GWRS water flow into Miraloma Basin

2024 ANNUAL REPORT

GROUNDWATER REPLENISHMENT SYSTEM

Groundwater Replenishment System
2024 Annual Report

Prepared for the
California Regional Water Quality Control Board, Santa Ana Region
Order No. R8-2022-0050

by
Debra L. Burris, P.E.
Board Certified Environmental Engineer, American Academy of Environmental Engineers

DDB ENGINEERING, INC.

1 Cavalier
Laguna Niguel, CA 92677
(949) 400-8575

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EXECUTIVE SUMMARY

The Groundwater Replenishment System (GWRS) is a water supply project jointly sponsored by Orange County Water District (OCWD) and Orange County Sanitation District (OC San) that supplements existing water supplies by providing a reliable, high-quality source of water to replenish the Orange County Groundwater Basin (the Basin), to protect it from degradation due to seawater intrusion, and for limited non-potable uses.

This Annual Report examines the GWRS operation and performance for calendar year 2024. This Annual Report fulfills the GWRS permit requirements set forth by the California Regional Water Quality Control Board, Santa Ana Region (RWQCB) in Order No. R8-2022-0050 (RWQCB 2022a). This Annual Report also describes requirements for emergency discharges from the GWRS to the Santa Ana River (SAR) per RWQCB Order No. R8-2022-0002 (RWQCB, 2022b). The GWRS had no emergency discharges to the SAR in 2024.

Introduction

The GWRS, which is operated by OCWD, consists of five major components:

- **Advanced Water Purification Facility (AWPF)**, featuring treatment processes and pump stations to produce up to 130 million gallons per day (MGD) of purified recycled water;
- **Talbert Seawater Intrusion Barrier (Talbert Barrier)**, comprised of 36 injection well sites supported by an extensive network of groundwater monitoring wells;
- **Kraemer-Miller-Miraloma-La Palma Basins (K-M-M-L Basins)**, four permitted spreading basins supported by maintenance dewatering pumps and numerous groundwater monitoring wells;
- **Mid-Basin Injection (MBI) Project**, consisting of five injection wells equipped with maintenance backwash pumps and supported by downgradient monitoring wells; and
- **Three non-potable end users**: Anaheim Canyon Power Plant (Anaheim CPP), Anaheim Regional Transportation Intermodal Center (ARTIC), and Anaheim Adventure Park (AAP), which operates at Miraloma Basin and utilizes the purified recycled water already being delivered to that location for recharge.

Figure ES-1 shows the location of the GWRS in central Orange County, California. The AWPF receives secondary-treated wastewater from OC San facilities that may be augmented with limited tertiary-treated wastewater from Irvine Ranch Water District (IRWD) facilities. The AWPF treats the source water to better than drinking water standards using full advanced treatment: membrane filtration (MF), reverse osmosis (RO), advanced oxidation/disinfection consisting of hydrogen peroxide addition and ultraviolet light exposure (UV/AOP), followed by partial decarbonation and lime stabilization. Pumping stations and pipelines convey purified recycled water from the AWPF to the Talbert Barrier, K-M-M-L Basins, MBI Project, and/or non-potable water users.

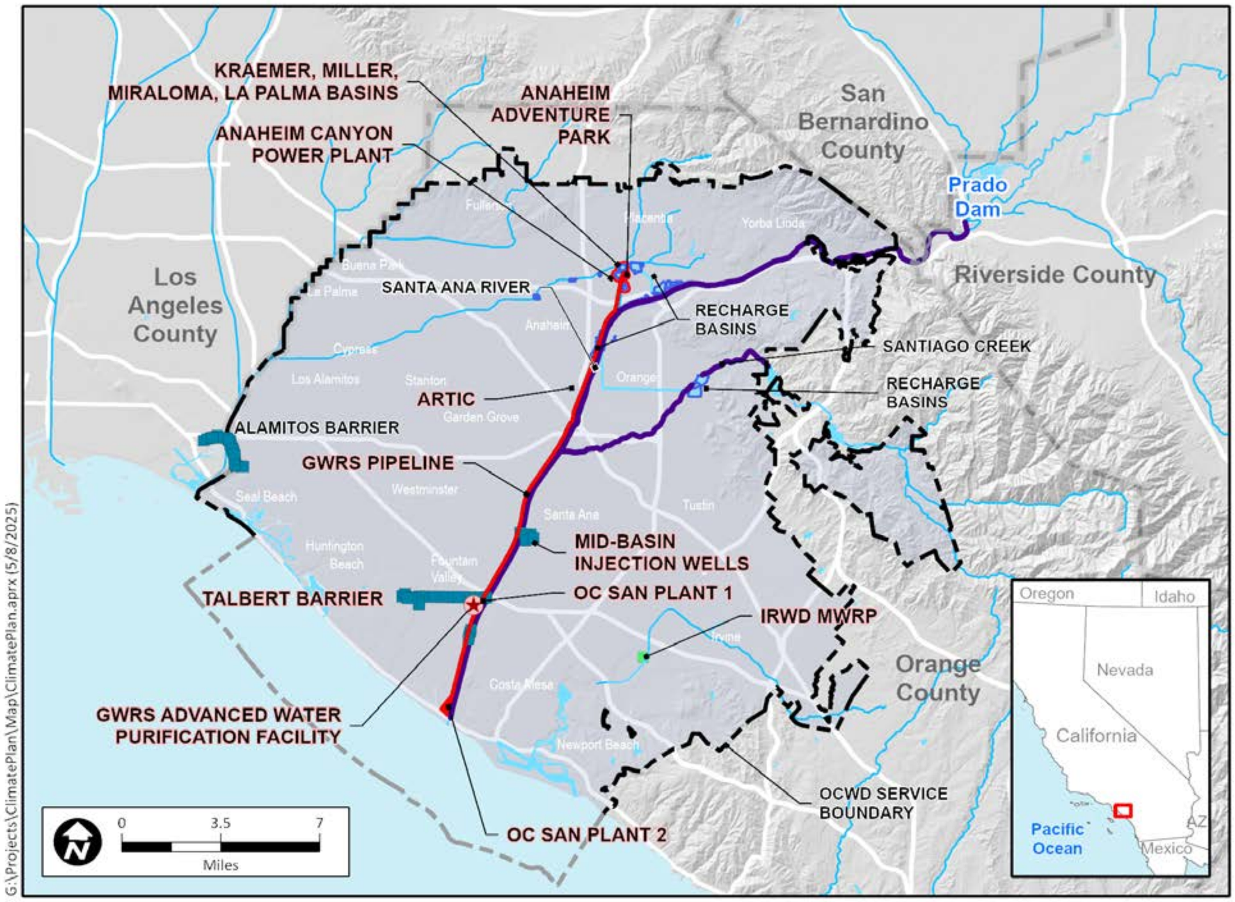


Figure ES-1. Groundwater Replenishment System Location Map

The original AWPF began operation in January 2008 and was designed to produce 70 MGD, or approximately 72,000 acre-feet per year (AFY) (243,000 cubic meters per day [m^3/day]), of purified recycled water based on a minimum on-line factor of 90%. The GWRS Initial Expansion (GWRSIE) began operation in May 2015, increasing the AWPF design production capacity up to 100 MGD, or approximately 103,000 AFY (348,000 m^3/day), of purified recycled water based on a minimum on-line factor of 90%. The GWRS Final Expansion (GWRSFE) began operation in December 2022, increasing the AWPF design production capacity up to 130 MGD, or approximately 134,000 AFY (452,000 m^3/day) based on a minimum on-line factor of 90%.

During 2024, most of the purified recycled water produced by the AWPF was injected at the Talbert Barrier or percolated at K-M-M-L Basins; a lesser volume was injected at the MBI Project and supplied to non-potable water customers.

The Talbert Barrier consists of a series of 36 injection well sites, I1 through I36, that are supplied by pipelines from the AWPF Barrier Pump Station. OCWD constructed the injection barrier to form an underground hydraulic mound, or pressure ridge, which prevents seawater intrusion near the coast in the Talbert Gap area. Without the Talbert Barrier, seawater would migrate inland and contaminate the fresh groundwater supply of the Basin. In addition to providing seawater intrusion control, the Talbert Barrier also injects purified recycled water into the deeper Main aquifer with the primary purpose of replenishing the Basin. Potable drinking water may also be injected at the barrier as needed, although blending of the recycled water injection is not required.

In the Anaheim Forebay area, GWRS purified recycled water and other waters are percolated at K-M-M-L Basins. Other waters may include SAR water and/or purchased untreated imported water. Purified recycled water is conveyed from the AWPF to these four spreading basins by the 13-mile GWRS Pipeline installed along the west levee of the SAR channel (Figure ES-1). GWRS recharge at Kraemer and Miller Basins began in January 2008 along with start-up of the rest of the original GWRS components. Miraloma Basin began spreading purified recycled water in July 2012. La Palma Basin began spreading purified recycled water in November 2016. While recharging with purified recycled water is restricted to K-M-M-L Basins, other waters (i.e., SAR and/or imported) may be recharged at those four basins. Blending of purified recycled water recharge with other waters is not required.

Turnouts from the GWRS Pipeline supply purified recycled water to the MBI Project, Anaheim CPP and ARTIC. The first component of the MBI Project (Demonstration MBI or DMBI Project) began operation in April 2015 at one injection well (MBI-1) near the SAR in Fountain Valley. The second element of the MBI Project (MBI Centennial Park Project) in Santa Ana began injecting purified recycled water at four injection wells (MBI-2 through MBI-5) in March 2020.

Purified recycled water deliveries to Anaheim CPP and to ARTIC for non-potable uses began in July 2011 and November 2014, respectively. A third non-potable water user, AAP, began operation at Miraloma Basin in July 2021.

Advanced Water Purification Facility Performance

During 2024 the AWPF produced a total of approximately 32,927 million gallons (MG), or 101,051 acre-feet (AF) (124,644,000 cubic meters [m^3]), of purified recycled water to prevent seawater intrusion, replenish the Basin, and supply non-potable users. A breakdown of the 2024 purified recycled water production and discharge by location is presented in Table ES-1 and illustrated on Figure ES-2.

In terms of average daily flows, the AWPF produced approximately 90.0 MGD (341,000 m^3/day) of purified recycled water in 2024. Figure ES-3 illustrates the average daily AWPF production by month with the reuse location.

Table ES-1. 2024 Summary of Purified Recycled Water Flows and Discharge Points

Purified Recycled Water Discharge Point	Annual Average Daily Flow Rate (Avg. MGD)	Annual Volume		Percent (rounded)
		Million Gallons (MG)	Acre-Feet (AF)	
Talbert Barrier	15.2	5,562	17,069	16.9%
Kraemer Basin	4.1	1,494	4,585	4.5%
Miller Basin	4.8	1,740	5,340	5.3%
Miraloma Basin[1]	18.3	6,709	20,589	20.4%
La Palma Basin	41.2	16,091	46,314	45.8%
MBI Project	6.3	2,315	7,104	7.0%
Anaheim CPP	<0.1	12	38	<0.1%
ARTIC	<0.1	4	12	<0.1%
Total	**90.0**	**32,927**	**101,051**	**100%**

[1] Flows and volumes include use by AAP, which is located at Miraloma Basin.

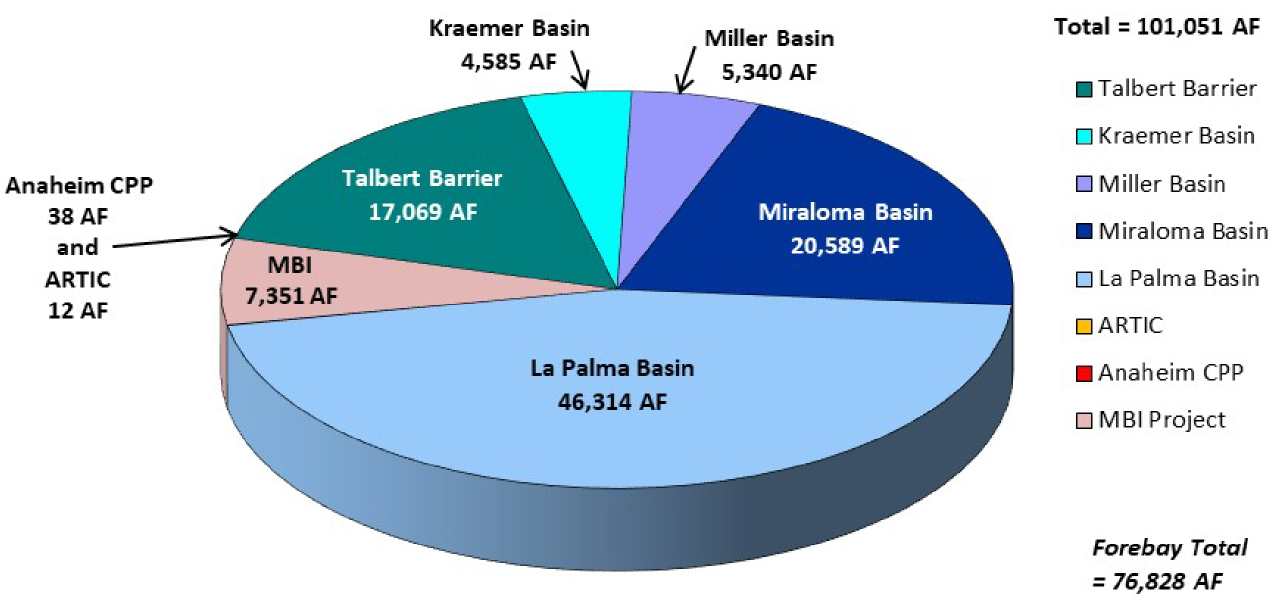
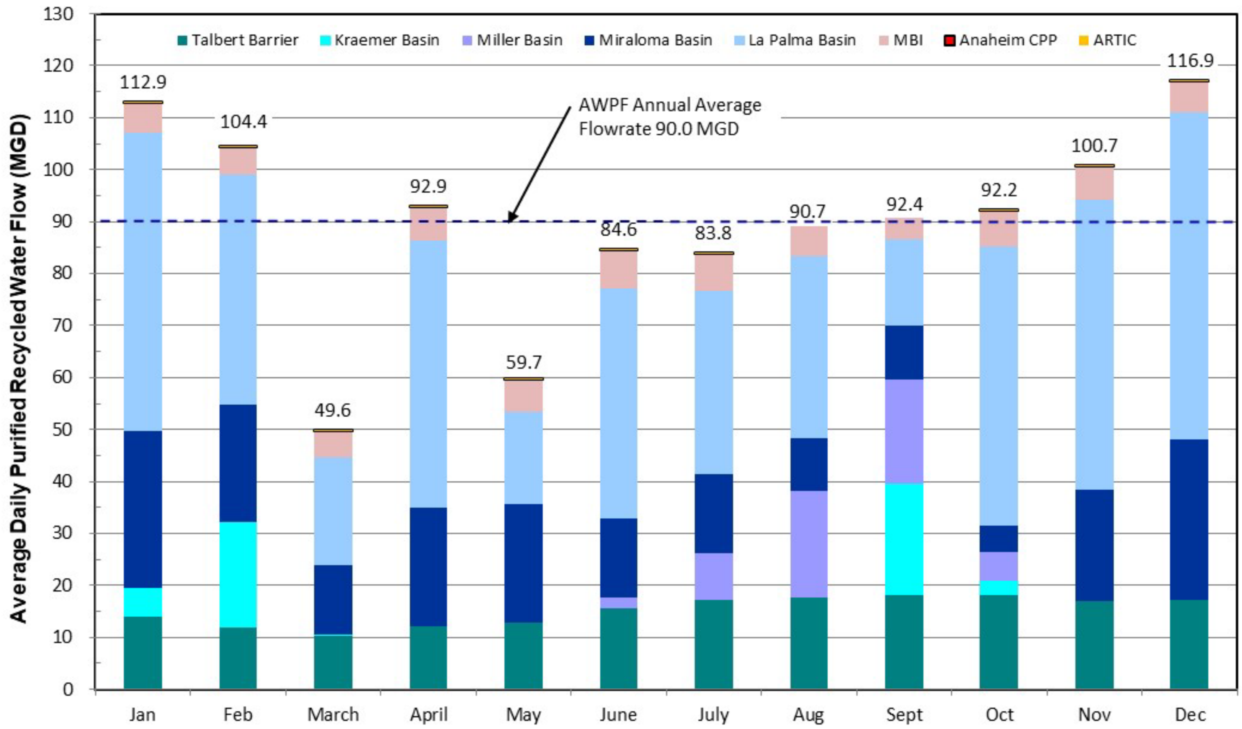


Figure ES-2. 2024 Purified Recycled Water Volume



Note: March average daily flows reflect reduced production due to planned shutdown for AWPF maintenance, spreading basin cleaning, heavy rains restricting recharge, and OC San Plant 2 work and Ocean Outfall Booster Station (OOBS) testing. May average daily flows reflect reduced source water availability due to OC San trunkline repairs requiring Plant 2 to operate in combined mode, which reduced AWPF production.

Figure ES-3. 2024 Average Daily Purified Recycled Water Flow By Month

As illustrated on Figure ES-4, the 2024 GWRS total purified recycled water production (32,927 MG, 101,051 AF, or 124,644,000 m^3) was less than that in 2023 primarily due to OC San's source water availability issues and heavy rains restricting Anaheim Forebay recharge capacity. Overall, the AWPF was on-line approximately 359.2 days in 2024 (98.15% of the year).

The AWPF treatment processes operated well during the year, producing high quality purified recycled water in compliance with all permit requirements. Table ES-2 summarizes the average purified recycled water, or finished product water (FPW), quality for selected parameters.

Concentrations of inorganic constituents in the purified recycled water, such as aluminum and chromium, were either non-detect or if detected, far below the permit limits. Concentrations of organic contaminants, such as volatile organic compounds, pesticides, and other synthetic organic compounds, were also non-detect or far below the permit limits. Analyses of purified recycled water for unregulated compounds and chemicals of emerging concern (CECs), such as endocrine disrupting chemicals and pharmaceuticals, were either non-detect or if detected, found at levels below public health risk thresholds. During 2024 the GWRS complied with pathogenic microorganism reduction requirements using the MF, RO, and UV/AOP processes at the AWPF, plus underground retention time as an environmental buffer. Table ES-3 summarizes the daily total pathogen log reduction values achieved in 2024 in comparison to the requirements.

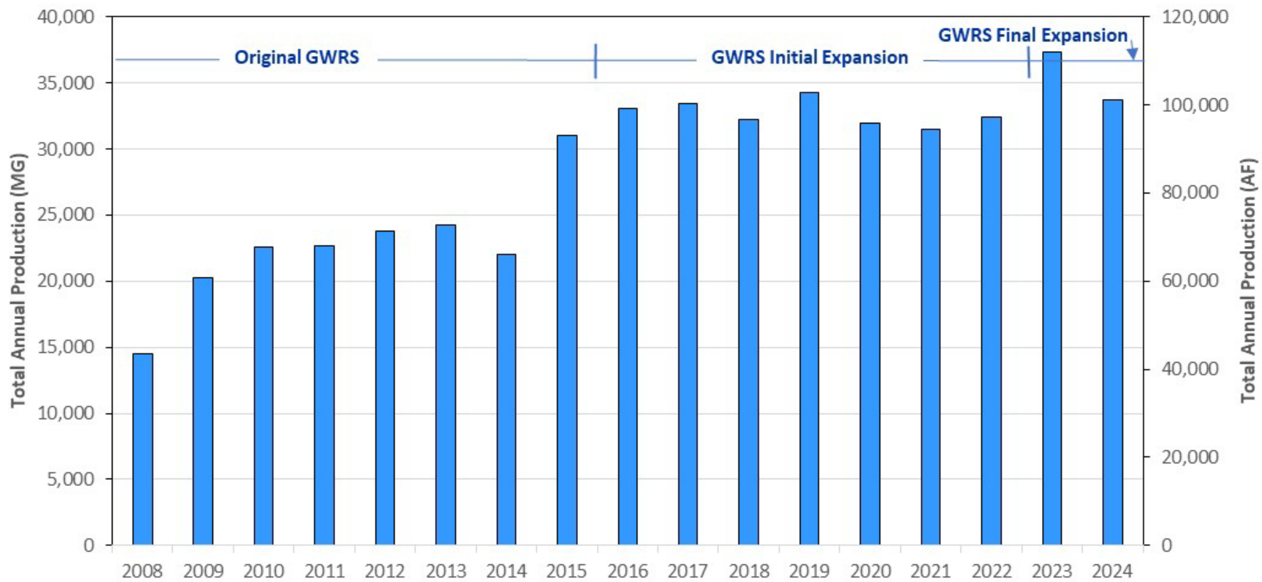


Figure ES-4. Historical GWRS Purified Recycled Water Production Since 2008

Table ES-2. 2024 Average Purified Recycled Water Quality

Parameter Name	Units [1]	FPW [2,3]	Permit Limit
Electrical Conductivity	µS/cm	94 [4]	900 [5]
Total Dissolved Solids	mg/L	47	500 [5]
pH	units	8.25 [4]	6 – 9
Chloride	mg/L	3.7	55
Total Nitrogen	mg/L	0.8	10
Arsenic	µg/L	<1 [6]	10
1,2,3-Trichloropropane (1,2,3-TCP)	µg/L	<0.005 [6]	0.005
N-nitrosodimethylamine (NDMA)	ng/L	0.3	N/A [7]
1,4-Dioxane	µg/L	<0.5 [6]	N/A
Perfluorooctanoic Acid (PFOA)	ng/L	<2 [6]	N/A
Perfluorooctane Sulfonic Acid (PFOS)	ng/L	<2 [6]	N/A
Perfluorobutane Sulfonic Acid (PFBS)	ng/L	<2 [6]	N/A
Perfluorohexane Sulfonic Acid (PFHxS)	ng/L	<2 [6]	N/A
Total Organic Carbon (unfiltered)	mg/L	0.06	0.5 [8]
Total Coliform	MPN/100 mL	0.2	2.2 [9]

1 See Abbreviations List for units' abbreviations.

2 FPW is GWRS Finished Product Water (Purified Recycled Water).

3 Arithmetic average of all available data in 2024. For purposes of calculating annual averages, 10% of the Reporting Limit (RL) was used for all non-detect (ND) values. Number of significant digits shown matches those in raw data.

4 On-line average.

5 See Appendix A for more information.

6 If all data for the period were ND, then the average is shown as "<RL."

7 Not applicable is abbreviated as N/A.

8 Compliance based on 20-week running average and 4-sample running average; see Section 2.2.2.2 and Appendix A for more information.

9 7-day median limit; see Appendix A for more information.

Table ES-3. Summary of GWRS Pathogen Log Reduction Credits Achieved in 2024

Pathogen	Minimum Log Reduction Requirements[1]	Daily Pathogen Log Reduction Value (LRV) Achieved in 2024					
		Secondary Treat-ment[2]	MF and Cl_2	RO[3]	UV/AOP	Underground Retention Time[4]	Total
Giardia cysts	10	0	$\geq$4.0	2.0	6.0	0	$\geq$10
Cryptosporidium oocysts	10	0	$\geq$4.0	2.0	6.0	0	$\geq$10
Viruses	12	0	0	2.0	6.0	4 (5)	$\geq$12

[1] Per Title 22 Water Recycling Criteria (CCR, 2018) and GWRS permit (RWQCB, 2022a).

[2] No pathogen reduction credits claimed for secondary treatment at OC San.

[3] Daily pathogen log reduction credits achieved by RO in 2024 were equal to or greater than 2.0-log, except on 7/31/2024 when the LRV credit was 1.9-log. The MF process achieved 4.5-log reduction of Giardia cysts and Cryptosporidium oocysts on 7/31/2024 to make up for the RO process shortfall. See Section 2.2.3.3.

[4] Daily virus LRV credit of 4-log for underground retention time throughout 2024, although 5-log virus LRV credits were available if needed to achieve the total virus LRV requirement.

Talbert Barrier Operations

The Talbert Barrier injection supply in 2024 was predominantly purified recycled water produced by the AWPF, as shown in Table ES-4. A negligible volume of potable water from the City of Fountain Valley (FV) was also injected at the barrier in 2024; no imported water from Metropolitan Water District of Southern California (MWD) OC-44 turnout was injected. Of the total annual volume of 5,569 MG (17,091 AF; 21,081,000 m^3) of injection water, the vast majority (99.87%), 5,562 MG (17,069 AF; 21,054,000 m^3), was GWRS purified recycled water. Only about 7.3 MG (22.5 AF; 27,700 m^3) of potable water was injected at the barrier during 2024. The potable water supply was used when the AWPF was temporarily off-line due to brief shutdowns to keep the barrier pipeline pressurized and maintain a minimal injection flow until purified recycled water production resumed. The total average daily flow rate injected at the Talbert Barrier in 2024 was 15.2 MGD.

Blending purified recycled water with potable water is no longer required at the Talbert Barrier. While the maximum allowable recycled water contribution (RWC) at the Talbert Barrier is 100%, potable water may still be injected at the barrier.

Annual barrier injection in 2024 was the lowest since the GWRS came on-line in 2008 due to relatively high groundwater elevations throughout the Basin, as well as in the Talbert Gap area where groundwater levels were effectively maintained at or above protective elevations seaward of the barrier. Barrier injection in 2024 was approximately 5% less than in 2023, primarily due to higher groundwater levels resulting from unusually wet years during 2023-2024 as well as reduced Basin pumping due to wells off-line due to per- and polyfluoroalkyl substances (PFAS) contamination.

Table ES-4. 2024 GWRS Injection at the Talbert Barrier

Water Source	Flow Rate (Avg. MGD)	Volume (rounded) (MG)	(AF)	(m^3)	Description
Purified recycled water	15.2	5,652	17,069	21,054,000	GWRS finished product water (FPW)
OC-44 Potable water	0.0	0.0	0.0	0	Imported water from MWD OC-44 turnout
FV Potable water	<0.1	7.3	22.5	27,700	Blend of imported water and groundwater from City of Fountain Valley
Total	**15.2**	**5,569**	**17,091**	**21,081,000**	

Operation of the Talbert Barrier was consistent and stable throughout 2024 due to a relatively constant purified recycled water supply.

Injection was intermittently maintained at relatively high rates at the operating injection wells during 2024. Barrier injection in 2024 was evenly divided between the shallow and intermediate zones, 36% and 38%, respectively, with the deep zone receiving 26%. Shallow and intermediate zone injection varied seasonally, decreasing in fall-winter months and increasing in spring-summer months. Deep zone injection, which is typically maintained year-round and lower than the shallow and intermediate zones, was reduced in March, May, and November relative to other months because of lower AWPF production. On an annual basis, larger volumes of GWRS water were injected on the west end of the barrier as compared to the east end of the barrier for both seawater intrusion control and Basin replenishment, as is characteristic every year.

Groundwater Monitoring at the Talbert Barrier

The GWRS permit requires quarterly groundwater monitoring near the Talbert Barrier at five OCWD multi-point monitoring well sites: M10, M11, M45, M46, and M47 (RWQCB 2022a). Groundwater level (piezometric elevation) measurements as well as groundwater quality monitoring for an extensive list of parameters were conducted during 2024 at these monitoring well sites near the barrier. Seasonal fluctuations in groundwater levels indicate that the potable aquifers in the Talbert Barrier area are largely controlled by groundwater production, which varies considerably from winter to summer, and to a lesser degree by barrier injection.

Barrier compliance monitoring wells were tested for an extensive list of inorganic and organic parameters including constituents with secondary maximum contaminant levels (MCLs), 1,4-dioxane, and NDMA. Dissolved chloride concentrations continued to be used as an intrinsic tracer to track the subsurface movement of injection water in 2024. Chloride is relatively unaffected by sorption, chemical, or biological reactions in the aquifer, making it a relatively good, conservative tracer, especially since the chloride concentration of GWRS purified recycled water is much lower than both native groundwater and pre-GWRS injection water.

During 2024, groundwater quality at all the Talbert Barrier compliance monitoring wells complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods.

Groundwater quality testing at the compliance monitoring wells during 2024 revealed some results above the Federal and State Secondary Drinking Water Standards for apparent color and odor, similar to those in past years and unrelated to the injection of GWRS purified recycled water. The elevated color and odor levels are likely due to the presence of naturally occurring organic matter in this very old groundwater commonly found in the coastal area.

Testing continued in 2024 for NDMA and voluntary testing for 1,4-dioxane at monitoring wells near the Talbert Barrier. During 2024, all NDMA groundwater monitoring results were below the DDW Notification Level (NL) of 10 ng/L, and 1,4-dioxane concentrations were detected above the NL of 1 µg/L at four compliance monitoring well zones, but significantly below the DDW Response Level of 35 µg/L for drinking water systems. Historically from 2002-2008, elevated 1,4-dioxane levels were detected and remained below the Response Level at the five compliance monitoring wells due to WF-21 injection. Since 2008, 1,4-dioxane concentrations at the compliance wells have generally been decreasing, except during intermittent periods of high Basin conditions when the groundwater gradient often reverses or shifts, temporarily bringing some proportion of older pre-GWRS (WF-21) injection water back to these wells.

Kraemer-Miller-Miraloma-La Palma Basins Operations

Water from three sources is typically percolated at K-M-M-L Basins: (1) GWRS purified recycled water; (2) SAR base flow and captured storm flow; and (3) untreated imported water. During 2024, only GWRS and SAR water were percolated at K-M-M-L Basins. Due to relatively high Basin conditions and reduced Basin pumping due to PFAS, no imported replenishment water was purchased during 2024.

Table ES-5 summarizes the volumes of various waters recharged at K-M-M-L Basins during 2024. A total volume of approximately 31,588 MG (96,940 AF; 119,574,000 m^3) of purified recycled water and other water (only SAR water in 2024) was recharged at these four basins.

Table ES-5. 2024 GWRS Spreading at Kraemer-Miller-Miraloma-La Palma Basins

Water Source	Flow Rate (Avg. MGD)	Volume (rounded) (MG)	(AF)	(m^3)	Description
Purified recycled water[1]	68.4	25,034	76,828	94,764,000	GWRS finished product water (FPW) delivered
Other water[2]	17.9	6,549	20,097	24,789,000	SAR water and/or imported water percolated
Total	**86.3**	**31,588**	**96,940**	**119,574,000**	Sum of purified recycled water, other water, and spreading basin storage change[3]

[1] Volume shown is based on AWPF production records.

[2] Other water volume is estimated based on total percolation and change in storage at K-M-M-L Basins from Forebay Operations records. No imported water was spread in 2024.

[3] Spreading basin storage change is the measured change in the stored volume of water in K-M-M-L Basins from the beginning to the end of the calendar year. A positive storage change represents delivered water not yet percolated. A negative storage change represents more water percolated than was delivered based on percolation records from Forebay Operations. Spreading basin storage change in 2024 was -5 MG (-15 AF or 18,500 m^3).

During 2024, the GWRS purified recycled water discharge was divided between the four spreading basins as follows:

- Kraemer Basin: 1,494 MG (4,585 AF; 5,655,000 m^3), or 4.1 MGD on average;
- Miller Basin: 1,740 MG (5,340 AF; 6,587,000 m^3), or 4.7 MGD on average;
- Miraloma Basin: 6,709 MG (20,589 AF; 25,396,000 m^3), or 18.3 MGD on average; and
- La Palma Basin: 15,091 MG (46,314 AF; 57,128,000 m^3), or 41.2 MGD on average.

In 2024, La Palma and Miraloma Basins received only GWRS purified recycled water. Historically, La Palma and Miraloma Basins have been dedicated almost exclusively to GWRS purified recycled water to minimize clogging and to maintain their exceptionally high percolation rates. Kraemer and Miller Basins typically receive both GWRS purified recycled water and other water.

Blending purified recycled water with other water is no longer required for the Anaheim Forebay recharge operations and determination of the RWC is no longer required.

Groundwater Monitoring Near Kraemer-Miller-Miraloma-La Palma Basins

Groundwater monitoring near K-M-M-L Basins is required by the GWRS permit (RWQCB, 2022a) at four OCWD monitoring well sites: single-point monitoring wells AM-7, AM-8, and AM-10 plus nested monitoring well AMD-12. OCWD continues to voluntarily sample single-point monitoring well OCWD-KB1 because of its proximity to Kraemer Basin and long historical record, as well as nested monitoring well site AMD-10, which was a compliance monitoring well prior to 2023.

Groundwater level measurements and groundwater quality monitoring for an extensive list of parameters were conducted during 2024 at these monitoring well sites near K-M-M-L Basins.

Anaheim Forebay compliance monitoring wells were tested for: an extensive list of inorganic and organic parameters including constituents with secondary MCLs, 1,4-dioxane, and NDMA. During 2024, groundwater quality at all four Forebay compliance monitoring wells complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods. No detections of 1,4-dioxane or NDMA were found in groundwater at any of the Forebay compliance monitoring wells in 2024.

Groundwater quality testing during 2024 at two compliance monitoring well sites, AM-7 and AM-8, revealed iron concentrations above the Federal Secondary Drinking Water Standard. Corrosion of the mild steel well casings at these two monitoring well sites was likely the contributing factor causing the Secondary MCL exceedances for total iron. These Secondary MCL exceedances at AM-7 and AM-8 during 2024 were consistent with historical data collected since 2008 and were not associated with the presence of GWRS purified recycled water.

During 2024, arsenic concentrations in all zones of the four compliance monitoring wells were either non-detect or remained at relatively low and stable concentrations well below the Primary MCL. Since 2008, OCWD has observed increases in groundwater arsenic concentrations correlating to contemporaneous chloride concentration decreases with sustained arrival of large percentages of GWRS water. Although GWRS purified recycled water arrival is the cause of the increased arsenic concentrations, it is not an arsenic source. Historically, SAR water recharged with elevated arsenic concentrations adsorbed onto mineral surfaces in the aquifer; the higher initial pH or lower ionic strength of GWRS water relative to surrounding groundwater caused the arsenic to desorb. Repeated cycles of sustained GWRS water recharge have generally resulted in diminished arsenic peaks with each subsequent cycle due to arsenic mass removal. To limit arsenic mobilization in the aquifer, the AWPF post-treatment processes were modified in 2015 to more closely control the FPW pH, targeting pH 8.5.

MBI Project Operation

The MBI Project was implemented in two phases: DMBI Project and MBI Centennial Park Project. The DMBI Project began injection of purified recycled water that was delivered via the GWRS Pipeline to the MBI-1 site in April 2015. The MBI Centennial Park Project began operation in March 2020 and consists of four injection wells: MBI-2, MBI-3, MBI-4, and MBI-5, which are also supplied purified recycled water by the GWRS Pipeline. The primary objective of the five-well MBI Project is to directly replenish a heavily pumped region of the Principal aquifer. Over 90% of groundwater production in the Basin occurs from the Principal aquifer system.

During 2024 approximately 2,315 MG (7,104 AF; 8,763,000 m^3) of purified recycled water was injected at the five MBI Project wells. Blending of purified recycled water with potable water is not required at the MBI Project, and no other water was injected in 2024. Periodic backwash pumping of the five MBI wells totaled approximately 15.1 MG (46.4 AF; 57,200 m^3) during 2024, representing 0.7% of the total injection. All water produced during backwash pumping of the MBI wells is discharged to adjacent channels near the SAR under RWQCB and County of Orange Flood Control permits.

The total monthly injection volume at the MBI Project was distributed among the five MBI Project wells, with MBI-3 consistently receiving less compared to the other four. The average daily injection rates by well during 2024 (average for all days, including on- and off-line) were:

- MBI-1 1.65 MGD
- MBI-2 1.41 MGD
- MBI-3 0.63 MGD
- MBI-4 1.29 MGD
- MBI-5 1.33 MGD

The total average daily injection rate was 6.31 MGD at the MBI Project during 2024, which was 4% less than in 2023. The average injection yield (defined as the injection flowrate in gpm per foot of groundwater level rise from static conditions within the injection well) of the five MBI wells increased approximately 7% from 2023 to 2024. Injection rates and yields had shown signs of stabilization in previous years; however, 2024 marked a notable shift with significant declines observed at MBI-3 and MBI-5 indicating a potential reduction in well performance.

Groundwater Monitoring at the MBI Project

Groundwater monitoring near the MBI Project is required by the GWRS permit (RWQCB, 2022a) at two monitoring wells: SAR-12 and SAR-13. Groundwater monitoring for the MBI Project began in 2012 and continued through 2024. As part of the DMBI Project, two monitoring wells, SAR-10 and SAR-11, were installed immediately downgradient of MBI-1. However, monitoring at SAR-10 and SAR-11 is no longer required. SAR-12 and SAR-13 were installed in late-2017 along a flow path from the MBI wells toward the closest downgradient drinking water production wells IRWD-12 and IRWD-17 and now serve as the required permit compliance wells for the MBI Project. All five MBI wells and the two compliance monitoring wells are screened in Principal aquifer zones, as are the nearest downgradient production wells.

Commencement of the MBI Project in March 2020 with all five MBI wells on-line represented the start of the GWRS intrinsic tracer test to determine the underground travel time of injected purified recycled water to the downgradient compliance wells SAR-12 and SAR-13. The tracer test was completed in late 2023, and the MBI Tracer Test Report (OCWD, 2024) showing proposed 4-month primary and 5-month secondary boundary areas (aka control zones) where drinking water wells are restricted is under review by DDW.

Groundwater quality monitoring for the MBI Project was similar to the Talbert Barrier and Anaheim Forebay and included an extensive list of inorganic and organic parameters including parameters with secondary MCLs, 1,4-dioxane, and NDMA. During 2024, groundwater quality at the two compliance monitoring wells SAR-12 and SAR-13 complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods.

No secondary MCL exceedances occurred in 2024 at MBI Project compliance monitoring wells SAR-12 and SAR-13. All zones of SAR-12 and SAR-13 continued to be non-detect for 1,4-dioxane in 2024. NDMA concentrations at all zones of monitoring wells SAR-12 and SAR-13 during 2024 were generally representative of recent GWRS purified recycled water concentrations, ranging from non-detect to 2.9 ng/L, well below the notification level of 10 ng/L.

One of the main constituents monitored along the injection flow path is arsenic since mobilization of aquifer sediment-bound arsenic has been shown to occur at some locations in association with the recharge and injection of GWRS purified recycled water. The primary MCL for total arsenic is 10 µg/L. Total arsenic and other total metals were sampled at least quarterly at SAR-12 and SAR-13 from 2018 through 2024. During 2024, arsenic concentrations in all zones remained below 4 µg/L, well below the primary MCL. A gradually increasing arsenic trend in some zones reached concentrations of 3 to 3.8 µg/L in 2024, coinciding with the arrival of GWRS water.

Conclusions

The GWRS operated in compliance with its permit throughout 2024, producing a total of 32,927 MG, or 101,051 AF (124,644,000 m^3) of purified recycled water for injection at the Talbert Barrier, spreading at K-M-M-L Basins, injection at the MBI Project, and delivery to Anaheim CPP, ARTIC, and AAP for non-potable use. Of the purified recycled water produced, nearly 17% was injected at the barrier and approximately 76% was recharged at K-M-M-L Basins, including 60% of the Forebay spreading volume at La Palma Basin alone. Approximately 7% was injected at the MBI Project, and a negligible volume (less than 0.1%) was used for non-potable water purposes.

On an annual average basis, the AWPF produced 90.0 MGD (340,000 m^3/day) of purified recycled water and was on-line 98.15% of the time in 2024. Daily purified recycled water production was periodically reduced to coordinate with Anaheim Forebay operations during wet weather events, OC San operational issues that restricted AWPF source water availability, and other short-term planned and unplanned events.

In conclusion, the GWRS operated well throughout 2024, complying with its permit and producing up to 120 MGD (456,000 m^3/day) of high quality purified recycled water to continue to supply the Talbert Barrier, replenish the Basin at the Anaheim Forebay and MBI Project, as well as non-potable purposes at the Anaheim CPP, ARTIC, and AAP. OCWD is planning to recharge GWRS purified recycled water at other sites in the future.

1. INTRODUCTION

The Groundwater Replenishment System (GWRS) is a water supply project jointly sponsored by Orange County Water District (OCWD) and Orange County Sanitation District (OC San). The GWRS supplements existing water supplies by providing a reliable high-quality source of water to replenish the Orange County Groundwater Basin (the Basin), to protect the Basin from degradation due to seawater intrusion, and to also provide a water source for non-potable uses.

This introductory section of the 2024 Annual Report for the GWRS presents the following:

- Purpose of the Annual Report;
- Description of the GWRS and Advanced Water Purification Facility (AWPF);
- History of OCWD Water Recycling Facilities; and
- Overview of the Operation Optimization Plan (OOP).

1.1 Purpose of the Annual Report

OCWD is the lead agency for the GWRS and is responsible for permit compliance. The GWRS permit sets forth requirements for production and use of purified recycled water for: (1) injection at the Talbert Barrier; (2) spreading at Kraemer-Miller-Miraloma-La Palma (K-M-M-L) Basins; (3) injection at the Mid-Basin Injection (MBI) Project; and (4) non-potable water uses. (RWQCB, 2022a).

This Annual Report for 2024 is prepared in fulfillment of the requirements specified in the GWRS permit issued by the California Regional Water Quality Control Board, Santa Ana Region (RWQCB) to OCWD (RWQCB, 2022a). The GWRS permit covers both groundwater replenishment and non-potable uses; monitoring and reporting requirements under the current permit became effective on January 1, 2023.

This Annual Report serves two overall purposes by providing: (1) an in-depth review and evaluation of the operation of the entire GWRS during 2024 in fulfillment of the permit requirements; and (2) a continuing historical record of the operations of the OCWD water reuse and groundwater recharge facilities.

Information for this report was based on: (1) review of laboratory and on-line water quality data; (2) review of operations reports and groundwater monitoring records compiled by OCWD; and (3) on-site and virtual observations by the author and OCWD staff.

A complete detailed list of water quality permit requirements and purified recycled water quality results from 2024 can be found in Appendix A. Appendices B and C contain laboratory analysis methods used for water quality monitoring. All water quality analyses are performed by state-certified laboratories that operate in accordance with quality assurance plans.

1.2 Groundwater Replenishment System

The GWRS produces a reliable, high-quality source of purified recycled water, replenishes the Basin, and protects it from further degradation due to seawater intrusion.

The GWRS consisted of the following major components during 2024:

- AWPF, which includes treatment processes and pumping stations (further described in Section 2);
- Talbert Barrier, featuring injection wells and pipelines (further described in Section 3);
- K-M-M-L Basins, which are surface percolation basins supplied by the GWRS Pipeline (further described in Section 5);
- MBI Project, consisting of injection wells supplied by the GWRS Pipeline (further described in Section 7); and
- Three non-potable end users: Anaheim Canyon Power Plant (Anaheim CPP) and Anaheim Regional Transportation Intermodal Center (ARTIC), both of which are supplied by turnouts from the GWRS Pipeline, and Anaheim Adventure Park (AAP), which operates at Miraloma Basin and utilizes the purified recycled water that is already being delivered to that location for recharge.

GWRS purified recycled water production by the AWPF began in 2008, featuring injection at the Talbert Barrier and spreading at Kraemer-Miller Basins. Spreading at Miraloma Basin began in July 2012. GWRS purified recycled water recharge at injection well MBI-1 began in April 2015; four additional MBI injection wells were placed on-line in March 2020. Spreading at La Palma Basin began in November 2016. Purified recycled water service for non-potable purposes began at Anaheim CPP in July 2011 and at ARTIC in November 2014. The third non-potable water user, AAP, began operation in July 2021.

The existing AWPF purified recycled water production design capacity is 130 million gallons per day (MGD). The GWRS Final Expansion (GWRSFE) began operation in December 2022, increasing the AWPF purified recycled water production design capacity from 100 to 130 MGD; related work included headworks improvements, flow equalization, and pumping facilities at OC San Plant 2 to convey reclaimable secondary-treated wastewater to the AWPF.

Figure 1-1 schematically shows the location of the GWRS facilities in central Orange County, California. Secondary-treated wastewater from OC San facilities and any supplemental tertiary-treated wastewater from Irvine Ranch Water District's (IRWD) facilities are conveyed to the GWRS AWPF, where it is treated to better than drinking water standards using membrane filtration (MF), reverse osmosis (RO), an ultraviolet light/advanced oxidation process (UV/AOP), decarbonation, and lime stabilization. Following advanced treatment, two pumping stations at the AWPF in Fountain Valley deliver the purified recycled water to: (1) the Talbert Barrier in

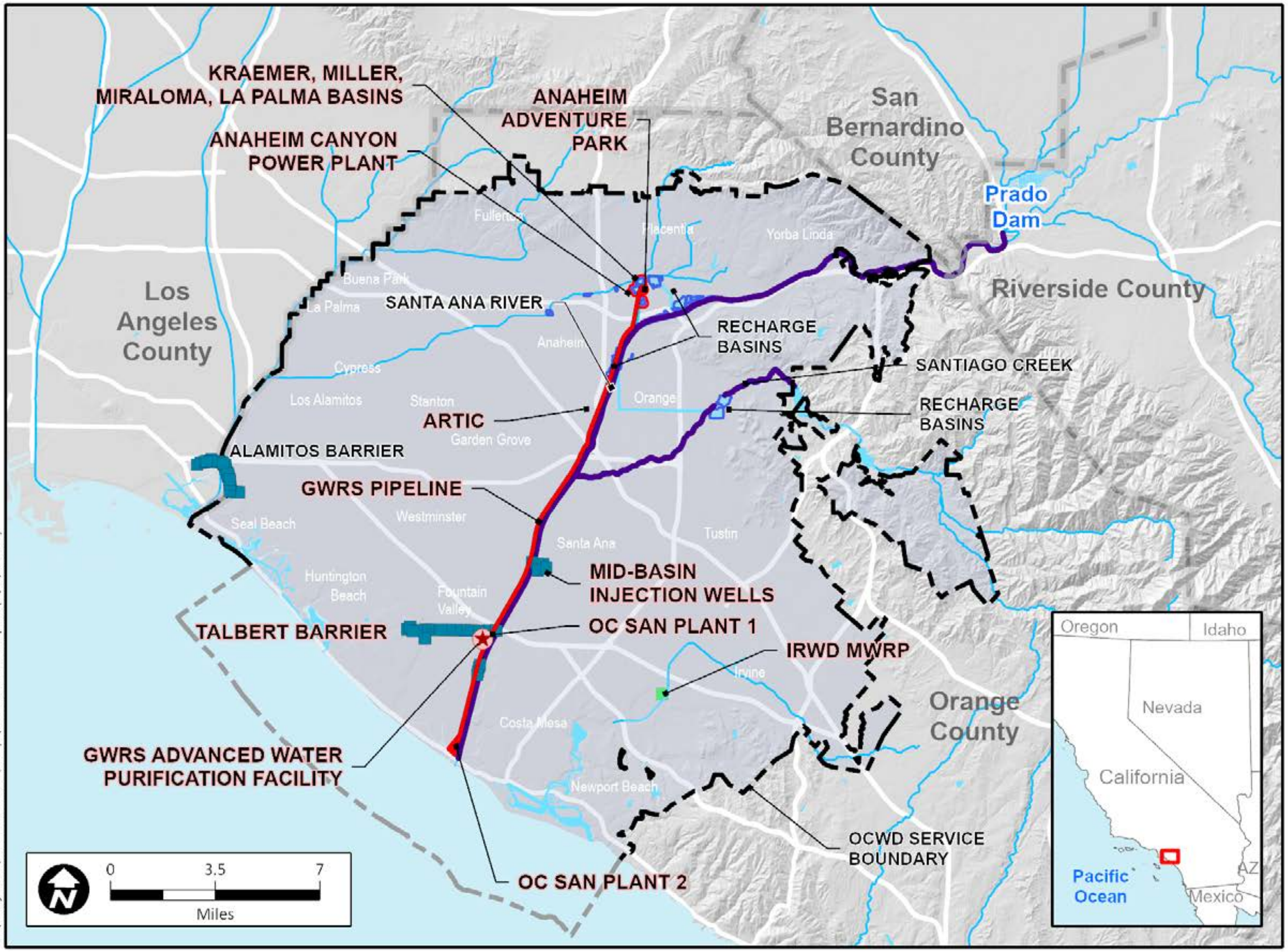


Figure 1-1. Groundwater Replenishment System Location Map

Fountain Valley and Huntington Beach, (2) K-M-M-L Basins in Anaheim, with service connections to Anaheim CPP and ARTIC also in Anaheim, and (3) the MBI Project in Fountain Valley and Santa Ana.

Besides water supply, another purpose of the GWRS is to provide peak flow relief for OC San during emergency, high wet weather flow conditions. During peak wastewater flow events, the AWPF can provide hydraulic relief for the OC San ocean outfall by discharging up to 100 MGD of membrane filtered, ultraviolet (UV)-disinfected, dechlorinated recycled water to the Santa Ana River (SAR) under RWQCB Order No. R8-2022-0002/NPDES CA8000408R8 (RWQCB, 2022b). Alternatively, the AWPF can provide similar hydraulic relief for the OC San ocean outfall by continuing normal operation and production of up to 130 MGD of purified recycled water for recharge and injection.

1.2.1 Source Water

Source water for the GWRS is secondary-treated wastewater, or secondary effluent, from OC San Plants 1 and 2, supplemented periodically with tertiary-treated wastewater, or tertiary effluent, from the IRWD Michelson Water Recycling Plant (MWRP). Prior to December 2022, the GWRS source water supply was entirely from OC San Reclamation Plant No. 1 (Plant 1 or P1). Beginning on December 12, 2022, available reclaimable secondary effluent from OC San Treatment Plant No. 2 (Plant 2 or P2) was added to the GWRS source water supply for normal purified recycled water production. To produce 130 MGD of purified recycled water, the AWPF needs approximately 170-173 MGD of secondary effluent based on design recovery rates. In addition to the variable blend of secondary effluent from OC San Plants 1 and 2, tertiary effluent from the IRWD MWRP may augment the AWPF source water. Prior to 2024, any diversions of tertiary effluent were sent over the AWPF influent weir to the OC San outfall rather than to the GWRS. In 2024, a small volume of MWRP effluent was directed to the AWPF influent screening facility along with Plant 1 secondary effluent, which represented the first use of tertiary effluent as influent to GWRS.

Plant 1, which is located adjacent to the OCWD AWPF in Fountain Valley, has a rated secondary treatment capacity of 182 MGD (annual average dry weather). In addition to the GWRS source water, Plant 1 provides secondary effluent for the Green Acres Project (GAP), which is a 7.5-MGD capacity tertiary treatment plant operated by OCWD that produces recycled water for non-potable irrigation and industrial uses.

Plant 2, which is located in Huntington Beach near the coast, has a rated secondary treatment capacity of 150 MGD (annual average dry weather). Plant 2 secondary effluent was not an approved source for the GWRS until December 2022 (RWQCB, 2022a). Headworks and treatment process modifications and flow equalization and pumping facilities were completed in 2022 at Plant 2 to segregate reclaimable secondary effluent to supplement the GWRS source water supply and support the GWRSFE. Non-reclaimable Plant 2 secondary effluent is discharged via an existing OC San outfall to the Pacific Ocean.

The MWRP is located in Irvine and has a rated treatment capacity of 28 MGD. The vast majority of its disinfected tertiary effluent is used in the IRWD service area for non-potable recycled water purposes. Under agreement with OCWD, MWRP effluent can be seasonally pumped to the GAP distribution system. Any excess tertiary effluent not used by IRWD or GAP may be discharged to OC San and either used potentially to augment the GWRS source water blend or diverted to the OC San outfall.

OC San maintains an industrial pretreatment and enhanced source control program to manage contaminants entering the wastewater tributary to both Plants 1 and 2 which may be harmful to the treatment facilities, environment, or to human health and drinking water supplies. As the designated Control Authority for the region, OC San's industrial pretreatment and enhanced source control program covers IRWD's MWRP because IRWD can discharge raw wastewater, solids, and excess treated wastewater to the OC San facilities. Thus, the comprehensive OC San enhanced source control program fulfills the GWRS permit requirements and Title 22 Water Recycling Criteria requirements for groundwater replenishment with recycled water (CCR, 2018), ultimately helping to protect GWRS purified recycled water quality.

1.2.1.1 OC San Plant 1 Secondary Treatment

Raw wastewater influent to Plant 1 passes through the metering and diversion structure, mechanical bar screens, and grit chambers, which comprise preliminary treatment. Following screening and grit removal, the wastewater receives advanced primary treatment using ferric chloride and anionic polymer addition and primary sedimentation. Primary effluent is then conveyed to the activated sludge (AS) plants or to trickling filters (TF) for secondary treatment. The existing TF and associated secondary clarifiers were upgraded and began operation in October 2006 with a design treatment capacity of 30 MGD. The older AS plant (OC San Project No. P1-82 or AS1), which consists of aeration basins and secondary clarifiers, was upgraded in August 2007 to include anoxic and oxic zones and has a design treatment capacity of 80 MGD. Historically, OC San operated the P1 AS1 plant in the carbonaceous biochemical oxygen demand (CBOD) mode. Since late 2009, the P1 AS1 plant has operated in the biological nitrification/partial denitrification (NdN) mode. The newer AS plant at Plant 1 (OC San Project No. P1-102 or AS2) was completed in July 2012 with a design capacity of 60 MGD and has operated in the NdN mode achieving partial denitrification. Both P1 AS1 and P1 AS2 effluents are blended and used as source water for the GWRS, along with TF secondary effluent.

Solids handling at Plant 1 consists of thickening centrifuges, anaerobic digestion, holding tanks, dewatering centrifuges, and truck loading facilities to haul stabilized solids to disposal. Support facilities include chemical addition, plant and city water systems, odor control, digester gas handling, and on-site power generation. Major upgrades to the biosolids thickening and dewatering facilities (OC San Project No. P1-101) were completed in 2019.

Since mid-2009, OC San has operated the Steve Anderson Lift Station (SALS) that conveys up to 50 MGD of additional raw wastewater to Plant 1 to increase the amount of secondary effluent available for the GWRS.

Nearly all secondary effluent from Plant 1 is recycled by OCWD at GWRS and GAP. Secondary effluent flows by gravity to the GWRS AWPF, first passing through fine screens which are located at the Plant 1 site. Secondary effluent flow equalization is used to deliver a consistent Plant 1 effluent flow to the AWPF screening facilities. While the ratio is variable, typically at least three times as much AS effluent (P1 AS1 plus P1 AS2) as TF effluent (P1 TF) is delivered from Plant 1 to the AWPF as feedwater.

1.2.1.2 OC San Plant 2 Secondary Treatment

Plant 2 features two separate wastewater treatment trains: reclaimable and non-reclaimable. The headworks was modified in 2022 by installing gates and stop plates to separate reclaimable wastewater from non-reclaimable wastewater as the various trunk sewer lines enter the plant (OC San Project No. P2-122). Modifications to the influent pump station were made to maintain the flow segregation, conveying wastewater to separate treatment process trains at Plant 2.

Reclaimable wastewater is screened, pumped to grit basins, metered and conveyed to primary sedimentation. Ferric chloride and polymer are added upstream of the primary clarifiers for advanced primary treatment. Primary effluent is pumped to trickling filter/solids contact (TF/SC) facilities. Clarified secondary effluent from the TF/SC facilities (P2 TF/SC effluent) is disinfected using sodium hypochlorite, stored in flow equalization tanks, and pumped to the GWRS AWPF screening facility. Up to 60 MGD of reclaimable secondary effluent can be delivered from Plant 2 to the AWPF as feedwater, although typically flows from Plant 1 are maximized as these flows are more easily treated by the GWRS, while also considering OC San's flow balancing and other operational needs. Any excess flow at Plant 2 is discharged to the ocean.

Non-reclaimable wastewater at Plant 2 is treated by a separate train featuring screens, grit removal, metering, and primary sedimentation. Ferric chloride and polymer can be added upstream of the primary clarifiers for advanced primary treatment. Primary effluent is pumped to the pure oxygen activated sludge (POAS) aeration basins followed by secondary clarifiers. Non-reclaimable secondary effluent is disinfected using sodium hypochlorite, dechlorinated using sodium bisulfite, and pumped to the ocean outfall.

Primary solids at Plant 2 are stabilized by anaerobic digesters. Waste secondary sludge is thickened by dissolved air flotation units and treated by the anaerobic digesters. Stabilized biosolids are dewatered using centrifuges, and the resulting cake is transferred to storage hoppers and trucked to biosolids recycling compost sites. Support facilities at Plant 2 include chemical addition, plant and city water systems, odor control, digester gas handling, and on-site power generation.

1.2.1.3 IRWD MWRP Tertiary Treatment

The MWRP produces disinfected tertiary treated wastewater that complies with Title 22 Water Recycling Criteria (CCR, 2018) for the highest level of recycled water for non-potable use. The MWRP receives raw wastewater from the IRWD service area at its headworks, which provides pre-treatment using grinders, screens, and grit chambers. Primary sedimentation removes solids and primary effluent is routed to flow equalization facilities. Secondary treatment features two parallel processes: a membrane bioreactor and an activated sludge system with anoxic and oxic basins followed by secondary sedimentation. Secondary effluent from the clarifiers is treated by a high-rate clarifier and dual media filters to remove suspended solids. The membrane bioreactor provides both clarification and filtration. Following filtration, the tertiary effluent is disinfected using chlorine. The membrane filtered effluent receives UV disinfection. Primary and secondary solids are treated, dewatered, and dried at the MWRP for reuse.

Pumps convey the combined streams of disinfected tertiary effluent to recycled water customers in the IRWD service area. In the winter, MWRP typically produces more recycled water than is needed for the IRWD service area demands and can be stored in designated surface reservoirs. MWRP recycled water can also be supplied to the OCWD GAP and GWRS during the winter months.

Up to 8 MGD of MWRP recycled water may be periodically available to supplement the GWRS AWPF as feedwater. The tertiary disinfected effluent can be pumped from MWRP to the OC San Plant 1 site where it blends with other AWPF source waters. As noted in Section 1.2.1, the first use of MWRP effluent for the GWRS was in 2024.

1.2.2 Advanced Water Purification Facility

The AWPF features MF, RO, and UV/AOP advanced water treatment processes applied to 100% of the influent flow stream, followed by decarbonation and lime stabilization post-treatment processes, with large pumping stations to convey the purified recycled water to the Talbert Barrier, K-M-M-L Basins, MBI Project, and three non-potable water customers. Figure 1-2 shows the entrance to the AWPF. The AWPF process flow diagram is shown on Figure 1-3, and Figure 1-4 shows the site layout.

Figure 1-2. Groundwater Replenishment System

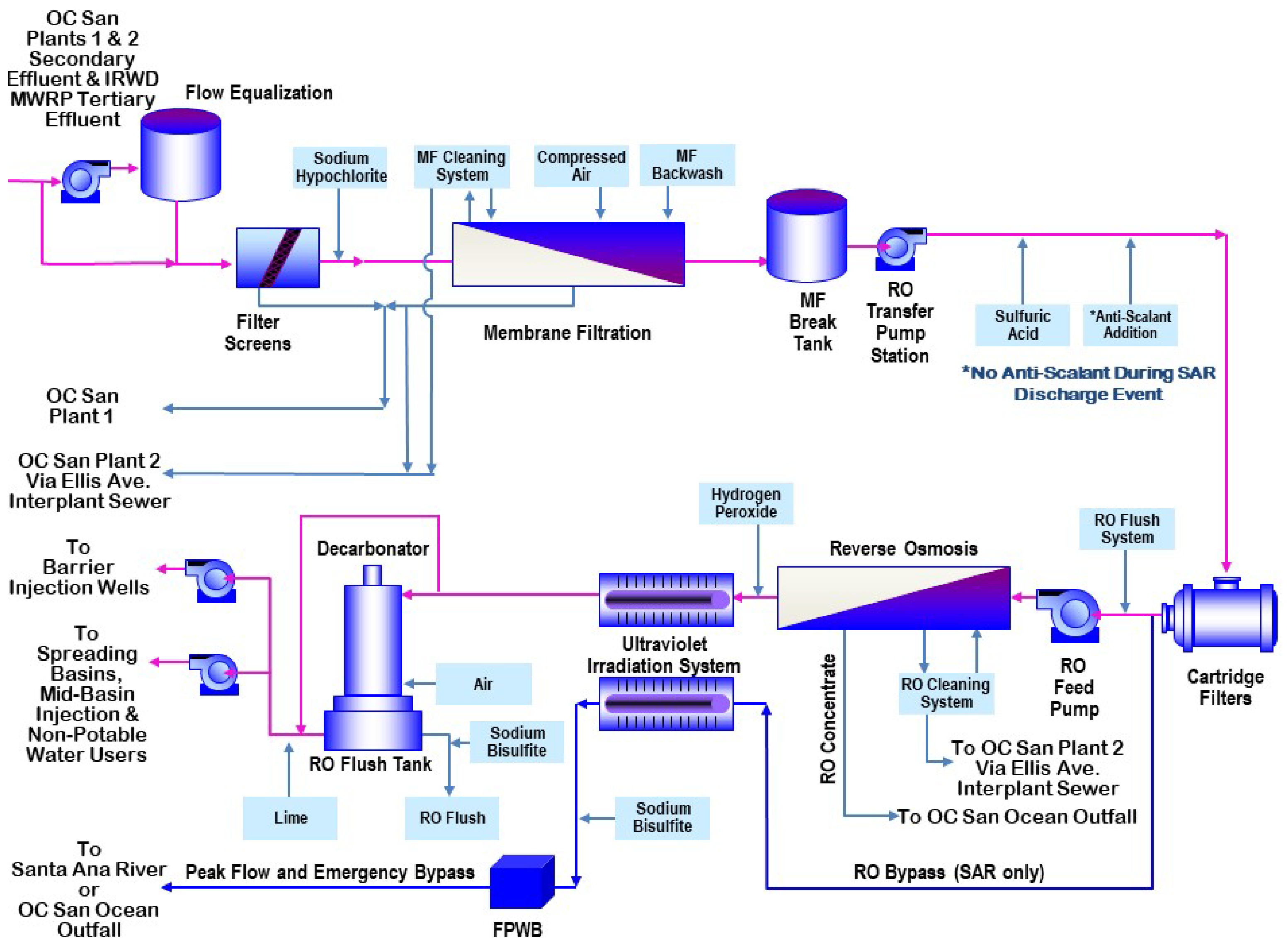


Figure 1-3. GWRS AWPF Process Flow Diagram

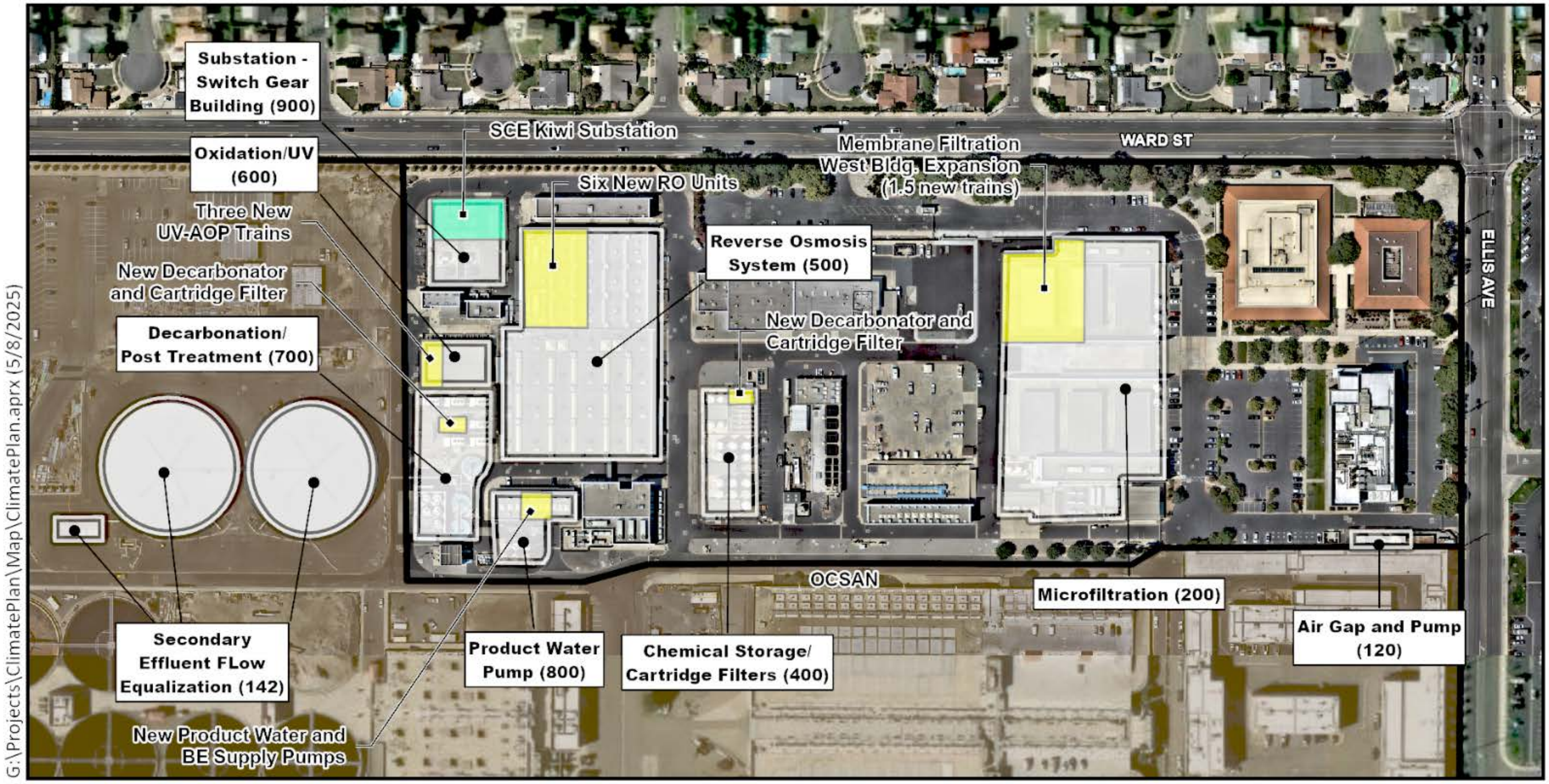


Figure 1-4. AWPF Site Layout with GWRSFE

1.3 History of OCWD Water Recycling Facilities

OCWD has a long history of water recycling for potable reuse, comprised of three recycled water groundwater recharge "eras" that can be identified by the water reclamation facilities in service at the time:

Water Factory 21 (WF-21)	October 1976 to January 2004
Interim Water Factory 21 (IWF-21)	June 2004 to August 2006
GWRS AWPF	January 2008 to present

These OCWD water recycling facilities have produced highly treated recycled water for groundwater recharge at the Talbert Barrier. During two transitional periods, from February to May 2004, and again from September 2006 until January 2008, OCWD had no operational facilities producing recycled water for groundwater recharge due to construction at the site.

Presently, the GWRS AWPF produces purified recycled water for injection and recharge at the Talbert Barrier and MBI Project and for recharge at K-M-M-L Basins to replenish the Orange County Groundwater Basin, plus limited non-potable uses.

1.3.1 Water Factory 21

OCWD operated WF-21 from October 1976 until January 2004 to produce recycled water for injection at the Talbert Barrier to help prevent the inflow of seawater into the Basin. Shown on Figure 1-5, WF-21 was originally designed as a 15-MGD capacity advanced water treatment (AWT) facility to reclaim secondary treated wastewater from OC San Plant 1.

Over this initial era of recycled water recharge, which spanned nearly three decades, the WF-21 facilities and operations were periodically modified and adjusted. The original WF-21 AWT system consisted of lime clarification, ammonia stripping, recarbonation, filtration, granular activated carbon (GAC), chlorination, blending-reservoir, and pumping station. In September 1977, a 5-MGD capacity RO system with cellulose acetate membranes was added to demineralize part of the recycled water flow stream. Initially, GAC was used ahead of the RO system, but was switched to a parallel process after mid-1981 because the fine carbon particles in the GAC clogged the RO membranes and RO demonstrated good organics removal. Later, when it was found that ammonia was removed by nitrification at the OC San plant and by the RO process, the ammonia stripping towers were taken out of service in 1987 and demolished in 1998. Lastly, a UV/AOP unit consisting of UV light exposure with hydrogen peroxide addition was added in 2001 to remove low molecular weight organic contaminants (e.g., NDMA and 1,4-dioxane).

Figure 1-5. Water Factory 21 in 1976

Two types of recycled water produced by WF-21, AWT water (GAC treated) and RO product water, were blended with deep well water and pumped to the Talbert Barrier injection wells until 2000. After that, only RO product was recharged, blending with groundwater from deep wells and potable water from the City of Fountain Valley and the OC-44 turnout (treated potable water from Metropolitan Water District of Southern California [MWD]).

Operation of WF-21 ceased on January 15, 2004, for construction of IWF-21 and the GWRS. Portions of WF-21, specifically the RO and UV/AOP processes as well as the blending reservoir and barrier pump station, were maintained for use in IWF-21. Other WF-21 facilities were demolished.

1.3.2 Interim Water Factory 21

Operation of IWF-21 began on June 21, 2004, and ceased on August 8, 2006, for relocation of portions of its equipment to the GWRS AWPF. Although this second era of water recycling for groundwater recharge was relatively brief, the purpose of IWF-21 was twofold: (1) produce up to 5 MGD of recycled water for the Talbert Barrier to help prevent seawater intrusion; and (2) serve as a training facility to allow operations and maintenance staff to gain experience with the same treatment train as planned for the larger GWRS AWPF. Figure 1-6 shows the IWF-21 facilities.

Figure 1-6. Interim Water Factory 21 in 2006

Utilizing new treatment processes along with modified WF-21 facilities, IWF-21 featured MF, RO, decarbonation, and UV/AOP to treat secondary effluent from OC San's Plant 1. Recycled water was blended with diluent water, chlorinated, and pumped to the Talbert Barrier injection wells.

The RO system removed minerals, organics, viruses, and other contaminants. The original WF-21 RO system was retrofitted with new thin-film composite polyamide membranes in 2004, which offered improved mineral and contaminant rejection rates and operated at lower pressure, thereby conserving energy. The IWF-21 RO process followed MF and consisted of three steps: chemical pretreatment and cartridge filtration, RO membrane treatment, and post-treatment. Following RO, treatment included decarbonation for product water degasification and removal of carbon dioxide. The nominal rated permeate capacity of the IWF-21 RO system was 5 MGD. Concentrate from the RO process was discharged via a brine pipeline to the OC San ocean outfall for disposal.

The IWF-21 UV/AOP facilities provided photolysis, advanced oxidation, and disinfection using hydrogen peroxide and UV exposure. Hydrogen peroxide was added to the decarbonated RO permeate upstream of the UV light treatment. UV exposure was used for disinfection and destruction of UV-sensitive contaminants (e.g., NDMA). Hydrogen peroxide exposed to UV light produces hydroxyl radicals that result in advanced oxidation to destroy UV-resistant contaminants (e.g., 1,4-dioxane). The UV/AOP featured a closed, in-vessel type UV system with low-pressure high-output lamps. The UV unit's nominal rated capacity of 8.75 MGD was oversized for IWF-21 because it was designed to be relocated to the GWRS AWPF.

IWF-21 utilized the original WF-21 chlorination system to help prevent biofouling of the injection wells. The blending reservoir combined water from three sources (purified recycled water, potable water from the City of Fountain Valley, and deep well water) for injection and in-plant use. The barrier pump station conveyed water from the blending reservoir to the Talbert Barrier.

After IWF-21 was taken out of service in August 2006 until construction of the full-scale GWRS was completed in January 2008, only potable water from MWD via the OC-44 turnout and from the City of Fountain Valley was available for injection at the Talbert Barrier.

1.3.3 Groundwater Replenishment System

The third and most recent era of OCWD water reclamation for groundwater recharge is the GWRS. Described in detail in subsequent sections of this report, the GWRS is a significant achievement and sets OCWD apart as a world leader in water recycling and groundwater management. The GWRS is the largest potable reuse facility in the world.

The original purified recycled water design production capacity of the GWRS was 70 MGD. Injection of purified recycled water produced by the AWPF at the Talbert Barrier began on January 10, 2008. Recharge of purified recycled water produced by the AWPF at Miller Basin began on January 17, 2008. Purified recycled water recharge at Kraemer Basin began on February 19, 2008.

The GWRS Initial Expansion (GWRSIE), increasing the AWPF purified recycled water design production capacity up to 100 MGD, began operation on May 21, 2015. By adding flow equalization facilities and 30 MGD of production capacity, the GWRSIE significantly enhanced the local water supply reliability within the Basin.

The GWRS Final Expansion (GWRSFE) construction began in 2019 and operation began on December 12, 2022. The GWRSFE added 30 MGD of capacity, increasing the AWPF purified recycled water design production capacity to 130 MGD.

Table 1-1 and Figure 1-7 summarize the history of the GWRS purified recycled water production since 2008, presenting the annual volumes recharged/used by site.

Table 1-1. GWRS Purified Recycled Water Production and Use by Site Since 2008

Year	Talbert Barrier (AFY)	Anaheim Forebay				MBI Project (AFY)	Non-Potable Uses					Total (AFY)
		Kraemer Basin (AFY)	Miller Basin (AFY)	Miraloma Basin (AFY) [1]	La Palma Basin (AFY)		Anaheim CPP (AFY)	ARTIC (AFY)	OC San Construction (AFY)	Carbon Canyon Diversion Channel (AFY)	Total Non-Potable Use (AFY)	
2008	22,248	9,064	12,243	-	-	-	-	-	-	-	-	43,537
2009	33,795	4,453	22,570	-	-	-	-	-	-	-	-	60,818
2010	38,257	5,340	24,133	-	-	-	-	-	-	-	-	67,730
2011	25,734	31,896	10,387	-	-	-	22	-	79	-	101	68,118
2012	24,486	22,813	11,610	12,442	-	-	57	-	17	17	91	71,442
2013	30,091	3,534	10,274	28,670	-	-	59	-	-	-	59	72,628
2014	32,942	60	3,955	29,076	-	-	52	1	-	-	53	66,086
2015	36,275	12,766	9,602	33,104	-	1,156	57	12	-	-	69	92,972
2016	34,664	28,878	2,571	28,298	3,301	1,523	67	16	-	-	83	99,298
2017	26,254	198	118	17,079	55,063	1,553	75	23	-	-	98	100,363
2018	24,848	666	-	16,805	52,836	1,521	75	18	-	-	93	96,769
2019	26,432	1,978	-	15,144	57,269	1,970	64	15	-	-	79	102,872
2020	24,138	396	3,342	3,220	56,140	8,536	75	11	-	-	86	95,858
2021	25,700	825	5,414	20,748	32,897	8,867	37	12	-	-	49	94,500
2022	22,696	93	2,913	13,801	50,045	7,769	64	12	-	-	76	97,393
2023	17,963	7,267	10,450	21,294	47,662	7,351	43	8	-	-	51	112,038
2024	17,069	4,585	5,340	20,589	46,314	7,104	38	12	-	-	50	101,051

[1] Spreading at Miraloma Basin includes Anaheim Adventure Park NPR use beginning in 2022

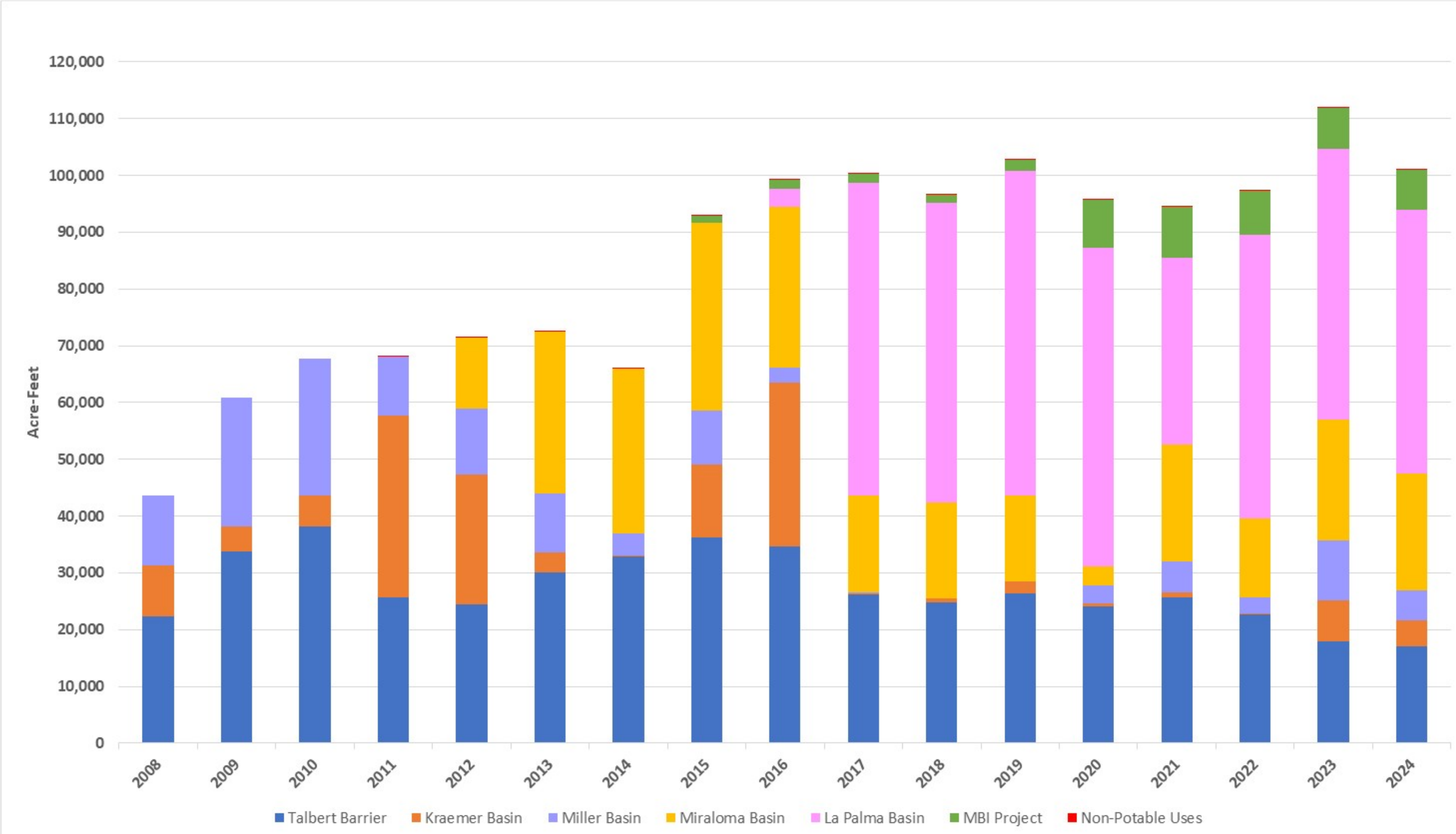


Figure 1-7. GWRS Purified Recycled Water Production and Use by Site Since 2008

1.4 Operation Optimization Plan Overview

The GWRS OOP describes the operating parameters, critical control points, maintenance schedules, and troubleshooting guides for the AWPF, Talbert Barrier, MBI Project, and K-M-M-L Basins. The GWRS is operated in accordance with the current permit (RWQCB, 2022a) and the OOP (OCWD and DDB Engineering, Inc., 2022) with minor updates to reflect the GWRSFE UV/AOP challenge test results that were conducted in late December 2022.

2. ADVANCED WATER PURIFICATION FACILITY PERFORMANCE

The GWRS AWPF continued to optimize performance and increase production during its seventeenth year of operation. The GWRS AWPF water quality met all compliance requirements in 2024. This section summarizes the performance of the AWPF during 2024:

- Purified recycled water production volume and flows;
- Purified recycled water quality and compliance record;
- Performance and operational record;
- Santa Ana River discharges;
- Non-potable water quality; and
- Anticipated changes.

2.1 Purified Recycled Water Volume and Flows

During 2024, the AWPF produced a total of approximately 32,927 MG, or 101,051 AF, of purified recycled water to help prevent seawater intrusion and replenish the Basin. The AWPF purified recycled water production volume is based on Product Water Pump Station and Barrier Pump Station discharge flow records and therefore, excludes any internal plant water uses and MF effluent (MFE) and UV product (UVP) water supplied to GAP. On an annual average basis, the AWPF produced approximately 90.0 MGD of purified recycled water for injection, recharge, and non-potable uses in 2024 (average includes periods of facility non-operation). As shown on Figure 2-1, approximately 76% of the GWRS purified recycled water was delivered to the Anaheim Forebay with the majority recharged at Miraloma and La Palma Basins.

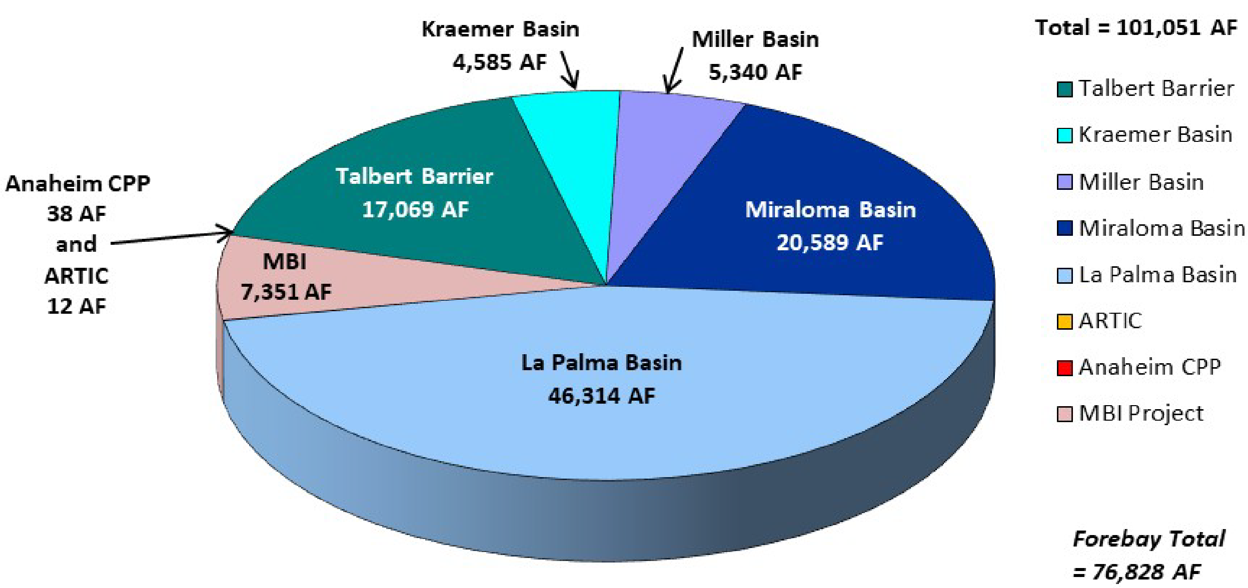
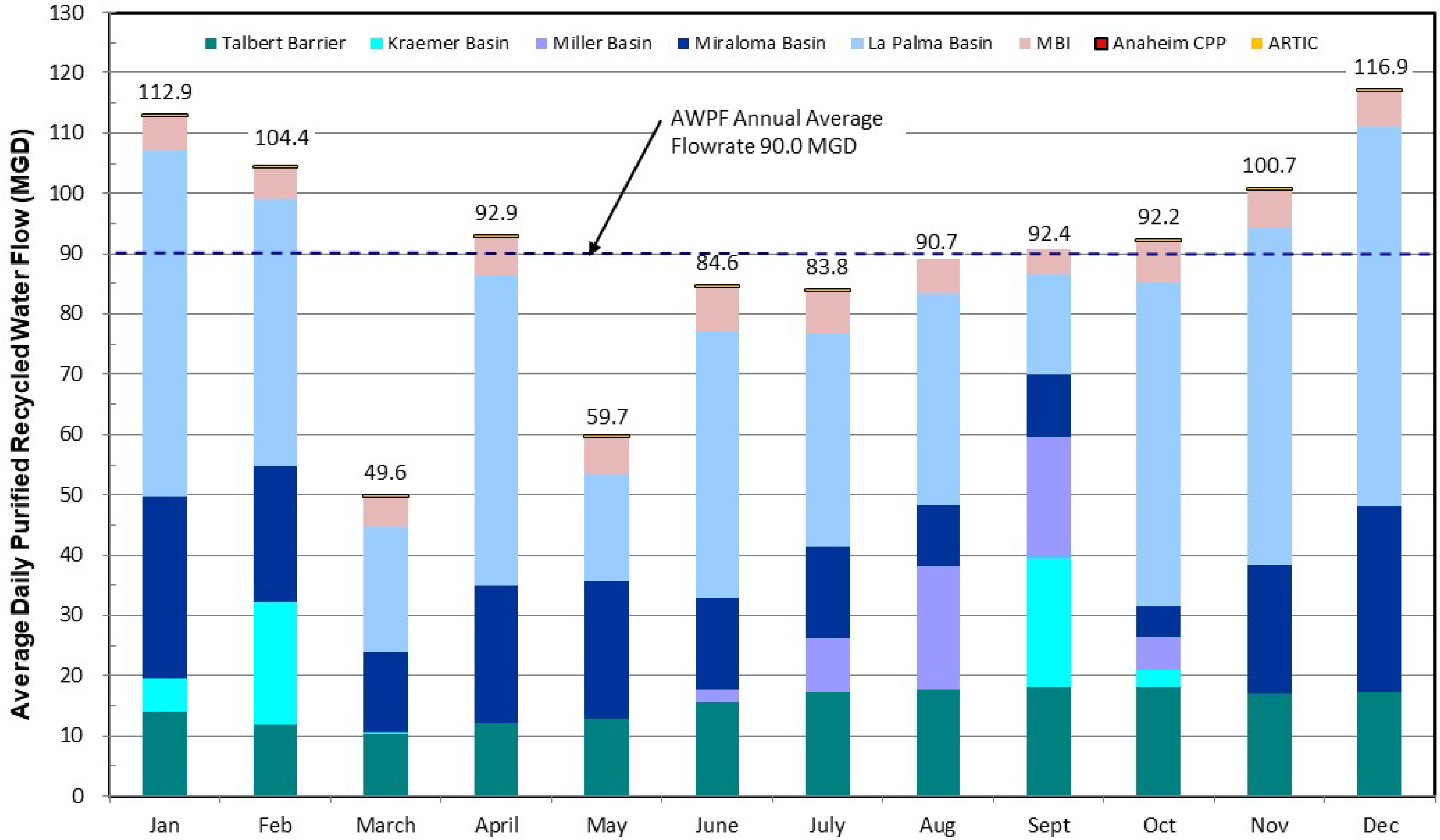


Figure 2-1. 2024 Purified Recycled Water Volume

Nearly 17% of the AWPF production was injected at the Talbert Barrier. Approximately 7% of the purified recycled water was injected via the MBI Project. Small amounts of purified recycled water were used for non-potable purposes at the Anaheim CPP and ARTIC. Non-potable use at Anaheim Adventure Park is included in the Miraloma Basin purified recycled water volume.

Figure 2-2 illustrates the average daily AWPF deliveries by month with the reuse location. At times in 2024, the AWPF operated at reduced production rates or was off-line entirely. AWPF operations are discussed in more detail in Section 2.3.

Overall, the AWPF was on-line 98.15% of the time during 2024 with daily average purified recycled water production ranging from 0.2 MGD (on March 26 for a planned shutdown) up to 120.3 MGD (on November 21) compared with its GWRSFE design production capacity of 130 MGD. OCWD's current RWQCB permit authorizes purified recycled water production up to 130 MGD for groundwater replenishment and non-potable use (RWQCB, 2022a).



Note: March average daily flows reflect reduced production due to planned shutdown for AWPF maintenance, spreading basin cleaning, heavy rains restricting recharge, OC San Plant 2 work and Ocean Outfall Booster Station (OOBS) testing. May average daily flows reflect reduced source water availability due to OC San trunkline repairs requiring Plant 2 to operate in unsegregated combined mode, which reduced AWPF production.

Figure 2-2. 2024 Average Daily Purified Recycled Water Flow by Month

2.1.1 Source Water in 2024

AWPF feedwater (Q1) during 2024 was almost exclusively a variable blend of secondary effluent from OC San:

- OC San Plant 1 AS and TF effluents; and
- OC San Plant 2 TF/SC effluent.

The AWPF influent was also supplemented with minimal amounts of tertiary effluent from IRWD during 2024. IRWD distributed 1,053 MG of MWRP tertiary effluent to the SEJB4 connection located at OC San Plant 1 in 2024. The SEJB4 connection is located upstream of the AWPF screening facility and MWRP flows to this connection may commingle with Plant 1 AS effluent. However, in 2024 only 80 MG of MWRP effluent was considered to have reached the GWRS because, under the agreement between OC San, OCWD, and IRWD, MWRP effluent is considered to be last into GWRS and first flows to the OC San ocean outfall system when flows are spilling over the GWRS influent weir overflow at P1 (OCWD et al., 2011).

The AWPF source water exhibited consistently low turbidity and nitrogen levels in 2024 because of the NdN operation of the AS facilities (see Section 2.2.2.1).

2.1.1.1 Secondary Effluent Flow Equalization and Influent Screening

Like other wastewater treatment plants, both OC San plants experience a daily diurnal flow pattern, peaking during the daytime and declining to minimal levels at night. Variations in secondary effluent flow are managed by equalization facilities to provide a more consistent feedwater flow rate to the GWRS. Secondary effluent flow equalization (SEFE) facilities store secondary effluent during the day when flows are higher and release it during the night when flows are lower, thereby enabling the AWPF to operate at a more constant flow rate.

At Plant 1, SEFE facilities located adjacent to the AWPF consist of two 7.5 million gallon (MG) above-ground tanks and a pump station, which are pictured on Figure 2-3. During the day, Plant 1 AS secondary effluent flows exceeding those needed for the AWPF production rate setpoint are pumped to the SEFE tanks for storage; at night and during the early morning, Plant 1 SEFE flows are released by gravity to the GWRS influent screening facility.

At Plant 2, flow equalization tanks store TF/SC secondary effluent that is pumped at a controlled flow rate to the AWPF influent screening facility via a 60-inch diameter pipeline. Shown on Figure 2-4, the Plant 2 SEFE facilities consist of two above-ground storage tanks (2.5 and 3.5 MG) and a pump station.

Secondary effluent is delivered to the AWPF influent screening facility, which consists of five fine screens that remove suspended solids larger than 2 millimeters (mm). Influent screening helps protect and extend the life of the downstream membrane treatment processes at the AWPF. Screened secondary effluent flows from the influent screening facility to the MF system. Solids with screen wash wastewater are returned to Plant 1 for treatment and disposal with other OC San solids.

Figure 2-3. OC San Plant 1 Secondary Effluent Flow Equalization (SEFE) Tanks and Pump Station

Figure 2-4. OC San Plant 2 Secondary Effluent Flow Equalization (SEFE) Tanks and Pump Station

2.1.1.2 TF Effluent and TF/SC Effluent Fractions

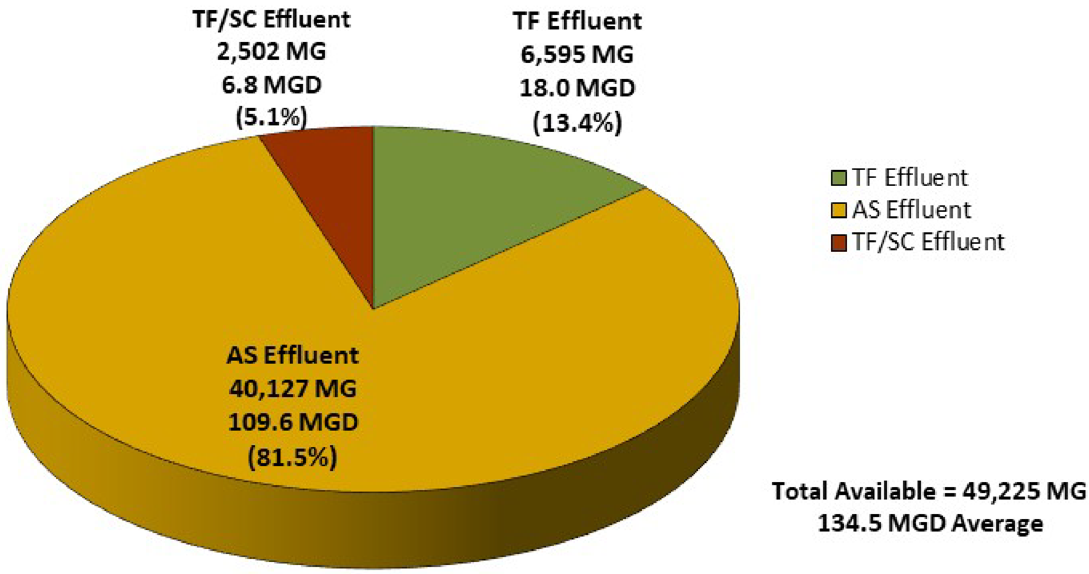
The OC San secondary effluent available as source water for the AWPF was a blend of Plant 1 AS effluent (P1 AS1 and P1 AS2, collectively AS) and TF effluent (P1 TF or TF) prior to mid-December 2022; Plant 2 TF/SC effluent (P2 TF/SC or TF/SC) was added to the AWPF feedwater beginning on December 12, 2022 as a part of the GWRSFE. The blend is variable, with typically more secondary effluent flow provided by the AS facilities. During 2024, the Q1 source water to the AWPF consisted of 40,127 MG of AS effluent (including 80 MG of MWRP tertiary effluent treated via parallel processes of membrane bioreactor or AS with secondary sedimentation), 6,595 MG of TF effluent, and 2,502 MG of TF/SC effluent, as illustrated on Figure 2-5, for a total annual influent flow of 49,225 MG (rounded) or 151,066 AF. On an annual average daily flow basis, the theoretical volumes of secondary effluent available to the AWPF were approximately 109.6 MGD of AS effluent, 18.0 MGD of TF effluent, and 6.8 MGD of TF/SC effluent for a total of 134.5 MGD; these values represent the average measured flows entering the Q1 influent station during 2024. However, due various hydraulic and operational factors, recycling all Q1 flows is not feasible.

The volume of TF effluent made up approximately 13% of the total influent available during 2024; however, the day-to-day operation varied with the daily proportion of TF effluent in AWPF source water ranging from 5.0% (May 8) to 28.8% (February 6). The average proportion of TF effluent in the AWPF source water during 2024 (14.5%) was about the same as that in 2023 (14.8%).

During 2024 the volume of TF/SC effluent made up approximately 5.5% on average of the total AWPF influent, which was lower than that in 2023 (11%) due to Plant 2 operating in the unsegregated combined mode (non-reclaimable wastewater co-mingled with reclaimable wastewater) for a majority of the year, restricting its effluent availability for the AWPF. The day-to-day operation varied with the daily proportion of TF/SC effluent in the AWPF source water ranging from 0.0% (from February 1 through April 8, May 1 through October 20, and October 22 through November 12) up to 28.1% (April 26). Various operational issues at OC San required that Plant 2 operate in the unsegregated combined mode during lengthy periods of 2024; GWRS does not use Plant 2 non-reclaimable wastewater from the Santa Ana Regional Interceptor (SARI) as source water for the AWPF.

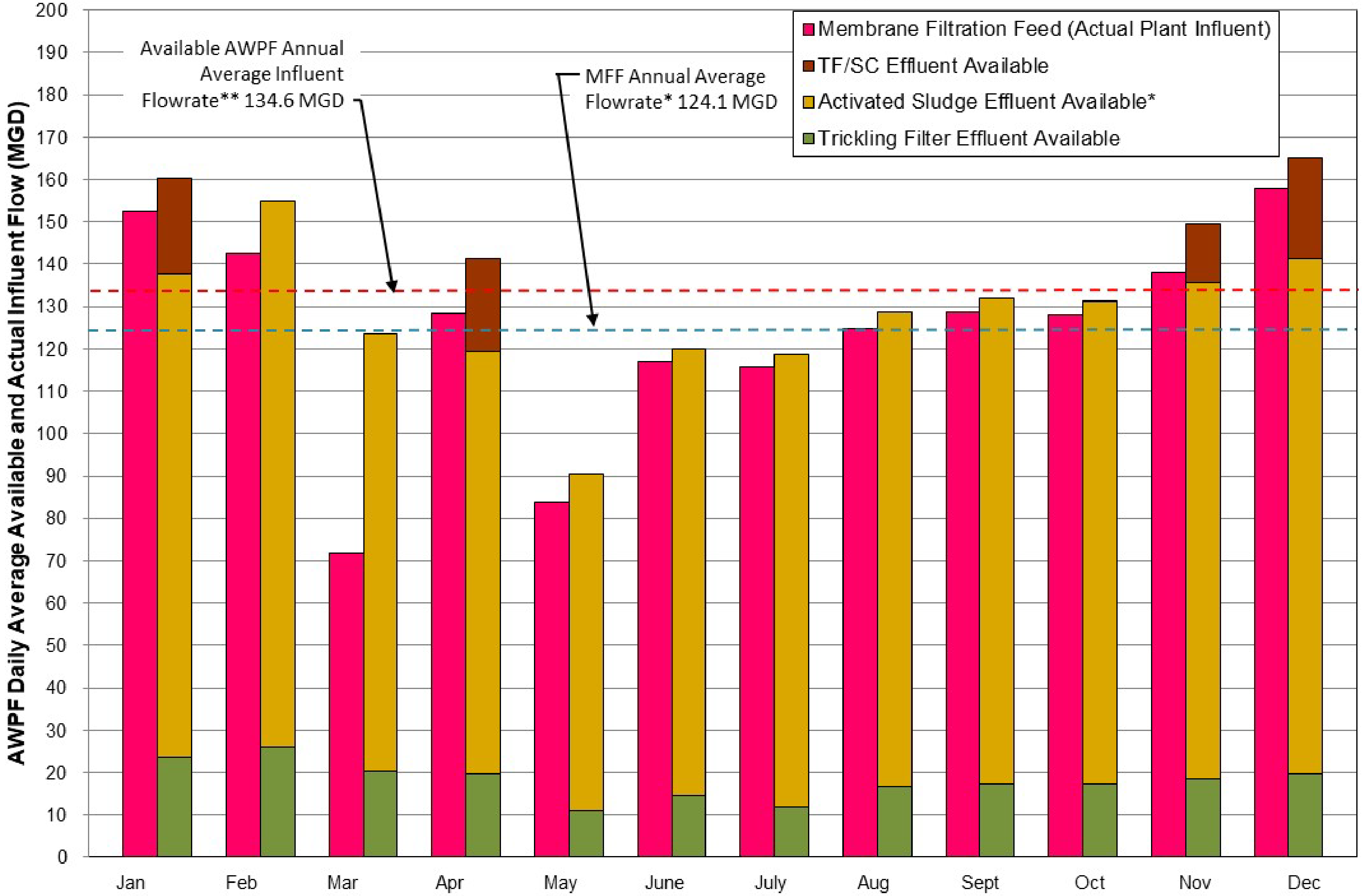
On an annual basis in 2024, the sum of TF/SC effluent and TF effluent in the AWPF source water averaged 20.1%; monthly averages of the sum of TF/SC effluent and TF effluent in the AWPF source water ranged from 10.1% (July) to 29.5% (April).

Figure 2-6 shows the average daily flow rate of AS effluent, TF effluent, and TF/SC effluent for each month in 2024. Of the 2024 total available influent flow stream (134.5 MGD), about 3,860 MG, or 10.5 MGD on average, was not sent to the AWPF and instead directed to the ocean outfall via the GWRS influent weir overflow at the P1 screening facility. The non-reclaimed flow volume in 2024 was less than that in 2023 (5,427 MG or 14.9 MGD on average), primarily due to more periods of reduced purified recycled water production. The monthly GWRS influent P1 weir overflow during 2024 ranged from approximately 204 MG, or 6.6 MGD on average, in May to 1,606 MG, or 51.8 MGD, in March. The net total MFF flow (i.e., actual AWPF influent flows) during 2024 was approximately 45,365 MG or an annual average daily flow of 124.1 MGD.



Notes: AS effluent volume includes IRWD (80 MG). Weir overflow (3,860 MG) not included in total available

Figure 2-5. 2024 AWPF Average Influent Flow Sources and Volumes



* Activated Sludge Effluent Available includes commingled flows from IRWD in January-April and October-December.

**Available flow includes GWRS influent weir overflow at Plant 1 sent to OC San. Difference between available flow and MFF flow is weir overflow return.

Figure 2-6. 2024 AWPF Influent Sources and Average Flows by Month

2.2 Purified Recycled Water Quality and Compliance Record

AWPF purified recycled water quality is monitored for compliance with the GWRS permit (RWQCB, 2022a). Except for turbidity and transmittance, all permit-required final purified recycled water monitoring was performed on finished product water (FPW), also referred to as final product water, following post-treatment and just prior to pumping for distribution. Turbidity is monitored continuously on the RO product (ROP) flow stream. Transmittance is measured continuously on the UV/AOP feed (UVF) flow stream (UVF is immediately downstream of the hydrogen peroxide addition to the ROP). As a backup for the redundant on-line analyzers, daily composite sampling and laboratory analysis for transmittance is also conducted at the UVF station.

Water quality results are reported to the RWQCB in conformance with the permit requirements on a quarterly basis. Since 2023 quarterly reports have been submitted digitally to the state GeoTracker database and the DDW California Laboratory intake Portal (CLIP), as required by the GWRS permit (RWQCB, 2022a). In addition to compliance monitoring, water quality is monitored throughout the AWPF treatment train to measure and optimize process performance. The AWPF process schematic and monitoring locations are illustrated on Figure 2-7. This operational monitoring is discussed in more detail in Section 2.3. Appendix A summarizes all available water quality data for the AWPF purified recycled water during 2024. Appendix B lists laboratory methods of analyses, and Appendix C presents water quality constituents with associated laboratory methods.

AWPF influent (Q1) flow is metered, and its quality is monitored for selected constituents to control and optimize the operation of the treatment processes; the GWRS permit requires quarterly Q1 composite sampling for Biochemical Oxygen Demand (5-day) (BOD_5), Total Suspended Solids (TSS), and Total Dissolved Solids (TDS). The Q1 sampling point is at the screening facility influent chamber immediately downstream of the fine screens; this location provides a representative sample of the Q1 source water because it is downstream of all SEFE facilities and upstream of the sodium hypochlorite injection prior to the MF system. The ratio of AS to TF plus TF/SC effluent flows in the Q1 supply is variable, as described in detail in Section 2.1.1.2.

In addition to the required finished product water quality compliance monitoring, process-specific monitoring is performed for pathogen reduction compliance. The operational performance of each of OC San's secondary treatment processes is independently monitored and may be reported for GWRS treatment virus log reduction credit when needed. The integrity of each MF cell is monitored via daily pressure decay testing and MF effluent (MFE)

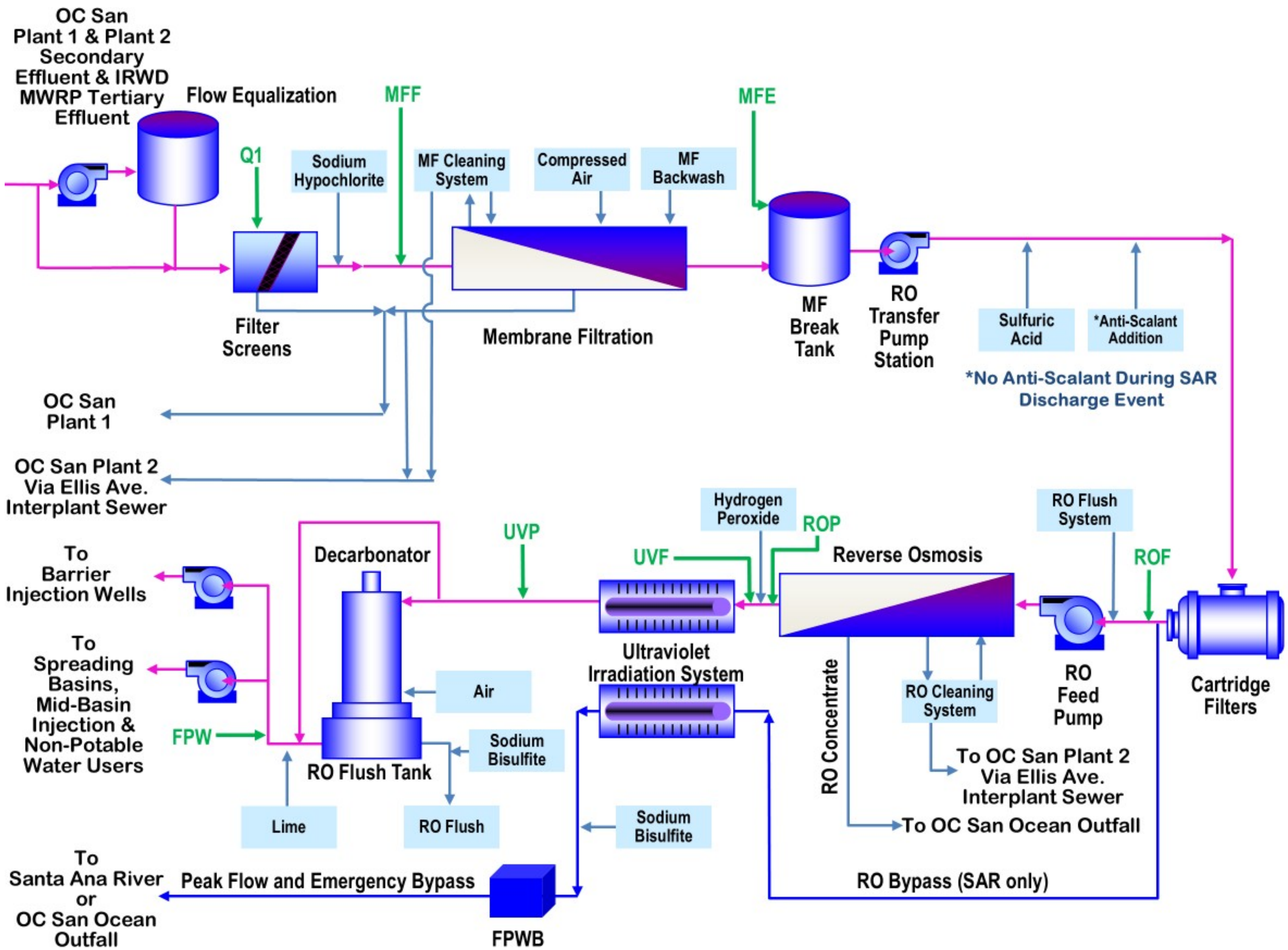


Figure 2-7. AWPF Process Sampling Locations Diagram

turbidity measurements downstream of each group of four MF cells ("half-trains") and the bulk MF in the downstream MF break tank. The performance of the bulk MF system is monitored by comparing upstream water quality in the MF feed (MFF) after sodium hypochlorite addition with downstream water quality in the MFE.

Similarly, the performance of the RO system is monitored upstream at the RO feed (ROF), after acid and threshold inhibitor (antiscalant) are added, and then downstream at the ROP station. On-line total organic carbon (TOC) and electrical conductivity (EC) analyzers monitor the ROF and ROP flow streams and provide continuous indication of the RO process performance and act as surrogates for monitoring pathogen removal. Daily grab samples of ROF and ROP may be analyzed for strontium, which is another surrogate that may be used to assess pathogen reduction by the RO process. Monitoring the UV/AOP process feed (UVF) and product (UVP) streams are indicators of its disinfection and organics degradation performance. Concentrations of 1,4-dioxane, NDMA, and sucralose are monitored as performance indicators for the RO and UV/AOP processes.

Furthermore, both select unit process and FPW monitoring are required under the GWRS permit (RWQCB, 2022a) to fulfill requirements from the *Water Quality Control Policy for Recycled Water* (SWRCB, 2018). Health-based constituents of emerging concern (CECs) and bioanalytical screening tools are assessed in FPW, while performance indicator CECs and CEC surrogates are assessed in both FPW and upstream (ROF) and downstream (ROP) of the RO process (see Section 2.2.4).

2.2.1 Source Water Compliance in 2024

The Title 22 Water Recycling Regulations for Groundwater Recharge Reuse Projects (GRRPs) require that the recycled municipal wastewater used for groundwater recharge is from a wastewater agency that is not in violation of effluent limits pertaining to groundwater replenishment, as established in the wastewater agency's RWQCB Permit (CCR, 2018; Title 22 GRRP Regulations Section 60320.200(j)). Additionally, the wastewater agency supplying recycled municipal wastewater must administer a pretreatment and pollutant source control program as described in the Title 22 GRRP Regulations (Section 60320.206).

OC San administers an industrial pretreatment and pollutant source control program as a requirement of its own separate NPDES permit for sewage collection, treatment, and discharge (RWQCB, 2021). OC San serves as the Control Authority to implement and enforce its EPA-approved Multijurisdictional Pretreatment Program, under which OC San operates its Source Control Program and permits, monitors, and regulates industrial facilities.

OC San maintains a comprehensive industrial pretreatment and source control program to prevent contaminants, which may be harmful to the treatment facilities, environment, and to human health and drinking water supplies, from entering the wastewater tributary to both Plants 1 and 2. Through an expanded comprehensive monitoring program required by the Title 22 GRRP Regulations, OC San can ensure that the treated municipal wastewater (secondary effluent and any disinfected tertiary effluent from IRWD) delivered to the GWRS AWPF protects GWRS recycled water quality.

OC San's pretreatment and source control activities for the first half of 2024 (January through June) are summarized in their *FY 2023/24 Pretreatment Program Annual Report* dated `October 31, 2024 (OC San, 2024). The pretreatment and source control activities for the second half of 2024 (July through December) will be summarized in the OC San FY 2024/25 Pretreatment Program report.

2.2.2 Finished Product Water Compliance in 2024

Table 2-1 summarizes the average purified recycled water quality for selected constituents during 2024 at various points in the AWPF treatment process. The GWRS permit requirements are shown for comparison. For other parameters, Appendix A contains the quarterly monitoring results for 2024. All FPW water quality compliance requirements were met in 2024. The performance of individual treatment processes measured by water quality is discussed later in this section.

It is interesting to compare 2024 average Q1 and FPW quality for selected constituents with average values in 2023 to monitor any trends. Table 2-2 compares these two years' results and shows that some changes occurred in the average water quality of Q1 and FPW in 2024 as compared to the previous year.

Table 2-1. 2024 Average Water Quality[1]

Parameter Name	Units	Q1	MFF	MFE	ROF	ROP	UVP	FPW	Permit Limit
Electrical Conductivity	uS/cm	1,767	1,848[2]	1,758	1,826[2]	29[2]	21	94[2]	900[3]
Total Dissolved Solids	mg/L	1,090	na	na	1,094	15	na	47	500[3]
Total Suspended Solids	mg/L	5.8	5.8	<2.5	na	na	na	<2.5	N/A
Turbidity	NTU	2.1	3.04[2]	0.03[2]	0.03[2]	0.01[4]	na	0.03[2]	≤0.2 / ≤0.5[3]
Ultraviolet percent transmittance (%UVT) @254nm	%	na	na	73.9	na	97.2[4]	na	na	≥90
pH	UNITS	7.45	7.14[2]	7.42	6.90[2]	5.25[2]	5.79	8.25[2]	6 - 9
Total Hardness (as CaCO3)	mg/L	347	na	na	333	<1	na	32.8	240[3]
Calcium	mg/L	85.3	na	na	82.5	<0.5	na	13.0	N/A
Magnesium	mg/L	32.6	na	na	31.5	<0.5	na	<0.5	N/A
Sodium	mg/L	242	na	na	234	4.6	na	4.5	45
Potassium	mg/L	19.2	na	na	19.1	0.1	na	0.1	N/A
Bromide	mg/L	na	na	na	na	na	na	0.02	N/A
Chloride	mg/L	301	na	na	302	3.3	3.9	3.7	55
Sulfate	mg/L	217	na	na	219	0.2	na	0.4	100
Bicarbonate (as CaCO3)	mg/L	na	na	na	199	7.5	na	36.6	N/A
Nitrate Nitrogen	mg/L	9.04	na	na	5.98	0.58	na	0.58	3[3]
Nitrite Nitrogen	mg/L	0.8	na	na	1.81	<0.002	na	0.043	1[3]
Ammonia Nitrogen	mg/L	3.0	na	na	6.48	0.3	na	0.2	N/A
Organic Nitrogen	mg/L	1.3	na	na	0.28	0.05	na	<0.1	N/A
Total Nitrogen	mg/L	14.1	na	na	14.4	na	na	0.8	10
Phosphate Phosphorus	mg/L	0.63	na	na	0.3	na	na	<0.01	N/A
Iron	ug/L	326	na	na	90	<5	na	<5	300
Manganese	ug/L	40.7	na	na	52	0.2	na	<1	50
Aluminum	ug/L	7.8	na	na	1.1	<5	na	<5	200[3]
Arsenic	ug/L	1.3	na	na	1.4	<1	na	<1	10
Barium	ug/L	41.9	na	na	40.5	<1	na	<1	1,000
Boron	mg/L	0.37	na	na	0.40	0.20	na	0.22	N/A
Cadmium	ug/L	<1	na	na	<1	<1	na	<1	5
Chromium	ug/L	0.4	na	na	0.4	<1	na	<1	50
Copper	ug/L	7.5	na	na	9.6	0.2	na	<1	1,000[3]
Cyanide	ug/L	<5	na	na	3.1	<5	na	<5	150
Fluoride	mg/L	0.88	na	na	0.79	na	na	<0.1	2
Lead	ug/L	<1	na	na	<1	<1	na	<1	15
Mercury	ug/L	<1	na	na	<1	<1	na	<1	2
Nickel	ug/L	5.0	na	na	4.8	<1	na	<1	100
Perchlorate	ug/L	na	na	na	na	na	na	<1	6
Selenium	ug/L	2.9	na	na	3.1	<1	na	<1	50
Silica	mg/L	20.2	na	na	20.1	<1	na	1.2	N/A
Silver	ug/L	0.2	na	na	<1	<1	na	<1	100
Zinc	ug/L	18.6	na	na	22.7	<5	na	<5	5,000
1,2,3-Trichloropropane	ug/L	<0.005	na	na	<0.005	<0.005	<0.005	<0.005	0.005
N-nitrosodimethylamine	ng/L	27.9[5]	na	na	13.1[5]	6.3[5]	<2[5]	0.3[5]	N/A
1,4-Dioxane	ug/L	0.6	na	na	0.7	<0.5	<0.5	<0.5	N/A
Perfluorooctanoic Acid	ng/L	na	na	na	12.5	<2	na	<2	N/A
Perfluorooctane Sulfonic Acid	ng/L	na	na	na	9.8	<2	na	<2	N/A
Perfluorobutane Sulfonic Acid	ng/L	na	na	na	6.9	<2	na	<2	N/A
Perfluorohexane Sulfonic Acid	ng/L	na	na	na	6.3	<2	na	<2	N/A
Total Trihalomethanes	ug/L	3.9	na	na	28.5	9.7	8.0	4.1	80
Dibromoacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Dichloroacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Monobromoacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Monochloroacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Trichloroacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Total Organic Carbon (unfiltered)	mg/L	9.22	9.21	na	7.15	0.08	0.06	0.06	0.5[3]
Total Coliform	MPN/100 mL	1,142,682	18,878	<1	na	<1	<1	0.2	2.2 / 23 / 240[3]
Escherichia coli (E. coli)	MPN/100 mL	319,790	1,061	<1	na	<1	<1	<1	N/A

Q1 Secondary Effluent (AWPF Influent)
MFF Microfiltration Feed
MFE Microfiltration Effluent
ROF Reverse Osmosis Feed
ROP Reverse Osmosis Product
UVF Ultraviolet UV/AOP Feed
UVP Ultraviolet UV/AOP Product
FPW Finished Product Water
na Not analyzed
N/A Not applicable

[1] For purposes of calculating annual averages, 10% of the Reporting Limit (RL) was used for all non-detect (ND) values. If all data for the period were ND, then the average is shown as "<RL". Number of significant digits shown match those in raw data.
[2] On-line average
[3] See Appendix A for more information
[4] On-line average shown for UVF, which is effectively ROP downstream of hydrogen peroxide addition.
[5] Average results shown using In-house Method NDMA-LOW with RL = 10 ng/L for Q1 and ROF, and In-house Method NDMA-LOW with RL = 2 ng/L for ROP, UVP, and FPW. See Appendix A.

Table 2-2. Comparison Between 2023 and 2024 Average Water Quality[1]

Parameter Name	Units	2023 Q1	2024 Q1	2023 FPW	2024 FPW	Permit Limit
Electrical Conductivity	uS/cm	2,157	1,767	115[2]	94[2]	900[3]
Total Dissolved Solids	mg/L	1,268	1,090	57	47	500[3]
Total Suspended Solids	mg/L	4.4	5.8	<2.5	<2.5	N/A
Turbidity	NTU	1.6	2.1	0.04[2]	0.03[2]	≤0.2 / ≤0.5[3]
Ultraviolet percent transmittance (%UVT) @254nm	%	na	na	na	na	≥90
pH	UNITS	7.43	7.45	8.27[2]	8.25[2]	6 - 9
Total Hardness (as CaCO3)	mg/L	367	347	35.4	32.8	240[3]
Calcium	mg/L	83.4	85.3	13.7	13.0	N/A
Magnesium	mg/L	38.5	32.6	<0.5	<0.5	N/A
Sodium	mg/L	284	242	8.3	4.5	45
Potassium	mg/L	21.2	19.2	0.5	0.1	N/A
Bromide	mg/L	0.95	na	0.03	0.02	N/A
Chloride	mg/L	391	301	8.7	3.7	55
Sulfate	mg/L	221	217	0.3	0.4	100
Bicarbonate (as CaCO3)	mg/L	232	na	39.3	36.6	N/A
Nitrate Nitrogen	mg/L	7.42	9.04	0.77	0.58	3[3]
Nitrite Nitrogen	mg/L	0.9	0.799	0.055	0.043	1[3]
Ammonia Nitrogen	mg/L	5.3	3.0	0.4	0.2	N/A
Organic Nitrogen	mg/L	1.2	1.3	0.01	<0.1	N/A
Total Nitrogen	mg/L	15.1	14.1	1.1	0.8	10
Phosphate Phosphorus	mg/L	0.49	0.63	<0.01	<0.01	N/A
Iron	ug/L	322	326	<5	<5	300
Manganese	ug/L	53.7	40.7	<1	<1	50
Aluminum	ug/L	9.4	7.8	<5	<5	200[3]
Arsenic	ug/L	1.8	1.3	<1	<1	10
Barium	ug/L	60.5	41.9	<1	<1	1,000
Boron	mg/L	0.51	0.37	0.31	0.22	N/A
Cadmium	ug/L	<1	<1	<1	<1	5
Chromium	ug/L	0.1	0.4	<1	<1	50
Copper	ug/L	6.8	7.5	<1	<1	1,000[3]
Cyanide	ug/L	<5	<5	<5	<5	150
Fluoride	mg/L	0.83	0.88	<0.1	<0.1	2
Lead	ug/L	<1	<1	<1	<1	15
Mercury	ug/L	<1	<1	<1	<1	2
Nickel	ug/L	5.5	5.0	<1	<1	100
Perchlorate	ug/L	na	na	<2	<1	6
Selenium	ug/L	4.2	2.9	<1	<1	50
Silica	mg/L	18.5	20.2	0.9	1.2	N/A
Silver	ug/L	0.3	0.2	<1	<1	100
Zinc	ug/L	15.6	18.6	<5	<5	5,000
1,2,3-Trichloropropane	ug/L	<0.005	<0.005	<0.005	<0.005	0.005
N-nitrosodimethylamine	ng/L	28.2[4]	28.2[4]	0.7[4]	0.7[4]	N/A
1,4-Dioxane	ug/L	0.6	0.6	<0.5	<0.5	N/A
Perfluorooctanoic Acid	ng/L	10.5	na	<2	<2	N/A
Perfluorooctane Sulfonic Acid	ng/L	8.9	na	<2	<2	N/A
Perfluorobutane Sulfonic Acid	ng/L	6.0	na	<2	<2	N/A
Perfluorohexane Sulfonic Acid	ng/L	4.8	na	<2	<2	N/A
Total Trihalomethanes	ug/L	2.4	3.9	2.4	4.1	80
Dibromoacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Dichloroacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Monobromoacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Monochloroacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Trichloroacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Total Organic Carbon (unfiltered)	mg/L	9.25	9.22	0.07	0.06	0.5[3]
Total Coliform	MPN/100 mL	810,704	1,142,682	<1	0.16	2.2 / 23 / 240[3]
Escherichia coli (E. coli)	MPN/100 mL	223,213	319,790	<1	<1	N/A

Q1 Secondary Effluent (AWPF Influent) na Not analyzed
FPW Finished Product Water N/A Not applicable

1 For purposes of calculating annual averages, 10% of the Reporting Limit (RL) was used for all non-detect (ND) values. If all data for the period were ND, then the average is shown as "<RL". Number of significant digits shown match those in raw data.

2 On-line average

3 See Appendix A for more information

4 Average results shown using In-house Method NDMA-LOW with RL = 10 ng/L for Q1, and In-house Method NDMA-LOW with RL = 2 ng/L for FPW. See Appendix A.

2.2.2.1 Total Nitrogen Removal in 2024

Performance data for AWPF total nitrogen removal are summarized in Table 2-1 and Table 2-2 presented earlier. On an annual basis, the Q1 total nitrogen concentration (sum of ammonia, nitrite, nitrate, and organic nitrogen, all expressed as nitrogen) averaged approximately 14.1 mg/L during 2024, which was less than the 2023 average (15.1 mg/L). Total nitrogen concentrations in the Q1 flow stream were an indication of OC San's NdN operation of the AS facilities at Plant 1, which began in late 2009. Prior to the introduction of NdN operation in 2009, concentrations of total nitrogen at Q1 were roughly double the current concentrations, as described in more detail in prior annual reports. With completion of the GWRSFE in late 2022, available Plant 2 secondary effluent with elevated total nitrogen levels was added to the AWPF source water, generally increasing the Q1 total nitrogen concentration. However, average Q1 total nitrogen concentrations in 2024 were lower than those in 2023 likely in part due to reduced Plant 2 flows in the AWPF source water.

Figure 2-8 illustrates the FPW total nitrogen concentration during 2024, showing it was always well below the total nitrogen GWRS permit limit of 10 mg/L (RWQCB, 2022a). The required FPW sampling frequency for total nitrogen analyses was reduced to weekly in 2023 under the 2022 permit (RWQCB, 2022a); however, voluntary twice weekly sampling for total nitrogen continued through 2024.

2.2.2.2 Total Organic Carbon Removal in 2024

Figure 2-9 shows the TOC concentration in the FPW during 2024 based on weekly 24-hour composite samples; the GWRS permit requires FPW 24-hour composite samples be taken at least weekly for TOC analysis (RWQCB, 2022a). The maximum individual daily composite FPW TOC result in 2024 was 0.2 mg/L (March 15). The running 20-week average TOC concentration in the FPW was generally about 0.06 mg/L. The running 4-sample average TOC concentration in the FPW generally ranged from 0.02 to 0.13 mg/L. The overall FPW annual average TOC concentration was 0.06 mg/L (Table 2-1).

Compliance with the permit's TOC limit is determined monthly based on a 20-week running average of all TOC results and the running average of the last four samples of FPW. The TOC limit is calculated based on the DDW-specified maximum RWC at each recharge location. The TOC limit for all recharge sites (Talbert Barrier, K-M-M-L Basins, and MBI Project) is 0.5 mg/L (determined by dividing 0.5 mg/L by the DDW-specified maximum allowable RWC at that location, which is 100% for all sites).

During 2024, the running 20-week average FPW TOC and the running average of the last four samples was consistently well below 0.5 mg/L and in compliance with the permit requirements.

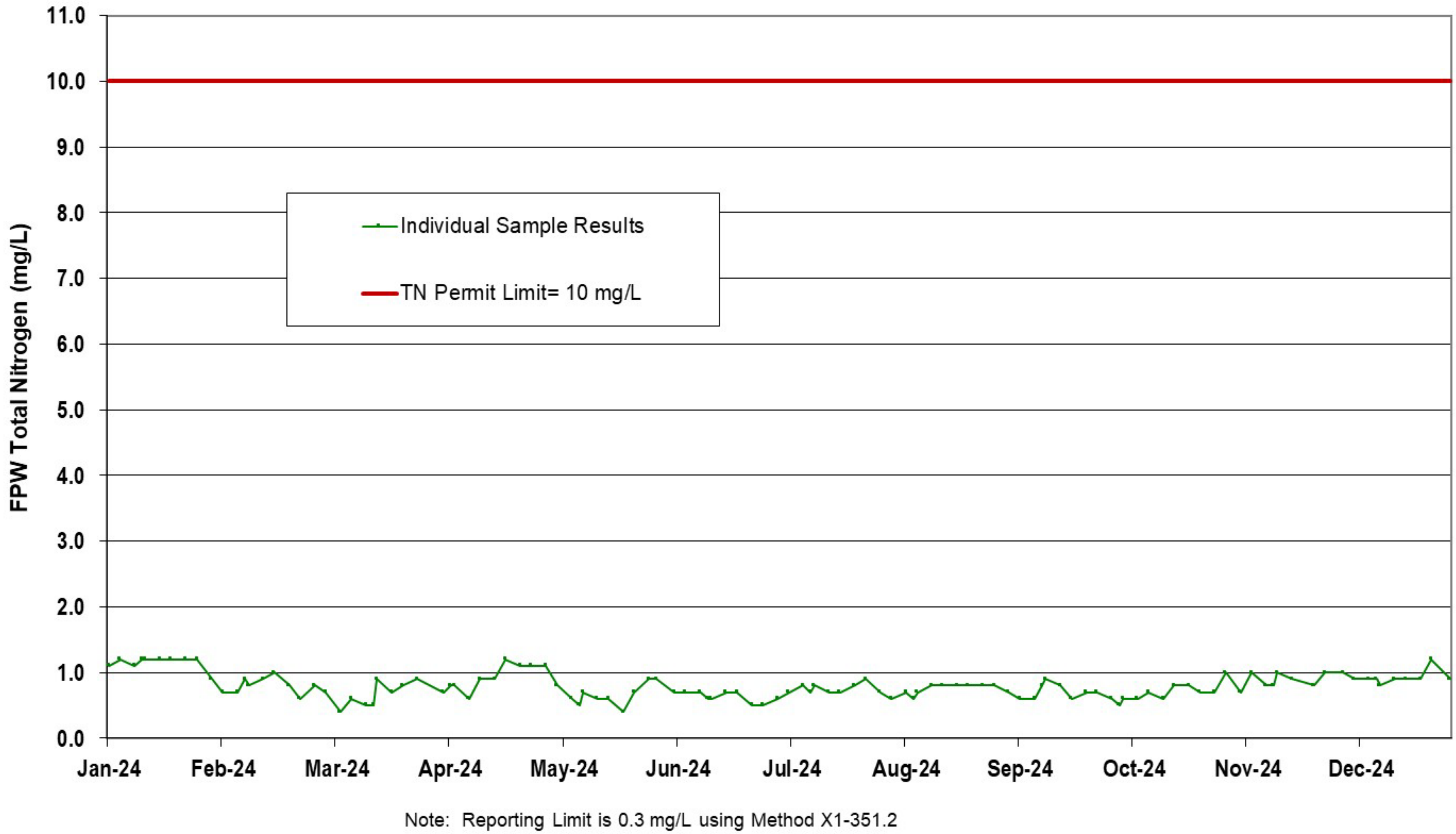
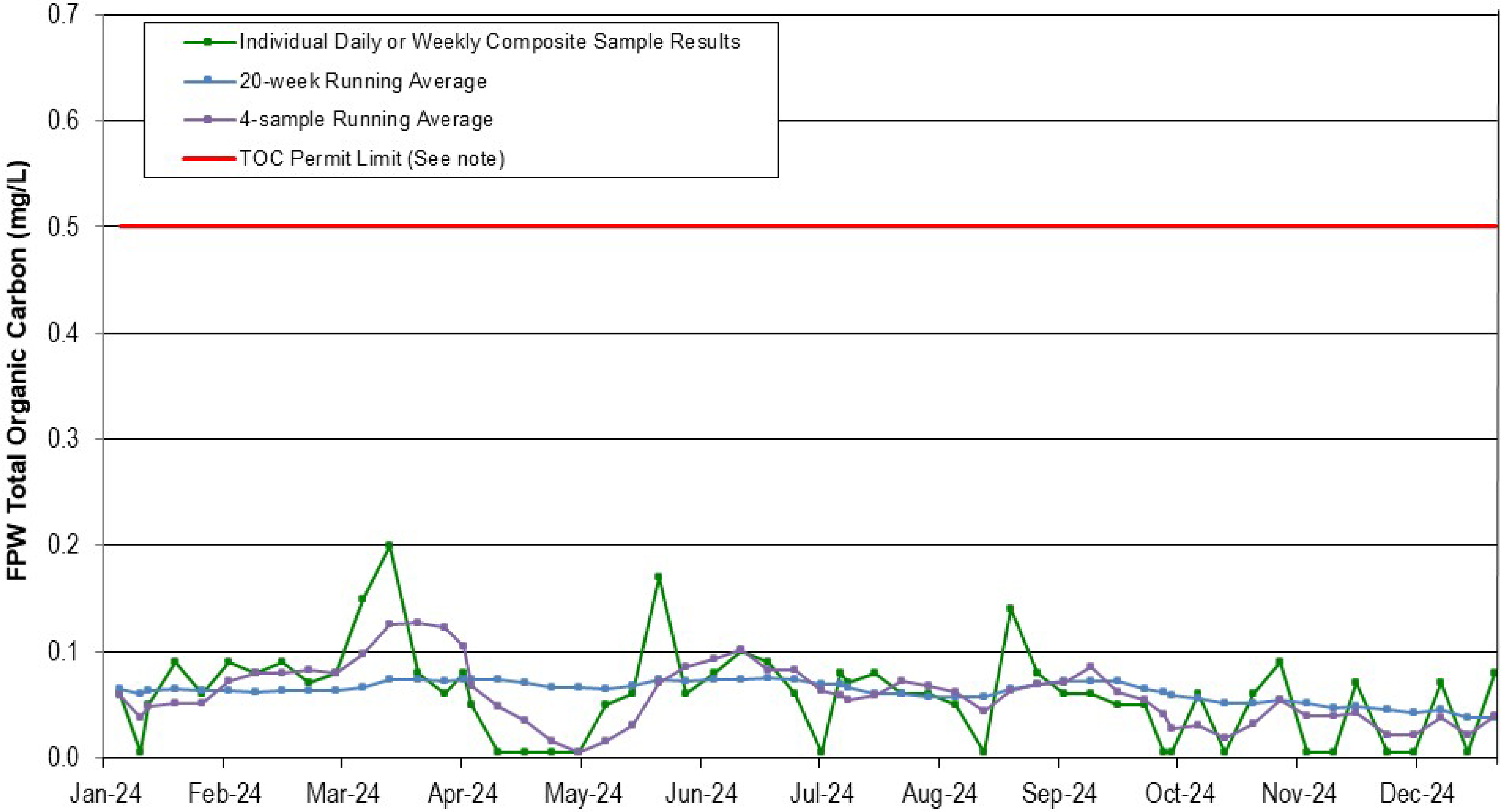


Figure 2-8. 2024 Purified Recycled Water Total Nitrogen



Note: Reporting Limit is 0.05 mg/L using Method 5310C.
TOC Permit Limit is based on a 20-week running average of all TOC results and the average of the last 4 TOC results.

Figure 2-9. 2024 Purified Recycled Water Total Organic Carbon

2.2.2.3 Total Coliform Removal in 2024

Compliance was maintained with the Title 22-based permit limit for total coliform, which requires that the FPW shall not exceed 240 MPN/100 mL in any single sample, 23 MPN/100 mL in more than one sample in any 30-day period, and the 7-day median shall not exceed 2.2 MPN/100 mL. The daily total coliform levels during 2024 were non-detectable (less than 1 MPN/100 mL), with the exception of 11 detections (equal to or greater than 1 MPN/100 mL); the highest of these detections was 8.6 MPN/100 mL (July 24). Despite this single elevated reading, the AWPF did not exceed the 7-day median, 30-day or single sample permit limits.

Investigations into elevated total coliform readings in late July 2024 (two detections of 1 MPN/100 mL and the annual maximum detection of 8.6 MPN/100 mL) found the cause to be bacterial growth in the decarbonation towers. During this period, the AWPF source water flow rate and quality varied due to OC San operational issues impacting the AWPF:

1) P2 TF/SC effluent was unavailable because OC San was unable to operate Plant 2 in the segregated mode (OC San diverted wastewater flow to Plant 2 because of their Sunflower Pump Station outage, which resulted in higher Plant 2 flows and the need for unsegregated co-mingling of reclaimable and non-reclaimable treatment streams);
2) Low ammonia levels in Plant 1 effluent combined with the AWPF's low purified recycled water production rate made it difficult to maintain a stable chloramine residual; and
3) Reduced AWPF production may cause hydraulic short-circuiting in the decarbonators, which can result in bacterial growth.

A similar elevated total coliform event was observed in 2018 when the AWPF operated at lower production rates. As in 2018, a special treatment event to disinfect the decarbonation towers with free chlorine was conducted in November 2024 during a planned AWPF shutdown; this corrective action eliminated further FPW total coliform detections in 2024.

2.2.3 Summary of GWRS Pathogen Log Reduction Compliance in 2024

Table 2-3 summarizes the daily total pathogen log reduction value (LRV) credits achievable by the GWRS, demonstrating compliance with the permit and Title 22 Water Recycling Regulations for GRRPs (RWQCB, 2022a and CCR, 2018). The pathogen log reduction achieved by each treatment process is discussed in Sections 2.2.3.1 (Secondary treatment), 2.2.3.2 (MF), 2.2.3.3 (RO), and 2.2.3.4 (UV/AOP). Figure 2-10 illustrates the daily total pathogen log reduction values actually achieved during 2024; these results are reported to DDW and the RWQCB on a monthly basis.

GWRS complies with pathogen reduction requirements using the MF, RO, and UV/AOP processes at the AWPF noted above plus underground retention as an environmental barrier. The GWRS may also claim credit for primary and secondary treatment by OC San; however, no pathogen reduction credits for primary and secondary treatment were claimed in 2024.

Table 2-3. Summary of Pathogenic Microorganism Control for the GWRS Achieved in 2024

Pathogen	Minimum Log Reduction Requirements[1]	Pathogen Log Reduction Credits Available by Treatment Process					
		Secondary Treat-ment[2]	MF and Cl_2	RO[3][3]	UV/AOP	Underground Retention Time[4]	Total[3,4]
Giardia cysts	10	0	≥4.0	2.0	6.0	0	≥10
Cryptosporidium oocysts	10	0	≥4.0	2.0	6.0	0	≥10
Viruses	12	0.18	0	2.0	6.0	4 (5)	≥12

[1] Per Title 22 Water Recycling Criteria (CCR, 2018) and GWRS permit (RWQCB, 2022a).

[2] Since December 2, 2022, 0.18-log virus reduction credit could be claimed for secondary treatment at OC San. However, no pathogen reduction credits claimed for secondary treatment in 2024.

[3] Daily pathogen log reduction credits achieved by RO in 2024 were equal to or greater than 2.0-log, except on 7/31/2024 when the LRV credit was 1.9-log. The MF process achieved 4.5-log reduction of *Giardia* cysts and *Cryptosporidium* oocysts on 7/31/2024 to make up for the RO process shortfall. See Sections 2.2.3.2 and 2.2.3.3 and Appendix D.

[4] Daily virus LRV credit of 4-log for underground retention time throughout 2024, although 5-log virus LRV credits were available if needed to achieve the total virus LRV requirement.

In addition to the pathogen log reduction achieved by OC San and the MF, RO, and UV/AOP systems, GWRS provides a minimum underground retention time prior to withdrawal at the nearest drinking water well of more than four months via established primary and secondary boundary areas at the Talbert Barrier and Anaheim Forebay that were confirmed by added tracer studies; the MBI Project area has approved boundary areas based on groundwater modeling which were verified by intrinsic tracer tests using chloride and sulfate conducted between 2020 and 2023; an updated project boundary for the MBI area was submitted to DDW for approval in February 2024 (OCWD, 2024). All drinking water wells are located outside these boundary areas, with the exception of a private well, GKAW-FV1, which is located within the Talbert Barrier boundary area but which has never seen arrival of GWRS water as indicated by the concentrations of chloride and sulfate measured at the well (see Section 4.4.2 for more information). Based on the 1-log virus reduction credit per month of underground retention time allowed by the Title 22 Water Recycling Criteria for groundwater recharge (CCR, 2018), GWRS therefore provides at least 4-log reduction of viruses after surface spreading and direct injection.

There were six days in 2024 when the virus log reduction achieved by the GWRS was less than 12.00-log. The minimum daily virus log reduction achieved was 11.94-log, achieved on July 31, 2024. For the purpose of reporting for compliance against the 12-log reduction requirement in Title 22, this is rounded to a minimum reduction of 12-log, as shown in Table 2-3. At no time was the minimum virus log reduction less than 10-log. The minimum daily *Giardia* and *Cryptosporidium* log reduction was 12.15-log, achieved on December 6 and December 20, 2024.

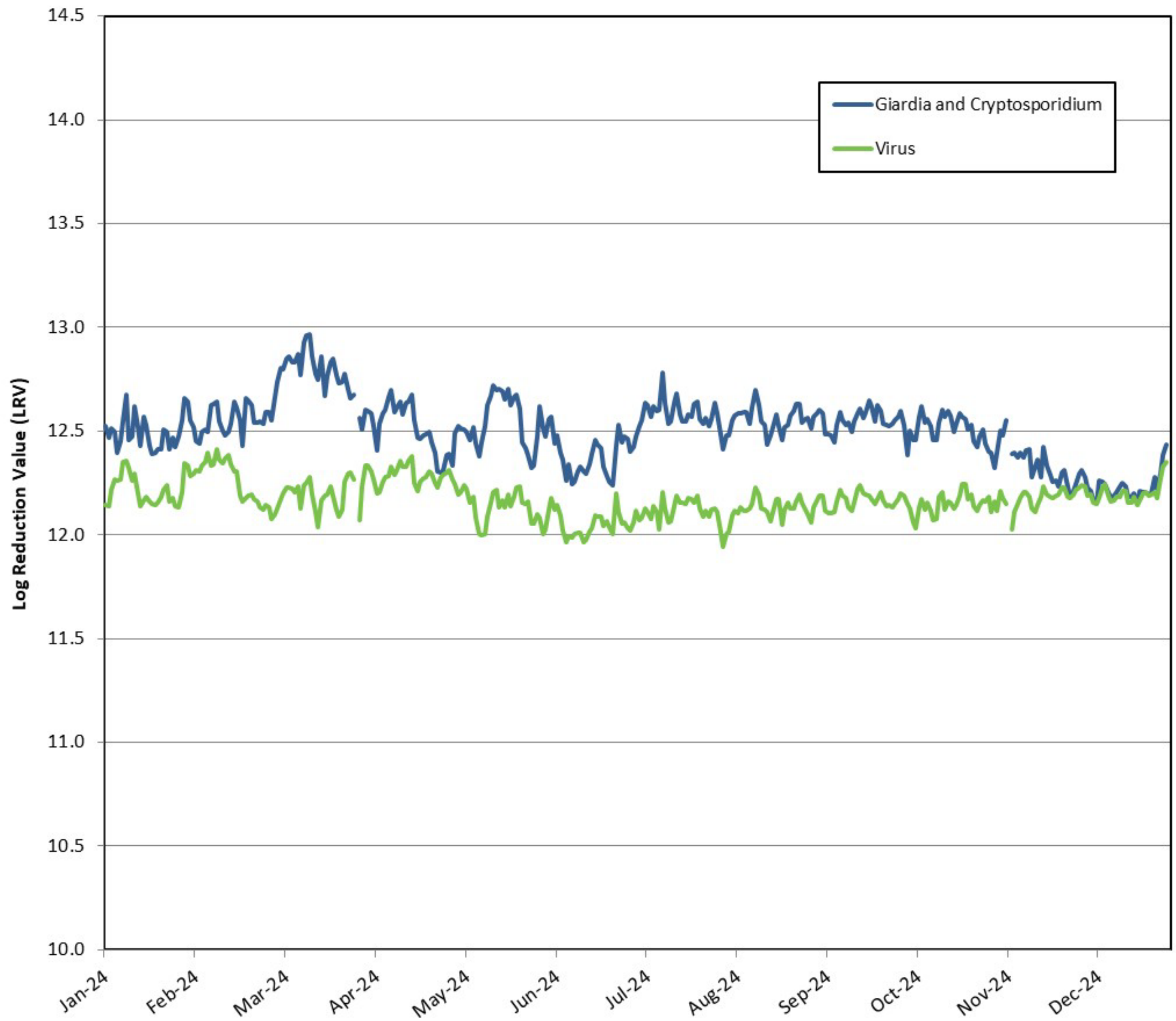


Figure 2-10. Summary of Daily GWRS Pathogen Log Reduction Credits Achieved in 2024

2.2.3.1 Secondary Treatment Pathogen Log Reduction Monitoring

Since December 2022, the AWPF has been eligible to receive virus reduction credit for the primary and secondary treatment conducted by OC San. To receive this credit, effluent from each of the four secondary treatment processes that provides influent to the AWPF (P1 AS1, P1 AS2, P1 TF, P2 TF/SC) is monitored daily by OC San. The turbidity of the blended AWPF influent is also measured by OCWD, as an indicator of the blended secondary effluent quality before (MFF) and following (MFE) MF treatment.

The OC San secondary treatment pathogen log reduction credit is a contingent credit and is only claimed by OCWD when needed to meet the total minimum 12-log virus reduction credit required by Title 22. This contingent pathogen log reduction credit by secondary treatment was not claimed in 2024.

2.2.3.2 MF System Pathogen Log Reduction Monitoring

The MF process receives pathogen log reduction credits for *Giardia* cysts and *Cryptosporidium* oocysts in accordance with the updated OOP (OCWD and DDB Engineering, Inc., 2022). No credit for reduction of enteric virus is attributed to the MF process. A combination of on-line turbidimeters and daily pressure decay test (PDT) results are used to show compliance with pathogen removal requirements. The critical control points and critical limits designated for MFE turbidity and MF PDT (See Section 2.3.2) establish the criteria that enable the MF process to demonstrate at least 4-log reduction of *Giardia* cysts and *Cryptosporidium* oocysts.

The MFE turbidity and MF PDT results are recorded and used to calculate the pathogen log removal credit achieved by each MF cell in accordance with the *Membrane Filtration Guidance Manual* (USEPA, 2005). The calculated pathogen log removal is automatically displayed in the GWRS process control system (PCS) and recorded as explained in the OOP. If a log removal result based on the PDT calculation for an individual MF cell is less than 4-log based on the retesting protocol described in the OOP, the affected cell is taken out of service until the cell can be inspected and restored to comply with the 4-log reduction requirement.

Monthly reports are submitted to DDW documenting the daily pathogen log reduction values achieved by the MF process; each day, the overall process is assigned the lowest daily individual cell log reduction value derived from the PDT results. Appendix D contains copies of the 2024 monthly reports submitted to DDW and the RWQCB documenting pathogenic microorganism control achieved by GWRS.

MF membrane integrity is monitored continuously with on-line turbidimeters on the MFF and MFE flow streams, and continuous readings are averaged to determine the daily averages. One bulk MFF turbidimeter measures the combined MFF turbidity (a second bulk MFF turbidimeter is a standby unit). The MFE turbidity is continuously measured using 12 individual high-resolution laser turbidimeters, each assigned each "half-train" group of four MF cells. In addition, one bulk MFE turbidimeter continuously tracks the combined MFE flow stream to supplement the 12 "half-train" turbidimeters.

Continuous MFF and MFE turbidity readings, plus daily MF PDT results are critical control points and compliance with those critical limits supports the pathogen reduction by the MF process. (See Appendix E, Figures E-3 and E-4 for MFF and MFE turbidity, respectively). Corresponding daily average PDT results for all cells confirm MF membrane integrity based on pressure decay results were within the target range throughout 2024. OCWD tracks the daily PDT results for each MF cell to recognize trends and confirm membrane integrity. The average annual MFF and MFE turbidity using on-line analyzers in 2024 was 3.04 and 0.03 NTU, respectively (See Table 2-1); the annual average turbidity removal by the MF process in 2024 was 99.0%.

OCWD Operations staff continued to follow the PDT retesting protocol that began in July 2022 and described in the GWRS OOP (OCWD and DDB Engineering, Inc., 2022). The MF system operates with built-in automatic reliability features to ensure adequate pathogen reduction is achieved at all times. If an MF cell fails to achieve 4.00-log LRV based on the daily PDT, it remains out of service until the issue causing the low LRV is resolved. Additionally, if the MFE "half-train" turbidity fails to meet critical control points of 0.2 NTU for more than 72 minutes in a calendar day or 0.5 NTU instantaneously (Table 2-7), the "half-train" group of four MF cells is automatically shut down by the AWPF PCS following a 30-second delay.

Figure 2-11 graphically illustrates the minimum log reduction values for *Giardia* cysts and *Cryptosporidium* oocysts achieved by the MF process (lowest PDT-based daily log reduction value achieve by any single MF cell) in 2024. (See Appendix D for monthly reports.) The lowest minimum daily log reduction value for *Giardia* cysts and *Cryptosporidium* oocysts achieved in 2024 by the MF process (all 48 MF cells) was 4.0-log. From mid-November through the end of 2024, the LRV achieved by the MF process was consistently at or slightly above 4.0-log for *Giardia* cysts and *Cryptosporidium* oocysts. This was due largely to the performance of MF Trains C, E, and F during this time frame, driven by the colder wintertime water temperatures along with the age of the membranes. Membranes in half of the Train C cells (Cells C01-C04) were replaced in 2024, with replacement of the other half of the Train C cell membranes following in early 2025. OCWD continues to monitor the performance of Trains E and F to consider if membrane replacement is warranted.

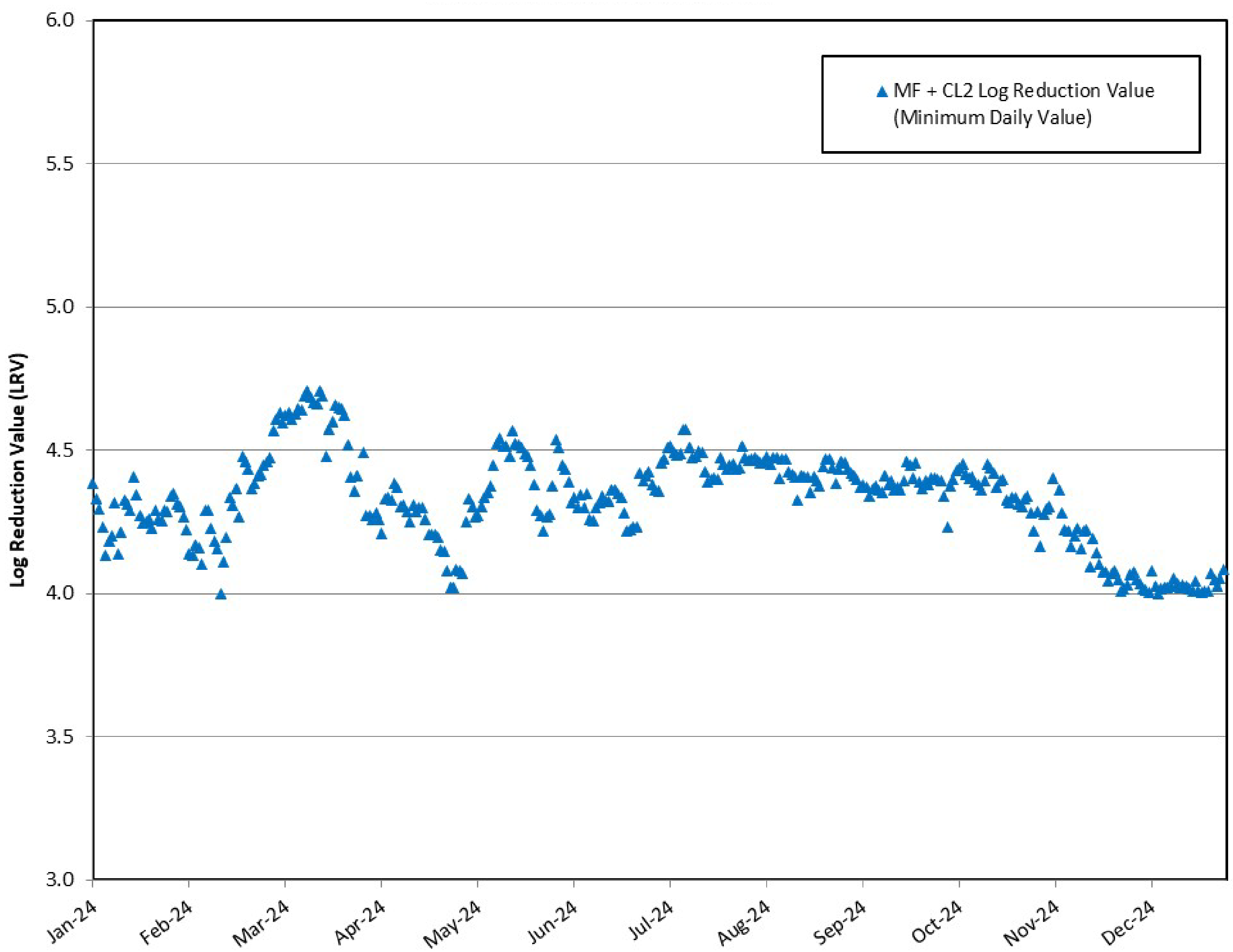


Figure 2-11. MF Log Reduction Values in 2024: *Giardia* Cysts and *Cryptosporidium* Oocysts (Minimum Daily Values of All 48 MF Cells)

2.2.3.3 RO System Pathogen Log Reduction Monitoring

The RO process receives a nominal pathogen log reduction credit of 2-log each for *Giardia* cysts, *Cryptosporidium* oocysts, and enteric virus, based on a tiered monitoring conducted in accordance with the OOP to determine the actual daily credit achieved (OCWD and DDB Engineering, Inc., 2022). Three tiers are approved under the GWRS permit (RWQCB, 2022a) to demonstrate pathogen reduction credits for the RO process:

- Tier 1 is based on a grab or on-line strontium, sulfate, or adenosine triphosphate (ATP) measurements of the bulk (common header) ROF and ROP from each RO unit. This methodology was not implemented in 2024.
- Tier 2 is based on continuous on-line TOC measurements of the bulk ROF and bulk ROP. Tier 2 was used throughout 2024 and details about the methodology are provided below.
- Tier 3 is based on continuous on-line EC measurements of the bulk ROF and ROP from each RO unit. Tier 3 is generally a backup approach if TOC readings are unavailable.

In 2024, OCWD continued to use Tier 2 as the primary means to demonstrate pathogen reduction credit, with Tier 3 used to supplement and confirm Tier 2 results. Under Tier 2, the RO process performance for pathogen reduction is measured using TOC removal; this methodology uses on-line TOC as a surrogate for RO membrane integrity and pathogen reduction. TOC removal as a continuous indicator of membrane integrity in 2024 compared on-line ROF and ROP TOC data. (See also critical control points discussion in Section 2.3.2 and Appendix E, Figure E-8 for ROP TOC results.)

Two redundant on-line TOC analyzers (one duty and one standby) continuously monitor the bulk (common header) ROF flow stream, providing full redundancy; likewise, two redundant on-line TOC analyzers (one duty and one standby) continuously monitor the bulk (common header) ROP flow stream, providing full redundancy. Minimum, maximum, and average results are recorded daily along with the calculated average percent daily TOC removal. Monthly reports are submitted to DDW and the RWQCB documenting the daily pathogen log reduction values achieved by the RO process (See also Appendix D for copies of the monthly reports).

The three-stage RO process is designed to remove inorganic and organic compounds as well as bacteria and virus pathogens, producing up to 130 MGD of product water at a recovery rate of approximately 85%. Monthly performance data for the RO process in 2024 for key constituents, EC and TOC, are summarized in Table 2-4. The monthly average ROF EC varied due to extended periods when P2 TF/SC effluent was unavailable (February 1 – April 8, May 1– October 20, and October 22 – November 22). The annual average bulk ROF EC was lower in 2024 (1,786 µS/cm) compared with that in 2023 (2,106 µS/cm) as well due to the comparative lack of higher salinity P2 TF/SC effluent in the AWPF source water. Regarding salinity removal in 2024, the bulk ROF EC averaged

Table 2-4. 2024 RO Performance

Month	Electrical Conductivity[1,2] RO Feed ROF[4] Avg. (µS/cm)	Electrical Conductivity[1,2] RO Feed ROF[4] Max. (µS/cm)	Electrical Conductivity[1,2] RO Product ROP[4] Avg. (µScm)	Electrical Conductivity[1,2] RO Product ROP[4] Max. (µS/cm)	Total Organic Carbon[3] RO Feed ROF Avg. (mg/L)	Total Organic Carbon[3] RO Feed ROF Max. (mg/L)	Total Organic Carbon[3] RO Product ROP Avg. (mg/L)	Total Organic Carbon[3] RO Product ROP Max. (mg/L)
January	2,198	2,360	43	49	7.60	8.40	0.08	0.18
February	1,590	1,680	21	24	7.09	8.07	0.11	0.25
March	1,643	1,670	28	42	7.47	8.51	0.09	0.20
April	1,848	2,120	27	35	7.44	9.46	0.06	0.12
May	1,634	1,760	25	42	7.96	8.32	0.09	0.18
June	1,553	1,580	21	22	7.58	11.70	0.10	0.19
July	1,618	1,640	24	26	6.68	7.39	0.09	0.17
August	1,565	1,580	26	27	6.40	7.11	0.07	0.12
September	1,568	1,580	32	56	6.87	7.42	0.07	0.13
October	1,555	1,620	24	25	6.70	7.50	0.08	0.14
November	1,850	2,160	31	33	6.92	7.41	0.07	0.14
December	2,142	2,200	35	37	6.74	6.74	0.07	0.11
Annual Average	1,766	---	28	---	7.15	---	0.08	---
Maximum	---	2,360	---	56	---	11.70	---	0.25
Average % Removal	98.4%				98.9%			

[1] Electrical Conductivity (EC) data for RO are not normalized with respect to ROF pressure or temperature

[2] EC semi-weekly grab sample results

[3] TOC daily grab sample results

[4] Lower EC due to less P2 TF/SC effluent to AWPF source water in February-early April and May-mid-November.

1,766 µS/cm, and the bulk ROP EC averaged 28 µS/cm based on semi-weekly grab samples. This represents an average salinity removal rate for the RO process of 98.4% during 2024.

Figure 2-12 presents the annual average TOC removal performance of the RO system, comparing 2023 and 2024 laboratory-analyzed composite sample results. The average TOC removal of 98.9% in 2024 was essentially identical to the 99.1% average TOC removal rate achieved in 2023. In general, this TOC removal performance indicates rejection rates remained constant over this period.

The TOC concentration in the ROF based on daily composite samples averaged 7.15 mg/L in 2024, which is slightly lower than the 7.38 mg/L average observed in 2023. The ROF TOC concentration range in 2024 (5.27 to 11.70 mg/L) was wider than in the prior year (6.36 to 9.58 mg/L) as shown by the vertical black bars on Figure 2-12. Throughout 2024, the ROP TOC concentration was consistently below the 0.5 mg/L permit limit (20-week running average and 4-sample running average, assessed at FPW). Available operating records are indicative of the dependable performance of the RO system in 2024. The TOC concentration in the ROP based on daily composite samples averaged 0.08 mg/L during 2024, ranging from less than the 0.05 mg/L RL (non-detectable) to 0.25 mg/L (February 18); for comparison, on-line ROP TOC average reading on February 18 was 0.05 mg/L.

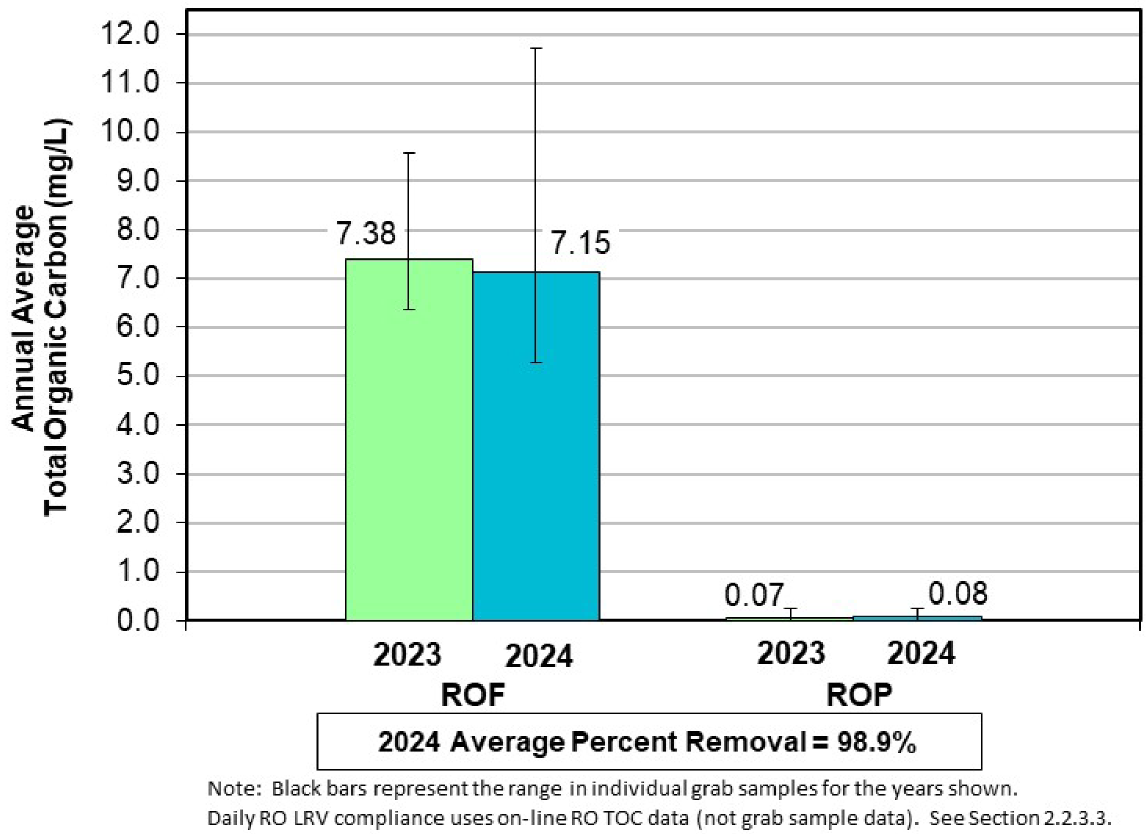


Figure 2-12. 2024 RO Total Organic Carbon Removal Performance

Figure 2-13 shows the daily average on-line ROF and ROP TOC results in 2024.

It is interesting to observe an increasing trend in the daily average on-line ROF TOC occurred in the latter half of April 2024 when P2 TF/SC effluent was reintroduced to the AWPF Q1 feedwater (See Figure 2-6). Between February 1 and April 8 when P2 TF/SC effluent was unavailable, the average on-line ROF TOC was 8.0 mg/L. Between April 9 and April 30 when P2 TF/SC effluent was part of the AWPF source water, the average on-line ROF TOC was 8.8 mg/L. Between May 1 and October 20 when P2 TF/SC effluent was again unavailable, the average on-line ROF TOC declined to 7.8 mg/L.

Figure 2-14 illustrates the minimum daily average pathogen LRVs achieved by the RO process based on TOC monitoring in 2024 as reported to DDW and the RWQCB; Appendix D includes monthly pathogen reduction reports in 2024. The annual daily average demonstrated pathogen LRV by the RO process in 2024 was 2.17-log. The maximum daily pathogen LRV demonstrated by the RO process was 2.41-log on February 8, 2024.

