

WELCOME

8TH ANNUAL CA WATER DATA SUMMIT

INTELLIGENT QUESTIONING (IQ) SHARING WATER WISDOM

SEPTEMBER 7&8, 2023



STANFORD UNIVERSITY | PALO ALTO, CA

[#CAWaterDataSummit](#) [#IntelligentQuestioning](#)

DAY ONE
10AM - 11AM

MODERATOR



Debby Dunn
Water Resources
Specialist, San Diego
County Water Authority



Ed Cooney
Project Manager,
Town of Hillsborough



William Granger
Conservation Coordinator,
City of Sacramento

LEVERAGING AMI FOR LEAK ALERTS & BEYOND: HOW AMI HELPS WITH LEAK ALERTS AND MORE?



Sandro Ayala and Luisa Cahua
Customer Service Representative and Customer Service
Clerk III, Nipomo Community Services District



Lindsey Stuvick and Justin Finch
Sustainable Resources Officer and Senior Water Efficiency Specialist,
Moulton Niguel Water District



Linda Higgins
Deputy Director of Customer
Services, Placer County Water
Agency



Deb Lane
Water Resources Analyst,
Santa Rosa Water



Mychel Teater
Customer Services Specialist,
Placer County Water Agency

Moderator: Debby Dunn



Debby Dunn (Figoni) is an enthusiastic advocate for the environment, with a passion for the wise use of water. In her prior position with the City of Beverly Hills, Debby utilized the advanced metering infrastructure's (AMI) amazing data to help her customers save hundreds of millions of gallons of water a year. Debby's present position with San Diego County Water Authority allows her to provide a variety of innovative water efficiency programs to 3.3 million people. She has a Bachelor of Art in Environmental Studies, a Master of Public Administration, is a 14-year Master Gardener and has a variety of water certifications. In her spare time, she loves to teach water wise landscaping classes and feels blessed to be able to educate people in a fun and relatable way!

Panelist: Sandro Ayala



Hello my name is Sandro Ayala I have been with Nipomo Community Services District (NCS D) for a little over five years now. This is where I started my career in the water industry as an entry level operator. I quickly developed a taste for the complexities of the industry and I went back to school full time in hopes that my education can help me move forward in the industry. I've managed the Ami program since its infancy stages and this fiscal year started our third year with Ami. I am a Nipomo native and on my time off I do one of two things, spend time with my wife and daughter or you'll catch me cycling up and down the coast.

Panelist: Luisa Cahua



Luisa has been with the Nipomo Community Services District for 10 years and is the lead for the District's AMI program, from implementation and troubleshooting to customer engagement. She brings together her administrative and operational experience as well as her experience in community outreach, to drive the District's efforts towards full rollout. In her spare time, Luisa enjoys spending time with her family camping and enjoying the great outdoors.

Panelist: Ed Cooney



Mr. Cooney has over 25 years of public works project management experience and expertise in water supply and conservation, open space vegetation management, solid waste management, wastewater and stormwater management, public works projects and operations management and analysis, emergency response plans, regulatory compliance and public policy development and implementation. He has served in a variety of roles on behalf of clients, acting as program manager, project manager, technical advisor, engineering team manager and management analyst. Mr. Cooney is adept at facilitating the coordination between various public agency departments, outside agencies and community stakeholders to complete public works projects and solve complex public works issues.

Justin Finch



Justin is the Senior Water Efficiency Specialist for Moulton Niguel Water District. Justin leads coordination efforts with other government agencies and establishes working relationships with local businesses, property managers, and homeowners. He currently serves as a board member of the California Water Efficiency Partnership, a state-wide organization focused on water efficiency policy, programs, and research. Justin graduated from San Jose State University with a Bachelor of Science degree in Environmental Studies, and California Polytechnic State University with a Master of Public Policy degree. He is also certified as a Water Use Efficiency Practitioner, Certified Landscape Irrigation Auditor, Certified Landscape Water Manager, and a Qualified Water Efficient Landscaper. Justin embraces the great joy of serving others and volunteers in his “free time” as the vice president of the Sycamore Grove Homeowners Association in Ladera Ranch. Justin’s favorite use of data is both overcoming and embracing confirmation bias.

Panelist: William Granger



William has served the past 10+ (10.5 as of August 11th) years as the Water Conservation Coordinator for the City of Sacramento. In total, he has over 29 years of water efficiency experience and has worked for wholesale and retail water agencies throughout California including Otay (pronounced Oh-tie) Water District, Valley Water (fna Santa Clara Valley Water District), Marin Water, and the City of San Diego. He currently serves as the Chair of the AWWA CA/NV Water Use Efficiency Practitioner Certification Committee and is a Board member for the California Irrigation Institute. He has a masters in Geography from San Diego State University and a bachelors in Geography from the University of Florida.

Panelist: Linda Higgins



Linda Higgins is Deputy Director of Customer Services for Placer County Water Agency (PCWA), the primary water resource agency for Placer County in Northern California. She has 21 years of experience in working in regional water efficiency roles. In her current role, Linda leads PCWA's Water Efficiency and Metering Division, overseeing a 12-person team. She is responsible for an array of vital programs and functions, including water efficiency programs, meter services, grant administration, customer services, and organizing community outreach events.

Linda's achievements include the successful implementation of PCWA's AMI Pilot meter retrofit program and transition to a monthly billing structure. Beyond her managerial duties, she frequently represents the agency as a spokesperson for water efficiency in media interviews and promotional contexts.

Panelist: Deb Lane



Deb is a Water Resources Analyst for the City of Santa Rosa where she provides training, education, and administration of water-use efficiency programs. She administers the City's Commercial, Industrial, Institutional (CII) program. Deb is a Board Member for the Qualified Water Efficient Landscaper Program. She holds multiple certifications in water-use efficiency.

Lindsey Stuvick



Lindsey is the Sustainable Resources Officer at Moulton Niguel Water District and supports water efficiency, water resource, and operational efficiency projects. Her career has been dedicated to developing sustainable, data-driven efficiency solutions and customer engagement strategies that can be replicated and adapted across the industry. She has a Master's Degree in Urban and Regional Planning from the University of California, Irvine and a Bachelor's Degree in Political Science from California State University, Fullerton. She is also the recipient of the Switzer Fellowship from the Robert & Patricia Switzer Foundation.

Panelist: Mychel Teater



Mychel Teater is a Sacramento State University graduate with 13 years of experience in water efficiency and water related outreach programs. Since 2014 she has worked at Placer County Water Agency (PCWA) in the Water Efficiency division. In her current role as Customer Services Specialist, Mychel has assisted in the Agency's Advanced Metering Infrastructure (AMI) pilot programs and is currently engaged in long-term meter replacement planning and AMI implementation. Mychel prepares, maintains and analyzes a variety of statistical and technical reports on various topics to support the Water Efficiency and Meter Division's goals, including the annual budget. Mychel's achievements include creating a monthly and annual dashboard to track and monitor the team's workload to gain insights on opportunities for efficiencies and look for trends. Beyond her data analysis duties, Mychel has been instrumental in processing and presenting data in useful ways for informing the Board of Directors.

California Data Collaborative

Water Data Summit

September 7, 2023

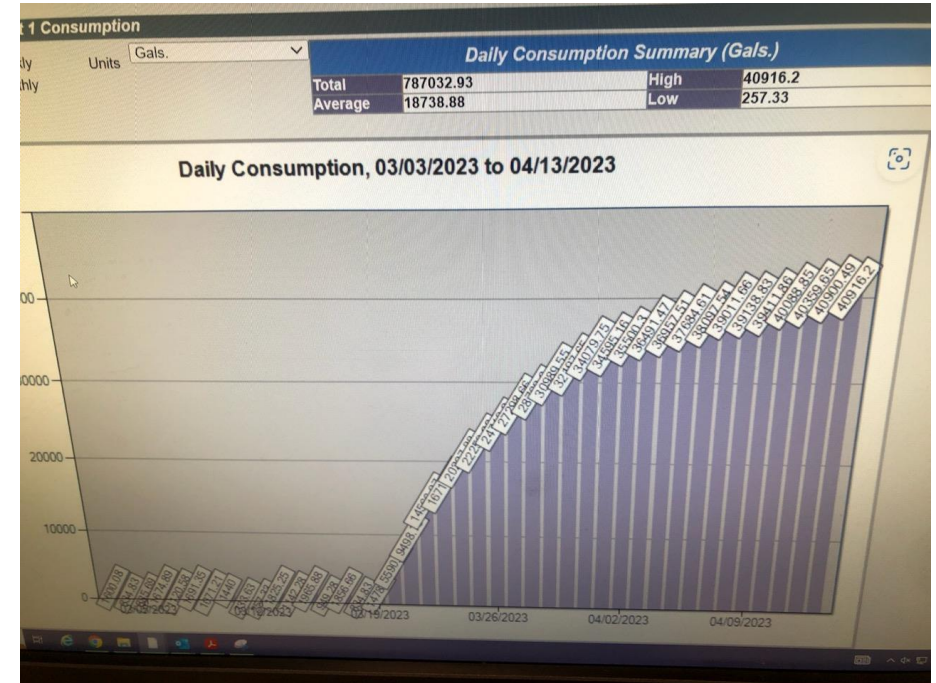
LEVERAGING AMI FOR LEAK ALERTS AND BEYOND

By: Awesome Magnificent Individuals (AMI's)



AGENDA

- 6 water providers have 6 minutes each to highlight their programs
- Q & A to follow
- Use handout for notes and future contact info





