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Board of Water Supply
City and County of Honolulu

Recycled Water Use on Oahu



2nd Annual Joint Government Water Conference
August 12, 2014



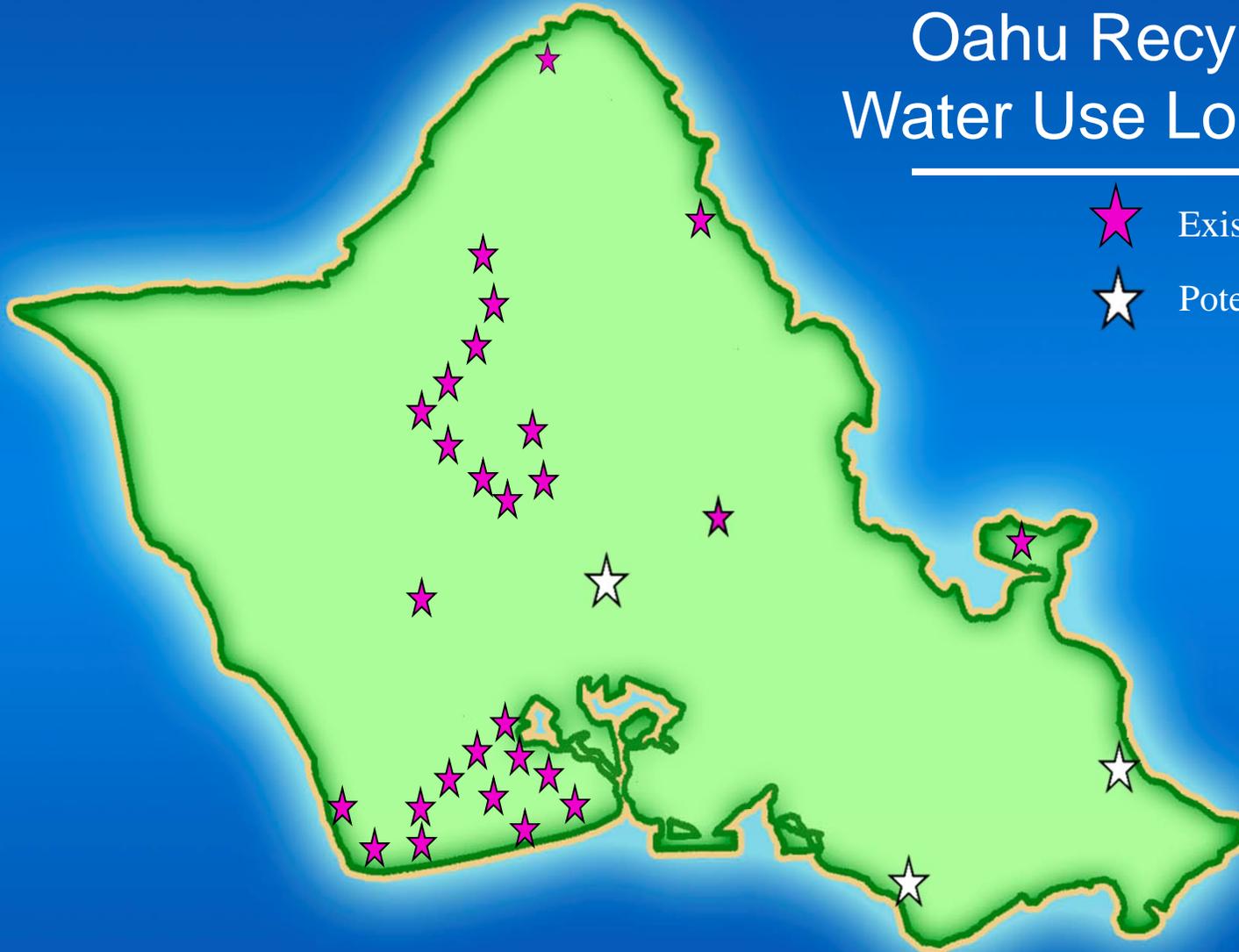
Presentation Outline

- Overview of recycled water use on Oahu
- Opportunities for recycled water projects



Oahu Recycled Water Use Locations

- ★ Existing
- ★ Potential





Recycled Water Uses on Oahu

Location	Owner/Developer	2012 Use (mgd)	Status/Type
Honouliuli WRF	BWS	8.8	R-1 (7.4) Urban RO (1.3) Industrial
Wahiawa WWTP	ENV	1.6	R-2 (R-1 soon) Agriculture
Schofield WWTP	US Army	2.3	R-2 (R-1 soon) Agriculture
Turtle Bay Hotel	Turtle Bay Resort	0.002	R-2 Golf Course
Laie WWTP	ENV	0.4	R-1 Agriculture
Kaneohe MCBH	US Marine Corps	0.6	R-2 Golf Course
Waiawa Correctional Facility	State of Hawaii	0.066	R-2 Agriculture, Landscape
Kunia Village WWTP	HARC	0.03	R-2 Agriculture
TOTAL EXISTING		13.8	
Waimanalo WWTP	ENV	0.2	R-1 Future Agriculture, Parks
Ala Wai Golf Course	BWS/DES/ENV	0.5	R-1 Future Golf course, Zoo
Koa Ridge	Castle & Cooke	0.3	R-1 Future Patsy Mink Park
TOTAL FUTURE		1.0	



R-1 Recycled Water Users (2012 avg use)