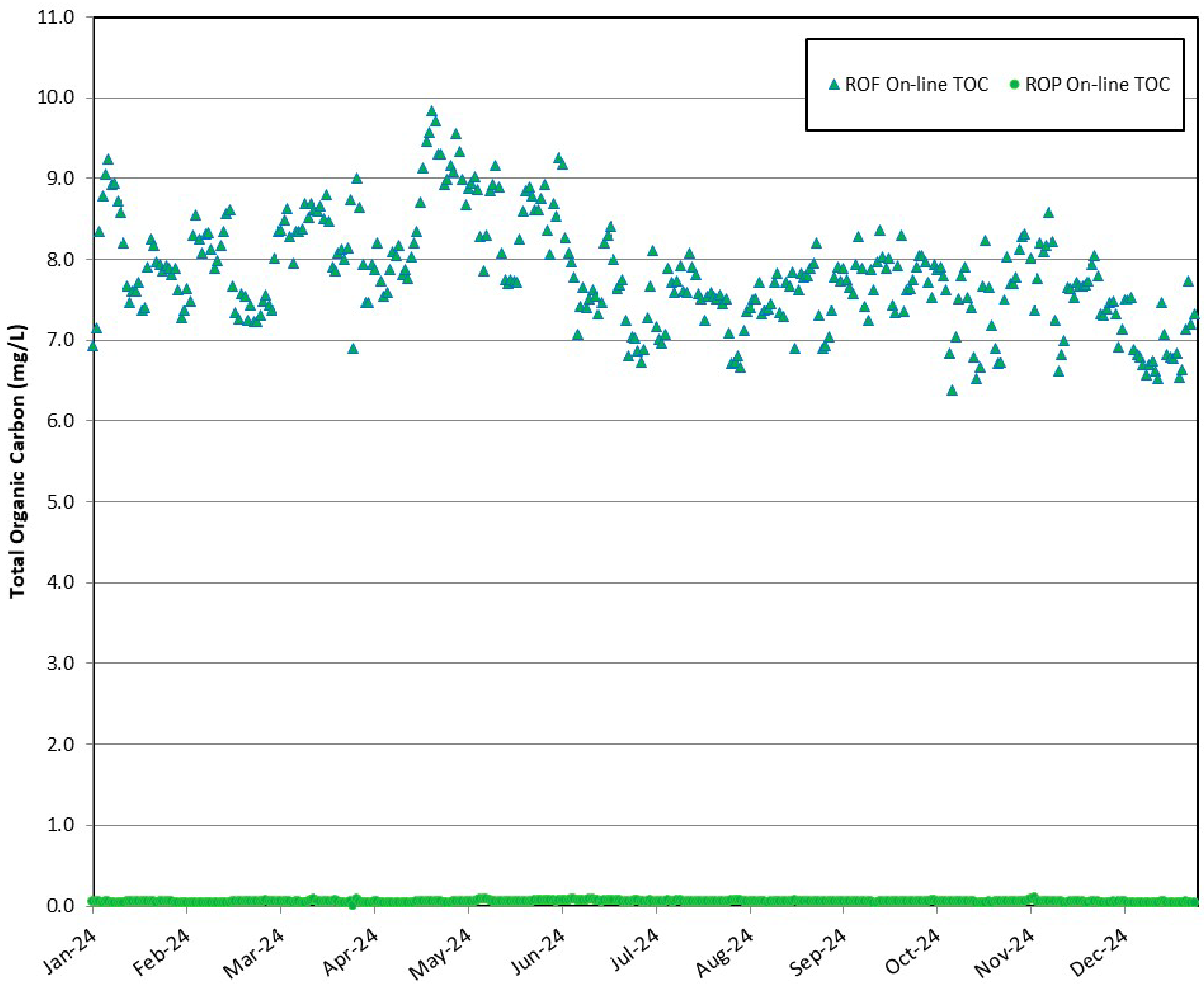


Figure 2-13. TOC Reduction Achieved by the RO Process in 2024

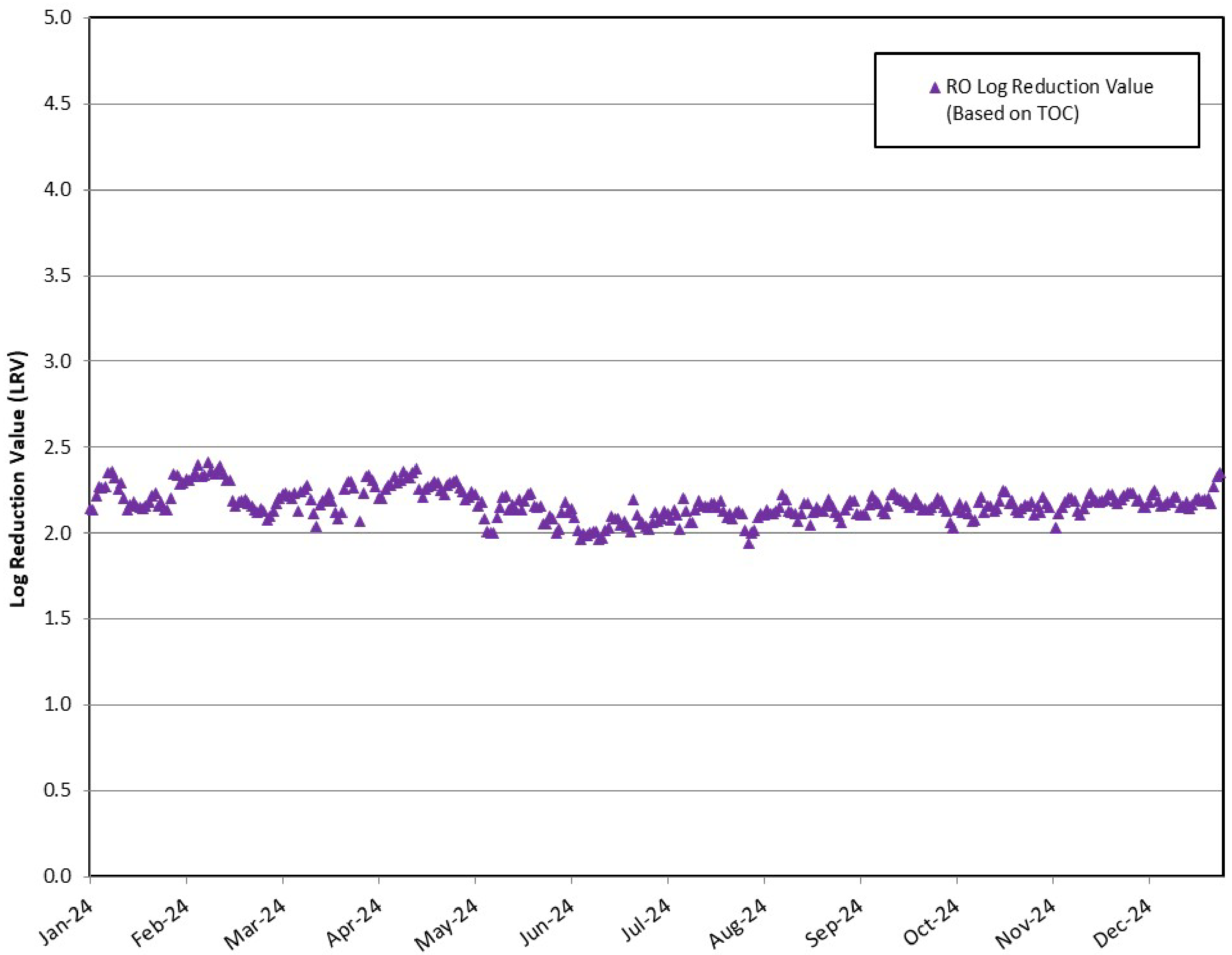


Figure 2-14. RO Log Reduction Values in 2024: *Giardia* Cysts, *Cryptosporidium* Oocysts, and Virus

The daily pathogen log reduction values demonstrated by the RO process during 2024 were equal to or greater than 2.00-log based on on-line TOC readings, except for these values:

- 1.96-log reduction on June 7, 2024
- 1.99-log reduction on June 8-9, 2024
- 1.97-log reduction on June 13-14, 2024
- 1.94-log reduction on July 31, 2024

A review of the June 9, 2024, LRV (1.99-log reduction) revealed that the daily maximum bulk ROP TOC was elevated above the internal CCP of 0.1 mg/L for approximately 4 minutes, reaching a maximum TOC concentration of 0.121 mg/L. The ROP excursion was due to a TOC spike following plant restart after an unplanned AWPF outage. The outage was caused by an SCE power blip (Appendix F).

A review of the June 13, 2024, LRV (1.97-log reduction) revealed that the daily maximum bulk ROP TOC was elevated above the internal CCP of 0.1 mg/L for 250 minutes, reaching a maximum TOC concentration of 0.119 mg/L. OC San was consulted and confirmed no abnormal activities that may have caused the ROP TOC increase. Analytical testing by the OCWD laboratory was not able to identify an associated organic constituent of concern that may have caused the increase.

The lower than usual reported daily pathogen reduction values for the RO process on June 7, June 8, June 14, and July 31, appear to be unrelated to any TOC analyzer issues, abnormal ROF or ROP readings, or operational changes. The daily average ROP TOC was slightly higher than typical each day (in the range of 0.077 to 0.087 mg/L), indicating TOC rejection by the RO membranes may have been slightly lower than usual, perhaps due to warm temperatures.

2.2.3.4 UV/AOP Pathogen Log Reduction Monitoring

The UV/AOP system receives up to 6-log pathogen log reduction credits each for *Giardia* cysts, *Cryptosporidium* oocysts, and enteric virus in accordance with the OOP (OCWD and DDB Engineering, Inc., 2022). The on-line UV transmittance analyzer and ballast power level are used to verify the 6-log pathogen removal. The GWRS permit (RWQCB, 2022a) requires that the UV/AOP achieve an adenovirus reduction equivalent dose (RED) of at least 300 mJ/cm^2 to receive a daily LRV credit of 6-log. By continuously monitoring critical control points, a UV transmittance of at least 95% combined with a minimum UV power level of 74 kW per train ensures that a minimum EED of 0.31 kWh/kgal achieves the required 6-log pathogen reduction. The UV/AOP validation completed by OCWD in December 2022 found that the 300 mJ/cm^2 adenovirus RED is achieved at a minimum EED of 0.08 kWh/kgal. By maintaining a higher EED of 0.31 kWh/kgal required for assuring 0.5 log of 1,4-dioxane removal, the required adenovirus RED is always met and exceeded.

The UV/AOP system continuously monitors UV transmittance, UV train power levels, calculated EED, and UV dose which are all critical control points (See Section 2.3.2 and Appendix E, Figures E-9, E-10, E-11, and E-12). The hydrogen peroxide dose, which is another critical control point required for pathogen credit, is monitored manually by GWRS operators. Operators perform a pump drawdown test at least one time per operating shift to ensure the minimum required peroxide dose of 4 mg/L is met. The pathogen reduction credits achieved by the UV/AOP process are based on these critical control points with the approval of DDW. Following start-up of the GWRSFE, results of the UV/AOP validation study performed on December 27-28, 2022, were approved by DDW on October 10, 2023, to establish the updated required UV/AOP setpoints for pathogen reduction credit (DDW, 2023).

Operating records for 2024 show that the daily average calculated EED was 0.349 kWh/kgal, ranging from 0.311 to 0.865 kWh/kgal, which is greater than the minimum EED of 0.31 kWh/kgal for 6-log virus reduction approved by DDW for the UV/AOP system.

The daily average on-line UV transmittance (%UVT) values during 2024 were well above the minimum 95% target.

The on-line UV train power throughout 2024 was greater than the minimum critical limit of 74 kW for each operational UV train. Individual UV trains were secured periodically for maintenance. The overall UV system average power level during 2024 was between 98.8 and 106.2 kW, which is well above the critical limit of 74 kW. Meeting the critical limit of 74 kW ensures that each train always exceeds the requirement for 300 mJ/cm^2 adenovirus reduction equivalent dose (RED) in the GWRS permit.

On this basis, the UV/AOP system demonstrated ample disinfection and can be credited for 6-log reduction of *Giardia* cysts, *Cryptosporidium* oocysts, and viruses throughout 2024. Figure 2-15 illustrates the daily LRV credits achieved by the UV/AOP system in 2024.

The UV/AOP system operates with built-in automatic reliability features to ensure adequate pathogen reduction is achieved at all times. If a UV train lamp power reading is more than 15kW below the 74kW critical limit, a Low-Low alarm is triggered in the AWPF PCS, triggering an automatic, immediate, train shutdown. At maximum per-train flow, this threshold for UV/AOP train shutdown is well above the threshold for achieving the minimum EED of 0.08 kWh/kgal required for 6-log pathogen reduction (see Table 2-7).

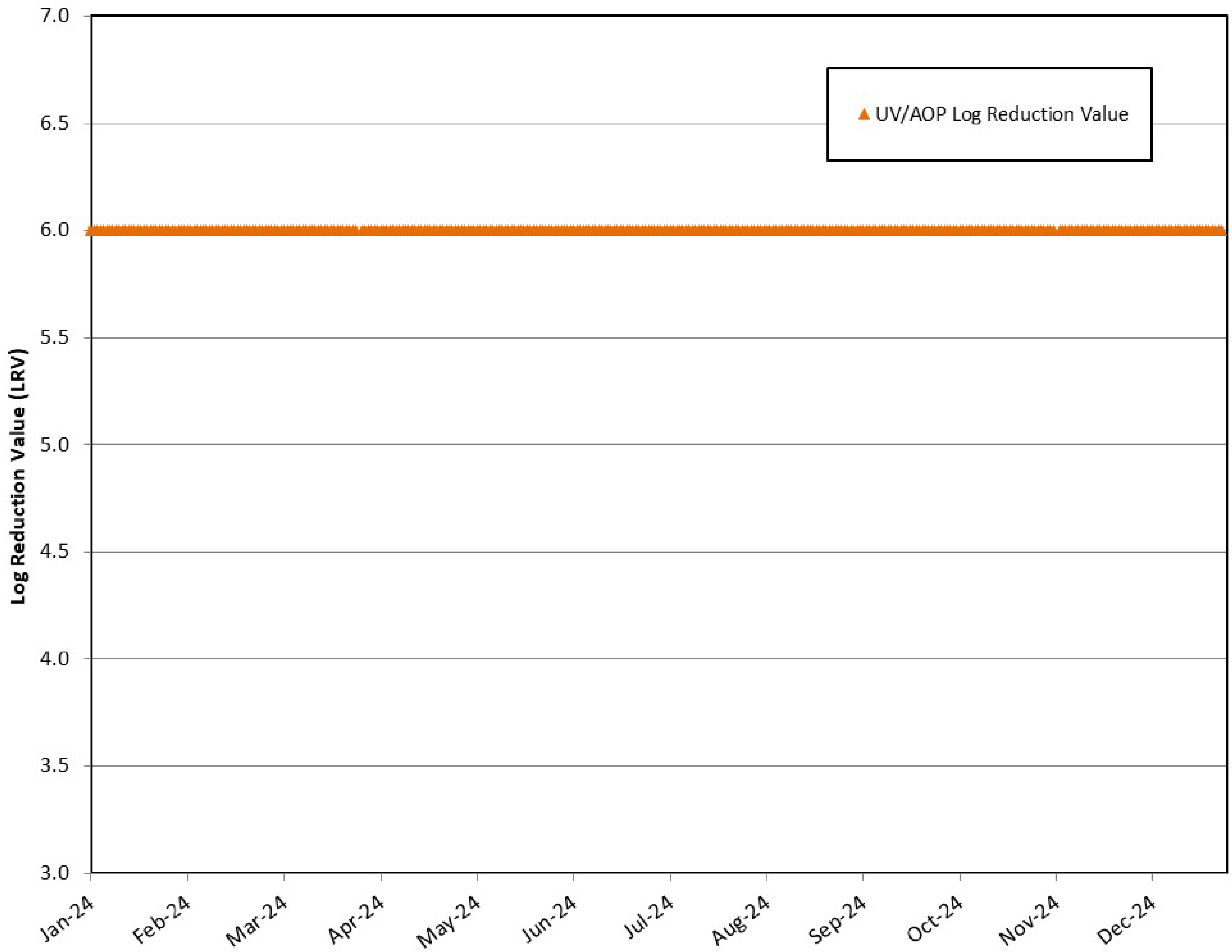


Figure 2-15. UV/AOP Log Reduction Values in 2024: *Giardia* Cysts, *Cryptosporidium* Oocysts and Virus

2.2.4 CEC Monitoring and Compliance with SWRCB Recycled Water Policy

The SWRCB adopted an updated *Water Quality Control Policy for Recycled Water* in 2018 (aka Recycled Water Policy) (SWRCB, 2018). The RWQCB included the SWRCB Recycled Water Policy requirements in the GWRS permit (RWQCB, 2022a).

The Recycled Water Policy requires submittal of a Quality Assurance Project Plan (QAPP) for review and approval by the SWRCB and RWQCB. CEC monitoring at the GWRS is conducted according to an updated QAPP, approved by the SWRCB on October 11, 2023 (SWRCB, 2023).

Initial phase quarterly monitoring of CECs and surrogates was conducted per the approved QAPP and GWRS permit monitoring and reporting requirements (RWQCB, 2022a) beginning in July 2021 and continuing through 2024 as follows:

- CECs (relevance/indicator type shown in parentheses)
    - 1,4-Dioxane (health) in ROF*, ROP*, and FPW;
    - NDMA (health and performance) in ROF, ROP*, UVP*, and FPW;
    - Perfluorooctane sulfonate (PFOS) (health) in ROF*, ROP*, and FPW;
    - Perfluorooctanoic acid (PFOA) (health) in ROF*, ROP*, and FPW;
    - N-nitrosomorpholine (NMOR) (health) in ROF*, ROP*, and FPW;
    - Sucralose (performance) in ROF, ROP*, and FPW; and
    - Sulfamethoxazole (performance) in ROF, ROP*, and FPW.
- Surrogates for CECs
    - Electrical conductivity (EC) in ROF, ROP, and FPW; and
    - Total Organic Carbon (TOC) in ROF, ROP, UVP*, and FPW.
- Bioanalytical screening tools
    - ER-a in FPW;
    - AhR in FPW.

* Monitoring location not required for CEC monitoring in the GWRS permit (RWQCB, 2022a). Location is monitored voluntarily.

Table 2-5 summarizes the monitoring requirements for subsurface injection projects (i.e., those using RO and AOP advanced treatment) and presents the results for GWRS in 2024.

Table 2-5. Summary of CEC and Surrogate Monitoring for GWRS in 2024

Constituent	Constituent Group	Relevance/Indicator Type		Required Reporting Limit	RDL	Units	ROF		ROP		UVP		FPW		Removal Percentages (%)			
		Health	Performance[1]				No. Of Samples	Average[2]	No. Of Samples	Average[2]	No. Of Samples	Average[2]	No. Of Samples	Average[2]	Average	Minimum	Maximum	Target[3]
CECs to be monitored[3]																		
Groundwater Recharge Reuse - Subsurface Applications																		
1,4-Dioxane	Industrial chemical	✓		0.5[4]	0.5	µg/L	66*	0.7*	66*	<0.5*	62*	<0.5*	4	<0.5	92.4%*	0.0%*	98.0%*	N/A
NDMA[5]	Disinfection byproduct	✓	✓	2	2	ng/L	56	13.1	56	6.3	52	<2	56	0.3	98.5%	0.0%	99.5%	>80%
NMOR	Industrial chemical	✓		2	2	ng/L	56*	16.9*	56*	<2*	52*	<2*	56	<2	98.8%*	80.0%*	99.5%*	N/A
PFOS	Consumer/industrial chemical	✓		6.5	2	ng/L	4*	9.8*	4*	<2*	na	na	4	<2	97.9%*	97.3%*	98.6%*	N/A
PFOA	Consumer/industrial chemical	✓		7	2	ng/L	4*	12.5*	4*	<2*	na	na	4	<2	98.4%*	97.0%*	99.1%*	N/A
Sucralose[6]	Food additive		✓	100	1000 (ROF) 100 (ROP/FPW)	ng/L	4	61,750	4	<100	na	na	4	<100	>99.9%	>99.9%	>99.9%	>90%
Sulfamethoxazole[6]	Antibiotic		✓	10	10 (ROF) 1 (ROP/FPW)	ng/L	4	658	4	<1	na	na	4	<1	>99.9%	>99.9%	>99.9%	>90%
Surrogates to be monitored[3]																		
Groundwater Recharge Reuse - Subsurface Applications																		
Electrical Conductivity (EC) [7,8]				N/A	1	µS/cm	60	1,766	56	28	na	na	363	88	95.0%	91.6%	97.7%	>90%
Total Organic Carbon (TOC) [7,8]				N/A	0.05	mg/L	395	7.15	371	0.08	10	0.06	56	0.06	99.2%	96.2%	>99.9%	>90%
Bioanalytical Screening Tools for CECs																		
Groundwater Recharge Reuse - Subsurface Applications																		
Estrogen receptor-α [9]				0.5	0.5	ng/L	na	na	na	na	na	na	4	<0.5	N/A	N/A	N/A	N/A
Aryl hydrocarbon receptor (AhR) [10]				0.5	0.5	ng/L	na	na	na	na	na	na	4	<0.5	N/A	N/A	N/A	N/A

[1] Results shown for initial assessment monitoring phase and may be refined for subsequent monitoring phases.
[2] Average of all available 2024 data based on using 10% of the Reporting Limit (RL) for non-detectable readings unless noted otherwise.
[3] GWRS compliance with the 2018 Recycled Water Policy is based on monitoring and reporting requirements for subsurface application (SWRCB, 2018) and Order No. R8-2022-0050 (RWQCB, 2022a).
[4] Recycled Water Policy required reporting limit is 0.1 µg/L. A higher reporting may be approved, as long as the ratio between the reporting limit and the monitoring trigger limit of 0.1 µg/L is no less than two. A reporting limit of 0.5 µg/L has been approved for GWRS.
[5] Percent removals for NDMA shown for ROF to UVP.
[6] Percentage removals for sucralose and sulfamethoxazole shown for ROF to ROP.
[7] Based on grab sample results. On-line measurements are also taken and available results are reported in Appendix E.
[8] Percent removals for EC and TOC shown for ROF to FPW.
[9] Estrogen receptor-α results shown as the required bioanalytical equivalent concentration (BEQ) of agonist 17-beta Estradiol measured in ng/L. The Monitoring Trigger Level (MTL) is 3.5 ng/L The calculated BEQ/MTL ratio is less than the 0.15 threshold that would require a response action.
[10] Aryl hydrocarbon receptor (AhR) results shown as the required bioanalytical equivalent concentration (BEQ) of agonist 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) measured in ng/L. The Monitoring Trigger Level (MTL) is 0.5 ng/L. The calculated BEQ/MTL ratio is less than the 1.0 threshold that would require a response

* Monitoring location not required for CEC monitoring in the GWRS permit (RWQCB, 2022a). Location is monitored voluntarily.
na = Not analyzed
N/A = Not applicable

2.3 Performance and Operational Record

The overall performance and operational record of the AWPF are summarized below in terms of general operating records, including start/restart issues, downtimes, operator certifications, compliance with critical control points, and focused studies to optimize performance and increase water production.

Appendix F includes a list of OCWD operators with their grades of certification. As of December 2024, OCWD had approximately 60 water production staff, of which 23 are certified operators; four operators have the highest wastewater certification level (WWTP V), and more than half of the operators have drinking water treatment certifications (T-1 through T-4). During 2024, OCWD complied with the GWRS permit requirement for California-Nevada Section of the Advanced Water Works Association/California Water Environment Association advanced water treatment operator (AWTO) certifications for some operators (RWQCB, 2022a). Four operators have AWTO certifications: the Chief Plant Operator has AWT-5, the Operations Manager has AWT-4, a Shift Supervisor has AWT-3, and a Senior Plant Operator has AWT-3. An AWT-3 certified operator was either on site or available for on-call support, 24-hours, 7-days a week in 2024. OCWD tracks the expiration dates for all certified operators to ensure certifications are maintained. The AWPF control room is staffed 24 hours per day, 7 days per week.

Appendix F also contains records of the cross-connection control and product water protection inspections that occurred at the AWPF in 2024. The purpose of this inspection program is to prevent bypass treatment and reversal of flow into the AWPF's product water lines. Inspections are completed by an independent Backflow Prevention Device Tester certified by the Orange County Health Care Agency (OCHA). The main connection to the City of Fountain Valley potable supply, which feeds a tank via an air gap connection and is used to supply industrial water to the AWPF, contains a double check assembly which is visually inspected yearly and tested every four years per City of Fountain Valley requirements. Onsite backflow devices at the AWPF are tested annually. If the annual inspection finds any repairs are required, they are completed and documented, then the backflow devices are retested.

2.3.1 General Operational Performance

The AWPF continued to successfully operate and produce purified recycled water for groundwater recharge through 2024, producing up to 130 MGD of purified recycled water for recharge.

The AWPF was on-line 359.2 days in 2024 (98.15% of the year). Table 2-6 summarizes the AWPF off-line events during 2024. Appendix F contains detailed descriptions of all plant shutdowns in 2024.

Table 2-6. Summary of AWPF Shutdowns in 2024

Start Date and Time	Duration (hours)	Cause
3/17/2024 at 1115 hours	3.50	Unplanned shutdown due to UV reactor M11 fault, which caused UV Train M to fail, leading to low UV capacity for production rate
3/26/2024 at 0550 hours	54.70	Planned shutdown for OCWD and OC San construction projects and system testing
5/29/2024 at 0516 hours	36.50	Planned shutdown for annual medium voltage testing
6/9/2024 at 1034 hours	4.45	Unplanned shutdown due to unscheduled power outage
8/20/2024 at 0925 hours	3.65	Unplanned shutdown due to SCE performing maintenance work at KIWI substation
11/5/2024 at 0335 hours	60.00	Planned shutdown for OCWD and OC San construction projects and system testing

2.3.2 Critical Control Points

Operation of the AWPF involves performance monitoring at multiple points or steps along the entire treatment process. This performance monitoring enables the operators to track how the system is doing at each step and gives them ample time to take corrective actions if necessary. Such performance monitoring ensures that the purified recycled water is safe, complies with regulatory requirements, and may be recharged and/or reused.

Critical control points and critical limits are shown in Table 2-7, as well as important process monitoring and control criteria used to operate the AWPF. The current critical control points and critical limits are documented in the updated OOP for the GWRSFE submitted to DDW in October 2022 (OCWD and DDB Engineering, Inc., 2022). Results of the GWRSFE UV/AOP validation test conducted in December 2022 revised the minimum EED and increased the target hydrogen peroxide dose. Evaluation of operating records for each critical control point with respect to the associated critical limit provides an indication of performance during the year.

Appendix E contains plots of data from the AWPF PCS showing how the AWPF operation compared with the critical limits listed above during 2024. Except for PDT monitoring and hydrogen peroxide dosage, the critical control point readings are from continuous on-line analyzers rather than sampling and laboratory analyses. PDT readings are taken daily at each MF cell; hydrogen peroxide dosage is checked once per operator shift. The plots in Appendix E are based on daily averages of the continuous data recorded at least every 15 minutes.

Exceedance of a critical control point triggers alarms in the AWPF PCS for the operators to take corrective actions if a limit is exceeded. The critical control points and corresponding critical limits are used for operating the AWPF and were not historically used for permit compliance. However, in order to comply with Title 22 regulations (CCR, 2018) and current RWQCB permit

Table 2-7. Summary of Critical Control Points and Critical Limits

	Parameter	Flow Stream or Process	Target Operating Range
1.	Combined Chlorine Residual	MFF (bulk)	3 to 5 mg/L
2.	Combined Chlorine Residual	ROF (bulk)	< 5 mg/L
3.	Turbidity	MFF (bulk)	< 5 NTU optimum ≤ 20 NTU for membrane warranty > 20 NTU for no more than 4 hours < 50 NTU at all times
4.	Turbidity	MFE (half MF train)[1]	< 0.15 NTU optimum > 0.20 NTU for no more than 72 minutes within 24 hours < 0.5 NTU at all times
5.	Turbidity	ROP (bulk)	0.01 to 0.15 NTU
6.	Transmembrane Pressure (TMP)	MF (cell)[2]	3 to 12.5 psi
7.	Pressure Decay Test (PDT)[3] based on daily testing	MF (cell)[2]	LRV calculation from PDT result ≤ 4.00 LRV triggers shutdown of cell and work order to be issued
8.	Electrical Conductivity (EC)	ROP (unit)[4]	< 90 µS/cm < 100 µS/cm for individual units
9.	Total Organic Carbon (TOC)	ROP (bulk)	< 0.1 mg/L
10.	Hydrogen Peroxide (H_2O_2) Dose	UV/AOP Feed (bulk)	≥ 4 mg/L
11.	UV Transmittance (UVT)	UV/AOP Feed (bulk)	95% minimum (at 254 nanometers)
12.	Electrical Energy Dose (EED)	UV/AOP Feed (train)[6]	0.31 kWh/kgal minimum[5]
13.	Average UV Train Power	UV/AOP (train)[6]	74 kW per train minimum[7]
14.	pH	FPW	< 9.0 units at all times <8.5 units as daily average

1 A half-train is four MF cells. The GWRS has 12 half-train turbidimeters for 48 MF cells.
2 TMP and PDT are assessed on each of the 48 MF cells.
3 PDT is also known as Membrane Integrity Testing (MIT).
4 EC is measured on the interstage and effluent of each of the 27 RO units. RO Trains F-I have full per stage EC monitoring capabilities. RO Trains A-E have been retrofitted to monitor EC per stage in an indirect fashion, from a stream corresponding to a set of vessels in each stage, which is representative of the entire stage.
5 EED is used to demonstrate compliance with 6-log virus reduction for each UV train. It is calculated based on the UV train power and UV train flow as follows: $\mathbf{EED_{Train} = (Power_{Train} / Q_{Train}) \times 16.667}$

Where: EED_{Train} = Electrical Energy Dose to a given train in units of kWh/kgal
$Power_{Train}$ = Train power in units of kW
Q_{Train} = Train flow in units of gpm
16.667 = Conversion factor equal to (1000 gal/kgal) ÷ (60 min/hr)

6 EED and train power are assessed on each of the 16 UV Trains.
7 Low-low alarm ensures the 300 mJ/cm^2 adenovirus RED requirement will be met at all times, with a significant safety factor. At a maximum flow per UV train of 8.75 MGD, equivalent to 6,076 gpm, automatic train shutdown will occur at an EED of 0.16 kWh/kgal. This is much greater than the required automatic shutdown trigger of 0.08 kWh/kgal. The equation relating train power to EED is above.

(RWQCB, 2022a), some critical control points have been adopted for demonstrating pathogen LRVs by each unit process; this is described in Sections 2.2.3.2 (MF), 2.2.3.3 (RO), and 2.2.3.4 (UV/AOP).

2.3.3 MF System Operation and Performance

2.3.3.1 MF System Facilities

MF removes suspended and colloidal solids, including bacteria and protozoa, and serves as a pretreatment step before the RO process. Screened secondary effluent flows by gravity to below-grade MF cells, pictured on Figure 2-16. With completion of the GWRSFE in 2022, the MF system operates with a total of 48 cells divided into six trains, each with eight cells containing 684 in-basin submerged membrane elements per cell. Of the total MF system, four trains (Trains A through D, 32 cells) featured polypropylene hollow-fiber membranes with a nominal pore size of 0.2 micrometers (microns) and two trains (Trains E and F, 16 cells) feature 0.04-micron PVDF membranes.

Figure 2-16. MF System

Filtrate pumps, operating in a vacuum mode, continuously pull water through the MF membranes using a piping manifold and discharge the filtrate, or MF effluent, to the MF Break Tank. The maximum rated filtrate production capacity of the MF system is 162.2 MGD with one cell out of service or in backwash. The design average filtrate production capacity of the MF system is 153 MGD based on 89% recovery to account for backwashing and clean-in-place (CIP) cycles and to enable the RO system to produce 130 MGD of ROP. The MF cells with polypropylene membranes are regularly backwashed using filtrate from the MF using citric acid and sodium hydroxide with a proprietary chemical to remove foulants and restore membrane performance.

The MF cells with PVDF membranes are periodically cleaned-in-place using sodium hypochlorite and citric acid with maintenance washes. Waste backwash is returned to OC San Plant 1 for treatment. MF CIP spent cleaning solutions are sent to OC San Plant 2.

2.3.3.2 MF System Operation

The MF system operated well during 2024. Various cells were temporarily taken off-line for normal membrane integrity testing (aka PDT), preventive maintenance on valves and instruments, and CIP procedures. Some temporary cell downtimes were required to investigate and correct elevated PDT values, adjust valves, repair piping, and resolve instrument communication issues. Transmembrane pressures (TMPs) varied seasonally, increasing with cooler water temperatures (fall-winter) and decreasing with warmer water temperatures (spring-summer).

Factors used to calculate MF process LRVs include flow rate, pressure/resistance, water temperature/viscosity, and PDT. In 2024, lower LRVs occurred with specific cells with higher-than-normal PDTs. Investigations found LRV issues were related to valve seating issues or differential pressure sensors, and corrective actions were taken to return the cell to service. Cells with older membranes tended to experience LRV issues that were resolved by replacing their membranes; for example, four MF Train C cells (C01-C04) with polypropylene membranes installed in 2020-2021 were replaced between October and December 2024.

Table 2-8 lists the MF membrane types and installation dates as of the end of 2024.

Table 2-8. Summary of MF Membrane Types and Installation Dates as of December 31, 2024

MF Train	MF Cell(s)	Membrane Type	Installation Date
A	A01 – A02	Memcor/Dupont Polypropylene	December 2022
	A03 – A04	Memcor/Dupont Polypropylene	November 2022
	A05 - A06	Memcor/Dupont Polypropylene	February 2023
	A07 – A08	Memcor/Dupont Polypropylene	January 2023
B	B01 – B08	Memcor/Dupont Polypropylene	September 2021—March 2022[1]
C	C01	Memcor/Dupont Polypropylene	December 2024
	C02	Memcor/Dupont Polypropylene	November 2024
	C03 – C04	Memcor/Dupont Polypropylene	October 2024
	C05 – C08	Memcor/Dupont Polypropylene	November 2020 – March 2021[1]
D	D01 – D02	Memcor/Dupont Polypropylene	April 2023
	D03 - D04	Memcor/Dupont Polypropylene	March 2023
	D05 – D06	Memcor/Dupont Polypropylene	May 2023
	D07 – D08	Memcor/Dupont Polypropylene	June 2023

Continued

MF Train	MF Cell(s)	Membrane Type	Installation Date
E	E01	Memcor/Dupont PVDF	September 2022
	E02	Memcor/Dupont PVDF	September 2022
	E03	Memcor/Dupont PVDF	November 2023
	E04	Memcor/Dupont PVDF	October 2022
	E05 – E08	Memcor/Dupont PVDF	October 2022[1]
F	F01 – F08	Memcor/Dupont PVDF	November 2022[1]

[1] Installation dates with GWRSFE.

2.3.4 RO System Operation and Performance

The RO process demineralizes water and removes inorganics, organics, viruses, and a wide range of other contaminants using spiral-wound, thin-film composite polyamide membranes. The RO system performed well during 2024. Beginning in mid-2015 and continuing through 2024, the three-stage RO system operated at an ROF pH of 6.9 and recovery rate of 85%.

2.3.4.1 RO System Facilities

MF effluent is pumped from the MF Break Tank to the RO system by the RO Transfer Pump Station. The RO process features pretreatment chemical addition using sulfuric acid and antiscalant (threshold inhibitor), cartridge filtration, and high-pressure feed pumps that supply the pressure vessels containing the RO membranes. Immediately upstream of the RO system are 16 cartridge filters using 10-micron filters. The RO system features 27 units (26 duty units and one standby unit), each rated at 5 MGD permeate capacity, and arranged in nine trains (A-I, each with three units).

Shown on Figure 2-17, each RO unit consists of 150 pressure vessels arranged in three banks (stages). The original 15 RO units (Trains A-E) are configured in a 78:48:24 array. The six GWRSIE RO units (Trains F-G) are configured in a 77:49:24 array with turbocharger energy recovery devices (ERDs) that provide interstage flux balancing and monitoring capabilities. The six GWRSFE RO units (Trains H-I) are configured in a 77:49:24 array. As part of the GWRSFE, interstage booster pumps were installed on 21 of the 27 RO units (Trains A-E and H-I). At a design recovery rate of 85%, the total nominal rated permeate capacity of the RO system is 130 MGD. Concentrate (i.e., reject) from the RO process is sent to the OC San ocean outfall for disposal. The RO system would be bypassed during a peak wet weather SAR discharge event.

Table 2-9 lists the RO trains, units, membrane types, and dates installed in the RO system. Six RO units' membranes were replaced in 2024: D03, E01, F03, G01, G02, and G03.

Figure 2-17. RO System

Table 2-9. RO System Membrane Types and Installation Dates as of December 31, 2024

RO Train[1,2]	RO Unit	Membrane Type[3]	Installation Date
A	A01	LG Chemical	October 2018
	A02	LG Chemical	October 2018
	A03	LG Chemical	October 2018
B	B01	Dupont-Filmtec BW30XFRLE	October 2020
	B02	Dupont-FilmTec BW30XFRLE	May 2022
	B03	Dupont-FilmTec BW30XFRLE	January 2023
C	C01	Dupont-FilmTec BW30XFRLE	October 2020
	C02	Dupont-FilmTec BW30XFRLE	April 2022
	C03	Dupont-FilmTec BW30XFRLE	February 2023
D	D01	Dupont-FilmTec BW30XFRLE	October 2020
	D02	Dupont-FilmTec BW30XFRLE	April 2022
	D03	Dupont-FilmTec BW30XFRLE	February 2024
E	E01	Dupont-FilmTec BW30XFRLE	February 2024
	E02	Dupont-FilmTec BW30XFRLE	March 2017
	E03	Dupont-FilmTec BW30XFRLE	March 2017
F	F01	Dupont-FilmTec BW30XFRLE	November 2023
	F02	Dupont-FilmTec BW30XFRLE	December 2023
	F03	Dupont-FilmTec BW30XFRLE	January 2024

Continued

RO Train[1,2]	RO Unit	Membrane Type[3]	Installation Date
G	G01	Dupont-FilmTec BW30XFRLE	January 2024
	G02	Dupont-FilmTec BW30XFRLE	January 2024
	G03	Dupont-FilmTec BW30XFRLE	February 2024
H	H01	Dupont FilmTec BW30XFRLE	September 2022
	H02	Dupont FilmTec BW30XFRLE	September 2022
	H03	Dupont FilmTec BW30XFRLE	September 2022
I	I01	Dupont-FilmTec BW30XFRLE	September 2022
	I02	Dupont-FilmTec BW30XFRLE	September 2022
	I03	Dupont-FilmTec BW30XFRLE	September 2022

[1] Trains F and G have ERDs. Trains A through E and Trains H and I do not have ERDs.
[2] Trains A through E and Trains H and I have interstage booster pumps. Trains F and G do not have interstage booster pumps.
[3] Thin Film Composite Polyamide RO Membranes.

2.3.4.2 Sucralose Removal

Sucralose is designated as an RO performance indicator in the GWRS permit (RWQCB, 2022a). Quarterly monitoring of sucralose in the ROF and ROP is performed and reported. Table 2-10 summarizes the sucralose monitoring results in 2024, demonstrating the efficacy of RO process.

Table 2-10. 2024 RO Sucralose Removal Performance

Quarter	Sucralose RO Influent ROF (ng/L)	Sucralose RO Effluent ROP (ng/L)	Removal[1] %
January-March	57,600	<100	>99.9%
April-June	58,800	<100	>99.9%
July-September	67,700	<100	>99.9%
October-December	62,900	<100	>99.9%
Annual Average	61,750	<100	>99.9%

[1] For purposes of calculating averages, 10% of the Reporting Limit (RL) was used for all non-detect (ND) values.

2.3.5 Ultraviolet/Advanced Oxidation Process Operation and Performance

The UV/AOP (hydrogen peroxide advanced oxidation and UV light exposure) system performance is demonstrated by the UVP results as compared with those in the UV/AOP influent, or feed water stream (UVF).

2.3.5.1 UV/AOP System Facilities

The UV/AOP system consists of two steps: hydrogen peroxide addition and UV light treatment. UV light exposure is used for primary disinfection and for photolysis of UV light-sensitive contaminants such as N-nitrosodimethylamine (NDMA). Hydrogen peroxide exposed to UV light produces hydroxyl radicals that result in an advanced oxidation process to destroy UV-resistant contaminants such as 1,4-dioxane. The closed, in-vessel type UV system utilizes low-pressure high-output lamps. The UV system is arranged with 16 trains. Each train contains six reactors and has a rated maximum capacity of 8.75 MGD for a total of 140 MGD capacity with all trains in service. Figure 2-18 shows a photo of two UV trains.

Figure 2-18. UV/AOP System

2.3.5.2 UV/AOP System Operation

The UV/AOP system currently operates with a minimum 95% UVT, minimum EED of 0.31 kWh/kgal, and a hydrogen peroxide dose of 4 mg/L. UV/AOP compliance data are tracked through SCADA and compiled into monthly reports as discussed in Section 2.2.3.4.

As a result of the DDW-approved UV/AOP validation tests, the minimum EED requirement was increased from 0.23 to 0.31 kWh/kgal and the minimum hydrogen peroxide dose was increased from 3 to 4 mg/L beginning October 10, 2023 (DDW, 2023). The hydrogen peroxide metering pumps operate in a two-duty, one-standby arrangement. Operations staff on each shift (i.e., twice daily) check the accuracy of the pump feed rates using calibration columns and manual pump drawdowns. The UV/AOP system operated well during 2024. Standby reactors came on-line when necessary. I&E staff were able to correct various issues, including replacing UV intensity sensors, ballasts, power supply to control panels, and UV lamps. For example, I&E staff corrected the UV reactor (M11) electrical fault that caused UV Train M to fail and led to an unexpected AWPF shutdown in March 2024 (See Appendix F). Staff continued replacing UV lamps according to the normal preventive maintenance schedule.

2.3.5.3 1,4-Dioxane Removal

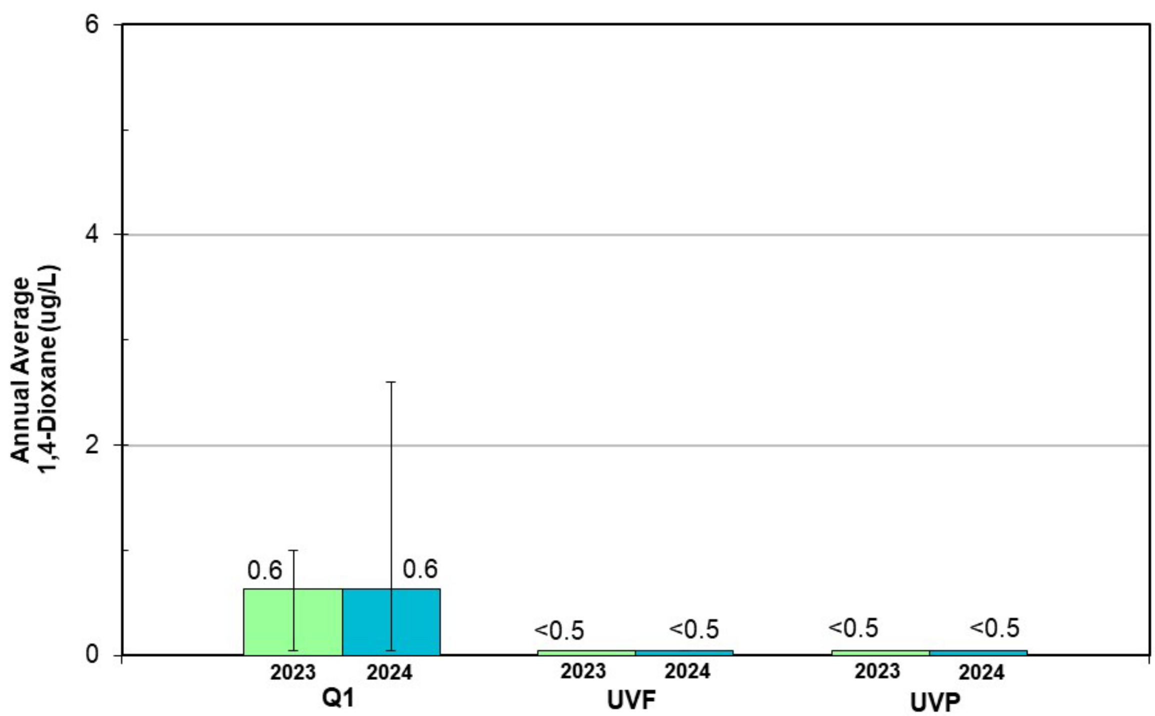
Performance of the UV/AOP system, as well as that of the RO system, can be measured based on removal of 1,4-dioxane. Table 2-11 and Figure 2-19 show how well 1,4-dioxane was removed by both the RO and UV/AOP processes. As was demonstrated in 2024, 1,4-dioxane was neither detected in UVF (after RO treatment) nor in UVP (after UV-AOP treatment). The RO/UV/AOP treatment processes removed 92.1% of the 1,4-dioxane in the AWPF source water, which was equivalent to 1.1-log reduction in 1,4-dioxane in 2024.

Table 2-11. 2024 RO/UV/AOP 1,4-Dioxane Removal Performance

Month	1,4 Dioxane					
	Secondary Effluent Q1		UV Influent UVF		UV Effluent UVP	
	Avg. [1] (µg/L)	Max. (µg/L)	Avg. [1] (µg/L)	Max. (µg/L)	Avg. [1] (µg/L)	Max. (µg/L)
January	0.7	0.8	<0.5	<0.5	<0.5	<0.5
February	0.2	0.5	<0.5	<0.5	<0.5	<0.5
March	0.8	2.6	<0.5	<0.5	<0.5	<0.5
April	0.3	0.6	<0.5	<0.5	<0.5	<0.5
May	0.7	0.8	<0.5	<0.5	<0.5	<0.5
June	0.7	0.9	<0.5	<0.5	<0.5	<0.5
July	0.7	0.8	<0.5	<0.5	<0.5	<0.5
August	0.6	0.7	<0.5	<0.5	<0.5	<0.5
September	0.6	0.6	<0.5	<0.5	<0.5	<0.5
October	0.6	0.7	<0.5	<0.5	<0.5	<0.5
November	0.7	0.8	<0.5	<0.5	<0.5	<0.5
December	0.7	0.8	<0.5	<0.5	<0.5	<0.5
Annual Average	0.6	---	<0.5	---	<0.5	---
Maximum	---	2.6	---	<0.5	---	<0.5
Average % Removal (RO/UV/AOP System) [2]	92.1%					
Average Log Removal (RO/UV/AOP System) [2]	1.1					

[1] Average of weekly grab samples. For purposes of calculating monthly averages, 10% of the Reporting Limit (RL) was used for all non-detect (ND) values. If all data for the month were ND, then the average is shown as "<RL".

[2] Average % removal and log removal calculated based on non-detect (ND) = 10% of RL.



2024 Average Percent Removal = 92.1%

Note: Black bars represent the range in individual weekly grab samples for the years shown.

Figure 2-19. 2024 RO/UV/AOP 1,4-Dioxane Removal Performance

2.3.5.4 NDMA Removal

In addition to disinfection and 1,4-dioxane removal, a key performance criterion for the UV/AOP system relates to destruction of NDMA as shown in Table 2-12 and illustrated on Figure 2-20. NDMA is a DDW-specified performance indicator constituent for the AOP process and must be monitored at least quarterly and reported in accordance with the GWRS permit (RWQCB, 2022a). The 2024 average concentration of NDMA in the UVF was approximately 6.7 ng/L, based on weekly grab samples ranging from non-detect (<2) to 21.1 ng/L (using OCWD's in-house NDMA-LOW laboratory method with an RL of 2 ng/L). UVF NDMA results reflect net effects of formation via MFF chlorine addition and partial removal via RO treatment. For comparison purposes, the average concentration of NDMA in the Q1 stream during 2024 was approximately 27.9 ng/L, ranging from non-detect (<10) to 77.0 ng/L.

All UVP NDMA results in 2024 were non-detect (<2 ng/L). Overall, comparison of the average UVF and UVP NDMA concentrations in 2024, the UV/AOP system attained an average NDMA removal rate of 97.0%, or a 1.5 log reduction if 10% of the reporting limit is assigned to the non-detect values. The average NDMA removal rate from the AWPF source water (Q1) through the UV/AOP system (UVP) during 2024 was 99.3%, or a 2.1-log reduction (assigning 10% of the reporting limit to non-detect values).

In 2024, all FPW NDMA results were below the DDW notification level for NDMA (10 ng/L). The highest NDMA concentration in the Q1 influent, 77.0 ng/L, occurred on May 17, 2024. The NDMA concentration in the FPW was non-detect (<2 ng/L) on that date. The UVP NDMA concentration on that day was also non-detect (<2 ng/L), demonstrating the efficacy of the UV/AOP process.

Comparing the available 2024 raw data for NDMA concentrations in FPW and UVP revealed that all FPW and UVP NDMA results were non-detect (<2 ng/L), with one exception. On May 31, 2024, a single detectable NDMA level (2.4 ng/L) was found in FPW, while the UVP concentration was non-detect (<2 ng/L) on that date. It should be noted that the FPW NDMA detection (2.4 ng/L) was well below the DDW notification level (10 ng/L). It is suspected that the FPW value was due to NDMA rebound occurring after UV treatment in the post-treatment FPW stabilization processes.

Potential causes for rebound during post-treatment include reformation of NDMA from previously photolyzed NDMA and/or formation of "new" NDMA from precursor compounds, both of which are likely dependent on the combined chlorine (chloramine) concentration. Investigations by OCWD into this NDMA rebound have revealed that the lime used during post-treatment is not a likely source of NDMA or precursor material, but the increase in pH caused by the lime allows for greater formation of NDMA in the presence of combined chlorine and

Table 2-12. 2024 UV/AOP NDMA Removal Performance

Month	NDMA Secondary Effluent Q1 Avg.[1] (ng/L)	NDMA Secondary Effluent Q1 Max. (ng/L)	NDMA UV Influent UVF Avg.[1] (ng/L)	NDMA UV Influent UVF Max. (ng/L)	NDMA UV Effluent UVP Avg.[1] (ng/L)	NDMA UV Effluent UVP Max. (ng/L)	Monthly Average Removal by UV/AOP %
January	30.2	48.2	7.8	11.9	<2	<2	97.4%
February	27.9	62.5	5.1	9.1	<2	<2	96.0%
March	19.1	23.8	6.6	10.4	<2	<2	97.0%
April	34.7	46.3	11.8	17.7	<2	<2	98.3%
May	54.3	77.0	11.4	21.1	<2	<2	98.2%
June	32.5	61.5	9.2	16.9	<2	<2	97.8%
July	10.4	20.4	4.8	6.5	<2	<2	95.8%
August	22.4	41.2	4.0	4.8	<2	<2	95.0%
September	28.6	76.5	6.2	13.7	<2	<2	96.8%
October	13.3	37.6	2.0	3.0	<2	<2	90.1%
November	20.7	42.7	4.7	7.7	<2	<2	95.7%
December	39.0	64.8	6.6	8.4	<2	<2	97.0%
Annual Average	27.9	---	6.7	---	<2	---	
Maximum	---	77.0	---	21.1	---	<2	
Annual Average % Removal (by UV/AOP)	97.0%						
Annual Average Log Removal (by UV/AOP)	1.5						

[1] Average of weekly grab samples. For purposes of calculating monthly averages, 10% of the Reporting Limit (RL) was used for all non-detect (ND) values. If all data for the month were ND, then the average is shown as "<RL".

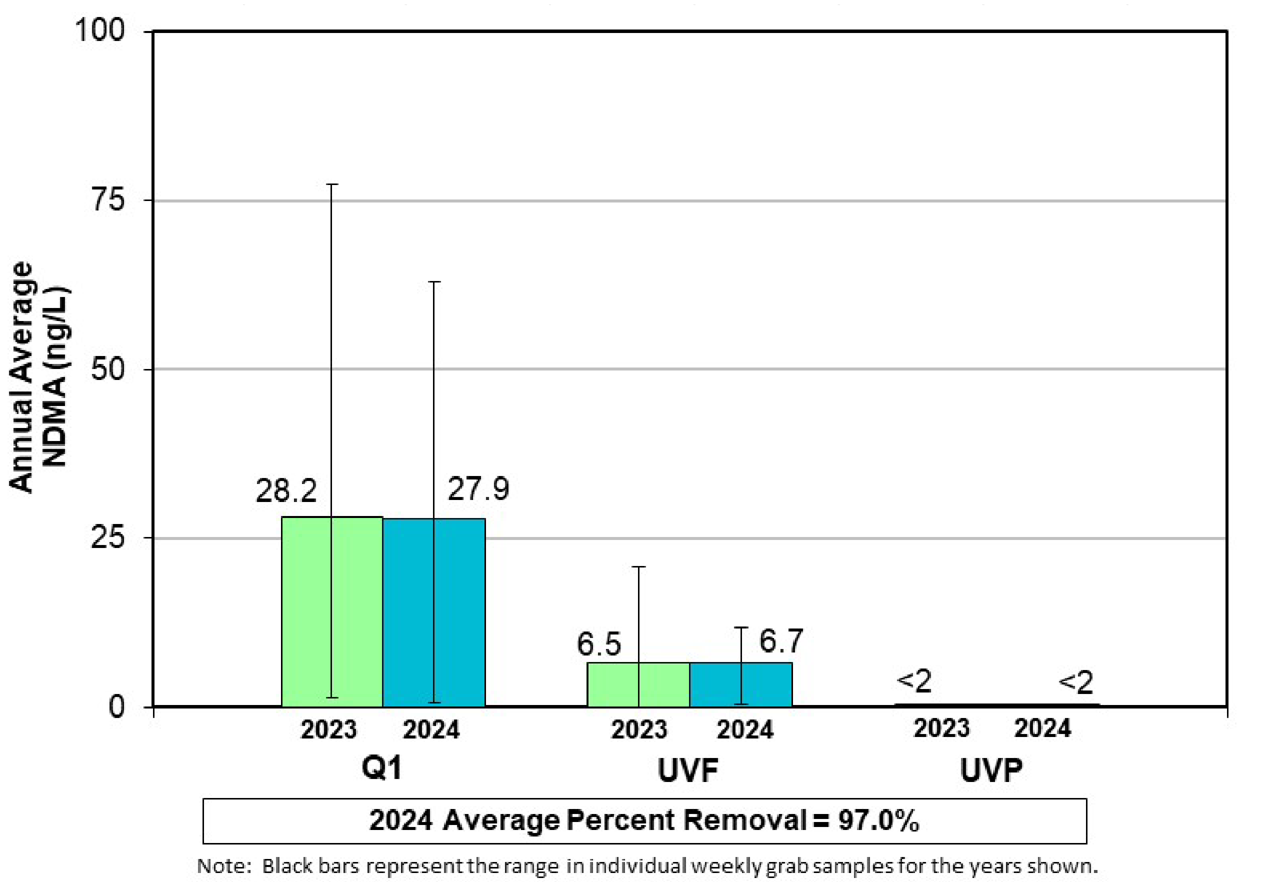


Figure 2-20. 2024 UV/AOP NDMA Removal Performance

precursors. Accordingly, the post-treatment pH target of 8.5 attempts to limit NDMA formation while also managing cement mortar-lined distribution pipeline stability and aquifer metals mobilization. It is also believed that removal of NDMA precursors may be a function of RO membrane age based on historic observations.

2.3.6 Decarbonation and Lime System Operation and Performance

Post-treatment systems include decarbonation and lime addition for pH adjustment and corrosivity control prior to recharging the finished product water. Post-treatment is required to stabilize the ROP stream because excess carbon dioxide builds up through the RO system due to the lower ROF pH. The excess carbon dioxide and removal of alkalinity drives down the pH of the ROP water. To remove excess carbon dioxide, which remains through the closed UV/AOP process, a portion of UVP is sent to forced draft decarbonation towers. These towers are filled with plastic media and the water being treated is trickled down over the media while a counter-current fan blows air onto the water, off-gassing, or releasing the excess carbon dioxide and yielding decarbonated product water (DPW). To ensure that all carbon dioxide is not removed, a portion of the UVP is bypassed around the decarbonation process and then mixed with the DPW. Adjusting the percentage of UVP that is bypassed around the decarbonation process helps to control the FPW pH and alkalinity.

Figure 2-21 shows a decarbonation tower. The total design capacity of the decarbonation system with seven decarbonators is 78 MGD, allowing for part of the UV-disinfected purified water to be treated by the decarbonators and bypassing the remaining flow. Decarbonated water is blended with the bypassed flow prior to lime stabilization in the FPW channel.

Hydrated lime (in the form of calcium hydroxide) addition is the final post-treatment step, adding minerals back into the RO/UV/AOP-treated water in the form of calcium and alkalinity to help stabilize the FPW water, raise pH, and reduce its corrosivity. Figure 2-22 shows a photo of the lime system, which features lime storage silos, slaker mixing tanks, slurry aging tanks, pumps, and saturators that prepare and deliver a saturated lime solution to the FPW channels. The lime system employs gravimetric feeders (based on weight) to control the amount of lime delivered.

A Tekkem lime delivery system began operation in late 2014 replacing the original GWRS lime delivery system. The Tekkem system is gravimetric, meaning that it uses weight to ensure the correct lime slurry concentration is maintained. The lime system consists of several components including: bulk storage of hydrated lime in silos; screw feeders moving dry lime to slaker tanks where it is mixed with water before being transferred; slurry aging tanks with loop pumps that convey slurry to a dosing assembly that feeds the saturators; polymer feed system to control lime particle carryover; and saturators acting as solids contact clarifiers to feed saturated lime solution to the FPW channel. Anionic polymer is added to the saturators as a coagulant aid to reduce lime

Figure 2-21. Decarbonation System

Figure 2-22. Lime Post-Treatment System

particle carryover. Lime sludge is pumped to OC San's Ellis Avenue Interplant Sewer and conveyed to Plant 2 for treatment and disposal.

During 2024, OCWD continued to optimize flow patterns through the decarbonation towers and RO flush supply tanks to stabilize the DPW prior to introducing DPW to the lime stabilization process. Operation of the lime saturators is enhanced by using fully decarbonated DPW because decarbonation expels carbon dioxide which can cause excess calcium carbonate precipitation in the saturators. One RO flush supply tank (A01) receives fully decarbonated DPW and supplies DPW to the RO flush pumps, dilution water for hydrogen peroxide, and dilution water for all lime processes (slurry production, polymer dilution, and saturator dilution). The other RO flush supply tank (A02) receives a blend of decarbonated and bypassed flow. The RO flush tanks discharge to segregated, parallel FPW channels where their respective amounts of lime saturated water are added and mixed. These streams are then blended in the common FPW channel.

The decarbonation bypass flow rate is adjusted for continuous management of the FPW pH (i.e., more bypass decreases the FPW pH; less bypass increases the FPW pH). The lime dose is also reduced to control high FPW pH periods when the decarbonation bypass flow rate cannot be further decreased. The partially decarbonated bypass flow (from RO flush tank A02) is the primary variable used to maintain FPW pH stability; most of the lime-saturated water is added to the partially decarbonated bypass stream under normal operating conditions.

Adjustments to the ROP/decarbonation bypass flow were made from time to time during 2024 by changing the decarbonation tower feed valve settings; the purpose of these adjustments was to limit back pressure on the UV and RO processes while maintaining the FPW pH near the target pH of 8.5. The decarbonation bypass monthly average flow ranged from 65% to 90% of the AWPF production during 2024. The decarbonator feed valves were automatically adjusted to as low as 35% open in response to changes in AWPF production flows designated in the PCS by Operations; for example, 2024 FPW production was reduced due to heavy rains (March) and lack of P2 TF/SC effluent source water availability resulting from OC San's operational issues and construction projects (February-April, May-October, and October-November; see Section 2.1.1). Adjustments to the decarbonator feed valves' settings in response to the AWPF production flows helps control FPW pH near the 8.5 target and balance backpressure on the RO process.

As discussed in Section 2.2.2.3, the decarbonation towers were disinfected with free chlorine in November 2024 to correct and eliminate FPW total coliform detections attributable to variations in AWPF source water flow and quality.

The lime dose was frequently below the normal operational 26 mg/L target in 2024 in response to reduced production. The lime dose varied to as low as 16 mg/L to maintain a stable FPW pH at lower production rates. The FPW pH was maintained between 6.8 and 8.7 based on grab samples, with an average of 8.0 in 2024. The daily average continuous on-line FPW pH ranged from 7.21 in March to 8.55 in August, with an average of 8.25 in 2024.

One of the three lime saturators (C) was off-line from mid-December 2023 to mid-March 2024 due to an oil leak from the mixer motor. The AWPF production capacity was limited to 115 MGD until a new gearbox was installed.

2.3.7 Purified Recycled Water Pumping Operation and Performance

Purified recycled water, or FPW, is conveyed by the Barrier Pump Station to the Talbert Barrier and by the Product Water Pump Station to K-M-M-L Basins, MBI Project, and non-potable uses. The Barrier Pump Station features four 600-horsepower pumps discharging FPW to the Talbert Barrier injection wells. The Product Water Pump Station features five 2,250-horsepower pumps discharging FPW to K-M-M-L Basins via the 13-mile GWRS Pipeline. Laterals from the GWRS Pipeline convey purified recycled water to the MBI Project and two non-potable water customers, Anaheim CPP and ARTIC. A third non-potable water customer, Anaheim Adventure Park, is located at Miraloma Basin. Both pump stations are housed in the building shown on Figure 2-23. Purified recycled water flows discharged to the Talbert Barrier, K-M-M-L Basins, MBI Project, Anaheim CPP, and ARTIC are metered, totalized, and recorded.

The Product Water Pump Station and GWRS Pipeline performed well during 2024, handling a range of FPW flows (See Section 2.1).

Figure 2-23. Barrier and Product Water Pump Stations

2.4 Santa Ana River Discharges

The AWPF did not discharge to the Santa Ana River to provide peak flow relief for OC San at any time during 2024. The emergency peak flow/rain event system was last tested in January 2021, when the AWPF discharged all treated water to the OC San 66-inch diameter Interplant Line, which conveyed it to the OC San ocean outfall. No purified recycled water was produced for recharge during the 2021 test.

Discharges to the Santa Ana River are covered by a separate permit, RWQCB Order No. R8-2022-0002 NPDES No. CA8000408, entitled *"Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the Orange County Water District Groundwater Replenishment System Advanced Water Treatment Facility Emergency Discharge to Reach 1 of the Santa Ana River,"* which was adopted by the RWQCB on March 18, 2022 (RWQCB, 2022b).

After completion of the GWRSIE in 2015, the AWPF could produce up to 100 MGD of purified recycled water. With completion of the GWRSFE in 2022, the AWPF can produce up to 130 MGD of purified recycled water. Thus, it is feasible for the AWPF to continue normal purified recycled water production and provide at least 100 MGD of emergency peak flow relief for the OC San ocean outfall without having to discharge to the Santa Ana River. The maximum daily purified recycled water production by the AWPF reached 120.3 MGD in mid-November 2024.

2.5 Non-Potable Water Quality

A small portion of GWRS purified recycled water is used for non-potable use and supplied to three customers as described earlier in this section: Anaheim CPP, ARTIC, and Anaheim Adventure Park. The requirements for non-potable uses are incorporated into the RWQCB Order No. R8-2022-0050 (RWQCB, 2022a). The purified recycled water complied with the requirements for non-potable water use set forth in the GWRS permit during 2024. Section 2.2 and Appendix A present the GWRS purified recycled water quality during 2024 including the constituents monitored for non-potable water use.

2.6 Anticipated Changes

The OC San Plant 2 reclaimable secondary effluent (P2 TF/SC effluent) has higher salinity than Plant 1 secondary effluent (P1 AS1, P1 AS2, and P1 TF). While forecasted TDS concentrations of the P2 TF/SC effluent TDS were higher than those of P1 AS1, AS2, and TF effluents, the actual values are greater than expected. OCWD is working with OC San and the City of Newport Beach to evaluate options and implement wastewater collection system improvements to manage the salinity of source water from Plant 2.

OCWD may secure a future RWQCB permit to recharge purified recycled water at additional sites, including those described in the GWRS Title 22 Engineering Report (OCWD and DDB Engineering, Inc., 2021) and OOP (OCWD and DDB Engineering, Inc., 2022):

- Burris-Riverview Spreading Basins, which will be supplied via a new turnout from the GWRS Pipeline in Anaheim. Plans for the new turnout are underway;
- Santiago System, which consists of Blue Diamond and Bond Spreading Basins and the local Santiago Creek streambed above Hart Park in the City of Orange;
- Lower Santa Ana River, from Carbon Creek Diversion near K-M-M-L Basins to River View Golf Course/West 19th Street in Anaheim; and
- Lower Santiago Creek, from Hart Park in Orange to the creek's confluence with the Santa Ana River in Santa Ana.

3. TALBERT BARRIER OPERATIONS

Talbert Barrier operations in 2024 focused on optimizing injection of the purified recycled water supply both for preventing seawater intrusion and replenishing the Basin. Operation of the barrier injection facilities, which are located as shown on Figure 3-1, is presented in this section:

- Barrier injection facilities;
- Injection water sources;
- Injection water volumes; and
- Barrier operations.

3.1 Barrier Injection Facilities

Table 3-1 lists the Talbert Barrier injection wells with their associated aquifers and injection depths. Sites OCWD-I1 through OCWD-I23 feature nested injection wells with up to four individual casings in one 30-inch borehole, each injecting into a different aquifer. These legacy injection wells are nested as schematically illustrated on Figure 3-2. Site OCWD-I24 is a modern nested injection well. Modern well sites OCWD-I25 and OCWD-I33 through OCWD-I36 are single point wells. Modern injection well sites OCWD-I26 through OCWD-I32 feature clustered injection wells with up to three individual, single-point wells at each site that are spaced approximately 20 feet apart. Figure 3-3 schematically illustrates these newer cluster-type injection well sites.

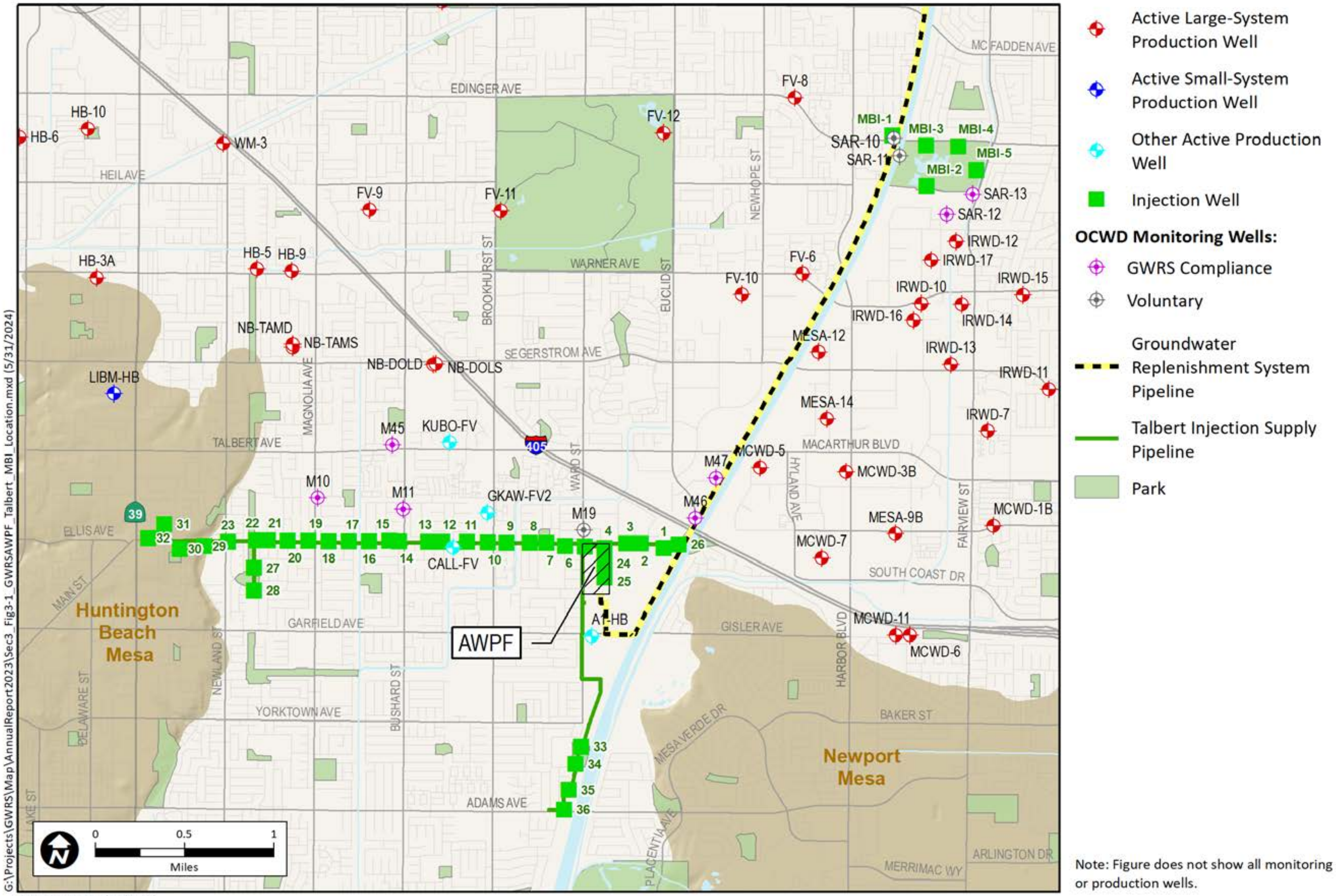
Eight of the modern injection well sites (OCWD-I24 and OCWD-I26 through OCWD-I32) each have a deeper Main aquifer injection zone primarily for replenishing the Basin, in addition to injection zones in shallower aquifers susceptible to seawater intrusion. Modern cluster-type injection well OCWD-I26 is pictured on Figure 3-4.

3.2 Injection Water Sources

The first two types of water listed below were injected at the Talbert Barrier during 2024. The third source listed was available but not used.

1. Purified recycled water produced by the AWPF;
2. Fountain Valley (FV) potable water comprised of a blend of groundwater and imported water; and
3. Imported potable water from the MWD OC-44 turnout delivered via the City of Huntington Beach was not used in 2024.

The injection supply was predominantly GWRS purified recycled water conveyed to the injection wells from the AWPF by the barrier pump station and pipeline. A negligible volume of FV potable water was used periodically during AWPF shutdowns in 2024, which are detailed in Appendix F.



SOURCE: OCWD (03/2023)

Figure 3-1. Talbert Barrier Well Locations

Table 3-1. Talbert Barrier Injection Well Design Criteria

<table>
<tr><th colspan="7">Aquifers and Perforated Intervals at Talbert Barrier</th></tr>
<tr><th rowspan="2">Injection Well No.</th><th rowspan="2">No. of Casings</th><th colspan="5">Aquifers and Perforated Interval Depth in feet below ground surface (ft bgs)</th></tr>
<tr><th>Talbert</th><th>Alpha</th><th>Beta</th><th>Lambda</th><th>Main</th></tr>
<tr><td>OCWD-I1</td><td>4</td><td>65-100</td><td>150-200</td><td>235-350</td><td>365-400</td><td>---</td></tr>
<tr><td>OCWD-I2</td><td>4</td><td>64-96</td><td>147-210</td><td>225-325</td><td>350-390</td><td>---</td></tr>
<tr><td>OCWD-I3</td><td>4</td><td>65-96</td><td>145-200</td><td>225-325</td><td>340-380</td><td>---</td></tr>
<tr><td>OCWD-I4</td><td>4</td><td>65-95</td><td>120-190</td><td>215-310</td><td>330-355</td><td>---</td></tr>
<tr><td>OCWD-I5</td><td>4</td><td>70-90</td><td>115-180</td><td>210-265</td><td>320-245</td><td>---</td></tr>
<tr><td>OCWD-I6</td><td>4</td><td>70-100</td><td>120-175</td><td>195-250</td><td>315-335</td><td>---</td></tr>
<tr><td>OCWD-I7</td><td>4</td><td>70-95</td><td>110-150</td><td>165-250</td><td>315-336</td><td>---</td></tr>
<tr><td>OCWD-I8</td><td>4</td><td>60-95</td><td>110-165</td><td>180-240</td><td>300-325</td><td>---</td></tr>
<tr><td>OCWD-I9</td><td>4</td><td>65-90</td><td>110-150</td><td>175-235</td><td>300-330</td><td>---</td></tr>
<tr><td>OCWD-I10</td><td>4</td><td>60-90</td><td>105-185</td><td>205-290</td><td>305-330</td><td>---</td></tr>
<tr><td>OCWD-I11</td><td>3</td><td>65-95</td><td>115-180</td><td>200-225</td><td>---</td><td>---</td></tr>
<tr><td>OCWD-I12</td><td>4</td><td>60-95</td><td>110-165</td><td>180-260</td><td>290-310</td><td>---</td></tr>
<tr><td>OCWD-I13</td><td>4</td><td>77-100</td><td>120-160</td><td>175-250</td><td>280-305</td><td>---</td></tr>
<tr><td>OCWD-I14</td><td>4</td><td>70-95</td><td>115-150</td><td>175-250</td><td>265-300</td><td>---</td></tr>
<tr><td>OCWD-I15</td><td>4</td><td>70-93</td><td>115-145</td><td>70-235</td><td>262-285</td><td>---</td></tr>
<tr><td>OCWD-I16</td><td>3</td><td>63-120</td><td>---</td><td>145-210</td><td>245-285</td><td>---</td></tr>
<tr><td>OCWD-I17</td><td>3</td><td>62-130</td><td>---</td><td>150-215</td><td>250-275</td><td>---</td></tr>
<tr><td>OCWD-I18</td><td>3</td><td>57-125</td><td>---</td><td>150-210</td><td>260-275</td><td>---</td></tr>
<tr><td>OCWD-I19</td><td>3</td><td>57-127</td><td>---</td><td>145-200</td><td>235-270</td><td>---</td></tr>
<tr><td>OCWD-I20</td><td>3</td><td>90-125</td><td>---</td><td>140-170</td><td>230-250</td><td>---</td></tr>
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<tr><td>OCWD-I23</td><td>2</td><td>70-155</td><td>---</td><td>---</td><td>215-252</td><td>---</td></tr>
<tr><td>OCWD-I24</td><td>2</td><td>---</td><td colspan="3">120-330</td><td>420-605</td></tr>
<tr><td>OCWD-I25</td><td>1</td><td>---</td><td colspan="3">120-320</td><td>---</td></tr>
<tr><td>OCWD-I26</td><td>3</td><td colspan="2">56-195</td><td colspan="2">271-400</td><td>476-660</td></tr>
<tr><td>OCWD-I27</td><td>3</td><td colspan="2">78-148</td><td colspan="2">210-260</td><td>355-420</td></tr>
<tr><td>OCWD-I28</td><td>3</td><td colspan="2">80-140</td><td colspan="2">185-235</td><td>360-460</td></tr>
<tr><td>OCWD-I29</td><td>3</td><td>---</td><td>90-120</td><td colspan="2">200-250</td><td>365-475</td></tr>
<tr><td>OCWD-I30</td><td>3</td><td>---</td><td>95-160</td><td colspan="2">230-295</td><td>425-650</td></tr>
<tr><td>OCWD-I31</td><td>3</td><td>---</td><td>90-165</td><td colspan="2">235-295</td><td>440-590</td></tr>
<tr><td>OCWD-I32</td><td>3</td><td>---</td><td>90-155</td><td colspan="2">226-295</td><td>425-670</td></tr>
<tr><td>OCWD-I33</td><td>1</td><td>61-156</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
<tr><td>OCWD-I34</td><td>1</td><td>60-135</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
<tr><td>OCWD-I35</td><td>1</td><td>60-115</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
<tr><td>OCWD-I36</td><td>1</td><td>60-110</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
</table>

[1] OCWD-I33 through OCWD-I36 each has one casing perforated in the merged Talbert/Beta/Lambda Aquifers

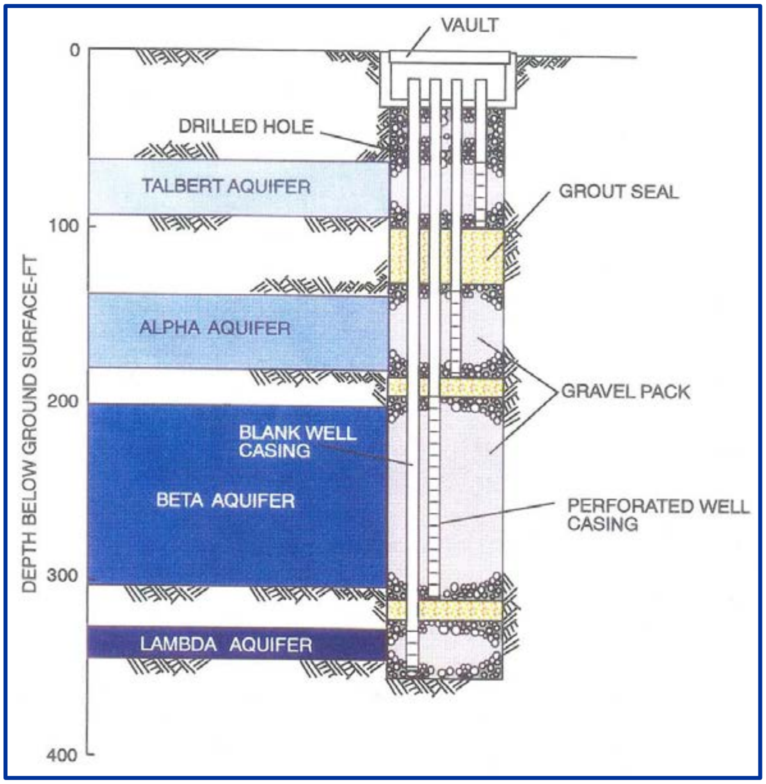


Figure 3-2. Typical Legacy Nested Injection Well

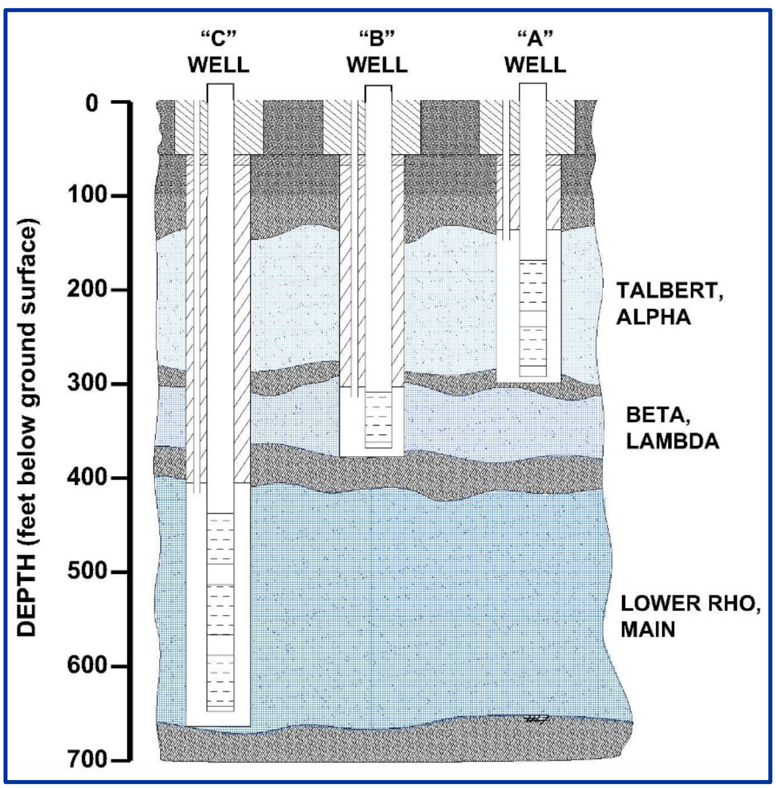


Figure 3-3. Typical Modern Cluster-Type Injection Well

Figure 3-4. Modern Injection Well Site OCWD-I26

Both OC-44 and FV potable water are drinking water supplies approved by DDW.

A limited volume of FV potable water was used on 15 days in 2024 to pressurize the barrier pipeline and to maintain a small injection flow into selected wells for operational purposes during AWPF shutdowns. During 2024, FV potable water was used preferentially for this purpose over OC-44 imported water due to its lower cost.

3.3 Injection Water Volumes and Flow Rates

The volume of water injected at the Talbert Barrier in 2024 is presented below and compared with historical barrier injection.

3.3.1 2024 Injection Water Volumes and Flow Rates

The total annual average daily flow rate of all sources (purified recycled water and FV potable water) injected at the Talbert Barrier in 2024 was 15.22 MGD (including periods of low or no injection during AWPF shutdowns). On a volumetric basis, a total volume of approximately 5,569 MG (17,091 AF) of purified recycled water and FV potable water was injected at the Talbert Barrier during 2024.

Figure 3-5 illustrates the volumes and average daily flow rates of each of the water sources injected at the Talbert Barrier during 2024. As noted above, essentially all barrier injection was GWRS purified recycled water (approximately 15.20 MGD on average (rounded to 5,562 MG or

17,069 AF). Only 0.02 MGD on average (rounded to 7.3 MG or 22.5 AF) of FV potable water was injected at the barrier during 2024.

Table 3-2 summarizes the 2024 monthly average daily flow rates and volumes of purified recycled water and potable water injected at the barrier. As discussed above, potable water was used when the AWPF was temporarily off-line due to brief shutdowns to keep the barrier pipeline pressurized and maintain a small injection flow into selected wells until purified recycled water production resumed.

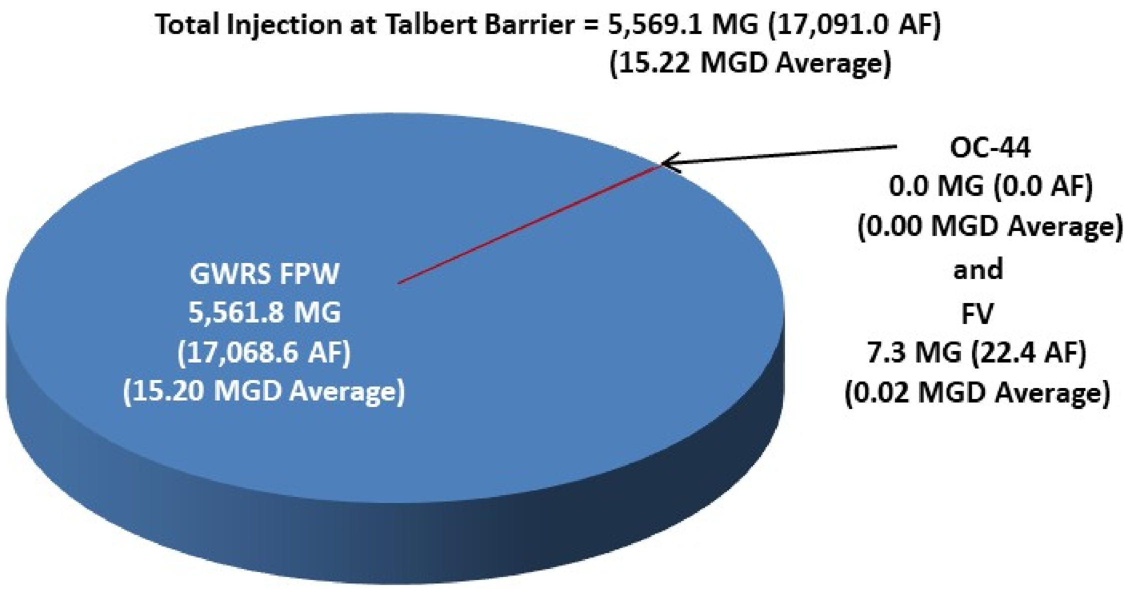


Figure 3-5. 2024 Talbert Barrier Injection Water Sources: Volumes and Average Flow Rates

Table 3-2. 2024 Monthly Injection Water Quantity at Talbert Barrier

Month	GWRS FPW		OC-44		FV		Total Injection Flow Rate and Volume			
	(Avg. MGD)	(MG)	(Avg. MGD)	(MG)	(Avg. MGD)	(MG)	(Avg. MGD)	(MG)	(AF)	(m^3)
January	13.97	433.09	0.00	0.00	0.00	0.00	13.97	433.09	1,329.12	1,639,440
February	11.89	344.74	0.00	0.00	0.00	0.00	11.89	344.74	1,057.96	1,304,975
March	10.28	318.74	0.00	0.00	0.05	1.44	10.33	320.17	982.58	1,211,994
April	12.24	367.21	0.00	0.00	0.00	0.09	12.24	367.30	1,127.19	1,390,366
May	12.76	395.71	0.00	0.00	0.07	2.31	12.84	398.02	1,221.49	1,506,685
June	15.60	468.11	0.00	0.00	0.01	0.23	15.61	468.34	1,437.28	1,772,853
July	17.30	536.45	0.00	0.00	0.00	0.00	17.30	536.45	1,646.32	2,030,701
August	17.60	545.47	0.00	0.00	0.01	0.20	17.60	545.67	1,674.60	2,065,587
September	18.21	546.35	0.00	0.00	0.00	0.00	18.21	546.35	1,676.68	2,068,146
October	18.16	562.94	0.00	0.00	0.00	0.00	18.16	562.94	1,727.60	2,130,954
November	17.08	512.47	0.00	0.00	0.10	3.05	17.18	515.52	1,582.09	1,951,468
December	17.11	530.53	0.00	0.00	0.00	0.00	17.11	530.53	1,628.13	2,008,261
Total	**15.20**	**5,561.79**	**0.00**	**0.00**	**0.02**	**7.32**	**15.22**	**5,569.11**	**17,091.04**	**21,081,430**

Abbreviations:

GWRS FPW	Groundwater Replenishment System Finished Product Water (Purified Recycled Water)
OC-44	MWD Turnout OC-44 via Huntington Beach (Imported Potable Water)
FV	City of Fountain Valley (Potable Water - groundwater and imported water)
MGD	Million Gallons per Day shown as an average (avg.) flow rate
MG	Million Gallons
AF	Acre-feet
m^3	Cubic Meters

3.3.2 Historical Injection Water Quantity

OCWD has operated the Talbert Barrier, injecting recycled water and potable water, since 1976. OCWD has historically injected water from six sources at the Talbert Barrier. Recycled water produced by WF-21, IWF-21, and the GWRS AWPF has been injected at the barrier. Diluents injected at the barrier have included (1) groundwater from OCWD deep wells, (2) potable blend of groundwater and imported water from the City of Fountain Valley, and (3) imported potable water from the MWD OC-44 turnout.

Table 3-3 and Figure 3-6 summarize the annual volumes of water from the six available sources that have been injected at the Talbert Barrier since the OCWD water reclamation projects began operation. In the 17 years since GWRS has been in operation, the average total injection at the Talbert Barrier has been approximately 27,606 AFY, with the annual total injection volumes ranging from a low of 17,091 AF in 2024 to a high of 38,531 AF in 2010. Maintaining groundwater elevations at or slightly above protective levels drives the demand for injection water at the Talbert Barrier, and these demands can vary seasonally and annually based on both the Basin accumulated overdraft condition and local groundwater pumping demands. Overall, the annual injection volumes from 2008 through 2024 have been significantly greater than pre-GWRS injection volumes.

The injection wells were supplied with high quality recycled water by WF-21 from 1976 to 2004. WF-21 recycled water that was treated with GAC, but not RO, is referred to as AWT water. AWT water was injected from 1976 to 2000. A portion of the WF-21 water was treated with RO from 1977 until 2000, after which time all WF-21 water was treated with RO until 2004. This WF-21 RO product water was also injected from 1977 through 2004. Purified recycled water from IWF-21 received 100% RO treatment and was injected at the Talbert Barrier from 2004 to 2006. Injection of GWRS purified recycled water began in January 2008. Additional specific treatment processes of these water reclamation facilities are described in detail in Section 1.3.

Table 3-3. Historical Injection Water Quantity at Talbert Barrier

Year	Injection Quantity								Q-10[1] or GWRS Average Quality[4] (mg/L)		OC-44[2] Average Quality[4,8] (mg/L)		FV[3] Average Quality[4,8] (mg/L)		Total Flow-Weighted Average Quality[4] (mg/L)	
	AWT (MG)	RO (MG)	GWRS (MG)	Well (MG)	FV (MG)	OC-44 (MG)	Total (MG)	Total (AF)	Cl^-	TDS	Cl^-	TDS	Cl^-	TDS	Cl^-	TDS
1976	290.15	0.00		542.80			832.95	2,556.06								
1977	1,192.30	235.30		2,875.30			4,302.90	13,204.25	80	415					80	415
1978	1,760.60	1,368.20		1,575.40			4,704.20	14,435.71	103	442					103	442
1979	1,695.20	1,338.50		1,487.00			4,520.70	13,872.61	78	400					78	400
1980	258.50	1,311.00		1,054.30			2,623.80	8,051.62	57	231					57	231
1981	90.60	1,107.30		1,344.30			2,542.20	7,801.21	50	204					50	204
1982	4.60	1,179.90		1,166.90			2,351.40	7,215.71	47	174					47	174
1983	0.00	1,220.56		1,173.21			2,393.77	7,345.73	37	154					37	154
1984	231.71	313.22		488.40			1,033.33	3,170.97	79	339					79	339
1985	476.18	568.12		577.26			1,621.56	4,976.06	103	389					103	389
1986	630.73	519.38		772.42			1,922.53	5,899.64	102	379					102	379
1987	408.50	469.46		590.04			1,468.00	4,504.83	93	366					93	366
1988	968.37	1,187.03		1,213.41			3,368.81	10,337.82	89	319					89	319
1989	949.27	1,098.75		1,814.02			3,862.04	11,851.39	87	342					87	342
1990	785.13	1,267.19		1,837.44			3,889.76	11,936.45	90	320					90	320
1991	1,084.19	1,226.75		2,967.16			5,278.10	16,196.83	109	380					109	380
1992	1,257.92	1,338.84		2,413.57			5,010.33	15,375.13	89	336					89	336
1993	860.11	1,494.87		2,026.14			4,381.12	13,444.28	85	328					85	328
1994	157.31	947.22		896.85			2,001.38	6,141.61	50	248					50	248
1995	203.47	655.98		740.20			1,599.65	4,908.82	49	243					49	243
1996	56.73	741.22		521.84			1,319.79	4,050.02	26	151					26	151
1997	16.40	690.27		545.54			1,252.21	3,842.64	22	129					22	129
1998	5.44	776.08		578.51			1,360.03	4,173.51	23	127					23	127
1999	450.08	1,327.24		1,191.98			2,969.30	9,111.85	57	239					57	239
2000	207.50	771.75		1,863.75			2,843.00	8,724.27	37	233					37	233
2001		1,071.62		2,166.06	1,350.83		4,588.51	14,080.70	33	252					33	252
2002		1,367.55		1,180.56	1,576.61		4,124.72	12,657.47	34	226					34	226
2003		1,053.38		751.59	1,591.85	33.73	3,430.55	10,527.28	38	237	98	374			39	238
2004[5]		935.30		421.22	1,321.64	2,559.46	5,237.62	16,072.61	32	230	93	390			62	308
2005		1,238.02		4.84	953.44	2,703.43	4,899.73	15,035.73	24	177	78	464			54	336
2006[6]		663.01			551.37	1,658.75	2,873.13	8,816.73	19	127	67	386			47	276
2007					0.00	2,245.52	2,245.52	6,890.80			89	474			89	474
2008[7]			7,247.08		0.00	1,712.25	8,959.33	27,493.37	4	40	97	560			21	140
2009			11,011.23		0.00	55.21	11,066.44	33,959.43	5	46	97	653			5	49
2010			12,465.25		0.00	44.62	12,509.86	38,393.98	4	43	89	532			5	45
2011			8,384.84		0.15	2.27	8,387.26	25,741.30	5	43	83	539	54	391	5	44
2012			7,978.15		0.09	0.97	7,979.21	24,488.96	7	45	83	479	67	410	7	45
2013			9,804.46		0.00	1.83	9,806.30	30,096.46	7	50	84	559			7	50
2014[8]			10,734.25		0.00	2.46	10,736.71	32,949.80	7	54	na	na			7	54
2015			11,820.22		0.00	5.52	11,825.74	36,291.90	11	64	na	na			11	64
2016			11,288.83		0.36	2.39	11,291.58	34,652.64	7	57	na	na	na	na	7	57
2017			8,554.73		0.00	5.06	8,559.78	26,269.04	5	50	na	na			5	50
2018			8,096.61		0.00	7.38	8,103.99	24,870.25	5	53	na	na	na	na	5	53
2019			8,613.03		0.13	1.83	8,614.98	26,438.44	5	49	na	na	na	na	5	49
2020			7,865.47		0.45	5.12	7,871.05	24,155.33	6	55	na	na	na	na	6	55
2021			8,374.46		0.59	2.27	8,377.32	25,709.01	5	50	na	na	na	na	5	50
2022			7,395.48		7.06	1.21	7,403.74	22,721.22	7	53	na	na	na	na	7	53
2023			5,853.23		4.73	0.12	5,858.07	17,977.73	9	57	na	na	na	na	9	57
2024			5,561.79		7.32	0.00	5,569.11	17,090.95	4	47	na	na	na	na	4	47
TOTALS	**14,040.99**	**29,483.01**	**151,049.10**	**36,782.01**	**7,366.61**	**11,051.38**	**249,773.10**	**766,510.18**								

Abbreviations:

- AWT - Granular Activated Carbon Effluent disinfected using chlorine (Recycled Water) at Water Factory 21
- RO - Reverse Osmosis Effluent disinfected using chlorine prior to March 2001 at Water Factory 21 and using UV/AOP from March 2001 until August 2006 (Recycled Water) at Interim Water Factory 21
- GWRS - Groundwater Replenishment System Finished Product Water (Purified Recycled Water)
- Well - Deep Well Water (Colored Groundwater)
- FV - City of Fountain Valley Potable (Domestic) Water (groundwater and imported water)
- OC-44 - MWD Turnout OC-44 Potable Imported Water (via City of Huntington Beach and Southeast Barrier Pipeline)
- Cl^- - Chloride
- TDS - Total Dissolved Solids
- mg/L - milligrams per liter
- MG - million gallons
- AF - acre-feet
- na - not analyzed (because blending is no longer required)

Notes:

1 Q-10 water was mixed in the Water Factory 21 and Interim Water Factory 21 blending reservoir from multiple sources prior to injection into the barrier: AWT, RO, Well and FV.

2 OC-44 water is provided directly into the barrier (via backflow prevention and pressure reduction devices).

3 FV water is provided directly into the barrier (via backflow prevention device and a pressure reduction valve).

4 Chloride and TDS concentrations shown for each year are based on a 12-month flow-weighted average of available samples.

5 Water Factory 21 ceased operation on January 15, 2004. Interim Water Factory 21 began operation on June 21, 2004

6 Interim Water Factory 21 ceased operation on August 8, 2006.

7 GWRS began operation on January 10, 2008.

8 Blending was not required for Talbert Barrier injection after December 2009. Beginning in December 2009, injection water quality was essentially the same as GWRS water because only limited volumes of OC-44 and FV water were used. OC-44 and FV water quality not analyzed beginning in 2014 because blending no longer required.

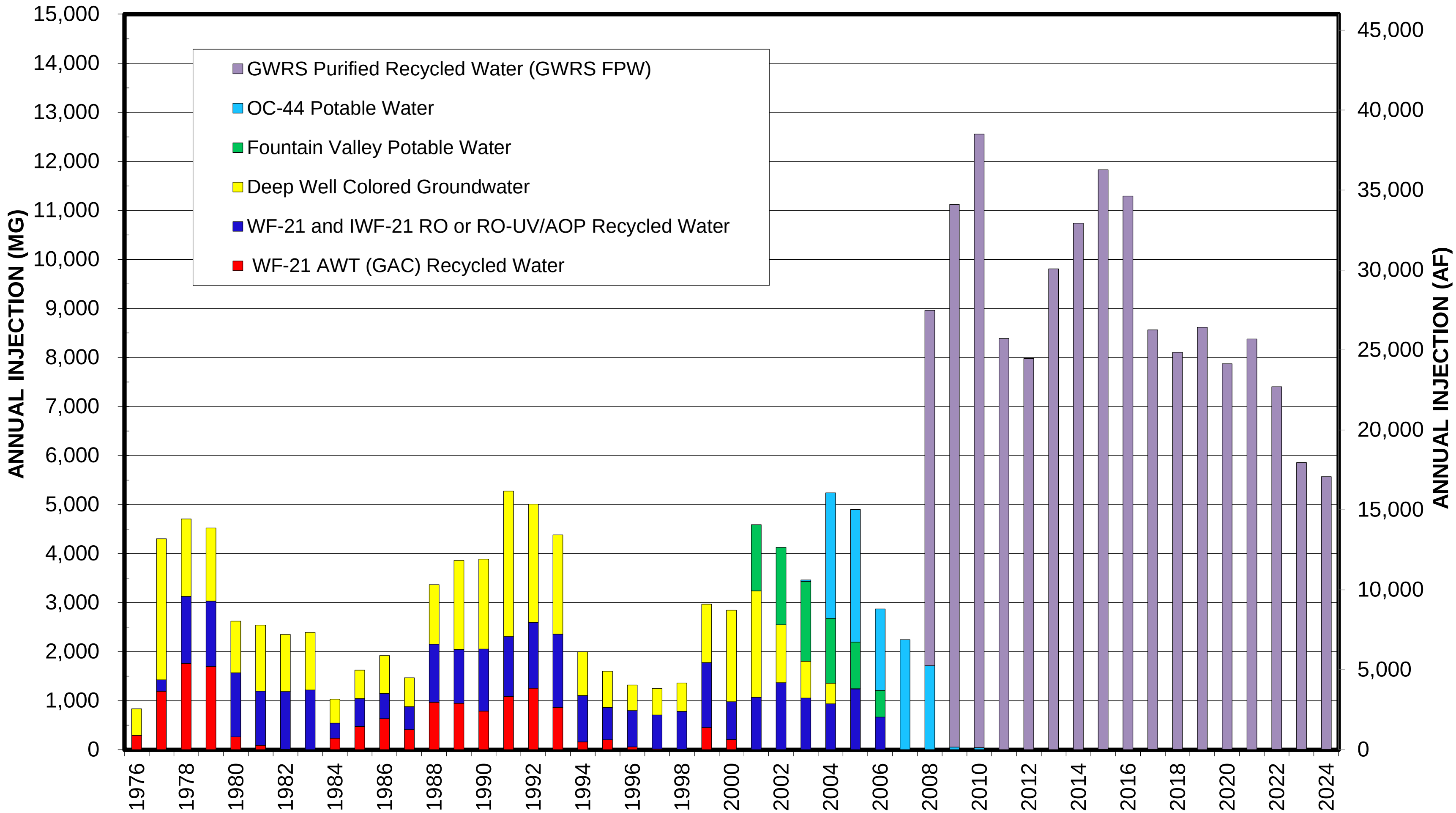


Figure 3-6. Historical Injection Water Quantity at Talbert Barrier

The three diluent water sources that have been historically injected at the barrier are listed below:

1. **Deep Well water** – groundwater that is low in salts but high in color and TOC and produced from deep aquifers that are not susceptible to seawater intrusion; deep well water was injected from 1976 to 2005.

2. **Potable water from the City of Fountain Valley** – variable blend of groundwater and surface imported water that was injected primarily from 2001 to 2006. Since then, small amounts of potable water from the City of Fountain Valley have been sporadically used to maintain pressure in the injection conveyance system and to maintain small injection flow into selected wells for operational purposes when purified recycled water was unavailable during brief periods when the AWPF was off-line. Negligible volumes of this water source (less than 1 MG) were used during 2011, 2012, 2016, and 2019 through 2021. Significantly more (4.73-7.06 MG) City of Fountain Valley potable water was used during 2022 through 2024 because it was less expensive than OC-44 imported water throughout recent years.

3. **Potable water from the MWD OC-44 turnout** – imported water from the MWD OC-44 turnout delivered via the City of Huntington Beach was injected from late 2003 through 2023; no MWD-OC-44 imported water was used in 2024. As shown in Table 3-3, only minor amounts of MWD OC-44 water (less than 8 MG/year) have been used since 2011, primarily for maintaining pressure in the barrier pipeline and for maintaining small injection flow into selected wells for operational purposes during AWPF shutdowns.

3.4 Barrier Operations

Injection of purified recycled water produced by the AWPF began on January 10, 2008. During 2024, AWPF purified recycled water was the primary injection water source, comprising essentially 100% of the water injected. Potable water from the FV connection was used for maintaining a small injection flow during AWPF and BPS shutdowns and pressurizing the barrier distribution system just prior to plant startup after such shutdowns. During calendar year 2024, the FV connection was used periodically on 15 days during or immediately following AWPF or BPS shutdowns, and the MWD OC-44 connection was not used, as discussed in Section 3.2. Since 2009, minimal volumes of potable water have been used, as shown by the small annual totals discussed in Section 3.3.1.

Annual barrier injection in 2024 was 17,091 AF, representing a decrease of 5% from the prior year and the lowest barrier injection since GWRS came on-line in 2008. Injection demand for seawater intrusion control was lower during 2024 due to favorably high groundwater conditions throughout the Basin including in the Talbert Gap area where groundwater levels were effectively maintained at or above protective elevations seaward of the barrier without becoming excessively high or above ground surface.

Figure 3-6 shows that annual barrier injection declined in 2024 for the third consecutive year, following a five-year period of relatively stable injection levels. The 5% decrease from 2023 to 2024 resulted primarily from a second consecutive wet year, which occurred during already high Basin conditions. As a result, groundwater levels continued to rise in the Talbert area and throughout the Basin, resulting in less barrier injection to maintain protective elevations and to prevent excessively high groundwater levels in the coastal area. From June 2023 to June 2024, groundwater levels in the Talbert Barrier area increased approximately 1-2 feet in the Shallow aquifer and up to 15 feet in the Principal aquifer, with Basin-wide groundwater storage increasing by 56,000 AF. The Basin accumulated overdraft was 133,000 AF as of June 30, 2024, representing a high Basin condition just above the District's target overdraft range of 150,000 to 200,000 AF. Throughout 2024, groundwater elevations were maintained slightly above mean sea level seaward of the barrier to protect against seawater intrusion, as further detailed in Section 4.3.

Operation of the barrier was consistent and stable during 2024 due to a constant, reliable AWPF water supply with very low turbidity. As discussed in the previous section, no potable water was used from the MWD OC-44 connection and an insignificant volume of potable water was used on 15 days from the FV connection due to brief AWPF or BPS shutdowns. During 2024, there were three instances of planned AWPF shutdowns for OCWD and OC San Plant 2 construction projects and system testing: March 26-28 (54.7 hours off-line), May 29-30 (36.5 hours off-line), and November 4-7 (60 hours off-line). There were also three instances of unplanned AWPF shutdowns during 2024, all related to unscheduled power outages or other system failures: March 17 (3.5 hours off-line), June 9 (4.45 hours off-line), and August 20 (3.65 hours off-line). FV potable water was used exclusively to pressurize the barrier distribution system during each of the planned and unplanned AWPF shutdowns. For a more detailed description of AWPF shutdowns, see Appendix F.

As shown in Table 3-2 presented earlier, monthly injection flow rates during 2024 ranged from a low daily average flow rate of 10.33 MGD in April to a high daily average flow rate of 18.21 MGD in September, with the highest monthly injection volume occurring in October (562.94 MG or 1,727.60 AF). Typically, the volume of injection required to achieve and maintain protective groundwater elevations is greater in the summer and early fall months when groundwater pumping is greater. This was the case in 2024, with the highest average injection flow rates occurring during August, September, and October.

Injection was maintained at relatively high rates at the on-line injection wells during 2024. Like 2023 however, many injection wells were kept off-line on stand-by for several months or the entire year during 2024 because they were not needed to maintain protective elevations for seawater intrusion control. Taking injection wells off-line for these reasons usually occurs in the winter and early spring months when groundwater levels are typically higher. Such was the case during 2024, but like 2023, several legacy wells were not needed at all and thus remained off-line on stand-by throughout the entire year.

In some years when seasonal injection requirements are relatively high due to low groundwater levels, a few injection wells must be taken off-line during the peak injection summer months because of hydraulic restrictions in the barrier pipeline. Typically, these include I30C, I31C, and I32C, which are used for replenishing the Basin rather than seawater intrusion control and are at a higher ground surface elevation on the Huntington Beach Mesa along the west end of the barrier. Pipeline hydraulic restrictions typically occur at a total Talbert Barrier injection rate of approximately 32 MGD; in 2024 injection rates remained below this threshold, therefore no wells were taken off-line due to hydraulic limitations. When Talbert Barrier injection is reduced due to high groundwater elevations as during 2024, additional GWRS water can generally be pumped up to K-M-M-L Basins for surface recharge and to the five MBI wells to maintain the AWPF operating at or near full capacity to the extent possible. However during portions of February through March of 2024, recharge capacity in the surface recharge facilities was also limited due to spreading basin cleaning and stormwater capture related to heavy seasonal rainfall (Section 2.1).

3.4.1 Seasonal and Vertical Distribution of Injection

For operational reasons related to the hydrogeology of the area, the aquifer zones that receive injection have been grouped into three major categories:

- Shallow Zone: Talbert and Alpha aquifers;
- Intermediate Zone: Beta, Lambda, Omicron, and Upper Rho aquifers; and
- Deep Zone: Lower Rho and Main aquifers.

These aquifers are described in more detail in Section 4 – Groundwater Monitoring at the Talbert Barrier. The shallow and intermediate zones are both susceptible to seawater intrusion. The 23 legacy injection well sites only inject into the shallow and intermediate zones. Most of the modern injection well sites constructed since 2000 inject into all three zones, with deep zone injection being primarily intended for replenishing the Basin rather than for seawater intrusion control. Therefore, injection into the deep zone is a lower priority when surplus injection supply and pipeline capacity are available over and above what is needed for seawater intrusion control in the shallow and intermediate zones. During 2024, 36% of all barrier injection was into the shallow zone, 38% into the intermediate zone, and 26% into the deep zone.

Figure 3-7 displays the 2024 monthly injection quantities grouped by aquifer zone and shows that seasonal trends are attributed primarily to variations in shallow and intermediate zone injection totals, while deep zone injection is more stable month-to-month. The typical seasonal pattern of combined shallow and intermediate zone injection held true for 2024: (1) moderate injection to begin the year and decreasing through the winter and early spring months, (2) steadily increasing in the late spring and peaking in late summer or early fall when temperatures and coastal pumping are at their highest, and (3) declining for the remainder of the year as the weather cools and coastal pumping declines.

Deep zone groundwater elevations are typically lower than in the shallow and intermediate zones, and therefore, deep zone injection rates can often be maintained year-round, even during relatively high Basin conditions. Deep zone injection is primarily governed by Barrier Operations' standard operating procedures, which aim to keep the injection levels below ground surface, except during low Basin years in which pipeline hydraulic restrictions may limit how much injection water can be supplied to the west-end modern wells. These hydraulic constraints typically emerge around 32 MGD of total barrier injection. As shown on Figure 3-7, injection into the deep zone for Basin replenishment remained somewhat constant during 2024, as sufficient pipeline capacity existed throughout the year to supply the lower priority deep zone injection wells due to the lower shallow and intermediate zone injection totals. Deep zone injection totals were reduced relative to other months in March, May, and November due to planned multi-day AWPF shutdowns.

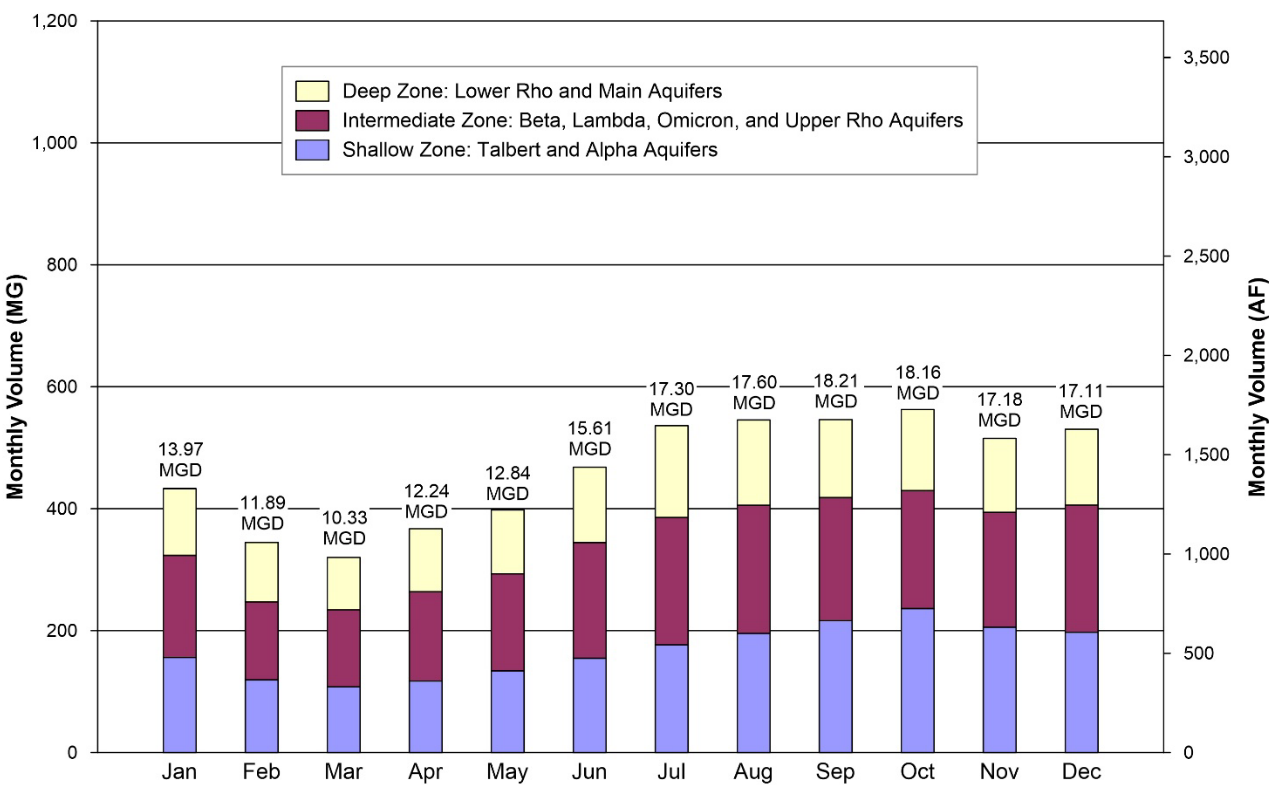


Figure 3-7. 2024 Talbert Barrier Monthly Injection Quantity by Aquifer Zone

3.4.2 Spatial Distribution of Injection along the Barrier

During 2024, injection rates and daily injection volumes at every injection point were measured using the process control system (PCS) that was installed as part of GWRS. Flow was continuously monitored for each injection well so that precise daily and monthly injection volumes were directly obtained for each injection well casing. The monthly volumes for each injection well casing were downloaded to spreadsheets, checked, adjusted slightly to match reported monthly total barrier injection, and uploaded to the OCWD Water Resources Management System (WRMS) database.

Table 3-4 shows the annual volume injected into each of the 36 injection well sites during 2024. Each well site consists of one to four discretely measured injection casings (installed at different depth zones). Table 3-4 is a summary of the total injection at each site grouped into the three different aquifer depth zones that were described above (shallow, intermediate, and deep). The injection volumes in Table 3-4 represent adjusted values. The measured monthly per well casing flow volumes were adjusted so that the sum of all individual wells for each month exactly equals the total barrier injection reported in Table 3-2 for that month (recorded from the AWPF Barrier Pump Station flow meter). For all injection well points, the raw transmitter injection measurements were multiplied by a small correction factor each month to obtain the values shown in Table 3-4. For a given month, all well points were adjusted by the same factor. During 2024, the monthly adjustments ranged from 1.29% to 1.66% and were within expected standards for comparing the Barrier Pump Station flow meter totals with the sum of all individual injection well transmitter readings over the course of each month. To keep the discrepancy acceptably small, OCWD staff frequently run diagnostic checks on flow meters and transmitters and re-calibrate them as necessary.

Table 3-4. 2024 Injection Quantity at Talbert Barrier Well Sites

	Well Site	Shallow Zone [1] (AF)	Intermediate Zone [2] (AF)	Deep Zone [3] (AF)	Total [4] (AF)	Total [4] (MG)
West	I32	832.11	607.50	653.34	2,092.95	681.99
	I31	572.94	976.67	771.49	2,321.10	756.33
	I30	761.79	1,072.66	1,069.04	2,903.49	946.11
	I29	90.15	434.61	408.81	933.57	304.20
	I23	0.00	0.00	–	0.00	0.00
	I28	242.89	282.15	487.05	1,012.09	329.79
	I27	242.90	419.24	475.43	1,137.58	370.68
	I22	0.00	0.00	–	0.00	0.00
	I21	–	64.49	–	64.49	21.01
	I20	143.67	227.77	–	371.44	121.03
	I19	–	0.00	–	0.00	0.00
	I18	0.00	0.00	–	0.00	0.00
	I17	109.26	124.31	–	233.57	76.11
	I16	0.00	0.00	–	0.00	0.00
	I15	0.00	0.00	–	0.00	0.00
	I14	113.03	19.12	–	132.15	43.06
	I13	200.40	157.96	–	358.36	116.77
	I12	276.30	145.80	–	422.10	137.54
	I11	405.86	83.33	–	489.18	159.40
	I10	0.00	0.00	–	0.00	0.00
	I9	0.00	0.00	–	0.00	0.00
	I8	0.00	0.00	–	0.00	0.00
	I7	646.30	220.61	–	866.91	282.48
	I6	0.00	0.00	–	0.00	0.00
	I5	139.08	244.94	–	384.02	125.13
	I25	–	0.00	–	0.00	0.00
	I24	–	0.00	0.00	0.00	0.00
	I4	281.72	623.18	–	904.90	294.86
	I3	0.00	0.00	–	0.00	0.00
	I2	0.00	46.98	–	46.98	15.31
	I1	212.10	219.04	–	431.14	140.49
East	I26	577.07	564.10	498.56	1,639.73	534.31
Southeast Barrier	I33	64.42	–	–	64.42	20.99
Southeast Barrier	I34	47.14	–	–	47.14	15.36
Southeast Barrier	I35	130.42	–	–	130.42	42.50
Southeast Barrier	I36	103.33	–	–	103.33	33.67
	Total:	6,192.88	6,534.45	4,363.72	17,091.05	5,569.13
	Percent:	36.23%	38.23%	25.53%		

1. Shallow Zone: Talbert and Alpha aquifers.
2. Intermediate Zone: Beta, Lambda, Omicron, and Upper Rho aquifers.
3. Deep Zone: Lower Rho and Main aquifers
4. Per well injection totals above represent adjusted values (by month) to reconcile with the reported total barrier injection in Table 3-2.

AF: Acre-feet: MG: Million Gallons: –: Well not screened to iniect into this zone.

Figure 3-8 graphically depicts the annual volume injected into each of the 36 injection well sites during 2024. The injection volumes are divided into the same three depth zones described above: shallow, intermediate, and deep. The 36 well sites on Figure 3-8 are generally ordered geographically from west to east (left to right) on the bar graph (rather than by well number) to give a visual sense of how the injection is spatially distributed along the barrier alignment. Notice the large annual injection amounts for the west-end modern well sites I27, I28, I30, I31, and I32, as is characteristic every year. Injection well site I29 had slightly lower injection relative to the other west-end modern wells because I29A was on stand-by for most of the year since it was not needed to maintain groundwater levels above protective elevations and to avoid groundwater levels from becoming unnecessarily elevated in the low-lying area farther to the west near Huntington Lake. Additionally, I29A was off-line for electrical repairs in August and September.

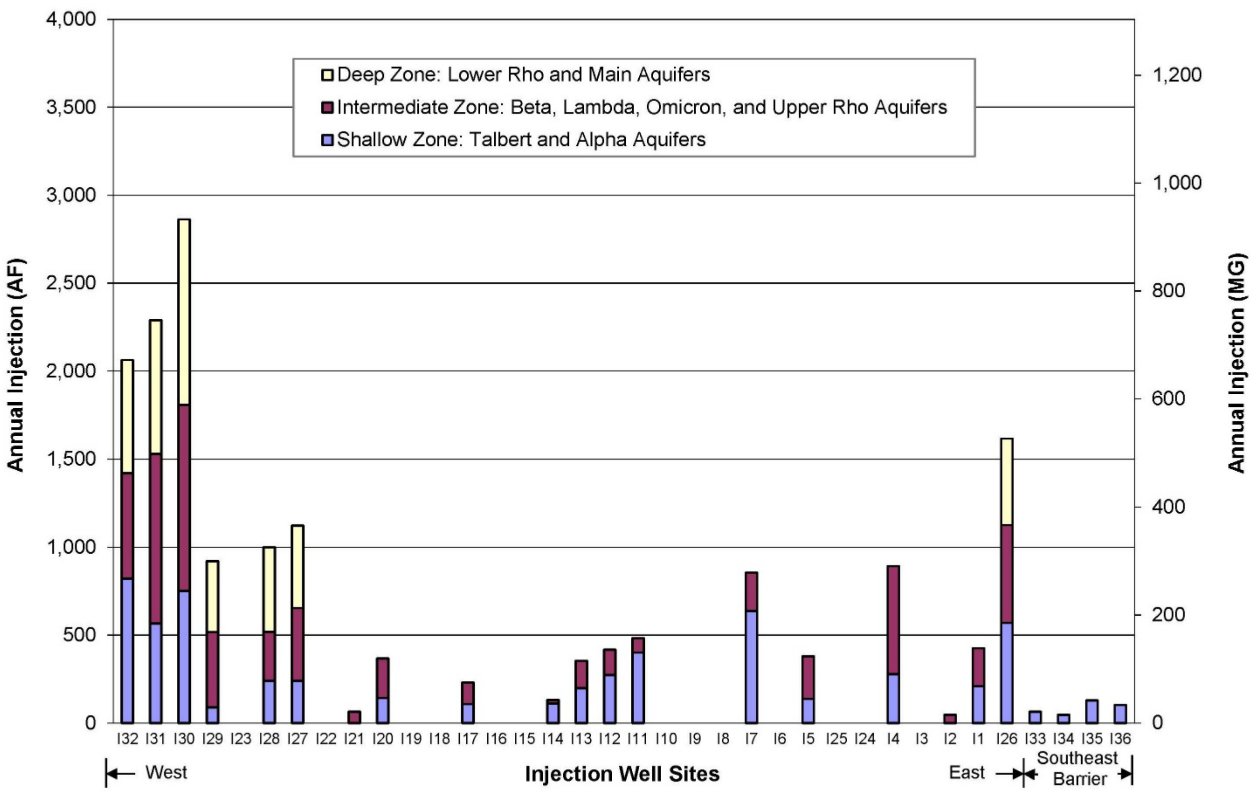


Figure 3-8. 2024 Talbert Barrier Injection Quantity at Each Well Site

East-side modern well I26 also had a large annual injection volume that was evenly distributed throughout the three depth zones at that site. Southeast barrier modern injection wells I33, I34, and I35 had relatively low annual injection totals during 2024 because they were off-line on stand-by for approximately 6 months during the winter, spring, and fall. Southeast barrier modern injection well I36 was off-line on stand-by for just two weeks but also had relatively low annual injection. The stand-by time at the southeast barrier wells was primarily during the nonsummer months as they were not needed during that time to maintain protective elevations due to higher groundwater levels.

Amongst the legacy wells, I4 and I7 were the top performers with the highest annual injection totals, each over 850 AF, while I1, I5, I11, I12, I13, and I20 also had relatively high injection totals during 2024.

The legacy well sites (I1 through I23) tend to have lower injection capacities than the modern wells. However, I4 and I7 performed comparably with combined shallow and intermediate zone injection totals similar to the modern injection wells during 2024 (Figure 3-8). Of all the legacy wells active during 2024, I4 had the highest combined shallow and intermediate zone annual injection of over 900 AF, slightly outperforming I7 which had annual injection of over 865 AF. I4 was off-line only during AWPF shutdowns and I7 was off-line during AWPF shutdowns and for an additional two-week period in November for redevelopment. During 2024, I1, I5, I11, I12, I13, and I20 also had relatively high combined shallow and intermediate zone annual injection ranging from approximately 360 to 490 AF, while the other legacy injection wells had relatively low combined shallow and intermediate zone annual injection volumes ranging from zero to approximately 235 AF, with the lower end of this range mostly due to legacy wells being off-line on stand-by for several months or for the entire year.

Similar to 2023, legacy wells I2 and I21 had very low annual injection in 2024 of 47 and 64 AF, respectively. Although these wells were on stand-by for a portion of the year, they, along with I3 which was off-line for the entirety of 2024, are poor performers and have lost capacity over the years due to leaky well seals and/or irreversible clogging. A total of 11 legacy wells had zero or negligible injection during 2024 (I3, I6, I8, I9, I10, I15, I16, I18, I19, I22, and I23) as compared to 9 wells in 2023; these wells were off-line on stand-by nearly the entire year and were not needed to maintain protective elevations (Figure 3-8). In the case of I8, it is typically not used since its access hatch is in the traffic lane on Ellis Avenue, making access both difficult and unsafe for OCWD Barrier Operations staff.

Table 3-5 shows which wells were off- or on-line on a weekly basis during 2024, including an explanation for inactive status. An injection well site is only shown to be off-line if it was secured for the majority of the specified week (4 days or more). Since the legacy wells are each typically operated with all zones at that site being on or all zones off (except for I2 in which only the intermediate zones are operable), Table 3-5 only shows a status entry for each entire legacy site. For the modern injection well sites I26 through I32 featuring a cluster of three separate injection wells (shallow "A", intermediate "B", and deep "C"), each individual injection zone is operated independently. Modern well I24 features I24/1 for the upper casing (intermediate zone) and

Table 3-5. 2024 Talbert Barrier Injection Wells Operational Status

Well	JAN				FEB				MAR				APR				MAY				JUN				JUL				AUG				SEP				OCT				NOV				DEC			
I32A																																																
I32B																																																
I32C																																																
I31A																																																
I31B																																																
I31C																																																
I30A																																																
I30B																																																
I30C																																																
I29A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S		M	M	M			M	M	M			S	S								S
I29B																																																
I29C																																																
I23	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I28A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S															S	S	S
I28B																																																
I28C																																																
I27A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																	S
I27B					S	S	S				S	S	S																																			
I27C																																																
I22	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I21					S	S	S	S	S	S	S	S																																				
I20					S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																									
I19	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I18	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I17					S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																				R	
I16	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I15	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I14	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S										S	S	S	S	S
I13				S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																R	R			
I12																																													R	R		
I11																																											R					
I10	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I9	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I8	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I7																																									R	R						
I6	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I5																								R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	S	S	S	S	S	S	S	S
I25/1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
I24/1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
I24/2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
I4																																																
I3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I2																	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I1																																																
I26A																																																
I26B																																																
I26C																																																
I33A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																S	S	S				S	S	S	S
I34A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																								S	S
I35A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S																											
I36A					S	S																																										

West (top) to East (bottom); I33A–I36A: Southeast Barrier

Legend:
- (blank) Well in Operation: GWRS Recycled Water
- (cyan) Well in Operation: OC-44 Potable Water
- (yellow) Well in Operation: City Fountain Valley
- M Maintenance Repair
- R Redevelopment
- Z GWRS off-line
- P Pipeline Restriction
- C Construction
- S Stand-by

Wells were specified as off-line if non-operational for the majority of the specified week or longer. Letters designate the reason for the well being off-line (not all letters are used in every year).

I24/2 for the lower casing (deep zone) due to its nested well construction with two casings in the same borehole but both can be operated independently. Modern well I25 is a single-point well screened primarily in the intermediate zone and is designated I25/1. Therefore, Table 3-5 shows a separate status entry for each individual injection zone for these modern wells. As described above, several legacy injection wells remained off-line for either all or a major portion of 2024 due to relatively high groundwater conditions. Seven legacy wells were on-line for the majority of 2024: I1, I4, I7, I11, I12, I20, and I21, as indicated in Table 3-5. Protective elevations were maintained throughout the year with the use of these seven legacy wells, intermittent use of other legacy wells, and most of the modern injection wells.

In years with lower groundwater levels and a higher injection requirement for seawater intrusion control in the shallow and intermediate zones, deep zone modern injection wells commonly need to be taken off-line during peak summer months due to pipeline hydraulic restrictions, i.e., to maintain safe flow velocities at critical points along the barrier pipeline identified as bottlenecks based on operational data. Barrier pipeline improvements are planned to remove these bottlenecks to maximize injection during years with lower Basin conditions and higher injection requirements. Due to the reduced injection into the shallow and intermediate zones during 2024, deep zone modern injection wells were on-line throughout 2024, when not undergoing maintenance or being taken off-line for construction activities. I24/2 was off-line the entire year awaiting maintenance repairs, while I26C, I27C, I28C, and I32C were on-line the entire year.

3.4.3 Injection Well Repairs and Redevelopment

The Talbert Barrier consists of 109 individual injection well points arranged into 36 injection well sites. During 2024, 23 of the 36 injection well sites were operated over the course of the year, with 11 of the 23 legacy well sites off-line on stand-by for the entire year since they were not needed to maintain protective elevations and modern injection well sites I24 and I25 off-line all year awaiting maintenance repairs. In general, various injection wells are typically placed off-line for either brief or extended periods during the year for the following reasons:

- Well redevelopment and backwash pumping to restore and improve injection rates;
- Maintenance repairs (plumbing, electrical, communications, well vaults, pipeline, etc.);
- Availability of injection water supply, including AWPF shutdowns;
- Optimize distribution of injection for controlling seawater intrusion and maintaining protective groundwater elevations;
- Reduce or redistribute injection to avoid overly high groundwater conditions;
- Hydraulic restrictions on the barrier pipeline and appurtenances (bottlenecks); and
- OCWD and OC San construction activities requiring localized dewatering in the vicinity of the injection barrier.

Since implementing GWRS purified recycled water as the primary injection source, a legacy redevelopment cycle of approximately two to three years of on-line run time has been sufficient to maintain injection flow rates without significant reductions in well efficiency and thus maintain overall barrier capacity. Six legacy injection wells (I5, I7, I11, I12, I13, and I17) were redeveloped during 2024 by conducting high-volume airlift purging to agitate the well bore and disturb, dislodge, and remove fine, loose sediment. Overall, an injection rate improvement of 88% was achieved for the six legacy wells redeveloped. Prior to 2024, the last legacy well redevelopment occurred in 2019. A detailed description of legacy well redevelopment is provided in Section 3.3.3 of the 2016 annual report.

Modern injection well sites I24, I25, and I26 were constructed and placed on-line over 20 years ago in 1999-2000, while I27 and I28 went on-line in 2004, and finally I29 through I36 went on-line in 2008 with the commencement of GWRS. Sustained injection capacity over the life of these wells thus far has largely been attributed to regularly scheduled short duration backwash pumping of these injection wells, either by the airlift pumping method using a portable compressor (most modern wells) or backwash pumping with dedicated submersible pumps (I24 and I25 sites). None of the modern injection wells had required extensive redevelopment until evaluations in 2023 determined otherwise; as a result, the first redevelopment of four modern wells I27A, I28A, I31C, and I32C, is currently planned for fiscal year 2025-26.

The three on-site modern injection wells (I24/1, I24/2, and I25/1) are equipped with dedicated submersible pumps allowing for regular backwash pumping. The submersible pump backwash frequency is based on the cumulative volume injected. In 2024, wells I24 and I25 remained non-operational due to failure of the downhole flow control valves. The valves, along with the backwash pumps and motors are planned to be replaced. The other modern injection wells (sites I26 through I36) are equipped with dedicated air lines and are regularly backwashed by OCWD staff using the airlift pumping method, which requires a portable air compressor to be transported to each site. The airlift pumping backwash frequency is also based on the cumulative volume injected like the submersible pump wells. Details of the modern injection well backwash procedures are provided in Section 3.4.3 of the 2022 Annual Report.

Historically, there has been some evidence of erosion of the barrier distribution pipeline materials via the presence of measurable amounts of sand found during maintenance blow-off activities and on in-line bypass filters. In fact, I32C, located at this west-end terminus of the barrier pipeline is the first modern injection well showing initial signs of requiring more extensive redevelopment since ongoing airlift pumping may not be removing all the injected fine-grained material from the lower portion of its screened interval. Therefore, I32C is one of the four modern wells scheduled for redevelopment in 2025.

To help limit potential pipeline erosion, the quality of the lime used during post-treatment operations has been improved and specific post-treatment stability targets have been adjusted. Barrier Operations and AWPF Operations staff continue to closely monitor the lime post-treatment process and operating parameters (e.g., pH) to help minimize the potential for well clogging. Bypass filter monitoring at I32 and the AWPF was conducted during 2024 but was discontinued in August because the data lacked sufficient variability to reveal any meaningful trends.

The AWPF began receiving water from OC San Plant 2 in mid-December 2022. The additional source increased the overall TDS of the combined influent, requiring a slight adjustment to the decarbonation bypass volume but no significant changes to the post-treatment process or the associated operating parameters. However, the monthly average TDS of GWRS-FPW increased slightly as well as the monthly chloride concentration from 4-9 mg/L during January through November 2022 to 5-12 mg/L from December 2022 through 2023. In 2024, the flow-weighted annual average chloride concentration decreased to 4 mg/L, down from 9 mg/L in 2023. This is related to the limited availability of OC San Plant 2 influent to the GWRS in 2024 (see Section 2). The TDS and chloride concentration of GWRS-FPW are also influenced by the age of the RO membranes.

4. GROUNDWATER MONITORING AT THE TALBERT BARRIER

OCWD has maintained a comprehensive groundwater monitoring program in the vicinity of the Talbert Barrier for decades as part of the operation of its water recycling program as well as the assessment of the effectiveness of the barrier in preventing seawater intrusion. This section presents the following for 2024:

- Description of Talbert Gap aquifers;
- Overview of groundwater monitoring program;
- Groundwater elevations and directions of flow; and
- Groundwater quality.

4.1 Talbert Gap Aquifers

Earlier studies (DWR, 1966) delineated numerous discrete aquifer units comprising the Talbert Gap area of the Orange County Groundwater Basin. In general, from shallowest to deepest, these include:

- Talbert aquifer;
- Alpha aquifer;
- Beta aquifer;
- Lambda aquifer;
- Omicron aquifer;
- Upper Rho aquifer;
- Lower Rho aquifer;
- Main aquifer; and
- Lower Main aquifer.

The Talbert aquifer is the primary conduit for inland migration of seawater. Being the shallowest of the potable aquifers listed above, it is also the youngest and therefore has not been appreciably folded or uplifted by the Newport-Inglewood Fault system that runs roughly parallel to the coastline through the Talbert Gap area as shown on Figure 4-1. Therefore, the Talbert aquifer is relatively horizontal, continuous, and in direct hydraulic connection with the Pacific Ocean. The Talbert aquifer is approximately 50 to 80 feet thick within the Talbert Gap area and is comprised of relatively coarse sand and gravel deposited by the ancestral SAR. The Talbert Gap was formed by the contemporaneous erosional processes of the ancestral SAR between the uplifted areas now known as the Huntington Beach Mesa and the Newport Mesa. Therefore, the Talbert aquifer does not occur beneath these mesas.

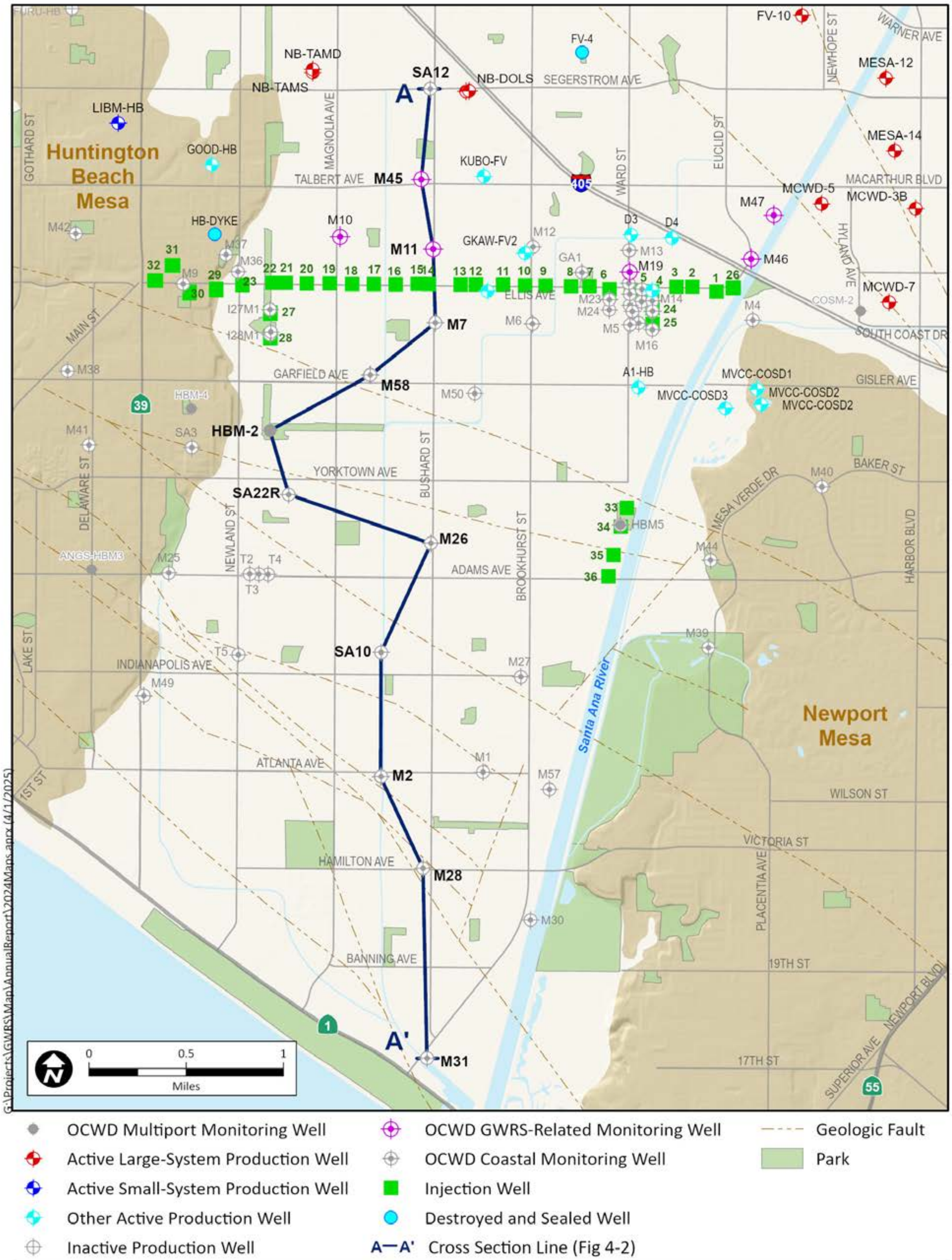


Figure 4-1. Talbert Gap Study Area and Well Location Map

The aquifers below the Talbert aquifer are considerably older and have thus been uplifted and offset to varying degrees by the Newport-Inglewood Fault system illustrated on Figure 4-2. Unlike the Talbert aquifer, these deeper aquifers exist not only within the Talbert Gap but also extend beneath the mesas. As discussed later in this section, the Alpha, Beta, Lambda, Omicron, and Upper Rho zones are all susceptible to seawater intrusion via hydraulic connection with the Talbert aquifer. That is, seawater migrating inland within the Talbert aquifer can flow into deeper aquifers via mergence zones where there is no depositional or hydraulic separation between horizontally or vertically adjacent (i.e., merged) aquifers.

The Main and Lower Main aquifers were historically not considered to be susceptible to seawater intrusion within the Talbert Gap area due to their considerable depth and vertical isolation from the shallower aquifers (DWR, 1966). Furthermore, due to the higher degree of faulting and offset, the Lower Main aquifer is thought to be non-existent seaward of approximately Yorktown Avenue. The Main aquifer is discontinuous and offset across the Newport-Inglewood Fault system, and thus largely hydraulically isolated from the ocean. Seaward of this fault zone, the Main aquifer is brackish and isolated from the inland portion of the Basin. Significant groundwater withdrawals from the Main aquifer in the coastal area over the last 30 years often causes groundwater elevations in the Main aquifer to seasonally decrease to 50-100 ft below mean sea level (see Section 4.3.2); these low groundwater elevations in the coastal area could increase the potential for leakage of saline water inland across the Newport-Inglewood Fault system within the Main aquifer (Herndon and Bonsangue, 2006). OCWD continues to monitor Main aquifer chloride concentrations in the coastal area.

As required by state regulation (CCR, 2018), OCWD has established retention time boundary areas for control of pathogenic microorganisms and response retention time in the area downgradient of the Talbert Barrier. Potable drinking water wells are prohibited within the 12-month underground retention time boundary illustrated on Figure 4-3. The boundary area is based on a September 2000 model simulation informed by earlier tracer studies (RWQCB, 2004). The boundary area is enforced by local well permitting authorities including the City of Fountain Valley and Orange County Health Care Agency, as well as DDW. In 2023, OCWD conducted an analysis to update this boundary area to ensure compliance with the state's Final Groundwater Recharge Reuse Project (GRRP) regulations (CCR, 2018). The proposed revised 12-month underground retention time boundary, which is slightly smaller than the original boundary area shown in Figure 4-3, is currently under review by DDW. If approved, the revised primary and secondary 12-month boundary area will be presented for adoption by the OCWD Board of Directors, and if adopted, provided to local well permitting authorities to enforce.

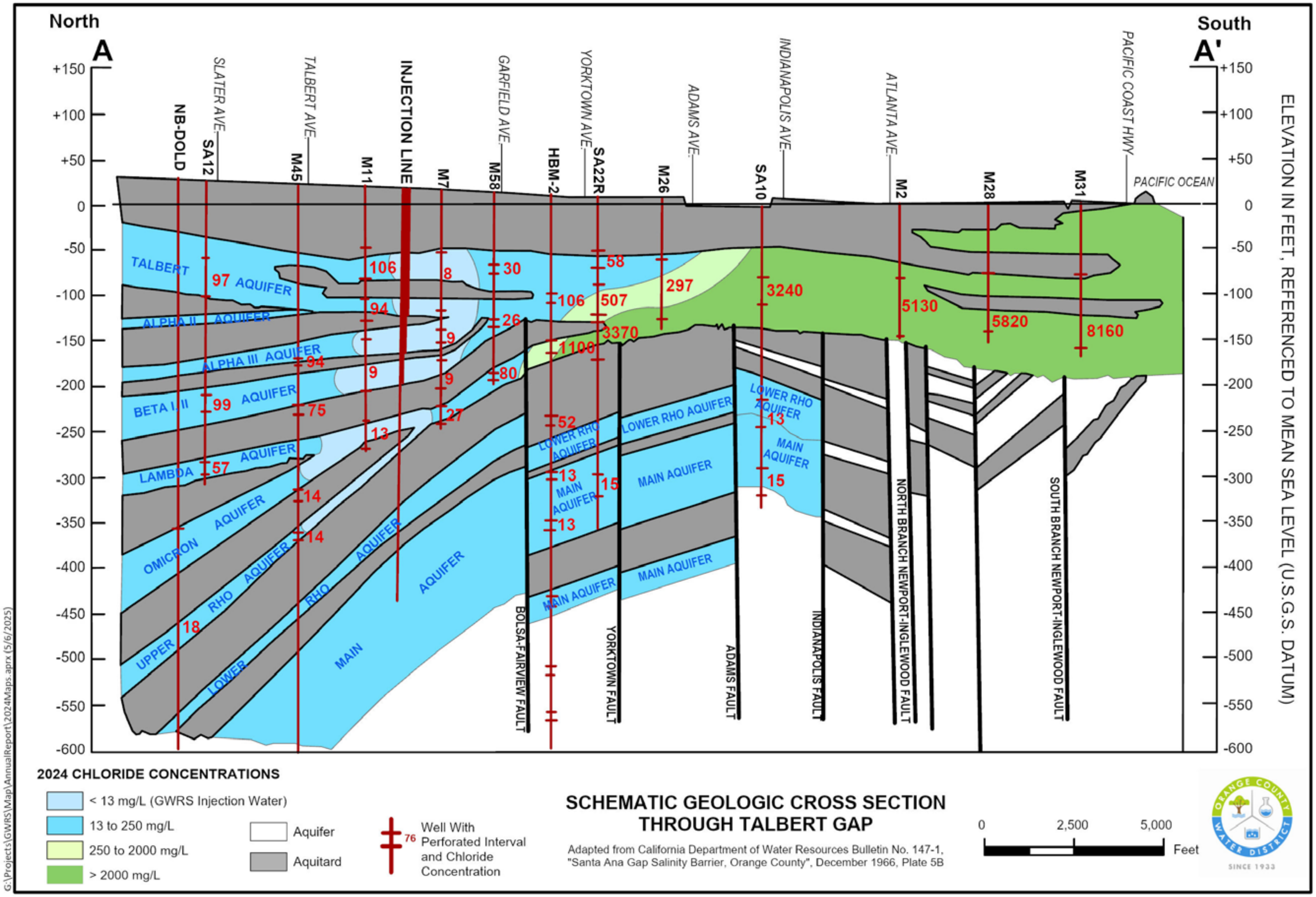


Figure 4-2. Schematic Geological Cross Section Through Talbert Gap

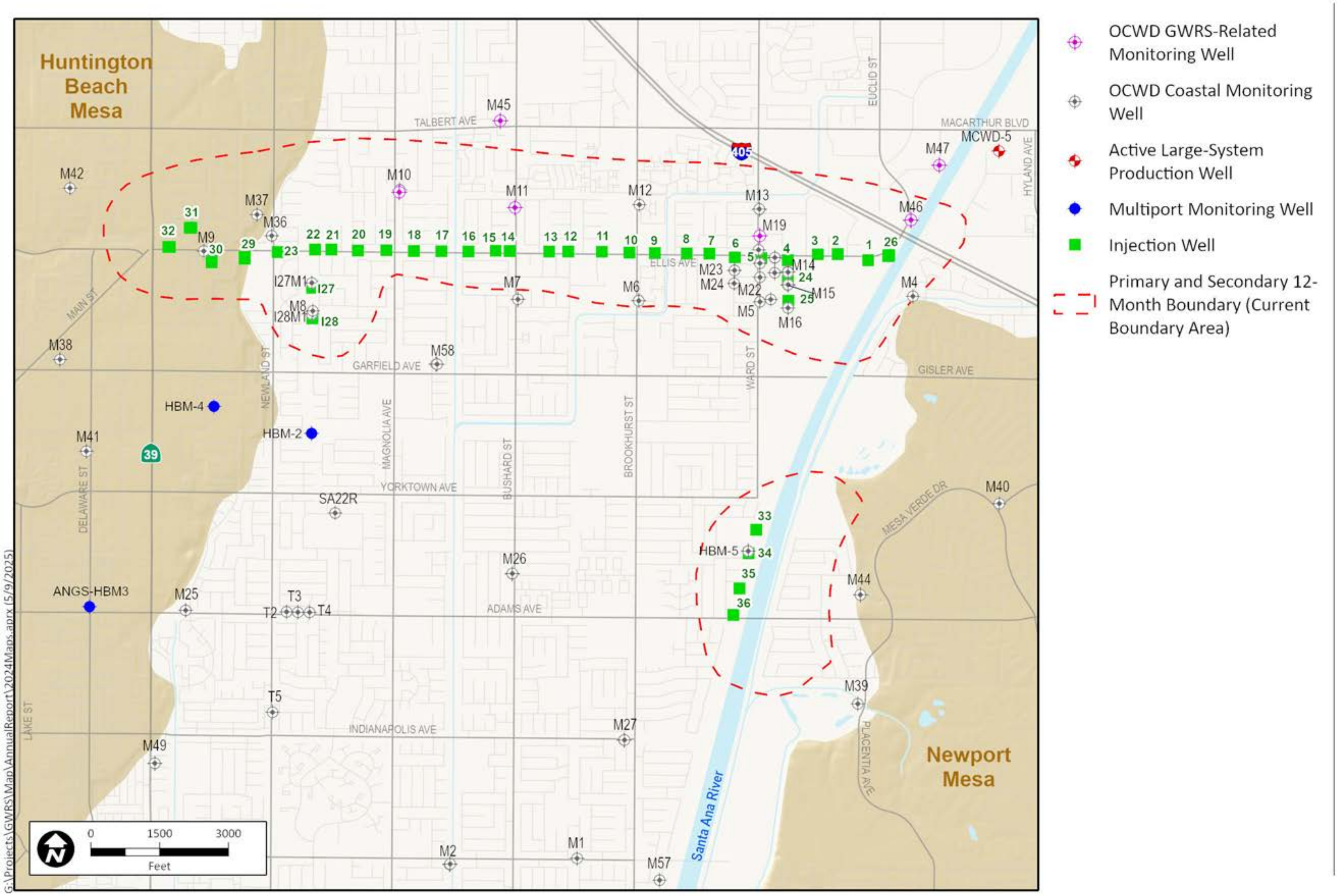


Figure 4-3. Talbert Barrier Boundary Areas

4.2 Groundwater Monitoring Program

As part of the groundwater monitoring program required by the permit for the GWRS (RWQCB, 2022a), OCWD-owned monitoring wells and several municipal and private wells in the Talbert Barrier area were sampled in 2024. OCWD performs additional coastal groundwater monitoring at numerous other wells on a semi-annual basis to monitor seawater intrusion. The locations of municipal production wells, private wells, OCWD's GWRS permit compliance wells, and other monitoring wells in the Talbert Gap area are shown on Figure 4-1.

Under the earlier WF-21 permit, OCWD monitoring well sites M9, M10, and M19 were sampled monthly. These wells were constructed between 1967-68, prior to injection of WF-21 recycled water. Under the subsequent initial GWRS permit issued in 2004, quarterly compliance monitoring was required from OCWD monitoring well sites M10, M11, M45, M46, and M47. The three newer GWRS compliance monitoring wells M45, M46, and M47 were constructed during 2004-05. The GWRS monitoring program began in mid-2004. On December 2, 2022, a new GWRS permit was issued by the RWQCB (RWQCB, 2022a). Table 4-1 summarizes the screened interval depths and aquifer zones for the five compliance monitoring wells and M19.

The 2022 GWRS permit requires the same monitoring locations and frequencies as the previous GWRS permit, although the constituents required for monitoring were changed slightly as follows:

- Required monitoring reduced or eliminated for the following constituents:
    - MBAS, silver, and thiobencarb no longer required; and
    - Color and odor reduced from quarterly to annually.
- Required monitoring added for the following constituents:
    - Lead, arsenic, beryllium, cadmium, trivalent chromium, selenium and thallium quarterly;
    - Hexavalent chromium annually; and
    - Dichloromethane, bromodichloromethane, chloroform, and NDMA quarterly.

Sampling of monitoring well site M19 is not required under the GWRS permit. However, this monitoring well site continued to be monitored voluntarily through 2024. At monitoring well site M19, only Zone 3 (M19/3) is tested quarterly like GWRS compliance wells and annually for the full comprehensive suite of analytes, as its water quality consistently reflects the presence of GWRS water; Zones 1 and 2 (M19/1 and M19/2) are tested twice a year for a reduced set of analytes for the assessment of seawater intrusion, as their water quality is not regularly influenced by the presence of GWRS water.

Table 4-1. Monitoring Wells at the Talbert Barrier

OCWD Well Name	Date Completed	Nearest Injection Well [1]	Approximate Distance and Direction from Barrier	Nearest Drinking Water Well(s)	Well Depth (ft bgs)	Aquifer Name(s)
OCWD-M10/1	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	80-160	Talbert and Alpha
OCWD-M10/2	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	175-195	Beta
OCWD-M10/3	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	215-240	Beta
OCWD-M10/4	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	280-305	Lambda, Omicron and Upper Rho
OCWD-M11/1	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	70-105	Talbert
OCWD-M11/2	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	125-150	Talbert and Alpha
OCWD-M11/3	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	170-225	Beta
OCWD-M11/4	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	260-290	Lambda and Omicron
OCWD-M19/1[2]	01/01/1968	OCWD-I5	500 ft N	MCWD-5	60-110	Talbert
OCWD-M19/2[2]	01/01/1968	OCWD-I5	500 ft N	MCWD-5	130-195	Alpha
OCWD-M19/3[2]	01/01/1968	OCWD-I5	500 ft N	MCWD-5	215-265	Beta
OCWD-M45/1	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	195-205	Alpha and Beta
OCWD-M45/2	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	250-260	Beta
OCWD-M45/3	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	335-345	Omicron
OCWD-M45/4	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	380-390	Upper Rho
OCWD-M45/5	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	780-790	Main
OCWD-M46A/1	11/02/2005	OCWD-I26	900 ft NE	MCWD-5	350-370	Lambda and Omicron
OCWD-M46/2	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	420-430	Upper Rho
OCWD-M46/3	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	515-535	Lower Rho
OCWD-M46/4	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	640-660	Main
OCWD-M46/5	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	890-910	Main
OCWD-M47/1	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	355-375	Beta
OCWD-M47/2	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	470-480	Upper Rho
OCWD-M47/3	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	580-600	Lower Rho
OCWD-M47/4	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	745-765	Main
OCWD-M47/5	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	940-960	Main

[1] The closest injection well is not necessarily the fastest source of injection water based on estimated arrival times and inferred groundwater flow directions.

[2] Monitoring well site OCWD-M19 is not a compliance well per the existing GWRS permit but is monitored voluntarily.

Monitoring well site M45 is located approximately halfway between the Talbert Barrier Ellis Avenue alignment and the City of Newport Beach municipal wells (NB-TAMS, NB-TAMD, NB-DOLS, and NB-DOLD) located north of the barrier (Figure 4-1). Well sites M46 and M47 are located approximately one-quarter and one-half the distance, respectively, between injection well site I26 and the nearest municipal production well MCWD-5, which is owned and operated by Mesa Water. These three newer compliance monitoring wells were each constructed with five nested casings designed to monitor the individual aquifers tapped by the nearby production wells.

4.3 Groundwater Elevations and Directions of Flow

Groundwater flow directions in the vicinity of the Talbert Barrier vary considerably due to barrier injection and seasonal fluctuations in coastal pumping as well as historical changes in pumping patterns, such as new well fields coming on-line. Also, due to the vertical distribution of coastal pumping, each of the aquifers receiving injection water has a somewhat different groundwater flow path.

To evaluate groundwater flow directions in the vicinity of the Talbert Barrier for the assessment of seawater intrusion control, observed groundwater elevations are contoured at the end of each water year (end of June). Groundwater elevation contour maps are prepared for the Shallow aquifer (Talbert and Alpha aquifers) and deeper Main aquifer, as shown in Figures 4-4 and 4-6, respectively. Groundwater elevation contour maps for the intermediate depth Lambda aquifer can be found in the annual reports for 2022 and earlier (DDBE, 2023).

Seaward of the barrier, monitoring wells screened in the Talbert, Alpha, and to a lesser extent Lambda aquifer have historically been intruded by seawater. Therefore, the observed end of June groundwater elevations used to construct those contour maps were first adjusted to freshwater equivalent elevations (heads) for wells with elevated salinity having chloride concentrations greater than 250 mg/L. For wells with chloride concentrations less than 250 mg/L, the freshwater equivalent adjustment is negligibly small. This adjustment accounts for the difference in density between fresh groundwater and the heavier saline groundwater, with the freshwater equivalent heads ranging from 0-2.5 ft higher than the observed elevations of brackish groundwater seaward of the Talbert Barrier. This upward adjustment is larger for higher levels of salinity and greater well depths. The freshwater equivalent head adjustment is necessary to accurately infer the variable-density groundwater flow direction and is based on the principle that an equivalent weight of water column in a monitoring well has a greater water column height if fresh than if saline (Guo and Langevin, 2002).

The freshwater equivalent head was calculated for monitoring wells seaward of the Talbert Barrier having elevated salinity using the formula below:

$h_f = h_w + z_f$ where:

h_f = freshwater equivalent head (ft msl)

h_w = head in well (observed groundwater elevation, ft msl)

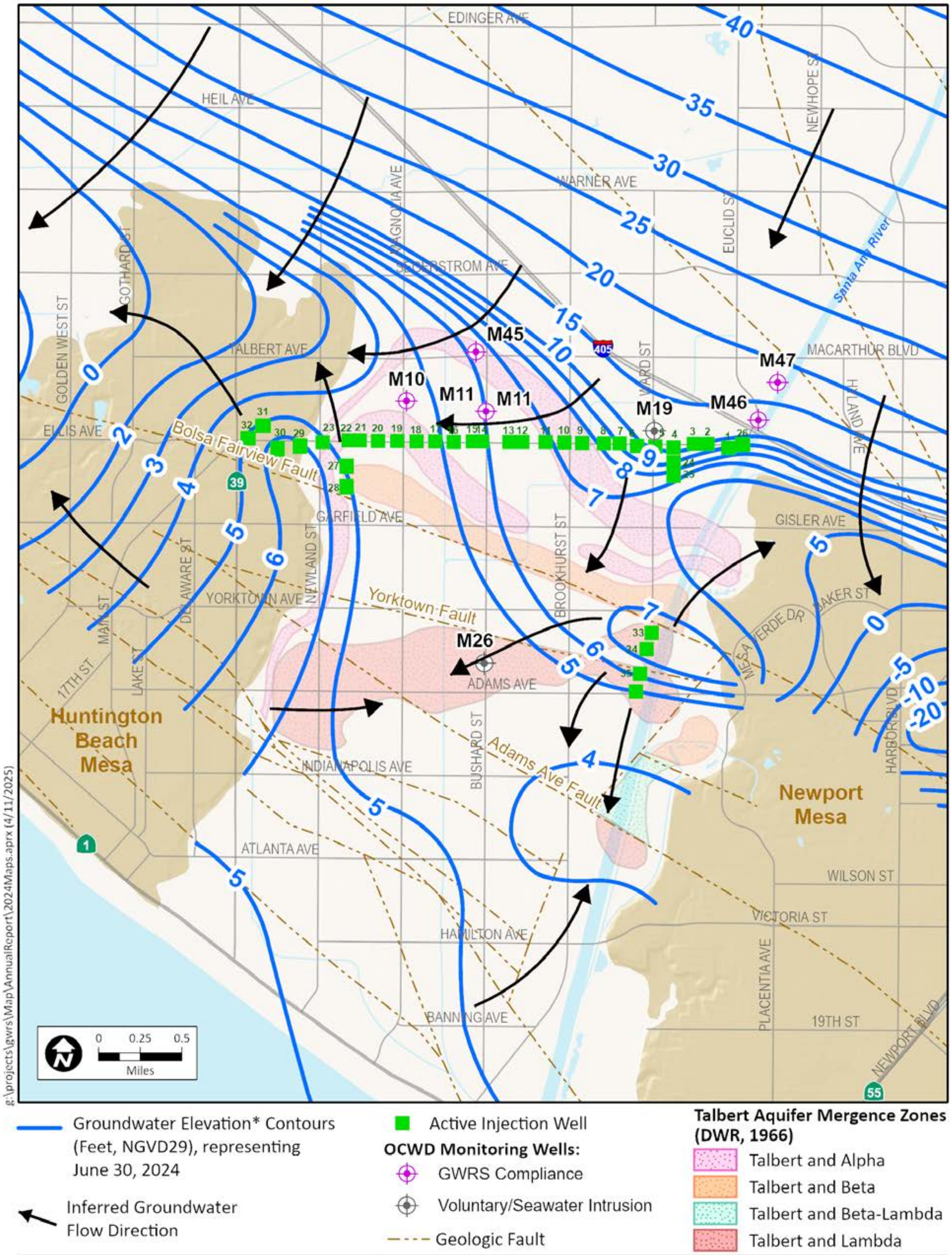
z_f = freshwater equivalent head adjustment (ft)
= 0.025 x (seawater fraction in well) x (water column height in well)
= 0.025 x (well chloride/seawater chloride) x (bottom screen depth – depth to water)

The above formula uses the chloride concentration of the pumped well sample closest to the date of the water level measurement as a reasonable approximation of the average chloride concentration throughout the entire water column in the well at the time of the water level measurement. This approximation was verified at two selected brackish monitoring wells to yield acceptably close estimates of the freshwater equivalent head adjustment calculated by using the weighted average of depth-specific field EC profile values measured in-situ at 10-ft intervals throughout the entire water column of each well.

4.3.1 Talbert and Alpha Aquifers

Figure 4-4 shows interpreted groundwater elevation contours and inferred groundwater flow directions within the shallow Talbert and Alpha aquifers for June 30, 2024, in the Talbert Gap area. These contours represent freshwater equivalent heads for monitoring wells with elevated salinity seaward of the barrier. For discussion purposes below, these freshwater equivalent heads will be referred to simply as groundwater elevations. The contours not overlying the Huntington Beach and Newport Mesas (i.e., within the Talbert Gap) represent groundwater elevations for the Talbert aquifer. A more-detailed one-foot contour interval was used in the Talbert Barrier area and seaward to better illustrate the groundwater flow patterns. On the mesas, the contours represent Alpha aquifer groundwater elevations since the Talbert aquifer does not exist beneath the mesas as was described earlier in Section 4.1; however, the Talbert aquifer is in lateral hydraulic connection with the Alpha aquifer beneath the Huntington Beach Mesa, such that they behave as one aquifer system.

Figure 4-4 also shows the Talbert aquifer mergence zones, which can act as drains transmitting water from the Talbert aquifer into the deeper Alpha, Beta, and Lambda aquifers due to a typically downward vertical gradient. Therefore, as groundwater flows laterally within the Talbert aquifer to the southwest in the Talbert Gap area, groundwater also flows vertically from the Talbert aquifer down into the Alpha, Beta, and Lambda aquifers. As shown on Figure 4-4 for June 2024 and typical of recent years, a relatively steep and uniform southwest seaward gradient existed in the Talbert aquifer north of the barrier but largely flattened out south of the barrier due to vertical flow losses to the mergence zones.



*For wells with chloride concentration greater than 250 mg/L, groundwater elevations adjusted to freshwater equivalent after Guo and Langevin (2002).

Figure 4-4. Shallow Aquifer Potentiometric Surface with Inferred Groundwater Flow Directions in the Talbert Gap Area During 2024

Groundwater elevations in the Talbert aquifer were at or above mean sea level throughout the Talbert Gap in June 2024, as shown on Figure 4-4, and were similar to the prior June. Along the Ellis Avenue barrier alignment, groundwater elevations ranged from 10 ft msl on the east end to 5 ft msl on the west end, resulting in a local west-southwest gradient with inferred groundwater flow from the Talbert aquifer into the Alpha aquifer beneath the Huntington Beach Mesa (via their mergence zones) where groundwater elevations are lower. Farther seaward along the southeast portion of the barrier near the SAR and Adams Avenue, groundwater elevations were approximately 7 feet above mean sea level with inferred groundwater flow primarily seaward to the south-southwest into a very subtle depression of approximately 4 ft msl, likely caused by vertical flow draining from the Talbert to Lambda aquifer via their respective mergence zones in this area. This subtle depression is likely transient and is not significant enough to cause any noticeable intrusion into this area over the longer term as evidenced by generally declining chloride concentrations at monitoring wells in this vicinity. Also, there is some uncertainty with inferring groundwater flow directions from the relatively flat lateral gradients in this seaward area because of salinity-induced vertical gradients as well as uncertainty in the equivalent freshwater head adjustments (e.g., assumed vertically constant salinity profile within the water column of the brackish monitoring wells).

This June 2024 condition represents sufficient barrier injection to largely overcome the vertical losses to the mergence zones while still maintaining a predominantly seaward and/or relatively flat gradient with groundwater elevations above mean sea level and only marginally (one foot) lower than the farthest seaward contour of 5 ft msl. Therefore, these Talbert aquifer groundwater elevations were at an optimal level in which they were high enough to be protective of seawater intrusion but with minimal or no losses to the ocean.

4.3.1.1 Key Monitoring Well M26

Monitoring well M26 is strategically located seaward of the barrier in the Talbert-Lambda mergence zone in the middle of the Talbert Gap (Figure 4-2 and Figure 4-4) and is screened across the merged Talbert and Lambda aquifers (screened from 70 to 135 ft bgs). Therefore, M26 is a key monitoring well for evaluating barrier injection requirements versus seawater intrusion potential. M26 is located approximately 1,000 feet north of Adams Avenue, which approximately represents the line at which the goal is to achieve protective groundwater elevations of approximately 3 feet above mean sea level (ft msl). This protective elevation is based on the Ghyben-Herzberg relation (Ghyben, 1888; Herzberg, 1901; Freeze and Cherry, 1979, pp. 375-376), which accounts for the depth of the Talbert aquifer at that location along with the density difference between saline and fresh groundwater. If this protective elevation is achieved in the Talbert-Lambda mergence zone area, at least on average during the year, then there would be no net annual inland movement of brackish groundwater; brackish water in the Talbert aquifer would ideally be maintained slightly seaward of the mergence zone and thus prevented from migrating down into the Lambda aquifer that is tapped by inland production wells.

Figure 4-5 shows the historical inter-relationship between coastal groundwater production, Talbert Barrier injection, and groundwater elevations at M26 over the last 16 years since the commencement of GWRS in January 2008. Groundwater elevations at M26 were approximately 15 feet below mean sea level at the beginning of 2008. This represented the lowest conditions at this well over the last 16 years because barrier injection supply was limited during 2007 before GWRS AWPF startup. Also, Basin pumping reached a historical maximum during 2007.

