

**DIVISION VII DESIGN STANDARDS**  
(Rewritten & adopted by Ordinance 2009-06)

**Section 7.00 General Specifications**

Except where modified by this Chapter, all materials furnished and work performed shall be done in accordance with the most current edition of the County of Placer General Specifications (herein referred to as General Specifications), or as directed by the District. In the event of conflict, error, ambiguity or discrepancy between the General Specifications and this Chapter, this Chapter shall take precedence.

**Section 7.01 Sewer Plans**

Before a sewer permit may be issued, plans for the proposed construction shall be submitted to and approved by the District. The plans submitted shall become the exclusive property of the District. After the fees required by this Chapter have been paid, the District shall check the submitted plans for compliance with the requirements of this Chapter and other applicable laws and ordinances of the District.

- A. The plans submitted shall be identical to plans for the same project submitted to other governmental entities. The District shall be notified of any changes in the plans. Any changes in the plans must be checked and approved by the District prior to the issuance or modification of the sewer permit and shall be subject to District Code Division VI (Fees and Charges).
- B. All structures, facilities, and other appurtenances shown on the plans shall comply with all applicable District standards including, but not limited to, design.
- C. The plans submitted shall be adequate for the District to determine the proposed demand to be placed on the District's sewer system. The plans submitted shall be adequate for the District to calculate the applicable fees and charges.
- D. Any plans submitted for approval under the provisions of this Chapter shall be prepared by or under the direction of and shall be signed and stamped by a Registered Civil Engineer of the State of California.
- E. Soil conditions, particularly in areas known to have high groundwater, rock, or filled ground, shall be prospected and the results shown on the profile.
- F. All substructures which will be encountered in the construction or which will be installed as part of the improvement shall be shown and designated on the plan. Large substructures which require special treatment in the design of the sewer shall also be shown in the profile.
- G. If a literal compliance with any engineering requirements of this Chapter is impossible or impractical because of peculiar conditions in no way the fault of the person requesting an exception, and the purposes of this Chapter may be accomplished and public safety secured by an alternate construction or procedure, and the District so finds that such alternate complies with sound engineering practice, the District may grant an exception permitting such alternate construction or procedure.
- H. For estimating wastewater design flows, unit wastewater generation rates shall be per the table below, or as directed by the District. Wastewater flow estimates for facilities not listed

shall be per the latest edition of the Uniform Plumbing Code. A peaking factor of 2.6 shall be applied for planning and design of sewer systems.

#### Unit Wastewater Generation Rates

Land Use	Recommended Unit Flow Factor (gpd/unit)
<b>Residential</b>	
Single Family	291
Single Family – Multiple Units	475
Multi-Family – Individually Metered	151
Multi-Family – Master Metered	244
<b>Other</b>	
Hotel/Motel	304
Commercial	0.38 gpd/ft <sup>2</sup> of building space

I. All surveying and design drawings shall conform to CA State Plane, Zone II, NAD 83 U.S. Survey FT for vertical datum and NAVD 88 for vertical datum.

### **Section 7.02 Sewer Service for Large Lots**

Where a lot is of sufficient size that the County Zoning Ordinance does not prohibit its division into smaller parcels, each of such possible parcels upon which one or more buildings containing plumbing facilities are or may be located, may be considered as a separate lot. Separate house laterals may be constructed to the main line sewer for each of such possible parcels except where the owner has entered into an agreement with the District, recorded against the property, which provides that the land will be held as a unit and that before any division of land is made, separate sewerage facilities will be provided for each parcel. If the main line sewer does not extend to a point from which such possible parcels can be served in accordance with this Division, the main line sewer must be extended in compliance with this Chapter.

### **Section 7.03 Sewer Easement Requirements**

A person who wishes to have constructed a sewer in an easement under the provisions of this Chapter shall present to the District a request for processing, sufficient information to enable the preparation of written **legal** description **with current Assessor's Parcel Numbers**, the appropriate fees and plans showing the locations of all structures in the proximity of the sewer.

The location and dimensions of a sanitary sewer easement shall be sufficient to provide present and future sewer service to abutting areas and adequate access for maintenance, as determined by the District. No easement shall be less than ten (10) feet in width.

Until the required easements have been properly executed and recorded, no plan shall be approved by the District for construction of sewer facilities across private property and no sewer facility shall be accepted for public use nor placed in use by any person.

#### **Section 7.04 Record Maps**

Two sets of 100% complete drawings delineating a record of sewers and appurtenances shall be filed with the District prior to and as a condition of approval and acceptance of construction. No certificate of final inspection will be issued until "As-Builts" have been filed with the District.

#### **Section 7.05 Size of Main Line Sewer**

The size of main line sewer pipe shall be determined by a Registered Civil Engineer, subject to the approval of the District, but in no case shall it be less than six (6) inches inside diameter unless approved by the District.

Sizes and Grades: Pipes 15" and under in diameter shall be designed to flow at 1/2 depth at maximum flows with  $n = 0.013$ . Pipe 18" in diameter and over shall be designed to flow at 3/4 depth at maximum flows with  $n = 0.013$ .

A main line sewer shall be designed to provide a minimum velocity of two (2) feet per second for pipes flowing one-half full, except that the District may approve a gradient that will develop a lower velocity if the District finds that a gradient that will develop a velocity of two (2) feet per second is unobtainable.

#### **Section 7.06 Depth of Sewer**

The minimum depth for main line sewers shall be five (5) feet.

The depth for residential main line sewers must be sufficient to provide for a house lateral with a minimum depth of at least three (3) feet below the curb grade or street or alley grade at the property line.

Exceptions to the above minimum may be made only as a special condition after review and approval by the District.

#### **Section 7.07 Additional Protection Required**

Sewer pipe installed under a conduit or other structure, or at depths greater than twenty (20) feet, or in other locations where the District determines that additional protection is required, shall be reinforced with a concrete cradle, or encased in concrete, or reinforced by other approved means which will protect the pipe to the same extent.

#### **Section 7.08 Water and Sewer Separation**

Any new development in which all underground utilities are being constructed for the first time must comply with the following sewer and water line separation standards:

- Sewer mains shall be installed at least ten (10) feet horizontally and one (1) foot vertically below water mains located parallel to each other.
- Sewer mains shall be installed perpendicular to and at least one (1) foot lower than water mains crossing the main with connection joints for both mains centered over the crossing.

