

# Feasibility Analysis & Portfolios for the Water Supply Alternatives Plan

Board of Public Utilities  
August 17, 2023

Colin Close  
Senior Water Resources Planner

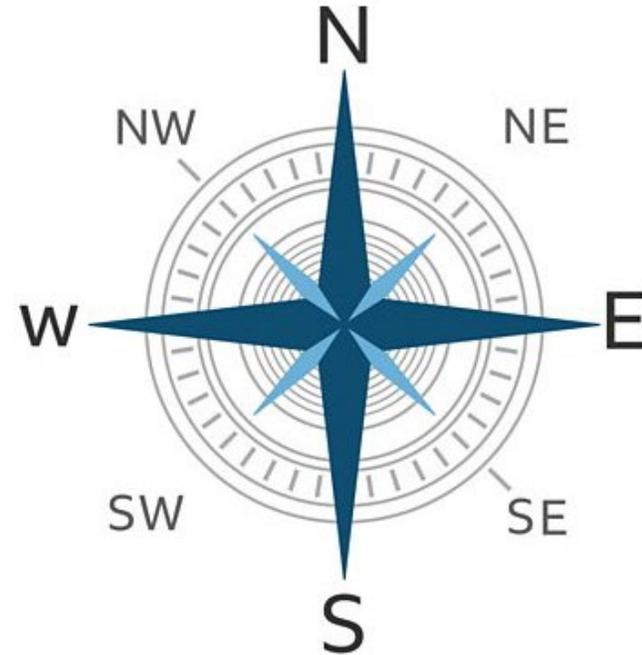
# Purpose for Today

Staff will present

- Final evaluation of supply options
- Draft portfolios (mixes of water supply options to achieve goals)

Seeking Board input on

- Analysis & Evaluation
- Draft Portfolios



# Water Supply Alternatives Plan

## Purpose

Enhance Santa Rosa's water supply resiliency and reliability to mitigate impacts of shortages due to severe droughts and emergencies.

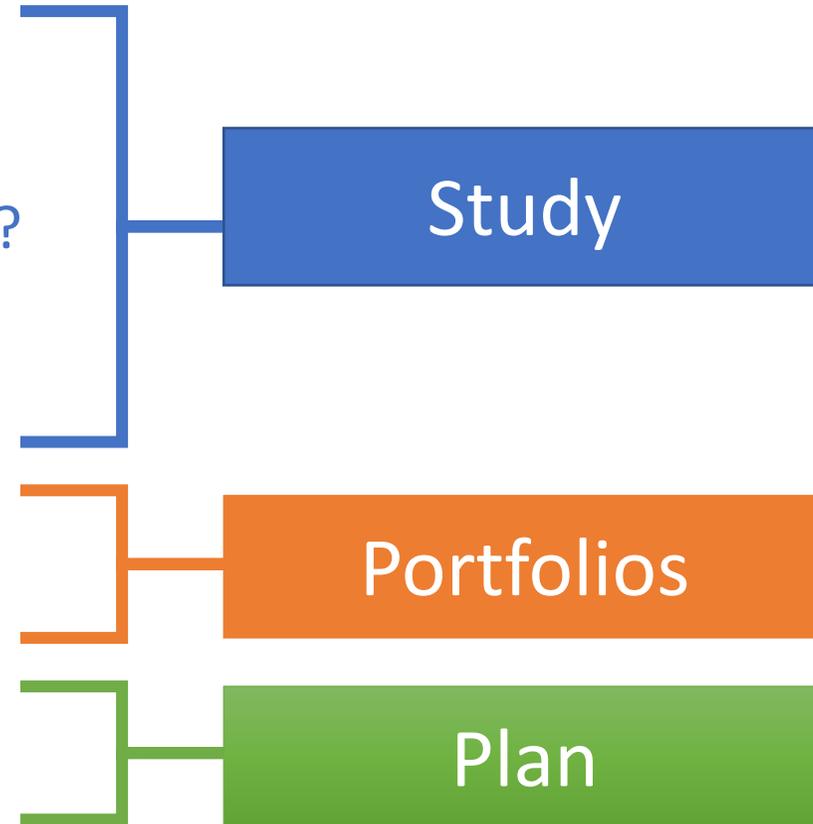
## Approach

Assess the feasibility of new water supply options and develop a plan for increasing resiliency.



# Questions the Project Will Address

- How much new water supply is optimal to mitigate the risk of shortages?
- Which supply options should be studied?
- What criteria should be used to assess each supply option?
- Which mix(es) of options will best help us meet our supply resiliency goal?
- What is the most reasonable and adaptive path forward?



# Project Overview

## ENGAGE STAKEHOLDERS

- ✓ Get input from a wide range of stakeholders, including our community.

## SET OBJECTIVES

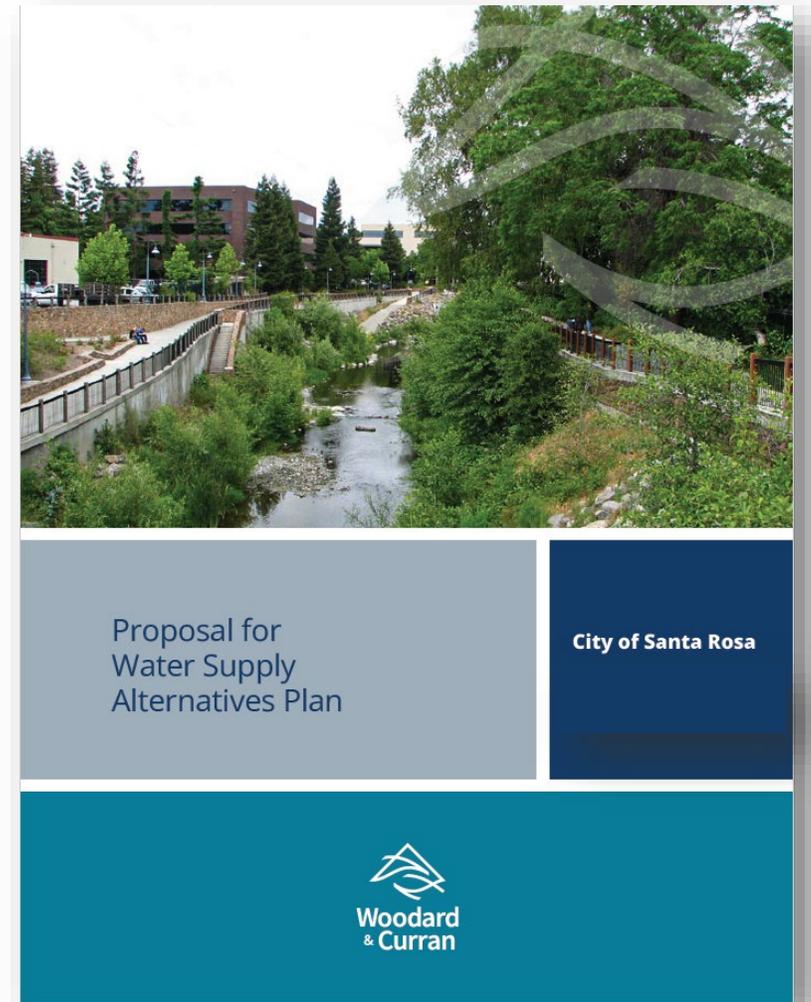
- ✓ Set water supply goals, identify potential supply options, establish criteria and study methods.

## STUDY SUPPLY OPTIONS

- ✓ Study feasibility of potential water supply options.
- Develop and assess portfolios of feasible options.

## DEVELOP A PLAN

- Develop long-term plan for achieving supply goals.