With the startup of several new injection wells in January 2008, coinciding with commencement of GWRS, the injection volume was significantly increased from previous years. This caused groundwater elevations at M26 to rise over a two-year period to reach protective elevations by the beginning of 2010 (Figure 4-5). Since then, groundwater elevations at M26 have consistently been maintained at or above protective elevations except for brief periods related to AWPF shutdowns, such as in June 2014. Since the inception of GWRS, the chloride concentration at M26 has gradually declined from approximately 1,500 mg/L in 2008 to approximately 300 mg/L in 2024, indicating regression of the saline front due to sustained protective elevations. Due to the declining but still slightly elevated chloride concentration, GWRS water arrival at M26 is likely but cannot yet be definitively confirmed.

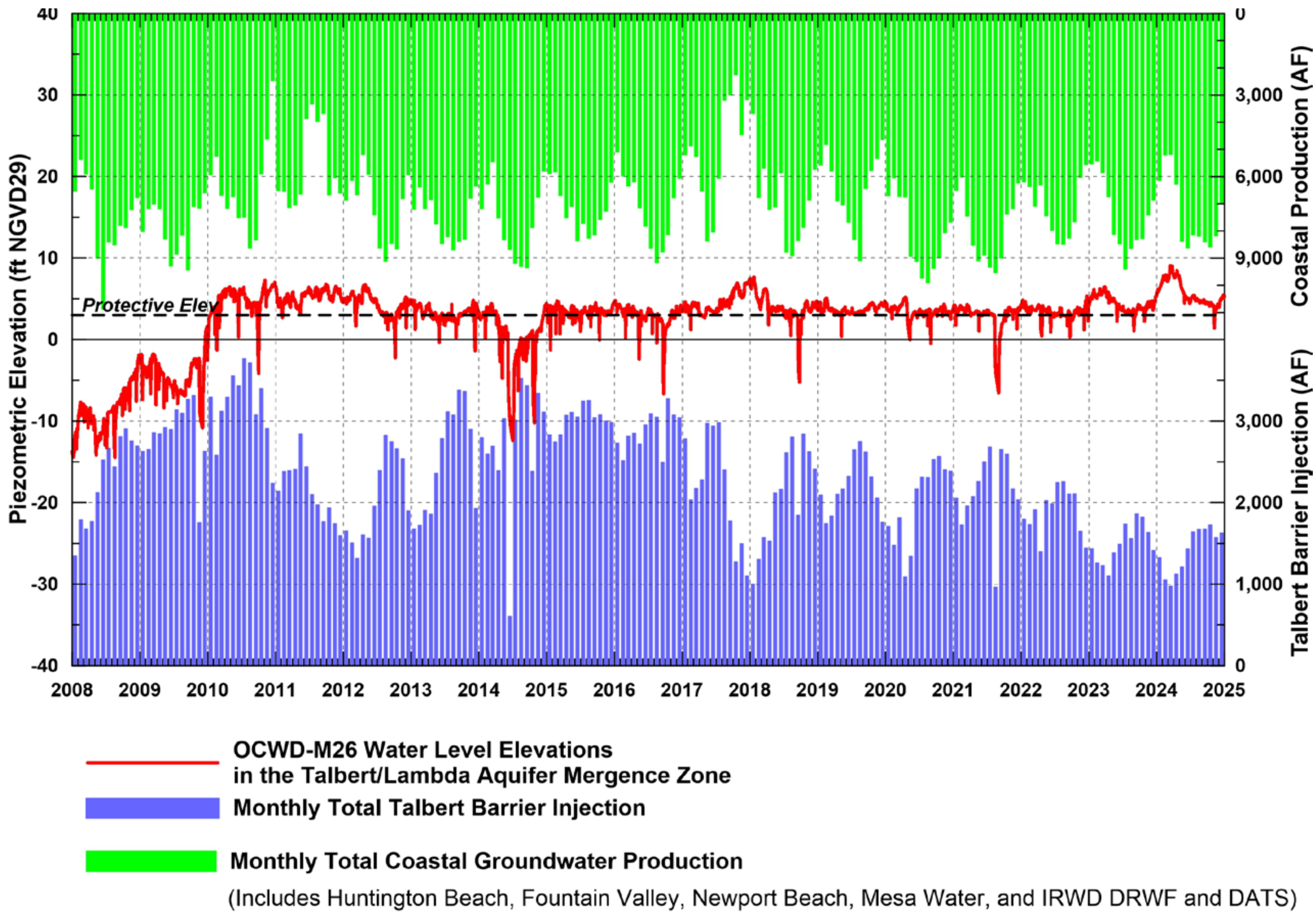


Figure 4-5. Talbert Barrier Injection, Coastal Production, and M26 Groundwater Levels

4.3.2 Main Aquifer

Figure 4-6 shows interpreted groundwater elevation contours and inferred groundwater flow directions within the lower portion of the Principal aquifer system for June 30, 2024. Over 90% of Basin pumping occurs from the Principal aquifer system, which vertically from top to bottom includes the Beta, Lambda, Omicron, Upper Rho, Lower Rho, and Main aquifers. The groundwater elevation contours shown on Figure 4-6 most closely represent the lower portion of the Principal aquifer system and thus for convenience will be referred to herein more specifically as Main aquifer groundwater elevations. The Main aquifer typically has the lowest groundwater elevations in the area.

Consistent with prior years, the June 2024 Main aquifer groundwater elevations shown on Figure 4-6 indicate a large pumping depression east-northeast of the barrier. The southern portion of the pumping depression encompasses the Mesa Water production wells, and the northern extent encompasses the majority of the IRWD Dyer Road Well Field (DRWF). At approximately -85 ft msl, the June 2024 Main aquifer groundwater elevations were approximately 0-5 ft higher than the prior June in the Mesa Water and IRWD DRWF areas.

North-northwest of the barrier, production wells owned by the cities of Huntington Beach and Newport Beach are relatively fewer and more spread out and therefore create a less pronounced pumping depression. June 2024 Main aquifer groundwater elevations in this area were approximately -35 ft msl (Figure 4-6), approximately 5 ft higher than the prior June.

Figure 4-6 shows Main aquifer groundwater elevations of approximately -10 ft msl at the west end of the Talbert Barrier, which is approximately 20 ft higher than the prior June. This significant increase is attributed to three of the six Talbert Barrier west-end deep injection wells being off-line for electrical repairs for approximately the first six months of 2023, then on-line the second half of 2023 and all of 2024. As shown in Figure 4-6, the inferred groundwater flow direction from the west end of the barrier was predominantly inland to the north-northeast towards the Newport Beach well field and Huntington Beach wells HB-5 and HB-9, as in previous years.

On the east end of the barrier, there are only two Main aquifer injection wells: I24/2 and I26C. As illustrated on Figure 4-6, their combined injection is typically not substantial enough to create a noticeable mound in the Main aquifer, especially given the aforementioned pumping depression to the east-northeast caused by the Mesa Water and IRWD DRWF and the pumping influence of the nearby OCWD Deep wells (D1, D3, and D4) used periodically for GAP blending supply. These two deep injection wells are typically kept on-line throughout the year, but I24/2 was off-line throughout 2024 awaiting maintenance repairs as discussed in Section 3. June 2024 Main aquifer groundwater elevations near the east end of the barrier were approximately -55 ft msl, approximately equal to the prior June. Although Main aquifer groundwater elevations

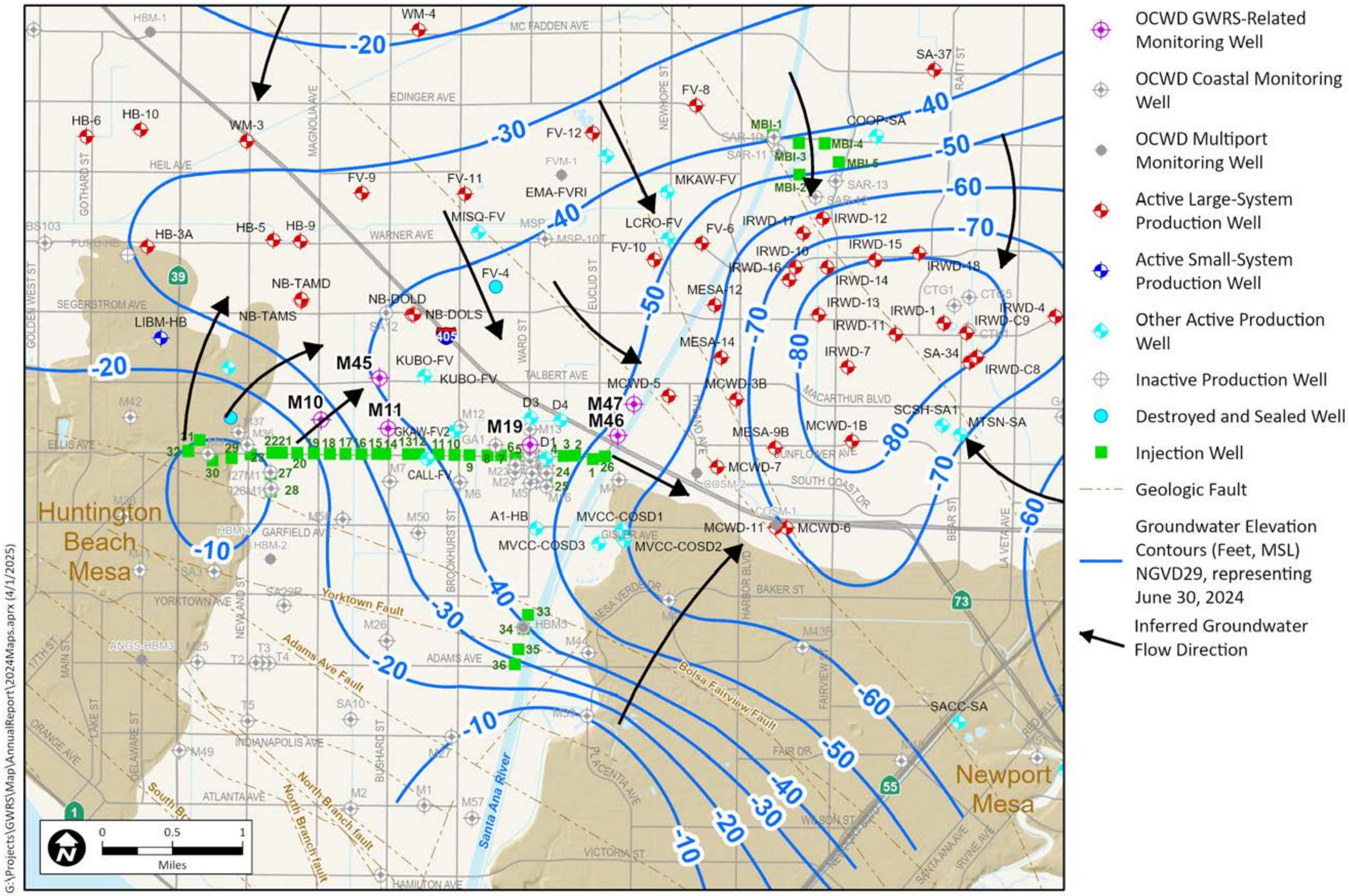


Figure 4-6. Main Aquifer Potentiometric Surface with Inferred Groundwater Flow Directions in the Talbert Gap Area During 2024

shown on Figure 4-6 were well below sea level, the Main aquifer is not directly susceptible to seawater intrusion in this area due to the Newport-Inglewood Fault Zone acting as an effective barrier to inland groundwater flow in the Main aquifer. All eight Main aquifer injection wells are primarily used for Basin replenishment.

4.3.3 Barrier Monitoring Well Trends

The groundwater elevation contour maps in the previous sections for the Shallow aquifer (Figure 4-4) and Main aquifer (Figure 4-6) represent one snapshot in time at the end of the water year (June 30). Throughout the calendar year, groundwater elevation trends in the barrier monitoring wells typically exhibit a seasonal pattern: (1) rising or remaining high during the winter and early spring months, (2) declining in the late spring and summer months to a low point in September, and (3) recovering in the fall months to the end of the year. In the coastal area, these seasonal groundwater level trends are largely controlled by coastal pumping which is greatest in the summer months due to seasonal water demands and to a lesser degree by barrier injection. During 2024, groundwater elevation trends at the barrier compliance monitoring wells generally followed the typical seasonal pattern. However, the usual year-end recovery was less than prior years. Some wells showed slight recovery, while others either remained stable or continued to decline through the end of the year. This limited recovery is attributed to almost no early wet-season rainfall in the final months of 2024, which led to increased seasonal water demand and higher coastal pumping.

4.4 Groundwater Quality

This section describes groundwater quality at the compliance monitoring wells and at production wells in the vicinity of the Talbert Barrier.

4.4.1 Compliance Monitoring Wells

Barrier compliance monitoring wells were tested for an extensive list of inorganic and organic parameters including constituents with secondary MCLs, 1,4-dioxane, and NDMA. Quarterly compliance groundwater quality data for the Talbert Barrier monitoring wells for 2024 are presented in Appendix G. Concentrations of 1,4-dioxane and NDMA for the barrier compliance monitoring wells for the last five years (2020-24) are summarized in Appendix H.

Table 4-2 shows all instances of secondary MCL exceedances at barrier compliance monitoring wells during 2024. Apparent color was detected at concentrations exceeding the secondary MCL of 15 color units at five separate monitoring well casings all screened in the Main aquifer at three sites (M45, M46, and M47). The threshold odor number was detected at concentrations exceeding the secondary MCL of 3 units at one monitoring well casing screened in the Lambda, Omicron, and Upper Rho aquifers (M10). Apparent color and threshold odor number are monitored annually at the barrier compliance wells and all exceedances were from the annual monitoring event in Q1. The elevated color and odor levels are likely due to the presence of naturally occurring organic matter in very old groundwater in the coastal area and therefore unrelated to purified recycled water injection.

Table 4-2. Secondary MCL Exceedances at Talbert Barrier Compliance Wells

	Background (pre-2008)		2022		2023		**2024**		Notes/Trends
	Range	Mean	Range	Mean	Range[1]	Mean	**Range[1]**	**Mean**	
APCOLOR (Secondary MCL = 15 Units)									
M45/5	100-120	114	90-110	98	110	110	**100**	**100**	Colored water zone; concentrations stable at background pre-GWRS levels.
M46/4	30-40	34	15-20	19	15	15	**25**	**25**	Colored water zone; concentrations stable below background pre-GWRS levels.
M46/5	25-50	35	60-70	66	70	70	**70**	**70**	Colored water zone; concentrations slightly increasing, unrelated to GWRS injection.
M47/4	25-52	38	12-15	14	10	10	**20**	**20**	Colored water zone; concentrations stable below background pre-GWRS levels.
M47/5	70-80	79	70-80	74	60	60	**70**	**70**	Colored water zone; concentrations stable at background pre-GWRS levels.
ODOR (Secondary MCL = 3 Units)									
M10/4	0-24	4	0-2	1	0	0	**8**	**8**	Concentrations stable at background pre-GWRS levels.

[1] Sampled once in 2023 and 2024.

Earlier changes in the GWRS groundwater monitoring program reduced the required frequency for some analytes from quarterly to annually based on a history of no detections (RWQCB, 2011 and CDPH, 2010; RWQCB 2018 and DDW, 2018) and eliminated a former permit requirement for total coliform monitoring at the GWRS groundwater compliance monitoring wells (RWQCB, 2018; DDW, 2018). The GWRS permit Monitoring and Reporting Program issued by the RWQCB in November 2020 formally incorporated both the removal of the total coliform monitoring requirement and the select monitoring frequency reductions (RWQCB, 2020). As noted in Section 4.2, additional changes to the required constituents for Talbert Barrier compliance monitoring were also made as part of the 2022 GWRS permit (RWQCB, 2022a).

As noted in previous annual reports, dissolved chloride concentrations can be used to trace the subsurface movement of injection water because chloride is relatively unaffected by sorption, chemical, or biological reactions in the aquifer. Thus, chloride is a relatively good conservative tracer. Arrival times at the Talbert Barrier have been documented previously in the GWRS Ramp Up Demonstration Report (DDB Engineering, Inc., 2009b). Arrival times at the Talbert Barrier were recently re-analyzed and re-confirmed (Section 4.1).

Aiding in tracking purposes, GWRS chloride concentrations are very low with an annual average ranging from 4-11 mg/L since 2008 and are therefore much lower than pre-GWRS (WF-21) injection which predominantly ranged from approximately 50-100 mg/L (with a few sporadic years slightly lower in the 20-50 mg/L range). Chloride concentrations in GWRS water are also noticeably lower than fresh native groundwater. Native groundwater inland of the barrier that is not impacted by seawater intrusion typically possesses chloride concentrations within the range of older pre-GWRS injection water in the shallow zones (Talbert and Alpha aquifers); lower than pre-GWRS injection water but still noticeably higher than GWRS water in the intermediate depth zones (Beta, Lambda, Omicron, and Upper Rho aquifers); and just slightly higher than GWRS water in the deeper Lower Rho and Main aquifer zones (15-20 mg/L). Only the shallow and intermediate depth aquifer zones are susceptible to seawater intrusion and thus historically received pre-GWRS injection water.

In 2000-2001, OCWD discovered elevated levels of 1,4-dioxane and NDMA present in injection water produced by WF-21. Subsequently, OCWD began frequent monitoring for 1,4-dioxane and NDMA at several locations: in the WF-21 source water, intermediate treatment steps, final product water, and monitoring and production wells located near the Talbert Barrier. By 2001, OC San and OCWD implemented additional source control measures and installed a UV/AOP treatment process as part of WF-21 to produce injection water in compliance with drinking water advisory levels for 1,4-dioxane and NDMA.

During GWRS arrival at a well, antecedent higher chloride concentrations characteristically decrease; this is typically accompanied by a contemporaneous decrease in any antecedent 1,4-dioxane concentrations present due to the historical impact of WF-21 injection. During high Basin conditions, several wells often exhibit a shift or reversal in the typically inland hydraulic gradient emanating from the barrier, causing older pre-GWRS (WF-21) water to migrate back to these wells; therefore, these gradient reversals typically lead to an increase in both chloride and 1,4-dioxane concentrations back toward pre-GWRS levels. These shifts can be observed seasonally within a given year and/or across multi-year periods. At some wells however, a gradient reversal indicated by increasing chloride concentrations may not lead to an increase in 1,4-dioxane concentrations if the pre-GWRS antecedent condition was native groundwater devoid of 1,4-dioxane. The chloride versus 1,4-dioxane relationship can be summarized as follows:

a) GWRS arrival – decrease in both chloride and 1,4-dioxane (if the latter is present in the pre-GWRS background condition);
b) Re-arrival of WF-21 water (gradient reversal) – increase in chloride and 1,4-dioxane; and
c) Re-arrival of native groundwater (gradient reversal) – chloride increase without any increase in 1,4-dioxane.

Figure 4-7 for OCWD-M11/4 (Lambda and Omicron aquifers) presents an illustrative example of the correlation between chloride and 1,4-dioxane. From 2013-2014, chloride concentrations at M11/4 were low and stable at GWRS levels, indicating approximately 100% GWRS arrival during that time. During that same time, 1,4-dioxane concentrations were also low and stable and were largely non-detect, confirming the 100% GWRS water arrival. During 2015, both chloride and 1,4-dioxane concentrations increased notably, signaling some proportion of older WF-21 water migrating back to this well due to a reversal in the gradient from landward to seaward.

Chloride and 1,4-dioxane time series graphs like Figure 4-7 for all five barrier compliance wells and voluntary monitoring well M19 were shown and discussed in detail in the 2022 and prior annual reports.

OCWD has continued testing for NDMA and voluntary testing for 1,4-dioxane at monitoring wells and production wells near the Talbert Barrier. NDMA and 1,4-dioxane concentrations from the compliance monitoring wells are presented in Appendix H. During 2024, NDMA concentrations were below the RL of 2 ng/L at all Talbert Barrier compliance monitoring wells except for M46A/1, where they ranged from ND to 2.4 ng/L, well below the Notification Level (NL) of 10 ng/L. Concentrations of 1,4-dioxane were detected above the NL of 1 µg/L at the following compliance wells during 2024:

- M10/3 (3.7 – 4.5 µg/L)
- M45/3 (1.5 – 2.9 µg/L)
- M45/4 (2.0 – 2.5 µg/L)

These detections were all well below the Response Level of 35 µg/L. Concentrations of 1,4-dioxane exceeding the NL have frequently been detected at these wells as shown in previous annual reports. These detections are not linked to GWRS injection which is devoid of 1,4-dioxane; rather, they are attributed to some percentage of pre-GWRS (WF-21) water either remaining or re-arriving at these wells due to the gradient reversals exemplified in Figure 4-7. As was discussed above, these gradient reversals often occur during high Basin conditions, as during 2022-2024.

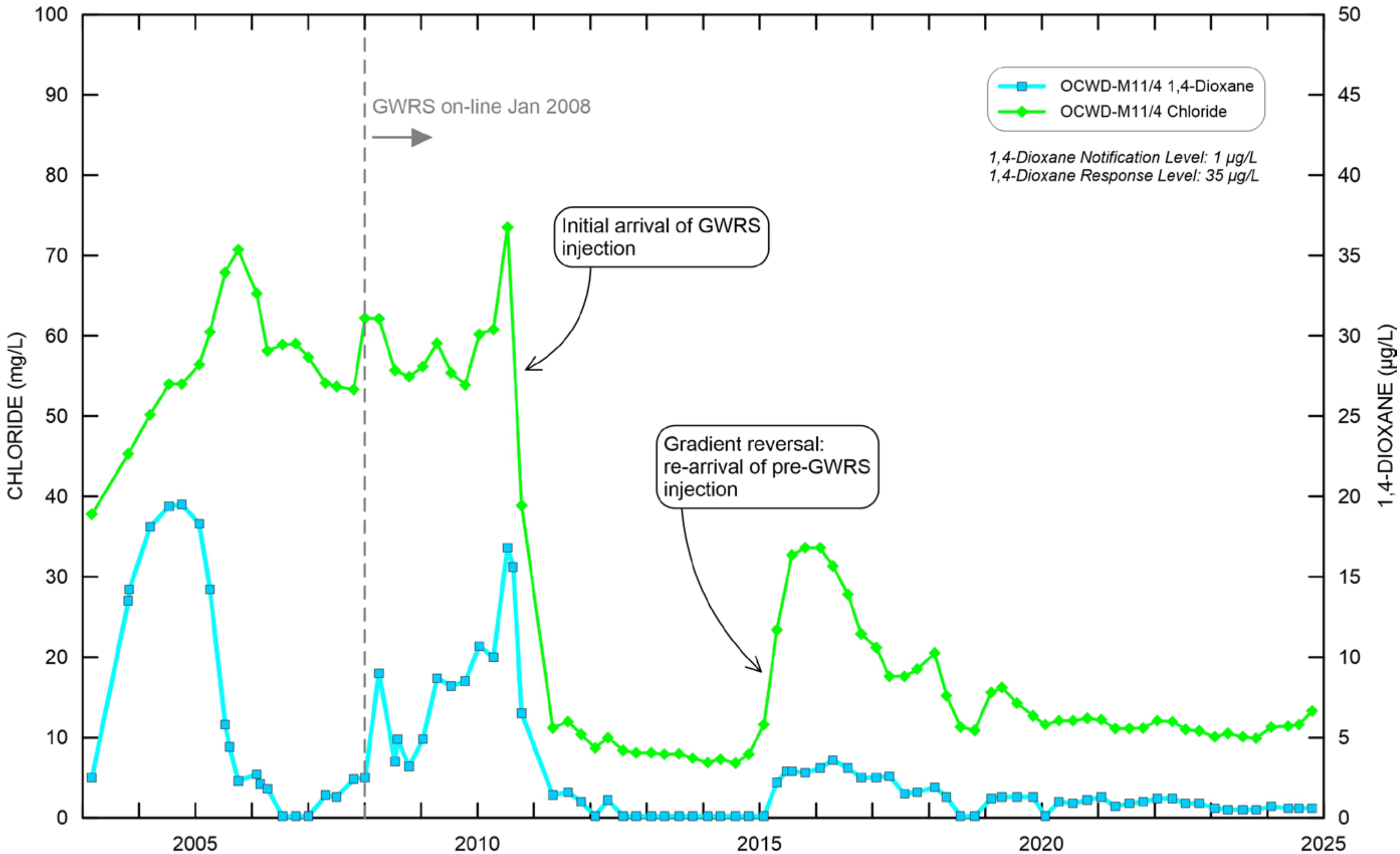


Figure 4-7. Compliance Monitoring Well OCWD-M11/4 Chloride and 1,4-Dioxane Concentrations

4.4.2 Production Wells

Groundwater quality data for water samples collected during 2024 from several potable and non-potable production wells in the vicinity of the Talbert Barrier are summarized in Table 4-3.

OCWD has established a primary boundary of 12 months underground travel time from the injection operation at the Talbert Barrier. Any new drinking water wells are to be constructed outside this primary boundary. The secondary boundary is defined as the area less than 12 months underground travel time from the Talbert Barrier injection operations. Generally, any new drinking water wells proposed to be constructed within the secondary boundary must be evaluated to assess any potential impact that the proposed well may have on the primary boundary, potentially changing the boundaries. In the case of the Talbert Barrier, the secondary boundary coincides with the primary boundary; therefore, drinking water wells are to be constructed outside the secondary boundary.

The Talbert Barrier injection operation complies with the GWRS permit requirements for underground retention time. The primary boundary is supported by Resolution No. 05-4-40 adopted by the OCWD Board of Directors on April 20, 2005 (OCWD, 2005). OCWD has notified the OCHCA and the City of Fountain Valley, which are the well permitting agencies in this area, of this boundary area requirement. The Orange County Well Standards Advisory Board has also been notified. No new drinking water wells have been installed in the 12-month underground

Table 4-3. 2024 Water Quality for Potable and Non-Potable Wells Within the Influence of the Talbert Barrier

OCWD Well Name	Well Depth (ft bgs)[1]	Perforation Interval (ft bgs)[1]	Distance from Injection Site (ft)[2]	Concentration[3,4]								
				Arsenic (As) ug/L	Chloride (Cl) mg/L	Bromide (Br) mg/L	Total Dissolved Solids (TDS) mg/L	Nitrate Nitrogen (NO3-N) mg/L	Nitrite Nitrogen (NO2-N) mg/L	Total Organic Carbon (Unfiltered) (TOC) mg/L	n-Nitrosodi-methylamine (NDMA) ng/L	1,4-Dioxane (14DIOX) ug/L
Large System Municipal Wells												
MCWD-5	960	400 - 940	3,300	2.9 (2.8 - 3.0)	13.1 (12.4 - 13.7)	0.04 (0.03 - 0.04)	134 (126 - 142)	1.51 (1.46 - 1.55)	ND	0.06	ND	0.7 (0.6 - 0.8)
MCWD-7	793	363 - 753	4,200	1.6 (1.5 - 1.6)	44.3 (44.2 - 44.3)	0.13 (0.12 - 0.14)	280 (268 - 292)	0.71 (0.64 - 0.76)	ND	0.14 (0.13 - 0.14)	ND	1.7 (1.4 - 1.9)
NB-DOLD	739	399 - 729	5,300	2.9 (2.8 - 2.9)	17.8 (17.6 - 17.9)	0.04 (0.03 - 0.05)	203 (202 - 204)	0.24 (0.22 - 0.27)	ND	0.1	ND	1.9 (1.7 - 2.1)
NB-DOLS	366	201 - 356	5,300	1	65.1 (61.9 - 69.2)	0.19 (0.14 - 0.22)	509 (468 - 550)	2.21 (2.16 - 2.25)	ND	0.2 (0.19 - 0.21)	ND	0.4 (ND - 0.6)
MCWD-3B	592	242 - 572	5,400	2.7	24.5	0.06	268	0.99 (0.88 - 1.10)	0.001 (ND-0.002)	0.09	ND	1.7 (1.0 - 2.1)
NB-TAMD	700	395 - 690	5,700	4.2 (3.8 - 4.5)	8.5 (8.1 - 8.9)	0.01	107 (98 - 116)	0.86 (0.79 - 0.89)	ND	0.04 (ND - 0.07)	ND	0.2 (ND - 0.5)
NB-TAMS	370	170 - 360	5,800	2.2 (1.6 - 2.7)	74.1 (66.9 - 84.1)	0.24 (0.14 - 0.34)	607 (576 - 638)	3.18 (2.73 - 3.62)	0.003 (ND-0.006)	0.28 (0.27 - 0.29)	ND	1.4 (0.6 - 1.9)
FV-10	990	460 - 980	7,600	1.3	36	0.1	316 (310 - 322)	1.94 (1.65 - 2.17)	ND	0.12	ND	1.4 (1.1 - 1.6)
HB-3A	660	370 - 640	7,600	Well did not operate during 2024								
HB-5	820	223 - 800	8,000	2.6	25.6 (23.4 - 27.7)	0.09 (0.08 - 0.1)	268	1.05 (0.78 - 1.32)	0.001 (ND-0.002)	0.15	ND	ND
HB-9	996	556 - 996	8,000	2	13.1 (13 - 13.2)	0.04	214	ND	ND	0.46	ND	ND
Small System and Private Wells												
GKAW-FV2	125	120 - 125	900	1.9	87.9 (87.7 - 88.1)	0.29 (0.28 - 0.29)	587 (534 - 640)	2.97	0.003	0.22	ND	1.7 (1.6 - 1.7)
KUBO-FV	133	122 - 132	2,900	1.6	95.6 (94.1 - 97.1)	0.32 (0.31 - 0.32)	651 (650 - 652)	3.72	0.005	0.27 (0.26 - 0.28)	NR[5]	ND
LIBM-HB		NA	4,100	1.6 (1.5 - 1.6)	38.7 (36.1 - 43.1)	0.13 (0.12 - 0.15)	243 (236 - 248)	2.55 (2.42 - 2.64)	ND	0.09 (0.08 - 0.09)	ND	0.4 (ND - 0.7)
Private Irrigation Wells												
CALL-FV		NA	400	1.9 (1.6 - 2.1)	19.9 (9.4 - 30.4)	0.06 (0.03 - 0.09)	137 (82 - 192)	1.50 (1.49 - 1.51)	ND	0.04 (ND - 0.07)	ND	0.6 (ND - 0.9)
A1-HB	305	188 - 300	1,800	2.1	41.95 (41 - 42.9)	0.13	334 (316 - 352)	1.89	ND	0.14 (0.13 - 0.15)	ND	0.9 (0.8 - 0.9)

[1] feet below ground surface

[2] Distance from Injection Site: Straight line shortest distance to the nearest Talbert Barrier injection well, estimated to the nearest 100 feet

[3] Concentrations are annual averages with annual ranges in parenthesis for the given year

[4] ND: Not detected or less than the reporting limit

[5] NR: Not Required (this parameter was not monitored at this site during the year)

retention area. As noted in Section 4.2, DDW is currently evaluating an updated and slightly smaller retention time boundary for the Talbert Barrier. If approved by DDW, this revised boundary will be presented to the OCWD Board of Directors for their approval, then distributed to the local well permitting agencies for enforcement.

The active municipal well closest to the Talbert Barrier is MCWD-5, which is owned and operated by Mesa Water and located approximately 3,300 feet northeast of the eastern end of the barrier. OCWD staff previously estimated the travel time for injection water to reach MCWD-5 to range from three to eight years (depending on the specific aquifer screened by the multi-aquifer production well) based on groundwater level conditions and injection operations over the last several years.

NDMA concentrations at MCWD-5 decreased below the RL in early 2010 and remained below the RL of 2 ng/L through 2024. To reduce drinking water concentrations of NDMA, a UV treatment system was previously operated at the MCWD-5 well site from 2001-2010. The steady decline in NDMA levels below the RL led to a DDW-approved shutdown of the UV system in 2010 via an amendment to Mesa Water's Domestic Water Supply Permit.

Concentrations of 1,4-dioxane and chloride for MCWD-5 and injection water for the period 2002-2024 are shown on Figure 4-8. Prior to commencement of GWRS injection from 2002-2008, concentrations of 1,4-dioxane at MCWD-5 were highly variable but with a gradually decreasing trend likely due to OCWD and OC San implementing source control measures and installing a UV/AOP post-treatment process to WF-21 in 2000-2001. Intermittent increases in 1,4-dioxane concentrations during this time were likely attributable to shifts in gradient direction based on groundwater level variations as was explained in Section 4.4.1 for the GWRS compliance monitoring wells based on comparing 1,4-dioxane and chloride concentration trends. In 2008, 1,4-dioxane concentrations declined further and more steadily, likely signaling arrival of imported OC-44 potable injection devoid of 1,4-dioxane that began in late 2004. Concentrations of 1,4-dioxane have continued to gradually decrease over time since 2008 due to increasing percentages of GWRS water arriving at MCWD-5, except for minor intermittent increases in some years likely caused by subtle shifts in the gradient direction based on groundwater level variations. Figure 4-8 shows one such temporary increase in both 1,4-dioxane and chloride during 2013, likely resulting from high Basin conditions causing a shift in the gradient direction which likely brought older pre-GWRS water back to this well.

Concentrations of 1,4-dioxane have remained well below the DDW Response Level of 35 μg/L at MCWD-5 since sampling began in 2002 and over the last several years have gradually declined, falling below the DDW NL of 1 μg/L for the first time in 2021. During 2024, 1,4-dioxane concentrations at MCWD-5 remained low and stable at 0.6-0.8 μg/L.

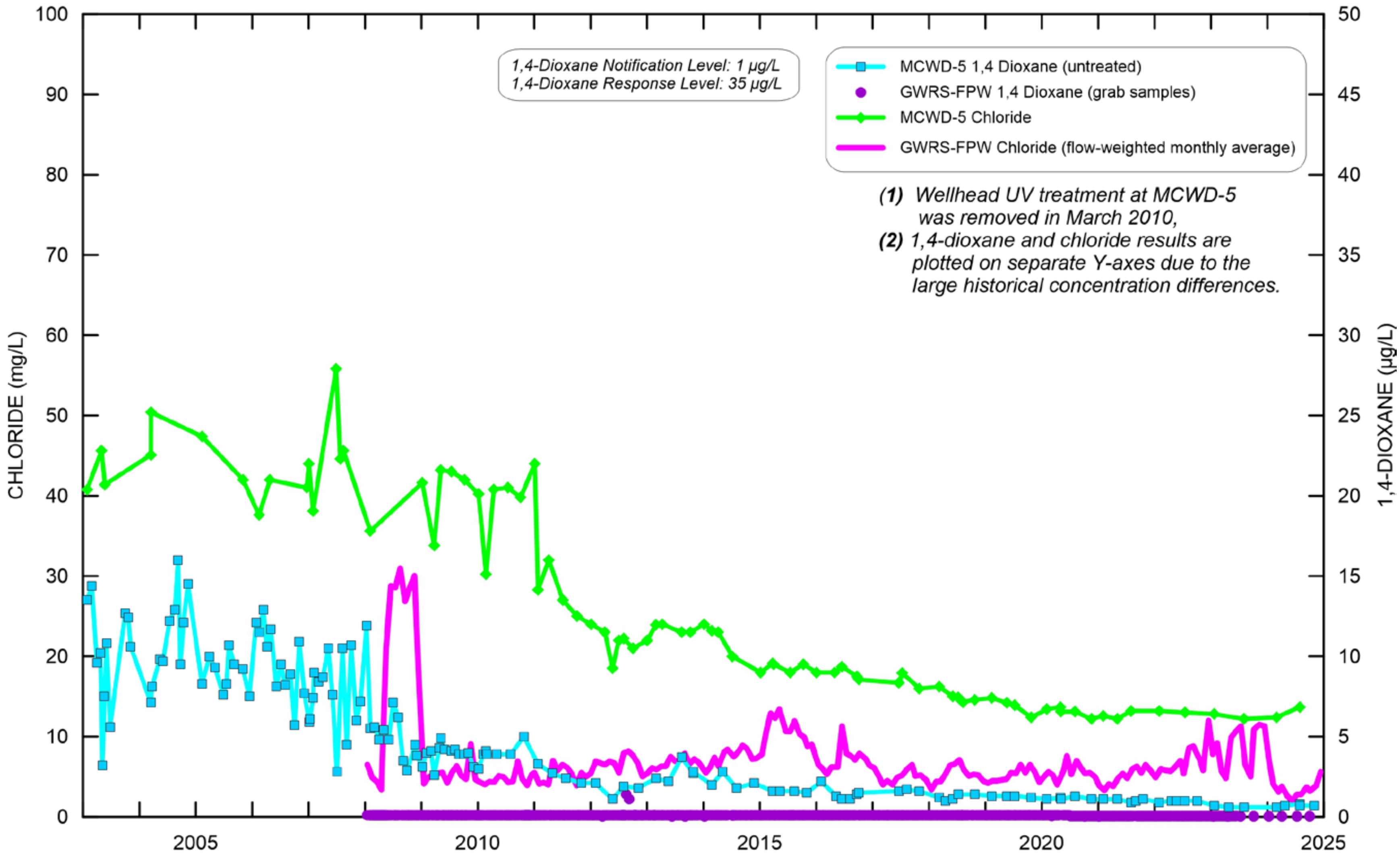


Figure 4-8. MCWD-5 Pre-Treatment and Injection Water Chloride and 1,4-Dioxane Concentrations

Since 1,4-dioxane concentrations are low but still detectable at MCWD-5 during 2024, GWRS arrival at this well is likely still blended with at least some small percentage of older pre-GWRS injection water. Due to the vertical blending in the well from the various screened intervals at MCWD-5, travel times for the individual aquifer zones screened at MCWD-5 are not discernable based on the vertically blended 1,4-dioxane concentrations from the pumped samples. The low 1,4-dioxane concentrations at MCWD-5 over the last several years (Figure 4-8) could represent a blend of nearly 100% GWRS injection water from one or more of the screened aquifer zones along with a small fraction of older pre-GWRS injection water from one or more of the other screened aquifer zones.

Figure 4-8 shows chloride concentrations at MCWD-5 ranged from 36-56 mg/L prior to GWRS injection from 2002-2008, reflective of a blend of native groundwater and pre-GWRS (WF-21) injection. Chloride concentrations sharply decreased in early 2011, signaling the arrival of GWRS water in one or more of the screened interval zones at MCWD-5. This initial GWRS arrival of just over three years is consistent with the fastest portion of the previously calculated travel time range of three to eight years, especially given a somewhat steeper gradient from the barrier since commencement of GWRS due to the higher injection volumes.

Except for the temporary increase in 2013, chloride concentrations at MCWD-5 have decreased steadily since 2011 down to approximately 13 mg/L during 2024, still slightly higher than GWRS injection water chloride concentrations (Figure 4-8). These declining chloride concentrations confirm the progressive arrival of greater proportions of GWRS water but still less than 100% and are consistent with the decline in 1,4-dioxane concentrations to just slightly above the RDL.

In 2012, OCWD became aware that existing private well GKAW-FV2/1 near the Talbert Barrier was being used to supply water to an occupied residence in Fountain Valley. Historically, this well had been used only for irrigation purposes. More recent inquiries with the owner have revealed that, beginning in approximately 2011, the well water is also being used for potable purposes with a reverse osmosis treatment system. Well GKAW-FV2/1 is located approximately 900 feet north of injection well site I10 and is perforated from 120-125 ft bgs in the Talbert aquifer. The underground retention time at this private drinking water well is estimated to be greater than 17 years since groundwater samples indicate that GWRS purified recycled water has not yet reached this well despite its proximity to the barrier.

During 2024, the chloride concentration at GKAW-FV2/1 was measured at 88 mg/L while 1,4-dioxane concentrations were detected ranging from 1.6 to 1.7 μg/L (Table 4-3), both indicative of pre-GWRS injection water and likely some proportion of ambient groundwater. Since the inception of GWRS, the groundwater flow direction in the Talbert aquifer at GKAW-FV2/1 has predominantly been seaward to the southwest towards the barrier (rather than inland towards GKAW-FV2/1), similar to what was shown in Figure 4-4 for the Talbert aquifer during June 2024 in the vicinity of this well. All water quality sample results reported by the OCWD Laboratory are reviewed by OCWD Water Quality Department staff and then sent to the well owner. This is consistent with typical practice by OCWD Water Quality staff for both public and private wells but is of particular importance for GKAW-FV2/1 since this well is near the Talbert Barrier.

5. KRAEMER-MILLER-MIRALOMA-LA PALMA BASINS OPERATIONS

During 2024, OCWD spread GWRS purified recycled water at Kraemer-Miller-Miraloma-La Palma (K-M-M-L) Basins to recharge the Orange County Groundwater Basin (Figure 1-1). Operation of the recharge facilities is presented in this section:

- Spreading facilities;
- Spreading water sources;
- Spreading water volumes; and
- K-M-M-L Basins operations.

5.1 Spreading Facilities

Table 5-1 summarizes the area, storage capacity and potential recharge water source(s) for each surface recharge facility owned or operated by OCWD. K-M-M-L Basins are the only spreading basins that receive GWRS purified recycled water. The locations of the surface spreading facilities are shown on Figure 5-1.

Table 5-1. Area and Storage Capacities of Recharge Facilities

Facility	Wetted Area (acres)	Maximum Storage Capacity (AF)	Possible Recharge Sources			
			GWRS Purified Recycled Water	Captured Storm Water	Imported Water	SAR Base Flow
Kraemer Basin	31	1,055	✓	✓	✓	✓
Miller Basin	25	350	✓	✓	✓	✓
Miraloma Basin[1]	11	53	✓	✓	✓	✓
La Palma Basin[2]	14	101	✓	✓	✓	✓
Other Basins[3,4]	1,018	23,688		✓	✓	✓

[1] Miraloma Basin has been essentially dedicated for GWRS purified recycled water recharge since coming on-line in 2012 to minimize basin clogging and maintain high percolation rates (small volume of non-GWRS water recharged there in 2017).

[2] La Palma Basin continues to be dedicated for only GWRS purified recycled water recharge since coming on-line in 2016 to minimize basin clogging and maintain high percolation rates.

[3] OCWD owns and/or operates a total of 27 surface water recharge basins near the SAR and Santiago Creek. These other basins are not used for recharge of GWRS water.

[4] Quagga mussel control requirements restrict the recharge of imported Colorado River water in some of the other basins.

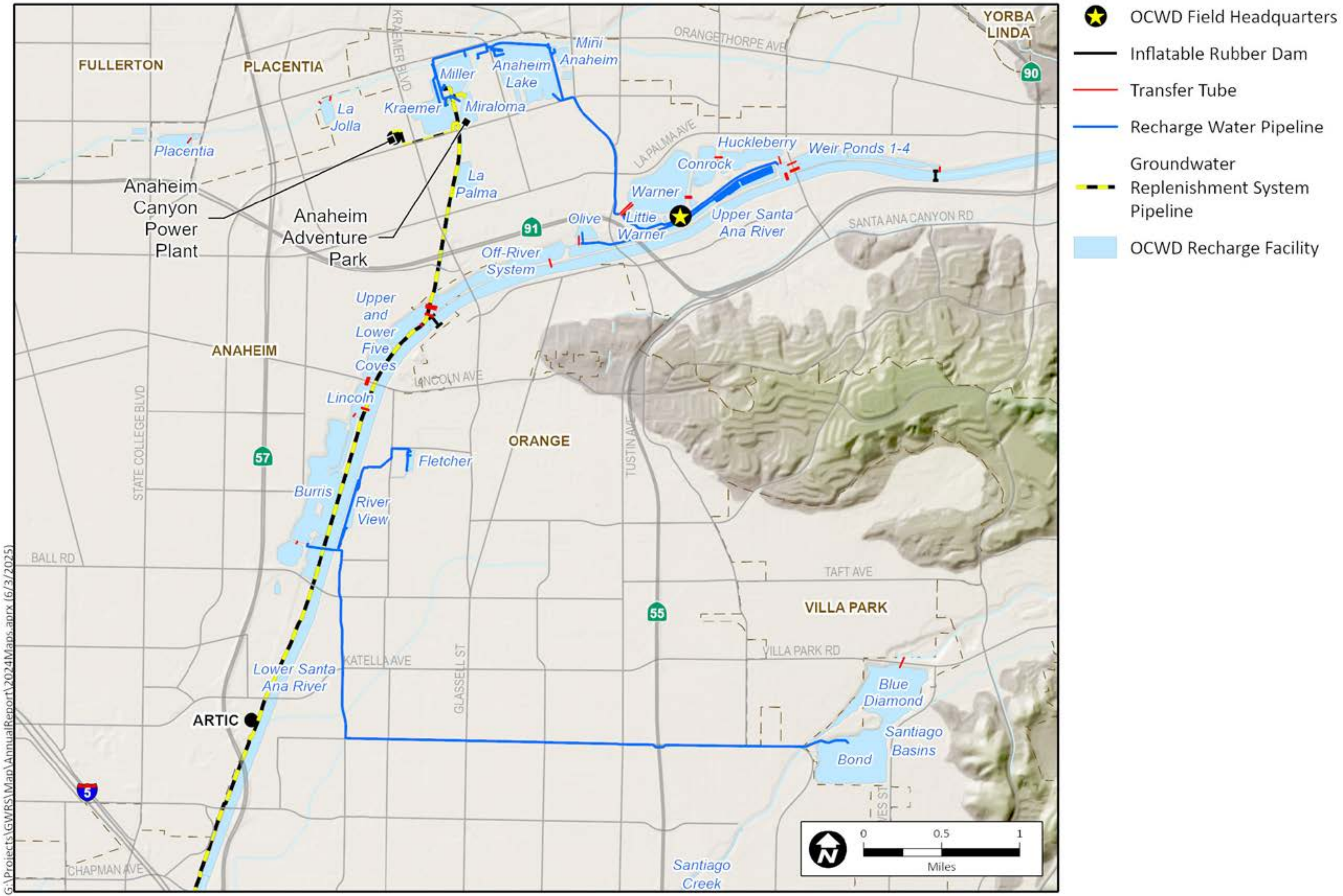


Figure 5-1. Surface Water Recharge Facilities

Kraemer Basin is one of eleven deep basins used for percolation. Figure 5-2 shows a photo of Kraemer Basin, which first recharged GWRS purified recycled water on February 19, 2008. Kraemer Basin covers an area of approximately 31 acres and has a maximum storage capacity of about 1,055 AF. Based on percolation tests with low turbidity water, its maximum percolation rate is estimated at 65 MGD (100 cubic feet per second [CFS]).

Figure 5-2. Kraemer Basin

Miller Basin is a flood control basin owned by the County of Orange and conjunctively used by OCWD as a recharge basin through a cooperative agreement. Miller Basin covers an area of approximately 25 acres and has a maximum storage capacity of about 350 AF. In winter, its usable storage capacity (and thus recharge potential) is reduced for flood control purposes. More storage capacity is available at Miller Basin in the summer. Its estimated maximum percolation rate is 29 MGD (45 CFS), assuming percolation of low turbidity GWRS and/or imported water. Shown on Figure 5-3, GWRS purified recycled water recharge first began at Miller Basin on January 17, 2008.

Figure 5-3. Miller Basin with GWRS Purified Recycled Water in 2008

Miraloma Basin is located immediately southeast of Kraemer-Miller Basins and along Carbon Creek Diversion Channel. Pictured on Figure 5-4, Miraloma Basin covers an area of approximately 11 acres and has a maximum storage capacity of about 53 AF. Based on the observed percolation of GWRS purified recycled water, its maximum percolation rate is estimated at 30 MGD (46 CFS). GWRS purified recycled water recharge first began at Miraloma Basin on July 26, 2012. Since then, OCWD has predominately recharged purified recycled water at Miraloma Basin, though the recharge was briefly supplemented with a small volume of non-GWRS water in 2017. The AAP is located at Miraloma Basin and began operation in July 2021.

La Palma Basin is the newest spreading basin located south of Kraemer and Miraloma Basins along Carbon Creek Diversion Channel as shown on Figure 5-5. La Palma Basin covers an area of approximately 14 acres and has a maximum storage capacity of about 101 AF. La Palma Basin has demonstrated exceptional percolation capabilities, achieving an estimated maximum percolation rate of 65 MGD (100 CFS). GWRS purified recycled water spreading first began at La Palma Basin on November 9, 2016. Since then, La Palma Basin has been dedicated to recharging purified recycled water and recharged nearly 46% of all GWRS production during 2024.

Figure 5-4. Miraloma Basin with GWRS Purified Recycled Water in 2012

Figure 5-5. La Palma Basin with GWRS Purified Recycled Water in 2016

5.2 Spreading Water Sources

Water from three sources is typically percolated at K-M-M-L Basins: (1) GWRS purified recycled water; (2) SAR base flow and captured storm flow; and (3) untreated imported water. During 2024, only GWRS and SAR water were percolated at K-M-M-L Basins. Due to relatively high Basin conditions and less Basin pumping due to PFAS, no imported surface water was purchased by OCWD for groundwater recharge during 2024. Except for a minor volume of other water recharged at Miraloma Basin in 2017, both Miraloma and La Palma Basins have been dedicated to recharging GWRS purified recycled water since their inception to prevent long-term clogging and maintain their exceptionally high percolation rates.

Prior to 2014, the volume of diluent water (recharge water of non-wastewater origin) was formally recorded for determining compliance with the maximum allowable Recycled Water Contribution (RWC), which was 75% at Kraemer-Miller-Miraloma Basins (La Palma Basin was not in operation at that time). Diluent consisted of SAR captured storm flow and imported water; SAR base flow was not classified as a diluent because it is principally comprised of tertiary treated wastewater effluent from upstream dischargers. Recharge of diluent at the nearby Anaheim Lake, Mini-Anaheim Lake, and La Jolla Basin were applied to the RWC calculation because of their effective blending with GWRS recharge at K-M-M-L Basins.

In 2014 DDW approved a maximum RWC at K-M-M-L Basins of 100%, eliminating the blending requirement. The volumes of spreading water from the aforementioned sources are reported herein for K-M-M-L Basins, but determination of the RWC and compliance with the RWC limit are no longer required. Therefore, the two non-GWRS sources are grouped together herein as “other water.” The volumes of water recharged at Anaheim Lake, Mini-Anaheim Lake, and La Jolla Basins can be found in the 2022 and earlier annual reports.

5.3 Spreading Water Volumes and Flow Rates

Spreading water volumes recharged in K-M-M-L Basins in 2024 are presented below and compared with historical spreading amounts.

5.3.1 2024 Spreading Water Quantities

Table 5-2 presents the monthly recharge volumes at each of the individual GWRS recharge basins. During 2024, a total volume of approximately 31,588 MG (96,940 AF) of GWRS purified recycled water and other water, comprised of SAR water and/or imported water, was recharged at K-M-M-L Basins.

The monthly volumes of water that were recharged at K-M-M-L Basins during calendar year 2024 based on OCWD Forebay Operations’ percolation records. The percolation records typically differ slightly from the AWPF purified recycled water production records due to storage effects in the spreading basins, GWRS Pipeline, flow measurement/metering inaccuracies, and unmeasured rainfall and local runoff to the basins. Based on AWPF flow records during 2024, the following volumes and average daily flow rates of GWRS purified recycled water were delivered to the Anaheim Forebay:

- Kraemer Basin: 1,494 MG (4,585 AF; 5,655,000 m^3), or 4.1 MGD on average;
- Miller Basin: 1,740 MG (5,340 AF; 6,587,000 m^3), or 4.7 MGD on average;
- Miraloma Basin: 6,709 MG (20,589 AF; 25,396,000 m^3), or 18.3 MGD on average; and
- La Palma Basin: 15,091 MG (46,314 AF; 57,128,000 m^3), or 41.2 MGD on average.

The total volume of GWRS purified recycled water recharged at K-M-M-L Basins during 2024 was 25,034 MG (76,828 AF). The annual average daily flow rate of GWRS purified recycled water spread in 2024 was 68.4 MGD.

Captured flow was diverted from the SAR and recharged at Kraemer and Miller Basins during 2024. No imported replenishment water was purchased in 2024. In 2024, a total of approximately 6,549 MG (20,097 AF) of other (non-GWRS) water comprised solely of SAR flows was recharged at Kraemer and Miller Basins. Kraemer and Miller Basins received both GWRS purified recycled water and non-GWRS (other) water during 2024. Miraloma and La Palma Basins received only GWRS purified recycled water during 2024 (excluding any unmeasured direct rainfall or site runoff). Miraloma and La Palma Basins have been dedicated almost exclusively to GWRS water as noted in Section 5.2.

Figure 5-6 illustrates the total 2024 water supply volumes recharged at K-M-M-L Basins. As noted above, a total of approximately 25,034 MG (76,828 AF) of GWRS purified recycled water was recharged at K-M-M-L Basins. Approximately 60% of the GWRS purified recycled water pumped to the Anaheim Forebay was recharged at La Palma Basin during 2024.

Figure 5-6 also shows how the recharge of GWRS purified recycled water at K-M-M-L Basins varied on a month-to-month basis. The monthly volume of purified recycled water delivered to K-M-M-L Basins varied throughout 2024, ranging from 3,261 AF in March to 8,940 AF in December (See Table 5-2). The low volume in March was due to (1) cleaning of La Palma and Miraloma Basins, (2) other water (captured SAR storm flow) in Kraemer and Miller Basins due to above average rainfall, and (3) a planned GWRS shutdown for maintenance and coordination with OC San's OOBS testing. The amounts of other (SAR) water varied seasonally based on winter/spring rainfall. Other water monthly volumes ranged from 0 AF in July, August, November, and December to 5,581 AF in March. The monthly volume of GWRS purified recycled water exceeded the monthly volume of other water recharged at K-M-M-L Basins throughout 2024, with the exception of March.

Table 5-2. 2024 Summary of Spreading Water Locations and Volumes at K-M-M-L Basins [1]

Month	Kraemer Basin				Miller Basin				Miraloma Basin				La Palma Basin				Total GWRS Water		Total Change in Storage	Total Other Water	TOTAL PERCOLATION		
	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	(AF)	(MG)	(AF)	(AF)	(AF)	(MG)	Average (MGD)
Jan	538	368	477	647	0	98	1,481	1,383	2,871	2	0	2,869	5,452	27	0	5,425	8,861	2,887	495	1,958	10,324	3,364	108.5
Feb	1,798	703	2,764	3,859	0	28	1,300	1,272	2,016	4	0	2,012	3,944	-1	0	3,945	7,758	2,528	734	4,064	11,088	3,613	124.6
Mar	14	18	4,195	4,191	0	-34	1,386	1,420	1,272	-46	0	1,318	1,976	41	0	1,935	3,261	1,063	-21	5,581	8,864	2,888	93.2
Apr	0	18	3,428	3,410	0	106	1,695	1,589	2,092	-7	0	2,099	4,728	-9	0	4,737	6,820	2,222	108	5,123	11,835	3,856	128.5
May	0	21	2891	2,870	0	-313	326	639	2,184	23	0	2,161	1,681	-15	0	1,696	3,865	1,259	-284	3,217	7,366	2,400	77.4
Jun	0	-1,128	97	1,225	186	2	0	184	1,404	-6	0	1,410	4,079	34	0	4,045	5,669	1,847	-1,098	97	6,864	2,237	74.6
Jul	0	0	0	0	835	16	0	819	1,452	-1	0	1,453	3,350	5	0	3,345	5,637	1,837	20	0	5,617	1,830	59.0
Aug	0	0	0	0	1,953	-1	0	1,954	960	-1	0	961	3,348	-3	0	3,351	6,261	2,040	-5	0	6,266	2,042	65.9
Sep	1,967	121	44	1,890	1,839	115	0	1,724	969	-16	0	985	1,526	-75	0	1,601	6,300	2,053	145	45	6,200	2,020	67.3
Oct	269	-121	12	402	527	-106	0	633	465	-7	0	472	5,106	34	0	5,072	6,368	2,075	-200	12	6,579	2,144	69.2
Nov	0	0	0	0	0	0	0	0	1,958	20	0	1,938	5,131	18	0	5,113	7,088	2,310	38	0	7,051	2,298	76.6
Dec	0	0	0	0	0	0	0	0	2,945	16	0	2,929	5,994	37	0	5,957	8,940	2,913	53	0	8,886	2,896	93.4
TOTAL	4,585	0	13,909	18,494	5,340	-89	6,188	11,617	20,589	-19	0	20,607	46,314	93	0	46,222	76,828	25,034	-15	20,097	96,940	31,588	86.3

[1] Volumes include:
- GWRS purified recycled water (GWRS water) data are based on AWPF flow meter records and Forebay Operations' records for flows delivered to individual spreading basins.
- Other water calculated as: Total Percolation - GWRS water + Change in Storage, based on Forebay Operations' records and typically include Santa Ana River (SAR) water and/or imported water.
- Total percolation volumes are based on Forebay Operations' percolation records.
- Change in Storage represents water retained in K-M-M-L Basins that has not yet percolated based on Forebay Operations' records at the beginning and end of each month. The change in storage values were also adjusted for some months to account for unmeasured inter-basin water transfers and to balance reported GWRS deliveries with measured total percolation for each basin.

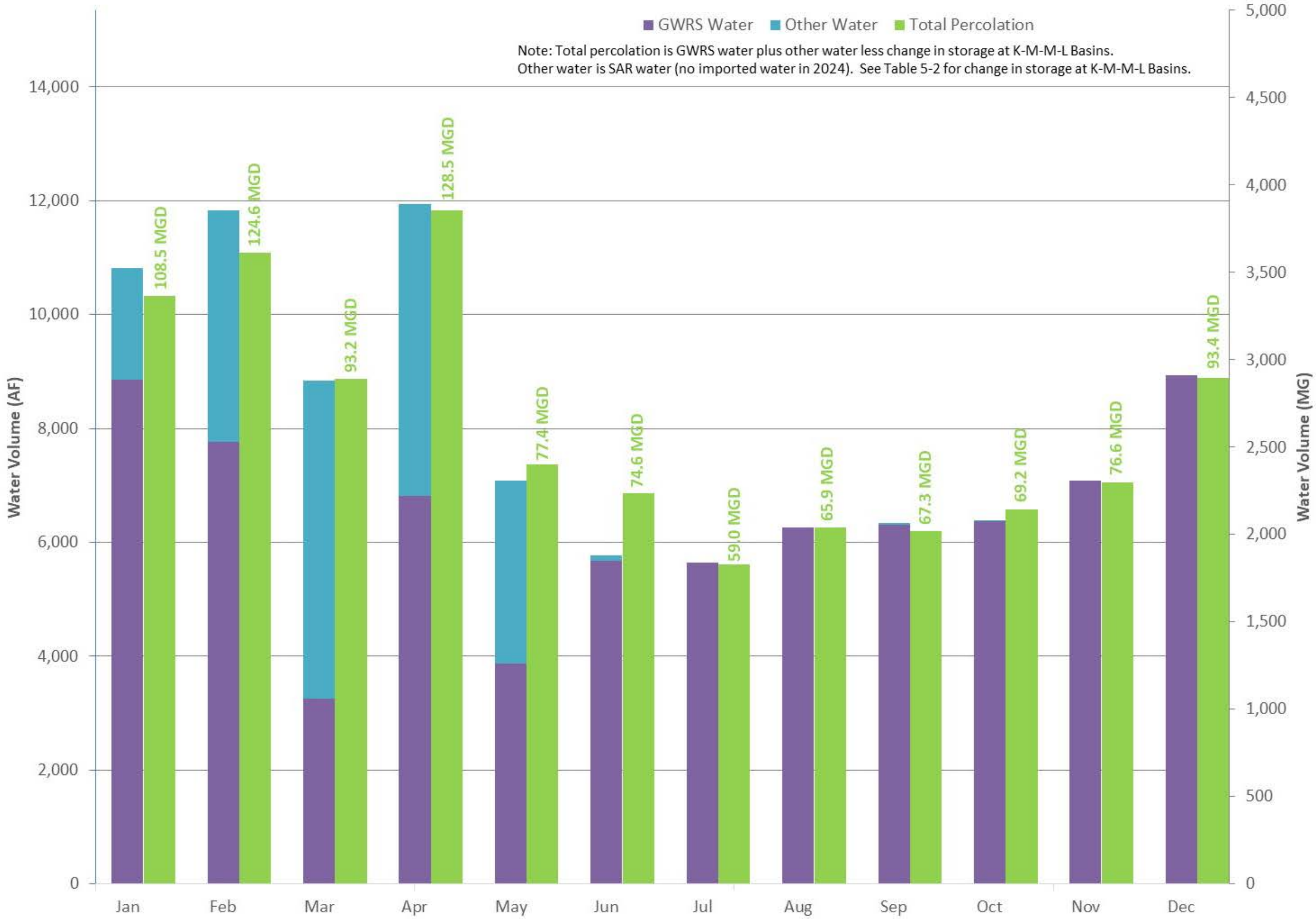


Figure 5-6. 2024 Monthly Percolation Water Volumes at K-M-M-L Basins

The annual average daily flow rate of GWRS purified recycled water recharged at K-M-M-L Basins was 68.4 MGD during 2024, with production affected by lower source water availability as discussed in Section 2. The combined average daily flow rate of other water (SAR water only in 2024) recharged at Kraemer and Miller Basins was approximately 17.9 MGD.

5.3.2 Historical Spreading Water Quantity

Prior to 2008, only SAR water and imported water were recharged at Kraemer-Miller Basins. GWRS purified recycled water spreading began at Kraemer Basin in February 2008 and continued through 2024. Purified recycled water spreading began at Miller Basin in January 2008 and continued through 2024. Purified recycled water spreading began at Miraloma Basin in July 2012 and has essentially been constant since, except for the April 2020 – January 2021 construction period for the AAP. Purified recycled water spreading began at La Palma Basin in November 2016 and continued through 2024.

Table 5-3 and Figure 5-7 compare the volume of purified recycled water and other water recharged at K-M-M-L Basins in 2024 with historical recharge data since the GWRS began operation in January 2008. Since 2008, the highest purified recycled water volume that was delivered to K-M-M-L Basins occurred in 2023 (28,242 MG or 86,673 AF) because the GWRSFE came on-line and high coastal groundwater levels resulted in less injection into the Talbert Barrier more flow available for surface recharge at K-M-M-L Basins. In comparison to 2023, the 2024 purified recycled water volume delivered to K-M-M-L Basins (28,034 MG or 76,828 AF) was approximately 11% lower than this historic peak volume due to OC San's source water shortages (see Section 2). There were also periods in February and March of 2024 when above average seasonal rainfall caused Kraemer and Miller Basins to be largely full of captured SAR storm flow, reducing the capacity for recycled water recharge.

The combined total of 96,940 AF (GWRS and other water) recharged at K-M-M-L Basins during 2024 was approximately 7% lower than the 2023 volume, primarily attributable to the decreased volume of GWRS purified recycled water recharge at K-M-M-L Basins. The recharge volume of other water (SAR only, no imported water) at K-M-M-L Basins in 2024 was approximately 14% greater than in 2023. Rainfall at the OCWD Field Headquarters in Anaheim was approximately 30% lower in 2024 (17.09 in) than in 2023 (24.36 in); both years were above the typical annual average (13 in) for that area. No imported replenishment water was purchased and recharged during 2024 or 2023 (0 AF).

Table 5-3. Summary of Annual Spreading Water Sources and Volumes Since 2008 at K-M-M-L Basins

Year	GWRS Purified Recycled Water[1] (AF)	Other Water[2,3] (AF)	TOTAL PERCOLATION[4]	
			(AF)	(MG)
2008	21,307	23,538	44,845	14,613
2009	27,023	14,822	41,845	13,635
2010	29,473	27,191	56,664	18,464
2011	42,283	18,872	61,155	19,927
2012	46,865	7,495	54,360	17,713
2013	42,478	13,420	55,898	18,214
2014	33,091	31,350	64,441	20,998
2015	55,472	13,525	68,891	22,448
2016	63,048	14,142	76,863	25,046
2017	72,458	48,029	120,153	39,152
2018	70,307	39,277	108,919	35,491
2019	74,391	21,879	96,393	31,410
2020	63,097	19,959	83,308	27,146
2021	59,884	26,497	86,010	28,026
2022	66,853	20,251	86,377	28,146
2023	86,673	17,618	104,138	33,934
2024	76,828	20,097	96,940	31,588
TOTAL	**931,531**	**377,962**	**1,307,200**	**425,953**

[1] GWRS purified recycled water flows are based on AWPF flow records.

[2] Other water is Santa Ana River (SAR) water and/or imported water.

[3] Other water calculated as: Total Percolation - GWRS water + Change in Storage in K-M-M-L Basins.

[4] Totals are based on percolation records measured by OCWD Forebay Operations staff.

Note: Other water consists of SAR water and/or imported water (no imported water in 2024). Other water calculated as: Total Percolation - GWRS water + Change in Storage in K-M-M-L Basins.

Figure 5-7. Annual Spreading Water Sources and Volumes Since 2008 at K-M-M-L Basins

5.4 K-M-M-L Basins Operations

Purified recycled water produced by the AWPF was pumped to the Anaheim Forebay and spread at K-M-M-L Basins in 2024. La Palma Basin was the primary site for recharging purified recycled water throughout 2024, as detailed in Table 5-4 and illustrated on Figure 5-8. Miraloma Basin required a relatively steady flowrate to ensure a proper water level for AAP operations. Miraloma Basin recharged purified recycled water through most of 2024 (October flow was lower to allow for maintenance); Miraloma Basin accounted for nearly 27% of the K-M-M-L Basins recharge volume. In total, La Palma Basin received approximately 60% of the purified recycled water spread at K-M-M-L Basins. Lesser volumes of purified recycled water were received and spread at Kraemer Basin (6%) and Miller Basin (7%) of the K-M-M-L Basins total recharge volume in 2024. Kraemer and Miller Basins were utilized to also recharge other water during 2024.

OCWD does not have a regularly scheduled cleaning cycle for K-M-M-L Basins. In March 2024 Miraloma Basin and La Palma Basin were sequentially taken out of service for cleaning. Purified recycled water deliveries were reduced during two cleaning periods: (1) Miraloma Basin between March 21-28, and (2) La Palma Basin between March 7-18. The need for a basin to be taken out of service and cleaned depends on the percolation performance.

Table 5-4. 2024 Monthly Purified Recycled Water Flow Rates at K-M-M-L Basins

Month	Kraemer Basin (Avg. MGD)	Miller Basin (Avg. MGD)	Miraloma Basin (Avg. MGD)	La Palma Basin (Avg. MGD)	TOTAL (Avg. MGD)
January	5.7	0.0	30.2	57.3	93.1
February	20.2	0.0	22.7	44.3	87.2
March	0.1	0.0	13.4	20.8	34.3
April	0.0	0.0	22.7	51.4	74.1
May	0.0	0.0	23.0	17.7	40.6
June	0.0	2.0	15.3	44.3	61.6
July	0.0	8.8	15.3	35.2	59.2
August	0.0	20.5	10.1	35.2	65.8
September	21.4	20.0	10.5	16.6	68.4
October	2.8	5.5	4.9	53.7	66.9
November	0.0	0.0	21.3	55.7	77.0
December	0.0	0.0	31.0	63.0	94.0
TOTAL	**4.1**	**4.8**	**18.3**	**41.2**	**68.4**

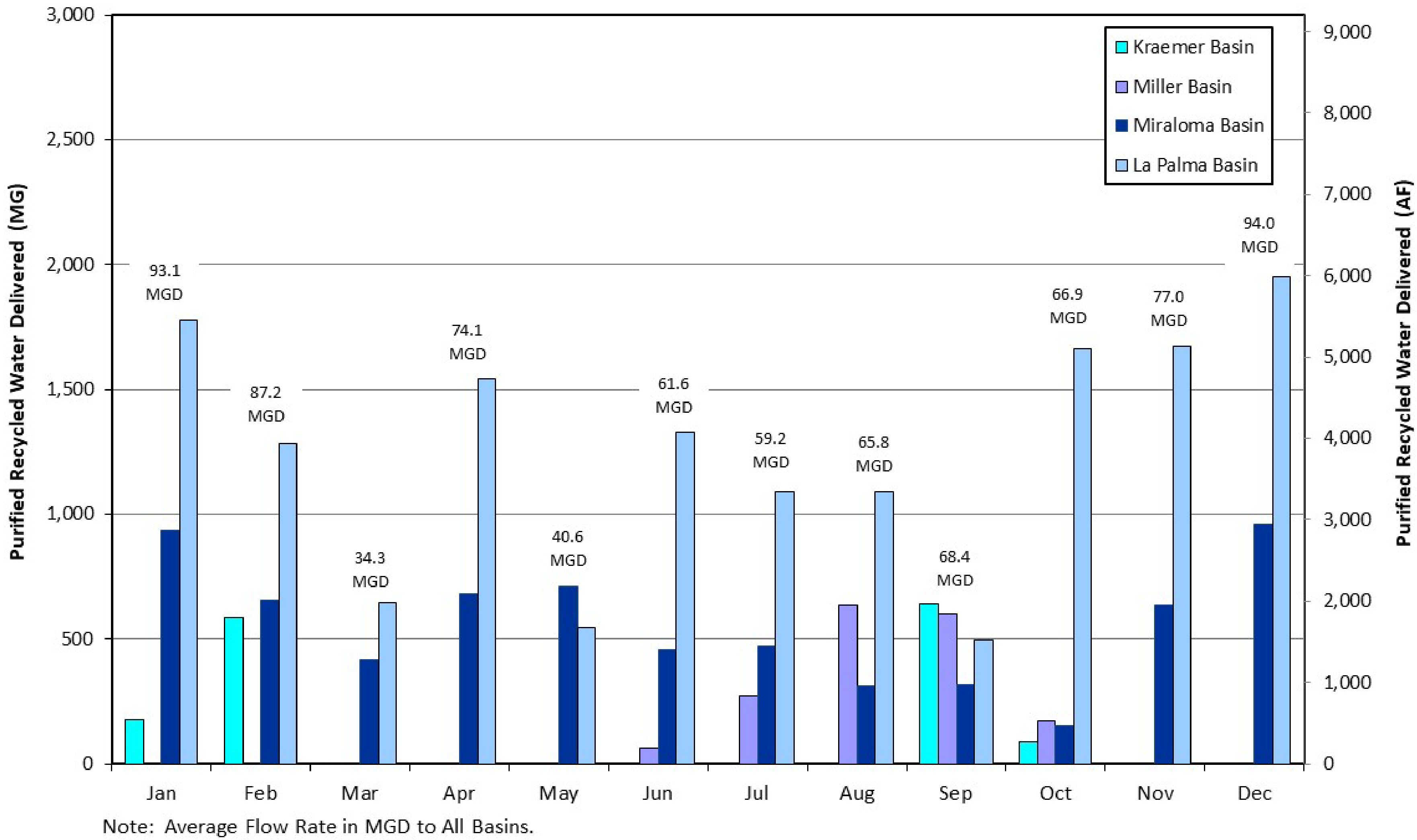


Figure 5-8. 2024 Purified Recycled Water Spreading Operations at K-M-M-L Basins

6. GROUNDWATER MONITORING AT THE ANAHEIM FOREBAY

OCWD has maintained a comprehensive groundwater monitoring program in the Anaheim and Orange Forebay areas for decades as part of its recharge operations and to monitor groundwater quality. Much of OCWD's current Forebay groundwater monitoring program was initially developed as part of the Santa Ana River Water Quality and Health (SARWQH) Study, which was conducted from 1994-2004 in the Anaheim Forebay (OCWD, 2004a; NWRI, 2004). The SARWQH Study assessed the use of SAR surface water as a recharge source for the Basin, given the potential for groundwater quality impacts due to the significant treated wastewater fraction in SAR base flow, as well as the agricultural and urban runoff components of storm flow.

For the purposes of GWRS permit compliance, OCWD began groundwater monitoring activities in the Anaheim Forebay downgradient of the GWRS spreading basins in 2005, well in advance of the initial delivery and spreading of GWRS purified recycled water in 2008. This annual report for 2024 marks 17 years of Forebay GWRS compliance monitoring. This section describes the following for calendar year 2024:

- Anaheim Forebay aquifer system;
- Groundwater monitoring program;
- Groundwater elevations and directions of flow; and
- Groundwater quality.

On December 2, 2022, a new GWRS permit was issued by the RWQCB (RWQCB, 2022a). Forebay compliance monitoring is slightly different under the 2022 permit than under the previous GWRS permit (RWQCB, 2004) and Monitoring and Reporting Program (RWQCB, 2020). Changes to the monitoring program under the 2022 permit are described in Section 6.2.

6.1 Anaheim Forebay Aquifer System

Earlier studies (DWR, 1934; DWR, 1967) divided the alluvial Orange County Groundwater Basin (the Basin) into the Pressure and Forebay areas. The Forebay refers to the inland area of intake or recharge generally characterized by higher permeability sediments (e.g., sands and gravels) and unconfined aquifer conditions. In contrast, the Pressure area refers to the coastal and central regions of the Basin where the presence of low-permeability clay and silt deposits limits surface percolation and creates confined or pressurized aquifer conditions at depth.

During the SARWQH Study, OCWD gained valuable insight into the local hydrogeology in the vicinity of K-M-M-L Basins through: (1) the installation of several multi-depth nested monitoring wells; (2) extensive groundwater quality testing; and (3) the performance of large-scale artificial tracer tests from various recharge basins (OCWD, 2004a; LLNL, 2004). These studies generally confirmed that most sediments down to approximately 1,000 ft bgs are coarse-grained, high-permeability sands and gravels, with only a minimal presence of intervening low-permeability sediments that do not appear to be laterally extensive.

For the purposes of the OCWD Basin-wide Groundwater Flow Model (Phraner, 2001; OCWD, 2004b) and the Annual Groundwater Storage Change calculation (OCWD, 2007), the Basin has been vertically characterized into three distinct aquifer systems: (1) Shallow, (2) Principal, and (3) Deep. Over 90% of groundwater production in the Basin occurs from the Principal aquifer. The approximate vertical intervals of the three aquifer systems in the immediate vicinity of K-M-M-L Basins are presented in Table 6-1. It should be noted that the Principal and Deep aquifers rapidly thicken and deepen to the west/southwest of this area, conforming to the Basin's overall synclinal structure (Herndon and Bonsangue, 2006).

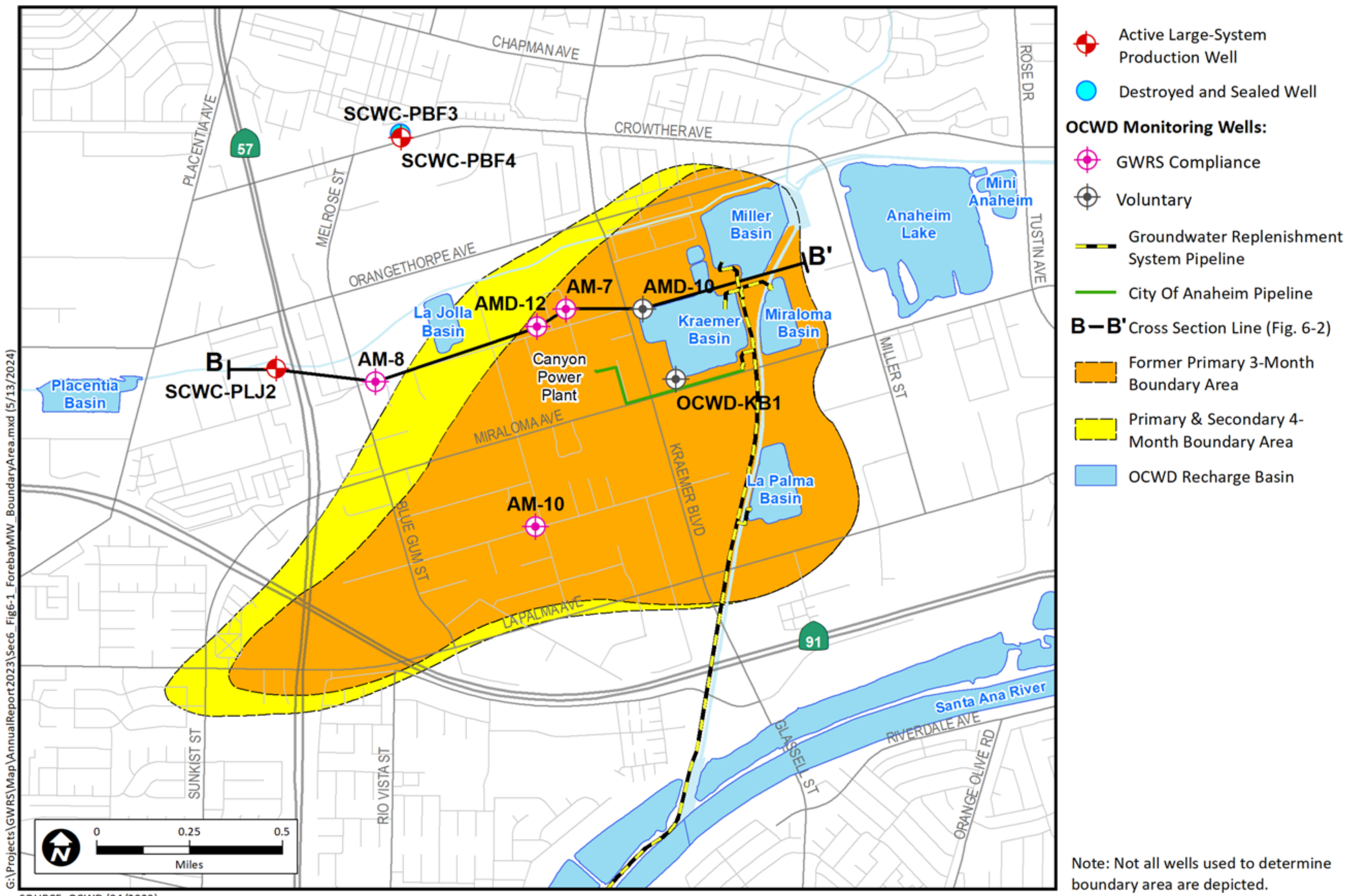
Table 6-1. Approximate Aquifer System Depths in the Vicinity of K-M-M-L Basins

Shallow Aquifer (ft bgs)	Principal Aquifer (ft bgs)	Deep Aquifer (ft bgs)
0 – 250	250 – 1,250	1,250 – 1,750

As required by state regulations (CCR, 2018), OCWD has established retention time boundary areas for the control of pathogenic microorganisms and response retention time in the area downgradient of K-M-M-L Basins that are illustrated on Figure 6-1; potable drinking water wells are prohibited in these areas. The boundary areas are based upon an artificial tracer test conducted in Kraemer Basin (Clark, 2009), with sequential modifications via numerical modeling and GIS to incorporate Miraloma Basin (OCWD, 2011; OCWD, 2012, CDPH, 2012; RWQCB, 2012; RWQCB, 2014) and La Palma Basin (OCWD and DDB Engineering, Inc., 2014, RWQCB 2016, OCWD, 2016). No existing public water supply wells are located inside the existing boundary areas. Due to changes to the GWRS Pathogen Log Reduction Requirements (Section 2.2.3, Table 2-3) following the state's adoption of the Final Groundwater Recharge Reuse Project (GRRP) regulations (CCR, 2018), the four-month boundary area now serves as both the primary and secondary project boundary. The boundary areas are enforced by the City of Anaheim and Orange County Health Care Agency well permitting authorities, as well as DDW.

6.2 Groundwater Monitoring Program

As part of the comprehensive groundwater monitoring program required by the December 2022 GWRS permit and its Monitoring and Reporting Program (RWQCB, 2022a), the following OCWD compliance monitoring well sites in the vicinity of K-M-M-L Basins were sampled in 2024: nested monitoring well AMD-12, plus single-point monitoring wells AM-7, AM-8, and AM-10. Although not required under the permit, another single-point monitoring well, OCWD-KB1, was also



SOURCE: OCWD (04/2023)

Figure 6-1. Selected Forebay Monitoring Well Locations and Boundary Areas

sampled in 2024 because of its proximity to the Kraemer Basin recharge site. Nested monitoring well AMD-10 was previously a compliance monitoring well but is no longer required under the 2022 GWRS permit. AMD-10 will continue to be monitored voluntarily for a subset of metals and organic constituents.

The locations of these wells and nearby municipal production wells are shown on Figure 6-1. A generalized geologic cross-section showing these wells in relation to the nearby recharge basins is presented on Figure 6-2. Note compliance well AM-10 is not shown on the cross-section since it is located farther south along the flow path emanating from La Palma Basin. Table 6-2 summarizes the screened interval depths and aquifer zones for the four compliance monitoring wells as well as AMD-10 and OCWD-KB1.

Other than the removal of well AMD-10 as a compliance well, the 2022 GWRS permit (RWQCB, 2022a) requires the same monitoring locations and frequencies as the previous GWRS permit, although the constituents required for monitoring were changed slightly as follows:

- Reduced or eliminated the following constituents:
  - MBAS, silver, and thiobencarb no longer required; and
  - Color and odor reduced from quarterly to annually.
- Added the following constituents:
  - Lead, arsenic, beryllium, cadmium, trivalent chromium, selenium and thallium quarterly;
  - Hexavalent chromium annually; and
  - Dichloromethane, bromodichloromethane and chloroform quarterly; and
  - NDMA annually.

Groundwater levels are measured at least quarterly for the OCWD monitoring wells shown on Figure 6-1, as well as at several other monitoring wells in the general vicinity to determine groundwater flow directions in this area and to track changes in groundwater storage, as this unconfined area represents the majority of the Basin’s available groundwater storage capacity.

6.3 Groundwater Elevations and Directions of Flow

Figure 6-3 illustrates the inferred groundwater flow paths within the Shallow aquifer near K-M-M-L Basins, based on the groundwater elevation contours representing June 30, 2024. As shown by the inferred flow arrows on Figure 6-3, the dominant groundwater flow direction was west-southwest away from the recharge basins as in previous years. Groundwater contour maps prepared each year for the Principal aquifer indicate a very similar groundwater flow direction. The Shallow and Principal aquifers behave quite similarly in the immediate vicinity of the Anaheim spreading grounds due to the lack of a laterally continuous aquitard between them.

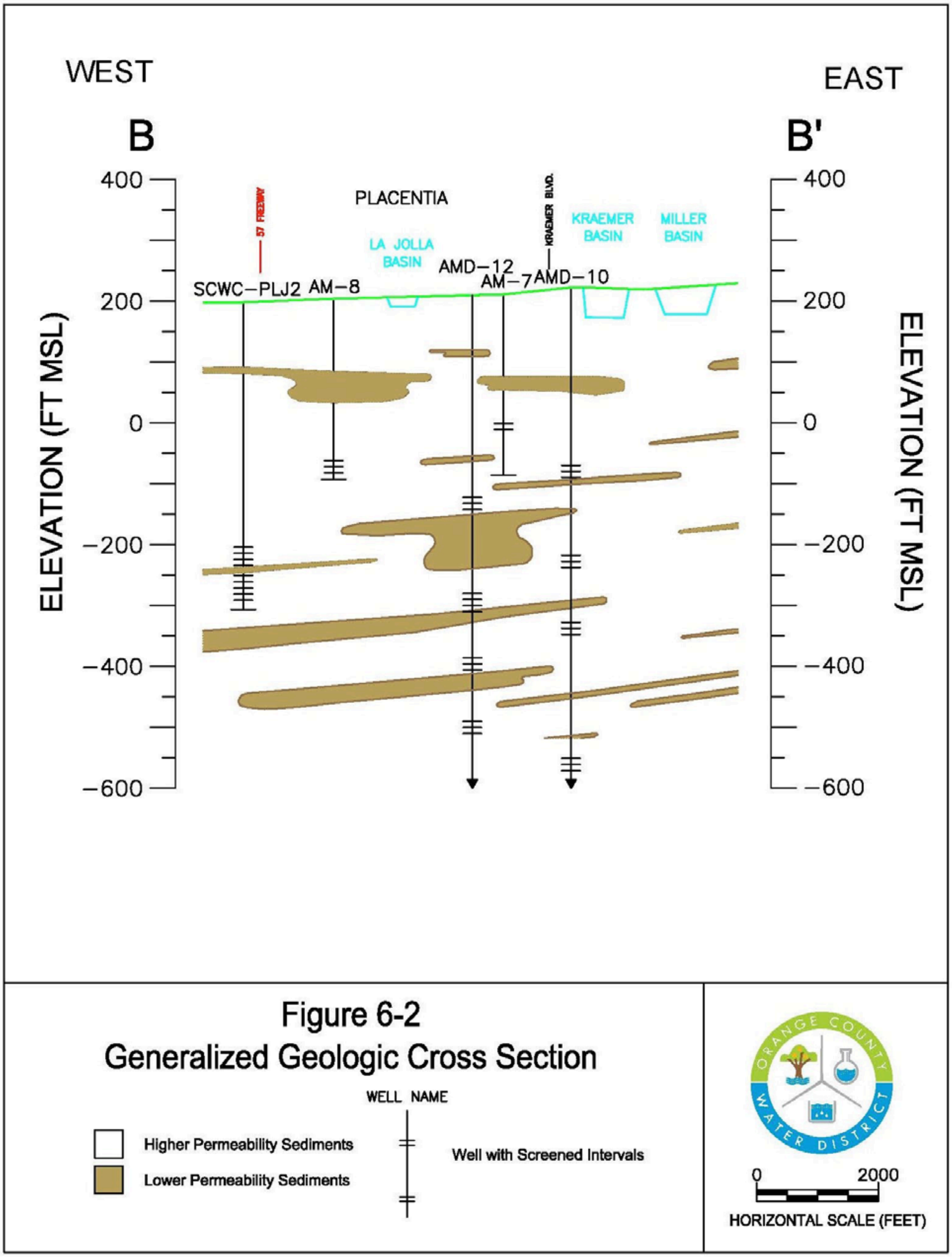


Figure 6-2. Generalized Geologic Cross Section in the Anaheim Forebay

Table 6-2. Monitoring Wells Near K-M-M-L Basins

OCWD Well Name	Date Completed	Nearest GWRS Recharge Basin [1]	Approximate Distance and Direction from Basin	Well Depth (ft bgs)	Aquifer Name	Nearest Drinking Water Well
AM-7/1	09/19/1990	Kraemer	1,135 ft W	210-225	Shallow	SCWC-PLJ2
AM-8/1	09/22/1990	Kraemer	3,900 ft SW	268-285	Shallow	SCWC-PLJ2
AMD-10/1[2]	10/13/1997	Kraemer	55 ft NW	292-312	Principal	SCWC-PLJ2
AMD-10/2[2]	10/13/1997	Kraemer	55 ft NW	440-460	Principal	SCWC-PLJ2
AMD-10/3[2]	10/13/1997	Kraemer	55 ft NW	550-570	Principal	SCWC-PLJ2
AMD-10/4[2]	10/13/1997	Kraemer	55 ft NW	774-794	Principal	SCWC-PLJ2
AMD-10/5[2]	10/13/1997	Kraemer	55 ft NW	934-954	Principal	SCWC-PLJ2
AMD-12/1	11/30/2004	Kraemer	1,510 ft W	300-350	Principal	SCWC-PLJ2
AMD-12/2	11/30/2004	Kraemer	1,510 ft W	490-520	Principal	SCWC-PLJ2
AMD-12/3	11/30/2004	Kraemer	1,510 ft W	595-615	Principal	SCWC-PLJ2
AMD-12/4	11/30/2004	Kraemer	1,510 ft W	725-745	Principal	SCWC-PLJ2
AMD-12/5	11/30/2004	Kraemer	1,510 ft W	940-960	Principal	SCWC-PLJ2
AM-10/1	09/12/1990	La Palma	3,000 ft SW	217-235	Shallow	SCWC-PLJ2
OCWD-KB1/1[3]	10/13/1987	Kraemer	100 ft SW	180-200	Shallow	SCWC-PLJ2

[1] The closest GWRS recharge basin is not necessarily the source of GWRS water arrival at each well based on the inferred groundwater flow paths.
[2] As of December 2, 2022, AMD-10/1 through AMD-10/5 are no longer compliance wells per the new GWRS permit. These wells will continue to be monitored on a voluntary basis for a targeted subset of metals and organic constituents.
[3] Monitoring well site OCWD-KB1/1 is not a compliance well per the existing GWRS permit but is monitored voluntarily due to its proximity to Kraemer Basin.

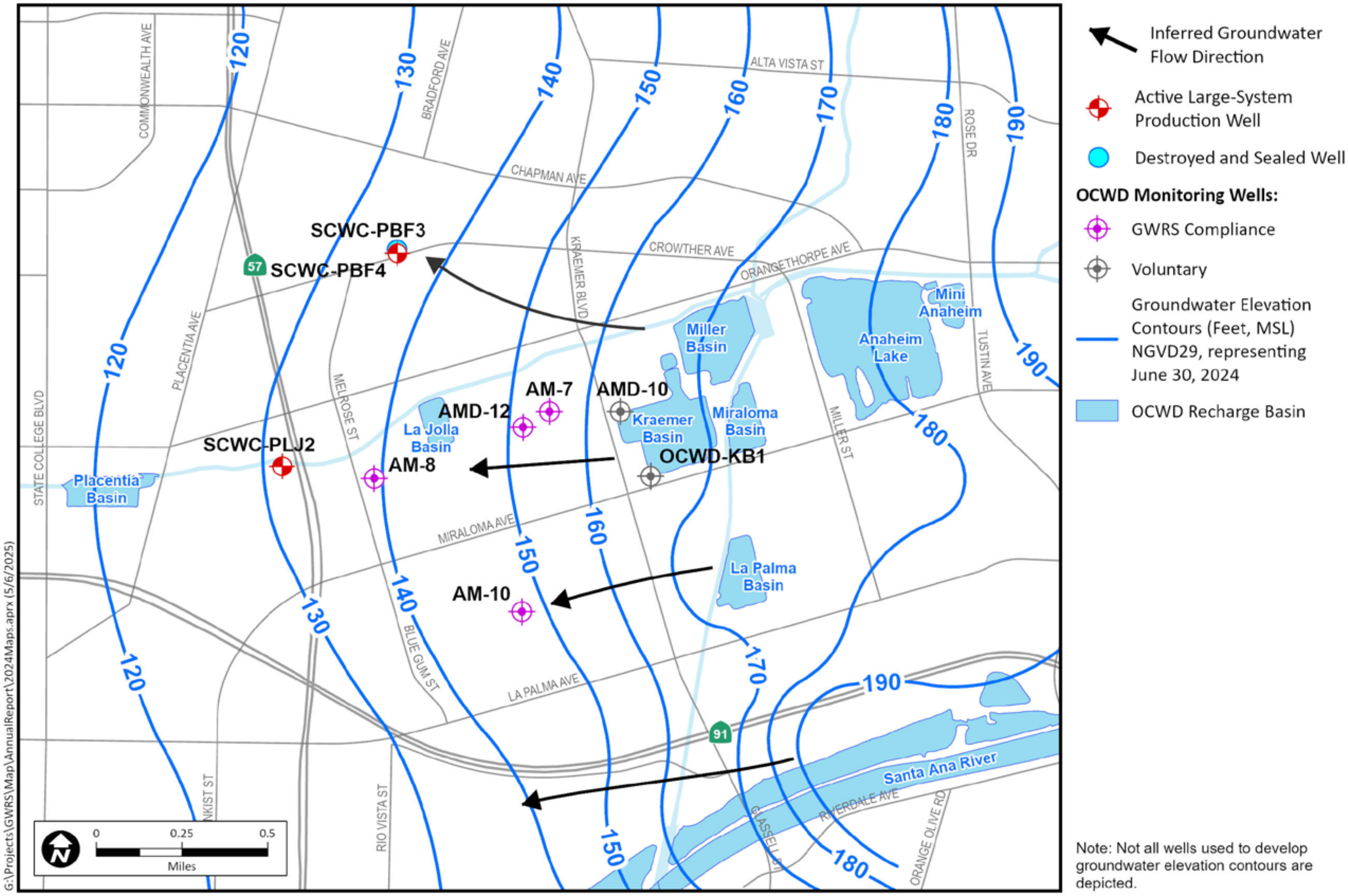


Figure 6-3. Shallow Aquifer Groundwater Elevation Contours and Inferred Groundwater Flow Directions in the Anaheim Forebay Area During 2024

The groundwater flow gradients and directions do not change significantly from year to year in the Anaheim Forebay. Groundwater level trends at the Forebay monitoring wells are influenced by OCWD's managed recharge activities, local precipitation, groundwater production, and the Basin's overall groundwater storage condition. Groundwater level hydrographs for the four compliance wells and the two voluntary wells AMD-10 and OCWD-KB1 can be found in the 2022 or prior annual reports.

Groundwater level trends in the Anaheim Forebay at all six monitoring wells typically follow a seasonal pattern: (1) rising during the winter and early spring months, (2) declining in the late spring and summer months, and (3) recovering somewhat in the late fall months near the end of the year. These seasonal trends are typically caused by a combination of increased recharge (both natural and managed) from local rainfall and captured SAR storm flows during the winter months and increased groundwater pumping during the warmer and drier summer months.

During 2024, groundwater level trends at all six monitoring wells generally followed the typical seasonal pattern. However, the usual year-end recovery was less than prior years, with some wells showing slight recovery while others remained stable. This was likely due to less than usual SAR recharge volumes in the last three months of the year stemming from an exceptionally dry start to the rainy season along with not purchasing any MWD imported surface water for recharge.

As shown in Table 6-2, the four single-point monitoring wells OCWD-KB1, AM-7, AM-8, and AM-10 are screened in the Shallow aquifer, whereas all casings for the two nested wells AMD-10 and AMD-12 are individually screened entirely in the Principal aquifer. However, all six monitoring wells have very similar groundwater elevation trends; only small differences are seen with depth within the Principal aquifer at nested monitoring wells AMD-10 and AMD-12. As discussed in Section 6.1, the Anaheim Forebay area in the vicinity of K-M-M-L Basins is largely devoid of any laterally extensive low-permeability aquitards. Therefore, the Shallow and Principal aquifers behave quite similarly, have similar groundwater flow directions, and relatively rapid vertical transport of recharge water occurs as evidenced by water quality trends.

6.4 Groundwater Quality

This section describes monitoring well groundwater quality for general constituents and arsenic in the Anaheim Forebay area in the vicinity of K-M-M-L Basins. Groundwater quality is also summarized for the closest downgradient production well.-

6.4.1 Monitoring Wells – General Water Quality

Quarterly compliance groundwater quality data for 2024 are presented in Appendix I. Concentrations of 1,4-dioxane and NDMA for the past five years (2020-24) are summarized in Appendix J for the four compliance monitoring wells. Compliance monitoring wells were tested for an extensive list of inorganic and organic parameters, including constituents with secondary MCLs, 1,4-dioxane, and NDMA.

In 2022, DDW approved changes to the groundwater monitoring program. Priority pollutants with no detection in the most recent two years of quarterly monitoring were eliminated from the required monitoring. Also, AMD-10 was eliminated as a compliance monitoring well because of its cross-gradient location relative to La Palma Basin, as well as the combination of its very close proximity to Kraemer, Miller, and Miraloma Basins plus its relatively deep screened intervals leading to the inconsistent presence of GWRS water at this location during its 15-year inclusion in the prior GWRS compliance monitoring program. The revised monitoring program was included in the GWRS permit and Monitoring and Reporting Program (M&RP) issued by the RWQCB in December 2022.

During 2024, groundwater quality at the compliance monitoring wells complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods. All 1,4-dioxane and NDMA concentrations were non-detect in 2024. Total arsenic at the four compliance wells remained relatively low and stable below 5 μg/L, well below the Primary MCL of 10 μg/L. Arsenic and chloride trends are discussed in Section 6.4.2.

As shown in Table 6-3, all analyses at monitoring well site AM-7 and three out of four analyses at AM-8 during 2024 exceeded the EPA Secondary MCL for iron of 300 μg/L. As discussed in prior reports, these exceedances are likely due to particulate iron from corrosion of their aging mild steel well casings (over 30 years old) and confirmed by low dissolved iron concentrations at both wells. These Secondary MCL exceedances at AM-7 and AM-8 during 2024 were consistent with historical data collected since 2008 and were not associated with the presence of GWRS purified recycled water.

Table 6-3. Secondary MCL Exceedances at Forebay Monitoring Wells.

	Background (pre-2008)		2023		**2024**		Notes/Trends
	Range	Mean	Range	Mean	**Range**	**Mean**	
IRON (Secondary MCL = 300 μg/L)							
AM-7/1	2-1,290	192	445-689	546	**396-811**	**618**	Increase since 2021 due to corrosion of aging mild steel casing.
AM-8/1	8-1,660	414	295-891	530	**266-418**	**351**	Increase since 2015 due to corrosion of aging mild steel casing.

6.4.2 Monitoring Wells – Intrinsic Chloride Tracer and Arsenic

As shown earlier in Section 4 for the Talbert Barrier area, dissolved chloride concentrations can be used to trace the subsurface movement of groundwater because chloride is relatively unaffected by sorption, chemical, or biological reactions in the aquifer. Thus, chloride is a good conservative tracer. Groundwater flow paths determined from groundwater level monitoring are also verified by comparing groundwater quality changes and trends in the recharge source water with nearby monitoring wells, primarily using chloride concentrations and EC.

For tracking purposes, GWRS water has a very low chloride concentration with an annual average ranging from 4-11 mg/L since 2008. The chloride concentration of GWRS water is largely dependent on the performance and age of the AWPF RO membranes, as well as OC San feed water quality. In comparison, background chloride concentrations in all four compliance monitoring wells and the two voluntary wells prior to 2008 had much higher chloride concentrations ranging from approximately 80-120 mg/L, reflective of SAR water and MWD imported supplies from the Colorado River, which were historically OCWD’s primary source of recharge water in the Anaheim Forebay. Occasional decreases below this background range prior to GWRS start-up were indicative of periods of greater SAR storm flow recharge and/or greater recharge of MWD imported supplies from the State Water Project (SWP), both of which have relatively low TDS and chloride concentrations, but still significantly greater than GWRS water.

Since the initial deliveries of GWRS water in January 2008 to Kraemer-Miller Basins, in July 2012 to Miraloma Basin, and in November 2016 to La Palma Basin, the migration of GWRS water in the subsurface was evidenced by chloride concentrations decreasing below 60 mg/L at all six monitoring well sites: OCWD-KB1, AMD-10, AMD-12, AM-7, AM-8, and AM-10. These chloride concentrations were lower than the bulk of historical recharge source waters. Also, the timing of these chloride concentration decreases corresponded well with previously established groundwater travel times away from Kraemer-Miller Basins (LLNL, 2004; Clark, 2009).

Since applied recharge in the Anaheim Forebay comes from multiple sources, water quality responses (e.g., chloride concentrations) at the monitoring wells do not always follow a single source water trend. Comparing Table 5-2 and Figure 5-6 presented in Section 5 provides a temporal sense of the volume and proportion of GWRS purified recycled water relative to other recharge sources at K-M-M-L Basins in 2024. These factors influence the strength, timing, and flow paths of both the GWRS low chloride signal and the non-GWRS higher chloride signal of other recharged water (SAR and/or imported). Knowing the monthly recharge source history at K-M-M-L Basins, increasing and decreasing chloride trends can be interpreted in terms of increasing and decreasing percentages of GWRS and/or non-GWRS other recharge arriving at the monitoring wells.

Figure 6-4 shows chloride concentration trends for the 10-year period 2015-2024 for compliance wells AM-7, AM-8, AM-10, and AMD-12/1. Since the running 10-year period displayed in these figures begins in 2015, the first arrival of the low-chloride GWRS signal at many of these monitoring wells may not be presented in these figures. First arrival is discussed more thoroughly in Section 6.4.2 of prior years’ annual reports, including arrival at the deeper zones at AMD-12 as well as the two voluntary wells OCWD-KB1 and AMD-10.

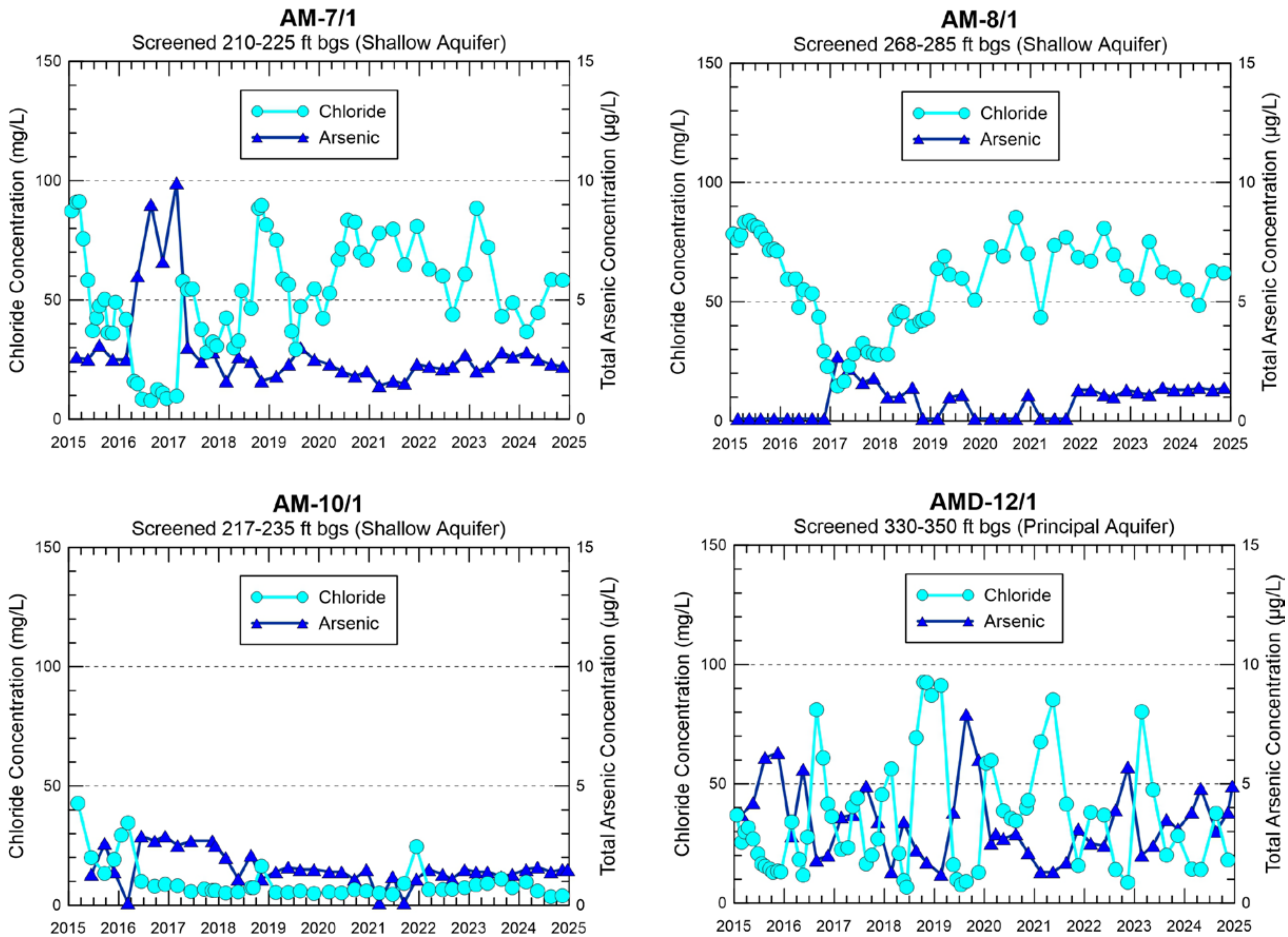


Figure 6-4. Monitoring Wells AM-7, AM-8, AM-10, and AMD-12/1 Chloride and Arsenic Concentrations

Figure 6-4 shows periodic arrivals of the low-chloride GWRS signal at the four compliance wells, such as the sustained arrival of 100% GWRS water at AM-7 from early 2016 to early 2017 denoted by chloride concentrations at low GWRS levels. Figure 6-4 also shows the periodic decreasing and increasing chloride trends signaling alternating arrivals of GWRS and non-GWRS other recharge sources, respectively, most notable at AMD-12/1. Alternatively, the low-chloride GWRS signal at AM-10 has been largely continuous since La Palma Basin came on-line in November 2016 dedicated to recharging only GWRS water.

Previous studies have indicated the potential for surface spreading of reverse osmosis purified wastewater to mobilize metals from alluvial aquifer sediments (Li, et al., 2006). In addition to the metals testing for the quarterly compliance monitoring, OCWD implemented a supplemental monthly sampling program of selected monitoring wells downgradient of K-M-M-L Basins to coincide with the first GWRS purified recycled water deliveries to the basins in January 2008.

Of all the metals with potential for mobilization, arsenic represents the greatest public health concern and has a Primary MCL of 10 µg/L. In addition to chloride trends discussed above, Figure 6-4 also features time series plots of quarterly arsenic concentrations at the four compliance wells AM-7, AM-8, AM-10, and AMD-12/1 for the 10-year period 2015-2024. Arsenic trends associated with the earlier arrival of GWRS water are discussed more thoroughly in Section 6.4.3 of prior years' annual reports for all zones at the four compliance wells and the two voluntary wells. Pre-GWRS arsenic concentrations for the 2000-2007 period at these wells ranged from non-detect (< 1 µg/L) to 5.3 µg/L (at AM-7); other higher pre-GWRS average arsenic concentrations were documented at AMD-10/1 (4.6 µg/L) and OCWD-KB1 (3.5 µg/L). As indicated below, this is likely reflective of pre-GWRS recharge activities in this area. Arsenic concentrations at the deeper zones of monitoring well AMD-12 (AMD-12/2 through AMD-12/5) are not shown on Figure 6-4; they generally remain within pre-GWRS background levels, ranging from non-detect to less than 4 µg/L due to lower percentages of GWRS water along those longer dispersive flow paths.

During 2024, arsenic concentrations in all zones of the four compliance wells were either non-detect or remained at relatively low and stable concentrations below 5 µg/L, well below the Primary MCL of 10 µg/L.

Over the course of the GWRS groundwater monitoring program, an inverse relationship between the chloride concentration (representing percentage of GWRS water present) and the observed arsenic concentration at monitoring wells has been observed. Arsenic concentrations have been shown to increase non-linearly as chloride concentrations decrease with the sustained arrival of large percentages of GWRS water, as evidenced by the chloride/arsenic plots in Figure 6-4, most exemplary at AM-7 from early 2016 to early 2017.

A broader review of the chloride and arsenic concentration trends since 2008 for the four compliance wells and two voluntary wells in the vicinity of K-M-M-L Basins indicates a generally non-linear and spatially variable relationship between the percentage of GWRS water and arsenic concentration in groundwater, after a minimum threshold percentage of GWRS water reached the monitoring well. The threshold percentage of GWRS water required to cause an initial arsenic concentration increase above background appears to become greater with travel distance downgradient from K-M-M-L Basins, implying a higher degree of geochemical stabilization within the aquifer with increased travel distance and/or less available arsenic for mobilization at locations farther downgradient from the recharge basins.

The historical dataset suggests that repeated cycles of sustained 100% GWRS recharge arrival events have resulted in diminishing arsenic peaks with each subsequent sufficiently sustained event due primarily to arsenic mass removal from the aquifer matrix. Similarly, following each sustained 100% GWRS arrival event, low arsenic concentrations due to the subsequent arrival of other recharge sources (SAR flows and/or imported water) have generally been below the pre-GWRS baseline arsenic concentrations due to arsenic mass removal during the prior sustained 100% GWRS events.

Although the GWRS purified recycled water was the likely cause of the increased arsenic concentrations, it is not an arsenic source. The mechanisms leading to the arsenic increases are the result of complex geochemical interactions between the GWRS water and arsenic bound to and/or comprising the aquifer matrix. A historical review of SAR water quality analyses showed arsenic concentrations during the late 1980s as high as 8-16 µg/L, which is similar in magnitude to the maximum arsenic peaks observed at the four compliance and two voluntary wells in prior years corresponding to the first arrival of sustained 100% GWRS recharge events. More recent SAR arsenic concentrations over the last three years at the compliance wells generally range from 2-6 µg/L.

Arsenic is known to adsorb onto naturally occurring alumina, iron, or manganese oxyhydroxides found on mineral surfaces within an alluvial aquifer matrix (Bowell, 1994). The higher initial pH or lower ionic strength of GWRS water relative to surrounding groundwater has the potential to release this adsorbed arsenic by altering the surface charge of these mineral surfaces relative to their isoelectric point (Welch and Stollenwerk, 2003). OCWD performed a laboratory study in 2012 with Stanford University aiming to identify the geochemical controls governing metals mobilization with GWRS purified recycled water and Forebay aquifer sediments, as well as optimizing post-treatment operating parameters such as pH. Findings revealed the important role of specific divalent cations in controlling the mobilization of arsenic and that the magnitude of observed arsenic desorption is inversely correlated to the concentrations of calcium and magnesium in GWRS water (Fakhreddine et al., 2015). Cation bridging within finer-grained portions of the aquifer is thought to be the mechanism controlling arsenic mobilization, along with pH-mediated sorption also playing a role.

To limit arsenic mobilization, the operation of the AWPF post-treatment decarbonation and lime stabilization processes were modified during 2010-2015. Completion of the GWRSIE post-treatment system upgrades in 2015 improved the ability to more closely control the FPW pH, targeting 8.5. During 2016-2024, there were no notable changes to post-treatment operations or GWRS-FPW quality, except for a slight increase in TDS in 2023 due to the AWPF receiving water from OC San Plant 2 for GWRSFE. This, along with aging RO membranes, contributed to a marginally higher annual average chloride concentration of 9 mg/L in 2023. In 2024, the annual average chloride of GWRS-FPW decreased to 4 mg/L. OCWD's metals monitoring will continue to evaluate the effects of any operational changes and the DDW, RWQCB, and NWRI GWRS Independent Advisory Panel will continue to be informed of any pertinent findings.

6.4.3 Production Well

The closest downgradient potable production well is SCWC-PLJ2 (Figure 6-3) owned and operated by Golden State Water Company (formerly Southern California Water Company). As was shown previously on Figure 6-1, this well is located outside of the primary and secondary four-month boundary area.

Other potable production wells are located farther downgradient and well outside the K-M-M-L Basins' retention time boundary area.

Table 6-4 summarizes 2024 water quality data at large system production well SCWC-PLJ2, which complied with all federal and state drinking water standards.

Well SCWC-PLJ2 is screened in the Principal aquifer and likely has never received 100% GWRS water as indicated by chloride concentrations in the well having never decreased to GWRS levels.

Figure 6-5 shows that chloride concentrations in this well ranged from 80-100 mg/L prior to the commencement of GWRS recharge in Kraemer-Miller Basins in 2008 and then significantly decreased upon arrival of GWRS water from these basins in 2009 to a low of 23 mg/L by mid-2010. Since then, chloride concentrations at SCWC-PLJ2 have generally cycled within a range of 20-75 mg/L and ranged from 33-43 mg/L during 2024 (Table 6-4). Like the upgradient monitoring wells discussed previously, the proportion of GWRS water at this well fluctuates with recharge operations and supplies.

As shown in Table 6-4 and Figure 6-5, the arsenic concentration at SCWC-PLJ2 during 2024 was measured once at 1.1 µg/L. Historically, both before and after GWRS recharge began at Kraemer-Miller Basins in 2008, arsenic concentrations at SCWC-PLJ2 were low with only intermittent detections, ranging from below the RL of 1 µg/L to a one-time maximum of 2 µg/L. During 2024, there were no detections of either NDMA or 1,4-dioxane at SCWC-PLJ2 (Table 6-4).

Table 6-4. 2024 Water Quality for Potable Well Within the Influence of K-M-M-L Basins

OCWD Well Name	Well Depth (ft bgs)[1]	Perforation Interval (ft bgs)[1]	Distance from Recharge Site (ft)[2]	Concentration [3,4]								
				Arsenic (As) ug/L	Chloride (Cl) mg/L	Bromide (Br) mg/L	Total Dissolved Solids (TDS) mg/L	Nitrate Nitrogen (NO3-N) mg/L	Nitrite Nitrogen (NO2-N) mg/L	Total Organic Carbon (Unfiltered) (TOC) mg/L	n-Nitrosodimethylamine (NDMA) ng/L	1,4-Dioxane (14DIOX) ug/L
Large System Municipal Well												
SCWC-PLJ2	504	402 - 492	5,300	1.1	37.6 (33.2 - 42.6)	0.06 (0.05 - 0.07)	231 (206 - 256)	1.47 (1.44 - 1.51)	ND	0.20 (0.18 - 0.22)	ND	ND

[1] feet below ground surface

[2] Distance from purified recycled water spreading: Straight line shortest distance to eastern edge of Kraemer Basin, estimated to the nearest 100 feet

[3] Concentrations are annual averages with annual ranges in parenthesis for the given year

[4] ND: Not detected or less than the reporting limit

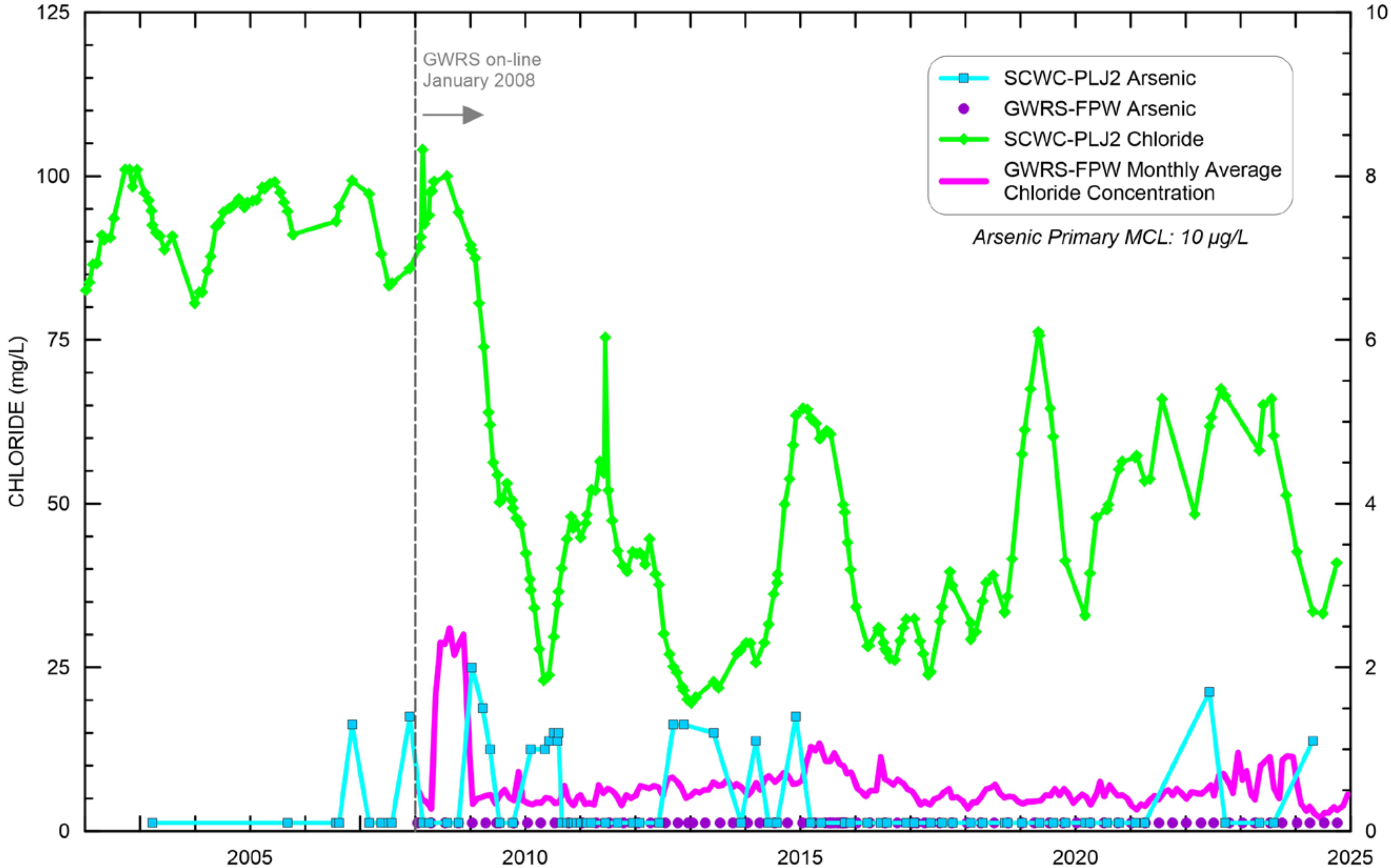


Figure 6-5. SCWC-PLJ2 Pre-Treatment and Injection Water Chloride and Arsenic Concentrations

7. MBI PROJECT OPERATIONS

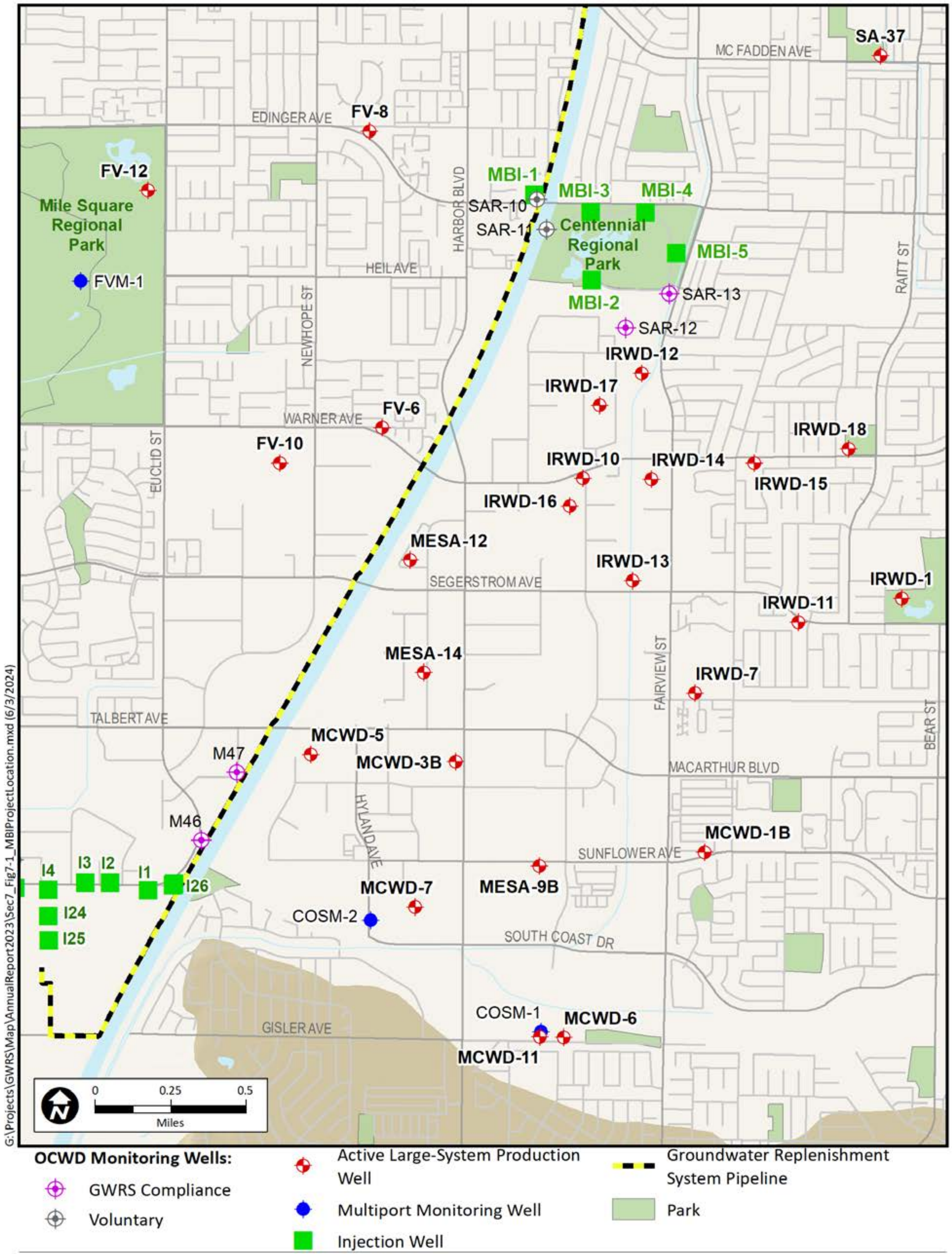
The Mid-Basin Injection (MBI) Project was implemented in two parts: an initial Demonstration MBI (DMBI) Project that became operational in April 2015, and subsequent MBI Centennial Park Project that began operation in March 2020 (Figure 1-1). An annual operations summary of the MBI Project including total injection water source, volumes, and flowrates, is presented in this section.

The primary objective of the MBI Project is to provide replenishment of a heavily pumped area of the Principal aquifer with purified recycled water from the GWRS AWPF. The MBI Project also increases the recharge capacity of the Basin, thereby reserving recharge capacity in the OCWD Forebay spreading grounds for available SAR and imported water flows. Together, the DMBI Project (injection well MBI-1) and MBI Centennial Park Project (injection wells MBI-2, MBI-3, MBI-4, and MBI-5) comprise the MBI Project. Figure 7-1 shows the location of the MBI Project.

7.1 MBI Project Components

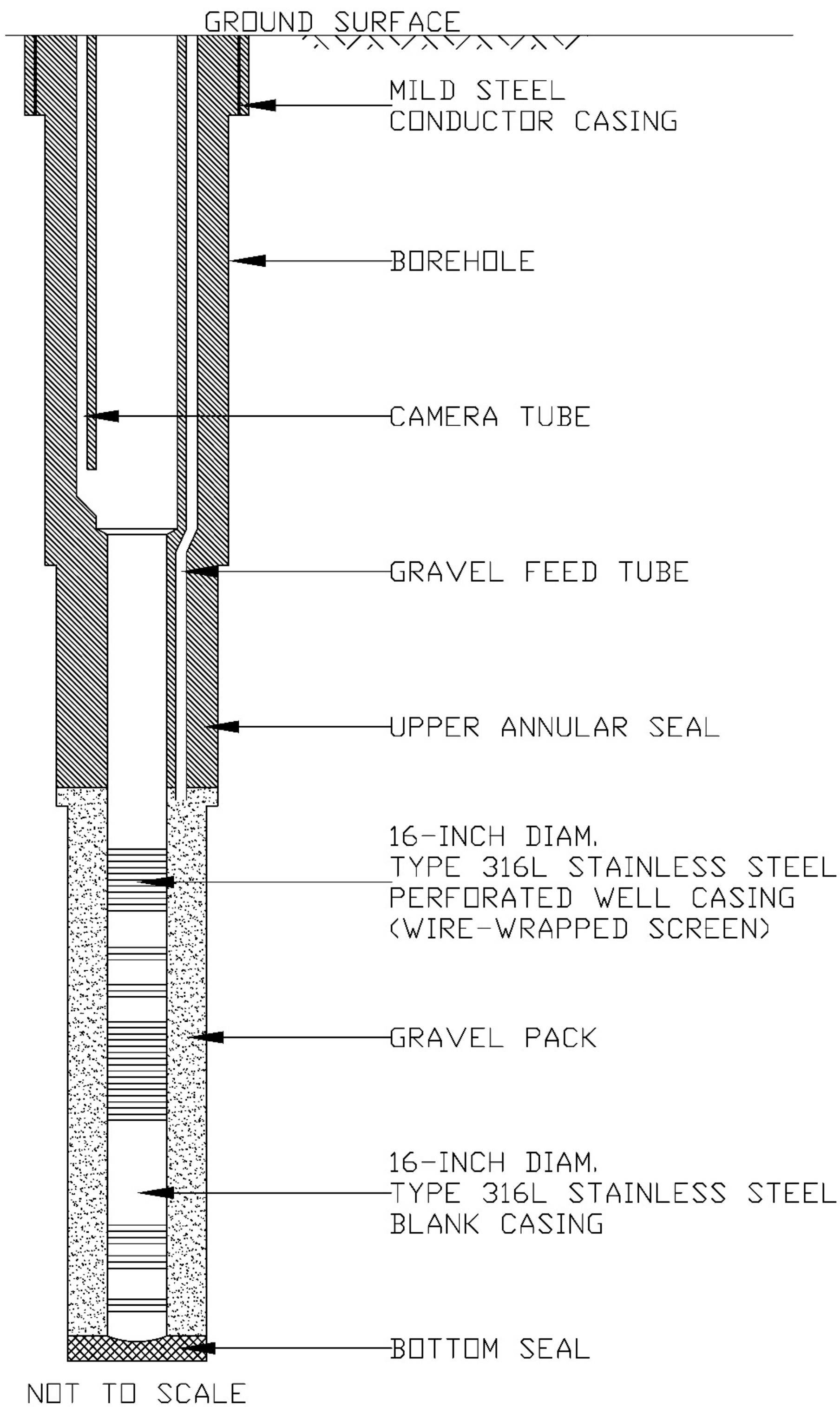
The MBI Project consists of five injection wells (MBI-1 through MBI-5) along with two nearby downgradient multi-depth nested compliance monitoring wells (SAR-12 and SAR-13), located approximately three miles north of the Talbert Barrier, along the GWRS Pipeline at the Santa Ana River and Edinger Avenue (Figure 7-1). As part of the DMBI Project, multi-depth monitoring wells SAR-10 and SAR-11 were also installed immediately downgradient of MBI-1; however, monitoring at SAR-10 and SAR-11 is no longer required as SAR-12 and SAR-13 now serve as the required permit compliance monitoring wells for the MBI Project (RWQCB, 2019 and RWQCB, 2022a).

Figure 7-2 shows a generalized well construction diagram representing the five MBI wells, while Table 7-1 summarizes their well construction details. Figure 7-3 shows a photo of an MBI Centennial Park injection well vault. All MBI wells have injected exclusively 100% GWRS water, including MBI-1 starting in 2015 and the four additional wells in March 2020. The concurrent operation of all five injection wells marking the commencement of the full-scale intrinsic tracer test, as required by state regulations (CCR, 2018), is discussed further in Section 8 along with groundwater level and quality data at all four MBI Project monitoring wells.



SOURCE: OCWD (03/2023)

Figure 7-1. MBI Project Location Map



Note: Well construction details generalized to represent all five MBI wells. For screened interval depths, refer to Table 7-1 and for specific as-built diagrams of each injection well, refer to 2020 GWRS Annual Report.

Figure 7-2. Generalized MBI Well Construction Diagram

Table 7-1. MBI Well Construction Summary

MBI-1		MBI-2		MBI-3		MBI-4		MBI-5		
Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Aquifer Unit
530-540 595-605	10 10	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	Upper Rho
660-710	50	645-675	30	655-680	25	650-675[1]	25	610-620[1] 630-665[1]	10 35	Lower Rho
----	----	695-720	25	715-735	20	702-722	20	680-715[1]	35	Upper Main
770-780	10	735-745	10	756-766	10	745-755	10	----	----	Main 1
800-830[2]	0	750-760 800-810	10 10	780-815	35	775-830	55	760-800[1]	40	Main 2
----	----	----	----	----	----	----	----	----	----	Main 3
970-980	10	920-930	10	945-965 975-985	20 10	930-940 955-975	10 20	915-935[1]	20	Main 4
990-1,000	10	980-995	15	1,005-1,015	10	----	----	----	----	Main 5
----	----	1,050-1,060	10	1,048-1,058	10	1,030-1,040	10	1,005-1,030[1]	25	Main 6
1,100-1,120	20	1,070-1,085	15	1,095-1,115	20	1,074-1,089	15	1,045-1,060[1]	15	Main 7
1,175-1,190	15	----	----	----	----	----	----	----	----	Main 8
Total:	135		135		160		165		180	

[1] Screened interval depths listed here are based on post-construction downhole video survery and differ from the depths listed in the GWRS Title 22 Engineering Report (OCWD, 2021).

[2] The screened interval from 800-830 ft bgs at MBI-1 was swaged off with a liner due to sand production during test pumping.

Figure 7-3. MBI Centennial Park Injection Well

7.2 MBI Project Injection Water Source, Volumes and Flow Rates

Purified recycled water produced by the GWRS AWPF and delivered via the GWRS Pipeline was the only source of water injected at the five MBI wells (MBI-1 through MBI-5) during 2024. No other water sources are available at the MBI well sites. Blending with other sources is not required (RWQCB, 2022a). When the AWPF or the GWRS Pipeline are off-line, the MBI wells are also off-line.

A total volume of approximately 2,315 MG (7,104 AF) of purified recycled water was injected at the MBI Project wells during 2024. A minor volume of approximately 15 MG (46 AF) was pumped from the MBI wells during 2024 during the regular backwash events throughout the year to maintain their injection capacity. The total backwash volume during 2024 represented only 0.7% of total MBI injection. Monthly quantities of GWRS purified recycled water injected and backwash pumped at the MBI Project are summarized in Table 7-2 and illustrated in Figure 7-4.

Table 7-2. 2024 Monthly Injection and Backwash Quantities at MBI Project

Month	Total MBI Injection[1]			Total MBI Backwash Pumping	
	(Avg. MGD)	(MG)	(AF)	(MG)	(AF)
January	5.74	178.04	546.38	1.30	3.98
February	5.34	154.93	475.47	1.39	4.27
March	5.06	156.81	481.23	1.21	3.70
April	6.58	197.43	605.88	1.25	3.85
May	6.29	195.05	598.58	1.40	4.29
June	7.36	220.66	677.18	1.28	3.93
July	7.18	222.50	682.83	1.58	4.86
August	7.19	222.91	684.08	0.92	2.82
September	5.66	169.82	521.15	1.23	3.78
October	7.02	217.58	667.73	1.28	3.92
November	6.61	198.17	608.15	0.90	2.76
December	5.83	180.84	554.98	1.37	4.22
Totals	**6.32**	**2,314.72**	**7,103.64**	**15.12**	**46.39**

[1] All MBI wells (MBI-1, MBI-2, MBI-3, MBI-4, and MBI-5) total injection volume of GWRS-FPW is shown. Average daily injection rates are based on the total number of days in each month. Refer to Table 7-3 for the annual daily average at each MBI well.

As shown in Table 7-2, the average daily injection rate for the MBI Project during 2024 was 6.32 MGD and ranged from 5.06 MGD in March to 7.36 MGD in June. The MBI Project injection volumes and average daily injection rates were less in March primarily because the AWPF was off-line from March 26-28 for planned OCWD and OC San Plant 2 construction projects and system testing (See Section 2), during a period when injection rates are typically near their annual low when groundwater levels are near their annual high. Total MBI injection volume during 2024 was 3% less than the prior year, with just two more days off-line. This minor decrease was primarily due to more frequent automatic injection rate reductions from elevated injection levels reaching the flow control set point at MBI-3 and MBI-5.

Table 7-2 shows a total MBI backwash volume of 15.12 MG (46.39 AF) in 2024, a decrease of 17% relative to the 18.12 MG (55.60 AF) backwashed the prior year. This decline is attributed to the conclusion of an operational test, which increased the backwash frequency at MBI-3 and MBI-5 from monthly to biweekly from February 2022 to April 2023. Consequently, these wells underwent biweekly backwashing throughout a portion of 2023 and only monthly backwashing throughout the entirety of 2024.

Figure 7-4 shows that while total monthly injection volumes were distributed relatively consistently among the five MBI Project wells in 2024, the distribution was somewhat uneven, with MBI-1 receiving the highest volume and MBI-3 significantly less than the others.

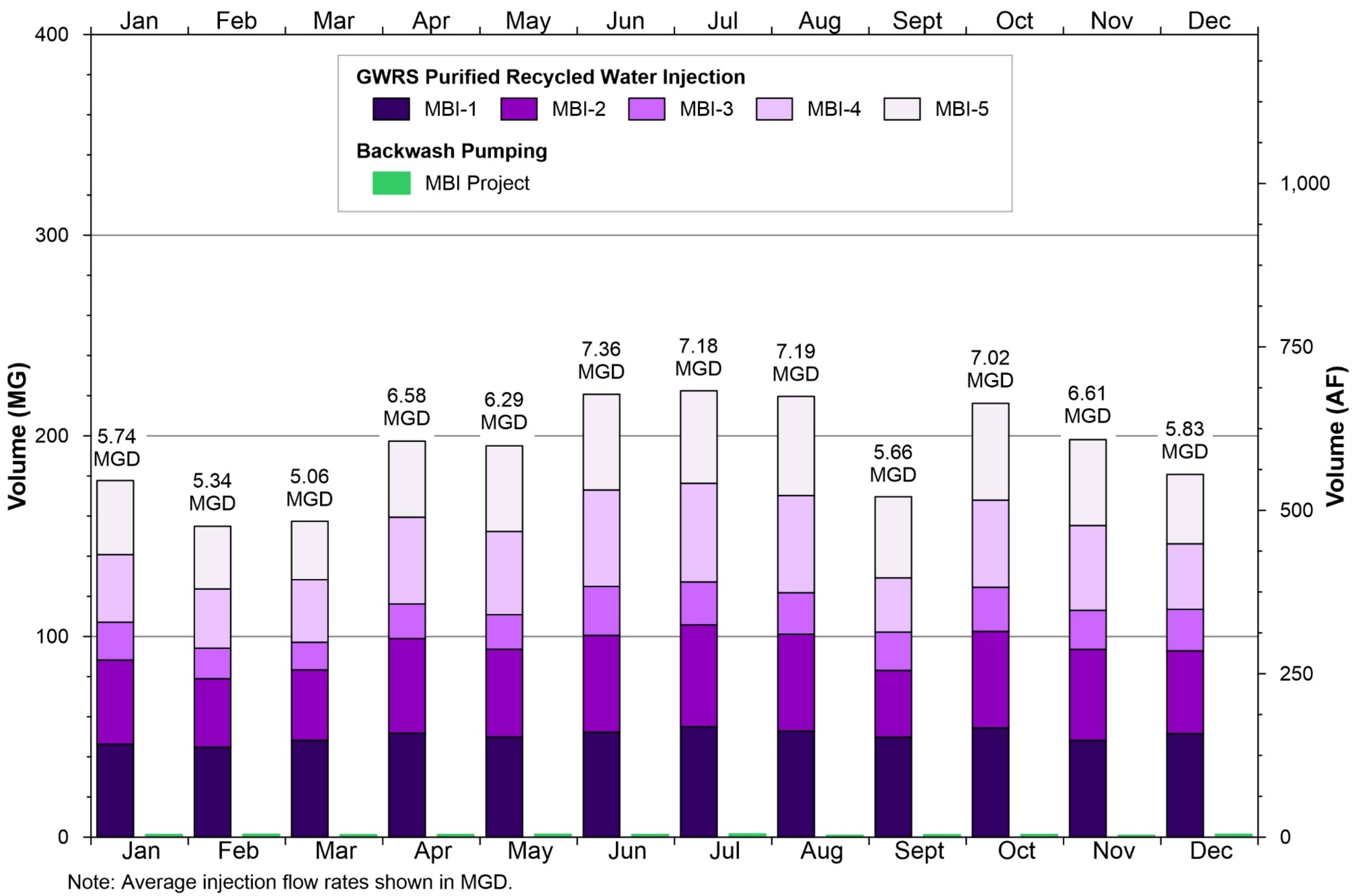


Figure 7-4. 2024 Monthly Injection and Backwash Quantities at MBI Project

Figure 7-4 also shows that aside from an anomalously low September, MBI Project injection volumes and average daily injection rates fluctuated based on seasonal trends in regional water levels. Monthly injection typically has an inverse correlation with seasonal water levels, i.e., injection is slightly lower in the winter months when regional water levels are higher due to less groundwater pumping during those cooler and wetter months. Figure 7-4 shows that monthly injection followed the typical seasonal pattern wherein injection was moderate and decreasing to begin the year, reached a seasonal low in the late winter/early spring, then increased through the warmer summer and early fall months before again decreasing in the final 1-2 months of the year.

7.3 MBI Project Injection Rates and Yields

OCWD Operations staff continuously monitor operational data from the MBI Project injection wells to target optimal and sustainable operating conditions throughout the year. Optimal operating conditions targeted at each well consist of injection rate set point and backwash frequency, which are adjusted as needed.

An injection rate set point is programmed into the PCS for each MBI well as an operational range within which the automated downhole flow control valve can feasibly operate. To avoid excessive opening and closing of the flow control valves attempting to maintain a precisely constant injection rate, operational experience led to implementing an injection rate set point range. For example, an injection rate set point with a range of 1,100-1,400 gpm would be programmed if the average injection rate were desired to be approximately 1,250 gpm. Adjustments are typically made to the injection rate set points after a backwash in response to well performance during the preceding backwash cycle for the purpose of maximizing injection volume over time without increasing the required backwash frequency. To prevent positive pressure at the wellhead and potential leakage into vaults or well seals, the injection rate in an MBI well is automatically reduced by the downhole flow control valve if the measured injection level rises above 10 feet bgs. This is known as an automatic injection rate reduction, or AIRR.

Injection operations were continuous throughout 2024 except for brief planned and unplanned AWPF shutdowns totaling 7 days off-line. During 2024, there were three instances of planned AWPF shutdowns for OCWD and OC San Plant 2 construction projects and system testing: March 26-28 (54.7 hours off-line), May 29-30 (36.5 hours off-line), and November 4-7 (60 hours off-line). There were also three instances of unplanned AWPF shutdowns during 2024, all related to unscheduled power outages or other system failures: March 17 (3.5 hours off-line), June 9 (4.45 hours off-line), and August 20 (3.65 hours off-line). For a more detailed description of AWPF shutdowns, see Appendix F.

Injection yield is defined as the injection flow rate in gpm per foot of groundwater level rise from static conditions within the injection well and is comparable to the specific capacity for a production well. Injection at the MBI Project wells resumed 30 minutes after each backwash to allow groundwater levels to recover to near-static conditions. Just prior to resuming injection, a static water level is measured in the injection well and used to calculate the injection yield for the next injection cycle. The first injection yield value following a backwash event and 30-minute static water level measurement is typically recorded one day after injection is resumed, allowing the injection mound to stabilize.

Table 7-3 shows the average daily injection rates for the five MBI wells in 2023 and 2024, while Table 7-4 shows the average daily injection yields for the same wells and years. Due to the interconnected nature of injection rates and yields, the trends observed in the two mimic each other as shown graphically in the 2022 and prior annual reports and discussed here. In 2024, average daily injection rates and yields increased at MBI-1, MBI-2, and MBI-4, and decreased significantly at MBI-3 and MBI-5 as compared to 2023. MBI-3 consistently had the lowest daily injection rates and yields throughout both years, and MBI-5 experienced a notable decline in 2024, dropping from the highest injection rate in 2023 to the third highest in 2024. The total average daily injection rate of the five MBI wells combined during 2024 was 6.31 MGD (4,382 gpm) based on flow meters at each well, representing a 0.25 MGD (approximately 4%) decrease relative to 2023 (Table 7-3). Injection rates and yields had shown signs of stabilization in previous years; however, 2024 marked a notable shift, with the significant declines observed at MBI-3 and MBI-5 indicating a potential reduction in well performance.

Table 7-3. 2024 and 2023 MBI Project Average Daily Injection Rates

Year	Days On-line	Average Daily Injection Rates (MGD)[1]					
		MBI-1	MBI-2	MBI-3	MBI-4	MBI-5	Total
2024	359	1.65	1.41	0.63	1.29	1.33	6.31
2023	361	1.54	1.36	0.80	1.19	1.68	6.56
2024-2023 Change	-1%	7%	4%	-21%	8%	-21%	-4%

[1] Average daily injection rates based on number of calendar days per year, regardless of days off-line.

Table 7-4. 2024 and 2023 MBI Project Average Injection Yields

Year	Average Daily Injection Yields (gpm/ft)					
	MBI-1	MBI-2	MBI-3	MBI-4	MBI-5	Average
2024	21	17	7	15	15	15
2023	15	16	8	14	17	14
2024-2023 Change	40%	6%	-13%	7%	-12%	7%

7.4 MBI Project Backwash Pumping Rates and Frequency

Table 7-5 summarizes the annual average pumping rates, durations, and frequency during 2024. MBI-3 had the lowest backwash pumping rate of all five wells because greater backwash pumping rates have been found to produce large quantities of fine sand from the aquifer formation at that well. The lower pumping rate at MBI-3 was based on the results of a dynamic video survey performed in January 2021 for the purpose of determining the optimum backwash pumping rate with minimal sand production. The pumping rates of all MBI backwash events were very stable throughout 2024 due to consistent backwash pumping rate set points, with minor variations in the pumping rates likely caused by fluctuations in regional groundwater levels.

Table 7-5. 2024 MBI Project Backwash Pumping Rates, Duration, and Frequency

	MBI-1	MBI-2	MBI-3	MBI-4	MBI-5
Avg. Pumping Rate (gpm)	3,500	3,400	1,100	3,300	2,000
Avg. Duration (minutes)	40	45	90	45	100
No. of Backwashes	44	13	13	13	13
Approx. Frequency	weekly	monthly	monthly	monthly	monthly

For injection wells that produce sand during backwash pumping (MBI-1, MBI-3, and MBI-5), the duration of each backwash was determined by the rate of sand production from the aquifer formation, with pumping continuing until the sand content decreased to a target of approximately 1 PPM. During 2024, the backwash duration averaged approximately 40 minutes at MBI-1, 90 minutes at MBI-3, and 100 minutes at MBI-5. For injection wells with negligible sand production (MBI-2 and MBI-4), the duration of each backwash was fixed at 45 minutes throughout the year.

The required backwash frequency provides a gauge of injection performance. For a given injection rate, the longer the time required between backwashes, the better the injection performance (i.e., the slower the rate of clogging). Based on early operational data prior to relining of the Unit 1 GWRS Pipeline, backwash pumping at approximately three times per week was required for MBI-1 to achieve and maintain its design injection rate of 2 MGD (1,400 gpm).

From 2016 to August 2018, slightly lower injection rates at MBI-1 averaging 1.5 MGD (1,000 gpm) had resulted in a more acceptable weekly backwash frequency. Post-rehabilitation of the Unit 1 GWRS Pipeline, MBI-1 operational data in 2018 and 2019 indicated a higher sustainable injection rate of 1.7-2.0 MGD with a backwash frequency of one week. Table 7-5 shows that a weekly backwash frequency was maintained at MBI-1 during 2024, which is more frequent than the four newer MBI wells and more frequent than required by the modern injection wells at the Talbert Barrier (4-8 weeks). Potential reasons for the faster rate of injection yield decline and thus more frequent backwashes at MBI-1 include the following:

- Differences in local geology at the MBI-1 site versus the Talbert Barrier;
- Well design differences at MBI-1 versus MBI-2, MBI-3, MBI-4, and MBI-5; and
- Previously accumulated particulate matter in MBI-1 from erosion of the interior mortar lining in the GWRS Unit 1 Pipeline prior to relining with epoxy coating in 2018.

Due to these factors, a weekly backwash interval will be maintained at MBI-1 for 2025.

The four MBI wells in Centennial Park have generally been backwashed monthly since they came on-line in March 2020. Based on the decline in injection yields observed at each of the four wells during 2021, the backwash frequency was increased at MBI-3 and MBI-5 from monthly to biweekly (Table 7-5) from June 2022 to April 2023 as an operational test to mitigate the loss of injection capacity. During 2023, Operations staff analyzed the test results and found a per well increase of approximately 10-15% in the monthly average injection during the testing period. However, it was determined that the added electrical cost and staff time required for the extra backwashes outweighed the benefit. As a result, MBI-3 and MBI-5 were maintained at a monthly backwash frequency for 2024 and will continue at this schedule for 2025 assuming the operational performance at these two wells is maintained.

8. GROUNDWATER MONITORING AT THE MBI PROJECT

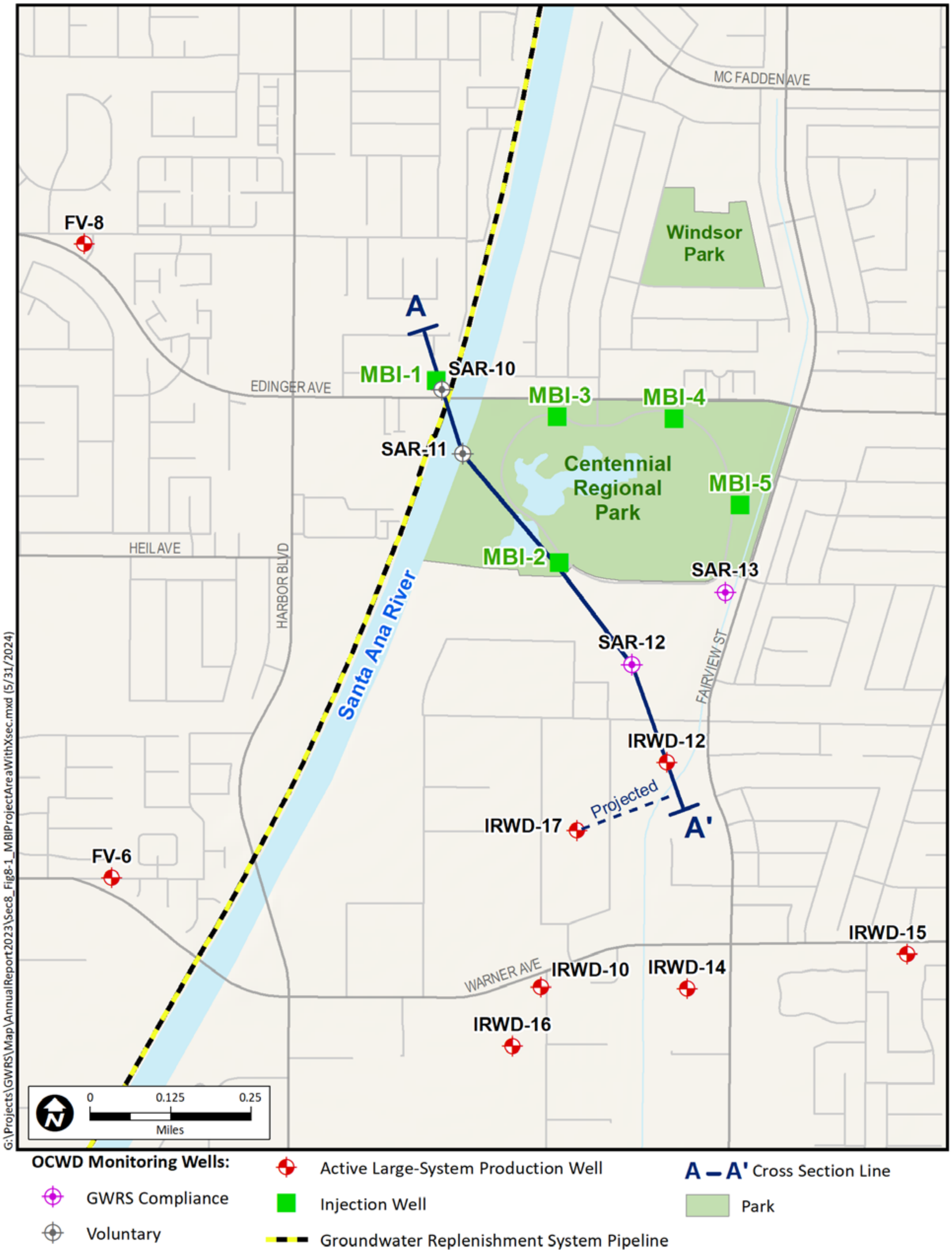
OCWD has maintained a comprehensive groundwater monitoring program throughout the Basin for decades, testing ambient groundwater for various organic, inorganic, and microbiological constituents at OCWD monitoring wells and potable drinking water wells.

As a part of the DMBI Project, OCWD began groundwater monitoring activities in 2012 at nested monitoring wells SAR-10 and SAR-11, prior to injecting GWRS purified recycled water at injection well MBI-1 in April 2015. Figure 8-1 shows the location of the MBI Project monitoring wells. Nested monitoring wells SAR-12 and SAR-13 were constructed during late 2017 as part of the subsequent MBI Centennial Park Project. As discussed in Section 7, these two wells were strategically located downgradient of MBI-1 and the four newer MBI wells in Centennial Park, along the flow path towards the nearest drinking water wells IRWD-12 and IRWD-17. SAR-12 and SAR-13 serve as the two required downgradient compliance monitoring wells (CCR, 2018; RWQCB, 2019; RWQCB, 2022a) for the combined five injection well MBI Project which went on-line in March 2020. Data from compliance monitoring wells SAR-12 and SAR-13 are included in this section. Data from monitoring wells SAR-10 and SAR-11, along with a detailed discussion of water quality trends and arrival times at all four monitoring wells can be found in the 2022 and earlier annual reports.

Commencement of GWRS purified recycled water injection at MBI-2, MBI-3, MBI-4, and MBI-5 on March 18, 2020, along with continued injection of GWRS water at MBI-1, marked the start of the full-scale intrinsic tracer test to comply with requirements (RWQCB, 2019) to track the injected GWRS water signal as it migrated to the compliance monitoring wells SAR-12 and SAR-13 and farther downgradient to municipal drinking water production wells IRWD-12 and IRWD-17. For purposes of the intrinsic tracer test, all five MBI wells were placed fully on-line on the same day and were operated at relatively high and stable injection rates to the extent possible for the remainder of 2020, except for a three-week off-line period from April 24 to May 13 related to a planned AWPF shutdown for GWRSFE construction activities and GWRS Pipeline inspection. The tracer test was completed in late 2023 and, as of spring 2025, the MBI Tracer Test Report (OCWD, 2024) is under review by DDW.

This section presents the following for calendar year 2024:

- Aquifers in the MBI Project area;
- Overview of groundwater monitoring program;
- Groundwater elevations and directions of flow; and
- Groundwater quality.



SOURCE: OCWD (03/2023)

Figure 8-1. MBI Project Area and Well Location Map

8.1 Aquifers in the MBI Project Area

Earlier studies (DWR, 1934; DWR, 1967) divided the Basin into the Forebay and Pressure areas. As was discussed in Section 6, the Forebay refers to the inland area of intake or recharge generally characterized by coarse-grained high permeability sediments (e.g., sands and gravels) and unconfined aquifer conditions, allowing for surface percolation of applied water to replenish the Basin. In contrast, the Pressure area refers to the coastal and central regions of the Basin where the presence of intervening fine-grained low-permeability clay and silt deposits creates confined or pressurized aquifer conditions at depth, thus making large-scale percolation of surface water impractical in these areas. Therefore, the most feasible method of recharge in the Pressure area is by direct injection into targeted confined aquifers.

For the purposes of the OCWD Basin-wide Groundwater Flow Model (Phraner, et al., 2001; OCWD, 2004b) and the Annual Groundwater Storage Change calculation (OCWD, 2007), the Basin has been vertically characterized into three distinct aquifer systems: (1) Shallow, (2) Principal, and (3) Deep. Over 90% of groundwater production in the Basin occurs from the Principal aquifer system. The approximate vertical intervals of the three aquifer systems in the vicinity of the MBI Project are presented in Table 8-1. The Principal and Deep aquifers are both approximately 1,000 feet thick in the MBI Project area and both rise and thin slightly to the southeast towards the IRWD Dyer Road Well Field (DRWF), conforming to the Basin's overall synclinal structure that plunges to the northwest towards the Buena Park area (Herndon and Bonsangue, 2006).

Table 8-1. Approximate Aquifer System Depths in the MBI Project Area

Shallow Aquifer (ft bgs)	Principal Aquifer (ft bgs)	Deep Aquifer (ft bgs)
0 – 250	250 -1,250	1,250 – 2,250

Figure 8-2 shows a schematic geological cross-section through the MBI Project area, extending to the southeast to IRWD-12. Since the cross-section in Figure 8-2 is a generalized schematic, it shows both IRWD-12 and IRWD-17, which are the two nearest municipal production wells directly downgradient from the MBI Project. Figure 8-1 presented earlier shows the schematic cross-section alignment (A-A'), with IRWD-17 being perpendicularly projected onto that alignment.

Extrapolating the same aquifer naming scheme used in the Talbert Barrier area from earlier studies (see Section 4 and DWR, 1966), Figure 8-2 shows that the Shallow aquifer system is comprised of both the Talbert and Alpha aquifers in the MBI Project area, like at the Talbert Barrier.

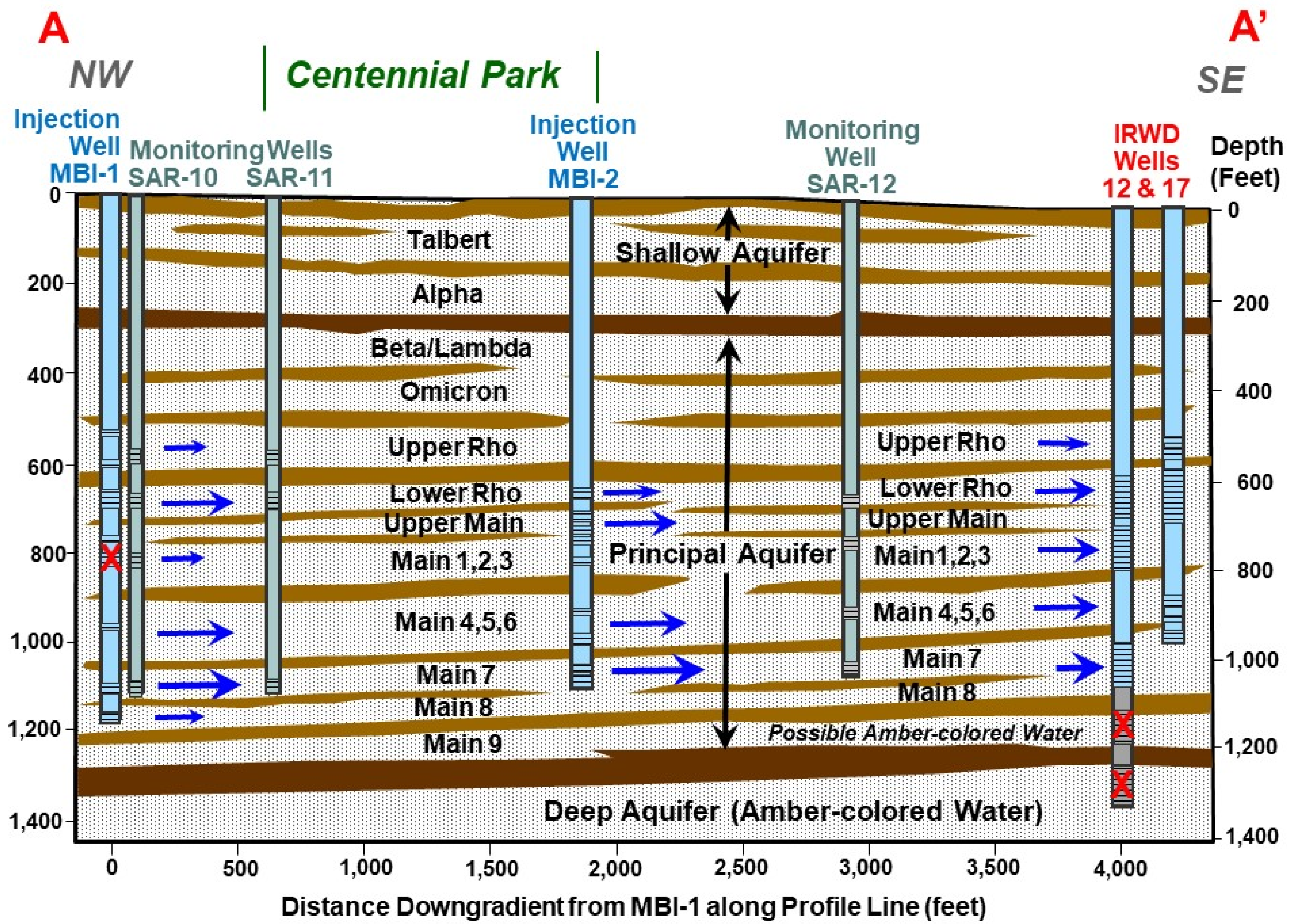


Figure 8-2. Schematic Geological Cross Section Through the MBI Project Area

The Principal aquifer system, from shallowest to deepest, consists of the following individual aquifers:

- Beta and Lambda aquifers, often locally merged;
- Omicron aquifer;
- Upper Rho aquifer;
- Lower Rho aquifer; and
- Main aquifer.

The Main aquifer is the most prolific and thickest aquifer within the Principal aquifer system, typically segregated into multiple discrete subunits separated by low-permeability aquitards that are not entirely laterally extensive (Figure 8-2). Although these Main aquifer subunits tend to be somewhat hydraulically connected to one another with only minor vertical head gradients between them, they were individually correlated across the MBI Project area based on lithologic and geophysical logs from the MBI injection and monitoring wells. Based on the MBI well logs, these Main aquifer subunits have varying hydraulic conductivities and thicknesses that affect the rate of injected GWRS water transport. The individual Main aquifer subunits were numbered from 1 to 9 (from shallow to deep, respectively) with some of these subunits (e.g., subunits 1, 2, and 3) being grouped together based on the interpreted stratigraphy, as shown in Figure 8-2.

Due to the synclinal structure of the Basin plunging to the northwest, the aquifers comprising the Principal aquifer system rise slightly to the southeast from MBI-1 to the nearest production wells, IRWD-12 and IRWD-17. The shallowest Principal aquifer system zones (Beta and Lambda) were interpreted to be approximately 50 feet shallower at IRWD-12 and IRWD-17, while the deepest Principal aquifer system zones (Main 8 and Main 9) were interpreted to be as much as 100-150 feet shallower at IRWD-12 and IRWD-17 than at the MBI-1 site (Figure 8-2). The correlated aquifer names and depths in the MBI Project area and the nearby production wells were based on review of all hydrogeologic data for the MBI wells and nearby production wells, including geophysical logs, existing OCWD Basin-wide geologic cross-sections in the vicinity, and depth-specific groundwater level and quality data, especially from SAR-10, SAR-11, SAR-12, and SAR-13.

All five MBI wells were screened entirely within the Principal aquifer system and were constructed similarly to nearby production wells (Figure 8-2 and Table 7-1).

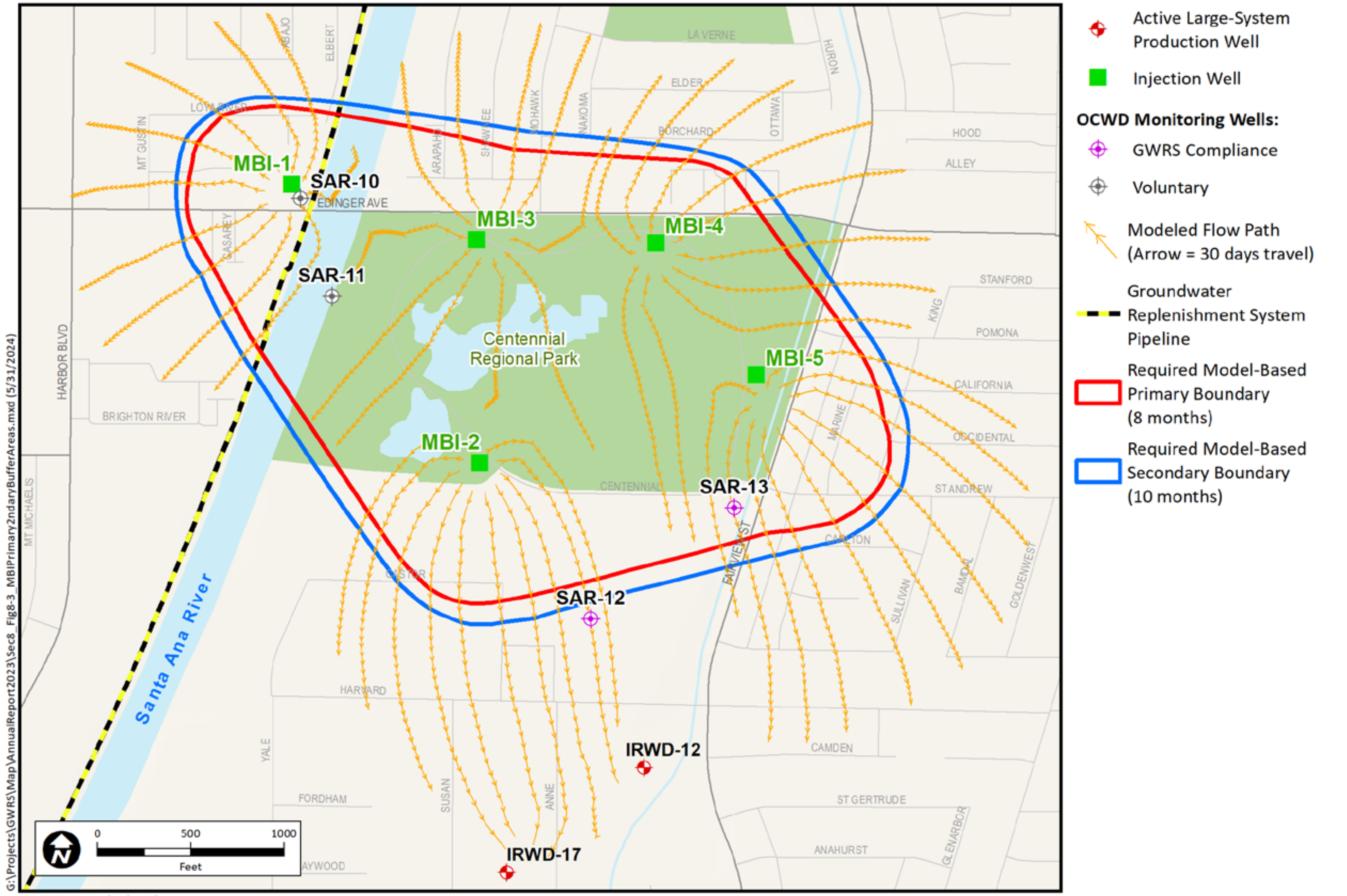
The Principal aquifer system has significantly lower groundwater levels than the Shallow and Deep aquifer systems in the MBI Project area and throughout much of the Basin, due to the large volume of pumping from the Principal aquifer system. Therefore, the greatest need for replenishing the Basin in the MBI Project area is within the Principal aquifer system, especially due to the proximity to the IRWD DRWF, where pumping often lowers groundwater levels to 100 feet below mean sea level in the summer months.