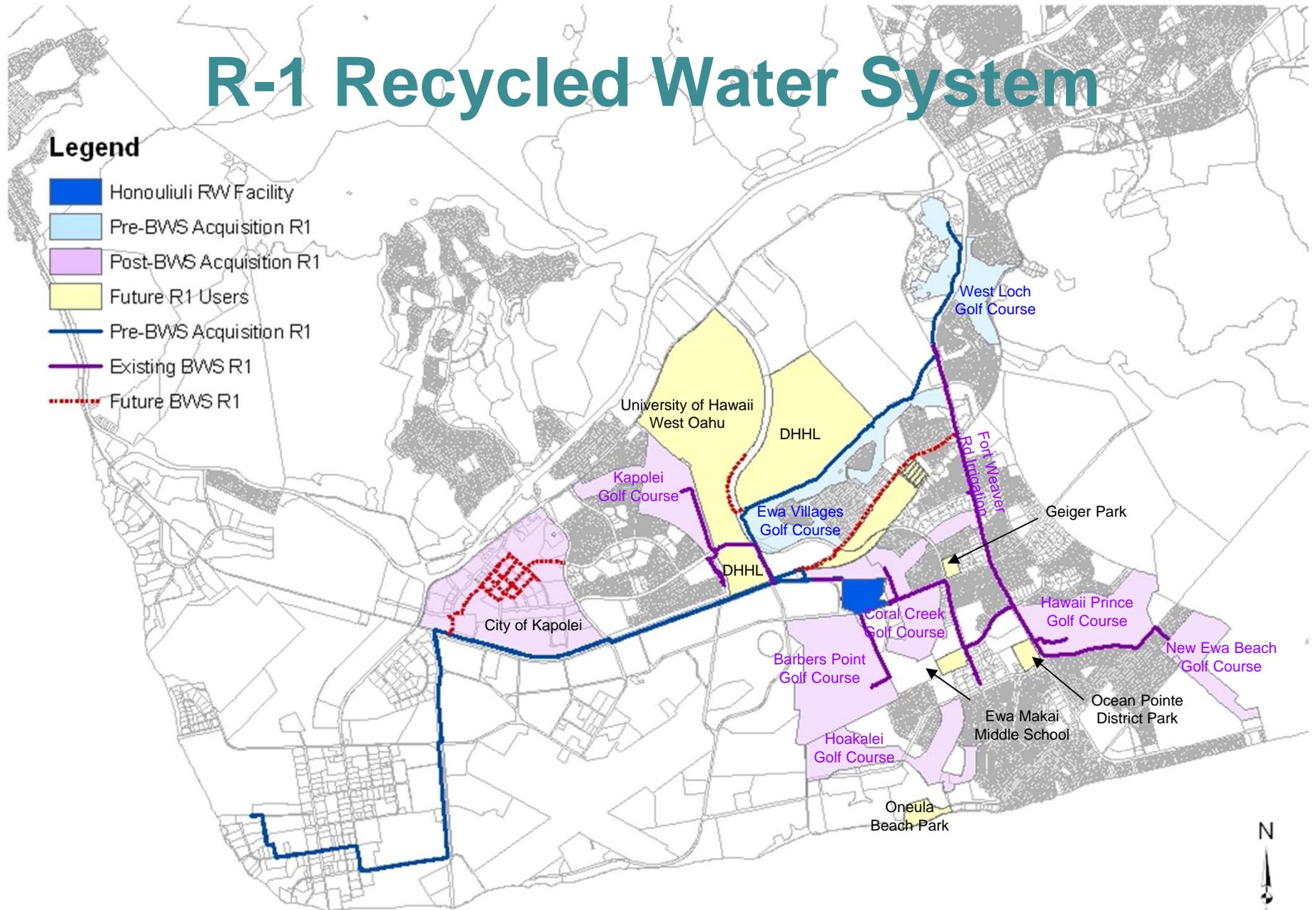
- Honouliuli WWTP (2.8 mgd)
- 8 Golf Courses
 - Barber's Point Golf Course (0.37 mgd)
 - Coral Creek Golf Course (0.54 mgd)
 - Ewa Beach Golf Course (0.45 mgd)
 - Ewa Villages Golf Course & Community (0.53 mgd)
 - Hawaii Prince Golf Course (0.79 mgd)
 - Hoakalei Country Club (0.51 mgd)
 - Kapolei Golf Course (0.35 mgd)
 - West Loch Golf Course & Community (0.79 mgd)
- Fort Weaver Rd - Medial Strip (0.05 mgd)
- Ewa Makai Middle School (0.02 mgd)
- Dust Control to various users (0.032 mgd)
- City of Kapolei (0.185 mgd Temp. Potable)



