

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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RICK BLANGIARDI
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DAWN TAKEUCHI APUNA
ACTING DIRECTOR



November 14, 2022

2022/ED-22(CK)

Ms. Mary Alice Evans, Director
State of Hawaii
Office of Planning and Sustainable Development
Environmental Review Program
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Ms. Evans:

SUBJECT: Chapter 25, Revised Ordinances of Honolulu
Draft Environmental Assessment (DEA)
Project: Pueo Farm
Applicant: Paul Alston
Agent: WHALE Environmental Consulting (Mark Howland)
Location: 68-431 Farrington Highway - Mokuleia
Tax Map Key: 6-8-003: 045

With this letter, the Department of Planning and Permitting hereby transmits the DEA and the Anticipated Finding of No Significant Impact for the Pueo Farm Project, located at 68-431 Farrington Highway in Mokuleia, Oahu, for publication in the November 23, 2022, edition of *The Environmental Notice*.

We have uploaded an electronic copy of this letter, the publication form, and the DEA to your online submittal site.

Should you have any questions, please contact Christi Keller, of our Zoning Regulations and Permits Branch, at (808) 768-8087, or via email at c.keller@honolulu.gov.

Very truly yours,

FOR 
Dawn Takeuchi Apuna
Acting Director

**NON-CHAPTER 343 DOCUMENT
PUBLICATION FORM
OFFICE OF ENVIRONMENTAL QUALITY CONTROL**

Project Name: Pueo Farm Project

Applicable Law: Chapter 25, Revised Ordinance of Honolulu (ROH), Special Management Area (SMA)

Type of Document: Draft Environmental Assessment (EA) and Anticipated Finding of No Significant Impact (AFONSI)

Island: Oahu

District: Council District 47; North Shore Sustainable Communities Plan Area

TMK: (1) 6-8-003: 045

Permits Required: SMA Use Permit; Development Permits; Well Permit

Applicant or Proposing Agency: Paul D. Alston
Contact: Paul D. Alston
Paul.alston@dentons.com
(808) 294-9254
2120 Puualii Place
Honolulu, Hawaii 96822

Approving Agency or Accepting Authority: City and County of Honolulu
Department of Planning and Permitting
Contact: Christi Keller
c.keller@honolulu.gov
(808) 768-8087
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Consultant: WHALE Environmental Services, LLC
Contact: Mark Howland
markahowland@hawaii.rr.com
(808) 294-9254
P.O. Box 455
Kahuku, Hawaii 96731

Status: Draft EA - Public Review and Comment

Project Summary: The Project proposes the construction of an ornamental plant farm with agribusiness components, and two accessory farm dwellings. The Project site is an undeveloped shoreline lot within the SMA, the AG-2 General Agricultural District, and the State Land Use Agricultural District. All activities are proposed to occur outside of the Shoreline Setback area. The proposed development of farm dwellings triggers the requirement for an EA and SMA Use Permit under Chapter 25, ROH. Upon acceptance of the Final EA and the issuance of a FONSI, the Applicant must submit an application for the SMA Use Permit, which is subject to approval by Resolution of the City Council.

Reasons Supporting Determination: Please refer to the analysis in the Draft EA.



WHALE Environmental Services LLC

P.O. Box 455, KAHUKU, HI 96731 808-294-9254

Pueo Farm Environmental Assessment

TMK: (1) 6-8-003-045

68-431
Farrington
Highway
Waialua

September 2022



Speak to the 'aina...
Work with Lokahi

HARMONY AND BALANCE

Prepared by: WHALE Environmental Services LLC www.whalees.com

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PUEO FARM - Agricultural Operations and Farm Structures Construction

Preface and Summary

PREFACE

This Environmental Assessment (EA) has been prepared to comply with:

- Chapter 343, and 205A of the Hawaii Revised Statutes (HRS); and
- Title 11, Chapter 200:1 of the revised Hawaii Administrative Rules (HAR) (August 2019).

Proposed Action and Location. Development of Agricultural Operations and Construction of Farm Associated Farm Dwellings and Support Structures Construction on a parcel at 68-431 Farrington Highway, Waialua, HI 96791. TMK 1-6-8-003:045

Project Summary. The Proposed Action would be the construction of agricultural operations and associated farm dwellings outside the shoreline setback. As construction costs are over \$500,000, it is agreed that a SMA Major will be required and will be submitted after DPP agrees to a Finding of Non Significance (FONSI) and issues a file number. As requested by DPP, with prior submission of the working copy for the pre-consult review DEA to DPP, we also developed the Farm Design required for AG lots use and submitted a request to the Neighborhood Board for a SMA hearing which was held March 27th, 2022 before this DEA/FONSI/LUPP permit application submittal in advance of a SMA Major Submission. As well, 24 federal, State and City and County agencies were notified with some comments received. Abutters were notified with no responses. A DPP pre-consult letter was received with a file # of 2021/ELOG-2457 (CK).

Chapter 343, HRS, is incorporated into the “Guide to the Implementation and Practice of the Hawai‘i Environmental Policy Act, 2012 Edition” published by the then Office of Environmental Quality Control (now OPSD). The Guidebook provides an explanation of the Hawai‘i Environmental Policy Act (HEPA), its practice, and its implementation. The Guidebook outlines the information to be provided to State and County agencies, prior to construction, that allows the agencies to evaluate the environmental, social, and economic impacts of proposed developments. The following nine (9) statutory conditions are key factors designed to achieve the standards of HEPA and Chapter 343, HRS, as identified in the Guidebook. For applicant actions that trigger one (1) or more of the nine (9) statutory conditions, EA review is required by the approving agency. EA review is triggered by these statutory conditions prior to the actual implementation of a proposed action.

Use of state or county lands or funds;
Use of conservation district lands;
Use within shoreline setback area or special management area;
Use of historic site or district;
Use of land in the Waikiki district;
Amendment to county general plan;
Reclassification of conservation lands;
Construction or modification of helicopter facilities; or
Construction or modification of a wastewater facility, waste-to-energy facility, landfill, oil refinery, or power-generating facility.

Proposed actions meeting one of the triggers cannot receive discretionary approval and proceed until one of the following takes place:

The agency with the authority to grant approval makes a finding that the proposed action falls within a certain class of activities that are routine and minor in scope and exempt from the law because it will probably have minimal or no significant effects on the environment. If not exempt, an EA must be prepared to determine whether an EIS is required. The agency with the authority to grant approval reviews the EA and issues a Finding of No Significant Impact (FONSI) and negative declaration if the action is not likely to have a significant effect on the environment, after which the proposed action may proceed without further study.

OR

If the agency with the authority to grant approval reviews the EA and determines that the action may have a significant effect on the environment, the agency must issue an Environmental Impact Statement Preparation Notice stating that an EIS will be required. The final EIS must be acceptable to the agency with the authority to grant approval before the Proposed Action can proceed.

OR

The Proposed Action triggers the requirements of Chapter 343, HRS, by being within the Special Management Area. This EA has been prepared in accordance with Chapter 343, HRS and other related regulations and rules.

Other studies prepared in conjunction with this EA included Draft Survey and Engineered Plans, botanical and Faunal Report, Cultural Impact Assessment, Erosion Control and Sedimentation Plan, Phase I ESA Hazmat Report and Farm Design and Operational Plan. The aforementioned studies are appended to this EA. This draft EA has also been prepared in consideration of the comments received in response to the early consultation package sent in April 2022 to the respective stakeholders listed in the *Consultation* Chapter 7 of this EA.

PROJECT SUMMARY

Project:	Pueo Farm Agricultural Operation and Farm Dwellings Construction
Applicant:	Name: Paul D. Alston for Pueo Farm Contact: same Address: 2120 Puualii Place, Honolulu HI 96822
Landowner:	Paul D. Alston, Amy C.E. Alston, Tanya R. Alston, Rob M. Alston
Approving Agency:	Department of Planning and Permitting City and County of Honolulu 650 South King Street, 7 th Floor Honolulu, HI 96813
Location:	68-431 Farrington Highway, Waialua, HI 96791
Proposed Action:	Agricultural Operations Development with related Farm Dwellings
Associated Actions Requiring Environmental Assessment	Construction within Special Management Area (SMA)
Tax Map Key:	(1) 6-8-003:045
Parcel Area:	7.9 acres
Project Area:	7.2 acres
Judicial District:	Waialua
Community/Development Plan Designation:	North Shore Sustainability Communities Plan and Oahu General Plan
State Land Use District:	Agricultural
County Zoning:	AG 2 - Agricultural
Required Permits and Approvals:	SMA Major Use permit Grubbing, Grading, and Stockpiling Permit Erosion and Sedimentation Control Plan Building Permits
Anticipated Determination:	Finding of No Significant Impact
Parties Consulted:	See Chapter 7
Consultant:	WHALE Environmental Services LLC PO Box 455, Kahuku, HI 96731 Email: markahowland@hawaii.rr.com Contact: Mark Howland (808-294-9254)

SUMMARY SHEET

Project Name:	Pueo Farm – Agricultural Operations and related Farm Dwellings and Structures
Proposing Group:	Paul D. Alston on behalf of Pueo Farms
Location:	68-431 Farrington Highway, Waialua, HI 96791
Tax Map Keys (TMKs):	1-6-8-003:045
Recorded Fee Owner :	Alston, Rob M., Fee Owner Alston, Amy C.E., Fee Owner Alston, Paul D. , Fee Owner Alston, Tanya R., Fee Owner
Existing Use:	Vacant Shoreline Agricultural Lot in possession of SMA Minor for perimeter fencing and associated access gates to be located outside of the shoreline setback area.
State Land Use Classification:	Agricultural
County Zoning Designation:	Agricultural – AG2
Proposed Action:	Pueo Farms (Applicant) through Landmark Builders (builder) proposes to construct an agricultural operations facility and related farm dwellings at 68-431 Farrington Highway in Waialua, Oahu. The primary purpose of the proposed project is an agricultural operations facility with two (2) accessory farm dwellings, on approximately 7.9 acres of agricultural zoned lands.
Impacts:	No significant impacts are anticipated that compliance with applicable regulatory requirements, proposed Mitigation Measures (MM) and Best Management Practices (BMPs) as recommended in the attached technical appendixes will sufficiently

minimize/reduce/ eliminate any potential impacts to the various resource categories presented.

Anticipated Determination: Finding of No Significant Impact (FONSI)

Parties Consulted during Pre-Consult: Please see Chapter 7 – Consultation List

Proposed Action Location Map

ACTION LOCATION MAP



Figure 1 - Action Location Map

**68-431 Farrington Highway, Waialua, HI 96791
TMK 1-6-8-003-045
7.9 acres - entire parcel in SMA**

Agricultural Operations Development with related farm dwellings and accessory farm structures

AAQS	Ambient Air Quality Standards
ac	acre(s)
BMPs	Best Management Practices
CAA	Clean Air Act
CCH	City and County of Honolulu
CFR	Code of Federal Regulations
CZM	Coastal Zone Management Program
DLNR	State of Hawaii Department of Land and Natural Resources
DPP	Department of Planning and Permitting
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
ft	feet/foot
ft ²	square feet/foot
HAR	Hawaii Administrative Rules
HDOH	State of Hawaii Department of Health
HECO	Hawaiian Electric Company
HRS	Hawaii Revised Statutes
m	meter(s)
m ²	square meter(s)
mi	mile
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OPSD	Office of Planning and Sustainability Development
PV	Photovoltaic
ROH	Revised Ordinances of Honolulu

SHPD	State Historic Preservation Division
SMA	Special Management Area
SPCP	Spill Prevention and Control Plan
SSA	Shoreline Setback Area
TMK	Tax Map Key
U.S.	United States
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter One

INTRODUCTION

1. Introduction

1.1 Background and General Information

The history of the property has been a vacant lot until acquisition of the parcel by the Alston Family. The Alston Family has named the property Pueo Farm and have made plans for the property. The Proposed Action would be multi-acre agricultural farm operations development with one associated farm barn and garage; as well as two farm residential dwellings placed on the site. The farm operation is the horticulture of landscaping plants for sale to the resort industry. The development will be setback 60' from the high tide mark (HTL), and an approved shoreline setback determination has been included for this proposed action in Chapter 3.


As well, for fencing of the property, driveway establishment and the gated entrance construction, a SMA Minor has already been approved as seen Appendix D. A DPP Pre-Consultation version of this DEA was submitted in November 2021, and a public hearing with the North Shore Neighborhood Board was held in March 2022. In November 2021, the agent for the owners was supposed to notify pertinent agency notifications, abutter notifications but failed to do so. This draft EA is advanced from DPP pre – consultation and the neighborhood board meeting/hearing. As such, we submitted this draft documentation to support a DEA to all agency/abutter for comments and reviews and this document filing is a DEA based on DPP pre-consult letter, agency review and comments, abutter notification and comments and the public hearing. As the 60-day comment period has ended, this is our DEA in support of a future SMA filing document.

City & County of Honolulu
Department of Planning & Permitting (DPP)
 Property Information

68 431 FARRINGTON HWY Friday, July 1, 2022 | 6:04:29 PM

General Information

TMK: 68003045:0000
 Building Value: \$0.00
 Building Exemption: \$0.00
 Land Value: \$4,161,500.00
 Land Exempt: \$0.00
 Acres: 8
 Square Feet: 0
Property Tax Class: Agricultural
 City: Waialua
 Zip Code: 96791
 Realtor Neighborhood: Mokuleia



Nearest Park: Makaleha Beach Park (undeveloped) [show route](#)

Tax Bill Owner Information				
Name	Type	Address	Address 2	City State Zip
ALSTON,ROB M	Fee Owner			
ALSTON,AMY C E	Fee Owner			
ALSTON,PAUL D	Fee Owner	2120 PUUALII PL		HONOLULU HI 96822
ALSTON,TANYA R	Fee Owner			

2010 Census Information		Voting Information	
Tract Number:	009904	City Council Member:	Heidi Tsuneyoshi
Block Number:	1007	Polling Place:	Waialua Elem Sch
Population (block):	582	Address:	67-020 Waialua Beach Rd
		Neighborhood Board:	North Shore

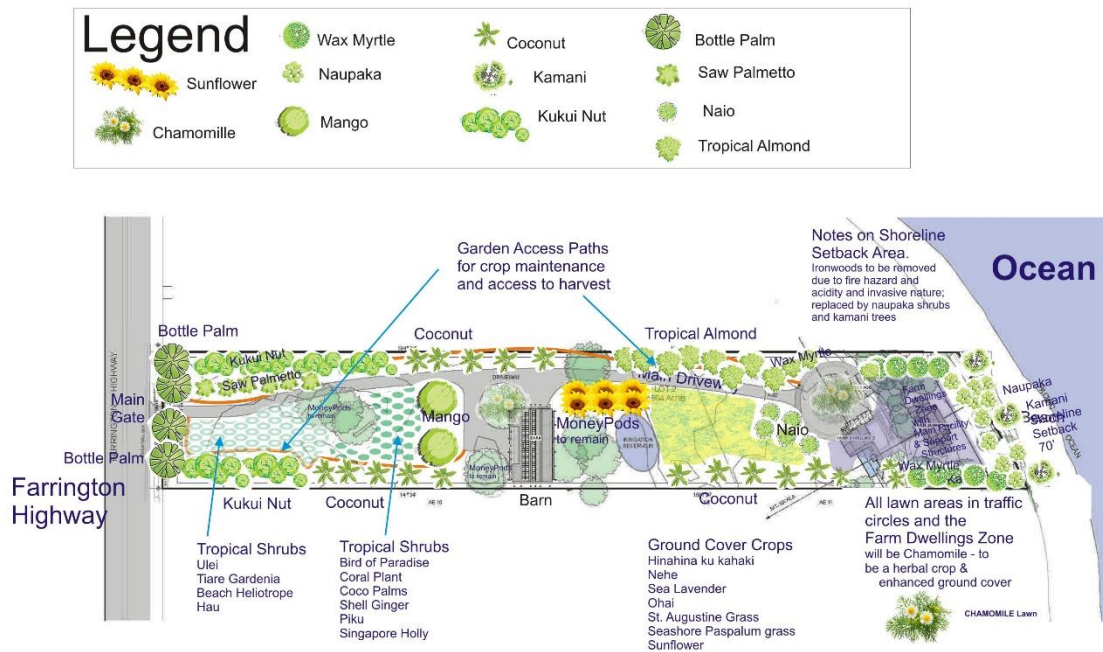
School and Transit Information		Zoning and Flood Information	
Elementary School:	Waialua show route	Zoning (LUD) Designation:	AG-2
High School:	WAIALUA show route	Ohana Zoning Designation:	Ineligible
Near Transit Route:	Yes	FEMA Flood Designation:	AE / AE / AE / XS
Near Bus Routes:		Tsunami Evacuation Zone:	Yes

[more public safety info >>](#)

Figure 2 - Property Information

1.2 Project Location and Surrounding Uses

Agricultural Operations Development with related Farm Dwellings Construction on a parcel at 68-431 Farrington Highway, Waialua, HI. The TMK is 1-6-8-003-045. This is the intended layout of the project.



Pueo Farm Landscaping Stock Plants CONCEPTUAL PLAN

Figure 3 - Conceptual Project Layout

Pueo Farm at 68-431 Farrington Highway, Waialua, HI. The subject parcel (hereinafter referred to as the "site") consists of approximately 7.9 acres of agricultural zoned lands and identified as Tax Map Key Number: (1) 6-8-003:045. The site is a rectangular-shaped parcel that is bounded by the Pacific Ocean to the north, vacant lots to the east and west, and Farrington Highway to the south.

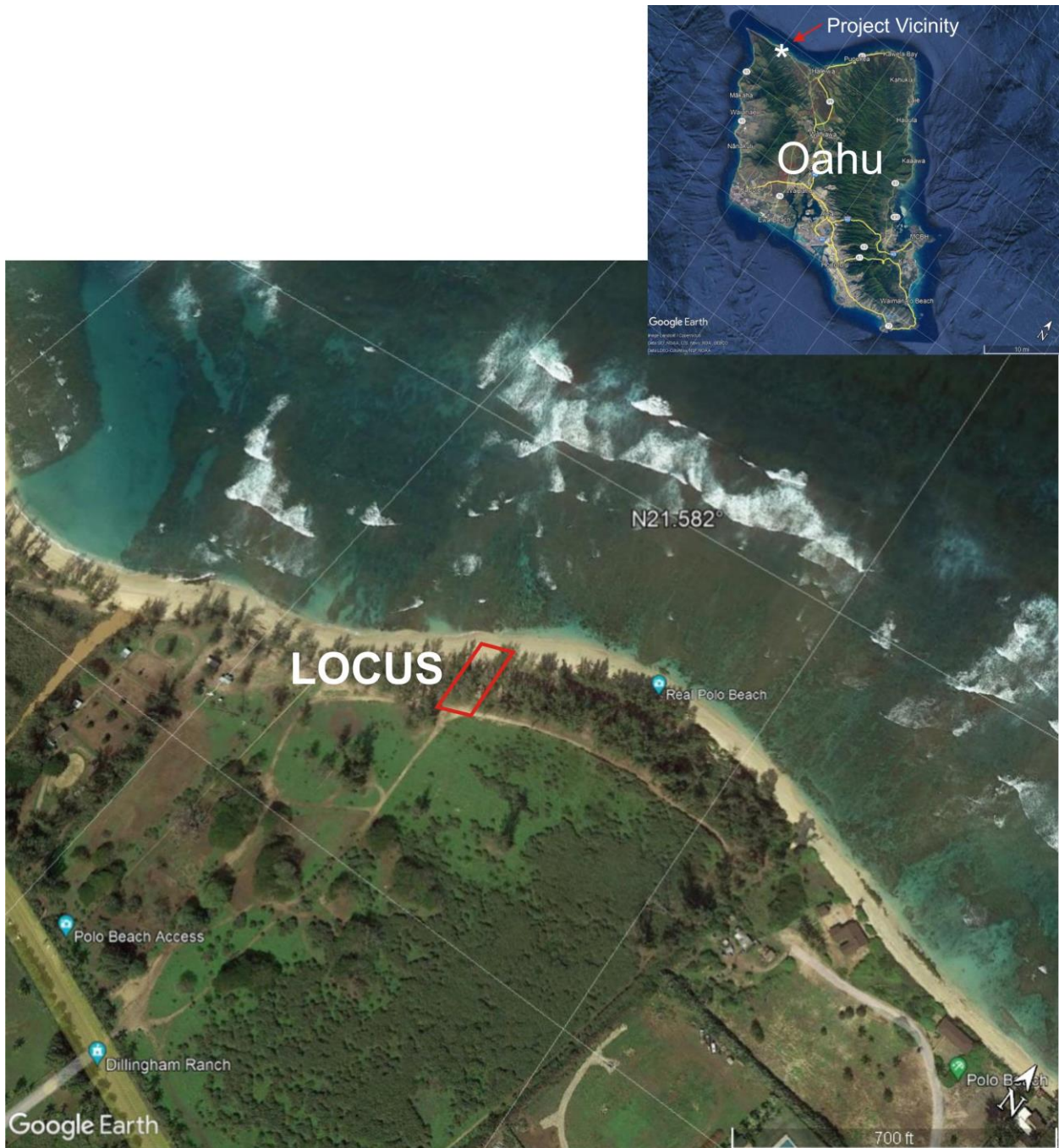
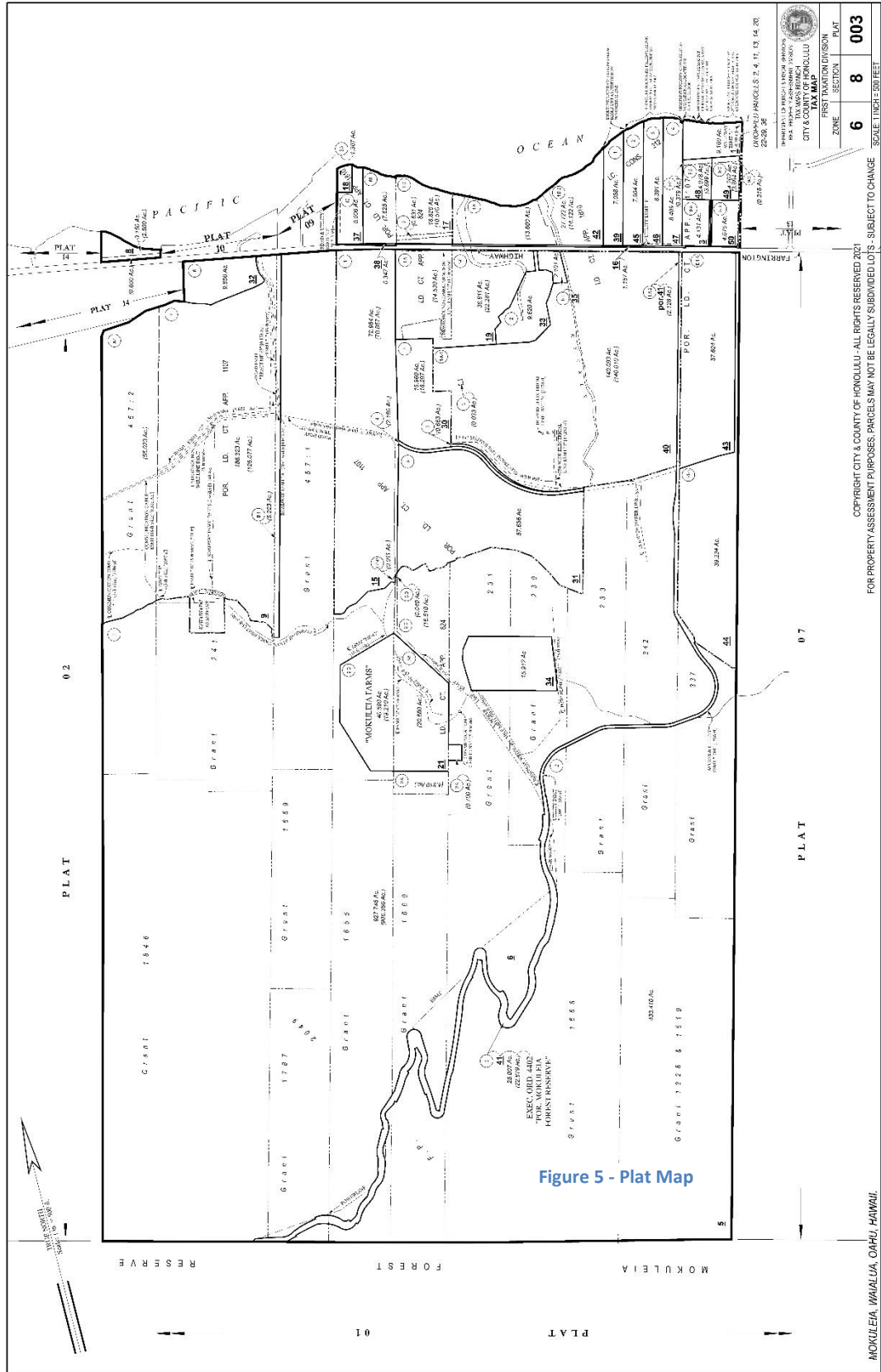


Figure 4 - Project Location
Pueo Farm, Waialua, Oahu



COPYRIGHT CITY & COUNTY OF HONOLULU - ALL RIGHTS RESERVED 2021
 FOR PROPERTY ASSESSMENT PURPOSES, PARCELS MAY NOT BE LEGALLY SUBDIVIDED LOTS - SUBJECT TO CHANGE

SCALE 1 INCH = 50 FEET

PLAT 07

PLAT 02

PLAT 01

MOKULEIA, WAIALUA, OAHU, HAWAII

Nearby Uses within ½ mile include Dillingham Ranch across the Farrington Highway and the project is across from the main drive to the ranch. Makai side is the Pacific Ocean whose beach spans the entire stretch of the northern extent of the ½ mile radius. To the immediate east, is a vacant lot slated also for farm development (in pre-consult stage), and three occupied farming operations beyond that parcel to the east. Eastern of the farm parcels is a residential neighborhood of Mahanaai Street. To the west, there is a vacant lot used for grazing horses, and a horse farm beyond that. Beyond that is the Makaleha Park which is bordered on its western side by the Makaleha Stream.

1.3 Land Ownership

The project site is within the boundaries of TMK 1-6-8-003:045 and is owned by the following fee owners:

- a) Alston, Rob M.
- b) Alston, Amy C E
- c) Alston, Paul D.
- d) Alston, Tanya R.

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Two

PROJECT DESCRIPTION

2. PROJECT DESCRIPTION

2.1 Purpose and Need

This Environmental Assessment (EA) analyzes the environmental consequences of the Proposed Action and reasonable alternatives in accordance with Revised Ordinances of Honolulu (ROH), Chapter 11-200.1 and Chapters 11-55 and 11-54 Hawaii Administrative Rules (HAR) and Chapter 343 and 205A, (HRS). This EA demonstrates that construction and operation of the Proposed Action would not result in any significant effects to the environment. Pursuant to Revised Ordinances of Honolulu (ROH), Chapter 11-200.1 and Chapters 11-55 and 11-54 Hawaii Administrative Rules (HAR) and Chapter 343 and 205A, (HRS), should an anticipated Finding of No Significant Impact (FONSI) be determined, an Environmental Impact Statement would not be required.

2.2 – Project Description

The purpose of the proposed project is to develop a site in an agricultural and environmentally-sound manner on Oahu and to provide ag land development and housing.

The Proposed Action would be multi-acre agricultural farm operations development with one associated farm barn and garage; as well as two farm residential dwellings placed on the site. The purpose and needs of the proposed project (action) are:

1. To construct the conceptual plan as shown in Appendix B,– Farm Design and Operational Plan
2. To support the State’s policy to increase the number of available housing units and insure there is on-island ag land development,
3. To help protect the State’s environmental and agricultural resources

It is anticipated that the site owner, State of Hawaii, the City and County of Honolulu, the citizens of Hawaii, and the environment will all benefit as follows:

- Mr. Alston and his family will benefit by gaining agricultural operations, dwelling capacity and sound environmental and sustainability actions;
- The State, City and County, citizens and environment would benefit from the agricultural, housing, economic and ecological characteristics of the project:

- ◇ Housing. The increase the number of available housing unit(s) is a stated goal for Oahu
- ◇ Economic. There will be direct economic activity during construction and operation (temporary jobs, equipment, materials and supplies), and the project-related agricultural income and excise tax revenues over the project's lifetime.
- ◇ Ecological. Ecological benefits will accrue through planned habitat and resource preservation and protection.

Site plans for the proposed action my be found in Appendix C.

2.3 – Development Schedule

Following design and permitting of an SMA Major – construction sequencing of the Proposed Action is as follows:

1. A SMA Minor permit (2020/SMA11)was approved in May 2020; for the development of an access gateway and perimeter fencing outside the shoreline setback area. Work associated with the SMA Minor permit is complete (see Appendix D).
2. Implementation of the development activities associated with the proposed actions are anticipated to commence in the second quarter of 2023, or upon approvals of required permits; and are anticipated to be complete within Eighteen (18) months there after.

This Draft EA provides an overview of the proposed project and approvals required in association with the implementation of the Proposed Action.

2.4 Project Costs

The proposed project is anticipated to cost approximately \$1.5 - 2 million to construct.

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Three

**DESCRIPTION of EXISTING
ENVIRONMENT, IMPACTS,
and MITIGATION MEASURES**

3. DESCRIPTION OF EXISTING ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES

3.1 Climate, Greenhouse Gas Emissions, and Climate Change

CLIMATE

Definition of Resource

Climate refers to meteorological conditions, such as the temperature range, precipitation levels, and wind conditions in a particular region. Due to their connection with precipitation levels, flooding hazards are addressed under climate for purposes of this EA.

Oahu lies just south of the Tropic of Cancer in the belt of the northeast trade winds. Its climate is generally mild and consistent. The annual average temperature is 76 degrees Fahrenheit (°F), although temperatures occasionally exceed 88 °F. Annual rainfall on the South Shore of Oahu is less than 20 inches and on the leeward side, Oahu dry side, annual rainfall is approximately five (5). In comparison, average annual rainfall is forty-five (45) inches in some areas of the North Shore. Trade winds prevail about 75 percent of the time and generally blow from the northeast at 5 to 15 miles per hour. Departures from normal trade wind weather, known as Kona storms, tend to occur during winter months. Such storms are characterized by several days of variable winds blowing from the south and west.

The weather on Oahu doesn't change much throughout the year, and the island really only has two seasons (winter and summer). In general, Oahu is usually much drier on the west side of the island (*the leeward side*) than the east side (*the windward side*), so you will find most of the greener landscape along the coastal areas to the east.

As one of the two states in the U.S. that doesn't observe daylight savings time, Hawaii doesn't experience a substantial variation in daylight hours, either. Throughout the year there is only about an hour discrepancy in sunrise and sunset times on the island of Oahu. One of the things that makes Oahu so special is its trade winds. For the majority of the year, winds coming from east to west on the island provide a welcome and necessary relief from the hot, humid environment.

The outstanding features of Hawaii's climate include mild temperatures throughout the year, moderate humidity, persistence of northeasterly trade winds, significant differences in rainfall within short distances, and infrequent severe storms. For most of Hawaii, there are

only two seasons: summer, between May and October, and winter, between October and April. The ocean supplies moisture to the air and acts as a giant thermostat, since its own temperature varies little compared with that of large land masses. The seasonal range of sea surface temperatures near Hawaii is only about 6 degrees, from a low of 73 or 74 degrees between late February and March to a high near 80 degrees in late September or early October. The variation from night to day, is one or two degrees.

Hawaii is more than 2,000 miles from the nearest continental land mass. Therefore, air that reaches it, regardless of source, spends enough time over the ocean to moderate its initial harsher properties. For example, Arctic air that reaches Hawaii, during the winter, may have a temperature increase by as much as 100 degrees during its passage over the waters of the North Pacific. Hawaii's warmest months are not June and July, but August and September. Its coolest months are not December and January, but February and March, reflecting the seasonal lag in the ocean's temperature.

Hawaii's mountains significantly influence every aspect of its weather and climate. The endless variety of peaks, valleys, ridges, and broad slopes, gives Hawaii a climate that is different from the surrounding ocean, as well as a climatic variety within the islands. These climatic differences would not exist if the islands were flat and the same size.

The mountains obstruct, deflect, and accelerate the flow of air. When warm, moist air rises over windward coasts and slopes, clouds and rainfall are much greater than over the open sea. Leeward areas, where the air descends, tend to be sunny and dry. In places sheltered by terrain, local air movements are significantly different from winds in exposed localities. Since temperature decreases with elevation by about 3 degrees per thousand feet, Hawaii's mountains, which extend from sea level to nearly 14,000 feet, contain a climatic range from the tropic to the sub-Arctic.

The climate of Hawaii can be defined by what it has and by what it does not have. It does not have the extremes of cold winters and summer heat waves and it usually does not have snowfall and hailstorms on most of the islands. However, on the isle of Hawaii's tallest peaks, do get their share of winter blizzards, ice, and snow. Highest temperatures may reach into the 90s. Thunderstorms, lightning, hail, floods, hurricanes, tornadoes, and droughts are not unknown. However, these phenomena are usually less frequent and less severe than their counterparts in continental regions.

The highest temperature ever recorded in Hawaii was 100 at Pahala (elevation 870 feet) on the Big Island of Hawaii on April 27, 1931. The lowest ever recorded was 12 on Mauna Kea (elevation 13,770 feet), also on the Big Island, on May 17, 1979.

A microclimate is a unique set of localized atmospheric conditions that differs to varying degrees from the greater surrounding region's weather. It can be as small as a few square feet or several hundred square miles in size but is always contained within the surrounding weather conditions.

Even in a local region with its prevailing weather conditions, one can find even smaller areas with their pockets of unique atmospheric conditions. These conditions are known as microclimates.

It is important to note the term "climate" in "microclimate." As discussed, climate refers to the average weather conditions that are unique to an area, compared to the weather, which refers to the atmospheric conditions at any given time. As a result, microclimate refers to atmospheric conditions that prevail within a relatively small space for a sustained period compared to the surrounding weather. The North Shore of Oahu is famous for its microclimates as anyone can attest to as they drive from Wahiawa to Haleiwa or west to Keana Point. Schofield Barracks in Wahiawa is known as the Grey Lady, constantly sprinkling. The drive down Kakanuhua Road brings one to dry "dust devils" crossing the road at mid-point on Central Oahu ag lands. One then crests over the hill and descends to Haleiwa – almost always in the sun. Going east to Kahuku, there is a more prevalence of trade wind showers along the coast, some microclimates so influenced by terrain that there can be showers on the mauka side of the Kam Highway by Turtle Bay, and bright sunshine on the makai side by the hotel. Going west to Keana Point, the rain shadows from Wahiawa disappears going over the mountain range to the Waianae. Most of the region between Haleiwa and Keana Point involve purely sea influenced weather patterns. Mostly sun, occasional squeals of rain, dryer conditions with moderate rainfall predominate.

The Waialua microclimate is usually classified as follows:

(BWh) WARM DESERT

Subcategory of Arid and Semi-Arid Climates (B)

Almost all of the lengthy stretches of white sand beach through Waialua and Mokuleia are found in this warm Hawai'i climate zone. On Oahu, the zone extends along the coast and a scant few miles inland. The area is the one of the driest in the Hawaiian Islands, recording 10-30 inches of rainfall annually and hot days averaging 81°F annually. As opposed to other hot spots around the world, this coastline is among the easiest to tolerate thanks to

cool ocean breezes dropping in on the land and, especially, the beaches. The actual site lies higher on the scale of this subcategory, getting a bit more rain averaging about 25-30” a year. This site like is more ideal for agriculture since the uplifting mountains above Dillingham Ranch is closer that other stretches of this coastline and possesses more downdrafts from ocean winds hitting the mountain range and returning, creating more moisture for the site. Its microclimate can be characterized as semi-arid with moderate moisture impact and stronger winds from both directions due to bounce-back of ocean off-shore winds encountering the nearby Waianae range and returning as low moisture returning lower velocity winds. As such, the makai side of the site gets the strongest trade winds and ocean winds; while the mauka side is sheltered from those winds and mostly gets wind-bounce dew-laden weaker winds from the Waianae Range. Thus, the makai side requires species that can tolerate higher wind levels and drier winds, while the Mauka side can support less wind-tolerant species and increased moisture.

Impacts and Mitigation Measures

The climate of the west side of Ōahu would not be adversely affected by the Proposed Action. It is not anticipated that there will be any effect on the context of the existing environment with regard to temperature, wind, rainfall events on-site or in the regions. Moreover, the project is not expected to exacerbate climate change impacts to the climate or microclimates and has been in fact designed to accommodate those changes as can be seen in the *Farm Design and Operation Plan* where developed plant biomass growth absorbs CO from the air. The ESCP recognizes short-term releases of greenhouse gases from the construction process by hopes to long term mitigate greenhouse gas emission by employing PV panel generated electrical maintenance equipment.

The ESCP address air emissions, dust control, and other measures needed as found in Appendix G. As well, given constant climate changes, the Pueo Farm operation intends to remain flexible and adjust as needed to policy and regulatory changes.

3.2 Physiography

3.2.1 Geology and Topography

Definition of Resource

Geology refers to the surface and subsurface materials of which a land area is composed, including soils and rocks. Important geologic characteristics of soils and underlying rocks include stability, slope, compatibility, shear strength, and productivity. Discussions of geology and soils typically identify existing conditions and determine how the Proposed Action and alternatives under consideration would likely affect, and be affected by, geology and soils.

Affected Environment Changes

The project area is located along the Waialua Coastal Plain of northern Oahu, Hawaii. The site consists of exposed Jaucas sands composed of sequences of relatively flat marine sedimentary deposits (calcareous silts, sands and gravels and seashell layers) intercalated with terrestrial alluvium deposits (silts and clays).

The Proposed Action is located on Jaucas sands and Mokuleia and Pulehu clay silty loams, but actually has several Artificial Fill Soils on major portions of the lot. The site is generally flat and level. The proposed project will not change the soils composition of the property, nor will it impact any significant geologic features or soil resources (See Soil Map Exhibit in ESA – Appendix F)). Small portions of the project elements, such as column footings and septic system will require excavation that may encounter soft rock from the fills placed years ago that will have to be removed using heavy equipment during construction. This Artificial Fill material does not have any notable natural resource value and it is not suitable for agriculture or other productive uses. All of the soils and underlying rock that would be affected by the Proposed Action are suitable for construction of the proposed facilities as they are designed.

Routine operation and maintenance of any farm related dwelling (s) does not have the potential to affect geological or soil resources as they will require soil amendments to growing beds to mature.

The Proposed Action site consists mostly of replaced Jaucas sands with Artificial soils during the 1960s Waikiki Beach sand replenishment efforts or Mokuleia and Pulehu clay silty loams. The Proposed Action site is generally level terrain that drains to the south.

Construction of the Proposed Action would involve minor site preparation, grading, and ground disturbance that would minimally alter the topography of the site.

All undesirable vegetation (i.e. haole koa/ironwood) will be removed via a *DPP Grubbing and Stockpiling Permit* and follow guidelines established in the ESCP in appendix G.

3.2.2 Soils

The site has an official classification of Jaucas sands (JaC) and Mokuleia Clay Loam (Mt). Mt soils occupy 2/3rds of the sites, and most of the registered Jaucas sands are artificial fill (rocks, cobble) from the Waikiki Beach replenishment efforts.

Affected Environment Changes

Soil Survey of Islands of Kauai, Oahu, Maui Molokai & Lanai

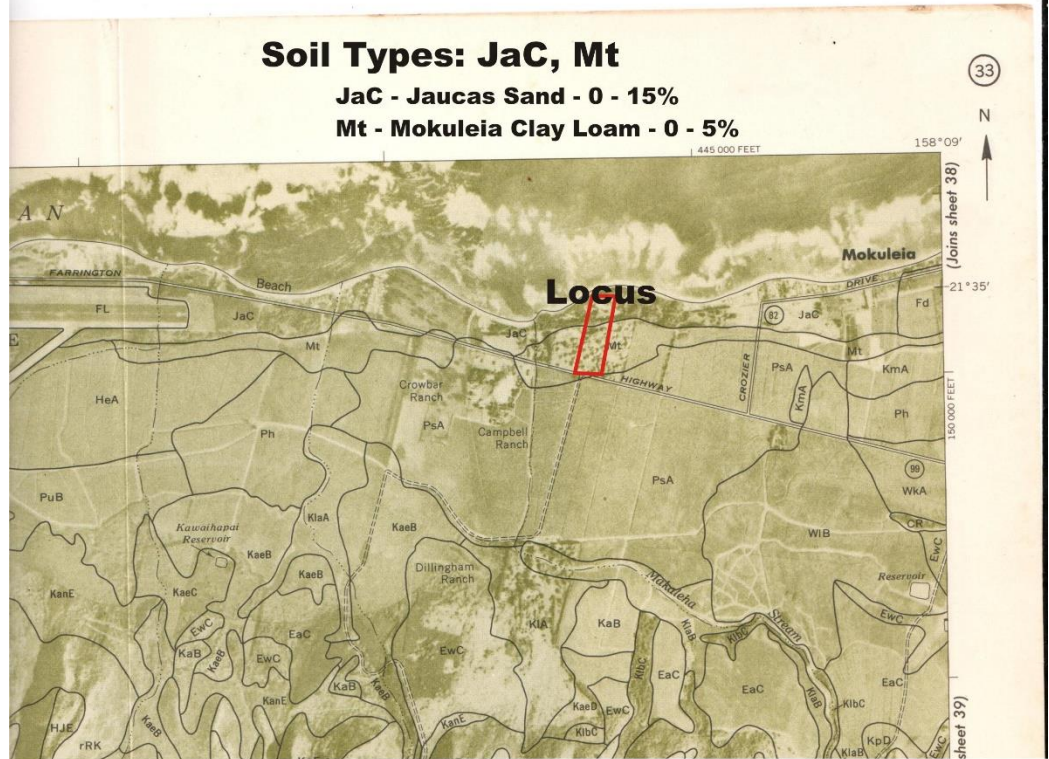


Figure 6 - NRCS Soils Map 1

**U. S Department of Agriculture
Soil Conservation Service
(now Natural Resources Geological Survey)**

Soils on the site are suitable for construction of the Proposed Action. The site does not contain significant geologic features or natural resources that could be affected by the Proposed Action. The Proposed Action will be consistent with drainage standards established by the City and County of Honolulu, Department of Environmental Services, Storm Water Management Plan. Implementation of BMPs for erosion and sediment controls during construction will ensure that geologic or soil hazards and adverse effects to

water quality do not occur. The Proposed Action would not result in significant effects associated with geology and soils.

3.3 Hydrology

3.3.1 Surface and Coastal Waters

Definition of Resource

Water resources is a broad term that encompasses surface water, groundwater, near-shore water, wetlands, and other sources of water that support a variety of human activities, plant and wildlife species, habitats, and ecosystems. Surface water resources typically include stormwater, lakes, streams, and rivers, while water located beneath the ground surface within soil pore spaces, or the fractures of rock formations is known as groundwater. Near-shore water is generally considered the area extending seaward from the shoreline beyond the surf zone. A wetland is an area of land that is saturated with water either permanently or seasonally in both inland and coastal environs. Water within wetlands can be saltwater, freshwater, or brackish. Examples of wetlands include marshes and swamps. Services performed by wetlands include water purification, shoreline stability, and habitat for plant and wildlife species.

Affected Environment Changes

Surface Water

There are no water bodies located onsite.

The proposed action will not increase any of these degradations to the environment as there is no surface waters on the site.

Groundwater Recharge

Groundwater depth at the project site is approximately six to eight feet below ground surface and may vary with tidal conditions. As an agricultural operation, the majority of the site will consist of permeable surfaces, and will not significantly interfere with natural groundwater recharge.

Nearshore Water Quality

Nearshore waters closest to the Proposed Action are classified as Class A, Open Coastal Waters. It is the objective of Class A waters that their use for recreational purposes and aesthetic enjoyment be protected. In addition, Class A waters shall not act as receiving

waters for any discharge that has not received the best degree of treatment of control compatible with the criteria established for Class A water (Chapter 11-54-3, HAR).

The Proposed Action would implement standard construction phase BMPs during construction of the Proposed Action (USEPA 2010). The appendixes contain an Erosion and Sediment Control Plan (ESCP). These BMPs would ensure that stormwater runoff from construction does not reach the shoreline located north of the property line. With implementation of construction BMPs, nearshore waters would not be impacted by the Proposed Action. The Proposed Action will comply with applicable sections of ROH (ROH, Article 11 Section 16-11) regarding flood-proofing, waterproofing, and structural requirements for buildings and structures. Therefore, no significant impacts related to flooding hazards would occur. No significant environmental consequences associated with water resources would result from the Proposed Action.

Ground Water Quality

The site does not lie within any known aquifers – Wai’alae, East Wai’alae, Palolo, Nu’uanu, Kalihi, or Moanalua. Irrigation will be from an approved on-site deep well. The proposed septic design for the property has been approved by the State of Hawaii DOH, and therefore not anticipated to result in adverse impacts to groundwater quality.

3.4 Natural Hazards

The Disaster Mitigation Act of 2000 (FEMA, 2000), 44 Code of Federal Regulations, Hazard Mitigation Planning, required States and Counties to have approved hazard mitigation plans as of November 1, 2004, to receive Pre-Disaster Mitigation funding. The development of State and local hazard mitigation plans is critical for maintaining eligibility for future Federal Emergency Management Agency (FEMA) mitigation and disaster recovery funding. Given Hawai‘i’s vulnerability to natural hazards and history of disasters, the State has maintained and implemented a comprehensive, multi-hazard mitigation strategy to reduce loss of life and property damage. This strategy is embodied in the 2018 State Multi-Hazard Mitigation Plan. The 2018 State Hazard Mitigation Plan identifies the major natural hazards that affect the State, assesses the risk that each hazard poses, analyzes the vulnerability of the State’s population, property, and infrastructure to the specific hazard, and recommends actions that can be taken to reduce the risk and vulnerability to the hazard. The State Hazard Mitigation Plan also contains a description of programs, policy, statues, and regulations applicable to hazard mitigation. It should be noted that the 2023 update to this plan has begun and is expected to be released at the end of 2023. The

CCH also maintains a Local Hazard Mitigation Plan, that the State of Hawai'i Emergency Management Agency reviews in accordance with The Disaster Mitigation Act of 2000 (FEMA, 2000), 44 Code of Federal Regulations and coordinates with the CCH to ensure compliance with the federal regulations. The identified major natural hazards that could affect the State, as well as the CCH are Climate Change Effects (including SLR/coastal erosion), floods, tsunamis, strong windstorms/hurricanes, earthquakes, landslides/rockfalls, wildfires, and volcanic hazards.

3.4.1 Sea Level Rise due to Climate Change

Climate change and its impacts have been discussed in detail in Section 3.1 above. This section will focus on (Sea Level Rise) SLR and coastal erosion impacts. The island of O'ahu is susceptible to flooding and SLR as it is home to the State's most populous city, Honolulu, which also serves as the State's capital. With approximately one million residents, O'ahu accounts for approximately 70% of the State's entire population. Thus, O'ahu also possesses many of the State's critical resources, infrastructure, and services. A major impact from SLR on O'ahu could reverberate and result in major economic and social impacts for the islands and communities throughout the State. Elevated seawater levels in the spring and summer of 2017 provided a glimpse of the near future when coastal flooding events are expected to occur more frequently and severely with continued SLR. Though a projection, enough evidence has been garnered to determine sites may have a future SLR threat. Findings by the UH Sea level Center showed that the 2017 anomalously high-water levels resulted from an unprecedented combination of Pacific-wide climate and ocean variability. The water levels in 2017 presented record highs. The rise in sea level caused localized flooding and coastal erosion throughout the State during the spring and summer of 2017.

Although coastal erosion is a naturally occurring event, as sea level continues to rise, the rate at which coastal erosion occurs is increasing which will have more severe impacts. Over the next 30 to 70 years, as sea level rises, homes and businesses located on or near the shoreline throughout the State will become exposed to chronic flooding. Sea level is rising at increasing rates due to global warming of the atmosphere and oceans and melting of the glaciers and ice sheets. Rising sea level and projections of stronger and more frequent El Niño events and tropical cyclones in water surrounding Hawai'i indicate a growing vulnerability to coastal flooding and erosion. The Hawai'i Sea Level Rise Vulnerability and Adaptation Report (2017) modeled exposure to chronic coastal flooding and erosion using projections from the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment

Report (IPCC, 2014) where the high-end scenario was up to 3.2-ft of sea level rise by the end of the century (Courtney et al., 2020).

For O‘ahu, the exposure area (SLR-XA) with 3.2 ft. of SLR is based on modeling passive inundation, coastal erosion, and annual high wave runup. According to a recent National Oceanic and Atmospheric Administration (NOAA) report, global SLR in the range of 6.4 ft. (2.0 m) to 8.8 ft (2.7 m) is “*physically plausible*” by the end of this century (Sweet et. al, 2017). The CCH Climate Commission issued SLR guidance for the County to use for areas exposed to 3.2 ft. of SLR as a planning benchmark for most developments, with consideration of 6 ft. of SLR as a planning benchmark for critical infrastructure with long expected lifespans and low risk tolerance (Climate Change Commission, 2018). The Proposed Project is not located within the 3.2 ft. SLR exposure areas (See Figures 7 [regional exposure] and Figure 8 [site exposure]).

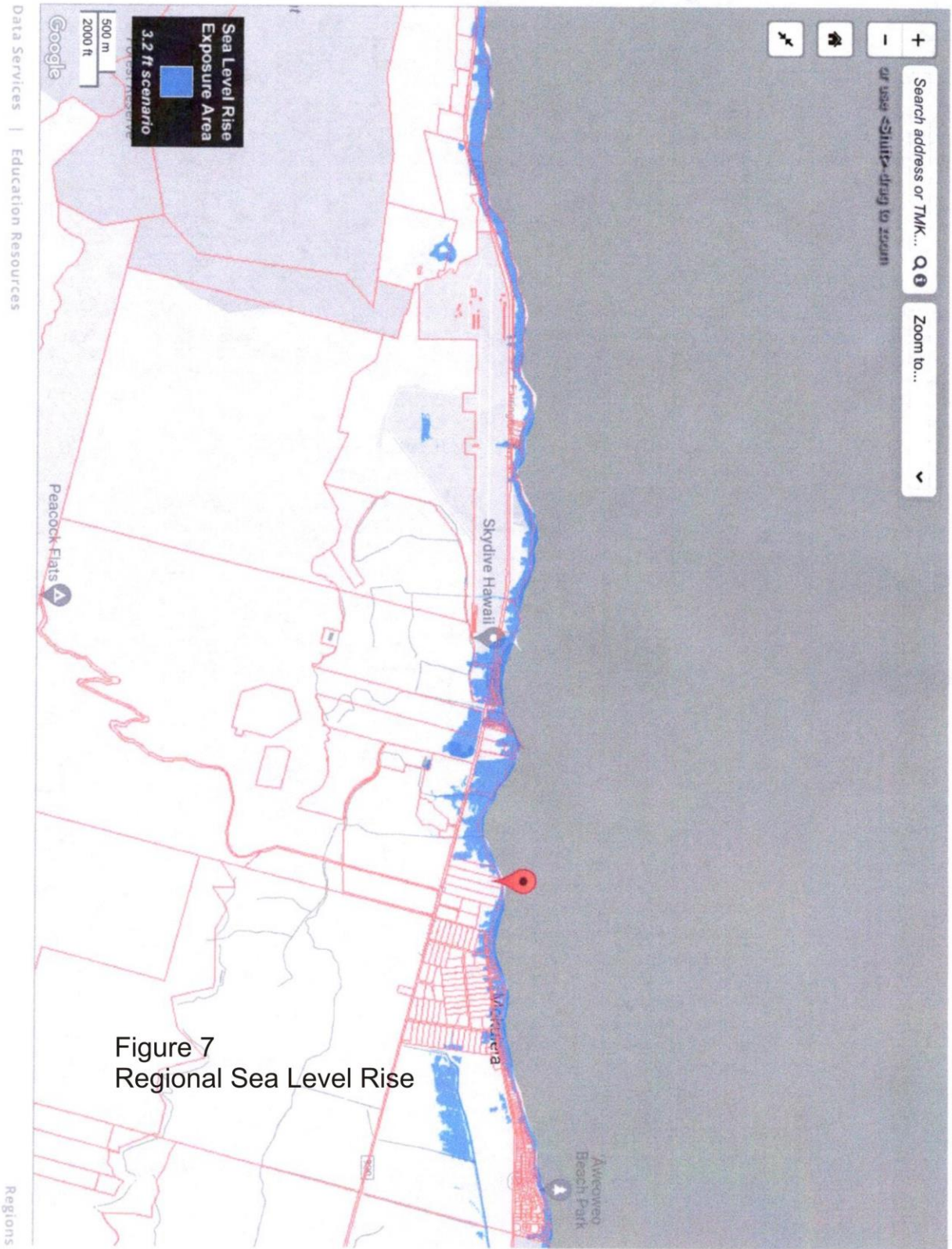


Figure 7
Regional Sea Level Rise

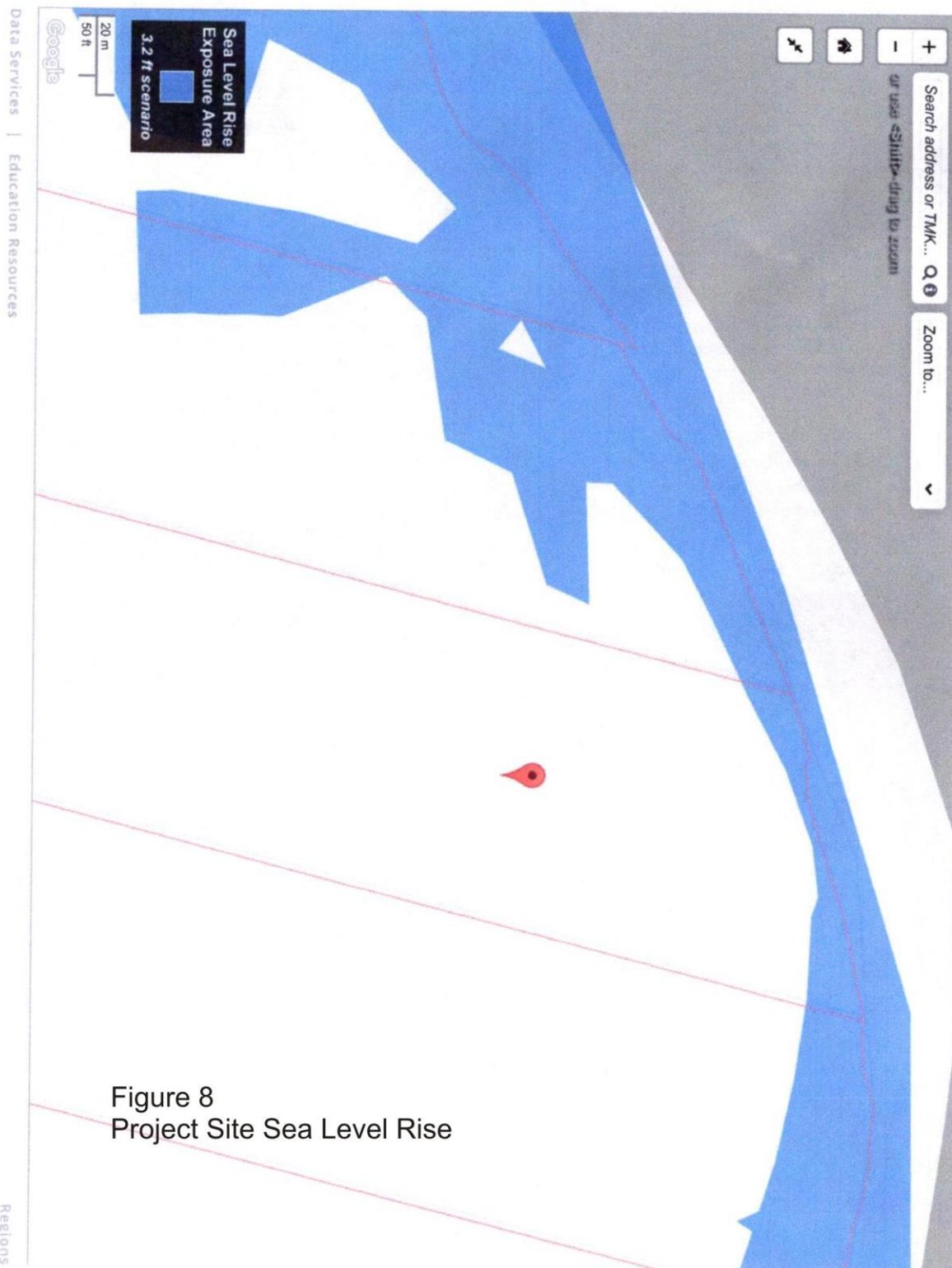


Figure 8
Project Site Sea Level Rise

The project action has been evaluated for potential impacts related to coastal hazards, particularly flooding potential using the Hawaii SLR Vulnerability and Adaptation Report and the SLR Guidance and Climate Change Study. Site-Specific, the proposed action has its lowest elevation at 14' above MSL, above the current 11' flood elevation standard, and also above a projected elevation change to that current standard in the next projection of the SLR Exposure Area. As can be seen on the following SLR 3.2' elevation change map above, the Pueo Farm property is not in an endangered zone as the rise would be contained by the high coastal berm for the shoreline setback, and hence not particularly subject to SLR exposure, though neighboring properties may be. The proposed farm structure has been placed on the poorest soils on the site for agricultural production and is designed to be flood zone mitigated.

On a broader policy level, new information will continually need to be incorporated within future assessments to identify where efforts should be focused when developing adaptation strategies to SLR impacts. It is anticipated that the Proposed Project will need to be flexible in order to conform with guidance set forth by best practices outlined by policies and research based on the best scientific data at the time as climate change science, technology, and policies evolve over time.

As well, for shoreline projects, below are two more graphics, the SMA regional map showing the site in common with neighboring properties; and the hi-wave/erosion potential map which shows the high coastal berm also stopping hi-wave action and erosion potentials.

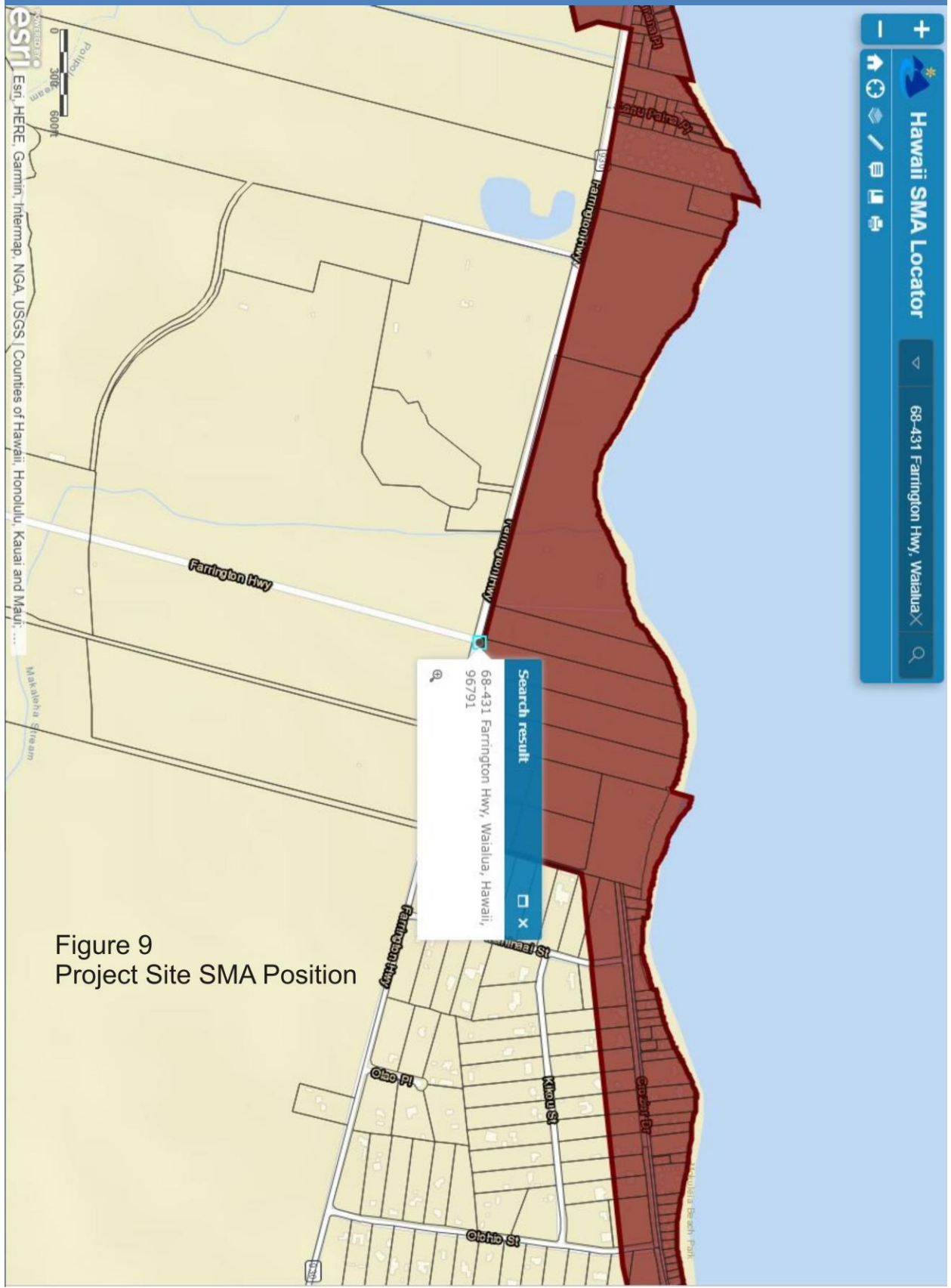


Figure 9
Project Site SMA Position

Sea Level Rise : State of Hawai'i Sea Level Rise Viewer

An Interactive Mapping Tool in Support of the State of Hawai'i Sea Level Rise Vulnerability and Adaptation Report

 View full-screen map

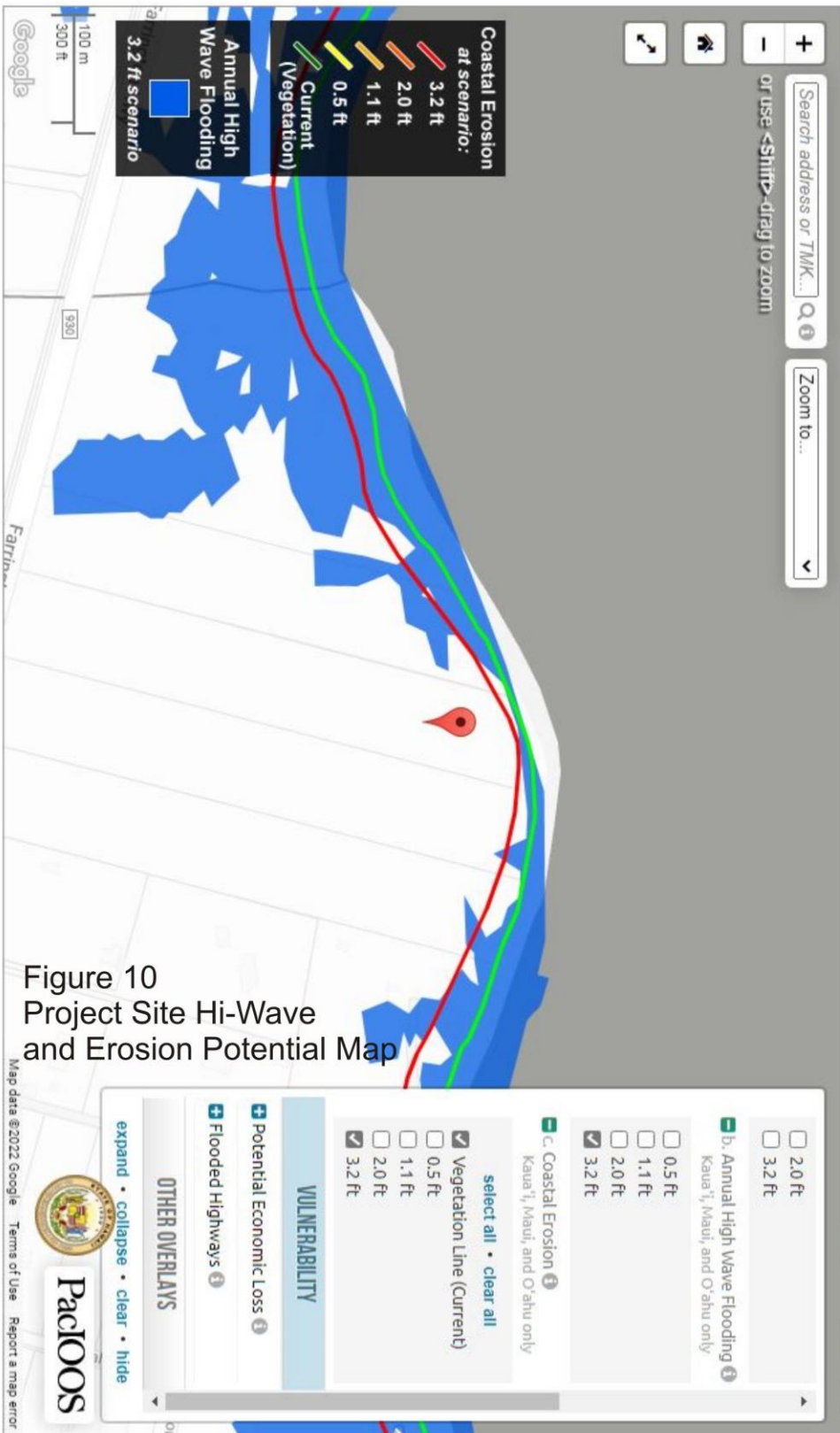


Figure 10
Project Site Hi-Wave
and Erosion Potential Map

3.4.2 Flood and Tsunami Hazards

Floods are the temporary inundation of land from excessive rainfall or other sources. Although floods are caused by natural events, most flood damage is a result of human occupation and development of lands that are susceptible to flooding without adequate protection. The CCH is vulnerable to flooding from storms, storm surge, high surf, and on rarer occasions, tsunamis. Every year flooding causes millions of dollars of damage. In the CCH, from about 1915 to 2018, floods caused by rainstorms, tsunamis, and hurricanes have claimed more than 140 lives and inflicted more than \$200 million dollars of direct and indirect damage (DEM, 2020). According to the Flood Insurance Rate Map (FIRM), prepared by the Federal Emergency Management Agency (FEMA), Pucio Farm is situated within two flood zone designations, Zone AE and Zone XS. Most of the Project Site itself is situated within Zone AE (See Figure 10). Zone AE includes areas subject to inundation by the 1-percent-annual-chance flood events. Zone AE is also within the Special Flood Hazard Area where mandatory flood insurance and floodplain management regulations apply. Zone XS includes areas of minimal flood hazard where there is a 0.1 percent annual chance of flooding. With regards to tsunami hazards, since the early 1800's, approximately 50 tsunamis have inundated the State of Hawai'i's shores, including the 1946 tsunami that resulted in wave heights of 11 meters and killed 6 people on O'ahu alone. Additional tsunamis impacting O'ahu shores occurred in 1952, 1957, 1960, 1964, and 2011. According to the Tsunami Evacuation Zone maps for O'ahu, Pucio Farm is situated within the Tsunami Evacuation Zone, but not the Extreme Tsunami Zone. However, the Project Site lies entirely within the Tsunami Evacuation Zone (See Figure 11 – FHAT Map).



BASEMAP: FIRM BASEMAP



Flood Hazard Assessment Report

www.hawaii.nfp.org

Pueo Farm

Property Information

COUNTY: HONOLULU
 TMK NO: (1) 6-8-003:045
 WATERSHED: MAKALEHA
 PARCEL ADDRESS: ADDRESS NOT DETERMINED
 WAIALUA, HI 96791

Notes:

Flood Hazard Information

FIRM INDEX DATE: NOVEMBER 05, 2014
 LETTER OF MAP CHANGE(S): 11-09-0171P
 FEMA FIRM PANEL: 15003C0085F
 PANEL EFFECTIVE DATE: SEPTEMBER 30, 2004

Figure 11
 Project Site FHAT Map

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: YES
 FOR MORE INFO, VISIT: <http://www.scd.hawaii.gov/>

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
 FOR MORE INFO, VISIT: <http://dlnreng.hawaii.gov/dam/>



Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND (Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone X5 (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.
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Impact and Mitigation

According to the Hawaii-National Flood Insurance Program Flood Hazard Assessment Tool, the Proposed Action is located within Zone AE and XS. The Proposed Action will comply with applicable sections of ROH (ROH, Article 11 Section 16-11 *and* Required Compliance with Chapter 21A ROH Flood Hazard Areas Ordinances) regarding elevation of the dwelling, flood-proofing, waterproofing, and structural requirements for buildings and with structures potentially subject to coastal flood waters due to tsunami.

As a result, the Proposed Action would not result in significant impacts to people or property due to a flooding hazard, including hazards related to coastal flooding due to a tsunami. In the short- and long-term, no significant impacts on flood hazards on the Proposed Project are anticipated as the proposed improvements are not anticipated to increase flood risks or cause any adverse flood-related impacts at the project area. The Proposed Project will be designed and constructed to applicable flood zone requirements.

For the development, all drainage improvements, excavation, drilling, and grading will be coordinated with the appropriate agencies during permitting and construction in order to ensure that the Proposed Project will not result in significant impacts regarding flood and tsunami hazards.

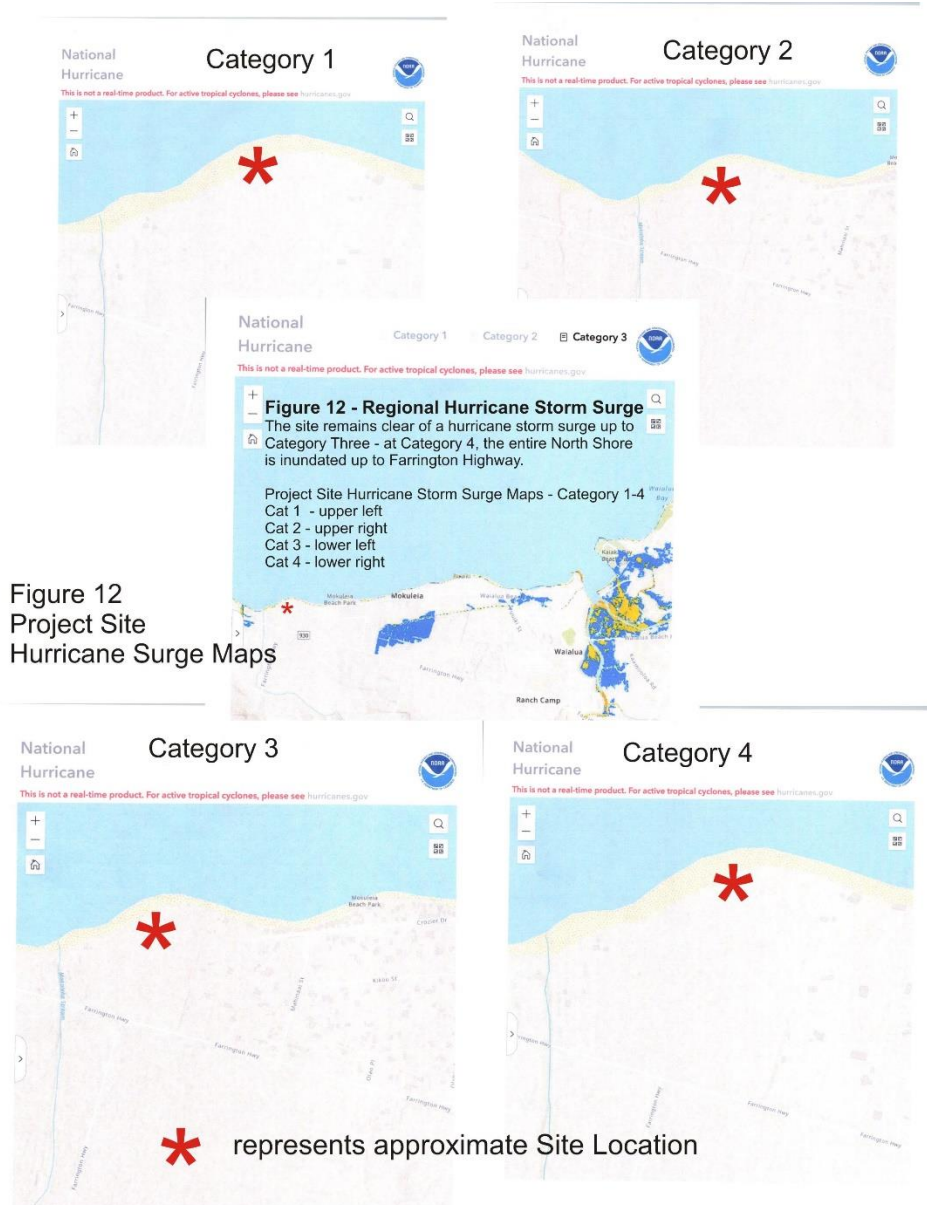
3.4.3 Hurricane and Wind Hazards

The Hawaiian Islands are seasonally affected by Pacific hurricanes from the late summer to early winter months. The State has been affected twice since 1982 by significant hurricanes, Iwa in 1982 and Iniki in 1992. During hurricanes and storm conditions, high winds caused strong uplift forces on structures, particularly on roofs. Wind-driven materials and debris can attain high velocity and cause devastating property damage and harm to life and limb. Along the coastline, a surge of water, topped by battering waves can move ashore into low lying coastal areas. However, it is difficult to predict how hurricane-induced storm surge may impact a specific location due to differences in atmospheric pressure, tidal stage, coastal topography, and location relative to the eye of the hurricane. It is difficult to predict these natural occurrences, but it is reasonable to assume that future events will occur. The Proposed Project is, however, no more or less vulnerable than the rest of the island to the destructive winds and torrential rains associated with hurricanes.

Impacts and Mitigation Measures

The potential for hurricanes, while relatively rare, is present across the State of Hawai'i. The Proposed Action's construction activities could potentially exacerbate the effect of hurricanes if loose materials are not secured prior to the event of a storm and become flying debris. To minimize this hazard, construction materials and equipment would be stored properly when not in use, consistent with construction best management practices. To safeguard against hurricane damage in the long-term, the Proposed Project improvements would be designed in compliance with American Society of Civil Engineers and International Building Code standards for wind exposure.

As can be seen from the Hurricane Surge Maps from the National Weather Service, the site is not particularly exposed, while nearby Haleiwa is susceptible.



3.4.4 Earthquake and Seismic Hazards

Seismic hazards are those related to ground shaking. Landslides, ground cracks, rock falls and tsunamis are all considered as seismic hazards. Although difficult to predict, an earthquake of sufficient magnitude causing structural or other property damage may occur in the future. However, except for the island of Hawai'i, the Hawaiian Islands are not situated in a high seismic area subject to numerous earthquakes (Macdonald et al. 1983). Thousands of earthquakes occur every year in the State of Hawai'i. Earthquakes in the Hawaiian Islands are associated with volcanic eruptions or tectonic movements. Most of these earthquakes are closely related to volcanic processes and are so small they can only be detected by seismometers. One of the larger and more recent earthquakes occurred offshore of Puakō, Hawai'i in 2006. The earthquake measured 6.7 on the Richter Scale and caused minor damages to structures and buildings on the island of O'ahu. Engineers and other professionals have created a system of classifying seismic hazards on the basis of the expected strength of ground shaking and the probability of the shaking actually occurring within a specified time. From our research in the International Building Code (IBC) seismic provisions, Hawaii has only adopted codes for Hawaiian Historic Properties, which this site does not contain. The IBC classifies the likelihood of seismic activity into zones ranging from 0 to 4. Seismic Zone 0 represents no chance of severe ground shaking and Seismic Zone 4 represents a 10 percent chance of severe shaking in a 50-year interval. The Project Site lies within the region of O'ahu, which is generally classified as Seismic Zone 2A under the IBC. Strong shaking is associated with earthquakes in this zone and may result in negligible damage to buildings in good design and construction, slight to moderate damage in well-built ordinary structures, and considerable damage in poorly built structures. Thus, Waialua is assessed to have low vulnerability to earthquakes.

Volcanic hazards on O'ahu are considered minimal due to the extinct status of former volcanoes; however, the effects of earthquakes occurring on the islands of Hawai'i and Maui may be felt on the island of O'ahu.

Impacts and Mitigation Measures

O'ahu has not experienced significant seismic events in the modern era. The development of the Proposed Action would not be subject to adherence to earthquake design requirements, but all buildings are expected to adhere to modern building standards that do incorporate seismic codes to ensure that all developments of the Proposed Action would comply with

geotechnical recommendations for seismic hazards and meet prevailing building codes by incorporating specifications to reduce vulnerability to earthquakes at that time.

3.4.5 Wildfire Hazards

Wildfires can threaten life and property, but they can also harm the environment and threaten important natural resources such as endangered species. While sometimes caused by lightning, nine out of ten wildfires are human caused. Put simply, "*wildfire*" is the term applied to any unwanted and unplanned fire burning in forest, shrub or grass regardless of whether it is naturally or human induced (DEM, 2020). On a global basis, the number of wildfires has significantly increased in the last decades. Such increase can be explained by four key factors:

1. *Past fire suppression policies, including one of "total suppression," which allowed for the accumulation of fuel in the form fallen leaves, branches, and excessive plant overgrowth in forest and wild land areas.*
2. *Increasingly dry, hot weather.*
3. *Changing weather patterns.*
4. *Increased residential development in the wild land/urban interface*

All the Hawaiian Islands are susceptible to wildfires, especially during prolonged drought and high winds. In recent years, the average annual cost to suppress wildfires in Hawai'i is about \$1,100,000 - making it a Statewide risk (DEM, 2020). The greatest danger of fire is where the wildland borders urban areas. Through August 2018, wildfires in Hawai'i have burned 30,000 acres (about double the annual average). Historically, most of these fires have been directly caused by humans, either directly or by negligence. Waialua is within a high-risk area for wildfires due to open brush area prone to fire risks and historical events.

Impacts and Mitigation Measures

The Proposed Project is not anticipated to have impacts that could result in wildfire events as the Proposed Project is within a low-risk area being mostly cleared of brush, particularly the troublesome haole koa. Also, the proposed action also involves the removal of the century old ironwood windbreaks, a species which is a fire hazard, and replacement with species non fire prone.

Moreover, the State Department of Land and Natural Resources-Division of Forestry and Wildlife (DLNR-DOFAW) has adopted a Fire Management Handbook, which specifies its standards for prevention, pre-suppression, and suppression. The document provides a structured approach in providing for public/firefighter safety and minimizing damage to

Hawai'i's environment. Funding for the fire management program is provided by the State's general fund and federal cost share programs through the U.S. Forest Service. These programs include the Rural Community Fire Protection and Rural Fire Protection and Control programs. Additionally, the DLNR-DOFAW is a key agency within the State who can trigger provisions of the Stafford Act (Fire Suppression Assistance) which provides for FEMA funding assistance in situations where forest and grass fires on public or private lands threaten a major disaster to communities and economies. For DLNR-DOFAW to meet its legal fire protection mandate for State-owned lands and honor its partnership with other fire services, DLNR-DOFAW negotiated with its local fire departments and established a cooperative mechanism for prevention, pre-suppression, and suppression measures by way of the current Memorandum of Agreements.

3.4.6 Volcanic Hazards

The island of O'ahu is formed from two principal volcanoes: Wai'anae and Ko'olau about *2.2 – 3.8 million years and 1.8 – 2.6 million years ago* respectively. O'ahu is also riddled with a number of more recent smaller "rejuvenation" vents such as Diamond Head, Koko head, Punchbowl and many others, which are believed to have occurred between 70,000 and 500,000 years ago. Hence, volcanic hazards on O'ahu are considered minimal due to the extinct status of the former volcanoes. The Island of Hawai'i is composed of five volcanoes, two of which (Mauna Loa and Kīlauea) have been very active in the past 100 years and pose the most immediate threat to life and property. A third volcano, Hualalai, last erupted in 1801 and has the potential to erupt again within our lifetime. The other two are dormant. Mauna Kea last erupted approximately 3,500 years ago and is considered dormant but not extinct. Kohala, considered extinct, is the oldest volcano on the island and last erupted approximately 60,000 years ago. Hawaiian volcanoes are not as explosive as continental margin volcanoes (e.g., Rainier, Mt. St. Helens, Mt. Shasta) and are characterized by relatively quiet outflow of relatively fluid lava, therefore the probability of harmful volcanic rock debris and ashfall on O'ahu from the volcanoes on Maui and Hawai'i is negligible. Consequently, the only credible volcanic hazard on O'ahu is "VOG," short for "volcanic gas" or "volcanic smog," resulting from ongoing eruptions on Hawai'i.

VOG is a term used in Hawai'i to describe hazy conditions caused by gaseous emissions from Kīlauea Volcano. VOG is created when volcanic gases react with sunlight, oxygen, and moisture. The VOG plumes from Kīlauea contain a variety of compounds, at varying concentrations, that could have adverse impacts on the downwind communities and environment. During slack or southerly winds, the entire island chain can be blanked in VOG. The VOG is most prevalent in the winter when Kona winds are most frequent.

Impacts and Mitigation Measures

The Proposed Project will not have an impact on volcanic hazards nor exacerbate the impacts associated with volcanic hazards. Any former volcanoes on O‘ahu are now considered inactive and the probability of eruption on O‘ahu is negligible. Therefore, only neighboring volcanoes on the Island of Hawai‘i and possibly Haleakalā on Maui, which last erupted in the 1700’s, are expected to have any impact on O‘ahu. The main impact from volcanic hazards on O‘ahu would occur from VOG.

VOG impacts are highly dependent on both proximity of the source to the affected area as well as the day-to-day climatic conditions. During trade-wind weather, VOG is carried from the Kīlauea vents is carried toward the southwest, around the southern tip of the island where some is trapped within an eddy system on the Leeward side of the island. Hence, during normal trade-wind conditions the southern and Kona communities on Hawai‘i Island are most heavily impacted by VOG. During slack or southerly winds, the entire island chain can be blanketed in VOG. However, due to the short half-life of sulfur dioxide (SO₂) and sulfuric acid in the environment, O‘ahu is not expected to experience the elevated SO₂ levels that may be experienced on Hawai‘i island (DEM, 2020). SO₂ levels are greatly reduced further away or upwind from the vents as the gas disperses and reacts with water to form sulfuric acid and then with ammonia to form ammonium sulfate which is eventually washed or settles out of the atmosphere. The visible “hazy” appearance of VOG is often intensified when the gases and particulate matter combine with high humidity due to the warmer tropical temperatures when brought up from the south. Informational resources on VOG distributions can be found at this website, which provides modeled VOG plume trajectories based on current and projected weather conditions:

<http://mkwc.ifa.hawaii.edu/vmap/>

Other informational resources on VOG and mitigation actions that the public can take to reduce the impacts of VOG can be found at these websites:

<https://vog.ivhhn.org/>

<https://hilo.hawaii.edu/natural-hazards/vog>

3.5 Natural Environment

3.5.1 BIOLOGICAL AND FAUNA RESOURCES

Definition of Resource

Biological resources include species of vegetation, wildlife, fisheries, and habitat. Biological resources discussed in this section include botanical, avian, or mammalian resources of special concern, particularly species listed under federal, or state endangered species law evaluated in Appendix E – *Botanical and Fauna Report*. Also discussed are species considered sensitive, protected, or proposed for protection.

Affected Environment Changes

The affected environment for biological resources described below is based on the biological resources survey report prepared for the EA (in Appendix E) unless otherwise noted (WHALE Environmental Services LLC, October 2021).

Botanical Resources

The Proposed Action site is currently not being used and is vacant. The vegetation in this area is non-native grasses and herbaceous plants that are common in disturbed coastal areas throughout the Hawaiian Islands. There are scattered Monkey Pods within the project area, and an ironwood windbreak along the shoreline setback area that will be removed due to invasive nature and fire hazard and replaced with salinity tolerate species such as kamani. Please see Farm Design in Appendix B's technical report for planting plans.

Mammalian and Avian Resources

A total of two (2) species of bird and zero (0) species of mammal were observed during the point counts in the Proposed Action site. None of the species detected are native to the Hawaiian Islands. The two species are introduced to the Hawaiian Islands and are common throughout the Hawaiian Islands, particularly in areas of human habitation.

Special Status Species

According to the biological resources survey report (ESA), the Proposed Action site does not contain any plant or mammal species protected or proposed for protection under either federal or state endangered species programs. This was supported with consultation with USFW, which advised only biological monitoring and a cease work provision if any endangered species were observed and consultation with USFW and DLNR before any further action.

Impacts and Mitigation Measures

Unless otherwise noted, this section is based on the Biological Resources Survey, at the site conducted by WHALE Environmental Services LLC, October 2021. The entire site has been intensively disturbed and highly altered by human activity (e.g. - invasive species intrusion). The Proposed Action will not result in adverse impacts to any plant or animal species currently listed or proposed for listing under federal or state endangered species statutes, because no such species have been found on or near the site according to the recent survey of the proposed site. Bird species were observed within the project area, none of which are an endangered species.

The Proposed Action site does not include, and would not affect, USFW critical habitat. There would be no significant impact to biological resources under the Proposed Action.

To adhere with provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), as amended (ESA) and from information received from USFW with pertinent information in their files, as it pertains to federally listed species in accordance with section 7 of the ESA; the applicant is aware that the following federally listed species *may* occur or *transit* through the vicinity of the proposed project area:

The endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*); endangered Hawaiian petrel (*Pterodroma sandwichensis*), threatened Newell's shearwater (*Puffinus auricularis newelli*), and endangered Hawaii DPS band-rumped storm-petrel (*Oceanodroma castro*) (hereafter collectively referred to as Hawaiian seabirds); the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot, (*Fulica alai*) Hawaiian gallinule (*Gallinula galeata sandvicensis*), and Hawaiian duck (*Anas wyvilliana*) (hereafter collectively referred to as Hawaiian waterbirds).

Hawaiian hoary bat The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they

forage and particularly like ironwood. If trees or shrubs 15 feet or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away.

To avoid and minimize impacts to the endangered Hawaiian hoary bat the applicant is incorporating the following applicable measure into the project mitigations:

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15). Ironwood will be removed after September and before June.
- Do not use barbed wire for fencing. Hawaiian seabirds may traverse the project area at night during the breeding, nesting, and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable.

To avoid and minimize potential project impacts to seabirds the following has been incorporate as applicable mitigation measures:

- Fully shield all outdoor lights so the bulb can only be seen from below bulb height and only use when necessary.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.
- In areas where waterbirds are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.
- If water resources are located within or adjacent to the project site, incorporate applicable best management practices regarding work in aquatic environments into the project design (see enclosure).

- Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the proposed project site prior to project initiation. Repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found:
 1. Contact the USFW Service within 48 hours for further guidance.
 2. Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.
 3. Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.

The same provisions of monitoring for site entry, halt to construction, notification of species presence to USFW and DLNR/DAR and request for guidance will apply to other species such as monk seals and green sea turtles that may enter the site from near shore waters and beaches.

3.6 Historical, Cultural and Archaeological Resources

Definition of Resource

Significant cultural resources are defined by the National Historic Preservation Act and Chapter 343 of the Hawaii Revised Statutes (HRS). According to the National Historic Preservation Act (NHPA), a historic resource is defined as, “*any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register...*” According to Chapter 343 of the HRS, cultural resources are defined as “cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups.” Chapter 343 requires that the environmental assessment process account for cultural resources in determining the significance of impacts that could occur because of a proposed action. Appendix H contains the *Cultural Impact Assessment*.

Unless otherwise noted, this section is based on the Cultural Impact Assessment prepared by WHALE Environmental Services LLC (WHALE), October 2021- April 2022. The cultural impact assessment completed by WHALE Environmental Services LLC supports the Project's environmental review under HRS Chapter 343. WHALE performed a field

inspection, historical research, and reviewed past archaeological and paleontological studies and found no significant cultural associations with the site. An excerpt from that report follows:

Regional Cultural History

As afore-mentioned, the project area lies about 5.3 miles from Keana Point. As our firm had done the ESA for the NAR expansion parcel acquisition, we have the cultural files for the overall Waialua – Mokuleia – Keana Point cultural regional history.

In all the ancient legends, mythology, story sets, and cultural collections along this shoreline in ascending historical context; the following locales prevail – Keana Point and the Maui Demi-God legends; the ancient times of the Kawaihāpai fishing village about 1 mile east of Keana Point which was located between Waialua and Ka‘ena, where Kaaemoku Kakulu ruled as the last konohiki of Kawaihāpai; and the construction of the Dillingham rail line between Kahuku and Waianae around Keana Point.

Ka‘ena (Hawaiian – *the heat*) and its surrounding region could have further importance as the birthplace of the Hawaiian islands, based on one mo‘olelo of the demigod Maui. Maui went fishing with his brothers, and with his fishing hook Manaiakalani, Maui caught something large. They paddled hard to land it, but when one brother looked back, the line snapped, the hook disappeared beneath the ocean, and the islands of Hawaii remained above water. There are other versions of this mo‘olelo (that explain how Maui attempted to join Kaua‘i and O‘ahu, forming the Pōhaku o Kaua‘i), and there are other versions of the story detailing the creation of the Hawaiian islands; thus the relationship of Ka‘ena to the birth of the Hawaiian islands is a rich area for further discussion and research.

There are likely many other residents of Wai‘anae and Waialua who have similar stories and recollections. The region’s original native plants found originally in the region (*now replaced by invasives*) would have been associated with traditional cultural practices and may have been used by previous families. ‘Ilima papa vines were used for basketry, various flowers for lei, and parts of the plant for medicinal and ceremonial purposes; hinahina was used for lei and medicinal purposes; and naio provided hard durable wood and was used for medicinal purposes. Likewise, seabirds have cultural significance as well: observations of flight paths and behaviors of certain seabirds were used to predict weather and to reveal schools of fish and to locate islands when navigating, seabirds provided food through their meat and eggs, seabirds provided feathers for kähili (feather standards), ‘ahu‘ula (feather capes), and lei, and several expressions and legends reference seabirds (e.g., Pōhai ka manu maluna, he i‘a ko lalo. *When the birds circle above, there are fish below.* ‘ōlelo no‘eau, M.K. Pukui 1983, No. 2667, as referenced in *Ko Hema Lamalama*, Kahoolawe Island Reserve 2008).

Sites of O‘ahu (1978) identifies several archaeological sites in the Mokulē‘ia- Ka‘ena region. In Kamananui, on the slopes of the Wai‘anae Mountain Range behind the old Waialua Sugar Company mill, the remains of a heiau were found along with stone piles and burial caves. Makai of these sites, along the coastline, were found a fishing shrine, or ko‘a, and skeletal remains. In western Mokulē‘ia, a heiau site and a ko‘a – both now destroyed – as well as extensive terracing have been recorded. Further into the valley area are sites that indicate that there was once a significant Hawaiian settlement there, including house sites, old coconut trees or dead trunks, and terracing. In Kawaihāpai, between Waialua and Ka‘ena, a heiau, ahu, ko‘a, and extensive terracing were recorded, as well as the four ‘hidden waters,’ the legendary streamlets Ulunui, Koheiki, Ulehulu, and Waiaka‘aiea that Hi‘iaka, one of the sisters of Pele, discovered at Ka‘ena and at which she quenched her thirst. The Keālia Trail, which zigzags up into the Wai‘anae Mountain Range from the coast, provided easy access to the Mokulē‘ia plateau. The Moka‘ena heiau in Kuaokalā, situated on the ridge at 1200 feet in elevation overlooking Ka‘ena Point and Keawa‘ula Bay, has the highest location of any heiau on O‘ahu. At Ka‘ena, the now-destroyed Ulehulu heiau was also located on the mountain ridge.

Historic properties identified so far at Ka‘ena Point within or near the project area fall within one of the following four major time-periods and uses: (1) Native Hawaiian subsistence and cultural uses; (2) Pasturage and ranching; (3) O‘ahu Railway and Land Company (OR&L); and (4) Ka‘ena Point Military Reservation. To date, a total of five extant historic properties that are considered native Hawaiian properties have been documented in the region concentrated at Ka‘ena Point. Together they form the Ka‘ena Complex, which was listed on the Hawai‘i Register of Historic Places in 1988. Major features of the Ka‘ena Complex include cultural deposits in the sand dune area, two stone platforms, Pōhaku o Kauai, and Leina a ka ‘Uthane (Soul’s Leap).

Both Pōhaku o Kauai, and Leina a ka ‘Uthane are considered the most important historical artifacts of the region – and lie approximately 5 miles from the site. Two natural formations compose the remaining two features of the Ka‘ena Complex: Pōhaku o Kaua‘i and Leina a ka ‘Uthane (Soul’s Leap). Both should be considered traditional cultural properties; the identification and evaluation of these otherwise natural features rely on known native Hawaiian traditions and beliefs. Pōhaku o Kaua‘i marks the end of a series of partially submerged rock outcrops that form the westernmost extent of O‘ahu. According to several recorded traditions, this rock formation was once part of Kaua‘i. In one tradition, the demigod Maui attempts to join Kaua‘i and O‘ahu by standing at Ka‘ena Point and using his hook, Manaiakalani, to pull Kaua‘i towards O‘ahu. When he pulled the hook, only a single, huge rock from Kaua‘i fell at his feet, to become known as the Pōhaku o Kaua‘i. The hook was attached to *‘ie‘ie* cordage, which ended up in Ka‘ie‘ie Channel (between Kaua‘i and O‘ahu) and the hook landed in Pālolo Valley, hollowing out a crater. In a

related/alternant version as related by Annie Keahipaka, a lineal descendant of the area, Maui had many helpers pulling the line. When one disobeyed orders and looked back at Kauaʻi as they pulled it towards Oʻahu, the line broke and Kauaʻi slipped back into the ocean, with only the fragment Pōhaku o Kauaʻi remaining as proof of Maui’s great effort. In a third traditional version, a Kauaʻi chief named Haʻupu hurled a huge boulder from Kauaʻi to Oʻahu to forestall what he thought was a fleet of Oʻahu warriors about to invade Kauaʻi. The group was, in fact, driving fish towards nets laid off-shore of Oʻahu. When the boulder fell, it killed the chief Kaʻena who was leading the drive and many of his followers. From then on, the point bore the name of this chief and the rock was called Pōhaku o Kauaʻi. Pōhaku o Kauaʻi is also mentioned incidentally in other traditions, demonstrating that it was a commonly known landmark.

The other important cultural formation is Leina a ka ʻUthane (Soul’s Leap), which is a limestone formation approximately 150 meters (500 feet) from the existing boulder barricade, perched between the existing Kaʻena trail and the ocean. It forms a tangible representation of native Hawaiian traditions and beliefs that identify Kaʻena Point as a place where the fate of departing souls is determined as death nears. Departing souls either passed into one of several spirit realms or were returned to the body to continue life. The fate of these souls often depended on the help or absence of friendly ʻaumakua (ancestral family or personal god) that would guide a soul to the appropriate realm: ao kuewa, a place of wandering souls, ao ʻaumakua, where the soul could be reunited with the souls of ancestors, or au milo or pō pau ʻole, a place of eternal night. In another version of what happens to souls after death, a soul wanders to Leina a ka ʻUthane if all its earthly obligations are fulfilled (if they are not, the soul returns to the body), where it is thrown into a pit known as Lua ahi a Kehena, at which time death actually occurs to the body. There has long been a legend that the *wilimili* (dust devils) that cross Kaukonahua Road and the Farrington Highway are the lost wandering souls of ao kuewa, a place of wandering souls. Again, these formations are over 5 miles from the project site.

The next historical and cultural legends are more centered on Hawaiian use of the region as fishing grounds. A road, following the traditional Waiʻanae-Waiialua trail, was constructed through the area and around the point sometime in the 1860s-70s. Several small fishing villages are thought to have existed in the area during this period. A settlement called Nēnēleʻa is documented as being about a mile east of Kaʻena Point, and several house foundations, measuring 14 x 20 feet, are documented from that area. An 1832 census listed the population of the local ahupuaʻa at forty-nine individuals.

The use of this project area having an ancient road may be the fact that it was a travel corridor between the activities at Keana Point, and the other end of Waiialua to the east as described below.

To the east of the site, approximately 4 miles away from the project area, East Waialua was rich in kalo (taro) lands.

The naming of Waialua has several derivations. In one tradition, Waialua was named for Waia, son of Haloa and Hinamaouulu'ai and grandson of Wakea. Waia was known to be a very cruel ali'i (chief) with a corrupt government. Nothing good was said of him. He disregarded his father's instructions, which were to pray to the gods, take care of the 'aina and maka'dinana (commoner) so the Kingdom would prosper. Some of his actions were not pleasant either. For example, when he saw a beautiful woman with attractive legs, he would have them cut off, or if he saw anyone with a beautiful tattoo, he would have that person killed. In the legend of Hi'iaka, the well-known Waia was said to have lived in Waialua as the ali'i.

"He utters no prayers, he employs no priests, he has no diviner, he knows not how to govern," said the people.

Because they suffered so much, the place was named for him, Waialua, doubly disgraced as the word Waia had come to mean disgraceful behavior. The term *lua* is defined in the Hawaiian dictionary as meaning "two, second, secondary, twice, deuce, double, doubly." Thus, the word traditionally defines the name Waialua. Other sources refer to *lua* as meaning the two rivers, Kaukonahua and Poamoho, that flow into Kaiaka Bay. The *haole* (foreigner) visitor, Gilbert Mathison, in 1822, gave one variation of the name Waialua. In his journal, he wrote:

Having enjoyed a most agreeable sail by moonlight, we this morning entered a small bay called Why-arouah, on the N.E. [northeast] side of the island, formed by two reefs of rocks which run out parallel a considerable way into the sea [Kaiaka Bay], and between which two small rivers discharge themselves. Hence, the name Why-arouah: Whye in the country language signifying water, and arouah the numeral two. Perhaps the natural definition of the name would be two waters as described in this version: "Waialua! Twin Rivers! Where two happy streams, companions since childhood now end their lives together in the sea."

Later contemporary sources indicated that Waialua was named after the lo'i (irrigated terrace) near Kaukonahua Stream and close to the former Halstead residence and sugar mill. Today, the smokestack of the mill can still be seen. The more poetic "*Ka 'ehu kai o Pua'ena*" (the sea sprays of Pua- 'ena) was another name for Waialua that described its physical nature. Pua'ena, the eastern point of Waialua harbor, was often veiled with a misty appearance because of the sea sprays from the pounding surf at that place.²⁷ The expression "*Waialua, 'aina ku palua i ka la'i* (Waialua, land that stands doubly becalmed) was said in praise and admiration for the place where the weather was usually pleasant and a tranquil lifestyle existed among the people."

Waiialua was also remembered as the place where the body of the O'ahu chief Elani was left to decompose. When Kahekili, the Maui king and his warriors invaded O'ahu, he left his chief Hu'eu alone at Ka'owakawaka, Kawailoa, Waiialua. The O'ahu chiefs planned to murder the warriors from Maui, most of whom were living in 'Ewa. After being forewarned of the impending plot, the Maui invaders fled to Waikiki and escaped, except for Hu'eu. He was killed while his guards were asleep. Elani, a suspect in the failed revolt against Kahekili, was found and his body disposed of:

At the death of Elani, who was greatly beloved by his people, his body was placed on a ledge of rocks near Puaena Point, where it was allowed to decompose. The place became known as Kahakakau Kanaka [the ledge (where) the man was placed]. As the odor came to the sands at Haleiwa, they became known as Maaaea [smelly]; the point on the other side became known as Kupava [Kapaoa? overwhelming smell]. . . . [I]f there was no one to care for the body of a commoner after his death, the corpse was placed on these rocks. The fluids from the decaying body would seep into the sea and attract sharks, which the people killed.

Impacts and Mitigation Measures

No surface historic properties were observed within or in the immediate vicinity of the Proposed Action. No intact sinkholes, sand dune deposits, or cultural material were observed within the project area, and none are believed to be present. As a result, the Proposed Action is not anticipated to adversely affect any historic properties. Furthermore, the Proposed Action would have no significant impact on historic properties as none are listed or detected.

Continued consultation with the State Historical Preservation Division (SHPD) will be necessary to determine if archaeological monitoring or other specific measures will be required. However, in that unlikely event that previously unidentified historical, archaeological, or cultural resources or human remains are encountered, work in the immediate area would cease and notification of the proper authorities, including the State Historical Preservation Division, would occur immediately according to applicable law.

3.7 – Air Quality

Definition of Resource

Air quality is defined by the concentrations of specific pollutants of concern in the general outdoor atmosphere to which the public has access, with respect to the health and welfare of the general public. These pollutants are generated by many direct and indirect sources

such as: Factories and power plants (stationary); automobiles, buses, and planes (mobile); windblown dust and volcanic eruptions (natural), construction and site preparation (fugitive dust).

The United State Environmental Protection Agency (EPA) administers and enforces the Clean Air Act, a federal law that regulates air emissions from stationary and mobile sources. Passed by Congress in 1970, and later amended in 1977 and 1990, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous, commonly occurring pollutants known as “criteria” pollutants. Thus far NAAQS have been set for six criteria pollutants (40 Code of Federal Regulations [CFR] 50): carbon monoxide (CO); nitrogen dioxides (NO₂); ozone (O₃) with nitrogen oxides [NO_x] and volatile organic compounds [VOCs] as precursors; particulate matter (PM) PM₁₀– less than 10 microns in particle diameter and PM_{2.5}– less than 2.5 microns in particle diameter; lead (Pb); and sulfur dioxide (SO₂). Two types of standards have been established. "Primary standards" set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. "Secondary standards" set limits to protect public welfare which includes protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. The EPA requires that states monitor the ambient air to determine attainment of the NAAQS and regulate industries that emit these and other pollutants.

In addition to NAAQS, the Hawaii DOH has established State ambient air quality standards (SAAQS) to further protect human health. SAAQS exist for the following pollutants: CO, NO₂, O₃, PM₁₀, Pb, hydrogen sulfide (H₂S), and SO₂. Performance standards exist for volatile organic compounds (VOC) and total suspended particulates (TSP) within HAR and are controlled by permit.

CHAPTER THREE – DESCRIPTION OF EXISTING ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES

Air Pollutant	Hawaii Standard	Federal Primary Standard	Federal Secondary Standard
Carbon Monoxide 1-hour average 8-hour average	9 ppm 4.4 ppm	35 ppm 9 ppm	None None
Lead 3-month average	1.5 µg/m ³ (calendar quarter)	0.15 µg/m ³ (running 3-month)	Same as primary
Nitrogen Dioxide 1-hour average Annual average	None 0.04 ppm	100 ppb 53 ppb	None Same as primary
Particulate Matter (PM₁₀) 24-hour block average Annual average	150 µg/m ³ 50 µg/m ³	150 µg/m ³ None	Same as primary None
Particulate Matter (PM_{2.5}) 24-hour block average Annual average	None None	35 µg/m ³ 12 µg/m ³	Same as primary 15 µg/m ³
Ozone 8-hour rolling average	0.08 ppm	0.075 ppm	Same as primary
Sulfur Dioxide 1-hour average 3-hour block average 24-hour block average Annual average	None 0.5 ppm 0.14 ppm 0.03 ppm	75 ppb - None None	None 0.5 ppm - -
Hydrogen Sulfide 1-hour average	25 ppb	None	None

ppb = parts per billion by volume
 ppm = parts per million by volume
 µg/m³ = micrograms per cubic meter of air

Chart 2 - Air Quality Standards for Criteria Pollutants (DOH 2013)

Impacts and Mitigation Measures

During the construction of the proposed activities there is expected to be a marginal increase in air pollutants associated with the operation of commercial construction vehicles and the grading of project access roads during construction. These pollutants will be limited to NO₂, HS₂, PM₁₀ and CO, from the operation of construction vehicles; dust from the grading of project access roads; in the form of fugitive dust from vehicle traffic and site grading. This marginal increase will be temporary, and limited in duration to a period of 4-6 months. In order to mitigate any potential impacts to air quality, Pucio Farm will proceed with construction under the guidelines of HAR Section 11-60.1-33.

During the operational lifetime of the project, air pollutants will be limited to mobile sources produced by the operation of residential vehicles entering and leaving the site.

