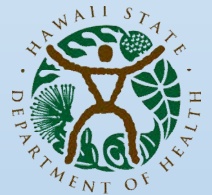


Recycled Water Use in Hawaii



Ocean Resources Management Plan Meeting
April 4, 2019



Overview

Introduction

**R-1 Plant
Processes**

RW Use

**Ag
Use**

**RW
Trends**

BMPs

**County
Projects**



Importance of RW Use

- Population increasing
- DW demand increasing
- Wastewater disposal issues



RW Grades

R-1

Filtration, Disinfection

R-2

Disinfection (Cl or UV)

R-3

Secondary treatment



Suitable RW Uses

R-1 All landscape & ag irrigation

R-2 Subsurface irrigation

**R-3 Non-edible vegetation
(min public access)**



R-1 Plant Processes



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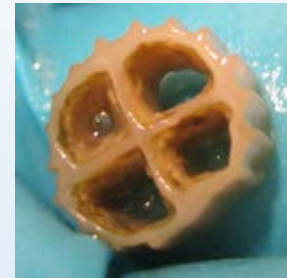
Poipu WWRF



headworks



MBBR (moving bed biofilm reactor)



aerated tank with plastic media where biofilm attaches (microorganisms)



Clarifier

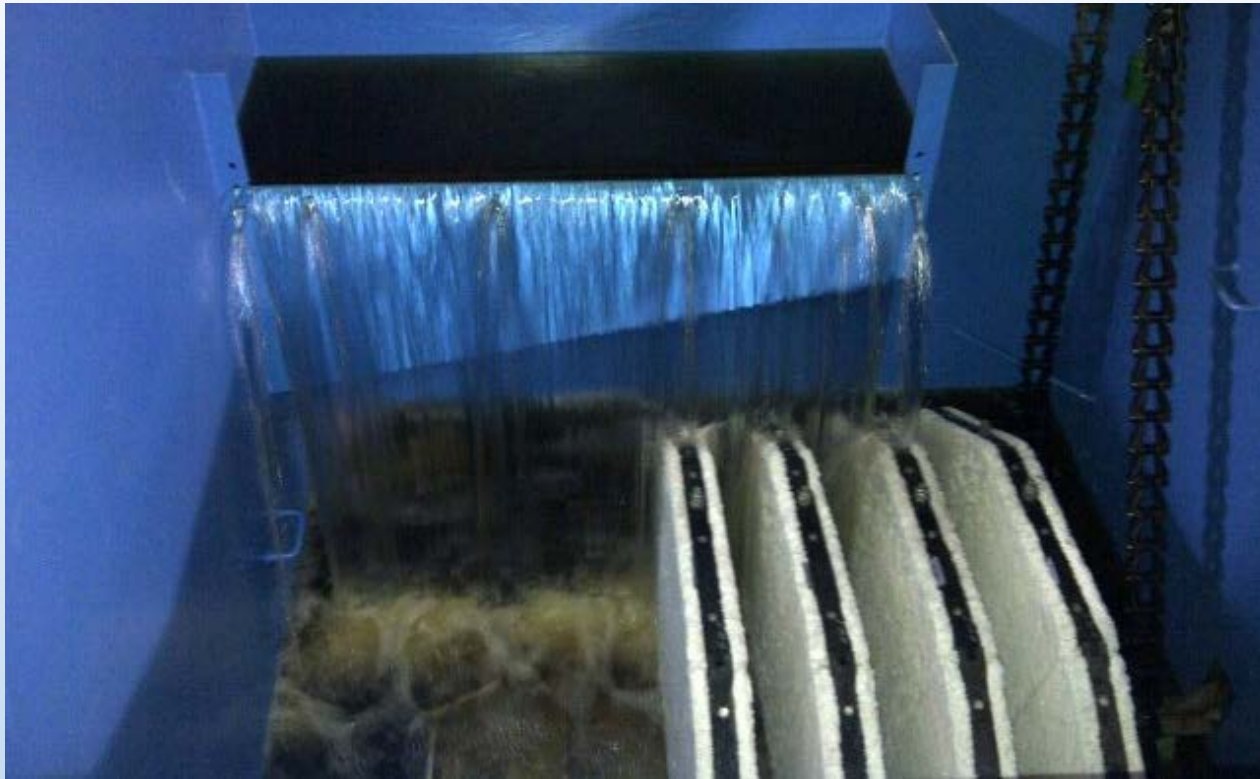


solids settle, clarified wastewater flows over weir



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Disk cloth filter



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UV disinfection



UV lamp banks located underwater in a channel



Final R-1 product



R-1 & Potable Visual Comparison



**R-1 (left) slight yellow
Drinking water (right)**



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Poipu R-1 Users



Kiahuna Golf Course



Koloa Landing Resort



Recycled Water Use



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Recycled Water Data

- Annual reports from operators
- Volume supplied for use
- Data since 2015



RW Statewide Use

Year	RW Use (mgd)	% Increase
2015	16.3	-
2016	17.2	5.5%
2017	18.3	6.4%
2018	18.8	2.7%



Factors Decreasing RW Use

- Rainy weather
- Off-spec water diversion
- Plant Malfunctions
- Construction (e.g.: new park gym decreases irrigated grass area)
- Cost, user demand, etc.



