

CHAPTER 2

DESIGN CONSIDERATION

2-1. General Design. The sizing of each component in the distribution system will depend upon the effective combination of the major system elements: supply source, storage, pumping, and distribution piping. The hydraulic analysis of the total distribution system is discussed in TM 5-813-5. Water storage is discussed in TM 5-813-4.

2-2. Demand.

a. General. Population and water consumption estimates are the basis for determining the flow demand of a water supply and distribution system. Flow and pressure demands at any point of the system are determined by hydraulic network analysis of the supply, storage, pumping, and distribution system as a whole. Supply point locations such as wells and storage reservoirs are normally known based on a given source of supply or available space for a storage facility. Criteria for determining water demands are discussed in TM 5-813-1 and TM 5-813-7.

b. Factors for Determining Demands. The hydraulic network analysis should assume the following demand rates:

- (1) Annual Average Daily Consumption (ADC)
- (2) Annual Maximum Daily Consumption (MDC)

- (3) Peak Hour Consumption on Annual Maximum Day (MDC/Peak-Hour)

- (4) MDC plus Simulated Fireflow

Several analyses should be made to investigate alternative piping arrangements within the distribution system as well as for connecting proposed pumping stations to the distribution system. If future improvements are contemplated, the analysis should be performed based on future conditions, thus assuring the correct selection of the final alternative to be implemented initially.

c. System Pressures. The pressure distribution in the system will assume the following criteria:

- (1) Maximum curb pressures (70 psi)

- (2) Minimum curb pressures at any point on the network (usually 30 psi)

- (3) Residual curb pressure to be maintained at a point of simulated fireflow (20 psi minimum) For large distribution system design a pressure contour map will be developed using known topography and the hydraulic network analysis and showing pressure in pounds per square inch. Pressure contours must be adjusted for elevations of surrounding terrain. The pump discharge head will be derived from the system pressures at the pump station location plus the pump station piping head loss.