Table 3.7 State and National Ambient Air Quality Standards

Pollutant	Unit	Averaging Period	NAAQS	SAAQs
CO	ppm	1-hour	35 ^b	9
		8-hour	9 ^b	4.4
Pb	µg/m ³	Quarterly	1.5 ^h	1.5
NO ₂	ppb	1-hour	100	None
	ppm	Annual	0.053 ^c	0.04
H ₂ S	ppm	1-hour	None	0.025
PM ₁₀	µg/m ³	24-hour	150 ^d	150
		Annual	None ^e	50
PM _{2.5}	µg/m ³	24-hour block avg.	35	None
		Annual	15 ^f	None
O ₃	ppm	8-hour rolling avg.	0.075 ^g	0.08
SO ₂	ppm	3-hour	0.5 ^a	0.5
		24-hour	0.14 ^b	0.14
		Annual	0.03 ^c	0.03
Notes:				
a. Federal Secondary Standard.				
b. Not to be exceeded more than once per year.				
c. Average of all 1-hour values in the year may not exceed the level of the standard.				
d. May not be exceeded more than one day per year.				
e. EPA revoked the annual PM ₁₀ standard effective December 17, 2006 due to lack of evidence linking health problems to long-term exposure. The State still has an annual standard.				
f. The 3-year average of 24-hour values must not exceed the level of the standard.				
g. The 3-year average of the fourth highest daily maximum value must not exceed the level of the standard.				
h. Average of all 24-hour values in any calendar quarter may not exceed the level of the standard.				
Source: DOH (2010)				

The marginal increase in emissions from construction activities will occur over a temporary, short-term period of 4 to 6 months. Use of water as-needed for dust control during construction will minimize the potential for visible emissions HAR §11-60.1-32. The Proposed Action will comply with the provisions of HAR §11-60.1-33 on fugitive dust by requiring the contractor to select appropriate measures to comply with the provision.

3.8 - Noise

Definition of Resource

Noise is defined by the EPA as “unwanted or disturbing sound”, and in the HAR as "any sound that may produce adverse physiological or psychological effects or interfere with individual or group activities, including but not limited to communication, work, rest, recreation, or sleep".

While the typical human response to noise pollution is annoyance, Noise pollution can cause stress related illnesses (eg. high blood pressure, sleep disruption, and lost productivity) and potentially hearing loss, with prolonged exposure. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable.

Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hertz (Hz), while intensity describes the sound’s loudness and is measured in decibels (dB). Normal speech has a sound level of approximately 60 dB. For the purpose of quantify sound for ordinance, sound level is usually expressed by reference to a known standard. Because the human ear is less sensitive to low audio frequencies, a table of octave values are added to the dB sound pressure level to make the A-weighted scale (dBA). The result is a standard scale relative to the loudness perceived by the human ear, which incorporates both sound intensity and frequency.

In 1970 under the CAA, the EPA established the Office of Noise Abatement and Control (ONAC) with the purpose of performing studies on noise and its effect on the public health and welfare. In 1972 Congress passed the Noise Control Act, followed by the Quiet Communities Act in 1978. By 1981 the EPA concluded that noise issues were best handled at the State and local level. The Hawaii DOH is the State administrator of noise control ordinance in Hawaii. The DOH has set maximum permissible sound levels (specified in HAR §11-46-4), which cannot be exceeded beyond the source's property line. These maximums vary based on zoning district, being the highest for industrially zoned parcels.

These noise limits apply to "stationary noise sources; and equipment related to agricultural, construction, and industrial activities". "Construction equipment" means any device designed and intended for use in construction, including but not limited to any air compressor, pile driver, bulldozer, pneumatic hammer, steam shovel, derrick, crane, tractor, grader, loader, power saw, pump, pneumatic drill, compactor, on-site vehicle, and power hand tool (HAR §11-46-4(a)).

Table 3.8 Hawai'i Administrative Rules §11-46 Noise Limits

Zoning District	Noise Limit (in dBA)	
	Daytime (7:00 am to 10:00 pm)	Nighttime (10:00 pm to 7:00 am)
Class A: Areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.	55	45
Class B: All Areas equivalent to lands zoned for multifamily dwellings, apartment, business, commercial, hotel, resort, or similar type.	60	50
Class C: All Areas equivalent to lands zoned agriculture, country, industrial, or similar type.	70	70

Construction noise is generated by the use of heavy equipment and portable powered tools on job sites and is generally considered temporary. The noise can vary greatly in overall duration and aggregate magnitude depending on the construction processes or activities being conducted, the type and condition of equipment used, the layout of the construction site and the proximity of sensitive receptors. Generally, construction noise levels primarily represent the acoustical contribution of two categories of dominant sources: impact devices (e.g., jackhammers, pile drivers) that produce high amplitude impulsive, and large engine-driven equipment and vehicles (e.g., bulldozers, backhoes, dump trucks) that produce noise as they idle, move, or utilize engine power to perform a function.

Operation and maintenance noise refers to the sounds produced by the completed project (i.e., post-construction) under typical conditions and includes activities, equipment, and building systems that may occur either during the day, night, or continuously.

Impact and Mitigation Measures

The existing environment is characterized by relatively high noise levels associated with the traffic on Farrington Road on the south side of the site, other residential-associated noises in the area and ocean-generated noise from wave action.

Grading and construction will involve the use of excavators, trucks, and other heavy equipment. Some of the construction equipment is inherently noisy. Construction related noise from those sources will be short term, less than 2 months.

The greatest source of typical day and nighttime noise is generated by vehicle traffic along Farrington Highway, which is expected to be the dominant source of noise in the affected environment. This remains true for all alternatives except for the No Action Alternative.

Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, “Community Noise Control” regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor’s responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits. Also, the guidelines for heavy equipment operation and noise curfew times, as set forth by the DOH noise control rules, will be adhered to; or, if necessary, a noise permit shall be obtained. In the long-term, operation of the Proposed Project is not anticipated to result in adverse noise impacts.

3.9 Hazardous Materials

Definition of Resource

The degree to which any given material or waste is deemed hazardous depends on its potential to pose a threat to human health or to the environment. The Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

define hazardous substances as those which can be severely harmful to human health and the environment. Many substances defined as hazardous are harmless in their normal uses but dangerous when released. Under the federal Resource Conservation and Recovery Act (RCRA) hazardous waste is defined as a solid waste which, because of its quality, concentration, or other characteristic may cause or contribute to impacts to human health or to the environment that are specified in the law. Substances are defined as hazardous under CERCLA, RCRA, and other federal laws. Appendix F holds the *Environmental Site Assessment (ESA)* Hazmat files.

Construction activities associated with the implementation of the Proposed Action improvements may involve the use of materials and processes that involve chemical agents or materials typical to construction that could be considered hazardous. These materials are primarily associated with vehicle and/or equipment maintenance that typically include flammable and combustible liquids, acids, aerosols, batteries, corrosives, solvents, paints, and hydraulic fluids.

Impacts and Mitigation Measures

No significant impacts are anticipated to result from the Proposed Project with regards to hazardous materials. As noted above, a Hazardous Material Survey was conducted prior to any construction activities. This survey identified any potential hazardous materials and recommended appropriate mitigation measures to handle and dispose of the hazardous materials. These remediation activities would comply with all established regulations and procedural guidelines. Design features specific to the reduction of the potential effects of hazardous spills will be implemented, where appropriate. No significant impacts to hazardous waste disposal are anticipated to result from the implementation and operation of the Proposed Project.

Hazardous substances are controlled in the United States primarily by laws and regulations administered by the EPA, OSHA, and USDOT. Each agency incorporates hazardous substance safeguards according to its unique Congressional mandate. EPA regulations focus on protection of human health and the environment. OSHA regulations are designed primarily to protect workplace health and safety, and DOT regulations promote the safe transportation of hazardous substances used in industry and commerce.

As stated in the ESA Phase I HazMat Report located in the Appendix F, WHALE Environmental Services, LLC has determined that there has been no negative impact from

past use that would raise any concerns related to hazardous materials or waste to affect current activities. The Phase One Historical Review report may be found in Appendix F.

3.10 Traffic

Surrounding Roadway Network

The Project Site is located at 68-431 Farrington Highway which lies to the south of the project. It is the only road in the area. The project site lies between the highway and the ocean, which is a shoreline lot. Farrington Highway is a two-lane, two-way roadway generally oriented in the east-west direction.

Transportation Facilities

Transit within the vicinity of the Project Site is provided by “The Bus” which is operated by the O’ahu Transit Service (OTS) for the City and County of Honolulu Department of Transportation Services. There are 2 bus stop locations within a quarter mile radius of the Project Site.

Bike Facilities

In the vicinity of the Project Site there are no existing bike facilities along Farrington Highway, but there is one planned by the Department of Transportation Services slated for the 2026 fiscal year. There are no cross walks or curb ramps along this stretch of the Farrington Highway and there is no parking allowed as well on the north side of the highway. There are no sidewalks or street lighting along the westbound side of the road.

Parking Facilities

All parking for the project site is contained within the lot, as shown on the plans found in Appendix C. There is garage space for farm vehicles, and parking spaces for residential parking next to the two dwellings.

Impacts and Mitigation Measures

Therefore, the Proposed Project is expected to result in an increase of vehicle trips to the Project Site. Short term will be the influx of construction vehicles. Long term will be the residents and farm workers. Accordingly, long-term transportation impacts are not anticipated as occupants of the site will be limited. Most of the potential traffic impacts

would be short-term, occurring during the construction of the facility, and would be caused by construction traffic. These would be temporary impacts, only occurring during construction. These impacts would no longer occur once the Proposed Project is complete. Potential traffic impacts associated with construction vehicles, construction workers, and construction parking demand would be mitigated through a construction traffic management plan developed by the builder. The area designated by the barn identified in the *Farm Design* in Appendix B as the future crop collection area will be the temporary construction material laydown area and used for staging the construction. It is outside the shoreline setback. The construction traffic management plan would identify appropriate parking areas for construction workers and construction vehicles that will park within the project area and, thus will not affect traffic flow along the adjoining roadway except while traveling to and from the Project Site. Construction contractor(s) will be required to mitigate potential vehicular and pedestrian traffic impacts through appropriate traffic control measures and safety devices. Examples of such measures that may be implemented include:

- Providing barriers, cones, signage, lighting, non-skid covering over trenches, adequate and safe sidewalk widths, adequate intersection visibility and other provisions to promote safe passage of vehicles and pedestrians through the construction zone's entrance;
- Restricting transport of construction vehicles during school and commuter peak traffic hours;
- Notifying providers of emergency services (fire, ambulance, police) prior to implementation of any required detours or street closures;
- Coordinating with the City Department of Transportation Services (DTS) and O'ahu Transit Services of any detours or street closures; and,
- Providing appropriate barriers as necessary to deter the public from unauthorized entry into restricted or hazardous construction zones during working and nonworking hours.

3.11 Visual Resources

Visual resources are public in nature and include views of a project to and from neighboring scenic resources. When evaluating scenic quality, both natural and manmade components of the existing visual environment should be collectively considered. These components

may be evaluated in terms of whether each contributes or detracts to the overall scenic landscape character. In turn, this evaluation contributes to the assessment of scenic quality levels, which are established by evaluating the distinctiveness and diversity of a particular landscape setting. Public concern over adverse visual impacts is also an important part of the visual impact assessment process. Public concerns over the visual impacts associated with a project are often directly connected to the size and scale of a project. Additionally, the number and presence of people or activities nearby will further inform the level of concern for impacts to the existing scenic quality of the area. Visual impacts associated with a project can be evaluated in the following objective terms: form, line, color and texture. Such terms are used to measure the existing scenic quality and proposed scenic quality with the addition of the project. This methodology allows for an objective assessment of visual resources. The visibility of a project determines how the Project will be seen from particular viewing areas, which directly relates to the level of concern nearby viewers will have. In general, however, perception of details relating to form, line, color, and texture diminishes with increasing distance.

Impacts and Mitigation Measures

The Proposed Action site is currently a vacant site that was used in the past for farming or perhaps beach access. Past farming operations had placed a windbreak along the shoreline of ironwood, blocking views of the ocean from Farrington Highway. As a result, vegetation within the site boundaries is non-native and largely invasive. The ironwood is slated for removal since its acidic nature is harmful to farming operations. For erosion protection purposes, they will be replaced by native trees such as kamani. As the lot is 7.9 acres, the lot depth makes visual views of the ocean difficult and there is a high coastal berm above the beach. The topography of the site is relatively flat and is located adjacent to the higher shoreline. There are no viewsheds identified in this region in the NSSCP or the 1987 viewshed study and the interviewee in the CIA, Thomas Shiria, mentioned how the high berm used to prevent fisherman along the shore being seen from inland locations due to the high coastal berm.

3.12 Socio-Economic Characteristics

Definition of Resource

Socio-economic resources and characteristics refer to the social and economic qualities of the human environment, such as demographic characteristics, employment and income-

generating activities, and the ways in which people live, relate to one another, organize to meet their needs, and engage in leisurely activities.

The CCH accounts for 68.8% of the State's total resident population, down from 69.7% just a few years ago. Based on the latest population projections, Honolulu's population is expected to continue climbing, but at a slower rate than the other counties. By 2045, the county is projected to be home to nearly 1.074 million residents. However, the average annual growth rate is predicted to slow from 0.4% between 2020 and 2030 to 0.1% by 2045. The projected population increases will result in increased demand for housing and public services across the island.

The project site lies in the *Agricultural* State Land Use zone, and the City and County of Honolulu classification is AG-2 *Agricultural*.

The population of Oahu was 953,207 in 2010 (U.S. Census 2010) and 1,106,508 in 2020. The town nearest the Proposed Action site and alternatives under consideration is Haleiwa, located approximately 1.5 miles to the east. The population of Haleiwa was 11,186 in 2010 (U.S. Census 2010). With a 2022 population of 5,135, it is the 55th largest city in Hawaii and the 6472nd largest city in the United States. Haleiwa is currently growing at a rate of 1.93% annually and its population has increased by 3.93% since the most recent census, which recorded a population of 4,941 in 2020. Spanning over 3 miles, Haleiwa has a population density of 2,249 people per square mile.

The average household income in Haleiwa is \$97,951 with a poverty rate of 3.84%. The median rental costs in recent years come to \$1,489 per month, and the median house value is \$881,700. The median age in Haleiwa is 36.4 years, 34.1 years for males, and 38.7 years for females.

Impacts and Mitigation Measures

No significant impacts are anticipated to result from the construction or operation of the Proposed Project. In the short-term, construction expenditures related to the Proposed Project will provide positive benefits to the local economy. This would include creation of construction and construction support jobs, and the purchase of materials from local suppliers, as well as indirect benefits to local retail businesses resulting from construction activities. In long goals, the project meets the goals of remaining zoned for agricultural use

common the goals of the Oahu General Plan and the North Shore Sustainable Community Plan.

3.13 Public Services and Facilities

3.13.1 Police, Fire and Medical Services

Police protection is provided by the City’s Honolulu Police Department. The Project Site is serviced by the Honolulu Police Department’s Wahiawa District. The Honolulu Fire Department provides emergency service to the region from its North Shore Fire Station located approximately 5.6 miles southeast on 64-120 Haleiwa Road. The nearest full-service hospital is Wahiawa Hospital, located at 128 Lehua Street approximately 8.8 miles from the Project Site. Emergency medical service is provided by the City’s Emergency Services Department, Emergency Medical Services (EMS) Division located in the fire station.

Impacts and Mitigation Measures

In the short- and long-term, no significant impacts on police, fire, and medical services are anticipated. In the long-term, the Proposed Project may require occasional police and fire protection, as well as medical services, however it would likely not represent a significant amount relative to the overall regional demand. The Proposed Project will be designed and built-in compliance with the applicable County fire code requirements.

3.13.2 Education

There are three schools in the Waialua region – two public and one private. Waialua Elementary School on Waialua Beach Road services children K-7. Waialua Intermediate and High School on Farrington Highway services children 7-12. St. Michael’s Academy in the private school servicing children K-7.

Impacts and Mitigations

The Proposed Project Action is not anticipated to affect any of the educational facilities. The project site population is not expected to utilize the schools.

3.13.3 Recreational Facilities

Definition of Resource

Recreational resources offer opportunities for residents and visitors to engage in leisurely activities. Recreational resources include parks and open space as well as other infrastructure

facilitating leisurely activities on land or water, such as piers and harbors. Recreational resources offer opportunities such as hiking, fishing, beachcombing, spelunking, and boating. Recreational opportunities and resources are important to economic activity and quality of life.

Recreational resources in the vicinity of the Proposed Action under consideration include the following parks and other recreational infrastructure within the nearby towns of Haleiwa and Mokuleia and along the shoreline (relative to the Proposed Action):

- Ocean – accessible by nearby beach access easement(s);
- Mokuleia Beach Park at the end of Farrington Highway
- Camp Mokuleia within ½ mile of the site
- Kaiaka Beach Park in Haleiwa town
- Ali'i Beach Park in Haleiwa town
- Dillingham Airfield – hang gliding, sailplanes, skydiving, and flight lessons

Impacts and Mitigation Measures

No significant impacts are anticipated to occur from the construction or operation of the proposed project.

3.13.4 Solid Waste

Solid waste collection and disposal service is provided by the ENV for incineration at the Campbell Industrial Park H-POWER Plant that generates electricity, followed by disposal of ash and non-combustibles at the Waimanalo Gulch Sanitary Landfill. Construction and demolition material is disposed of at the privately-owned PVT landfill in Wai'anae.

Impacts and Mitigation Measures

No short-term or long-term significant impacts to municipal solid waste collection and disposal facilities are anticipated as a result of the construction and operation of the proposed project. Green slash resulting from the operation of landscaping plant stock is expected to be composted on-site and used again as planting materials.

3.13.5 Infrastructure and Utilities

3.13.5.1 Water System

Water for domestic use and fire protection is provided to the project site and surrounding area through the City and County Board of Water Supply (BWS) municipal water system which draws only from groundwater sources. The Project Site also has a private well for irrigation purposes.

Impacts and Mitigation Measures

No short- or long-term significant impacts are anticipated to result from the development and operation of the Proposed Project. On-site water system improvements will be required to accommodate the Proposed Project. The final line size and location will be determined during the design phase of the project.

Connections and improvements will be confirmed when construction drawings for the Proposed Project are developed and submitted to BWS for review and approval. It is anticipated that the connection would be the existing metered connection to the existing adjacent 6" water line in Farrington Highway.

3.13.5.2 Wastewater System

The site is served by a private septic system for which a permit has been obtained. There is no public sewage in this region.

Impacts and Mitigation Measures

No significant impacts are anticipated on the existing wastewater system as a result of the construction and operation of the Proposed Project.

3.13.5.3 Drainage System

There is no drainage system on the site or on this section of Farrington Highway. All drainage on the site will be through evaporation or percolation. Farrington Highway's paved asphalt surface directs runoff to the roadsides where it also percolates or evaporates.

Impacts and Mitigation Measures

No short- or long-term significant impacts on the quantity or quality of drainage in the project vicinity are anticipated during construction or operation of the Proposed Project. Construction of the Proposed Project will not involve major land disturbing activities that

will significantly alter site contours. Applicable erosion control measures and best management practices will be implemented in order to mitigate any possible adverse effects relating to runoff. As applicable for each phase, these may include but are not limited to: temporary sediment basins, temporary diversion berms and swales to intercept runoff, silt fences, dust fences, slope protection, stabilized construction vehicle entrance, grate inlet protection, truck wash down areas, and use of compost filter socks. Planting of landscaping also will be done as soon as possible on completed areas to help control erosion. Permanent sediment control measures will be used once construction is completed. More details can be found in the *Erosion and Sedimentation Control Plan* found in Appendix G.

3.13.5.4 Electrical and Communications Systems

Electrical power on the island of O‘ahu is provided by Hawaiian Electric Company (HECO). Telephone service in the area is provided by Hawaiian Telcom. Spectrum is the local CATV provider in the region and also offers telephone service.

Impacts and Mitigation Measures

In the short- and long-term, the proposed project is not anticipated to impact or increase overall demand for electrical and communication systems in the area.

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Four

RELATIONSHIP TO PLANS,
POLICIES, and CONTROLS

4. RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

Pursuant to HAR Section 11-200.1-24, this section describes the relationship of the Proposed Project to “*land use and natural or cultural resource plans, policies, and controls for the affected area.*” Discussed is how the Proposed Project “*may conform or conflict with objectives and specific terms of approved or proposed land use and resource plans, policies, and controls, if any, for the affected area.*” Where a conflict or inconsistency exists, described is the extent to which the Proposed Project has been reconciled “*with the plan, policy, or control, and the reasons why*” the proposing entity (Pueo Farm) “*...has decided to proceed, notwithstanding the absence of full reconciliation.*” To facilitate describing the relationships of the Proposed Action to the numerous land use and natural or cultural resource plans, policies, and controls for the affected area, some of those plans, policies, and controls are presented in tabular form, and are described with text and/or the following letter code:

S = Supportive, NS = Not Supportive, N/A = Not Applicable

4.1 Land Use Plans and Policies – O‘ahu General Plan and North Shore Sustainable Communities Plan

4.1.1 O‘ahu General Plan

The General Plan for the City and County of Honolulu is a comprehensive statement of objectives and policies that sets forth the long-range aspirations of O‘ahu’s residents and the strategies to achieve them. It is the first tier of and lays the foundation for a comprehensive planning process that addresses physical, social, cultural, economic, and environmental concerns affecting the City and County of Honolulu. This planning process serves as the coordinative means by which the City government provides direction to the population projected for O‘ahu. The City’s planning process is comprised of three distinct tiers. As the first tier of planning, the General Plan establishes policy guidance for O‘ahu as a whole, with all subsequent community development plans, policy plans, and implementing regulations of the City and County of Honolulu required to be consistent with the General Plan. The second tier consists of the eight regional Development Plans (DPs) and Sustainable Communities Plans (SCPs). These plans relate to specific regions of the island, and (1) conceptually describe the pattern of land use desired for the region, (2) provide guidance for functional infrastructure planning, and (3) identify areas within the DP/SCP boundary that might benefit from more detailed planning. The third tier is comprised of the specific mechanisms to implement the two higher levels of the planning hierarchy. These

include the implementing ordinances and regulations (i.e., the Land Use Ordinance and Zoning Maps, the Subdivision Rules and Regulations, and the City's Capital Improvement Program), public facilities and infrastructure functional plans, and special area plans that give specific guidance for specific portions of a DP or SCP area.

Specific consistency with the Oahu General Plan policies is as follows:

Population

Objective A –

Policy 3 Seek a balanced pace of physical development in harmony with the City's environmental, social, cultural, and economic goals by effecting and enforcing City regulations.

Finding: The project would increase the population in this rural area by a negligible amount.

Objective B –

Policy 3 Manage land use and development in the urban-fringe and rural areas so that:

- a. Development is contained within growth boundaries; and
- b. Population densities in all areas remain consistent with the character, culture, and environmental qualities desired for each community.

Finding: The project would adhere to land use and development in rural agricultural areas.

Balanced Economy

Objective A:

Policy 1 Support a strong, diverse, and dynamic economic base that protects the natural environment and is resilient to changes in global conditions.

Policy 2 Encourage the viability of businesses and industries, including support for small businesses, which contribute to the economic and social well-being of O'ahu residents.

Policy 3 Pursue opportunities to grow and strategically develop non-polluting industries such as healthcare, agriculture, renewable energy, and technology in appropriate locations that contribute to O'ahu's long-term environmental, economic, and social sustainability.

Finding: The project would enhance economic viable agricultural growth in an appropriate location.

Objective C:

Policy 1 Foster a positive business climate for agricultural enterprises of all sizes, as well as innovative approaches to farming as a business, to ensure the continuation of agriculture as an important component of O‘ahu’s economy.

Policy 2 Support agricultural diversification to strengthen the agricultural industry and make more locally grown food available for local consumption.

Policy 3 Foster market opportunities and increased consumer demand for safe, locally grown, fresh, processed, and value-added agricultural products.

Policy 4 Streamline the implementation of regulations to enhance a producer’s ability to develop, market, and distribute locally grown food and products.

Policy 5 Identify the economic benefits of local food production for local markets. Provide economic incentives to encourage local food production and sustainability and encourage agricultural and landscaping occupations.

Policy 6 Promote small-scale farming activities and other operations, such as truck farming, flower growing, aquaculture, livestock production, taro growing, subsistence farms, and community gardens.

Policy 7 Encourage landowners to actively use agricultural lands for agricultural purposes, and to pursue the long-term preservation of agricultural land with high productivity potential for agricultural production.

Policy 8 Encourage sustainable agricultural production to coexist on lands with renewable energy generation.

Policy 9 Prohibit the urbanization of agricultural land located outside the City’s growth boundaries.

Policy 10 Support and encourage technologies and agricultural practices that conserve and protect water, soil, air quality, and drainage areas, reduce carbon emissions, and promote public health and safety.

Policy 11 Support and encourage the availability and use of non-potable water for irrigation, where feasible.

Policy 12 Provide plans, incentives, and strategies to ensure the affordability of agricultural land for farmers.

Policy 13 Encourage both public and private investments to improve and expand agricultural infrastructure, such as irrigation systems, agricultural processing centers, and distribution networks.

Policy 14 Promote farming as a desirable and fulfilling occupation by encouraging agricultural education and training programs and by raising public awareness and appreciation for agriculture.

Policy 15 Protect the right to farm by enforcing right-to-farm laws, enacting policies to protect agricultural operations, and imposing meaningful buffer zones.

Policy 16 Seek ways to discourage agricultural theft and vandalism.

Policy 17 Recognize the scenic value of agricultural lands as an open-space resource and amenity.

Finding: The proposed project is in full agreement with these policies and adheres to the guidelines presented in each. Pueo Farm has addressed these policies by using renewable energy, using no BWS water for irrigation, fencing the property to discourage agricultural theft, etc...

Environment

Objective A

Policy 1 Protect O‘ahu's natural environment, especially the shoreline, valleys, ridges, watershed areas, and wetlands from incompatible development.

Policy 4 Require development projects to give due consideration to natural features and hazards such as slope, inland and coastal erosion, flood hazards, water-recharge areas, and existing vegetation, as well as to plan for coastal hazards that threaten life and property.

Policy 5 Require sufficient setbacks from O‘ahu’s shorelines to protect life and property, preserve natural shoreline areas and sandy beaches, and minimize the future need for protective structures or relocation of structures.

Policy 7 Protect the natural environment from damaging levels of air, water, carbon, and noise pollution.

Policy 8 Protect plants, birds, and other animals that are unique to the State of Hawai'i and O'ahu, and protect their habitats.

Policy 9 Increase tree canopy and ensure its integration into new developments and protect significant trees on public and private lands.

Finding: The proposed project is in full agreement with these policies and adheres to the guidelines presented in each. Pueo Farm has addressed these policies by enhancing tree canopy, protecting unique species avoiding the shoreline, etc...

Housing

Objective A

Policy 2 Streamline approval and permit procedures, in a transparent manner, for housing and other development projects.

Finding: Strong support for this policy.

Transportation

Finding: Not applicable to the Proposed Action

Energy Systems

Finding: Not applicable to the Proposed Action

Physical Development and Urban Design

Objective E

Policy 4 Maintain rural areas that reflect an open and scenic setting, dominated by small to moderate size agricultural pursuits, with small towns of low-density and low-rise character, and which allows modest growth opportunities tailored to address area residents' future needs.

Objective F

Policy 3 Require developments in stable, established communities and rural areas to be compatible with the existing communities and areas.

Finding: The Proposed Action meets this requirement

Public Safety and Community Resilience

Finding: Not applicable to the Proposed Action

Health and Education

Finding: Not applicable to the Proposed Action

Culture and Recreation

Finding: Not applicable to the Proposed Action

Government Operations and Fiscal Management

Finding: Not applicable to the Proposed Action

The following pages are a summary table of the Proposed Action relationship to the Oahu General Plan. It highlights the Proposed Action overall relatability to the 11 major areas of the Oahu General Plan.

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4.1.1 - Oahu General Plan	S	NS	NA
<p>GOALS - The General Plan is a guide for all levels of government, private enterprise, neighborhood and citizen groups, organizations, and individual citizens. It is intended to guide land use and development decisions and to influence actions in 11 key areas</p>			
<p>(1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations</p>	X		
<p>(2) A desired and sustainable physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well being of the people.</p>	X		
<p>(3) Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life</p>	X		
<p>Discussion: The Proposed Project will support the Oahu General Plan goals, for present and future generations, to ensure individuals and groups may approach their desired levels of self-reliance and self-determination. The Proposed Project will support the State of Hawai'i economy by providing the creation of construction, construction support jobs, and the purchase of materials. The Proposed Project will provide an enhanced agricultural opportunity with elements that provide for a better socio-economic well-being. Moreover, the Proposed Project will meet AG-2 requirements, by providing needed crops that adhere to the rural characteristics of the Waialua region and produce viable agricultural products which will participate in enhancing the physical environment and nourishes a sense of well-being in sustainable fashion.</p>			
<p>OBJECTIVES AND POLICIES - A future which is sustainable is also of great importance for an island community interested in the current and future well-being of its people. The principles of sustainability recognize that there are limits to the complex network of systems (environmental, economic and social) that define our lifestyles and overall well-being. A sustainable Honolulu means having the capacity to support the current generation's basic resource needs without compromising the ability of future generations to meet their own needs. To do this, the City shall seek to find the appropriate balance and synthesis of the major elements of sustainability that are essential to the creation of a sustainable place.</p>			
<p>OBJECTIVES AND POLICIES - POPULATION</p>			
<p>The first is to provide for our existing and anticipated population in a manner that respects the limits of O'ahu's natural resources, protects the environment, and minimizes social, cultural, economic, and environmental disruptions. This includes the active management of tourism to prevent visitor impacts from overwhelming the quality of life for our island community</p>	X		

The second is to maintain a pattern of population distribution that will allow people to live, work, and play in harmony

X

Discussion: The Proposed Project will support the Oahu General Plan goals, for present and future generations, to ensure individuals and groups may approach their desired levels of self-reliance and self-determination. The Proposed Project will support the objective of protecting the environment and avoiding or mitigating impacts. The intent of the farm operations is to produce mainly Hawaiian-based landscaping plants to see to resorts and tourist venues which is believed to help them become aware of Hawaiian themes.

BALANCED ECONOMY

The objectives and policies for balanced economic activity attempt to address the needs for an adequate standard of living, an improved quality of life for residents and future generations, and a diversified economy that advances O’ahu’s long-term sustainability. Critical issues include varied employment and advancement opportunities, living wage jobs, viability of both major industries and small businesses, the location of jobs, inclusion of flexible and remote work, and diversification of the economic base to ensure its resiliency to changes in global conditions. Policies address what government can do to provide, encourage, and promote economic opportunities, and reduce economic inequity for our residents. An innovative, sustainable, and technologically savvy economy that respects our unique traditions and cultural values will advance an equitable economic future.

X

Discussion: Pueo Farm will create economic viability with crops sold to defined outlets in a sustainable fashion, also while creating jobs, diversity of products, and crops that respect cultural values with technological advancement in crop production.

NATURAL ENVIRONMENT AND RESOURCE STEWARDSHIP

The natural environment, next to the island’s people, is O’ahu’s greatest asset. Protecting the island’s natural resources and environmental quality is essential to ensuring the long term health and well-being of the community. O’ahu’s array of biologically rich and diverse ecosystems, year-round temperate climate, beautiful mountains, beaches, scenic vistas, and freshwater and marine environments are enjoyed by all. However, these precious resources that are fundamental to O’ahu’s lifestyle and economy are also adversely impacted by climate change, and in some cases the ill-effects of overuse. The City’s policies seek to protect and enhance O’ahu’s natural beauty and environment by increasing public awareness and appreciation, and by mitigating against the degradation of these assets. The objectives and policies recognize the importance of protecting the natural environment for current and future generations.

X

HOUSING AND COMMUNITIES

Obtaining decent, reasonably priced housing in safe and attractive neighborhoods has been a persistent problem for the residents of O’ahu, and is a primary concern of the General Plan. This section recognizes the importance of diverse communities that are well-integrated with transportation, the surrounding land uses, and the natural environment, and that include housing and access to schools, services, amenities, and job opportunities. The objectives and policies for housing seek to ensure a wide range of housing opportunities and choices and to increase the availability of affordable housing, including at the lowest income levels, and meet City and State affordability goals; to encourage higher-density housing via mixed-use and transit-oriented developments in rail station areas; to encourage infill housing where permitted; to increase the use of sustainable building designs and techniques; to reduce speculation in land and housing; and to address issues associated with homelessness so that all people have decent and stable housing options.

Discussion: The Project is not in an urban district with access to rail and does not address homelessness issues or other housing issues.

TRANSPORTATION AND UTILITIES

Moving quickly toward a safe, efficient, and cost-effective multi-modal transportation system that is not dependent on fossil fuels and generates far less greenhouse gas emissions is essential to the environment, economic prosperity, and quality of life. The cost of building and maintaining the various elements of a comprehensive transportation system to service the island is a major public investment. Coordinated planning of accessibility and circulation requirements and integration of the island's transportation network within existing and planned developments is important in the effective management of urban growth and in meeting the community's daily needs. The transportation objectives and policies address the need for a balanced ground transportation system that allows safe, comfortable and convenient travel for all users, including pedestrians, micro-mobility users, bicyclists, public transit riders, and motorists. The airports and harbors are State facilities and are under State jurisdiction. The City’s role is limited to align and regulate surrounding land uses, provide connectivity to these key facilities, and process certain needed permits. Population growth results in increased demands for water, sewerage, recycling, and solid waste disposal services provided by government, as well as the communication, electricity, and other utility systems provided by the private sector. When meeting such needs, the social, economic, and environmental consequences must be carefully considered at all decision points. Reliability, cost-effectiveness, and capacity are necessary attributes of a highly functioning utility system. In addition to emphasizing the importance of these attributes, the objectives and policies for utilities emphasize the need for efficient and dependable transmission and service, adequate supplies of water, and environmentally sound waste disposal systems.

X

X

Discussion: The Proposed Action is not related to transportation or utilities issues or activities. By filing this DEA and subsequent SMA Major, Pueo Farms is adhering to meeting the CCH goals of regulation and permitting requirements.

ENERGY SYSTEMS

There is no more salient example of the direct impact of changing global conditions on an island community than the provision of energy and the attendant dangers of escalating global warming and the volatility of global energy supply chains. With more than 90 percent of O’ahu’s electrical and transportation needs powered by imported fossil fuels, achieving energy self-sufficiency is a critical component of achieving sustainability. Our health and livability, even in the most urban area, directly depend on the health and integrity of natural ecosystems. Our island's achievement of 100 percent renewable energy and renewable transportation must include increasing the resilience of our energy grid, protecting agricultural productivity, enhancing community trust, and guarding against the most hazardous impacts of climate change. Policies have been revised to support net zero to net positive performance in the areas of energy, low carbon emissions, waste streams, all utilities, and food security.

Discussion: The Development of a Landscape Plant Stock Farm does not create emissions or use much energy. Positive factors are that the vast amount of green plants filters carbon dioxide and regenerates oxygen. Power will be PV based and not reliant on the grid.

PHYSICAL DEVELOPMENT AND URBAN DESIGN

X

Physical development and urban design are concerned with the management of growth and the quality of life that occur within the various parts of the island. The objectives and policies in this area are concerned with the coordination of public facilities and land development, compatibility of land uses, and specification of certain land uses at particular locations. It also deals with creating active, vibrant communities linked not only physically but digitally, and through social media and other forms of technology to promote public participation in the planning process in ways that engage our increasingly digital society. New policies also emphasize the need to recognize and prepare for the current and even greater long-term impacts of climate change. Urban design emphasis is contained in objectives to create and maintain attractive, meaningful, and stimulating environments, and to promote and enhance the social and physical character of O'ahu's older towns and neighborhoods. Given the population distribution reflected in the General Plan, it is intended that rural centers be allowed incremental growth over time, providing for generations to remain in their hometowns and maintain the economic viability of our rural and suburban communities. The General Plan now also contains an objectives on climate change and sea level rise, and the continued need to plan for and mitigate associated impacts. It calls for all public and private organizations to prepare for problems caused by rises in sea level, rises in groundwater levels, more frequent and severe storms, shifts in local rainfall patterns, increased flooding, and higher urban temperatures. The State and the City have adopted strategies and plans that guide the response to climate change.

X

Discussion: The Proposed Project has meet all strategies and plans that respond to potential climate change issues and events.

PUBLIC SAFETY AND COMMUNITY RESILIENCE

Many of the City's services derive from the concern for the safety of the people. The prevention and control of crime and maintenance of public order are one aspect of public safety. The City's policies reflect the roles of the citizen, and the City, State, and federal governments in providing for the safety of residents and visitors. Another aspect deals with the protection of people and property from natural disasters and other emergencies, traffic and fire hazards, and other unsafe conditions. This includes creating resilient, disaster-ready communities that are mentally and physically prepared for disasters and environmental stressors including those driven by climate change.

X

Discussion: The Proposed Project does not affect or interact with public safety and poses no traffic, fire hazards, or unsafe conditions

HEALTH AND EDUCATION

Public health and health care services are a joint State, City, and private sector responsibility. The City provides ambulance services, regulates hospital structures, helps to enforce the State health code, and promotes healthy lifestyles. New policies promote active lifestyles, enhance personal health, and support age-friendly cities so that people of all ages and abilities can thrive. Objectives and policies for education call for a wide range of educational opportunities, development of employable skills, efficient use of facilities and appropriate facility location, and the promotion of Honolulu as a center for higher education in the Pacific. A new education policy also calls for recognizing Honolulu's status as an international Pacific crossroads, and another encourages outdoor learning opportunities and venues that reflect O'ahu's unique natural environment and Native Hawaiian culture.

Discussion: The guidelines presented are not applicable to the Proposed Project

CULTURE AND RECREATION

Preservation and enhancement of Hawai'i's multiethnic culture will be achieved through policies that encourage and respect the Native Hawaiian culture and its vital influence on the way of life on O'ahu; recognize unique local cultures, values and traditions; prioritize equity for historically marginalized groups; protect and enhance cultural, historic and archaeological sites, buildings, and artifacts; and promote the living arts and culture of our multi-cultural heritage. The City also recognizes the importance of providing adequate park space and facilities to meet changing demand. Objectives and policies encourage visual and performing arts and the provision of a wide range of recreational facilities and services that are readily available to residents and visitors. New policies also call for using our unique natural environment in a responsible way for cultural events and activities, and for creating and promoting recreational venues for all to enjoy from kūpuna to keiki, and kama'āina to malihini.

Discussion: The guidelines presented are not applicable to the Proposed Project

GOVERNMENT OPERATIONS AND FISCAL MANAGEMENT

X

X

The objectives and policies in the first ten key areas rely on a well-run, transparent, and resourceful City government. Increased efficiency, effectiveness, responsiveness, and fiscal responsibility in carrying out the functions of City government are crucial to the City's ability to successfully fulfill its many duties. In an age of increased technology, automation, and citizen engagement, government operations must evolve to become more open and transparent, embrace crowd-sourcing, and collaborate with communities while also delivering services quickly and ensuring integrity. Increasing challenges require more nimble systems that are able to quickly adapt and adjust. Revenue mechanisms to support these operations should ensure social and economic equity, encourage sustainability, and be aligned to support the first ten key areas.

Discussion: The guidelines presented are not applicable to the Proposed Project

X

4.1.2 North Shore Sustainable Communities Plan

North Shore Sustainable Communities Plan

The North Shore Sustainable Communities Plan (NSSCP) provides policies and guidelines for future development along the North Shore. The NSSCP covers an area that extends from Ka‘ena Point to Waiale‘e Gulch, with the shoreline defining the northern edge and the slopes of the Wai‘anae and Ko‘olau Mountain Ranges defining the southern edge. The NSSCP Vision Statement focuses on retaining unique qualities that define the North Shore’s attractiveness to residents and visitors alike, including coastal resources, scenic open spaces, and the community’s heritage. While the region is to remain “*country*,” a mix of housing units is desired to meet the needs of residents, in a manner consistent with rural design and principles of sustainability (DPP 2011). The project is consistent with the below objectives.

Open Space and Natural Environment

- Discourage development or activities which result in beach loss and encourage development practices or activities such as increased shoreline setbacks which result in beach preservation or enhancement.

Finding: The proposed project would be located outside of the shoreline setback area and would not adversely impact shoreline habitats or resources.

- Require buildings along the shoreline to adhere to the City’s and Federal Emergency Management Agency (FEMA) minimum building elevations and structural guidelines. In addition, adopt development standards that require new structures to incorporate building styles compatible with coastal hazards such as coastal erosion, tsunami and hurricane over wash.

Finding: The units’ foundations are designed to conform and exceed all FEMA and National Flood Insurance programs and requirements. The design ensures that the dwellings will withstand the impact and remain intact under worst-case disaster scenarios.

- Minimize soil erosion, runoff of pesticides, fertilizers and other nonpoint source contaminants into streams, wetlands, and marine habitats. In addition to stream setback, utilize erosion control devices, integrated pest management plans, and revegetation of disturbed areas. Incorporate erosion control measures and best management practices, as recommended in the State Coastal Nonpoint Pollution Control Program, to prevent pollution of wetlands, streams, estuaries, and nearshore waters.

Finding: The proposed project would employ erosion and spill control BMPs, which would be implemented during construction to avoid and minimize potential indirect impacts to streams, bays or other aquatic resources, as described in the ESCP. All disturbed soils would be replaced and stabilized, and landscaping would be installed around the proposed units to stabilize soils and prevent erosion over the long term.

- Adopt outdoor night lighting standards that encourage efforts to minimize glare and stray light and reinforce the differences between urban and rural communities.

Finding: All outdoor lights would be fully shielded so bulbs could only be seen from below, and all outdoor lights would be turned off when human activity is not occurring (or motion sensors would be installed). All permanent outdoor lighting would be shielded using a seabird-friendly light style that also protects the dark, starry skies of Hawai'i.

- Encourage the use of indigenous vegetation that is slow growing and thus minimizes the need to use herbicides for vegetation control.

Finding: Proposed landscaping would consist of native Hawaiian plants or non-invasive plants to the maximum extent possible. If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive would be substituted.

- Consider the particular historical and cultural qualities of a site and its relationship to its physical surroundings when determining the appropriate treatment for a site. Determine appropriate preservation measures, site boundaries and setbacks, and development restrictions on a site-by-site basis in consultation with the State Historic Preservation Division.

Finding: The CIA research found no historic properties on the portion of the subject property that is currently planned for agricultural development. The area has previously been cleared and graded and no extant surface historic properties are present within the planned construction area. As part of the permitting process for the current project, the project proponent initiated HRS 6E-42 historic preservation review for the project through the SHPD.

- Rural Agricultural Communities - Densities range from 1 units per 2 acres, or up to 2 units per 4 acres for agricultural home options which enhance rural character and maximize consolidated, usable open space.

Finding: Two units would be constructed on a parcel that is 7.9 acres, and both units would be located toward the makai side of the property in the poorest agricultural soils. The project would not impact any public open space resources.

- Use rural development standards to determine appropriate scale and character, smaller building footprints, greater setbacks, and more landscaping (use of hedges to create walls and grassed front yards, and rural roadways with no sidewalk, curbs, and gutters).

Finding: The proposed development is compatible with the surrounding agricultural development. The proposed units and associated landscaping would be visually consistent with the surrounding farm landscape setting. Landscaping Stock Development at the site would include native flora.

4.1.3 LAND USE ORDINANCE (CHAPTER 21)

The City and County of Honolulu Land Use Ordinance (LUO), Chapter 21 of the ROH, regulates land use and development in accordance with adopted land use policies and plans, including the city's General Plan. The provisions of the LUO are also referred to as the zoning ordinance. The project area is located within the AG-2 Agricultural zoning district, which is intended to provide areas for agricultural development, as stated in the LUO (Sec 21-3.70). The proposed project constitutes an allowed use within the AG-2 zoning district.

The project is also in compliance with the requirements set forth by Chapter 21A Flood Hazard Areas of the ROH. The structures would be above base flood elevations XS and AE.

4.1.4 SHORELINE SETBACKS (CHAPTER 23)

Chapter 23 of the ROH establishes standards and rules that apply to all shoreline areas of the city, and generally prohibits any construction or activity that may adversely affect beach processes, public access along the shoreline, or shoreline open space. ROH Sec 23-1.5 prohibits structures or activities in the shoreline area with exceptions granted for certain, minor structures or activities that do not affect shoreline processes or public access. An updated shoreline survey is being completed that will be submitted to the DLNR for certification. A revised certified shoreline survey will be submitted to DPP as soon as it is approved by the DLNR, and will be included in the Final EA. The proposed development would be located 60+ feet mauka of the shoreline area. Therefore, the project would follow shoreline setback requirements outlined under Chapter 23 of the ROH.

4.1.5 SPECIAL MANAGEMENT AREAS (CHAPTER 25)

Chapter 25 of the ROH regulates development within special management areas, including coastal zones and natural or historic wetlands. According to Sec 25-3.3, all development within the SMA is subject to review and approval by the agency and is subject to compliance with the objectives, policies, and guidelines set forth under Chapter 25 of the ROH. The project proponent requested an SMA determination from the City and County of Honolulu DPP in early 2021, and it was determined that the project would require an SMP based on the project's location within a shoreline parcel and the project's valuation in exceedance of \$500,000.00. Article 5 of the SMA regulations outlines submittal requirements for proposed developments seeking an SMP. In accordance with Sec 25-6.3, special requirements applicable to shoreline lots, all exterior lighting for the proposed housing units would be shielded to reduce potential impacts to wildlife, and all landscaping and irrigation would be contained and maintained within the property boundaries and would not extend into the shoreline area which has been added as Mitigation Measures (MM) to the *Biological Resources* section of Chapter 3.

4.2 State Regulations

4.2.1 Hawai'i Coastal Zone Management Program (HRS 205A)

The Hawai'i Coastal Zone Management (CZM) Program (HRS Chapter 205A) was promulgated in 1977 in response to the Federal Coastal Zone Management Act of 1972. Hawai'i's CZM area encompasses the entire state, including all marine waters seaward to the extent of the state's police power and management authority, including the 12-mile U.S. territorial sea and all archipelagic waters. The project is located within the SMA and requires an SMA permit. The purpose of the SMA permit is to ensure that uses, activities, and operations within the SMA are carried out in compliance with the state's CZM law (HRS 205A). SMA permits regulate permissible land uses that are already allowed by land use policies, considering zoning designations, county general plans, and community plans. Projects within the SMA are required to undergo procedural steps set forth in HRS 343 prior to applying for an SMA permit.

Hawai'i's CZM program has 10 objectives and policies. Each of these objectives and policies are listed below, along with a description of how the proposed project is consistent with each of them.

- **Recreational resources:** The proposed project is located on private land and will have no adverse effect on recreational uses or public access. The project would not result in a change

or adverse effect to recreational resources or public access to the beach and coastal resources.

- **Historic resources:** The property through CIA research did not detect any indicators that an archaeological inventory survey would be required as CIAs mainly use cultural historical research, SHPD and OHA database research and cursory surface land examination. The project area was the location of a previously cleared agricultural land. Grubbing, grading, and leveling for that activity would have destroyed any surface historic properties within the planned construction area. As aforementioned, SHPD will be further consulted with The applicant has agreed to stop work immediately in the event any historical or cultural artifacts are discovered and contact SHPD.

During that cursory surface examination, no surface historic properties were observed within or in the immediate vicinity of the Proposed Action. No intact sinkholes, sand dune deposits, or cultural material were observed within the project area, and none are believed to be present. As a result, the Proposed Action is not anticipated to adversely affect any historic properties. Furthermore, the Proposed Action would have no significant impact on historic properties as none are listed or detected.

Continued consultation with the State Historical Preservation Division (SHPD) will be necessary to determine if archaeological monitoring or other specific measures will be required. However, in that unlikely event that previously unidentified historical, archaeological, or cultural resources or human remains are encountered, work in the immediate area would cease and notification of the proper authorities, including the State Historic Preservation Division, would occur immediately according to applicable law.

- **Scenic and open space resources:** The proposed farm and associated plantings would be visually consistent with the surrounding residential landscape setting (see Appendix B – *Farm Design and Operational Plan*). The project would not impact any public open space resources. Landscaping Plant stock at the site would include native flora.
- **Coastal ecosystems:** The proposed units would be located outside the 60-foot shoreline setback area. Erosion and spill control BMPs would be implemented during construction to avoid and minimize potential indirect impacts to coastal ecosystems. All disturbed soils would be replaced and stabilized, and landscaping would be installed around the proposed units to stabilize soils and prevent erosion over the long term.

- Economic uses: The proposed housing units would provide additional residential housing and agricultural production within the community, would generate tax revenue for the City, and would create temporary jobs during construction. The houses are appropriately located within an existing AG-2 zoning designation and neighborhood.
- Coastal hazards: The units' foundations are designed to conform to and exceed all FEMA and National Flood Insurance programs and requirements. The design ensures that the dwellings will withstand the impact and remain intact under disaster scenarios. In addition, the proposed project has been designed to avoid development within sea level rise exposure areas up to 3.2 feet by 2100.
- Managing development: The proposed project represents an agricultural development within an existing AG-2 zoning designation and established agricultural neighborhood. The impacts of the proposed project have been analyzed and disclosed in this Draft EA as part of the SMA permitting process and will inform the City's management of development in the SMA.
- Public participation: In addition to the 30-day public review and comment period of the Draft EA, the project's SMA permitting process provides opportunities for public participation, including providing written notice and a presentation to appropriate neighborhood boards, providing written notice to surrounding property owners, and holding a public hearing. Twenty-four (24) agencies were contacted and approximately 1/3 responded with comments ranging from no comment to specific suggestions such as with USFW. Abutters were notified with no response. NSNB was contacted, hearing requested and held. Board members were satisfied with response given to questions. Communication can be found in Appendix I – Consultation with agencies and stakeholders.
- Beach protection: The proposed development is located outside of the shoreline setback, and there are no other forms of development proposed within the shoreline area (e.g., landscaping or seawalls). Therefore, the project would have no impact on existing beach conditions or access.
- Marine resources: The proposed units would have no impact on marine resources. Erosion control, spill prevention, and stormwater management measures would be implemented to protect off-site marine waters from being affected by the project.

4.2.2 Hawai‘i Revised Statutes, Chapter 343

The State of Hawai‘i EIS law, HRS Chapter 343, was developed “to establish a system of environmental review which will ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations” (HRS 343-1). This chapter requires the development of an EA or EIS that discloses the effects of a proposed action, including the cumulative and overall effects, relative to an established set of 13 significance criteria, as defined in 11 HAR 200-12. HRS 343 also mandates that state agencies consider the potential effects of a proposed action on cultural practices as part of the environmental review process. Act 50 of the Session Laws of Hawai‘i (*A Bill for an Act Relating to EISs*) clarifies that “*the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai‘i’s culture, and traditional and customary rights*” and stresses the need to include consideration of cultural resources, customs, practices, and beliefs as part of the EA and EIS process. As part of the project’s SMA permitting process, this Draft EA has been prepared in accordance with HRS Chapter 343, as required under ROH Chapter 25.

4.2.3 Hawai‘i Land Use Law (Hawai‘i Revised Statutes 205)

Hawai‘i Land Use Law (HRS Chapter 205) classifies the state into four land use districts: Urban, Rural, Agricultural, and Conservation. The proposed project is located in an area classified as Agricultural. Private residences used for farming purposes are permitted within the Agricultural district, and thus the project is consistent with its land use classification.

4.2.4 Hawai‘i State Planning Act

The Hawai‘i State Planning Act (HRS 226-1) was implemented in 1978, to “improve the planning process in this state, to increase the effectiveness of government and private actions, to improve coordination among different agencies and levels of government, to provide for wise use of Hawai‘i’s resources and to guide the future development of the State.” The project is consistent with the Hawai‘i State Planning Act’s objectives and policies, particularly those related to the physical environment land-based, shoreline, and marine resources; scenic, natural beauty, and historic resources; and land, air, and water quality. The project has been designed to avoid or minimize impacts to all natural resources and would not cause any long-term adverse effects to natural resources as demonstrated in this Draft EA.

4.2.5 Hawai'i State Environmental Policy (HRS Chapter 344)

The purpose of this chapter is to “*establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii.*” HRS Chapter 344 provides specific guidelines for the conservation of natural resources and enhancement of quality of life for Hawai'i's people. The project is consistent with HRS 344 guidelines for the conservation of land, water, mineral, visual, air, and other natural resources because the project has been designed to avoid or minimize impacts to all natural resources and would not cause any significant adverse effects to natural resources as demonstrated in this Draft EA. The project is also consistent with HRS 344 guidelines for the enhancement of quality of life since the project would create a new housing and agricultural use and opportunity for the farm owners that is in balance with the unique natural and social environment of Hawai'i.

4.3 Federal Regulations

4.3.1 Endangered Species Act

The Endangered Species Act (ESA) provides broad protection for plants, fish, and wildlife that have been listed as threatened or endangered in the United States or elsewhere and conserves ecosystems on which these species depend (16 United States Code 1531–1544). Section 9 of the ESA prohibits the unauthorized take of any endangered or threatened species of fish or wildlife listed under the ESA. Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect species listed as endangered or threatened, or to attempt to engage in any such conduct (50 Code of Federal Regulations [CFR] 17.3). Harm has been defined by the USFWS to mean an act that actually kills or injures wildlife and may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass has been defined to mean an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns that include but are not limited to breeding, feeding, or sheltering (50 CFR 17.3). Section 10 of the ESA contains exceptions and exemptions to Section 9 if such taking is incidental to the carrying out of an otherwise lawful activity. Due to the lack of a federal nexus, formal consultation under the

ESA is not required for the project. However, official species lists were requested from USFWS and DLNR and are included in Appendix I (*Letters and Responses*). Biological resource surveys were performed at the project area to document flora and fauna species and assess the site's potential to provide habitat for special-status species. A detailed description of the survey methods and results can be found in the biological resources memorandum (Appendix E – *Botanical and Fauna Report*). The project area is largely disturbed from previous land use and is dominated by plant species that are not native to Hawai'i. No federally or state-listed threatened, endangered, or candidate plant species or rare native Hawaiian plant species were observed in the survey area. Although there are no special-status wildlife species known to occur within the project area, potential habitat for Hawaiian hoary bat, Hawaiian monk seal, and sea turtles occurs within the project area. In Chapter 3, under *Biological Resources*, Mitigation Measures (MMs) for these species and other are discussed. In order to prevent impacts to these species during construction and introduce MMs, regular on-site construction staff would be trained to identify special-status fauna with the potential to occur on-site and would know the appropriate measures to be taken if they are present. A Biological Monitor may be needed if the staff cannot be sufficiently trained. WHALE Environmental Services LLC staff contains certified wetlands and wildlife biologist and soil scientists and are certified erosion control and stormwater mitigation experts. No long-term impacts to wildlife species are anticipated to result from the proposed development since they would be located within previously disturbed habitats and would have no effect on the long-term health and function of adjacent coastal or riparian habitats where most wildlife species are expected to occur. Therefore, with the consideration of BMPs and species-specific measures that would be implemented during construction, the project is not anticipated to have any adverse effects on special-status species.

4.1.2 Migratory Bird Treaty Act

The MBTA prohibits the take of migratory birds. A list of birds protected under MBTA regulations is provided in 50 CFR 10.13. Unless permitted by regulations, under the MBTA it is unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess, offer to, or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product. The USFWS does not currently have a comprehensive program under the MBTA to permit the take of migratory birds by otherwise lawful activities. On December 22, 2017, the U.S. Department of the Interior, Office of the Solicitor issued a memorandum opinion concluding that the MBTA does not prohibit incidental take of migratory birds.

Conservation measures that avoid or minimize impacts to listed species would be incorporated into the project's plans and specifications. No MBTA-protected bird species were observed in the project area during biological resource surveys (see Appendix E). However, given the property's proximity to shoreline, estuarine, and riparian habitats, there is potential for migratory birds to be present on-site or transit the area. Implementation of the MBTA-related guidelines is expected to avoid all direct impacts to birds protected by the MBTA which are the same guidelines as provided by the USFW and can be found as MMs in Chapter 3 under *Biological Resources* for crucial species in need of protection.

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Five

ALTERNATIVES

5. Review of Alternatives including the Proposed Action

The project site and its project action zone are a current vacant lot with a mostly dominant tree and shrub canopy with a grassed underlay. The site's botanical and faunal characteristics are fully described in Appendix E to the DEA – *Botanical and Faunal Report*. The site is composed mainly of artificial fill soils as in the 1960s, workers from the Dillingham Ranch across the street, removed the sands of the site for transport to Waikiki Beach replenishment plans, and replace the excavations with extracted artificial materials from the quarry development operations at the nearby airfield and the sugar mill rail line developed – composed mainly of waste rocks and cobbles. As well, invasive ironwood was planted as a windbreak to the farm. Culturally, it appears from research and contacts that the site was not used for farming, but the shoreline used to be used pre-contact for fishing. The proposed action zone does not affect the shoreline. Other details on the site may be found in Appendix F of the DEA – the *Environmental Site Assessment* which includes a Hazardous Materials Investigation, Database, Historical Aerial Imagery, and other information.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The applicant (Pueo Farm) intended to construct an Agricultural Operations development with related agricultural operations structure. A detail description of the proposed action may be found in Appendix B of this DEA – *Farm Design and Operational Plan* which further details the required components and layout.

A: Physical Setting

The proposed site is located in Waialua on the north side of Oahu. The Proposed Action will be located on approximately 7.9 acres that is denoted by TMK Parcel (1) 6-8-033:045 and is identified as Proposed Action Site.

Project Site

The Proposed Action will be located on a vacant, approximately 7.9-acre site that is dominant by invasive species vegetation and a barren landscape. The proposed site is classified as Jaucas mineral sands but in actuality is Artificial Fill Soils mixed with Mokuleia clay silty loams. There is a fine layer of vegetative-derived detritus that forms a small ½ inch to 1 inch silt layer above the soils in some locations. As well, some areas of the uplands are vegetated with low grasses, particularly invasive guinea grass, and the tree

canopy portion is dominated by ironwood, monkey pod, and shower trees along with the guinea grass – the latter being the major invasive species.

Project Site Access

There is an existing parking area and access from Farrington Highway used to access the site. The entrance and perimeter fencing has been SMA Minor approved. There is no beach access path on this property.

B. Mitigation Measures

There are three proposed mitigation measures planned. First is the BMPs (Best Management Practices) proposed to mitigate construction activity. These are outlined in Appendix G of the DEA – *Erosion and Sedimentation Control Plan*. These are designed to minimize construction impact such as dust control, runoff, equipment storage and use, etc.... Second is the operation mitigation of farm activities. The Farm Design and Operational Plan in Appendix B outlines things like crop rotation, organic practices, harvesting techniques, processing impacts, etc...

Last is land use alteration. Removal of fire-prone undesired invasive species and irrigation provision lowers fire dangers. Agricultural crop placement minimizes soil erosion, runoff infiltration, removal of acid soil generating ironwood needles to return the land to a desirable pH balance and brings ecological diversity to the site.

Alternatives

An EA must consider alternatives to the Proposed Action in accordance with Chapter 343, HRS. However, detailed analysis is only required for those alternatives determined to be reasonable.

Reasonable alternatives are alternatives that could attain the purpose and need of the Proposed Action, regardless of cost. This EA identifies and evaluates the environmental impacts of alternative uses on the 7.9-acre property (Alternatives 1-3) capable of attaining the purpose and need of the Proposed Action.

Alternatives

A DEA must consider alternatives to the Proposed Action in accordance with Chapter 343, HRS. However, detailed analysis is only required for those alternatives determined to be reasonable.

Reasonable alternatives are alternatives that could attain the purpose and need of the Proposed Action, regardless of cost. This EA identifies and evaluates the environmental impacts of alternative uses on the 7.9-acre property capable of attaining the purpose and need of the Proposed Action.

5.1 Alternative 1 – (Proposed Action)

5.1.1 Technical Characteristics

Well-developed agricultural operations with associated farm structures including agricultural operational center. The project would consist of two housing units - a main house of living room, kitchen, lanai, six bedrooms, two master bathrooms and three half baths of an unit of floor area of 3500 SF totaling 4994 SF of the lot. The second housing unit – the guest house consists of dining pavilion, pool, spa, pool deck, pool ½ bath, lanai, three bedrooms and three baths totaling 2417 SF floor area totaling 4949 SF of lot area. The two-story barn will contain a garage and equipment storage on its base floor, as well as an bedroom and bath, living room and wet bar and lanai. The barn's southern roof will be PV lined for solar electricity production. As well, the site has both Board of Water Supply water provision intended for the dwellings, and an approved well on the Farrington Highway side of the site for irrigation purposes.

5.2 Alternatives Considered but Dismissed

Other Alternatives of previous designs and layout for farm development were considered but dismissed to avoid site security risks, no reduction of impact to resources, or lack of viability for crop production. Consideration was given to:

- A reduced operational plan reserving only 50% of lot area for crop production, with agricultural operational center (barn) and farm dwellings. This lessens revenue for the operation, does not introduce crop diversity to protect investment or not change site impact from the proposed development

- A limited agricultural operation with low maintenance species grown without the agricultural operational center (barn) folded into farm dwellings. This design limits housing use of the property diminishes crop security, and limit productivity of harvests.

5.3 No Action Alternative

The No-Action Alternative where the proposed project would not be constructed and there would be no allowed development (agriculture) in the SMA area. Therefore, Pueo Farm would not benefit from use of the property for agricultural operations and security of agricultural operations oversight.

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Six

**ANTICIPATED DETERMINATION
OF FONSI**

The proposed project involves the construction and operation of an agricultural operation with related farm structures and dwellings. Potential impacts of the proposed improvements have been evaluated in accordance with the significance criteria of §11-200.1- 13 of the Administrative Rules. Discussion of the project's conformance to the criteria is presented as follows:

6. A FONSI is anticipated for this project, based on the following analysis:

(1) *Irrevocably commit a natural, cultural, or historic resource;*

No irrevocable commitment to loss or destruction of any natural or cultural resource would result. The project is not expected to irrevocably commit to the loss or destruction of any natural or cultural resources. The project area has been previously disturbed, and the proposed units have been designed to avoid sensitive and protected resource areas. BMPs would be implemented during construction to further avoid or minimize potential construction impacts to natural or cultural resources. In the event of unexpected discovery of historic or archaeological resources, the SHPD will be immediately notified for appropriate response and action.

(2) *Curtail the range of beneficial uses of the environment;*

The Proposed Action would not curtail the range of beneficial uses of the environment. The project is not expected to curtail the range of beneficial uses of the environment.

(3) *Conflict with the State's environmental policies or long-term environmental goals established by law;*

The State's environmental policies enumerated in Chapter 344, HRS promote conservation of natural resources, and an enhanced quality of life for all citizens. The Proposed Project does not conflict with the State's long-term environmental policies, goals, or guidelines as expressed in Chapter 344, HRS, and will not significantly impact natural resources due to the fact that the Project Site is already disturbed and has been subject to human utilization since the project area was developed for current agricultural uses. The project would be in conformance with the State's long-term environmental policies and goals expressed under HRS 344.

(4) *Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State;*

In the short term, construction expenditures will provide positive benefits to the local economy. This would include creation of some construction and construction support jobs, and the purchase of materials from local suppliers, as well as indirect benefits to local retail businesses resulting from construction activities, but not at a level that would generate any significant population expansion. The Proposed Action would not substantially affect the economic or social welfare of the community or State. The project is not anticipated to cause substantial, adverse effects to the economic or social welfare of the community or State. The project would increase tax revenue for the City and will create temporary jobs during construction.

(5) Have a substantial adverse effect on public health;

The Proposed Action would not affect public health. The project is not anticipated to affect public health. No identifiable adverse short- or long-term impacts on public health are anticipated to result from the construction and operation of the Proposed Project. Typical short-term construction-related impacts (e.g., noise and air quality) are anticipated, however, they will be temporary in nature and will comply with Federal, State, and County regulations.

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities;

No substantial secondary impacts, such as population changes or effects on public facilities, are expected. The project is not expected to result in substantial secondary impacts to population or public facilities. Substantial impacts to public facilities are not anticipated to result from the construction and operation of the Proposed Project. Moreover, the Proposed Project is not anticipated to induce population growth in the area or region. Existing public water and utility infrastructure have served the area for many years and are expected to have sufficient capacity to serve project demands. Agencies with jurisdiction over their respective infrastructure systems will be consulted as the Proposed Project proceeds to assure that it can be accommodated.

(7) Involve a substantial degradation of environmental quality;

No substantial degradation of environmental quality is expected due to the Proposed Action. The project is not anticipated to cause substantial degradation of environmental quality. The Proposed Project is not anticipated to substantially degrade environmental quality. Long-term impacts to air and water quality, noise levels and natural resources will

be minimal. Typical short-term construction-related impacts (e.g., noise and air quality) are anticipated, but will be temporary and will comply with State and County regulations.

(8) Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions;

No cumulative effect on the environment or commitment to larger actions would be involved. The project is not anticipated to have adverse cumulative environmental effects and it is not linked to any larger action. The Proposed Project will not have any substantial negative secondary impacts on the environment. Implementation of the Proposed Project will not commit the applicant to any other larger actions and will not generate any additional actions that could have a cumulative effect on the environment.

(9) Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat;

No rare, threatened and/or endangered flora or fauna species are known to inhabit the project area. However, it was acknowledged by the State Department of Land and Natural Resources – Division of Forestry and Wildlife (DLNR-DOFAW) that the State listed Hawaiian Hoary Bat or ‘Ōpe‘ape‘a (*Lasiurus cinereus semotus*) could potentially occur in the vicinity of the project area and may roost in nearby trees, the State threatened White Tern (*Gygis alba*) or Manu o Kū is known to nest in the vicinity of the Proposed Project, State-listed waterbirds such as the Hawaiian Duck (*Anas wyvilliana*), Hawaiian Stilt (*Himantopus mexicanus knudseni*), Hawaiian Coot (*Fulica alai*), and Hawaiian Common Gallinule (*Gallinula chloropus sandvicensis*) could potentially occur in the vicinity of the Proposed Project. No adverse impacts resulting from the project are anticipated. However, measures to prevent adverse effects to protected species include the following:

- Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should be avoided for any construction because bat mortalities have been documented as a result of becoming ensnared by this type of fencing during flight.
- During construction activities, all nighttime lighting will be shielded and angled downward to reduce glare and disruption of bird flight. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15. This is the period when young seabirds take their maiden voyage to

the open sea. Following construction, permanent light sources will be shielded and angled downward to eliminate glare that could disturb or disorient birds in flight.

- If tree trimming or removal is planned, DLNR-DOFAW strongly recommends a qualified biologist survey for the presence of Hawaiian Sea Birds prior to any action that could disturb the trees.
- If any of the State-listed waterbirds are present during construction activities, then all activities within 100 feet (30 meters) should cease, and the bird should not be approached. Work may continue after the bird leaves the area of its own accord.

No rare, threatened, or endangered species or their habitats would be adversely affected. Although no special-status species are known to occur within the project area, potential habitat for Hawaiian hoary bat, Hawaiian monk seal, and sea turtles – as well as Hawaiian Sea Birds and Migratory Birds such as the Pacific Golden Plover occurs within or near the project area. In order to prevent impacts to these species during construction, regular on-site staff would be trained to identify special-status fauna with the potential to occur on-site and would know the appropriate measures to be taken if they are present or use other MMs identified in Chapter 3 under Biological Resources. Long-term impacts are not anticipated. Therefore, it is not anticipated that the project would adversely impact any rare, threatened, or endangered species or their habitats.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels;

The Proposed Action would not detrimentally affect air or water quality, or ambient noise levels. The project is not anticipated to adversely affect air or water quality or ambient noise levels. Construction of the project would temporarily increase air emissions and noise levels within the immediate project area but would be minimized through BMPs. Erosion and spill control BMPs would be implemented during construction to avoid and minimize potential indirect impacts to streams or water resources. Compliance with all state and local regulations would be followed to ensure that the impacts are less than significant.

No long-term significant impacts to air quality, water quality, or noise levels within the Project Site are anticipated as a result of the construction and operation of the Proposed Project. Land disturbing activities include demolition, foundation work, and potential utility upgrades. Construction and operation of the farm will be performed in accordance with Federal, State and County regulations, thereby minimizing potential impacts to air and water quality. In the short-term, noise from construction activities will be unavoidable. The increase in noise level will vary according to the particular phase of construction. Noise may

also increase as a result of operating power equipment during the construction period. Construction noise impacts will be mitigated by compliance with provisions of the State DOH Administrative Rules, Title 11, Chapter 46, “Community Noise Control” regulations. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels stated in the DOH Administrative Rules. It shall be the contractor’s responsibility to minimize noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits. In the long-term, no significant noise impacts are anticipated once the construction of the Proposed Project has been completed. Since the Proposed Project is not expected to significantly increase roadway capacity or travel demand, ambient noise levels in the vicinity attributable to the Proposed Project should not change significantly.

(11) Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The Proposed Action would not detrimentally affect environmentally sensitive areas such as floodplains, tsunami zones, beaches, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters, or coastal waters. The project has been designed to avoid impacts to, and development within, environmentally sensitive areas including coastal hazard areas, coastal shorelines and setbacks, waters features, and riparian buffers, and the units would be above the base flood elevations XS and AE. BMPs would be implemented to minimize potential erosion due to construction activities.

In the short- and long-term, no significant impacts on flood hazards on the Proposed Project are anticipated as the proposed improvements are not anticipated to increase flood risks or cause any adverse flood-related impacts at the project area. The Proposed Project will be designed and constructed to applicable flood zone requirements.

(12) Have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in county or state plans or studies;

The Proposed Action would not substantially affect scenic vistas and view planes identified in county or state plans or studies. The project would not adversely impact scenic vistas and view planes. The proposed farm and associated landscaping and structures would be visually consistent with the surrounding residential landscape setting. Moreover, the Proposed Project is not expected to adversely affect scenic and visual resources in the project area. The

Proposed Project will not degrade lateral coastal views or mauka-makai views from areas in the vicinity of the site. The vertical components of the Proposed Project will be consistent with the visual character of the surrounding uses in terms of height and character as well as surrounding community.

(13) Require substantial energy consumption or emit substantial greenhouse gases.

There would be no requirement for substantial energy consumption. The project would not require substantial energy consumption. The proposed farm development would increase energy consumption within the overall community by small amount but is expected to be off-set by use of PV panels. The Proposed Project will not require substantial energy consumption nor produce substantial GHG emissions. Additionally, it is anticipated that the Proposed Project will implement energy efficient fixtures as feasible to reduce overall energy consumption and develop significant CO emissions removal.

6.1 Anticipated Determination

Based on a review of the significance criteria in HRS Chapter 343, and HAR Section 11-200.1- 13, it is anticipated that the project would not result in significant adverse effects on the natural or human environment.

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Seven

CONSULTATION

7. CONSULTATION

7.1 Pre-Assessment Consultation

Below are the following agencies and organizations were consulted during the preparation of the Draft EA. Consultation was conducted to solicit comments regarding potential concerns and requirements pursuant to refining the scope of EA documentation. All written comments are reproduced in Appendix I.

The agencies and organizations listed in Table below received electronic copies of the Draft EA as part of the Chapter 25, ROH & HRS 343 review process during the DPP pre-consultation review, and before the Neighborhood Public Hearing.

**Table - List of Agencies and Organizations
Receiving the Pre-Consult Documents for formulating aDraft Environmental Assessment**

FEDERAL AGENCIES
United States Army Corps of Engineers Pacific Ocean Division, Building 230 Fort Shafter, Hawaii 96858-5440
United States Department of the Interior Fish and Wildlife Service Pacific Islands Fish and Wildlife Office 300 Ala Moana Blvd., Room 3-122, Box 50088 Honolulu, Hawaii 96813
United States Department of Agriculture Natural Resources Conservation Service Hawaii State Office 300 Ala Moana Blvd. Room 4-118 Honolulu, HI 96850-4118

STATE AGENCIES
State of Hawaii Department of Agriculture Office of the Chairperson 428 S. King Street Honolulu, Hawaii 96814
State of Hawaii Department of Accounting and General Services Kalanimoku Building 1151 Punchbowl Street Honolulu, HI 96813
State of Hawaii Department of Business, Economic Development and Tourism

STATE AGENCIES
Office of Planning P.O. Box 2359 Honolulu, Hawaii 96804
Hawaii Dept. of Health Environmental Management Division 2827 Waimano Home Road Rm 222 Pearl City, Hawaii 96782
State of Hawaii Department of Defense 3949 Diamond Head Road Honolulu, HI 96816-4495
State of Hawaii Department of Education 1390 Miller Street Honolulu, Hawaii 96813
State of Hawaii Department of Hawaiian Home Lands 91-5420 Kapolei Pkwy Kapolei, HI 96707
State of Hawaii Department of Health Environmental Planning Office 1177 Alakea Street., Room 402 Honolulu, HI 96813
State of Hawaii Department of Labor and Industrial Relations 830 Punchbowl Street Honolulu, HI 96813
State of Hawaii Department of Land and Natural Resources Historic Preservation Division (via – HICRES) Kakuhihewa Building 601 Kamokila Blvd., Room 555 Kapolei, HI 96707
State of Hawaii Department of Land and Natural Resources Land Division 1151 Punchbowl St, Room 220 Honolulu, Hawaii 96813
Office of Hawaiian Affairs 560 Nimitz Highway Honolulu, Hawaii 96817
Office of Conservation and Coastal Lands Kalanimoku Building, 1151 Punchbowl St. Rm 131 Honolulu HI 96813

COUNTY AGENCIES
Board of Water Supply 630 S. Beretania Street Honolulu, HI 96843
Department of Community Services 715 South King Street, Suite 311 Honolulu, HI 96813

CHAPTER SEVEN– CONSULTATION

Department of Design and Construction 650 S. King Street, 11th Floor Honolulu, HI 96813
Department of Environmental Management 1000 Uluohia Street, Suite 308 Kapolei, HI 96707
Department of Transportation Services 650 S. King Street, 3rd Floor Honolulu, HI 96813
C&C of Honolulu, Police Dept. 801 S. Beretania Street Honolulu HI 96813
County of Oahu – Fire Department Administrator – Dept of Fire and Public Safety 636 South Street Honolulu. HI 96813
City and County of Honolulu Department of Planning and Permitting Land Use Permits Division 650 South King Street, 7 th floor Honolulu, HI 96713

ADJACENT AND NEARBY PROPERTIES
Abutters North Shore Neighborhood Board

PUEO FARM - Agricultural Operations and Farm Structures Construction

Chapter Eight

PREPARERS

CHAPTER 8 - LIST OF PREPARERS

This report was prepared for Pueco Farm/Landmark Builders - Agent by WHALE Environmental Services LLC. Members of the WHALE professional staff are listed below.

Project Management

- Mark Howland/Bonnie Howland

Quality Assurance

- Mark Howland/Kri Brook

Technical Analysts

- Mark Howland, Caitlin Coska

Graphic Design

- Mark Howland/Gabe Blossom



APPENDIX A

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

LOCUS MAP



Conservation Plan

for

Pueo Farm
Paul Alston

**Prepared in cooperation with the
O‘AHU RESOURCE CONSERVATION AND DEVELOPMENT COUNCIL**



September 2020

Cooperator Information:

Property Name & Operator: Pueo Farm / Paul Alston
Mailing Address: 2120 Puualii Place
Honolulu, HI 96822
Phone: 808-722-6000
Email: paul.alston@dentons.com

Site Description:

Location of Property: 68-431 Farrington Hwy, Mokuleia
Tax Map Key #(s): 6-8-003-045
Size of Property: 7.9 acres
Type of Operation: Landscaping plant nursery
Annual Precipitation: ~32 inches (Online Rainfall Atlas of Hawai'i)
Elevation: 0-10 feet
Zoning: AG-2
Flooding: 0.2% Annual chance flood hazard
Soils: JaC: Jaucas sand, 0-15% slope
Mt: Mokuleia clay loam, 0-2%

Soil Type Summary:

Soil Series: Jaucas

Description: Carbonatic, isohyperthermic Typic Ustipsamments

Soil Order: Entisol

Water: Low water holding capacity. Extremely fast permeability. Due to nearby ocean and brackish water sources, this soil is often rich in salts, which are often detrimental to plant growth.

Fertility: Infertile. Low nutrient holding capacity. However, with good nutrient management and irrigation, it can be very productive.

Acidity: Near neutral to alkaline (pH = 6.6 - 8.4), and rich in calcium carbonate. Micronutrients (boron, copper, iron, manganese, zinc) and phosphorus can be deficient when pH rises above 8. Additions of organic matter can increase nutrient availability.

Phosphorus: Low phosphorus reactivity. Phosphorus readily available to plants, but it can bind to calcium and become plant unavailable when pH rises above 8.

Structure: Weak physical structure. Unsuitable for engineering and construction.

Soil Series: Mokuleia

Description: Clayey over sandy or sandy-skeletal, mixed, active, isohyperthermic Entic Haplustolls

Soil Order: Mollisol

Water: Moderate water holding capacity. Moderate permeability at the surface clay layer, and fast permeability at subsurface sand layer. Dry conditions in some areas require irrigation.

Fertility: Fertile. Well-supplied in calcium, magnesium, and potassium.

Acidity: Near neutral to slightly alkaline (pH = 6.6 - 7.3), thus liming is not necessary. Acidity expected to increase if have history of plantation agriculture (i.e. sugarcane, pineapple). May require liming when intensively farmed.

Phosphorus: Moderate phosphorus reactivity. "Fixes" some phosphorus, making some added phosphorus initially unavailable to plants. Requires moderate phosphorus additions to compensate.

Structure: Moderate physical structure provides moderate soil tilth and stable conditions for engineering and cultivation. Coral sand reached at 12 to 24 inch depth may limit farming and engineering activities.

Note: *For site-specific details of soil fertility and soil health, annual soil testing is recommended to track changes in soil condition and assist in nutrient management planning for water quality protection.*

Purpose

The conservation plan is designed to document and address the resource concerns involving soil, water, plants, animals and air found on the property. The plan will aid the client in achieving sound use and management of the resources to prevent resource degradation and assure their sustained and productive use in the future.

What is a conservation plan?

A conservation plan is a tool that assists land managers, usually farmers and ranchers (the Cooperator), to protect and enhance natural resources found on their property such as soil, water, air, wildlife, etc. These plans are flexible, working blueprints for an area of land that can be adapted or revised to meet evolving land management goals. It is recommended to update a conservation plan every five years. These plans are created in partnership with a Conservation Planner in a process including site visits, photographs, technical notes, and conversations with the Cooperator(s) to develop a plan that works within their objectives to address existing natural resource concerns.

Resource Concerns

Natural resource concerns are environmental occurrences or trends that impact soil and water quality and/or the operating objectives for the property. These concerns are identified by the Cooperator in conjunction with a Conservation Planner and are addressed through the implementation of best management practices (BMPs) that enhance or mitigate. Examples include erosion by wind or water and maintaining/enhancing soil quality. The land at Pueo Farm has been fallow and will transition into use as a landscape plant nursery. Resource concerns identified include:

1. *Soil erosion*: Erosion of exposed soil
2. *Soil quality degradation*: Compaction due to previous land use
3. *Invasive species*: Overgrowth of invasive trees and understory

Cooperator Objectives

Pueo Farm intends improve soil health and cultivate soil for agricultural production. With this plan, the operator intends to:

1. Minimize soil erosion
2. Improve soil health
3. Manage invasive species

Vegetative clearing to prepare the land for cultivation and conservation practices may be needed. All land and vegetative clearing activities must be conducted in a way that minimizes movement of soil.

Extensive grading is not permitted with this Conservation Plan.

Conservation practices / activities that address resource concerns:

- 1. Access road (560).** A travel-way for equipment and vehicles constructed as an established route.
- 2. Conservation cover (327).** Establishing and maintaining permanent vegetative cover
- 3. Fence (382).** A constructed barrier to animals or people.
- 4. Irrigation pipeline (430).** A pipeline and appurtenances installed to convey water for storage or application, as part of an irrigation water system.
- 5. Irrigation reservoir (436).** An irrigation water storage structure made by constructing a dam, embankment, pit, or tank.
- 6. Irrigation system, micro-irrigation (441).** An irrigation system for frequent application of small quantities of water on or below the soil surface: as drops, tiny streams or miniature spray through emitters or applicators placed along a water delivery line.
- 7. Land smoothing (466).** Land smoothing is removing irregularities on the land surface.
- 8. Mulching (484).** Applying plant residues or other suitable materials produced off site, to the land surface.
- 9. Tree/shrub establishment (612).** Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.
- 10. Tree/shrub site preparation (490).** Treatment of areas to improve site conditions for establishing trees and/or shrubs.

Schedule of Conservation Practice Implementation

Operator: Pueo Farm / Paul Alston
Tax Map Key #: 6-8-003-045

Plan Overview: This parcel is currently not in cultivation and will be prepared to operate as a plant nursery and orchard. Once water supply is established, the invasive vegetation will be removed and the replaced with nursery plant field stock and ground cover.

Access Road

The access road provides a fixed route for vehicular travel which can reduce the risk of soil erosion from vehicular activity, facilitate the control and disposal of surface and subsurface water, and limit areas of soil compaction. The operator shall inspect culverts, roadside ditches, water bars, and outlets after each major runoff event and restore flow capacity as needed. Maintenance of the road may include filling low areas in the travel treads or replacing surfacing materials as needed.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Access Road (560)	An access road is an established route for equipment and vehicles.	Through parcel running north-south	0.25 miles	2020	

Conservation Cover

In the northern portion of the parcel, a conservation cover will be established and maintained. The cooperorator would like to use native species where possible. A conservation cover can reduce erosion, improve soil health and ecosystem services, as well as reduce ground and surface water quality degradation. For greatest benefit, it is recommended to select a mix of plant species that provide year round habitat and food for natural enemies of crop pests. For continual maintenance, the operator may re-vegetate bare spots and control noxious weeds or invasive species. Spraying or other control of noxious weeds shall be done on a "spot" basis to protect forbs and legumes that benefit native pollinators and other wildlife and bare areas shall be re-vegetated when possible.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Conservation Cover (327)	Establishing and maintaining permanent vegetative cover.	Northern portion of parcel	1.64 acres	2021	

Fence

This practice facilitates the accomplishment of conservation objectives by providing a means to control movement of animals and people. Operator shall conduct regular inspection of fences to ensure continuing proper function of the fence. Maintenance of this practice may include repairing and/or replacing loose or broken material, gates and other forms of ingress/egress, repair of eroded areas as necessary and repair and/or replacement of markers or other safety and control features as required.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Fence (382)	A constructed barrier to animals or people.	Around parcel perimeter	0.74 miles	2020	

Irrigation Pipeline

The operator will install a pipeline to connect the well to the irrigation reservoir, and along perimeter to carry water across the property to be used for micro-irrigation. This standard applies to water conveyance and distribution pipelines installed above or below ground. Buried pipe shall be installed at sufficient depth below the ground surface to provide protection from hazards imposed by traffic loads, farming operations, freezing temperatures, or soil cracking, as applicable. Pipelines shall be designed to meet all service requirements such that internal pressure at any point is less than the pressure rating of the pipe. The operator shall adhere to installation and maintenance standards and monitor the system for any flaws or necessary repairs.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Irrigation pipeline (430)	A pipeline and appurtenances installed to convey water for storage or application, as part of an irrigation water system.	Along parcel perimeter	0.47 miles	2020	

Irrigation Reservoir

The cooperators plans to construct one reservoir with approximately 50,000 gallons in holding capacity *requiring an engineer for proper design and installation**. This practice may be applied to store water to provide reliable irrigation, improve water use efficiency, provide storage for tailwater recovery and reuse, provide runoff retention time, reduce energy use, or develop renewable energy systems. Storage reservoirs shall be planned and located to serve as an integral part of an irrigation system. Structure type selection shall be based on a site specific assessment and follow all applicable permitting regulations. The operator shall periodically clean the storage facility, inspect and repair as needed, follow routine maintenance of mechanical components, and periodically inspect or test all pipelines and pumping plant components as needed.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Irrigation reservoir (436)	An irrigation water storage structure made by constructing a dam, embankment, pit, or tank.	Middle of parcel	0.09 acre-ft	2020	

***This conservation plan does not address nor satisfy engineering design considerations. The cooperator must work with an engineer to properly site, design, and install the reservoir.**

Irrigation System, Micro-irrigation

The micro-irrigation system implementation assists in efficient and uniform irrigation water application, supporting soil moisture and plant growth, conserving water, and preventing ground and surface water contamination. The irrigation water supply shall be tested and assessed for physical, chemical and biological constituents to determine suitability and treatment requirements for use in a micro-irrigation system. Operator will maintain the system to ensure that it functions properly, including periodic inspections and identifying components of the system that will likely need replacing on a more frequent basis.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Irrigation system, micro-irrigation (441)	An irrigation system for frequent application of small quantities of water on or below the soil surface: as drops, tiny streams or miniature spray through emitters or applicators placed along a water delivery line.	Southern half of parcel	4.8 acres	2021	

Land Smoothing

After brush removal, the parcel intended for operation will be smoothed to prepare for planting. This practice removes irregularities on the land surface to improve surface drainage, provide uniform cultivation, and improve equipment operation and efficiency. It is recommended to consider the effects on water quality and soil loss due to increased erosion potential and plans should be made accordingly to protect soil and water resources. The operator shall insure that surface irregularities are maintained at the degree required and inspected annually as well as after significant rain events.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Land smoothing (466)	Land smoothing is removing irregularities on the land surface.	Southern half of parcel	4.8 acres	2021	

Mulching

The operator intends to implement hydro-mulching to establish ground cover around trees and field stock plants after land smoothing. Mulch will also be applied intermittently around plant growth. Mulching has beneficial purposes including soil moisture conservation, erosion control, and improving soil health. The operator should avoid applying thick or tightly packed mulch or materials with high water holding capacity which may limit the water available to plants. It is recommended to select mulch materials, thickness, and rates of application that do not contribute to pest problems, and test for potential well-known pests regularly. The operator shall monitor and control undesirable weeds in the mulched areas and evaluate the effectiveness, adjusting accordingly.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Mulching (484)	Applying plant residues or other suitable materials produced off site, moved and placed onto the land surface.	Southern half of parcel	4.8 acres	Intermittently 2021-2025	

Tree/shrub Establishment

Long-term orchard trees will be established, as well as nursery field stock trees and shrubs. This practice is intended to improve the plant community, sequester carbon, control erosion, create habitat, and improve water and soil quality and applies to any site capable of growing woody plants. Tree establishment should plan for appropriate planting dates and handling methods with planned post-planting maintenance to increase rates of survival. The operator shall protect plantings from adverse impacts and maintain any necessary mulching or supplemental water supply during routine inspection.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Tree/shrub Establishment (612)	Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.	Southern half of parcel	4.8 acres	2021	

Tree/shrub Site Preparation

Tree/shrub preparation is useful for areas designated for future tree plantings and encourages natural regeneration of desired woody plants. Treatment may include identifying undesired species and methods of removal while protecting water quality and desired vegetation. The operator shall maintain erosion control and control invasive plants as needed while also controlling access of equipment to reduce soil compaction in the area after preparation.

Practice Code	Description	Location	Quantity (~)	Planned Date	Installation Date
Tree/shrub site preparation (490)	Treatment of areas to improve site conditions for establishing trees and/or shrubs.	Southern half of parcel	4.8 acres	2021	

Additional Notes:

Stockpiling

This operation may utilize stockpiling for use in implementation/maintenance of access roads and/or utilizing mulch/green waste on property. Proper storage and handling of stockpiled materials will minimize risks to nearby water resources and preserve the quality of stockpiled materials.

To minimize runoff and potential pollution from stockpiled materials, it is recommended to:

- Limit stockpiles to a height of no greater than 15 feet
- Locate stockpiles away from waterways
- Use a tarp or fast growing vegetation to cover stockpiles
- Place erosion socks or silt fencing around the perimeter of stockpiles

It is recommended to consult the City and County of Honolulu Storm Water Best Management Practice Manual for additional recommendations.

Special Management Area

The property is within an area designated as Special Management Area under the Coastal Zone Management Law. Agricultural land use and activities may be exempt from permitting if they do not otherwise have a significant impact in the area. The Cooperator is responsible for any documentation of exemptions as any intended uses, activities, or operations may be considered as 'development' within the SMA regulatory system and shall require the operator to obtain a permit.

Threatened and Endangered Species

The nearest occurrence of critical habitat for threatened and/or endangered species is 2.5 miles away from the property.

Cultural Resources

The practices in this plan should not exceed the extent and depth of previous operations and therefore should not have an effect on archeological resources. In addition, conservation practices proposed for the Jaucas sands areas on the property entail minimal soil disturbance to reduce potential for cultural resource disturbance. However, in the event any artifacts or human remains are uncovered during agricultural operations, the operator shall immediately suspend work and notify the Honolulu Police Department, the State Department of Land and Natural Resources-Historic Preservation Division (692-8015), and the Civil Engineering Branch, Department of Planning and Permitting (523-4881).

Proposed Buildings

The operator intends to construct a barn to support agricultural operations and will use an engineering foundation design and material. The operator is responsible for obtaining any permits associated with the site preparation and construction of the barn. Additionally, the operator intends to construct a residence in the northern-most portion of the property. Design, permitting, and construction of residential buildings is outside the scope of this plan.

Conservation Practices to Consider for the Future:

Cover crop: Crops including grasses, legumes, and forbs for seasonal cover and other conservation purposes.

- This practice could be utilized on all operation fields as a ground cover to improve soil health and organic matter over time.

Restoration and management of rare or declining habitats: Restoring, conserving, and managing unique or diminishing native terrestrial and aquatic ecosystems.

- This practice could be considered to encourage habitat for the native short-eared owl (pueo). If individuals/populations are observed, it is recommended to establish some grassland features on the parcel for nesting, and preserve existing trees for roosting.

Windbreak/shelterbelt establishment: Windbreaks or shelterbelts are single or multiple rows of trees or shrubs in linear configurations.

- This practice could be implemented along prevailing wind direction(s) to help reduce potential soil erosion and evaporation of irrigated water.

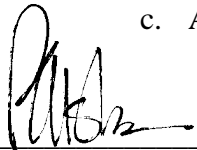
Note for future: Conservation Plan should be amended when Cooperator aims to install different practices than listed in the Schedule of Practices above and/or five (5) years after Conservation Plan approval.

This plan consists of general guidelines which were developed from Natural Resources Conservation Service conservation planning directives, standards, and specifications. These can be accessed at: <http://efotg.sc.egov.usda.gov>. Oahu RC&D has provided these recommendations in good faith based on information provided by the Cooperator and field observations made during one or more site visits.

It is the managerial and financial responsibility of the Cooperator to decide to accept and implement the recommended conservation practices. To ensure compliance with NRCS standards, guidance from a qualified engineer is recommended for the installation of structural practices, e.g., diversions, waterways and sediment basins. Oahu RC&D is not responsible for implementation and/or enforcing compliance with local ordinances of conservation practice installation and maintenance.

COOPERATOR CERTIFICATION

- I. Cooperator has been fully involved in the planning process and agrees to the practices listed in this plan.
- II. Cooperator will implement the practices listed in the plan and accepts the responsibilities of
 - a. Ensuring the practices meet or exceed current NRCS specifications,
 - b. Complying with applicable federal, state, or county regulations and policies, and
 - c. Acquiring any additional permit or approval that may be required before implementing a practice.



Paul Alston
Pueo Farm

9/17/2020

Date

O'AHU RESOURCE CONSERVATION AND DEVELOPMENT COUNCIL



Hannah Hubanks, Conservation Planner

9/18/20

Date




Jean Brokish, Technical Service Provider

9/16/2020

Date

WEST O'AHU SOIL AND WATER CONSERVATION DISTRICT



Signature

Alan Gottlieb

September 29, 2020

Date

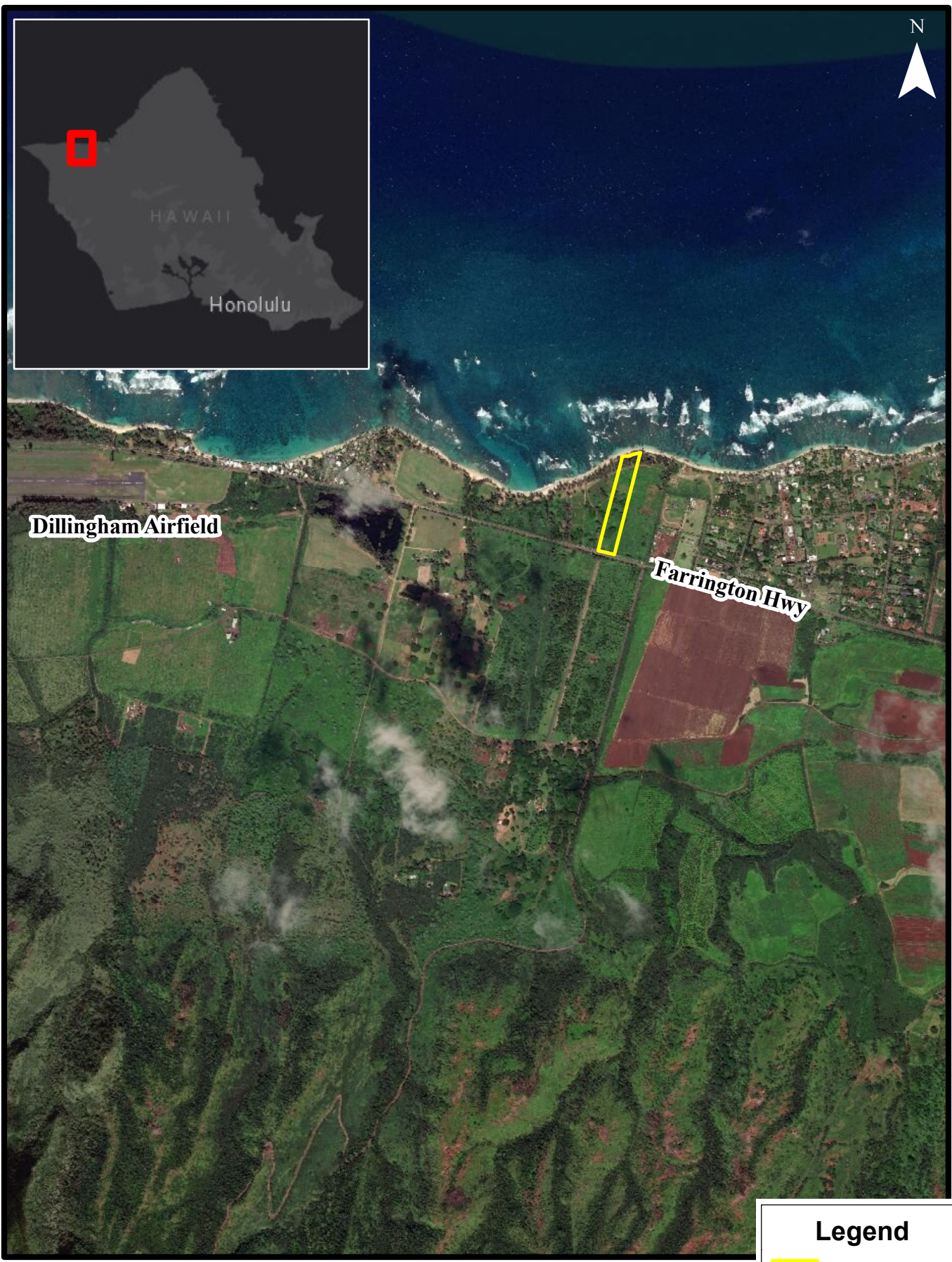
Printed Name

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

Location Map

Pueo Farm


Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



Dillingham Airfield

Farrington Hwy

Legend

 TMK Boundary

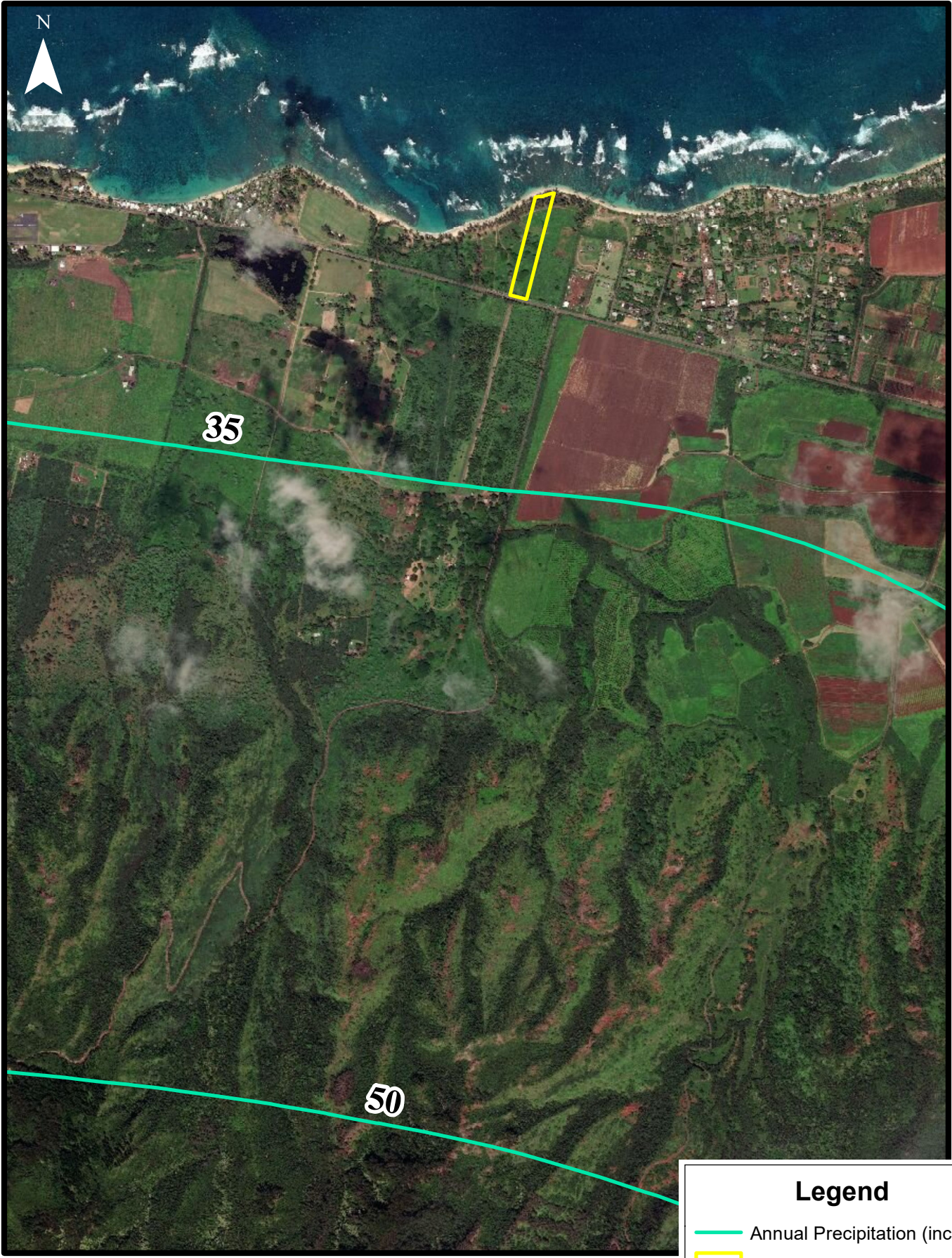
0 0.25 0.5 1 Miles

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres



Precipitation Map

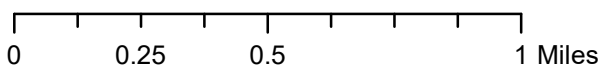
Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



Legend

-  Annual Precipitation (inches)
-  TMK Boundary



District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres



Critical Habitat Map

Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



Legend

-  Critical Habitat Zone
-  TMK Boundary

0 0.5 1 2 Miles

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

TMK Map


Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



0 125 250 500 Feet

Legend

 TMK Boundary

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

Zoning Map


Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020




0 125 250 500 Feet

Legend

 TMK Boundary

Zoning Designation

 AG-2 General Agriculture District

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres



Special Management Area Map

Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



Legend

-  Special Management Area
-  TMK Boundary

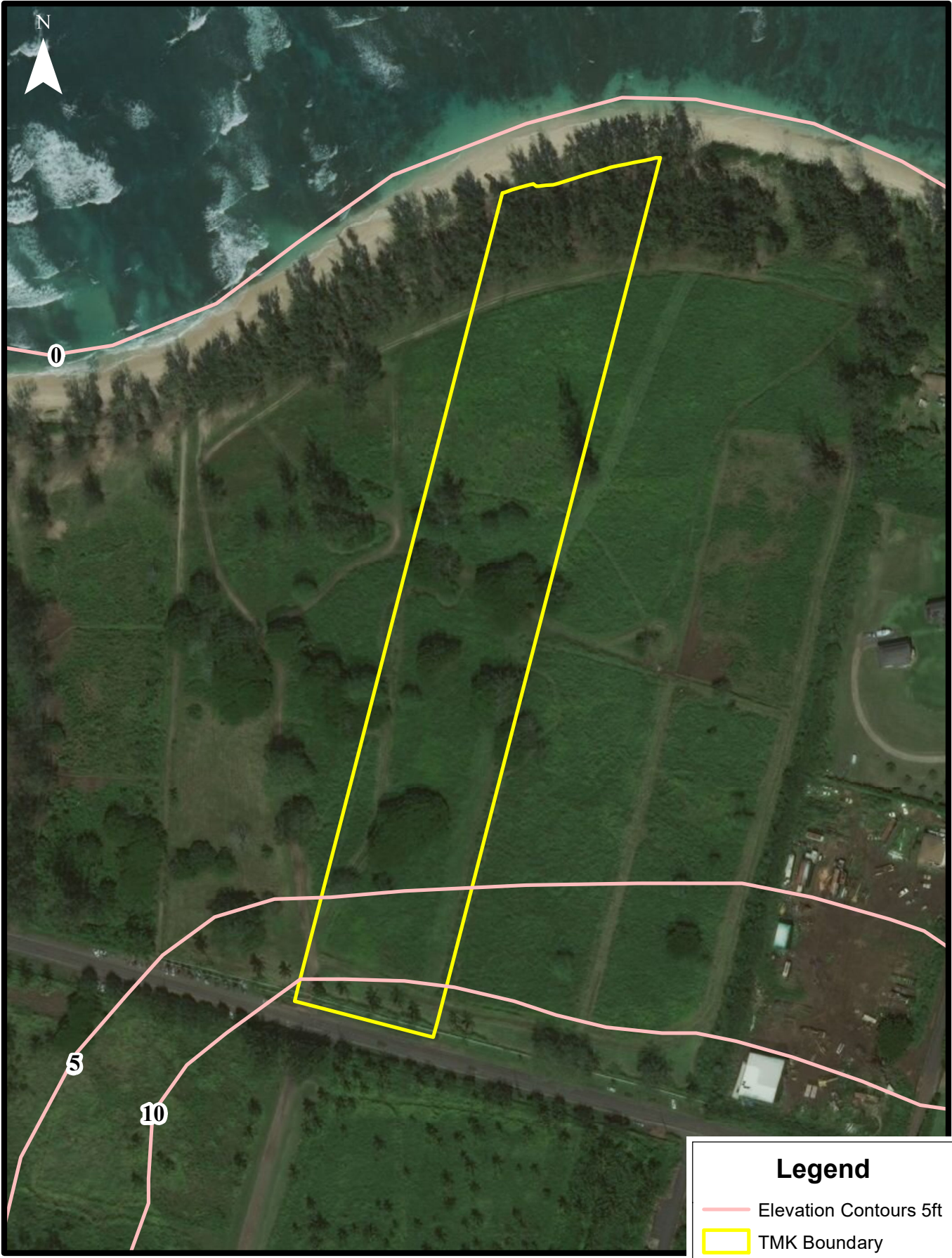
0 125 250 500 Feet

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

Elevation Map

Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



0 155 310 620 Feet

Legend

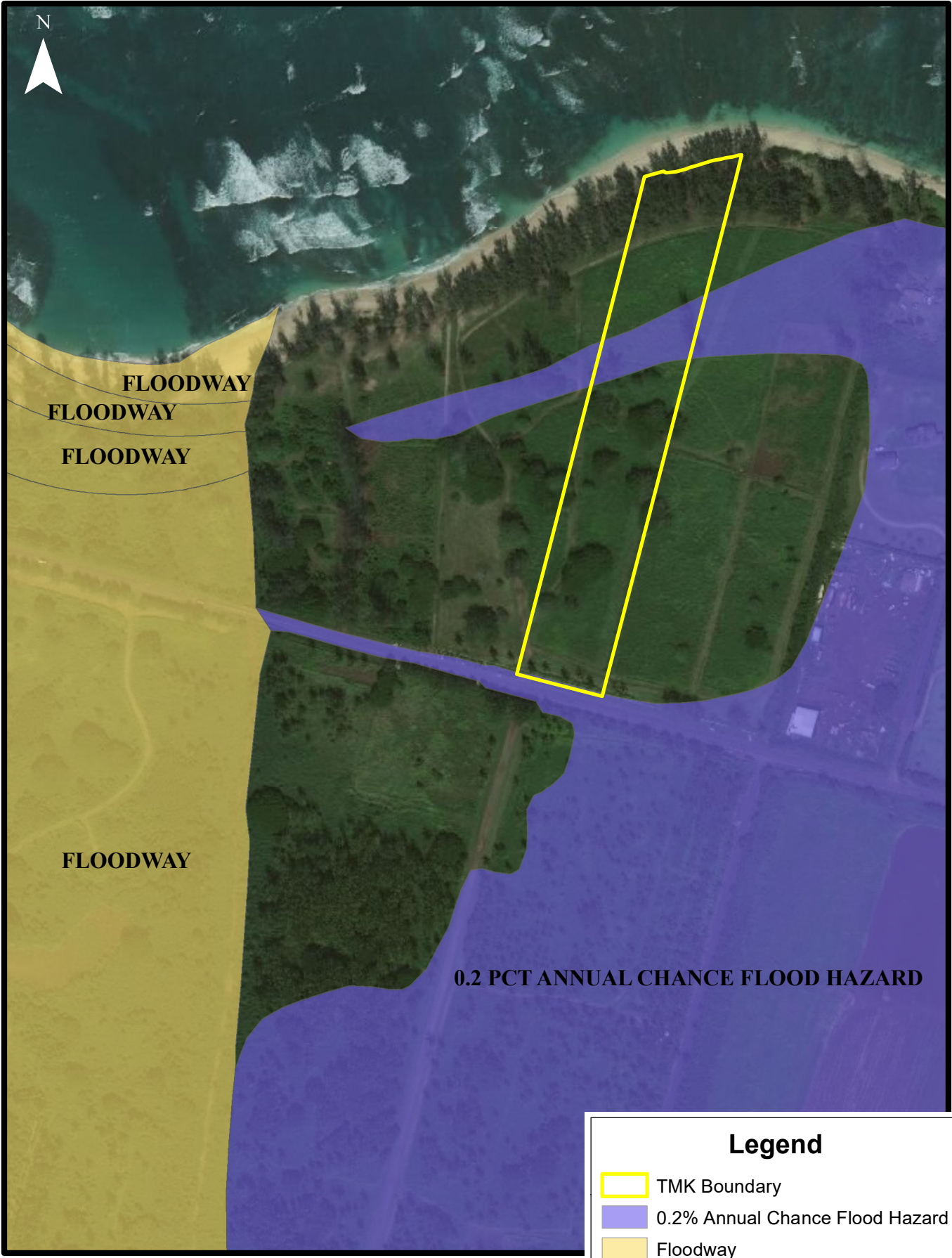
- Elevation Contours 5ft
- TMK Boundary

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

Flood Hazard Areas Map

Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



0 250 500 1,000 Feet

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

Soil Classification Map

Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



0 125 250 500 Feet

Legend

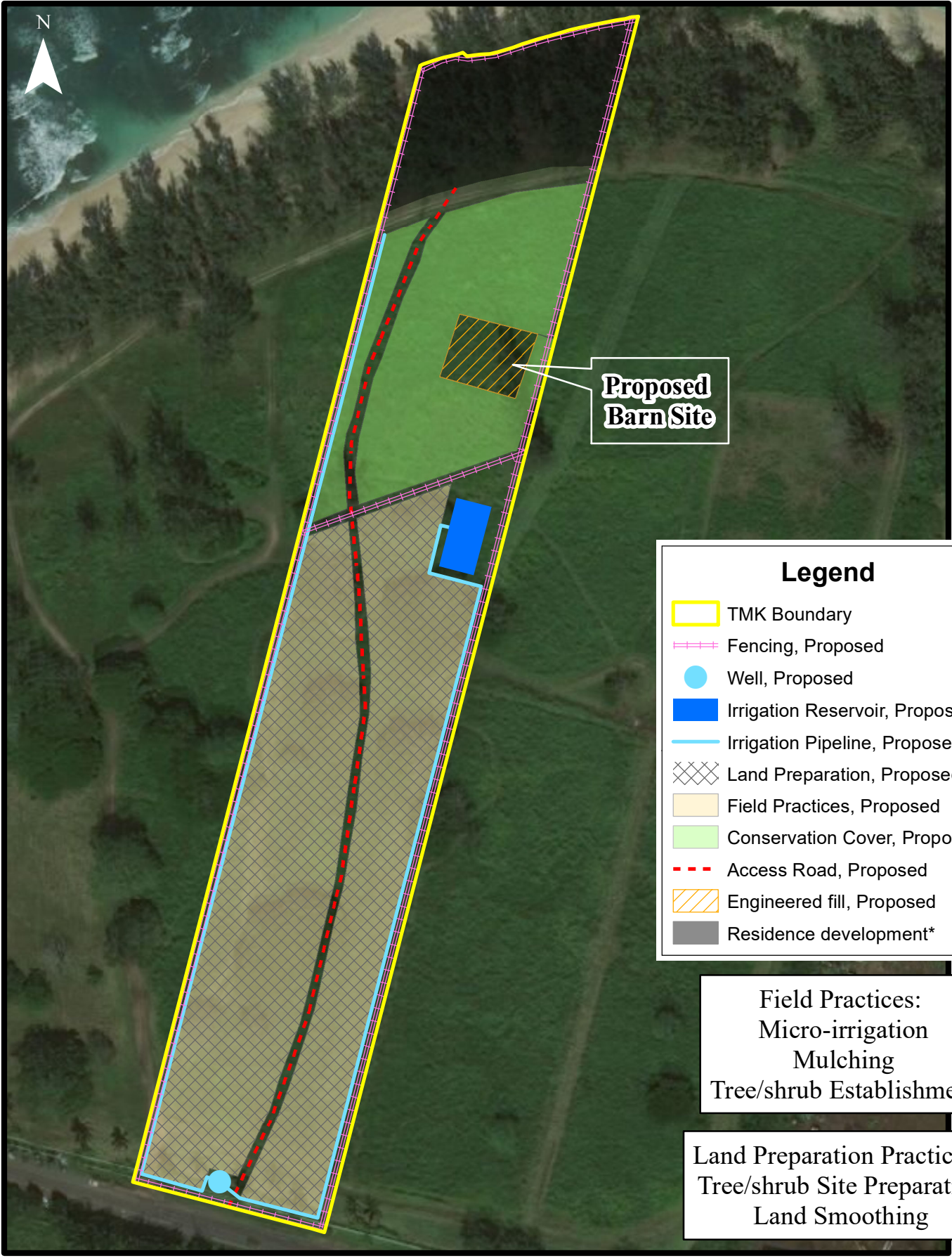
- TMK Boundary
- Soil Series Code**
- JaC
- Mt

District: West SWCD
Cooperator: Paul Alston
TMK: 6-8-003-045
Acres: 7.9 acres

Conservation Practices Map

Pueo Farm

Created by: ORCD
Assisted by: H. Hubanks
Date: Sept 2020



**Proposed
Barn Site**

Legend

- TMK Boundary
- Fencing, Proposed
- Well, Proposed
- Irrigation Reservoir, Proposed
- Irrigation Pipeline, Proposed
- Land Preparation, Proposed
- Field Practices, Proposed
- Conservation Cover, Proposed
- Access Road, Proposed
- Engineered fill, Proposed
- Residence development*

Field Practices:
Micro-irrigation
Mulching
Tree/shrub Establishment

Land Preparation Practices:
Tree/shrub Site Preparation
Land Smoothing

*Residence development zone will be independently permitted and developed by a licensed engineer and contractor, and are not included in this conservation plan.

PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX B

FARM DESIGN AND
OPERATIONAL PLAN

Pueo Farm

68-431 Farrington Highway, Waialua

TMK: (1) 6-8-003-045

FARM DESIGN
& Operational Plan



December 2021

Prepared by: WHALE Environmental Services LLC www.whalees.com



PUEO FARM

DESIGN and

OPERATIONAL

PLAN

Introduction

The Business

Pueo Farms will be a registered and licensed horticultural and agricultural business owned by Paul and Rob Alston. The business will be started in Waialua, Oahu, Hawaii and will include growing landscape greenery and plants by using the latest techniques of growing profitable crops by providing optimal medium required by plants.

Management

Both Paul and Rob Alston are experienced in crop production. Paul Alston and his family operate Hawaii's largest Cape Gooseberry (*poha*) on the Big Island. Rob has also developed several crop species on Maui. The Pueo Farm operation is intended as mainly a nursery and specialty crop production unit taking avail of the culturally and historically vital farmlands of the Waialua region. The main intent of Pueo Farm is as a horticulture operation – developing and growing landscaping plants for the landscaping industry. As well, some specialty crops to take avail of site conditions and growing regimes will be produced as well for other specialty markets.

Customers

Planned customers will mostly be the landscaping firms, specialty food companies, resorts, and other venues needing special landscaping needs and some individual buyers, residing in Hawaii. A focus will be made to produce crops with a Hawaiian theme and nature.

Target of the Company

The primary target is to grow and sell landscaping stock complemented by specialty crops creating an example of Hawaiian standard and quality for landscape plants. In this farm design and operation plan, details of the site's suitability to maintain

viable production of the crops selected will be detailed. As well, justification for crop selection will be outlined, as well as details on individual plants, their needs and their value.

With the development of Hawaii's largest Cape Gooseberry (*poha*) farm on the Big Island, the Alstons have learned the value of placing crop production on locations where viability and niche marketing insures a viable agricultural enterprise. The location on Oahu offers year-round production and will offer a low regional impact for a business operation minimizing off-site impact such as traffic, resource depletion, and market competition. With a focus on landscaping plant production, this is a niche market which currently exists mainly on the windward side, and provides the North Shore of Oahu with competitive and regionally provided products.

Planning Horizon

The planning horizon is not for one or two years, nor five. There is a long-term planning horizon measured in decades, not years. Many landscaping crops require two to three years to develop to marketable size. Even using a rotational basis for crop production still places production measured in years, not months. Though the main focus is as a profit center, the enterprise can also be considered an investment center for Hawaii's future.

So in many ways, this farm design and operational plan is an enterprise strategy, which will be a *competitive* strategy – one that will discuss the crops, their viability, and their insertion into markets and industries.

This Pueo Farm Design and Operational Plan is intended to be forward-thinking – a design and plan that is forward-thinking, pro-active, and focused on where it is going and how it is going to get there.



PUEO FARM

DESIGN and

OPERATIONAL

PLAN

Part I – Habitat Analysis



Part 1 – Habitat Analysis



General Climate

The weather on Oahu doesn't change much throughout the year, and the island really only has two seasons (winter and summer). In general, Oahu is usually much drier on the west side of the island (*the leeward side*) than the east side (*the windward side*), so you will find most of the greener landscape along the coastal areas to the east.

As one of the two states in the U.S. that doesn't observe daylight savings time, Hawaii doesn't experience a substantial variation in daylight hours, either. Throughout the year there is only about an hour discrepancy in sunrise and sunset times on the island of Oahu. One of the things that makes Oahu so special is its trade winds. For a majority of the year, winds coming from east to west on the island provide a welcome and necessary relief from the hot, humid environment.

The outstanding features of Hawaii's climate include mild temperatures throughout the year, moderate humidity, persistence of northeasterly trade winds, significant differences in rainfall within short distances, and infrequent severe storms. For most of Hawaii, there are only two seasons: summer, between May and October, and winter, between October and April. The ocean supplies moisture to the air and acts as a giant thermostat, since its own temperature varies little compared with that of large land masses. The seasonal range of sea surface temperatures near Hawaii is only about 6 degrees, from a low of 73 or 74 degrees between late February and March to a high near 80 degrees in late September or early October. The variation from night to day is one or two degrees.

Hawaii is more than 2,000 miles from the nearest continental land mass. Therefore, air that reaches it, regardless of source, spends enough time over the ocean to moderate its initial harsher properties. For example, Arctic air that reaches Hawaii, during the winter, may have a temperature increase by as much as 100 degrees during its passage over the waters of the North Pacific. Hawaii's warmest months are not June and July, but August and September. Its coolest months, are not December and January, but February and March, reflecting the seasonal lag in the ocean's temperature.

Hawaii's mountains significantly influence every aspect of its weather and climate. The endless variety of peaks, valleys, ridges, and broad slopes, gives Hawaii a climate that is different from the surrounding ocean, as well as a climatic variety within the islands. These climatic differences would not exist if the islands were flat and the same size.

The mountains obstruct, deflect, and accelerate the flow of air. When warm, moist air rises over windward coasts and slopes, clouds and rainfall are much greater than over the open sea. Leeward areas, where the air descends, tend to be sunny and dry. In places sheltered by terrain, local air movements are significantly different from winds in exposed localities. Since temperature decreases with elevation by about 3 degrees per thousand feet, Hawaii's mountains, which extend from sea level to nearly 14,000 feet, contain a climatic range from the tropic to the sub-Arctic.

The climate of Hawaii can be defined by what it has and by what it does not have. It does not have the extremes of cold winters and summer heat waves and it usually does not have hurricanes and hailstorms. However, Hawaii's tallest peaks do get their share of winter blizzards, ice, and snow. Highest temperatures may reach into the 90s. Thunderstorms, lightning, hail, floods, hurricanes, tornadoes, and droughts are not unknown. However, these phenomena are usually less frequent and less severe than their counterparts in continental regions.

The highest temperature ever recorded in Hawaii was 100 at Pahala (elevation 870 feet) on the Big Island of Hawaii on April 27, 1931. The lowest ever recorded was 12 on Mauna Kea (elevation 13,770 feet), also on the Big Island, on May 17, 1979.

Pueo Farm Design and Operational Parameters Impact – *The general climate offers year-round production of crops with moderate rainfall needs.*

Site's MicroClimate

A microclimate is a unique set of localized atmospheric conditions that differs to varying degrees from the greater surrounding region's weather. It can be as small as a few square feet or several hundred square miles in size but is always contained within the surrounding weather conditions.

Even in a local region with its prevailing weather conditions, one can find even smaller areas with their pockets of unique atmospheric conditions. These conditions are known as microclimates.

It is important to note the term "climate" in "microclimate." As discussed, climate refers to the average weather conditions that are unique to an area, compared to the weather, which refers to the atmospheric conditions at any given time. As a result, microclimate refers to atmospheric conditions that prevail within a relatively small space for a sustained period compared to the surrounding weather. The North Shore of Oahu is famous for its microclimates as anyone can attest to as they drive from Wahiawa to Haleiwa or west to Keana Point. Schofield Barracks in Wahiawa is known as the Grey Lady, constantly sprinkling. The drive down Kakonahua Road brings one to dry "dust devils" crossing the road at mid-point on Central Oahu ag lands. One then crests over the hill and descends to Haleiwa – almost always in the sun. Going east to Kahuku, there is a more prevalence of trade wind showers along the coast, some microclimates so influenced by terrain that there can be showers on the mauka side of the Kam Highway by Turtle Bay, and bright sunshine on the makai side by the hotel. Going west to Keana Point, the rain shadows from Wahiawa disappears going over the mountain range to the Waianae. Most of the region between Haleiwa and Keana Point involve purely sea influenced weather patterns. Mostly sun, occasional squeals of rain, dryer conditions with moderate rainfall predominate.

The Waialua microclimate is usually classified as follows:

(BWh) WARM DESERT

Subcategory of Arid and Semi-Arid Climates (B)

Almost all of the lengthy stretches of white sand beach through Waialua and Mokuleia are found in this warm Hawai'i climate zone. On Oahu, the zone extends along the coast and a scant few miles inland. The area is the one of the driest in the Hawaiian Islands, recording 10-30 inches of rainfall annually and hot days averaging 81°F annually. As opposed to other hot spots around the world, this coastline is among the easiest to tolerate thanks to cool ocean breezes dropping in on the land and, especially, the beaches. The actual site lies higher on the scale of this subcategory, getting a bit more rain averaging about 25-30" a year. This site like is more ideal for agriculture since the uplifting mountains above Dillingham Ranch is closer than other stretches of this coastline, and possesses more downdrafts from ocean winds hitting the mountain range and returning, creating more moisture for the site. Its microclimate can be characterized as semi-arid with moderate moisture impact and stronger winds from both directions due to bounce-back of ocean off-shore winds encountering the nearby Waianae range and returning as low moisture returning lower velocity winds. As such, the makai side of the site gets the strongest trade winds and ocean winds; while the mauka side is sheltered from those winds and mostly gets wind-bounce dew-laden weaker winds from the Waianae Range. Thus, the makai side requires species that can tolerate higher wind levels and drier winds, while the Mauka side can support less wind-tolerant species and increased moisture.

Pueo Farm Design and Operational Parameters Impact – *The microclimate of the site offers a variety production of crops across the 7.9 acre site from mauka to makai delineation allowing greater crop diversity and less irrigation needs on some portions of the site. Site design will take into account these factors.*

Wind Parameters

The winds of Waialua are called *Hinakokea of Mokule'i'a* and Pu'uka'ala of Ka'ala. The wind of Ka'ena turns in two directions, Hinakokea is of Mokule'ia, *The winds of Waialua blow, Moving silently at the cape of Ka'ena*, Pu'u-ka'ala blows at Ka'ala, *Kehau is of Kapo*, The ancient recital of wind patterns in this region appear to confirm the bi-directional wind directions we note in present day events.

Because Waialua and Mokule'ia have almost constant offshore winds creating wonderful kite-boarding opportunities; WIND will be a factor in crop placement decisions. Gentle winds off the mountains, stronger winds ocean-side.



Pueo Farm Design and Operational Parameters Impact – *The wind patterns will require detailed placement of plantings for production of crops to insure lessened wind impact. Potential need for windbreak plantings of non-productive species.*

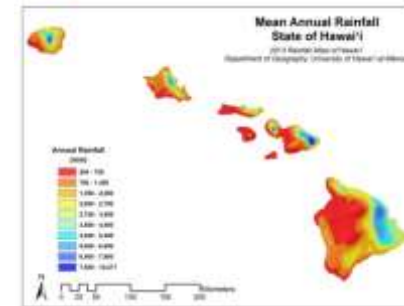
Rainfall Parameters

When people talk about climate change in Hawaii, it's often through the lens of what might lie ahead if global temperatures continue to rise. But climate change is already here, and the impacts of a warming planet are being felt by the state's farmers and ranchers. On the North Shore of Oahu, corn growers are having a harder time pollinating crops. On Kauai, farmers are grappling with the loss of topsoil from intense flooding. On Hawaii island, warmer nights are making it harder for macadamia nut trees to flower.

"Agriculture is probably impacted more severely by climate change than any other industry that I can think of," said Jerry Ornellas, a farmer on Kauai. "We're really the canary in the coal mine."

It is reasonable to assume that the farm design for Pueo Farm will need to incorporate some of these factors in its operational plan. The site's parameters center on moderate rainfall, relatively intense winds, low seasonal microclimates and other factors. Climate change has recently and likely to increase in the future rainfall events – severe downpours, flooding, droughts and much more events, not common to the historical evidence found in the region.

Hawaii's rainfall pattern is spectacularly diverse (*side panel*). In general, high mean rainfall is found on the windward mountain slopes, and low rainfall prevails in leeward lowlands and on the upper slopes of the highest mountains. What causes these patterns?

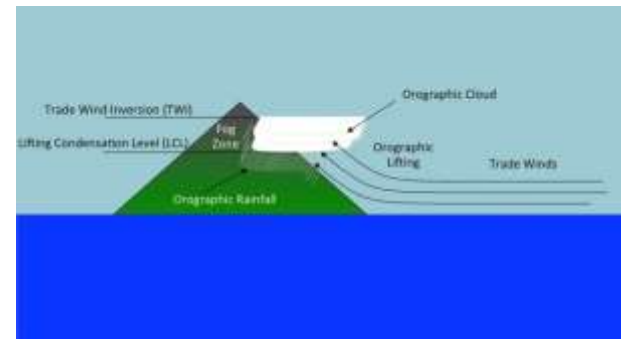


Cloud formation leading to precipitation is always associated with air being cooled. Lowering the temperature of air reduces its capacity to store water as a gas (water vapor). For any given air temperature, there is a maximum amount of water vapor that can be stored. Air containing any amount of water vapor, if cooled, will eventually reach a point where the water vapor content is exactly equal to the capacity of the air to hold water vapor. That condition is called saturation. Any additional

cooling of saturated air will cause condensation to occur, i.e. some water vapor (gas) will change phase to a liquid (water droplets) or solid (ice particles) form. Those water droplets and/or ice particles are what clouds are made of.

Cooling of unsaturated air, then, is the key to forming clouds and eventually causing precipitation. By far the most common way air is cooled is by lifting. Air always cools when it is lifted, because it moves from higher pressure to lower pressure by going up. Conversely, air that sinks always gets warmer. Pressure, volume, and temperature of air are related to each other according to a well-known physical law. Depending on the temperature and humidity of the air approaching the islands, air has to be lifted to a certain height in order to form a cloud. That level, where the bottom of the cloud can be found, is called the lifting condensation level (LCL).

So, the question is what are the main causes of lifting of air over Hawai‘i? Air can be lifted in several ways, each resulting in cooling of the lifted air. First and foremost, when wind blows against the slopes of mountains, air is forced to rise (orographic lifting), producing orographic clouds and rain on the windward slopes. Because “trade winds” in Hawai‘i blow persistently from the ENE direction, the pattern of cloudy, wet conditions on the windward slopes is familiar to everyone in Hawai‘i. This simple relationship between wind direction and topography explains much of the pattern of rainfall in Hawai‘i. These windward mountain slopes receive abundant rainfall throughout the year. Note the relatively even distribution of rainfall throughout the year at windward station Mountain View (right). Because this site does not lie in a direct ocean to mountain pattern, the effect is still present, but reduced. Kailua to the left, Waialua to the right.



Orographic lifting is not the whole story, but is likely the main factor for this site. This fact is related to another persistent feature of Hawaii’s climate, the “trade wind inversion” (TWI). The TWI is a shallow layer of air, usually found at about 2200 m (7200 ft) above sea level over the islands, in which the air gets warmer as you go up. This is the inverse of the usual situation in which air above is cooler than air below, and has an effect on the ability of air to move up or down. In essence, the TWI puts the brakes on rising air, preventing it from continuing to move up the windward mountain slopes, and directing the flow around the mountain instead. This has the effect of capping the clouds at the level of the bottom of the TWI layer. As a result, the tops of mountains reaching well above the TWI level are quite dry.

Lifting is also caused when air over the islands is heated during the day. The lighter warm air rises by a process called “convection”, sometimes producing clouds and rainfall over island interiors. Daytime heating also leads to on-shore wind (“sea breeze”) along the coasts. On days without strong trade winds, the sea breeze pattern causes wind to converge toward the middle of each island. This convergence of surface winds forces air to rise over the island. This is why Mokuleia is such a good kite-surfing spot.

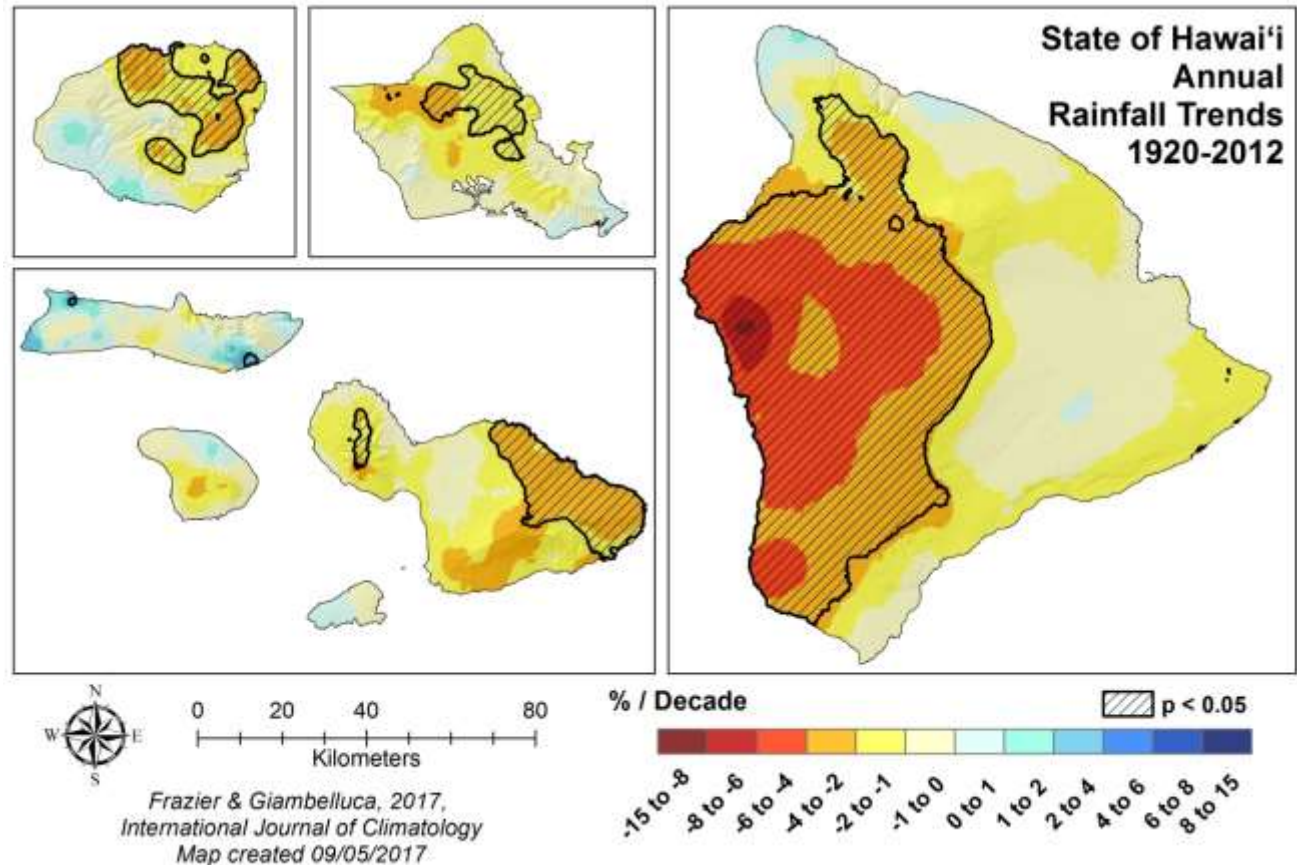
When weather disturbances, such as cold fronts, Kona storms, upper-level low-pressure systems, or tropical storms, affect the islands, extensive lifting can occur causing widespread clouds and rain. These disturbances often disrupt the TWI, allowing lifting to continue to much higher levels in the atmosphere. This can result in thunderstorms, which are absent whenever the TWI is present.

But, we must be aware that rainfall varies over time. For example, we have strong evidence that rainfall in Hawai‘i is affected on a year-to-year time scale by the occurrence of El Niños and La Niñas. These events are part of a large-scale interaction between the ocean and atmosphere centered in the equatorial Pacific, known as El Niño-Southern Oscillation (ENSO). In particular, El Niño is consistently associated with lower than normal rainfall during winter months in Hawai‘i. Because Hawai‘i is relatively close to the center of action of ENSO, its effects are stronger here. El Niños and La Niñas recur on average about every 3 to 7 years. This gives rise to large year-to-year variability in rainfall in Hawai‘i.

Another, perhaps less familiar ocean-atmosphere interaction, known as the Pacific Decadal Oscillation (PDO), also exerts a strong influence on Hawai‘i rainfall. The PDO is somewhat similar to ENSO, but varies much more slowly, with each phase lasting up to 30 years. During most of the base period for the 2011 Hawai‘i Rainfall Atlas of Hawai‘i (1978-2007), the PDO was in its positive phase, which is generally associated with lower rainfall in Hawai‘i.

In addition to natural variations in rainfall, there is an awareness of long-term trends that might be caused by global warming. Over the past 90-100 years, while the effects of ENSO and PDO caused large ups and downs, rainfall in Hawai‘i has slowly declined overall. This decline has been especially apparent during recent decades, in part, because it coincides with the low rainfall phase of the PDO. However, the rainfall record and other evidence point to a downward trend in mean rainfall that may persist at least through the end of this century. One possible explanation for the decline has to do with the weather disturbances that regularly disrupt the trade wind inversion and produce widespread rainfall over the islands. These disturbances, often associated with incursions of mid-latitude weather systems into the Hawai‘i region during winter, have declined in frequency, as storm tracks have apparently migrated northward. This shift in storm tracks is thought to be a result

of global warming and is predicted to continue. If these predictions are borne out, we will continue to see ups and downs in rainfall in the future related to ENSO and PDO, but mean rainfall will decline, and drought will become more frequent.



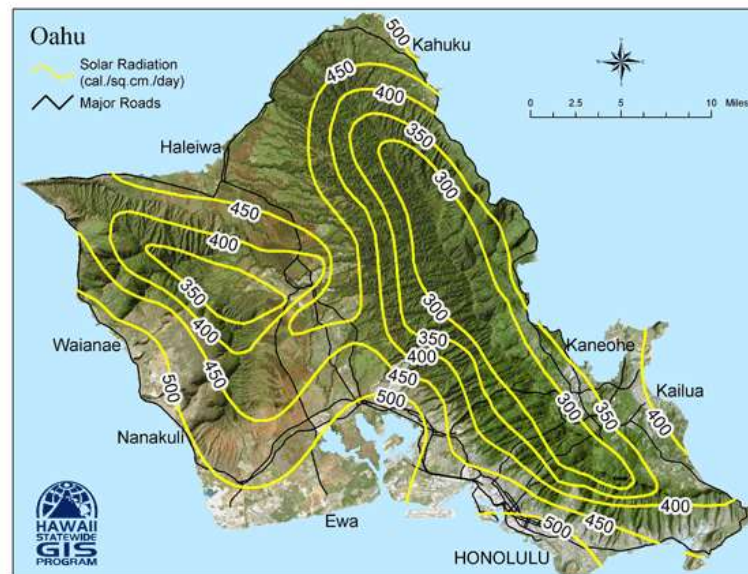
Pueo Farm Design and Operational Parameters

Impact – To make sure that Pueo Farm has a future in Hawaii, we will be seeking out crops that will be able to withstand the increased heat, soil salinity, floods and droughts expected in the region's Global Warming potential future. As can be seen in this illustration, a 2 to 4" annual rainfall reductions is predicted to the Waialua region. This means crops with a 30-35" common Waialua regional rainfall regimes for optimal growth will be replaced by a new 20-30" rainfall regime – more crops that need irrigation. This leads to choices for lesser water demanding species for the site.

Sunlight Parameters

The Solar Radiation Map for Oahu indicates that the Waialua area has a 450 cal./sq.cm/day solar radiation factor. This translates to 5.2 peak sun hours. In the digital version of this document, an appendix contains the EXCEL spreadsheet from NASA's computation of SUNPOWER. This measures daily solar radiation over a year from 1/4/2021 to 1/3/2022 and exhibits varied factors such as dew wet bulb temperatures (2 meters above ground – shrub height), humidity, common daily temperatures.

Pueo Farm Design and Operational Parameters Impact – As can be seen studying this spreadsheet, at the two meter height which is common to shrub/tree canopy heights, earth skin temperatures range from 70-75 degrees F, with dew wet bulb (shrub/tree enviro-transpiration/[leaf sweat]) temperatures slightly lower at 68-70. Humidity is relative high, averaging 75-85%. This means that for the site, the relative high solar radiation factor, the high humidity, average earth skin temperatures above the dew wet bulb limits means that shrubs and trees will have a higher than normal loss of moisture to evaporation and enviro-transpiration. This will lead to higher than normal irrigation needs. One factor to keep in mind is that a plant's stomata cell only opens at dawn or dusk when the earth skin temperature is below the dew wet bulb limit and has the ability to effectively absorb water. Irrigation done in the heat of the day does not enter the plant trying to shed moisture (sweat), and the stomata cell is closed. Key is to time irrigation periods given these conditions to insure the plant is receiving moisture. Otherwise, irrigation waters are lost.



Energy Unit Conversion Table

600	calories per square centimeter	=	2200	Btu per square foot	=	7	peak sun hours
550	calories per square centimeter	=	2000	Btu per square foot	=	6.4	peak sun hours
500	calories per square centimeter	=	1800	Btu per square foot	=	5.8	peak sun hours
450	calories per square centimeter	=	1700	Btu per square foot	=	5.2	peak sun hours
400	calories per square centimeter	=	1500	Btu per square foot	=	4.6	peak sun hours
350	calories per square centimeter	=	1300	Btu per square foot	=	4.1	peak sun hours
300	calories per square centimeter	=	1100	Btu per square foot	=	3.5	peak sun hours
250	calories per square centimeter	=	900	Btu per square foot	=	2.9	peak sun hours

Cal/cm2 times 3.688 gives Btu/ft2 . Cal/cm2 times 0.0116 gives peak sun hours.

credit: DBEDT

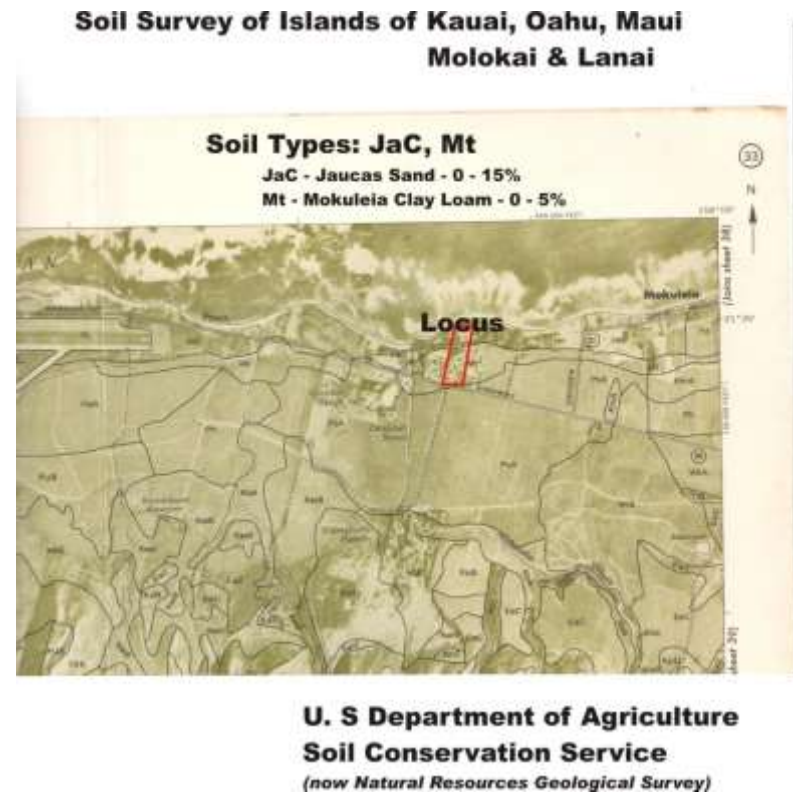
Soil Types

The NRCS Soil Survey for the Hawaiian Islands published in August 1972 is the most accurate definition of soil types for areas. These soil surveys were done painstakingly over years, with actual physical soil cores taken by then Soil Conservation Service (SCS) scientists (now NRCS) beginning in 1965 with the cooperation of UHawaii Cooperative Extension Service. Our firm is lucky to own one of the six remaining copies as our role as wetlands scientists since 1970 involved detailed knowledge of soil types for wetland delineations purposes. This document is particularly important to farmers as many soil factors for a site's soils are very detailed.

As can be seen, over 95% of the site is JaC – Jaucas sands. A very small portion of the site is Mt – Mokuleia Clay Loam – which on the site is essentially the entrance drive and gate. A small corner of the lot also contains these soils on the southeast corner of the lot. If a fire or irrigation pond is to be established, this would be the area to create one due to lower permeability.

Jaucas sands

The highlight of this soil is its excessive permeability. This is usually a problem for farmers as the soils drain far too fast to provide moisture to plant roots. On the other hand, for stormwater management, the soil type almost totally prevent flooding. Regardless of soil amendments used, plants that like dry conditions would prefer this site over wet-loving plant types.



Jaucas sands also retain relatively high soil temperatures around 75 degrees F. This can pose problems for plants needing cooler soils such as lettuce, kale, celery and other leaf plants. It is formed from shell fragments and coral fragments and is almost always level in slope. Depths are often in excess of five feet. Another detrimental factor to farming is the mobility of the soil – subject to the relocation of soil particles due to wind erosions. As seen in the EA under BMPs proposed, a wind screen is proposed which will reduce deposition of dust on shrub/tree leaves. The available water capacity of the soil is a very low 0.5” to 1.0” which means roots will deepen and try to extend below 5’ to reach moisture. As well, the soil is relatively loose and poses difficulty for equipment movement. This will also be addressed.

Mokuleia clay loam

This soil type is also well-drained but not to the level of Jaucas sands. It is usually a shallow soil of less than 1’ formed by alluvial deposits of organic matter. Its soil temperature is usually around 72 degrees F. They are usually found in the drainage ways on a site where runoff collects and brings organic material to accumulate. The site has a very slight sloping to the southeast corner of the site which is why these soils may be found here. Permeability is relatively slow. It is not wind mobile, or loose.

Pueo Farm Design and Operational Parameters Impact – *The soils on this site pose the largest challenge to farming on the site. The Jaucas sands will require several mitigation measures which will be outlined in the Part II – Crop Design section of this report. Soil stability for equipment movement, wind borne dust, rapid permeability, moisture deprivation, high soil temperatures are all factors that will need to be addressed. These will require a mix of soil stabilizers, soil amendments, irrigation improvements, soil replacements, and other factors.*

Soil Tests

Soil testing and plant analysis are useful tools for making recommendations for the application of fertilizers to crops. Whereas soil testing gives a measure of the availability of nutrients to crops, plant analysis indicates the actual removal of the nutrients from the soil. Soil testing aims at:

- (i) Grouping soils into classes relative to the levels of nutrients for suggesting fertilizer practices,
- (ii) Predicting the probability of getting profitable responses,
- (iii) Helping to evaluate soil productivity, and
- (iv) Determining specific soil conditions, like alkali, salinity and acidity which limits the crop yields.

There are 20 elements known to be essential for crop growth. Three of these elements - nitrogen, phosphorus and potassium are widely deficient in soils. Soil pH also is a common limitation to plant growth. Soil testing, therefore, chiefly involves nitrogen, phosphorus, potassium and pH. Farmer's acceptance of soil testing is strongly dependent on the extent and severity to which nitrogen, phosphorus, potassium and pH are problems for crop production in the area, and the accuracy with which the tests can be used to predict crop responses and fertilizer needs.

Whether one is a commercial farmer or a homeowner only concerned about having a lush, green lawn, the fertility or quality of the soil can make or break any gardening venture. The success and productivity of any crop is directly related to the fertility of the soil as required by a given crop. Soil testing is the primary method by which all growers analyze and amend their soil to ensure optimal growth and crop production.

Types of Soil Tests

Soil tests fall into two general categories – those required to test soil nutrients and conditions to ensure optimum growth and those tests which are useful for understanding the capability of soil for engineering purposes, known as the field of foundation

engineering. For this site, only nutritional soil testing was conducted. Foundation testing has already been done for the site by others for the proposed structures.

Nutritional soil testing typically includes, but is not limited to, testing for elements such as potassium, phosphorus, calcium, magnesium, iron, zinc and manganese, as well as soluble salts and nitrates. Other physical conditions of the soil can also be measured, such as pH factor, base saturation, lime requirement index, electrical conductivity, soil organic matter, moisture content and contaminants such as benzene and other petroleum by-products.

Contaminant testing was not done for this site.

How Soil Tests Work

The most important aspect of soil testing is that the sample be obtained using clean collection implements, such as a soil auger or probe, spade or other sampling tool (*Soil Auger was used to obtain comparable sized samples – cleaned with distilled water between samples*). Testers must also ensure that the storage device, such as a pail or bin, is also clean (*Ziplok bags were used for storage and placed in coolers*). Tools should be washed between sample collections to prevent cross-contamination and preserve the accuracy of the results (*Done*). Testers should prepare a map of the plot and indicate the testing sites, along with annual plant productivity, which can be invaluable in tracking and predicting the nutritional needs of soil. (*as seen below*)

Soil samples should be taken once the soil is workable. First, testers should remove any debris from the top of the soil, or in the case of lawns, remove the turf thatch. While lawns should be sampled at a depth of 3", an orchard, flower bed or landscaping should be sampled at a depth of 6-8". Crop fields or gardens should be sampled between the rows to avoid concentrated bands of fertilizer. Any soil that is distinguishable by color or any fields with a differing fertilizer schedule should be sampled separately.

As can be seen, twelve (12) soil samples were taken with their GPS location documented by lat/long and then plotted on a Google Earth image. It is our opinion that this provides a good representation of soil testing for the site given the largely same soil type.



Results

A division of the site was made into four quadrants. Each quadrant contained three soil sampling sites staggered within that quadrant. A variety of tests were conducted – some on-site such as soil temperature, salinity, organic matter levels and notes on soil composition. The main range of nutrient levels vital for crop selection if the lands are un-mitigated was chemically tested, while other factors vital for crop production are reported as well. Results follow:

PUEO FARM Soils Analysis

<u>Test Sample Type</u>	QUADRANT 1		
	Site Test 1	Site Test 2	Site Test 3
pH	8	7.9	8
Potassium	high	very high	very high
Phosphorus	low	low	medium
Nitrogen	trace	low	trace
Salinity			
Parameter (dS m⁻¹)			
Non-Saline - <4			
Slightly Saline - 4-8	5	6	9
Moderately Saline - 8-16			
Saline - 16+			
Leaching Factor %	12	6	21
Organic Matter %	44	25	28
Consolidation	moderate	moderate	loose
Permeability	moderate	rapid	very rapid
Soil Temperature	72	74	75
Soil Texture	loamy clay	loamy clay	sand

PUEO FARM Soils Analysis

<u>Test Sample Type</u>	QUADRANT 2		
	Site Test 4	Site Test 5	Site Test 6
pH	7.8	7.9	7.8
Potassium	high	high	very high
Phosphorus	low	medium	medium
Nitrogen	trace	low	low
Salinity			
Parameter (dS m⁻¹)			
Non-Saline - <4			
Slightly Saline - 4-8	7	10	11
Moderately Saline - 8-16			
Saline - 16+			
Leaching Factor %	34	36	44
Organic Matter %	12	15	21
Consolidation	loose	loose	loose
Permeability	rapid	rapid	very rapid
Soil Temperature	73	73	74
Soil Texture	sand	sand	sand

PUEO FARM Soils Analysis

<u>Test Sample Type</u>	QUADRANT 3		
	<i>Site Test 7</i>	<i>Site Test 8</i>	<i>Site Test 9</i>
pH	8.2	8.1	8.2
Potassium	<i>very high</i>	<i>very high</i>	<i>very high</i>
Phosphorus	<i>medium</i>	<i>medium</i>	<i>medium</i>
Nitrogen	<i>trace</i>	<i>low</i>	<i>trace</i>
Salinity			
Parameter (dS m⁻¹)			
<i>Non-Saline - <4</i>			
<i>Slightly Saline - 4-8</i>	13	15	16
<i>Moderately Saline - 8-16</i>			
<i>Saline - 16+</i>			
Leaching Factor %	55	49	45
Organic Matter %	10	12	9
Consolidation	<i>loose</i>	<i>loose</i>	<i>loose</i>
Permeability	<i>rapid</i>	<i>very rapid</i>	<i>very rapid</i>
Soil Temperature	73	72	73
Soil Texture	<i>sand</i>	<i>sand</i>	<i>sand</i>

PUEO FARM Soils Analysis

<u>Test Sample Type</u>	QUADRANT 4		
	Site Test 10	Site Test 11	Site Test 12
pH	8.2	8	8.2
Potassium	<i>very high</i>	<i>very high</i>	<i>very high</i>
Phosphorus	<i>medium</i>	<i>medium</i>	<i>medium</i>
Nitrogen	<i>low</i>	<i>low</i>	<i>trace</i>
Salinity			
Parameter (dS m⁻¹)			
<i>Non-Saline - <4</i>			
<i>Slightly Saline - 4-8</i>	21	25	26
<i>Moderately Saline - 8-16</i>			
<i>Saline - 16+</i>			
Leaching Factor %	60	52	55
Organic Matter %	7	10	9
Consolidation	<i>loose</i>	<i>loose</i>	<i>loose</i>
Permeability	<i>very rapid</i>	<i>very rapid</i>	<i>very rapid</i>
Soil Temperature	73	72	73
Soil Texture	<i>sand</i>	<i>sand</i>	<i>sand</i>

Pueo Farm Design and Operational Parameters Impact – The soils tests on this site pose the largest challenge to farming on the site. The Jaucas sands will require several mitigation measures which will be outlined in the Part II – Crop Design section of this report. Soil stability for equipment movement, wind borne dust, rapid permeability, moisture deprivation, high soil temperatures are all factors that will need to be addressed. These will require a mix of soil stabilizers, soil amendments, irrigation improvements, soil replacements, and other factors. Highlights of the soil tests show that leaching is a large factor meaning that mitigations can simply cannot replace soils in select planting location without losing nutrients and other factors to leaching. Salinity is high, meaning salt-tolerant crops need to be selected since salt spray contribution to the land is likely an on-going factor. Basic nutrient levels for successful plant growth are relatively low, meaning amendments will need to address leaching and permeability to insure good nutrient feed to the crops themselves. pH is relatively alkaline which is one of the only good factors for the site as acidic conditions detrimental to plant growth does not seem to be present. The high presence of shell materials in the Jaucas sands is another positive factor as they will provide rapid pollution mitigation and absorption from off-site sources such as oil spills. Soil texture poses issues for surface stability for equipment movement. Many of these factors will contribute to the SWOT Analysis section of this report.

Moisture Regime

As can be seen in the soil investigations above, moisture regimes is likely to be an issue for this site, creating excessive irrigation needs. Over 90% of the soils on the site are extremely permeable, meaning that water drains rapidly. Even during the field work on this site over three weeks which involved 5 straight days of intensive rain; soils were well-drained within 24-48 hours, rapid permeability. As well, the loose, unconsolidated nature of the soils increases leaching factors, meaning nutrients and other amendments will be pulled away from root structures. Mitigations for moisture issues will need to be addressed.

Pueo Farm Design and Operational Parameters Impact – As can be seen, moisture retention is a vital need for crop production and is an issue on this site. The mitigation section in Part II will detail efforts expended.

Herbaceous Understory

Details on plant existence on the site can be seen in the Botanical and Fauna Report in the Draft EA. The herbaceous layer is almost totally invasive and is of need of removal.

Pueo Farm Design and Operational Parameters Impact – None, removal of invasives is needed

Shrub Understory

Details on plant existence on the site can be seen in the Botanical and Fauna Report in the Draft EA. The shrub layer is almost non-existent and any species such as haole koa is invasive and is of need of removal.

Pueo Farm Design and Operational Parameters Impact – None, removal of invasives is needed

Existing Tree Canopy

Details on plant existence on the site can be seen in the Botanical and Fauna Report in the Draft EA. The tree canopy is composed mostly of ironwoods and monkey pods, with the exception of a few palms by the entrance which will not be impacted.

For the ironwoods, they are an invasive species brought in to be wind breaks for ag crops. They add acidity to the soils, and shed needles preventing understory growth. They are also a severe fire hazard.

The Monkey Pods are a different tree species. Though invasive, they have value as a superior shade tree. As well, their wood when harvested, bears an often \$16-20/bf price for its slabs harvested. For this site, the retention of the few monkey pods on the site is a value to be considered for the site.

Pueo Farm Design and Operational Parameters Impact –removal of invasive Ironwoods is needed with replacement with other wind break/erosive species natural to the site. Consideration given to monkey pod retention.

SWOT Analysis

What is a SWOT Analysis?

SWOT analysis (or SWOT matrix) is a strategic planning and strategic management technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. It is sometimes called situational assessment or situational analysis. This technique is designed for use in the preliminary stages of decision-making processes and can be used as a tool for evaluation of the strategic position of organizations of many kinds (for-profit enterprises, local and national governments, NGOs, etc.). It is intended to identify the internal and external factors that are favorable and unfavorable to achieving the objectives of the venture or project. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage. SWOT has been described as a tried-and-true tool of strategic analysis.

The name is an acronym for the four components the technique examines:

Strengths: characteristics of the business or project that give it an advantage over others

Weaknesses: characteristics that place the business or project at a disadvantage relative to others

Opportunities: elements in the environment that the business or project could exploit to its advantage

Threats: elements in the environment that could cause trouble for the business or project

Strengths and weaknesses are usually considered internal, while opportunities and threats are usually considered external. The degree to which the internal strengths of the firm matches with the external opportunities is expressed by the concept of strategic fit.

Internal factors are viewed as strengths or weaknesses depending upon their effect on the organization's objectives. What may represent strengths with respect to one objective may be weaknesses (distractions, competition) for another objective. The factors may include personnel, finance, manufacturing capabilities, and all of the marketing mix's 4Ps.

External factors include macroeconomics, technological change, legislation, and sociocultural changes, as well as changes in the marketplace.

Site Strengths

- Size of Property sufficient for agricultural operations
- Location of Property is remote, minimizing land competition and incompatibility with region
- Site is level and relatively cleared

Site Weaknesses

- Soil is saline and in need of macronutrients
- Soil is exposed to salt spray on a routine basis
- Site is exposed to higher winds from bi-directional venues posing danger for unsecured trees by rocking
- Site does not possess any waterways or sources of natural irrigation

Site Opportunities

- Specialized landscaping crops has access to niche markets with low competition
- Good infrastructure support for movement to market
- Exists in a region with little to none competition

On-Site and Off-Site Threats

- On-Site soils threats from soil nutrient deficiency and irrigation leaching
- Off-Site crop pollution threats from nearby GMO operations using pesticides threatening organic practices..

Site Core Analysis for Crop Placement

We live in an era of increasing concern over the conservation and management of our renewable and non-renewable natural resources. Soil, water and air are essential needs for any agricultural enterprise. Similarly as erosion can wipe out years and centuries of landscapes and land forms took to develop; an improperly designed farm can eliminate the factors needed for successful and growing plants, developing a downward spiral of poor cultivation and harvests – resulting in an exhausted soil regime, overextended water resources, or pollutant impacted air flows.

The following are the factors that will affect the Pueo Farm Agricultural Operations.

Wind Factors

Strong coastal winds coupled with bi-directional winds coming down off nearby mountains means that particularly trees will require guy wires. Bi-Directional winds means that a tree will “rock” in two directions – essentially losing root stability and in danger of toppling. The loose Jancus sands will also make stabilizing guy wires difficult. This should be done for a least the first two years of a tree’s or tall shrub’s life. Consideration should be given to pouring concrete stanchions to anchor guy wires.

Salt-carrying winds from the oceans will also carry saline overloads to the leaves of the plants on the site. Preference will be given to saline tolerant species, but consideration should also be given to a coastal barrier such as *naupaka* to screen some of the wind. During construction, a wind screen should be employed to prevent on-site dust from reaching ocean environs.

Many in the region blamed odor and other pollutant issues on pesticide spraying ag operations on the lower slopes of the Waianae Range. Pueo Farms should consider joining forces with those opposing the use of these sprays as there can be an effect on Pueo Farm with the descending mountain bi-directional winds.

Water Factors

There are no on-site water resources. Nor are there any Board of Water Supply water lines which end at Crozier Drive. Though consideration could be given to extending the line, likely irrigation will come from on-site well(s). Consideration needs to be given to deep artisan wells as the groundwater six feet down is likely saline in nature. Reaching the freshwater lens low in the aquifer will insure good quality water.

Soil Factors

Soil Texture and Organic Matter

The soil is loose, unconsolidated Jaucas sand. Mobile, very permeable, leaching – this is not an ideal agricultural soil. Soil amendments with addition of soils with dense organic matter will need to be introduced into the planting areas. Mycorrhizae fungi amendments will be introduced to enhance root development. The decomposition of organic matter will add nutrients to the soil, particularly nitrogen – essential for good plant growth. Water holding capacity will increase countering the sands leaching abilities.

Soil Nutrients

pH is a factor that needs to be considered. Plants like neither acid conditions or alkaline conditions - largely staying in the 5.0 to 8.0 range. Most of the soil on this site is sweet averaging around a factor of 8.0 pH. This is another reason to bring in organic matter. This also affects the range of suitable plant selections described in the next section. Compost and other organics can be obtained from nearby composting operations. Molasses for example is employed by Turtle Bay Resort to keep their golf greens *green*.

Nitrogen is part of every living cell. It is directly involved in photosynthesis. It stimulates above ground growth and greenery of plants. Eliminating the leaching nature of the sands will insure lower nitrogen depletions. Fertilizations is a needed consideration at first.

Phosphorus

Young plants need large amounts of phosphorus to promote root development. It is also vital for the development of seed and fruits in trees and shrubs. As it does not move easily even through non-leaching soils, consideration again should be given to augmented fertilization.

Potassium

Plants require potassium to enhance biochemical functions such as disease resistance and minimized water loss through envirotranspiration.

More details on individual crop needs and maintenance needs for fertilization will be found in Part Two – Crop Design.

Thus to capitalize on the SWOT structure, addressing site limitations in soil, water and air factors will lead to stronger crop production, thus greater marketability in sales moving the SWOT model to a positive strategy.

Range of Suitable Plant Selections

Part II Crop Design will detail the individual plants selected for this farm design and operational plan. This is a generalization of what species will not likely fare well versus those that likely will even despite site mitigations.

The site conditions of saline soils, wind factors, irrigation difficulties will make life hard for these species. As most of these will not be used in this farm design, but some of the food crops will be avoided.

Name	pH Preference	Name	pH Preference	Name	pH Preference
Apple	5.5-7.0	Avocado	5.5-6.5	Fig	5.5-6.5
Apricot	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Banana	5.5-6.5	Cashew	5.5-6.5	Fig	5.5-6.5
Blackberry	5.5-7.0	Cashew	5.5-6.5	Fruit	5.5-6.5
Blueberry	4.5-5.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Cherry	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Citrus	5.5-7.0	Cashew	5.5-6.5	Fruit	5.5-6.5
Coffee	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Cucumber	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Eggplant	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Grape	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Guava	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Honeydew	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Jalapeno	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Kiwi	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Lychee	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Mango	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Orange	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Papaya	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Peach	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Pineapple	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Raspberry	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Strawberry	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Tangerine	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Watermelon	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5
Yam	5.5-6.5	Cashew	5.5-6.5	Fruit	5.5-6.5

Group B Plants (Prefer Moderately Acid Soils)					
Name	pH Preference	Name	pH Preference	Name	pH Preference
Amaryllis	5.0-6.0	Holly	5.0-6.0	Orchids (Many Varieties)	5.0-6.0
Azalea	5.0-6.0	Iris, Japanese	5.0-6.0	Peanut	5.0-6.0
Bean, Lima	5.3-6.0	Jack-in-the-		Pine	5.0-6.0
Bentgrass	5.5-6.5	Pulpit	5.0-6.0	Potato	4.8-5.4
Carrot	6.4-6.0	Ladyslipper	5.0-6.0	Raspberry	5.0-6.0
Cauliflower	5.5-6.5	Lily	5.0-6.0	Rhododendron	5.0-6.0
Chestnut	5.0-6.0	Magnolia	5.0-6.0	Spruce	5.0-6.0
Coreopsis	5.5-6.5	Mountain		Wintergreen	5.0-6.0
Gardenia	5.5-6.5	Laurel	5.0-6.0		
Hemlock	5.0-6.0	Oak	5.0-8.0		

As many of these are non-native to Hawaii, it is unlikely these species will be introduced. However, it does point out for example that the pine species will not thrive in this site's environ, so Norfolk Pine would not be a good candidate for the costal wind buffer screening. Fruit trees like apples or oranges will not thrive here. Leaf

vegetables like lettuce, kale, cabbage etc... would not like these conditions. Vegetables like broccoli, cucumber, onion etc... again will not thrive.

The intent to use this site as a source for landscaping plants is a sound niche market. Those species will be studied as to the suitability in the micro-climates of the site. As such, there will be a concentration to tree and shrub species rather than ground species.



Legend



Sunflower



Chamomille



Wax Myrtle



Naupaka



Mango



Coconut



Kamani



Kukui Nut



Bottle Palm



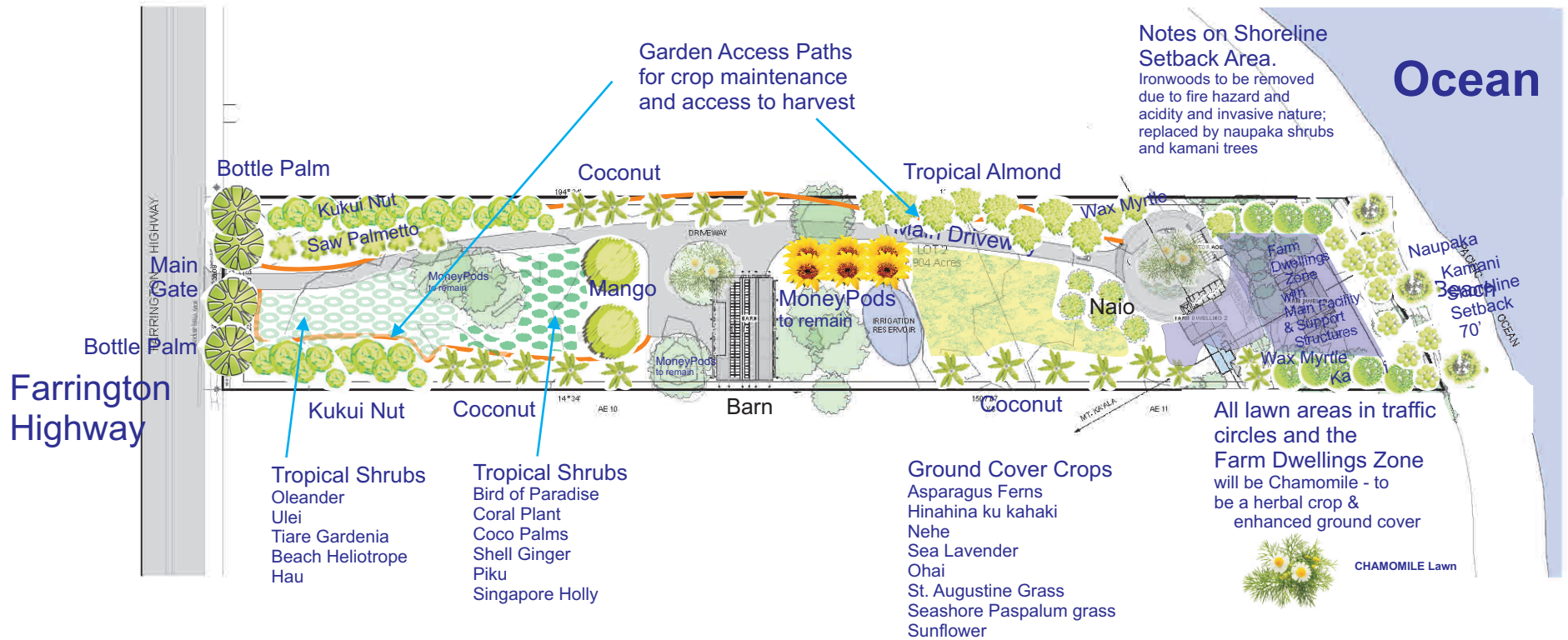
Saw Palmetto



Naio



Tropical Almond



Pueo Farm Landscaping Stock Plants CONCEPTUAL PLAN



PUEO FARMS

DESIGN and

OPERATIONAL

PLAN

Part II – Farm Design



Part II – Farm Design



Site Conceptual Design

This is a description of the Site Conceptual Design as seen on the previous page.

Introduction

The development of a farm plan for Pueo Farms involves several factors. They may be listed as such. Unlike other proposed farm operations in the state where out-of-state land owners want to take avail of agricultural zoning to develop a homestead with scant, non-viable crops; this farm design involves already on-island Hawaiian business owners who wish to successfully farm their lands. The Paul Alston family has operated a Cape Gooseberry Farm on the Big Island of Hawaii. Rob Alston has developed various agricultural crops on Maui. Paul Alston of Oahu plans to develop the Pueo Farm Property with his son Rob Alston of Maui and their families. The concept for this agricultural operation is as a landscaping stock plant farm. There is a need for landscaping materials for resorts, luxury properties, office parks and more. Due to the rapidly growing tourism trade, more and more venues are being established with a needed for Hawaiian plant landscaping. As such, with the Poha venture on the Big Island of Hawaii, and legal and other business connection in the State, the firm already has insights in market venues, distribution, and delivery. Most of the landscaping materials with the exception of one North Shore firm come from the windward shores – particularly in Waimanalo. As such, the market demand is so high that existing nurseries cannot keep up with the demand. Part of the reason is that landscaping crops are generally not rapid growing crops – not the 6-8 weeks a flowering plant takes, but years for trees and shrubs of the Hawaiian nature to develop to a point-of-sale level of growth. A kukui nut tree for example often seen in resort landscaping is a 3-5 year crop. Even with rotational planting, the market demand will remain at high level due to the scant provision of sufficient products. These are not out-of-state folks taking avail of Ag zoning – these are our locals with an insight to what the North Shore growing regimes can offer beyond the valuable service the region already provide in aquatic tourism resources like surfing and SUP, dining, aviation services and more. This is a niche market which will have a small effect on competition.

As this project involves construction costs of more than \$500,000, a SMA Major permit to allow the construction of an Equipment Storage and Crop Treatment materials working structure on the property; and associated farm dwellings, there is a public hearing needed, and application to DPP will be a Draft EA and SMA Major application. DPP already has been submitted the draft EA for pre-consultation and has responded. With the completion of this farm design and an accompanying *Erosion and Sedimentation Control Plan*, A SMA application will be developed and a request for a public hearing before the North Shore Neighborhood made as per DPP filing instructions. Once the public hearing is completed and as the state and City and County agencies have already been sent the Draft Environmental Assessment (DEA); filing of the DEA and SMA Major will be filed with DPP with a copy sent to OEQC for publication in the *Environmental Notice*. It is intended with this document to demonstrate the farm viability for this site; develop the site more fully with an FONSI Environmental Assessment Approval and SMA Major Approval for expansion into a full-fledged agricultural operation with on-site farm dwellings monitoring of the operations. This farm design is intended to support that SMA Major Approval process and illustrates the viability of the planned agricultural operations.

Part I was the Habitat Analysis for the site. Soil parameters and other factors were judged to weigh the viability of crops on the site. Factors like permeability, leaching factors, salinity, nutrient levels, airflow, rainfall, soil composition and much more were studied and evaluated for crop suitability.

As common to site enhancements, in Part I as part of the habitat analysis, we outlined a SWOT framework – Strengths, Weaknesses, Opportunities, and Threats. We are hopeful that we have demonstrated how in this Part II Farm Design, how we have moved Weaknesses and Threats factors to a more balanced Strengths and Opportunities scenario.

Goals and Objectives

WHALE Environmental Services have been involved with agricultural enterprises for decades. The principal grew up in the greenhouse business that had 250+ crops, and in his college years developed New England's largest aquaculture and hydroponics operation along with a wetlands plant nursery of over 400+ species cultivated. We are very strong in the belief that the land dictates the crop and it is not humans' place to try and tell the 'aina what to grow. As such, we take the *Habitat Analysis* in Part I very seriously. We do not like to try and fit ill-advised crops on to land that has other growth parameters. As such, we have advised our clients, the Alstons of Pueo Farm with what we feel is the best fit for their background and the Pueo Farms' site. And it is agreed to develop a farm plan that takes advantage of their particular vision and insights for a

landscaping stock plant farm. With the exception of two mango trees on the property for personal consumption, this is not a food crop production, but purely a landscape plant operation.

The goal was to find a suitable scenario for farming this site. There are challenges to traditional farming – saline soils, salt-laden winds, leaching factors, rapid permeability, lack of organic matter, low nutrient levels. With discussions with the Alstons, we have designed landscaping crops and their placement on the site that is best suited to the various microclimates. More saline loving species are placed closer to the oceans, others more to the mauka side. The site dictates that some traditional landscaping crops will not be able to withstand the high salinity, the poor nutrient levels, or the lack of organic matters in the soils. As such, per our recommendation, the landscaping crops have been utilized and limited to species that are salt-tolerant and will grow in outdoor growth areas fed with organic enhancements. These are detailed later in this Part II section. Crops like coconuts that may be thought to provide coconuts to traditional food markets is intended for coconut **tree** harvest for ground extraction of semi-mature trees in root balls and shipped to venues needing coconut tree landscaping – and all of these other species also taking advantage of their high salinity resistance.

Objectives – objectives are as follows:

1. Place Kamani trees and Naupaka shrubs on the ocean shoreline side which means removing the plant-damaging, invasive ironwood eucalyptus.
2. Along the east and west property sidelines, Coconut, Tropical Almond and Kukui Nut trees on the perimeters of the property to provide screenage, wind breaks, and needed landscape plant stock capacity.
3. Place growing beds of chamomile that is salt tolerant around lawn and areas on the site such as traffic circles that cannot have a high growing crop impeding fire safety equipment. Beyond the scent and aesthetic values, these ground covers produce valuable herbal crops that can be sold as a plant to health outlets and then re-sown.
4. Countering the site's soil conditions, the site will use nutrient-enhanced growing beds and specially designed root ball containments for the trees, shrubs and herbaceous crops. Mitigation measures to counter the soils' high leaching factors will be used. Control of water supply, saline conditions, nutrient levels, etc... can then be safely conditioned and monitored.
5. Insure that the site has the components for successful crop production and market-ready products. A stabilized garden cart path will be developed weaving in and around crop growing areas to host irrigation lines, and allow plant extraction equipment to access landscaping crops, or to do maintenance needs. Storage of that equipment and space to prepare landscape harvested crops for shipment to their destination. Growth units for the landscape plants will be clearly outlined in following sections. Marketing and delivery will plug into the Alston's existing network and contacts.

Pueo Farms Design and Operational Parameters Impact – It is felt that there has been a thorough examination of growth parameters, a fit of crop and farm design to fit the habitat offered, an evaluated viable crop and use selection, and an end-use projected all outlined. A weakness to strength change.

Crop Locations Justification

WHALE Environmental Services LLC has studied the growth regimes of many plants and has made choices based on plant parameters and the habitat locations. Since the Pacific Ocean waters are saline, there is a penetration into the site from saline tainted upper groundwater layers, salt-laden rain from ocean driven showers, and saline sea spray from wind movement. As such, the regions of the site closest to the shoreline have been left along with a 70' setback to host the already existing tolerant plants species. *Naupaka* and *hou* shrubs have been left in place in the shoreline region for the tree/shrub canopy layer as they are common shoreline trees/shrubs in Hawaii and are the most salt-tolerant species. Its preferred soils are sandy which the nature on this site is. The only plants on the site in the tree layer that will be removed is the ironwood – fire dangerous, invasive eucalyptuses that alter soil chemistry, retard other plant growth and are generally considered undesirable. Any other desired species on the site outside the 70' setback will also be retained and used for shade trees in the growing species. There are only a few – mostly monkey pod.

On the east and west property lines, a row of Coconut Trees *Cocos nucifera* will be placed. Details on this species will be discussed in detail later in this report. The second row under and between the coconuts will be the shrub layer species of tropical almond (*Terminalia catappa*), which also likes these conditions and will be the understory under the coconuts. The groundcover on inner regions will be the planned crops shown on the conceptual plan which are salt tolerant, certified by CTAHR at the University of Hawaii, Manoa. The resort desirability for these crops were mainly outlined by discussed with Turtle Bay Resort which has similar site conditions. Details on this species will be discussed in detail later in this report.

Behind these species will be the farm dwellings and a landscape crop staging area (Barn). Both the lawns and the crop collection staging area will not use traditional grass lawns. Instead, as common in Europe, the lawns will be chamomile (*Anthemis nobilis*). Not requiring as frequent mowing as grass as it grows more slowly, it remains a comfortable lawn material and has the advantage of being a sellable crop (*herbal plants*) to health stores as well as resort landscaping. Though it will be sown from seed on this site, chamomile actually establishes to a new area better as a transplant.



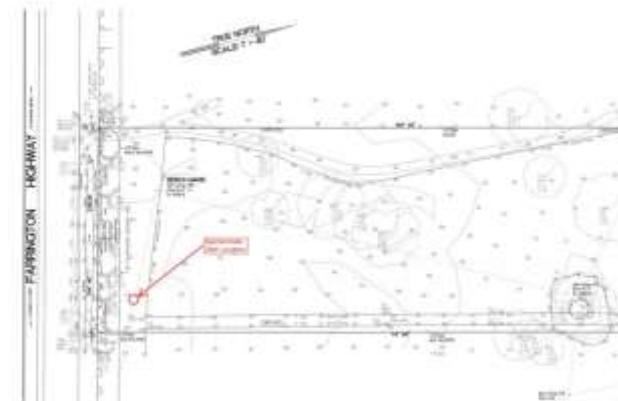
As the crop collection, irrigation line placement and maintenance needs cart paths areas will have to support harvest equipment, the cart path will be under-laid with GeoWeb *GeoCells*. As the site is mostly shifting Jaucas sands, the paths will need to be permeable to allow the irrigation to penetrate the soil, and structurally sound to support the equipment. Examples of this structure surface stabilizing material can be seen at Turtle Bay Resort where it supports the path to the beach by Roy's. The *GeoCells* will only be used where farm equipment needs to move on various areas.



The forepart of the site and middle regions will be less-salt tolerant Tropical Shrubs in the forepart (*Ulei, Tiare Gardenia, Beach Heliotrope and Hau*), more tropical shrubs with high salt resistance in the midpart (*Bird of Paradise, Coral Plant, Coco palms, Shell Ginger, Piku, and Singapore Holly*), and two Mango trees. More details later.

The front zones and the front perimeters of the site will be Bottle Palms. This will be an attractive entrance and provide good access to full sun they need. The well for the property is also located in this zone.

Past the mangos and the first circular drive for the barn will be the on-site retained monkey pods, the water reservoir, and a sunflower patch. The sunflowers are used as pollinator attractors for the other crops.



The remainder of the site as one moves makai site is the driveway for access and to comply with fire codes and the farm dwellings. As aforementioned the traffic circles and the lawn areas around the dwelling will be chamomile, crop rotated as plants develop for sale with over-seeding every 90 days or so. There is also another growing bed region for ground cover crops. Intended crops are (*Hinahina ku kāhaka, Nehe, Sea Lavender, Ohai, St. Augustine Grass, Seashore Paspalum Grass and a shrub grove of Naio*). A small grove of *Wax Myrtle* will be on the other side of the drive.

It is estimated that approximately 80% of the site will be of an agricultural nature – far in excess of the 50% farming requirement.

Reference – Salt and Wind Tolerance of Landscape Plants for Hawaii; CTAHR, University of Hawaii, March 2001

Viability of Crops

Each crop has been selected to fit the site's studied habitat. The Building is placed in the less hardy zone with the highest shade concentration of monkey pods retained on the property making crop growth under them difficult. Driveways and staging areas are required by fire codes that will be seen in the Honolulu Fire Department's response letter to the Draft EA submission to 24 agencies for comment and will be included in the *Environmental Notice*. In summary, fire regulations require that any driveway has a turn-around for fire vehicles and is at least 75' close to any structure on the property – thus the two turn-arounds.

As well, the timing of crops does not pose conflicts. Herbaceous crops are ten to sixteen weeks to reach marketable size. Shrubs are usually six to nine months, and herbal plant stock like chamomile 60-90 days and then re-seeding quarterly. Coconuts will take 3-5 years to develop to market size, Mango and Kukui Nut about the same, Wax Myrtle, Naïo, and naupaka about a year for good development. Bottle Palms about 4 years for market size. Tropical almond about two years for market size. Naupaka and kamani on the shoreline will not be harvested inside the 70' shoreline setback, any kamani planted outside the 70' zone may be harvested and sold for coastal landscaping. The property will have year-round activity on the site which justifies the needed farm quarters for on-site monitoring, planting harvesting and processing, the driveways and the crop collection barn area.

Viability is strong – crops that respond well to site conditions will thrive and produce abundance of products. The outdoor crop areas and herbal crops will provide a strong and steady supply of landscaping materials once crops are established and rotational planting is established. The packaging will be a harvest enterprise requiring sanitized facilities in the barn to treat root balls and other plant containers to prevent pest transport, bagging and processing facilities and packaging and labelling supplies. Indoor irrigation will be required to water harvested and packaged crops awaiting transport to their sales destinations.

This farm is well-balanced both for crop viability, crop timing and economic viability. Entry to landscaping markets with the plant crops will be local production because it will be North Shore Oahu crops production marketing to local Hawaii companies needing landscape material in a supply chain deficit. There is a strong niche market for landscape materials. This site will be full of viable species with good crop output and economic value.

Maintenance Needs of Crops

There has also been an attempt to minimize the maintenance component. So many people think farming is easy, it is not, but is rewarding. The Alstons know the value of hard work as local business people – and as Nā kama'āina, they wish to further advance the North Shore's agricultural needs. Here are some of the maintenance needs for the proposed crops...

Sunflowers

Once the plants mature from seeding (approx. 2 months), there is likely a weekly clipping of deadhead flowers or stalks. It likes dry conditions, watering only needed in extended dry periods and likes heat and full sun. Sunflowers need to be re-seeding bi-annual, flowers will be removed after maturity and pollination use.

Chamomile

Once the plants mature from seeding, there is likely a weekly mowing of the flower and the upper stalks to develop a stronger root structure. Chamomile will be extracted and placed in biodegradable plant pots for sale. Watering is likely daily at dawn or dusk through existing on-site irrigation.

Tropical Almond

It is likely these trees will be planted from seedlings from Waimanalo nurseries or cutting development from other stock. They take three to five years to grow unless started from larger stock. They will be root-ball extracted.

Wax Myrtle

A relatively easy plant to maintain. Grows pretty rapidly from cuttings that can be established on the site. Will survive without irrigation, but an occasional assist is advised. Berry production is indicative of plant maturity; shrub then subject to root ball extraction.

Coconut

It is mainly let them grow and secure with guy wires if wind-affected. Value as a landscaping tree that can be harvested as such for landscaping, but the real value lies in constant coconut production and landscaping extraction is not anticipated.

Kukui Nut Tree

It is likely these trees will be planted from seedlings from Waimanalo nurseries or cutting development from North Shore existing stock. They take three to five years to grow unless started from larger stock. They will be root-ball extracted.

Mango

It is mainly let them grow and secure with guy wires if wind-affected. This is on-site for personal consumption. Relativity easy to find mango harvesters to collect fruits that can have mango chunks or dried pieces used.

Outdoor Herbaceous and Tropical Shrubs Crops

There is tremendous difference in crops needs here. Details are in crop descriptions.

Harvesting Needs of Crops

There are no special harvesting needs for these crops. Herbal, herbaceous crops will need standard spade plant extraction and placement into shipping containers. Larger shrubs and/or trees like Coconut, bottle palms Tropical Almond and Wax Myrtle will require root ball extractors which will need to be an equipment farm purchase to minimize soil disturbance. The harvest of specialize crops all geared to an output of landscaping plant materials to provide a variety of crops desired by resort and other entities. Consideration can be given to stockpiling other landscaping materials like fabric, erosion blankets. fertilizers, etc..., in the barn - since current there is only one supplier on Oahu. Yet the output function of this farm is unique, its own crops really reflecting Hawaiian products for tourism pleasures in viewing landscapes geared to Hawaiian plant themes, development of a farm plan that utilizes trees, shrubs and ground covers for a variety of landscape plant crops, which makes this the cog engine of this farm. The Pueo Farms plant stock will be Hawaiian-centric and will be unique to the North Shore and Hawaii, and have good market potential.

Individual Crops Descriptions

Chamomile

Chamomile is a unique herb; it is as pretty as it is useful. Unbeknownst to most gardeners, there are two types of common chamomile: German and Roman. Both are native to Europe and both have medicinal qualities, often being incorporated into herbal remedies, beverages, and skincare interchangeably. Both boast fragrant, daisy-like flowers with white petals surrounding a yellow center.

Both varieties of chamomile grow quickly (reaching full bloom within about 10 weeks), and are best planted in the spring, either via seed or young plants. Roman chamomile is often used as a ground cover or creeping plant to soften the edges of a stone wall or walkway, while its German counterpart is more commonly used for making tea.

For this site, one variety will be farmed – the Roman version as the perennial version in the lawn areas of the traffic circle and farm dwelling lawns. A small patch of the German Chamomile may be planted near the water reservoir for personal tea consumption.

Common Name Chamomile, German chamomile, Roman chamomile, Barnyard daisy, ground apple

Botanical Names: *Chamaemelum nobile*

Family Asteraceae

Plant Type German chamomile is an annual flower; Roman chamomile is a perennial

Mature Size 8–24 in. tall, 8–12 in. wide

Sun Exposure Full sun

Soil Type Not too rich, organic soil

Soil pH	5.6-7.5 <i>for this site, pH will be adjusted and organic matter brought in to mix with Jaucas sands</i>
Bloom Time	Summer <i>in Hawaii, year-round blooms about every 45-60 days</i>
Flower Color	White petals with a yellow center
Hardiness Zones	2a-9a (USDA) <i>This site is in zone 9A</i>
Native Area	Europe

Chamomile Care

German chamomile (*Matricaria chamomilla*) is an annual plant; however, it self-seeds so readily, you may think it's a perennial just like Roman chamomile (*Chamaemelum nobile*). *These areas using this variety will have annual overseed to insure maximum production in both species areas.* Both are easy to care for in a garden and require very few extras to thrive. German chamomile produces more abundant flowers, while Roman chamomile has more fragrant blooms.

Chamomile isn't typically great as a bedding plant—it tends to be too delicate and floppy when over-grown and insignificant when paired with more formal and imposing plants. It is however a good ground cover and is commonly used in the place of grass in European lawns. It can be used for under-planting in an herb or vegetable garden, to soften rock wall edges, and is a good candidate for herbal container sales.

For herbal use of flowers: Harvest the chamomile flowers and upper leaves when they are fully open. They can be used fresh or dried. When dried, store the flowers and leaves in a cool, dark environment in an air-tight container (or frozen). If one finds that the leaves make your tea too bitter, just harvest the flowers. *The sorting process in the drying racks will remove stray debris (sand, rogue leaves, detritus) and separate flowers from leaves after mowing and collection. The flowers will be dried and packaged for herbal tea products, while the leaves will be marketed to the beer and ale brewing houses in Hawaii as a common additive to add some bitterness to brew, Both are viable niche markets.*

Light

Both Roman and German chamomile grow well in either full sun or partial shade. The plants will flower best in full sun, but in hot climates, a bit of partial shade is a better choice (especially during the hot afternoon hours) to avoid burning the delicate blooms. More sun typically leads to faster growth, but this plant grows rapidly by nature. *The temperature at this site is mitigated by the ocean breezes. As well, nearby monkey pod trees and coconut trees will provide partial shade.*

Soil

Both versions of chamomile will flower best if grown in rich, organic soil. They can survive in poorer mixtures, but it will often cause their stems to be floppier. Chamomile is not particular about its soil pH, preferring a neutral range of between 5.6 to 7.5. *pH will be adjusted, compost brought in from the compost farm on Kakonahua Road facility to properly prepare growing beds.*

Water

Water young chamomile plants about an inch per week. As they age and become established, the plants are drought tolerant. It's best to allow plants to dry out between moderate watering. However, in extremely hot climates, chamomile will appreciate a bit more moisture. *Both chamomile areas will be tied into the site irrigation system to be developed.*

Temperature and Humidity

Chamomile is capable of thriving in any summer weather under 100 degrees Fahrenheit. It prefers a moderate temperature range between 60 to 68 degrees Fahrenheit. Because it's drought-tolerant, it does thrive in excessively humid areas.

Fertilizer

Chamomile does not need fertilizer; it grows quickly without any particular need for feeding. *Pueo Farms is devoted to be 100% organic – any additives or amendments needs will comply with organic standards.*

How to Grow Chamomile From Seed

Chamomile is easy to start from seed. Start seeds indoors or outdoors in a proper climate (*plants will be started by seed in the all areas*). Chamomile seeds need light to germinate, so scatter the seeds and press them firmly onto the soil (*a standard plant roller to press the seeds*), but do not cover the seeds with soil. (*We also recommend soaking the seeds first for 10-12 hours before sowing*). Water regularly and they should germinate in seven to 14 days.

Common Pests

Most insects stay clear of chamomile. Chamomile is used as a pest deterrent. However, aphids can sometimes be a problem. Both can be washed off the plant or treated with insecticidal soap. *If needed, biodegradable soap will be used.*

How to Get Chamomile to Bloom

Chamomile blooms are small with yellow centers and white petals; they look like miniature daisies. The flowers have a sweet, herbaceous aroma, and bloom in the spring and summer *Year-round in Hawai'i*. The best way to get chamomile to bloom is by providing it direct, full-sun—it may not bloom if it's shaded. *Shading from nearby trees will be minimum, coconuts do not cast much shade and wax myrtle and tropical almond too short to cast shade that far.* Other than that, this plant is super-easy: no extreme deadheading or fertilizer needed.

Common Problems with Chamomile

Chamomile is an easy-to-grow herb, both inside and out, and experiences very few problems. But occasionally, it needs a little TLC mostly centered around the moisture regime. It is also wise not to let the blooms go to seed frequently – this diminishes the strength of the plant and slows frequency of blooms and hinders plant development for its intended sale as an herbal plant stock. For re-seeding, letting a patch of chamomile to go to seed over every six months or so suffices for the Roman variety. Chamomile is also pleasant to walk on and releases pleasant scents. Sprigs rebound after the lawn is walked on. Heavier equipment use will require underlying structural support (see *GeoCell* section)

GeoCells

Since there is a structural need for equipment movement, cart path uses, we have added this commentary in this location. Any ground cover using heavy equipment, harvesting equipment, collection support, etc... will need a strong structural surface to work on. This site will require nut harvesting root ball extractors, , trimmers, mowers, and other specialty harvest equipment and collection equipment to transfer to proper processing locations elsewhere on the site or off. Any plant material or travel surface placed over a light organic soil layer over the Jaucas sands will not provide a stable surface. A common technique to stabilize a live growing surface is to use *GeoCells*. One can see this product at Turtle Bay Resort on the beach path by Roy's. These cells from non-toxic HDPE plastic are simply filled with plant mixture and seeded with seeds or plants. Drainage is maintained and the cells provide a strong workable surface with living greens.



Coconut

Young coconut palms grow rapidly, and their multiple leaves will develop into a trunk in about five years. It is envisioned that semi-mature seedlings will be purchased from on Oahu nurseries in the 8-12' one to two year- old stage. At that stage, flower clusters begin to be formed in the axil of each leaf. A few weeks after flowering, many immature fruits will drop from the cluster. To grow the coconut in a site, choose a site with well-drained soil in limited shade (*ideal for this site*). During the first year of growth, the planted coconut plant absorbs nutrients and responds to fertilizer as does any other plant. Initially this site

plans to have extracted root balls of 4-5 year old plants brought to the extraction facility for root ball packaging and shipment preparation. Upon the tree's extraction and sold as a landscaping tree, they will be replaced with a new tree sapling.

Wax Myrtle

This is an undervalued species in Hawaii. Known as Bayberry in New England, this seaside plant is highly valued for attractiveness from its fragrant wax berries and valued for screening landscaping. Its prickly branches deter pedestrian movement and it is often used in resort landscaping as a deterrent to discourage and direct walking movement away from undesired areas.

Morella cerifera (wax myrtle) is an evergreen shrub to small tree that is native to the coastal southeastern United States from Maryland to Texas. In its native range, *Morella cerifera* grows in sand dunes, edges of marshes and ponds, and woods and is seen often in Hawaii. Here, it is mainly found on the North Shore.

Family: Myricaceae (Bayberry family Latin name: *Morella cerifera* (L.))

Common names: Southern wax myrtle, wax-myrtle, wax myrtle

Taxonomic notes: The family Myricaceae is made up of 3 genera and possibly up to 50 species that are widespread in the Old and New World, mostly in temperate and subtropical regions and are represented in Hawai'i by two naturalized species, *Morella cerifera* and *Morella faya* (Wagner et al. 1999, Meidell et al. 1997).

Wax Myrtle can reach a height and spread of 35 ft., but is usually seen in the 10-12 ft. range in Hawaii, particularly when used as an understory over large trees like Kamani on this site. Growth rate is rapid and it is projected to harvest in the 4-5' range. Leaves simple, alternate, oblanceolate, to 4 in long, often undulate. The thin, olive green leaves are often coarsely serrate along apical margins and dotted with tiny rusty glands on both sides. It is aromatic. Multiple crooked trunks are covered with smooth, grayish-white bark. Young stems light green to gray, pubescent. Suckers frequently from trunk bases and roots. Plants dioecious; flowers inconspicuous, small axillary catkins appear in spring months. Fruit grayish-blue, 0.25 in wide, in dense clusters along the twigs in the summer or fall. The fruit are heavily coated with wax. The surfaces have abundant waxy granules, especially the underside.

The waxy surfaces of *M. cerifera* and other species is removed by boiling in water and used as a source of candle wax. It is cultivated as a hedge, screen, or enclosure plant as well as a background shrub (*intended use here*). Lower branches can be trimmed to make an excellent small tree for roadside or park plantings. *M. cerifera* grows in full sun or partial shade on almost any soil type. It can tolerate salty conditions and flooding, but does not withstand excessive drought. It has a history of cultivation in the Hawaiian Islands, with its nitrogen-fixing capabilities, and ability to colonize and dominate disturbed areas in a variety of habitat. Wax Myrtle is easily and rapidly propagated from seed and can also be propagated from tip cuttings.

Mango

A mango tree (*Mangifera indica*) can make for an interesting specimen when grown in the ground. In the right conditions, this tree forms a dense canopy of long oblong green leaves and rewards you with white flowers in its ideal habitat; the fruit comes three to five months later. Mango trees planted in the outdoors are more likely to fruit than indoor potted trees. Fruiting usually depends on if they receive enough sunlight. Mango trees should be planted in the spring and are generally fast-growing. Also, note that the sap, bark, or fruit skin can be toxic to people.

Common Name	Mango
Botanical Name	<i>Mangifera indica</i>
Family	<i>Anacardiaceae</i>
Plant Type	Fruit, tree
Size	Up to 100 ft. tall, 35 ft. wide
Sun Exposure	Full sun
Soil Type	Loamy, moist, well-drained
Soil pH	Acidic, neutral, alkaline (5.5 to 7.5)

Bloom Time Winter

Hardiness Zones 9–11 (USDA)

Native Area Asia

Toxicity Toxic to people

Selecting a Planting Site

Mango trees prefer a sunny spot with loose, well-draining soil. Make sure to consider the tree's mature size when selecting a planting site, and note the site's proximity to other plants and structures. *(This is placed sun side of the barn isolated from other species. Owner's preference for on-site consumption.)*

Spacing, Depth, and Support

Spacing depends on the mango variety one is growing. Check the mature canopy width, along with the height, to make sure there is enough room to grow the tree. Saplings should be planted at the same depth they were growing in their nursery container. Saplings might need staking for support as they grow, especially if they are in an area that gets strong winds. *Unlikely – sheltered by the barn.*

Mango Tree Care

Light

Mango trees require full sun, meaning at least eight hours of direct sunlight on most days. Their flower and fruit production will suffer if they don't get enough light. A south-facing site works *(which is why it is located to the forepart of the barn)*, full sunlight exposure is recommended.

Soil

These trees can tolerate a variety of soil types. But a sandy loam that's light and well-draining is best. The soil pH can range from slightly acidic to slightly alkaline. *Light amendments will be utilized.*

Water

Mango trees have some drought tolerance, though drought can negatively impact the fruit production. It's best to water whenever the top couple inches of soil dries out, but do not let the tree sit in soggy soil.

Temperature and Humidity

Mango trees prefer humidity above 50 percent. Also, keep a tree as warm as possible, ideally always above 70 degrees. *Hawaii.* Mango trees can't tolerate freezing, and even temperatures in the 40s can cause flowers and fruit to drop.

Fertilizer

These trees don't need a lot of fertilizer, and if you already have nutrient-rich soil you likely won't have to provide supplemental feeding. A slow-release balanced organic fertilizer can be applied in poor soil conditions, following label instructions. *Soil Testing on a monthly basis will determine organic fertilizer needs.*

Pollination

Mango trees are pollinated by bees, ants, flies, and other pollinators, along with wind. *Again, consideration giving to on-site bee hives, already providing pollination attracting sunflower as nearby.*

Types of Mango Trees

Some good choices include:

- **'Pickering'** develops into a bushy tree. You can expect it to flower in late winter and to bear fruit in the summer.

- **'Ice Cream'** makes a good plant for the patio, as it grows to 6 feet tall. When ripe, the fruit is yellow-green rather than red.
- **'Cogshall'** is an excellent choice for growing in a container and produces fruit consistently.

It is likely that grafted cuttings from Oahu existing producing mangoes will be used.

Harvesting Mangoes

Planted from seed, a mango tree requires five to eight years before it will bear fruit; a nursery sapling should produce fruit in about four years. *Nursey stock will be used.*

The mango fruit takes three to five months to ripen after the tree has flowered. The color of the ripe fruit depends on the variety. The fruit is typically harvested by hand and must be handled gently to avoid breaking the skin. One way to test for readiness is to pick a fruit and sniff to see if it has a sweet scent. Mango can be eaten raw or cooked. Immature fruit is often used to make pickled or dried mango. It also can be frozen.

Bottle Palm

Botanical name: *Hyophorbe lagenicaulis*

Frond type: Pinnate

How to ID it: The trunk of a bottle palm is rounded and swollen at the bottom and shaped like a bottle (hence, the name).

Landscape uses: These palms look great with the lower trunk exposed in a container. They can be incorporated into tropical and drought-tolerant gardens. Often confused with a ponytail



palm, which is not really a palm tree but has a similar-shaped trunk.

Height: 10 to 12 feet

Native to: The Mascarene Islands, which are in the Indian Ocean east of Madagascar.

Though it can be cold-sensitive, this palm is an outstanding accent palm for tropical garden beds or sheltered entry areas. Its small size and striking appearance enhance formal or eclectic landscapes. The fronds are few but long and graceful. And the crown shaft (the area above the trunk) and leaf stems (petioles) have an attractive reddish color that fades as the palm slowly matures. Most often seen as a single specimen, bottle palms are also available as novel, eye-catching multi-trunk specimens, usually with 2 or 3 trunks. Contrary to popular belief, the swollen trunk of this mini palm tree is not for water storage. Though it can be moderately drought-tolerant once it's established, this palm does need regular irrigation during dry spells.

Plant specs

Bottles are slow growing palms that could end up about 10 feet at maturity...but maturity takes many, many years. Most specimens in the landscape average only 5 to 7 feet tall. *Harvest will be done with semi-maturing species – likely in 5 year range.*

Cold is a very real threat, so growing in especially in warmer coastal areas - is fine for normal winter temperatures. *Not an issue.* Bottles are drought-tolerant and like full to part sun locations.

They can be used in partial shade as well, but if there's too much shade the crown shaft will grow elongated and lean toward the light - turning unique into just plain ugly. *On the full sun Farrington side.* These palms are highly salt-tolerant making them ideal for coastal plantings.

Plant care

Plant in an area where the soil drains well, like a beach environment. This palm does not like an overly wet area. Add top soil to the hole when you plant. Bottles aren't self-cleaning but, due to their slow growth rate, you'll rarely have to trim off an old frond. Since there are only a limited number of fronds anyway - usually only 4 to 6 - the palm may look sparse or even bald.

This is not a hungry palm, so fertilizing with a slow-release granular three times a year - once a season in spring, summer and autumn - is plenty. Bottles are fairly drought-tolerant once established, though a regular watering keeps them looking their best. *The entrance will be in full sun with irrigation likely evaporating quickly, so this site is ideal for the species*

Plant spacing

The limited number of fronds keeps them from competing with one another, so these palms can be planted in groups or in a line as close as 4 to 6 feet apart. Multi-trunk bottles should be positioned well away from any structure, since their swollen bases keep the trunks fanned out fairly far apart. This is an excellent container palm since it grows so slowly, *which makes it a good Pueo Farm sales. If it succeeds on the site well, plantings might expand to other areas.*

Landscape uses for bottle palm

- specimen for small to large garden beds
- in the center of a circular drive
- lining a drive or walk
- at the entry - as long as there's enough space for fronds to spread out *Pueo Farm use*
- as a container plant for a sunny patio

Saw Palmetto

Saw palmetto is also a useful plant for home landscapes throughout the state. This plant tolerates a range of conditions and provides wonderful textural interest beneath new or established trees. And it's highly salt-tolerant, making it ideal for coastal gardening. Known scientifically as *Serenoa repens*, saw palmetto is native to the Southeast USA and can be found growing as far north as South Carolina and as far west as the southern states exist. *Good climate in Hawaii.*



Characteristics

Saw palmetto is a slow-growing, clumping, multi-trunked palm that typically grows 5 to 10 feet tall and spreads 4 to 10 feet wide. It has stout stems that usually crawl across the ground and produce fan-shaped fronds. While most forms have green leaves, leaf color is variable, with silver to blue-silver forms also common in higher sun areas. In the horticultural trade, forms with more silvery foliage are sometimes given names including 'Sericea', 'Cinerea', or 'Glauca'.

In the spring, 3-foot long flower stalks appear, sporting small yellow-white, fragrant flowers. Bees are attracted by these flowers, making high-grade saw palmetto honey. Flowers are followed by small, yellow berries that turn black and ripen in the hotter months. Saw palmetto is great for wildlife, as the berries are an important food source for many mammals and birds. Some people believe that extracts from the berries could be an alternative treatment for prostate cancer, despite statements from the American Cancer Society that say there is no evidence of this.

Planting and Care

It's important to pick the right methods for planting, since saw palmetto can be difficult to move once established (*Bentonite Mat root containment will be used – see root ball planting method*). Choose an area that will allow the plant room to grow and mature. Position plants away from walkways, driveways, play areas, or any place where the saw-like teeth along the stems might cause harm. (*We have placed this near the entrance to discourage unauthorized site entry*). This plant provides a beautiful backdrop for mixed borders and works well as a privacy hedge or foundation planting. *It will be harvested at the 3-5 sapling height – sufficient to act as a privacy hedge, mature enough for sale as a landscape plant, It will be rotational planted.*

Saw palmetto prefers full sun but will grow in almost any light conditions. It will benefit from regular watering at first, but will be very drought tolerant once established. Occasional pruning of dead fronds and old flower/fruit stems is all the maintenance this plant will need.

Naio

Scientific Name: *Myoporum sandwicense*

AKA: False sandalwood

Indigenous: All of Hawaii except Kaho'olawe; Endemic subspecies: O'ahu

Description: Depending on which island you are on or perhaps more specifically which part of the island you are on, naio can take the form of a prostrate ground cover, such as naio papa at South Point on the island of Hawaii; or fairly large shrub (about 8-10 ft. tall) as in other coastal localities on most islands (*as is the case here*) including the Pukahuloa region again on the island of Hawai'i or a 50-80 ft. tall tree like those in the upper dry forests and subalpine regions of Maui and Hawaii. All of these forms will usually have glossy dark green, glabrous leaves which are anywhere from 1-8 inches long and about 1-2 inches wide. All plants will have small, whitish-pink flowers about a half an inch in diameter that emits a spicy-sandalwood like fragrance. Once pollinated the flowers develop in to small fleshy white fruit of about the same size containing a single hard seed.

Distribution: This is an indigenous plant found in the coastal dry forest up to the sub-alpine dry forest on all the main islands except never recorded from Kaho'olawe. On O'ahu this plant is primarily found around Ka'iwi (*Allen Davis*), Ka'ena, as well as at Kalaeloa (Barber's Point) where that endangered, endemic subspecies mentioned above is located.

Cultural Uses: The hard wood of this plant was used in the construction of houses, spears and other smaller utensils.

Landscape Uses and Care: This extremely hardy plant thrives in full sun with minimal watering. It does well as a specimen plant or as a medium sized hedge and looks really nice especially with its dark green leaves. Few pests bother this plant so pesticide application is usually not necessary. Naio is also used in soil bioremediation since studies have shown it to remove and breakdown petroleum based substances in the ground. This plant is used more in landscapes especially for its striking foliage and screening capabilities. *We have placed it on the sunny side of the farm dwellings in its own grove.*

Additional Info: This plant is also known as bastard sandalwood since it was used to fill orders of sandalwood to the orient when sandalwood became scarce. Its fragrance resembles the scent of sandalwood when the tree is cut or burned, however it doesn't retain the scent as long as normal sandalwood.

Tropical Almond

The almond belongs to the rose family (Rosaceae), making it a relative of several well-known fruit trees. There are different types, ranging from small ornamental shrubs (*Prunus glandulosa*) the planned species for the site - grown only for their pretty flowers to medium-sized trees that produce edible nuts. It is not difficult to grow almond trees and harvest their nuts as long as you have the right kind of climate and are armed with a few critical growing tips.

Botanical Name	<i>Prunus dulcis</i>
Common Name	Almond tree
Plant Type	Deciduous tree
Mature Size	10 to 15 feet tall and wide
Sun Exposure	Full sun
Soil Type	Rich, deep, well-drained loam
Soil pH	Slightly acidic to neutral to slightly alkaline
Bloom Time	March
Flower Color	White, pink
USDA Plant Hardiness Zones	7 to 9

Native Area

North Africa and the Middle East

How to Grow Tropical Almond Trees

The almond tree functions best when grown in a climate in which the summer is hot, with low humidity.

Light

Your almond tree will bear the most flowers if located in full sun. It is an attractive landscaping plant and commonly harvest when 3-4' high.

Soil

Good drainage is important, so sandy soils are preferred over clayey soils. Till deeply into the soil so that the roots can strike down deep. *But only down to the tap root preventing bentonite layer for ease of harvesting as a landscape plant.*

Water

Almond trees have average water needs.

Fertilizer

You fertilize an almond tree in upon discovery of nutrient needs via testing. A balanced fertilizer is best. Apply this fertilizer along the drip line of the tree. Plant your almond trees 15 to 25 feet apart from one another.

Kamani

Calophyllum inophyllum

Names: kamani, Alexandrian laurel, beautyleaf, Borneo mahogany, beach mahogany, poon, oil nut tree (English), kamani, kamanu (Hawaii), dilo (Fiji), beach Calophyllum (Papua New Guinea), daog or daok (Guam, Northern Marianas), btaches (Palau), biyuch (Yap), rakich (Chuuk), isou (Pohnpei), eet (Kosrae), lueg (Marshalls), fetau (Samoa), fetau (Tonga), tamanu (Cook Islands, Society Islands, Marquesas), te itai (Kiribati)

- Family Clusiaceae (syn. Guttiferae).
- Native to tropical Africa, East India, and eastern Polynesia and Micronesia.
- Special areas in Hawaii: Waimea Arboretum, Iolani Palace.
- Wood was used in Hawaii for turned and carved craft wood, elsewhere for general construction, boat building, and cabinetmaking and railroad crossties. Oil is extracted from the nuts (*tamanu*) and used medicinally in Pacific Island cultures.

On most of this site, Kamani will not be harvested but will be the preferred tree species in the shoreline setback replacing ironwood along with the existing and enhanced naupaka layer.

This slow growing tree can grow as tall as 60 feet, and like many other nut trees it can sprout numerous keiki trees in its vicinity when the nuts are not harvested or eaten by rats and pigs. Kamani trees can tolerate some shade, and kamani trees prefer sandy soil and an elevation from sea level to 1500 feet, but will also do well in clay or rocky soil.

To start a new tree, gather several nuts from an existing tree. Soak them in water overnight to hasten germination and then plant one nut in a one-gallon pot filled with potting soil. Keep your pot or pots in a sunny spot and keep the soil evenly moist until germination occurs—be patient, as this can take some time. *It is anticipated to use nursery saplings.*

When seedlings are at least one foot tall, transplant to an area with plenty of space, since the root system of a mature tree can spread as wide as the mature canopy. *For species extracted for sale outside the 70' shoreline setback zone, harvest will be made when 8-10' high – about 4-5 years maturity.*

Kamani trees are resistant to most insect pests and plant diseases. To ensure continued growth and health of your tree, place mulch around it with compost. Its roots can be in sand.

Kukui Nut

Kukui Nut, Candlenut Tree (*aleurites moluccana*) – Hundreds of flowers, small and ivory to white in color are hardly even noticed but the nut that develops is prized for its high oil content and its ability to burn for about 15 minutes giving it the nickname candlenut. Candlenut trees thrive in moist tropical regions. Considered highly ornamental it can reach 65 feet or more at maturity and have wide spreading branches. *This tree will be harvested in the 4-6 foot sapling range for landscape crop stock plant use in resort plantings.*

The growth rate of Kukui Nut will vary greatly depending on soil type, sunlight, temperature and other factors. A few leaves are often trimmed due to habitat stress if needed.

These tropical trees grow happily while flowering and fruiting in a pot or in ground. They will add an attractive accent to your outdoor space, garden or patio with its silver underside of leaves. All tropical fruiting varieties grow very well in containers, or outdoors. Smaller varieties grow best in pots while larger varieties need enough room for growth Remember the looser the roots, the taller and healthier the tree will be. When the tree becomes root bound its growth will slow, at that point it is time for a larger container. *This is the intent, bentonite confined roots, and harvest when shrub size is fully formed – 2-3 year point.*

SOIL

Kukui nut Trees enjoy a loose, well drained, general potting. Remember try to stay away from arid or wet, mucky soils. *Mix of sand and compost will be used.*

FERTILIZER

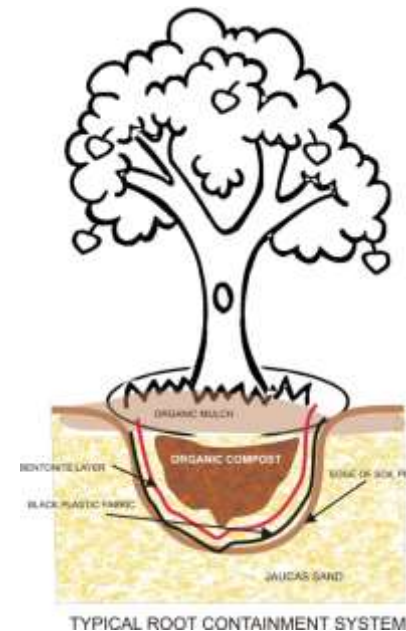
To help establish the new plant, fertilize sparingly ten inches away from the base, tri-annually with a slow time released product. Unfertilized they will tend to grow at a slower pace. Make sure the fertilizer has no salt content, this species is only lightly salt tolerant why it is proposed for the forefront of the site and needs no additional salts in fertilizers.

GROW ZONE & LIGHT

This tree requires 80-100% sunlight. Depending on your location full sun is often best.

Tree and/or Shrub Root Ball Containment

This site is a landscaping plant production farm with the intent to sell landscaping vegetation to resorts and other entities looking for Hawaiian landscape plants. As such, crops will be developed from seed, cutting or purchased saplings and then grown to mature species likely in a younger phase that will be sold to client venues. As the site has a high leaching factor, most trees and shrubs will try to extend deep tap roots past the 5-6 Jaucas sand layer to reach the groundwater table. Trees and shrubs with deep tap roots are difficult to extract when harvested for landscape plants. To prevent that, a root containment system will be used. The dug soil pit is sized according to the expected root ball size at time of harvest (*shrubs will be smaller than trees for example*). So excavation is expected at 2-4' for plantings. Each pit will be lined with



landscape black fabric to slow the salt intrusion from groundwater, then lined with bentonite clay sheeting to reduce the permeability caused by leaching and prevent tap root development. The pit will be filled above these layers with compost mixes suitable for the species planted. Upon harvest as a landscape plant, a standard root ball extractor will remove the plant at the bentonite layer extracting it for future root ball protection for shipping in burlap or other standard balling materials.



The excavated hole will then have its fabric and bentonite layers replaced and a new replacement put in place in new compost and or sand mixes as needed.

Outdoor Tropical Shrub and Ground Cover Growing Beds

There are three areas on the site that will be converted to a series of outdoor growing beds. Construction of the beds area as

follows:

- A 4'x8' frame of pressure-treated 2"x6"s for ground cover crops and 2"x10" for the tropical shrubs will be framed. Side upright seams will be silicone caulked.
- Black permeable landscape fabric will be placed in the frame for weed/grass retardation.
- A sheet of bentonite matting will be placed over the landscape fabric. Bentonite is an absorbent swelling clay consisting mostly of montmorillonite. It usually forms from weathering of volcanic ash in seawater, which converts the volcanic glass present in the ash to clay minerals. It assists in keeping moisture levels present in the growing beds.

Bentonite 1



Capillary Matting 1



- Next will be a sheet of capillary matting. Capillary Matting, also known as wicking fabric or spreader mat can evenly dispense moisture to the bottoms of the plant roots that rest on it.
- A Mix of compost obtained from the Kakonahua Road compost operation will be added to the frame. In some cases it will be mixed with the on-site Jaucas sands, in other crops demanding high organic matter, Perlite and Vermiculite will also be added to the mix in the beds to provide a loose growing substrate.
- There will be growing beds of species as described below.
- For adjusting the nutrients, careful regard to the organic compost, sand, perlite, vermiculate mixture will be adjusted as needed for each species demands. Standard irrigation system watering will be set up, but one that can add nutrients solutions to the dispersed waters dependent on soil tests indicating over fertilization or nutrient needs. The capillary matting will evenly disperse the dispersed solutions of water and/or nutrients through the matting. This will be a timed irrigation system that commands each watering need to the PVC system feeding a specific outdoor growing bed section and its particular crops watering/nutrient needs.



