

KARL KEMP RESERVOIR 2

Years Constructed:	1992 - 1995/Dedicated October 1996
Capacity:	18 million gallons
Pump Station Capacity:	18,800 gpm
Depth:	35.5 feet
Diameter:	300 feet
Area of Reservoir Site:	4.5 acres/Pump station site: 0.5 acres
Concrete Used:	10,000 cubic yards
Steel Cable Wrap:	528,000 feet, equivalent to 100 miles
Reinforced Steel:	1.2 million pounds



History of Reservoir 2

The Karl Kemp Reservoir is the second reservoir owned and operated by Mesa Consolidated Water District (Mesa). It was named in honor of Karl Kemp, who served as Mesa's General Manager from 1981 until December 2001. Previously, Mr. Kemp worked as Mesa's Assistant General Manager from 1978 to 1981.

Reservoir 2 is an underground reservoir located under the activity field at a local school site. Construction on Reservoir 2 began in Spring of 1992 and was completed in 1995.

Operations

When filled to capacity, the Karl Kemp Reservoir holds 18 million gallons of water. Together with Reservoir 1, Mesa's local water storage capacity equals 28 million gallons or about 1 1/2 days of average water use.

Some reservoirs are above-ground and others are buried. Compared to an above-ground facility, buried reservoirs are designed to withstand more weight. A buried reservoir's roof and foundation are thicker, and additional columns are used to support the roof.

The Karl Kemp Reservoir is a circular, steel reinforced concrete tank with 121 columns supporting the roof.

More than one million pounds of steel reinforces the 10,000 cubic yards of concrete. The tank is wrapped with 100 miles of high strength steel cable from top to bottom.

The 40- by 80-foot pump station is architecturally designed to resemble a nearby townhome structure. The purpose of the pump station is to pump and distribute water stored in the reservoir.

Reservoirs "float" on the water system, meaning the flow into the reservoir is set at average water usage. During times of the day when system usage is low, the Karl Kemp Reservoir is filled. During periods of above-average or peak use, the reservoir empties. Reservoirs help equalize the demand on supply facilities.

Mesa wells produce water from the groundwater basin. System pressure fills the reservoirs. Four natural gas engines are used to pump water from the Karl Kemp Reservoir to customers' homes.

In addition to daily use, the reservoir provides emergency water storage. During an emergency, the water demand may exceed the capability of local wells and available import sources. Continuous local storage helps safeguard adequate supplies for such an event.

After construction of the reservoir was completed, the management and use of the school site and buildings were returned to the Newport-Mesa Unified School District. Mesa irrigates the landscaped field area. The school facilities and field are maintained by the School District, and the City Park is maintained by the City of Costa Mesa.

Safety Considerations

Safety is the primary concern with any public facility. Before the design of a buried reservoir begins, engineers and geologists study soil conditions to maximize protection from earthquake activity.

Structures on a school site are designed in accordance with the most up-to-date standards and technology, and are inspected and approved by the Office of the State Architect. Throughout construction, the Office of the State Architect conducted regular inspections and enforced stringent criteria to ensure construction of a safe structure.

Long-range Planning

In 1986, the District introduced a Master Plan to meet the long-term growing needs of its customers. The plan defined ways to improve water delivery systems, create additional local storage facilities, and develop new sources of water. In 1990, the Master Plan was updated with a primary focus to "drought-proof" the service area. This is accomplished by developing additional supplies of local groundwater thereby reducing reliance on imported water.

Increasing the use of well water provides operational flexibility and local control that enables Mesa to minimize the use of imported water. Well water is higher in quality, and lower in cost than imported water. Mesa is fortunate to have access to such a reliable low-cost source of water.

Source of Water

Mesa's primary source of water is groundwater. Mesa strives to provide its customers with as much groundwater as possible, which is pumped from Orange County's natural groundwater basin or aquifer via nine wells.

The groundwater basin stretches 350 square miles from the Orange County line at Seal Beach and Long Beach, along the coast, down to the 55 freeway and east to Yorba Linda.

Backup for Mesa's well water is imported water, which comes from the Colorado River. It flows through aqueducts to the Robert B. Diemer Filtration Plant in Yorba Linda. Imported water is more costly than groundwater because of transportation and treatment costs.

Currently Mesa owns and operates two reservoirs, which have the combined capacity to store more than 28 million-gallons of water.

Groundwater Basin

Groundwater in Orange County occurs in horizontal layers of water-bearing sand, gravel or broken rock and not in underground lakes or streams. These formations, called aquifers, are separated by layers of non-water bearing materials, and make up the groundwater basin. The Orange County Water District manages the local area groundwater basin and utilizes advanced techniques for helping nature recharge the groundwater basin.

The Santa Ana River is the main contributor to the groundwater supply. Water from the Santa Ana River reaches the aquifers through a number of routes. It infiltrates the soil on the earth's surface as rainfall, or percolates through the gravel of streambeds or unlined ditches. Water is also placed in the ground artificially, through man-made percolation ponds or injection wells.

Service Area

Mesa provides water service to more than 100,000 customers in an 18-square mile area including the City of Costa Mesa, parts of Newport Beach and unincorporated Orange County, including the John Wayne Airport.