BWS Initiatives to Conserve and Potentially Utilize Existing Assets?

Presentation for:

2025 Hawai‘i Water Works Association

Aulani, A Disney Resort & Spa in Ko Olina

Thurs., Oct. 15, 2025 – 1:30 Session

Presented by:

Okahara and Associates, Inc.
CIVIL AND MECHANICAL ENGINEERING CONSULTANTS

Presenters

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Okahara and Associates, Inc.

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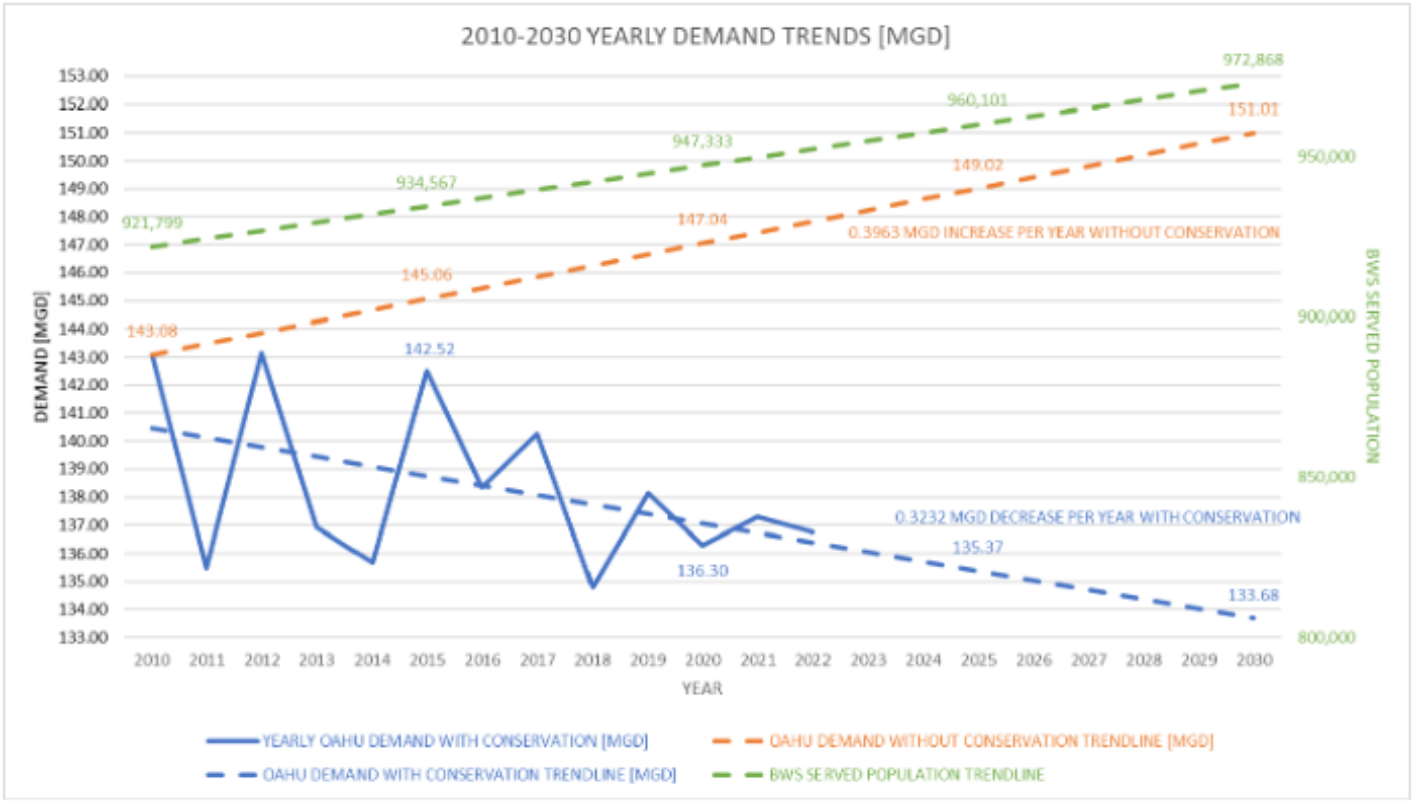
Civil Engineer, Vice President

Okahara and Associates, Inc.