Downward vertical gradients typically exist between the individual aquifer units comprising the Principal aquifer system in the MBI Project area and throughout the larger Pressure area of the Basin, with groundwater levels generally becoming progressively lower with each successively deeper Principal aquifer system unit; groundwater levels are typically highest in the shallowest Beta and Lambda aquifers, and lowest in the deepest Main aquifer unit. These vertical gradients have consequences for injection well performance. For production or injection wells screened across these Principal aquifer system units, groundwater level differences can cause wellbore flow under static or idle conditions, effectively producing water into the well from screened intervals with higher head (pressure) and injecting this same water back out of the well through screened intervals with lower groundwater head. Under pumping and injection conditions, such groundwater level differences as well as each individual unit's transmissivity can significantly influence the amount of water produced from or injected into each screened interval (OCWD, 2010).

Spinner log tests were performed at MBI-1 and the four MBI wells in Centennial Park to determine the relative contribution of each individual screened interval during backwash pumping and injection conditions. At MBI-1, pumping and injection spinner log tests were conducted in August 2015, but then a new injection spinner log test was conducted at MBI-1 in July 2020 when injection spinner logs were also completed at the four MBI wells in Centennial Park. The pumping and injection contribution within each Principal aquifer system unit varies considerably from one MBI well to another (refer to Table 8-2 of the 2021 Annual Report for the percent contribution of pumping versus injection for each screened interval) and is likely caused primarily by differences in aquifer thickness, screened interval length, and hydraulic conductivity at the different MBI locations. These local heterogeneities in the MBI Project area are confirmed and consistent with the lithologic and geophysical logs at the five MBI wells.

As required by state regulation (CCR, 2018), OCWD has established retention time boundary areas for control of pathogenic microorganisms and response retention time in the area downgradient of MBI. Initial model-based boundaries for the project were developed using MODFLOW (Harbaugh and McDonald, 1996) plus MODPATH (Pollock, 1994) particle tracking and approved by the State Water Resource Control Board Division of Drinking Water (DDW) in 2019. Potable drinking water wells are prohibited within the 8-month primary underground retention time boundary illustrated on Figure 8-3. Additionally, no drinking water wells are located within the 10-month secondary underground retention time boundary. The boundary area is enforced by local well permitting authorities including the Orange County Health Care Agency, as well as DDW.

Beginning on March 18, 2020, with the commencement of injection at MBI-2 through MBI-5 along with continued injection of GWRS water at MBI-1, OCWD conducted a full-scale intrinsic tracer test to refine the model-based retention time boundaries displayed in Figure 8-3. Proposed 4-month primary and 5-month secondary boundary areas based on both the tracer



SOURCE: OCWD (04/2023)

Figure 8-3. MBI Project Boundary Areas

test study results and refined flow and transport modeling were documented in the MBI Tracer Test Report (OCWD, 2024) and are currently under review by DDW.

8.2 Groundwater Monitoring Program

The MBI Project follows a groundwater monitoring program like those conducted within the other GWRS recharge areas (Talbert Barrier and K-M-M-L Basins). SAR-12 and SAR-13 serve as the two required downgradient compliance monitoring wells in the December 2022 GWRS permit and its Monitoring and Reporting Program (RWQCB, 2022a) for the combined five injection well MBI Project.

Table 8-2 summarizes the screened interval depths and aquifer zones for all four MBI monitoring wells (SAR-10, SAR-11, SAR-12, and SAR-13). For monitoring the fate and transport of injected GWRS water, SAR-10 and SAR-11 were screened in Principal aquifer zones corresponding to individual screened intervals at MBI-1, while SAR-12 and SAR-13 were screened in Principal aquifer zones corresponding to individual screened intervals common to the four newer Centennial Park wells (MBI-2, MBI-3, MBI-4, and MBI-5).

Table 8-2. Monitoring Wells at the MBI Project

OCWD Well Name	Date Completed	Nearest Injection Well [1]	Approximate Distance and Direction from MBI well	Nearest Drinking Water Well	Well Depth (ft bgs)	Aquifer Name
SAR-10/1[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	590-600	Upper Rho
SAR-10/2[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	690-710	Lower Rho
SAR-10/3[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	800-820	Main 2
SAR-10/4[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	1,100-1,115	Main 7
SAR-11/1[2]	11/10/2011	MBI-1	650 ft SE	IRWD-12	592-602	Upper Rho
SAR-11/2[2]	11/10/2011	MBI-1	650 ft SE	IRWD-12	675-690	Lower Rho
SAR-11/3[2]	11/10/2011	MBI-1	650 ft SE	IRWD-12	1,100-1,110	Main 7
SAR-12/1	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	605-625	Lower Rho
SAR-12/2	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	755-775	Main 2
SAR-12/3	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	915-930	Main 4
SAR-12/4	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	1,045-1,055	Main 7
SAR-13/1	10/30/2017	MBI-5	500 ft S	IRWD-12	600-620	Lower Rho
SAR-13/2	10/30/2017	MBI-5	500 ft S	IRWD-12	750-770	Main 2
SAR-13/3	10/30/2017	MBI-5	500 ft S	IRWD-12	910-930	Main 4
SAR-13/4	10/30/2017	MBI-5	500 ft S	IRWD-12	1,045-1,055	Main 7

[1] The closest injection well is not necessarily the fastest source of injection water based on estimated arrival times and inferred groundwater flow directions.

[2] Monitoring well sites SAR-10 and SAR-11 are not compliance wells per the GWRS permit (RWQCB, 2022a). Monitoring at these sites continues voluntarily.

Groundwater levels at SAR-10, SAR-11, SAR-12, and SAR-13 were manually measured approximately monthly during 2024. In addition, all zones of all four wells were equipped with automated data loggers and pressure transducers for at least daily groundwater level monitoring prior to commencement of the MBI Project intrinsic tracer test in March 2020 to monitor the associated rise in groundwater levels. The monthly hand-measured water levels were used to verify that the pressure transducers were accurate and within acceptable calibration limits.

The 2022 GWRS permit (RWQCB, 2022a) requires the same monitoring locations and frequencies as the previous GWRS permit, although the constituents required for monitoring were changed slightly as follows:

- Required monitoring reduced or eliminated for the following constituents:
  - MBAS, silver, and thiobencarb no longer required; and
  - Color and odor reduced from quarterly to annually.
- Required monitoring added for the following constituents:
  - Lead, arsenic, beryllium, cadmium, trivalent chromium, selenium and thallium quarterly;
  - Hexavalent chromium annually;
  - Dichloromethane, bromodichloromethane, chloroform, and NDMA quarterly; and
  - Acrolein and acrylonitrile quarterly through third quarter 2023, after which time monitoring may cease if all results are non-detect.

Groundwater level and quality results from all four monitoring wells have been instrumental in determining groundwater flow patterns and velocities within the MBI Project area as described in Section 8.4 of the 2021 and 2022 annual reports. Data from these four monitoring wells were also used to help refine and calibrate a groundwater flow and transport model of the MBI Project area as summarized in Section 8.5 of the 2022 annual report and described in the MBI Tracer Test Report (OCWD, 2024) currently under review by DDW.

8.3 Groundwater Elevations and Directions of Flow

This section discusses groundwater elevations and groundwater flow paths within the Principal aquifer system in the MBI Project area.

8.3.1 Principal Aquifer System

For the MBI Project, the Principal aquifer system is of primary concern since all five MBI wells are screened in this aquifer zone, as are the nearest downgradient production wells IRWD-12 and IRWD-17 that have been shown to receive some proportion of injected GWRS water from the project. Principal aquifer system groundwater elevations vary considerably due to seasonal fluctuations in the amount and location of Basin pumping, as well as year-to-year changes in Basin groundwater storage. However, regional groundwater flow directions have remained relatively stable in the greater MBI Project area over the last several years.

Figure 8-4 shows interpreted groundwater elevation contours and inferred groundwater flow directions for the Principal aquifer system for June 30, 2024. Groundwater levels from SAR-10/4, SAR-11/3, SAR-12/4, and SAR-13/4, all screened in the Main 7 Principal aquifer unit (Table 8-2), were used to help construct and constrain these Basin-wide regional contours in the MBI Project area, and all five MBI wells were operational at the time of the groundwater level measurements. IRWD-12 and IRWD-17 were pumping during the time of the groundwater level measurements and therefore neither well had a static water level measurement during the late June timeframe to help constrain the contours downgradient of the MBI Project. The only downgradient IRWD production wells in this vicinity that had a reliable static water level for the contour map in Figure 8-4 were IRWD-13, measured at -81 ft msl, and IRWD-7, measured at -85 ft msl. These wells are located approximately 5,300 feet (IRWD-13) and 7,500 feet (IRWD-7) south-southeast of MBI-2, just outside the map extent of Figure 8-4.

As shown on Figure 8-4, groundwater elevations in the Principal aquifer system were approximately 42 feet below mean sea level in the northwest portion of the MBI Project area between SAR-10 and SAR-11, approximately 6 feet higher than in June 2023. In the southeast portion of the MBI Project area between SAR-12 and SAR-13, Principal aquifer system groundwater elevations were approximately 55 feet below mean sea level, approximately 8 feet higher than in June 2023. The small rise in Principal aquifer groundwater levels from June 2023 to June 2024 is consistent with observations throughout the Basin and reflect the 4,000 AF increase in Principal aquifer system storage during the same period.

Based on the Principal aquifer system groundwater elevation contours in Figure 8-4, the inferred groundwater flow direction in the MBI Project area in June 2024 was to the south-southeast towards the IRWD DRWF. This flow direction is consistent with previous years since the MBI Project became operational, during which a predominantly southern gradient has been typical. Prior to startup of the MBI Project wells in 2020, however, the inferred groundwater flow direction had a stronger easterly component.

The closest downgradient production wells to the MBI Project are IRWD-12 and IRWD-17, both located approximately 2,200 feet downgradient from the nearest MBI wells, MBI-5 and MBI-2, respectively. As such, the inferred groundwater flow directions in Figure 8-4 indicated flow from MBI-5 towards IRWD-12 and from MBI-2 towards IRWD-17. Figure 8-4 shows that Principal aquifer system groundwater elevations near IRWD-12 at the end of June 2024 were approximately 63 feet below mean sea level, 8 feet higher than in June 2023 and generally consistent with the minor change in Principal aquifer system groundwater levels observed throughout the Pressure area of the Basin and at the four MBI monitoring wells during that period. Since Principal aquifer system groundwater elevations from June 2023 to June 2024 were 6-8 feet higher at the MBI monitoring wells and 8 feet higher near IRWD-12, the hydraulic gradient from the MBI Project wells to IRWD-12 was slightly flatter in June 2024 compared to

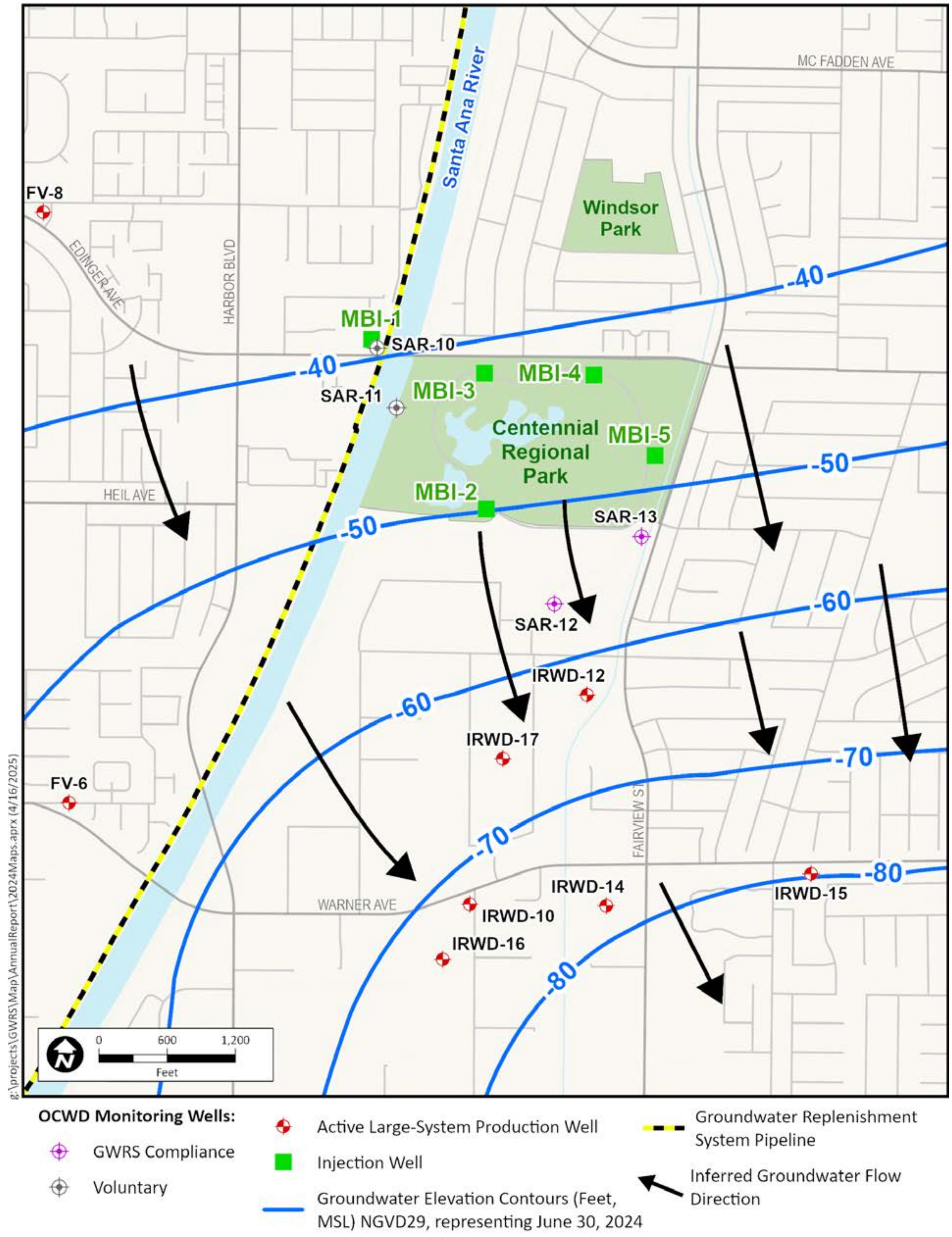


Figure 8-4. Principal Aquifer System Potentiometric Surface with Inferred Groundwater Flow Directions in the MBI Project Area During 2024

June 2023, likely attributable to decreased overall IRWD DRWF pumping during 2024. In addition to the effects of MBI Project injection, the hydraulic gradient in this area can be influenced by Basin storage conditions and also the timing and amount of pumping from nearby production wells, especially in the IRWD DRWF.

The Principal aquifer groundwater elevation contour map shown in Figure 8-4 represents one snapshot in time at the end of the water year (June 30). Throughout the calendar year, groundwater elevation trends in the MBI Project monitoring wells typically exhibit a seasonal pattern: (1) rising or remaining high during the winter and early spring months, (2) declining in the late spring and summer months to a low point in September, and (3) recovering considerably in the late fall months to the end of the year. In the MBI Project area, these seasonal trends largely result from seasonal water demands which lead to increased pumping during the summer and reduced pumping during the winter, and to a lesser degree from increased Forebay recharge (both natural and managed) from local rainfall and captured SAR storm flows during the winter months. During 2024, groundwater elevation trends at the four MBI Project monitoring wells generally followed the typical seasonal pattern, except that the usual year-end recovery was less than prior years. The limited year-end recovery was likely due to having almost no early-season rainfall in the final months of 2024, which led to: (1) increased seasonal water demand and thus higher than usual pumping, and (2) less natural and managed recharge in the Forebay during these months.

As mentioned previously, downward vertical gradients typically exist between the individual aquifer units comprising the Principal aquifer system in the MBI Project area and throughout the larger Pressure area of the Basin, with groundwater levels generally becoming progressively lower with each successively deeper Principal aquifer unit. At SAR-12 and SAR-13, the typical downward vertical gradient is not observed prior to or during MBI Centennial Park operations; this is likely due to their proximity to production wells IRWD-12 and IRWD-17, which both have their upper screened intervals within the same aquifer zones as the upper two zones at SAR-12 and SAR-13 (Figure 8-2). SAR-12 is located only 850 ft from IRWD-12, while SAR-13 is located 1,475 ft from IRWD-12, as compared to SAR-10 and SAR-11 which are both over 3,000 ft away from IRWD-12 (Figure 8-1) and thus have a much more dampened response to pumping from IRWD-12 and IRWD-17.

8.4 Groundwater Quality

The two MBI Project compliance monitoring wells SAR-12 and SAR-13 have been sampled quarterly from March 2018 through 2024 and tested for an extensive list of inorganic and organic parameters, including constituents with secondary MCLs, 1,4-dioxane, and NDMA. SAR-12 and SAR-13 were sampled for background data collection purposes from March 2018 until February 2020, then for compliance monitoring purposes beginning in March 2020 with MBI Project startup. Quarterly compliance groundwater quality data for SAR-12 and SAR-13 for 2024 are presented in Appendix K and 1,4-dioxane and NDMA results for the last five years (2020-24) are summarized in Appendix L. During 2024, groundwater quality at SAR-12 and SAR-13 complied with all Federal and State Primary Drinking Water Standards, and there were no Secondary MCL exceedances.

8.4.1 Monitoring Wells – Chloride, NDMA, and 1,4-Dioxane

As discussed in Sections 4 and 6 related to the Talbert Barrier and Anaheim Forebay recharge facilities, respectively, chloride has been effectively used as an intrinsic tracer of GWRS water in the subsurface arriving at nearby downgradient monitoring wells. Chloride is a conservative tracer and thus is expected to migrate at the same groundwater velocity as the injected water without any significant reactions with other constituents in the groundwater or aquifer substrate. Fortunately for tracking purposes, GWRS-FPW has a very low and relatively stable chloride concentration with an annual average ranging from 4-11 mg/L since 2020 when the MBI tracer test began.

Ambient background chloride concentrations in all Principal aquifer units ranged from 11-16 mg/L prior to the commencement of GWRS injection at the MBI Project monitoring wells. The lack of chloride variability between these aquifer units and the lack of seasonal chloride variation provided a reliable and stable antecedent chloride condition that was noticeably higher than GWRS water at the monitoring wells. Also, as discussed in Section 8.4.2, chloride concentrations at the nearest downgradient production well IRWD-12 were similarly stable within approximately the same range over a much longer historical period than the MBI Project monitoring wells.

Beginning in mid-2020 and continuing through 2021, the sampling frequency at SAR-12 and SAR-13 was voluntarily increased to biweekly to track the injected GWRS water for the MBI intrinsic tracer test, then reduced back down to quarterly in the beginning of 2022. GWRS arrival estimates for the MBI monitoring wells are provided in previous annual reports (e.g., DDBE, 2023). The MBI Tracer Test Report (OCWD, 2024) is currently under review by DDW.

As discussed in Section 4.4.1, OCWD has historically monitored NDMA in the vicinity of the Talbert Barrier for GWRS permit compliance purposes and to track the release of NDMA within the aquifers receiving injection in the late 1990s and early 2000s from WF-21. Since then, through a combination of industrial source control, appropriate polymer selection and waste stream diversion at OC San, improved NDMA rejection by RO membranes, and UV treatment, the concentration of NDMA in GWRS-FPW has been significantly reduced (OCWD, 2015).

Figure 8-5 for SAR-13/4 (Main 7 aquifer) presents an illustrative example of the correlation between chloride and NDMA. From 2018-2020, chloride concentrations at SAR-13/4 were stable at approximately 12 mg/L, indicating no arrival of GWRS water from MBI-1 during that time.

Concurrent NDMA concentrations were consistently non-detect, confirming no GWRS water arrival from MBI-1. In mid-2020, chloride concentrations decreased while NDMA concentrations increased notably, signaling GWRS arrival. In fall 2021 chloride concentrations briefly rose along with a contemporaneous decrease in NDMA concentrations , indicating some proportion of older native pre-GWRS water briefly migrating to this well following a 21-day AWPF shutdown in August-September 2021. Chloride and NDMA time series graphs like Figure 8-5 for all four MBI monitoring wells were shown and discussed in detail in the 2022 and previous annual reports. During 2024, NDMA concentrations at MBI Project compliance monitoring wells SAR-12 and SAR-13 were generally representative of recent GWRS levels, ranging from non-detect to 2.9 ng/L, well below the notification level of 10 ng/L.

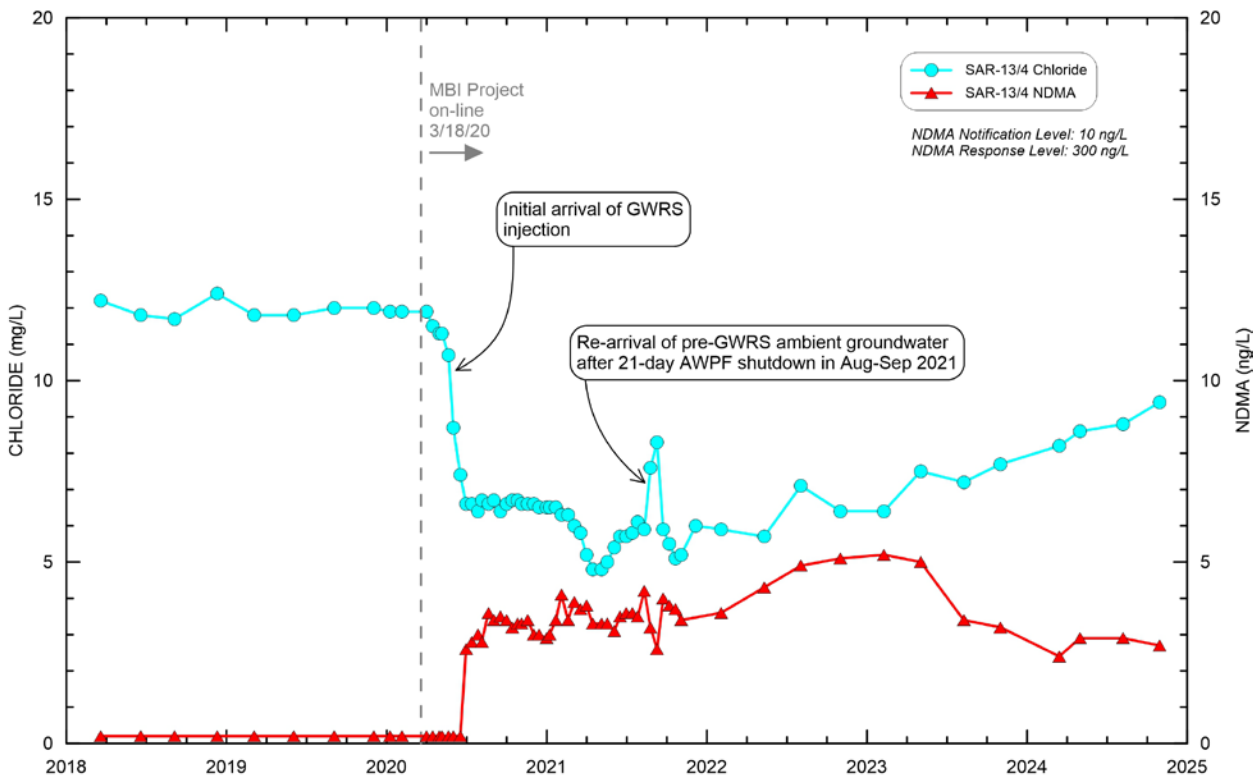


Figure 8-5. Monitoring Well SAR-13/4 Chloride and NDMA Concentrations

During 2024, all zones at SAR-12 and SAR-13 continued to be non-detect for 1,4-dioxane, as expected since historical ambient levels at the compliance wells and GWRS levels since 2015 were all non-detect.

8.4.2 Monitoring Wells – Metals

This subsection describes groundwater monitoring results at the compliance wells SAR-12 and SAR-13 for key metals arsenic, aluminum, and iron, all of which have shown some degree of mobilization from aquifer sediments downgradient of GWRS recharge at the MBI wells. These key metals were sampled at least quarterly at SAR-12 and SAR-13 from 2018 through 2024. A comprehensive list of 2024 groundwater quality results for all monitored metals at SAR-12 and

SAR-13 is available in Appendix K. For a description of vanadium trends related to the arrival of GWRS water at MBI Project monitoring wells, see Section 8.4.4 of the 2022 Annual Report.

8.4.2.1 Arsenic

One of the main constituents monitored along the injection flow path is arsenic since mobilization of aquifer sediment-bound arsenic has been shown to occur at some locations in association with the recharge and injection of GWRS purified recycled water. The primary MCL for total arsenic is 10 µg/L.

As previously documented, the mobilization of arsenic from aquifer sediments has been observed at some locations downgradient of GWRS water injected at the Talbert Barrier and percolated in K-M-M-L Basins in the Anaheim Forebay area. However, GWRS water is not an arsenic source, as GWRS-FPW arsenic concentrations have remained below the RL of 1 µg/L since GWRS inception in 2008. Figure 8-6 and Figure 8-7 show total arsenic and chloride concentrations during 2018-2024 for SAR-12 and SAR-13, respectively.

Figure 8-6 shows a slight one-time increase in arsenic concentrations at each of the four zones of SAR-12 in the second quarter April 2024 sample. Although this increase represented a new historical high in all four zones, it is not interpreted as an increasing trend and disregarded in the following discussion for SAR-12. For all four zones at SAR-12, the pre-injection ambient background arsenic concentrations ranged from below the RL of 1 to 2.2 µg/L. At SAR-12/1, Figure 8-6 shows that arsenic concentrations remained at ambient background levels during 2020-2024 since very little to no GWRS water has arrived at this well based on very stable chloride concentrations above 10 mg/L. At SAR-12/2, arsenic concentrations also remained at ambient background levels during 2020-2024 even though initial arrival of some proportion of GWRS water appears to have finally occurred during August 2023 based on chloride concentrations decreasing to 10 mg/L for the first time at this well (and substantiated by a similar contemporaneous decrease in sulfate). At SAR-12/3, where GWRS water arrived in early April 2021, arsenic concentrations began increasing gradually in August 2021 to just over 3 µg/L in October 2024, still well below the MCL of 10 µg/L. At SAR-12/4, where GWRS water arrived in September 2020, arsenic concentrations have remained stable at ambient background levels of approximately 2 µg/L through 2024.

Figure 8-7 shows that the pre-injection ambient background arsenic concentrations at SAR-13/1, SAR-13/2, and SAR-13/3 were consistent with those at all other MBI Project monitoring wells, while the pre-injection ambient background arsenic concentrations at SAR-13/4 were elevated relative to all others, ranging from 2.8-3.8 µg/L. At SAR-13/1, where GWRS water arrived in mid-August 2020, arsenic concentrations began gradually increasing in early-2021, reaching a historical high of 3.8 µg/L in March 2024. At SAR-13/2, where GWRS water arrived in July 2021, arsenic concentrations began increasing above background levels in late 2022, stabilizing at just above 2 µg/L during 2024. At SAR-13/3, where GWRS water arrived in August 2020, arsenic

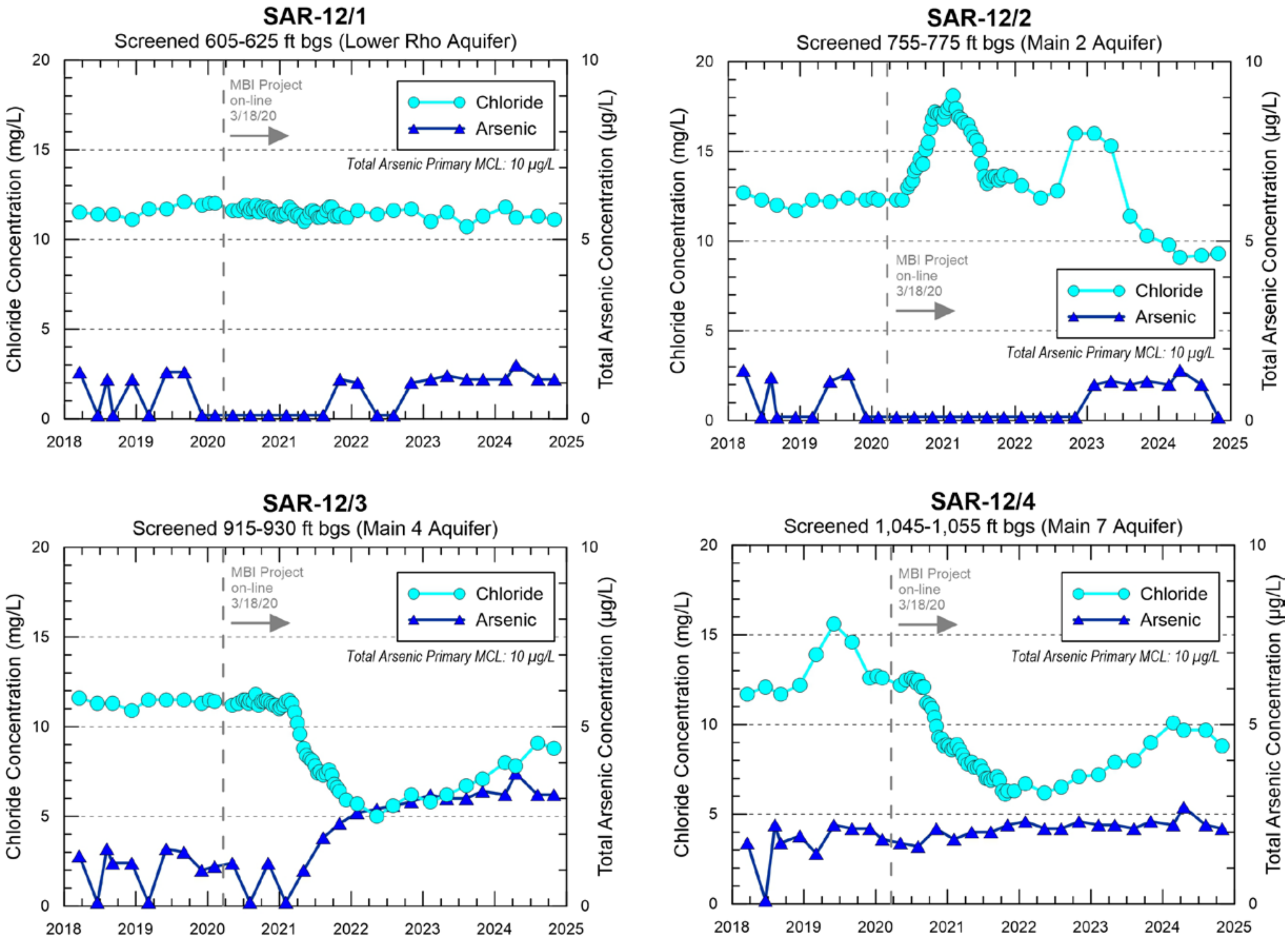


Figure 8-6. Monitoring Well SAR-12 Chloride and Total Arsenic Concentrations

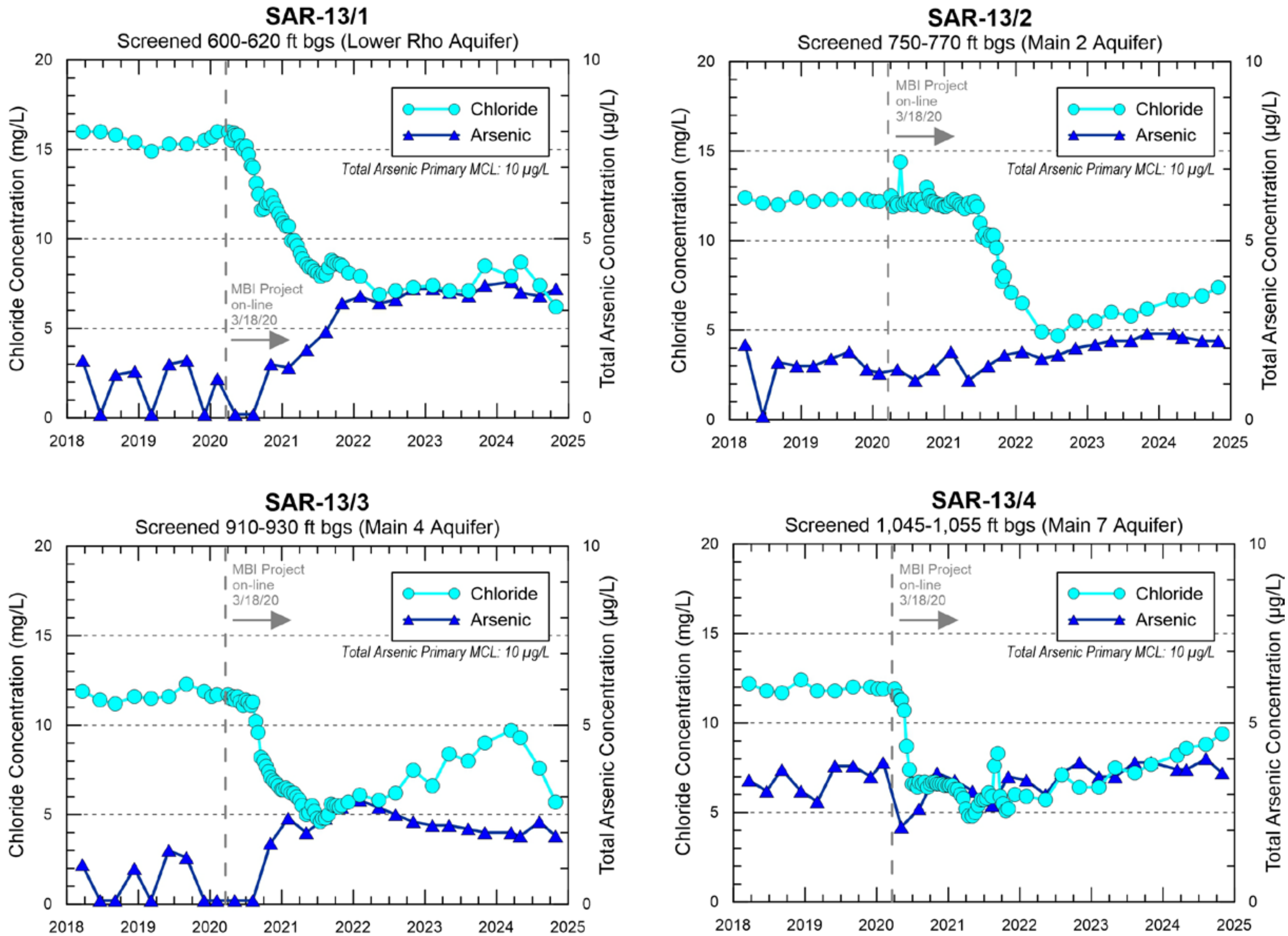


Figure 8-7. Monitoring Well SAR-13 Chloride and Total Arsenic Concentrations

concentrations increased slightly in late-2020 from below the RL to 1.7 µg/L in November 2020 and have since remained slightly elevated above background levels, peaking at 2.9 µg/L in February 2022 before gradually decreasing to below 2 µg/L in October 2024. At SAR-13/4, where GWRS water arrived in May 2020, arsenic concentrations remained at or below 4 µg/L, near the higher ambient background levels at this well during 2020-2024.

The source of the arsenic release in the MBI Project area is likely the oxidation of iron sulfide minerals, such as pyrite, which was detected in some aquifer sediment samples collected from the DMBI Project well borings. Arsenic is known to be associated with pyrite and can be released into the aqueous phase during oxidation by introducing oxidizing GWRS water into a geochemically reduced aquifer, as measured by oxidation-reduction potential (ORP). Prior to the arrival of GWRS water, all MBI Project monitoring well zones showed negative ORP, while GWRS water has positive ORP. However, the oxidation of pyrite can also create hydroferrous oxide (HFO) coatings on the aquifer mineral surfaces. These HFO coatings can provide additional sorption sites for arsenic and other species that are controlled by pH and other geochemical factors, thereby limiting the extent of mobilization. This geochemistry may help limit arsenic mobilization and may also help to explain sulfate concentrations in some of the zones at MBI Project compliance wells (e.g., SAR-13/3 and SAR-13/4) never declining as low as GWRS levels despite chloride concentrations indicative of 100% GWRS water.

8.4.2.2 Aluminum

Aluminum is regulated via a California primary and secondary MCL of 1,000 µg/L and 200 µg/L, respectively, as well as a PHG of 600 µg/L. Ambient background aluminum concentrations at the MBI Project compliance monitoring wells SAR-12 and SAR-13 ranged from non-detect to 57.8 µg/L. Aluminum concentrations elevated above ambient background levels have been measured at several SAR-12 and SAR-13 casings both prior to and following GWRS arrival.

Aluminum concentrations above ambient background levels were measured prior to GWRS arrival at SAR-12/1 (early 2023) and SAR-13/2 (late 2020). These pre-arrival spikes were not associated with GWRS arrival from earlier injection at MBI-1 as evidenced by contemporaneously high and stable chloride concentrations. The elevated total aluminum concentrations are believed to result from localized particle association, potentially driven by pH-mediated aluminum hydroxide dissolution from these aquifer zones, similar to what was documented at SAR-10/1 (see Section 8.4.5 of the 2022 Annual Report).

Aluminum concentrations above ambient background levels were measured after GWRS arrival at SAR-12/2 (mid-2023) and SAR-13/3 (early 2021). These one-time aluminum spikes are attributed to aluminum desorbed from the aquifer mineral surfaces and transported along the leading edge of the GWRS water to this well, as aluminum concentrations in GWRS water have remained at or below 5 µg/L since 2015. The subsequent trailing arrival of GWRS water was then devoid of detectable aluminum due to mass removal, as evidenced by the immediate decrease in aluminum concentrations to lower than pre-GWRS ambient concentrations at both wells. After the one-time spikes, total aluminum concentrations at SAR-12/2 and SAR-13/2 have remained consistently low at ambient background levels from 2021-2024. All other SAR-12 and SAR-13 zones with GWRS arrival (SAR-12/3, SAR-12/4, SAR-13/1, SAR-13/4) have not had any aluminum concentrations above ambient background levels.

No MBI Project compliance monitoring wells had aluminum concentrations above the background ambient range during 2024. For a more detailed description of aluminum trends related to the arrival of GWRS water at MBI Project compliance monitoring wells, see Section 8.4.2.2 of the 2023 Annual Report.

8.4.2.3 Iron

Iron is regulated via a California and Federal Secondary MCL, both set at 300 µg/L. Total iron concentrations at the MBI monitoring wells have followed a nearly identical trend as total aluminum, including at SAR-12/2 where total iron concentrations peaked contemporaneously with aluminum in August 2023 to 612 µg/L, well above the Secondary MCL. Similar to aluminum, the elevated total iron concentrations at SAR-12/2 were likely related to the initial arrival of GWRS purified recycled water. The iron was likely released by the oxidation of pyrite and other iron sulfide minerals known to occur in the Principal aquifer system. As with arsenic and aluminum, GWRS water is not a source of iron; GWRS iron concentrations have remained below 5 µg/L since 2015 except for a small one-time increase of 9.6 µg/L in October 2021, far below the Secondary MCL. No MBI Project compliance monitoring wells had iron concentrations above the background ambient range during 2024. For a more detailed description of iron trends related to the arrival of GWRS water at MBI Project compliance monitoring wells, see Section 8.4.2.3 of the 2023 Annual Report.

8.4.3 Production Wells

Data for water samples collected from potable production wells in the vicinity of the MBI Project are summarized in Table 8-3. The closest downgradient production wells to the MBI Project are IRWD-12 and IRWD-17, both located approximately 2,200 feet downgradient from the nearest MBI wells, MBI-5 and MBI-2, respectively (Figure 8-4). Municipal production well FV-8 is located upgradient to the northwest of the MBI Project and FV-6 is located to the southwest and somewhat cross-gradient of the MBI Project based on the June 2024 Principal aquifer system groundwater elevation contours in Figure 8-4. The production wells listed in Table 8-3 and shown on Figure 8-4 are all located less than one mile from the nearest MBI well.

Table 8-3. 2024 Water Quality for Potable Wells Within the Influence of the MBI Project

OCWD Well Name	Well Depth (ft bgs)[1]	Perforation Interval (ft bgs)[1]	Distance from Injection Site (ft)[2]	Concentration[3,4] Arsenic (As), ug/L	Chloride (Cl) mg/L	Sulfate (SO4) mg/L	Total Dissolved Solids (TDS) mg/L	Nitrate Nitrogen (NO3-N) mg/L	Nitrite Nitrogen (NO2-N) mg/L	Total Organic Carbon (Unfiltered) (TOC) mg/L	n-Nitrosodi-methylamine (NDMA) ng/L	1,4-Dioxane (14DIOX) ug/L
Large System Municipal Wells												
IRWD-12	1,335	580 - 1040	1,850	1.9 (1.8 - 2)	9.8 (9.3 - 11.5)	11.9 (11.3 - 12.6)	154 (144 - 168)	0.99 (0.89 - 1.08)	ND	0.02 (ND - 0.08)	ND	ND
IRWD-17	980	504 - 960	2,200	2.2 (2.1 - 2.3)	12.3 (12.1 - 12.6)	22 (21 - 22)	179 (178 - 180)	0.73 (0.69 - 0.77)	ND	0.06 (ND - 0.09)	ND	ND
FV-8[5]	864	312 - 844	3,100	NR[6]	34.1 (31.2 - 36.6)	67.7 (64.9 - 70.6)	358 (346 - 392)	1.79 (1.48 - 1.91)	ND	0.08 (0.06 - 0.11)	NR[6]	ND
FV-6	1,120	370 - 1110	4,500	NR[6]	33.0 (30.2 - 37.8)	62.8 (59.8 - 68.8)	321 (312 - 340)	0.95 (0.78 - 1.16)	ND	0.12 (0.09 - 0.17)	NR[6]	1.2 (1.0 - 1.4)

[1] Feet below ground surface

[2] Approximate straight-line distance to nearest MBI injection well

[3] Concentrations are annual averages with annual ranges in parenthesis for the given year

[4] ND: Not detected or less than the reporting limit

[5] Upgradient from injection site

[6] NR: Not Required (this parameter was not monitored at this site during the year)

As discussed earlier in Section 8.4, intrinsic tracers have been used to track the arrival of injected GWRS water at the downgradient MBI Project monitoring wells. The results of this intrinsic tracer test and groundwater modeling results were documented in the MBI Tracer Test Report (OCWD, 2024) which was submitted to DDW in February 2024. The model-based boundary areas currently permitted in the MBI area assume a primary boundary of eight months and a secondary boundary of ten months (Figure 8-3) and are subject to revision based on the tracer test modeling results currently under review by DDW.

The GWRS arrival signal at the two nearest downgradient production wells IRWD-12 and IRWD-17 is more dampened relative to the signal at project monitoring wells due to dispersive transport farther downgradient and vertical blending from these long-screened interval production wells.

Figure 8-8 shows chloride and arsenic concentrations for 2014-2024 at the nearest downgradient production well IRWD-12. The relatively stable chloride concentrations prior to 2020 confirmed that similar ambient concentrations as observed at SAR-12 and SAR-13 prior to MBI Project injection were representative of longer-term regional conditions in this area. Chloride concentrations at IRWD-12 began to noticeably decline below stable ambient levels in the second half of 2020, continued their decline in 2021, and remained well below ambient background levels in 2022, thus confirming the arrival of an increasing percentage of GWRS water at this well. Based on the considerable magnitude of the chloride reduction (and supported by the intrinsic tracers sulfate and field-measured electrical conductivity) from 2020-2022, the 2020 GWRS arrival at IRWD-12 is interpreted to be from the 2020 MBI Project tracer test rather than from older GWRS injection at MBI-1.

As shown on Figure 8-8, arsenic concentrations have gradually increased since about 6 months after initial GWRS arrival with increasing proportions of GWRS water, reaching a historical maximum of 2.1 µg/L in late 2022, well below the primary MCL of 10 µg/L. IRWD-12 was not sampled during 2023 since it was off-line all year. The well came back on-line in April 2024 and arsenic concentrations remained stable between 1.8 and 2.0 µg/L for the rest of the year. Because arsenic has remained non-detect in GWRS-FPW since injection began, the slight but steady increase in arsenic concentrations since GWRS arrival shown in Figure 8-8 is attributed to oxidation of iron sulfide minerals within the aquifer and is expected to eventually decline with sustained arrival of large proportions of GWRS water due to mass removal from the aquifer sediments.

IRWD-17 has shown minor detections of arsenic over the last several years. Arsenic concentrations at IRWD-17 have historically ranged from below the RL up to 2.4 µg/L, including the period after GWRS arrival in 2021. During 2024, two samples collected showed minor arsenic detections ranging from 2.1 to 2.3 µg/L (Table 8-3), well below the primary MCL of 10 µg/L.

IRWD-17 historically has had no detections of NDMA through 2024. For 1,4-dioxane, there have not been any detections at IRWD-17 except from 2019-2022 with low detections ranging from the newer RL of 0.5 to 1.1 µg/L, before declining again to non-detect through 2024, as shown in Table 8-3. These minor detections of 1,4-dioxane during 2019-2022 likely indicate a small percentage of historical (pre-GWRS) injection water arriving at IRWD-17 from the Talbert Barrier approximately 2 miles away.

Production well FV-6 has also had low concentrations of 1,4-dioxane over recent years as well as during 2024 (Table 8-3), historically remaining less than 3 µg/L. Similar to IRWD-17, the low 1,4-dioxane concentrations at FV-6 likely indicated some percentage of pre-GWRS injection water from the Talbert Barrier arriving at this well.

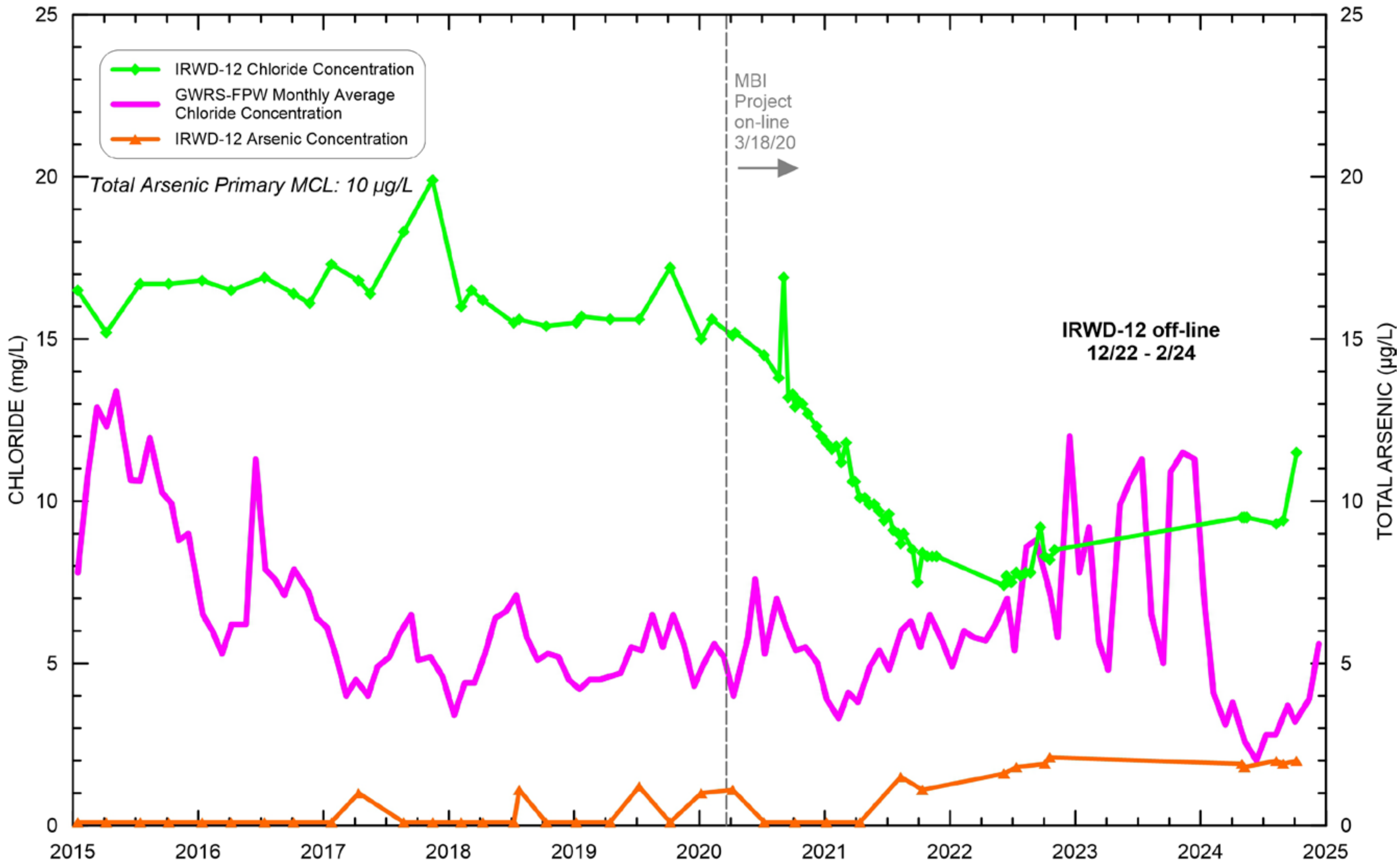


Figure 8-8. Municipal Production Well IRWD-12 Chloride and Arsenic Concentrations

ABBREVIATIONS LIST

1,2,3-TCP	1,2,3-trichloropropane
AAP	Anaheim Adventure Park
ABF	ammonium bifluoride (antiscalant)
AF	acre-foot, acre-feet
AFY	acre-feet per year
AhR	aryl hydrocarbon receptor
AI	Aggressive Index or Aggressivity Index
AIRR	automatic injection rate reduction
AL	action level
AOP	advanced oxidation process
ARTIC	Anaheim Regional Transportation Intermodal Center
AS	activated sludge
AS1	OC San Plant No. 1 P1-82 Activated Sludge Plant 1
AS2	OC San Plant No. 1 P1-102 Activated Sludge Plant 2
ASTM	American Society for Testing and Materials (ASTM International)
ATP	adenosine triphosphate
AVG	average
AWC	American Water Chemicals
AWPF	advanced water purification facility
AWT	advanced water treatment
AWTO	advanced water treatment operator
Basin	Orange County Groundwater Basin
Basin Model	OCWD Basin-wide Groundwater Flow Model

bgs	below ground surface
BP	Basin Plan (Water Quality Control Plan for the Santa Ana River Basin)
BPL	UV reactor ballast power level
BPP	basin production percentage
BPS	barrier pump station
BWW	backwash waste
CA UCMR	California Unregulated Chemical Monitoring Regulations
CBOD	carbonaceous biochemical oxygen demand
CCPP	calcium carbonate precipitation potential
CDPH	California Department of Public Health (formerly DHS; now DDW)
CEC	chemicals of emerging concern or constituents of emerging concern
cfm	cubic feet per minute
CFS	cubic feet per second
CIP	clean-in-place
Cl^-	chloride
CLIP	California Laboratory Intake Portal (for DDW)
CPP	(Anaheim) Canyon Power Plant
CPTP	Coastal Pumping Transfer Program
CUP	Conjunctive Use Program
CY	calendar year
DBP	disinfection by-product
DDW	Division of Drinking Water, State Water Resources Control Board (formerly DHS, then CDPH)
DHS	California Department of Health Services (later CDPH, now DDW)
DMBI	Demonstration Mid-Basin Injection

DOC	dissolved organic carbon
DPW	decarbonated product water
DRWF	Dyer Road Well Field
DWEL	drinking water equivalent level
DWR	California Department of Water Resources
EC	electrical conductivity
EED	electrical energy dose
EPA	U. S. Environmental Protection Agency
ER-a	estrogen receptor α
F-EC	field electrical conductivity
FPW	finished product water or final product water (purified recycled water)
FPWB	finished product water bypass structure
ft	foot, feet
FV	Fountain Valley, City of Fountain Valley
GAC	granular activated carbon
GAP	Green Acres Project
GeoTracker	State water quality database (for RWQCB)
gpm, GPM	gallons per minute
GRRP	Groundwater Recharge Reuse Project
GSWC	Golden State Water Company (formerly Southern California Water Company)
GWRS	Groundwater Replenishment System
GWRSIE	Groundwater Replenishment System Initial Expansion
GWRSFE	Groundwater Replenishment System Final Expansion
HFO	hydroferrous oxide

hr	hour(s)
I	injection well numbering designation
I&E	instrumentation and electrical
IRWD	Irvine Ranch Water District
IWF-21	Interim Water Factory 21
kgal	thousand gallons
K-M-M-L	Kraemer-Miller-Miraloma-La Palma (Basins)
kW	kilowatt
kWh	kilowatt-hours
LLNL	Lawrence Livermore National Laboratory
LP	UV reactor lamp output
LRV	log reduction value (for pathogenic microorganisms)
LSI	Langelier Saturation Index
M	monitoring well numbering designation
m^3	cubic meter
m^3/day	cubic meters per day
MBI	Mid-Basin Injection
MCL	maximum contaminant level
MCWD	Mesa Water District (formerly Mesa Consolidated Water District)
Mesa Water	Mesa Water District
MF	membrane filtration
MFE	membrane filtration effluent (filtrate)
MFF	membrane filtration feed
MFL	million fibers greater than 10 microns in length per liter
MG	million gallons

mil gal	million gallons
mJ/cm^2	millijoules per square centimeter
MGD	million gallons per day
mg/L	milligrams per liter
micron	micrometer
mL	milliliters
MPN	most probable number
msl	mean sea level
MWD	Metropolitan Water District of Southern California
MWRP	Michelson Water Recycling Plant (IRWD facility)
na	not analyzed
N/A	not applicable
ND	non-detect, not detected (numerically designated as 10% of the reportable detection limit for purposes of calculating the average)
NDMA	N-nitrosodimethylamine
NdN	nitrification/partial denitrification
ng/L	nanograms per liter
NL	California Notification Level
nm	nanometers
nr	not reported
NR	Not Required
NS	not sampled
NTU	nephelometric turbidity unit
NWRI	National Water Research Institute
OC-44	MWD Turnout designation in Huntington Beach

OCHCA	Orange County Health Care Agency
OC San	Orange County Sanitation District (aka OCSD)
OCWD	Orange County Water District
OMMP	Operation, Maintenance, and Monitoring Plan
OOP	Operation Optimization Plan
ORP	oxidation reduction potential
%	percent
P1	OC San Reclamation Plant No. 1
P1 AS1	OC San Reclamation Plant No. 1 Activated Sludge Plant 1 (effluent)
P1 AS2	OC San Reclamation Plant No. 1 Activated Sludge Plant 2 (effluent)
P1 TF	OC San Reclamation Plant No. 1 Trickling Filter (effluent)
P2	OC San Treatment Plant No. 2
P2 TF/SC	OC San Treatment Plant No. 2 Trickling Filter/Solids Contact (effluent)
Panel	Independent Advisory Panel
PCS	process control system
PDT	pressure decay test
PEPS	Primary Effluent Pump Station
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PISB	Primary Influent Splitter Box
Plant 1	OC San Reclamation Plant No. 1
Plant 2	OC San Treatment Plant No. 2
PMCL	Primary Maximum Contaminant Level
PP	polypropylene

PPM	parts per million
psi	pounds per square inch
PVDF	polyvinylidene difluoride
PWPS	product water pump station
Q	flow rate
Q1	secondary effluent from OC San Plant No. 1 (same as Q-1)
R	number of reactors in service in a UV train
RAS	return activated sludge
RL	reporting limit
RfD	Reference Dose
RO	reverse osmosis
ROF	reverse osmosis feed
ROP	reverse osmosis product
%RW	percentage recycled water (instantaneous; not averaged over 60 months)
RWC	recycled water contribution (monthly; averaged over 60 months)
RWQCB	Regional Water Quality Control Board, Santa Ana Region
SALS	Steve Anderson Lift Station (at OC San Plant No. 1)
SAR	Santa Ana River
SARI	Santa Ana Regional Interceptor
SARWQH	Santa Ana River Water Quality and Health (Study)
SCADA	supervisory control and data acquisition (see also PCS)
SCE	Southern California Edison
SCWC	Southern California Water Company, now Golden State Water Company
SEB	Southeast Barrier Pipeline
SIM	simulation mode

SMCL	secondary maximum contaminant level
SOC	synthetic organic compound
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TF	trickling filter(s)
TIC	tentatively identified compound
TMP	transmembrane pressure
TOC	total organic carbon
TR	trace
ug/L, µg/L	micrograms per liter
µmhos/cm, µm/cm, um/cm	micromhos per centimeter
UPS	uninterruptible power supply
UR	unregulated chemicals requiring monitoring
µS	microsiemens (same as micromhos)
µS/cm	microsiemens per centimeter (same as micromhos per centimeter)
USEPA	United States Environmental Protection Agency
UV	ultraviolet (light exposure or irradiation)
UV/AOP	ultraviolet/advanced oxidation process
UVF	ultraviolet/advanced oxidation process feed
UVP	ultraviolet/advanced oxidation process product
UV%T, %UVT	percent UV Transmissivity
VFD	variable frequency drive
VOC	volatile organic compound
WF-21	Water Factory 21

WRMS	Water Resources Management System
YLWD	Yorba Linda Water District

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APPENDICES

Appendix A

Water Quality Requirements for

Groundwater Replenishment System

and

Final Product Water Quality Data

January 1 through December 31, 2024

Advanced Water Purification Facility

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
Total Purified Recycled Water Flow	Plant Monitoring	N/A	MGD	88.98	79.08	88.95	103.27					≤ 130
REQUIRED REVERSE OSMOSIS PRODUCT MONITORING[5]												
Turbidity	Plant Monitoring	N/A	NTU	0.016	0.013	0.016	0.013		5			<0.2/0.5[6]
REQUIRED ULTRAVIOLET FEED MONITORING												
Ultraviolet Transmittance (UV%/T) at 254	Plant Monitoring	0.10%	%	96.9%	97.6%	97.6%	97.2%					≥95%
BIOLOGICAL												
Aryl Hydrocarbon receptor as 2,3,7,8-tetrachlorodibenzop-dioxin (TCDD)	BIOASCEC	0.5	ng/L	ND	ND	ND	ND			0.5		N/A
E. Coli (Colilert - MPN/100mL) (ECOLIQ)	9223B	1	MPN	ND	ND	ND	ND					N/A
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	BIOASCEC	0.5	ng/L	ND	ND	ND	ND			3.5		N/A
Total Coliform (Colilert - MPN/100mL) (TCOLIQ)	9223B	1	MPN	0.12	0.11	0.29	0.11					2.2[7]
INORGANIC												
Aggressive Index (AI)	Plant Monitoring		A.I.	11.4	11.0	11.1	11.0					NA
Alkalinity-Phenolphthalein (ALKPHE)	2320B	1	mg/L	ND	ND	ND	ND					N/A
Aluminum (Al)	X200.8	5	ug/L	ND	ND	ND	ND	1,000	200			200
Ammonia Nitrogen (NH3-N)	350.1	0.1	mg/L	0.33	0.18	0.12	0.22					N/A
Antimony (Sb)	X200.8	1	ug/L	ND	ND	ND	ND	6				6
Apparent Color (unfiltered) (APCOLR)	2120B	3	UNITS	Not Required	ND	Not Required	Not Required		15			15
Arsenic (As)	X200.8	1	ug/L	ND	ND	ND	ND	10				10
Asbestos (ASBESTOS)	100.2		MFL	Not Required	Not Required	Not Required	Not Required	7				7
Barium (Ba)	X200.8	1	ug/L	ND	ND	ND	ND	1,000				1,000
Beryllium (Be)	X200.8	1	ug/L	ND	ND	ND	ND	4				4
Bicarbonate (as CaCO3) (HCO3Ca)	2320B	1	mg/L	36.68	35.46	38.75	35.68					N/A
Bicarbonate (as HCO3) (HCO3)	CALC	1.2	mg/L	44.71	40.34	47.24	43.49					N/A
Biochemical Oxygen Demand (BOD)	5210B	2	mg/L	ND	ND	ND	ND					20/Mo; 30/wk
Boron (B)	X200.7	0.1	mg/L	0.26	0.24	0.21	0.17			1	0.75	0.75
Bromate (BrO3)	300.1B	5	ug/L	ND	ND	ND	ND	10				10
Bromide (Br)	300.1B / X1-300.0	0.01	mg/L	0.02	0.016	0.013	0.019					N/A
Cadmium (Cd)	X200.8	1	ug/L	ND	ND	ND	ND	5				5
Calcium (Ca)	X200.7	0.5	mg/L	12.94	13.05	13.75	12.45					N/A
Calcium Hardness (CaHRD)	X200.7	0.25 - 0.5	mg/L	32.30	32.59	34.32	31.08					N/A
Carbonate (as CaCO3) (CO3Ca)	2320B	1	mg/L	ND	ND	ND	ND					N/A
Cation-Anion meq balance (CATANI)	CALC		RATIO	-10.53	ND	-0.68	-5.35					N/A
Chlorate (CLO3)	300.1B	10	ug/L	ND	ND	ND	ND			800		N/A
Chloride (Cl)	X1-300.0	0.5	mg/L	4.77	2.80	3.10	4.23		500 [9,10]		55	55 [9]
Chlorite (CLO2)	300.1B	10	ug/L	ND	ND	ND	ND	1,000				1,000
Chromium (Cr)	X200.8	1	ug/L	ND	ND	ND	ND	50				50

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INORGANIC (Continued)												
Cobalt (Co)	X200.8	1	ug/L	ND	ND	ND	ND					N/A
Copper (Cu)	X200.8	1	ug/L	ND	ND	ND	ND	1,300	1,000			1,000
Corrosivity (CORROS)	2330B	-100	S.I.	-0.86	-0.80	-0.61	-0.77					N/A
Cyanide (CN)	X1-335.4	5	ug/L	ND	ND	ND	ND	150				150
Electrical Conductivity (EC)	2510B	1	uS/cm	91.4	84.9	87.9	87.3		900			N/A
Fluoride (F)	X1-300.0	0.1	mg/L	ND	ND	ND	ND	2			1	1
Free Chlorine (FRCL2)	4500CLF	0.1	mg/L	ND	ND	ND	ND					N/A
Gadolinium (Gd)	X200.8	10	ng/L	ND	ND	ND	ND					N/A
Hexavalent Chromium (CrVI)	X1-218.7	0.1 - 0.2	ug/L	ND	ND	ND	0.13	10				N/A
Hydrogen Peroxide (H2O2)	4500H202	0.1	mg/L	3.50	3.57	3.50	3.48					N/A
Hydroxide (as CaCO3) (OHCa)	2320B	1	mg/L	ND	ND	ND	ND					N/A
Iron (Fe)	X200.7	5	ug/L	ND	ND	ND	ND		300		300	300
Lead (Pb)	X200.8	1	ug/L	ND	ND	ND	ND	15				15
Magnesium (Mg)	X200.7	0.5	mg/L	ND	ND	ND	ND					N/A
Manganese (Mn)	X200.8	1	ug/L	ND	ND	ND	ND		50	500		50
Mercury (Hg)	X200.8	1	ug/L	ND	ND	ND	ND	2				2
Molybdenum (Mo)	X200.8	1	ug/L	ND	ND	ND	ND					N/A
Nickel (Ni)	X200.8	1	ug/L	ND	ND	ND	ND	100				100
Nitrate (NO3)	CALC	0.4	mg/L	2.57	2.33	2.55	2.81	45				45
Nitrate + Nitrite Nitrogen (NO3NO2-N)	CALC	0.1	mg/L	0.64	0.56	0.61	0.68	10 [11]				10
Nitrate Nitrogen (NO3-N)	4500NO3F / X1-300.0	0.1	mg/L	0.58	0.53	0.58	0.63	10 [11]				10
Nitrite (NO2)	CALC	0.007	mg/L	0.189	0.122	0.114	0.138					N/A
Nitrite Nitrogen (NO2-N)	4500NO3F	0.002	mg/L	0.057	0.037	0.035	0.042	1 [11]				1
Odor Range High (ODORHI)	2150B	0	TON	Not Required	ND	Not Required	Not Required					N/A
Odor Range Low (ODORLO)	2150B	0	TON	Not Required	ND	Not Required	Not Required					N/A
Organic Nitrogen (ORG-N)	X1-351.2	0.1	mg/L	ND	ND	0.013	ND					N/A
Perchlorate (CLO4)	332.0	1	ug/L	ND	ND	ND	ND	6				6
pH (pH)	4500H+B	1	UNITS	7.9	7.9	8.1	8.0				6 - 9	6 - 9
Phosphate Phosphorus (orthophosphate) (PO4-P)	365.1	0.01	mg/L	ND	ND	ND	ND					N/A
Potassium (K)	X200.7	0.5	mg/L	0.20	ND	ND	ND					N/A
Selenium (Se)	X200.8	1	ug/L	ND	ND	ND	ND	50				50
Silica (SIO2)	4500SIOC	1	mg/L	1.0	1.3	1.2	1.2					N/A
Silver (Ag)	X200.8	1	ug/L	ND	ND	ND	ND		100 [10]		50	50
Sodium (Na)	X200.7	0.5	mg/L	4.8	4.0	4.6	4.7					NA
Strontium (Sr)	X200.8	1	ug/L	2.9	2.5	2.7	2.8					N/A
Sulfate (SO4)	X1-300.0	0.3 - 0.5	mg/L	0.63	0.37	0.4	0.3		250		500	250
Surfactants (MBAS)	5540C	0.02	mg/L	Not Required	ND	Not Required	Not Required		0.5 [10]		0.05	0.05

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Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
INORGANIC (Continued)												
Suspended Solids (SUSSOL)	2540D	2.5	mg/L	ND	ND	ND	ND					20/Mo; 30/wk
Temperature (Laboratory) (TEMP)	4500H+B	1	C	22.0	21.9	21.8	22.0					N/A
Thallium (Tl)	X200.8	1	ug/L	ND	ND	ND	ND	2				2
Threshold Odor Number (Median) (ODOR)	2150B	0	TON	Not Required	ND	Not Required	Not Required		3			3
Title 22 Cation-Anion Balance (T22CAB)	CALC		meq/L	-9.74	0.43	-0.45	-4.99					N/A
Title 22 Total Anions (T22ANI)	CALC		meq/L	1.01	0.93	0.88	0.84					N/A
Title 22 Total Cations (T22CAT)	CALC		meq/L	0.88	0.87	0.88	0.78					N/A
Total Alkalinity (as CaCO3) (TOTALK)	2320B	1 - 5	mg/L	36.8	35.7	38.7	35.7					N/A
Total Anions (TOTANI)	CALC		meq/L	1.02	0.93	0.89	0.85					N/A
Total Cations (TOTCAT)	CALC		meq/L	0.92	0.93	0.88	0.80					N/A
Total Chlorine (TOTCL2)	4500CLF	0.1	mg/L	1.0	1.2	1.3	1.4					N/A
Total Dissolved Solids (TDS)	2540C	2.5	mg/L	47.29	45.58	49.63	45.96		[12]		580	580[12]
Total Hardness (as CaCO3) (TOTHRD)	X200.7	1	mg/L	33.2	35.0	34.1	28.9					N/A
Total Inorganic Nitrogen (TIN)	350.1	0.1	mg/L	0.96	0.73	0.72	0.89				3.4	3.4
Total Kjeldahl Nitrogen (TKN)	X1-351.2	0.2 - 1	mg/L	0.23	0.14	0.06	0.11					N/A
Total Nitrogen (TOT-N)	CALC	0.3	mg/L	0.882	0.745	0.727	0.832					10
Total Organic Carbon (Unfiltered) (TOC)	5310C	0.05	mg/L	0.083	0.059	0.061	0.034					0.5[13]
Trivalent Chromium (CrIII)	CALC	1	ug/L	ND	ND	ND	ND					N/A
Ultraviolet (absorbance) (UVAB)	5910B	0.005	1/cm	0.009	0.016	0.005	0.007					N/A
Uranium (U)	X200.8	1	ug/L	ND	ND	ND	ND	30				N/A
UV Absorbance/TOC (unfiltered) ratio (UV/TOC)	5910B	0.0001	L/mg-cm	0.183	0.210	0.062	0.153					N/A
Vanadium (V)	X200.8	1	ug/L	ND	ND	ND	ND			50		N/A
Zinc (Zn)	X200.8	5	ug/L	ND	ND	ND	ND		5,000			5,000
ORGANIC												
1,1,1,2-Tetrachloroethane (1112PC)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,1,1-Trichloroethane (111TCA)	524.2	0.5	ug/L	ND	ND	ND	ND	200				200
1,1,1-Trichloropropanone (111TCP)	551.1	0.1	ug/L	ND	ND	ND	ND					
1,1,2,2-Tetrachloroethane (1122PC)	524.2	0.5	ug/L	ND	ND	ND	ND	1				1
1,1,2-Trichloroethane (112TCA)	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
1,1-Dichloro-2-propanone (11DC2P)	551.1	0.1	ug/L	ND	ND	ND	0.1					N/A
1,1-Dichloroethane (11DCA)	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
1,1-Dichloroethene (11DCE)[14]	524.2	0.5	ug/L	ND	ND	ND	ND	6				6
1,1-Dichloropropene (11DCP)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,2,3-Trichlorobenzene (123TCB)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,2,3-Trichloropropane (123TCP)	14DIOX / 504.1 / 524.2 / 524M-TCP	0.005 - 0.5	ug/L	ND	ND	ND	ND	0.005				0.005
1,2,4-Trichlorobenzene (124TCB)	524.2 / 625.1 / 8270C	0.5 - 1	ug/L	ND	ND	ND	ND	5				5

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
1,2,4-Trimethylbenzene (124TMB)	524.2	0.5	ug/L	ND	ND	ND	ND			330		N/A
1,2-Dibromo-3-chloropropane (DBCP)[15]	14DIOX / 504.1 / 524.2 / 524M-TCP	0.01 - 0.5	ug/L	ND	ND	ND	ND	0.2				0.2
1,2-Dibromoethane (EDB)[16]	14DIOX / 504.1 / 524.2 / 524M-TCP	0.005 - 0.5	ug/L	ND	ND	ND	ND	0.05				0.05
1,2-Dichlorobenzene (12DCB)	524.2 / 625.1 / 8270C	0.5 - 1	ug/L	ND	ND	ND	ND	600				600
1,2-Dichloroethane (12DCA)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
1,2-Dichloropropane (12DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
1,2-Diphenylhydrazine (12DPH)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
1,3,5-Trimethylbenzene (135TMB)	524.2	0.5	ug/L	ND	ND	ND	ND			330		N/A
1,3-Dichlorobenzene (13DCB)	524.2 / 625.1 / 8270C	0.5 - 1	ug/L	ND	ND	ND	ND					N/A
1,3-Dichloropropane (13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,4-Dichlorobenzene (14DCB)	524.2 / 625.1 / 8270C	0.5 - 1	ug/L	ND	ND	ND	ND	5				5
1,4-Dioxane (14DIOX)	14DIOX / 522	0.07 - 0.5	ug/L	ND	ND	ND	ND			1 (NL & MTL)		N/A
11-chloroeicosafluoro-3-oxaundecane-1sulfonic acid (11CLPF)	533	2	ng/L	ND	ND	ND	ND					N/A
17a-Estradiol (aESTRA)	CEC	1	ng/L	ND	ND	ND	ND					N/A
17a-Ethynylestradiol (aETEST)[17]	CEC	2	ng/L	ND	ND	ND	ND					N/A
17b-Estradiol (bESTRA)	CEC	2	ng/L	ND	ND	ND	ND					N/A
2,2-Dichloropropane (22DCP)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1613B	4.7 - 5.2	pg/L	ND	ND	ND	ND	30				30
2,4,5-Trichlorophenol (245TCP)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
2,4,6-Trichlorophenol (246TCP)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
2,4-Dichlorophenol (24DCPH)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
2,4-Dimethylphenol (24DMP)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
2,4-Dinitrophenol (24DNP)	625.1 / 8270C	10	ug/L	ND	ND	ND	ND					N/A
2,4-Dinitrotoluene (24DNT)	525.2 / 625.1 / 8270C	0.1 - 1.0	ug/L	ND	ND	ND	ND					N/A
2,6-Dinitrotoluene (26DNT)	525.2 / 625.1 / 8270C	0.1 - 1.0	ug/L	ND	ND	ND	ND					N/A
2-Chloroethylvinyl ether (2ClEVE)	14DIOX	1	ug/L	ND	ND	ND	ND					N/A
2-Chloronapthalene (2ClNAP)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
2-Chlorophenol (2ClPNL)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
2-Chlorotoluene (2CLTOL)	524.2	0.5	ug/L	ND	ND	ND	ND			140		N/A
2-Methyl naphthalene (2MNAP)	8270C	1	ug/L	ND	ND	ND	ND					N/A
2-Methyl-4,6-Dinitrophenol (2MDNP)	625.1 / 8270C	5	ug/L	ND	ND	ND	ND					N/A
2-Methylphenol (oCRESL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
2-Nitroaniline (oNTANL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
2-Nitrophenol (2NPNL)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
3- & 4-Methylphenol (mpCRESL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
3,3'-Dichlorobenzidine (DCBZDE)	625.1 / 8270C	5	ug/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
3-Nitroaniline (mNTANL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	533	2	ng/L	ND	ND	ND	ND					N/A
4:2 Fluorotelomer sulfonate (4:2FTS)	533	2	ng/L	ND	ND	ND	ND					N/A
4-Androstene-3,17-dione (ANDROS)	CEC	2	ng/L	ND	ND	ND	ND					N/A
4-Bromophenyl phenyl ether (4BrPPE)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
4-Chloro-3-methylphenol (43CMP) [18]	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
4-Chloroaniline (pClANL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
4-Chlorophenyl phenyl ether (4ClPPE)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
4-Chlorotoluene (4CLTOL)	524.2	0.5	ug/L	ND	ND	ND	ND			140		N/A
4-Isopropyltoluene (4IPTOL)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
4-Nitroaniline (pNTANL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
4-Nitrophenol (4NPNL)	625.1 / 8270C	5	ug/L	ND	ND	ND	ND					N/A
4-n-Octylphenol (4nOCPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
4-tert-Octylphenol (4tOCPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
6:2 Fluorotelomer sulfonate (6:2FTS)	533	2	ng/L	ND	ND	ND	ND					N/A
8:2 Fluorotelomer sulfonate (8:2FTS)	533	2	ng/L	ND	ND	ND	ND					N/A
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CLPF3)	533	2	ng/L	ND	ND	ND	ND					N/A
Acetaldehyde (ACEALD)	556	2	ug/L	ND	ND	ND	ND					N/A
Acetone (ACETNE)	524.2	10	ug/L	ND	ND	ND	ND					N/A
Acrolein (ACROLN)	524.2	5	ug/L	ND	ND	ND	ND					N/A
Acrylonitrile (ACRYLO)	524.2	2	ug/L	ND	ND	ND	ND					N/A
Aniline (ANLN)	8270C	1	ug/L	ND	ND	ND	ND					N/A
Aspartame (ASPATM)	CEC	100	ng/L	ND	ND	ND	ND					N/A
Atenolol (ATENOL)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Benzaldehyde (BENALD)	556	2	ug/L	ND	ND	ND	ND					N/A
Benzene (BENZ)	524.2	0.5	ug/L	ND	ND	ND	ND	1				1
Benzidine (BNZDE)	625.1 / 8270C	10	ug/L	ND	ND	ND	ND					N/A
Benzoic Acid (BNZACD)	8270C	100	ug/L	ND	ND	ND	ND					N/A
Benzyl Alcohol (BNZALC)	8270C	1	ug/L	ND	ND	ND	ND					N/A
bis (2-chloroethoxy) methane (B2CEM)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
bis (2-chloroethyl) ether (B2CLEE)	524.2 / 625.1 / 8270C	1 - 2.5	ug/L	ND	ND	ND	ND					N/A
bis (2-chloroisopropyl) ether (B2CIPE)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
Bisphenol A (BisPHA)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
Bromobenzene (BRBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Bromochloroacetic Acid (BCAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Bromochloroacetonitrile (BCAN)	551.1	0.1	ug/L	0.1	0.4	0.3	1					N/A
Bromochloromethane (CH2BrC)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Bromodichloroacetic Acid (BDCAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
Bromodichloromethane (CHBrCl)[19]	524.2	0.5	ug/L	ND	1.6	1.7	2.4	80				80, total TTHMs
Bromoform (CHBr3)	524.2	0.5	ug/L	ND	ND	ND	ND	80				80, total TTHMs
Bromomethane (CH3Br)[20]	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Carbazole (CARBZL)	8270C	1	ug/L	ND	ND	ND	ND					N/A
Carbon Disulfide (CS2)	524.2	0.5	ug/L	ND	ND	ND	ND			160		N/A
Carbon tetrachloride (CCl4)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
Chlorobenzene (CLBENZ)[21]	524.2	0.5	ug/L	ND	ND	ND	ND	70				70
Chlorodibromoacetic Acid (CDBAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Chlorodifluoromethane (FREN22)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Chloroethane (ClETHA)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Chloroform (CHCl3)	524.2	0.5	ug/L	TR	4.0	2.40	4.1	80				80, total TTHMs
Chloromethane (CH3Cl)[22]	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Chloropicrin (ClPICR)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
cis-1,2-Dichloroethene (c12DCE)[23]	524.2	0.5	ug/L	ND	ND	ND	ND	6				6
cis-1,3-Dichloropropene (c13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	0.50				0.5, total 13DCP
Crotonaldehyde (CRTALD)	556	2	ug/L	ND	ND	ND	ND					N/A
Cyclohexanone (CYCHXN)	556	2	ug/L	ND	ND	ND	ND					N/A
Decanal (DECNAL)	556	2	ug/L	ND	ND	ND	ND					N/A
Dibenzofuran (DBFUR)	8270C	1	ug/L	ND	ND	ND	ND					N/A
Dibromoacetic Acid (DBAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Dibromoacetonitrile (DBAN)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
Dibromochloromethane (CHBr2C)[25]	524.2	0.5	ug/L	ND	ND	TR	TR	80				80, total TTHMs
Dibromomethane (CH2Br2)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Dichloroacetic Acid (DCAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Dichloroacetonitrile (DCAN)	551.1	0.1	ug/L	0.2	0.9	0.6	1.2					N/A
Dichlorodifluoromethane (CCl2F2)	524.2	0.5	ug/L	ND	ND	ND	ND			1,000		N/A
Diclofenac (DICLFN)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Diethylstilbestrol (DESTBL)	CEC	2	ng/L	ND	ND	ND	ND					N/A
Diisopropyl ether (DIPE)	524.2	1	ug/L	ND	ND	ND	ND					N/A
Dilantin (DILANT)	CEC	10	ng/L	ND	ND	ND	ND					N/A
Dissolved Organic Carbon (DOC)	5310C	0.05	mg/L	0.1	0.09	0.08	0.09					N/A
Endosulfan II (ENDOII)[26]	508.1 / 525.2	0.01 - 0.10	ug/L	ND	ND	ND	ND					N/A
Epitestosterone (cis-Testosterone) (EPITES)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Equilin (EQUILN)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Estriol (ESTRIO)	CEC	2	ng/L	ND	ND	ND	ND					N/A
Estrone (ESTRON)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Ethyl tert-butyl ether (ETBE)	524.2	1	ug/L	ND	ND	ND	ND					N/A

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AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
Ethylbenzene (EtBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND	300				300
Fluoxetine (FLUXET)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Formaldehyde (FORALD)	556	2	ug/L	13	14	14	11			100		N/A
Freon 123a (FR123A)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Glyoxal (GLYOXL)	556	2	ug/L	ND	ND	ND	ND					N/A
HCH-alpha (Alpha-BHC) (BHCa)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
HCH-beta (Beta-BHC) (BHCb)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
HCH-delta (Delta-BHC) (BHCd)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Heptanal (HEPNAL)	556	2	ug/L	ND	ND	ND	ND					N/A
Hexachlorobutadiene (HClBut)	524.2 / 625.1 / 8270C	0.5 - 1	ug/L	ND	ND	ND	ND					N/A
Hexachloroethane (HCE)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
Hexafluoropropylene oxide dimer acid (GenX) (HFPODA)	533	2	ng/L	ND	ND	ND	ND					N/A
Hexanal (HEXNAL)	556	2	ug/L	ND	ND	ND	ND					N/A
Imidacloprid (IMIDCP)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Iohexol (IOHEXL)	CEC	20	ng/L	ND	ND	ND	ND					N/A
Iopromide (IOPRMD)	CEC	10	ng/L	ND	ND	ND	ND					N/A
Isophorone (IPHOR)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Isopropylbenzene (ISPBNZ)	524.2	0.5	ug/L	ND	ND	ND	ND			770		N/A
Linuron (LINURN)	CEC	0.005	ug/L	ND	ND	ND	ND					N/A
m,p-Xylene (mp-XYL)[30]	524.2	0.5	ug/L	ND	ND	ND	ND	1,750				1,750[30]
Meprobamate (MEPROB)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Methyl Ethyl Ketone (MEK)	524.2	2.5	ug/L	ND	ND	ND	ND					N/A
Methyl Isobutyl Ketone (MIBK)	524.2	2.5	ug/L	ND	ND	ND	ND			120		N/A
Methyl tert-butyl ether (MTBE)	524.2	0.2	ug/L	ND	ND	ND	ND	13	5			5
Methylene Chloride (CH2Cl2)[27]	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
Methylglyoxal (MGLYOX)	556	2	ug/L	ND	ND	ND	ND					N/A
Methylisothiocyanate (MITC)	14DIOX	0.05	ug/L	ND	ND	ND	ND					N/A
Metolachlor (METOCL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Monobromoacetic Acid (MBAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Monochloroacetic Acid (MCAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Naphthalene (NAP)	524.2/ 525.2/ 625.1/ 8270C	0.1 - 1	ug/L	ND	ND	ND	ND			17		N/A
Naproxen (NAPRXN)	CEC	5	ng/L	ND	ND	ND	ND					N/A
n-Butylbenzene (nBBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Neotame (NEOTAM)	CEC	10	ng/L	ND	ND	ND	ND					N/A
N-ethyl perfluorooctanesulfonamidoacetic acid (EtFOSA)	537.1	2	ng/L	ND	ND	ND	ND					N/A
Nitrobenzene (NBENZ)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
N-methyl perfluorooctanesulfonamidoacetic acid (MeFOSA)	537.1	2	ng/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
N-Nitrosodiethylamine (NDEA)	NDMA-LOW	2	ng/L	ND	ND	ND	ND			10		N/A
n-Nitrosodimethylamine (NDMA)	NDMA-LOW	2	ng/L	ND	0.36	0.36	ND			10 (NL & MTL)		N/A
n-Nitroso-di-n-propylamine (NDPA)	625.1 / 8270C / NDMA-LOW	2 - 1,000	ng/L	ND	ND	ND	ND			10		N/A
n-Nitrosodiphenylamine (NDPhA)	625.1 / 8270C	1,000	ng/L	ND	ND	ND	ND					N/A
N-Nitrosomorpholine (NMOR)	NDMA-LOW	2	ng/L	ND	ND	ND	ND			12		N/A
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	533	2	ng/L	ND	ND	ND	ND					N/A
Nonanal (NONNAL)	556	2	ug/L	ND	ND	ND	ND					N/A
Nonylphenol (NONYPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
o-Xylene (o-XYL)[30]	524.2	0.5	ug/L	ND	ND	ND	ND	1,750				1,750[30]
PCB-1016 (PCB16)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1221 (PCB21)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1232 (PCB32)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1242 (PCB42)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1248 (PCB48)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1254 (PCB54)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1260 (PCB60)[28]	508.1	0.1 - 0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCBs, Total (TOTPCB)[28]	508.1	0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
Perfluoro butane sulfonic acid (PFBS)	533	2	ng/L	ND	ND	ND	ND			500		N/A
Perfluoro heptanoic acid (PFHpA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro hexane sulfonic acid (PFHxS)	533	2	ng/L	ND	ND	ND	ND			3		N/A
Perfluoro nonanoic acid (PFNA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro octane sulfonic acid (PFOS)	533	2	ng/L	ND	ND	ND	ND			6.5 (NL) & 13 (MTL)		N/A
Perfluoro octanoic acid (PFOA)	533	2	ng/L	ND	ND	ND	ND			5.1 (NL) & 14 (MTL)		N/A
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro-3-methoxypropanoic acid (PFMPA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro-4-methoxybutanoic acid (PFMBA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorobutanoic acid (PFBA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorodecanoic acid (PFDA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorododecanoic acid (PFDoA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoroheptanesulfonic Acid (PFHpS)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorohexanoic acid (PFHxA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoropentanesulfonic acid (PFPeS)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoropentanoic acid (PFPeA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorotetradecanoic acid (PFTA)	537.1	2	ng/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
Perfluorotridecanoic acid (PFTrDA)	537.1	2	ng/L	ND	ND	ND	ND					N/A
Perfluoroundecanoic acid (PFUnA)	533	2	ng/L	ND	ND	ND	ND					N/A
Phenol (PHENOL)	625.1 / 8270C	1	ug/L	ND	ND	ND	ND					N/A
PhenylPhenol (PHNYPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
Progesterone (PRGSTR)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Propylbenzene (PRPBNZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Pyridine (PYRDN)	8270c	5	ug/L	ND	ND	ND	ND					N/A
sec-Butylbenzene (sBBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Styrene (STYR)	524.2	0.5	ug/L	ND	ND	ND	ND	100				100
Sucralose (SUCRAL)	CEC	100	ng/L	ND	ND	ND	ND					N/A
Sum of five Haloacetic Acids (HAA5)	CALC	1	ug/L	ND	ND	ND	ND	60				60
Sum of nine Haloacetic Acids (HAA9)	CALC	1	ug/L	ND	ND	ND	ND					N/A
Sum of Six Brominated Haloacetic Acids (HAA6Br)	CALC	1	ug/L	ND	ND	ND	ND					N/A
Terbufos Sulfone (TERSUL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Tert-amyl methyl ether (TAME)	524.2	1	ug/L	ND	ND	ND	ND					N/A
tert-butyl alcohol (TBA)	524.2	2	ug/L	ND	ND	ND	ND			12		N/A
tert-Butylbenzene (tBBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Testosterone (trans-Testosterone) (TESTOR)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Tetrabromobisphenol A (TBBISA)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
Tetrachloroethene (PCE)[29]	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
Toluene (TOLU)	524.2	0.5	ug/L	ND	ND	ND	ND	150				150
Total 1,3-Dichloropropene (x13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
Total Trihalomethanes (TTHMs)	524.2	0.5	ug/L	TR	5.60	4.20	6.50	80				80
Total Xylenes (m,p,&o) (TOTALX)[30]	524.2	0.5	ug/L	ND	ND	ND	ND	1,750				1,750[30]
trans-1,2 Dichloroethene (t12DCE)[31]	524.2	0.5	ug/L	ND	ND	ND	ND	10				10
trans-1,3-Dichloropropene (t13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	0.50				0.5, total 13DCP
Tribromoacetic Acid (TBAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Trichloroacetic Acid (TCAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Trichloroacetonitrile (TCAN)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
Trichloroethene (TCE)[32]	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
Trichlorofluoromethane (Freon 11) (CCl3F)	524.2	0.5	ug/L	ND	ND	ND	ND	150				150
Trichlorotrifluoroethane (Freon 113) (Cl3F3E)[33]	524.2	0.5	ug/L	ND	ND	ND	ND	1,200				1,200
Trimethoprim (TRIMTP)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Tris-2-chloroethyl phosphate (TCEP)	CEC	5	ng/L	ND	ND	ND	ND					N/A

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ORGANIC (Continued)												
Vinyl chloride (VNYLCL)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
RADIOLOGICALS												
Gross Alpha Excluding Uranium (TOTa-U)	CALC	DLR[34] 3, 1.08	pCi/L	0.419	1.26	ND	0.314	15				15
Natural Uranium (NTUr)	X200.8	DLR[34] 1, 0.67	pCi/L	ND	ND	ND	ND	20				20
Radium 226 + Radium 228 (Ra6Ra8)	CALC	DLR[34] 1, 0.247 - 0.676	pCi/L	-0.069	0.051	0.365	0.953	5				5
Radium 226 + Radium 228 Counting Error (Ra68CE)	CALC	0.247 - 0.676	pCi/L	0.150	0.099	1.130	1.147					N/A
Total Alpha (TOTa)	7110C	1.08	pCi/L	0.419	1.260	-0.105	0.314					N/A
Total Alpha Counting Error (TOTaCE)	7110C	1.08	pCi/L	0.939	1.100	0.819	0.916					N/A
Total Beta (TOTb)	900.0	DLR[34] 4, 0.151-1.34	pCi/L	3.14	5.61	-0.41	-0.27	50				50
Total Beta Counting Error (TOTbCE)	900.0	0.151 - 1.34	pCi/L	1.35	1.880	0.948	0.957					N/A
Total Radium 226 (TRa226)	903.0	0.247 - 0.676	pCi/L	-0.069	0.051	0.011	0.302	5				5, Ra226+Ra228
Total Radium 226 Counting Error (TRa6CE)	903.0	0.247 - 0.676	pCi/L	0.150	0.099	0.234	0.222					N/A
Total Radium 228 (TRa228)	RA-05	0.0491 - 0.0514	pCi/L	ND	ND	0.354	0.651	5				5, Ra226+Ra228
Total Radium 228 Counting Error (TRa8CE)	RA-05	0.0491 - 0.0514	pCi/L	ND	ND	0.896	0.925					N/A
Total Strontium-90 (TS90)	905.0MOD	DLR[34] 2, 0.525-1.37	pCi/L	0.13	0.201	0.390	0.589	8				8
Total Strontium-90 Counting Error (TS90CE)	905.0MOD	0.525 - 1.37	pCi/L	0.253	0.276	0.596	0.675					N/A
Total Tritium (TTr)	906.0	DLR[34] 1000, 434	pCi/L	268.00	2,457.67	267.00	356.25	20,000				20,000
Total Tritium Counting Error (TTrCE)	906.0	434	pCi/L	272.5	320.3	270.8	273.0					N/A
SEMI-ORGANIC												
1-Naphthol (NPTHOL)	531.2	5	ug/L	ND	ND	ND	ND					N/A
2,4,5-T (245T)	515.4	0.2	ug/L	ND	ND	ND	ND					N/A
2,4,5-TP (Silvex) (245TP)	515.4	0.2	ug/L	ND	ND	ND	ND	50				50
2,4,6-Trinitrotoluene (246TNT)	8330A	1	ug/L	ND	ND	ND	ND			1		N/A
2,4-DB (24DB)	515.4	2	ug/L	ND	ND	ND	ND					N/A
2,4-Dichlorophenoxyacetic Acid (24D)	515.4	0.4	ug/L	ND	ND	ND	ND	70				70
3,5-Dichlorobenzoic Acid (35DBA)	515.4	1	ug/L	ND	ND	ND	ND					N/A
3-Hydroxycarbofuran (HYDCFR)	531.2	2	ug/L	ND	ND	ND	ND					N/A
4,4'-DDD (DDD)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
4,4'-DDE (DDE)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
4,4'-DDT (DDT)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Acenaphthene (ACNAPE)	525.2 / 625.1 / 8270C	0.1 - 1.0	ug/L	ND	ND	ND	ND					N/A
Acenaphthylene (ACENAP)	525.2 / 625.1 / 8270C	0.1 - 1.0	ug/L	ND	ND	ND	ND					N/A
Acetaminophen (ACTMNP)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Acetochlor (ACETOC)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A

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SEMI-ORGANIC (Continued)												
Acifluorfen (ACIFEN)	515.4	0.4	ug/L	ND	ND	ND	ND					N/A
Alachlor (ALACHL)	525.2	0.1	ug/L	ND	ND	ND	ND	2				2
Aldicarb (ALDI)	531.2	1	ug/L	ND	ND	ND	ND					N/A
Aldicarb sulfone (ALDISN)	531.2	2	ug/L	ND	ND	ND	ND					N/A
Aldicarb sulfoxide (ALDISX)	531.2	2	ug/L	ND	ND	ND	ND					N/A
Aldrin (ALDRIN)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Ametryn (AMERYN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Anthracene (ANTHRA)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Atrazine (ATRAZ)	525.2 / CEC	0.001 - 0.1	ug/L	ND	ND	ND	ND	1				1
Baygon (BAYGON)	531.2	1	ug/L	ND	ND	ND	ND					N/A
Bentazon (BENTAZ)	515.4	2	ug/L	ND	ND	ND	ND	18				18
Benzo(a)anthracene (BaANTH)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Benzo(a)pyrene (BaPYRE)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND	0.2				0.2
Benzo(b)fluoranthene (BbFLUR)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Benzo(g,h,i)perylene (BghiPR)	525.2 / 625.1 / 8270C	0.1 - 2	ug/L	ND	ND	ND	ND					N/A
Benzo[k]fluoranthene (BkFLUR)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
bis (2-ethylhexyl) adipate (DEHA)[35]	525.2	2	ug/L	ND	ND	ND	ND	400				400
bis (2-ethylhexyl) phthalate (DEHP)[36]	525.2 / 625.1 / 8270C	2 - 5	ug/L	ND	ND	ND	ND	4				4
Bromacil (BROMAC)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Butachlor (BUTACL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Butanal (BUTAN)	556	2	ug/L	ND	ND	ND	ND					N/A
Butylate (BTYATE)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Butylbenzyl phthalate (BBP)	525.2 / 625.1 / 8270C	1 - 2	ug/L	ND	ND	ND	ND					N/A
Caffeine (CAFFEI)	525.2 / CEC	3 - 100	ng/L	ND	ND	ND	ND					N/A
Captan (CAPTAN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Carbamazepine (CBMAZP)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Carbaryl (CARBAR)	531.2	2	ug/L	ND	ND	ND	ND					N/A
Carbofuran (CARBOF)	531.2	1	ug/L	ND	ND	ND	ND	18				18
Chlordane (ClDANE)	508.1	0.1	ug/L	ND	ND	ND	ND	0.1				0.1
Chlordane-alpha (CLDA)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chlordane-gamma (CLDG)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chlorobenzilate (CLBZLA)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chloroneb (CLNEB)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chlorothalonil (CLTNIL)	508.1 / 525.2	0.05 - 0.1	ug/L	ND	ND	ND	ND					N/A
Chlorpropham (CPRPHM)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chlorpyrifos (ClPYRI)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A

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SEMI-ORGANIC (Continued)												
Chrysene (CHRYS)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Dalapon (DALAPN)	515.4 / 552.2	0.4 - 1	ug/L	ND	ND	ND	ND	200				200
DCPA-Dacthal (DCPA)	515.4 / 525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Diazinon (DIAZI)	525.2	0.1	ug/L	ND	ND	ND	ND			1.2		N/A
Dibenzo(a,h)anthracene (DBahAN)	525.2 / 625.1 / 8270C	0.1 - 2	ug/L	ND	ND	ND	ND					N/A
Dicamba (DICAMB)	515.4	0.6	ug/L	ND	ND	ND	ND					N/A
Dichlorprop (24DP)	515.4	0.3	ug/L	ND	ND	ND	ND					N/A
Dichlorvos (DCLVOS)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Dieldrin (DIELDR)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Diethyl phthalate (DEP)	525.2 / 625.1 / 8270C	1 - 2	ug/L	ND	ND	ND	ND					N/A
Dimethoate (DMTH)	525.2	1	ug/L	ND	ND	ND	ND					N/A
Dimethyl phthalate (DMP)	525.2 / 625.1 / 8270C	1 - 2	ug/L	ND	ND	ND	ND					N/A
Di-n-butylphthalate (DnBP)	525.2 / 625.1 / 8270C	1 - 2	ug/L	ND	ND	ND	ND					N/A
Di-n-octyl phthalate (DnOP)	525.2 / 625.1 / 8270C	1 - 2	ug/L	ND	ND	ND	ND					N/A
Dinoseb (DINOSB)	515.4	0.4	ug/L	ND	ND	ND	ND	7				7
Diphenamid (DPHNMD)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Diquat (DIQUAT)	549.2	4	ug/L	ND	ND	ND	ND	20				20
Diuron (DIURON)	CEC	0.005	ug/L	ND	ND	ND	ND					N/A
Endosulfan I (ENDOI)[37]	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Endosulfan sulfate (ENDOSL)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Endothall (ENDOTL)	548.1	45	ug/L	ND	ND	ND	ND	100				100
Endrin (ENDRIN)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND	2				2
Endrin Aldehyde (ENDR-A)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
EPTC (EPTC)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Erythromycin (ERYTHN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Ethion (ETHION)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Ethoprop (ETHPRP)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Ethylene Glycol (GLYCOL)	8015B	10,000	ug/L	ND	ND	ND	ND			14,000		N/A
Etridiazole (ETRDZL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Fluoranthene (FLANTH)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Fluorene (FLUOR)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Gemfibrozil (GMFIBZ)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Glyphosate (GLYPHO)	547	25	ug/L	ND	ND	ND	ND	700				700
HCH-gamma (Lindane) (LINDNE)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND	0.2				0.2
Heptachlor (HEPTA)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND	0.01				0.01

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SEMI-ORGANIC (Continued)												
Heptachlor epoxide (HEPEPX)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND	0.01				0.01
Hexachlorobenzene (HEXCLB)	508.1 /525.2 /625.1 /8270C	0.05 - 1	ug/L	ND	ND	ND	ND	1				1
Hexachlorocyclopentadiene (HClCPD)	508.1 /525.2 /625.1 /8270C	0.1 - 5	ug/L	ND	ND	ND	ND	50				50
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	8330A	1	ug/L	ND	ND	ND	ND			0.3		N/A
Hexazinone (HEXZON)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Ibuprofen (IBPRFN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Indeno(1,2,3-cd)pyrene (INDPYR)	525.2 / 625.1 / 8270C	0.1 - 2	ug/L	ND	ND	ND	ND					N/A
Malathion (MALATH)	525.2	2	ug/L	ND	ND	ND	ND					N/A
Methiocarb (MTHCRB)	531.2	4	ug/L	ND	ND	ND	ND					N/A
Methomyl (MTHOMY)	531.2	1	ug/L	ND	ND	ND	ND					N/A
Methoxychlor (METHOX)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND	30				30
methyl-Parathion (MPARA)	525.2	0.5	ug/L	ND	ND	ND	ND					N/A
Metribuzin (MTRBZN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Molinate (MOLINT)	525.2	0.1	ug/L	ND	ND	ND	ND	20				20
N,N-diethyl-m-toluamide (DEET)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Norflurazon (NORFLR)	525.2	1	ug/L	ND	ND	ND	ND					N/A
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	8330A	1	ug/L	ND	ND	ND	ND			350		N/A
Oxamyl (OXAMYL)	531.2	2	ug/L	ND	ND	ND	ND	50				50
Oxybenzone (BP3)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Paraquat (PARAQT)	549.2	4	ug/L	ND	ND	ND	ND					N/A
Parathion (PARA)	525.2	0.5	ug/L	ND	ND	ND	ND					N/A
Pentachlorophenol (PCP)	515.4 / 525.2 / 625.1 / 8270C / CEC	0.2 - 1	ug/L	ND	ND	ND	ND	1				1
Pentanal (PENTNL)	556	2	ug/L	ND	ND	ND	ND					N/A
Permethrin-(total of cis/trans) (PMTHRN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Phenanthrene (PHENAN)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Picloram (PICLOR)	515.4	0.6	ug/L	ND	ND	ND	ND	500				500
Primidone (PRIMDN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Prometryn (PROMET)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Pronamide (PROAMD)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Propachlor (PROPCL)	508.1 / 525.2	0.1 - 0.2	ug/L	ND	ND	ND	ND			90		N/A
Propanal (PROPNL)	556	2	ug/L	ND	ND	ND	ND					N/A
Propazine (PROPAZ)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Pyrene (PYRENE)	525.2 / 625.1 / 8270C	0.1 - 1	ug/L	ND	ND	ND	ND					N/A
Simazine (SIMAZ)	525.2 / CEC	0.005 - 0.1	ug/L	ND	ND	ND	ND	4				4
Sulfamethoxazole (SULTHZ)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Tebuthiuron (TBTURN)	525.2	2	ug/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1]) AVERAGES FOR ALL AVAILABLE DATA FOR 2024[2]

Parameters[3]	Methods	Reporting Limit	Units	2024 Quarter 1	2024 Quarter 2	2024 Quarter 3	2024 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
SEMI-ORGANIC (Continued)												
Terbacil (TRBACL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Thiobencarb (THIO)	525.2	0.1	ug/L	ND	ND	ND	ND	70	1			1
Toxaphene Mixture (TOXA)	508.1	1	ug/L	ND	ND	ND	ND	3				3
Triclosan (TRICLN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Trifluralin (TRFLRN)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Trithion (TRTION)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A

Purified Recycled Water Monitoring

Footnotes:

1 Purified Recycled Water (also called Finished Product Water (FPW) or Final Product Water) is the final recycled water flow stream.
2 For purposes of calculating quarterly averages, 10% of corresponding Reporting Limits (RL) was used for all non-detect (ND) values. If all data for the quarter were ND, then the average is shown as ND.
3 Permit and monitoring and reporting requirements per RWQCB Order No. R8-2022-0050.
4 Primary maximum contaminant levels (MCLs) are incorporated as 4-week running average permit limits unless otherwise noted.
5 Secondary MCLs are incorporated as annual average permit limits unless otherwise noted.
6 Exceedance of Division of Drinking Water Notification Levels (NLs) or Recycled Water Policy Monitoring Trigger Levels (MTLs) results in implementation of required response actions. For constituents with both NLs and MTLs (i.e., 1,4-dioxane, NDMA, PFOS, PFOA), NL and MTL exceedance response actions may differ. NLs and MTLs are not associated with effluent limitations in RWQCB Order No. R8-2022-0050.
7 Reverse Osmosis Product turbidity shall not exceed: 0.2 Nephelometric Turbidity Units (NTU) more than 5 percent of the time in any 24-hour period; and 0.5 NTU at any time.
8 The 7-day average concentration of total coliform shall not exceed 2.2 MPN/100mL. No more than one sample in any 30-day period shall exceed a concentration of 23 MPN/100mL. No sample shall exceed a concentration of 240 MPN/100mL.
9 Chloride has a recommended Secondary MCL of 250 mg/L and a RWQCB Basin Plan Water Quality Objective of 55 mg/L. The daily maximum permit limit, which is based on the upper range of the Secondary MCL, is 500 mg/L. The annual average limit is 55 mg/L.
10 Chloride, silver, and methylene blue activated substances (MBAS) secondary MCLs are expressed as a daily maximum effluent limitation in RWQCB Order No. R8-2022-0050. Most secondary MCLs are expressed as annual average effluent limitations.
11 Nitrate, nitrite, and nitrate+nitrite primary MCLs are expressed as daily maximum effluent limitations in RWQCB Order No. R8-2022-0050. Most primary MCLs are expressed as running 4-week average effluent limitations.
12 Total Dissolved Solids has a Secondary MCL of 500 mg/L and a RWQCB Basin Plan Water Quality Objective of 580 mg/L. The permit limit is based upon the Basin Plan Water Quality Objective.
13 TOC limit of 0.5 mg/L is based on a Recycled Water Contribution (RWC) of 100%. TOC must not exceed 0.5 mg/L based on a 20-week running average of all TOC results and the average of the last four monitoring results for TOC.
14 Alternate name for 1,1-Dichloroethene is 1,1-Dichloroethylene.
15 Alternate name for 1,2-Dibromo-3-chloropropane is Dibromochloropropane (DBCP).
16 Alternate name for Dibromoethane is Ethylene Dibromide (EDB).
17 Alternate name for 17a-Ethynyl Estradiol is Ethinyl Estradiol.
18 Alternate name for 4-Chloro-3-methylphenol is 3-Methyl-4-Chlorophenol.
19 Alternate name for Bromodichloromethane is Dichlorobromomethane.
20 Alternate name for Bromomethane is Methyl Bromide.
21 Alternate name for Chlorobenzene is Monochlorobenzene .
22 Alternate name for Chloromethane is Methyl Chloride.
23 Alternate name for cis-1,2-Dichloroethene is cis-1,2-Dichloroethylene.
24 Total Haloacetic acids (five) (HAA5) are listed separately as Monochloroacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Monobromoacetic Acid, and Dibromoacetic Acid.
25 Alternate name for Dibromochloromethane is Chlorodibromomethane.
26 Alternate name for Endosulfan II is Beta Endosulfan.
27 Alternate name for Methylene chloride is Dichloromethane.
28 Polychlorinated Biphenyls are listed separately as PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260; however the PMCL is for the total mixture of PCB congeners (TOTPCB) and not individual PCB's.
29 Alternate name for Tetrachloroethene is Tetrachloroethylene.
30 Primary MCL for Total Xylenes and not isomers (o-, m-, p-xylene).
31 Alternate name for trans-1,2-Dichloroethene is trans-1,2-Dichloroethylene.
32 Alternate name for Trichloroethene is Trichloroethylene.
33 Alternate name for Trichlorotrifluoroethane (Freon 113) is 1,1,2-Trichloro-1,2,2-Trifluoroethane.
34 California Reporting Level for purposes of Reporting (DLR).
35 Alternate name for bis (2-ethylhexyl) adipate is Di(2-ethylhexyl)adipate.
36 Alternate name for bis (2-ethylhexyl) phthalate is Di(2-ethylhexyl)phthalate (DEHP).
37 Alternate name for Endosulfan I is Alpha Endosulfan.

GWRS 2024 Quarterly Sampling Dates
OCWD Water Quality Department
GWRS FINAL PRODUCT WATER (GWRS-FPW)

Station Name	Quarter 1[1]	Quarter 2[2]	Quarter 3[3]	Quarter 4[4]
GWRS-FPW	01/10/2024	04/03/2024	07/10/2024	10/02/2024

Qtr 1: Additional sample collected on 2/26/2024

Qtr 2: Additional samples collected on 5/20/2024

Qtr 3: Additional samples collected on 7/29/2024

Qtr 4: Additional sample collected on 10/29/2024

Notes for Appendix A Tables:

► Listed dates (above) are the quarterly compliance monitoring dates; other samples may have been collected during the year. Detections of organic chemicals are reported for all samples collected in 2021 and are not limited to the quarterly compliance samples.

► Appendices B and C contain a list of all methods and detection limits (RL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate. RWQCB Order No. R8-2022-0050 does not have a permit limit for TDS or EC.

► Analysis for priority pollutants is performed by multiple inorganic and organic methods

► MCL: Maximum Contaminant Level

► NA: Not applicable

► ND: Not detected at Reporting Limit (RL)

► NL: SWRCB DDW (formerly CDPH) Notification Level. Exceedance of notification levels triggers required response actions. Notification levels are not permit effluent limitations.

► NS: Not sampled

► SMCL: Secondary Maximum Contaminant Level

► TR: Trace

Summary of 2024 Water Quality Analyses Per Permit Table Sections

**** NO PERMIT EXCEEDANCES WERE REPORTED ****

Station Description	Category	Labs	Reported Methods	RL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
EFFLUENT MONITORING FOR RECYCLED WATER (TITLE 22) (RWQCB ORDER NO. R8-2022-0050 TABLE E-3)										
Final Product Water	Total Coliform (Colilert - MPN/100mL) (TCOLIQ), MPN	OCWD	9223B	1	2.2	0.02	0.01	0.2	0.01	0.01 - 0.2
Final Product Water	Electrical Conductivity (EC), uS/cm	OCWD	2510B	1	N/A	91.36	84.93	87.86	87.26	84.93 - 91.36
Final Product Water	Total Dissolved Solids (TDS), mg/L	OCWD	2540C	2.5	580	47.29	45.58	49.62	45.96	45.58 - 49.62
Final Product Water	BOD (24-hr composite) (BOD), mg/L	Weck Lab	5210B	2	20	ND	ND	ND	ND	ND
Final Product Water	Total Suspended Solids (SUSSOL), mg/L	OCWD	2540D	2.5	20	ND	ND	ND	ND	ND
Final Product Water	Chloride (Cl), mg/L	OCWD	300.0	0.5	55	4.77	2.8	3.1	4.23	2.8 - 4.77
Final Product Water	Sulfate (SO4), mg/L	OCWD	300.0	0.3 / 0.5	250	0.63	0.37	0.4	0.33	0.33 - 0.63
Final Product Water	Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	0.3	10	0.88	0.74	0.73	0.83	0.73 - 0.88
Final Product Water	Nitrate + Nitrite Nitrogen (NO3NO2-N), mg/L	OCWD	Calculated	0.1	10	0.64	0.56	0.61	0.67	0.56 - 0.67
Final Product Water	Nitrate Nitrogen (NO3-N), mg/L	OCWD	4500-NO3F	0.1	10	0.58	0.53	0.58	0.64	0.53 - 0.64
Final Product Water	Nitrite Nitrogen (NO2-N), mg/L	OCWD	4500-NO3F	0.002	1	0.0574	0.0371	0.0346	0.0419	0.0346 - 0.0574
Final Product Water	Ammonia Nitrogen (NH3-N), mg/L	OCWD	350.1	0.1	NA	0.33	0.18	0.11	0.22	0.11 - 0.33
Final Product Water	Total Inorganic Nitrogen (TIN). mg/L	OCWD	350.1	0.1	3.4	0.96	0.73	0.72	0.89	0.72 - 0.96
Final Product Water	Iron (Fe), ug/L	OCWD	200.7	5	300	ND	ND	ND	ND	ND
Final Product Water	Manganese (Mn), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Methylene Blue Activated Substances (MBAS), mg/L	OCWD	5540C	0.02	0.05	Not Required	ND	Not Required	Not Required	ND
Final Product Water	Threshold Odor Number (Median) (ODOR), TON	OCWD	2150B	0	3	Not Required	ND	Not Required	Not Required	ND
Final Product Water	Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	2120B	3	15	Not Required	ND	Not Required	Not Required	ND
Final Product Water	Lead (Pb), ug/L	OCWD	200.8	1	15	ND	ND	ND	ND	ND
Final Product Water	Copper (Cu), ug/L	OCWD	200.8	1	1000	ND	ND	ND	ND	ND
Final Product Water	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	0.5	0.083	0.057	0.06	0.031	0.031 - 0.083
Final Product Water	Silver (Ag), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Zinc (Zn), ug/L	OCWD	200.8	5	5,000	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - INORGANIC (RWQCB ORDER NO. R8-2022-0050 TABLE E-4)										
Final Product Water	Aluminum (Al), ug/L	OCWD	200.8	5	200	ND	ND	ND	ND	ND
Final Product Water	Antimony (Sb), ug/L	OCWD	200.8	1	6	ND	ND	ND	ND	ND
Final Product Water	Arsenic (As), ug/L	OCWD	200.8	1	10	ND	ND	ND	ND	ND
Final Product Water	Asbestos (ASBESTOS), MFL	Eurofins CEI	100.2	(Once every 3 Years)	7	Not Required	Not Required	Not Required	Not Required	Not Required
Final Product Water	Barium (Ba), ug/L	OCWD	200.8	1	1,000	ND	ND	ND	ND	ND
Final Product Water	Beryllium (Be), ug/L	OCWD	200.8	1	4	ND	ND	ND	ND	ND
Final Product Water	Cadmium (Cd), ug/L	OCWD	200.8	1	5	ND	ND	ND	ND	ND
Final Product Water	Chromium (Cr), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Hexavalent Chromium (CrVI), ug/L	OCWD	218.7	0.1 / 0.2	N/A	ND	ND	ND	0.13	ND - 0.13
Final Product Water	Cyanide (CN), ug/L	OCWD	335.4	5	150	ND	ND	ND	ND	ND
Final Product Water	Fluoride (F), mg/L	OCWD	300.0	0.1	2	ND	ND	ND	ND	ND
Final Product Water	Mercury (Hg), ug/L	OCWD	200.8	1	2	ND	ND	ND	ND	ND
Final Product Water	Nickel (Ni), ug/L	OCWD	200.8	1	100	ND	ND	ND	ND	ND
Final Product Water	Perchlorate (CLO4), ug/L	OCWD	332.0	1	6	ND	ND	ND	ND	ND
Final Product Water	Selenium (Se), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Thallium (Tl), ug/L	OCWD	200.8	1	2	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - VOLATILE ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-5)										
Final Product Water	Benzene (BENZ), ug/L	OCWD	524.2	0.5	1	ND	ND	ND	ND	ND
Final Product Water	Carbon Tetrachloride (CCl4), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	1,2-Dichlorobenzene (12DCB), ug/L	OCWD	524.2	0.5	600	ND	ND	ND	ND	ND
Final Product Water	1,4-Dichlorobenzene (14DCB), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND

Summary of 2024 Water Quality Analyses Per Permit Table Sections

**** NO PERMIT EXCEEDANCES WERE REPORTED ****

Station Description	Category	Labs	Reported Methods	RL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
PRIMARY DRINKING WATER STANDARDS - VOLATILE ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-5 Continued)										
Final Product Water	1,1-Dichloroethane (11DCA), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,2-Dichloroethane (12DCA), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	1,1-Dichloroethylene (11DCE), ug/L	OCWD	524.2	0.5	6	ND	ND	ND	ND	ND
Final Product Water	cis-1,2-Dichloroethylene (c12DCE), ug/L	OCWD	524.2	0.5	6	ND	ND	ND	ND	ND
Final Product Water	trans-1,2-Dichloroethylene (t12DCE), ug/L	OCWD	524.2	0.5	10	ND	ND	ND	ND	ND
Final Product Water	Dichloromethane (CH2Cl2), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,2-Dichloropropane (12DCP), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,3-Dichloropropene (x13DCP), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	Ethylbenzene (EtBENZ), ug/L	OCWD	524.2	0.5	300	ND	ND	ND	ND	ND
Final Product Water	Methyl-tert-butyl ether (MTBE), ug/L	OCWD	524.2	0.2	13	ND	ND	ND	ND	ND
Final Product Water	Monochlorobenzene (ClBENZ), ug/L	OCWD	524.2	0.5	70	ND	ND	ND	ND	ND
Final Product Water	Styrene (STYR), ug/L	OCWD	524.2	0.5	100	ND	ND	ND	ND	ND
Final Product Water	1,1,2,2-Tetrachloroethane (1122PC), ug/L	OCWD	524.2	0.5	1	ND	ND	ND	ND	ND
Final Product Water	Tetrachloroethylene (PCE), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	Toluene (TOLU), ug/L	OCWD	524.2	0.5	150	ND	ND	ND	ND	ND
Final Product Water	1,2,4-Trichlorobenzene (124TCB), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,1,1-Trichloroethane (111TCA), ug/L	OCWD	524.2	0.5	200	ND	ND	ND	ND	ND
Final Product Water	1,1,2-Trichloroethane (112TCA), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	Trichloroethylene (TCE), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	Trichlorofluoromethane (CCl3F), ug/L	OCWD	524.2	0.5	150	ND	ND	ND	ND	ND
Final Product Water	1,1,2-Trichloro-1,1,2- Trifluoroethane (Cl3F3E), ug/L	OCWD	524.2	0.5	1,200	ND	ND	ND	ND	ND
Final Product Water	Vinyl Chloride (VNYLCL), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	m,p-Xylene (mp-XYL), ug/L	OCWD	524.2	0.5	1,750	ND	ND	ND	ND	ND
Final Product Water	o-Xylene (o-XYL), ug/L	OCWD	524.2	0.5	1,750	ND	ND	ND	ND	ND
Final Product Water	Xylenes (TOTALX), ug/L	OCWD	524.2	0.5	1,750	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - SYNTHETIC ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-6)										
Final Product Water	Alachlor (ALACHL), ug/L	OCWD	525.2	0.1	2	ND	ND	ND	ND	ND
Final Product Water	Atrazine (ATRAZ), ug/L	OCWD	525.2	0.1	1	ND	ND	ND	ND	ND
Final Product Water	Bentazon (BENTAZ), ug/L	Weck Lab	515.4	2	18	ND	ND	ND	ND	ND
Final Product Water	Benzo(a)pyrene (BaPYRE), ug/L	OCWD	525.2	0.1	0.2	ND	ND	ND	ND	ND
Final Product Water	Carbofuran (CARBOF), ug/L	OCWD	531.2	1	18	ND	ND	ND	ND	ND
Final Product Water	Chlordane (ClDANE), ug/L	Weck Lab	508.1	0.1	0.1	ND	ND	ND	ND	ND
Final Product Water	2,4-Dichlorophenoxyacetic acid (24D), ug/L	Weck Lab	515.4	0.4	70	ND	ND	ND	ND	ND
Final Product Water	Dalapon (DALAPN), ug/L	OCWD/Weck Lab	515.4 / 552.2	0.4 / 1	200	ND	ND	ND	ND	ND
Final Product Water	1,2-Dibromo-3-chloropropane (DBCP), ug/L	OCWD	504.1	0.01	0.2	ND	ND	ND	ND	ND
Final Product Water	Di(2-ethylhexyl) adipate (DEHA), ug/L	OCWD	525.2	2	400	ND	ND	ND	ND	ND
Final Product Water	Di(2-ethylhexyl) phthalate (DEHP), ug/L	OCWD	525.2	2	4	ND	ND	ND	ND	ND
Final Product Water	Dinoseb (DINOSB), ug/L	Weck Lab	515.4	0.4	7	ND	ND	ND	ND	ND
Final Product Water	Diquat (DIQUAT), ug/L	OCWD	549.2	4	20	ND	ND	ND	ND	ND
Final Product Water	Endothall (ENDOTL), ug/L	Weck Lab	548.1	45	100	ND	ND	ND	ND	ND
Final Product Water	Endrin (ENDRIN), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	2	ND	ND	ND	ND	ND
Final Product Water	Ethylene Dibromide (EDB), ug/L	OCWD	504.1	0.01	0.05	ND	ND	ND	ND	ND
Final Product Water	Glyphosate (GLYPHO), ug/L	OCWD	547	25	700	ND	ND	ND	ND	ND
Final Product Water	Heptachlor (HEPTA), ug/L	Weck Lab	508.1	0.01	0.01	ND	ND	ND	ND	ND
Final Product Water	Heptachlor Epoxide (HEPEPX), ug/L	Weck Lab	508.1	0.01	0.01	ND	ND	ND	ND	ND

Summary of 2024 Water Quality Analyses Per Permit Table Sections

**** NO PERMIT EXCEEDANCES WERE REPORTED ****

Station Description	Category	Labs	Reported Methods	RL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
PRIMARY DRINKING WATER STANDARDS - SYNTHETIC ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-6 Continued)										
Final Product Water	Hexachlorobenzene (HEXCLB), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.05 / 0.1	1	ND	ND	ND	ND	ND
Final Product Water	Hexachlorocyclopentadiene (HEXCIPD), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.1 / 0.2	50	ND	ND	ND	ND	ND
Final Product Water	Gamma BHC (Lindane) (LINDNE), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	0.2	ND	ND	ND	ND	ND
Final Product Water	Methoxychlor (METHOX), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	30	ND	ND	ND	ND	ND
Final Product Water	Molinate (MOLINT), ug/L	OCWD	525.2	0.1	20	ND	ND	ND	ND	ND
Final Product Water	Oxamyl (OXAMYL), ug/L	OCWD	531.2	2	50	ND	ND	ND	ND	ND
Final Product Water	Pentachlorophenol (PCP), ug/L	OCWD/Weck Lab	515.4 / 525.2	0.2 / 1	1	ND	ND	ND	ND	ND
Final Product Water	Picloram (PICLOR), ug/L	Weck Lab	515.4	0.6	500	ND	ND	ND	ND	ND
Final Product Water	Polychlorinated Biphenyls (PCBs) (TOTPCB), ug/L	Weck Lab	508.1	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	Simazine (SIMAZ), ug/L	OCWD	525.2	0.1	4	ND	ND	ND	ND	ND
Final Product Water	Thiobencarb (THIO), ug/L	OCWD	525.2	0.1	70	ND	ND	ND	ND	ND
Final Product Water	Toxaphene (TOXA), ug/L	Weck Lab	508.1	1	3	ND	ND	ND	ND	ND
Final Product Water	1,2,3-Trichloropropane (123TCP), ug/L	OCWD	524M-TCP	0.005	0.005	ND	ND	ND	ND	ND
Final Product Water	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), pg/L	EUROTSAC	1613B	4.7 / 5.2	30	ND	ND	ND	ND	ND
Final Product Water	2-(2,4,5-trichlorophenoxy) propionic acid (Silvex) (245TP), ug/L	Weck Lab	515.4	0.2	50	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - DISINFECTION BYPRODUCTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-7)										
Final Product Water	Total Trihalomethanes (TTHMs), ug/L	OCWD	524.2	0.5	80	TR	5.6	4.2	6.5	TR - 6.5
Final Product Water	Sum of five Haloacetic Acids (HAA5), ug/L	OCWD	Calculated	1	60	ND	ND	ND	ND	ND
Final Product Water	Bromodichloromethane (CHBrCl), ug/L	OCWD	524.2	0.5	80, total TTHMs	ND	1.60	1.7	2.4	ND - 2.4
Final Product Water	Bromoform (CHBr3), ug/L	OCWD	524.2	0.5	80, total TTHMs	ND	ND	ND	ND	ND
Final Product Water	Chloroform (CHCl3), ug/L	OCWD	524.2	0.5	80, total TTHMs	TR	4	2.4	4.1	TR - 4.1
Final Product Water	Dibromochloromethane (CHBr2C), ug/L	OCWD	524.2	0.5	80, total TTHMs	ND	ND	TR	TR	ND - TR
Final Product Water	Monochloroacetic Acid (MCAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Dichloroacetic Acid (DCAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Trichloroacetic Acid (TCAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Monobromoacetic Acid (MBAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Dibromoacetic Acid (DBAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Bromate (BRO3), ug/L	OCWD	300.1B	5	10	ND	ND	ND	ND	ND
Final Product Water	Chlorite (ClO2), ug/L	OCWD	300.1B	10	1,000	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - RADIONUCLIDES (RWQCB ORDER NO. R8-2022-0050 TABLE E-8)										
Final Product Water	Combined Radium-226 and Radium-228 (Ra6Ra8), pCi/L	FGL / Eberline	Calculated (Ra226 by 903.0; Ra228 by Ra-05)	0.247 / 0.676	5	-0.07	0.05	0.37	0.95	-0.07 - 0.95
Final Product Water	Gross Alpha Excluding Uranium (TOTa-U), pCi/L	FGL	SM7110C	1.08	15	0.42	1.26	-0.1	0.31	-0.1 - 1.26
Final Product Water	Uranium (NTUr), pCi/L	FGL	200.8	0.67	20	ND	ND	ND	ND	ND
Final Product Water	Beta/Photon emitters (TOTb), pCi/L	FGL	900.0	0.151 / 1.34	50	3.14	5.61	-0.408	-0.265	-0.408 - 5.61
Final Product Water	Strontium-90 (TS90), pCi/L	Eberline	905.0 MOD	0.525 / 1.37	8	0.13	0.20	0.39	0.59	0.13 - 0.589
Final Product Water	Tritium (TTr), pCi/L	FGL	906.0	434	20,000	268	2,457.67	267	356.25	267 - 2,457.67
CONSTITUENTS WITH NOTIFICATION AND RESPONSE LEVELS (RWQCB ORDER NO. R8-2022-0050 TABLE E-9)										
Final Product Water	Boron (B), mg/L	OCWD	200.7	0.1	0.75	0.26	0.24	0.21	0.17	0.17 - 0.26
Final Product Water	n-Butylbenzene (nBBENZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND
Final Product Water	sec-Butylbenzene (sBBENZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND
Final Product Water	tert-Butylbenzene (tBBENZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND

Summary of 2024 Water Quality Analyses Per Permit Table Sections

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Station Description	Category	Labs	Reported Methods	RL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
CONSTITUENTS WITH NOTIFICATION AND RESPONSE LEVELS (RWQCB ORDER NO. R8-2022-0050 TABLE E-9 Continued)										
Final Product Water	Carbon disulfide (CS2), ug/L	OCWD	524.2	0.5	160	ND	ND	ND	ND	ND
Final Product Water	Chlorate (CLO3), ug/L	OCWD	300.1B	10	800	ND	ND	ND	ND	ND
Final Product Water	2-Chlorotoluene (2ClTOL), ug/L	OCWD	524.2	0.5	140	ND	ND	ND	ND	ND
Final Product Water	4-Chlorotoluene (4ClTOL), ug/L	OCWD	524.2	0.5	140	ND	ND	ND	ND	ND
Final Product Water	Diazinon (DIAZI), ug/L	OCWD	525.2	0.1	1.2	ND	ND	ND	ND	ND
Final Product Water	Dichlorodifluoromethane (CCl2F2), ug/L	OCWD	524.2	0.5	1,000	ND	ND	ND	ND	ND
Final Product Water	1,4-Dioxane (14DIOX), ug/L	OCWD	522	0.07	1	ND	ND	ND	ND	ND
Final Product Water	Ethylene glycol (GLYCOL), ug/L	Weck Lab	8015B	10000	14,000	ND	ND	ND	ND	ND
Final Product Water	Formaldehyde (FORALD), ug/L	Weck Lab	556	2	100	13	14	14	11	11 - 14
Final Product Water	HMX (Octogen) (HMX), ug/L	Weck Lab	8330A	1	350	ND	ND	ND	ND	ND
Final Product Water	Isopropylbenzene (ISPBNZ), ug/L	OCWD	524.2	0.5	770	ND	ND	ND	ND	ND
Final Product Water	Manganese (Mn), ug/L	OCWD	X200.8	1	500	ND	ND	ND	ND	ND
Final Product Water	Methyl isobutyl ketone (MIBK), ug/L	OCWD	524.2	2.5	120	ND	ND	ND	ND	ND
Final Product Water	Naphthalene (NAP), ug/L	OCWD	524.2	0.5	17	ND	ND	ND	ND	ND
Final Product Water	N-Nitrosodiethylamine (NDEA), ng/L	OCWD	NDMA-LOW	2	10	ND	ND	ND	ND	ND
Final Product Water	N-nitrosodymethylamine (NDMA), ng/L	OCWD	NDMA-LOW	2	10	ND	0.17	0.17	ND	ND - 0.17
Final Product Water	N-Nitrosodi-n-propylamine (NDPA), ng/L	OCWD	NDMA-LOW	2	10	ND	ND	ND	ND	ND
Final Product Water	Perfluorobutanesulfonic acid (PFBS), ng/L	OCWD	533	2	500	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanesulfonic acid (PFOS), ng/L	OCWD	533	2	6.5	ND	ND	ND	ND	ND
Final Product Water	Perfluorohexanesulfonic acid (PFHxS), ng/L	OCWD	533	2	3	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanoic acid (PFOA), ng/L	OCWD	533	2	5.1	ND	ND	ND	ND	ND
Final Product Water	Propachlor (PROPCL), ug/L	Weck Lab	508.1	0.2	90	ND	ND	ND	ND	ND
Final Product Water	n-Propylbenzene (PRPBNZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND
Final Product Water	1,3,5-Trinitroperhydro-1,3,5-triazine (RDX), ug/L	Weck Lab	8330A	1	0.3	ND	ND	ND	ND	ND
Final Product Water	Tertiary butyl alcohol (TBA), ug/L	OCWD	524.2	2	12	ND	ND	ND	ND	ND
Final Product Water	1,2,4-Trimethylbenzene (124TMB), ug/L	OCWD	524.2	0.5	330	ND	ND	ND	ND	ND
Final Product Water	1,3,5-Trimethylbenzene (135TMB), ug/L	OCWD	524.2	0.5	330	ND	ND	ND	ND	ND
Final Product Water	2,4,6-Trinitrotoluene (246TNT), ug/L	Weck Lab	8330A	1	1	ND	ND	ND	ND	ND
Final Product Water	Vanadium (V), ug/L	OCWD	X200.8	1	50	ND	ND	ND	ND	ND
REMAINING PRIORITY POLLUTANTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-10)										
Final Product Water	Aldrin (ALDRIN), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Dieldrin (DIELDR), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	4,4' - DDT (DDT), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	4,4' - DDE (DDE), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	4,4' - DDD (DDD), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Alpha-endosulfan (ENDOI), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Beta-endosulfan (ENDOII), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Endosulfan sulfate (ENDOSL), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Endrin aldehyde (ENDR-A), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Alpha-BHC (BHCa), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Beta-BHC (BHCb), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Delta-BHC (BHCd), ug/L	OCWD/Weck Lab	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Acrolein (ACROLN), ug/L	OCWD	524.2	5	NA	ND	ND	ND	ND	ND
Final Product Water	Acrylonitrile (ACRYLO), ug/L	OCWD	524.2	2	NA	ND	ND	ND	ND	ND

Summary of 2024 Water Quality Analyses Per Permit Table Sections

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Station Description	Category	Labs	Reported Methods	RL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
REMAINING PRIORITY POLLUTANTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-10 Continued)										
Final Product Water	Chlorobenzene (ClBENZ)	CONSTITUENT HAS A PRIMARY MCL. SEE TABLE E-5.								
Final Product Water	Chloroethane (ClETHA), ug/L	OCWD	524.2	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	1,1-Dichloroethylene (11DCE)	CONSTITUENT HAS A PRIMARY MCL. SEE TABLE E-5.								
Final Product Water	Methyl chloride (CH3Cl), ug/L	OCWD	524.2	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	Methyl bromide (CH3Br), ug/L	OCWD	524.2	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	2-chloroethyl vinyl ether (2ClEVE), ug/L	OCWD	14DIOX	1	NA	ND	ND	ND	ND	ND
Final Product Water	2,4,6-trichlorophenol (246TCP), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	3-methyl-3-chlorophenol (P-chloro-m-cresol) (43CMP), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	2-Chlorophenol (2ClPNL), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-dichlorophenol (24DCPH), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-dimethylphenol (24DMP), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	2-nitrophenol (2NPNL), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	4-nitrophenol (4NPNL), ug/L	Weck Lab	625.1	5	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-dinitrophenol (24DNP), ug/L	Weck Lab	625.1	10	NA	ND	ND	ND	ND	ND
Final Product Water	2-methyl-4,6-dinitrophenol (2MDNP), ug/L	Weck Lab	625.1	5	NA	ND	ND	ND	ND	ND
Final Product Water	Phenol (PHENOL), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	Chromium (III) trivalent (CrIII), ug/L	OCWD	CALC	1	NA	ND	ND	ND	ND	ND
Final Product Water	Acenaphthene (ACNAPE), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Benzidine (BNZDE), ug/L	Weck Lab	625.1	10	NA	ND	ND	ND	ND	ND
Final Product Water	Hexachloroethane (HCE), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	Bis(2-Chloroethyl)ether (B2CLEE), ug/L	OCWD/Weck Lab	524.2 / 625.1	1 / 2.5	NA	ND	ND	ND	ND	ND
Final Product Water	2-Chloronaphthalene (2ClNAP), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	1,3-Dichlorobenzene (13DCB), ug/L	OCWD/Weck Lab	524.2 / 625.1	0.5 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	3,3'-Dichlorobenzidine (DCBZDE), ug/L	Weck Lab	625.1	5	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-Dinitrotoluene (24DNT), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	2,6-Dinitrotoluene (26DNT), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Fluoranthene (FLANTH), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	4-Chlorophenyl Phenyl Ether (4ClPPE), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	4-Bromophenyl Phenyl Ether (4BrPPE), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	Bis (2-Chloroisopropyl) Ether (B2ClPE), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	Bis (2-Chloroethoxyl) Methane (B2CEM), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	Hexachlorobutadiene (HClBut), ug/L	OCWD/Weck Lab	524.2 / 625.1	0.5 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Isophorone (IPHOR), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Nitrobenzene (NBENZ), ug/L	Weck Lab	625.1	1	NA	ND	ND	ND	ND	ND
Final Product Water	N-Nitrosodiphenylamine (NDPhA), ng/L	Weck Lab	625.1	1000	NA	ND	ND	ND	ND	ND
Final Product Water	Bis(2-ethylhexyl) phthalate or Di(2-ethylhexyl) phthalate (DEHF	CONSTITUENT HAS A PRIMARY MCL. SEE TABLE E-6.								
Final Product Water	Butylbenzyl Phthalate (BBP), ug/L	OCWD/Weck Lab	525.2 / 625.1	1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Di-n-butyl phthalate (DnBP), ug/L	OCWD/Weck Lab	525.2 / 625.1	1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Di-n-octyl phthalate (DnOP), ug/L	OCWD/Weck Lab	525.2 / 625.1	1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Diethyl phthalate (DEP), ug/L	OCWD/Weck Lab	525.2 / 625.1	1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Dimethyl Phthalate (DMP), ug/L	OCWD/Weck Lab	525.2 / 625.1	1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Benzo(a)anthracene (BaANTH), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Benzo(b)fluoranthene (BbFLUR), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Benzo(k)fluoranthene (BkFLUR), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Chrysene (CHRYS), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Acenaphthylene (ACENAP), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Anthracene (ANTHRA), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	1,12-benzoperylene (BghiPR), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Fluorene (FLUOR), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	Phenanthrene (PHENAN), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
Final Product Water	1,2,5,6-dibenzanthracene (DBahAN), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 2	NA	ND	ND	ND	ND	ND

Summary of 2024 Water Quality Analyses Per Permit Table Sections

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Station Description	Category	Labs	Reported Methods	RL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
REMAINING PRIORITY POLLUTANTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-10 Continued)										
Final Product Water	Indeno(1,2,3-cd)pyrene (INDPYR), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 2	NA	ND	ND	ND	ND	ND
Final Product Water	Pyrene (PYRENE), ug/L	OCWD/Weck Lab	525.2 / 625.1	0.1 / 1	NA	ND	ND	ND	ND	ND
CEC MONITORING: HEALTH AND PERFORMANCE SURROGATES (RWQCB ORDER NO. R8-2022-0050 TABLE E-12)										
Final Product Water	1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX / 522	0.07 / 0.5	1	ND	ND	ND	ND	ND
Final Product Water	n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	2	10	ND	0.17	0.17	ND	ND - 0.17
RO Feed	n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	2 / 10	NA	13.24	22.03	7.66	8.54	7.66 - 22.03
RO Feed - Final Product Water	NDMA Removal Percentage, %	OCWD	Calculated	%	NA	100.0%	99.5%	98.9%	100.0%	98.9% - 100%
Final Product Water	n-Nitrosomorpholine (NMOR), ng/L	OCWD	NDMA-LOW	2	12	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanoic sulfonate (PFOS), ng/L	OCWD	533	2	6.5	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanoic acid (PFOA), ng/L	OCWD	533	2	5.1	ND	ND	ND	ND	ND
CEC MONITORING: HEALTH AND PERFORMANCE SURROGATES (RWQCB ORDER NO. R8-2022-0050 TABLE E-12 Continued)										
Final Product Water	Sucralose (SUCRAL), ng/L	OCWD	CEC	100	NA	ND	ND	ND	ND	ND
RO Feed	Sucralose (SUCRAL), ng/L	OCWD	CEC	1,000	NA	57,600	58,800	67,700	62,900	57,600 - 67,700
RO Feed - Final Product Water	Sucralose Removal Percentage, %	OCWD	Calculated	%	NA	100.0%	100.0%	100.0%	100.0%	100.0%
Final Product Water	Sulfamethoxazole (SULTHZ), ng/L	OCWD	CEC	1	NA	ND	ND	ND	ND	ND
RO Feed	Sulfamethoxazole (SULTHZ), ng/L	OCWD	CEC	1 / 10	NA	990	660	390	590	390 - 990
RO Feed - Final Product Water	Sulfamethoxazole Removal Percentage, %	OCWD	Calculated	%	NA	100%	100%	100%	100%	100%
Final Product Water	Specific Conductance (EC), uS/cm	OCWD	2510B	1	NA	91.4	84.9	87.9	87.3	84.9 - 91.4
RO Permeate	Specific Conductance (EC), uS/cm	OCWD	2510B	1	NA	33.0	24.6	26.6	29.2	24.6 - 33.0
RO Feed	Specific Conductance (EC), uS/cm	OCWD	2510B	1	NA	1,921	1,687	1,589	1,829	1,589 - 1,921
RO Feed - Final Product Water	EC Removal Percentage, %	OCWD	Calculated	%	NA	95.2%	95.2%	94.4%	95.3%	94.4% - 95.3%
Final Product Water	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	0.5	0.083	0.057	0.060	0.031	0.031 - 0.083
RO Permeate	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	NA	0.093	0.083	0.080	0.071	0.071 - 0.093
RO Feed	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	NA	7.388	7.666	6.648	6.781	6.648 - 7.666
RO Feed - Final Product Water	TOC Removal Percentage, %	OCWD	Calculated	%	NA	98.9%	99.2%	99.1%	99.6%	98.9% - 99.6%
CEC MONITORING: BIOANALYTICAL SCREENING TOOLS (RWQCB ORDER NO. R8-2022-0050 TABLE E-13)										
Final Product Water	Estrogen receptor alpha (ER-alpha), ng/L	BDS-AMST	BIOASSAY CEC	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	Aryl hydrocarbon receptor (AhR), ng/L	BDS-AMST	BIOASSAY CEC	0.5	NA	ND	ND	ND	ND	ND

Note: Table E-11 was excluded since the table of analytes was set for groundwater monitoring wells only.

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	Eurofins Sac.	ND	ND	ND	ND
504.1	EDB, DBCP & 123TCP	OCWD	ND	ND	ND	ND
508.1	Chlorinated Pesticides	Weck Lab	ND	ND	ND	ND
515.4	Chlorinated Acids	Weck Lab	ND	ND	ND	ND
522	1.4-Dioxane in drinking water	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
524M-TCP	123TCP & EDB	OCWD	ND	ND	ND	ND
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	ND	ND	ND
531.2	Carbamates	OCWD	ND	ND	ND	ND
533	PFAS Compounds	OCWD	ND	ND	ND	ND
537.1	PFAS Compounds	OCWD	ND	ND	ND	ND
547	Glyphosate	OCWD	ND	ND	ND	ND
548.1	Endothall	Weck Lab	ND	ND	ND	ND
549.2	Diquat and Paraquat	OCWD	ND	ND	ND	ND
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND - Detections	ND - Detections	ND - Detections	ND - Detections
552.2	Disinfection Byproducts (DBPs) - Haloacetic Acids	OCWD	ND	ND	ND	ND
556	Determination of Carbonyl Compounds	Weck Lab	ND < NL	ND < NL	ND < NL	ND < NL
625.1	Semi-Volatile Organic Compounds, including Priority Pollutants	Weck Lab	ND	ND	ND	ND
8015B	Nonhalogenated Organics	Weck Lab	ND	ND	ND	ND
8270C	Semivolatile Organics	Weck Lab	ND	ND	ND	ND
8330A	Nitroaromatics and Nitramines	Weck Lab	ND	ND	ND	ND
CEC	Chemicals of Emerging Concern	OCWD	ND	ND	ND	ND
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND < NL	ND < NL	ND

GWRS-FPW
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/10/2024	9:25	Chloroform (CHCl3)	TR	ug/L	0.5
1/10/2024	9:25	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/10/2024	9:25	Bromochloroacetonitrile (BCAN)	0.1	ug/L	0.1
1/10/2024	9:25	Dichloroacetonitrile (DCAN)	0.2	ug/L	0.1

METHOD: 556

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/10/2024	9:25	Formaldehyde (FORALD)	13	ug/L	2

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/3/2024	10:10	Bromodichloromethane (CHBrCl)	1.6	ug/L	0.5
4/3/2024	10:10	Chloroform (CHCl3)	4	ug/L	0.5
4/3/2024	10:10	Total Trihalomethanes (TTHMs)	5.6	ug/L	0.5

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/3/2024	10:10	Bromochloroacetonitrile (BCAN)	0.4	ug/L	0.1
4/3/2024	10:10	Dichloroacetonitrile (DCAN)	0.9	ug/L	0.1

METHOD: 556

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/3/2024	10:10	Formaldehyde (FORALD)	14	ug/L	2

GWRS-FPW
Organic Detections by Method

Year 2024, Quarter 2

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/31/2024	5:55	N-Nitrosodimethylamine (NDMA)	2.4	ng/L	2

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/10/2024	9:10	Bromodichloromethane (CHBrCl)	1.7	ug/L	0.5
7/10/2024	9:10	Chloroform (CHCl3)	2.4	ug/L	0.5
7/10/2024	9:10	Dibromochloromethane (CHBr2C)	TR	ug/L	0.5
7/10/2024	9:10	Total Trihalomethanes (TTHMs)	4.2	ug/L	0.5

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/10/2024	9:10	Bromochloroacetonitrile (BCAN)	0.3	ug/L	0.1
7/10/2024	9:10	Dichloroacetonitrile (DCAN)	0.6	ug/L	0.1

METHOD: 556

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/10/2024	9:10	Formaldehyde (FORALD)	14	ug/L	2

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
9/20/2024	5:25	N-Nitrosodimethylamine (NDMA)	2.4	ng/L	2

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/2/2024	9:40	Bromodichloromethane (CHBrCl)	2.4	ug/L	0.5
10/2/2024	9:40	Chloroform (CHCl3)	4.1	ug/L	0.5
10/2/2024	9:40	Dibromochloromethane (CHBr2C)	TR	ug/L	0.5

GWRS-FPW
Organic Detections by Method

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/2/2024	9:40	Total Trihalomethanes (TTHMs)	6.5	ug/L	0.5

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/2/2024	9:40	1,1-Dichloro-2-propanone (11DC2P)	0.1	ug/L	0.1
10/2/2024	9:40	Bromochloroacetonitrile (BCAN)	1	ug/L	0.1
10/2/2024	9:40	Dichloroacetonitrile (DCAN)	1.2	ug/L	0.1

METHOD: 556

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/2/2024	9:40	Formaldehyde (FORALD)	11	ug/L	2

Appendix B

Laboratory Methods of Analysis

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

Laboratory Method: 14DIOX

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
1,2,3-Trichloropropane (123TCP)	0.005	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.01	ug/L
1,2-Dibromoethane (EDB)	0.005	ug/L
1,4-Dioxane (14DIOX)	0.5	ug/L
2-Chloroethylvinyl ether (2ClEVE)	1	ug/L
Methylisothiocyanate (MITC)	0.05	ug/L

Laboratory Method: 1601

Laboratory: CEL ANALYTICAL INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Bacteriophage, Male Specific (BACTMLSP)	0	P/A PERL
Bacteriophage, Somatic (BACTSOMT)	0	P/A PERL

Laboratory Method: 1613B

Laboratory: EUROFINS SACRAMENTO

Constituent Name & Abbreviation	Reporting Limit Range	Units
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	4.7 - 5.2	pg/L

Laboratory Method: 2120B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Apparent Color (unfiltered) (APCOLR)	3 - 6	UNITS
True Color (filtered) (TRCOLR)	3	UNITS

ORANGE COUNTY WATER DISTRICT
LABORATORY METHODS OF ANALYSES FOR 2024

Laboratory Method: 2130B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Turbidity (TURB)	0.1	NTU

Laboratory Method: 2150B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Odor Range High (ODORHI)	0	TON
Odor Range Low (ODORLO)	0	TON
Threshold Odor Number (Median) (ODOR)	0	TON

Laboratory Method: 2320B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Alkalinity-Phenolphthalein (ALKPHE)	1	mg/L
Bicarbonate (as CaCO3) (HCO3Ca)	1	mg/L
Bicarbonate (as HCO3) (HCO3)	1.2	mg/L
Carbonate (as CaCO3) (CO3Ca)	1	mg/L
Carbonate (as CO3) (CO3)	0.6	mg/L
Hydroxide (as CaCO3) (OHCa)	1	mg/L
Hydroxide (as OH) (OH)	0.3	mg/L
Total Alkalinity (as CaCO3) (TOTALK)	1 - 5	mg/L

Laboratory Method: 2330B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Corrosivity (CORROS)	-100	S.I.

