2026 ONSITE WASTEWATER MEGA CONFERENCE
Westminster, Colorado

Swiftwater Solutions
Small Systems Engineering & Operations

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

NSF Convergence Accelerator
Future Water Systems

Honu Hub – An Adaptive Decentralized Wastewater Infrastructure Solution (ADWIS) for Island Communities

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University of South Florida

Adaptive Decentralized
Wastewater Infrastructure Solutions

Disclaimer: The materials presented represent the opinions of Team Honu, and do NOT reflect the opinions of NOWRA.

Honu
Island wastewater solutions

NSF Convergence Accelerator

Future Water Systems

ADVANCING WATER RESOURCES FOR EVERYONE

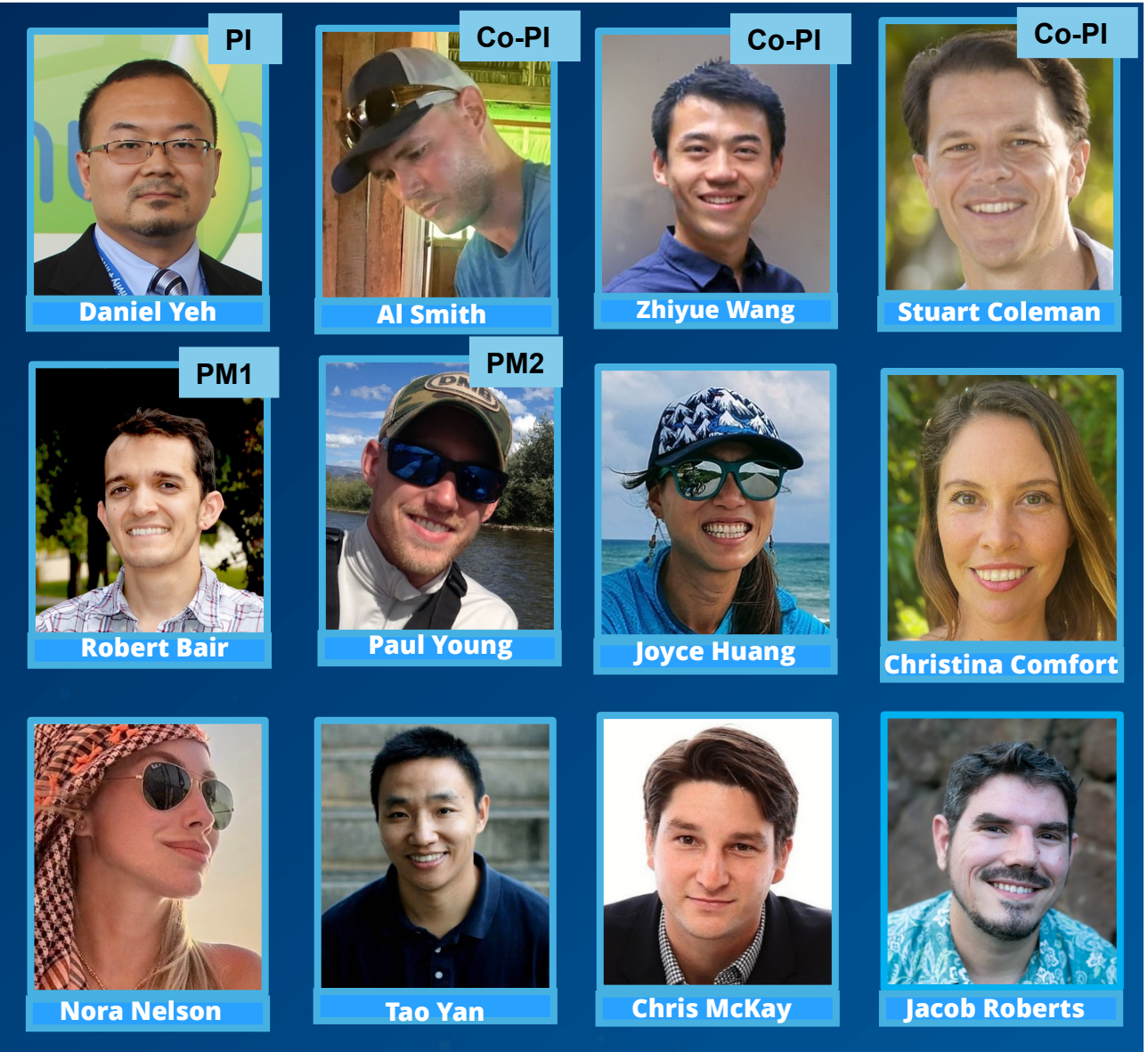
NSF Convergence Accelerator awards 16 teams to develop innovative water solutions



Phase 1

Phase 2
6 teams
$5 M
3 years

Overview



Honu
Island wastewater solutions

NSF Convergence Accelerator
Future Water Systems

Honuwater.com

Our mission

To develop innovative decentralized wastewater solutions that protect public health and the environment

12 core members + 4 postdocs + 10 students
(4 G / 7 U)

Industry partners

natural systems utilities

LIXIL
Link to Good Living

Orenco SYSTEMS

Project Advisory Board (14 SMEs)



What happens after the flush?



Onsite wastewater systems

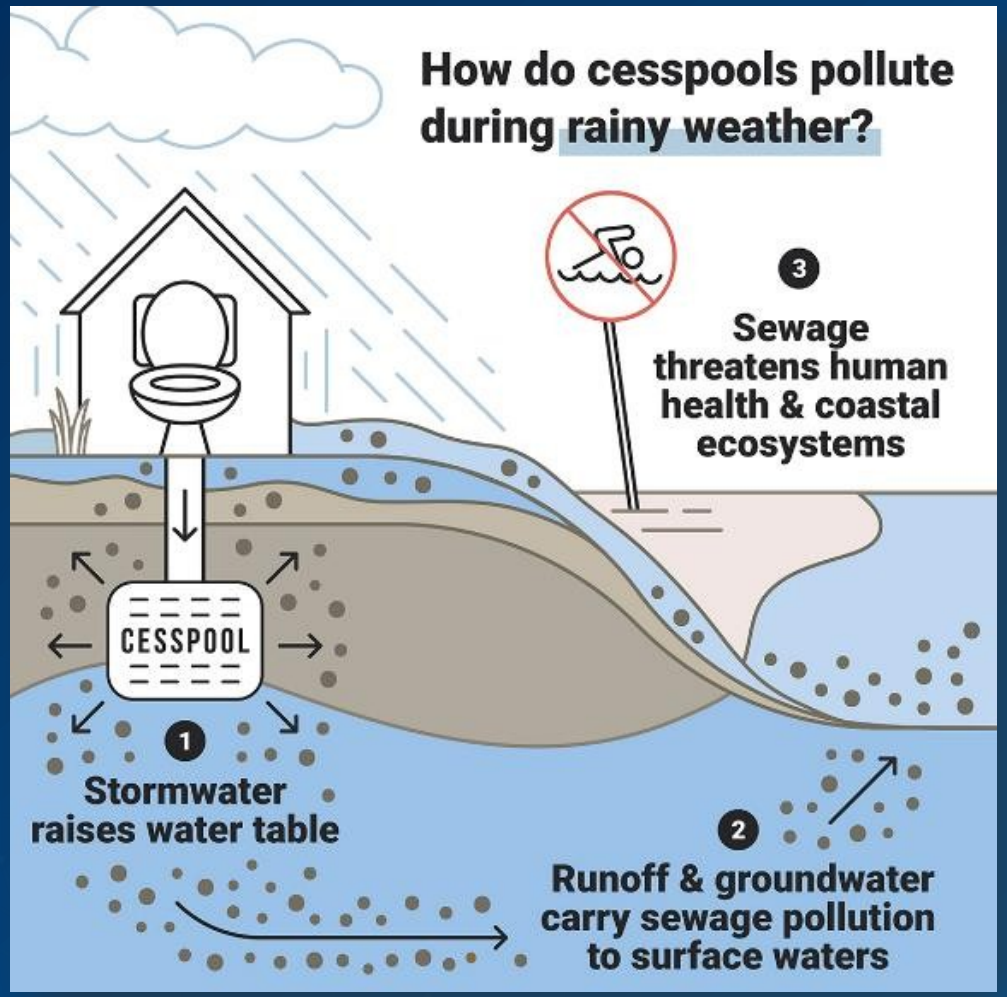
An estimated **25% of the U.S. population**, or **31 million households**, do not have access to sewers. They must rely on **onsite wastewater systems** for sanitation.