Species Planned

Tropical Shrubs 1 (less salt resistant)

Ulei

Osteomeles anthyllidifolia

Main Plant Information

Genus: *Osteomeles*

Species: *anthyllidifolia*

Hawaiian Names with Diacritics

- Eluehe
- U' ulei
- ' Ūlei

Common Names

- Hawaiian hawthorn
- Hawaiian rose

Plant Characteristics

Distribution Status: Indigenous

Endangered Species Status: No Status

Plant Form / Growth Habit: Sprawling Shrub

Shrub: Mature Size, Height (in feet)

- Shrub, Dwarf, Less than 2
- Shrub, Small, 2 to 6
- Shrub, Medium, 6 to 10
- Shrub, Tall, Greater than 10
- Tree, Small, 15 to 30

Mature Size, Width

' Ūlei can grow from a prostrate ground cover to an upright shrub-like tree with a spread of 4 to 10 feet.



Life Span: Long lived (Greater than 5 years)

Landscape Uses

- Accent
- Container
- Erosion Control
- Ground Cover
- Hedges
- Screening
- Specimen Plant
- Trellis or Fence Climber

Additional Landscape Use Information

This is a hardy xeric plant requiring little or no maintenance once established. But in many landscapes 'ūlei is grown far too wet, which produces luxuriant growth but little or no flowers. Cut back on watering to initiate flowering. Although these plants can be grown in containers, they do best when planted in the ground. The white flowers are slightly fragrant, reminiscent of rose with a hint of mountain apple ('ōhi'a 'ai). ' Ūlei can be reluctant to bloom if given too much water. To initiate blooming grow as a xeric plant and provide water when necessary and not continually throughout the year. The fruits are white to whitish with lavender flush. They contain very hard seeds. The fruits are edible but somewhat bland-tasting. Each leaflet ranges in size from under an inch to nearly 3 inches on a compound leaf arrangement that is 9 to 20 inches long. 'Ūlei leaflets are dark green and have an upper surface that is glossy and leathery. ' Ūlei is prone to ants, scale, mealy bugs and aphids.

Fertilizer

' Ūlei are not heavy feeders and will thrive very well with little additional fertilizers if soil has a proper balance of nutrients. However, if additional fertilizer is required, an application of a balanced slow release organic fertilizer with minor elements every 6 months should suffice. Once a month apply foliar feed with a kelp or fish emulsion, or a water-soluble fertilizer with a dilution of one-half to one-third of recommended strength may also be applied. Trim ' ūlei to encourage branching, reduce size or to maintain its shape, but avoid cutting old growth. It can also be trimmed to form topiary arrangements.

Water Requirements

Prefers dry conditions. Water plants until established and then water only in severe drought periods.
Soil must be well drained

Light Conditions are full sun or partial sun, prefers full sun. Spacing Information: 'Ūlei should be spaced at least 3 to 5 feet apart. Salt tolerances are moderate (coastal varieties). Its tolerances are:

- Drought
- Wind
- Salt Spray
- Heat

' Ūlei is indigenous and also occurring in the Cook Islands, Tonga, Rarotonga, Rapa Iti in the Austral Islands, and a single remaining plant on Pitcairn Island. These plants are known to grow on coastal cliffs, open lava fields, dry shrub land and in dry to mesic forests from near sea level to over 7,600 feet. ' Ūlei belong to the very large Rose family (Rosaceae) of nearly 3,000 species. Though ' ūlei is indigenous, there are three other endemic members: Hawaiian strawberry or ' ōhelo papa (*Fragaria chiloensis* subsp. *sandwicensis*), and two species Hawaiian raspberries or ' ākalo (*Rubus hawaiiensis* & *R. macraei*). All have edible fruit, but range from bland to bitter to sweet. The generic name *Osteomeles* comes from the Greek *osteon*, bone, and *melon*, apple, in reference to the pome-type fruit with its hard endocarps (seed shell).

Hawaiian Information:

Eluehe is the Moloka'i name for this plant. 'Ūlei are one of the few native Hawaiian plants that can often survive fires and resprout from stem bases. Early Hawaiian use was a number of uses for ' ūlei, including fashioning the very hard reddish brown wood into digging sticks (' ō' ō), long spears for catching octopus, kapa beaters, ' ūkēkē boards (musical instrument), back scratchers, carrying poles (' auamo) for water and food.

Dye:

The white fruit produced a lavender to purple dye for kapa (tapa).

Fishing:

The strong flexible branches were looped to make round fish nets.

Food:

The small sweet fruits were eaten and is similar to the taste of rose petals.

Games & Sports:

‘ Ūlei wood was fashioned into spears for the games of spear throwing (‘ ō‘ ō ihe) and spear fencing (kākā lā‘ au). Short tapered sticks were used to play the game of pahe‘ e.

Lei:

The flowers and fruit of ‘ ūlei were used in lei making.

Medicinal:

Early Hawaiians used the seeds and buds as a laxative for babies. The leaves, root bark and salt were pounded together and the liquid used for deep cuts.

Modern Use

Flowers and fruits of ‘ ūlei are still used in lei making and the fruits are still eaten today as they were in the times of the early Hawaiians.

Hawaiian Tiare Gardenia

Gardenia brighamii tiare

Main Plant Information

Genus: *Gardenia*

Species: *brighamii*

Hawaiian Names with Diacritics

- Nā‘ ū

Hawaiian Names

- Nanu
- Nau

Common Names

- Forest gardenia
- Hawaiian gardenia



Plant Characteristics

Distribution Status: Endemic

Endangered Species Status: Federally Listed for native species, not listed for the common tiare form.

Plant Form / Growth Habit:

- Shrub
- Tree

Mature Size, Height (in feet)

- Shrub, Medium, 6 to 10
- Shrub, Tall, Greater than 10
- Tree, Small, 15 to 30

Nā' ū has a canopy spread of 10 to 15+ foot spread with a height to width ratio of 1:5:1.

Life Span: Long lived (Greater than 5 years)

Landscape Uses

- Accent
- Container
- Hedges
- Provides Shade
- Screening
- Specimen Plant

Additional Landscape Use Information

Fortunately, nā' ū is easy to grow and care for in the landscape and not too particular about soil conditions. As a growing bed use, plant with generous amounts of perlite with potting soil mix at about a 1:1 ratio. Perlite will ensure good drainage. The very fragrant gardenia smell has a hint of coconut oil. When several flowers are in bloom at the same time, the air is filled with scent, The porcelain-white flowers are much smaller than the flamboyant introduced gardenias, but no less fragrant. Its blooming period is year-round. In the wild, flowering and fruiting varies among populations.* On O' ahu and Hawai' i Island, nā' ū blooms from October to December. On Maui, Moloka' i and Lana' i, nā' ū blooms primarily in the spring months of March, April and May, with sporadic blooming in December and July. Cultivated plants seem to flower more or less continuously year round with brief or sporadic rest periods. Some nā' ū shrubs or trees will regularly and consistently fruit, while others are reluctant to do so. Following flowering, dark green fruits in the productive plants will eventually reach about the size of a golf ball or smaller. The fruits will remain green for several months. Just before ripening the green disappears and

the fruit turn a yellowish to tan color and are semi mushy or soft to the feel. Inside are numerous rock-hard whitish seeds encased in a bright orange-yellow pulp. Nā' ū leaves are dark green and shiny under an inch to over 4 inches long. Nā' ū is prone to ants, scale, mealybugs, thrips, red spider mites and aphids. Black twig borers may cause minor to major damage.

Fertilizer

Nā' ū respond well to fertilizers, but avoid high nitrogen fertilizers which may cause luxuriant growth but fewer flowers. Use a balanced slow release organic fertilizer with minor elements every six months. Foliar feed monthly with kelp or fish emulsion, or a water-soluble fertilizer with a dilution of one half to one third of recommended strength. Nā' ū appreciate frequent applications of iron chelate and fertilizers for acid loving plants Apply at half or third strength according to directions on the label for gardenias. Prune off dead twigs and branches as needed for a desired landscape appearance.

Water Requirements

It likes dry conditions and when nā' ū is well established, water once a month during drought-like conditions. Otherwise, watering should be kept minimal. Surface mulch to help maintain moisture in soil and reduce need for watering. Soil must be well drained.

Light Conditions

Nā' ū require full sun for good flower production. Plants should be spaced 4 to 6 feet apart for use as a hedge. To showcase specimens, space plants 10 to 15 feet apart.

Tolerances

- Drought
- Wind

Special Features and Information

Nā' ū (*Gardenia brighamii*) is one of several members of the Coffee family (Rubiaceae) native to the Hawaiian islands. The generic name *Gardenia* is named in honor of Alexander Garden (1730-1791) of Charleston, South Carolina who was a botanist, zoologist and physician, and correspondent to John Ellis, zoologist, and Carolus Linnaeus, who devised the classification of genus/species we presently used today. The specific epithet *brighamii*, is named in honor of William Tufts Brigham (1841-1926), geologist, botanist and the first director of the Bernice P. Bishop Museum, Honolulu, Hawai' i. The non-native subspecies tiare form is more common for landscaping, but grows in a form close to the native.

Early Hawaiian Use

Dye:

The intense orange-yellow colored pulp of the fruit was also used to dye to kapa a rich yellow by early Hawaiians for the ali' i. This vibrant color used for kapa was called nā' ū, after the plant itself.

Lei:

The beautiful fragrant flowers were strung into lei by early Hawaiians.

Wood:

Kapa anvils or *kua kuku* on which kapa was beaten in the second-stage process was made from the wood of nā' ū.

Modern Use

Today, dyes are still made from the fruit of nā' ū turn out to be a beautiful, bright golden yellow which does not fade when dried.

Beach Heliotrope



Heliotropium foertherianum

Common name(s): English: East Indian velvleaf, beach heliotrope, tree heliotrope, tree-heliotrope

Hawaiian: tahinu

Habit: shrub/tree

Description: Tournefortia (genus): "Shrubs, sometimes vines or treelets. Widely branching shrub or small tree up to 4 m. or more tall, young growth brittle and densely whitish--or buff--pubescent. Leaves alternate, clustered near ends of branches,

obovate to spatulate, obtuse or acute, base wedge-shaped, entire, up to 20 cm. long and 8 cm. wide, densely silvery hairy. Flowers small, very numerous, white, sessile, in large, branching, long-pedunculate, scorpioid-cymose clusters; fruit round, four-parted, about 7 mm. in diameter."

Habitat/ecology: Beach heliotrope is native to all tropical seashores of the Indian and Pacific Oceans and sometimes occurs in inland saline habitats on sandy or limestone soils. . . . It is adapted to saline, nutrient-poor sand or limestone soils, salt spray and strong prevailing winds, and exposure to intense sunlight with high reflection from the ground and ocean surfaces.

Fertilizer

Foliar feeding in early morning with a water-soluble or an organic fertilizer (e.g. kelp or fish emulsion) at one third to one fourth the recommended strength monthly has proved beneficial. An occasional soil drench of sea (salt) water seems to benefit these plants, perhaps due to nutrient deficiency in most fertilizers. Drenching is best reserved for potted plants or for planting areas dedicated for salt tolerant plants, keeping in mind the surrounding plants that may not be salt tolerant. Note too that once salts are in the soil it can very difficult, if not impossible, to leach them out. Pruning Information - Prune back the stragglers to encourage new growth and maintain desired shape. Do not severely prune or it can kill the plant. A maximum of 1/3 of the stems can be pruned at a time. Look for new growth before pruning again.

Water Requirements

The shrub likes dry conditions, allow it to dry between watering. Water only enough to keep plant from wilting. Soil must be well drained.

Light Conditions

The shrub need at least 6 hours of full sun every day for optimal growth and does best in south or west facing areas.

Spacing Information

The plant can be spaced between 6 to 12 inches for dense plantings or up to 3 to 5 feet apart to showcase the plants.

Tolerances

- Drought
- Brackish Water
- Wind

- Salt Spray
- Heat

Limitations

Plant does not like wet environments and will become greener and leggier if given too much water. These shrubs are well-suited for coastal or lowland regions.

Hau

Hibiscus tiliaceus

Main Plant Information

Genus: *Hibiscus*

Species: *tiliaceus*

Hawaiian Names with Diacritics

Hau

Common Names

Hau



Hibiscadelphus means "brother of Hibiscus," suggesting their close affiliation to the genus *Hibiscus*. The curved flowers are perfectly designed to match their pollinators the Hawaiian honeycreepers which have curved beaks.

Plant Form / Growth Habit

- Shrub
- Tree

Mature Size, Height (in feet)

- Shrub, Medium, 6 to 10
- Shrub, Tall, Greater than 10

- Tree, Dwarf, Less than 15
- Tree, Small, 15 to 30

Life Span: Long lived (Greater than 5 years)

Landscape Uses

- Accent
- Specimen Plant

Hau does well at lower elevations in urban gardens. Use as an accent or a specimen plant. The small tubular and curved flowers are bright green, becoming dull reddish, and are not always immediately noticeable because of hidden behind the much larger leaves. Blooms year round. The green leaves are broadly ovate (egg-shaped) or heart-shaped, 1 1/2 to 4 inches long with upper surface sparsely pubescent, lower surface more densely so.

Additional Pest & Disease Information: Aphids, mealybugs, thrips, ants. Chinese rose beetles can chew unsightly holes in leaves giving them a laced appearance and weakening the plants if excessive damage is done.

Fertilizer

Foliar feed monthly with diluted solution and half-strength or less. Organic fertilizers are great with only draw-back in using kelp emulsion is a brownish residue on leaves. Use fertilizers with low nitrogen amounts. Over fertilizing can produce large flaccid leaves, lower flower production, and attract insect pests. Pruning Information: None necessary. But if done, do so sparingly by not to pruning too much woody material at any one time.

Water Requirements

. The plant likes dry conditions. After planting to a sunny site, monitor watering. Once established keep watering to a minimum. Hau prefer large occasional drenches of water in the hottest, driest summer months, rather than frequent light watering. Too much water creates large flaccid leaves and lower flower production. Even worse, over watering is the prime culprit for fungal and root rot problems as well as black sooty mold on leaves. Soil must be well drained.

Light Conditions

- Full sun

Tolerances

- Drought
- Heat

Tropical Shrubs II (more salt resistant) *These are nice landscaping plants not as Hawaiian-centric as the group in Tropical Shrubs I. As they are more common in Hawaiian landscapes, the production in this group is intended for fill-in in Hawaiian coastal landscapes at resorts or other tropical landscape areas.*

Bird of Paradise

Bird of paradise, or *strelitzia reginae*, produces thick, leathery leaves and colorful flowers that resemble the shape of a bird's head. The plant is native to South Africa and requires a steady climate between 50-72 degrees Fahrenheit (10-20 degrees Celsius) to thrive. Bird of paradise is easy to grow with adequate sunlight and keeping the soil consistently moist. Bird of paradise is a striking and beautiful plant that doesn't require much maintenance.

Bird of paradise seeds take up to a year to germinate, and young plants may not flower for seven years. It's much easier to buy a bird of paradise plant or cutting rather than to start the plant from seed, but with patience it can be done. Look for bird of paradise seeds or plants in the local garden nursery.

- If you prefer to plant seeds, get fresh seeds, soak them in water for three days (changing the water daily), and plant them while they're still fresh

Bird of paradise requires at least a steady temperature between 50-72 degrees Fahrenheit. Bird of paradise grows best in rich, moist soil that has been amended with plenty of compost so that it



drains well. Good drainage is key to the health of bird of paradise. The plant will die if its roots stay wet and waterlogged.

If you're planting bird of paradise outdoors, till the soil in your planting bed to a depth of 12 inches. Work in 4 inches of rich compost or other organic material in order to enrich the soil and promote good drainage. One can mix in a tablespoon of bone meal to make the soil even richer. Keep the soil evenly moist. Inadequate watering is the most common cause of death for bird of paradise. It's very important to keep the soil evenly moist, but not drenched. Water the plant deeply one or two times a week, giving the soil time to dry out a little in between watering. Aim to water the plant about an inch of water per week. Trim old flower stalks. The bird of paradise doesn't require much pruning. You need only cut off old flower stalks at the base of the plant to keep your bird of paradise healthy.

Coral Plant

Scientific Name: *Sida fallax*

Also Known As: Black Coral



Distribution: 'Ilima is a common shrub or ground cover found on the coast and on up into the dry and mesic forest of all the Hawaiian Islands, this particular variety is found more in the mesic forests of Kaua'i and O'ahu. Other than that, 'ilima is classified as an indigenous plant so that means it is native to Hawai'i as well as other parts of the world.

Description: There are many different varieties of 'ilima in Hawai'i. On the coast, 'Ilima papa (flat 'ilima) grows prostrate, perhaps up to a foot tall, while others in dry and mesic forests grow into bushes up to four to six feet or so. All have rounded green leaves with serrated margins but the mountain varieties tend to have more of a pointed apex on the leaf tip. Some coastal varieties have leaves that are covered with extremely soft, velvet-like hairs which are actually an evolutionary adaptation to reflect sunlight and prevent the plant from drying out but are really nice to touch. Their flowers for which they

are most known for are about an inch in diameter and a rich orange hue, they are also very soft but at the same time very fragile.

Landscape use: This plant makes an attractive low hedge or can be left alone as a specimen plant. Plant it in full sun to achieve maximum number of flowers and water less after plant shows signs of new growth. This will help the plant stay more bushier and not so leggy. Less watering will also increase the velvety look of the leaves and help keep the bugs away. 'Ilima generally likes dry and hot conditions. Few pests are known to attack 'Ilima, occasionally white fly may be found on the undersides of the leaves or aphids on the new leaves, a quick wash with a mild soap solution should help or following the label on a store bought pesticide for white fly and aphids will also work.

Cultural Uses: The flowers of 'Ilima can be strung into lei and they are also used as a mild laxative for babies.

Additional Info: Today, 'Ilima is known as the island flower of Oahu and is still strung into lei, but what people don't realize is that you can add the flowers to your salads, they add great color taste pretty good too. Make sure you pop out the flower from the calyx which is the little green cup at the base of the petals, just roll the calyx in between your fingers and the flower should pop right out. Don't eat the flowers if you sprayed the plant with pesticides. If you did, read the label of the pesticide to see if you can eat from the plant after spraying and how long you should wait before you do.

Coco Palms

The coco palms is also known as the landscaping dwarf coconut palm. These are ornamental palms not know for coconut production. They are actively used as landscaping plants sometimes growing 8-10' dependent on variety used. In initial plantings several species will be tried to see which ones are best suited to the habitat.

Light

One of the reasons palm plants are such common landscaping plants is that they can easily adapt to low-light conditions if placed in an understory situation. Most palms are tolerant of (or prefer) shade and may fail to thrive if they receive too much



direct sunlight. Low-light palm species prefer bright indirect light but also can tolerate less light, especially during the winter months.

Soil

The best soil for any palm plant is a loose, porous mixture, like a combination of vermiculate, compost, and perlite. They will grow just fine in a general-purpose commercial potting soil with these amendments.

Water

Good drainage is essential for healthy palm plants. Just because palms live in warm (tropical) regions does not mean they enjoy being waterlogged. In fact, many palms grow best in slightly sandy soils with ample drainage. Never let a palm's root ball sit in water and allow the plant's soil to dry out in-between watering.

Temperature and Humidity

Few palms will thrive in truly cold temperatures, and some, like the coconut palm, cannot tolerate any cold at all. Cold-hardy palms include the parlor palm and kentia palm, which explains why these are among the most popular indoor palms. As a general rule of thumb, palms prefer temperatures no lower than 50 degrees Fahrenheit.

Fertilizer

Feed your palm regularly during its growing season. If possible, choose a palm fertilizer, which contains all the required micronutrients for a healthy palm, as well as extra potassium and manganese. Potassium deficiency is especially common in palms and can result in yellowing or brownish fronds. If you notice your palm turning, it may be time to increase your feedings.

Shell Ginger

Shell Ginger, also called *Alpinia zerumbet*, is a leaf-watching perennial herbaceous plant of the genus Ginger. Shell Ginger has beautiful leaf color and blooms from June to July. It has elegant flowers and attractive flowers. Outdoor growing adorns the courtyard, pool or corner, with a unique style.



Its best growing soil: Shell Ginger cultivation management is extensive. Cultivation soil using fertile, well-drained Garden soil, with the mature dry feces mixed with calcium superphosphate as the base fertilizer. Nitrogen fertilizer should not be too much, it will affect the color of the leaves and is too tender for strong fertilizers – especially those acid based.

Growth humidity requirements: shell ginger likes wet and humid environments, and is more resistant to water and moisture, but not to drought. In the spring to summer growth season in addition to watering, also maintain a higher air humidity, especially when the summer weather is dry.

Best growth temperature: Shell Ginger is not cold resistant and can only withstand the temperature of about 40 degrees F in general. If the temperature drops to about 50 degrees, cover the plant with paper, then cover it with a plastic film to survive the period. *Unlikely, few two blanket nights*

Best Growth Light: Shell Ginger grows in bright or semi-cloudy environments. Outdoor, in late spring and early summer, there should be appropriate sunshine. In the hot summer shade, or placed under the tree sparse shade, the pattern on such leaves will become more obvious. If placed in a dark environment for a long time, the leaf color fades to green and loses its original bright color.

Fertilize once a month during the growing period, mainly with phosphorus and potash. The soil in the basin is kept moist. Water is often sprayed on the leaves in summer and autumn, and the leaves are put in the semi-shady place in midsummer to make the leaf markings more obvious. When growing outdoors, choose well-drained loose loam, see more sunshine in late spring and early summer, a little shade in midsummer, autumn and winter will be dug out and put indoors for storage. *These will be planted closer to the mango trees for some shading factor.* Shell Ginger likes a humid climate environment, and should pay attention to keep the soil moist when farming, avoid too dry. Water should be often sprayed on the leaves of Shell Ginger in summer and autumn to increase air humidity. *Tropical Shrubs II planting bed is going to be more moist than Tropical Shrubs I beds.*

Shell Ginger Propagation

Stem division: Shell Ginger has strong tillering ability and rapid growth, and it is easier to cultivate seed plants with stem splitting propagation methods. Shoot propagation is generally carried out in late spring and early summer with the combination of repot. To do this, pour out the large clump of Shell ginger from the pot and divide it into small clumps of 3-5 pieces per clump, including 1-2 new buds. After dividing the cluster, it can be planted in a pot together with underground stems and roots. When the ground is planted, it can also be divided into small clumps and planted in the container for about 2 months, and then transplanted after it grows new roots. In order to increase the survival rate of high-score plants, some leaves in the lower part of the stem can be cut off to reduce transpiration when dividing plants. In addition, new plants in the pot of dividing plants should be managed in a shaded place and watered adequately.

Piku

Hawaiian Ti Plants Ti plants (*Cordyline minalis*) come in a wide variety of colors, including green, red, chocolate, pink, orange, variegated and combinations of all of these. They grow in a tiered rosette and do not often flower. They make excellent landscaping plants on their own or can be combined with other layered landscaping shrubs with similar needs to make a stunning display. When planting a ti plant, it is best to avoid potting soils that contain perlite, as some perlites can contain fluoride as well. *Organic perlites intended for us do not contain fluoride.* Other than this, a well-draining potting soil will work best for potting or repotting your ti plant. These plants cannot tolerate temperatures below 50 F. (10 C.), so be careful not to place them where they may experience those temperatures.



As with many tropical plants, it is best to allow the plant to dry out some in between watering. Check the ti plant weekly to see if the top of the soil is dry. If the soil is dry, go ahead and water the plant until the moisture meter indicate saturation. If you have a problem with brown tips on your plant despite proper watering, try reducing watering more. When growing a Hawaiian ti plant, one will want to fertilize it about once a month in the spring and summer and once every two months in the fall and winter.

Singapore Holly

The *Malpighia coccigera* is native to the West Indies where it grows in partly shaded scrub thickets. It is not a true holly but got this common name from its holly shaped leaves. It needs moist, well-drained soil and cannot tolerate temperatures below 55 degrees. In Zones 9A-11 in the United States, it can be used as a small hedge or landscape plant. It is also used extensively as a tropical bonsai subject. After it is finished flowering, red berries (drupes) appear, which are edible.

This plant is named after Marcello Malpighi (1628-1694), an Italian physician and botanist. He wrote a book called *Anatome Plantarum* or Plant Anatomy in 1672 and is credited with discovering stomata or pores of plants through his studies with the microscope. Stomata cells control the watering of plants and paying attention to watering is a key for all these landscaping plant groups.



Ground Cover Crops

Hinahina ku kahaki

A beautiful ground cover when planted in black cinder and rocks which will show off the silvery foliage. Use in xeric and coastal landscapes. Hinahina will generally suppress weed growth once established.

Fertilizer and Watering

Foliar feeding in early morning with a water-soluble or an organic fertilizer (e.g. kelp or fish emulsion) at one third to one fourth the recommended strength monthly has proved beneficial. An occasional soil drench of sea (salt) water seems to benefit these plants, perhaps due to nutrient deficiency in fertilizers. Drenching is best reserved for potted plants or for planting areas dedicated for salt tolerant plants, keeping in mind the surrounding plants that may not be salt tolerant. Prune back the stragglers to encourage new growth and maintain desired shape. Do not severely prune or it can kill the plant. A maximum of 1/3 of the stems can be pruned at a time. Look for new growth before pruning again.



Water Requirements are dry conditions. Allow hinahina to dry between waterings. Water only enough to keep plant from wilting. Soil must be well drained

Light Conditions

Hinahina need at least 6 hours of full sun every day for optimal growth and does best in south or west facing areas. Hinahina can be spaced between 6 to 12 inches for dense plantings or up to 3 to 5 feet apart to showcase the plants.

Tolerances

- Drought
- Brackish Water
- Wind
- Salt Spray
- Heat

Hawaiian Names:

Hinahina refers to gray or silver-ish gray in Hawaiian.

Early Hawaiian Use

Lei:

The fragrant white flowers and the succulent leaves were used, providing a long-lived attractive lei.

Modern Use

Hinahina ku haka'i was adopted in 1923 as the official flower and lei material for Kaho'olawe, which is strange since it is not naturally found there, though it may have been in the past. Still, it is a beautiful natural and native component of haku.

Nehe

Description

Wollastonia integrifolia is a slightly woody perennial plant with spreading stems up to 6 1/2 feet long. The stems grow outward from the center intertwining with the stems of neighboring plants, often rooting where they touch the soil, to form a mat 6 to 8 inches thick. The oval green leaves are small and succulent. The leaves range in length from 1/3 to 1 1/4 inches long, but only a fraction as wide. The 1/2 inch wide yellow flowers are daisy-like and grow on stems above the foliage. The flowers can be single or in groups of two or three. *Wollastonia integrifolia* flowers throughout the year.

Habitat and Geographic Range

Wollastonia integrifolia is endemic to Hawai'i. It is found along the coastal areas of all of the main Hawaiian islands and on Kure Atoll and Laysan.

Propagation by Seeds

The seeds of *Wollastonia integrifolia* are tiny, generally less than 1/8 inch long. *Wollastonia integrifolia* can be grown from seeds.

Propagation by Cuttings

Wollastonia integrifolia is most easily grown from cuttings. It is recommended to planting tip cuttings in a moist, well-drained, sterile medium such as perlite or sharp sand. Rooting hormones, mist beds, and humidity chambers are not necessary. Rooting will take place in 2 to 4 weeks.

Propagation by Division

Wollastonia integrifolia plants can be divided. Because the stems often root at the nodes, sections of established planting beds can be removed with a sharp shovel or knife and replanted. Do not over water these divisions.

Sea Lavender

Also known as marsh rosemary and lavender thrift, sea lavender (*Limonium carolinianum*), which has nothing to do with lavender, rosemary or thrift, is a perennial plant often found growing wild in salt marshes and along coastal sand dunes. Sea lavender displays red-tinted stems and leathery, spoon-shaped leaves. Delicate purple blooms appear in summer.



However, a knowledgeable local nursery can advise one about the best limonium varieties for one's area. Don't attempt to remove plants from the wild because sea lavender is protected by federal, local or state laws in many areas. Development along coastal areas has destroyed much of the natural habitat, and the plant is further threatened by overharvesting. Although the blooms are beautiful and highly valued by plant enthusiasts and florists, picking the flower prevents the plant from expanding and forming colonies, and removing the plant by the roots destroys the entire plant. Sea Lavender growing is possible in USDA plant hardiness zones 3 through 9. Plant sea lavender in full sunlight in most areas. However, the plant benefits from afternoon shade in hotter climates. Sea lavender tolerates average, well-drained soil, but thrives in sandy soil. Water new plants regularly to establish a deep, healthy root system, but only occasionally once the plant is established, as sea lavender is drought tolerant. Divide sea lavender every two to three years in early spring, but dig deeply to prevent damage to the long roots. Sea lavender is sometimes difficult to divide. Taller plants may require stakes to remain upright. Sea lavender turns brown in fall and winter. This is normal and isn't cause for concern. Feel free to remove dead leaves to make room for new growth in spring.

Ohai

Scientific Name: *Sesbania tomentosa*

Endemic Endangered Species - *there is the native species, and the introduced landscaping copycat species. The growing conditions are the same – this site will grow the landscaping version.*



Description: Unreal-looking flowers. These are small, upright trees 10 to 18 feet tall when mature, with evenly pinnate leaves, which means that they have an even number of leaflets on each compound leaf. Cultivated, they can be harvested as young plants and transplanted to new locations. Young leaves also have shiny, golden hairs on the surface, an evolutionary adaptation to help reflect the sun so that they don't dry out. The hairy texture of the leaves is called *tomentos*. The plant's flowers are pea-shaped and about 2 inches long. They emerge in clusters of about two to five and are either bright orange or orange with streaks of yellow and red. Once the flowers have been pollinated, narrow seed pods form, filled with small green-dark brown seeds.

Cultural Uses: The flowers of ohai or its copycats are strung into lei, either front to back, side to side (facing forward, keel down) or with the keel of the flowers alternating up and down.

Landscape Uses and Care: This plant will require full sun with minimal watering and well-drained soil. Watch out for aphids and spider-mites.

Additional Information: Sorry to say, but the plant known to most of us as *ohai alii* is not native and it is the copycat landscaping plant proposed here – in fact, it's not even a Polynesian introduction. When it was brought to the islands, it was given that name because its leaves resemble those of the real ohai and its flowers are red and yellow – the colors of the alii, or royalty.

St. Augustine Grass and Seashore Paspalum grass

St. Augustine grass and SeaShore Paspalum grass are both salt tolerant turf suited for subtropical, humid areas. For this site, it is planned to put in a couple of experimental plots to judge invasiveness, growing regimen etc.... and is not a dominant planting planned. St. Augustine will be the first species tried, if not satisfied Seashore Paspalum will be tried next. It is widely grown in warm season states. St. Augustine grass lawn is a compact blue-green color that grows well on a variety of soil types provided they are well drained. St Augustine grass is the most widely used warm season turf grass in the southern United States. A St. Augustine grass lawn is grown in coastal areas due to its salt tolerance. Also known as carpetgrass, St. Augustine creates a smooth even turf which is tolerant to extremely high temperatures and low moisture. It retains its color longer than other warm season grasses when exposed to cool temperatures and requires infrequent mowing. The propagation of St. Augustine grass is usually vegetated through stolens, plugs, and sod. St. Augustine grass seed has not traditionally been easy to establish but new methods have made seeding a viable option. Once a lawn is prepared, St. Augustine grass seed is planted at a rate of 1/3 to 1/2 pound per 1,000 square feet (93 sq. m.) in early spring or late summer. St. Augustine grass seed needs to be kept moist while it is establishing. Plugs are the more common method of planting St Augustine grass. Plugs should be placed 6 to 12 inches (15-31 cm.) apart in a prepared lawn.



Sunflower

Bright yellow sunflowers (*Helianthus annuus*) are the poster flowers of summer. They typically begin blooming in the peak growing period and can persist. The flowers, which stretch around 3 to 6 inches across on average, have a wide central disk surrounded by short petals. The main species plant features orange-yellow petals with a brown or purple disk, but growers now have produced flowers in several other colors. Sunflowers grow on a hairy, sturdy, upright stem that can be several feet high. The stems can hold a single flower or be branched with multiple flowers. Rough, hairy, oval to triangular leaves grow along the stem. In the fall, the disks give way to sunflower seeds, which are a major draw for birds and other wildlife and this site's intended crop – pollinators.

Sunflowers get their common name because the flower heads turn toward the path of the sun each day. These flowers are annuals, meaning they complete their growth cycle in one year. Thus, they are fast-growing plants and typically will reach their flowering maturity around 80 to 120 days after the seeds germinate. They should be planted in the spring after the garden soil has warmed to at least 55 degrees Fahrenheit. *On this site, there will be rotating crops.*

Botanical Name	<i>Helianthus annuus</i>
Common Names	Sunflower, common sunflower
Plant Type	Annual
Mature Size	3–10 ft. tall, 1.5–3 ft. wide
Sun Exposure	Full
Soil Type	Well-drained
Soil pH	Acidic, neutral, alkaline
Bloom Time	Summer, fall
Flower Color	Yellow, red, mahogany, bicolors
Hardiness Zones	2–11 (USDA)
Native Area	North America

Sunflower Care

About the only mandatory requirements for growing sunflowers are a sunny location and well-drained soil. It can be helpful to plant sunflowers in groups, so they can support each other against wind and rain. Mulching around your sunflowers will help with both maintaining soil moisture and weed suppression.

Light

For the best flowering and sturdiest stems, plant the sunflowers in full sun, meaning at least six hours of direct sunlight on most days. Because they are heliotropic (their flower heads follow the sun), ample sun exposure will help them remain straight rather than bending toward the direction where the light is predominant.

Soil

Sunflowers will grow in almost any soil. They can tolerate poor, dry soils. However, they will do best in well-drained soil that contains a good amount of organic matter.

Water

Although tolerant of dry conditions, watering sunflowers regularly will help those set flowers. They often stop blooming during periods of drought. Allow the top 1 to 2 inches of soil to dry out between watering. If your sunflowers are drooping and the soil is dry, that's often a sign they need more water.

Temperature and Humidity

Optimal temperatures for growing sunflowers are between 70 and 78 degrees Fahrenheit. But they are tolerant to high heat as long as their moisture needs are met. And they can handle somewhat chilly but sunny environments. Plus, they're tolerant to high humidity, but they must have well-draining soil and good air circulation to prevent root rot and other disease.

Fertilizer

Sunflowers appreciate a fertilizer high in phosphorus and potassium to remind them that they're supposed to set flowers on those tall stalks. If one has a rich, loamy soil, one might not need to supplement with fertilizer. But if there is poor soil, apply a slow-release fertilizer starting in the beginning growing period, following label instructions. Be careful not to over-feed your plants, which can cause the stalks to become spindly.

Propagating Sunflowers

Sunflowers can be propagated by taking cuttings and rooting them, but the easier method is simply to collect some of the seeds and save them for planting. The flowers should begin to mature in about 80 days. When this happens, the heads will turn downward and the florets in the center disk will shrivel. The only sure way to tell whether the seeds are ready to harvest is to pull a few out and open them. If the seed kernels inside the shell are plump, they're ready for harvesting.

To harvest, cut the whole flower head with about 1 foot of stem attached, and hang it in a warm, dry, ventilated spot away from insects and rodents. Cover the seed heads with cheesecloth or a paper bag to catch loose seeds; poke small holes in the cover for ventilation. When the seeds are completely dry, they can be easily rubbed off the flower head and collected. Select some of the largest, plumpest seeds that will have the best chance at germinating, and store them in a dry, cool location until spring planting time. If sunflower seed heads are left on the stalks to provide winter food for birds, you can expect them to readily self-seed and send up many volunteer seedlings the next spring. These seedlings can be thinned out as needed to establish a new patch of sunflowers.

How to Grow Sunflowers From Seed

Sunflowers are usually grown from seed. Seeds can be sown directly into the garden once the soil temperature is right. Peat or paper pots that ultimately can be planted directly into the ground are recommended for seedlings started indoors, as sunflowers don't like to have their roots disturbed.

Plant seeds in the garden 1 to 2 inches deep in a shallow trench spaced about 6 inches apart. Keep them lightly moist (but not soggy) until they sprout, which takes around seven to 10 days. Taller varieties should be thinned to about 1 to 1.5 feet apart. Dwarf varieties can be grown about a foot apart.

Pueo Farms in this outdoor growing bed section turns threats (internal of poor soils, saline soils, low rainfall; and external of saline winds, high winds, sea spray) into opportunities for highly marketable crops that fits in with the pollination needs found elsewhere on the site. This turns the SWOT analysis again in a positive direction.

Various Choices for Substrates (growing support materials)]

One of the most obvious decisions farmers have to make is which medium they should use. Different media are appropriate for different growing techniques.

Coconut Coir

Regardless of hydroponic demand, coconut coir is a natural byproduct derived from coconut processes. The outer husk of a coconut consists of fibers which are commonly used to make a myriad of items ranging from floor mats to brushes. After the long fibers are used for those applications, the dust and short fibers are merged to create coir. Coconuts absorb high levels of nutrients throughout their life cycle, so the coir must undergo a maturation process before it becomes a viable growth medium. This process removes salt, tannins and phenolic compounds through substantial water washing. Contaminated water is a byproduct of this process, as three hundred to six hundred liters of water per one cubic meter of coir is needed. Despite requiring attention, posing health risks and environmental impacts, coconut coir has impressive material properties. When exposed to water, the brown, dry, chunky and fibrous material expands nearly three-four times its original size. This characteristic combined with coconut coir's water retention capacity and resistance to pests and diseases make it an effective growth medium. Used as an alternative to rock wool, coconut coir, also known as coir peat, offers optimized growing conditions. *This is not proposed, regardless of washing, the coir is still highly saline and its processing is not environmentally friendly.*

Rice husks

Parboiled rice husks (PBH) are an agricultural byproduct that would otherwise have little use. They decay over time, and allow drainage, and even retain less water than growstones. A study showed that rice husks did not affect the effects of plant growth regulators. *Not proposed for use...*



Perlite

Perlite is a volcanic rock that has been superheated into very lightweight expanded glass pebbles. It is used loose or in plastic sleeves immersed in the water. It is also used in potting soil mixes to decrease soil density. Perlite has similar properties and uses to vermiculite but, in general, holds more air and less water and is buoyant. *Proposed for use....*



Vermiculite

Like perlite, vermiculite is a mineral that has been superheated until it has expanded into light pebbles. Vermiculite holds more water than perlite and has a natural "wicking" property that can draw water and nutrients in passive growing systems. If too much water and not enough air surround the plants roots, it is possible to gradually lower the medium's water-retention capability by mixing in increasing quantities of perlite. *Proposed for use....*



Pumice

Like perlite, pumice is a lightweight, mined volcanic rock that finds application in hydroponics. *Not proposed*

Sand

Sand is cheap and easily available. However, it is heavy, does not hold water very well, and it must be sterilized between uses. Despite to sand being easily available on the site; and commercial sources in high demand with sand shortages are on our horizon as we are running out. *Not Proposed*

Gravel

The same type that is used in aquariums, though any small gravel can be used, provided it is washed first. Indeed, plants growing in a typical traditional gravel filter bed, with water circulated using electric powerhead pumps, are in effect being grown using gravel hydroponics, also termed "*nutriculture*". Gravel is inexpensive, easy to keep clean, drains well and will not become waterlogged. However, it is also heavy, and, if the system does not provide continuous water, the plant roots may dry out. *Not Proposed*

Wood fiber

Wood fibre, or Excelsior produced from steam friction of wood, is a very efficient organic substrate for hydroponics. It has the advantage that it keeps its structure for a very long time. Wood wool (i.e. wood slivers) have been used since the earliest days of the substrate research. However, more recent research



suggests that wood fibre may have detrimental effects on "plant growth regulators". *Used to use, replaced with perlite and vermiculite....*

Sheep wool

Wool from shearing sheep is a little-used yet promising renewable growing medium. In a study comparing wool with peat slabs, coconut fibre slabs, perlite and rockwool slabs to grow cucumber plants, sheep wool had a greater air capacity of 70%, which decreased with use to a comparable 43%, and water capacity that increased from 23% to 44% with use. Using sheep wool resulted in the greatest yield out of the tested substrates, while application of a biostimulator consisting of humic acid, lactic acid and *Bacillus subtilis* improved yields in all substrates. *Not readily available in Hawaii.*

Brick shards

Brick shards have similar properties to gravel. They have the added disadvantages of possibly altering the pH and requiring extra cleaning before reuse.

Polystyrene packing peanuts

Polystyrene packing peanuts are inexpensive, readily available, and have excellent drainage. However, they can be too lightweight for some uses. Note that non-biodegradable polystyrene peanuts must be used; biodegradable packing peanuts will decompose into a sludge. Plants may absorb styrene and pass it to their consumers; this is a possible health risk. *Not protected for use.*



Nutrient solutions

Organic nutrient solutions (*Proposed for Use*)

Organic fertilizers can be used to supplement or entirely replace the inorganic compounds used in conventional fertilization solutions. However, using organic fertilizers introduces a number of challenges that are not easily resolved. Examples include:

- organic fertilizers are highly variable in their nutritional compositions in terms of minerals and different chemical species. Even similar materials can differ significantly based on their source (e.g. the quality of manure varies based on an animal's diet). So careful research needs to be conducted.
- organic fertilizers are often sourced from animal byproducts, making disease transmission a serious concern for plants grown for human consumption or animal forage. *Decontamination will be conducted before use...*
- organic fertilizers are often particulate and can clog substrates or other growing equipment. Sieving or milling the organic materials to fine dusts is often necessary. *Liquid versions will be used*
- some organic materials (i.e. particularly manures and offal) can further degrade to emit foul odors under anaerobic conditions. *Denatured nutrient solutions are used*
- many organic molecules (i.e. sugars) demand additional oxygen during aerobic degradation, which is essential for cellular respiration in the plant roots. *Capillary Mat technique provide adequate oxygen.*

Nevertheless, if precautions are taken, organic fertilizers can be used successfully in growing bed nutrient balancing.

Compounds can be added to improve nutrition acquisition and uptake by the plant. Chelating agents and humic acid have been shown to increase nutrient uptake. Additionally, plant growth promoting rhizobacteria (PGPR), which are regularly utilized in field and greenhouse agriculture, have been shown to benefit plant growth development and nutrient acquisition. Some PGPRs are known to increase nitrogen fixation.

Tools

Managing nutrient concentrations, oxygen saturation, and pH values within acceptable ranges is essential for successful horticulture. Common tools used to manage nutrient solutions include:

- Electrical conductivity meters, a tool which estimates nutrient ppm by measuring how well a solution transmits an electric current.
- pH meter, a tool that uses an electric current to determine the concentration of hydrogen ions in solution.
- Oxygen electrode, an electrochemical sensor for determining the oxygen concentration in solution.
- Litmus paper, disposable pH indicator strips that determine hydrogen ion concentrations by color changing chemical reaction.
- Graduated cylinders or measuring spoons to measure out premixed, commercial fertilization solutions.

Other Equipment

Chemical equipment can also be used to perform accurate chemical analyses of nutrient solutions. Examples include:

- Balances for accurately measuring materials.
- Laboratory glassware, such as burettes and pipettes, for performing titrations.
- Colorimeters for solution tests.

Consideration given to a root ball extractor for ease of root ball removal for harvesting. And a gator ATV for plant root ball movement to processing facility.

January 2022

WHALE Environmental Services LLC



PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX C

SITE SPECIFIC CONCEPTUAL
DESIGN AND PROJECT PLANS



PUEO FARM

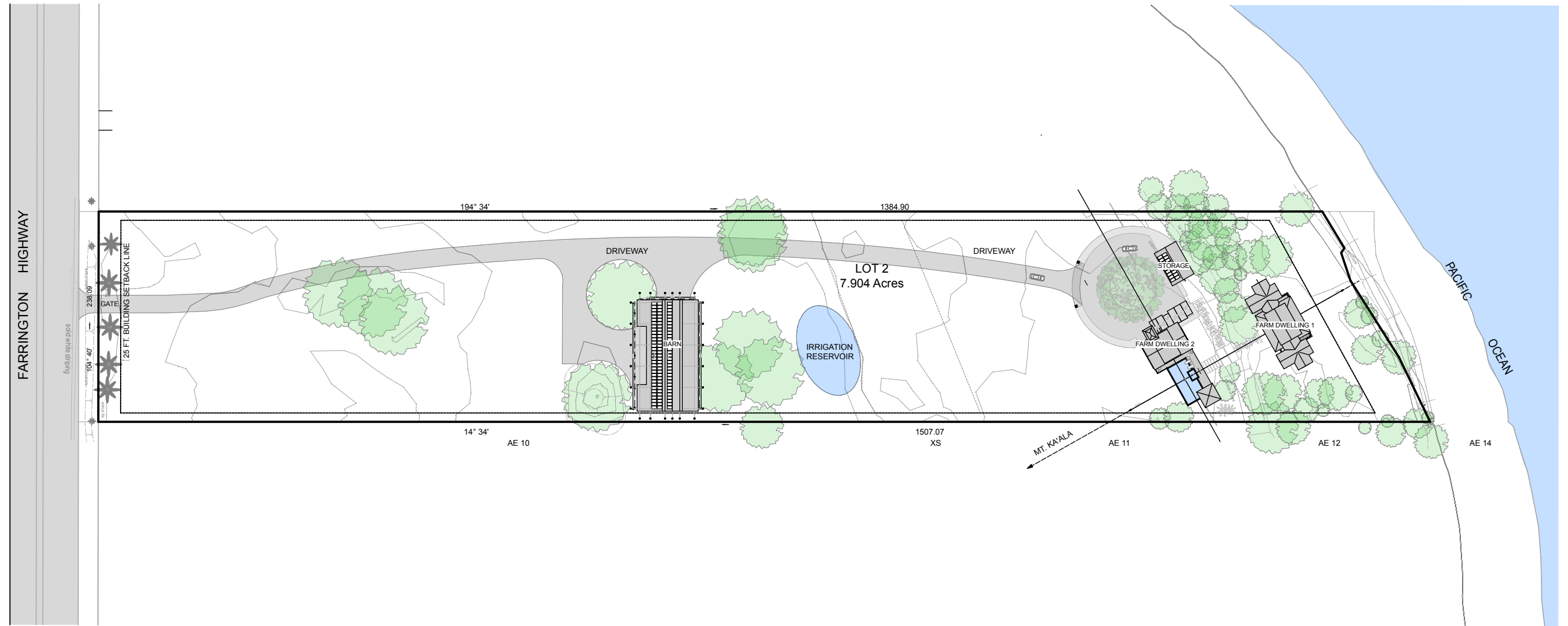
Conceptual Design Drawings

July 30, 2021

PUEO FARM
Proposed Conceptual Design
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PVA
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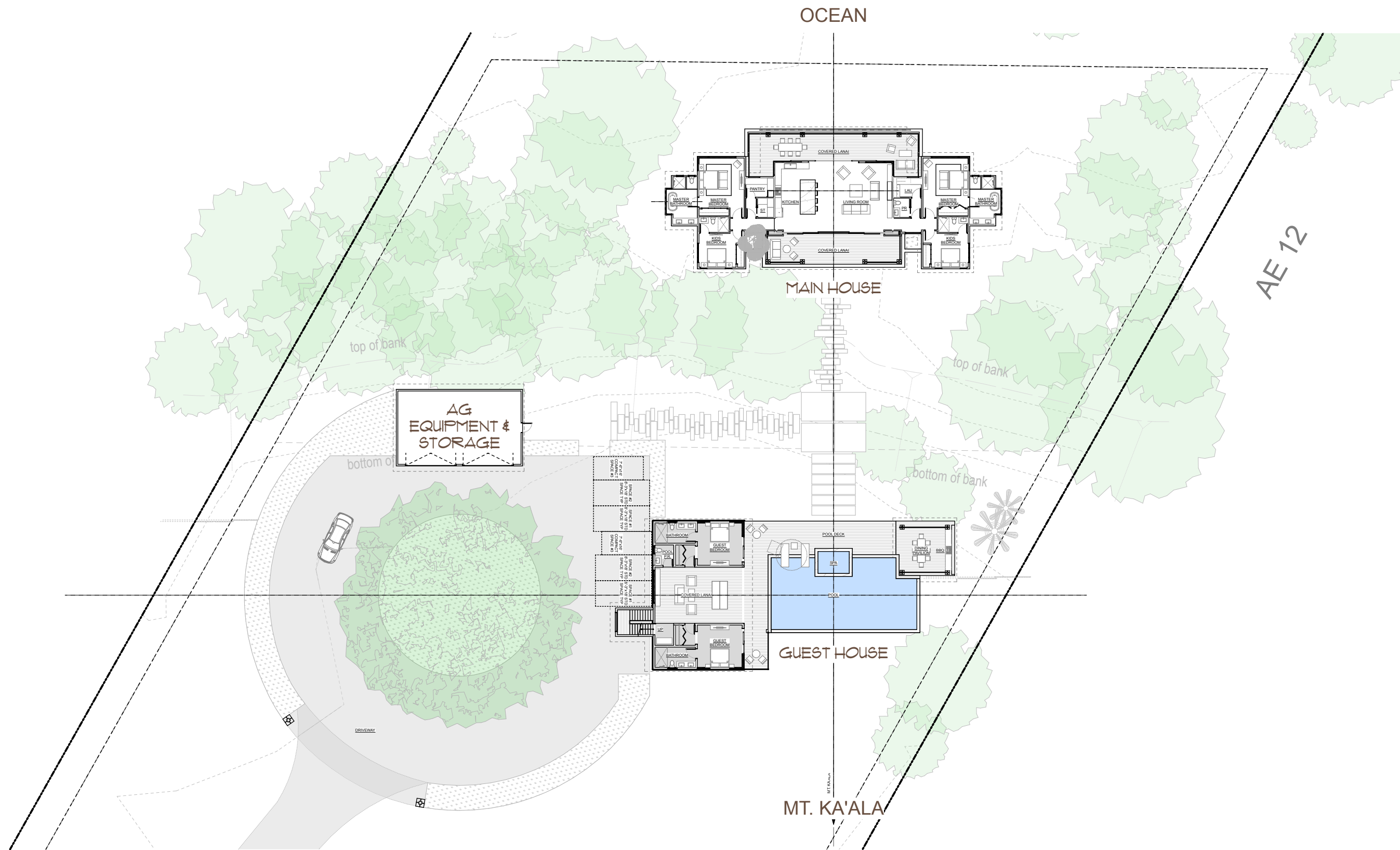
PUEO FARM
Proposed Conceptual Design
 68-431 Farrington Highway
 Waialua, Hawai'i

Site Plan - Proposed
 SCALE: 1/128" = 1'-0"



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PUEO FARM
Proposed Conceptual Design
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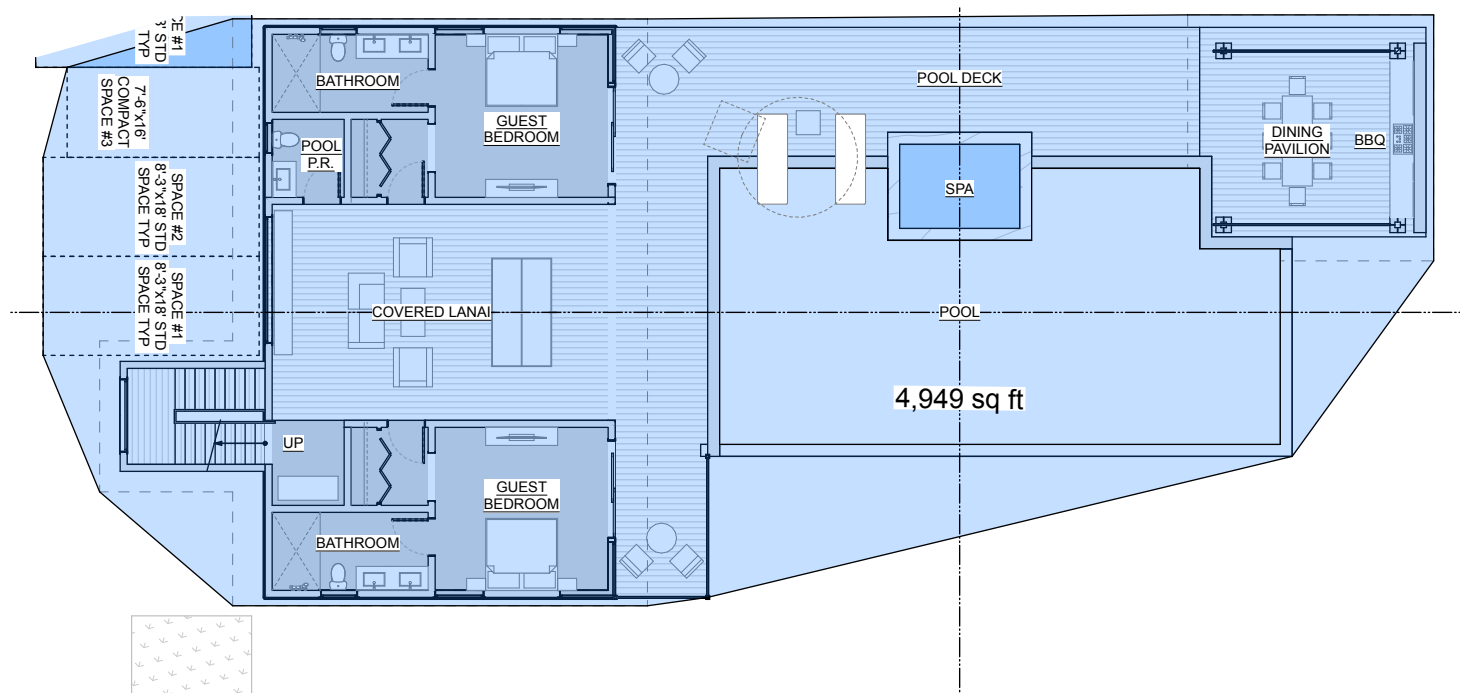
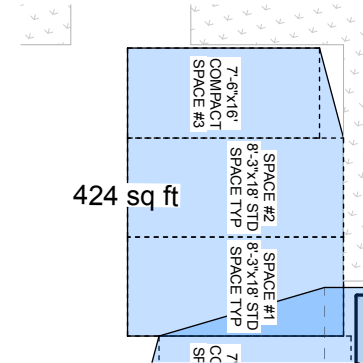
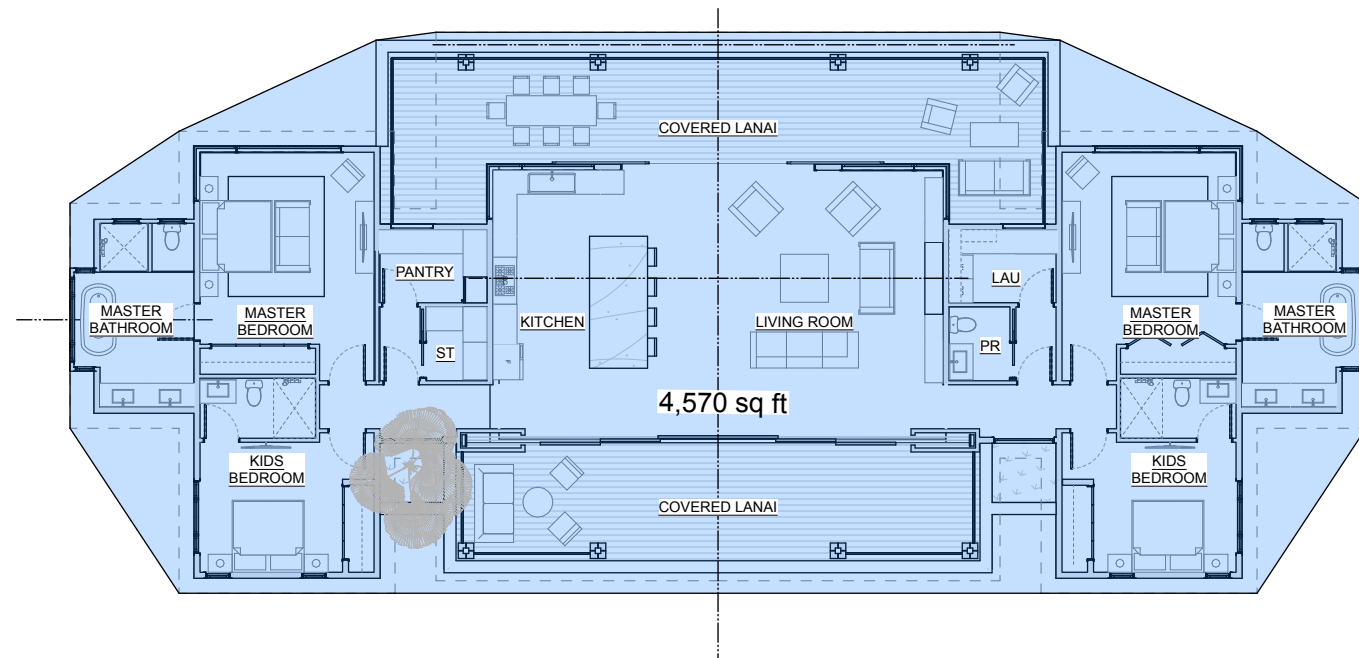
Enlarged Site Plan - Proposed

SCALE: 3/32" = 1'-0"



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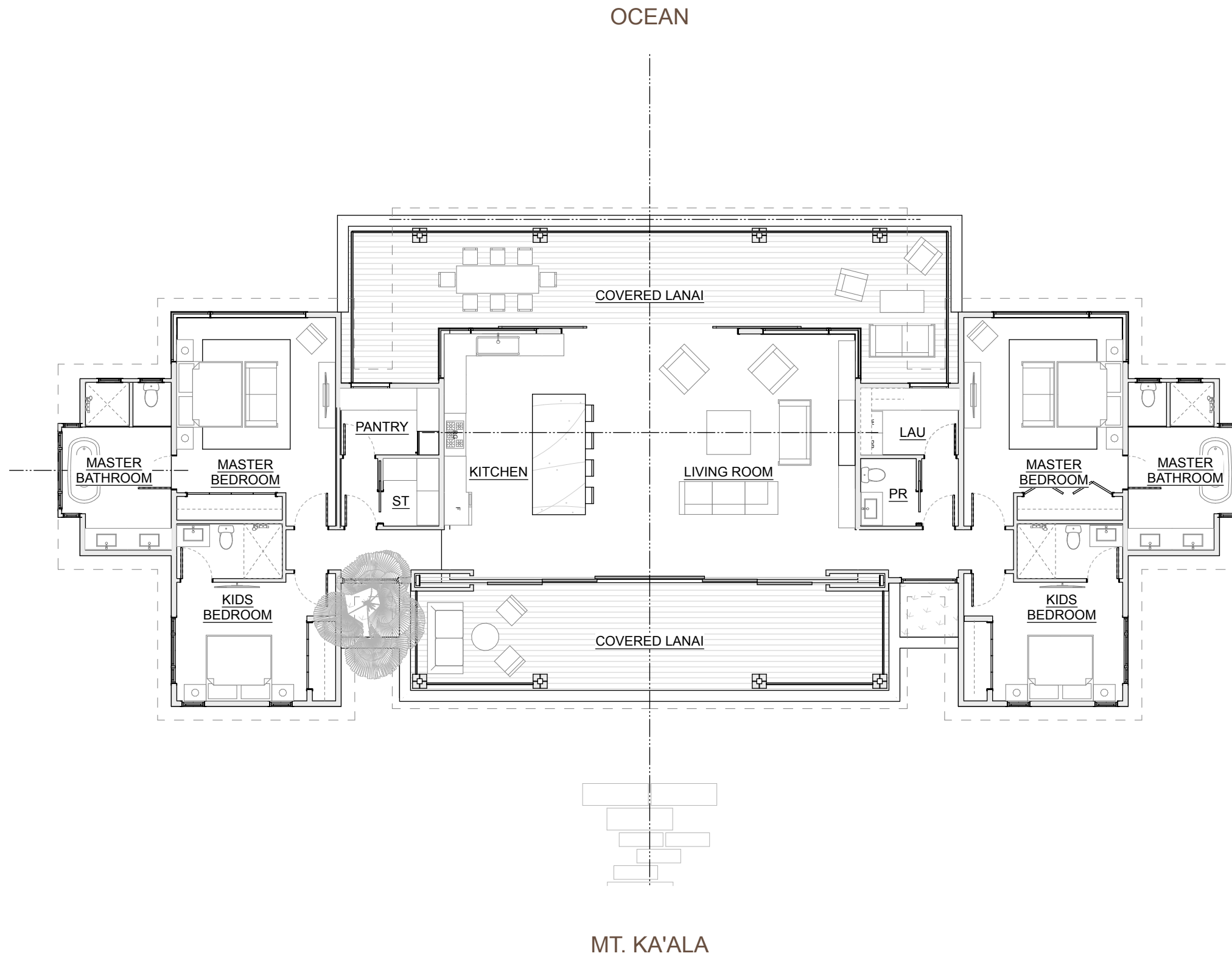


MAIN HOUSE

FLOOR AREA:	3500 SQFT	
LOT AREA:	4570 SQFT	
	+ 424 SQFT	PARKINGS AS REQUIRED
	<hr/>	
	4994 SQFT	

GUEST HOUSE

FLOOR AREA:	2417 SQFT
LOT AREA:	4949 SQFT
	(WITH REQRD PARKINGS AS SHOWN)



PUEO FARM
Proposed Conceptual Design
 68-431 Farrington Highway
 Waialua, Hawai'i

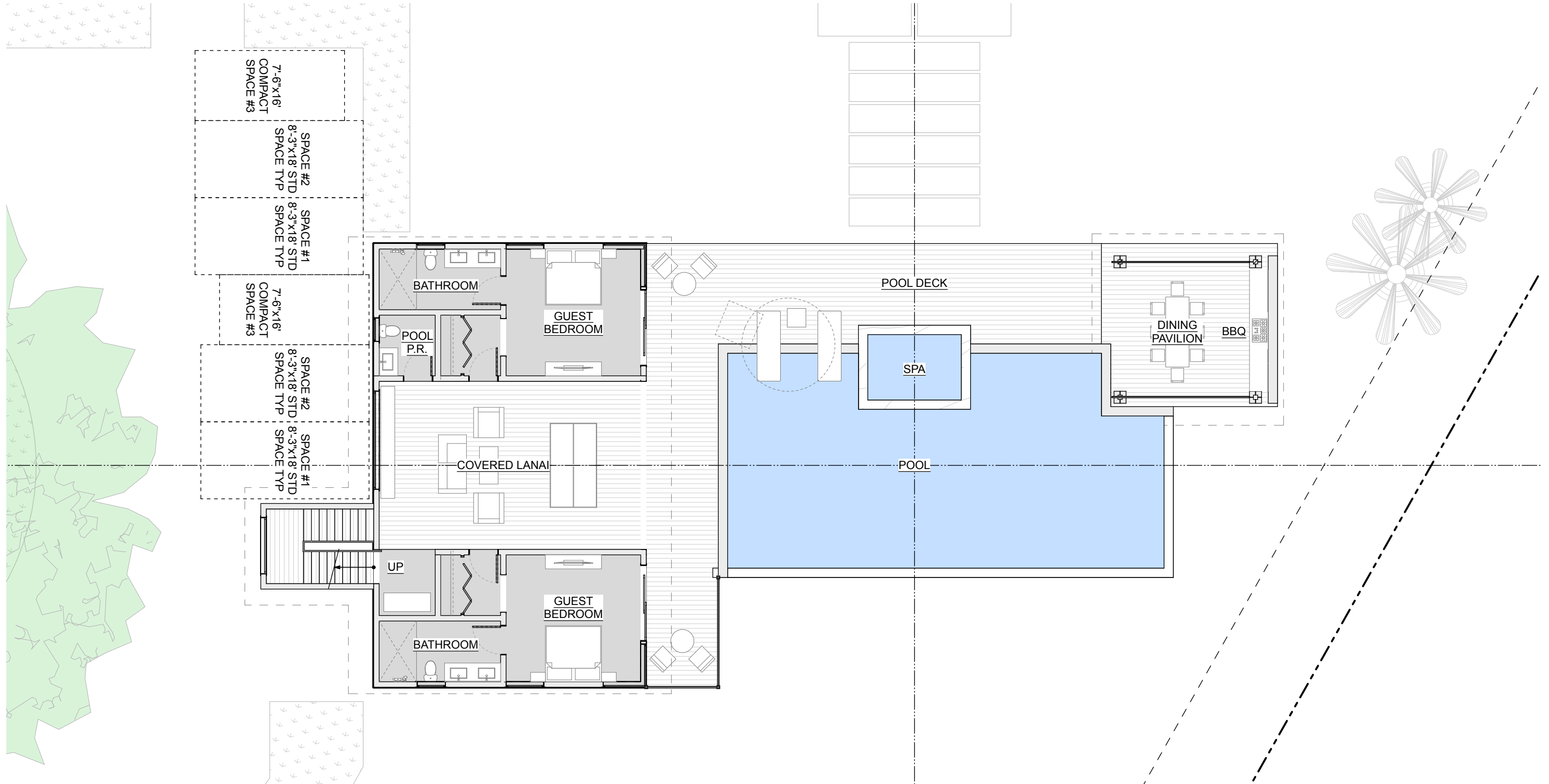
Main House Floor Plan - Proposed

SCALE: 3/32" = 1'-0"



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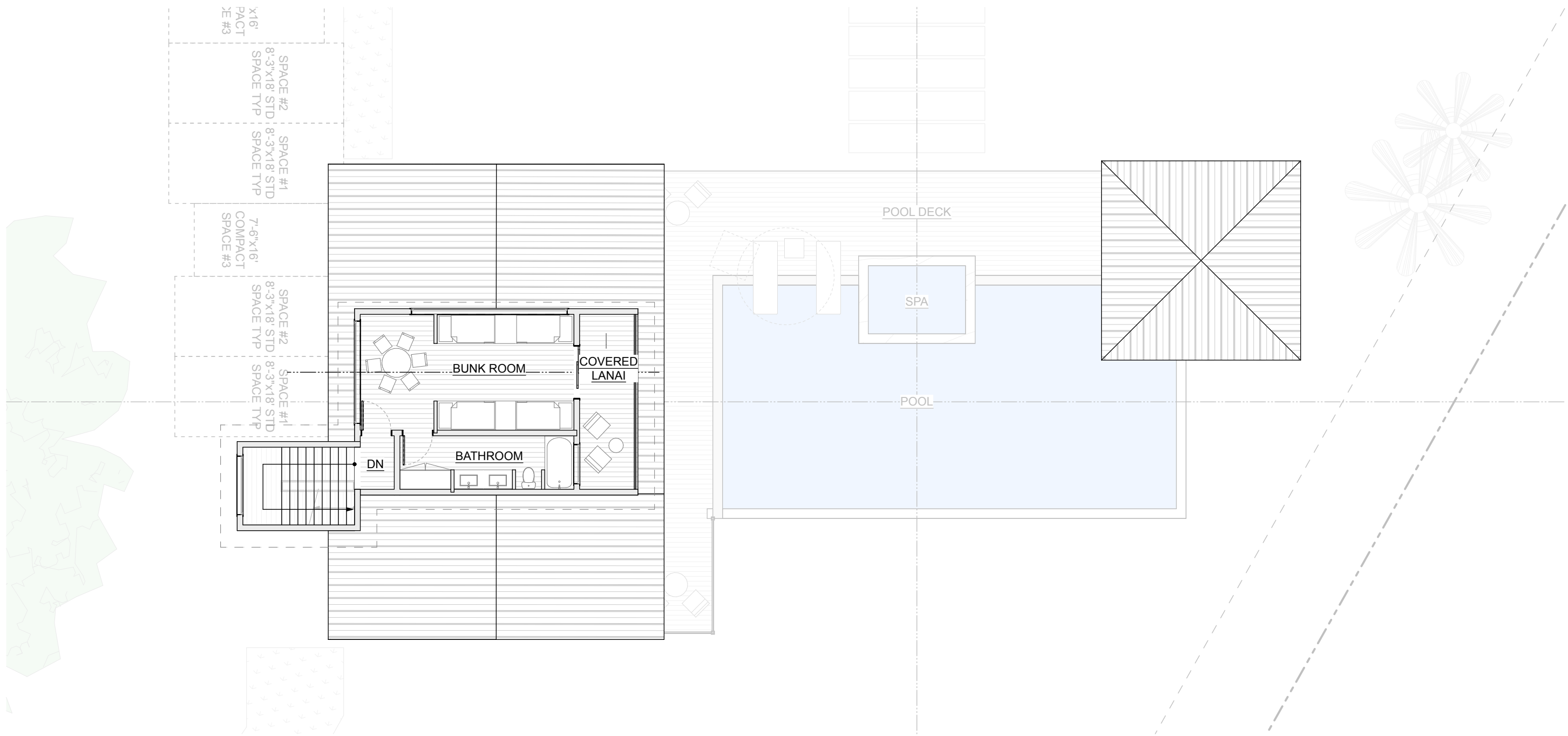
PUEO FARM
Proposed Conceptual Design
 68-431 Farrington Highway
 Waialua, Hawai'i

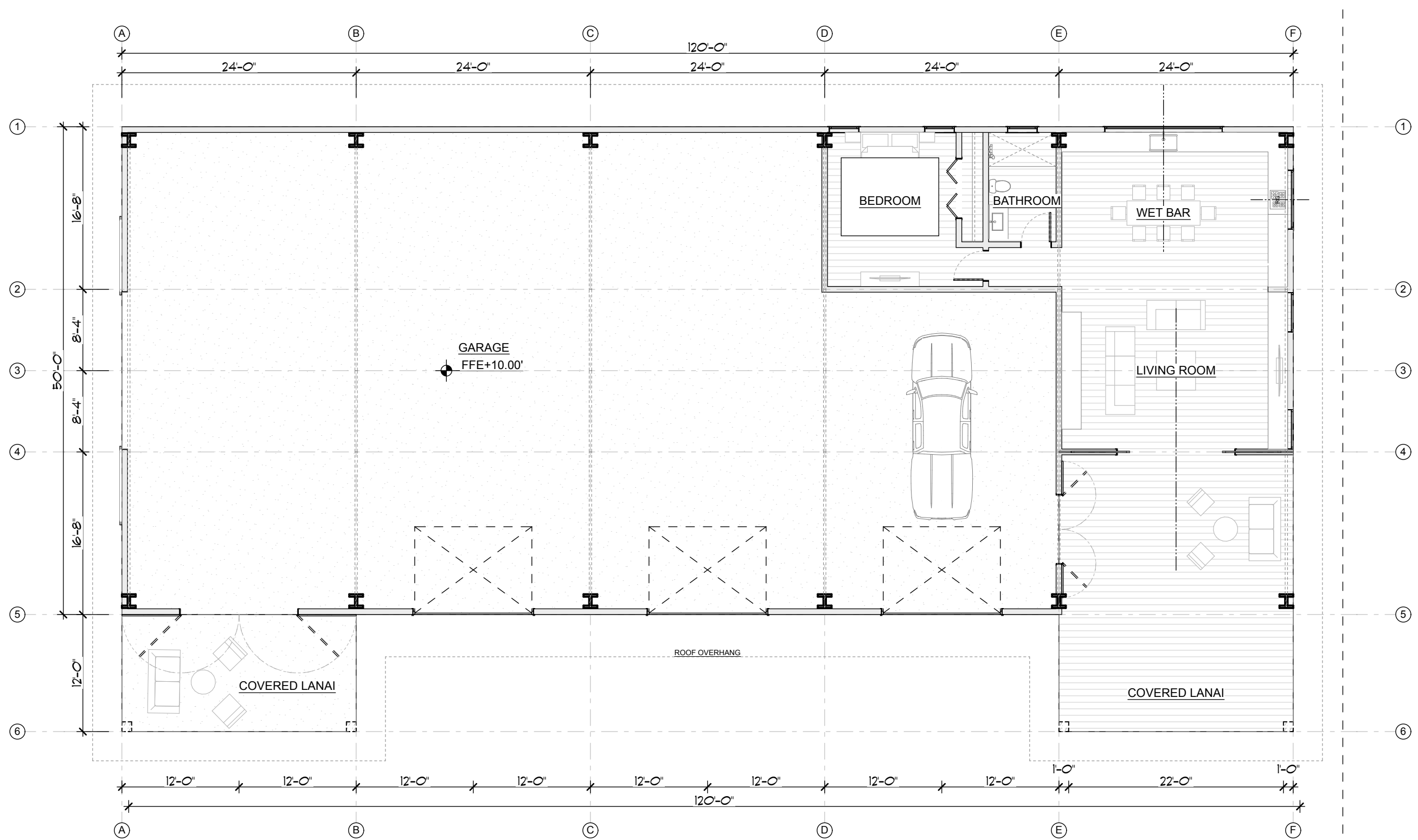
Pool/Guest House First Floor Plan - Proposed
 SCALE: 3/32" = 1'-0"



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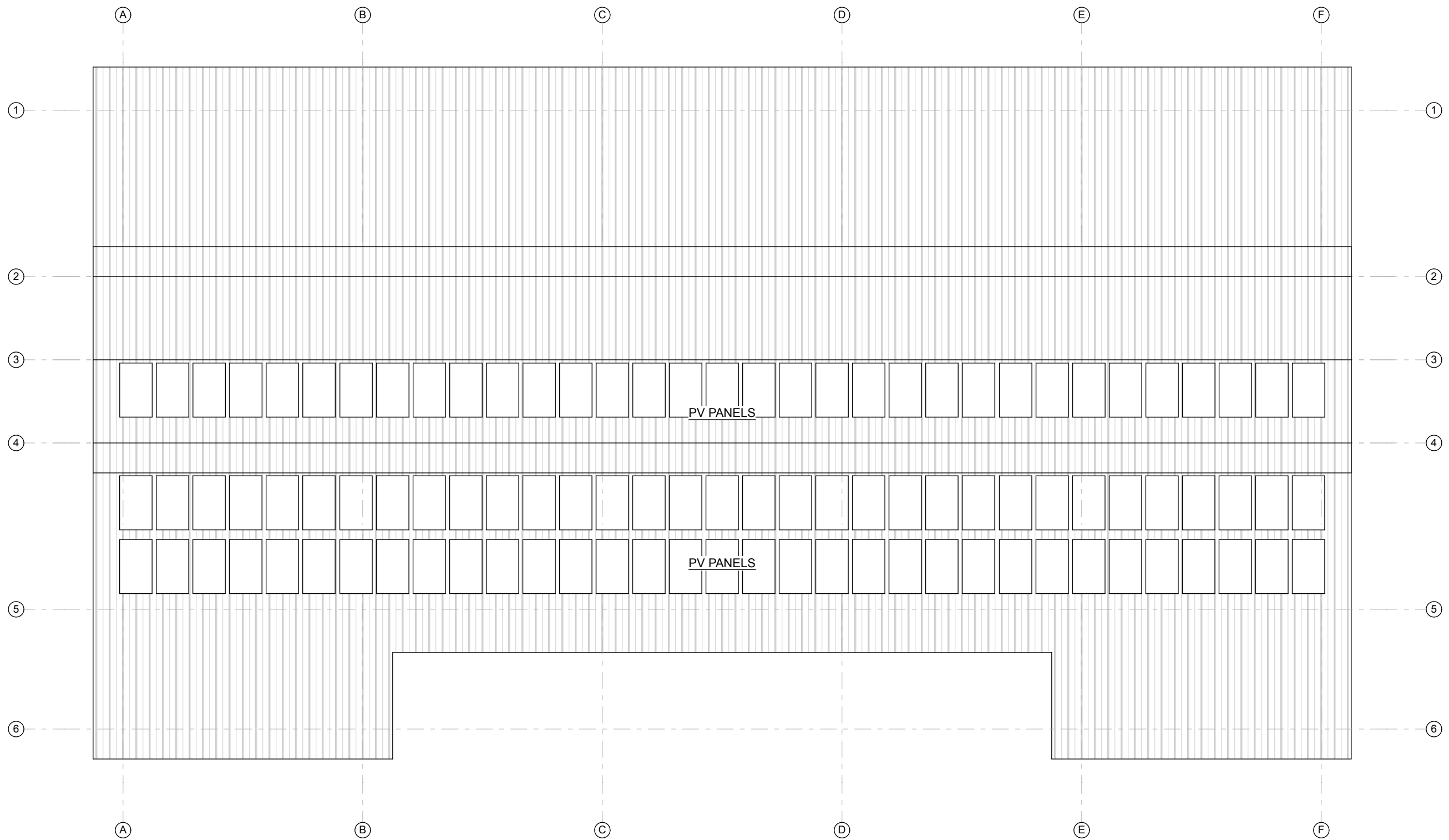
Barn Floor Plan - Proposed

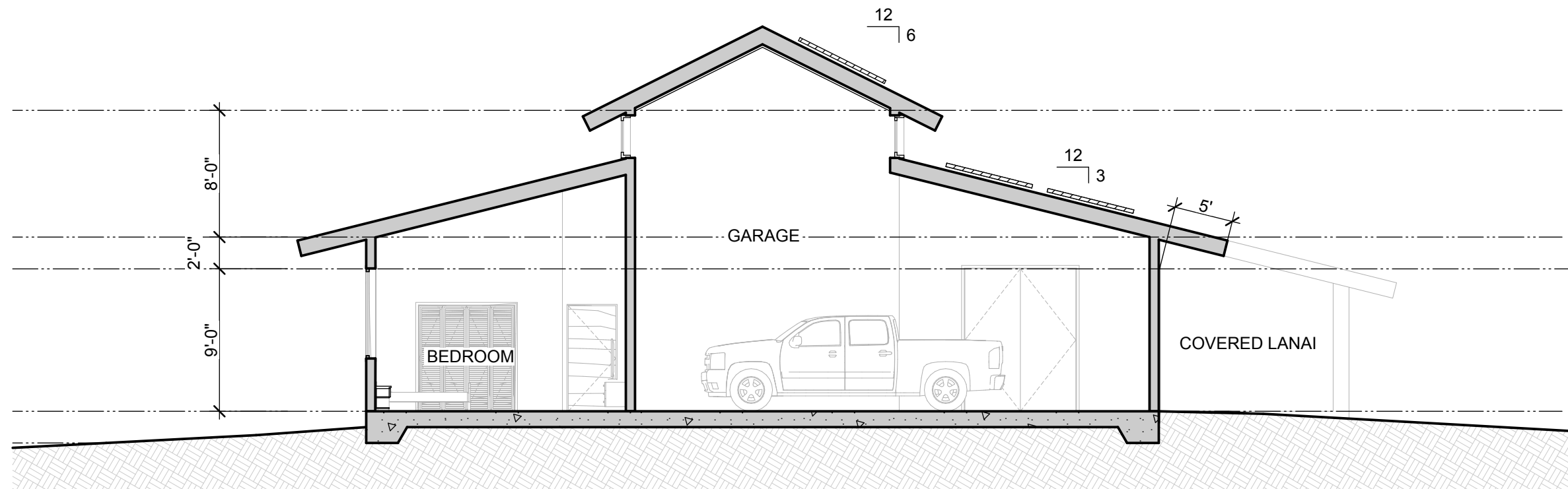
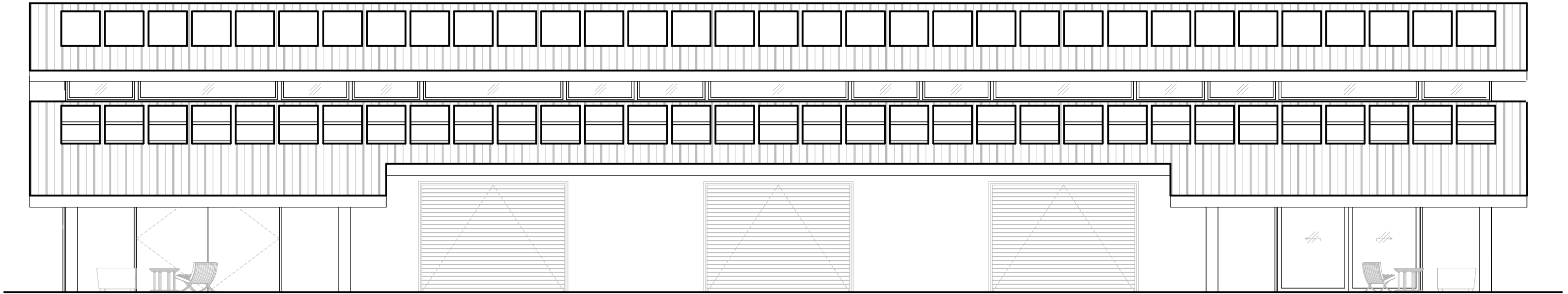
SCALE: 3/32" = 1'-0"



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PUEO FARM
Proposed Conceptual Design
 68-431 Farrington Highway
 Waialua, Hawai'i

Barn Elevation & Section - Proposed

SCALE: 1/8" = 1'-0"

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Barn Renderings

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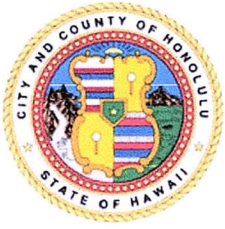


Alston Mokuleia Residence
Proposed Conceptual Design
68-431 Farrington Highway
Waialua, Hawaii

Concept Images

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Department of Planning and Permitting (DPP)

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Building Permit - Status: Inspection(s) in Progress

Building Permit	853365		
Application Number:	A2020-06-0349	Job Number:	076713940-002
Description:	(BP #853365) [TMK: 68003045] Alston Residence - New 6'-0" Max Ht Rock Wall at front of Property and New 5'-0" Max Ht Vinyl Perimeter Fence		
Created Date:	Jun 8, 2020	Job Completed Date:	
Issued Date:	Aug 28, 2020	Date Construction Completed:	mmm dd, yyyy
Status:	Inspection(s) in Progress		
Specific Location:	68-431 FARRINGTON HWY		

Tax Map Key

Warnings	Description
	TMK 6-8-003:045 [348480 sq ft.] 8 ac. POID= 401649 68-431 FARRINGTON HWY 07/06/2006 to Current TAXPIN = 401649

Details

Staff Assignment:	Eroditha Cubacub	Is this a City Project?:	No
		Job Address(if not primary):	
Estimated Value of Work:	\$45,000.00	Remarks:	2020/SMA-11; 72/CUP-12; 72/SUP-3; 2005/SUB-2;
Accepted Value:	\$45,000.00		
Require Plan Review Fee?	<input type="checkbox"/>		
Occupancy Group Category:	U-2 Fence	Structure Code:	02 - WALL OR FENCE
Occupancy Group:	20 - Structure other than building & unclassified	Require Affidavit:	(None)
Ownership:	01 - Private	Require Special Inspection:	(None)
Commercial/Residential:	Residential	Require Called Inspection:	(None)
Proposed Use:	Fence	Certificate of Occupancy must be issued before building is occupied:	<input type="checkbox"/>
Floor Level:		FLOOD HAZARD DISTRICT	
Types of Construction (Min):	(None)	Flood Hazard District:	Flood Fringe
Types of Construction (Actual):	(None)	<input type="checkbox"/> Complied	
Number of Existing Stories:		<input checked="" type="checkbox"/> Exempt	
Number of Final Stories:		<input type="checkbox"/> As-Built Elevation Certification	
Existing Floor Area:		RESIDENTIAL UNITS CODE	
New Floor Area:		Number Units - Added:	0
Total Floor Area:		Number Units - Deleted:	
Building Inspection Required:	Yes	HOTEL ROOM CODE	
Electrical Inspection	No		

Required:

Plumbing Inspection Required: No

Plumbing Phases: NONE

Electrical Phases: NONE

Number of Rooms - Added:

Number of Rooms - Deleted:

Location where Permit was created: FMB

Location where Permit was issued: (None)

Type of Work

- New Building
- Foundation Only
- Shell Only
- Addition
- Alteration
- Repair
- Demolition
- Fence
- Retaining Wall
- Electrical Work
- Electrical Meter Only
- Fire Alarm
- Plumbing Work
- Fire Sprinkler
- Air Conditioning
- Ohana
- Accessory Dwelling Unit (ADU)
- Pool
- Electrical Vehicle Charger
- Solar
- Solar Photovoltaic Installation
- Solar PV Installation W/ Battery Storage
- Heat Pump
- Antenna
- Temporary
- Relocation To
- Relocation From

Other:

Driveway, Sewer, Retrofit

RIGHT-OF-WAY WORK

- Driveway: New Existing Private
- Driveway Repair:
- Driveway Types: (None)
- Linear Feet of Driveway:
- Sidewalk Repair:
- Sidewalk Types: (None)
- Linear Feet of Sidewalk:
- Curbing Types: (None)
- Linear Feet of Curbing:

SEWAGE

- Sewer Connection Permit No.:
- Sewage Disposal Type: Existing New (None)
- Sewage Disposal Method: Aerobic Unit Private Sewage Treatment Plant Septic Tank

RETROFIT

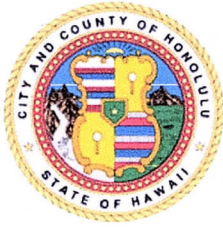
- No. of Showers to be replaced:
- No. of Faucets to be replaced:
- No. of Urinals to be replaced:
- No. of Toilets to be replaced:

MAJOR OCCUPANCY GROUP

- Commercial
- Hotel
- Industrial
- Residential

- Cesspool
- Public Sewer
- (None)

Cancel



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Building Permit - Status: Plans review in progress

Details	Application Number	Job Number	Application Description
Building Permit	A2022-03-0110	095844052-002	[TMK: 68003045] 68-431 FARRINGTON HWY. // Alston Property - New water well enclosure, new meter and 5' max ht' vinyl fence.
Created Date:	Mar 2, 2022	Job Completed Date:	
Issued Date:		Date Construction Completed:	mmm dd, yyyy
Status:	Plans review in progress		
Specific Location:	68-431 FARRINGTON HWY		

Tax Map Key

Warnings	Description
	TMK 6-8-003:045 [348480 sq ft.] 8 ac. POID= 401649 68-431 FARRINGTON HWY 07/06/2006 to Current TAXPIN = 401649

Details

Staff Assignment:	Paul Gamble	Is this a City Project?:	No
		Job Address(if not primary):	
Estimated Value of Work:	\$20,000.00	Remarks:	2022/ELOG-328; 22021/ELOG-2457; Portion flood AE, SMA/Shoreline utility easement at front of property
Accepted Value:	\$20,000.00		
Require Plan Review Fee?	<input checked="" type="checkbox"/>	Structure Code:	89 - OTHERS
Occupancy Group Category:	U-2 Ag structures	Require Affidavit:	(None)
Occupancy Group:	20 - Structure other than building & unclassified	Require Special Inspection:	No
Ownership:	01 - Private	Require Called Inspection:	No
Commercial/Residential:	Commercial	Certificate of Occupancy must be issued before building is occupied:	<input type="checkbox"/>
Proposed Use:	pump shed, ut pole, cmu wall	FLOOD HAZARD DISTRICT	
Floor Level:		Flood Hazard District:	Flood Fringe
Types of Construction (Min):	(None)	<input type="checkbox"/> Complied	
Types of Construction (Actual):	(None)	<input type="checkbox"/> Exempt	
Number of Existing Stories:		<input type="checkbox"/> As-Built Elevation Certification	
Number of Final Stories:		RESIDENTIAL UNITS CODE	
Existing Floor Area:		Number Units - Added:	0
New Floor Area:		Number Units - Deleted:	
Total Floor Area:		HOTEL ROOM CODE	
Building Inspection Required:	Yes		

Electrical Inspection Required: Yes
 Plumbing Inspection Required: Yes
 Plumbing Phases:
 Electrical Phases: E-2,4,5,6

Number of Rooms - Added:
 Number of Rooms - Deleted:
 Location where Permit was created: FMB
 Location where Permit was issued: (None)

Type of Work

- | | | |
|---|---|---|
| <input type="checkbox"/> New Building | <input type="checkbox"/> Electrical Work | <input type="checkbox"/> Electrical Vehicle Charger |
| <input type="checkbox"/> Foundation Only | <input checked="" type="checkbox"/> Electrical Meter Only | <input type="checkbox"/> Solar |
| <input type="checkbox"/> Shell Only | <input type="checkbox"/> Fire Alarm | <input type="checkbox"/> Solar Photovoltaic Installation |
| <input type="checkbox"/> Addition | <input type="checkbox"/> Plumbing Work | <input type="checkbox"/> Solar PV Installation W/ Battery Storage |
| <input type="checkbox"/> Alteration | <input type="checkbox"/> Fire Sprinkler | <input type="checkbox"/> Heat Pump |
| <input type="checkbox"/> Repair | <input type="checkbox"/> Air Conditioning | <input type="checkbox"/> Antenna |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Ohana | <input type="checkbox"/> Temporary |
| <input checked="" type="checkbox"/> Fence | <input type="checkbox"/> Accessory Dwelling Unit (ADU) | <input type="checkbox"/> Relocation To |
| <input type="checkbox"/> Retaining Wall | <input type="checkbox"/> Pool | <input type="checkbox"/> Relocation From |
| | | Other: |

Driveway, Sewer, Retrofit

RIGHT-OF-WAY WORK

Driveway: New Existing Private
 Driveway Repair:
 Driveway Types: (None)
 Linear Feet of Driveway:
 Sidewalk Repair:
 Sidewalk Types: (None)
 Linear Feet of Sidewalk:
 Curbing Types: (None)
 Linear Feet of Curbing:

RETROFIT

No. of Showers to be replaced:
 No. of Faucets to be replaced:
 No. of Urinals to be replaced:
 No. of Toilets to be replaced:

MAJOR OCCUPANCY GROUP

- Commercial
 Hotel
 Industrial
 Residential

SEWAGE

Sewer Connection Permit No.:
 Sewage Disposal Type: Existing New (None)
 Sewage Disposal Method: Aerobic Unit Private Sewage Treatment Plant Septic Tank

- Cesspool
 Public Sewer
 (None)

Cancel

PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX D

SMA APPLICATION AND
APPROVAL

SMA Minor Application for the Alston Family

Address: 68-431 Farrington Hwy. Waialua, HI 96791

TMK: 6-8-003-045

Zoning: AG-2

Lot Square Footage: 348,480 s.f.

Reason for Application:

Building permit application for new perimeter fencing and rock fence wall with gates. (IBP 2019/IBP10357)

Compliance with HRS Chapter 343, EA/EIA:

It is anticipated that the project will qualify for SMA Minor approval and therefore the project should be exempt from needing an Environmental Assessment.

Project Description:

- (1) **Objectives:** The project consists of the installation of a new 4-Rail vinyl horse fence around the perimeter of the property. The Vinyl shall be “weathered Cedar” in color. The ocean side will include a short rock fence wall with vinyl fencing on top. The project will also include the installation of main entry gate that will be flanked by rock fence walls and planter.
- (2) **Construction Characteristics:** The parcel is currently vacant and work does not include any new building space. The only construction will be for fencing, fence walls and entry gate.
- (3) **Access to the site:** Approximately 238 l.f. of the parcel affronts Farrington Hwy. Access will be permitted through a 22’ opening at the center of the road frontage as pre-defined in 2003 Subdivision.
- (4) **Utilities:** A 1.5” water meter is currently being applied for with Board of Water Service. Meter is to be located on the Haleiwa side of the property and the State Highway setback.

There is no power to the parcel at this time.

The project has no Gas lines or tanks.

- (5) **Liquid and solid waste disposal:** There is currently no Individual Wastewater System on the parcel.

(6) **Impacts on Coastal Zone Management objective:** The entire parcel is located in the SMA area, see exhibit 'A' attached. The parcel abuts the ocean and is approximately 1,500 ft. deep. There is a public beach access 240 l.f. from this parcel through the undeveloped Makaleha Beach Park so access to coastal recreational opportunities will not be limited.

Since the project is only for perimeter fencing (that is setback 60' from the shoreline at the closest) there should not be any adverse impacts on coastal ecosystems, beaches, or marine resources.

The project will be of a style that is line with the existing fencing in the area and a generally pleasant farm/country aesthetic. At no point will the fencing be over 6' tall and will be predominantly see through (4-rail horse fence). As such there will be no adverse impact on the general population's scenic views or open spaces.

The project is located in FIRM Zone AE and XS. The primary flood hazard would be due to flooding from the Makaleha Stream on the Farrington Hwy. side of the parcel and from Ocean run up on the ocean side.

(7) **Estimate Valuation:** The valuation of the project is \$125,000. See Exhibit 'C' Attached.

(8) **Construction Time:** Total construction time is estimated to be a maximum of 6 weeks.

Affected Environment:

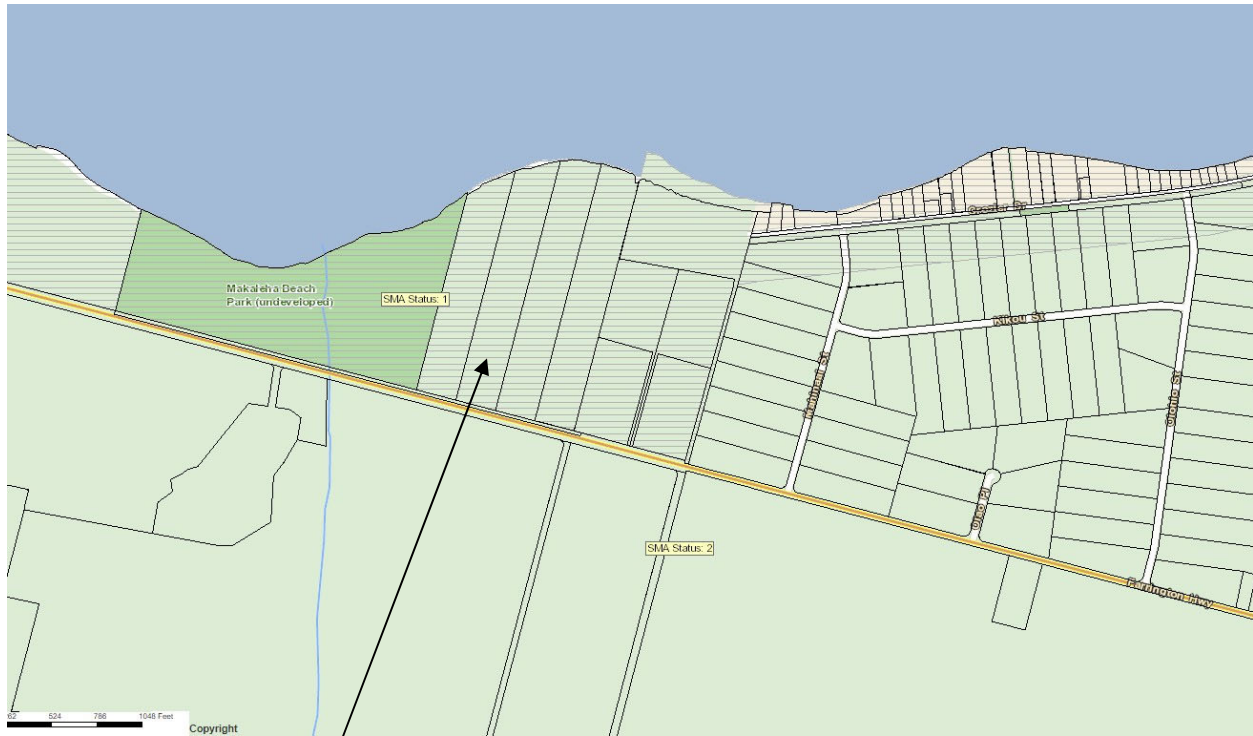
This work will be covered by an Erosion and Sediment Control Plan that will be submitted with the building permit application. As such the effect on the environment is expected to be negligible during construction. No known long term effects.

This parcel is in a tsunami inundation zone and therefore considered subject to tsunami hazards.

No known cultural or historical resources are known to be affected by the project and there are no records of any previous structures on the parcel.

Exhibit 'A'

Subject Parcel Location



Subject Parcel

This map shows the subject parcel location relative to the overall SMA boundary lines. Property borders Farrington Hwy. on the Mauka side. One lot over is the City's undeveloped Makaleha Beach Park with beach access.

Exhibit 'B'

Photos of parcel



View of parcel from Farrington Hwy. looking toward ocean. (Existing Fence and gate to be replaced).



View from Parcel near ocean looking Mauka.



View of parcel along Makai side.

Exhibit 'C'

Alston Family Fence Project
Cost Breakdown

Revised 11-4-2019

Phase #	Phase Name	Allowances	Landmark	Sub/Supplier
Sitework				
01-01	Final Grading/Additional fill/Haul out		\$500.00	Grover Masonry
01-02	Layout/Surveying Layout property corners, points on line		\$1,500.00	Park Engineering
01-05	Demolition			NIC
01-07	Erosion Control & BMPs		\$750.00	Landmark Builders, Inc.
01-08	Mobilization/Demob		\$800.00	Landmark Builders, Inc.
Masonry				
02-11	Fence Post Footings		\$15,000.00	Grover Masonry
02-13 02-14	CRM Walls and Planters		\$18,000.00	Hikila Rock Walls
Plumbing				
				N/A
Electrical				
				N/A
Framing				
05-28	Fencing Material		\$33,000.00	Husker Vinyl
	Shipping		\$8,600.00	Lynden Freight
05-29	Fence Installation Labor		\$15,000.00	Landmark Builders, Inc.
Doors & Windows				
				N/A
Exterior Trim & Siding				
07-40	Solar Gate Motor and Keypads		\$3,500.00	Mighty Mule/Landmark
Roofing				
				N/A
Drywall				
				N/A
Cabinets/Countertops				
				N/A
Interior Trim				
				N/A
Glass & Metal				
				N/A
Painting				
				N/A
Floors				
				N/A
Misc.				
15-82				
15-83				
15-84	Lift/Telehandler rental		\$2,500.00	Landmark Builders

15-87	Clean up/Dumpster - (1) roll-offs	\$1,100.00	The Trash Man
	Site Labor/Material Handling/stocking	\$1,200.00	Landmark Builders, Inc.
15-91	Construction Toilet	\$300.00	Paradise Lua

Supervision

16-95	Project Management	\$5,300.00	Landmark Builders
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Taxe/Insurance/Bond


17-97	Taxes		Below
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Contingency

18-99	Contractor Contingency	\$1,475.00	
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Total		\$0.00	\$0.00	\$108,525.00
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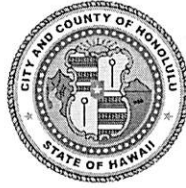
Total Materials and Labor (including Allowances)	\$108,525.00
5% Overhead	\$5,426.25
5% Profit	\$5,426.25
Subtotal	\$119,377.50
4.712% GE Tax	\$5,621.98
Total	\$125,000.00


 11-4-2019
 Mark Woodfield - President
 Landmark Builders, Inc.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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KIRK CALDWELL
MAYOR



KATHY K. SOKUGAWA
ACTING DIRECTOR

TIMOTHY F. T. HIU
DEPUTY DIRECTOR

EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

2020/SMA-11(CK)

MINOR PERMIT: SPECIAL MANAGEMENT AREA	
File Number:	2020/SMA-11
Project: (Valuation)	Alston Fence Project (\$115,000)
Owner/Applicant:	Paul Alston
Agent:	Landmark Builders, LLC (Mark Woodfield)
Location:	68-431 Farrington Highway - Mokuleia
Tax Map Key:	6-8-003: 045
Zoning:	AG-2 Agricultural District
Date Received:	April 9, 2020

The application for a Special Management Area (SMA) Minor Permit to allow for the development of a five-foot-high vinyl horse rail perimeter fence along the front and two side property boundaries, and a new front gate with a rock wall entry feature on the subject site, which is within the SMA, is **APPROVED**, subject to the following conditions:

1. Development must be in general conformance with the approved plans, labeled Exhibits A through J. Any modifications to the Project and/or approved plan are subject to the prior review of and approval by the Director of the Department of Planning and Permitting (DPP). Major modifications will require a new SMA Permit in accordance with the provisions of Chapter 25, Revised Ordinances of Honolulu (ROH).
2. If the actual valuation of the proposed work ultimately exceeds \$500,000, then the Project must be returned to the DPP for further review under Chapter 25, ROH.

3. To avoid impacts to Hawaiian Hoary bats and nesting avian species related to lighting, no construction may occur during nighttime hours. Construction must also be avoided during the seabird fledging period from June 1 through September 15.
4. If, during construction, any previously unidentified archaeological sites or remains (such as, artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, paving, or walls) are encountered, the Applicant shall stop work and contact the State Historic Preservation Division (SHPD) immediately. Work in the immediate area must be stopped until the SHPD is able to assess the impact and make further mitigative recommendations.
5. This application has only been reviewed and approved pursuant to the provisions of Chapter 25, ROH, and its approval does not constitute compliance with the requirements of other governmental agencies. These are subject to separate review and approval. The Applicant is responsible for ensuring that the final plans for the Project approved under this permit comply with all applicable provisions and requirements of other government agencies, including compliance with the provisions of the Land Use Ordinance.

Location: The Project site consists of a 348,460-square-foot undeveloped shoreline lot, located in the Mokuleia area on the north shore of Oahu. Surrounding properties to the west, east and south are also undeveloped agricultural lands. The property is bounded by the Pacific Ocean to the north, Farrington Highway to the south, and is one parcel east of Makaleha Beach Park (see Exhibit A). The subject property is zoned AG-2 General Agricultural (see Exhibit B) and is entirely within the SMA (see Exhibit C). It is also in the State Land Use Agricultural District (see Exhibit D).

Project: The Applicant proposes to install a new "weathered cedar" colored horse fence along the front (south) and side (east and west) property boundaries, the front segment of which would also include a new access gate with rock wall features on either end. Implementation of the Project will consist of the following activities, as shown on Exhibits E and F:

- Installation of a five-foot-high vinyl horse fencing along the 238-foot-wide front property line;
- Installation of a new 16-foot-wide roadway access gate within the new front fence alignment, including five-foot-high by six-foot-wide rock wall features on either end of the gateway. The rock wall will incorporate planter features, as well as solar-powered lighting features. The lighting features will be located atop the rock wall, extending to a maximum height of six feet above grade;

- Installation of a five-foot-high vinyl horse fencing along the west property boundary, extending 1,385 feet from the front fence towards the ocean, and ending approximately 113 feet mauka of the shoreline;
- Installation of a five-foot-high vinyl horse fencing along the east property boundary, extending approximately 1,507 feet from the front fence towards the ocean, and ending approximately 98 feet mauka of the shoreline; and,
- Installation of a five-foot-high “middle” vinyl horse fence extending approximately 238 feet from the east to the west property boundary, at approximately 995 feet makai of the front property line.

The Project site was created as part of a four-parcel Subdivision action in 2003 (File No. 2003/SUB-83). As a part of that Subdivision, specific access locations off Farrington Highway were designated for each of the four parcels and depicted on both the Final Subdivision Map and the Land Court Consolidation Map. The proposed main gate along the front property line will be located at the designated access location for the subject property.

In addition, there is a 25-foot-wide State highway setback along Farrington Highway and the front property line. In a letter dated May 20, 2020, the Hawaii Department of Transportation (HDOT), having reviewed the Project description, plot plan and elevation drawings, stated that *“based on the information provided, the proposed Project does not appear to significantly impact the State highway system. Therefore, HDOT has no comments or objections.”* As such, no conflict with the State highway setback is anticipated as a result of Project implementation.

Analysis:

Water Resources: According to Federal Emergency Management Agency Federal Flood Insurance Rate Map No. 15003C0085F, the majority of the Project site is located in Flood Zone AE, which corresponds to areas subject to inundation by the one-percent-annual-chance flood (see Exhibit G). Therefore, development at the subject property is required to comply with the requirements for a Flood District Certification pursuant to the Flood Hazard Area Ordinance, Chapter 21A, ROH. However, implementation of the proposed fencing and gate features are not anticipated to result in increased hazards related to flooding.

There are no streams on the site. Makaleha Stream runs mauka-to-makai approximately 750 feet west of the Project site. The shoreline (beach) area of the Project site is classified as Estuarine and Marine Wetland (M2USN), and waters further offshore are designated as Estuarine and Marine Deepwater (M1RF1L; Exhibit C). The closest Project activities will be approximately 98 feet from the presumed shoreline, outside of the shoreline setback area. Temporary impacts during Project construction are anticipated to include dust and noise, to be reduced through

implementation of required water and air quality Best Management Practices. Therefore, no runoff or other impact to surface waters, the Pacific Ocean or marine resources is anticipated to occur as a result of Project implementation.

