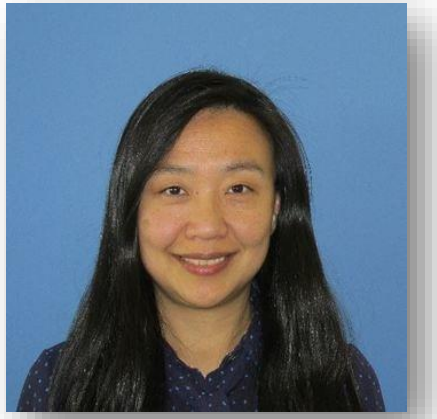
Recycled Water Strategic Plan Update Workshop No. 2

Board of Directors

September 24, 2024

Today's Speakers



Linda Hu
Manager *of* Water Supply Improvements

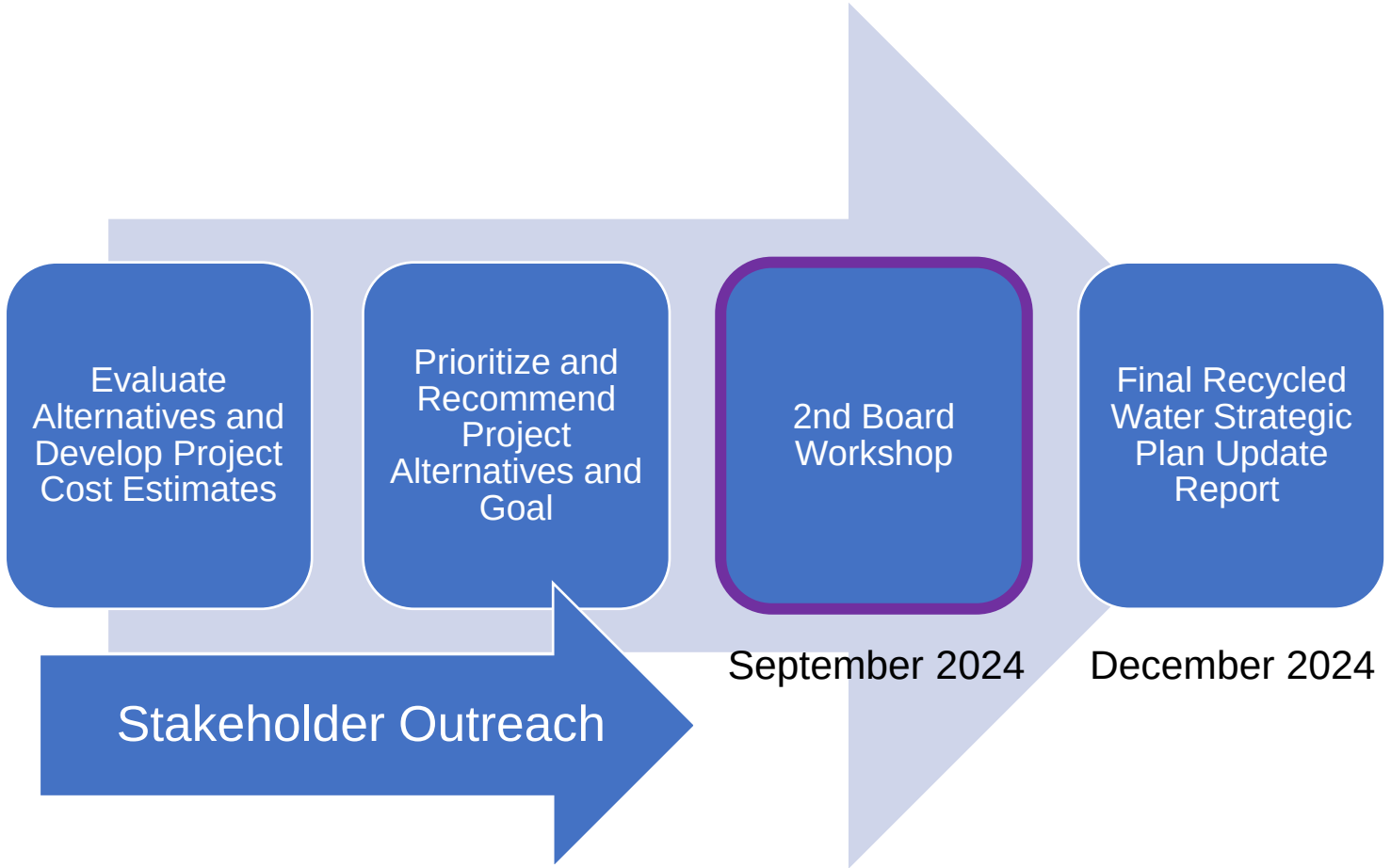
Florence Wedington
Supervisor *of* Water Recycling

Reena Thomas
Associate Civil Engineer

Agenda

- Requested background information on potable reuse
- 2024 Recycled Water Strategic Plan (RWSP) Process Update
- RWSP Draft Report Findings
- Recommendations and Next Steps

