

MANHOLES

DESCRIPTION

- 1801.1 **General:** Manholes shall be constructed at the locations and elevations shown on the Plans. The size, location and direction of conduits entering or leaving structures shall be as shown on the Plans.
- 1801.2 **Manholes:** Manholes shall be constructed with precast reinforced concrete pipe sections, tapers, adjustment rings and metal frames and covers, as shown on the Standard Detail, "*Standard Type I Manhole*," as specified herein. Brick construction may be used when permitted by the Engineer.
- 1801.3 Manholes shall be placed at the intersections of all main sewer and storm drain lines.
- 1801.4 Manholes shall be placed at all changes of alignment, either vertical or horizontal.
- 1801.5 Manholes shall be placed at all changes of pipe sizes.
- 1801.6 The maximum distance between manholes shall be three hundred fifty feet (350'), except that to six hundred feet (600') for mains fifteen inches (15") in diameter, or larger, as directed by the Engineer.
- 1801.7 A one-tenth foot (0.1') energy drop shall be allowed for flow through manholes with a deflection of forty-five degrees (45°) or more.
- 1801.8 Invert elevations of varying size pipes leading into and out of manholes shall be set by matching elevations of the pipe soffits.
- 1801.9 Manholes shall be placed at the connection of an eight inch (8") or larger service lateral connected to an equal or larger sewer main.
- 1801.10 **Drop Manholes:** Whenever the vertical distance between the inverts of the sewer line connections of a manhole exceeds thirty inches (30"), a Standard Drop Manhole shall be constructed, as shown on the Standard Detail, "*Standard Drop Manhole*."

MATERIALS

- 1802.1 **Precast Sections:** Precast concrete pipe sections, taper and adjustment rings shall conform to the requirements of A.S.T.M. Designation C-478-03a.
- 1802.2 **Castings:** Frames and covers shall be of good quality cast iron, shall be of three hundred-eighty pounds (380 lbs) minimum weight, shall be made to the

dimensions shown on the Plans and shall be so milled that all covers shall set evenly and firmly in the required frames.

- 1802.3** **Concrete:** Concrete for use in constructing manhole bases shall be Class A, and shall conform to the requirements of Section 90, "**Portland Cement Concrete,**" of the Standard Specifications. Portland Cement shall conform to Standard Specifications for Type II cement, A.S.T.M. Designation C150-02ae1 with subsequent amendments.

CONSTRUCTION PROCEDURE

- 1803.1** The contractor shall perform all excavation necessary to construct the manhole structure. Excavation shall include the removal and disposal of all materials of whatever nature encountered. Any damage resulting from a lack of adequate shoring, bracing, or sheathing shall be repaired at the contractor's expense. Excavation for each manhole shall be confined to as small an area as practicable and as directed by the Engineer.

Precast concrete sections shall be joined with mortar composed of not less the one (1) part Portland Cement to two (2) parts clean, well-graded sand mixed together with water. Fire clay may be used to improve workability. The quality and proportions of the components of the mortar shall be subject to the approval of the Engineer. The ends of precast sections shall be thoroughly cleaned and wetted prior to placing of mortar. Mortar bands shall be applied completely around the joint both on the inside and outside of the precast sections.

The external bands shall be one and one-half inches (1 ½") thick, shall be six inches (6") wide and shall be centered on the joint. Immediately after finishing, the band shall be covered with wet building paper the width of the band. It shall be applied so that it adheres to the band.

- 1803.2** **Backfill:** Structure backfill shall be compacted in the following manner.

- a) The backfill (except the top twenty-four inches (24") below street subgrade) shall have a relative compaction of not less than ninety percent (90%).
- b) The top twenty-four inches (24") below street subgrade shall have a relative compaction of not less than ninety five percent (95%).

Water shall be taken from a city owned meter only. Contractor shall pay for all water used for this project. Contractor shall rent the number of meters he requires by payment of appropriate fees to the City Finance Department. Contractor will be billed for all water used and any damage to the meters. City personnel will move the meters when requested.

1803.3 **Resurfacing:** After compaction of backfill and removal of excess earth, the trench to be resurfaced shall be prepared to receive the resurfacing materials. The edges of the existing pavement shall be trimmed to straight, vertical faces. Broken or damaged pavement adjacent to the trench shall be removed and replaced.

Pavement and base thickness shall be replaced in kind but in no case shall the pavement be less than a minimum of two inches (2") Asphalt Concrete over four inches (4") of Aggregate Base or as specified in the Special Provisions. The Aggregate Base and Asphalt Concrete shall conform to the Standard Specifications of the State of California, Department of Public Works, Division of Highways, latest edition.

The Aggregate Base shall be constructed in accordance with Section 26 of the Standard Specifications and in accordance with the requirements for Class 2, Aggregate Base. Aggregate shall conform to the grading specified for three-quarter inch (3/4") maximum aggregate.

Asphalt Concrete shall be constructed in accordance with Section 39, **Asphalt Concrete** of the Standard Specifications. The mineral aggregate for Asphalt Concrete shall conform to the grading specified for one-half inch (1/2") maximum aggregate.

MEASUREMENT AND PAYMENT

1804.1 Payment will be made at the contract unit price per structure in accordance with the provisions of Section 901.1, General Provisions.