San Gorgonio Pass Water Agency

DATE: November 17, 2025

TO: Board of Directors

FROM: Lance Eckhart, General Manager

BY: Lance Eckhart, General Manager

SUBJECT: RECYCLED WATER STUDIES IN THE SGPWA AREA

RECOMMENDATION

Accept and file two reports concerning recycled water by TR Holliman & Associates.

BACKGROUND

In 2023, TR Holliman & Associates (TRH) produced a report titled *Recycled Water Facilitator Report for City of Beaumont*. In 2025, TRH produced a technical memorandum titled *Summary of current California regulations regarding recharging recycled water in a groundwater basin and regarding utilizing recharge basins for California State Water Project and recycled water*. Both of these documents were produced to facilitate the advancement of recycled water usage in the greater Beaumont region. The 2023 document was co-sponsored by the Beaumont Cherry Valley Water District (BCVWD) and the Agency. The 2025 technical memorandum was produced under the direction of the Agency to continue work on recycled water during a period of reduced program activity.

ANALYSIS

The 2023 report and the 2025 technical memorandum are significant steps in the local use of recycled water. Staff is continuing to work with the City of Beaumont and BCVWD to develop a regional recycled water program. It is important that the two documents (attached) are available to the Board and public as recycled water efforts continue.

FISCAL IMPACT

None at this time.

ACTION

Accept and file the 2023 and 2025 documents prepared by TRH.

ATTACHMENTS

- Recycled Water Facilitator Report for the City of Beaumont, CA – June 2023
- Summary of current California regulations regarding recharging recycled water in a groundwater basin and regarding utilizing recharge basins for California State Water Project and recycled water – September 2025

Recycled Water Facilitator Report for City of Beaumont, CA

June 2023

T.R. HOLLIMAN
& ASSOCIATES
3543 Citrus St., Highland, CA 92346

Recycled Water (RW) Program Implementation Plan

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Recycled Water (RW) Program Implementation Plan

Executive Summary

TR Holliman and Associates (TRHA) was retained by the City of Beaumont (City) to facilitate discussions between the City, Beaumont Cherry Valley Water District (BCVWD), and the San Gorgonio Pass Water Agency (Pass) to formulate a recommended plan to move the use of recycled water forward in the Beaumont Valley.

The City currently produces advanced treated recycled water from its treatment plant and would like to take a portion of recycled water currently being discharged to Cooper's Creek and have it used in the City's service area.

BCVWD currently owns and operate a non-potable distribution system which provides untreated groundwater to approximately 300 irrigation customers in their service area. BCVWD has determined that the recycled water from the City could be used in place of the non-potable water. Based on their planning, over the years to come, the demand for non-potable water could utilize all of the City's recycled water production.

Pass imports raw water from the State Water Project. Their mission is to provide imported water for water use.

TRHA reviewed each of the agency's planning documents and met with each of the agency's 2X2X2 groups to review the respective agency's activities and the steps needed to move the use of recycled water forward. After meeting with each agency's 2X2X2 representatives a meeting of all parties was held on June 1, 2023 (see attached minutes). After that meeting TRHA finalized their report and is recommending the following.

1. The **City** will enter into an agreement with BCVWD for a term of not less than 20-years which will include requirements that:
    a. The City will pursue a Change of Use Permit (CUP) to allow for diversions from Cooper's Creek above their permit requirement of 1.8 MGD. This amount might be increased through the completion of an Adaptive Management Plan (AMP).
    b. The City will pay for the CUP and AMP, and once approved will deliver recycled water to BCVWD at the boundary of the City's treatment plant through a metered connection, selling all of the recycled water produced at the WRP at a cost of 50% of the cost of replenishment water charged by Pass to BCVWD.
2. **BCVWD** will enter into an agreement with the City for a term not less than 20-years that will stipulate:
    a. BCVWD will purchase all of the recycled water produced by the City at the boundary of the City's WRP through a metered connection.

   b. They will construct all facilities to move the recycled water into their system for distribution or recharge.
   c. They will be responsible for obtaining the required permits for recharge and making any system changes needed.
   d. BCVWD will pay the City, on a take-or-pay basis, 50% of the replenishment water fee charged by Pass.
3. **Pass** will assist the City and BCVWD in the use of recycled water by supporting BCVWD's pursuit of a permit to recharge the recycled water and monitor the basin for any impacts from recycled water recharge.
4. **Governance** – in order to ensure that all of the information is disseminated at the same time, and decisions in a collaborative way, a Joint Powers Authority (JPA) model is recommended. This can be one through either a formal JPA, or a binding memorandum of understanding between the three agencies.

City of Beaumont (City)

RW Background Overview Current Status

1. City of Beaumont – 4,148 ac-ft of recycled water produced in 2021 and discharged to Cooper Creek [(1)]
2. Flow ranged from 3.44 mgd in February to 4.55 mgd in June (average for 2021 = 3.70 mgd.) [(1)]
3. 1.8 MGD to Cooper Creek - minimum required by existing Regional Water Quality Control Board (RWQCB) permit, permit includes multiple discharge points.
4. 1.5 MGD (1,681 AFY) available after CUP and AMP based on current net average of 3.30 mgd. This value reflects the loss of creek discharge to brine line concentrate flow with the RIO system now fully functional which has a 20% rejection rate.
5. Complete and implement Change of Use Permit (CUP) which is required to take recycled water from Cooper Creek. *(See Attachment 1 for CUP process).*
6. CUP will cost $1.5 to $3 million and 2-3 years to prepare and obtain approvals.
7. Adaptive Management Plan (AMP) part of CUP effort - required if City wants to send less than 1.8 MGD to Cooper Creek.
8. City WRP is currently operating under RWQCB permit, updated 2022.
9. In order to lower Total Dissolved Solids (TDS) in the effluent the City was required to install an Advanced Treatment (i.e., reverse osmosis) to remove TDS from the effluent so the discharge was compliant with the Basin Plan.
10. City currently has a salt mitigation deficit (salt mortgage), and the permit extended the due date to January 2027. There is some internal discussion if this deadline is correct as engineering forecast the deficit completion in Quarter 4 of 2028. This will be discussed with Regional Board.
11. Capital invested by the City of Beaumont to upgrade treatment plant was approximately $100 million.

City Options for RW Use

Option 1

Wholesale the recycled water to Beaumont Cherry Valley Water District (BCVWD). In order to do this, an agreement will be required that will require the following from BCVWD:

a) Save and hold the City harmless and defend the City in the event of claims. To be determined by City and BCVWD.
b) Require BCVWD complies with all RWQCB NPDES discharge permit conditions including mapping, cross connection control, overspray control, etc.
c) Have an AWWA certified Cross Control Program Specialist on staff or retained.
d) Prepare and obtain approval for Title 22 Engineering Report from DDW.
e) Prepare and submit for approval the Notice of Intent to RWWQB.
f) Provide site location for BCVWD pump station next to the City's WRP.

City to agree upon compensation for the recycled water. Multiple options for pricing include:

- 1 = 100% O&M only
- 2 = 50% of O&M
- 3 = Indexed to San Gorgonio Pass Water Agency (SGPWA) cost of replenishment water at = 50% of replenishment. Discount would be applied because of special handling requirements (recycled water monitoring, recycled water testing, cross connection testing , reporting, training supervisors) needed for recycled water. The City and BCVWD could determine a different split more appropriate for the index.
- 4 = Select a third-party rate consultant to recommend a rate based on a Prop 218 style analysis of City costs.

Advantages:

- BCVWD already has infrastructure in place to use the recycled water for beneficial use in Beaumont Valley.
- All water produced will create a cash flow to the City after salt mitigation obligation is complete.
- If BCVWD lowers the cost for recycled water for irrigation customers, it will create cost savings for City irrigation connections.
- This option creates a clear line of demarcation between RW wholesaler/producer and RW retail district.

Disadvantages:

- Does not eliminate liability directly per City legal counsel.

Option 2

The City would design, construct, and operate a recycled water system which would include pipelines, pump station(s), and spreading basins in order to recharge the groundwater. This would allow the City to utilize it's existing 30,000 AF storage agreement within the Basin. If determined feasible by Watermaster, this capacity could be assigned to developers to satisfy their 20-year water supply requirement, or others.

Advantages:

- There would be no liability of shift.
- City has a 30,000 AF storage agreement with Watermaster so the project would allow the City to take advantage of the existing agreement.
- The City has licensed staff in water distribution and wastewater treatment which would support the operations and maintenance of a City controlled recycled water distribution and recharge system.

Disadvantages:

- City must design and build equalization storage on site, a pump station and pipeline, purchase land and build a spreading basin.

- City must operate the recharge basins or contract with BCVWD or SGPWA.
- This may impact BCVWD's potable water wells resulting litigation or relocation of the wells at the City's cost.
- Per the Watermaster, a separate modeling effort would be required to establish credits above the Safe Yield.
- Losses in spreading through evaporation and leakage out of basin may result if percolation rates are not managed. Net loss through recharge would have to be verified through modeling.
- City might have to obtain a public water system permit from DDW to operate the recycled water distribution system.
- City will have to obtain a groundwater recharge permit from DDW, and secure and pay for the modeling effort required for the permit and the required annual updates.
- To keep the water in the Beaumont Basin, recharging would have to occur in the SGPWA's Brookside East Recharge Facility (future Brookside West to be built on property purchased in 2023 by SGPWA). or BCVWD's recharge basin.
- This would create stranded assets for BCVWD with potential political impacts.
- Could be challenged as duplication of service with BCVWD and could trigger potential litigation.

Option 3

Design and build a pump station and pipeline to local golf courses (e.g., Morongo) in exchange for water rights. The water rights could be made available to others by the City, if determined feasible by the Watermaster.

Advantages:

- Acquired pumping rights can be sold to developers.
- The City has licensed staff in water distribution and wastewater treatment which would support the operations and maintenance of a City controlled recycled water distribution and recharge system.

Disadvantages:

- The volume of water produced by the WRP will be more than pumping rights from tribal lands.
- Liability issues are not addressed unless tribe accepts liability and guarantee all operating permit conditions are met.
- Golf course demand is subject to seasonal variations resulting in potential discharges to Cooper Creek to balance production versus demand.
- There would be a capital cost to design and build a pump station and pipeline to the tribal golf courses.
- Moving recycled water out of the City could be problematic politically (not using locally produced recycled water in City).

- Would create stranded assets for BCVWD with potential political/legal impacts.

Recycled Water (RW) Program Implementation Plan

A. Beaumont Cherry Valley Water District

RW Background Overview Current Status

1. BCVWD already has an extensive non-potable distribution system serving 300+ sites.
2. Water is obtained from groundwater wells in the Beaumont Basin.
3. BCVWD currently has 24 wells (1 standby), and Well 26 which can pump to the potable or non-potable system.
4. Replenishment water is purchased from SGPWA.
5. BCVWD has existing groundwater recharge facilities to spread State Water Project (SWP) water purchased from SGPWA, as well as local stormwater when available.
6. BCVWD has a storage account in the Beaumont Basin and standing to petition access and use of the Conjunctive Use set aside (200,000 AFT).
7. BCVWD is a member of the Beaumont Watermaster.
8. The current BCVWD Recycled Water Master Plan shows that BCVWD can utilize all of the City's WRP discharge capacity at full build-out of the non-potable water system. In the interim, excess flows can be discharged to groundwater recharge.
9. Greatest potential for recycled water is landscape irrigation.
10. City irrigation accounts represent 38% of the total non-potable demand.
11. Discharging recycled water into the groundwater basin during periods of low irrigation demands could result in raising groundwater levels which could decrease future groundwater pumping costs.
12. Stored water could be sold to developers to meet their requirement for a 20-year water supply, if determined feasible by the Watermaster.
13. Currently paying SGPWA for recharge water.

Beaumont Cherry Valley Water District Options for RW Use

Option 1- Do not use the recycled water provided from the City (i.e., No project option)

Advantages:

- No agreement required, no capital expenditures for additional transmission main, pump station, reservoir.
- Title 22 Engineer Report not required.
- Notice of Intent submittal to RWQCB not required.
- No cross-connection testing, mapping, or training.

Disadvantages:

- Removes firm local water source from supply portfolio.
- Loss of long-term water supply to compensate for drought and groundwater over drafting.
- Continues dependence on imported replenishment water and stormwater capture.
- Stranded investment in prior facilities, studies, and staff time.
- No reduction in non-potable which could be converted to potable use.

Option 2 – Purchase RW from City of Beaumont. In order to use the recycled water from the City the following actions are required:

1. Execute water purchase agreement with City which will include the wholesale price of the recycled water.
2. Need to lease site and build pump station, reservoir, and connecting pipelines ($2 million) from City of Beaumont WRP to BCVWD non-potable distribution and recharge basins. This would be part of the water purchase agreement with City.
3. Need to indemnify City. This would be part of the water purchase agreement with City.
4. Approve agreement to include "Take or Pay" arrangement to ensure long term supply.
5. Work with the City to modify the NPDES permit to add groundwater recharge for RW recharging until all RW utilized at build-out of the non-potable water system.
6. If RW is recharged it may require the relocation of existing production wells due to limited detention time in Basin. (i.e., production wells within the 6-month resident time). Because Beaumont produces high quality recycled water this requirement may be modified by DDW.
7. RW recycled water could also push existing Chromium 6 plumes and impact well field capacity. Additional modeling is needed to determine true detention time between the basins and the first domestic water well.
8. To convert from non-potable to RW, BCVWD will have to, for each of the 300+ sites:
    a. Map the sites showing onsite potable and irrigation systems.
    b. Train an onsite supervisor.
    c. Verify the systems are marked properly and there are no cross connections.
    d. Prepare a Master Engineering Report.
    e. Prepare Supplemental Engineering Reports for each site after the Master. Engineering Report is prepared and approved.
    f. Test initially for overspray and cross connections.
    g. Perform, or assist in, any on-site construction needed to convert the site.
9. Need to identify staff support needed to meet conditions for recycled water in two years (i.e., develop Master Engineering Report (MER), prepare MER Supplemental Engineering Reports for each use site, identify and train onsite supervisors, conduct preliminary overspray and cross connection testing, ensure that all corrections are made, verify all signage and tags in place, conduct final cross connection test.)
10. Cooperate with City in their acquiring a CUP and potentially creating an AMP.
11. Need to set a RW rate for BCVWD customers after conversion. Typically, 50-90% domestic water, or 90% non-potable water. Need to determine discount to allow customers to pay for O&M of onsite system to remain in compliance with permit requirements.

Advantages:

- Provides a reliable water supply for irrigation and other Title 22 approved uses.
- Releases non-potable water supply which could be treated and used for direct potable use.

- Improves water levels in basin (because recharging during low irrigation demand periods could raise the groundwater level).
- Creates a conjunctive use account of pumping rights that can be sold to developers.
- Recycled water would be less expensive that imported water from SWP, if the rate set by the City is less than the replenishment water rate from SGPWA.

Disadvantages:

- Requires additional capital facilities.
- There will be increased regulatory requirements over non-potable groundwater.
- Additional staff or consultants will be needed to the manage conversion process and on-going permit compliance.

B. San Gorgonio Pass Water Agency

Current Status

1. Currently purchases imported water from State Water Project, single sale transfers.
2. State Water Project recharged [1] at BCVWD's Noble Creek spreading basin, 2019 Pass built their own spreading basin 2019 recharged 257.80 acre-ft.
3. SGPWA receives their current allocation of SWP at about 58% of its max contract amount. [2]
4. Always looking for water transfers which could be put into the basin. [2]

San Gorgonio Pass Water Agency Potential Role in Recycled Water Programs

1. Could work with Watermaster on current groundwater modeling efforts to include establishing dilution credits, mounding, and movement of recycled water recharge to first BCVWD production wells.
2. Invest in additional monitoring equipment to monitor and model the basin with higher resolution with RW being recharged.
3. Construct new recharge basins (two recharge sites recently acquired).
4. Improve recharge basin efficiency through more frequent basin cleaning.
5. Provide water quality monitoring and modeling support.
6. Install water quality monitoring wells to check movement of recycled water ("mounding"), as well as validate detection time from recharge to first extraction wells (tracer testing).

References:

(1) *Beaumont Basin Watermaster 2021 Annual Report - Draft - April 6, 2022*
(2) *Beaumont Cherry Valley Water District, 2020 Water Shortage Contingency Plan*

C. Governance Model Options

1. Current Method- 2X2X2 Coordination Meetings

The current method of coordination between the three agencies has been through 2X2X2 meetings with representatives from the Boards/City Councils of the respective agencies and key staff including their General Managers, City Managers, and other staff.

Advantages:

- This coordination method is familiar, and the participants understand the process.

Disadvantages:

- Information is not received by all three parties at the same time. Only a portion of each agency is represented. There is no set schedule for the meetings, creating long information exchange gaps.

2. Joint Power Authority

A Joint Power Authority (JPA) could be made up of representatives from each of the three agencies, plus potentially, a representative from a group that is directly impacted by the actions of the JPA, specifically the business community (businesses and developers). The JPA could be comprised of two representatives from each agency (voting member) and one member from the development community (e.g., President of NAIOP, Commercial Real Estate Development Association, Inland Empire Chapter). This would be a seven-member board to avoid a tie vote, only elected representatives from each agency would be on the Board.