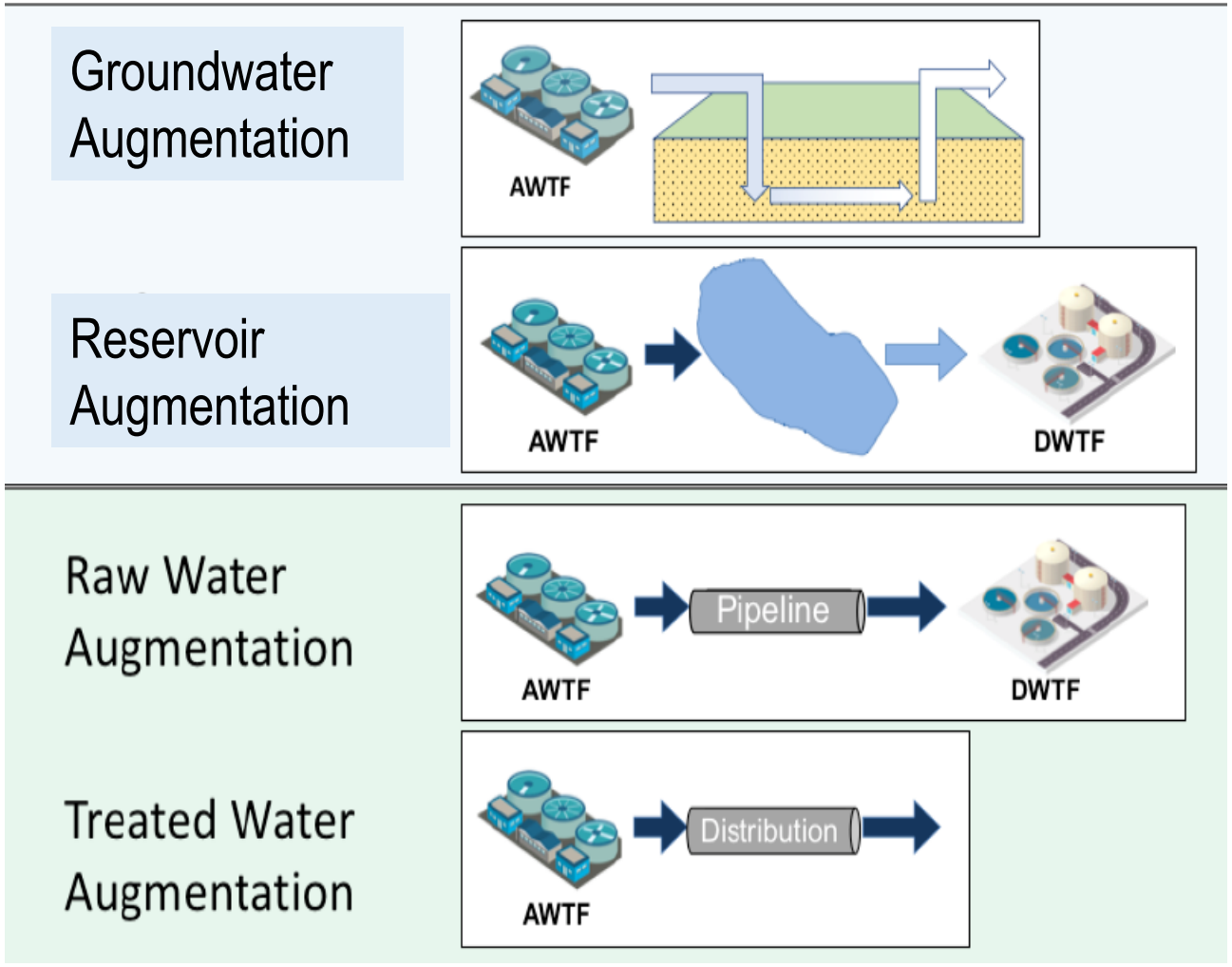
Tasks Complete Since Last Workshop



All Types of Potable Reuse = Purified Water

INDIRECT POTABLE REUSE (IPR)

DIRECT POTABLE REUSE (DPR)