Quality of RW Supplied



RW	2018
R-1	92%
R-2	8%
R-3	~.3%

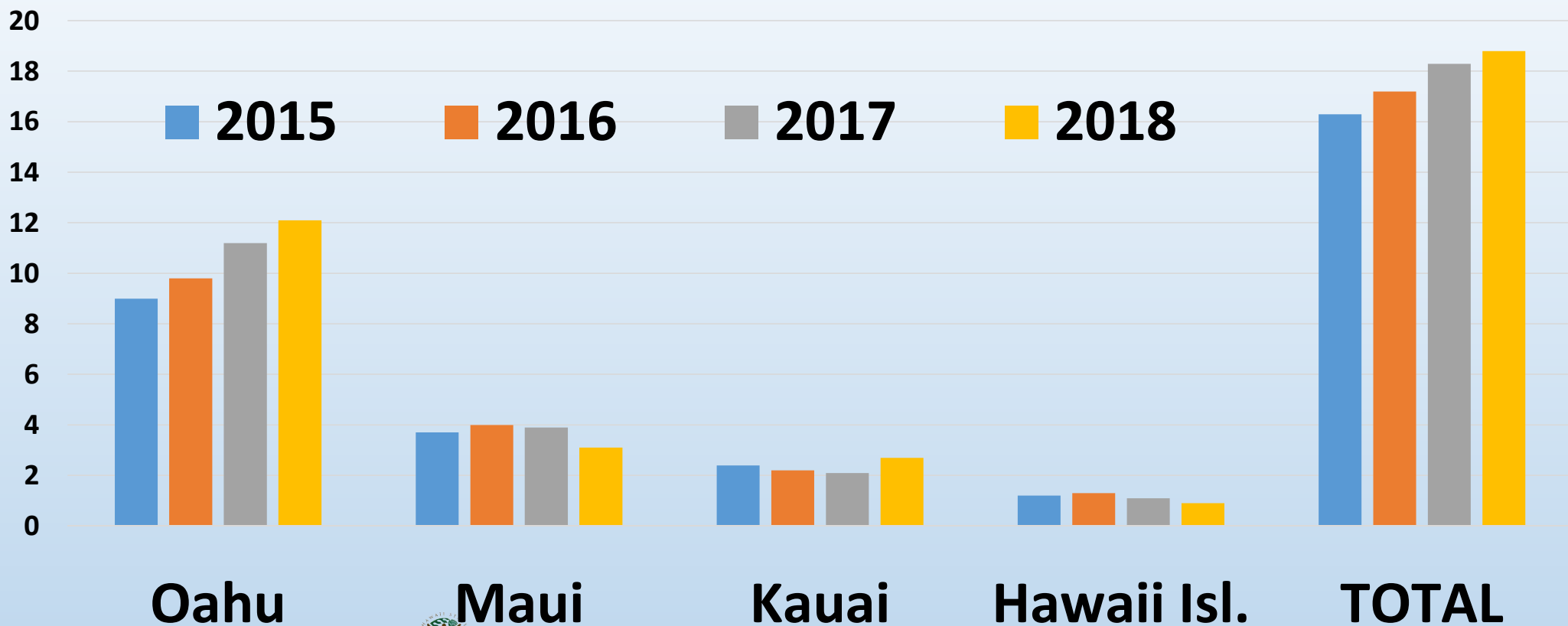


County RW Use (mgd)

	2015	2016	2017	2018
Oahu	9.0	9.8	11.2	12.1
Maui	3.7	4.0	3.9	3.1
Kauai	2.4	2.2	2.1	2.7
Hawaii Is.	1.2	1.3	1.1	0.9
TOTAL	16.3	17.2	18.3	18.8