Agricultural Lands: The U.S. Department of Agriculture's Natural Resources Conservation Service's web soil survey identifies the site's soil type as Mokuleia Clay Loam and Jaucus Sand, of which the Mokuleia Clay Loam is rated as Class "A" by the Land Survey Bureau (see Exhibit H). Under the provisions of the State Land Use Agricultural District and the City AG-2 General Agricultural zoning designation, the Project site is eligible to be used for authorized agricultural uses. Further, Subdivision No. 2003/SUB-83 required the recordation of a Declaration of Restrictive Covenants, under which the Declarant and all subsequent property owners were required to agree that uses of the land must comply with Section 205-4.5(b), Hawaii Revised Statutes (HRS), and the permitted uses within the AG-2 General Agricultural District in the Land Use Ordinance. The Applicant has indicated their intent to actively farm the Project site in the future, at which time additional permits will be sought. However, as the proposed Project is limited to partial perimeter fencing to limit site access from the mauka side, it is not anticipated to result in adverse impacts to agricultural lands or prohibit future agricultural uses of the land.

Biological Resources: The Project site and surrounding properties to the west, south and east are undeveloped agricultural lands, with the Pacific Ocean to the north. There are no nearby federally designated critical habitat areas shown on the Oahu Critical Habitat mapping website (see Exhibit I). It is not anticipated that Project construction will significantly affect sensitive species or habitats. However, there are trees on the Project site, so the area may be visited for foraging by Hawaiian hoary bats, endangered avian species, or native Hawaiian seabirds. The Applicant has indicated that no night-time work is proposed or will be required. In addition, work would be scheduled to avoid sensitive species' breeding seasons. These are included as a condition of approval.

Archeological Resources: Given that the subject property consists of undeveloped vacant land, unknown archeological resources may be encountered during earth-moving activities associated with construction of the proposed fencing, entrance features, or gates. The possibility of encountering such resources may be reduced by the limited depth of excavation required to install fencing posts. In addition the subject property was previously utilized for sand mining under Special Use Permit No. 72/SUP-3 and Conditional Use Permit No. 72/CUP-12, which have since been terminated. Nonetheless, the proposed work is subject to the standard stop-work condition should historic artifacts, cultural resources, or human remains be encountered.

Traffic and Access: Traffic increases are expected to be minimal and will primarily be limited to the transport of equipment and personnel to the site. All Project staging and vehicle parking will occur on-site. Therefore, implementation of the Project is not anticipated to result in an adverse impact to traffic or emergency access in the area.

Open Space and Recreational Resources: The construction of partial perimeter fencing, entry features, and two gates around an agriculturally-zoned property will not result in any reduction of open space or recreational resources, or otherwise conflict with objectives of the Coastal Zoning Management Program, Chapter 205A-2, HRS, and the SMA Ordinance, found in Section 25-3.1, ROH. No actions are proposed to occur within the shoreline setback area or affecting a public beach. Further, no actions are proposed that would affect the existing public beach access at the nearby of Makaleha Beach Park.

Sea Level Rise (SLR): Mayor's Directive 18-2, issued on July 16, 2018, requires all City Departments and Agencies to use the SLR Guidance and Hawaii SLR Vulnerability and Adaptation Report in planning decisions. Based on review of the PacIOOS SLR Exposure Area viewer, the proposed Project construction and infrastructure will be located outside of the scenario envisioning 3.2 feet of SLR by Year 2100 (see Exhibit J).

For the reasons discussed above, implementation of the proposed fencing, gate and entry features are not anticipated to result in direct increases, or a cumulatively considerable contribution, to coastal hazards or significant adverse impacts to sensitive coastal zone resources within the SMA. It is anticipated that any unforeseen impacts will be mitigated through implementation of the conditions of approval, as well as through mandatory compliance with all applicable regulatory standards.

Any person who is specifically, personally, and adversely affected by the Director's action (on the SMA Permit) and wishing to appeal any part or requirement of the action, must submit a written request for a contested case hearing to the DPP within 30 calendar days from the date of mailing, personal service, or publication of the action of the Director. Contested case hearings shall be conducted pursuant to Chapter 12 of the DPP Part 2 Rules Relating to Shoreline Setbacks and the SMA. Essentially, these Rules require that a petitioner show that the Director based his/her action on an erroneous finding of a material fact, and/or that the Director otherwise acted in an arbitrary or capricious manner, or there are extenuating circumstances. The filing fee for a contested case hearing is \$400.00 (payable to the City and County of Honolulu).

A copy of this approval should accompany your application(s) for construction permits.

Should you have any questions, please contact Christi Keller, of our Zoning Regulations and Permits Branch, at 768-8087 or by email at c.keller@honolulu.gov

Enclosure: Exhibits A through J
Receipts No. 126762 and 126790

cc: Office of Planning, Shichao Li (via email)

THIS COPY, WHEN SIGNED BELOW, IS NOTIFICATION OF THE ACTION TAKEN.

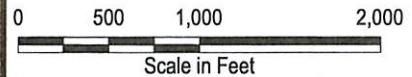
 *Christi Keller*
SIGNATURE

For: Acting Director
TITLE

May 28, 2020
DATE



**EXHIBIT A - PROJECT
LOCATION MAP**



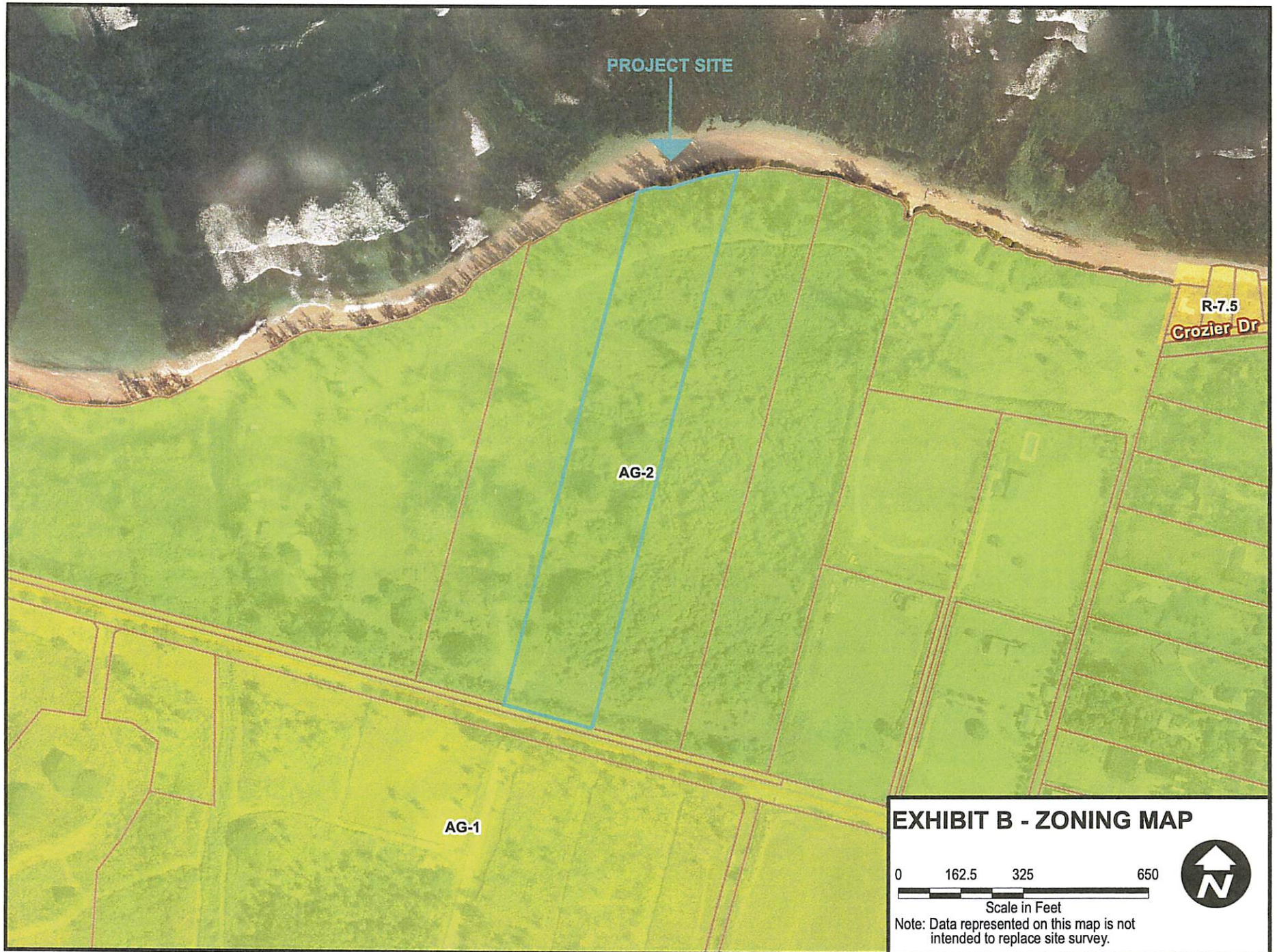
Note: Data represented on this map is not intended to replace site survey.

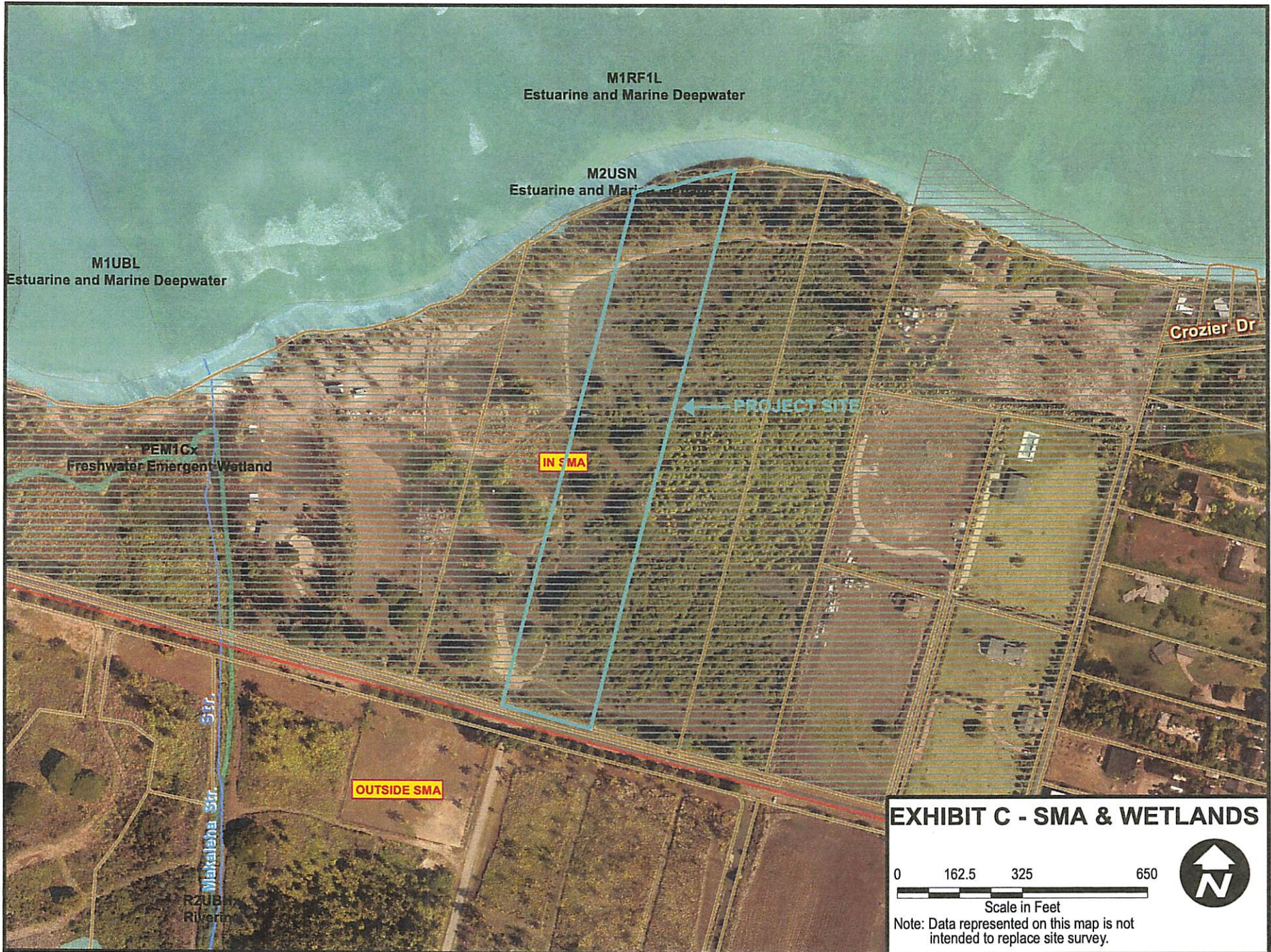


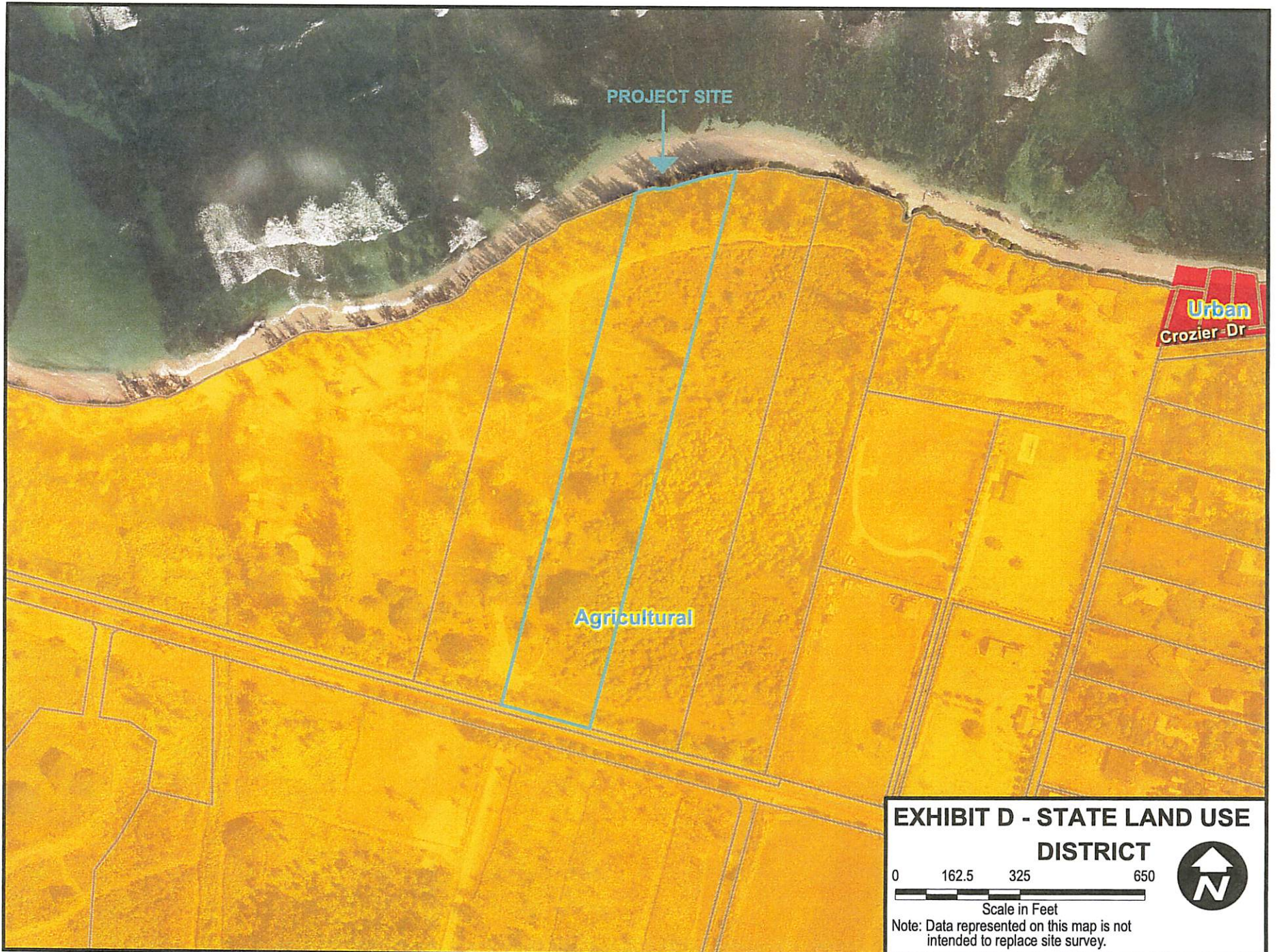
Prepared by:

Date Prepared:

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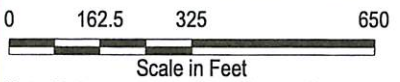


PROJECT SITE

Agricultural

Urban
Crozier Dr

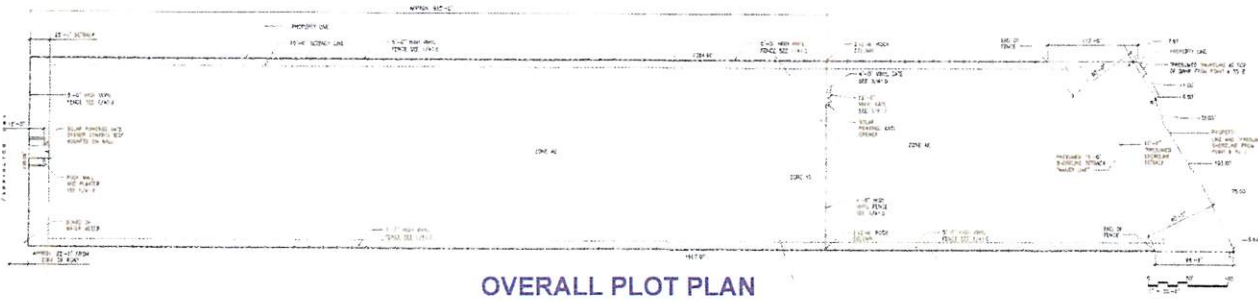
EXHIBIT D - STATE LAND USE DISTRICT



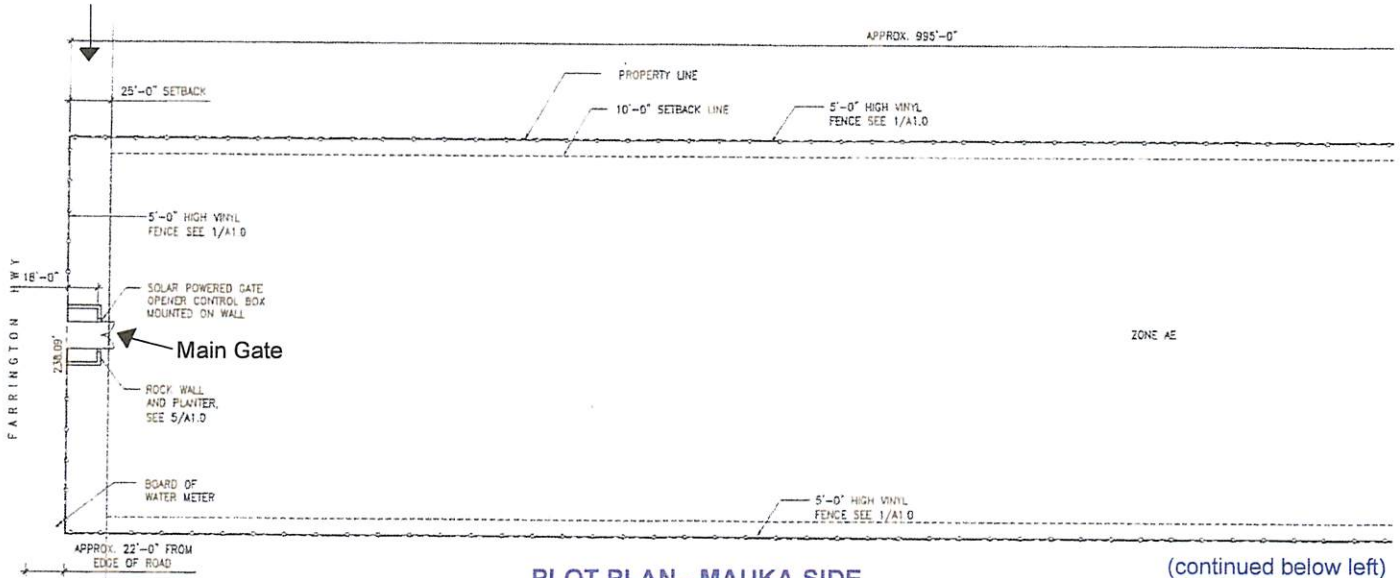
Note: Data represented on this map is not intended to replace site survey.

Farrington Highway

Pacific Ocean



SDOT Setback



(continued from above right)

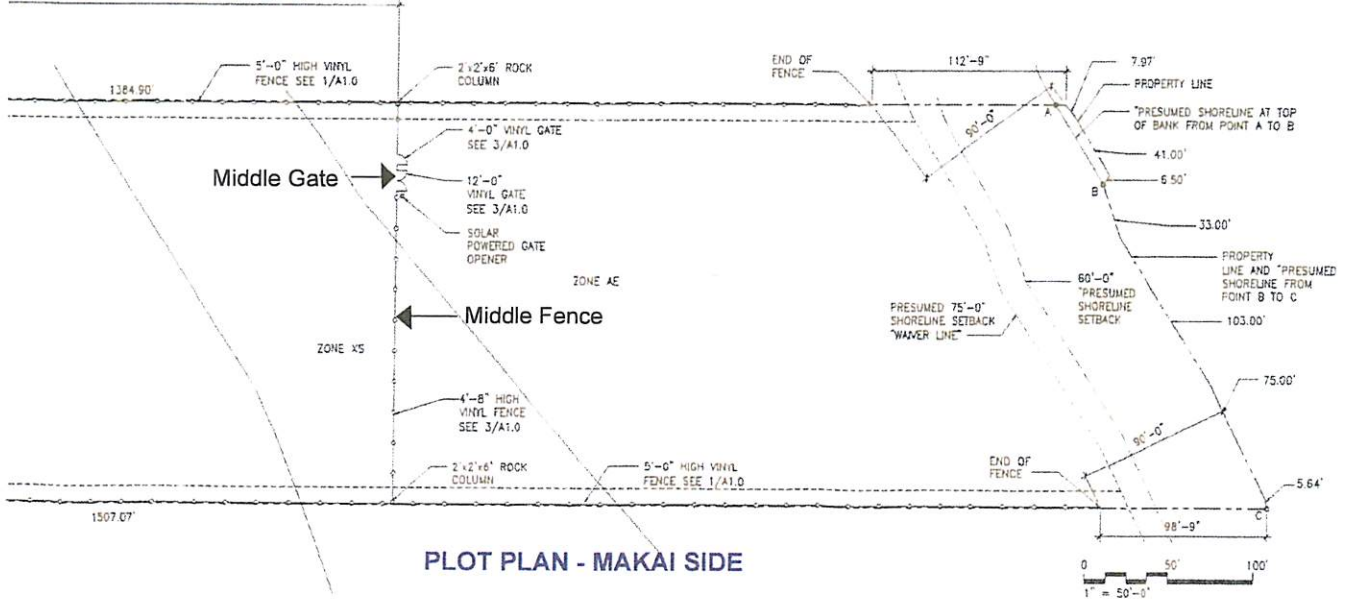
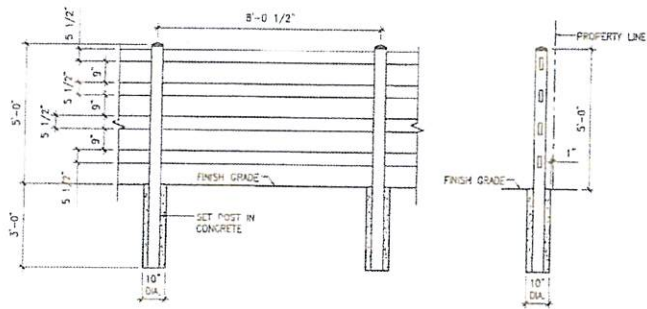
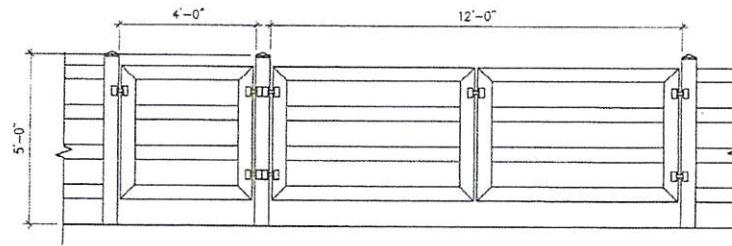


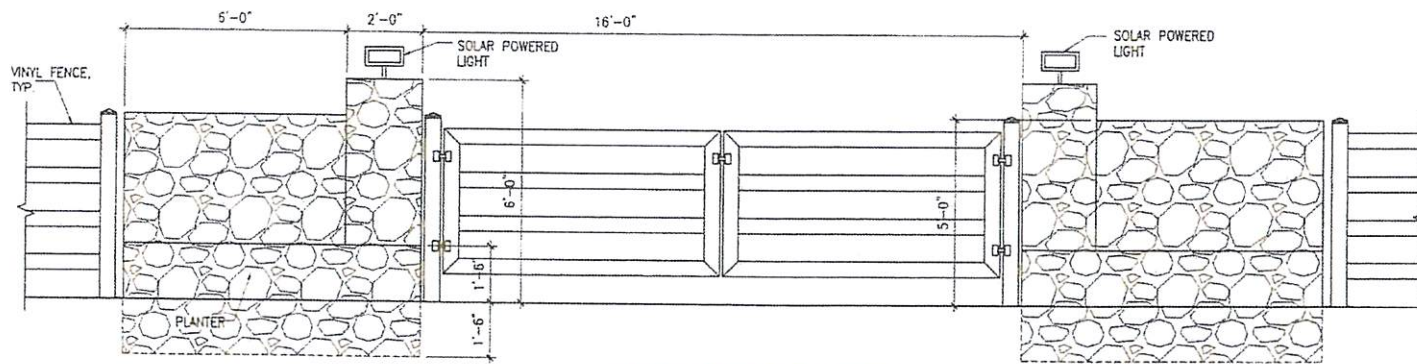
EXHIBIT E - PLOT PLAN



TYPICAL VINYL FENCE ELEVATION AND SECTION

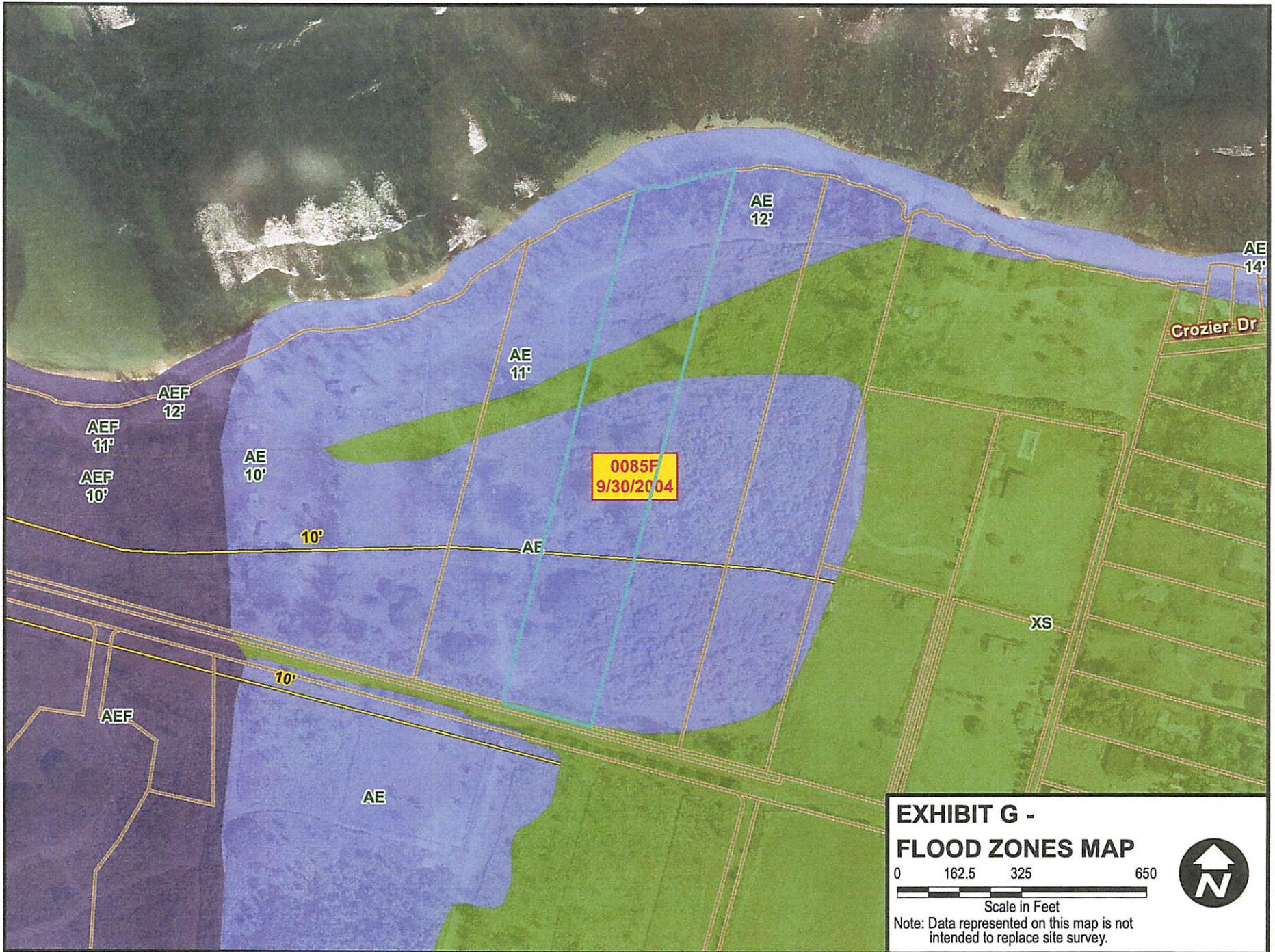


MIDDLE VINYL GATE ELEVATION

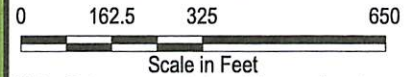


FRONT GATE ELEVATION

EXHIBIT F - ELEVATION DRAWINGS



**EXHIBIT G -
FLOOD ZONES MAP**



Scale in Feet

Note: Data represented on this map is not intended to replace site survey.





0 300 600ft

EXHIBIT H - HAWAII LAND SURVEY BUREAU SOIL CLASS MAP



May 5, 2020

Wetlands

- | | | |
|--|---|--|
|  Estuarine and Marine Deepwater |  Freshwater Emergent Wetland |  Lake |
|  Estuarine and Marine Wetland |  Freshwater Forested/Shrub Wetland |  Other |
| |  Freshwater Pond |  Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

EXHIBIT I - USFWS NATIONAL WETLANDS INVENTORY MAP



PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX E

BOTANICAL AND FAUNAL REPORT

Biological & Faunal Assessment – Pueo Farm

BIOLOGICAL ASSESSMENT - BOTANICAL AND FAUNAL SURVEY

Pueo Farm, 68-431 Farrington Highway, Waialua, Oahu
TMK: 1-6-8-003-045

Prepared By: WHALE Environmental Services LLC

Prepared For: Paul Alston, a.k.a Pueo Farms

October 2021



Biological & Faunal Assessment – Pueo Farm

BIOLOGICAL ASSESSMENT - BOTANICAL AND FAUNAL SURVEY

INTRODUCTION

The Pueo Farm is located at 68-431 Farrington Highway, Waialua, Oahu, TMK: (1-6-8-003-045). The project area has its frontage on Farrington Highway marking the mauka boundary and the Pacific Ocean, Kaiaka Bay boundary marking the makai boundary. The goal of the project is to realign much of the existing Lower Waiohuli Trail, to a less steep grade. This assessment was initiated to ensure no biological resources would be significantly impacted by the trail realignment.

CONTACT INFORMATION

Contact Information:

Property Name & Operator: Pueo Farm / Paul Alston

Mailing Address: 2120 Puualii Place

Honolulu, HI 96822

Phone: 808-722-6000

Email: paul.alston@dentons.com

SITE LOGISTICS

Site Description:

Location of Property: 68-431 Farrington Hwy, Mokuleia

Tax Map Key #(s): 6-8-003-045

Size of Property: 7.9 acres

Type of Operation: Landscaping plant nursery

Annual Precipitation: ~32 inches (Online Rainfall Atlas of Hawai'i)

Elevation: 0-10 feet

Zoning: AG-2

Flooding: 0.2% Annual chance flood hazard

Soils: JaC: Jaucas sand, 0-15% slope

Mt: Mokuleia clay loam, 0-2%

SITE DESCRIPTION

The project area is situated in the Waialua, Oahu region, makai of the Dillingham Ranch entrance. Most of the land is level and vegetated with mostly sparse, disturbed ground cover with lightly scattered Monkeypod, Ironwood and Coconut Palm trees. For the most part, there is only a herbaceous layer and tree canopy, the site being mostly devoid of a shrub

Biological & Faunal Assessment – Pueo Farm

layer. The project elevation ranges from 0 to 10 feet above sea level. Annual rainfall averages 32 inches. Annual air temperature averages 77.1 degrees Fahrenheit. ([Climate Waialua - Hawaii and Weather averages Waialua \(usclimatedata.com\)](#))

Project site, Pueo Farm – 68-431 Farrington Highway, Waialua, Oahu. Blue line is area surveyed.



Biological & Faunal Assessment – Pueo Farm

The original vegetation on the site would have been a diverse coastal zone. Typical canopy species would have included milo, kamani, and naupaka.

After the arrival of humans, a series of forces including fire, agriculture, forestry, and introduced plants, animals, and diseases transformed the site to predominantly non-native vegetation. Major uses of the land included cattle grazing and agricultural plantings.

It is unclear when the native tree canopy would have been removed. The fact that there is a band of ironwood (*Casuarina equisetifolia*) along the shoreline in a clearly planting line formation likely means that species was placed as a wind break along the shoreline from ocean tradewinds for likely agricultural crop protection. The inner zone of the property is mostly golden shower trees (*Leucaena leucocephala*) and monkeypod (*Samanea saman*) which would have provided shade. The Farrington Highway entrance to the site is coconut palm (*Cocos nucifera*) which is believed to be for ornamental purposes.



Figure 1 - Coconut Palms at entrance



Figure 4 - ironwood at shoreline 1



Figure 2 - shower trees mid-site

Today, the site is predominantly vacant with a proposed use of a landscaping nursery and home. The bulk of the vegetation on the site is non-native, dominated by non-native trees, aggressive non-native grasses, and scattered remnant other invasive, endemic, and plants common-to-disturbed areas.

SURVEY OBJECTIVES

The objectives of the survey were to:

- Document what plant and animal species occur on the site or may likely occur in the existing habitat.
- Document the status and abundance of each species.

Biological & Faunal Assessment – Pueo Farm

- Determine the presence or likely occurrence of any native flora and fauna, particularly any which are Federally-listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
- Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.

SURVEY METHODS

A walk-through botanical survey method was used following horizontal-to-the-shoreline transects in 50' wide swaths. The width surveyed was slightly varied based on vegetation locations, but was generally at least twenty-five feet on either side of the transects on this relatively open site. Notes on vegetative types were photo and words recorded.

Notes were made on plant species, distribution and abundance. Extra emphasis was placed on areas with high diversity (if present), such as gullies with ferns and other pockets of remnant native plants. The route was surveyed on October 12, 2021 and October 15, 2021. Vegetation on the site is predominantly non-native, with two main habitat types. The mauka section consists of an open field covered by guinea grass as the dominant species. The makai section is dominated by ironwood trees, with no shrub canopy and sparse herbaceous layer of endemic goosefoot (*Hawaiian 'aweoweo*), invasive golden crownbeard aster (*verbessina encelinides*), morning glories (*Hawaiian – hunakai, Latin – ipooea imperati*), and very few Hawaiian sedges (*fimbristylis cymosa*).

MAUKA SECTION

From the entrance to the site on the Farrington Highway to about the midpoint of the 7.9 acre site, the disturbed grounds are bare in many areas or vegetated with patches of guinea grass (*Urochloa maxima*).

Outside of the dominant grass understory in the mauka portion, there are several coconut palm trees at the entrance (*see Figure 1*). Interdispersed among the grasses is an occasional clump of Hawaiian sedge (*fimbristylis cymosa*). There were less than a dozen of this species on the site.

There are no native plants in the mauka section.

Between the mauka section and the makai section lays an area of guinea grass with a monkeypod tree canopy in a few areas.



Figure 5 - mauka side of site



Figure 6 - stands of monkeypods

MAKAI SECTION

The makai portion of the site is predominantly a sandy coastal zone with a windbreak of ironwood trees (*Casuarina equisetifolia*). These trees are along a seaside trail used for horse rides, with a sparse canopy and sparse canopy.

Non-native shrubs are trying to grow in the few sunny openings, but also appear stunted. ‘Koa haole (*Leucaena leucocephala*) is the most common of these, but less than a dozen of this normally highly invasive species are established. A few Hawaiian asters are in the area, along with the goosefoot and morning glories.



Figure 7 - morning glories

Figure 9 - golden crowbeard aster

Guinea grass is more common than other species here, which is normal as that species often chokes out other species.

Biological & Faunal Assessment – Pueo Farm

Most of the project area has been heavily impacted by previous human disturbances and is currently dominated by hardy non-native plants. None are of special conservation concern. No special native plant habitats occur on the project site that is not found elsewhere in this part of the island. The proposed project is not expected to have a significant negative impact on the botanical resources in this part of Oahu. A *Conservation Management Plan* for the site's proposed activities has been prepared by the Oahu Resource Conservation and Development Council (*September 2020*) and is included as Appendix A of this Botanical and Faunal Assessment Report.

PLANT SPECIES LIST

Following is a checklist of all vascular plant species inventoried during field studies. Taxonomy and nomenclature are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

Common English name

Hawaiian *name (if known)*

Scientific name

- Bio-geographical status:
 - o Endemic = Native to Hawaii; not naturally occurring anywhere else in the world.
 - o Indigenous = Native to Hawaii and also to one or more other geographic area(s).
 - o Non-native = Brought to Hawaii intentionally or accidentally by humans.
- Abundance of each species within the project area:
 - o Dominant = Forming a major part of the vegetation within the project area.
 - o Common = Widely scattered throughout the area or locally abundant within a portion of it.
 - o Occasional = Scattered sparsely throughout the area or occurring in a few small patches.
 - o Rare = Only a few isolated individuals within the project area.

Biological & Faunal Assessment – Pueo Farm

Common Name	Hawaiian Name	Scientific Name	Bio-Graphical Status	Abundance
MonkeyPod		<i>samanea saman</i>	Non-Native	Occasional
Ironwood		<i>casuarina equisetifolia</i>	Non-Native	Occasional
Coconut Palm		<i>cocos nucifera</i>	Non-Native	Occasional
Goosefoot	<i>'aweoweo</i>	<i>chenopodium oahuense</i>	Endemic	Rare
Golden Crowbeard		<i>verbena encelinides</i>	Invasive Non-Native	Occasional
Morning glory	<i>hunakai</i>	<i>ipomoea imperati</i>	Indigenous	Rare
Hawaiian Sedge		<i>fimbristylis cymosa</i>	Indigenous	Rare
Koa Ha'ole	<i>Koa Ha'ole</i>	<i>leucaena leucocephala</i>	Invasive Non-Native	Rare
Golden Shower Tree		<i>cassia fistula</i>	Invasive Non-Native	Rare
Guinea Grass		<i>urochloa maxima</i>	Invasive Non-Native	Common

FAUNAL SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. Field observations were made with the aid of binoculars and by listening to vocalizations.

Notes were made on species, abundance, activities and location as well as observations of trails, tracks, scat and signs of feeding. Conspicuous insects were noted.

In addition, an evening visit was made to record crepuscular activities and vocalizations and to look for presence of Hawaiian Hoary Bats (*Lasiurus cinereus semotus*). Along with visually scanning the sky for bats, active and passive ultrasonic bat detectors were used to help detect bats.

The site was surveyed on October 12 and October 15, 2021. Night visit was on October 15th, 2021.

Hawaiian Hoary Bats are present over all of Oahu, some of their highest numbers occur in forested sections of the mid-elevations, and they have been documented from the Kahuku Training Area Army Reserve and at Peacock Flats in the Waianae Range. No bats were detected during the night survey for this project. As well, it is unlikely that they frequent this low elevation flat and barren area.

Hawaiian Hoary Bats roost in tall trees in sheltered areas, such as on the branch tips of mature Eucalyptus trees. The trees on this site are somewhat stunted by salt spray and not seen to host the bats. As well, they are not slated for removal as they lie within the shoreline setback area. The bats give birth to and raise their young in the summer. Avoiding cutting large trees during the summer months will help minimize potential impact to young bats that have not yet learned to fly.

Pueo Farm has the nomenclature of *pueo* – Hawaiian short-eared owl. However, no pueos were observed here but have been sighted in the nearby Makaleha Stream corridor, which is common for the species to travel in stream corridors looking for prey. There are vague signs of game mammals found within this unit which would include feral pigs. There is a potential for pig damage in places, but no old pig scat was detected and the small excavations could have been from the disturbed land grubbing activities. Other mammals likely to utilize this property, but which were not observed or heard include rats (*Rattus spp.*), mice (*Mus domesticus*), cats (*Felis domesticus*) and mongoose (*Herpestes javanicus*).

A Pacific Golden-Plover or *Kolea* (*Pluvialis fulva*) was flushed from the seashore area. On the endangered list, these migratory birds arrive in Hawaii August and depart in April.

Biological & Faunal Assessment – Pueo Farm

Albatross were not observed, but are known from the Kaena Forest Reserve to traverse into the Dillingham Airfield area. If albatross are seen on the site, specialists within DLNR should be contacted to determine appropriate actions.

A complete inventory of the insects was beyond the scope of this survey. Conspicuous insects were noted and special effort was made to look for native insects of conservation concern. In general, there were few insects present found on-site. Perhaps the salt air, lack of wetlands and monotypic vegetation contributed to that.

Honey bees (*Apis mellifera*) were one of the only sighted insects. They could be heard buzzing in warm sunny areas and were observed visiting the Hawaiian golden asters flowers.

There were no detected galls on or leaves that would appear to be chewed on. Vacancy of insect damage indicates insect presences is sparse. Common houseflies were detected just off-site along the shoreline attracted by the horse dung on the riding trail.

More intensive surveys would undoubtedly turn up many more cryptic species, though it is unlikely any would be of conservation concern.

Nishida, G. M. 2002. Hawaii Arthropod Checklist Fourth Edition. Bishop Museum Technical Report 22: iv+313 pp.

Palmer, D. D. 2003. Hawaii's Ferns and Fern Allies. University of Hawaii Press, Honolulu, HI.

Pyle, R.L., and P. Pyle. 2009. The Birds of the Hawaiian Islands: Occurrence, History, Distribution, and Status. B.P. Bishop Museum, Honolulu, HI, U.S.A. Version 1 (31 December 2009) <http://hbs.bishopmuseum.org/birds/rlp-monograph>

Wagner, W. L., D. R. Herbst, and S. H. Sohmer. 1999. Manual of the Flowering Plants of Hawaii. Univ. of Hawaii Press and Bishop Museum Press, Honolulu, HI.

PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX F

PHASE 1 - ENVIRONMENTAL
SITE ASSESSMENT - HAZMAT

ENVIRONMENTAL SITE ASSESSMENT

for 68-431 Farrington Highway - Pueo Farm
including Hazardous Materials Review

Pueo Farm - Paul Alston
Waialua, Hawaii



WHALE Environmental Services LLC

P.O. Box 455, KAHUKU, HI 96731 808-294-9254

Phase I Environmental Site Assessment

This provision of a Phase I ESA includes a hazardous material review conforming to the standards of the American Society for Testing and Materials (ASTM) and “All-Appropriate-Inquiry” (AAI) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); with the requirements of the ASTM E1527-13 Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process.

Pueo Farms, Waialua region on the Island of Oahu, Hawaii.

Prepared For:

Landmark Builders – agents for Pueo Farms – Paul Alston

Tax map key, Address, & parcel(s) as follows:

Parcel: 1-6-8-003-045
Address: 68-431 Farrington Highway, Waialua, Oahu, Hawaii
Parcels ~7.9 acres

October, 2021

WHALE Environmental Services LLC

PO Box 455, Kahuku HI 96731



808-294-9254 www.whalees.com

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

Mr. Mark Woodfield (Builder), Mr. Paul Alston (Owner)
Landmark Builders/Pueo Farms
Kamehameha Highway, Haleiwa, HI 96712
Honolulu, HI, 96813

Re : Phase I Environmental Site Assessment: Pueo Farms, Waialua region on the Island of Oahu, Hawaii.

Dear Builder/Property Owner:

In accordance with the project award and Builder's written authorization, WHALE Environmental Services LLC conducted a Phase I environmental site assessment (ESA) of the above-referenced site (Site). The objective of the Phase I ESA was to evaluate the Site for indications of recognized environmental conditions and to assist in satisfying All Appropriate Inquiries (AAI) standards and practices. The Phase I ESA was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E1527-13 and 40 CFR Part 312.

The Phase I ESA was prepared on behalf of, and for use by the Property Owner, and execution for building permits by the Builder. No other party has a right to rely on the contents of the Phase I ESA without written authorization by WHALE Environmental Services LLC. The Phase I ESA was prepared in association with the development of the Site. Please refer to the attached report for the scope, methods and conclusions of our assessment.

We appreciate the opportunity to provide our professional services for you for this project. If you have any questions regarding this letter or the attached report, please contact Mark Howland, COO and Chief Biologist at 808.294.9254.

Sincerely,

WHALE Environmental Services LLC
Mark Howland, PMP

Mark A. Howland

Mark Howland, COO

Attachment: Phase I Environmental Site Assessment Report

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

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D: HIG Historical Database Research Report

E: Aerial Photographs

F: Site Photographs, Soil Mapping Report, Groundwater Regime (if applicable)

G: References

H: Resume

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

Executive Summary

WHALE Environmental Services LLC conducted a Phase I Environmental Site Assessment (ESA) of the Pueo Farms, 68-431 Farrington Highway in the region of Waialua on the Island of Oahu, Hawaii (Site), in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E1527-13 and 40 CFR Part 312.

At the time of the reconnaissance, the Site consisted of:

The tax map key & parcel(s) as follows:

Parcel:

TMK: 1-6-8:003:045

This vacant parcel is located in Waialua, directly across from the entrance to Dillingham Farm in the Waialua District of Oahu. WHALE Environmental Services LLC has provided historical records review services and visual site inspection; and assumes no liability for any undetected or unreported toxic chemicals not reported or detected in the visual review of the property or reported in the historical data review.

A Site Location Map is included in Appendix A, and parcel assignments are depicted on the Site Map in Appendix B. The Site topography was mostly level outside of the coastal berm separating the site from the Pacific Ocean along the shoreline. The Site consists of an abandoned agricultural enterprise, until its unknown closure in the past. The Site is currently not used and is mostly vacant, outside of initial fencings and site development activities for a planned landscaping operation and residential use. The Site is covered mostly with invasive species; concentrating on grassland guinea grass.

Recognized Environmental Conditions

This assessment identified no recognized environmental conditions in connection with the Site, with the exception of the following:

Historical Aerial Photo information indicates that the Site was operated as a former agricultural enterprise. The site is currently void of any agricultural activities. The site was observed (see Photos) and no hazardous materials were noted. Based on this information there is minimal potential for hazardous substance and/or petroleum contamination in the range which is out of the range for testing in present day environs. We consider this site has no recognized environmental condition(s).

Additional Considerations

Historical information and interview information indicates no presence of underground heating pipelines, fuel pipelines, and conveyance tunnels. There is no indication for asbestos-containing materials on the site as materials on the site are all land-based.

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A. Introduction

A.1. Purpose

WHALE Environmental Services LLC received authorization for the Phase I Environmental Site Assessment in the Waialua region on the Island of Oahu, Hawaii. In accordance with the project award and Builder's written authorization, WHALE Environmental Services LLC conducted a Phase I environmental site assessment (ESA) of the (Site), which consists of One (1) Parcel (listed in Section A.2). The objective of the Phase I ESA was to evaluate the Site for indications of recognized environmental conditions and to assist in satisfying All Appropriate Inquiries (AAI) standards and practices. The Phase I ESA was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E1527-13 and 40 CFR Part 312. No intentional deviations from the ASTM Practice E1527-13 were made in conducting this Phase I ESA for the Site. The Phase I ESA was prepared on behalf of, and for the use by the Owner, and the Builder previously identified in accordance with the contract between WHALE Environmental Services LLC and those parties, including the WHALE Environmental Services LLC General Conditions limiting liability instructions. No other party has a right to rely on the contents of the Phase I ESA without written authorization by WHALE Environmental Services LLC. All authorized parties are entitled to rely on the attached report according to our contract with Client, and under the same terms, conditions and circumstances. Please note that our contract with Client may contain a limitation of our total liability. If so, such limitations also apply as well to all those receiving additional permissions.

According to the User, the Phase I ESA was conducted in association with the future development of the Site. The purpose of this Phase I ESA was to evaluate the Site for Indications of "recognized environmental conditions." A recognized environmental condition is defined by ASTM Practice E1527-13 as: "*the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: 1) due to any release to the environment, 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.*"

In addition, a "*controlled recognized environmental condition*" is also a recognized environmental condition. A controlled recognized environmental condition is defined by ASTM Practice E1527-13 as "*a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.*"

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A.2. Site Location

The approximate center of the Site is the piles of gravel and soil mixtures being used for driveway improvement next to the access road and was examined with no signs of contaminated soils and/or stone.

A Site Location Map and Site Map are included in Appendices A and B, respectively. Information obtained from the Builder, and/or Google Earth, and/or ArcMap data files is included in Appendix C.

The Site consists of one (1) parcel. The parcel is described herein as TMKs. Parcel assignments are depicted on the Site Map(s) in Appendix B.

The following is a summary of Parcel information from the Department of Budget and Fiscal Services; Real Property Assessment Division, from which property information was extracted:

The tax map key & parcel(s) as follows:

Parcel:

1-6-8:003: 045

Total: ~7.9 acre

The parcel information lists Paul Alston – a private individual whose designated responder is Landmark Builders - Mr. Mark Woodfield; as the owner of the parcel. The combined total area of the single parcels is ~7.9 acres.

A.3. Scope of Services

Services provided for this project included:

- Preparing a description of the Site location, current use and improvements, and surrounding area.
- Preparing a general description of the topography, soils, geology, and groundwater flow direction at the Site.
- Reviewing reasonably ascertainable and practically reviewable regulatory information published by local, county, state and federal agencies, health, and/or environmental agencies.
- Reviewing the history of the Site, including aerial photographs, fire insurance maps, directories, and other readily available Site development data.

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- Conducting a reconnaissance and environmental review of the Site, including observations of the Site for indications of hazardous materials, petroleum products, polychlorinated biphenyls (PCBs), wells, storage tanks, solid waste disposal, pits and sumps, and utilities. Conducting an area reconnaissance, including a brief review of adjoining property uses and pertinent environmental information noted in the Site vicinity. Interviewing current owners and/or occupants of the Site and accessible past Site owners, operators and/or occupants. Reviewing previous environmental reports prepared for the Site, if provided. Preparing a written report of our methods, results, and conclusions. The Standard Scope of the ASTM Practice E1527-13 is not intended to provide a universal analysis of potential environmental risks and hazards. This assessment included no analysis of non-standard scope environmental risks and hazards unless otherwise listed above. Analysis of other non-standard scope issues by WHALE Environmental Services LLC would require additional contractual arrangements.

This assessment does not include vapor encroachment screening as defined in ASTM Practice E2600-10, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions. ASTM Practice E2600-10 is not a requirement or component of “*all appropriate inquiry*,” but a tool for evaluating vapor migration. Its results are not determinative of whether hazardous substances from a release are or may be present at the property for the sake of “*all appropriate inquiry*” or ASTM Practice E1527-13. An ASTM Practice E2600-10 vapor encroachment screen is not within the scope of this Phase I ESA and will not be conducted unless specifically requested by the *User*. However, vapors present or likely present from hazardous substances or petroleum products are considered no differently than hazardous substances or petroleum products present or likely present as a result of a release to the environment. Therefore, while a vapor encroachment screening per the ASTM Practice E2600-10 standard is not part of this assessment, the potential for impacts to the property from vapor migration that is a result of a release of hazardous substances and/or petroleum products to the environment will be considered when assessing for the presence of a recognized environmental condition as defined by ASTM E1527-13 and is deemed unlikely.

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A.4. User-Provided Information

The purpose of this section is to describe tasks to be performed by the “User.” The “User” as defined by ASTM Practice E1527-13, is “*the party seeking to use ASTM Practice E1527-13 to complete an environmental site assessment of the property. A User may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager.*”

As stated in 40 CFR 312 (the rule), the Brownfields Amendments provide important liability protections for *Users* who qualify as contiguous property owners, bona fide prospective purchasers, or innocent landowners. To meet the statutory requirements for any of these Landowner Liability Protections (LLPs), a *User* must meet certain threshold requirements and satisfy certain continuing obligations. To qualify as one of the three LLPs, the User must perform “*all appropriate inquiries*” (AAI) on or before the date on which the User acquired the Site. Since the site was acquired in 2018, we are unaware if an AAI was done – there is no record of any, so legally it is not required. But for the purposes of this ESA, we have conducted one as the rule defines an AAI, which includes inquiries and activities performed by the User and an environmental professional (EP) as a standard part of an ESA.

The rule allows (*but does not mandate*) the *User* performing AAI to conduct inquiries or activities that may include searches for environmental liens, assessments of any specialized knowledge on the part of the *User*, an assessment of commonly known or reasonably ascertainable information about the Site, and an assessment of the relationship of the purchase price to fair market value. However, if the *User* performing AAI conducts one or more of these inquiries and/or activities, the rule allows (but does not mandate) that the *User* may communicate information gathered from these inquiries and/or activities to their EP to identify a possible recognized environmental condition.

WHALE Environmental Services LLC provided a *User Questionnaire* to the Owner’s Representative - Landmark Builders as a means to communicate information gathered from these inquiries and/or activities to the EP. The *User* may elect whether to communicate this information to the EP and/or to communicate this information to the EP by other means (*e.g., through conversation or submission of documents (method provided)*). As indicated in our contract, if multiple Users are requesting reliance on the Phase I ESA, the Client was responsible for forwarding a copy of the questionnaire to all appropriate entities (*collectively the User(s)*).

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User-supplied information is discussed in applicable sections of this report. Sections A.4.a through A.4.f present any information communicated to us by the *User* that the EP has determined to indicate the possible presence or likely presence of a recognized environmental condition.

A.4.a. Environmental Liens

An environmental lien is a charge, security, or encumbrance, upon title to the Site to secure the payment of a cost, damage, debt, obligation, or duty arising out of response actions, cleanup, or other remediation of environmental issues at the Site.

We were provided no information indicating record or awareness of environmental liens recorded against the Site.

A.4.b. Activity and Use Limitations

Activity and Use Limitations (AULs) are legal or physical restrictions or limitations on the use of, or access to, a Site to reduce or eliminate potential exposure to hazardous substances or petroleum products in the soil, soil vapor, groundwater, and/or surface water on the Site or to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment. AULs, which may include institutional and/or engineering controls, are intended to prevent adverse impacts to individuals or populations that may be exposed to hazardous substances and petroleum products in the soil, groundwater, and/or surface water on the Site.

We were provided no information indicating a record or awareness of AULs recorded for the Site.

A.4.c. Specialized Environmental Knowledge

Specialized environmental knowledge includes any information and/or experience related to the Site or adjoining properties including, but not limited to, any obvious indicators that point to the presence or likely presence of environmental issues at the Site.

The User did not provided previous environmental reports conducted at the Site. The User was aware of additional information regarding environmental knowledge pertaining to the Site already provided to the C&C of Honolulu (SMA Minor Application). The User did provide responses to the AAI as seen on the next page through written documents:

All Appropriate Inquiry (AAI) ASTM E1527-13 User Questionnaires

In accordance with ASTM E1527-13 and in order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, the user (client or client representative) must provide the following information (if available) to the environmental professional (WHALE Environmental Services LLC). Failure to provide this information could result in a determination that “all appropriate inquiry” (AAI) is not complete.

When the “user” (the party or client representative for whom the assessment is being prepared) of the Phase I is required to help the environmental professional identify recognized environmental conditions at the property, a “User Questionnaire” called an AAI Appropriate Inquiry (AAI) is completed by the user to help gather information that may identify recognized environmental conditions at the property.

The user (client representative) was Landmark Builders – a private business entity who designated responder was Mr. Mark Woodfield. Mr. Woodfield was requested by WHALE Environmental Services LLC to provide information that would gain insights to the questions below to the best of his knowledge. That information was provide in complete forms to our satisfaction. The agent was advised that completion of the assessment to the Standard, when conducted in connection with the asset purchase and/or development of a real property, may entitle the user to certain federal liability protections that result from conducting "All Appropriate Inquiries" into the previous ownership and uses of a property.

The E1527-13 Standard requires that the User will ensure that the consultant is made aware if any hazardous materials exist for a site, and if so, that related documents be provided for the consultant’s review. The Agent was asked to indicate whether any of these documents are available, and ensure that Environmental Services Company (WES) will either receive copies or be provided an opportunity to review the relevant materials (Occurred).

AAI questionnaire responses provided by Agent: *(response in blue)*

1. Is the property or any adjoining property used for an industrial use? *The current site owner (agent represented) responded to the AAI with a **NO**. Property was previously*

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used as an agricultural operation (date unknown). Property has been unused since that time.

2. To the best of your knowledge, has the property or any adjoining property been used for an industrial use in the past? *The current site owner (Agent) responded to the AAI with a **No**. Property was not previously used for industrial use.*
3. Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? *The current site owner (Agent) responded to the AAI with a **NO**, that they are not aware of any cleanup liens.*
4. Are you aware of any area use limitation (AULs), such as engineering controls, land use restriction or institutional controls that are in place at the property and/or have been filed or recorded in a registry under federal, trial, state or local law? *The current site owner responded to the AAI that they are not aware of any such limitations with a response of "**None**, other than generally applicable zoning or land use regulations of public record (such as SMA status) or as otherwise disclosed to the Buyer".*
5. As the user of this ESA do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property, so that you would have specialized knowledge of the chemicals and processes used by this type of business? *No*
6. Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? *The Agent response was "Fair market price paid".*
7. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? *The owner's response was **CONDITIONAL** that they would have been aware of commonly known or reasonably ascertainable information about the property, and are not aware of any such information that would help the environmental professional identify conditions indicative of releases or threatened releases.*

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- a. For example, do you know the past uses of the property? *The current site owner (Agent) is the OWNER/DEVELOPER of the property and stated that the property was former agricultural lands.*

Do you know of specific chemicals that are present or once were present at the property? *Owner's response is No, None known.*

- a. Do you know of spills or chemical releases that have taken place at the property? *Owner's response is No.*
- b. Do you know of any environmental cleanups that have taken place at the property? *Owner's response is No.*
- c. As the user of this ESA, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property? *Owner's response is: No.*

8. In addition to the above questions, certain information should be collected, if available, and provided to the environmental professional. This information is intended to assist the environmental professional, but is not necessarily required to qualify for one of the LLPs. *Owner's response is that further information is not available.*

9. The reason why the ESA is required (i.e. sale, purchase, exchange, etc.). *Owner's response is "Development of the property - vacant land".*

10. The complete name, correct address and/or parcel number for the property (a map or other documentation showing property location and boundaries is helpful). *Owner refers to the beginnings sections of this document.*

11. A description of the property (i.e. acreage, square footage, number of buildings, other structures, age of buildings, above/underground storage tanks, etc...). *Owner refers to the Real Property Assessment - ~7.9 acres*

12. Knowledge of previous owners and/or previous uses of the property? *Not provided*

13. Current or previous deeds? *On record.*

14. The site contact agent name and number. *Mr. Mark Woodfield,*
landmarkbuilders@hawaii.rr.com 808-630-0368

15. Previous reports available? Any other available documentation, correspondence, etc... concerning the environmental condition of the property. *Owner's response is "Previously provided related environmental assessments from 1990 and 1998".*

As part of this study, which of the following are you providing?

1. Previous environmental site assessment reports Yes **NO**

2. Environmental compliance audit reports Yes **NO**

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3. Environmental permits (including but not limited to solid waste disposal permits, hazardous waste disposal permits, wastewater permits, NPDES permits, underground injection permits) Yes **X NO**

4. Registrations for underground and aboveground storage tanks Yes **X NO**

5. Registrations for underground injection systems Yes **X NO**

6. Material safety data sheets Yes **X NO**

7. Community Right-to-Know plan Yes **X NO**

8. Safety plans; preparedness and prevention plans; spill prevention, countermeasure, and control plans; etc. Yes **X NO**

9. Reports regarding hydro-geologic conditions on the property or surrounding area

1. Yes **X NO, See Full EA document.**

10. Notices or other correspondence from any government agency relating to past or current violations of environmental laws with respect to the property or relating to environmental liens encumbering the property Yes **X NO**

11. Hazardous waste generator notices or reports Yes **X NO**

12. Geotechnical studies Yes **X NO**

13. Risk assessments Yes **X NO**

14. Recorded Activity and Use Limitations (AULs). Yes **X NO**

A.4.d. Valuation Reduction for Environmental Issues

Valuation reduction for environmental issues includes the relationship of the purchase price to the fair market value of the property.

No information was provided to use by the User indicating any reduction in purchase price or fair market value of the Site due to environmental issues. C&C Real Property Division records indicated fair market prices were used.

A.4.e. Commonly Known or Reasonably Ascertainable Information

Commonly known or reasonable ascertainable information includes information about the

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Site that generally is known to the public within the community where the Site is located and can be easily sought and found from individuals familiar with the Site or from easily attainable public sources of information.

The User provided no previous environmental reports conducted at the Site. The site is remotely located and does not reside in a known community. Individuals familiar with the site did not provide any additional information.

A.4.f. Degree of Obviousness

The User must consider the degree of obviousness of the presence or likely presence of releases or threatened releases at the Site and the ability to detect releases or threatened releases by appropriate investigation.

The User provided no previous environmental reports conducted at the Site.

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B. Records Review

The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the Site. We consulted only those regulatory and historical sources that were readily available, practically reviewable, and likely to be useful to develop a history of previous uses of the Site and surrounding area within the time and cost constraints of this Phase I ESA.

Environmental Records Source

A review of environmental records pertaining to the Site and its adjacent and surrounding properties to evaluate potential impacts to the Site was conducted.

B.1. Physical Setting Information

B.1.a. Topography

Waiahua ahupua‘a

The ahupua‘a of Waiahua is just west of Haleiwa. It forms a fairly-narrow wedge of land with an average elevation of about 1900ft (ranging from 0’-3700’). according to the United States Geological Survey (U.S.G.S) 2013 topographic map series, ArcGis Oahu. The elevation of the Site and surrounding area ranges from 0’-10’ in the lower part of the ahupua‘a.

B.1.b. Geology

The soil types in the Site vicinity are shown in the HIG report. These soil types do not possess hazardous conditions.

B.1.c. Hydrogeology

There is no published geologic information, or regional groundwater flow directions within the unconsolidated deposits in the Site vicinity. However, nearby streams, lakes, wells, and/or wetlands may locally affect the flow direction of groundwater.

The Site-specific groundwater depth and flow direction was not determined through direct measurement during this Phase I ESA. Additional field investigation, beyond the Scope of Services of this Phase I ESA, would be required to determine this information.

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The flood hazard mapping report for the site may be seen in appendix C.

B.2. Regulatory Report

We obtained regulatory database information pertaining to the Site and surrounding area from HIG. The HIG Envirosearch report is a compilation of records of facilities that are included on current federal and state and county and local environmental regulatory databases. The databases were searched based on the specified minimum search distances from the Site as established by ASTM Practice E1527-13.

The HIG Envirosearch report also includes a description, source reference, date of acquisition, and the specified approximate minimum search distance criteria for each database and list. A copy of the HIG Envirosearch report is attached in Appendix D.

We reviewed the HIG Envirosearch report to identify records that indicate known or potential recognized environmental conditions on the Site and/or surrounding area and to evaluate the likelihood for those recognized environmental conditions to impact the Site based on the information obtained in this Phase I ESA.

B.2.a. Site

The HIG Envirosearch report does not identify any database listings for facilities with addresses indicating a location on the Parcels so studied. The HIG Envirosearch report associates no hazardous substances and/or petroleum product releases with this address.

B.2.b. Adjoining Properties

The HIG Envirosearch report listed the no reportable facilities on adjoining properties.

B.2.c. Surrounding Area

We reviewed the HIG Envirosearch report for facilities located beyond adjoining properties that may indicate a release or likely release of hazardous substances and/or petroleum products that may impact the Site. Based on factors that include regulatory status, distance from the Site, and/or location relative to the regional groundwater flow direction, as referenced in Section B.1., no facilities are identified in the HIG Envirosearch report that warrant further consideration as potential recognized environmental conditions that would impact the site. The closest release is about ½ mile away and not in adjoining waterways.

B.2.d. Unmapped Sites

The HIG Envirosearch report identified some “Un-locatable” sites, which, because of the remoteness and/or poor or inadequate address information could not be mapped by HIG

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Envirosite. Based on available information all sites were identified outside the appropriate minimum search distances for the Site, could not be located based on the information provided, or do not warrant further consideration as potential recognized environmental conditions. These are mostly mauka site high in elevation, far above and remote from the Site.

B.3. Regulatory Agency File and Records Review

The purpose of the regulatory file review is to obtain sufficient information to assist in determining if a recognized environmental condition, historical recognized environmental condition, controlled recognized environmental condition, or a de minimis condition exists at the Site in connection with a regulatory report listing.

Based on our review of the regulatory report, and available information discussed in Section B.6, it is our opinion that an additional regulatory agency file and records review is not warranted due to factors that include current regulatory status(es), distance from the Site, and/or location relative to the limited knowledge of regional groundwater flow direction, as referenced in Section B.1.

B.4. Additional Federal, State, County and Local Environmental Records

To enhance and supplement the regulatory database report, we attempted to obtain or review practically reviewable or reasonably ascertainable local city and/or county records and/or additional state records to identify records that indicate known or potential recognized environmental conditions at the Site.

We did not find any such records, which are expected for a small, remote site.

B.4.a. Well Databases

Our review of the Oahu Board of Water Supply Well database map revealed no documentation of water wells located on the Site.

B.4.b. State Regulatory Web Pages

We did not identify facilities on the state regulatory web pages we accessed that were not already listed in the HIG EnviroSite report discussed in Section B.2 above.

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B.5. Historical-Use Information

The objective of the historical-use information review was to develop a history of the previous uses of the Site and surrounding area, to help evaluate the likelihood of past uses having led to recognized environmental conditions in connection with the Site.

B.5.a. Historical Topographic Maps

The USGS topographic map used for the figure in Appendix A is dated 2013. The map depicts the Site consisting of vacant land based on aerial photographs of the corresponding time period.

B.5.b. Aerial Photographs

We retained Historical Information Gatherers Inc. (HIG) to obtain aerial photographs of the Site and surrounding area. HIG provided aerial photographs. Copies of selected aerial photographs are attached in Appendix E.

The Site appears to be currently vacant land, with invasive species-introduced cover, or grass covered and undeveloped. The present day alignments are apparent in the aerial photographs for recent year photos of the site.

The AII questionnaire indicated *past use as an agricultural operation* prior to 1994 at the Site. There is no present day indication of that activity. No other significant changes are noted at the Site or surrounding area in the aerial review.

C. Interviews

We contacted the following individual to obtain knowledge or historical and current land-use information regarding the Site:

The user (client representative) was Landmark Builders – a business entity who designated responder was Mr. Mark Woodfield, landmarkbuilders@hawaii.rr.com. Mr. Woodfield was requested by WHALE Environmental Services LLC to provide documented knowledge related to the site. They were advised that completion of the assessment to the Standard, when conducted in connection with the asset purchase/development of a real property, may entitle the user to certain federal liability protections that result from conducting "*All Appropriate Inquiries*" into the previous ownership and uses of a property (found in section A-4-C). The E1527-13 Standard requires that the User will ensure that the consultant is made aware if any hazardous materials exist for a site, and if so, that related documents be provided for the consultant's review.

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According to Mr. Woodfield, he indicated that he is not aware of any environmental concerns in connection with the site. Mr. Woodfield indicated that he is not aware of any spills or leaks of hazardous substances and/or petroleum products or other environmental concerns at the Site.

We contacted the Oahu County Police Department (Wahiawa). They have no records of any spills and/or hazardous conditions on the site.

We contacted the Oahu County Fire Department (Wahiawa). They have no records of any spills and/or hazardous conditions on the site.

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D. Site Reconnaissance

The objective of the Site reconnaissance is to obtain information indicating the likelihood of identifying recognized environmental conditions in connection with the Site.

As WHALE Environmental Services LLC's, environmental professional, Mark Howland, conducted a Site reconnaissance. In addition, Mr. Howland conducted a survey for hazmat containing materials (HAZMAT) and other hazardous building materials and was accompanied by a drone operator for inspection of non-accessible areas (site was open and drone use was limited to off-site nearby areas). We were un-accompanied during the Site visits.

At the time of the Site visits, the weather was partly cloudy with a slight breeze and temperatures ranging from about 74 (Waialua) to 72 degrees Fahrenheit (Site).

D.1. Site Characteristics

At the time of the reconnaissance, the Site consisted of a one (1) contiguous parcel totaling approximately 7.9 acres. The Site topography was level with an abutting coastal berm down to the shoreline.

D.2. Adjoining Property Use and Characteristics

The Site was bordered by other vacant lands and isolated agricultural or governmental parcels. No observations of environmental concerns were noted on adjoining properties to the Site at the time of the reconnaissance.

D.3. Site Layout

A Site Sketch and Site Photographs are attached in Appendices B and F, respectively.

D.4. Pits, Ponds, or Lagoons

No indications of pools of hazardous liquids, polluted standing water, septic cisterns, cesspools, or other contaminated surface-water features were observed at the Site or on adjoining properties at the time of our reconnaissance.

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D.5. Stained Soil, Pavement, or Corroded Surfaces

Stained and/or discolored soil surfaces were not observed throughout the Site. In general, only piles of construction gravel appeared to be on the surface for driveway ongoing improvement and did not appear to any indicators of potential significant releases of hazardous substances and/or petroleum products (piles appear to be clean of materials).

It is our opinion that this observation of gravel piles is considered a de minimis condition for the Site.

D.6. Solid Waste Disposal

Based on aerial photographs and observations, much of the Site has remained un-disturbed for the past decades. There is no current potential for solid waste on the site.

D.7. Stressed Vegetation

No areas of stressed, discolored, stained or dead vegetation were observed at the time of the Site reconnaissance. Therefore, it appears that the healthy vegetation (invasive or not) is indicative of no significant release of hazardous substances and/or petroleum products.

D.8. Hazardous Substances

No indications of a significant release or threat of release of hazardous substances were observed at the Site at the time of the reconnaissance.

D.9. Petroleum Products

No indication of a significant release was observed on the Site at the time of the reconnaissance.

D.10. Storage Tanks

Above Ground Storage tanks or indications of underground storage tanks (USTs) were not noted at the Site at the time of the reconnaissance. Non Applicable.

D.11. Odors

No indications of strong, pungent, or noxious odors were observed at the time of the Site reconnaissance.

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D.12. Potential PCB-Containing Electrical and Hydraulic Equipment

No leaks or spills of oil were observed in connection with any electrical or hydraulic equipment at the facility at the time of our reconnaissance.

D.13. Wastewater Discharges

No indications of wastewater discharging into a drain, ditch, underground injection system, or stream on or adjacent to the Site were observed at the Site at the time of the reconnaissance.

D.14. Sewage Disposal System

Not applicable.

D.15. Wells

No indications of wells such as monitoring wells, dry wells, irrigation wells, injection wells, abandoned wells, or other non-potable wells were observed at the Site at the time of the reconnaissance.

D.16. Potable Water Supply

The Site is unknown as to its connection to municipal water services to our knowledge.

E. Limiting Conditions and Data Gaps

The findings and conclusions presented in this report are based on procedures described in ASTM Practice E1527-13, inquiries with public official databases, available literature cited in this report, conditions noted at the time of our Phase I ESA, and our interpretation of the information obtained as part of this Phase I ESA. Our findings and conclusions are limited to the specific project and properties described in this report and by the accuracy and completeness of information provided by others.

WHALE Environmental Services LLC was contracted upon award on October 2021 to perform a Phase I Environmental Site Assessment (ESA) under the ASTM E1527-13 Standard Practice for

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

Environmental Assessments standards. Limiting conditions, deviations, exceptions, significant assumptions, and special terms and conditions are as follows:

- Site Investigator – WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731 PH: 808-294-9254
- Principal Investigator: Mark Howland – Email: markahowland@hawaii.rr.com
 1. WHALE Environmental Services LLC declares that, to the best of their professional knowledge and belief, that our firm’s personnel meet the definition of Environmental Professional(s) as defined in §312.10 of this part.
 2. WHALE Environmental Services LLC’s personnel in the capacity of COO & Chief Biologist, Mark Howland, have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. Mr. Howland has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.”
 3. Mr. Howland’s resume is attached as part of this submission. Mr. Howland has also recently taught a course in writing Environmental Impact Assessments – (ESA, EA, EIS) at HPU under course number ENV5 3010.
- Limiting Conditions – Limiting Conditions to the site investigation center on terrain and access issues. Sometimes a parcel is inaccessible due to dense vegetation, neighboring gulch conditions and blocked access points. However, WHALE Environmental Services LLC, given the small site size and no limiting conditions, was able to visually survey all portions of the property.
- Deviations – HIG database agent - Envirosite Corporation - conducted a search of all reasonably ascertainable records in accordance with EPA’s AAI (40 CFR Part 312) requirements and the ASTM E-1527-13 Environmental Site Assessments standard; which involves a search records back to 1940. The aerial decade photo package provided by HIG only goes back to 1962, however, as aerial photography for all of Hawaii is limited.
- Exceptions – no exceptions listed
- Significant Assumptions - WHALE Environmental Services LLC assumes that information provided by HIG, the AAI responder, and other sources is accurate and true.
- Special Terms and Conditions: WHALE Environmental Services LLC has provided historical records review services and visual site inspection; and assumes no liability for any undetected or unreported toxic chemicals not reported or detected in the visual review of the property or reported in the historical data review.

An environmental site assessment cannot wholly eliminate uncertainty regarding the potentials for recognized environmental conditions in connection with a property.

Performance of this practice is intended to reduce, but not eliminate, uncertainty regarding

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

the potential for recognized environmental conditions in connection with a property within reasonable limits of time and cost.

In performing its services, WHALE Environmental Services LLC used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

The following limiting condition was encountered:

- ❖ Observation of the Site was slightly limited due to accessibility (fencing) and vegetation covering small portions of the interior (tree stands). As such, some observations were from a site observation distance of less than 50'.

Site reconnaissance observations as discussed in Section 9, Site Reconnaissance of ASTM E1527-13, included general site setting, interior and exterior observations, varied uses and conditions of the property and adjoining properties are presented here.

From the information observed during the Visual Site Inspection, it is determined that there was no detection of negative *Recognition of Environmental Conditions* (RECs) on the target property. In general, these are the findings on the site:

- The site is approximately ~7.9 acres in size and consists of a mix of coastal zones grasslands of guinea grass with other varied dryland species on level slopes.

In order to visually inspect the site with limited access due to terrain and vegetation limiting accessibility, WHALE Environmental Services LLC used the availability of access driveways/roads/trails to walk the accessible portions of the site.

WHALE Environmental Services LLC did not find any RECs of concern. Photos of the site are represented as seen in the Photos section.

No data gaps were identified during the Phase I ESA process, with the exception of the following:

Historical resources were not readily available for intervals from the time of the first developed use (ancient Hawaii). The identified data gap did not affect the environmental professional's ability to render opinions regarding conditions indicative of a release or threatened release.

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

F. Findings

The findings may include identified known or suspect recognized environmental conditions, controlled recognized environmental conditions, historical recognized conditions, de minimis conditions and additional issues in connection with the Site.

We are of the opinion that NO Recognizable Environmental Conditions are present.

The following findings are based on the results of our assessment: Historical information does not indicate a use of site. It is currently vacant. The origins of the agricultural activity are undocumented. The government database records review identified no currently regulated facilities within the vicinity of the Site outside of agricultural zoning.

G. Opinions

According to the User, the Phase I ESA was conducted in association with the development of the Site by the Owner from an construction business entity. Opinions expressed herein are influenced by the stated reason for conducting the Phase I ESA. Furthermore, the expressed opinions might not be applicable to alternate reasons for reliance on the content of the Phase I ESA.

G.1. Recognized Environmental Conditions

A recognized environmental condition is defined by ASTM Practice E1527-13 as: “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: 1) due to any release to the environment, 2) under conditions indicative of a release to the environment: or 3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.”

This assessment identified no recognized environmental conditions in connection with the Site.

G.2. Controlled Recognized Environmental Conditions

A controlled recognized environmental condition is defined by ASTM Practice E1527-13 as “*a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.*”

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

This assessment identified no controlled recognized environmental conditions in connection with the Site.

G.3. Historical Recognized Environmental Conditions

A historical recognized environmental condition is defined by ASTM Practice E1527-13 as “*a past release of any hazardous substances or petroleum products that has occurred in connection with the Site and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the Site to any required controls.*”

This assessment identified no historical recognized environmental conditions in connection with the Site.

G.4. De Minimis Conditions

A de minimis condition is defined by ASTM Practice E1527-13 as “a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.”

The following findings are considered de minimis conditions:

Prior to 1994, the Site uses included agricultural operations and assumed grazing, and cultivated uses prior to that. It is our opinion that the use of the Site for agricultural and non-impact purposes is considered a de minimis condition for the Site.

The government database records review identified the Site on several database listings that do not indicate a release on-site or nearby within ½ mile(s). Based on available information, it is our opinion that these database listings for the Site are considered de minimis conditions.

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

G.5. Additional Considerations

An additional consideration is a condition that does not meet the definition of a recognized environmental condition, controlled recognized environmental condition, or historical recognized environmental condition but, in our opinion, should be brought to the attention of the User. No additional considerations were identified during the Phase I ESA.

H. Conclusions

We have conducted this Phase I ESA of the Site in general conformance with the scope and limitations of ASTM Practice E1527-13.

This assessment identified no recognized environmental conditions in connection with the Site.

I. References

References are listed in Appendix G.

J. Environmental Professional Statement and Qualifications

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. We have developed and performed the all-appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Qualifications of the environmental professional and the qualifications of the personnel conducting the site reconnaissance and interviews, if conducted by someone other than an environmental professional, are attached in Appendix H.

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

WHALE Environmental Services LLC

Mark A. Howland, PMP, COO and Chief Biologist

Site Investigations

WHALE Environmental Services LLC performed a complete inspection of the entire site to the extent practical: (walk-through and inspection).

Physical Setting

- WHALE Environmental Services LLC visually inspected the site for the presence or absence of Underground Storage Tanks (USTs) or Aboveground Storage Tanks (ASTs). None observed.
- WHALE Environmental Services LLC visually inspected all areas of etched concrete or paving potentially indicating the location of a historic spill or release of corrosive material. None observed.
- WHALE Environmental Services LLC visually inspected all areas of patched concrete or paving potentially indicating a location of former subsurface equipment such as underground storage tanks, vehicle lifts, floor drains, oil-water separators, sumps, etc. WHALE Environmental Services LLC noted no such activities evident in site inspection as of 10/2021.
- WHALE Environmental Services LLC visually inspected all areas for staining at the site. This shall include, but may not necessarily be limited to, the approximate dimensions of staining, type of material spilled, age/freshness of the stain, possible severity of the spill, underlying material, the integrity of the surface spilled upon, and evidence of cracks or expansion joints on the pavement material, etc. that may indicate a release to the subsurface. None observed.
- WHALE Environmental Services LLC observed the presence of all surface waters, retention basins and detention ponds on the site. WHALE Environmental Services LLC visually inspected each of these surface waters for any visual evidence of a release to the surface water. WHALE Environmental Services LLC detected no evidence of any releases to the runoff waters, waters of the watershed, or the ocean was observed.
- WHALE Environmental Services LLC visually inspected and noted the presence of swamps, marshes, wet areas, etc. that may indicate a potential wetland. Not noted on the site, but a waterway (stream) does exist about ¼ mile from its western

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

border. No portions of the site has wetlands, marshes, fish ponds and ocean environments on or nearby the site. No sign of releases in those waters was observed.

Underground and Aboveground Storage Tanks

No underground or aboveground storage tanks are listed in the historical records reviews, and the Interviewee was not knowledgeable about any underground storage tanks (UST), only the aboveground storage holding tanks (AST) on the property. Our firm did not note any presence of vents, soil depressions, piping or other indicators of possible USTs or ASTs.

Asbestos and Lead

WHALE Environmental Services LLC observed no signs of lead paint or asbestos on the properties(s), but this is not a requirement of Phase I ESAs for reporting.

Abutting Property Contaminants of Concern

None observed that appear to impact the property at the present time. No visible staining of petroleum or oils on the site with potential for draining to adjoining lands.

Noise

WHALE Environmental Services LLC observed no site-generated noise on the property outside of routine nearby roadway traffic which was sparse in nature.

Photo Observations

WHALE Environmental Services LLC observed no signs of spills, distressed vegetation, or other environmental factors that would lead to potential contamination. Most of the site is re-vegetative growth of invasive guinea grass or other varied species with no sign of pollution at those sources and locations. Representative pictures to follow in the appendixes.

General Comments on Field Observations

WHALE Environmental Services LLC detected no issues with the parcel. There are no visible signs of any contamination issues.

Data Gaps: As required in §312.21(c)(2) of the final rule, the report documents and discuss significant data gaps that affect the ability of the environmental professional to identify conditions indicative of releases or threatened releases.

There were no significant data gaps that limited the environmental professional. Accessibility was an issue to some locales, but the data gap was closed with the small site size allowing visual viewing.

Phase I ESA Pueo Farms, Waialua, Oahu, Hawaii

Conclusion

WHALE Environmental Services LLC has obtained and reviewed the environmental historical database report which lists all reported negative Recognized Environmental Conditions (RECs) and their release locations if applicable. No RECs are reported for the site (target property) in the HIG historical database that is found in the appendix(es).

As well, a physical site reconnaissance did not detect any RECs. WHALE Environmental Services, LLC is of the opinion that no further environmental investigations need to proceed for the site.

If you have any questions, please do not hesitate to contact us...

Mark Howland

Mark Howland
WHALE Environmental Services LLC
PO Box 455
Kahuku HI 96731
808-294-9254

APPENDIXES



A: Site Location Map

B: Site Map

C: Maui County Flood Information

D: HIG Historical Database Research Report

E: Aerial Imagery

F: Site Photos, Topographical Map, Flood Hazard Map
& Soil Mapping

G: References

H: Resume



APPENDIX A

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

LOCUS MAP







APPENDIX B

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

SITE PROJECT MAP





Parcels

State

County

Parcel #

Owner

[More](#)

Showing all Parcels.

0 FIELDS

[Get Full Report](#)



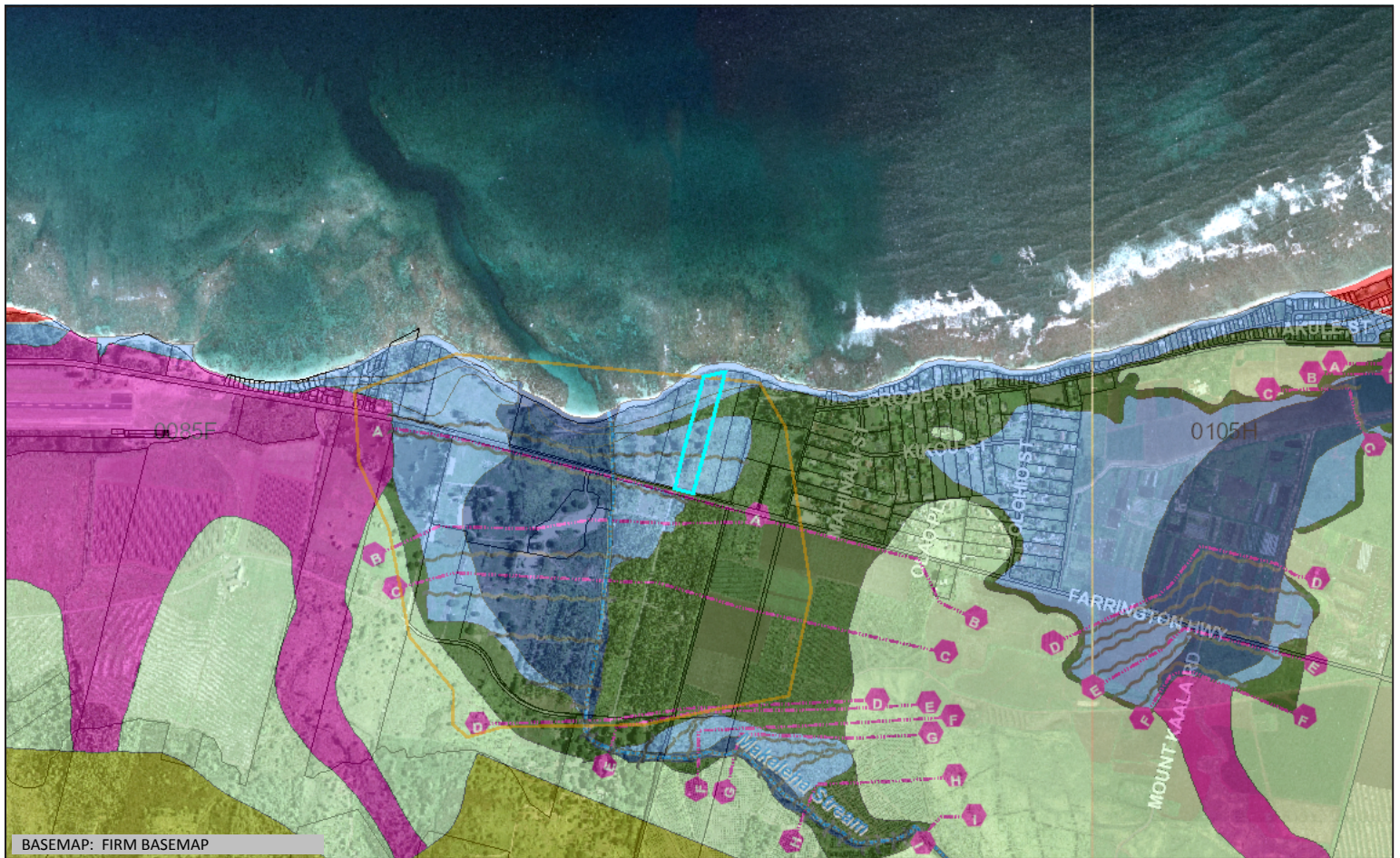


APPENDIX C

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

FLOOD HAZARD INFO





BASEMAP: FIRM BASEMAP



Flood Hazard Assessment Report

www.hawaiiinfip.org

Pueo Farm

Property Information

COUNTY: HONOLULU
 TMK NO: (1) 6-8-003:045
 WATERSHED: MAKALEHA
 PARCEL ADDRESS: ADDRESS NOT DETERMINED
 WAIALUA, HI 96791

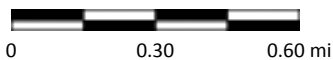
Notes:

Flood Hazard Information

FIRM INDEX DATE: NOVEMBER 05, 2014
 LETTER OF MAP CHANGE(S): 11-09-0171P
 FEMA FIRM PANEL: 15003C0085F
 PANEL EFFECTIVE DATE: SEPTEMBER 30, 2004

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: YES
 FOR MORE INFO, VISIT: <http://www.scd.hawaii.gov/>

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
 FOR MORE INFO, VISIT: <http://dlnreng.hawaii.gov/dam/>



Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND

(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase applies, but coverage is available in participating communities.
--	---



APPENDIX D

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

HISTORICAL HAZMAT DATABASE INFORMATION





Government Records Report | 2021

Order Number: 62184

Report Generated: 10/18/2021

Project Name: Pueo Farm

Project Number: Pueo Farm 2021

Pueo Farm
68-431 Farrington Hwy
Waialua, HI 96791

2 Corporate Drive
Suite 450
Shelton, CT 06484
Toll Free: 866-211-2028
www.envirositecorp.com

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Envirosite Corporation has conducted a search of all reasonably ascertainable records in accordance with EPA's AAI (40 CFR Part 312) requirements and the ASTM E-1527-13 Environmental Site Assessments standard.

SUBJECT PROPERTY INFORMATION:

ADDRESS:

Pueo Farm
68-431 Farrington Hwy
Waialua, HI 96791

COORDINATES:

Latitude (North):	21.578530 - 21°34'42.7"
Longitude (West):	-158.163985 - -158°9'50.3"
Universal Transverse Mercator:	Zone 4N
UTM X (Meters):	586549.05
UTM Y (Meters):	2386409.52

ELEVATION:

Elevation:	4 ft. above sea level
------------	-----------------------

USGS TOPOGRAPHIC MAP ASSOCIATED WITH SUBJECT PROPERTY:

Subject Property Map: 21158-E2 Kaena, HI
Most Recent Revision: 2017

<u>MAP ID</u>	<u>SITE NAME</u>	<u>ADDRESS</u>	<u>DATABASE(S)</u>	<u>RELATIVE ELEVATION</u>	<u>DIRECTION / DISTANCE</u>
1	Mount Kaala Natural Area Reserve	68-350 Farrington Hwy	CERCLIS-HIST, HIST SPILLS 2 - HI, SEMS_8R_A...	Higher	ESE / 0.458 mi., 2421 ft.
2	CROWBAR RANCH DILLINGHAM RAN...	68-540 FARRINGTON HIGHWAY	CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - ...	Equal	W / 0.519 mi., 2742 ft.
3	Dillingham Ranch	68-540A Farrington Hwy	I C - HI, SHWS - HI	Equal	W / 0.531 mi., 2806 ft.
4	Dillingham Air Force Base	21.5863, -158.1826	HIST DOD	N/R	NNW / 0.649 mi., 3425...

SUBJECT PROPERTY SEARCH RESULTS:

The subject property was not listed in any of the databases searched by EnviroSite Corporation.

SEARCH RESULTS:**FEDERAL CERCLIS LIST**

CERCLIS-HIST: The CERCLIS program database contains information on the assessment and remediation of federal hazardous waste sites. The Environmental Protection Agency decommissioned the CERCLIS data in 2014. The last update was November 12, 2013. **1 SITE FOUND WITHIN .5 MILE**

EQUAL/HIGHER ELEVATION

<u>MAP ID</u>	<u>SITE NAME</u>	<u>SITE ADDRESS</u>	<u>DIRECTION/DISTANCE</u>	<u>PAGE</u>
1	Mount Kaala Natural Area Reserve	68-350 Farrington Hwy	ESE / 0.458 mi., 2421 ft.	15
	- ID: HID984468496	Status: NFRAP-Site does not qualify for the NPL based on existing information	Date: 2010-08-06	

SEMS_8R_ARCHIVED SITES: The Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. **1 SITE FOUND WITHIN .5 MILE**

EQUAL/HIGHER ELEVATION

<u>MAP ID</u>	<u>SITE NAME</u>	<u>SITE ADDRESS</u>	<u>DIRECTION/DISTANCE</u>	<u>PAGE</u>
1	Mount Kaala Natural Area Reserve	68-350 Farrington Hwy	ESE / 0.458 mi., 2421 ft.	15
	- ID: 0904503	Status: NFRAP-Site does not qualify for the NPL based on existing information	Date: N/A	

STATE- AND TRIBAL - EQUIVALENT CERCLIS

SHWS - HI: Listing of state hazardous waste sites **3 SITES FOUND WITHIN 1 MILE**

EQUAL/HIGHER ELEVATION

<u>MAP ID</u>	<u>SITE NAME</u>	<u>SITE ADDRESS</u>	<u>DIRECTION/DISTANCE</u>	<u>PAGE</u>
1	Mount Kaala Natural Area Reserve	68-350 Farrington Hwy	ESE / 0.458 mi., 2421 ft.	15
	- ID: Facility Registry Identifier 110013766291	Status: Response Complete	Date: 2012-02-07	
2	CROWBAR RANCH DILLINGHAM RANCH LTD LLC DILLINGHAM RANCH AINA, LLC.	68-540 FARRINGTON HIGHWAY	W / 0.519 mi., 2742 ft.	19
	- ID: Facility Registry Identifier 110013779526	Status: N/R	Date: 1996-01-10	
3	Dillingham Ranch	68-540A Farrington Hwy	W / 0.531 mi., 2806 ft.	37
	- ID: Facility Registry Identifier 110013779526	Status: Response Ongoing	Date: 2008-01-22	

OTHER ASCERTAINABLE RECORDS

HIST DOD: Department of Defense historical sites **1 SITE FOUND WITHIN 1 MILE**

EQUAL/HIGHER ELEVATION

<u>MAP ID</u>	<u>SITE NAME</u>	<u>SITE ADDRESS</u>	<u>DIRECTION/DISTANCE</u>	<u>PAGE</u>
4	Dillingham Air Force Base	21.5863, -158.1826	NNW / 0.649 mi., 3425 ft.	39

Following sites were unable to be mapped.

<u>SITE NAME:</u>	<u>ADDRESS, CITY, ZIP:</u>	<u>DATABASE(S):</u>
Dillingham Military Reservation PCB Spill ...	N/R, Mokuleia	SHWS - HI
FUDS Nike No. 1 (Dillingham Military Rese...	N/R, Mokuleia	SHWS - HI
HAWAIIAN BITUMULS & PAVING QUARRY	NEAR DILLINGHAM AIR FI..., Mokuleia 96791	EPA UST, HIST LUST - HI, UST - HI
KAALA RS (HI028)	MT KAALA, Mokuleia	EPA LUST
MOUNT KAALA RADIO SITE	MT KAALA, Mokuleia 96791	LUST - HI, UST - HI
NIKE SITE NO. 1	N/R, MOKULEIA	FUDS
Pearl City Penninsula Landfill	N/R, NO CITY	FUDS
QUARTERMASTER SUPPLY	N/R, NO CITY	FUDS
RURAL EMERGENCY OPERATING CENTER	67-170 Farrington Hwy 6..., WAIALUA 96791	EPA UST
SCHOFIELD ARMY SOLID WASTE DISPOSAL...	OAHU STREET SCHOFIELD..., NOT APPLICABLE	ODI
T. OTAKE & SONS, LTD.	66-212 FARRINGTON HWY, WAIALUA 96791	EPA UST
Waialua Service	67-016 FARRINGTON HWY, WAIALUA 96791	EPA UST
WAIPIO STO SITE	N/R, NO CITY	FUDS

DATABASE(S) WITH NO MAPPED SITES:

FEDERAL RCRA NON-CORRACTS TSD FACILITIES LIST

ARCHIVED RCRA TSDF	Archived Resource Conservation and Recovery Act: Treatment Storage and Disposal Facilities
RCRA_TSDF	Resource Conservation and Recovery Act: Treatment Storage and Disposal Facilities

STATE, TRIBAL, AND FEDERAL REGISTERED STORAGE TANK LISTS

AST PBS	ASTs at Bulk Petroleum Terminals
EPA UST	EPA UST Finder database
FEMA UST	FEMA Underground Storage Tanks
INDIAN UST R1	Underground Storage Tanks on Indian Land in EPA Region 1
INDIAN UST R10	Underground Storage Tanks on Indian Land in EPA Region 10
INDIAN UST R2	Underground Storage Tanks on Indian Land in EPA Region 2
INDIAN UST R4	Underground Storage Tanks on Indian Land in EPA Region 4
INDIAN UST R5	Underground Storage Tanks on Indian Land in EPA Region 5
INDIAN UST R6	Underground Storage Tanks on Indian Land in EPA Region 6
INDIAN UST R7	Underground Storage Tanks on Indian Land in EPA Region 7
INDIAN UST R8	Underground Storage Tanks on Indian Land in EPA Region 8
INDIAN UST R9	Underground Storage Tanks on Indian Land in EPA Region 9
AST - HI	Aboveground Storage Tanks
HIST AST - HI	Historical Aboveground Storage Tanks
UST - HI	Underground Storage Tanks

FEDERAL CERCLIS LIST

CERCLIS NFRAP	Comprehensive Environmental Response Compensation and Liability Act No Further Remedial Action Planned
FEDERAL FACILITY	Federal Facility sites
SEMS_8R_ACTIVE SITES	Sites on SEMS Active Site Inventory

FEDERAL RCRA CORRACTS FACILITIES LIST

CORRACTS	Hazardous Waste Corrective Action
HIST CORRACTS 2	Historical Hazardous Waste Corrective Action

FEDERAL DELISTED NPL SITE LIST

DELISTED NPL	Delisted National Priority List
DELISTED PROPOSED NPL	Delisted proposed National Priority List
SEMS_DELETED NPL	Sites Deleted from National Priorities List

FEDERAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

EPA LF MOP EPA Landfill Methane Outreach Project Database

STATE, TRIBAL, AND FEDERAL LEAKING STORAGE TANK LISTS

EPA LUST	EPA LUST
INDIAN LUST R1	Leaking Underground Storage Tanks on Indian Land in EPA Region 1
INDIAN LUST R10	Leaking Underground Storage Tanks on Indian Land in EPA Region 10
INDIAN LUST R2	Leaking Underground Storage Tanks on Indian Land in EPA Region 2
INDIAN LUST R4	Leaking Underground Storage Tanks on Indian Land in EPA Region 4
INDIAN LUST R5	Leaking Underground Storage Tanks on Indian Land in EPA Region 5
INDIAN LUST R6	Leaking Underground Storage Tanks on Indian Land in EPA Region 6
INDIAN LUST R7	Leaking Underground Storage Tanks on Indian Land in EPA Region 7
INDIAN LUST R8	Leaking Underground Storage Tanks on Indian Land in EPA Region 8
INDIAN LUST R9	Leaking Underground Storage Tanks on Indian Land in EPA Region 9
HIST LUST - HI	Historical Leaking Underground Storage Tanks
LUST - HI	Leaking Underground Storage Tanks

FEDERAL ERNS LIST

ERNS Emergency Response Notification System

FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

FED E C	Engineering Controls
FED I C	Institutional Controls
RCRA IC_EC	RCRA sites with Institutional and Engineering Controls

FEDERAL RCRA GENERATORS LIST

HIST RCRA_CESQG	Historical Resource Conservation and Recovery Act_Conditionally Exempt Small Quantity Generators
HIST RCRA_LQG	Historical Resource Conservation and Recovery Act_ Large Quantity Generators
HIST RCRA_NONGEN	Historical Resource Conservation and Recovery Act_Non Generators
HIST RCRA_SQG	Historical Resource Conservation and Recovery Act_Small Quantity Generators
RCRA_LQG	Resource Conservation and Recovery Act_ Large Quantity Generators
RCRA_NONGEN	Resource Conservation and Recovery Act_Non Generators
RCRA_SQG	Resource Conservation and Recovery Act_Small Quantity Generators
RCRA_VSQG	Resource Conservation and Recovery Act_Very Small Quantity Generator

FEDERAL NPL SITE LIST

NPL	National Priority List
NPL EPA R1 GIS	GIS for EPA Region 1 NPL
NPL EPA R3 GIS	GIS for EPA Region 3 NPL
NPL EPA R6 GIS	GIS for EPA Region 6 NPL
NPL EPA R8 GIS	GIS for EPA Region 8 NPL
NPL EPA R9 GIS	GIS for EPA Region 9 NPL
PART NPL	Part National Priority List
PROPOSED NPL	Proposed National Priority List
SEMS_FINAL NPL	Sites included on the Final National Priorities List
SEMS_PROPOSED NPL	Sites Proposed to be Added to the National Priorities List

STATE AND TRIBAL BROWNFIELD SITES

TRIBAL BROWNFIELDS	Tribal Brownfields
BROWNFIELDS - HI	Brownfields

STATE INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

I C - HI	Institutional Controls
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STATE AND TRIBAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

SWF LF CLOSED - HI	Closed Solid Waste Facilities and Landfills
SWF/LF - HI	Solid Waste Facilities and Landfills

STATE AND TRIBAL VOLUNTARY CLEANUP SITES

VCP - HI Voluntary Cleanup Program

LOCAL BROWNFIELD LISTS

BROWNFIELDS-ACRES EPA ACRES Brownfields
FED BROWNFIELDS Federal Brownfields

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

FED CDL DOJ Clandestine Drug Labs
US HIST CDL Historical Clandestine Drug Labs

LOCAL LISTS OF LANDFILL / SOLID WASTE DISPOSAL SITES

HIST INDIAN ODI R8 Historical Open Dump Inventory
INDIAN ODI R8 Open Dump Inventory
ODI Open Dump Inventory
TRIBAL ODI Indian Open Dump Inventory Sites

RECORDS OF EMERGENCY RELEASE REPORTS

HMIRS (DOT) Hazardous Materials Information Reporting Systems
HIST SPILLS - HI Historical Spills
HIST SPILLS 2 - HI Historical Spills
SPILLS - HI Spills

LOCAL LAND RECORDS

LIENS 2 CERCLA Lien Information

OTHER ASCERTAINABLE RECORDS

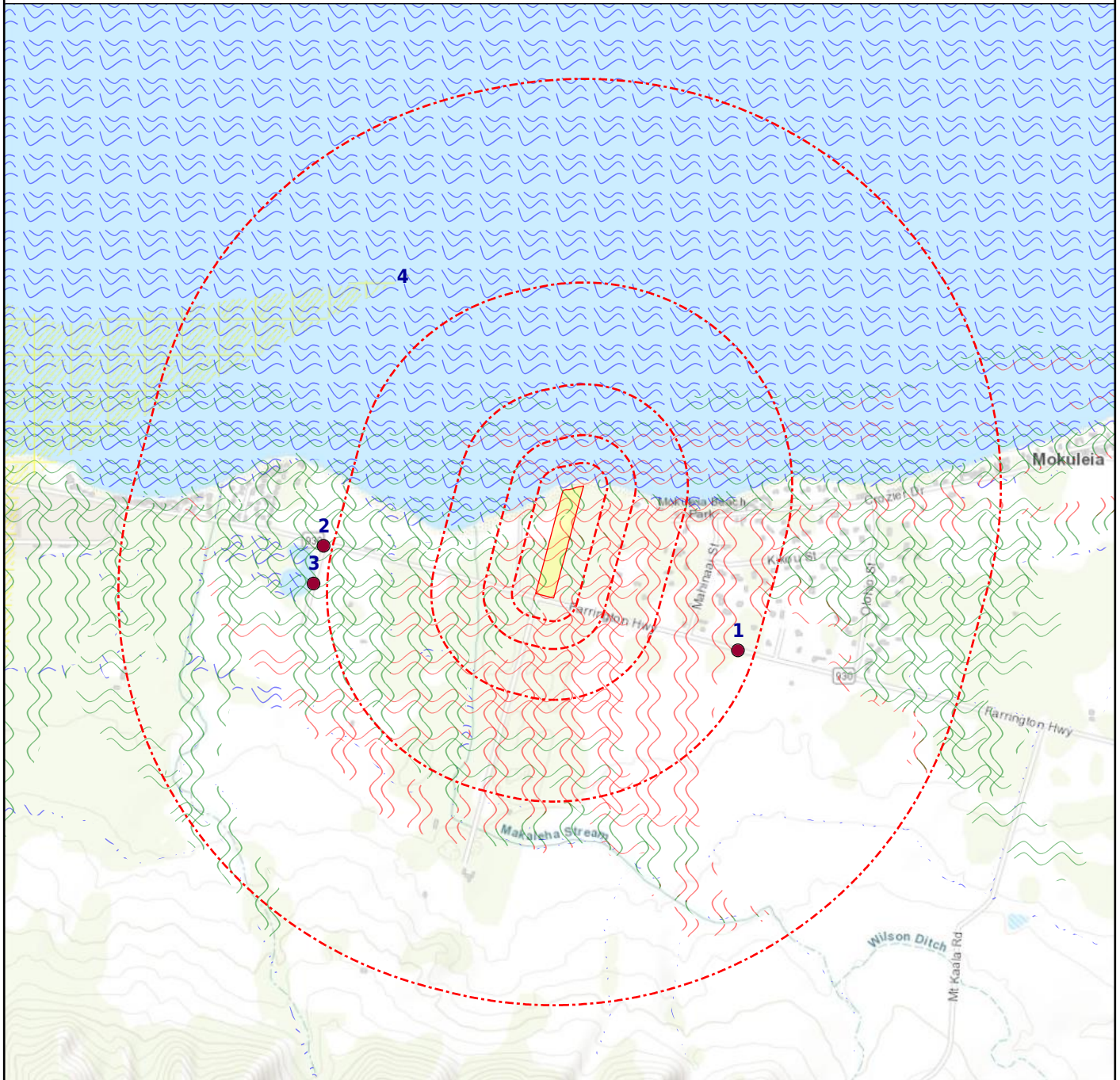
AFS Air Facility Systems
ALT FUELING Alternative Fueling Stations
BRS Biennial Reporting Systems
CDC HAZDAT Hazardous Substance Release and Health Effects Information
COAL ASH DOE Coal Ash: Department of Energy
COAL ASH EPA Coal Ash: Environmental Protection Agency
COAL GAS Coal Gas Plants
CONSENT (DECREEES) Superfund Consent Decree
CORRECTIVE ACTIONS_2020 Wastes - Hazardous Waste - Corrective Action
DEBRIS EPA LF EPA Disaster Debris Landfill Sites
DEBRIS EPA SWRCY EPA Disaster Debris Recovery Sites
DOD Department of Defense
DOT OPS Department of Transportation Office of Pipeline Safety
ECHO EPA Enforcement and Compliance History Online
ENOI Electronic Notice of Intent
EPA FUELS EPA Fuels Registration, Reporting, and Compliance List
EPA OSC EPA On-Site Coordinator
EPA WATCH EPA Watch List
FA HWF Financial Assurance for Hazardous Waste Facilities
FEDLAND Federal Lands
FRS Facility Index Systems
FTTS FIFRA/TSCA Tracking System
FTTS INSP FIFRA/TSCA Tracking System: Inspections
FUDS Formerly Used Defense Sites
HIST AFS Historical Air Facility Systems
HIST AFS 2 Historical Air Facility Systems
HIST LEAD_SMELTER Historical Lead Smelter Sites
HIST MLTS Historical Material Licensing Tracking Systems
HIST PCB TRANS Historical Polychlorinated Biphenyl (PCB) Facilities
HIST PCS ENF Historical Enforced Permit Compliance Facilities
HIST PCS FACILITY Historical Permit Compliance Facilities
HIST SSTS Historical Section 7 Tracking Systems
HWC DOCKET Hazardous Waste Compliance Docket

OTHER ASCERTAINABLE RECORDS (cont.)