- If a sewer service lateral parallels a water main or water service lateral, the sewer service lateral must be in a separate trench and located at least twelve (12) inches lower than the water main or water service lateral and at least four (4) feet away from the water main or water service lateral.
- If a sewer main crosses a water service lateral, the sewer main must be located at least eighteen (18) inches lower than the water service lateral.
- If a sewer service lateral crosses a water main or water service lateral, the sewer service lateral must be located at least twelve (12) inches lower than the water main or water service lateral.

Alternative separation criteria may be approved by the District if the criteria meet the requirements of the California Department of Public Health.

### **Section 7.09 Inclusion of Other Utilities within Pipe Trench**

No other utility shall be allowed in the pipe trench excavated for sewers or sewer appurtenances within the County rights-of-way. Utilities crossing over or under sewers shall be adequately marked and protected against future excavation for necessary repair of sewer lines.

### **Section 7.10 Materials**

#### **A. Polyvinyl Chloride (PVC) Gravity Sewer Pipe**

PVC gravity sewer pipe and fittings shall conform to ASTM D 3034 for diameters from 4" to 15", and ASTM F 679 for 18" to 24", with integral-bell and gasket joints. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D 3212.

#### **B. PVC Pressure Pipe**

PVC Pressure Pipe (PVC C900 & C905): PVC C900 & C905 pipe shall conform to and meet the requirements of AWWA C900 and C905, respectively. Compound material shall meet ASTM D1784, cell class 12454-B. Pipe shall be supplied with an integral bell with gasket meeting the requirements of ASTM F 477. The gasket joint assembly shall meet the requirements of ASTM D 3139.

#### **C. High Density Polyethylene Pipe (HDPE)**

HDPE pipe shall be high molecular weight, high density polyethylene pipe. The material shall be listed by the Plastic Pipe Institute (PPI) with a designation of PE 3408 and have a minimum cell classification of 345434C, D, or E (inner wall shall be light in color) as described in ASTM D3350. The pipe material shall meet the requirements for Type III, Class B or C, Category 5, Grade P34 material as described in ASTM D1248. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe. Pipe (excluding black colored pipe) stored outside shall not be recycled. Pipe and fittings shall be made in conformance with ASTM F714 and ASTM D3261 as modified for the specified material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall

be uniform in density and other physical properties. Any pipe not meeting these criteria shall be rejected.

D. Ductile Iron Pipe (DIP)

Ductile iron pipe shall conform to and meet the requirements of ANSI/AWWA C151/A21.51. It shall be the thickness class required for supporting the imposed loads. Joints shall conform to ANSI/AWWA C111/A21.11. Fittings shall be ductile iron and shall meet the requirements of ANSI/AWWA C110/A21.11. An exception to this is the 4 to 12 inch pipe size whereby ductile iron compact fittings may be used provided they meet the requirements of ANSI/AWWA C153/A21.53 and have a working pressure rating of 350 pounds per square inch.

### Section 7.11 Manholes

A. General

This work shall consist of the construction of manhole structures at the locations as shown on the plans.

B. Manhole Placement

Manhole structures shall be placed in the main line sewer at all changes of alignment and gradient. The maximum distance between structures shall be not more than four hundred (400) feet. All structures shall be designed according to **the standard drawings of this Chapter**. Where the location of two manholes is determined by intersecting lines, the distance between intervening manholes shall be approximately equal.

Sewers on curved alignment with a radius of less than four hundred (400) feet shall have manholes spaced at a maximum of three hundred (300) feet and adjusted down to fit the individual case. Curved alignments shall not be used unless specifically permitted by the District.

C. Materials

For precast manhole sections, the manhole sections, adjustment rings and tapered sections with tongue and groove joints shall conform to ASTM Designation C478. Manhole cones shall be constructed with an internal flat vertical surface at the upper joint to allow installation of internal manhole chimney seals. Vertical surface shall measure no less than two (2) inches and be continuous along the entire circumference of the top cone opening. Metal forms shall be used in the manufacture of the precast sections so as to obtain smooth surfaces. The concrete shall be well compacted by being centrifugally-spun, vibrated, or mechanically-tamped.

For cast-in-place manhole bases, concrete shall conform to ASTM Specification C478-64T. Portland cement shall be Type II, conforming to the requirements of ASTM Designation C-150.

Frame and cover assemblies shall be traffic weight, South Bay Foundry Model SBF-1900-OS-CPH, or approved equal, marked sanitary sewer, ten (10) degree tapered cover with o-ring. Frames and covers shall be matched and marked in pairs before delivery. Manhole covers shall fit without rocking.

Joint sealant shall be "Ram Nek" as manufactured by K. T. Snyder Co., or approved equal.

If used, mortar shall consist of one (1) part portland cement to two (2) parts clean, well graded sand. All sand shall pass through a one-eighth (1/8) inch screen. Admixtures may not exceed the following percentages of weight of cement: hydrated lime ten (10) percent; diatomaceous earth or other inert materials five (5) percent. Mortar shall be of such consistency as to readily adhere to all surfaces. Mortar shall be used within thirty (30) minutes of mixing.

#### D. Construction

Manholes shall be watertight structures constructed in accordance with the details of this Chapter.

The ends of barrel sections, cone sections and grade rings shall be of such design and construction that when properly laid they shall have a smooth and uniform surface. To prevent infiltration or exfiltration each joint shall be sealed with a flexible joint sealant compound in accordance with the manufacturer's recommendations.

The inside bottom of manholes shall be shaped to provide channels conforming to the size and shape of the inlets and outlets to the manhole. The exact configuration of transitions from branch size to mainline sizes shall be as directed by the Engineer. All work shall be cured for a period of ten (10) days after being placed and shall be protected from injury.

During the pour of the manhole base, adequate care shall be taken to ensure the proper bond between the sewer pipe and the concrete to prevent leakage at that location.

Concrete surfaces shall be furnished as specified in Section 51 of the State of California Standard Specifications. Finish for surfaces underground and not exposed to view shall be "Ordinary Surface Finish." Finish for surfaces exposed to view and manhole bottoms, shall be Class 1.

