

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



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Tailored to Fit:
The Essentials of
Designing a Successful
Water Conservation Program

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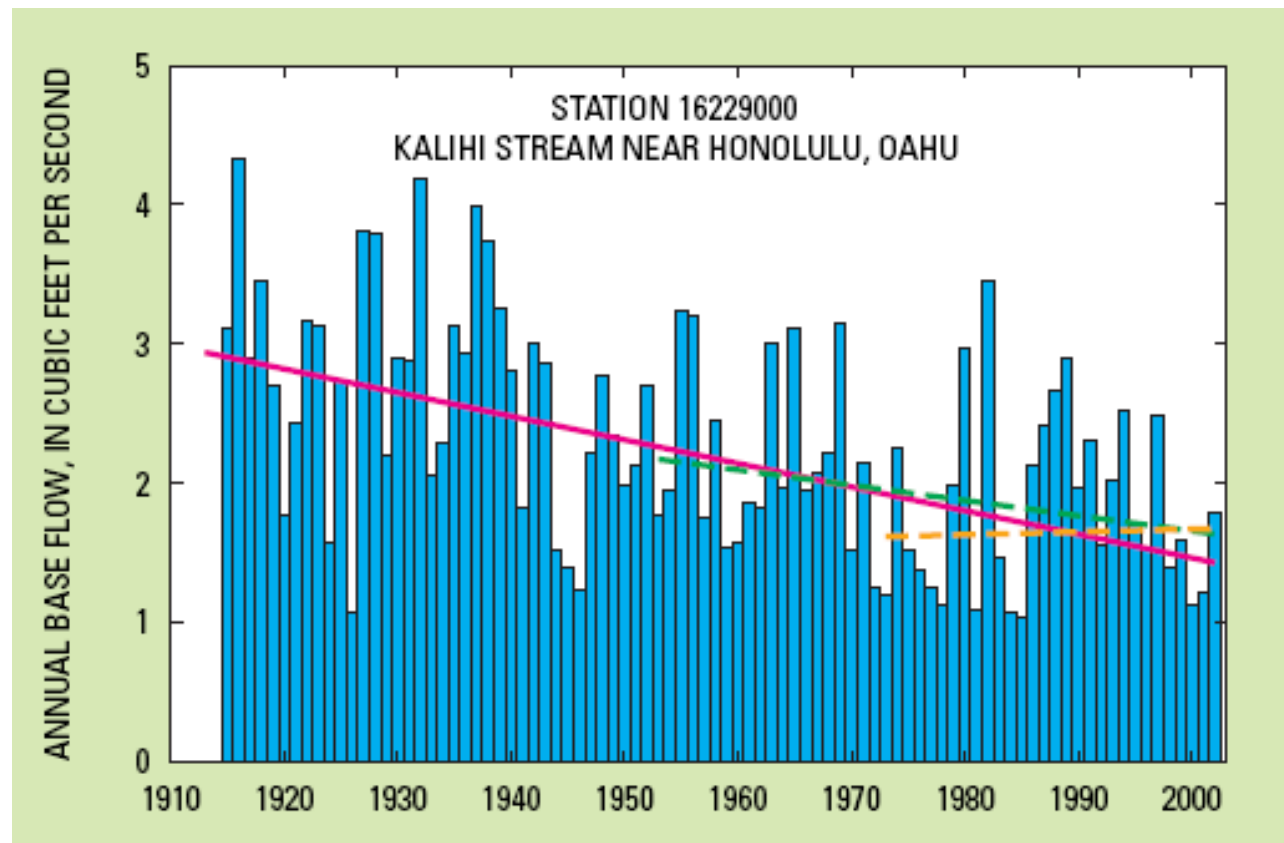
Overview

- Local water efficiency drivers and benefits
- Internal Conservation
- External Conservation
- Case Study: Honolulu Board of Water Supply



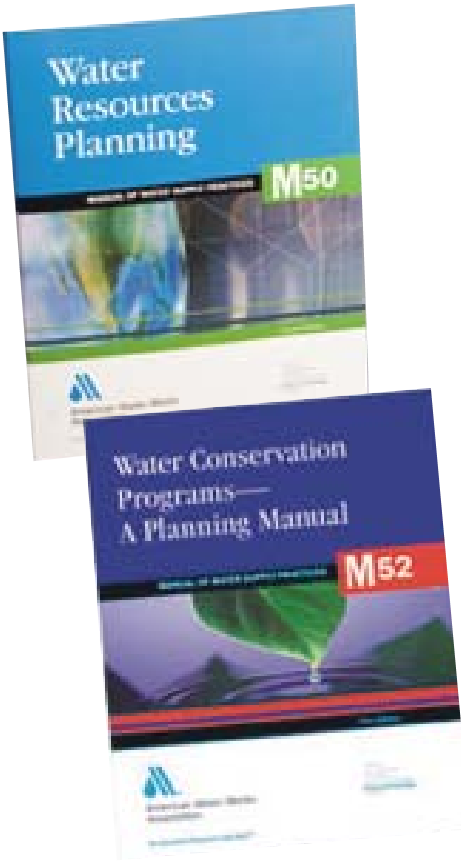
Regional Water Efficiency Drivers

- **Need for sustainable water supply**
- Declines in sources of supply
- Not enough developed water for all needs
- Water quality
- Environmental goals
- **Droughts**
- Community support
- Plumbing code
- Water Sense partnership
- **Beyond basic stewardship**