R-1 Recycled Water System

Legend

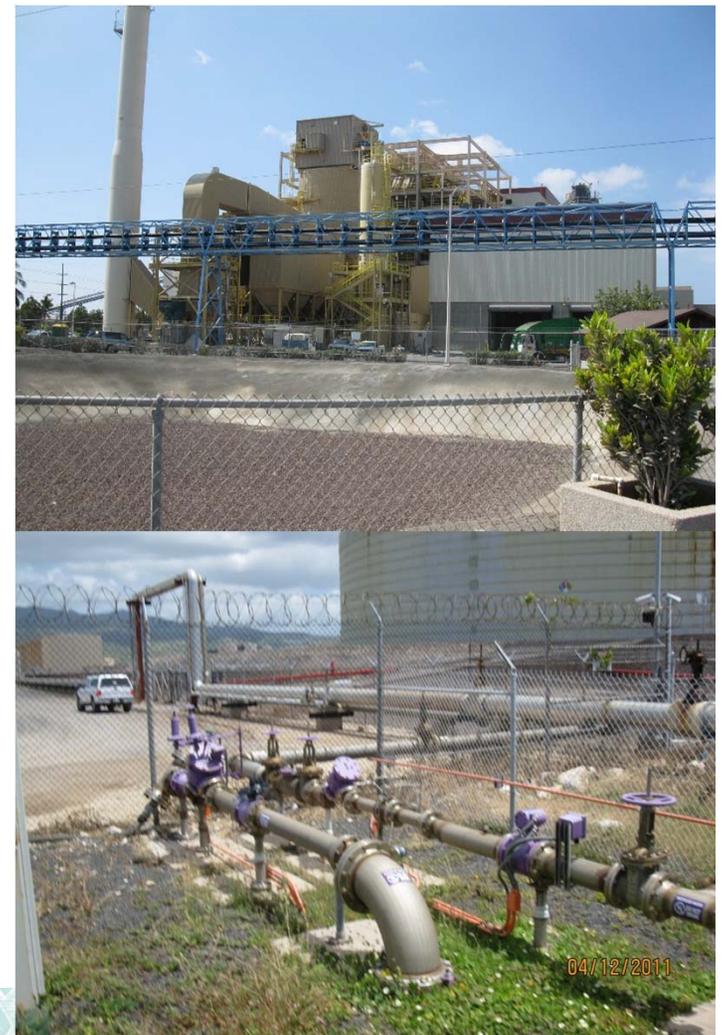
-  Honouliuli RW Facility
-  Pre-BWS Acquisition R1
-  Post-BWS Acquisition R1
-  Future R1 Users
-  Pre-BWS Acquisition R1
-  Existing BWS R1
-  Future BWS R1



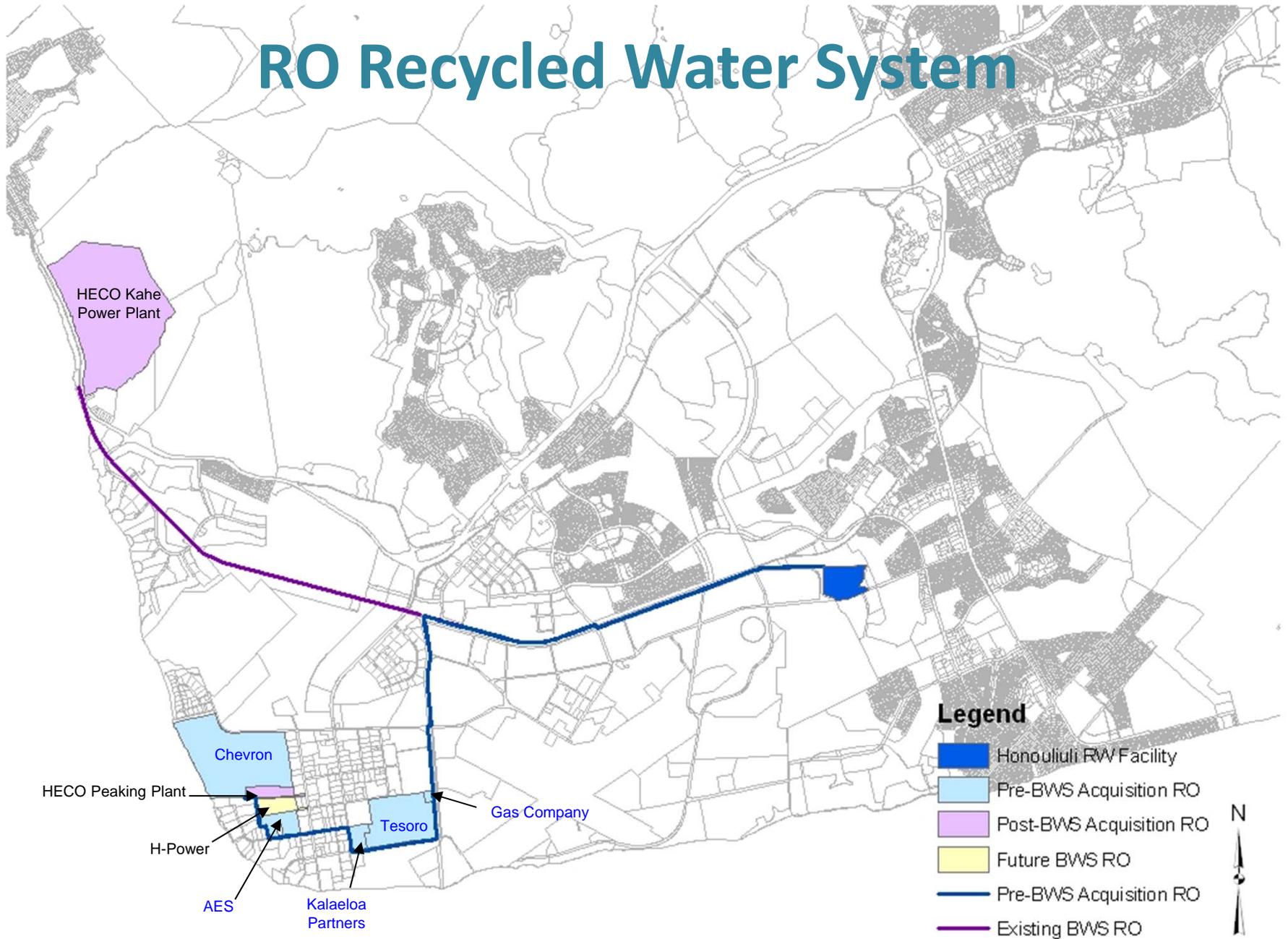


RO Recycled Water Users (2012 avg use)