Grade rings may be set with Polymer Concrete Shimz or mortar if necessary for adjustment of the final cover elevation. A full bed of mortar shall be used, and all excess mortar shall be trimmed flush. The outside of each mortar joint shall be sealed with an approved bituminous sealing compound. Mortared joints shall not exceed a thickness of one-half (1/2) inch. The total height of grade rings shall not exceed twelve (12) inches. In paved areas or areas of high groundwater, or when mortar is being used to adjust final elevation, an internal rubber chimney seal and/or seal extension shall be installed. The internal rubber seal and seal extensions shall be as manufactured by Cretex Specialty Products, or approved equal. The seals and extensions shall have a minimum thickness of three-sixteenth (3/16) inches and shall be extruded from a high grade rubber compound conforming to the applicable requirements of ASTM C93. The bands used for compressing the seal and extension against the manhole shall be fabricated from 16 gauge stainless steel conforming to ASTM A240 Type 304, any screws, bolts or nuts used on the band shall also be Type 304 stainless steel.

The top of manhole elevations shown on the plans are approximate only. In general, the finished grade of the manhole shall be set one-half (1/2) inch below pavement grade in paved areas, four (4) inches below grade in shoulders or similar unpaved areas, and one (1) inch above grade in other areas. When the manhole is located in the pavement area, it shall not be constructed to final grade until the pavement has been completed.

### **Section 7.12 Connection to Existing Manhole**

Connections to existing manhole walls shall be made by core drilling into the wall of the manhole. Pipe penetration through the manhole wall shall be sealed with a watertight seal by one of the following:

- Equipping the pipe with a flexible pipe-to-manhole connector (Kor-N-Seal®, or equivalent) that provides a watertight seal of the pipe to the manhole. The rubber for the connector shall comply with ASTM C923 and consist of elastomers designed to be resistant to ozone, weather elements, chemicals, including acid, alkalis, animal and vegetable fats, oils, and petroleum products from spills. Stainless steel elements of the connector shall be non-magnetic series 316 stainless steel.
- Alternative mechanical seal requiring prior District approval
- If either of the above pipe to manhole connectors cannot be used due to constraining field conditions, the following application will be allowed on a case-by-case basis: inserting the end of the pipe through the core drilled opening, and either using a manufactured water stop around the pipe centered in the penetration or packing the opening around the pipe with Ram-Nek and primer, then covering with a stiff mix of cement mortar, thoroughly compacted. The mortar shall be composed of one part Type II Portland cement and three parts clean sand. The mortar shall be troweled smooth and flush with the interior surface of the manhole.

Connection of a pipeline to an existing manhole which has a stub-out shall be accomplished with a rigid repair coupling (FERNCO 1056-66RC, or equal). No flexible rubber couplings are allowed.

The use of impact hammers to break into a manhole wall is prohibited.

### **Section 7.13 Drop Manholes**

When in the opinion of the District the flow line grades are such as to require a drop manhole this shall be accomplished as detailed in the standard details. A drop inlet shall not be permitted within five (5) feet of the flow line.

### **Section 7.14 House Laterals**

For each lot, a four (4) inch internal diameter house lateral sewer shall be provided in the street straight in alignment and grade between the mainline sewer and the property line, with minimum depths as required in this section and at right angles to the mainline sewer whenever possible. Existing four (4) inch house laterals and four (4) inch wyes may be used for connection to the sewer.

A District inspector shall be present during the installation of all house laterals to ensure that the locations of all house laterals are properly marked on as-built maps and to ensure that the house laterals are marked with a steel stake or some other means to guarantee ease of location of the house lateral at any future date. No backfill shall occur without prior District inspection.

The depth of house laterals at the property line shall be sufficient to provide service to the lowest or farthest point to be served on the lot at a minimum grade of two (2) percent with the top of the pipe not less than one foot below the ground surface at any point. The minimum depth for house laterals shall be three (3) feet below the curb grade or the street or alley grade at the property line.

House laterals shall be installed in accordance with the standard details within this chapter and the UPC.

**Section 7.15 Cleanouts**

A cleanout shall be installed in each building lateral at the property line of the premises being provided with sewer service, and a second cleanout installed within 5 feet of where the lateral exits the structure foundation. Cleanouts located under the house are not acceptable; rather the cleanout must be located outside the building foundation. Additional cleanouts shall be installed at intervals not to exceed one hundred (100) feet, and at any other point the owner or their agent may select for the purpose of keeping said sewer pipeline clean and free of obstruction. A cleanout, boxed to grade, shall also be installed at the property line on vacant parcels, and on the upstream side of the fitting at all forty-five (45) degree or greater bends.

All cleanout boxes shall be constructed according to the standard detail provided in this Chapter. Cleanout boxes shall be set to grade and backfilled to prevent accidental displacement or removal. Lids shall have "SEWER" or equivalent imprinted on the lid. Lids with verbiage other than a sewer utility designation (i.e., Water, Gas, etc.) imprinted on the lid are not permitted.

All cleanout risers must be from three (3) to eight (8) inches below finished grade and boxed to finished grade with an appropriate removable watertight plug in the end of the riser. Cleanout risers and appropriate boxes are required on all cleanouts.

**Section 7.16 Excavation and Backfill**

Excavation and backfill for all sewers shall conform to Section 19-3.01 and Section 71-1.03 of the Placer County General Specifications.

**Section 7.17 Trench Bedding and Initial Backfill**

Trench bedding and initial backfill shall consist of material placed from the bottom of the trench to one (1) foot above the top of pipe or as required by the District. This material shall have a minimum sand equivalent of twenty-five (25) and shall pass the three-quarter ( $\frac{3}{4}$ ) inch aggregate grading requirements shown below. All exceptions shall be approved by the District.

**AGGREGATE GRADING REQUIREMENTS**

Percentage Passing For  $\frac{3}{4}$ " Maximum Aggregate

Sieve Size	% Passing
1"	100
$\frac{3}{4}$ "	90-100
No. 4	35-60
No. 30	10-30
No. 200	2-5

Compactable concrete may also be approved as pipe bedding material. The compactable concrete shall be prepared and placed as specified in Section 19-3.061 of the General Specifications. When determined by the District that the foundation material is wet or rocky, drain rock bedding material shall be placed to a depth of at least six (6) inches below the pipe or one-fourth (1/4) the outside diameter of the pipe barrel, whichever is greater. This material shall be washed rock one hundred (100) percent passing the three-quarter (¾) inch screen, and wrapped in filter fabric as appropriate to prevent migration of fines into rock voids.