County RW Use

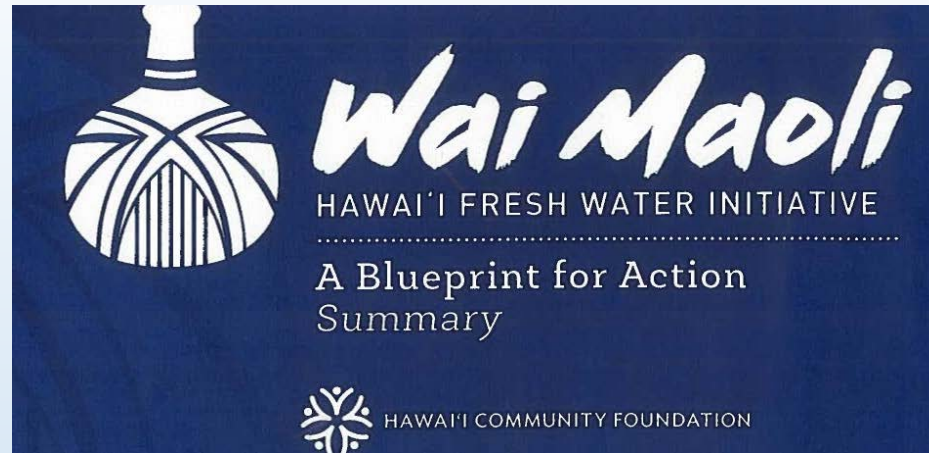


Population & RW Use

County	% State Population	% State RW Use
Oahu	68%	64%
Hawaii	14%	5%
Maui	12%	17%
Kauai	5%	14%



Hawaii Fresh Water Initiative Goal



- Current RW use: 18.8 mgd
- Goal: 30 mgd by 2030
- 11 years to increase by 11 mgd



Agriculture Use



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Farm	Acres	RW	Est GPD
Laie	17	R-1	57,500
Waikele	2,800	R-1	1,007,000
Kunia WA	2,700	R-1	1,000,000
Kunia Loa Ridge	50	R-1	5,000
Dole ***	18,000	R-2	573,000
Waiwa Correct Fac	10	R-2	56,000
Monsanto-Maui	65	R-1	234,135
TOTAL	23,632 acres		~ 3 MGD



CROPS GROWN WITH RECYCLED WATER

FARM



CROPS



Laie

Thai basil, bananas

Waiawa CF



citrus, bananas, Christmas trees



Waikele

bananas, cabbage, won bok, watermelon

Kunia Water Assoc

avocado, sugar, taro,



won bok, bananas



Kunia Loa Ridge



orchards, trees, flowers

Dole

pineapple, papaya, coffee, cacao, mango



County Projects



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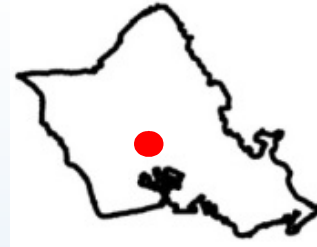
City & County of Honolulu



Department of Health Wastewater Branch ~ April 4, 2019

Waikele & Kunia Farms (2017)

- 5,500 acres, largest R-1 ag project
- 2.3 mgd from Schofield WWTP



Honouliuli WWTP Upgrades



- Plant going full secondary treatment
- Secondary flow to increase **14 to 28 mgd**
Estimated completion 2023
- Will allow increased R-1 production

