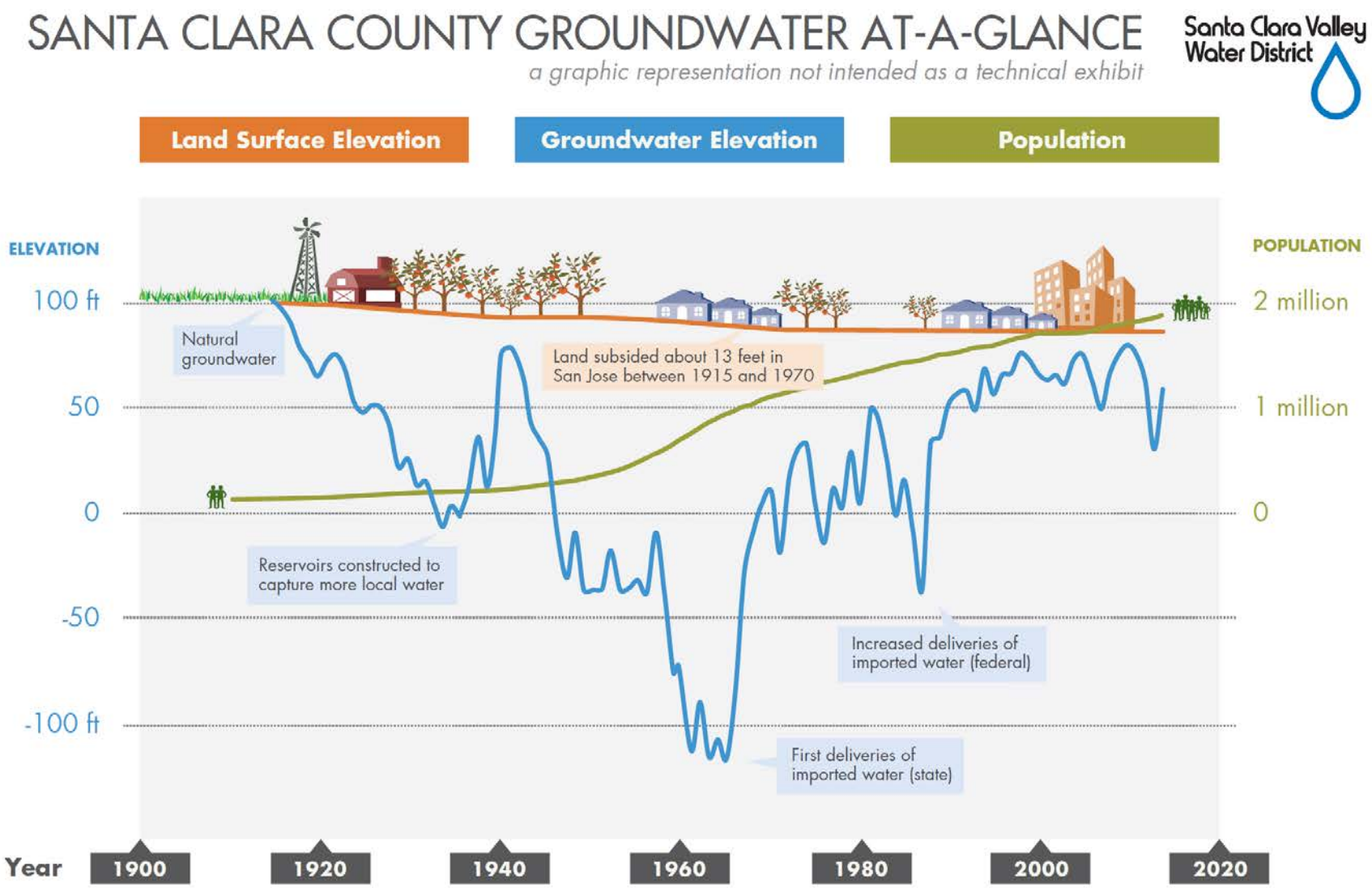
Water Supply Master Plan Update

January 31, 2017

Santa Clara Valley Water District

Long history of investments in reliability



Water supply planning driven by Board policy

E-2.1 – "Current and future water supply for municipalities, industries, agriculture, and the environment is reliable"

EL-4.2 – "[A BAO shall] spend in ways that are cost-efficient"