City of
**SACRA
MENTO**
Utilities

City of
SACRAMENTO
Department of Utilities

AMI HIGHLIGHTS

CADC Annual Water Summit
September 8, 2023

William Granger
Water Conservation Coordinator





CITY OF SACRAMENTO, DEPARTMENT OF UTILITIES

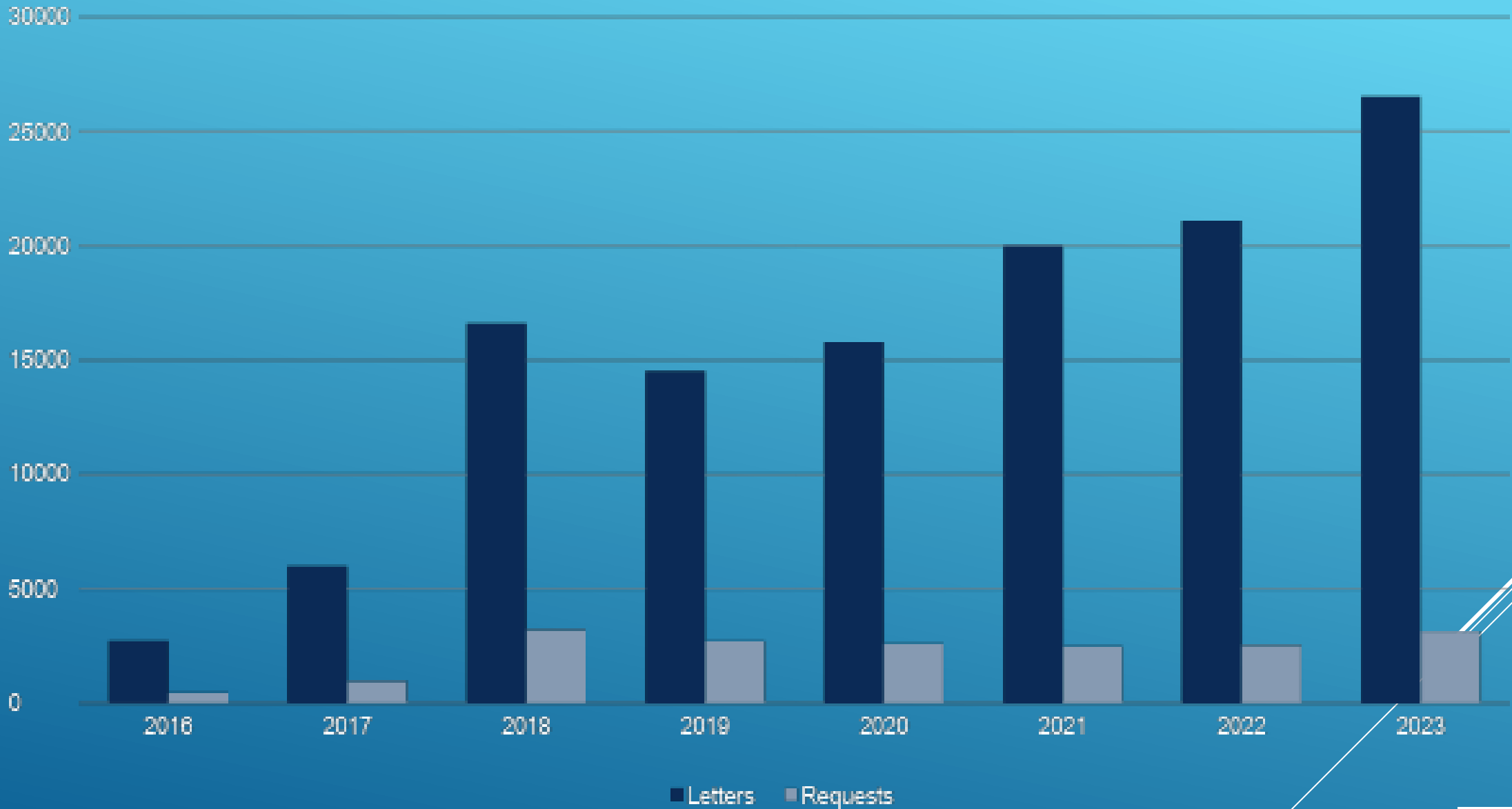
143,400 connections,
100% AMI, 92%
residential, serving
~530,000 customers

Water sources-American
and Sacramento Rivers
(85%) plus groundwater
(15%)

Fixed network with ~270
gateways

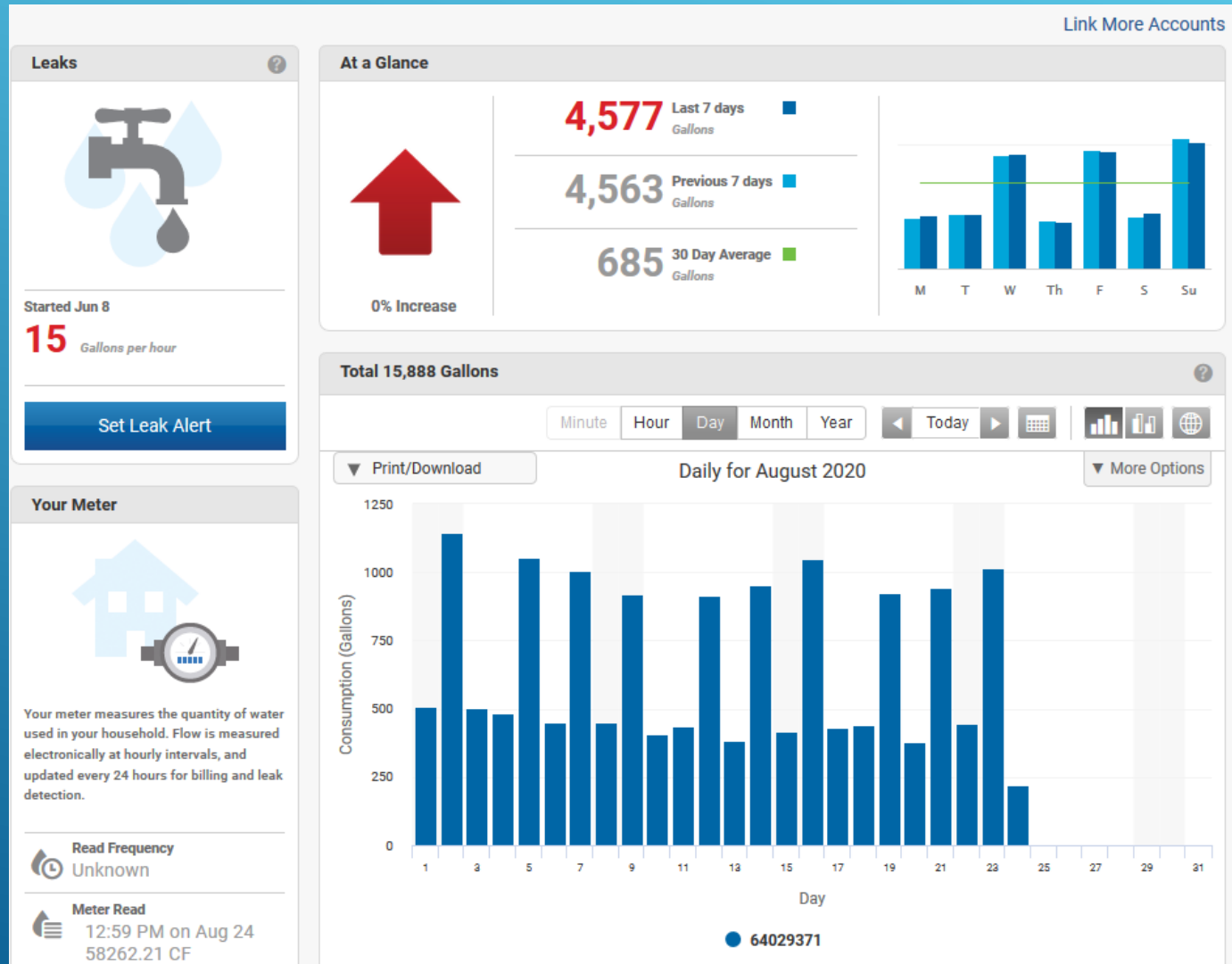
AUTOMATED LEAK ALERT LETTER PROCESS

- ▶ 2-month automatic follow up if 130 gpd, 5 days (for SF accts)
- ▶ Cycle repeats after 2 months
- ▶ 10-15-20% response for leak inspections (pre-COVID)
- ▶ 16/32 premise types can receive letters