# Water Team

Director Burke

Deputy Directors & Staff

- ✓ Engineering Services
- ✓ Environmental Services
- ✓ Local Operations
- ✓ Regional Operations
- ✓ Water Resources



# Stakeholder Group

- Business & economic interests
- Community & service organizations
- Regional recycled water users
- Environmental & climate interests
- Local resource agencies

1. Calpine
2. Community Action Partnership
3. Los Cien Sonoma County
4. NAACP Santa Rosa
5. North Bay Black Chamber of Commerce
6. North Coast Builders Exchange
7. Recycled Water User – Ag (Berreta)
8. Recycled Water User – Urban (RP)
9. RED Housing Fund
10. Regional Climate Protection Authority
11. Russian River Watershed Association
12. Russian River Water Protection Committee
13. Santa Rosa Metro Chamber of Commerce
14. Santa Rosa Subregional TAC
15. Sonoma Clean Power
16. Sonoma County Alliance
17. Sonoma RCD
18. Sonoma Water

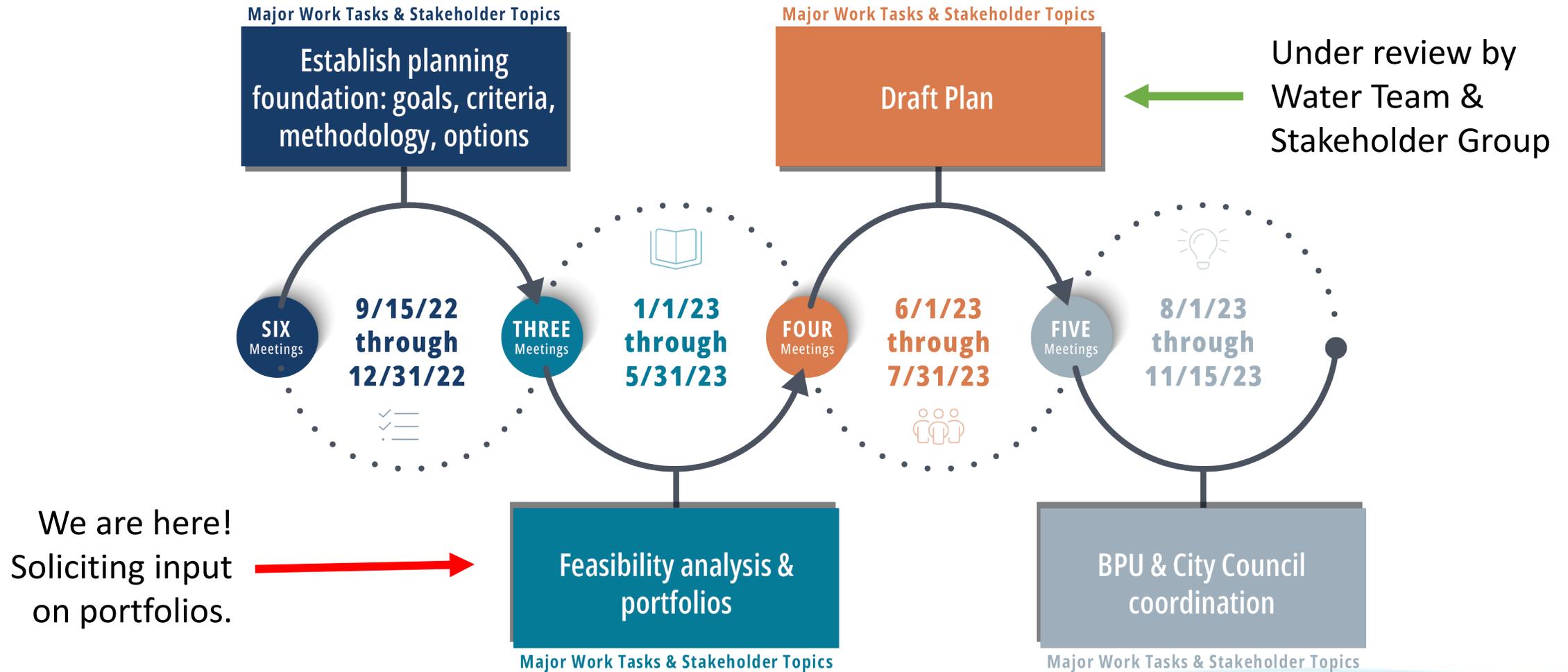
# Work Completed to Date



Understand the foundational work to build the plan

*Katie Cole, Woodard & Curran*

# Project Timeline



# Project Work Update



## Water Team

- 5 working sessions (Oct, Dec, May, Jul, Aug).
- Input on study parameters, study results, portfolios.

## Community

- 3 community webinars (Oct, Jan, Jun). Final: Aug 28.
- Input on study parameters, study results, portfolios.

## Stakeholder Group

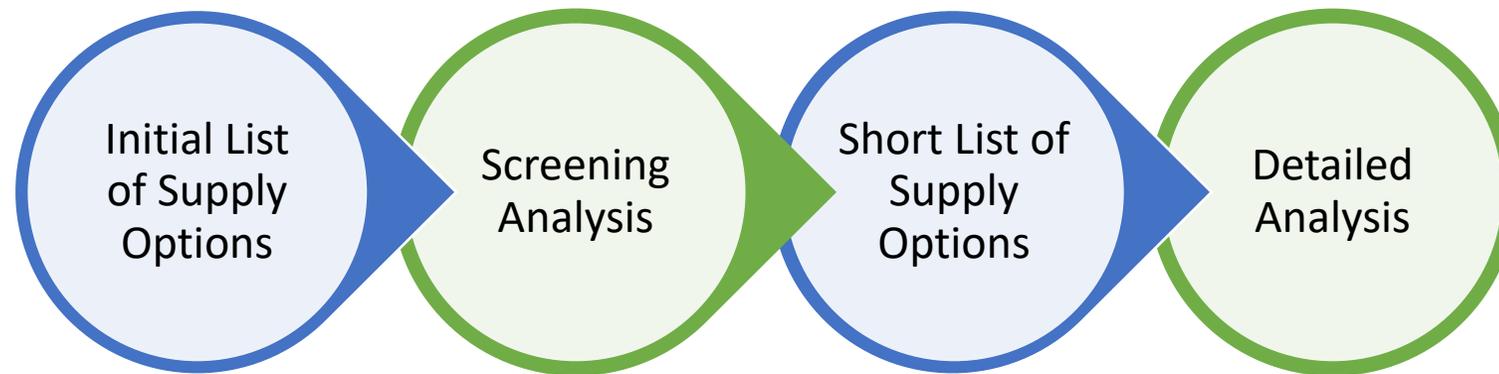
- 4 working sessions (Nov, Dec, May, July).
- Input on study parameters, study results, portfolios.

## Woodard & Curran

- Stakeholder engagement.
- Preparation of deliverables.

# At Our Last Study Session...

- Reviewed study parameters
  - Water Supply Resiliency Goal
  - Supply Options for Study
  - Evaluation Criteria
  - Study Methodology



# Water Supply Option Analysis



Review analysis of water supply options

*Katie Cole, Woodard & Curran*

# Water Supply Resiliency Goals

Diversify and increase city supplies to reduce dependence on Sonoma Water, particularly during Sonoma Water supply shortages or disruption in delivery

## **Mitigate Droughts**

- Produce 30% of city's water demand with city supplies
- About 7,500 acre-feet/year in 2045

## **Mitigate Disasters/Catastrophic Events**

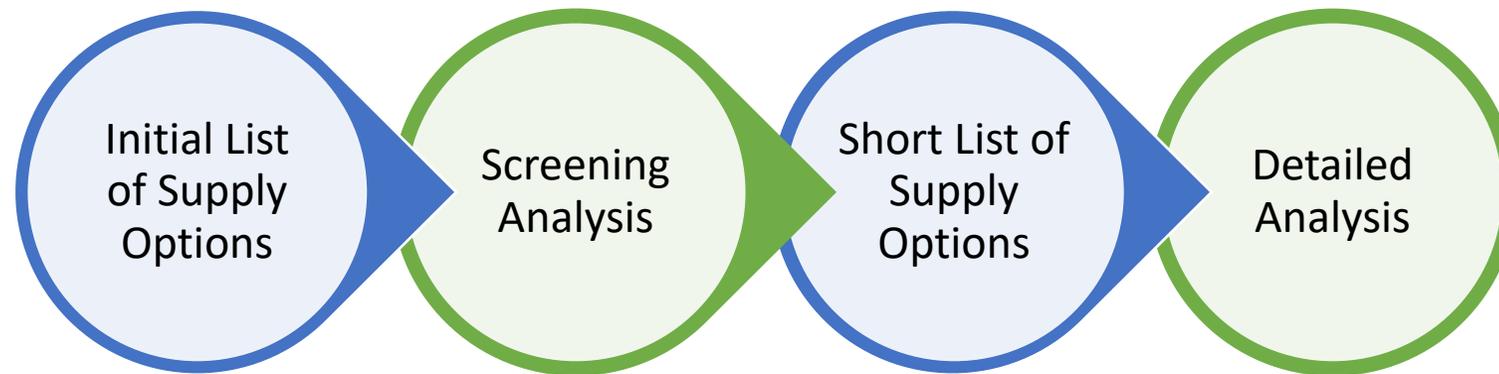
- Produce half of normal domestic/indoor demand with city supplies
- About 9 million gallons per day in 2045