Advantages:

- A JPA (Beaumont Valley Water Reclamation Authority) could provide a unified approach to the use of recycled water in the Beaumont Valley. Information would be disseminated to all parties at the same time. It would provide a cohesive multi-agency that represented the entire Beaumont Valley, when dealing with local, State, and Federal elected official. This would be very important when pursuing grants for capital improvements, upgrades, etc. It would help to minimize overlapping or duplicate activities.

Disadvantages:

- May be perceived as bypassing fully elected boards. It would require all three agencies to agree to the formation, composition, powers, and obligations of the JPA.

3. Independent Oversight Group

This option would consist of creating a new group that could be created from either representative designated by the agencies or other public groups. It would have no agency staff or elected board/council members. The oversight group would provide oversight of the program and provide an annual plan of operations that would be reviewed by the three agencies.

Advantages:

- A separate political entity with no specific agency controlling voting would establish a customer centric governing body without the "legacy" of previous interactions between elected groups.

Disadvantages:

- Agencies would have to relinquish authority to a potentially un-elected body (appointment based). It would have to be determined if this option is legally possible.

D. Recommended Plan- Framework

The focus of the recommended framework is to concentrate on the core strengths of each agency, build on previous work and discussions, and clearly define the suggested role of each agency.

Roles and Activities

City of Beaumont

1. Operate and maintain the sewer collection system, sewer treatment plant, and recycled water production which meets permits and regulatory requirements.
2. Be the RWQCB permit holder.
3. ***Enter into to agreement with BCVWD for take or pay all the recycled water produced over the 1.8 MGD required for permit compliance.***
4. ***Sell all recycled water produced in excess of the environmental requirements to BCVWD for a price equal to 50% of the cost of SWP replenishment water from SGPWA.***
5. Lease property to BCVWD for a forebay and pump station for 99 years at $1/yr.
6. Operate and maintain the sewer treatment plant in full compliance with both the RWQCB discharge permit and DDW operating permit.
7. Produce recycled water which will meet all water quality requirements for all Title 22 approved uses and indirect potable recharge through groundwater recharge.
8. Join in supporting political outreach to secure grants of operation, maintenance, and capital construction of the recycled water program.

Benefits to City of Beaumont

1. Provides a consistent revenue source through the sale of recycled water.
2. Would lower irrigation water rates for City landscape accounts if recycled water is priced lower than current non-potable water.
3. Creates storage credits that can be purchased by developers seeking a water supply for new developments from BCVWD's storage account.

Beaumont Cherry Valley Water District

1. ***Build, operate, and maintain all facilities needed to accept and distribute all of the recycled water produced by the City and use it for all approved uses, including groundwater recharge.***
2. ***Enter into a take-or-pay agreement and will pay City 50% of the cost of SWP replenishment water for all recycled water produced by the City.***

3. Include in the agreement with the City a commitment to hold and save harmless the City against any and all claims arising from the District's distribution and use of the recycled water provided by the City.
4. Receive the recycled water at the boundary of the WRP .
5. Assist the City to modify the WRP discharge permit to include groundwater recharge discharge for groundwater recharge.
6. Assist the City in completing the 1211 Change of Use Permit (CUP) process and potentially an Advanced Management Plan (AMP).
7. Join in supporting political outreach to secure grants of operation, maintenance, and capital construction of the recycled water program.
8. Assist City BCVWD in obtaining a groundwater recharge permit for groundwater recharging.

Benefits to Beaumont Cherry Valley Water District

1. Beneficial use recycled water and drought proofing irrigation use.
2. Would be a local supply of water for BCVWD residents and commercial/industrial customers.
3. Disencumbers non-potable water supplies for potential treatment and use as potable water.
4. Reduce dependence on imported water.
5. Would utilize existing investment and facilities therefor eliminating stranded costs.

San Gorgonio Pass Water Agency

1. Will work with Watermaster to determine if expanding current hydrological modeling to include adding additional sensors as needed to verify basin mixing, mounding effects, tracer studies to establish transit time for recycled water under differing operating conditions is necessary.
2. Make their basin(s) available during local recycled water demand periods for recharge to ensure that all the excess recycled water is recharged in the Beaumont Basin.
3. Host the JPA meetings at their headquarters.
4. Join in supporting political outreach to secure grants of operation, maintenance, and capital construction of the recycled water program.

Benefits to San Gorgonio Pass Water Agency

1. Reduces pressure on State Water Project supplies and pursuing one-time transfers.

Recycled Water (RW) Program Implementation Plan

Governance

1. ***City, BCVWD, and SGPWA to support the creation of the JPA*** consisting of two elected council/board members from each agency, and one representing the development community in the Beaumont Valley.
2. The JPA will meet at the SGPWA board room on a quarterly basis, or as determined by the Board.

Plan Benefit to all parties involved:

1. Builds consensus for beneficial use of recycled water in the Beaumont Valley.
2. Creates a united focus and approach to recycled water use.
3. Improves communication between the agencies by gathering everyone to general meetings, rather than 2X2X2 format.
4. Improves political impact in securing local support for grants and other funding.
5. If a developer member is included, the political support of the private sector could be added to increase political effectiveness in securing grants and other funding.

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TECHNICAL MEMORANDUM

Date: September 25, 2025

To: Lance Eckhart, General Manager/Chief Hydrogeologist
San Gorgonio Pass Water Agency

From: Tom Holliman, T.R. Holliman and Associates, Inc.

Copy: John Robinson, Principal with John Robinson Consulting, Inc.

SUBJECT: Summary of current California regulations regarding recharging recycled water in a groundwater basin and regarding utilizing recharge basins for California State Water Project and recycled water

2.0 Background

San Gorgonio Pass Water Agency (SGPWA or Pass) and Beaumont Cherry Valley Water District (BCVWD) are partnering to evaluate the use of recycled water as a part of the recharge of the Brookside West Recharge Facility Expansion. The recycled water be used to develop a new drought-resistant water source for SGPWA's member agencies and the offers potentially significant regional benefits. The production of up to 3,361 AFY [(1)] of purified water for indirect potable reuse (IPR) via the City of Beaumont's AWTP can help to maintain groundwater production locally. This new supply has the potential to complement other Pass water supply initiatives by providing reliable replenishments, freeing up imported water to be placed in storage as a drought buffer. The program also prepares Southern California for a catastrophic earthquake by developing a new reliable water supply wholly within the region. Furthermore, the program can be integrated into the existing recharge system and become part of Pass's network of facilities.

The City of Beaumont (City or Beaumont) has constructed facilities at the Beaumont Wastewater Treatment Plant (WWTP) to produce recycled water in compliance with California Code of Regulations (CCR) Title 22, Division 4, Chapter 3 (Title 22) which provides reuse options to the community to enhance water supply reliability and improve sustainability. There are multiple options to utilize recycled water for beneficial purposes and this section of the Technical Memorandum (TM) is focused on providing a summary of California regulations regarding recharged recycled water with or without State Water Project (SWP) water. The TM is being prepared to support and assist the SGPWA and BCVWD in determining their preferred reuse option(s) and might help them to work cooperatively with the City and other involved agencies to maximize use of this resource in the most sustainable and cost-effective manner.

(1) City of Beaumont Staff Report dated March 15, 2022 – Accept the Final Recycled Water Reuse Strategy Analysis Report for the City of Beaumont and Provide Direction to City Staff.

Recycled water is treated domestic wastewater that can be used for beneficial purposes and is a valuable water resource that is widely used across California, the country, and the world as a supplemental water supply. In normal times, but particularly in times of drought and water shortages, recycled water provides a relatively drought resilient water source supporting overall water supply sustainability because recycled water is locally available and controlled and is available even when other sources may be restricted.

From a regulatory perspective, recycled water reuse in California is divided into three types:

1) Non-Potable Reuse,
2) Indirect Potable Reuse, and
3) Direct Potable Reuse.

Regulations have been adopted for non-potable reuse, indirect potable reuse, and most recently direct potable reuse. Non-potable uses include activities such as agricultural and landscape irrigation, toilet flushing, cooling towers, and dust control that do not involve recycled water being intentionally introduced to the groundwater or drinking water sources. During non-potable reuse, the recycled water is typically taken up by plants, evaporated, consumed by the activity, or returned to the wastewater treatment plant. This TM is not summarizing the current regulations for non-potable reuse.

Indirect potable reuse involves indirect, intentional replenishment of drinking water sources, such as groundwater recharge through surface application (spreading), groundwater recharge through subsurface application (injection), or surface water augmentation (mixing into drinking water reservoirs).

Direct potable reuse involves direct, intentional addition of recycled water to a potable drinking water supply. This TM is not summarizing the current regulations for direct potable reuse.

This TM only considers indirect potable reuse (groundwater recharge by surface spreading only) and not any other uses. There are separate State regulations, requirements, and permits associated with each of these two uses. Title 22 specifies the minimum treatment requirements (e.g., disinfected secondary, disinfected tertiary, and advanced wastewater treatment) depending on the final use. For disinfected secondary treatment, the organic matter is stabilized to ensure oxygen is present and disinfection occurs to reduce bacteria. For disinfected tertiary treatment, filtration is utilized to remove turbidity prior to disinfection to reduce viruses and bacteria. For advanced wastewater treatment (AWT), oxidation treatment and reverse osmosis (RO) is utilized to remove dissolved constituents, and an ultraviolet treatment is added to for disinfection.

Water Supply Strategy Deliverables for Planned Water Projects

Governor Newsom's August 2022 Water Supply Strategy (Strategy) set goals of recycling at least 800,000 acre-feet of water per year by 2030 and 1.8 million acre-feet by 2040, with most of that additional recycling involving re-directing wastewater discharges that are now going to the ocean. Refer to *Attachment A* for the Water Supply Strategy.

To evaluate progress towards these goals, the Strategy directed the State Water Board to work with local water and sanitation agencies to identify recycled water projects that hold the potential to be operational by 2030 and by no later than 2040. Staff compiled the list of planned recycled water projects in coordination with WateReuse California and the California Association of Sanitation Agencies and with input from recycled water and wastewater agencies, regional water boards, and data from the Volumetric Annual Report.

Refer to *Attachment B* for the planned recycled water projects. This list is a snapshot of planned projects that anticipate additional recycled water production. State Water Board staff are tracking recycled water production on an annual basis through the Volumetric Annual Report to evaluate progress towards the recycled water goals.

Per the Water Supply Strategy, the State Water Board convened a Recycled Water Strike Team (Strike Team) to support planned recycled water projects by assisting to resolve permitting and funding obstacles. The Strike Team's objectives are to communicate with project proponents on permitting and funding barriers to implementation; and to then facilitate discussion and recommend solutions to address those barriers.

Recycled Water Policy

The State Water Board recognizes the importance of recycled water as a critical water supply for California and is implementing the Recycled Water Policy, streamlining permitting for recycled water projects, and identifying and funding the highest priority research needs to ensure the State's recycled water goals are achieved. The State Water Board adopted an amendment to the Recycled Water Policy on December 11, 2018 (effective on April 8, 2019), which includes numeric goals for the use of recycled water, two narrative goals to encourage recycled water use in groundwater-over drafted and coastal areas, and annual reporting requirements statewide for the volume of recycled water produced and used as well as the volume of wastewater treated and discharged. Refer to *Attachment C* of the State Water Board Recycled Water Policy.

California's Recycled Water Goals:

1. Increase the volume of recycled water
2. Reuse all dry weather discharge to enclosed bays, estuaries and coastal lagoons, and ocean waters
3. Maximize reuse where groundwater supplies are in a state of overdraft.

Definition of Indirect Potable Reuse

Indirect Potable Reuse (IPR) is the planned use of recycled water to replenish drinking water supplies with a suitable environmental barrier. There are two types of IPR projects:

- Groundwater Replenishment Reuse Projects
- Surface Water Source Augmentation Projects

There are two types of Groundwater Replenishment Reuse Projects (GRRPs):

- Surface application, where the recharge water is applied to a spreading area – Per Title 22, Article 5.1
- Subsurface application, where the recharge water is applied by other means – Per Title 22, Article 5.2

Currently the project that is contemplated by the SGPWA and BCVWD is a GRRP via surface application. A GRRP is a project involving the planned use of recycled municipal wastewater that is operated for the purpose of replenishing a groundwater basin designated in the Water Quality Control Plan [as defined in Water Code section 13050(j)] for use as a source of municipal and domestic water supply.

Regulations for GRRPs became effective on June 18, 2014 and were updated on October 1, 2018. The two types of GRRPs are included in Articles 5.1 and 5.2 of the Water Recycling Criteria, Title 22, Division 4, Chapter 3 of the California Code of Regulations. Refer to *Attachment D* for the Water Recycling Criteria, Title 22, Division 4, Chapter 3 of the California Code of Regulations included Articles 5.1 and 5.2.

Surface Water Source Augmentation Projects (SWSAP)

A SWSAP is a project involving the planned placement of recycled municipal wastewater into a surface water reservoir that is used as a source of domestic drinking water supply, for the purpose of supplementing the source of domestic drinking water supply.

Regulations for SWSAPs became effective on October 1, 2018 and are included in Article 5.3 of the Water Recycling Criteria, Title 22, Division 4, Chapter 3 of the California Code of Regulations.

Since at this time, the recycled GRRP anticipated is not a current GRRP Surface Water Augmentation (SWSAP) project, no supporting documentation is available.

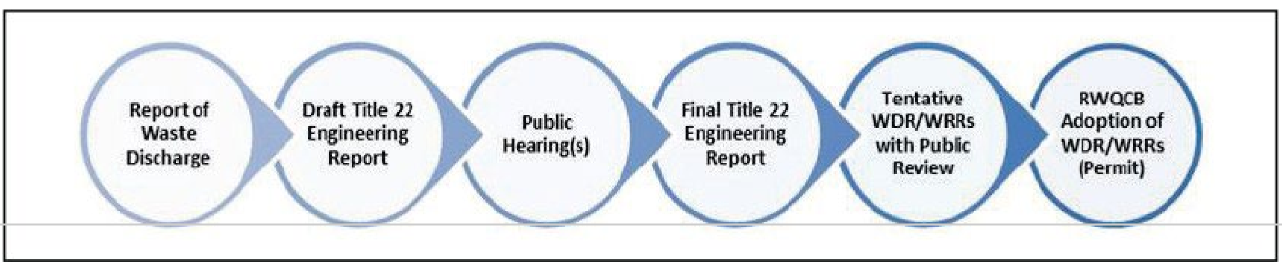
2.1 Regulatory Framework

The use of recycled water for IPR is regulated in California to ensure protection of public health and water quality. IPR refers to the augmentation of groundwater or surface water with highly treated recycled water. IPR through groundwater replenishment, which is the focus of the SGPWA/BVWD program, has been conducted for decades in California.

The draft criteria used to evaluate projects evolved over time. The revised groundwater replenishment regulations were incorporated into Title 22 of the California Code of Regulations in June 2014. The state's Water Recycling Criteria and Groundwater Replenishment Regulations are implemented and enforced through water reclamation requirements (WRRs) and waste discharge requirements (WDRs) that are imposed by the individual Regional Water Quality Control Boards (RWQCBs).

For projects involving surface water discharge, a National Pollutant Discharge Elimination System (NPDES) permit is also required. The RWQCB prescribes WRRs and/or WDRs that reasonably protect all beneficial uses and implement relevant water quality control plans and policies. Any entity proposing to recycle water would file a Title 22 Engineering Report with the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) and the RWQCB on the proposed use. **Figure 1** summarizes the permit approval process for a water recycling project in California.

Figure 1 – Permit Approval Process



Required Treatment Process

"Disinfected tertiary recycled water" is the minimum level of treatment required for surface application (spreading). To meet the California Code of Regulations (CCR) Title 22 requirements for disinfected tertiary recycled water, the wastewater must be oxidized, coagulated (if using filter media), filtered, and subsequently disinfected to inactivate and/or remove 99.999% of the plaque forming units of F-specific bacteriophage MS2 or polio virus in the wastewater. The recycled water currently produced at the Banning WWTP meets the minimum treatment requirements. A portion of the filtered effluent is also pumped through a RO system to remove TDS. The extra treatment is needed to meet the Maximum Benefit WQOs for discharge to surface waters and groundwater.

Advanced Wastewater Treatment (AWT) is the next higher quality of recycled water defined in CCR Title 22. To achieve AWT, oxidized wastewater is treated using RO and an oxidation process that achieves 0.5-log reduction of 1,4-dioxane. The oxidation process typically involves UV disinfection followed by the addition of disinfection chemicals such as sodium hypochlorite or hydrogen peroxide. The treatment processes are validated through performance monitoring and pilot testing and DDW must approve the test results.

Pathogen removal

For an IPR project, the treatment system must achieve 12-log enteric virus reduction, 10-log Giardia cyst reduction, and 10-log Cryptosporidium oocyst reduction using at least three treatments. **Table 1** describes the pathogen log removal credits that are typically granted for an MFRO-UV/AOP train, as well as the minimum 2.5-log for MBR that would be needed to meet California's requirements of 10-log removal of Cryptosporidium and Giardia with an MBR-RO-UV/AOP train. These additional pathogen removal credits through the MBR will be pursued through demonstration testing.

