WATER TREATMENT APPROACH TO MEET PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) REGULATIONS

Riverside Public Utilities

Board of Public Utilities

September 8, 2025

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OVERVIEW

1. **Groundwater Quality** – RPU groundwater sources contain PFAS/PFOA levels above the newly adopted Federal drinking water standards.
2. **Treatment Costs** – Achieving compliance will require advanced treatment, which is projected to be costly.
3. **Litigation Relief** – Ongoing PFAS litigation settlements are expected to provide some financial relief, helping to offset a portion of treatment costs.
4. **Future Surcharge** – A dedicated Water Treatment Surcharge will ultimately be necessary to ensure long-term compliance and funding stability.

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OVERVIEW CONT.

5. **Recommendation**
   a. **Temporary Delay** – Postpone implementation of the Water Treatment Surcharge at this time.
   b. **Monitoring** – Continue to monitor EPA's actions regarding possible compliance extensions.
   c. **Follow-Up** – Provide a detailed report and updated recommendation to the Board of Public Utilities (BPU) within one year.

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BACKGROUND

Per- and Polyfluoroalkyl Substances (PFAS) are human-made chemical compounds, a group of more than 12,000 substances of emerging contaminants of concern.

1. Designed to repel oil and water
2. Known as "forever chemicals"
3. Bioaccumulate in living organisms
4. Potential to cause adverse human and ecological health effects

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LEGISLATIVE HISTORY

1. In May 2016, US EPA issued a lifetime health advisory for (PFOS) and (PFOA) for drinking water, to notify customers of the presence of levels over 70 parts-per-trillion (ppt).
2. In July 2018, State Water Resources Control Board, Division of Drinking Water (DDW) established an interim notification level (NL) of 14 ppt for PFOA and 13 ppt for PFOS and a single response level (RL) of 70 ppt for the combined concentrations of PFOA and PFOS.
3. In August 2019, DDW revised the NL to 6.5 ppt for PFOS and 5.1 ppt for PFOA. RL remains at 70 ppt.
4. On February 6, 2020, DDW issued updated drinking water RL of 10 ppt for PFOA and 40 ppt for PFOS based on a running four-quarter average.
5. On March 5, 2021, DDW issued a drinking water NL of 500 ppt and RL of 5,000 ppt for PFBS.

LEGISLATIVE HISTORY CONT.

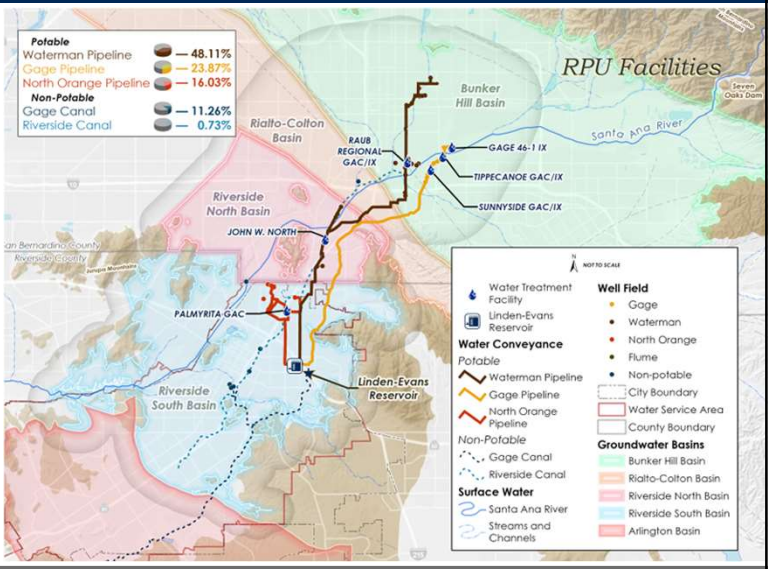
6. On October 31, 2022, DDW issued a drinking water NL of 3 ppt and RL of 20 ppt for PFHxS.
7. On March 14, 2023, US EPA proposed MCL's for six (6) compounds: PFOA: 4 ppt, PFOS: 4 ppt, PFHxS 10 ppt, Gen X 10 ppt, PFNA 10 ppt and a Hazard Index (HI) not to exceed 1 for: PFNA, PFHxS, PFBS, and GenX (HI is made up of a sum of fractions) with compliance by 2029.
8. On May 14, 2025, the EPA announced its intent to extend compliance deadlines for PFOA and PFOS from 2029 to 2031. The rule promulgation process can take well over 1-year to complete and, in some instances, rules are not implemented at the end of the process.
9. On August 6, 2025, DDW discussed reducing NLs for PFOA and PFOS to 4 ppt, RL for PFHxS to 10 ppt and creating a PFHxA NL at 1 ppb and RL of 10 ppb at the State Water Board meeting, which will likely be implemented in September 2025.
10. DDW MCLs anticipated to be released in late 2025.