In excessively wet areas a special foundation design shall be required by the District.

### **Section 7.18 Intermediate Backfill**

Intermediate backfill shall consist of material placed from one (1) foot above the pipe to subgrade. All intermediate backfill shall be free of debris and organic matter, and shall be free of any rocks over three (3) inches in diameter.

Sewer lines placed with less than one (1) foot of intermediate backfill, shall be encased in concrete or provided with a concrete cover, cement slurry or other method approved by the District.

### **Section 7.19 Trench Compaction**

The required compaction for utility trenches within the roadway shall be a minimum of:

#### Bedding and Initial Backfill

Ninety-five (95) percent relative compaction, unless otherwise specified by the utility owner.

#### Intermediate Backfill

Ninety-two (92) percent relative compaction to subgrade, or as shown on the plans or in the project specifications.

The required compaction for utility trenches outside the roadway shall be a minimum of ninety (90) percent from the bottom of the trench to finished grade, or as shown on the plans or in the project specifications.

Compaction shall be obtained by mechanical means in layers not to exceed 8 inches in thickness. Trench jetting will not be allowed within the roadway prism.

### **Section 7.20 Grease Traps and Interceptors**

Where any grease or other objectionable materials may be discharged into a public or private sanitary sewer system shall have installed on the premises an appropriately sized grease interceptor or grease trap as required by Chapter 7, Uniform Plumbing Code.

Facilities are classified into the following categories based on the type of facility, the nature and volume of the waste flow produced, the hours of operation, and the number of meals served per day:

- Industrial - commercial facilities as defined in sections 709 and 710 of the Uniform Plumbing Code, and those facilities designated by the District.
- High Volume - full menu type establishments operating more than sixteen (16) hours per day and/or serving five hundred (500) or more meals per day.
- Medium Volume - full menu or specialty menu type establishments serving full meals eight (8) to sixteen (16) hours per day, and/or one hundred (100) to four hundred (400) meals per day.
- Small Volume - fast food, take-out or specialty type food establishments with limited menus, a minimum of dish washing, and/or minimal seating capacity.

The District shall approve the size, type and location of each grease trap or interceptor.

Waste in excess of 140 degrees Fahrenheit (60 degrees Celsius) shall not be discharged into a grease trap or interceptor.

For the purpose of this division, the term "fixture" shall mean and include each plumbing fixture, appliance, apparatus or other equipment required to be connected to or discharged into a grease trap or interceptor by any provision of this Chapter.

Waste discharge from fixtures and equipment in the above-mentioned types of establishments which may contain grease or other objectionable materials, including, but not limited to, scullery sinks, pot and pan sinks, dishwashers, food waste disposal, soup kettles, etc., and floor drains located in areas where such objectionable materials may exist, must be drained into the sanitary waste through a grease trap or interceptor when approved by the District (Exception: Toilets, urinals, and other fixtures containing fecal material may not flow through interceptors, traps, or sand/oil interceptors).

District personnel will periodically schedule inspections of grease traps and interceptors. It shall be the responsibility of the owner or their agent to maintain grease traps and interceptors in an efficient operating condition by periodic removal and proper disposal of the accumulated grease. No such collected grease shall be introduced into any drainage piping or public or private sanitary sewer facility.

The owner or their agent shall post and maintain a current grease trap/interceptor cleaning and maintenance log on the premises and shall have the log available for review by District personnel at all times.

#### A. Grease Interceptors

Industrial facilities and High Volume food establishments are required to install a grease interceptor. Medium Volume and Small Volume food establishments may require a grease interceptor as determined by the District.

Interceptors shall be constructed and installed at the expense of the owner, in accordance with the standard detail of this Chapter.

Each grease interceptor shall be so installed and connected that it shall be easily accessible at all times for inspection, cleaning, and removal of the intercepted grease. A grease interceptor may not be installed in any part of a building where food is handled. Proper location of the grease interceptor shall meet the Uniform Plumbing Code Requirements and the approval of the District.

Each commercial facility or business establishment for which a grease interceptor is required shall have an interceptor which shall serve only that business establishment.

Buildings remodeled for use requiring interceptors shall be subject to these regulations.

Grease interceptors shall have a minimum seven hundred fifty (750) gallon capacity.

Interceptors shall be installed in such a manner that surface drainage may not enter. Interceptors located in vehicle traffic areas shall be capable of withstanding an H-20 axle load. The access port cover shall be at least one-half ( $\frac{1}{2}$ ) inch below finished grade and shall also be capable of withstanding an H-20 axle load. Except as otherwise provided, the cover and access ports shall be gas-tight. The waste shall enter the interceptor through the inlet pipe only. Interceptors shall be so designed that they will not become air bound. Each interceptor shall be properly vented, as required by Section 708(d), Uniform Plumbing Code.

A sample port shall be installed at the Owner's expense to ensure proper operation of the grease interceptor. The sample port shall be located just outside of the building foundation and downstream of the foundation cleanout as shown in the standard detail of this Division. Sample ports shall be sized such that a sample may be taken at any time, under any flow conditions. An additional sample port for grease interceptors may be located inside the facility only with prior authorization from the District.

Grade rings may be used to establish final grade for the access ports and shall be installed using Ram-Nek and Ram-Nek primer.

Interceptors shall be tested in the same manner as manholes. The test shall be witnessed by a District Inspector.

Abandoned grease interceptors shall be emptied and filled in the same manner as required for abandoned septic tanks as described in Section 1119, Uniform Plumbing Code.

## B. Grease Traps

Before Small / Medium Volume food establishments are allowed to install a grease trap in place of a grease interceptor, they must attain express written permission from the Placer County Department of Environmental Health and the District.

No grease trap shall be installed which has an approved rate of flow of more than fifty-five (55) gallons per minute, nor less than twenty (20) gallons per minute, except with prior written approval of the District.