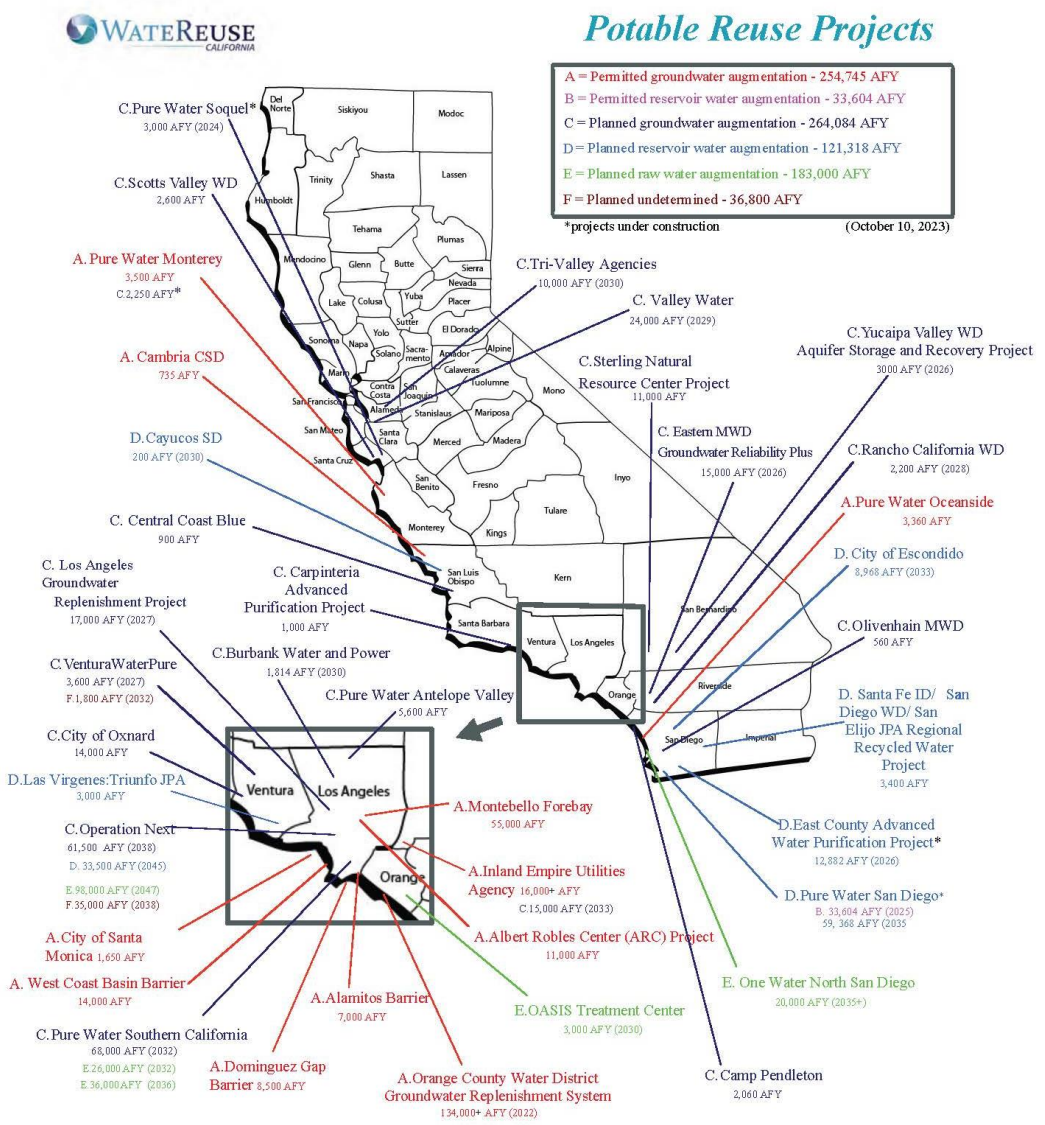


AWTF = Advanced Water Treatment Facility
DWTP = Drinking Water Treatment Facility

California Map of Potable Reuse

- Potable reuse projects in various levels of development, planning, permitting, and operations.

Augmentation Project Type	Total
A. Permitted groundwater	11
B. Permitted reservoir	1
C. Planned groundwater	21
D. Planned reservoir	7
E. Planned raw water	5
F. Planned undetermined	1



Potable Reuse Regulations and Significant Projects

- Indirect Potable Reuse (IPR)
  - Groundwater Augmentation approved June 2014
  - Reservoir Augmentation approved October 2018
- Direct Potable Reuse (DPR)
  - Raw and Treated Water Augmentation approved December 2023

Agency	Type	Capacity	Status
Orange County Water District and Orange County Sanitation District	Groundwater Augmentation	130 MGD	Operating since 2008
Monterey One Water	Groundwater Augmentation	5 MGD	Operating since 2020
City of San Diego	Reservoir Augmentation (future)	Up to 83 MGD	Demonstration facility operating since 2011. 7.5 MGD Phase 1 operational in 2027, full operation by 2035.
Pure Water Southern California	Groundwater/Raw Water Augmentation (future)	60 MGD/ 55 MGD	Groundwater and Phase 1 raw water operational in 2032; Phase 2 raw water operational in 2036
Valley Water (Pilot)	Groundwater Augmentation with potential for DPR (future)	18 MGD	8 MGD demonstration project operating since 2014. Additional 10 MGD in 2028.

MGD = Million Gallons per Day

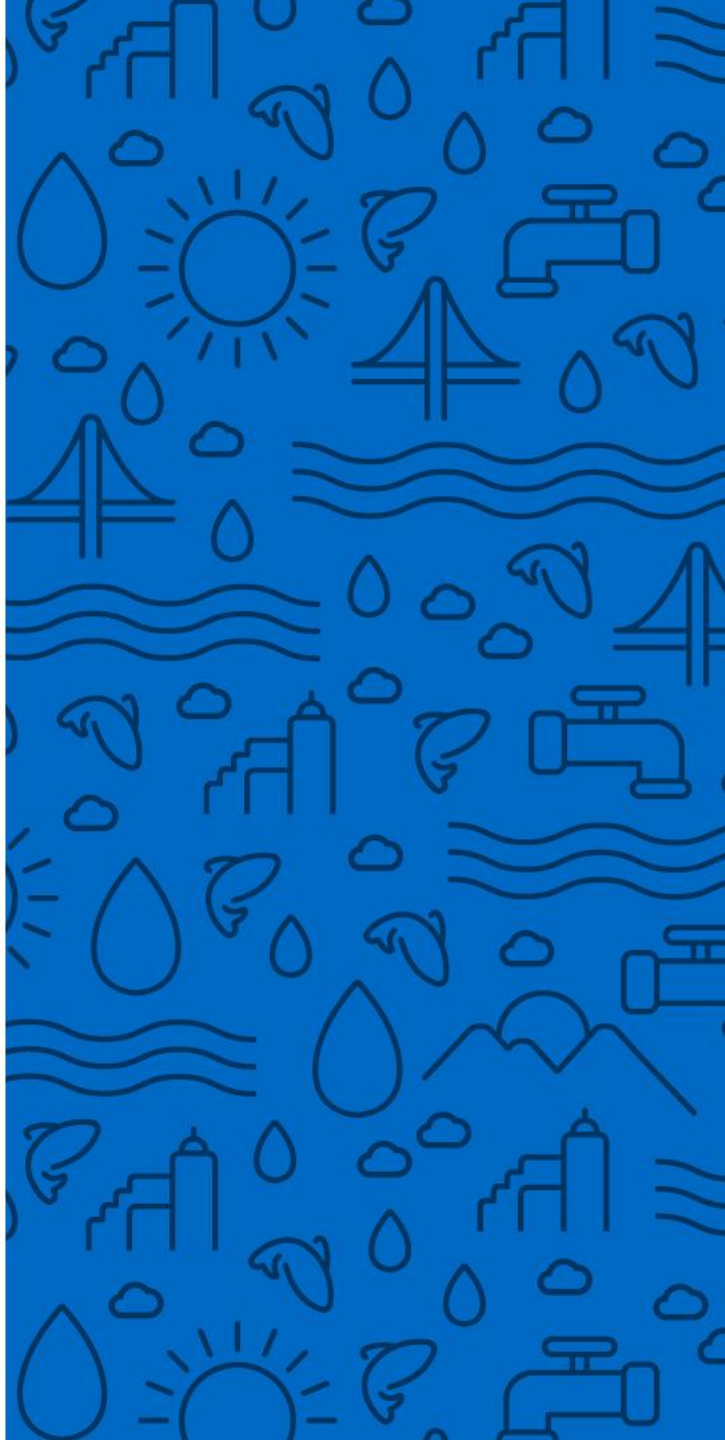
Timeline of San Diego Purified Water Project