Laboratory Method: 2510B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Electrical Conductivity (EC)	1	uS/cm

Laboratory Method: 2540C

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Dissolved Solids (TDS)	2.5	mg/L

Laboratory Method: 2540D

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Suspended Solids (SUSSOL)	2.5	mg/L

Laboratory Method: 300.1B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Bromate (BrO3)	5	ug/L
Bromide (Br)	0.01 - 0.10	mg/L
Chlorate (CLO3)	10	ug/L
Chlorite (CLO2)	10	ug/L

Laboratory Method: 332.0

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Perchlorate (CLO4)	1	ug/L

Laboratory Method: 350.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Ammonia Nitrogen (NH3-N)	0.1 - 1	mg/L
Total Inorganic Nitrogen (TIN)	0.1	mg/L

Laboratory Method: 365.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Phosphate Phosphorus (orthophosphate) (PO4-P)	0.01 - 0.02	mg/L

Laboratory Method: 4500CLF

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Free Chlorine (FRCL2)	0.1 - 0.2	mg/L
Total Chlorine (TOTCL2)	0.1 - 0.2	mg/L

Laboratory Method: 4500H+B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
pH (pH)	1	UNITS
Temperature (Laboratory) (TEMP)	1	C

Laboratory Method: 4500H2O2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Hydrogen Peroxide (H2O2)	0.1 - 0.2	mg/L

Laboratory Method: 4500NO3F

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Nitrate (NO3)	0.4	mg/L
Nitrate Nitrogen (NO3-N)	0.1 - 2.0	mg/L
Nitrite Nitrogen (NO2-N)	0.002 - 0.04	mg/L

Laboratory Method: 4500SIOC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Silica (SIO2)	1	mg/L

Laboratory Method: 504.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
1,2,3-Trichloropropane (123TCP)	0.05	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.01	ug/L
1,2-Dibromoethane (EDB)	0.01	ug/L

Laboratory Method: 508.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
4,4'-DDD (DDD)	0.01	ug/L
4,4'-DDE (DDE)	0.01	ug/L
4,4'-DDT (DDT)	0.01	ug/L
Aldrin (ALDRIN)	0.01	ug/L
Chlordane (ClDANE)	0.1	ug/L
Chlorothalonil (CLTNIL)	0.05	ug/L
Dieldrin (DIELDR)	0.01	ug/L

Laboratory Method: 508.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Endosulfan I (ENDOI)	0.01	ug/L
Endosulfan II (ENDOII)	0.01	ug/L
Endosulfan sulfate (ENDOSL)	0.01	ug/L
Endrin (ENDRIN)	0.01	ug/L
Endrin Aldehyde (ENDR-A)	0.01	ug/L
HCH-alpha (Alpha-BHC) (BHCa)	0.01	ug/L
HCH-beta (Beta-BHC) (BHCb)	0.01	ug/L
HCH-delta (Delta-BHC) (BHCd)	0.01	ug/L
HCH-gamma (Lindane) (LINDNE)	0.01	ug/L
Heptachlor (HEPTA)	0.01	ug/L
Heptachlor epoxide (HEPEPX)	0.01	ug/L
Hexachlorobenzene (HEXCLB)	0.05	ug/L
Hexachlorocyclopentadiene (HClCPD)	0.2	ug/L
Methoxychlor (METHOX)	0.01	ug/L
PCB-1016 (PCB16)	0.1 - 0.5	ug/L
PCB-1221 (PCB21)	0.1 - 0.5	ug/L
PCB-1232 (PCB32)	0.1 - 0.5	ug/L
PCB-1242 (PCB42)	0.1 - 0.5	ug/L
PCB-1248 (PCB48)	0.1 - 0.5	ug/L
PCB-1254 (PCB54)	0.1 - 0.5	ug/L
PCB-1260 (PCB60)	0.1 - 0.5	ug/L
PCBs, Total (TOTPCB)	0.5	ug/L
Propachlor (PROPCL)	0.2	ug/L
Toxaphene Mixture (TOXA)	1	ug/L
Trifluralin (TRFLRN)	0.01	ug/L

Laboratory Method: 515.4

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
2,4,5-T (245T)	0.2	ug/L
2,4,5-TP (Silvex) (245TP)	0.2	ug/L

Laboratory Method: 515.4

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
2,4-DB (24DB)	2	ug/L
2,4-Dichlorophenoxyacetic Acid (24D)	0.4	ug/L
3,5-Dichlorobenzoic Acid (35DBA)	1	ug/L
Acifluorfen (ACIFEN)	0.4	ug/L
Bentazon (BENTAZ)	2	ug/L
Dalapon (DALAPN)	0.4	ug/L
DCPA-Dacthal (DCPA)	0.1	ug/L
Dicamba (DICAMB)	0.6	ug/L
Dichlorprop (24DP)	0.3	ug/L
Dinoseb (DINOSB)	0.4	ug/L
Pentachlorophenol (PCP) (PCP)	0.2	ug/L
Picloram (PICLOR)	0.6	ug/L

Laboratory Method: 5210B

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Biochemical Oxygen Demand (BOD)	2	mg/L

Laboratory Method: 522

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
1,4-Dioxane (14DIOX)	0.07	ug/L

Laboratory Method: 524.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
1,1,1,2-Tetrachloroethane (1112PC)	0.5	ug/L
1,1,1-Trichloroethane (111TCA)	0.5	ug/L
1,1,2,2-Tetrachloroethane (1122PC)	0.5	ug/L
1,1,2-Trichloroethane (112TCA)	0.5	ug/L
1,1-Dichloroethane (11DCA)	0.5	ug/L
1,1-Dichloroethene (11DCE)	0.5	ug/L
1,1-Dichloropropene (11DCP)	0.5	ug/L
1,2,3-Trichlorobenzene (123TCB)	0.5	ug/L
1,2,3-Trichloropropane (123TCP)	0.5	ug/L
1,2,4-Trichlorobenzene (124TCB)	0.5	ug/L
1,2,4-Trimethylbenzene (124TMB)	0.5	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.5	ug/L
1,2-Dibromoethane (EDB)	0.5	ug/L
1,2-Dichlorobenzene (12DCB)	0.5	ug/L
1,2-Dichloroethane (12DCA)	0.5	ug/L
1,2-Dichloropropane (12DCP)	0.5	ug/L
1,3,5-Trimethylbenzene (135TMB)	0.5	ug/L
1,3-Dichlorobenzene (13DCB)	0.5	ug/L
1,3-Dichloropropane (13DCP)	0.5	ug/L
1,4-Dichlorobenzene (14DCB)	0.5	ug/L
2,2-Dichloropropane (22DCP)	0.5	ug/L
2-Chlorotoluene (2CLTOL)	0.5	ug/L
4-Chlorotoluene (4CLTOL)	0.5	ug/L
4-Isopropyltoluene (4IPTOL)	0.5	ug/L
Acetone (ACETNE)	10	ug/L
Acrolein (ACROLN)	5	ug/L
Acrylonitrile (ACRYLO)	2	ug/L
Benzene (BENZ)	0.5	ug/L
bis (2-chloroethyl) ether (B2CLEE)	2.5	ug/L
Bromobenzene (BRBENZ)	0.5	ug/L
Bromochloromethane (CH2BrC)	0.5	ug/L
Bromodichloromethane (CHBrCl)	0.5	ug/L
Bromoform (CHBr3)	0.5	ug/L
Bromomethane (CH3Br)	0.5	ug/L

ORANGE COUNTY WATER DISTRICT
LABORATORY METHODS OF ANALYSES FOR 2024

Laboratory Method: 524.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Carbon Disulfide (CS2)	0.5	ug/L
Carbon tetrachloride (CCl4)	0.5	ug/L
Chlorobenzene (CLBENZ)	0.5	ug/L
Chlorodifluoromethane (FREN22)	0.5	ug/L
Chloroethane (ClETHA)	0.5	ug/L
Chloroform (CHCl3)	0.5	ug/L
Chloromethane (CH3Cl)	0.5	ug/L
cis-1,2-Dichloroethene (c12DCE)	0.5	ug/L
cis-1,3-Dichloropropene (c13DCP)	0.5	ug/L
Dibromochloromethane (CHBr2C)	0.5	ug/L
Dibromomethane (CH2Br2)	0.5	ug/L
Dichlorodifluoromethane (CCl2F2)	0.5	ug/L
Diisopropyl ether (DIPE)	1	ug/L
Ethyl tert-butyl ether (ETBE)	1	ug/L
Ethylbenzene (EtBENZ)	0.5	ug/L
Freon 123a (FR123A)	0.5 - 2	ug/L
Hexachlorobutadiene (HClBut)	0.5	ug/L
Isopropylbenzene (ISPBNZ)	0.5	ug/L
m,p-Xylene (mp-XYL)	0.5	ug/L
Methyl Ethyl Ketone (MEK) (MEK)	2.5	ug/L
Methyl Isobutyl Ketone (MIBK) (MIBK)	2.5	ug/L
Methyl tert-butyl ether (MTBE)	0.2	ug/L
Methylene Chloride (CH2Cl2)	0.5	ug/L
Naphthalene (NAP)	0.5	ug/L
n-Butylbenzene (nBBENZ)	0.5	ug/L
o-Xylene (o-XYL)	0.5	ug/L
Propylbenzene (PRPBNZ)	0.5	ug/L
sec-Butylbenzene (sBBENZ)	0.5	ug/L
Styrene (STYR)	0.5	ug/L
Tert-amyl methyl ether (TAME)	1	ug/L
tert-butyl alcohol (TBA)	2	ug/L
tert-Butylbenzene (tBBENZ)	0.5	ug/L
Tetrachloroethene (PCE)	0.5	ug/L
Toluene (TOLU)	0.5	ug/L

Laboratory Method: 524.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total 1,3-Dichloropropene (x13DCP)	0.5	ug/L
Total Trihalomethanes (TTHMs)	0.5	ug/L
Total Xylenes (m,p,&o) (TOTALX)	0.5	ug/L
trans-1,2 Dichloroethene (t12DCE)	0.5	ug/L
trans-1,3-Dichloropropene (t13DCP)	0.5	ug/L
Trichloroethene (TCE)	0.5	ug/L
Trichlorofluoromethane (Freon 11) (CCl3F)	0.5	ug/L
Trichlorotrifluoroethane (Freon 113) (Cl3F3E)	0.5	ug/L
Vinyl chloride (VNYLCL)	0.5	ug/L

Laboratory Method: 524M-TCP

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
1,2,3-Trichloropropane (123TCP)	0.005	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.01	ug/L
1,2-Dibromoethane (EDB)	0.005	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
2,4-Dinitrotoluene (24DNT)	0.1	ug/L
2,6-Dinitrotoluene (26DNT)	0.1	ug/L
4,4'-DDD (DDD)	0.1	ug/L
4,4'-DDE (DDE)	0.1	ug/L
4,4'-DDT (DDT)	0.1	ug/L
Acenaphthene (ACNAPE)	0.1	ug/L
Acenaphthylene (ACENAP)	0.1	ug/L
Acetochlor (ACETOC)	0.1	ug/L
Alachlor (ALACHL)	0.1	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Aldrin (ALDRIN)	0.1	ug/L
Ametryn (AMERYN)	0.1	ug/L
Anthracene (ANTHRA)	0.1	ug/L
Atrazine (ATRAZ)	0.1	ug/L
Benzo(a)anthracene (BaANTH)	0.1	ug/L
Benzo(a)pyrene (BaPYRE)	0.1	ug/L
Benzo(b)fluoranthene (BbFLUR)	0.1	ug/L
Benzo(g,h,i)perylene (BghiPR)	0.1	ug/L
Benzo[k]fluoranthene (BkFLUR)	0.1	ug/L
bis (2-ethylhexyl) adipate (DEHA)	2	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	2	ug/L
Bromacil (BROMAC)	0.1	ug/L
Butachlor (BUTACL)	0.1	ug/L
Butylate (BTYATE)	0.1	ug/L
Butylbenzyl phthalate (BBP)	2	ug/L
Caffeine (CAFFEI)	100	ng/L
Captan (CAPTAN)	0.1	ug/L
Chlordane-alpha (CLDA)	0.1	ug/L
Chlordane-gamma (CLDG)	0.1	ug/L
Chlorobenzilate (CLBZLA)	0.1	ug/L
Chloroneb (CLNEB)	0.1	ug/L
Chlorothalonil (CLTNIL)	0.1	ug/L
Chlorpropham (CPRPHM)	0.1	ug/L
Chlorpyrifos (ClPYRI)	0.1	ug/L
Chrysene (CHRYS)	0.1	ug/L
DCPA-Dacthal (DCPA)	0.1	ug/L
Diazinon (DIAZI)	0.1	ug/L
Dibenzo(a,h)anthracene (DBahAN)	0.1	ug/L
Dichlorvos (DCLVOS)	0.1	ug/L
Dieldrin (DIELDR)	0.1	ug/L
Diethyl phthalate (DEP)	2	ug/L
Dimethoate (DMTH)	1	ug/L
Dimethyl phthalate (DMP)	2	ug/L
Di-n-butylphthalate (DnBP)	2	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Di-n-octyl phthalate (DnOP)	2	ug/L
Diphenamid (DPHNMD)	0.1	ug/L
Endosulfan I (ENDOI)	0.1	ug/L
Endosulfan II (ENDOII)	0.1	ug/L
Endosulfan sulfate (ENDOSL)	0.1	ug/L
Endrin (ENDRIN)	0.1	ug/L
Endrin Aldehyde (ENDR-A)	0.1	ug/L
EPTC (EPTC)	0.1	ug/L
Ethion (ETHION)	0.1	ug/L
Ethoprop (ETHPRP)	0.1	ug/L
Etridiazole (ETRDZL)	0.1	ug/L
Fluoranthene (FLANTH)	0.1	ug/L
Fluorene (FLUOR)	0.1	ug/L
HCH-alpha (Alpha-BHC) (BHCa)	0.1	ug/L
HCH-beta (Beta-BHC) (BHCb)	0.1	ug/L
HCH-delta (Delta-BHC) (BHCd)	0.1	ug/L
HCH-gamma (Lindane) (LINDNE)	0.1	ug/L
Heptachlor (HEPTA)	0.1	ug/L
Heptachlor epoxide (HEPEPX)	0.1	ug/L
Hexachlorobenzene (HEXCLB)	0.1	ug/L
Hexachlorocyclopentadiene (HClCPD)	0.1	ug/L
Hexazinone (HEXZON)	0.1	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	0.1	ug/L
Isophorone (IPHOR)	0.1	ug/L
Malathion (MALATH)	2	ug/L
Methoxychlor (METHOX)	0.1	ug/L
methyl-Parathion (MPARA)	0.5	ug/L
Metolachlor (METOCL)	0.1	ug/L
Metribuzin (MTRBZN)	0.1	ug/L
Molinate (MOLINT)	0.1	ug/L
Naphthalene (NAP)	0.1	ug/L
Norflurazon (NORFLR)	1	ug/L
Parathion (PARA)	0.5	ug/L
Pentachlorophenol (PCP) (PCP)	1	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Permethrin-(total of cis/trans) (PMTHRN)	0.1	ug/L
Phenanthrene (PHENAN)	0.1	ug/L
Prometryn (PROMET)	0.1	ug/L
Pronamide (PROAMD)	0.1	ug/L
Propachlor (PROPCL)	0.1	ug/L
Propazine (PROPAZ)	0.1	ug/L
Pyrene (PYRENE)	0.1	ug/L
Simazine (SIMAZ)	0.1	ug/L
Tebuthiuron (TBTURN)	2	ug/L
Terbacil (TRBACL)	0.1	ug/L
Terbufos Sulfone (TERSUL)	0.1	ug/L
Thiobencarb (THIO)	0.1	ug/L
Trifluralin (TRFLRN)	0.1	ug/L
Trithion (TRTION)	0.1	ug/L

Laboratory Method: 531.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
1-Naphthol (NPTHOL)	5	ug/L
3-Hydroxycarbofuran (HYDCFR)	2	ug/L
Aldicarb (ALDI)	1	ug/L
Aldicarb sulfone (ALDISN)	2	ug/L
Aldicarb sulfoxide (ALDISX)	2	ug/L
Baygon (BAYGON)	1	ug/L
Carbaryl (CARBAR)	2	ug/L
Carbofuran (CARBOF)	1	ug/L
Methiocarb (MTHCRB)	4	ug/L
Methomyl (MTHOMY)	1	ug/L
Oxamyl (OXAMYL)	2	ug/L

Laboratory Method: 5310C

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Dissolved Organic Carbon (DOC)	0.05	mg/L
Total Organic Carbon (Unfiltered) (TOC)	0.05	mg/L

Laboratory Method: 533

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
11-chloroeicosafluoro-3-oxaundecane-1sulfonic acid (11CLPF)	2	ng/L
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2	ng/L
4:2 Fluorotelomer sulfonate (4:2FTS)	2	ng/L
6:2 Fluorotelomer sulfonate (6:2FTS)	2	ng/L
8:2 Fluorotelomer sulfonate (8:2FTS)	2	ng/L
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CLPF3)	2	ng/L
Hexafluoropropylene oxide dimer acid (GenX) (HFPODA)	2	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	2	ng/L
Perfluoro butane sulfonic acid (PFBS)	2	ng/L
Perfluoro heptanoic acid (PFHpA)	2	ng/L
Perfluoro hexane sulfonic acid (PFHxS)	2	ng/L
Perfluoro nonanoic acid (PFNA)	2	ng/L
Perfluoro octane sulfonic acid (PFOS)	2	ng/L
Perfluoro octanoic acid (PFOA)	2	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	2	ng/L
Perfluoro-3-methoxypropanoic acid (PFMPA)	2	ng/L
Perfluoro-4-methoxybutanoic acid (PFMBA)	2	ng/L
Perfluorobutanoic acid (PFBA)	2	ng/L
Perfluorodecanoic acid (PFDA)	2	ng/L
Perfluorododecanoic acid (PFDoA)	2	ng/L
Perfluoroheptanesulfonic Acid (PFHpS)	2	ng/L
Perfluorohexanoic acid (PFHxA)	2 - 10	ng/L
Perfluoropentanesulfonic acid (PFPeS)	2	ng/L
Perfluoropentanoic acid (PFPeA)	2 - 10	ng/L
Perfluoroundecanoic acid (PFUnA)	2	ng/L

Laboratory Method: 537.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
N-ethyl perfluorooctanesulfonamidoacetic acid (EtFOSA)	2	ng/L
N-methyl perfluorooctanesulfonamidoacetic acid (MeFOSA)	2	ng/L
Perfluorotetradecanoic acid (PFTA)	2	ng/L
Perfluorotridecanoic acid (PFTrDA)	2	ng/L

Laboratory Method: 547

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Glyphosate (GLYPHO)	25	ug/L

Laboratory Method: 548.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Endothall (ENDOTL)	45	ug/L

Laboratory Method: 549.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Diquat (DIQUAT)	4	ug/L
Paraquat (PARAQT)	4	ug/L

Laboratory Method: 551.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
1,1,1-Trichloropropanone (111TCP)	0.1	ug/L
1,1-Dichloro-2-propanone (11DC2P)	0.1	ug/L
Bromochloroacetonitrile (BCAN)	0.1	ug/L
Chloropicrin (ClPICR)	0.1	ug/L
Dibromoacetonitrile (DBAN)	0.1	ug/L
Dichloroacetonitrile (DCAN)	0.1	ug/L
Trichloroacetonitrile (TCAN)	0.1	ug/L

Laboratory Method: 552.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Bromochloroacetic Acid (BCAA)	1	ug/L
Bromodichloroacetic Acid (BDCAA)	1	ug/L
Chlorodibromoacetic Acid (CDBAA)	1	ug/L
Dalapon (DALAPN)	1	ug/L
Dibromoacetic Acid (DBAA)	1	ug/L
Dichloroacetic Acid (DCAA)	1	ug/L
Monobromoacetic Acid (MBAA)	1	ug/L
Monochloroacetic Acid (MCAA)	1	ug/L
Tribromoacetic Acid (TBAA)	1	ug/L
Trichloroacetic Acid (TCAA)	1	ug/L

Laboratory Method: 5540C

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Surfactants (MBAS)	0.02 - 0.04	mg/L

Laboratory Method: 556

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Acetaldehyde (ACEALD)	2	ug/L
Benzaldehyde (BENALD)	2	ug/L
Butanal (BUTAN)	2	ug/L
Crotonaldehyde (CRTALD)	2	ug/L
Cyclohexanone (CYCHXN)	2	ug/L
Decanal (DECNAL)	2	ug/L
Formaldehyde (FORALD)	2	ug/L
Glyoxal (GLYOXL)	2	ug/L
Heptanal (HEPNAL)	2	ug/L
Hexanal (HEXNAL)	2	ug/L
Methylglyoxal (MGLYOX)	2	ug/L
Nonanal (NONNAL)	2	ug/L
Pentanal (PENTNL)	2	ug/L
Propanal (PROPNL)	2	ug/L

Laboratory Method: 5910B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Ultraviolet (absorbance) (UVAB)	0.005	1/cm
Ultraviolet percent transmittance @254nm (UV%T-254)	0.1	%
UV Absorbance/TOC (unfiltered) ratio (UV/TOC)	0.0001	L/mg-cm

Laboratory Method: 625.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
1,2,4-Trichlorobenzene (124TCB)	1	ug/L
1,2-Dichlorobenzene (12DCB)	1	ug/L
1,2-Diphenylhydrazine (12DPH)	1	ug/L
1,3-Dichlorobenzene (13DCB)	1	ug/L

Laboratory Method: 625.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
1,4-Dichlorobenzene (14DCB)	1	ug/L
2,4,6-Trichlorophenol (246TCP)	1	ug/L
2,4-Dichlorophenol (24DCPH)	1	ug/L
2,4-Dimethylphenol (24DMP)	1	ug/L
2,4-Dinitrophenol (24DNP)	10	ug/L
2,4-Dinitrotoluene (24DNT)	1	ug/L
2,6-Dinitrotoluene (26DNT)	1	ug/L
2-Chloronaphthalene (2ClNAP)	1	ug/L
2-Chlorophenol (2ClPNL)	1	ug/L
2-Methyl-4,6-Dinitrophenol (2MDNP)	5	ug/L
2-Nitrophenol (2NPNL)	1	ug/L
3,3'-Dichlorobenzidine (DCBZDE)	5	ug/L
4-Bromophenyl phenyl ether (4BrPPE)	1	ug/L
4-Chloro-3-methylphenol (43CMP)	1	ug/L
4-Chlorophenyl phenyl ether (4ClPPE)	1	ug/L
4-Nitrophenol (4NPNL)	5	ug/L
Acenaphthene (ACNAPE)	1	ug/L
Acenaphthylene (ACENAP)	1	ug/L
Anthracene (ANTHRA)	1	ug/L
Benzidine (BNZDE)	10	ug/L
Benzo(a)anthracene (BaANTH)	1	ug/L
Benzo(a)pyrene (BaPYRE)	1	ug/L
Benzo(b)fluoranthene (BbFLUR)	1	ug/L
Benzo(g,h,i)perylene (BghiPR)	2	ug/L
Benzo[k]fluoranthene (BkFLUR)	1	ug/L
bis (2-chloroethoxy) methane (B2CEM)	1	ug/L
bis (2-chloroethyl) ether (B2CLEE)	1	ug/L
bis (2-chloroisopropyl) ether (B2CIPE)	1	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	5	ug/L
Butylbenzyl phthalate (BBP)	1	ug/L
Chrysene (CHRYS)	1	ug/L
Dibenzo(a,h)anthracene (DBahAN)	2	ug/L
Diethyl phthalate (DEP)	1	ug/L
Dimethyl phthalate (DMP)	1	ug/L

Laboratory Method: 625.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Di-n-butylphthalate (DnBP)	1	ug/L
Di-n-octyl phthalate (DnOP)	1	ug/L
Fluoranthene (FLANTH)	1	ug/L
Fluorene (FLUOR)	1	ug/L
Hexachlorobenzene (HEXCLB)	1	ug/L
Hexachlorobutadiene (HClBut)	1	ug/L
Hexachlorocyclopentadiene (HClCPD)	5	ug/L
Hexachloroethane (HCE)	1	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	2	ug/L
Isophorone (IPHOR)	1	ug/L
Naphthalene (NAP)	1	ug/L
Nitrobenzene (NBENZ)	1	ug/L
N-Nitrosodimethylamine (NDMA)	1,000	ng/L
N-Nitroso-di-n-propylamine (NDPA)	1,000	ng/L
N-Nitrosodiphenylamine (NDPhA)	1,000	ng/L
Pentachlorophenol (PCP) (PCP)	1	ug/L
Phenanthrene (PHENAN)	1	ug/L
Phenol (PHENOL)	1	ug/L
Pyrene (PYRENE)	1	ug/L

Laboratory Method: 7110C

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Alpha (TOTa)	1.08	pCi/L
Total Alpha Counting Error (TOTaCE)	1.08	pCi/L

Laboratory Method: 8015B

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Ethylene Glycol (GLYCOL)	10,000	ug/L

Laboratory Method: 8270C

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
1,2,4-Trichlorobenzene (124TCB)	1	ug/L
1,2-Dichlorobenzene (12DCB)	1	ug/L
1,2-Diphenylhydrazine (12DPH)	1	ug/L
1,3-Dichlorobenzene (13DCB)	1	ug/L
1,4-Dichlorobenzene (14DCB)	1	ug/L
2,4,5-Trichlorophenol (245TCP)	1	ug/L
2,4,6-Trichlorophenol (246TCP)	1	ug/L
2,4-Dichlorophenol (24DCPH)	1	ug/L
2,4-Dimethylphenol (24DMP)	1	ug/L
2,4-Dinitrophenol (24DNP)	10	ug/L
2,4-Dinitrotoluene (24DNT)	1	ug/L
2,6-Dinitrotoluene (26DNT)	1	ug/L
2-Chloronaphthalene (2ClNAP)	1	ug/L
2-Chlorophenol (2ClPNL)	1	ug/L
2-Methyl naphthalene (2MNAP)	1	ug/L
2-Methyl-4,6-Dinitrophenol (2MDNP)	5	ug/L
2-Methylphenol (oCRESL)	1	ug/L
2-Nitroaniline (oNTANL)	1	ug/L
2-Nitrophenol (2NPNL)	1	ug/L
3- & 4-Methylphenol (mpCRESL)	1	ug/L
3,3'-Dichlorobenzidine (DCBZDE)	5	ug/L
3-Nitroaniline (mNTANL)	1	ug/L
4-Bromophenyl phenyl ether (4BrPPE)	1	ug/L
4-Chloro-3-methylphenol (43CMP)	1	ug/L
4-Chloroaniline (pClANL)	1	ug/L
4-Chlorophenyl phenyl ether (4ClPPE)	1	ug/L

Laboratory Method: 8270C

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
4-Nitroaniline (pNTANL)	1	ug/L
4-Nitrophenol (4NPNL)	5	ug/L
Acenaphthene (ACNAPE)	1	ug/L
Acenaphthylene (ACENAP)	1	ug/L
Aniline (ANLN)	1	ug/L
Anthracene (ANTHRA)	1	ug/L
Benzidine (BNZDE)	10	ug/L
Benzo(a)anthracene (BaANTH)	1	ug/L
Benzo(a)pyrene (BaPYRE)	1	ug/L
Benzo(b)fluoranthene (BbFLUR)	1	ug/L
Benzo(g,h,i)perylene (BghiPR)	2	ug/L
Benzo[k]fluoranthene (BkFLUR)	1	ug/L
Benzoic Acid (BNZACD)	100	ug/L
Benzyl Alcohol (BNZALC)	1	ug/L
bis (2-chloroethoxy) methane (B2CEM)	1	ug/L
bis (2-chloroethyl) ether (B2CLEE)	1	ug/L
bis (2-chloroisopropyl) ether (B2CIPE)	1	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	5	ug/L
Butylbenzyl phthalate (BBP)	1	ug/L
Carbazole (CARBZL)	1	ug/L
Chrysene (CHRYS)	1	ug/L
Dibenzo(a,h)anthracene (DBahAN)	2	ug/L
Dibenzofuran (DBFUR)	1	ug/L
Diethyl phthalate (DEP)	1	ug/L
Dimethyl phthalate (DMP)	1	ug/L
Di-n-butylphthalate (DnBP)	1	ug/L
Di-n-octyl phthalate (DnOP)	1	ug/L
Fluoranthene (FLANTH)	1	ug/L
Fluorene (FLUOR)	1	ug/L
Hexachlorobenzene (HEXCLB)	1	ug/L
Hexachlorobutadiene (HClBut)	1	ug/L
Hexachlorocyclopentadiene (HClCPD)	5	ug/L
Hexachloroethane (HCE)	1	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	2	ug/L

Laboratory Method: 8270C

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Isophorone (IPHOR)	1	ug/L
Naphthalene (NAP)	1	ug/L
Nitrobenzene (NBENZ)	1	ug/L
N-Nitrosodimethylamine (NDMA)	1,000	ng/L
N-Nitroso-di-n-propylamine (NDPA)	1,000	ng/L
N-Nitrosodiphenylamine (NDPhA)	1,000	ng/L
Pentachlorophenol (PCP) (PCP)	1	ug/L
Phenanthrene (PHENAN)	1	ug/L
Phenol (PHENOL)	1	ug/L
Pyrene (PYRENE)	1	ug/L
Pyridine (PYRDN)	5	ug/L

Laboratory Method: 8330A

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
2,4,6-Trinitrotoluene (246TNT)	1	ug/L
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	1	ug/L

Laboratory Method: 900.0

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Total Beta (TOTb)	0.151 - 1.340	pCi/L
Total Beta Counting Error (TOTbCE)	0.151 - 1.340	pCi/L

Laboratory Method: 903.0

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Radium 226 (TRa226)	0.41	pCi/L
Total Radium 226 Counting Error (TRa6CE)	0.41	pCi/L

Laboratory Method: 903.0MOD

Laboratory: EBERLINE ANALYTICAL

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Radium 226 (TRa226)	0.247 - 0.676	pCi/L
Total Radium 226 Counting Error (TRa6CE)	0.247 - 0.676	pCi/L

Laboratory Method: 905.0MOD

Laboratory: EBERLINE ANALYTICAL

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Strontium-90 (TS90)	0.525 - 1.37	pCi/L
Total Strontium-90 Counting Error (TS90CE)	0.525 - 1.37	pCi/L

Laboratory Method: 906.0

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Tritium (TTr)	434	pCi/L
Total Tritium Counting Error (TTrCE)	434	pCi/L

Laboratory Method: 9223B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
E. Coli (Colilert - MPN/100mL) (ECOLIQ)	1 - 3400	MPN
Total Coliform (Colilert - MPN/100mL) (TCOLIQ)	1 - 3400	MPN

Laboratory Method: BIOASCEC

Laboratory: BIODETECTION SYSTEMS-AMSTERDAM

Constituent Name & Abbreviation	Reporting Limit Range	Units
Aryl Hydrocarbon Receptor as TCDD (AhRTCDD)	0.5	ng/L
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	0.5	ng/L

Laboratory Method: CALC

Laboratory: COMBINED EBERLINE AND FGL DATA

Constituent Name & Abbreviation	Reporting Limit Range	Units
Radium 226 + Radium 228 (Ra6Ra8)	0.247 - 0.676	pCi/L
Radium 226 + Radium 228 Counting Error (Ra68CE)	0.247 - 0.676	pCi/L

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Gross Alpha Excluding Uranium (TOTa-U)	1.08	pCi/L
Radium 226 + Radium 228 (Ra6Ra8)	0.41	pCi/L
Radium 226 + Radium 228 Counting Error (Ra68CE)	0.41	pCi/L

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Aggressive Index (AI)		A.I.
Bicarbonate (as HCO3) (HCO3)	1.2	mg/L
Cation-Anion meq balance (CATANI)		RATIO
Nitrate (NO3)	0.4 - 8.9	mg/L

Laboratory Method: CALC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Nitrate + Nitrite Nitrogen (NO3NO2-N)	0.1 - 2.0	mg/L
Nitrite (NO2)	0.007 - 0.131	mg/L
Sum of five Haloacetic Acids (HAA5)	1	ug/L
Sum of nine Haloacetic Acids (HAA9)	1	ug/L
Sum of Six Brominated Haloacetic Acids (HAA6Br)	1	ug/L
Title 22 Cation-Anion Balance (T22CAB)		meq/L
Title 22 Total Anions (T22ANI)		meq/L
Title 22 Total Cations (T22CAT)		meq/L
Total Anions (TOTANI)		meq/L
Total Cations (TOTCAT)		meq/L
Total Nitrogen (TOT-N)	0.2 - 2.0	mg/L
Trivalent Chromium (CrIII)	1	ug/L

Laboratory Method: CEC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
17a-Estradiol (aESTRA)	1	ng/L
17a-Ethynylestradiol (aETEST)	2	ng/L
17b-Estradiol (bESTRA)	2	ng/L
4-Androstene-3,17-dione (ANDROS)	2	ng/L
4-n-Octylphenol (4nOCPH)	0.2	ug/L
4-tert-Octylphenol (4tOCPH)	0.2	ug/L
Acetaminophen (ACTMNP)	5	ng/L
Aspartame (ASPATM)	100	ng/L
Atenolol (ATENOL)	5	ng/L
Atrazine (ATRAZ)	0.001	ug/L
Bisphenol A (BisPHA)	0.2	ug/L
Caffeine (CAFFEI)	3 - 30	ng/L
Carbamazepine (CBMAZP)	1	ng/L
Diclofenac (DICLFN)	5	ng/L
Diethylstilbestrol (DESTBL)	2	ng/L

Laboratory Method: CEC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Dilantin (DILANT)	10	ng/L
Diuron (DIURON)	0.005	ug/L
Epitestosterone (cis-Testosterone) (EPITES)	1	ng/L
Equilin (EQUILN)	5	ng/L
Erythromycin (ERYTHN)	1	ng/L
Estriol (ESTRIO)	2	ng/L
Estrone (ESTRON)	1	ng/L
Fluoxetine (FLUXET)	5	ng/L
Gemfibrozil (GMFIBZ)	1	ng/L
Ibuprofen (IBPRFN)	1	ng/L
Imidacloprid (IMIDCP)	1	ng/L
Iohexol (IOHEXL)	20 - 1,000	ng/L
Iopromide (IOPRMD)	10	ng/L
Linuron (LINURN)	0.005	ug/L
Meprobamate (MEPROB)	5	ng/L
N,N-diethyl-m-toluamide (DEET)	1 - 5	ng/L
Naproxen (NAPRXN)	5 - 50	ng/L
Neotame (NEOTAM)	10	ng/L
Nonylphenol (NONYPH)	0.2	ug/L
Oxybenzone (BP3)	1	ng/L
Pentachlorophenol (PCP) (PCP)	0.2	ug/L
PhenylPhenol (PHNYPH)	0.2	ug/L
Primidone (PRIMDN)	1	ng/L
Progesterone (PRGSTR)	1	ng/L
Simazine (SIMAZ)	0.005	ug/L
Sucralose (SUCRAL)	100 - 1,000	ng/L
Sulfamethoxazole (SULTHZ)	1 - 10	ng/L
Testosterone (trans-Testosterone) (TESTOR)	1	ng/L
Tetrabromobisphenol A (TBBISA)	0.2	ug/L
Triclosan (TRICLN)	1	ng/L
Trimethoprim (TRIMTP)	5	ng/L
Tris-2-chloroethyl phosphate (TCEP)	5	ng/L

Laboratory Method: NDMA-LOW

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
N-Nitrosodiethylamine (NDEA)	2 - 10	ng/L
N-Nitrosodimethylamine (NDMA)	2 - 10	ng/L
N-Nitroso-di-n-propylamine (NDPA)	2 - 10	ng/L
N-Nitrosomorpholine (NMOR)	2 - 10	ng/L

Laboratory Method: RA-05

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Total Radium 228 (TRa228)	0.0491 - 0.0514	pCi/L
Total Radium 228 Counting Error (TRa8CE)	0.0491 - 0.0514	pCi/L

Laboratory Method: X1-218.6

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Hexavalent Chromium (CrVI)	0.1 - 0.2	ug/L

Laboratory Method: X1-218.7

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Hexavalent Chromium (CrVI)	0.1 - 0.4	ug/L

Laboratory Method: X1-300.0

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Bromide (Br)	0.01	mg/L
Chloride (Cl)	0.5 - 2.5	mg/L
Fluoride (F)	0.1	mg/L
Nitrate (NO3)	0.4	mg/L
Nitrate Nitrogen (NO3-N)	0.1	mg/L
Sulfate (SO4)	0.3 - 2.5	mg/L

Laboratory Method: X1-335.4

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Cyanide (CN)	5	ug/L

Laboratory Method: X1-351.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Organic Nitrogen (ORG-N)	0.1	mg/L
Total Kjeldahl Nitrogen (TKN)	0.2 - 2.0	mg/L

Laboratory Method: X200.7

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Boron (B)	0.1	mg/L
Boron (dissolved) (B-DIS)	0.1	mg/L
Calcium (Ca)	0.5	mg/L
Calcium Hardness (CaHRD)	0.25 - 0.50	mg/L
Iron (Fe)	5 - 25	ug/L

Laboratory Method: X200.7

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Iron (dissolved) (Fe-DIS)	5	ug/L
Magnesium (Mg)	0.5	mg/L
Potassium (K)	0.5	mg/L
Sodium (Na)	0.5	mg/L
Total Hardness (as CaCO3) (TOTHRD)	1	mg/L

Laboratory Method: X200.8

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reporting Limit Range	Units
Natural Uranium (NTUr)	0.67	pCi/L

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reporting Limit Range	Units
Aluminum (Al)	5 - 10	ug/L
Aluminum (dissolved) (Al-DIS)	5	ug/L
Antimony (Sb)	1	ug/L
Antimony (dissolved) (Sb-DIS)	1	ug/L
Arsenic (As)	1	ug/L
Arsenic (dissolved) (As-DIS)	1	ug/L
Barium (Ba)	1 - 10	ug/L
Barium (dissolved) (Ba-DIS)	1	ug/L
Beryllium (Be)	1	ug/L
Beryllium (dissolved) (Be-DIS)	1	ug/L
Cadmium (Cd)	1	ug/L
Cadmium (dissolved) (Cd-DIS)	1	ug/L
Chromium (Cr)	1 - 2	ug/L
Chromium (dissolved) (Cr-DIS)	1	ug/L
Cobalt (Co)	1 - 2	ug/L
Cobalt (dissolved) (Co-DIS)	1	ug/L
Copper (Cu)	1 - 2	ug/L

ORANGE COUNTY WATER DISTRICT
LABORATORY METHODS OF ANALYSES FOR 2024

Laboratory Method: X200.8

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reporting Limit Range*	*Units*
Copper (dissolved) (Cu-DIS)	1	ug/L
Gadolinium (Gd)	10	ng/L
Lead (Pb)	1	ug/L
Lead (dissolved) (Pb-DIS)	1	ug/L
Manganese (Mn)	1 - 2	ug/L
Manganese (dissolved) (Mn-DIS)	1	ug/L
Mercury (Hg)	1	ug/L
Mercury (dissolved) (Hg-DIS)	1	ug/L
Molybdenum (Mo)	1	ug/L
Nickel (Ni)	1 - 2	ug/L
Nickel (dissolved) (Ni-DIS)	1	ug/L
Selenium (Se)	1	ug/L
Selenium (dissolved) (Se-DIS)	1	ug/L
Silver (Ag)	1	ug/L
Silver (dissolved) (Ag-DIS)	1	ug/L
Strontium (Sr)	1 - 10	ug/L
Thallium (Tl)	1	ug/L
Thallium (dissolved) (Tl-DIS)	1	ug/L
Uranium (U) (U)	1 - 10	ug/L
Vanadium (V)	1 - 2	ug/L
Vanadium (dissolved) (V-DIS)	1	ug/L
Zinc (Zn)	5	ug/L
Zinc (dissolved) (Zn-DIS)	5	ug/L

Appendix C

Water Quality Constituents
With Laboratory Methods

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: BIOLOGICAL

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Aryl Hydrocarbon Receptor as TCDD (AhRTCDD)	BIOASCEC	0.5	ng/L	BDS-AMST
Bacteriophage, Male Specific (BACTMLSP)	1601	0	P/A PERL	CELANASF
Bacteriophage, Somatic (BACTSOMT)	1601	0	P/A PERL	CELANASF
E. Coli (Colilert - MPN/100mL) (ECOLIQ)	9223B	1 - 3400	MPN	OCWD
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	BIOASCEC	0.5	ng/L	BDS-AMST
Total Coliform (Colilert - MPN/100mL) (TCOLIQ)	9223B	1 - 3400	MPN	OCWD

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Aggressive Index (AI)	CALC		A.I.	OCWD
Alkalinity-Phenolphthalein (ALKPHE)	2320B	1	mg/L	OCWD
Aluminum (Al)	X200.8	5 - 10	ug/L	OCWD
Aluminum (dissolved) (Al-DIS)	X200.8	5	ug/L	OCWD
Ammonia Nitrogen (NH3-N)	350.1	0.1 - 1	mg/L	OCWD
Antimony (Sb)	X200.8	1	ug/L	OCWD
Antimony (dissolved) (Sb-DIS)	X200.8	1	ug/L	OCWD
Apparent Color (unfiltered) (APCOLR)	2120B	3 - 6	UNITS	OCWD
Arsenic (As)	X200.8	1	ug/L	OCWD
Arsenic (dissolved) (As-DIS)	X200.8	1	ug/L	OCWD
Barium (Ba)	X200.8	1 - 10	ug/L	OCWD
Barium (dissolved) (Ba-DIS)	X200.8	1	ug/L	OCWD
Beryllium (Be)	X200.8	1	ug/L	OCWD
Beryllium (dissolved) (Be-DIS)	X200.8	1	ug/L	OCWD

Laboratory Abbreviation Descriptions:

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Bicarbonate (as CaCO3) (HCO3Ca)	2320B	1	mg/L	OCWD
Bicarbonate (as HCO3) (HCO3)	2320B	1.2	mg/L	OCWD
Bicarbonate (as HCO3) (HCO3)	CALC	1.2	mg/L	OCWD
Biochemical Oxygen Demand (BOD)	5210B	2	mg/L	WECKLAB
Boron (B)	X200.7	0.1	mg/L	OCWD
Boron (dissolved) (B-DIS)	X200.7	0.1	mg/L	OCWD
Bromate (BrO3)	300.1B	5	ug/L	OCWD
Bromide (Br)	300.1B	0.01 - 0.10	mg/L	OCWD
Bromide (Br)	X1-300.0	0.01	mg/L	OCWD
Cadmium (Cd)	X200.8	1	ug/L	OCWD
Cadmium (dissolved) (Cd-DIS)	X200.8	1	ug/L	OCWD
Calcium (Ca)	X200.7	0.5	mg/L	OCWD
Calcium Hardness (CaHRD)	X200.7	0.25 - 0.50	mg/L	OCWD
Carbonate (as CaCO3) (CO3Ca)	2320B	1	mg/L	OCWD
Carbonate (as CO3) (CO3)	2320B	0.6	mg/L	OCWD
Cation-Anion meq balance (CATANI)	CALC		RATIO	OCWD
Chlorate (CLO3)	300.1B	10	ug/L	OCWD
Chloride (Cl)	X1-300.0	0.5 - 2.5	mg/L	OCWD
Chlorite (CLO2)	300.1B	10	ug/L	OCWD
Chromium (Cr)	X200.8	1 - 2	ug/L	OCWD
Chromium (dissolved) (Cr-DIS)	X200.8	1	ug/L	OCWD
Cobalt (Co)	X200.8	1 - 2	ug/L	OCWD
Cobalt (dissolved) (Co-DIS)	X200.8	1	ug/L	OCWD
Copper (Cu)	X200.8	1 - 2	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Copper (dissolved) (Cu-DIS)	X200.8	1	ug/L	OCWD
Corrosivity (CORROS)	2330B	-100	S.I.	OCWD
Cyanide (CN)	X1-335.4	5	ug/L	OCWD
Electrical Conductivity (EC)	2510B	1	uS/cm	OCWD
Fluoride (F)	X1-300.0	0.1	mg/L	OCWD
Free Chlorine (FRCL2)	4500CLF	0.1 - 0.2	mg/L	OCWD
Gadolinium (Gd)	X200.8	10	ng/L	OCWD
Hexavalent Chromium (CrVI)	X1-218.6	0.1 - 0.2	ug/L	OCWD
Hexavalent Chromium (CrVI)	X1-218.7	0.1 - 0.4	ug/L	OCWD
Hydrogen Peroxide (H2O2)	4500H2O2	0.1 - 0.2	mg/L	OCWD
Hydroxide (as CaCO3) (OHCa)	2320B	1	mg/L	OCWD
Hydroxide (as OH) (OH)	2320B	0.3	mg/L	OCWD
Iron (Fe)	X200.7	5 - 25	ug/L	OCWD
Iron (dissolved) (Fe-DIS)	X200.7	5	ug/L	OCWD
Lead (Pb)	X200.8	1	ug/L	OCWD
Lead (dissolved) (Pb-DIS)	X200.8	1	ug/L	OCWD
Magnesium (Mg)	X200.7	0.5	mg/L	OCWD
Manganese (Mn)	X200.8	1 - 2	ug/L	OCWD
Manganese (dissolved) (Mn-DIS)	X200.8	1	ug/L	OCWD
Mercury (Hg)	X200.8	1	ug/L	OCWD
Mercury (dissolved) (Hg-DIS)	X200.8	1	ug/L	OCWD
Molybdenum (Mo)	X200.8	1	ug/L	OCWD
Nickel (Ni)	X200.8	1 - 2	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Nickel (dissolved) (Ni-DIS)	X200.8	1	ug/L	OCWD
Nitrate (NO3)	4500NO3F	0.4	mg/L	OCWD
Nitrate (NO3)	CALC	0.4 - 8.9	mg/L	OCWD
Nitrate (NO3)	X1-300.0	0.4	mg/L	OCWD
Nitrate + Nitrite Nitrogen (NO3NO2-N)	CALC	0.1 - 2.0	mg/L	OCWD
Nitrate Nitrogen (NO3-N)	4500NO3F	0.1 - 2.0	mg/L	OCWD
Nitrate Nitrogen (NO3-N)	X1-300.0	0.1	mg/L	OCWD
Nitrite (NO2)	CALC	0.007 - 0.131	mg/L	OCWD
Nitrite Nitrogen (NO2-N)	4500NO3F	0.002 - 0.04	mg/L	OCWD
Odor Range High (ODORHI)	2150B	0	TON	OCWD
Odor Range Low (ODORLO)	2150B	0	TON	OCWD
Organic Nitrogen (ORG-N)	X1-351.2	0.1	mg/L	OCWD
Perchlorate (CLO4)	332.0	1	ug/L	OCWD
pH (pH)	4500H+B	1	UNITS	OCWD
Phosphate Phosphorus (orthophosphate) (PO4-P)	365.1	0.01 - 0.02	mg/L	OCWD
Potassium (K)	X200.7	0.5	mg/L	OCWD
Selenium (Se)	X200.8	1	ug/L	OCWD
Selenium (dissolved) (Se-DIS)	X200.8	1	ug/L	OCWD
Silica (SIO2)	4500SIOC	1	mg/L	OCWD
Silver (Ag)	X200.8	1	ug/L	OCWD
Silver (dissolved) (Ag-DIS)	X200.8	1	ug/L	OCWD
Sodium (Na)	X200.7	0.5	mg/L	OCWD
Strontium (Sr)	X200.8	1 - 10	ug/L	OCWD
Sulfate (SO4)	X1-300.0	0.3 - 2.5	mg/L	OCWD

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Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Surfactants (MBAS)	5540C	0.02 - 0.04	mg/L	OCWD
Suspended Solids (SUSSOL)	2540D	2.5	mg/L	OCWD
Temperature (Laboratory) (TEMP)	4500H+B	1	C	OCWD
Thallium (Tl)	X200.8	1	ug/L	OCWD
Thallium (dissolved) (Tl-DIS)	X200.8	1	ug/L	OCWD
Threshold Odor Number (Median) (ODOR)	2150B	0	TON	OCWD
Title 22 Cation-Anion Balance (T22CAB)	CALC		meq/L	OCWD
Title 22 Total Anions (T22ANI)	CALC		meq/L	OCWD
Title 22 Total Cations (T22CAT)	CALC		meq/L	OCWD
Total Alkalinity (as CaCO3) (TOTALK)	2320B	1 - 5	mg/L	OCWD
Total Anions (TOTANI)	CALC		meq/L	OCWD
Total Cations (TOTCAT)	CALC		meq/L	OCWD
Total Chlorine (TOTCL2)	4500CLF	0.1 - 0.2	mg/L	OCWD
Total Dissolved Solids (TDS)	2540C	2.5	mg/L	OCWD
Total Hardness (as CaCO3) (TOTHRD)	X200.7	1	mg/L	OCWD
Total Inorganic Nitrogen (TIN)	350.1	0.1	mg/L	OCWD
Total Kjeldahl Nitrogen (TKN)	X1-351.2	0.2 - 2.0	mg/L	OCWD
Total Nitrogen (TOT-N)	CALC	0.2 - 2.0	mg/L	OCWD
Total Organic Carbon (Unfiltered) (TOC)	5310C	0.05	mg/L	OCWD
Trivalent Chromium (CrIII)	CALC	1	ug/L	OCWD
True Color (filtered) (TRCOLR)	2120B	3	UNITS	OCWD
Turbidity (TURB)	2130B	0.1	NTU	OCWD
Ultraviolet (absorbance) (UVAB)	5910B	0.005	1/cm	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: INORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
Ultraviolet percent transmittance @254nm (UV%T-254)	5910B	0.1	%	OCWD
Uranium (U) (U)	X200.8	1 - 10	ug/L	OCWD
UV Absorbance/TOC (unfiltered) ratio (UV/TOC)	5910B	0.0001	L/mg-cm	OCWD
Vanadium (V)	X200.8	1 - 2	ug/L	OCWD
Vanadium (dissolved) (V-DIS)	X200.8	1	ug/L	OCWD
Zinc (Zn)	X200.8	5	ug/L	OCWD
Zinc (dissolved) (Zn-DIS)	X200.8	5	ug/L	OCWD

Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
1,1,1,2-Tetrachloroethane (1112PC)	524.2	0.5	ug/L	OCWD
1,1,1-Trichloroethane (111TCA)	524.2	0.5	ug/L	OCWD
1,1,1-Trichloropropanone (111TCP)	551.1	0.1	ug/L	OCWD
1,1,2,2-Tetrachloroethane (1122PC)	524.2	0.5	ug/L	OCWD
1,1,2-Trichloroethane (112TCA)	524.2	0.5	ug/L	OCWD
1,1-Dichloro-2-propanone (11DC2P)	551.1	0.1	ug/L	OCWD
1,1-Dichloroethane (11DCA)	524.2	0.5	ug/L	OCWD
1,1-Dichloroethene (11DCE)	524.2	0.5	ug/L	OCWD
1,1-Dichloropropene (11DCP)	524.2	0.5	ug/L	OCWD
1,2,3-Trichlorobenzene (123TCB)	524.2	0.5	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	14DIOX	0.005	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	504.1	0.05	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	524.2	0.5	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
1,2,3-Trichloropropane (123TCP)	524M-TCP	0.005	ug/L	OCWD
1,2,4-Trichlorobenzene (124TCB)	524.2	0.5	ug/L	OCWD
1,2,4-Trichlorobenzene (124TCB)	625.1	1	ug/L	WECKLAB
1,2,4-Trichlorobenzene (124TCB)	8270C	1	ug/L	WECKLAB
1,2,4-Trimethylbenzene (124TMB)	524.2	0.5	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	14DIOX	0.01	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	504.1	0.01	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	524.2	0.5	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	524M-TCP	0.01	ug/L	OCWD
1,2-Dibromoethane (EDB)	14DIOX	0.005	ug/L	OCWD
1,2-Dibromoethane (EDB)	504.1	0.01	ug/L	OCWD
1,2-Dibromoethane (EDB)	524.2	0.5	ug/L	OCWD
1,2-Dibromoethane (EDB)	524M-TCP	0.005	ug/L	OCWD
1,2-Dichlorobenzene (12DCB)	524.2	0.5	ug/L	OCWD
1,2-Dichlorobenzene (12DCB)	625.1	1	ug/L	WECKLAB
1,2-Dichlorobenzene (12DCB)	8270C	1	ug/L	WECKLAB
1,2-Dichloroethane (12DCA)	524.2	0.5	ug/L	OCWD
1,2-Dichloropropane (12DCP)	524.2	0.5	ug/L	OCWD
1,2-Diphenylhydrazine (12DPH)	625.1	1	ug/L	WECKLAB
1,2-Diphenylhydrazine (12DPH)	8270C	1	ug/L	WECKLAB
1,3,5-Trimethylbenzene (135TMB)	524.2	0.5	ug/L	OCWD
1,3-Dichlorobenzene (13DCB)	524.2	0.5	ug/L	OCWD
1,3-Dichlorobenzene (13DCB)	625.1	1	ug/L	WECKLAB
1,3-Dichlorobenzene (13DCB)	8270C	1	ug/L	WECKLAB
1,3-Dichloropropane (13DCP)	524.2	0.5	ug/L	OCWD
1,4-Dichlorobenzene (14DCB)	524.2	0.5	ug/L	OCWD
1,4-Dichlorobenzene (14DCB)	625.1	1	ug/L	WECKLAB
1,4-Dichlorobenzene (14DCB)	8270C	1	ug/L	WECKLAB

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
1,4-Dioxane (14DIOX)	14DIOX	0.5	ug/L	OCWD
1,4-Dioxane (14DIOX)	522	0.07	ug/L	OCWD
11-chloroeicosafluoro-3-oxaundecane-1sulfonic acid (11CLPF)	533	2	ng/L	OCWD
17a-Estradiol (aESTRA)	CEC	1	ng/L	OCWD
17a-Ethynylestradiol (aETEST)	CEC	2	ng/L	OCWD
17b-Estradiol (bESTRA)	CEC	2	ng/L	OCWD
2,2-Dichloropropane (22DCP)	524.2	0.5	ug/L	OCWD
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1613B	4.7 - 5.2	pg/L	EUROTSAC
2,4,5-Trichlorophenol (245TCP)	8270C	1	ug/L	WECKLAB
2,4,6-Trichlorophenol (246TCP)	625.1	1	ug/L	WECKLAB
2,4,6-Trichlorophenol (246TCP)	8270C	1	ug/L	WECKLAB
2,4-Dichlorophenol (24DCPH)	625.1	1	ug/L	WECKLAB
2,4-Dichlorophenol (24DCPH)	8270C	1	ug/L	WECKLAB
2,4-Dimethylphenol (24DMP)	625.1	1	ug/L	WECKLAB
2,4-Dimethylphenol (24DMP)	8270C	1	ug/L	WECKLAB
2,4-Dinitrophenol (24DNP)	625.1	10	ug/L	WECKLAB
2,4-Dinitrophenol (24DNP)	8270C	10	ug/L	WECKLAB
2,4-Dinitrotoluene (24DNT)	525.2	0.1	ug/L	OCWD
2,4-Dinitrotoluene (24DNT)	625.1	1	ug/L	WECKLAB
2,4-Dinitrotoluene (24DNT)	8270C	1	ug/L	WECKLAB
2,6-Dinitrotoluene (26DNT)	525.2	0.1	ug/L	OCWD
2,6-Dinitrotoluene (26DNT)	625.1	1	ug/L	WECKLAB
2,6-Dinitrotoluene (26DNT)	8270C	1	ug/L	WECKLAB
2-Chloroethylvinyl ether (2ClEVE)	14DIOX	1	ug/L	OCWD
2-Chloronaphthalene (2ClNAP)	625.1	1	ug/L	WECKLAB
2-Chloronaphthalene (2ClNAP)	8270C	1	ug/L	WECKLAB

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
2-Chlorophenol (2ClPNL)	625.1	1	ug/L	WECKLAB
2-Chlorophenol (2ClPNL)	8270C	1	ug/L	WECKLAB
2-Chlorotoluene (2CLTOL)	524.2	0.5	ug/L	OCWD
2-Methyl naphthalene (2MNAP)	8270C	1	ug/L	WECKLAB
2-Methyl-4,6-Dinitrophenol (2MDNP)	625.1	5	ug/L	WECKLAB
2-Methyl-4,6-Dinitrophenol (2MDNP)	8270C	5	ug/L	WECKLAB
2-Methylphenol (oCRESL)	8270C	1	ug/L	WECKLAB
2-Nitroaniline (oNTANL)	8270C	1	ug/L	WECKLAB
2-Nitrophenol (2NPNL)	625.1	1	ug/L	WECKLAB
2-Nitrophenol (2NPNL)	8270C	1	ug/L	WECKLAB
3- & 4-Methylphenol (mpCRESL)	8270C	1	ug/L	WECKLAB
3,3'-Dichlorobenzidine (DCBZDE)	625.1	5	ug/L	WECKLAB
3,3'-Dichlorobenzidine (DCBZDE)	8270C	5	ug/L	WECKLAB
3-Nitroaniline (mNTANL)	8270C	1	ug/L	WECKLAB
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	533	2	ng/L	OCWD
4:2 Fluorotelomer sulfonate (4:2FTS)	533	2	ng/L	OCWD
4-Androstene-3,17-dione (ANDROS)	CEC	2	ng/L	OCWD
4-Bromophenyl phenyl ether (4BrPPE)	625.1	1	ug/L	WECKLAB
4-Bromophenyl phenyl ether (4BrPPE)	8270C	1	ug/L	WECKLAB
4-Chloro-3-methylphenol (43CMP)	625.1	1	ug/L	WECKLAB
4-Chloro-3-methylphenol (43CMP)	8270C	1	ug/L	WECKLAB
4-Chloroaniline (pClANL)	8270C	1	ug/L	WECKLAB
4-Chlorophenyl phenyl ether (4ClPPE)	625.1	1	ug/L	WECKLAB
4-Chlorophenyl phenyl ether (4ClPPE)	8270C	1	ug/L	WECKLAB
4-Chlorotoluene (4CLTOL)	524.2	0.5	ug/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
4-Isopropyltoluene (4IPTOL)	524.2	0.5	ug/L	OCWD
4-Nitroaniline (pNTANL)	8270C	1	ug/L	WECKLAB
4-Nitrophenol (4NPNL)	625.1	5	ug/L	WECKLAB
4-Nitrophenol (4NPNL)	8270C	5	ug/L	WECKLAB
4-n-Octylphenol (4nOCPH)	CEC	0.2	ug/L	OCWD
4-tert-Octylphenol (4tOCPH)	CEC	0.2	ug/L	OCWD
6:2 Fluorotelomer sulfonate (6:2FTS)	533	2	ng/L	OCWD
8:2 Fluorotelomer sulfonate (8:2FTS)	533	2	ng/L	OCWD
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CLPF3)	533	2	ng/L	OCWD
Acetaldehyde (ACEALD)	556	2	ug/L	WECKLAB
Acetone (ACETNE)	524.2	10	ug/L	OCWD
Acrolein (ACROLN)	524.2	5	ug/L	OCWD
Acrylonitrile (ACRYLO)	524.2	2	ug/L	OCWD
Aniline (ANLN)	8270C	1	ug/L	WECKLAB
Aspartame (ASPATM)	CEC	100	ng/L	OCWD
Atenolol (ATENOL)	CEC	5	ng/L	OCWD
Benzaldehyde (BENALD)	556	2	ug/L	WECKLAB
Benzene (BENZ)	524.2	0.5	ug/L	OCWD
Benzidine (BNZDE)	625.1	10	ug/L	WECKLAB
Benzidine (BNZDE)	8270C	10	ug/L	WECKLAB
Benzoic Acid (BNZACD)	8270C	100	ug/L	WECKLAB
Benzyl Alcohol (BNZALC)	8270C	1	ug/L	WECKLAB
bis (2-chloroethoxy) methane (B2CEM)	625.1	1	ug/L	WECKLAB
bis (2-chloroethoxy) methane (B2CEM)	8270C	1	ug/L	WECKLAB

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
bis (2-chloroethyl) ether (B2CLEE)	524.2	2.5	ug/L	OCWD
bis (2-chloroethyl) ether (B2CLEE)	625.1	1	ug/L	WECKLAB
bis (2-chloroethyl) ether (B2CLEE)	8270C	1	ug/L	WECKLAB
bis (2-chloroisopropyl) ether (B2CIPE)	625.1	1	ug/L	WECKLAB
bis (2-chloroisopropyl) ether (B2CIPE)	8270C	1	ug/L	WECKLAB
Bisphenol A (BisPHA)	CEC	0.2	ug/L	OCWD
Bromobenzene (BRBENZ)	524.2	0.5	ug/L	OCWD
Bromochloroacetic Acid (BCAA)	552.2	1	ug/L	OCWD
Bromochloroacetonitrile (BCAN)	551.1	0.1	ug/L	OCWD
Bromochloromethane (CH2BrC)	524.2	0.5	ug/L	OCWD
Bromodichloroacetic Acid (BDCAA)	552.2	1	ug/L	OCWD
Bromodichloromethane (CHBrCl)	524.2	0.5	ug/L	OCWD
Bromoform (CHBr3)	524.2	0.5	ug/L	OCWD
Bromomethane (CH3Br)	524.2	0.5	ug/L	OCWD
Carbazole (CARBZL)	8270C	1	ug/L	WECKLAB
Carbon Disulfide (CS2)	524.2	0.5	ug/L	OCWD
Carbon tetrachloride (CCl4)	524.2	0.5	ug/L	OCWD
Chlorobenzene (CLBENZ)	524.2	0.5	ug/L	OCWD
Chlorodibromoacetic Acid (CDBAA)	552.2	1	ug/L	OCWD
Chlorodifluoromethane (FREN22)	524.2	0.5	ug/L	OCWD
Chloroethane (ClETHA)	524.2	0.5	ug/L	OCWD
Chloroform (CHCl3)	524.2	0.5	ug/L	OCWD
Chloromethane (CH3Cl)	524.2	0.5	ug/L	OCWD
Chloropicrin (ClPICR)	551.1	0.1	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
cis-1,2-Dichloroethene (c12DCE)	524.2	0.5	ug/L	OCWD
cis-1,3-Dichloropropene (c13DCP)	524.2	0.5	ug/L	OCWD
Crotonaldehyde (CRTALD)	556	2	ug/L	WECKLAB
Cyclohexanone (CYCHXN)	556	2	ug/L	WECKLAB
Decanal (DECNAL)	556	2	ug/L	WECKLAB
Dibenzofuran (DBFUR)	8270C	1	ug/L	WECKLAB
Dibromoacetic Acid (DBAA)	552.2	1	ug/L	OCWD
Dibromoacetonitrile (DBAN)	551.1	0.1	ug/L	OCWD
Dibromochloromethane (CHBr2C)	524.2	0.5	ug/L	OCWD
Dibromomethane (CH2Br2)	524.2	0.5	ug/L	OCWD
Dichloroacetic Acid (DCAA)	552.2	1	ug/L	OCWD
Dichloroacetonitrile (DCAN)	551.1	0.1	ug/L	OCWD
Dichlorodifluoromethane (CCl2F2)	524.2	0.5	ug/L	OCWD
Diclofenac (DICLFN)	CEC	5	ng/L	OCWD
Diethylstilbestrol (DESTBL)	CEC	2	ng/L	OCWD
Diisopropyl ether (DIPE)	524.2	1	ug/L	OCWD
Dilantin (DILANT)	CEC	10	ng/L	OCWD
Dissolved Organic Carbon (DOC)	5310C	0.05	mg/L	OCWD
Endosulfan II (ENDOII)	508.1	0.01	ug/L	WECKLAB
Endosulfan II (ENDOII)	525.2	0.1	ug/L	OCWD
Epitestosterone (cis-Testosterone) (EPITES)	CEC	1	ng/L	OCWD
Equilin (EQUILN)	CEC	5	ng/L	OCWD
Estriol (ESTRIO)	CEC	2	ng/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Estrone (ESTRON)	CEC	1	ng/L	OCWD
Ethyl tert-butyl ether (ETBE)	524.2	1	ug/L	OCWD
Ethylbenzene (EtBENZ)	524.2	0.5	ug/L	OCWD
Fluoxetine (FLUXET)	CEC	5	ng/L	OCWD
Formaldehyde (FORALD)	556	2	ug/L	WECKLAB
Freon 123a (FR123A)	524.2	0.5 - 2	ug/L	OCWD
Glyoxal (GLYOXL)	556	2	ug/L	WECKLAB
HCH-alpha (Alpha-BHC) (BHCa)	508.1	0.01	ug/L	WECKLAB
HCH-alpha (Alpha-BHC) (BHCa)	525.2	0.1	ug/L	OCWD
HCH-beta (Beta-BHC) (BHCb)	508.1	0.01	ug/L	WECKLAB
HCH-beta (Beta-BHC) (BHCb)	525.2	0.1	ug/L	OCWD
HCH-delta (Delta-BHC) (BHCd)	508.1	0.01	ug/L	WECKLAB
HCH-delta (Delta-BHC) (BHCd)	525.2	0.1	ug/L	OCWD
Heptanal (HEPNAL)	556	2	ug/L	WECKLAB
Hexachlorobutadiene (HClBut)	524.2	0.5	ug/L	OCWD
Hexachlorobutadiene (HClBut)	625.1	1	ug/L	WECKLAB
Hexachlorobutadiene (HClBut)	8270C	1	ug/L	WECKLAB
Hexachloroethane (HCE)	625.1	1	ug/L	WECKLAB
Hexachloroethane (HCE)	8270C	1	ug/L	WECKLAB
Hexafluoropropylene oxide dimer acid (GenX) (HFPODA)	533	2	ng/L	OCWD
Hexanal (HEXNAL)	556	2	ug/L	WECKLAB
Imidacloprid (IMIDCP)	CEC	1	ng/L	OCWD
Iohexol (IOHEXL)	CEC	20 - 1,000	ng/L	OCWD
Iopromide (IOPRMD)	CEC	10	ng/L	OCWD
Isophorone (IPHOR)	525.2	0.1	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Isophorone (IPHOR)	625.1	1	ug/L	WECKLAB
Isophorone (IPHOR)	8270C	1	ug/L	WECKLAB
Isopropylbenzene (ISPBNZ)	524.2	0.5	ug/L	OCWD
Linuron (LINURN)	CEC	0.005	ug/L	OCWD
m,p-Xylene (mp-XYL)	524.2	0.5	ug/L	OCWD
Meprobamate (MEPROB)	CEC	5	ng/L	OCWD
Methyl Ethyl Ketone (MEK) (MEK)	524.2	2.5	ug/L	OCWD
Methyl Isobutyl Ketone (MIBK) (MIBK)	524.2	2.5	ug/L	OCWD
Methyl tert-butyl ether (MTBE)	524.2	0.2	ug/L	OCWD
Methylene Chloride (CH2Cl2)	524.2	0.5	ug/L	OCWD
Methylglyoxal (MGLYOX)	556	2	ug/L	WECKLAB
Methylisothiocyanate (MITC)	14DIOX	0.05	ug/L	OCWD
Metolachlor (METOCL)	525.2	0.1	ug/L	OCWD
Monobromoacetic Acid (MBAA)	552.2	1	ug/L	OCWD
Monochloroacetic Acid (MCAA)	552.2	1	ug/L	OCWD
Naphthalene (NAP)	524.2	0.5	ug/L	OCWD
Naphthalene (NAP)	525.2	0.1	ug/L	OCWD
Naphthalene (NAP)	625.1	1	ug/L	WECKLAB
Naphthalene (NAP)	8270C	1	ug/L	WECKLAB
Naproxen (NAPRXN)	CEC	5 - 50	ng/L	OCWD
n-Butylbenzene (nBBENZ)	524.2	0.5	ug/L	OCWD
Neotame (NEOTAM)	CEC	10	ng/L	OCWD
N-ethyl perfluorooctanesulfonamidoacetic acid (EtFOSA)	537.1	2	ng/L	OCWD
Nitrobenzene (NBENZ)	625.1	1	ug/L	WECKLAB
Nitrobenzene (NBENZ)	8270C	1	ug/L	WECKLAB

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
N-methyl perfluorooctanesulfonamidoacetic acid (MeFOSA)	537.1	2	ng/L	OCWD
N-Nitrosodiethylamine (NDEA)	NDMA-LOW	2 - 10	ng/L	OCWD
N-Nitrosodimethylamine (NDMA)	625.1	1,000	ng/L	WECKLAB
N-Nitrosodimethylamine (NDMA)	8270C	1,000	ng/L	WECKLAB
N-Nitrosodimethylamine (NDMA)	NDMA-LOW	2 - 10	ng/L	OCWD
N-Nitroso-di-n-propylamine (NDPA)	625.1	1,000	ng/L	WECKLAB
N-Nitroso-di-n-propylamine (NDPA)	8270C	1,000	ng/L	WECKLAB
N-Nitroso-di-n-propylamine (NDPA)	NDMA-LOW	2 - 10	ng/L	OCWD
N-Nitrosodiphenylamine (NDPhA)	625.1	1,000	ng/L	WECKLAB
N-Nitrosodiphenylamine (NDPhA)	8270C	1,000	ng/L	WECKLAB
N-Nitrosomorpholine (NMOR)	NDMA-LOW	2 - 10	ng/L	OCWD
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	533	2	ng/L	OCWD
Nonanal (NONNAL)	556	2	ug/L	WECKLAB
Nonylphenol (NONYPH)	CEC	0.2	ug/L	OCWD
o-Xylene (o-XYL)	524.2	0.5	ug/L	OCWD
PCB-1016 (PCB16)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCB-1221 (PCB21)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCB-1232 (PCB32)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCB-1242 (PCB42)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCB-1248 (PCB48)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCB-1254 (PCB54)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCB-1260 (PCB60)	508.1	0.1 - 0.5	ug/L	WECKLAB
PCBs, Total (TOTPCB)	508.1	0.5	ug/L	WECKLAB
Perfluoro butane sulfonic acid (PFBS)	533	2	ng/L	OCWD

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Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
Perfluoro heptanoic acid (PFHpA)	533	2	ng/L	OCWD
Perfluoro hexane sulfonic acid (PFHxS)	533	2	ng/L	OCWD
Perfluoro nonanoic acid (PFNA)	533	2	ng/L	OCWD
Perfluoro octane sulfonic acid (PFOS)	533	2	ng/L	OCWD
Perfluoro octanoic acid (PFOA)	533	2	ng/L	OCWD
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	533	2	ng/L	OCWD
Perfluoro-3-methoxypropanoic acid (PFMPA)	533	2	ng/L	OCWD
Perfluoro-4-methoxybutanoic acid (PFMBA)	533	2	ng/L	OCWD
Perfluorobutanoic acid (PFBA)	533	2	ng/L	OCWD
Perfluorodecanoic acid (PFDA)	533	2	ng/L	OCWD
Perfluorododecanoic acid (PFDoA)	533	2	ng/L	OCWD
Perfluoroheptanesulfonic Acid (PFHpS)	533	2	ng/L	OCWD
Perfluorohexanoic acid (PFHxA)	533	2 - 10	ng/L	OCWD
Perfluoropentanesulfonic acid (PFPeS)	533	2	ng/L	OCWD
Perfluoropentanoic acid (PFPeA)	533	2 - 10	ng/L	OCWD
Perfluorotetradecanoic acid (PFTA)	537.1	2	ng/L	OCWD
Perfluorotridecanoic acid (PFTrDA)	537.1	2	ng/L	OCWD
Perfluoroundecanoic acid (PFUnA)	533	2	ng/L	OCWD
Phenol (PHENOL)	625.1	1	ug/L	WECKLAB
Phenol (PHENOL)	8270C	1	ug/L	WECKLAB
PhenylPhenol (PHNYPH)	CEC	0.2	ug/L	OCWD
Progesterone (PRGSTR)	CEC	1	ng/L	OCWD
Propylbenzene (PRPBNZ)	524.2	0.5	ug/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
Pyridine (PYRDN)	8270C	5	ug/L	WECKLAB
sec-Butylbenzene (sBBENZ)	524.2	0.5	ug/L	OCWD
Styrene (STYR)	524.2	0.5	ug/L	OCWD
Sucralose (SUCRAL)	CEC	100 - 1,000	ng/L	OCWD
Sum of five Haloacetic Acids (HAA5)	CALC	1	ug/L	OCWD
Sum of nine Haloacetic Acids (HAA9)	CALC	1	ug/L	OCWD
Sum of Six Brominated Haloacetic Acids (HAA6Br)	CALC	1	ug/L	OCWD
Terbufos Sulfone (TERSUL)	525.2	0.1	ug/L	OCWD
Tert-amyl methyl ether (TAME)	524.2	1	ug/L	OCWD
tert-butyl alcohol (TBA)	524.2	2	ug/L	OCWD
tert-Butylbenzene (tBBENZ)	524.2	0.5	ug/L	OCWD
Testosterone (trans-Testosterone) (TESTOR)	CEC	1	ng/L	OCWD
Tetrabromobisphenol A (TBBISA)	CEC	0.2	ug/L	OCWD
Tetrachloroethene (PCE)	524.2	0.5	ug/L	OCWD
Toluene (TOLU)	524.2	0.5	ug/L	OCWD
Total 1,3-Dichloropropene (x13DCP)	524.2	0.5	ug/L	OCWD
Total Trihalomethanes (TTHMs)	524.2	0.5	ug/L	OCWD
Total Xylenes (m,p,&o) (TOTALX)	524.2	0.5	ug/L	OCWD
trans-1,2 Dichloroethene (t12DCE)	524.2	0.5	ug/L	OCWD
trans-1,3-Dichloropropene (t13DCP)	524.2	0.5	ug/L	OCWD
Tribromoacetic Acid (TBAA)	552.2	1	ug/L	OCWD
Trichloroacetic Acid (TCAA)	552.2	1	ug/L	OCWD
Trichloroacetonitrile (TCAN)	551.1	0.1	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Trichloroethene (TCE)	524.2	0.5	ug/L	OCWD
Trichlorofluoromethane (Freon 11) (CCl3F)	524.2	0.5	ug/L	OCWD
Trichlorotrifluoroethane (Freon 113) (Cl3F3E)	524.2	0.5	ug/L	OCWD
Trimethoprim (TRIMTP)	CEC	5	ng/L	OCWD
Tris-2-chloroethyl phosphate (TCEP)	CEC	5	ng/L	OCWD
Vinyl chloride (VNYLCL)	524.2	0.5	ug/L	OCWD

Constituent Type: RADIOLOGICALS

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Gross Alpha Excluding Uranium (TOTa-U)	CALC	1.08	pCi/L	FGL
Natural Uranium (NTUr)	X200.8	0.67	pCi/L	FGL
Radium 226 + Radium 228 (Ra6Ra8)	CALC	0.41	pCi/L	FGL
Radium 226 + Radium 228 (Ra6Ra8)	CALC	0.247 - 0.676	pCi/L	EBER_FGL
Radium 226 + Radium 228 Counting Error (Ra68CE)	CALC	0.41	pCi/L	FGL
Radium 226 + Radium 228 Counting Error (Ra68CE)	CALC	0.247 - 0.676	pCi/L	EBER_FGL
Total Alpha (TOTa)	7110C	1.08	pCi/L	FGL
Total Alpha Counting Error (TOTaCE)	7110C	1.08	pCi/L	FGL
Total Beta (TOTb)	900.0	0.151 - 1.340	pCi/L	FGL
Total Beta Counting Error (TOTbCE)	900.0	0.151 - 1.340	pCi/L	FGL
Total Radium 226 (TRa226)	903.0	0.41	pCi/L	FGL
Total Radium 226 (TRa226)	903.0MOD	0.247 - 0.676	pCi/L	EBER
Total Radium 226 Counting Error (TRa6CE)	903.0	0.41	pCi/L	FGL
Total Radium 226 Counting Error (TRa6CE)	903.0MOD	0.247 - 0.676	pCi/L	EBER
Total Radium 228 (TRa228)	RA-05	).0491 - 0.0514	pCi/L	FGL

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: RADIOLOGICALS

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Total Radium 228 Counting Error (TRa8CE)	RA-05	).0491 - 0.0514	pCi/L	FGL
Total Strontium-90 (TS90)	905.0MOD	0.525 - 1.37	pCi/L	EBER
Total Strontium-90 Counting Error (TS90CE)	905.0MOD	0.525 - 1.37	pCi/L	EBER
Total Tritium (TTr)	906.0	434	pCi/L	FGL
Total Tritium Counting Error (TTrCE)	906.0	434	pCi/L	FGL

Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
1-Naphthol (NPTHOL)	531.2	5	ug/L	OCWD
2,4,5-T (245T)	515.4	0.2	ug/L	WECKLAB
2,4,5-TP (Silvex) (245TP)	515.4	0.2	ug/L	WECKLAB
2,4,6-Trinitrotoluene (246TNT)	8330A	1	ug/L	WECKLAB
2,4-DB (24DB)	515.4	2	ug/L	WECKLAB
2,4-Dichlorophenoxyacetic Acid (24D)	515.4	0.4	ug/L	WECKLAB
3,5-Dichlorobenzoic Acid (35DBA)	515.4	1	ug/L	WECKLAB
3-Hydroxycarbofuran (HYDCFR)	531.2	2	ug/L	OCWD
4,4'-DDD (DDD)	508.1	0.01	ug/L	WECKLAB
4,4'-DDD (DDD)	525.2	0.1	ug/L	OCWD
4,4'-DDE (DDE)	508.1	0.01	ug/L	WECKLAB
4,4'-DDE (DDE)	525.2	0.1	ug/L	OCWD
4,4'-DDT (DDT)	508.1	0.01	ug/L	WECKLAB
4,4'-DDT (DDT)	525.2	0.1	ug/L	OCWD
Acenaphthene (ACNAPE)	525.2	0.1	ug/L	OCWD
Acenaphthene (ACNAPE)	625.1	1	ug/L	WECKLAB

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
Acenaphthene (ACNAPE)	8270C	1	ug/L	WECKLAB
Acenaphthylene (ACENAP)	525.2	0.1	ug/L	OCWD
Acenaphthylene (ACENAP)	625.1	1	ug/L	WECKLAB
Acenaphthylene (ACENAP)	8270C	1	ug/L	WECKLAB
Acetaminophen (ACTMNP)	CEC	5	ng/L	OCWD
Acetochlor (ACETOC)	525.2	0.1	ug/L	OCWD
Acifluorfen (ACIFEN)	515.4	0.4	ug/L	WECKLAB
Alachlor (ALACHL)	525.2	0.1	ug/L	OCWD
Aldicarb (ALDI)	531.2	1	ug/L	OCWD
Aldicarb sulfone (ALDISN)	531.2	2	ug/L	OCWD
Aldicarb sulfoxide (ALDISX)	531.2	2	ug/L	OCWD
Aldrin (ALDRIN)	508.1	0.01	ug/L	WECKLAB
Aldrin (ALDRIN)	525.2	0.1	ug/L	OCWD
Ametryn (AMERYN)	525.2	0.1	ug/L	OCWD
Anthracene (ANTHRA)	525.2	0.1	ug/L	OCWD
Anthracene (ANTHRA)	625.1	1	ug/L	WECKLAB
Anthracene (ANTHRA)	8270C	1	ug/L	WECKLAB
Atrazine (ATRAZ)	525.2	0.1	ug/L	OCWD
Atrazine (ATRAZ)	CEC	0.001	ug/L	OCWD
Baygon (BAYGON)	531.2	1	ug/L	OCWD
Bentazon (BENTAZ)	515.4	2	ug/L	WECKLAB
Benzo(a)anthracene (BaANTH)	525.2	0.1	ug/L	OCWD
Benzo(a)anthracene (BaANTH)	625.1	1	ug/L	WECKLAB
Benzo(a)anthracene (BaANTH)	8270C	1	ug/L	WECKLAB
Benzo(a)pyrene (BaPYRE)	525.2	0.1	ug/L	OCWD
Benzo(a)pyrene (BaPYRE)	625.1	1	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Benzo(a)pyrene (BaPYRE)	8270C	1	ug/L	WECKLAB
Benzo(b)fluoranthene (BbFLUR)	525.2	0.1	ug/L	OCWD
Benzo(b)fluoranthene (BbFLUR)	625.1	1	ug/L	WECKLAB
Benzo(b)fluoranthene (BbFLUR)	8270C	1	ug/L	WECKLAB
Benzo(g,h,i)perylene (BghiPR)	525.2	0.1	ug/L	OCWD
Benzo(g,h,i)perylene (BghiPR)	625.1	2	ug/L	WECKLAB
Benzo(g,h,i)perylene (BghiPR)	8270C	2	ug/L	WECKLAB
Benzo[k]fluoranthene (BkFLUR)	525.2	0.1	ug/L	OCWD
Benzo[k]fluoranthene (BkFLUR)	625.1	1	ug/L	WECKLAB
Benzo[k]fluoranthene (BkFLUR)	8270C	1	ug/L	WECKLAB
bis (2-ethylhexyl) adipate (DEHA)	525.2	2	ug/L	OCWD
bis (2-ethylhexyl) phthalate (DEHP)	525.2	2	ug/L	OCWD
bis (2-ethylhexyl) phthalate (DEHP)	625.1	5	ug/L	WECKLAB
bis (2-ethylhexyl) phthalate (DEHP)	8270C	5	ug/L	WECKLAB
Bromacil (BROMAC)	525.2	0.1	ug/L	OCWD
Butachlor (BUTACL)	525.2	0.1	ug/L	OCWD
Butanal (BUTAN)	556	2	ug/L	WECKLAB
Butylate (BTYATE)	525.2	0.1	ug/L	OCWD
Butylbenzyl phthalate (BBP)	525.2	2	ug/L	OCWD
Butylbenzyl phthalate (BBP)	625.1	1	ug/L	WECKLAB
Butylbenzyl phthalate (BBP)	8270C	1	ug/L	WECKLAB
Caffeine (CAFFEI)	525.2	100	ng/L	OCWD
Caffeine (CAFFEI)	CEC	3 - 30	ng/L	OCWD
Captan (CAPTAN)	525.2	0.1	ug/L	OCWD
Carbamazepine (CBMAZP)	CEC	1	ng/L	OCWD
Carbaryl (CARBAR)	531.2	2	ug/L	OCWD
Carbofuran (CARBOF)	531.2	1	ug/L	OCWD

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Chlordane (ClDANE)	508.1	0.1	ug/L	WECKLAB
Chlordane-alpha (CLDA)	525.2	0.1	ug/L	OCWD
Chlordane-gamma (CLDG)	525.2	0.1	ug/L	OCWD
Chlorobenzilate (CLBZLA)	525.2	0.1	ug/L	OCWD
Chloroneb (CLNEB)	525.2	0.1	ug/L	OCWD
Chlorothalonil (CLTNIL)	508.1	0.05	ug/L	WECKLAB
Chlorothalonil (CLTNIL)	525.2	0.1	ug/L	OCWD
Chlorpropham (CPRPHM)	525.2	0.1	ug/L	OCWD
Chlorpyrifos (ClPYRI)	525.2	0.1	ug/L	OCWD
Chrysene (CHRYS)	525.2	0.1	ug/L	OCWD
Chrysene (CHRYS)	625.1	1	ug/L	WECKLAB
Chrysene (CHRYS)	8270C	1	ug/L	WECKLAB
Dalapon (DALAPN)	515.4	0.4	ug/L	WECKLAB
Dalapon (DALAPN)	552.2	1	ug/L	OCWD
DCPA-Dacthal (DCPA)	515.4	0.1	ug/L	WECKLAB
DCPA-Dacthal (DCPA)	525.2	0.1	ug/L	OCWD
Diazinon (DIAZI)	525.2	0.1	ug/L	OCWD
Dibenzo(a,h)anthracene (DBahAN)	525.2	0.1	ug/L	OCWD
Dibenzo(a,h)anthracene (DBahAN)	625.1	2	ug/L	WECKLAB
Dibenzo(a,h)anthracene (DBahAN)	8270C	2	ug/L	WECKLAB
Dicamba (DICAMB)	515.4	0.6	ug/L	WECKLAB
Dichlorprop (24DP)	515.4	0.3	ug/L	WECKLAB
Dichlorvos (DCLVOS)	525.2	0.1	ug/L	OCWD
Dieldrin (DIELDR)	508.1	0.01	ug/L	WECKLAB
Dieldrin (DIELDR)	525.2	0.1	ug/L	OCWD

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Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Diethyl phthalate (DEP)	525.2	2	ug/L	OCWD
Diethyl phthalate (DEP)	625.1	1	ug/L	WECKLAB
Diethyl phthalate (DEP)	8270C	1	ug/L	WECKLAB
Dimethoate (DMTH)	525.2	1	ug/L	OCWD
Dimethyl phthalate (DMP)	525.2	2	ug/L	OCWD
Dimethyl phthalate (DMP)	625.1	1	ug/L	WECKLAB
Dimethyl phthalate (DMP)	8270C	1	ug/L	WECKLAB
Di-n-butylphthalate (DnBP)	525.2	2	ug/L	OCWD
Di-n-butylphthalate (DnBP)	625.1	1	ug/L	WECKLAB
Di-n-butylphthalate (DnBP)	8270C	1	ug/L	WECKLAB
Di-n-octyl phthalate (DnOP)	525.2	2	ug/L	OCWD
Di-n-octyl phthalate (DnOP)	625.1	1	ug/L	WECKLAB
Di-n-octyl phthalate (DnOP)	8270C	1	ug/L	WECKLAB
Dinoseb (DINOSB)	515.4	0.4	ug/L	WECKLAB
Diphenamid (DPHNMD)	525.2	0.1	ug/L	OCWD
Diquat (DIQUAT)	549.2	4	ug/L	OCWD
Diuron (DIURON)	CEC	0.005	ug/L	OCWD
Endosulfan I (ENDOI)	508.1	0.01	ug/L	WECKLAB
Endosulfan I (ENDOI)	525.2	0.1	ug/L	OCWD
Endosulfan sulfate (ENDOSL)	508.1	0.01	ug/L	WECKLAB
Endosulfan sulfate (ENDOSL)	525.2	0.1	ug/L	OCWD
Endothall (ENDOTL)	548.1	45	ug/L	WECKLAB
Endrin (ENDRIN)	508.1	0.01	ug/L	WECKLAB
Endrin (ENDRIN)	525.2	0.1	ug/L	OCWD
Endrin Aldehyde (ENDR-A)	508.1	0.01	ug/L	WECKLAB
Endrin Aldehyde (ENDR-A)	525.2	0.1	ug/L	OCWD
EPTC (EPTC)	525.2	0.1	ug/L	OCWD

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
Erythromycin (ERYTHN)	CEC	1	ng/L	OCWD
Ethion (ETHION)	525.2	0.1	ug/L	OCWD
Ethoprop (ETHPRP)	525.2	0.1	ug/L	OCWD
Ethylene Glycol (GLYCOL)	8015B	10,000	ug/L	WECKLAB
Etridiazole (ETRDZL)	525.2	0.1	ug/L	OCWD
Fluoranthene (FLANTH)	525.2	0.1	ug/L	OCWD
Fluoranthene (FLANTH)	625.1	1	ug/L	WECKLAB
Fluoranthene (FLANTH)	8270C	1	ug/L	WECKLAB
Fluorene (FLUOR)	525.2	0.1	ug/L	OCWD
Fluorene (FLUOR)	625.1	1	ug/L	WECKLAB
Fluorene (FLUOR)	8270C	1	ug/L	WECKLAB
Gemfibrozil (GMFIBZ)	CEC	1	ng/L	OCWD
Glyphosate (GLYPHO)	547	25	ug/L	OCWD
HCH-gamma (Lindane) (LINDNE)	508.1	0.01	ug/L	WECKLAB
HCH-gamma (Lindane) (LINDNE)	525.2	0.1	ug/L	OCWD
Heptachlor (HEPTA)	508.1	0.01	ug/L	WECKLAB
Heptachlor (HEPTA)	525.2	0.1	ug/L	OCWD
Heptachlor epoxide (HEPEPX)	508.1	0.01	ug/L	WECKLAB
Heptachlor epoxide (HEPEPX)	525.2	0.1	ug/L	OCWD
Hexachlorobenzene (HEXCLB)	508.1	0.05	ug/L	WECKLAB
Hexachlorobenzene (HEXCLB)	525.2	0.1	ug/L	OCWD
Hexachlorobenzene (HEXCLB)	625.1	1	ug/L	WECKLAB
Hexachlorobenzene (HEXCLB)	8270C	1	ug/L	WECKLAB
Hexachlorocyclopentadiene (HClCPD)	508.1	0.2	ug/L	WECKLAB
Hexachlorocyclopentadiene (HClCPD)	525.2	0.1	ug/L	OCWD
Hexachlorocyclopentadiene (HClCPD)	625.1	5	ug/L	WECKLAB
Hexachlorocyclopentadiene (HClCPD)	8270C	5	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reporting Limit Range	Units	Laboratory
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	8330A	1	ug/L	WECKLAB
Hexazinone (HEXZON)	525.2	0.1	ug/L	OCWD
Ibuprofen (IBPRFN)	CEC	1	ng/L	OCWD
Indeno(1,2,3-cd)pyrene (INDPYR)	525.2	0.1	ug/L	OCWD
Indeno(1,2,3-cd)pyrene (INDPYR)	625.1	2	ug/L	WECKLAB
Indeno(1,2,3-cd)pyrene (INDPYR)	8270C	2	ug/L	WECKLAB
Malathion (MALATH)	525.2	2	ug/L	OCWD
Methiocarb (MTHCRB)	531.2	4	ug/L	OCWD
Methomyl (MTHOMY)	531.2	1	ug/L	OCWD
Methoxychlor (METHOX)	508.1	0.01	ug/L	WECKLAB
Methoxychlor (METHOX)	525.2	0.1	ug/L	OCWD
methyl-Parathion (MPARA)	525.2	0.5	ug/L	OCWD
Metribuzin (MTRBZN)	525.2	0.1	ug/L	OCWD
Molinate (MOLINT)	525.2	0.1	ug/L	OCWD
N,N-diethyl-m-toluamide (DEET)	CEC	1 - 5	ng/L	OCWD
Norflurazon (NORFLR)	525.2	1	ug/L	OCWD
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	8330A	1	ug/L	WECKLAB
Oxamyl (OXAMYL)	531.2	2	ug/L	OCWD
Oxybenzone (BP3)	CEC	1	ng/L	OCWD
Paraquat (PARAQT)	549.2	4	ug/L	OCWD
Parathion (PARA)	525.2	0.5	ug/L	OCWD
Pentachlorophenol (PCP) (PCP)	515.4	0.2	ug/L	WECKLAB
Pentachlorophenol (PCP) (PCP)	525.2	1	ug/L	OCWD
Pentachlorophenol (PCP) (PCP)	625.1	1	ug/L	WECKLAB
Pentachlorophenol (PCP) (PCP)	8270C	1	ug/L	WECKLAB

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Pentachlorophenol (PCP) (PCP)	CEC	0.2	ug/L	OCWD
Pentanal (PENTNL)	556	2	ug/L	WECKLAB
Permethrin-(total of cis/trans) (PMTHRN)	525.2	0.1	ug/L	OCWD
Phenanthrene (PHENAN)	525.2	0.1	ug/L	OCWD
Phenanthrene (PHENAN)	625.1	1	ug/L	WECKLAB
Phenanthrene (PHENAN)	8270C	1	ug/L	WECKLAB
Picloram (PICLOR)	515.4	0.6	ug/L	WECKLAB
Primidone (PRIMDN)	CEC	1	ng/L	OCWD
Prometryn (PROMET)	525.2	0.1	ug/L	OCWD
Pronamide (PROAMD)	525.2	0.1	ug/L	OCWD
Propachlor (PROPCL)	508.1	0.2	ug/L	WECKLAB
Propachlor (PROPCL)	525.2	0.1	ug/L	OCWD
Propanal (PROPNL)	556	2	ug/L	WECKLAB
Propazine (PROPAZ)	525.2	0.1	ug/L	OCWD
Pyrene (PYRENE)	525.2	0.1	ug/L	OCWD
Pyrene (PYRENE)	625.1	1	ug/L	WECKLAB
Pyrene (PYRENE)	8270C	1	ug/L	WECKLAB
Simazine (SIMAZ)	525.2	0.1	ug/L	OCWD
Simazine (SIMAZ)	CEC	0.005	ug/L	OCWD
Sulfamethoxazole (SULTHZ)	CEC	1 - 10	ng/L	OCWD
Tebuthiuron (TBTURN)	525.2	2	ug/L	OCWD
Terbacil (TRBACL)	525.2	0.1	ug/L	OCWD
Thiobencarb (THIO)	525.2	0.1	ug/L	OCWD
Toxaphene Mixture (TOXA)	508.1	1	ug/L	WECKLAB
Triclosan (TRICLN)	CEC	1	ng/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2024

Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reporting Limit Range*	*Units*	*Laboratory*
Trifluralin (TRFLRN)	508.1	0.01	ug/L	WECKLAB
Trifluralin (TRFLRN)	525.2	0.1	ug/L	OCWD
Trithion (TRTION)	525.2	0.1	ug/L	OCWD

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Appendix D

Pathogenic Microorganism Reduction Reports

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
Date	*LRV*	*LRV*	*LRV*	*Y/N*	*Y/N*	*Y/N*	>0.2	>0.5	>0.2	>0.5	>0.5
01/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/02/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/06/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/09/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/10/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/13/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/16/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/17/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/18/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/19/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/20/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/22/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/23/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/24/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/25/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/27/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/30/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/31/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
01/01/24	0.00	4.38	2.14	6.00	0	12.53
01/02/24	0.00	4.33	2.14	6.00	0	12.47
01/03/24	0.00	4.30	2.22	6.00	0	12.51
01/04/24	0.00	4.23	2.27	6.00	0	12.50
01/05/24	0.00	4.13	2.26	6.00	0	12.40
01/06/24	0.00	4.18	2.27	6.00	0	12.45
01/07/24	0.00	4.20	2.35	6.00	0	12.55
01/08/24	0.00	4.32	2.36	6.00	0	12.68
01/09/24	0.00	4.14	2.32	6.00	0	12.46
01/10/24	0.00	4.22	2.26	6.00	0	12.47
01/11/24	0.00	4.32	2.30	6.00	0	12.62
01/12/24	0.00	4.31	2.20	6.00	0	12.52
01/13/24	0.00	4.29	2.14	6.00	0	12.43
01/14/24	0.00	4.40	2.17	6.00	0	12.57
01/15/24	0.00	4.35	2.18	6.00	0	12.53
01/16/24	0.00	4.27	2.16	6.00	0	12.43
01/17/24	0.00	4.24	2.15	6.00	0	12.39
01/18/24	0.00	4.25	2.15	6.00	0	12.40
01/19/24	0.00	4.26	2.16	6.00	0	12.41
01/20/24	0.00	4.23	2.18	6.00	0	12.41
01/21/24	0.00	4.29	2.22	6.00	0	12.51
01/22/24	0.00	4.26	2.24	6.00	0	12.50
01/23/24	0.00	4.25	2.16	6.00	0	12.41
01/24/24	0.00	4.29	2.18	6.00	0	12.47
01/25/24	0.00	4.28	2.14	6.00	0	12.42
01/26/24	0.00	4.34	2.13	6.00	0	12.48
01/27/24	0.00	4.35	2.20	6.00	0	12.55
01/28/24	0.00	4.31	2.35	6.00	0	12.66
01/29/24	0.00	4.30	2.34	6.00	0	12.64
01/30/24	0.00	4.27	2.28	6.00	0	12.55
01/31/24	0.00	4.22	2.30	6.00	0	12.52

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
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Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	LRV	LRV	LRV	LRV	LRV
01/01/24	0.00	0.00	2.14	6.00	4	12.14
01/02/24	0.00	0.00	2.14	6.00	4	12.14
01/03/24	0.00	0.00	2.22	6.00	4	12.22
01/04/24	0.00	0.00	2.27	6.00	4	12.27
01/05/24	0.00	0.00	2.26	6.00	4	12.26
01/06/24	0.00	0.00	2.27	6.00	4	12.27
01/07/24	0.00	0.00	2.35	6.00	4	12.35
01/08/24	0.00	0.00	2.36	6.00	4	12.36
01/09/24	0.00	0.00	2.32	6.00	4	12.32
01/10/24	0.00	0.00	2.26	6.00	4	12.26
01/11/24	0.00	0.00	2.30	6.00	4	12.30
01/12/24	0.00	0.00	2.20	6.00	4	12.20
01/13/24	0.00	0.00	2.14	6.00	4	12.14
01/14/24	0.00	0.00	2.17	6.00	4	12.17
01/15/24	0.00	0.00	2.18	6.00	4	12.18
01/16/24	0.00	0.00	2.16	6.00	4	12.16
01/17/24	0.00	0.00	2.15	6.00	4	12.15
01/18/24	0.00	0.00	2.15	6.00	4	12.15
01/19/24	0.00	0.00	2.16	6.00	4	12.16
01/20/24	0.00	0.00	2.18	6.00	4	12.18
01/21/24	0.00	0.00	2.22	6.00	4	12.22
01/22/24	0.00	0.00	2.24	6.00	4	12.24
01/23/24	0.00	0.00	2.16	6.00	4	12.16
01/24/24	0.00	0.00	2.18	6.00	4	12.18
01/25/24	0.00	0.00	2.14	6.00	4	12.14
01/26/24	0.00	0.00	2.13	6.00	4	12.13
01/27/24	0.00	0.00	2.20	6.00	4	12.20
01/28/24	0.00	0.00	2.35	6.00	4	12.35
01/29/24	0.00	0.00	2.34	6.00	4	12.34
01/30/24	0.00	0.00	2.28	6.00	4	12.28
01/31/24	0.00	0.00	2.30	6.00	4	12.30

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
01/01/24	5.03	4.99	5.07	4.88	4.48	4.80	4.99	4.80	5.11	5.16	4.75	4.71	4.38	5.02	4.92	4.65
01/02/24	4.97	5.03	5.05	4.89	4.46	4.75	5.01	4.80	5.15	5.05	4.75	4.67	4.66	4.99	4.94	4.75
01/03/24	4.94	5.08	5.03	4.93	5.03	4.85	4.94	4.83	5.02	5.03	4.80	4.67	4.40	4.94	4.92	4.78
01/04/24	4.86	4.96	4.96	4.90	4.94	4.76	4.97	4.81	5.02	4.94	4.76	4.57	4.74	4.94	4.88	4.78
01/05/24	4.83	N/A *	4.92	4.82	4.87	4.65	4.94	4.76	5.02	4.88	4.71	4.54	4.49	4.90	4.87	4.78
01/06/24	4.74	N/A *	4.84	4.72	4.82	4.64	4.86	4.72	5.02	4.84	4.62	4.48	4.96	4.89	4.90	4.75
01/07/24	4.86	N/A *	4.96	4.80	4.81	4.71	4.91	4.75	4.97	4.78	4.62	4.50	4.57	4.93	4.84	4.69
01/08/24	4.85	N/A *	4.83	4.79	4.82	4.63	4.86	4.78	4.95	4.74	4.62	4.46	4.36	4.85	4.81	4.61
01/09/24	4.81	5.01	4.75	4.69	4.83	4.57	4.80	4.73	4.86	4.70	4.59	4.75	4.14	4.80	4.75	4.60
01/10/24	4.73	5.01	4.69	4.66	4.81	4.54	4.82	4.71	4.85	4.69	4.57	4.89	4.22	4.76	4.77	4.59
01/11/24	4.68	4.96	4.73	4.58	4.60	4.47	4.75	4.65	4.80	5.23	4.51	4.89	4.96	4.73	4.70	4.57
01/12/24	4.63	4.90	4.68	4.65	4.64	4.45	4.77	4.57	4.73	5.30	4.42	4.82	4.63	4.69	4.70	4.49
01/13/24	4.66	4.94	4.70	4.62	4.64	4.44	4.77	4.59	4.75	5.26	4.42	4.86	4.44	4.67	4.64	4.43
01/14/24	4.55	4.90	4.63	4.60	4.54	4.43	4.74	4.58	4.70	5.28	4.40	4.86	4.93	4.68	4.64	4.46
01/15/24	4.51	4.87	4.96	4.55	4.43	4.48	4.70	4.49	4.52	5.30	4.37	4.76	5.12	4.61	4.67	4.40
01/16/24	4.89	4.87	4.97	4.56	4.37	4.77	4.69	4.43	4.50	5.27	4.35	4.83	5.24	4.59	4.62	4.39
01/17/24	4.92	4.86	4.96	4.57	4.49	4.81	4.67	4.51	4.56	5.36	4.63	4.83	4.87	4.61	4.60	4.41
01/18/24	4.86	4.87	4.90	4.51	4.46	4.76	4.65	4.86	4.51	5.17	4.67	4.81	4.55	4.55	4.63	4.49
01/19/24	4.75	4.89	4.85	4.47	4.36	4.76	4.60	4.84	4.87	5.03	4.64	4.75	5.10	4.52	4.60	4.52
01/20/24	4.80	4.87	4.84	4.47	4.32	4.72	4.60	4.81	4.86	5.01	4.60	4.69	4.88	4.86	4.62	4.50
01/21/24	4.74	4.77	4.84	4.78	4.45	4.61	4.90	4.81	4.87	5.03	4.58	4.73	4.94	4.91	4.57	4.51
01/22/24	4.78	4.83	4.82	4.76	4.50	4.55	4.92	4.81	4.89	5.00	4.53	4.74	4.34	4.89	4.77	4.73
01/23/24	4.73	4.77	4.77	4.64	4.32	4.56	4.86	4.79	4.75	4.99	4.47	4.75	4.85	4.82	4.87	4.79
01/24/24	4.74	4.79	4.75	4.90	4.76	4.52	4.85	4.76	4.64	4.93	4.43	4.74	5.09	4.79	4.86	4.80
01/25/24	4.74	4.81	4.76	4.88	4.82	4.54	4.87	4.75	4.74	4.90	4.41	4.72	4.96	4.77	4.84	4.78
01/26/24	4.76	4.77	4.75	4.91	4.78	4.52	4.84	4.70	4.81	4.85	4.36	4.66	4.98	4.73	4.82	4.71
01/27/24	4.74	4.95	4.67	4.83	4.78	4.54	4.81	4.67	4.74	4.83	4.35	4.66	4.56	4.74	4.81	4.73
01/28/24	4.72	4.96	4.61	4.80	4.78	4.43	4.79	4.57	4.72	4.81	4.31	4.59	4.83	4.74	4.79	4.71
01/29/24	4.66	4.96	4.61	4.87	4.77	4.46	4.78	4.56	4.70	4.82	4.31	4.60	4.93	4.72	4.76	4.67
01/30/24	4.61	4.95	4.59	4.79	4.68	4.46	4.74	4.60	4.61	4.81	4.27	4.85	4.52	4.69	4.77	4.63
01/31/24	4.63	4.95	4.57	4.73	4.65	4.45	4.71	4.54	4.61	4.78	4.22	4.87	4.48	4.68	4.75	4.59

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
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	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
01/01/24	4.62	4.89	4.79	4.42	4.84	4.49	4.63	4.70	4.95	4.65	4.96	4.94	4.63	5.04	4.76	4.95
01/02/24	4.57	4.95	4.78	4.33	4.80	4.63	4.76	4.71	4.93	4.63	4.93	4.98	4.62	5.06	4.75	4.94
01/03/24	4.53	4.87	4.79	4.30	4.80	4.63	4.71	4.65	4.89	4.84	4.93	4.99	4.58	5.05	4.71	4.92
01/04/24	4.55	4.84	4.73	4.23	4.77	4.61	4.69	4.58	4.91	5.01	4.89	4.93	4.57	5.00	4.67	4.92
01/05/24	4.51	4.82	4.68	4.13	4.69	4.59	4.66	4.53	4.87	4.94	4.89	4.85	4.47	4.89	4.63	4.88
01/06/24	4.53	4.82	4.70	4.18	4.73	4.55	4.66	4.56	4.77	4.64	4.87	4.88	4.69	4.84	4.62	4.88
01/07/24	4.49	4.80	4.66	4.20	4.70	4.51	4.65	4.52	4.76	4.58	4.84	4.88	4.88	4.90	4.63	4.83
01/08/24	4.42	4.74	4.60	4.39	4.60	4.50	4.61	4.42	4.71	4.73	4.80	4.85	4.81	4.89	4.77	4.86
01/09/24	4.34	4.65	4.50	4.55	4.51	4.47	4.56	4.36	4.71	4.81	4.79	4.82	4.78	4.84	5.00	4.84
01/10/24	4.35	4.64	4.50	4.52	4.48	4.39	4.54	4.33	4.72	4.69	4.75	4.75	4.78	4.79	5.00	4.77
01/11/24	4.59	4.59	4.49	4.42	4.67	4.32	4.53	4.40	4.68	4.34	4.85	4.82	4.79	4.73	4.96	4.73
01/12/24	4.54	4.54	4.60	4.42	4.74	4.31	4.51	4.56	4.59	4.32	5.00	4.92	4.76	4.68	4.91	4.66
01/13/24	4.51	4.52	4.68	4.42	4.68	4.29	4.52	4.58	4.54	4.61	5.01	4.91	4.74	4.82	4.95	4.66
01/14/24	4.51	4.82	4.71	4.42	4.69	4.46	4.53	4.53	4.53	4.55	5.02	4.91	4.74	5.00	4.90	4.64
01/15/24	4.47	4.85	4.69	4.35	4.68	4.55	4.62	4.48	4.80	4.60	5.03	4.85	4.70	4.96	4.92	4.62
01/16/24	4.45	4.80	4.64	4.27	4.65	4.54	4.70	4.43	4.84	4.46	4.99	4.87	4.69	4.98	4.90	4.97
01/17/24	4.40	4.79	4.56	4.24	4.58	4.52	4.66	4.40	4.78	4.55	4.99	4.90	4.68	4.87	4.86	4.88
01/18/24	4.31	4.78	4.58	4.25	4.55	4.50	4.62	4.36	4.80	4.78	5.03	4.84	4.68	4.89	4.87	4.88
01/19/24	4.33	4.74	4.53	4.26	4.55	4.47	4.61	4.33	4.78	4.78	5.04	4.87	4.66	4.86	4.84	4.88
01/20/24	4.34	4.66	4.43	4.23	4.51	4.39	4.60	4.30	4.72	4.79	4.99	4.81	4.66	4.82	4.85	4.85
01/21/24	4.32	4.65	4.44	4.33	4.46	4.39	4.61	4.29	4.69	4.69	4.97	4.73	4.64	4.84	4.83	4.81
01/22/24	4.26	4.65	4.46	4.51	4.46	4.37	4.59	4.29	4.72	4.58	4.98	4.80	4.61	4.86	4.82	4.78
01/23/24	4.25	4.62	4.44	4.48	4.40	4.31	4.55	4.49	4.74	4.54	4.92	4.82	4.58	4.83	4.85	4.77
01/24/24	4.44	4.57	4.68	4.42	4.56	4.29	4.53	4.65	4.67	4.53	4.90	4.76	4.54	4.80	4.75	4.71
01/25/24	4.55	4.55	4.82	4.36	4.71	4.28	4.54	4.54	4.66	4.75	4.93	4.81	4.51	4.70	4.67	4.70
01/26/24	4.48	4.49	4.72	4.34	4.70	4.45	4.55	4.50	4.64	4.84	4.92	4.75	4.49	4.74	4.68	4.72
01/27/24	4.45	4.71	4.70	4.37	4.69	4.60	4.51	4.50	4.58	4.65	4.86	4.72	4.44	4.72	4.74	4.75
01/28/24	4.42	4.84	4.65	4.35	4.64	4.57	4.64	4.43	4.51	4.45	4.79	4.72	4.56	4.70	4.73	4.74
01/29/24	4.38	4.81	4.64	4.30	4.60	4.52	4.75	4.38	4.53	4.72	4.80	4.68	4.78	4.71	4.81	4.68
01/30/24	4.36	4.76	4.63	4.27	4.58	4.51	4.73	4.39	4.55	4.61	4.82	4.67	4.76	4.69	4.99	4.67
01/31/24	4.36	4.74	4.59	4.23	4.55	4.51	4.70	4.33	4.50	4.78	4.82	4.67	4.73	4.63	4.98	4.64

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	MicroFiltration Process online monitoring results Log Removal Value															
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
01/01/24	4.42	4.80	5.13	4.52	4.88	4.94	4.76	4.89	4.76	5.06	4.66	4.73	4.42	4.47	4.56	4.91
01/02/24	4.48	4.74	4.99	4.49	4.84	4.98	4.65	4.77	4.67	4.79	4.60	4.75	4.48	4.28	4.50	4.87
01/03/24	4.48	4.91	4.98	4.52	5.02	4.85	4.70	4.77	4.69	4.83	4.50	4.60	4.22	4.24	4.60	4.83
01/04/24	4.57	4.65	4.97	4.40	4.83	4.80	4.75	4.80	4.56	4.85	4.67	4.68	4.45	4.36	4.51	4.90
01/05/24	4.46	4.62	4.85	4.36	4.72	4.89	4.69	4.78	4.47	4.83	4.68	4.95	4.46	4.33	4.41	4.85
01/06/24	4.40	4.67	4.84	4.47	4.82	5.02	4.63	4.77	4.64	4.75	4.53	4.66	4.29	4.36	4.46	4.92
01/07/24	4.50	4.58	4.82	4.40	4.85	5.18	4.60	4.80	4.50	4.80	4.62	4.60	N/A *	4.36	4.48	4.82
01/08/24	4.32	4.64	4.73	4.50	4.70	4.79	4.66	4.66	4.56	4.70	4.58	4.68	4.61	4.35	4.36	4.82
01/09/24	4.32	4.44	4.81	4.41	4.80	4.85	4.74	4.65	4.62	4.76	4.57	4.65	4.53	4.24	4.61	4.91
01/10/24	4.49	4.57	4.97	4.26	4.93	4.95	4.62	4.71	4.54	4.83	4.64	4.63	4.31	4.23	4.51	4.85
01/11/24	4.35	4.74	4.99	4.48	5.19	4.89	4.65	4.71	4.55	4.78	4.59	4.70	4.51	4.39	4.40	4.83
01/12/24	4.34	4.48	5.04	4.39	4.86	4.89	4.76	4.65	4.70	4.61	4.57	4.63	4.59	4.40	4.89	4.91
01/13/24	4.48	4.50	4.89	4.43	4.86	5.07	4.69	4.81	4.68	4.78	4.75	4.61	4.51	4.56	4.82	4.92
01/14/24	4.44	4.74	4.98	4.57	5.04	4.87	4.68	4.89	4.75	4.84	4.74	4.70	4.53	4.54	4.96	4.85
01/15/24	4.45	4.70	5.11	4.49	5.00	4.91	4.76	4.94	4.74	4.89	4.74	4.74	4.60	4.52	4.93	5.10
01/16/24	4.60	4.87	4.98	4.41	4.96	5.06	4.83	4.92	4.71	4.90	4.77	4.69	4.51	4.62	4.85	5.01
01/17/24	4.53	4.69	4.90	4.56	5.06	4.97	4.75	4.87	4.80	4.90	4.68	4.71	4.53	4.47	4.90	4.82
01/18/24	4.65	4.71	5.09	4.48	4.98	5.20	4.82	4.92	4.69	4.92	4.69	4.73	4.54	4.44	4.91	5.11
01/19/24	4.56	4.87	4.99	4.61	4.96	5.08	4.85	4.90	4.66	4.85	4.75	4.78	4.53	4.50	4.91	5.08
01/20/24	4.55	4.75	5.02	4.57	4.95	5.13	4.95	4.85	4.71	4.78	4.78	4.76	4.56	4.51	4.92	4.92
01/21/24	4.58	4.66	4.99	4.59	5.00	5.09	4.83	4.94	4.71	4.89	4.82	4.80	4.54	4.50	4.90	4.93
01/22/24	4.60	4.78	5.15	4.72	5.00	5.03	4.77	4.93	4.72	4.89	4.84	4.86	4.50	4.55	4.96	4.94
01/23/24	4.46	4.80	5.25	4.60	5.05	5.01	4.89	5.13	4.80	4.93	4.92	4.84	4.60	4.54	4.99	4.95
01/24/24	4.52	4.85	5.05	4.54	5.02	5.11	4.87	4.92	4.79	5.02	4.87	4.81	4.57	4.53	4.97	4.97
01/25/24	4.59	4.72	5.09	4.62	5.27	5.08	4.87	4.92	4.77	4.94	4.77	4.85	4.55	4.59	4.97	4.98
01/26/24	4.61	4.81	5.19	4.72	4.94	5.00	4.87	5.06	4.77	4.89	4.82	4.81	4.60	4.60	4.97	4.96
01/27/24	4.54	4.91	5.08	4.68	4.97	5.07	4.82	4.90	4.77	4.93	4.80	4.80	4.60	4.69	4.90	4.98
01/28/24	4.56	4.71	5.08	4.77	5.11	4.95	4.76	4.90	4.84	4.91	4.74	4.82	4.54	4.61	4.84	5.01
01/29/24	4.60	4.63	5.19	4.70	5.06	4.98	4.86	5.10	4.78	4.89	4.78	4.79	4.57	4.53	4.84	5.07
01/30/24	4.58	4.65	5.07	4.73	4.98	5.11	4.84	4.92	4.79	4.94	4.76	4.87	4.53	4.61	4.84	4.94
01/31/24	4.55	4.81	5.05	4.71	5.09	4.94	4.80	4.96	4.83	4.97	4.75	4.87	4.54	4.57	5.12	4.90

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
01/01/24	0.032	0.034	0.030	0.033	0.029	0.049	0.023	0.025	0.034	0.043	0.040	0.050	0.027	0.043	0.043	0.046	0.033	0.036	0.051	0.056	0.037	0.040	0.051	0.054	0.036
01/02/24	0.032	0.035	0.031	0.034	0.030	0.032	0.025	0.031	0.036	0.038	0.042	0.046	0.028	0.033	0.044	0.046	0.037	0.042	0.060	0.071	0.041	0.045	0.057	0.063	0.039
01/03/24	0.031	0.035	0.032	0.044	0.030	0.034	0.023	0.034	0.036	0.048	0.044	0.047	0.029	0.032	0.050	0.057	0.046	0.058	0.079	0.087	0.046	0.050	0.069	0.071	0.043
01/04/24	0.031	0.037	0.031	0.033	0.029	0.030	0.022	0.023	0.034	0.036	0.034	0.044	0.031	0.039	0.050	0.057	0.039	0.052	0.056	0.092	0.039	0.051	0.057	0.077	0.038
01/05/24	0.031	0.034	0.032	0.034	0.030	0.032	0.022	0.023	0.034	0.035	0.029	0.033	0.031	0.033	0.048	0.049	0.030	0.034	0.027	0.030	0.028	0.029	0.037	0.041	0.031
01/06/24	0.031	0.033	0.032	0.035	0.030	0.042	0.022	0.025	0.034	0.063	0.030	0.052	0.031	0.033	0.049	0.069	0.032	0.051	0.028	0.034	0.028	0.033	0.036	0.039	0.032
01/07/24	0.031	0.064	0.032	0.035	0.030	0.032	0.022	0.052	0.034	0.042	0.029	0.040	0.031	0.033	0.048	0.050	0.030	0.033	0.028	0.029	0.028	0.031	0.036	0.038	0.031
01/08/24	0.030	0.035	0.032	0.067	0.029	0.033	0.022	0.026	0.034	0.039	0.029	0.030	0.030	0.033	0.049	0.061	0.030	0.039	0.028	0.034	0.028	0.029	0.036	0.039	0.031
01/09/24	0.031	0.035	0.032	0.052	0.030	0.032	0.022	0.025	0.033	0.034	0.029	0.031	0.032	0.036	0.048	0.050	0.031	0.040	0.028	0.031	0.028	0.033	0.037	0.040	0.032
01/10/24	0.031	0.034	0.033	0.035	0.030	0.032	0.023	0.035	0.034	0.052	0.029	0.034	0.032	0.038	0.049	0.049	0.030	0.032	0.028	0.039	0.028	0.029	0.037	0.039	0.032
01/11/24	0.031	0.042	0.033	0.035	0.031	0.035	0.023	0.026	0.035	0.042	0.031	0.092	0.034	0.056	0.049	0.050	0.031	0.043	0.029	0.035	0.029	0.035	0.037	0.039	0.033
01/12/24	0.031	0.035	0.033	0.036	0.030	0.032	0.022	0.024	0.034	0.037	0.030	0.031	0.033	0.035	0.049	0.056	0.031	0.036	0.029	0.036	0.030	0.035	0.038	0.038	0.032
01/13/24	0.031	0.037	0.033	0.037	0.030	0.036	0.022	0.026	0.035	0.072	0.030	0.036	0.033	0.039	0.049	0.053	0.031	0.035	0.030	0.033	0.030	0.040	0.038	0.038	0.033
01/14/24	0.032	0.037	0.033	0.040	0.030	0.034	0.022	0.023	0.035	0.054	0.030	0.039	0.032	0.037	0.049	0.050	0.032	0.047	0.031	0.034	0.029	0.032	0.038	0.040	0.033
01/15/24	0.031	0.042	0.033	0.036	0.030	0.031	0.022	0.024	0.035	0.105	0.030	0.031	0.033	0.084	0.049	0.051	0.031	0.035	0.032	0.034	0.030	0.033	0.038	0.040	0.033
01/16/24	0.031	0.034	0.033	0.037	0.030	0.031	0.022	0.023	0.034	0.036	0.030	0.030	0.033	0.034	0.049	0.050	0.031	0.032	0.030	0.033	0.030	0.034	0.038	0.040	0.033
01/17/24	0.031	0.033	0.033	0.036	0.030	0.033	0.022	0.023	0.034	0.042	0.030	0.031	0.033	0.035	0.049	0.050	0.033	0.038	0.030	0.032	0.030	0.033	0.038	0.041	0.033
01/18/24	0.030	0.034	0.032	0.036	0.030	0.032	0.022	0.023	0.032	0.035	0.029	0.032	0.034	0.045	0.050	0.051	0.033	0.035	0.031	0.031	0.032	0.035	0.038	0.039	0.033
01/19/24	0.029	0.031	0.032	0.035	0.029	0.032	0.022	0.022	0.031	0.058	0.029	0.030	0.033	0.037	0.049	0.050	0.032	0.033	0.030	0.038	0.031	0.033	0.039	0.044	0.032
01/20/24	0.029	0.040	0.032	0.034	0.029	0.031	0.021	0.024	0.030	0.034	0.028	0.035	0.033	0.034	0.049	0.053	0.033	0.038	0.031	0.037	0.033	0.036	0.040	0.042	0.032
01/21/24	0.028	0.037	0.031	0.043	0.029	0.029	0.021	0.023	0.030	0.031	0.028	0.077	0.033	0.036	0.048	0.049	0.032	0.035	0.032	0.039	0.033	0.035	0.042	0.045	0.032
01/22/24	0.028	0.032	0.031	0.070	0.029	0.030	0.021	0.024	0.030	0.031	0.028	0.033	0.032	0.034	0.049	0.055	0.032	0.039	0.035	0.041	0.035	0.036	0.043	0.046	0.033
01/23/24	0.027	0.030	0.030	0.032	0.028	0.032	0.020	0.023	0.029	0.031	0.027	0.031	0.031	0.032	0.047	0.050	0.031	0.035	0.031	0.038	0.032	0.039	0.042	0.051	0.031
01/24/24	0.028	0.030	0.030	0.033	0.029	0.065	0.021	0.032	0.030	0.041	0.027	0.033	0.032	0.045	0.047	0.049	0.030	0.031	0.029	0.032	0.029	0.031	0.039	0.042	0.031
01/25/24	0.028	0.030	0.030	0.032	0.028	0.035	0.021	0.022	0.029	0.031	0.027	0.028	0.031	0.041	0.048	0.049	0.032	0.038	0.030	0.033	0.031	0.037	0.041	0.048	0.031
01/26/24	0.028	0.039	0.030	0.041	0.028	0.030	0.021	0.021	0.030	0.031	0.027	0.031	0.031	0.039	0.048	0.049	0.031	0.034	0.031	0.033	0.032	0.036	0.045	0.050	0.032
01/27/24	0.028	0.035	0.030	0.041	0.028	0.031	0.021	0.027	0.029	0.039	0.027	0.041	0.031	0.035	0.048	0.053	0.031	0.033	0.033	0.036	0.035	0.040	0.050	0.053	0.033
01/28/24	0.028	0.030	0.030	0.033	0.029	0.030	0.021	0.025	0.030	0.062	0.028	0.033	0.031	0.033	0.049	0.070	0.034	0.040	0.037	0.041	0.040	0.050	0.057	0.061	0.034
01/29/24	0.031	0.036	0.030	0.037	0.029	0.054	0.021	0.022	0.030	0.032	0.027	0.030	0.031	0.033	0.048	0.066	0.032	0.036	0.034	0.045	0.036	0.045	0.051	0.063	0.033
01/30/24	0.034	0.039	0.031	0.033	0.029	0.033	0.021	0.023	0.030	0.032	0.027	0.028	0.031	0.033	0.048	0.075	0.031	0.039	0.030	0.031	0.030	0.032	0.042	0.044	0.032
01/31/24	0.034	0.038	0.030	0.032	0.028	0.030	0.020	0.023	0.030	0.033	0.027	0.031	0.031	0.033	0.047	0.048	0.032	0.036	0.032	0.038	0.031	0.035	0.045	0.047	0.032

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
01/01/24	0.016	0.016	6.945	6.170	7.767	0.050	0.047	0.054	2,340	2,143	2,630	49	41	59	99.28	2.14	97.89	1.68
01/02/24	0.016	0.016	7.138	6.166	8.499	0.052	0.045	0.068	2,455	2,262	2,667	52	46	61	99.27	2.14	97.87	1.67
01/03/24	0.016	0.016	8.349	7.319	9.269	0.051	0.035	0.082	2,379	2,192	2,627	47	43	53	99.39	2.22	98.02	1.70
01/04/24	0.016	0.016	8.747	8.184	9.827	0.047	0.038	0.065	2,346	2,137	2,621	48	40	57	99.46	2.27	97.95	1.69
01/05/24	0.016	0.020	9.061	8.435	9.771	0.049	0.043	0.057	2,344	2,161	2,623	49	42	58	99.45	2.26	97.91	1.68
01/06/24	0.016	0.016	9.249	8.512	10.281	0.050	0.038	0.071	2,303	2,079	2,596	46	32	55	99.46	2.27	97.98	1.70
01/07/24	0.016	0.016	8.937	8.103	10.154	0.040	0.032	0.051	2,286	2,134	2,604	44	40	52	99.55	2.35	98.06	1.71
01/08/24	0.016	0.016	8.959	8.227	10.178	0.039	0.030	0.046	2,295	2,052	2,648	46	39	57	99.56	2.36	98.01	1.70
01/09/24	0.016	0.016	8.733	8.130	9.745	0.042	0.040	0.056	2,364	2,134	2,674	46	38	54	99.52	2.32	98.04	1.71
01/10/24	0.016	0.016	8.598	8.204	9.555	0.047	0.036	0.077	2,398	2,122	2,699	46	38	54	99.45	2.26	98.10	1.72
01/11/24	0.016	0.016	8.213	7.089	9.453	0.042	0.034	0.051	2,413	2,181	2,723	46	40	90	99.49	2.30	98.07	1.72
01/12/24	0.049**	0.363**	7.675	6.829	8.406	0.048	0.034	0.060	2,490	2,299	2,766	49	41	59	99.37	2.20	98.02	1.70
01/13/24	0.047**	0.132**	7.477	7.174	7.843	0.055	0.049	0.091	2,528	2,352	2,735	51	45	58	99.27	2.14	97.97	1.69
01/14/24	0.048**	0.130**	7.605	7.169	8.221	0.052	0.046	0.065	2,327	2,076	2,609	45	34	54	99.32	2.17	98.06	1.71
01/15/24	0.022	0.041	7.613	7.167	8.149	0.050	0.044	0.058	2,351	2,147	2,648	45	38	55	99.34	2.18	98.07	1.71
01/16/24	0.017	0.017	7.723	7.357	8.418	0.053	0.047	0.060	2,289	2,083	2,570	44	37	53	99.31	2.16	98.07	1.71
01/17/24	0.017	0.017	7.374	7.036	7.863	0.053	0.049	0.062	2,414	2,211	2,656	46	40	52	99.29	2.15	98.09	1.72
01/18/24	0.017	0.017	7.406	7.125	7.710	0.053	0.049	0.056	2,425	2,259	2,605	45	39	50	99.29	2.15	98.14	1.73
01/19/24	0.016	0.020	7.904	7.283	8.500	0.055	0.052	0.064	2,301	2,122	2,463	42	36	47	99.30	2.16	98.16	1.74
01/20/24	0.015	0.015	8.252	7.718	9.172	0.054	0.048	0.092	2,304	2,109	2,455	42	38	46	99.34	2.18	98.19	1.74
01/21/24	0.015	0.015	8.184	7.500	9.438	0.049	0.045	0.059	2,097	1,963	2,415	37	32	44	99.40	2.22	98.25	1.76
01/22/24	0.015	0.015	7.968	7.239	8.823	0.046	0.044	0.056	2,073	1,917	2,255	35	31	41	99.42	2.24	98.31	1.77
01/23/24	0.015	0.015	7.948	7.378	8.628	0.055	0.049	0.074	2,179	2,030	2,455	37	31	44	99.31	2.16	98.32	1.78
01/24/24	0.015	0.015	7.861	7.478	8.324	0.052	0.047	0.088	2,310	2,121	2,535	40	34	46	99.34	2.18	98.28	1.76
01/25/24	0.015	0.015	7.928	7.654	8.346	0.058	0.046	0.064	2,395	2,225	2,577	42	37	48	99.27	2.14	98.24	1.75
01/26/24	0.015	0.015	7.903	7.451	8.541	0.058	0.049	0.066	2,395	2,236	2,539	42	37	46	99.27	2.13	98.26	1.76
01/27/24	0.015	0.015	7.816	7.303	8.441	0.049	0.034	0.067	2,386	2,261	2,497	41	36	45	99.37	2.20	98.30	1.77
01/28/24	0.015	0.015	7.903	7.303	8.864	0.036	0.031	0.051	2,243	2,106	2,423	38	33	45	99.55	2.35	98.31	1.77
01/29/24	0.015	0.015	7.632	7.005	8.513	0.035	0.026	0.062	2,228	2,038	2,415	39	33	45	99.54	2.34	98.26	1.76
01/30/24	0.015	0.015	7.283	6.965	7.869	0.038	0.031	0.043	2,320	2,195	2,426	41	36	45	99.48	2.28	98.25	1.76
01/31/24	0.015	0.015	7.371	6.907	8.597	0.037	0.030	0.047	2,126	1,847	2,385	36	30	42	99.49	2.30	98.32	1.77

Notes:

** Erroneous value due to instrument issue, turbidity verified to be within limits with hanheld meter and laboratory analysis during period of online instrument inaccuracy.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	UltraViolet / AOP Process online monitoring results					
	UVT %	FLOW	POWER	EED	Peroxide Dose	Log
Date	avg	MG	kW	kWh/kgal	mg/L	Removal
01/01/24	96.72	113.366	37,313.7	0.34	4	6
01/02/24	96.72	100.546	37,725.0	0.34	4	6
01/03/24	96.65	106.279	36,456.8	0.34	4	6
01/04/24	96.61	114.929	35,982.1	0.34	4	6
01/05/24	96.50	114.715	38,312.9	0.33	4	6
01/06/24	96.35	102.054	38,105.4	0.33	4	6
01/07/24	96.52	104.950	35,493.0	0.35	4	6
01/08/24	96.30	110.779	35,709.5	0.34	4	6
01/09/24	96.16	113.584	37,243.8	0.33	4	6
01/10/24	96.37	114.709	38,277.4	0.33	4	6
01/11/24	96.47	114.333	38,308.1	0.33	4	6
01/12/24	96.63	114.560	38,294.7	0.33	4	6
01/13/24	96.80	114.615	38,290.7	0.33	4	6
01/14/24	96.88	109.415	38,283.6	0.34	4	6
01/15/24	96.66	111.327	36,845.7	0.34	4	6
01/16/24	96.73	114.602	37,409.6	0.33	4	6
01/17/24	96.80	114.476	38,351.5	0.33	4	6
01/18/24	96.79	114.761	38,312.6	0.33	4	6
01/19/24	96.93	114.792	38,349.3	0.33	4	6
01/20/24	96.75	114.685	38,331.9	0.33	4	6
01/21/24	97.11	113.506	38,335.2	0.33	4	6
01/22/24	97.23	114.732	38,028.9	0.33	4	6
01/23/24	96.97	114.729	38,344.7	0.33	4	6
01/24/24	96.54	114.569	38,340.9	0.33	4	6
01/25/24	96.46	114.838	38,523.7	0.33	4	6
01/26/24	96.44	114.912	38,448.4	0.33	4	6
01/27/24	96.57	115.029	38,349.8	0.33	4	6
01/28/24	97.01	114.827	38,355.0	0.33	4	6
01/29/24	97.13	115.095	38,361.9	0.33	4	6
01/30/24	97.16	115.070	38,146.4	0.33	4	6
01/31/24	97.22	113.843	38,280.2	0.34	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
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Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
02/01/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/02/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/03/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/04/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/11/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/12/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/17/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/18/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/20/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/23/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/24/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/25/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/26/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/27/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

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Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
02/01/24	0.00	4.14	2.31	6.00	0	12.45
02/02/24	0.00	4.13	2.31	6.00	0	12.44
02/03/24	0.00	4.17	2.33	6.00	0	12.50
02/04/24	0.00	4.16	2.35	6.00	0	12.51
02/05/24	0.00	4.10	2.39	6.00	0	12.50
02/06/24	0.00	4.29	2.33	6.00	0	12.62
02/07/24	0.00	4.29	2.34	6.00	0	12.63
02/08/24	0.00	4.23	2.41	6.00	0	12.64
02/09/24	0.00	4.18	2.36	6.00	0	12.55
02/10/24	0.00	4.15	2.35	6.00	0	12.50
02/11/24	0.00	4.00	2.37	6.00	0	12.48
02/12/24	0.00	4.11	2.39	6.00	0	12.50
02/13/24	0.00	4.20	2.34	6.00	0	12.54
02/14/24	0.00	4.33	2.31	6.00	0	12.64
02/15/24	0.00	4.31	2.31	6.00	0	12.61
02/16/24	0.00	4.37	2.19	6.00	0	12.55
02/17/24	0.00	4.27	2.16	6.00	0	12.43
02/18/24	0.00	4.48	2.18	6.00	0	12.66
02/19/24	0.00	4.46	2.19	6.00	0	12.65
02/20/24	0.00	4.44	2.19	6.00	0	12.63
02/21/24	0.00	4.37	2.17	6.00	0	12.54
02/22/24	0.00	4.39	2.16	6.00	0	12.54
02/23/24	0.00	4.41	2.13	6.00	0	12.55
02/24/24	0.00	4.42	2.12	6.00	0	12.54
02/25/24	0.00	4.45	2.14	6.00	0	12.59
02/26/24	0.00	4.46	2.13	6.00	0	12.59
02/27/24	0.00	4.48	2.08	6.00	0	12.55
02/28/24	0.00	4.57	2.10	6.00	0	12.67
02/29/24	0.00	4.61	2.13	6.00	0	12.73

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
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	Documented Virus Reduction Achieved					
	OC San	MF+Cl_2	RO	UV/AOP	Underground travel time	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
02/01/24	0.00	0.00	2.31	6.00	4	12.31
02/02/24	0.00	0.00	2.31	6.00	4	12.31
02/03/24	0.00	0.00	2.33	6.00	4	12.33
02/04/24	0.00	0.00	2.35	6.00	4	12.35
02/05/24	0.00	0.00	2.39	6.00	4	12.39
02/06/24	0.00	0.00	2.33	6.00	4	12.33
02/07/24	0.00	0.00	2.34	6.00	4	12.34
02/08/24	0.00	0.00	2.41	6.00	4	12.41
02/09/24	0.00	0.00	2.36	6.00	4	12.36
02/10/24	0.00	0.00	2.35	6.00	4	12.35
02/11/24	0.00	0.00	2.37	6.00	4	12.37
02/12/24	0.00	0.00	2.39	6.00	4	12.39
02/13/24	0.00	0.00	2.34	6.00	4	12.34
02/14/24	0.00	0.00	2.31	6.00	4	12.31
02/15/24	0.00	0.00	2.31	6.00	4	12.31
02/16/24	0.00	0.00	2.19	6.00	4	12.19
02/17/24	0.00	0.00	2.16	6.00	4	12.16
02/18/24	0.00	0.00	2.18	6.00	4	12.18
02/19/24	0.00	0.00	2.19	6.00	4	12.19
02/20/24	0.00	0.00	2.19	6.00	4	12.19
02/21/24	0.00	0.00	2.17	6.00	4	12.17
02/22/24	0.00	0.00	2.16	6.00	4	12.16
02/23/24	0.00	0.00	2.13	6.00	4	12.13
02/24/24	0.00	0.00	2.12	6.00	4	12.12
02/25/24	0.00	0.00	2.14	6.00	4	12.14
02/26/24	0.00	0.00	2.13	6.00	4	12.13
02/27/24	0.00	0.00	2.08	6.00	4	12.08
02/28/24	0.00	0.00	2.10	6.00	4	12.10
02/29/24	0.00	0.00	2.13	6.00	4	12.13

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
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	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
02/01/24	4.57	4.91	4.60	4.77	4.65	4.87	4.73	4.56	4.55	5.05	4.19	4.86	4.66	4.63	4.68	4.62
02/02/24	4.51	4.90	4.53	4.70	4.46	4.91	4.65	4.53	4.60	5.08	4.15	4.88	4.70	4.64	4.64	4.58
02/03/24	4.49	4.96	4.56	4.65	4.40	4.87	4.64	4.44	4.62	5.01	4.17	4.84	4.71	4.60	4.67	4.56
02/04/24	4.54	4.91	4.52	4.63	4.48	4.91	4.63	4.49	4.60	5.01	4.16	4.83	5.00	4.53	4.63	4.52
02/05/24	4.52	4.78	5.03	4.61	4.46	4.85	4.61	4.42	4.60	5.02	4.10	4.75	5.08	4.52	4.53	4.45
02/06/24	5.07	4.82	5.06	4.63	4.50	4.85	4.58	4.53	4.55	5.04	4.57	4.79	5.03	4.49	4.59	4.45
02/07/24	5.07	4.83	5.03	4.63	4.55	4.84	4.53	4.42	4.89	4.95	4.61	4.78	5.01	4.48	4.44	4.37
02/08/24	5.03	4.78	5.05	4.58	4.49	4.76	4.51	4.65	5.03	4.93	4.63	4.75	4.99	4.51	4.39	4.33
02/09/24	5.10	4.73	5.06	4.54	4.52	4.78	4.55	4.85	5.02	4.88	4.65	4.75	4.73	4.51	4.35	4.34
02/10/24	5.03	4.74	5.04	4.56	5.00	4.81	N/A *	4.87	5.01	4.88	4.64	4.69	4.50	4.98	4.36	4.30
02/11/24	5.04	4.74	4.99	5.02	4.88	4.79	N/A *	4.87	5.04	4.86	4.64	4.71	4.43	4.93	4.45	4.28
02/12/24	4.93	4.68	5.00	5.02	4.92	4.75	4.76	4.86	4.99	4.82	4.60	4.71	4.51	4.92	4.42	4.66
02/13/24	4.95	4.62	4.92	5.02	4.85	4.78	4.92	4.87	4.98	4.78	4.57	4.70	4.49	4.93	4.47	4.87
02/14/24	4.92	4.66	4.98	5.04	4.88	4.81	4.94	4.83	4.94	4.73	4.56	4.64	4.86	4.88	4.48	4.83
02/15/24	4.85	4.62	4.99	5.06	4.83	4.72	4.95	4.75	4.91	4.68	4.49	4.55	4.60	4.85	4.71	4.77
02/16/24	4.91	4.64	4.89	5.00	4.82	4.64	4.85	4.85	4.95	4.68	4.58	4.54	4.37	4.90	4.92	4.79
02/17/24	4.96	5.04	4.92	5.02	4.85	4.59	4.89	4.79	4.98	4.64	4.56	4.51	4.27	4.88	4.92	4.80
02/18/24	5.03	5.03	4.96	5.09	4.84	4.65	4.90	4.79	4.94	4.70	4.55	4.83	4.84	4.82	4.90	4.79
02/19/24	4.91	4.93	4.93	5.03	4.73	4.63	4.85	4.77	4.91	4.66	4.54	4.97	5.23	4.83	4.71	4.74
02/20/24	4.90	4.94	4.84	4.98	4.78	4.92	4.84	4.75	4.83	4.98	4.49	4.88	5.47	4.80	4.66	4.72
02/21/24	4.87	4.96	4.86	5.02	4.82	4.92	4.85	4.78	4.86	5.06	4.49	4.93	5.23	4.86	4.82	4.72
02/22/24	4.95	4.96	4.95	5.01	4.78	4.85	4.82	4.72	4.81	5.05	4.51	4.97	4.82	4.85	4.82	4.72
02/23/24	4.88	4.94	4.87	4.89	4.78	4.86	4.79	4.76	4.78	5.07	4.46	4.91	5.06	4.80	4.86	4.71
02/24/24	4.93	5.03	5.15	5.01	4.83	4.90	4.87	4.86	4.83	5.16	4.57	4.92	5.24	4.85	4.91	4.66
02/25/24	5.18	5.00	5.19	5.04	4.83	4.96	4.92	4.84	4.90	5.19	4.77	4.95	5.25	4.91	4.91	4.69
02/26/24	5.15	5.03	5.20	5.02	5.08	4.93	4.98	5.01	5.11	5.20	4.84	4.91	4.80	5.03	4.94	4.79
02/27/24	5.10	5.06	5.17	5.08	5.09	4.90	5.00	5.06	5.21	5.20	4.80	4.95	5.20	5.02	4.96	4.80
02/28/24	5.15	5.07	5.16	5.07	5.03	4.91	4.97	5.02	5.18	5.29	4.76	4.97	5.30	5.01	4.94	4.78
02/29/24	5.20	5.01	5.12	5.17	4.97	4.93	4.99	5.02	5.19	5.33	4.78	4.94	4.73	5.05	4.92	4.79

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
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	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
02/01/24	4.31	4.67	4.54	4.14	4.49	4.41	4.71	4.29	4.47	4.33	4.90	4.53	4.74	4.58	4.90	4.57
02/02/24	4.28	4.63	4.49	4.13	4.43	4.37	4.68	4.29	4.45	4.60	5.01	4.62	4.67	4.59	4.85	4.51
02/03/24	4.29	4.62	4.45	4.31	4.39	4.41	4.67	4.29	4.42	4.99	4.97	4.87	4.62	4.84	4.89	4.51
02/04/24	4.29	4.60	4.47	4.42	4.37	4.40	4.65	4.23	4.42	4.68	5.02	4.84	4.66	5.12	4.94	4.48
02/05/24	4.52	4.51	4.47	4.37	4.34	4.32	4.63	4.48	4.60	4.67	4.97	4.83	4.60	5.07	4.90	4.49
02/06/24	4.74	4.51	4.80	4.33	4.53	4.29	4.58	4.68	4.98	5.05	4.97	4.81	4.56	5.04	4.85	4.63
02/07/24	4.68	4.51	4.82	4.29	4.82	4.62	4.55	4.67	4.92	4.98	4.97	4.76	4.55	4.99	4.83	4.97
02/08/24	4.57	4.84	4.76	4.23	4.79	4.60	4.50	4.69	4.87	4.84	4.91	4.75	4.52	4.95	4.83	4.95
02/09/24	4.53	4.87	4.76	4.18	4.77	4.52	4.48	4.65	4.91	4.82	4.93	4.73	4.48	4.96	4.79	4.94
02/10/24	4.47	4.87	4.74	4.15	4.77	4.54	4.62	4.60	4.93	4.81	4.94	4.64	4.49	4.99	4.75	4.96
02/11/24	4.48	4.84	4.72	4.11	4.74	4.57	4.70	4.56	4.91	4.83	4.90	4.70	4.45	5.00	4.80	4.97
02/12/24	4.51	4.84	4.68	4.11	4.73	4.55	4.67	4.57	4.89	4.81	4.87	4.85	4.40	4.99	4.76	4.93
02/13/24	4.51	4.83	4.66	4.20	4.75	4.49	4.67	4.59	4.90	4.71	4.86	4.81	4.38	4.95	4.73	4.94
02/14/24	4.48	4.79	4.64	4.35	4.71	4.46	4.66	4.55	4.89	4.71	4.87	4.62	4.33	4.92	4.64	4.94
02/15/24	4.41	4.70	4.57	4.31	4.63	4.46	4.66	4.49	4.83	4.70	4.85	4.65	4.40	4.94	4.65	4.93
02/16/24	4.37	4.72	4.60	4.43	4.64	4.47	4.64	4.51	4.80	4.66	4.84	4.62	4.93	4.93	4.64	4.94
02/17/24	4.38	4.74	4.60	4.56	4.67	4.50	4.64	4.53	4.84	4.64	4.79	4.75	4.96	4.95	4.64	4.86
02/18/24	4.75	4.73	4.58	4.52	4.65	4.48	4.64	4.71	4.85	4.70	4.75	4.77	4.98	4.95	4.69	4.91
02/19/24	4.69	4.68	4.69	4.49	4.73	4.46	4.60	4.67	4.80	4.72	4.81	4.61	4.97	4.91	4.93	4.89
02/20/24	4.55	4.60	4.79	4.44	4.76	4.53	4.59	4.59	4.76	4.58	4.96	4.55	4.96	4.92	4.88	4.83
02/21/24	4.47	4.77	4.73	4.37	4.71	4.56	4.55	4.61	4.78	4.65	5.06	4.68	4.95	4.91	4.92	4.83
02/22/24	4.48	4.88	4.62	4.39	4.70	4.49	4.53	4.60	4.81	4.65	5.00	5.07	4.93	4.90	4.92	4.83
02/23/24	4.50	4.83	4.65	4.41	4.74	4.51	4.64	4.57	4.85	4.65	5.00	5.08	4.97	4.96	4.93	4.87
02/24/24	4.52	4.85	4.66	4.42	4.75	4.53	4.75	4.60	4.92	5.02	5.00	5.12	5.01	5.14	4.98	4.92
02/25/24	4.60	4.87	4.68	4.45	4.79	4.56	4.75	4.61	5.03	5.09	4.99	5.14	5.03	5.10	4.93	4.94
02/26/24	4.59	4.86	4.75	4.46	4.82	4.60	4.74	4.64	5.12	4.98	5.01	5.21	5.01	5.09	5.03	5.05
02/27/24	4.63	4.89	4.76	4.48	4.81	4.59	4.76	4.67	5.13	4.98	5.02	5.10	5.04	5.03	5.22	5.02
02/28/24	4.68	4.88	4.74	4.66	4.82	4.57	4.78	4.65	5.27	5.02	5.03	5.18	5.06	5.08	5.42	5.01
02/29/24	4.68	4.87	4.77	4.72	4.80	4.61	4.77	4.67	5.23	4.98	5.03	5.35	5.10	5.11	5.67	5.00

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
02/01/24	4.63	4.72	5.05	4.67	5.03	4.97	4.80	5.07	4.79	5.03	4.87	4.78	4.57	4.50	4.92	5.05
02/02/24	4.52	4.94	4.99	4.60	4.98	4.95	4.80	4.82	4.78	5.00	4.80	4.89	4.56	4.60	4.93	4.97
02/03/24	4.44	4.64	5.06	4.73	4.92	4.95	4.77	4.97	4.79	4.89	4.73	4.84	4.50	4.53	5.08	4.98
02/04/24	4.45	4.69	5.06	4.69	4.94	5.09	4.78	4.91	4.72	5.04	4.74	4.81	4.55	4.53	4.90	5.01
02/05/24	4.54	4.74	4.96	4.58	5.02	4.99	4.79	4.75	4.71	4.88	4.83	4.94	4.45	4.59	4.91	4.92
02/06/24	4.57	4.56	5.12	4.63	4.92	4.88	4.93	4.86	4.79	4.95	4.71	4.75	4.55	4.52	4.94	4.83
02/07/24	4.49	4.65	5.10	4.58	4.90	4.95	4.81	4.89	4.71	4.92	4.79	4.71	4.59	4.51	4.93	5.10
02/08/24	4.46	4.80	5.05	4.64	4.93	4.97	4.71	4.85	4.65	4.83	4.86	4.72	4.39	4.54	4.94	4.88
02/09/24	4.47	4.57	5.09	4.62	4.93	5.05	4.66	4.88	4.65	4.84	4.78	4.74	4.43	4.51	4.95	4.92
02/10/24	4.52	4.60	5.06	4.52	4.97	5.35	4.66	4.84	4.65	4.86	4.73	4.73	4.49	4.47	4.92	4.92
02/11/24	4.44	4.78	5.05	4.69	5.07	4.90	4.63	4.91	4.64	4.85	4.76	4.73	4.00	4.47	4.95	4.82
02/12/24	4.56	4.62	5.23	4.71	4.99	4.96	4.61	5.25	4.66	4.79	4.70	4.70	4.59	4.44	4.97	4.83
02/13/24	4.47	4.59	5.09	4.62	4.96	5.10	4.63	4.91	4.67	4.84	4.66	4.75	4.49	4.45	4.91	4.83
02/14/24	4.44	4.62	5.15	4.63	5.00	4.85	4.68	4.85	4.81	4.83	4.76	4.79	4.53	4.37	4.89	4.83
02/15/24	4.52	4.54	5.15	4.61	4.98	4.98	4.77	4.88	4.69	4.80	4.70	4.73	4.60	4.31	4.91	4.94
02/16/24	4.42	4.56	5.19	4.56	4.94	5.02	4.71	4.90	4.67	4.89	4.67	4.73	4.51	4.36	4.86	4.98
02/17/24	4.42	4.71	5.38	4.66	4.90	4.97	4.60	4.87	4.77	4.83	4.70	4.82	4.43	4.42	4.85	4.92
02/18/24	4.53	4.57	5.14	4.64	4.94	4.95	4.73	4.93	4.68	4.74	4.64	4.71	4.46	4.39	4.88	4.85
02/19/24	4.51	4.50	5.07	4.54	4.93	4.96	4.67	4.94	4.67	4.77	4.62	4.64	4.47	4.48	4.89	4.75
02/20/24	4.50	4.48	5.16	4.56	4.91	4.85	4.65	5.21	4.67	4.79	4.59	4.63	4.40	4.39	4.95	4.68
02/21/24	4.42	4.51	5.01	4.57	4.90	4.88	4.76	4.80	4.60	4.84	4.59	4.67	4.49	4.39	4.93	4.68
02/22/24	4.46	4.69	5.04	4.57	5.22	4.90	4.69	4.85	4.54	4.85	4.77	4.64	4.63	4.50	4.82	4.74
02/23/24	4.53	4.63	5.13	4.64	4.94	4.88	4.70	5.09	4.59	4.83	4.70	4.68	4.69	4.43	4.91	4.67
02/24/24	4.57	4.71	5.34	4.81	4.99	5.22	4.81	5.08	4.67	5.02	4.74	4.81	4.59	4.50	5.00	4.77
02/25/24	4.67	4.88	5.35	4.81	5.12	5.15	4.82	5.06	4.72	5.00	4.81	4.95	4.60	4.59	4.99	4.93
02/26/24	4.76	4.82	5.49	4.82	5.13	5.19	4.93	5.19	4.79	5.03	4.77	4.81	4.63	4.59	4.97	5.09
02/27/24	4.71	4.79	5.37	4.87	5.10	5.18	4.88	5.14	4.83	5.04	4.84	4.85	4.66	4.64	5.06	5.06
02/28/24	4.76	4.88	5.33	4.87	5.09	5.13	4.92	5.26	4.87	5.04	4.86	4.85	4.65	4.68	4.94	5.00
02/29/24	4.69	4.95	5.45	4.93	5.11	5.20	4.98	5.25	4.79	5.02	4.81	4.85	4.72	4.69	5.05	5.01

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
02/01/24	0.033	0.035	0.030	0.033	0.029	0.033	0.021	0.055	0.030	0.041	0.027	0.039	0.032	0.038	0.047	0.048	0.032	0.036	0.035	0.039	0.034	0.039	0.050	0.053	0.033
02/02/24	0.032	0.035	0.028	0.031	0.027	0.034	0.019	0.022	0.029	0.044	0.025	0.028	0.030	0.032	0.046	0.048	0.035	0.052	0.039	0.042	0.036	0.041	0.055	0.060	0.033
02/03/24	0.033	0.035	0.029	0.036	0.027	0.031	0.019	0.033	0.029	0.031	0.026	0.032	0.031	0.036	0.047	0.050	0.038	0.043	0.045	0.050	0.041	0.045	0.061	0.065	0.035
02/04/24	0.032	0.036	0.028	0.031	0.026	0.034	0.019	0.031	0.028	0.031	0.025	0.040	0.030	0.034	0.046	0.049	0.041	0.045	0.051	0.060	0.047	0.053	0.069	0.072	0.037
02/05/24	0.032	0.041	0.027	0.031	0.026	0.028	0.018	0.036	0.027	0.031	0.024	0.027	0.029	0.034	0.046	0.050	0.046	0.064	0.056	0.060	0.051	0.055	0.076	0.082	0.038
02/06/24	0.032	0.040	0.027	0.035	0.026	0.030	0.018	0.020	0.027	0.032	0.025	0.030	0.029	0.031	0.047	0.051	0.033	0.059	0.035	0.066	0.034	0.059	0.048	0.091	0.030
02/07/24	0.032	0.038	0.027	0.031	0.026	0.028	0.018	0.021	0.026	0.036	0.024	0.026	0.028	0.029	0.047	0.050	0.028	0.032	0.030	0.034	0.028	0.032	0.041	0.042	0.030
02/08/24	0.032	0.036	0.028	0.031	0.026	0.027	0.018	0.021	0.027	0.031	0.024	0.028	0.029	0.068	0.048	0.078	0.031	0.053	0.031	0.033	0.031	0.034	0.042	0.044	0.031
02/09/24	0.032	0.036	0.028	0.040	0.026	0.033	0.018	0.020	0.026	0.028	0.024	0.028	0.028	0.030	0.047	0.048	0.029	0.034	0.035	0.044	0.031	0.035	0.045	0.049	0.031
02/10/24	0.031	0.033	0.027	0.032	0.025	0.026	0.017	0.030	0.025	0.029	0.023	0.030	0.027	0.032	0.046	0.050	0.029	0.035	0.037	0.041	0.034	0.044	0.048	0.049	0.031
02/11/24	0.031	0.034	0.027	0.029	0.025	0.026	0.017	0.021	0.025	0.027	0.023	0.025	0.028	0.029	0.046	0.048	0.033	0.042	0.042	0.050	0.036	0.041	0.052	0.057	0.032
02/12/24	0.031	0.034	0.027	0.045	0.024	0.027	0.017	0.019	0.026	0.027	0.023	0.025	0.027	0.028	0.046	0.047	0.034	0.036	0.047	0.052	0.040	0.044	0.058	0.061	0.033
02/13/24	0.030	0.034	0.028	0.033	0.025	0.041	0.018	0.021	0.026	0.030	0.024	0.030	0.028	0.031	0.045	0.050	0.034	0.040	0.041	0.060	0.037	0.049	0.053	0.066	0.032
02/14/24	0.029	0.033	0.028	0.031	0.026	0.029	0.018	0.022	0.026	0.029	0.024	0.027	0.031	0.034	0.045	0.048	0.033	0.042	0.027	0.032	0.030	0.036	0.038	0.039	0.030
02/15/24	0.030	0.038	0.028	0.033	0.026	0.031	0.019	0.021	0.027	0.029	0.024	0.027	0.031	0.041	0.046	0.050	0.031	0.035	0.027	0.030	0.030	0.035	0.037	0.040	0.030
02/16/24	0.029	0.034	0.028	0.038	0.025	0.031	0.018	0.019	0.026	0.038	0.023	0.032	0.032	0.065	0.045	0.047	0.032	0.046	0.027	0.032	0.030	0.035	0.038	0.039	0.029
02/17/24	0.029	0.034	0.027	0.030	0.025	0.028	0.018	0.034	0.026	0.028	0.024	0.031	0.030	0.055	0.045	0.049	0.031	0.035	0.029	0.038	0.030	0.035	0.038	0.043	0.029
02/18/24	0.029	0.033	0.027	0.029	0.025	0.027	0.017	0.021	0.026	0.031	0.025	0.070	0.030	0.033	0.044	0.049	0.030	0.034	0.030	0.032	0.031	0.037	0.038	0.041	0.029
02/19/24	0.029	0.031	0.028	0.034	0.026	0.028	0.018	0.021	0.026	0.034	0.024	0.028	0.031	0.044	0.044	0.046	0.032	0.047	0.033	0.038	0.033	0.042	0.038	0.039	0.030
02/20/24	0.027	0.031	0.026	0.031	0.025	0.028	0.018	0.020	0.028	0.030	0.024	0.026	0.033	0.035	0.046	0.049	0.034	0.039	0.033	0.040	0.029	0.039	0.041	0.044	0.030
02/21/24	0.025	0.026	0.025	0.027	0.025	0.031	0.018	0.046	0.028	0.031	0.023	0.026	0.033	0.035	0.048	0.048	0.037	0.039	0.028	0.031	0.025	0.029	0.028	0.043	0.029
02/22/24	0.024	0.027	0.024	0.027	0.025	0.045	0.017	0.043	0.028	0.051	0.023	0.028	0.032	0.034	0.047	0.048	0.038	0.046	0.028	0.038	0.025	0.037	0.020	0.022	0.028
02/23/24	0.024	0.031	0.023	0.025	0.024	0.025	0.016	0.017	0.027	0.049	0.022	0.024	0.031	0.033	0.046	0.060	0.036	0.038	0.027	0.036	0.024	0.027	0.020	0.024	0.027
02/24/24	0.025	0.031	0.023	0.025	0.024	0.028	0.015	0.017	0.026	0.028	0.022	0.034	0.032	0.041	0.046	0.048	0.036	0.039	0.026	0.030	0.024	0.032	0.019	0.022	0.027
02/25/24	0.025	0.037	0.024	0.028	0.025	0.029	0.016	0.018	0.027	0.035	0.022	0.024	0.033	0.040	0.047	0.052	0.039	0.047	0.028	0.065	0.024	0.032	0.019	0.030	0.027
02/26/24	0.024	0.034	0.026	0.047	0.025	0.027	0.017	0.021	0.027	0.028	0.022	0.024	0.032	0.033	0.047	0.053	0.037	0.046	0.028	0.032	0.024	0.028	0.020	0.025	0.027
02/27/24	0.024	0.027	0.025	0.030	0.025	0.026	0.017	0.020	0.027	0.029	0.023	0.034	0.031	0.033	0.046	0.049	0.037	0.043	0.026	0.028	0.024	0.028	0.019	0.021	0.027
02/28/24	0.026	0.037	0.024	0.027	0.025	0.028	0.016	0.022	0.027	0.030	0.022	0.033	0.032	0.035	0.047	0.049	0.038	0.045	0.027	0.037	0.024	0.028	0.019	0.022	0.027
02/29/24	0.033	0.035	0.025	0.028	0.025	0.028	0.018	0.023	0.028	0.030	0.023	0.024	0.033	0.038	0.047	0.049	0.039	0.044	0.027	0.030	0.025	0.028	0.025	0.030	0.029

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
02/01/24	0.015	0.015	7.656	7.128	8.724	0.037	0.030	0.049	1,685	1,493	1,933	26	22	32	99.51	2.31	98.47	1.82
02/02/24	0.015	0.015	7.470	6.828	8.643	0.037	0.029	0.042	1,618	1,496	1,766	24	21	28	99.51	2.31	98.49	1.82
02/03/24	0.015	0.015	8.302	7.601	9.419	0.039	0.033	0.043	1,727	1,675	1,804	26	23	29	99.53	2.33	98.51	1.83
02/04/24	0.015	0.015	8.559	7.709	9.564	0.038	0.029	0.065	1,682	1,626	1,751	25	23	29	99.55	2.35	98.51	1.83
02/05/24	0.015	0.015	8.270	6.855	9.627	0.033	0.024	0.043	1,488	1,401	1,645	22	19	25	99.60	2.39	98.51	1.83
02/06/24	0.015	0.015	8.095	7.153	9.142	0.038	0.024	0.056	1,515	1,455	1,613	21	18	24	99.53	2.33	98.61	1.86
02/07/24	0.015	0.015	8.307	7.503	9.041	0.038	0.031	0.056	1,701	1,521	1,880	24	20	30	99.54	2.34	98.59	1.85
02/08/24	0.015	0.015	8.336	7.549	9.107	0.032	0.030	0.037	1,808	1,693	1,923	27	24	31	99.61	2.41	98.52	1.83
02/09/24	0.017	0.020	8.136	7.410	9.196	0.035	0.031	0.042	1,885	1,787	1,971	28	25	31	99.57	2.36	98.51	1.83
02/10/24	0.020	0.020	7.905	7.219	8.471	0.036	0.029	0.041	1,874	1,813	1,931	28	26	31	99.55	2.35	98.49	1.82
02/11/24	0.019	0.020	8.000	7.116	9.181	0.034	0.028	0.047	1,792	1,731	1,864	26	24	29	99.57	2.37	98.53	1.83
02/12/24	0.020	0.020	8.173	7.253	9.238	0.034	0.030	0.041	1,772	1,696	1,875	25	22	28	99.59	2.39	98.59	1.85
02/13/24	0.019	0.020	8.366	7.654	9.337	0.038	0.033	0.053	1,770	1,678	1,862	25	23	29	99.54	2.34	98.56	1.84
02/14/24	0.020	0.020	8.552	7.444	10.149	0.042	0.034	0.069	1,802	1,705	1,942	27	24	33	99.51	2.31	98.48	1.82
02/15/24	0.019	0.020	8.636	7.659	10.366	0.043	0.033	0.051	1,813	1,740	1,888	26	24	30	99.51	2.31	98.54	1.84
02/16/24	0.016	0.020	7.691	6.877	8.652	0.050	0.047	0.060	1,749	1,679	1,827	26	23	29	99.35	2.19	98.52	1.83
02/17/24	0.013	0.013	7.352	6.831	7.901	0.051	0.047	0.054	1,721	1,668	1,793	25	23	29	99.31	2.16	98.54	1.83
02/18/24	0.013	0.013	7.270	6.695	7.883	0.048	0.044	0.052	1,664	1,602	1,747	24	22	28	99.33	2.18	98.53	1.83
02/19/24	0.013	0.013	7.580	6.886	8.453	0.049	0.047	0.054	1,661	1,584	1,780	26	22	31	99.35	2.19	98.46	1.81
02/20/24	0.013	0.013	7.557	6.784	8.504	0.049	0.044	0.054	1,619	1,588	1,695	24	22	27	99.36	2.19	98.51	1.83
02/21/24	0.013	0.013	7.251	6.685	7.868	0.049	0.044	0.126 *	1,675	1,573	1,820	24	22	27	99.33	2.17	98.56	1.84
02/22/24	0.013	0.013	7.448	6.977	8.001	0.052	0.047	0.059	1,778	1,715	1,867	25	23	30	99.30	2.16	98.58	1.85
02/23/24	0.013	0.013	7.239	6.862	7.765	0.053	0.049	0.062	1,820	1,739	1,905	25	22	29	99.27	2.13	98.60	1.85
02/24/24	0.013	0.013	7.231	6.749	8.298	0.055	0.048	0.062	1,813	1,759	1,885	26	24	28	99.24	2.12	98.57	1.84
02/25/24	0.013	0.013	7.315	6.628	7.898	0.053	0.044	0.062	1,763	1,702	1,850	25	24	28	99.28	2.14	98.56	1.84
02/26/24	0.013	0.013	7.482	6.971	8.065	0.055	0.050	0.086	1,717	1,633	1,825	26	23	29	99.26	2.13	98.50	1.82
02/27/24	0.013	0.013	7.574	7.103	8.235	0.064	0.051	0.081	1,769	1,681	1,875	26	24	29	99.16	2.08	98.50	1.83
02/28/24	0.013	0.013	7.435	6.963	8.059	0.059	0.050	0.072	1,785	1,700	1,888	26	24	29	99.21	2.10	98.54	1.83
02/29/24	0.013	0.013	7.374	6.866	8.026	0.055	0.048	0.066	1,777	1,720	1,854	26	24	28	99.25	2.13	98.56	1.84

Notes:

* Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
02/01/24	96.80	112.770	37,752.7	0.34	4	6
02/02/24	96.77	114.627	38,370.0	0.34	4	6
02/03/24	96.63	109.958	37,448.3	0.33	4	6
02/04/24	96.54	109.246	36,498.4	0.33	4	6
02/05/24	95.95	112.861	38,209.4	0.35	4	6
02/06/24	96.15	94.236	38,466.4	0.34	4	6
02/07/24	96.04	114.651	33,971.8	0.34	4	6
02/08/24	96.10	114.615	38,375.1	0.33	4	6
02/09/24	96.50	114.588	38,357.0	0.33	4	6
02/10/24	96.24	114.544	38,354.9	0.33	4	6
02/11/24	96.37	114.698	38,379.5	0.33	4	6
02/12/24	96.28	114.769	38,388.4	0.33	4	6
02/13/24	96.38	113.683	38,384.4	0.34	4	6
02/14/24	96.29	112.068	38,377.9	0.34	4	6
02/15/24	96.18	109.167	38,205.1	0.34	4	6
02/16/24	96.33	110.756	38,272.6	0.35	4	6
02/17/24	96.42	109.552	38,289.3	0.35	4	6
02/18/24	96.49	109.568	38,351.3	0.35	4	6
02/19/24	96.29	113.036	38,380.3	0.35	4	6
02/20/24	95.95	114.502	38,360.2	0.34	4	6
02/21/24	95.85	114.450	38,233.8	0.34	4	6
02/22/24	96.31	114.210	38,580.8	0.34	4	6
02/23/24	97.01	92.318	37,243.4	0.33	4	6
02/24/24	97.53	80.043	31,195.8	0.35	4	6
02/25/24	97.52	80.034	28,129.1	0.35	4	6
02/26/24	97.04	80.214	28,129.8	0.35	4	6
02/27/24	97.39	79.319	28,131.5	0.35	4	6
02/28/24	97.45	80.017	28,144.1	0.35	4	6
02/29/24	97.16	80.134	28,182.3	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
03/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/02/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/04/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/05/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/17/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/18/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/20/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/23/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/24/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/25/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/26/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/27/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
03/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/30/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/31/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

* GWRS offline for a planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	LRV	LRV	LRV	LRV	LRV
03/01/24	0.00	4.63	2.17	6.00	0	12.80
03/02/24	0.00	4.60	2.20	6.00	0	12.80
03/03/24	0.00	4.62	2.23	6.00	0	12.85
03/04/24	0.00	4.63	2.23	6.00	0	12.86
03/05/24	0.00	4.61	2.22	6.00	0	12.83
03/06/24	0.00	4.63	2.20	6.00	0	12.83
03/07/24	0.00	4.64	2.23	6.00	0	12.87
03/08/24	0.00	4.64	2.13	6.00	0	12.77
03/09/24	0.00	4.69	2.24	6.00	0	12.93
03/10/24	0.00	4.71	2.25	6.00	0	12.96
03/11/24	0.00	4.69	2.28	6.00	0	12.96
03/12/24	0.00	4.67	2.19	6.00	0	12.86
03/13/24	0.00	4.66	2.11	6.00	0	12.77
03/14/24	0.00	4.71	2.04	6.00	0	12.75
03/15/24	0.00	4.69	2.17	6.00	0	12.86
03/16/24	0.00	4.48	2.19	6.00	0	12.67
03/17/24	0.00	4.57	2.19	6.00	0	12.77
03/18/24	0.00	4.60	2.23	6.00	0	12.83
03/19/24	0.00	4.66	2.19	6.00	0	12.85
03/20/24	0.00	4.65	2.12	6.00	0	12.77
03/21/24	0.00	4.64	2.09	6.00	0	12.73
03/22/24	0.00	4.62	2.12	6.00	0	12.74
03/23/24	0.00	4.52	2.26	6.00	0	12.78
03/24/24	0.00	4.41	2.30	6.00	0	12.70
03/25/24	0.00	4.36	2.30	6.00	0	12.66
03/26/24	0.00	4.41	2.26	6.00	0	12.68
03/27/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
03/28/24	0.00	4.49	2.07	6.00	0	12.56
03/29/24	0.00	4.27	2.23	6.00	0	12.50
03/30/24	0.00	4.27	2.33	6.00	0	12.60
03/31/24	0.00	4.26	2.34	6.00	0	12.60

Notes:

* GWRS offline for a planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
03/01/24	0.00	0.00	2.17	6.00	4	12.17
03/02/24	0.00	0.00	2.20	6.00	4	12.20
03/03/24	0.00	0.00	2.23	6.00	4	12.23
03/04/24	0.00	0.00	2.23	6.00	4	12.23
03/05/24	0.00	0.00	2.22	6.00	4	12.22
03/06/24	0.00	0.00	2.20	6.00	4	12.20
03/07/24	0.00	0.00	2.23	6.00	4	12.23
03/08/24	0.00	0.00	2.13	6.00	4	12.13
03/09/24	0.00	0.00	2.24	6.00	4	12.24
03/10/24	0.00	0.00	2.25	6.00	4	12.25
03/11/24	0.00	0.00	2.28	6.00	4	12.28
03/12/24	0.00	0.00	2.19	6.00	4	12.19
03/13/24	0.00	0.00	2.11	6.00	4	12.11
03/14/24	0.00	0.00	2.04	6.00	4	12.04
03/15/24	0.00	0.00	2.17	6.00	4	12.17
03/16/24	0.00	0.00	2.19	6.00	4	12.19
03/17/24	0.00	0.00	2.19	6.00	4	12.19
03/18/24	0.00	0.00	2.23	6.00	4	12.23
03/19/24	0.00	0.00	2.19	6.00	4	12.19
03/20/24	0.00	0.00	2.12	6.00	4	12.12
03/21/24	0.00	0.00	2.09	6.00	4	12.09
03/22/24	0.00	0.00	2.12	6.00	4	12.12
03/23/24	0.00	0.00	2.26	6.00	4	12.26
03/24/24	0.00	0.00	2.30	6.00	4	12.30
03/25/24	0.00	0.00	2.30	6.00	4	12.30
03/26/24	0.00	0.00	2.26	6.00	4	12.26
03/27/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
03/28/24	0.00	0.00	2.07	6.00	4	12.07
03/29/24	0.00	0.00	2.23	6.00	4	12.23
03/30/24	0.00	0.00	2.33	6.00	4	12.33
03/31/24	0.00	0.00	2.34	6.00	4	12.34

Notes:

* GWRS offline for a planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
03/01/24	5.11	5.07	5.09	5.19	4.97	4.94	5.00	5.02	5.16	5.30	4.78	5.05	5.42	5.06	5.02	4.98
03/02/24	5.09	5.10	5.14	5.16	4.98	4.98	4.99	5.01	5.14	5.28	4.77	5.01	4.83	5.04	4.99	5.08
03/03/24	5.15	5.12	5.06	5.20	4.99	5.06	5.00	5.03	5.09	5.29	4.77	5.01	4.81	5.00	4.99	5.07
03/04/24	5.12	5.09	5.09	5.14	4.90	5.04	4.96	4.97	5.08	5.32	4.74	5.00	5.06	5.00	4.97	5.01
03/05/24	5.09	5.02	5.14	5.11	4.88	5.04	4.93	4.99	5.07	5.34	4.69	4.95	5.42	4.97	4.93	4.99
03/06/24	5.04	5.04	5.12	5.10	4.89	4.97	4.96	4.97	5.06	5.33	4.71	4.93	5.49	4.97	4.93	5.01
03/07/24	5.21	5.07	5.17	5.09	4.95	5.00	4.98	4.97	5.05	5.34	4.71	5.00	5.22	4.98	4.94	5.02
03/08/24	5.13	5.13	5.36	5.16	5.03	5.14	5.17	4.96	5.19	5.45	4.87	5.00	5.33	5.07	5.01	5.12
03/09/24	5.21	5.06	5.26	5.12	5.03	5.14	5.10	5.02	5.17	5.47	4.82	4.96	5.24	5.05	4.97	4.89
03/10/24	5.24	5.13	5.33	N/A**	N/A**	N/A**	N/A**	N/A**	5.17	5.53	4.85	4.98	5.27	5.02	5.00	4.86
03/11/24	5.14	5.08	5.27	5.16	5.04	5.12	N/A**	N/A**	5.15	5.42	4.79	4.98	5.23	5.01	4.97	4.89
03/12/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.12	5.37	4.78	4.96	5.19	4.99	4.96	4.87
03/13/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.20	5.55	4.80	4.99	5.26	5.04	5.01	4.90
03/14/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.12	5.49	4.80	5.00	5.23	4.98	5.00	4.86
03/15/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.25	5.50	4.83	5.04	5.28	5.04	5.02	4.87
03/16/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.23	5.42	4.83	5.03	5.19	5.02	4.98	4.89
03/17/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/18/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.19	5.46	4.88	5.01	5.21	4.99	4.99	5.03
03/19/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.19	5.40	4.83	5.01	5.20	5.00	4.98	5.01
03/20/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.09	5.39	4.82	5.02	5.24	5.03	4.97	5.03
03/21/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.10	5.46	4.81	4.98	5.22	5.00	4.97	5.03
03/22/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	5.00	5.22	4.84	4.95	5.17	4.92	4.90	4.98
03/23/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.94	5.14	4.80	4.90	5.11	4.91	4.90	4.92
03/24/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.95	5.06	4.75	4.83	5.08	4.90	4.90	4.90
03/25/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.92	5.07	4.73	4.83	5.07	4.87	4.87	4.92
03/26/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.94	5.10	4.77	4.87	5.10	4.86	4.89	4.92
03/27/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
03/28/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.98	5.24	4.81	4.94	5.13	4.97	4.92	4.92
03/29/24	5.17	5.10	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.83	5.13	4.73	4.87	5.02	4.85	4.87	4.92
03/30/24	5.06	4.95	5.15	N/A**	N/A**	N/A**	N/A**	N/A**	4.78	5.00	4.69	4.84	5.03	4.78	4.90	4.92
03/31/24	5.01	4.97	5.10	5.21	N/A**	N/A**	N/A**	N/A**	4.78	4.98	4.69	4.90	5.01	4.83	4.82	4.87

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

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** Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results — Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
03/01/24	4.67	4.87	4.76	4.63	4.77	4.63	4.75	4.64	5.13	4.99	5.04	5.13	5.07	5.09	5.63	5.01
03/02/24	4.78	4.83	4.69	4.60	4.89	4.64	4.77	4.73	5.12	4.99	5.03	4.92	5.05	5.10	5.08	5.00
03/03/24	4.84	4.84	4.75	4.62	4.90	4.67	4.77	4.76	5.14	4.98	5.02	5.09	5.06	5.12	5.07	5.01
03/04/24	4.83	4.81	4.85	4.64	4.86	4.68	4.74	4.72	5.10	4.98	5.03	5.19	5.06	5.08	5.04	4.97
03/05/24	4.81	4.88	4.84	4.63	4.83	4.65	4.72	4.73	5.05	4.92	5.04	5.09	5.14	5.08	5.01	4.94
03/06/24	4.81	4.94	4.82	4.63	4.82	4.63	4.70	4.74	5.03	4.89	5.05	4.97	5.23	5.05	4.97	4.95
03/07/24	4.81	5.00	4.85	4.64	4.89	4.68	4.73	4.73	5.17	4.94	5.07	5.35	5.31	5.09	5.07	5.00
03/08/24	4.90	5.03	4.88	4.64	4.91	4.67	4.81	4.73	5.17	4.93	5.08	5.45	5.28	5.07	5.04	5.00
03/09/24	4.96	5.02	4.96	4.77	4.87	4.74	4.88	4.81	5.20	5.10	5.14	5.10	5.39	5.22	N/A**	N/A**
03/10/24	4.92	5.00	4.90	4.71	4.87	4.72	4.85	4.77	5.17	5.08	5.14	N/A**	N/A**	N/A**	N/A**	N/A**
03/11/24	4.96	5.07	4.86	4.69	4.90	4.69	4.80	4.75	5.16	5.02	5.07	5.25	N/A**	N/A**	N/A**	N/A**
03/12/24	4.88	5.03	4.85	4.68	4.86	4.67	4.76	4.81	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/13/24	4.87	5.00	4.84	4.66	4.87	4.68	4.78	4.81	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/14/24	4.85	5.02	4.90	4.71	4.91	4.71	4.86	4.79	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/15/24	4.82	5.01	4.87	4.69	4.89	4.69	4.85	4.77	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/16/24	4.96	5.02	4.86	4.68	4.93	4.48	4.84	4.76	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/17/24	4.92	5.00	4.81	4.65	4.91	4.57	4.84	4.72	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/18/24	4.87	4.97	4.79	4.63	4.88	4.66	4.83	4.68	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/19/24	4.90	4.66	4.90	4.67	4.88	4.69	4.83	4.75	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/20/24	4.90	4.81	4.84	4.66	4.87	4.69	4.83	4.74	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/21/24	5.00	4.64	4.91	4.72	4.94	4.69	4.82	4.76	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/22/24	4.87	4.85	4.83	4.69	4.90	4.67	4.80	4.74	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/23/24	4.72	4.91	4.73	4.52	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/24/24	4.65	4.86	4.69	4.49	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/25/24	4.60	4.83	4.66	4.46	4.81	4.62	4.73	4.64	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/26/24	N/A**	N/A**	N/A**	N/A**	4.80	4.61	4.70	4.54	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/27/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
03/28/24	4.90	4.91	4.99	4.70	4.93	4.73	4.82	4.74	5.16	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/29/24	4.57	4.73	4.73	4.41	4.70	4.52	4.60	4.48	5.14	5.13	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
03/30/24	4.48	4.65	4.65	4.27	4.96	4.51	4.68	4.50	5.08	4.98	5.06	N/A**	N/A**	N/A**	N/A**	N/A**
03/31/24	4.44	4.67	4.67	4.28	4.68	4.48	4.65	4.42	5.13	4.93	5.00	N/A**	N/A**	N/A**	N/A**	N/A**

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

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** Cell out of service due to low production setpoint.