ACTIONS

1. On October 28, 2019, the Board of Public Utilities approved a PFAS study.
2. On May 23, 2022, the Board of Public Utilities received and filed an update on the Per and Polyfluoroalkyl Substances Updates.
3. In November 2022, staff received the final report from the consultant, HDR, outlining a cost-effective and optimized long-term treatment strategy for reducing PFOA and PFAS.
4. On November 14, 2022, staff presented the results of the PFAS removal demonstration study at the Palmyrita Treatment Plant to the Board of Public Utilities.
5. On June 12, 2025, staff presented a PFAS update to the Mobility & Infrastructure Committee.
6. On July 28, 2025, staff presented a PFAS update to the Board of Public Utilities.

RPU GROUNDWATER WELLS

1. Forty-Five groundwater wells extract water from the Riverside, Rialto Colton and Bunker Hill groundwater basins.
2. Several wells are treated with GAC and/or IX to remove anthropogenic compounds.
3. Three transmission mains convey the City's domestic groundwater to a 32-million-gallon central reservoir complex, where it receives final treatment via blending and disinfection before being delivered to customers.



WATER SAMPLES, BLENDING AND ALTERNATIVES

1. Water samples from more than 30 wells exceed the existing State notification levels for PFAS.

2. Treatment capacity is still capable of combining water sources to reduce PFAS concentrations during low demand season, but in high water demand periods, it will exceed the PFAS Federal limits without additional treatment or turning off wells with high PFAS concentrations.

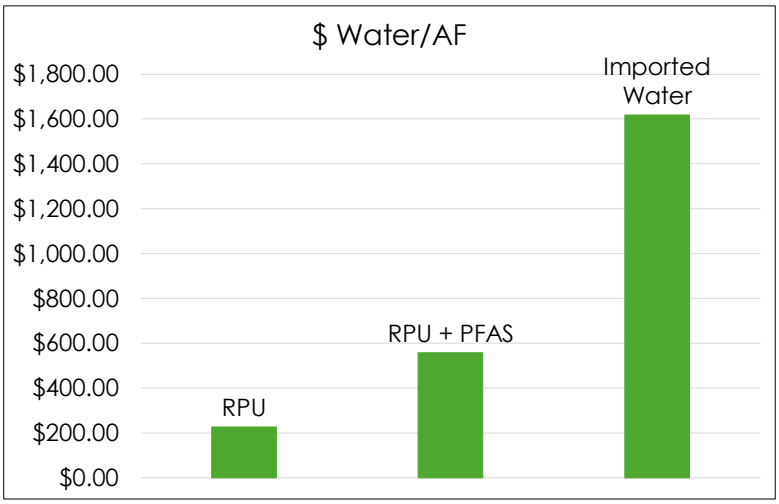
3. Three (3) alternatives with two (2) commercially and readily available PFAS treatment technologies, Granulated Activated Carbon (GAC) and Ion Exchange (IX), were identified to reduce the concentrations as part of the HDR Study.