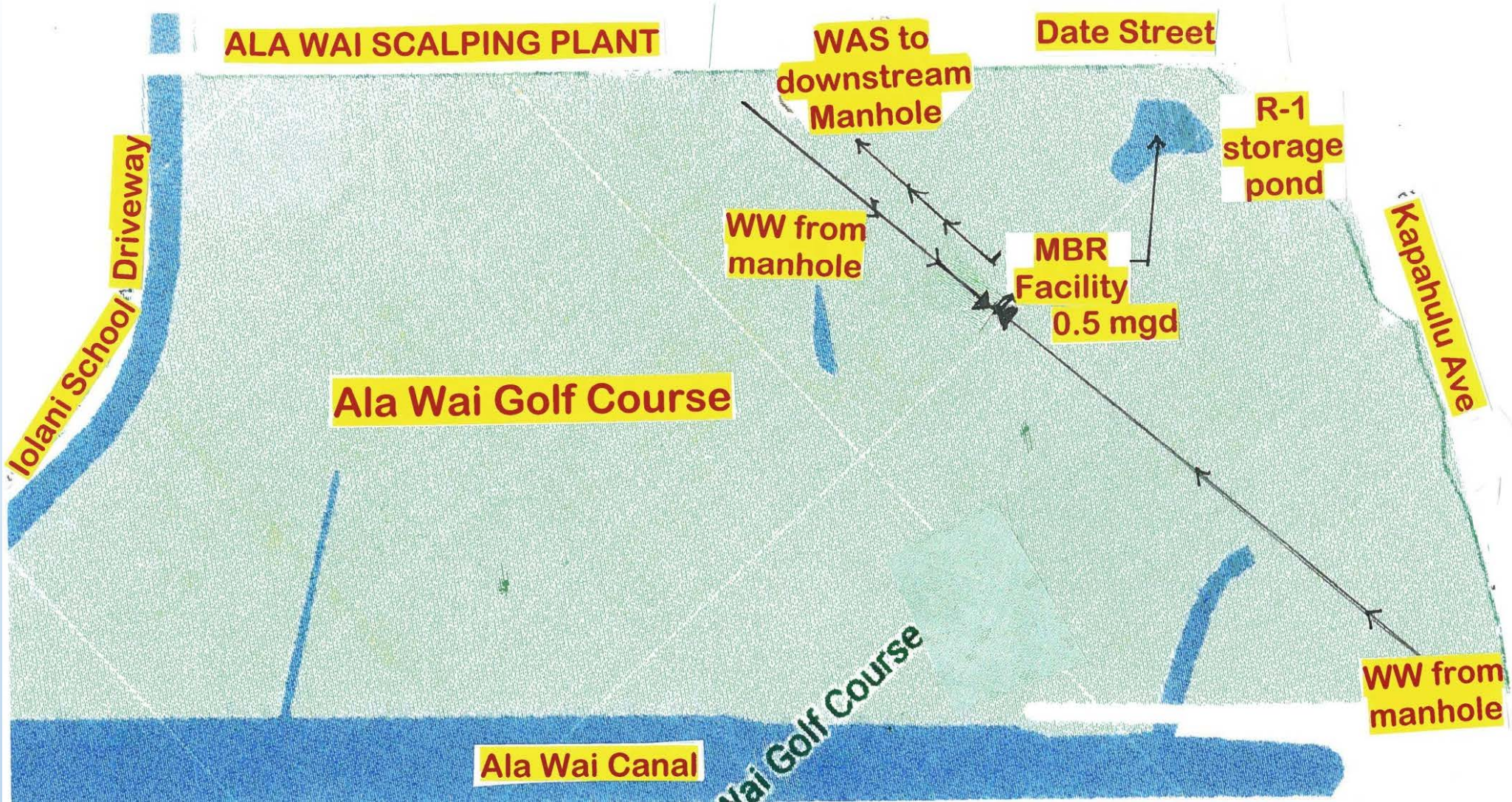


Ala Wai GC scalping plant



- WW from manholes in Kapahulu area
- 0.5 mgd MBR facility
- R-1 goes to GC pond
- WAS disposal in downstream manhole
- WW chloride study - Levels acceptable
- Pre-draft phase of EA



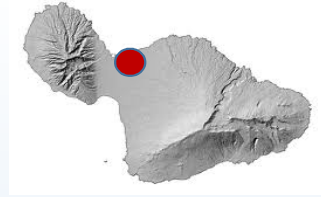


County of Maui



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Kahului Airport Scalping Plant

