3.100 GENERAL

Sanitary sewers shall be designed in accordance with accepted engineering principles and shall conform to these Design Standards.

Storm water shall not be connected or discharged into a sanitary sewer.

The latest edition of the California State Department of Health Services "Criteria for the Separation of Water Mains and Sanitary Sewers" shall take precedence in horizontal and vertical alignment issues.

Engineering calculations used for the design of all proposed sanitary sewer systems, shall be submitted to the City Engineer. The calculations shall include the following items:

1. A plan, preferably 1" = 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary areas, outside the project limits, zoning, projected land use, and any features affecting the system design.
2. Design flows at major junction points including flows coming from outside the project limits.
3. Size, length, slope, and invert elevations of all proposed lines and locations of manholes.

3.200 AVERAGE FLOW

Where possible, the average residential flows shall be computed on a per capita basis using a minimum of 90 gallons per capita per day. Commercial and light industrial shall be computed at 1500 gallons per acre per day. All other industrial shall be computed utilizing 2500 gallons per acre per day. When the exact density is not known, the zoning map and the general plan shall be used to determine the appropriate densities. Multi family residential ($\leq$ 2 bedroom/unit) shall be 2.75 persons per unit. All other residential uses shall be 3.25 persons per unit.

Schools shall be computed at 45 gallons per capita per day. Churches shall be computed at 23 gallons per capita per day.

The averages indicated above are minimum blows and in some situations may have to be increased due to higher densities or differing land uses.

The total design flow shall be determined by multiplying the average design flow by a peak factor obtained from the following graph:

Peak Factor Table (cfs)	
Qav	**Pf**
0 – 0.1	3.50
0.1 – 0.3	2.80
0.3 – 0.6	2.60
0.6 – 1.9	2.50
0.9 – 1.2	2.40
1.2 – 1.5	2.35
1.5 – 1.9	2.30
1.9 – 2.4	2.25
2.4 – 3.0	2.20
3.0 – 3.8	2.15
3.8 – 4.9	2.10
4.9 – 6.3	2.05
6.3 – 7.5	2.00
7.5 – 8.3	1.90
8.3 – 9.2	1.98
9.2 – 10.3	1.96
10.3 – 11.4	1.94
11.4 – 12.7	1.92
12.7 – 14.2	1.90
14.2 – 15.9	1.88
15.9 – 18.0	1.86
18.0 – 20.0	1.84

Note: The accuracy of hydraulic calculations does not warrant interpolation of Peak Factor.

3.400 VERTICAL ALIGNMENT

The minimum cover on sanitary sewer lines shall be 3 feet. When minimum cover cannot be achieved, polyurethane-lined ductile iron shall be used, or PVC C900 upon City Engineer Approval.

When crossing a water main, the sanitary sewer shall be installed below the water main with a minimum clearance of 12 inches.

At points of convergence of pipes of various sizes, the tops of the pipe elevations shall match within a manhole structure.

3.500 HORIZONTAL ALIGNMENT

Sanitary sewers shall be placed within street rights-of-way unless placement in an easement is specifically approved by the City Engineer.

Alignment shall be parallel to the street centerline wherever possible.

Curved sewers are allowed in curved streets when curvature does not exceed pipe manufacturer's recommendations.

Sanitary sewers shall not be constructed within 50 feet of any existing or proposed well site. Installations within 200 feet of an existing well or future well site shall be brought to the attention of the City Engineer and shall be designed under his direction and in accordance with the California State Department of Public Health recommendations.

3.600 SLOPE

Sanitary sewers shall be designed to flow at, d/D=0.7, with a minimum velocity of 2.0 feet per second. Minimum slope shall be .002. Use of lower velocities shall have the specific approval of the City Engineer. The maximum velocity shall be 10 feet per second.

3.700 PIPE

Pipe used for sanitary sewers shall have a minimum diameter of 6-inches when located in the street right-of-way. The pipe shall have rubber gasket joints and shall conform to the latest edition of the following ASTM Standards:

1. ABS SOLID WALL PIPE	D 2751 (SDR 26)
2. ABS or PVC COMPOSITE PIPE (TRUSS)	D 2680 (SDR 23.5 min.)
3. PVC SEWER PIPE	D 3034 (SDR 26)
4. DUCTILE IRON PIPE (Gravity or Force)	Class 50 Polyurethane-Lined
5. PVC C 900 (Gravity or Force)	AWWA C 900

6. VITRIFIED CLAY PIPE (Extra Strength) Compression joint for Bell & Spigot Pipe (15" and larger)	C 700 (use of VCP must be approved by City)
Compression Couplings for Plain End Pipe (15" and larger)	C 425

Note: Polyurethane-Lined Ductile Iron Pipe shall be used for all Force Mains, or PVC C900 upon City Engineer approval. The minimum cover for ductile iron pipe and PVC C900 is 2 feet.

3.800 BUILDING LATERAL

The minimum size lateral shall be 4 inches and installed per Standard Detail S-2.

3.900 MANHOLES

Manholes shall be placed at the intersections of all sanitary sewers, at all locations where there is change in size, grade or direction and at the ends of all permanent lines.

Manhole spacing shall not exceed the following limits:

Diameter	Maximum Spacing
10" and under	400 feet
12" to 18"	600 feet
21" and over	900 feet

Precast manhole bases may be permitted subject to City Engineer approval.

Manholes shall be constructed at all service lateral connections where the main line is not at least 1.5 times the size of the service lateral.