Do as you say…

Water Demand Trend



To extend the life of this precious resource, we need to be more conscious of water conservation practices in our everyday lives. With a little effort and a little common sense, you can make water conservation a way of life by locating and fixing leaks, choosing plants and trees which require a minimum of water, and following other water saving tips that can save thousands of gallons every year.

Water Waste Hotline

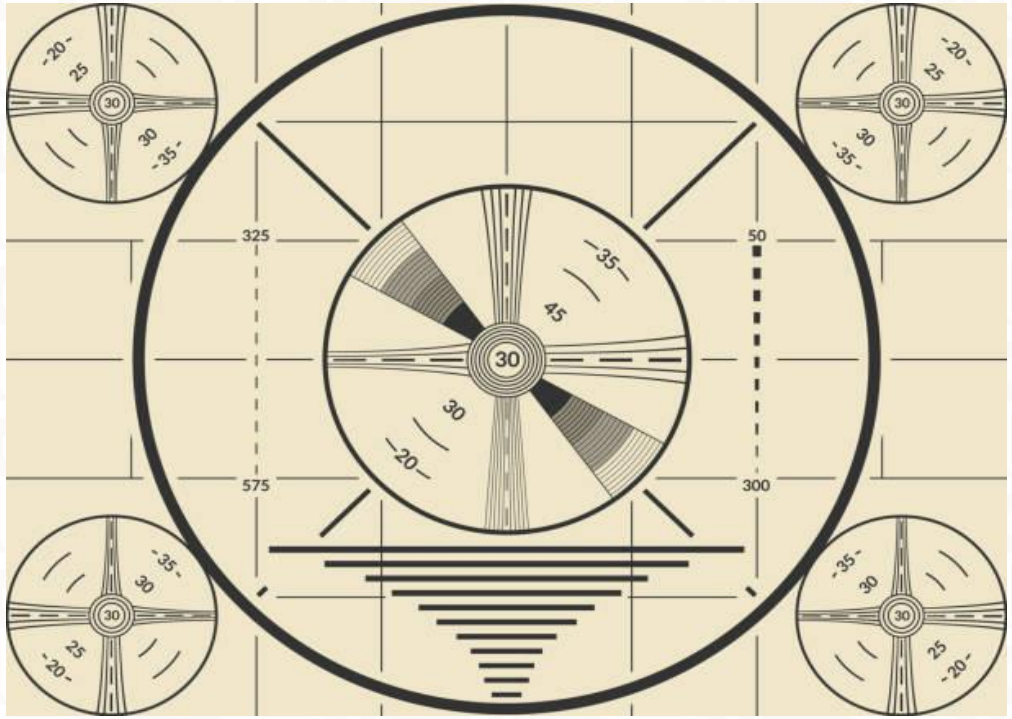
Need to report a water waste concern? Contact us at the Water Waste Hotline.

So What is BWS Doing?

Presentation Focus:

Source Meter Accuracy Verification
- Purpose of Project
- Determining Source Priorities
- Verification Methodology
- Preliminary Findings
- Challenges

Water Loss
10% to 15%
(10 years)

