

TECHNICAL MEMORANDUM

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SENT VIA: EMAIL

TO: Puente Basin Water Agency

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SUBJECT: Technical Memorandum 3 – Part 1: *Basin Management Alternatives for the Puente Basin Groundwater Management Plan*

1.0 BACKGROUND AND OBJECTIVES

The Puente Basin Water Agency (PBWA) is in the process of developing the Puente Basin Groundwater Management Plan (GMP) to maximize the beneficial use of groundwater in the Puente Basin and thereby decrease dependence on less reliable imported water supplies. The development of the GMP is being executed by West Yost Associates (West Yost) pursuant to a multi-phase scope of work.

This Technical Memorandum *Basin Management Alternatives for the Puente Basin Groundwater Management Plan* (TM-3) describes the methods and results of Phase 2 – Part 1 of the scope of work, which involves the design of several “Basin Management Alternatives” for the Puente Basin. The ranking and selection of specific alternatives for further evaluation will be done in Phase 2 - Part 2 of the scope of work. And the selected alternatives will be evaluated in Phase 2 – Part 3.

This section of TM-3 describes the background that has led to the development of the GMP, the objectives of the GMP, the scope of work to prepare the GMP, and the organization of this TM-3.

1.1 Puente Basin, Narrows Agreement and Judgment

The Puente Basin is a small groundwater basin located between the San Jose and Puente Hills in eastern Los Angeles County in Southern California that is approximately 20 square miles (12,800 acres). Groundwater pumped from the Puente Basin is used as a non-potable water supply by various pumpers in the basin.

In 1971, the PBWA was formed as a joint powers authority between the Walnut Valley Water District (WVWD) and the Rowland Water District (RWD) to oversee the protection and utilization of local, imported, and recycled water within the Puente Basin. The following year in 1972, the PBWA entered into the Puente Narrows Agreement with the Upper San Gabriel Valley Municipal Water District to ensure that water

management activities in the Puente Basin do not interfere with the subsurface groundwater outflow from the Puente Basin to the adjacent Main San Gabriel Basin.¹

In 1986, the pumping rights in the Puente Basin were adjudicated pursuant to the Puente Basin Judgment (Judgment) which established a physical solution for the management of the Basin.² The Judgment provided for the creation of the Puente Basin Watermaster to administer the Judgment and manage the Basin in accordance with the Physical Solution. Puente Basin groundwater is pumped and used primarily by five “Primary Parties” to the Judgment, including the WVWD and RWD.

1.2 Scope of Work to Prepare the GMP

In 2022, the PBWA contracted with West Yost to develop a GMP to enhance the management of the Puente Basin beyond the execution of the Judgment and the Puente Narrows Agreement. At that time, the PBWA expressed desires to maximize the beneficial use of the Puente Basin and thereby decrease dependence on less reliable imported water supplies. As described in the West Yost proposal³ to develop the GMP, the work is being performed in three phases:

- **Phase 1 – Describe the State of the Puente Basin and Establish GMP Goals.** The objective of this phase is to develop an understanding of the physical structure and hydrology of the Puente Basin and articulate the specific goals of the Puente Basin stakeholders for improved groundwater basin management.
- **Phase 2 – Evaluate Alternatives for Basin Management.** The objective of this phase is to design and evaluate various management alternatives, and then based on the evaluations, select a preferred management alternative that will become the GMP for the Puente Basin.
- **Phase 3 – Prepare GMP and Implementation Plan.** The objective of this phase is to publish a final GMP and its implementation plan.

In December 2023, the first part of Phase 1 was completed and final *Technical Memorandum 1: Description of the Puente Basin Groundwater Management Plan Area and Basin Setting* (TM-1) was published.⁴ TM-1 describes the plan area and the physical structure and hydrology of the Puente Basin. In March 2024, the second part of Phase 1 was completed and the final *Technical Memorandum 2: Goals and Concepts for Improved Management of the Puente Basin* (TM-2) was published.⁵ TM-2 describes goals and objectives and general concepts for improved management of the Puente Basin. Phase 1 has been completed.

Phase 2 was initiated in June 2024 and is divided into three parts:

- **Part 1: Describe Basin Management Alternatives.** This effort requires the PBWA to first identify and describe more specific “Basin Management Alternatives” that consist of one or more project concepts.
- **Part 2: Select Alternatives for Evaluation.** This effort identifies which of the Basin Management Alternatives should be evaluated in Part 3. The scope of the evaluation in Part

¹<https://puentebasin.com/wp-content/uploads/2024/10/Puente-Narrows-Agreement-with-the-Upper-San-Gabriel-Valley-Municipal-Water-District.pdf>

² <https://puentebasin.com/wp-content/uploads/2024/10/Puente-Basin-Judgment.pdf>

³ Proposal to Develop a Groundwater Management Plan for the Puente Basin. West Yost. Submitted December 3, 2021.

⁴ https://puentebasin.com/wp-content/uploads/2023/12/TM-PBWA_TM1_20231204-Final.pdf

⁵ https://puentebasin.com/wp-content/uploads/2024/03/FINAL-TM-PuenteBasin_TM-2_240326.pdf

3 will be dependent upon the specific Basin Management Alternatives that are selected; hence, Part 2 will include the preparation of the cost estimate to perform Part 3.

- **Part 3: Select Preferred Basin Management Alternative.** This effort consists of the evaluation of selected Basin Management Alternatives. The evaluation will include (i) a hydrologic analysis of the impacts to the Puente Basin and (ii) a cost analysis for project implementation to produce the new water supply. The evaluation will result in the selection of the preferred Basin Management Alternative that will become the basis for the GMP.

1.3 Goals for Basin Management, GMP Objective Statement, and Concepts for Improved Basin Management

During Phase 1 to develop a GMP, West Yost conducted multiple stakeholder meetings with the PBWA and developed goals for improved management of the Puente Basin, a GMP Objective Statement, and high-level project concepts for the GMP. These are described in TM-2 and summarized below.

Management Goals

The management goals for the Puente Basin GMP are:

- Increase use of Puente Basin groundwater to become less reliant on imported water.
- Manage the Puente Basin in a manner that avoids adverse impacts, such as chronic lowering on groundwater levels, land subsidence, degrading water quality, impacting to GDEs, etc.
- Control groundwater underflow through the Puente Narrows in a manner to comply with the Puente Narrows Agreement while utilizing existing credits and minimizing the accumulation of credits in the future.

GMP Objective Statement

Based on the Management Goals, the Objective Statement for the Puente Basin GMP is:

Enhance the use of Puente Basin groundwater in a sustainable manner to become less reliant on imported water while maintaining compliance with the Puente Narrows Agreement.

Project Concepts for Improved Basin Management

Three high-level project concepts are proposed to achieve the Management Goals and GMP Objective Statement:

- **Increase Groundwater Pumping**
 - *Purpose:* Enhance the use of the groundwater basin to create new potable or non-potable water supplies, decrease reliance on imported water, and minimize subsurface outflow of groundwater to the Main San Gabriel Basin.
 - *Conceptual Project Alternatives:* There can be various alternatives for increased groundwater pumping at various locations across the Puente Basin. In addition, there can be various alternatives for the ultimate use of the water which could include potable or non-potable uses (i.e., projects that require treatment of the pumped groundwater or not).
- **Enhance Recharge**

- *Purpose:* Utilize local reliable water sources that are not currently used in the basin (e.g., surplus recycled water, storm water runoff, dry weather flow) for artificial recharge to enhance the sustainable yield of the Puente Basin.
- *Conceptual Project Alternatives:* There can be various project alternatives based on location of recharge, method of recharge (e.g., injection, spreading, or infiltration galleries), and different sources of recharge waters.
- **Expand Monitoring Program**
 - *Purpose:* Fill data gaps to support the design and implementation of any project alternatives listed above.
 - *Conceptual Project Alternatives:* Expansion of the monitoring program should be designed to specifically support the project alternatives that are chosen for implementation. Expansion of the monitoring program could include, but not be limited to increased groundwater monitoring at existing wells (e.g., water-levels, water-quality, pumping); construction of new monitoring wells; controlled aquifer-system testing; remote-sensing of land subsidence and potential GDEs; etc.