Tailoring Internal and External Conservation Programs

- **Theme:** most water savings for least cost
- **Launch and continue to focus on “cleaning house” first**
 - credibility with customers
 - production cost savings
- **Set example for customers** by reducing visible waste on part of utility and other government agencies (e.g., gutter flooding from parks)
- **Target highest water conservation potential** (leakage, residential and commercial, irrigation)
- **“Shared vision”** strategic plan founded on stakeholder buy-in
- **Build on other’s lessons learned** and pay attention to local setting and drivers
- Fund and implement plan with clear milestones
- Track and incorporate your own lessons learned

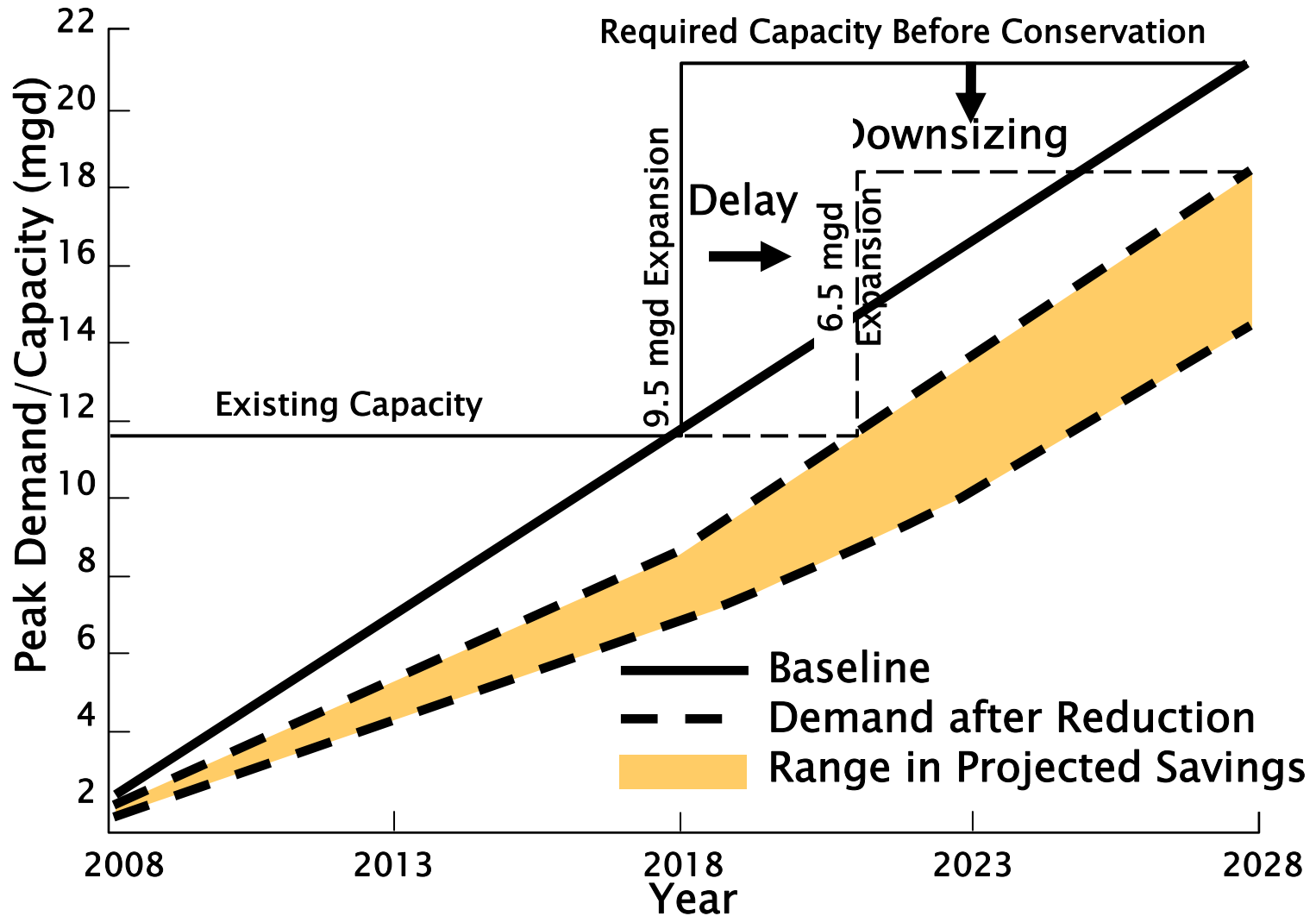


Potential Benefits: Multiple Perspectives on the Triple Bottom Line

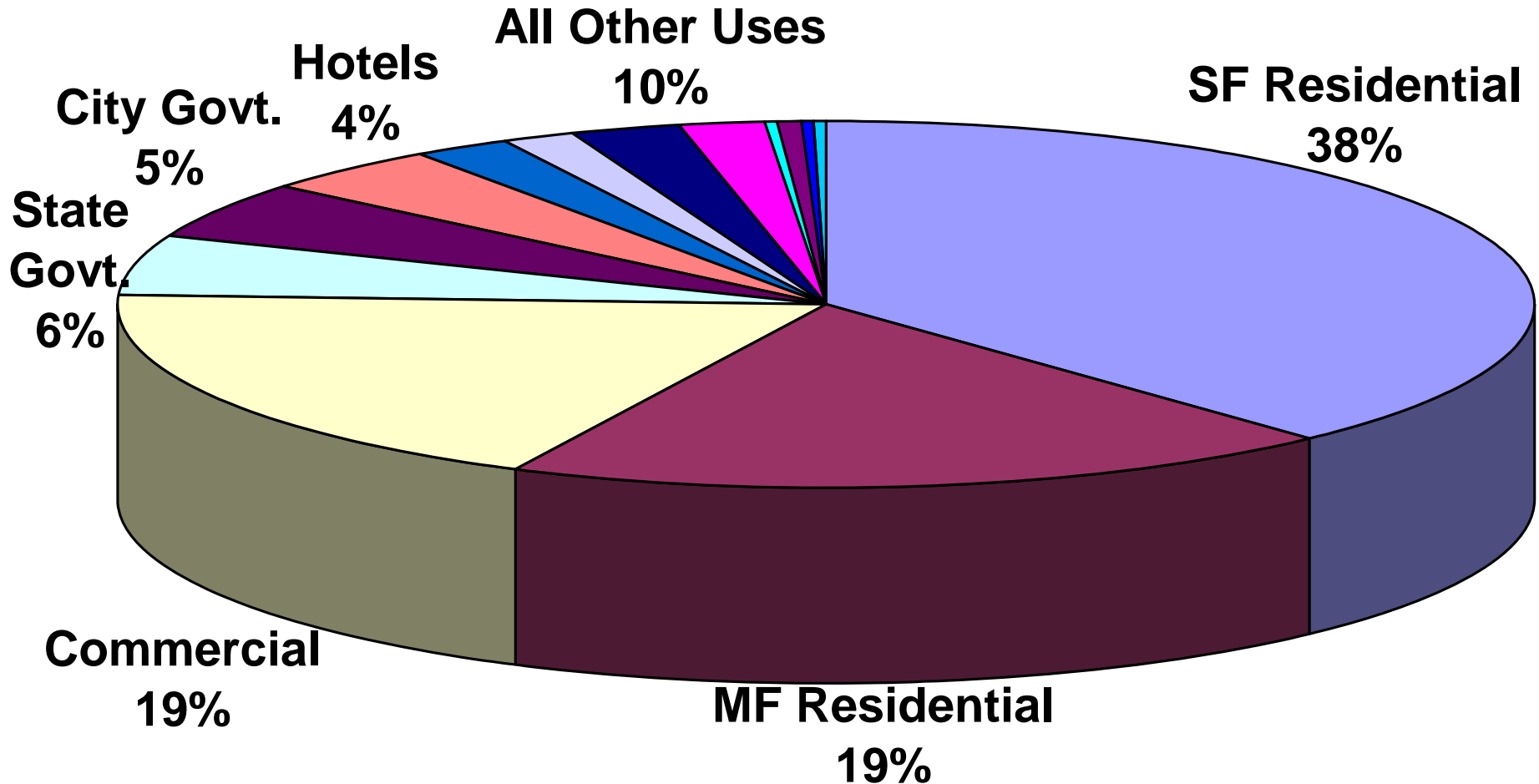


- To the Utility
 - deferred capital projects
 - reduced O&M
 - water, energy and greenhouse gas emissions savings
 - **more reliable supplies**
- To the Customer
 - lower water/sewer bill
 - lower energy bill
 - **“green” actions for better quality of life**
- To the Environment
 - increased stream flows
 - higher groundwater table
 - **more sustainable ecosystems improves water quality**

