

6. Recycled Water

6.1. Agency Coordination

YLWD does not own or operate wastewater treatment facilities; it sends all collected wastewater to OCSD for treatment and disposal. YLWD relies on the Orange County Groundwater Basin for half of its water supply. As manager of the Basin, OCWD strives to maintain and increase the reliability of the Basin by increasing recycled water usage to replace dependency on groundwater. To further this goal, OCWD and OCSD have jointly constructed two water recycling projects, described below:

OCWD Green Acres Project

The Green Acres Project (GAP) provides recycled water for landscape irrigation at parks, schools and golf courses as well as for industrial uses, such as carpet dyeing.

GAP provides an alternate source of water to the cities of Fountain Valley, Huntington Beach, Newport Beach, Santa Ana, and Mesa Consolidated Water District. Current water users include Mile Square Park in Fountain Valley, Costa Mesa Golf Course, Home Ranch bean field and Chroma Systems carpet dyeing. Due to a growing demand for water in Orange County, it is sensible that recycled water be used whenever possible for irrigation and industrial uses to supplement potable water supplies. The use of GAP water will diminish to approximately 3 MGD upon completion of OCSD's P1-102 (Fountain Valley Wastewater Secondary Treatment Expansion) project in the fall of 2011.

OCWD Groundwater Replenishment System

The Groundwater Replenishment System (GWRS), which has been operational since January 2008, takes highly treated sewer water and purifies it to a level that meets state and federal drinking water standards. It uses a three-step process that includes microfiltration, reverse osmosis, and ultraviolet light and hydrogen peroxide advanced oxidation treatment. The finished water is then injected into the ground to provide seawater barrier and percolated into deep aquifers where it eventually becomes part of Orange County's drinking water supply.

The design and construction of the GWRS was a project jointly-funded by OCWD and OCSD. These two public agencies have worked together for more than 30 years. They are leading the way in water recycling and providing a locally-controlled, drought-proof and reliable supply of high-quality water in an environmentally sensitive and economical manner.

The first step, Microfiltration (MF), is a separation process that uses polypropylene hollow fibers, similar to straws, with tiny holes in the sides that are 0.2 micron in diameter. By drawing water through the holes into the center of the fibers, suspended solids, protozoa, bacteria and some viruses are filtered out of the water.

In the second step, Reverse osmosis (RO), membranes are made of semi-permeable polyamide polymer (plastic). During the RO process, water is forced through the molecular structure of the membranes under high pressure, removing dissolved chemicals, viruses and pharmaceuticals in the water. The end result is near-distilled-quality water so pure that minerals have to be added back in to stabilize the water. RO has been successfully used by OCWD since the mid-1970s to purify highly-treated wastewater for its seawater intrusion barrier at its Water Factory 21 (WF-21) from 1975-2004.

In the third step, water is exposed to high-intensity ultraviolet (UV) light with hydrogen peroxide (H₂O₂) to disinfect and destroy any trace organic compounds that may have passed through the reverse osmosis membranes. Examples of these trace organic compounds are N-Nitrosodimethylamine (NDMA) and 1-4 Dioxane, which have to be removed to the parts-per-trillion level. UV with H₂O₂ is an effective disinfection/advanced oxidation process that keeps these compounds from reaching drinking water supplies.

The GWRS has a current production capacity of 70 MGD, and a total production of 23.5 billion gallons per year. Once the water has been treated with the three-step process at the GWRS as described above, approximately 35 MGD of GWRS water is pumped into injection wells where it serves as a seawater intrusion barrier. Another 35 MGD is pumped to recharge basins in the City of Anaheim, where GWRS water filters through sand and gravel to replenish the deep aquifers of north and central Orange County's groundwater basin. At this time, OCWD has designed Phase 2 of the expansion, which will recycle approximately another 28 MGD of effluent. Investments beyond Phase 2 have not been approved by OCWD and would require further review before proceeding. If the further envisioned phase of the project is approved and developed, it is projected that up to 118 MGD of water will be produced.

Table 6-1 lists participating agencies in developing the recycled water section.

Table 6-1: Participating Agencies

Participating Agencies	Participated
Water Agencies	YLWD
Wastewater Agencies	OCSD
Groundwater Agencies	OCWD

6.2. Wastewater Description and Disposal

Within its political boundary, YLWD owns and maintains nearly 150 miles of various diameter sewer pipes and one sewer lift station. This area serves about 11,786 single family, commercial, industrial and public school accounts, and 1,240 multiple dwelling units (condominiums, mobile homes, and apartments) for a total of about 13,206 services.