S-2.1- "Develop supplies to meet at least 100 percent of demands in the Urban Water Management Plan in non-drought years and 90 percent of demands in drought years"

Recommendations

- Receive information on the updated long-term water supply outlook
- Receive and discuss risk assessment results
- Discuss level of service goal
- Receive and discuss information on preliminary project and portfolio analyses
- Receive and discuss information on potential storage options

Summary of Findings to Date

- Investments above currently planned investments are needed to meet current level of service goal
- Level of service goal determines the level of investment needed
- No individual project meets the current level of service goal – need to consider portfolios and full range of benefits
- Some additional investment decisions will be required in the next 6-18 months

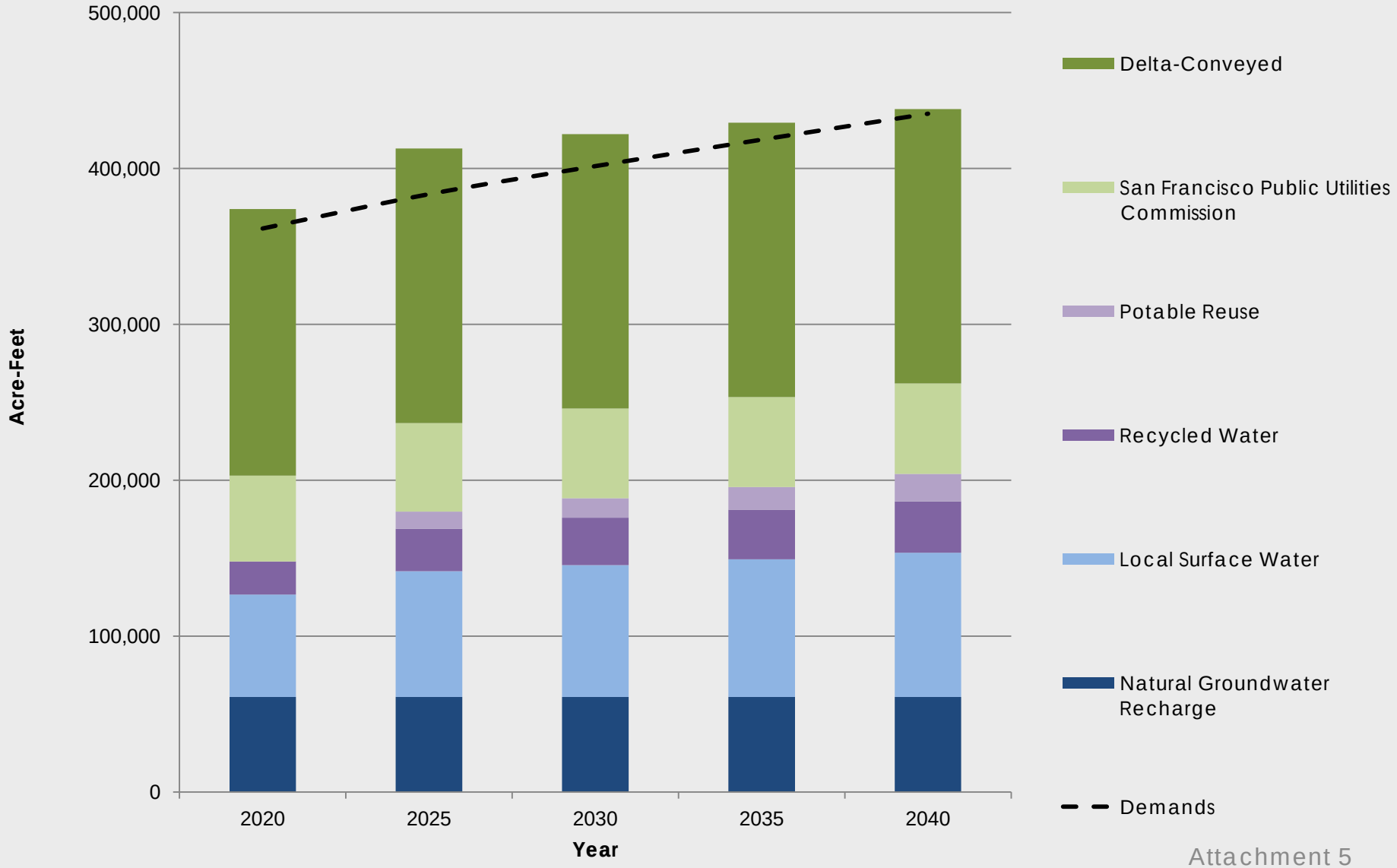
A. Long-Term Water Supply Outlook

Key Baseline Scenario Assumptions

- Dam seismic retrofits complete by 2025
- 24,000 AFY of potable reuse capacity by 2025
- 99,000 AFY of long-term water conservation savings by 2030
- Retailer projections from final 2015 UWMPs
- FAHCE flow and release requirements
- No decrease in imported water supply reliability

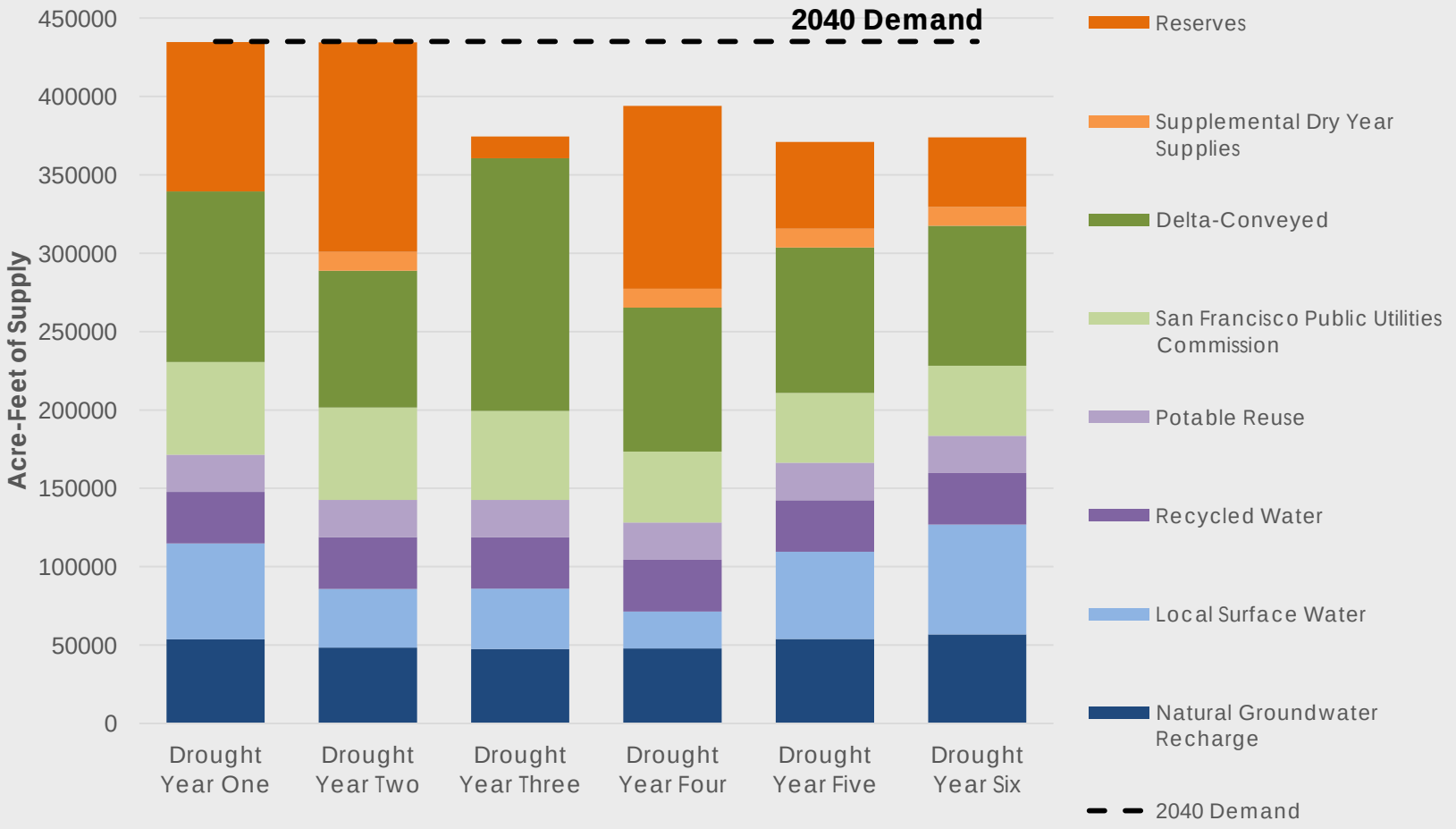
Baseline supplies sufficient for average annual demands