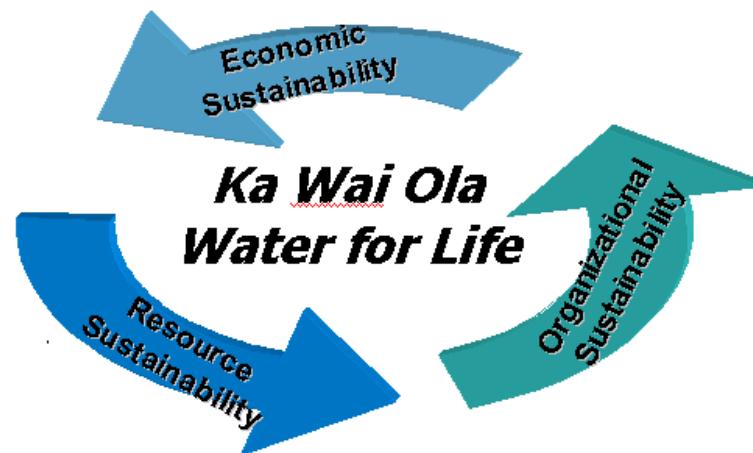
Potential Benefits: Utility Perspective



Tailor Programs to Target Potential: Example BWS Demand



Case Study: Honolulu Board of Water Supply

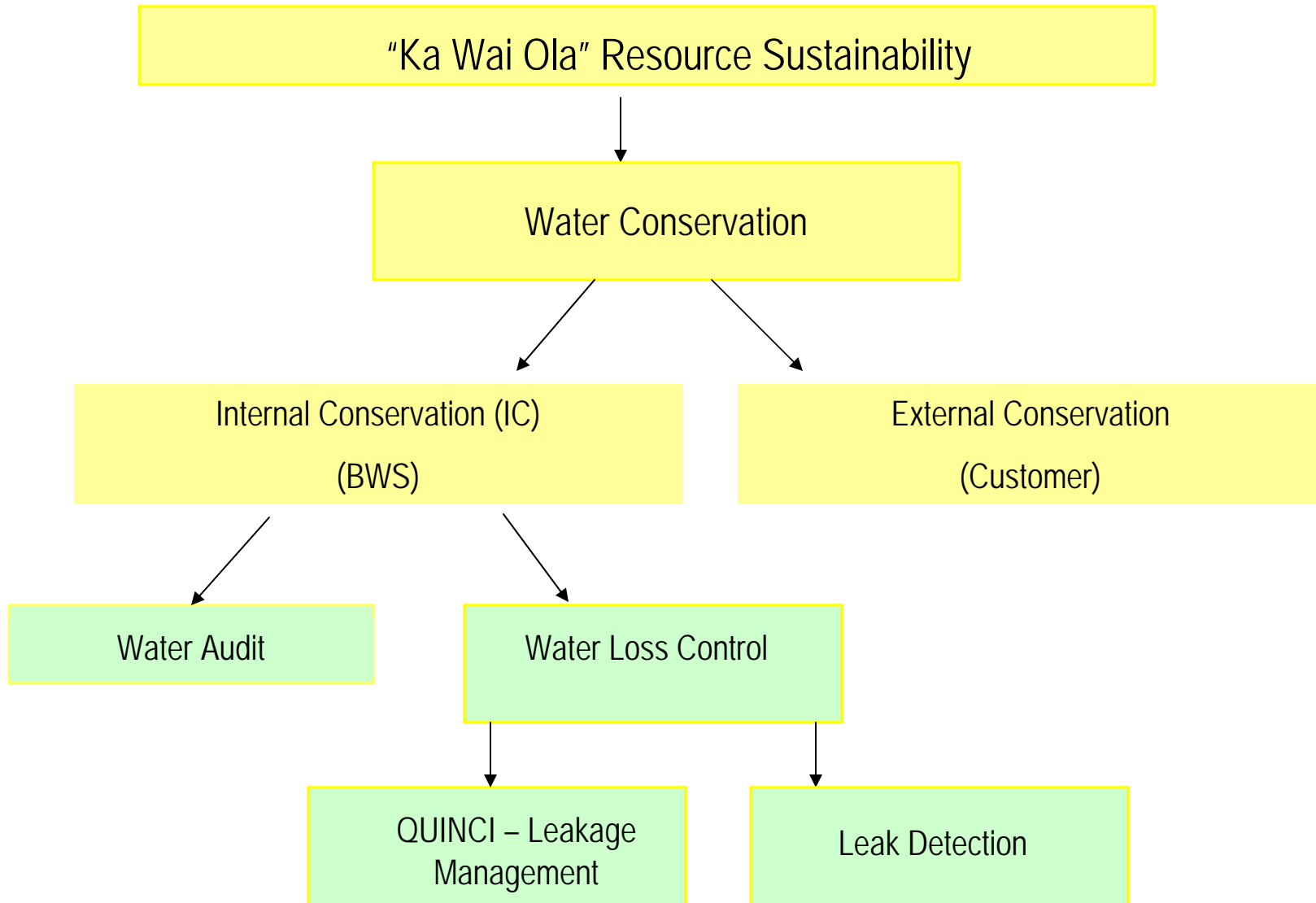


BWS Background - The Board of Water Supply

- 1929, Act 96
- 7-member board
- 1 million customers
- 166,445 active services
- 600 employees
- 150 MGD pumpage
- 104 water sources
- 164 storage tanks
- 2,037 miles of pipeline



Current BWS Efforts - Conservation Program



Current Internal BWS Efforts - Leak Detection Program



Statistics for 2007:

- 56 leaks totaling about 829 MG/yr
- \$265,000 savings



Current Internal BWS Efforts - QUINCI - Leakage Management Program



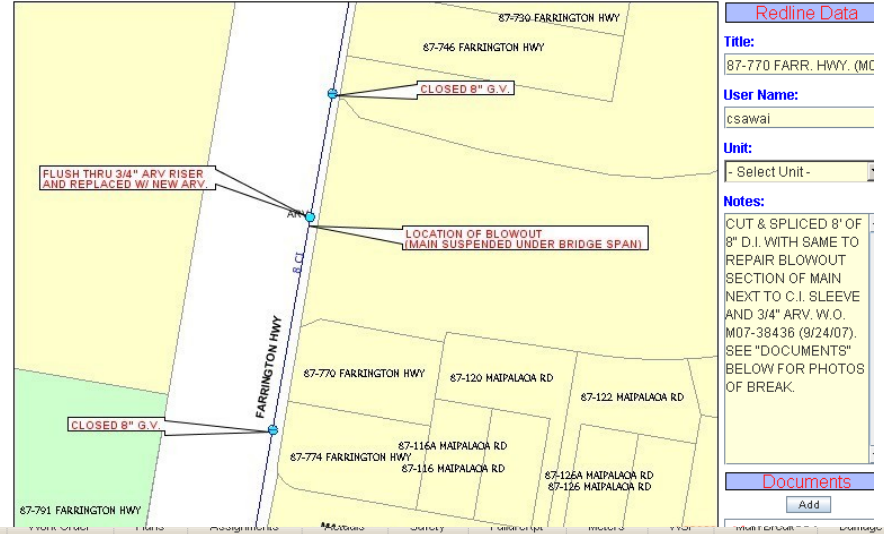
- Corrosion Control Program
- Pipeline Failure Analysis Program



Current Internal BWS Efforts - Main Repair Statistics 2005-2007

	2005		2006		2007	
	No.	%	No.	%	No.	%
Defective Pipe	1	0	0	0	0	0
Corrosion	164	43	163	44	165	58
Contractor in Area	8	2	15	4	7	2
Settlement	29	8	33	9	15	5
Rock	8	2	5	1	2	1
Expansive soil	0	0	0	0	0	0
Pressure	11	3	12	3	4	1
Tree roots	7	2	8	2	1	0
Unknown	132	34	114	31	89	31
Other	29	8	10	3	1	0
TOTAL BREAKS	385		373		284	

Current Internal BWS Efforts - Data Collection



Redline Data

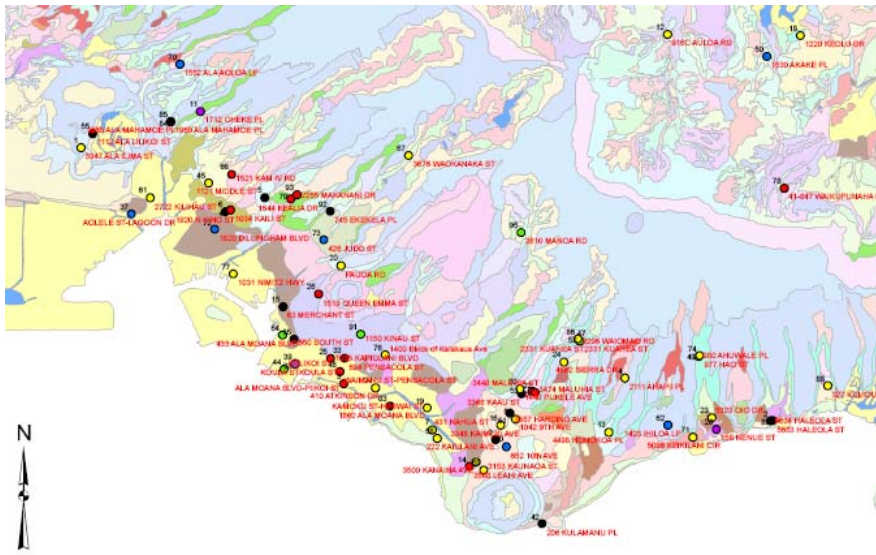
Title:
87-770 FARR. HWY. (MC)

User Name:
csawai

Unit:
- Select Unit -

Notes:
CUT & SPliced 8' OF 8" D.I. WITH SAME TO REPAIR BLOWOUT SECTION OF MAIN NEXT TO C.I. SLEEVE AND 3/4" ARV. W.O. M07-38436 (9/24/07). SEE "DOCUMENTS" BELOW FOR PHOTOS OF BREAK.

Documents
Add



Work Order: * M06-8368 * 8" CI main break **Status:** * 4COMPLT **SR #:** []

1 Break
Filter **Displaying 1 - 1 of 1**

Horizontal Corroded Outside None Utilities

Water Main Failure

Throttle Date/Time: 11/30/06 6:15 AM

Type of Break: Horizontal **CAUSE OF BREAK:** CORROSION

Type of Soil: Adobe

Pipe Condition: Corroded Outside

Utils Encountered: None

Difficulties: None

Pavement Damage? none

Cover (ft): 3.00 **Splice Length (ft):** 7.00

Pipe Thickness (in): 0.469

Pipe Inside Diam (in): 8.062 **Pipe Outside Diam (in):** 9.000

Water Audit Info

Split Length (in): 10.00 **Split Width (in):** 0.062

Puncture Length (in): [] **Puncture Width (in):** []

Blow Out Length (in): [] **Blow Out Width (in):** []

Pressure at Meter: 60.00 psi

Pressure at FH#: L-2107 = 60.00 psi

Estimated Flush Flow (gallons): 3,000

Soil Resistivity (ohm-cm): []

