plugs are in place. The engineer may select low air pressure, water infiltration or water exfiltration as the method of testing.

Air testing: The line between two manholes shall not drop more than 0.5 p.s.i. from 3.5 to 3.0 p.s.i. in excess of the ground water pressure at the top of the sewer in 5 minutes for an 8" line, 6.5 minutes for a 10" line or 7 minutes for a 12" line.

Infiltration: The line shall not exceed 50 gallons per inch of internal pipe diameter per mile per

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BY _____	DATE _____
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day and shall be used only when ground water level is above the top of the pipe throughout the length of the pipe.

**Exfiltration:** The line shall not allow water exfiltration for any length of sewer pipe between manholes to exceed 50 gallons per inch of internal pipe diameter per mile of pipe in 24 hours. The maximum water pressure at any point shall not exceed 25 feet of water. The minimum head shall be 2'-0" above ground water at the top end of the run or over the top of the pipe.

**Deflection testing:** The maximum allowable vertical inside diameter reduction shall be 5.0%. The contractor shall perform deflection tests of pipe runs selected by the engineer. The contractor shall pull a mandrell of proper size through the line (the line must be thoroughly cleaned before this test).

At the time of completion of the work the contractor shall furnish all material, labor and equipment needed for the tests and shall clean lines if required before testing, at no expense to the city. If any selected sewer line is found defect, all sewer lines on the same project shall be given the same test.

The City may make any of the above tests of the lines at any time before 12 months have passed since the contractor has tested the line and completed work on the subdivision or construction contract project. If found defective, upon notice of the city, the contractor may be present for a repeat of the test.

All lines found defective by any test shall be repaired or corrected in a manner approved by the city, by the developer of the subdivision or by the contractor if the contractor was doing the work under contract to the city.

**MATERIAL REQUIREMENTS**

Polyvinyl chloride (PVC) sewer pipe and fittings shall meet the requirements of ASTM D-3034 and the requirements stated herein.

The PVC sewer pipe shall use a flexible gasketed jointing system. The integral ball shall have a gasket between it and the spigot end. The gasket shall be the only element depended upon to make the joint flexible and water-tight.

Gaskets shall be made of rubber and meet the requirements of ASTM F-477, D-1869, C-361 or C-443.

The lubricant used for assembly shall have no detrimental effect on the gasket or on the pipe.

PVC pipe and fittings shall meet the dimension, physical, property and marking requirements of UNI-B-4-77 recommended specification.

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		CK. BY _____	DATE <u>2-22</u>
BY	DATE	<u>Larry B. Allison</u>	
REVISIONS		APPROVED CITY ENGINEER	
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