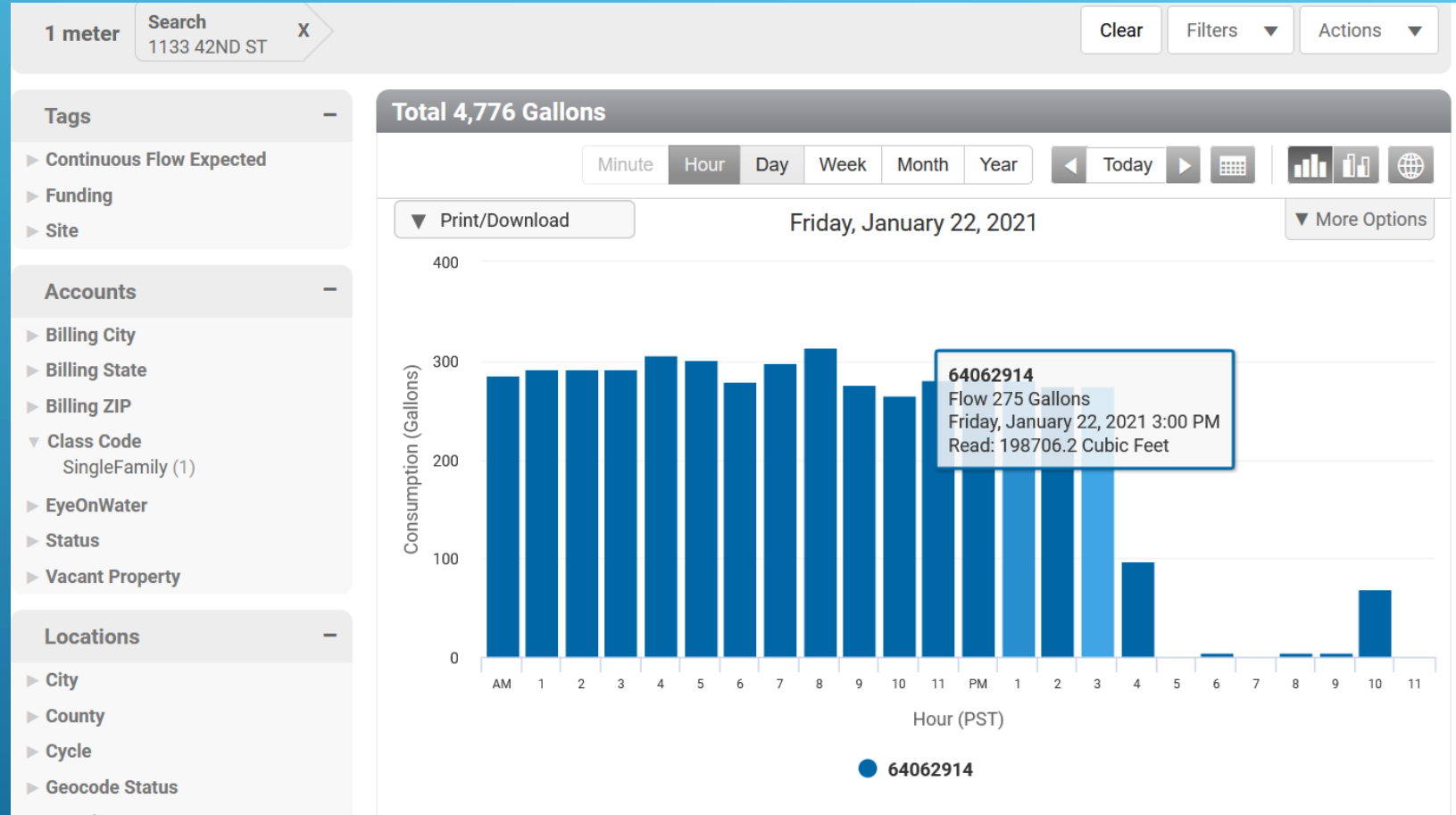
AMI LEAK LETTERS FY 2016-2023

CUSTOMERS CAN SET UP THEIR OWN LEAK ALERTS



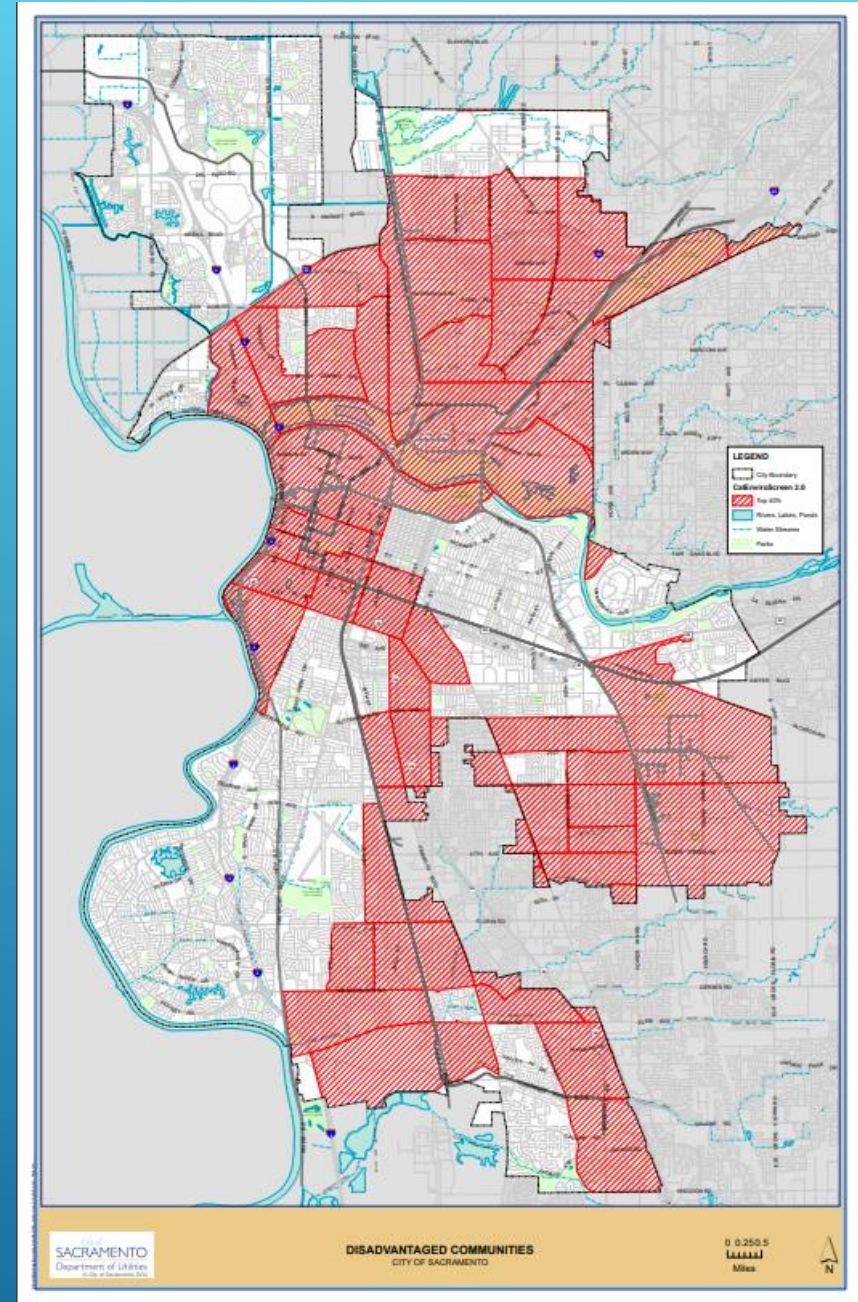
SINGLE FAMILY OUTREACH- LARGEST AND OLDEST LEAKS

- 56 SF accounts- 75+ gal/ hr, 90+ days
- 15 SF accounts, 75+ gal/hr, 60-90 days
- 97 SF accounts- 37.4- 75 gal/hr, 90+ days:
- 11 SF accounts, 60-90 days, 37.4- 75 gph
- 148 SF accounts- 60-90 days, 7.5- 37.4 gal/hr



LEAK ASSISTANCE PROGRAMS

- ▶ Leak Free Sacramento
- ▶ Leak Repair Assistance Rebate



HOLD THOSE QUESTIONS...

WILLIAM GRANGER
WGRANGER@CITYOFSACRAMENTO.ORG
SACWATERWISE.COM
(916) 808-1417

Reducing Water Waste and Supporting Customers Through AMI

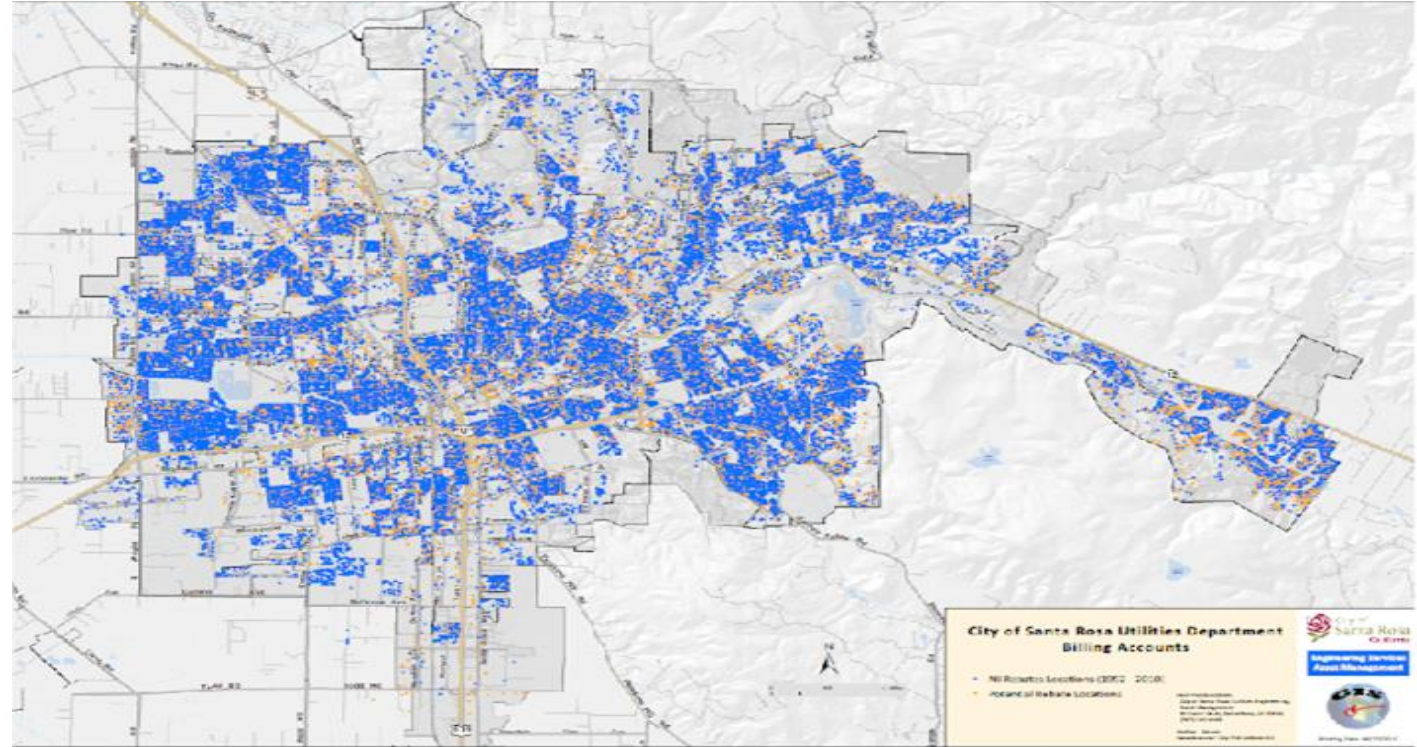
Deb Lane: Water Resources Analyst
CA Water Data Summit, 2023



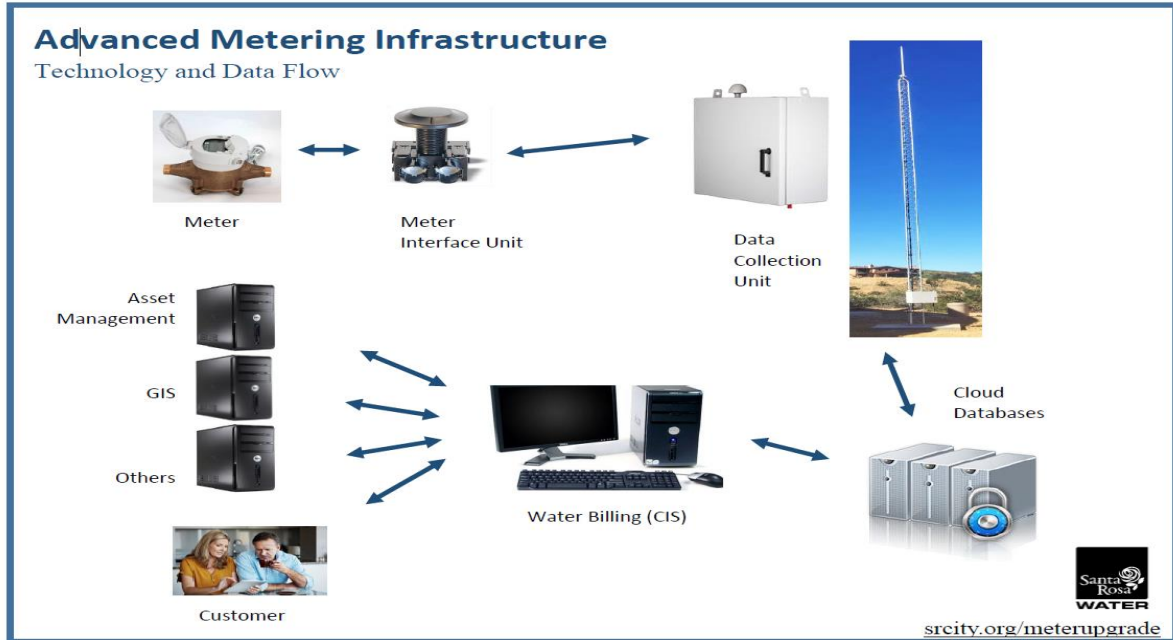
OUR FUTURE IN EVERY DRÖP

City of Santa Rosa

- 54,000 accounts
- 19,000 ac-ft/year
- 45,000 residential
- 3,000 multi-family
- 4,400 CII
- 1,650 dedicated irrigation



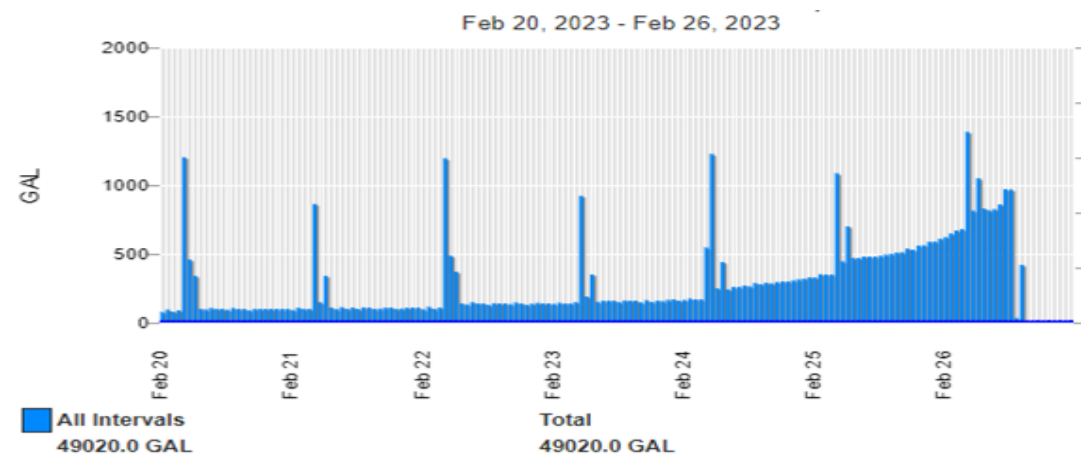
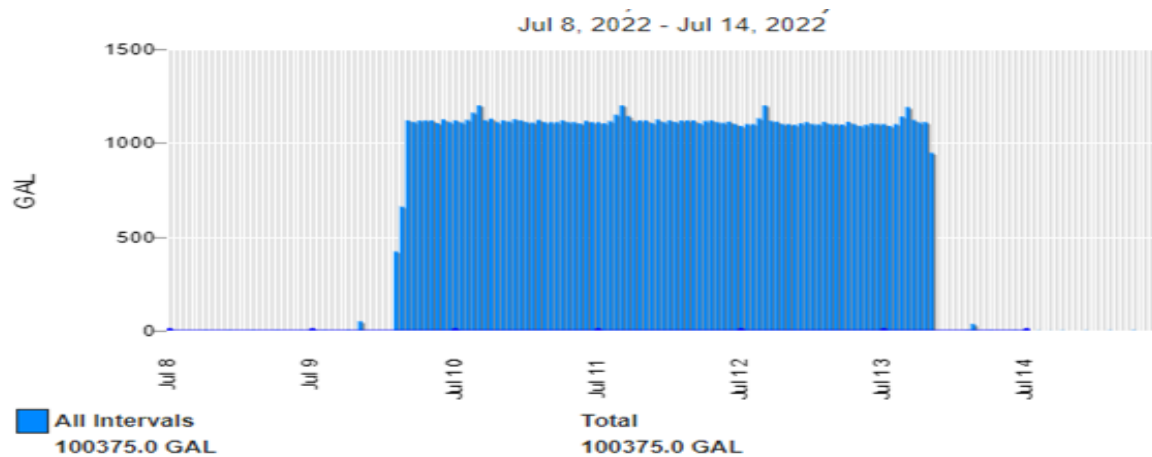
Our AMI System



