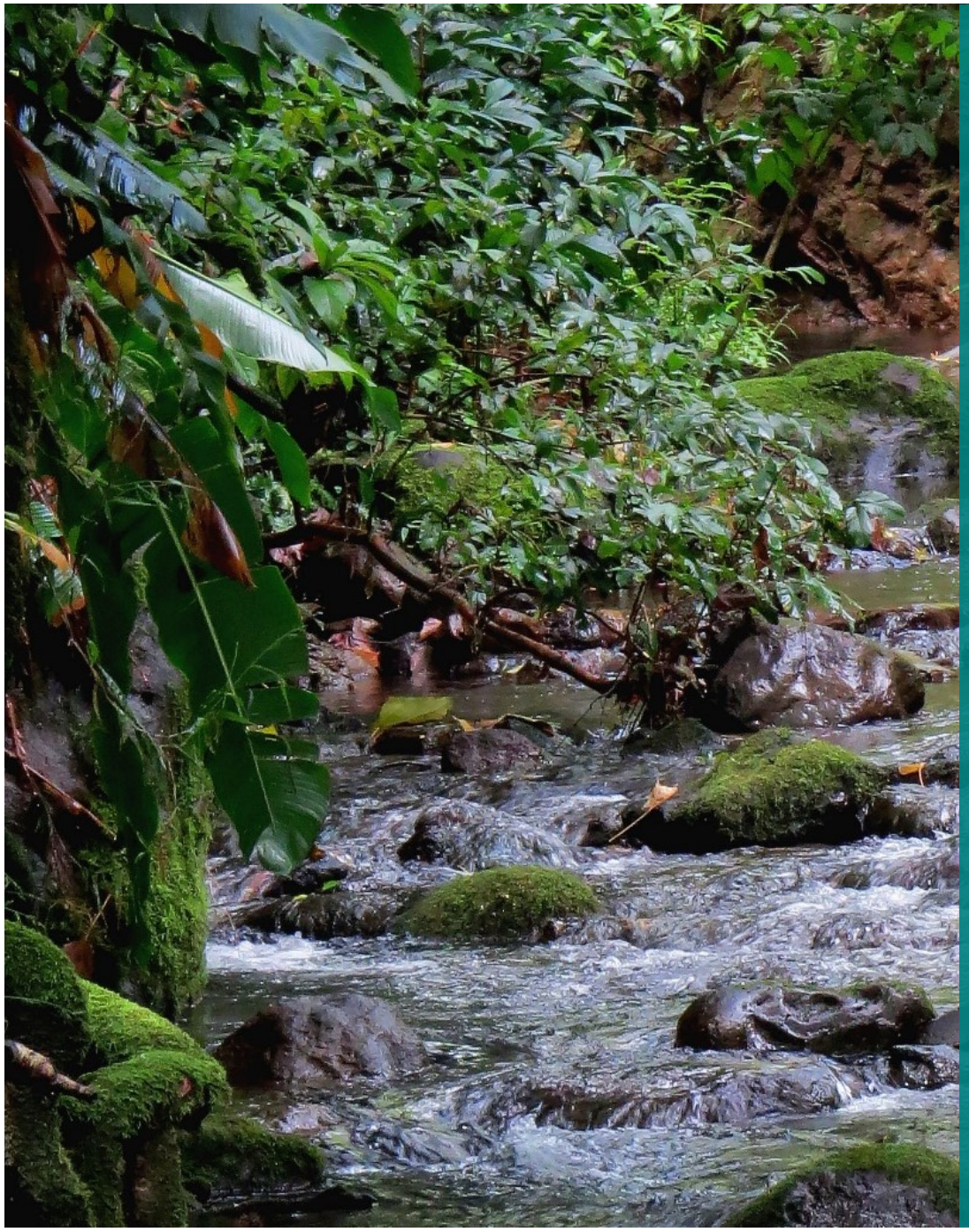
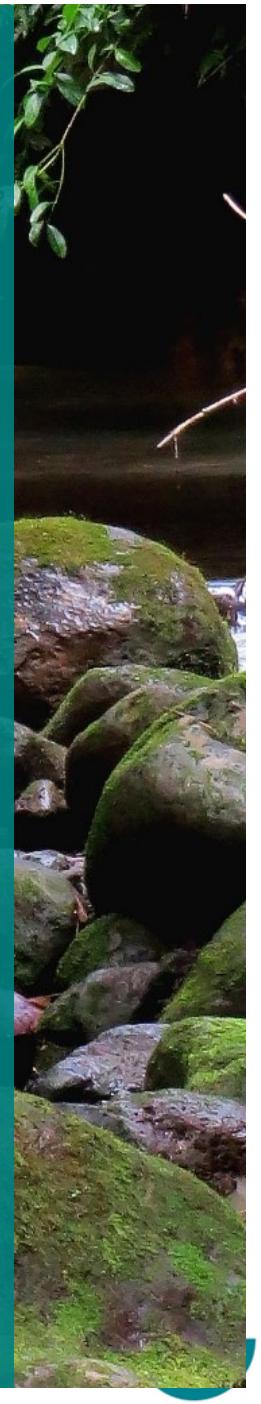


Who Picked This Site Anyway Kalaeloa Seawater Desalination Challenges and Progress

Barry Usagawa P.E.
Water Resources Program Administrator

2025 HWWA Conference
October 15, 2025



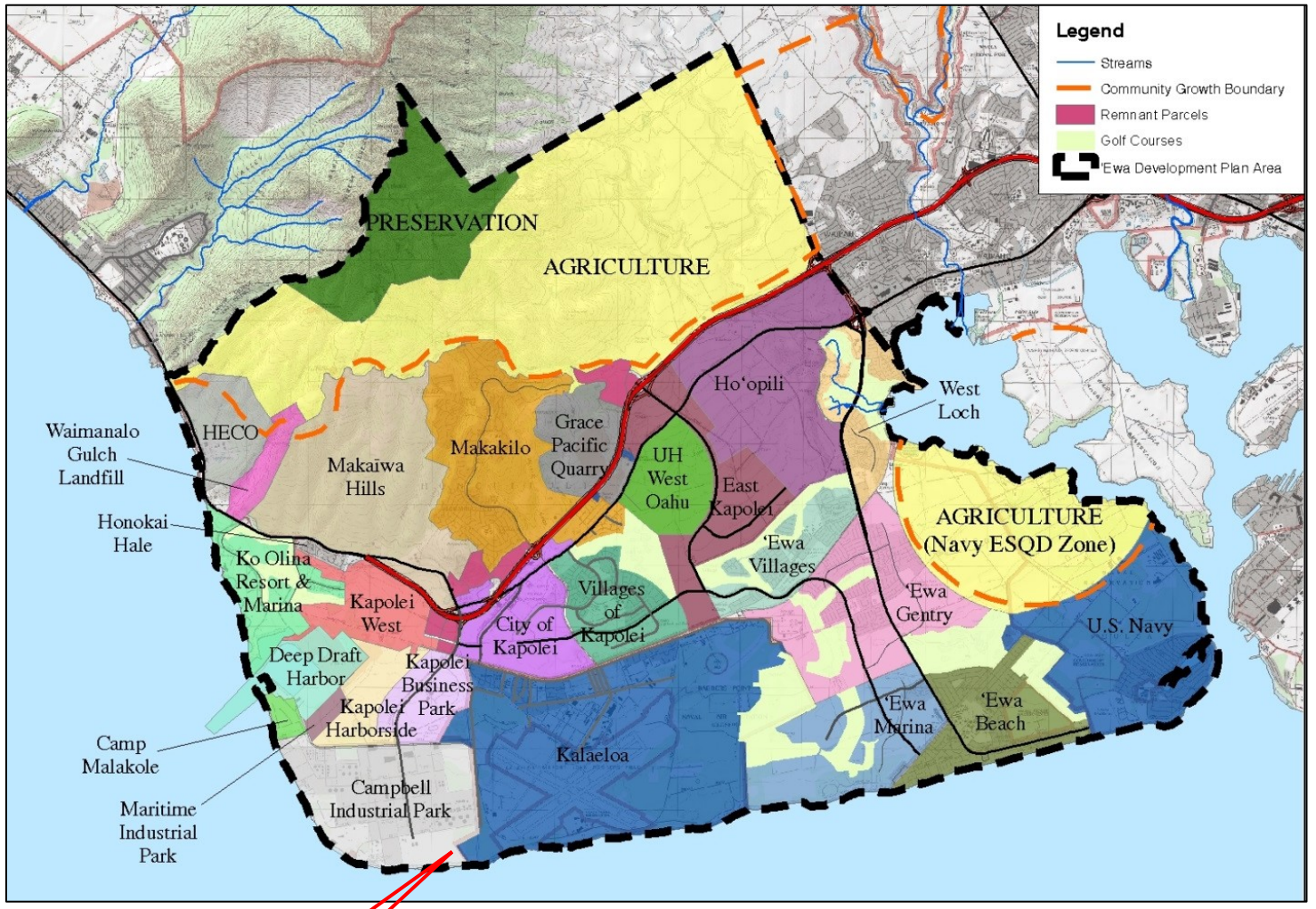
Kalaeloa Seawater Desalination Facility Project

- Project Background and Progress
- Financing Strategy
- Source Water Protection: Saltwater Wells and Aquifer Testing
- Section 106 Archaeological Sites
- Section 7 Biological Resources
- Schedule

PROJECT BENEFITS

- Develops a new, drought-proof freshwater supply for Campbell Industrial Park, Kapolei Business Park & Deep Draft Harbor

- Existing groundwater supply redirected for Ewa`s growth in support of the ‘Ewa Development Plan’s directed growth policies



PROJECT TEAM

HONOLULU BOARD OF WATER SUPPLY

wsp

Project Engineering Advisor

carollo

Project Management

INTERA

Hydro-Geology

TLCG

Environmental

Brown AND Caldwell

Feasibility & Grants

HAWKINS

HAWKINS DELAFIELD & WOOD LLP

Legal Services

KALAELOA

DESALCO LLC

DBOM Contractor

PACE

Advanced Water Engineering

Engineer of Record

BK

BOWERS + KUBOTA

Civil Engineering Design

NORDIC PCL CONSTRUCTION

General Contractor

KALAELOA SEAWATER DESALINATION FACILITY

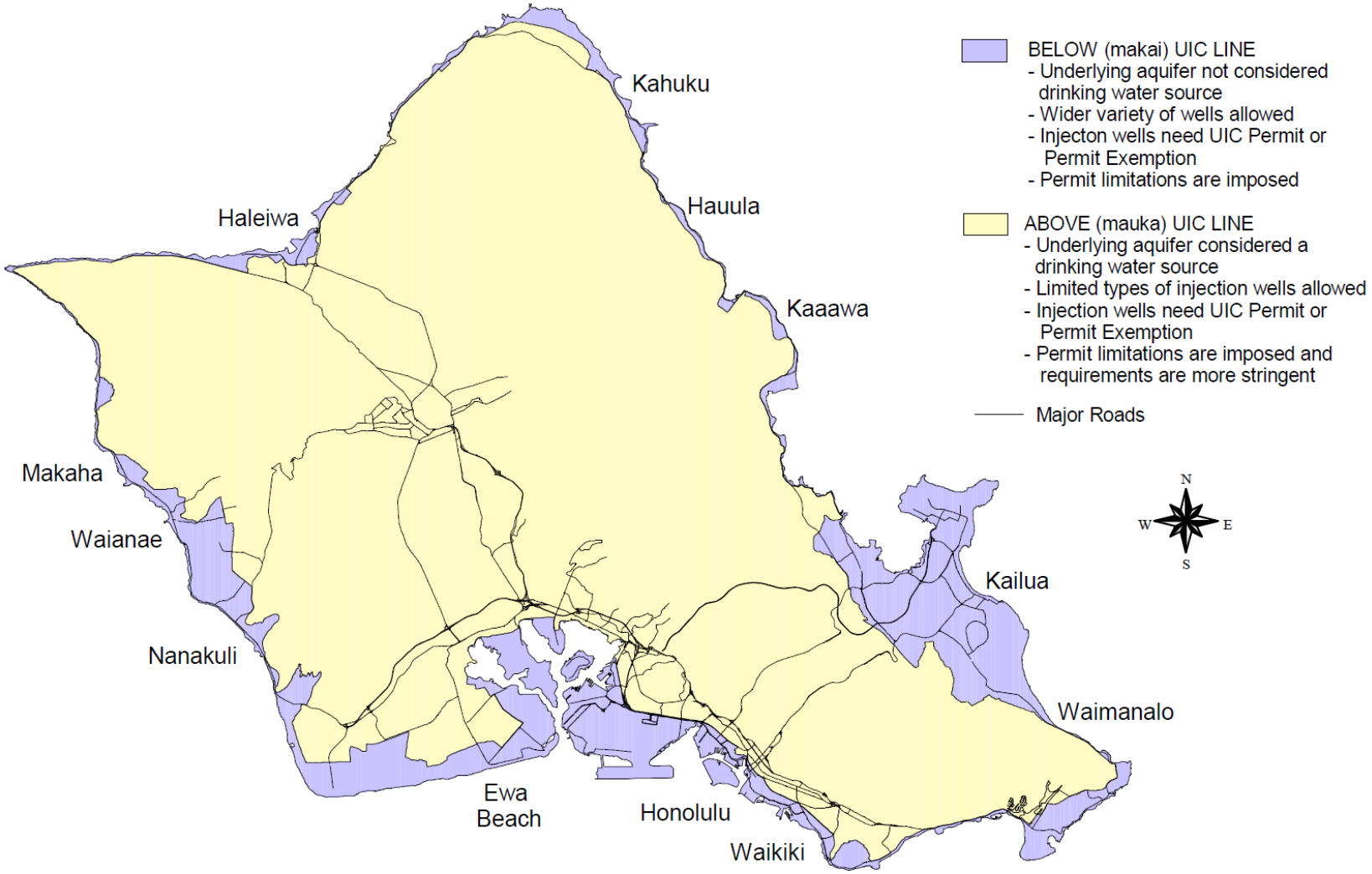
- Project was authorized by Congress in 2005
- BWS entered into a Service Agreement in June 2023 with Kalaeloa Desalco LLC to pilot, design, permit, construct, operate and maintain the new seawater desalination facility.
- Fixed Price DBOM with 20-year O&M, and Two optional 5-year extensions
- Capacity:
  - 2-RO trains 1.7 mgd min
  - 3-RO trains 2.55 mgd max
- Source: Deep Basalt Saltwater Wells
- Brine Disposal: Shallow Caprock Wells
- Energy Recovery System
- Enhanced Water Quality Standards for a reasonable match to the existing water system to ensure no detrimental impacts to customers & assets

Figure 21. 1993 NOAA Kalaeloa Coast aerial photograph (UH MAGIS) showing the project area

Site Conditions

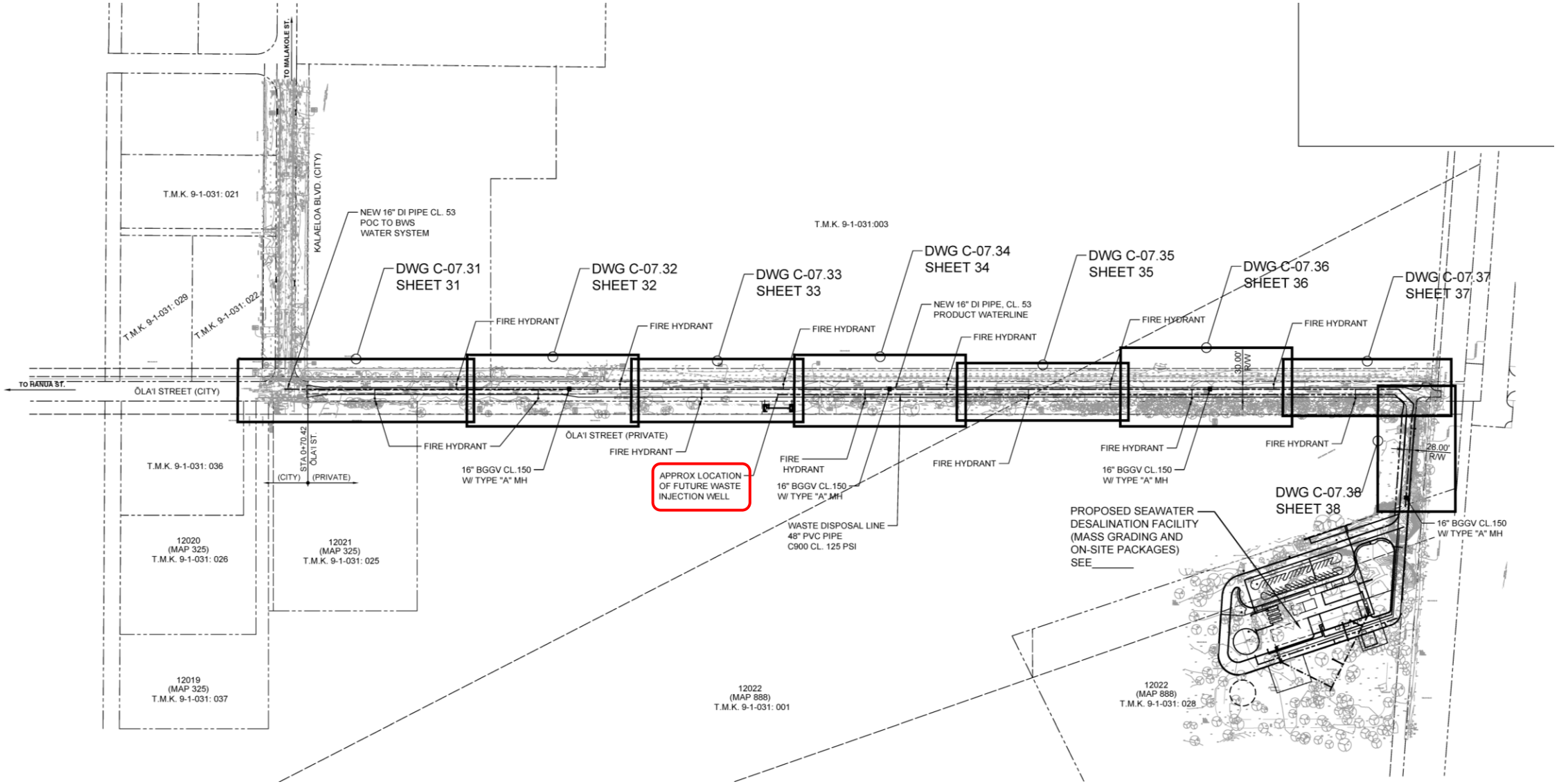
- On Former Military Land, Barbers Point Naval Air Station
- Airfield Avigation Easement Overlays
- Within Campbell Industrial Park, adjacent to PAR Refinery and Kalaeloa Co-Gen Power Plant
- Within DOH Underground Injection Control Area
- State Agricultural Cattle Feed Lot
- Special Management Area District overlays southern portion of parcel
- Tsunami Evacuation Zone
- Adjacent to Pearl Harbor National Wildlife Refuge

Island of Oahu
Underground Injection Control Areas

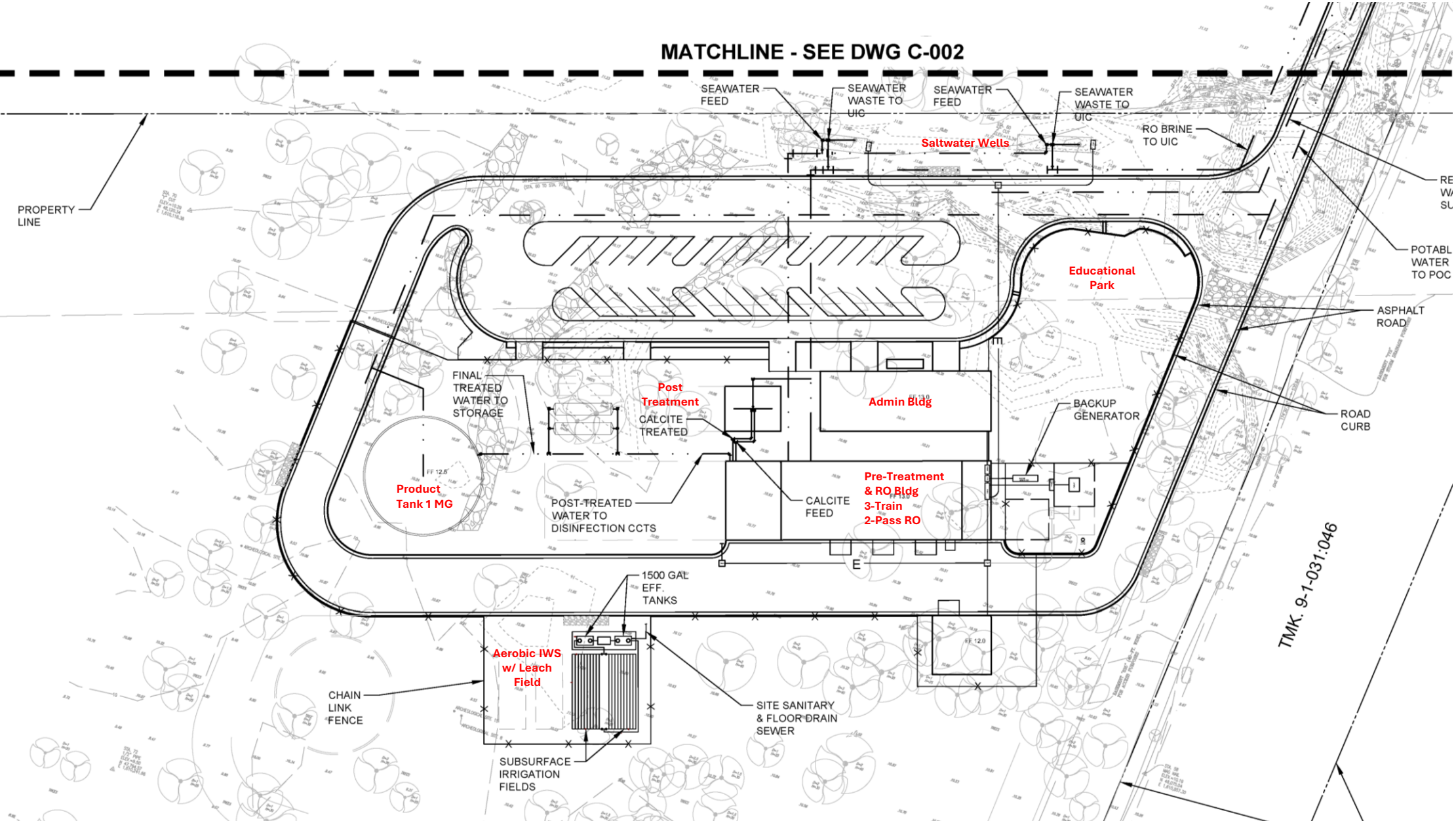


Department of Health EGIS 9/99

PROJECT SITE PLAN



FACILITY SITE PLAN



Financing Strategy

Federal Grants & Loans

- American Rescue Plan Act
- US Bureau of Reclamation WaterSmart Title XVI Grant
- Water Infrastructure Financing Innovation Act (WIFIA) Loan (pending)

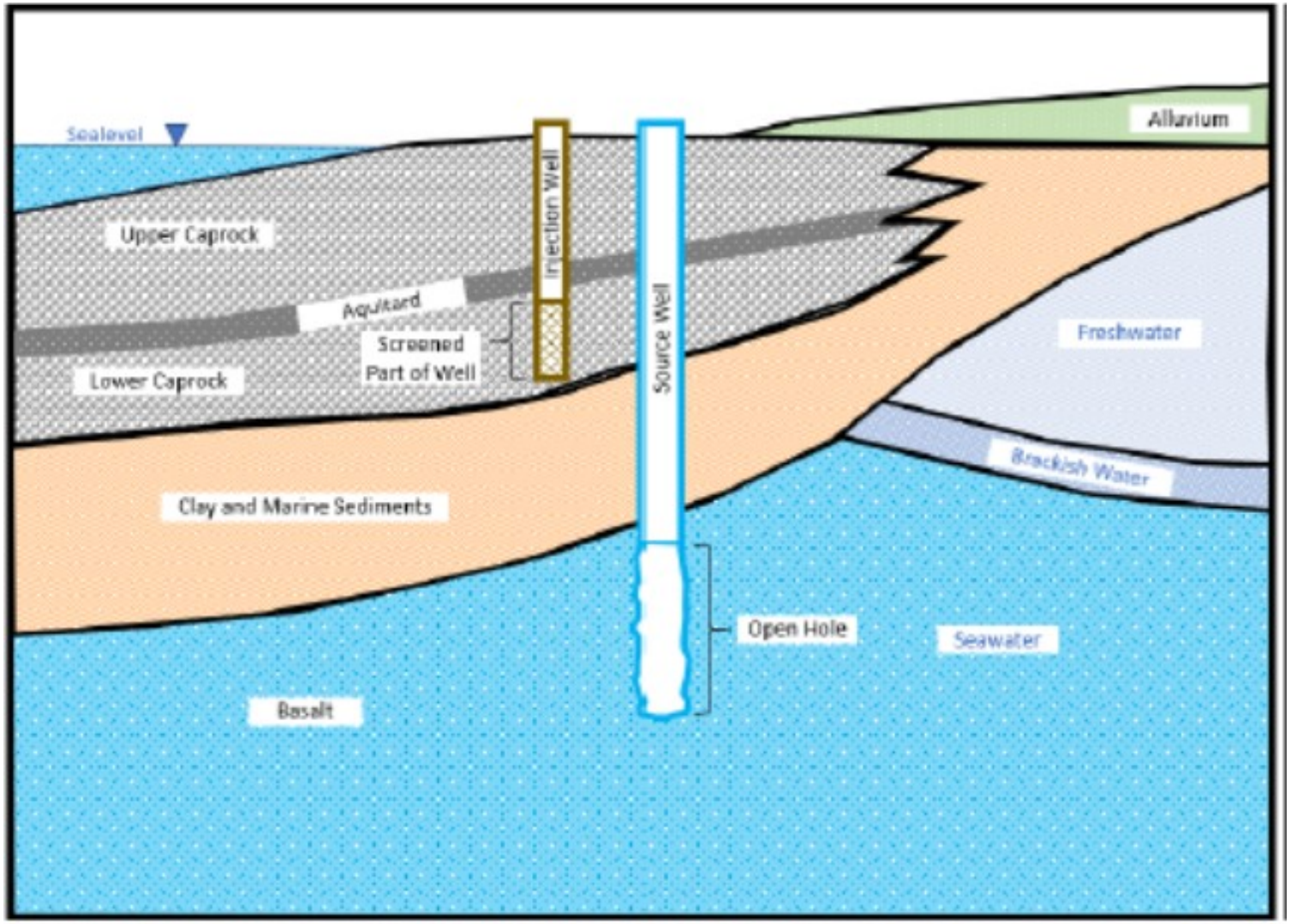
Alternative BWS Funds

- BWS WSFC Impact Fees

Challenge #1: Understanding and Ensuring Source Water Protection by Proving Hydrologic Separation of Basalt & Caprock Aquifers

- Proof Requires Multiple Lines of Evidence
  - Hydro-Geologic Research & Modeling
  - Basalt and Caprock Well Assessments and Video Logging
  - Installed Shallow Monitor Wells
  - Water Quality and Water Level Testing
  - Aquifer Pump Testing

Ewa Caprock & Basalt Geology is Hydraulically Separate



JCIP is an underground injection control area regulated by DOH

Saltwater source is from deep basalt wells 1,600‘ & 2,100‘ cased through the caprock

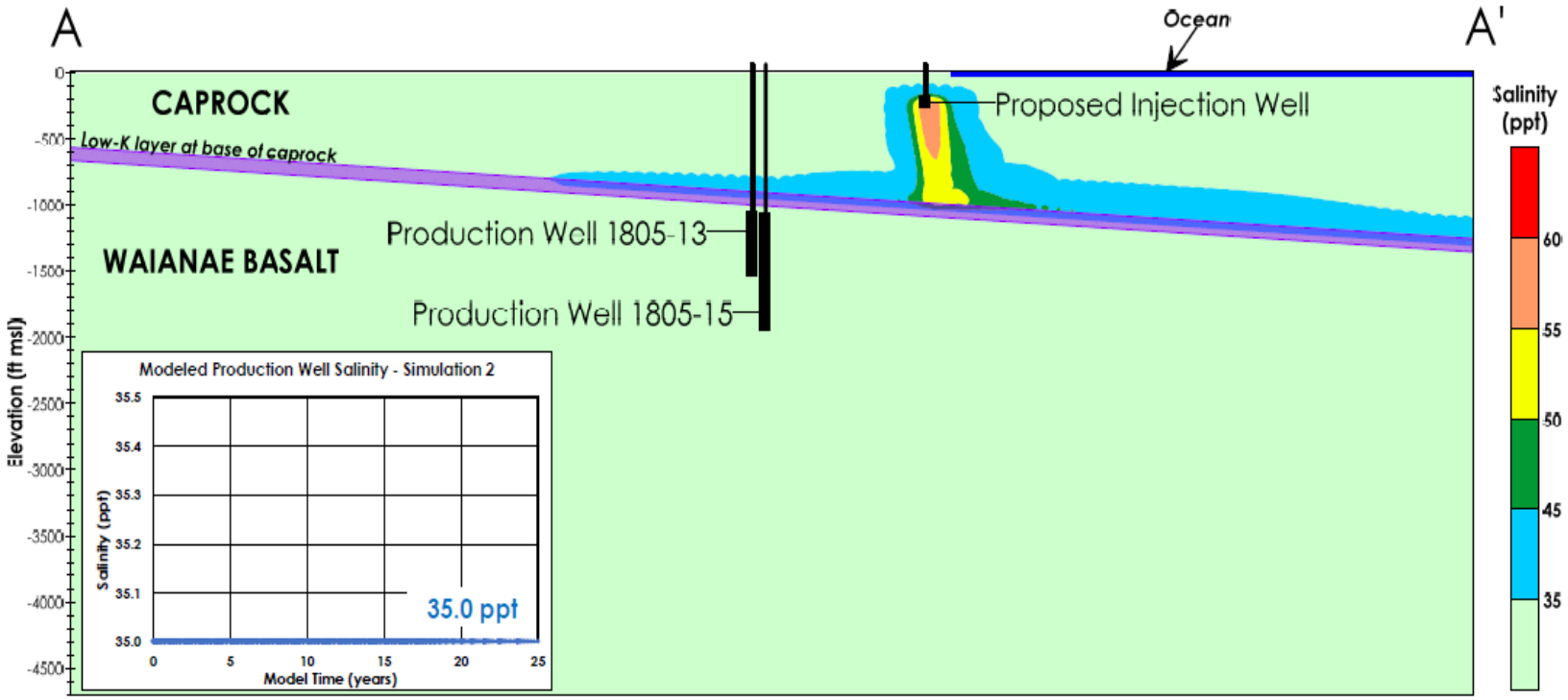
Brine injection into the overlying caprock, 300‘ deep, and by Regulation, >1/4 mile from source wells

Caprock and Basalt Formations are Hydraulicaly Separate but need to prove it

Photo of Clay Fragment Well #15 Bailing

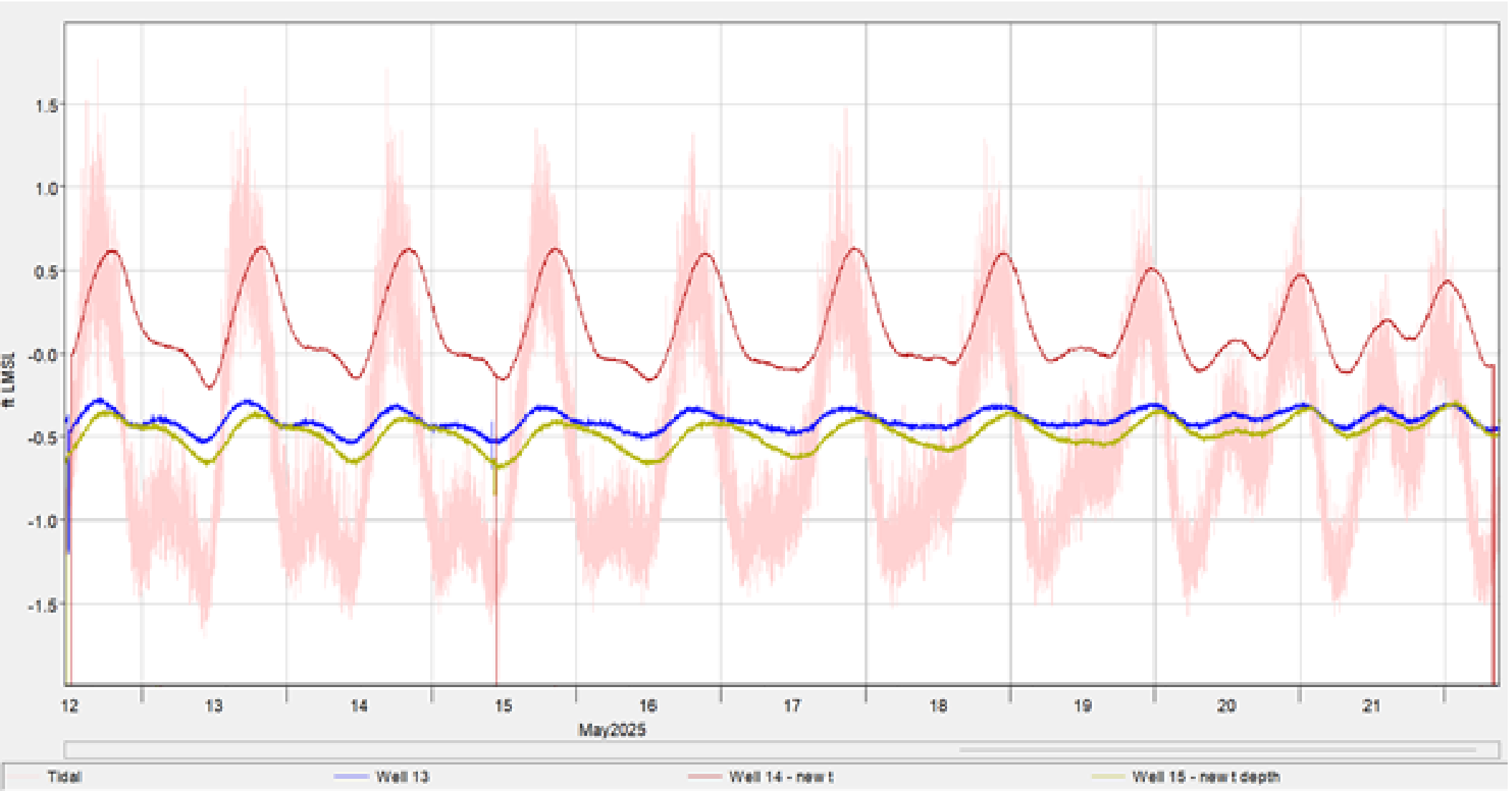
Concentrate Disposal Well Groundwater Model Findings

- Brine will sink because of higher density and flow along the caprock/basal contact along a 4% slope to the ocean and be diluted. Brine will not impact the benthic nearshore environment.



B) Simulation 2 - Base of Caprock K = 0.1 ft/d

Different Water Levels in Basalt and Caprock Wells is Evidence of Aquifer Separation

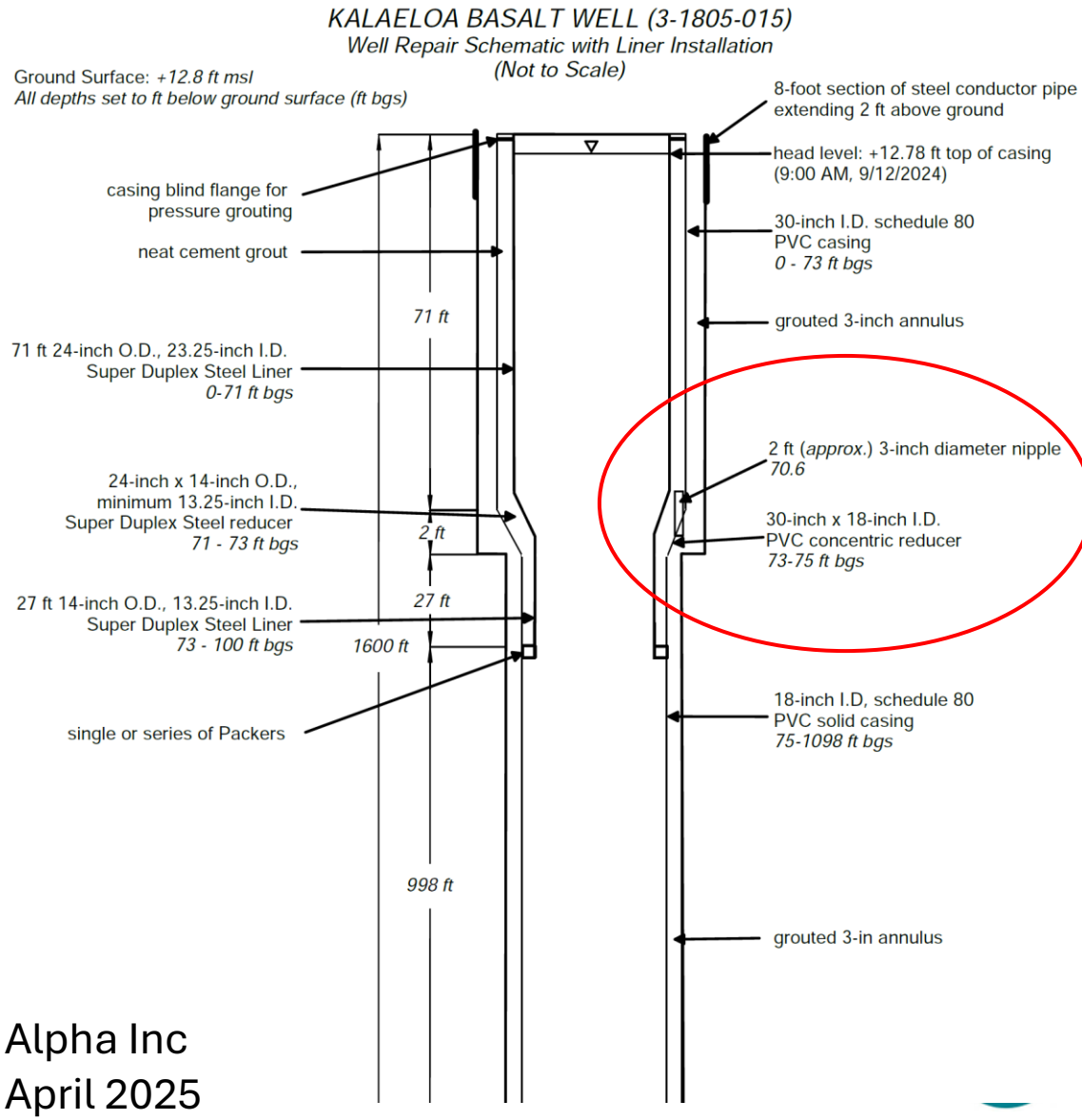


Basalt Wells
13 (Blue) &
15 (Green)

Caprock Well
14 (Red)

Tidal Response
Data (Pink)

Well #15 Casing Repair to Seal Open 3” Grout Nipple at Reducer
100‘ Super Duplex S/S Casing w/ Water Activated Swellable Packers

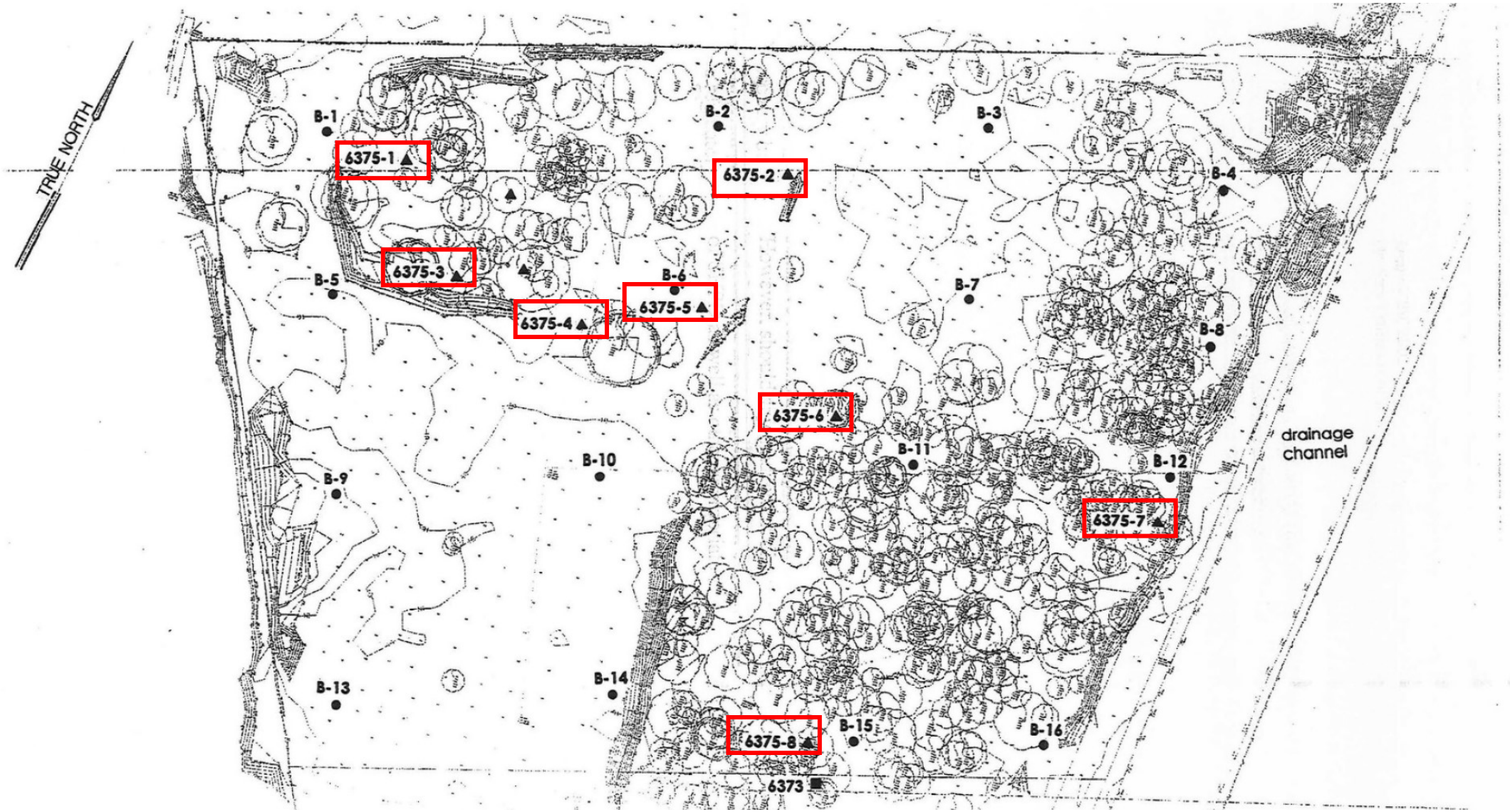


Alpha Inc
April 2025

Challenge #2: Section 106 Archaeological Sites

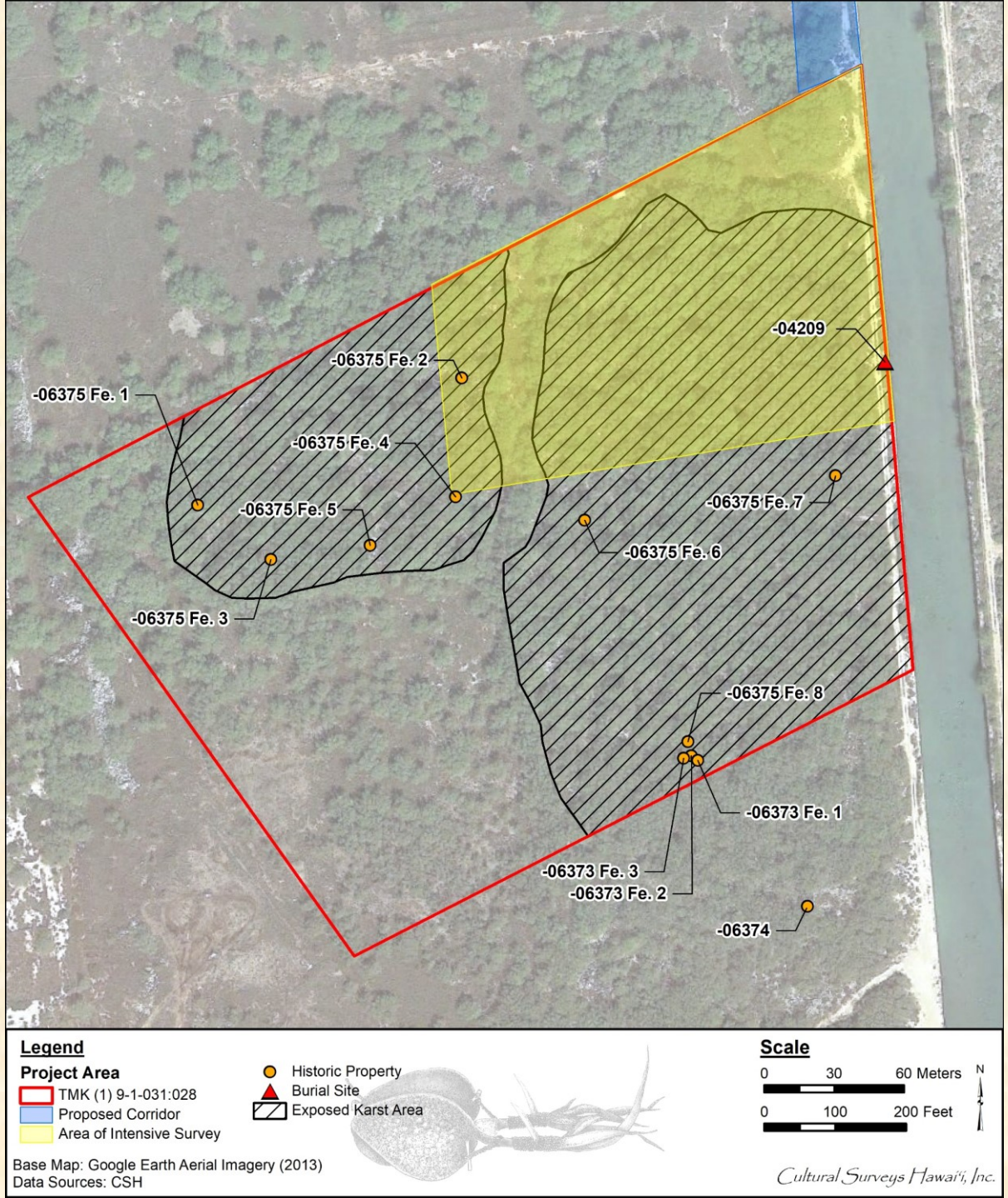
- 3 known archaeological sites
  - Site 4209 Human Burial
  - Site 6373 Habitation Site
  - Site 6375 Pit Caves in Karsts with Paleontological bird remains
- 2 Archaeological Inventory Surveys
- Historic Preservation Plan
- Archaeological Monitoring Plan
- Archaeological and Cultural Monitors during construction
- MOA Commitment (USBR, EPA, SHPO, BWS)
- Mitigation: Avoidance and Burying

Sinoto and Titchenal 2002 AIS, Site 6375, 8 Pit Caves Identified

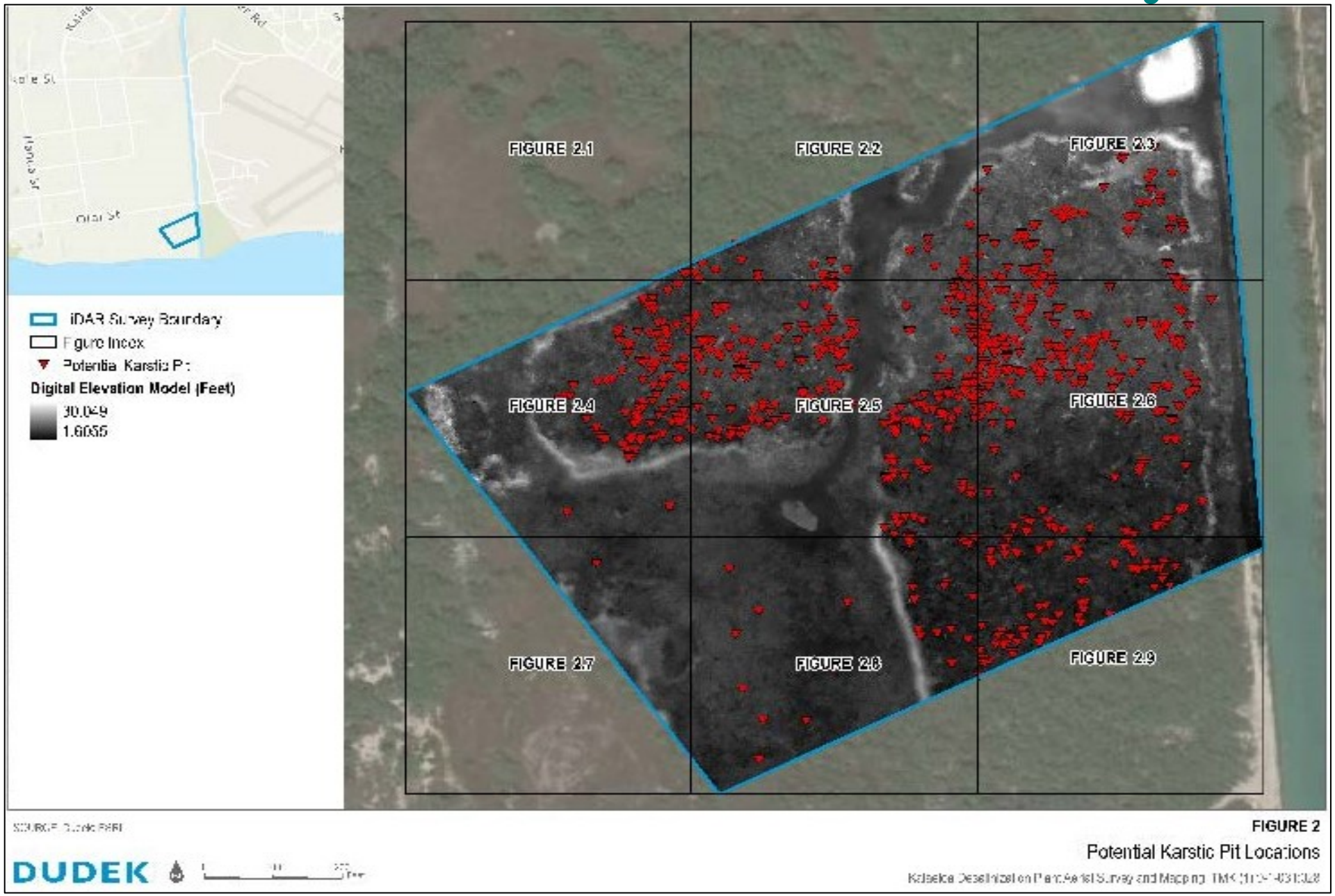


AIS Fieldwork and Results 2021

- Pedestrian Inspection
- LiDAR Survey
- GPR Survey
- Subsurface Testing

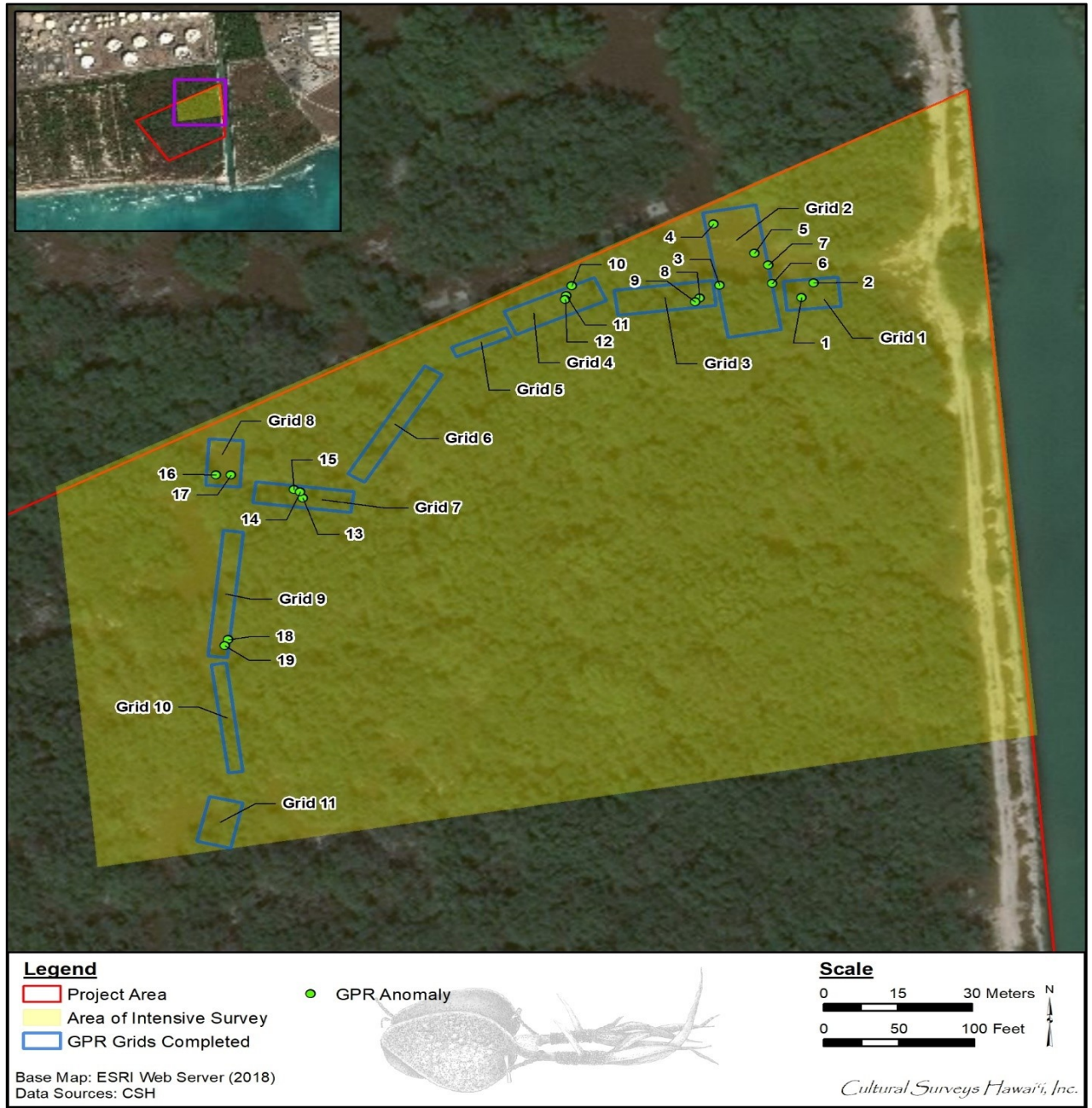


AIS Results—LiDAR Survey



AIS Results—Ground Penetrating Radar Survey

- Identified 19 anomalies that have been interpreted as possible buried pit caves
- Identified possible subsurface metal objects in several of the possible pit caves



Ground Penetrating Radar Images of Highly Reflective Surfaces in Grids 2, 4 and 9

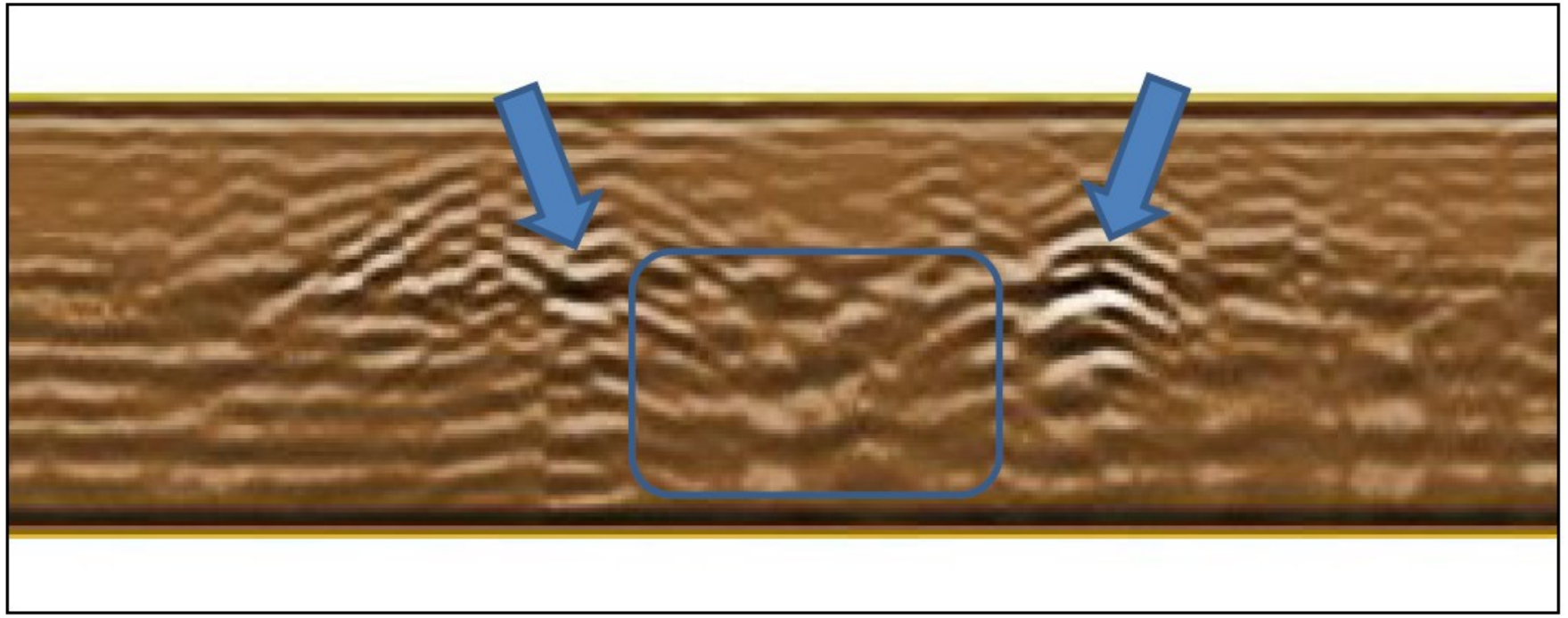


Figure 75. GPR Anomaly 3 within GPR Grid 2, a possible pit cave (blue box) between two highly reflective surfaces/edges (blue arrows)

Challenge #3: Section 7 Biological Resources

Ewa Euphorbia skottsbergii var skottsbergii

Ewa Achyranthes splendens var. rotundata

Challenge #3: Section 7 Biological Resources

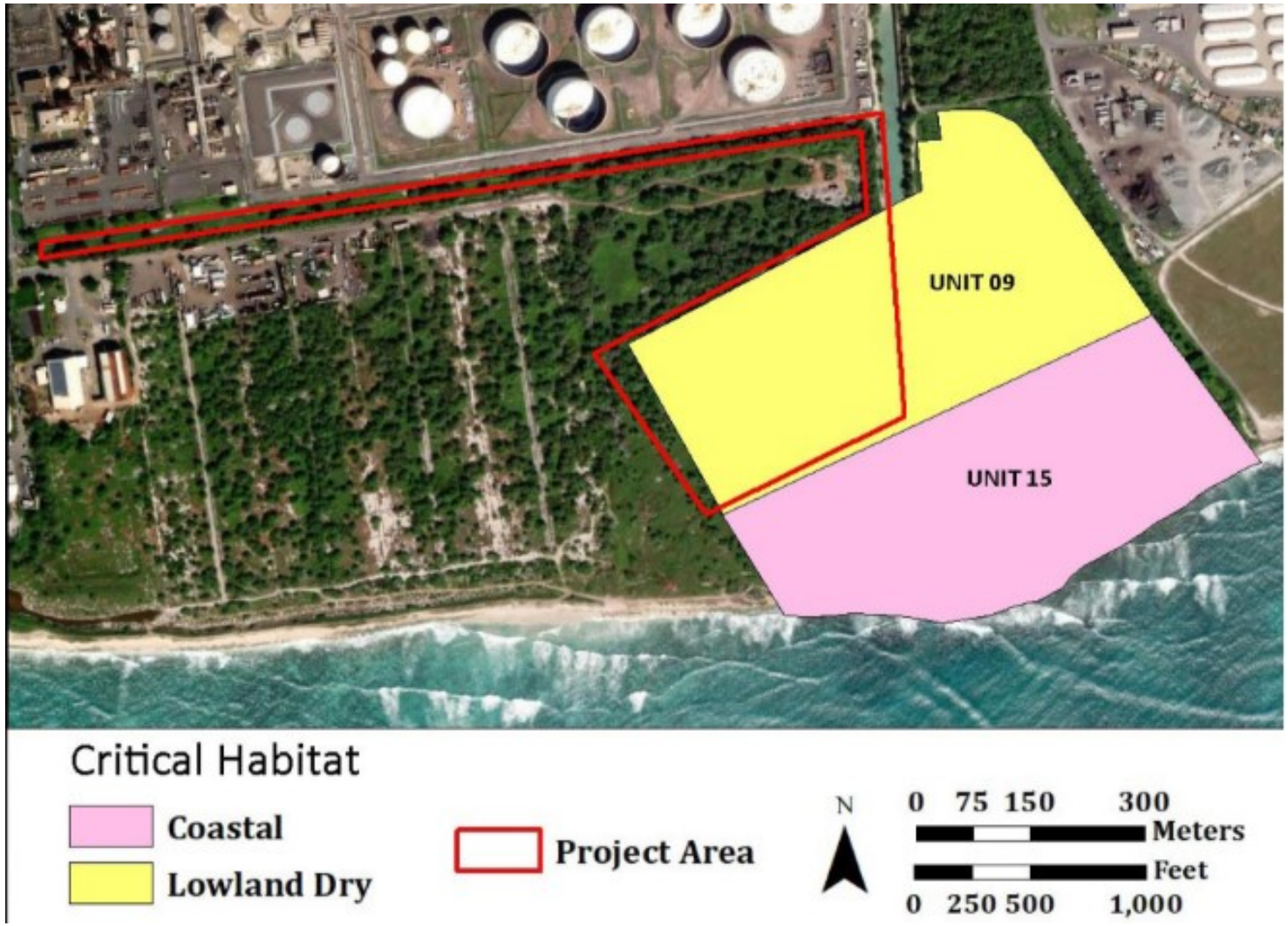
- Biological Surveys Found No Threatened or Endangered Species on the parcel
- A 2024 USBR Determination Evaluated the 2008 FEIS and found a NEPA EIS is not required. However, USBR noted
- In 2012, USFWS Designated Undeveloped Ewa Lands, including the BWS Kalaeloa parcel as a Critical Habitat.

Lowland Dry and Coastal Critical Habitat Overlay of the Project Area

USFWS opined that the project construction would constitute an Adverse Modification, requiring a conservation recovery commitment citing the Endangered Species Act Compensatory Mitigation Policy,

OR

Disqualify the project from federal funding.



USFWS Conservation Commitment

- Conservation Commitment will Likely Require the Long-term Recovery
  - Ewa Akoko (Euphorbia skottsbergii var. skottsbergii)
  - Ewa Achyranthes (Achyranthes splendens var. rotundata),
  - Other Native Plants, TBD
- The implemention of a compensatory mitigation program to offset and exceed the ecological value of the affected habitat will provide a net conservation benefit, creating a conservation uplift that exceeds the extent of the initial adverse modification

Figure 3. Boundary conditions overlapping the project site.

Draft Biological Recovery Plan

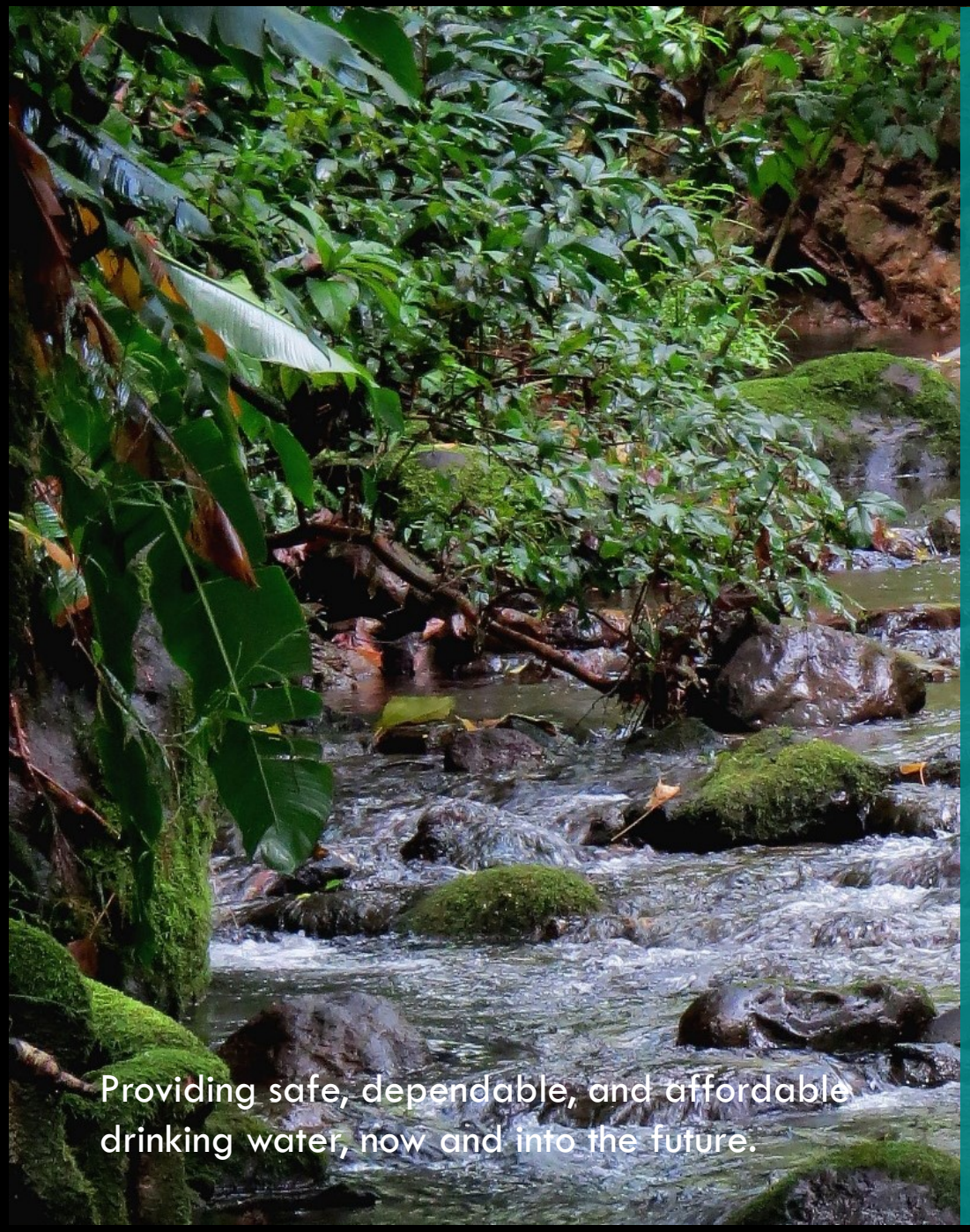
- Clear Fire Breaks surrounding karsts and savannah recovery areas
- Install a fire hydrant, R-1 irrigation system and controls
- Remove invasive plants (Kiawe and buffalo grass)
- Archaeological monitoring and preservation
- Seed Bank, Propagate and Plant Ewa Akoko & Achyranthes
- Down-cast lighting per Dark-Sky Standards
  - Hoary Bats
  - Shearwaters
  - Petrels

Figure 7. Fire break layout for TMK: 9-1-031: 028.

PROJECT TIMELINE

Operations Period Commences After Acceptance
(20 Years with Two Additional 5-year Renewal Terms at BWS's Discretion)

Dates are preliminary and subject to change.



Providing safe, dependable, and affordable drinking water, now and into the future.

Mahalo!

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