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system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
03/01/24	4.70	5.00	5.40	4.95	5.12	5.23	4.96	5.16	4.76	4.97	4.77	4.86	4.68	4.67	5.01	4.95
03/02/24	4.71	4.87	5.17	4.88	5.09	5.14	4.90	5.18	4.85	5.01	4.78	4.88	4.67	4.64	5.01	4.99
03/03/24	4.65	4.90	5.04	4.92	5.11	5.16	4.91	5.18	4.80	5.11	4.75	4.84	4.68	4.65	5.02	5.01
03/04/24	4.63	4.92	5.04	4.88	5.13	5.20	4.85	5.17	4.79	5.03	4.79	4.86	4.64	4.67	4.95	4.93
03/05/24	4.64	4.85	5.07	4.80	5.15	5.21	4.84	5.22	4.82	5.10	4.75	4.89	4.62	4.61	4.99	5.05
03/06/24	4.67	4.88	5.04	4.80	5.13	5.15	4.98	5.19	4.81	5.11	4.78	4.86	4.70	4.65	5.02	5.05
03/07/24	4.71	4.97	5.14	4.79	5.14	5.25	4.95	5.44	4.83	5.10	4.83	4.92	4.68	4.74	5.05	4.90
03/08/24	4.71	4.98	5.21	4.78	5.14	5.28	4.98	5.64	4.87	5.08	4.82	4.91	4.68	4.72	5.05	5.08
03/09/24	4.77	4.97	5.16	4.98	5.13	5.26	5.02	5.68	4.87	5.08	4.83	4.89	4.69	4.72	5.07	5.05
03/10/24	4.77	4.97	5.11	4.98	5.16	5.25	4.98	5.61	4.84	5.09	4.80	4.92	4.73	4.73	5.09	5.03
03/11/24	4.75	5.01	5.10	4.86	5.18	5.26	5.01	5.53	4.84	5.12	4.80	4.88	4.71	4.75	5.07	5.02
03/12/24	4.71	5.07	5.05	4.90	5.16	5.28	4.98	5.37	4.85	5.13	4.78	4.88	4.72	4.76	5.03	5.03
03/13/24	4.72	4.97	5.07	4.94	5.14	5.20	4.97	5.23	4.89	5.08	4.77	4.88	4.73	4.71	5.06	5.06
03/14/24	4.72	4.95	5.05	4.87	5.16	5.21	5.01	5.28	4.84	5.08	4.77	4.87	4.72	4.72	5.08	4.97
03/15/24	4.71	4.85	5.02	4.75	5.12	5.20	4.95	5.25	4.82	5.06	4.82	4.87	4.69	4.72	5.05	4.95
03/16/24	4.71	4.85	5.08	4.73	5.13	5.17	4.94	5.37	4.81	5.08	4.79	4.85	4.67	4.67	5.04	4.95
03/17/24	4.61	4.84	5.04	4.79	5.15	5.13	4.97	5.37	4.84	5.09	4.77	4.83	4.78	4.64	5.05	4.95
03/18/24	4.60	4.88	5.09	4.89	5.12	5.23	4.96	5.29	4.83	5.04	4.82	4.85	4.71	4.66	5.05	4.96
03/19/24	4.72	4.88	5.16	4.95	5.13	5.19	4.93	5.33	4.84	5.05	4.82	4.88	4.68	4.66	5.04	4.98
03/20/24	4.69	4.93	5.06	4.87	5.14	5.19	4.94	5.44	4.83	5.08	4.81	4.87	4.73	4.65	5.05	4.98
03/21/24	4.72	4.93	5.05	4.85	5.14	5.20	4.97	5.42	4.83	5.11	4.82	4.92	4.69	4.65	5.04	4.95
03/22/24	4.65	4.80	5.11	4.83	5.14	5.17	4.96	5.42	4.86	5.11	4.80	4.90	4.68	4.62	5.02	4.95
03/23/24	4.57	4.71	4.86	4.65	5.03	5.04	4.92	5.14	4.70	5.05	4.69	4.81	4.53	4.52	4.87	4.84
03/24/24	4.49	4.55	4.94	4.55	4.94	4.92	4.74	4.89	4.69	4.75	4.66	4.78	4.44	4.41	4.84	4.93
03/25/24	4.37	4.68	5.09	4.46	5.09	4.98	4.72	4.88	4.72	4.76	4.65	4.66	4.41	4.36	4.86	4.79
03/26/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.71	4.94	4.62	4.61	4.46	4.41	4.91	4.74
03/27/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
03/28/24	4.49	4.60	5.23	4.71	5.00	5.18	4.92	5.11	4.68	5.04	4.55	4.66	4.50	4.56	5.07	4.86
03/29/24	4.36	4.53	5.21	4.60	4.88	4.77	4.60	4.80	4.59	4.71	4.47	4.43	4.36	4.27	4.75	4.81
03/30/24	4.33	4.35	5.16	4.42	4.95	4.81	4.79	4.98	4.59	4.75	4.61	4.69	4.51	4.27	4.79	4.66
03/31/24	4.42	4.34	5.14	4.57	4.83	4.96	4.61	4.26	4.52	4.98	4.58	4.69	4.39	4.40	4.83	4.80

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	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
03/01/24	0.031	0.035	0.024	0.028	0.027	0.031	0.020	0.033	0.028	0.031	0.023	0.024	0.033	0.035	0.047	0.052	0.041	0.048	0.026	0.029	0.027	0.029	0.028	0.029	0.030
03/02/24	0.030	0.041	0.025	0.028	0.026	0.031	0.020	0.026	0.028	0.038	0.024	0.030	0.032	0.034	0.046	0.048	0.041	0.046	0.027	0.030	0.026	0.029	0.028	0.030	0.029
03/03/24	0.030	0.039	0.025	0.039	0.026	0.029	0.020	0.028	0.028	0.032	0.024	0.026	0.033	0.039	0.046	0.047	0.040	0.042	0.026	0.031	0.026	0.032	0.028	0.030	0.029
03/04/24	0.029	0.032	0.025	0.027	0.027	0.033	0.019	0.023	0.028	0.032	0.024	0.026	0.034	0.038	0.046	0.049	0.041	0.049	0.026	0.031	0.026	0.030	0.029	0.029	0.030
03/05/24	0.027	0.033	0.023	0.030	0.025	0.029	0.021	0.024	0.028	0.032	0.024	0.028	0.036	0.039	0.040	0.048	0.037	0.045	0.026	0.031	0.027	0.031	0.026	0.029	0.028
03/06/24	0.025	0.029	0.022	0.025	0.024	0.026	0.022	0.026	0.025	0.026	0.023	0.024	0.036	0.039	0.035	0.037	0.035	0.043	0.025	0.028	0.029	0.036	0.025	0.028	0.026
03/07/24	0.027	0.036	0.023	0.028	0.024	0.032	0.024	0.037	0.027	0.075	0.023	0.031	0.036	0.050	0.036	0.044	0.037	0.043	0.025	0.032	0.029	0.035	0.025	0.029	0.028
03/08/24	0.032	0.040	0.025	0.040	0.025	0.028	0.025	0.031	0.026	0.044	0.024	0.033	0.034	0.040	0.036	0.045	0.036	0.041	0.025	0.031	0.028	0.032	0.026	0.027	0.029
03/09/24	0.028	0.036	0.022	0.032	0.022	0.026	0.020	0.023	0.026	0.031	0.027	0.035	0.037	0.042	0.040	0.054	0.036	0.039	0.025	0.028	0.029	0.034	0.026	0.029	0.027
03/10/24	0.030	0.035	N/A**	N/A**	0.025	0.032	0.023	0.035	0.024	0.026	0.024	0.026	0.034	0.037	N/A**	N/A**	0.037	0.040	0.025	0.029	0.029	0.033	0.026	0.028	0.028
03/11/24	0.027	0.034	0.023	0.026	0.023	0.025	0.021	0.024	0.025	0.034	0.024	0.028	0.037	0.042	N/A**	N/A**	0.036	0.043	0.026	0.031	0.029	0.032	0.026	0.027	0.027
03/12/24	N/A**	N/A**	N/A**	N/A**	0.022	0.025	0.020	0.024	0.025	0.039	0.023	0.046	N/A**	N/A**	N/A**	N/A**	0.035	0.040	0.024	0.030	0.027	0.031	0.022	0.026	0.026
03/13/24	N/A**	N/A**	N/A**	N/A**	0.026	0.030	0.025	0.036	0.027	0.035	0.027	0.056	N/A**	N/A**	N/A**	N/A**	0.038	0.052	0.026	0.041	0.029	0.040	0.022	0.034	0.029
03/14/24	N/A**	N/A**	N/A**	N/A**	0.025	0.027	0.023	0.025	0.031	0.039	0.030	0.075	N/A**	N/A**	N/A**	N/A**	0.038	0.041	0.027	0.030	0.030	0.034	0.022	0.024	0.028
03/15/24	N/A**	N/A**	N/A**	N/A**	0.027	0.038	0.025	0.026	0.027	0.030	0.025	0.028	N/A**	N/A**	N/A**	N/A**	0.039	0.045	0.027	0.031	0.030	0.033	0.023	0.025	0.029
03/16/24	N/A**	N/A**	N/A**	N/A**	0.024	0.027	0.022	0.025	0.027	0.029	0.025	0.027	N/A**	N/A**	N/A**	N/A**	0.039	0.042	0.027	0.030	0.031	0.033	0.024	0.026	0.028
03/17/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	0.026	0.037	0.023	0.026	N/A**	N/A**	N/A**	N/A**	0.039	0.046	0.028	0.030	0.030	0.034	0.024	0.026	0.028
03/18/24	N/A**	N/A**	N/A**	N/A**	0.024	0.028	0.022	0.025	0.026	0.027	0.023	0.025	N/A**	N/A**	N/A**	N/A**	0.040	0.054	0.027	0.030	0.030	0.034	0.023	0.025	0.028
03/19/24	N/A**	N/A**	N/A**	N/A**	0.023	0.028	0.022	0.024	0.026	0.029	0.023	0.029	N/A**	N/A**	N/A**	N/A**	0.036	0.044	0.026	0.030	0.028	0.033	0.022	0.025	0.027
03/20/24	N/A**	N/A**	N/A**	N/A**	0.024	0.026	0.022	0.025	0.026	0.028	0.022	0.024	N/A**	N/A**	N/A**	N/A**	0.034	0.036	0.026	0.030	0.028	0.033	0.021	0.024	0.026
03/21/24	N/A**	N/A**	N/A**	N/A**	0.023	0.025	0.021	0.024	0.027	0.029	0.024	0.028	N/A**	N/A**	N/A**	N/A**	0.035	0.044	0.026	0.027	0.028	0.030	0.021	0.022	0.026
03/22/24	N/A**	N/A**	N/A**	N/A**	0.025	0.035	0.023	0.025	0.026	0.029	0.023	0.024	N/A**	N/A**	N/A**	N/A**	0.035	0.039	0.026	0.032	0.028	0.029	0.021	0.024	0.026
03/23/24	N/A**	N/A**	N/A**	N/A**	0.023	0.025	0.021	0.022	0.026	0.028	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	0.034	0.036	0.026	0.031	0.028	0.033	0.021	0.021	0.026
03/24/24	N/A**	N/A**	N/A**	N/A**	0.023	0.024	0.021	0.022	0.026	0.030	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	0.035	0.043	0.026	0.032	0.029	0.031	0.021	0.023	0.026
03/25/24	N/A**	N/A**	N/A**	N/A**	0.022	0.025	0.021	0.022	0.026	0.030	0.024	0.074	N/A**	N/A**	N/A**	N/A**	0.034	0.037	0.026	0.031	0.028	0.030	0.021	0.023	0.025
03/26/24	N/A**	N/A**	N/A**	N/A**	0.023	0.026	0.022	0.025	N/A**	N/A**	0.024	0.028	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	0.029	0.030	0.021	0.022	0.025
03/27/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
03/28/24	N/A**	N/A**	N/A**	N/A**	0.024	0.028	0.022	0.026	0.028	0.046	0.025	0.029	0.036	0.036	N/A**	N/A**	0.037	0.047	0.030	0.053	0.031	0.034	0.022	0.024	0.026
03/29/24	0.041	0.118	N/A**	N/A**	0.024	0.032	0.022	0.024	0.027	0.035	0.024	0.025	0.048	0.109	N/A**	N/A**	0.037	0.041	0.029	0.030	0.031	0.034	0.022	0.022	0.029
03/30/24	0.037	0.111	N/A**	N/A**	0.025	0.026	0.022	0.024	0.027	0.030	0.024	0.033	0.043	0.063	N/A**	N/A**	0.036	0.039	0.029	0.031	0.031	0.037	0.023	0.025	0.030
03/31/24	0.034	0.092	N/A**	N/A**	0.022	0.023	0.020	0.022	0.025	0.026	0.022	0.024	0.038	0.040	N/A**	N/A**	0.035	0.038	0.027	0.029	0.029	0.033	0.023	0.025	0.027

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* GWRS offline for a planned outage.

** Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
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system no. 3090001 , Project no. 745

	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
Date	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
03/01/24	0.013	0.013	7.998	7.030	8.774	0.054	0.049	0.056	1,752	1,674	1,837	25	23	27	99.32	2.17	98.58	1.85
03/02/24	0.013	0.013	8.351	7.643	9.140	0.053	0.046	0.058	1,717	1,655	1,781	24	23	26	99.37	2.20	98.61	1.86
03/03/24	0.013	0.013	8.369	7.728	9.171	0.050	0.043	0.054	1,660	1,598	1,760	23	21	26	99.40	2.23	98.63	1.86
03/04/24	0.013	0.013	8.498	7.716	9.464	0.050	0.046	0.060	1,652	1,564	1,747	22	20	25	99.41	2.23	98.66	1.87
03/05/24	0.013	0.013	8.637	7.860	9.570	0.052	0.047	0.060	1,718	1,626	1,826	23	21	27	99.40	2.22	98.64	1.87
03/06/24	0.013	0.013	8.300	7.671	9.103	0.052	0.042	0.056	1,740	1,665	1,821	24	22	28	99.37	2.20	98.59	1.85
03/07/24	0.013	0.013	7.965	7.331	8.864	0.047	0.036	0.054	1,690	1,564	1,825	24	21	27	99.41	2.23	98.60	1.85
03/08/24	0.013	0.013	8.343	7.657	8.968	0.062	0.042	0.102***	1,750	1,684	1,818	23	20	26	99.25	2.13	98.67	1.87
03/09/24	0.013	0.013	8.356	7.641	9.317	0.048	0.043	0.057	1,732	1,664	1,804	23	21	26	99.42	2.24	98.67	1.88
03/10/24	0.013	0.013	8.386	7.673	9.356	0.047	0.038	0.056	1,679	1,593	1,774	22	20	25	99.44	2.25	98.69	1.88
03/11/24	0.013	0.014	8.706	8.055	9.553	0.046	0.036	0.055	1,679	1,609	1,775	22	20	25	99.47	2.28	98.69	1.88
03/12/24	0.013	0.013	8.540	7.356	9.521	0.055	0.046	0.076	1,719	1,638	1,839	22	21	25	99.36	2.19	98.69	1.88
03/13/24	0.013	0.013	8.689	8.168	9.493	0.067	0.053	0.143***	1,771	1,674	1,903	25	20	71	99.22	2.11	98.60	1.85
03/14/24	0.013	0.013	8.633	7.878	9.656	0.079	0.051	0.387***	1,767	1,685	1,859	31	26	40	99.09	2.04	98.27	1.76
03/15/24	0.013	0.013	8.597	7.770	9.339	0.059	0.051	0.065	1,757	1,657	1,954	27	24	31	99.32	2.17	98.47	1.82
03/16/24	0.013	0.013	8.663	8.002	9.262	0.056	0.048	0.064	1,718	1,648	1,813	25	22	28	99.35	2.19	98.52	1.83
03/17/24	0.013	0.013	8.635	8.020	9.274	0.055	0.045	0.152***	1,648	1,576	1,717	25	21	72	99.36	2.19	98.48	1.82
03/18/24	0.013	0.013	8.797	8.240	9.636	0.052	0.047	0.058	1,634	1,550	1,758	23	20	26	99.41	2.23	98.57	1.84
03/19/24	0.013	0.013	8.491	7.418	9.867	0.055	0.048	0.072	1,690	1,613	1,800	24	21	27	99.35	2.19	98.61	1.86
03/20/24	0.013	0.013	7.913	7.334	8.455	0.060	0.051	0.069	1,744	1,666	1,840	24	22	27	99.24	2.12	98.61	1.86
03/21/24	0.013	0.013	7.867	7.322	8.442	0.064	0.059	0.069	1,734	1,651	1,824	24	22	27	99.18	2.09	98.60	1.85
03/22/24	0.013	0.013	8.084	7.557	8.629	0.062	0.036	0.083	1,737	1,658	1,833	25	22	33	99.24	2.12	98.58	1.85
03/23/24	0.013	0.013	8.139	7.567	8.771	0.045	0.037	0.051	1,712	1,661	1,790	23	21	25	99.45	2.26	98.68	1.88
03/24/24	0.013	0.013	8.003	7.420	8.602	0.040	0.034	0.045	1,663	1,610	1,743	21	19	24	99.50	2.30	98.72	1.89
03/25/24	0.013	0.013	8.148	7.493	8.887	0.041	0.037	0.047	1,660	1,592	1,762	21	19	25	99.50	2.30	98.71	1.89
03/26/24	0.013	0.013	8.888	8.575	9.085	0.048	0.041	0.053	1,722	1,674	1,748	23	21	24	99.46	2.26	98.69	1.88
03/27/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
03/28/24	0.049	0.418****	8.995	8.382	9.803	0.076	0.056	0.435****	1,742	1,641	1,827	26	23	30	99.15	2.07	98.51	1.83
03/29/24	0.013	0.013	8.657	7.581	9.956	0.050	0.037	0.064	1,716	1,623	1,788	24	21	27	99.42	2.23	98.58	1.85
03/30/24	0.013	0.013	7.952	7.120	8.870	0.037	0.027	0.048	1,610	1,513	1,737	22	19	25	99.53	2.33	98.63	1.86
03/31/24	0.013	0.013	7.476	6.939	8.222	0.034	0.028	0.042	1,559	1,480	1,661	19	18	22	99.54	2.34	98.75	1.90

Notes:

* GWRS offline for a planned outage.

*** Value affected by short term TOC spike.

****Value affected by short term turbidity and TOC spike upon plant restart. Duration of spike less than 72 minutes.

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Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
03/01/24	96.90	80.106	28,103.1	0.35	4	6
03/02/24	96.91	80.096	28,100.2	0.35	4	6
03/03/24	97.21	80.163	28,100.1	0.35	4	6
03/04/24	97.78	80.155	28,101.8	0.35	4	6
03/05/24	97.49	80.147	28,085.1	0.35	4	6
03/06/24	97.74	53.953	27,135.5	0.35	4	6
03/07/24	98.15	36.514	19,232.6	0.37	4	6
03/08/24	98.53	35.102	13,391.6	0.37	4	6
03/09/24	97.89	35.160	12,647.5	0.36	4	6
03/10/24	97.98	33.651	12,523.4	0.36	4	6
03/11/24	98.03	35.019	12,301.3	0.36	4	6
03/12/24	97.86	35.098	12,643.8	0.36	4	6
03/13/24	97.98	35.304	12,698.6	0.36	4	6
03/14/24	97.84	35.525	12,754.4	0.36	4	6
03/15/24	97.17	35.527	12,745.3	0.36	4	6
03/16/24	97.23	35.535	12,751.8	0.36	4	6
03/17/24	97.46	29.873	12,814.1	0.35	4	6
03/18/24	97.56	35.142	10,019.0	0.38	4	6
03/19/24	97.42	35.459	12,797.0	0.36	4	6
03/20/24	97.40	35.435	12,771.7	0.36	4	6
03/21/24	97.36	35.512	12,765.1	0.36	4	6
03/22/24	97.15	50.516	14,739.3	0.39	4	6
03/23/24	96.98	65.633	19,801.4	0.37	4	6
03/24/24	96.97	65.653	23,039.6	0.35	4	6
03/25/24	97.34	58.667	23,065.0	0.35	4	6
03/26/24	97.47	7.550	17,302.3	0.36	4	6
03/27/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
03/28/24	97.56	41.757	1,387.0	0.49	4	6
03/29/24	97.37	86.957	19,475.6	0.39	4	6
03/30/24	97.79	91.558	31,259.3	0.36	4	6
03/31/24	97.11	93.462	32,102.8	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
Date	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
04/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/02/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/04/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/05/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/17/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/18/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/19/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/20/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/21/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/22/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/23/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/24/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/25/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/27/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/28/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/29/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/30/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

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	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
04/01/24	0.00	4.40	2.30	6.00	0	12.70
04/02/24	0.00	4.40	2.27	6.00	0	12.67
04/03/24	0.00	4.40	2.20	6.00	0	12.60
04/04/24	0.00	4.33	2.20	6.00	0	12.54
04/05/24	0.00	4.33	2.25	6.00	0	12.59
04/06/24	0.00	4.32	2.28	6.00	0	12.60
04/07/24	0.00	4.38	2.28	6.00	0	12.66
04/08/24	0.00	4.37	2.33	6.00	0	12.70
04/09/24	0.00	4.30	2.29	6.00	0	12.59
04/10/24	0.00	4.31	2.31	6.00	0	12.62
04/11/24	0.00	4.28	2.36	6.00	0	12.64
04/12/24	0.00	4.25	2.33	6.00	0	12.58
04/13/24	0.00	4.31	2.33	6.00	0	12.63
04/14/24	0.00	4.29	2.36	6.00	0	12.64
04/15/24	0.00	4.30	2.38	6.00	0	12.68
04/16/24	0.00	4.30	2.25	6.00	0	12.55
04/17/24	0.00	4.26	2.21	6.00	0	12.47
04/18/24	0.00	4.21	2.26	6.00	0	12.46
04/19/24	0.00	4.21	2.27	6.00	0	12.48
04/20/24	0.00	4.21	2.28	6.00	0	12.48
04/21/24	0.00	4.19	2.30	6.00	0	12.50
04/22/24	0.00	4.15	2.29	6.00	0	12.45
04/23/24	0.00	4.15	2.25	6.00	0	12.39
04/24/24	0.00	4.08	2.23	6.00	0	12.30
04/25/24	0.00	4.02	2.28	6.00	0	12.30
04/26/24	0.00	4.02	2.29	6.00	0	12.31
04/27/24	0.00	4.09	2.30	6.00	0	12.38
04/28/24	0.00	4.08	2.31	6.00	0	12.39
04/29/24	0.00	4.07	2.26	6.00	0	12.33
04/30/24	0.00	4.25	2.24	6.00	0	12.49

Notes:

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	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	LRV	LRV	LRV	LRV	LRV	LRV
04/01/24	0.00	0.00	2.30	6.00	4	12.30
04/02/24	0.00	0.00	2.27	6.00	4	12.27
04/03/24	0.00	0.00	2.20	6.00	4	12.20
04/04/24	0.00	0.00	2.20	6.00	4	12.20
04/05/24	0.00	0.00	2.25	6.00	4	12.25
04/06/24	0.00	0.00	2.28	6.00	4	12.28
04/07/24	0.00	0.00	2.28	6.00	4	12.28
04/08/24	0.00	0.00	2.33	6.00	4	12.33
04/09/24	0.00	0.00	2.29	6.00	4	12.29
04/10/24	0.00	0.00	2.31	6.00	4	12.31
04/11/24	0.00	0.00	2.36	6.00	4	12.36
04/12/24	0.00	0.00	2.33	6.00	4	12.33
04/13/24	0.00	0.00	2.33	6.00	4	12.33
04/14/24	0.00	0.00	2.36	6.00	4	12.36
04/15/24	0.00	0.00	2.38	6.00	4	12.38
04/16/24	0.00	0.00	2.25	6.00	4	12.25
04/17/24	0.00	0.00	2.21	6.00	4	12.21
04/18/24	0.00	0.00	2.26	6.00	4	12.26
04/19/24	0.00	0.00	2.27	6.00	4	12.27
04/20/24	0.00	0.00	2.28	6.00	4	12.28
04/21/24	0.00	0.00	2.30	6.00	4	12.30
04/22/24	0.00	0.00	2.29	6.00	4	12.29
04/23/24	0.00	0.00	2.25	6.00	4	12.25
04/24/24	0.00	0.00	2.23	6.00	4	12.23
04/25/24	0.00	0.00	2.28	6.00	4	12.28
04/26/24	0.00	0.00	2.29	6.00	4	12.29
04/27/24	0.00	0.00	2.30	6.00	4	12.30
04/28/24	0.00	0.00	2.31	6.00	4	12.31
04/29/24	0.00	0.00	2.26	6.00	4	12.26
04/30/24	0.00	0.00	2.24	6.00	4	12.24

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
04/01/24	4.40	4.40	4.40	4.40	4.40	4.40	N/A *	N/A *	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
04/02/24	4.40	4.40	4.40	4.40	4.40	4.40	N/A *	N/A *	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
04/03/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
04/04/24	4.45	4.67	4.45	4.71	4.61	4.66	4.63	4.83	4.73	4.66	4.55	4.59	4.61	4.63	4.56	4.59
04/05/24	4.99	4.89	4.97	4.95	4.90	4.86	4.92	4.99	4.98	4.99	4.78	4.75	4.99	4.92	4.79	4.84
04/06/24	4.93	4.92	4.98	5.00	4.92	4.91	4.93	4.95	5.01	4.98	4.75	4.80	4.98	4.89	4.82	4.82
04/07/24	4.99	4.93	5.01	5.00	4.87	4.98	4.92	5.00	5.03	5.05	4.77	4.83	4.99	4.90	4.87	4.67
04/08/24	4.94	4.90	5.00	4.99	4.88	4.91	4.87	4.92	4.93	5.01	4.77	4.87	5.00	4.85	4.83	4.63
04/09/24	4.90	4.89	4.94	5.00	4.78	4.85	4.87	4.87	4.90	4.99	4.71	4.98	4.98	4.83	4.76	4.69
04/10/24	4.96	4.83	4.99	5.03	4.80	4.86	4.88	4.91	4.89	5.26	4.73	4.98	5.16	4.84	4.80	4.83
04/11/24	4.94	4.90	4.95	4.97	4.82	4.80	4.85	4.89	4.90	5.25	4.76	4.92	5.16	4.83	4.89	4.96
04/12/24	5.13	4.89	4.94	5.01	4.87	4.78	4.90	4.86	4.85	5.27	4.73	4.85	5.10	4.83	4.93	4.66
04/13/24	5.06	4.84	4.97	4.97	4.80	4.80	4.90	4.87	4.82	5.17	4.72	4.84	5.11	4.78	4.95	4.61
04/14/24	4.97	4.81	4.95	4.93	4.74	4.78	4.85	4.90	4.83	5.11	4.73	4.85	5.04	4.77	4.89	4.80
04/15/24	5.02	4.85	4.87	4.92	4.81	4.68	4.81	4.81	4.79	5.13	4.74	4.88	5.01	4.81	4.87	4.91
04/16/24	5.04	4.93	4.94	4.95	5.07	4.70	4.84	4.82	4.87	5.18	4.70	4.86	5.06	4.81	4.91	4.90
04/17/24	5.02	5.01	4.97	4.98	4.97	4.73	4.82	4.87	4.83	5.25	4.68	4.88	5.11	4.79	4.92	4.80
04/18/24	4.96	5.01	4.83	5.10	4.93	4.69	4.92	4.78	4.71	5.16	4.68	4.86	5.04	4.75	4.87	4.64
04/19/24	4.99	4.96	4.91	5.10	4.88	4.71	4.95	4.97	4.78	5.22	4.69	4.85	5.02	4.76	4.85	4.40
04/20/24	4.95	4.94	4.82	5.09	4.86	4.63	4.96	4.98	4.82	5.21	4.67	4.82	5.06	4.72	4.85	4.27
04/21/24	4.92	4.95	4.92	5.06	4.83	4.65	4.92	4.92	4.78	5.24	4.64	4.82	5.06	4.71	4.88	4.25
04/22/24	4.98	4.96	4.83	5.11	4.82	4.97	5.04	4.92	4.77	5.14	4.65	4.81	5.01	4.75	4.89	4.22
04/23/24	4.97	4.95	4.81	5.02	4.81	4.87	5.00	4.86	4.66	5.05	4.60	4.71	4.96	4.74	4.80	4.17
04/24/24	4.92	4.89	4.81	5.00	4.79	4.78	4.91	4.86	4.67	5.01	4.54	4.75	4.92	4.69	4.80	4.08
04/25/24	4.87	4.87	4.95	4.92	4.71	4.76	4.81	4.80	4.56	4.97	4.44	4.65	4.95	4.65	4.80	4.02
04/26/24	4.88	4.82	5.06	4.97	4.69	4.64	4.79	4.74	4.57	4.93	4.45	4.66	4.94	4.69	4.78	4.02
04/27/24	4.91	4.84	5.12	4.93	4.78	4.79	4.90	4.80	4.66	4.99	4.47	4.72	4.95	4.70	4.81	4.31
04/28/24	4.84	4.87	5.01	5.00	4.77	4.67	4.88	4.78	4.63	5.01	4.58	4.74	4.88	4.69	4.80	4.30
04/29/24	4.88	4.88	5.01	4.99	4.77	4.77	4.89	4.83	4.58	4.95	4.78	4.68	4.90	4.70	4.80	4.12
04/30/24	4.88	4.86	5.04	4.97	4.77	4.68	N/A**	4.84	4.80	4.91	4.71	4.68	4.89	4.88	4.76	4.54

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline due to low production setpoint.

** Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
04/01/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	N/A *	N/A *	N/A *	N/A *
04/02/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	N/A *	N/A *
04/03/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	N/A *	N/A *
04/04/24	4.40	4.52	4.41	4.33	4.46	4.39	4.46	4.37	4.99	4.57	4.64	4.58	4.82	4.44	5.10	5.03
04/05/24	4.33	4.52	4.43	4.35	4.51	4.35	4.57	4.35	5.02	4.79	4.99	5.01	5.17	4.98	5.13	5.00
04/06/24	4.32	4.53	4.46	4.49	4.52	4.36	4.60	4.38	5.02	4.79	5.00	5.02	5.13	4.98	5.04	4.95
04/07/24	4.38	4.59	4.48	4.51	4.64	4.42	4.64	4.39	5.10	4.83	4.98	5.03	5.13	4.98	4.98	4.95
04/08/24	4.37	4.52	4.46	4.49	4.62	4.41	4.62	4.38	5.08	4.85	4.96	5.02	5.12	4.97	4.95	4.92
04/09/24	4.61	4.49	4.40	4.44	4.56	4.38	4.55	4.32	5.04	4.80	4.93	4.99	5.04	4.97	4.90	4.91
04/10/24	4.69	4.50	4.68	4.43	4.53	4.35	4.50	4.31	5.01	4.71	4.92	4.97	5.06	4.96	4.92	4.92
04/11/24	4.59	4.48	4.70	4.38	4.70	4.51	4.48	4.40	5.00	4.90	4.92	4.99	5.04	4.94	4.91	4.89
04/12/24	4.53	4.71	4.66	4.34	4.77	4.59	4.47	4.58	4.98	5.05	4.91	5.03	5.03	4.89	4.91	4.86
04/13/24	4.53	4.85	4.66	4.31	4.75	4.51	4.45	4.54	5.01	4.97	4.91	4.93	5.01	4.94	4.87	4.88
04/14/24	4.50	4.77	4.60	4.29	4.73	4.48	4.42	4.51	5.12	4.88	4.88	4.94	5.03	4.91	4.88	4.88
04/15/24	4.49	4.77	4.62	4.30	4.72	4.53	4.68	4.49	5.07	4.83	4.88	4.95	5.05	4.88	4.90	4.87
04/16/24	4.49	4.78	4.60	4.30	4.70	4.54	4.78	4.47	5.10	4.82	4.92	4.97	5.01	4.89	4.92	4.85
04/17/24	4.43	4.73	4.51	4.26	4.66	4.48	4.69	4.44	5.09	4.82	4.89	4.96	4.95	4.90	4.96	4.85
04/18/24	4.42	4.70	4.52	4.21	4.66	4.46	4.66	4.44	4.98	4.78	4.87	4.96	4.96	4.87	4.88	4.86
04/19/24	4.43	4.70	4.53	4.21	4.65	4.48	4.69	4.44	5.01	4.76	4.88	5.00	4.99	4.87	4.89	4.84
04/20/24	4.36	4.72	4.48	4.21	4.66	4.43	4.67	4.42	4.98	4.77	4.96	5.01	5.08	4.88	4.88	5.00
04/21/24	4.33	4.70	4.43	4.19	4.68	4.41	4.65	4.45	4.98	4.75	5.03	5.03	5.24	4.88	4.87	4.99
04/22/24	4.27	4.66	4.44	4.15	4.63	4.42	4.65	4.40	4.99	4.67	5.00	4.98	5.17	4.88	4.85	4.93
04/23/24	4.29	4.60	4.38	4.15	4.61	4.47	4.58	4.34	4.95	4.60	4.96	4.99	5.06	4.90	4.82	4.90
04/24/24	4.28	4.56	4.32	4.12	4.54	4.42	4.52	4.31	4.91	4.57	4.92	4.98	5.02	4.87	4.85	4.93
04/25/24	4.30	4.53	4.34	4.10	4.45	4.33	4.49	4.23	4.90	4.58	4.86	5.00	5.03	4.80	4.99	4.83
04/26/24	4.28	4.51	4.34	4.09	4.48	4.30	4.53	4.19	4.88	4.59	4.88	5.07	4.97	4.76	5.05	4.88
04/27/24	4.24	4.45	4.33	4.09	4.48	4.29	4.56	4.21	4.88	4.64	4.92	5.15	4.98	4.80	5.01	4.89
04/28/24	4.26	4.42	4.35	4.08	4.40	4.29	4.56	4.23	4.90	4.57	4.94	5.12	4.98	4.85	4.97	4.87
04/29/24	4.28	4.40	4.34	4.07	4.39	4.28	4.55	4.22	4.82	4.53	4.91	5.08	5.01	4.94	4.90	4.85
04/30/24	4.25	4.42	4.27	4.34	4.41	4.25	4.55	4.32	4.85	4.72	4.92	5.06	5.02	5.07	4.94	4.89

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	**E02**	**E03**	**E04**	**E05**	**E06**	**E07**	**E08**	**F01**	**F02**	**F03**	**F04**	**F05**	**F06**	**F07**	**F08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
04/01/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
04/02/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
04/03/24	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
04/04/24	4.40	4.59	4.67	4.49	4.64	4.64	4.50	4.60	4.48	4.59	4.48	4.52	4.42	4.46	4.57	4.52
04/05/24	4.37	4.66	5.28	4.58	5.05	4.93	4.68	4.80	4.68	4.82	4.68	4.65	4.45	4.48	4.87	4.78
04/06/24	4.42	4.62	5.33	4.63	4.97	4.90	4.77	4.82	4.72	4.85	4.64	4.68	4.48	4.58	4.87	4.83
04/07/24	4.52	4.64	5.42	4.59	4.99	4.92	4.71	4.84	4.80	4.88	4.63	4.67	4.49	4.50	4.88	4.85
04/08/24	4.43	4.53	5.36	4.59	4.88	4.96	4.68	4.83	4.68	4.87	4.76	4.65	4.56	4.39	4.91	4.83
04/09/24	4.30	4.52	5.26	4.55	4.88	5.18	4.66	4.77	4.64	4.75	4.57	4.70	4.53	4.43	4.84	4.82
04/10/24	4.42	4.61	5.42	4.50	4.92	4.88	4.62	4.83	4.71	4.79	4.52	4.63	4.40	4.44	4.83	4.82
04/11/24	4.28	4.43	5.37	4.49	4.93	4.94	4.59	4.92	4.62	4.82	4.53	4.61	4.42	4.41	4.87	4.85
04/12/24	4.25	4.45	5.28	4.53	4.97	5.04	4.62	4.80	4.56	4.96	4.53	4.65	4.48	4.44	4.80	4.82
04/13/24	4.37	4.51	5.37	4.38	5.12	4.84	4.57	4.78	4.67	4.85	4.57	4.62	4.44	4.44	4.83	4.75
04/14/24	4.36	4.51	5.39	4.39	4.95	4.85	4.56	4.84	4.63	4.86	4.61	4.64	4.49	4.41	4.89	4.79
04/15/24	4.49	4.48	5.44	4.48	4.92	5.07	4.56	4.82	4.67	4.97	4.52	4.71	4.46	4.46	4.82	4.83
04/16/24	4.38	4.52	5.52	4.53	4.94	4.92	4.57	4.81	4.72	4.96	4.47	4.71	4.54	4.46	5.15	4.81
04/17/24	4.42	4.43	5.50	4.51	4.95	4.95	4.64	4.89	4.69	4.83	4.60	4.82	4.56	4.47	4.89	4.89
04/18/24	4.44	4.66	5.54	4.47	4.93	4.98	4.60	4.89	4.67	4.89	4.65	4.76	4.50	4.49	4.86	4.87
04/19/24	4.43	4.48	5.42	4.51	4.93	4.93	4.63	4.92	4.69	4.88	4.69	4.72	4.54	4.42	4.92	4.94
04/20/24	4.36	4.53	5.35	4.66	4.93	4.86	4.73	4.83	4.65	4.82	4.66	4.74	4.55	4.40	5.01	4.89
04/21/24	4.43	4.54	5.54	4.56	4.91	4.94	4.60	4.87	4.72	4.90	4.60	4.67	4.51	4.44	5.01	4.82
04/22/24	4.48	4.50	5.45	4.59	4.90	4.94	4.59	4.90	4.69	4.79	4.59	4.64	4.42	4.43	4.93	4.86
04/23/24	4.51	N/A *	N/A *	N/A *	4.86	4.90	4.58	4.75	4.62	4.73	4.55	4.65	4.42	N/A *	4.84	4.79
04/24/24	4.25	N/A *	N/A *	N/A *	N/A *	N/A *	4.52	N/A *	N/A *	N/A *	N/A *	4.57	4.28	N/A *	4.83	N/A *
04/25/24	4.25	N/A *	N/A *	4.42	4.99	4.86	4.52	4.79	4.79	N/A *	4.48	4.55	4.19	N/A *	4.81	4.73
04/26/24	4.34	N/A *	N/A *	4.45	4.87	4.75	4.51	4.77	4.66	N/A *	4.48	4.54	N/A *	N/A *	4.81	4.78
04/27/24	4.39	N/A *	N/A *	4.45	4.87	4.71	4.44	4.78	4.67	N/A *	4.50	4.57	N/A *	N/A *	4.81	4.88
04/28/24	4.35	N/A *	5.49	N/A *	4.84	4.67	4.39	4.74	4.65	4.81	4.50	4.49	4.33	N/A *	4.79	4.84
04/29/24	4.46	4.83	5.43	4.41	4.82	4.70	4.49	4.66	4.54	4.80	4.66	4.71	4.41	4.48	4.76	4.71
04/30/24	4.34	4.77	5.31	4.45	4.84	4.69	4.54	4.69	4.63	4.84	4.68	4.62	4.47	4.52	4.80	4.80

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline due to low production setpoint.

Date	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
04/01/24	0.032	0.073	0.036	0.074	0.023	0.036	0.020	0.022	0.025	0.027	0.022	0.024	0.041	0.056	N/A *	N/A *	0.036	0.039	0.028	0.033	0.030	0.033	0.023	0.024	0.028
04/02/24	0.032	0.054	0.029	0.037	0.025	0.079	0.020	0.022	0.026	0.028	0.023	0.027	0.040	0.054	0.058	0.089	0.036	0.038	0.029	0.034	0.030	0.036	0.024	0.026	0.030
04/03/24	0.033	0.036	0.032	0.114	0.024	0.046	0.022	0.045	0.027	0.054	0.024	0.047	0.040	0.049	0.049	0.055	0.038	0.047	0.030	0.032	0.031	0.033	0.025	0.026	0.031
04/04/24	0.033	0.036	0.030	0.035	0.025	0.032	0.022	0.024	0.028	0.032	0.024	0.027	0.040	0.066	0.048	0.073	0.038	0.042	0.031	0.034	0.033	0.035	0.026	0.027	0.032
04/05/24	0.033	0.040	0.028	0.031	0.024	0.031	0.021	0.027	0.027	0.029	0.023	0.031	0.039	0.093	0.045	0.050	0.037	0.040	0.031	0.036	0.032	0.035	0.026	0.027	0.030
04/06/24	0.033	0.037	0.028	0.048	0.024	0.024	0.021	0.023	0.027	0.040	0.023	0.025	0.039	0.041	0.045	0.082	0.038	0.042	0.031	0.035	0.033	0.036	0.026	0.027	0.030
04/07/24	0.033	0.036	0.028	0.030	0.024	0.030	0.021	0.023	0.026	0.028	0.023	0.031	0.039	0.082	0.044	0.046	0.037	0.040	0.031	0.034	0.033	0.039	0.026	0.028	0.030
04/08/24	0.035	0.075	0.029	0.039	0.025	0.027	0.024	0.073	0.028	0.092	0.024	0.045	0.039	0.048	0.045	0.056	0.038	0.041	0.033	0.038	0.034	0.037	0.027	0.028	0.032
04/09/24	0.030	0.040	0.026	0.033	0.025	0.072	0.022	0.032	0.027	0.034	0.023	0.059	0.040	0.042	0.045	0.084	0.040	0.044	0.033	0.034	0.034	0.039	0.027	0.032	0.031
04/10/24	0.030	0.056	0.025	0.028	0.026	0.032	0.025	0.036	0.029	0.050	0.027	0.050	0.039	0.085	0.040	0.046	0.038	0.042	0.032	0.040	0.032	0.036	0.026	0.030	0.031
04/11/24	0.033	0.039	0.026	0.029	0.027	0.029	0.027	0.031	0.031	0.041	0.031	0.049	0.040	0.085	0.040	0.053	0.039	0.045	0.032	0.035	0.032	0.034	0.025	0.028	0.032
04/12/24	0.034	0.056	0.027	0.035	0.027	0.031	0.026	0.032	0.032	0.037	0.030	0.033	0.036	0.053	0.040	0.042	0.040	0.044	0.033	0.035	0.032	0.037	0.025	0.028	0.032
04/13/24	0.036	0.077	0.028	0.094	0.028	0.030	0.027	0.036	0.032	0.066	0.031	0.059	0.033	0.085	0.041	0.103	0.040	0.042	0.034	0.041	0.033	0.035	0.025	0.028	0.032
04/14/24	0.035	0.050	0.028	0.035	0.027	0.031	0.026	0.027	0.032	0.034	0.030	0.032	0.031	0.032	0.040	0.043	0.040	0.044	0.034	0.037	0.033	0.040	0.025	0.029	0.032
04/15/24	0.036	0.040	0.028	0.038	0.028	0.033	0.026	0.032	0.034	0.132	0.032	0.051	0.030	0.189	0.040	0.042	0.040	0.043	0.034	0.038	0.033	0.035	0.023	0.030	0.032
04/16/24	0.037	0.060	0.029	0.052	0.029	0.053	0.026	0.031	0.034	0.220	0.031	0.069	0.027	0.034	0.040	0.059	0.044	0.049	0.036	0.038	0.035	0.041	0.023	0.030	0.033
04/17/24	0.039	0.124	0.028	0.036	0.030	0.050	0.027	0.063	0.033	0.035	0.033	0.083	0.029	0.037	0.042	0.045	0.049	0.061	0.038	0.040	0.037	0.041	0.022	0.025	0.034
04/18/24	0.043	0.236	0.029	0.047	0.030	0.033	0.027	0.029	0.033	0.036	0.034	0.036	0.029	0.058	0.043	0.060	0.049	0.052	0.040	0.044	0.038	0.045	0.022	0.028	0.035
04/19/24	0.043	0.054	0.028	0.034	0.030	0.034	0.027	0.058	0.033	0.046	0.038	0.044	0.030	0.044	0.047	0.060	0.050	0.054	0.042	0.044	0.039	0.045	0.023	0.024	0.036
04/20/24	0.045	0.063	0.028	0.049	0.030	0.032	0.027	0.035	0.033	0.037	0.048	0.056	0.032	0.085	0.048	0.081	0.054	0.060	0.045	0.048	0.041	0.044	0.023	0.028	0.038
04/21/24	0.047	0.170	0.028	0.037	0.032	0.105	0.027	0.031	0.035	0.111	0.066	0.085	0.031	0.058	0.047	0.098	0.055	0.058	0.051	0.056	0.043	0.047	0.023	0.027	0.040
04/22/24	0.048	0.074	0.032	0.061	0.032	0.058	0.028	0.065	0.034	0.042	0.100	0.122 ***	0.031	0.035	0.048	0.060	0.060	0.067	0.058	0.067	0.048	0.052	0.025	0.030	0.045
04/23/24	0.040	0.089	0.030	0.046	0.031	0.036	0.029	0.141	0.034	0.082	0.083	0.227 ***	0.031	0.109	0.050	0.090	0.057	0.065	0.050	0.064	0.043	0.052	0.023	0.030	0.041
04/24/24	0.031	0.049	0.028	0.035	0.030	0.039	0.027	0.029	0.032	0.036	0.036	0.212	0.030	0.034	0.050	0.058	0.050	0.053	0.034	0.035	0.034	0.037	0.021	0.023	0.034
04/25/24	0.031	0.037	0.028	0.035	0.030	0.034	0.028	0.056	0.034	0.114	0.034	0.038	0.030	0.037	0.051	0.077	0.055	0.110	0.039	0.047	0.039	0.073	0.025	0.034	0.035
04/26/24	0.030	0.039	0.027	0.031	0.030	0.034	0.027	0.056	0.033	0.173	0.034	0.042	0.031	0.055	0.051	0.055	0.056	0.060	0.041	0.044	0.041	0.044	0.027	0.037	0.036
04/27/24	0.031	0.040	0.028	0.080	0.030	0.033	0.026	0.031	0.032	0.034	0.034	0.070	0.031	0.070	0.051	0.064	0.062	0.066	0.045	0.049	0.046	0.050	0.029	0.031	0.037
04/28/24	0.031	0.038	0.028	0.032	0.035	0.394	0.027	0.042	0.032	0.034	0.036	0.196	0.030	0.044	0.052	0.065	0.071	0.086	0.052	0.059	0.052	0.059	0.035	0.050	0.039
04/29/24	0.032	0.058	0.029	0.085	0.032	0.048	0.029	0.048	0.033	0.035	0.035	0.042	0.031	0.088	0.054	0.057	0.083	0.091	0.060	0.066	0.061	0.069	0.041	0.045	0.043
04/30/24	0.031	0.054	0.028	0.092	0.031	0.042	0.029	0.058	0.034	0.040	0.035	0.168	0.031	0.040	0.052	0.069	0.069	0.097	0.049	0.070	0.049	0.074	0.033	0.050	0.039

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* Cell offline due to low production setpoint.

*** Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
04/01/24	0.013	0.013	7.468	6.986	8.489	0.037	0.032	0.043	1,648	1,543	1,821	21	18	26	99.50	2.30	98.73	1.90
04/02/24	0.013	0.013	7.952	7.253	8.647	0.043	0.031	0.048	1,768	1,687	1,894	23	20	27	99.46	2.27	98.72	1.89
04/03/24	0.013	0.013	7.890	7.204	8.625	0.050	0.037	0.198	1,796	1,694	2,024	26	22	29	99.37	2.20	98.57	1.85
04/04/24	0.013	0.013	8.204	7.731	9.301	0.051	0.041	0.073	1,793	1,712	1,879	25	22	29	99.38	2.20	98.62	1.86
04/05/24	0.013	0.013	7.746	7.207	8.572	0.043	0.036	0.055	1,798	1,706	1,898	23	21	27	99.44	2.25	98.70	1.89
04/06/24	0.013	0.013	7.549	7.031	8.117	0.040	0.034	0.050	1,783	1,749	1,832	22	21	25	99.48	2.28	98.74	1.90
04/07/24	0.013	0.013	7.592	7.110	8.386	0.040	0.029	0.114 ***	1,726	1,663	1,785	22	20	25	99.48	2.28	98.74	1.90
04/08/24	0.013	0.013	7.879	7.352	8.745	0.037	0.033	0.042	1,703	1,617	1,812	22	19	25	99.53	2.33	98.72	1.89
04/09/24	0.013	0.013	8.108	7.515	9.033	0.042	0.035	0.053	1,753	1,676	1,834	22	20	25	99.49	2.29	98.72	1.89
04/10/24	0.013	0.013	8.056	4.599	9.163	0.040	0.033	0.050	2,018	1,698	2,940	26	20	42	99.51	2.31	98.69	1.88
04/11/24	0.013	0.013	8.195	7.389	9.414	0.036	0.032	0.042	2,086	1,931	2,269	28	25	32	99.56	2.36	98.64	1.87
04/12/24	0.013	0.013	7.813	7.283	8.402	0.037	0.028	0.044	2,100	1,975	2,268	29	25	33	99.53	2.33	98.63	1.86
04/13/24	0.013	0.013	7.890	7.385	8.468	0.037	0.028	0.046	2,158	2,034	2,344	30	27	33	99.53	2.33	98.63	1.86
04/14/24	0.013	0.013	7.775	7.306	8.404	0.034	0.029	0.047	2,067	1,952	2,217	28	25	31	99.56	2.36	98.65	1.87
04/15/24	0.013	0.013	8.032	7.495	8.774	0.034	0.028	0.072	2,047	1,873	2,339	28	24	33	99.58	2.38	98.64	1.87
04/16/24	0.013	0.013	8.209	7.629	9.099	0.046	0.035	0.056	2,154	1,903	2,487	31	25	39	99.44	2.25	98.55	1.84
04/17/24	0.013	0.013	8.351	7.794	9.115	0.051	0.039	0.063	2,251	2,101	2,487	33	30	37	99.39	2.21	98.52	1.83
04/18/24	0.013	0.013	8.615	8.401	9.619	0.048	0.036	0.065	2,264	2,102	2,471	34	31	44	99.44	2.26	98.48	1.82
04/19/24	0.016	0.017	9.135	8.256	10.080	0.049	0.041	0.062	2,244	2,082	2,484	33	27	38	99.47	2.27	98.52	1.83
04/20/24	0.017	0.017	9.462	8.667	10.175	0.050	0.041	0.071	2,224	2,124	2,425	33	31	38	99.47	2.28	98.50	1.82
04/21/24	0.017	0.017	9.583	8.708	10.540	0.048	0.038	0.055	2,175	2,028	2,436	34	29	41	99.50	2.30	98.44	1.81
04/22/24	0.017	0.017	9.838	9.143	10.681	0.050	0.038	0.062	2,146	1,970	2,414	33	30	40	99.49	2.29	98.44	1.81
04/23/24	0.017	0.017	9.726	8.979	10.681	0.055	0.038	0.069	2,215	2,004	2,460	34	29	40	99.43	2.25	98.44	1.81
04/24/24	0.017	0.017	9.308	8.665	9.978	0.055	0.043	0.076	2,190	2,027	2,360	34	30	38	99.41	2.23	98.46	1.81
04/25/24	0.017	0.018	9.304	8.516	10.080	0.049	0.042	0.060	2,186	2,015	2,362	33	28	37	99.47	2.28	98.50	1.82
04/26/24	0.014	0.018	8.933	7.994	9.726	0.046	0.034	0.058	2,285	2,116	2,512	35	31	40	99.49	2.29	98.47	1.82
04/27/24	0.013	0.013	8.990	8.050	9.839	0.045	0.037	0.059	2,269	2,150	2,486	34	31	40	99.50	2.30	98.49	1.82
04/28/24	0.013	0.013	9.165	8.455	10.080	0.045	0.038	0.056	2,205	2,075	2,459	35	32	41	99.51	2.31	98.41	1.80
04/29/24	0.013	0.013	9.088	8.291	10.381	0.049	0.038	0.060	2,209	1,990	2,504	34	29	41	99.46	2.26	98.45	1.81
04/30/24	0.013	0.013	9.543	8.734	10.380	0.055	0.043	0.076	2,230	1,931	2,570	34	28	43	99.43	2.24	98.48	1.82

Notes:

*** Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	UltraViolet / AOP Process online monitoring results					
	UVT %	FLOW	POWER	EED	Peroxide Dose	Log
Date	avg	MG	kW	kWh/kgal	mg/L	Removal
04/01/24	97.50	78.948	31,822.1	0.35	4	6
04/02/24	97.50	79.822	28,003.8	0.35	4	6
04/03/24	97.14	87.033	28,389.7	0.35	4	6
04/04/24	96.89	99.524	30,561.9	0.35	4	6
04/05/24	96.83	98.135	34,093.6	0.35	4	6
04/06/24	96.65	95.007	34,023.1	0.35	4	6
04/07/24	96.93	95.000	33,201.6	0.35	4	6
04/08/24	96.92	97.092	33,205.1	0.35	4	6
04/09/24	96.91	99.903	33,191.3	0.34	4	6
04/10/24	96.59	99.743	33,135.9	0.33	4	6
04/11/24	96.20	99.677	33,230.3	0.33	4	6
04/12/24	96.26	99.698	33,266.4	0.33	4	6
04/13/24	96.14	99.560	33,262.8	0.33	4	6
04/14/24	96.31	99.531	33,248.7	0.33	4	6
04/15/24	96.10	92.160	32,304.9	0.34	4	6
04/16/24	96.11	91.897	31,652.8	0.34	4	6
04/17/24	96.07	94.344	31,137.1	0.35	4	6
04/18/24	95.91	94.332	33,394.5	0.35	4	6
04/19/24	96.12	94.297	33,232.3	0.35	4	6
04/20/24	96.25	94.242	33,049.5	0.35	4	6
04/21/24	96.19	94.174	33,196.2	0.35	4	6
04/22/24	96.37	94.043	33,212.1	0.35	4	6
04/23/24	96.38	91.057	32,804.3	0.35	4	6
04/24/24	96.53	83.908	31,545.6	0.35	4	6
04/25/24	96.20	79.987	28,962.8	0.36	4	6
04/26/24	96.31	94.752	28,699.0	0.34	4	6
04/27/24	96.50	94.895	33,203.8	0.35	4	6
04/28/24	96.54	91.276	33,225.9	0.35	4	6
04/29/24	96.56	94.601	31,500.9	0.35	4	6
04/30/24	96.59	85.343	32,765.6	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
Date	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
05/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/02/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/07/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/08/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/09/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/17/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/18/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/20/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/23/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/24/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/25/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/27/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/28/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/30/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/31/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Re

Date	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	Documented Giardia and Cryptosporidium Reduction Achieved					
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
05/01/24	0.00	4.33	2.19	6.00	0	12.52
05/02/24	0.00	4.30	2.21	6.00	0	12.51
05/03/24	0.00	4.27	2.24	6.00	0	12.51
05/04/24	0.00	4.27	2.22	6.00	0	12.49
05/05/24	0.00	4.30	2.16	6.00	0	12.46
05/06/24	0.00	4.34	2.18	6.00	0	12.52
05/07/24	0.00	4.35	2.08	6.00	0	12.44
05/08/24	0.00	4.37	2.00	6.00	0	12.38
05/09/24	0.00	4.45	2.00	6.00	0	12.45
05/10/24	0.00	4.52	2.00	6.00	0	12.53
05/11/24	0.00	4.54	2.09	6.00	0	12.63
05/12/24	0.00	4.52	2.15	6.00	0	12.67
05/13/24	0.00	4.51	2.21	6.00	0	12.72
05/14/24	0.00	4.48	2.22	6.00	0	12.69
05/15/24	0.00	4.57	2.13	6.00	0	12.70
05/16/24	0.00	4.52	2.17	6.00	0	12.69
05/17/24	0.00	4.52	2.13	6.00	0	12.65
05/18/24	0.00	4.51	2.19	6.00	0	12.70
05/19/24	0.00	4.49	2.14	6.00	0	12.62
05/20/24	0.00	4.48	2.18	6.00	0	12.66
05/21/24	0.00	4.45	2.23	6.00	0	12.67
05/22/24	0.00	4.38	2.23	6.00	0	12.61
05/23/24	0.00	4.29	2.16	6.00	0	12.45
05/24/24	0.00	4.27	2.15	6.00	0	12.42
05/25/24	0.00	4.22	2.16	6.00	0	12.38
05/26/24	0.00	4.27	2.05	6.00	0	12.32
05/27/24	0.00	4.28	2.06	6.00	0	12.33
05/28/24	0.00	4.38	2.10	6.00	0	12.47
05/29/24	0.00	4.54	2.08	6.00	0	12.62
05/30/24	0.00	4.51	2.00	6.00	0	12.51
05/31/24	0.00	4.45	2.03	6.00	0	12.47

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Wa

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
05/01/24	0.00	0.00	2.19	6.00	4	12.19
05/02/24	0.00	0.00	2.21	6.00	4	12.21
05/03/24	0.00	0.00	2.24	6.00	4	12.24
05/04/24	0.00	0.00	2.22	6.00	4	12.22
05/05/24	0.00	0.00	2.16	6.00	4	12.16
05/06/24	0.00	0.00	2.18	6.00	4	12.18
05/07/24	0.00	0.00	2.08	6.00	4	12.08
05/08/24	0.00	0.00	2.00	6.00	4	12.00
05/09/24	0.00	0.00	2.00	6.00	4	12.00
05/10/24	0.00	0.00	2.00	6.00	4	12.00
05/11/24	0.00	0.00	2.09	6.00	4	12.09
05/12/24	0.00	0.00	2.15	6.00	4	12.15
05/13/24	0.00	0.00	2.21	6.00	4	12.21
05/14/24	0.00	0.00	2.22	6.00	4	12.22
05/15/24	0.00	0.00	2.13	6.00	4	12.13
05/16/24	0.00	0.00	2.17	6.00	4	12.17
05/17/24	0.00	0.00	2.13	6.00	4	12.13
05/18/24	0.00	0.00	2.19	6.00	4	12.19
05/19/24	0.00	0.00	2.14	6.00	4	12.14
05/20/24	0.00	0.00	2.18	6.00	4	12.18
05/21/24	0.00	0.00	2.23	6.00	4	12.23
05/22/24	0.00	0.00	2.23	6.00	4	12.23
05/23/24	0.00	0.00	2.16	6.00	4	12.16
05/24/24	0.00	0.00	2.15	6.00	4	12.15
05/25/24	0.00	0.00	2.16	6.00	4	12.16
05/26/24	0.00	0.00	2.05	6.00	4	12.05
05/27/24	0.00	0.00	2.06	6.00	4	12.06
05/28/24	0.00	0.00	2.10	6.00	4	12.10
05/29/24	0.00	0.00	2.08	6.00	4	12.08
05/30/24	0.00	0.00	2.00	6.00	4	12.00
05/31/24	0.00	0.00	2.03	6.00	4	12.03

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
05/01/24	4.88	4.91	5.12	4.97	4.85	4.86	4.90	4.83	4.87	5.13	4.77	4.76	4.94	5.04	4.78	4.82
05/02/24	4.89	4.92	5.04	4.97	4.80	4.73	4.95	4.87	4.86	5.08	4.79	4.73	4.94	4.94	4.77	4.75
05/03/24	4.91	4.94	5.11	5.01	4.78	4.95	5.02	4.95	4.87	5.03	4.80	4.74	4.96	4.95	4.79	4.78
05/04/24	4.97	4.94	5.12	5.00	4.70	4.92	4.99	4.98	4.93	5.14	4.75	4.77	5.01	4.97	4.83	4.98
05/05/24	4.94	4.95	5.11	5.05	4.81	4.88	4.95	4.92	4.95	5.15	4.75	4.77	5.04	4.95	4.82	5.01
05/06/24	4.88	4.93	5.03	4.91	4.86	4.81	4.91	4.86	4.91	5.52	4.75	4.88	5.25	4.92	4.81	4.97
05/07/24	4.96	4.95	5.11	4.98	4.87	4.85	4.93	4.90	4.87	5.60	4.78	4.90	5.27	4.96	4.87	4.99
05/08/24	4.94	4.99	5.09	4.96	4.86	4.85	4.96	4.90	4.86	5.65	4.79	4.90	5.11	4.96	4.86	4.95
05/09/24	5.02	4.97	5.09	4.98	4.88	4.91	4.97	4.94	4.88	5.58	4.80	4.94	5.10	4.95	4.84	4.97
05/10/24	5.09	4.96	5.10	5.00	4.89	4.94	4.99	4.94	4.88	5.61	4.77	4.90	5.17	4.96	4.87	4.95
05/11/24	5.11	4.99	5.06	5.00	4.87	4.93	4.99	4.92	4.82	5.57	4.77	4.89	5.10	4.97	4.90	4.92
05/12/24	5.12	5.00	5.09	5.01	4.99	4.97	4.98	4.97	4.87	5.67	4.78	4.89	5.09	4.96	4.97	4.96
05/13/24	5.12	5.13	5.19	5.03	5.05	5.02	5.00	4.99	4.90	6.01	4.77	4.91	5.14	4.98	4.96	5.01
05/14/24	5.13	5.07	5.13	5.18	5.04	4.95	5.01	4.99	4.87	5.74	4.78	4.87	5.09	4.97	4.92	4.96
05/15/24	5.10	5.00	5.08	5.03	5.03	4.95	4.98	4.96	4.91	5.66	4.77	4.88	5.09	4.98	4.92	4.95
05/16/24	5.09	5.03	5.11	5.03	5.02	4.99	4.96	4.97	4.88	5.73	4.78	4.89	5.10	4.94	4.95	4.94
05/17/24	5.09	5.05	5.09	5.06	5.04	4.96	4.94	5.00	4.84	5.56	4.77	4.86	5.09	4.98	4.92	4.93
05/18/24	5.11	5.06	5.12	5.12	4.99	5.16	4.97	4.99	4.85	5.66	4.73	4.86	5.05	4.96	4.96	4.91
05/19/24	5.03	5.09	5.12	5.02	5.02	5.12	4.99	4.98	4.84	5.54	4.74	4.85	5.06	4.94	4.94	4.92
05/20/24	5.05	5.09	5.11	5.06	5.03	5.12	4.95	4.98	4.87	5.60	4.74	4.87	5.05	4.94	4.95	4.93
05/21/24	5.07	5.09	5.06	5.03	5.04	5.10	5.03	4.98	4.96	5.36	4.75	4.85	5.00	4.92	4.90	4.86
05/22/24	4.95	4.98	4.99	4.93	4.92	4.89	4.95	4.91	4.81	5.08	4.67	4.78	4.94	4.80	4.83	4.82
05/23/24	4.94	4.93	4.95	4.97	4.87	4.93	4.88	4.90	4.74	5.06	4.65	4.77	4.97	4.79	4.85	4.81
05/24/24	4.97	4.98	4.99	5.01	4.94	5.00	4.93	4.92	4.75	5.26	4.70	4.74	4.94	4.84	4.92	4.82
05/25/24	4.91	5.01	4.97	4.95	4.88	4.89	4.93	4.90	4.73	5.13	4.79	4.74	4.96	4.95	4.92	4.78
05/26/24	4.89	5.02	5.01	4.98	4.90	5.02	4.93	4.90	4.85	5.14	4.75	4.77	4.97	4.94	4.84	4.80
05/27/24	4.87	5.01	5.03	4.95	4.89	4.97	4.92	4.94	4.86	5.16	4.78	4.75	4.96	4.92	4.92	4.79
05/28/24	4.98	4.97	5.08	4.99	4.93	5.03	4.90	4.95	4.88	5.15	4.76	4.75	4.97	4.93	4.93	4.79
05/29/24	4.92	4.99	5.04	4.97	4.94	5.03	4.90	4.94	4.89	5.14	4.75	4.75	4.98	4.93	4.87	4.81
05/30/24	5.06	5.06	5.18	4.96	4.99	5.11	5.01	5.01	5.03	5.59	4.94	4.87	5.01	5.05	5.00	4.95
05/31/24	4.95	5.06	5.03	4.95	4.94	5.01	4.96	4.98	4.92	5.26	4.77	4.81	4.96	4.97	4.93	5.05

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)

Date	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
	MicroFiltration Process online monitoring results Log Removal Value															
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
05/01/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/02/24	4.30	4.51	4.37	4.46	4.45	4.32	4.61	4.51	4.94	5.01	4.93	5.05	5.06	5.07	4.97	4.88
05/03/24	4.31	4.52	4.35	4.48	4.48	4.27	4.62	4.50	4.96	5.02	4.91	5.09	5.09	5.04	4.99	4.91
05/04/24	4.35	4.53	4.36	4.49	4.50	4.27	4.61	4.48	4.99	4.99	4.95	5.12	5.09	5.05	4.98	4.90
05/05/24	4.30	4.54	4.37	4.48	4.48	4.31	4.59	4.52	5.00	5.00	4.97	5.05	N/A *	N/A *	N/A *	N/A *
05/06/24	4.34	4.57	4.41	4.45	4.52	4.35	4.61	4.58	5.01	4.97	4.96	5.06	5.13	5.13	5.02	N/A *
05/07/24	4.56	4.60	4.37	4.47	4.60	4.35	4.65	4.60	5.05	4.95	4.98	5.08	5.14	5.11	5.08	4.97
05/08/24	4.64	4.59	4.37	4.45	4.60	4.38	4.66	4.59	5.06	4.96	4.98	5.10	5.11	5.10	5.06	4.97
05/09/24	4.71	4.66	4.70	4.53	4.67	4.45	4.69	4.87	5.01	5.02	4.96	5.11	5.15	5.11	5.03	4.98
05/10/24	4.65	5.04	4.77	4.52	4.81	4.66	4.69	4.83	5.12	5.01	4.95	5.12	5.15	5.04	5.01	5.00
05/11/24	4.65	4.92	4.75	4.54	4.75	4.61	4.65	4.80	5.20	5.00	4.97	5.10	5.13	5.04	5.00	5.00
05/12/24	4.65	4.93	4.72	4.52	4.70	4.60	4.70	4.80	5.22	5.07	4.98	5.12	5.19	5.07	5.04	4.95
05/13/24	4.70	4.96	4.76	4.51	4.86	4.60	4.64	4.80	5.16	5.06	5.00	5.16	5.18	5.08	5.08	4.93
05/14/24	4.69	4.89	4.71	4.48	4.81	4.55	4.69	4.78	5.14	5.05	5.00	5.14	5.14	5.07	5.05	4.95
05/15/24	4.71	4.89	4.71	4.57	4.81	4.57	4.74	4.79	5.16	5.07	4.99	5.10	5.16	5.05	4.99	4.98
05/16/24	4.69	4.95	4.66	4.52	4.83	4.59	4.71	4.78	5.17	5.07	5.00	5.11	5.14	5.10	4.98	4.95
05/17/24	4.68	4.90	4.73	4.52	4.79	4.59	4.71	4.76	5.17	5.06	5.02	5.07	5.13	5.03	5.04	4.95
05/18/24	4.64	4.92	4.73	4.51	4.79	4.58	4.72	4.75	5.11	5.06	5.01	5.07	5.25	5.03	4.99	4.94
05/19/24	4.63	4.92	4.72	4.49	4.80	4.58	4.76	4.75	5.15	5.07	5.03	5.14	5.31	5.07	5.02	4.94
05/20/24	4.63	4.91	4.72	4.48	4.79	4.57	4.81	4.76	5.15	5.10	5.08	5.15	5.19	5.05	5.03	4.98
05/21/24	4.58	4.89	4.60	4.45	4.71	4.56	4.76	4.71	5.09	5.00	5.05	5.12	5.15	5.04	4.97	4.96
05/22/24	4.48	4.75	4.51	4.38	4.64	4.45	4.66	4.63	5.04	4.92	4.99	5.02	5.13	4.97	4.91	4.93
05/23/24	4.47	4.66	4.50	4.29	4.60	4.36	4.62	4.60	5.01	4.87	4.98	5.07	5.10	4.94	4.87	4.93
05/24/24	4.47	4.70	4.50	4.27	4.59	4.36	4.64	4.61	5.02	4.88	4.98	5.17	5.12	4.94	4.90	4.94
05/25/24	4.42	4.67	4.46	4.22	4.60	4.40	4.67	4.56	5.01	4.83	4.97	5.08	5.10	4.87	5.02	4.91
05/26/24	4.41	4.65	4.45	4.27	4.59	4.43	4.68	4.56	5.05	4.78	4.99	5.07	5.07	4.89	4.98	4.88
05/27/24	4.36	4.69	4.47	4.28	4.56	4.42	4.67	4.59	5.06	4.85	5.01	5.09	5.13	4.96	4.95	4.93
05/28/24	4.38	4.73	4.50	4.47	4.55	4.42	4.68	4.59	5.05	5.07	5.00	5.10	5.15	5.07	4.97	4.94
05/29/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	4.70	4.54	5.00	5.18	5.00	5.13	5.10	5.04	5.00	4.91
05/30/24	4.51	4.82	N/A *	N/A *	4.55	N/A *	N/A *	4.65	5.23	5.32	5.03	5.17	5.18	5.11	5.04	4.98
05/31/24	4.45	4.79	4.54	4.64	4.50	4.45	4.65	4.62	5.20	5.21	5.02	5.12	5.18	5.07	5.03	4.95

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline due to low plant production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)

Date	MicroFiltration Process online monitoring results Log Removal Value															
	E01	**E02**	**E03**	**E04**	**E05**	**E06**	**E07**	**E08**	**F01**	**F02**	**F03**	**F04**	**F05**	**F06**	**F07**	**F08**
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
05/01/24	4.33	N/A *	5.52	4.41	4.85	4.70	4.56	4.89	4.63	4.87	N/A *	4.65	4.54	4.51	4.84	4.83
05/02/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	4.58	5.22	4.63	4.88	N/A *	4.70	4.51	4.49	N/A *	N/A *
05/03/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/04/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/05/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/07/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/08/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/09/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/10/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/11/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/12/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/13/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/14/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/15/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/16/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/17/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/18/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/19/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/20/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/21/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/22/24	4.68	4.72	5.45	4.50	4.99	4.89	4.56	5.02	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/23/24	4.55	4.59	5.50	4.43	5.04	4.95	4.63	4.85	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/24/24	4.38	4.59	5.57	4.42	4.86	4.92	4.54	4.85	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/25/24	4.37	4.59	5.44	4.54	4.88	4.90	4.55	4.87	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/26/24	4.39	4.61	5.30	4.43	4.89	5.03	4.51	4.76	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/27/24	4.40	4.77	5.42	4.44	4.86	4.88	4.52	4.69	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/28/24	4.48	4.57	5.45	4.38	5.00	4.90	4.58	5.13	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/29/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/30/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
05/31/24	4.53	4.70	5.53	4.58	5.05	5.05	4.60	5.01	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline due to low plant production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
05/01/24	0.025	0.045	0.023	0.060	0.026	0.034	0.023	0.047	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.047	0.057	0.030	0.051	0.029	0.033	0.021	0.045	0.026
05/02/24	0.024	0.028	0.022	0.072	0.025	0.036	0.021	0.024	0.031	0.113	0.029	0.122	0.027	0.076	0.046	0.061	N/A *	N/A *	0.029	0.035	0.030	0.034	0.022	0.026	0.027
05/03/24	0.024	0.028	0.022	0.028	0.026	0.045	0.022	0.032	0.027	0.033	0.026	0.123	0.025	0.041	0.045	0.049	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.027
05/04/24	0.026	0.030	0.020	0.031	0.024	0.032	0.023	0.109	0.026	0.031	0.024	0.026	0.024	0.087	0.046	0.171	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.026
05/05/24	0.023	0.060	0.024	0.433**	0.024	0.034	0.022	0.079	0.025	0.029	0.025	0.028	0.023	0.033	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.024
05/06/24	0.023	0.029	0.020	0.062	0.026	0.033	0.023	0.111	0.026	0.032	0.031	0.404**	0.024	0.042	0.045	0.070	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.027
05/07/24	0.023	0.091	0.020	0.165	0.025	0.026	0.021	0.037	0.026	0.031	0.031	0.408**	0.023	0.033	0.044	0.066	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.027
05/08/24	0.025	0.076	0.020	0.039	0.025	0.029	0.022	0.037	0.026	0.037	0.027	0.030	0.023	0.027	0.045	0.139	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.027
05/09/24	0.024	0.030	0.020	0.030	0.025	0.030	0.021	0.030	0.027	0.040	0.028	0.038	0.023	0.030	0.044	0.050	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029
05/10/24	0.022	0.025	0.019	0.021	0.023	0.025	0.019	0.027	0.026	0.033	0.027	0.032	0.022	0.030	0.041	0.053	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.026
05/11/24	0.023	0.037	0.020	0.029	0.023	0.025	0.021	0.026	0.028	0.049	0.028	0.060	0.024	0.027	0.043	0.045	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.031
05/12/24	0.025	0.029	0.024	0.029	0.025	0.028	0.022	0.026	0.029	0.034	0.031	0.037	0.026	0.030	0.045	0.049	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029
05/13/24	0.029	0.035	0.025	0.029	0.025	0.028	0.023	0.026	0.031	0.037	0.033	0.039	0.027	0.031	0.046	0.049	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.031
05/14/24	0.027	0.034	0.024	0.033	0.024	0.028	0.021	0.026	0.029	0.039	0.030	0.042	0.025	0.034	0.045	0.051	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029
05/15/24	0.023	0.027	0.023	0.029	0.023	0.026	0.019	0.022	0.027	0.032	0.028	0.066	0.024	0.028	0.043	0.045	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.027
05/16/24	0.023	0.026	0.024	0.025	0.024	0.026	0.020	0.021	0.028	0.042	0.028	0.034	0.024	0.026	0.044	0.045	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.027
05/17/24	0.022	0.024	0.023	0.028	0.023	0.025	0.019	0.020	0.027	0.032	0.028	0.035	0.025	0.033	0.043	0.050	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.028
05/18/24	0.022	0.026	0.024	0.028	0.023	0.028	0.020	0.024	0.028	0.069	0.029	0.035	0.025	0.029	0.045	0.051	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.028
05/19/24	0.023	0.027	0.024	0.027	0.024	0.026	0.020	0.023	0.028	0.031	0.029	0.040	0.025	0.028	0.048	0.056	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029
05/20/24	0.022	0.027	0.026	0.037	0.024	0.027	0.020	0.024	0.029	0.039	0.030	0.083	0.025	0.028	0.047	0.052	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029
05/21/24	0.025	0.028	0.029	0.036	0.027	0.034	0.023	0.027	0.031	0.034	0.033	0.044	0.028	0.030	0.050	0.053	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.034
05/22/24	0.025	0.030	0.026	0.031	0.026	0.030	0.023	0.025	0.031	0.041	0.031	0.034	0.027	0.029	0.044	0.052	0.046	0.086	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.031
05/23/24	0.024	0.028	0.024	0.028	0.025	0.029	0.023	0.028	0.031	0.114	0.030	0.054	0.028	0.035	0.038	0.041	0.046	0.051	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
05/24/24	0.024	0.027	0.023	0.033	0.025	0.028	0.023	0.028	0.030	0.032	0.029	0.038	0.027	0.031	0.038	0.049	0.045	0.050	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
05/25/24	0.024	0.026	0.023	0.026	0.026	0.035	0.025	0.030	0.029	0.031	0.029	0.035	0.027	0.028	0.038	0.046	0.045	0.053	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
05/26/24	0.024	0.026	0.024	0.045	0.027	0.035	0.023	0.026	0.030	0.110	0.030	0.100	0.027	0.029	0.038	0.039	0.046	0.053	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.031
05/27/24	0.024	0.027	0.024	0.034	0.026	0.030	0.023	0.029	0.030	0.033	0.030	0.072	0.027	0.033	0.040	0.049	0.045	0.046	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
05/28/24	0.024	0.027	0.023	0.026	0.025	0.028	0.022	0.025	0.029	0.034	0.029	0.038	0.027	0.030	0.038	0.043	0.045	0.049	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029
05/29/24	0.026	0.041	0.027	0.054	0.029	0.045	0.027	0.068	N/A *	N/A *	0.032	0.064	0.028	0.029	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
05/30/24	0.025	0.061	0.028	0.100	0.028	0.069	0.026	0.077	0.075	0.213**	0.060	0.176	0.030	0.100	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.032
05/31/24	0.023	0.030	0.023	0.027	0.025	0.027	0.023	0.037	0.030	0.033	0.029	0.035	0.026	0.029	0.037	0.041	0.045	0.049	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.029

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* Cell offline due to low plant production setpoint.

** Erroneous value due to instrumentation issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
Date	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
05/01/24	0.013	0.013	9.360	8.655	10.680	0.060	0.041	0.080	1,822	1,782	1,925	23	21	27	99.36	2.19	98.72	1.89
05/02/24	0.013	0.013	9.002	8.468	9.592	0.056	0.044	0.085	1,768	1,724	1,801	23	21	25	99.38	2.21	98.69	1.88
05/03/24	0.013	0.013	8.681	8.298	9.091	0.050	0.038	0.062	1,750	1,670	1,867	24	22	29	99.43	2.24	98.61	1.86
05/04/24	0.013	0.013	8.876	8.542	9.297	0.053	0.043	0.062	1,720	1,679	1,757	23	21	25	99.40	2.22	98.65	1.87
05/05/24	0.014	0.014	8.940	8.489	9.676	0.062	0.035	0.089	1,658	1,613	1,702	22	20	25	99.30	2.16	98.66	1.87
05/06/24	0.013	0.014	9.032	8.550	9.817	0.060	0.043	0.085	1,648	1,604	1,719	22	19	24	99.34	2.18	98.68	1.88
05/07/24	0.013	0.013	8.874	8.363	9.641	0.073	0.056	0.096	1,710	1,659	1,797	22	20	24	99.18	2.08	98.71	1.89
05/08/24	0.013	0.013	8.292	7.608	9.219	0.082	0.062	0.098	1,741	1,675	1,799	22	20	26	99.01	2.00	98.71	1.89
05/09/24	0.013	0.013	7.858	7.513	8.279	0.078	0.061	0.090	1,715	1,654	1,778	21	19	23	99.00	2.00	98.75	1.90
05/10/24	0.013	0.013	8.290	7.725	8.858	0.082	0.062	0.093	1,731	1,651	1,857	22	19	25	99.01	2.00	98.75	1.90
05/11/24	0.013	0.013	8.851	8.489	9.257	0.072	0.054	0.091	1,757	1,716	1,814	22	20	24	99.18	2.09	98.77	1.91
05/12/24	0.013	0.013	8.934	8.188	10.175	0.063	0.046	0.086	1,698	1,654	1,757	21	18	25	99.30	2.15	98.77	1.91
05/13/24	0.013	0.013	9.163	8.209	10.380	0.057	0.043	0.090	1,684	1,632	1,775	22	20	26	99.38	2.21	98.67	1.88
05/14/24	0.013	0.013	8.913	8.347	9.977	0.054	0.044	0.075	1,718	1,649	1,791	22	20	24	99.39	2.22	98.72	1.89
05/15/24	0.013	0.013	8.102	7.370	9.465	0.059	0.050	0.070	1,740	1,655	1,851	21	20	23	99.27	2.13	98.77	1.91
05/16/24	0.013	0.013	7.762	7.412	8.324	0.053	0.043	0.064	1,772	1,726	1,831	21	20	22	99.32	2.17	98.81	1.93
05/17/24	0.013	0.013	7.714	7.491	8.086	0.057	0.047	0.067	1,739	1,668	1,820	20	19	22	99.26	2.13	98.84	1.94
05/18/24	0.013	0.013	7.747	7.354	8.090	0.050	0.038	0.056	1,747	1,698	1,837	20	19	22	99.36	2.19	98.85	1.94
05/19/24	0.013	0.013	7.743	7.278	8.361	0.057	0.036	0.079	1,700	1,663	1,732	20	18	21	99.27	2.14	98.85	1.94
05/20/24	0.013	0.013	7.728	7.162	8.561	0.051	0.039	0.075	1,664	1,594	1,734	20	18	21	99.35	2.18	98.82	1.93
05/21/24	0.013	0.013	8.254	7.553	9.159	0.049	0.044	0.060	1,733	1,631	1,875	22	19	27	99.41	2.23	98.73	1.89
05/22/24	0.013	0.013	8.594	7.372	9.863	0.050	0.041	0.066	1,779	1,691	1,881	24	21	27	99.41	2.23	98.65	1.87
05/23/24	0.013	0.013	8.856	8.029	10.079	0.062	0.056	0.069	1,754	1,670	1,830	24	21	28	99.30	2.16	98.61	1.86
05/24/24	0.013	0.013	8.911	8.033	9.977	0.063	0.058	0.070	1,773	1,712	1,873	25	22	29	99.29	2.15	98.60	1.85
05/25/24	0.013	0.013	8.792	7.867	9.692	0.061	0.055	0.068	1,723	1,671	1,813	25	23	28	99.31	2.16	98.54	1.84
05/26/24	0.013	0.013	8.623	7.784	9.780	0.076	0.052	0.096	1,653	1,591	1,713	30	23	37	99.12	2.05	98.20	1.74
05/27/24	0.013	0.013	8.630	7.669	9.552	0.076	0.065	0.107**	1,638	1,574	1,698	30	27	34	99.12	2.06	98.18	1.74
05/28/24	0.013	0.013	8.759	7.717	9.852	0.070	0.061	0.093	1,624	1,547	1,728	27	23	34	99.20	2.10	98.34	1.78
05/29/24	0.016	0.016	9.769	9.619	9.838	0.081	0.065	0.097	1,690	1,668	1,716	27	21	34	99.17	2.08	98.39	1.79
05/30/24	0.014	0.035	7.862	7.492	8.713	0.078	0.064	0.117***	1,727	1,664	1,781	25	21	30	99.01	2.00	98.57	1.84
05/31/24	0.013	0.013	8.051	7.275	9.240	0.076	0.067	0.323**	1,696	1,635	1,761	27	24	30	99.06	2.03	98.42	1.80

Notes:

** Erroneous value due to instrumentation error not confirmed by backup analyzer. Backup analyzer value on 05/27/24 was 0.091 ppm and backup analyzer value on 05/31/24 was 0.065 ppm.

*** Short term TOC spike following plant restart after planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water	UltraViolet / AOP Process online monitoring results					
	UVT %	FLOW	POWER	EED	Peroxide Dose	Log
Date	avg	MG	kW	kWh/kgal	mg/L	Removal
05/01/24	97.93	41.433	28,396.3	0.35	4	6
05/02/24	98.67	58.672	16,569.3	0.38	4	6
05/03/24	98.16	55.213	20,266.4	0.36	4	6
05/04/24	98.59	58.341	20,203.3	0.36	4	6
05/05/24	98.93	52.456	19,974.8	0.35	4	6
05/06/24	98.44	60.777	19,498.3	0.35	4	6
05/07/24	98.99	58.232	22,047.7	0.36	4	6
05/08/24	99.37	58.904	20,369.2	0.35	4	6
05/09/24	99.58	55.207	20,035.9	0.35	4	6
05/10/24	99.49	59.525	20,427.8	0.37	4	6
05/11/24	99.02	56.134	21,493.1	0.36	4	6
05/12/24	97.69	58.072	20,088.8	0.36	4	6
05/13/24	97.36	53.963	19,972.6	0.34	4	6
05/14/24	97.86	56.422	19,229.1	0.35	4	6
05/15/24	98.31	53.377	19,550.5	0.35	4	6
05/16/24	97.70	51.007	19,053.8	0.35	4	6
05/17/24	97.78	57.057	18,117.4	0.35	4	6
05/18/24	97.84	55.155	20,041.7	0.35	4	6
05/19/24	98.06	55.114	20,549.3	0.37	4	6
05/20/24	98.25	55.098	20,544.8	0.37	4	6
05/21/24	97.20	69.753	20,543.2	0.37	4	6
05/22/24	96.75	87.430	25,091.4	0.36	4	6
05/23/24	96.95	83.714	30,318.6	0.35	4	6
05/24/24	96.63	79.377	29,285.9	0.35	4	6
05/25/24	97.19	86.825	27,755.4	0.35	4	6
05/26/24	97.15	82.526	30,105.8	0.35	4	6
05/27/24	97.06	78.764	28,856.8	0.35	4	6
05/28/24	97.45	72.374	27,319.0	0.35	4	6
05/29/24	98.35	9.198	22,182.0	0.36	4	6
05/30/24	98.86	13.942	3,738.1	0.40	4	6
05/31/24	97.22	85.825	10,134.7	0.38	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
06/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/02/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/03/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/06/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/07/24	12	12	12	Y	Y	N	0.0	0.0	0.0	0.0	0.0
06/08/24	12	12	12	Y	Y	N	0.0	0.0	0.0	0.0	0.0
06/09/24	12	12	12	Y	Y	N	0.0	0.0	0.0	0.0	0.0
06/10/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/11/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/12/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/13/24	12	12	12	Y	Y	N	0.0	0.0	0.0	0.0	0.0
06/14/24	12	12	12	Y	Y	N	0.0	0.0	0.0	0.0	0.0
06/15/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/16/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/17/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/18/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/19/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/20/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/21/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/22/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/23/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/24/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/25/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/27/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/28/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/29/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/30/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
06/01/24	0.00	4.43	2.12	6.00	0	12.56
06/02/24	0.00	4.39	2.18	6.00	0	12.57
06/03/24	0.00	4.32	2.12	6.00	0	12.44
06/04/24	0.00	4.33	2.14	6.00	0	12.48
06/05/24	0.00	4.30	2.09	6.00	0	12.39
06/06/24	0.00	4.34	2.02	6.00	0	12.36
06/07/24	0.00	4.30	1.96	6.00	0	12.26
06/08/24	0.00	4.35	1.99	6.00	0	12.34
06/09/24	0.00	4.26	1.99	6.00	0	12.25
06/10/24	0.00	4.26	2.00	6.00	0	12.26
06/11/24	0.00	4.30	2.01	6.00	0	12.31
06/12/24	0.00	4.32	2.01	6.00	0	12.33
06/13/24	0.00	4.34	1.97	6.00	0	12.30
06/14/24	0.00	4.32	1.97	6.00	0	12.29
06/15/24	0.00	4.32	2.02	6.00	0	12.34
06/16/24	0.00	4.36	2.03	6.00	0	12.39
06/17/24	0.00	4.36	2.09	6.00	0	12.46
06/18/24	0.00	4.35	2.09	6.00	0	12.43
06/19/24	0.00	4.33	2.09	6.00	0	12.42
06/20/24	0.00	4.28	2.04	6.00	0	12.33
06/21/24	0.00	4.22	2.07	6.00	0	12.28
06/22/24	0.00	4.22	2.04	6.00	0	12.26
06/23/24	0.00	4.23	2.01	6.00	0	12.24
06/24/24	0.00	4.23	2.20	6.00	0	12.43
06/25/24	0.00	4.42	2.11	6.00	0	12.53
06/26/24	0.00	4.39	2.05	6.00	0	12.45
06/27/24	0.00	4.41	2.06	6.00	0	12.47
06/28/24	0.00	4.43	2.03	6.00	0	12.46
06/29/24	0.00	4.38	2.02	6.00	0	12.40
06/30/24	0.00	4.36	2.06	6.00	0	12.42

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
06/01/24	0.00	0.00	2.12	6.00	4	12.12
06/02/24	0.00	0.00	2.18	6.00	4	12.18
06/03/24	0.00	0.00	2.12	6.00	4	12.12
06/04/24	0.00	0.00	2.14	6.00	4	12.14
06/05/24	0.00	0.00	2.09	6.00	4	12.09
06/06/24	0.00	0.00	2.02	6.00	4	12.02
06/07/24	0.00	0.00	1.96	6.00	4	12.00
06/08/24	0.00	0.00	1.99	6.00	4	12.00
06/09/24	0.00	0.00	1.99	6.00	4	12.00
06/10/24	0.00	0.00	2.00	6.00	4	12.00
06/11/24	0.00	0.00	2.01	6.00	4	12.01
06/12/24	0.00	0.00	2.01	6.00	4	12.01
06/13/24	0.00	0.00	1.97	6.00	4	12.00
06/14/24	0.00	0.00	1.97	6.00	4	12.00
06/15/24	0.00	0.00	2.02	6.00	4	12.02
06/16/24	0.00	0.00	2.03	6.00	4	12.03
06/17/24	0.00	0.00	2.09	6.00	4	12.09
06/18/24	0.00	0.00	2.09	6.00	4	12.09
06/19/24	0.00	0.00	2.09	6.00	4	12.09
06/20/24	0.00	0.00	2.04	6.00	4	12.04
06/21/24	0.00	0.00	2.07	6.00	4	12.07
06/22/24	0.00	0.00	2.04	6.00	4	12.04
06/23/24	0.00	0.00	2.01	6.00	4	12.01
06/24/24	0.00	0.00	2.20	6.00	4	12.20
06/25/24	0.00	0.00	2.11	6.00	4	12.11
06/26/24	0.00	0.00	2.05	6.00	4	12.05
06/27/24	0.00	0.00	2.06	6.00	4	12.06
06/28/24	0.00	0.00	2.03	6.00	4	12.03
06/29/24	0.00	0.00	2.02	6.00	4	12.02
06/30/24	0.00	0.00	2.06	6.00	4	12.06

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
06/01/24	4.99	4.94	5.02	4.90	4.93	5.01	4.92	4.95	4.84	5.14	4.72	4.95	4.98	4.93	4.90	4.95
06/02/24	4.90	4.90	5.02	4.88	4.89	4.95	4.91	4.88	4.84	5.40	4.71	4.90	5.00	4.90	4.86	4.93
06/03/24	4.89	4.94	4.95	4.88	4.86	4.93	4.89	4.90	4.79	5.48	4.68	4.86	5.17	4.89	4.83	4.90
06/04/24	4.78	4.92	4.93	4.85	4.76	4.90	4.85	4.86	4.77	5.31	4.67	4.85	5.17	4.86	4.82	4.88
06/05/24	5.11	4.92	4.87	4.85	4.79	4.87	4.86	4.86	4.77	5.39	4.68	4.85	5.13	4.85	4.81	4.84
06/06/24	5.09	4.90	4.89	4.85	4.81	4.83	4.89	4.85	4.75	5.36	4.66	4.87	5.13	4.85	4.77	4.84
06/07/24	5.06	4.91	4.82	4.77	4.73	4.79	4.85	4.82	4.74	5.48	4.65	4.88	5.10	4.84	4.79	4.85
06/08/24	5.09	4.81	4.87	4.81	4.99	4.78	4.84	4.80	4.73	5.39	4.61	4.87	5.08	4.81	4.75	4.88
06/09/24	5.09	4.85	4.84	4.80	5.02	4.76	4.83	4.81	4.71	5.39	4.62	4.88	5.09	4.82	4.75	4.86
06/10/24	5.10	5.17	5.24	4.79	4.96	4.75	4.83	4.77	4.75	5.29	4.63	4.87	5.09	4.82	4.74	4.86
06/11/24	5.12	5.04	5.10	4.92	5.01	4.77	4.84	4.82	4.76	5.26	4.65	4.87	5.09	4.79	4.90	4.86
06/12/24	5.11	5.02	5.07	5.00	4.99	4.78	4.85	5.03	4.74	5.33	4.67	4.87	5.11	4.85	4.92	4.87
06/13/24	5.10	5.05	5.04	5.00	4.97	4.80	4.85	5.00	4.72	5.38	4.65	4.85	5.11	4.87	4.87	4.88
06/14/24	5.07	5.04	5.09	4.91	5.03	5.11	4.92	4.93	4.69	5.40	4.63	4.83	5.11	4.85	4.88	4.88
06/15/24	5.07	5.08	5.07	4.96	5.04	5.10	4.93	4.99	N/A *	5.40	4.68	4.86	5.08	4.84	4.89	4.85
06/16/24	5.08	5.02	5.05	4.97	4.92	5.06	4.93	4.97	N/A *	5.30	4.68	4.88	5.08	4.89	4.90	4.87
06/17/24	5.09	5.04	5.06	4.91	5.04	5.04	5.09	4.95	5.15	5.43	4.73	4.86	5.10	4.86	4.90	4.88
06/18/24	5.04	4.98	5.00	4.92	4.97	5.00	5.04	4.95	5.04	5.37	4.71	4.81	5.06	4.81	4.92	4.85
06/19/24	5.06	4.98	5.01	4.96	4.96	5.03	5.01	4.94	4.96	5.37	4.67	4.81	5.04	4.82	4.89	4.83
06/20/24	5.03	4.99	5.02	4.95	4.96	5.00	4.97	4.90	4.90	5.36	4.67	4.79	5.03	4.83	4.82	4.79
06/21/24	5.02	4.94	4.97	4.91	4.93	4.97	4.94	4.92	4.89	5.30	4.63	4.79	5.00	5.07	4.81	4.78
06/22/24	5.06	4.98	5.06	4.88	4.96	5.03	4.94	4.95	4.91	5.33	4.73	4.78	5.01	5.04	4.82	4.77
06/23/24	5.10	5.00	4.98	4.90	4.95	5.01	4.96	4.94	4.92	5.33	4.81	4.77	5.00	4.98	4.87	4.80
06/24/24	5.09	5.01	5.00	4.92	4.92	5.07	4.96	4.98	4.93	5.38	4.83	4.77	5.00	4.99	4.89	4.81
06/25/24	5.04	5.01	5.02	4.94	4.95	5.06	4.97	4.92	5.02	5.31	4.82	4.73	4.99	4.97	4.88	4.80
06/26/24	4.97	5.01	5.04	4.92	4.92	5.02	4.99	4.90	5.07	5.19	4.77	4.76	5.01	4.96	4.84	4.94
06/27/24	5.04	4.96	4.97	4.84	4.90	4.99	4.99	4.88	5.02	5.11	4.79	4.86	4.99	4.94	4.81	4.90
06/28/24	5.05	4.97	4.97	4.87	4.91	4.97	4.97	4.92	5.02	5.41	4.75	4.87	4.97	4.94	4.83	4.88
06/29/24	5.00	4.96	4.91	4.85	4.84	4.91	4.94	4.88	5.02	5.44	4.75	4.84	5.05	4.93	4.83	4.89
06/30/24	4.98	4.96	4.99	4.86	4.88	4.91	4.94	4.88	5.00	5.41	4.73	4.83	5.08	4.94	4.84	4.90

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	**C02**	**C03**	**C04**	**C05**	**C06**	**C07**	**C08**	**D01**	**D02**	**D03**	**D04**	**D05**	**D06**	**D07**	**D08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
06/01/24	4.45	4.72	4.48	4.58	4.44	4.43	4.63	4.59	5.01	5.09	4.98	5.08	5.14	5.03	5.00	4.87
06/02/24	4.42	4.70	4.46	4.50	4.41	4.40	4.61	4.53	4.99	5.07	4.96	5.05	5.06	5.03	5.02	4.89
06/03/24	4.37	4.66	4.41	4.52	4.38	4.36	4.56	4.51	5.00	5.05	4.97	5.04	5.07	5.02	4.99	4.89
06/04/24	4.61	4.64	4.36	4.51	4.37	4.33	4.54	4.49	4.98	5.03	4.93	5.08	5.08	4.97	4.97	4.88
06/05/24	4.69	4.58	4.31	4.43	4.32	4.30	4.52	4.44	4.91	4.96	4.93	5.09	5.04	4.96	4.93	4.85
06/06/24	4.64	4.53	4.52	4.39	4.34	4.55	4.48	4.58	4.88	4.91	4.92	5.05	5.03	4.95	4.91	4.86
06/07/24	4.63	4.75	4.68	4.32	4.45	4.59	4.46	4.74	5.05	4.91	4.91	5.01	4.99	4.94	4.89	4.86
06/08/24	4.59	4.85	4.67	4.35	4.54	4.51	4.48	4.71	5.06	4.90	4.91	4.98	4.99	4.94	4.89	4.87
06/09/24	4.58	4.85	4.64	4.38	4.26	4.53	4.51	4.70	5.07	4.99	4.89	4.97	5.05	5.01	4.94	4.85
06/10/24	4.61	4.86	4.62	4.37	4.75	4.54	4.54	4.76	5.07	4.97	4.90	5.05	5.07	5.05	4.94	4.83
06/11/24	4.61	4.85	4.60	4.30	4.75	4.48	4.60	4.66	4.98	4.89	4.90	5.01	5.02	4.98	4.93	4.87
06/12/24	4.61	4.86	4.60	4.32	4.77	4.49	4.69	4.64	5.01	4.84	4.90	5.02	5.01	4.97	4.94	4.87
06/13/24	4.58	4.87	4.62	4.34	4.79	4.52	4.67	4.68	5.03	4.86	5.02	5.02	5.04	4.99	4.93	4.90
06/14/24	4.65	4.87	4.64	4.32	4.78	4.51	4.69	4.70	5.06	4.90	5.08	5.06	5.10	5.01	4.93	4.91
06/15/24	4.65	4.88	4.66	4.32	4.77	4.50	4.65	4.69	5.04	4.94	5.06	5.04	5.16	5.02	4.95	4.94
06/16/24	4.65	4.90	4.67	4.36	4.78	4.53	4.68	4.72	5.03	5.00	5.03	5.00	5.20	5.00	4.96	5.00
06/17/24	4.64	4.85	4.63	4.36	4.75	4.50	4.70	4.69	5.05	4.99	5.02	5.04	5.19	4.98	4.92	5.06
06/18/24	4.62	4.81	4.57	4.35	4.69	4.48	4.65	4.64	5.03	4.96	5.03	5.05	5.24	4.96	4.90	5.06
06/19/24	4.58	4.80	4.56	4.33	4.70	4.50	4.66	4.66	4.99	4.97	5.02	5.06	5.22	4.94	4.93	5.04
06/20/24	4.58	4.80	4.56	4.28	4.65	4.47	4.68	4.63	4.97	4.92	4.99	5.10	5.18	4.94	4.93	5.00
06/21/24	4.56	4.78	4.52	4.22	4.64	4.43	4.63	4.61	4.94	4.90	4.98	5.12	5.09	4.90	5.00	4.98
06/22/24	4.53	4.74	4.54	4.22	4.66	4.43	4.61	4.62	4.94	4.91	5.00	5.07	5.08	4.93	5.04	4.99
06/23/24	4.56	4.75	4.57	4.23	4.66	4.45	4.64	4.63	4.99	4.92	5.02	5.14	5.03	5.04	4.99	5.01
06/24/24	4.57	4.75	4.56	4.23	4.65	4.46	4.67	4.60	5.01	5.00	4.99	5.17	5.04	5.15	5.03	5.03
06/25/24	4.56	4.74	4.52	4.43	4.65	4.42	4.66	4.60	5.03	5.13	4.96	5.14	5.18	5.01	5.02	5.01
06/26/24	4.53	4.72	4.49	4.54	4.66	4.39	4.65	4.60	5.03	5.05	4.94	5.11	5.18	5.02	5.01	4.98
06/27/24	4.51	4.70	4.41	4.53	4.65	4.41	4.65	4.59	5.04	5.07	4.92	5.11	5.17	5.04	5.04	4.99
06/28/24	4.46	4.67	4.43	4.51	4.61	4.43	4.63	4.58	5.05	5.10	4.95	5.10	5.18	5.02	4.97	5.01
06/29/24	4.44	4.60	4.43	4.48	4.57	4.38	4.62	4.56	5.01	5.04	4.92	5.12	5.08	4.98	4.98	4.98
06/30/24	4.41	4.64	4.41	4.46	4.57	4.36	4.58	4.56	4.97	5.03	4.91	5.10	5.09	5.01	4.98	4.96

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
06/01/24	4.44	4.77	5.43	4.50	4.89	4.93	4.56	4.86	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/02/24	4.54	4.61	5.60	4.39	4.90	4.90	4.58	4.85	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/03/24	4.45	4.56	5.69	4.32	4.92	4.88	4.56	4.79	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/04/24	4.40	4.56	5.38	4.40	4.85	4.86	4.51	4.72	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/05/24	4.39	4.52	5.31	4.37	4.88	4.86	4.52	4.75	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/06/24	4.39	4.47	5.43	4.52	4.89	4.87	4.55	4.81	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/07/24	4.38	4.54	5.46	4.30	4.83	4.86	4.63	4.90	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/08/24	4.41	4.53	5.41	4.49	4.83	4.84	4.48	5.14	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/09/24	4.30	4.67	5.42	4.43	4.81	4.87	4.52	4.74	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/10/24	4.26	4.57	5.44	4.38	4.88	4.91	4.60	4.92	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/11/24	4.42	4.66	5.39	4.48	5.10	4.89	4.58	4.96	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
06/12/24	4.39	4.87	5.43	4.50	4.90	4.93	4.58	4.90	4.79	5.05	4.70	5.05	4.58	4.55	5.03	4.90
06/13/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.80	4.94	4.68	4.79	4.60	4.55	5.01	4.92
06/14/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.73	4.92	4.67	4.78	4.60	4.52	4.99	4.85
06/15/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.65	4.92	4.67	4.80	4.55	4.50	4.91	4.82
06/16/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.66	4.92	4.64	4.69	4.50	4.50	4.89	4.90
06/17/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.69	4.93	4.63	4.68	4.50	4.51	4.89	4.94
06/18/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.64	4.84	4.61	4.69	4.45	4.67	4.80	4.82
06/19/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.64	4.91	4.59	4.71	4.48	4.56	4.89	4.80
06/20/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.65	4.94	4.71	4.70	4.47	4.47	4.86	4.78
06/21/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.64	4.95	4.68	4.70	4.46	4.50	4.82	4.83
06/22/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.69	4.87	4.65	4.72	4.50	4.48	4.89	4.85
06/23/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.68	4.86	4.69	4.81	4.47	4.48	4.88	4.78
06/24/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.68	4.92	4.71	4.75	4.55	4.51	5.09	4.78
06/25/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.70	4.94	4.70	4.68	4.56	4.56	4.88	4.90
06/26/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.69	5.10	4.70	4.78	4.58	4.57	4.87	4.89
06/27/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.68	5.00	4.69	4.74	4.71	4.61	4.92	4.87
06/28/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.67	5.01	4.66	4.73	4.60	4.62	4.95	4.90
06/29/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.75	4.98	4.74	4.80	4.58	4.60	4.92	4.93
06/30/24	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	4.81	4.94	4.74	4.74	4.65	4.60	4.93	4.97

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline for low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
06/01/24	0.024	0.027	0.024	0.078	0.027	0.037	0.023	0.026	0.030	0.051	0.030	0.132	0.027	0.039	0.038	0.082	0.045	0.048	0.028	0.030	N/A**	N/A**	N/A**	N/A**	0.030
06/02/24	0.024	0.088	0.024	0.137	0.026	0.035	0.023	0.026	0.030	0.130	0.030	0.124	0.027	0.033	0.038	0.134	0.046	0.055	0.028	0.030	N/A**	N/A**	N/A**	N/A**	0.030
06/03/24	0.023	0.032	0.024	0.084	0.026	0.030	0.024	0.034	0.031	0.092	0.030	0.094	0.031	0.376***	0.039	0.163	0.046	0.048	0.028	0.033	N/A**	N/A**	N/A**	N/A**	0.031
06/04/24	0.027	0.223	0.026	0.169	0.027	0.030	0.024	0.065	0.031	0.041	0.028	0.040	0.029	0.204***	0.038	0.044	0.046	0.052	0.029	0.043	N/A**	N/A**	N/A**	N/A**	0.031
06/05/24	0.023	0.053	0.023	0.119	0.026	0.034	0.022	0.061	0.030	0.033	0.027	0.066	0.026	0.031	0.037	0.040	0.045	0.050	0.028	0.030	N/A**	N/A**	N/A**	N/A**	0.029
06/06/24	0.023	0.072	0.022	0.030	0.026	0.031	0.021	0.050	0.030	0.075	0.029	0.064	0.027	0.032	0.035	0.040	0.046	0.050	0.029	0.033	N/A**	N/A**	N/A**	N/A**	0.032
06/07/24	0.023	0.075	0.023	0.034	0.026	0.052	0.021	0.026	0.030	0.037	0.032	0.272***	0.029	0.041	0.034	0.051	0.046	0.049	0.030	0.040	N/A**	N/A**	N/A**	N/A**	0.031
06/08/24	0.023	0.030	0.024	0.030	0.026	0.031	0.021	0.022	0.030	0.032	0.027	0.030	0.029	0.089	0.034	0.050	0.047	0.050	0.032	0.036	N/A**	N/A**	N/A**	N/A**	0.029
06/09/24	0.024	0.033	0.023	0.032	0.025	0.034	0.022	0.120	0.030	0.050	0.031	0.213***	0.031	0.248***	0.037	0.214***	0.046	0.054	0.032	0.036	N/A**	N/A**	N/A**	N/A**	0.036
06/10/24	0.026	0.041	0.021	0.024	0.024	0.037	0.019	0.021	0.028	0.031	0.027	0.110	0.027	0.085	0.033	0.037	0.045	0.047	0.032	0.045	N/A**	N/A**	N/A**	N/A**	0.028
06/11/24	0.025	0.031	0.022	0.026	0.023	0.026	0.020	0.030	0.028	0.031	0.034	0.190	0.026	0.029	0.029	0.040	0.045	0.052	0.030	0.036	N/A**	N/A**	N/A**	N/A**	0.028
06/12/24	0.022	0.026	0.021	0.025	0.021	0.022	0.019	0.030	0.027	0.028	0.024	0.026	0.024	0.028	0.024	0.026	0.042	0.047	0.026	0.030	0.026	0.044	0.023	0.038	0.024
06/13/24	0.022	0.025	0.021	0.026	0.023	0.025	0.020	0.023	0.028	0.032	0.039	0.190	0.027	0.032	0.025	0.031	N/A**	N/A**	N/A**	N/A**	0.028	0.031	0.023	0.030	0.026
06/14/24	0.024	0.026	0.023	0.029	0.024	0.025	0.020	0.024	0.030	0.032	0.027	0.029	0.028	0.030	0.027	0.036	N/A**	N/A**	N/A**	N/A**	0.030	0.036	0.022	0.027	0.026
06/15/24	0.023	0.026	0.023	0.026	0.025	0.056	0.020	0.022	0.030	0.032	0.027	0.028	0.027	0.029	0.029	0.041	N/A**	N/A**	N/A**	N/A**	0.032	0.035	0.022	0.025	0.026
06/16/24	0.024	0.026	0.024	0.029	0.026	0.027	0.021	0.040	0.031	0.033	0.028	0.045	0.028	0.030	0.030	0.036	N/A**	N/A**	N/A**	N/A**	0.034	0.037	0.021	0.023	0.027
06/17/24	0.025	0.028	0.026	0.030	0.026	0.030	0.022	0.026	0.032	0.034	0.029	0.032	0.029	0.031	0.030	0.036	N/A**	N/A**	N/A**	N/A**	0.038	0.047	0.020	0.025	0.028
06/18/24	0.025	0.028	0.024	0.029	0.025	0.029	0.022	0.024	0.031	0.035	0.029	0.032	0.030	0.032	0.030	0.033	N/A**	N/A**	N/A**	N/A**	0.041	0.045	0.022	0.024	0.028
06/19/24	0.023	0.027	0.023	0.029	0.024	0.028	0.020	0.026	0.029	0.035	0.027	0.034	0.028	0.038	0.029	0.040	N/A**	N/A**	N/A**	N/A**	0.029	0.044	0.019	0.040	0.025
06/20/24	0.023	0.025	0.022	0.026	0.023	0.028	0.019	0.021	0.028	0.030	0.027	0.029	0.028	0.033	0.026	0.028	N/A**	N/A**	N/A**	N/A**	0.019	0.022	0.017	0.018	0.023
06/21/24	0.023	0.025	0.022	0.023	0.023	0.029	0.020	0.026	0.027	0.030	0.026	0.030	0.026	0.029	0.026	0.032	N/A**	N/A**	N/A**	N/A**	0.018	0.021	0.017	0.019	0.023
06/22/24	0.022	0.025	0.021	0.023	0.023	0.044	0.019	0.023	0.027	0.029	0.026	0.027	0.025	0.034	0.026	0.028	N/A**	N/A**	N/A**	N/A**	0.017	0.021	0.016	0.017	0.022
06/23/24	0.022	0.025	0.021	0.023	0.022	0.024	0.019	0.021	0.027	0.046	0.026	0.029	0.025	0.028	0.026	0.033	N/A**	N/A**	N/A**	N/A**	0.017	0.021	0.017	0.020	0.022
06/24/24	0.024	0.032	0.022	0.024	0.024	0.030	0.019	0.022	0.029	0.042	0.027	0.030	0.027	0.193	0.026	0.030	N/A**	N/A**	N/A**	N/A**	0.019	0.021	0.018	0.020	0.024
06/25/24	0.022	0.026	0.021	0.025	0.023	0.036	0.018	0.021	0.027	0.032	0.026	0.029	0.023	0.026	0.025	0.028	N/A**	N/A**	N/A**	N/A**	0.017	0.024	0.018	0.019	0.022
06/26/24	0.022	0.023	0.021	0.022	0.022	0.026	0.018	0.028	0.027	0.028	0.026	0.031	0.023	0.024	0.024	0.025	N/A**	N/A**	N/A**	N/A**	0.017	0.018	0.019	0.026	0.022
06/27/24	0.022	0.023	0.022	0.024	0.025	0.033	0.018	0.022	0.028	0.032	0.027	0.030	0.024	0.026	0.025	0.028	N/A**	N/A**	N/A**	N/A**	0.019	0.022	0.021	0.021	0.023
06/28/24	0.022	0.023	0.022	0.022	0.024	0.034	0.019	0.026	0.029	0.037	0.027	0.032	0.023	0.024	0.025	0.026	N/A**	N/A**	N/A**	N/A**	0.021	0.025	0.021	0.023	0.023
06/29/24	0.021	0.022	0.023	0.024	0.025	0.026	0.020	0.021	0.031	0.033	0.028	0.029	0.024	0.024	0.026	0.027	N/A**	N/A**	N/A**	N/A**	0.025	0.028	0.024	0.027	0.025
06/30/24	0.024	0.031	0.025	0.027	0.027	0.029	0.021	0.024	0.035	0.038	0.030	0.033	0.026	0.028	0.029	0.031	N/A**	N/A**	N/A**	N/A**	0.031	0.036	0.027	0.028	0.028

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

** Cell offline for low production setpoint.

*** Erroneous value due to instrumentation issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
Date	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
06/01/24	0.013	0.013	8.692	7.879	9.603	0.066	0.058	0.084	1,678	1,655	1,723	25	22	29	99.24	2.12	98.52	1.83
06/02/24	0.013	0.013	8.544	7.661	9.780	0.057	0.051	0.067	1,616	1,569	1,654	23	21	25	99.34	2.18	98.60	1.85
06/03/24	0.013	0.013	9.247	7.812	12.378	0.070	0.054	0.148 ****	1,626	1,549	1,774	23	20	29	99.24	2.12	98.57	1.84
06/04/24	0.013	0.013	9.211	8.254	11.563	0.066	0.059	0.083	1,665	1,596	1,735	23	20	28	99.28	2.14	98.63	1.86
06/05/24	0.013	0.013	8.300	7.218	9.800	0.067	0.059	0.077	1,672	1,595	1,775	23	20	26	99.19	2.09	98.64	1.87
06/06/24	0.013	0.013	8.080	7.781	8.643	0.077	0.064	0.097	1,731	1,690	1,780	25	22	33	99.04	2.02	98.57	1.85
06/07/24	0.013	0.013	7.974	7.533	8.627	0.087	0.062	0.108 *****	1,711	1,663	1,769	27	24	32	98.91	1.96	98.40	1.79
06/08/24	0.013	0.013	7.788	7.194	8.598	0.079	0.062	0.096	1,707	1,672	1,752	27	22	32	98.99	1.99	98.40	1.80
06/09/24	0.013	0.013	7.480	6.974	8.428	0.077	0.059	0.121 ******	1,623	1,587	1,668	27	20	30	98.97	1.99	98.36	1.79
06/10/24	0.013	0.013	7.419	7.108	8.122	0.074	0.059	0.094	1,599	1,532	1,691	23	20	28	99.00	2.00	98.54	1.83
06/11/24	0.013	0.013	7.662	7.213	8.412	0.075	0.046	0.113 ****	1,659	1,603	1,730	25	22	29	99.02	2.01	98.48	1.82
06/12/24	0.013	0.013	7.403	7.038	7.828	0.072	0.056	0.090	1,683	1,601	1,775	25	21	30	99.03	2.01	98.51	1.83
06/13/24	0.013	0.013	7.513	7.007	8.410	0.081	0.067	0.095	1,688	1,620	1,753	24	21	29	98.92	1.97	98.57	1.84
06/14/24	0.013	0.013	7.630	7.257	8.254	0.081	0.072	0.098	1,665	1,614	1,727	23	21	25	98.94	1.97	98.64	1.87
06/15/24	0.013	0.013	7.544	7.142	8.116	0.073	0.062	0.086	1,660	1,618	1,691	23	21	25	99.04	2.02	98.61	1.86
06/16/24	0.013	0.013	7.327	6.789	8.068	0.069	0.060	0.077	1,589	1,559	1,615	24	21	28	99.06	2.03	98.47	1.82
06/17/24	0.013	0.013	7.472	6.824	8.440	0.060	0.041	0.072	1,597	1,546	1,685	23	20	27	99.20	2.09	98.56	1.84
06/18/24	0.013	0.013	8.203	7.162	9.154	0.067	0.064	0.073	1,649	1,598	1,712	23	21	25	99.18	2.09	98.62	1.86
06/19/24	0.013	0.013	8.312	7.499	9.323	0.068	0.061	0.075	1,705	1,643	1,811	23	21	26	99.18	2.09	98.63	1.86
06/20/24	0.013	0.013	8.409	7.709	9.229	0.076	0.063	0.090	1,697	1,637	1,759	24	21	27	99.09	2.04	98.58	1.85
06/21/24	0.013	0.013	8.014	7.488	8.723	0.069	0.060	0.079	1,649	1,550	1,722	22	21	24	99.14	2.07	98.64	1.87
06/22/24	0.013	0.013	7.656	7.051	8.489	0.071	0.060	0.079	1,612	1,578	1,681	23	20	26	99.08	2.04	98.55	1.84
06/23/24	0.013	0.013	7.694	7.133	8.326	0.076	0.043	0.379 *****	1,534	1,501	1,573	22	20	24	99.01	2.01	98.58	1.85
06/24/24	0.013	0.013	7.762	7.036	8.643	0.049	0.041	0.060	1,514	1,465	1,600	21	19	25	99.37	2.20	98.58	1.85
06/25/24	0.013	0.013	7.267	6.498	8.669	0.057	0.047	0.085	1,578	1,528	1,654	23	22	25	99.22	2.11	98.55	1.84
06/26/24	0.013	0.013	6.806	6.236	7.242	0.060	0.047	0.079	1,606	1,550	1,705	23	21	25	99.11	2.05	98.55	1.84
06/27/24	0.013	0.013	7.055	6.640	7.426	0.062	0.051	0.074	1,621	1,554	1,691	24	22	25	99.13	2.06	98.53	1.83
06/28/24	0.014	0.015	7.028	6.359	7.423	0.065	0.054	0.077	1,682	1,572	1,781	24	21	28	99.08	2.03	98.55	1.84
06/29/24	0.015	0.015	6.886	6.536	7.485	0.066	0.051	0.075	1,701	1,636	1,769	25	23	28	99.05	2.02	98.51	1.83
06/30/24	0.015	0.015	6.736	5.949	7.153	0.059	0.046	0.070	1,659	1,618	1,728	25	24	28	99.13	2.06	98.48	1.82

Notes:

**** Value affected by short term TOC spike.

***** Erroneous vale due to instrumentation issue.

****** Short term TOC spike following plant restart after unplanned outage.

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
06/01/24	97.13	82.917	29,984.5	0.35	4	6
06/02/24	97.08	88.963	29,594.4	0.35	4	6
06/03/24	97.00	83.318	31,257.9	0.35	4	6
06/04/24	97.16	88.985	29,278.1	0.35	4	6
06/05/24	97.49	89.333	30,669.4	0.34	4	6
06/06/24	97.22	87.490	30,436.5	0.34	4	6
06/07/24	97.52	86.345	30,299.6	0.35	4	6
06/08/24	97.43	85.901	30,141.3	0.35	4	6
06/09/24	98.01	68.124	28,934.8	0.35	4	6
06/10/24	98.82	82.739	25,121.7	0.35	4	6
06/11/24	98.87	86.692	29,238.8	0.35	4	6
06/12/24	99.27	83.165	29,871.8	0.35	4	6
06/13/24	98.80	87.894	30,177.2	0.36	4	6
06/14/24	98.31	82.822	30,393.6	0.35	4	6
06/15/24	98.19	85.110	30,047.4	0.36	4	6
06/16/24	98.03	80.987	30,020.5	0.35	4	6
06/17/24	98.02	84.140	29,499.8	0.36	4	6
06/18/24	97.99	89.271	30,264.7	0.35	4	6
06/19/24	97.87	84.541	30,567.6	0.35	4	6
06/20/24	97.88	85.600	30,142.1	0.35	4	6
06/21/24	98.34	88.262	29,313.9	0.35	4	6
06/22/24	98.89	88.539	30,422.7	0.34	4	6
06/23/24	98.96	84.303	29,727.0	0.34	4	6
06/24/24	98.68	84.103	29,923.9	0.36	4	6
06/25/24	98.67	88.730	30,880.1	0.36	4	6
06/26/24	99.28	84.082	30,616.1	0.35	4	6
06/27/24	99.08	82.069	30,454.7	0.36	4	6
06/28/24	99.40	85.538	29,114.9	0.35	4	6
06/29/24	99.37	86.428	30,133.5	0.35	4	6
06/30/24	99.00	86.449	30,416.9	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
07/01/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/02/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/04/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/05/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/17/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/18/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/20/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/23/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/24/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/25/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/26/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/27/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/30/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/31/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
07/01/24	0.00	4.36	2.12	6.00	0	12.48
07/02/24	0.00	4.46	2.07	6.00	0	12.53
07/03/24	0.00	4.47	2.08	6.00	0	12.55
07/04/24	0.00	4.51	2.13	6.00	0	12.64
07/05/24	0.00	4.51	2.11	6.00	0	12.62
07/06/24	0.00	4.49	2.08	6.00	0	12.57
07/07/24	0.00	4.48	2.14	6.00	0	12.62
07/08/24	0.00	4.49	2.11	6.00	0	12.59
07/09/24	0.00	4.57	2.02	6.00	0	12.60
07/10/24	0.00	4.57	2.21	6.00	0	12.78
07/11/24	0.00	4.51	2.13	6.00	0	12.64
07/12/24	0.00	4.48	2.06	6.00	0	12.54
07/13/24	0.00	4.48	2.06	6.00	0	12.54
07/14/24	0.00	4.50	2.14	6.00	0	12.64
07/15/24	0.00	4.49	2.19	6.00	0	12.68
07/16/24	0.00	4.43	2.16	6.00	0	12.58
07/17/24	0.00	4.39	2.16	6.00	0	12.55
07/18/24	0.00	4.40	2.15	6.00	0	12.54
07/19/24	0.00	4.40	2.18	6.00	0	12.58
07/20/24	0.00	4.40	2.17	6.00	0	12.57
07/21/24	0.00	4.47	2.15	6.00	0	12.63
07/22/24	0.00	4.45	2.19	6.00	0	12.64
07/23/24	0.00	4.43	2.13	6.00	0	12.56
07/24/24	0.00	4.45	2.09	6.00	0	12.54
07/25/24	0.00	4.45	2.12	6.00	0	12.56
07/26/24	0.00	4.44	2.09	6.00	0	12.52
07/27/24	0.00	4.44	2.12	6.00	0	12.56
07/28/24	0.00	4.51	2.12	6.00	0	12.64
07/29/24	0.00	4.47	2.11	6.00	0	12.58
07/30/24	0.00	4.47	2.02	6.00	0	12.48
07/31/24	0.00	4.47	1.94	6.00	0	12.41

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
07/01/24	0.00	0.00	2.12	6.00	4	12.12
07/02/24	0.00	0.00	2.07	6.00	4	12.07
07/03/24	0.00	0.00	2.08	6.00	4	12.08
07/04/24	0.00	0.00	2.13	6.00	4	12.13
07/05/24	0.00	0.00	2.11	6.00	4	12.11
07/06/24	0.00	0.00	2.08	6.00	4	12.08
07/07/24	0.00	0.00	2.14	6.00	4	12.14
07/08/24	0.00	0.00	2.11	6.00	4	12.11
07/09/24	0.00	0.00	2.02	6.00	4	12.02
07/10/24	0.00	0.00	2.21	6.00	4	12.21
07/11/24	0.00	0.00	2.13	6.00	4	12.13
07/12/24	0.00	0.00	2.06	6.00	4	12.06
07/13/24	0.00	0.00	2.06	6.00	4	12.06
07/14/24	0.00	0.00	2.14	6.00	4	12.14
07/15/24	0.00	0.00	2.19	6.00	4	12.19
07/16/24	0.00	0.00	2.16	6.00	4	12.16
07/17/24	0.00	0.00	2.16	6.00	4	12.16
07/18/24	0.00	0.00	2.15	6.00	4	12.15
07/19/24	0.00	0.00	2.18	6.00	4	12.18
07/20/24	0.00	0.00	2.17	6.00	4	12.17
07/21/24	0.00	0.00	2.15	6.00	4	12.15
07/22/24	0.00	0.00	2.19	6.00	4	12.19
07/23/24	0.00	0.00	2.13	6.00	4	12.13
07/24/24	0.00	0.00	2.09	6.00	4	12.09
07/25/24	0.00	0.00	2.12	6.00	4	12.12
07/26/24	0.00	0.00	2.09	6.00	4	12.09
07/27/24	0.00	0.00	2.12	6.00	4	12.12
07/28/24	0.00	0.00	2.12	6.00	4	12.12
07/29/24	0.00	0.00	2.11	6.00	4	12.11
07/30/24	0.00	0.00	2.02	6.00	4	12.02
07/31/24	0.00	0.00	1.94	6.00	4	11.94

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results — Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
07/01/24	5.17	5.00	5.00	4.87	4.92	4.99	5.02	4.92	5.07	5.47	4.80	4.84	5.08	4.96	4.85	4.94
07/02/24	5.11	5.00	4.99	4.89	4.97	5.01	5.01	4.93	5.09	5.43	4.80	4.85	5.09	4.94	4.88	4.92
07/03/24	5.13	5.00	4.97	4.90	4.93	5.04	4.95	4.93	5.06	5.38	4.78	4.82	5.10	4.89	4.88	4.88
07/04/24	5.09	4.97	4.96	4.94	4.95	5.07	4.96	4.95	5.11	5.44	4.78	4.84	5.13	4.93	4.86	4.93
07/05/24	5.05	5.00	4.96	4.95	5.00	5.01	5.01	4.91	5.08	5.46	4.79	4.81	5.14	4.92	4.86	4.93
07/06/24	5.06	5.20	4.91	4.91	5.02	4.94	4.99	4.91	5.04	5.45	4.76	4.83	5.12	4.93	4.85	4.90
07/07/24	5.05	5.07	5.06	5.11	4.98	5.02	4.98	4.88	5.00	5.43	4.75	4.84	5.07	4.95	4.87	4.89
07/08/24	5.10	5.02	5.03	5.06	4.95	5.06	4.95	4.95	5.02	5.38	4.75	4.79	5.08	4.97	4.87	4.89
07/09/24	5.15	5.13	5.09	5.15	5.05	5.10	4.96	5.02	5.11	6.62	4.76	4.83	5.16	4.99	4.87	4.95
07/10/24	5.09	5.09	5.07	5.05	5.05	5.32	4.98	5.24	5.05	5.82	4.75	4.87	5.14	4.96	4.86	4.96
07/11/24	5.12	5.06	5.05	5.05	5.08	5.16	4.94	5.05	5.05	5.53	4.70	4.85	5.13	4.91	4.85	4.90
07/12/24	5.09	5.00	5.03	5.00	5.05	5.06	4.91	4.98	5.00	5.41	4.69	4.83	5.11	4.91	4.86	4.84
07/13/24	5.07	5.05	5.06	5.01	5.06	5.10	5.06	4.96	5.04	5.41	4.72	4.82	5.10	4.94	4.89	4.85
07/14/24	5.08	5.07	5.03	5.10	5.05	5.16	5.01	5.02	5.08	5.50	4.72	4.84	5.08	4.95	4.90	4.87
07/15/24	5.05	5.07	4.99	5.01	5.01	5.06	4.94	4.94	4.98	5.38	4.73	4.82	5.09	4.92	4.88	4.84
07/16/24	5.02	5.02	4.97	4.95	4.97	5.04	4.93	4.93	4.95	5.24	4.69	4.78	5.02	4.87	4.84	4.81
07/17/24	5.04	5.01	5.01	4.99	4.95	5.07	4.94	4.97	4.97	5.30	4.69	4.79	5.05	4.97	4.82	4.81
07/18/24	5.01	5.03	5.00	4.99	4.98	5.09	4.97	4.99	4.97	5.37	4.81	4.79	5.02	4.99	4.86	4.82
07/19/24	5.03	4.98	4.93	4.94	4.97	5.04	4.97	5.00	4.94	5.32	4.75	4.77	5.05	4.95	4.87	4.82
07/20/24	5.00	4.99	4.95	4.97	4.97	5.03	4.97	4.98	5.13	5.31	4.75	4.77	5.04	4.94	4.86	4.82
07/21/24	4.99	5.05	4.98	5.00	4.97	5.04	4.96	4.98	5.08	5.35	4.75	4.76	5.04	4.95	4.88	4.77
07/22/24	4.97	5.05	5.00	4.99	4.99	5.06	4.93	4.98	5.07	5.33	4.71	4.74	5.10	4.93	4.88	4.88
07/23/24	4.96	4.96	4.96	4.93	5.05	5.11	4.91	4.97	5.08	5.67	4.69	4.85	5.01	4.95	4.87	4.91
07/24/24	4.95	4.98	4.95	4.95	4.96	5.07	4.94	4.98	5.07	5.62	4.69	4.88	5.16	4.93	4.87	4.89
07/25/24	5.03	4.99	4.97	4.95	4.99	5.03	4.95	5.00	5.09	5.54	4.68	4.86	5.16	4.95	4.85	4.91
07/26/24	4.98	5.00	4.93	4.93	4.96	5.07	4.95	4.96	5.10	5.20	4.67	4.86	5.09	4.96	4.86	4.92
07/27/24	5.09	5.01	4.94	4.90	4.99	5.08	4.92	4.95	5.06	5.09	4.66	4.87	5.12	4.96	4.83	4.92
07/28/24	4.94	4.98	4.94	4.89	4.91	5.11	4.93	4.97	4.99	5.10	4.69	4.85	5.13	4.93	4.85	4.93
07/29/24	4.94	4.98	4.93	4.90	5.13	5.05	4.91	4.96	5.00	5.07	4.70	4.85	5.12	4.93	4.86	4.91
07/30/24	4.95	4.98	4.90	4.92	5.04	5.01	4.94	4.94	4.97	5.05	4.67	4.83	5.12	4.90	4.85	4.89
07/31/24	4.97	4.94	4.91	4.90	4.98	4.99	4.87	4.92	5.02	5.02	4.66	4.85	5.12	4.91	4.91	4.88

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
07/01/24	4.67	4.72	4.44	4.49	4.62	4.36	4.59	4.55	5.00	5.09	4.96	5.08	5.12	4.99	4.98	4.98
07/02/24	4.71	4.74	4.46	4.48	4.62	4.53	4.62	4.67	5.03	5.05	4.98	5.10	5.12	5.04	5.00	4.99
07/03/24	4.66	4.70	4.56	4.47	4.59	4.59	4.58	4.74	5.06	5.02	4.97	5.09	5.15	5.05	5.01	4.97
07/04/24	4.70	4.82	4.70	4.51	4.72	4.57	4.59	4.75	5.05	5.02	4.96	5.09	5.14	5.03	4.98	4.98
07/05/24	4.68	4.85	4.71	4.51	4.78	4.57	4.61	4.73	5.04	5.04	4.96	5.13	5.14	5.00	5.00	5.00
07/06/24	4.65	4.83	4.70	4.49	4.73	4.56	4.57	4.70	5.01	5.05	4.98	5.09	5.15	5.02	4.99	4.99
07/07/24	4.64	4.83	4.66	4.48	4.73	4.56	4.54	4.70	5.03	5.00	4.97	5.08	5.15	5.01	4.93	5.02
07/08/24	4.63	4.85	4.70	4.49	4.79	4.55	4.70	4.75	5.05	5.03	4.98	5.11	5.14	5.05	4.93	5.01
07/09/24	4.77	4.90	4.77	4.57	4.84	4.60	4.80	4.80	5.08	5.13	5.01	5.10	5.24	5.08	4.99	5.04
07/10/24	4.73	4.91	4.75	4.57	4.82	4.60	4.73	4.83	5.08	5.14	5.00	5.12	5.24	5.03	5.01	5.05
07/11/24	4.66	4.87	4.68	4.51	4.75	4.57	4.67	4.76	5.04	5.08	4.98	5.11	5.43	4.92	4.98	5.04
07/12/24	4.66	4.82	4.67	4.48	4.71	4.53	4.63	4.72	5.01	5.03	4.99	5.05	5.13	5.02	4.93	5.03
07/13/24	4.68	4.84	4.68	4.48	4.71	4.54	4.64	4.77	4.99	5.02	4.98	5.04	5.11	5.00	4.94	5.00
07/14/24	4.71	4.87	4.69	4.50	4.73	4.55	4.67	4.78	5.02	5.05	4.99	5.06	5.18	5.00	4.96	5.01
07/15/24	4.68	4.82	4.67	4.49	4.72	4.54	4.66	4.76	5.03	5.06	5.02	5.09	5.22	4.97	4.95	5.04
07/16/24	4.64	4.81	4.62	4.43	4.67	4.50	4.66	4.71	5.01	5.07	5.00	5.07	5.15	4.97	4.92	4.98
07/17/24	4.59	4.80	4.59	4.39	4.63	4.48	4.63	4.67	4.97	5.07	4.96	5.09	5.08	5.02	4.95	4.97
07/18/24	4.60	4.80	4.59	4.40	4.65	4.48	4.63	4.65	4.94	5.04	4.96	5.05	5.11	5.01	5.06	5.00
07/19/24	4.60	4.82	4.57	4.40	4.67	4.47	4.63	4.67	4.97	5.01	4.95	5.03	5.12	5.03	5.08	4.97
07/20/24	4.62	4.80	4.56	4.40	4.64	4.47	4.59	4.67	4.99	5.14	4.96	5.06	5.17	5.08	5.00	4.97
07/21/24	4.62	4.80	4.64	4.53	4.64	4.47	4.60	4.67	5.02	5.22	4.96	5.06	5.17	5.05	4.96	5.00
07/22/24	4.56	4.79	4.61	4.55	4.63	4.46	4.63	4.67	4.99	5.18	4.96	5.10	5.17	5.03	4.98	5.02
07/23/24	4.57	4.78	4.57	4.55	4.62	4.44	4.63	4.67	4.95	5.17	4.96	5.10	5.15	5.04	4.97	5.00
07/24/24	4.59	4.78	4.55	4.55	4.64	4.45	4.63	4.69	4.97	5.15	4.94	5.10	5.16	5.04	4.99	5.02
07/25/24	4.59	4.79	4.57	4.56	4.63	4.45	4.62	4.68	4.97	5.15	4.94	5.12	5.14	5.03	5.01	5.01
07/26/24	4.57	4.79	4.59	4.54	4.63	4.44	4.61	4.66	4.96	5.13	4.94	5.09	5.12	5.00	4.97	4.98
07/27/24	4.57	4.77	4.57	4.54	4.60	4.44	4.63	4.65	4.96	5.09	4.94	5.07	5.12	5.03	4.94	4.99
07/28/24	4.64	4.74	4.55	4.55	4.59	4.53	4.62	4.72	4.95	5.08	4.93	5.06	5.12	5.02	4.99	5.00
07/29/24	4.65	4.74	4.54	4.53	4.59	4.58	4.62	4.83	5.04	5.11	4.92	5.07	5.13	5.02	4.99	4.98
07/30/24	4.65	4.73	4.64	4.51	4.69	4.56	4.61	4.79	5.05	5.10	5.02	5.06	5.10	5.01	4.96	4.95
07/31/24	4.66	4.85	4.71	4.50	4.68	4.56	4.59	5.88	5.00	5.05	4.94	5.03	5.09	5.02	4.94	4.93

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
07/01/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.72	4.97	4.75	4.69	4.58	4.61	4.92	4.87
07/02/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.66	4.92	4.74	4.68	4.52	4.69	4.90	4.83
07/03/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.71	4.93	4.70	4.68	4.59	4.55	4.87	4.86
07/04/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.67	4.96	4.74	4.76	4.60	4.57	4.85	4.87
07/05/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.70	4.94	4.71	4.68	4.70	4.60	4.88	4.86
07/06/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.72	4.93	4.67	4.67	4.61	4.58	4.86	4.89
07/07/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.72	5.05	4.73	4.79	4.59	4.55	4.86	4.86
07/08/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.71	5.07	4.74	4.75	4.65	4.61	4.85	4.87
07/09/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.74	5.10	4.75	4.78	4.71	4.64	5.06	4.94
07/10/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.72	5.09	4.74	4.74	4.67	4.61	4.90	4.90
07/11/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.68	5.07	4.71	4.77	4.60	4.57	4.97	4.85
07/12/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.68	4.97	4.76	4.79	4.59	4.51	4.97	4.88
07/13/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.72	4.97	4.69	4.77	4.62	4.53	4.91	4.88
07/14/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.78	4.92	4.60	4.78	4.67	4.55	4.86	4.86
07/15/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	4.72	4.91	4.66	4.75	4.57	4.52	4.82	4.84
07/16/24	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/17/24	4.52	5.12	5.71	4.63	5.05	5.05	4.84	5.10	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/18/24	4.54	5.03	5.77	4.62	5.05	5.04	4.84	5.09	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/19/24	4.46	4.92	5.55	4.50	5.05	4.92	4.68	4.91	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/20/24	4.43	5.08	5.53	4.59	4.88	4.95	4.66	4.84	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/21/24	4.53	4.80	5.54	4.62	4.87	5.01	4.65	4.90	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/22/24	4.45	4.78	5.54	4.61	4.88	5.08	4.59	4.92	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/23/24	4.43	4.92	5.47	4.60	4.92	4.93	4.71	4.88	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/24/24	4.49	4.82	5.59	4.62	4.93	4.96	4.66	4.91	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/25/24	4.49	4.84	5.78	4.71	4.95	5.03	4.63	5.04	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/26/24	4.48	4.88	5.55	4.76	4.99	5.00	4.60	5.07	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/27/24	4.50	4.90	5.51	4.82	4.94	4.96	4.71	5.07	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/28/24	4.51	4.95	5.51	4.77	4.94	4.96	4.69	4.95	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/29/24	4.47	4.82	5.48	4.75	4.95	4.95	4.71	5.01	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/30/24	4.47	4.80	5.52	4.76	5.00	4.95	4.77	4.97	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
07/31/24	4.47	4.82	5.36	4.75	4.99	5.00	4.70	4.95	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for low plant production setpoint

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
07/01/24	0.024	0.027	0.026	0.028	0.028	0.029	0.022	0.024	0.037	0.039	0.031	0.034	0.027	0.028	0.029	0.031	N/A*	N/A*	N/A*	N/A*	0.035	0.038	0.029	0.031	0.029
07/02/24	0.025	0.026	0.025	0.028	0.029	0.031	0.020	0.023	0.034	0.040	0.028	0.037	0.024	0.028	0.027	0.031	N/A*	N/A*	N/A*	N/A*	0.027	0.040	0.024	0.032	0.026
07/03/24	0.026	0.027	0.026	0.035	0.031	0.032	0.019	0.020	0.031	0.034	0.025	0.028	0.024	0.029	0.025	0.026	N/A*	N/A*	N/A*	N/A*	0.018	0.022	0.018	0.018	0.024
07/04/24	0.027	0.030	0.028	0.031	0.033	0.037	0.019	0.022	0.033	0.039	0.026	0.032	0.024	0.027	0.027	0.030	N/A*	N/A*	N/A*	N/A*	0.020	0.023	0.019	0.021	0.026
07/05/24	0.027	0.029	0.028	0.031	0.034	0.035	0.019	0.021	0.033	0.039	0.026	0.033	0.024	0.025	0.027	0.029	N/A*	N/A*	N/A*	N/A*	0.021	0.023	0.021	0.023	0.026
07/06/24	0.031	0.041	0.028	0.030	0.036	0.038	0.019	0.021	0.035	0.037	0.027	0.029	0.025	0.027	0.028	0.029	N/A*	N/A*	N/A*	N/A*	0.025	0.030	0.022	0.023	0.027
07/07/24	0.033	0.043	0.028	0.033	0.038	0.041	0.021	0.024	0.036	0.039	0.029	0.031	0.026	0.028	0.029	0.031	N/A*	N/A*	N/A*	N/A*	0.029	0.032	0.024	0.025	0.029
07/08/24	0.031	0.036	0.027	0.033	0.039	0.041	0.020	0.023	0.037	0.040	0.030	0.031	0.025	0.028	0.029	0.031	N/A*	N/A*	N/A*	N/A*	0.031	0.040	0.025	0.028	0.029
07/09/24	0.033	0.037	0.025	0.030	0.043	0.045	0.027	0.032	0.040	0.045	0.029	0.032	0.029	0.033	0.031	0.034	N/A*	N/A*	N/A*	N/A*	0.039	0.044	0.030	0.032	0.032
07/10/24	0.034	0.037	0.024	0.034	0.045	0.050	0.033	0.038	0.044	0.050	0.031	0.036	0.031	0.037	0.035	0.044	N/A*	N/A*	N/A*	N/A*	0.047	0.055	0.033	0.036	0.036
07/11/24	0.032	0.035	0.022	0.025	0.045	0.046	0.032	0.040	0.043	0.046	0.030	0.032	0.030	0.033	0.036	0.041	N/A*	N/A*	N/A*	N/A*	0.050	0.054	0.036	0.038	0.036
07/12/24	0.033	0.035	0.022	0.026	0.047	0.049	0.032	0.036	0.044	0.048	0.031	0.035	0.029	0.032	0.036	0.039	N/A*	N/A*	N/A*	N/A*	0.059	0.064	0.040	0.043	0.037
07/13/24	0.036	0.040	0.025	0.030	0.050	0.054	0.035	0.039	0.048	0.053	0.035	0.039	0.031	0.036	0.039	0.043	N/A*	N/A*	N/A*	N/A*	0.067	0.078	0.044	0.049	0.042
07/14/24	0.038	0.040	0.026	0.028	0.053	0.055	0.036	0.039	0.051	0.052	0.037	0.039	0.034	0.036	0.040	0.042	N/A*	N/A*	N/A*	N/A*	0.076	0.079	0.048	0.050	0.044
07/15/24	0.039	0.041	0.024	0.027	0.054	0.056	0.036	0.041	0.051	0.055	0.038	0.041	0.033	0.035	0.040	0.042	N/A*	N/A*	N/A*	N/A*	0.080	0.087	0.051	0.055	0.041
07/16/24	0.036	0.042	0.024	0.030	0.045	0.060	0.032	0.038	0.045	0.055	0.034	0.041	0.035	0.037	0.042	0.043	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	0.037
07/17/24	0.029	0.033	0.020	0.024	0.027	0.029	0.027	0.032	0.032	0.034	0.025	0.027	0.036	0.038	0.042	0.044	0.036	0.073	0.031	0.125	N/A*	N/A*	N/A*	N/A*	0.030
07/18/24	0.031	0.034	0.021	0.024	0.028	0.033	0.028	0.029	0.032	0.034	0.026	0.029	0.032	0.040	0.035	0.044	0.029	0.032	0.026	0.029	N/A*	N/A*	N/A*	N/A*	0.029
07/19/24	0.032	0.036	0.022	0.027	0.028	0.033	0.028	0.033	0.034	0.039	0.028	0.031	0.028	0.033	0.032	0.038	0.030	0.041	0.025	0.032	N/A*	N/A*	N/A*	N/A*	0.029
07/20/24	0.033	0.048	0.022	0.080	0.029	0.037	0.027	0.029	0.034	0.037	0.028	0.031	0.028	0.031	0.032	0.036	0.028	0.031	0.026	0.029	N/A*	N/A*	N/A*	N/A*	0.029
07/21/24	0.033	0.063	0.021	0.027	0.029	0.053	0.028	0.037	0.034	0.052	0.028	0.048	0.028	0.030	0.031	0.033	0.028	0.032	0.026	0.029	N/A*	N/A*	N/A*	N/A*	0.029
07/22/24	0.035	0.077	0.022	0.025	0.031	0.036	0.030	0.039	0.035	0.038	0.030	0.034	0.029	0.031	0.032	0.034	0.029	0.033	0.026	0.030	N/A*	N/A*	N/A*	N/A*	0.030
07/23/24	0.035	0.061	0.021	0.025	0.031	0.037	0.028	0.032	0.033	0.044	0.028	0.055	0.028	0.035	0.031	0.048	0.029	0.030	0.023	0.028	N/A*	N/A*	N/A*	N/A*	0.029
07/24/24	0.030	0.054	0.021	0.027	0.030	0.033	0.029	0.034	0.031	0.034	0.027	0.035	0.029	0.068	0.031	0.033	0.029	0.033	0.023	0.031	N/A*	N/A*	N/A*	N/A*	0.028
07/25/24	0.026	0.031	0.021	0.025	0.029	0.032	0.027	0.037	0.031	0.060	0.027	0.042	0.027	0.076	0.030	0.032	0.028	0.031	0.024	0.026	N/A*	N/A*	N/A*	N/A*	0.027
07/26/24	0.025	0.029	0.020	0.023	0.028	0.054	0.025	0.027	0.030	0.032	0.026	0.048	0.025	0.026	0.029	0.030	0.027	0.033	0.024	0.029	N/A*	N/A*	N/A*	N/A*	0.026
07/27/24	0.027	0.030	0.021	0.023	0.029	0.031	0.025	0.028	0.031	0.034	0.027	0.033	0.026	0.028	0.030	0.031	0.028	0.031	0.025	0.027	N/A*	N/A*	N/A*	N/A*	0.027
07/28/24	0.026	0.030	0.020	0.023	0.029	0.041	0.025	0.032	0.031	0.037	0.028	0.035	0.026	0.028	0.030	0.037	0.027	0.029	0.024	0.027	N/A*	N/A*	N/A*	N/A*	0.027
07/29/24	0.026	0.030	0.022	0.028	0.029	0.049	0.026	0.027	0.031	0.033	0.028	0.031	0.027	0.030	0.030	0.031	0.028	0.032	0.025	0.032	N/A*	N/A*	N/A*	N/A*	0.027
07/30/24	0.025	0.030	0.020	0.026	0.028	0.031	0.025	0.038	0.031	0.040	0.045	0.074	0.026	0.030	0.029	0.030	0.027	0.030	0.024	0.027	N/A*	N/A*	N/A*	N/A*	0.028
07/31/24	0.025	0.025	0.020	0.023	0.029	0.031	0.025	0.027	0.031	0.041	0.054	0.066	0.026	0.028	0.029	0.033	0.028	0.031	0.026	0.029	N/A*	N/A*	N/A*	N/A*	0.029

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* Cell offline for low plant production setpoint

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
07/01/24	0.015	0.015	6.892	6.381	7.659	0.053	0.048	0.059	1,625	1,569	1,726	24	21	26	99.24	2.12	98.52	1.83
07/02/24	0.016	0.016	7.279	6.841	7.774	0.062	0.050	0.080	1,690	1,626	1,783	25	22	28	99.15	2.07	98.54	1.83
07/03/24	0.015	0.016	7.666	6.779	8.633	0.064	0.053	0.077	1,701	1,633	1,775	24	23	26	99.17	2.08	98.59	1.85
07/04/24	0.015	0.016	8.120	7.589	8.869	0.061	0.051	0.078	1,735	1,706	1,778	25	23	27	99.25	2.13	98.58	1.85
07/05/24	0.015	0.015	7.180	6.240	8.445	0.056	0.050	0.064	1,657	1,603	1,713	25	21	27	99.23	2.11	98.52	1.83
07/06/24	0.015	0.015	7.014	6.434	7.520	0.059	0.047	0.078	1,611	1,567	1,657	24	23	27	99.16	2.08	98.49	1.82
07/07/24	0.015	0.015	6.970	6.339	7.512	0.051	0.043	0.062	1,578	1,541	1,612	24	23	31	99.27	2.14	98.45	1.81
07/08/24	0.015	0.015	7.081	6.377	7.902	0.055	0.044	0.078	1,554	1,499	1,633	23	21	25	99.22	2.11	98.55	1.84
07/09/24	0.015	0.015	7.888	7.642	8.232	0.075	0.046	0.099	1,626	1,581	1,709	25	22	28	99.05	2.02	98.49	1.82
07/10/24	0.015	0.015	7.718	7.194	8.567	0.048	0.045	0.051	1,702	1,615	1,834	26	24	29	99.38	2.21	98.44	1.81
07/11/24	0.015	0.015	7.608	6.893	8.544	0.057	0.049	0.064	1,695	1,626	1,800	26	25	29	99.25	2.13	98.46	1.81
07/12/24	0.015	0.015	7.740	7.195	8.403	0.067	0.057	0.083	1,727	1,654	1,851	26	21	30	99.13	2.06	98.50	1.82
07/13/24	0.015	0.015	7.923	7.227	8.803	0.069	0.061	0.081	1,735	1,668	1,809	29	24	38	99.13	2.06	98.33	1.78
07/14/24	0.015	0.015	7.625	6.852	8.703	0.056	0.052	0.064	1,658	1,591	1,744	28	25	34	99.27	2.14	98.30	1.77
07/15/24	0.015	0.015	7.606	6.860	8.547	0.049	0.028	0.057	1,611	1,528	1,704	26	22	30	99.35	2.19	98.40	1.80
07/16/24	0.015	0.015	8.090	7.237	9.456	0.056	0.051	0.067	1,679	1,628	1,780	29	25	33	99.30	2.16	98.27	1.76
07/17/24	0.015	0.015	7.918	7.149	9.084	0.055	0.049	0.060	1,702	1,608	1,844	28	25	32	99.30	2.16	98.33	1.78
07/18/24	0.015	0.015	7.812	7.443	8.344	0.056	0.048	0.064	1,728	1,658	1,875	28	25	32	99.29	2.15	98.40	1.80
07/19/24	0.016	0.017	7.585	6.845	8.585	0.051	0.046	0.057	1,751	1,685	1,832	30	25	37	99.33	2.18	98.27	1.76
07/20/24	0.016	0.017	7.529	6.847	8.385	0.051	0.046	0.062	1,712	1,678	1,776	30	28	34	99.33	2.17	98.27	1.76
07/21/24	0.016	0.016	7.249	6.618	8.195	0.051	0.041	0.065	1,661	1,621	1,702	32	28	36	99.30	2.15	98.07	1.71
07/22/24	0.016	0.016	7.546	6.751	8.545	0.049	0.045	0.055	1,653	1,590	1,754	32	28	37	99.36	2.19	98.08	1.72
07/23/24	0.017	0.017	7.603	6.902	8.684	0.057	0.049	0.062	1,715	1,664	1,804	32	29	36	99.25	2.13	98.16	1.74
07/24/24	0.017	0.017	7.560	6.874	8.288	0.062	0.049	0.071	1,739	1,687	1,827	32	29	38	99.18	2.09	98.18	1.74
07/25/24	0.017	0.017	7.516	6.823	8.422	0.058	0.050	0.072	1,741	1,669	1,801	33	29	37	99.23	2.12	98.12	1.73
07/26/24	0.017	0.020	7.572	7.076	8.240	0.062	0.053	0.073	1,751	1,707	1,810	30	26	34	99.18	2.09	98.27	1.76
07/27/24	0.017	0.017	7.455	6.790	8.200	0.056	0.049	0.064	1,718	1,679	1,780	29	27	32	99.24	2.12	98.33	1.78
07/28/24	0.017	0.017	7.515	6.993	8.248	0.056	0.047	0.066	1,666	1,618	1,708	28	25	30	99.25	2.12	98.35	1.78
07/29/24	0.017	0.017	7.116	6.271	8.312	0.055	0.048	0.064	1,641	1,567	1,744	28	24	32	99.22	2.11	98.29	1.77
07/30/24	0.017	0.017	6.727	6.310	7.313	0.065	0.058	0.077	1,698	1,630	1,775	27	24	30	99.04	2.02	98.39	1.79
07/31/24	0.017	0.017	6.725	6.414	7.073	0.077	0.067	0.091	1,721	1,655	1,796	28	26	30	98.86	1.94	98.39	1.79

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
07/01/24	98.24	85.723	30,479.5	0.35	4	6
07/02/24	98.36	88.621	30,621.1	0.36	4	6
07/03/24	98.58	84.230	30,587.8	0.35	4	6
07/04/24	98.52	85.149	30,591.9	0.36	4	6
07/05/24	97.98	81.525	30,686.8	0.36	4	6
07/06/24	98.28	84.575	29,241.4	0.36	4	6
07/07/24	97.85	86.469	29,811.3	0.35	4	6
07/08/24	98.83	69.751	29,497.2	0.35	4	6
07/09/24	99.11	58.757	23,304.5	0.36	4	6
07/10/24	98.40	81.942	24,253.4	0.37	4	6
07/11/24	98.27	89.431	28,742.2	0.35	4	6
07/12/24	98.53	89.607	31,152.9	0.35	4	6
07/13/24	97.37	85.714	30,613.2	0.35	4	6
07/14/24	97.32	87.916	30,525.2	0.36	4	6
07/15/24	97.90	84.492	31,352.1	0.36	4	6
07/16/24	98.42	80.388	29,940.5	0.36	4	6
07/17/24	98.30	80.861	28,821.9	0.35	4	6
07/18/24	97.97	88.202	28,423.8	0.35	4	6
07/19/24	97.77	88.796	30,580.9	0.35	4	6
07/20/24	97.40	89.337	30,575.5	0.34	4	6
07/21/24	97.60	87.810	30,494.2	0.34	4	6
07/22/24	97.41	89.452	30,260.1	0.34	4	6
07/23/24	97.67	88.605	30,574.8	0.34	4	6
07/24/24	98.31	80.611	30,260.0	0.34	4	6
07/25/24	97.69	85.490	30,034.3	0.36	4	6
07/26/24	97.89	86.249	30,137.5	0.35	4	6
07/27/24	98.07	86.846	30,438.4	0.35	4	6
07/28/24	97.82	85.594	30,049.5	0.35	4	6
07/29/24	97.70	82.580	29,245.4	0.35	4	6
07/30/24	98.03	88.281	30,181.6	0.35	4	6
07/31/24	98.14	85.183	30,600.8	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
08/01/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/02/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/04/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/05/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/15/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/16/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/17/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/18/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/20/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/23/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/24/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/25/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/26/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/27/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/30/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/31/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
08/01/24	0.00	4.47	2.00	6.00	0	12.48
08/02/24	0.00	4.46	2.01	6.00	0	12.48
08/03/24	0.00	4.46	2.09	6.00	0	12.55
08/04/24	0.00	4.46	2.12	6.00	0	12.58
08/05/24	0.00	4.48	2.11	6.00	0	12.58
08/06/24	0.00	4.45	2.14	6.00	0	12.59
08/07/24	0.00	4.48	2.12	6.00	0	12.59
08/08/24	0.00	4.48	2.12	6.00	0	12.59
08/09/24	0.00	4.40	2.13	6.00	0	12.53
08/10/24	0.00	4.47	2.15	6.00	0	12.62
08/11/24	0.00	4.47	2.23	6.00	0	12.69
08/12/24	0.00	4.43	2.20	6.00	0	12.62
08/13/24	0.00	4.42	2.13	6.00	0	12.54
08/14/24	0.00	4.40	2.12	6.00	0	12.53
08/15/24	0.00	4.32	2.11	6.00	0	12.43
08/16/24	0.00	4.41	2.07	6.00	0	12.48
08/17/24	0.00	4.41	2.11	6.00	0	12.52
08/18/24	0.00	4.41	2.17	6.00	0	12.58
08/19/24	0.00	4.35	2.17	6.00	0	12.52
08/20/24	0.00	4.41	2.05	6.00	0	12.45
08/21/24	0.00	4.39	2.12	6.00	0	12.52
08/22/24	0.00	4.37	2.15	6.00	0	12.53
08/23/24	0.00	4.44	2.13	6.00	0	12.57
08/24/24	0.00	4.47	2.13	6.00	0	12.60
08/25/24	0.00	4.47	2.16	6.00	0	12.63
08/26/24	0.00	4.44	2.19	6.00	0	12.63
08/27/24	0.00	4.39	2.16	6.00	0	12.54
08/28/24	0.00	4.43	2.12	6.00	0	12.56
08/29/24	0.00	4.46	2.10	6.00	0	12.56
08/30/24	0.00	4.46	2.06	6.00	0	12.52
08/31/24	0.00	4.43	2.14	6.00	0	12.57

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
08/01/24	0.00	0.00	2.00	6.00	4	12.00
08/02/24	0.00	0.00	2.01	6.00	4	12.01
08/03/24	0.00	0.00	2.09	6.00	4	12.09
08/04/24	0.00	0.00	2.12	6.00	4	12.12
08/05/24	0.00	0.00	2.11	6.00	4	12.11
08/06/24	0.00	0.00	2.14	6.00	4	12.14
08/07/24	0.00	0.00	2.12	6.00	4	12.12
08/08/24	0.00	0.00	2.12	6.00	4	12.12
08/09/24	0.00	0.00	2.13	6.00	4	12.13
08/10/24	0.00	0.00	2.15	6.00	4	12.15
08/11/24	0.00	0.00	2.23	6.00	4	12.23
08/12/24	0.00	0.00	2.20	6.00	4	12.20
08/13/24	0.00	0.00	2.13	6.00	4	12.13
08/14/24	0.00	0.00	2.12	6.00	4	12.12
08/15/24	0.00	0.00	2.11	6.00	4	12.11
08/16/24	0.00	0.00	2.07	6.00	4	12.07
08/17/24	0.00	0.00	2.11	6.00	4	12.11
08/18/24	0.00	0.00	2.17	6.00	4	12.17
08/19/24	0.00	0.00	2.17	6.00	4	12.17
08/20/24	0.00	0.00	2.05	6.00	4	12.05
08/21/24	0.00	0.00	2.12	6.00	4	12.12
08/22/24	0.00	0.00	2.15	6.00	4	12.15
08/23/24	0.00	0.00	2.13	6.00	4	12.13
08/24/24	0.00	0.00	2.13	6.00	4	12.13
08/25/24	0.00	0.00	2.16	6.00	4	12.16
08/26/24	0.00	0.00	2.19	6.00	4	12.19
08/27/24	0.00	0.00	2.16	6.00	4	12.16
08/28/24	0.00	0.00	2.12	6.00	4	12.12
08/29/24	0.00	0.00	2.10	6.00	4	12.10
08/30/24	0.00	0.00	2.06	6.00	4	12.06
08/31/24	0.00	0.00	2.14	6.00	4	12.14

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
08/01/24	4.97	5.02	4.91	4.93	4.98	5.01	4.91	4.92	5.00	5.07	4.66	4.86	5.08	4.89	4.86	4.91
08/02/24	4.91	5.01	5.08	4.89	5.00	5.03	4.94	4.94	5.04	5.08	4.65	4.81	5.10	4.90	4.86	4.87
08/03/24	4.93	5.01	4.97	4.99	5.03	5.05	4.91	5.06	5.04	5.05	4.68	4.81	5.09	4.91	4.86	4.87
08/04/24	4.99	5.09	5.01	4.99	5.04	4.99	4.93	4.93	5.00	5.06	4.70	4.82	5.09	4.91	4.86	4.90
08/05/24	4.90	5.05	4.98	5.01	5.00	5.11	4.92	4.93	4.96	5.04	4.71	4.82	5.12	4.90	4.84	4.89
08/06/24	4.95	5.06	5.04	5.10	5.06	5.05	4.92	4.95	5.00	5.05	4.72	4.83	5.12	4.92	4.84	4.89
08/07/24	4.92	5.06	4.99	5.04	5.03	5.08	4.93	4.93	5.04	5.03	4.72	4.82	5.08	4.92	4.85	4.89
08/08/24	4.90	5.06	4.94	5.04	5.00	5.11	4.98	4.93	5.05	5.03	4.71	4.80	5.07	4.88	4.85	4.90
08/09/24	4.92	5.07	4.96	5.01	5.03	5.12	4.97	4.94	4.99	5.04	4.71	4.81	5.09	4.86	4.84	4.89
08/10/24	4.92	5.06	4.96	5.01	5.02	5.10	4.92	4.93	5.00	5.02	4.70	4.81	5.06	4.89	4.81	4.85
08/11/24	4.89	5.03	4.94	5.00	5.01	5.04	4.90	4.89	4.99	4.99	4.66	4.78	5.05	5.09	4.87	4.85
08/12/24	4.91	4.98	4.90	4.97	5.13	5.04	4.91	4.88	5.03	4.98	4.63	4.76	5.04	4.96	4.87	4.83
08/13/24	4.90	5.00	4.91	4.99	5.04	4.99	4.84	4.87	4.93	4.97	4.76	4.76	5.02	4.91	4.87	4.81
08/14/24	4.86	4.98	4.89	4.94	4.96	5.00	4.90	4.82	4.88	4.95	4.71	4.75	4.99	4.91	4.88	4.81
08/15/24	4.87	4.95	4.85	4.87	4.91	4.99	4.87	4.81	4.90	4.91	4.67	4.71	4.95	4.89	5.01	4.77
08/16/24	4.82	4.97	4.85	4.87	4.88	5.01	4.85	4.84	4.97	4.89	4.67	4.71	4.94	4.87	4.98	4.79
08/17/24	4.83	4.99	4.90	4.90	4.88	5.01	4.87	4.85	4.99	4.84	4.71	4.80	4.96	4.87	4.94	4.83
08/18/24	4.81	4.95	4.85	4.92	4.90	5.01	4.85	4.83	4.95	4.94	4.71	4.80	5.20	4.89	4.92	4.86
08/19/24	4.84	4.94	4.80	4.83	4.86	5.04	4.84	4.84	4.91	4.98	4.68	4.82	5.09	4.90	4.89	4.85
08/20/24	4.84	5.01	4.83	4.85	4.92	4.99	4.85	4.80	4.93	4.99	4.67	4.79	5.05	4.92	4.88	4.87
08/21/24	4.83	5.00	4.87	4.91	4.91	4.99	4.87	4.79	4.99	5.00	4.65	4.82	5.04	4.91	4.87	4.88
08/22/24	4.78	4.97	4.85	4.92	4.93	5.00	4.89	4.81	4.97	4.97	4.66	4.83	5.05	4.90	4.87	4.89
08/23/24	4.89	4.94	4.82	4.88	4.90	5.03	4.87	4.85	4.98	4.97	4.65	4.84	5.08	4.90	4.86	4.86
08/24/24	4.88	5.00	4.86	4.82	4.91	4.99	4.87	4.83	5.00	5.00	4.65	4.83	5.07	4.93	4.87	4.91
08/25/24	4.90	5.00	4.84	4.90	5.00	5.04	4.84	4.81	4.97	5.01	4.61	4.84	5.09	4.93	4.92	4.93
08/26/24	4.86	4.93	4.85	4.87	4.97	5.00	4.86	4.80	4.90	5.02	4.63	4.84	5.08	4.90	4.94	4.92
08/27/24	4.89	4.92	4.82	4.88	5.02	4.99	4.84	4.79	4.93	4.98	4.64	4.81	5.07	4.89	4.94	4.89
08/28/24	4.85	5.09	4.78	4.86	4.99	5.00	4.85	4.80	4.99	4.97	4.61	4.79	5.04	4.88	4.93	4.88
08/29/24	4.89	5.01	4.93	5.02	4.95	4.99	4.82	N/A*	4.96	4.98	4.59	4.82	5.03	4.89	4.92	4.88
08/30/24	4.90	4.99	4.94	4.95	5.00	4.98	4.82	N/A*	4.95	4.97	4.60	4.81	5.04	4.87	4.92	4.83
08/31/24	4.88	4.99	4.90	4.95	4.94	5.05	4.85	N/A*	4.92	4.94	4.59	4.78	5.01	4.87	4.95	4.85

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
08/01/24	4.63	4.87	4.62	4.47	4.67	4.53	4.60	5.93	4.99	5.03	4.90	5.05	5.09	5.00	4.93	4.95
08/02/24	4.63	4.87	4.63	4.46	4.70	4.52	4.61	4.76	4.95	5.02	4.90	5.02	5.08	4.98	4.96	4.95
08/03/24	4.66	4.88	4.66	4.50	4.70	4.51	4.61	4.77	4.95	5.08	N/A*	5.03	5.11	4.96	4.94	4.96
08/04/24	4.69	4.88	4.68	4.54	4.72	4.54	4.71	4.81	5.04	5.18	N/A*	5.08	5.11	4.99	5.06	4.96
08/05/24	4.69	4.88	4.69	4.53	4.74	4.58	4.72	4.82	5.03	5.15	N/A*	5.07	5.12	5.00	4.96	4.95
08/06/24	4.68	4.89	4.69	4.51	4.76	4.57	4.69	4.80	5.00	5.08	5.01	5.06	5.15	5.01	4.95	4.97
08/07/24	4.67	4.88	4.67	4.49	4.75	4.54	4.72	4.76	5.00	5.08	4.98	5.05	5.14	5.02	4.92	4.97
08/08/24	4.65	4.86	4.64	4.48	4.73	4.50	4.66	4.75	5.01	5.07	4.96	5.03	5.12	5.01	4.92	4.99
08/09/24	4.65	4.86	4.68	4.49	4.70	4.51	4.66	4.77	5.01	5.07	4.99	5.02	5.10	5.00	4.91	5.00
08/10/24	4.65	4.86	4.70	4.47	4.71	4.54	4.68	4.78	5.01	5.09	4.99	5.06	5.10	4.97	4.94	4.97
08/11/24	4.63	4.84	4.64	4.47	4.69	4.53	4.68	4.75	N/A*	5.10	4.98	5.05	5.09	5.03	4.93	4.98
08/12/24	4.60	4.82	4.60	4.43	4.65	4.50	4.66	4.70	N/A*	5.09	4.96	5.11	5.08	4.98	4.90	4.99
08/13/24	4.58	4.80	4.57	4.42	4.64	4.47	4.64	4.68	N/A*	5.06	4.95	5.06	5.08	4.95	4.93	4.95
08/14/24	4.57	4.79	4.57	4.40	4.61	4.47	4.63	4.68	N/A*	5.05	4.95	5.05	5.09	4.93	4.90	4.93
08/15/24	4.52	4.74	4.54	4.32	4.59	4.45	4.61	4.65	N/A*	5.13	4.96	5.00	5.06	5.01	4.95	4.90
08/16/24	4.49	4.72	4.48	4.42	4.58	4.41	4.59	4.61	N/A*	5.17	4.93	5.01	5.03	4.99	5.03	4.88
08/17/24	4.50	4.72	4.47	4.51	4.58	4.41	4.60	4.62	N/A*	5.06	4.94	5.02	5.00	4.98	4.94	4.90
08/18/24	4.49	4.70	4.48	4.50	4.58	4.41	4.60	4.64	N/A*	5.09	4.93	5.01	4.94	5.00	4.96	4.88
08/19/24	4.49	4.69	4.49	4.49	4.57	4.41	4.61	4.64	N/A*	5.11	4.92	5.07	4.99	4.99	5.01	4.91
08/20/24	4.49	4.71	4.47	4.54	4.59	4.41	4.63	4.66	N/A*	5.12	4.99	5.10	5.05	5.01	5.03	4.91
08/21/24	4.49	4.74	4.48	4.51	4.59	4.39	4.61	4.63	N/A*	5.13	5.00	5.06	5.07	5.03	5.03	4.89
08/22/24	4.48	4.73	4.46	4.48	4.55	4.37	4.55	4.59	N/A*	5.09	4.95	5.03	5.00	5.00	4.99	4.88
08/23/24	4.47	4.71	4.44	4.49	4.53	4.49	4.54	4.59	N/A*	5.07	4.96	5.04	4.99	5.00	5.00	4.91
08/24/24	4.57	4.71	4.47	4.48	4.56	4.57	4.55	4.70	N/A*	5.08	4.94	5.04	4.97	4.99	5.00	4.90
08/25/24	4.64	4.72	4.49	4.47	4.56	4.54	4.59	4.79	N/A*	5.09	4.92	5.06	5.03	4.99	4.97	4.92
08/26/24	4.61	4.73	4.69	4.49	4.61	4.50	4.59	4.77	N/A*	5.09	4.91	5.05	4.99	4.95	4.97	4.90
08/27/24	4.63	4.83	4.73	4.48	4.65	4.50	4.57	4.74	N/A*	5.11	4.86	5.02	4.94	4.93	4.97	4.88
08/28/24	4.64	4.84	4.66	4.45	4.65	4.53	4.57	4.71	N/A*	5.09	4.88	5.04	4.96	4.96	4.92	4.89
08/29/24	4.60	4.84	4.68	4.46	4.64	4.51	4.59	4.75	N/A*	5.09	4.93	5.04	4.94	4.99	4.94	4.87
08/30/24	4.61	4.86	4.65	4.46	4.69	4.49	4.58	4.75	N/A*	5.08	4.90	5.01	4.96	4.97	4.97	4.86
08/31/24	4.62	4.85	4.62	4.43	4.74	4.49	4.66	4.72	N/A*	5.07	4.86	5.04	5.00	4.98	4.98	4.87

