Water Distribution and Wastewater Collection

Holly DeRamus
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Introduction

Distribution
Drinking Water
Collection
Wastewater
Distribution System Components

- Water mains
- Fittings
- Services
- Tanks
- Meters
- Pumping Stations
- Hydrants
- Valves
Collection System Components

- Pipes
- Fittings
- Cleanouts
- Pump Stations
- Manholes
Distribution System Requirements

- Meet at all times the consumer needs for water quality, quantity, and pressure.
- Providing enough reserve for fire protection.
Water must be safe from possible microbial contamination; have safe levels of toxic and nuisance chemicals; be free of radiation; be below maximum standards for physical problems such as color and turbidity and be free of odor and taste.
Each customer should have sufficient pressure to operate all appliances at all times. In most cases a pressure of 20 psi at maximum demand.
The amount of water stored is dependent upon the type of structures and is established for each system by the Insurance Service Office. (ISO)
Water Consumption

- Consumption range is 40 – 400 gpcd with the average about 200 gpcd.

- Customer Categories
  - Domestic
  - Commercial
  - Industrial
  - Public

Got water? Do your part, be water smart!
Domestic Variables

- Pressure – higher the pressure more leaks
- Cost – higher the cost lower the usage
- Meters – reduces usage by $1/3$ to $1/2$
- Climate – warmer climates higher usage
- Standard of Living – higher = higher
- Sewers – higher usage with sewer connections
Storage Requirements

- Not considering fire needs – storage should be 3x maximum daily demand.
  (three days to fix the problem)
Line Sizing

- Normal
- Emergencies
- Peak Demand
  - Normal peak demand will be from $1 \frac{1}{2}$ to 3 times the average daily demand. Peak could be as high as 10 times average hourly demand. Pressure must not drop below 20 psi.
Fire Insurance
- Rates to homeowners based on adequacy of fire protection

ISO Determines rates
- Not government/not insurance – a service for fee

Deficiency Points Used

Class Determines Insurance Rates
- Class 1 is best – lowest rate
- Class 10 is worst – highest rates
In residential areas:
- Hydrants within 250 feet of each house
- Each hydrant provide 250 psi
- No hydrant on a line <6 inches
ISO reviews records – sets insurability for city