Each plumbing fixture or piece of equipment connected to a grease trap shall be provided with an approved type flow control or a restricting device installed in a readily accessible and visible location in the tailpiece or the drain outlet of each such fixture. Flow control devices shall be so designed that the flow through such device or devices shall at no time be greater than the rated

capacity of the grease trap. No flow control device having adjustable or removable parts shall be approved.

Each grease trap required by this section shall have an approved rate of flow, expressed in gallons per minutes, which is not less than forty (40) percent of the total capacity in gallons of fixtures discharging into said trap.

The grease retention capacity of the trap, expressed in pounds of grease, shall not be less than two (2) times the approved rate of flow in gallons per minute.

Any grease trap installed with the inlet more than four (4) feet lower in elevation than the outlet of any fixture discharging into such grease trap shall have an approved rate of flow which is not less than fifty (50) percent greater than that given in the preceding paragraph. No more than four separate fixtures shall be connected to or discharged into any one grease trap.

Each fixture discharging into a grease trap shall be individually trapped and vented in an approved manner. An approved type grease trap may be used as a fixture trap for a single fixture when the horizontal distance between the fixture outlet and the grease trap does not exceed 4 feet and the vertical tailpipe or drain does not exceed two and one-half (2 ½) feet.

No water jacketed grease trap or grease interceptor shall be approved or installed. No mechanical grease trap shall be allowed.

Each grease trap shall have an approved water seal of not less than two (2) inches in depth or the diameter of its outlet whichever is greater.

A sample port shall be installed at the Owner's expense to ensure proper operation of the grease trap. The sample port shall be located just outside of the building foundation and downstream of the foundation cleanout as shown in the standard detail of this Division. Sample ports shall be sized such that a sample may be taken at any time, under any flow conditions. An additional sample port for grease traps may be located inside the facility only with prior authorization from the District.

### C. Sand/Oil Interceptors

Every private or public wash rack used for cleaning vehicles, machinery or machine parts or facilities used for vehicle maintenance shall drain or discharge into a sand/oil interceptor of an approved design for this use.

The minimum internal dimensions of the interceptor shall be approximately twenty-four (24) inches wide by seventy-two (72) inches long with fifty-seven (57) inches between the tank bottom and the bottom opening of the ninety (90) degree bend at the outlet for a four hundred ninety (490) gallon minimum liquid capacity.

Sand/oil interceptors shall be constructed and installed at the expense of the owner, in accordance with the standard detail of this Chapter.

The inlet and outlet sewer piping shall conform to District specifications. The sewer outlet pipe shall have a downward pointing ninety (90) degree bend inside the tank. The bottom entrance to the ninety (90) degree bend shall extend six (6) inches below the invert of the outlet pipe. The

top of the sewer inlet and outlet pipes shall be at least thirty (30) inches below the pavement surface where they enter and exit the tank.

The tank shall have a minimum of one self sealing access port and shall be maintained in a leak tight condition so there is no entry of surface storm water. There shall also be no leakage of groundwater into the tank, and waste flow shall not be allowed to flow into the surrounding ground. Grade rings may be used to establish final grade for the access ports and shall be installed using Ram-Nek and Ram-Nek primer.

When the tank is located in a vehicle traffic area, the access port(s) shall be set at least one-half (½) inch below finished grade. Tank covers and access ports located in vehicle traffic areas shall be capable of withstanding an H-20 axle load.

A sample port shall be installed at the Owner's expense to ensure proper operation of the sand/oil separator. The sample port shall be located just outside of the building foundation and downstream of the foundation cleanout as shown in the standard detail of this Division. Sample ports shall be sized such that a sample may be taken at any time, under any flow conditions. An additional sample ports may be required on the sewer service lateral as required by the District.

District personnel will periodically schedule inspections of sand/oil interceptors. It shall be the responsibility of the owner or their agent to maintain the sand/oil interceptor in an efficient operating condition by periodic removal and proper disposal of the accumulated sand and oil. No such collected sand and oil shall be introduced into any drainage piping or public or private sanitary sewer facility.

The owner or their agent shall post and maintain a sand/oil interceptor cleaning and maintenance log on the premises and shall have the log available for review by District personnel at all times.

All trapped materials removed from the interceptor, including filters and filter media, shall be disposed of in accordance with current existing environmental codes and regulations. It is the responsibility of the owner or their agent to determine the governing agency and comply with the code requirements.

Sand/oil Interceptors shall be tested in the same manner as manholes. The test shall be witnessed by a District Inspector.

Abandoned sand/oil interceptors shall be emptied and filled in the same manner as required for abandoned septic tanks as described in Section 1119, Uniform Plumbing Code.

All vehicle wash installations shall be equipped with an appropriate sand/oil interceptor. Potable water piping to the wash installation shall be metered to verify water consumption. No other facility other than the wash installation shall be fed potable water through the meter.

Vehicle wash installations shall utilize a recycle system. The clarification, filtration and recycle system shall be designed by the owner or their agent and approved by the District. When a recycle system is used, there shall be a closed shutoff valve in the sewer outlet pipeline external to the interceptor tank. It shall have the necessary access and protection.

It shall be the responsibility of the owner or their agent to maintain the system for proper operation. The District shall be notified at least seventy-two (72) hours in advance of any emptying and/or flushing of the system into the sanitary sewer.

The design of automated full service vehicle wash installations must be approved by the District on an individual basis.

Each vehicle maintenance facility shall have a sand/oil interceptor that meets the minimum tank requirements described above.

## **Section 7.21 Sewer Line Flushing and Testing**

### **A. General**

As a condition of acceptance of the completed sewer system, the contractor shall ball, flush and test the entire gravity sewer system, including laterals, and shall flush and test all force mains, all as specified herein. The authorized representative of the District shall be present during the performance of all such work.

Prior to any balling, flushing or testing, all trenches shall be properly backfilled and compacted to a minimum depth of four (4) feet above the top of the pipes. All adjacent facilities, including water lines and other underground utilities, shall be in place and satisfactorily backfilled. The entire trench area shall be cleaned up and brought to the approved grade.

