Anatomy of a Water System

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ANATOMY OF A WATER SYSTEM

A water supply system is a system for the provision of potable water from a water treatment facility through pipes or other constructed conveyances to residential consumers, for use as drinking water, water for cooking, water for sanitary conditions, and other water use in a domestic environment.

Water supply also is essential for business and industry to operate in a municipal environment. Of no less importance is the need to supply water to properly located fire hydrants to provide the public with an effective level of fire protection. Municipal water systems also may need to provide water for special services that include street cleaning, the selling of water to contractors for erecting buildings, parks and recreation, and miscellaneous uses.

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OBJECTIVES OF A WATER SUPPLY SYSTEM

The objectives of the community water supply system are

1. to provide whole some water to the consumers for drinking purpose.
2. to supply adequate quantity to meet at least the minimum needs of the individuals
3. to supply adequate quality of water to meet Regulatory Requirements
4. to make adequate provisions for emergencies like firefighting, festivals, meeting etc.
5. to make provision for future demands due to increase in population, increase in standard of living, storage and conveyance
6. to prevent pollution of water at source, storage and conveyance
7. to maintain the treatment units and distribution system in good condition with adequate staff and materials
8. to design and maintain the system that is economical and reliable (the required amount of water needs to be available 24 hours a day, 365 days a year)

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CONSTIUENTS OF A WATER SUPPLY SYSTEM

A water supply system typically includes:

1. **A raw water collection point** (above or below ground) where the water accumulates, such as a lake, a river, or ground water from an underground aquifer. Raw water may be transferred using uncovered ground-level aqueducts, covered tunnels or underground water pipes to water purification facilities.
2. **Water purification facilities.** Treated water is transferred using water pipes (usually underground).

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3. **Water storage facilities** such as reservoirs, water tanks, or water towers. Smaller water systems may store the water in cisterns or pressure vessels. Tall buildings may also need to store water locally in pressure vessels in order for the water to reach the upper floors.
4. **Additional water pressurizing components such as pumping stations** may need to be situated at the outlet of underground or above ground reservoirs or cisterns (if gravity flow is impractical).
5. **A pipe network** for distribution of water to the consumers (which may be private houses or industrial, commercial or institution establishments) and other usage points (such as fire hydrants).
6. **Connections to the sewers** are generally found downstream of the water consumers, but the sewer system is considered to be a separate system, rather than part of the water supply system.

POPULATION ESTIMATION AND FORECASTING

Prior to the design of a water supply system, it is necessary to forecast the future population of the communities to be served for the adequate design period. Any underestimated value will make system inadequate for the purpose intended; similarly overestimated value will make it costly.

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