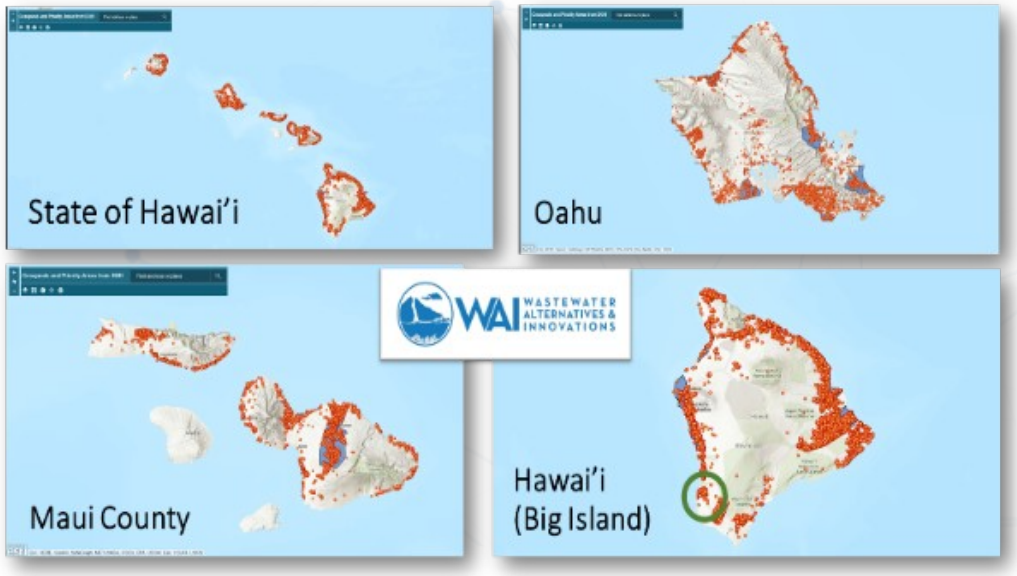
Why Cesspool Crisis



NSF Convergence Accelerator

Hawai‘i in focus

- Hawai’i has **83,000** cesspools, contaminating water resources with **52 million gallons** of sewage each day.
- All cesspools need to be replaced by **2050**
  - State mandate, Act 125
- Average cost for replacement is **$30,000-50,000** per household.
- Need innovative technologies that can accelerate solution.



Urgency

How

- Damage to coral reefs, fisheries, aquifers
  (20 tons N each day!)
- Harm to human health
- Impact on tourism and rest of economy
- Islands need to become more resilient to hazards



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Equivalent to ~900,000 bags of fertilizer each year