GAC 20-Year Life Cycle Cost Estimate is Higher than that of IX

Parameter	Granular Activated Carbon			Ion Exchange		
	Alt 1 – Regional	Alt 2 – North Orange & Palm Meadows	Alt 3 – North Orange & JWN	Alt 1 – Regional	Alt 2 – North Orange & Palm Meadows	Alt 3 – North Orange & JWN
Design Capacity (gpm)	23,458	10,850	12,454	23,458	10,850	12,454
Capital Cost	$84 M	$35 M	$38 M	$63 M	$24 M	$27 M
NPV Total O&M	$238 M	$107 M	$117 M	$248 M	$108 M	$124 M
Total PV	$322 M	$142 M	$156 M	$311 M	$132 M	$151 M
Annual $/kgal Treated	$1.30	$1.24	$1.19	$1.26	$1.16	$1.15

WATER SOURCE COMPARISION

Riverside also considered utilizing imported water in lieu of local groundwater, but this was not a cost-effective solution.



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WATER SOURCE COMPARISION

1. Cost for utilizing imported water as a blending source
   a. $40,000,000 to construct a pipeline from the delivery point to Linden Evans for blending water
   b. $9,00,000 to purchase water annually for blending purposes at Tier 1 rates.
   c. Additional chlorination station, chemical costs and O& M.

2. Operational Concerns
   a. Minimum flow 21,000 gpm needed for blending the current interconnect is rated for 13,500 gpm
   b. Nitrification from chloramines
   c. Stranding of assets

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PFAS CONCENTRATION & COMPLIANCE

The data below compares PFAS concentrations at RPU's drinking water compliance point to the Federal and State standards.

Units in parts per trillion (ppt)	PFOA	PFOS	GenX	PFBS	PFNA	PFHxS	HI (<100%)
CA Notification Level	**5.1**	**6.5**		500		**3**	
Compliance Point (7th & Chicago) *	**ND - 4.7**	**ND - 6.4**	ND	ND - 4	ND	**ND -5.5**	
Health-Based Value and EPA MCL	**4**	**4**	10	2000	10	**10**	
Hazard Index (HI) in %			0%	0-0.002%	0%	**0-61%**	0-61%

*Data ranges 2019-current. SWRCB-DDW proposed MCLs are anticipated this year.

PFAS REDUCTION NEEDED

1. The analysis revealed that an additional local treatment plant on the Waterman transmission main would be needed in addition to the optimum alternative proposed by the consultant HDR.
2. Staff also modified the Alternate 2 proposal to expand the current Palmyrita WTP, which will provide treatment on the North Orange transmission main.

The table below shows the amount of reduction needed to meet the regulations.

Units in parts per trillion (ppt)	PFOS	PFOA	PFHxS
CA Notification Level (NL)	6.5	5.1	3
Percent Reduction to NL	38%	25%	70%
EPA MCL	4	4	10*
Percent Reduction to MCL	62%	31%	21%

*PFHxS MCL is part of the Hazard Index (HI)

RPU WATER QUALITY POLICY

1. On January 24, 2022, the Board of Public Utilities approved the Drinking Water Quality Policy Principles.
2. On February 22, 2022, the City Council adopted the Drinking Water Quality Policy Principles.
3. The nine water quality policy principles guide RPU in its compliance with drinking water standards, as well as its coordination with Federal and State policies and agreements with responsible parties.
4. RPU is actively collaborating with regulatory agencies, water association workgroups and has been evaluating and developing treatment options to reduce PFAS levels and meet regulatory requirements.

PFAS SETTLEMENT PROCEEDS

1. RPU's low water rates are a result of the City's success in mitigating higher treatment costs by successfully holding polluters responsible for groundwater contamination. Over the last 30 years, this effort has provided funding for five of the six water treatment plants to reduce contamination.
2. Currently, RPU expects to receive $39.6M in PFAS settlement proceeds manufacturers of PFAS over the next 8 years. A small portion of the settlement is pending final Court approval and may be adjusted when finalized.
3. Establish a Water Treatment Designated Reserve for settlement proceeds to fund water treatment operating and capital costs.