These are generalized descriptions of project concepts to achieve the Basin Management Goals and GMP Objective Statement. The projects can be implemented individually or in combination, with a range of potential alternatives for each concept depending on the PBWA needs and desires.

1.4 Organization of TM3 – Part 1

The purpose of TM-3–Part 1 is to describe various potential Basin Management Alternatives for the Puente Basin GMP. TM-3–Part 1 includes the following sections:

1. **Background and Objectives.**
2. **Process to Develop Basin Management Alternatives.** This section describes the process of developing the six Basin Management Alternatives for the Puente Basin GMP.
3. **Basin Management Alternatives.** This section describes the six Basin Management Alternatives including: summary description, objectives, existing/new wells, water volumes, and new facilities.
4. **Next Steps.** This section describes the next steps for review/comment on this TM and the remainder of Phase 2.

2.0 PROCESS TO DEVELOP BASIN MANAGEMENT ALTERNATIVES

This section describes the process to develop up to six conceptual Basin Management Alternatives to achieve the Basin Management Goals and GMP Objective Statement. The process involved: (i) compiling data and information; (ii) working with the PBWA to identify specific projects and management actions for the management of the Puente Basin; and (iii) identify combinations of projects and management actions that can be described as six Basin Management Alternatives.

Data Collection and Planning Assumptions

To develop project concepts for the Basin Management Alternatives, it was essential to first compile foundational data and planning assumptions for Puente Basin operations and water supplies. This included gathering information on pumping, basin yield, obligation of groundwater underflow through the Puente

Narrows, well pumping capacities, maximum and average pumping at each well, recycled water reuse, and non-potable supply volumes. The data and information were compiled from the work done during Phase 1 to describe the plan area, physical structure, and hydrology of Puente Basin that is documented in TM-1, and then additional data and feedback collected from the PBWA. These data and planning assumptions form the basis for assigning the pumping and recharge rates for the Basin Management Alternatives. The list of data and planning assumptions are described in Tables 1 and 2 below.

Table 1 presents the assumptions for annual pumping rates for both existing and new wells in the Puente Basin. Figure 1 shows the locations of existing wells in the Puente Basin. The pumping rates in Table 1 serve as the planning assumptions for the Basin Management Alternatives aimed at maximizing pumping efficiency to achieve the goals and objectives of the Puente Basin GMP. The annual pumping rates take into account the pumping capacities derived from well construction reports and/or pumping tests, as well as the operational feasibility of year-round pumping to meet demands considering resource availability and maintenance requirements. Most of the pumping rates are based on historical pumping that occurred since 2000. Table 1 also describes the basis for the pumping rate assumptions.

Table 1. Planning Assumptions of Pumping Rates by Well or Well Group to Maximize Pumping in the Various Basin Management Alternatives for the Puente Basin		
Well	Assumption of Annual Pumping in Basin Management Alternatives, acre-feet per year (afy)	Basis for Assumptions
Business Parkway	496	Maximum annual pumping between 2000-2022 + 15%
Baker	0	Currently dry and assumed dry in future
Tony Poli	290	Maximum annual pumping between 2020-2023 -15%
Lycoming	458	Maximum annual pumping between 2000-2022 + 15%
Fairway	486	Maximum annual pumping between 2000-2022 + 15%
RV-1/RV-2	505	Maximum annual pumping between 2000-2022 + 15%
Carrier BDP Wells Combined	190	Average annual pumping between 2020-2023
New Wells (1-6)	486	Average of the maximum pumping at wells historically + 15%

Table 2 presents the data compiled on historical operations and water use in the Puente Basin and/or assumptions for future operations and use, including: basin yield, aggregate pumping, groundwater underflow through the Puente Narrows, recycled water reuse, and non-potable supply and demands. This information forms the basis for developing six Basin Management Alternatives that are designed to meet the Management Goals and Objective Statement of the Puente Basin GMP.

Table 2. Data and Assumptions of Puente Basin Operations and Water Use to Support the Development of Basin Management Alternatives for the Puente Basin

No.	Volumetric Rate, afy	Description of Data and/or Assumption
1	1,000 to 3,400	Range in the annual Operating Safe Yield set by the Puente Basin Watermaster historically from 1987-2023.
2	1,718	Average of the annual Operating Safe Yield set by the Puente Basin Watermaster historically from 1987-2023.
3	1447	Average of historical annual pumping in Puente Basin from 2000 to 2022. Reported in TM-1.
4	1,425	The developed yield of the Puente Basin estimated in TM-1 for the 2000 to 2022 period. The developed yield is the annual average yield that was pumped from the groundwater basin over a finite period but is corrected for the change in groundwater storage and the volume of supplemental water recharge that occurred during the period of interest. The developed yield is very similar to the average historical pumping.
5	861	Average of historical annual volume of groundwater underflow from the Puente Basin to the Main Basin from 1973 to 2023.
6	298	Average of historical annual volume of groundwater underflow from the Puente Basin to the Main Basin from 1973 to 2023 that is over the PBWA's 580 afy obligation.
7	430	Maximum of historical annual volume of groundwater underflow from the Puente Basin to the Main Basin from 1973 to 2023 that is over the PBWA's 580 afy obligation.
8	20,081	The credit accumulated from 1973 to 2023 per the Puente Narrows Agreement for excess groundwater underflow over the 580 afy obligation and credit for clean-up pumping.
9	413	Assumed injection well capacity for a new injection well used for artificial recharge in a Basin Management Alternative. This is estimated as 85 percent of the average assumptions of annual pumping volumes for wells in the center portion of the Puente Basin (Lycoming, Business Parkway, RV-1/RV-2, and Fairway).
10	2,400	Maximum annual volume of recycled water from the San Jose Creek Water Reclamation Plant (WRP) used for reuse from 2021 to 2024 for the Puente Basin recycled water system for the City of Industry rights. This is recycled water used by RWD, La Puente Vally County Water District, Upper San Gabriel Valley Municipal Water District, and Industry Hills Golf Club. This is the volume of recycled water from San Jose Creek WRP assumed available to meet non-potable demands in the future.
11	1,300	Average annual volume of recycled water from the Pomona WRP used for reuse from 2010 to 2023 for the Puente Basin recycled water system from the WVWD rights. This is the volume of recycled water from Pomona WRP assumed available to meet non-potable demands or for other projects in the future.
12	1,000	Average annual volume of surplus recycled water from the Pomona WRP not used but available to WVWD from 2020 to 2023. This is the volume of recycled water from Pomona WRP assumed available to WVWD for additional projects in the Puente Basin.
13	140	Assumed volume of groundwater pumped from the Industry well along the border of Puente and Spadra Basins available to meet non-potable demands or for other projects in the future. This assumption is based on the maximum pumping from 2000 to 2022 plus 15 percent.
14	4,672	Average of the historical annual volume of the aggregate non-potable supplies for the RWD and WVWD's recycled water systems (Puente Basin recycled water system) from 2010 to 2023. This is 1,297 afy from Pomona WRP, 2,100 afy from San Jose Creek WRP ^(a) , 1,206 afy from Puente Basin pumping ^(b) , and 69 afy from the Industry Well. This is the volume of non-potable demands assumed will need to be met in the future that are currently supplied by the Puente Basin recycled water system.
<p>(a) Based on average for the last four years (2020-2023) instead of 2010 to 2023 as done for the remaining of the non-potable supplies</p> <p>(b) Puente basin pumping includes groundwater pumped by RWD, WVWD and Carrier BDP. It does not include pumping by Royal Vista Golf Course that was used for irrigation of the golf course and was not part of the Puente Basin recycled water system. Royal Vista closed February 2024 and WVWD will acquire the two wells previously operated and used by Royal Vista and can use for future supplies.</p>		

Process to Develop Basin Management Alternatives

In June 2024, West Yost and PBWA met in person to begin developing an initial list and conceptual descriptions for up to six potential Basin Management Alternatives. During the meeting, PBWA brainstormed various ideas for potential projects and management actions to achieve the goals and objectives of the GMP. The feedback from this meeting was used to create six draft Basin Management Alternatives with maps and tables for visual representation.

In July 2024, West Yost, PBWA, and the City of Industry reconvened in person to review and discuss the six draft Basin Management Alternatives. The feedback from PBWA and the City of Industry at this meeting was subsequently used to refine and update the draft alternatives.

On August 21, 2024, a PBWA Stakeholder meeting was held virtually to present the six draft Basin Management Alternatives and facilitate discussion and further feedback. PBWA and stakeholders will have additional time to consider and provide input on the draft alternatives as described in this technical memorandum below.

3.0 BASIN MANAGEMENT ALTERNATIVES

The six draft Basin Management Alternatives described herein are intended to achieve the Management Goals and the GMP Objective Statement. These alternatives will later be evaluated using appropriate tools to assess the hydrologic response of the Puente Basin and determine how effectively they meet the goals and objectives for basin management. The six draft Basin Management Alternatives include one option to increase pumping in the basin to create additional non-potable water supply, and five options to increase pumping to generate a new potable water supply:

- Basin Management Alternative 1: Increase Non-Potable Water Supplies via Increased Pumping
- Basin Management Alternative 2: Increase Potable Water Supplies via Increased Pumping in the West and RO Treatment
- Basin Management Alternative 3: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping, and RO Treatment
- Basin Management Alternative 4: Increase Potable Water Supplies via Increased Pumping in the West and Center and RO Treatment
- Basin Management Alternative 5: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping in the West and Center and RO Treatment
- Basin Management Alternative 6: Increase Potable and Non-Potable Water Supplies via Increased Pumping and DPR of Recycled Water

Groundwater pumped from the Puente Basin is currently used to supplement the non-potable recycled water systems of RWD and WVWD (Puente Basin recycled water system), along with other sources connected to the Puente Basin (such as recycled water). Hence, for each Basin Management Alternative, the sources and volumes required to continue meeting these non-potable demands were considered if Puente Basin groundwater is used create a new potable supply. The volume and sources to meet the non-potable demands is described for each alternative below. Table 3 summarizes assumptions of aggregate pumping from the Puente Basin, artificial recharge, and the aggregate volume and sources for the potable and non-potable supplies for each proposed Basin Management Alternatives and compares to historical operations.

The six proposed Basin Management Alternative are described in more detail below. The description includes the following categories:

- **Description.** A description of the specific projects and management concepts in the alternative
- **Objective.** The specific objective/s of the alternative to achieve the management goals of the Puente Basin.
- **Groundwater Pumping.** The assumed aggregate groundwater pumping rate for the Puente Basin and the active pumping wells
- **Non-Potable Water Supply.** The assumed aggregate volumetric rate of non-potable supply for the Puente Basin RWD and WVWD recycled water systems, and the list of sources for this non-potable supply.
- **New Potable Water Supply.** The assumed aggregate volumetric rate of a new potable supply created from the alternative, and the list of sources for this potable supply.
- **Managed Aquifer Recharge.** A conceptual description of the recharge rate and means for artificial recharge to the Puente Basin.
- **Treatment.** A conceptual description of the proposed treatment of groundwater and/or other water supplies for the new potable supply.
- **New Facilities/Wells.** A general list of the new wells or facilities that would be needed to implement the alternative.

Figures 2 through 7 are maps that show the location of existing and new wells and facilities in each of the Basin Management Alternatives.

Basin Management Alternative 1: Increase Non-Potable Water Supplies via Increased Pumping

- **Description:** Maximize pumping at all existing wells in the Puente Basin for non-potable supply.
- **Objectives:** Increase non-potable water supply with Puente Basin groundwater, maintain sustainable groundwater levels, comply with the Puente Narrows outflow obligation, and utilize Puente Narrows credits.
- **Groundwater Pumping:** Total pumping in the Puente Basin of 2,425 afy at all existing wells (Tony Poli, RV-1/RV-2, Fairway, Business Parkway, Lycoming, and Carrier BDP wells). This is 886 afy more than the historical average pumping.
- **Non-Potable Water Supply:** 6,465 afy (1,500 afy = Pomona WRP; 2,400 afy = San Jose Creek WRP; 140 afy = Industry Well; and 2,425 afy = Puente Basin Wells)
- **New Potable Water Supply:** No new potable water supply.
- **Managed Aquifer Recharge:** No artificial recharge included.
- **Treatment:** No groundwater treatment.
- **New Facilities/Wells:** Non-potable supply storage tank (likely at Spadra Landfill). San Jose Pipeline to connect the WVWD and RWD recycled water systems.

Basin Management Alternative 2: Increase Potable Water Supplies via Increased Pumping in the West and RO Treatment

- **Description:** Increase groundwater pumping in the west portion of the Puente Basin at existing and new wells. Treat groundwater at a centralized Reverse Osmosis (RO) Treatment System in the western portion of the basin for potable supply.
- **Objectives:** Produce a new potable water supply with Puente Basin groundwater, become less reliant on imported water, maintain sustainable groundwater levels, comply with the Puente Narrows outflow obligation, and utilize Puente Narrows credits.
- **Groundwater Pumping:** Total pumping in the Puente Basin of 4,369 afy at all existing wells and four new wells in the west (1, 2, 3, 4). This is 2,830 afy greater than the historical average pumping.
- **Non-Potable Water Supply:** 5,985 afy (1,500 afy = Pomona WRP; 2,400 afy = San Jose Creek WRP; 140 afy = Industry Well; and 1,945 afy = Puente Basin Wells). The Puente Basin pumping wells that will be used for the non-potable system include RV-1/RV-2, Fairway, Business Parkway, and Lycoming.
- **New Potable Water Supply:** 2,424 afy from Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, and Carrier BDP wells.
- **Managed Aquifer Recharge:** No artificial recharge.
- **Treatment:** RO treatment of pumped groundwater from Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, and Carrier BDP wells, at a centralized treatment system in the west.
- **New Facilities/Wells:** RO treatment plant, four pumping wells, pipelines to convey pumped groundwater to RO treatment plant, potable pipeline connections, and San Jose Pipeline to connect the WVWD and RWD recycled water systems.

Basin Management Alternative 3: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping, and RO Treatment

- **Description:** Increase pumping in the west portion of the Puente Basin at existing and new wells. Treat groundwater at a centralized RO Treatment System in the western portion of the basin for potable supply. New artificial recharge to the basin via injections wells.
- **Objectives:** Increase the groundwater yield of the Puente Basin, produce a new potable water supply, become less reliant on imported water, maintain sustainable groundwater levels, comply with the Puente Narrows outflow obligation, and utilize Puente Narrows credits.
- **Groundwater Pumping:** Total pumping in the Puente Basin of 4,369 afy at all existing wells and four new wells in the west (1, 2, 3, 4). This is 2,830 afy greater than the historical average pumping.
- **Non-Potable Water Supply:** 5,985 afy (1,500 afy = Pomona WRP; 2,400 afy = San Jose Creek WRP; 140 afy = Industry Well; and 1,945 afy = Puente Basin Wells). The Puente Basin pumping wells that will be used for the non-potable system include RV-1/RV-2, Fairway, Business Parkway, and Lycoming.
- **New Potable Water Supply:** 2,424 afy from Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, and Carrier BDP wells.

- **Managed Aquifer Recharge:** Artificial recharge via three injection wells. The source of recharge water will be identified later but should prioritize recycled water from the Pomona WRP and/or surface water within the San Jose Creek channel. The construction and operation of the injection wells will progress initially from one well to three wells. Each injection well is estimated to recharge 413 afy. Total recharge via three injection wells is 1,239 afy.
- **Treatment:** RO treatment of pumped groundwater from Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, and Carrier BDP wells, at a centralized treatment system in the west.
- **New Facilities/Wells:** RO treatment plant, four pumping wells, pipelines to convey pumped groundwater to RO treatment plant from the western portion of the basin, potable pipeline connections from treatment plant, three injections wells, infrastructure for recharge water diversion, and San Jose Pipeline to connect the WVWD and RWD recycled water systems.

Basin Management Alternative 4: Increase Potable Water Supplies via Increased Pumping in the West and Center and RO Treatment

- **Description:** Increase pumping in the western and central portions of the Puente Basin at existing and new wells. Treat groundwater at a centralized RO Treatment System in the western portion of the basin for potable supply.
- **Objectives:** Produce a new potable water supply, become less reliant on imported water, maintain sustainable groundwater levels, comply with the Puente Narrows outflow obligation, and utilize Puente Narrows credits.
- **Groundwater Pumping:** Total of 4,853 afy of pumping at all existing wells in the Puente Basin, 4 new wells in the west (1, 2, 3, 4), and one new well in the center (5). This is 3,314 afy more than the historical average pumping.
- **Non-Potable Water Supply:** 5,479 afy (1,500 afy = Pomona WRP; 2,400 afy = San Jose Creek WRP; 140 afy = Industry Well; and 1,439 afy = Puente Basin Wells). The Puente Basin pumping wells that will be used for the non-potable system include Lycoming, Business Parkway, and Fairway.
- **New Potable Water Supply:** 3,414 afy from Tony Poli, Carrier BDP wells, New Well 1, New Well 2, New Well 3, New Well 4, RV-1/RV-2, and New Well 5.
- **Managed Aquifer Recharge:** No artificial recharge.
- **Treatment:** RO treatment of pumped groundwater from Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, Carrier BDP wells, RV-1/RV-2, and New Well 5, at a centralized treatment system in the west.
- **New Facilities/Wells:** RO treatment plant, five pumping wells, pipelines to convey pumped groundwater to RO treatment plant from western and central portions of the basin, , potable pipeline connections from treatment plant, and San Jose Pipeline to connect the WVWD and RWD recycled water systems.

Basin Management Alternative 5: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping in the West and Center and RO Treatment

- **Description:** Increase pumping in the western and central portions of the Puente Basin at existing and new wells. Treat groundwater at a centralized RO Treatment System in the

- western portion of the basin for potable supply. New artificial recharge to the basin via injections wells
- **Objectives:** Increase the groundwater yield of the Puente Basin, produce a new potable water supply, become less reliant on imported water, maintain sustainable groundwater levels, comply with the Puente Narrows outflow obligation, and utilize Puente Narrows credits.
 - **Groundwater Pumping:** Total of 4,853 afy of pumping at all existing wells in the Puente Basin, 4 new wells in the west (1, 2, 3, 4), and one new well in the center (5). This is 3,314 afy greater than the historical average pumping.
 - **Non-Potable Water Supply:** 5,479 afy (1,500 afy = Pomona WRP; 2,400 afy = San Jose Creek WRP; 140 afy = Industry Well; and 1,439 afy = Puente Basin Wells). The Puente Basin pumping wells that will be used for the non-potable system include Lycoming, Business Parkway, and Fairway.
 - **New Potable Water Supply:** 3,414 afy from Tony Poli, Carrier BDP wells, New Well 1, New Well 2, New Well 3, New Well 4, RV-1/RV-2, and New Well 5.
 - **Managed Aquifer Recharge:** Artificial recharge via four injection wells. The source of recharge water will be identified later but should prioritize recycled water from the Pomona WRP and/or surface water within the San Jose Creek channel. The construction and operation of the injection wells will progress initially from one well to four wells. Each injection well is estimated to recharge 413 afy. Total recharge via four injection wells is 1,652 afy.
 - **Treatment:** RO treatment of pumped groundwater from Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, Carrier BDP wells, RV-1/RV-2, and New Well 5, at a centralized treatment system in the west.
 - **New Facilities/Wells:** RO treatment plant, five pumping wells, pipelines to convey pumped groundwater to treatment plant from western and central portions of the basin, potable pipeline connections from treatment plant, and San Jose Pipeline to connect the WVWD and RWD recycled water systems.

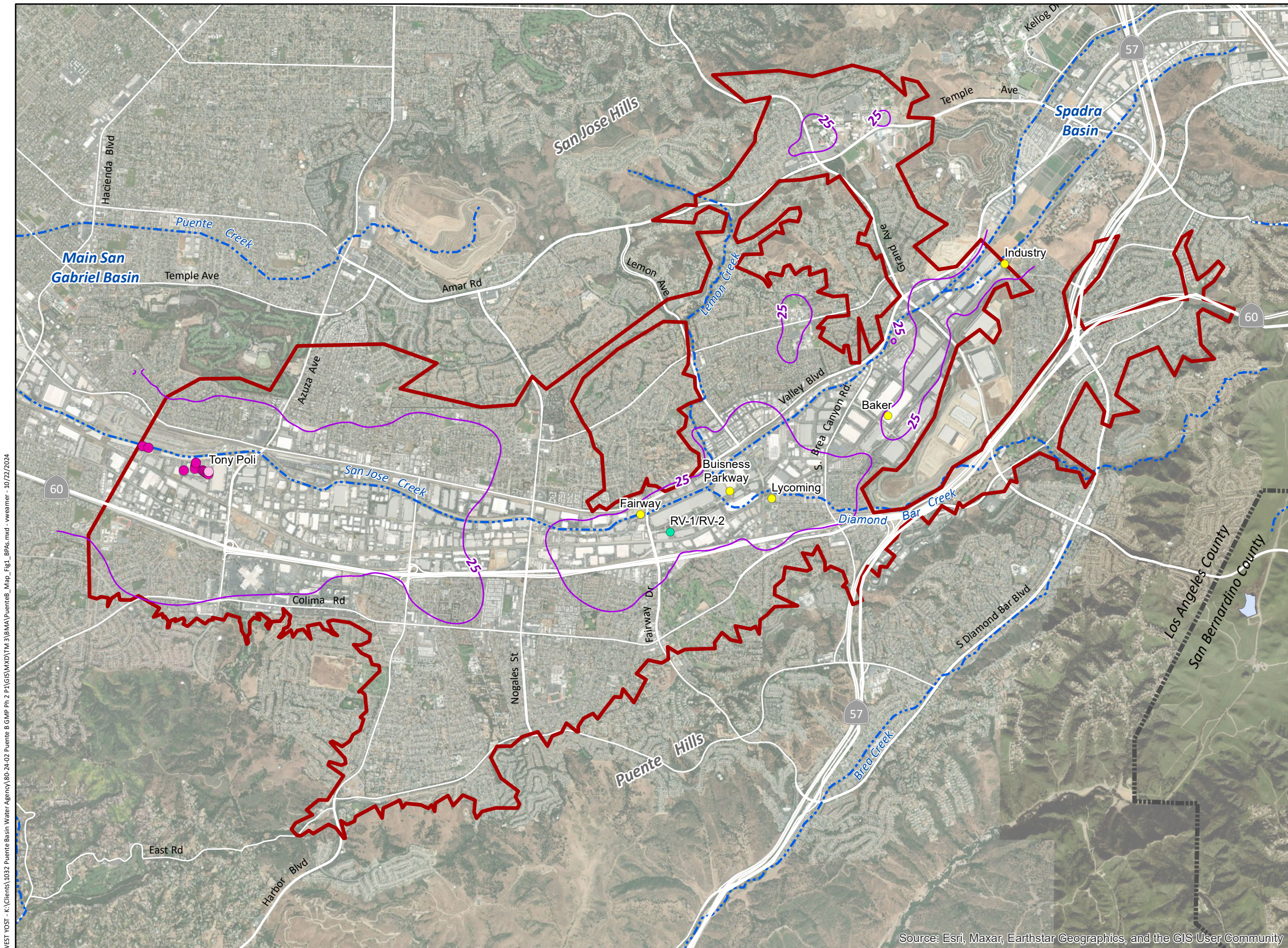
Basin Management Alternative 6: Increase Potable and Non-Potable Water Supplies via Increased Pumping and DPR of Recycled Water

- **Description:** Increase pumping at existing wells in Puente Basin and new wells in the west and treat a portion of the groundwater, along with recycled water effluent from Pomona WRP at a direct potable reuse (DPR) Treatment System in the eastern portion of the basin, for a new potable supply.
- **Objectives:** Produce new potable and non-potable water supplies, become less reliant on imported water, maintain sustainable groundwater levels, comply with the Puente Narrows outflow obligation, and utilize Puente Narrows credits.
- **Groundwater Pumping:** Total of 4,854 afy of pumping at all existing wells in the Puente Basin and five new wells in the west (1,2,3,4, and 6). This is 3,315 afy more than the historical average pumping.
- **Non-Potable Water Supply:** 5,310 afy (2,400 afy = San Jose Creek WRP; and 2,910 afy = Puente Basin Wells). The Puente Basin pumping wells that will be used for the non-potable system include Tony Poli, New Well 1, New Well 2, New Well 3, New Well 4, and New Well 6.

- **New Potable Water Supply:** 4,360 afy (2,276 afy = Pomona WRP; 140 afy = Industry Well; and 1,944 afy = Puente Basin Wells). The Puente Basin pumping wells that will provide groundwater for advanced treatment at the DPR plant include RV-1/RV-2, Fairway, Business Parkway, and Lycoming.
- **Managed Aquifer Recharge:** No artificial recharge.
- **Treatment:** Advance treatment at an East DPR Treatment System of all available Pomona WRP effluent along with groundwater pumped from the RV-1/RV-2, Fairway, Business Parkway, and Lycoming wells in the Puente Basin, and Industry well in the Spadra Basin.
- **New Facilities/Wells:** DPR treatment plant, pipelines to convey pumped groundwater to DPR treatment plant from central and eastern portions of the basin, potable pipeline connections from treatment plant, five pumping wells in the western portion of the basin with non-potable connections, and San Jose Pipeline to connect the WVWD and RWD recycled water systems.

4.0 NEXT STEPS

The next steps in developing the Puente Basin GMP within Phase 2, involve review of this TM-3 with input due by November 19th, 2024. During this period, the PBWA and stakeholders will submit their written comments and suggestions to West Yost vweamer@westyost.com and the PBWA jmacias@walnutvalleywater.gov. Concurrently, West Yost will collaborate with the PBWA to create ranking criteria for the Basin Management Alternatives and develop an initial ranking of the alternatives. Following this, a new Section 4 of this TM-3 will be prepared, detailing the draft ranking and a recommendation for selecting Basin Management Alternatives for further evaluation. TM-3 will then be redistributed for review by the PBWA and Stakeholders, culminating in a workshop to discuss the draft ranking and a recommendation for Basin Management Alternatives to further evaluate.

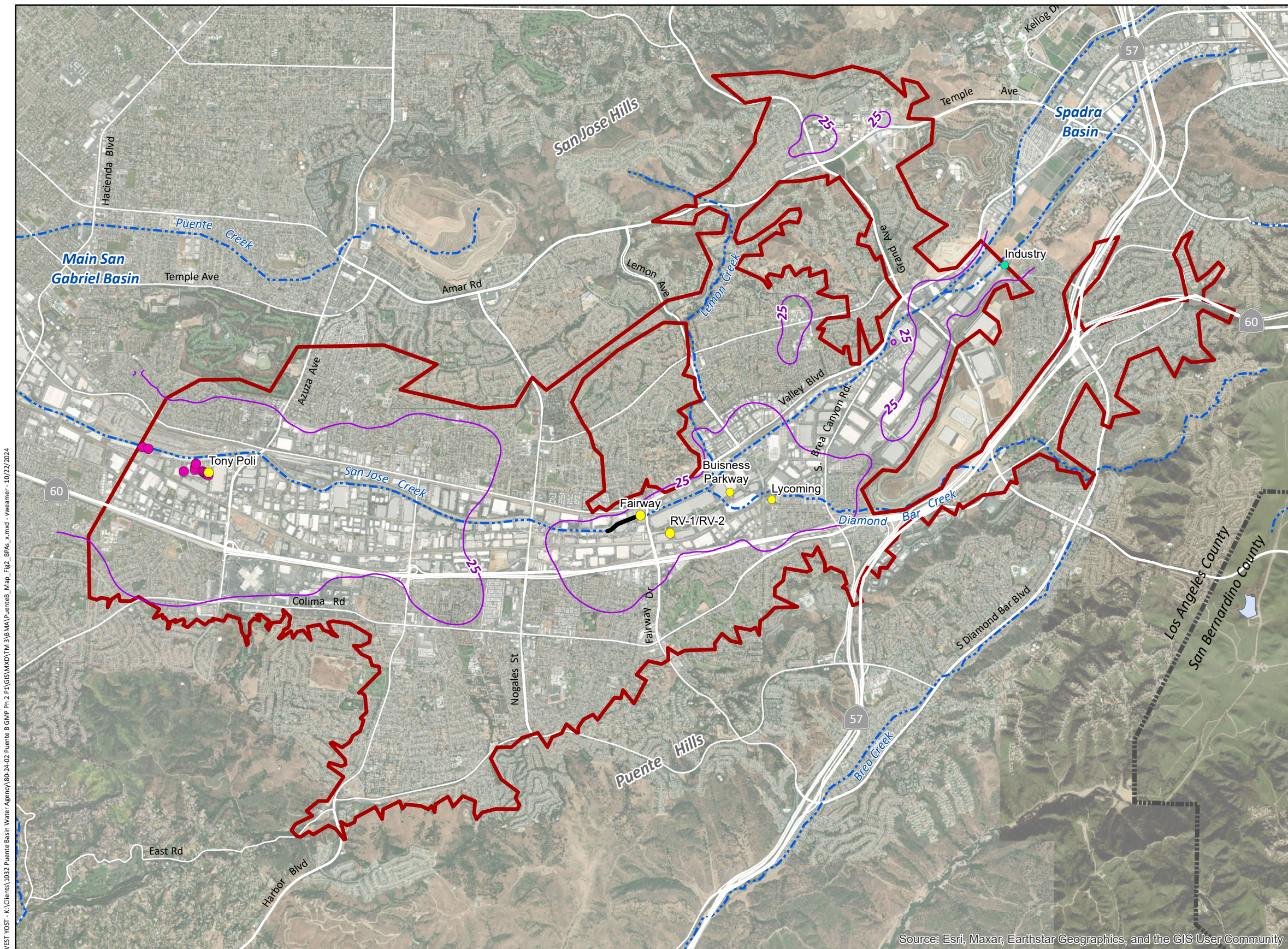


- Wells Symbolized by Well Owner**
- WWWD
 - WWWD (Formerly Royal Vista Golf Course)
 - RWD
 - Carrier BDP
- 25— Contour of Depth to Bedrock >25 ft-bgs
- Puente Basin Adjudicated Boundary
- - - Streams & Flood Control Channels



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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

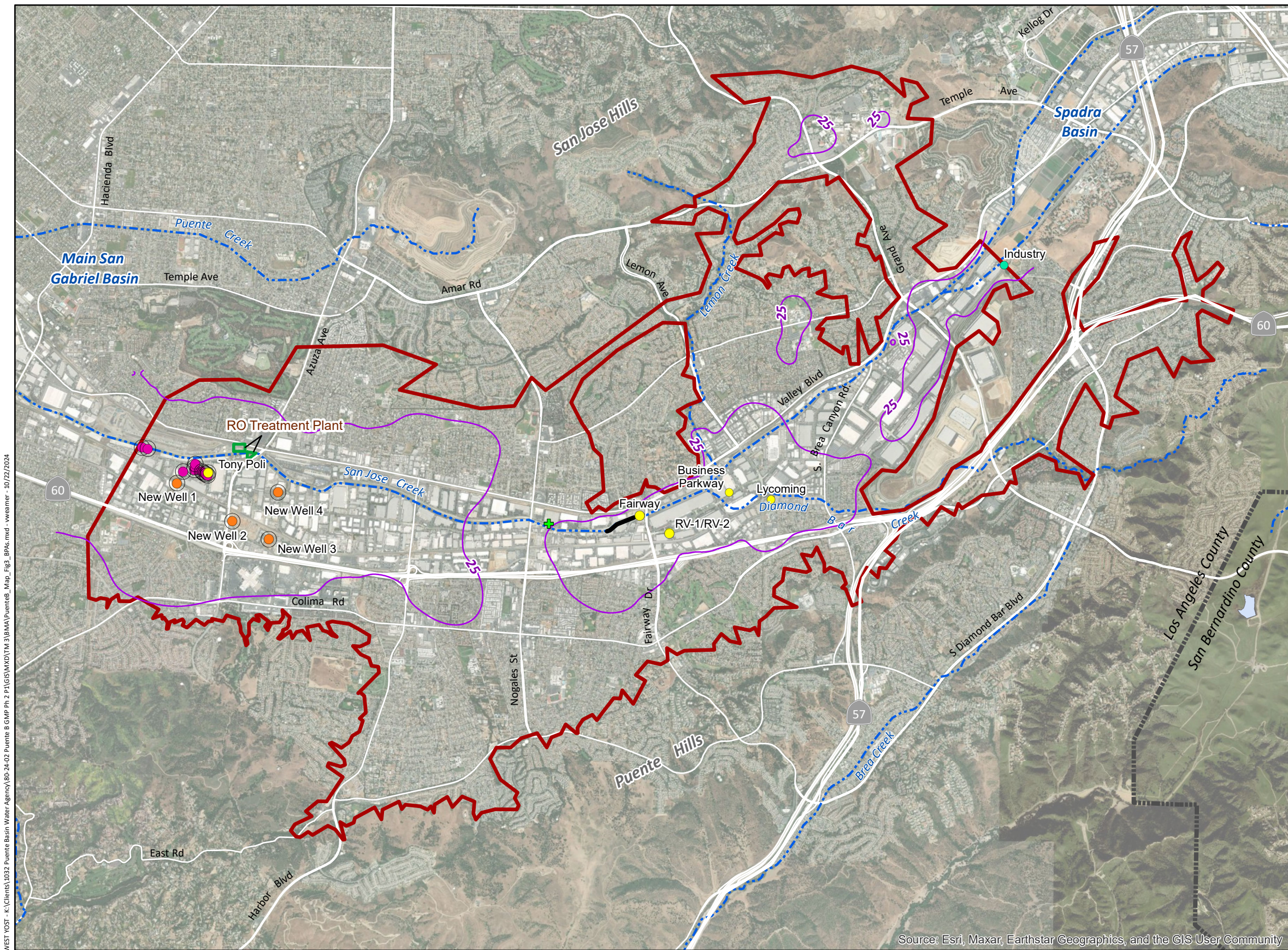


- Existing Facilities**
- WWWD and RWD Pumping Well in Puente Basin
 - WWWD Pumping Well in Spadra Basin
 - Carrier BDP Pumping Well
- Planned New Facilities for Alternative 1**
- San Jose Pipeline Connecting RWD/WWWD Recycled Water Systems
 - 25— Contour of Depth to Bedrock >25 ft-bgs
 - Puente Basin Adjudicated Boundary
 - Streams & Flood Control Channels



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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

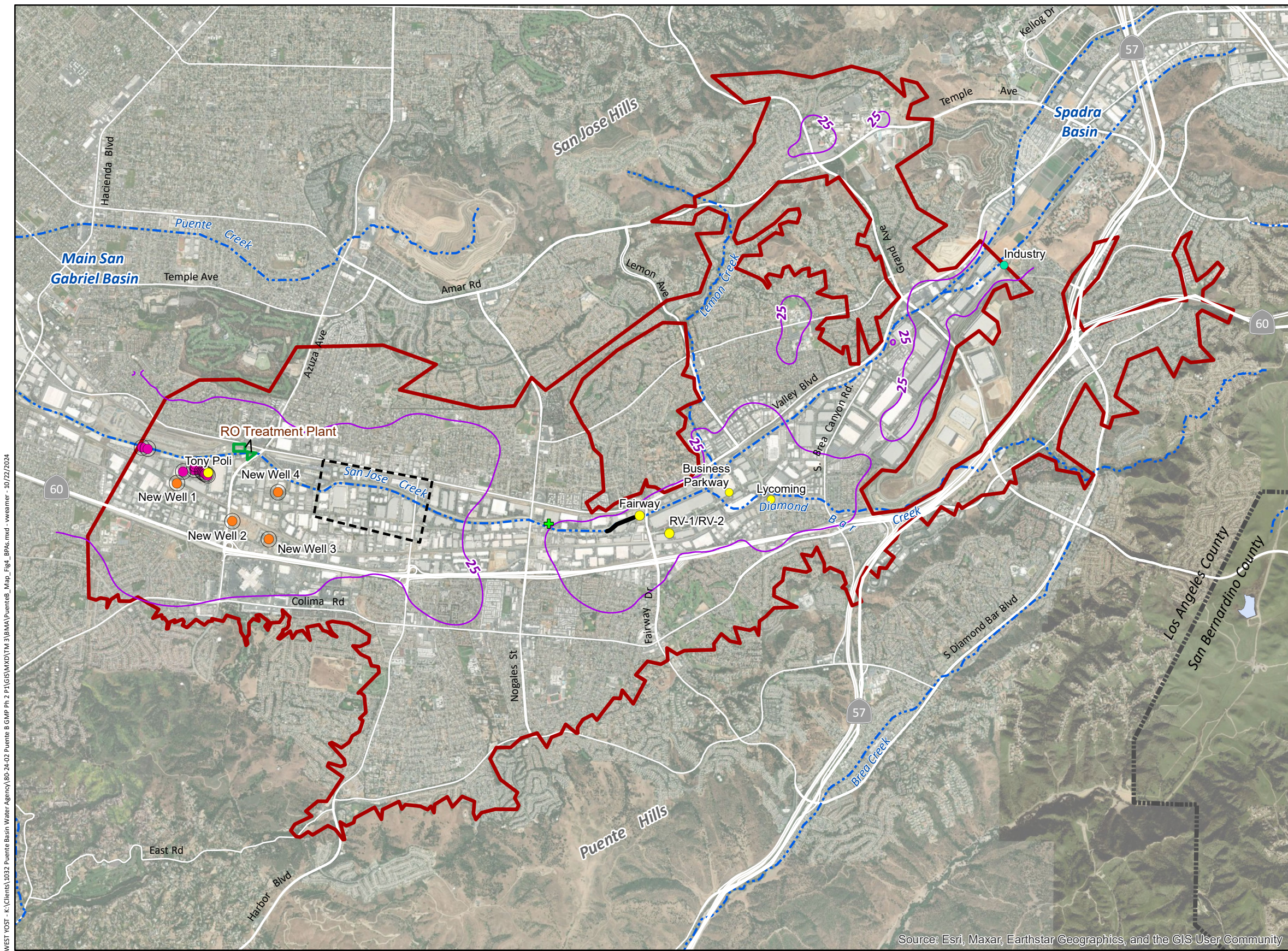


- Existing Facilities**
- WWWD and RWD Pumping Well in Puente Basin
 - WWWD Pumping Well in Spadra Basin
 - Carrier BDP Pumping Well
 - + Potable Water Intertie between WWWD/RWD
- Planned New Facilities for Alternative 2**
- Pumping Well
 - Well – Groundwater is Conveyed to Plant for Treatment
 - Potable Water Treatment Plant
 - San Jose Pipeline Connecting RWD/WWWD Recycled Water Systems
 - 25- Contour of Depth to Bedrock >25 ft-bgs
 - ▬ Puente Basin Adjudicated Boundary
 - ~ Streams & Flood Control Channels



WEST YOST - K:\Clients\1032 Puente Basin Water Agency\80-24-02 Puente B GMP Ph 2 P1\GIS\MXD\TM3\BMA\Map_Fig3_BPMs.mxd - wswanner - 10/23/2024

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

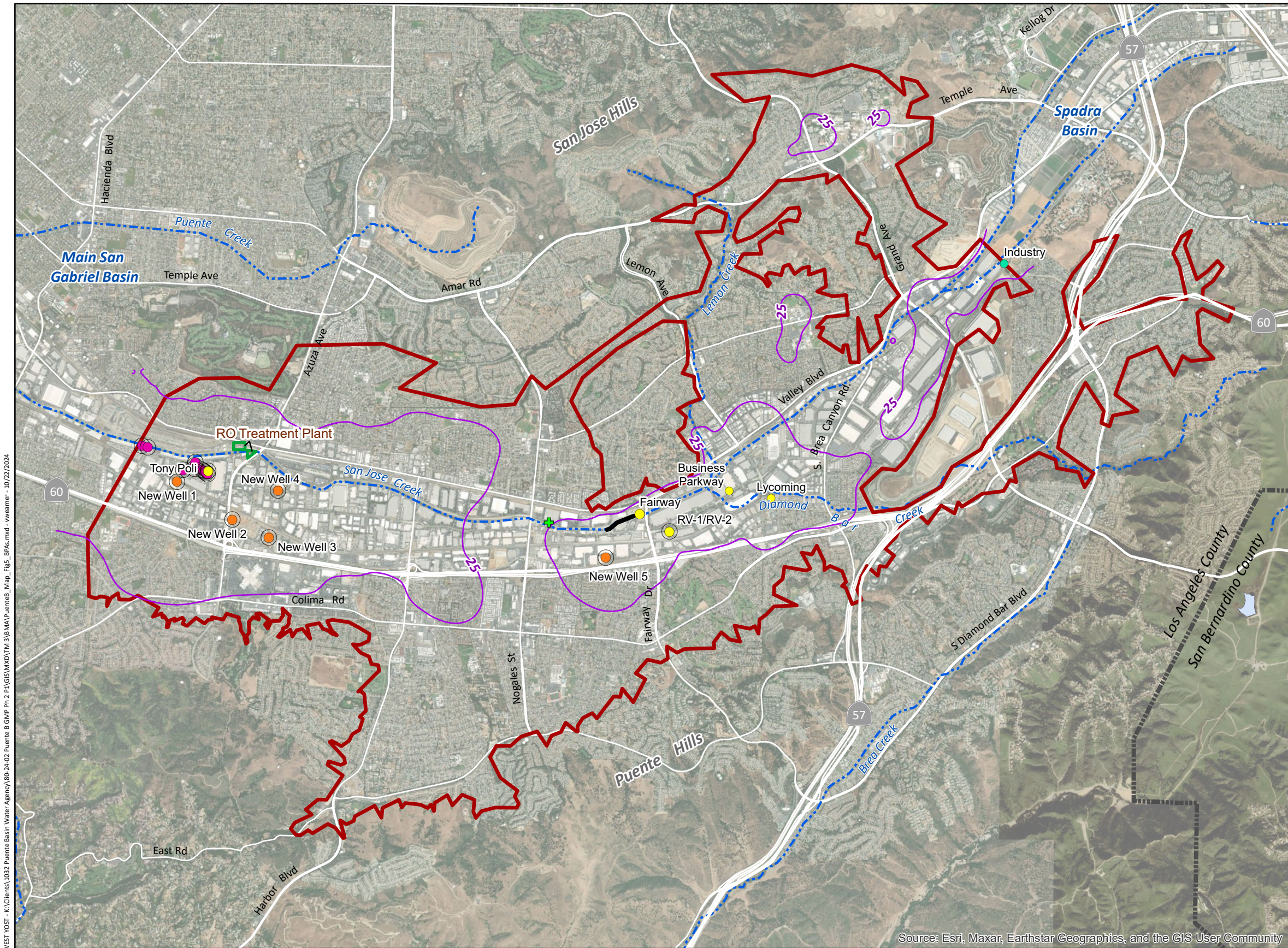


- Existing Facilities**
- WWWD and RWD Pumping Well in Puente Basin
 - WWWD Pumping Well in Spadra Basin
 - Carrier BDP Pumping Well
 - + Potable Drinking Water Intertie between WWWD/RWD
- Planned New Facilities for Alternative 3**
- Pumping Well
 - Target Area for Injection Wells
 - Well – Groundwater is Conveyed to Plant for Treatment
 - Potable Water Treatment Plant
 - San Jose Pipeline Connecting RWD/WWWD Recycled Water Systems
 - 25- Contour of Depth to Bedrock >25 ft-bgs
 - ▬ Puente Basin Adjudicated Boundary
 - ~ Streams & Flood Control Channels

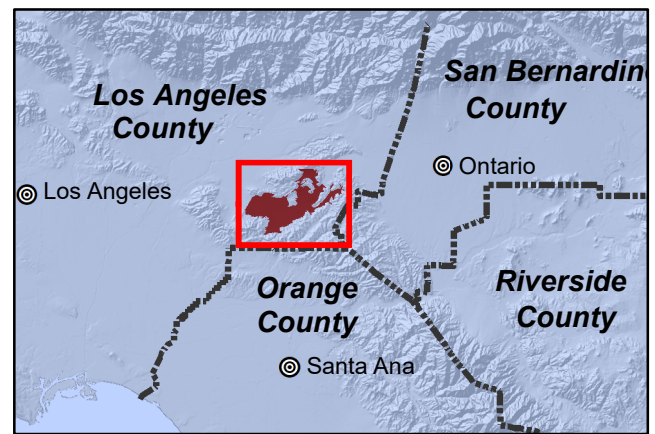


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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