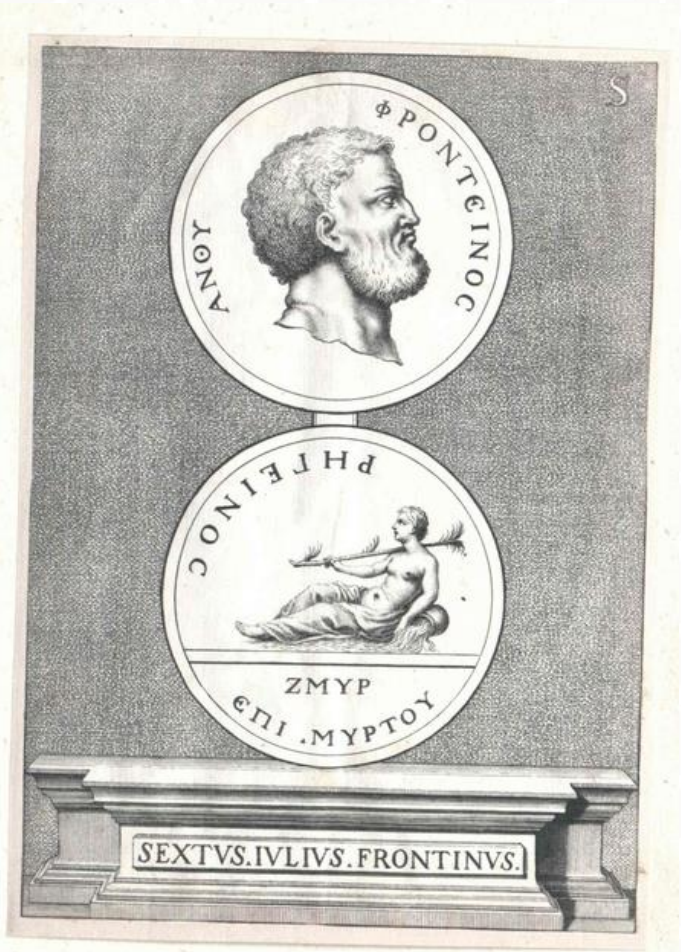


Well Condition Assessments
- Assess Physical Conditions
- Evaluate Aquifer's Ability to Recover from Continuous Pumping
- Evaluate Water Quality from the Wells
- Provide Recommendations

Source Meter Accuracy Verification: What's the Point?