Outside of its political boundary, YLWD also owns and maintains approximately 18 miles of sewer system in the “Locke Ranch” area. Here, there are about 1,565 single family, commercial, industrial and public school sewer connections. These customers receive their water service from the Golden State Water Company and pay for sewer service on their property tax bills.

Wastewater is collected within YLWD and delivered to the Orange County Sanitation District (OCSD) trunk sewer system. Wastewater flows by gravity to OCSD’s Reclamation Plant No. 1, which is located in the City of Fountain Valley, about 4 miles northeast of the ocean and adjacent to the Santa Ana River. The plant provides advanced primary and secondary treatment and supplies secondary-treated water to OCWD which further treats and distributes the water for various uses, including groundwater recharge, and operation of ocean water intrusion barrier system.

Table 6-2 summarizes OCSD past, current, and projected wastewater volumes collected and treated, as well as the quantity of wastewater treated to recycled water standards for treatment plants within OCSD’s service area. Table 6-3 summarizes the disposal method, and treatment level of discharge volumes.

Table 6-2: Wastewater Collection and Treatment (AFY)

Type of Wastewater	Fiscal Year Ending						
	2005	2010	2015	2020	2025	2030	2035-opt
Wastewater Collected & Treated in OCSD Service Area	273,017	232,348	302,400	312,704	321,104	329,392	333,536
Volume that Meets Recycled Water Standards	12,156	75,000	105,000	105,000	105,000	105,000	105,000

Table 6-3: Disposal of Wastewater (Non-Recycled) (AFY)

Method of Disposal	Treatment Level	Fiscal Year Ending					
		2010	2015	2020	2025	2030	2035-opt
OCSD Ocean Outfall	Secondary	157,348	197,400	207,704	216,104	224,392	228,536

6.3. Current Recycled Water Uses

There are no existing recycled water treatment facilities in or around YLWD. The Orange County Water District produces Title 22 recycled water in Fountain Valley for the purpose of direct reuse (i.e. recycled water for irrigation of golf courses, parks, street medians, agricultural, etc.), groundwater recharge and ocean water intrusion barrier. There are no plans for this recycled water to be used for other purposes within the YLWD service area.

6.4. Potential Recycled Water Uses

YLWD is completing a Water Recycling Facilities Planning Study (WRFPS) which will investigate construction of a new 5 MGD water recycling facility. The water recycling facilities plan will investigate the diversion of raw wastewater from existing trunk sewer pipelines within YLWD into a new water recycling facility (i.e. scalping plant) to produce Title 22 recycled water within YLWD. YLWD has several sewer pipelines that have enough flow to supply a small water recycling facility.

The WRFPS will evaluate the cost to treat, distribute and operate a water recycling facility and distribution system to supply specific customers. Water quality restrictions may require additional treatment for certain types of use and will be evaluated as part of the WRFPS. The WRFPS will evaluate the water quality requirements of existing customers and will determine if the water recycling facility can meet or exceed those water quality requirements.

The WRFPS will determine effectiveness of a future 5 MGD Wastewater Treatment Plant within YLWD’s service area. The WRFPS should be completed by Spring 2011, and if the project is feasible a target completion date of 2014 is forecasted. YLWD has located two source points for collection of about 3 MGD of wastewater for the feasibility study.

6.4.1. Direct Non-Potable Reuse

YLWD currently does not have the potential for direct non-potable reuse within its service area but is conducting a WRFPS to investigate the opportunities for a water recycling facility.

6.4.2. Indirect Potable Reuse

YLWD benefits indirectly from the replenishment of the Orange County groundwater basin using GWRS water that meets state and federal drinking water standards for potable reuse.

6.5. Optimization Plan

Because YLWD is not using recycled water at this time, it is not practicable to provide a recycled water optimization plan. YLWD has positioned itself to receive recycled water if it becomes available to serve some of the large development areas.

In Orange County, the majority of recycled water is used for irrigating golf courses, parks, schools, business and communal landscaping. However, future recycled water use can increase by requiring dual piping in new developments, retrofitting existing landscaped areas and constructing recycled water pumping stations and transmission mains to reach areas far from the treatment plants. Gains in implementing some of these projects have been made throughout the county; however, the additional costs, large energy requirements and facilities to create such projects are very expensive to pursue.

To determine if a recycled water project is cost-effective, cost/benefit analyses must be conducted for each potential project. This brings about the discussion on technical and economic feasibility of a recycled water project requiring a relative comparison to alternative water supply options.

YLWD is currently conducting a WRFPS to determine feasibility of a future 5 MGD Wastewater Treatment Plant within the service area. Study should be completed by spring 2011.