Table 1 – Approaches to Achieving Pathogen Log Reduction Credits

Unit Process	Currently Approved AWT Train			Alternate AWT Train Using MBR[1]		
	Virus	Cryptosporidium	Giardia	Virus	Cryptosporidium	Giardia
Membrane bio-reactor	—	—	—	0	2.5[2]	2.5[2]
Microfiltration/Ultraviolet filtration	0	4	4	—	—	—
Reverse osmosis	1.5	1.5	1.5	1.5	1.5	1.5
Ultraviolet light with advanced oxidation process	6	6	6	6	6	6
Free chlorine	6	0	0	6	0	0
Total	13.5	11.5	11.5	13.5	10	10
Regulatory requirement	12	10	10	12	10	10

[1]Pathogen log removal credits currently not granted for MBRs by regulators.

[2]Requires demonstration and approval by regulator.

It should be noted that demonstrating pathogen removal can be difficult as analytical challenges exist for detection of Cryptosporidium and Giardia. This is partly due to the lack of standardized methods for the quantification of Cryptosporidium in large volumes of advanced treated wastewater, such as MBR filtrates or RO permeates.

Although U.S. Environmental Protection Agency (EPA) Method 1693 was developed for the quantification of Cryptosporidium and Giardia in 1- to 10-L samples of disinfected wastewater, some studies have reported extremely poor recoveries for spiked secondary effluent samples. Fortunately, the drinking water and regulatory communities can build upon prior research to help address these challenges. Metropolitan Water District of Southern California is investigating Cryptosporidium analytical challenges within the context of potable reuse, including exploring the application of previously developed research methods, such as cell culture infectivity assessment and genotyping to potable reuse.

Water quality

The Santa Ana Regional Water Quality Control Board (SARWQCB adopts and implements the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan). The Basin Plan identifies the beneficial uses of groundwater and surface waters within the Beaumont Basin, establishes water quality objectives (WQOs) to maintain the beneficial uses, and prescribes how the WQOs are implemented in permits. For discharges to groundwater and surface waters in the Beaumont Groundwater Management Zone (GMZ), the Basin Plan establishes Maximum Benefit WQOs “to develop and implement projects that will assure reliable water supplies to meet rapidly increasing demands in this area.” The Maximum Benefit WQOs for recycled water recharge projects are 330 milligrams per liter (mg/L) for total dissolved solids (TDS) and 5.0 mg/L for nitrate-nitrogen, implemented as 10-year running averages. Compliance can be met by recycled water treatment or blending recycled water with other sources (dilution water), such as State Water Project (SWP) water and/or stormwater. Maximum Benefit commitments (projects, requirements) are prescribed to ensure water quality is consistent with maximum benefit to the people of the state. The SARWQCB must review any proposed recycled water recharge projects to determine compliance with Maximum Benefit commitments.

The State Water Board adopts and implements statewide regulations and policies. Title 22, Chapter 3 includes the regulatory requirements for treatment, distribution, and reuse of domestic wastewater. The Cross-Connection Control Policy Handbook and the California Plumbing Code include the regulatory requirements for protection of drinking water systems which involves installing and testing backflow prevention devices and conducting cross-connection control investigations and testing.

The State Water Board’s Division of Drinking Water (DDW) develops recycled water regulations; reviews recycled water projects to determine regulatory consistency and provides permitting requirements to the SARWQCB. DDW evaluates regulatory compliance during its review and acceptance of each project’s Engineering Report. The Regional Water Boards then develops, adopts, implements, and enforces operating permits that are consistent with DDW requirements.

The Beaumont WWTP must produce recycled water well below this requirement. The Beaumont WWTP will need to evaluate the impact of MBR filtrate water quality on RO fouling rates, determine the suitability of tertiary MBR biological nitrification/denitrification (NdN), and evaluate hydrogen peroxide and sodium hypochlorite as oxidants that drive the UV/AOP process.

2.2 Difference between 100% Recycled Water versus Recycled Water and State Water Project

2.2.1 Requirement of Diluent Water

If disinfected tertiary treated recycled water from Beaumont WWTP is utilized to recharge to the Beaumont Basin, diluent water will be required beginning with a Recycled Municipal Wastewater Contribution (RWC) of 0.20 or 20% and a diluent water contribution of 0.80 or 80%. Diluent water can include SWP water and stormwater recharged in the Beaumont Basin as well groundwater underflow within a defined mixing area. These percentages are calculated as a running average over 10 years.

Recycled Municipal Wastewater Contribution (RWC) is defined as the fraction equal to the quantity of recycled municipal wastewater applied at the spreading divided by the sum of the quantity of recycled municipal wastewater and credited diluent water (CCR Title 22 Section 60301.705).

BCVWD and Banning have recharged a 10-year running average of approximately 9,800 AFY of SWP in the Noble Creek Spreading Grounds between 2011 and 2020. The current volume of recycled water produced by the WWTP is approximately 1,568 AFY (see **Table 2** below). These relative volumes of SWP and recycled water would result in a RWC of 0.16 or 16%, which would meet the initial regulatory requirements.

Table 2 - Projected WWTP Effluent Supply

Year	2020	2025	2030	2035	2040	2045
WWTP Gross Production, MGD	4.0	6.0	6.5	7.0	7.5	8.0
WWTP Net for Reuse, MGD[1]	1.4	3	3.4	3.8	4.2	4.6
WWTP Net for Reuse, AFY	1,568	3,360	3,808	4,257	4,705	5,153

Notes:
WWTP – Beaumont Wastewater Treatment Plant MGD – million gallons per day
AFY – acre-feet per year1 (Source: City of Beaumont projected WWTP flows)
1 – Net effluent available for reuse after 20% in-plant losses and 1.8 MGD discharge to Cooper's Creek for environmental mitigation

At full plant build-out flows of 8 MGD, and considering losses during treatment, recycled water reused at the plant, 1.8 MGD discharged to Cooper's Creek for environmental habitat, and effluent discharged to the Brine Line results in an estimated maximum 4.6 MGD available for recharge. This is equivalent to 5,153 AFY of recycled water.

Using the 10-year running average of SWP diluent water recharged in the Noble Creek Spreading Grounds yields a RWC of 38%, which is greater than the regulations allow. The RWC can be increased over time. An alternative initial RWC (up to 1.0) can be approved by DDW based on effluent TOC concentrations and public hearing results. For example, the Montebello Forebay Spreading Grounds in Los Angeles County have been tentatively approved for a RWC of 45%; however, the increase from 20% to 45% has been gradual and taken a number of years (LARWQCB, 2009).

Running Monthly Average RWC

As indicated RWC is interlinked with Dilution Water. If disinfected tertiary treated recycled water from Beaumont WWTP is utilized to recharge to the Beaumont Basin, the permit will specify a maximum 120-month running monthly average RWC and define the method used to demonstrate compliance. The initial project RWC is 0.20 or 20% unless DDW approves an alternate initial value. The alternate RWC will be based on the Engineering Report, public hearing results, and a demonstration that treatment processes can reliably achieve TOC concentrations ≤ 0.5 mg/L divided by the RWC.

If AWT treated recycled water from Beaumont WWTP is utilized to recharge to the Beaumont basin, the allowable RWC would increase to 1.0 or 100% and decrease/eliminate the amount of diluent water required for permit compliance.

Response Retention Time

Recycled water must be retained underground for a specific period of time:

- At least 10 months for disinfected treated recycled water
- At least 2 months with AWT treated recycled water
- The retention time is to identify treatment failures and implement actions to protect public health.

The response retention time is determined by the time needed to collect, analyze, and confirm problematic recycled water or groundwater samples, discuss actions with DDW and SARWQCB, and procure an alternate drinking water supply or provide wellhead treatment. The response retention time must be less than the underground retention time needed to achieve pathogenic microorganism control.

For example, the response retention time must be less than the 10-months of underground travel time estimated for tertiary recycled water produced at the WWTP. Modeled underground retention time provides 0.5-log virus removal per month, so 10-months of modeled (modeled values are doubled to account for model uncertainties) underground travel time will be needed to meet the minimum 12-log virus reduction requirement. If the WWTP is upgraded to meet Full Activated Treatment (FAT) requirements and all log reductions are met through treatment, a minimum of 2-months underground travel time will be required.

2.3 Identify implications regarding regulation (who, what, etc.)

The City of Beaumont's (City) Wastewater Treatment Plant (WWTP) is designed to produce disinfected tertiary recycled water with RO provided as a treatment enhancement to reduce total dissolved solids. For full advanced treatment (FAT), reverse osmosis (RO) is utilized to remove dissolved constituents and an oxidation treatment is added to reduce constituents of emerging concern and pathogenic microorganisms (viruses, giardia, cryptosporidium).

Disinfected tertiary treated recycled water can be used for non-potable reuse and indirect potable reuse (groundwater spreading only) projects. Indirect potable reuse for groundwater injection and surface water augmentation requires FAT.

Indirect potable reuse projects (i.e., spreading) using recycled water produced at the WWTP will be regulated under site-specific Water Reclamation Requirements (WRRs) for the groundwater spreading projects. The site-specific WRRs will include required treatment processes, minimum recycled water quality, authorized discharge locations, allowable sources of diluent water (supplemental water such as imported water or stormwater), running monthly average recycled water contribution (RWC), response retention time, pathogenic microorganism control, monitoring, and reporting.

Who would regulate the project?

The Regional Board is responsible for the enforcement of water quality and pollution control measures associated with the Water Code for the reuse areas, in this case groundwater recharge project. The Regional Board reviews and comments on the required Title 22 engineering report and the antidegradation analysis; however, State Water Resources Control Board Division of Drinking Water (DDW) has the primary role of reviewing and approving the Title 22 engineering report and antidegradation analysis. The Regional Board is also responsible for implementing requirements of the Title 22 engineering report and antidegradation analysis into the applicable NPDES, WRRs and/or WDRs for the WWTP.

As mentioned above, the groundwater recharge project would be regulated by the DDW. Prior to June 18, 2014, the Water Recycling Criteria in the California Code of Regulations, Title 22, Division 4, Chapter 3 (CCR, 2014) included narrative requirements for planned groundwater recharge projects. The regulations required that recycled water must be at all times of a quality that fully protects public health and that DDW recommendations would be made on an individual case basis and taking into consideration all relevant aspects of each project, including the following factors: treatment provided; effluent quality and quantity; spreading area operations; soil characteristics; hydrogeology; residence time; and distance to withdrawal.

Since 1976, DDW issued numerous draft versions of more detailed groundwater recharge regulations. Final groundwater recharge regulations were adopted and went into effect June 18, 2014. The groundwater recharge regulations are organized by type of project:

(1) surface application (surface spreading) and

(2) subsurface application (injection or vadose zone wells).

As required by the Clean Water Act, the discharge of any pollutant to surface waters that are deemed waters of the United States (US) must be regulated by a National Pollutant Discharge Elimination System (NPDES) permit. Because the proposed discharge constitutes a new discharge to a surface water of the US, an NPDES permit governing the proposed discharge must be requested from the Santa Ana RWQCB. Under State and federal antidegradation policies, the Santa Ana RWQCB is required to make a finding regarding the satisfaction of the policies as they pertain to a surface water discharge for which it issues a NPDES permit.

State antidegradation policy, which incorporates federal antidegradation policy, seeks to maintain the existing high quality of water to the maximum extent possible, and only allows a lowering of water quality if:

- Changes in water quality are consistent with maximum benefit to the people of the State, will not unreasonably affect present and potential beneficial uses, and will not result in water quality lower than applicable standards, and
- Waste discharge requirements for a proposed discharge will result in the best practicable treatment or control of the discharge necessary to ensure:
- No pollution or nuisance, and Highest water quality consistent with maximum benefit to the people of the State.

The purpose of this antidegradation analysis is to document the proposed discharge of Title 22 recycled water to BCVWD and SGPWA spreading basin from the Beaumont WWTP. Water quality impacts to surface water would have been evaluated for BCVWD's Noble Creek spreading basin, and to groundwater for both Noble Creek and SGPWA's Brookside Spreading Grounds. The antidegradation analysis would be prepared for the Santa Ana RWQCB to provide it with the information it needs to determine whether the proposed discharge is consistent with state and federal antidegradation policies. The analysis must determine whether or not water quality degradation would occur and would be permissible when balanced against the benefit to the public.

While this antidegradation analysis would evaluate the water quality impacts to Noble Creek and Brookside Spreading Grounds groundwater basins of the proposed discharge, it does not specifically evaluate the removal of discharges to the Noble Creek or Brookside Spreading Ground from the Beaumont WWTP in order to determine or demonstrate that the impact of removal of the discharge flow is negligible.

What would they regulate?

The SGPWA Project is considering groundwater recharge via surface spreading (Option 1 listed above). Surface applications may spread either disinfected tertiary-treated (filtered) recycled water or full advanced treated (FAT) recycled water. The Project must comply with all specified Title 22 Criteria and Groundwater Recharge Criteria addressing the following key issues:

- <u>Source Control</u>

The municipal wastewater used as source water for the recharge project must be from a wastewater agency that administers an industrial pretreatment and pollutant source control program that has been enhanced to include chemicals specified by DDW and the RWQCB, and an inventory of chemicals that may be discharged to the sewer system in that area.

- Recycled Water Contribution (RWC) and Diluent Water Requirements

  Recharged recycled water must be blended with diluent water to comply with the DDW-specified maximum RWC. For surface spreading projects, the initial maximum RWC allowed under the regulations is 20%, unless an alternative initial RWC is approved by DDW based on demonstration of the treatment processes preceding soil aquifer treatment (SAT) can reliability meet the total organic carbon (TOC) limit calculated for the proposed maximum RWC.

1. The diluent water requirement would likely be reduced if additional RO treatment (greater than 50% of the flow) is provided and would drop to zero if FAT recycled water were delivered for recharge.
2. Diluent water is used to reduce the RWC. Typical diluent waters are drinking water or water from a DDW-approved source (e.g., storm water, imported untreated water, or groundwater underflow). With the exception of potable water used for blending, diluent water must demonstrate compliance with drinking water standards for nitrate, nitrite, and the sum of nitrate and nitrite. Except for potable water used as diluent, a source water evaluation of the diluent source shall be conducted and approved by DDW. Diluent water quality must also comply with drinking water standards (primary maximum contaminant levels [MCL], secondary MCLs, and notification levels [NL]).
3. In order to comply with the maximum RWC limit, diluent water may be blended (1) directly with the recycled water (e.g., in the same spreading basins or in storage tanks or piping), or (2) indirectly with the recycled water (e.g., in nearby spreading basins or as underflow within the "buffer zone" surrounding the recharge area, which is a three-dimensional area of restricted well development designated to provide the required underground retention time).

   KEY NOTE: DDW will require an annual analysis to verify RWC which would be calculated based on diluent/underflow, recycled water, and any imported/local recharge. Underflow is estimated as annual average from T22 engineering report Darcian calculations.

  - Pathogen Control and Multiple Barrier Requirements

    With regard to pathogen control, the Title 22 Water Recycling Criteria require multiple barriers (at least three) to be used from raw sewage to extracted, usable groundwater in order to achieve at least:

- 12-log enteric virus reduction
- 10-log Giardia cyst reduction

- 10-log Cryptosporidium oocyst reduction

Projects must suspend operation if the virus reduction achieved is less than 9-log or if the Giardia cyst or Cryptosporidium oocyst reduction achieved is less than 8-log.

Each barrier must achieve a minimum of 1-log reduction and will not be credited for more than a 6-log reduction in each of the above pathogens. Underground retention time may be credited with 1-log/month for virus reduction. Barriers must be validated to receive credit for the log reduction using demonstration reports or challenge testing. Underground retention time must be verified using an added tracer study in order to receive credit for the full log removal (1 log/month). Depending on the method used for project planning purposes, the regulations give partial log-reduction credit for intrinsic tracer studies (0.67 log/month), numerical modeling (0.5 log/month), or analytical modeling (0.25 log/month). For demonstration purposes, retention time is defined as the time between when the water with the added or intrinsic tracer is recharged at the site and when water with either 2% of the tracer has reached the downgradient monitoring well, or 10% of the peak tracer value is observed at a downgradient monitoring well.

- KEY NOTE: The regulations require that a tracer study be initiated within three months of project start-up.

For projects without FAT, filtration and disinfection are required to attain Title 22 disinfected tertiary effluent requirements and the underground retention time must be at least six months in order to be credited with 10-log Giardia cyst and 10-log Cryptosporidium oocyst reduction.

- Response Retention Time (RRT)

RRT is the time recycled water must be retained underground to identify any treatment failure and implement actions so that inadequately treated recycled water does not enter a potable water system, including the plan to provide an alternative water supply or treatment.

- KEY NOTE: The minimum RRT is 2 months, but must be justified by SGPWA as the project sponsor.

The greatest of the horizontal and vertical distances reflecting the retention times required for Pathogen Control or for RRT establish the zone within which drinking water wells cannot be constructed (i.e., "buffer zone" that effectively establishes a boundary between potable and non-potable use of the groundwater basin).

For planning purposes, the Groundwater Recharge Regulations allow use of modeling to estimate residence time for project facility siting.

- SGPWA must validate retention time using an added tracer or a DDW approved intrinsic tracer within the first three months of operation.

Total Organic Carbon Requirements

The Title 22 Water Recycling Criteria include provisions for increasing the maximum RWC based on the recycled water total organic carbon (TOC) concentration. The maximum allowable TOC concentration is established by the following equation:

$$TOC^{max} = 0.5 \text{ mg/L} \div RWC$$

For surface spreading projects, the point of TOC compliance may be in the (1) undiluted recycled water or within the percolation zone, (2) diluted percolated recycled water adjusted for dilution, or (3) undiluted recycled water with a DDW-approved SAT factor, demonstrating TOC removal using SAT. For example, the TOCmax for a surface spreading project operating with an initial RWC of 20% would be 2.5 mg/L. Compliance with the TOC limit is based on weekly samples (as a minimum frequency) and a 20-week running average of all TOC results as well as the average of the last four TOC results.