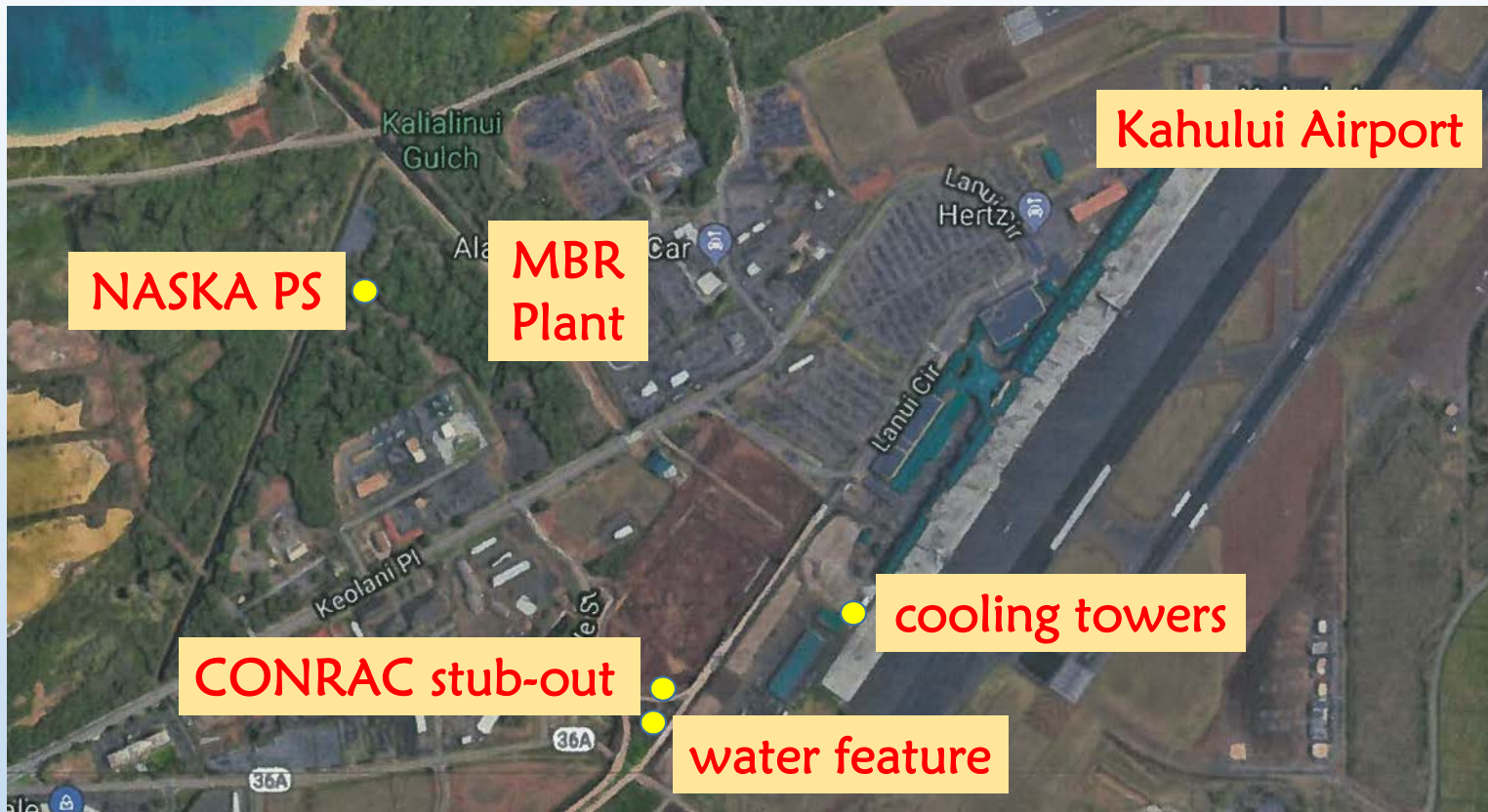


- DOT Airports pilot project -federal funds
- ~30,000 gpd MBR plant
- Cooling towers ~ 28,000 gpd
- New CONRAC ~ 6,600 gpd

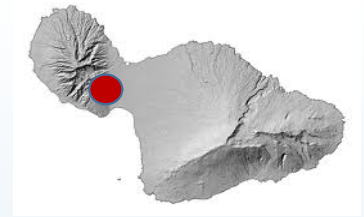
Courtesy of: DOT Airports, Akinaka & Assoc., Ltd.



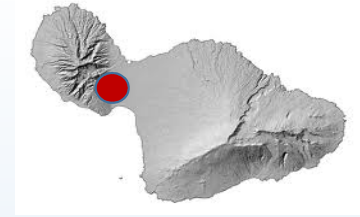
Kahului Airport Scalping Plant



Waikapu Country Town



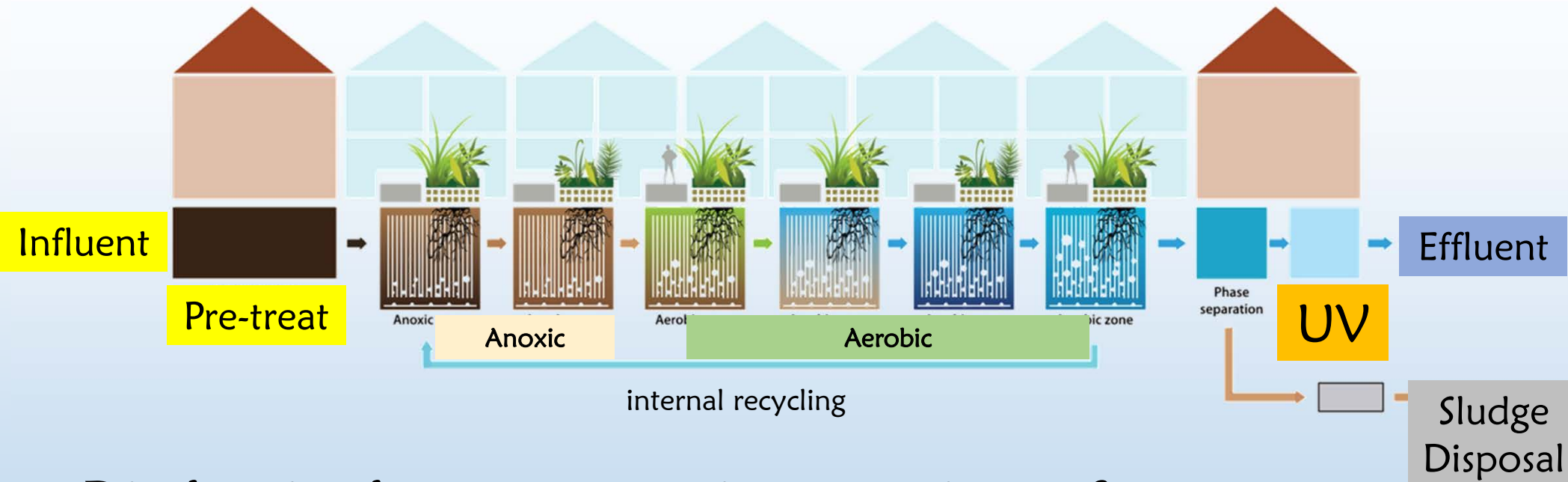
Waikapu Country Town



- 1,400 residential units
- Shops, restaurants, schools, offices, parks
- Construct ~ Oct. 2019
- 0.65 mgd R-1 WWRF



Waikapu Organica System



- Biological processes in a series of reactors
- Different ecologies in each stage.