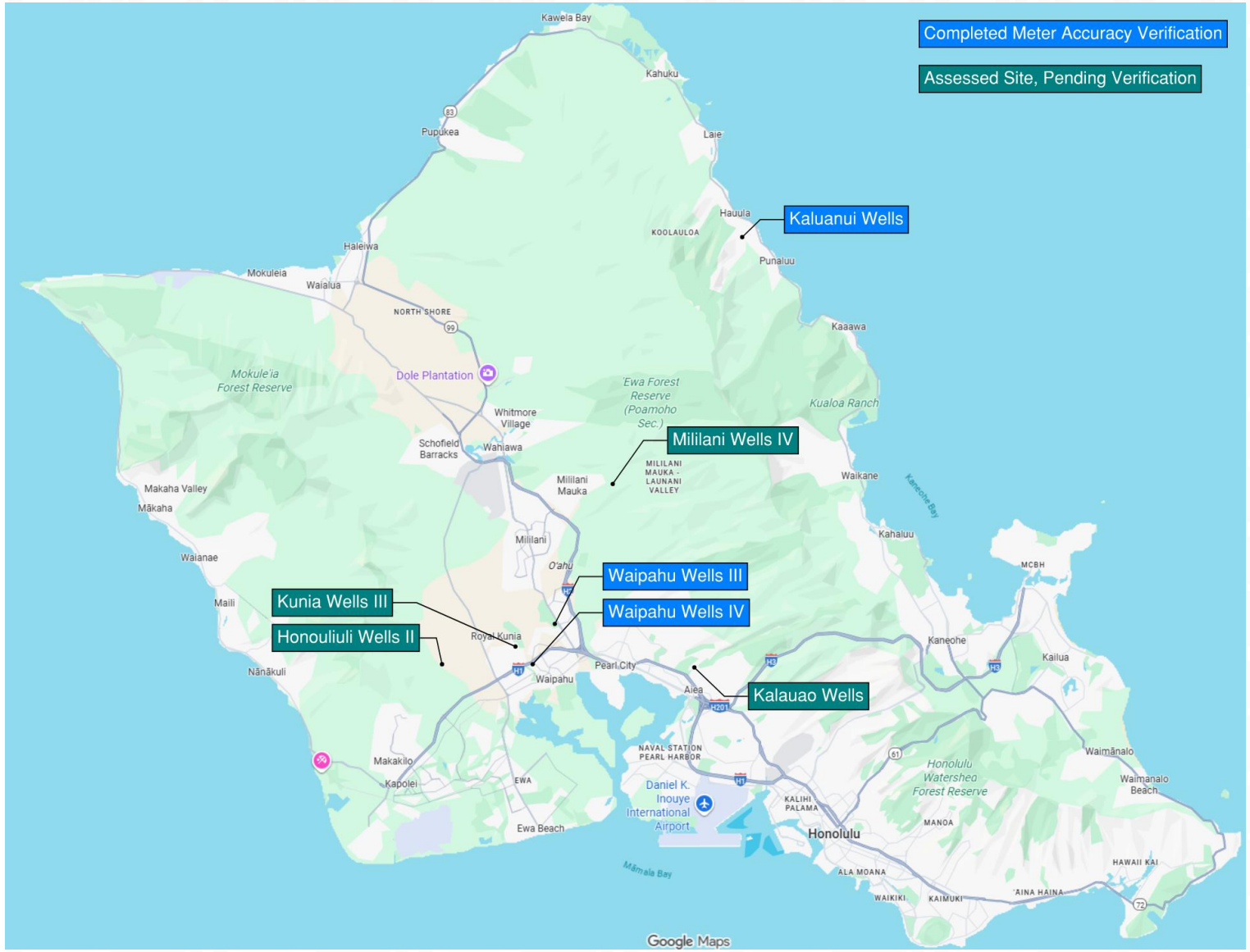
- Confirm accurate water measurement to:
  - Produce revenue fairly to cover expenses
  - Charge customers equitably
  - Incentivize conservation
  - Reduce waste of water
  - Reduce load on wastewater facilities