### **B. Test for Obstructions**

Prior to hydrostatic or air testing, all gravity sewer lines shall be tested for obstructions and cleaned by balling and flushing. This shall be done with a commercial sewer cleaning ball, such as the Wayne sewer cleaning ball manufactured by the Sidu Company, P. O. Box 3537, Long Beach, the "Flexible" sewer ball manufactured by Flexible, Inc. of 3786 Durango Avenue, Los Angeles, or equal. The ball shall be controlled by a calibrated tag line or sewer rods, allowing a slow and controlled movement of the ball through the line. All obstructions, deficiencies or irregularities shall be repaired or removed as necessary.

### **C. Gravity Sewer Air Tests**

Low Pressure Testing: Pressure testing of the completed sewer pipe installation by low pressure air testing shall be as specified herein. The maximum length of sewer line that may be tested at one time shall be limited to the length between adjacent manholes.

The Contractor shall provide all personnel and equipment necessary to conduct the test, including test plugs, air compressor and test gauge. The test gauge shall have minimum divisions of 0.10 psi, and an accuracy of 0.04 psi. Accuracy and calibration of the gauge shall be certified at six month intervals by a reliable testing firm, or if requested by the District. The gauge may be checked by the District at any time.

Test Procedure: Slowly pressurize the test section to an internal pressure 4.0 PSI greater than the average back pressure of any ground water which may submerge the pipe. Check all exposed portions of the section with a soap solution for abnormal leakage. If any such leakage is observed, slowly release the air pressure and make necessary repairs before resuming testing.

At least two minutes shall be allowed for stabilization before proceeding further. Add air as required to maintain pressure. After at least two minutes, disconnect the air supply and observe the time required for the internal air pressure to drop from 3.5 PSI to 3.0 PSI greater than the average back pressure of any ground water which may surround the pipe.

The requirements of these provisions shall be considered as satisfied if the observed time is not less than the greater of the times indicated in the following table:

Pipe (Diameter)	Time (Seconds)
4"	180 or 40 x L <sup>1</sup>
6"	180 or 40 x L
8"	240 or 70 x L
10"	300 or 160 x L
12"	360 or 160 x L
15"	420 or 160 x L
18"	480 or 160 x L

<sup>1</sup>Where L is the length of test section in hundreds of feet.

If the test section fails to meet the requirements of this test, the source or sources of the leakage shall be determined and any necessary repairs or replacement of materials shall be made. The repaired section shall be retested for compliance with the requirements of this test.

#### D. Hydrostatic Test

A section of gravity sewer can be prepared for hydrostatic testing by plugging the upper side of the downstream manhole and all openings in the upstream manhole except the downstream opening.

The section thus prepared shall be tested by filling with water to an elevation five feet above the top of the pipe at the up-stream end of the test section or five (5) feet above the existing groundwater elevation, whichever is greater. The water level need not exceed the manhole rim elevation. The water shall be introduced into the test section at least four (4) hours in advance of the actual test period to allow the pipe and joint materials to become saturated. The pipe shall be refilled to the original water level at the start of the actual test period, and the elevation of the water in the upstream manhole carefully measured.

After a period of four (4) hours, the water level elevation shall be again carefully measured and the loss of water during the test period calculated. If this calculation is difficult due to manhole taper, loss can be determined by measuring the amount of water added to restore the water level to its initial elevation.

The leakage in the test section shall not exceed three hundred fifty (350) gallons per mile per day per inch diameter of line tested at the five (5) foot test head. If it is necessary or desirable to increase the test head above five feet, the allowable leakage shall be increased eighty (80) gallons for each foot of such increase in test head.

Test sections showing leakage in excess of that allowed shall be repaired or reconstructed as necessary to reduce the leakage to that specified above and the section retested.

It shall be permitted to test the upstream manhole separately, subtract the manhole leakage from the combined total, and thus determine the line leakage along. Any manholes tested individually shall be tested by the procedure described hereinafter.

#### E. Test for Pipe Distortion (PVC Pipe only)

Following the placement and compaction of backfill and prior to the placing of permanent surfacing, all PVC gravity sewer main lines shall be cleaned and then mandrelled in the presence of the District Inspector or Representative to determine the existence of any obstructions such as deflections, joint offsets and lateral pipe intrusions.

A rigid mandrel with a circular cross section having a diameter of at least ninety-five (95) percent of the specified average inside diameter of the pipe shall be pulled through the pipe by hand. The mandrel shall have a minimum length of circular section equal to the nominal diameter of the pipe, and shall be subject to the approval of the District. Any obstructions encountered by the mandrel shall be properly repaired and rechecked as directed by the District Inspector or Representative at no cost to the District.

Approximately eleven months after acceptance of the work (at least twenty [20] days but not more than fifty [50] days prior to the expiration of the two [2] year maintenance period) all PVC gravity sewer lines shall again be mandrelled in the presence of the District. A rigid mandrel with a circular cross section having a diameter of at least ninety (90) percent of the specified average inside diameter of the pipe shall be pulled through the pipe by hand. The mandrel shall have a minimum length of circular section equal to the nominal diameter of the pipe, and shall be subject to the approval of the District Inspector or Representative. Any obstructions encountered by the mandrel shall be properly repaired and rechecked as directed by the District Inspector or Representative at no cost to the District.

#### F. Television Inspection

Television Tests: Each section of sewer pipeline shall be subject to inspection by use of a closed circuit television (CCTV) camera. Use of the CCTV inspection shall not relieve the contractor of the responsibility for performing the other tests outlined in this section nor shall it be used in lieu thereof.

Pre-inspection Preparation -CCTV inspection will not be scheduled or made until the following operations are complete:

- All sewer pipelines are installed and backfilled to finished grade, or, if pavement will be finished grade, to the final street sub grade, but prior to paving.
- All structures are in place and pipelines are accessible from structures.
- All pipelines have been balled, flushed, and test for deflection.
- All pipelines have been successfully tested.

Arrangements for Inspection – When the contractor determines that the pipeline is ready for inspection, the Contractor shall notify the District and request a date for the CCTV inspection to be completed. The District shall notify the contractor of the scheduled date. If it is determined by the contractor that the job site will not be ready or accessible for the CCTV inspection on the scheduled date, as notified, the contractor shall notify the District of the necessary cancellation at least 48 hours in advance of the scheduled inspection. Rescheduling shall be accomplished in the same manner as for the initial inspection.