- An In Situ Study for TOC Compliance would be required. Lysimeter-based monitoring program at the recharge basins to demonstrate soil-aquafer treatment (SAT) efficacy. This lysimeter would be constructed at the recharge basin and require weekly sampling.

- Total Nitrogen (N)

An MBR system alone or in combination with SAT should be able to produce a recycled water that meets the total N of 10 mg/L. However, the nitrogen requirements may be more stringent based on the Basin Plan groundwater objectives.

- An anti-degradation analysis is required to demonstrate that less than 10% of the available basin assimilative capacity is utilized.

- Drinking Water Standards

An MBR system alone or in combination with SAT will produce recycled water that meets primary and secondary MCLs, with the exception of secondary MCLs for salts. The regulations allow compliance with secondary MCLs in the recharge water, which is the combination of recycled water and credited diluent water. Compliance with primary MCLs is based on the annual running average of quarterly samples. For those primary MCLs with acute toxicity (e.g., perchlorate), compliance is based on the running four-week results. For secondary MCLs, compliance is based on a single annual sample. Recharge water may be monitored in lieu of recycled water where the recharge water is comprised primarily of recycled water or a dilution factor is applied (i.e., recharge water monitoring may be applicable to disinfection byproducts in some cases).

Recycled water and groundwater from the downgradient monitoring wells must also be monitored for priority toxic pollutants and chemicals specified by DDW.

2.4 Identify impacts to existing pumping activities (e.g., local wells, proximity, additional testing, permitting, modeling, monitoring, etc.)

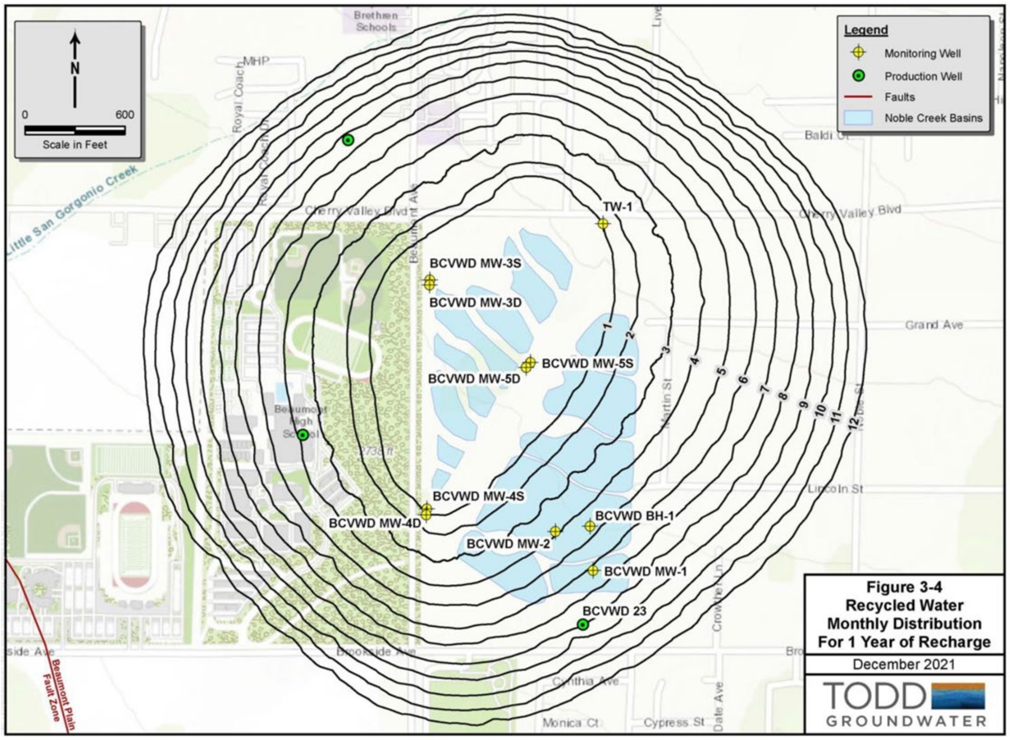
Travel time to production wells (underground travel time)

Title 22 requires the recharged recycled water must have a certain amount of residence time in the groundwater system prior to extraction at a drinking water well in order to provide time for pathogenic microorganism control (length of time depends on level of treatment provided at the WWTP) and to allow time to respond to potential off-specification recycled water being recharged in the spreading grounds (response retention time, regulatory minimum of 2 months).

BCVWD owns a potable water supply well located adjacent to the Noble Creek Spreading Grounds (BCVWD Well 23). Travel time to this Well 23 is on the order of months and may not meet the underground retention time requirements for pathogenic microorganism control (for disinfected tertiary recycled water) or possibly the regulatory minimum response retention time (for disinfected tertiary or FAT recycled water).

Accordingly, this Well 23 will need to be converted to non-potable uses or used solely for monitoring to allow recycled water recharge in the Noble Creek Spreading Grounds under all options. This issue was discussed with BCVWD, and BCVWD indicated conversion of this well to non-potable uses is a possibility. In addition, two other community wells are located near the Noble Creek Spreading Grounds and their use and status will need to be verified prior to project start-up. The wells located near the Noble Creek Spreading Grounds are shown in **Figure 2**.

Figure 2 Recycled Water Monthly Distribution for 1 Year of Recharge in the Noble Creek Spreading Grounds



Nearby Water Supply Wells and Travel Times

Understanding travel time for water to flow underground from one point to another is also important in recycled water recharge planning. Recycled water recharge regulations require various water travel times to be demonstrated including travel time to the nearest monitoring and drinking supply wells, pathogen reduction time, and time to respond to improperly treated recycled water recharge (response retention time). Water travel times are used to define the zone of controlled drinking water wells. For planning purposes, these travel times are typically demonstrated with a groundwater flow model and confirmed with a tracer test after project startup.

The Watermaster's groundwater flow model was used as a preliminary evaluation of travel times to nearby potable supply wells. The modeling assumed the 2010 to 2019 SWP recharge volumes (average 9,416 AFY) and current volume of recycled water (1,568 AFY) being produced. When using a groundwater flow model for recycled water recharge planning, the regulations require a safety factor of two to account for uncertainties associated with groundwater flow models. Assuming the underground travel time to provide pathogen reduction credit is 5 months, under the regulations this is equivalent to 10-months when estimated with groundwater modeling.

The importance of travel time is demonstrated in **Figures 2 and 3.**

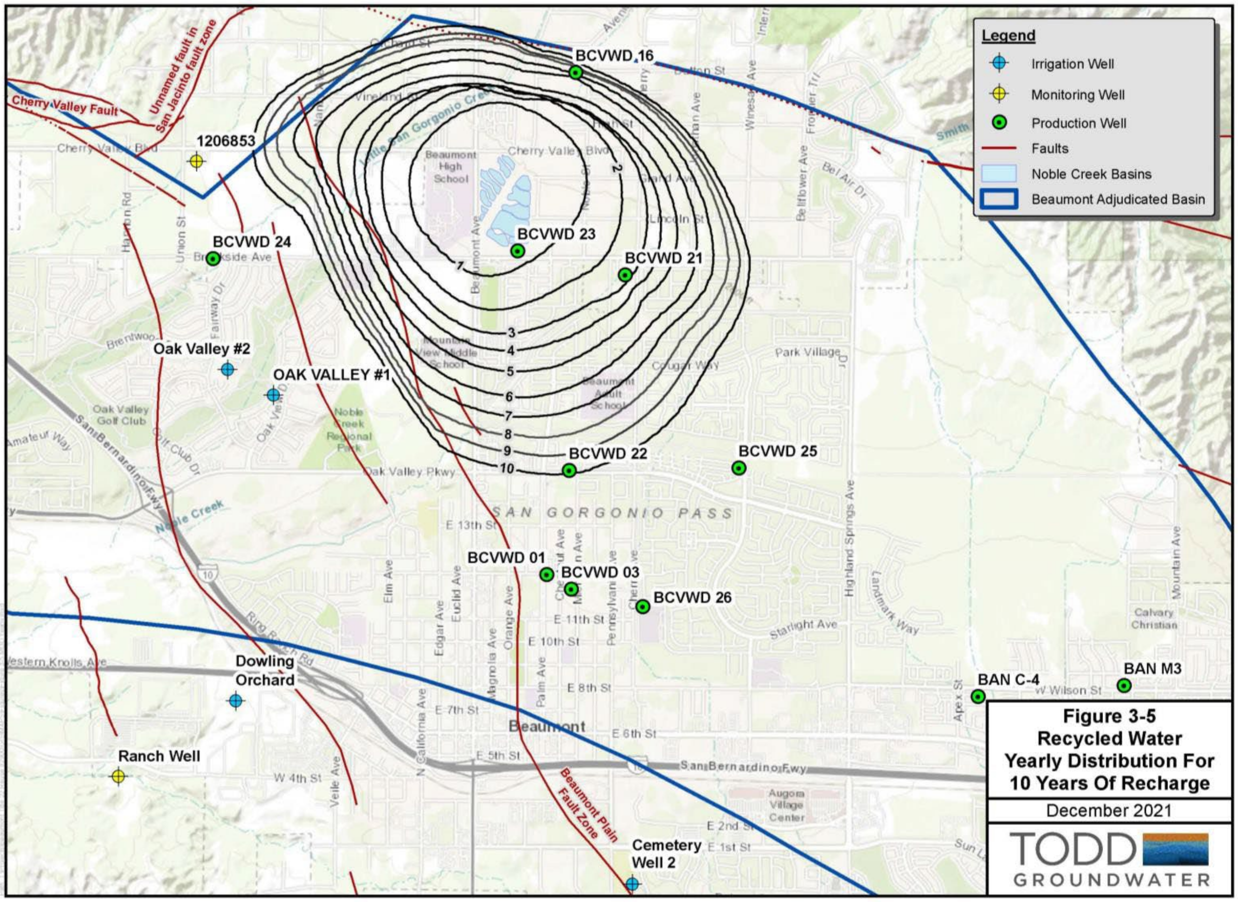
Figure 2 shows modeled travel times with monthly contours for the first year of recycled water recharge in the Noble Creek Spreading Grounds.

Figure 3 shows annual contours for 10 years of travel time for recycled water recharge. BCVWD Well 23 is located just south of the Noble Creek Spreading Grounds and is currently used for potable supply. <u>This well is at 8-months travel time from the spreading grounds and would not meet regulatory criteria for underground residence time of recycled water assuming a required pathogen reduction time of 10-months.</u> BCVWD has indicated the well could be converted to non-potable uses to allow use of the spreading grounds for recycled water recharge (Jagger, 2021). <u>The County of Riverside Department of Environmental Health website shows wells located on the Beaumont High School and California Baptist College sites located just west and northwest of the spreading grounds, respectively.</u> These wells are located 4 to 7-months of travel time from the spreading grounds. It is unclear from the website if these wells are used for potable supply or irrigation. The usage for these two wells will need to be clarified, and if used for potable supply, the wells will need to be converted to non-potable uses or destroyed in order to implement recycled water recharge.

As shown in **Figure 2** recycled water is estimated to take a little less than 3 years to reach the next closest drinking water well to the Noble Creek Spreading Grounds, BCVWD Well 21. This amount of travel time is likely sufficient to meet underground retention time requirements.

The 10-year travel time is shown to indicate the area where well owners would need to be notified of the recycled water project. **Figure 3** shows wells included in the Watermaster's modeled pumping. Other potential well owners in the area will need to be verified and given notice prior to the required public hearing.

Figure 3 Recycled Water Yearly Distribution For 10 Years of Recharge in the Noble Creek Spreading Grounds



- BCVWD Well 23 would need to be converted to non-potable uses. Usage of wells on the Beaumont High School and California Baptist College sites would need to be confirmed and if presently used for drinking water supply, would need to be converted to non- potable uses or destroyed.
- Beaumont/BCVWD will need to address other potential chemicals in recycled water including CECs. Specifically, PFAS and other constituents which may get through treatment process.
- A tracer study for Travel Time verification would be required. A monitoring program at the monitoring well to understand and validate travel time estimated in hydrogeological modeling. A work plan has to be submitted to DDW for review and approval.

What kind of permits would be required to spread recycled water?

The use of recycled water produced at the City WWTP for groundwater replenishment by surface application (i.e., spreading) will be regulated under Site-Specific WRRs issued to the City. The Site-Specific WRRs will include requirements for specific treatment processes, minimum recycled water quality, authorized discharge location, allowable sources of diluent water, running monthly average RWC, response retention time, pathogenic microorganism control, monitoring, and reporting.

Depending on the quality of recycled water produced at the WWTP and ownership of the conveyance pipeline.

- BCVWD (as the owner/operator of conveyance pipeline and the Noble Creek Spreading Grounds) will receive requirements to operate and maintain its facilities to prevent spills and ensure compliance with requirements for recycled water contribution, response retention time, and underground travel time. These specific requirements are discussed in more detail below.
- Recycled water produced at the WWTP could also potentially be recharged in the Brookside Spreading Grounds which are owned and operated by the SGPWA and located just south of the Noble Creek Spreading Grounds. For recharge in the Brookside Spreading Grounds, it is anticipated the City would be the sole permittee in separate Site-Specific WRRs.

The anticipated requirements for groundwater replenishment by surface application are described below.

Required Treatment Processes

"Disinfected tertiary recycled water" is the minimum level of treatment required for surface application (spreading). To meet CCR Title 22 requirements for disinfected tertiary recycled water[16], the wastewater must be oxidized, coagulated (if using filter media), filtered, and subsequently disinfected to inactivate and/or remove 99.999% of the plaque forming units of F-specific bacteriophage MS2 or polio virus in the wastewater. The recycled water currently produced at the City WWTP meets the minimum treatment requirements. A portion of the filtered effluent is also pumped through a RO system to remove TDS. The extra treatment is required to meet the Maximum Benefit Water Quality Objectives (WQOs) for discharge to surface waters and groundwater.

Full advanced treatment (FAT) is the next higher quality of recycled water defined in CCR Title 22. To achieve FAT, oxidized wastewater is treated using RO and an oxidation process that achieves 0.5-log reduction of 1,4-dioxane. The oxidation process typically involves UV disinfection followed by the addition of disinfection chemicals such as sodium hypochlorite or hydrogen peroxide. The treatment processes are validated through performance monitoring and pilot testing and DDW must approve the test results.

What kinds of monitoring would be required after recharging the basin?

The amended Recycled Water Policy adopted by the SWRCB in Resolution 2013-0003 (SWRCB, 2013) establishes CEC monitoring requirements for recycled water groundwater recharge projects. It also instructs all RWQCBs to not issue requirements for monitoring of additional CECs in recycled water beyond the requirements provided in the Recycled Water Policy, except when recommended by DDW or requested by the project sponsor.

The SGPWA Project at the proposed surface application locations will comply with the SWRCB's amended Recycled Water Policy (SWRCB, 2013). The amended Recycled Water Policy provides for development of a CEC monitoring program for a recycled water groundwater recharge project by completing three phases:

1. Initial monitoring phase
2. Baseline monitoring phase
3. Standard operation phase

The Recycled Water Policy requires that an initial assessment monitoring phase be conducted to assess the occurrence of health-based CECs, performance-indicator CECs, and surrogates in recycled water and groundwater recharged via surface spreading. This initial phase requires quarterly monitoring of health-based and performance-indicator CECs, plus monitoring of surrogates on a project-by-project basis.

- Recycled water quality monitoring must be conducted prior to discharge at the spreading basin(s) for surface applications.
- Groundwater monitoring at a monitoring well located within 30-days downgradient from the spreading basin(s) is required for health-based CECs, performance indicated CECs and surrogates for that specific project.

Based on the findings of the initial assessment monitoring phase, the RWQCB with input from DDW selects project specific-performance indicator CECs and surrogates for monitoring during the subsequent baseline monitoring phase. The monitoring phase requirements are similar to those for the initial phase, except that the sampling frequency is reduced to semi-annually. Health-based CECs continue to be monitored, but only selected performance-indicator CECs and surrogates must be monitored to establish a project-specific baseline.

The findings of the baseline monitoring phase are used to establish the standard operation monitoring program for the project. As above, the RWQCB with DDW refine and select the project-specific requirements for monitoring CECs and surrogates in the standard operation monitoring program for the project. The Recycled Water Policy requires semi-annual monitoring for health-based CECs and selected performance-indicator CECs, treatment process performance, and recycled water quality, and in that case, annual monitoring may be allowed.

Groundwater Monitoring Wells

Groundwater monitoring will be used in the continuous assessment of groundwater quality and to determine any impacts from the recharge of recycled water. A finalized groundwater monitoring program will be developed in conjunction with the DDW and the RWQCB. Both agencies may specify any contaminants and chemicals be monitored based on the results of the recycled municipal wastewater monitoring conducted.

Should any of the groundwater monitoring results exceed the MCL for a specific contaminant, a second sample shall be analyzed for the contaminant within 48 hours of being notified by the laboratory. If the second sample exceeds MCL, within 24 hours of being notified by the laboratory, the district will notify the DDW and RWQCB and the district shall discontinue surface application of recycled water. Continued surface application of recycled will begin once corrective actions have been taken or evidence is provided to the DDW and RWQCB that the contamination was not a result of the GRRP.