ICIS	Integrated Compliance Information System
INACTIVE PCS	Inactive Permit Compliance Facilities
INDIAN RESERVATION	American Indian Lands
LUCIS	Land Use Control Information Systems
LUCIS 2	Land Use Control Information Systems 2
MANIFEST EPA	EPA Hazardous Waste Manifests
MINES	Mines
MINES USGS	Mines list from USGS
MLTS	Material Licensing Tracking Systems
NPL AOC	Areas related to NPL remediation sites
NPL LIENS	National Priority List Liens
OSHA	Occupational Safety & Health Administration
PADS	PCB Activity Database Systems
PCB TRANSFORMER	Polychlorinated Biphenyl (PCB) Waste
PCS ENF	Enforced Permit Compliance Facilities
PCS FACILITY	Permit Compliance Facilities
RAATS	RCRA Administrative Action Tracking Systems
RADINFO	Radiation Information Systems
RMP	Risk Management Plans
ROD	Record of Decision
SCRD DRYCLEANERS	SCRD Drycleaners
SEMS_SMELTER	Sites on SEMS Potential Smelter Activity
SSTS	Section 7 Tracking Systems
STORMWATER	Storm Water Permits
TOSCA-PLANT	Toxic Substance Control Act: Plants
TRIS	Toxic Release Inventory Systems
UMTRA	Uranium Mill Tailing Sites
VAPOR	EPA Vapor Intrusion
AIRS - HI	Air permits
DRYCLEANERS - HI	Drycleaners

SUBJECT NAME: Pueo Farm
 ADDRESS: 68-431 Farrington Hwy, Waialua, HI, 96791
 LAT/LONG: 21.578530 / -158.163985

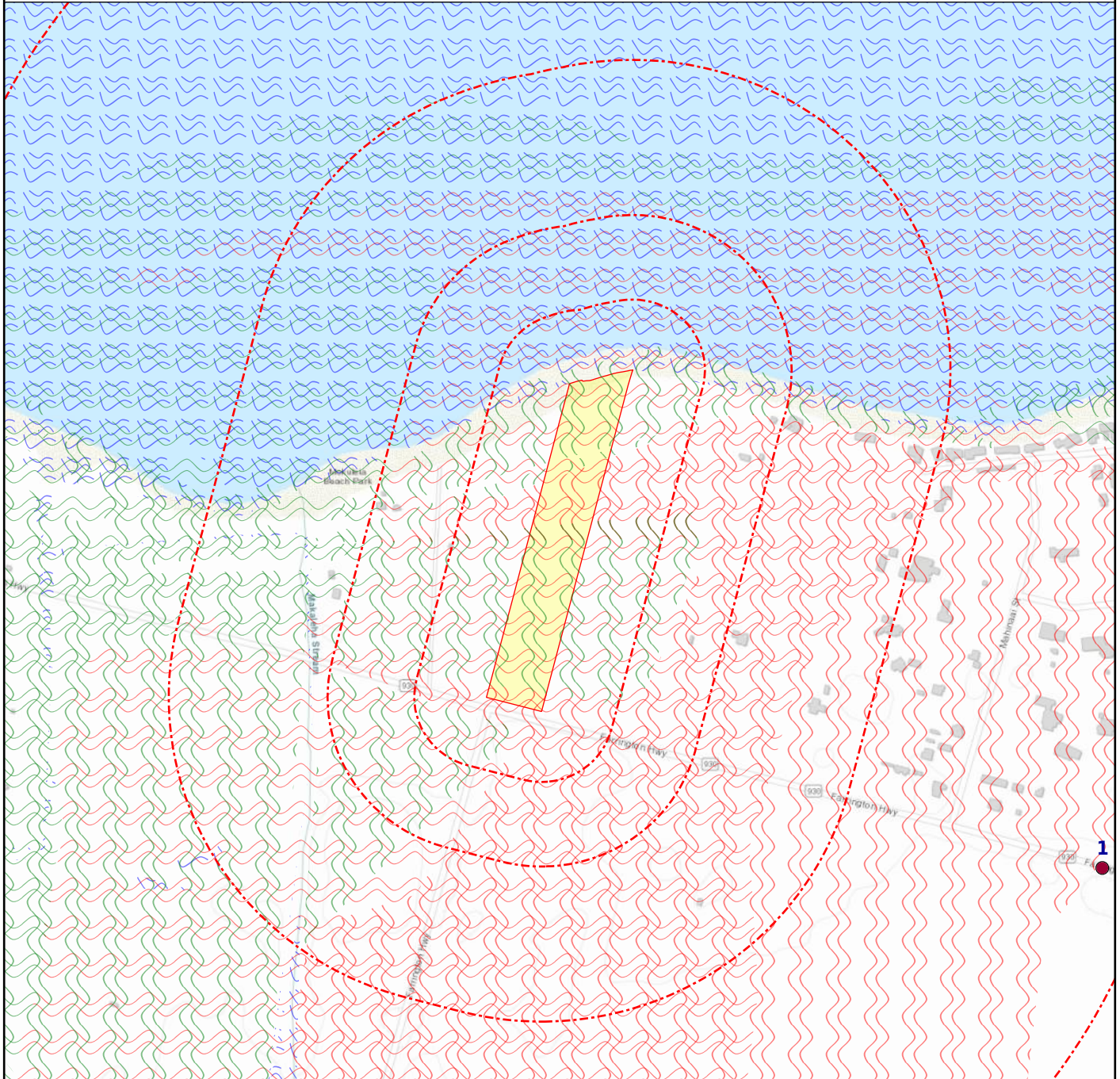
PREPARED FOR: Historical Information Gatherers
 ORDER #: 62184
 REPORT DATE: October 18, 2021



- | | | | | | | | |
|---|----------------------------------|---|------------------------|---|---------------------|---|------------------------------|
| + | Subject Property | ● | Equal/Higher Elevation | ● | Lower Elevation | ⚠ | CDC HAZDAT (No Data) |
| ■ | Department of Defense (No Data) | ⊃ | DFIRM Floodzone 100 | ⊃ | DFIRM Floodzone 500 | ■ | Federal Lands (No Data) |
| ⊃ | FEMA FloodZone 100 | ⊃ | FEMA FloodZone 500 | ■ | Historical DOD | ⊃ | Indian Reservation (No Data) |
| ■ | National Priority List (No Data) | ⊃ | NWI | | | | |

SUBJECT NAME: Pueo Farm
 ADDRESS: 68-431 Farrington Hwy, Waialua, HI, 96791
 LAT/LONG: 21.578530 / -158.163985

PREPARED FOR: Historical Information Gatherers
 ORDER #: 62184
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- | | | | | | | | |
|---|----------------------------------|---|------------------------|---|---------------------|---|------------------------------|
| + | Subject Property | ● | Equal/Higher Elevation | ● | Lower Elevation | → | CDC HAZDAT (No Data) |
| ■ | Department of Defense (No Data) | ⊘ | DFIRM Floodzone 100 | ⊘ | DFIRM Floodzone 500 | ■ | Federal Lands (No Data) |
| ⊘ | FEMA FloodZone 100 | ⊘ | FEMA FloodZone 500 | ■ | Historical DOD | ⊘ | Indian Reservation (No Data) |
| ■ | National Priority List (No Data) | ⊘ | NWI | | | | |

<u>DATABASE</u>	<u>SUBJECT PROPERTY</u>	<u>SEARCH DISTANCE (MILES)</u>	<u><1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>>1</u>	<u>TOTAL MAPPED</u>
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FEDERAL RCRA NON-CORRACTS TSD FACILITIES LIST

ARCHIVED RCRA TSD		0.500	0	0	0	--	--	0
RCRA_TSD		0.500	0	0	0	--	--	0

STATE, TRIBAL, AND FEDERAL REGISTERED STORAGE TANK LISTS

AST PBS		0.250	0	0	--	--	--	0
EPA UST		0.250	0	0	--	--	--	0
FEMA UST		0.250	0	0	--	--	--	0
INDIAN UST R1		0.250	0	0	--	--	--	0
INDIAN UST R10		0.250	0	0	--	--	--	0
INDIAN UST R2		0.250	0	0	--	--	--	0
INDIAN UST R4		0.250	0	0	--	--	--	0
INDIAN UST R5		0.250	0	0	--	--	--	0
INDIAN UST R6		0.250	0	0	--	--	--	0
INDIAN UST R7		0.250	0	0	--	--	--	0
INDIAN UST R8		0.250	0	0	--	--	--	0
INDIAN UST R9		0.250	0	0	--	--	--	0
AST - HI		0.250	0	0	--	--	--	0
HIST AST - HI		0.250	0	0	--	--	--	0
UST - HI		0.250	0	0	--	--	--	0

FEDERAL CERCLIS LIST

CERCLIS NFRAP		0.500	0	0	0	--	--	0
CERCLIS-HIST		0.500	0	0	1	--	--	1
FEDERAL FACILITY		1.000	0	0	0	0	--	0
SEMS_8R_ACTIVE SITES		0.500	0	0	0	--	--	0
SEMS_8R_ARCHIVED SITES		0.500	0	0	1	--	--	1

FEDERAL RCRA CORRACTS FACILITIES LIST

CORRACTS		1.000	0	0	0	0	--	0
HIST CORRACTS 2		1.000	0	0	0	0	--	0

FEDERAL DELISTED NPL SITE LIST

DELISTED NPL		1.000	0	0	0	0	--	0
DELISTED PROPOSED NPL		1.000	0	0	0	0	--	0
SEMS_DELETED NPL		1.000	0	0	0	0	--	0

FEDERAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

EPA LF MOP		0.500	0	0	0	--	--	0
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<u>DATABASE</u>	<u>SUBJECT PROPERTY</u>	<u>SEARCH DISTANCE (MILES)</u>	<u><1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>>1</u>	<u>TOTAL MAPPED</u>
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STATE, TRIBAL, AND FEDERAL LEAKING STORAGE TANK LISTS

EPA LUST		0.500	0	0	0	--	--	0
INDIAN LUST R1		0.500	0	0	0	--	--	0
INDIAN LUST R10		0.500	0	0	0	--	--	0
INDIAN LUST R2		0.500	0	0	0	--	--	0
INDIAN LUST R4		0.500	0	0	0	--	--	0
INDIAN LUST R5		0.500	0	0	0	--	--	0
INDIAN LUST R6		0.500	0	0	0	--	--	0
INDIAN LUST R7		0.500	0	0	0	--	--	0
INDIAN LUST R8		0.500	0	0	0	--	--	0
INDIAN LUST R9		0.500	0	0	0	--	--	0
HIST LUST - HI		0.500	0	0	0	--	--	0
LUST - HI		0.500	0	0	0	--	--	0

FEDERAL ERNS LIST

ERNS		SP	0	--	--	--	--	0
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FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

FED E C		0.500	0	0	0	--	--	0
FED I C		0.500	0	0	0	--	--	0
RCRA IC_EC		0.250	0	0	--	--	--	0

FEDERAL RCRA GENERATORS LIST

HIST RCRA_CESQG		0.250	0	0	--	--	--	0
HIST RCRA_LQG		0.250	0	0	--	--	--	0
HIST RCRA_NONGEN		0.250	0	0	--	--	--	0
HIST RCRA_SQG		0.250	0	0	--	--	--	0
RCRA_LQG		0.250	0	0	--	--	--	0
RCRA_NONGEN		0.250	0	0	--	--	--	0
RCRA_SQG		0.250	0	0	--	--	--	0
RCRA_VSQG		0.250	0	0	--	--	--	0

FEDERAL NPL SITE LIST

NPL		1.000	0	0	0	0	--	0
NPL EPA R1 GIS		1.000	0	0	0	0	--	0
NPL EPA R3 GIS		1.000	0	0	0	0	--	0
NPL EPA R6 GIS		1.000	0	0	0	0	--	0
NPL EPA R8 GIS		1.000	0	0	0	0	--	0
NPL EPA R9 GIS		1.000	0	0	0	0	--	0

<u>DATABASE</u>	<u>SUBJECT PROPERTY</u>	<u>SEARCH DISTANCE (MILES)</u>	<u><1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>>1</u>	<u>TOTAL MAPPED</u>
FEDERAL NPL SITE LIST (cont.)								
PART NPL		1.000	0	0	0	0	--	0
PROPOSED NPL		1.000	0	0	0	0	--	0
SEMS_FINAL NPL		1.000	0	0	0	0	--	0
SEMS_PROPOSED NPL		1.000	0	0	0	0	--	0
STATE AND TRIBAL BROWNFIELD SITES								
TRIBAL BROWNFIELDS		0.500	0	0	0	--	--	0
BROWNFIELDS - HI		0.500	0	0	0	--	--	0
STATE INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES								
I C - HI		0.500	0	0	0	--	--	0
STATE- AND TRIBAL - EQUIVALENT CERCLIS								
SHWS - HI		1.000	0	0	1	2	--	3
STATE AND TRIBAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS								
SWF LF CLOSED - HI		0.500	0	0	0	--	--	0
SWF/LF - HI		0.500	0	0	0	--	--	0
STATE AND TRIBAL VOLUNTARY CLEANUP SITES								
VCP - HI		0.500	0	0	0	--	--	0
LOCAL BROWNFIELD LISTS								
BROWNFIELDS-ACRES		0.500	0	0	0	--	--	0
FED BROWNFIELDS		0.500	0	0	0	--	--	0
LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES								
FED CDL		SP	0	--	--	--	--	0
US HIST CDL		SP	0	--	--	--	--	0
LOCAL LISTS OF LANDFILL / SOLID WASTE DISPOSAL SITES								
HIST INDIAN ODI R8		0.500	0	0	0	--	--	0
INDIAN ODI R8		0.500	0	0	0	--	--	0
ODI		0.500	0	0	0	--	--	0
TRIBAL ODI		0.500	0	0	0	--	--	0
RECORDS OF EMERGENCY RELEASE REPORTS								
HMIRS (DOT)		SP	0	--	--	--	--	0
HIST SPILLS - HI		0.125	0	--	--	--	--	0
HIST SPILLS 2 - HI		0.125	0	--	--	--	--	0
SPILLS - HI		0.125	0	--	--	--	--	0

<u>DATABASE</u>	<u>SUBJECT PROPERTY</u>	<u>SEARCH DISTANCE (MILES)</u>	<u><1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>>1</u>	<u>TOTAL MAPPED</u>
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LOCAL LAND RECORDS

LIENS 2		SP	0	--	--	--	--	0
---------	--	----	---	----	----	----	----	---

OTHER ASCERTAINABLE RECORDS

AFS		SP	0	--	--	--	--	0
ALT FUELING		0.250	0	0	--	--	--	0
BRS		SP	0	--	--	--	--	0
CDC HAZDAT		1.000	0	0	0	0	--	0
COAL ASH DOE		0.500	0	0	0	--	--	0
COAL ASH EPA		0.500	0	0	0	--	--	0
COAL GAS		1.000	0	0	0	0	--	0
CONSENT (DECREES)		1.000	0	0	0	0	--	0
CORRECTIVE ACTIONS_2020		0.500	0	0	0	--	--	0
DEBRIS EPA LF		0.500	0	0	0	--	--	0
DEBRIS EPA SWRCY		0.500	0	0	0	--	--	0
DOD		1.000	0	0	0	0	--	0
DOT OPS		SP	0	--	--	--	--	0
ECHO		SP	0	--	--	--	--	0
ENOI		SP	0	--	--	--	--	0
EPA FUELS		SP	0	--	--	--	--	0
EPA OSC		0.125	0	--	--	--	--	0
EPA WATCH		SP	0	--	--	--	--	0
FA HWF		SP	0	--	--	--	--	0
FEDLAND		1.000	0	0	0	0	--	0
FRS		SP	0	--	--	--	--	0
FTTS		SP	0	--	--	--	--	0
FTTS INSP		SP	0	--	--	--	--	0
FUDS		1.000	0	0	0	0	--	0
HIST AFS		SP	0	--	--	--	--	0
HIST AFS 2		SP	0	--	--	--	--	0
HIST DOD		1.000	0	0	0	1	--	1
HIST LEAD_SMELTER		SP	0	--	--	--	--	0
HIST MLTS		SP	0	--	--	--	--	0
HIST PCB TRANS		SP	0	--	--	--	--	0
HIST PCS ENF		SP	0	--	--	--	--	0
HIST PCS FACILITY		SP	0	--	--	--	--	0
HIST SSTS		SP	0	--	--	--	--	0
HWC DOCKET		SP	0	--	--	--	--	0

<u>DATABASE</u>	<u>SUBJECT PROPERTY</u>	<u>SEARCH DISTANCE (MILES)</u>	<u><1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>>1</u>	<u>TOTAL MAPPED</u>
OTHER ASCERTAINABLE RECORDS (cont.)								
ICIS		SP	0	--	--	--	--	0
INACTIVE PCS		SP	0	--	--	--	--	0
INDIAN RESERVATION		1.000	0	0	0	0	--	0
LUCIS		0.500	0	0	0	--	--	0
LUCIS 2		0.500	0	0	0	--	--	0
MANIFEST EPA		0.250	0	0	--	--	--	0
MINES		0.250	0	0	--	--	--	0
MINES USGS		0.250	0	0	--	--	--	0
MLTS		SP	0	--	--	--	--	0
NPL AOC		1.000	0	0	0	0	--	0
NPL LIENS		SP	0	--	--	--	--	0
OSHA		SP	0	--	--	--	--	0
PADS		SP	0	--	--	--	--	0
PCB TRANSFORMER		SP	0	--	--	--	--	0
PCS ENF		SP	0	--	--	--	--	0
PCS FACILITY		SP	0	--	--	--	--	0
RAATS		SP	0	--	--	--	--	0
RADINFO		SP	0	--	--	--	--	0
RMP		0.500	0	0	0	--	--	0
ROD		1.000	0	0	0	0	--	0
SCRD DRYCLEANERS		0.250	0	0	--	--	--	0
SEMS_SMELTER		SP	0	--	--	--	--	0
SSTS		SP	0	--	--	--	--	0
STORMWATER		SP	0	--	--	--	--	0
TOSCA-PLANT		SP	0	--	--	--	--	0
TRIS		SP	0	--	--	--	--	0
UMTRA		0.500	0	0	0	--	--	0
VAPOR		0.500	0	0	0	--	--	0
AIRS - HI		SP	0	--	--	--	--	0
DRYCLEANERS - HI		0.250	0	0	--	--	--	0

Map Id: 1
 Direction: ESE
 Distance: 0.458 mi., 2421 ft.
 Elevation: 10 ft.
 Relative: Higher

Site Name : Mount Kaala Natural Area Reserve
 68-350 Farrington Hwy
 Waialua | WAIALUA, HI 96791

Database(s) : [CERCLIS-HIST, HIST SPILLS 2 - HI,
 SEMS_8R_ARCHIVED SITES, SHWS - HI]

EnviroSite ID: 1917520
EPA ID: N/R

CERCLIS-HIST

Facility Name : MOUNT KAALA NATURAL AREA RESERVE
 Facility Address : 68350 FARRINGTON HWY., WAIALUA, HI 96791
 County : HONOLULU

Site ID : 0904503
 Epa ID : HID984468496
 Short Name : MOUNT KAALA NATURAL AREA
 Congressional District : 02
 IFMS ID : N/R
 SMSA Number : 3320
 USGC Hydro Unit : N/R
 Federal Facility : N
 DMNSN Number : N/R
 Site Orphan Flag : N
 RCRA ID : N/R
 USGS Quadrangle : N/R
 Site Init by Prog : N/R
 NFRAP Flag : N/R
 Parent ID : N/R
 RST Code : N/R
 EPA Region : 09
 Classification : N/R
 Site Settings Code : N/R
 NPL Status : Not on the NPL
 DMNSN Unit Code : N/R
 RBRAC Code : N/R
 RResp Fed Agency Code : N/R
 Non NPL Status : NFRAP-Site does not qualify for the NPL based on existing information
 Non NPL Status Date : 2010-08-06
 Site Fips Code : 15003
 CC Concurrence Date : N/R
 CC Concurrence FY : N/R
 Alias EPA ID : N/R
 Site FUDS Flag : N/R

CERCLIS Site Contact Name(s)

Contact ID : 9000059
 Contact Name : Eugenia Chow
 Contact Tel. : 4159723160
 Contact Title : Site Assessment Manager (SAM)
 Contact Email : N/R

Alias Comments : N/R
 Site Description : N/R

CERCLIS Assessment History

Action Code : 001
 Action : DISCOVERY
 Date Started : N/R

Map Id: 1
 Direction: ESE
 Distance: 0.458 mi., 2421 ft.
 Elevation: 10 ft.
 Relative: Higher

Site Name : Mount Kaala Natural Area Reserve
 68-350 Farrington Hwy
 Waialua | WAIALUA, HI 96791

Database(s) : [CERCLIS-HIST, HIST SPILLS 2 - HI,
 SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917520
EPA ID: N/R

CERCLIS-HIST (cont.)

Date Completed : 1992-05-11
 Priority Level : 1
 Operational Unit : 00
 Primary Responsibility : EPA Fund-Financed
 Planning Status : N/R
 Urgency Indicator : N/R
 Action Anomaly : N/R

Action Code : 001
 Action : PRELIMINARY ASSESSMENT
 Date Started : N/R
 Date Completed : 2010-08-06
 Priority Level : 1
 Operational Unit : 00
 Primary Responsibility : EPA Fund-Financed
 Planning Status : N/R
 Urgency Indicator : N/R
 Action Anomaly : N/R

HIST SPILLS 2 - HI

Facility Name : Mount Kaala Natural Area Reserve
 Facility Address : 68-350 Farrington Hwy, Waialua, 96791

Case Number : 19920908-1
 Activity End Date : N/R
 HID Number : HID984468496
 Facility Registry Identifier : 110013766291
 Activity Type : Response
 Activity Lead : N/R
 Activity Result : SOSCA NFA
 Substances : Potential Hazardous Waste, containing 1) Barium 2) Cadmium 3) Lead
 Quantity : N/R
 Lead and Program : HEER EP&R
 National Response Center Incident Report: N/R
 Organization : United States, Department of Air Force, Kaala Air Force Station
 Location Island : Oahu
 Supplemental Location : N/R
 EP&R Environmental Interest : MOUNT KAALA, 6.5 MILE MARKER, STORM DRAIN 77, WAIANAE
 Was coordination needed on or off scene?: N/R
 Last Date in Agency List : 2018-07-17

Tax Map Key : 184002065

SEMS_8R_ARCHIVED SITES

Facility Name : MOUNT KAALA NATURAL AREA RESERVE
 Facility Address : 68350 FARRINGTON HWY., WAIALUA, HI 96791
 County : HONOLULU

Map Id: 1
 Direction: ESE
 Distance: 0.458 mi., 2421 ft.
 Elevation: 10 ft.
 Relative: Higher

Site Name : Mount Kaala Natural Area Reserve
 68-350 Farrington Hwy
 Waialua | WAIALUA, HI 96791

Database(s) : [CERCLIS-HIST, HIST SPILLS 2 - HI,
 SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917520
EPA ID: N/R

SEMS_8R_ARCHIVED SITES **(cont.)**

Site Details

Site ID : 0904503
 EPA ID : HID984468496
 Region : 09
 Congressional District : 02
 Federal Facility : N
 Federal Facility Docket : N
 NPL Status : Not on the NPL
 Non NPL Status : NFRAP-Site does not qualify for the NPL based on existing information
 FIPS Code : 15003
 Superfund Alternative Agreement : N
 Last Date in Agency List : 2021-08-10

Additional Information

Start Date : 1992-05-11
 Finish Date : 1992-05-11
 OU : 00
 Action Code : DS
 Action Name : DISCVRY
 Sequence : 1
 Quality : N/R
 Current Action Lead : EPA Perf

Start Date : N/R
 Finish Date : 2010-08-06
 OU : 00
 Action Code : PA
 Action Name : PA
 Sequence : 1
 Quality : N
 Current Action Lead : EPA Perf

Start Date : N/R
 Finish Date : 2013-11-08
 OU : 00
 Action Code : VS
 Action Name : ARCH SITE
 Sequence : 1
 Quality : N/R
 Current Action Lead : EPA Perf In-Hse

SHWS - HI

Facility Name : Mount Kaala Natural Area Reserve
 Facility Address : 68-350 Farrington Hwy, Waialua
 County : Oahu

Map Id: 1
 Direction: ESE
 Distance: 0.458 mi., 2421 ft.
 Elevation: 10 ft.
 Relative: Higher

Site Name : Mount Kaala Natural Area Reserve
 68-350 Farrington Hwy
 Waialua | WAIALUA, HI 96791

Database(s) : [CERCLIS-HIST, HIST SPILLS 2 - HI,
 SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917520
EPA ID: N/R

SHWS - HI (cont.)

Site Details

SDAR Environmental Interest Name :	Mount Kaala Natural Area Reserve
Supplemental Location Text :	N/R
HID Number :	HID984468496
Facility Registry Identifier :	110013766291
Program Full Name :	N/R
Potential Hazard and Controls :	No Hazard
Assessment :	Response Necessary
Priority :	NFA
Nature of Contamination :	N/R
 Nature of Residual Contamination :	 PAHs was detected below EPA screening levels and arsenic was detected at maximum concentrations of 4.0mg/kg (above EPA PRG). The concentration of arsenic was determined to be comparable to naturally occurring background levels.
 Response :	 Response Complete
Response Action Completed :	2012-02-07
Lead Agency :	HEER
Use Restrictions :	No Hazard Present For Unrestricted Residential Use
Description of Restrictions :	N/R
Engineering Control :	N/R
Institutional Control :	N/R
Date Issued :	N/R
Within Designated Areawide Contamination:	N/R
Document Date :	2012-02-07
Document Number :	2012-068-AH
 Document Subject :	 No Further Action (NFA) Unrestricted Use Determination for drum release for Mount Kaala Natural Area Reserve, Bog Plateau
 Site Closure Document :	 No Further Action Letter - Unrestricted Residential Use
Project Manager :	Amelia Hicks
Unit :	N/R
Last Activity :	N/R
Number of Acres :	N/R
Status :	N/R
Contact Information :	(808) 586-4249, 2385 Waimano Home Rd, Pearl City, HI 96782
Latitude :	N/R
Longitude :	N/R
Last Date in Agency List :	2019-06-05

Tax Map Key Information

Tax Map Key :	N/R
Description of Portion :	Plotted in ArcGIS and compared to oahtmkwithowner basemap load date 12/23/05

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]

EnviroSite ID: 1917629
 EPA ID: N/R

CERCLIS NFRAP

Facility Name : CROWBAR RANCH
 Facility Address : 68-540 FARRINGTON HWY, WAIALUA, HI 96791
 County : HONOLULU

Site ID : 0905143
 Epa ID : HI0000901454
 Short Name : CROWBAR RANCH
 Congressional District : 02
 IFMS ID : N/R
 SMSA Number : 3320
 USGC Hydro Unit : N/R
 Federal Facility : N
 DMNSN Number : N/R
 Site Orphan Flag : N
 RCRA ID : N/R
 USGS Quadrangle : N/R
 Site Init by Prog : N/R
 NFRAP Flag : NFA
 Parent ID : N/R
 RST Code : N/R
 EPA Region : 09
 Classification : N/R
 Site Settings Code : N/R
 NPL Status : Not on the NPL
 DMNSN Unit Code : N/R
 RBRAC Code : N/R
 RResp Fed Agency Code : N/R
 Non NPL Status : NFRAP-Site does not qualify for the NPL based on existing information
 Non NPL Status Date : 1995-09-29
 Site Fips Code : 15003
 CC Concurrence Date : N/R
 CC Concurrence FY : N/R
 Alias EPA ID : N/R
 Site FUDS Flag : N/R

CERCLIS Site Contact Name(s)
 Contact ID : 9000059
 Contact Title : Site Assessment Manager (SAM)

Alias Comments : N/R
 Site Description : N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917629
 EPA ID: N/R

CERCLIS NFRAP **(cont.)**

CERCLIS Assessment History

Action Code : 001
 Action : PRELIMINARY ASSESSMENT
 Date Started : N/R
 Date Completed : 1995-09-29
 Priority Level : 1
 Operational Unit : 00
 Primary Responsibility : State, Fund Financed
 Planning Status : N/R
 Urgency Indicator : N/R
 Action Anomaly : N/R

Action Code : 001
 Action : ARCHIVE SITE
 Date Started : N/R
 Date Completed : 1996-01-23
 Priority Level : 1
 Operational Unit : 00
 Primary Responsibility : EPA In-House
 Planning Status : N/R
 Urgency Indicator : N/R
 Action Anomaly : N/R

Action Code : 001
 Action : DISCOVERY
 Date Started : N/R
 Date Completed : 1994-10-26
 Priority Level : 1
 Operational Unit : 00
 Primary Responsibility : EPA Fund-Financed
 Planning Status : N/R
 Urgency Indicator : N/R
 Action Anomaly : N/R

ECHO

Facility Name : DILLINGHAM RANCH LTD LLC
 Facility Address : 68-540 FARRINGTON HIGHWAY, WAIALUA, HI 96791
 County : HONOLULU

Last Inspection Date : N/R
 Registry ID : 110064273655
 FIPS Code : 15003
 EPA Region : 09
 Inspection Count : 0
 Last Inspection Days : N/R
 Informal Count : 0

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917629
 EPA ID: N/R

ECHO (cont.)

Last Informal Action Date :	N/R
Formal Action Count :	0
Last Formal Action Date :	N/R
Total Penalties :	0
Penalty Count :	N/R
Last Penalty Date :	N/R
Last Penalty Amount :	N/R
QTRS IN NC :	0
Programs IN SNC :	0
Current Compliance Status :	N/R
Three-Year Compliance Status :	N/R
Collection Method :	ADDRESS MATCHING-HOUSE NUMBER
Reference Point :	ENTRANCE POINT OF A FACILITY OR STATION
Accuracy Meters :	50
Derived Tribes :	N/R
Derived HUC :	20060000
Derived WBD :	200600000101
Derived STCTY FIPS :	15003
Derived Zip :	96791
Derived CD113 :	02
Derived CB2010 :	150030099041019
MYRTK Universe :	NNN
NPDES IDs :	HIF005782
CWA Permit Types :	Minor
CWA Compliance Tracking :	Off
CWA NAICS :	N/R
CWA SICS :	N/R
CWA Inspection Count :	N/R
CWA Last Inspection Days :	N/R
CWA Informal Count :	N/R
CWA Formal Action Count :	N/R
CWA Last Formal Action Date :	N/R
CWA Penalties :	N/R
CWA Last Penalty Date :	N/R
CWA Last Penalty Amount :	N/R
CWA Quarters IN NC :	0
CWA Current Compliance Status :	Terminated Permit
CWA Current SNC Flag :	N
CWA 13 Quarters Compliance Status :	N/R
CWA 13 Quarters Effluent Exceedances:	N/R
CWA Three-Year QNCR Codes :	N/R
DFR URL :	Click here for hyperlink provided by the agency.
Facility SIC :	N/R
Facility NAICS :	N/R
Facility Last Inspection EPA Date :	N/R
Facility Last Inspection State Date :	N/R
Facility Last Formal Act EPA Date :	N/R
Facility Last Formal Act State Date :	N/R
Facility Last Informal Act EPA Date :	N/R
Facility Last Informal Act State Date:	N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917629
 EPA ID: N/R

ECHO (cont.)

Facility Federal Agency : N/R
 TRI Reporter : N/R
 Facility Imp Water Flag : N/R
 Current SNC Flag : N
 Indian County Flag : N
 Federal Flag : N/R
 US Mexico Border Flag : N/R
 Chesapeake Bay Flag : N/R
 AIR Flag : N
 NPDES Flag : Y
 SDWIS Flag : N
 RCRA Flag : N
 TRI Flag : N
 GHG Flag : N
 Major Flag : N/R
 Active Flag : N/R
 NAA Flag : N
 Latitude : 21.579725
 Longitude : -158.1792
 Last Date in Agency List : 2021-08-20

Facility Name : DILLINGHAM RANCH LTD LLC
 Facility Address : 68 540 FARRINGTON HWY, WAIALUA, HI 96791
 County : HONOLULU

Last Inspection Date : N/R
 Registry ID : 110014459996
 FIPS Code : 15003
 EPA Region : 09
 Inspection Count : 0
 Last Inspection Days : N/R
 Informal Count : 0
 Last Informal Action Date : N/R
 Formal Action Count : 0
 Last Formal Action Date : N/R
 Total Penalties : 0
 Penalty Count : N/R
 Last Penalty Date : N/R
 Last Penalty Amount : N/R
 QTRS IN NC : 0
 Programs IN SNC : 0
 Current Compliance Status : No Violation Identified
 Three-Year Compliance Status : _____
 Collection Method : N/R
 Reference Point : N/R
 Accuracy Meters : 17896
 Derived Tribes : N/R
 Derived HUC : 20060000

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917629
 EPA ID: N/R

ECHO (cont.)

Derived WBD :	200600000101
Derived STCTY FIPS :	15003
Derived Zip :	96791
Derived CD113 :	02
Derived CB2010 :	150030099041019
MYRTK Universe :	NNN
NPDES IDs :	N/R
CWA Permit Types :	N/R
CWA Compliance Tracking :	N/R
CWA NAICS :	N/R
CWA SICS :	N/R
CWA Inspection Count :	N/R
CWA Last Inspection Days :	N/R
CWA Informal Count :	N/R
CWA Formal Action Count :	N/R
CWA Last Formal Action Date :	N/R
CWA Penalties :	N/R
CWA Last Penalty Date :	N/R
CWA Last Penalty Amount :	N/R
CWA Quarters IN NC :	N/R
CWA Current Compliance Status :	N/R
CWA Current SNC Flag :	N
CWA 13 Quarters Compliance Status :	N/R
CWA 13 Quarters Effluent Exceedances:	N/R
CWA Three-Year QNCR Codes :	N/R
DFR URL :	Click here for hyperlink provided by the agency.
Facility SIC :	N/R
Facility NAICS :	81391 - Business Associations
Facility Last Inspection EPA Date :	N/R
Facility Last Inspection State Date :	N/R
Facility Last Formal Act EPA Date :	N/R
Facility Last Formal Act State Date :	N/R
Facility Last Informal Act EPA Date :	N/R
Facility Last Informal Act State Date:	N/R
Facility Federal Agency :	N/R
TRI Reporter :	N/R
Facility Imp Water Flag :	N/R
Current SNC Flag :	N
Indian County Flag :	N
Federal Flag :	N/R
US Mexico Border Flag :	N/R
Chesapeake Bay Flag :	N/R
AIR Flag :	N
NPDES Flag :	N
SDWIS Flag :	N
RCRA Flag :	Y
TRI Flag :	N
GHG Flag :	N
Major Flag :	N/R
Active Flag :	Y

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

Envirosite ID: 1917629
 EPA ID: N/R

ECHO (cont.)

NAA Flag : N
 Latitude : 21.579537
 Longitude : -158.177989
 Last Date in Agency List : 2021-08-20

ERNS

Facility Address : 68540 FARRINGTON HWY, WAIALUA, HI 96791
 County : HAWAII

Incident Information

Incident Date Time : 1992-09-11 17:00:00
 Type of Incident : FIXED
 Incident Cause : NATURAL PHENOMENON
 Incident DTG : OCCURRED
 Incident Location : N/R
 Sequence Number : 136590
 Potential Flag : N/R
 Description of Incident : SMALL TANK/HURRICANE INIKI CAUSED THE DAMAGE
 Last Date in Agency List : 2015-12-23

Incident Response Summary

Date Time Received : 1992-09-14 14:41:00
 Date Time Completed : 1992-09-14 14:47:00
 Call Type : Incident
 Source : UNAVAILABLE
 Responsible Company : MOKULEIA LAND CO
 Responsible Org Type : PRIVATE ENTERPRISE
 Responsible City : WAIALUA
 Responsible State : HI
 Responsible Zip : 96791

Incident Details Summary

Remedial Action : NONEMATERIAL EVAPORATED.
 Medium : SOIL
 Medium Description : LAND
 Body of Water : N/R
 Weather Conditions : N/R
 Water Temperature : N/R
 Water Supply Contaminated : N/R
 Waterway Closed : N/R
 Waterway Description : N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

ERNS (cont.)

Additional Incident Details Summary

Actual Amount :	N/R
Actual Amount Units :	N/R
Capacity of Tank :	N/R
Capacity of Tank Units :	N/R
Continuous Release Begin Date :	N/R
Continuous Release End Date :	N/R
Continuous Release Change Date :	N/R
Continuous Release Permit :	N/R
Continuous Release Type :	N/R
Description of Tank :	N/R
Device Operational :	Y
DOT Crossing Number :	N/R
DOT Regulated :	U
NPDES :	N/R
NPDES Compliance :	U
Pipeline Aboveground :	ABOVE
Pipeline Covered :	U
Pipeline Type :	UNKNOWN
Tank ID :	N/R
Tank Regulated :	U
Tank Regulated by :	N/R

Materials Involved Summary

Name of Material :	CHLORINE
CAS Number :	N/R
Amount of Material :	40
Unit of Measure :	POUND(S)
UN Number :	N/R
CHRIS Code :	CLX
Reached Water :	YES
Amount in Water :	0
Unit of Measure (Reach Water) :	UNKNOWN AMOUNT

Additional Materials Involved Summary

Name of Material :	N/R
CAS Number :	N/R
CHRIS Code :	N/R
Upper Bounds :	N/R
Upper Bounds Unit :	N/R
Upper Bounds Rate :	N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917629
 EPA ID: N/R

ERNS (cont.)

Trains Details

Train Name Number :	N/R
Train Type :	N/R
Train Speed :	N/R
Train Direction :	N/R
Number Locomotives :	N/R
Number Cars :	N/R
Number Derailed :	N/R
Track Speed :	N/R
Railroad Name :	N/R
Non Compliance with Hazmat :	N/R

Derailed Units Summary

Train Name Number :	N/R
Car Number :	N/R
Car Content :	N/R
Position in Train :	N/R
Derailed Type :	N/R

Vessels Details

Vessel Name :	N/R
Vessel Type :	N/R
Vessel Length :	N/R
Hull Construction :	N/R
Fuel Capacity :	N/R
Fuel on Board :	N/R
Cargo Capacity :	N/R
Cargo on Board :	N/R
Is Vessel Aground :	N/R
Flag :	N/R
Breadth :	N/R
Draught :	N/R
Fuel Capacity Units :	N/R
Fuel on Board Units :	N/R
Cargo Capacity Units :	N/R
Cargo on Board Units :	N/R

Mobile Details

Vehicle Own Fuel Capacity :	N/R
Cargo Capacity :	N/R
Amount of Cargo on Board :	N/R
Hazmat Carrier :	N/R
Carrier Licensed :	N/R
Noncompliance with Hazmat :	N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
EPA ID: N/R

ERNS (cont.)

Mobile Type :	N/R
Cargo Capacity Units :	N/R
Amount of Cargo on Board Units :	N/R
Vehicle Year :	N/R
Vehicle Make :	N/R
Vehicle Model :	N/R
Vehicle Number :	N/R
Trailer Number :	N/R

FRS

Facility Name :	DILLINGHAM RANCH LTD LLC
Facility Address :	68-540 FARRINGTON HIGHWAY, WAIALUA, HI 96791
County :	HONOLULU

Site Details

Registry ID :	110064273655
FRS Facility URL :	Click here for hyperlink provided by the agency.
Last Date in Agency List :	2021-07-17

Source Description

Source Description : The Environmental Health Warehouse (EHW) contains the Hawaii Department of Health - Environmental Health Administration's (HDOH-EHA) environmental data. The web-based application allows EHA to inquire about sites in Hawaii that are regulated by the administration due to activities that affect the environment, regardless of the regulation or program that directly monitors those activities. The system allows users a consolidated view of sites without disrupting the underlying source systems or the staff involved as they process their day-to-day workload. The EHW offers geo-spatial and tabular inquiry, mapping, reconciliation/data consolidation, and GIS services. The NPDES module of the Compliance Information System (ICIS) tracks surface water permits issued under the Clean Water Act. Under NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a permit. The permit will likely contain limits on what can be discharged, impose monitoring and reporting requirements, and include other provisions to ensure that the discharge does not adversely affect water quality.

FRS Environmental Interest

Source and System ID :	HI-EHW - 2026
	HI-EHW - 2031
	ICIS - HIF005782

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
EPA ID: N/R

FRS (cont.)

Facility Name : DILLINGHAM RANCH LTD LLC
 Facility Address : 68 540 FARRINGTON HWY, WAIALUA, HI 96791
 County : HONOLULU

Site Details

Registry ID : 110014459996
 FRS Facility URL : [Click here for hyperlink provided by the agency.](#)
 Last Date in Agency List : 2021-07-17

Source Description

Source Description :

The Environmental Health Warehouse (EHW) contains the Hawaii Department of Health - Environmental Health Administration's (HDOH-EHA) environmental data. The web-based application allows EHA to inquire about sites in Hawaii that are regulated by the administration due to activities that affect the environment, regardless of the regulation or program that directly monitors those activities. The system allows users a consolidated view of sites without disrupting the underlying source systems or the staff involved as they process their day-to-day workload. The EHW offers geo-spatial and tabular inquiry, mapping, reconciliation/data consolidation, and GIS services.

Source Description :

RCRAInfo is EPA's comprehensive information system that supports the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984 through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA. RCRAInfo also supports generation of the National Hazardous Waste Biennial Report. All generators and treatment, storage, and disposal facilities who handle hazardous waste are required to report to the EPA Administrator at least once every two years to support creation of the Biennial Report.

FRS Environmental Interest

Source and System ID : HI-EHW - 2030
 RCRAINFO - HIR000135145

HAZNET - CA

Facility Name : DILLINGHAM RANCH LTD LLC
 Facility Address : 68 540 FARRINGTON HWY, WAILUA, HI 96791
 County : N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

HAZNET - CA **(cont.)**

Site Details

Generator EPA ID : HIR000135145
 Active : N/R
 Category : N/R
 Facility Types : N/R
 Type : N/R
 Contact Name : SAM DELGADO
 Contact Phone : 8186387499
 Facility Mailing Address : 68 540 FARRINGTON HWY, WAILUA, HI 96791
 Latitude : N/R
 Longitude : N/R
 Agency Hyperlink : [Click here for hyperlink provided by the agency.](#)
 Last Date in Agency List : 2021-07-08

Waste Generator Details

State Waste : 2003: 343 - Unspecified organic liquid mixture, 0.45 tons to CAD059494310

HIST PCS ENF

Facility Name : DILLINGHAM RANCH
 Facility Address : 68-540 FARRINGTON HIGHWAY, WAIALUA, HI 96791

Effective Date : 2008-12-23
 Expiration Date : 2012-10-21
 NPDES ID : HIF005782
 FRS Facility Site ID : 571698
 Primary Facility SIC Code : N/R
 Primary Facility SIC Description : N/R
 Current Major/Minor Status : Minor
 Facility Type Description : N/R
 Facility Non-Government Contact Name: N/R
 Facility Non-Gov Addresses : N/R
 Total Actual Average Flow (MGD) : N/R
 Total App. Design Flow (MGD) : N/R
 Pretreat Program Required Indicator : N/R
 State Water Body : N/R
 State Water Body Name : N/R
 Tribal Land Code : N/R
 Tribal Land Name : N/R
 Contact Office Telephone Number : N/R
 Permit Non-Gov Addresses : 9601 Wilshire Blvd., Suite 220
 Permit Non-Government Contact Name : N/R
 Permit Type Description : General Permit Covered Facility
 Last Date in Agency List : 2015-01-15

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

HIST PCS FACILITY

Facility Name : DILLINGHAM RANCH
 Facility Address : 68-540 FARRINGTON HIGHWAY, WAIALUA, HI 96791
 County : N/R

FRS Facility Site ID : 571698
 NPDES ID : HIF005782
 Current Major/Minor Status : Minor
 Facility Type Description : N/R
 Permit Type : General Permit Covered Facility
 Primary Facility SIC Code : N/R
 Primary Facility SIC Description : N/R
 Total Actual Average Flow (MGD) : N/R
 Total App. Design Flow (MGD) : N/R
 Pretreat Prog Req'd Indicator Description: N/R
 State Water Body Number : N/R
 State Water Body Name : N/R
 Effective Date : 2008-12-23 00:00:00
 Expiration Date : 2012-10-21 00:00:00
 Tribal Land Code : N/R
 Tribal Land Name : N/R
 Facility Contact Name : N/R
 Contact Number : N/R
 Contact Address : N/R
 Permit Contact Name : N/R
 Permit Contact Address : 9601 Wilshire Blvd., Suite 220, Beverly, CA 90210
 Latitude : 21.577037
 Longitude : -158.173142
 Last Date in Agency list : 2014-12-10

HIST SPILLS - HI

Facility Name : Crowbar Ranch
 Facility Address : 68-540 Farrington Hwy, Waialua, 96791

Case Number : 19930310-1
 Assignment End Date : N/R
 HID Number : HI0000901454
 Facility Registry Identifier : 110013779526
 Activity Type : Response
 Activity Lead : Sheila Mackenzie
 Lead and Program : HEER EP&R
 ERNS : N/R
 ER : N/R
 Location Island : Oahu
 Supplemental Location : Crowbar Ranch
 EP and R Environmental Interest : Crowbar Ranch, Mokuleia, Oahu
 Result : SOSC NFA

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI]
(cont.)

EnviroSite ID: 1917629
 EPA ID: N/R

HIST SPILLS - HI **(cont.)**

Substances : Potential PCB, DIOXIN or PBB
 Numerical Quantity : N/R
 File Under : Crowbar Ranch
 Less or Greater Than : N/R
 Units : N/R
 Last Date in Agency List : 2015-06-04

Case Number : 19940503-2
 Assignment End Date : N/R
 HID Number : HI0000901454
 Facility Registry Identifier : 110013779526
 Activity Type : Response
 Activity Lead : Sheila Mackenzie
 Lead and Program : HEER EP&R
 ERNS : N/R
 ER : N/R
 Location Island : Oahu
 Supplemental Location : Crowbar Ranch
 EP and R Environmental Interest : Crowbar Ranch, Mokuleia Land Company called River Pasture behind Ranch.

Result : SOSC NFA
 Substances : N/R
 Numerical Quantity : N/R
 File Under : Crowbar Ranch
 Less or Greater Than : N/R
 Units : N/R
 Last Date in Agency List : 2015-06-04

HIST SPILLS 2 - HI

Facility Name : Crowbar Ranch
 Facility Address : 68-540 Farrington Hwy, Mokuleia, 96791

Case Number : 19930310-1
 Activity End Date : N/R
 HID Number : HI0000901454
 Facility Registry Identifier : 110013779526
 Activity Type : Response
 Activity Lead : Sheila Mackenzie
 Activity Result : SOSC NFA
 Substances : Potential PCB, DIOXIN or PBB
 Quantity : N/R
 Lead and Program : HEER EP&R
 National Response Center Incident Report: N/R
 Organization : Crowbar Ranch
 Location Island : Oahu
 Supplemental Location : Crowbar Ranch

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

HIST SPILLS 2 - HI **(cont.)**

EP&R Environmental Interest :	Crowbar Ranch, Mokuleia, Oahu
Was coordination needed on or off scene?:	N/R
Last Date in Agency List :	2018-07-17
Tax Map Key :	N/R
Case Number :	19940503-2
Activity End Date :	N/R
HID Number :	HI0000901454
Facility Registry Identifier :	110013779526
Activity Type :	Response
Activity Lead :	Sheila Mackenzie
Activity Result :	SOSC NFA
Substances :	N/R
Quantity :	N/R
Lead and Program :	HEER EP&R
National Response Center Incident Report:	N/R
Organization :	Crowbar Ranch
Location Island :	Oahu
Supplemental Location :	Crowbar Ranch
EP&R Environmental Interest :	Crowbar Ranch, Mokuleia Land Company called River Pasture behind Ranch.
Was coordination needed on or off scene?:	N/R
Last Date in Agency List :	2018-07-17
Tax Map Key :	N/R

ICIS

Facility Name :	DILLINGHAM RANCH
Facility Address :	68-540 FARRINGTON HIGHWAY, WAIALUA, HI 96791

Site Details

NPDES ID :	HIF005782
ICIS Facility Interest ID :	1400010917
Facility UIN :	110064273655
Facility Type Code :	N/R
Impaired Waters :	N/R
Latitude :	21.577037
Longitude :	-158.173142
Last Date in Agency List :	2021-08-17

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

ICIS (cont.)

Facility NAICS
 NAICS Code : N/R
 NAICS Description : N/R

Facility SIC
 SIC Code : N/R
 SIC Description : N/R

INACTIVE PCS

Issue Date : 2008-12-23
 Original Issue Date : 2008-12-23
 Effective Date : 2008-12-23
 Expiration Date : 2012-10-21
 Retirement Date : N/R
 Termination Date : 2009-06-01
 Issuing Agency : Department of Health - Clean Water Branch
 Agency Type : State
 Activity ID : 1400020452
 External Permit Number : HIF005782
 Facility Type Indicator : NON-POTW
 Permit Type : General Permit Covered Facility-NPDES)
 Major Minor Status : N
 Permit Status : Terminated
 Total Design Flow Number : N/R
 Actual Average Flow Number : N/R
 State Water Body : N/R
 State Water Body Name : N/R
 Permit Name : Dillingham Ranch Aina, LLC
 Permit Comp Status : Y
 RNC Tracking : Y
 Master External Permit Number : HIR100000
 TMDL Interface : N/R
 EDMR Authorization : N
 Pretreatment Indicator : N/R
 Last Date in Agency List : 2021-08-19

RCRA_NONGEN

Facility Name : DILLINGHAM RANCH AINA, LLC.
 Facility Address : 68-540 FARRINGTON HWY, WAIALUA, HI 96791
 County : HONOLULU

Date Form Received by Agency : 2021-08-24
 EPA ID : HIR000135145
 Mailing Address : 151 EL CAMINO DRIVE, BEVERLY HILLS, CA 90212
 Contact : ELIZABETH FUENTES

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

RCRA_NONGEN (cont.)

Contact Address : 151 EL CAMINO DRIVE, BEVERLY HILLS, CA 90212
 Contact Country : US
 Contact Telephone : 310-822-1096
 Contact Email : EFUENTES@KENNEDYWILSON.COM
 EPA Region : 09
 Land Type : Private
 Source Type : Deactivation
 Classification : Not a generator, verified
 Description : Not a generator, verified
 Last Date in Agency List : 2021-10-13

Owner/Operator Summary

Owner/Operator Name : DILLINGHAM RANCH AINA, LLC
 Owner/Operator Address : 151 EL CAMINO DRIVE, BEVERLY HILLS, CA 90212
 Owner/Operator Country : US
 Owner/Operator Telephone : 310-822-1096
 Owner/Operator Email : EFUENTES@KENNEDYWILSON.COM
 Owner/Operator Fax : N/R
 Legal Status : Private
 Owner/Operator Type : Operator
 Owner/Operator Start Date : 2021-07-12
 Owner/Operator End Date : N/R

Owner/Operator Name : DILLINGHAM RANCH AINA, LLC
 Owner/Operator Address : 151 EL CAMINO DRIVE, BEVERLY HILLS, CA 90212
 Owner/Operator Country : US
 Owner/Operator Telephone : 310-822-1096
 Owner/Operator Email : EFUENTES@KENNEDYWILSON.COM
 Owner/Operator Fax : N/R
 Legal Status : Private
 Owner/Operator Type : Owner
 Owner/Operator Start Date : 2021-07-12
 Owner/Operator End Date : N/R

Handler Activities Summary

U.S. Importer of Hazardous Waste : N
 Mixed Waste (Haz. and Radioactive) : N/R
 Recycler of Hazardous Waste : N
 Transporter of Hazardous Waste : N
 Treater, Storer or Disposer of HW : N
 Underground Injection Activity : N
 On-site Burner Exemption : N
 Furnace Exemption : N
 Used Oil Fuel Burner : N
 Used Oil Processor : N

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
EPA ID: N/R

RCRA_NONGEN (cont.)

Used Oil Refiner : N
 Used Oil Fuel Marketer to Burner : N
 Used Oil Specification Marketer : N
 Used Oil Transfer Facility : N
 Used Oil Transporter : N

Historical Generators

Date Form Received by Agency : 2003-04-22
 Facility Name : DILLINGHAM RANCH LTD LLC
 Classification : Small Quantity Generator

Notices of Violations Summary

Regulation Violated : N

SEMS_8R_ARCHIVED SITES

Facility Name : CROWBAR RANCH
 Facility Address : 68-540 FARRINGTON HWY, WAIALUA, HI 96791
 County : HONOLULU

Site Details

Site ID : 0905143
 EPA ID : HI0000901454
 Region : 09
 Congressional District : 02
 Federal Facility : N
 Federal Facility Docket : N
 NPL Status : Not on the NPL
 Non NPL Status : NFRAP-Site does not qualify for the NPL based on existing information
 FIPS Code : 15003
 Superfund Alternative Agreement : N
 Last Date in Agency List : 2021-08-10

Additional Information

Start Date : 1994-10-26
 Finish Date : 1994-10-26
 OU : 00
 Action Code : DS
 Action Name : DISCVRY
 Sequence : 1
 Quality : N/R
 Current Action Lead : EPA Perf

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
 EPA ID: N/R

SEMS_8R_ARCHIVED SITES **(cont.)**

Start Date : N/R
 Finish Date : 1996-01-23
 OU : 00
 Action Code : VS
 Action Name : ARCH SITE
 Sequence : 1
 Quality : N/R
 Current Action Lead : EPA Perf In-Hse

Start Date : N/R
 Finish Date : 1995-09-29
 OU : 00
 Action Code : PA
 Action Name : PA
 Sequence : 1
 Quality : N
 Current Action Lead : St Perf

SHWS - HI

Facility Name : Crowbar Ranch
 Facility Address : 68-540 Farrington Hwy, Mokuleia
 County : Oahu

Site Details

SDAR Environmental Interest Name : Crowbar Ranch
 Supplemental Location Text : Crowbar Ranch
 HID Number : HI0000901454
 Facility Registry Identifier : 110013779526
 Program Full Name : N/R
 Potential Hazard and Controls : Hazard Undetermined
 Assessment : Response Not Necessary
 Priority : NFA
 Nature of Contamination : Found: None.
 Nature of Residual Contamination : None.
 Response : N/R
 Response Action Completed : 1996-01-10
 Lead Agency : HEER
 Use Restrictions : Undetermined
 Description of Restrictions : N/R
 Engineering Control : N/R
 Institutional Control : N/R
 Date Issued : N/R
 Within Designated Areawide Contamination: N/R
 Document Date : 1996-01-10
 Document Number : N/R

Map Id: 2
 Direction: W
 Distance: 0.519 mi., 2742 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : CROWBAR RANCH | DILLINGHAM RANCH LTD LLC | DILLINGHAM RANCH AINA, LLC. 68-540 FARRINGTON HIGHWAY WAIALUA | Mokuleia | WAILUA, HI 96791

Database(s) : [CERCLIS NFRAP, ECHO, ERNS, FRS, HAZNET - CA, HIST PCS ENF, HIST PCS FACILITY, HIST SPILLS - HI, HIST SPILLS 2 - HI, ICIS, INACTIVE PCS, RCRA_NONGEN, SEMS_8R_ARCHIVED SITES, SHWS - HI] **(cont.)**

EnviroSite ID: 1917629
EPA ID: N/R

SHWS - HI **(cont.)**

Document Subject :	Site Screening Sheet for Crowbar Ranch 68-540 Farrington Hwy Waialua Case ID HI0000901454
Site Closure Document :	ISST NFA - No Letter
Project Manager :	Sheila MacKenzie
Unit :	N/R
Last Activity :	N/R
Number of Acres :	N/R
Status :	N/R
Contact Information :	(808) 586-4249, 2385 Waimano Home Rd, Pearl City, HI 96782
Latitude :	N/R
Longitude :	N/R
Last Date in Agency List :	2019-06-05

Tax Map Key Information

Tax Map Key :	N/R
Description of Portion :	N/R

Map Id: 3
 Direction: W
 Distance: 0.531 mi., 2806 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : Dillingham Ranch 68-540A Farrington Hwy Waialua, HI

Database(s) : [I C - HI, SHWS - HI]

EnviroSite ID: 1919049
EPA ID: N/R

I C - HI

Facility Name :	Dillingham Ranch
Facility Address :	68-540A Farrington Hwy, Waialua
County :	Oahu

Site Details

SDAR Environmental Interest Name :	Dillingham Ranch
Supplemental Location Text :	Dillingham Ranch
HID Number :	HI0000901454
Facility Registry Identifier :	110013779526
Program Full Name :	State
Potential Hazard and Controls :	Hazard Managed With Controls
Assessment :	Response Necessary
Priority :	NFA
Nature of Contamination :	Found: PCB in soil

Map Id: 3
 Direction: W
 Distance: 0.531 mi., 2806 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : Dillingham Ranch
 68-540A Farrington Hwy
 Waialua, HI

Database(s) : [I C - HI, SHWS - HI] **(cont.)**

EnviroSite ID: 1919049
EPA ID: N/R

I C - HI (cont.)

Nature of Residual Contamination :	N/R
Response :	Response Ongoing
Response Action Completed :	2008-01-22
Lead Agency :	HEER
Use Restrictions :	Controls Required to Manage Contamination
Description of Restrictions :	Remains as agricultural use.
Engineering Control :	N/R
Institutional Control :	Government - Hawaii Dept. of Health Letter Issued
Date Issued :	2008-01-22
Within Designated Area-wide Contamination:	N/R
Document Date :	2008-01-22
Document Number :	2008-040-MS
Document Subject :	Review of Follow-up Site Investigation Dillingham Ranch Dec 2007 by Element Environmental LLC
Site Closure Document :	No Further Action Letter - Restricted Use
Project Manager :	Mark Sutterfield
Unit :	N/R
Last Activity :	N/R
Number of Acres :	N/R
Status :	N/R
Contact Information :	(808) 586-4249, 2385 Waimano Home Rd, Pearl City, HI 96782
Latitude :	N/R
Longitude :	N/R
Last Date in Agency List :	2019-06-05

Tax Map Key Information

Tax Map Key :	168003019
Description of Portion :	N/R

SHWS - HI

Facility Name :	Dillingham Ranch
Facility Address :	68-540A Farrington Hwy, Waialua
County :	Oahu

Site Details

SDAR Environmental Interest Name :	Dillingham Ranch
Supplemental Location Text :	Dillingham Ranch
HID Number :	HI0000901454
Facility Registry Identifier :	110013779526
Program Full Name :	N/R
Potential Hazard and Controls :	Hazard Managed With Controls
Assessment :	Response Necessary
Priority :	NFA
Nature of Contamination :	Found: PCB in soil
Nature of Residual Contamination :	N/R
Response :	Response Ongoing
Response Action Completed :	2008-01-22
Lead Agency :	HEER
Use Restrictions :	Controls Required to Manage Contamination

Map Id: 3
 Direction: W
 Distance: 0.531 mi., 2806 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : Dillingham Ranch
 68-540A Farrington Hwy
 Waialua, HI

Database(s) : [I C - HI, SHWS - HI] **(cont.)**

Envirosite ID: 1919049
EPA ID: N/R

SHWS - HI **(cont.)**

Description of Restrictions :	Remains as agricultural use.
Engineering Control :	N/R
Institutional Control :	Government - Hawaii Dept. of Health Letter Issued
Date Issued :	2008-01-22
Within Designated Areawide Contamination:	N/R
Document Date :	2008-01-22
Document Number :	2008-040-MS
Document Subject :	Review of Follow-up Site Investigation Dillingham Ranch Dec 2007 by Element Environmental LLC
Site Closure Document :	No Further Action Letter - Restricted Use
Project Manager :	Mark Sutterfield
Unit :	N/R
Last Activity :	N/R
Number of Acres :	N/R
Status :	N/R
Contact Information :	(808) 586-4249, 2385 Waimano Home Rd, Pearl City, HI 96782
Latitude :	N/R
Longitude :	N/R
Last Date in Agency List :	2019-06-05

Tax Map Key Information	
Tax Map Key :	168003019
Description of Portion :	N/R

Map Id: 4
 Direction: NNW
 Distance: 0.649 mi., 3425 ft.
 Elevation: N/R
 Relative: N/R

Site Name : Dillingham Air Force Base
 21.5863, -158.1826
 HI

Database(s) : [HIST DOD]

Envirosite ID: 16662024
EPA ID: N/R

HIST DOD

Facility Name :	Dillingham Air Force Base
Facility Address :	HI
Internal Feature Number :	0
Primary Federal Land Type :	Air Force DOD
Primary GNIS ID :	N/R
Primary Administering Agency :	DOD
Secondary Federal Land Type :	N/R
Secondary GNIS ID :	N/R
Secondary GNIS Name :	N/R
Secondary Administering Agency :	N/R
Tertiary Federal Land Type :	N/R
Tertiary GNIS ID :	N/R

Map Id: 4
Direction: NNW
Distance: 0.649 mi., 3425 ft.
Elevation: N/R
Relative: N/R

Site Name : Dillingham Air Force Base 21.5863, -158.1826 HI
Database(s) : [HIST DOD] (cont.)

Envirosite ID: 16662024
EPA ID: N/R

HIST DOD (**cont.**)

Tertiary GNIS Name :	N/R
Tertiary Administering Agency :	N/R
State FIPS Code :	15
GIS Acreage :	0
Perimeter (in Miles) :	0.0876166
Area :	0.00028708
Orig Name :	N/R
Link :	N/R
Last Date in Agency List :	2018-08-17

<u>ENVIROSITE ID</u>	<u>NAME</u>	<u>ADDRESS</u>	<u>CITY</u>	<u>ZIP</u>	<u>DATABASE(S)</u>
<u>16630548</u>	Dillingham Military Reser...	N/R	Mokuleia		SHWS - HI
<u>16640956</u>	FUDS Nike No. 1 (Dillingh...	N/R	Mokuleia		SHWS - HI
<u>16624451</u>	HAWAIIAN BITUMULUS & PAVIN...	NEAR DILLINGHAM AIR FIELD	Mokuleia	96791	EPA UST, HIST LUST - H...
<u>42967767</u>	KAALA RS (HI028)	MT KAALA	Mokuleia		EPA LUST
<u>16662139</u>	MOUNT KAALA RADIO SITE	MT KAALA	Mokuleia	96791	LUST - HI, UST - HI
<u>31250002</u>	NIKE SITE NO. 1	N/R	MOKULEIA		FUDS
<u>40575752</u>	Pearl City Peninsula Land...	N/R	NO CITY		FUDS
<u>40575051</u>	QUARTERMASTER SUPPLY	N/R	NO CITY		FUDS
<u>43174755</u>	RURAL EMERGENCY OPERATING...	67-170 Farrington Hwy 67-...	WAILUUA	96791	EPA UST
<u>16633893</u>	SCHOFIELD ARMY SOLID WAST...	OAHU STREET SCHOFIELD BAR...	NOT APPLICABLE		ODI
<u>42960913</u>	T. OTAKE & SONS, LTD.	66-212 FARRINGTON HWY	WAILUUA	96791	EPA UST
<u>42999961</u>	Waialua Service	67-016 FARRINGTON HWY	WAILUUA	96791	EPA UST
<u>40575899</u>	WAIPIO STO SITE	N/R	NO CITY		FUDS

FEDERAL RCRA NON-CORRACTS TSD FACILITIES LIST

ARCHIVED RCRA TSD: Resource Conservation and Recovery Act hazardous waste transportation storage disposal and treatment facilities

Agency Version Date: 10/05/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 215-814-2469
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

RCRA_TSD: Resource Conservation and Recovery Act hazardous waste transportation storage disposal and treatment facilities

Agency Version Date: 10/05/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 215-814-2469
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

STATE, TRIBAL, AND FEDERAL REGISTERED STORAGE TANK LISTS

AST PBS: Bulk petroleum terminals with a total bulk storage capacity of 50,000 barrels or more.

Agency Version Date: 08/31/2021	Agency: Department of Homeland Security
Agency Update Frequency: Quarterly	Agency Contact: 202-853-5361
Planned Next Contact: 11/26/2021	Most Recent Contact: 08/31/2021

EPA UST: Facilities listed in the EPA UST Finder database

Agency Version Date: 08/23/2021	Agency: EPA
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 11/19/2021	Most Recent Contact: 08/23/2021

FEMA UST: FEMA underground storage tank listing

Agency Version Date: 04/16/2021	Agency: FEMA
Agency Update Frequency: Varies	Agency Contact: 202-212-5283
Planned Next Contact: 01/04/2022	Most Recent Contact: 10/08/2021

INDIAN UST R1: Underground Storage Tanks on Indian Land in EPA Region 1

Agency Version Date: 07/26/2021	Agency: U.S. Environmental Protection Agency Region 1
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/21/2021	Most Recent Contact: 07/26/2021

INDIAN UST R10: Underground Storage Tanks on Indian Land in EPA Region 10

Agency Version Date: 08/23/2021	Agency: U.S. Environmental Protection Agency Region 10
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 11/18/2021	Most Recent Contact: 08/23/2021

INDIAN UST R2: Underground Storage Tanks on Indian Land in EPA Region 2

Agency Version Date: 12/07/2016	Agency: U.S. Environmental Protection Agency Region 2
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/26/2021	Most Recent Contact: 07/30/2021

INDIAN UST R4: Underground Storage Tanks on Indian Land in EPA Region 4

Agency Version Date: 05/27/2021	Agency: U.S. Environmental Protection Agency Region 4
Agency Update Frequency: Semi Annually	Agency Contact: 855-246-3642
Planned Next Contact: 11/18/2021	Most Recent Contact: 08/23/2021

STATE, TRIBAL, AND FEDERAL REGISTERED STORAGE TANK LISTS (cont.)

INDIAN UST R5: Underground Storage Tanks on Indian Land in EPA Region 5

Agency Version Date: 02/15/2021	Agency: U.S. Environmental Protection Agency Region 5
Agency Update Frequency: Varies	Agency Contact: 855-246-3642
Planned Next Contact: 11/04/2021	Most Recent Contact: 08/10/2021

INDIAN UST R6: Underground Storage Tanks on Indian Land in EPA Region 6

Agency Version Date: 12/18/2020	Agency: U.S. Environmental Protection Agency Region 6
Agency Update Frequency: Semi Annually	Agency Contact: 855-246-3642
Planned Next Contact: 12/03/2021	Most Recent Contact: 09/08/2021

INDIAN UST R7: Underground Storage Tanks on Indian Land in EPA Region 7

Agency Version Date: 05/14/2021	Agency: U.S. Environmental Protection Agency Region 7
Agency Update Frequency: Varies	Agency Contact: 855-246-3642
Planned Next Contact: 11/04/2021	Most Recent Contact: 08/10/2021

INDIAN UST R8: Underground Storage Tanks on Indian Land in EPA Region 8

Agency Version Date: 07/26/2021	Agency: U.S. Environmental Protection Agency Region 8
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/21/2021	Most Recent Contact: 07/26/2021

INDIAN UST R9: Underground Storage Tanks on Indian Land in EPA Region 9

Agency Version Date: 07/26/2021	Agency: U.S. Environmental Protection Agency Region 9
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/21/2021	Most Recent Contact: 07/26/2021

AST - HI: Aboveground storage tank listing

Agency Version Date: 09/23/2021	Agency: Hawaii Fire Department
Agency Update Frequency: No Update	Agency Contact: 808-640-3728
Planned Next Contact: 12/20/2021	Most Recent Contact: 09/23/2021

HIST AST - HI: Historical list of Aboveground storage tank listing

Agency Version Date: 10/11/2021	Agency: Hawaii Fire Department
Agency Update Frequency: Quarterly	Agency Contact: 808-640-3728
Planned Next Contact: 01/05/2022	Most Recent Contact: 10/11/2021

UST - HI: Underground storage tank listing

Agency Version Date: 07/27/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Quarterly	Agency Contact: 808-586-4226
Planned Next Contact: 10/22/2021	Most Recent Contact: 07/27/2021

FEDERAL CERCLIS LIST

CERCLIS NFRAP: The CERCLIS sites with No Further Remedial Action Planned from the CERCLIS program database. The Environmental Protection Agency decommissioned the CERCLIS data in 2014. The last update was November 12, 2013.

Agency Version Date: 10/25/2013	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 800-424-9346
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

FEDERAL CERCLIS LIST (cont.)

CERCLIS-HIST: The CERCLIS program database contains information on the assessment and remediation of federal hazardous waste sites. The Environmental Protection Agency decommissioned the CERCLIS data in 2014. The last update was November 12, 2013.

Agency Version Date: 10/29/2013
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 800-424-9346
 Most Recent Contact: 08/06/2021

FEDERAL FACILITY: Sites where Federal Facilities Restoration and Reuse Office (FFRRO) arranged cleanup for Base Closure and Property Transfer at Federal Facilities

Agency Version Date: 08/06/2021
 Agency Update Frequency: Varies
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8712
 Most Recent Contact: 08/06/2021

SEMS_8R_ACTIVE SITES: The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted. NPL sites include latitude and longitude information. For non-NPL sites, a brief site status is provided.

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

SEMS_8R_ARCHIVED SITES: The Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time.

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

FEDERAL RCRA CORRACTS FACILITIES LIST

CORRACTS: List of facilities where Resource Conservation and Recovery Act Corrective Action Program used to investigate and remediate hazardous releases

Agency Version Date: 10/05/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 12/30/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-1667
 Most Recent Contact: 10/05/2021

HIST CORRACTS 2: List of facilities where Resource Conservation and Recovery Act Corrective Action Program used to investigate and remediate hazardous releases that are no longer in current agency list.

Agency Version Date: 10/12/2018
 Agency Update Frequency: Annually
 Planned Next Contact: 11/30/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-1667
 Most Recent Contact: 09/03/2021

FEDERAL DELISTED NPL SITE LIST

DELISTED NPL: National Priority List of sites that were delisted and no longer require action

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

DELISTED PROPOSED NPL: Sites that have been delisted from the proposed National Priority List

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

FEDERAL DELISTED NPL SITE LIST (cont.)

SEMS_DELETED NPL: All Deleted National Priority List Sites

Agency Version Date: 08/06/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 703-603-8867
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

FEDERAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

EPA LF MOP: Sites in the EPA Landfill Methane Outreach Program

Agency Version Date: 10/04/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 703-603-8867
Planned Next Contact: 12/29/2021	Most Recent Contact: 10/04/2021

STATE, TRIBAL, AND FEDERAL LEAKING STORAGE TANK LISTS

EPA LUST: Releases listed in the EPA UST Finder database

Agency Version Date: 08/23/2021	Agency: EPA
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 11/19/2021	Most Recent Contact: 08/23/2021

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land in EPA Region 1

Agency Version Date: 07/26/2021	Agency: U.S. Environmental Protection Agency Region 1
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/21/2021	Most Recent Contact: 07/26/2021

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land in EPA Region 10

Agency Version Date: 08/23/2021	Agency: U.S. Environmental Protection Agency Region 10
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 11/18/2021	Most Recent Contact: 08/23/2021

INDIAN LUST R2: Leaking Underground Storage Tanks on Indian Land in EPA Region 2

Agency Version Date: 12/07/2016	Agency: U.S. Environmental Protection Agency Region 2
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/26/2021	Most Recent Contact: 07/30/2021

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land in EPA Region 4

Agency Version Date: 05/27/2021	Agency: U.S. Environmental Protection Agency Region 4
Agency Update Frequency: Semi Annually	Agency Contact: 855-246-3642
Planned Next Contact: 11/18/2021	Most Recent Contact: 08/23/2021

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land in EPA Region 5

Agency Version Date: 08/10/2021	Agency: U.S. Environmental Protection Agency Region 5
Agency Update Frequency: Varies	Agency Contact: 855-246-3642
Planned Next Contact: 11/04/2021	Most Recent Contact: 08/10/2021

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land in EPA Region 6

Agency Version Date: 08/12/2021	Agency: U.S. Environmental Protection Agency Region 6
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 11/08/2021	Most Recent Contact: 08/12/2021

STATE, TRIBAL, AND FEDERAL LEAKING STORAGE TANK LISTS (cont.)

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land in EPA Region 7

Agency Version Date: 08/10/2021	Agency: U.S. Environmental Protection Agency Region 7
Agency Update Frequency: Varies	Agency Contact: 855-246-3642
Planned Next Contact: 11/04/2021	Most Recent Contact: 08/10/2021

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land in EPA Region 8

Agency Version Date: 05/18/2021	Agency: U.S. Environmental Protection Agency Region 8
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 11/11/2021	Most Recent Contact: 08/16/2021

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land in EPA Region 9

Agency Version Date: 07/26/2021	Agency: U.S. Environmental Protection Agency Region 9
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/21/2021	Most Recent Contact: 07/26/2021

HIST LUST - HI: List of leaking underground storage tank sites that are no longer in current agency list.

Agency Version Date: 10/11/2021	Agency: Hawaii State Department of Health
Agency Update Frequency: Annually	Agency Contact: 808-586-4226
Planned Next Contact: 01/05/2022	Most Recent Contact: 10/11/2021

LUST - HI: Leaking underground storage tank sites listing

Agency Version Date: 07/29/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Quarterly	Agency Contact: 808-586-4226
Planned Next Contact: 10/25/2021	Most Recent Contact: 07/29/2021

FEDERAL ERNS LIST

ERNS: Emergency Response Notification System records of reported spills

Agency Version Date: 07/30/2021	Agency: National Response Center United States Coast Guard
Agency Update Frequency: Annually	Agency Contact: N/R
Planned Next Contact: 10/26/2021	Most Recent Contact: 07/30/2021

FEDERAL INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

FED E C: Federal listing of remediation sites with engineering controls

Agency Version Date: 09/01/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: 800-424-9346
Planned Next Contact: 11/26/2021	Most Recent Contact: 09/01/2021

FED I C: Federal listing of remediation sites with institutional controls

Agency Version Date: 09/01/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: 800-424-9346
Planned Next Contact: 11/26/2021	Most Recent Contact: 09/01/2021

RCRA IC_EC: Sites with institutional or engineering controls related to Resource Conservation and Recovery Act

Agency Version Date: 08/16/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: 215-814-2469
Planned Next Contact: 11/11/2021	Most Recent Contact: 08/16/2021

FEDERAL RCRA GENERATORS LIST

HIST RCRA_CESQG: List of Resource Conservation and Recovery Act licensed conditionally exempt small quantity generators that are no longer in current agency list.

Agency Version Date: 10/12/2018	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: 215-814-2469
Planned Next Contact: 11/30/2021	Most Recent Contact: 09/03/2021

HIST RCRA_LQG: List of Resource Conservation and Recovery Act licensed large quantity generators that are no longer in current agency list.

Agency Version Date: 10/12/2018	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: 215-814-2469
Planned Next Contact: 11/30/2021	Most Recent Contact: 09/03/2021

HIST RCRA_NONGEN: List of Resource Conservation and Recovery Act licensed non-generators that are no longer in current agency list.

Agency Version Date: 10/12/2018	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: 215-814-2469
Planned Next Contact: 11/30/2021	Most Recent Contact: 09/03/2021

HIST RCRA_SQG: List of Resource Conservation and Recovery Act licensed small quantity generators that are no longer in current agency list.

Agency Version Date: 10/12/2018	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: 215-814-2469
Planned Next Contact: 11/30/2021	Most Recent Contact: 09/03/2021

RCRA_LQG: Resource Conservation and Recovery Act listing of licensed large quantity generators

Agency Version Date: 10/05/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 215-814-2469
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

RCRA_NONGEN: Resource Conservation and Recovery Act listing of licensed non-generators

Agency Version Date: 10/05/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: 215-814-2469
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

RCRA_SQG: Resource Conservation and Recovery Act listing of licensed small quantity generators

Agency Version Date: 10/05/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 215-814-2469
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

RCRA_VSQG: Resource Conservation and Recovery Act listing of licensed very small quantity generators.

Agency Version Date: 10/05/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: 215-814-2469
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

FEDERAL NPL SITE LIST

NPL: List of priority contaminated sites among identified releases or threatened releases of hazardous substances pollutants or contaminants nationally

Agency Version Date: 08/06/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 703-603-8867
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

FEDERAL NPL SITE LIST (cont.)

NPL EPA R1 GIS: Geospatial data for the Environmental Protection Agency Region 1 National Priority List subject to environmental regulation

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-2132
 Most Recent Contact: 08/06/2021

NPL EPA R3 GIS: Geospatial data for the Environmental Protection Agency Region 3 National Priority List subject to environmental regulation

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-2132
 Most Recent Contact: 08/06/2021

NPL EPA R6 GIS: Geospatial data for the Environmental Protection Agency Region 6 National Priority List subject to environmental regulation

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-2132
 Most Recent Contact: 08/06/2021

NPL EPA R8 GIS: Geospatial data for the Environmental Protection Agency Region 8 National Priority List subject to environmental regulation

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-2132
 Most Recent Contact: 08/06/2021

NPL EPA R9 GIS: Geospatial data for the Environmental Protection Agency Region 9 National Priority List subject to environmental regulation

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 202-566-2132
 Most Recent Contact: 08/06/2021

PART NPL: Sites that are a part of a National Priority List site referred to as the parent site

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

PROPOSED NPL: Sites that have been proposed for the National Priority List

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

SEMS_FINAL NPL: All Included National Priority List Sites

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

SEMS_PROPOSED NPL: All Proposed National Priority List Sites

Agency Version Date: 08/06/2021
 Agency Update Frequency: Quarterly
 Planned Next Contact: 11/02/2021

Agency: U.S. Environmental Protection Agency
 Agency Contact: 703-603-8867
 Most Recent Contact: 08/06/2021

STATE AND TRIBAL BROWNFIELD SITES

TRIBAL BROWNFIELDS: Tribal brownfield remediation site listing

Agency Version Date: 02/10/2017	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: 855-246-3642
Planned Next Contact: 12/21/2021	Most Recent Contact: 09/24/2021

BROWNFIELDS - HI: Listing of brownfield remediation sites

Agency Version Date: 09/08/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Varies	Agency Contact: 808-586-4249
Planned Next Contact: 12/03/2021	Most Recent Contact: 09/08/2021

STATE INSTITUTIONAL CONTROLS / ENGINEERING CONTROLS REGISTRIES

I C - HI: Remediation sites with institutional controls

Agency Version Date: 09/08/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Semi Annually	Agency Contact: 808-586-4249
Planned Next Contact: 12/03/2021	Most Recent Contact: 09/08/2021

STATE- AND TRIBAL - EQUIVALENT CERCLIS

SHWS - HI: Listing of state hazardous waste sites

Agency Version Date: 09/08/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Semi Annually	Agency Contact: 808-586-4226
Planned Next Contact: 12/03/2021	Most Recent Contact: 09/08/2021

STATE AND TRIBAL LANDFILL AND/OR SOLID WASTE DISPOSAL SITE LISTS

SWF LF CLOSED - HI: Closed solid waste facilities and landfill listing

Agency Version Date: 05/26/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Semi Annually	Agency Contact: 808-586-4226
Planned Next Contact: 11/18/2021	Most Recent Contact: 08/23/2021

SWF/LF - HI: Solid waste facility and landfill listing

Agency Version Date: 07/23/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Semi Annually	Agency Contact: 808-586-4226
Planned Next Contact: 10/19/2021	Most Recent Contact: 07/23/2021

STATE AND TRIBAL VOLUNTARY CLEANUP SITES

VCP - HI: Voluntary cleanup program remediation sites listing

Agency Version Date: 09/08/2021	Agency: Hawai'i State Department of Health
Agency Update Frequency: Varies	Agency Contact: 808-586-4249
Planned Next Contact: 12/03/2021	Most Recent Contact: 09/08/2021

LOCAL BROWNFIELD LISTS

BROWNFIELDS-ACRES: EPA Brownfields Assessment, Cleanup and Redevelopment Exchange System.

Agency Version Date: 06/23/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 12/14/2021	Most Recent Contact: 09/17/2021

LOCAL BROWNFIELD LISTS (cont.)

FED BROWNFIELDS: Federal brownfield remediation sites

Agency Version Date: 07/30/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Semi Annually	Agency Contact: 855-246-3642
Planned Next Contact: 10/27/2021	Most Recent Contact: 07/30/2021

LOCAL LISTS OF HAZARDOUS WASTE / CONTAMINATED SITES

FED CDL: The U.S. Department of Justice listing of clandestine drug lab locations

Agency Version Date: 07/23/2021	Agency: U.S. Department of Justice
Agency Update Frequency: Quarterly	Agency Contact: 202-307-7610
Planned Next Contact: 10/19/2021	Most Recent Contact: 07/23/2021

US HIST CDL: The U.S. Department of Justice historical listing of clandestine drug lab locations

Agency Version Date: 08/05/2019	Agency: U.S. Department of Justice
Agency Update Frequency: Quarterly	Agency Contact: 202-307-7610
Planned Next Contact: 11/22/2021	Most Recent Contact: 08/25/2021

LOCAL LISTS OF LANDFILL / SOLID WASTE DISPOSAL SITES

HIST INDIAN ODI R8: List of Region 8 Indian land open dump inventory sites maintained within the STARS program that is no longer in current agency list.

Agency Version Date: 11/12/2018	Agency: Indian Health Service
Agency Update Frequency: Annually	Agency Contact: 855-246-3642
Planned Next Contact: 10/19/2021	Most Recent Contact: 07/23/2021

INDIAN ODI R8: Region 8 Indian land open dump inventory sites maintained within the STARS program

Agency Version Date: 08/06/2021	Agency: Indian Health Service
Agency Update Frequency: Varies	Agency Contact: 855-246-3642
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

ODI: Open dump inventory sites

Agency Version Date: 10/03/2017	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: No Update	Agency Contact: 855-246-3642
Planned Next Contact: 11/17/2021	Most Recent Contact: 08/20/2021

TRIBAL ODI: Indian land open dump inventory for all regions

Agency Version Date: 08/31/2021	Agency: Indian Health Service
Agency Update Frequency: Varies	Agency Contact: 301-443-3593
Planned Next Contact: 11/25/2021	Most Recent Contact: 08/31/2021

RECORDS OF EMERGENCY RELEASE REPORTS

HMIRS (DOT): Hazardous Material spills reported by the Department of Transportation

Agency Version Date: 06/29/2021	Agency: U.S. Department of Transportation
Agency Update Frequency: Varies	Agency Contact: (202) 366-4996
Planned Next Contact: 12/22/2021	Most Recent Contact: 09/27/2021

HIST SPILLS - HI: List of oil and hazardous material spills report sites that are no longer in current agency list.

Agency Version Date: 07/17/2018	Agency: Hawaii State Department of Health
Agency Update Frequency: Annually	Agency Contact: 808-586-4249
Planned Next Contact: 11/12/2021	Most Recent Contact: 08/17/2021

RECORDS OF EMERGENCY RELEASE REPORTS (cont.)

HIST SPILLS 2 - HI: List of oil and hazardous material spills reported through June of 2015.

Agency Version Date: 08/06/2019	Agency: Hawaii State Department of Health
Agency Update Frequency: Varies	Agency Contact: 808-586-4249
Planned Next Contact: 11/22/2021	Most Recent Contact: 08/25/2021

SPILLS - HI: Incidents from the HEER Emergency Response System

Agency Version Date: 05/03/2021	Agency: Hawaii State Department of Health
Agency Update Frequency: Varies	Agency Contact: 808-586-4249
Planned Next Contact: 10/25/2021	Most Recent Contact: 07/29/2021

LOCAL LAND RECORDS

LIENS 2: Comprehensive Environmental Response Compensation and Liability Act sites with liens

Agency Version Date: 05/11/2017	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: 800-424-9346
Planned Next Contact: 12/20/2021	Most Recent Contact: 09/23/2021

OTHER ASCERTAINABLE RECORDS

AFS: Air Facility Systems Quarterly Extract

Agency Version Date: 08/10/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 11/04/2021	Most Recent Contact: 08/10/2021

ALT FUELING: Alternative Fueling Stations by fuel type.

Agency Version Date: 10/04/2021	Agency: U.S. Department of Energy
Agency Update Frequency: Quarterly	Agency Contact: N/R
Planned Next Contact: 12/29/2021	Most Recent Contact: 10/04/2021

BRS: Reporting of hazardous waste generation and management from large quantity generators

Agency Version Date: 10/05/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Biennial	Agency Contact: (202) 566-1667
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

CDC HAZDAT: The Agency for Toxic Substances and Disease Registry's Hazardous Substance Release/Health Effects Database.

Agency Version Date: 08/21/2020	Agency: Agency for Toxic Substances and Disease Registry
Agency Update Frequency: Varies	Agency Contact: 770-488-6399
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

COAL ASH DOE: List of existing and planned generators with 1 megawatt or greater of combined capacity that are utilizing coal ash impoundments.

Agency Version Date: 07/02/2021	Agency: Department of Energy
Agency Update Frequency: Varies	Agency Contact: (202) 586-8800
Planned Next Contact: 12/24/2021	Most Recent Contact: 09/29/2021

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

Agency Version Date: 02/18/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 11/05/2021	Most Recent Contact: 08/11/2021

OTHER ASCERTAINABLE RECORDS (cont.)

COAL GAS: Manufactured Gas Plant locations

Agency Version Date: 10/12/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 01/07/2022	Most Recent Contact: 10/12/2021

CONSENT (DECREES): Legal decisions regarding responsibility for Superfund locations

Agency Version Date: 08/06/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (800) 424-9346
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

CORRECTIVE ACTIONS 2020: In 2009 the EPA created the 2020 Corrective Action Baseline list of contaminated or potentially contaminated sites with a cleanup goal to complete 95% by the year 2020. The names on the list indicate the facility owners who may or may not have caused the contamination.

Agency Version Date: 12/21/2018	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: N/R
Planned Next Contact: 10/26/2021	Most Recent Contact: 07/30/2021

DEBRIS EPA LF: EPA list of designated landfill facilities for the safe disposal of disaster debris.

Agency Version Date: 07/23/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/20/2021	Most Recent Contact: 07/23/2021

DEBRIS EPA SWRCY: EPA list of facilities for the safe recovery, recycling, and disposal of disaster debris.

Agency Version Date: 07/23/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 855-246-3642
Planned Next Contact: 10/20/2021	Most Recent Contact: 07/23/2021

DOD: Department of Defense sites from the Protected Areas Database (PAD-US)

Agency Version Date: 08/06/2021	Agency: United States Geologic Survey (USGS)
Agency Update Frequency: Varies	Agency Contact: 1-888-275-8747
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

DOT OPS: Incident Data Report

Agency Version Date: 05/26/2021	Agency: U.S. Department of Transportation
Agency Update Frequency: Varies	Agency Contact: (202) 366-4996
Planned Next Contact: 11/18/2021	Most Recent Contact: 08/23/2021

ECHO: ECHO is EPA Enforcement and Compliance History Online website to search for facilities in your community to assess their compliance with environmental regulations related to CAA, CWA, RCRA, & SDWA.

Agency Version Date: 07/01/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 202-566-1667
Planned Next Contact: 12/24/2021	Most Recent Contact: 09/28/2021

ENOI: The Electronic Notice of Intent (eNOI) database contains construction sites and industrial facilities that submit permit requests to EPA for Construction General Permits (CGP) and Multi-Sector General Permits (MSGP).

Agency Version Date: 09/25/2020	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 12/10/2021	Most Recent Contact: 09/13/2021

OTHER ASCERTAINABLE RECORDS (cont.)

EPA FUELS: List of companies and facilities registered to participate in EPA Fuel Programs under Title 40 CFR Part 80.

Agency Version Date: 08/16/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 564-2307
Planned Next Contact: 11/11/2021	Most Recent Contact: 08/16/2021

EPA OSC: Listing of oil spills and hazardous substance release sites requiring EPA On-Site Coordinators.

Agency Version Date: 06/29/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 564-2307
Planned Next Contact: 12/21/2021	Most Recent Contact: 09/24/2021

EPA WATCH: The EPA Watch List was used to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. EPA maintained the lists from 2011 - 2013.

Agency Version Date: 02/09/2018	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: (202) 564-2307
Planned Next Contact: 12/20/2021	Most Recent Contact: 09/23/2021

FA HWF: Hazardous Waste Facilities with Financial Assurance

Agency Version Date: 07/15/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (800) 424-9346
Planned Next Contact: 01/06/2022	Most Recent Contact: 10/11/2021

FEDLAND: Federal land locations

Agency Version Date: 01/06/2020	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (800) 424-9346
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

FRS: Facility Registry Systems

Agency Version Date: 05/24/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 11/15/2021	Most Recent Contact: 08/19/2021

FTTS: Tracking of administrative and enforcement activities related to FIFRA/TSCA

Agency Version Date: 04/16/2013	Agency: Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: (202) 564-2280
Planned Next Contact: 01/05/2022	Most Recent Contact: 10/11/2021

FTTS INSP: Tracking of inspections related to FIFRA/TSCA

Agency Version Date: 05/08/2017	Agency: Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: (202) 564-2280
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

FUDS: Defense sites that require cleanup

Agency Version Date: 08/16/2021	Agency: US Army Corps of Engineering
Agency Update Frequency: Varies	Agency Contact: (202) 761-0011
Planned Next Contact: 11/11/2021	Most Recent Contact: 08/16/2021

OTHER ASCERTAINABLE RECORDS (cont.)

HIST AFS: List of Air Facility Systems Quarterly Extract that are no longer in current agency list.

Agency Version Date: 06/14/2019	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 12/20/2021	Most Recent Contact: 09/23/2021

HIST AFS 2: List of Air Facility Systems Quarterly Extract that are no longer in current agency list.

Agency Version Date: 11/26/2018	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 10/22/2021	Most Recent Contact: 07/28/2021

HIST DOD: Department of Defense historical sites

Agency Version Date: 08/17/2018	Agency: Environmental Protection Agency
Agency Update Frequency: No Longer Maintained	Agency Contact: (800) 424-9346
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

HIST LEAD_SMELTER: List of former lead smelter sites that is no longer in current agency list.

Agency Version Date: 12/12/2018	Agency: Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: (202) 566-1667
Planned Next Contact: 01/05/2022	Most Recent Contact: 10/11/2021

HIST MLTS: List of sites in possession/use of radioactive materials regulated by NRC that is no longer in current agency list.

Agency Version Date: 07/13/2016	Agency: Nuclear Regulatory Commission
Agency Update Frequency: Annually	Agency Contact: (800) 397-4209
Planned Next Contact: 10/19/2021	Most Recent Contact: 07/23/2021

HIST PCB TRANS: List of PCB Disposal Facilities that are no longer in current agency list.

Agency Version Date: 01/18/2018	Agency: Environmental Protection Agency
Agency Update Frequency: No Update	Agency Contact: (703) 308-8404
Planned Next Contact: 11/09/2021	Most Recent Contact: 08/13/2021

HIST PCS ENF: List of permitted facilities to discharge wastewater (Federal equivalent to NPDES) that are no longer in current agency list.

Agency Version Date: 12/08/2018	Agency: Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: (202) 564-6582
Planned Next Contact: 11/24/2021	Most Recent Contact: 08/30/2021

HIST PCS FACILITY: List of Permitted facilities to discharge wastewater (Federal equivalent to NPDES) that are no longer in current agency list.

Agency Version Date: 12/18/2018	Agency: Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: (202) 564-6582
Planned Next Contact: 11/24/2021	Most Recent Contact: 08/30/2021

HIST SSTS: List of tracking of facilities who produce pesticides and their quantity that are no longer in current agency list.

Agency Version Date: 02/13/2019	Agency: Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: (202) 566-1667
Planned Next Contact: 11/12/2021	Most Recent Contact: 08/17/2021

OTHER ASCERTAINABLE RECORDS (cont.)

HWC DOCKET: Listing of Federal facilities which are managing or have managed hazardous waste; or have had a release of hazardous waste.

Agency Version Date: 05/17/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 564-2307
Planned Next Contact: 11/09/2021	Most Recent Contact: 08/13/2021

ICIS: Comprised of all Federal Administrative and Judicial enforcement information [intended to replace PCS] by tracking enforcement and compliance information (also contains what used to be known as FFTS)

Agency Version Date: 07/07/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 12/28/2021	Most Recent Contact: 10/01/2021

INACTIVE PCS: Inactive Permitted facilities to discharge wastewater

Agency Version Date: 07/07/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 564-6582
Planned Next Contact: 12/28/2021	Most Recent Contact: 10/01/2021

INDIAN RESERVATION: American Indian Lands from the Protected Areas Database (PAD-US)

Agency Version Date: 07/15/2021	Agency: United States Geologic Survey (USGS)
Agency Update Frequency: Varies	Agency Contact: 1-888-275-8747
Planned Next Contact: 11/02/2021	Most Recent Contact: 07/15/2021

LUCIS: Land Use Control Information Systems

Agency Version Date: 09/24/2021	Agency: Department of the Navy: BRAC PMO
Agency Update Frequency: Quarterly	Agency Contact: (619) 532-0900
Planned Next Contact: 12/21/2021	Most Recent Contact: 09/24/2021

LUCIS 2: Land Use Control Information Systems

Agency Version Date: 01/17/2018	Agency: Department of the Navy: BRAC PMO
Agency Update Frequency: No Longer Maintained	Agency Contact: (619) 532-0900
Planned Next Contact: 11/09/2021	Most Recent Contact: 08/13/2021

MANIFEST EPA: EPA Hazardous Waste Electronic Manifest System (e-Manifest)

Agency Version Date: 08/16/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (202) 566-1667
Planned Next Contact: 11/12/2021	Most Recent Contact: 08/16/2021

MINES: Mines Master Index Files

Agency Version Date: 10/04/2021	Agency: Department of Labor
Agency Update Frequency: Varies	Agency Contact: (202) 693-9400
Planned Next Contact: 12/29/2021	Most Recent Contact: 10/04/2021

MINES USGS: Listing of all active mines and mineral plants in 2003

Agency Version Date: 10/05/2021	Agency: USGS Mineral Resources Program
Agency Update Frequency: Varies	Agency Contact: (703) 648-5953
Planned Next Contact: 12/30/2021	Most Recent Contact: 10/05/2021

OTHER ASCERTAINABLE RECORDS (cont.)

MLTS: Sites in possession/use of radioactive materials regulated by NRC

Agency Version Date: 07/30/2021	Agency: Nuclear Regulatory Commission
Agency Update Frequency: Varies	Agency Contact: (800) 397-4209
Planned Next Contact: 10/26/2021	Most Recent Contact: 07/30/2021

NPL AOC: Areas of Concern related to NPL remediation sites

Agency Version Date: 08/06/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: N/R
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

NPL LIENS: National Priority List of sites with Liens

Agency Version Date: 08/06/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: 703-603-8867
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

OSHA: OSHA's listing of inspections violations and fatality information

Agency Version Date: 07/05/2021	Agency: Occupational Safety & Health Administration
Agency Update Frequency: Varies	Agency Contact: 800-321-6742
Planned Next Contact: 12/27/2021	Most Recent Contact: 09/30/2021

PADS: Listing of generators transporters commercial store/ brokers and disposers of PCB

Agency Version Date: 08/06/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (703) 308-8404
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

PCB TRANSFORMER: Disposal and Storage of Polychlorinated Biphenyl (PCB) Waste

Agency Version Date: 05/24/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: (703) 308-8404
Planned Next Contact: 11/16/2021	Most Recent Contact: 08/20/2021

PCS ENF: Permitted facilities to discharge wastewater (Federal equivalent to NPDES)

Agency Version Date: 07/07/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 564-6582
Planned Next Contact: 12/28/2021	Most Recent Contact: 10/01/2021

PCS FACILITY: Permitted facilities to discharge wastewater (Federal equivalent to NPDES)

Agency Version Date: 07/07/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 564-6582
Planned Next Contact: 12/28/2021	Most Recent Contact: 10/01/2021

RAATS: Listing of major violators with enforcement actions issued under RCRA. Includes administrative and civil actions filed by the EPA. This dataset is no longer maintained.

Agency Version Date: 09/23/2019	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 10/26/2021	Most Recent Contact: 07/30/2021

RADINFO: EPA regulated facilities with radiation and radioactive materials

Agency Version Date: 08/01/2019	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 01/10/2022	Most Recent Contact: 10/14/2021

OTHER ASCERTAINABLE RECORDS (cont.)

RMP: Facilities producing/handling/ process/ distribute/ store specific chemicals report plans required by the Clean Air Act

Agency Version Date: 07/13/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Monthly	Agency Contact: (202) 564-2534
Planned Next Contact: 01/04/2022	Most Recent Contact: 10/08/2021

ROD: Permanent remedy at an NPL site

Agency Version Date: 08/06/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (800) 424-9346
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners

Agency Version Date: 06/14/2021	Agency: Environmental Protection Agency
Agency Update Frequency: No Update	Agency Contact: (202) 566-1667
Planned Next Contact: 12/06/2021	Most Recent Contact: 09/09/2021

SEMS_SMELTER: This report includes sites that have smelting-related, or potentially smelting-related, indicators in the SEMS database. The report includes information on the site location as well as contaminants of concern.

Agency Version Date: 08/06/2021	Agency: U.S. Environmental Protection Agency
Agency Update Frequency: Quarterly	Agency Contact: 703-603-8867
Planned Next Contact: 11/02/2021	Most Recent Contact: 08/06/2021

SSTS: Tracking of facilities who produce pesticides and their quantity

Agency Version Date: 09/14/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Annually	Agency Contact: (202) 566-1667
Planned Next Contact: 12/10/2021	Most Recent Contact: 09/14/2021

STORMWATER: Permitted storm water sites

Agency Version Date: 09/24/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 12/21/2021	Most Recent Contact: 09/24/2021

TOSCA-PLANT: Plants controlled by the Toxic Substance Control Act

Agency Version Date: 06/23/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 12/16/2021	Most Recent Contact: 09/20/2021

TRIS: Information regarding toxic chemicals that are being used/manufactured/ treated/ transported/released into the environment

Agency Version Date: 07/06/2021	Agency: Environmental Protection Agency
Agency Update Frequency: Varies	Agency Contact: (202) 566-1667
Planned Next Contact: 12/28/2021	Most Recent Contact: 10/01/2021

UMTRA: Uranium Recovery Sites

Agency Version Date: 07/08/2021	Agency: United States Nuclear Regulatory Commission
Agency Update Frequency: Varies	Agency Contact: (301) 415-8200
Planned Next Contact: 12/29/2021	Most Recent Contact: 10/04/2021

OTHER ASCERTAINABLE RECORDS (cont.)

