

## SECTION 13

### RESERVOIRS AND PUMPING STATIONS

#### 13-1 GENERAL

Reservoirs, or storage tanks, work in conjunction with the pipelines and pumping stations to supply water for both the domestic and fire fighting purposes. These facilities must be designed for reliability. They must also be designed to be aesthetically pleasing with emphasis on minimization of their visibility, particularly with regards to any visual corridor such as the 101 Freeway, scenic highways, etc. This section is not a design document. Rather, it is a limited discussion of a few key points. The applicants engineer should refer to the City's Water Master Plan for reservoir storage analysis.

#### 13-2 RESERVOIR STRUCTURAL DESIGN

Reservoirs (tanks) must be designed to withstand all expected forces: internal pressure, wind load, earthquake load, the dead load of the structure and the live loads of the water when completely filled.

For steel tanks, AWWA D100 is the applicable standard for welded carbon steel tanks, and AWWA D103 is the applicable standard for factory coated bolted steel tanks.

Reinforced concrete or prestressed concrete reservoirs are to be designed to the standards of the American Concrete Institute.

#### 13-3 GENERAL RESERVOIR DESIGN PARAMETERS

Wherever possible, the entire reservoir shall be fully located on a pad which only involves cut grading. An alternate is to locate the reservoir on a pad which at all locations has at least 10 feet of compacted fill.

All new steel reservoirs shall be supported on ringwall footings.

Unless otherwise approved, all steel reservoirs shall be welded carbon steel and have a knuckle corner between the shell and roof.

All aboveground reservoirs shall have a flush-type cleanout in addition to an access manway.

All reservoirs shall have an altitude valve with a bypass.

All new reservoirs shall have ladders with safety cages.

#### **13-4 PUMPING STATION DESIGN**

Pumping stations shall be designed with at least two pumps so that at least one unit can be considered a standby unit. Further, in any station, the required pumping capacity must be met with one pump of the largest size out of service.

Each pump station shall be capable of supplying the maximum daily flow plus that flow necessary to replace one full fire flow storage in a period of 72 hours (3 days). Each pump station will have one standby pump with a capacity of the largest undivided pump at that station. At every pump station it is required that a control system be set up so that each pump operates approximately the same amount of time in any given period. Pump motors shall be of the high efficiency variety wherever it can be shown that the extra cost for the motor is less than the present value of 15 years of reduced energy costs.

#### **13-5 TELEMETRY SYSTEM**

All reservoir levels and key pumping station parameters (i.e., pump run, pump call, pump off, flow rate, pump hours, valve malfunctions, etc.) are telemetered to the Municipal Service Center which houses the telemetry computer and central control.