Note: Baseline includes 24,000 AFY of purified water capacity by 2025



Droughts continue to be the greatest challenge

Note: Baseline includes 24,000 AFY of potable reuse capacity by 2025



Baseline Water Supply Outlook

Assumes 24,000 AFY of potable reuse capacity by 2025 and other baseline investments

Parameter	2020	2025	2030	2035	2040
Average Annual Supply (AF)	374,800	414,700	423,900	431,300	440,000
Normal Year Demand (AF)	361,400	383,400	401,500	418,500	435,000
Maximum Level of Shortage Incurred (% of Normal Year Demand)	Stage 3 (15%)	Stage 2 (10%)	Stage 3 (15%)	Stage 3 (15%)	Stage 3 (15%)
Number of Years with Shortage (Over 94 Years)	11	5	6	8	13
Number of Years with Stage 2 (10%) Shortages	6	5	4	4	7
Number of Years with Stage 3 (15%) Shortages	5	0	2	4	6

B. Risk Analysis

Risks are important to consider

Climate Change
- Supplies
- Demands

Regulatory Uncertainty
- Delta
- Instream recharge operations
- Potable reuse

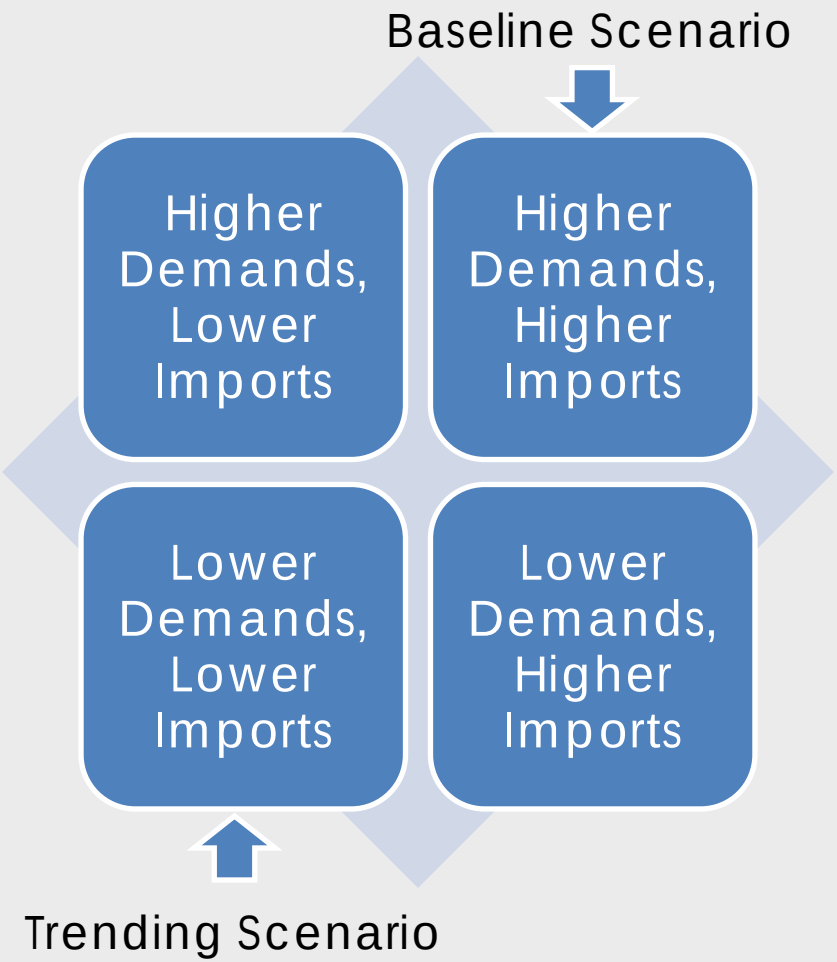
Development/Land Use
- Demands
- Reuse
- Infiltration