- RNI (Sensus) - **Regional Network Interface**
- MDM or SmartWorks Compass - Meter Data Management system
- WaterSmart portal (Customer Connect) – Customer portal
- CIS (Advanced) – Billing Software
- Hansen – Asset Management Software

AMI and Leak Notifications

- Leak notifications process
 - Internal Reporting
 - Customer driven notifications



OUR FUTURE IN EVERY DRÖP

Internal Leak Alert Threshold

Customer Class	Hours of Use Above Threshold	Gallons Used Per Hour
Commercial	48	50
Industrial	72	100
Institutional	24	30
Multi-Family	48	80
Single Family	24	20



OUR FUTURE IN EVERY DRÖP

Water Billing Collaboration

- Billing pulls continuous use reports
- Clears as many as they can
- Sends letter to customer
- Calls customer if over 100gph
- Forwards to WUE after no response

8/24/2023 12:00	94	GAL	Failed Validation
8/24/2023 13:00	168	GAL	Failed Validation
8/24/2023 14:00	138	GAL	Failed Validation
8/24/2023 15:00	152	GAL	Failed Validation
8/24/2023 16:00	128	GAL	Failed Validation
8/24/2023 17:00	100	GAL	Failed Validation



OUR FUTURE IN EVERY DRÖP

WUE Water Waste Process

- Contact account holder
- Offer audit
- Discuss data
- Explain Water Waste Ordinance
- Follow up until resolved



Water Waste Ordinance

- City of Santa Rosa Water Waste Ordinance, City Code Chapter 14-21 (adopted in 1999)
- Start with education, WUE assistance then move to enforcement
- SFR: send three warning letters, calls, disconnection door tag, then shutoff
- Follow up on ~800 cases of water waste annually
- ~5 residential customers per year have service disconnected due to water waste
- City Council to consider Ordinance revision to add administrative fine - Oct/2023
 - Will motivate CII customers where shutoff is not an option

Success Supporting Customers

- Increase in
 - WaterSmart checkups
 - Phone calls/emails/high usage letters
- Water savings



OUR FUTURE IN EVERY DRÖP

Evaluation of SFR Program Success

- Leak report that is accessible in real time (SmartWorks)
- Report is only for single-family residential continuous use customers
- Between January 2020 to April 2023
 - 2,136 leaks detected
 - About 500 to 700 leaks detected annually (about 1% of service area)
 - Average leak amount per hour = 49 gallons
 - Average leak hours = 322 hours (13.4 days)
 - Water saved through advanced (prior to bill) notification = 2,184,000 gallons



OUR FUTURE IN EVERY DRÖP

Customer Portal: SmartWorks

- 10% of service area has an account
- Alerts are “opt in”, and self-determined
 - relatively low participation
- Reports are limited
- Portal is not intuitive to navigate



OUR FUTURE IN EVERY DRÖP



Track your water use online and set leak alerts with the WaterSmart Portal!

Unforeseen Benefits

- Increased contact with our customers
- Increased number of WaterSmart check-ups
- More accurate regulatory reporting data
- Increased inter-dept collaboration
- Improved emergency response and recovery





moulton niguel water district

Water Efficiency Programmatic Uses of AMI

Justin Finch

September 7, 2023

QUICK FACTS

- Elected 7-Member Board of Directors
- Water, Recycled Water, and Wastewater Services
- 170+ Employees
- 37 Square Miles
- 55,000 Customer Accounts
- 170,000+ Customers
- Serve 6 Cities in South Orange County
- Water Budget Based Rate Structure



Duane Cave
President



Diane Rifkin
Vice President



Brian Probolsky
Vice President



Richard Fiore
Director



Donald Froelich
Director



William Moorhead
Director



Sherry Wanninger
Director

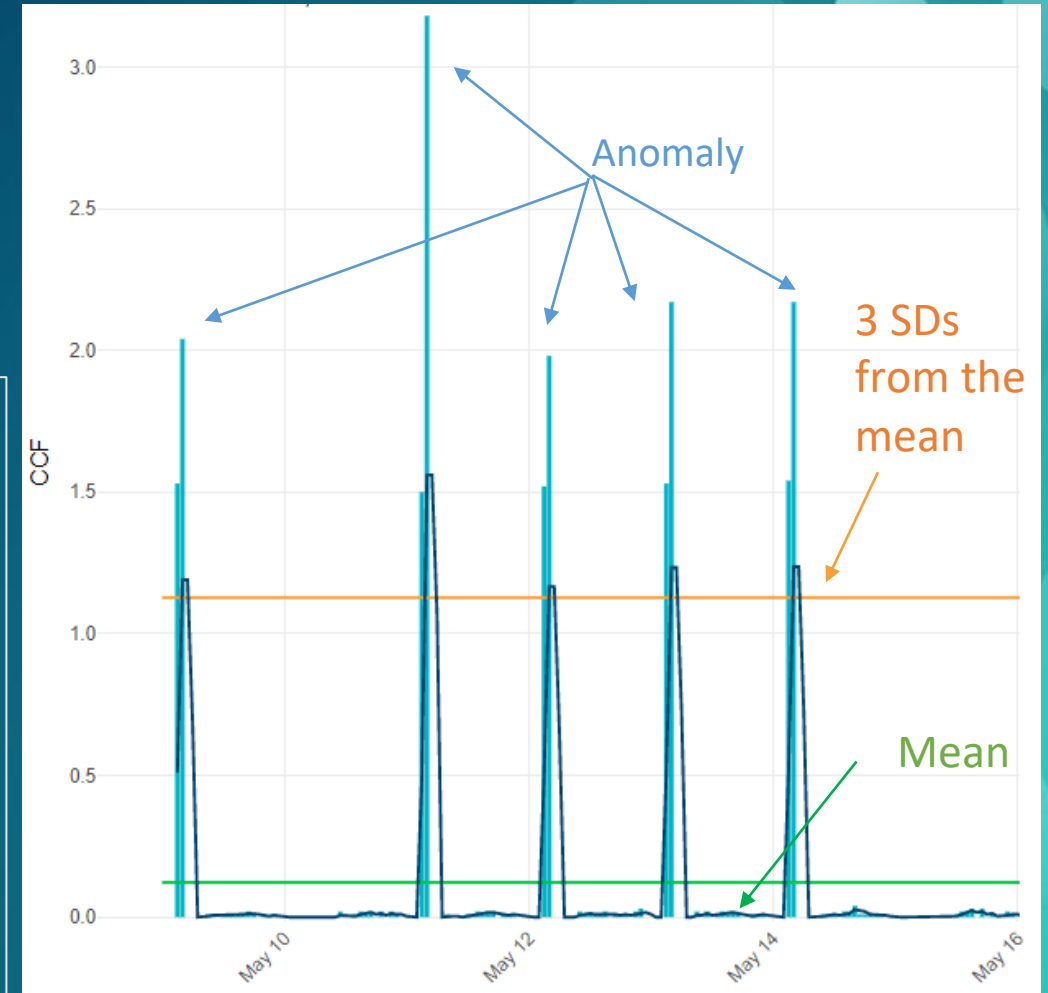
Water Efficiency Programmatic Uses of AMI

- Commercial Mixed-Use Meter identification
- 7 Days per Week Irrigation
- Estimate Potential Savings for Irrigation System
Master Valve & Flow Sensor Devices

AMI Data & Analytics to Identify CII Mixed-Use Meters

- Irrigation is often a spike in hourly consumption.
- Identify mixed meters via an anomaly detection (outlier detection).
- By calculating the standard deviation for a set of data, we can determine anomalies.

- Mean (μ) (Average)
 - calculated "central" value of a set of numbers
- Standard Deviation (σ)
 - measure of how spread out a set of numbers are
- Normal Distribution
 - 68.3% is within 1 standard deviation
 - 95.5% is within 2 standard deviations
 - 99.7% is within 3 standard deviations

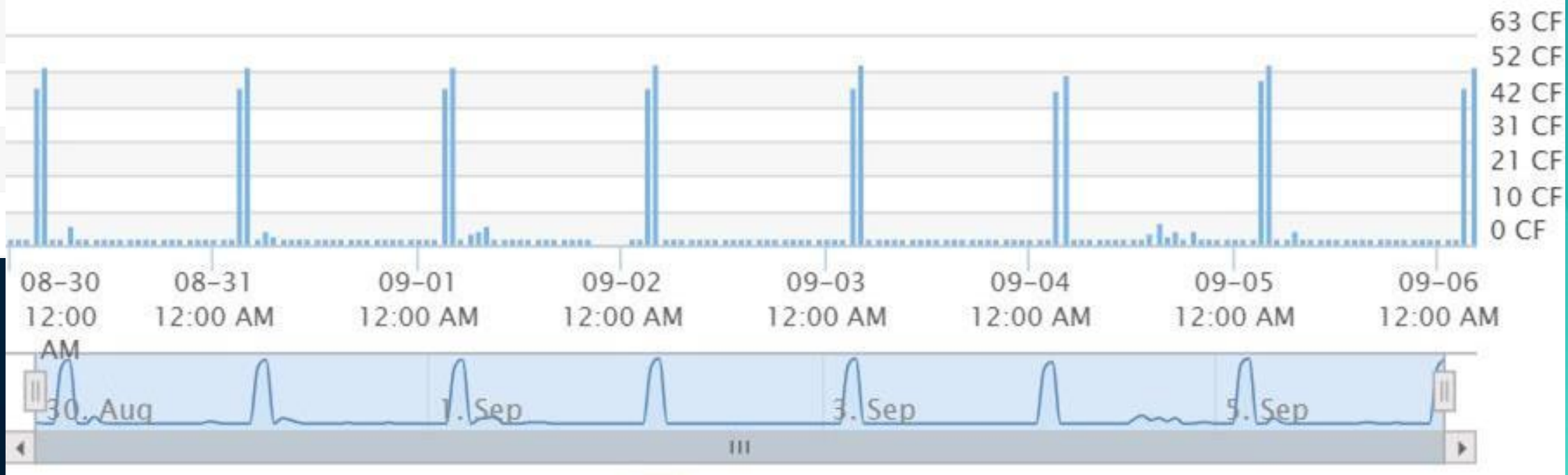


7 Days per Week Irrigation

Full Contact List

Account Number	Service Address	Address Number	Rate Schedule	Effective Date	Square Feet	Hour	POB
----------------	-----------------	----------------	---------------	----------------	-------------	------	-----