Fiscal Year	Estimated Settlement Proceeds
FY 2025/26	$23,325,332
FY 2026/27	$8,127,588
FY 2027/28	$2,760,321
FY 2028/29	$1,521,195
FY 2029/30	$1,034,412
FY 2030/31	$1,034,412
FY 2031/32	$912,717
FY 2032/33	$851,869
Total	$39,567,846

DISCUSSION

1. Compliance with the Federal PFAS MCLs is estimated to cost:

Treatment Plant	Year in Service	Capital Costs	O&M/Personnel Costs *
Plant #1	**FY 2028/29**	**$27,000,000**	**$4,431,000**
Plant #2	**FY 2029/30**	**$15,000,000**	**$2,727,000**
Plant #3	**FY 2030/31**	**$55,200,000**	**$11,914,000**
Total		**$97,200,000**	**$19,072,000**
*- Cost in FY 2030/31 when all 3 plants are online.			

2. Financing capital costs of treatment plants:

Treatment Plant Capital Funding	Estimated Financing Costs - 30 Years
100% Bond Financing ($97.2 million)	**$91,000,000**
Combination $35.7 million settlement proceeds and $61.5 million bond financing	**$58,500,000**

WATER TREATMENT SURCHARGE

1. The estimated annual water system rate impacts from the cost of service and rate design for the City's drinking water customers in the first five years beginning July 1, 2027, are:

	Estimated Annual Rate Increases & Effective Date				
	7/1/2027	7/1/2028	7/1/2029	7/1/2030	7/1/2031
Water Treatment Surcharge (No Settlement Proceeds)	4.5%	5.0%	5.0%	5.0%	2.5%
Water Treatment Surcharge (With Settlement Proceeds)	3.5%	4.0%	4.0%	4.5%	3.0%

2. Staff will continue to monitor regulations and will return with adjustments as necessary before returning for conceptual approval.
3. The Water Treatment Surcharge will augment the current water utility rate plan. Future Water Utility Undesignated Reserves will be considered as a funding option depending on availability and water utility financial metrics and strength.

WATER TREATMENT SURCHARGE

1. The Water Treatment Surcharge per CCF from the cost of service and rate design for the City's drinking water customers in the first five years beginning July 1, 2027, are as follows:

	Estimated Annual Water Charge Per CCF & Effective Date				
	7/1/2027	7/1/2028	7/1/2029	7/1/2030	7/1/2031
Water Treatment Surcharge (No Settlement Proceeds)	$0.18	$0.40	$0.65	$0.92	$1.08
Water Treatment Surcharge (With Settlement Proceeds)	$0.14	$0.32	$0.51	$0.74	$0.92

2. Staff will continue to monitor regulations and will return with adjustments as necessary.

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COMMUNITY OUTREACH

1. Attend Event/Community Group Meetings, Social Media and Webpage
2. Public Hearing notice on website and direct mailed to customers for City Council (Prop 218 Compliance)

Event/Community Group Examples
Greater Riverside Chamber of Commerce (GRCC)
Building Industry Association (BIA)
Residents for Responsible Representation (RRR)
Downtown Area Neighborhood Alliance (DANA)
Mission Grove Neighborhood Association
Neighbors of the Wood Streets (NOWS)
Neighbors Better Together (NBT)
City Sponsored Events at Community Centers such as Orange Terrace Cener Ballroom, La Sierra Senior Center Ballroom, and Bobby Bonds/Cesar Chavez Community Cener Auditorium