According to the Title 22 Monitoring Well Requirements (§60320.126) for surface spreading, at least two down gradient monitoring wells shall be constructed and located between the spreading basin discharge facility and the nearest down gradient municipal wells. One of these wells is required to be situated no less than two weeks but no more than six months of travel time through the saturated zone affected by the recharged water. The other shall be located at least 30 days upgradient of the nearest drinking water well.

Prior to the commencement of GRRP operation at least two samples will be analyzed from each monitoring well that has recharge water located within one year of travel time of the well(s). Each sample must be analyzed for total nitrogen, nitrate, nitrite, any contaminants, and chemicals specified by the DDW or the Santa Ana RWQCB based on the results of the recycled municipal wastewater monitoring conducted pursuant to Title 22 §60320.126.

A. Standard Operation Groundwater Monitoring

Following the commencement of GRRP operation at least one sample per quarter must be analyzed from each monitoring well that has recharge water is located within one year of travel time of the well(s). Each sample will be analyzed for total nitrogen, nitrate, nitrite, and any contaminants and chemicals specified by the DDW or the Santa Ana RWQCB based on the results of the recycled municipal wastewater monitoring conducted pursuant to Title 22 §60320.126. In addition, the groundwater shall be tested quarterly for specified priority toxic pollutants listed in 40 CFR section 131.38 of “Establishment of numeric criteria for priority toxic pollutants for the State of California” and other chemicals that the DDW has deemed necessary based on the GRRP’s engineering report, affected groundwater basin, and the results of the assessment performed pursuant to Title 22 §60320.106.

B. Groundwater Monitoring Summary

As mandated by Title 22, groundwater monitoring will occur at least once per quarter, for all required constituents and report all required information.

Indirect Potable Reuse Special Studies and Approvals

Various special studies and approvals are required to obtain an operating permit for groundwater replenishment by surface application. The studies include validation of treatment processes, verification of recycled water quality, groundwater monitoring and modeling, diluent water monitoring, and documented plans to safeguard the public water supply. The anticipated special studies are described below.

1. **Groundwater Monitoring.** Prior to project operation, the City and/or BCVWD (and potentially SGPWA) must determine the existing quality of all potentially affected groundwater aquifers. At least 4 representative samples, one sample per quarter to evaluate seasonal variations, must be collected from each aquifer and analyzed for specific chemicals, contaminants, and characteristics.

2. **Groundwater Modeling.** The City and/or BCVWD (and potentially SGPWA) must conduct groundwater modeling to determine flow direction, underground travel time, and location of the nearest drinking water well. The modeling results will be used to select appropriate locations for monitoring wells, establish credits for enteric virus log reductions based on underground travel time, and the volume of underflow available for calculating diluent water contributions for compliance with the running monthly average RWC.

3. **Treatment Process Validation.** Each treatment process utilized at the WWTP (including underground retention for virus removal) will be assigned a specific log reduction value that will be used to determine compliance with pathogenic microorganism control requirements. The City will need to submit standard values, approved results from tests conducted at similar facilities, or onsite testing results to DDW for validation and approval.

4. **Diluent Water Quality.** The proposed diluent water sources may require testing and approval by DDW and SARWQCB. Potable water and SWP water are exempt from testing requirements. “New” (post 2004) stormwater must be evaluated to ensure compliance with Maximum Benefit WQOs. The testing methodology and planned compliance approach must be approved by the SARWQCB. A source water evaluation (per the American Water Works Association Watershed Sanitary Survey Guidance Manual) may be required for stormwater and groundwater underflow. The City and/or BCVWD will need to submit required documentation to DDW and the SARWQCB for review and approval.

5. **Diluent Water Volume.** The proposed method for determining the volume of diluent water to be credited and the planned approach for introducing diluent water to ensure compliance with the running monthly average RWC must be submitted by the City and/or BCVWD to DDW and the SARWQCB for review and approval.

6. **Total Nitrogen and TOC Compliance.** Recycled water (samples collected before or after spreading surface) must comply with a total nitrogen limit of 10 mg/L and a TOC limit of 0.5 mg/L. Sampling is recommended to predict compliance, evaluate treatment process operations, or propose groundwater compliance locations prior to preparation of the Engineering Report. If soil aquifer treatment (SAT) will be utilized to comply with the TOC limit, a soil-aquifer treatment factor must be approved by DDW based on demonstration studies conducted to predict removal efficiencies through the soil column. The City and/or BCVWD will need to submit the SAT studies to DDW for review and approval.

7. **Wastewater Source Control.** The City must implement a pollutant source control program that includes chemical source investigations and monitoring for DDW-specified chemicals, outreach programs to minimize discharge of pollutants to the WWTP, tracking the fate of DDW-specified chemicals through the treatment processes, and current inventories of DDW-specified chemicals. A revised sewer use ordinance is recommended to prescribe local limits, develop appropriate enforcement procedures, and prohibit discharge of constituents of concern to the sewer system.

8. **Alternative Source of Drinking Water.** The City and/or BCVWD (and potentially SGPWA) will need to develop a plan to provide an alternative source of drinking water or implement wellhead treatment if water quality standards are exceeded due to recycled water recharge. The proposed source of drinking water and implementation plan must be submitted to DDW for review and approval.

9. **Response Retention Time.** The City and/or BCVWD (and potentially SGPWA) will need to develop a response retention time (minimum of 2 months) that provides sufficient time to identify treatment failures and implement actions to protect public health. The proposed response retention time must be submitted to DDW for review and approval.

10. **Zone of Controlled Drinking Water Well Construction.** A primary zone of controlled drinking water well construction must be established based on the larger of the underground travel time approved for pathogen control or the response retention time. A secondary boundary is also required to delineate an area where more study or potentially mitigating activities may be conducted prior to drilling new drinking water wells.

Riverside County (County), Department of Environmental Health issues permits for new well construction, reconstruction, abandonment, and destruction (Ordinance 682). Watermaster Resolution 2004-04 accepts the County well regulations and includes some additional stipulations. The City and/or BCVWD will need to coordinate with the County and Watermaster to identify existing potable supply wells and prevent drilling of new potable supply wells within the zone of controlled drinking water well construction. Adoption of an ordinance or agreement by or among the City, BCVWD, County, and Watermaster to prohibit new drinking water well construction within the primary zone is encouraged and may be required by DDW.

- Title 22 Engineering Report. The City and BCVWD (and potentially SGPWA) must prepare Title 22 Engineering Report to describe the project facilities, treatment processes, results of the special studies (described above), and operational plans. The draft Engineering Reports are submitted to DDW and SARWQCB for their review and comment. After DDW and SARWQCB comments are addressed, the revised draft Engineering Reports will be made available for a 30-day public review period. At a minimum, all drinking water well owners located within 10-years underground travel time must be notified of the project by direct mail, newsletter, or local newspaper/TV/radio advertisements.

- Groundwater Tracer Study. After the project is approved and groundwater recharge is initiated, the City and/or BCVWD (and potentially SGPWA) must conduct a groundwater tracer study to verify the groundwater modeling results and ensure the required virus log reduction is achieved. Use of an intrinsic tracer (e.g., comparison between the mineral compositions of recycled water and ambient groundwater) is allowed, but only 0.67-log virus removal is credited per month.

2.5 Evaluate impacts of blending water qualities (i.e., full advanced treated effluent with non-full advanced treated effluent)

The primary difference between using Title 22 tertiary treated recycled water versus Full Advanced Treatment (FAT) recycled water would be the requirement for dilution water. If Title 22 Tertiary is recharged to the Beaumont Basin, diluent water is required beginning with a RWC of 0.20 or 20% and a diluent water contribution of 0.80 or 80%. Diluent water can include SWP water and stormwater recharged in the ponds as well groundwater underflow within a defined mixing area. These percentages are calculated as a running average over 10 years.

BCVWD and Banning have recharged a 10-year running average of approximately 9,800 AFY of SWP in the Noble Creek Spreading Grounds between 2011 and 2020. The current volume of recycled water produced by the WWTP is approximately 1,568 AFY.

These relative volumes of SWP and recycled water would result in a RWC of 0.16 or 16%, which would meet the initial regulatory requirements.

A larger RWC (up to 1.0 or 100%) may be approved for recharge using FAT recycled water. In addition, the SARWQCB and DDW are more likely to approve increases in the RWC if tertiary/100% RO recycled water is produced and recharged in the spreading basins.

The Basin Plan contains numeric and/or narrative water quality objectives for a wide range of constituents. All of the water quality objectives listed in the Basin Plan that are applicable to the Project are to be assessed in the Antidegradation Analysis; more specifically, Total Dissolved Solids (TDS) and Nitrate are the key water quality constituents addressed in the analysis.

Because of the treatment processes to achieve either Title 22 tertiary or FAT there is a possibility that constituents of concern may still be present in the final effluent used for recharge. This include NDMA, PFAS, and others which may pass through the wastewater process and be present in undesirable levels in the recycled water. In order to avoid contaminating the recharge basins, these constituents must be monitored and removed from any recharge recycled water. This could be done at the City WWTP or at a satellite treatment facility near the groundwater recharge basins.

2.6 Review options and issued related to injection and pumping of recycled water

As outlined in Section 2.6, the City's WWTP is designed to produce disinfected tertiary recycled water with RO provided as a treatment enhancement to reduce total dissolved solids. For FAT, RO is utilized to remove dissolved constituents and an oxidation treatment is added to reduce constituents of emerging concern and pathogenic microorganisms (viruses, giardia, cryptosporidium).

Due to the above treatment the disinfected tertiary treated recycled water can be used for non-potable reuse and indirect potable reuse (groundwater recharge). The indirect potable reuse for groundwater recharge can be accomplished via groundwater spreading or injection.

An assessment of the potential impacts of the proposed recharge (injection) activities on the underlying Beaumont Basin, and evaluate the compliance with Title 22. The objectives of this evaluation should be focused on the following:

- Recharge the Beaumont Basin to improve water supply reliability within SGPWA service area, and
- Meet all applicable regulatory requirements while minimizing any impacts on the groundwater basin.

This evaluation of groundwater recharge impacts should be conducted with these two objectives.

Conduct a series of hydrogeological analyses of the Beaumont Basin as a part of the evaluation of the identified discharge location alternatives. The analyses should focus on the evaluation of discharge to Beaumont Basin to evaluate compliance with Title 22 requirements for various recycled water recharge scenarios.

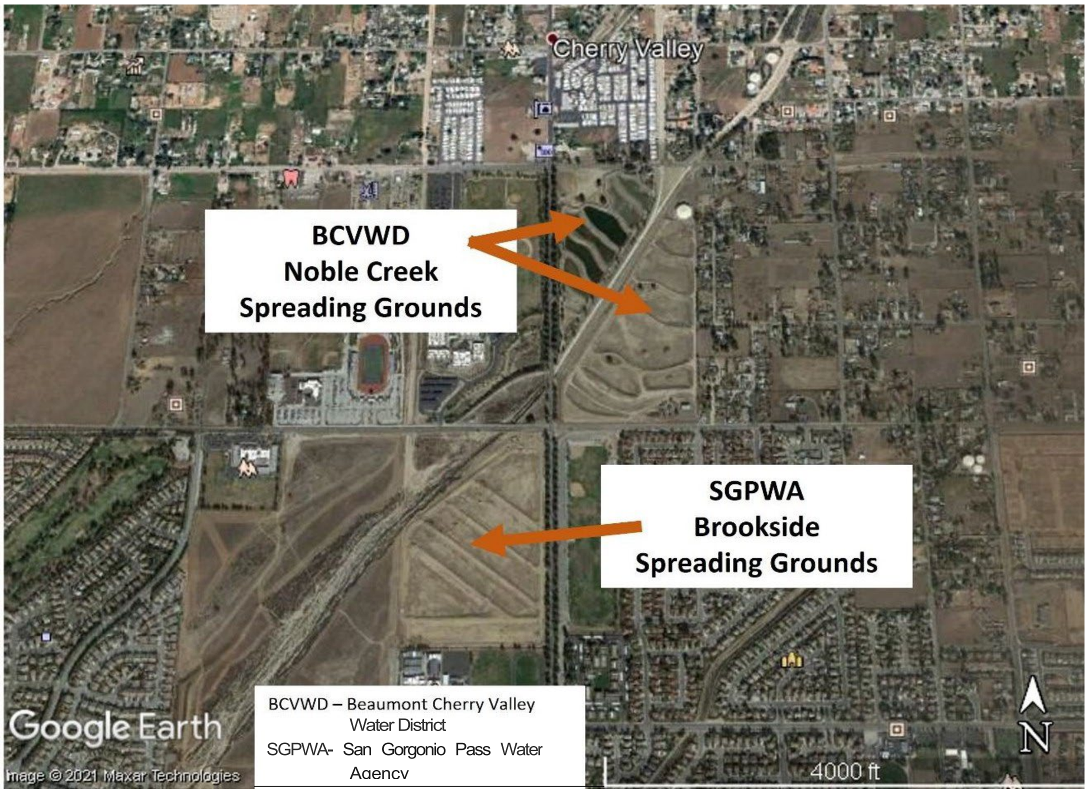
In order to predict compliance with recycled water regulatory requirements, an existing calibrated numerical groundwater model has to be utilized. One model that could be selected is a Refined Basin Flow Model which if not already in existence could be developed jointly by the SGPWA and BCVWD. This model could integrated streamflow, groundwater flow, and solute transport model.

This potential model could be utilized to address key issues, including:

- Predicted travel distance and seepage velocity of recycled water after 12 months, 10 years and 20 years of Project recharge
- Predicted retention time of recycled water
- Predicted distribution of percent recycled water after 12 months, 10 years and 20 years of Project recharge
- Predicted percentage of RWC at the **nearest active municipal wells**

The initial analyses of the Beaumont Basin could be conducted assuming a variety of discharge/recharge rates. Three preliminary hydrogeological analyses are recommended for the Project with the MGD flow discharge to be determined which are shown in **Figure 4** below and scenarios summarized below:

Figure 4 – Beaumont Basin Spreading Basins



- **Scenario 1**: Discharge to the Brookside Spreading Grounds owned and operated by SGPWA at a flow to be determined.
- **Scenario 2**: Discharge to Noble Creek Spreading Grounds owned and operated by BCVWD at a flow to be determined.
- **Scenario 3**: Discharge to Brookside and Noble Creek Spreading Grounds at a flow to be determined.

2.7 Evaluated Charge through all of the potential ponds including Beaumont Cherry Valley Water District recharge ponds

As discussed in **Section 2.6** an evaluation of recycled water recharge would originally include groundwater spreading or injection at the Beaumont Basin but as recommended scenarios has to be developed to include the BCVWD recharge ponds. The evaluation will include modeling, antidegradation analysis with a review of the impacts to the groundwater basin plan quality.

Operational Scenario

The Refined Basin Flow Model can be utilized to evaluate the hydrogeological impacts of the proposed Operational Scenario of groundwater recharge of recycled water produced at the City's WWTP.

The analysis of recycled water recharge into the Beaumont Basin assumes that 100% of City's WWTP flow of except for the current flow, which has to be determined by the City's Adaptive Management Plan that is discharged to the creek. Historic data is available at the City's WWTP but there is no data at or near the proposed Beaumont Basin location. The available historic flow data for the City's WWTP discharge has to be reviewed, and a model analysis of the above three (3) scenarios has to be taken into consideration with the estimated historic occurrences maintained.

Antidegradation Analysis

As required by the Clean Water Act, the discharge of any pollutant to surface waters that are deemed waters of the United States (US) must be regulated by a National Pollutant Discharge Elimination System (NPDES) permit. Because the proposed Project discharge constitutes a new discharge to a surface water of the US, a NPDES permit governing the proposed discharge must be requested from the Santa Ana Regional Water Quality Control Board (Santa Ana RWQCB). This Project will require the creation of an Antidegradation Analysis. to support a RWQCB's future finding that the Project discharge maintains the existing high quality of water to the maximum extent possible.

Assimilative Capacity and Groundwater Quality

The RWQCB has established Antidegradation and Maximum Benefit Water Quality Objectives (Antidegradation WQOs and Maximum Benefit WQOs) for TDS and nitrate as nitrogen (nitrate-nitrogen or nitrate) and other constituents in groundwater in its Basin Plan (SARWQCB, 2019). Antidegradation WQOs consider the goal of preserving historical groundwater ambient concentrations. Maximum Benefit WQOs consider management activities such as recharge with recycled water. As shown in **Table 3**, the Maximum Benefit WQOs for groundwater for TDS and nitrate-nitrogen are 330 mg/L and 5 mg/L, respectively.