- Assist BWS with fulfilling DLNR-CWRM audit requirements



Source Meter Accuracy Verification: Where are they?

- 3 Sites Completed
- 4 Sites Assessed
- 20 Sites Pending Assessment
- Priorities based on:
  - Flow:
    - Higher flow = higher priority
  - Meter Accessibility:
    - Easier access = higher priority
  - Site Access:
    - Available = higher priority



Source Meter Accuracy Verification: How to do it?

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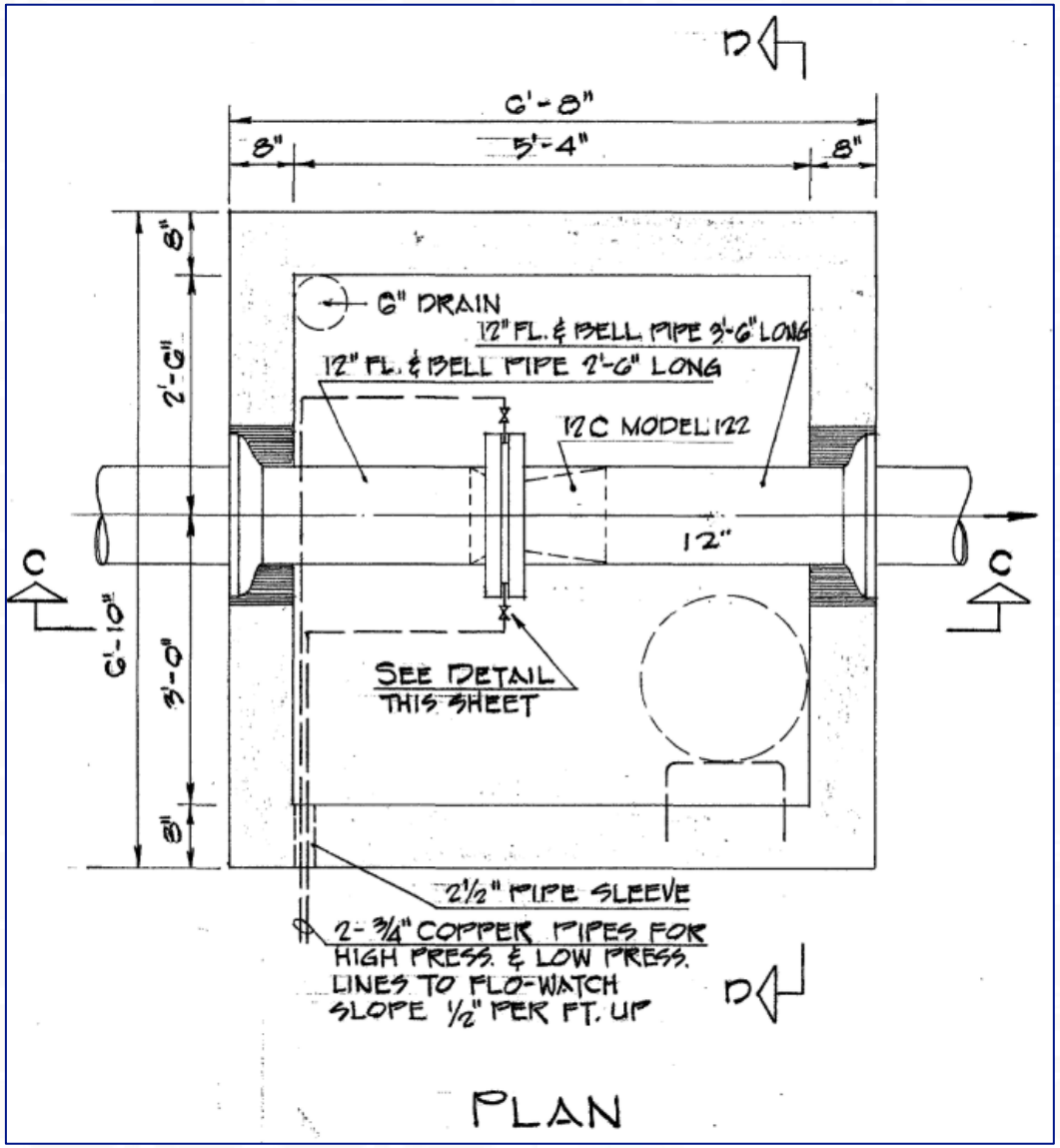
Transit-Time Ultrasonic Flowmeter