The Contractor shall bear the cost of all CCTV inspection made for the purpose of determining acceptance. The District shall charge the Contractor for labor, materials, equipment, and travel time associated with all inspections and CCTV camera assistance.

Grounds for Refusal of Acceptance – All pipelines that have been televised will be evaluated by the District for deficiencies. If no deficiencies are noted, the sewer installation portion of the work will be considered satisfactory.

The following conditions are considered unacceptable for sewer pipelines and will result in refusal of acceptance:

- Standing water greater than one-half ( $\frac{1}{2}$ ) inch
- Joint separations greater than recommended by manufacturer
- Cocked joints present in straight runs or on the wrong side of the pipe curve
- Chipped pipe
- Cracked pipe
- Infiltration or exfiltration
- Debris or other foreign matter
- Protrusion or excessive roughness in pipe
- Offset joint
- Out of round or diameter deflected pipe
- Improper alignment or curves not conforming to specified line
- Upset in normal hydraulic regime
- Any conditions that prevents the economical, safe or reasonable use of the sewer
- Pipelines sags in excess of one-half ( $\frac{1}{2}$ ) inch standing water

Video - Televised sewer pipelines will be recorded and the images retained by the District. The Contractor may view video within two (2) working days at the District Offices by making an

appointment. All video produced as a result of the work shall be the sole property of the District and shall remain under its care and custody at all times.

Re-inspection – If the sewer pipeline offered for acceptance fails to meet applicable specifications, the District shall have the right to re-inspect after correction of defects and to charge a re-televising fee in accordance with the current District rates or expense. The CCTV testing process shall be repeated as necessary until all defects have been corrected to satisfaction of the District.

### **Section 7.22 Manhole Leakage Test**

All manholes shall be tested for leakage. Manhole testing shall be by either a water test or vacuum test conducted as follows:

#### **A. Water Test**

All inlet and outlet pipes shall be plugged and the manhole filled with water to the top of the reducing cone section. The water should be introduced into the test section at least four hours in advance of the official test period to allow the manhole and joint material to become saturated. The manhole shall then be refilled to the original water level.

At the beginning of the test, the elevation of the water in the upper manhole shall be carefully measured from a point on the manhole rim. After a period of four (4) hours, or less with the approval of the Engineer, the water elevation shall be measured from the same point on the manhole rim and the loss of water during the test period calculated. If this calculation is difficult, enough water shall be measured into the upper manhole to restore the water to the level existing at the beginning of the test, and the amount added taken as the total leakage.

For manholes, the allowable leakage shall not exceed 0.13 gallons per hour per foot of manhole depth.

Manholes showing leakage in excess of that allowed shall be repaired or reconstructed as necessary to reduce the leakage to that specified above and the manhole retested.

#### **B. Vacuum Test**

Vacuum test equipment shall be used per the manufacturer's specifications. A vacuum of 10 inch Hg should be drawn on the manhole, and the time for the vacuum to drop to 9 inch Hg shall be measured. The minimum allowable for this drop in vacuum shall be conservatively established at sixty (60) seconds for a forty-eight (48) inch diameter manhole; seventy-five (75) seconds for a sixty (60) inch diameter manhole; and ninety (90) seconds for a seventy-two (72) inch diameter manhole.

### **Section 7.23 Wastewater Lift Stations**

New sewage pumping plants shall be designed by a California Registered Civil Engineer and approved by the District. Consideration shall be given to the safety of the public, District employees and the environment. Minimum standards for construction shall address downstream capacity, wet well capacity, pump cycles, and emergency storage or a backup power supply. Video and audio alarm systems shall be incorporated into the District's telemetry system.

## Section 7.24 Residential Pump Systems

For all building sites in which the improvement plans designate a pumped sewer service or for any owner wishing to construct a structure on a portion of a lot or parcel for which gravity service was not provided, the owner shall install a sewage pump as specified herein for the purpose of lifting sewage to the public sewer.

A pumped sewer service shall consist of a gravity sewer, a waste water holding tank, one (1) or more pumps, a force main, electrical controls, and an alarm system. Two (2) pumps may be required at the District's discretion. The pump and holding tank shall be installed in a location such as to be reasonably accessible for inspection and maintenance. If the holding tank is located outside of the building foundation it shall not be located within five (5) feet of any building used as a dwelling, within ten (10) feet of any property line or within a defined flood plain. Where installed, such installations shall be maintained by the owner at the owner's expense.

### A. Installation

**Gravity Pipeline** – The gravity sewer lateral from the building sewer to the wastewater holding tank shall be tested in accordance with Sewer Line Flushing and Testing and Gravity Sewer Tests as specified in these design standards. Pipe must be grouted or sealed to a watertight condition at the point of holding tank penetration.

**Wastewater Holding Tank** – The holding tank shall be a solid impervious walled container. All openings in the walls of the tank, including pipe or conduit penetrations, are to be sealed to prevent inflow of surface water, infiltration of groundwater, or exfiltration of contained wastewater. The tank shall have a minimum capacity of one hundred fifty (150) gallons. The tank shall be vented with a one and one-quarter (1 ¼) inch minimum vent line. The tank shall be buried to a depth such that the top cover of the tank is eighteen (18) inches below finished grade. A weatherproof housing, with adequate insulation, shall be installed and extended to six (6) inches above finished grade. It shall be the owner's responsibility to determine groundwater conditions that may cause the tank to float when empty and to provide the appropriate solutions to prevent it. Internal ballast that reduces the tank capacity below one hundred fifty (150) gallons will not be acceptable.

**Pumping Equipment** – Pumps shall be centrifugal of the non-clog or grinder type. Pumps shall be capable of passing a minimum of a two (2) inch diameter sphere. Pumps and motors shall be sized so as to maintain a minimum of four (4) feet per second flow velocity throughout the entire discharge piping system when a maximum of one (1) pump is pumping under actual installed conditions. A copy of the pump specifications and pump curve shall be required and made available to the District Inspector before testing is allowed.