## **Mitigating Peak Day Demand**

- Produce 30% of summer average peak day demand with city supplies
- About 9 million gallons per day in 2045

# Study Methodology

1. Screen all supply options.
  - Use 2 key criteria: high-level assessment of cost effectiveness and scalability.
  - Document reasoning for why supply options advance for further consideration (or not)
  - Yield manageable “short list” of options for detailed analysis.
2. Use defined metrics for each criterion for scoring.
3. Assign weight to each criterion to inform scoring process.



# 18 Options for Initial Assessment

## Groundwater

**GW-1** Additional groundwater extraction wells

**GW-2** Conversion of emergency wells to supply wells

**GW-3** Aquifer Storage and Recovery

**GW-4** Regional groundwater extraction wells

**GW-5** Regional Aquifer Storage and Recovery

## Purified Recycled Water

**PR-1** Produce at Laguna Treatment Plant (direct use)

**PR-2** Produce at a satellite location (direct use)

**PR-3a** Produce at Laguna Treatment Plant and inject into groundwater via aquifer storage & recovery wells (indirect use)

**PR-3b** Produce at Laguna Treatment Plant and add to Lake Ralphine before use (indirect use)

**PR-3c** Produce at Laguna Treatment Plant and add to Lake Sonoma (or alternate) before (indirect) use

**PR-4** Regional purified recycled water

## Nonpotable Recycled

**RW-1** Expand Nonpotable Recycled Water Service

## Desalination

**DE-1** Brackish desalination (likely Regional)

**DE-2** Ocean desalination (Santa Rosa or Regional)

## Surface/Stormwater

**SW-1** Capture excess winter flows from Santa Rosa Creek/ Laguna de Santa Rosa, store in aquifer for later withdrawal

**SW-2** Store excess winter flows from Santa Rosa Creek/Laguna de Santa Rosa, store in enlarged Lake Ralphine, construct water treatment plant to withdraw from Lake Ralphine

**SW-3** Regional Stormwater

## Efficiency Programs to Reduce Demand

**E-1** Aggressive incentives for efficiency programs (turf removal, direct install toilets) to reduce demand

# Rationale for Supply Options

- Retains a broad diversity of options.
- Includes City and Regional projects.
- Includes aggressive efficiency incentives to reduce demand over time.
- Integrates input from Water Team, Community, and Stakeholder Group.

# 13 Options Carried Into Screening Analysis

## Groundwater

**GW-1** Additional groundwater extraction wells

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# Screening Results: 6 Options Removed

Option	Yield (AFY)	\$/AF (At max yield)	Baseline Usage (Average AFY)	\$/AF (Baseline Scenario)	Annual O&M (\$/Year)
GW-1	10,080	\$700	6,734	\$843	\$3M
GW-2	2,462	\$452	1,744	\$540	\$0.7M
GW-3	5,130	\$2,400	3,634	\$2,600	\$9M
<del>PR-1</del>	<del>10,065</del>	<del>\$2,050</del>	<del>4,131</del>	<del>\$3,600</del>	<del>\$10M</del>
PR-2	10,065	\$2,150	4,131	\$3,900	\$10M
<del>PR-3a</del>	<del>10,065</del>	<del>\$2,700</del>	<del>4,131</del>	<del>\$4,800</del>	<del>\$13M</del>
<del>PR-3c</del>	<del>10,065</del>	<del>\$3,350</del>	<del>4,131</del>	<del>\$6,430</del>	<del>\$14M</del>
PR-4	10,065	\$1,850	4,131	\$3,200	\$10M
<del>RW-1</del>	<del>3,000</del>	<del>\$8,800</del>	<del>3,000</del>	<del>\$8,800</del>	<del>\$1M</del>
<del>DE-1</del>	<del>10,080</del>	<del>\$1,200</del>	<del>4,441</del>	<del>\$2,000</del>	<del>\$5M</del>
<del>DE-2</del>	<del>10,080</del>	<del>\$2,700</del>	<del>4,441</del>	<del>\$4,500</del>	<del>\$13M</del>
SW-1	10,080	\$1,135	2,600	\$3,500	\$4M
E-1	2,145	\$2,500	2,145	\$1,000	\$6M

# Rationale for Screening

- Retains options that rank higher on cost-effectiveness and scalability.
- Keeps options that further diversify portfolio (stormwater, satellite purified water).
- Includes City and Regional projects.
- Includes aggressive efficiency incentives to reduce demand over time.
- Integrates input from Water Team, Community, and Stakeholder Group.

# 7 Options Underwent Further Analysis

- GW-1: Add Extraction Wells
- GW-2: Convert Emergency Wells to Production Wells
- GW-3: Add Aquifer Storage & Recovery Wells
- PR-2: Satellite Direct Potable Reuse
- PR-4: Regional Direct Potable Reuse at Laguna Treatment Plant
- SW-1: Stormwater Storage in Aquifer
- E-1: Efficiency Programs

# Criteria and Weights Used for Evaluation

Criterion	How assessed	Weight	Score Multiplier
Cost effectiveness	Capital and O&M costs	High	5
Scalability	Can capacity be tailored to need? Can actual production be tailored to need?	High	5
Resiliency	How well does the option perform if future conditions differ from projected?	High	3
Equity	Does option avoid disproportionate impact on vulnerable communities?	High	3
Environmental performance	Does option minimize adverse effects?	High	3
Legal, permitting, and regulatory	Does the option face major implementation challenges? Consider level of mitigation required.	Med	1
City control and interagency coordination	Would the City be able to tailor to meet City priorities?	Med	1
Multi-benefit	Does the project provide multiple benefits?	Med	1

# Results of Qualitative Scoring

(Higher Score is Better)

Criterion	Groundwater			Purified Recycled Water		Stormwater	E-1: Efficiency Programs
	GW-1: Add Extraction Wells	GW-2: Convert Emergency Wells	GW-3: City ASR Wells	PR-2: Satellite DPR	PR-4: Regional DPR	SW-1: Stormwater Storage in Aquifer	
Cost effectiveness	2	2	2	0	0	0	1
Scalability	2	0	1	2	2	1	1
Resiliency	1	1	2	2	2	1	1
Equity	2	2	2	1	0	1	0
Environmental performance	1	2	1	0	1	1	2
Legal, permitting, and regulatory	1	2	0	0	0	1	2
City control and interagency coordination	2	2	1	2	0	2	2
Multi-benefit	0	0	1	0	0	2	1
<b>Total Unweighted</b>	<b>11</b>	<b>11</b>	<b>10</b>	<b>7</b>	<b>5</b>	<b>9</b>	<b>10</b>
<b>Total Weighted</b>	<b>35</b>	<b>29</b>	<b>32</b>	<b>21</b>	<b>19</b>	<b>19</b>	<b>24</b>