Maui R-1 Dust Control Projects



Project	WWTP
N-S Maui Road Improvements	Kihei
Nuu Aina Estates	Kihei
Piilani Hotel	Kihei
Wailea sewer	Kihei
Waipuilani	Kihei
Kaanapali Ocean Resort	Lahaina
Maui R&T	Kihei
EPA CD - Countywide Sewer CCTV	Kihei
Kihei Bikeway Ph. 2	Kihei
South Maui Solar Panel	Kihei
Kaiwahine Village	Kihei
Kulanihako St Recycled Waterline Ext	Kihei
Maui Memory Care	Kihei
South Maui Community Rec Ctr	Kihei
Luana Villas	Lahaina
Lahaina Stage 1	Lahaina



County of Kauai



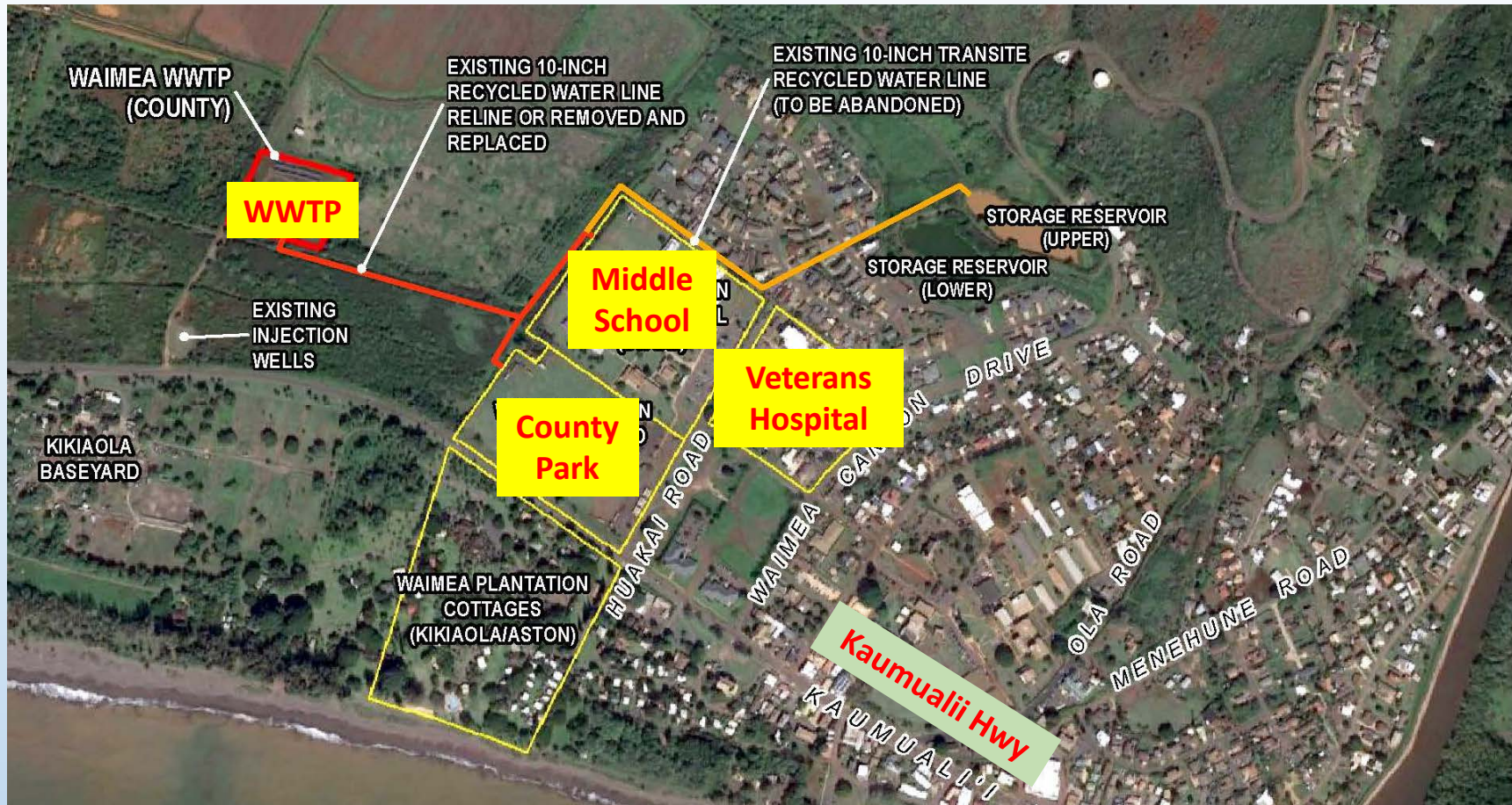
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Waimea WWTP