Funding

Planning Outside of WSMP Context

Demand Growth Uncertainty

Risk analysis includes "Trending" Scenario



- Demand growth lower than Baseline
- Imported water deliveries lower than Baseline

Trending Scenario shows more shortages

Assumes 24,000 AFY of potable reuse capacity and other baseline investments

Parameter	2040 Baseline	2040 Trending
Average Annual Supply (Acre-Feet, AF)	440,000	391,000
Normal Year Demand (AF)	435,000	402,000
Maximum Level of Shortage (% of Normal Year Demands)	Stage 3 (15%)	Stage 4 (30%)
Number of Years with Shortage (Over 94 Years)	13	22
Number of Years with Stage 2 (10%) Shortages	7	16
Number of Years with Stage 3 (15%) Shortages	6	4
Number of Years with Stage 4 (30%) Shortages	0	2

C. Level of Service Goal

Current Level of Service Goal

E-2 – "There is reliable, clean water supply for current and future generations"

S-2.1- "Develop supplies to meet at least 100 percent of demands in the Urban Water Management Plan in non-drought years and 90 percent of demands in drought years"

Level of service goal determines costs

Level of Service Goal	Range of District Costs (2016$)*	
	Baseline Scenario	Trending Scenario
Current Level of Service (Stage 2 or 10% Shortage)	Up to $700 million	Up to $3,000 million
Stage 3 or 15% Shortage	None	Up to $1,200 million

Costs to the community for shortages increase as the District's costs and level of service decrease. Going from a 15 percent level of shortage to a 10 percent level of shortage increases District costs from up to $700 million to up to $3,000 million. The commensurate increase in costs to the community for shortage is on the order of about $360 million.

*Non-District costs include costs such as recycled water and some water conservation investments

D. Water Supply Alternatives

Water Supply Project Alternatives

- Storage, inside and outside county, surface and groundwater
- Groundwater recharge ponds
- Additional potable reuse
- Recycled water
- Conservation and demand management
- Graywater reuse
- Raw Water Pipelines
- Ag land fallowing
- Stormwater reuse
- Desalination
- Transfers/dry year options
- Additional water rights
- SFPUC deliveries
- Shallow groundwater reuse
- Ag land flooding
- California WaterFix

Initial Baseline Portfolio Analysis

Preliminary estimates

Portfolio	Description	Number of Years with Shortages (15%, 10%)	Lifecycle Cost (2016$)
n/a	Baseline Scenario	13 (7, 6)	n/a
B1	All Water Use Efficiency (WUE)	8 (5, 3)	$500 million
B2	All WUE and Groundwater Banking	7 (2, 5)	$600 million
B3	Los Vaqueros and 15,000 AFY of Additional Potable Reuse	6 (2, 4)	$1,500 Million
B4	All WUE and 15,000 AFY of Additional Potable Reuse	6 (1, 5)	$1,700 million
B5	All WUE and Sites Reservoir	6 (0, 6)	$700 million
B6	Pacheco Reservoir and 15,000 AFY of Additional Potable Reuse	4 (0, 4)	$2,700 million

All projects and portfolios analyses assume the baseline projects/planned investments are implemented, such as maintaining and restoring existing assets, seismic retrofits, and 24,000 AFY of potable reuse capacity.

Initial Trending Project and Portfolio Analysis

Preliminary estimates

Portfolio	Description	Number of Years with Shortages (30%, 15%, 10%)	Lifecycle Cost (2016$)
n/a	Trending Scenario	22 (2, 4, 16)	n/a
T1	Anderson Reservoir	18 (1, 2, 15)	$1,900 million
T2	Pacheco Reservoir	17 (1, 4, 12)	$1,500 million
T3	15,000 AFY of Additional Potable Reuse Capacity	6 (0, 5, 1)	$1,200 million
T4	California WaterFix	4 (0, 1, 3)	$1,800 million
T5	California WaterFix and Pacheco Reservoir	2 (0, 0, 2)	$3,300 million
T6	California WaterFix and 15,000 AFY of Additional Potable Reuse Capacity	2 (0, 0, 2)	$3,000 million

All projects and portfolios analyses assume the baseline projects/planned investments are implemented, such as maintaining and restoring existing assets, seismic retrofits, and 24,000 AFY of potable reuse capacity.