# Draft Portfolios



Review draft portfolios & analysis

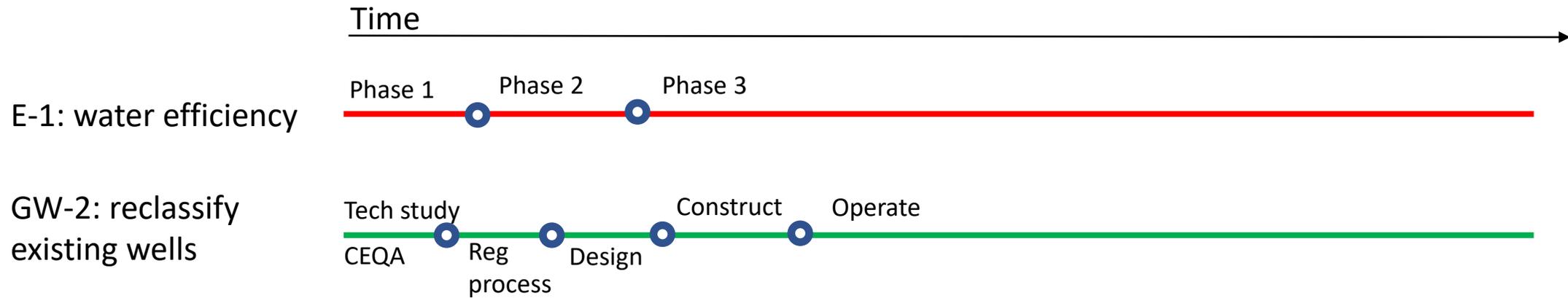
*Katie Cole, Woodard & Curran*

# Rationale for Portfolio Development

- Uses variety of themes to capture different outcomes: least cost, fastest implementation, most water, most flexibility.
- Uses options scoring well in multiple portfolios (efficiency & converting emergency wells).
- Includes options that further diversify portfolio (stormwater, satellite purified water).
- Reflects various implementation logic for portfolio components.
- Integrates input from Water Team, Community, and Stakeholder Group.

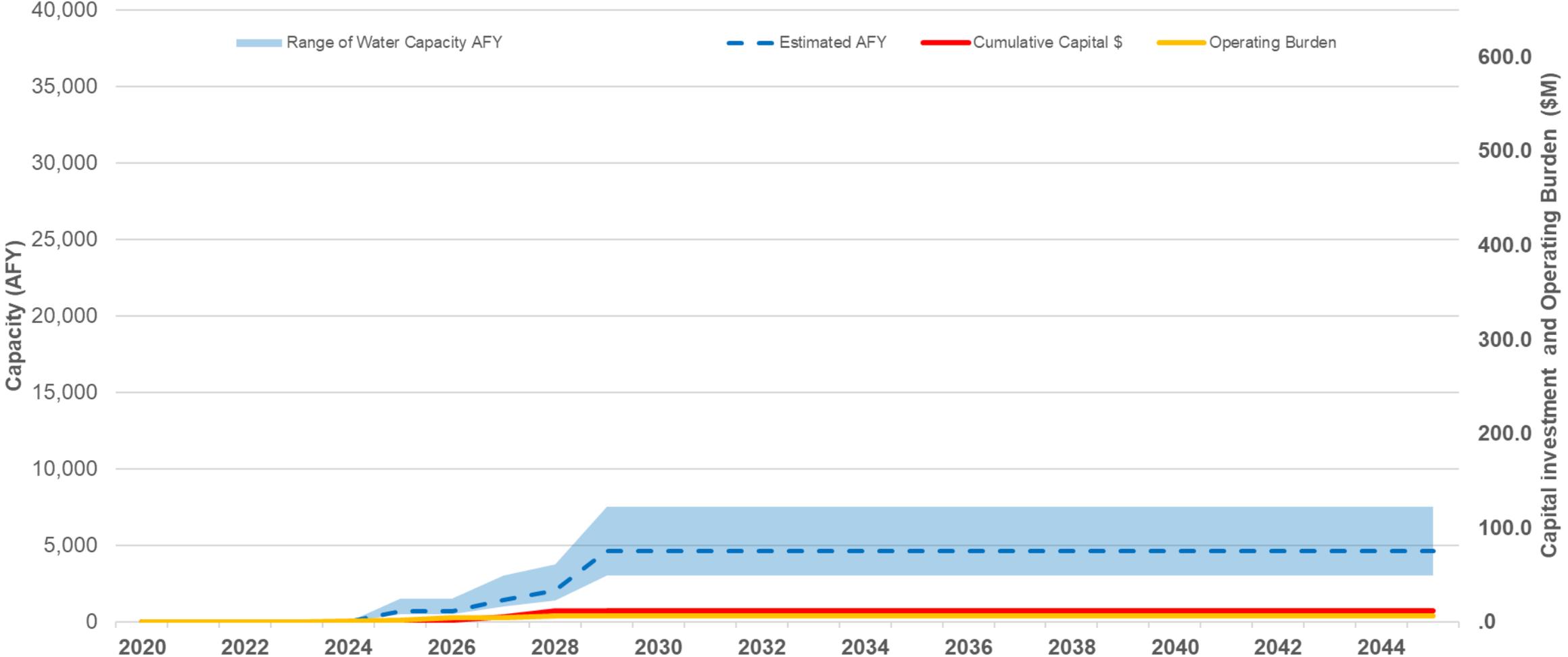
<b>DRAFT PORTFOLIOS (prior to input from Water Team &amp; Stakeholder Group)</b>	<b>Portfolio 1 Most Economical</b>	<b>Portfolio 2 Fastest Implementation</b>	<b>Portfolio 3 Maximizes Water</b>	<b>Portfolio 4 Adaptive</b>
<b>GW-1: Add Extraction Wells (Up to 12)</b>		X	X	Consider
<b>GW-2: Convert Emergency Wells to Production Wells</b>	X	X	X	X
<b>GW-3: Add Aquifer Storage &amp; Recovery Wells</b>				
<b>PR-2: Satellite Direct Potable Reuse</b>			X	Consider
<b>PR-4: Regional Direct Potable Reuse at Laguna Treatment Plant</b>				
<b>SW-1: Stormwater Storage in Aquifer</b>			Study further	
<b>E-1: Efficiency Programs</b>	X	X	X	X

