CHAPTER 20 A
DESIGN OF ALTERNATIVE SEWERS

21A. DEFINITION

Alternative sewers include small diameter gravity sewers (SDG), grinder pump pressure sewers (GP/PS), septic tank effluent pump sewers (STEP), vacuum sewers, and combinations of the above. Any small diameter sewers shall be used only in conjunction with grinder pumps, septic tanks, or other acceptable solids reduction devices.

22A. REFERENCES

Alternative sewers may be designed in accordance with:

a. Alternative Sewer Systems (1986), WEF Manual of Practice No. FD-12;

b. Small Diameter Gravity Sewers, an Alternative for Unsewered Communities (1986)EPA/600/2-86/022;

c. Alternative Wastewater Collection Systems (1991), EPA/625/1-91/024, or;

d. Other appropriate references.

23A. DESIGN

23A.1

___ The requirements of Section 28 (Protection of Water Supplies) and all subsections shall apply to alternative sewers.

23A.2

___ New alternative sewer systems shall be designed on the basis of an average daily per capita flow of sewage of 70 to 120 gpd, as described in Section 22.1.

The peaking factor for inflow is likely to be smaller than that given in Section 22.2.a.

23A.3

___ The requirements of Section 23.2 (Depth) shall apply.

23A.4

___ Septic tanks shall be used in SDG and STEP systems and shall have a capacity of at least 1000 gallons. If multiple customers are connected to a single tank, a larger tank will be necessary. Tanks shall be completely buried and shall utilize an effluent (scum) baffle; it is recommended that all openings except the influent line be screened. A removable top or other access for cleaning shall be provided. Tanks shall be concrete, plastic, fiberglass, or other acceptable material. Masonry, brick, bare steel, etc. shall not be used. Only new tanks are recommended; existing tanks should not be used for new SDG projects. If new tanks are not installed at each service, all of the existing tanks proposed to be reused shall be opened, cleaned, inspected, baffled and renovated to ensure that they meet all of the requirements of a new tank. Multiple connections to a single septic tank, STEP pump or grinder pump, etc. will be allowed if the sizing and design are acceptable considering the number of users and any other project specific concerns.

The tanks shall be owned and maintained by the local sewer authority (city, town, district, county, etc.), rather than the individual users.

23A.5

___ Septic tank effluent is very corrosive. All concrete and metal surfaces (including pump stations) which will be exposed to septic tank effluent should be protected from corrosion.

23A.6

___ Variable grade sewers need not be laid on grade, but unnecessary undulations shall be avoided. The use of negative grades is prohibited. Sewers shall be designed based on appropriate criteria from the WEF or other acceptable source. Air and vacuum release devices should be provided at high points as needed to prevent air locking. The hydraulic grade line for each variable grade sewer shall be calculated and plotted on the profile view of the plans.

23A.7

___ SDG sewers shall be at least 3 inches (8 cm) in diameter; a 4 inch (10 cm) minimum is recommended.

23A.8

___ SDG sewers shall have cleanouts at the end of each line and at reasonable distances within the line. The cleanout openings shall not be buried.

23A.9

___ GP/PS and STEP systems shall have redundant backflow prevention devices to preclude the possibility of wastewater from the system entering a building.

23A.10

___ The requirements of Chapter 30 (Pump Stations) and all subsections shall apply to GP/PS and STEP systems; however, Section 37.1 (Velocity) does not apply to STEP systems.

23A.11

___ If a GP/PS or STEP system will have any closed loops, the design flow and direction of flow in each part of the loop shall be given (either in the P/S or in a separate letter).