- Working on R-1 turbidity issues



Future R-1 use - school, park, hospital



County of Hawaii



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Kealakehe WWTP

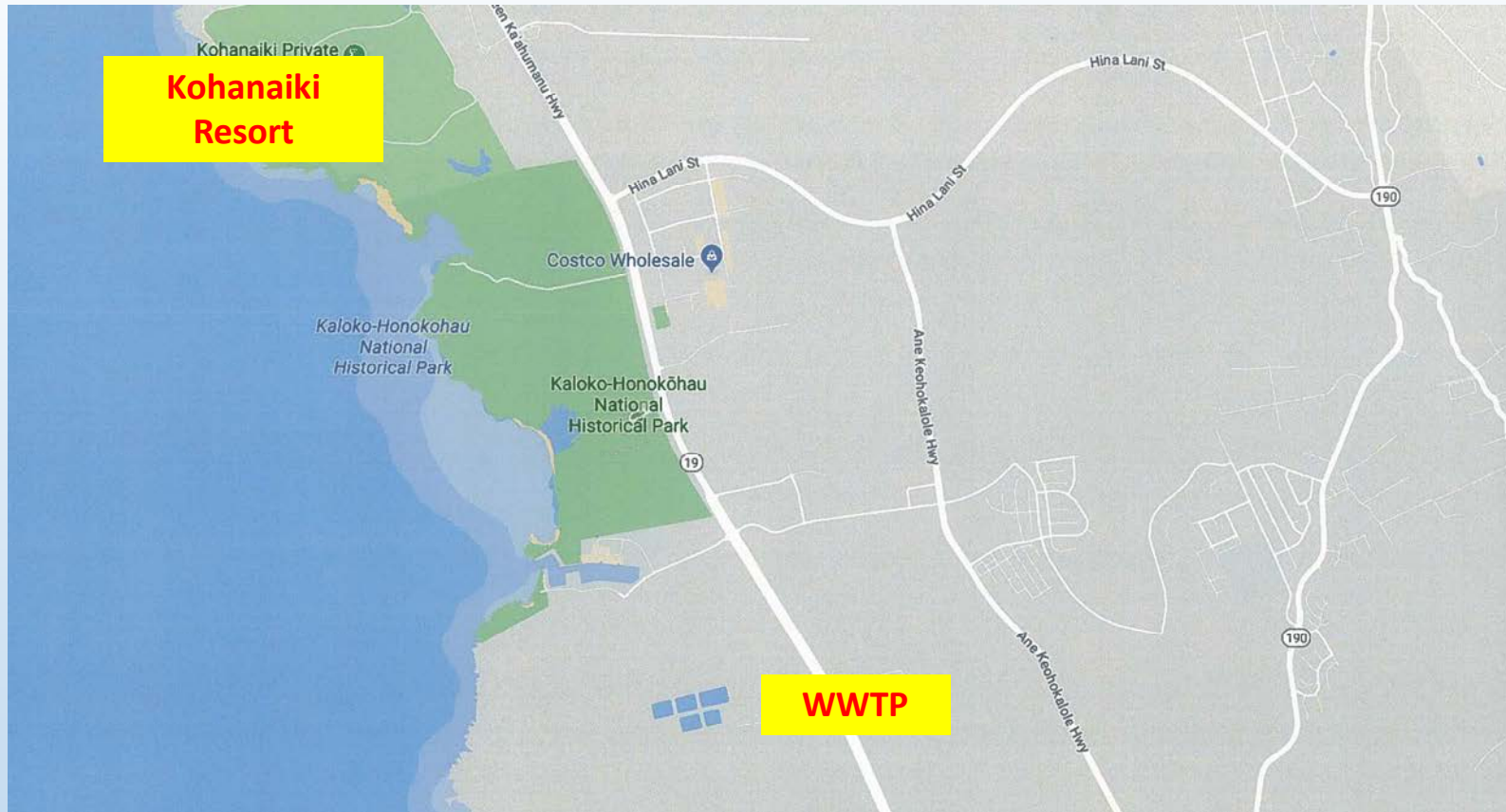
- First COH R-1 plant – 1.8 mgd
- 90% design plans ~ May 2019



Kealakehe Initial R-1 Users (S of WWTP)



Kealakehe Initial R-1 User (N of WWTP)





~5 mile straight
line distance
passing through

- N user
- WWTP
- S user



Best Management Practices (BMPs)



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**Minimize
public contact
w/ RW**