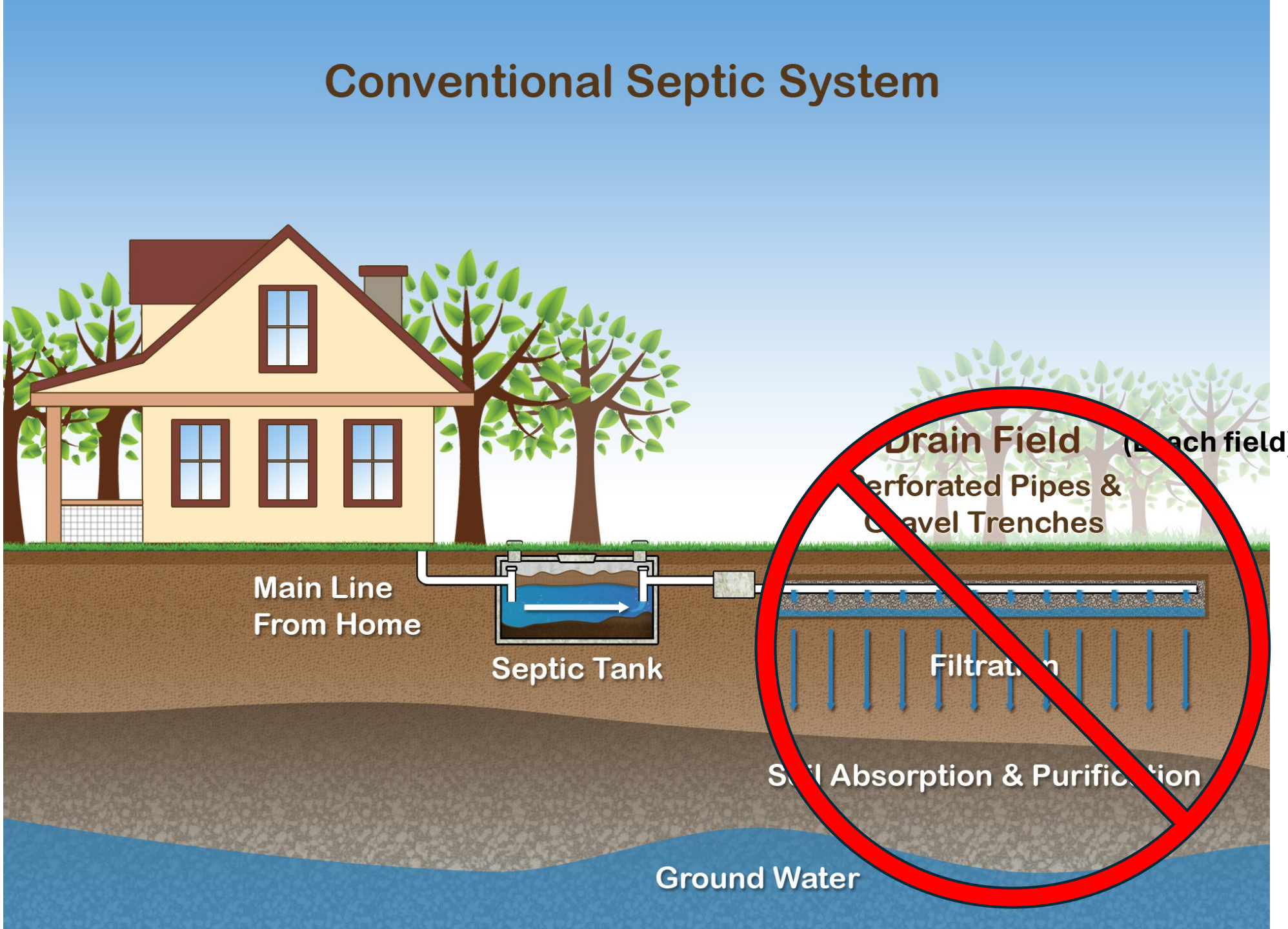






“Island communities”

Video: Honu promo


Conventional Septic System
Drain Field
(Leach field)
Perforated Pipes &
Gravel Trenches
Main Line
From Home
Septic Tank
Filtration
Soil Absorption & Purification
Ground Water







Homeowner W

Renovation permit for in-law ADU addition triggered requirement to convert cesspool to an ATU septic system

- **Installation of drainfield** required that his **50 ft mango tree be cut down…**

Our mango tree was a community resource and provided fruit to the entire neighborhood.

Removing our mango tree was a huge financial burden.



Waialua, Oahu

Customer Feedback

Project Phase 1 interviews with prospective customers, partners, and stakeholders



LOW/MINIMAL SITE DISRUPTION DURING INSTALLATION



ENERGY INDEPENDENCE



ABOVE-GROUND INSTALLATION



DESIGNED TO MEET INDUSTRY CERTIFICATION (NSF 40/245/350)

Focus of today's presentation

Technology

Workforce

Regulations

Financing



Adaptive Decentralized
Wastewater Infrastructure Solutions

Nitrogen Removal

DRIVER

- **Groundwater discharge** from onsite systems directly enter coastal waters
- Nutrient runoff damages coral reefs

APPROACH

- **NSF 245** (or equivalent) standard for N removal
- Opportunities for onsite nutrient recovery for circular economuy

OUTCOME

Protection of nearshore environments that we all love.

Adaptive Decentralized
Wastewater Infrastructure Solutions

Onsite Water Reuse

DRIVER

- **Water scarcity** in many island locations
- Wastewater is freshwater, just need to clean it to acceptable standards
- Water can be reused locally for toilet flushing, landscaping, cleaning, nature-based firebreaks, fire-fighting water reserve

APPROACH

- **NSF 350** onsite water reuse standard (or equivalent)
- Local onsite recycled water standard

OUTCOME

- A resilient water supply for communities

Adaptive Decentralized
Wastewater Infrostructure Solutions



Automation & Remote Monitoring

DRIVER

- Onsite systems are generally not monitored after installation. Performance is a black box.
- **Automation** for simplicity. Turn onsite system into an *appliance*.
- **Remote monitoring** can inform *predictive* maintenance

APPROACH

- Smart, flexible, control system with machine learning “soft sensors” for enhanced reliability. Decentralized system to complement centralized infrastructure.

OUTCOME

- Reliable, measurable performance to protect ecosystem and public health

Adaptive Decentralized
Wastewater Infrastructure Solutions



DRIVER

- High energy costs on islands
- Many locations do not have access to reliable grid electricity
- ADWIS guiding principle calls for low-energy processes and keen design focus on energy balance

APPROACH

- 100% powered by solar, wind, geothermal, or other onsite energy sources

OUTCOME

- Reliable, resilient, affordable solution for homeowners

Honu
Island wastewater solutions

Our solution...