- 2 Oil Refineries
 - Chevron (0.33 mgd)
 - Tesoro Refinery (0.23 mgd)
- 6 Power Plants (boiler feed)
 - AES Coal (0.14 mgd)
 - Kalaeloa Cogeneration (0.52 mgd)
 - Hawaii Gas (0.05 mgd)
 - HECO Kahe & Campbell (0.15 mgd)
 - H-Power refuse to energy (0.02 mgd)

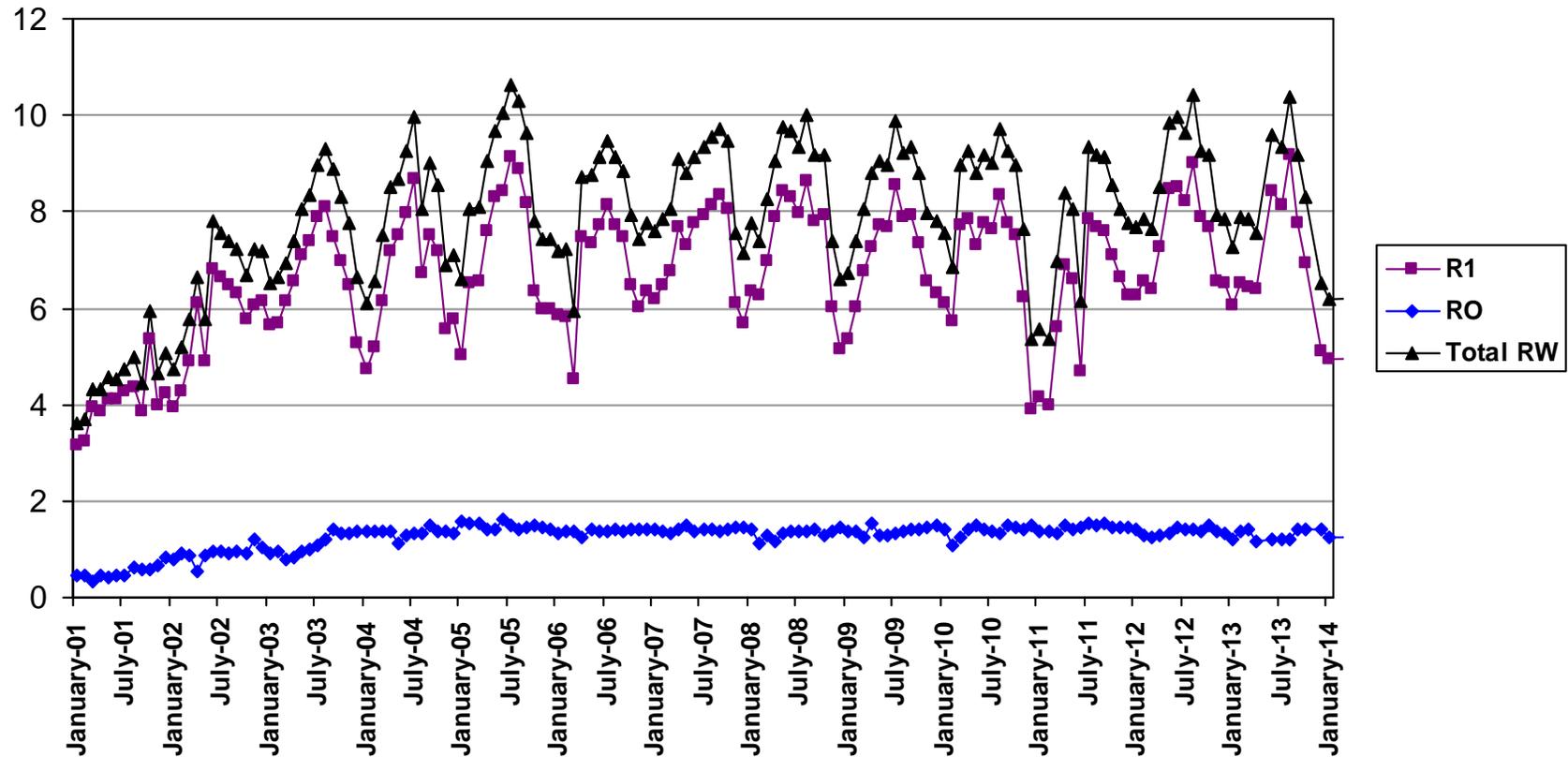


RO Recycled Water System





BWS Honouliuli R-1 and RO Recycled Water Use 2001-2014





Recycled Water Barriers and Opportunities

- Recycled water use on Oahu has plateaued
- Revised Reuse Guidelines are needed to simplify permitting and expand reuse over the potable aquifer
- Cost of Infrastructure & O&M are primary barriers
- Alternative delivery approaches could reduce overall costs
- Opportunities
 - City of Kapolei
 - Koa Ridge
 - Ala Wai Golf Course
 - Waimanalo WWTP