VAPOR: EPA Vapor Intrusion Database

Agency Version Date: 03/19/2021
Agency Update Frequency: Varies
Planned Next Contact: 12/09/2021

Agency: U.S. Environmental Protection Agency
Agency Contact: 855-246-3642
Most Recent Contact: 09/13/2021

AIRS - HI: Facilities with air permits

Agency Version Date: 03/31/2021
Agency Update Frequency: Varies
Planned Next Contact: 12/07/2021

Agency: Hawai'i State Department of Health
Agency Contact: 808-586-4200
Most Recent Contact: 09/10/2021

DRYCLEANERS - HI: Drycleaner facility listing

Agency Version Date: 03/31/2021
Agency Update Frequency: Quarterly
Planned Next Contact: 12/07/2021

Agency: Hawai'i State Department of Health
Agency Contact: 808-586-4226
Most Recent Contact: 09/10/2021

SUBJECT PROPERTY ADDRESS:

Pueo Farm
68-431 Farrington Hwy
Waialua, HI 96791

SUBJECT PROPERTY COORDINATES:

Latitude(North):	21.578530 - 21°34'42.7"
Longitude(West):	-158.163985 - -158°9'50.3"
Universal Transverse Mercator:	Zone 4N
UTM X (Meters):	586549.05
UTM Y (Meters):	2386409.52

ELEVATION:

Elevation: 4 ft. above sea level

USGS TOPOGRAPHIC MAP:

Subject Property Map:	21158-E2 Kaena, HI
Most Recent Revision:	2017

GEOHYDROLOGY DATA:

SUBJECT PROPERTY TOPOGRAPHY:

Topographic Gradient: East

DFIRM FLOOD ZONE:

	DFIRM Flood
Subject Property County:	Electronic Data:
HONOLULU	Yes - refer to the PROPERTY PROXIMITY MAP and AREA MAP
Flood Plain Panel at Subject Property:	15003C0085F (Eff. date 9/30/2004)
Additional Panels in search area:	15003C0095F (Eff. date 9/30/2004) 15003C0105H (Eff. date 1/19/2011)

FEMA FLOOD ZONE:

	FEMA Flood
Subject Property County:	Electronic Data:
HONOLULU	Yes - refer to the PROPERTY PROXIMITY MAP and AREA MAP
Flood Plain Panel at Subject Property:	1500010040B
Additional Panels in search area:	1500010035B

NATIONAL WETLAND INVENTORY:

	NWI Electronic
<u>NWI Quad at Subject Property:</u>	<u>Data Coverage:</u>
Kaena	Yes - refer to the Geological Findings Map

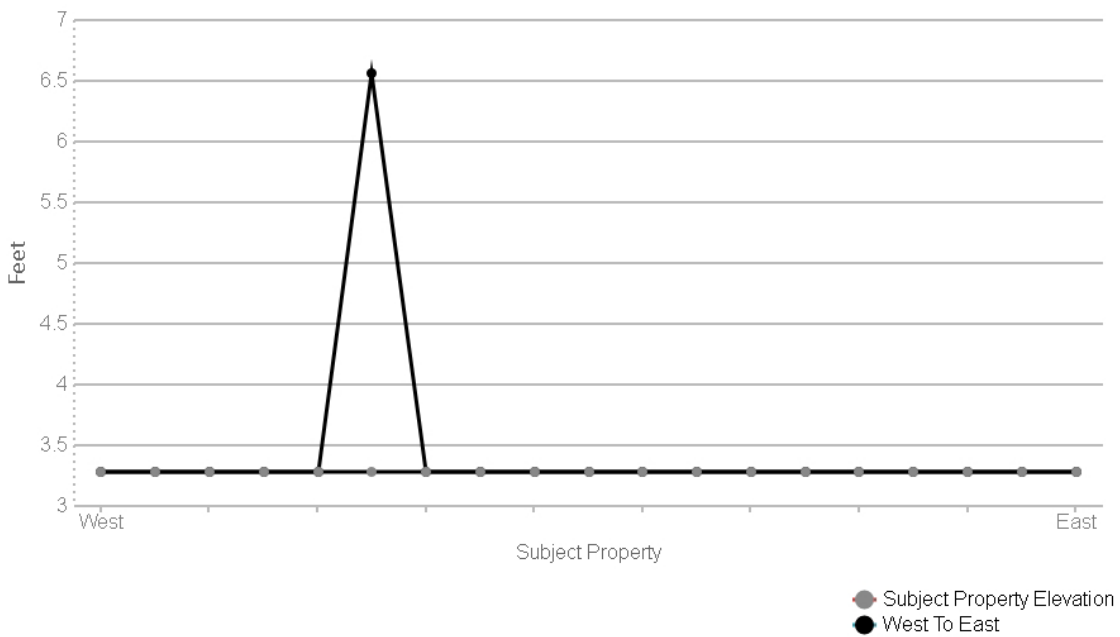
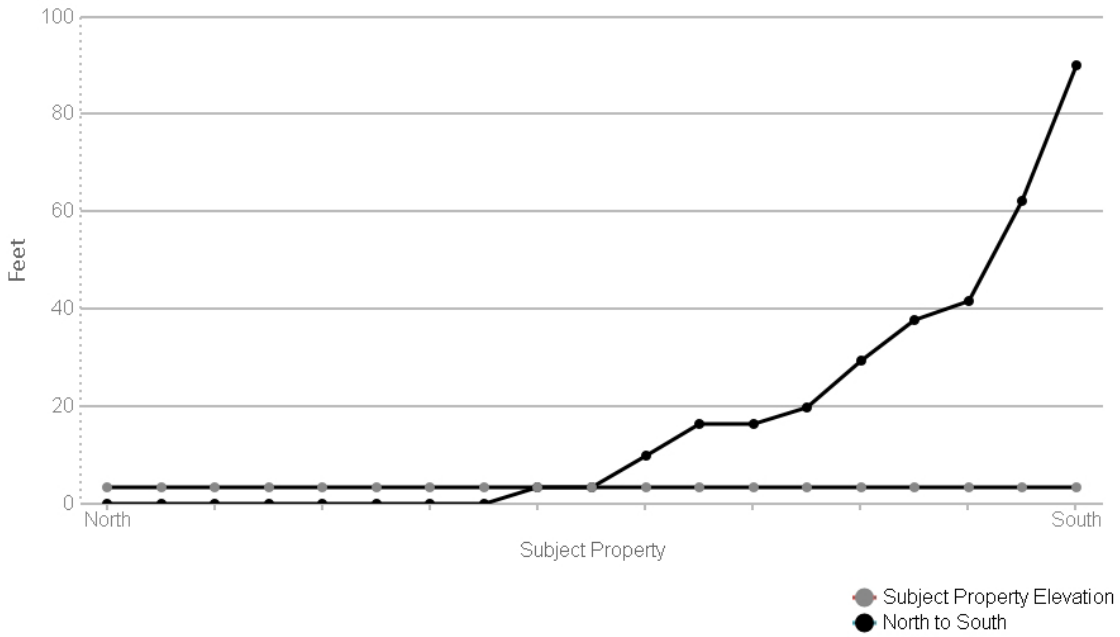
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ROCK STRATIGRAPHIC UNIT:

GEOLOGIC AGE IDENTIFICATION

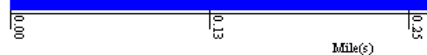
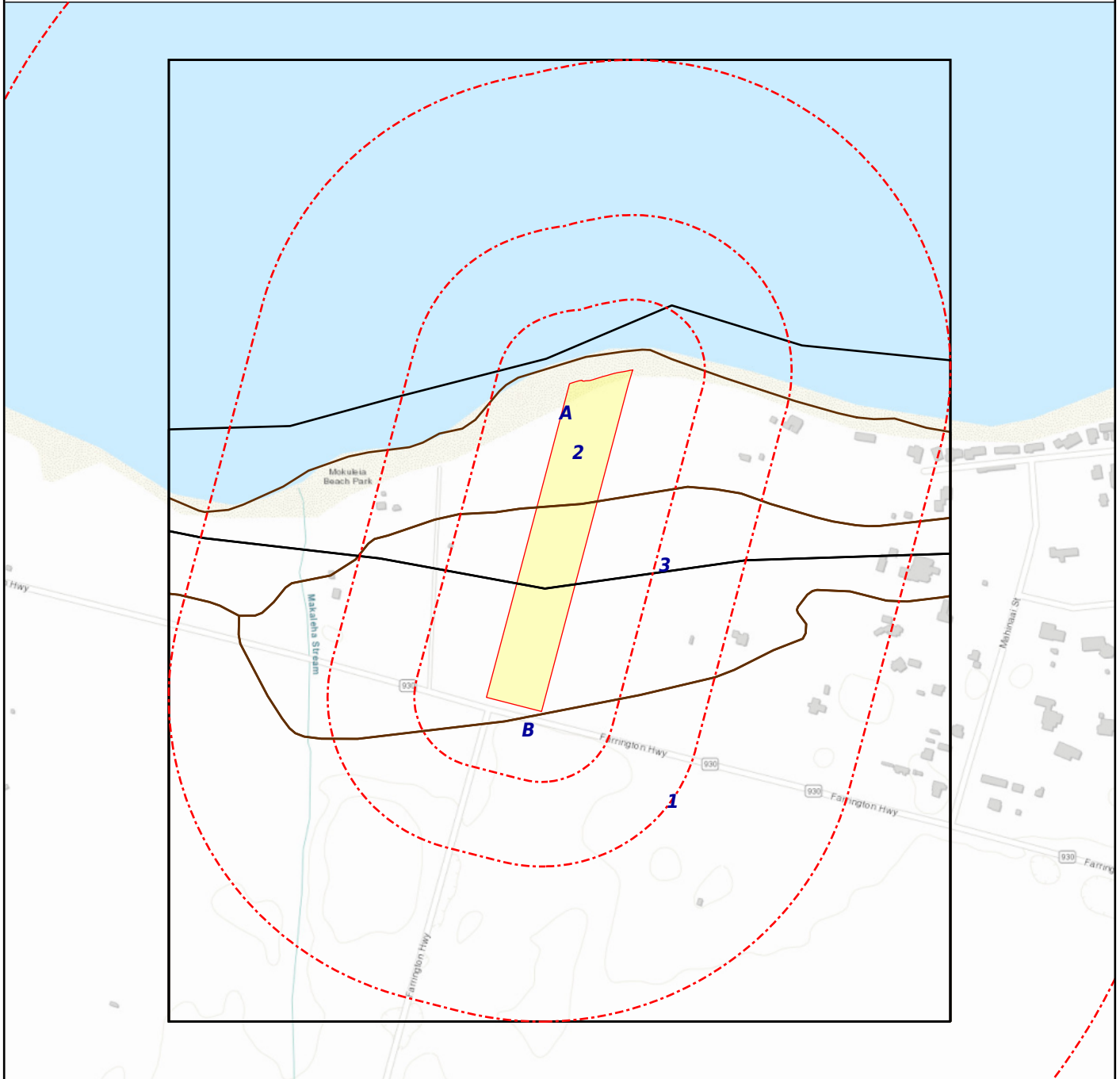
Era:	No available data	Category:	No available data
System:	No available data		
Series:	No available data		
Code:	No available data		

SURROUNDING ELEVATION PROFILES:



SUBJECT NAME: Pueo Farm
ADDRESS: 68-431 Farrington Hwy, Waialua, HI, 96791
LAT/LONG: 21.578530 / -158.163985

PREPARED FOR: Historical Information Gatherers
ORDER #: 62184
REPORT DATE: October 18, 2021



+ Subject Property - SSURGO - STATSGO

SOIL COMPOSITION IN GENERAL AREA OF SUBJECT PROPERTY:

Agency source: Soil Conservation Service, US Department of Agriculture

SOIL MAP ID 1

USDA Soil Name	Pulehu, Series
USDA Soil Texture	Clay loam
Hydrologic Soil Group	B
Soil Drainage Class	Well drained
Hydric Classification	0
Corrosion Potential - Uncoated Steel	Low

Layer	Depth (inches)	Soil Texture	AASHTO Group	Unified Soil Description	Saturated Hydraulic Conductivity micro m/sec	Soil Reaction pH
1	0-53	Clay loam	Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	FINE-GRAINED SOILS, Silts and clays (liquid limit is less than 50%), Lean Clay. Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	4.23-14.11	6.6-7.3
2	53-84	Loam	Silt-Clay materials (more than 35% passing No. 200) clayey soils. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	COARSE-GRAINED SOILS, Sands, sands with fines, Clayey Sand. Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	14.11-141.14	6.6-7.8
3	84-94	Loamy sand	Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand. Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and	14.11-141.14	6.6-7.8

Layer	Depth (inches)	Soil Texture	AASHTO Group	Unified Soil Description	Saturated Hydraulic Conductivity micro m/sec	Soil Reaction pH
3	84-94	Loamy sand	Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	14.11-141.14	6.6-7.8
4	94-119	Fine sandy loam	Silt-Clay materials (more than 35% passing No. 200) clayey soils. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	COARSE-GRAINED SOILS, Sands, sands with fines, Clayey Sand. Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	14.11-141.14	6.6-7.8
5	119-152	Silt loam	Silt-Clay materials (more than 35% passing No. 200) clayey soils. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	FINE-GRAINED SOILS, Silts and clays (liquid limit is less than 50%), Lean Clay. Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	14.11-141.14	6.6-7.8

SOIL MAP ID 2

USDA Soil Name	Jaucas, Series
USDA Soil Texture	Sand
Hydrologic Soil Group	A
Soil Drainage Class	Excessively drained
Hydric Classification	0
Corrosion Potential - Uncoated Steel	Low

Layer	Depth (inches)	Soil Texture	AASHTO Group	Unified Soil Description	Saturated Hydraulic Conductivity micro m/sec	Soil Reaction pH
1	0-33	Sand	Granular materials (35% or less passing No. 200), fine sand. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	42.34-141	6.6-7.3
2	33-56	Sand	Granular materials (35% or less passing No. 200), fine sand. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	42.34-141	6.6-8.4
3	56-152	Sand	Granular materials (35% or less passing No. 200), fine sand. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984).	Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	42.34-141	6.6-8.4

SOIL MAP ID 3

USDA Soil Name	Mokuleia, Series
USDA Soil Texture	Clay loam
Hydrologic Soil Group	B
Soil Drainage Class	Well drained
Hydric Classification	0
Corrosion Potential - Uncoated Steel	High

Layer	Depth (inches)	Soil Texture	AASHTO Group	Unified Soil Description	Saturated Hydraulic Conductivity micro m/sec	Soil Reaction pH
1	0-41	Clay loam	Silt-Clay materials (more than 35% passing No. 200), clayey soils. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984.	FINE-GRAINED SOILS, Silts and clays (liquid limit is less than 50%), Lean Clay. Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	4.23-14	6.6-7.3
2	41-150	Sand	Granular materials (35% or less passing No. 200), fine sand. Reference: This is a classification of soil material for highway and airfield construction (Procedure M 145-73 in Am. Assoc. of State Highway and Transportation Officials, 1984.	Reference: This is a classification of soil material designed for general construction purposes. It is dependent on the particle size distribution of the <75 mm, the liquid limit, and the plasticity index and on whether the soil material is high in organic matter (ASTM test D 2487, in ASTM, 1984).	42.34-141	7.9-8.4

SOIL MAP ID A

USDA Soil Name	Lithic Ustorthents, Taxon above family
USDA Soil Texture	Not Reported
Hydrologic Soil Group	D
Soil Drainage Class	Well drained
Hydric Classification	6
Corrosion Potential - Uncoated Steel	High

Layer	Depth (inches)	Soil Texture	AASHTO Group	Unified Soil Description	Saturated Hydraulic Conductivity micro m/sec	Soil Reaction pH
1	0-6		No data	No data	1.4114-14.1143	6.1-7.3
2	6-60	Silty clay	No data	No data	1.4114-14.1143	6.1-7.3
3	60-64		No data	No data	0.4234-14.1143	No data

SOIL MAP ID B

USDA Soil Name	Kawaihapai, Series
USDA Soil Texture	Clay loam
Hydrologic Soil Group	B
Soil Drainage Class	Well drained
Hydric Classification	0
Corrosion Potential - Uncoated Steel	Moderate

Layer	Depth (inches)	Soil Texture	AASHTO Group	Unified Soil Description	Saturated Hydraulic Conductivity micro m/sec	Soil Reaction pH
1	0-22	Clay loam	No data	No data	4.2343-14.1143	6.6-7.3
2	22-32	Sandy loam	No data	No data	14.1143-42.343	6.6-7.3
3	32-54	Sand	No data	No data	14.1143-42.343	6.6-7.3

WATER AGENCY DATA:

WATER AGENCY SEARCH DISTANCES:

<u>DATABASE:</u>	<u>SEARCH DISTANCE (MILES):</u>
NWIS	1.000
PWS	1.000

<u>DISTANCE TO NEAREST:</u>	<u>DISTANCE:</u>
NWIS	0.080 mi / 424 ft
PWS	N/A

FEDERAL WATER AGENCY DATA SUMMARY:

<u>MAP ID:</u>	<u>WELL ID:</u>	<u>LOCATION FROM SP:</u>
1	213443158100301	< 1/8 Mile SSW
2	213442158095501	1/8 - 1/4 Mile SSE
3	213438158100301	1/8 - 1/4 Mile S
A4	213439158095401 213439158095402	1/8 - 1/4 Mile SSE
A5	213439158091101	1/8 - 1/4 Mile SSE
6	213433158095901	1/4 - 1/2 Mile S
7	213432158100701	1/4 - 1/2 Mile SSW
8	213435158101701	1/4 - 1/2 Mile SW
B9	213442158093801	1/4 - 1/2 Mile ESE
B10	213442158093701	1/4 - 1/2 Mile ESE
B11	213442158093601	1/4 - 1/2 Mile ESE
B12	213442158093501	1/4 - 1/2 Mile ESE
13	213428158102001	1/4 - 1/2 Mile SW
14	213436158102801	1/4 - 1/2 Mile SW
15	213421158100301	1/4 - 1/2 Mile S
C16	213421158095701	1/2 - 1 Mile S
C17	213421158095401	1/2 - 1 Mile S
18	213421158100901	1/2 - 1 Mile SSW
19	213445158093101	1/2 - 1 Mile ESE
20	213441158093201	1/2 - 1 Mile ESE
21	213423158094401	1/2 - 1 Mile SSE
22	213441158103801	1/2 - 1 Mile WSW

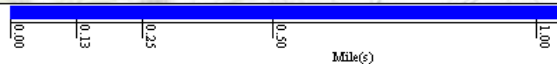
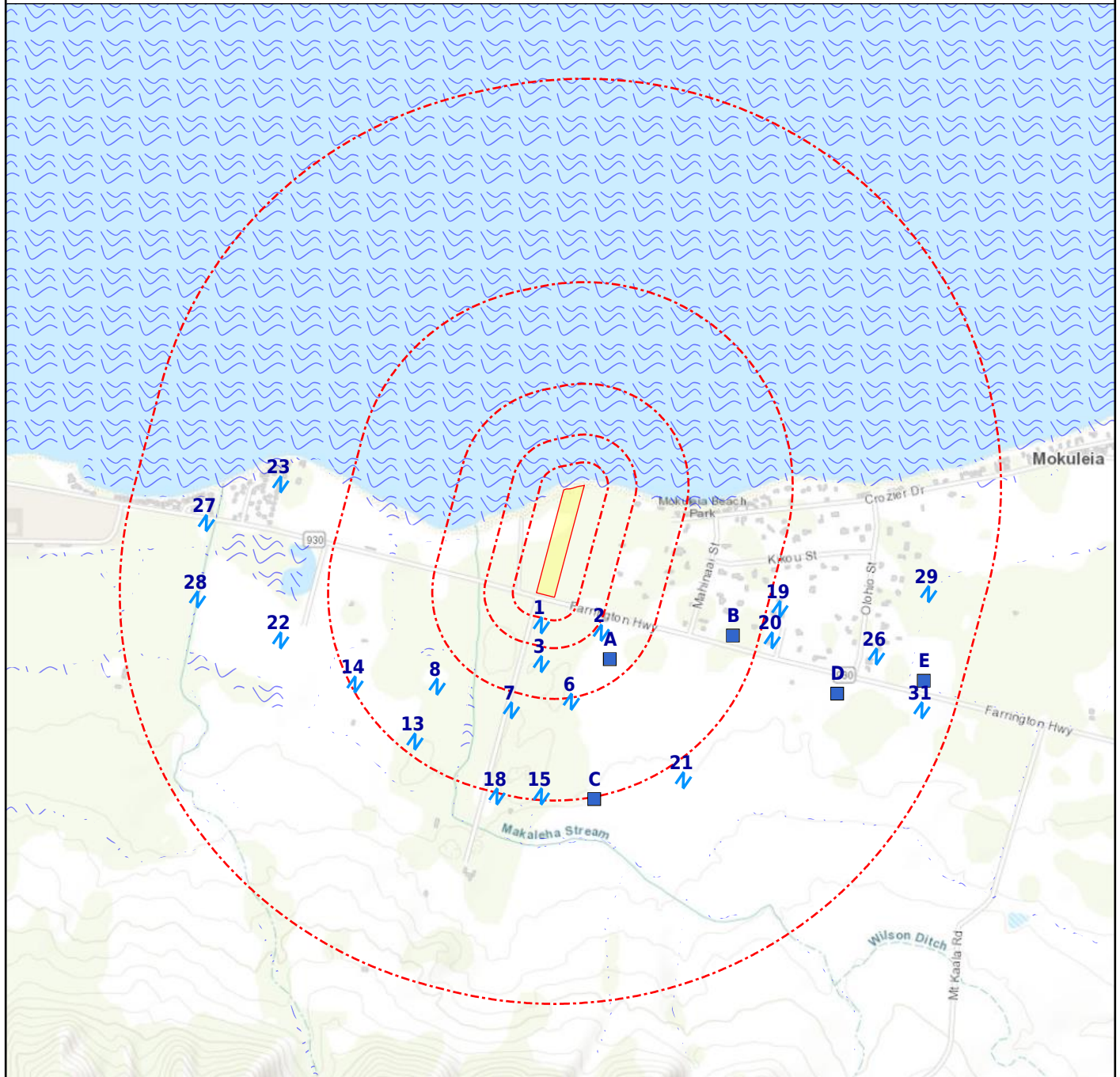
FEDERAL WATER AGENCY DATA SUMMARY: (cont.)

<u>MAP ID:</u>	<u>WELL ID:</u>	<u>LOCATION FROM SP:</u>
23	213501158103801	1/2 - 1 Mile W
D24	213435158092301	1/2 - 1 Mile ESE
D25	213434158092301	1/2 - 1 Mile ESE
26	213439158091801	1/2 - 1 Mile ESE
27	213456158104801	1/2 - 1 Mile W
28	213446158104901	1/2 - 1 Mile W
29	213447158091101	1/2 - 1 Mile E
E30	213426158090201	1/2 - 1 Mile ESE
31	213432158091201	1/2 - 1 Mile ESE
E32	213435158091101	1/2 - 1 Mile ESE
E33	213438158091101	1/2 - 1 Mile ESE

Note: PWS System location is not always the same as well location.

SUBJECT NAME: Pueo Farm
 ADDRESS: 68-431 Farrington Hwy, Waialua, HI, 96791
 LAT/LONG: 21.578530 / -158.163985

PREPARED FOR: Historical Information Gatherers
 ORDER #: 62184
 REPORT DATE: October 18, 2021



- + Subject Property
 - N NWI
- Basins (No Data)
 - N NWIS
- Geologic Cluster with Water Well
- Geological Site

Map Id: 3
 Direction: S
 Distance: 0.173 mi., 916 ft.
 Elevation: 17 ft.
 Relative: Higher

Site Name : 213438158100301
 21.574072, -158.164739
 HI
Database(s) : [NWIS]

Envirosite ID: 16651992
EPA ID: N/R

NWIS

Site Identification Number :	213438158100301
Site Type :	Well
Station Name :	3-3410-05 W293
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	15.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	N/R
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Data have been checked by the reporting agency.
Data-Other GW Files :	YYNNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	506
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.574072
Longitude :	-158.164739
Last Date in Agency List :	2021-10-11

Map Id: A4
Direction: SSE
Distance: 0.195 mi., 1032 ft.
Elevation: 20 ft.
Relative: Higher

Site Name : 213439158095401 | 213439158095402
21.57435, -158.162239
HI
Database(s) : [NWIS]

Envirosite ID: 16666383
EPA ID: N/R

NWIS

Site Identification Number : 213439158095402
 Site Type : Multiple wells
 Station Name : 3-3409-01, 13 W296 A-B WSCO P11A,11B OAHU
 Agency : U.S. Geological Survey
 District : N/R
 State : HI
 County : Honolulu County
 Country : USA
 Land Net Location : N/R
 Name of Location Map : N/R
 Scale of Location Map : N/R
 Altitude of Gage/Land Surface : N/R
 Method Altitude Determined : N/R
 Altitude Accuracy : N/R
 Altitude Datum : N/R
 Hydrologic Unit : Oahu
 Drainage Basin : N/R
 Topographic Setting : N/R
 Flags for the Type of Data Collected: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 Flags for Instruments at Site : NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 Date of First Construction : N/R
 Date Site Established or Inventoried: N/R
 Drainage Area : N/R
 Contributing Drainage Area : N/R
 Data Reliability : Data have been checked by the reporting agency.
 Data-Other GW Files : NYNNNNNN
 National Aquifer : Hawaii volcanic-rock aquifers
 Local Aquifer : N/R
 Local Aquifer Type : N/R
 Well Depth : N/R
 Hole Depth : N/R
 Source of Depth Data : N/R
 Project Number : N/R
 Real-Time Data Flag : 0
 Peak-Streamflow Data Begin Date : N/R
 Peak-Streamflow Data End Date : N/R
 Peak-Streamflow Data Count : 0
 Water-Quality Data Begin Date : 1978-02-01
 Water-Quality Data End Date : 1980-09-01
 Water-Quality Data Count : 32
 Field Water-Level Measurements Begin Date: N/R
 Field Water-level Measurements End Date: N/R
 Field Water-Level Measurements Count: 0
 Site-Visit Data Begin Date : N/R
 Site-Visit Data End Date : N/R
 Site-Visit Data Count : 0
 Latitude : 21.57435
 Longitude : -158.162239
 Last Date in Agency List : 2021-10-11

Site Identification Number : 213439158095401
 Site Type : Well
 Station Name : 3-3409-01 W296-A
 Agency : U.S. Geological Survey

Geological Landscape Section Map Findings

2021

Map Id: A4
 Direction: SSE
 Distance: 0.195 mi., 1032 ft.
 Elevation: 20 ft.
 Relative: Higher

Site Name : 213439158095401 | 213439158095402
 21.57435, -158.162239
 HI

Database(s) : [NWIS] (*cont.*)

Envirosite ID: 16666383
 EPA ID: N/R

NWIS (*cont.*)

District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	16.60
Method Altitude Determined :	Level or other surveyed method.
Altitude Accuracy :	.1
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	Flat surface
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1914-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	488
Hole Depth :	488
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.57435
Longitude :	-158.162239
Last Date in Agency List :	2021-10-11

Map Id: A5
 Direction: SSE
 Distance: 0.207 mi., 1095 ft.
 Elevation: 20 ft.
 Relative: Higher

Site Name : 213439158091101
 21.57435, -158.161961
 HI
Database(s) : [NWIS]

Envirosite ID: 16651997
EPA ID: N/R

NWIS

Site Identification Number :	213439158091101
Site Type :	Well
Station Name :	3-3409-13 W296-B
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	16.60
Method Altitude Determined :	Level or other surveyed method.
Altitude Accuracy :	.1
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	Flat surface
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1913-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Data have been checked by the reporting agency.
Data-Other GW Files :	YYNNYYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	549
Hole Depth :	560
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1938-01-17
Field Water-level Measurements End Date:	1939-09-13
Field Water-Level Measurements Count:	2
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.57435
Longitude :	-158.161961
Last Date in Agency List :	2021-10-11

Map Id: 6
 Direction: S
 Distance: 0.268 mi., 1415 ft.
 Elevation: 20 ft.
 Relative: Higher

Site Name : 213433158095901
 21.572683, -158.163628
 HI
Database(s) : [NWIS]

Envirosite ID: 16666375
EPA ID: N/R

NWIS

Site Identification Number :	213433158095901
Site Type :	Well
Station Name :	3-3409-18 T95
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	21
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	40
Hole Depth :	N/R
Source of Depth Data :	D
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1962-09-27
Field Water-level Measurements End Date:	1962-09-27
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.572683
Longitude :	-158.163628
Last Date in Agency List :	2021-10-11

Map Id: 7
 Direction: SSW
 Distance: 0.303 mi., 1598 ft.
 Elevation: 17 ft.
 Relative: Higher

Site Name : 213432158100701
 21.572406, -158.16585
 HI
Database(s) : [NWIS]

Envirosite ID: 16666371
EPA ID: N/R

NWIS

Site Identification Number :	213432158100701
Site Type :	Well
Station Name :	3-3410-04 W292
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	12
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	N/R
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNYYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	488
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1934-09-22
Field Water-level Measurements End Date:	1934-09-22
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.572406
Longitude :	-158.16585
Last Date in Agency List :	2021-10-11

Map Id: B9
 Direction: ESE
 Distance: 0.421 mi., 2221 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : 213442158093801
 21.575183, -158.157794
 HI
Database(s) : [NWIS]

Envirosite ID: 16652007
EPA ID: N/R

NWIS

Site Identification Number :	213442158093801
Site Type :	Well
Station Name :	3-3409-04 W298
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	12
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNYYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	588
Hole Depth :	N/R
Source of Depth Data :	D
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1937-02-17
Field Water-level Measurements End Date:	1937-02-17
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.575183
Longitude :	-158.157794
Last Date in Agency List :	2021-10-11

Map Id: B12
Direction: ESE
Distance: 0.472 mi., 2494 ft.
Elevation: 7 ft.
Relative: Higher

Site Name : 213442158093501 21.575183, -158.156961 HI
Database(s) : [NWIS]

Envirosite ID: 16652003
EPA ID: N/R

NWIS

Site Identification Number :	213442158093501
Site Type :	Well
Station Name :	3-3409-17 W300
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	17.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1937-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Data have been checked by the reporting agency.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	587
Hole Depth :	604
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.575183
Longitude :	-158.156961
Last Date in Agency List :	2021-10-11

Map Id: 13
 Direction: SW
 Distance: 0.476 mi., 2514 ft.
 Elevation: 14 ft.
 Relative: Higher

Site Name :	213428158102001 21.571297, -158.169461 HI
Database(s) :	[NWIS]

Envirosite ID: 16651978
EPA ID: N/R

NWIS

Site Identification Number :	213428158102001
Site Type :	Well
Station Name :	3-3410-07 W295
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	16.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	N/R
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	N/R
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.571297
Longitude :	-158.169461
Last Date in Agency List :	2021-10-11

Map Id: 14
Direction: SW
Distance: 0.495 mi., 2616 ft.
Elevation: 7 ft.
Relative: Higher

Site Name : 213436158102801 21.573333, -158.171667 HI
Database(s) : [NWIS]

EnviroSite ID: 16642777
EPA ID: N/R

NWIS

Site Identification Number :	213436158102801
Site Type :	Well
Station Name :	3-3410-01 Mokuleia W288, Oahu, HI
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	11
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	N/R
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Data have been checked by the reporting agency.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	426
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.573333
Longitude :	-158.171667
Last Date in Agency List :	2021-10-11

Map Id: 15
Direction: S
Distance: 0.497 mi., 2625 ft.
Elevation: 34 ft.
Relative: Higher

Site Name : 213421158100301 21.56935, -158.164739 HI
Database(s) : [NWIS]

Envirosite ID: 16666367
EPA ID: N/R

NWIS

Site Identification Number :	213421158100301
Site Type :	Well
Station Name :	3-3410-12 T111
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	35.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	30.0
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.56935
Longitude :	-158.164739
Last Date in Agency List :	2021-10-11

Map Id: C16
 Direction: S
 Distance: 0.501 mi., 2645 ft.
 Elevation: 43 ft.
 Relative: Higher

Site Name : 213421158095701
 21.56935, -158.163072
 HI
Database(s) : [NWIS]

Envirosite ID: 16666365
EPA ID: N/R

NWIS

Site Identification Number :	213421158095701
Site Type :	Well
Station Name :	3-3409-23 T110
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	45.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	30.0
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.56935
Longitude :	-158.163072
Last Date in Agency List :	2021-10-11

Map Id: C17
 Direction: S
 Distance: 0.511 mi., 2700 ft.
 Elevation: 47 ft.
 Relative: Higher

Site Name : 213421158095401
 21.56935, -158.162239
 HI
Database(s) : [NWIS]

Envirosite ID: 16666364
EPA ID: N/R

NWIS

Site Identification Number :	213421158095401
Site Type :	Well
Station Name :	3-3409-22 T109
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	40.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	20.0
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.56935
Longitude :	-158.162239
Last Date in Agency List :	2021-10-11

Map Id: 18
 Direction: SSW
 Distance: 0.516 mi., 2723 ft.
 Elevation: 30 ft.
 Relative: Higher

Site Name : 213421158100901
 21.569353, -158.166406
 HI
Database(s) : [NWIS]

Envirosite ID: 16666368
EPA ID: N/R

NWIS

Site Identification Number :	213421158100901
Site Type :	Well
Station Name :	3-3410-03 W291
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	29
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	10
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	N/R
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Data have been checked by the reporting agency.
Data-Other GW Files :	YYNNYYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	N/R
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1934-09-22
Field Water-level Measurements End Date:	1934-09-22
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.569353
Longitude :	-158.166406
Last Date in Agency List :	2021-10-11

Map Id: 19
Direction: ESE
Distance: 0.527 mi., 2784 ft.
Elevation: 4 ft.
Relative: Equal

Site Name :	213445158093101 21.576017, -158.15585 HI
Database(s) :	[NWIS]

Envirosite ID: 16666392
EPA ID: N/R

NWIS

Site Identification Number :	213445158093101
Site Type :	Well
Station Name :	3-3409-06 W302
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	11.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	647
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.576017
Longitude :	-158.15585
Last Date in Agency List :	2021-10-11

Map Id: 20
 Direction: ESE
 Distance: 0.529 mi., 2793 ft.
 Elevation: 11 ft.
 Relative: Higher

Site Name : 213441158093201
 21.574906, -158.156128
 HI
Database(s) : [NWIS]

Envirosite ID: 16652000
EPA ID: N/R

NWIS

Site Identification Number :	213441158093201
Site Type :	Well
Station Name :	3-3409-07 W303
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	16
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	587
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1937-08
Field Water-level Measurements End Date:	1937-08
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.574906
Longitude :	-158.156128
Last Date in Agency List :	2021-10-11

Map Id: 21
 Direction: SSE
 Distance: 0.549 mi., 2898 ft.
 Elevation: 41 ft.
 Relative: Higher

Site Name : 213423158094401
 21.569906, -158.159461
 HI
Database(s) : [NWIS]

Envirosite ID: 16651970
EPA ID: N/R

NWIS

Site Identification Number :	213423158094401
Site Type :	Well
Station Name :	3-3409-21 T108
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	40.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	10.0
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.569906
Longitude :	-158.159461
Last Date in Agency List :	2021-10-11

Map Id: 22
 Direction: WSW
 Distance: 0.629 mi., 3324 ft.
 Elevation: 7 ft.
 Relative: Higher

Site Name : 213441158103801
 21.574908, -158.174461
 HI
Database(s) : [NWIS]

Envirosite ID: 16652001
EPA ID: N/R

NWIS

Site Identification Number :	213441158103801
Site Type :	Well
Station Name :	3-3410-09 W287
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	11.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	443
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.574908
Longitude :	-158.174461
Last Date in Agency List :	2021-10-11

Map Id: D24
Direction: ESE
Distance: 0.715 mi., 3775 ft.
Elevation: 7 ft.
Relative: Higher

Site Name :	213435158092301 21.573239, -158.153631 HI
Database(s) :	[NWIS]

Envirosite ID: 16651989
EPA ID: N/R

NWIS

Site Identification Number :	213435158092301
Site Type :	Well
Station Name :	3-3409-12 W304
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	13.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1899-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	533
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.573239
Longitude :	-158.153631
Last Date in Agency List :	2021-10-11

Map Id: D25
 Direction: ESE
 Distance: 0.721 mi., 3808 ft.
 Elevation: 8 ft.
 Relative: Higher

Site Name : 213434158092301
 21.572961, -158.153631
 HI
Database(s) : [NWIS]

Envirosite ID: 16666381
EPA ID: N/R

NWIS

Site Identification Number :	213434158092301
Site Type :	Well
Station Name :	3-3409-14 W305
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	12.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NN
Flags for Instruments at Site :	NN
Date of First Construction :	1917-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	542
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.572961
Longitude :	-158.153631
Last Date in Agency List :	2021-10-11

Map Id: 26
 Direction: ESE
 Distance: 0.780 mi., 4121 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : 213439158091801
 21.57435, -158.152242
 HI
Database(s) : [NWIS]

Envirosite ID: 16666382
EPA ID: N/R

NWIS

Site Identification Number :	213439158091801
Site Type :	Well
Station Name :	3-3409-08 W306
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	7.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	1
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	584
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.57435
Longitude :	-158.152242
Last Date in Agency List :	2021-10-11

Map Id: 27
 Direction: W
 Distance: 0.813 mi., 4291 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : 213456158104801
 21.579075, -158.177239
 HI
Database(s) : [NWIS]

Envirosite ID: 16652023
EPA ID: N/R

NWIS

Site Identification Number :	213456158104801
Site Type :	Well
Station Name :	3-3410-11 T94
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	7
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	1
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	90
Hole Depth :	N/R
Source of Depth Data :	D
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1962-09-20
Field Water-level Measurements End Date:	1962-09-20
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.579075
Longitude :	-158.177239
Last Date in Agency List :	2021-10-11

Map Id: 28
 Direction: W
 Distance: 0.818 mi., 4320 ft.
 Elevation: 7 ft.
 Relative: Higher

Site Name : 213446158104901
 21.576389, -158.177583
 HI
Database(s) : [NWIS]

Envirosite ID: 16643356
EPA ID: N/R

NWIS

Site Identification Number :	213446158104901
Site Type :	Well
Station Name :	3-3410-08 Kawaihapai, Mokuleia, Oahu, HI
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	11.54
Method Altitude Determined :	Level or other surveyed method.
Altitude Accuracy :	.01
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	Flat surface
Flags for the Type of Data Collected:	NANNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Data have been checked by the reporting agency.
Data-Other GW Files :	YYNYNYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	Waianae Volcanic Series, Lava Flows
Local Aquifer Type :	Confined single aquifer
Well Depth :	447
Hole Depth :	447
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	1973-06-18
Water-Quality Data End Date :	2008-10-15
Water-Quality Data Count :	174
Field Water-Level Measurements Begin Date:	1929-02-26
Field Water-level Measurements End Date:	2008-10-15
Field Water-Level Measurements Count:	772
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.576389
Longitude :	-158.177583
Last Date in Agency List :	2021-10-11

Map Id: 29
 Direction: E
 Distance: 0.863 mi., 4557 ft.
 Elevation: 4 ft.
 Relative: Equal

Site Name : 213447158091101
 21.576572, -158.150297
 HI
Database(s) : [NWIS]

Envirosite ID: 16666398
EPA ID: N/R

NWIS

Site Identification Number :	213447158091101
Site Type :	Well
Station Name :	3-3409-19 T96
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	9
Method Altitude Determined :	Reported method of determination.
Altitude Accuracy :	1
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNO
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1962-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNYNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	60
Hole Depth :	N/R
Source of Depth Data :	D
Project Number :	N/R
Real-Time Data Flag :	0
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	0
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	0
Field Water-Level Measurements Begin Date:	1962-09-24
Field Water-level Measurements End Date:	1962-09-24
Field Water-Level Measurements Count:	1
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	0
Latitude :	21.576572
Longitude :	-158.150297
Last Date in Agency List :	2021-10-11

Map Id: E30
 Direction: ESE
 Distance: 0.893 mi., 4717 ft.
 Elevation: 11 ft.
 Relative: Higher

Site Name : 213426158090201
 21.573889, -158.150556
 HI
Database(s) : [NWIS]

Envirosite ID: 16647178
EPA ID: N/R

NWIS

Site Identification Number :	213426158090201
Site Type :	Well
Station Name :	3-3409-24 MAF 1, Oahu, HI
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	15
Method Altitude Determined :	Interpolated from Digital Elevation Model
Altitude Accuracy :	5
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	N/R
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	Y
National Aquifer :	N/R
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	102
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.573889
Longitude :	-158.150556
Last Date in Agency List :	2021-10-11

Map Id: 31
 Direction: ESE
 Distance: 0.919 mi., 4855 ft.
 Elevation: 16 ft.
 Relative: Higher

Site Name :	213432158091201
	21.572406, -158.150575
	HI
Database(s) :	[NWIS]

Envirosite ID: 16651985
 EPA ID: N/R

NWIS

Site Identification Number :	213432158091201
Site Type :	Well
Station Name :	3-3409-02 W309
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	10.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1887-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	396
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.572406
Longitude :	-158.150575
Last Date in Agency List :	2021-10-11

Map Id: E32
 Direction: ESE
 Distance: 0.920 mi., 4861 ft.
 Elevation: 14 ft.
 Relative: Higher

Site Name : 213435158091101
 21.573239, -158.150297
 HI
Database(s) : [NWIS]

Envirosite ID: 16651988
 EPA ID: N/R

NWIS

Site Identification Number :	213435158091101
Site Type :	Well
Station Name :	3-3409-09 W307
Agency :	U.S. Geological Survey
District :	N/R
State :	HI
County :	Honolulu County
Country :	USA
Land Net Location :	N/R
Name of Location Map :	KAENA, HI
Scale of Location Map :	24000
Altitude of Gage/Land Surface :	7.00
Method Altitude Determined :	Interpolated from topographic map.
Altitude Accuracy :	2
Altitude Datum :	Local Mean Sea Level
Hydrologic Unit :	Oahu
Drainage Basin :	N/R
Topographic Setting :	N/R
Flags for the Type of Data Collected:	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Flags for Instruments at Site :	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
Date of First Construction :	1890-01-01
Date Site Established or Inventoried:	N/R
Drainage Area :	N/R
Contributing Drainage Area :	N/R
Data Reliability :	Unchecked data.
Data-Other GW Files :	YYNNNNNN
National Aquifer :	Hawaii volcanic-rock aquifers
Local Aquifer :	N/R
Local Aquifer Type :	N/R
Well Depth :	528
Hole Depth :	N/R
Source of Depth Data :	N/R
Project Number :	N/R
Real-Time Data Flag :	N/R
Peak-Streamflow Data Begin Date :	N/R
Peak-Streamflow Data End Date :	N/R
Peak-Streamflow Data Count :	N/R
Water-Quality Data Begin Date :	N/R
Water-Quality Data End Date :	N/R
Water-Quality Data Count :	N/R
Field Water-Level Measurements Begin Date:	N/R
Field Water-level Measurements End Date:	N/R
Field Water-Level Measurements Count:	N/R
Site-Visit Data Begin Date :	N/R
Site-Visit Data End Date :	N/R
Site-Visit Data Count :	N/R
Latitude :	21.573239
Longitude :	-158.150297
Last Date in Agency List :	2021-10-11

Map Id: E33
 Direction: ESE
 Distance: 0.930 mi., 4911 ft.
 Elevation: 13 ft.
 Relative: Higher

Site Name :	213438158091101 21.573361, -158.150111 HI
Database(s) :	[NWIS]

Envirosite ID: 16646599
 EPA ID: N/R

NWIS

Site Identification Number : 213438158091101
 Site Type : Well
 Station Name : 3-3409-16 Mokuleia, Oahu, HI
 Agency : U.S. Geological Survey
 District : N/R
 State : HI
 County : Honolulu County
 Country : USA
 Land Net Location : N/R
 Name of Location Map : KAENA, HI
 Scale of Location Map : 24000
 Altitude of Gage/Land Surface : 8
 Method Altitude Determined : Interpolated from topographic map.
 Altitude Accuracy : 5
 Altitude Datum : Local Mean Sea Level
 Hydrologic Unit : Oahu
 Drainage Basin : N/R
 Topographic Setting : Flat surface
 Flags for the Type of Data Collected: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 Flags for Instruments at Site : NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 Date of First Construction : N/R
 Date Site Established or Inventoried: N/R
 Drainage Area : N/R
 Contributing Drainage Area : N/R
 Data Reliability : Data have been checked by the reporting agency.
 Data-Other GW Files : YYNYNYNN
 National Aquifer : Hawaii volcanic-rock aquifers
 Local Aquifer : Waianae Volcanic Series, Lava Flows
 Local Aquifer Type : Confined single aquifer
 Well Depth : 518
 Hole Depth : 518
 Source of Depth Data : N/R
 Project Number : N/R
 Real-Time Data Flag : 0
 Peak-Streamflow Data Begin Date : N/R
 Peak-Streamflow Data End Date : N/R
 Peak-Streamflow Data Count : 0
 Water-Quality Data Begin Date : 1972-04-28
 Water-Quality Data End Date : 1984-08-10
 Water-Quality Data Count : 91
 Field Water-Level Measurements Begin Date: 1924-12-19
 Field Water-level Measurements End Date: 2017-08-23
 Field Water-Level Measurements Count: 793
 Site-Visit Data Begin Date : N/R
 Site-Visit Data End Date : N/R
 Site-Visit Data Count : 0
 Latitude : 21.573361
 Longitude : -158.150111
 Last Date in Agency List : 2021-10-11

RADON DATA:

STATE SOURCE: No Available Data

FEDERAL AREA RADON INFORMATION FOR: 96791

NUMBER OF SAMPLE SITES: 1

<u>Area:</u>	<u>Average Activity:</u>	<u>% <4 pCi/L:</u>	<u>% 4-20 pCi/L:</u>	<u>% >20 pCi/L:</u>
basement	0 pCi/L	100%	0%	0%

FEDERAL EPA RADON ZONE FOR HONOLULU COUNTY: Zone = 3

Note: Zone 1 indoor average level > 4 pCi/L

: Zone 2 indoor average level > = 2 pCi/L and <= 4 pCi/L

: Zone 3 indoor average < 2 pCi/L

HIST PWS ENF

Historical Public Water Supply locations with Enforcement Violations

Environmental Protection Agency

(800) 426-4791

List of Safe Drinking Water Information Systems (SDWIS) with enforcement violations that are no longer in current agency list.

NWIS

National Water Information Systems

United States Geological Society

(703) 648-5953

Information on all water resources for the United States. This database contains all current and historical data for the nation.

PWS

Public Water Supply

Environmental Protection Agency

(800) 426-4791

Safe drinking water information Systems

PWS ENF

Public Water Supply locations with Enforcement Violations

Environmental Protection Agency

(800) 426-4791

Safe drinking water information Systems with enforcement violations

FLOOD Q3

Flood data

Environmental Protection Agency

(202) 566-1667

Q3 Flood Data

HYDROLOGIC UNIT

Hydrologic Unit Maps

USGS

The United States Geological Survey created a hierarchical system of hydrologic units originally called regions, sub-regions, accounting units, and cataloging units. Each unit was assigned a unique Hydrologic Unit Code (HUC). As first implemented the system had 21 regions, 221 subregions, 378 accounting units, and 2,264 cataloging units. Over time the system was changed and expanded. As of 2010 there are six levels in the hierarchy, represented by hydrologic unit codes from 2 to 12 digits long, called regions, subregions, basins, subbasins, watersheds, and subwatersheds. The table below describes the system's hydrologic unit levels and their characteristics, along with example names and codes.

WETLANDS NWI

National Wetland Inventory

U.S. Fish and Wildlife Service

(703) 358-2171

Wetland Inventory for the United States

SSURGO

Detailed Soil Data Map

Natural Resources Conservation Service: U.S. Department of Agriculture

(202) 690-4985

Detailed Soil Data Map

STATSGO & MUI

General Soil Data Map

Natural Resources Conservation Service: U.S. Department of Agriculture
(202) 690-4985

General Soil Data Map

USGS GEOLOGIC AGE

USGS Digital Data Series DDS

Natural Resources Conservation Service: U.S. Department of Agriculture
(202) 690-4985

USGS Digital Data Series DDS: Geologic Age and Rock Stratigraphic Unit

RADON

National Radon Database

U.S. Environmental Protection Agency

215-814-2469

A study of the EPA/State Residential Radon Survey and the National Residential Radon Survey.

RADON EPA

RADON EPA

U.S. Environmental Protection Agency

215-814-2469

EPA list of Radon zones

AIRPORT FACILITIES

Airport landing facilities

Federal Aviation Administration

(866) 835-5322

Airport landing facilities

BASINS

Better Assessment Science Integrating point & Non-point Sources

U.S. Environmental Protection Agency

855-246-3642

Integrated geographical information system national watershed data and environmental assessment known as Better Assessment Science Integrating point & Non-point Sources

DIGITAL OBSTACLE

Obstacles of interest to aviation users

Federal Aviation Administration

855-379-6518

The Digital Obstacle File describes all known obstacles of interest to aviation users in the U.S. with limited coverage of the Pacific the Caribbean Canada and Mexico. The obstacles are assigned unique numerical identifiers; accuracy codes and listed in order of ascending latitude within each state or area by FAA Region.

EPICENTERS

National Geographical Data Center

National Geographical Data Center

303-497-6826

List of recent and historic earthquakes and information.

FLOOD DFIRM

National Flood Hazard Layer Database

Federal Emergency Management Agency

The National Flood Hazard Layer Database (NFHL) is a computer database that contains the flood hazard map information from FEMA's Flood Map Modernization program. These map data are from Digital Flood Insurance Rate Map (DFIRM) databases and Letters of Map Revision.



APPENDIX E

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

HISTORICAL AERIAL IMAGERY





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



2017

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



2000

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



1998

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



1993

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



1977

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 6,000 (1"=500')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



1965

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 9,600 (1"=800')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



1962

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 9,600 (1"=800')
www.historicalinfo.com





Site boundaries shown in red are approximate

Pueo Farm
68-431 Farrington Highway
Waialua, HI



1951

HIG Project # 2056243
Client Project # Pueo Farm 2021
Approximate Scale 1: 9,600 (1"=800')
www.historicalinfo.com





APPENDIX F

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

SITE PHOTOS, TOPO, and FLOOD HAZARD MAP



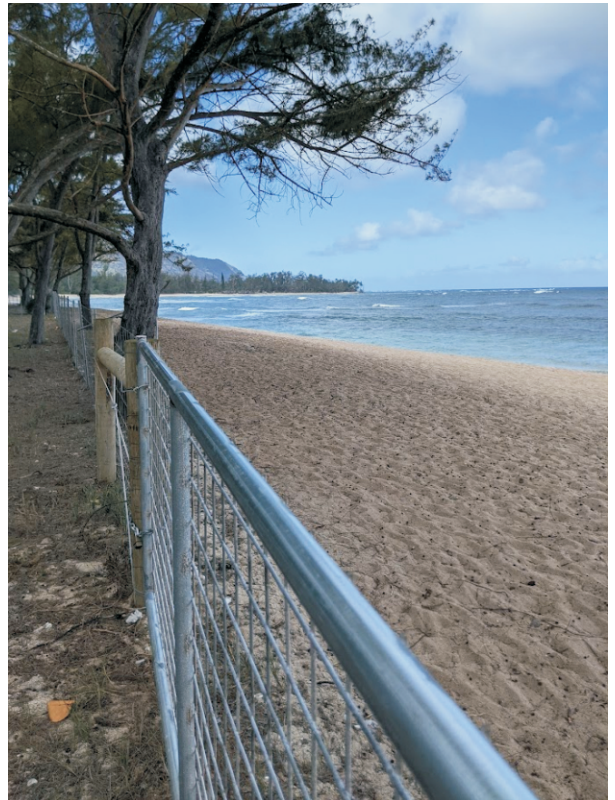


Above - mauka (frontage) side of site has entrance, palms, driveway, and bare areas
Below - middle portion of site is monkeypod and shower trees with guinea grass





Above - makai (seashore) side of site has ironwoods, asters, and bare areas
Below - shoreline side has beach sands, ironwood needles, salt affected grasses



Parcels

State

County

Parcel #

Owner

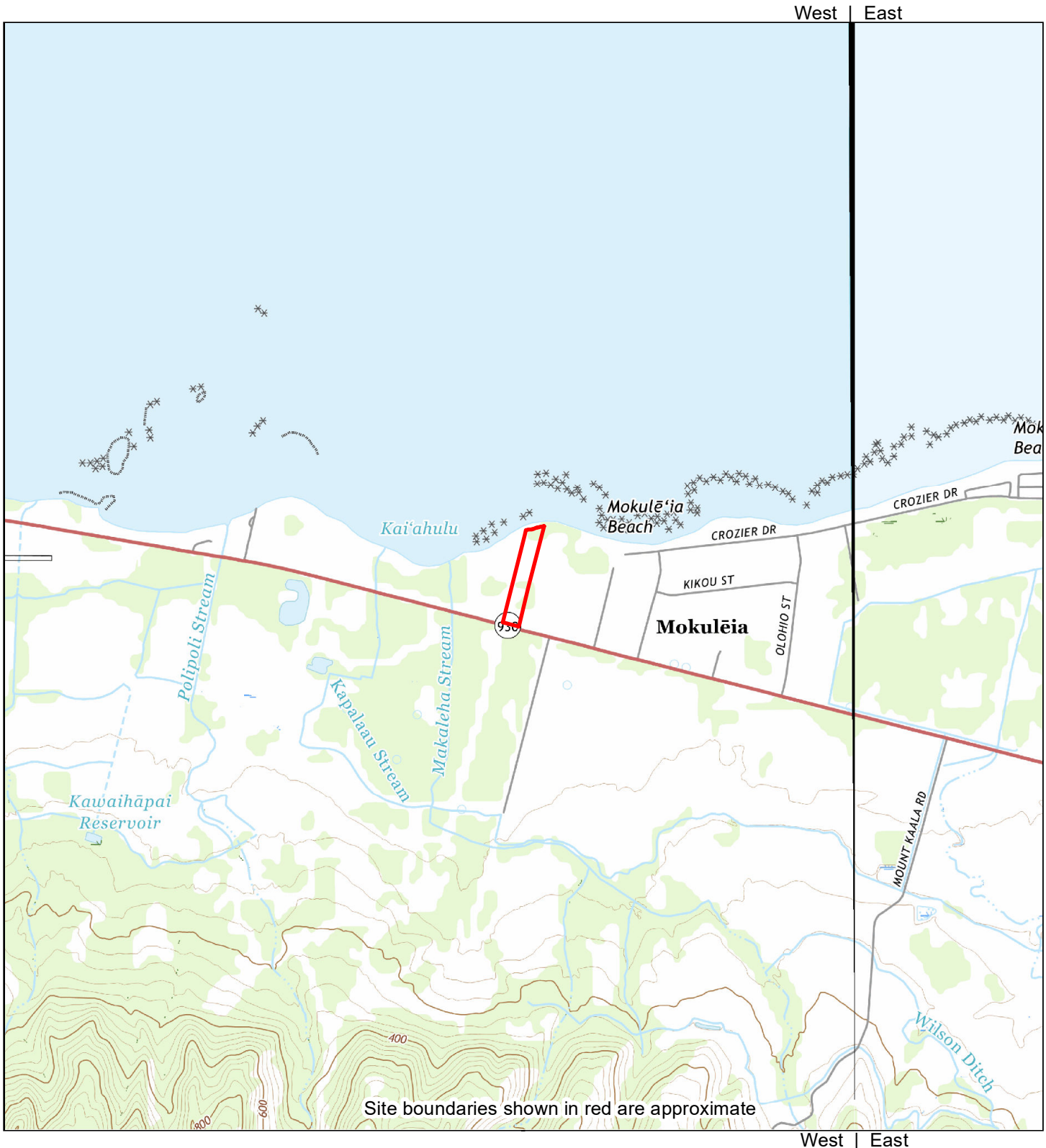
[More](#)

Showing all Parcels.

0 FIELDS

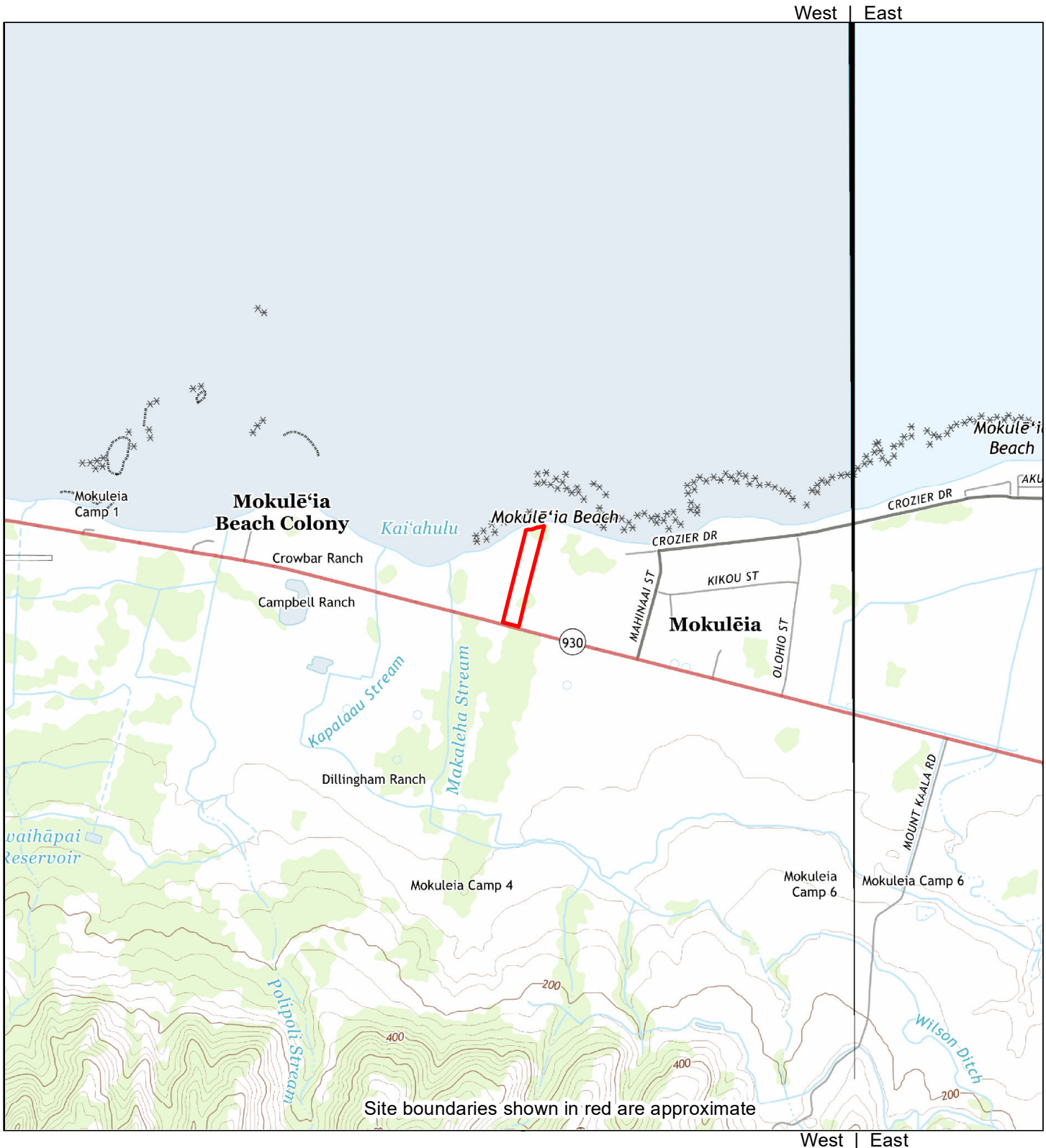
[Get Full Report](#)





Site boundaries shown in red are approximate

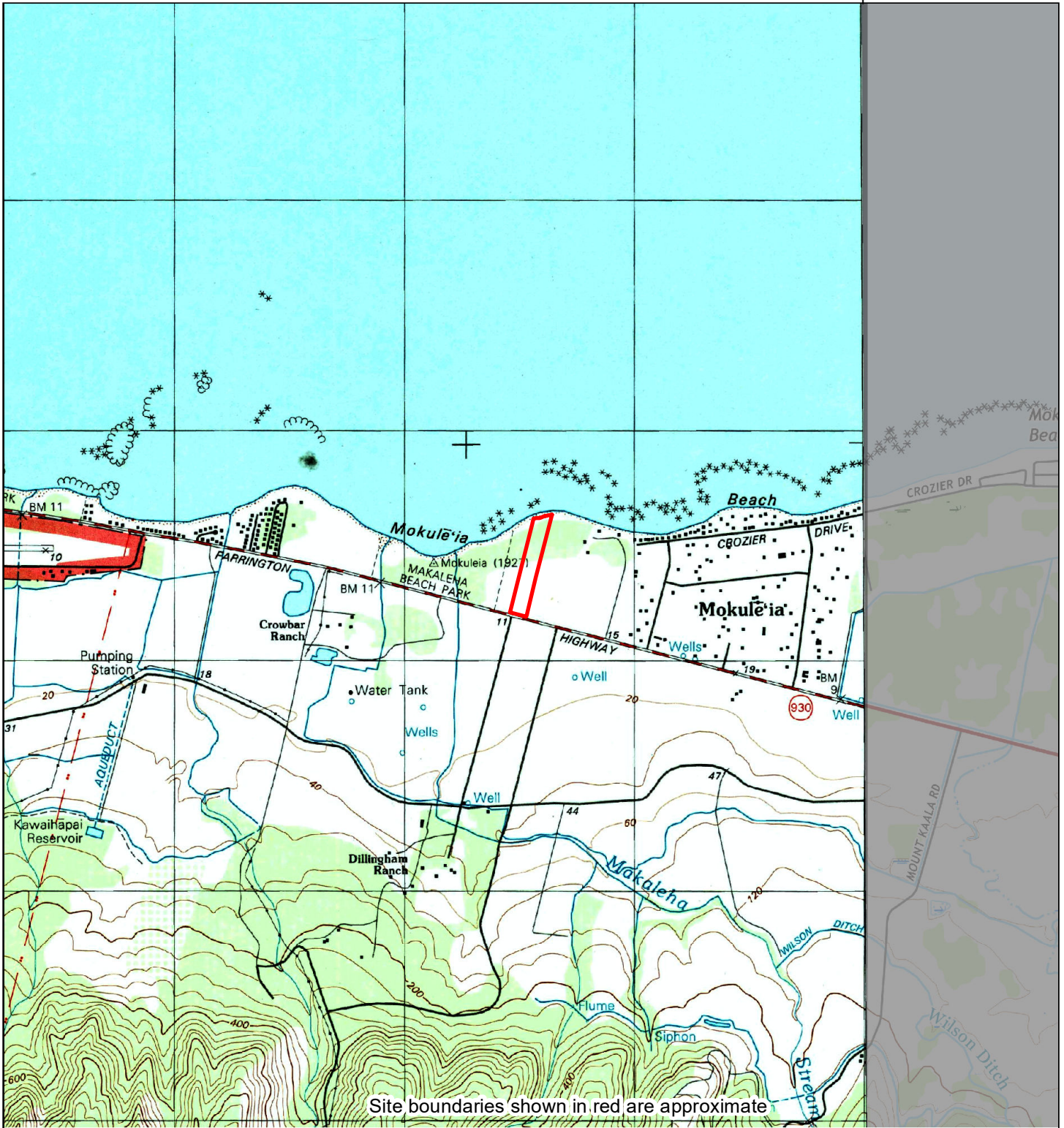
2017	0 Distance in Miles 1	Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791					
	1: 24,000 (1"=2,000') NAD 1983 UTM Zone 4N						
Unified maps show subdued modern topo features where corresponding maps of the same year were not published.		WHALE Environmental Services LLC project #Pueo Farm 2021 HIG #212056243 completed: 10/20/2021 09:14					
Zone	Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
East	Haleiwa, HI	USGS	7½' x 7½'	2017	Photo Year	Inspected	Revised
West	Kaena, HI	USGS	7½' x 7½'	2017	--	--	--



Site boundaries shown in red are approximate

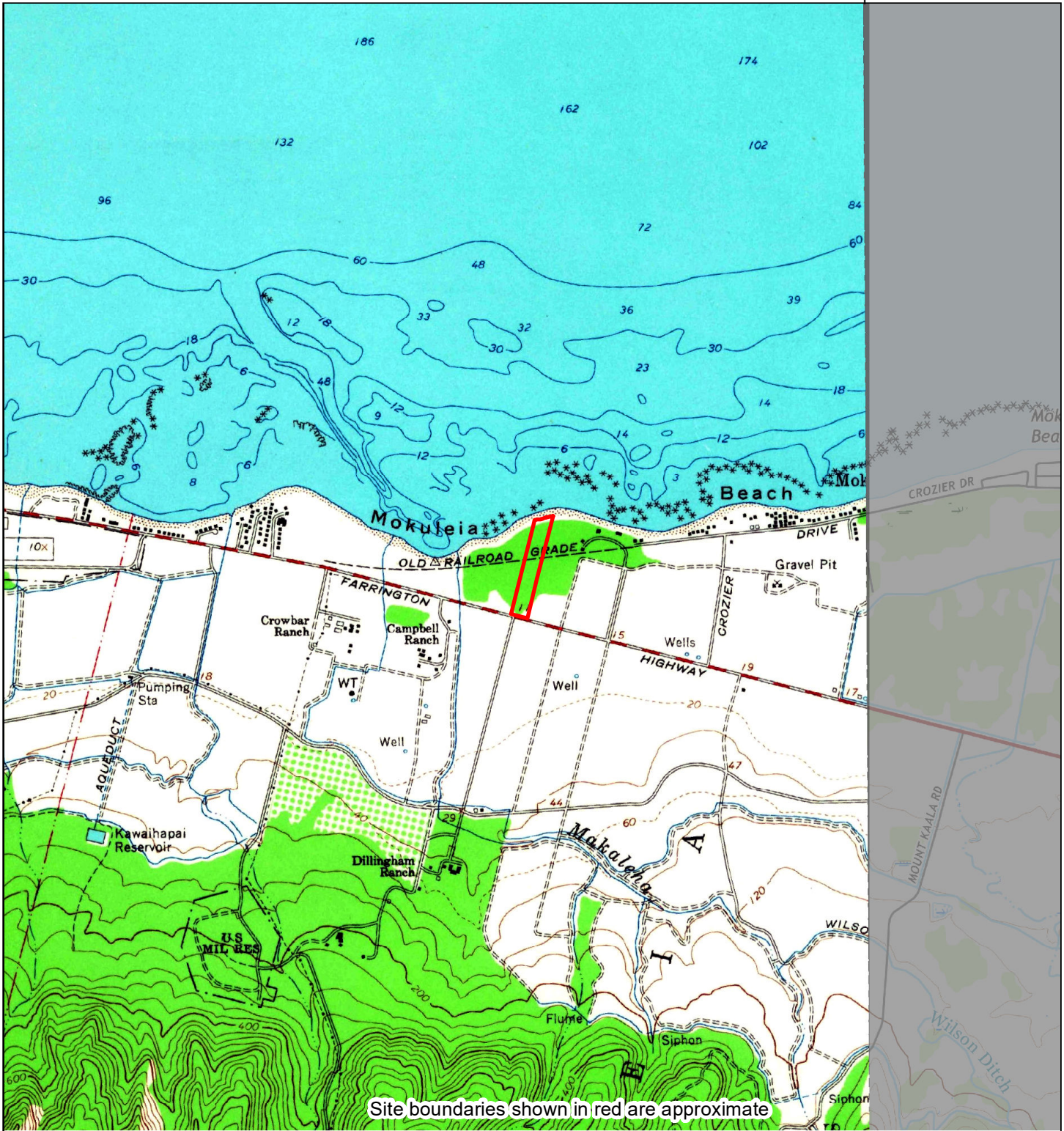
<h1>2013</h1>	0	Distance in Miles	1	Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791			
Unified maps show subdued modern topo features where corresponding maps of the same year were not published.				WHALE Environmental Services LLC project #Pueo Farm 2021 HIG #212056243 completed: 10/20/2021 09:14			
Zone	Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
East	Haleiwa, HI	USGS	7½' x 7½'	2013	Photo Year	Inspected	Revised
West	Kaena, HI	USGS	7½' x 7½'	2013	--	--	--

West | East



West | East

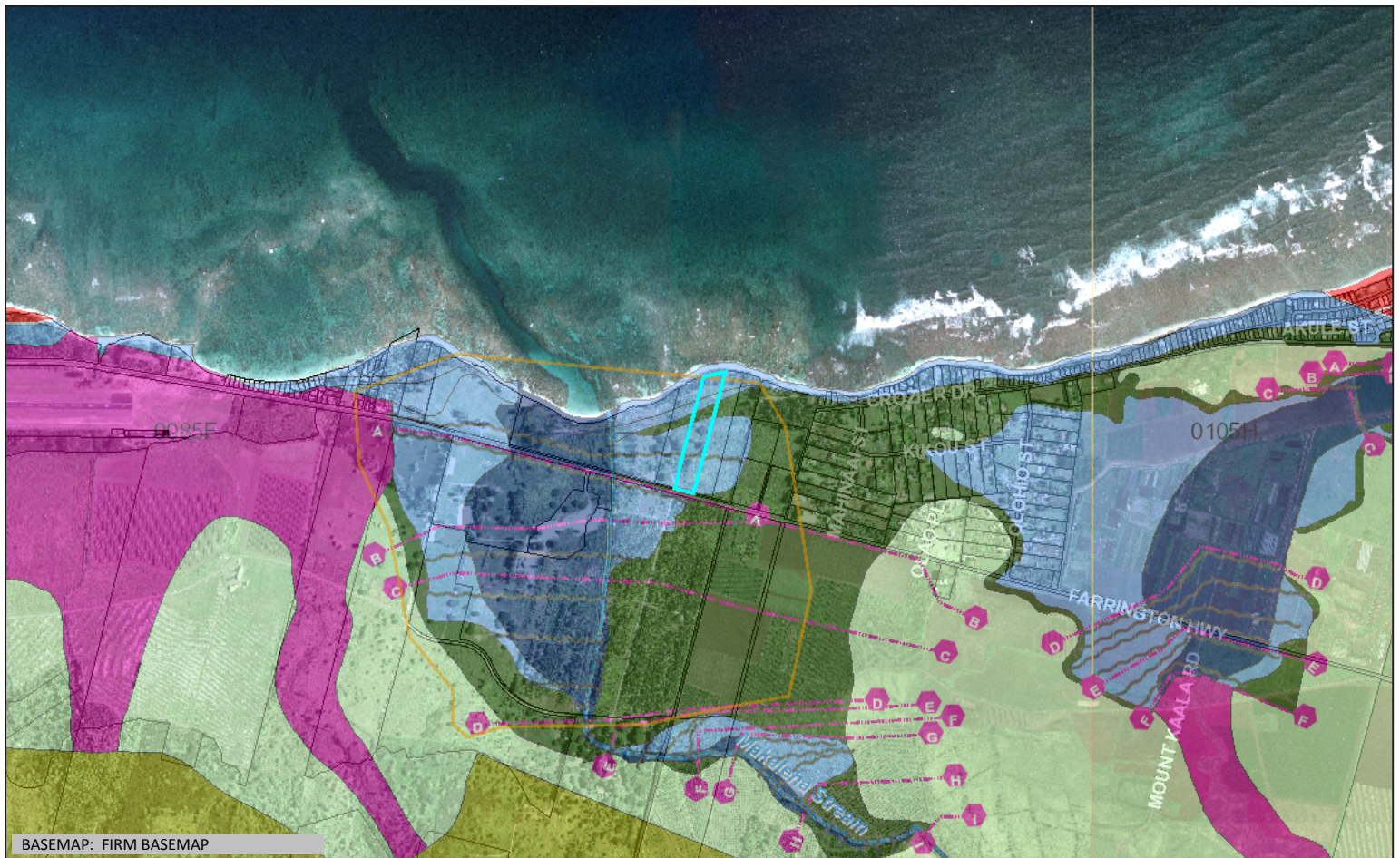
1998	0 Distance in Miles 1	Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791						
	1: 24,000 (1"=2,000') NAD 1983 UTM Zone 4N							
Unified maps show subdued modern topo features where corresponding maps of the same year were not published.		WHALE Environmental Services LLC project #Pueo Farm 2021 HIG #212056243 completed: 10/20/2021 09:14						
Zone	Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates	Photo Year	Inspected	Revised
West	Kaena, HI	USGS	7½' x 7½'	1998	1998	--	--	--



<h1>1964</h1>	<p>0 Distance in Miles 1</p> <p>1: 24,000 (1"=2,000') NAD 1983 UTM Zone 4N</p>	<p>Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791</p>	
<p>Unified maps show subdued modern topo features where corresponding maps of the same year were not published.</p>		<p>WHALE Environmental Services LLC project #Pueo Farm 2021 HIG #212056243 completed: 10/20/2021 09:14</p>	
<p>Zone Topographic Map Name</p> <p>West Kaena, HI</p>	<p>Publisher</p> <p>USGS</p>	<p>Map Size</p> <p>7½' x 7½'</p>	<p>Base Map</p> <p>1964</p> <p>Aerial Photo Topo Updates</p> <p>Photo Year Inspected Revised</p> <p>1954 -- --</p>



<h1>1954</h1>	<p>0 Distance in Miles 1</p> <p>1: 24,000 (1"=2,000') NAD 1983 UTM Zone 4N</p>		<p>Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791</p>		
	<p>Unified maps show subdued modern topo features where corresponding maps of the same year were not published.</p>		<p>WHALE Environmental Services LLC project #Pueo Farm 2021 HIG #212056243 completed: 10/20/2021 09:14</p>		
Zone	Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates
West	Kaena, HI	USGS	7½' x 7½'	1954	Photo Year Inspected Revised
					1952 -- --



BASEMAP: FIRM BASEMAP



Flood Hazard Assessment Report

www.hawaiiinfip.org

Pueo Farm

Property Information

COUNTY: HONOLULU
 TMK NO: (1) 6-8-003:045
 WATERSHED: MAKALEHA
 PARCEL ADDRESS: ADDRESS NOT DETERMINED
 WAIALUA, HI 96791

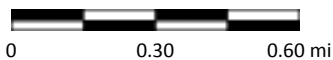
Notes:

Flood Hazard Information

FIRM INDEX DATE: NOVEMBER 05, 2014
 LETTER OF MAP CHANGE(S): 11-09-0171P
 FEMA FIRM PANEL: 15003C0085F
 PANEL EFFECTIVE DATE: SEPTEMBER 30, 2004

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: YES
 FOR MORE INFO, VISIT: <http://www.scd.hawaii.gov/>

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
 FOR MORE INFO, VISIT: <http://dlnreng.hawaii.gov/dam/>



Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND

(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

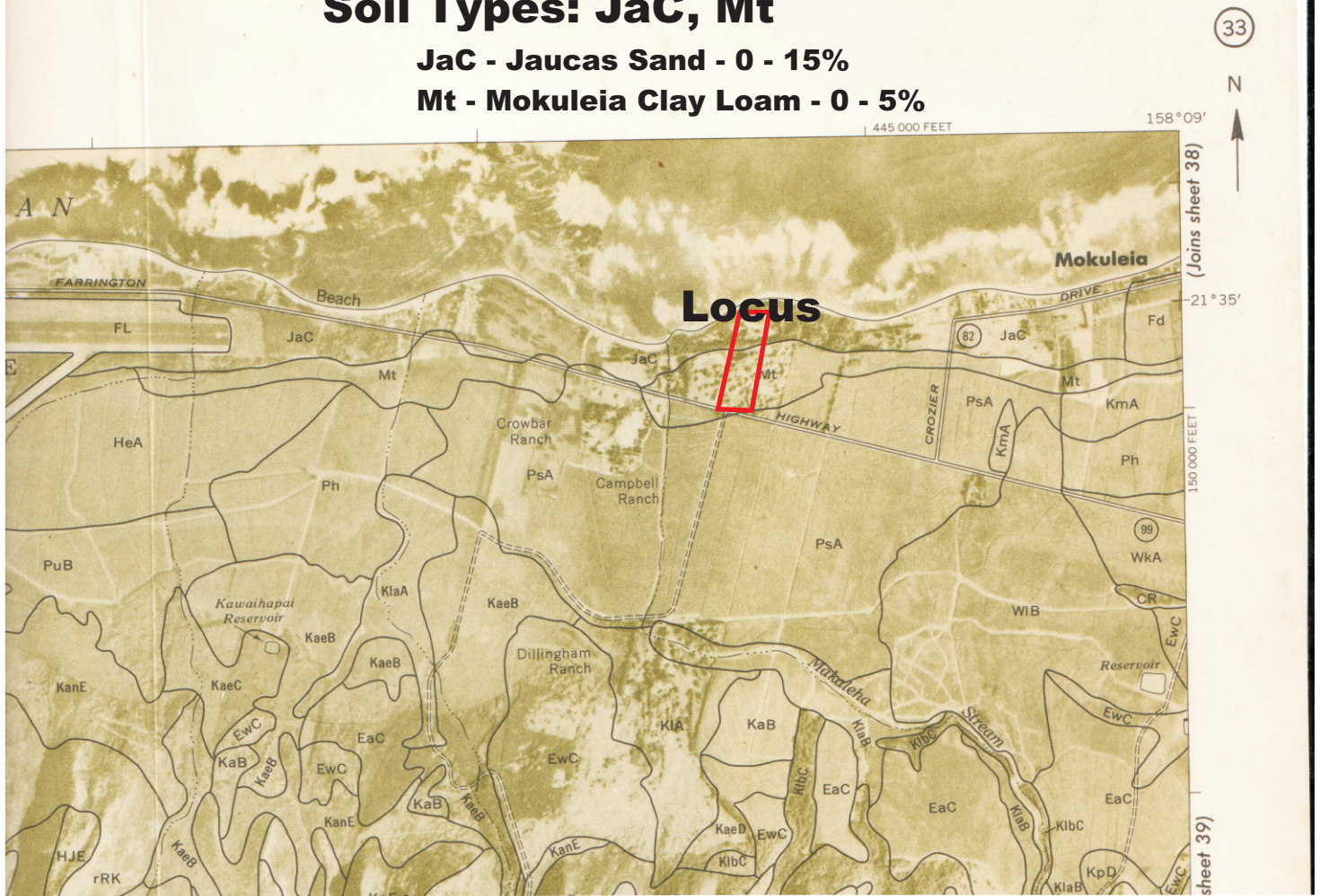
	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase applies, but coverage is available in participating communities.
--	---

Soil Survey of Islands of Kauai, Oahu, Maui Molokai & Lanai

Soil Types: JaC, Mt

JaC - Jaucas Sand - 0 - 15%

Mt - Mokuleia Clay Loam - 0 - 5%



U. S Department of Agriculture
Soil Conservation Service
(now Natural Resources Geological Survey)



APPENDIX G

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

REFERENCES



References

U.S. Environmental Protection Agency: Rules for All Appropriate Inquiries

U.S. F&W National Wetlands Inventory: <https://www.fws.gov/wetlands/>

Historical Information Gatherers: www.historicalinfo.com

National Center for Environmental Health: <https://www.cdc.gov/nceh/data.htm>

Flood Hazard Assessment Tool: <http://gis.hawaiiinfo.org/FHAT/>

ArcMap GIS Oahu:

<https://www.arcgis.com/home/webmap/viewer.html?webmap=402854e56d044454a35c4a458d09bd78>

Drone Mapping Guidance: <https://www.digmap.com/> & <https://www.dronezon.com/learn-about-drones-quadcopters/multispectral-sensor-drones-in-farming-yield-big-benefits/>

Hydrology: https://waterdata.usgs.gov/nwis/inventory/?site_no=16200000&agency_cd=USGS

Soils: <https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=HI>

WHALE Environmental Services LLC declares that, to the best of their professional knowledge and belief, that our firm's personnel meet the definition of Environmental Professional(s) as defined in §312.10 of this part.

“WHALE Environmental Services LLC's personnel in the capacity of Chief Biologist, Mark Howland, have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. Mr. Howland has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.”

Mr. Howland's resume is attached as part of this submission. Mr. Howland is also teaches a course in writing Environmental Impact Assessments – (ESA, EA, EIS) at HPU under course number ENVS 3010.



APPENDIX H

TO PUEO FARMS ENVIRONMENTAL SITE ASSESSMENT

RESUME



Mark Howland
Principal Program Manager
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Education

- ✓ B.S. Biology – Southeastern Massachusetts University (now UMASS Dartmouth)
- ✓ M.S. Public Affairs with concentration in Environmental Policy – UMASS Boston

Highlights/Certifications/Professional Training

- ✓ Certified Project Manager,
- ✓ Natural Resource Management and Land Rehabilitation;
- ✓ NEPA Specialist and Pollution Investigator under 21E, Phase Levels 1-3;
- ✓ Wetlands and Wildlife Biologist; EA, EIR, and EIS development;
- ✓ BioMimicry Designer;
- ✓ Erosion Control Professional,
- ✓ Stormwater Mitigation Expert;
- ✓ Aquaculture and Hydroponics Specialist,
- ✓ Senior Principal Engineer- Environment, Senior Program Manager/Group Leader;
- ✓ CEO, COO and Principal Office Manager.

Awards/Recognition

- ✓ Winner of EPA Environmental Technology Innovator Award for erosion control product development in 1999
- ✓ Winner of EPA Environmental Technology Innovator Award for stormwater mitigation design in 1998.
- ✓ EPA Environmental Merit Award in 2000.
- ✓ Business Development Leader selected by State and Federal Government for Trade Missions to France, England, Northern Ireland, Ireland, Germany, Japan, China and Australia to represent the environmental industry.
- ✓ ACECH Design Award 2012 for pollution mitigation design.

Years of Experience

40+

Security Clearance

LEVEL: Confidential, DoD CAD card issued for Army/Air Force work

Professional Summary

Technical, Management and Cooperative Abilities and Skills

Staff Management, Contracts and Budgets

Office management, executive policies, budgetary planning and processing, grant and contract development, employee hiring and staff supervision. Familiarity with Army, Marine, and Air Force contracting. Responsibilities include performance management of staff of 14, development of materials, documents, briefs and handouts, as well as equipment, and budgets. Past budgetary responsibility with levels in excess of \$22 million. Have managed staffs as large as 33 employees, and projects with \$25-\$100 million budgets. Public Policy experience (State Representative) in the Legislature (\$30 billion budget) and Municipal (Selectman) levels (\$18 million budget). Chair of the Board of Selectmen, Chair of Municipal Board of Health, Chair of Soil Conservation Zoning Board, Municipal Personnel

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Committee member, Police Commissioner. Chair Conservation Commission (2 communities), Conservation Agent (4 communities). Program Management with both immediate staff supervision and with remote located technical teams/individuals for assembling projects for client fulfillment. Interactive environmental contract experience with the military (Army, Air Force, Marines) and decades of experience in the environmental field.

NEPA Experience

NEPA documentation, permit application and investigative studies with preparation and review. Federal work with the USDA/NRCS, DoD/Army, Air Force, Army OEA, ACOE, EPA and other federal agencies. State Agencies work in the Northeast U.S., Florida and Hawai'i such as here in Hawai'i with the HDOT, HDOH CWB, HDOH HEER, DOFAW, DBEDT, HDOA, DNLR, CZM, and DAR. Private NEPA work for utility companies such as L3 Communications, MFS Network Technologies, Verizon, ComElectric and others. Local work with C&C of Honolulu agencies such as Mayor's Office, OED, HART, DPP, ENV. Comparable experience with counterpart agencies in states from Maryland to Maine (Northeast corridor) and Florida (Disney). Environmental Compliance (Qa/Qc) for base operations with the Army and Air Force.

Instructional Experience

- ✓ Lecturer, Cape Cod Community College – aquaculture
- ✓ Lecturer, UMASS Dartmouth – aquaculture and hydroponics, environmental policy
- ✓ Lecturer – Wellesley College – environmental policy
- ✓ Past President, Intl. Erosion Control Assoc. – seminar in erosion control and stormwater management
- ✓ Adjunct Professor, HPU – Environmental Impact Assessments Course – ESA, EA, EIS

Natural Resource Management

Natural resource management, wetland delineations, wildlife habitat studies, wildlife hazard assessments (WHA), environmental impact statements, environmental assessments, environmental baseline studies, coastal studies, wetland replication and restoration services, wetland species nursery management, wetland and wildlife protection products, experience in land rehabilitation practices, wildlife biology, botany, forestry and other types of applied ecology. All work environments from tropics to alpine. Ability to work in rough terrain under extreme weather conditions. Project count over the last four decades in this field in excess of 28,000 studies conducted by self or under my direction as owner of firm(s).

Communications and Public Relations

Ability to make public presentations on technical issues and policy directives. As a Selectman and State Representative, attended, conducted, organized and presented public hearings, seminars, organizational forums and Q & A sessions. As a Manager, Business Owner and Corporate Group Leader, responsibility was for client interactions, client presentations, public presentations, community outreach and technical presentations. Interaction with community groups, federal, state and local agencies, DoD decision makers, State and Federal legislative bodies and committees. Example is the presentation of a Lesson Learned PowerPoint demonstration to the North Shore Neighborhood Board on behalf of the U.S. Army U.S. Garrison Hawai'i on advances in stormwater and erosion control methods used during Army land rehabilitation efforts.

Hazardous Materials Coordination

Spill prevention plans, along with pollution prevention studies, and hazardous materials and waste mitigation. Environmental Site Assessments, 21Es, Phase I and Phase II hazardous materials studies and worked on projects

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where environmental remediation activities were conducted serving as the site overseer and controlling the hazardous materials testing regime. Experienced in characterizing soil, air and water HazMat incidents.

Stormwater Mitigation and Erosion Control

Drainage calculations, erosion control designs and products, stormwater mitigation designs and products, slope and bank stabilization designs and products, Stormwater Mitigation Plans, Storm Water Pollution Prevention Plans (SWPPP), erosion control monitoring plans, mitigation monitoring plans (MMP), Best Management Practices (BMP) plans.

Sustainability

Environmental audits, energy audits and lighting inventories, lumen analysis, sustainability studies, baseline environmental management systems, identify and research sustainability initiatives as related to energy, water, waste, design, sourcing, decision-making and marketing/education. Prioritized implementation of sustainability projects to maximize cost savings and green marketing promotion. Developed LEED grant applications to support sustainability initiatives.

Renewable Energy – Wind, Solar, Biomass and innovations

Experience in renewable energy source selection of wind, solar or biomass based on need, client preference and siting. Familiar with large wind and small wind systems as well as solar thermal and solar photovoltaic. Environmental permitting, environmental impacts and regulatory compliance. Work with energy balancing systems such as harmonic filters, sensors, timers, etc...Fatal Flaw or Critical Issues Analysis and siting reviews. Onshore and Offshore experience. Public involvement and baseline studies for wildlife issues, habitat mapping, modeling, visual impact analysis and mitigation and monitoring plans.

Permitting

Prepared applications and support documentation for all environmental permits such as shoreline setback variances, noise permits, special management area permits, CZM and floodplain permits, 404/401 permits, MS4 approvals, NPDES applications, Notice of Intents, Records of Environmental Consideration, Requests for Determinations, EA, EIR and EIS etc...

Horticulture and Crop Technology

Experience with a variety of crop technologies. Expertise in aquaculture, hydroponics and traditional greenhouse operations. Grew up in traditional greenhouse operations business with a wide variety of plant and shrub species such as geraniums, poinsettias, chrysanthemums, annuals, perennials, herbs and more. Owner and Operator of New England's largest wetland plant nursery with over 400 species cultivated from seed or cuttings. Owner and Operator of aquaculture operations for trout and prawn species. Owner and operator of hydroponics facilities often integrated with aquaculture operations in an aquaponics setting with species such as strawberries, mache lettuce, haricot vert green beans, oyster mushrooms and over 500 other cultivars. Experienced with Green Roof Technology, diverse growing systems, water management and a host of other operational parameters of growing systems.

Biomimicry Design

Biomimicry principles offer "fresh architectural solutions" for landscapes such as coastal areas susceptible to flooding. Biomimicry is using designs that draw inspiration from the intricate ways that plants and animals have adapted to their situations over hundreds of millions of years. Award-winning eco-designs expertise using Biomimicry principles. Award winning designer of BioFence™ – the biodegradable siltation fence and the Howland Swale™ – the EPA award winning stormwater mitigation design presented by VP Al Gore. Hawaii's

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2013 ACECH award for pollution mitigation design in Hawaii for dry dock copper and zinc discharges mitigation at the Campbell Industrial Park.

Geographical Information Systems

Experience with geographical information systems such as ESRI/ArcMap, GPS usage of (GIS) and GPS (Trimble) equipment. Have a working knowledge and experience with a variety of computer software and technologies, including GIS software. Developed skills in data collection, use of geographical position systems (GPS), and database development.

Marine Environment Experience

Experience with coastal environs such as dock and pier studies, shellfish inventories, beach erosion mitigation designs. Associate member of New England Fisheries Development Council and Aquaculture Coordinator and Public Outreach Coordinator for the New England Fisheries Steering Committee. Worked with many fisheries trade groups, fishermen organizations, fish processors, vessel operators, Coast Guard, NMFS, NOAA and state agencies. Sample project was an EIS for the undersea fiber optic cable from Green Hill Beach in Rhode Island to London for habitat impact, current impact, vessel interference, maintenance issues and more...

Aquaculture and Hydroponic Experience

Operator and Manager of Aquaculture and Hydroponics operations. Experience with the culture of over 400 species including but not limited to trout, prawns, oysters, mussels, haricot vert, mache lettuce, strawberries, etc... all with integrated aquaponic systems.

Greenscaping and BioEngineering

Experience with environmental appraisal and design enhancement of land and properties. Designed environmental improvements for water management, land maintenance, aesthetics appeal and environmental correctness. Work on resort properties such as hotels and golf courses to design green roofs, songbird gardens, stormwater gardens, porous pavements, wildlife buffer and research zones and greenscaping maintenance alternatives to grass. Considered one of the nation's top experts in stormwater bioengineering designs for pollution mitigation at residential, commercial and governmental facilities. Complete project management from visionary design to concept development to implementation to post-construction review. Cost appraisal of both implementation costs and value-added bioengineering's present and future values. Sample project was as the lead design consultant for WED Enterprises (Disney) for "The Land" exhibit at EPCOT Center, Florida and environmental assessment consultant for Disney Imagineering in Tokyo Disney, Japan; EuroDisney, France and future hotel/resort sites in Kauai and South Carolina.

Policy

Ability to work with diverse issues that may not fall under established practices or guidelines. Ability to resolve complex issues by working with stakeholder organizations and to find creative solutions to land use requirements with environmental compliance and conservation goals. Written and oral communication skills. Have the ability to work independently with limited supervision. Board of Health Chairman, Soil and Land Conservation Zoning Board Chairman, Police Commissioner. Personnel Board member.

Present Experience

Present – COO/Chief Biologist, WHALE Environmental Services, LLC, North Shore, Oahu 2009-present

Professional Duties - wetland and wildlife expert, aquatic design, environmental and energy audits and

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inventories, land rehabilitation specialist, erosion control and stormwater mitigation specialist and environmental design and planning.

Current and past 2014-2021 project(s): Environmental Audit for Turtle Bay Resort; Environmental Coordination Services for Environmental Management System implementation at Turtle Bay Resort. Energy Audit and Implementation; EIS for Biomass facility siting; Energy Audits for HECO DR program; and private firm energy audits. DLNR West Maui Coral Reef Resiliency Study. Named Conservation Champion of Turtle Bay Resort in May 2014. Waimea Valley Environmental and Energy Coordination Services. DOFAW Phase I Keana Point, NELHA DBEDT Biota and Benthic Study, HDOA/ABC Phase I 77 acres Dole Foods; OHA Energy Consultant; Leidos Contract for NEPA Office Development; C&C of Honolulu DoD Project Coordinator for Community Interaction, HDOT – A Wildlife Hazard Assessment, Kalaeloa Airport, DOFAW – Waihee Ridge Trail EA, Turtle Bay Forest/Landscape Management and Safety Plan; HDOA/ABC Phase I 287 acres Dole Foods, HDOA/ABC Phase I 900 acres Dole Foods, HDOA/ADC Phase I 89 acres UH Hawaii, HDLNR/F&W Phase I 800 acres Molokai; DOFAW Wood Utilization Analysis, DOFAW – Forest Products Price Analysis; DOFAW – EA Lower Waiohuli Trails, Coca Cola Mapunapuna – NPDES work and Water Source Viability Study, Daniel K. Inouye Intl. Airport Stormwater Monitoring.

Selected Previous Experience

Hawaii Business Development and Program Manager, URS 2013-2014

Professional Duties – Responsible for URS Business Development interests in Federal Interactions. Dual role serving as Project Manager and Program Manager for URS awarded contracts. Client interaction, technical expertise and subject matter expert for various projects and project team review and supervision. Key services provided to DoD clients such as Navy, Army, Marines and Air Force; and federal agencies such as USFW, NRCS, EPA, FAA, NOAA and NMFS.

Division Manager for Environmental & Planning Services, URS, Honolulu Hawaii. 2012-2013

Professional Duties – Principal-in-Charge to manage the URS Honolulu Office staff in the Environmental & Planning Services division. Responsibility to manage federal, state, local and private projects. Develop and implements strategic marketing plans with proposal preparation and presentation to the government, industrial and private market sectors. Significant HEPA and NEPA interactions along with state and federal agency regulatory compliance. Environmental and Planning Division leadership for project teams conducting environmental compliance, site assessment & remediation, GIS support services, environmental sciences, sustainability, planning and military solutions. Supervise team leaders, responsible for the day-to-day operations of the group comprised of project managers, technical specialists and junior level planners. Responsible for hiring, staff utilization, group sales goals, mentoring, financial control, quality assurance and business development and marketing.

Permits Coordinator, Honolulu Authority for Rapid Transportation (HART), Honolulu, Oahu – Honolulu Rail Transit Project 2011-2012

Professional Duties – Coordinated the Permits Program at HART, responsible for oversight of all 12,000+ permits for the Oahu Rail Project including but not limited to environmental permits such as shoreline setback variances, noise permits, special management area permits, CZM and floodplain

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permits, 404/401 permits, MS4 approvals, NPDES applications, etc... Also responsible for general construction permitting along with coordination with contractor resident engineers, regulatory agencies on City and County, State and Federal levels and other affected parties. Familiar with Oracle's Primavera P6 Enterprise Project Portfolio Management and scheduling and CMS Contracts Management System. HART HazMat liaison and auditor for Phase I, Phase II and Hazardous Materials (HazMat) studies and submittals.

Selected Previous Projects

Program Manager, NEPA Specialist WHALE Environmental Services LLC

Project Name: Technical Assistance to Air Force Natural Resources Program

Company work was performed for: U.S. Air Force/TEAM Integrated Engineering, LLC

Hickam Air Force Base, Oahu

August 2009 – August 2010

Professional Duties - Managed TEAM IE's Global Engineering, Integration and Technical Assistance (GEITA) contract. Provided and supervised NEPA and NHPA personnel at the Air Force's Natural Resources Program at Hickam Air Force Base. Support, assist, and facilitate implementation of regulatory environmental programs. Provided expertise in the preparation of environmental baseline studies, environmental audit of joint basing requirements, environmental permits, and coordination with historical and architectural needs. Coordinate and monitor NEPA efforts. Ensure Air Force interests are represented and composed of the following: real estate site review and planning, and interaction with consultants, and federal and government civil servants of US Air Force agencies and others. Wrote Environmental Baseline Studies and Joint Base Pearl Harbor/Hickam Environmental Base Closure Plan under an AFCEE \$230,000 contract.

Selected Previous Projects

Senior Principal Engineer - Environment, ITAM Coordinator, Directorate of Planning, Training, Mobilization, and Security (DPTMS) U.S. Army, Schofield Barracks

Company work was performed for: General Dynamics Informational Technology at *Schofield Barracks, Kahuku Training Area, South Range, East Range, Kunia Training Area, Makua Training Area, Dillingham Air Field, Pohakuloa Training Area. Coordination with Marine Training Programs at Camp Smith and Kaneohe Base.*

August 2008-August 2010

Professional Duties - Managed the U.S. Army's Hawaii Garrison's Integrated Training Areas Management (ITAM) program, coordinated, executed, and assisted in all ITAM program components, including Land Rehabilitation and Management (LRAM), Range and Training Land Assessment (RTLTA), Training Requirements Integration (TRI), Sustainable Range Awareness (SRA), and Geographic Information Systems (GIS). Direct, support, assist and facilitate implementation of regulatory environmental programs. Provided expertise in the preparation of scopes of work for land inventory and monitoring, land rehabilitation projects and management, environmental awards, and training/environmental integration requirements. Prepared Independent Government Cost Estimates (IGCEs), Statements of Work (SOWs) and Requests for Statement of Qualifications (SOQs). Selected firms for contracts based on submissions. Coordinate and monitor NEPA efforts that affect the Directorate of Planning, Training, Mobilization and Security (DPTMS) and other military agencies in the region. Ensure DPTMS interests are represented and composed of the following: 5 year Master Planning Cycles, real estate site review and planning, and interaction with DPW Facilities, USAGHI,

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Kaneohe Marine Base Hawaii, consultants, and federal and government civil servants of US Army agencies and others. Coordinate mitigation and workarounds between users (DPTMS) and federal agencies such as EPA, NRCS, and ACOE. Coordinated permitting activities with State of Hawaii DOH. Conduct basic environmental assessments, environmental impact statements, records of environmental consideration, review permit approvals, and file notice of intents. Provided information to support installation command decisions. Worked with military training schedules to help insure that training lands are available in sufficient quality and land status to successfully accomplish the requested training. Experience in land management of over 153,000 acres of US Hawaii Army training lands on Oahu and the Big Island. Reviewed NEPA documents, assists in project scoping efforts, updates program management modules and provides expertise and assistance to the DPTMS Range Division Office staff. Coordinates with the USAGHI Installation environmental staff to assist the Installation land managers in making informed land management decisions and coordinating military land use requirements. Sought new funding sources for Army land restoration projects. Succeeded in acquiring \$22 million for new projects.

Selected Previous Projects

Land Rehabilitation and Maintenance Coordinator (LRAM), Directorate of Planning, Training, Mobilization, and Security (DPTMS) U.S. Army, Schofield Barracks Company work was performed for: Colorado State University's Center for Environmental Management of Military Lands (CEMML) at *Schofield Barracks, Kahuku Training Area, South Range, East Range, Kunia Training Area, Makua Training Area, Dillingham Air Field, Coordination with Marine Training Programs at Kahuku Training Area for Marines from Kaneohe Base.* August 2007-August 2008

Professional Duties - Support, assist, and facilitate implementation of regulatory environmental programs. Provided expertise in the preparation of scopes of work for land rehabilitation projects and management, and training/environmental integration requirements. Coordinate and monitor NEPA efforts that affect DPTMS and other military agencies in the region. Ensure DPTMS interests are represented with interaction with DPW Facilities, USAGHI, Kaneohe Marine Base Hawaii, consultants, and federal and government civil servants of US Army agencies and others. Coordinated permitting activities with State of Hawaii DOH and Section 106 consultations. Conduct basic environmental assessments, environmental impact statements, records of environmental consideration, review permit approvals, and file notice of intents. Provided information to support installation command decisions. Worked with military training schedules to help insure that training lands are available in sufficient quality and land status to successfully accomplish the requested training. Reviewed NEPA documents, assists in project scoping efforts, updates program management modules and provides expertise and assistance to the DPTMS Range Division Office staff.

Other Sample Projects

Program Manager, Chief Biologist, Environmental Research Corps

Company work was performed for: Kiewit Pacific

Drum Road, Kawaihoa, Oahu

January 2008-April 2010

Environmental Consultant responsible for the preparation of General Best Management Plan (BMP) plan for \$39 million dollar Army Corps of Engineers Drum Road construction project. Duties included field investigations of site-specific BMP

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needs for erosion control needs, design, stormwater mitigation needs as exhibited by the development of a Storm Water Pollution Prevention Plan (SWPPP), and NEPA permit narratives. Also responsible for QA/QC for BMP implementation by Kiewit Pacific.

Other Sample Projects

Owner/Operator, BioMass Farms

Company work was performed for: P A Landers

Wetland Replication - Carver Massachusetts

Project: October 2002 - November 2004

Cultivated, transplanted and matured over 400 wetland species for use in a ten acre wetland restoration project. Worked at establishing multi-functional wetlands with all three plant layers – herbaceous, shrub and tree as well as establish correct hydrology and soil regimes. Species induced obligates, facultative wet and facultative species as well as upland species of trees and plants for buffer and wildlife enhancement. Installation of erosion control measures such as BioFence – biodegradable siltation fencing, and Curlex – slope stabilization erosion blankets. Soil enhancements such as mycorizae fungi, moisture retention agents, organic fertilizers, pest deterrents were employed.

Other Sample Projects

Owner/Operator, Environmental Research Corps

Company work was performed for: IONICS

Saline Marine Environment Mitigation, Bermuda

Project: October 1999 - January 2000

Design/Construct of a saline mitigation structure for a desalination plant in Bermuda. IONICS processed seawater to create fresh water for drinking purposes resulted in a waste flow of byproduct of extreme salinized waters. With the use of salt-loving species with large bio-uptakes such as rosemary, successfully reduced high salt levels in discarded desalination waters back to natural seawater levels. Also completed the EIS for that discharge and the placement and permitting of an under-lagoon fiber optic cable to tie control of the system to the main desalination plants EMS.

Other Sample Projects

Owner/Operator, New England AquaFarms, Inc.

Company work was performed for: Shaw's Supermarkets

Rhode Island & Massachusetts

Project: 1980 - 1983

Cultivation of rainbow and brown trout to specific market size for supermarkets sales of farm to table fish species. Designed and erected in-store holding tanks for rainbow trout to insure freshness and the ability to provide a source for "trout en blue" a gourmet dish that requires an less-than-an-hour fish to create a reaction with the protective gelatinous cover on the fish skin reacting with vinegar to turn "blue". Complete design and implementation of aeration and filtrations systems.

Other Sample Projects

Owner/Operator, WHALE Environmental Services LLC

Project: February 2011 -present

Company work was performed for: Turtle Bay Resort

Environmental and Energy Audit; Environmental Coordination Services for sustainability implementation, Kahuku, HI

Conducted Environmental Audit using EPA's 7 parameter method for evaluation. Expanded audit to detail energy aspects including lighting inventory, runtime analysis and lumen analysis. Assisted in the selection of renewable energy sources such as Solar PV and Bio Carbonization Units. Completed financial analysis of energy implementation designs and efforts. Prepared feasibility studies for various energy and water management scenarios. Saved TBR over \$1.4M/yr. in costs.

Mark Howland
Principal Program Manager
57-101 Kuilima Drive #23W
Kahuku HI 96731
808-294-9254
markahowland@hawaii.rr.com

Other Sample Projects

Program Manager, Chief Biologist, Environmental Research Corps

Company work was performed for: WorldCom/MFS Network Technologies

Northeast US Corridor

Project: January 1998-April 2000

Environmental Consultant responsible for the preparation of all wetlands delineations (2132 locations), wildlife habitat studies and environmental impact statements for fiber optic cable placement of the 1200 mile EZ toll system in New Jersey and the main fiber optic cable East coast backbone line from Washington DC to Green Hill Beach, Rhode Island to London England. Responsible for all federal, state and county/municipal permitting for cable trenching, directional bores and undersea placement.

Sample of Services provided by Environmental Research Corps/WHALE Environmental Services LLC that formed the basis for company contracts on over 28,000 projects.

Array of Services

<i>Wetland Delineations</i>	<i>Wetland Design & Computer Modeling</i>
<i>Wetlands Replication & Plantings</i>	<i>Wetlands Restoration & Mitigation</i>
<i>Wetlands Maintenance & Management</i>	<i>Water Quality Monitoring</i>
<i>Expert Witness</i>	<i>Site Walks and Public Hearings</i>
<i>Riverfront Area Delineations</i>	<i>Environmental Impact Reports</i>
<i>Natural Resource Inventories</i>	<i>Wildlife Habitat Designs</i>
<i>Refuge Construction & Habitat Enhancement</i>	<i>Vernal Pool Certification</i>
<i>Endangered Species Review & Wildlife Checklists</i>	<i>Water Gardens Creation</i>
<i>Specialized Plantings and Seed Mixtures for Wildlife</i>	<i>Wildlife Area Evaluations, HCP(s), WHA(s), WEP(s)</i>
<i>Wildlife Mitigation Products & Barriers</i>	<i>Sources for Wildlife Enhancing Materials</i>
<i>Preliminary Assessment of Pollution</i>	<i>Calculations of Pollution Potential</i>
<i>Review of Federal and State Files</i>	<i>Design of Mitigation Structures</i>
<i>Environmental Audits & Sustainability Reports</i>	<i>Silt and Sediment Control Products</i>
<i>Specialists in Constructed Wetlands for Clean-up</i>	<i>Wetland Impact Solutions</i>
<i>Constructed Wetlands for Stormwater Runoff</i>	<i>Stormwater Calculations and Computation</i>
<i>Review of Stormwater Designs</i>	<i>Verification of Site Development Modeling</i>
<i>Inventory of Stormwater Runoff Products</i>	<i>Water Saving Products</i>
<i>Specialists in Commercial Pollution Mitigation</i>	<i>Specialists in Residential Subdivision Runoff</i>
<i>Narratives for regulatory submission on erosion</i>	<i>Erosion Potential Calculations and Computation</i>
<i>Review of Erosion Control Plans</i>	<i>Inventory of Erosion Control Products</i>
<i>Specialists in Bank Stabilization</i>	<i>Leaders in Erosion Control Designs</i>
<i>Coastal and Inland Wetlands Solutions</i>	<i>Coastal and Inland Bank Stabilization</i>
<i>Dock and Pier Impact Studies</i>	<i>Shellfish Inventories</i>
<i>Maintenance & Management of Planted Areas</i>	<i>Permitting and As-Built Narratives</i>
<i>Design of replication/restoration areas</i>	<i>Invasive Species and Weed control</i>
<i>Detailed investigations of hydrology and soil types</i>	<i>Energy Audits and Inventories</i>

PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX G

EROSION CONTROL AND SEDIMENTATION PLAN

Pueo Farm

Agricultural Operations and Farm Dwellings
Waialua, HI

Erosion and Sedimentation Control Plan

PARCEL

Pueo Farm

Farrington Hwy

Mahinaaf St

930



WHALE Environmental Services LLC

P.O. Box 455, KAHULUI, HI 96731 808-248-9224

Pueo Farm Erosion and Sedimentation Control Plan 2021

Introduction

Pueo Farm is intending to use this Erosion and Sediment Control (ESCP) plan in coordination with its planned SMA Major submission in coordination with its Environmental Assessment (EA) submission. This ESCP plan is prepared in accordance with industry Standards. No pollutants shall be allowed to discharge to adjacent waterways directly or indirectly via any storm drain conveyance system or other potential pathway(s) such as sheet flow or concentrated channels. DPP's Building Department will be notified when the site is ready for the initial BMP inspection to ensure that all proper BMPs would be in place two (2) weeks prior to the start of construction activities. A final inspection will be conducted to at the conclusion of the construction activities on-site.

Plan Components

ESCPs includes a narrative section and plan sheets - some of the required content may not be known at the time of contract development (e.g., final building footprints, runoff discharge locations, off-site support areas, etc...) and must be added by the contractor as required by the contract and Permit once construction begins. It is important that each ESCP plan identify site specific risks that may impact waters of the state to ensure the contractor can plan for and bid anticipated work. While there is no required format for an ESCP, there is required content.

The following information must be included in every ESCP narrative:

- **Co-potential impacts** to waters of the state, such as; topography, climate, drainage, soil type, vegetation, waterbody impairment, existing contamination etc.
- **Potential erosion problem areas** – high risk or hard to manage areas or work activities.
- **Planning elements** – include a risk analysis and BMP selections made to manage risks.
- **Construction schedule** – include information about construction phasing relevant to erosion and sediment control and a general BMP implementation schedule.
- **Contingency planning** – identify actions to be taken if performance goals are not achieved.
- **Engineering/Architect drawings and calculations** – include for designed structures like ponds or landscaping areas.

This plan is prepared for the construction of agricultural operations and related farm dwellings in Waialua, Hawaii. Construction is intended for 2022 and will commence once all necessary permits have been obtained. The development is on privately owned land with permits from the C&C of Honolulu DPP Building Department, who will have the review function of this ESCP.

Submitted by:

Mark Woodfield, Landmark Builders

Date:

Pueo Farm Erosion and Sedimentation Control Plan 2021

EROSION SEDIMENT CONTROL PLAN NARRATIVE

Pueo Farm Agricultural Operations and Farm Dwellings

Submitted to: C&C of Honolulu DPP Building Department

Date: October 2021

ESCP Designer:

WHALE Environmental Services, LLC

Pueo Farm Erosion and Sedimentation Control Plan 2021

Why use a Erosion and Sedimentation Control Plan?