- Signal quality (>30%)
  - Clean pipe surface
  - Homogeneous fluid
  - Effective transceiver positions
  - Low noise/vibration
- Uniform flow-velocity profile
- Straight pipe lengths
- +/- 0.5% accuracy

Source Meter Accuracy Verification: Challenges

- Accessibility
  - Buried flowmeter
  - Flowmeter in vault
  - Lack of exposed straight pipe lengths
- Multiple Locations
  - Requires simultaneous deployment
  - Simultaneous deployment will negatively impact test accuracy
- Power Availability
  - Requires utility power
  - Site power connection too far or only in secured location

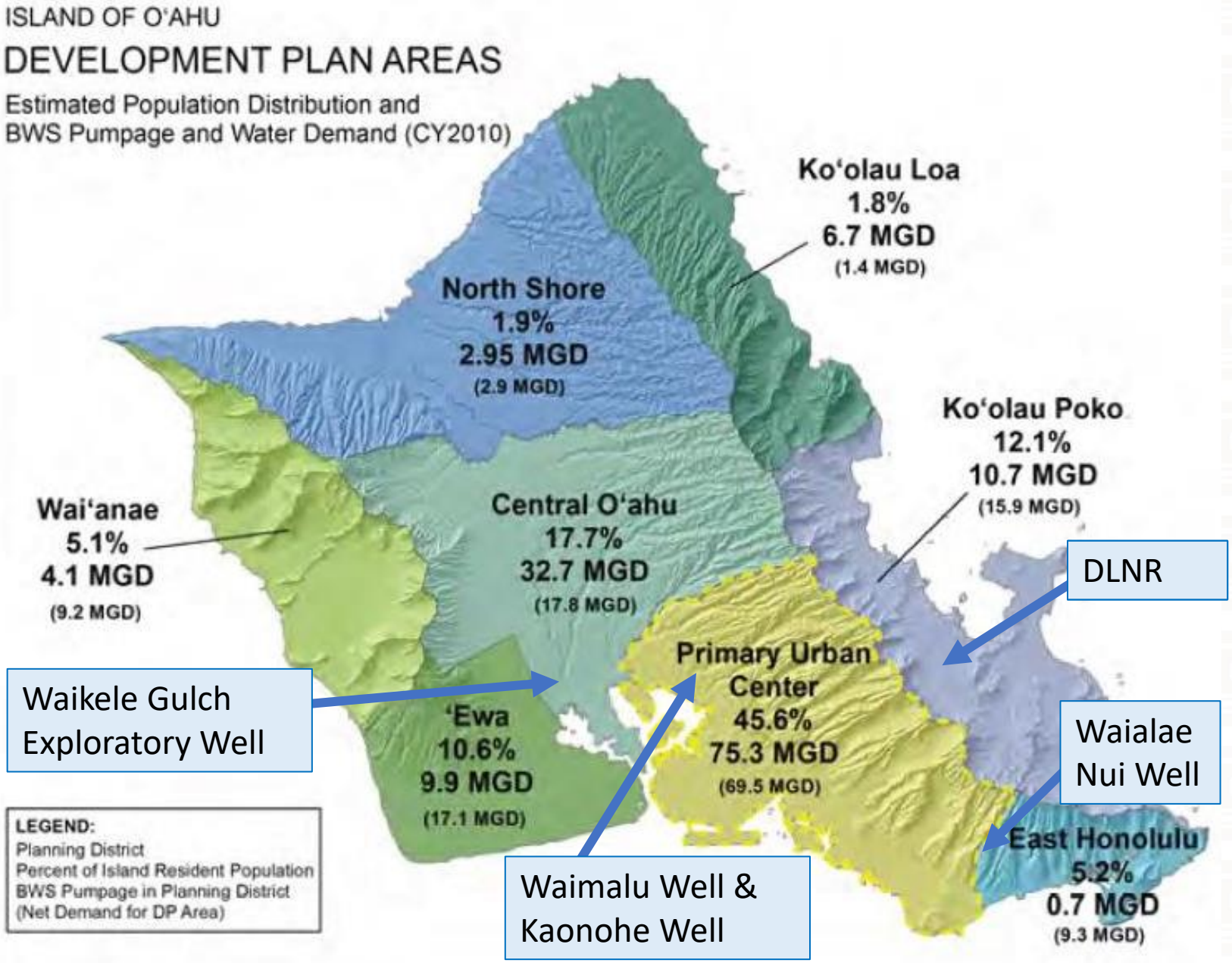


Wells Regional Map

Deactivated Wells
- Kaonohi Wells II, Well #1 (completed 2025)
- Waimalu Wells II, Well #2 (completed 2025)

Exploratory Wells
- Waikele Gulch Exploratory Well (completed 2019)
- DLNR Windward Well (on-going)

Monitoring Well
- Waialae Nui Well (completed 2025)