Wide range of yields and costs

Preliminary estimates based on Baseline Scenario analysis

Water Conservation and Demand Management

Project	Lifecycle Cost (2016$)	Average Annual Yield (AF)	Average Annual Drought Yield (AF)	Cost/AF
Advanced Metering Infrastructure	$30 million	4,000	4,000	$500
Graywater	$1.5 million	100	100	$1,500
Local Land Fallowing	$90 million	1,000	5,000	$2,500
Model Ordinance	$1.4 million	5,000	5,000	<$100
On-Site Stormwater Capture	$20 million to $50 million	100 to 300	200 to 500	$3,500 to $20,000
Regional Stormwater Capture	$9 million to $60 million	100 to 1,000	100 to 1,000	$500 to $23,000

Note: Cost/AF estimates focus on average annual yield. Portfolio analysis is best for decision making regarding drought supply.

Wide range of yields and costs

Preliminary estimates based on Baseline Scenario analysis

South County Projects

Project	Lifecycle Cost (2016$)	Average Annual Yield (AF)	Average Annual Drought Year Yield (AF)	Cost/AF
Butterfield Recharge	$30 million	TBD	TBD	TBD
Church Ave Pipeline	$40 million	TBD	TBD	TBD
Morgan Hill Recycling*	$220 million	3,000	3,000	$1,500
San Pedro Ponds	$40 million	1,000	500	$1,000

*Incremental to planned costs for the South County Recycled Water Program

Note: Cost/AF estimates focus on average annual yield. Portfolio analysis is best for decision making regarding drought supply.

Wide range of yields and costs

Preliminary estimates based on Baseline Scenario analysis

Other Projects

Project	Lifecycle Cost (2016$)	Average Annual Yield (AF)	Average Annual Drought Year Yield (AF)	Cost/AF
Additional Potable Reuse	$500 million to $1,200 million	4,000 to 10,000	6,000 to 15,000	$3,500
Regional Desalination	$90 million	1,000	4,000	$4,000
Transfers/Dry Year Options	$250 million	2,000	8,000	$1,500
Water Rights Purchase	$800 million	12,000	5,000	$1,000
California WaterFix*	$1,800 million	30,000	18,000	$1,500

* California WaterFix was analyzed in the Trending Scenario

Note: Cost/AF estimates focus on average annual yield. Portfolio analysis is best for decision making regarding drought supply.

E. Potential Storage Options

Storage Project Summary

Preliminary estimates based on Baseline Scenario analysis

Project*	Lifecycle Cost (2016$)	Average Annual Yield (AF)	Average Annual Drought Year Yield (AF)	Cost/AF
Anderson	$1,900 million	10,000	20,000	$10,000
Pacheco	$1,500 million	6,000	24,000	$11,000
Calero	$510 million	3,000	5,000	$8,500
Uvas	$450 million	500	1,000	$46,000
Los Vaqueros	$340 million	2,000	7,000	$9,500
Sites	$230 million	16,000	40,000	$1,000
Groundwater Banking	$90 million	500	2,000	$5,000

* Other storage projects to be reviewed include Temperance Flat and Tulare Lake

Note: Cost/AF estimates focus on average annual yield. Portfolio analysis is best for decision making regarding drought supply.

