



# Phase 2 Expansion

## Legend

- 1 Influent Sewers**

Wastewater from inside homes and businesses travels through gravity sewer pipelines to the Michelson Water Reclamation Plant (MWRP). The MWRP Expansion Project, Phase 2, includes replacing the terminal ends of the two sewers that feed the plant. These two new sewer segments will connect to a junction structure and discharge to the Headworks facility through a sewer.
- 2 Headworks**

At the headworks, wastewater enters the reclamation plant and is sent through in-channel grinders to liquefy larger debris. The new headworks facility will include three automatically cleaned screens to remove debris and three grit chambers to remove sand, rocks, and grit. The facility will handle an anticipated average flow of 33 million gallons per day (mgd) and a peak flow of 63 mgd.
- 3 Primary Sedimentation Tanks**

Four new primary treatment sedimentation tanks, which remove biosolids from the wastewater, will supplement five existing tanks. Wastewater flows slowly through the in-ground tanks, allowing suspended solids to settle to the bottom or float to the surface, where the solids are collected for disposal. The new primary sedimentation tanks will have a combined capacity of 33 mgd.
- 4 Flow Equalization**

Flow equalization is the process of storing and routing flow to even out the normal daily flow variation, resulting in a constant flow to downstream processes. A new primary effluent pumping station will be the heart of flow equalization operations at Michelson. The pumping station will direct flow to the existing secondary treatment process, the new membrane bioreactor, or the existing flow equalization basins for storage. The flow equalization basins will be expanded for additional storage capacity.
- 5 Expansion of Existing Secondary Treatment**

Secondary treatment mimics nature by using microorganisms to consume organic matter and remove nutrients. The process includes aerated basins to provide oxygen and sustain the microorganisms for removal of organic matter and anoxic (no free oxygen) basins to remove nutrients, followed by sedimentation tanks to separate the solids from the water. The existing secondary treatment system includes six treatment basins, nine rectangular sedimentation tanks, and one circular sedimentation tank. A new aeration blower will be installed to provide a backup supply of aeration air. The upgraded secondary treatment system will provide 18 mgd of treatment capacity.

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- 6 Membrane Bioreactor**

This cutting-edge process will include treatment basins similar to the typical secondary treatment process, but will replace the sedimentation tanks and dual-media filters with membrane filters. The result is high-quality water that can be disinfected without further treatment for reuse. The new membrane bioreactor will have approximately 10 mgd of initial treatment capacity with the ability to expand to 15 mgd.
- 7 High-Rate Clarifier**

High-rate clarifiers are used to condition secondary-treated water prior to filtration in order to maximize the effectiveness and capacity of the filters. The high rate clarifier uses coagulants and sand to bind suspended and dissolved matter into larger and heavier particles that can be settled and collected. The sand is then cleaned and recycled within the system. The new high-rate clarifier will receive secondary treated water from the existing secondary treatment process and will have a capacity of 18 mgd.
- 8 Dual-Media Filters**

Conditioned secondary-treated water is further treated in the existing dual-media filters to remove the smallest solids particles and produce tertiary-treated water. The water passes by gravity through an anthracite coal layer followed by a sand layer. The existing filters will operate at a capacity of 18 mgd.
- 9 Chlorine Contact Chamber Improvements**

Following filtration, tertiary-treated water must be disinfected prior to reuse applications. The existing chlorine contact chamber provides the appropriate detention time for chlorine disinfection to occur. The chambers will be repaired and upgraded to improve their hydraulic characteristics. In addition, the existing chlorine gas system will be replaced with a sodium hypochlorite system. The chlorine contact basins will operate at a capacity of 18 mgd.
- 10 Ultraviolet Disinfection**

The high-quality water produced by the new membrane bioreactor will be disinfected using ultraviolet light. The water flows by gravity in concrete channels past specially designed ultraviolet lights. The new ultraviolet disinfection facility will provide an initial capacity of 10 mgd day with the ability to expand to 15 mgd.
- 11 Recycled Water Pumping**

Disinfected water from the existing chlorine contact chamber and the new ultraviolet disinfection system will be blended and pumped for reuse at the existing recycled water pumping station. Two new 600-horsepower pumps will be added to the pumping station to supplement the four existing pumps, resulting in a station pumping capacity of 28 mgd.
- 12 Floodwall**

Excessive vegetative growth within the San Diego Creek adjacent to MWRP has diminished the storm flow capacity of the creek. A block wall will be constructed around the MWRP site to provide flood protection per County of Orange, Army Corps of Engineers and Federal Emergency Management Agency design criteria. In the event of a 200-year storm, this wall will protect MWRP from flooding with an additional three to four feet of height.

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Established in 1961, The Irvine Ranch Water District (IRWD) provides potable water, sewage collection and treatment and produces recycled water. IRWD's tertiary treatment of wastewater at its Michelson Water Reclamation Plant (MWRP) and Los Alisos Water Reclamation Plant (LAWRP) results in an excellent quality of recycled water that is used for landscape and agricultural irrigation, and for industrial and commercial needs.

To keep up with a growing demand for potable water and a decreasing imported water supply, IRWD adopted progressive water reuse and conservation standards, and began ambitious capital improvement projects. The MWRP Phase 2 Expansion Project will increase the capacity of MWRP from approximately 18 million gallons per day (mgd) to 28 mgd. Design of this project started in September 2006 and was completed in March 2009. Construction began in September 2009 and is anticipated to be completed by July 2012.

About 20 percent of IRWD's current supply is recycled water, enough to provide landscape irrigation for 80 percent of the District's business and community customers including parks, school grounds, and golf courses. For every gallon of water recycled by IRWD, a gallon of potable water is spared for our drinking water customers, an equation that helps keep IRWD's water rates among the lowest in Orange County. The MWRP Phase 2 Expansion will allow IRWD to continue providing water to meet the community's needs while decreasing IRWD's dependence on imported potable water.