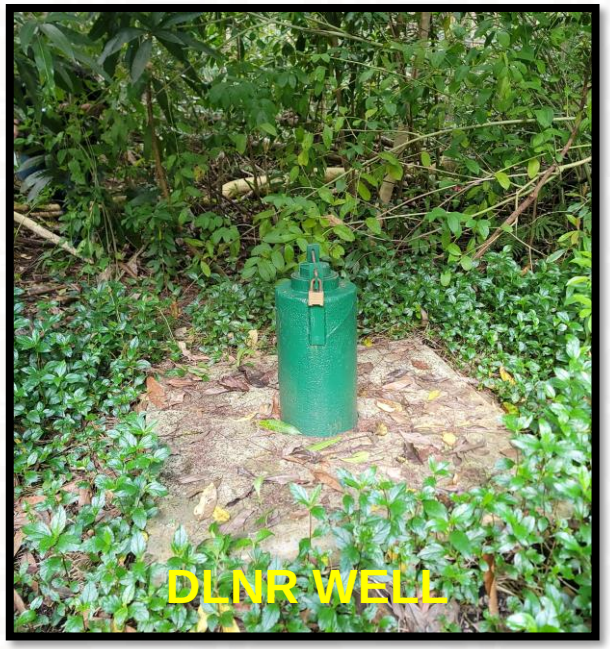


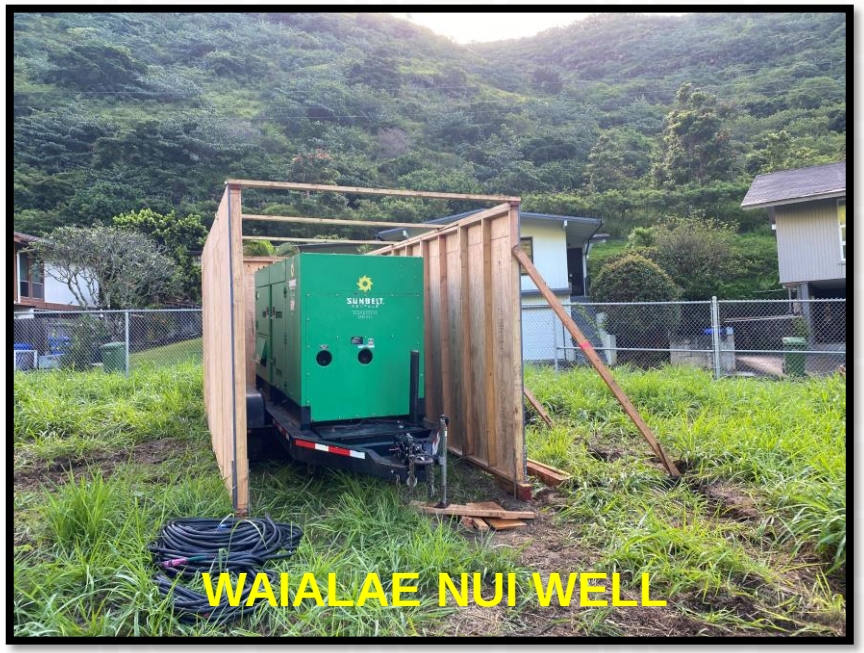
Well Testing Procedures

- Site Preparation & Permitting
- CCTV Camera Inspection
  - Real-time viewing, dual (side and downhole) viewing, variable light intensity for various borehole diameters
- Plumbness and Alignment Tests
  - AWWA A100-20 Water Wells
- Submersible Test Pump
  - Step-drawdown test
  - Constant rate test
- Generator and Mute Structure, if needed
- Data Gathering
  - Yield, drawdown, salinity, recovery, and quality
  - Hawaii Well Construction & Pump Installation Stds.
- Measure and log water level, pressure, conductivity, and temperature, and rate of discharge (sounding tubes and water meter)
- Samples – US EPA Lab per DOH requirements for potable well and EPA Methods for PFAS