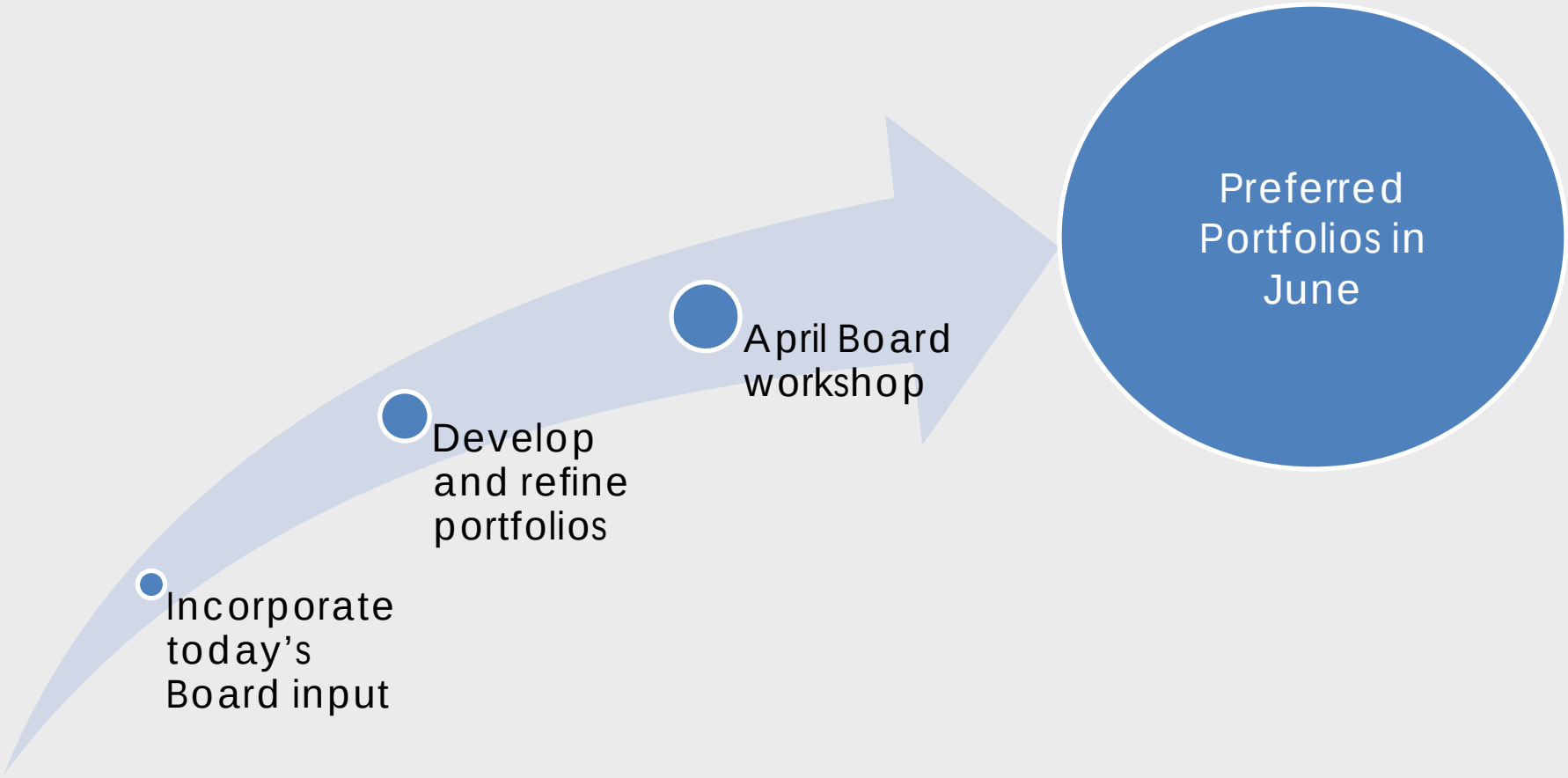
Expert Panel Input

Expert Panel Input to Date

- Look at portfolios of projects rather than individual projects
- Need to assess portfolios for their ability to achieve the District's objectives rather than just ranking them by cost effectiveness
- Consider multiple types of risk – cost risks, implementation risks, yield risks
- Consider the magnitude of risks and their potential impact on portfolio performance
- Apply consistent assumptions and methods

Next Steps and Summary

Next Steps


Incorporate today's Board input
Develop and refine portfolios
April Board workshop
Preferred Portfolios in June

2017 Water Master Plan Approach

Activity*	Scheduled Completion Date
Conduct Stakeholder Engagement	Ongoing
Establish Expert Panel	Completed
Develop Planning Objectives	Completed
Evaluate Risk Scenarios	January 2017
Update Model	January 2017
Prepare Baseline System Evaluation	January 2017
Define Projects and Programs	January 2017
Identify Recommended Portfolio	June 2017
Develop Implementation Program	October 2017
Prepare Water Supply Master Plan	December 2017

* Related Board discussion/decisions on WaterFix, Expedited Purified Water Program, storage, and other projects will occur in Calendar Year 2017

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- Level of service goal determines the level of investment needed
- No individual project meets the current level of service goal – need to consider portfolios and full range of benefits
- Some investment decisions will be required in the next 6-18 months to take advantage of windows of opportunity