- 1993 – Initial proposal of potable reuse project
- 1994 – DHS granted conditional approval; supported by the EPA, Sierra Club, USBR, San Diego Medical Society, citizen's advisory panel, businesses and community interest
- 1995 to 1998 – Public and media raised concerns; negative slogans popularized; inaccurately portrayed as targeting poor/ethnic communities; affected political campaigns
- 1999 – Project cancelled by the Council
- 2015 - City restarted the project planning and updated the public outreach program
- 2024 – Constructing a 30 MGD reservoir augmentation project

Pure Water San Diego construction site
Photo courtesy of F. Wedington

DHS – Department of Health Services
EPA – Environmental Protection Agency
USBR – Unites States Bureau of Reclamation

2024 Strategic Plan Update Process and Findings



Stakeholder Coordination

Provided project updates to stakeholder agencies, customers and non-governmental organizations including:

- Central Contra Costa Sanitary District
- Chevron Refinery
- Chuck Corica Golf Course (Alameda)
- City of Alameda
- City of Albany
- City of Berkeley
- City of Pinole
- City of Richmond
- City of San Leandro
- Dublin San Ramon Services District
- East Bay Dischargers Authority
- Oro Loma Sanitary District
- Phillips 66 Refinery
- San Francisco Save the Bay
- Sierra Club
- UC Berkeley
- West County Wastewater District

Non-Potable and Purified Water Alternatives Evaluation

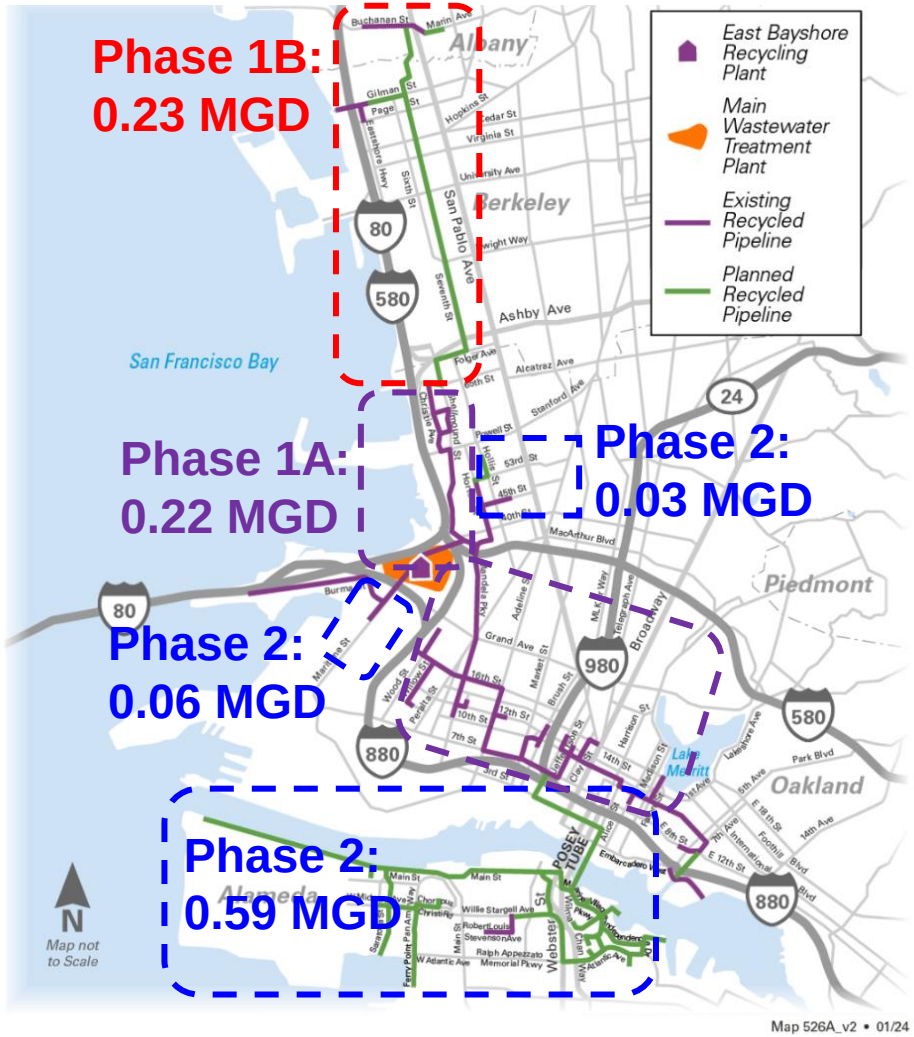
- Non-cost criteria: environmental and social objectives, complexity and risks