**Electrical** – The electrical control cabinet shall be isolated from the holding tank. All wiring, controls, conduits, boxes, et cetera shall meet or exceed National Electrical Code (NEC) requirements for materials, ratings, placement, and installation, et cetera. All equipment located in the holding tank shall be U.L. approved for its specific and proper use. All wiring in the area above the holding tank shall be provided with protection from physical damage by a combination of cable routing and/or conduits. Any wiring which hinders entry or view into the holding tank when opened will not be acceptable. All electrical connections shall be in an approved electrical junction box. All conduits leaving the holding tank, or the enclosed area above or surrounding

the holding tank, shall be sealed. A circuit disconnecting means for all circuits must be located within sight of the holding tank unless a lockout device is installed on the disconnecting means for each individual circuit attached to or related to the pump system at the holding tank.

**Alarm System** – The holding tank and electrical controls shall include an alarming system that produces an audible and visual alarm when the liquid level in the holding tank exceeds a predetermined safe level. The audible and visual devices indicating such an alarm state shall be located within the building or structure served by the sewage system with the intent to notify the occupant of the possibility of a wastewater spillage. The alarm system power shall be supplied through a dedicated circuit, separate from the pump power supply. It is recommended that the alarm system include a battery backup to provide alarm functionality during an electrical power outage. The alarm system shall include a relay switch to activate the water system shut off solenoid valve.

**Discharge Piping** – The discharge pipeline shall be ductile iron, polyvinyl chloride (PVC), polyethylene, or an approved pressure rated material designed for wastewater. The piping shall be pressure class 150 minimum and rated for the pressure service being installed. The pipeline size shall be two (2) inch diameter minimum and not be of a size smaller than the pump discharge port. The discharge pipeline shall be fitted with an approved pressure rated check valve and a gate valve. The discharge pipeline shall also include a one-quarter (¼) inch pressure test port located between the check portion of the check valve and the gate valve. The gate valve shall be located on the discharge side of the check valve. Both valves and the test port shall be located as close to the pump or holding tank as possible and in such a manner that they are accessible for operation and for maintenance or repairs. It is recommended that valves are installed with unions and boxed to grade.

Discharge pipelines shall have a trench cutoff block located every fifty (50) linear feet of pipe, at changes in pipeline type and/or grade, and at the pump tank. Thrust blocks shall be located at all fittings that change the direction of the pipe. Thrust blocks shall be constructed of concrete with a minimum size of two (2) cubic feet. A cleanout shall be placed in the discharge pipeline at the property line.

#### B. Inspection and Testing

The gravity portion of the pipeline from the building to the holding tank shall be tested in accordance with the Gravity Sewer Tests as specified in these design standards.

A visual inspection shall be performed to check for the following:

- proper venting of the holding tank
- an acceptable weather proof, insulated box with an insulated lid directly above the holding tank
- a weather tight seal on the holding tank lid and at all pipe or conduit penetrations.

The discharge pipeline shall be pressure tested with water to a pressure of one hundred fifty (150) percent of the calculated maximum possible working pressure (the Total Dynamic Head, or TDH) for the installed pump. The maximum possible working pressure for the system can be assumed to occur at the pump's shut off point. The pressure must remain constant for ten (10)

minutes. The required test equipment shall be provided by the owner or owner's agent and be acceptable to the District.

The electrical system and controls shall be inspected and approved by the local governing authority for building electrical inspection. Pumping and alarm tests shall only be performed after the electrical system has been inspected and approved by the proper authority. The District inspector shall require proof of such approval before starting any of the following functional tests:

- The pump shall be started and stopped so the check valve can be tested for proper operation.
- The pumping system shall be tested for a discharge pipeline velocity of four (4) feet per second. The flow velocity test shall be performed with the discharge pipeline full of water and the pumping system functional under normal operating conditions.
- The pump shall be run to pump down the holding tank to allow a visual inspection of the tank and to check it for leaks.
- The alarm system shall be checked for proper function of audio and visual alarms.

#### **Section 7.25 Backflow Prevention Devices**

Private and commercial building laterals are subject to the provisions of the UPC. Drainage piping serving fixtures installed on a floor level that is located below the elevation of the next upstream manhole cover of the sewer serving such drainage piping shall be protected from backflow of wastewater by installing an approved type of backwater valve.

Buildings with laterals which connect to a double service or a joint lateral (a privately owned shared lateral pipeline that receives wastewater flow from two or more parcels) shall also install a backflow prevention device to protect private property.

In the events of a pipeline stoppage in the joint lateral, a backflow prevention device installed on each private building lateral would inhibit wastewater in the joint lateral from backing-up through the private building lateral into the building served.

Backflow prevention devices are useful in areas where a joint lateral provides services to parcels of different elevations.

#### **Section 7.26 Clean Up**

During the progress of the work, the owner or their agent shall keep the entire job site in a clean and orderly condition. Excess or unsuitable backfill material, broken pipe or other waste material shall be removed from the job site. Spillage resulting from hauling operations along or across existing streets or roads shall be removed immediately by the contractor. All gutters and roadside ditches shall be kept clean and free from obstructions. Any deviation from this practice shall have prior approval from the District.

Before final acceptance of the work, the owner or their agent shall carefully clean up the work and premises, remove all temporary structures built for the work, and remove all surplus

construction materials and rubbish of all kinds from the grounds which he has occupied and leave them in a neat condition.

## Section 7.27 Standard Details

Detail SS-01.....	Manhole Frame and Cover
Detail SS-02.....	Standard Sewer Manhole
Detail SS-03.....	Inside Drop Manhole
Detail SS-04.....	Outside Drop Manhole
Detail SS-05.....	Internal Manhole Chimney
Detail SS-06.....	Manhole Construction Over Existing Line
Detail SS-07.....	Pipe Connection to Existing Manhole
Detail SS-08.....	Wastewater Service Lateral
Detail SS-09.....	Service Lateral Detail (Isometric View)
Detail SS-10.....	Lateral Clean-Out Assembly
Detail SS-11.....	Typical Sewer Trench
Detail SS-12.....	Trench Cut-Off-Block
Detail SS-13.....	Residential Pump Station
Detail SS-14.....	Grease Interceptor
Detail SS-15.....	Sample Port for Service Lateral
Detail SS-16.....	Sample Port Location
Detail SS-17.....	Sand / Oil Interceptor