

SECTION 11100 - DESIGN STANDARDS FOR SANITARY SEWERS

(SEE STANDARD TECHNICAL SPECIFICATIONS AND 10 STATE STANDARDS FOR COMPLETE REQUIREMENTS)

DESIGN CAPACITY

<u>Average Flow</u>	<u>400 GPD/Single Family Dwelling</u>
Peak Factor	1 to 248 ERU's - 4.0
	250 to 499 ERU's - 3.75
	500 to 1,999 ERU's - 3.5
	2,000 to 7,499 ERU's - 3.0
	>7,500 ERU's - 2.7
<u>Infiltration Allowance</u>	<u>600 GPD/Acres for the local watershed</u>
Pipe Co-efficient of Friction	n = 0.013

MINIMUM DESIGN VELOCITY 2 fps when sewer is flowing at the average daily rate

ACCEPTABLE PIPE MATERIALS AND DEPTHS

- No sewer shall exceed a depth of 25 feet without the approval of BCWS. See Technical Specifications for force main bedding requirements.

Approved Sewer Materials Include:

- Reinforced Concrete Pipe
- ABS or PVC Composite
- PVC Plastic Sewer Pipe
- Profile Wall PVC (18-inch and larger)
- Ductile Iron Pipe (requires special approval)

See Technical Specifications for details on each material type

MINIMUM SEWER SIZE

- Sewers shall be sized with enough capacity to serve the proposed development and all potential flow from upstream properties. For unplanned development upstream, use a minimum density factor of 2.5 ERUs/acre unless a higher density development is possible per land use maps and zoning. An eight-inch (8”) sanitary sewer is the minimum size sewer for any public sewer including residential developments. All sewers shall be sized for the entire watershed area as approved by BCWS.

MINIMUM GRADE

- Sewers shall meet the minimum grade listed below unless it can be shown by the above design criteria that the sewers will have sufficient cleaning velocity (2 fps) at lesser grades. Spans of sewer that have less than 10 single family dwellings, or equivalent, connected upstream shall have an 8-inch sewer at a minimum grade of 0.80%. If 2 fps cleaning velocities at average design flows can be documented, the minimum grades for sewers 8-inch to 15-inch are as follows:

8-inch -	0.50%
10-inch -	0.40%
12-inch -	0.28%
15inch -	0.15%

Sewers larger than 15-inch shall be reviewed on an individual basis.

MANHOLE

- Manholes shall be located at all changes in sewer size, material, grade or alignment. Manholes shall also be located at all junctions of public sewers. Maximum spacing for all pipe sizes is 400 feet. Where possible, manholes shall be placed eight feet (8') behind the back of the curb if there is no storm sewer that will conflict with this location. A second preferred location for the manhole is 18 inches (18") behind the back of the curb. Manholes shall not be located in driveways. All sewer extensions shall terminate at a manhole, including sewers to be extended in the future. Pipe stubs from manholes may be permitted with special approval from the Director. Special consideration for manholes in flood plains is required. Such things as raised manholes or waterproof bolted down lids may be required.

See Sewer Technical Specifications for:

- Pre-cast Manholes
- Manhole Protective Coatings
- Connections to Existing Manholes
- Frames, Covers and Steps

PRIVATE SEWER LATERALS

- A private sewer lateral shall be installed for each lot during the construction of local sewers. In cases where a local sewer already exists, the developer is responsible for installing a sewer lateral for each lot before the development is accepted for connection. This portion of the existing sewer must also pass a new Closed Circuit Television Inspection (CCTV). Said private laterals shall terminate at a point at least 10 feet (10') inside of the property line or right-of-way line or to the edge of the easement, whichever is greater.

SEWER EASEMENTS

- Sewers installed outside the public right-of-way will reside in an easement having the following minimum widths:

Minimum 10 feet (10') to each side of the centerline

Easement widths will be set per span according to the deepest section along the span.

Sewer depth up to 12 feet (12')	20-foot easement
Sewer depth up to 16 feet (16')	25-foot easement
Sewer depth greater than 16 feet (16')	30-foot easement

EXTENSION TO DEVELOPMENT BOUNDARIES

- Sewers shall be extended to all upstream boundaries of the property or development being served. This includes installing sewer through non-developed land, open space, detention/retention areas, green space, etc., when there is developable upstream property, as determined by BCWS.

INSPECTION

- **Inspection requirements:**
 - An authorized agent of BCWS must inspect all work.
 - Contractors must notify BCWS at least 48 hours in advance of initiating construction or amending a construction schedule.
- **Fee:** Plan Review and Inspection fees required per Section 10200 of this manual
- **Testing:** See Standard Specifications.
- **Acceptance:** See Section 10250 of this manual.

END OF SECTION