Criteria	Recommended Weighting Factor
Distribution of Benefits	15%
Environmental Challenges	10%
Chemical and Energy Use	10%
Wastewater Discharge	10%
Institutional	10%
Regulatory	15%
Design and Construction	10%
Long-Term Operational Viability	20%

- Cost criteria: capital costs, operations and maintenance costs, and relative unit costs

Significant Changes to Non-Potable Reuse Irrigation Projects

- East Bayshore Recycled Water Project
  - Recycled water demands decreased significantly due to conservation and customer use changes
    - Original Phase 1B anticipated demand = 0.51 MGD
    - Updated Phase 1B demand = 0.23 MGD
    - Golden Gate Field closure reduced Phase 1B demands by 0.16 MGD
  - Project capital cost and unit cost have increased
    - Difficult construction conditions and contaminated soils
    - Phase 1B every year unit cost = $16,100/AF
  - Start with the most cost-effective phase of expansion into Alameda, Emeryville, and Oakland with federal funding
    - Phase 2 every year unit cost = $3,500/AF



AF = Acre-Feet

Significant Changes to Non-Potable Reuse Irrigation Projects

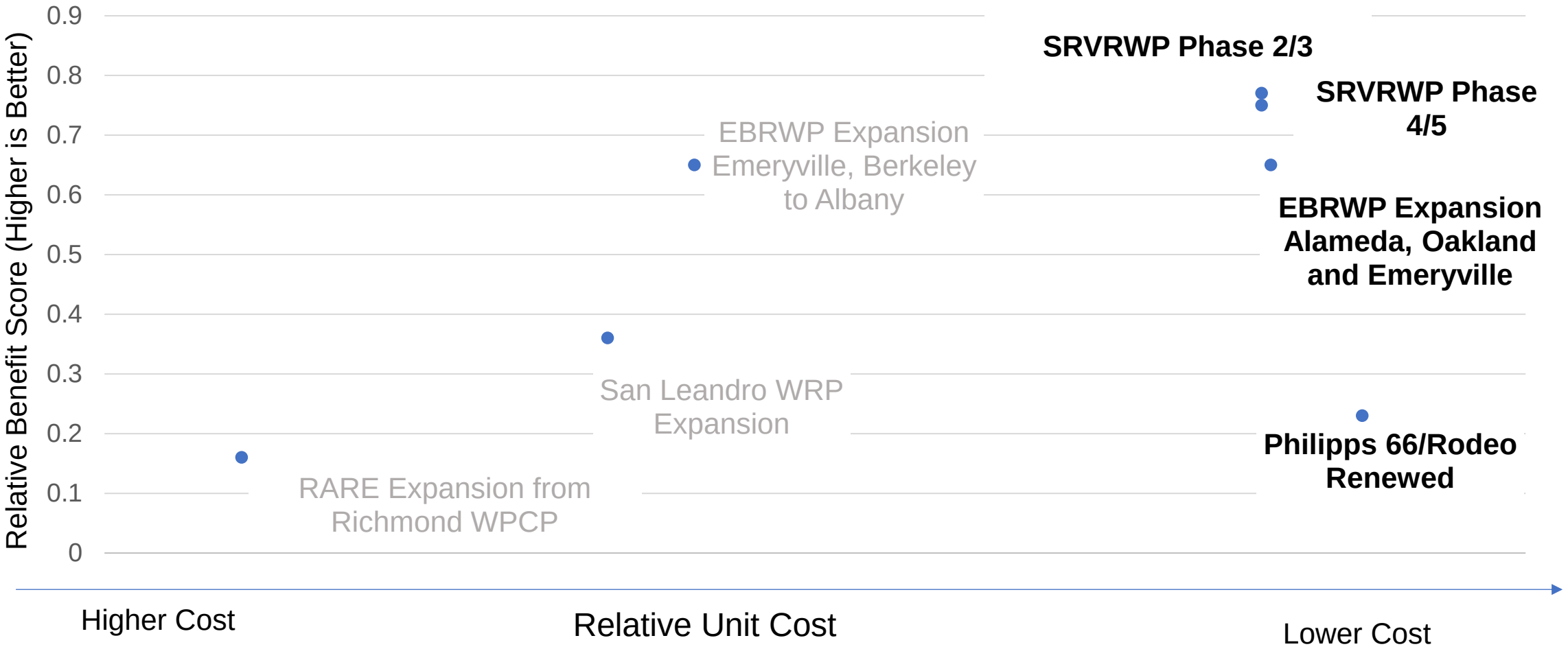
- San Ramon Valley Recycled Water Project
  - Supplemental supply is needed to expand project
  - Central San open to developing long-term agreement to divert wastewater flows to DERWA
  - Additional flows will allow EBMUD to expand to future phases
- Satellite Projects
  - Slower than anticipated pace for customer development of projects
  - Consider removing these projects from recycled water goal but continue to support their efforts
    - Diablo Country Club = 0.2 MGD
    - Rossmoor = 0.5 MGD
    - Sequoyah Country Club = 0.1 MGD
    - University of California at Berkeley = 0.4 MGD

Significant Changes to Non-Potable Reuse Industrial Projects

- Chevron/RARE Water Project
  - Insufficient wastewater supply from West County Wastewater District to meet demands
  - Expensive supply alternatives to route flows from other sources
  - Uncertainty in refinery industry water demands
  - Consider Chevron funding for any project expansion
- Phillips 66/Rodeo Renewed Project
  - Refinery looking to possibly develop on-site reuse project (phase 1)
  - After phase 1 is complete, EBMUD will coordinate with refinery to evaluate phase 2
  - Refinery demands have decreased and there is uncertainty in refinery industry in the future
  - Project approach should avoid stranded assets