# Implementation Concept for Portfolio #1

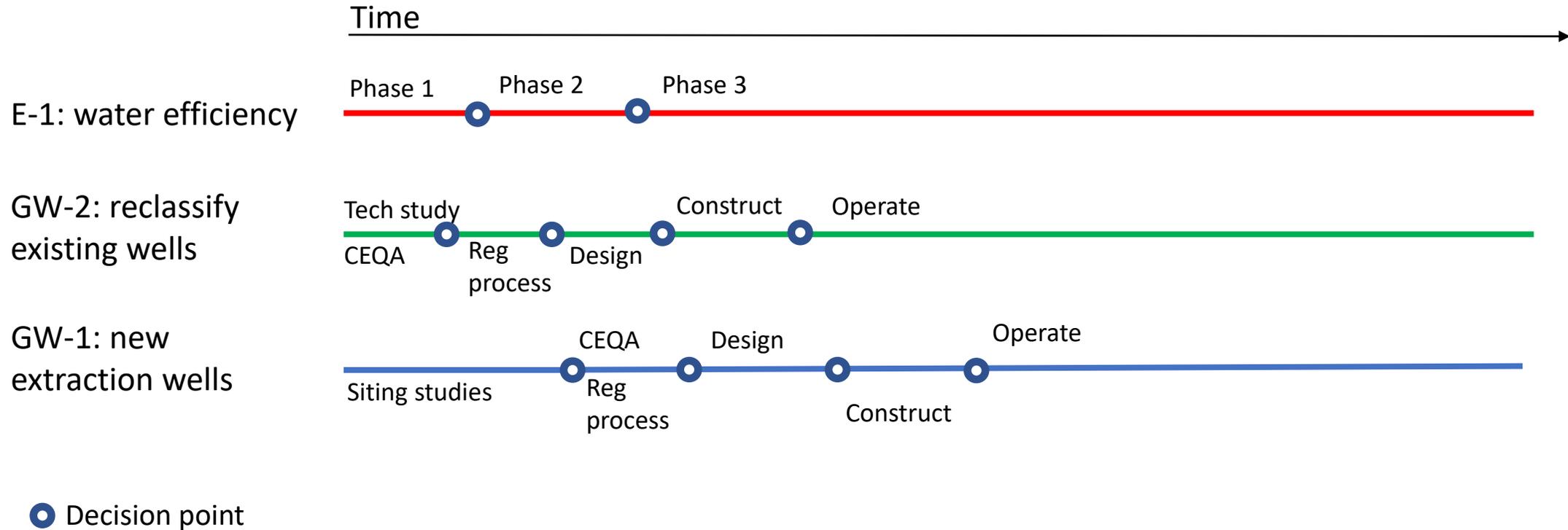


● Decision point

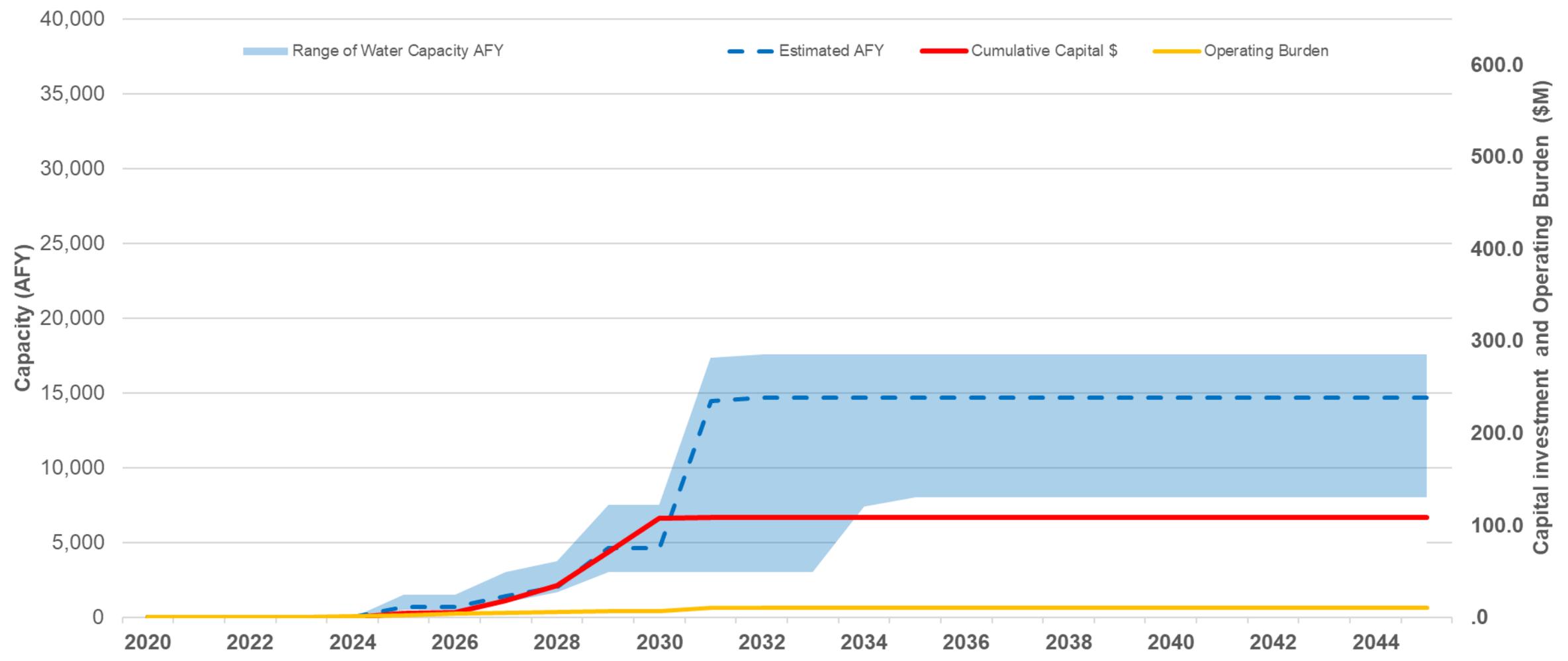
# Portfolio 1



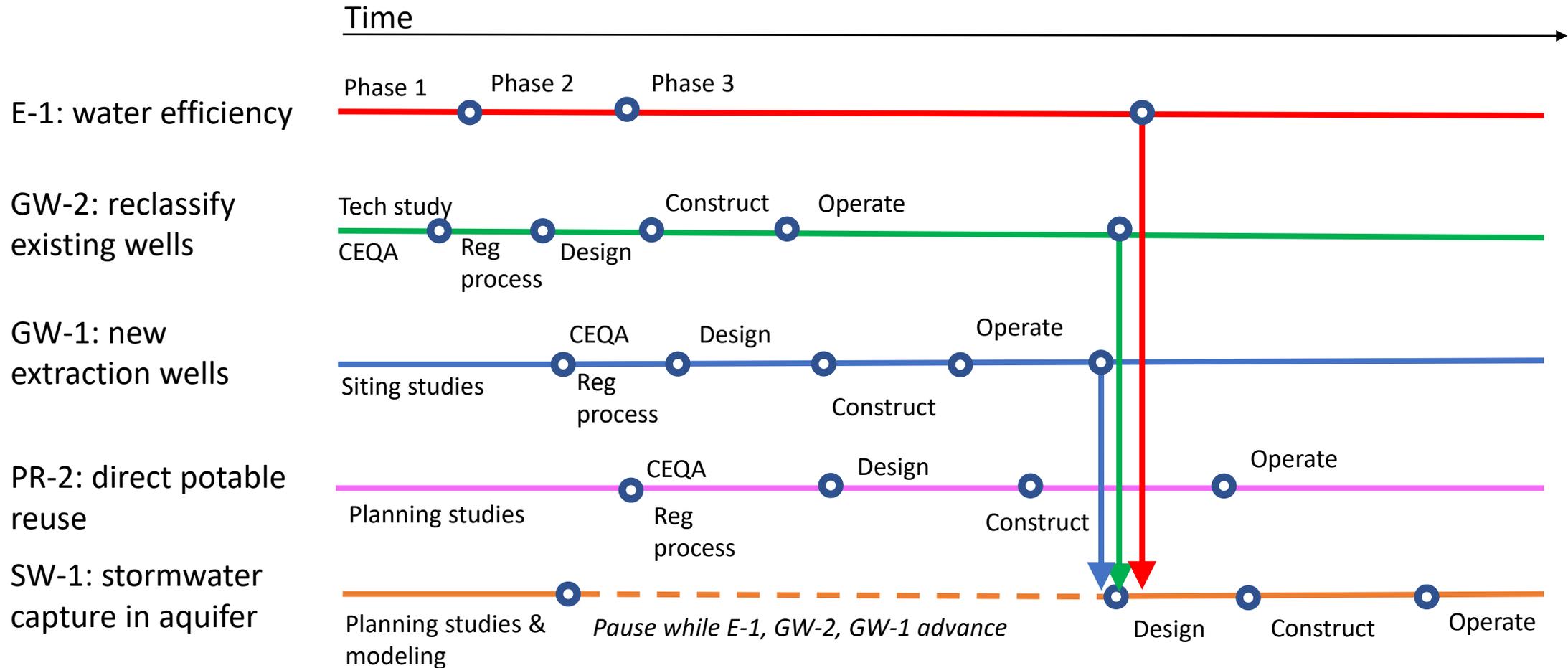
# Implementation Concept for Portfolio #2



