

system may produce a meaningless figure because the average number of feet of pipe per person or per unit served varies geographically, and within geographic areas they further vary on account of population densities. Historically, it has required an average of 12.06 feet of pipe per each person served, or 38.59 feet of pipe per unit served. However, in some subdivisions it may require as much as 50 to 60 feet of pipe per person served or 160 to 200 feet of pipe per dwelling unit served.

Though the size of pipe used for sewer collecting systems varies from 6 inches in diameter to massive box-type culverts, over 96 percent of all the pipe in sewer collecting systems are less than 24 inches in diameter. Over 86 percent of the total footage of collecting sewers are 12 inches or less in diameter.

2. OPERATION AND MAINTENANCE COSTS

The large percentage of the smaller sizes of pipe in sewer collecting systems, causes the maintenance and repair cost to be fairly uniform throughout the United States. Though it varies from less than 50 cents per person served to over \$10 per person served per year the average maintenance and repair cost is around \$2.50 per person per year.

The maintenance of a sewer collecting system involves the periodic removal of solids deposited in the lines as well as the removal of foreign objects, such as junk deposited by vandals, and tree roots which infiltrate sewer lines for moisture. Due to the diverse nature of the materials encountered, separate schedules of maintenance are required. A majority of the problems encountered are solved as they come to light. Routine inspection of lines for necessary repairs are conducted on most systems annually, or semiannually, at which time any deposits or foreign material are removed. Routine inspections are designed to detect areas of pipe settlement, collapse, deterioration, of joint failure, which then must be corrected by unearthing the pipe, or wherever practical from within the pipe. During the past several years great advances have been made in developing equipment for repairing the smaller diameter pipes from within, thus avoiding needless excavation.

The cost of repairs for sewer collecting systems consequently varies more by the method of repair employed, than by the size of facility to be repaired. Since each repair must be evaluated on the basis of the circumstances surrounding it, such as maximum permissible time allowed, disruption to other normal community services, access to the problem, et cetera, no attempt has been made to determine the range of possible costs involved for repairs. It suffices to say, however, that because of the nature of the service, the cost of repairs is insignificant, compared to the damage arising from failure to remedy the situation.

During their early development sewer systems were considered a necessary public service to protect the public health. Their construction was financed through direct assessment or general appropriation, using general obligation funds with no provisions for continuing charges to cover operations and maintenance activities. This practice is still employed in many communities.