RARE = Richmond Advanced Recycled Expansion

Non-Potable Reuse Projects Evaluation Results



EBRWP = East Bayshore Recycled Water Project
SRVRWP = San Ramon Valley Recycled Water Project
RARE = Richmond Advanced Recycled Expansion
WRP = Water Recycling Project
WPCP = Water Pollution Control Plant

Non-Potable Reuse Projects Evaluation Results

Non-Potable Reuse	Outside Funding Source	Future Demand (MGD)	Capital Cost ($)	Every Year Unit Cost ($/AF)	Dry Year Unit Cost ($/AF)
East Bayshore Expansion to Oakland, Alameda, Emeryville	Federal funding authorized (existing $25 M and seeking additional $20 M)	0.7	$34 M (after $25M federal funding)	$3,500	$11,550
Phillips 66/Rodeo Renewed	Potential for refinery funding	2.8	$41 M	$1,500	$5,000
SRVRWP Phases 2 & 3 – San Ramon & Danville		0.8	$32 M	$3,700	$12,200
SRVRWP Phases 4/5 - Blackhawk		0.5	$27 M	$3,700	$12,200
Total		4.8	$134 M		

AF = Acre-Feet
M = Million

Other Non-Potable Reuse Projects Included

Non-Potable Reuse	Outside Funding Source	Future Demand (MGD)	Capital Cost ($)	Every Year Unit Cost ($/AF)	Dry Year Unit Cost ($/AF)
SRVRWP Future Infill		0.3	No District Capital Cost		
RARE (Chevron)	Refinery funding	0.5	No District Capital Cost		
Satellites (On-site)	Customer funding	1.2	No District Capital Cost		
Total		2.0			

AF = Acre-Feet
M = Million

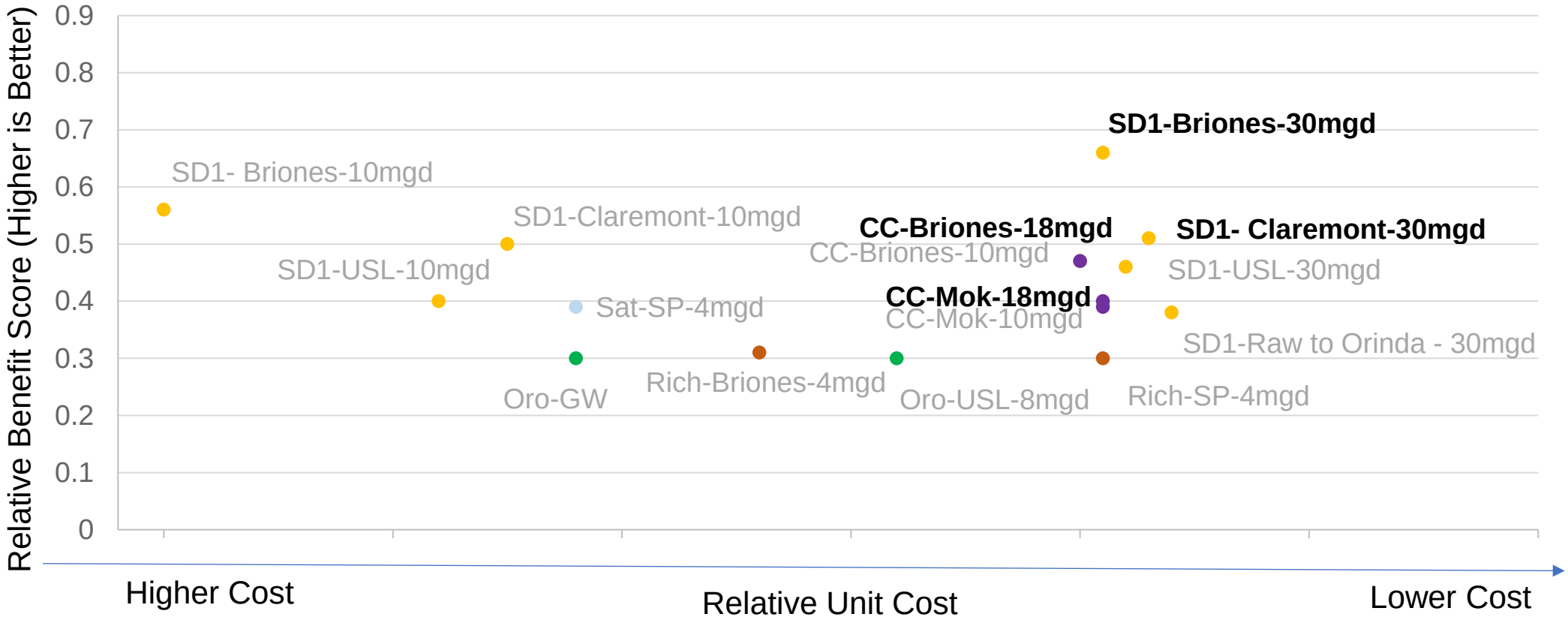
Purified Water Alternatives Review

- Evaluation of alternatives considered:
  - Different supply sources
    - SD-1, Central San, Oro Loma, Richmond
  - Reservoir and groundwater augmentation with purified water
    - Briones, Upper San Leandro, San Pablo, groundwater basin
  - Addition of purified water to drinking water plants, aqueducts, or distribution system
    - Mokelumne aqueducts, Claremont Center, drinking water treatment plants, distribution system