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------



Estimate Potential Savings for Irrigation System Master Valve & Flow Sensor Devices

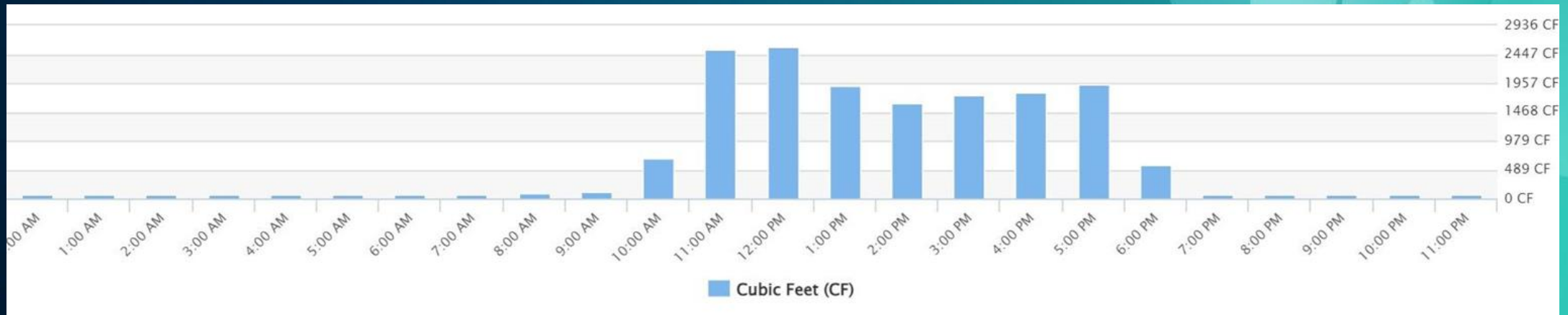
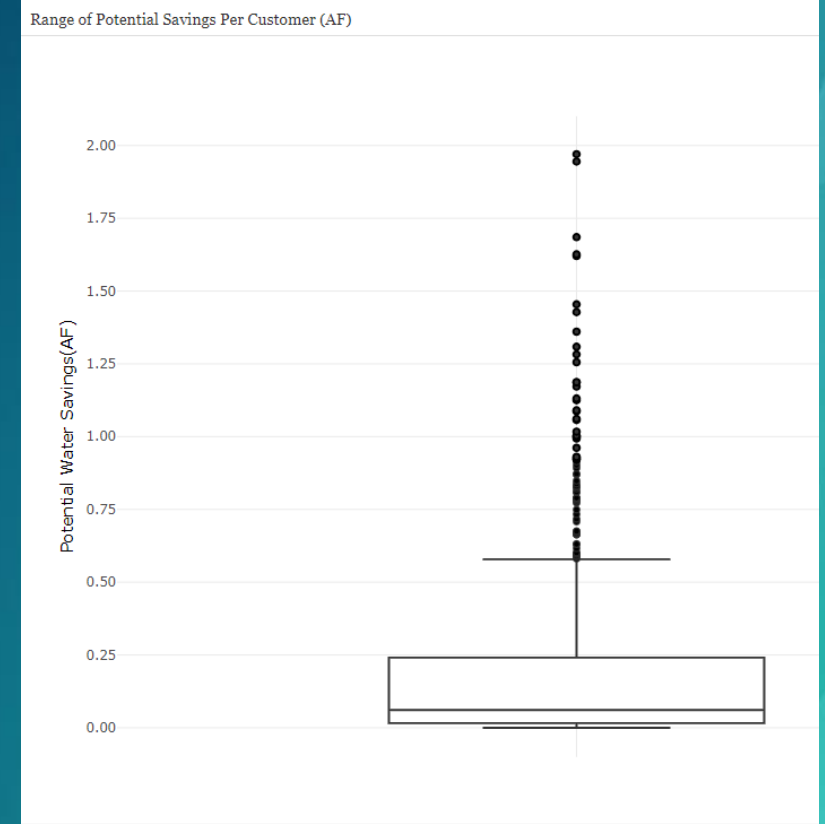


0.2693

Average Potential Water Savings (AF)

0.061

Median Potential Water Savings (AF)





moulton niguel water district

Operational Benefits of AMI

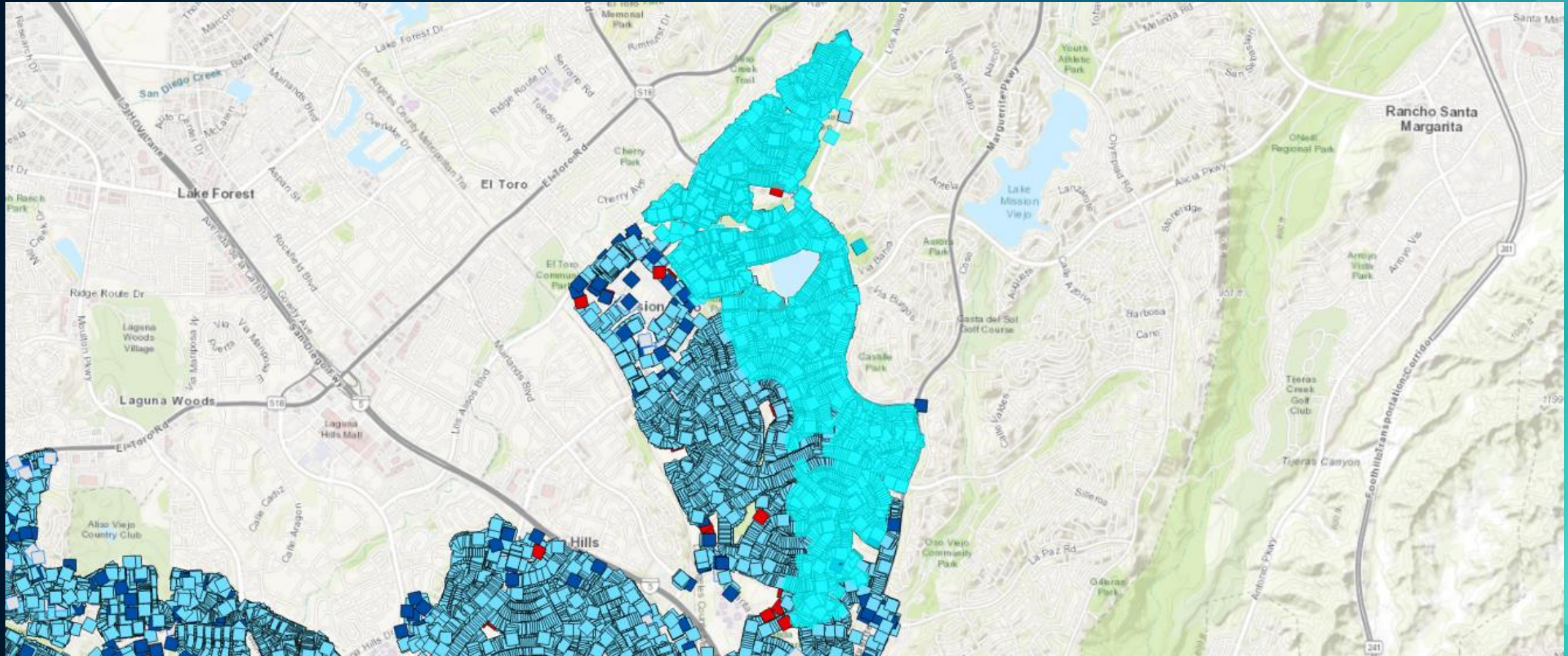
Lindsey Stuvick

September 7, 2023

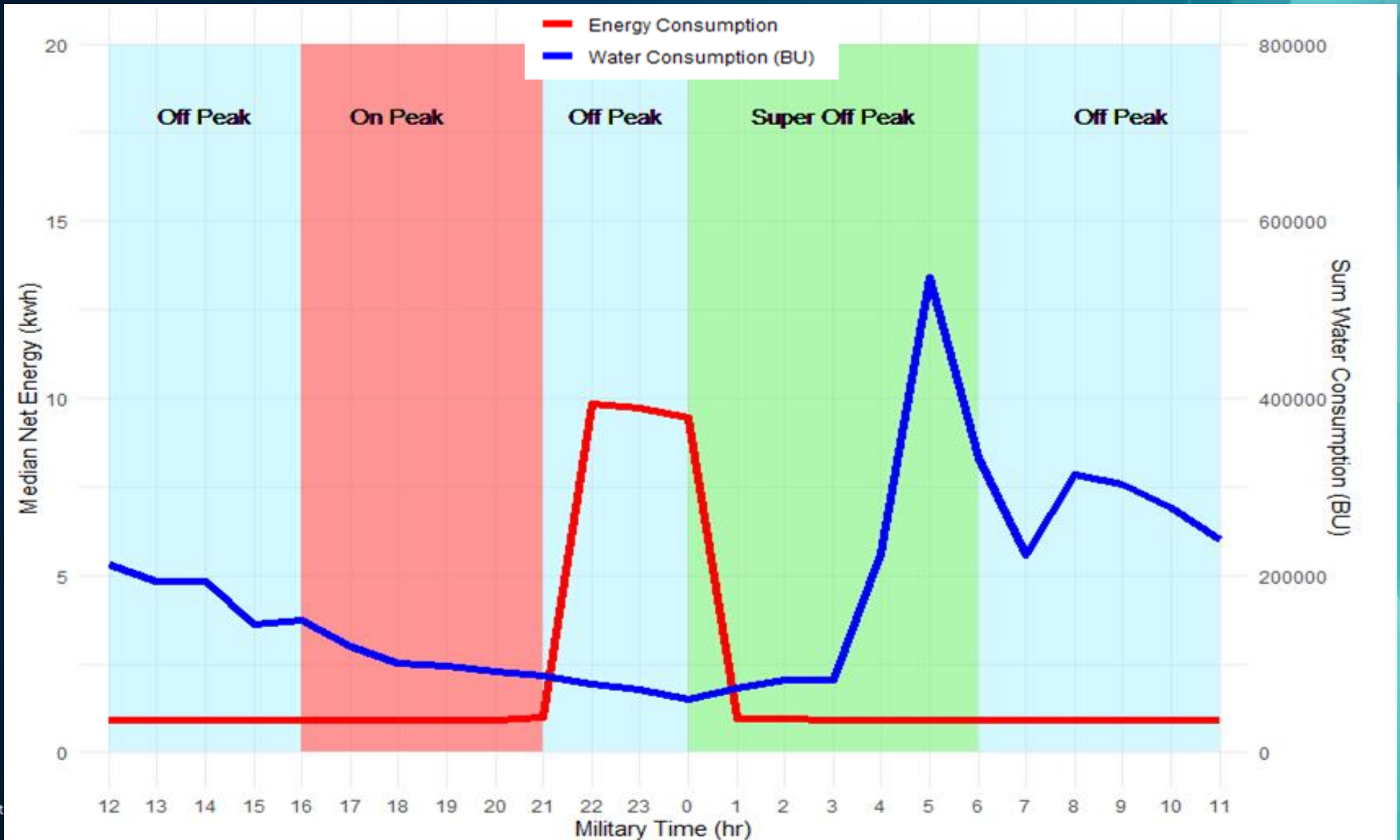
Operational Projects

- Water loss mass balance model by pressure zone & virtual DMAs
- Data disaggregation of indoor & outdoor use
- Refine return to sewer factors
- Inflow & Infiltration analysis by sewershed
- Water savings model for master valves and flow sensors