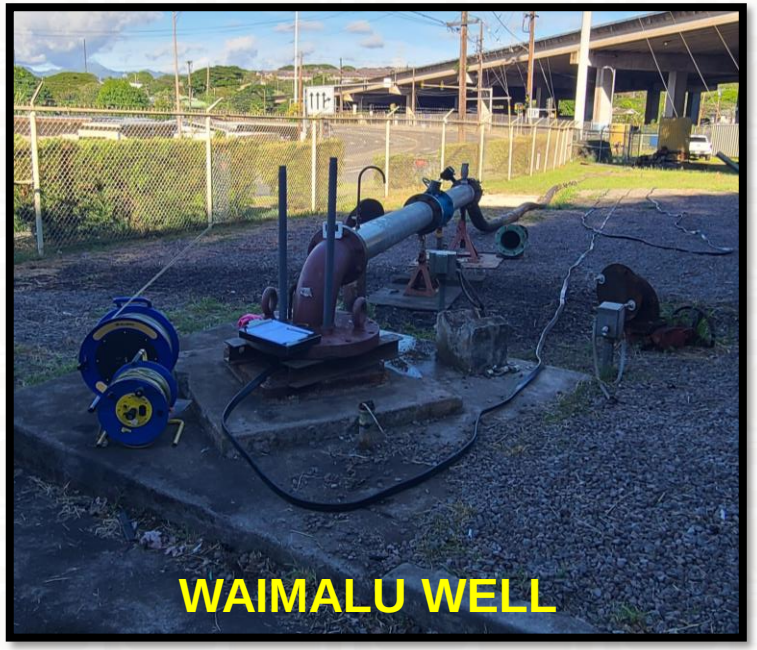

WAIKELE GULCH WELL


KAONOHI WELL


DLNR WELL


WAIALAE NUI WELL


WAIMALU WELL


WAIMALU WELL

Well Testing Summary

Well	Step-Drawdown Rate	Constant-Rate (Estimated)	Constant-Rate (Actual)	Chlorides (avg)	Recommended Pumpage Rate
Kaonohi	350, 500, 750 gpm	500 gpm	500 gpm	488 mg/L	None
Waimalu	350, 500, 750 gpm	500 gpm	300 gpm	910 mg/L	None
Waikele Gulch	850, 1350, 1500 gpm	1100 gpm	1400 gpm	46 mg/L	1100 gpm
Waialae Nui	350, 500, 750 gpm	500 gpm	500 gpm	49 mg/L	350 gpm
DLNR	350, 500, 700 gpm	500 gpm	TBD	TBD	TBD

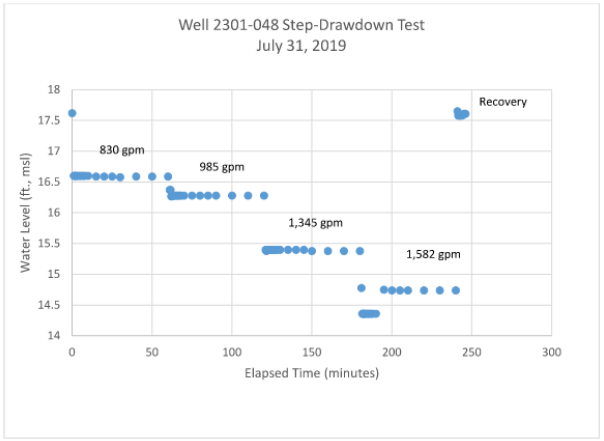


Figure 8: Measured water levels during the step-drawdown test.

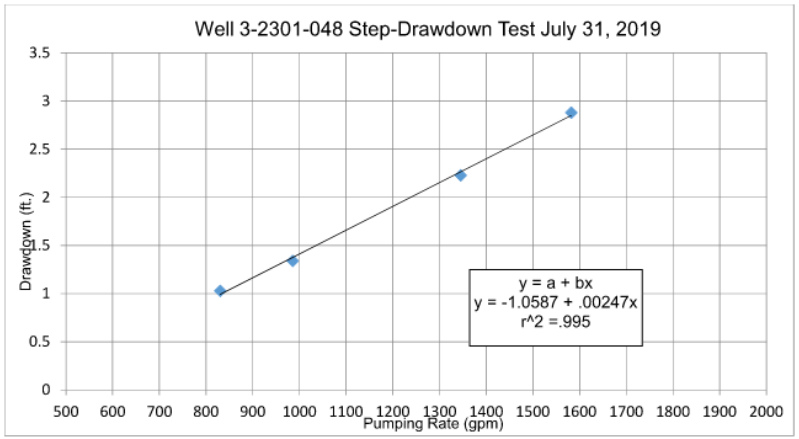


Figure 6: Drawdown vs. pumping rate.

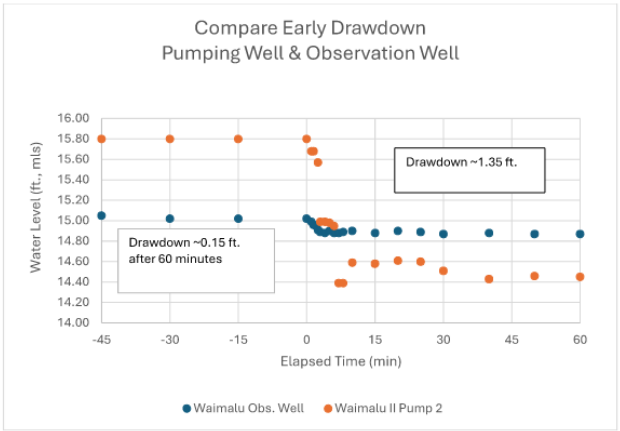


Figure 12: Comparison of drawdown between pumping and observation wells

Questions?