Santa Clara Valley Water District

Water Use Projections, Water Demand Elasticity, and Customer Affordability Study

Board of Directors Meeting

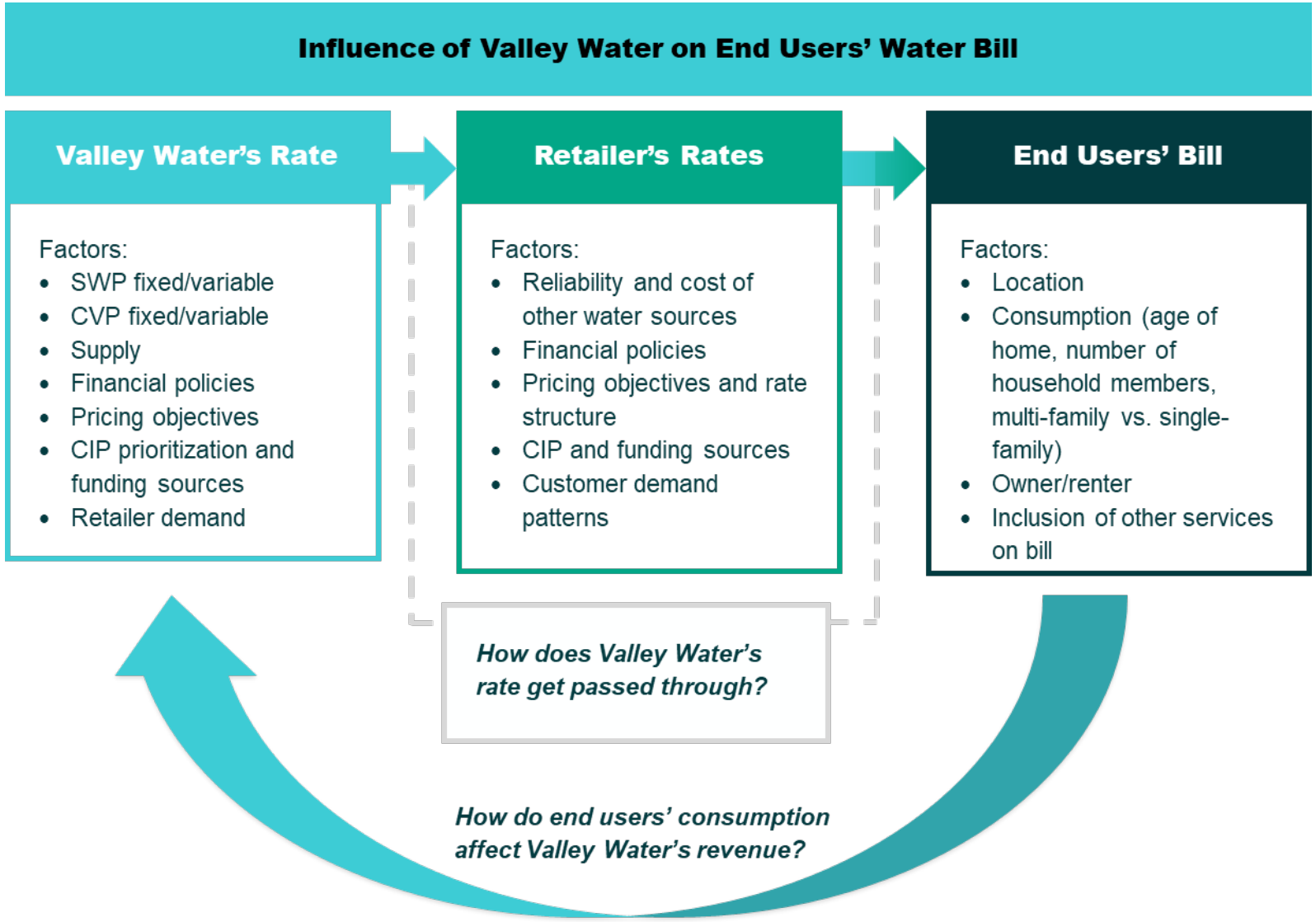
November 12, 2025

RAFTELIS

Hazen

Project Goals

- Identify how Valley Water's rates impact water demand (elasticity) and affordability of water service in Santa Clara County
- Validate and/or refine water demand forecasting for purposes of annual rate setting and long-term capital planning
- Tasks:
  - Demand Forecast
  - Elasticity Analysis
  - Affordability Assessment