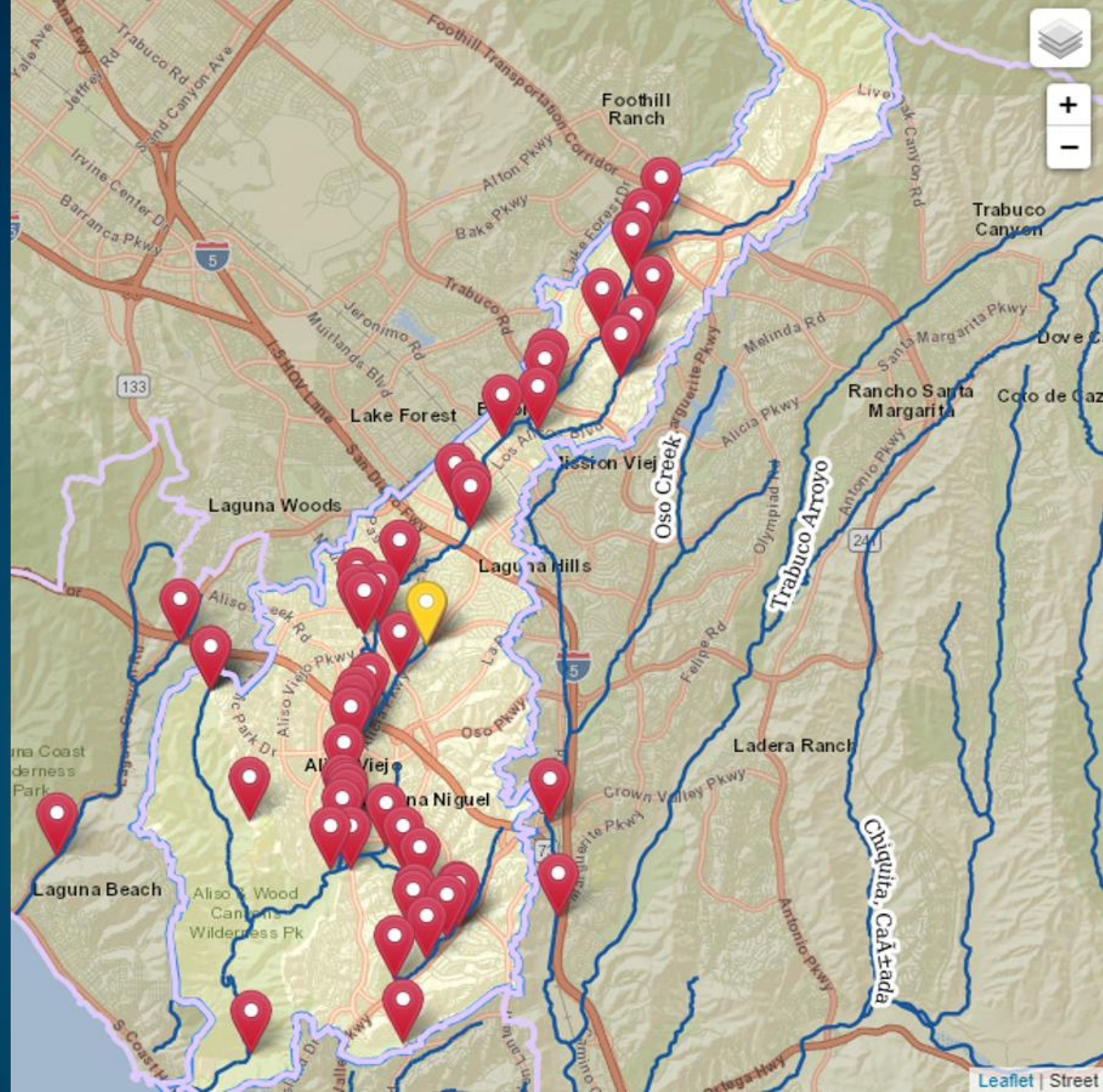
Water Loss Mass Balance



Energy & Water Use Peaking Analysis



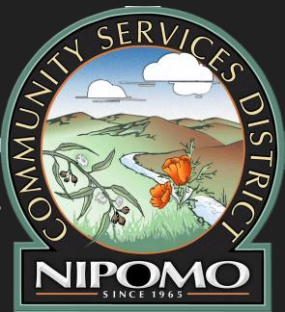
Aliso Creek In-Creek Flow Monitoring



BIG TECH IN A SMALL TOWN

PHASED IMPLEMENTATION OF AN AMI SYSTEM

Nipomo Community Services District
Sandro Ayala, Customer Service Specialist
Luisa Cahua, Customer Service Clerk



THE ROAD TO AMI

OVERVIEW

- ❑ 4,600 water customers
- ❑ District elevation ranges from 100 ft above sea level to about 800 ft above sea level.
- ❑ Terrain varies from dune sand to hard-pack adobe

PATH TO AMI

- ❑ PHASE 1:
 - ❑ INSTALL RADIO COMMUNICATION NETWORK, VIA 2 BASE STATIONS.
 - ❑ INSTALL MONITORING DEVICES
 - ❑ ACOUSTIC MONITORING FOR SYSTEM-WIDE LEAK DETECTION
 - ❑ AMI-CAPABLE METERS FOR CUSTOMER-SIDE LEAK DETECTION.
- ❑ PHASE 2:
 - ❑ IMPLEMENT METER AGING PROGRAM TO CONVERT ALL METERS TO AMI-CAPABLE METERS OVER THE COURSE OF 10 YEARS.
 - ❑ TARGETED COMMERCIAL AND IRRIGATION CONVERSION FIRST – HIGHEST WATER USERS
- ❑ THE DISTRICT IS IN YEAR 3 OF AMI IMPLEMENTATION AND IS AT 35% COMPLETION



AMI IN ACTION: SCALABILITY OF DATA

DISTRICT

? IRRIGATION - NIPOMO COMMUNITY PARK

- ? LARGEST IRRIGATION ACCOUNT
- ? ON AMI SINCE 2020

? COMMERCIAL - OLDE TOWNE PLAZA

- ? PLAZA WITH 5 BUSINESSES
- ? ON AMI SINCE JANUARY 2022

? RESIDENTIAL – 200 BLOCK OF S BURTON

- ? SINGLE-FAMILY RESIDENCE
- ? ON AMI SINCE NOVEMBER 2022

? LEAK DETECTION

? NON-REVENUE WATER LOSS

- ? 2016: 14%
- ? 2022: 4%



PLACER COUNTY WATER AGENCY

Leveraging AMI for Leak Alerts and Beyond

SEPTEMBER 7, 2023



VA At-A-Glance



Agency created in **1957**



Five-member Board of Directors, elected by the people of Placer County, and serving **4-year** terms.



1,500 square miles of service area



Provides water service to **41,000+** customers

236,900

acre-feet of water delivery capacity



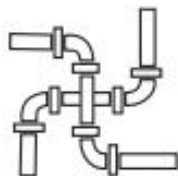
343,000

acre-feet of reservoir storage capacity



223.75

megawatts of installed generation capacity



623 miles of treated water pipeline

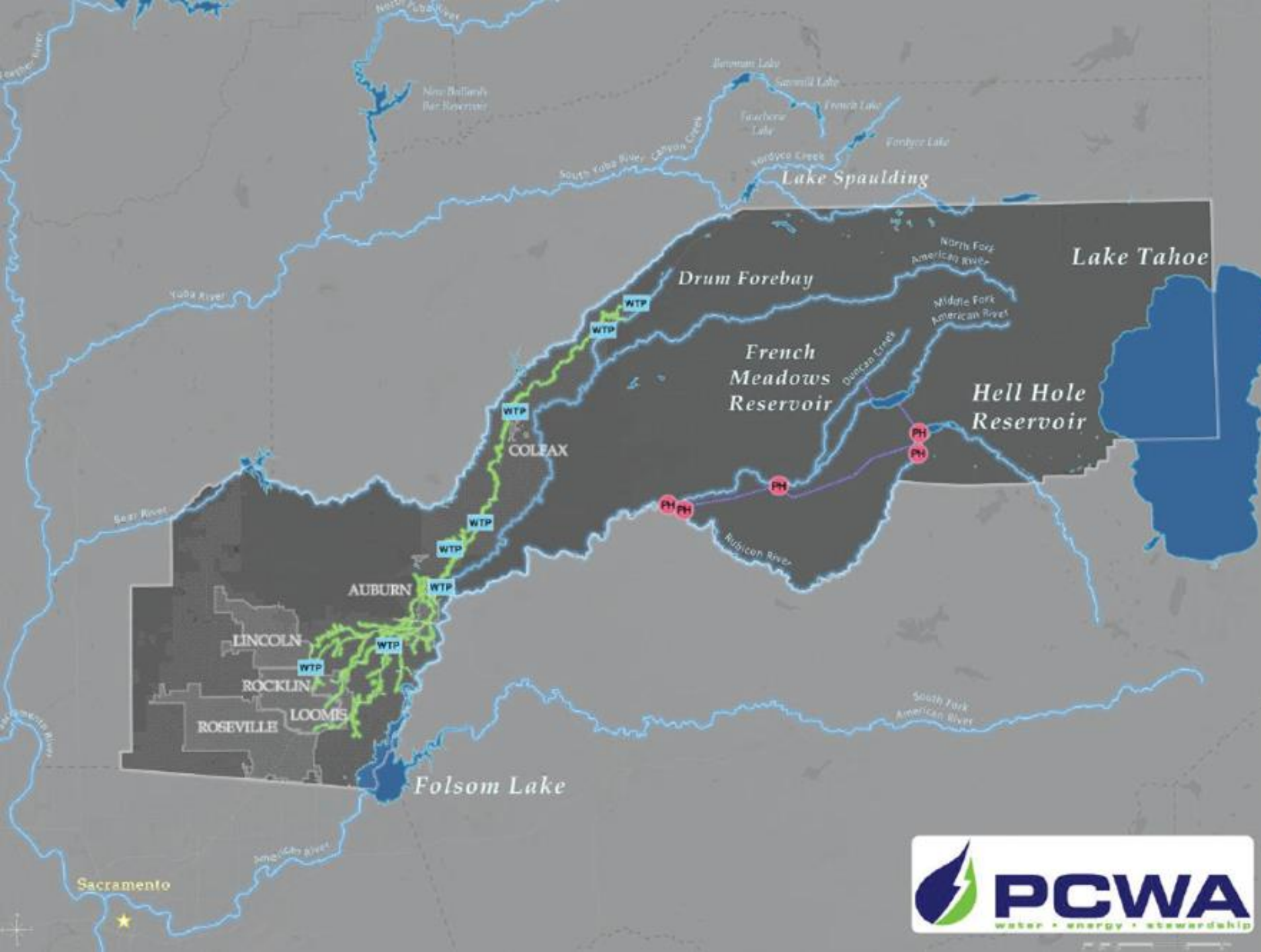
8 water treatment plants delivering safe drinking water

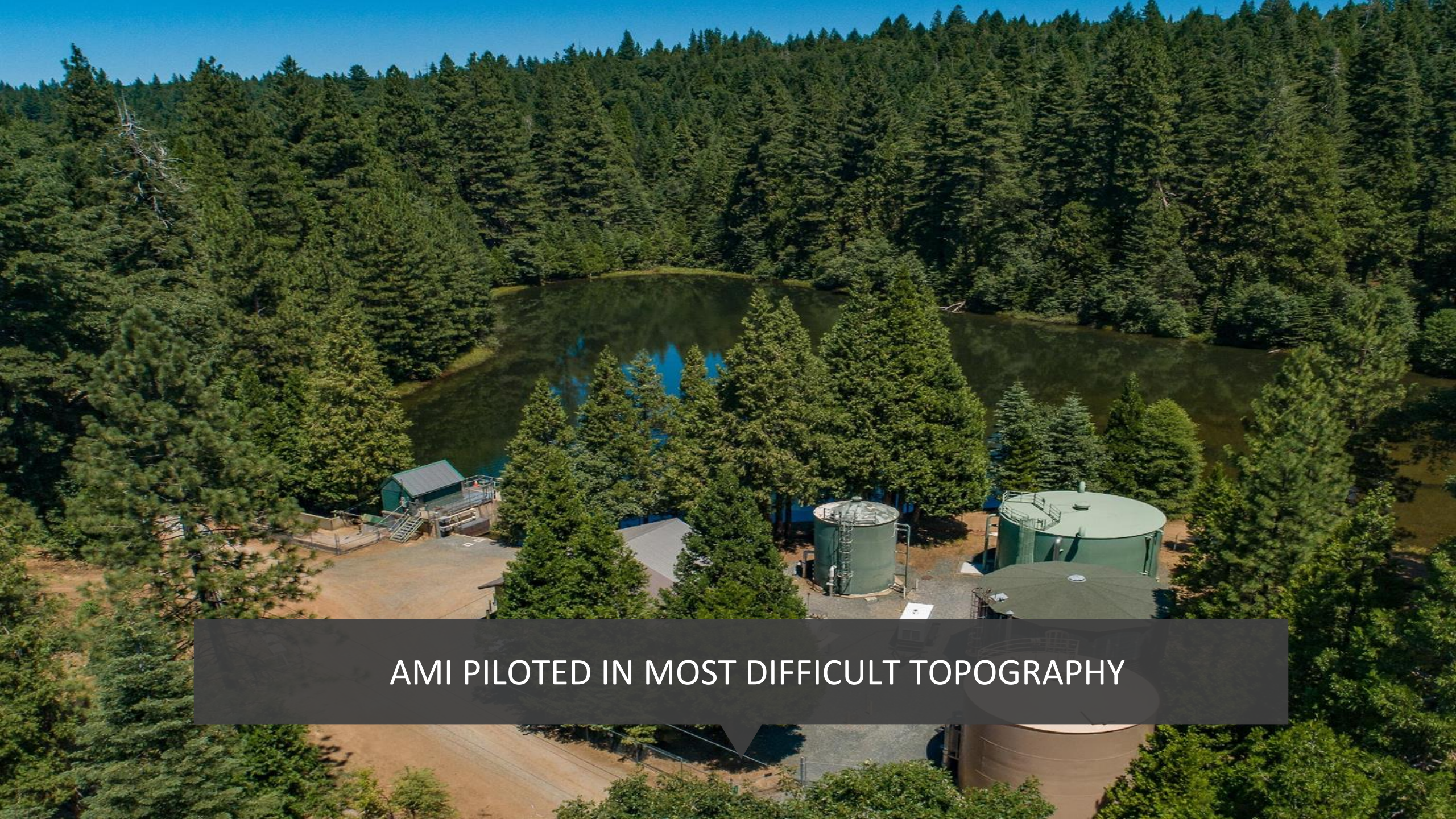


170 miles of canal

5 powerhouses supplying clean hydro-electric energy to the CA grid







AMI PILOTED IN MOST DIFFICULT TOPOGRAPHY



BILLING READS
FIRST SUCCESS STORIES
2021 RIVER FIRE – AMI ASSISTANCE FOR TREATMENT PLANT CONCERNS



WHO'S GOING TO LOOK
AT THE DATA?

SO MUCH DATA!!

Collect

Review

Analyze

Manage

Prioritize

Delegate

Follow up

Measure

Report



**NEXT STEPS
THANK YOU
QUESTIONS**



BIG TAKEAWAYS

Alerts/Notifications

- Data can inform you about continuous water flow issues within days or hours
- Data can inform you about high use days
- If customer relies on water bill, might take 3+ months to know about the issue

Easy Reads

Staff can get fast, easy and accurate reads in hard to reach areas.

Data Knowledge

Data can be used to track:

- use in areas (neighborhood, CII vs Res, Indoor vs Outdoor) for State Reporting
- water loss for State Reporting
- customer consumption behavior
- and model water uses across different customer bases



HILLSBOROUGH
California

CaDC Data Summit

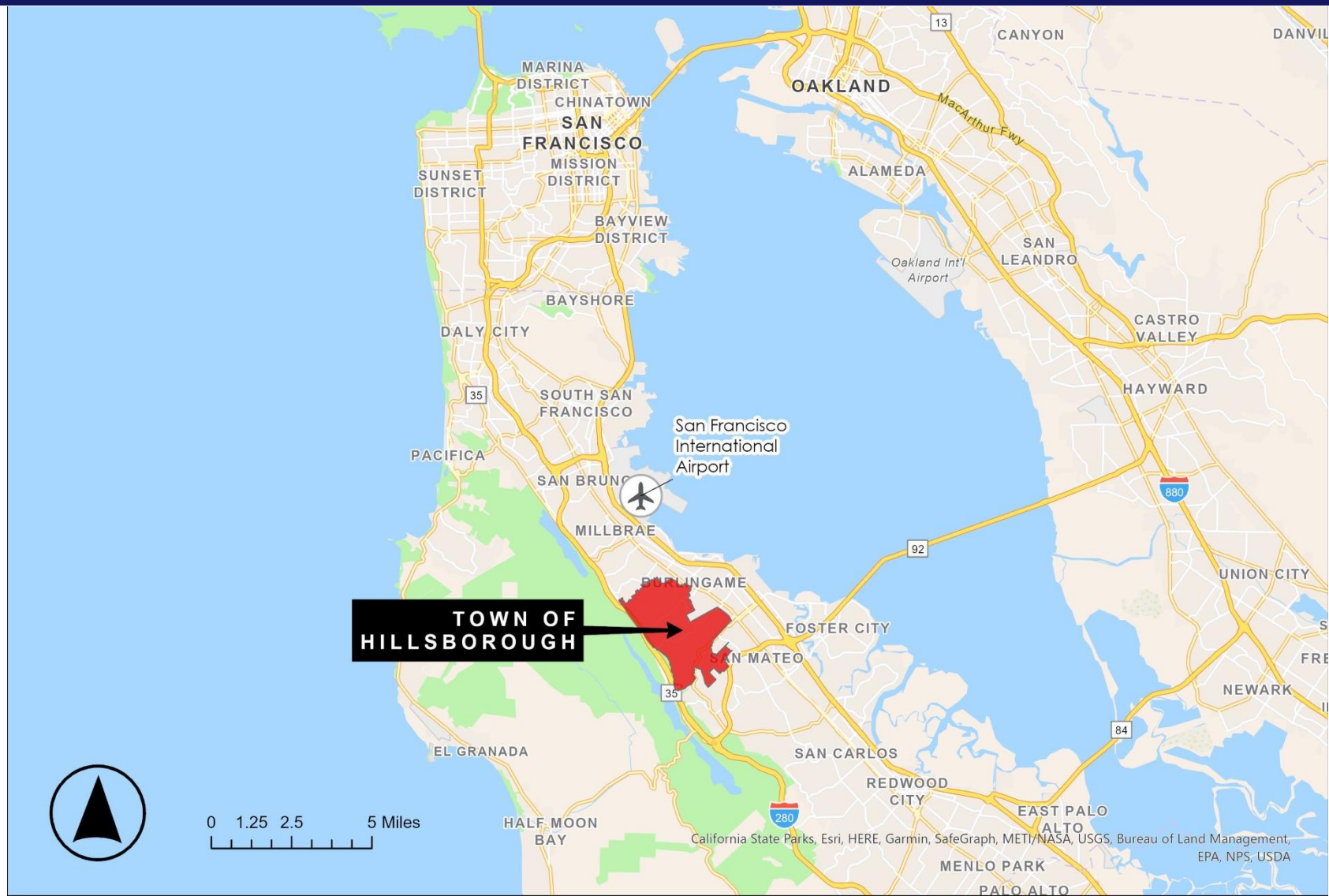
September 7, 2023



HILLSBOROUGH *California*

Town of Hillsborough

- **Residential Community**
- **+/- 11,000 population**
- **Affluent Customer Base**
- **Large Landscaped Parcels**
- **Services:**
 - **Water Distribution**
 - **Sewer Conveyance**
 - **Storm Conveyance**
 - **Streets**
 - **Building/Planning**
 - **Finance/Billing**
 - **Police**





HILLSBOROUGH *California*

AMI Project

- **Replaced Sensus touch read** system and 20+ year old meters
- **Installed Sensus AMI** meters and Flexnet AMI system (3 companies evaluated)
- **Selected WaterSmart** customer service portal (5 companies evaluated)
- Approximately 4,200 meters (93% = 1" meters)

Milestone	Date
AMI RFP Issued	October 2015
Notice of Award	May 2016
Base Station Installation	August – October 2016
Meter/Radio Installation	November 2016 – April 2017
WaterSmart Go-Live	May 2017



HILLSBOROUGH *California*

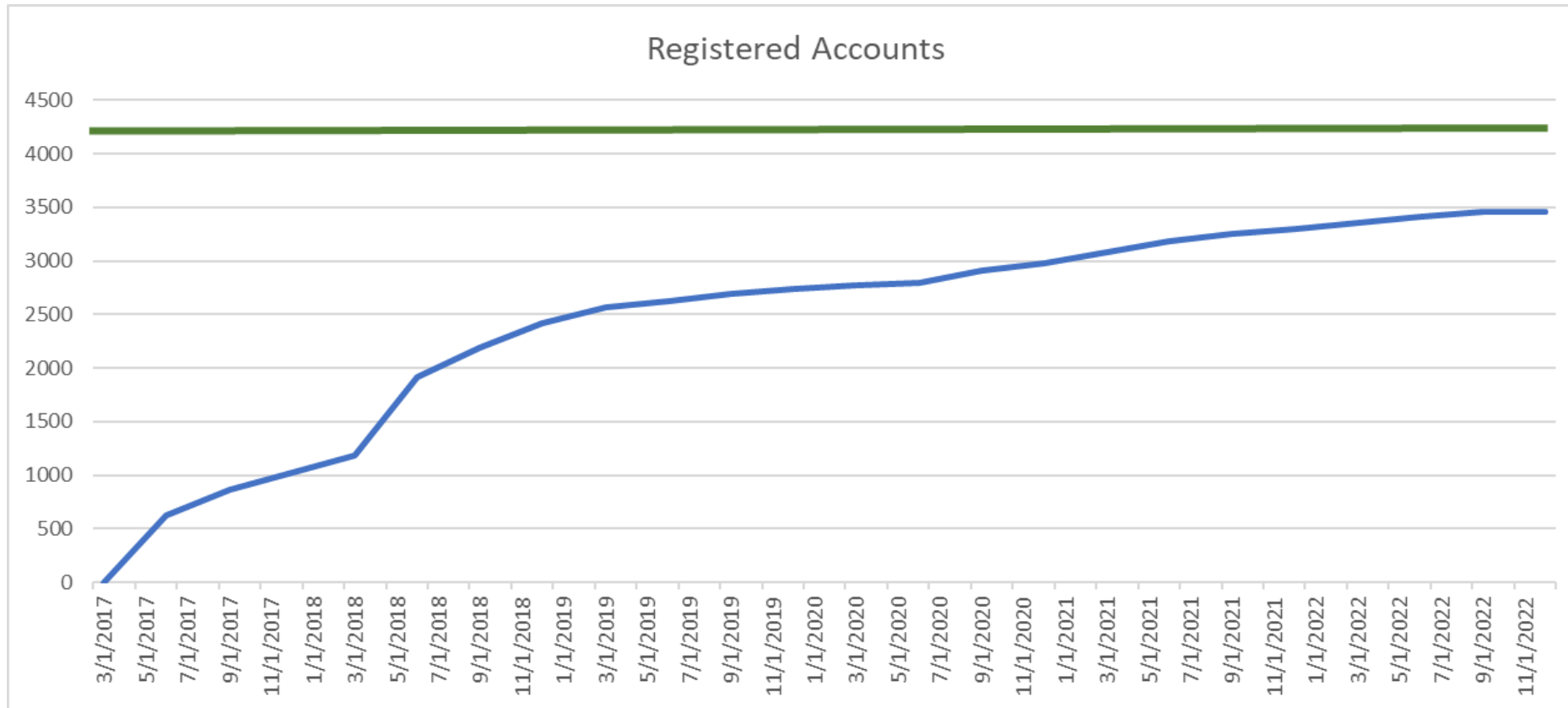
WaterSmart Registration Rate

Registration Rate

84%

Accounts with Email or Phone

95%



100% Goal

84% Registered



Tried Everything & Measured Results

- Print Outreach (Welcome Letters, Leak Letters, Bill Inserts...)
- E-Announcements
- Truck Billboards
- Banners
- Door Hangers
- Community Events
- Newsletter Articles
- Group Messenger
- Swag

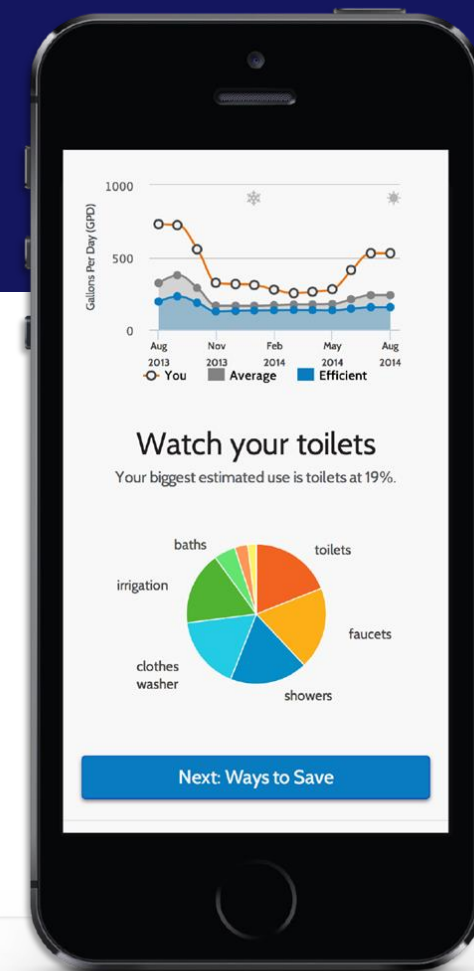
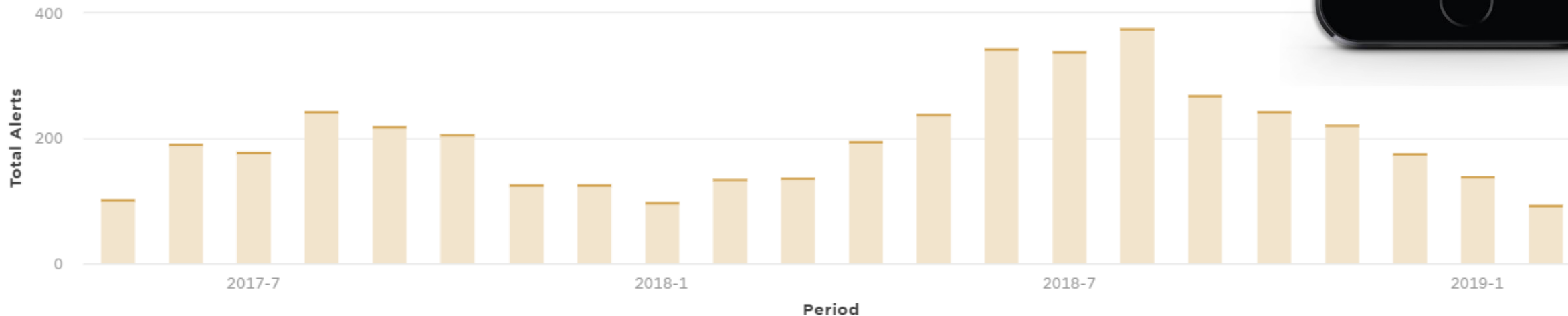
What Worked

1. Formal Outreach Plan
2. Finance Customer Contact Letters
3. Winter Irrigation & Leak Alerts
4. Customer Service Interaction
5. Field Staff Interaction

**Focused on non-registered
accounts**



- Meter Data Interruptions
- Non-Detectable Leaks (e.g., cracked spray head)
- Leak Alert Non-Response
- Utilizing Hourly Data





Data Sources

- **Sensus:** MDMS, RNI and Data Lake
- **WaterSmart:** Use Alerts
- **Eye-On-Water:** Hourly Purchased Water
- **Tyler Munis:** Customer Billing
- **Geo Data:** Water System Assets & per Parcel Land Use Data
- **SCADA:** Tank Levels & Pump Run Times
- **Water System Pressure:** 2023 Water Pressure Study
- **AWWA Water Audit:** Water Loss
- **Water Quality Sampling:** Weekly Sample Results
- **Water Main Breaks:** Water Main Break Dates/Location
- **Sewer Flow Meters:** Effluent to Treatment Plants

Possible/Existing Use Cases

- **Sewer Inflow/Infiltration Analysis**
- **Water Main Dead-End Turnover Analysis**
- **Drought Emergency Water Allocation vs. Use Tracking**
- **Meter Data Interruption Tracking and Analysis**
- **Customer Water Use Efficiency Analysis**
- **Water Main Breaks vs. Pressure (e.g., Ally Meters)**

Working with the CaDC to
Scope Use Cases



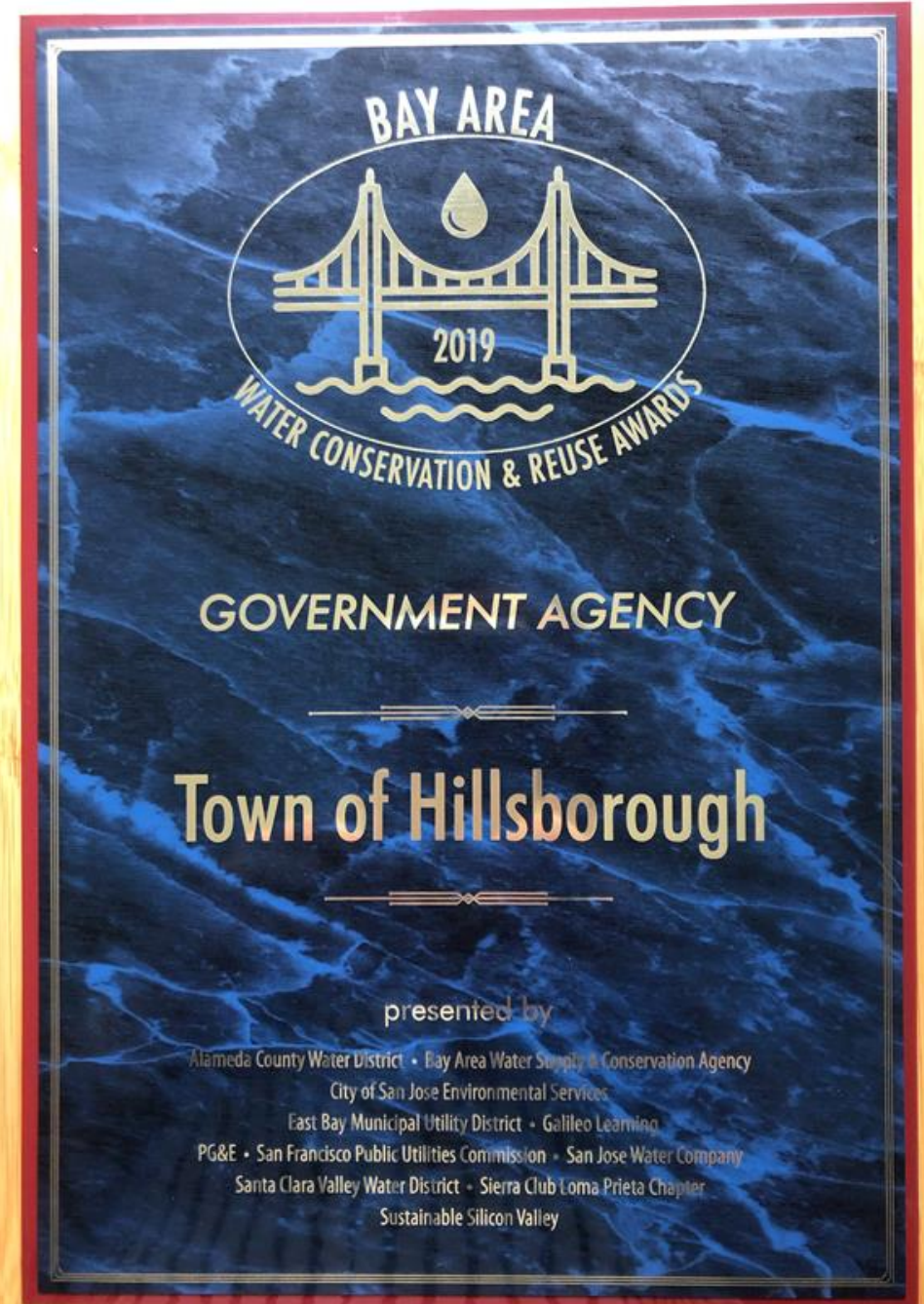
HILLSBOROUGH *California*

Questions?

Ed Cooney

(415) 606-6786

ecooney@hillsborough.net





THANK YOU!
QUESTIONS?

CONNECT WITH US!



Stanford Visitor
(no password needed)



moulton niguel water district



CALIFORNIA
DATA
COLLABORATIVE



SWAN
SMART WATER NETWORKS FORUM



@MNWDWater

@california-data-collaborative

@swanforum



@MNWDWater

@cadc_io

@SWAN_Forum



#MNWDWater

#CAWaterDataSummit

#SWANForum

#CaWaterDataSummit #IntelligentQuestioning