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
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system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
08/01/24	4.50	4.83	5.29	4.77	4.98	5.00	4.68	5.07	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/02/24	4.51	4.84	5.25	4.73	5.00	4.98	4.67	5.06	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/03/24	4.46	4.85	5.28	4.73	4.94	4.96	4.76	4.92	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/04/24	4.46	4.84	5.29	4.69	4.95	4.93	4.82	4.92	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/05/24	4.48	4.81	5.29	4.72	4.96	5.07	4.74	4.94	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/06/24	4.45	4.77	5.31	4.76	4.94	5.00	4.66	4.94	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/07/24	4.48	4.87	5.28	4.74	4.92	5.02	4.72	5.03	N/A**	N/A**	N/A*	N/A**	N/A**	N/A**	N/A**	N/A**
08/08/24	4.48	4.93	5.28	4.68	4.94	5.01	4.68	5.00	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/09/24	4.40	4.82	5.32	4.69	4.88	4.91	4.67	4.93	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/10/24	N/A**	4.81	5.30	4.68	4.89	4.95	4.67	4.91	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/11/24	N/A**	4.82	5.29	4.59	4.88	4.93	4.65	4.89	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/12/24	N/A**	4.72	5.26	4.44	4.87	4.89	4.79	4.82	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/13/24	4.67	4.70	5.26	4.54	4.90	4.86	4.49	4.91	4.68	5.06	N/A**	4.74	4.61	4.57	4.86	4.89
08/14/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.69	5.05	N/A**	4.69	4.59	4.59	4.88	4.86
08/15/24	4.60	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.71	4.99	N/A**	4.70	4.52	4.55	4.94	4.86
08/16/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.69	4.83	N/A**	4.81	4.49	4.49	4.87	4.88
08/17/24	4.67	5.02	5.31	N/A**	N/A**	N/A**	N/A**	N/A**	4.71	4.88	N/A**	4.72	4.53	4.49	4.83	4.83
08/18/24	4.57	4.95	5.26	N/A**	N/A**	N/A**	N/A**	N/A**	4.75	4.90	N/A**	4.70	4.56	4.48	4.78	4.81
08/19/24	4.35	4.78	5.25	4.58	4.88	5.05	4.59	5.05	4.67	4.89	N/A**	4.77	4.52	4.47	4.79	4.85
08/20/24	4.47	4.88	5.29	4.53	4.90	4.94	4.61	5.03	4.71	4.99	N/A**	4.76	4.52	4.52	4.77	4.90
08/21/24	4.51	4.90	5.26	4.51	4.90	4.99	4.64	5.27	4.77	5.03	N/A**	4.79	4.55	4.57	4.88	4.87
08/22/24	4.47	4.74	5.30	4.52	4.89	5.10	4.57	4.95	4.74	4.95	N/A**	4.80	4.56	4.56	4.86	4.91
08/23/24	4.48	4.77	5.31	4.55	4.86	4.93	4.61	4.99	4.74	4.91	N/A**	4.75	4.57	4.58	4.87	4.93
08/24/24	4.51	4.85	5.34	4.55	4.82	4.95	4.68	5.07	4.77	4.95	N/A**	4.72	4.69	4.61	4.92	4.92
08/25/24	4.48	4.88	5.24	4.58	4.92	4.96	4.56	4.99	4.72	4.92	N/A**	4.78	4.62	4.59	4.91	4.92
08/26/24	4.44	4.92	5.27	4.50	4.85	4.87	4.51	4.98	4.73	4.88	N/A**	4.77	4.61	4.60	4.87	4.90
08/27/24	4.39	4.73	5.25	4.48	4.86	4.93	4.56	4.98	4.74	4.94	N/A**	4.77	4.67	4.55	4.87	4.97
08/28/24	4.43	4.81	5.31	4.59	4.91	4.93	4.60	5.00	4.74	4.99	N/A**	4.80	4.64	4.55	4.87	4.87
08/29/24	4.48	4.86	5.27	4.67	4.89	4.91	4.65	4.97	4.72	4.98	N/A**	4.78	4.61	4.60	4.87	4.91
08/30/24	4.47	4.80	5.30	4.65	4.97	4.92	4.60	4.98	4.73	4.99	N/A**	4.80	4.60	4.56	4.89	4.95
08/31/24	4.48	4.80	5.33	4.66	4.86	4.86	4.69	5.01	4.68	5.01	N/A**	4.80	4.55	4.55	4.90	4.90

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline due to low plant production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Effluent Turbidity - NTU A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
08/01/24	0.027	0.031	0.022	0.023	0.030	0.031	0.026	0.038	0.032	0.033	0.058	0.075	0.026	0.030	0.029	0.030	0.028	0.031	0.025	0.029	N/A**	N/A**	N/A**	N/A**	0.030
08/02/24	0.029	0.031	0.021	0.023	0.031	0.032	0.026	0.026	0.032	0.033	0.061	0.080	0.025	0.027	0.029	0.031	0.026	0.027	0.024	0.026	N/A**	N/A**	N/A**	N/A**	0.030
08/03/24	0.030	0.033	0.025	0.029	0.033	0.036	0.028	0.031	0.034	0.039	0.065	0.080	0.027	0.030	0.030	0.032	0.028	0.030	0.025	0.029	N/A**	N/A**	N/A**	N/A**	0.032
08/04/24	0.028	0.031	0.023	0.027	0.033	0.035	0.026	0.029	0.033	0.035	0.068	0.088	0.025	0.027	0.028	0.031	0.027	0.030	0.024	0.027	N/A**	N/A**	N/A**	N/A**	0.032
08/05/24	0.028	0.031	0.024	0.026	0.034	0.037	0.027	0.029	0.035	0.037	0.069	0.081	0.025	0.028	0.030	0.039	0.028	0.035	0.025	0.027	N/A**	N/A**	N/A**	N/A**	0.033
08/06/24	0.029	0.031	0.025	0.027	0.036	0.037	0.028	0.029	0.036	0.037	0.075	0.090	0.026	0.030	0.032	0.038	0.029	0.031	0.027	0.029	N/A**	N/A**	N/A**	N/A**	0.034
08/07/24	0.029	0.030	0.025	0.028	0.036	0.037	0.028	0.030	0.037	0.038	0.078	0.093	0.026	0.027	0.031	0.032	0.028	0.030	0.027	0.029	N/A**	N/A**	N/A**	N/A**	0.034
08/08/24	0.031	0.032	0.027	0.031	0.038	0.039	0.029	0.030	0.038	0.039	0.078	0.089	0.027	0.030	0.031	0.033	0.030	0.033	0.028	0.030	N/A**	N/A**	N/A**	N/A**	0.036
08/09/24	0.031	0.032	0.027	0.029	0.039	0.040	0.030	0.031	0.038	0.040	0.076	0.087	0.027	0.032	0.031	0.033	0.030	0.032	0.030	0.033	N/A**	N/A**	N/A**	N/A**	0.036
08/10/24	0.031	0.034	0.028	0.031	0.040	0.043	0.031	0.034	0.040	0.043	0.079	0.094	0.027	0.030	0.032	0.034	0.032	0.040	0.031	0.033	N/A**	N/A**	N/A**	N/A**	0.037
08/11/24	0.034	0.038	0.030	0.033	0.043	0.046	0.035	0.039	0.042	0.045	0.089	0.108	0.031	0.037	0.033	0.035	0.034	0.038	0.034	0.038	N/A**	N/A**	N/A**	N/A**	0.040
08/12/24	0.035	0.038	0.031	0.040	0.045	0.050	0.034	0.039	0.043	0.102	0.092	0.111	0.030	0.033	0.033	0.036	0.034	0.037	0.035	0.037	N/A**	N/A**	N/A**	N/A**	0.041
08/13/24	0.035	0.039	0.031	0.034	0.046	0.053	0.033	0.036	0.044	0.047	0.092	0.118	0.029	0.032	0.035	0.043	0.034	0.037	0.035	0.040	0.058	0.060	0.027	0.038	0.042
08/14/24	0.031	0.041	0.028	0.037	0.043	0.050	0.031	0.036	0.038	0.047	0.056	0.111	0.030	0.033	0.035	0.043	N/A**	N/A**	N/A**	N/A**	0.054	0.062	0.022	0.030	0.037
08/15/24	0.031	0.041	0.027	0.031	0.042	0.046	0.032	0.091	0.036	0.039	0.039	0.139	0.033	0.148	0.033	0.064	N/A**	N/A**	N/A**	N/A**	0.054	0.058	0.019	0.020	0.035
08/16/24	0.029	0.034	0.025	0.032	0.042	0.053	0.030	0.076	0.036	0.039	0.038	0.046	0.031	0.034	0.031	0.034	N/A**	N/A**	N/A**	N/A**	0.055	0.058	0.019	0.020	0.034
08/17/24	0.029	0.032	0.025	0.031	0.043	0.048	0.030	0.033	0.034	0.037	0.037	0.041	0.030	0.032	0.030	0.033	0.036	0.040	N/A**	N/A**	0.056	0.060	0.018	0.020	0.033
08/18/24	0.031	0.059	0.027	0.030	0.044	0.048	0.032	0.066	0.036	0.043	0.041	0.101	0.030	0.032	0.032	0.082	0.035	0.039	N/A**	N/A**	0.058	0.061	0.018	0.020	0.035
08/19/24	0.029	0.034	0.026	0.035	0.044	0.049	0.030	0.034	0.035	0.057	0.039	0.108	0.030	0.050	0.031	0.037	0.036	0.039	0.035	0.043	0.057	0.060	0.019	0.030	0.034
08/20/24	0.029	0.047	0.025	0.034	0.045	0.052	0.030	0.091	0.034	0.046	0.037	0.057	0.029	0.052	0.032	0.088	0.046	0.059	0.035	0.038	0.058	0.065	0.018	0.021	0.035
08/21/24	0.029	0.038	0.026	0.031	0.046	0.070	0.029	0.068	0.035	0.053	0.038	0.044	0.030	0.033	0.032	0.035	0.046	0.058	0.036	0.042	0.060	0.068	0.018	0.019	0.035
08/22/24	0.030	0.033	0.027	0.044	0.043	0.046	0.028	0.033	0.035	0.050	0.038	0.042	0.030	0.049	0.031	0.059	0.040	0.041	0.036	0.038	0.060	0.063	0.018	0.020	0.034
08/23/24	0.029	0.034	0.025	0.031	0.044	0.077	0.027	0.046	0.034	0.043	0.038	0.049	0.029	0.031	0.031	0.046	0.040	0.047	0.036	0.038	0.061	0.069	0.018	0.021	0.034
08/24/24	0.029	0.036	0.027	0.034	0.045	0.047	0.028	0.059	0.035	0.062	0.039	0.044	0.029	0.033	0.031	0.042	0.039	0.041	0.037	0.040	0.063	0.067	0.019	0.020	0.035
08/25/24	0.029	0.035	0.028	0.035	0.046	0.050	0.028	0.045	0.035	0.038	0.039	0.044	0.030	0.032	0.032	0.034	0.039	0.042	0.037	0.040	0.064	0.068	0.019	0.019	0.036
08/26/24	0.030	0.034	0.028	0.031	0.048	0.063	0.029	0.050	0.037	0.082	0.040	0.043	0.030	0.037	0.033	0.041	0.041	0.044	0.039	0.041	0.066	0.069	0.018	0.020	0.037
08/27/24	0.031	0.036	0.029	0.038	0.048	0.054	0.030	0.036	0.039	0.041	0.041	0.042	0.031	0.034	0.034	0.036	0.041	0.043	0.040	0.043	0.068	0.073	0.018	0.020	0.037
08/28/24	0.033	0.040	0.028	0.032	0.047	0.073	0.030	0.044	0.039	0.042	0.040	0.044	0.031	0.042	0.033	0.056	0.040	0.042	0.039	0.041	0.063	0.070	0.018	0.020	0.037
08/29/24	0.033	0.041	0.028	0.038	0.049	0.081	0.031	0.038	0.039	0.042	0.041	0.086	0.030	0.033	0.033	0.035	0.040	0.047	0.037	0.042	0.057	0.062	0.018	0.020	0.036
08/30/24	0.032	0.044	0.028	0.039	0.049	0.057	0.030	0.051	0.039	0.044	0.042	0.050	0.029	0.079	0.033	0.057	0.039	0.041	0.037	0.040	0.057	0.060	0.018	0.018	0.036
08/31/24	0.032	0.043	0.030	0.040	0.051	0.080	0.031	0.037	0.040	0.071	0.045	0.254***	0.030	0.034	0.036	0.045	0.040	0.046	0.037	0.043	0.058	0.061	0.017	0.018	0.037

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

** Cell offline due to low plant production setpoint.

*** Erroneous value due to instrumentation issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results															
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
08/01/24	0.017	0.017	6.815	6.364	7.184	0.068	0.062	0.076	1,730	1,668	1,791	27	25	29	99.01	2.00	98.43	1.80
08/02/24	0.016	0.020	6.676	6.307	7.241	0.065	0.058	0.070	1,748	1,689	1,814	28	25	31	99.03	2.01	98.41	1.80
08/03/24	0.014	0.014	7.111	6.381	8.141	0.057	0.041	0.077	1,705	1,648	1,782	27	26	30	99.19	2.09	98.40	1.79
08/04/24	0.014	0.014	7.376	6.755	8.518	0.056	0.049	0.066	1,635	1,566	1,691	27	24	30	99.23	2.12	98.36	1.78
08/05/24	0.014	0.014	7.406	6.790	8.179	0.058	0.049	0.077	1,627	1,573	1,712	27	25	31	99.22	2.11	98.34	1.78
08/06/24	0.014	0.014	7.531	6.978	8.273	0.055	0.050	0.061	1,682	1,630	1,757	28	27	31	99.27	2.14	98.31	1.77
08/07/24	0.017	0.021	7.515	7.027	8.147	0.057	0.049	0.066	1,705	1,616	1,804	28	25	30	99.24	2.12	98.38	1.79
08/08/24	0.014	0.015	7.717	7.061	9.097	0.059	0.051	0.072	1,686	1,623	1,757	28	26	32	99.23	2.12	98.35	1.78
08/09/24	0.014	0.020	7.326	6.775	8.030	0.054	0.047	0.065	1,677	1,596	1,754	29	26	32	99.26	2.13	98.28	1.76
08/10/24	0.014	0.014	7.377	6.756	8.020	0.053	0.042	0.061	1,622	1,583	1,712	28	26	34	99.29	2.15	98.27	1.76
08/11/24	0.014	0.014	7.395	6.559	8.405	0.044	0.037	0.050	1,559	1,505	1,594	28	25	31	99.41	2.23	98.23	1.75
08/12/24	0.014	0.014	7.464	5.950	8.584	0.048	0.033	0.056	1,533	1,454	1,625	26	23	30	99.36	2.20	98.27	1.76
08/13/24	0.014	0.014	7.728	6.943	8.778	0.058	0.050	0.074	1,587	1,522	1,682	27	24	31	99.26	2.13	98.31	1.77
08/14/24	0.014	0.014	7.843	6.986	8.784	0.059	0.049	0.073	1,674	1,604	1,779	29	25	34	99.24	2.12	98.27	1.76
08/15/24	0.014	0.014	7.359	6.460	8.587	0.057	0.049	0.062	1,651	1,581	1,716	28	26	30	99.22	2.11	98.31	1.77
08/16/24	0.014	0.020	7.286	6.351	8.387	0.063	0.056	0.070	1,649	1,597	1,705	27	25	31	99.14	2.07	98.35	1.78
08/17/24	0.014	0.014	7.729	7.017	8.589	0.060	0.052	0.064	1,617	1,552	1,700	27	25	30	99.23	2.11	98.34	1.78
08/18/24	0.014	0.014	7.675	6.862	8.636	0.052	0.040	0.090	1,582	1,557	1,630	27	25	30	99.33	2.17	98.31	1.77
08/19/24	0.014	0.014	7.850	6.836	8.758	0.053	0.045	0.063	1,573	1,498	1,698	26	24	30	99.32	2.17	98.33	1.78
08/20/24	0.015	0.016	7.586	6.474	9.052	0.068	0.055	0.093	1,633	1,556	1,733	29	24	51	99.10	2.05	98.19	1.74
08/21/24	0.014	0.015	7.622	6.590	8.545	0.058	0.050	0.064	1,649	1,575	1,747	29	25	34	99.24	2.12	98.24	1.75
08/22/24	0.014	0.014	7.830	7.196	8.646	0.055	0.047	0.064	1,658	1,587	1,732	28	25	31	99.30	2.15	98.33	1.78
08/23/24	0.014	0.014	7.788	7.162	8.624	0.058	0.054	0.066	1,674	1,614	1,760	28	25	31	99.25	2.13	98.36	1.78
08/24/24	0.014	0.014	7.805	7.202	8.505	0.059	0.046	0.075	1,674	1,641	1,722	28	26	30	99.25	2.13	98.35	1.78
08/25/24	0.014	0.014	7.892	7.190	8.673	0.054	0.046	0.062	1,605	1,552	1,654	27	25	30	99.31	2.16	98.31	1.77
08/26/24	0.014	0.014	7.961	7.250	8.798	0.051	0.046	0.060	1,577	1,489	1,719	27	24	30	99.36	2.19	98.32	1.77
08/27/24	0.014	0.014	8.212	7.652	9.051	0.057	0.052	0.064	1,669	1,608	1,730	27	25	30	99.30	2.16	98.36	1.78
08/28/24	0.014	0.014	7.342	6.543	8.839	0.055	0.051	0.065	1,658	1,577	1,769	27	24	33	99.25	2.12	98.36	1.79
08/29/24	0.014	0.014	6.911	6.236	7.876	0.055	0.048	0.067	1,687	1,613	1,776	28	25	31	99.21	2.10	98.36	1.78
08/30/24	0.014	0.014	6.931	6.420	7.566	0.061	0.050	0.071	1,718	1,670	1,785	28	26	32	99.13	2.06	98.35	1.78
08/31/24	0.014	0.014	7.043	6.401	7.855	0.052	0.048	0.057	1,652	1,593	1,710	27	25	29	99.27	2.14	98.35	1.78

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
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system no. 3090001 , Project no. 745

	UltraViolet / AOP Process online monitoring results					
Date	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
08/01/24	97.38	84.799	30,019.0	0.35	4	6
08/02/24	97.36	86.430	29,787.3	0.35	4	6
08/03/24	99.13	88.644	30,693.4	0.35	4	6
08/04/24	98.73	82.650	30,690.7	0.35	4	6
08/05/24	99.00	88.083	29,364.5	0.35	4	6
08/06/24	98.99	84.972	30,543.9	0.35	4	6
08/07/24	99.04	88.818	30,430.3	0.36	4	6
08/08/24	98.22	88.380	30,670.8	0.35	4	6
08/09/24	98.25	89.068	30,489.9	0.34	4	6
08/10/24	98.29	90.639	30,658.9	0.35	4	6
08/11/24	97.83	92.177	31,476.2	0.35	4	6
08/12/24	97.67	92.005	32,345.3	0.35	4	6
08/13/24	97.35	92.955	33,240.4	0.35	4	6
08/14/24	96.95	94.088	32,269.7	0.35	4	6
08/15/24	96.84	93.713	33,346.2	0.35	4	6
08/16/24	97.34	94.223	32,985.9	0.35	4	6
08/17/24	97.26	97.505	33,320.7	0.35	4	6
08/18/24	96.86	97.838	33,855.7	0.35	4	6
08/19/24	97.37	97.074	32,929.6	0.34	4	6
08/20/24	96.70	77.026	32,646.1	0.34	4	6
08/21/24	96.70	97.722	27,783.4	0.35	4	6
08/22/24	96.85	93.833	31,929.3	0.35	4	6
08/23/24	96.88	91.242	33,116.7	0.35	4	6
08/24/24	97.33	92.218	32,415.5	0.36	4	6
08/25/24	96.54	92.605	32,050.4	0.35	4	6
08/26/24	96.44	91.332	31,856.3	0.34	4	6
08/27/24	96.54	90.773	31,331.2	0.35	4	6
08/28/24	96.61	92.214	32,911.8	0.35	4	6
08/29/24	96.91	89.380	31,993.2	0.35	4	6
08/30/24	96.77	88.958	31,668.7	0.36	4	6
08/31/24	96.55	90.615	31,838.0	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
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system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
09/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/02/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/06/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/07/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/11/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/12/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/13/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/17/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/18/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/20/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/23/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/24/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/25/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/26/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/27/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/29/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/30/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
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system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
09/01/24	0.00	4.42	2.17	6.00	0	12.59
09/02/24	0.00	4.41	2.19	6.00	0	12.60
09/03/24	0.00	4.40	2.19	6.00	0	12.59
09/04/24	0.00	4.37	2.12	6.00	0	12.49
09/05/24	0.00	4.38	2.11	6.00	0	12.49
09/06/24	0.00	4.37	2.11	6.00	0	12.48
09/07/24	0.00	4.34	2.11	6.00	0	12.45
09/08/24	0.00	4.37	2.16	6.00	0	12.53
09/09/24	0.00	4.38	2.22	6.00	0	12.59
09/10/24	0.00	4.36	2.19	6.00	0	12.55
09/11/24	0.00	4.35	2.17	6.00	0	12.53
09/12/24	0.00	4.41	2.13	6.00	0	12.54
09/13/24	0.00	4.38	2.12	6.00	0	12.49
09/14/24	0.00	4.39	2.15	6.00	0	12.55
09/15/24	0.00	4.36	2.22	6.00	0	12.58
09/16/24	0.00	4.37	2.24	6.00	0	12.61
09/17/24	0.00	4.36	2.20	6.00	0	12.56
09/18/24	0.00	4.39	2.20	6.00	0	12.59
09/19/24	0.00	4.46	2.19	6.00	0	12.65
09/20/24	0.00	4.45	2.17	6.00	0	12.62
09/21/24	0.00	4.40	2.15	6.00	0	12.55
09/22/24	0.00	4.45	2.17	6.00	0	12.63
09/23/24	0.00	4.39	2.21	6.00	0	12.60
09/24/24	0.00	4.37	2.17	6.00	0	12.53
09/25/24	0.00	4.39	2.14	6.00	0	12.53
09/26/24	0.00	4.38	2.14	6.00	0	12.52
09/27/24	0.00	4.40	2.13	6.00	0	12.53
09/28/24	0.00	4.40	2.15	6.00	0	12.55
09/29/24	0.00	4.40	2.17	6.00	0	12.57
09/30/24	0.00	4.39	2.20	6.00	0	12.59

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	LRV	LRV	LRV	LRV	LRV	LRV
09/01/24	0.00	0.00	2.17	6.00	4	12.17
09/02/24	0.00	0.00	2.19	6.00	4	12.19
09/03/24	0.00	0.00	2.19	6.00	4	12.19
09/04/24	0.00	0.00	2.12	6.00	4	12.12
09/05/24	0.00	0.00	2.11	6.00	4	12.11
09/06/24	0.00	0.00	2.11	6.00	4	12.11
09/07/24	0.00	0.00	2.11	6.00	4	12.11
09/08/24	0.00	0.00	2.16	6.00	4	12.16
09/09/24	0.00	0.00	2.22	6.00	4	12.22
09/10/24	0.00	0.00	2.19	6.00	4	12.19
09/11/24	0.00	0.00	2.17	6.00	4	12.17
09/12/24	0.00	0.00	2.13	6.00	4	12.13
09/13/24	0.00	0.00	2.12	6.00	4	12.12
09/14/24	0.00	0.00	2.15	6.00	4	12.15
09/15/24	0.00	0.00	2.22	6.00	4	12.22
09/16/24	0.00	0.00	2.24	6.00	4	12.24
09/17/24	0.00	0.00	2.20	6.00	4	12.20
09/18/24	0.00	0.00	2.20	6.00	4	12.20
09/19/24	0.00	0.00	2.19	6.00	4	12.19
09/20/24	0.00	0.00	2.17	6.00	4	12.17
09/21/24	0.00	0.00	2.15	6.00	4	12.15
09/22/24	0.00	0.00	2.17	6.00	4	12.17
09/23/24	0.00	0.00	2.21	6.00	4	12.21
09/24/24	0.00	0.00	2.17	6.00	4	12.17
09/25/24	0.00	0.00	2.14	6.00	4	12.14
09/26/24	0.00	0.00	2.14	6.00	4	12.14
09/27/24	0.00	0.00	2.13	6.00	4	12.13
09/28/24	0.00	0.00	2.15	6.00	4	12.15
09/29/24	0.00	0.00	2.17	6.00	4	12.17
09/30/24	0.00	0.00	2.20	6.00	4	12.20

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
09/01/24	4.79	5.00	4.85	4.92	4.93	5.10	4.82	N/A *	4.88	4.96	4.59	4.77	4.99	4.82	4.92	4.81
09/02/24	4.84	5.02	4.90	4.97	4.96	5.09	4.80	N/A *	4.91	4.98	4.56	4.78	5.01	4.85	4.91	4.82
09/03/24	4.84	5.02	4.87	4.87	4.94	5.04	4.86	5.02	4.93	4.98	4.57	4.74	5.00	4.86	4.89	4.81
09/04/24	4.84	4.98	4.89	4.95	4.98	5.02	4.87	4.93	4.91	4.97	4.57	4.74	5.00	4.84	4.87	4.81
09/05/24	4.85	5.02	4.88	4.96	4.95	5.06	4.89	4.94	4.87	4.96	4.54	4.76	5.01	4.84	4.88	4.79
09/06/24	4.85	5.01	4.85	4.94	4.92	4.98	4.90	4.91	4.85	4.93	4.52	4.79	4.98	4.99	4.87	4.77
09/07/24	4.83	5.04	4.89	4.94	4.96	5.03	4.86	4.88	4.89	4.91	4.53	4.75	4.99	4.99	4.87	4.78
09/08/24	4.86	5.05	4.89	4.98	4.95	5.07	4.89	4.91	4.90	4.96	4.52	4.77	4.99	4.94	4.91	4.81
09/09/24	4.80	5.01	4.89	4.92	4.94	5.05	4.85	4.90	4.89	4.93	4.59	4.77	4.96	4.96	4.90	4.79
09/10/24	4.82	4.99	4.90	4.92	4.97	5.03	4.90	4.88	5.11	4.88	4.62	4.75	4.97	4.94	4.90	4.78
09/11/24	4.83	4.97	4.85	4.89	4.92	5.03	4.89	4.84	4.97	4.91	4.60	4.74	4.97	4.90	4.96	4.76
09/12/24	4.83	4.94	4.86	4.91	4.91	5.04	4.87	4.84	4.99	5.07	4.58	4.83	4.94	4.91	4.97	4.84
09/13/24	4.78	4.99	4.85	4.87	4.87	4.97	4.87	4.85	4.95	5.06	4.56	4.84	5.03	4.91	4.98	4.88
09/14/24	4.80	4.99	4.85	4.88	4.92	5.04	4.84	4.84	4.93	5.04	4.53	4.81	5.06	4.91	4.98	4.85
09/15/24	4.79	4.94	4.83	4.89	4.89	4.98	4.87	4.83	4.95	4.99	4.53	4.81	5.02	4.91	4.95	4.85
09/16/24	4.80	4.97	4.80	4.86	4.85	4.93	4.85	4.81	4.90	5.01	4.51	4.82	5.06	4.90	4.96	4.81
09/17/24	4.77	4.92	4.76	4.83	4.86	4.98	4.81	4.80	4.89	4.96	4.48	4.81	5.03	4.89	4.96	4.78
09/18/24	4.84	4.94	4.78	4.85	4.91	4.99	4.83	4.81	4.90	5.00	4.50	4.81	5.00	4.88	4.97	4.80
09/19/24	4.85	4.95	4.78	4.87	5.06	4.97	4.85	4.84	4.92	5.02	4.50	4.79	5.01	4.88	4.96	4.79
09/20/24	4.90	4.94	4.81	4.86	5.05	4.95	4.83	4.80	4.90	5.06	4.57	4.81	5.00	4.88	4.88	4.78
09/21/24	4.83	4.90	4.75	4.84	4.96	4.90	4.79	4.81	4.90	4.98	4.61	4.79	5.02	4.85	4.81	4.78
09/22/24	4.85	4.92	4.73	4.81	4.95	4.90	4.80	4.85	4.89	5.01	4.59	4.79	5.00	4.85	4.83	4.75
09/23/24	4.82	5.01	4.75	4.74	4.95	4.96	4.79	4.81	4.85	5.00	4.60	4.78	4.97	4.82	4.83	4.73
09/24/24	4.81	5.00	4.88	5.03	4.95	4.90	4.78	4.81	4.89	4.99	4.59	4.79	4.99	4.82	4.82	4.75
09/25/24	4.82	5.01	4.87	4.94	4.98	4.94	4.80	4.78	4.88	5.06	4.63	4.77	4.98	4.83	4.82	4.75
09/26/24	4.86	4.99	4.88	5.03	4.97	5.08	4.79	4.75	4.87	5.04	4.66	4.77	4.97	4.80	4.84	4.72
09/27/24	4.85	4.97	4.87	5.07	4.94	5.03	4.75	4.79	4.83	4.98	4.63	4.79	4.95	4.81	4.89	4.70
09/28/24	4.84	5.01	4.86	5.09	4.94	4.98	4.77	4.78	4.81	4.99	4.60	4.78	4.95	4.82	4.92	4.69
09/29/24	4.83	4.98	4.89	5.08	4.97	5.00	4.88	4.79	4.82	5.06	4.61	4.77	4.98	4.82	4.91	4.67
09/30/24	4.86	4.98	4.88	5.03	4.96	4.98	4.84	4.76	4.83	5.07	4.59	4.78	4.99	4.82	4.90	4.66

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
09/01/24	4.58	4.79	4.61	4.42	4.71	4.48	4.75	4.72	N/A *	5.03	4.88	5.01	5.02	4.94	4.95	4.87
09/02/24	4.60	4.81	4.62	4.42	4.71	4.49	4.76	4.71	N/A *	5.04	4.91	4.99	5.00	4.94	4.92	4.94
09/03/24	4.57	4.83	4.59	4.40	4.71	4.48	4.75	4.67	5.19	5.06	4.93	4.97	5.00	4.93	4.94	4.95
09/04/24	4.55	4.82	4.58	4.37	4.69	4.47	4.73	4.67	5.11	5.04	4.98	4.93	4.98	4.92	4.95	4.95
09/05/24	4.57	4.79	4.58	4.38	4.68	4.46	4.70	4.68	5.00	5.02	5.03	4.94	4.97	4.91	4.96	4.93
09/06/24	4.56	4.76	4.56	4.37	4.67	4.46	4.67	4.67	4.97	5.04	4.97	4.96	4.95	4.92	4.93	4.91
09/07/24	4.57	4.76	4.57	4.34	4.67	4.46	4.69	4.67	4.97	5.05	4.96	5.09	4.98	4.93	4.92	4.93
09/08/24	4.56	4.81	4.61	4.37	4.70	4.46	4.75	4.70	4.99	5.05	4.98	5.08	5.01	4.93	4.93	4.95
09/09/24	4.55	4.81	4.61	4.38	4.70	4.45	4.76	4.68	5.01	5.10	4.98	5.07	5.01	4.96	4.97	4.95
09/10/24	4.55	4.78	4.58	4.36	4.66	4.46	4.70	4.66	5.00	5.10	4.99	5.06	4.97	5.03	5.00	4.93
09/11/24	4.54	4.75	4.56	4.35	4.64	4.46	4.66	4.66	5.01	5.12	4.97	5.07	4.97	4.98	5.00	4.94
09/12/24	4.52	4.76	4.51	4.47	4.63	4.45	4.65	4.63	5.02	5.16	4.97	5.09	5.00	4.98	4.98	4.94
09/13/24	4.49	4.74	4.49	4.53	4.60	4.43	4.66	4.62	4.99	5.15	4.97	5.08	4.97	5.00	4.98	4.93
09/14/24	4.48	4.72	4.51	4.48	4.59	4.39	4.65	4.63	4.96	5.18	4.94	5.07	4.96	4.98	4.98	4.92
09/15/24	4.51	4.76	4.50	4.48	4.61	4.37	4.63	4.63	4.95	5.20	4.95	5.06	4.97	4.96	5.00	4.91
09/16/24	4.50	4.74	4.50	4.48	4.60	4.37	4.60	4.59	4.98	5.17	4.94	4.99	4.96	4.93	4.98	4.92
09/17/24	4.49	4.71	4.51	4.48	4.58	4.36	4.61	4.57	5.02	5.11	4.93	4.95	4.95	4.95	4.93	4.91
09/18/24	4.46	4.71	4.47	4.48	4.59	4.44	4.63	4.59	5.06	5.10	4.94	4.97	4.94	4.97	4.93	4.88
09/19/24	4.54	4.70	4.46	4.47	4.56	4.51	4.60	4.69	5.05	5.08	4.95	5.00	4.94	4.97	4.95	4.88
09/20/24	4.65	4.71	4.45	4.46	4.55	4.49	4.60	4.75	5.02	5.09	4.95	4.96	4.93	4.94	4.95	4.87
09/21/24	4.63	4.69	4.64	4.45	4.63	4.47	4.62	4.72	4.99	5.09	4.94	4.99	4.92	4.93	4.97	4.86
09/22/24	4.62	4.85	4.63	4.45	4.69	4.49	4.61	4.72	4.99	5.07	4.92	5.03	4.94	4.91	4.97	4.87
09/23/24	4.61	4.87	4.59	4.46	4.69	4.48	4.60	4.72	4.96	5.06	4.92	5.05	4.90	4.90	4.95	4.85
09/24/24	4.61	4.84	4.59	4.44	4.70	4.46	4.58	4.70	4.94	5.07	4.90	4.99	4.86	4.90	4.92	4.86
09/25/24	4.56	4.82	4.61	4.43	4.67	4.45	4.57	4.68	4.98	5.05	4.90	4.94	4.87	4.93	4.92	4.87
09/26/24	4.58	4.81	4.61	4.42	4.67	4.46	4.58	4.70	4.97	5.03	4.88	4.96	4.97	4.92	4.91	4.87
09/27/24	4.58	4.81	4.59	4.40	4.66	4.46	4.62	4.69	4.95	5.04	4.90	4.98	5.01	4.89	4.94	4.92
09/28/24	4.57	4.80	4.58	4.43	4.65	4.47	4.76	4.70	4.93	5.05	4.90	5.00	4.97	4.88	4.92	4.94
09/29/24	4.58	4.84	4.60	4.44	4.69	4.47	4.75	4.72	4.94	5.07	4.88	5.03	4.98	4.89	4.92	4.93
09/30/24	4.57	4.80	4.59	4.41	4.69	4.45	4.70	4.71	4.95	5.05	4.85	4.99	4.96	4.92	4.93	4.93

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
09/01/24	4.48	4.71	5.28	4.49	4.76	4.86	4.90	5.08	4.60	5.01	N/A *	4.76	4.52	4.59	4.94	4.83
09/02/24	4.41	4.68	5.22	4.50	4.81	5.06	4.56	4.84	4.69	4.88	N/A *	4.75	4.56	4.54	4.86	4.90
09/03/24	4.40	4.70	5.25	4.58	4.78	4.90	4.57	4.91	4.68	4.93	N/A *	4.73	4.54	4.49	4.87	4.87
09/04/24	4.44	4.76	5.26	4.45	4.82	4.95	4.64	5.12	4.69	4.96	N/A *	4.76	4.58	4.54	4.96	4.89
09/05/24	4.47	4.85	5.26	4.50	4.85	5.10	4.61	5.04	4.73	4.94	N/A *	4.86	4.62	4.53	4.93	4.93
09/06/24	4.54	4.92	5.35	4.51	4.84	4.92	4.58	4.92	4.71	4.95	N/A *	4.79	4.60	4.54	4.87	4.88
09/07/24	4.51	4.87	5.39	4.58	4.86	4.96	4.61	5.07	4.74	4.97	N/A *	4.78	4.61	4.55	4.85	4.88
09/08/24	4.49	4.82	5.37	4.60	4.85	4.97	4.58	4.93	4.68	4.98	N/A *	4.78	4.56	4.55	4.86	4.88
09/09/24	4.49	4.79	5.35	4.60	4.79	4.86	4.53	4.93	4.66	4.92	N/A *	4.72	4.51	4.55	4.88	4.84
09/10/24	4.44	4.77	5.37	4.48	4.89	4.86	4.58	4.96	4.68	4.91	N/A *	4.71	4.54	4.56	4.90	4.93
09/11/24	4.47	4.76	5.36	4.49	4.81	4.90	4.55	4.98	4.66	4.92	N/A *	4.73	4.49	4.56	4.86	4.89
09/12/24	4.46	4.77	5.39	4.41	4.84	4.86	4.56	5.00	4.65	4.97	N/A *	4.71	4.51	4.58	4.84	4.85
09/13/24	4.38	4.72	5.43	4.42	4.92	4.82	4.57	4.99	4.68	5.01	N/A *	4.79	4.54	4.49	4.84	4.90
09/14/24	4.41	4.76	5.46	4.43	4.81	4.90	4.54	4.98	4.62	4.99	N/A *	4.75	4.57	4.52	4.85	4.83
09/15/24	4.43	4.85	5.48	4.36	4.80	4.94	4.51	5.02	4.63	4.98	N/A *	4.76	4.51	4.52	4.89	4.83
09/16/24	4.44	4.88	5.38	4.40	4.83	5.07	4.50	4.88	4.65	4.98	N/A *	4.78	4.48	4.52	4.80	4.87
09/17/24	4.46	5.02	5.33	4.41	4.80	4.90	4.48	4.87	4.60	4.93	N/A *	4.72	4.50	4.52	4.79	4.83
09/18/24	4.42	4.75	5.53	4.39	5.03	4.89	4.49	4.98	4.61	4.97	N/A *	4.71	4.61	4.56	4.85	4.79
09/19/24	4.48	4.79	5.53	4.50	4.81	5.03	4.54	5.04	4.65	4.99	N/A *	4.73	4.63	4.54	4.88	4.83
09/20/24	4.53	4.84	5.42	4.50	4.91	4.87	4.61	5.13	4.66	4.98	N/A *	4.69	4.62	4.50	4.88	4.83
09/21/24	4.49	4.76	5.48	4.40	4.94	4.82	4.58	4.94	4.66	5.02	N/A *	4.65	4.64	4.57	4.87	4.84
09/22/24	4.49	4.83	5.49	4.46	4.86	4.93	4.51	5.01	4.65	4.97	N/A *	4.74	4.58	4.57	4.84	4.87
09/23/24	4.45	4.83	5.38	4.39	4.86	4.89	4.53	5.02	4.67	4.92	N/A *	4.74	4.55	4.58	4.80	4.84
09/24/24	4.41	4.70	5.48	4.37	4.85	4.87	4.52	4.98	4.70	4.93	N/A *	4.74	4.57	4.55	4.81	4.86
09/25/24	4.50	4.75	5.45	4.39	4.83	4.89	4.50	4.95	4.70	4.96	N/A *	4.76	4.60	4.53	4.80	4.87
09/26/24	4.46	4.75	5.43	4.38	4.80	4.89	4.53	4.98	4.70	4.97	N/A *	4.75	4.55	4.61	4.85	4.86
09/27/24	4.44	4.74	5.46	4.44	4.79	4.92	4.52	4.99	4.72	4.97	N/A *	4.79	4.57	4.59	4.86	4.84
09/28/24	4.47	4.81	5.50	4.40	4.85	4.95	4.54	4.97	4.69	4.96	N/A *	4.74	4.57	4.54	4.86	4.81
09/29/24	4.47	5.01	5.51	4.40	4.92	4.98	4.54	4.91	4.65	5.09	N/A *	4.70	4.56	4.58	4.94	4.77
09/30/24	4.47	4.75	5.55	4.39	4.91	5.12	4.52	4.93	4.68	4.93	N/A *	4.77	4.56	4.56	4.84	4.82

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Effluent Turbidity - NTU A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
09/01/24	0.031	0.040	0.028	0.040	0.051	0.117	0.030	0.043	0.040	0.054	0.045	0.253**	0.030	0.038	0.036	0.042	0.040	0.046	0.038	0.040	0.058	0.063	0.018	0.022	0.037
09/02/24	0.032	0.075	0.029	0.064	0.051	0.060	0.030	0.096	0.041	0.097	0.044	0.084	0.030	0.047	0.036	0.039	0.040	0.044	0.037	0.045	0.058	0.062	0.017	0.018	0.037
09/03/24	0.030	0.067	0.031	0.043	0.049	0.057	0.030	0.069	0.039	0.085	0.040	0.047	0.030	0.048	0.035	0.045	0.040	0.045	0.037	0.041	0.059	0.063	0.018	0.019	0.037
09/04/24	0.029	0.047	0.030	0.044	0.049	0.060	0.029	0.032	0.039	0.068	0.041	0.147	0.032	0.050	0.035	0.042	0.040	0.043	0.037	0.043	0.060	0.066	0.018	0.020	0.037
09/05/24	0.030	0.059	0.031	0.077	0.050	0.107	0.028	0.041	0.039	0.057	0.040	0.048	0.031	0.037	0.035	0.049	0.040	0.044	0.036	0.040	0.057	0.064	0.018	0.030	0.036
09/06/24	0.029	0.056	0.030	0.045	0.050	0.141	0.029	0.035	0.038	0.044	0.040	0.120	0.031	0.090	0.035	0.059	0.041	0.048	0.036	0.040	0.058	0.062	0.017	0.024	0.036
09/07/24	0.028	0.044	0.030	0.085	0.049	0.055	0.029	0.035	0.039	0.063	0.039	0.042	0.030	0.035	0.035	0.039	0.041	0.044	0.036	0.038	0.058	0.061	0.018	0.019	0.036
09/08/24	0.029	0.044	0.030	0.040	0.051	0.056	0.029	0.049	0.039	0.046	0.040	0.082	0.030	0.040	0.036	0.046	0.041	0.043	0.036	0.040	0.059	0.062	0.017	0.022	0.036
09/09/24	0.030	0.047	0.031	0.041	0.053	0.112	0.030	0.034	0.041	0.043	0.041	0.046	0.031	0.034	0.041	0.045	0.043	0.046	0.038	0.042	0.061	0.064	0.018	0.025	0.038
09/10/24	0.029	0.049	0.030	0.040	0.053	0.058	0.031	0.054	0.041	0.043	0.041	0.043	0.031	0.038	0.040	0.045	0.039	0.046	0.038	0.040	0.059	0.064	0.022	0.027	0.038
09/11/24	0.030	0.035	0.031	0.041	0.054	0.060	0.034	0.076	0.043	0.096	0.043	0.061	0.034	0.082	0.040	0.090	0.037	0.041	0.039	0.047	0.059	0.065	0.024	0.029	0.039
09/12/24	0.030	0.037	0.032	0.046	0.056	0.059	0.034	0.042	0.043	0.061	0.044	0.064	0.033	0.065	0.041	0.060	0.038	0.043	0.040	0.043	0.060	0.067	0.024	0.029	0.040
09/13/24	0.029	0.049	0.030	0.035	0.054	0.062	0.033	0.037	0.041	0.044	0.042	0.048	0.031	0.036	0.040	0.089	0.036	0.039	0.038	0.044	0.059	0.061	0.024	0.026	0.038
09/14/24	0.029	0.067	0.030	0.056	0.054	0.067	0.031	0.054	0.041	0.045	0.042	0.059	0.030	0.036	0.039	0.049	0.037	0.046	0.038	0.041	0.059	0.064	0.024	0.025	0.038
09/15/24	0.029	0.044	0.030	0.035	0.054	0.097	0.032	0.057	0.044	0.140	0.042	0.047	0.030	0.035	0.039	0.050	0.037	0.041	0.039	0.044	0.060	0.063	0.024	0.025	0.038
09/16/24	0.029	0.034	0.031	0.050	0.055	0.084	0.031	0.042	0.043	0.082	0.042	0.048	0.031	0.084	0.040	0.098	0.037	0.039	0.038	0.042	0.060	0.065	0.024	0.025	0.038
09/17/24	0.030	0.034	0.032	0.074	0.055	0.138	0.031	0.043	0.042	0.068	0.044	0.154	0.033	0.040	0.040	0.082	0.037	0.042	0.040	0.046	0.061	0.083	0.024	0.026	0.039
09/18/24	0.029	0.038	0.031	0.048	0.056	0.153	0.030	0.065	0.042	0.052	0.043	0.049	0.034	0.041	0.039	0.080	0.036	0.042	0.038	0.047	0.049	0.064	0.022	0.025	0.037
09/19/24	0.028	0.035	0.033	0.038	0.054	0.058	0.030	0.113	0.043	0.051	0.043	0.048	0.038	0.041	0.037	0.044	0.036	0.040	0.037	0.047	0.029	0.032	0.019	0.031	0.035
09/20/24	0.029	0.035	0.033	0.037	0.057	0.143	0.029	0.039	0.044	0.082	0.044	0.102	0.037	0.043	0.038	0.081	0.037	0.041	0.038	0.041	0.030	0.037	0.019	0.021	0.036
09/21/24	0.027	0.033	0.031	0.037	0.055	0.057	0.028	0.036	0.043	0.065	0.044	0.056	0.037	0.066	0.037	0.054	0.035	0.040	0.038	0.040	0.030	0.037	0.019	0.021	0.035
09/22/24	0.030	0.054	0.032	0.061	0.059	0.133	0.029	0.040	0.045	0.074	0.044	0.079	0.037	0.044	0.037	0.042	0.037	0.046	0.038	0.044	0.029	0.033	0.019	0.020	0.036
09/23/24	0.032	0.066	0.033	0.069	0.057	0.059	0.029	0.034	0.045	0.079	0.044	0.046	0.037	0.044	0.037	0.041	0.037	0.040	0.039	0.042	0.030	0.035	0.020	0.022	0.036
09/24/24	0.033	0.042	0.033	0.110	0.058	0.091	0.029	0.052	0.045	0.077	0.045	0.053	0.036	0.047	0.038	0.061	0.037	0.039	0.039	0.042	0.030	0.033	0.019	0.021	0.037
09/25/24	0.030	0.038	0.033	0.042	0.057	0.060	0.028	0.034	0.044	0.052	0.044	0.047	0.035	0.038	0.038	0.040	0.037	0.040	0.039	0.041	0.029	0.033	0.020	0.022	0.036
09/26/24	0.032	0.043	0.032	0.039	0.056	0.098	0.029	0.035	0.042	0.047	0.044	0.066	0.036	0.055	0.040	0.046	0.034	0.040	0.038	0.043	0.029	0.039	0.018	0.021	0.036
09/27/24	0.029	0.033	0.028	0.045	0.052	0.084	0.026	0.046	0.038	0.068	0.042	0.093	0.033	0.042	0.039	0.046	0.030	0.032	0.035	0.038	0.026	0.033	0.017	0.018	0.033
09/28/24	0.028	0.033	0.029	0.040	0.052	0.055	0.027	0.056	0.038	0.058	0.042	0.044	0.033	0.054	0.038	0.041	0.030	0.035	0.036	0.042	0.026	0.038	0.018	0.018	0.033
09/29/24	0.029	0.032	0.030	0.034	0.053	0.056	0.027	0.037	0.038	0.052	0.042	0.044	0.034	0.036	0.038	0.042	0.031	0.033	0.036	0.040	0.027	0.031	0.018	0.019	0.033
09/30/24	0.029	0.034	0.030	0.041	0.054	0.061	0.027	0.030	0.039	0.048	0.043	0.049	0.035	0.041	0.039	0.043	0.031	0.034	0.037	0.042	0.027	0.031	0.017	0.017	0.034

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

** Erroneous value due to instrumentation issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
09/01/24	0.014	0.014	7.367	6.221	8.622	0.050	0.044	0.057	1,574	1,517	1,632	26	24	31	99.32	2.17	98.33	1.78
09/02/24	0.014	0.014	7.796	7.075	8.834	0.050	0.044	0.060	1,560	1,508	1,649	26	24	30	99.35	2.19	98.31	1.77
09/03/24	0.014	0.014	7.918	7.270	8.907	0.051	0.045	0.058	1,573	1,508	1,675	26	23	29	99.35	2.19	98.37	1.79
09/04/24	0.014	0.014	7.748	7.055	8.701	0.059	0.051	0.074	1,646	1,566	1,749	27	24	30	99.23	2.12	98.38	1.79
09/05/24	0.014	0.014	7.894	7.112	8.490	0.062	0.055	0.069	1,678	1,632	1,728	27	25	32	99.22	2.11	98.37	1.79
09/06/24	0.014	0.014	7.776	7.037	8.540	0.061	0.052	0.071	1,676	1,616	1,764	27	24	31	99.22	2.11	98.37	1.79
09/07/24	0.014	0.014	7.668	7.016	8.520	0.060	0.050	0.072	1,640	1,594	1,722	27	25	31	99.22	2.11	98.34	1.78
09/08/24	0.014	0.014	7.580	6.802	8.484	0.052	0.043	0.062	1,594	1,548	1,660	27	25	31	99.31	2.16	98.31	1.77
09/09/24	0.014	0.014	7.933	7.056	9.104	0.048	0.043	0.058	1,598	1,523	1,744	27	23	33	99.39	2.22	98.30	1.77
09/10/24	0.014	0.014	8.292	7.407	9.298	0.054	0.048	0.062	1,666	1,602	1,741	28	25	31	99.35	2.19	98.30	1.77
09/11/24	0.014	0.014	7.933	6.858	9.206	0.053	0.047	0.062	1,681	1,590	1,776	28	25	33	99.33	2.17	98.31	1.77
09/12/24	0.014	0.014	7.440	6.853	8.352	0.055	0.046	0.067	1,683	1,609	1,762	28	25	31	99.26	2.13	98.33	1.78
09/13/24	0.014	0.014	7.240	6.477	8.788	0.056	0.048	0.071	1,698	1,612	1,774	28	25	31	99.23	2.12	98.35	1.78
09/14/24	0.014	0.014	7.892	7.148	8.778	0.055	0.047	0.070	1,680	1,627	1,757	28	25	31	99.30	2.15	98.36	1.78
09/15/24	0.014	0.014	7.635	6.904	8.530	0.046	0.040	0.054	1,590	1,530	1,664	27	24	31	99.40	2.22	98.32	1.78
09/16/24	0.014	0.014	7.968	7.040	9.325	0.046	0.042	0.057	1,563	1,487	1,651	26	23	30	99.42	2.24	98.32	1.77
09/17/24	0.014	0.014	8.383	7.379	9.568	0.053	0.048	0.061	1,622	1,539	1,734	27	23	32	99.37	2.20	98.35	1.78
09/18/24	0.014	0.014	8.046	7.271	9.121	0.051	0.046	0.058	1,669	1,582	1,780	27	24	32	99.36	2.20	98.37	1.79
09/19/24	0.014	0.014	7.906	7.304	8.847	0.052	0.046	0.062	1,700	1,639	1,752	27	24	31	99.35	2.19	98.42	1.80
09/20/24	0.014	0.014	8.027	7.302	8.989	0.054	0.050	0.058	1,693	1,633	1,765	27	24	30	99.33	2.17	98.42	1.80
09/21/24	0.014	0.014	7.458	6.558	8.561	0.053	0.044	0.067	1,674	1,629	1,719	27	25	29	99.29	2.15	98.41	1.80
09/22/24	0.020	0.062	7.329	6.303	8.843	0.049	0.043	0.057	1,573	1,517	1,624	26	23	29	99.33	2.17	98.36	1.79
09/23/24	0.045	0.070	7.938	6.468	9.021	0.049	0.043	0.059	1,564	1,478	1,691	26	22	29	99.38	2.21	98.37	1.79
09/24/24	0.051	0.126	8.306	7.744	9.560	0.057	0.049	0.072	1,635	1,535	1,717	28	23	49	99.32	2.17	98.26	1.76
09/25/24	0.032	0.079	7.389	6.564	8.863	0.054	0.046	0.065	1,686	1,614	1,777	27	25	31	99.27	2.14	98.38	1.79
09/26/24	0.020	0.037	7.626	6.527	8.468	0.055	0.050	0.061	1,715	1,642	1,789	28	25	30	99.28	2.14	98.39	1.79
09/27/24	0.014	0.015	7.650	7.042	8.312	0.056	0.052	0.067	1,676	1,616	1,756	27	25	29	99.26	2.13	98.41	1.80
09/28/24	0.014	0.014	7.760	7.240	8.524	0.055	0.047	0.065	1,610	1,572	1,676	26	24	37	99.29	2.15	98.39	1.79
09/29/24	0.014	0.014	7.912	7.236	8.885	0.053	0.042	0.069	1,579	1,527	1,667	26	23	29	99.32	2.17	98.37	1.79
09/30/24	0.014	0.014	8.063	7.285	9.050	0.051	0.045	0.061	1,564	1,477	1,698	26	23	30	99.37	2.20	98.36	1.79

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
09/01/24	96.63	93.565	32,267.6	0.35	4	6
09/02/24	96.77	89.653	32,147.2	0.35	4	6
09/03/24	96.73	94.610	32,143.3	0.35	4	6
09/04/24	96.82	91.646	32,597.2	0.35	4	6
09/05/24	96.81	92.135	32,204.5	0.35	4	6
09/06/24	97.01	95.309	32,154.8	0.35	4	6
09/07/24	96.86	92.732	32,716.2	0.34	4	6
09/08/24	96.65	93.514	32,692.4	0.35	4	6
09/09/24	96.52	94.344	32,674.0	0.35	4	6
09/10/24	96.66	92.793	32,877.8	0.35	4	6
09/11/24	96.57	97.161	32,119.2	0.34	4	6
09/12/24	96.67	90.377	32,806.3	0.34	4	6
09/13/24	97.32	96.647	31,105.5	0.34	4	6
09/14/24	97.31	93.247	32,361.5	0.34	4	6
09/15/24	97.60	92.968	31,763.4	0.34	4	6
09/16/24	97.27	95.388	32,309.1	0.34	4	6
09/17/24	97.06	92.573	32,706.8	0.34	4	6
09/18/24	97.55	87.066	32,488.3	0.35	4	6
09/19/24	97.74	91.086	30,642.7	0.35	4	6
09/20/24	97.47	92.532	32,203.0	0.35	4	6
09/21/24	98.03	90.722	32,495.3	0.35	4	6
09/22/24	97.70	92.612	31,943.8	0.35	4	6
09/23/24	97.23	94.237	31,568.7	0.34	4	6
09/24/24	97.39	78.864	32,301.1	0.34	4	6
09/25/24	97.40	95.892	28,167.2	0.36	4	6
09/26/24	97.21	89.196	32,655.1	0.34	4	6
09/27/24	97.68	92.949	31,219.4	0.35	4	6
09/28/24	97.88	94.497	31,665.8	0.34	4	6
09/29/24	97.64	92.899	32,249.5	0.35	4	6
09/30/24	97.38	90.562	32,826.8	0.35	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
10/01/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/02/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/06/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/07/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/08/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/09/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/10/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/11/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/12/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/13/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/14/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/15/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/16/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/17/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/18/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/19/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/20/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/21/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/22/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/23/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/24/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/25/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/27/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/28/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/29/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/30/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/31/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
10/01/24	0.00	4.34	2.19	6.00	0	12.53
10/02/24	0.00	4.23	2.15	6.00	0	12.38
10/03/24	0.00	4.38	2.13	6.00	0	12.50
10/04/24	0.00	4.40	2.06	6.00	0	12.46
10/05/24	0.00	4.43	2.03	6.00	0	12.46
10/06/24	0.00	4.44	2.13	6.00	0	12.57
10/07/24	0.00	4.45	2.17	6.00	0	12.62
10/08/24	0.00	4.42	2.12	6.00	0	12.54
10/09/24	0.00	4.40	2.16	6.00	0	12.56
10/10/24	0.00	4.41	2.12	6.00	0	12.52
10/11/24	0.00	4.39	2.07	6.00	0	12.46
10/12/24	0.00	4.38	2.08	6.00	0	12.46
10/13/24	0.00	4.36	2.18	6.00	0	12.54
10/14/24	0.00	4.39	2.21	6.00	0	12.60
10/15/24	0.00	4.45	2.12	6.00	0	12.57
10/16/24	0.00	4.44	2.16	6.00	0	12.60
10/17/24	0.00	4.42	2.15	6.00	0	12.57
10/18/24	0.00	4.37	2.13	6.00	0	12.50
10/19/24	0.00	4.39	2.14	6.00	0	12.54
10/20/24	0.00	4.40	2.19	6.00	0	12.59
10/21/24	0.00	4.33	2.24	6.00	0	12.57
10/22/24	0.00	4.32	2.24	6.00	0	12.56
10/23/24	0.00	4.34	2.17	6.00	0	12.51
10/24/24	0.00	4.34	2.19	6.00	0	12.53
10/25/24	0.00	4.31	2.14	6.00	0	12.45
10/26/24	0.00	4.30	2.12	6.00	0	12.42
10/27/24	0.00	4.33	2.14	6.00	0	12.48
10/28/24	0.00	4.34	2.17	6.00	0	12.51
10/29/24	0.00	4.28	2.16	6.00	0	12.44
10/30/24	0.00	4.22	2.18	6.00	0	12.40
10/31/24	0.00	4.29	2.11	6.00	0	12.40

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
10/01/24	0.00	0.00	2.19	6.00	4	12.19
10/02/24	0.00	0.00	2.15	6.00	4	12.15
10/03/24	0.00	0.00	2.13	6.00	4	12.13
10/04/24	0.00	0.00	2.06	6.00	4	12.06
10/05/24	0.00	0.00	2.03	6.00	4	12.03
10/06/24	0.00	0.00	2.13	6.00	4	12.13
10/07/24	0.00	0.00	2.17	6.00	4	12.17
10/08/24	0.00	0.00	2.12	6.00	4	12.12
10/09/24	0.00	0.00	2.16	6.00	4	12.16
10/10/24	0.00	0.00	2.12	6.00	4	12.12
10/11/24	0.00	0.00	2.07	6.00	4	12.07
10/12/24	0.00	0.00	2.08	6.00	4	12.08
10/13/24	0.00	0.00	2.18	6.00	4	12.18
10/14/24	0.00	0.00	2.21	6.00	4	12.21
10/15/24	0.00	0.00	2.12	6.00	4	12.12
10/16/24	0.00	0.00	2.16	6.00	4	12.16
10/17/24	0.00	0.00	2.15	6.00	4	12.15
10/18/24	0.00	0.00	2.13	6.00	4	12.13
10/19/24	0.00	0.00	2.14	6.00	4	12.14
10/20/24	0.00	0.00	2.19	6.00	4	12.19
10/21/24	0.00	0.00	2.24	6.00	4	12.24
10/22/24	0.00	0.00	2.24	6.00	4	12.24
10/23/24	0.00	0.00	2.17	6.00	4	12.17
10/24/24	0.00	0.00	2.19	6.00	4	12.19
10/25/24	0.00	0.00	2.14	6.00	4	12.14
10/26/24	0.00	0.00	2.12	6.00	4	12.12
10/27/24	0.00	0.00	2.14	6.00	4	12.14
10/28/24	0.00	0.00	2.17	6.00	4	12.17
10/29/24	0.00	0.00	2.16	6.00	4	12.16
10/30/24	0.00	0.00	2.18	6.00	4	12.18
10/31/24	0.00	0.00	2.11	6.00	4	12.11

Notes:

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
10/01/24	4.81	4.98	4.84	5.03	4.98	4.96	4.82	4.91	4.83	5.00	4.61	4.80	4.96	4.81	4.83	4.66
10/02/24	4.83	5.02	4.86	5.06	4.96	5.01	4.82	4.86	4.83	4.99	4.62	4.76	4.96	4.89	4.80	4.65
10/03/24	4.84	5.01	4.92	5.14	4.96	5.03	4.89	4.86	4.86	5.03	4.60	4.73	4.97	4.92	4.83	4.66
10/04/24	4.81	5.01	4.88	5.09	4.98	5.00	4.85	4.87	4.80	5.04	4.59	4.76	4.95	4.90	4.82	4.68
10/05/24	4.79	4.94	4.81	5.06	4.92	4.93	4.82	4.81	4.81	4.97	4.57	4.72	4.95	4.86	4.81	4.66
10/06/24	4.79	4.97	4.82	5.05	4.92	4.98	4.85	4.86	4.94	5.02	4.60	4.76	4.96	4.89	4.85	4.65
10/07/24	4.84	5.01	4.88	5.07	4.94	4.98	4.85	4.86	4.88	5.12	4.59	4.76	5.00	4.92	4.85	4.67
10/08/24	4.82	5.01	4.84	5.03	4.88	5.01	4.83	4.83	4.88	5.29	4.59	4.80	4.97	4.88	4.83	4.71
10/09/24	4.81	4.98	4.83	5.01	4.96	4.97	4.83	4.82	4.87	5.16	4.57	4.82	5.05	4.87	4.81	4.71
10/10/24	4.80	4.98	4.80	5.05	4.91	4.97	4.85	4.78	4.84	5.09	4.56	4.82	5.04	4.85	4.80	4.69
10/11/24	4.77	4.96	4.77	5.05	4.89	4.91	4.80	4.79	4.85	5.11	4.55	4.82	5.02	4.82	4.87	4.68
10/12/24	4.81	4.94	4.78	5.03	4.91	4.94	4.80	4.78	4.83	5.10	4.54	4.78	5.00	4.82	4.92	4.66
10/13/24	4.75	4.93	4.76	5.02	4.85	4.94	4.83	4.77	4.88	5.11	4.55	4.80	4.99	4.80	4.89	4.69
10/14/24	4.87	4.90	4.75	4.96	4.89	4.91	4.83	4.74	4.82	5.09	4.52	4.82	4.98	4.78	4.86	4.68
10/15/24	4.79	4.88	4.78	5.02	4.96	4.91	4.82	4.71	4.86	5.12	4.55	4.82	5.01	4.79	4.83	4.69
10/16/24	4.77	4.87	4.74	5.03	4.94	4.91	4.80	4.71	4.82	5.14	4.57	4.80	4.98	4.81	4.83	4.71
10/17/24	4.80	4.94	4.78	5.07	4.96	4.92	4.80	4.77	4.84	5.15	4.56	4.83	4.96	4.81	4.84	4.67
10/18/24	4.79	4.94	4.77	5.00	4.91	4.91	4.81	4.74	4.83	5.12	4.54	4.80	4.99	4.80	4.85	4.64
10/19/24	4.78	5.17	4.73	4.98	4.94	4.93	4.81	4.71	4.81	5.12	4.54	4.79	5.00	4.76	4.84	4.63
10/20/24	4.87	4.97	4.85	5.17	4.89	4.84	4.75	4.70	4.81	5.03	4.50	4.80	4.93	4.75	4.84	4.61
10/21/24	4.76	4.93	4.77	5.11	4.84	4.86	4.76	4.67	4.73	5.05	4.49	4.77	4.93	4.73	4.81	4.61
10/22/24	4.75	4.97	4.76	5.05	4.85	4.97	4.74	4.67	4.74	5.07	4.48	4.77	4.92	4.72	4.80	4.58
10/23/24	4.76	4.91	4.75	5.00	4.85	4.94	4.73	4.65	4.74	5.01	4.46	4.72	4.88	4.68	4.80	4.58
10/24/24	4.76	4.88	4.73	5.02	4.85	4.94	4.71	4.65	4.73	5.07	4.44	4.70	4.90	4.71	4.80	4.59
10/25/24	4.75	4.88	4.73	5.03	4.86	4.89	4.90	4.69	4.71	5.02	4.45	4.72	4.90	4.69	4.78	4.57
10/26/24	4.72	4.92	4.72	4.99	4.85	4.93	4.85	4.67	4.76	5.12	4.44	4.73	4.89	4.69	4.79	4.56
10/27/24	4.74	4.91	4.74	4.96	4.84	4.92	4.81	4.83	4.78	N/A*	4.44	4.72	4.89	4.68	4.79	4.57
10/28/24	4.71	4.89	4.72	4.95	4.86	4.85	4.77	4.73	4.71	5.10	4.45	4.73	4.90	4.89	4.78	4.56
10/29/24	4.69	4.91	4.70	5.00	4.82	4.88	4.78	4.74	4.71	5.12	4.43	4.73	4.87	4.83	4.77	4.56
10/30/24	4.75	4.89	4.70	5.00	4.87	4.84	4.75	4.77	4.76	5.10	4.42	4.72	4.86	4.76	4.77	4.54
10/31/24	4.77	4.88	4.71	5.01	4.87	4.90	4.79	4.77	4.73	5.04	4.39	4.71	4.85	4.76	4.75	4.55

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results — Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
10/01/24	4.57	4.79	4.53	4.35	4.64	4.43	4.70	4.65	4.99	5.04	4.90	4.96	4.97	4.92	4.96	4.93
10/02/24	4.56	4.79	4.54	4.34	4.62	4.41	4.68	4.63	4.95	5.05	4.96	4.94	4.96	4.89	4.92	4.93
10/03/24	4.56	4.81	4.62	4.38	4.67	4.41	4.71	4.64	4.94	5.05	4.96	5.03	4.97	4.89	4.88	4.93
10/04/24	4.55	4.82	4.63	4.40	4.69	4.43	4.73	4.62	4.96	5.05	4.94	5.13	4.95	4.90	4.93	4.94
10/05/24	4.51	4.82	4.59	N/A**	4.68	4.43	4.70	4.63	4.94	5.03	4.93	5.11	4.92	4.94	4.97	4.93
10/06/24	4.54	4.84	4.58	N/A**	4.70	4.44	4.71	4.63	5.00	5.01	4.90	5.11	4.91	4.97	4.99	4.93
10/07/24	4.58	4.84	4.61	N/A**	4.69	4.45	4.71	4.63	5.01	5.13	4.91	5.09	4.96	4.96	5.00	4.94
10/08/24	4.58	4.78	4.62	N/A**	4.68	4.42	4.70	4.61	4.96	5.22	4.95	5.11	5.01	4.97	4.96	4.95
10/09/24	4.52	4.76	4.53	N/A**	4.65	4.40	4.69	4.60	4.95	5.12	4.96	5.14	4.95	4.93	4.97	4.92
10/10/24	4.49	4.73	4.45	4.84	4.62	4.41	4.65	4.59	4.95	5.10	4.94	5.12	4.94	4.93	5.00	4.91
10/11/24	4.49	4.74	4.48	5.21	4.63	4.39	4.64	4.58	4.93	5.05	4.93	5.06	4.89	4.94	4.97	4.91
10/12/24	4.49	4.74	4.50	5.29	4.62	4.38	4.66	4.57	4.91	5.02	4.93	5.06	4.90	4.94	4.95	4.91
10/13/24	4.50	4.74	4.55	5.35	4.60	4.36	4.67	4.57	4.92	5.06	4.91	5.05	4.88	4.93	4.92	4.90
10/14/24	4.48	4.74	4.53	5.35	4.60	4.44	4.66	4.58	4.95	5.09	4.91	5.06	4.89	4.94	4.91	4.91
10/15/24	4.47	4.72	4.53	5.34	4.59	4.45	4.64	4.58	5.00	5.11	4.92	5.06	4.88	4.95	4.91	4.92
10/16/24	4.49	4.72	4.51	5.33	4.57	4.44	4.64	4.62	5.04	5.13	4.95	5.07	4.90	4.94	4.93	4.89
10/17/24	4.56	4.73	4.50	5.32	4.59	4.42	4.61	4.61	5.00	5.12	4.93	5.07	4.89	4.91	4.92	4.89
10/18/24	4.58	4.71	4.51	5.32	4.66	4.42	4.59	4.60	5.00	5.06	4.89	5.06	4.84	4.91	4.95	4.88
10/19/24	4.55	4.91	N/A**	5.34	4.68	4.41	4.58	4.62	4.98	5.06	4.91	5.05	4.86	4.90	4.94	4.86
10/20/24	4.53	4.85	N/A**	5.38	4.64	4.40	4.57	4.63	4.94	5.09	4.90	5.05	4.85	4.89	4.92	4.89
10/21/24	4.51	4.79	N/A**	5.34	4.64	4.37	4.56	4.63	4.93	5.06	4.88	5.02	4.81	4.89	4.89	4.85
10/22/24	4.48	4.74	N/A**	5.28	4.64	4.32	4.54	4.59	4.91	4.98	4.87	4.99	4.86	4.86	4.86	4.88
10/23/24	4.44	4.73	N/A**	5.26	4.61	4.34	4.53	4.55	4.90	4.97	4.85	4.99	4.95	4.82	4.83	4.97
10/24/24	4.43	4.72	4.66	5.26	4.59	4.34	4.61	4.54	4.84	5.00	4.84	4.96	4.89	4.84	4.84	4.86
10/25/24	4.41	4.70	4.88	5.24	4.57	4.31	4.70	4.53	4.84	4.99	4.82	4.97	4.88	4.88	4.84	4.92
10/26/24	4.42	4.69	4.87	5.24	4.59	4.30	4.69	4.52	4.89	4.95	4.84	4.97	4.87	4.86	4.85	4.94
10/27/24	4.47	4.70	4.92	5.26	4.62	4.33	4.69	4.53	4.94	4.98	4.98	4.97	4.85	4.86	4.84	4.93
10/28/24	4.47	4.67	5.01	5.28	4.61	4.34	4.64	4.53	4.95	5.00	4.94	5.01	4.85	4.86	4.84	4.90
10/29/24	4.44	4.67	5.08	5.28	4.58	4.33	4.61	4.52	4.91	4.99	4.91	5.12	4.84	4.82	4.85	4.86
10/30/24	4.43	4.68	5.13	5.26	4.57	4.27	4.61	4.51	4.88	4.98	4.90	5.20	4.85	4.82	4.84	4.88
10/31/24	4.43	4.68	5.21	5.29	4.59	4.29	4.62	4.50	4.82	4.94	4.93	5.09	4.83	4.87	4.85	4.90

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
10/01/24	4.35	4.79	5.54	4.34	4.90	4.90	4.56	4.97	4.69	4.94	N/A*	4.76	4.56	4.55	4.84	4.83
10/02/24	4.23	4.82	5.67	4.39	4.89	4.96	4.56	4.99	4.67	4.96	N/A*	4.75	4.61	4.58	4.88	4.81
10/03/24	4.54	4.78	5.68	4.48	4.86	4.99	4.56	5.01	4.61	4.98	N/A*	4.79	4.60	4.56	4.82	4.84
10/04/24	4.47	4.83	5.73	4.67	4.90	4.97	4.58	5.16	4.66	4.98	N/A*	4.77	4.60	4.55	4.83	4.85
10/05/24	4.48	4.86	5.42	5.03	4.90	4.94	4.55	5.08	4.67	4.95	N/A*	4.77	4.62	4.54	4.83	N/A*
10/06/24	4.48	4.77	5.37	5.08	4.86	4.92	4.51	4.99	4.66	4.91	N/A*	4.76	4.55	4.53	4.78	N/A*
10/07/24	4.46	4.88	5.52	4.91	4.88	4.91	4.53	5.05	4.65	4.89	N/A*	4.71	4.50	4.62	4.81	4.98
10/08/24	4.43	4.81	5.58	4.90	4.89	4.87	4.53	4.99	4.63	4.96	N/A*	4.82	4.48	4.56	4.77	4.89
10/09/24	4.47	4.79	5.52	4.89	4.89	4.88	4.63	4.96	4.65	4.99	N/A*	4.76	4.49	4.55	4.78	4.84
10/10/24	4.41	4.79	5.54	4.86	4.86	4.84	4.54	4.96	4.61	5.00	4.93	4.72	4.49	4.56	4.82	4.82
10/11/24	4.39	4.74	5.40	N/A*	4.87	4.88	4.48	4.97	4.60	4.97	4.89	4.74	4.46	4.54	4.81	4.85
10/12/24	4.45	4.72	5.51	N/A*	4.85	4.87	4.53	4.93	4.62	4.92	4.88	4.70	4.50	4.50	4.80	4.86
10/13/24	4.40	4.75	5.41	N/A*	4.86	4.90	4.49	4.77	4.61	N/A*	4.89	4.67	4.50	4.53	4.81	4.93
10/14/24	4.39	4.62	5.42	4.91	4.85	5.00	4.46	4.76	4.60	5.12	4.89	4.70	4.49	4.45	4.79	4.88
10/15/24	4.45	4.65	5.48	4.83	4.84	4.88	4.51	4.93	4.62	4.92	4.97	4.68	4.49	4.48	4.76	4.84
10/16/24	4.49	4.69	5.46	4.79	4.87	4.94	4.46	4.86	4.60	4.93	4.86	4.70	4.50	4.47	4.81	4.81
10/17/24	4.50	4.62	5.51	4.85	4.83	5.01	4.48	4.89	4.63	4.93	4.83	4.75	4.48	4.51	4.86	4.79
10/18/24	4.37	4.61	5.51	4.94	4.78	4.85	4.54	4.99	4.62	4.95	4.90	4.72	4.46	4.49	4.83	4.82
10/19/24	4.39	4.75	5.45	4.80	4.80	4.86	4.49	4.84	4.61	4.93	4.80	4.64	4.47	4.52	4.75	4.80
10/20/24	4.40	4.83	5.40	4.74	4.81	4.90	4.46	4.75	4.60	4.97	4.85	4.63	4.48	4.41	4.79	4.79
10/21/24	4.33	4.61	5.47	4.81	4.83	4.89	4.39	4.80	4.54	4.92	4.87	4.63	4.48	4.43	4.76	4.81
10/22/24	4.32	4.64	5.36	4.70	4.82	4.86	4.38	4.81	4.52	4.84	4.79	4.60	4.38	4.46	4.73	4.85
10/23/24	4.36	4.69	5.48	4.64	4.81	4.81	4.49	4.74	4.58	4.91	4.80	4.61	4.34	4.42	4.77	4.78
10/24/24	4.43	4.53	5.39	4.76	4.83	4.80	4.43	4.75	4.56	4.83	4.89	4.67	4.50	4.44	4.73	4.76
10/25/24	4.78	4.60	5.40	4.72	4.78	4.84	4.49	4.75	4.56	4.85	4.82	4.75	4.46	4.48	4.72	4.78
10/26/24	5.14	4.72	5.48	4.72	4.76	4.90	4.58	5.03	4.58	5.06	4.79	4.67	4.44	4.44	4.71	4.80
10/27/24	4.85	4.62	5.46	4.69	4.81	4.86	4.44	4.84	4.57	4.85	4.83	4.63	4.45	4.43	4.73	4.79
10/28/24	4.38	4.57	5.38	4.68	4.78	4.82	4.43	4.90	4.58	4.92	4.82	4.63	4.43	4.45	4.79	4.79
10/29/24	4.28	4.66	5.43	4.69	4.79	4.86	4.50	4.92	4.60	4.93	4.86	4.63	4.43	4.44	4.79	4.76
10/30/24	4.48	4.61	5.44	4.70	4.83	4.83	4.47	4.92	4.56	4.90	4.91	4.63	4.22	4.57	4.77	4.76
10/31/24	4.49	4.59	5.48	4.76	4.78	4.88	4.41	4.94	4.60	4.89	4.83	4.68	4.51	4.47	4.77	4.83

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
10/01/24	0.029	0.034	0.031	0.040	0.055	0.069	0.028	0.035	0.039	0.041	0.043	0.048	0.037	0.048	0.039	0.041	0.032	0.037	0.037	0.041	0.028	0.035	0.017	0.019	0.034
10/02/24	0.028	0.033	0.030	0.037	0.054	0.056	0.028	0.034	0.038	0.042	0.042	0.052	0.035	0.038	0.038	0.039	0.031	0.035	0.036	0.038	0.027	0.031	0.017	0.018	0.034
10/03/24	0.027	0.035	0.029	0.036	0.053	0.055	0.027	0.031	0.037	0.072	0.041	0.043	0.034	0.037	0.038	0.058	0.030	0.036	0.036	0.039	0.027	0.031	0.017	0.018	0.033
10/04/24	0.027	0.030	0.028	0.032	0.053	0.061	0.026	0.030	0.036	0.040	0.040	0.041	0.033	0.035	0.036	0.040	0.030	0.032	0.035	0.040	0.026	0.030	0.018	0.020	0.032
10/05/24	0.028	0.030	0.029	0.032	0.054	0.058	0.026	0.029	0.037	0.040	0.042	0.046	0.035	0.039	0.040	0.050	0.032	0.036	0.038	0.042	0.032	0.037	0.019	0.021	0.034
10/06/24	0.029	0.031	0.031	0.034	0.058	0.063	0.028	0.030	0.039	0.041	0.044	0.046	0.036	0.038	0.042	0.047	0.034	0.036	0.041	0.044	0.036	0.040	0.020	0.022	0.037
10/07/24	0.029	0.032	0.030	0.034	0.060	0.063	0.029	0.037	0.039	0.041	0.044	0.047	0.037	0.041	0.042	0.045	0.035	0.037	0.042	0.044	0.038	0.043	0.021	0.023	0.037
10/08/24	0.029	0.031	0.031	0.034	0.060	0.063	0.030	0.036	0.038	0.041	0.044	0.046	0.037	0.040	0.042	0.044	0.034	0.039	0.040	0.043	0.032	0.043	0.023	0.026	0.037
10/09/24	0.029	0.031	0.031	0.033	0.059	0.061	0.030	0.033	0.039	0.041	0.045	0.047	0.037	0.038	0.042	0.043	0.034	0.040	0.038	0.041	0.023	0.028	0.026	0.027	0.036
10/10/24	0.028	0.031	0.030	0.034	0.059	0.060	0.030	0.038	0.043	0.064	0.046	0.049	0.036	0.037	0.038	0.043	0.033	0.035	0.037	0.043	0.024	0.027	0.026	0.029	0.036
10/11/24	0.025	0.028	0.028	0.032	0.059	0.061	0.029	0.038	0.043	0.050	0.047	0.050	0.034	0.037	0.034	0.035	0.033	0.040	0.037	0.043	0.023	0.025	0.026	0.027	0.035
10/12/24	0.025	0.028	0.027	0.029	0.058	0.060	0.028	0.031	0.041	0.045	0.046	0.050	0.033	0.035	0.033	0.035	0.032	0.033	0.037	0.039	0.023	0.026	0.027	0.029	0.034
10/13/24	0.027	0.035	0.028	0.030	0.060	0.063	0.029	0.031	0.043	0.046	0.048	0.050	0.035	0.045	0.034	0.036	0.033	0.035	0.038	0.040	0.025	0.028	0.027	0.029	0.035
10/14/24	0.028	0.033	0.030	0.042	0.061	0.063	0.028	0.032	0.043	0.047	0.050	0.053	0.037	0.042	0.036	0.038	0.034	0.041	0.039	0.043	0.027	0.034	0.026	0.028	0.037
10/15/24	0.028	0.034	0.032	0.040	0.061	0.063	0.029	0.032	0.044	0.048	0.050	0.056	0.037	0.041	0.037	0.039	0.034	0.039	0.040	0.043	0.027	0.030	0.026	0.029	0.037
10/16/24	0.027	0.031	0.030	0.034	0.059	0.066	0.028	0.030	0.043	0.046	0.049	0.051	0.038	0.042	0.036	0.040	0.031	0.034	0.039	0.042	0.025	0.030	0.026	0.029	0.036
10/17/24	0.026	0.031	0.029	0.033	0.059	0.061	0.027	0.029	0.042	0.045	0.048	0.061	0.035	0.040	0.033	0.035	0.028	0.032	0.036	0.040	0.022	0.025	0.026	0.029	0.034
10/18/24	0.026	0.028	0.029	0.033	0.058	0.060	0.028	0.046	0.043	0.046	0.049	0.052	0.033	0.035	0.032	0.035	0.025	0.028	0.034	0.038	0.022	0.024	0.026	0.029	0.034
10/19/24	0.029	0.038	0.030	0.070	0.060	0.071	0.028	0.032	0.045	0.051	0.048	0.052	0.033	0.037	0.034	0.078	0.026	0.030	0.035	0.039	0.023	0.026	0.027	0.028	0.035
10/20/24	0.033	0.056	0.030	0.035	0.061	0.081	0.029	0.038	0.044	0.053	0.050	0.069	0.035	0.054	0.035	0.068	0.027	0.032	0.036	0.040	0.023	0.027	0.027	0.030	0.036
10/21/24	0.030	0.037	0.032	0.049	0.062	0.097	0.030	0.036	0.045	0.049	0.050	0.060	0.034	0.067	0.035	0.060	0.027	0.030	0.035	0.040	0.023	0.028	0.027	0.030	0.036
10/22/24	0.030	0.061	0.032	0.037	0.063	0.133	0.030	0.037	0.047	0.149	0.052	0.110	0.033	0.059	0.038	0.045	0.028	0.035	0.035	0.041	0.024	0.030	0.027	0.029	0.037
10/23/24	0.030	0.044	0.032	0.044	0.064	0.067	0.031	0.036	0.046	0.061	0.052	0.078	0.033	0.039	0.038	0.043	0.028	0.032	0.035	0.038	0.024	0.028	0.027	0.028	0.037
10/24/24	0.030	0.111	0.033	0.043	0.062	0.077	0.033	0.075	0.047	0.075	0.051	0.055	0.035	0.096	0.038	0.041	0.030	0.031	0.036	0.056	0.026	0.029	0.027	0.028	0.037
10/25/24	0.026	0.093	0.034	0.199	0.058	0.067	0.030	0.038	0.047	0.115	0.048	0.133	0.032	0.038	0.037	0.097	0.028	0.031	0.035	0.040	0.024	0.044	0.026	0.038	0.035
10/26/24	0.025	0.099	0.031	0.042	0.059	0.130	0.029	0.033	0.044	0.048	0.046	0.053	0.032	0.054	0.035	0.047	0.027	0.031	0.034	0.036	0.024	0.027	0.027	0.041	0.034
10/27/24	0.025	0.031	0.032	0.039	0.058	0.112	0.029	0.036	0.044	0.056	0.047	0.131	0.033	0.037	0.035	0.040	0.027	0.030	0.034	0.036	0.023	0.027	0.027	0.032	0.034
10/28/24	0.025	0.088	0.031	0.071	0.059	0.218***	0.030	0.035	0.043	0.056	0.046	0.051	0.032	0.039	0.035	0.039	0.027	0.039	0.035	0.039	0.024	0.028	0.026	0.032	0.034
10/29/24	0.024	0.036	0.031	0.043	0.042	0.060	0.030	0.037	0.042	0.052	0.043	0.053	0.026	0.035	0.034	0.050	0.026	0.030	0.035	0.038	0.023	0.026	0.027	0.032	0.032
10/30/24	0.023	0.067	0.030	0.092	0.033	0.059	0.029	0.032	0.043	0.104	0.041	0.047	0.023	0.023	0.035	0.090	0.026	0.030	0.035	0.037	0.023	0.027	0.027	0.029	0.031
10/31/24	0.024	0.037	0.030	0.036	0.034	0.038	0.030	0.065	0.042	0.047	0.042	0.052	0.023	0.023	0.036	0.043	0.028	0.032	0.036	0.043	0.024	0.027	0.027	0.028	0.031

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

*** Value affected by short term turbidity spike.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
10/01/24	0.014	0.014	8.059	7.478	9.349	0.053	0.048	0.058	1,665	1,563	1,771	27	24	30	99.35	2.19	98.38	1.79
10/02/24	0.014	0.014	7.682	7.053	8.701	0.054	0.050	0.061	1,649	1,579	1,740	27	24	30	99.29	2.15	98.38	1.79
10/03/24	0.014	0.014	7.728	7.229	8.344	0.058	0.051	0.067	1,667	1,609	1,730	26	24	29	99.25	2.13	98.42	1.80
10/04/24	0.014	0.014	7.537	6.948	8.289	0.066	0.057	0.082	1,651	1,588	1,711	26	23	28	99.13	2.06	98.45	1.81
10/05/24	0.014	0.014	7.943	7.312	8.861	0.074	0.060	0.096	1,618	1,558	1,689	26	25	28	99.07	2.03	98.39	1.79
10/06/24	0.014	0.014	7.888	7.251	8.877	0.058	0.047	0.072	1,554	1,509	1,640	26	23	29	99.26	2.13	98.34	1.78
10/07/24	0.014	0.014	7.911	7.252	8.965	0.053	0.047	0.062	1,541	1,483	1,636	25	23	31	99.32	2.17	98.35	1.78
10/08/24	0.014	0.014	7.822	6.465	9.028	0.059	0.049	0.071	1,606	1,531	1,716	26	24	29	99.24	2.12	98.36	1.79
10/09/24	0.014	0.014	7.637	7.158	8.774	0.053	0.041	0.071	1,624	1,548	1,720	26	24	29	99.30	2.16	98.39	1.79
10/10/24	0.014	0.014	6.853	6.062	8.238	0.052	0.047	0.061	1,665	1,563	1,787	26	23	29	99.24	2.12	98.44	1.81
10/11/24	0.014	0.014	6.398	6.012	7.104	0.055	0.034	0.071	1,639	1,568	1,730	26	24	28	99.15	2.07	98.41	1.80
10/12/24	0.014	0.014	7.029	6.312	8.050	0.059	0.048	0.067	1,634	1,583	1,696	26	25	28	99.16	2.08	98.40	1.79
10/13/24	0.014	0.014	7.512	6.955	9.124	0.049	0.041	0.059	1,558	1,514	1,614	26	24	29	99.34	2.18	98.34	1.78
10/14/24	0.014	0.014	7.801	7.203	8.834	0.048	0.041	0.058	1,554	1,477	1,684	26	23	30	99.38	2.21	98.34	1.78
10/15/24	0.014	0.014	7.913	7.271	9.069	0.060	0.049	0.098	1,623	1,545	1,698	27	24	31	99.24	2.12	98.34	1.78
10/16/24	0.014	0.014	7.548	7.041	8.418	0.052	0.044	0.061	1,637	1,555	1,739	27	25	30	99.31	2.16	98.35	1.78
10/17/24	0.014	0.014	7.417	6.979	8.026	0.052	0.044	0.061	1,676	1,626	1,725	27	25	29	99.30	2.15	98.37	1.79
10/18/24	0.014	0.014	6.804	6.025	7.876	0.051	0.044	0.066	1,652	1,601	1,717	27	25	29	99.25	2.13	98.36	1.79
10/19/24	0.014	0.014	6.530	6.097	7.199	0.047	0.030	0.076	1,634	1,587	1,694	27	25	29	99.28	2.14	98.36	1.79
10/20/24	0.014	0.014	6.675	6.152	7.352	0.043	0.026	0.057	1,571	1,510	1,658	26	24	30	99.36	2.19	98.32	1.78
10/21/24	0.014	0.014	7.647	6.314	9.553	0.044	0.030	0.068	1,574	1,487	1,763	27	24	31	99.43	2.24	98.30	1.77
10/22/24	0.014	0.014	8.253	7.303	9.553	0.047	0.029	0.062	1,613	1,542	1,701	27	24	32	99.43	2.24	98.30	1.77
10/23/24	0.013	0.013	7.676	6.429	9.180	0.051	0.043	0.069	1,619	1,545	1,697	28	24	32	99.33	2.17	98.26	1.76
10/24/24	0.013	0.013	7.194	6.631	8.165	0.046	0.042	0.053	1,629	1,565	1,688	28	26	31	99.36	2.19	98.26	1.76
10/25/24	0.012	0.014	6.916	6.436	7.664	0.050	0.045	0.054	1,640	1,541	1,727	26	23	30	99.27	2.14	98.39	1.79
10/26/24	0.012	0.012	6.721	6.122	7.441	0.051	0.047	0.060	1,661	1,614	1,719	26	24	33	99.24	2.12	98.41	1.80
10/27/24	0.012	0.012	6.736	6.064	7.518	0.048	0.044	0.053	1,597	1,548	1,673	26	23	30	99.28	2.14	98.37	1.79
10/28/24	0.012	0.012	7.487	6.139	9.056	0.051	0.047	0.058	1,582	1,491	1,727	26	22	32	99.32	2.17	98.38	1.79
10/29/24	0.012	0.012	8.052	7.220	9.174	0.056	0.047	0.073	1,642	1,554	1,715	27	24	32	99.31	2.16	98.33	1.78
10/30/24	0.012	0.012	7.724	6.945	8.889	0.051	0.044	0.073	1,666	1,595	1,769	29	25	34	99.34	2.18	98.28	1.77
10/31/24	0.012	0.012	7.719	6.534	8.791	0.060	0.048	0.079	1,689	1,620	1,741	29	26	32	99.22	2.11	98.26	1.76

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
10/01/24	97.20	91.681	31,255.0	0.35	4	6
10/02/24	97.69	88.456	31,969.0	0.35	4	6
10/03/24	97.73	89.247	30,873.7	0.35	4	6
10/04/24	98.46	91.761	30,569.0	0.35	4	6
10/05/24	98.31	90.446	31,875.6	0.35	4	6
10/06/24	96.93	89.505	31,411.0	0.35	4	6
10/07/24	97.51	84.389	30,938.9	0.35	4	6
10/08/24	97.42	93.138	30,226.3	0.35	4	6
10/09/24	97.59	92.583	32,363.5	0.35	4	6
10/10/24	97.21	94.202	31,987.9	0.35	4	6
10/11/24	97.70	93.757	32,925.2	0.35	4	6
10/12/24	98.69	93.759	32,512.2	0.35	4	6
10/13/24	97.75	92.479	31,853.0	0.34	4	6
10/14/24	97.55	92.206	31,905.4	0.35	4	6
10/15/24	97.35	88.211	32,377.8	0.34	4	6
10/16/24	97.48	92.018	29,650.7	0.34	4	6
10/17/24	97.56	93.317	30,750.8	0.34	4	6
10/18/24	97.04	93.406	32,546.3	0.35	4	6
10/19/24	96.92	92.090	32,522.1	0.35	4	6
10/20/24	96.51	91.296	32,171.0	0.35	4	6
10/21/24	96.22	92.364	31,427.8	0.35	4	6
10/22/24	97.02	94.135	32,201.4	0.35	4	6
10/23/24	97.23	95.132	34,225.8	0.35	4	6
10/24/24	98.16	97.466	32,586.4	0.35	4	6
10/25/24	96.92	96.206	33,660.5	0.35	4	6
10/26/24	96.92	94.302	33,277.9	0.35	4	6
10/27/24	96.93	91.864	32,963.9	0.35	4	6
10/28/24	96.77	93.881	31,572.8	0.35	4	6
10/29/24	96.60	94.788	32,184.2	0.34	4	6
10/30/24	97.18	94.814	32,916.1	0.34	4	6
10/31/24	97.01	92.154	32,178.9	0.34	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
11/01/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/02/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/03/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/05/24	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/08/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/09/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/10/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/11/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/12/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/13/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/14/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/15/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/16/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/17/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/18/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/19/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/20/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/21/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/22/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/23/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/24/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/25/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/27/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/28/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/29/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/30/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

* GWRS offline for planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
11/01/24	0.00	4.16	2.16	6.00	0	12.32
11/02/24	0.00	4.28	2.12	6.00	0	12.39
11/03/24	0.00	4.29	2.21	6.00	0	12.50
11/04/24	0.00	4.30	2.18	6.00	0	12.48
11/05/24	0.00	4.40	2.15	6.00	0	12.55
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	0.00	4.36	2.03	6.00	0	12.39
11/08/24	0.00	4.28	2.11	6.00	0	12.39
11/09/24	0.00	4.22	2.15	6.00	0	12.37
11/10/24	0.00	4.22	2.18	6.00	0	12.40
11/11/24	0.00	4.16	2.21	6.00	0	12.37
11/12/24	0.00	4.20	2.20	6.00	0	12.40
11/13/24	0.00	4.23	2.18	6.00	0	12.41
11/14/24	0.00	4.15	2.12	6.00	0	12.28
11/15/24	0.00	4.22	2.11	6.00	0	12.33
11/16/24	0.00	4.22	2.14	6.00	0	12.36
11/17/24	0.00	4.09	2.18	6.00	0	12.28
11/18/24	0.00	4.19	2.23	6.00	0	12.42
11/19/24	0.00	4.14	2.19	6.00	0	12.34
11/20/24	0.00	4.10	2.19	6.00	0	12.29
11/21/24	0.00	4.07	2.18	6.00	0	12.25
11/22/24	0.00	4.08	2.19	6.00	0	12.26
11/23/24	0.00	4.04	2.19	6.00	0	12.24
11/24/24	0.00	4.07	2.23	6.00	0	12.30
11/25/24	0.00	4.08	2.23	6.00	0	12.31
11/26/24	0.00	4.05	2.18	6.00	0	12.23
11/27/24	0.00	4.01	2.17	6.00	0	12.18
11/28/24	0.00	4.02	2.19	6.00	0	12.21
11/29/24	0.00	4.03	2.21	6.00	0	12.24
11/30/24	0.00	4.07	2.23	6.00	0	12.30

Notes:

* GWRS offline for planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
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Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
11/01/24	0.00	0.00	2.16	6.00	4	12.16
11/02/24	0.00	0.00	2.12	6.00	4	12.12
11/03/24	0.00	0.00	2.21	6.00	4	12.21
11/04/24	0.00	0.00	2.18	6.00	4	12.18
11/05/24	0.00	0.00	2.15	6.00	4	12.15
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	0.00	0.00	2.03	6.00	4	12.03
11/08/24	0.00	0.00	2.11	6.00	4	12.11
11/09/24	0.00	0.00	2.15	6.00	4	12.15
11/10/24	0.00	0.00	2.18	6.00	4	12.18
11/11/24	0.00	0.00	2.21	6.00	4	12.21
11/12/24	0.00	0.00	2.20	6.00	4	12.20
11/13/24	0.00	0.00	2.18	6.00	4	12.18
11/14/24	0.00	0.00	2.12	6.00	4	12.12
11/15/24	0.00	0.00	2.11	6.00	4	12.11
11/16/24	0.00	0.00	2.14	6.00	4	12.14
11/17/24	0.00	0.00	2.18	6.00	4	12.18
11/18/24	0.00	0.00	2.23	6.00	4	12.23
11/19/24	0.00	0.00	2.19	6.00	4	12.19
11/20/24	0.00	0.00	2.19	6.00	4	12.19
11/21/24	0.00	0.00	2.18	6.00	4	12.18
11/22/24	0.00	0.00	2.19	6.00	4	12.19
11/23/24	0.00	0.00	2.19	6.00	4	12.19
11/24/24	0.00	0.00	2.23	6.00	4	12.23
11/25/24	0.00	0.00	2.23	6.00	4	12.23
11/26/24	0.00	0.00	2.18	6.00	4	12.18
11/27/24	0.00	0.00	2.17	6.00	4	12.17
11/28/24	0.00	0.00	2.19	6.00	4	12.19
11/29/24	0.00	0.00	2.21	6.00	4	12.21
11/30/24	0.00	0.00	2.23	6.00	4	12.23

Notes:

* GWRS offline for planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
11/01/24	4.74	4.85	4.68	5.01	4.85	4.90	4.80	4.75	4.81	5.03	4.39	4.71	4.88	4.79	4.78	4.56
11/02/24	4.73	4.87	4.67	4.95	4.83	4.85	4.79	4.73	4.83	5.00	4.48	4.82	4.84	4.72	4.81	4.55
11/03/24	4.68	4.86	4.65	4.94	4.82	4.85	4.77	4.73	4.80	5.02	4.51	4.83	4.91	4.72	4.81	4.69
11/04/24	4.71	4.87	4.61	4.98	4.79	4.83	4.74	4.75	4.81	5.22	4.49	4.81	4.98	4.72	4.79	4.68
11/05/24	4.71	4.88	4.60	4.97	4.78	4.83	4.73	4.76	5.04	5.27	4.48	4.80	4.97	4.71	4.77	4.65
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	4.78	4.89	4.70	5.01	4.82	4.88	4.83	4.74	4.92	5.43	4.50	4.83	4.96	4.70	4.74	4.73
11/08/24	4.71	4.85	4.68	4.98	4.80	4.84	4.79	4.68	4.85	5.27	4.47	4.81	4.92	4.70	4.73	4.66
11/09/24	4.70	4.82	4.61	4.93	4.79	4.77	4.76	4.65	4.74	5.15	4.47	4.76	4.92	4.68	4.70	4.60
11/10/24	4.68	4.81	4.61	4.94	4.79	4.77	4.74	4.65	4.70	5.17	4.42	4.77	4.90	4.67	4.68	4.63
11/11/24	4.70	4.80	4.58	4.94	4.99	4.78	4.73	4.66	4.73	5.13	4.43	4.77	4.89	4.65	4.69	4.64
11/12/24	4.81	4.77	4.61	4.92	4.91	4.75	4.70	4.63	4.71	5.13	4.41	4.75	4.88	4.62	4.79	4.60
11/13/24	4.74	4.74	4.58	4.88	4.82	4.71	4.65	4.65	4.70	5.06	4.40	4.71	4.85	4.61	4.80	4.57
11/14/24	4.75	4.73	4.58	4.86	4.84	4.71	4.72	4.64	4.72	5.07	4.38	4.72	4.87	4.58	4.79	4.52
11/15/24	4.67	4.69	4.55	4.82	4.78	4.61	4.71	4.63	4.70	5.05	4.37	4.69	4.80	4.55	4.78	4.51
11/16/24	4.69	4.92	4.44	5.04	4.78	4.59	4.67	4.59	4.59	5.03	4.36	4.72	4.79	4.54	4.76	4.51
11/17/24	4.71	4.87	4.48	4.98	4.80	4.63	4.68	4.57	4.58	5.01	4.37	4.74	4.83	4.54	4.73	4.52
11/18/24	4.72	4.84	4.69	4.91	4.78	4.66	4.68	4.61	4.59	5.00	4.37	4.72	4.80	4.54	4.72	4.50
11/19/24	4.69	4.75	4.66	4.90	4.70	4.79	4.63	4.54	4.57	4.96	4.34	4.67	4.78	4.51	4.71	4.45
11/20/24	4.61	4.77	4.60	4.85	4.86	4.71	4.63	4.51	4.55	4.93	4.30	4.63	4.75	4.47	4.70	4.44
11/21/24	4.62	4.76	4.59	4.90	4.89	4.66	4.61	4.51	4.49	4.88	4.27	4.63	4.73	4.47	4.67	4.43
11/22/24	4.64	4.70	4.54	4.86	4.71	4.72	4.85	4.49	4.50	4.85	4.22	4.58	4.74	4.42	4.65	4.41
11/23/24	4.63	4.73	4.51	4.94	4.67	4.72	4.81	4.43	4.48	4.84	4.21	4.59	4.70	4.42	4.66	4.41
11/24/24	4.64	4.79	4.56	4.82	4.67	4.68	4.76	4.46	4.51	4.82	4.22	4.58	4.67	4.44	4.66	4.39
11/25/24	4.63	4.71	4.56	4.83	4.67	4.72	4.68	4.62	4.50	4.80	4.22	4.58	4.69	4.45	4.65	4.38
11/26/24	4.61	4.70	4.55	4.84	4.63	4.61	4.70	4.60	4.46	4.79	4.19	4.54	4.71	4.58	4.64	4.33
11/27/24	4.62	4.71	4.54	4.85	4.61	4.58	4.71	4.62	4.44	4.78	4.17	4.49	4.67	4.63	4.64	4.33
11/28/24	4.56	4.73	4.47	4.86	4.57	4.60	4.63	4.59	4.41	4.74	4.16	4.48	4.61	4.60	4.65	4.32
11/29/24	4.57	4.67	4.45	4.81	4.56	4.61	4.64	4.61	4.82	4.72	4.13	4.50	4.62	4.59	4.64	4.32
11/30/24	4.49	4.70	4.48	4.78	4.58	4.63	4.64	4.56	4.72	4.71	4.40	4.88	4.61	4.58	4.61	4.32

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* GWRS offline for planned outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
11/01/24	4.40	4.69	5.23	5.33	4.59	4.31	4.64	4.53	4.78	4.92	4.96	5.03	4.83	4.92	4.87	4.88
11/02/24	4.37	4.68	5.21	5.29	4.55	4.30	4.62	4.52	4.80	5.01	4.94	5.01	4.81	4.89	4.95	4.86
11/03/24	4.42	4.69	5.24	5.28	4.57	4.29	4.62	4.52	4.81	5.27	4.93	5.01	4.78	4.89	4.91	4.84
11/04/24	4.41	4.67	5.28	5.30	4.58	4.30	4.62	4.51	4.81	5.10	4.92	4.98	4.81	4.84	4.91	4.86
11/05/24	N/A**	4.64	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.79	5.04	4.87	4.99	4.82	4.85	4.94	4.88
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	4.47	4.72	5.32	5.26	4.65	4.36	4.68	4.57	4.80	5.18	4.99	5.01	4.81	4.87	4.95	4.85
11/08/24	4.35	4.68	5.34	5.29	4.60	4.28	4.64	4.52	4.78	5.09	4.94	4.97	4.77	4.85	4.94	4.85
11/09/24	4.32	4.60	5.30	5.30	4.54	4.22	4.58	4.47	4.76	5.02	4.89	4.92	4.73	4.80	4.89	4.82
11/10/24	4.31	4.58	5.24	5.30	4.52	4.22	4.60	4.47	4.80	4.99	4.92	4.96	4.74	4.82	4.85	4.82
11/11/24	4.29	4.58	5.21	5.30	4.52	4.33	4.60	4.45	4.89	4.95	4.89	4.98	4.73	4.82	4.84	4.81
11/12/24	4.25	4.51	5.23	5.28	4.45	4.38	4.57	4.40	4.87	4.97	4.87	4.92	4.72	4.81	4.88	4.79
11/13/24	4.24	4.49	5.25	5.27	4.40	4.35	4.53	4.47	4.80	4.93	4.85	4.91	4.71	4.80	4.79	4.78
11/14/24	4.20	4.47	5.23	5.29	4.37	4.30	4.49	4.50	4.82	4.91	4.86	4.93	4.68	4.80	4.86	4.76
11/15/24	4.36	4.45	5.19	5.27	4.54	4.27	4.44	4.50	4.77	4.87	4.85	4.92	4.62	4.75	4.83	4.74
11/16/24	4.42	N/A***	5.17	5.26	4.61	4.24	4.44	4.50	4.77	4.83	4.81	4.89	4.62	4.76	4.81	4.74
11/17/24	4.36	N/A***	5.15	5.27	4.55	4.24	4.41	4.48	4.80	4.82	4.81	4.80	4.62	4.78	4.77	4.75
11/18/24	4.36	N/A***	5.15	5.27	4.48	4.20	4.39	4.44	4.80	4.82	4.81	4.79	4.59	4.77	4.78	4.76
11/19/24	4.31	4.45	5.22	5.25	4.48	4.16	4.39	4.39	4.78	4.75	4.79	4.77	4.69	4.77	4.75	4.74
11/20/24	4.25	4.45	5.13	5.22	4.48	4.15	4.34	4.39	4.77	4.65	4.76	4.75	4.79	4.73	4.73	4.76
11/21/24	4.23	4.89	5.02	5.21	4.41	4.07	4.32	4.40	4.76	4.66	4.70	4.74	4.72	4.65	4.69	4.84
11/22/24	4.20	5.05	5.07	5.24	4.39	4.08	4.49	4.39	4.75	4.67	4.70	4.72	4.69	4.70	4.68	4.78
11/23/24	4.16	5.04	5.15	5.23	4.40	4.09	4.58	4.37	4.75	4.65	4.83	4.77	4.69	4.72	4.72	4.77
11/24/24	4.14	5.07	5.20	5.22	4.37	4.07	4.56	4.34	4.75	4.63	4.98	4.78	4.68	4.72	4.74	4.78
11/25/24	4.13	5.05	5.22	5.19	4.37	4.08	4.54	4.32	4.75	4.65	4.89	4.80	4.62	4.70	4.73	4.79
11/26/24	4.06	5.05	5.21	5.18	4.38	4.05	4.52	4.33	4.74	4.65	4.87	4.90	4.61	4.68	4.70	4.77
11/27/24	4.08	5.05	5.26	5.23	4.35	4.01	4.47	4.34	4.75	4.60	4.87	4.96	4.62	4.66	4.70	4.75
11/28/24	4.08	5.04	5.25	5.24	4.30	4.02	4.47	4.31	4.73	4.62	4.88	4.90	4.61	4.61	4.64	4.72
11/29/24	4.08	5.04	5.20	5.18	4.30	4.27	4.47	4.26	4.69	4.61	4.84	4.92	4.59	4.39	4.60	4.75
11/30/24	4.09	5.03	5.17	5.17	4.30	4.23	4.45	4.24	4.68	4.58	4.84	4.92	4.58	4.60	4.75	4.76

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* GWRS offline for planned outage. ** Cell offline due to low plant production setpoint. *** Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
11/01/24	4.37	4.61	5.49	4.74	4.79	4.85	4.43	5.16	4.56	4.84	4.81	4.63	4.16	4.40	4.77	4.78
11/02/24	4.28	4.64	5.40	4.81	4.82	4.81	4.48	4.80	4.56	4.82	4.83	4.68	4.42	4.46	4.79	4.81
11/03/24	4.42	4.60	5.34	4.64	4.78	4.76	4.59	4.75	4.63	4.84	4.75	4.72	4.46	4.45	4.82	4.77
11/04/24	4.31	4.61	5.33	4.75	4.85	4.77	4.39	4.78	4.55	4.91	4.84	4.60	4.45	4.44	4.77	4.74
11/05/24	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	4.52	4.94	4.81	4.57	4.40	4.47	4.76	4.82
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	4.59	4.65	5.53	4.72	4.84	4.79	4.38	4.95	4.50	5.00	4.79	4.55	N/A****	4.50	4.76	4.86
11/08/24	4.52	4.59	5.54	4.68	4.80	4.83	4.41	4.85	4.57	4.98	4.82	4.68	N/A****	4.48	4.73	4.81
11/09/24	4.33	4.50	5.29	4.59	4.75	4.85	4.38	4.73	4.53	4.95	4.76	4.58	4.48	4.39	4.68	4.75
11/10/24	4.28	4.47	5.23	4.64	4.77	4.78	4.22	4.69	4.52	4.86	4.78	4.52	4.52	4.36	4.66	4.68
11/11/24	4.35	4.43	5.22	4.60	4.76	4.72	4.16	4.68	4.61	4.79	4.75	4.56	N/A****	4.40	4.62	4.68
11/12/24	4.20	4.48	5.29	4.51	4.68	4.69	4.28	4.69	4.49	4.77	4.70	4.55	4.47	4.33	4.69	4.66
11/13/24	4.25	4.39	5.27	4.55	4.68	4.64	4.23	4.61	4.48	4.76	4.74	4.52	4.36	4.42	4.71	4.63
11/14/24	4.26	4.31	5.23	4.52	4.65	4.64	4.21	4.55	4.47	4.73	4.76	4.52	4.15	4.29	4.72	4.64
11/15/24	4.22	4.33	5.07	4.55	4.59	4.66	4.22	4.60	4.37	4.77	4.80	4.46	4.52	4.24	4.54	4.58
11/16/24	4.40	4.25	5.14	4.36	4.58	4.52	4.22	4.55	4.39	4.74	4.59	4.43	4.36	4.30	4.56	4.68
11/17/24	4.09	4.26	5.22	4.40	4.76	4.45	4.30	4.47	4.48	4.67	4.70	4.47	4.35	4.25	4.56	4.57
11/18/24	4.35	4.26	5.13	4.44	4.80	4.51	4.19	4.45	4.42	4.65	4.72	4.52	4.45	4.20	4.56	4.59
11/19/24	4.26	4.27	5.09	4.43	4.67	4.48	4.14	4.47	4.39	4.65	4.61	4.65	4.35	4.24	4.56	4.63
11/20/24	4.10	4.38	5.12	4.30	4.55	4.43	4.35	4.35	4.35	4.77	4.60	4.42	4.22	4.21	4.56	4.52
11/21/24	4.12	4.16	5.12	4.52	4.59	4.49	4.19	4.40	4.30	4.72	4.59	4.35	4.25	4.11	4.54	4.50
11/22/24	4.18	4.26	5.16	4.36	4.52	4.56	4.21	4.39	4.29	4.61	4.61	4.36	4.14	4.15	4.51	4.49
11/23/24	4.22	4.31	5.09	4.31	4.49	4.72	4.29	4.31	4.29	4.67	4.71	4.35	4.04	4.07	4.51	4.46
11/24/24	4.39	4.14	5.13	4.28	4.60	4.54	4.13	4.32	4.34	4.65	4.65	4.40	4.25	4.39	4.54	4.51
11/25/24	4.22	4.08	5.15	4.29	4.52	4.48	4.16	4.39	4.39	4.59	4.70	4.47	4.23	4.09	4.51	4.57
11/26/24	4.15	4.09	5.15	4.47	4.45	4.55	4.17	4.60	4.32	4.60	4.77	4.36	4.18	4.20	4.49	4.48
11/27/24	4.10	4.12	4.98	4.41	4.48	4.42	4.09	4.34	4.31	4.53	4.62	4.30	4.22	4.29	4.49	4.62
11/28/24	4.05	4.11	5.09	4.39	4.61	4.43	4.04	4.32	4.29	4.49	4.56	4.32	4.21	4.13	4.49	4.59
11/29/24	4.03	4.15	5.03	4.43	4.77	4.50	4.03	4.41	4.23	4.60	4.63	4.30	4.34	4.21	4.49	4.57
11/30/24	4.08	4.21	5.05	4.26	4.55	4.36	4.07	4.30	4.31	4.52	4.54	4.26	4.28	4.30	4.43	4.61

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* GWRS offline for planned outage. ** Cell offline due to low plant production setpoint. **** Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
11/01/24	0.024	0.028	0.030	0.075	0.034	0.038	0.030	0.065	0.043	0.086	0.042	0.088	0.023	0.023	0.039	0.067	0.026	0.029	0.036	0.038	0.024	0.028	0.026	0.031	0.031
11/02/24	0.023	0.027	0.030	0.110	0.036	0.040	0.028	0.033	0.042	0.047	0.041	0.044	0.023	0.023	0.037	0.040	0.027	0.032	0.035	0.040	0.024	0.027	0.027	0.029	0.031
11/03/24	0.024	0.035	0.029	0.046	0.036	0.041	0.032	0.036	0.043	0.099	0.043	0.114	0.023	0.023	0.036	0.039	0.027	0.030	0.036	0.039	0.025	0.029	0.026	0.029	0.032
11/04/24	0.024	0.086	0.030	0.051	0.037	0.040	0.031	0.034	0.042	0.047	0.042	0.053	0.023	0.023	0.036	0.041	0.027	0.031	0.036	0.038	0.025	0.026	0.027	0.046	0.032
11/05/24	0.026	0.038	0.033	0.048	0.039	0.048	0.032	0.036	0.045	0.047	0.043	0.043	0.023	0.023	0.037	0.040	0.029	0.031	0.039	0.039	0.027	0.027	0.030	0.030	0.033
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	0.022	0.042	0.029	0.039	0.041	0.069	0.036	0.048	0.046	0.083	0.041	0.045	0.023	0.023	0.043	0.082	0.029	0.051	0.038	0.045	0.027	0.030	0.029	0.042	0.030
11/08/24	0.024	0.028	0.030	0.045	0.036	0.040	0.031	0.036	0.043	0.058	0.042	0.044	0.023	0.023	0.037	0.052	0.027	0.029	0.036	0.041	0.026	0.029	0.027	0.029	0.032
11/09/24	0.025	0.027	0.032	0.034	0.037	0.039	0.031	0.033	0.047	0.054	0.044	0.045	0.023	0.023	0.038	0.039	0.028	0.028	0.038	0.042	0.027	0.029	0.027	0.031	0.033
11/10/24	0.024	0.029	0.030	0.032	0.037	0.044	0.031	0.040	0.045	0.058	0.044	0.046	0.023	0.023	0.038	0.064	0.027	0.029	0.037	0.040	0.026	0.029	0.027	0.029	0.033
11/11/24	0.026	0.034	0.032	0.043	0.038	0.040	0.031	0.034	0.044	0.051	0.044	0.049	0.023	0.023	0.038	0.041	0.028	0.031	0.038	0.042	0.026	0.031	0.027	0.038	0.033
11/12/24	0.026	0.037	0.032	0.035	0.039	0.041	0.033	0.039	0.044	0.047	0.044	0.047	0.023	0.023	0.038	0.052	0.028	0.031	0.038	0.041	0.026	0.030	0.028	0.032	0.033
11/13/24	0.027	0.054	0.032	0.039	0.040	0.045	0.033	0.080	0.045	0.078	0.047	0.056	0.024	0.057	0.039	0.043	0.029	0.036	0.039	0.042	0.027	0.031	0.028	0.031	0.034
11/14/24	0.027	0.031	0.034	0.068	0.042	0.074	0.034	0.063	0.046	0.056	0.050	0.057	0.026	0.094	0.040	0.043	0.030	0.047	0.041	0.047	0.028	0.029	0.028	0.030	0.036
11/15/24	0.028	0.092	0.035	***** 0.234	0.041	0.117	0.033	0.037	0.046	0.063	0.057	0.111	0.025	0.069	0.039	0.042	0.028	0.029	0.041	0.044	0.028	0.029	0.029	0.032	0.036
11/16/24	0.029	0.038	0.033	0.039	0.041	0.061	0.033	0.036	0.045	0.052	0.069	0.081	0.024	0.041	0.040	0.092	0.028	0.034	0.041	0.043	0.029	0.032	0.031	0.031	0.037
11/17/24	0.029	0.034	0.032	0.047	0.040	0.083	0.033	0.043	0.045	0.061	0.087	0.117	0.024	0.037	0.040	0.057	0.028	0.030	0.042	0.047	0.030	0.032	0.032	0.033	0.039
11/18/24	0.028	0.043	0.036	***** 0.214	0.041	0.073	0.034	0.037	0.046	0.053	0.121	0.195	0.024	0.041	0.040	0.115	0.029	0.030	0.043	0.046	0.031	0.036	0.034	0.036	0.042
11/19/24	0.026	0.033	0.032	0.040	0.034	0.052	0.034	0.046	0.043	0.050	0.087	0.140	0.025	0.062	0.041	0.057	0.029	0.034	0.045	0.052	0.032	0.037	0.037	0.044	0.039
11/20/24	0.024	0.050	0.030	0.036	0.029	0.064	0.034	0.056	0.041	0.051	0.042	0.046	0.023	0.024	0.040	0.048	0.029	0.032	0.041	0.049	0.030	0.041	0.027	0.039	0.032
11/21/24	0.024	0.031	0.031	0.036	0.028	0.050	0.034	0.037	0.044	0.059	0.042	0.108	0.024	0.028	0.038	0.052	0.028	0.033	0.040	0.041	0.026	0.028	0.020	0.021	0.032
11/22/24	0.025	0.078	0.031	0.045	0.028	0.035	0.034	0.039	0.043	0.046	0.044	0.177	0.024	0.026	0.038	0.054	0.028	0.029	0.040	0.043	0.027	0.035	0.021	0.022	0.032
11/23/24	0.024	0.080	0.030	0.034	0.028	0.049	0.034	0.037	0.045	0.050	0.045	0.050	0.025	0.050	0.038	0.042	0.028	0.031	0.041	0.044	0.028	0.030	0.026	0.028	0.033
11/24/24	0.025	0.080	0.031	0.082	0.029	0.032	0.034	0.037	0.044	0.046	0.049	0.053	0.024	0.029	0.038	0.114	0.028	0.032	0.042	0.043	0.029	0.031	0.028	0.032	0.033
11/25/24	0.024	0.030	0.031	0.098	0.028	0.040	0.032	0.042	0.041	0.043	0.045	0.060	0.024	0.035	0.037	0.050	0.028	0.030	0.039	0.045	0.028	0.030	0.023	0.030	0.032
11/26/24	0.023	0.027	0.030	0.036	0.028	0.031	0.031	0.112	0.040	0.050	0.040	0.057	0.026	0.029	0.037	0.039	0.028	0.029	0.035	0.039	0.026	0.027	0.018	0.019	0.030
11/27/24	0.025	0.064	0.031	0.042	0.028	0.032	0.030	0.042	0.040	0.042	0.041	0.047	0.026	0.029	0.037	0.054	0.029	0.032	0.036	0.037	0.026	0.028	0.018	0.021	0.030
11/28/24	0.025	0.096	0.031	0.039	0.029	0.035	0.030	0.035	0.040	0.042	0.041	0.063	0.026	0.074	0.037	0.040	0.028	0.031	0.037	0.042	0.027	0.030	0.018	0.019	0.031
11/29/24	0.023	0.030	0.029	0.034	0.029	0.046	0.030	0.046	0.039	0.041	0.041	0.045	0.025	0.027	0.038	0.080	0.028	0.035	0.037	0.038	0.028	0.030	0.018	0.020	0.030
11/30/24	0.024	0.057	0.030	0.037	0.030	0.047	0.030	0.035	0.039	0.044	0.046	0.056	0.025	0.027	0.039	0.044	0.029	0.031	0.039	0.041	0.030	0.031	0.018	0.019	0.032

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* GWRS offline for planned outage.

***** Value affected by short term turbidity spike.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
11/01/24	0.012	0.013	7.982	7.301	8.949	0.055	0.045	0.073	1,718	1,642	1,806	29	25	32	99.31	2.16	98.31	1.77
11/02/24	0.013	0.013	8.135	7.408	9.015	0.062	0.042	0.084	1,660	1,596	1,738	30	27	33	99.24	2.12	98.21	1.75
11/03/24	0.013	0.013	8.298	7.505	9.105	0.051	0.032	0.061	1,587	1,534	1,669	29	26	33	99.38	2.21	98.17	1.74
11/04/24	0.013	0.013	8.240	7.263	9.298	0.055	0.043	0.082	1,573	1,502	1,691	29	24	35	99.33	2.18	98.16	1.74
11/05/24	0.016	0.017	9.504	9.298	9.699	0.068	0.060	0.075	1,661	1,634	1,676	30	28	32	99.29	2.15	98.18	1.74
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	0.015	0.018	8.003	6.477	9.890	0.075	0.058	****** 0.187	1,728	1,621	1,819	37	33	50	99.06	2.03	97.86	1.67
11/08/24	0.012	0.013	7.761	6.549	8.940	0.060	0.055	0.071	1,674	1,609	1,748	30	25	35	99.23	2.11	98.21	1.75
11/09/24	0.013	0.013	8.215	7.499	9.076	0.058	0.053	0.079	1,626	1,538	1,683	28	26	31	99.29	2.15	98.25	1.76
11/10/24	0.012	0.013	8.105	7.339	9.260	0.054	0.049	0.062	1,524	1,473	1,592	27	24	31	99.34	2.18	98.21	1.75
11/11/24	0.013	0.013	8.177	7.211	9.186	0.051	0.038	0.058	1,512	1,444	1,600	28	25	31	99.38	2.21	98.15	1.73
11/12/24	0.012	0.012	8.594	7.655	9.735	0.054	0.046	0.071	1,566	1,481	1,683	27	24	32	99.38	2.20	98.24	1.76
11/13/24	0.012	0.013	8.241	6.728	9.815	0.054	0.045	0.075	1,811	1,530	2,306	31	25	42	99.35	2.18	98.26	1.76
11/14/24	0.012	0.013	7.268	6.625	8.467	0.055	0.040	0.075	2,221	2,119	2,310	38	34	41	99.25	2.12	98.31	1.77
11/15/24	0.012	0.012	6.624	6.168	7.205	0.052	0.047	0.062	2,216	2,123	2,300	36	25	39	99.22	2.11	98.36	1.79
11/16/24	0.012	0.012	6.822	6.191	7.615	0.049	0.045	0.058	2,167	2,069	2,251	37	33	39	99.28	2.14	98.31	1.77
11/17/24	0.012	0.012	6.996	6.157	7.985	0.046	0.043	0.052	2,094	2,018	2,174	35	32	38	99.34	2.18	98.33	1.78
11/18/24	0.012	0.012	7.665	7.056	8.234	0.045	0.041	0.051	2,067	1,969	2,139	34	31	37	99.41	2.23	98.34	1.78
11/19/24	0.012	0.012	7.657	6.302	8.425	0.049	0.044	0.054	2,177	2,056	2,270	36	32	40	99.36	2.19	98.35	1.78
11/20/24	0.012	0.012	7.529	7.022	8.994	0.049	0.046	0.056	2,250	2,129	2,359	37	33	41	99.35	2.19	98.38	1.79
11/21/24	0.012	0.012	7.714	7.376	8.235	0.051	0.047	0.055	2,193	2,059	2,311	36	32	39	99.34	2.18	98.36	1.79
11/22/24	0.012	0.013	7.674	7.165	8.350	0.050	0.047	0.059	2,123	2,020	2,216	35	31	37	99.35	2.19	98.37	1.79
11/23/24	0.013	0.013	7.680	7.197	8.198	0.049	0.047	0.056	2,105	2,007	2,172	35	31	38	99.36	2.19	98.35	1.78
11/24/24	0.013	0.013	7.685	7.233	8.212	0.046	0.044	0.051	2,037	1,966	2,120	34	32	37	99.41	2.23	98.31	1.77
11/25/24	0.013	0.013	7.740	6.732	8.592	0.046	0.043	0.053	2,019	1,900	2,165	34	31	38	99.41	2.23	98.32	1.78
11/26/24	0.013	0.013	7.946	7.502	8.740	0.052	0.049	0.056	2,080	1,961	2,181	35	31	38	99.35	2.18	98.34	1.78
11/27/24	0.013	0.013	8.048	7.574	8.596	0.054	0.049	0.063	2,120	2,006	2,205	35	32	38	99.33	2.17	98.34	1.78
11/28/24	0.013	0.013	7.801	7.325	8.448	0.050	0.047	0.058	2,108	2,002	2,299	35	32	40	99.36	2.19	98.35	1.78
11/29/24	0.013	0.013	7.337	6.804	8.005	0.045	0.042	0.051	2,051	1,901	2,301	34	31	40	99.39	2.21	98.32	1.77
11/30/24	0.013	0.013	7.309	6.829	7.838	0.043	0.041	0.047	2,222	2,103	2,361	36	34	40	99.41	2.23	98.36	1.78

Notes:

* GWRS offline for planned outage.

****** Short term TOC spike following plant restart after planned outage.

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Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
11/01/24	96.84	91.299	31,719.1	0.34	4	6
11/02/24	96.88	98.153	32,478.9	0.35	4	6
11/03/24	96.96	94.421	33,580.2	0.34	4	6
11/04/24	97.32	84.936	32,948.6	0.34	4	6
11/05/24	96.36	5.401	23,547.5	0.35	4	6
11/06/24	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
11/07/24	99.25	45.676	4,210.4	0.44	4	6
11/08/24	97.46	104.550	18,793.5	0.40	4	6
11/09/24	96.90	103.617	36,191.7	0.35	4	6
11/10/24	97.22	103.523	35,766.3	0.35	4	6
11/11/24	97.26	103.289	36,104.3	0.35	4	6
11/12/24	97.02	106.003	35,632.8	0.34	4	6
11/13/24	96.91	109.406	36,353.5	0.34	4	6
11/14/24	97.06	115.124	37,620.7	0.34	4	6
11/15/24	96.97	115.077	38,146.6	0.33	4	6
11/16/24	97.23	114.890	38,157.5	0.33	4	6
11/17/24	97.04	114.920	38,173.6	0.33	4	6
11/18/24	97.13	114.972	38,170.7	0.33	4	6
11/19/24	97.42	114.948	38,269.7	0.33	4	6
11/20/24	97.46	117.699	38,202.1	0.33	4	6
11/21/24	97.16	120.547	39,064.2	0.33	4	6
11/22/24	97.17	119.824	40,642.6	0.34	4	6
11/23/24	97.19	118.652	40,779.2	0.34	4	6
11/24/24	97.17	119.351	40,060.0	0.34	4	6
11/25/24	97.11	119.850	40,550.2	0.34	4	6
11/26/24	96.92	118.847	40,739.2	0.34	4	6
11/27/24	96.74	120.071	40,738.7	0.34	4	6
11/28/24	97.10	118.549	40,319.5	0.34	4	6
11/29/24	96.91	113.315	40,342.4	0.34	4	6
11/30/24	96.86	116.908	38,218.3	0.34	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

* GWRS offline for planned outage.

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
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	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
Date	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
12/01/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/02/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/03/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/04/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/05/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/06/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/07/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/08/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/09/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/10/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/11/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/12/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/13/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/14/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/15/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/16/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/17/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/18/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/19/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/20/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/21/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/22/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/23/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/24/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/25/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/26/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/27/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/28/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/29/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/30/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/31/24	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

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Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
12/01/24	0.00	4.07	2.24	6.00	0	12.31
12/02/24	0.00	4.05	2.23	6.00	0	12.28
12/03/24	0.00	4.04	2.19	6.00	0	12.23
12/04/24	0.00	4.02	2.19	6.00	0	12.21
12/05/24	0.00	4.01	2.15	6.00	0	12.17
12/06/24	0.00	4.00	2.15	6.00	0	12.15
12/07/24	0.00	4.08	2.18	6.00	0	12.26
12/08/24	0.00	4.03	2.23	6.00	0	12.25
12/09/24	0.00	4.00	2.25	6.00	0	12.25
12/10/24	0.00	4.01	2.19	6.00	0	12.20
12/11/24	0.00	4.02	2.16	6.00	0	12.18
12/12/24	0.00	4.02	2.17	6.00	0	12.19
12/13/24	0.00	4.03	2.18	6.00	0	12.21
12/14/24	0.00	4.05	2.18	6.00	0	12.23
12/15/24	0.00	4.04	2.21	6.00	0	12.25
12/16/24	0.00	4.02	2.21	6.00	0	12.23
12/17/24	0.00	4.03	2.15	6.00	0	12.18
12/18/24	0.00	4.02	2.16	6.00	0	12.18
12/19/24	0.00	4.02	2.18	6.00	0	12.20
12/20/24	0.00	4.01	2.14	6.00	0	12.15
12/21/24	0.00	4.04	2.17	6.00	0	12.21
12/22/24	0.00	4.01	2.20	6.00	0	12.21
12/23/24	0.00	4.00	2.20	6.00	0	12.20
12/24/24	0.00	4.01	2.19	6.00	0	12.20
12/25/24	0.00	4.01	2.19	6.00	0	12.20
12/26/24	0.00	4.07	2.21	6.00	0	12.28
12/27/24	0.00	4.05	2.18	6.00	0	12.22
12/28/24	0.00	4.03	2.27	6.00	0	12.30
12/29/24	0.00	4.05	2.33	6.00	0	12.38
12/30/24	0.00	4.08	2.35	6.00	0	12.44
12/31/24	0.00	4.05	2.33	6.00	0	12.38

Notes:

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	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
12/01/24	0.00	0.00	2.24	6.00	4	12.24
12/02/24	0.00	0.00	2.23	6.00	4	12.23
12/03/24	0.00	0.00	2.19	6.00	4	12.19
12/04/24	0.00	0.00	2.19	6.00	4	12.19
12/05/24	0.00	0.00	2.15	6.00	4	12.15
12/06/24	0.00	0.00	2.15	6.00	4	12.15
12/07/24	0.00	0.00	2.18	6.00	4	12.18
12/08/24	0.00	0.00	2.23	6.00	4	12.23
12/09/24	0.00	0.00	2.25	6.00	4	12.25
12/10/24	0.00	0.00	2.19	6.00	4	12.19
12/11/24	0.00	0.00	2.16	6.00	4	12.16
12/12/24	0.00	0.00	2.17	6.00	4	12.17
12/13/24	0.00	0.00	2.18	6.00	4	12.18
12/14/24	0.00	0.00	2.18	6.00	4	12.18
12/15/24	0.00	0.00	2.21	6.00	4	12.21
12/16/24	0.00	0.00	2.21	6.00	4	12.21
12/17/24	0.00	0.00	2.15	6.00	4	12.15
12/18/24	0.00	0.00	2.16	6.00	4	12.16
12/19/24	0.00	0.00	2.18	6.00	4	12.18
12/20/24	0.00	0.00	2.14	6.00	4	12.14
12/21/24	0.00	0.00	2.17	6.00	4	12.17
12/22/24	0.00	0.00	2.20	6.00	4	12.20
12/23/24	0.00	0.00	2.20	6.00	4	12.20
12/24/24	0.00	0.00	2.19	6.00	4	12.19
12/25/24	0.00	0.00	2.19	6.00	4	12.19
12/26/24	0.00	0.00	2.21	6.00	4	12.21
12/27/24	0.00	0.00	2.18	6.00	4	12.18
12/28/24	0.00	0.00	2.27	6.00	4	12.27
12/29/24	0.00	0.00	2.33	6.00	4	12.33
12/30/24	0.00	0.00	2.35	6.00	4	12.35
12/31/24	0.00	0.00	2.33	6.00	4	12.33

Notes:

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	MicroFiltration Process online monitoring results Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
12/01/24	4.55	4.68	4.48	4.75	4.52	4.60	4.64	4.52	4.69	4.66	4.42	4.82	4.59	4.56	4.58	4.29
12/02/24	4.55	4.66	4.50	4.73	4.56	4.65	4.67	4.52	4.64	5.08	4.36	4.76	4.85	4.56	4.58	4.56
12/03/24	4.56	4.60	4.42	4.70	4.46	4.58	4.62	4.50	4.67	5.17	4.35	4.75	4.89	4.54	4.56	4.55
12/04/24	4.53	4.61	4.42	4.74	4.45	4.47	4.62	4.48	4.60	5.18	4.33	4.72	4.84	4.52	4.55	4.49
12/05/24	4.47	4.59	4.43	4.73	4.44	4.47	4.62	4.48	4.74	5.21	4.32	4.74	4.83	4.52	4.55	4.49
12/06/24	4.44	4.50	4.36	4.66	4.37	4.47	4.60	4.49	4.74	5.09	4.30	4.72	4.83	4.51	4.56	4.47
12/07/24	4.47	4.51	4.32	4.70	4.57	4.39	4.55	4.43	4.72	5.05	4.28	4.70	4.86	4.48	4.52	4.46
12/08/24	4.79	4.47	4.24	4.66	4.74	4.45	4.54	4.40	4.69	4.98	4.26	4.66	4.79	4.46	4.51	4.47
12/09/24	4.75	4.44	4.26	4.63	4.71	4.43	4.54	4.41	4.65	5.00	4.28	4.67	4.79	4.44	4.50	4.45
12/10/24	4.69	4.47	4.26	4.61	4.73	4.40	4.50	4.39	4.66	4.96	4.26	4.64	4.79	4.41	4.46	4.43
12/11/24	4.72	4.46	4.25	4.56	4.74	4.36	4.47	4.37	4.62	4.89	4.22	4.63	4.77	4.37	4.43	4.40
12/12/24	4.71	4.34	4.15	4.94	4.65	4.32	4.44	4.33	4.58	4.78	4.17	4.60	4.75	4.33	4.68	4.40
12/13/24	4.66	4.75	4.10	4.85	4.66	4.24	4.40	4.38	4.54	4.87	4.14	4.60	4.69	4.30	4.74	4.38
12/14/24	4.68	4.74	4.57	4.84	4.64	4.25	4.39	4.40	4.53	4.81	4.12	4.55	4.66	4.28	4.70	4.36
12/15/24	4.68	4.67	4.58	4.93	4.61	4.76	4.38	4.38	4.53	4.75	4.11	4.52	4.69	4.29	4.68	4.33
12/16/24	4.67	4.68	4.54	4.86	4.48	4.76	4.39	4.34	4.52	4.75	4.10	4.52	4.69	4.29	4.65	4.33
12/17/24	4.65	4.68	4.53	4.87	4.61	4.70	4.37	4.32	4.48	4.68	4.09	4.48	4.68	4.26	4.68	4.30
12/18/24	4.59	4.60	4.51	4.82	4.54	4.64	4.33	4.29	4.39	4.63	4.04	4.41	4.58	4.24	4.67	4.27
12/19/24	4.56	4.65	4.45	4.80	4.51	4.57	4.65	4.30	4.42	4.59	4.02	4.43	4.54	4.20	4.66	4.25
12/20/24	4.52	4.68	4.43	4.79	4.50	4.56	4.66	4.28	4.40	4.56	4.01	4.40	4.52	4.18	4.63	4.21
12/21/24	4.50	4.63	4.46	4.78	4.48	4.53	4.63	4.53	4.36	4.43	4.29	4.40	4.50	4.15	4.60	4.18
12/22/24	4.56	4.64	4.43	4.72	4.44	4.51	4.61	4.61	4.33	4.50	4.37	4.34	4.53	4.44	4.60	4.16
12/23/24	4.51	4.58	4.39	4.68	4.45	4.46	4.61	4.65	4.35	4.52	4.30	4.32	4.51	4.54	4.62	4.14
12/24/24	4.52	4.60	4.43	4.69	4.44	4.49	4.62	4.59	4.38	4.52	4.30	4.32	4.48	4.52	4.63	4.13
12/25/24	4.51	4.61	4.39	4.67	4.42	4.50	4.57	4.57	4.76	4.50	4.30	4.29	4.45	4.51	4.62	4.08
12/26/24	4.46	4.57	4.31	4.64	4.43	4.43	4.57	4.60	4.82	4.50	4.24	4.65	4.43	4.52	4.57	4.08
12/27/24	4.41	4.49	4.30	4.67	4.38	4.40	4.47	4.57	4.79	4.43	4.24	4.69	4.38	4.43	4.55	4.05
12/28/24	4.37	4.51	4.27	4.64	4.35	4.32	4.51	4.54	4.67	5.07	4.25	4.71	4.63	4.42	4.54	4.03
12/29/24	4.36	4.46	4.26	4.57	4.34	4.32	4.43	4.51	4.72	5.09	4.18	4.63	4.60	4.45	4.50	4.26
12/30/24	4.36	4.45	4.24	4.53	4.68	4.37	4.45	4.51	4.70	5.06	4.15	4.64	4.49	4.43	4.47	4.42
12/31/24	4.36	4.44	4.17	4.56	4.82	4.37	4.44	4.48	4.67	5.04	4.13	4.66	4.37	4.39	4.45	4.43

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
12/01/24	4.07	5.05	5.17	5.16	4.29	4.18	4.46	4.19	4.66	N/A *	4.83	4.89	4.55	4.83	4.82	4.73
12/02/24	4.07	5.04	5.19	5.12	4.28	4.19	4.40	4.17	4.65	5.07	4.79	4.88	4.54	4.78	4.81	4.73
12/03/24	4.04	5.07	5.18	5.09	4.24	4.21	4.38	4.19	4.72	5.06	4.76	4.88	4.57	4.81	4.77	4.74
12/04/24	4.02	5.06	5.17	5.07	4.22	4.21	4.35	4.18	4.71	4.92	4.77	4.88	4.53	4.81	4.76	4.74
12/05/24	4.01	5.02	5.21	5.20	4.21	4.16	4.33	4.14	4.64	4.82	4.75	4.88	4.50	4.79	4.77	4.67
12/06/24	4.00	5.00	5.19	5.31	4.19	4.12	4.32	4.12	4.61	4.79	4.75	4.86	4.46	4.76	4.76	4.62
12/07/24	N/A **	5.04	5.11	5.27	4.16	4.09	4.28	4.10	4.85	4.77	4.75	4.81	4.44	4.74	4.74	4.64
12/08/24	N/A **	5.05	5.11	5.25	4.12	4.03	4.23	4.09	4.91	4.73	4.74	4.85	4.39	4.74	4.71	4.67
12/09/24	N/A **	5.01	5.09	5.30	4.11	4.00	4.21	4.11	4.87	4.71	4.72	4.80	4.33	4.70	4.73	4.66
12/10/24	N/A **	4.98	5.10	5.29	4.12	4.01	4.20	4.12	4.83	4.72	4.71	4.79	4.27	4.71	4.67	4.62
12/11/24	N/A **	4.97	5.04	5.25	4.52	4.03	4.15	4.35	4.84	4.70	4.68	4.78	4.29	4.70	4.66	4.57
12/12/24	4.69	4.96	4.99	5.26	4.50	4.02	4.13	4.43	4.81	4.64	4.63	4.73	4.25	4.66	4.65	4.46
12/13/24	5.12	4.98	5.02	5.21	4.45	4.03	4.16	4.41	4.79	4.56	4.61	4.73	4.27	4.64	4.64	4.39
12/14/24	5.10	4.96	5.06	5.20	4.41	4.07	4.15	4.41	4.79	4.59	4.60	4.72	4.23	4.63	4.62	4.39
12/15/24	5.07	4.92	5.03	5.18	4.39	4.24	4.09	4.37	4.77	4.58	4.58	4.68	4.25	4.64	4.58	4.40
12/16/24	5.08	4.90	5.04	5.16	4.38	4.22	4.08	4.33	4.76	4.53	4.56	4.68	4.63	4.63	4.61	4.48
12/17/24	5.05	4.91	5.03	5.17	4.45	4.16	4.06	4.31	4.73	4.50	4.42	4.68	4.63	4.62	4.61	4.69
12/18/24	5.04	4.91	4.97	5.18	4.40	4.11	4.02	4.30	4.72	4.49	4.45	4.66	4.63	4.58	4.56	4.79
12/19/24	5.09	5.07	4.95	5.18	4.33	4.08	4.15	4.24	4.70	4.42	4.74	4.60	4.62	4.57	4.55	4.78
12/20/24	5.09	5.16	5.08	5.14	4.30	4.08	4.40	4.16	4.65	4.41	4.86	4.59	4.60	4.52	4.52	4.77
12/21/24	5.08	5.13	5.13	5.09	4.27	4.04	4.38	4.15	4.66	4.44	4.83	4.60	4.57	4.49	4.48	4.72
12/22/24	5.06	5.12	5.18	5.11	4.26	4.01	4.44	4.18	4.67	4.48	4.83	4.69	4.56	4.50	4.45	4.75
12/23/24	5.06	5.11	5.20	5.07	4.26	4.00	4.40	4.17	4.65	4.47	4.82	4.96	4.54	4.43	4.42	4.72
12/24/24	5.06	5.08	5.19	5.05	4.24	4.01	4.39	4.12	4.62	4.45	4.82	4.90	4.54	4.42	4.41	4.70
12/25/24	5.06	5.11	5.15	5.06	4.20	4.01	4.38	4.09	4.61	4.41	4.80	4.87	4.51	4.67	4.37	4.72
12/26/24	5.08	5.13	5.14	5.04	4.18	4.07	4.37	4.07	4.59	4.38	4.75	4.89	4.47	4.84	4.35	4.70
12/27/24	5.08	5.07	5.12	5.02	4.16	4.20	4.31	4.08	4.52	4.79	4.70	4.91	4.42	4.75	4.75	4.66
12/28/24	5.04	5.04	5.11	4.98	4.15	4.13	4.26	4.08	4.51	4.87	4.71	4.85	4.31	4.73	4.77	4.66
12/29/24	5.03	5.04	5.10	4.94	4.42	4.12	4.19	4.29	4.35	4.81	4.66	4.83	4.35	4.74	4.74	4.61
12/30/24	5.04	5.05	5.10	4.98	4.52	4.12	4.22	4.43	4.38	4.77	4.67	4.84	4.39	4.74	4.74	4.60
12/31/24	5.03	5.05	5.10	4.99	4.49	4.11	4.21	4.41	4.43	4.74	4.68	4.79	4.37	4.74	4.75	4.62

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

** Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
12/01/24	4.08	4.36	5.12	4.30	4.49	4.46	4.15	4.31	4.35	4.52	4.52	4.36	4.32	4.20	4.42	4.52
12/02/24	4.05	4.17	5.10	4.37	4.52	4.48	4.10	4.33	4.30	4.53	4.53	4.38	4.42	4.26	4.43	4.52
12/03/24	4.06	4.24	5.16	4.27	4.51	4.46	4.04	4.27	4.26	4.52	4.53	4.58	4.28	4.29	4.44	4.53
12/04/24	4.08	4.30	5.08	4.27	4.48	4.43	4.18	4.24	4.31	4.65	4.58	4.39	4.14	4.19	4.70	4.51
12/05/24	4.10	4.20	5.08	4.40	4.49	4.46	4.12	4.24	4.27	4.58	4.59	4.32	4.23	4.18	4.74	4.49
12/06/24	4.06	4.14	5.04	4.42	4.45	4.41	4.10	4.21	4.34	4.57	4.51	4.43	4.18	4.19	4.74	4.53
12/07/24	4.10	4.19	4.97	4.52	4.40	4.35	4.13	4.18	4.35	4.84	4.45	4.33	4.08	4.14	4.74	4.45
12/08/24	4.18	4.15	5.05	4.31	4.45	4.43	4.09	4.29	4.25	4.58	4.43	4.27	4.11	4.16	4.49	4.41
12/09/24	4.05	4.11	5.05	4.31	4.43	4.37	4.07	4.31	4.22	4.51	4.48	4.28	4.11	4.16	4.44	4.43
12/10/24	4.04	4.15	5.08	4.37	4.40	4.34	4.05	4.35	4.23	4.52	4.58	4.24	4.06	4.06	4.42	4.45
12/11/24	4.06	4.23	5.06	4.24	4.41	4.41	4.02	4.31	4.20	4.46	4.54	4.21	4.12	4.11	4.37	4.58
12/12/24	4.12	4.29	4.99	4.19	4.44	4.28	4.03	4.18	4.27	4.42	4.48	4.28	4.06	4.14	4.33	4.45
12/13/24	4.34	4.06	4.96	4.23	4.52	4.41	4.05	4.23	4.22	4.52	4.52	4.24	4.05	4.05	4.46	4.42
12/14/24	4.05	4.15	5.01	4.26	4.42	4.51	4.12	4.23	4.23	4.52	4.42	4.22	4.10	4.12	4.42	4.47
12/15/24	4.04	4.17	4.93	4.27	4.33	4.43	4.25	4.14	4.32	4.42	4.41	4.27	4.09	4.14	4.36	4.45
12/16/24	4.11	4.16	4.94	4.33	4.59	4.30	4.06	4.26	4.24	4.46	4.49	4.28	4.23	4.02	4.43	4.37
12/17/24	4.09	4.11	5.08	4.26	4.45	4.35	4.03	4.22	4.15	4.50	4.44	4.31	4.14	4.10	4.30	4.39
12/18/24	4.06	4.12	4.96	4.39	4.37	4.41	4.05	4.20	4.18	4.62	4.40	4.23	4.13	4.12	4.28	4.35
12/19/24	4.13	4.13	4.96	4.25	4.37	4.59	4.02	4.25	4.19	4.60	4.47	4.20	4.41	4.03	4.36	4.31
12/20/24	4.08	4.33	4.98	4.31	4.33	4.30	4.05	4.31	4.18	4.51	4.42	4.28	4.16	4.13	4.29	4.40
12/21/24	4.07	4.14	5.03	4.53	4.41	4.36	4.05	4.40	4.24	4.59	4.43	4.24	4.09	4.13	4.26	4.41
12/22/24	4.13	4.13	5.17	4.29	4.56	4.44	4.14	4.34	4.19	4.55	4.51	4.27	4.29	4.21	4.42	4.52
12/23/24	4.11	4.15	5.08	4.28	4.54	4.45	4.13	4.28	4.15	4.52	4.49	4.37	4.20	4.26	4.40	4.49
12/24/24	4.23	4.06	5.05	4.34	4.48	4.43	4.19	4.39	4.25	4.59	4.54	4.36	4.21	4.14	4.61	4.46
12/25/24	4.05	4.11	5.10	4.33	4.49	4.45	4.14	4.33	4.31	4.58	4.50	4.41	4.29	4.23	4.46	4.52
12/26/24	4.09	4.15	5.06	4.30	4.45	4.49	4.10	4.33	4.34	4.59	4.50	4.33	4.22	4.26	4.44	4.46
12/27/24	4.13	4.12	5.11	4.38	4.53	4.62	4.07	4.41	4.29	4.64	4.50	4.24	4.11	4.18	4.63	4.42
12/28/24	4.03	4.25	5.18	4.35	4.44	4.43	4.11	4.36	4.31	4.54	4.50	4.43	4.24	4.23	4.50	4.54
12/29/24	4.10	4.13	5.04	4.42	4.48	4.43	4.05	4.34	4.35	4.53	4.48	4.37	4.15	4.22	4.45	4.48
12/30/24	4.16	4.15	4.97	4.35	4.52	4.52	4.08	4.29	4.28	4.57	4.51	4.34	4.16	4.11	4.50	4.53
12/31/24	4.11	4.19	5.05	4.35	4.49	4.39	4.05	4.22	4.24	4.56	4.45	4.43	4.27	4.13	4.39	4.53

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
12/01/24	0.024	0.060	0.031	0.098	0.030	0.042	0.030	0.068	0.039	0.043	0.051	0.061	0.025	0.028	0.039	0.059	0.028	0.032	0.041	0.045	0.032	0.034	0.018	0.021	0.032
12/02/24	0.024	0.053	0.031	0.074	0.030	0.055	0.031	0.038	0.039	0.057	0.057	0.106	0.025	0.033	0.038	0.048	0.029	0.034	0.042	0.043	0.035	0.039	0.018	0.020	0.033
12/03/24	0.024	0.042	0.031	0.095	0.029	0.049	0.031	0.032	0.040	0.044	0.065	0.081	0.026	0.040	0.038	0.061	0.029	0.032	0.044	0.047	0.038	0.040	0.018	0.019	0.034
12/04/24	0.023	0.029	0.029	0.039	0.028	0.030	0.030	0.032	0.039	0.053	0.054	0.080	0.025	0.030	0.037	0.040	0.029	0.032	0.040	0.052	0.036	0.042	0.018	0.030	0.032
12/05/24	0.024	0.053	0.029	0.033	0.029	0.030	0.029	0.031	0.039	0.044	0.038	0.040	0.024	0.028	0.036	0.037	0.029	0.031	0.032	0.034	0.033	0.037	0.017	0.019	0.030
12/06/24	0.023	0.026	0.029	0.095	0.029	0.031	0.030	0.039	0.039	0.052	0.038	0.092	0.024	0.031	0.036	0.037	0.029	0.032	0.032	0.034	0.033	0.034	0.017	0.019	0.030
12/07/24	0.023	0.026	0.029	0.032	0.029	0.053	0.030	0.037	0.039	0.040	0.037	0.040	0.025	0.031	0.036	0.057	0.030	0.032	0.033	0.037	0.033	0.036	0.017	0.019	0.030
12/08/24	0.024	0.028	0.030	0.061	0.029	0.049	0.031	0.111	0.039	0.040	0.038	0.069	0.024	0.030	0.036	0.078	0.030	0.034	0.033	0.035	0.033	0.035	0.017	0.020	0.030
12/09/24	0.023	0.026	0.029	0.048	0.030	0.098	0.029	0.032	0.043	0.046	0.042	0.169	0.025	0.030	0.032	0.040	0.030	0.033	0.030	0.040	0.026	0.034	0.018	0.030	0.030
12/10/24	0.025	0.108	0.029	0.033	0.031	0.092	0.029	0.036	0.047	0.109	0.043	0.064	0.025	0.027	0.029	0.040	0.032	0.034	0.027	0.030	0.022	0.023	0.017	0.021	0.030
12/11/24	0.025	0.075	0.030	0.034	0.030	0.034	0.032	0.161	0.046	0.047	0.044	0.048	0.026	0.037	0.030	0.033	0.033	0.035	0.027	0.030	0.022	0.026	0.018	0.018	0.030
12/12/24	0.026	0.128	0.029	0.039	0.030	0.035	0.031	0.057	0.048	0.069	0.043	0.062	0.026	0.048	0.030	0.032	0.034	0.037	0.028	0.034	0.022	0.024	0.018	0.020	0.030
12/13/24	0.025	0.028	0.029	0.033	0.030	0.041	0.030	0.033	0.048	0.056	0.043	0.045	0.025	0.065	0.030	0.048	0.036	0.044	0.028	0.031	0.022	0.023	0.018	0.020	0.030
12/14/24	0.025	0.028	0.029	0.032	0.030	0.033	0.029	0.033	0.046	0.051	0.043	0.084	0.025	0.027	0.029	0.031	0.039	0.041	0.028	0.033	0.022	0.024	0.018	0.019	0.030
12/15/24	0.025	0.029	0.029	0.032	0.030	0.045	0.029	0.043	0.046	0.048	0.043	0.048	0.025	0.030	0.030	0.123	0.042	0.045	0.028	0.034	0.022	0.024	0.018	0.021	0.031
12/16/24	0.025	0.047	0.029	0.032	0.030	0.034	0.029	0.038	0.046	0.048	0.043	0.044	0.025	0.038	0.030	0.033	0.045	0.053	0.029	0.032	0.023	0.025	0.019	0.020	0.031
12/17/24	0.025	0.031	0.030	0.049	0.031	0.062	0.031	0.130	0.045	0.049	0.043	0.047	0.026	0.027	0.029	0.031	0.049	0.053	0.029	0.032	0.024	0.026	0.019	0.024	0.032
12/18/24	0.025	0.057	0.029	0.052	0.029	0.034	0.032	0.035	0.043	0.078	0.038	0.045	0.025	0.034	0.029	0.032	0.040	0.053	0.029	0.040	0.024	0.030	0.019	0.021	0.030
12/19/24	0.025	0.028	0.030	0.087	0.030	0.070	0.034	0.064	0.042	0.050	0.037	0.043	0.026	0.028	0.030	0.032	0.035	0.040	0.030	0.035	0.025	0.026	0.019	0.021	0.030
12/20/24	0.024	0.028	0.029	0.034	0.030	0.079	0.034	0.125	0.042	0.076	0.036	0.038	0.026	0.096	0.029	0.031	0.035	0.037	0.030	0.032	0.026	0.030	0.021	0.023	0.030
12/21/24	0.024	0.030	0.029	0.032	0.030	0.042	0.034	0.044	0.041	0.045	0.035	0.041	0.025	0.068	0.029	0.031	0.037	0.043	0.030	0.031	0.028	0.033	0.022	0.024	0.030
12/22/24	0.024	0.029	0.029	0.032	0.030	0.033	0.034	0.041	0.040	0.044	0.036	0.099	0.026	0.092	0.029	0.052	0.040	0.043	0.032	0.033	0.030	0.032	0.025	0.027	0.031
12/23/24	0.025	0.039	0.029	0.032	0.029	0.037	0.033	0.039	0.041	0.046	0.036	0.089	0.025	0.027	0.029	0.031	0.045	0.051	0.034	0.037	0.032	0.036	0.028	0.031	0.032
12/24/24	0.025	0.050	0.029	0.034	0.031	0.093	0.035	0.068	0.041	0.043	0.036	0.061	0.026	0.044	0.029	0.033	0.051	0.055	0.038	0.041	0.035	0.038	0.032	0.034	0.034
12/25/24	0.024	0.056	0.029	0.033	0.030	0.033	0.034	0.050	0.040	0.046	0.035	0.045	0.025	0.030	0.030	0.056	0.057	0.062	0.040	0.042	0.038	0.040	0.035	0.038	0.035
12/26/24	0.024	0.027	0.030	0.108	0.030	0.061	0.034	0.043	0.041	0.049	0.037	0.074	0.026	0.038	0.030	0.034	0.064	0.069	0.045	0.052	0.042	0.045	0.040	0.045	0.037
12/27/24	0.025	0.050	0.029	0.033	0.030	0.035	0.034	0.053	0.041	0.044	0.037	0.061	0.026	0.039	0.030	0.034	0.072	0.077	0.051	0.054	0.047	0.051	0.046	0.047	0.039
12/28/24	0.025	0.085	0.030	0.086	0.031	0.057	0.035	0.039	0.041	0.045	0.038	0.054	0.026	0.030	0.031	0.049	0.080	0.085	0.057	0.060	0.053	0.057	0.051	0.054	0.041
12/29/24	0.025	0.116	0.030	0.038	0.031	0.033	0.035	0.049	0.041	0.046	0.039	0.064	0.026	0.046	0.031	0.034	0.090	0.098	0.064	0.068	0.059	0.061	0.057	0.060	0.044
12/30/24	0.025	0.098	0.030	0.032	0.031	0.033	0.034	0.041	0.041	0.078	0.041	0.046	0.026	0.031	0.030	0.032	0.098	0.103	0.071	0.075	0.064	0.070	0.062	0.065	0.046
12/31/24	0.024	0.045	0.030	0.066	0.030	0.034	0.031	0.040	0.038	0.048	0.037	0.042	0.028	0.036	0.029	0.036	0.108	0.113	0.079	0.087	0.072	0.077	0.068	0.072	0.048

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
12/01/24	0.013	0.013	7.390	6.938	7.923	0.043	0.039	0.048	2,168	2,046	2,260	35	32	39	99.42	2.24	98.39	1.79
12/02/24	0.013	0.013	7.476	7.114	8.008	0.044	0.027	0.049	2,155	1,973	2,332	34	31	39	99.41	2.23	98.40	1.80
12/03/24	0.013	0.013	7.496	7.090	8.183	0.048	0.047	0.051	2,245	2,134	2,384	36	33	39	99.35	2.19	98.40	1.80
12/04/24	0.013	0.013	7.336	6.985	7.836	0.047	0.047	0.047	2,242	2,108	2,328	36	33	40	99.36	2.19	98.38	1.79
12/05/24	0.013	0.013	6.934	6.283	7.849	0.049	0.042	0.058	2,208	2,079	2,366	36	32	40	99.30	2.15	98.37	1.79
12/06/24	0.013	0.014	7.123	6.296	7.818	0.050	0.043	0.072	2,253	2,122	2,387	35	32	38	99.29	2.15	98.44	1.81
12/07/24	0.014	0.014	7.505	6.936	8.168	0.050	0.037	0.071	2,248	2,148	2,318	34	31	38	99.34	2.18	98.49	1.82
12/08/24	0.014	0.014	7.503	7.054	8.237	0.044	0.041	0.051	2,167	2,073	2,289	33	30	37	99.41	2.23	98.48	1.82
12/09/24	0.014	0.014	7.534	7.096	8.002	0.043	0.041	0.046	2,139	1,726	2,319	32	25	36	99.43	2.25	98.50	1.82
12/10/24	0.014	0.014	6.905	6.442	8.162	0.045	0.042	0.048	2,250	2,119	2,365	33	30	36	99.35	2.19	98.53	1.83
12/11/24	0.014	0.014	6.831	6.580	7.146	0.047	0.046	0.050	2,272	2,105	2,450	34	30	38	99.31	2.16	98.52	1.83
12/12/24	0.014	0.014	6.796	6.509	7.253	0.046	0.043	0.053	2,244	2,118	2,380	33	29	36	99.32	2.17	98.53	1.83
12/13/24	0.014	0.014	6.710	6.440	7.265	0.044	0.041	0.051	2,226	2,119	2,395	33	30	38	99.34	2.18	98.51	1.83
12/14/24	0.014	0.014	6.576	6.259	7.078	0.043	0.042	0.046	2,275	2,151	2,395	34	31	38	99.34	2.18	98.49	1.82
12/15/24	0.014	0.014	6.705	6.381	7.187	0.041	0.038	0.047	2,156	2,055	2,292	33	30	36	99.39	2.21	98.48	1.82
12/16/24	0.014	0.014	6.745	6.509	7.152	0.042	0.038	0.048	2,158	2,036	2,382	33	29	37	99.38	2.21	98.49	1.82
12/17/24	0.014	0.014	6.619	6.376	7.127	0.046	0.043	0.051	2,386	2,236	2,532	35	32	40	99.30	2.15	98.52	1.83
12/18/24	0.014	0.014	6.528	6.241	6.948	0.045	0.043	0.049	2,371	2,240	2,492	35	32	39	99.30	2.16	98.51	1.83
12/19/24	0.014	0.014	7.451	6.492	8.716	0.049	0.046	0.056	2,144	1,712	2,420	33	25	38	99.34	2.18	98.48	1.82
12/20/24	0.014	0.014	7.088	6.456	8.102	0.051	0.049	0.058	2,281	2,151	2,423	35	30	38	99.28	2.14	98.47	1.82
12/21/24	0.014	0.014	6.835	6.469	7.283	0.046	0.044	0.051	2,240	2,151	2,360	34	32	38	99.32	2.17	98.47	1.82
12/22/24	0.014	0.014	6.800	6.483	7.302	0.043	0.041	0.046	2,150	2,034	2,333	33	30	37	99.37	2.20	98.47	1.82
12/23/24	0.014	0.014	6.789	6.434	7.377	0.043	0.038	0.047	2,219	2,085	2,353	34	31	38	99.37	2.20	98.46	1.81
12/24/24	0.014	0.014	6.849	6.468	7.414	0.044	0.041	0.048	2,198	2,109	2,299	34	32	38	99.35	2.19	98.46	1.81
12/25/24	0.014	0.014	6.546	6.193	7.001	0.042	0.038	0.048	2,115	1,989	2,284	33	29	37	99.36	2.19	98.46	1.81
12/26/24	0.014	0.014	6.633	6.207	7.452	0.041	0.036	0.050	2,217	2,091	2,378	35	32	38	99.38	2.21	98.43	1.80
12/27/24	0.014	0.014	7.143	6.746	7.655	0.048	0.044	0.054	2,195	2,078	2,304	33	31	36	99.33	2.18	98.48	1.82
12/28/24	0.014	0.014	7.729	6.837	8.667	0.042	0.028	0.057	2,209	2,119	2,277	34	31	37	99.46	2.27	98.47	1.82
12/29/24	0.014	0.014	7.237	6.620	8.754	0.034	0.030	0.042	2,179	2,057	2,357	33	31	38	99.53	2.33	98.47	1.82
12/30/24	0.014	0.014	7.314	6.580	8.383	0.032	0.026	0.043	2,261	2,161	2,384	34	32	37	99.56	2.35	98.49	1.82
12/31/24	0.014	0.014	7.224	6.667	8.471	0.034	0.026	0.042	2,246	2,136	2,335	35	32	38	99.53	2.33	98.44	1.81

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
12/01/24	96.93	117.034	39,198.0	0.34	4	6
12/02/24	96.97	117.973	39,806.7	0.34	4	6
12/03/24	97.14	119.961	40,277.5	0.34	4	6
12/04/24	97.13	116.827	40,468.6	0.34	4	6
12/05/24	96.83	119.681	39,974.2	0.34	4	6
12/06/24	96.88	119.389	40,582.3	0.34	4	6
12/07/24	97.24	118.158	39,911.2	0.34	4	6
12/08/24	97.31	119.787	39,870.0	0.34	4	6
12/09/24	97.21	119.966	40,643.3	0.34	4	6
12/10/24	96.96	120.018	40,745.5	0.34	4	6
12/11/24	96.92	120.028	40,748.4	0.34	4	6
12/12/24	96.91	119.250	40,453.4	0.34	4	6
12/13/24	96.98	119.992	40,595.5	0.34	4	6
12/14/24	97.11	120.053	40,726.5	0.34	4	6
12/15/24	97.02	119.943	40,725.3	0.34	4	6
12/16/24	97.04	119.886	40,717.8	0.34	4	6
12/17/24	97.08	120.010	39,954.2	0.33	4	6
12/18/24	97.13	119.879	40,490.2	0.34	4	6
12/19/24	97.02	116.123	40,598.4	0.34	4	6
12/20/24	97.04	119.943	39,873.0	0.34	4	6
12/21/24	97.26	116.041	40,092.4	0.34	4	6
12/22/24	97.20	118.471	39,144.3	0.34	4	6
12/23/24	97.18	117.144	39,720.0	0.34	4	6
12/24/24	97.22	114.802	38,595.4	0.33	4	6
12/25/24	97.11	114.205	38,090.6	0.33	4	6
12/26/24	97.00	113.213	38,052.2	0.33	4	6
12/27/24	97.01	114.955	38,084.7	0.34	4	6
12/28/24	97.10	114.812	38,078.4	0.33	4	6
12/29/24	97.33	114.562	38,132.3	0.33	4	6
12/30/24	97.31	114.931	38,081.8	0.33	4	6
12/31/24	97.33	110.876	38,134.0	0.33	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

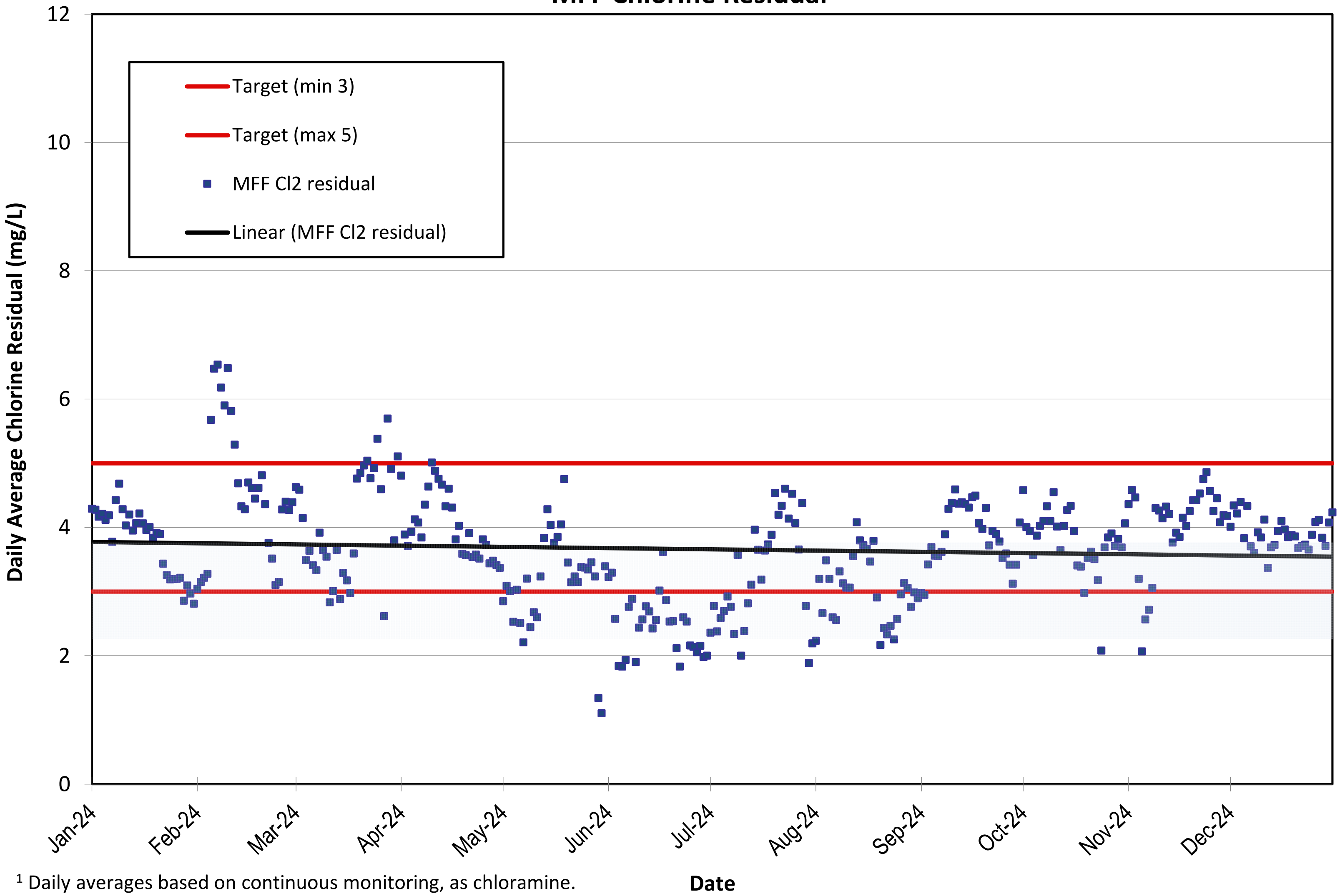
minimum EED = 0.31 kwh/kgal

Appendix E

Critical Control Points

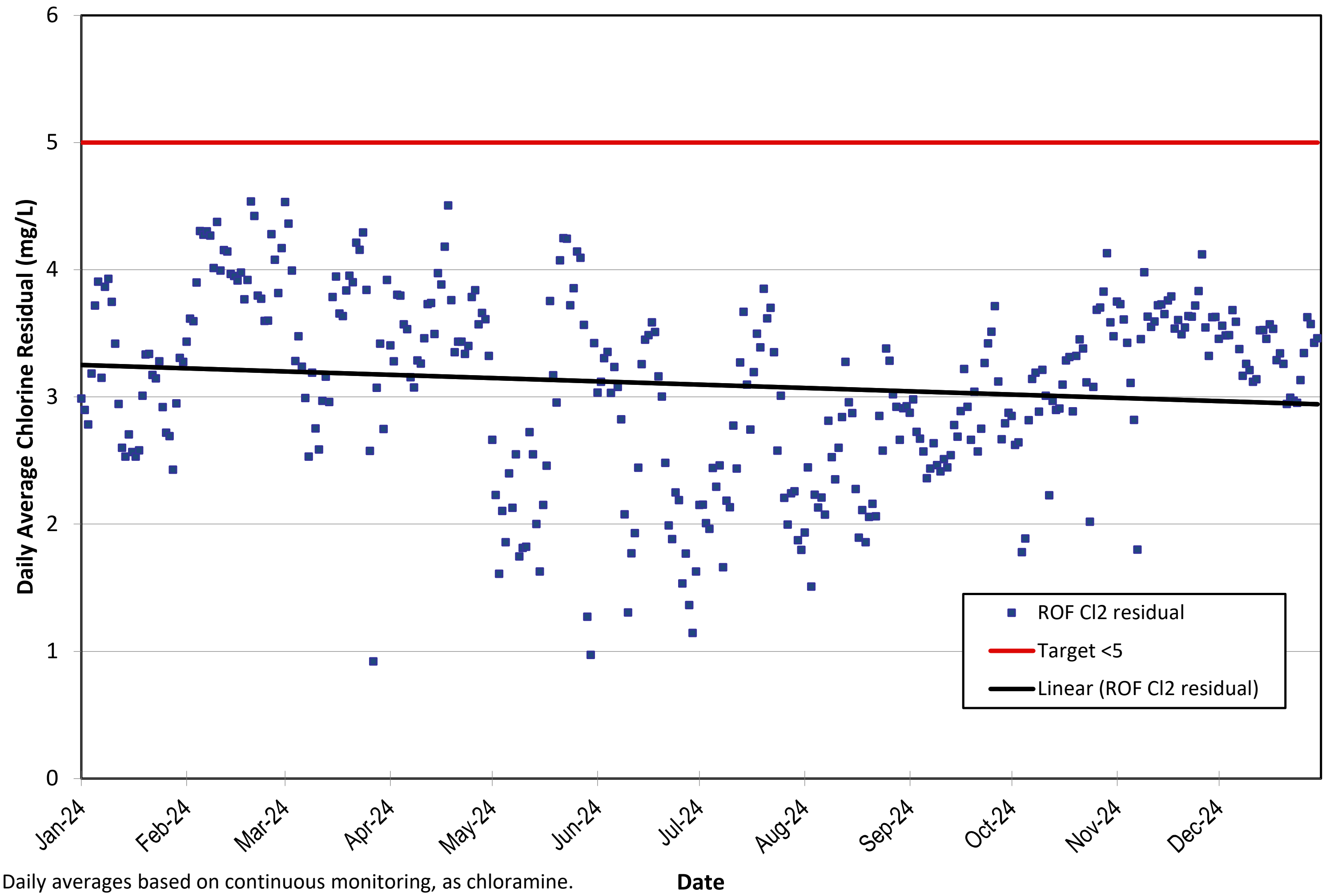
Orange County Water District
Groundwater Replenishment System
2024 Annual Report

Figure E-1
MFF Chlorine Residual[1]



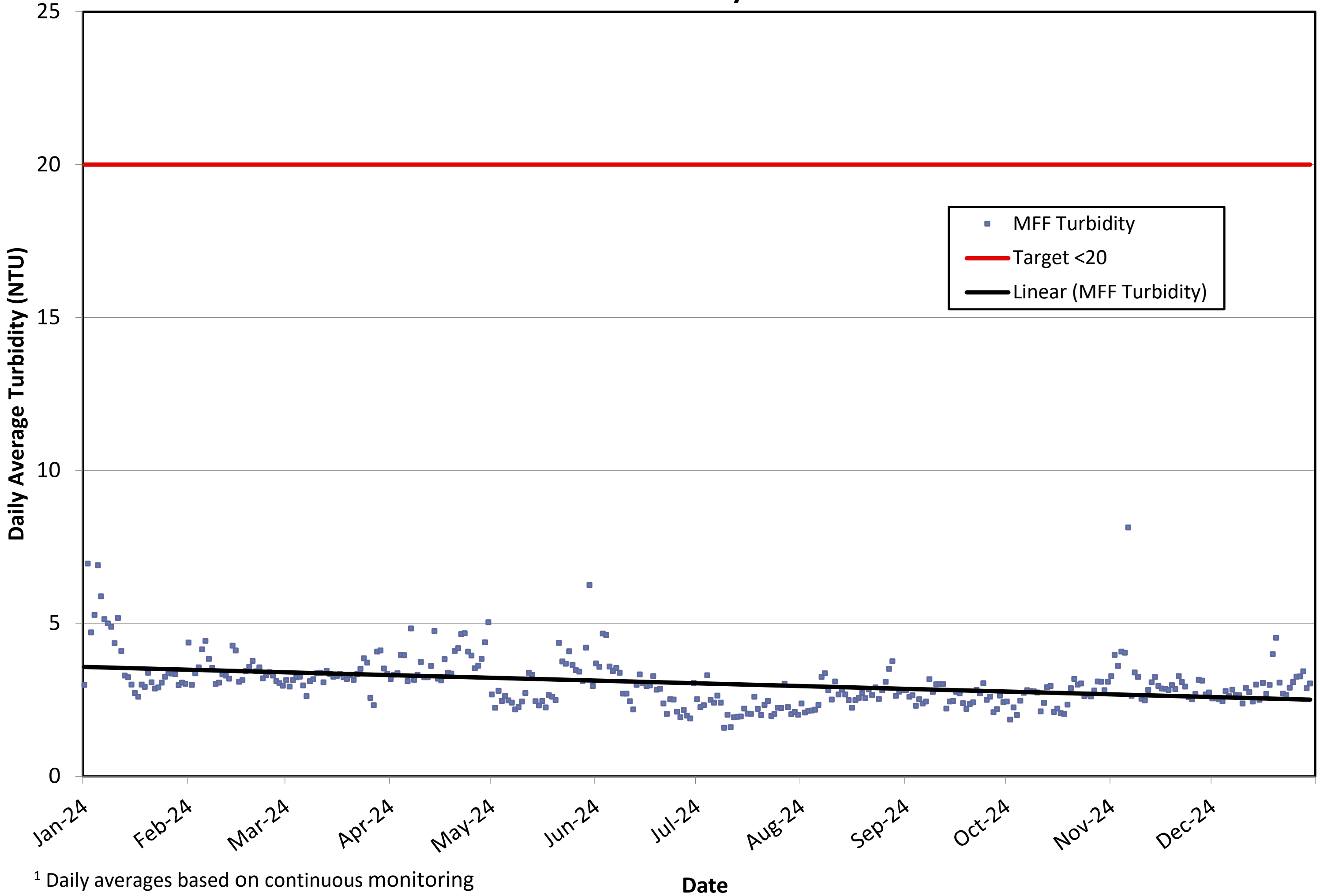
[1] Daily averages based on continuous monitoring, as chloramine.