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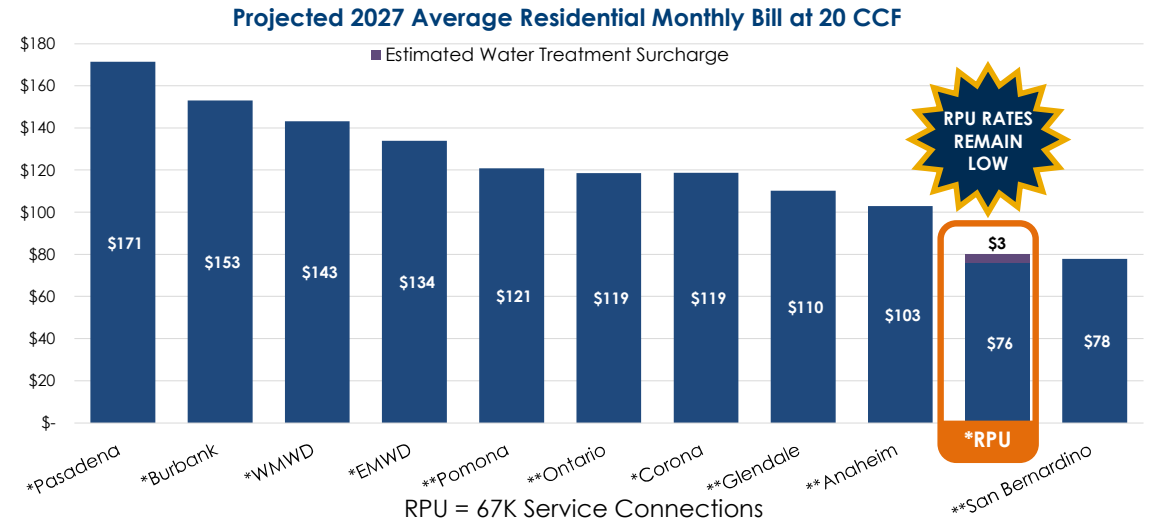

Note: * Includes known rate increases through July 1, 2027
** Includes assumed rate increases at 6.5% through July 1, 2027

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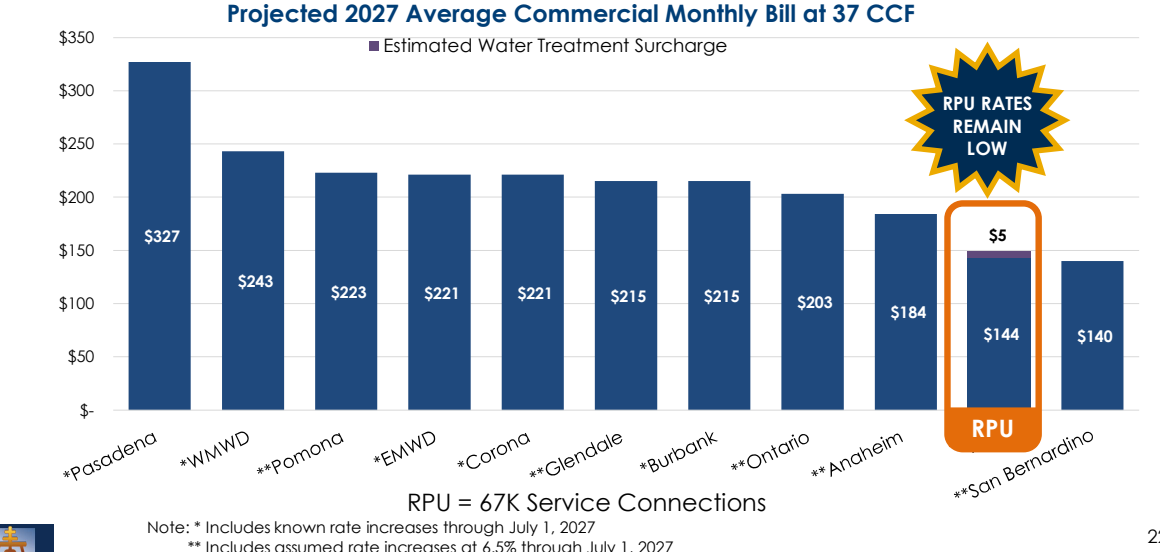
COMMERCIAL



Note: * Includes known rate increases through July 1, 2027
** Includes assumed rate increases at 6.5% through July 1, 2027