City of Kapolei Recycled Water Delayed

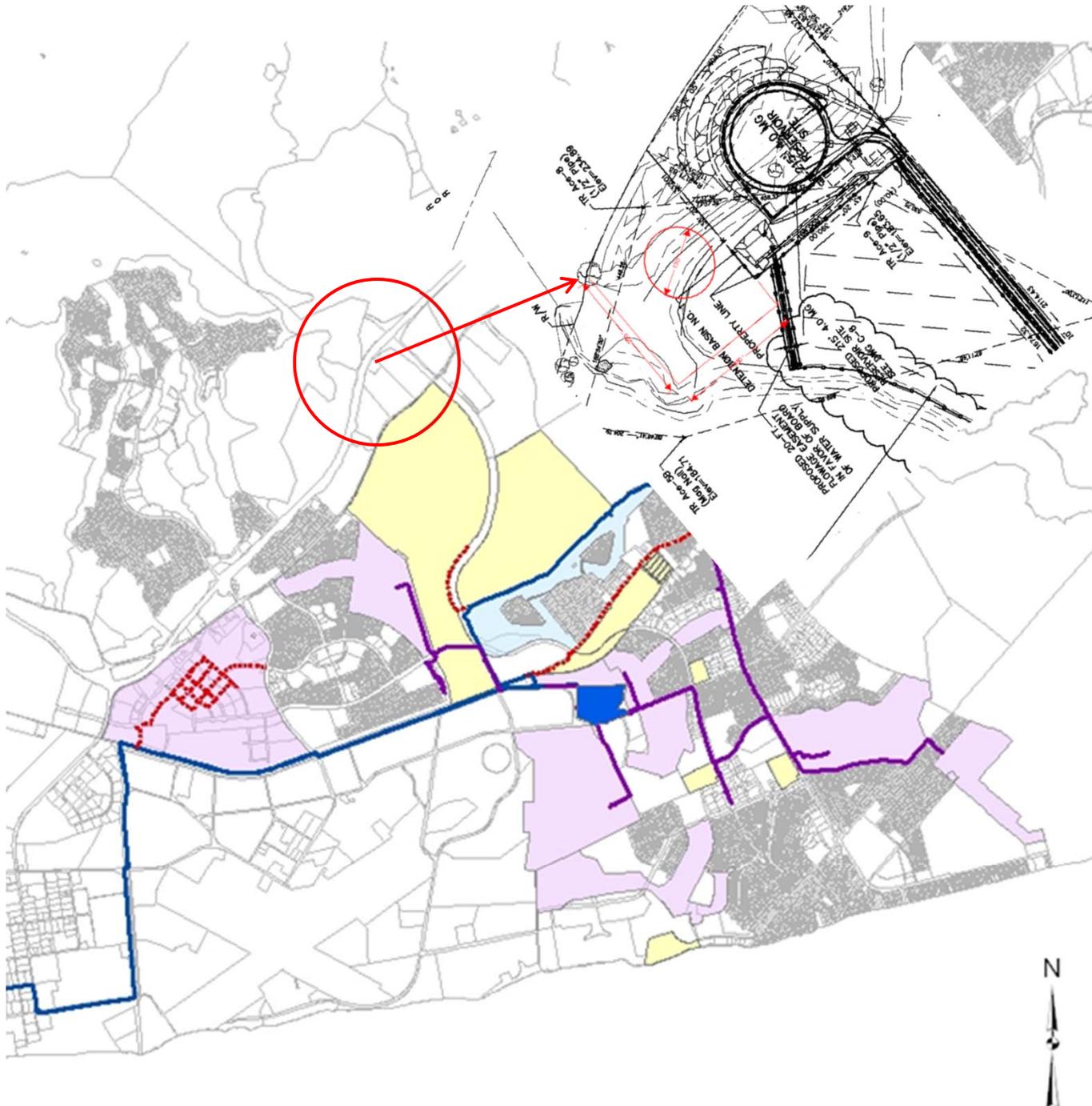
- Ewa Development Plan requires dual water lines for developments with large landscaped areas
- 18 irrigation meters using 185,000 gpd (Nov. 2012)
- After brackish wells got too salty, a temporary fire hydrant meter was installed
- Permitting for each individual meter is a barrier
- Explore Blanket Permitting for entire City





Elevated storage is needed

- Land required to build the East Kapolei 215' 3 MG R-1 Recycled Water Reservoir
- 2-miles of 16" pipe
- ~\$15 M. SRF Funds
- Will allow UH WOC & DHHL E. Kapolei Service
- Gravity fed Irrigation instead of on-site booster pumps



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Koa Ridge by Castle & Cooke



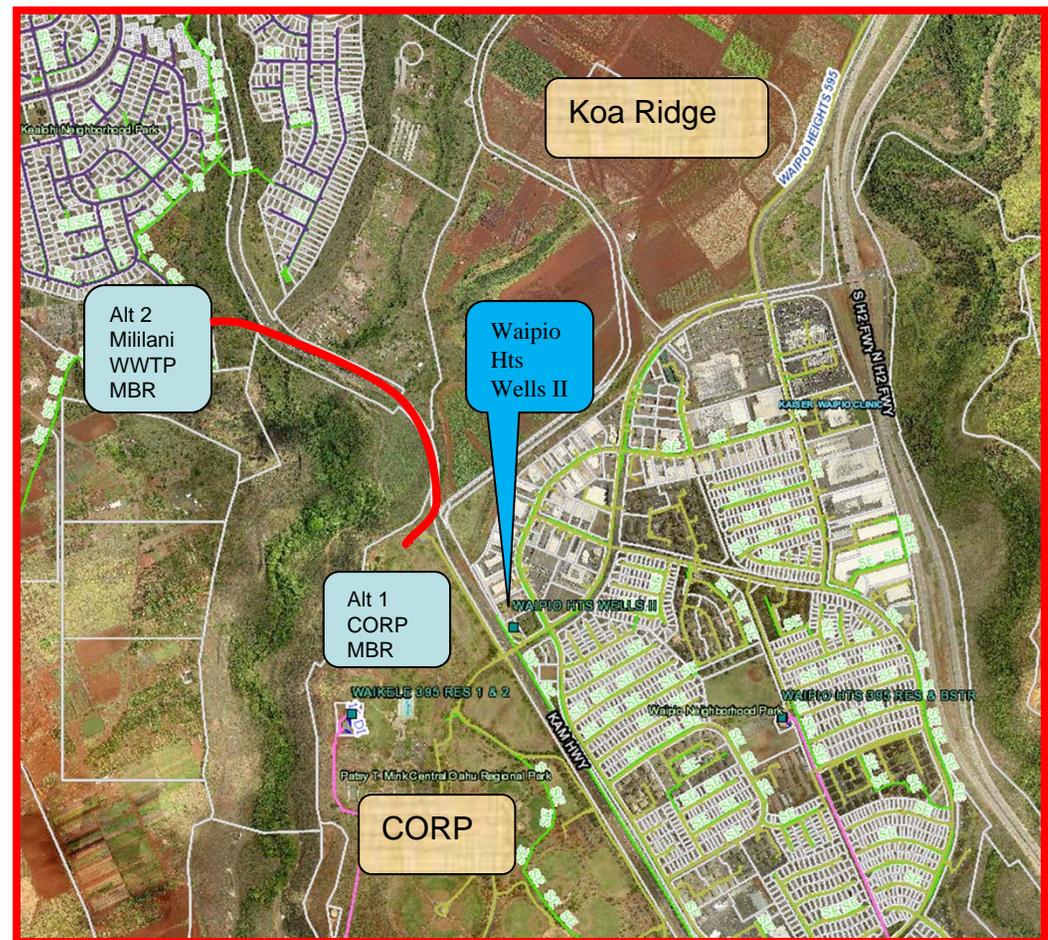
571 acre Master Planned Residential Community





Koa Ridge Recycled Water Opportunity

- Koa Ridge needs a potable water source
- BWS Waipio Heights Wells II irrigates Central Oahu Regional Park with untreated potable water
- Opportunity to construct 0.3 mgd MBR recycled water facility to irrigate CORP.
 - 2 alternatives
- Frees up Waipio Hts II for Koa Ridge
- BWS-Castle & Cooke agreement needed



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Ala Wai Golf Course MBR Recycled Water Project A Public-Private Partnership Opportunity





Cost Incentives

- Few golf courses irrigate with BWS potable water
- Ala Wai Golf Course uses about 0.25 MGD
- Estimated cost of potable water is \$410,000 per year based on BWS non-residential rates of \$4.53/k-gal as of July 2014
- West Loch GC and Ewa Villages GC pays \$1.65/k-gal for R-1 recycled water (2014).
- Makalena GC & Waipio Soccer Complex is irrigated with Waikele Stream infiltration wells



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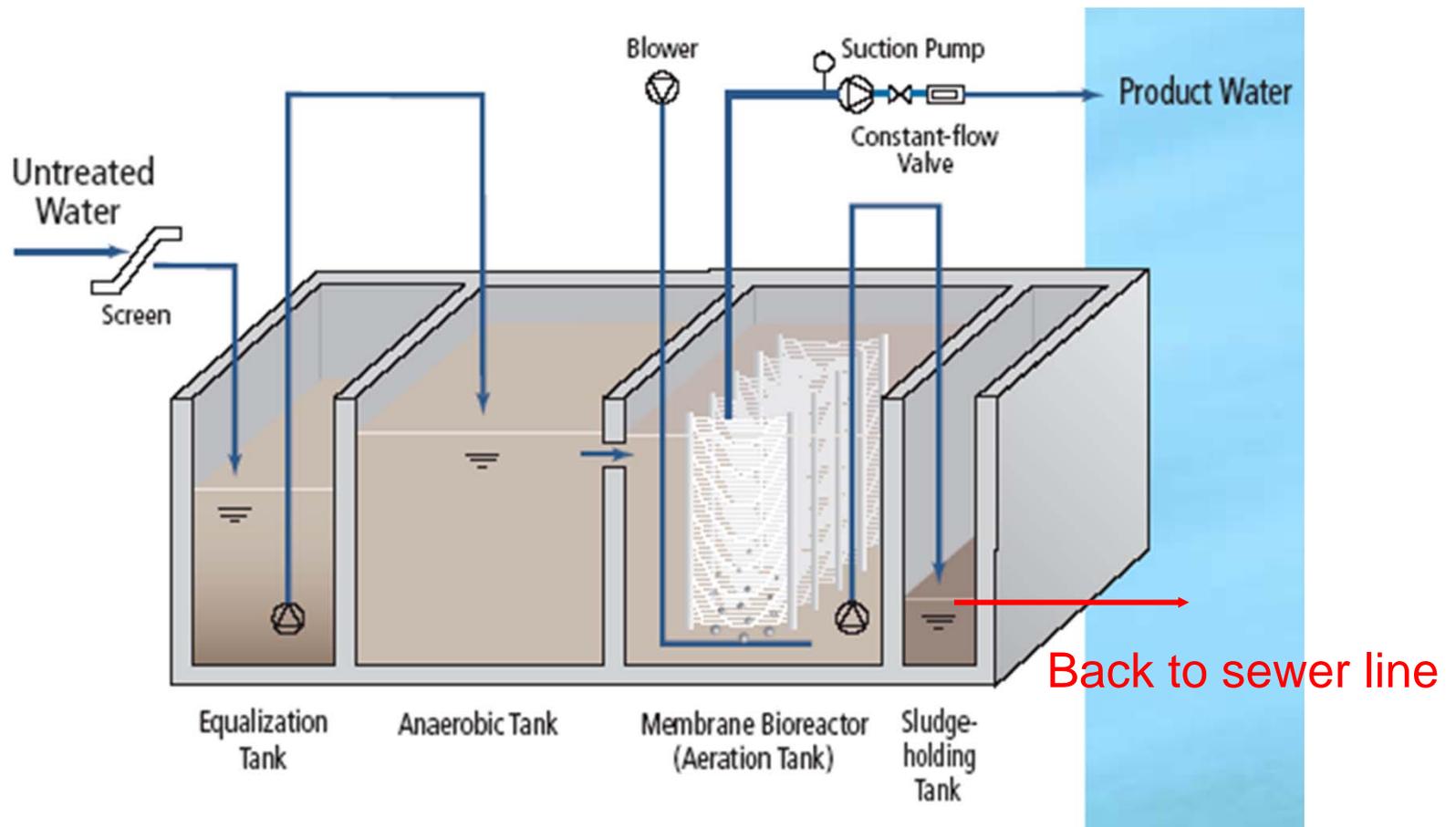
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Wastewater System Ala Wai Golf Course



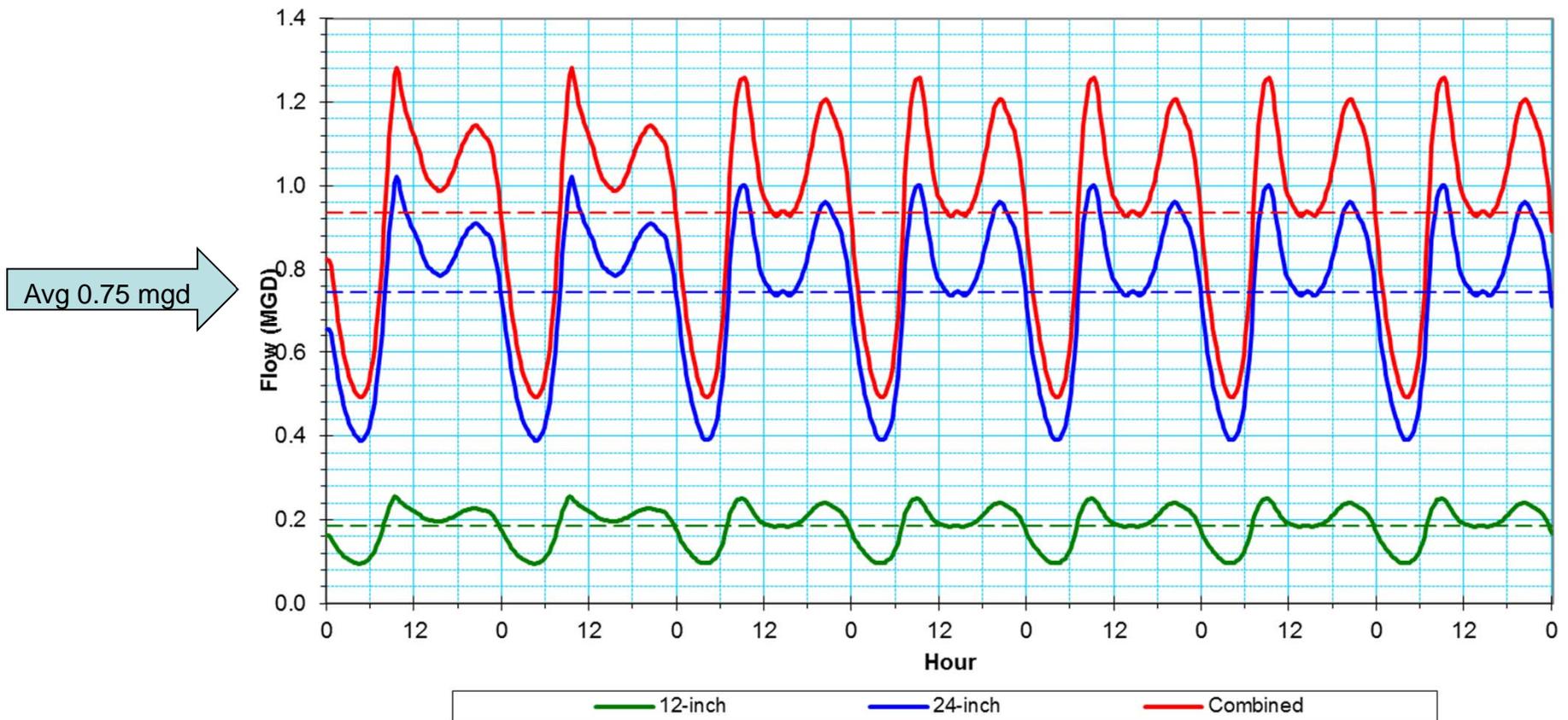


Basic MBR System Design





Wastewater Flows Through Ala Wai GC





Ala Wai GC MBR Project Site

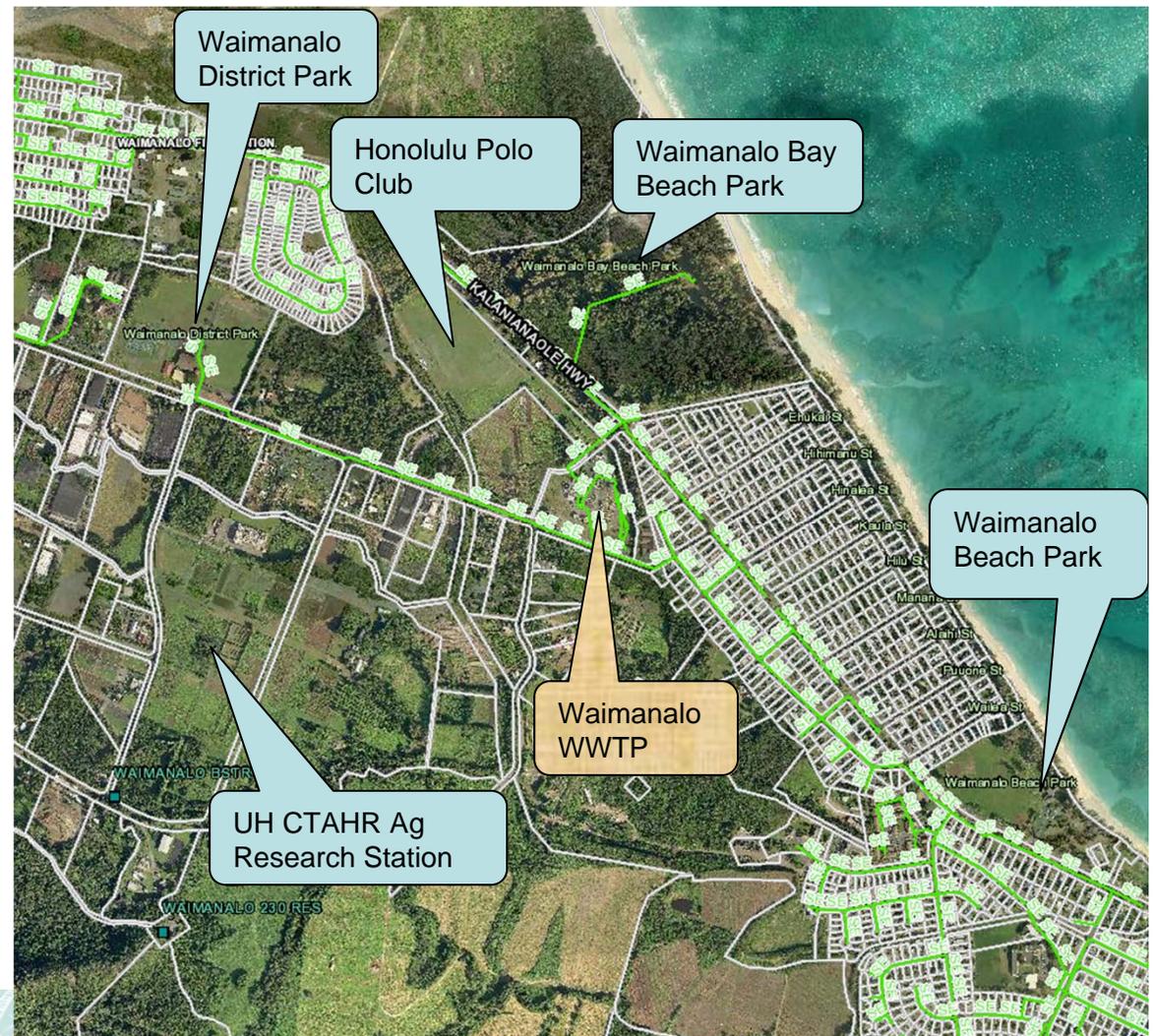
- Cost incentive on water bill
- Source & Space is available
 - 24" & 12" sewer lines are adjacent to the golf course's irrigation pond
 - Flows 24" avg. 0.75 mgd
 - Salinity is minimum to low in 1997 study
- Inter-Agency funding commitment (BWS-ENV-DES)
- Public-Private Partnership with Rockefeller RE.invest Green Infrastructure Initiative
 - RFP for Design-Build-Operate-Maintain contract
 - O&M contractor recovers capital costs with long term operating contract





Waimanalo WWTP R-1 Recycled Water

- Windward dike water resources are susceptible to drought
- Mitigates wastewater disposal challenges
 - Reduces hydraulic loading on WWTP's injection wells
 - Reduces nutrient loading on near shore waters
- ENV 2014 R-1 reuse study
 - R-1 recycled water improvements at Waimanalo WWTP: \$2.2 Million + P&E
 - Off-site costs are dependent on pipeline and storage requirements
 - If ENV constructs, operates & maintains, BWS will purvey





Summary

- Reasons to expand recycled water:
 - Conserve water resources
 - Reduce customer costs for irrigation water
 - Mitigate drought
 - Address wastewater disposal challenges
- Streamlining regulations could increase use
- High costs can be reduced through
 - Alternative delivery approaches
 - Developer-Agency agreements (Koa Ridge)
 - Inter-agency agreements (Waimanalo WWTP)
 - Public-Private Partnerships and Design-build-operate-maintain contracts (Ala Wai Golf Course)





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