Table 3
Groundwater Quality Objectives and Average SWP, Recycled Water and Groundwater Quality

	TDS (mg/L)	**Total Inorganic Nitrogen (mg/L)**	**Nitrate as Nitrogen (mg/L)**
Antidegradation WQO	230		1.5
Maximum Benefit WQO	330		5.0
Average Ambient Groundwater[1]	280		2.7
Average SWP[2]	262		0.42
Average Tertiary RW with 50% RO[3]	365[4]/260[5]	3.9	
Ten-Year Running Average for RW Recharge[6]	330	6.7	6.7
Typical FAT RW[7]	55 - 80		0.3 – 1.1
Available Assimilative Capacity	**50**		**2.3**

Notes:

TDS – total dissolved solids mg/L – milligrams per liter BPO – Basin Plan Objective RW – recycled water

1 – Average in Beaumont Groundwater Management Zone from 1999 to 2018 (WSC, 2020)
2 – Average 2015 to 2018 (SGPWA, 2020)
3 – 50% of RW is run through RO treatment
4 – Average 2021 concentrations with limited RO runs
5 – WWTP Engineer's estimate of TDS when plant operations are optimized
6 – Per SARWQCB (2014 and 2015) including bended water such as SWP, surface water and/or stormwater
7 – Typical range observed at West Basin Municipal Water District's Edward C. Little Water Reclamation Water Replenishment District of Southern California's Leo J. Vanderlans Advanced Water Treatment Facility, Santa Clara Valley Water District's Silicon Valley Advanced Water Purification Center and Orange County Water District's Groundwater Replenishment System

As specified in its Basin Plan (RWQCB, 2019), the ambient groundwater quality in the Santa Ana Watershed, including the Beaumont GMZ, must be recalculated every three years. The Beaumont GMZ is an area defined by the SARWQCB that is slightly larger than the adjudicated Beaumont Basin area; however, ambient concentrations for the Beaumont Groundwater Management Zone are considered representative of the adjudicated Beaumont Basin, as most monitored wells are located within the Basin. The most recent recalculation was completed in 2020 for water quality data collected from 1999 to 2018 (WSC, 2020). The ambient TDS and nitrate-nitrogen groundwater quality for this period are 280 mg/L and 2.7 mg/L, respectively, as shown in **Table 3**.

Impacts on Groundwater Quality

For the groundwater quality analysis, the proposed Project operational strategy typically is modeled using a spreadsheet model to calculate mass loading of all basin inflows in comparison with allowable basin loading per adopted water quality objectives.

Groundwater levels and Mounding

Groundwater levels at the Noble Creek Spreading Grounds have risen since BCVWD began recharging SWP water in 2006 forming a mound around the basins. Groundwater levels rose approximately 90 feet between 2016 and 2020 (ALDA, et al., 2021). BCVWD has increased pumping in the area east of the Noble Creek Spreading Grounds to mitigate the mounding. Based on the groundwater elevation contours in December 2020 and an estimated ground surface elevation of 2,700 feet mean sea level, the depth to groundwater beneath the spreading basins was about 400 feet. The degree of mounding will vary based on the volume of recharge in the Noble Creek Spreading Grounds and Brookside Spreading Grounds. Mounding affects groundwater flow directions resulting in radial flow in the local area of the spreading basins. Understanding flow patterns/directions and velocities is essential to recycled water recharge planning.

Mounding can be an issue if groundwater levels rise to near the ground surface, which can reduce infiltration rates, impact shallow underground structures like basements or freeway underpasses, discharge to surface water, or mobilize shallow contamination areas (i.e., environmental release sites).

Given the depth to groundwater (400 feet) after 15 years of spreading grounds operation, any additional mounding due to recycled water recharge, which is a small percentage of the total recharge, is not expected to have adverse impacts. This should be confirmed with groundwater modeling, which showed groundwater levels do not rise above current levels with maximum projected recycled water recharge.

BCVWD Water Supply Wells and Travel Times

Understanding travel time for water to flow underground from one point to another is also important in recycled water recharge planning. Recycled water recharge regulations require various water travel times to be demonstrated including travel time to the nearest monitoring and drinking supply wells, pathogen reduction time, and time to respond to improperly treated recycled water recharge (response retention time). Water travel times are used to define the zone of controlled drinking water wells.

For planning purposes, these travel times are typically demonstrated with a groundwater flow model and confirmed with a tracer test after project startup.

The Watermaster's groundwater flow model should be updated and be used as a preliminary evaluation of travel times to nearby potable supply wells. When using a groundwater flow model for recycled water recharge planning, the regulations require a safety factor of two to account for uncertainties associated with groundwater flow models. Assuming the underground travel time to provide pathogen reduction credit is 5 months, under the regulations this is equivalent to 10-months when estimated with groundwater modeling.

The importance of travel time is to show travel times with monthly contours for the 1 year, 10 years and 20 years as outlined in Section 2.6 for the three scenarios outlined above. BCVWD Well 23 is located just south of the Noble Creek Spreading Grounds and is currently used for potable supply. This well could potentially not meet the regulatory criteria for underground residence time of recycled water assuming a required pathogen reduction time.. BCVWD has indicated the well could be converted to non-potable uses to allow use of the spreading grounds for recycled water recharge (Jagger, 2021). The Riverside County, Department of Environmental Health website shows wells located on the Beaumont High School and California Baptist College sites located just west and northwest of the spreading grounds, respectively. These wells should be modeled for their travel time from the spreading grounds. It is unclear from the website if these wells are used for potable supply or irrigation. The usage for these two wells will need to be clarified, and if used for potable supply, the wells, if impacted would need to be converted to non-potable uses or destroyed in order to implement recycled water recharge.

Once the zone of controlled drinking water wells is defined, it is recommended that a study be conducted to determine if there may be undocumented wells within the zone through review of drillers' logs, County and Watermaster records and databases, BCVWD water supply connection records, and a windshield survey.

The 1-year, 10-years and 20-years travel time has to be evaluated and, if necessary the well owners would need to be notified of the recycled water project via a public hearing.

Potential for Recycled Water Recharge

The use of the Brookside Spreading Grounds and potentially Noble Creek Spreading Grounds to recharge recycled water appears feasible considering the following.

- TDS and nitrate-nitrogen (and TIN) concentrations in tertiary/50% RO recycled water, tertiary/100% RO recycled water, and FAT recycled water meet regulatory requirements for spreading with recycled water assuming blending with SWP water and/or stormwater for tertiary treated recycled water.
- The available spreading grounds capacity is more than adequate to accommodate current and maximum recycled water and diluent water volumes.
- Available diluent water (SWP) based on 1 year, 10 years and 20 years of recharge in the Brookside Spreading Basin and Noble Creek Spreading Grounds is adequate to allow recharge of tertiary treated recycled water assuming 50% of the recycled water undergoes RO treatment. After this threshold is determined, an increase in the RWC, more SWP water, introduction of stormwater recharge, a higher percentage of RO treatment, and/or FAT recycled water will be needed.
- Modeling of travel times to determine the impact to BCVWD 21, BCVWD Well 23, well at Beaumont High School and well at California Baptist College sites.

2.8 Summary of similar projects (success and failures), and summary of unintended consequences

In Southern California, a number of large-scale, highly successful groundwater recharge projects use purified recycled water to replenish groundwater basins. These projects increase local water supplies and protect coastal aquifers from seawater intrusion. These successful projects include:

Orange County Groundwater Replenishment System (GWRS)

- A joint project between the Orange County Water District (OCWD) and the Orange County Sanitation District (OC San), GWRS is a large water purification project for indirect potable reuse. It utilizes a three-step advanced treatment process involving microfiltration, reverse osmosis, and ultraviolet light with hydrogen peroxide to purify treated wastewater. The resulting high-quality water replenishes the Orange County Groundwater Basin, creates a seawater intrusion barrier, and helps meet the water needs of nearly one million people. This project has allowed OCWD to eliminate the need for imported water for groundwater replenishment.

Groundwater Reliability Improvement Program (GRIP)

- Led by the Water Replenishment District of Southern California (WRD), GRIP aims to achieve local water independence using recycled water. Its Advanced Water Treatment Facility (AWTF) in Pico Rivera produces highly purified recycled water that is sent to the Montebello Forebay Spreading Grounds for groundwater replenishment. This program enables WRD to use recycled water instead of imported water, increasing the region's self-sufficiency.

2.8.1 Successful Groundwater Recharge Projects With Recycled Water

The Los Angeles Department of Water and Power (LADWP) is developing this project to significantly increase its local water supply. It will provide up to 22,000 acre-feet of purified water annually to replenish the San Fernando Groundwater Basin using advanced technologies to treat recycled wastewater. This project is part of Operation NEXT, which aims to recycle all available treated wastewater from the Hyperion Water Treatment Plant by 2035.

This long-standing project in Los Angeles County began active groundwater recharge with recycled water in the 1960s. It involves injecting recycled water into groundwater supplies for later use as drinking water.

Operated by the Los Angeles County Department of Public Works, these projects use recycled water to create an underground freshwater barrier. This barrier prevents seawater from contaminating coastal groundwater aquifers, protecting a critical local water source. The West Coast Basin Barrier has been active since 1994, with the Alamitos Barrier starting in 2005.

The East Valley Water District's (EVWD) recycled water recharge project is centered on the Sterling Natural Resource Center (SNRC). In partnership with the San Bernardino Valley Municipal Water District and the City of San Bernardino Municipal Water Department, this initiative aims to create a sustainable, local water supply by treating wastewater and using it to replenish the Bunker Hill Groundwater Basin.

Project components

Sterling Natural Resource Center (SNRC): A $250 million facility that recycles up to 8 million gallons of wastewater per day. The center began operations in 2024. It is designed to be a "net-zero energy" facility when fully operational.

- Weaver Recharge Basins: These basins are a critical part of the project's groundwater recharge plan. They became operational in January 2024 and are designed to percolate treated recycled water into the Bunker Hill Basin.
- Regional Recycled Water System: This is a regional pipeline network that transports recycled water to the Weaver Basins for recharge.
- Advanced Treatment: The SNRC uses advanced technologies, including Membrane BioReactors (MBR) and ultraviolet treatment, to produce highly disinfected, tertiary-treated recycled water that meets safety requirements for groundwater recharge.

a. Project benefits

- Enhanced water reliability: By creating a local, drought-proof water source, the project lessens the region's dependence on imported water supplies.
- Groundwater replenishment: The initiative recharges the Bunker Hill Basin, which serves as a vital water source for approximately 650,000 people in the region.
- Regional collaboration: The project is a collaboration between the East Valley Water District, the San Bernardino Municipal Water Department, and the San Bernardino Valley Municipal Water District.
- Environmental stewardship: The project transforms a wastewater stream that was previously discharged out of the area into a valuable resource for the community and environment.

The Inland Empire Utilities Agency (IEUA) is using recycled water for groundwater recharge in the Chino Basin to bolster local water supplies and reduce dependence on imported water. This effort is part of the larger Chino Basin Program, which seeks to improve water supply reliability and sustainability for a growing population.

a. Key components of the groundwater recharge program
    a. Blending of water sources. IEUA uses a mix of different water sources to recharge the Chino Basin aquifer. This includes:
    b. Recycled water from its treatment facilities.
    c. Captured stormwater runoff.
    d. Imported water from the State Water Project.

Recharge facilities

The IEUA operates a network of 19 groundwater recharge basins throughout its service area. These basins use a natural filtration process to further treat the recycled water. Treated water is delivered to these above-ground basins. Gravity then causes the water to slowly percolate through the soil. This process, known as soil aquifer treatment (SAT), allows native soil bacteria to break down dissolved organic matter, further purifying the water.

The IEUA is designing an advanced water purification facility (AWPF) as part of Phase II of the Chino Basin Program.

a. Capacity: The facility will have a capacity of 15,000 acre-feet per year (AFY).

b. Advanced purification: The AWPF will allow for the direct injection of highly purified water into the Chino Basin aquifer, enhancing groundwater supplies.

c. Infrastructure: Phase II also includes new injection wells and pipelines to support the expanded recharge efforts.

1. Recent and future project funding

In July 2025, the IEUA secured conditional federal funding for its Montclair Basin Improvement Project. This project is a collaborative effort with the Chino Basin Watermaster and Chino Basin Water Conservation District to expand local groundwater recharge capacity.

2. Program benefits

a. Drought resilience: Relying on locally produced recycled water makes the region's water supply more resilient to droughts, which disproportionately affect imported water sources.

b. Increased local supply: The program creates a new, local water supply, reducing the need for expensive imported water.

c. Groundwater quality: The recharge process, especially with advanced purification, improves the quality of the Chino Basin aquifer.

d. Environmental stewardship: Reusing 100% of the agency's recycled water protects the environment and manages water resources responsibly.

The IEUA ensures its recycled water is safe for groundwater recharge through a multi-stage treatment and purification process, followed by constant monitoring and regulatory oversight. This involves advanced treatment at IEUA's facilities and a natural purification step as the water percolates into the ground.

The recycled water used by IEUA for groundwater recharge is treated to strict standards set by the California Department of Public Health. The treatment process includes:

- Preliminary and primary treatment: Removes large solids, debris, and grit.
- Secondary treatment: Involves an activated sludge process, where microorganisms consume remaining organic material. This removes over 90% of organic matter from the wastewater.

- Tertiary treatment: Utilizes filtration and disinfection to further polish the water. It removes remaining suspended solids using media filters and eliminates bacteria and viruses through disinfection.

After tertiary treatment, the water is released into IEUA's 19 recharge basins. The natural process of percolation through the soil provides a final, robust purification step called Soil Aquifer Treatment (SAT).

a. Natural filtration: As the water slowly travels through layers of rock and soil, it is naturally filtered, which removes more contaminants.
b. Biological breakdown: Native soil bacteria in the ground consume and metabolize the low concentrations of dissolved organic material that may remain after the plant's treatment.
c. Monitoring effectiveness: The effectiveness of the SAT process is reliably monitored using specialized equipment and monitoring wells.

The safety of IEUA's recycled water is overseen by multiple regulatory bodies and backed by a rigorous sampling schedule.

a. State and federal oversight: The California Department of Public Health, the Regional Water Quality Control Board, and other state and federal agencies constantly monitor the water's quality.
b. Comprehensive sampling: IEUA conducts daily, weekly, quarterly, and annual sampling based on requirements from regulatory permits. The results are reported to the appropriate authorities.
c. Physical separation: Recycled water is distributed in its own dedicated, clearly marked purple pipeline system to prevent cross-connection with the potable (drinking) water supply.

For future projects under the Chino Basin Program, IEUA is designing a new Advanced Water Purification Facility (AWPF) for direct injection into the groundwater basin. This system will use even more advanced treatment, including:

a. Microfiltration and reverse osmosis: These technologies remove additional impurities, including salts and emerging contaminants.
b. Advanced oxidation process: A final disinfection step using ultraviolet light and hydrogen peroxide.
c. Continuous testing: This advanced system will also involve continuous and rigorous monitoring to ensure the highest quality of purified water for aquifer replenishment.

Lessons learned and successful projects

a. The highly successful Orange County Groundwater Replenishment System (GWRS) has provided a roadmap for managing public perception and implementing effective projects. Lessons include:

b. Public engagement: Orange County launched an aggressive and successful public education campaign in the late 1990s to overcome public and political pushback against recycled water.

c. Strong partnerships: The GWRS was launched with a strong partnership between the Orange County Water District and the Orange County Sanitation District, sharing the costs and benefits of expansion.

d. Phased expansion: The GWRS has a long history of success, operating for decades and expanding over time. The project was able to scale its operations gradually to increase its capacity.

Improving project viability

a. To address potential issues and help new projects succeed, the State Water Resources Control Board has taken steps to streamline processes and ensure safety:

b. New regulations for direct potable reuse (DPR) were adopted in December 2023.

c. There are new processes for streamlining permits for groundwater recharge projects.

d. The State Water Board continues to fund and encourage research into contaminants of emerging concern in recycled water.

2.8.2 Unsuccessful Groundwater Recharge Projects With Recycled Water

Groundwater projects with recycled water that failed in California

While California has several successful recycled water projects for groundwater replenishment some have been abandoned or failed due to public relations issues, high costs, and other complications.

Potential issues with new projects

Some of the challenges that have affected past projects could still impact new ones. For example, some Central Valley water agencies report having suitable land for recharge but not enough available recycled water to meet their goals. Other potential challenges include:

- Infrastructure limitations: Physical capacity of local infrastructure can be a major barrier to capturing water for underground storage during wet years.
- Cost and complexity: Increasing water efficiency can increase the concentration of salts and other contaminants in wastewater. This could necessitate additional desalination, adding to the cost and complexity of treatment.

- Finding suitable aquifers: A location's geology is critical for a project's success. As one water expert noted, if a city is not situated over a suitable groundwater aquifer, it may be "shut out" from potable reuse. Additionally, injecting purified water into an already polluted aquifer can risk contamination.

A Los Angeles project to use recycled water for groundwater replenishment was effectively mothballed for decades after negative public relations campaigns in the 1990s. Despite a cost of more than $55 million at the time, the project was sidelined due to "toilet-to-tap" messaging that was highly successful in influencing public perception. Public opposition to the Los Angeles Groundwater Replenishment Project in the 1990s was rooted in a combination of public relations failures, political opportunism, and visceral emotional reactions. Opponents weaponized the phrase "toilet-to-tap," which successfully derailed the $55 million project just as it was about to go online in 2000.

The opposition successfully tapped into a deep-seated human fear of contaminated drinking water; a phenomenon sometimes called the "yuck factor".

- Visceral disgust: The "toilet-to-tap" messaging was highly effective at provoking a sense of disgust among residents who couldn't overcome the mental image of sewage being reused for drinking water. This was an emotional argument that was often divorced from the scientific facts about the advanced purification technology.
- Distrust of technology: Some residents also expressed distrust of the purification technology itself, fearing potential waterborne illnesses.

The project was swept up in the political dynamics of a mayoral election, with candidates using public fears for political gain.