Soil Rating (1,2,3,4,5): []

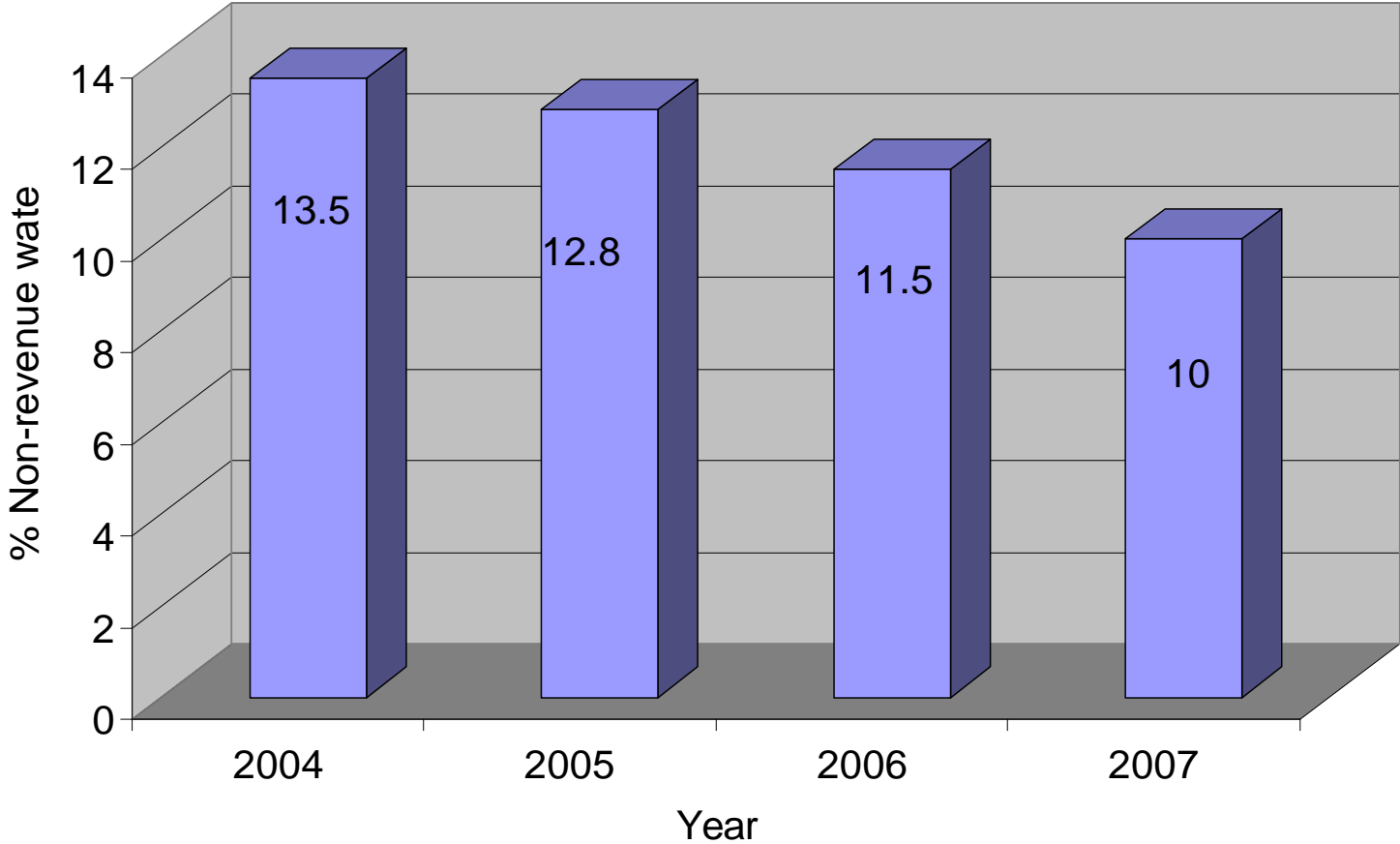
Comments: cut & spliced 7' of 8" ci with di pipe to repair horizontal split next to bell.

Current Internal BWS Efforts - Response Plan





Current Internal BWS Efforts - Water Trend

Non-revenue Water Trend 2004-2007



Internal BWS Efforts - Next Steps

Type of Main	Type of Failure & Description	What to Look For / What to do	Photo Examples
Cast Iron & Ductile Iron	<p>Electrolytic Corrosion</p> <p>Driven by oxygen, soil chemistry, and resistivity of soil.</p>	<ul style="list-style-type: none"> • Shows wastage of metal • Look for thinning of wall thickness from outside-in or inside-out • Big pits or interconnected pits will typically be present • Scrape pipe from outside with a sharp, blunt tool – see if metal is soft and can be removed. Probably not if it is electrolytic corrosion. • Look for sharp knife-like edges • Get a soil sample 	 <p data-bbox="1338 732 1512 761">Cast Iron main</p>
Cast Iron & Ductile Iron	<p>Graphitic Corrosion</p> <p>Preferential leaching out of iron from the metal matrix leaving the graphite flake network. Slow corrosion mechanism – so pipe will probably be quite old (40 years or more). Driven by slightly acidic soil or ground water conditions.</p>	<ul style="list-style-type: none"> • Won't show pitting • Scrape the pipe from the outside with a sharp, blunt tool and the metal will be soft and easily removed. • There will not be sharp knife-like edges • Saw through the pipe and look at the cross section of the pipe wall. You will see a color variation due to graphitic corrosion (see photo below) • Get a soil sample 	 <p data-bbox="1493 1246 1686 1332">Top: DI main 2 left photos: CI main</p>