Figure illustrates some of the alternatives evaluated and does not show all alternatives

AWPF = Advanced Water Purification Facility
WPCP = Water Pollution Control Plant
SD-1 = Special District 1

Purified Water Project Alternatives Evaluation Results



USL = Upper San Leandro Reservoir
Mok = Mokelumne Aqueduct
CC = Central Contra Costa Sanitary District
Oro = Oro Loma Sanitary District
Rich = Richmond
Sat = Satellite Plant at Pt Isabel
GW = Groundwater
SP = San Pablo Reservoir
Note: Production shown in Million Gallons per Day

Alternative abbreviations:

- Source water – Integration point – Production capacity (mgd)
- Example: SD1 – Briones – 30 = advanced treatment at SD1, supply conveyed to Briones Reservoir, 30 mgd production capacity

Purified Water Projects Evaluation Results (Potential Alternatives for Further Evaluation)

Purified Water Project	Production (MGD)	Capital Cost ($)	Every Year Unit Cost ($/AF)	Dry Year Unit Cost ($/AF)
Central San to Briones Reservoir (IPR - Reservoir Augmentation)	18	$740 M	$3,700	$12,200
Central San to Mokelumne Aqueduct (DPR - Raw Water Augmentation)	18	$655 M	$3,600	$11,900
SD-1 to Briones Reservoir (IPR - Reservoir Augmentation)	30	$1,210 M	$3,600	$11,900
SD-1 to Claremont Center (DPR - Treated Water Augmentation)	30	$990 M	$3,500	$11,600

AF = Acre-Feet

Changed Conditions

Program	Current RW Demand (MGD)	Previous Forecast of 2040 RW Demand (MGD)	Workshop #1 Draft Forecast of 2040 RW Demand (MGD)	Workshop #2 Updated Forecast of 2040 RW Demand (MGD)
East Bayshore	0.2	2.4	1.8	0.9
San Ramon Valley*	0.8	2.4	2.4	2.4
Chevron Refinery*	6.4	11	11	6.9
Phillips 66/Rodeo Renewed	0	3.7	1.4 to 2.8	1.4 to 2.8
San Leandro Facility	0	0.2	0	0
Satellite Projects	0	0.2	1.1	1.2
Total – Non-Potable Reuse	**7.4**	**20**	**Up to 19**	**Up to 14.2** **Up to 13** (excluding satellite projects)
Potential Range of Potable Reuse	0	0	8-30	18-30

*Supplemental recycled water supply needed to meet recycled water demand.
RW = Recycled Water

Considerations and Challenges

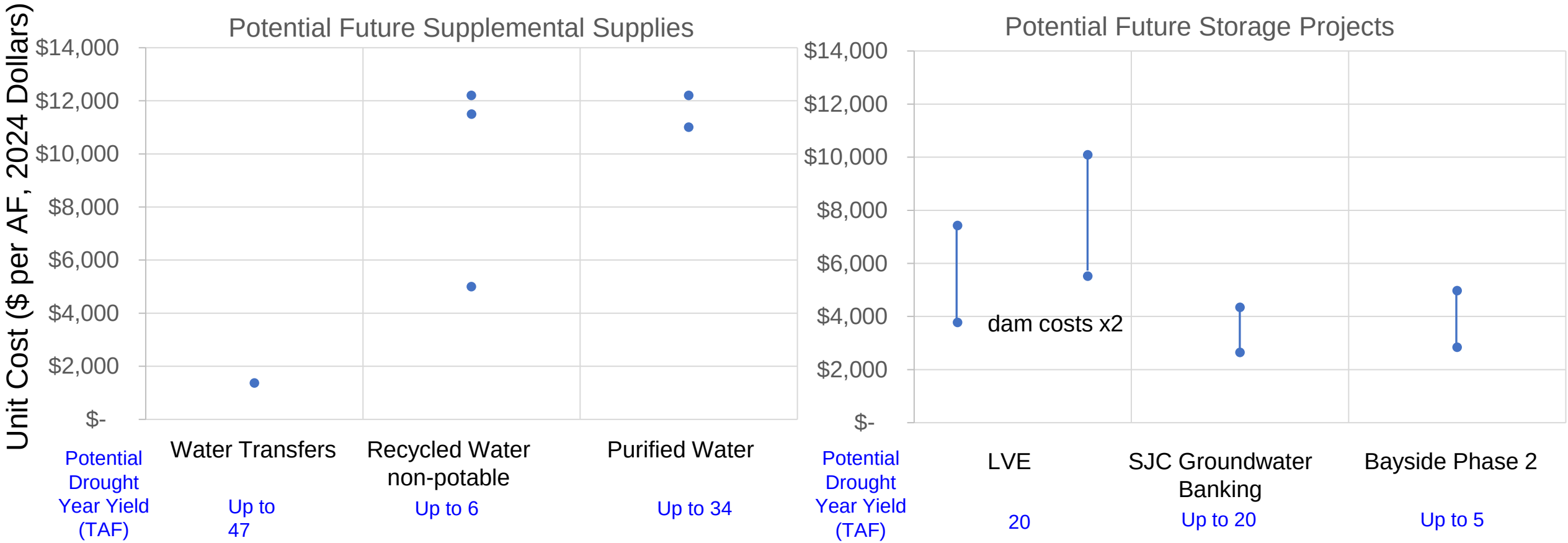
- Due to conservation, declining wastewater flows, and refinery changes:
  - Existing recycled water deliveries have decreased to 7.4 MGD
  - Additional future non-potable reuse is projected at up to 5.6 MGD, excluding satellite projects, instead of 11 MGD
  - Challenging to achieve even the 5.6 MGD of additional non-potable reuse due to future uncertainties and changes
- Reduction in recycled water goal to less than 20 MGD is offset by increase in conservation, so the combined net reduction in demands remains approximately the same
- Purified water is a future opportunity but has significant challenges including high project capital cost ($660 million to $1.2 billion), complex permitting and operations, and need for extensive public outreach

Future Analyses

- Upcoming near-term studies:
  - Update need for water analysis to 2050 to reflect demand changes, availability of supplies, and climate change, to be completed by 2025
  - Update water supply management portfolio (recycled water, conservation, CVP availability, water transfers, groundwater, Los Vaqueros, etc.)
  - Compare recycling to other water supply portfolio elements
  - Update 2025 Urban Water Management Plan (UWMP) with recommendations
- Future studies:
  - 5-year UWMP updates
  - Comprehensive update of the Water Supply Management Program in 2032-2033 with updated need for water and supply options, depending on status of voluntary agreements and conditions of FERC relicensing

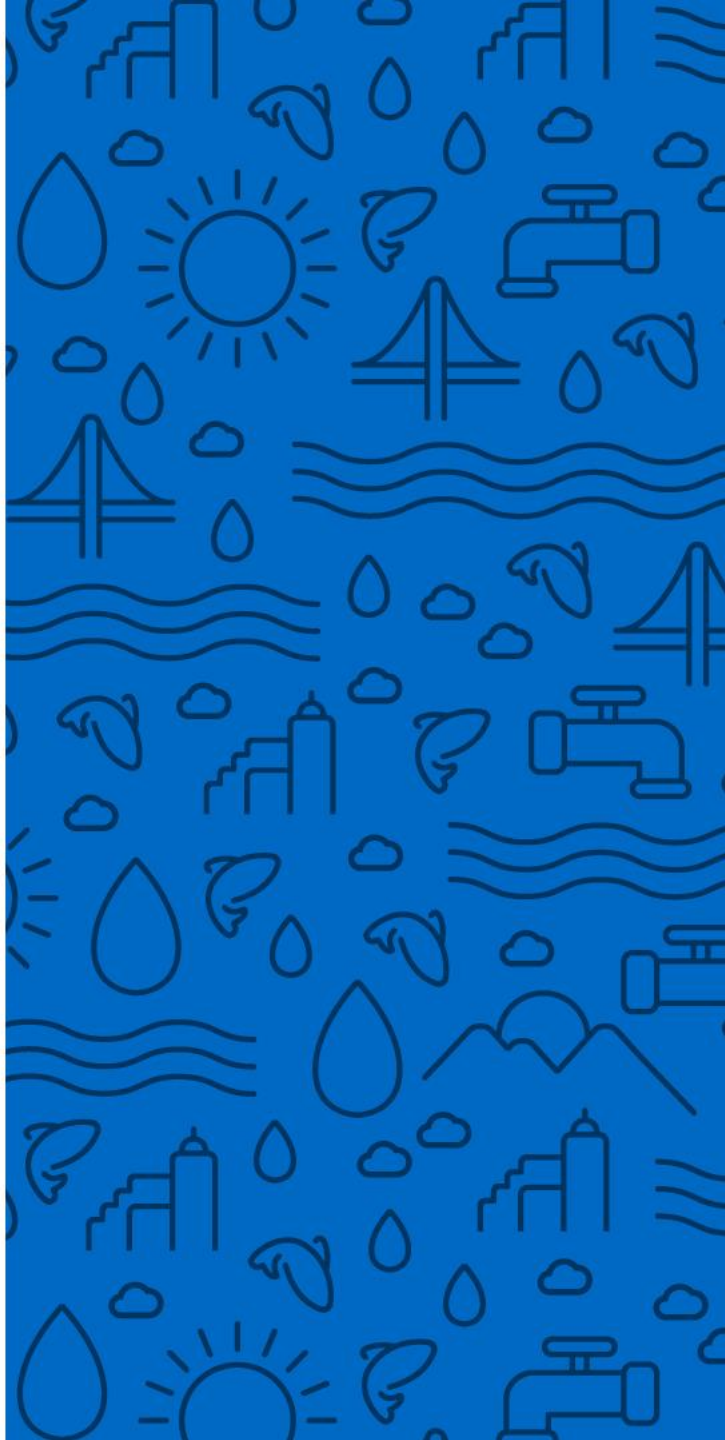
CVP = Central Valley Project, FERC = Federal Energy Regulatory Commission

Preliminary Water Supply Option Costs and Potential Yields (Dry Year Unit Costs)



TAF=Thousand Acre-feet

Recommendations and Next Steps



Options and Considerations

- Option 1: Reduce recycled water goal to 13 MGD of non-potable reuse by 2050
  - Recycled water reduction offset by increase in water conservation savings
  - By 2033 through the comprehensive Water Supply Management Program Update, re-evaluate need for water and supply options, and determine when potable reuse is needed
  - Revise the goal in the future as needed
- Option 2 (Staff's Recommendation): Maintain recycled water goal of 20 MGD, extend to 2050
  - Will need to add potable reuse in the long-term to meet goal
  - By 2033 through the comprehensive Water Supply Management Program Update, re-evaluate need for water and supply options, and determine when potable reuse is needed
  - Revise the goal in the future as needed
- For Options 1 and 2, Develop and implement outreach and education plan in advance to support potential purified water in the future

Next Steps

- Incorporate Board Feedback
- Finalize the Recycled Water Strategic Plan Update by December 2024
- Results and recommendations to be included in the 2025 Urban Water Management Plan

Board and Public Comments

FLOWING INTO THE FUTURE