- Campaign fodder: Several mayoral candidates seized upon opposition to the East Valley project as campaign fodder, pledging to stop "toilet-to-tap".
- Scapegoating the LADWP: An aspiring mayoral candidate framed the issue as a public safety failure by the Los Angeles Department of Water and Power (LADWP), claiming the department was trying to "pull a fast one" on the public.

Mayoral action: Ultimately, City Attorney James Hahn was elected mayor in 2001 and made good on his promise to shut down the project.

Hostile headlines in local newspapers significantly fueled public outrage, often without providing sufficient context on the safety of the project's advanced purification methods. The tipping point occurred when the *Los Angeles Daily News* published an article with the headline “Tapping Toilet Water,” which sparked a public outcry. The media attention also captured the notice of national figures, with late-night host Jay Leno even doing a bit on the project with a flushing toilet sound effect.

The LADWP had received regulatory approval for the project and held public meetings in 1990, but these events were poorly attended and failed to anticipate the public relations disaster that was to come.

- Limited engagement: The department's initial public outreach was a textbook example of what not to do. The meetings were attended by a small number of people and failed to effectively communicate the project's safety.

- Lessons for the future: Gerald Silver, a homeowner and opponent of the project, critiqued the LADWP's outreach, stating that "reaching out means reaching out in a way that people will understand". This was a lesson learned by Orange County, which used robust and proactive public engagement to build support for its own project.

Some opponents argued that the project was a form of environmental racism, unfairly burdening the East San Fernando Valley, which was home to a large low-income and Latino population.

- Perception of unfair burden: Arguments were made that the city was prioritizing clean water for more affluent areas while attempting to introduce potentially unsafe recycled wastewater in a less powerful, minority community.
- Inadequate information sharing: Accusations were made that local authorities failed to adequately share information with the community, leading to a breakdown of trust and the perception that they were taking advantage of a disadvantaged population.

Despite scientific assurances, opponents and some media outlets raised fears about the safety and long-term health effects of the recycled water.

- New technology, unknown risks: Some voiced skepticism about the advanced treatment technology being used, arguing that there wasn't enough long-term data to guarantee the absence of unknown contaminants, including pharmaceuticals, hormones, and microplastics.
- Systemic failure: Critics raised concerns about the risk of system malfunctions, human error, or illegal toxic dumping that could quickly compromise the water supply due to the short distance between treatment and consumption.

The high cost of the project and the potential for increased water rates for residents were also a point of opposition.

- High expense: The $55 million initial investment for the East Valley project was a significant amount, and opponents questioned whether the project was worth the price.
- Distraction from true solutions: Critics from environmental groups like Food & Water Watch argued that "toilet-to-tap" projects were expensive distractions from the real solutions to water scarcity, such as conservation and addressing corporate water abuse.

A key component of the opposition stemmed from the Los Angeles Department of Water and Power's (LADWP) failure in public relations and community engagement.

- Lack of early engagement: The utility's initial public meetings were poorly attended and did not effectively communicate the project's benefits and safety to the public.
- Political cover-up narrative: The perception that the LADWP was trying to "pull a fast one" by secretly implementing the project damaged the utility's credibility and fed into the political rhetoric of a cover-up.

What lessons did LADWP learn from the East Valley project failure?

The failure of the East Valley Groundwater Replenishment Project taught the Los Angeles Department of Water and Power (LADWP) the critical importance of public engagement, careful messaging, transparency, and a long-term, integrated water strategy. Since the project's shutdown in 2000, LADWP has overhauled its approach to water recycling to rebuild public trust and lay the groundwork for future projects. The lessons and subsequent changes included:

The primary lesson was that public outreach must be proactive and continuous, beginning in the earliest planning stages. The original project's failure was partly due to inadequate public information, which allowed a negative narrative to take hold. Today LADWP now runs extensive outreach campaigns for new water recycling initiatives like Pure Water Los Angeles. These efforts include:

- Briefings with elected officials and neighborhood councils.
- Creating advisory groups with community stakeholders.
- Hosting informational workshops and forums.
- Producing brochures, fact sheets, and maintaining robust project websites.
- Partnering with organizations to reach youth through art programs.

The "toilet-to-tap" messaging effectively sabotaged the original project. The lesson was that technical information must be delivered carefully in clear, non-technical language to avoid fear and emphasize the safety and reliability of purified recycled water.

Today's approach: LADWP's current strategy focuses on demystifying the advanced treatment process and highlighting the project's benefits, such as drought resiliency and reduced dependence on imported water. Successful outreach efforts by Orange County Water District (OCWD) also serve as a blueprint, showing how bottling purified water and allowing the public to taste it can help overcome the "yuck factor".

Opponents of the East Valley project capitalized on a perception that LADWP was not being transparent. This led to a complete breakdown of trust.

Today's approach: For projects like Pure Water Los Angeles, LADWP works closely with city partners, water agencies, and external research bodies like the UCLA Luskin Center for Innovation. The goal is to ensure transparency and build confidence in the purification process. This approach also includes direct engagement with the media, providing accurate and timely information to prevent misinformation.

The failure prompted LADWP to integrate its approach to water management.

Today's approach: The Water Integrated Resources Plan (Water IRP) was developed to create a comprehensive strategy for managing wastewater, stormwater, and recycled water as a single resource. LADWP's current projects aim to reduce reliance on costly imported water and increase local water supplies, with a goal of achieving 70% local water supply. Key initiatives include:

- Pure Water Los Angeles: A massive, multi-year project to purify wastewater from the Hyperion plant for groundwater replenishment and direct potable reuse.
- Headworks Direct Potable Reuse (DPR) Demonstration Project: A pilot program to evaluate advanced treatment processes and build public trust in direct potable reuse.

The original project became a political football in a mayoral race, with candidates using opposition for political gain.

Today's approach: LADWP seeks to secure strong political support and alignment from the City Council and other elected officials in advance. They also ensure that messaging is not just about the technical benefits but also addresses the political importance of creating a resilient, secure water future for all residents.

2.9 Summarize strategic positioning on basin operation to limit regulatory oversight

To minimize oversight by the California State Water Resources Control Board (SWRCB) for groundwater recharge, focus on complying with existing regulations through streamlined permits and working within the framework of the Sustainable Groundwater Management Act (SGMA).

For specific, short-term projects, the SWRCB offers expedited permitting processes that reduce the time and complexity of regulatory oversight.

- Use temporary permits: The SWRCB offers temporary permits for groundwater recharge, which are faster to obtain than standard permits. These are best for short-term diversions, such as during high-flow events.
- Take advantage of flood diversion authorization: California Water Code § 1242.1 allows diversion of floodwaters for groundwater recharge with less state oversight than traditional water rights, provided you comply with all reporting requirements.
- Follow the streamlined process for standard permits: For long-term projects, using the streamlined process for standard water rights applications can reduce processing time. This is especially relevant for Groundwater Sustainability Agencies (GSAs) working to implement SGMA.

SGMA emphasizes local control and planning, which can reduce direct SWRCB oversight as long as sustainability goals are met.

Develop strong Groundwater Sustainability Plans (GSPs): The cornerstone of minimizing state intervention is developing a robust GSP that clearly outlines how the basin will achieve sustainability. The SWRCB can intervene if local management is insufficient.

Create strong accounting and crediting systems: This is a key part of an effective GSP. Robust accounting allows local agencies to accurately track recharge and credit those who invest in projects, reducing the need for direct state involvement.

Collaborate with GSAs: Work with your local GSA to ensure your project aligns with the broader basin management plan. This partnership demonstrates local capacity to manage groundwater, which minimizes the likelihood of state intervention.

The SWRCB heavily regulates activities that could impact water quality and beneficial uses of groundwater. Proactive measures can prevent issues that trigger increased oversight.

- Protect beneficial uses: Identify and protect the beneficial uses of groundwater in your project area, such as drinking water or irrigation. Adhering to state standards will prevent water quality violations.
- Consider water quality in project design: Incorporate water quality modeling and impact assessments into your project's planning and accounting. This demonstrates that your operation will not negatively affect the quality of the aquifer.

- Consult the SWRCB's groundwater quality tool: Use the Groundwater Quality Visualization Tool to identify water quality issues that should be addressed in your GSP. Addressing these issues preemptively can prevent future state scrutiny.

Understanding and adhering to all applicable regulations is the most direct path to minimizing enforcement actions and associated oversight.

- Document and report accurately: For flood diversions and other operations, follow all reporting requirements, including initial notices, preliminary reports, and final reports.
- Use appropriate permits for different operations: Different methods, like in-lieu recharge versus dedicated spreading basins, have different rules. Ensure you have the right permit for your specific type of recharge activity.
- Stay informed on evolving regulations: The state's approach to groundwater recharge is continually evolving, particularly in response to droughts and climate change. Stay up-to-date on changes to executive orders, policies, and regulations.

The SWRCB offers two types of temporary permits for groundwater recharge. Here are the differences between standard and temporary permits for groundwater recharge in California, according to the State Water Resources Control Board (SWRCB).

a. Standard permits

Standard permits are for long-term projects and involve a lengthy, multi-year process. The primary benefit is that they secure a senior "priority date," which is crucial during water shortages.

- Duration: These are long-term authorizations for water diversion.
- Priority: A standard permit secures a priority date based on the filing date of the application. The rule "first in time, first in right" applies, meaning that during shortages, older (senior) rights are served before newer (junior) ones.
- Eligibility: Any individual, public agency, or private entity can apply.
- Process: The application is complex and rigorous, involving:
- Water availability analysis: A detailed study demonstrating that unappropriated water is available.
- CEQA compliance: Full environmental review under the California Environmental Quality Act (CEQA) is required.
- Public notice and protest: The application is publicly noticed, and affected parties can file protests, which may lead to a hearing.
- For SGMA: Groundwater Sustainability Agencies (GSAs) can use a streamlined standard permit process to obtain long-term water rights for projects that implement their Groundwater Sustainability Plans (GSPs).

b. **Temporary permits**

Temporary permits are for short-term or urgent projects and offer an expedited application process. They are not considered a permanent water right and hold a junior priority to all other water rights.

Duration:

- 180-day permit: Appropriate for short-term projects that have an urgent need for water. They are valid for 180 days but can be renewed.
- 5-year permit: An option for local agencies (including GSAs) to capture water during high-flow events. It is often used as a bridge to get a project started while a standard permit application is pending.
- Priority: Temporary permits are junior to all water rights. Diversions may be restricted or revoked during times of water shortage to protect senior water right holders.
- Eligibility: The 5-year permit is available only to local or state agencies, while the 180-day permit can be obtained by any party.
- Process: The process is faster than for a standard permit, with less intensive requirements.
- Urgent need: Applicants must demonstrate an urgent need for the water.
- Less review: While public notice is still required, the review process is more streamlined.

CEQA: Generally required, but was temporarily suspended by past executive orders to expedite high-flow event recharge projects.

Combined approach: Applicants pursuing a standard permit for a long-term project may file for a temporary permit simultaneously to begin operations sooner.

Table 4 - Comparison table

Feature	Standard Permit	Temporary Permit
Duration	Long-term	Short-term (180 days or 5 years)
Urgency	Not required	An urgent need for water must be demonstrated
Priority	Secures a senior priority date	Junior to all water rights; subject to curtailment
Process time	Multiple years	Quicker (processing times vary)
Purpose	Long-term water supply and reliability	Immediate, high-flow event capture
Eligibility	Any party	Depends on type; 5-year only for local/state agencies
CEQA	Full compliance required	Required unless an exemption or temporary suspension applies

Water Availability Analysis

For a standard groundwater recharge permit in California, the water availability analysis (WAA) must prove that unappropriated water is reliably available over the long term without harming other water rights holders or instream beneficial uses. This is a more complex and robust analysis than for a temporary permit. The key requirements for the analysis include the following.

The core of the WAA is to quantify the amount of unappropriated water that is reliably available for your project. This requires a comprehensive hydrological study that accounts for:

- Existing senior water rights: All existing senior water rights, both surface and groundwater, must be respected. The analysis must show that your proposed diversions will not harm these existing legal users.
- Instream beneficial uses: In accordance with Water Code § 1243, the analysis must reserve enough water in the source to protect beneficial instream uses, such as fish and wildlife habitat, recreation, and water quality.
- Hydrologic variability: The analysis must evaluate the amount of water available under a range of foreseeable hydrologic conditions, including drought years.
- Fully Appropriated Streams (FAS) determination: If your project is located on a stream designated as "fully appropriated" by the SWRCB, you must petition the board to reopen the FAS determination and present compelling evidence that unappropriated water is available.

In many watersheds, especially those that are highly managed, a simple hydrological analysis may be insufficient. Instead, a more sophisticated model may be required.

- Watershed models: In key watersheds, the SWRCB has developed its own water supply and demand assessment models. Your analysis should be consistent with these or demonstrate why a different approach is necessary.

- Data refinement: The SWRCB refines its water use data over time. Your analysis should utilize the most current and best-available data on both supply and demand.

Consider other pending applications

The principle of "first in time, first in right" means that all pending senior applications must also be considered in your analysis.

- Senior applications: The analysis must account for any pending senior applications in the watershed, including State Filed Applications. These hold priority over your project.
- "Without" scenario: SWRCB staff may recommend that applicants run a scenario showing water availability both with and without consideration of senior applications. This helps determine if the project is viable even if those senior rights are perfected.

The WAA must be well-developed before you file your permit application because it informs the project's environmental review.

- Pre-filing consultation: Applicants are encouraged to consult with SWRCB Division staff before filing and to provide a draft WAA for review. This ensures the analysis will be sufficient when the formal application is submitted.
- Support CEQA review: The WAA is needed to support the mandatory California Environmental Quality Act (CEQA) documentation. The analysis must demonstrate that the project has a valid source of water to avoid potential environmental impacts.

Beyond showing that water is physically available, a standard permit requires a finding that the appropriation is in the public interest. The WAA and other parts of the application contribute to this finding by demonstrating:

- No injury to other users: The analysis must show that your project will not cause injury to other legal water users.
- Beneficial use: The diverted water must be put to beneficial use. The WAA and Underground Storage Supplement must show how the stored water will be accounted for and eventually used.

<u>References</u>:

1. Recycled Water Reuse Strategy Analysis Report for City of Beaumont, CA, January 2022, Hunt Thornton Resources Strategies, LWA, Todd Groundwater.
2. Title 22 Engineering Report: Sterling Natural Resource Center, April 2018, RMC.
3. Antidegradation Analysis: Sterling Natural Resources, April 2018, R

3. EXECUTIVE SUMMARY

San Gorgonio Pass Water Agency (SGPWA) and Beaumont Cherry Valley Water District (BCVWD) are partnering to evaluate the use of recycled water for groundwater recharge at the Brookside West Recharge Facility Expansion. The recycled water will be used to develop a new drought-resistant water source for SGPWA's member agencies and offers potentially significant regional benefits. The source of the recycled water would be from the City of Beaumont (City). The City produces up to 3,361 AFY of purified recycled water for indirect potable reuse (IPR) from its Advance Wastewater Treatment Plant (AWTP) in compliance with California Code of Regulations (CCR) Title 22, Division 4, Chapter 3 (Title 22). This new supply has the potential to complement other SGPWA water supply initiatives by providing reliable replenishment water, freeing up imported water to be placed in storage as a drought buffer. The program also protects the local regional water supply in the event of a catastrophic earthquake which interrupts imported water supply from the State.

3.1 Water Supply Strategy Deliverables for Planned Water Projects

3.1.1 Regulatory Framework

The use of recycled water for Indirect Potable Reuse (IPR) is regulated in California to ensure protection of public health and water quality. For projects involving surface water discharge, a National Pollutant Discharge Elimination System (NPDES) permit is also required. Any entity proposing to recycle water would file a Title 22 Engineering Report with the State Water Resources Control Board Division of Drinking Water (SWRCB DDW or DDW) and the RWQCB on the proposed use.

3.1.2 Required Treatment Process

The recycled water currently produced at the Beaumont AWTP meets the minimum treatment requirements. The treatment processes are validated through performance monitoring and pilot testing and DDW must approve the test results.

3.1.3 Pathogen Removal

For an IPR project, the treatment system must achieve 12-log enteric virus reduction, 10-log Giardia cyst reduction, and 10-log Cryptosporidium oocyst reduction using at least three treatments.

3.1.4 Water Quality

For discharges to groundwater and surface waters in the Beaumont Groundwater Management Zone (GMZ), the Basin Plan establishes Maximum Benefit Water Quality Objectives (WQOs). The Maximum Benefit WQOs for recycled water recharge projects are 330 milligrams per liter (mg/L) for total dissolved solids (TDS) and 5.0 mg/L for nitrate-nitrogen, implemented as 10-year running averages.. The Santa Ana Regional Water Quality Control Board (SARWQCB) must review any proposed recycled water recharge projects to determine compliance with Maximum Benefit commitments. The Beaumont AWTP must produce recycled water well below this requirement.

3.2 Difference between 100% Recycled Water versus Recycled Water and State Water Project

3.2.1 Requirement of Diluent Water

If disinfected tertiary treated recycled water from Beaumont AWTP is utilized to recharge to the Beaumont Basin, diluent water will be required beginning with a Recycled Municipal Wastewater Contribution (RWC) of 0.20 or 20% and a diluent water contribution of 0.80 or 80%. Diluent water can include SWP water and stormwater recharged in the Beaumont Basin as well groundwater underflow within a defined mixing area. These percentages are calculated as a running average over 10 years.