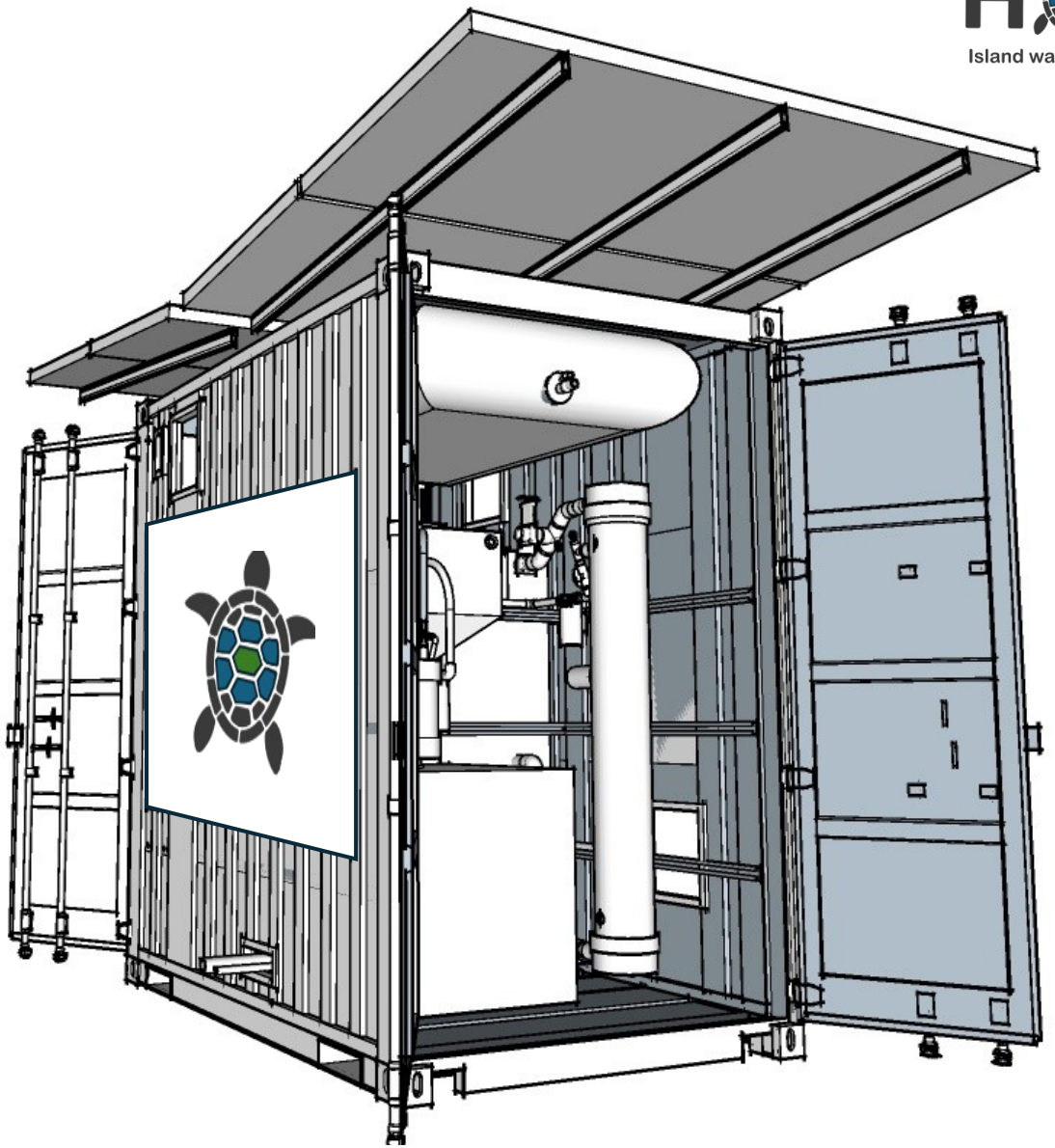
Honu Hub

off-grid wastewater system

Compact, above ground, no leach field

Key features

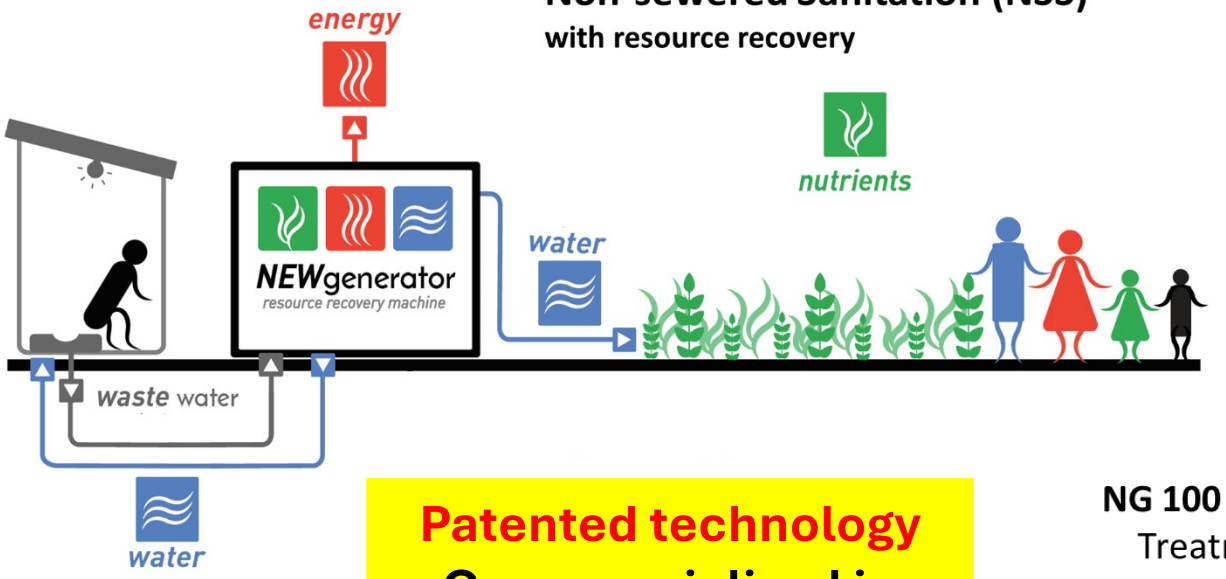
- Nitrogen removal
- Onsite water reuse
- Automation & remote monitoring
- Energy independence



Powered by NEWgenerator™ resource recovery machine™

Developed through support by BILL & MELINDA GATES foundation

Non-sewered Sanitation (NSS)
with resource recovery



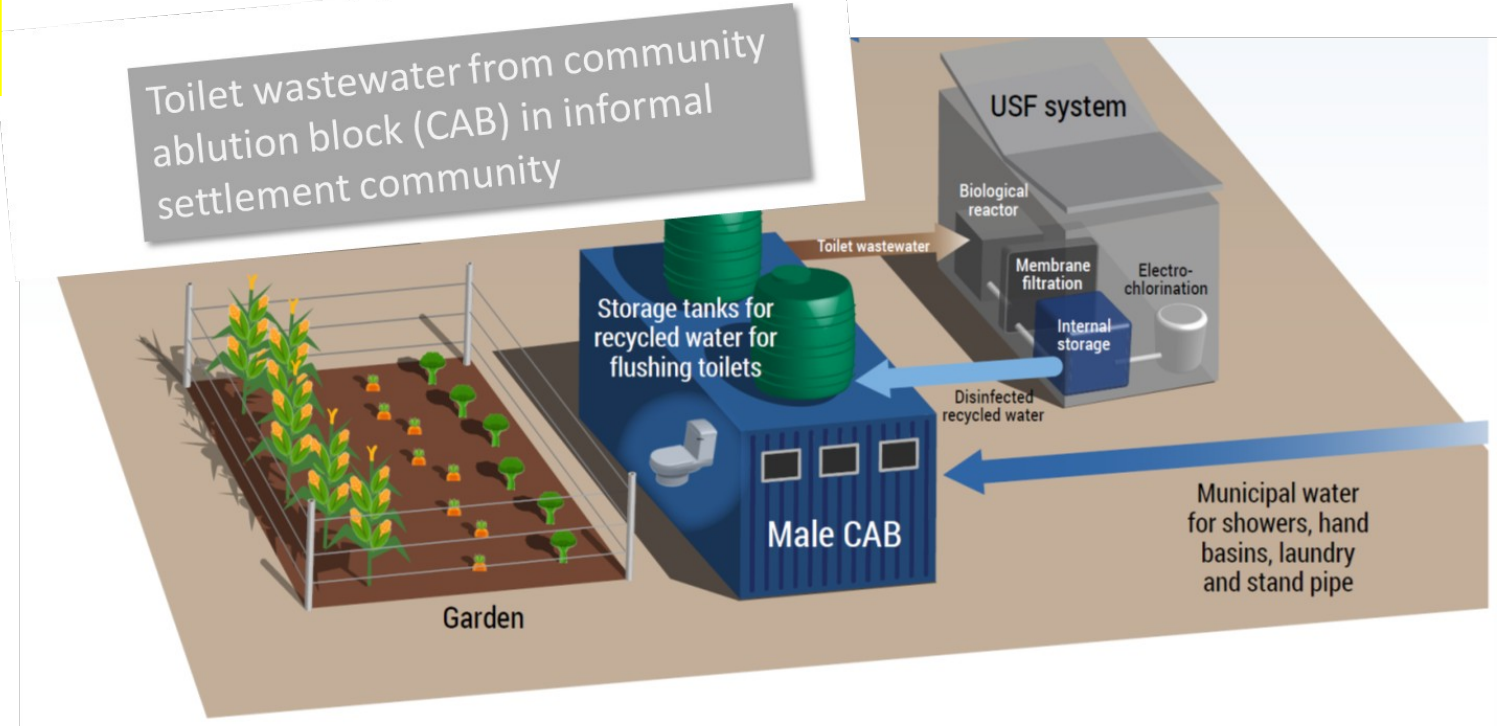
BILL & MELINDA GATES foundation

Reinvent The Toilet Challenge

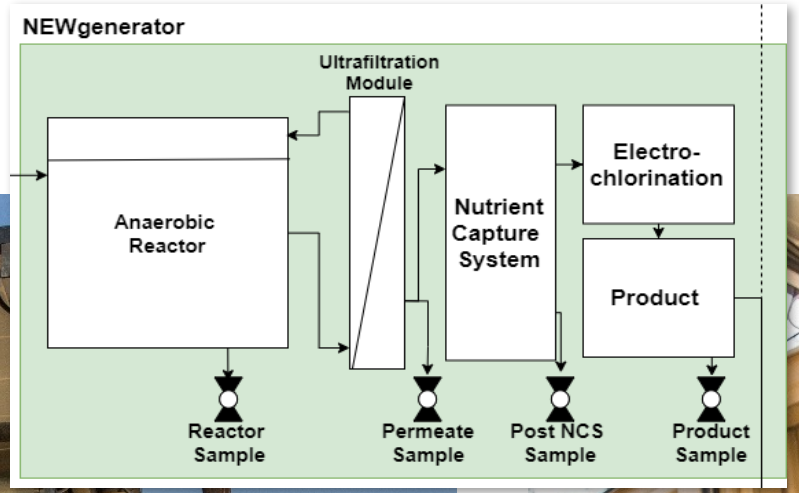
Patented technology
Commercialized in India and South Africa

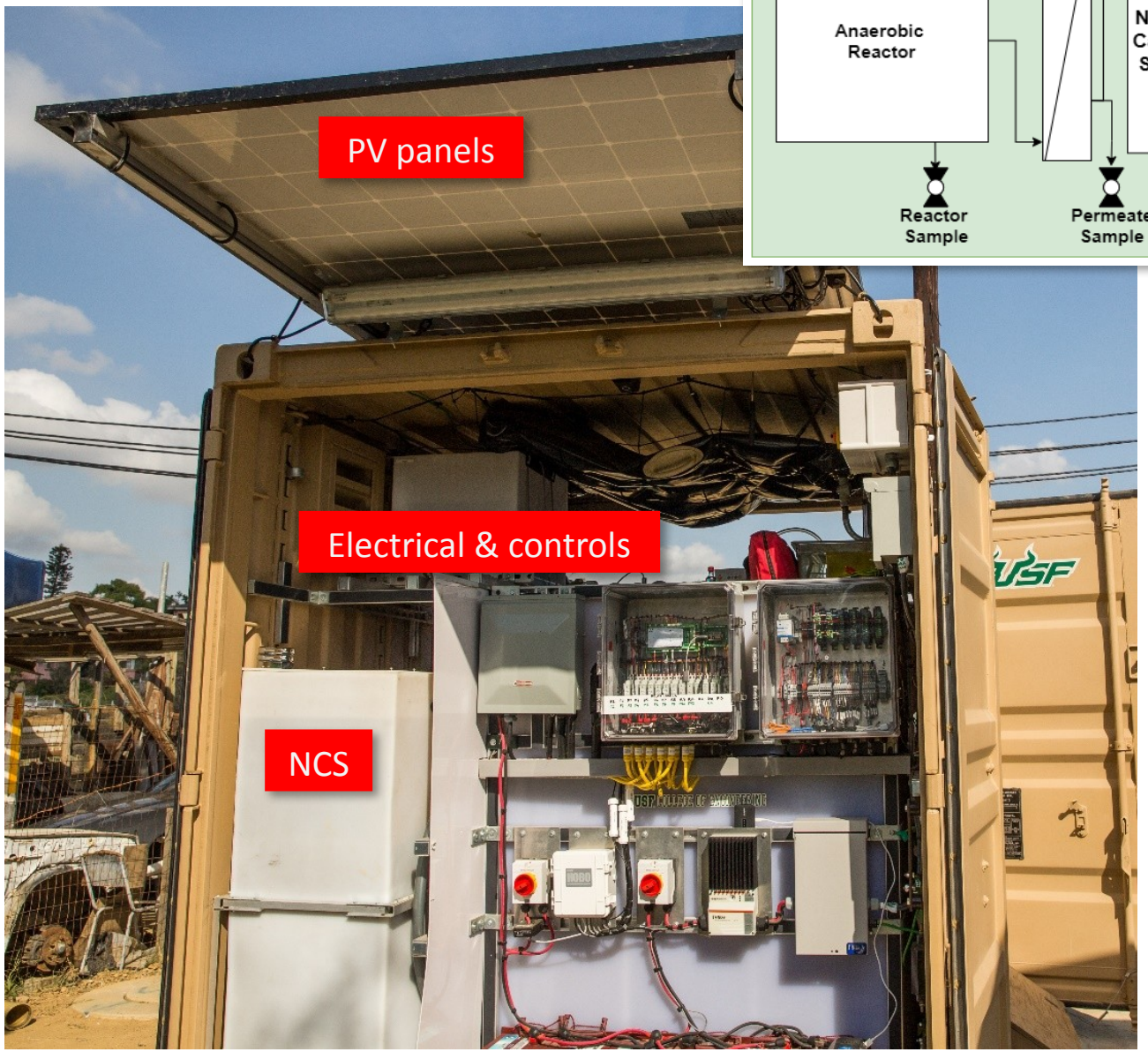


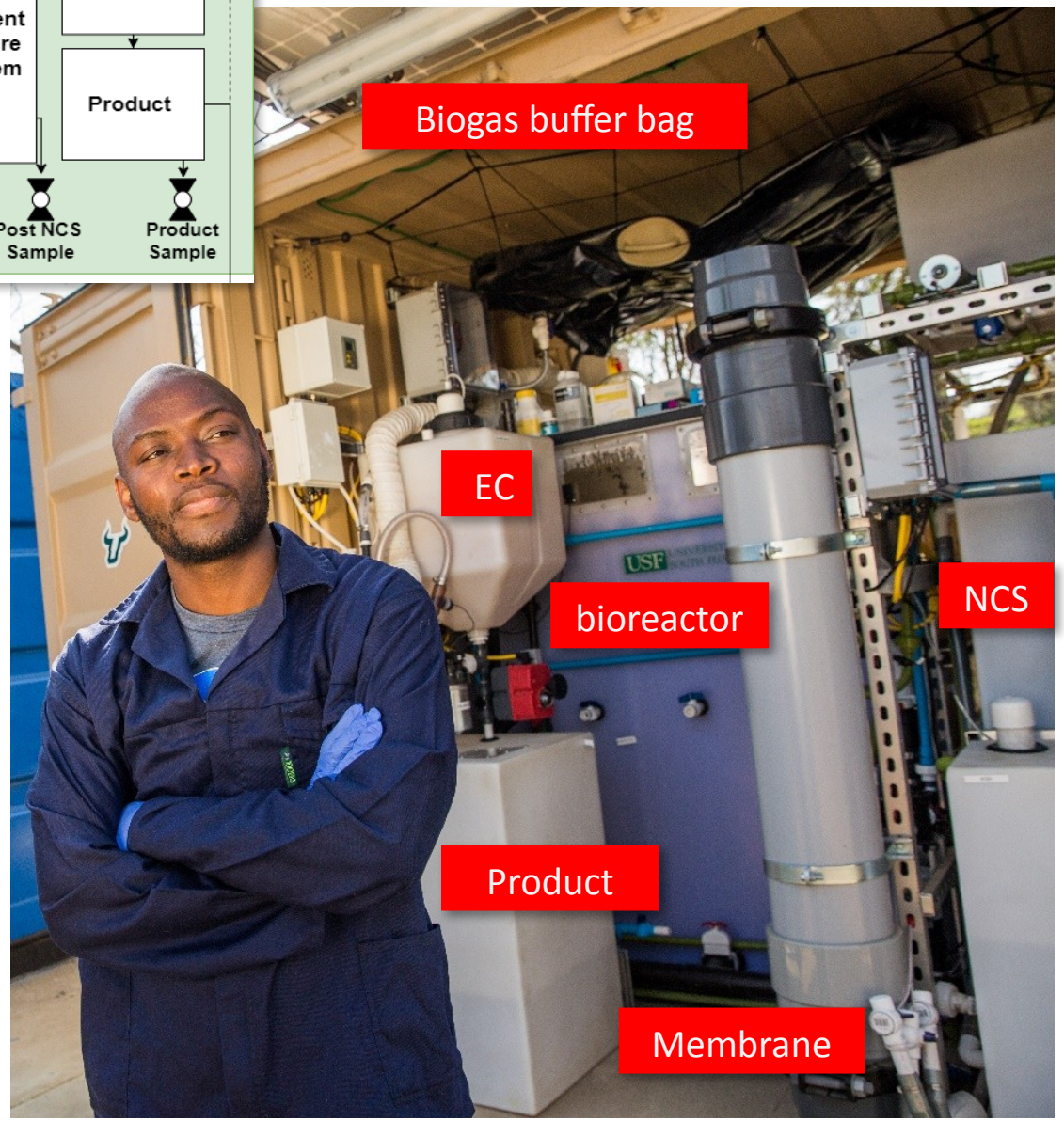
NG 100 Engineering Field Test (EFT) in Durban, South Africa (2018-2022)
Treatment performance assessment for partial waste stream (Black, Yellow)



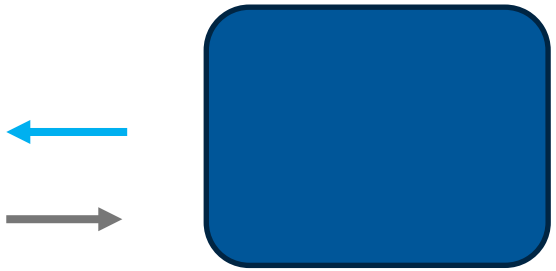
PV: photovoltaic
NCS: nutrient capture system
EC: electro-chlorination



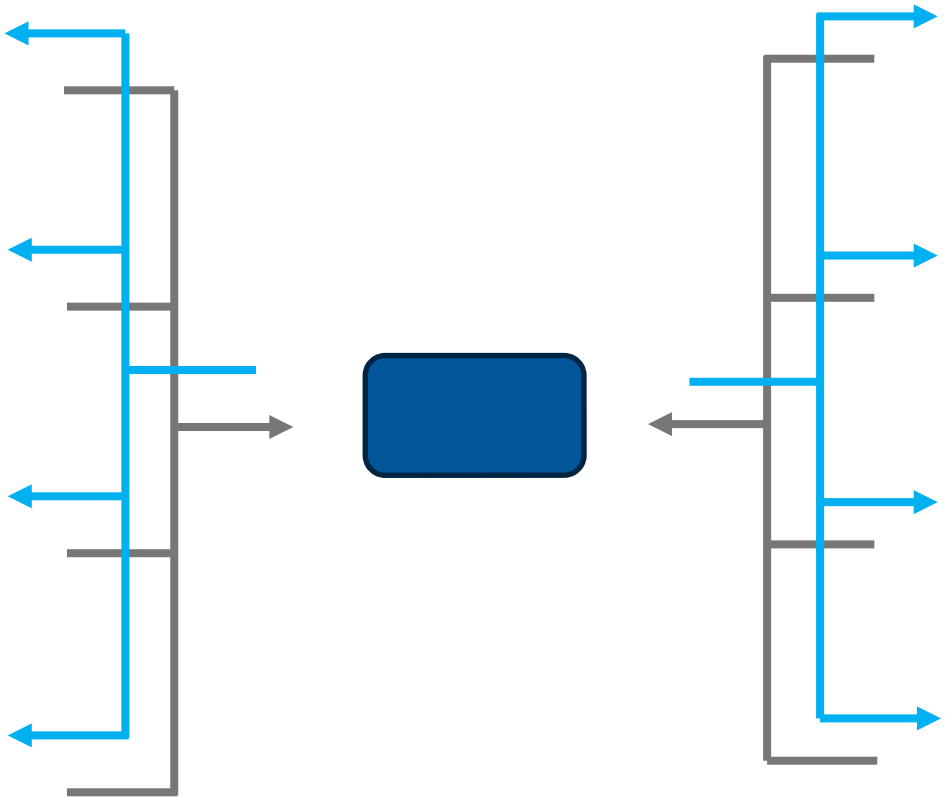




Video: Honu Hub Tech Focus



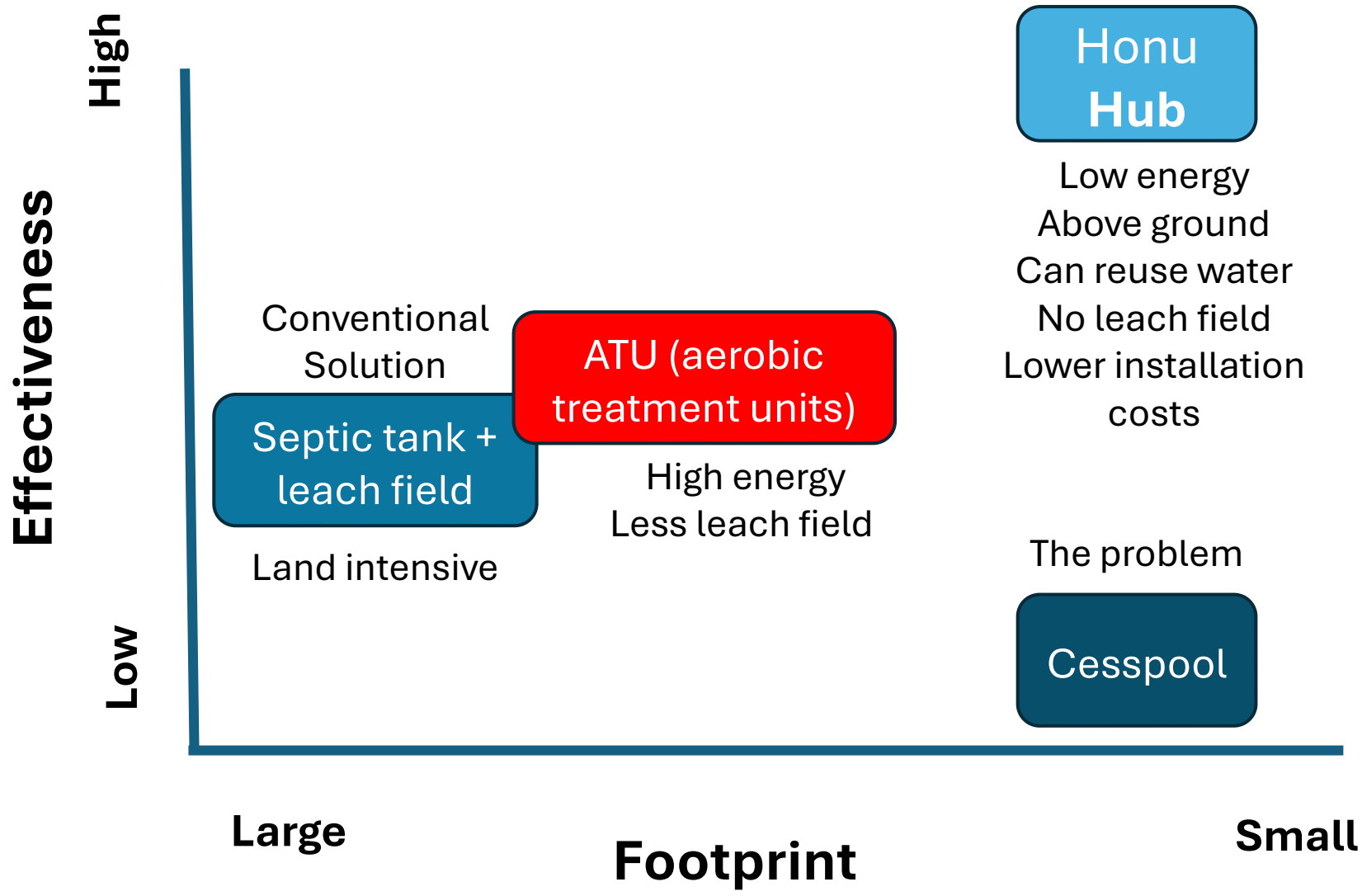
Honu Hub
individual
household
system



Honu Hub micro-cluster system

The Honu Advantage

Honu Hub will enable **effective** and **compact** household wastewater management.



Removal of installation barriers

- No leach field needed
- Rapid install
- Saving space and time

Drainfield in HI: up to 1200 SF
HH footprint: 52 SF

☾ 23X less, and no digging for drainfield

Competitive Landscape Analysis

Price Point (to customer)

"Honu Hub will cost less, install faster, and protect your backyard for other uses"

Typical cost of cesspool conversion to septic system

Other (permitting, etc)
$10,000 (20%)

Engineering
$5,000 (10%)

Total cost
$50,000



Equipment
$15,000 (30%)

Site work/Excavation
$20,000 (40%)

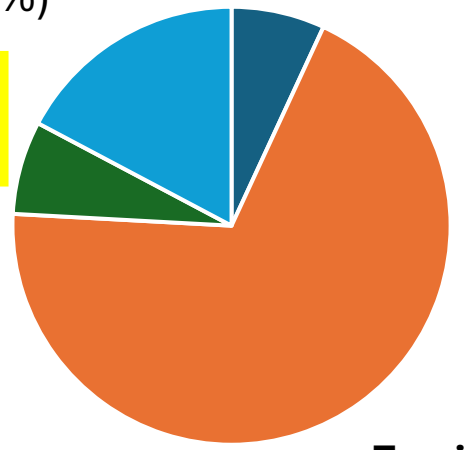
Engineering design | Equipment | Site work/Excavation | Other (permiting, etc)

Honu Hub

Other
(10%)

Engineering
(4%)

Site work
(4%)



Equipment
(40%)

GTM Strategy

Key milestones in product development

Field demonstration /customer engagement

- **WWTP testing**
- **Community demonstration**

Unit 1

Unit 2

Commercial Unit

High fidelity prototype

Y1Q4

Field performance validation

Y2Q2

Customer engagement

Y2Q3

Hawaii DoH approval

Y2Q4

2025-26

Industry certification

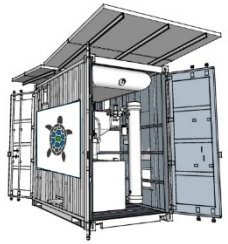
Y3Q2

First sale (2027)

Y3Q3

2026-27

2027-28



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CITY AND COUNTY OF HONOLULU

Wahiawa WWTP Pilot demonstration in O‘ahu, Hawai‘i

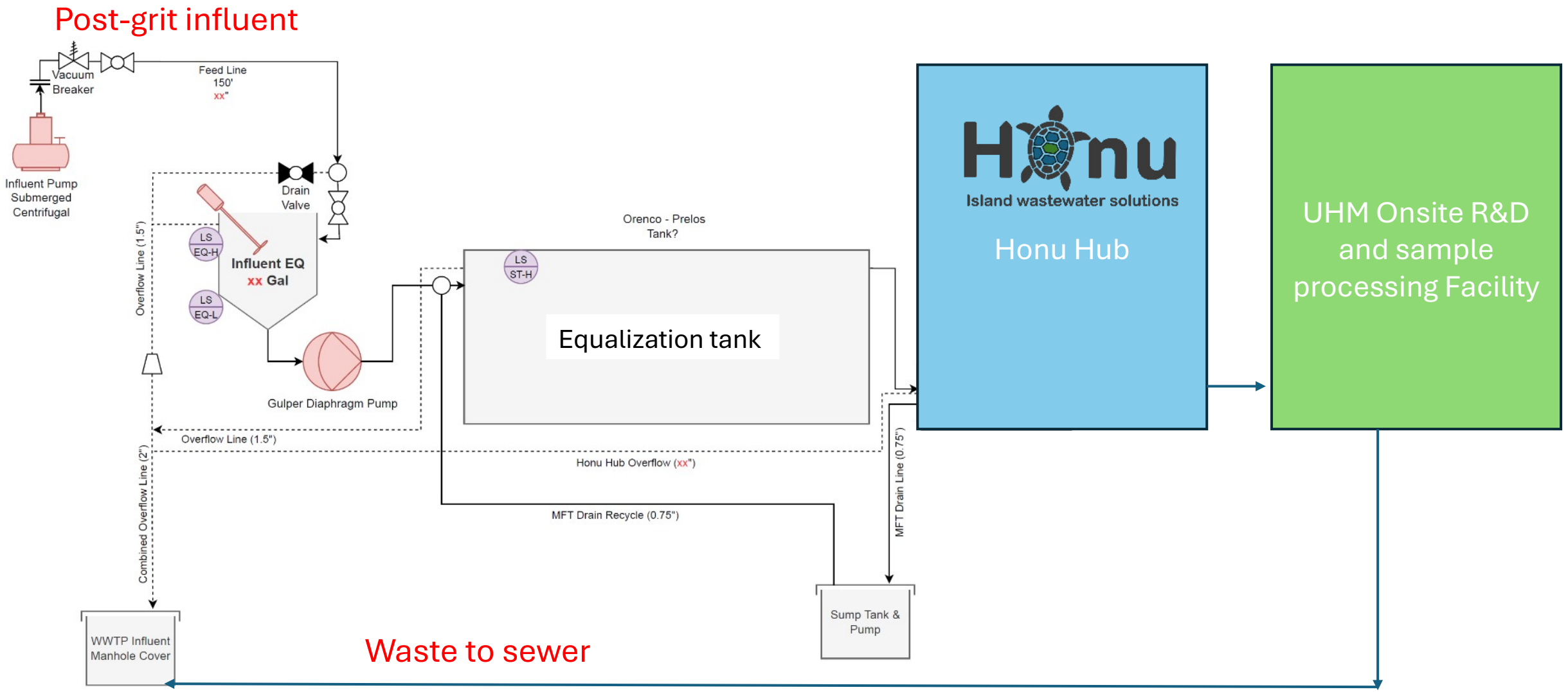





Post-grit influent
Honu Hub pilot testing area
Honolulu City
Wahiawa Wastewater
Recently viewed

Honu Hub pilot test site at Wahiawa WWTP: Flow diagram

Note: drawing not to scale





- Testing by UHM WRRC (Innovative onsite wastewater technology evaluation program)
- 12-month pilot testing (incl. 6 months of NSF testing for DoH approval)
- Honu Hub unit arrived June 2026
- Open house August 26 2026 (additional in 2027).
- Big thank you to City and County of Honolulu, Dept of Environmental Services!



Honu Hub transported
from Florida to Hawai‘i

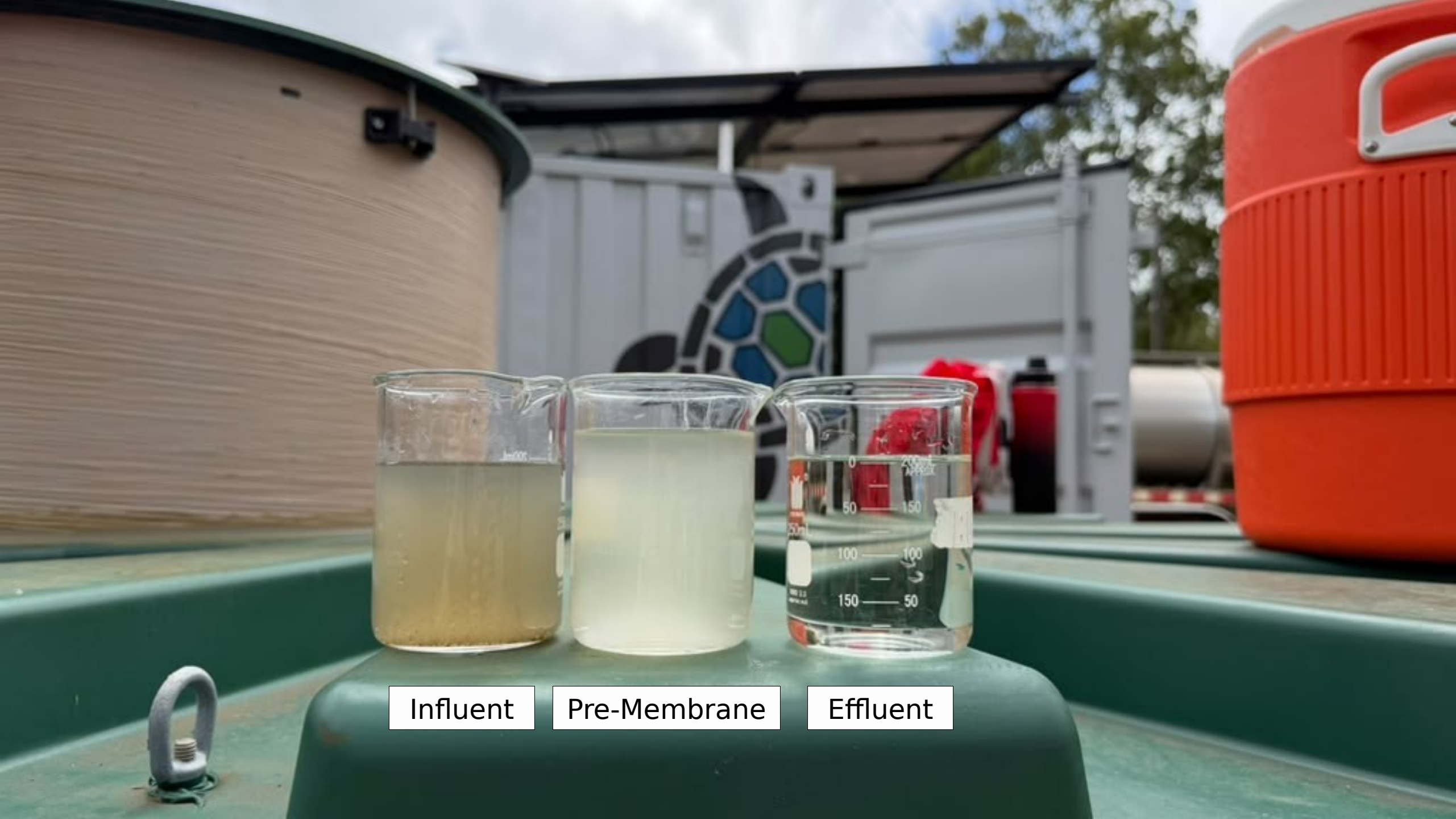






Honu Pilot demonstration in O'ahu




Influent
Pre-Membrane
Effluent

Contact us:

Honuwater.com

info@honuwater.com

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