Figure E-2
ROF Chlorine Residual[1]



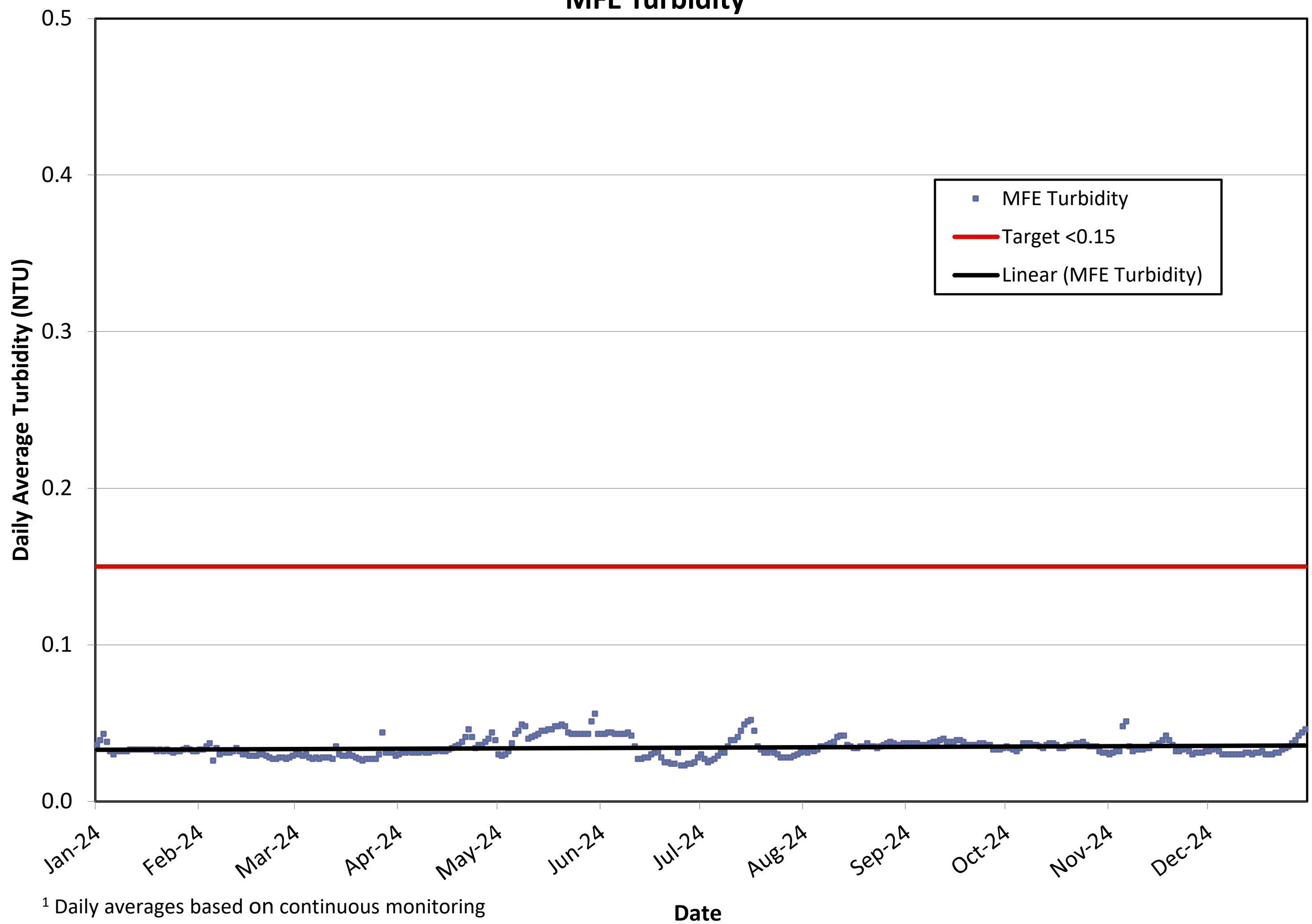
[1] Daily averages based on continuous monitoring, as chloramine.

Figure E-3
MFF Turbidity[1]



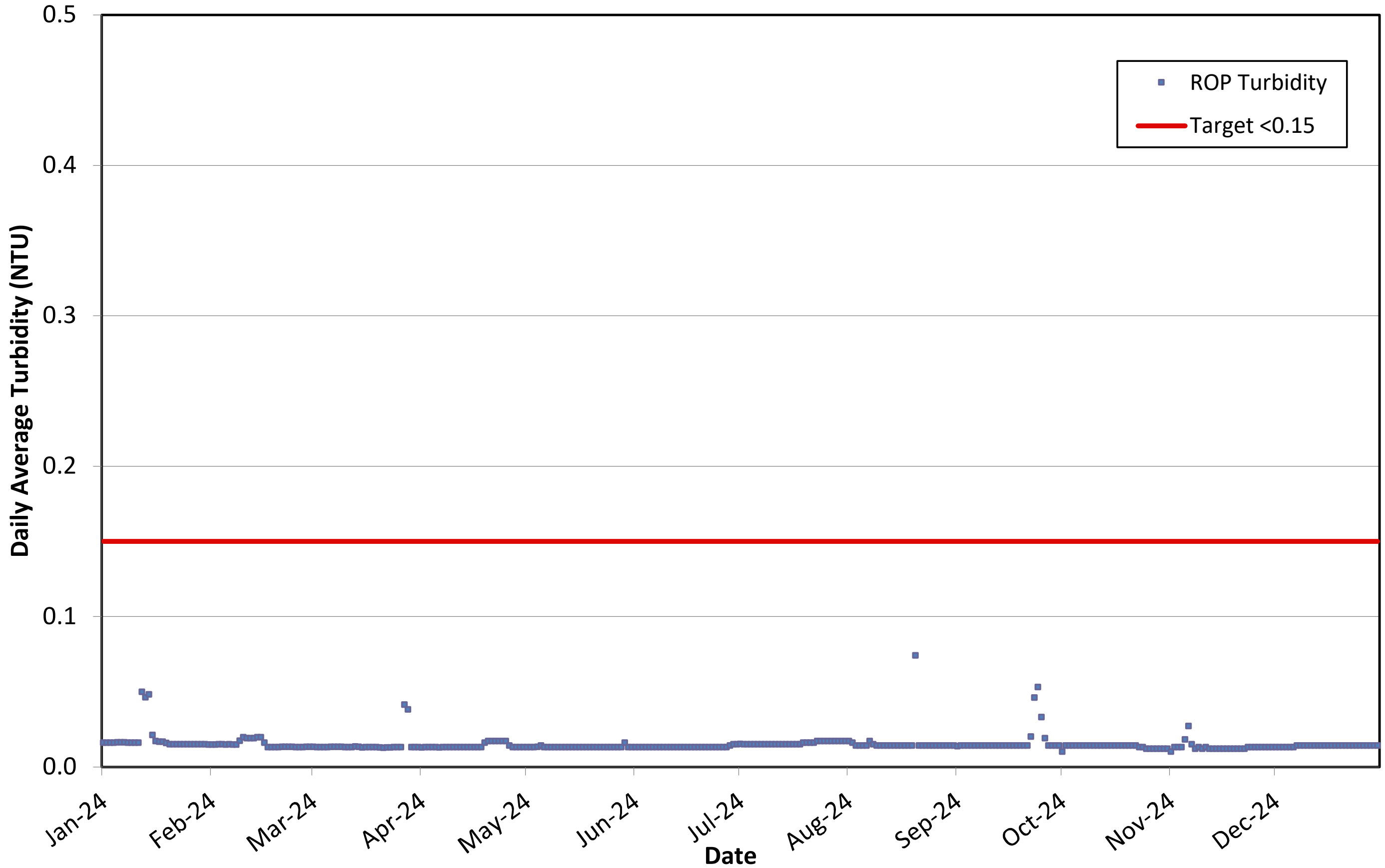
[1] Daily averages based on continuous monitoring

Figure E-4
MFE Turbidity[1]



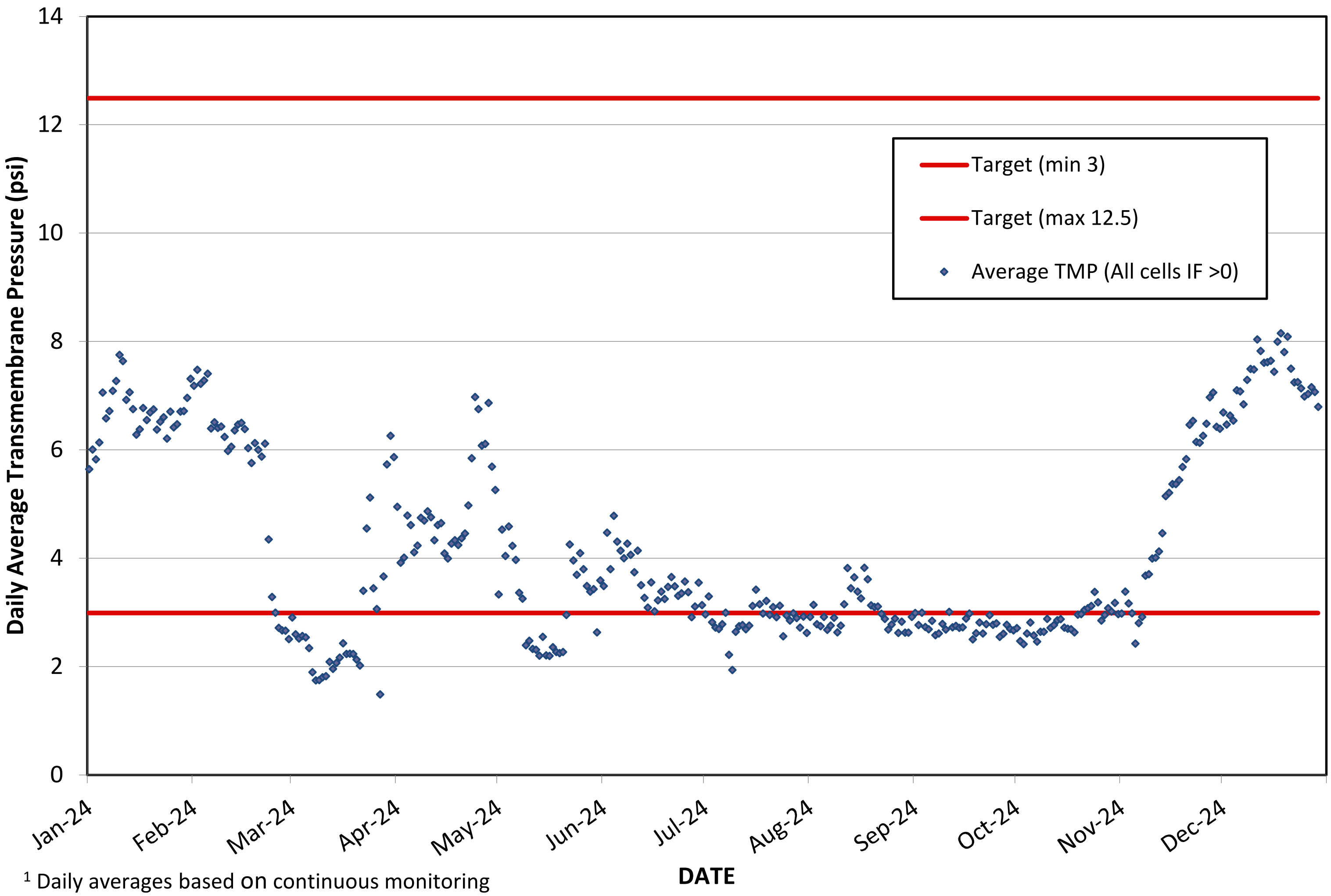
[1] Daily averages based on continuous monitoring

Figure E-5
ROP Turbidity[1]



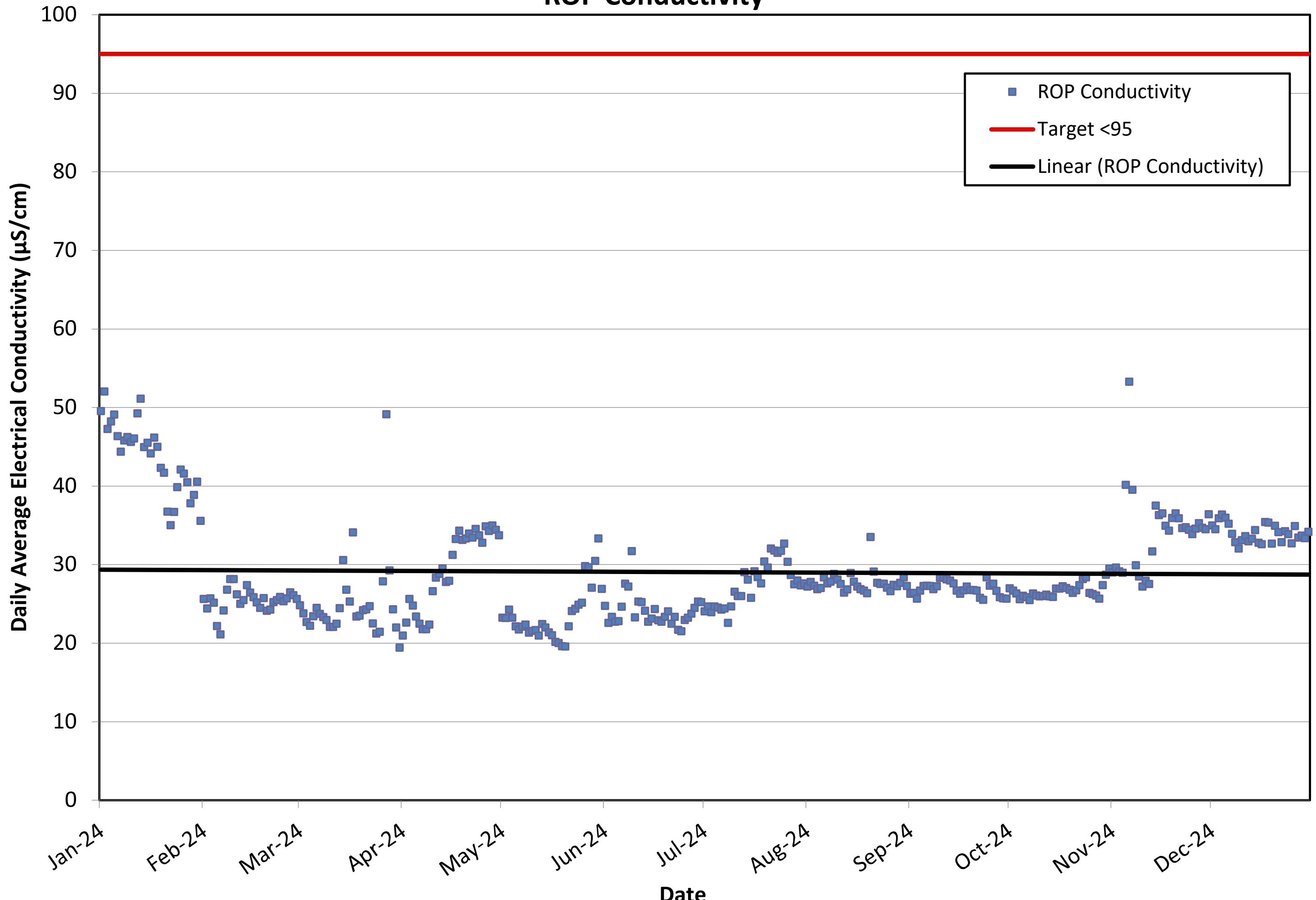
[1] Turbidity shown for UVF, which is effectively ROP downstream of hydrogen peroxide addition.
Daily averages based on continuous monitoring

Figure E-6
MF Transmembrane Pressure (TMP)[1]
Average of All Operational Cells with TMP > 0



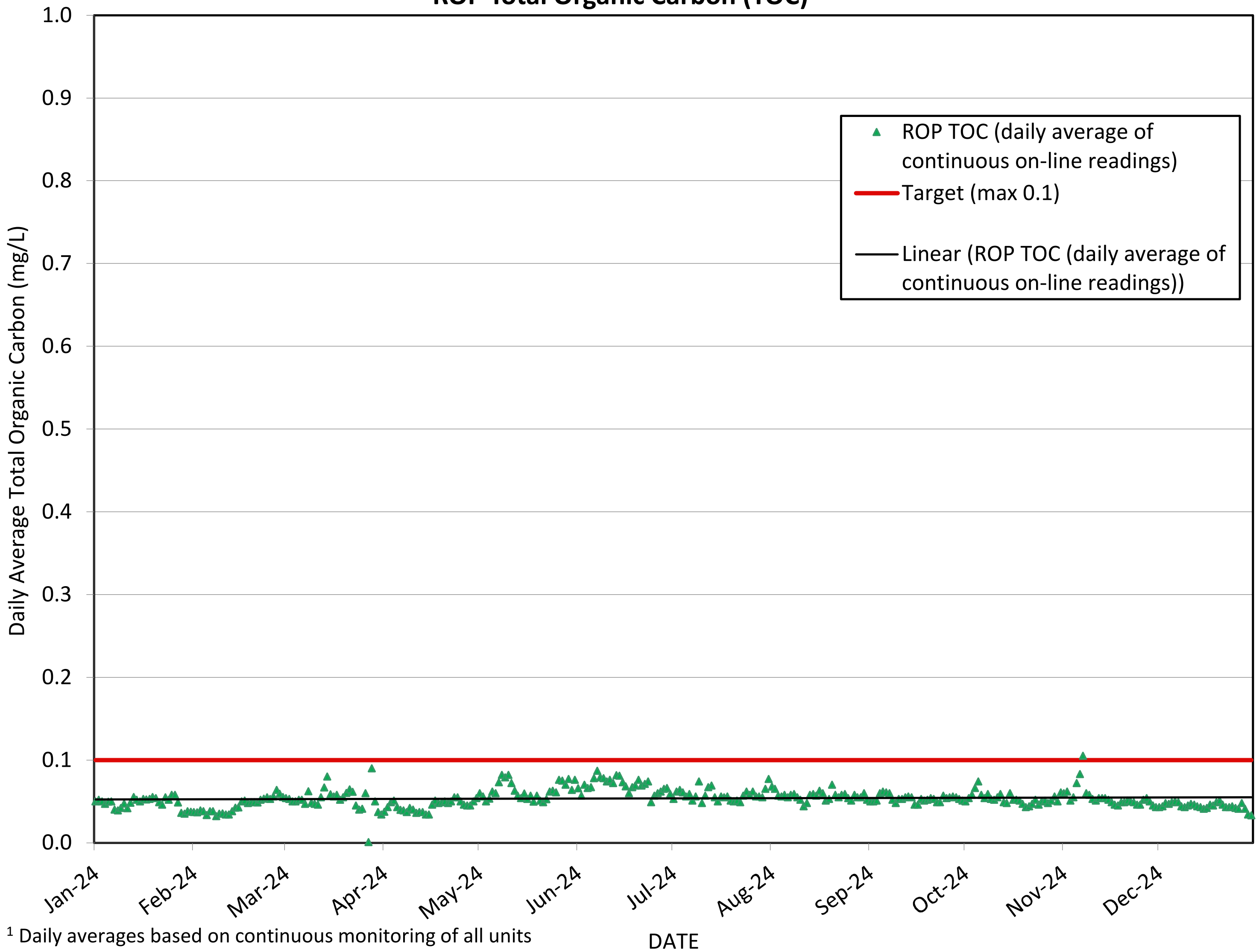
[1] Daily averages based on continuous monitoring

Figure E-7
ROP Conductivity[1]



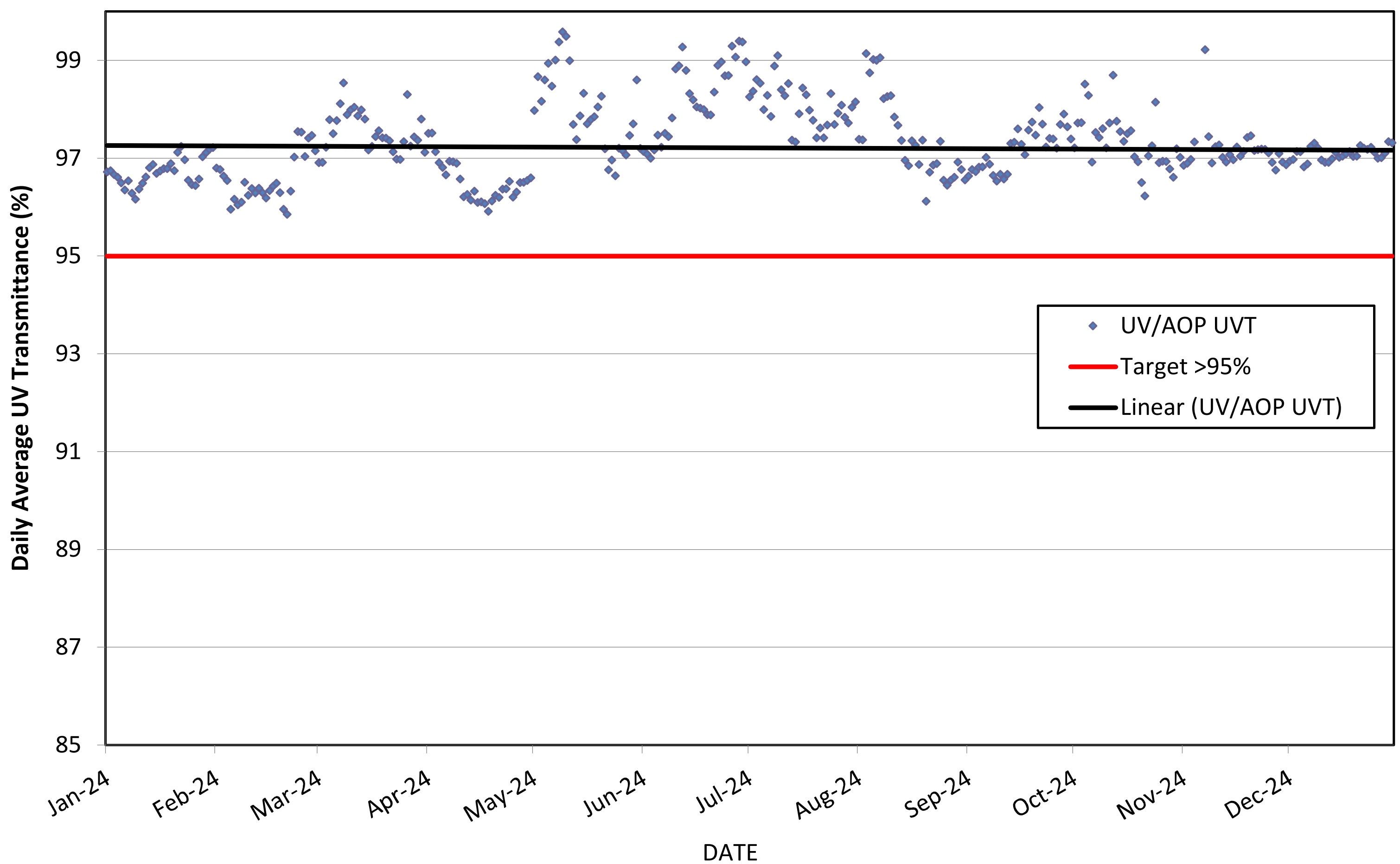
[1] Daily averages based on continuous monitoring of all units.
Electrical conductivity data for ROP are not normalized

Figure E-8
ROP Total Organic Carbon (TOC)[1]



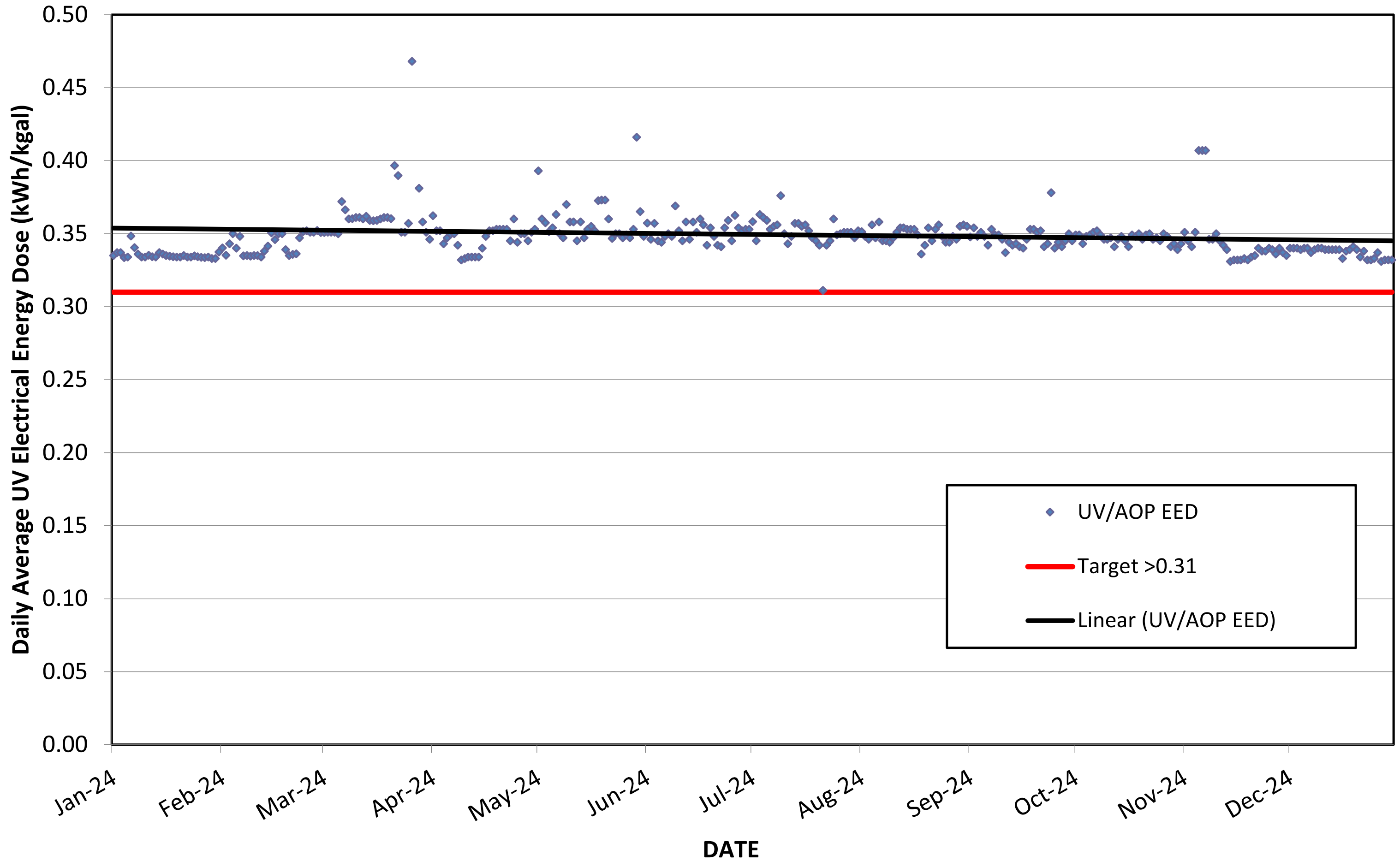
[1] Daily averages based on continuous monitoring of all units

Figure E-9
UV/AOP UV Transmittance [1]



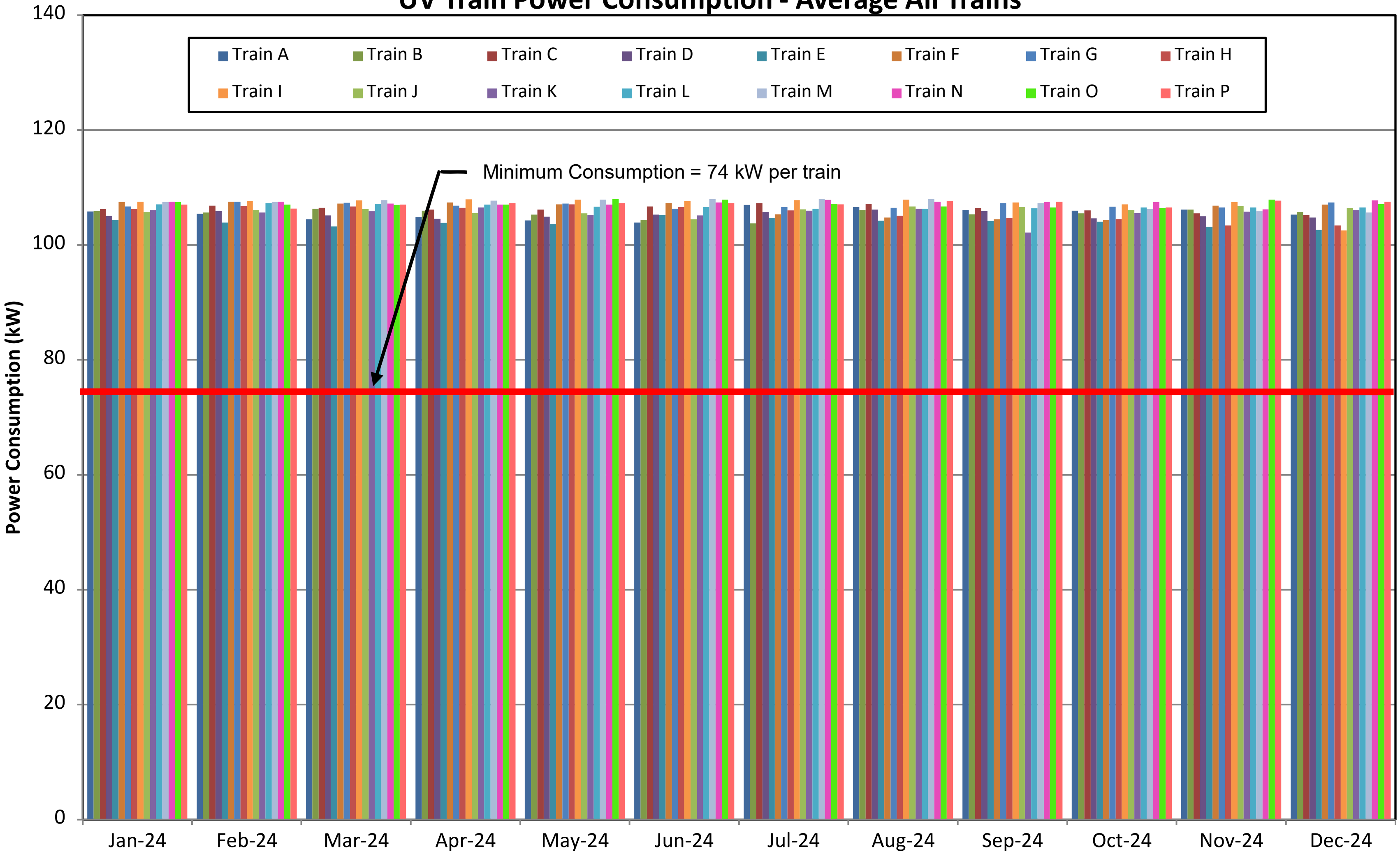
[1] UV Transmittance shown for UVF, which is effectively ROP downstream of hydrogen peroxide addition.
Daily averages based on continuous monitoring

Figure E-10
UV/AOP Electrical Energy Dose (EED)[1]



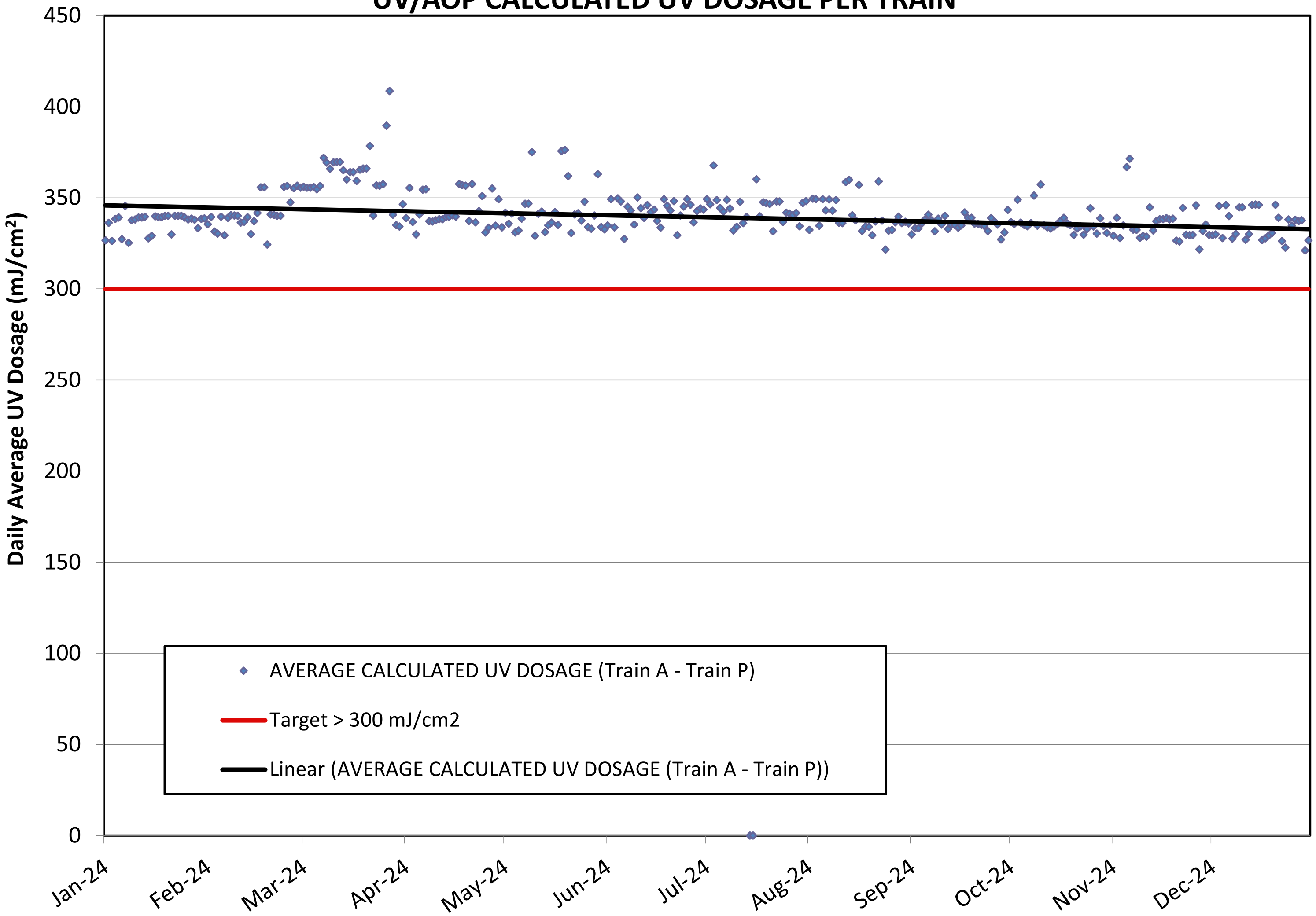
[1] Daily averages based on continuous monitoring of all units

Figure E-11
UV Train Power Consumption - Average All Trains



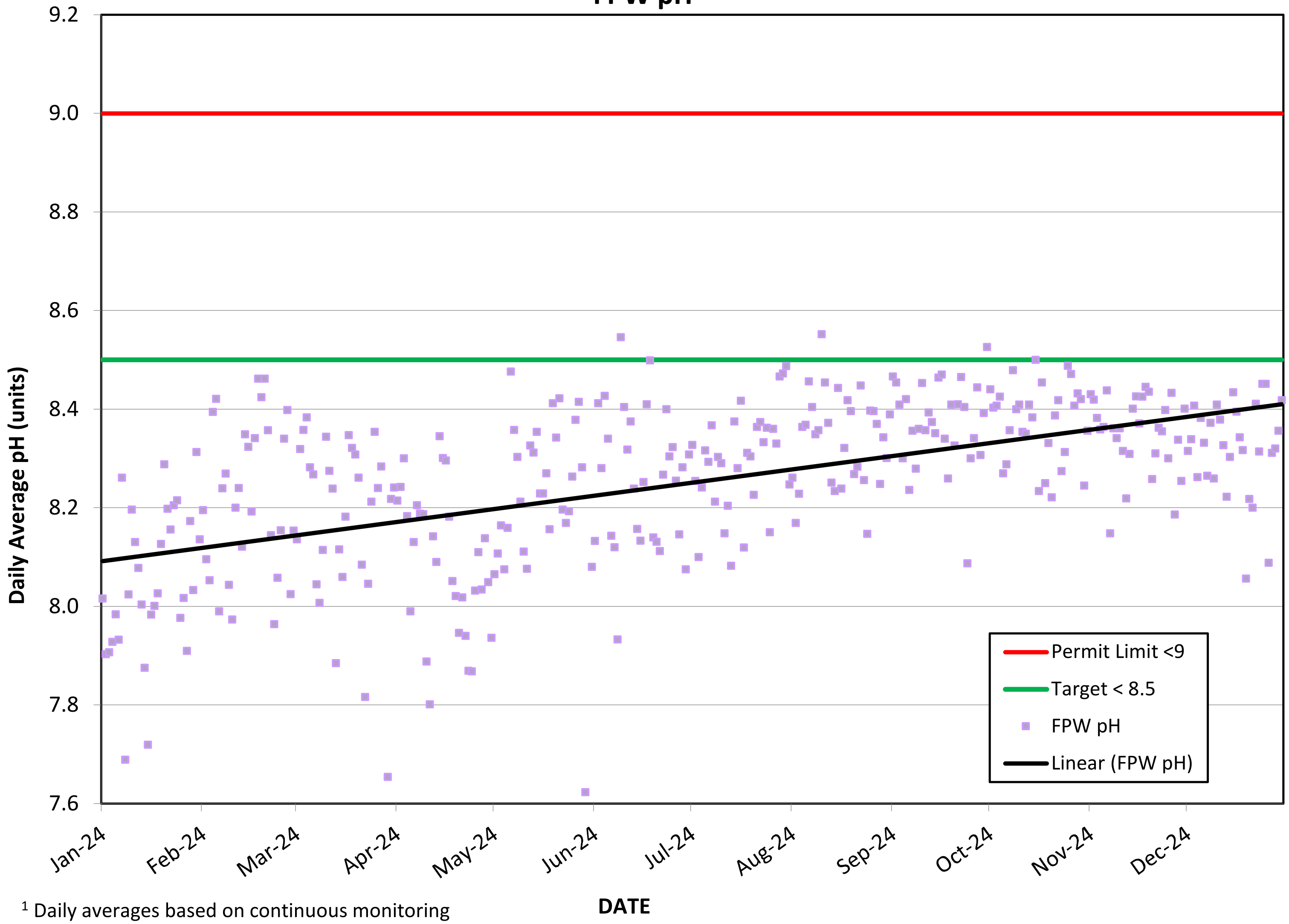
[1] Daily averages based on continuous monitoring of all units

Figure E-12
UV/AOP CALCULATED UV DOSAGE PER TRAIN[1]



[1] Daily averages based on continuous monitoring of all units

Figure E-13
FPW pH[1]



[1] Daily averages based on continuous monitoring

Appendix F

Operator Certifications and Operations Summary

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

Orange County Water District
Groundwater Replenishment System
Advanced Water Purification Facility

Operations Certification Levels
(As of December 2024)

Listed according to level of Operator Certification, high-to-low

Operator	OCWD Job Title	WWTP Certification Level & No.		DWT Certification Level & No.		AWTO Certification Level & No.	
Derrick Mansell	Operations Manager	V	V-28340			AWT-4	233
Craig Liebzeit	Chief Plant Operator	V	V-43546	T-2	34896	AWT-5	242
Jacob Bermudez	Shift Supervisor	V	V-43637				
John Souza	Shift Supervisor	IV	IV-3998			AWT-3	346
Christopher Owens	Shift Supervisor			T-4	29560		
Luis Torres	Lead Plant Operator	III	III-28285	T-2	27383		
Mike Ewing	Lead Plant Operator	III	III-10199				
Curtis Sanders	Lead Plant Operator	III	III-28461				
Anthony Lockhart	Lead Plant Operator	II	II-44824	T-3	38600		
Jonathan Mok	Lead Plant Operator	III	II-43357	T-2	41147		
Chris Vu	Sr. Plant Operator III	III	III-10630				
Heinz Roehler	Sr. Plant Operator III	III	III-3534	T-3	9202		
Ricardo Noguera	Sr. Plant Operator III	V	V-44599	T-2	45491	AWT-3	307
Philip Jacobs	Sr. Plant Operator III	III	III-42110				
Stanley Vielma	Plant Operator II			T-3	27226		
Kevin Johnson	Plant Operator II			T-3	43691		
Princewell Obinma	Plant Operator II	III	III-72860	T-1	43850		
Charles Spade	Plant Operator II	II	II-7966				
Eric Gautier	Plant Operator II	II	II-10135				
Jason Kuhn	Plant Operator II	II	III-44098	T-2	40759		
Jonathan Wilson	Plant Operator I	II	II-73964	T-2	44519		
Andy King	Plant Operator I			T-1	44056		
Ron Eversole	Plant Operator I			T-2	44791		

Plant Shutdown Summary for Advanced Water Purification Facility
2024 Groundwater Replenishment System Annual Report

Cause of AWPF Shutdown		Hours Offline per Month												Annual Total
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
1	Unplanned shutdown due to UV reactor M11 fault & UV train M failure			3.50										3.50
2	Planned shutdown for OCWD & OC San Plant 2 construction projects and system testing			54.70								60.00		114.70
3	Planned shutdown for medium voltage testing					36.50								36.50
4	Unplanned shutdown due to power outage						4.45							4.45
5	Unplanned shutdown due to loss of power due to SCE maintenance work at KIWI substation								3.65					3.65
Total Hours Offline		**0.00**	**0.00**	**58.20**	**0.00**	**36.50**	**4.45**	**0.00**	**3.65**	**0.00**	**0.00**	**60.00**	**0.00**	**162.80**
Total Days Offline		**0.00**	**0.00**	**2.43**	**0.00**	**1.52**	**0.19**	**0.00**	**0.15**	**0.00**	**0.00**	**2.50**	**0.00**	**6.78**

Appendix F
Plant Shutdown Summary

F.1 January 2024

January 1 - 31: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of January.

F.2 February 2024

February 1 - 29: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of February.

F.3 March 2024

March 1 - 31: Total Downtime 58.20 hours (7.82%)

The AWPF / GWRS experienced one unexpected and one scheduled shutdown during the month of March.

The first shutdown was unexpected and occurred March 17 at 1115 hours. UV reactor M11 fault caused UV train M to fail which had a cascading effect as the production logic began securing the plant due to low UV capacity limits. I&E resolved the issue, and the plant was placed back online. The GWRS resumed FPW distribution on March 17 at 1445 hours. The total downtime GWRS experienced during the shutdown was 3.50 hours.

During the shutdown staff used 0.14 MG of City of Fountain Valley potable water to keep the Talbert Seawater Barrier injection system pressurized until the GWRS plant resumed FPW injection.

The second shutdown was scheduled and occurred March 26 – 28 so both OCWD and OC San Plant No. 2 could complete some construction projects and system testing. On March 26 at 0550 hours the plant was secured. After both agencies completed their work, the plant was restarted on March 27 in flow to waste mode with all discharge directed to OC San's Ocean Outfall Booster Pump Station (OOBS). GWRS resumed normal operation with FPW distribution on March 28 at 1231 hours. The total downtime GWRS experienced during the shutdown was 54.7 hours.

During the shutdown period a total of 12.28 MG of water was sent to OC San's OOBS station over a duration of 10.010 hours.

During the shutdown staff used 1.29 MG of City of Fountain Valley potable water to keep the Talbert Seawater Barrier injection system pressurized until the GWRS plant resumed FPW injection.

F.4 April 2024

April 1 - 30: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of April.

F.5 May 2024

May 1 - 31: Total Downtime 36.5 hours (4.91%)

The AWPF / GWRS experienced one scheduled shutdown during May for GWRS I&E annual medium voltage testing. The 36.5-hour long shutdown began May 29 at 0516 hours. The plant was restarted on May 30 in flow to waste mode with all discharge directed to OC San's Ocean Outfall Booster Station (OOBS). GWRS resumed normal operation with FPW distribution on May 30 at 1824 hours.

F.6 June 2024

June 1 - 30: Total Downtime 4.45 hours (0.62%)

The AWPF / GWRS experienced one unscheduled shutdown during June as a result of a SCE power blip. The 4.45-hour long shutdown began on June 9 at 1034 hours. The GWRS resumed FPW distribution on June 9 at 1501 hours.

F.7 July 2024

July 1 - 31: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of July.

F.8 August 2024

August 1 - 31: Total Downtime 3.65 hours (0.49%)

The AWPF / GWRS experienced one unscheduled shutdown due to Southern California Edison (SCE) performing maintenance at our campus KIWI substation and inadvertently manipulated the wrong panel resulting in a plant-wide power blip. The 3.65-hour long shutdown began on August 20 at 0925 hours. The GWRS resumed FPW distribution on August 20 at 1304 hours.

F.9 September 2024

September 1 - 30: Total Downtime 0.0 hours (0.00%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of September.

F.10 October 2024

<u>October 1 - 31: Total Downtime 0.0 hours (0.00%)</u>

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of October.

F.11 November 2024

<u>November 1 - 30: Total Downtime 60.00 hours (8.33%)</u>

The AWPF / GWRS experienced one scheduled shutdown during the month of November.

The shutdown was scheduled and occurred November 5-7 so both OCWD and OC San Plant No. 2 could complete some construction projects and system testing. On November 5 at 0335 hours the plant was secured. The plant was restarted on November 7 in flow to waste mode with all discharge directed to OC San's Ocean Outfall Booster Pump Station (OOBS). GWRS resumed normal operation with FPW distribution on November 7 at 1533 hours. The total downtime GWRS experienced during shutdown was 60.0 hours.

During the shutdown period a total of 28.75 MG of water was sent to OC San's OOBS station over a duration of 20.8 hours.

During the shutdown staff used 3.05 MG of City of Fountain Valley potable water to keep the Talbert Seawater Barrier injection system pressurized until the GWRS plant resumed FPW injection.

F.12 December 2024

<u>December 1 - 31: Total Downtime 0.0 hours (0.00%)</u>

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of December.

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld G Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	399J80165

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at X 3.9 PSID LEAKED	Held at 5.7 PSID CLOSED TIGHT ☒ LEAKED	Opened at ______ PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ______ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld G, Domestic

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L L153851

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.4 PSID LEAKED ☐	Held at ______ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.0 PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ______ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments [illegible]

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, CA 92708 Lime sludge

Type	Size	Make	Model	Serial #
RPDA	3"	Watts	909	13528

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 78

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at X 9.6 PSID LEAKED	Held at ______ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 2.7 PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ______ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Lime Sludge Bypass

Type	Size	Make	Model	Serial #
RP	3/4	WATTS	909	651924

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 78

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 10.8 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 4.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bldg Fire

Type	**Size**	**Make**	**Model**	**Serial #**
DCDA	6"	Ames	3000 SS	1376190105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 4.2 PSID LEAKED	Held at 5.0 PSID CLOSED TIGHT ☑ LEAKED	Opened at ______ PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ______ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-10

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

CS 410

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2qt	241432

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB AIR INLET
INITIAL TEST	Held at 9.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☒ LEAKED	Opened at 3.2 PSID DID NOT OPEN ☐	Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-11

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 UV Area

Type	**Size**	**Make**	**Model**	**Serial #**
RP	3"	Wilkins	375	66562

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☒ REPLACED ☒ DISC ☒ DIAPHRAGM ☒ FLOAT ☐ SPRING ☐ OTHER ☒ DESCRIBE: ☐
FINAL TEST	Held at 7.9 PSID	Held at ____ PSID CLOSED TIGHT ☒	Opened at 3.4 PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments: RV Leaking

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
Mark Miller	Mark Miller	1502	7/2/24
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld L Garage
Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	3909411104

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1		CHECK VALVE #2		RELIEF VALVE		PVB/SVB	
INITIAL TEST	Held at X5.9 PSID		Held at 4.4 PSID		Opened at ____ PSID		AIR INLET Opened at ____ PSID	
			CLOSED TIGHT	☒				
	LEAKED		LEAKED		DID NOT OPEN	☐	DID NOT OPEN	☐
	CLEANED	☐	CLEANED	☐	CLEANED	☐	CHECK VALVE	
	REPLACED	☐	REPLACED	☐	REPLACED	☐	Held at ____ PSID	
							LEAKED	☐
R	DISC	☐	DISC	☐	DISC(S)	☐		
E	SPRING	☐	SPRING	☐	SPRING	☐	CLEANED	☐
P	GUIDE	☐	GUIDE	☐	DIAPHRAGM	☐	REPLACED	☐
A	HINGE PIN	☐	HINGE PIN	☐	SEAT(S)	☐		
I	SEAT	☐	SEAT	☐	O-RING(S)	☐	DISC	☐
R	MODULE	☐	MODULE	☐	MODULE	☐	DIAPHRAGM	☐
S	OTHER	☐	OTHER	☐	OTHER	☐	FLOAT	☐
	DESCRIBE:	☐	DESCRIBE:	☐	DESCRIBE:	☐	SPRING	☐
							OTHER	☐
							DESCRIBE:	☐
FINAL TEST	Held at ____ PSID		Held at ____ PSID		Opened at ____ PSID		Air Inlet ____ PSID	
			CLOSED TIGHT	☐			Check Valve ____ PSID	

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis st Fountain Valley, Ca 92708 Pit @ admin

Type	Size	Make	Model	Serial #
RP	1"	Wilkins	975XLII	4273461

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 60

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held a 10.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, CA 92708 Pit @ admin

Type	Size	Make	Model	Serial #
RP	1"	Wilkins	975XL	AB4,9806

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 60

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.0 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.8 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld C LAB Fire

Type	Size	Make	Model	Serial #
350DCDA	6"	Watkins	350 DCDA	V17279

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ______ PSID LEAKED ☑	Held at ______ PSID CLOSED TIGHT ☐ LEAKED ☑	Opened at ______ PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☑ REPLACED ☑ DISC ☒ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☑ REPLACED ☑ DISC ☒ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ______ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at 5.6 PSID	Held at 3.8 PSID CLOSED TIGHT ☒	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bldc GAIS Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	Wilkins	950	2884718

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at x 2.0 PSID LEAKED ☐	Held at 2.4 PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld C Lab, roof

Type	Size	Make	Model	Serial #
RP	3/4	Watts	919QT	19885

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 50

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at X 8.6 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.7 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld. C LAB roof

Type	Size	Make	Model	Serial #
RP	3/4	Watts	919QT	90396

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	LINE PRESSURE 50 / PVB/SVB
INITIAL TEST	Held at 9.5 PSID LEAKED ☐	Held at ______ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 2.5 PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ______ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld 6 Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	WAtts	007ml	64739

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 3.9 PSID LEAKED ☐	Held at 5.7 PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld F Domestic

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L153857

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at X 8.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.9 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
R E P A I R S	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-21

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld F Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	370200105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 4.7 PSID LEAKED ☐	Held at 3.6 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-22

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld F Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	WAtts	007M1	63469

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 24 PSID LEAKED ☐	Held at 2.5 PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	2502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, CA 92708 Bld 5 east in rocks

Type	**Size**	**Make**	**Model**	**Serial #**
RP	1.5"	Watts	009m2	112036

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.9 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-24

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld T North

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	241449

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 10.3 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.5 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-25

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bldg U South

Type	Size	Make	Model	Serial #
RP	1.5	Watts	009M2	111997

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE ______

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.4 PSID LEAKED ☐	Held at ______ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ______ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-26

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, CA 92708 Bld U Domestic

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L66561

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 71

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 10.1 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.7 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-27

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld U Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	Wilkins	007M1	64798

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 2.5 PSID LEAKED ☐	Held at 2.6 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-28

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld U Across on PAd

Type	Size	Make	Model	Serial #
RP	2"	watts	009m2	807662

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.9 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.0 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-29

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld Y Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	300CSS	398010105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 3.4 PSID LEAKED ☐	Held at 3.6 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 3/4 Y Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	watts	007ml	64784

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY / DOUBLE CHECK VALVE ASSEMBLY	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	LINE PRESSURE 70 / PVB/SVB AIR INLET
INITIAL TEST	Held at 3.0 PSID LEAKED ☐	Held at 3.5 PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ________________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

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City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld Y west

Type	**Size**	**Make**	**Model**	**Serial #**
RP	2"	Watts	009m2	076867

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1		CHECK VALVE #2		RELIEF VALVE		PVB/SVB	
							AIR INLET	
INITIAL TEST	Held at 10.4 PSID		Held at ______ PSID		Opened at 3.6 PSID		Opened at ______ PSID	
			CLOSED TIGHT	☑				
	LEAKED	☐	LEAKED	☐	DID NOT OPEN	☐	DID NOT OPEN	☐
	CLEANED	☐	CLEANED	☐	CLEANED	☐	CHECK VALVE	
	REPLACED	☐	REPLACED	☐	REPLACED	☐	Held at ______ PSID	
							LEAKED	☐
R	DISC	☐	DISC	☐	DISC(S)	☐		
E	SPRING	☐	SPRING	☐	SPRING	☐	CLEANED	☐
P	GUIDE	☐	GUIDE	☐	DIAPHRAGM	☐	REPLACED	☐
A	HINGE PIN	☐	HINGE PIN	☐	SEAT(S)	☐		
I	SEAT	☐	SEAT	☐	O-RING(S)	☐	DISC	☐
R	MODULE	☐	MODULE	☐	MODULE	☐	DIAPHRAGM	☐
S	OTHER	☐	OTHER	☐	OTHER	☐	FLOAT	☐
	DESCRIBE:	☐	DESCRIBE:	☐	DESCRIBE:	☐	SPRING	☐
							OTHER	☐
							DESCRIBE:	☐
FINAL TEST	Held at ______ PSID		Held at ______ PSID		Opened at ______ PSID		Air Inlet ______ PSID	
			CLOSED TIGHT	☐			Check Valve ______ PSID	

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld Q south

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	241269

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 10.3 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 4.1 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

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City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Guard shack

Type	Size	Make	Model	Serial #
RP	1"	Wilkins	975XL	1987222

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.9 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Between 6+K
Area 235

Type	Size	Make	Model	Serial #
RP	1"	Watts	009m2	245396

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 10.2 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened a. 2.3 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bldg K north

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	241290

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.0 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Area 450 AET

Type	Size	Make	Model	Serial #
RP	1"	watts	009m2	174914

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.7 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.1 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
R E P A I R S	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/7/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

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City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld L Garage
Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	Watts	007M2	62977

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	LINE PRESSURE 75 — PVB/SVB
INITIAL TEST	Held at 3.9 PSID	Held at 2.7 PSID	Opened at ____ PSID	AIR INLET
		CLOSED TIGHT ☑		Opened at ____ PSID
	LEAKED ☐	LEAKED ☐	DID NOT OPEN ☐	DID NOT OPEN ☐
	CLEANED ☐	CLEANED ☐	CLEANED ☐	CHECK VALVE
	REPLACED ☐	REPLACED ☐	REPLACED ☐	Held at ____ PSID
				LEAKED ☐
R	DISC ☐	DISC ☐	DISC(S) ☐	
E	SPRING ☐	SPRING ☐	SPRING ☐	CLEANED ☐
P	GUIDE ☐	GUIDE ☐	DIAPHRAGM ☐	REPLACED ☐
A	HINGE PIN ☐	HINGE PIN ☐	SEAT(S) ☐	
I	SEAT ☐	SEAT ☐	O-RING(S) ☐	DISC ☐
R	MODULE ☐	MODULE ☐	MODULE ☐	DIAPHRAGM ☐
S	OTHER ☐	OTHER ☐	OTHER ☐	FLOAT ☐
	DESCRIBE: ☐	DESCRIBE: ☐	DESCRIBE: ☐	SPRING ☐
				OTHER ☐
				DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID	Opened at ____ PSID	Air Inlet ____ PSID
		CLOSED TIGHT ☐		Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Side R R/O
Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Wilkins	350	V37212

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 4.9 PSID LEAKED ☐	Held at 5.1 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R R/O
Fire Bypass

Type	Size	Make	Model	Serial #
DA	3/4	Wilkins	950XL	3786036

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 4.0 PSID LEAKED ☐	Held at 3.1 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/12/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Bld R Are

Device Location/Address:

10500 Ellis St Fountain Valley, Ca 92708

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	399020105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB AIR INLET
INITIAL TEST	Held at ____ PSID LEAKED ☒	Held at ____ PSID CLOSED TIGHT LEAKED ☒	Opened at ____ PSID DID NOT OPEN ☐	Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☒ REPLACED ☒	CLEANED ☒ REPLACED ☒	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☒ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☒ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at 5.6 PSID	Held at 3.8 PSID CLOSED TIGHT ☒	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R
Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	Watts	007m1	63980

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1		CHECK VALVE #2		RELIEF VALVE		PVB/SVB	
INITIAL TEST	Held at 26 PSID		Held at 2.9 PSID		Opened at ____ PSID		AIR INLET Opened at ____ PSID	
			CLOSED TIGHT	☑				
	LEAKED	☐	LEAKED	☐	DID NOT OPEN	☐	DID NOT OPEN	☐
REPAIRS	CLEANED	☐	CLEANED	☐	CLEANED	☐	CHECK VALVE	
	REPLACED	☐	REPLACED	☐	REPLACED	☐	Held at ____ PSID	
							LEAKED	☐
R	DISC	☐	DISC	☐	DISC(S)	☐		
E	SPRING	☐	SPRING	☐	SPRING	☐	CLEANED	☐
P	GUIDE	☐	GUIDE	☐	DIAPHRAGM	☐	REPLACED	☐
A	HINGE PIN	☐	HINGE PIN	☐	SEAT(S)	☐		
I	SEAT	☐	SEAT	☐	O-RING(S)	☐	DISC	☐
R	MODULE	☐	MODULE	☐	MODULE	☐	DIAPHRAGM	☐
S	OTHER	☐	OTHER	☐	OTHER	☐	FLOAT	☐
	DESCRIBE:	☐	DESCRIBE:	☐	DESCRIBE:	☐	SPRING	☐
							OTHER	☐
							DESCRIBE:	☐
FINAL TEST	Held at ____ PSID		Held at ____ PSID		Opened at ____ PSID		Air Inlet ____ PSID	
			CLOSED TIGHT	☐			Check Valve ____ PSID	

Comments ________________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/7/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-42

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld 12
Domestic

Type	Size	Make	Model	Serial #
RP	2"	Watts	009M2 QT	018T55

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.7 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 3.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/14
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-43

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R
inside - industrial
feed to RO

Type	Size	Make	Model	Serial #
RP	4"	watts	909	15304

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ... PSID LEAKED ☑	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at -- -- PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☑ REPLACED ☑ DISC ☑ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☑ DESCRIBE: ☐	CLEANED ☑ REPLACED ☑ DISC ☑ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☑ DESCRIBE: ☐	CLEANED ☑ REPLACED ☑ DISC(S) ☑ SPRING ☐ DIAPHRAGM ☑ SEAT(S) ☐ O-RING(S) ☑ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at 7.6 PSID	Held at ____ PSID CLOSED TIGHT ☑	Opened at 4.0 PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-44

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R
Basement
Hose 13.35

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L87252

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.2 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.4 PSID DID NOT OPEN ☐	AIR INLET Opened at - PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/12/24
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld C WRB
Industrial

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L 73155

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.5 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	7/2/21
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis st Fountain Valley, Ca 92708

Bld C WRB
Domestic

Type	Size	Make	Model	Serial #
RP	4"	Wilkins	375	L73145

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.8 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
Mark Miller	Mark Miller	2502	7/2/24

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-47

CITY OF FOUNTAIN VALLEY
WATER UTILITIES DIVISION
CROSS CONNECTION INSPECTION REPORT
17300 MT HERRMANN ST, FOUNTAIN VALLEY, CA 92708
(714) 593-4624

DBA/NAME: ORANGE COUNTY WATER DISTRICT : DUAL PLUMBED COMMERCIAL		DATE: 06/11/2024
ADDRESS: 18700 WARD ST. FOUNTAIN VALLEY, CA 92708		PR:
CONTACT PERSON: JIM SMITH – ORANGE COUNTY WATER DISTRICT		PHONE: 714-962-1005
NUMBER-BACKFLOW ASSEMBLIES:	WATER PURVEYOR: CITY OF FOUNTAIN VALLEY	

Cross Connection Program:

Cross connection means any actual or potential connection or structural arrangement between a public or a consumer's water system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas or substance other than the intended potable water with which the system supplied.

A two-way cross connection shut down test was conducted this date at the above facility.

1. Staff on site:
   - Jim Smith, OC Water District
   - Joe Flint, OC Water District

2. Test procedures for dual-plumbed commercial facility were carried out this date.
   - Shut down recycled water at point of connection. Walked through facility to confirm no flow/ pressure condition on recycled water fixtures. Confirm flow/pressure condition on domestic water fixtures. Return pressure to recycled water.
   - Shut down domestic water at backflow assembly. Walked through facility to confirm no flow/ pressure condition on domestic water fixtures. Confirm flow/pressure condition on recycled water fixtures. Return pressure to domestic water.

3. No apparent cross-connections observed this date.

4. Note : inspection of recycled water swivel-L revealed that it is physically disconnected & only a Fountain Valley City Employee can gain access to connect to domestic. There has been no additional plumbing work done. The lock box was observed over the point of connection, it was opened only to inspect and then relocked by Kevin Deason, City of Fountain Valley. The swivel-L was not tested this date. It appears readily accessible for use and has a backflow device.

COPY OF THIS REPORT SENT TO: Jim Smith : Jsmith@ocwd.com Joe Flint : Jflint@ocwd.com State Water Resources Control Board Orange County Public Health	CROSS CONNECTION SPECIALIST: Kevin Deason AWWA #3247 Kevin.Deason@fountainvalley.gov (714) 593-4624 6-18-24

CORRECT HAZARDOUS CONDITIONS BY: **n/a**	PHONE NUMBER: (714) 593-4624	PAGE 1 OF 1

Appendix G

Groundwater Quality Data at the Talbert Barrier

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

GWRS 2024 Quarterly Sampling Dates
OCWD Water Quality Department
TALBERT BARRIER - GROUNDWATER

Monitoring Well	Qtr 1	Qtr 2	Qtr 3	Qtr 4
OCWD-M10/1-4	01/22/2024	04/02/2024	07/22/2024	10/14/2024
OCWD-M11/1-4	01/24/2024	05/15/2024	07/24/2024	10/16/2024
OCWD-M19/3	01/09/2024	05/13/2024	07/09/2024	10/03/2024
OCWD-M45/1-5	02/07/2024	04/15/2024	08/05/2024	10/28/2024
OCWD-M46/2-5	01/08/2024	04/01/2024	07/08/2024	10/01/2024
OCWD-M46A/1	01/08/2024	04/01/2024	07/08/2024	10/01/2024
OCWD-M47/1-5	01/23/2024	04/16/2024	07/23/2024	10/15/2024

Notes for Appendix H Tables:

► Water quality data are summarized for monitoring wells M10, M11, M19, M45, M46, M46A and M47 in the following tables. OCWD-M19/3 is a non-compliance monitoring well.

► Listed dates (above) are the quarterly compliance monitoring dates; other samples may have been collected during the year. Detections of organic chemicals are reported for all samples collected in 2024 and are not limited to the quarterly compliance samples.

► The annual compliance samples were collected during the second quarter of 2024 per the previously established compliance quarter rotation schedule.

► Results listed in the table for each quarter are the range of the minimum and maximum values detected at the well location, which may consist of one to five well casings. Figures and report text list the well ID (e.g. OCWD-M10), casing number (e.g., M10/1, M10/2, M10/3 and M10/4), as appropriate.

► Appendices B & C contain a list of all methods and reporting limits (RL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate.

► MCL: Maximum Contaminant Level

► N/A: Not applicable

► ND: Not detected at reporting limit (RL)

► NL: SWRCB Division of Drinking Water (DDW) Notification Level

► nr: Not reported

► NR: Not required

► NS: Not sampled

► SMCL: Secondary Maximum Contaminant Level

► TR: Trace

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M10 Qtr 1	OCWD-M10 Qtr 2	OCWD-M10 Qtr 3	OCWD-M10 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	108 - 848	164 - 722	96 - 744	102 - 774
Chloride (Cl), mg/L	OCWD	EPA 300.0	10.3 - 100	10.3 - 100	10.1 - 99.4	10 - 95.6
Sulfate (SO4), mg/L	OCWD	EPA 300.0	8.1 - 202	7.6 - 203	7.1 - 209	7.2 - 210
Sodium (Na), mg/L	OCWD	EPA 200.7	19.7 - 62	20.7 - 64.4	19.7 - 60.7	20.3 - 61.5
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	ND - 2.4	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 2.17	ND - 2.48	ND - 2.66	ND - 2.58
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	Not Required	ND - 0.006	Not Required	ND - 0.007
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 55.3	ND - 41.5	ND - 91.1	ND - 14.4
Manganese (Mn), ug/L	OCWD	EPA 200.8	2.9 - 29.5	2.8 - 32.6	2.6 - 24.3	3 - 28.5
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND - 8	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.1 - 0.74	-0.16 - 0.69	-0.12 - 0.65	-0.1 - 0.7
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.3	ND	ND - 0.15	ND
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	40.5 - 493	40.9 - 498	38.5 - 478	40.5 - 484
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND - 1.2	ND - 1.1	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 10	ND - 7.4	ND - 9	ND - 8.3
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 3.2	ND - 3.3	ND - 3.2	ND - 3.9
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND - 1.6	ND - 1.2	ND	ND - 1.1
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 3.1	ND - 3.2	ND - 4.2	ND - 2.7
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 2.1	ND - 2.1	ND - 2.4	ND - 2.2
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND - 0.2	ND - 0.2	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 3.1	ND - 3.1	ND - 2.5	ND - 2.8
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 4.5	ND - 4.2	ND - 4	ND - 3.7

Summary of 2024 Water Quality Monitoring

Method	Description	Lab	OCWD-M10 Qtr 1	OCWD-M10 Qtr 2	OCWD-M10 Qtr 3	OCWD-M10 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < NL	ND < MCL	ND < NL	ND < NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M10/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/22/2024	11:50	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/22/2024	11:50	cis-1,2-Dichloroethene (c12DCE)	0.6	ug/L	0.5
1/22/2024	11:50	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/2/2024	9:50	cis-1,2-Dichloroethene (c12DCE)	0.6	ug/L	0.5
4/2/2024	9:50	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/22/2024	11:35	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5
7/22/2024	11:35	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/14/2024	11:45	cis-1,2-Dichloroethene (c12DCE)	0.5	ug/L	0.5
10/14/2024	11:45	Trichloroethene (TCE)	TR	ug/L	0.5

OCWD-M10/2
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/22/2024	12:35	cis-1,2-Dichloroethene (c12DCE)	0.8	ug/L	0.5
1/22/2024	12:35	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2
1/22/2024	12:35	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/2/2024	10:45	cis-1,2-Dichloroethene (c12DCE)	0.7	ug/L	0.5
4/2/2024	10:45	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/22/2024	10:55	cis-1,2-Dichloroethene (c12DCE)	0.7	ug/L	0.5
7/22/2024	10:55	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/14/2024	11:10	cis-1,2-Dichloroethene (c12DCE)	0.7	ug/L	0.5
10/14/2024	11:10	Trichloroethene (TCE)	TR	ug/L	0.5

OCWD-M10/3
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
1/22/2024 13:20	1,4-Dioxane (14DIOX)	4.5	ug/L	0.5

Year 2024, Quarter 2

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
4/2/2024 11:40	1,4-Dioxane (14DIOX)	4.2	ug/L	0.5

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reporting Limit
4/2/2024 11:40	Primidone (PRIMDN)	2.785	ng/L	1

Year 2024, Quarter 3

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
7/22/2024 10:05	1,4-Dioxane (14DIOX)	4	ug/L	0.5

Year 2024, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
10/14/2024 10:30	1,4-Dioxane (14DIOX)	3.7	ug/L	0.5

OCWD-M10/4
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/22/2024	14:10	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

Year 2024, Quarter 2

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/2/2024	12:35	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/2/2024	12:35	Carbamazepine (CBMAZP)	1.05	ng/L	1
4/2/2024	12:35	Gemfibrozil (GMFIBZ)	1.904	ng/L	1
4/2/2024	12:35	N,N-diethyl-m-toluamide (DEET)	4.999	ng/L	1

Year 2024, Quarter 3

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/22/2024	9:25	1,4-Dioxane (14DIOX)	0.7	ug/L	0.5

Year 2024, Quarter 4

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/14/2024	9:50	1,4-Dioxane (14DIOX)	0.9	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M11 Qtr 1	OCWD-M11 Qtr 2	OCWD-M11 Qtr 3	OCWD-M11 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	92 - 704	104 - 690	86 - 688	98 - 686
Chloride (Cl), mg/L	OCWD	EPA 300.0	7.9 - 110	11.2 - 105	9.8 - 106	8.8 - 106
Sulfate (SO4), mg/L	OCWD	EPA 300.0	2.6 - 175	7.2 - 168	5 - 173	3.3 - 174
Sodium (Na), mg/L	OCWD	EPA 200.7	13 - 55.7	13.4 - 54.6	13.6 - 57.1	13.4 - 55.5
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	1.5 - 2.7	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.16 - 2.75	1.53 - 2.7	1.55 - 2.73	1.47 - 2.63
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	Not Required	ND - 0.004	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND - 5.8	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 7.6	ND - 8.2	ND - 9.9	ND - 8.7
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.96 - 0.8	-0.87 - 0.77	-0.97 - 0.76	-1.01 - 0.76
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	ND	ND	ND - 0.1
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	36.6 - 446	41.8 - 442	42.8 - 462	39.8 - 458
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.1 - 2.9	1.2 - 2.8	1.2 - 2.6	1.3 - 2.6
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 3	ND - 2.9	ND - 3.7	ND - 2.9
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 3.9	ND - 4	ND - 3.9	ND - 4
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.2 - 3.8	2.3 - 3	2.1 - 3.3	2 - 3.1
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 0.7	ND - 0.6	ND - 0.6	ND - 0.6

Summary of 2024 Water Quality Monitoring

Method	Description	Lab	OCWD-M11 Qtr 1	OCWD-M11 Qtr 2	OCWD-M11 Qtr 3	OCWD-M11 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < NL	ND < MCL	ND < NL	ND < NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND	ND	ND	ND
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M11/4
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
1/24/2024 10:10	1,4-Dioxane (14DIOX)	0.7	ug/L	0.5

Year 2024, Quarter 2

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
5/15/2024 10:55	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reporting Limit
5/15/2024 10:55	Carbamazepine (CBMAZP)	1.122	ng/L	1
5/15/2024 10:55	Sulfamethoxazole (SULTHZ)	2.062	ng/L	1

Year 2024, Quarter 3

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
7/24/2024 10:10	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

Year 2024, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reporting Limit
10/16/2024 10:30	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M19/3 Qtr 1	OCWD-M19/3 Qtr 2	OCWD-M19/3 Qtr 3	OCWD-M19/3 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	102	74	204	94
Chloride (Cl), mg/L	OCWD	EPA 300.0	11.9	5.9	23.2	7.3
Sulfate (SO4), mg/L	OCWD	EPA 300.0	5.3	1.5	29.8	2
Sodium (Na), mg/L	OCWD	EPA 200.7	15.1	11.3	22.6	13.1
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	1	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.79	1.17	2.49	1.32
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	ND	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	1.1	ND	2.3	3.4
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.55	-1.08	0.02	-0.85
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	0.1	0.15	0.1
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	51.2	29.6	116	40
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	5.8	ND	5.2
Arsenic (As), ug/L	OCWD	EPA 200.8	1.4	1.8	1.1	1.6
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	0.38	0.21	0.44	0.6
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	1.2	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	1.9	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	1.2	2.5	1.1	1.8
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	3.3	3.9	2.8	3.9
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	0.8	ND

Summary of 2024 Water Quality Monitoring

Method	Description	Lab	OCWD-M19/3 Qtr 1	OCWD-M19/3 Qtr 2	OCWD-M19/3 Qtr 3	OCWD-M19/3 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	<NL	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M19/3
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/9/2024	10:10	Chloroform (CHCl3)	1.2	ug/L	0.5
1/9/2024	10:10	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/13/2024	11:20	Chloroform (CHCl3)	2.5	ug/L	0.5
5/13/2024	11:20	Total Trihalomethanes (TTHMs)	2.5	ug/L	0.5

Year 2024, Quarter 3

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/9/2024	10:50	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/9/2024	10:50	Chloroform (CHCl3)	1.1	ug/L	0.5
7/9/2024	10:50	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/3/2024	11:55	Chloroform (CHCl3)	1.8	ug/L	0.5
10/3/2024	11:55	Total Trihalomethanes (TTHMs)	1.8	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M45 Qtr 1	OCWD-M45 Qtr 2	OCWD-M45 Qtr 3	OCWD-M45 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	130 - 706	136 - 746	142 - 726	126 - 722
Chloride (Cl), mg/L	OCWD	EPA 300.0	14.9 - 95.8	14.3 - 92.8	12.1 - 93.6	13.5 - 93.5
Sulfate (SO4), mg/L	OCWD	EPA 300.0	ND - 181	ND - 180	ND - 182	ND - 190
Sodium (Na), mg/L	OCWD	EPA 200.7	21.5 - 111	23.1 - 110	22.7 - 111	24.3 - 108
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	ND - 2.9	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 2.78	ND - 2.84	ND - 2.7	ND - 2.54
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.164	ND - 0.149	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 141	ND - 122	ND - 148	ND - 149
Manganese (Mn), ug/L	OCWD	EPA 200.8	3.4 - 20.4	4.1 - 21.5	2.9 - 16	3.2 - 18.8
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND - 1	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND - 100	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.22 - 0.72	-0.15 - 0.7	-0.35 - 0.75	-0.32 - 0.75
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.2	ND - 0.25	ND - 0.2	ND - 0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	34.7 - 453	35.3 - 462	34.5 - 455	34 - 464
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 1.8	ND - 1.9	ND - 2.2	ND - 2.8
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 7.6	ND - 9.7	ND - 8	ND - 7.4
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 3.2	ND - 3.3	ND - 3	ND - 3.2
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND - 1.5	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND - 0.15
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 3.1	ND - 3.6	ND - 3.8	ND - 2.9
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 3.2	ND - 3	ND - 2.9	ND - 2.7
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND - 0.2
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 3.3	ND - 3.3	ND - 3.2	ND - 3.1
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 2.6	ND - 2.9	ND - 2	ND - 2.1

Summary of 2024 Water Quality Monitoring

Method	Description	Lab	OCWD-M45 Qtr 1	OCWD-M45 Qtr 2	OCWD-M45 Qtr 3	OCWD-M45 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < NL	ND < MCL	ND < NL	ND < NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M45/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/7/2024	11:05	cis-1,2-Dichloroethene (c12DCE)	0.6	ug/L	0.5
2/7/2024	11:05	Tetrachloroethene (PCE)	TR	ug/L	0.5
2/7/2024	11:05	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/15/2024	9:50	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5
4/15/2024	9:50	Tetrachloroethene (PCE)	TR	ug/L	0.5
4/15/2024	9:50	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/5/2024	10:00	cis-1,2-Dichloroethene (c12DCE)	0.6	ug/L	0.5
8/5/2024	10:00	Tetrachloroethene (PCE)	TR	ug/L	0.5
8/5/2024	10:00	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/28/2024	9:25	cis-1,2-Dichloroethene (c12DCE)	0.9	ug/L	0.5
10/28/2024	9:25	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2
10/28/2024	9:25	Tetrachloroethene (PCE)	TR	ug/L	0.5
10/28/2024	9:25	Trichloroethene (TCE)	TR	ug/L	0.5

OCWD-M45/3
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/7/2024	10:10	1,4-Dioxane (14DIOX)	2.6	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/15/2024	11:15	1,4-Dioxane (14DIOX)	2.9	ug/L	0.5

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/15/2024	11:15	Primidone (PRIMDN)	2.62	ng/L	1

Year 2024, Quarter 3

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/5/2024	11:10	1,4-Dioxane (14DIOX)	1.5	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/28/2024	10:50	1,4-Dioxane (14DIOX)	1.7	ug/L	0.5

OCWD-M45/4
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/7/2024	9:30	1,4-Dioxane (14DIOX)	2.2	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/15/2024	12:00	1,4-Dioxane (14DIOX)	2.5	ug/L	0.5

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/15/2024	12:00	Carbamazepine (CBMAZP)	1.256	ng/L	1
4/15/2024	12:00	Primidone (PRIMDN)	1.762	ng/L	1

Year 2024, Quarter 3

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/5/2024	11:45	1,4-Dioxane (14DIOX)	2	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/28/2024	11:30	1,4-Dioxane (14DIOX)	2.1	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M46 & 46A Qtr 1	OCWD-M46 & 46A Qtr 2	OCWD-M46 & 46A Qtr 3	OCWD-M46 & 46A Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	88 - 230	84 - 224	92 - 224	84 - 220
Chloride (Cl), mg/L	OCWD	EPA 300.0	7.9 - 15.5	9.3 - 14.1	8.4 - 15.5	9.2 - 12.6
Sulfate (SO4), mg/L	OCWD	EPA 300.0	1.1 - 27.8	1 - 27.9	1.1 - 28.3	1.2 - 27.8
Sodium (Na), mg/L	OCWD	EPA 200.7	8 - 78.5	8.6 - 82.7	8.4 - 81.5	8.4 - 77.2
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	ND - 1.4	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.64	ND - 1.54	ND - 1.51	ND - 1.47
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.005	ND - 0.005	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 28.8	ND - 26.4	ND - 23.8	ND - 19.9
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 5.4	ND - 5.4	ND - 5.4	ND - 5.3
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND - 70	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.41 - 0.15	-0.39 - 0.17	-0.21 - 0.18	-0.45 - 0.14
Turbidity (TURB), NTU	OCWD	SM 2130B	0.1 - 0.25	0.1 - 0.7	ND - 0.2	ND - 0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	14.1 - 71.6	14.4 - 68.3	14.1 - 75.6	13.8 - 58.6
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 1.9	ND - 1.5	ND - 1.8	ND - 1.5
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 16.2	ND - 28.3	ND - 15.4	ND - 15.5
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 4.2	ND - 4.1	ND - 3.6	ND - 4.1
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.44	ND - 0.44	ND - 0.53	ND - 0.43
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 2.4	ND - 2.5	ND - 2.2	ND - 3
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND - TR	ND - TR	ND - TR
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.5	ND - 1.4	ND - 1.7	ND - 2.1
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND - 2.4	ND	ND	ND - 2.1
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	1 - 8.4	1.2 - 8.6	ND - 8	1.1 - 7.8
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 0.9	ND - 1	ND - 0.5	ND

Summary of 2024 Water Quality Monitoring

Method	Description	Lab	OCWD-M46 & 46A Qtr 1	OCWD-M46 & 46A Qtr 2	OCWD-M46 & 46A Qtr 3	OCWD-M46 & 46A Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < NL	ND < MCL	ND < NL	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND	ND	ND < NL

OCWD-M46A/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/8/2024	8:50	Chloroform (CHCl3)	1.5	ug/L	0.5
1/8/2024	8:50	Total Trihalomethanes (TTHMs)	1.5	ug/L	0.5

METHOD: ***NDMA-LOW***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/8/2024	8:50	N-Nitrosodimethylamine (NDMA)	2.4	ng/L	2

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/1/2024	10:05	Chloroform (CHCl3)	1.2	ug/L	0.5
4/1/2024	10:05	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
4/1/2024	10:05	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/8/2024	9:20	Chloroform (CHCl3)	1.7	ug/L	0.5
7/8/2024	9:20	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
7/8/2024	9:20	Total Trihalomethanes (TTHMs)	1.7	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/1/2024	10:05	Chloroform (CHCl3)	1.3	ug/L	0.5
10/1/2024	10:05	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
10/1/2024	10:05	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

OCWD-M46A/1
Organic Detections by Method

Year 2024, Quarter 4

METHOD: ***NDMA-LOW***

Sample Date & Time	Parameter	Result	Units	Reporting Limit
10/1/2024 10:05	N-Nitrosodimethylamine (NDMA)	2.1	ng/L	2

OCWD-M46/2
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date &	Time	Parameter	Result	Units	Reporting Limit
1/8/2024	10:30	Chloroform (CHCl3)	1.2	ug/L	0.5
1/8/2024	10:30	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date &	Time	Parameter	Result	Units	Reporting Limit
4/1/2024	12:30	Chloroform (CHCl3)	1.4	ug/L	0.5
4/1/2024	12:30	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date &	Time	Parameter	Result	Units	Reporting Limit
7/8/2024	10:05	Chloroform (CHCl3)	1.6	ug/L	0.5
7/8/2024	10:05	Total Trihalomethanes (TTHMs)	1.6	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date &	Time	Parameter	Result	Units	Reporting Limit
10/1/2024	12:10	Chloroform (CHCl3)	2.1	ug/L	0.5
10/1/2024	12:10	Total Trihalomethanes (TTHMs)	2.1	ug/L	0.5

OCWD-M46/5
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/8/2024	9:25	1,4-Dioxane (14DIOX)	0.9	ug/L	0.5

Year 2024, Quarter 2

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/1/2024	10:50	1,4-Dioxane (14DIOX)	1	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/1/2024	10:50	Primidone (PRIMDN)	1.163	ng/L	1

Year 2024, Quarter 3

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/8/2024	9:50	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M47 Qtr 1	OCWD-M47 Qtr 2	OCWD-M47 Qtr 3	OCWD-M47 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	110 - 230	98 - 230	100 - 240	90 - 228
Chloride (Cl), mg/L	OCWD	EPA 300.0	7.9 - 12.8	8.4 - 13.7	8.8 - 18.5	8 - 20.1
Sulfate (SO4), mg/L	OCWD	EPA 300.0	3.5 - 36.3	3.2 - 35.4	3.1 - 35.6	3 - 34.2
Sodium (Na), mg/L	OCWD	EPA 200.7	13.4 - 80.1	14.4 - 84.3	16.7 - 91.1	17.7 - 82
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	ND - 1.4	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.6	ND - 1.58	ND - 1.68	ND - 1.65
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	Not Required	ND	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 35	5.1 - 43.1	ND - 33.9	5.1 - 21.8
Manganese (Mn), ug/L	OCWD	EPA 200.8	1.6 - 15.9	ND - 15.6	ND - 14.1	ND - 12.6
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND - 70	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.32 - 0.2	-0.22 - 0.23	-0.13 - 0.26	-0.12 - 0.23
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 1.7	ND - 0.35	ND - 0.5	ND - 0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	11 - 60.7	11.7 - 68	12.6 - 88	11.5 - 99.3
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 2.5	ND - 1.5	ND - 1.4	ND - 1.6
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 42	ND - 52.2	ND - 19.9	ND - 14
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 4.9	ND - 5.4	ND - 4.5	ND - 4.3
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.29	ND - 0.31	ND - 0.42	ND - 0.47
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND - 1.3	ND - 1.5	ND - 1.8
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.3	ND - 1.3	ND - 1.1	ND - 1.1
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 3.5	ND - 3.6	ND - 3.3	ND - 3.5
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	ND	ND

Summary of 2024 Water Quality Monitoring

Method	Description	Lab	OCWD-M47 Qtr 1	OCWD-M47 Qtr 2	OCWD-M47 Qtr 3	OCWD-M47 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M47/2
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
1/23/2024	10:00	Chloroform (CHCl3)	1.3	ug/L	0.5
1/23/2024	10:00	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/16/2024	11:05	Chloroform (CHCl3)	1.3	ug/L	0.5
4/16/2024	11:05	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
7/23/2024	9:40	Chloroform (CHCl3)	1.1	ug/L	0.5
7/23/2024	9:40	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/15/2024	10:30	Chloroform (CHCl3)	1.1	ug/L	0.5
10/15/2024	10:30	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Appendix H

Talbert Barrier Compliance Monitoring Well Groundwater Quality Data

1,4-Dioxane and NDMA

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

TABLE H-1
MONITORING WELL OCWD-M10
1,4-dioxane and NDMA Concentrations, 2020 - 2024

M10/1 *Talbert, Alpha-III Aquifers* *Perforations: 80-160 ft bgs*			**M10/2** *Beta-I,II Aquifers* *Perforations: 175-195 ft bgs*			**M10/3** *Beta-III Aquifer* *Perforations: 215-240 ft bgs*			**M10/4** *Lambda, Omicron, Upper Rho Aquifers* *Perforations: 280-305 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/20/2020	<1	<2	1/20/2020	<1	<2	1/20/2020	4.8	<2	1/20/2020	1.1	<2
4/20/2020	1	<2	4/20/2020	<1	<2	2/18/2020	5.8	<2	4/20/2020	1.4	<2
7/20/2020	0.8	<2	7/20/2020	<0.5	<2	4/20/2020	5.8	<2	7/20/2020	1.5	<2
10/19/2020	1	<2	10/19/2020	<0.5	<2	7/20/2020	5.2	<2	10/19/2020	1.9	<2
1/18/2021	0.8	<2	1/18/2021	<0.5	<2	10/19/2020	5.2	<2	1/18/2021	1.9	<2
4/19/2021	0.8	<2	4/19/2021	<0.5	<2	1/18/2021	4.5	<2	4/19/2021	1.8	<2
7/19/2021	1.1	<2	7/19/2021	<0.5	<2	4/19/2021	5	<2	7/19/2021	2	<2
10/18/2021	1.5	<2	10/18/2021	0.6	<2	7/19/2021	4.3	<2	10/18/2021	2.5	<2
1/17/2022	1.3	<2	1/17/2022	<0.5	<2	10/18/2021	4.7	<2	1/17/2022	2.1	<2
4/25/2022	0.7	<2	4/25/2022	<0.5	<2	1/17/2022	4.9	<2	4/25/2022	1.2	<2
7/18/2022	1	<2	7/18/2022	<0.5	<2	4/25/2022	4.5	<2	7/18/2022	1.8	<2
10/5/2022	0.8	<2	10/5/2022	<0.5	<2	7/18/2022	5.5	<2	10/5/2022	1.1	<2
1/9/2023	0.7	<2	1/9/2023	<0.5	<2	10/5/2022	3.7	<2	1/9/2023	1.1	<2
4/4/2023	<0.5	<2	4/4/2023	<0.5	<2	1/9/2023	4.4	<2	4/4/2023	1	<2
5/18/2023	0.5	na	7/24/2023	<0.5	<2	4/4/2023	4.1	<2	5/18/2023	0.9	na
7/24/2023	<0.5	<2	10/16/2023	<0.5	<2	5/18/2023	4.2	na	7/24/2023	0.8	<2
10/16/2023	0.7	<2	1/22/2024	<0.5	<2	7/24/2023	4.1	<2	10/16/2023	0.9	<2
1/22/2024	0.5	<2	4/2/2024	<0.5	<2	10/16/2023	4.4	<2	1/22/2024	0.8	<2
4/2/2024	<0.5	<2	7/22/2024	<0.5	<2	1/22/2024	4.5	<2	4/2/2024	0.8	<2
7/22/2024	<0.5	<2	10/14/2024	<0.5	<2	4/2/2024	4.2	<2	7/22/2024	0.7	<2
10/14/2024	<0.5	<2				7/22/2024	4	<2	10/14/2024	0.9	<2
						10/14/2024	3.7	<2			

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-2
MONITORING WELL OCWD-M11
1,4-dioxane and NDMA Concentrations, 2020 - 2024

M11/1 *Talbert Aquifer Perforations 70-105 ft bgs*			**M11/2** *Talbert, Alpha-III Aquifers Perforations 125-150 ft bgs*			**M11/3** *Beta-I, Beta-II, Beta-III Aquifers Perforations 170-225 ft bgs*			**M11/4** *Lambda, Omicron Aquifers Perforations 260-290 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/22/2020	1.6	<2	1/22/2020	<1	<2	1/22/2020	<1	<2	1/22/2020	<1	<2
4/22/2020	1.1	<2	4/22/2020	<1	<2	4/22/2020	<1	<2	4/22/2020	1	<2
7/22/2020	1.2	<2	7/22/2020	0.6	<2	7/22/2020	<0.5	<2	7/22/2020	0.9	<2
10/21/2020	1.3	<2	10/21/2020	0.8	<2	10/21/2020	<0.5	<2	10/21/2020	1.1	<2
1/20/2021	1.8	<2	1/20/2021	1	<2	1/20/2021	<0.5	<2	1/20/2021	1.3	<2
4/21/2021	1.4	<2	4/21/2021	0.6	<2	4/21/2021	<0.5	<2	4/21/2021	0.7	<2
7/21/2021	1.6	<2	7/21/2021	0.9	<2	7/21/2021	<0.5	<2	7/21/2021	0.9	<2
10/20/2021	1.5	<2	10/20/2021	0.9	<2	10/20/2021	<0.5	<2	10/20/2021	1	<2
1/19/2022	1.4	<2	1/19/2022	0.9	<2	1/19/2022	<0.5	<2	1/19/2022	1.2	<2
4/27/2022	1	<2	4/27/2022	<0.5	<2	4/27/2022	<0.5	<2	4/27/2022	1.2	<2
7/20/2022	1.6	<2	7/20/2022	0.7	<2	7/20/2022	<0.5	<2	7/20/2022	0.9	<2
10/17/2022	1.4	<2	10/17/2022	0.8	<2	10/17/2022	<0.5	<2	10/17/2022	0.9	<2
1/25/2023	0.9	<2	1/25/2023	<0.5	<2	1/25/2023	<0.5	<2	1/25/2023	0.6	<2
4/19/2023	0.7	<2	4/19/2023	<0.5	<2	4/19/2023	<0.5	<2	4/19/2023	0.5	<2
7/26/2023	0.8	<2	7/26/2023	<0.5	<2	7/26/2023	<0.5	<2	7/26/2023	0.5	<2
10/18/2023	0.6	<2	10/18/2023	<0.5	<2	10/18/2023	<0.5	<2	10/18/2023	0.5	<2
1/24/2024	<0.5	<2	1/24/2024	<0.5	<2	1/24/2024	<0.5	<2	1/24/2024	0.7	<2
5/15/2024	<0.5	<2	5/15/2024	<0.5	<2	5/15/2024	<0.5	<2	5/15/2024	0.6	<2
7/24/2024	<0.5	<2	7/24/2024	<0.5	<2	7/24/2024	<0.5	<2	7/24/2024	0.6	<2
10/16/2024	<0.5	<2	10/16/2024	<0.5	<2	10/16/2024	<0.5	<2	10/16/2024	0.6	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-3
MONITORING WELL OCWD-M45
1,4-dioxane and NDMA Concentrations, 2020 - 2024

M45/1 *Alpha-III, Beta-I,II Perforations 195-205 ft bgs*			**M45/2** *Beta-III Aquifer Perforations 250-260 ft bgs*			**M45/3** *Omicron Aquifer Perforations 335-345 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
2/5/20	<1	<2	02/05/20	<1	<2	02/05/20	3.1	<2
5/4/20	<1	<2	05/04/20	<1	<2	05/04/20	7.4	<2
8/3/20	<0.5	<2	08/03/20	0.5	<2	08/03/20	5.6	<2
11/2/20	<0.5	<2	11/02/20	<0.5	<2	11/02/20	3.9	<2
2/1/21	<0.5	<2	02/01/21	<0.5	<2	02/01/21	2.7	<2
5/3/21	<0.5	<2	05/03/21	<0.5	<2	05/03/21	7.6	<2
8/9/21	<0.5	<2	08/09/21	0.5	<2	08/09/21	3.1	<2
11/1/21	<0.5	<2	11/01/21	<0.5	<2	11/01/21	4.2	<2
1/31/22	<0.5	<2	01/31/22	0.6	<2	01/31/22	5.3	<2
5/9/22	<0.5	<2	05/09/22	0.6	<2	05/09/22	2.3	<2
5/23/22	na	na	5/23/22	na	na	05/23/22	3	na
8/1/22	<0.5	<2	08/01/22	0.6	<2	08/01/22	3.5	<2
10/31/22	<0.5	<2	10/31/22	0.6	<2	10/31/22	2	<2
2/6/23	<0.5	<2	02/06/23	0.5	<2	02/06/23	2.1	<2
5/1/23	<0.5	<2	05/01/23	<0.5	<2	05/01/23	4.6	<2
8/7/23	<0.5	<2	08/07/23	0.6	<2	08/07/23	3.2	<2
10/30/23	<0.5	<2	10/30/23	0.6	<2	10/30/23	1.8	<2
2/7/24	<0.5	<2	02/07/24	<0.5	<2	02/07/24	2.6	<2
4/15/24	<0.5	<2	04/15/24	<0.5	<2	04/15/24	2.9	<2
8/5/24	<0.5	<2	08/05/24	<0.5	<2	08/05/24	1.5	<2
10/28/24	<0.5	<2	10/28/24	<0.5	<2	10/28/24	1.7	<2

M45/4 *Upper Rho Aquifer Perforations 380-390 ft bgs*			**M45/5** *Main Aquifer Perforations 780-790 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
02/05/20	1.3	<2	02/05/20	<1	<2
05/04/20	1.8	<2	05/04/20	<1	<2
08/03/20	1.6	<2	08/03/20	<0.5	<2
11/02/20	1.3	<2	11/02/20	<0.5	<2
02/01/21	1.2	<2	02/01/21	<0.5	<2
05/03/21	1.3	<2	05/03/21	<0.5	<2
08/09/21	1.1	<2	08/09/21	<0.5	<2
11/01/21	1.7	<2	11/01/21	<0.5	<2
01/31/22	1.4	<2	01/31/22	<0.5	<2
05/09/22	1.4	<2	05/09/22	<0.5	<2
06/23/22	1.2	na	06/23/22	na	na
08/01/22	1	<2	08/01/22	<0.5	<2
10/31/22	0.8	<2	10/31/22	<0.5	<2
02/06/23	0.9	<2	02/06/23	<0.5	<2
05/01/23	1.1	<2	05/01/23	<0.5	<2
08/07/23	0.8	<2	08/07/23	<0.5	<2
10/30/23	1	<2	10/30/23	<0.5	<2
02/07/24	2.2	<2	02/07/24	<0.5	<2
04/15/24	2.5	<2	04/15/24	<0.5	<2
08/05/24	2	<2	08/05/24	<0.5	<2
10/28/24	2.1	<2	10/28/24	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-4
MONITORING WELL OCWD-M46
1,4-dioxane and NDMA Concentrations, 2020 - 2024

M46A/1 *Lambda/Omicron Aquifers Perforations 350-370 ft bgs*			**M46/2** *Upper Rho Aquifer Perforations 420-430 ft bgs*			**M46/3** *Lower Rho Aquifer Perforations 515-535 ft bgs*			**M46/4** *Main Aquifer Perforations 640-660 ft bgs*			**M46/5** *Main Aquifer Perforations 890-910 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/06/20	<1	3.1	01/06/20	<1	<2	01/06/20	<1	<2	01/06/20	<1	<2	01/06/20	2.8	<2
04/08/20	<1	3.5	04/08/20	<1	<2	04/08/20	<1	<2	04/08/20	<1	<2	04/08/20	3.5	<2
07/06/20	<0.5	2.8	07/06/20	<0.5	<2	07/06/20	<0.5	<2	07/06/20	<0.5	<2	07/06/20	3.5	<2
10/05/20	<0.5	2.8	10/05/20	<0.5	<2	10/05/20	<0.5	<2	10/05/20	<0.5	<2	10/05/20	3.5	<2
01/04/21	<0.5	3.5	01/04/21	<0.5	<2	01/04/21	<0.5	<2	01/04/21	<0.5	<2	01/04/21	3.1	<2
04/05/21	<0.5	3.4	04/05/21	<0.5	<2	04/05/21	<0.5	<2	04/05/21	<0.5	<2	04/05/21	3.1	<2
07/06/21	<0.5	2.6	07/06/21	<0.5	<2	07/06/21	<0.5	<2	07/06/21	<0.5	<2	07/06/21	2.6	<2
10/04/21	<0.5	3	10/04/21	<0.5	<2	10/04/21	<0.5	<2	10/04/21	<0.5	<2	10/04/21	2.7	<2
01/03/22	<0.5	3.3	01/03/22	<0.5	<2	01/03/22	<0.5	<2	01/03/22	<0.5	<2	01/03/22	3.4	<2
04/11/22	<0.5	3	04/11/22	<0.5	<2	04/11/22	<0.5	<2	04/11/22	<0.5	<2	04/11/22	3.6	<2
07/05/22	<0.5	3.4	07/05/22	<0.5	<2	07/05/22	<0.5	<2	07/05/22	<0.5	<2	07/05/22	2.8	<2
10/03/22	<0.5	3.6	10/03/22	<0.5	<2	10/03/22	<0.5	<2	10/03/22	<0.5	<2	10/03/22	1.5	<2
01/09/23	<0.5	4.1	01/09/23	<0.5	<2	01/09/23	<0.5	<2	01/09/23	<0.5	<2	01/09/23	1.7	<2
04/03/23	<0.5	4.3	04/03/23	<0.5	<2	04/03/23	<0.5	<2	04/03/23	<0.5	<2	04/03/23	1	<2
07/10/23	<0.5	3	07/10/23	<0.5	<2	07/10/23	<0.5	<2	07/10/23	<0.5	<2	05/17/23	1.4	na
10/02/23	<0.5	2.5	10/02/23	<0.5	<2	10/02/23	<0.5	<2	10/02/23	<0.5	<2	07/10/23	1	<2
01/08/24	<0.5	2.4	01/08/24	<0.5	<2	01/08/24	<0.5	<2	01/08/24	<0.5	<2	10/02/23	1	<2
04/01/24	<0.5	<2	04/01/24	<0.5	<2	04/01/24	<0.5	<2	04/01/24	<0.5	<2	01/08/24	0.9	<2
07/08/24	<0.5	<2	07/08/24	<0.5	<2	07/08/24	<0.5	<2	07/08/24	<0.5	<2	04/01/24	1	<2
10/01/24	<0.5	2.1	10/01/24	<0.5	<2	10/01/24	<0.5	<2	10/01/24	<0.5	<2	07/08/24	0.5	<2
												10/01/24	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-5
MONITORING WELL OCWD-M47
1,4-dioxane and NDMA Concentrations
2020 - 2024

M47/1 *Beta-III Aquifer Perforations 355-375 bgs*			**M47/2** *Upper Rho Aquifer Perforations 470-480 ft bgs*			**M47/3** *Lower Rho Aquifer Perforations 580-600 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/21/20	<1	<2	01/21/20	<1	<2	01/21/20	<1	<2
04/21/20	<1	<2	04/21/20	<1	<2	04/21/20	<1	<2
07/21/20	0.6	<2	07/21/20	0.5	<2	07/21/20	<0.5	<2
10/20/20	0.7	<2	10/20/20	0.6	<2	10/20/20	<0.5	<2
01/19/21	0.7	<2	01/19/21	<0.5	<2	01/19/21	<0.5	<2
04/20/21	0.6	<2	04/20/21	<0.5	<2	04/20/21	<0.5	<2
07/20/21	0.5	<2	07/20/21	0.5	<2	07/20/21	<0.5	<2
10/19/21	0.6	<2	10/19/21	0.5	<2	10/19/21	<0.5	<2
01/18/22	0.5	<2	01/18/22	0.6	<2	01/18/22	<0.5	<2
04/26/22	<0.5	<2	04/26/22	<0.5	<2	04/26/22	<0.5	<2
07/19/22	0.5	<2	07/19/22	0.6	<2	07/19/22	<0.5	<2
10/18/22	0.5	<2	10/18/22	<0.5	<2	10/18/22	<0.5	<2
01/23/23	<0.5	<2	01/23/23	<0.5	<2	01/23/23	<0.5	<2
04/18/23	<0.5	<2	04/18/23	<0.5	<2	04/18/23	<0.5	<2
07/25/23	<0.5	<2	07/25/23	<0.5	<2	07/25/23	<0.5	<2
10/17/23	<0.5	<2	10/17/23	<0.5	<2	10/17/23	<0.5	<2
01/23/24	<0.5	<2	01/23/24	<0.5	<2	01/23/24	<0.5	<2
04/16/24	<0.5	<2	04/16/24	<0.5	<2	04/16/24	<0.5	<2
07/23/24	<0.5	<2	07/23/24	<0.5	<2	07/23/24	<0.5	<2
10/15/24	<0.5	<2	10/15/24	<0.5	<2	10/15/24	<0.5	<2

M47/4 *Main Aquifer Perforations 745-765 ft bgs*			**M47/5** *Main Aquifer Perforations 940-960 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/21/20	<1	<2	01/21/20	<1	<2
04/21/20	<1	<2	04/21/20	<1	<2
07/21/20	<0.5	<2	07/21/20	<0.5	<2
10/20/20	<0.5	<2	10/20/20	<0.5	<2
01/19/21	<0.5	<2	01/19/21	<0.5	<2
04/20/21	<0.5	<2	04/20/21	<0.5	<2
07/20/21	<0.5	<2	07/20/21	<0.5	<2
10/19/21	<0.5	<2	10/19/21	<0.5	<2
01/18/22	<0.5	<2	01/18/22	<0.5	<2
04/26/22	<0.5	<2	04/26/22	<0.5	<2
07/19/22	<0.5	<2	07/19/22	<0.5	<2
10/18/22	<0.5	<2	10/18/22	<0.5	<2
01/23/23	<0.5	<2	01/23/23	<0.5	<2
04/18/23	<0.5	<2	04/18/23	<0.5	<2
07/25/23	<0.5	<2	07/25/23	<0.5	<2
10/17/23	<0.5	<2	10/17/23	<0.5	<2
01/23/24	<0.5	<2	01/23/24	<0.5	<2
04/16/24	<0.5	<2	04/16/24	<0.5	<2
07/23/24	<0.5	<2	07/23/24	<0.5	<2
10/15/24	<0.5	<2	10/15/24	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

Appendix I

Groundwater Quality Data
at the Anaheim Forebay

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

GWRS 2024 Quarterly Sampling Dates
OCWD Water Quality Department
ANAHEIM FOREBAY - GROUNDWATER

Monitoring Well	Qtr 1	Qtr 2	Qtr 3	Qtr 4
AM-7/1	02/21/2024	05/14/2024	08/21/2024	11/14/2024
AM-8/1	02/21/2024	05/14/2024	08/21/2024	11/13/2024
AM-10/1	02/21/2024	05/14/2024	08/21/2024	11/14/2024
AMD-12/1-5	02/21/2024	04/29/2024	08/19/2024	11/12/2024
OCWD-KB1/1	02/21/2024	05/14/2024	08/21/2024	11/13/2024

Notes for Appendix J Tables:

► Water quality data are summarized for compliance monitoring wells AM-7, AM-8, AM-10, AMD-12, and also a non-compliance monitoring well OCWD-KB1 in the following tables.

► Listed dates (above) are the quarterly compliance monitoring dates; other samples may have been collected during the year. Detections of organic chemicals are reported for all samples collected in 2024 and are not limited to the quarterly compliance samples.

► The annual compliance samples were collected during the second quarter of 2024 per the previously established compliance quarter rotation schedule.

► Results listed in the table for each quarter are the range of the minimum to maximum value detected at the well location, which may consist of one to five well casings. Figures and report text list the well ID (e.g., AMD-10) and casing number (e.g., AMD-12 has five well casings: AMD-12/1, AMD-12/2, AMD-12/3, AMD-12/4 and AMD12/5), as appropriate.

► Appendices B & C contain a list of all methods and Reporting limits (RL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate.

► MCL: Maximum Contaminant Level

► N/A: Not applicable

► ND: Not detected at Reporting Limit (RL)

► NL: SWRCB DDW (formerly CDPH) Notification Level

► NR: Not required

► NS: Not sampled

► RL: Response Level

► TR: Trace

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	AM-7 Qtr 1	AM-7 Qtr 2	AM-7 Qtr 3	AM-7 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	250	256	344	294
Chloride (Cl), mg/L	OCWD	EPA 300.0	36.7	44.6	58.4	58.3
Sulfate (SO4), mg/L	OCWD	EPA 300.0	35.3	40.9	63.4	58.3
Sodium (Na), mg/L	OCWD	EPA 200.7	44.3	46.3	51.4	51.5
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	1.5	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.61	1.55	1.75	1.46
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	0.004	0.008	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	811	396	574	692
Manganese (Mn), ug/L	OCWD	EPA 200.8	10.1	7.5	11.3	13.3
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.22	-0.09	0.04	0.08
Turbidity (TURB), NTU	OCWD	SM 2130B	1.9	1.2	1.1	2.1
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	83.3	106	152	155
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	1	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	2.8	2.5	2.3	2.2
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	1.1	2	1.3
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	0.5	0.7	0.6	0.8
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	Not Required	ND	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	3.9	3.2	3	3
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	Not Required	ND	Not Required	Not Required

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AM-7 Qtr 1	AM-7 Qtr 2	AM-7 Qtr 3	AM-7 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	Not Required	ND	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	Not Required	ND	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required

AM-7/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	10:30	Chloroform (CHCl3)	0.5	ug/L	0.5
2/21/2024	10:30	Total Trihalomethanes (TTHMs)	0.5	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	10:05	Chloroform (CHCl3)	0.7	ug/L	0.5
5/14/2024	10:05	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	10:05	Carbamazepine (CBMAZP)	13.19	ng/L	1
5/14/2024	10:05	Imidacloprid (IMIDCP)	3.36	ng/L	1
5/14/2024	10:05	Primidone (PRIMDN)	14.651	ng/L	1
5/14/2024	10:05	Sucralose (SUCRAL)	5940	ng/L	100
5/14/2024	10:05	Sulfamethoxazole (SULTHZ)	23.331	ng/L	1

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/21/2024	11:05	Chloroform (CHCl3)	0.6	ug/L	0.5
8/21/2024	11:05	Total Trihalomethanes (TTHMs)	0.6	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/14/2024	9:15	Chloroform (CHCl3)	0.8	ug/L	0.5
11/14/2024	9:15	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	AM-8 Qtr 1	AM-8 Qtr 2	AM-8 Qtr 3	AM-8 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	334	294	364	310
Chloride (Cl), mg/L	OCWD	EPA 300.0	54.9	48.5	62.8	62
Sulfate (SO4), mg/L	OCWD	EPA 300.0	67.2	57.4	77.6	46.7
Sodium (Na), mg/L	OCWD	EPA 200.7	53.4	49.9	57.3	59.6
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	1.2	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.2	1.21	1.33	1.38 - 2.32
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	0.012	0.013	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	266	418	390	329
Manganese (Mn), ug/L	OCWD	EPA 200.8	6.5	6.3	8	8.9
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	ND	-0.08	0.02	0.07
Turbidity (TURB), NTU	OCWD	SM 2130B	0.5	0.65	1.1	1.1
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	134	119	157	157
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	1.1	ND	ND	1.2
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.3	1.4	1.3	1.4
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	1.2	1.1	1.8	1.1
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	0.8	0.8	0.7	0.8
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	Not Required	ND	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.3	2.3	2	2.2
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	Not Required	ND	Not Required	Not Required

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AM-8 Qtr 1	AM-8 Qtr 2	AM-8 Qtr 3	AM-8 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	Not Required	ND	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	Not Required	ND	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required

AM-8/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	11:30	Chloroform (CHCl3)	0.8	ug/L	0.5
2/21/2024	11:30	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	12:05	Chloroform (CHCl3)	0.8	ug/L	0.5
5/14/2024	12:05	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	12:05	Carbamazepine (CBMAZP)	3.945	ng/L	1
5/14/2024	12:05	Imidacloprid (IMIDCP)	1.257	ng/L	1
5/14/2024	12:05	Primidone (PRIMDN)	7.739	ng/L	1
5/14/2024	12:05	Simazine (SIMAZ)	0.0072	ug/L	0.005
5/14/2024	12:05	Sucralose (SUCRAL)	2130	ng/L	100
5/14/2024	12:05	Sulfamethoxazole (SULTHZ)	14.838	ng/L	1

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/21/2024	10:35	Chloroform (CHCl3)	0.7	ug/L	0.5
8/21/2024	10:35	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/13/2024	10:40	Chloroform (CHCl3)	0.8	ug/L	0.5

AM-8/1
Organic Detections by Method

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/13/2024	10:40	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	AM-10 Qtr 1	AM-10 Qtr 2	AM-10 Qtr 3	AM-10 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	106	66	61	38
Chloride (Cl), mg/L	OCWD	EPA 300.0	9.8	6	3.5	3.9
Sulfate (SO4), mg/L	OCWD	EPA 300.0	0.7	0.9	0.8	0.6
Sodium (Na), mg/L	OCWD	EPA 200.7	7.7	7.4	7.2	7.3 - 7.6
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	0.9	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.59	1.11	0.85	0.92
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	ND	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	15.5	28.3	12.3	10.5 - 23.2
Manganese (Mn), ug/L	OCWD	EPA 200.8	1.7	1.9	1.5	1.3
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-1.06	-1.17	-1.11	-1.1
Turbidity (TURB), NTU	OCWD	SM 2130B	0.1	0.1	0.85	ND
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	36.6	32.3	29.8	30.8
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.5	1.6	1.4	1.5
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	0.16
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	TR	TR	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	TR	TR	0.8	1.3
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	0.7	1.6	1.8	2.4
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	Not Required	ND	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	3.4	3.5	3.1	3.2 - 3.5
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	Not Required	ND	Not Required	Not Required

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AM-10 Qtr 1	AM-10 Qtr 2	AM-10 Qtr 3	AM-10 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	Not Required	ND	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	Not Required	ND	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required

AM-10/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	9:25	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
2/21/2024	9:25	Chloroform (CHCl3)	0.7	ug/L	0.5
2/21/2024	9:25	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
2/21/2024	9:25	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	9:10	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/14/2024	9:10	Chloroform (CHCl3)	1.6	ug/L	0.5
5/14/2024	9:10	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
5/14/2024	9:10	Total Trihalomethanes (TTHMs)	1.6	ug/L	0.5

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/21/2024	11:45	Bromodichloromethane (CHBrCl)	0.8	ug/L	0.5
8/21/2024	11:45	Chloroform (CHCl3)	1.8	ug/L	0.5
8/21/2024	11:45	Total Trihalomethanes (TTHMs)	2.5	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/14/2024	9:55	Bromodichloromethane (CHBrCl)	1.3	ug/L	0.5
11/14/2024	9:55	Chloroform (CHCl3)	2.4	ug/L	0.5
11/14/2024	9:55	Total Trihalomethanes (TTHMs)	3.8	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	AMD-12 Qtr 1	AMD-12 Qtr 2	AMD-12 Qtr 3	AMD-12 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	124 - 558	90 - 562	100 - 578	70 - 548
Chloride (Cl), mg/L	OCWD	EPA 300.0	14.2 - 104	12.1 - 103	9.1 - 103	7.2 - 99.8
Sulfate (SO4), mg/L	OCWD	EPA 300.0	8.6 - 135	3.5 - 139	1.9 - 139	1 - 124
Sodium (Na), mg/L	OCWD	EPA 200.7	20.9 - 87.2	18.1 - 87.5	15.1 - 85.8	13.4 - 85.4
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	1 - 1.4	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1 - 1.63	0.92 - 1.55	1.04 - 1.66	1.07 - 1.4
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	ND	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 14.6	ND - 12.7	ND - 7.1	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 1.9	ND - 1.5	ND - 1.6	ND
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.68 - 0.48	-1.1 - 0.42	-1.12 - 0.46	-1.19 - 0.4
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.2	ND	ND - 0.1	ND - 0.1
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	44.2 - 265	28.6 - 273	27.4 - 266	23.9 - 251
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 2.1	ND - 1.3	ND - 1.5	ND - 1.6
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND - 5.2
Arsenic (As), ug/L	OCWD	EPA 200.8	1 - 3.8	ND - 4.8	1.1 - 3	1.3 - 4.9
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND - 1.8	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.21	ND	ND	0.13 - 0.26
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 6.8	ND - 5.2	ND - 7	ND - 6
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 1.5	ND - 1.3	ND - 1.6	ND - 1.2
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND - TR
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 0.9	ND - 0.8	ND - 0.9	ND - 1.5
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	Not Required	ND	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.3 - 5	2 - 5.1	2.4 - 5.6	2.6 - 6.4
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	Not Required	ND	Not Required	Not Required

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AMD-12 Qtr 1	AMD-12 Qtr 2	AMD-12 Qtr 3	AMD-12 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	Not Required	ND	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	Not Required	ND	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required

AMD-12/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	9:35	Chloroform (CHCl3)	0.9	ug/L	0.5
2/21/2024	9:35	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	9:40	Chloroform (CHCl3)	0.7	ug/L	0.5
4/29/2024	9:40	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	9:40	Primidone (PRIMDN)	1.224	ng/L	1
4/29/2024	9:40	Sucralose (SUCRAL)	206.346	ng/L	100
4/29/2024	9:40	Sulfamethoxazole (SULTHZ)	2.915	ng/L	1

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/19/2024	10:15	Chloroform (CHCl3)	0.9	ug/L	0.5
8/19/2024	10:15	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/12/2024	10:05	Chloroform (CHCl3)	1.5	ug/L	0.5
11/12/2024	10:05	Total Trihalomethanes (TTHMs)	1.5	ug/L	0.5

AMD-12/2
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	10:20	Chloroform (CHCl3)	0.9	ug/L	0.5
2/21/2024	10:20	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	10:40	Chloroform (CHCl3)	0.8	ug/L	0.5
4/29/2024	10:40	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	10:40	Simazine (SIMAZ)	0.0062	ug/L	0.005

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/19/2024	11:05	Chloroform (CHCl3)	0.8	ug/L	0.5
8/19/2024	11:05	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/12/2024	10:45	Chloroform (CHCl3)	1.1	ug/L	0.5
11/12/2024	10:45	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
11/12/2024	10:45	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

AMD-12/3
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	11:00	Chloroform (CHCl3)	0.5	ug/L	0.5
2/21/2024	11:00	Total Trihalomethanes (TTHMs)	0.5	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	11:45	Chloroform (CHCl3)	0.6	ug/L	0.5
4/29/2024	11:45	Total Trihalomethanes (TTHMs)	0.6	ug/L	0.5

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	11:45	Carbamazepine (CBMAZP)	10.693	ng/L	1
4/29/2024	11:45	Imidacloprid (IMIDCP)	1.539	ng/L	1
4/29/2024	11:45	Primidone (PRIMDN)	13.099	ng/L	1
4/29/2024	11:45	Simazine (SIMAZ)	0.0121	ug/L	0.005
4/29/2024	11:45	Sucralose (SUCRAL)	2180	ng/L	100
4/29/2024	11:45	Sulfamethoxazole (SULTHZ)	15.261	ng/L	1

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/19/2024	12:10	Chloroform (CHCl3)	0.5	ug/L	0.5
8/19/2024	12:10	Total Trihalomethanes (TTHMs)	0.5	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
11/12/2024	11:40	Chloroform (CHCl3)	0.5	ug/L	0.5

AMD-12/3
Organic Detections by Method

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
11/12/2024 11:40	Total Trihalomethanes (TTHMs)	0.5	ug/L	0.5

AMD-12/4
Organic Detections by Method

Year 2024, Quarter 2

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/29/2024	11:20	Carbamazepine (CBMAZP)	28.834	ng/L	1
4/29/2024	11:20	Imidacloprid (IMIDCP)	2.639	ng/L	1
4/29/2024	11:20	Primidone (PRIMDN)	27.012	ng/L	1
4/29/2024	11:20	Simazine (SIMAZ)	0.0223	ug/L	0.005
4/29/2024	11:20	Sucralose (SUCRAL)	5150	ng/L	100
4/29/2024	11:20	Sulfamethoxazole (SULTHZ)	23.463	ng/L	1

AMD-12/5
Organic Detections by Method

Year 2024, Quarter 2

METHOD: ***CEC***

Sample Date & Time	Parameter	Result	Units	Reporting Limit
4/29/2024 10:15	Atrazine (ATRAZ)	0.0023	ug/L	0.001
4/29/2024 10:15	Carbamazepine (CBMAZP)	11.47	ng/L	1
4/29/2024 10:15	Primidone (PRIMDN)	18.321	ng/L	1
4/29/2024 10:15	Simazine (SIMAZ)	0.0495	ug/L	0.005
4/29/2024 10:15	Sucralose (SUCRAL)	1560	ng/L	100
4/29/2024 10:15	Sulfamethoxazole (SULTHZ)	23.953	ng/L	1

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	OCWD-KB1 Qtr 1	OCWD-KB1 Qtr 2	OCWD-KB1 Qtr 3	OCWD-KB1 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	280	476	274	72
Chloride (Cl), mg/L	OCWD	EPA 300.0	47.3	86.4	36.6	41.5
Sulfate (SO4), mg/L	OCWD	EPA 300.0	41	95.3	40.6	35.7
Sodium (Na), mg/L	OCWD	EPA 200.7	38.6	62.5	48.3	25.3
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	2	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	2.03	1.97	1.2	ND - 1.24
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	ND	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND	7.2
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.27	0.24	-0.15	-0.91
Turbidity (TURB), NTU	OCWD	SM 2130B	0.1	ND	1.1	0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	111	232	103	25.1
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	1.4	2	1.7	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	13
Arsenic (As), ug/L	OCWD	EPA 200.8	1.7	1.1	1.6	3.9
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	0.25
Nickel (Ni), ug/L	OCWD	EPA 200.8	1	2.2	1.4	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	0.8	TR	1.4	1.5
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	Not Required	ND	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	3.9	2.1	2.9	6.2
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	Not Required	ND	Not Required	Not Required

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	OCWD-KB1 Qtr 1	OCWD-KB1 Qtr 2	OCWD-KB1 Qtr 3	OCWD-KB1 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	Not Required	ND	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	Not Required	ND	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND - Detections	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	Not Required	ND	Not Required	Not Required

OCWD-KB1/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
2/21/2024	12:15	Chloroform (CHCl3)	0.8	ug/L	0.5
2/21/2024	12:15	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	10:55	Chloroform (CHCl3)	TR	ug/L	0.5
5/14/2024	10:55	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
5/14/2024	10:55	Carbamazepine (CBMAZP)	36.905	ng/L	1
5/14/2024	10:55	Dilantin (DILANT)	13.067	ng/L	10
5/14/2024	10:55	Diuron (DIURON)	0.01	ug/L	0.005
5/14/2024	10:55	Imidacloprid (IMIDCP)	7.744	ng/L	1
5/14/2024	10:55	Primidone (PRIMDN)	39.717	ng/L	1
5/14/2024	10:55	Simazine (SIMAZ)	0.01	ug/L	0.005
5/14/2024	10:55	Sucralose (SUCRAL)	9370	ng/L	1000
5/14/2024	10:55	Sulfamethoxazole (SULTHZ)	40.068	ng/L	1

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/21/2024	9:30	Chloroform (CHCl3)	1.4	ug/L	0.5
8/21/2024	9:30	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

OCWD-KB1/1
Organic Detections by Method

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
11/13/2024 11:25	Chloroform (CHCl3)	1.5	ug/L	0.5
11/13/2024 11:25	Total Trihalomethanes (TTHMs)	1.5	ug/L	0.5

Appendix J

Anaheim Forebay Compliance Monitoring Well Groundwater Quality

1,4-Dioxane and NDMA

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

TABLE J-1
OCWD MONITORING WELL AM-7
1,4-dioxane and NDMA
Concentrations
2020 - 2024

AM-7/1 *Shallow Aquifer* *Perforations: 210-225 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/28/2020	<1	na
3/17/2020	<1	na
6/16/2020	<1	<2
9/15/2021	<0.5	<2
11/29/2022	<0.5	<2
2/22/2023	<0.5	<2
5/14/2024	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"

2) na = not analyzed

TABLE J-2
OCWD MONITORING WELL AM-8
1,4-dioxane and NDMA
Concentrations
2020 - 2024

AM-8/1 *Shallow Aquifer* *Perforations: 268-285 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
3/17/2020	<1	na
6/16/2020	<1	<2
9/15/2021	<0.5	<2
11/29/2022	<0.5	<2
2/22/2023	<0.5	<2
5/14/2024	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-3
OCWD MONITORING WELL AMD-12
1,4-dioxane and NDMA Concentrations
2020 - 2024

AMD-12/1 *Principal Aquifer* *Perforations: 330-350 ft bgs*			**AMD-12/2** *Principal Aquifer* *Perforations: 490-520 ft bgs*			**AMD-12/3** *Principal Aquifer* *Perforations: 595-615 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
05/18/20	<1	<2	05/18/20	<1	<2	05/18/20	<1	<2
08/23/21	<0.5	<2	08/23/21	<0.5	<2	08/23/21	<0.5	<2
11/14/22	<0.5	<2	11/14/22	<0.5	<2	11/14/22	<0.5	<2
02/21/23	<0.5	<2	02/21/23	<0.5	<2	02/21/23	<0.5	<2
04/29/24	<0.5	<2	04/29/24	<0.5	<2	04/29/24	<0.5	<2

AMD-12/4 *Principal Aquifer* *Perforations: 725-745 ft bgs*			**AMD-12/5** *Principal Aquifer* *Perforations: 940-960 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
05/18/20	<1	<2	05/18/20	<1	<2
08/23/21	<0.5	<2	08/23/21	<0.5	<2
11/14/22	<0.5	<2	11/14/22	<0.5	<2
02/21/23	<0.5	<2	02/21/23	<0.5	<2
04/29/24	<0.5	<2	04/29/24	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-4
OCWD MONITORING WELL AM-10
1,4-dioxane and NDMA
Concentrations
2020 - 2024

AM-10/1 *Shallow Aquifer* *Perforations: 217-235 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
03/17/20	<1	na
06/16/20	<1	<2
09/15/21	<0.5	<2
11/29/22	<0.5	<2
02/22/23	<0.5	<2
05/14/24	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

Appendix K

Groundwater Quality Data at the Mid-Basin Area

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

GWRS 2024 Quarterly Sampling Dates

OCWD Water Quality Department

MID-BASIN INJECTION (MBI) PROJECT

GROUNDWATER

Monitoring Well	Qtr 1	Qtr 2	Qtr 3	Qtr 4
SAR-12/1-4	02/22/2024	04/17/2024	08/06/2024	10/29/2024
SAR-13/1-4	03/14/2024	04/30/2024	08/07/2024	10/29/2024

Notes for Appendix L Tables:

► The full-scale Mid-Basin (MBI) project operations began in March 2020.

► Listed dates (above) are the 2024 dates of quarterly baseline monitoring activities.

► Results listed in the table for each quarter are the range of the minimum and maximum values detected at the well location, which may consist of one to four well casings. Figures and report text list the well ID (e.g. SAR-12) and casing number (e.g., SAR-12/1, SAR-12/2, SAR-12/3 and SAR-12/4), as appropriate.

► Appendices B & C contain a list of all methods and Reporting limits (RL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate.

► MCL: Maximum Contaminant Level

► N/A: Not applicable

► ND: Not detected at Reporting Limit (RL)

► NL: SWRCB DDW (formerly CDPH) Notification Level

► NR: Not required

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	SAR-12 Qtr 1	SAR-12 Qtr 2	SAR-12 Qtr 3	SAR-12 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	84 - 230	100 - 234	108 - 254	98 - 232
Chloride (Cl), mg/L	OCWD	EPA 300.0	8 - 11.8	7.8 - 11.2	9.1 - 11.3	8.8 - 11.1
Sulfate (SO4), mg/L	OCWD	EPA 300.0	1.4 - 32	1.3 - 30.3	1.1 - 30.1	1 - 30.4
Sodium (Na), mg/L	OCWD	EPA 200.7	20.3 - 33.7	19.8 - 34.6	19.8 - 35	20.2 - 36.6
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	ND - 1.3	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.54	ND - 1.41	ND - 1.49	ND - 1.46
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	ND	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 9.4	ND - 15.8	ND - 10.1	ND - 10.7
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 13.7	ND - 13.6	ND - 13.1	ND - 13
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.71 - 0.3	-0.67 - 0.27	-0.75 - 0.22	-0.74 - 0.26
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	ND	ND - 0.35	ND
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	27.6 - 125	27.2 - 123	27.1 - 123	28 - 131
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND - 1.2	ND	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 6.2	ND - 6.4	ND - 6.6	ND - 6.6
Arsenic (As), ug/L	OCWD	EPA 200.8	1 - 3.1	1.4 - 3.7	1 - 3.1	ND - 3.1
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 5.47	ND - 5.23	ND - 5.82	ND - 6.11
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 1.1	ND - 1.4	ND - 1.8	ND - 1.5
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 1.5	ND - 1.7	ND - 1.3	ND - 1.4
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND - TR	ND - TR	ND - TR	ND - 0.25
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND - TR	ND - TR	ND - TR	ND - 0.7
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.4	ND - 1.4	ND - 1.2	ND - 1.7
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND - 2.1	ND - 2.7	ND - 2.5	ND - 2.5
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 7.8	ND - 7.1	ND - 7.4	ND - 7.3
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	ND	ND

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	SAR-12 Qtr 1	SAR-12 Qtr 2	SAR-12 Qtr 3	SAR-12 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND < NL	ND < NL	ND < NL

SAR-12/1
Organic Detections by Method

Year 2024, Quarter 3

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reporting Limit
8/6/2024	10:10	Chloroform (CHCl3)	TR	ug/L	0.5
8/6/2024	10:10	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reporting Limit
10/29/2024	10:00	Chloroform (CHCl3)	TR	ug/L	0.5
10/29/2024	10:00	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

SAR-12/3
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
2/22/2024 11:45	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
2/22/2024 11:45	Chloroform (CHCl3)	1.4	ug/L	0.5
2/22/2024 11:45	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
2/22/2024 11:45	N-Nitrosodimethylamine (NDMA)	2.1	ng/L	2

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
4/17/2024 13:00	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
4/17/2024 13:00	Chloroform (CHCl3)	1.4	ug/L	0.5
4/17/2024 13:00	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
4/17/2024 13:00	N-Nitrosodimethylamine (NDMA)	2.7	ng/L	2

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reporting Limit*
8/6/2024 11:55	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
8/6/2024 11:55	Chloroform (CHCl3)	1.2	ug/L	0.5
8/6/2024 11:55	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
8/6/2024 11:55	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

SAR-12/3
Organic Detections by Method

Year 2024, Quarter 3

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/6/2024	11:55	N-Nitrosodimethylamine (NDMA)	2.5	ng/L	2

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/29/2024	11:45	Bromodichloromethane (CHBrCl)	0.7	ug/L	0.5
10/29/2024	11:45	Chloroform (CHCl3)	1.7	ug/L	0.5
10/29/2024	11:45	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
10/29/2024	11:45	Total Trihalomethanes (TTHMs)	2.4	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/29/2024	11:45	N-Nitrosodimethylamine (NDMA)	2.5	ng/L	2

SAR-12/4
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reporting Limit
2/22/2024 10:50	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reporting Limit
4/17/2024 11:00	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reporting Limit
8/6/2024 10:40	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reporting Limit
10/29/2024 10:30	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Summary of 2024 Water Quality Monitoring

Parameter	Lab	Method	SAR-13 Qtr 1	SAR-13 Qtr 2	SAR-13 Qtr 3	SAR-13 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	74 - 118	88 - 130	84 - 142	60 - 130
Chloride (Cl), mg/L	OCWD	EPA 300.0	6.7 - 9.7	6.7 - 9.3	6.9 - 8.8	5.7 - 9.4
Sulfate (SO4), mg/L	OCWD	EPA 300.0	0.9 - 7.4	1.3 - 7.5	1.3 - 7.4	1.3 - 7.7
Sodium (Na), mg/L	OCWD	EPA 200.7	12 - 29.6	12.2 - 26.6	11.5 - 26.6	11.3 - 26.9
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	Not Required	ND - 2	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.54	ND - 1.46	ND - 1.41	ND - 1.45
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	Not Required	ND - 0.008	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 6.7	ND - 6	ND - 5.9	ND - 6.4
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	Not Required	ND	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	Not Required	ND	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.8 - -0.15	-0.78 - -0.11	-0.81 - -0.24	-0.81 - -0.2
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	ND	ND	ND
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	22.9 - 67.9	19.2 - 68.4	20.1 - 65.3	21 - 65.8
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND - 1.1	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 6.2	ND - 6.6	ND - 6.1	ND - 6.4
Arsenic (As), ug/L	OCWD	EPA 200.8	2 - 3.8	1.9 - 3.7	2.2 - 4	1.9 - 3.6
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.59	ND - 0.53	ND - 0.53	ND - 0.48
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 1.2	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND - TR	ND - TR	TR	0.25 - 0.5
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND - 0.9	ND - 0.8	ND - 0.7	ND - 1
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.9	ND - 1.5	ND - 1.5	ND - 2.3
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND - 2.4	ND - 2.9	ND - 2.9	ND - 2.7
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 15.2	ND - 14.4	ND - 14.7	ND - 15.3
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	ND	ND

Summary of 2024 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	SAR-13 Qtr 1	SAR-13 Qtr 2	SAR-13 Qtr 3	SAR-13 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	Not Required	ND	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	Not Required	ND	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	Not Required	ND	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND < NL	ND < NL	ND < NL

SAR-13/1
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
3/14/2024	10:20	Bromodichloromethane (CHBrCl)	0.8	ug/L	0.5
3/14/2024	10:20	Chloroform (CHCl3)	1.9	ug/L	0.5
3/14/2024	10:20	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
3/14/2024	10:20	Total Trihalomethanes (TTHMs)	2.7	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/30/2024	10:25	Bromodichloromethane (CHBrCl)	0.7	ug/L	0.5
4/30/2024	10:25	Chloroform (CHCl3)	1.5	ug/L	0.5
4/30/2024	10:25	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
4/30/2024	10:25	Total Trihalomethanes (TTHMs)	2.3	ug/L	0.5

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/7/2024	10:40	Bromodichloromethane (CHBrCl)	0.7	ug/L	0.5
8/7/2024	10:40	Chloroform (CHCl3)	1.5	ug/L	0.5
8/7/2024	10:40	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
8/7/2024	10:40	Total Trihalomethanes (TTHMs)	2.2	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/29/2024	10:30	Bromodichloromethane (CHBrCl)	0.8	ug/L	0.5
10/29/2024	10:30	Chloroform (CHCl3)	2	ug/L	0.5
10/29/2024	10:30	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
10/29/2024	10:30	Total Trihalomethanes (TTHMs)	2.8	ug/L	0.5

SAR-13/2
Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
3/14/2024	12:05	Methylene Chloride (CH_2Cl_2)	TR	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/30/2024	12:05	Methylene Chloride (CH_2Cl_2)	TR	ug/L	0.5

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/7/2024	11:50	Methylene Chloride (CH_2Cl_2)	TR	ug/L	0.5

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/29/2024	12:20	Methylene Chloride (CH_2Cl_2)	TR	ug/L	0.5

SAR-13/3

Organic Detections by Method

Year 2024, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
3/14/2024	11:40	Bromodichloromethane (CHBrCl)	0.9	ug/L	0.5
3/14/2024	11:40	Chloroform (CHCl3)	1.6	ug/L	0.5
3/14/2024	11:40	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
3/14/2024	11:40	Total Trihalomethanes (TTHMs)	2.5	ug/L	0.5

Year 2024, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/30/2024	12:00	Bromodichloromethane (CHBrCl)	0.8	ug/L	0.5
4/30/2024	12:00	Chloroform (CHCl3)	1.4	ug/L	0.5
4/30/2024	12:00	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
4/30/2024	12:00	Total Trihalomethanes (TTHMs)	2.1	ug/L	0.5

METHOD: ***NDMA-LOW***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/30/2024	12:00	N-Nitrosodimethylamine (NDMA)	2.2	ng/L	2

Year 2024, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/7/2024	12:15	Bromodichloromethane (CHBrCl)	0.7	ug/L	0.5
8/7/2024	12:15	Chloroform (CHCl3)	1.4	ug/L	0.5
8/7/2024	12:15	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
8/7/2024	12:15	Total Trihalomethanes (TTHMs)	2.1	ug/L	0.5

SAR-13/3
Organic Detections by Method

Year 2024, Quarter 4

METHOD: ***524.2***

Sample Date & Time	Parameter	Result	Units	Reporting Limit
10/29/2024 11:45	Bromodichloromethane (CHBrCl)	1	ug/L	0.5
10/29/2024 11:45	Chloroform (CHCl3)	2.3	ug/L	0.5
10/29/2024 11:45	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
10/29/2024 11:45	Total Trihalomethanes (TTHMs)	3.3	ug/L	0.5

SAR-13/4
Organic Detections by Method

Year 2024, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
3/14/2024	10:50	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
3/14/2024	10:50	Chloroform (CHCl3)	1.4	ug/L	0.5
3/14/2024	10:50	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
3/14/2024	10:50	N-Nitrosodimethylamine (NDMA)	2.4	ng/L	2

Year 2024, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/30/2024	10:45	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
4/30/2024	10:45	Chloroform (CHCl3)	1.4	ug/L	0.5
4/30/2024	10:45	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
4/30/2024	10:45	N-Nitrosodimethylamine (NDMA)	2.9	ng/L	2

Year 2024, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/7/2024	10:55	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
8/7/2024	10:55	Chloroform (CHCl3)	1.3	ug/L	0.5
8/7/2024	10:55	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
8/7/2024	10:55	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

SAR-13/4
Organic Detections by Method

Year 2024, Quarter 3

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
8/7/2024	10:55	N-Nitrosodimethylamine (NDMA)	2.9	ng/L	2

Year 2024, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/29/2024	11:15	Bromodichloromethane (CHBrCl)	0.6	ug/L	0.5
10/29/2024	11:15	Chloroform (CHCl3)	1.6	ug/L	0.5
10/29/2024	11:15	Methylene Chloride (CH2Cl2)	0.5	ug/L	0.5
10/29/2024	11:15	Total Trihalomethanes (TTHMs)	2.1	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reporting Limit
10/29/2024	11:15	N-Nitrosodimethylamine (NDMA)	2.7	ng/L	2

Appendix L

Mid-Basin Injection Area Compliance Monitoring Well Groundwater Quality

1,4-Dioxane and NDMA

Orange County Water District
Groundwater Replenishment System
2024 Annual Report

TABLE L-1
OCWD MONITORING WELL SAR-12
1,4-dioxane and NDMA Concentrations
2020 - 2024

SAR-12/1			**SAR-12/2**			**SAR-12/3**		
Lower Rho Aquifer			*Main 2 Aquifer*			*Main 4 Aquifer*		
Perforations: 605-625 ft bgs			*Perforations: 755-775 ft bgs*			*Perforations: 915-930 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2	1/8/2020	na	<2	1/8/2020	na	<2
2/4/2020	<1	<2	2/4/2020	<1	<2	2/4/2020	<1	<2
5/5/2020	<1	<2	5/5/2020	<1	<2	5/5/2020	<1	<2
6/4/2020	na	<2	6/4/2020	na	<2	6/4/2020	na	<2
6/30/2020	na	<2	6/30/2020	na	<2	6/30/2020	na	<2
7/13/2020	na	<2	7/13/2020	na	<2	7/13/2020	na	<2
7/27/2020	na	<2	7/27/2020	na	<2	7/27/2020	na	<2
8/4/2020	<0.5	<2	8/4/2020	<0.5	<2	8/4/2020	<0.5	<2
8/20/2020	na	<2	8/20/2020	na	<2	8/20/2020	na	<2
9/2/2020	na	<2	9/2/2020	na	<2	9/2/2020	na	<2
9/17/2020	na	<2	9/17/2020	na	<2	9/17/2020	na	<2
10/1/2020	na	<2	10/1/2020	na	<2	10/1/2020	na	<2
10/14/2020	na	<2	10/14/2020	na	<2	10/14/2020	na	<2
10/26/2020	na	<2	10/26/2020	na	<2	10/26/2020	na	<2
11/5/2020	<0.5	<2	11/5/2020	<0.5	<2	11/5/2020	<0.5	<2
11/18/2020	na	<2	11/18/2020	na	<2	11/18/2020	na	<2
12/2/2020	na	<2	12/2/2020	na	<2	12/2/2020	na	<2
12/14/2020	na	<2	12/14/2020	na	<2	12/14/2020	na	<2
12/31/2020	na	<2	12/31/2020	na	<2	12/31/2020	na	<2
1/7/2021	na	<2	1/7/2021	na	<2	1/7/2021	na	<2
1/21/2021	na	<2	1/21/2021	na	<2	1/21/2021	na	<2
2/2/2021	<0.5	<2	2/2/2021	<0.5	<2	2/2/2021	<0.5	<2
2/18/2021	na	<2	2/18/2021	na	<2	2/18/2021	na	<2
3/4/2021	na	<2	3/4/2021	na	<2	3/4/2021	na	<2
3/18/2021	na	<2	3/18/2021	na	<2	3/18/2021	na	<2
4/1/2021	na	<2	4/1/2021	na	<2	4/1/2021	na	<2
4/15/2021	na	<2	4/15/2021	na	<2	4/15/2021	na	<2
5/4/2021	<0.5	<2	5/4/2021	<0.5	<2	5/4/2021	<0.5	<2
5/19/2021	na	<2	5/19/2021	na	<2	5/19/2021	na	<2
6/3/2021	na	<2	6/3/2021	na	<2	6/3/2021	na	<2
6/17/2021	na	<2	6/17/2021	na	<2	6/17/2021	na	<2
7/1/2021	na	<2	7/1/2021	na	<2	7/1/2021	na	<2
7/15/2021	na	<2	7/15/2021	na	<2	7/15/2021	na	<2
7/26/2021	na	<2	7/26/2021	na	<2	7/26/2021	na	2.5
8/10/2021	<0.5	<2	8/10/2021	<0.5	<2	8/10/2021	<0.5	2.4
8/25/2021	na	<2	8/25/2021	na	<2	8/25/2021	na	3.0
9/9/2021	na	<2	9/9/2021	na	<2	9/9/2021	na	3.0
9/23/2021	na	<2	9/23/2021	na	<2	9/23/2021	na	2.7
10/7/2021	na	<2	10/7/2021	na	<2	10/7/2021	na	3.5
10/21/2021	na	<2	10/21/2021	na	<2	10/21/2021	na	2.9
11/2/2021	<0.5	<2	11/2/2021	<0.5	<2	11/2/2021	<0.5	2.3
2/1/2022	<0.5	<2	2/1/2022	<0.5	<2	2/1/2022	<0.5	2.5
5/10/2022	<0.5	<2	5/10/2022	<0.5	<2	5/10/2022	<0.5	2.3
8/2/2022	<0.5	<2	8/2/2022	<0.5	<2	8/2/2022	<0.5	2.9
11/1/2022	<0.5	<2	11/1/2022	<0.5	<2	11/1/2022	<0.5	3.7
2/7/2023	<0.5	<2	2/7/2023	<0.5	<2	2/7/2023	<0.5	3.9
5/2/2023	<0.5	<2	5/2/2023	<0.5	<2	5/2/2023	<0.5	4.4
8/8/2023	<0.5	<2	8/8/2023	<0.5	<2	8/8/2023	<0.5	4.7
10/31/2023	<0.5	<2	10/31/2023	<0.5	<2	10/31/2023	<0.5	3.5
2/22/2024	<0.5	<2	2/22/2024	<0.5	<2	2/22/2024	<0.5	2.1
4/17/2024	<0.5	<2	4/17/2024	<0.5	<2	4/17/2024	<0.5	2.7
8/6/2024	<0.5	<2	8/6/2024	<0.5	<2	8/6/2024	<0.5	2.5
10/29/2024	<0.5	<2	10/29/2024	<0.5	<2	10/29/2024	<0.5	2.5

TABLE L-1
OCWD MONITORING WELL SAR-12
1,4-dioxane and NDMA Concentrations
2020 - 2024

SAR-12/4 *Main 7 Aquifer* *Perforations: 1,045-1,055 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2
2/4/2020	<1	<2
5/5/2020	<1	<2
6/4/2020	na	<2
6/30/2020	na	<2
7/13/2020	na	<2
7/27/2020	na	<2
8/4/2020	<0.5	<2
8/20/2020	na	<2
9/2/2020	na	<2
9/17/2020	na	<2
10/1/2020	na	<2
10/14/2020	na	<2
10/26/2020	na	<2
11/5/2020	<0.5	<2
11/18/2020	na	<2
12/2/2020	na	<2
12/14/2020	na	<2
12/31/2020	na	<2
1/7/2021	na	<2
1/21/2021	na	<2
2/2/2021	<0.5	<2
2/18/2021	na	<2
3/4/2021	na	<2
3/18/2021	na	<2
4/1/2021	na	<2
4/15/2021	na	<2
5/4/2021	<0.5	<2
5/19/2021	na	<2
6/3/2021	na	<2
6/17/2021	na	<2
7/1/2021	na	<2
7/15/2021	na	<2
7/26/2021	na	<2
8/10/2021	<0.5	<2
8/25/2021	na	<2
9/9/2021	na	<2
9/23/2021	na	<2
10/7/2021	na	5.9
10/21/2021	na	<2
11/2/2021	<0.5	<2
2/1/2022	<0.5	<2
5/10/2022	<0.5	2.4
8/2/2022	<0.5	<2
11/1/2022	<0.5	<2
2/7/2023	<0.5	2
5/2/2023	<0.5	<2
8/8/2023	<0.5	<2
10/31/2023	<0.5	<2
2/22/2024	<0.5	<2
4/17/2024	<0.5	<2
8/6/2024	<0.5	<2
10/29/2024	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE L-2
OCWD MONITORING WELL SAR-13
1,4-dioxane and NDMA Concentrations
2020 - 2024

SAR-13/1 *Lower Rho Aquifer* *Perforations: 600-620 ft bgs*			**SAR-13/2** *Main 2 Aquifer* *Perforations: 750-770 ft bgs*			**SAR-13/3** *Main 4 Aquifer* *Perforations: 910-930 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2	1/8/2020	na	<2	1/8/2020	na	<2
2/4/2020	<1	<2	2/4/2020	<1	<2	2/4/2020	<1	<2
4/1/2020	na	<2	4/1/2020	na	<2	4/1/2020	na	<2
4/15/2020	na	<2	4/15/2020	na	<2	4/15/2020	na	<2
4/30/2020	na	<2	4/30/2020	na	<2	4/30/2020	na	<2
5/6/2020	<1	<2	5/6/2020	<1	<2	5/6/2020	<1	<2
5/21/2020	na	<2	5/21/2020	na	<2	5/21/2020	na	<2
6/4/2020	na	<2	6/4/2020	na	<2	6/1/2020	na	<2
6/17/2020	na	<2	6/17/2020	na	<2	6/17/2020	na	<2
6/30/2020	na	<2	6/30/2020	na	<2	6/30/2020	na	<2
7/13/2020	na	<2	7/13/2020	na	<2	7/13/2020	na	<2
7/27/2020	na	<2	7/27/2020	na	<2	7/27/2020	na	<2
8/5/2020	<0.5	<2	8/5/2020	<0.5	<2	8/5/2020	<0.5	<2
8/20/2020	na	<2	8/20/2020	na	<2	8/20/2020	na	<2
9/2/2020	na	<2	9/2/2020	na	<2	9/2/2020	na	<2
9/17/2020	na	<2	9/17/2020	na	<2	9/17/2020	na	<2
10/1/2020	na	<2	10/1/2020	na	<2	10/1/2020	na	<2
10/14/2020	na	<2	10/14/2020	na	<2	10/14/2020	na	2.2
10/26/2020	na	<2	10/26/2020	na	<2	10/26/2020	na	2.4
11/4/2020	<0.5	<2	11/4/2020	<0.5	<2	11/4/2020	<0.5	2.8
11/18/2020	na	<2	11/18/2020	na	<2	11/18/2020	na	3.1
12/2/2020	na	<2	12/2/2020	na	<2	12/2/2020	na	3.2
12/14/2020	na	<2	12/14/2020	na	<2	12/14/2020	na	3.7
12/31/2020	na	<2	12/31/2020	na	<2	12/31/2020	na	3.2
1/7/2021	na	<2	1/7/2021	na	<2	1/7/2021	na	3.1
1/21/2021	na	<2	1/21/2021	na	<2	1/21/2021	na	3.7
2/3/2021	<0.5	<2	2/3/2021	<0.5	<2	2/3/2021	<0.5	4.5
2/18/2021	na	<2	2/18/2021	na	<2	2/18/2021	na	4.4
3/4/2021	na	<2	3/4/2021	na	<2	3/4/2021	na	4.5
3/18/2021	na	<2	3/18/2021	na	<2	3/18/2021	na	4.3
4/1/2021	na	<2	4/1/2021	na	<2	4/1/2021	na	4.4
4/15/2021	na	<2	4/15/2021	na	<2	4/15/2021	na	4.0
5/5/2021	<0.5	<2	5/5/2021	<0.5	<2	5/5/2021	<0.5	3.7
5/19/2021	na	<2	5/19/2021	na	<2	5/19/2021	na	3.3
6/3/2021	na	<2	6/3/2021	na	<2	6/3/2021	na	2.9
6/17/2021	na	<2	6/17/2021	na	<2	6/17/2021	na	3.0
7/1/2021	na	<2	7/1/2021	na	<2	7/1/2021	na	3.0
7/15/2021	na	<2	7/15/2021	na	<2	7/15/2021	na	2.9
7/27/2021	na	<2	7/27/2021	na	<2	7/27/2021	na	3.0
8/11/2021	<0.5	<2	8/11/2021	<0.5	<2	8/11/2021	<0.5	3.6
8/25/2021	na	<2	8/25/2021	na	<2	8/25/2021	na	4.4
9/9/2021	na	<2	9/9/2021	na	<2	9/9/2021	na	3.7
9/23/2021	na	<2	9/23/2021	na	<2	9/23/2021	na	3.6
10/7/2021	na	<2	10/7/2021	na	<2	10/7/2021	na	4.7
10/21/2021	na	<2	10/21/2021	na	<2	10/21/2021	na	3.6
11/3/2021	<0.5	<2	11/3/2021	<0.5	<2	11/3/2021	<0.5	4.0
2/2/2022	<0.5	<2	2/2/2022	<0.5	<2	2/2/2022	<0.5	4.2
5/11/2022	<0.5	<2	5/11/2022	<0.5	<2	5/11/2022	<0.5	4.1
8/3/2022	<0.5	<2	8/3/2022	<0.5	<2	8/3/2022	<0.5	5.1
11/1/2022	<0.5	2.2	11/1/2022	<0.5	<2	11/1/2022	<0.5	4.0
2/8/2023	<0.5	<2	2/8/2023	<0.5	<2	2/8/2023	<0.5	3.3
5/3/2023	<0.5	2.1	5/3/2023	<0.5	<2	5/3/2023	<0.5	3.5
8/9/2023	<0.5	<2	8/9/2023	<0.5	<2	8/9/2023	<0.5	3.6
11/1/2023	<0.5	2.1	11/1/2023	<0.5	<2	11/1/2023	<0.5	2.8
3/14/2024	<0.5	<2	3/14/2024	<0.5	<2	3/14/2024	<0.5	<2
4/30/2024	<0.5	<2	4/30/2024	<0.5	<2	4/30/2024	<0.5	2.2
8/7/2024	<0.5	<2	8/7/2024	<0.5	<2	8/7/2024	<0.5	<2
10/29/2024	<0.5	<2	10/29/2024	<0.5	<2	10/29/2024	<0.5	<2

TABLE L-2
OCWD MONITORING WELL SAR-13
1,4-dioxane and NDMA Concentrations
2020 - 2024

SAR-13/4 *Main 7 Aquifer* *Perforations: 1,045-1,055 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2
2/4/2020	<1	<2
4/1/2020	na	<2
4/15/2020	na	<2
4/30/2020	na	<2
5/6/2020	<1	<2
5/21/2020	na	<2
6/1/2020	na	<2
6/17/2020	na	<2
6/30/2020	na	2.6
7/13/2020	na	2.8
7/27/2020	na	3.0
8/5/2020	<0.5	2.8
8/20/2020	na	3.6
9/2/2020	na	3.4
9/17/2020	na	3.5
10/1/2020	na	3.4
10/14/2020	na	3.2
10/26/2020	na	3.3
11/4/2020	<0.5	3.3
11/18/2020	na	3.4
12/2/2020	na	3.0
12/14/2020	na	3.0
12/31/2020	na	2.9
1/7/2021	na	3.0
1/21/2021	na	3.4
2/3/2021	<0.5	4.1
2/18/2021	na	3.4
3/4/2021	na	3.9
3/18/2021	na	3.7
4/1/2021	na	3.8
4/15/2021	na	3.3
5/5/2021	<0.5	3.3
5/19/2021	na	3.3
6/3/2021	na	3.1
6/17/2021	na	3.5
7/1/2021	na	3.6
7/15/2021	na	3.6
7/27/2021	na	3.5
8/11/2021	<0.5	4.2
8/25/2021	na	3.2
9/9/2021	na	2.6
9/23/2021	na	4.0
10/7/2021	na	3.8
10/21/2021	na	3.7
11/3/2021	<0.5	3.4
2/2/2022	<0.5	3.6
5/11/2022	<0.5	4.3
8/3/2022	<0.5	4.9
11/1/2022	<0.5	5.1
2/8/2023	<0.5	5.2
5/3/2023	<0.5	5.0
8/9/2023	<0.5	3.4
11/1/2023	<0.5	3.2
3/14/2024	<0.5	2.4
4/30/2024	<0.5	2.9
8/7/2024	<0.5	2.9
10/29/2024	<0.5	2.7

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed