

Development of a Puente Basin Groundwater Management Plan

# Selection of Basin Management Alternatives for Evaluation

Puente Basin Water Agency Stakeholder Meeting

March 18, 2025



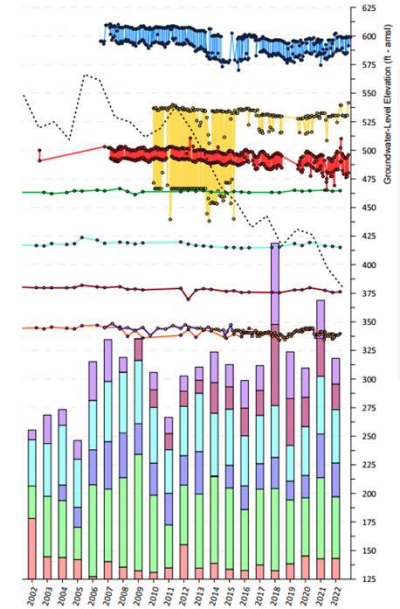
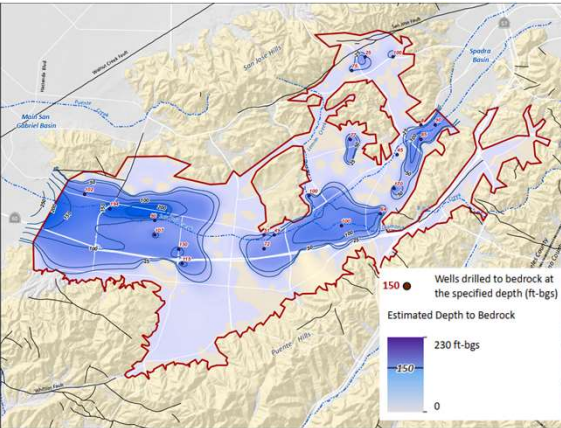
# Agenda

- Update of the Conceptual Basin Management Alternatives for the Puente Basin Groundwater Management Plan (GMP), and Technical Memorandum-3 (TM-3)
- Initial Ranking of Basin Management Alternatives
- Scope and Cost to Evaluate the Basin Management Alternatives
- Next Steps to Develop the GMP

# Development of a Groundwater Management Plan (GMP) for the Puente Basin

- **Phase 1 – Describe the State of the Puente Basin and Establish GMP Goals**
- **Phase 2 – Evaluate Alternatives for Basin Management (Current)**
  - Define 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**

Part 1



Part 2

- (i) Hydrologic Impact to the Basin
- (ii) Cost Analysis for Project Implementation

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

**Section 1** – Background and Objectives

**Section 2** – Process to Develop Basin Management Alternatives

**Section 3** – Basin Management Alternatives

**Section 4** - Select Basin Management Alternatives for Evaluation

- Ranking
- Scope to Evaluate
- Selected Basin Management Alternatives

**Section 5** – Scope of Services to Perform Evaluation

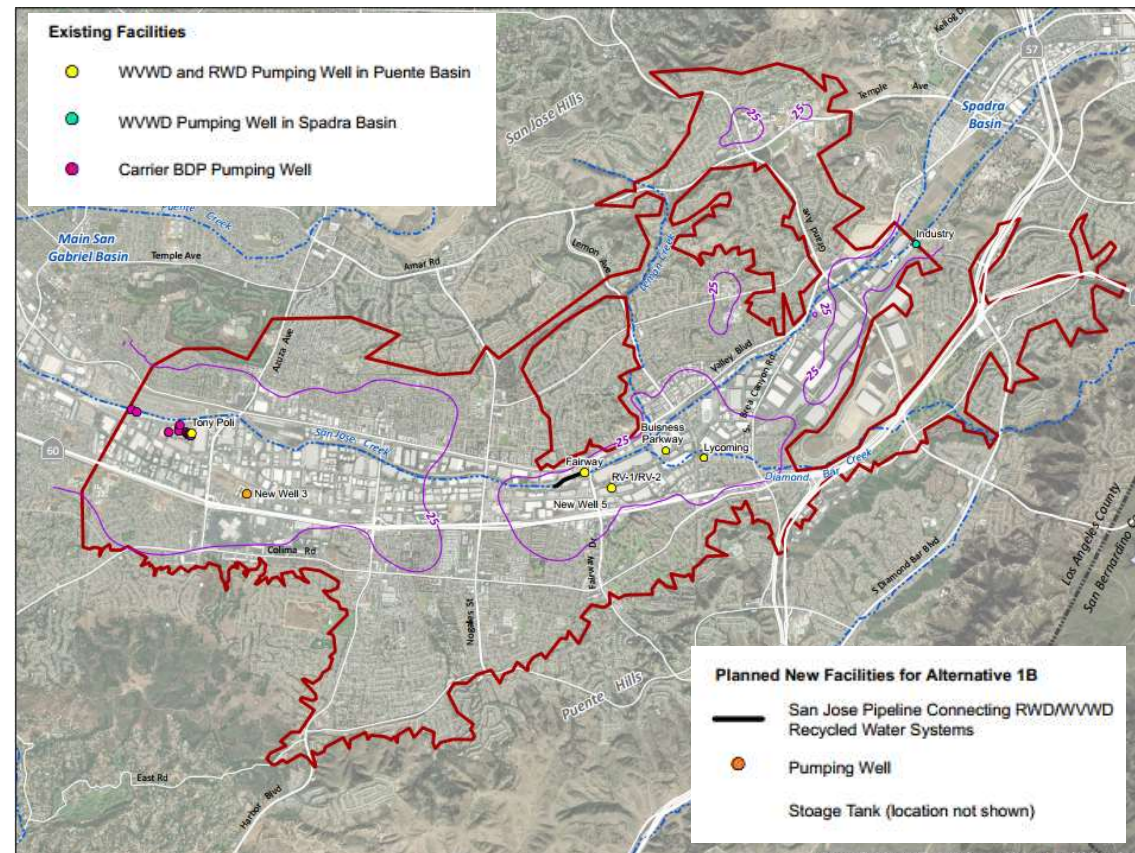
**TM-3 Part 1**

**TM-3 Part 2**

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

## Draft TM-3 Part 1 Updates:

- Comments and Responses - Appendix A
  - LACSD
- Refinements to Basin Management Alternatives
  - New Alternative 1B - Increase pumping at existing wells (5%↑), and new well in west for non-potable supply. Aims to reduce subsurface outflow.



## 7 Basin Management Alternatives

### 1A. Increase Pumping for Non-Potable

- Alternative 1A - Increase Pumping at Existing Wells (15%↑) for Non-Potable Supply



### 1B. Increase Pumping for Non-Potable – 1 New Well

- Alternative 1B – Increase Pumping at Existing Wells (5%↑) and New Well in West for Non-Potable Supply

### 2. West Pumping/RO Treatment

- Alternative 2 - Increase Pumping at Existing Wells and New Wells in the West for Potable Supply – West RO Treatment System

### 3. West Pumping/RO Treatment/Recharge

- Alternative 3 - Increase Pumping at Existing Wells and New Wells in the West for Potable Supply – West RO Treatment System – with Artificial Recharge

### 4. West & Center Pumping/RO Treatment

- Alternative 4 - Increase Pumping at Existing Wells and New Wells in the West and Center for Potable Supply – West RO Treatment System

### 5. West & Center Pumping/RO Treatment/ Recharge

- Alternative 5 - Increase Pumping at Existing Wells and New Wells in the West and Center for Potable Supply – West RO Treatment System – with Artificial Recharge

### 6. Center & West Pumping/East DPR Treatment

- Alternative 6 - Increase Pumping at Existing Wells for Potable Supply at an East DPR Treatment System with Pomona WRP Effluent, and New Wells in the West for Non-Potable Supply

## Ranking of Basin Management Alternatives – Ranking Criteria A through I

- A. How well does the alternative meet the objective of the GMP to become less reliant on imported water
- B. How well do you think the alternative will avoid the chronic lowering of groundwater levels
- C. How effectively do you think the alternative will minimize outflow to the Main Basin through the Puente Basin Narrows (compared to historical outflow) while still meeting the 580 acre-feet per year obligation
- D. Do you think the alternative will minimize outflow to Main Basin through the Puente Narrows (compared to historical outflow), to a level below the 580 afy obligation that can utilize credits in a sustainable manner
- E. How Feasible is the alternative considering the technical implementation and securing permits
- F. How feasible is the alternative when weighing the perceived implementation cost at this time against the potential benefits
- G. Does the alternative enhance the diversity of the water supply portfolio
- H. What is the level of complexity involved in the implementation of this alternative
- I. What is the estimated timeframe for implementing the alternative (planning, design; build)

## Ranking of Basin Management Alternatives – Ranking Criteria & Scale

All seven Basin Management Alternatives were ranked for all 9 Criteria (A-I)

Example of Ranking Scale:

Criteria		Ranking Scale	Ranking
<b>A</b>	How well does the alternative meet the objective of the Groundwater Management Plan to become less reliant on imported water	1: Does not meet the objective at all	
		2: Meets the objective to a small extent	
		3: Moderately meets the objective	
		4: Largely meets the objective	
		5: Fully meets the objective	

Ranking Scale 1 to 5, with 5 being the highest ranking



## Ranking of Basin Management Alternatives – Ranking Results

All seven Basin Management Alternatives were ranked for all 9 Criteria (A-I)

Example of Ranking Results for Alternative 1B :

Alternative	Criteria	Ranking			Criteria Total	Ranking Total Criteria A-I
		WVWD 1	WVWD 2	RWD		
1B - Increase Non-Potable Water Supplies via Increased Pumping at Existing Wells and New Well In the West	A	3	3	4	10	90
	B	4	4	3	11	
	C	4	3	3	10	
	D	4	4	3	11	
	E	4	4	3	11	
	F	4	4	3	11	
	G	2	2	4	8	
	H	3	3	3	9	
	I	3	3	3	9	

# Ranking of Basin Management Alternatives – Ranking Results

## Ranking of Top 3 Results

Alternative	Top 3 Ranking			Top 3 Ranking Total	
	WVWD 1	WVWD 2	RWD		
1A: Increase Non-Potable Water Supplies via Increased Pumping at Existing Wells	3	3	2	8	1st
1B: Increase Non-Potable Water Supplies via Increased Pumping at Existing Wells and New Well in the West	2	2	3	7	2nd
2: Increase Potable Water Supplies via Increased Pumping in the West and RO Treatment	1	1		2	3rd
3: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping in the West, and RO Treatment				0	
4: Increase Potable Water Supplies via Increased Pumping in the West and Center and RO Treatment				0	
5: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping in the West and Center and RO Treatment				0	
6: Increase Potable and Non-Potable Water Supplies via Increased Pumping and DPR of Recycled Water			1	1	

# Ranking of Basin Management Alternatives – Ranking Results

## Overall Ranking Results

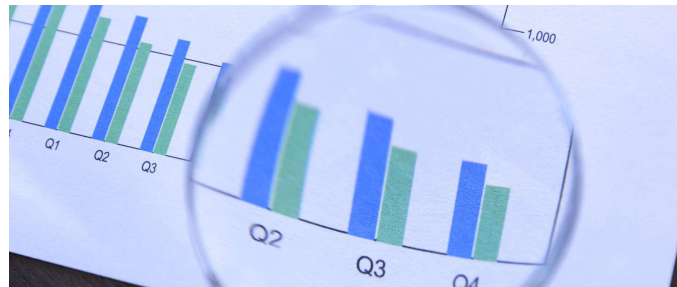
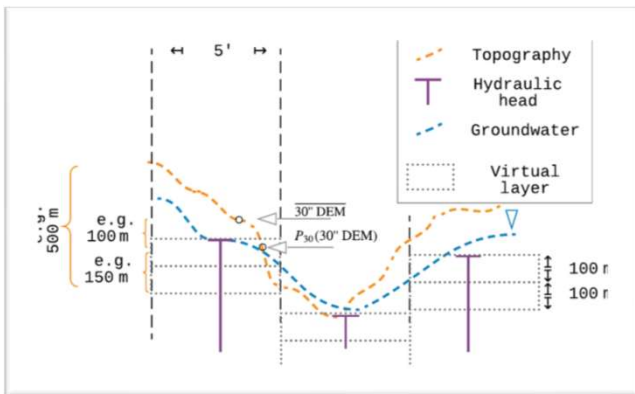
	Alternative	Ranking Total Top 3	Ranking Total Criteria A-I	Ranking Total Overall
1st	1A: Increase Non-Potable Water Supplies via Increased Pumping at Existing Wells	8	102	110
2nd	1B: Increase Non-Potable Water Supplies via Increased Pumping at Existing Wells and New Well in the West	7	90	97
3rd	2: Increase Potable Water Supplies via Increased Pumping in the West and RO Treatment	2	87	89
	3: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping in the West, and RO Treatment	0	78	78
	4: Increase Potable Water Supplies via Increased Pumping in the West and Center and RO Treatment	0	76	76
4th	5: Increase Potable Water Supplies via Artificial Recharge, Increased Pumping in the West and Center and RO Treatment	0	81	81
	6: Increase Potable and Non-Potable Water Supplies via Increased Pumping and DPR of Recycled Water	1	72	73

## Scope and Cost to Evaluate Basin Management Alternatives

Evaluate the Basin Management Alternatives for:

1. Hydrologic Analysis of the impacts to the Puente Basin
2. Cost Analysis for project implementation to produce the new water supply

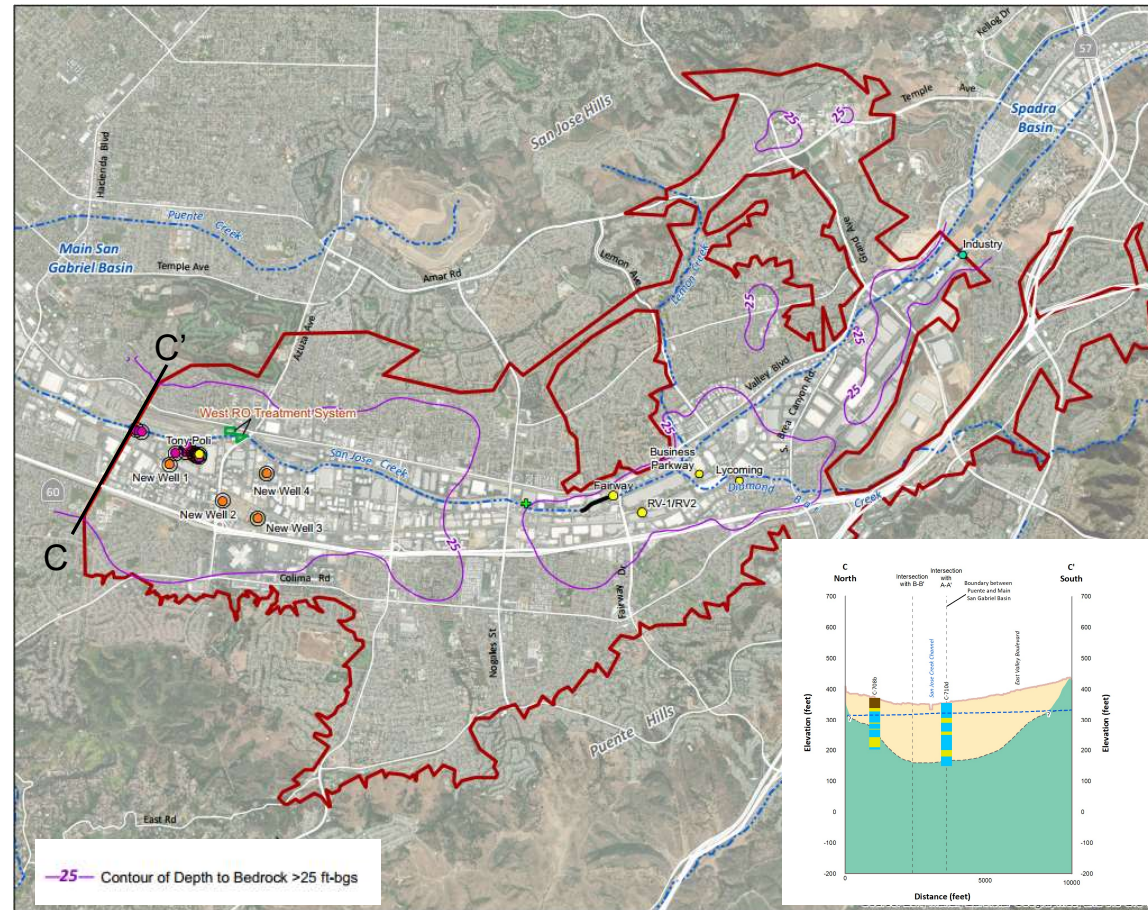
★ Inform PBWA decisions on which Alternatives to implement



# Scope and Cost to Evaluate Basin Management Alternatives

## – Hydraulic Analysis

- Understand the physical impacts on the Puente Basin resulting from the implementation of Alternatives, primarily:
  - ★ Groundwater levels
  - ★ Subsurface outflow to Main Basin
- GMP Objective: Minimize outflow and utilize Puente Narrows Credits:
  - How will an alternative impact outflow
  - Remain compliant with Puente Narrows Agreement



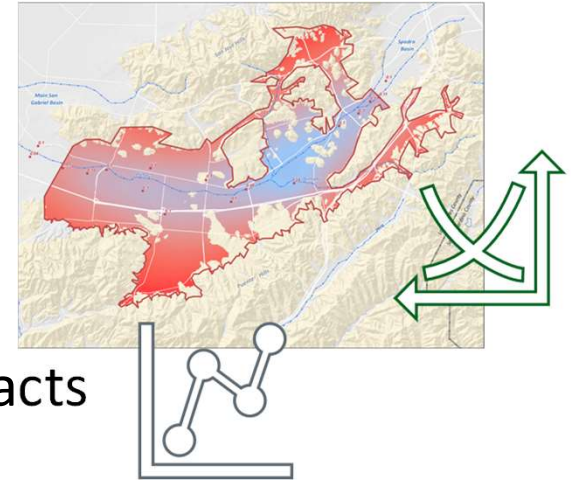
# Scope and Cost to Evaluate Basin Management Alternatives

## – Hydraulic Analysis

- Recommend Approach :

- ★ Groundwater Flow Model – predict impacts  
and/or

- ★ Monitoring Program – to tracking/measure impacts



- TM-3 includes high-level overview of the approach, scope, and estimated costs for modeling and monitoring

- ★ Recommended to **first perform the cost evaluation** of each alternative described before initiating these approaches

# Scope and Cost to Evaluate Basin Management Alternatives

## – Hydraulic Analysis - Groundwater Model

**Table 7. Scope Description and Rough Order of Magnitude (ROM) Costs to Perform Groundwater Flow Modeling**

Task No	Task Name	Description	Deliverables	ROM Costs
1	Data Collection, Management, and Assessment	This task consists of the collection and assessment of data that would be needed to develop a numerical groundwater model in addition to the data gathered as part of the development of the hydrologic conceptual model. Includes identification and collection of additional data that would help inform the numerical model, including climate datasets (precipitation and potential evapotranspiration), aquifer parameters, and more.	None	\$35,500
2	Groundwater Model Construction and Calibration	This task includes the creation of the numerical groundwater flow model. It includes calibration of the model to historical data.	The results will be incorporated into the Project Report (Task 4) and calibration results will be provided as an interim milestone at a project meeting	\$157,000
3	Model Scenarios	This task consists of the development, running, and post-processing of a baseline scenario and one or more planning scenarios. Each scenario will simulate conditions in the Puente Basin under a set of assumed stresses.	The results will be incorporated into the Report (Task 4) and scenario results will be provided as an interim milestone at a project meeting	\$76,100
4	Modeling Report	We will prepare a Draft and Final Report to describe and document the process of numerical model construction and calibration, and the results of the model scenarios	One (1) Draft and one (1) Final Report	\$63,400
<b>Modeling Total</b>				<b>\$332,000</b>

# Scope and Cost to Evaluate Basin Management Alternatives – Hydraulic Analysis - Monitoring Program

**Table 8. Scope Description and Rough Order of Magnitude (ROM) Costs to Develop and Implement a Monitoring Program for Two Years**

Task No	Task Name	Description	Deliverables	ROM Costs
1	Prepare Monitoring Plan	This task consists of designing a monitoring program and the preparing a monitoring plan	One Draft and one Final TM	\$22,500
2	Setup Monitoring Network <sup>(a)</sup>	This task includes the purchasing of equipment, installation, and set up of the monitoring sites	None	\$41,500
3	Conduct Monitoring Program for Year 1 <sup>(a)</sup>	This task includes the performing the first year of the monitoring program and maintaining the data in a database	All data will be uploaded and maintained in project database	\$46,600
4	Conduct Monitoring Program for Year 2 <sup>(a)</sup>	This task includes the performing the second year of the monitoring program and maintaining the data in a database	All data will be uploaded and maintained in project database	\$45,400
5	Analysis and Reporting for Year 1 <sup>(b)</sup>	This task includes the preparation of maps, tables, and time-series plots of hydrologic data, and conducting a meeting to review.	Maps, tables, exhibits	\$25,000
6	Analysis and Reporting for Year 2 <sup>(b)</sup>	This task includes preparation of Draft and Final Report to describe and analyses the data and conducting a meeting to review.	One Draft and one Final Report	\$49,000
<b>Monitoring Total (Setup and 2 Years)</b>				<b>\$230,000</b>

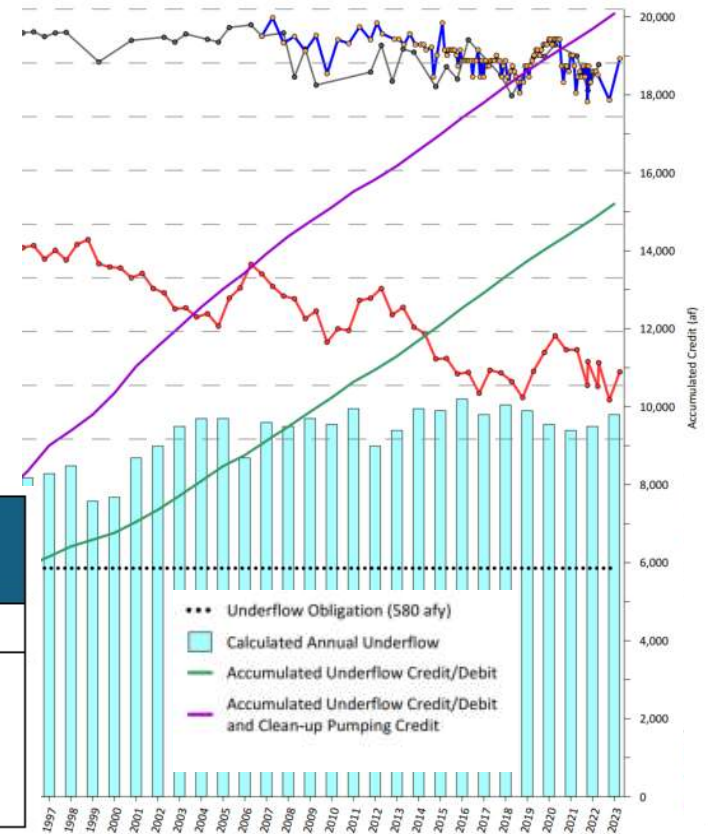


# Scope and Cost to Evaluate Basin Management Alternatives

## – Hydraulic Analysis

- The Basin Management Alternatives can be categorized:
  - \* **1A, 1B: Moderate increase in pumping (50-70% ↑)**
  - \* **2 through 6: Significant increase in pumping (> 150 % ↑)**
- Hence, the scope is varies based on Alternative:

Alternative	Evaluation Approach	Assumed Time (for cost estimating)	Total ROM Cost
1A and 1B	Develop and Implement Monitoring Program	Two years	<b>\$230,000</b>
2, 3, 4, 5, 6	Perform Groundwater Modeling	Modeling: One year	\$332,000
	Develop and Implement Monitoring Program	Monitoring: Two years	+ \$230,000
			<b>Total: \$562,000</b>



# Scope and Cost to Evaluate Basin Management Alternatives

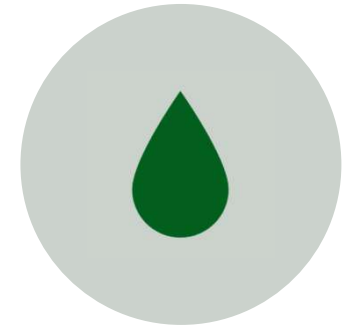
## – Cost Analysis



LOOKS AT MELED COST OF  
WATER SUPPLY FOR PUENTE  
BASIN – WILL IT BENEFIT IN THE  
LONG TERM FROM  
IMPLEMENTATION



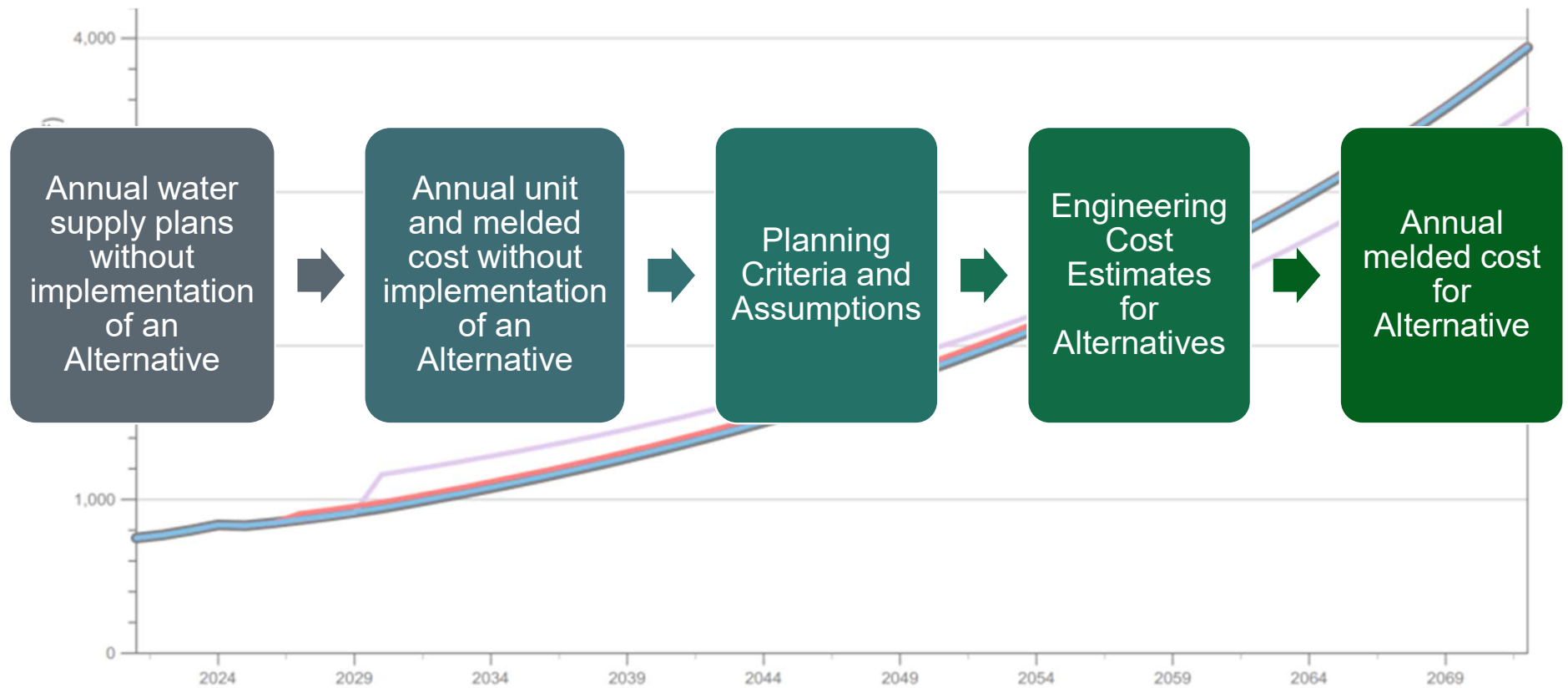
UNDERSTAND THE  
POTENTIAL ECONOMIC  
ADVANTAGE OR  
DISADVANTAGE OF EACH  
ALTERNATIVE



INFORMED DECISION  
MAKING - CHOSE  
ALTERNATIVES TO  
FURTHER EVALUATE

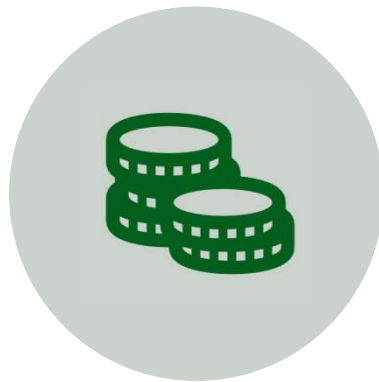
# Scope and Cost to Evaluate Basin Management Alternatives

## – Cost Analysis

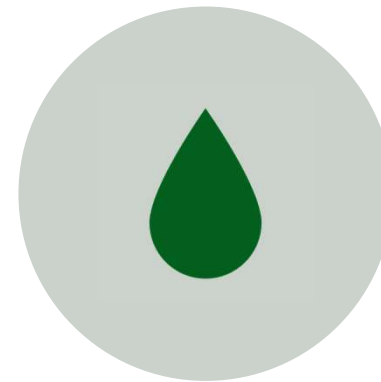


## Scope and Cost to Evaluate Basin Management Alternatives

- Scope of Services to Perform Phase 2 - Part 2
- Recommended Approach



FIRST PERFORM THE COST  
EVALUATION FOR THE  
SELECTED BASIN  
MANAGEMENT ALTERNATIVES



RESULTS WILL INFORM NEXT  
STEPS TO FURTHER EVALUATE  
ALTERNATIVES

# Scope and Cost to Evaluate Basin Management Alternatives

## – Scope of Services to Perform Phase 2 - Part 2

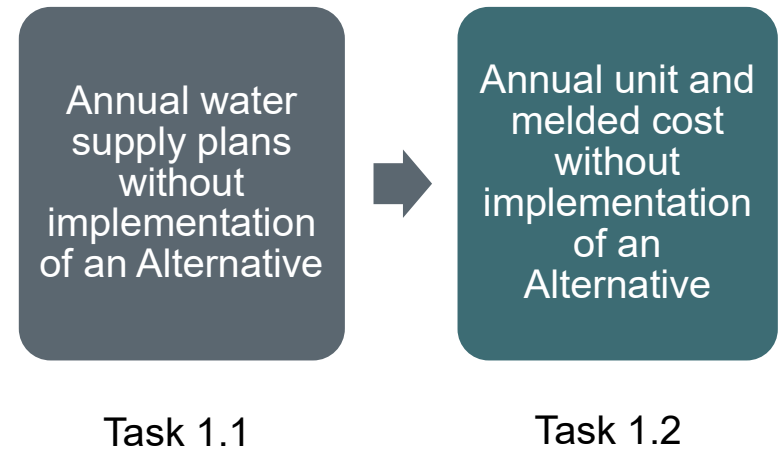
Work Breakdown Structure and Fee Estimate to Perform Cost Analysis of Five (5) Basin Management Alternatives for the Puente Basin and Determine Next Steps to Develop a Groundwater Management Plan												
Description	Labor							Total Labor		Total Program Costs		
	Principal Engineer/Geologist II	Principal Scientist I	Senior Engineer II	Tech Specialist II	Geologist II	Tech Specialist I	Task Multiplier	Person Hours	Labor Cost		Sub-Task	Phase/Task
									Sub-task	Phase/Task		
<b>Task 1 - Prepare Long-Term Cost Analyses Without the Implementation of a Basin Management Alternative</b>								<b>\$12,442</b>		<b>\$12,442</b>		
1.1 Develop annual water supply plans for each water purveyors, and in aggregate, for 2025 to 2075		3.0		7.0		2.0	1	12.0	\$2,911		\$2,911	
1.2 Develop annual unit costs and melded unit cost each water purveyors, and in aggregate, for 2025 to 2075		4.0	3.0	20.0		3.0	1	30.0	\$7,236		\$7,236	
1.3 As-needed coordination and meetings with PBWA to confirm water supply plans and cost		3.0		6.0			1	9.0	\$2,295		\$2,295	
<b>Task 2 – Prepare Long-Term Cost Analyses for Basin Management Alternatives</b>								<b>\$42,882</b>		<b>\$42,882</b>		
2.1 Develop Planning Criteria and Assumptions	5.0	6.0		10.0			1	21.0	\$5,832		\$5,832	
2.2 Develop Engineering Cost Estimates for Basin Management Alternatives	4.0	5.0		10.0		0.5	5	97.5	\$26,375		\$26,375	
2.3 Develop Cost Estimates for the Water Purveyors' Aggregate Water Supply Plans for the Basin		1.0	2.0	5.0		0.5	5	42.5	\$10,675		\$10,675	
<b>Task 3 - Prepare Technical Memorandum</b>								<b>\$32,438</b>		<b>\$32,438</b>		
3.1 Draft Sections 1 and 2 of TM-4	4.0	14.0		14.0	6.0	5.0	1	43.0	\$11,196		\$11,196	
3.2 Conduct Workshop to Review Sections 1 and 2 of TM-4.	2.0	10.0		10.0			1	22.0	\$6,086		\$6,086	
3.3 As-needed meeting with PBWA on TM-4	2.0	4.0		2.0			1	8.0	\$2,392		\$2,392	
3.4 Draft Sections 3 and 4 of TM-4	6.0	14.0	5.0	5.0		4.0	1	34.0	\$9,870		\$9,870	
3.5 Prepare Final TM-4	1.0	4.0		4.0		2.0	1	11.0	\$2,894		\$2,894	
<b>Task 4 – Project Management, Administration, and Meetings</b>								<b>\$8,600</b>		<b>\$8,600</b>		
4.1 Project Coordination and Administration and Meetings		2.5				0.3	7	19.3	\$5,891		\$5,891	
4.2 As-needed Project Meetings	2.0	5.0		2.0			1	9.0	\$2,709		\$2,709	
<b>Total ( 5 Alternatives)</b>											<b>\$96,362</b>	<b>\$96,362</b>

# Scope and Cost to Evaluate Basin Management Alternatives

## – Scope of Services to Perform Phase 2 - Part 2

### Task 1 - Prepare Long-Term Cost Analyses Without the Implementation of a Basin Management Alternative

- 1.1 Develop annual water supply plans for each water purveyors, and in aggregate, for 2025 to 2075
- 1.2 Develop annual unit costs and melded unit cost each water purveyors, and in aggregate, for 2025 to 2075
- 1.3 As-needed coordination and meetings with PBWA to confirm water supply plans and cost



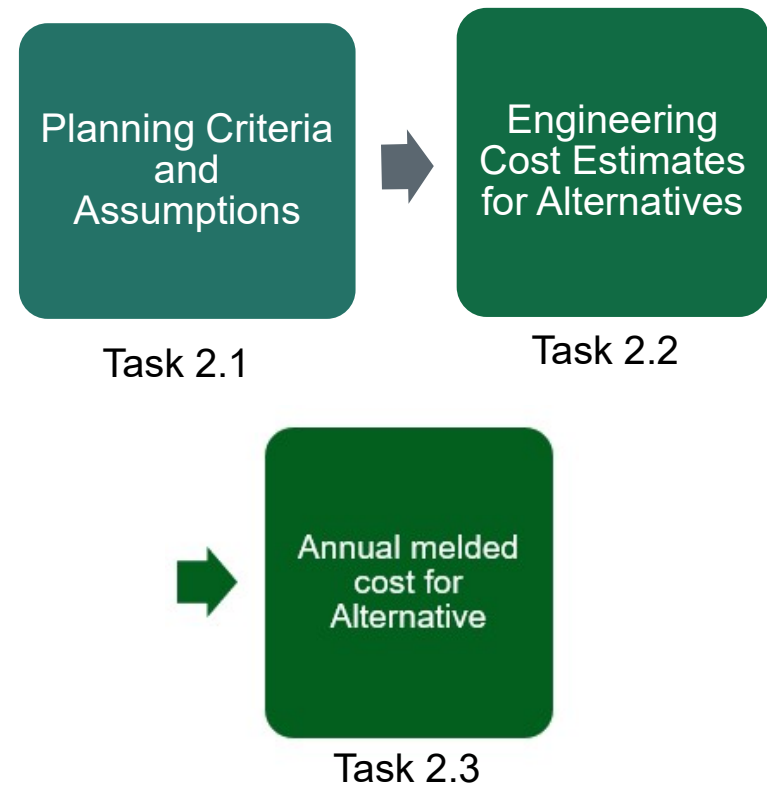
Surface Water		Non-Potable Water								Total Annual Cost			Unit Cost			
Imported Water		Spadra Basin			Recycled Water					Spadra Basin	Imported Water	Recycled Water	Spadra Basin	Imported Water	Recycled Water	Melded Total
Tier 1	Other	Assessment	Production	O&M	Assessment	Production	Treatment	O&M								
\$1,104	\$49	\$0	\$54	\$0	\$606	\$49	\$0	\$0	\$583,233	\$119,084	\$608,409	\$916	\$1,153	\$655	\$786	
\$1,143	\$50	\$0	\$55	\$0	\$622	\$50	\$0	\$0	\$600,288	\$105,252	\$635,569	\$881	\$1,193	\$671	\$781	
\$1,200	\$51	\$0	\$56	\$0	\$637	\$51	\$0	\$0	\$617,831	\$91,525	\$663,707	\$850	\$1,251	\$688	\$778	

# Scope and Cost to Evaluate Basin Management Alternatives

## – Scope of Services to Perform Phase 2 Part 2

### Task 2 - Prepare Long-Term Cost Analyses for Basin Management Alternatives

- 2.1 Develop planning criteria and assumptions
- 2.2 Develop Engineering Cost Estimates for Basin Management Alternatives
- 2.3 Develop Cost Estimates for the Water Purveyors' Aggregate Water Supply Plans for the Basin Management Alternative



# Scope and Cost to Evaluate Basin Management Alternatives

## – Scope of Services to Perform Phase 2 Part 2

### **Task 3 - Prepare Technical Memorandum**

- 3.1 Draft Sections 1 and 2 of TM-4
- 3.2 Conduct Workshop to Review TM-4 (Sections 1 & 2)
- 3.3 As-needed Meeting with PBWA on TM-4
- 3.4 Draft Section 3 and 4 of TM-4
- 3.4 Prepare Final TM-4

### **Task 4 - Project Management, Administration, and Meetings**

- 4.1 Project Coordination and Administration
- 4.2 As-needed Meetings



# Scope and Cost to Evaluate Basin Management Alternatives

## – Scope of Services to Perform Phase 2 Part 2

Table 11. Summary of Cost to Perform Cost Analysis for Five (5) Basin Management Alternatives for the Puente Basin and Determine Next Steps to Develop a Groundwater Management Plan		
Task No.	Task Name	Cost
1	Prepare Long-Term Cost Analyses for Without the Implementation of a Basin Management Alternative	\$12,442
2	Prepare Long-Term Cost Analyses for Basin Management Alternatives	\$42,882
3	Prepare Technical Memorandum	\$32,438
4	Project Management, Administration, and Meetings	\$8,600
<b>Total (5 Alternatives)</b>		<b>\$ 96,362</b>
<p><b>Notes:</b> The total cost to perform Cost Analysis for other numbers of Basin Management Alternatives are listed below. The cost variability is within Task 2:</p> <ul style="list-style-type: none"> <li>• Total for 7 Alternatives - \$ \$105,029</li> <li>• Total for 6 Alternatives - \$ \$98,498</li> <li>• Total for 4 Alternatives - \$ 88,952</li> <li>• Total for 3 Alternatives - \$ 81,542</li> <li>• Total for 2 Alternatives - \$74,132</li> </ul>		

## Next Steps to Develop a GMP

- **Late March 2025** – Share draft TM-3 (new Part 2 of ranking, recommended scope to evaluate) with PBWA stakeholders for review and comment
- **April 2025** – Three-week review period. PBWA to make decisions on which Basin Management Alternatives to further evaluate.
- **Late April 2025** – Prepare final TM-3 (selected Alternatives, and Recommended Scope)
- **May/June 2025** – Kick off next part of Phase 2 – Evaluation (Part 3)

**THANK YOU**



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