# Portfolio 2

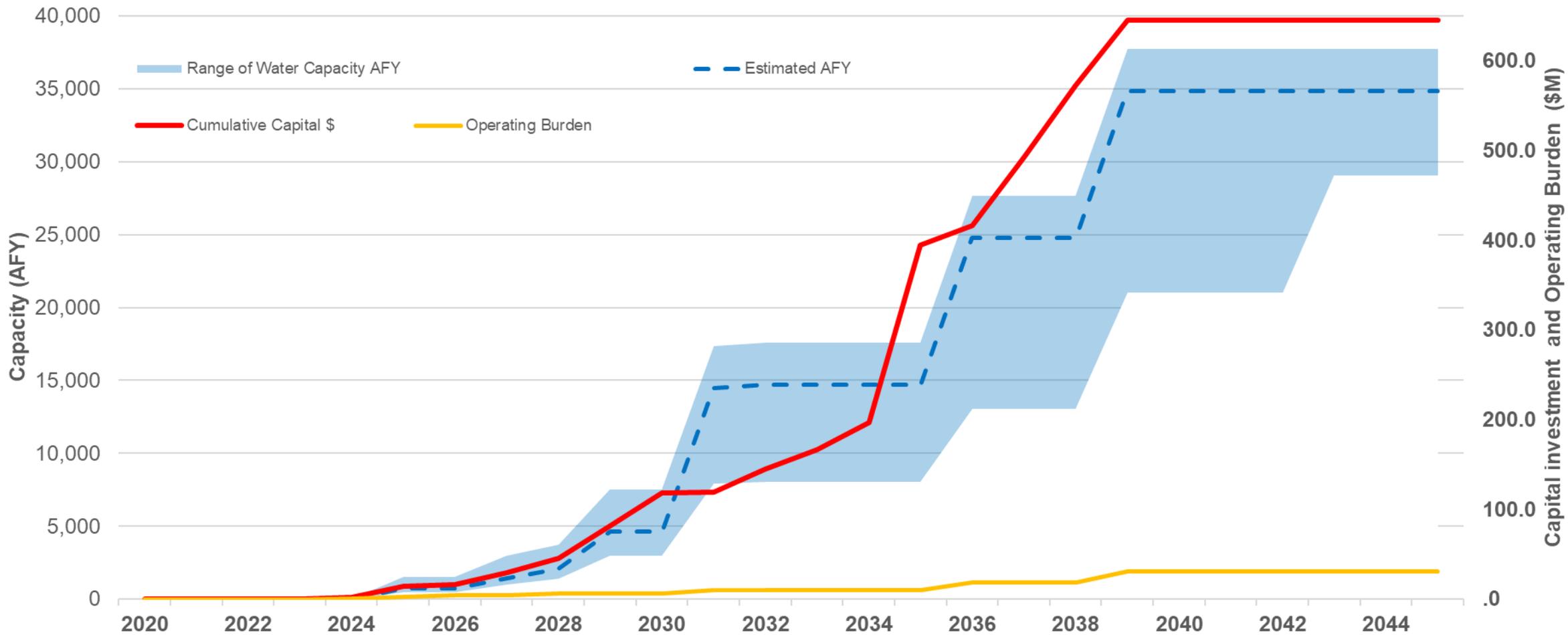


# Implementation Concept for Portfolio #3

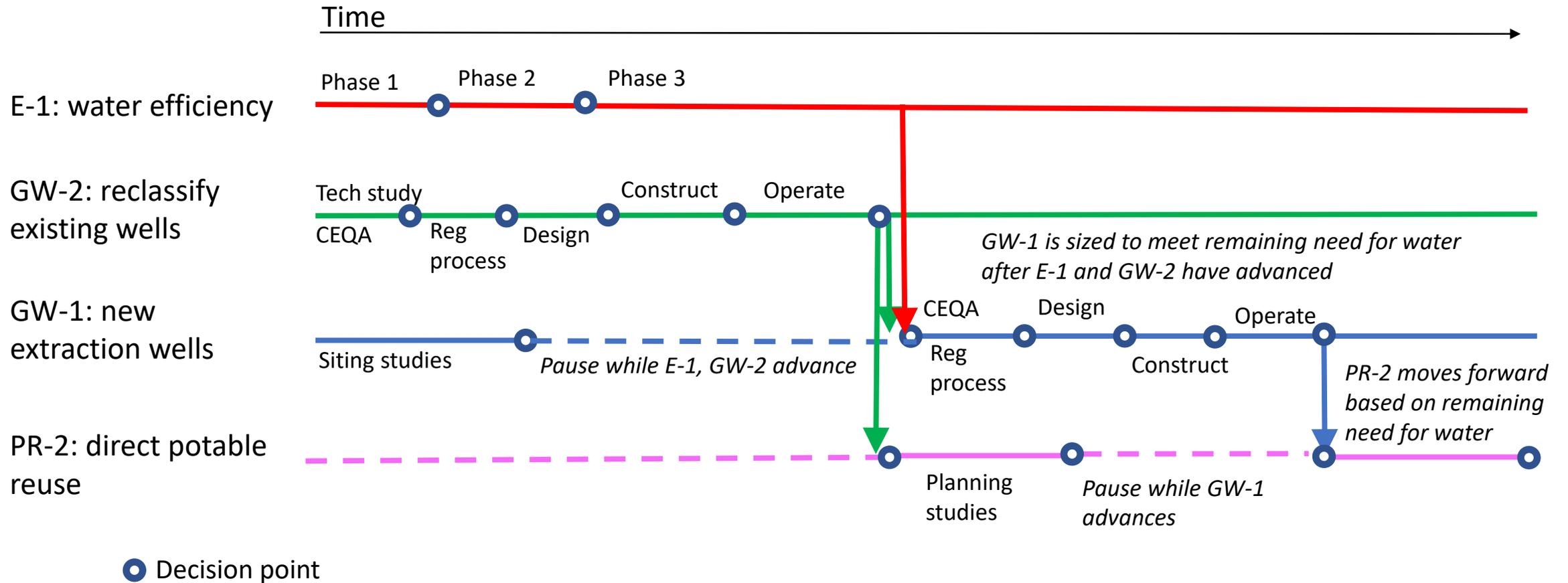


● Decision point

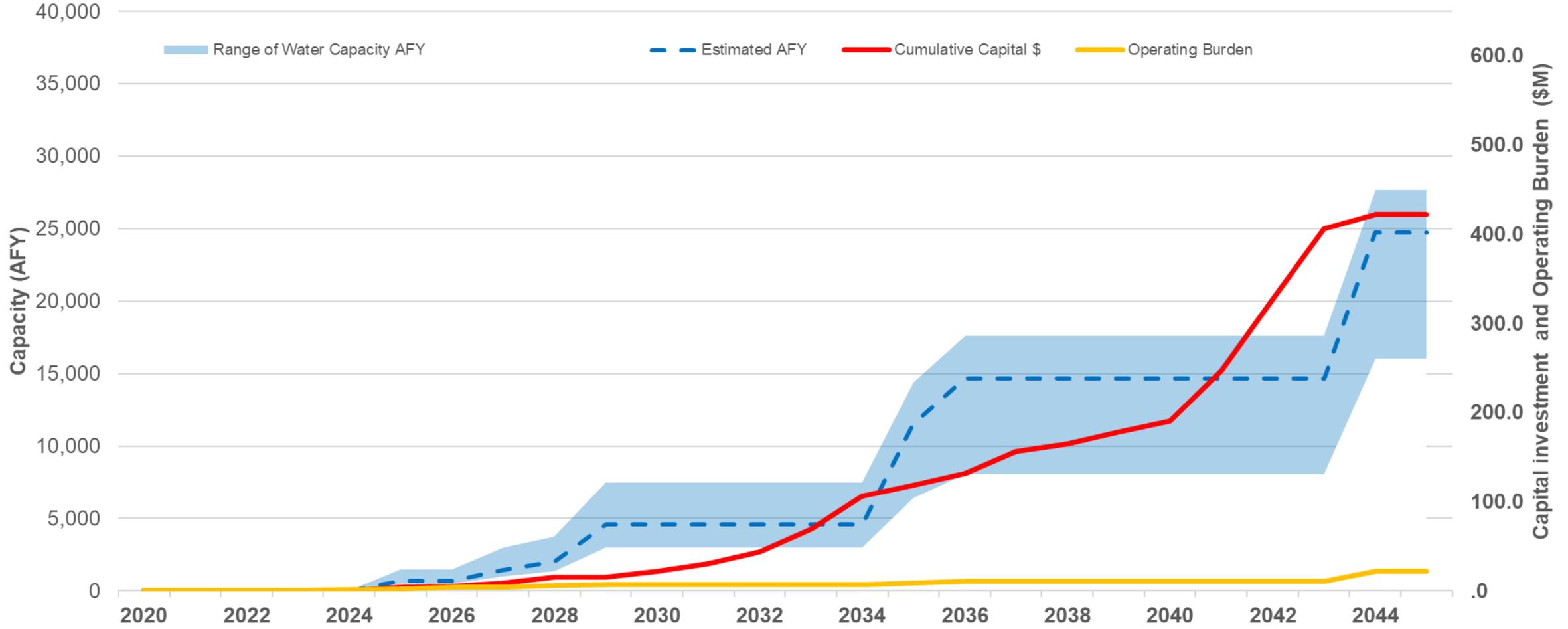
### Portfolio 3



# Implementation Concept for Portfolio #4



# Portfolio 4



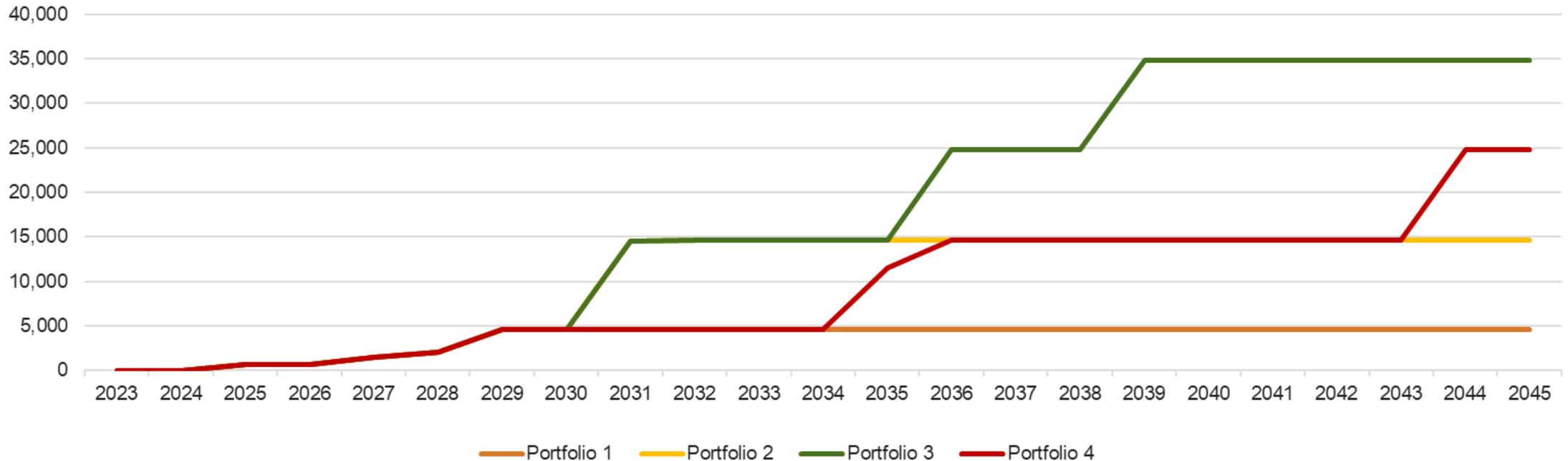
# Benefits to Adaptive Portfolio Planning

- Each component (project) has well-defined milestones at which the project can be refined
  - Example: water use efficiency phases
- Timing and scale of later projects are informed by the remaining need for water based on experience with earlier projects
  - Example: potable reuse
- Early, inexpensive tasks are done off the critical path even if a project's timing and scale may depend on earlier projects