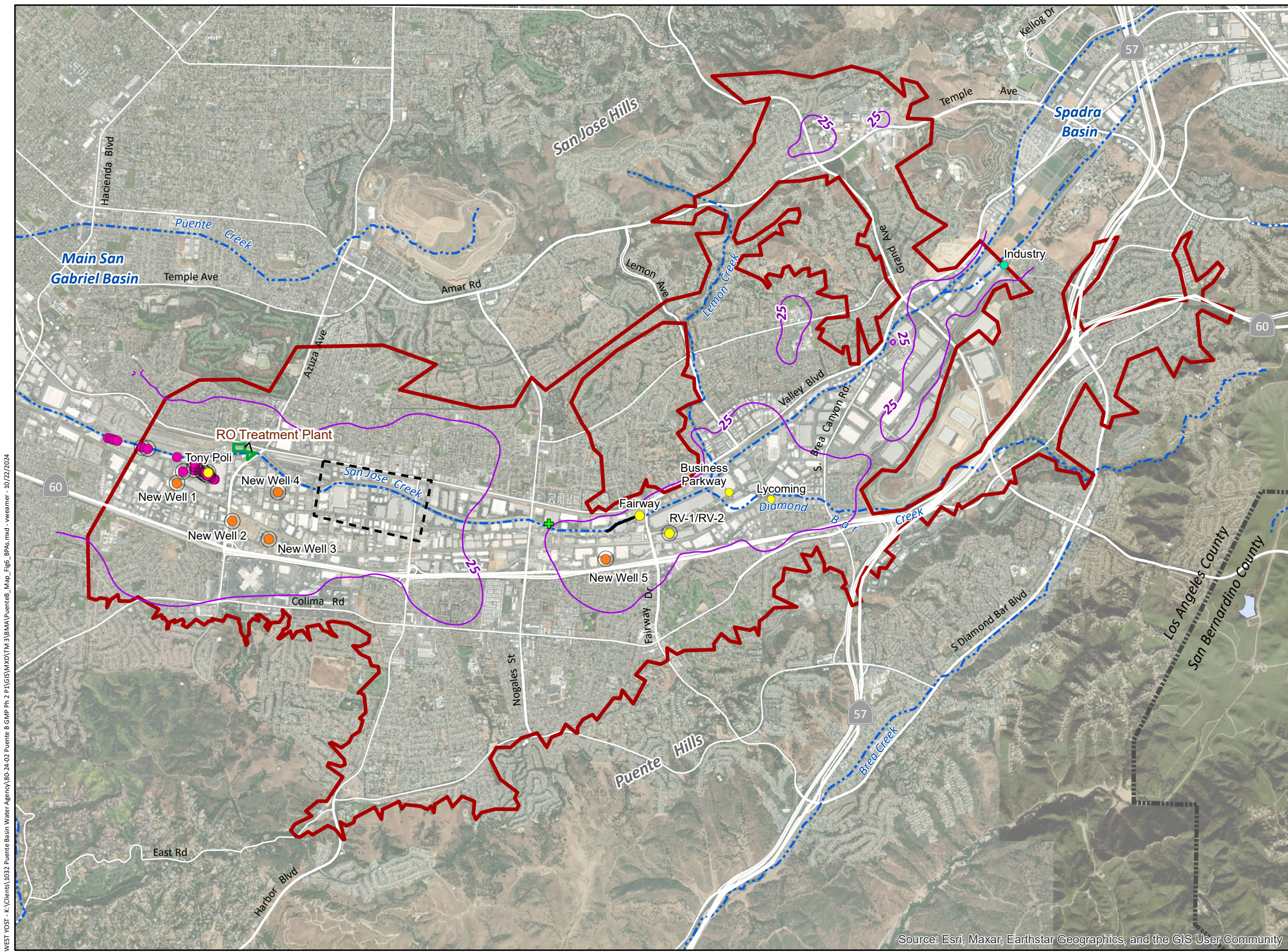


- Existing Facilities**
- WWWD and RWD Pumping Well in Puente Basin
 - WWWD Pumping Well in Spadra Basin
 - Carrier BDP Pumping Well
 - + Potable Water Intertie between WWWD/RWD
- Planned New Facilities for Alternative 4**
- Pumping Well
 - Well – Groundwater is Conveyed to Plant for Treatment
 - Potable Water Treatment Plant
 - San Jose Pipeline Connecting RWD/WWWD Recycled Water Systems
 - 25- Contour of Depth to Bedrock >25 ft (ft-bgs)
 - Puente Basin Adjudicated Boundary
 - Streams & Flood Control Channels



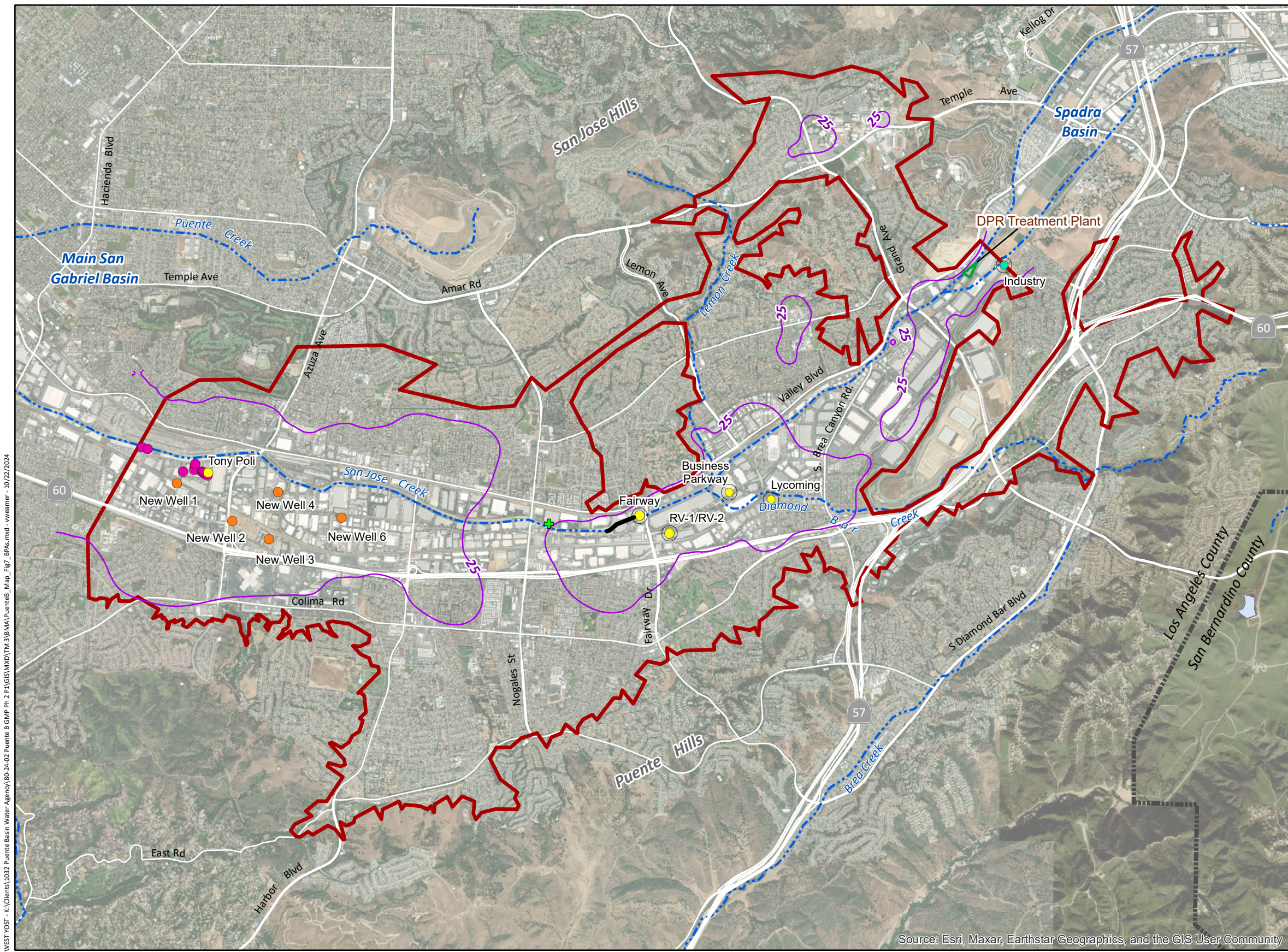
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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



- Existing Facilities**
- WWD and RWD Pumping Well in Puente Basin
 - WWD Pumping Well in Spadra Basin
 - Carrier BDP Pumping Well
 - + Potable Drinking Water Intertie between WWD/RWD
- Planned New Facilities for Alternative 5**
- Pumping Well
 - Target Area for Injection Wells
 - Well – Groundwater is Conveyed to Plant for Treatment
 - Potable Water Treatment Plant
 - San Jose Pipeline Connecting RWD/WWD Recycled Water Systems
 - 25- Contour of Depth to Bedrock >25 ft-bgs
 - Puente Basin Adjudicated Boundary
 - Streams & Flood Control Channels





- Existing Facilities**
- WWD and RWD Pumping Well in Puente Basin
 - WWD Pumping Well in Spadra Basin
 - Carrier BDP Pumping Well
 - + Potable Drinking Water Intertie
- Planned New Facilities for Alternative 6**
- New Pumping Well
 - Well – Groundwater is Conveyed to Plant for Treatment
 - Potable Water Treatment Plant
 - San Jose Pipeline Connecting RWD/WVWD Recycled Water Systems
 - 25- Contour of Depth to Bedrock >25 ft-bgs
 - ⬮ Puente Basin Adjudicated Boundary
 - ~ Streams & Flood Control Channels