Current External BWS Efforts - Integration in water planning

- Build on existing momentum
- Utilize successful examples
- Develop programs specific to region, climate, and culture
- Consider as option for deferring development of additional supplies



Current External BWS Efforts - Pilot Projects

- BWS screened and ranked 10 potential pilot projects against criteria
- Top four ranked projects selected
- Data collection
 - Effectiveness
 - End use demand
- Insight for full-scale program
- Education and outreach
 - Program participants
 - Honolulu BWS



Photo Sources:

http://www.roadsideamerica.com/hotels_motels/images-hotel/h25404/1.jpg
<http://www.rainbarrelguide.com/>

Current External BWS Efforts - Wai Akamai – Residential Pilot

- Retrofit of indoor fixtures
- Annual water savings per household:
 - Toilets:
 - >16,000 gal
 - Showerheads:
 - >500 gal
 - Faucets:
 - >2,000 gal
- Potential outdoor savings component
 - Rain barrels

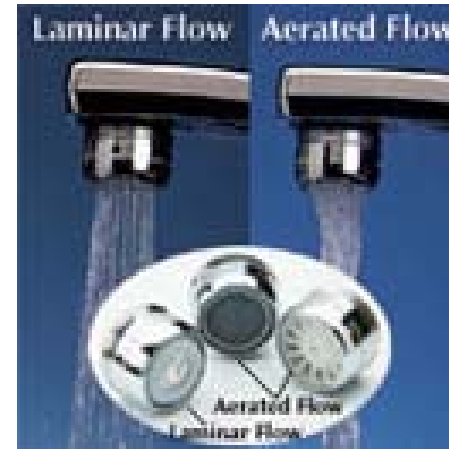


Photo Sources

Toilet: http://www.us.kohler.com/tech/products/why_flushsystems.jsp

Showerhead and faucet aerator: <http://amconservationgroup.com>

Current External BWS Efforts - Green, Green Building – Commercial Pilot

- Retrofit of indoor fixtures
- Pilot site: BWS Public Service Building (PSB)
- Benefits:
 - BWS leading by example
 - Buy-in from custodians with new purchases
 - Water, energy, and financial savings
- Starting point for potential LEED certification



Photo Source: <http://www.waterless.com/>

Current External BWS Efforts - Pre-rinse Spray Valve Retrofit



Photo Source:

<http://www.wapa.gov/ES/pubs/esb/2005/apr/apr057.htm>

- Retrofit of commercial pre-rinse spray valves
- Pilot sites: Two school cafeterias and one private business
- Documented water savings with flow meters
- Up to 50,000 gal/year – water savings
- Up to 21 kWh/year - energy savings
- Less than 4 month payback by private business customer
- Local business serves as example to others

Current External BWS Efforts - Toilet Flapper Replacement

- Ongoing program
- Documented water savings
- Up to 200 gal/day savings per toilet (other programs)
- ~26,000 gal/day documented savings since January 2007

