Flow Determination

A. Sanitary Sewers Design Period

The length of time used in forecasting flows and setting capacities of the sanitary sewer is called the design period. The design period is related to the planning horizon for development of the project area and the expected life of the sanitary sewer pipe. In some cases, no specific planning horizon is identified. Instead the build-out population or land use is used. This is the maximum population and/or commercial and industrial development that could occur within the project area and beyond, if appropriate. The flows are determined based on that population or land use development without regard to time frames.

For residential development, the flows can be predicted using the following densities:

1. **Discharge (Q) Average Daily Flow (minimum):**

   Area x Area Density x Flow Rate = Average Daily Flow **Equation 3B-1.01**

   Number of Units x Unit Density x Flow Rate = Average Daily Flow **Equation 3B-1.02**

2. **Discharge (Q) Peak Sewer Flow (minimum):** Average daily flow times ratio of peak to average daily flow (See Figure 3B-1.01 for ratio). NOTE: Population values shown in Figure 3B-1.01 are based on the area that discharges into the sewer.

3. **Design Density and Rate:** See Table 3B-1.01.

B. Footing Drain Inflow

If a proposed sewer is to serve an older developed area with existing footing drain inflow, special design information should be obtained from the Jurisdiction. Additional extraneous flow allowances may be warranted where high groundwater levels, significant inflow sources, or higher than average per capita wastewater flow rates are expected to occur over the design life of the sewer.

C. Area

Gross area should be used in determining design flows and include streets, alleys, school grounds, parks, and similar dedicated open space.

D. Density Table

Table 3B-1.01: Minimum Values

Land Use	Area Density	Unit Density	Rate
Low Density (Single Family) Residential	10 people / AC	3 people / unit	100 gpcd*
Medium Density (Multi-Family) Residential	15 people / AC 6.0 people / duplex	3 people / unit	100 gpcd*
High Density (Multi-Family) Residential	30 people / AC	2.5 people / unit	100 gpcd*
Office and Institutional	5,000 gpd / AC (IDNR)	Special Design Density	N/A
Commercial and Light Industrial	5,000 gpd/AC (IDNR)	Special Design Density	N/A
Industrial	10,000 gpd/AC (IDNR)	Special Design Density	N/A

* Iowa Department of Natural Resources (DNR) - Dry Weather Flow - One hundred gallons per capita per day (gpcd) should be used in design calculations as the minimum average dry weather flow. This 100 gpcd value may, with adequate justification, include maximum allowable infiltration for proposed sewer lines.

The area densities listed include the peaking factor.

Note: If the Project Engineer uses values different from the above table, approval by the Jurisdictional Engineer is required.

E. Special Design Densities

Special design densities should be based on specific flow measurements or known flow rates and are subject to approval by the Jurisdiction Engineer based on methodology provided by the Project Engineer prior to submittal to the Iowa DNR.

Figure 3B-1.01: Ratio of Peak to Average Daily Sewage Flow