3.2.2 Response Retention Time

The response retention time is determined by the time needed to collect, analyze, and confirm problematic recycled water or groundwater samples, discuss actions with DDW and SARWQCB, and procure an alternate drinking water supply or provide wellhead treatment. The response retention time must be less than the underground retention time needed to achieve pathogenic microorganism control.

3.3 Identify implications regarding regulation (who, what, etc.)

Indirect potable reuse projects (i.e., spreading) using recycled water produced at the AWTP will be regulated under site-specific Water Reclamation Requirements (WRRs) for the groundwater spreading projects. The site-specific WRRs will include required treatment processes, minimum recycled water quality, authorized discharge locations, allowable sources of diluent water (supplemental water such as imported water or stormwater), running monthly average recycled water contribution (RWC), response retention time, pathogenic microorganism control, monitoring, and reporting.

3.3.1 Who would regulate the project?

The Regional Board is responsible for the enforcement of water quality and pollution control measures associated with the Water Code for the reuse areas, in this case groundwater recharge project. The Regional Board reviews and comments on the required Title 22 engineering report and the antidegradation analysis; however, DDW has the primary role of reviewing and approving the Title 22 engineering report and antidegradation analysis. The Regional Board is also responsible for implementing requirements of the Title 22 engineering report and antidegradation analysis into the applicable NPDES, WRRs and/or Waste Discharge Requirements (WDRs) for the AWTP.

3.3.2 What would they regulate?

The Project must comply with all specified Title 22 Criteria and Groundwater Recharge Criteria addressing the following key issues:

- Source Control
- Recycled Water Contribution (RWC) and Diluent Water Requirements
- Pathogen Control and Multiple Barrier Requirements

- Response Retention Time (RRT)
- Total Organic Carbon Requirements
- Total Nitrogen (N)
- Drinking Water Standards

3.4 Identify impacts to existing pumping activities (e.g., local wells, proximity, additional testing, permitting, modeling, monitoring, etc.)

3.4.1 Travel time to production wells (underground travel time)

Title 22 requires the recharged recycled water must have a certain amount of residence time in the groundwater system prior to extraction at a drinking water well in order to provide time for pathogenic microorganism control (length of time depends on level of treatment provided at the AWTP) and to allow time to respond to potential off-specification recycled water being recharged in the spreading grounds (response retention time, regulatory minimum of 2 months).

3.4.2 Nearby Water Supply Wells and Travel Times

Understanding travel time for water to flow underground from one point to another is also important in recycled water recharge planning. Recycled water recharge regulations require various water travel times to be demonstrated including travel time to the nearest monitoring and drinking supply wells, pathogen reduction time, and time to respond to improperly treated recycled water recharge (response retention time). Water travel times are used to define the zone of controlled drinking water wells. For planning purposes, these travel times are typically demonstrated with a groundwater flow model and confirmed with a tracer test after project startup.

3.4.3 Next Steps

BCVWD Well 23 would need to be converted to non-potable uses. Beaumont/BCVWD will need to address other potential chemicals in recycled water including CECs. Specifically, PFAS and other constituents which may get through treatment process. A tracer study for Travel Time verification would be required. A work plan has to be submitted to DDW for review and approval.

Figure 2 Recycled Water Monthly Distribution for 1 Year of Recharge in the Noble Creek Spreading Grounds

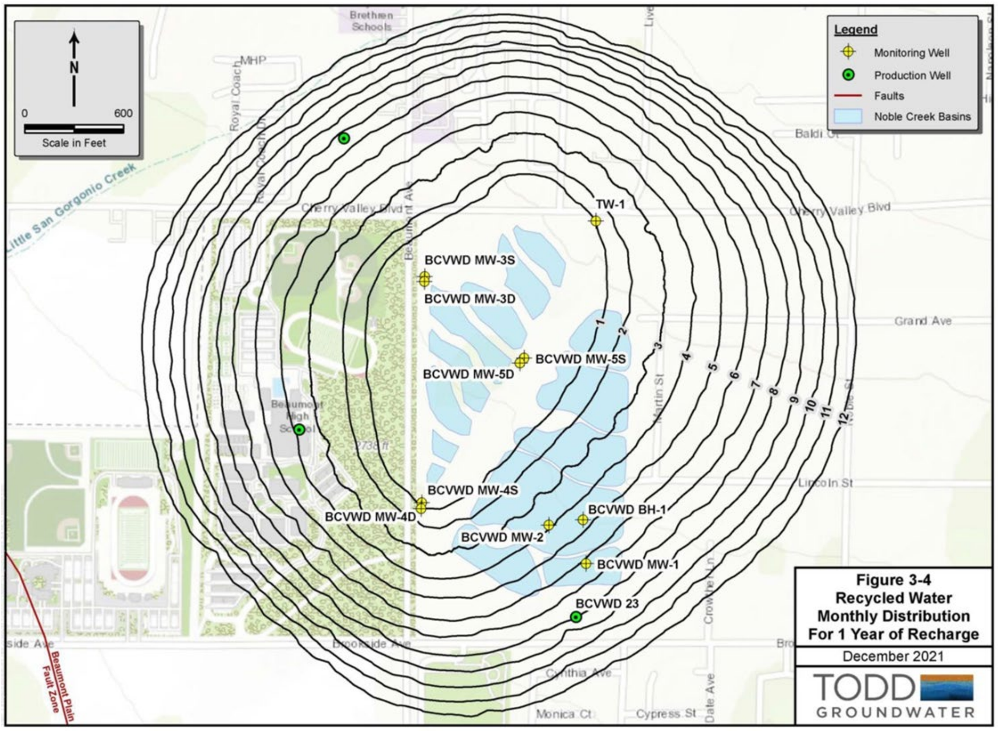
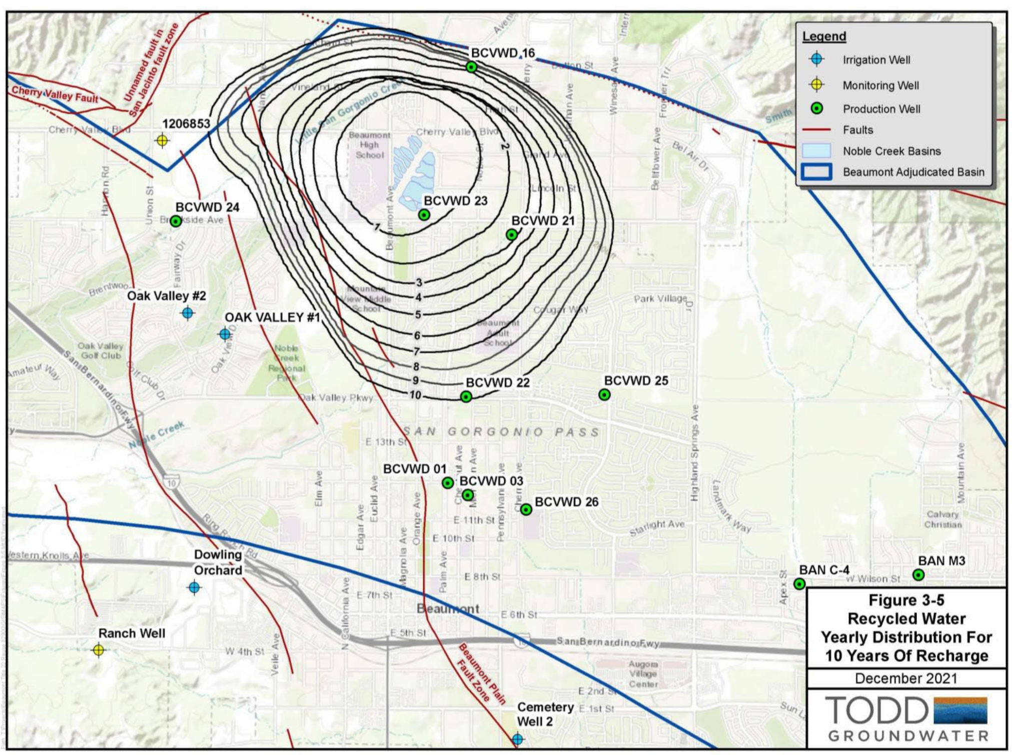


Figure 3 Recycled Water Yearly Distribution For 10 Years of Recharge in the Noble Creek Spreading Grounds



3.4.3 What kind of permits would be required to spread recycled water?

The use of recycled water produced at the City AWTP for groundwater replenishment by surface application (i.e., spreading) will be regulated under Site-Specific WRRs issued to the City. The Site-Specific WRRs will include requirements for specific treatment processes, minimum recycled water quality, authorized discharge location, allowable sources of diluent water, running monthly average RWC, response retention time, pathogenic microorganism control, monitoring, and reporting.

3.4.4 Required Treatment Processes

"Disinfected tertiary recycled water" is the minimum level of treatment required for surface application (spreading). The recycled water currently produced at the City AWTP meets the minimum treatment requirements.

3.4.5 What kinds of monitoring would be required after recharging the basin?

The amended Recycled Water Policy adopted by the SWRCB in Resolution 2013-0003 (SWRCB, 2013) establishes CEC monitoring requirements for recycled water groundwater recharge projects. The SGPWA Project at the proposed surface application locations will comply with the SWRCB's amended Recycled Water Policy (SWRCB, 2013).

3.4.6 roundwater Monitoring Wells

Groundwater monitoring will be used in the continuous assessment of groundwater quality and to determine any impacts from the recharge of recycled water. According to the Title 22 Monitoring Well Requirements (§60320.126) for surface spreading, at least two down gradient monitoring wells must be constructed and located between the spreading basin discharge facility and the nearest down gradient municipal wells.

3.5 Indirect Potable Reuse Special Studies and Approvals

Various special studies and approvals are required to obtain an operating permit for groundwater replenishment by surface application. The anticipated special studies are described below.

1. Groundwater Monitoring
2. Groundwater Modeling
3. Treatment Process Validation
4. Diluent Water Quality
5. Diluent Water Volume
6. Total Nitrogen and TOC Compliance
7. Wastewater Source Control
8. Alternative Source of Drinking Water
9. Response Retention Time
10. Zone of Controlled Drinking Water Well Construction

- Adoption of an ordinance or agreement by or among the City, BCVWD, County, and Watermaster to prohibit new drinking water well construction within the primary zone is encouraged and may be required by DDW.
- Title 22 Engineering Report. The City and BCVWD (and potentially SGPWA) must prepare Title 22 Engineering Report to describe the project facilities, treatment processes, results of the special studies (described above), and operational plans.
- Groundwater Tracer Study. After the project is approved and groundwater recharge is initiated, the City and/or BCVWD (and potentially SGPWA) must conduct a groundwater tracer study to verify the groundwater modeling results and ensure the required virus log reduction is achieved.

3.6 Review options and issues related to injection and pumping of recycled water.

The City's AWTP is designed to produce disinfected tertiary recycled water with Reverse Osmosis (RO) provided as a treatment enhancement to reduce total dissolved solids. The indirect potable reuse for groundwater recharge can be accomplished via groundwater spreading or injection.

An assessment of the potential impacts of the proposed recharge (injection) activities on the underlying Beaumont Basin, and an evaluation the compliance with Title 22 must be done. The objectives of this evaluation should be focused on:

1. Recharge the Beaumont Basin to improve water supply reliability within SGPWA service area, and
2. Meet all applicable regulatory requirements while minimizing any impacts on the groundwater basin.

The initial analyses of the Beaumont Basin could be conducted assuming a variety of discharge/recharge rates.

3.7 Evaluate recharge through all of the potential ponds including BCVWD recharge ponds.

As discussed in Section 2.6 an evaluation of recycled water recharge would originally include groundwater spreading or injection at the Beaumont Basin but, as recommended, scenarios have to be developed to include the BCVWD recharge ponds.

3.7.1 Operational Scenario: The analysis of recycled water recharge into the Beaumont Basin assumes that 100% of City's AWTP flow, except for the current flow to San Timoteo Creek, is available for recharge. This quantity has to be determined by the City's Adaptive Management Plan for the creek.

3.7.2 Antidegradation Analysis: This Project will require the creation of an Antidegradation Analysis. to support a RWQCB's future finding that the Project discharge maintains the existing high quality of water to the maximum extent possible.

3.7.3 Assimilative Capacity and Groundwater Quality: As specified in its Basin Plan (RWQCB, 2019), the ambient groundwater quality in the Santa Ana Watershed, including the Beaumont GMZ, must be recalculated every three years.

3.7.4 Impacts on Groundwater Quality: **T**he proposed Project operational strategy typically is modeled using a spreadsheet model to calculate mass loading of all basin inflows in comparison with allowable basin loading per adopted water quality objectives.

3.7.5 Groundwater Levels and Mounding: Given the depth to groundwater (400 feet) after 15 years of spreading grounds operation, any additional mounding due to recycled water recharge is not expected to have adverse impacts.

3.7.6 BCVWD Water Supply Wells and Travel Times: Recycled water recharge regulations require various water travel times to be demonstrated including travel time to the nearest monitoring and drinking supply wells, pathogen reduction time, and time to respond to improperly treated recycled water recharge (response retention time). BCVWD Well 23 is located just south of the Noble Creek Spreading Grounds and is currently used for potable supply. This well could potentially not meet the regulatory criteria for underground residence time of recycled water assuming a required pathogen reduction time. The 1-year, 10-years and 20-years travel time has to be evaluated and, if necessary the well owners would need to be notified of the recycled water project via a public hearing.

3.7.7 Potential for Recycled Water Recharge: The use of the Brookside Spreading Grounds and potentially Noble Creek Spreading Grounds to recharge recycled water appears feasible considering the following.

1. The available spreading grounds capacity is more than adequate to accommodate current and maximum recycled water and diluent water volumes.
2. Available diluent water (SWP) based on 1 year, 10 years and 20 years of recharge in the Brookside Spreading Basin and Noble Creek Spreading Grounds is adequate to allow recharge of tertiary treated recycled water assuming 50% of the recycled water undergoes RO treatment.

3.8 Summary of similar projects (success and failures), and summary of unintended consequences

In Southern California, two large-scale, highly successful groundwater recharge projects use purified recycled water to replenish groundwater basins. These successful projects include:

- Orange County Groundwater Replenishment System (GWRS)
- Groundwater Reliability Improvement Program (GRIP) - Led by the Water Replenishment District of Southern California (WRD

3.8.1 Successful Groundwater Recharge Projects With Recycled Water

Operation NEXT, which aims to recycle all available treated wastewater from the Hyperion Water Treatment Plant by 2035, has been a long-standing project in Los Angeles County. It involves injecting recycled water into groundwater supplies for later use as drinking water and as a seawater intrusion barrier. The West Coast Basin Barrier has been active since 1994, with the Alamitos Barrier starting in 2005.

The East Valley Water District's (EVWD) recycled water recharge project is centered on the Sterling Natural Resource Center (SNRC). In partnership with the San Bernardino Valley Municipal Water District and the City of San Bernardino Municipal Water Department, this initiative aims to create a sustainable, local water supply by treating wastewater and using it to replenish the Bunker Hill Groundwater Basin.

3.8.1.1 Lessons learned and successful projects

The highly successful Orange County Groundwater Replenishment System (GWRS) has provided a roadmap for managing public perception and implementing effective projects. Lessons include:

- Public engagement
- Strong partnerships
- Phased expansion

3.8.1.2 Improving project viability

To address potential issues and help new projects succeed, the State Water Resources Control Board has taken steps to streamline processes and ensure safety:

- New regulations for direct potable reuse (DPR) were adopted in December 2023.
- There are new processes for streamlining permits for groundwater recharge projects.
- The State Water Board continues to fund and encourage research into contaminants of emerging concern in recycled water.

3.8.2 Unsuccessful Groundwater Recharge Projects With Recycled Water

3.8.2.1 Groundwater projects with recycled water that failed in California

While California has several successful recycled water projects for groundwater replenishment some have been abandoned or failed due to public relations issues, high costs, and other complications.

3.8.2.2 Potential issues with new projects

Potential challenges include:

- Infrastructure limitations
- Cost and complexity

- Finding suitable aquifers
- Lack of early community engagement
- Political cover-up narrative

3.8.2.3 What lessons did LADWP learn from the East Valley project failure?

Since the project's shutdown in 2000, LADWP has overhauled its approach to water recycling to rebuild public trust and lay the groundwork for future projects. The primary lesson was that public outreach must be proactive and continuous, beginning in the earliest planning stages.

3.9 Summary of strategic positioning on basin operation to limit regulatory oversight

To minimize oversight by the California State Water Resources Control Board (SWRCB) for groundwater recharge, focus on complying with existing regulations through streamlined permits and working within the framework of the Sustainable Groundwater Management Act (SGMA).

- For specific, short-term projects, the SWRCB offers expedited permitting processes that reduce the time and complexity of regulatory oversight.
- Develop strong Groundwater Sustainability Plans (GSPs): The cornerstone of minimizing state intervention is developing a robust GSP that clearly outlines how the basin will achieve sustainability. The SWRCB can intervene if local management is insufficient.
- For a standard groundwater recharge permit in California, the water availability analysis (WAA) must prove that unappropriated water is reliably available over the long term without harming other water right holders or instream beneficial uses.
- The principle of "first in time, first in right" means that all pending senior applications must also be considered in your analysis.