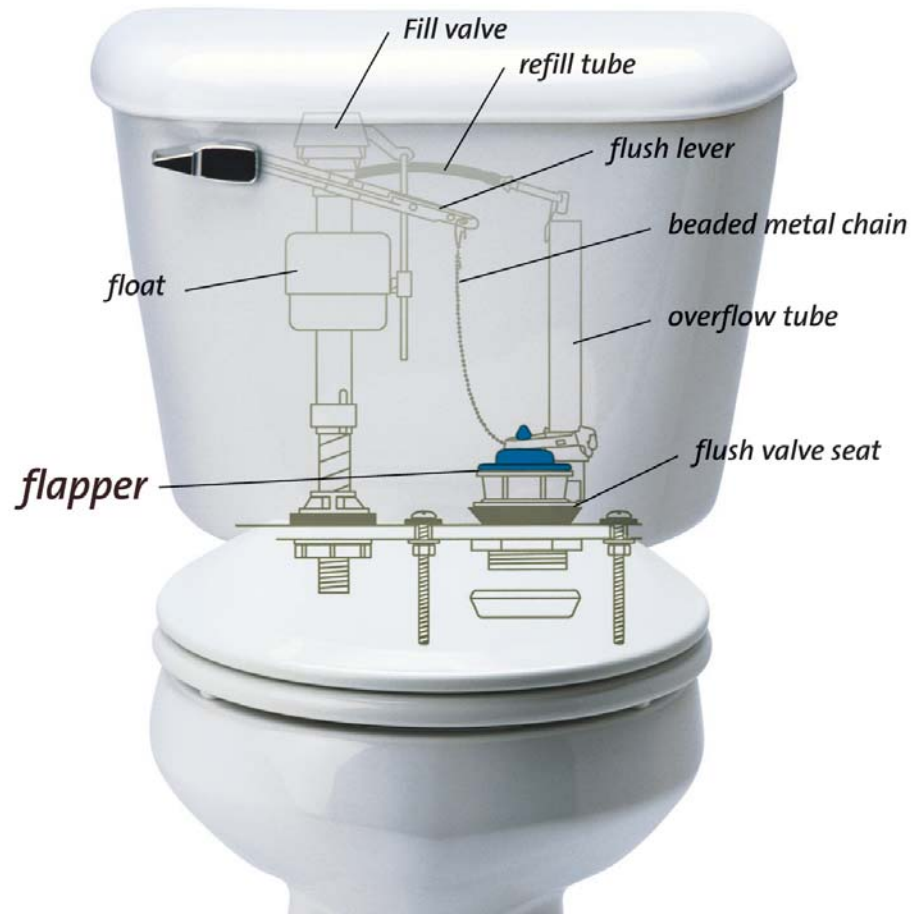


Photo Source: <http://www.toiletflapper.org>

External BWS Efforts - Phase 2



*Waikēle Stream at Waipahu, Oahu
Photo Source: USGS*

- Collection and evaluation of pilot project water savings and lessons learned
- Full-scale Water Conservation Plan development
 - Market Penetration Study
 - Detailed cost-effectiveness evaluation
- Public outreach campaign
- Implementation of full-scale program

Resources for Additional Information

- Thanks to WaterSmart Innovations, SNWA and USEPA
- Honolulu BWS
www.hbws.org
- AWWA WaterWiser
www.waterwiser.org
- US EPA Office of Water
www.epa.gov/ow
- California Urban Water Conservation Council
www.cuwcc.org
- National Drought Mitigation Center
drought.unl.edu

Emails:

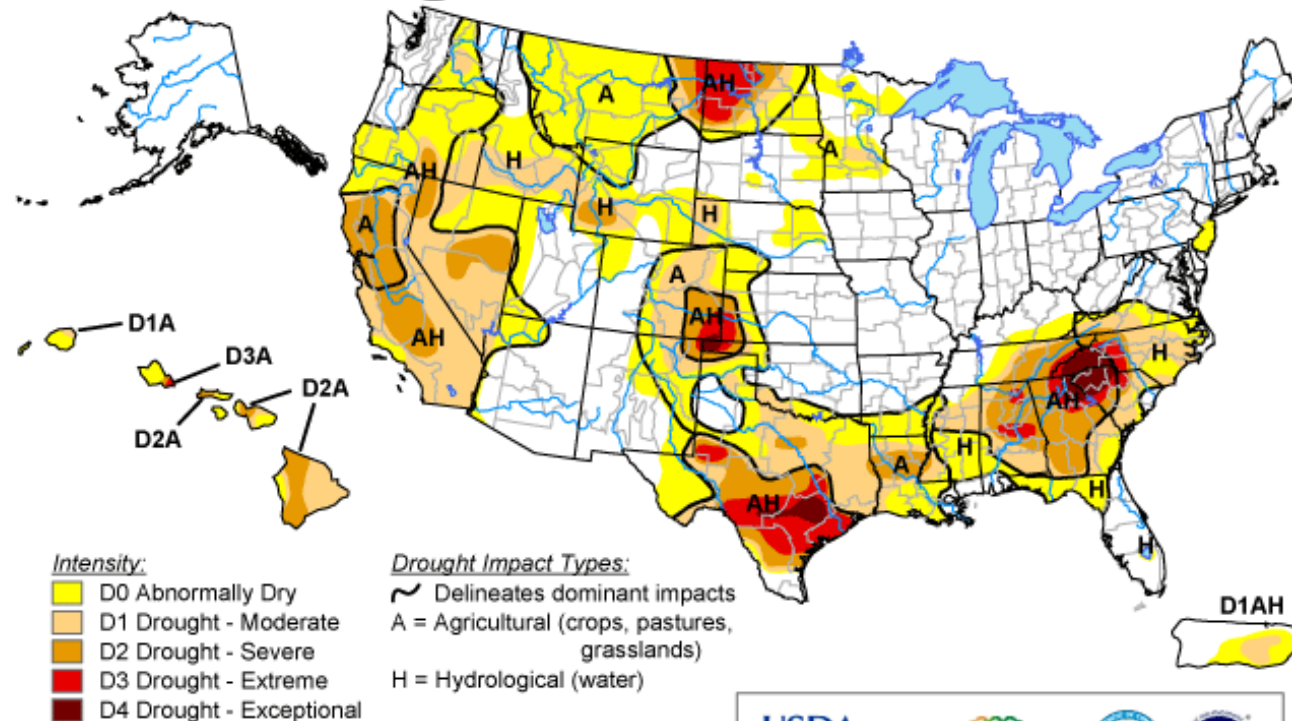
csawai@bws.org

lmaddaus@brwncald.com

jgain@brwncald.com

U.S. Drought Monitor

August 5, 2008
Valid 8 a.m. EDT



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



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