  - Example: siting and geotechnical studies for new groundwater wells

# Comments from Stakeholder Group on Portfolio 4

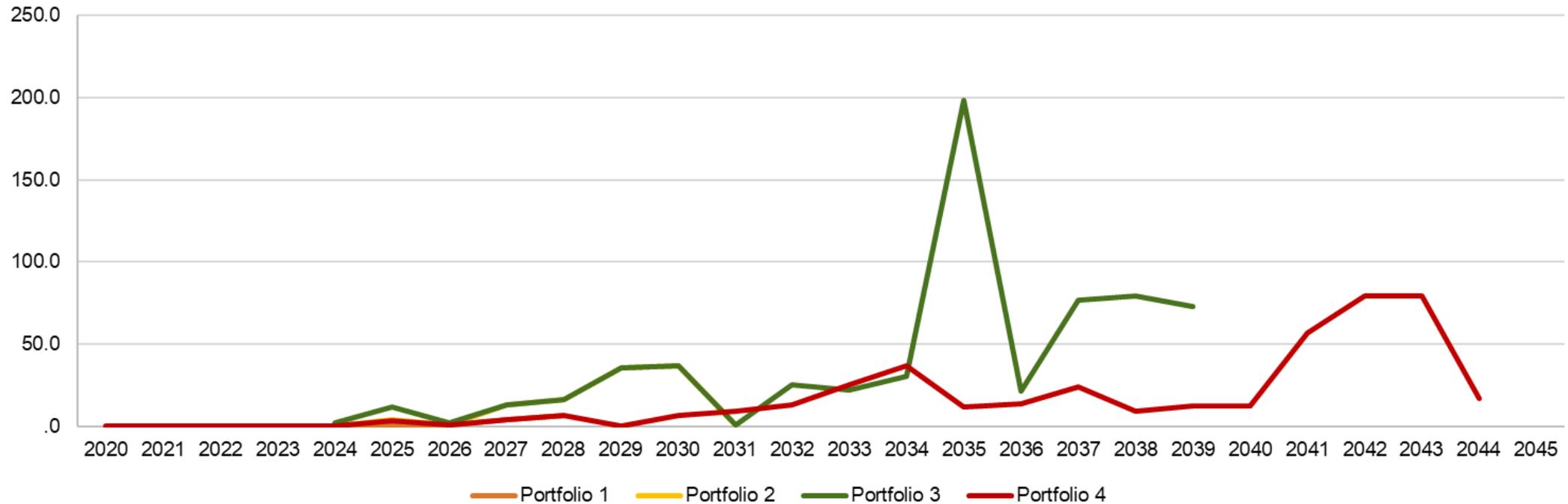
- Portfolio should include more supply options to allow greater flexibility and increase regional and basin sustainability
- City needs to be ready to quickly move in any direction:
  - Groundwater siting studies – consider sites eligible for extraction wells and ASR wells to support basin sustainability
  - Potable reuse studies – consider partnerships/regional collaboration
  - Stormwater capture/use studies – consider ASR and potable reuse, as well as locations for groundwater recharge for basin sustainability (and flood risk reduction)