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WHAT'S NEXT

Action	Date
Mobility & Infrastructure Committee Update	June 12, 2025
Board of Public Utilities Update	July 28, 2025
Board of Public Utilities Cost of Service and Rate Results	September 8, 2025
City Council Cost of Service and Rate Results	October 28, 2025
Board of Public Utilities Update	June 22, 2026
City Council Update	July 28, 2026
Community Outreach	To Be Determined
Board of Public Utilities Public Hearing and Consideration	To Be Determined
City Council Public Hearing and Consideration	To Be Determined
Proposed Effective Date	July 1, 2027

WATER QUALITY INFORMATION

- Riverside's water meets or exceeds all Federal and State Regulations
- The Annual Water Quality report is available online at RiversidePublicUtilities.com/WQR

- The Groundwater Atlas is also available at RiversidePublicUtilities.com/Reports

OVERVIEW RECAP

1. **Groundwater Quality** – RPU groundwater sources contain PFAS/PFOA levels above the newly adopted Federal drinking water standards.
2. **Treatment Costs** – Achieving compliance will require advanced treatment, which is projected to be costly.
3. **Litigation Relief** – Ongoing PFAS litigation settlements are expected to provide some financial relief, helping to offset a portion of treatment costs.
4. **Future Surcharge** – A dedicated Water Treatment Surcharge will ultimately be necessary to ensure long-term compliance and funding stability.

RECOMMENDATION

That the Board of Public Utilities recommend the City Council:

1. Receive the cost of service and rate design study results and recommendations for water treatment facilities to meet Per- and Polyfluoroalkyl Substances (PFAS) regulations;
2. Approve establishing a Water Treatment Designated Reserve in the Water Utility Fund to set aside proceeds received from PFAS settlements to fund capital costs for water treatment plants;

RECOMMENDATIONS CONT.

Treatment Facility no. 1, Ion Exchange (IX) WTP

3. Recommend staff offset the capital cost of the water Treatment Facility no. 1, utilizing an Ion Exchange (IX) WTP, to meet PFAS regulations with PFAS settlement proceeds;
4. Receive an update on RFP No. 2415 for Design and Construction Management services for the first PFAS treatment plant, Treatment Facility No. 1, using an Ion Exchange (IX) WTP, and recommend staff return with an update on project design and timeline; and

RECOMMENDATIONS CONT.

Treatment Facilities nos. 2 and 3

5. Recommend staff return to the Board of Public Utilities for review of a Water Treatment Surcharge within one year for water treatment facilities, not covered by PFAS settlement proceeds, to meet Per- and Polyfluoroalkyl Substances (PFAS) regulations.

ABBREVIATIONS & ACRONYMS

- $/kgal Dollar per 1,000 gallons
- ACWA Association of California Water Agencies
- AWWA American Water Works Association
- CA California
- DBCP Dibromochloropropane
- DDW Division of Drinking Water a division of the SWRCB
- EPA Environmental Protection Agency - Federal regulatory agency
- GAC Granular activated carbon
- Gen X Trade name for a processing aid technology used to make high-performance fluoropolymers
- GPM Gallons per minute
- HFPO-DA Hexafluoropropylene oxide dimer acid
- HI Hazard index
- IX Ion exchange
- JWN John W. North
- MCL Maximum contaminant level
- NL Notification level
- NPDWR National primary drinking water regulation

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ABBREVIATIONS & ACRONYMS

- NPV Net present value (estimated in 2022)
- O&M Operation & Maintenance
- PFAS Per and polyfluoroalkyl substances
- PFBS Perfluorobutane sulfonic acid
- PFHxS Perfluorohexane sulfonic acid
- PFNA Perfluorononanoic acid
- PFOA Perfluorooctanoic acid
- PFOS Perfluorooctane sulfonic acid
- PPB Parts per billion
- PPT Parts per trillion
- PV Present value (estimated in 2022)
- RFP Request for proposals
- RL Response level
- RPU Riverside Public Utilities
- SWRCB State Water Resources Control Board - State regulatory agency
- TCE Trichloroethene
- TM Transmission main
- WTP Water treatment plant

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