**Train
workers**

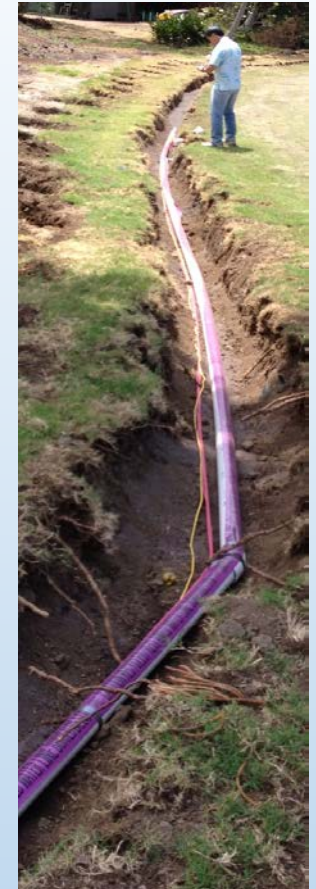
**Component
Identification**

**RW
manager**

**Warning
signs**



Identify RW Components



- Paint purple (Pantone 512)
- Label, tag “Recycled Water”



Warning signs

~8.5" x 11"

Writing &
Icon

250'
spacing

Post near
impoundments

Post on dust
ctrl trucks



Replaced damaged signs



Recycled Water Manager

- Owner designates
- Implement BMPs
- Appropriate irrigation schedule
- Maintain irrigation system



Employee Training

- Don't drink RW
- Minimize contact; wash w/ soap & DW if contact occurs
- RW component identification
- No standard hose bibs allowed (use secured access)



RW Trends



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Australia Onsite Reclamation

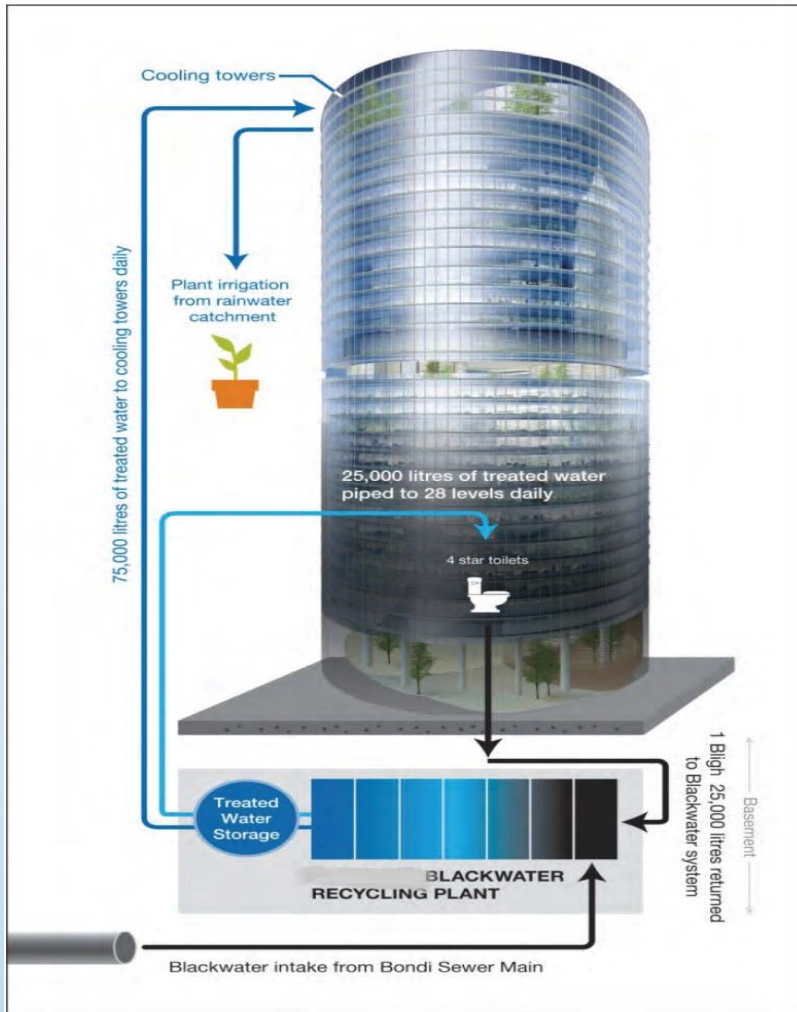


**1 Bligh Street Tower
Sydney, Australia**

**29 stories, 26,000 gpd
90% RW**



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Processes WW from building and from nearby sewer main

toilet flushing, cooling tower, landscape irrigation



Japan laws

- **Require developers to use recycled wastewater or harvested rainwater for toilet flushing and landscape irrigation at new developments.**

Ref: Management of Wastewater in Japan, Japan Sewage Works Assoc., April 2016



Questions?

<http://health.hawaii.gov/wastewater>

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