# Cumulative Estimated Water Yield (AFY)



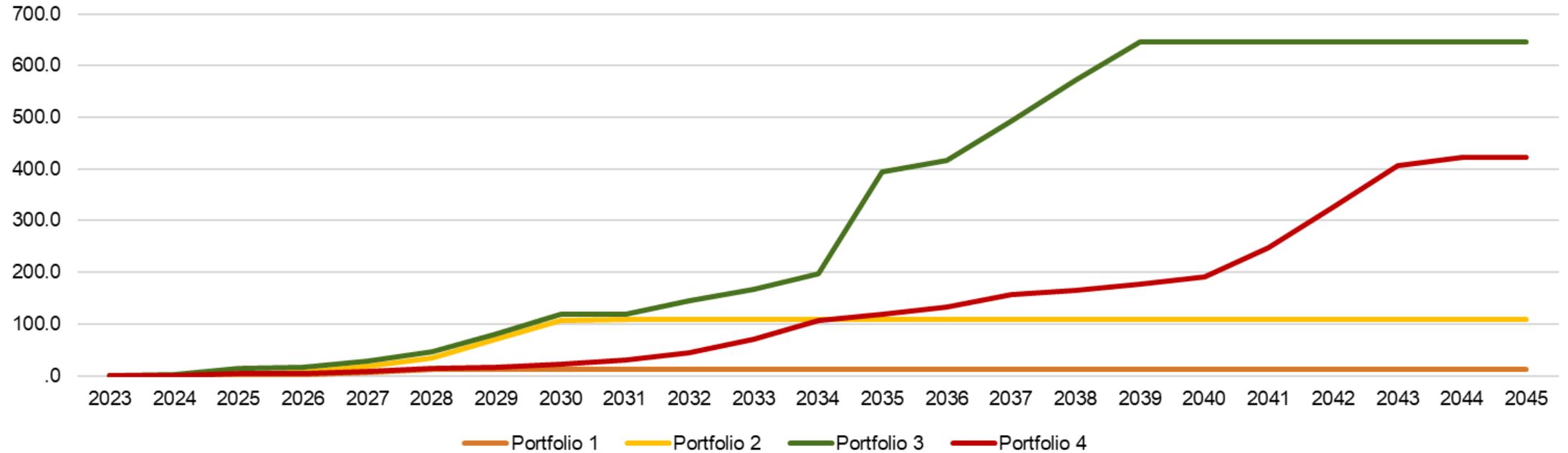
	E-1 Water Efficiency	GW-2 Reclassify Existing Wells	GW-1 New Extraction Wells	PR-2 Direct Potable Reuse	SW-1 Stormwater Capture
<b>Portfolio 1</b>	X	X			
<b>Portfolio 2</b>	X	X	X		
<b>Portfolio 3</b>	X	X	X	X	Study further
<b>Portfolio 4</b>	X	X	Consider	Consider	

# Capital Funding Needs by Year (\$M/yr)



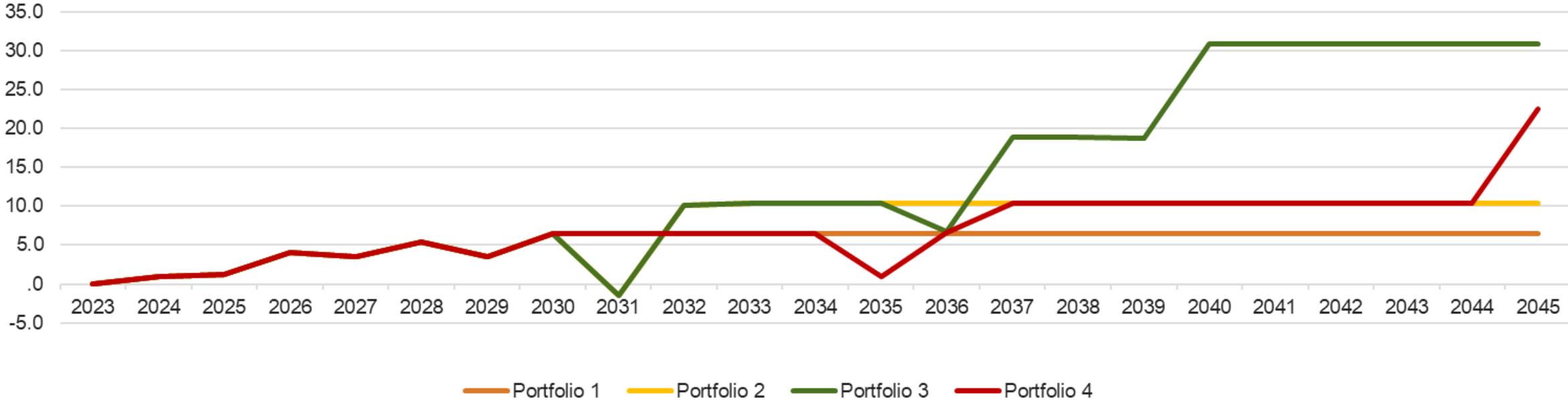
	E-1 Water Efficiency	GW-2 Reclassify Existing Wells	GW-1 New Extraction Wells	PR-2 Direct Potable Reuse	SW-1 Stormwater Capture
Portfolio 1	X	X			
Portfolio 2	X	X	X		
Portfolio 3	X	X	X	X	Study further
Portfolio 4	X	X	Consider	Consider	

# Cumulative Capital Investment (\$M/yr)



	E-1 Water Efficiency	GW-2 Reclassify Existing Wells	GW-1 New Extraction Wells	PR-2 Direct Potable Reuse	SW-1 Stormwater Capture
<b>Portfolio 1</b>	X	X			
<b>Portfolio 2</b>	X	X	X		
<b>Portfolio 3</b>	X	X	X	X	Study further
<b>Portfolio 4</b>	X	X	Consider	Consider	

# Net Operating Burden (\$M/yr)



	E-1 Water Efficiency	GW-2 Reclassify Existing Wells	GW-1 New Extraction Wells	PR-2 Direct Potable Reuse	SW-1 Stormwater Capture
<b>Portfolio 1</b>	X	X			
<b>Portfolio 2</b>	X	X	X		
<b>Portfolio 3</b>	X	X	X	X	Study further
<b>Portfolio 4</b>	X	X	Consider	Consider	

# Next Steps



Review of next steps

*Colin Close, Santa Rosa Water*

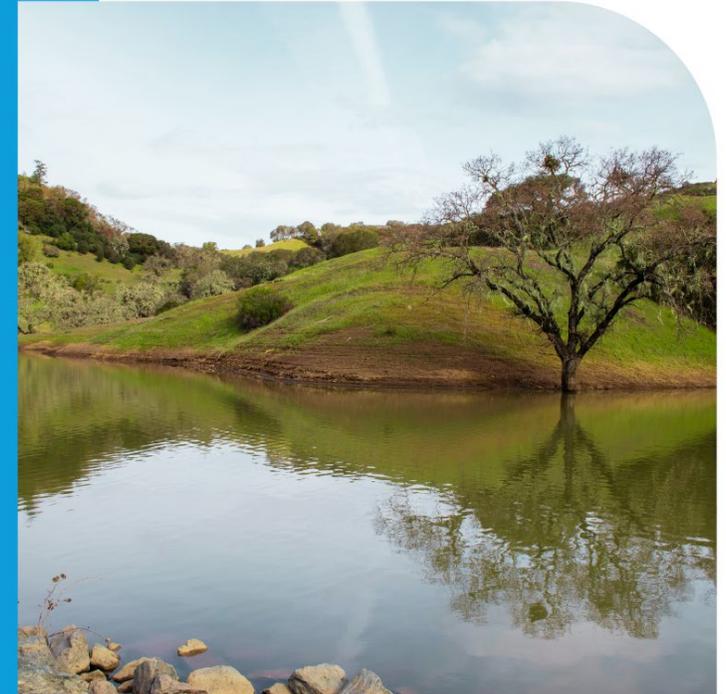
# Project Timeline and Milestones

WORKING SESSIONS	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	
Water Team	WT		WT					WT		WT	WT			
Stakeholder Group		SG	SG					SG		SG				
BPU				BPU							BPU	BPU	BPU	
Council												CC	CC	
Community	Com			Com					Com		Com			
KEY DELIVERABLES	<ol style="list-style-type: none"> <li>Supply goals</li> <li>Supply options</li> <li>Criteria &amp; methods</li> </ol>			<ol style="list-style-type: none"> <li>Feasibility study report</li> <li>Synopsis of portfolios</li> </ol>						<ol style="list-style-type: none"> <li>Working draft Plan</li> <li>Admin draft Plan</li> <li>Final Plan</li> </ol>				

# Community Meeting #4 – Our Water Future



OUR FUTURE IN EVERY DROP



**Exploring  
Opportunities for  
Our Water Future**

Monday, August 28<sup>th</sup> from 5:00-7:00 PM via Zoom

- Project update
- Water supply portfolios
- Community comments
- Q&A
- Live Spanish interpretation



More information & registration link  
[srcity.org/OurWaterFuture](https://srcity.org/OurWaterFuture)

# Discussion/Direction

Seeking Board questions on information presented.

Seeking Board input on the draft portfolios:

- Is the Board supportive of 7 water supply options included?
- Is the Board supportive of the portfolio approach, which provides adaptive path for decision making and implementation?