Retailer Survey Results

Retailer Survey and Data Requested

- **Requests sent to Retailers in January of 2025**
- **Survey – Received *four* responses received**
- **Data requested – Received *three* responses**
  - ☑ Historical rate information
  - ☑ Service area water demand by customer class
  - ☑ Current number of metered connections by meter size and customer class
  - ☒ Detailed account billing data

What We Heard From Four Survey Responses

- Rate setting priorities of **affordability** led followed by level of service, conservation, and financial stability
- Future water supply strategies include **water supply augmentation** projects
- Willing to pay for **existing** water reliability but less for future water reliability.
- Rate increases have and will average around **10% per year**
- Revenue from **fixed** portion of water bills range from **25% to 46%.**
- **Average water use** for typical residential customers ranges from **9 to 12 HCF** per month
- **All** respondents have affordability programs but only **two** define it using either **AR_{20}** or **hours at minimum wage**
- Key considerations for Valley Water study include improved **communication** and understanding of how **Valley Water's rate impact affordability** for their customers

Task 1:
Water Use Projections

Task 1: Objectives

- Review the existing District-managed water demand forecast (water use projections) which informs Valley Water's ***rate setting process***
- Evaluate the performance of prior water use projections
- Analyze alternative approaches against the current approach
- Identify potential improvements to Valley Water's demand forecasting
- Consider other quantitative and qualitative tools to help inform annual demand forecasting

Task 1: Key Findings

- Valley Water's Approach is consistent with peers
- Forecast-to-Actual water sales have been largely accurate, with reduced variance in recent years
- High level statistical analyses demonstrate that the current approach yields reasonable ranges for near-term demand
- Water sales overall continue to trend downward
- Tools exist to refine the forecasting method, if desired

Task 2:
Elasticity Analysis

Task 2: Objectives

- Assess Retailer's sensitivity (water demand) to Valley Water's rates
- Understand relationship between Valley Water's rates, Retailer rates, and the effect on retail customers

Task 2: Approach

- Use available data
  - Valley Water sales (water supplied by source) to Retailers
  - Valley Water (wholesale) and Retailer rates
  - Non-Valley Water volumes supplied by source, as available
- Find the relationship on total water use using
  - Retailer price to end customer
  - Valley Water price (consumption-weighted)
  - Valley Water price (consumption-weighted) and SFPUC price

Task 2: Preliminary Findings

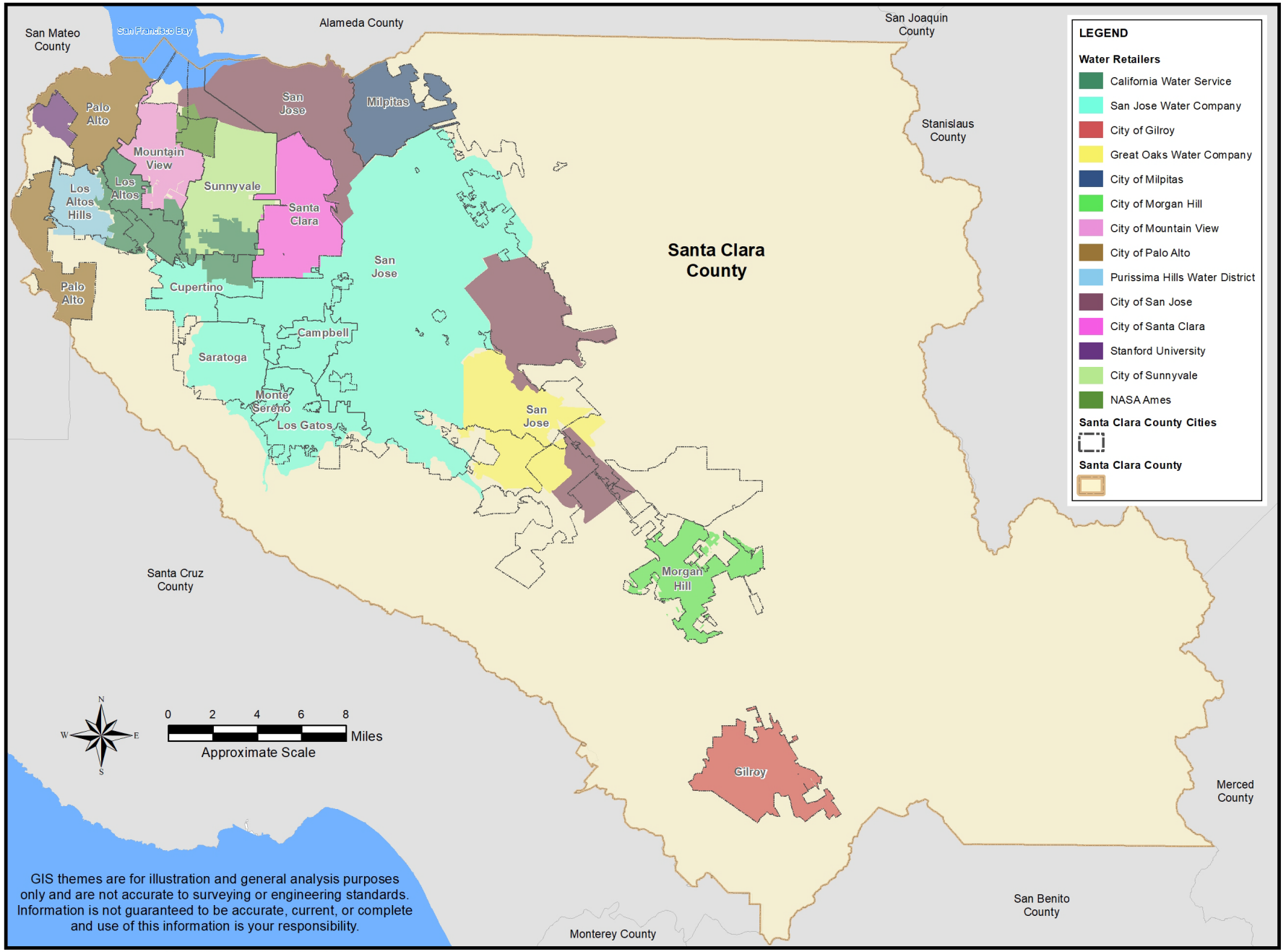
- Price elasticity estimates vary
- Preliminary findings suggest
  - Water use is inelastic with respect to price
  - Elasticity range in ballpark of -0.12 to -0.34, with convergence around –0.2
  - Elasticity results are reasonable compared to other similar industry studies and align with prior Valley Water elasticity study for long-term water supply planning
- High correlation between Valley Water and Retailer prices
  - Share a general common trend **volumetrically**
  - Valley Water (weighted) prices explain about 83% of variability in Retailer volumetric rates

Task 3:
Affordability Analysis

Task 3: Objectives

- Identify affordability metrics for Valley Water
- Provide point-in-time affordability of water for Valley Water's service area
- Develop a baseline of affordability for Valley Water to inform future decision-making

Water Retailers in Santa Clara County



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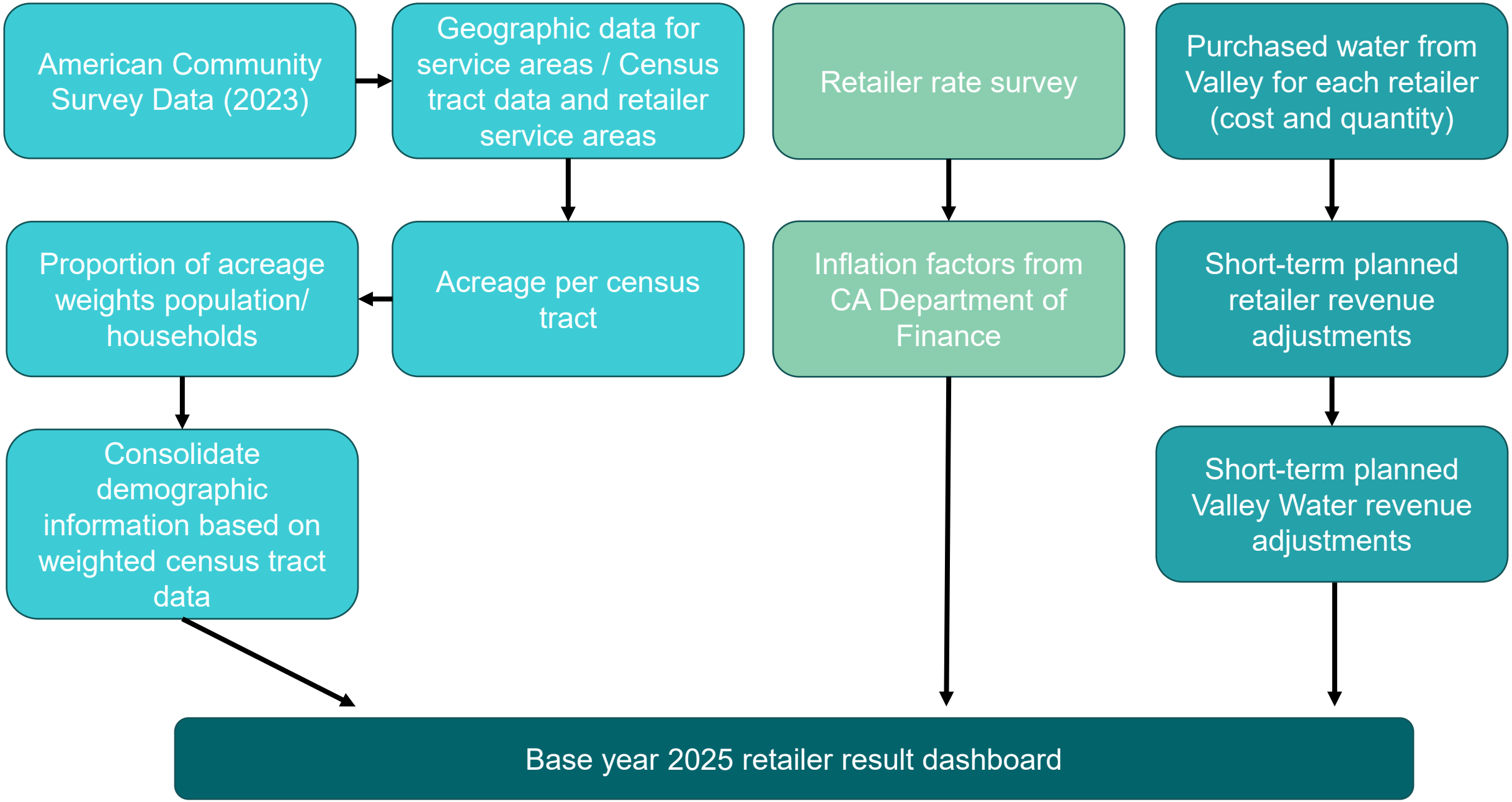
Water Retailers in Santa Clara County


American Community Survey Data (2023)
Geographic data for service areas / Census tract data and retailer service areas
Retailer rate survey
Purchased water from Valley for each retailer (cost and quantity)
Proportion of acreage weights population/ households
Acreage per census tract
Inflation factors from CA Department of Finance
Short-term planned retailer revenue adjustments
Consolidate demographic information based on weighted census tract data
Short-term planned Valley Water revenue adjustments
Base year 2025 retailer result dashboard

Retailer Affordability Characteristics*

Characteristics	North Zones	South Zones	Total Valley Water Service Area
% of Total Service Area Population	4% - 52%	3% - 5%	**100%**
Average Household Size	2.3 – 3.5	3.1 – 3.4	**3.0**
Minimum Hourly Wage	$18.20 - $19.00	$18.20	**$18.30**
Median Household Income (MHI)	$120k - $236k	$142k - $169k	**$169k**
Lowest Quintile Income (LQI)	$68k - $80k	$69k - $112k	**$76k**
Monthly Water Bill @ Essential Use (~6 HCF)	$54 - $98	$45 - $64	**$83**
Monthly Water Bill @ Average Use (~8 HCF)	$65 - $118	$52 - $71	**$96**

*All figures are rounded

Residential Affordability Indicators

Measurement Approaches (Metrics):		Used By
MHI RI: Median Household (Income) Residential Indicator	*Average* Water Bill / 50th Percentile Household Income	California Urban Water Agencies (CUWA), California Water Association (CWA), EPA, SFPUC
LQI RI: Lowest Quintile Income	*Essential* Water Bill / 20th Percentile Household Income	EPA, SFPUC
HMW: Hours at Minimum Wage	*Essential* Water Bill / Minimum Wage Rate	California PUC, EPA
AR_{20}: Affordability Ratio	*Essential* Water Use Bill / (Total Income - Non-Discretionary Expenses[1])	California PUC[2]
HBI: Household Burden Index (HBI)	*Average* Water Bill / LQI	AWWA/NACWA "New Framework"
PPI: Poverty Prevalence Indicator	Population at or below 200% FPL[3]/ Total population	AWWA/NACWA "New Framework"
Essential Water Use Bill	Bill at 47 gallons per capita per day	California PUC, CWA
Average Water Use Bill	Bill at 64 gallons per capita per day	CUWA, EPA, SFPUC

[1, 2] *Non-Discretionary expenses = Housing, health care, food, and home energy*
[3] *Federal Poverty Level*

Example Calculation: AR_{20}

AFFORDABILITY = **Customer water bill (essential use)** ÷ **Customer Household Income**

= [**Customer water demand** × **Retailer's rates**] ÷ [**Customer Household Income (HI)** − [**Housing Costs** − **Other Utilities costs**]]

Essential (approximately 6 HCF)

CPUC Discretionary Income Definition at 20th Percentile of Income

Resulting Retailer Metrics – AR20, HMW, LQRI, MHRI[1]

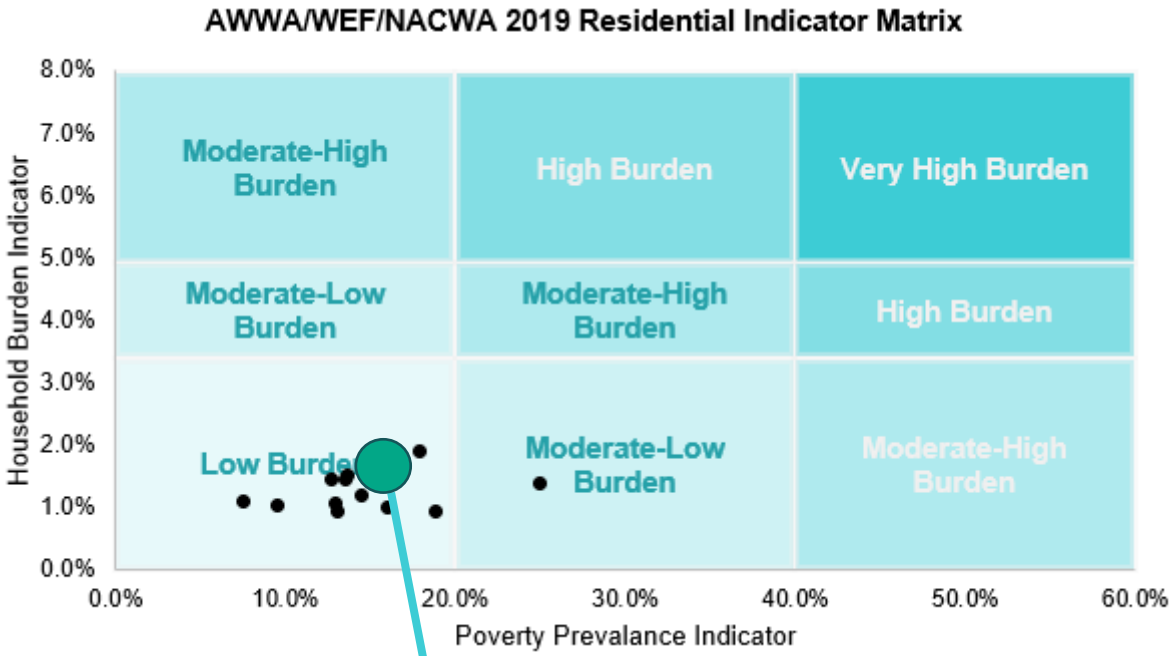
Retail Metrics	North Zones	South Zones	Total Valley Water Service Area	Metric Thresholds
AR_{20}	1.4% - 3.8%	1.7% - 1.9%	**2.8%**	***5%***
HMW	3.7 – 6.2	2.7 – 3.8	**5.3**	***4***
LQI RI	0.8% - 1.7%	0.8% - 1.0%	**1.3%**	***2%***
MHI RI	0.4% - 0.7%	0.4% - 0.5%	**0.6%**	***2%***

[1]*All results shown at essential water use of 6 HCF*

- AR_{20}, LQI, and MHI are all below thresholds across the service area
- HMW is modestly above the threshold value across the service area
- Results are generally lower (water bill is less burdensome) in the South zones

Resulting Retailer Metrics – HBI/PPI Matrix

Retail Metrics	North Zones	South Zones	Total VW Service Area	Metric Threshold Low Burden
HBI	0.8% - 1.7%	0.8% - 1.0%	**1.3%**	***3.5%***
PPI	7.5% - 25%	13% - 19%	**15.7%**	***20%***



- HBI and PPI are both within the low burden category
  - All but one retailer are in the Low Burden category
- Both metrics have a wider range in the North zones than in the South zones

Valley Water Service Area Result (Weighted Average)

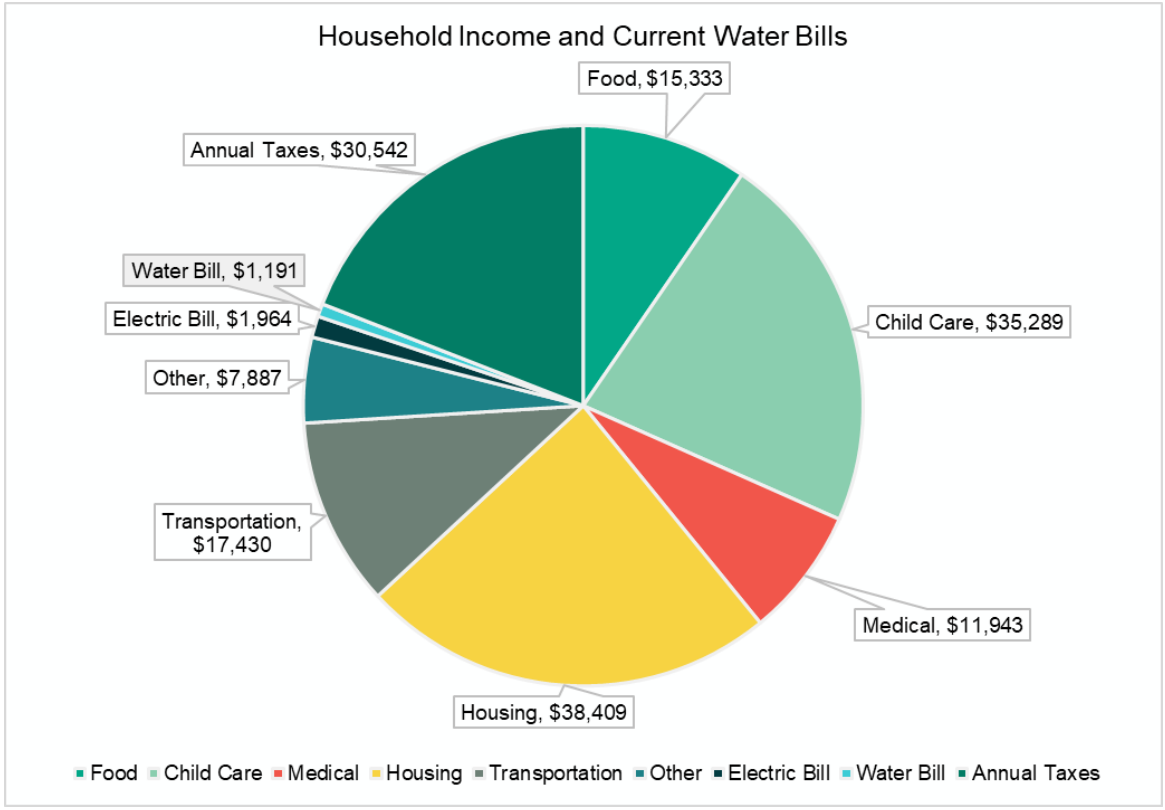
Resulting Retailer Metrics – Estimate of Affordability Impact[1]

Retail Metrics	North Zones (per Retailer)	South Zones (per Retailer)	Estimated Households Valley Water Service Area[2]
Estimated Number of Customers with Unaffordable Water Bills	200 – 24,000	1,000 - 1,200	**38,500**

[1] Estimate of customers that could be have bills considered unaffordable
[2] Out of approximately 625,000 households

- Estimates extrapolated based on public use micro statistics (PUMS) household survey data including self reported income, water use, household size, and/or payment of a water bill
- Then, calculate bills over 2% of reported household income *and* estimated essential water use at each retailers' service area rates
- **Household water bills estimated as unaffordable across the Valley Water service area is 6.2%**

Cost of Living and Water Affordability: 2 Adults and 2 Children



- Based on household income requirement for a two-working adult, two-child household in Santa Clara County
  - Household income requirement = $**159,988**
  - Data from *MIT Living Wage Calculator* and the *United Way Real Cost Measure*
  - Annual electric bill is based on average use of 570 kWh

What We Heard

- Affordability results averaged by retailer may not tell the whole story within a community
- Is there a way to harmonize these affordability indicators with other non-utility indicators?
- At what change in rates would people make behavioral changes? What is that elasticity estimate?
- Does Valley Water have a low-income assistance program?
- What is Valley Water doing to increase recycled water use?

Key Takeaways

- There is a wide range in the affordability of water service throughout Valley Water's service area, though all indicators show a relatively low burden
- The North zones has higher results on average and a wider range of results compared to the South zones
- Estimate of unaffordable water bills using extrapolated household survey data is estimated at 6.2% of households (38,500)
- Cost of living issues are centered around housing, childcare, healthcare, and food costs
- This analysis provides a baseline which decision makers can use to assess affordability in the future

Next Steps

- Finalize elasticity analysis
  - Additional information for Valley Water demand projections
  - Identify any impact on affordability
- Prepare technical memorandums to document elasticity and affordability tasks and a final study report

Glossary of Terms

- HCF: Hundred Cubic Feet (748 gallons)
- gpcd: gallons per capita per day
- MHI: Median Household Income
- LQI: Lowest Quintile of Income
- AR: Affordability Ratio
- HW: Hours at Minimum Wage
- PPI: Poverty Prevalence Indicator
- HBI: Household Burden Indicator
- SFR: Single Family Residential
- MFR: Multi-Family Residential
- PPH: Persons per Household
- CPUC: California Public Utilities Commission
- California Urban Water Agencies (CUWA)
- EPA: United States Environmental Protection Agency
- MIT: Massachusetts Institute of Technology
- CIP: Capital Improvement Program
- SWP: State Water Project
- CVP: Central Valley Project
- SFPUC: San Francisco Public Utilities Commission
- RI: Residential Indicator
- AWWA: American Water Works Association
- WEF: Water Environment Federation
- NACWA: National Association of Clean Water Agencies
- PUMS: Public Use Micro Statistics
- FPL: Federal Poverty Level
- California Water Association (CWA)

Groundwater Benefit Zones

North County Zone W2

- Santa Clara County north of Metcalf Road

South County Zone W5

- Morgan Hill to Pajaro River

South County Zone W7

- Coyote Valley

South County Zone W8

- Foothills below Uvas & Chesbro Reservoirs