Erosion and sediment control is much more than silt fence and hay bales. Prior to developing an Erosion and Sediment Control Plan (ESCP), it is important to have minimized the areas of disturbed soils and the duration of exposure. It is also imperative to control water at up-slope site perimeters, control water on-site, control sediment on-site, and control sediment at the downslope site perimeters. An ESCP is the final element in the erosion and sediment control planning process and a necessary component of building permit application. The ESCP ensures that sediment transport is addressed in one of the most crucial stages of the project: the planning stage. A good erosion prevention and sediment control plan first minimizes the extent of disturbance by focusing on erosion control (*minimizing disturbed areas, seeding, mulching, matting*) by controlling the amount of soil that can run off and by stabilizing exposed soil. Sediment control measures (*i.e. stabilized construction entrances*) are identified and installed; and then there will be a focus on any sediment that has escaped erosion control measures. Erosion prevention measures are far more effective than sediment control measures (*such as silt fence*) and should be the primary focus of any ESCP. An ESCP has five primary components:

1. Location map (USGS and other)
2. Existing conditions site plan
3. Grading plan and construction timetable
4. Erosion prevention and sediment control site plan and timetable
5. Narrative briefly describing the four plans

The location map shows the proximity of the site to any surface water bodies, roads, etc. and should include a USGS map, as well as a map of greater detail. The existing conditions site plan shows the grading and features as they exist. It should also include a soils map for the existing conditions. The grading plan and construction timetable shows the proposed finished contours and addresses sequencing of the project, a key component of erosion control. The timetable does not have to contain specific dates, but should show how each phase of the project relates to the others. This preliminary plan also shows that you have taken steps to minimize the amount of exposed soil at any time. The erosion prevention and sediment control site plan and timetable should be prepared using the grading plan as a base. The site plan used for construction will depict the location of all erosion and sediment control measures recommended by this ESCP and include a timetable of charts the sequencing of control measures. It may be possible to combine the landscaping, grading and erosion control plans. The narrative should briefly describe the four plans; highlight erosion control measures and why they will be effective, site characteristics, and erosion control done in the planning stages, such as phasing the project.

Pueo Farm Erosion and Sedimentation Control Plan 2021

PROJECT INFORMATION

Project name: Pueo Farm (*new*)

Location: lat. 21.3439N long. -158.0951W

Transfer of Coverage: *Yes/No* Permittee: *Pueo Farm*

Elevation Above Sea Level: Eleven (11) feet

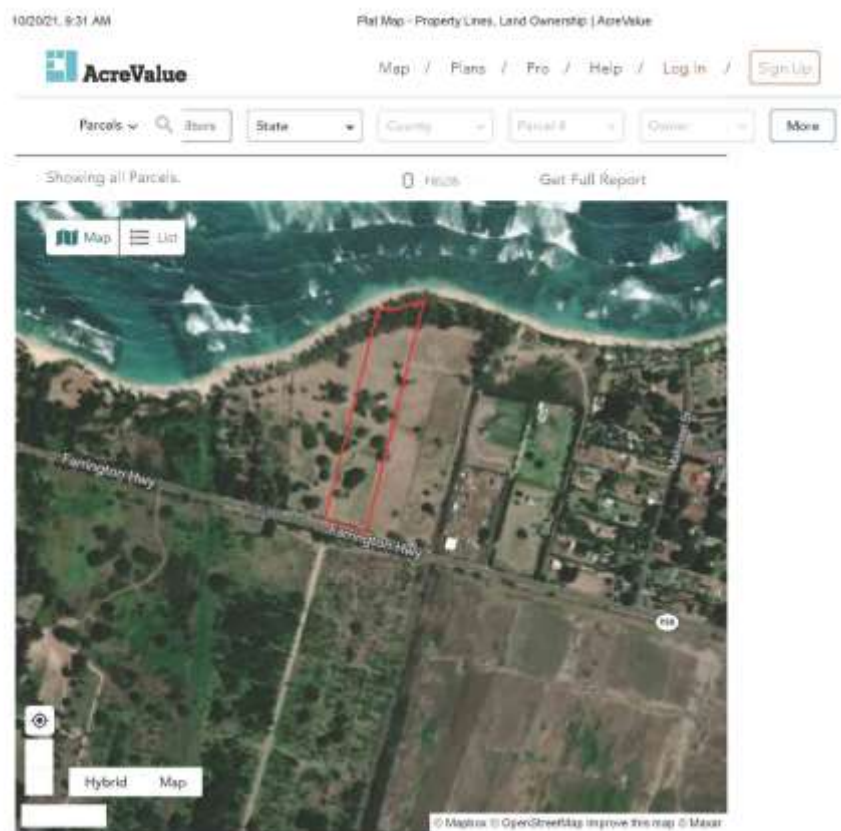
1. Location Map showing property lines of the project, critical natural or man-made features within 3000 feet of the project, including streams, ponds, wetlands, roads, buildings, and utilities sufficient nearby features to allow reviewer to locate the site for an inspection.

Overall Location Map

As can be seen in this overall location map, the Pueo facility lies at the street address of 68-431 Farrington Highway, Waialua.

The proposed building site is the layout presented in the conceptual design for the property found in the appendixes **East** is a vacant lot for sale. **North** is the Pacific Ocean, and **South** is Farrington Highway and the entrance to Dillingham Farms, and **West** is another vacant lot for sale.

As can be seen, the site is already level and has an pervious mostly sand surface. There will be minimal grading for the site construction as the existing surface require minor grading.



Pueo Farm Erosion and Sedimentation Control Plan 2021

Existing Conditions Topographical and Aerial Imagery Plan

- existing topographic contours (5 feet or smaller interval),
- drainage-ways if present,
- water features if present,
- general vegetative cover types within 200 feet of water features (e.g. field, hardwood forest, grass etc.) vegetative cover types in all proposed disturbance areas and areas receiving and treating runoff from the construction site as shown on aerial imagery,
- soil map and key,
- identified sensitive areas (e.g. steep slopes, erodible soils, wet areas),
- structures, roads, utilities,
- north arrow, scale, date, elevation datum, and
- property lines

The proposed construction layout plan in *Appendix A* has these details as well as including the present topographical map; and the previous page's images also show many of these details. The historical aerial imagery details are shown in *Appendix B*. Preliminary Landscaping Details may be found in *Appendix C*.

3. Grading Plan and Construction Timetable

- existing and proposed topographic contours *Appendix A*
- limits of soil disturbance and method to be used for demarcation of these limits on site
There is minimal soil disturbance, soil entry largely limited to insertion of plant materials into the existing soils or concrete slabs for farm dwellings. Excess soil from any activities will be used as plant insertion backfill. Amount is expected to be minimal.
- areas of various construction phases, including sequential and concurrent activities
*Sequencing is expected to be assembly of the farm dwelling components including grading and foundation work using the proposed conceptual layout shown in **Appendix A**, followed by assembly on-site of farm-related dwellings, followed by plantings of agricultural crops.*
- proposed structures, roads, utilities *Appendixes A, B, C*
- location of topsoil stockpiles, staging areas, equipment storage, and refueling/maintenance areas and stump disposal areas *TBD*
- location of disposal areas for excess soil (include map if off-site) *TBD*
- boundaries for undisturbed riparian buffers *See Shoreline Setback map in Appendix A*
- north arrow, scale, date, elevation datum *Appendix A* topo
- property lines *Appendix A, B, C*

4. Erosion Prevention and Sediment Control Plan

- limits of soil disturbance
Soil disturbance is limited to planting and slab insertion of concrete slab.
- riparian conservation buffer limits and method to be used for demarcation
The site has an shoreline setback of sixty (60) feet. No runoff is directed to marine waters. As the site lies in a Shoreline Management Area (SMA) and construction is over \$500,000, a SMA Major application is being developed, with a request for approval of the work under that permit by the DPP.

Pueo Farm Erosion and Sedimentation Control Plan 2021

- location of all structural erosion and sediment control measures and details
Site Specific BMPs proposed are a wind screen along the shoreline to minimize construction dust movement into the ocean; and filter sock/sediment log placement along edges of the work area.
- location of areas to be seeded and mulched **Appendix C**
- stormwater pathways *surface evaporation on remaining pervious surfaces contained by perimeter berms*
- erosion control matting on slopes greater than 3:1 *N/A*
- no hay bales or silt fence running across contours or in areas of concentrated flow *N/A*
- chart of inspection and maintenance schedule of all control measures
The on-site Environmental Compliance Officer (Builder) conducts weekly inspections and documents the inspection's logs maintained in their office.
- name and phone number of on-site coordinator
Mr. Mark Woodfield: 808-383-1479
- storm sewer inlets adequately protected (detail required) *N/A*
- stabilized construction entrance shown (detail required)
As shown above in photos in the HazMat report, entrance gate and perimeter fencing has already been permitted and construction with SMA Minor approval
- north arrow, scale, date, elevation datum
*As seen above, and also found in **Appendixes A, B, C***

5. Narrative

General description of project

- project description
The purpose of the project is to construct an agricultural operation and related farm dwellings in vacant uplands. The project lies with a SMA (Shoreline Management Area), and a SMA Minor Permit Application was approved for the fencing and gate area; and a SMA Major is being prepared for the agricultural operations and related farm dwellings.
- site description
All of the terrain has level topography with slopes generally 0 to 1.5 percent. There is no likeliness of significant erosion potential under present site conditions given the majority of the site is a level concrete pad.
- site drainage characteristics (up and down-gradient)
The site utilizes filter berms on the perimeter of the site to contain runoff on to the site's surface where it will dissipates via evaporation or permeation.
- drainage, waterways, bodies of water
Surface sheet flow only with minimal travel distance as site is level. There is nearby waterways: the Pacific Ocean. There are no on-site waterways.
- topography, existing roads, buildings, utilities
Topography is level, pervious surface, existing roads and pathways are Farrington Highway and the facility's driveway
- vegetation
Vegetation is sparse, most of the surface is barren with the exception of some areas with guineaw grass clumps.
- soils
Soils are P – pervious, and the majority is Jancus sands.
- proximity to natural or man-made water features *N/A*

Pueo Farm Erosion and Sedimentation Control Plan 2021

Grading Plan and Timetable

- description of proposed grading, seasonal limitations
There is proposed grading, excavation of farm dwelling found in the building plans, Hawaii has no seasonal limitations.
- timetable of all major construction and earth change activities, including stabilization methods for winter
N/A

Erosion Prevention and Sediment Control Plan and Timetable

- description of the strategies of the control plan and why it will be effective in protecting water resources

PLANNED EROSION AND SEDIMENTATION AND CONTROL PRACTICES

1. *Sediment Trap (ST) A Sediment Trap will be made available where necessary to pump out backfilled waters from excavation activities if groundwater is encounter during excavation (i.e – foundation stabilizers insertion) This is considered an unlikely event. All water from disturbed areas, will be directed to the ST™ unit before leaving the project locus if needed. Sample of ST shown:*



2. *Temporary Diversions (TD) Temporary diversions will be constructed above any work area next to resource areas. It is intended to prevent surface runoff from eroding any banks to marine water resources. These are commonly sediment logs of about 6-12” in height. Sample of TD shown:*



Figure 1 - Curlex Sediment Logs

3. *Wind Screen (WS) Wind Screening will be used to protect to ocean resources and detain airborne construction dust. This will be along the shoreline area of the Shoreline Setback line to prevent dust migration. This will be a temporary installation during the construction period. Sample of WS shown:*

4. *Land Grading (LG) grading may be required on approximately 5 acres total on the site but is unlikely excessive or deep due to the site’s levelness. Temporary diversions will be maintained at the edge of any grading area at all times for the building construction.*

5. *Dust control is not expected to be a problem due to the type of soil, the undisturbed perimeter of fencing and shoreline setback around the project work area, and the relatively short time of exposure (not to exceed 2 months for grading). Should excessive dust be generated during construction on the surface, it will be controlled by water sprinkling.*

Pueo Farm Erosion and Sedimentation Control Plan 2021

MAINTENANCE PLAN

1. All erosion and sediment control practices will be checked for stability and integrity following every runoff-producing rainfall but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed.
2. Sediment will be removed from the sediment trap and diversion berms as needed.
3. Sediment will be removed from behind the sediment logs when it becomes about 1/2 foot deep at the wattle log. The sediment log will be repaired as necessary to maintain effectiveness.

An inspection form such as below will be used and stored into records.

Sample BMP Inspection Form (from the construction of Drum Road, Kahuku, 2008)

3/19/2008 BMP Inspection Report

Construction BMPs Site Inspection Report

General Information			
Project Name	Drum Road, Phase II - Kiewit		
NPDES Tracking No.		Location	Kahuku
Date of Inspection	March 19, 2008	Start/End Time	7:00-8:00 AM
Inspector's Name(s)	Mark Howland		
Inspector's Title(s)	CEO & Chief Biologist		
Inspector's Contact Information	Cell: 508-958-1217		
Inspector's Qualifications	CV of Inspector included in BMP narrative in section 5.1		
Describe present phase of construction	Tree and shrub clearing of area for hosting wood chipper and residue mulch. Placement of silt fence to control runoff around work area.		
Type of Inspection:			
<input checked="" type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
If yes, provide:			
Storm Start Date & Time:	Storm Duration (hrs):	Approximate Amount of Precipitation (in):	
Weather at time of this inspection?			
<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: Temperature:			
Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
If yes, describe:			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
If yes, describe:			

Pueo Farm Erosion and Sedimentation Control Plan 2021

Site-specific BMPs

- Number the structural and non-structural BMPs identified in your BMPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Silt fence	X Yes <input type="checkbox"/> No	X Yes <input type="checkbox"/> No	Silt fence installed incorrectly in wrong direction
2		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	Engineer Sparks informed of need to change
3		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes X No	X Yes <input type="checkbox"/> No	Kiewit advised of need for corrective action

Pueo Farm Erosion and Sedimentation Control Plan 2021

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Non-Compliance

Describe any incidents of non-compliance not described above:

Pueo Farm Erosion and Sedimentation Control Plan 2021

Print name and title: Mark Howland, Chief Biologist ERC

Signature: _____ Date: _____

General Risks from construction projects:

Potential Sources of Pollution

Potential sources of sediment to stormwater runoff are:

- Clearing, grading, excavating, and un-stabilized areas
- Paving operations
- Demolition and debris disposal
- De-watering operations
- Drilling and blasting
- Material delivery and storage
- Landscaping Operations

Potential pollutants and sources, other than sediment, to stormwater runoff are:

Pollutants:

- Nutrients
- Heavy metals
- pH level in soil (acidic or base)
- pesticides or herbicides
- oils and greases
- bacteria and viruses
- trash, debris, and solid wastes
- other toxic chemicals

Potential Sources are:

- Clearing, grading, excavating, and un-stabilized areas
- Paving operations

Pueo Farm Erosion and Sedimentation Control Plan 2021

- Concrete wash-out and waste
- Structure construction (i.e.) culverts, headwalls, curbing
- Demolition and debris disposal
- De-watering operations
- Drilling and blasting
- Material delivery and storage
- Material use during construction
- Solid waste
- Hazardous waste
- Contaminated spills
- Sanitary/septic waste
- Vehicle use/fueling/storage
- Landscaping operations

To minimize these risks, the following BMPs are employed as common construction practices.

GENERAL CONSTRUCTION EROSION AND SEDIMENT CONTROL BMPS

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

Based on site-specific studies of work segments during construction, the following BMPS may be used where needed, though unlikely and noted as such below. These are listed so that the contractor team can be aware of the tools and products available should a need arise during construction. Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, and frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

1. Erosion control blankets (matting) in various forms from permanent (TRM – turf reinforcement mats) to biodegradable (temporary). Blankets shall be non-toxic and free of weed seeds. Excelsior and/or coco-fiber composites are preferred over straw and hay based materials due to invasive weed seed potentials. *Unlikely, no slopes on-site*
2. Siltation barriers such as sediment logs, bioberms, biodegradable siltation fencing, mulch, established and planted vegetative filter strips, and armored or paved curbing may be employed *Agreed, sediment logs/wattles will be employed along the perimeter*
3. Managed clearing practices to minimize ground cover removal, construction care of BMPs, prevention of disposal of slash and brush toward resource areas and mulching to be done in defined area to prevent nutrients from mulch. *N/A – no clearing expected or mulching, already done*
4. Soil stabilizers such as soil tackifiers, hydro-seeding, dust control, and soil hardeners will be employed as deemed necessary. *Not expected to be needed*

Pueo Farm Erosion and Sedimentation Control Plan 2021

5. Careful implantation of seed placement using species inured and conditioned to locale – care given to avoid annual species, salt-intolerant species, or maintenance-heavy species. Likely selected seed for hydroseeding or under erosion blankets are: St. Augustine's, zoysia, or seashore palladium.

Not expected to be needed except around farm dwellings

2.2 Control Stormwater Flowing onto and through the Project

Based on site-specific studies of work segments, the following BMPS may be used where needed.

Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, and frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

1. Existing natural runoff will be diverted away from the work area with the use of berms, sediment logs, diversion dikes, and/or siltation barriers *Will be employed*
2. Runoff from the work site shall be diverted to engineered discharge point and passed through BMPs before reaching receiving waters. BMPS employed may be settling basins, armored take-off channels in high flows, vegetated take-off channels in low flows, detention and retention basins, surface permeation and stormwater swales. *Evaporation in place is the expected mitigation, no discharge*
3. Roadway structures such as oil/gas separators, hydrologically-sized culverts, diversionary headwalls, concrete ditches, and roadway curbing may be employed where necessary. *Believe driveway is permeable crushed road, not paved*
4. Use of BMPS such as cable concrete, rock armoring, pea stone sediment traps and other structures to trap sediment-laden waters may be employed where necessary. *N/A*

2.3 Stabilize Soils

Based on site-specific studies of work segments, the following BMPS may be used where needed.

Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, and frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

1. Containment of rock, loam, or other soil materials in contained stockpile areas *Agreed – concrete materials will be in mobile trucks or building areas*
2. Temporary cover BMPS such as seeding, mulches, geo-synthetic matrixes, blankets, and mats will minimize erosion *Not believe to be needed, but sourcing of such products available on island*
3. Permanent BMPS such as soil binders, seeding, planting, and sodding, channel stabilization, and vegetative buffer strips. *N/A*
4. 70% vegetative cover will be the standard for successful soil stabilization. *N/A*

2.4 Protect Slopes

Based on site-specific studies of work segments, the following BMPS may be used where needed.

Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, and frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

Pueo Farm Erosion and Sedimentation Control Plan 2021

1. Erosion control blankets (matting) in various forms from permanent (TRM – turf reinforcement mats) to biodegradable (temporary). Blankets shall be non-toxic and free of weed seeds. Excelsior and/or coco-fiber composites are preferred over straw and hay based materials due to invasive weed seed potentials. **N/A – no slopes**
2. Siltation barriers such as sediment logs, bioberms, biodegradable siltation fencing, mulch, established and planted vegetative filter strips, and armored or paved curbing may be employed **N/A – no slopes**
3. Managed clearing practices to minimize ground cover removal, construction care of BMPs, prevention of disposal of slash and brush toward resource areas and mulching to be done in defined area to prevent nutrients from mulch. **N/A – no slopes**
4. Soil stabilizers such as soil tackifiers, hydro-seeding, dust control, and soil hardeners will be employed as deemed necessary. Hydroseeding may be seed-alone, seed with paper mulch, or bonded fiber matrix. **N/A – no slopes**
5. Careful implantation of seed placement using species inured and conditioned to locale – care given to avoid annual species, salt-intolerant species, or maintenance-heavy species. Likely selected seed for hydroseeding or under erosion blankets are: St. Augustine's, zoysia, or seashore palladium.

Will be detailed in the planting plan

2.5 Protect Storm Drain Inlets

Based on site-specific studies of work segments, the following BMPS may be used where needed. Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

1. Filter Barriers such as Catch Basin Guard, Sediment Sack, Dirt Bag, sandbags, rock-filled bags, and gravel berms.
2. Inlets to be fitted with oil gas separators where manholes are used.
3. Inlets to be designed to handle expected water flows – no surcharging allowed
4. BMPS will be used in conjunction with other BMPS from slope stabilization, work area containment, or stormwater discharge BMPs.

All not Applicable

2.6 Establish Perimeter Controls and Sediment Barriers

Based on site-specific studies of work segments, the following BMPS may be used where needed. Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, and frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

1. Siltation barriers such as sediment logs, bioberms, biodegradable siltation fencing, mulch, established and planted vegetative filter strips, and armored or paved curbing may be employed

These measure will be employed – sediment logs, perimeter curbing

2.7 Retain Sediment On-Site

Based on site-specific studies of work segments, the following BMPS may be used where needed. Determination of use will be geared toward proximity to waterbodies, stability of surrounding soils, and frequency of discharged water from natural runoff or work related runoff, and vegetative cover.

Pueo Farm Erosion and Sedimentation Control Plan 2021

1. Settling basins, sediment trap basins, detention and retention ponds will be used as BMPs to trap sediment laden water, and/or store water to match pre-development flow rates. **N/A**
2. Stabilized discharge BMPs such as armored take-off channels, concrete washboards, vegetative filter channels, stormwater swales will be employed where necessary. **N/A**
3. De-watering practices will be employed for accumulated rain water, construction waste waters, and evacuation of sediment-trap pond waters to de-watering areas where infiltration or removal of site from the work area is possible. **If needed.**

2.8 Establish Stabilized Construction Exits

1. Stabilized discharge of runoff waters use BMPs such as armored take-off channels, concrete washboards, vegetative filter channels, or stormwater swales, and will be employed where necessary. **N/A**
2. Geo-textile may be employed under rock or aggregates where underlying soils are mobile. **N/A**
3. Provide defined routes for vehicles entering or exiting the work locus. Train personnel to be aware of BMP locations and adhere to a no disturbance policy of the BMPs on-site. **As shown on layout plan in Appendix A.**

2.9 Additional BMPs

Other BMPs that may be employed if needed may include but not be limited to:

- Surface scarifying to slow runoff **N/A**
- Compaction techniques such as rollers and/or sheep's foot machines **N/A**
- Live staking of saplings/shrubs **See Appendix C**
- Brush piles and wattles **N/A**
- Composting **N/A**
- Hydro-sprigging **N/A**
- Sand bags and gravel bags **Potential**
- Compost berms **Not recommended due to nutrient overloading**
- Rock filters **driveway**
- Sediment basin baffles **perimeter**
- Soil contouring **N/A**
- Check dams **N/A**
- Energy dissipaters **N/A**
- Level spreaders **N/A**

Pueo Farm Erosion and Sedimentation Control Plan 2021

GOOD HOUSEKEEPING BMPS

The good housekeeping and pollution prevention BMPs that will be implemented to control pollutants in stormwater. These are standard construction practices. There are seven categories:

2.9.1 Material Handling and Waste Management

2.9.2 Establish Proper Building Material Staging Areas

2.9.3 Designate Washout Areas

2.9.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

2.9.5 Allowable Non-Stormwater Discharges and Control Equipment/Vehicle Washing

2.9.6 Spill Prevention and Control Plan

2.9.7 Any Additional BMPs

2.9.1 Material Handling and Waste Management

- Provide convenient and well-maintained toilet facilities located away from storm drains and waterways. Portable toilets to be securely fastened & >50' from resources
- Implement hazardous waste material handling standards and provide standard spill kits on site based on manpower/vehicle ratios
- Recycle materials where possible
- Establish daily litter and debris management practice
- Locate waste collection area off-site or near construction exits to minimize disposal near storm inlets or water bodies.
- Provide tie-downs for supplies and/or equipment in areas of high winds
- Educate all personnel on the function and location of BMPs
- Ban the burying of solid waste or the disposal of wastewater on-site
- Provide maintenance personnel to inspect for equipment leaks, structural failures, and proper storage of equipment and supplies.

2.9.2 Establish Proper Building Material Staging Areas

- Any hazardous materials such as oils, greases, paints, chemicals, additives, lubricants, or other hazardous materials shall not be store in work area. Containment should be in a proper facility outside the immediate work area. Storage area to include secondary containment of an encircling berm, dike, or curbing.
- Staging areas shall not be located where infiltration to groundwater is possible
- Provide a map in each segmental report of the location and type of staging area, and the measures employed to protect the environs form the area.

2.9.3 Designate Washout Areas

- If wash-out areas are on-site, minimize the number of locations.
- Designate locations based on distance to receiving waters, sensitive environmental areas, and cultural sites.
- Design facilities to minimize the use of water.
- Use signage to identify washout areas.
- Inspect Wash-out areas daily.
- Dispose of wash-out area collected materials off-site or recycle into construction process.

2.9.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

- Fuel off-site whenever possible
- Create an on-site fueling area with adequate safeguards for equipment that cannot be fueled off-site. Include location in each segmental BMP plan.
- Maintain spill kits at each location
- Cover the fueling area where possible to minimize stormwater entry and dilution of hydrocarbons.
- Allow only trained personnel to do fueling
- Collect all spent fluids and disposed of off-site in proper disposal facilities

2.9.5 Control Equipment/Vehicle Washing

- Provide a defined location for a vehicle wash rack and mark location on segmental BMP plans if done on-site *not advised*
- Insure that the wash waters drain to a settling pond or sediment-trap pond.
- Use high water pressure rather than detergents for wash action
- No other activities (such as vehicle repair) to be conducted in wash areas.

2.9.6 Spill Prevention and Control Plan

- File standard spill prevention, control, and countermeasure plan with appropriate authorities.

Pueo Farm Erosion and Sedimentation Control Plan 2021

2.9.7 Allowable Non-Stormwater Discharge Management

BMP plans and narrative will identify all allowable sources of non-stormwater discharges that are not identified. The allowable non-stormwater discharges identified might include the following:

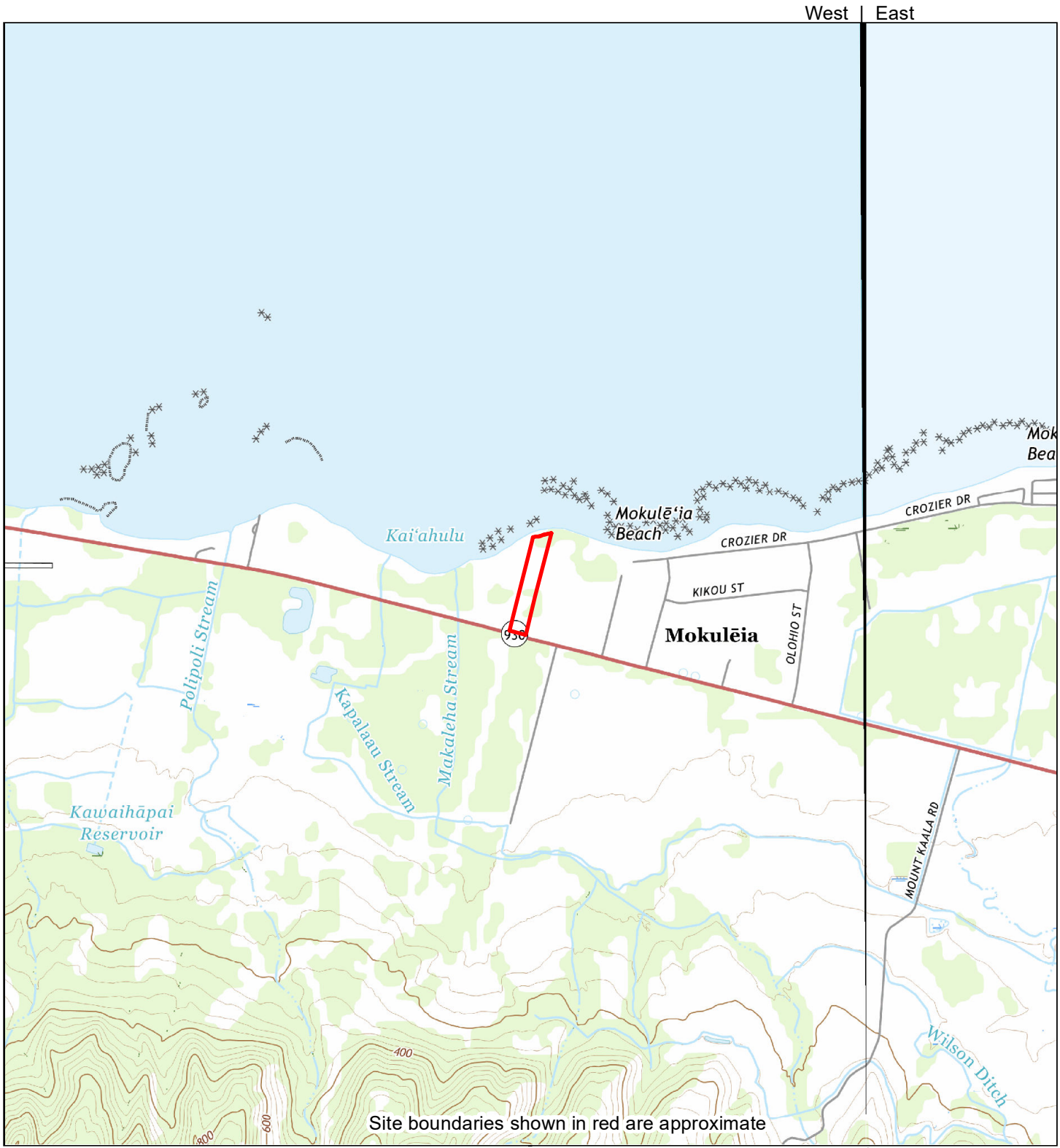
- ✓ Waters used to wash vehicles where detergents are not used
- ✓ Water used to control dust
- ✓ Potable water including uncontaminated water line flushing
- ✓ Routine external building wash down that does not use detergents
- ✓ Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
- ✓ Uncontaminated air conditioning or compressor condensate
- ✓ Uncontaminated ground water or spring water
- ✓ Foundation or footing drains where flows are not contaminated with process materials such as solvents
- ✓ Uncontaminated excavation dewatering
- ✓ Landscape irrigation

The amended BMP narrative will identify measures used to eliminate or reduce these discharges and the BMPs used to prevent them from becoming contaminated if identified during construction after pre-planning.

- description of seeding and mulching plan including:
 - location of areas to be seeded
 - lime and fertilizer application rates
 - seed mixes (appropriate for soil type)
 - types of mulch/matting materials and discussion of appropriateness of each measure for soil type, topography, etc.
 - mulch/matting application rates
 - mulch/matting anchoring methods (including discussion of wind-throw and winter conditions)
- N/A

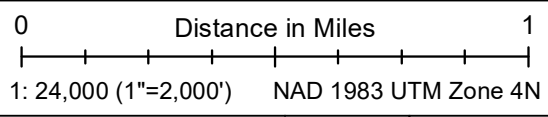
Pueo Farm
Erosion and Sedimentation
Control Plan

Appendix A
Topographical Map



Site boundaries shown in red are approximate

2017



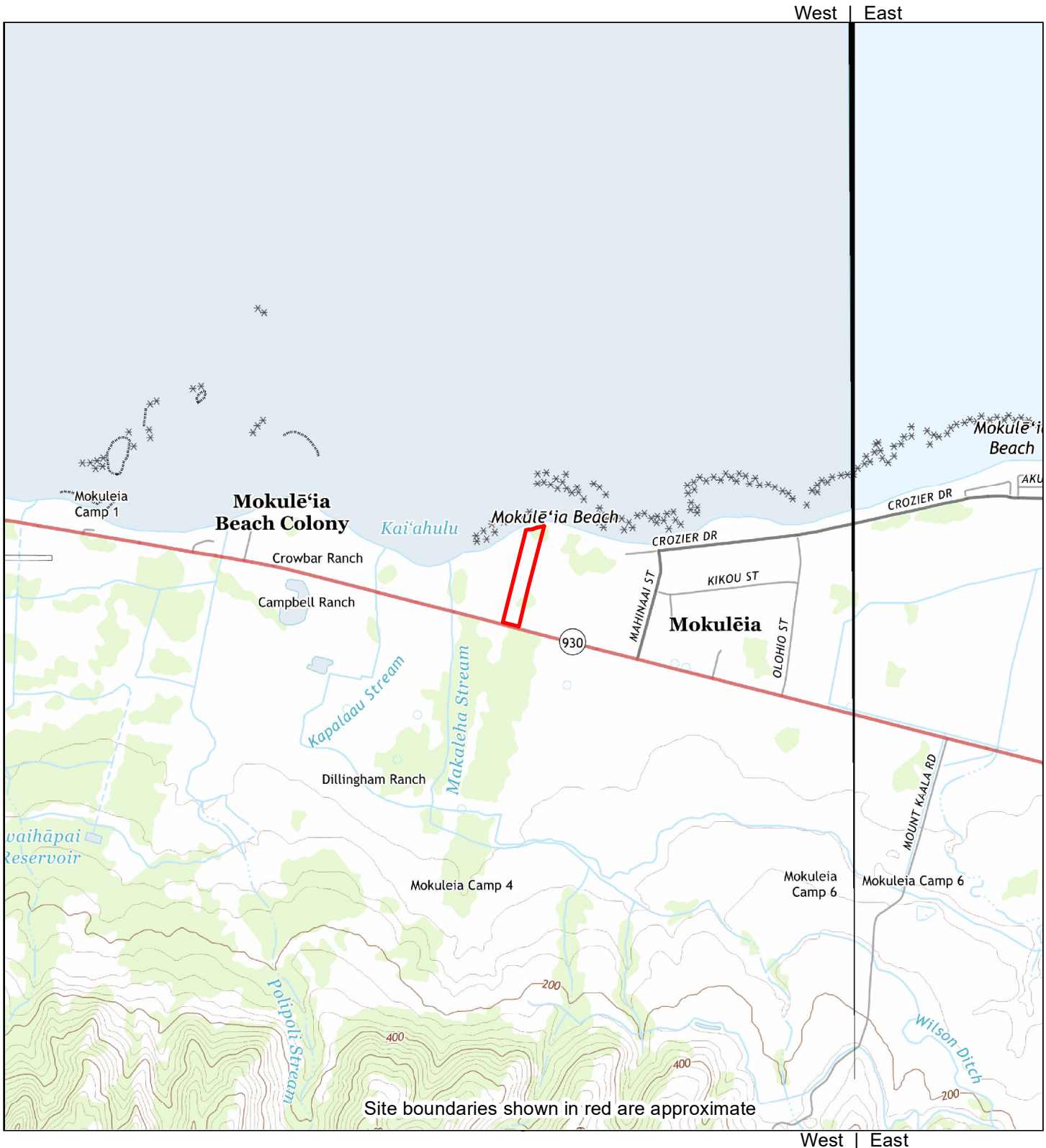
Site information:
 Pueo Farm
 68-431 Farrington Highway
 Waialua, HI 96791



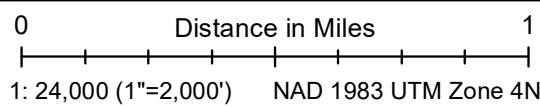
Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

WHALE Environmental Services LLC project #Pueo Farm 2021
 HIG #212056243 completed: 10/20/2021 09:14

Zone	Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	Haleiwa, HI	USGS	7½' x 7½'	2017	--	--	--
West	Kaena, HI	USGS	7½' x 7½'	2017	--	--	--



2013



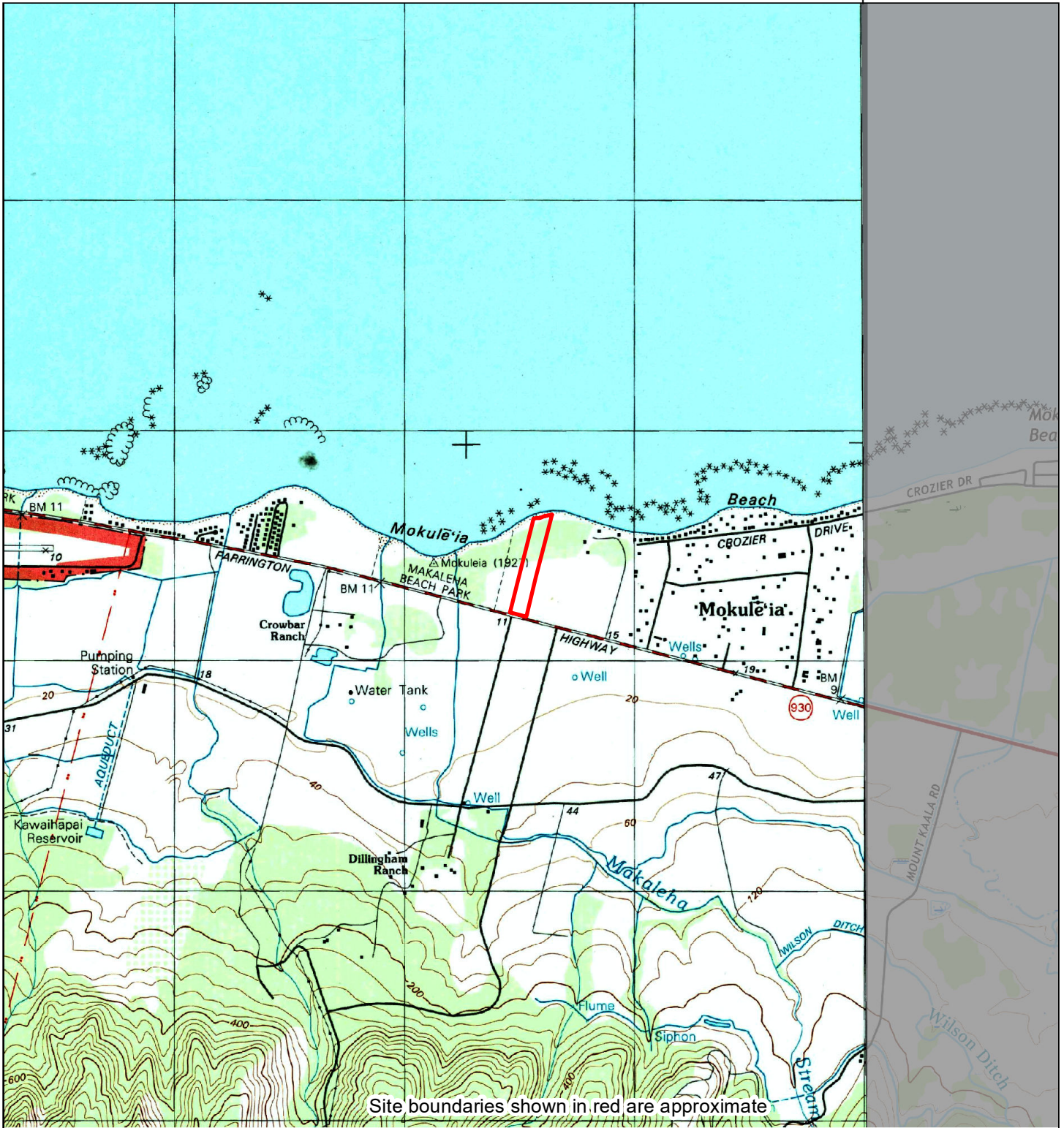
Site information:
 Pueo Farm
 68-431 Farrington Highway
 Waialua, HI 96791



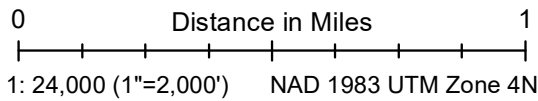
Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

WHALE Environmental Services LLC project #Pueo Farm 2021
 HIG #212056243 completed: 10/20/2021 09:14

Zone	Topographic Map Name	Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
					Photo Year	Inspected	Revised
East	Haleiwa, HI	USGS	7½' x 7½'	2013	--	--	--
West	Kaena, HI	USGS	7½' x 7½'	2013	--	--	--



1998



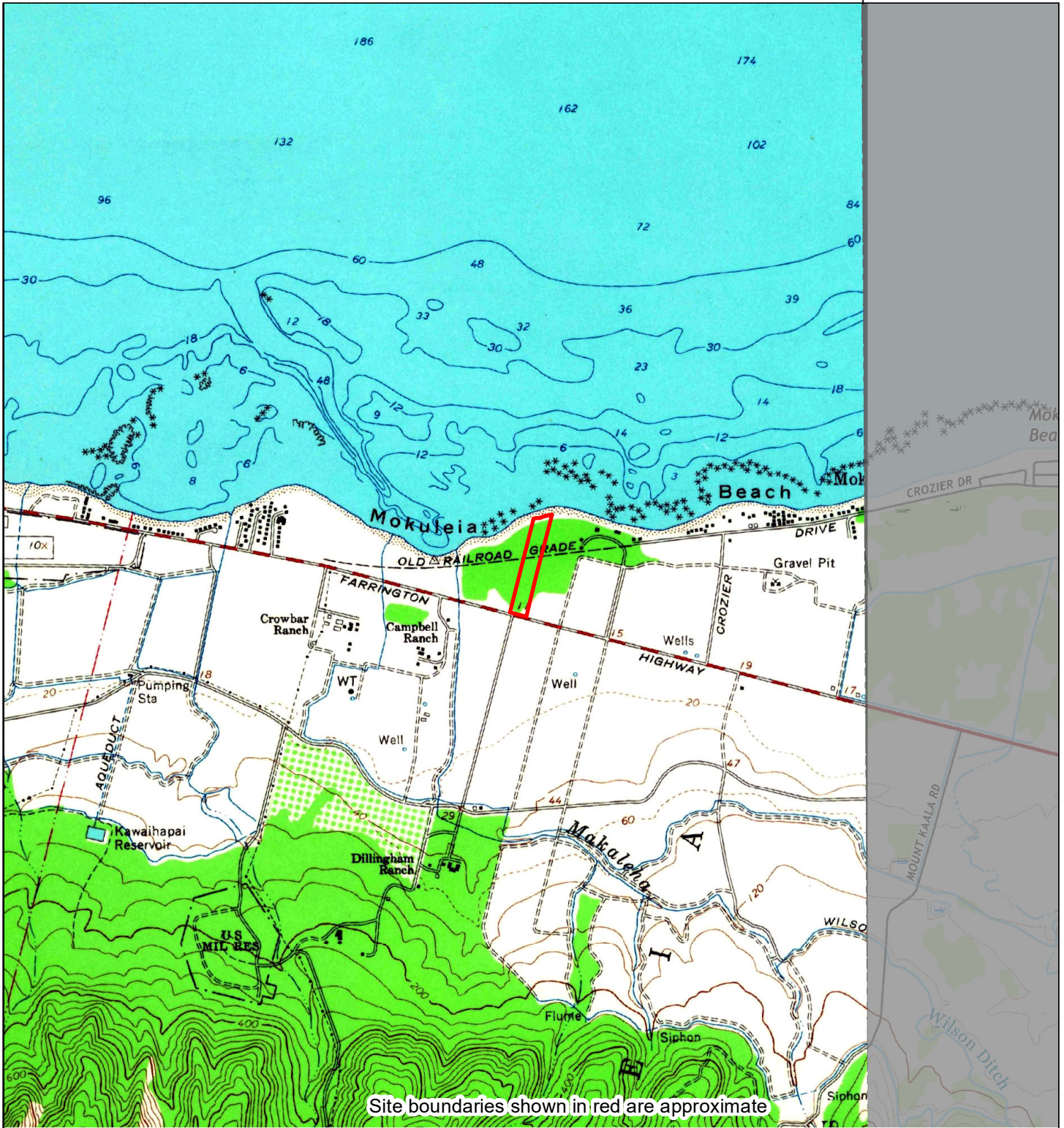
Site information:
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68-431 Farrington Highway
Waialua, HI 96791



Unified maps show subdued modern topo features where corresponding maps of the same year were not published.

WHALE Environmental Services LLC project #Pueo Farm 2021
HIG #212056243 completed: 10/20/2021 09:14

Zone Topographic Map Name		Publisher	Map Size	Base Map	Aerial Photo Topo Updates		
West	Kaena, HI	USGS	7½' x 7½'	1998	Photo Year	Inspected	Revised
					1998	--	--



Site boundaries shown in red are approximate

1964	<p>0 Distance in Miles 1</p>		<p>Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791</p>				
	<p>1: 24,000 (1"=2,000') NAD 1983 UTM Zone 4N</p>		<p>WHALE Environmental Services LLC project #Pueo Farm 2021 HIG #212056243 completed: 10/20/2021 09:14</p>				
<p>Unified maps show subdued modern topo features where corresponding maps of the same year were not published.</p>			<p>Aerial Photo Topo Updates</p>				
Zone	Topographic Map Name	Publisher	Map Size	Base Map	Photo Year	Inspected	Revised
West	Kaena, HI	USGS	7½' x 7½'	1964	1954	--	--



<h1>1954</h1>	<p>0 Distance in Miles 1</p> <p>1: 24,000 (1"=2,000') NAD 1983 UTM Zone 4N</p>	<p>Site information: Pueo Farm 68-431 Farrington Highway Waialua, HI 96791</p>		
		<p>Unified maps show subdued modern topo features where corresponding maps of the same year were not published.</p>		
<p>Zone Topographic Map Name Publisher Map Size Base Map Aerial Photo Topo Updates</p> <p>West Kaena, HI USGS 7½' x 7½' 1954 Photo Year Inspected Revised</p> <p>1952 -- --</p>				

Pueo Farm
Erosion and Sedimentation
Control Plan

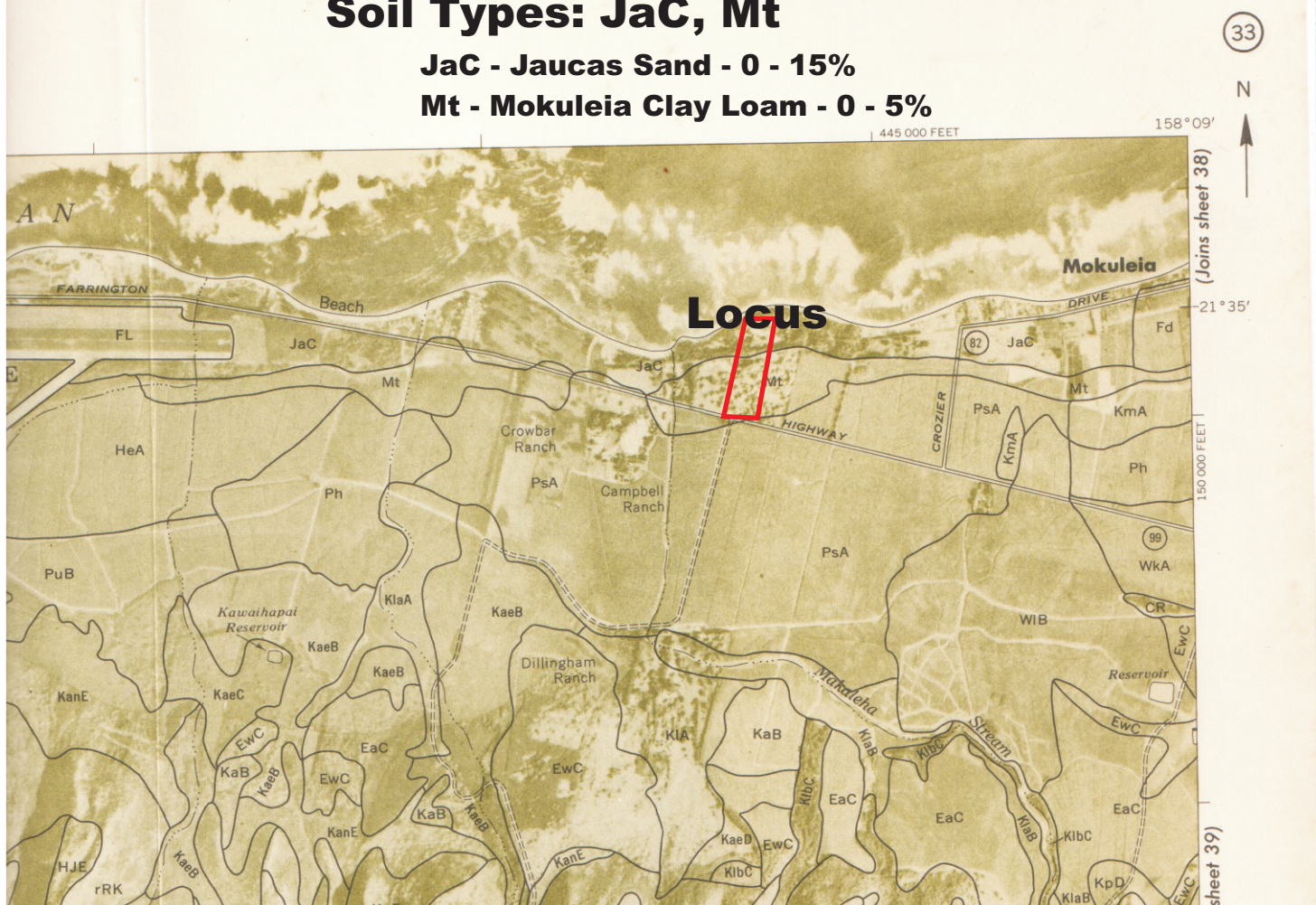
Appendix B
Flood Hazard map
Soil Survey

Soil Survey of Islands of Kauai, Oahu, Maui Molokai & Lanai

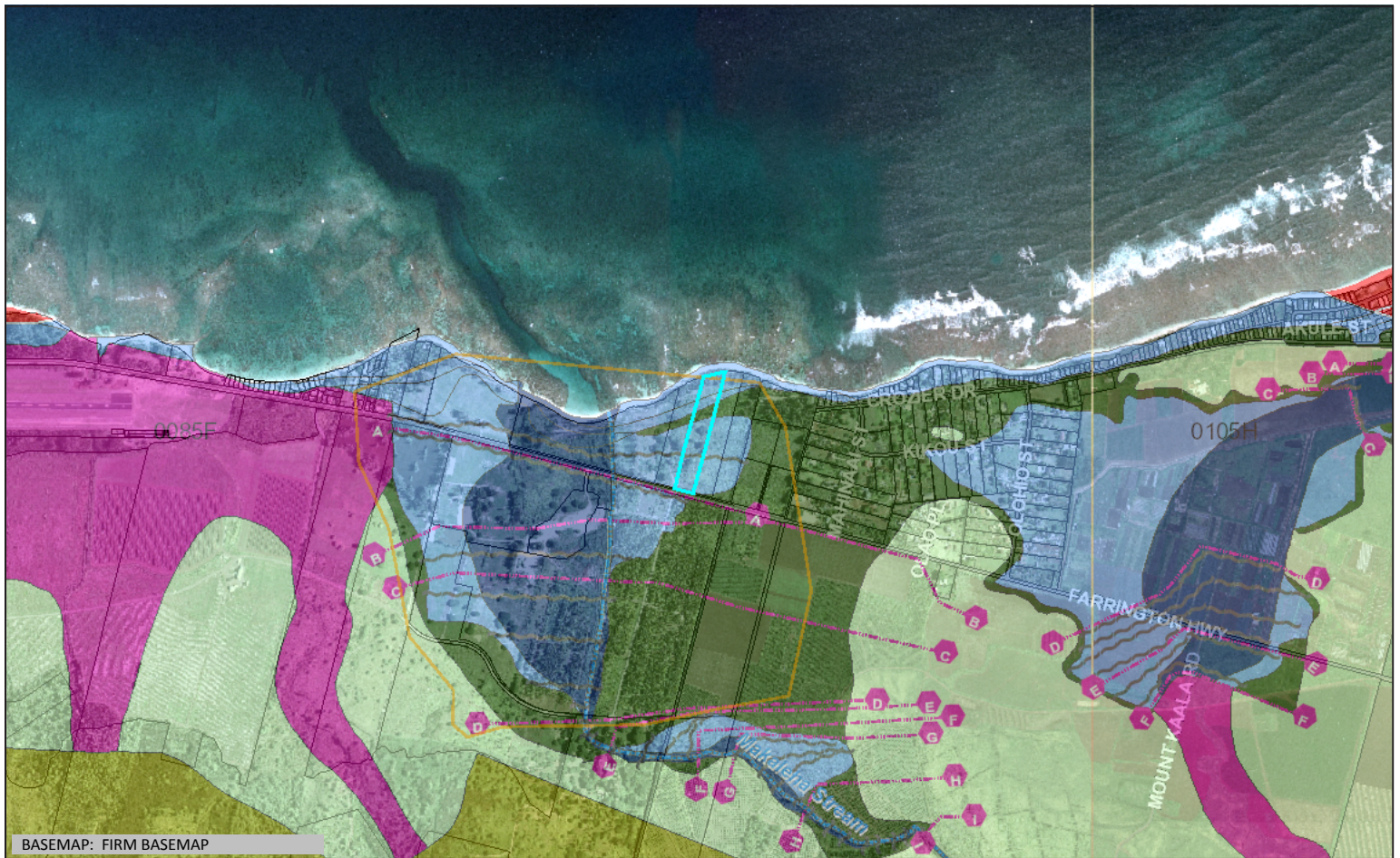
Soil Types: JaC, Mt

JaC - Jaucas Sand - 0 - 15%

Mt - Mokuleia Clay Loam - 0 - 5%



U. S Department of Agriculture
Soil Conservation Service
(now Natural Resources Geological Survey)



BASEMAP: FIRM BASEMAP



Flood Hazard Assessment Report

www.hawaiiinfip.org

Pueo Farm

Property Information

COUNTY: HONOLULU
 TMK NO: (1) 6-8-003:045
 WATERSHED: MAKALEHA
 PARCEL ADDRESS: ADDRESS NOT DETERMINED
 WAIALUA, HI 96791

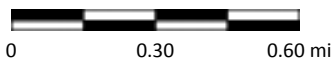
Notes:

Flood Hazard Information

FIRM INDEX DATE: NOVEMBER 05, 2014
 LETTER OF MAP CHANGE(S): 11-09-0171P
 FEMA FIRM PANEL: 15003C0085F
 PANEL EFFECTIVE DATE: SEPTEMBER 30, 2004

THIS PROPERTY IS WITHIN A TSUNAMI EVACUATION ZONE: YES
 FOR MORE INFO, VISIT: <http://www.scd.hawaii.gov/>

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
 FOR MORE INFO, VISIT: <http://dlnreng.hawaii.gov/dam/>



Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND

(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

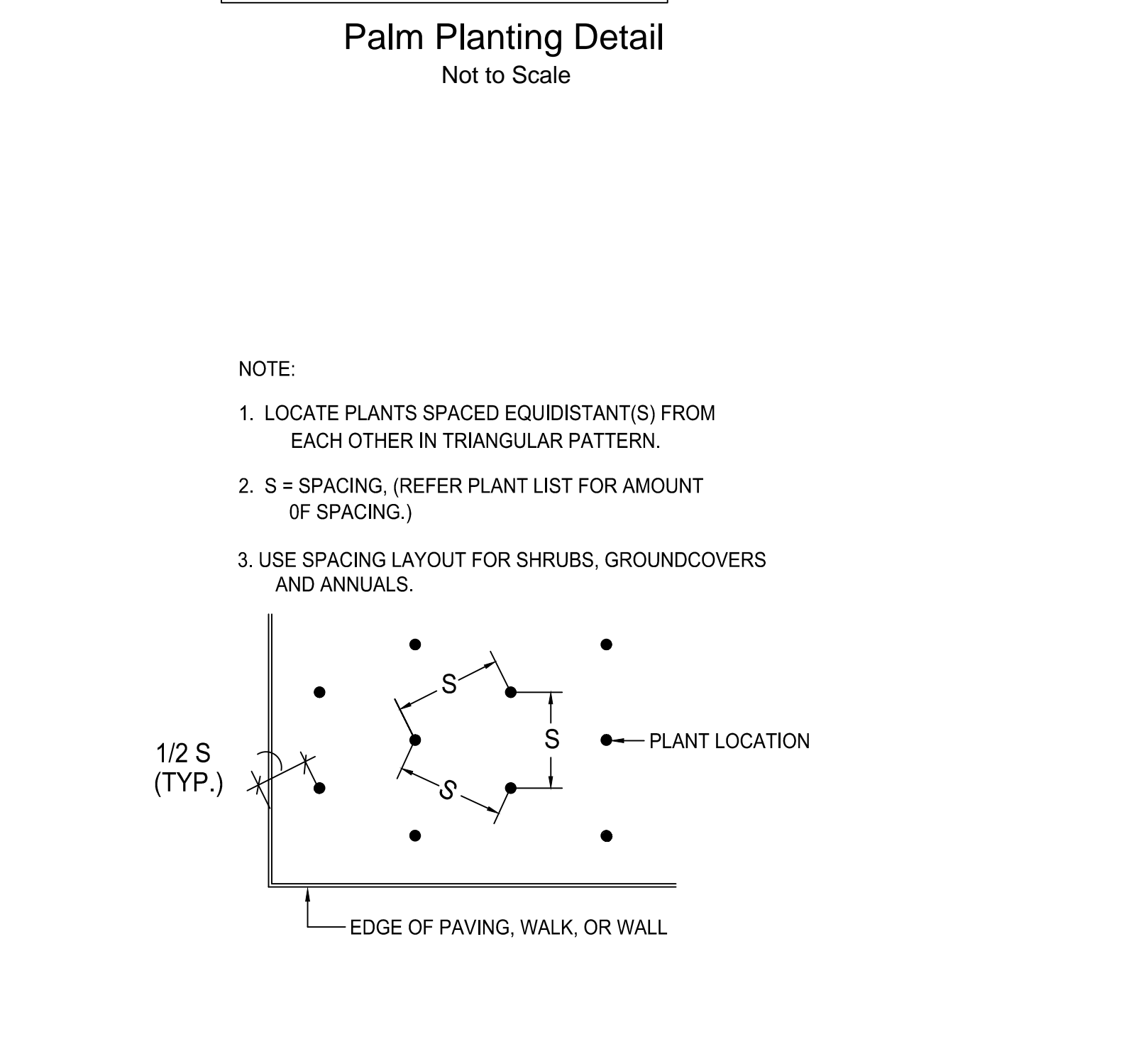
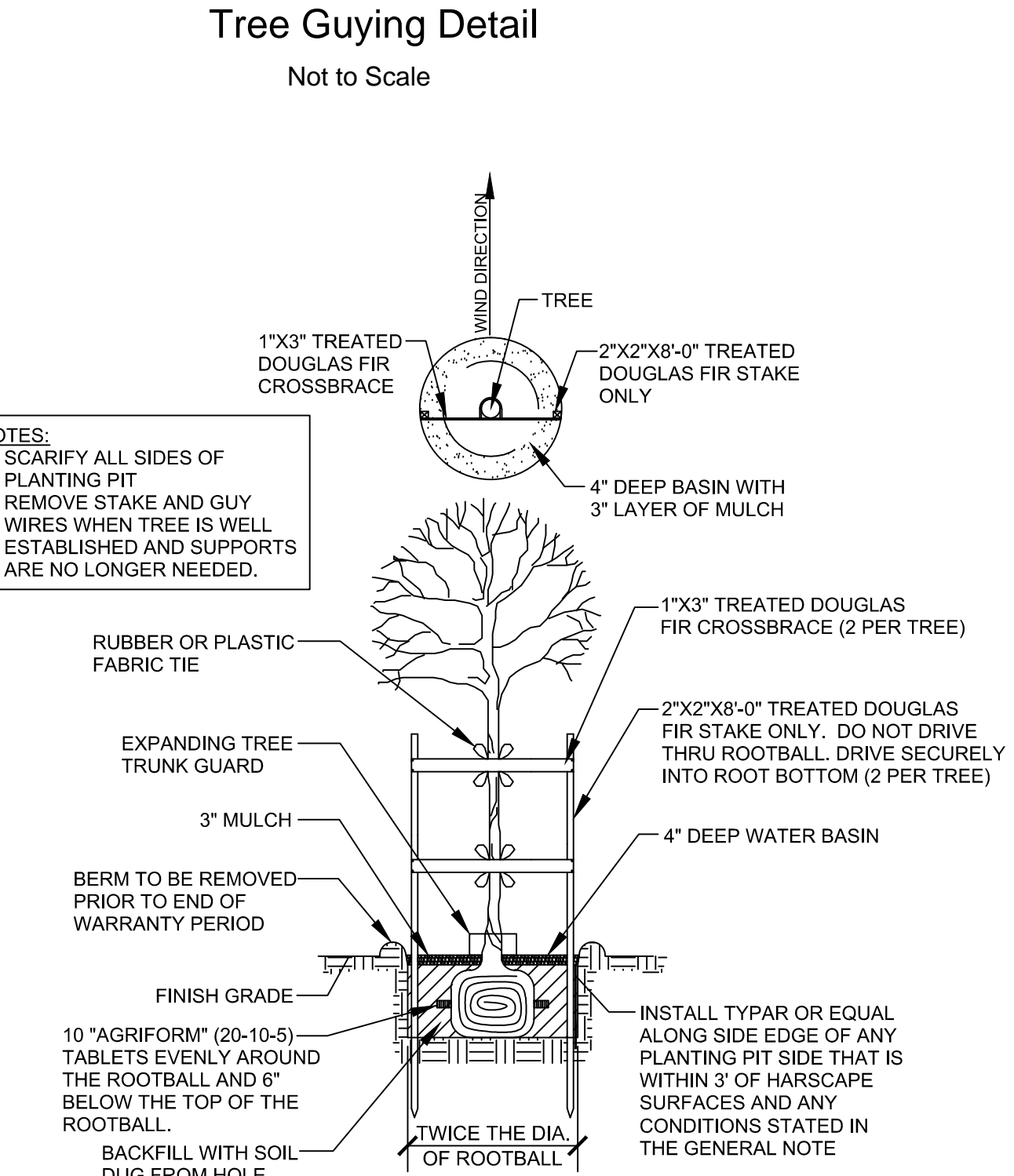
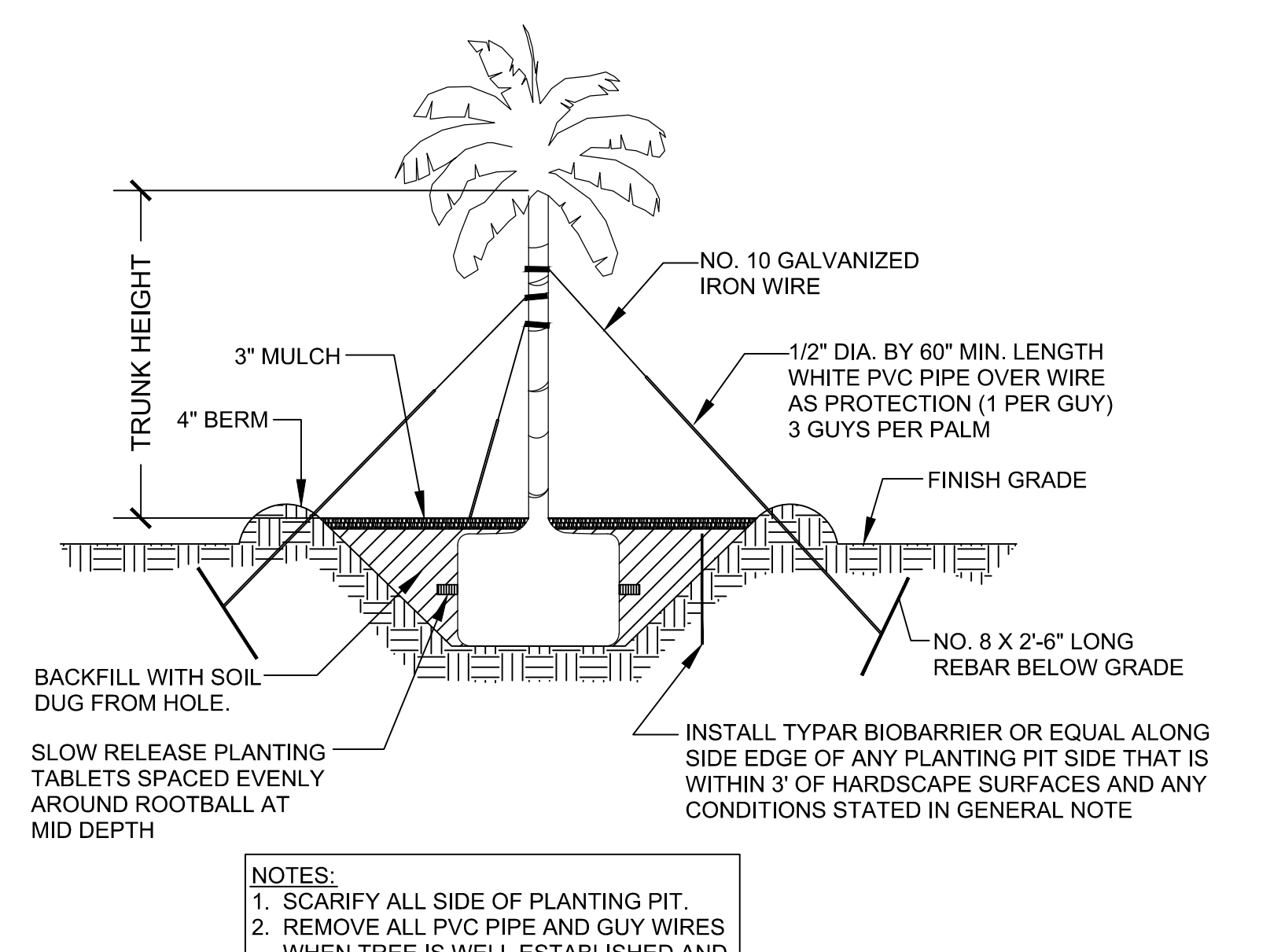
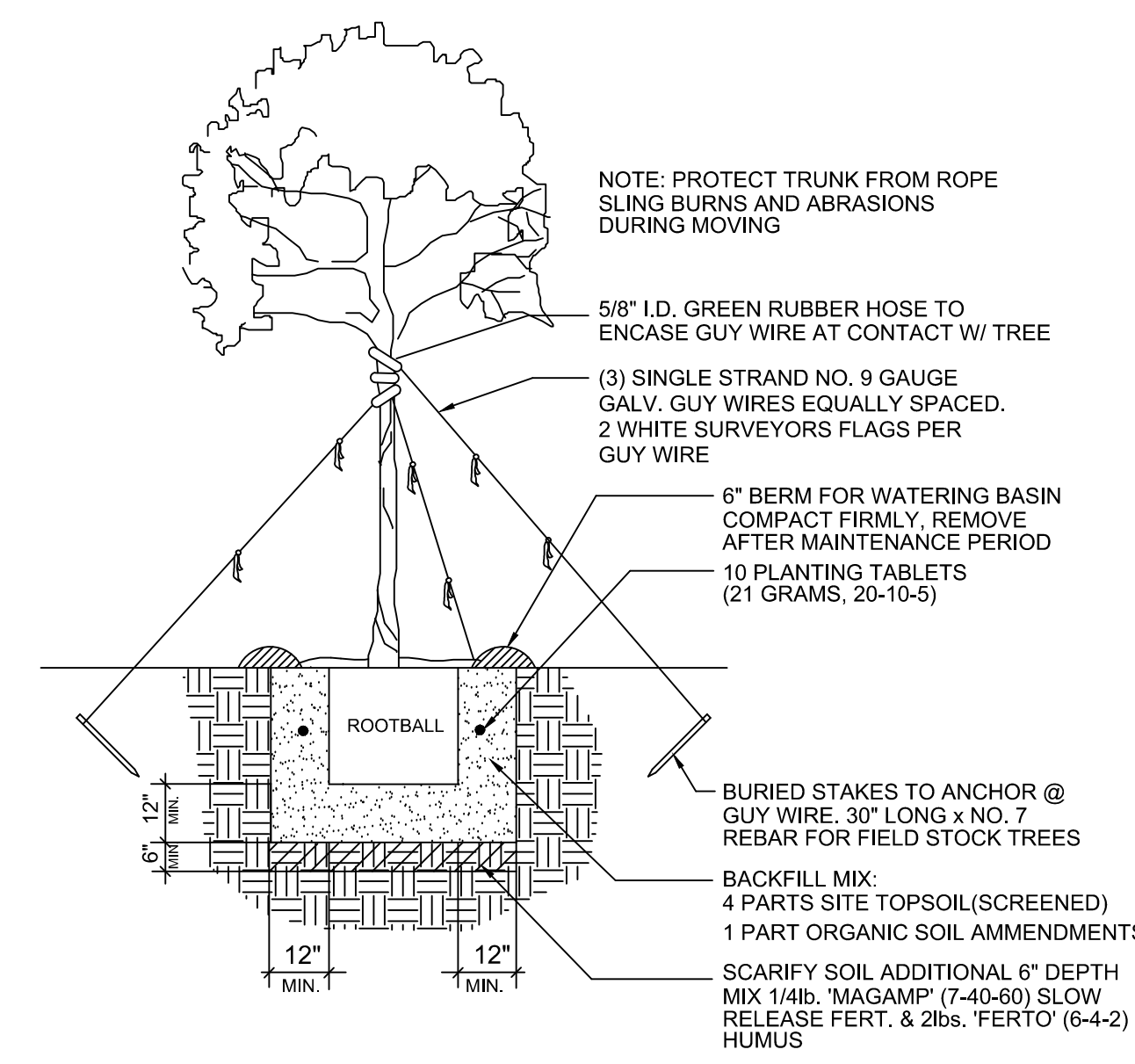
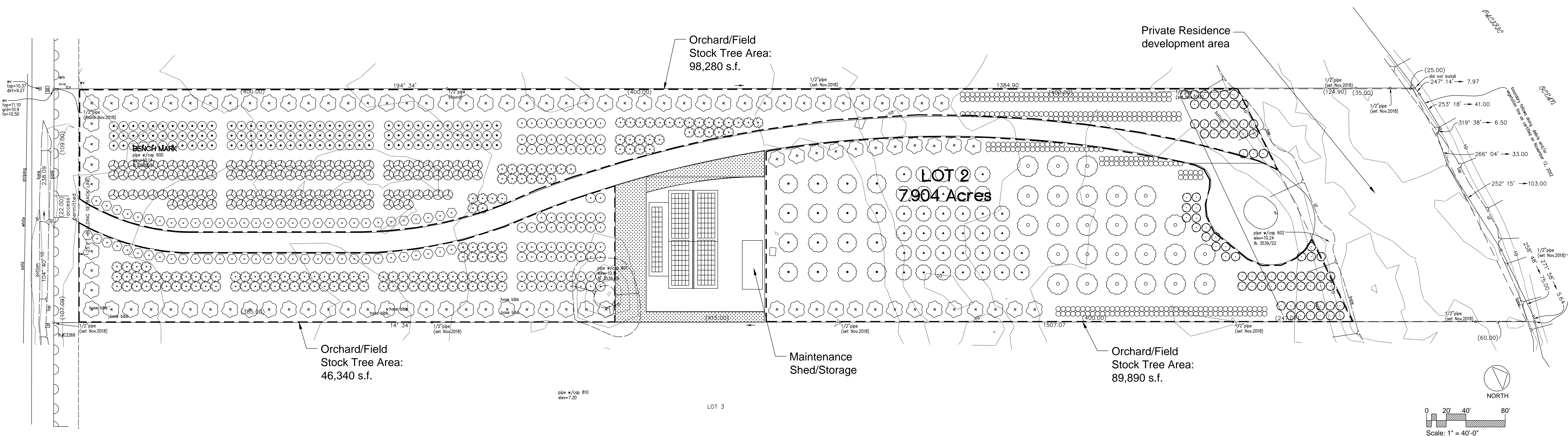
	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase applies, but coverage is available in participating communities.
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Pueo Farm
Erosion and Sedimentation
Control Plan

Appendix C
Preliminary Building Plans



FRUIT ORCHARD TREES

- Artocarpus altiiis
'Ulu/Breadfruit
Plant at 30' o.c. spacing
- Persea americana
Avocado
Plant at 20' o.c. spacing
- Mangifera indica
Mango
Plant at 30' o.c. spacing

MISC. LANDSCAPE

- Agave attenuata
Swan's Neck Agave
Plant at 2' o.c. spacing
- Golden Glory (Arachis pintoi)
groundcover to be used under specimen tree and fruit trees to prevent erosion control and for dust control. Golden Glory can tolerate light foot and vehicle traffic)

SPECIMEN TREE NURSERY FIELD STOCK TREES

- Cordia subcordata
Kou
Plant at 20' o.c. spacing
- Delonix regia
Golden Poinciana
Plant at 10' o.c. spacing
- Gardenia taitensis
Tiare Gardenia
Plant at 5' o.c. spacing
- Hibiscus tiliaceus 'Dwarf'
Dwarf Hau
Plant at 10' o.c. spacing
- Lagerstromia speciosa
Crepe Myrtle
Plant at 10' o.c. spacing
- Magnolia grandiflora
Magnolia
Plant at 10' o.c. spacing
- Pritchardia hillebrandii
Loulou lelo
Plant at 10' o.c. spacing
- Tournefortia argentea
Beach Heliotrope
Plant at 10' o.c. spacing

GENERAL NOTES-PLANTING

1. DRAWINGS ARE DIAGRAMMATIC. CONTRACTOR TO VERIFY ALL LOCATIONS OF EXISTING EQUIPMENT, STRUCTURES, AND CONDITIONS IN FIELD. COUNT ALL PLANT MATERIAL BEFORE BIDDING.
2. DO NOT WILLFULLY INSTALL PLANTING IF A CONDITION EXISTS WHERE IT IS OBVIOUS IN THE FIELD THAT THE PROPOSED LAYOUT IS OBSTRUCTED BY AN EXISTING CONDITION, AND/OR GRADE DIFFERENCE THAT MAY NOT HAVE BEEN CONSIDERED IN THE DESIGN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE LANDSCAPE ARCHITECT SO THAT CONSTRUCTION CAN BE CORRECTED IN THE FIELD. IF THIS NOTIFICATION IS NOT GIVEN, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY NECESSARY REVISIONS.
3. FINISH GRADE TO BE 1/2" BELOW ALL WALKS, CURBS, AND PAVING.
4. ALL NEW PLANTING AREA TO RECEIVE 6" AMEND TOPSOIL. PLANTING PIT TO BE TWICE AS WIDE AND ONE AND A HALF TIMES AS DEEP AS PLANT ROOTBALL, UNLESS OTHERWISE NOTED. BACKFILL AND COMPACT TO 80% WITH 4 PARTS TOPSOIL, 1 PART ORGANIC SOIL AMENDMENT, AND 15 LBS. 'GO-POWER' OR EQ. PER MANUFACTURER'S SPECIFICATIONS. PLACE TABLETS BETWEEN THE BOTTOM OF THE ROOTBALL, BUT NO HIGHER THAN 1/2 OF THE WAY UP TO THE SURFACE OF THE ROOTBALL. SPACE TABLETS EQUALLY AROUND THE PERIMETER OF THE ROOTBALL APPROX. 2' FROM ROOT TIPS.
5. ALL PROPOSED SHRUB AND GROUNDCOVER AREAS ARE TO BE TREATED WITH A PRE-EMERGENT WEED KILLER (RONSTAR OR EQ.) APPLY PER MANUFACTURER'S SPECIFICATIONS.
6. CONTRACTOR SHALL REPAIR AT HIS OWN EXPENSE ANY DAMAGE WHICH OCCURS DURING PROJECT INSTALLATION.
7. UTILITIES: PRESERVE IN OPERATING CONDITION ALL ACTIVE UTILITIES ON SITE. CONTRACTOR SHALL REPAIR ANY DAMAGE TO SUCH UTILITIES CAUSED BY WORK UNDER HIS CONTRACT AT NO EXPENSE TO THE OWNER. CONTRACTORS SHALL REPAIR ANY DAMAGED UTILITIES TO THE SATISFACTION OF THE OWNING UTILITY COMPANY AND OWNER.
8. ALL DEBRIS RESULTING FROM THE WORK OF THIS SECTION, INCLUDING TOOLS, EQUIPMENT, AND APPLIANCES USED SHALL BE REMOVED FROM SITE UPON UPON COMPLETION OF THE WORK.
9. 'DEEP ROOT BARRIERS' ARE TO BE USED AROUND ALL TREES AND PALMS WITHIN 5' OF PAVING OR STRUCTURE. INSTALL PER MANUFACTURER'S INSTRUCTIONS. INSTALL ROOT BARRIERS AROUND ALL TREES AND PALMS WITHIN 10' OF WATER FEATURES.
10. ALL 5 GALLON AND LARGER CONTAINER GROWN TREES TO BE STAKED PER DETAILS. FIELD STOCK TREES SHALL BE GUYED, PER DETAIL.
11. GUARANTEE: PLANT MATERIAL INSTALLED UNDER THE CONTRACT SHALL BE GUARANTEED AGAINST ANY AND ALL POOR AND/OR INFERIOR MATERIALS AND/OR WORKMANSHIP FOR A PERIOD OF ONE YEAR. ANY PLANT FOUND TO BE DEAD OR IN A POOR CONDITION DUE TO FAULTY MATERIALS OR POOR WORKMANSHIP SHALL BE REPLACED BY THE CONTRACTOR AT HIS/HER EXPENSE.
12. POST-INSTALLATION MAINTENANCE PERIOD: LANDSCAPE CONTRACTOR SHALL INCLUDE A 90 DAY (3 MONTH) POST-INSTALLATION MAINTENANCE PERIOD WITHIN THE SCOPE OF WORK. START OF MAINTENANCE PERIOD WILL COMMENCE ONCE FINAL INSTALLATION PUNCHLIST HAS BEEN COMPLETED AND APPROVED BY LANDSCAPE ARCHITECT. WRITTEN NOTIFICATION OR START DATE WILL BE ISSUED BY THE LANDSCAPE ARCHITECT.
13. CONTRACTOR MUST IMPLEMENT BMP STANDARDS TO ANY PROJECT AREAS SUBJECT TO GRADING, EROSION CONTROL, OR SURFACE RUN OFF.
14. CONTRACTOR SHALL CONTACT HAWAII'S ONE CALL CENTER (1-866-423-7287) PRIOR TO ANY EXCAVATION OR TRENCHING ACTIVITIES.

TOTAL PROPERTY AREA DEDICATED TO FRUIT TREE ORCHARD AND SPECIMEN FIELD STOCK TREE NURSERY:
234,510 S.F. (5.38 ACRES)

PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX H

CULTURAL IMPACT
ASSESSMENT

Cultural Impact Assessment – Pueo Farm

CULTURAL IMPACT ASSESSMENT OF PUEO FARM IN SUPPORT OF AN ENVIRONMENTAL ASSESSMENT OF ITS PROPOSED AGRICULTURAL AND RESIDENTIAL DEVELOPMENT

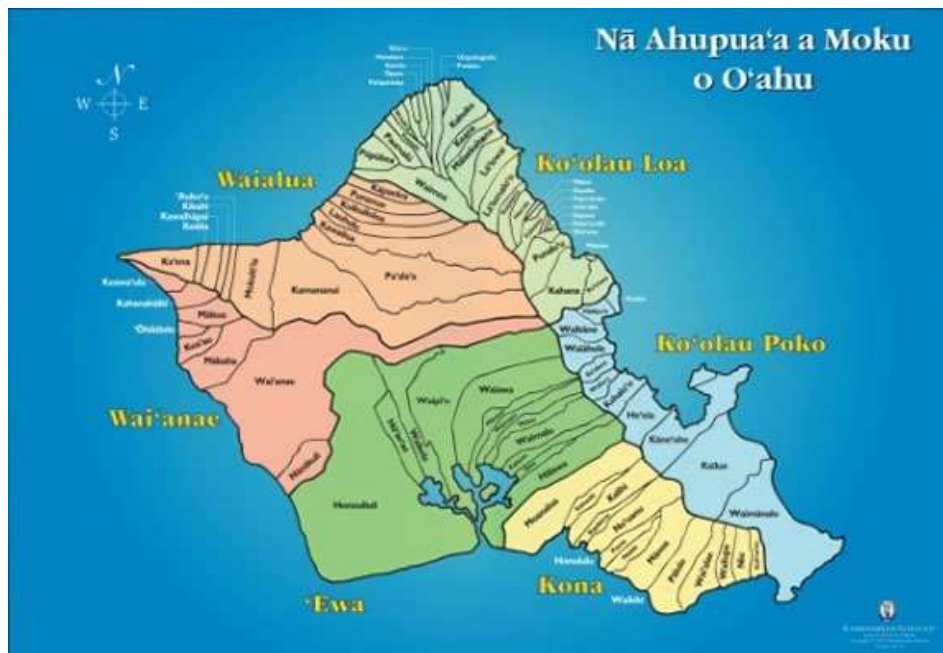
MOKULĀ'IA AHUPUA'A, WAIALUA MOKU DISTRICT, ISLAND OF OAHU
TMK (1) 6-8-003:045

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Pueo Farm
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October 2021



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ABSTRACT – EXECUTIVE SUMMARY

WHALE Environmental Services LLC has completed a Cultural Impact Assessment (CIA) of the Pueo Farm location in Waialua and its proposed development as an agricultural operation with farm dwellings. The approximately 7.9 project area is located in Mokulē‘ia Ahupua‘a, Waialua Moku District, Oahu Island, located at 68-431 Farrington Highway.

The trail is TMK (1) 6-8-003:045. This CIA is written in accordance with HRS § 343 (law governing Environmental Impact Statements [EIS]) and HAR § 11-200 (rules governing content of EIS and Environmental Assessment [EA] documents) as well as the OEQC’s 2012 *Guide to the Implementation and Practice of the Hawaii Environmental Policy Act*.

We conducted one formal interview with Thomas Shirnia for this CIA, and also spoke informally about the proposed project with (1) OHA, Kamamaka Ferreira, Lead Compliance manager, and (2) Buddie Crabbe, Cultural Specialist of Waimea Valley. The results of these consultations are presented in this CIA along with the findings of our archival research, which included historical map analysis; review of Māhele ‘Āina (Land Commission) records; a consideration of the Hawaiian cultural landscape; nineteenth-century developments in and near the project area; early twentieth-century developments in and near the project area.

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INTRODUCTION

On behalf of the landowner, Mr. Paul Alston of Pueo Farm, WHALE Environmental Services, LLC, has completed a Cultural Impact Assessment (CIA) of the Pueo Farm project. The approximately 7.9 acre project area is located in Mokulē‘ia Ahupua‘a, Waialua Moku District, Oahu Island.

The project is in TMK (1) 6-8-003:045. In general, the objective of the proposed project is to develop an agricultural enterprise with farm dwellings. The project lies in a Special Management Area (SMA) and is in the process of applying for an SMA Major Permit for the development. A SMA Minor Permit has already been issued for the entrance gate, walls and fencing.



Figure 1 - Locus Map (in red border) 1

Purpose and Content of Cultural Impact Assessments

This CIA is designed to satisfy HRS § 343 (law governing Environmental Impact Statements [EIS]) and HAR § 11-200 (rules governing content of EIS and Environmental Assessment [EA] documents) as well as the OEQC’s 2012 Guide to the Implementation and Practice of the Hawaii Environmental Policy Act (see Appendix A for a relevant excerpt). Interestingly, cultural resources valued by individuals and communities with historical and genealogical ties to a given project area may be different than those deemed significant by “outsiders,” including scientists, anthropologists, and other researchers not from the area.¹ Likewise, the same resource may be valued in different ways by “insiders” and “outsiders.” A pertinent example in this study is the abundance of

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ironwood trees (*See Botanical and Faunal Assessment in the EA*) in the project area. This resource may be viewed by those interested in the pre-Contact Hawaiian landscape as invasive species, reflecting the history of deforestation and loss in the Waialua moku; and others, for example, may interpret these trees as part of the work history of the Civilian Conservation Corps (CCC) in the 1930s. In CIA work, we are interested in both of these perspectives. Our objectives are to identify *all* the various types of cultural resources in and near the project area, to explain why they are important to different individuals or groups, and to recommend ways they can be preserved or protected, if appropriate. We are also interested in expressing the intangible values people attribute to the project area. Maly and Maly (2005), citing Kent et al. (1995), use the term “cultural attachment” to describe this important class of phenomenon:

“Cultural Attachment” embodies the tangible and intangible values of a culture—how a people identify with, and personify the environment around them. It is the intimate relationship (developed over generations of experiences) that people of a particular culture feel for the sites, features, phenomena, and natural resources etc., that surround them—their sense of place. This attachment is deeply rooted in the beliefs, practices, cultural evolution, and identity of a people. The significance of cultural attachment in a given culture is often overlooked by others whose beliefs and values evolved under a different set of circumstances. (Maly and Maly 2005:3)

In Hawai‘i, commonly identified cultural resources include archaeological sites; burial sites and cemeteries; *wahi pana* (legendary places associated with oral history); natural landscape features such as *pu‘u* (e.g., hills, outcrops and other promontories), ridges, and water sources and courses; natural phenomena such as characteristic weather patterns, winds and rain (many of which have place-specific names); and other place names and landscape features that are important to local families. Such resources need not necessarily refer to Hawaiian culture but may also include other ethnic groups.

Anthropologists have long recognized the value in studying both “insider” and “outsider” perspectives, called “emic” and “etic,” respectively, when trying to understand cultural values and significance.

In Hawaiian culture, there is no hard and fast distinction between cultural and natural resources; thus, for example, a clean and healthy kahawai (stream) is just as much a cultural resource—because its existence is crucial to carrying out traditional and customary practices such as irrigated (pond-field) agriculture—as a natural one.

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We conducted one formal interview with Thomas Shirnia for this CIA, and spoke informally about the proposed project with (1) Kamamaka Ferreira, of OHA; and (2) Buddie Crabbe of Waimea Valley. The results of this consultation are presented in this CIA along with the findings of our archival research, which included historical map analysis; review of Māhele ‘Āina (Land Commission) records; information on the Hawaiian cultural landscape; nineteenth-century developments in and near the project area; and early twentieth-century developments in and near the project area.

Project Area Description

The Pueo Farm project has frontage along the Farrington Highway, directly across from the entrance to Dillingham Ranch; and heads across relatively level ground, in the makai direction, until it connects with the Pacific Ocean. The terrain over which the project passes is relatively level. Mean annual rainfall in the project area is approximately 35 inches, but it also receives additional precipitation from sea mist that rolls in during high wave periods. Due to its relatively low elevation (~ 0 to 20 ft. above mean sea level), the project area in its whole receives a great deal of sea mist for which the vegetation is distressed and stunted by the salt content. The area has a mean annual temperature of 73°F.

A Biological Survey (WES 2021) of the project area provides some information on historic and modern changes to the landscape and vegetation in and around the project area.

According to WES 2021), prior to the arrival of the first humans on Oahu, vegetation in and around the project area was likely a forest with a canopy of milo and/or naupaka.

Following the start of Hawaiian settlement in the islands, *“a series of forces including fires, agriculture, forestry, and introduced plants, animals, and diseases transformed the site [project area] to predominantly non-native vegetation”* (ibid.) In historic times, the primary land uses would have been cattle grazing and/or agricultural plantings. Currently, the project area and environs is vacant and the historical aerial imagery for the site seen in the Environmental site Assessment (ESA) in the EA shows its vacant status since at least 1951 and present day representative photographs of the project area taken on our recent (October, 2021) reconnaissance for both the botanical and ESA reports.

Topographical maps for the project area may also be found in the ESA over several decades and again no change in site elevation for many decades has persisted.

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METHODS

This section describes the methods of a field inspection, archival research, consultation/interviews, and report writing activities for this project.

Field Inspection

We obtained details on the proposed project development and its geospatial location prior to conducting a field inspection for this CIA (see *Conceptual Plan for Pueo Farm – Appendix 2*). Mr. Mark Woodfield (Builder - Landmark Builders) provided data (drawings) of the planned development.

Mitigating Factors, Conditions and Caveats

In general, our objective was to walk as precisely as possible the entire project area. In reality, conditions on the ground in a small portion of the project area made this not possible. There are portions where the ground surface is simply not visible, covered with stockpile gravel for driveway construction on less than ¼ acre of the 7.9 acre site. In most of the project area, ground visibility is generally good to excellent, and one can observe conditions on the ground surface from a distance without having to walk over every square foot.

Archival Research

Prior to going into the field, Howland utilized UHWO Hawai'i's reference library to obtain some general information about the project area and its environs. Howland also visited the State Historic Preservation Division's (SHPD) library of reference materials online (no reports of any previous archaeological studies in or near the project area were found). We also utilized these on-line databases to obtain cultural, historical and archaeological data:

- OHA's Papakilo database (<http://papakilodatabase.com/main/main.php>)
- OHA's Kipuka database (<http://kipukadatabase.com/kipuka/>)
- Bernice P. Bishop Museum archaeological site database
(<http://has.bishopmuseum.org/index.asp>)
- Bishop's Hawaii Ethnological Notes
(<http://data.bishopmuseum.org/HEN/browse.php?stype=3>)
- University of Hawai'i-Mānoa's digital maps
(<http://magis.manoa.hawaii.edu/maps/index.html>)
- DAGS' State Land Survey (<http://ags.hawaii.gov/survey/map-search/>)
- Waihona 'Aina website (www.waihona.com)

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- Digital newspaper archive “Chronicling America, Historic American Newspapers” (<http://chroniclingamerica.loc.gov/lccn/sn82014681/>)
- US Library of Congress digital maps (<https://www.loc.gov/maps/>)
- Hawai‘i State Archives digital collections (<http://archives1.dags.hawaii.gov/>)

A review of both OHA’s databases, OHA’s Papakilo and OHA’s Kipuka database yielded no pertinent information – no community input, no ‘ili, no place name or historical records, and only links to the DAGS State land survey plat map. Bishop’s Museum’s web site is unavailable at this time as well as UH Manoa digital map collection. The remaining web sites had no pertinent information in their records.

Consultation/Interviews

In addition to consulting with Thomas Shirnia, who has direct knowledge of the project area, we also consulted with Kamamaka Ferreira, OHA Lead Compliance Specialist, by email in October 2021. In addition to Mr. Ferreira, Howland also spoke informally by iMessenger in October 2021, with Budde Crabbe, Waimea Valley cultural specialist.

Report Writing Activities

Our research was processed, merged with other gathered information, and was used to develop this report.

Historical and Cultural context of Pueo Farm

This section presents a selection of information related to the project area, including relevant place names and oral history, traditional land uses, historical changes in land uses in and near the project area, and historically-significant features shown on historic maps in and near the project area.

Hawaiian Cultural Landscape: Place Names and Oral History

Hawaiian place names and wahi pana (legendary or storied places) are repositories of oral-historical knowledge, cultural significance and community values about indigenous landscapes. Because Hawaiians did not have a written system of communication prior to the arrival of Captain James Cook in 1778, our understanding of the meaning of Hawaiian place names is based on translations and interpretations from the nineteenth and twentieth century. As such, some places have more than one possible interpretation, which is particularly so since Hawaiians also highly valued both kaona (“hidden meaning”) and huna (“secret meaning”), or “double meanings,” in their poetic description of the natural world.

Moku Waialua can be translated as “two waters,” the joining of two rivers. Ahupua‘a Mokulē‘a can be translated to “isle of abundance”. To the east, the adjacent ahupua‘a Kamananui can be translated to “the wide path”; and to the west the adjacent ahupua‘a

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Makaleha can be translated to “eyes or glances on wonders”. On the North Shore which was one of the last areas to be settled pre-contact, habitation centered around Waimea Valley rather than the Mokulē‘a region. There is only one report that the area had a few fishing villages, but all were known to be about 1 mile east of Kaena Point and this site lies 5.3 miles to the east. The area mostly only became fully used by Dillingham Ranch (sugar) and Dole (pineapples) in the mid-1800s. This coastal region however has been mentioned in mele(s) as sources of healing plants, though specific locations are not known, and the Mokulē‘a region was known to be a good growing region so shoreline medical plants might have been on the site for gathering purposes by Hawaiian women while men fished the shores.

Historical Changes and Map Analysis

Commercial forestry and harvesting of large trees in Hawai‘i began very early in the historic period with the taking of sandalwood starting in the 1790s. This fragrant wood was a valuable international trade item, and it connected markets in China with Hawai‘i. By the 1830s, the several species of endemic sandalwood, or ‘iliahi in Hawaiian, were depleted from the archipelago’s forests (Merlin et al. 1990). However, this project area is too low in elevation to have sandalwood populations. The only tree species likely would have been milo which is a common shoreline tree canopy and larger trees for canoe making would have been farther inland. Starting in the late 1800s, ranchers and sugarcane plantations began replanting efforts to replace trees lost to fire, cattle grazing, windbreaks, and commercial harvesting which likely explains the monkeypods and ironwoods.

Regional Cultural History

As afore-mentioned, the project area lies about 5.3 miles from Keana Point. As our firm had done the ESA for the NAR expansion parcel acquisition, we have the cultural files for the overall Waialua – Mokuleia – Keana Point cultural regional history.

In all the ancient legends, mythology, story sets, and cultural collections along this shoreline in ascending historical context; the following locales prevail – Keana Point and the Maui Demi-God legends; the ancient times of the



5.3 Mile Distance Soul's Leap to site 1

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Kawaihāpai fishing village about 1 mile east of Keana Point which was located between Waialua and Ka‘ena, and Kaaemoku Kakulu ruled as the last konohiki of Kawaihāpai; and the construction of the Dillingham rail line between Kahuku and Waianae around Keana Point.

Ka‘ena (Hawaiian – *the heat*) and its surrounding region could have further importance as the birthplace of the Hawaiian islands, based on one mo‘olelo of the demigod Maui. Maui went fishing with his brothers, and with his fishing hook Manaiakalani, Maui caught something large. They paddled hard to land it, but when one brother looked back, the line snapped, the hook disappeared beneath the ocean, and the islands of Hawaii remained above water. There are other versions of this mo‘olelo (that explain how Maui attempted to join Kaua‘i and O‘ahu, forming the Pōhaku o Kaua‘i), and there are other versions of the story detailing the creation of the Hawaiian islands; thus the relationship of Ka‘ena to the birth of the Hawaiian islands is a rich area for further discussion and research.

There are likely many other residents of Wai‘anae and Waialua who have similar stories and recollections. The region’s original native plants found originally in the region (*now replaced by invasives*) would have been associated with traditional cultural practices and may have been used by previous families. ‘Ilima papa vines were used for basketry, various flowers for lei, and parts of the plant for medicinal and ceremonial purposes; hinahina was used for lei and medicinal purposes; and naio provided hard durable wood and was used for medicinal purposes. Likewise, seabirds have cultural significance as well: observations of flight paths and behaviors of certain seabirds were used to predict weather and to reveal schools of fish and to locate islands when navigating, seabirds provided food through their meat and eggs, seabirds provided feathers for kāhili (feather standards), ‘ahu‘ula (feather capes), and lei, and several expressions and legends reference seabirds (e.g., Pōhai ka manu maluna, he i‘a ko lalo. *When the birds circle above, there are fish below.* ‘ōlelo no‘eau, M.K. Pukui 1983, No. 2667, as referenced in *Ko Hema Lamalama*, Kahoolawe Island Reserve 2008).

Sites of O‘ahu (1978) identifies several archaeological sites in the Mokulē‘ia- Ka‘ena region. In Kamananui, on the slopes of the Wai‘anae Mountain Range behind the old Waialua Sugar Company mill, the remains of a heiau were found along with stone piles and burial caves. Makai of these sites, along the coastline, were found a fishing shrine, or ko‘a, and skeletal remains. In western Mokulē‘ia, a heiau site and a ko‘a – both now destroyed – as well as extensive terracing have been recorded. Further into the valley area are sites that indicate that there was once a significant Hawaiian settlement there, including house sites, old coconut trees or dead trunks, and terracing. In Kawaihāpai, between Waialua and Ka‘ena, a heiau, ahū, ko‘a, and extensive terracing were recorded, as well as the four ‘hidden waters,’ the legendary streamlets Ulunui, Koheiki, Ulehulu, and Waiaka‘aiea that Hi‘iaka, one of the sisters of Pele, discovered at Ka‘ena and at which she quenched her thirst. The Keālia Trail, which zigzags up into the Wai‘anae

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Mountain Range from the coast, provided easy access to the Mokulē‘ia plateau. The Moka‘ena heiau in Kuaokalā, situated on the ridge at 1200 feet in elevation overlooking Ka‘ena Point and Keawa‘ula Bay, has the highest location of any heiau on O‘ahu. At Ka‘ena, the now-destroyed Ulehulu heiau was also located on the mountain ridge.

Historic properties identified so far at Ka‘ena Point within or near the project area fall within one of the following four major time-periods and uses: (1) Native Hawaiian subsistence and cultural uses; (2) Pasturage and ranching; (3) O‘ahu Railway and Land Company (OR&L); and (4) Ka‘ena Point Military Reservation. To date, a total of five extant historic properties that are considered native Hawaiian properties have been documented in the region concentrated at Ka‘ena Point. Together they form the Ka‘ena Complex, which was listed on the Hawai‘i Register of Historic Places in 1988. Major features of the Ka‘ena Complex include cultural deposits in the sand dune area, two stone platforms, Pōhaku o Kauai, and Leina a ka ‘Uthane (Soul’s Leap).

Both Pōhaku o Kauai, and Leina a ka ‘Uthane are considered the most important historical artifacts of the region – and lie approximately 5 miles from the site. Two natural formations compose the remaining two features of the Ka‘ena Complex: Pōhaku o Kaua‘i and Leina a ka ‘Uthane (Soul’s Leap). Both should be considered traditional cultural properties; the identification and evaluation of these otherwise natural features rely on known native Hawaiian traditions and beliefs. Pōhaku o Kaua‘i marks the end of a series of partially submerged rock outcrops that form the westernmost extent of O‘ahu. According to several recorded traditions, this rock formation was once part of Kaua‘i. In one tradition, the demigod Maui attempts to join Kaua‘i and O‘ahu by standing at Ka‘ena Point and using his hook, Manaiakalani, to pull Kaua‘i towards O‘ahu. When he pulled the hook, only a single, huge rock from Kaua‘i fell at his feet, to become known as the Pōhaku o Kaua‘i. The hook was attached to *‘ie‘ie* cordage, which ended up in Ka‘ie‘ie Channel (between Kaua‘i and O‘ahu) and the hook landed in Pālolo Valley, hollowing out a crater. In a related/alternant version as related by Annie Keahipaka, a lineal descendant of the area, Maui had many helpers pulling the line. When one disobeyed orders and looked back at Kaua‘i as they pulled it towards O‘ahu, the line broke and Kaua‘i slipped back into the ocean, with only the fragment Pōhaku o Kaua‘i remaining as proof of Maui’s great effort. In a third traditional version, a Kaua‘i chief named Ha‘upu hurled a huge boulder from Kaua‘i to O‘ahu to forestall what he thought was a fleet of O‘ahu warriors about to invade Kaua‘i. The group was, in fact, driving fish towards nets laid off-shore of O‘ahu. When the boulder fell, it killed the chief Ka‘ena who was leading the drive and many of his followers. From then on, the point bore the name of this chief and the rock was called Pōhaku o Kaua‘i. Pōhaku o Kaua‘i is also mentioned incidentally in other traditions, demonstrating that it was a commonly known landmark.

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The other important cultural formation is Leina a ka 'Uhane (Soul's Leap), which is a limestone formation approximately 150 meters (500 feet) from the existing boulder barricade, perched between the existing Ka'ena trail and the ocean. It forms a tangible representation of native Hawaiian traditions and beliefs that identify Ka'ena Point as a place where the fate of departing souls is determined as death nears. Departing souls either passed into one of several spirit realms or were returned to the body to continue life. The fate of these souls often depended on the help or absence of friendly 'aumakua (ancestral family or personal god) that would guide a soul to the appropriate realm: ao kuewa, a place of wandering souls, ao 'aumakua, where the soul could be reunited with the souls of ancestors, or au milo or pō pau 'ole, a place of eternal night. In another version of what happens to souls after death, a soul wanders to Leina a ka 'Uhane if all its earthly obligations are fulfilled (if they are not, the soul returns to the body), where it is thrown into a pit known as Lua ahi a Kehena, at which time death actually occurs to the body. There has long been a legend that the *wilimili* (dust devils) that cross Kaukonahua Road and the Farrington Highway are the lost wandering souls of ao kuewa, a place of wandering souls. Again, these formations are over 5 miles from the project site.

The next historical and cultural legends are more centered on Hawaiian use of the region as fishing grounds. A road, following the traditional Wai'anae-Waialua trail, was constructed through the area and around the point sometime in the 1860s-70s. Several small fishing villages are thought to have existed in the area during this period. A settlement called Nēnēle'a is documented as being about a mile east of Ka'ena Point, and several house foundations, measuring 14 x 20 feet, are documented from that area. An 1832 census listed the population of the local ahupua'a at forty-nine individuals.

The use of this project area having an ancient road may be the fact that it was a travel corridor between the activities at Keana Point, and the other end of Waialua to the east as described below.

To the east of the site, approximately 4 miles away from the project area, East Waialua was rich in kalo (taro) lands.

The naming of Waialua has several derivations. In one tradition, Waialua was named for Waia, son of Haloa and Hinamauoulu'ai and grandson of Wakea. Waia was known to be a very cruel ali'i (chief) with a corrupt government. Nothing good was said of him. He disregarded his father's instructions, which were to pray to the gods, take care of the 'aina and maka'dinana (commoner) so the Kingdom would prosper. Some of his actions were not pleasant either. For example, when he saw a beautiful woman with attractive legs, he would have them cut off, or if he saw anyone with a beautiful tattoo, he would have that person killed. In the legend of Hi'iaka, the well-known Waia was said to have lived in Waialua as the ali'i.

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"He utters no prayers, he employs no priests, he has no diviner, he knows not how to govern," said the people.

Because they suffered so much, the place was named for him, Waialua, doubly disgraced as the word Waia had come to mean disgraceful behavior. The term *lua* is defined in the Hawaiian dictionary as meaning "two, second, secondary, twice, deuce, double, doubly." Thus, the word traditionally defines the name Waialua. Other sources refer to *lua* as meaning the two rivers, Kaukonahua and Poamoho, that flow into Kaiaka Bay. The *haole* (foreigner) visitor, Gilbert Mathison, in 1822, gave one variation of the name Waialua. In his journal, he wrote:

Having enjoyed a most agreeable sail by moonlight, we this morning entered a small bay called Why-arouah, on the N.E. [northeast] side of the island, formed by two reefs of rocks which run out parallel a considerable way into the sea [Kaiaka Bay], and between which two small rivers discharge themselves. Hence, the name Why-arouah: Whye in the country language signifying water, and arouah the numeral two. Perhaps the natural definition of the name would be two waters as described in this version: "Waialua! Twin Rivers! Where two happy streams, companions since childhood now end their lives together in the sea."

Later contemporary sources indicated that Waialua was named after the lo'i (irrigated terrace) near Kaukonahua Stream and close to the former Halstead residence and sugar mill. Today, the smokestack of the mill can still be seen. The more poetic "*Ka 'ehu kai o Pua'ena*" (the sea sprays of Pua- 'ena) was another name for Waialua that described its physical nature. Pua'ena, the eastern point of Waialua harbor, was often veiled with a misty appearance because of the sea sprays from the pounding surf at that place.²⁷ The expression "*Waialua, 'aina ku palua i ka la'i* (Waialua, land that stands doubly becalmed) was said in praise and admiration for the place where the weather was usually pleasant and a tranquil lifestyle existed among the people."

Waialua was also remembered as the place where the body of the O'ahu chief Elani was left to decompose. When Kahekili, the Maui king and his warriors invaded O'ahu, he left his chief Hu'eu alone at Ka'owakawaka, Kawaihoa, Waialua. The O'ahu chiefs planned to murder the warriors from Maui, most of whom were living in 'Ewa. After being forewarned of the impending plot, the Maui invaders fled to Waikiki and escaped, except for Hu'eu. He was killed while his guards were asleep. Elani, a suspect in the failed revolt against Kahekili, was found and his body disposed of:

At the death of Elani, who was greatly beloved by his people, his body was placed on a ledge of rocks near Puaena Point, where it was allowed to decompose. The place became known as Kahakakau Kanaka [the ledge (where) the man was placed]. As the odor came to the sands at Haleiwa, they became known as Maaeae [smelly]; the point on the other side became

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known as Kupava [Kapaoa? overwhelming smell]. . . [I]f there was no one to care for the body of a commoner after his death, the corpse was placed on these rocks. The fluids from the decaying body would seep into the sea and attract sharks, which the people killed.

James King, a lieutenant with Captain Cook on the Resolution and later commander of the ship Discovery after August 1779, also wrote his impressions of this northwest end of O'ahu. His journal entry reads:

Sunday Febr 28. After Noon bore away round the N[orth] end of the Island & running within a mile of the Shore, carrying regular Sounding . . . as we came nearer the Shore. The Appearance of so fine a river running thro: a deep Valley made us drop Anchor. . . I walkd a little farther & observed it to be the produce of 2 branches, or small streams or rivers, that came down 2 Valleys, to the right of a remarkable & romantick [sic] bluff head, about V2 mile from the Sea. At the bottom of this flat swampy place, the bank of this river as well as the face of this NW [Northwest] part of Woahoo [O'ahu] was a beautiful as any Island we have seen, & appear'd very well Cultivated & Popular."

Later, King wrote that the vista of this northwest side of O'ahu "was by far the most beautiful country of any in the Group. . . the Valleys look'd exceedingly pleasant . . . charmed with the narrow border full of villages, & the Moderate hills that rose behind them. . . ." From these early observations, we can conjecture that this north-west side of O'ahu was covered with lush vegetation, well-cultivated and heavily populated. This was further confirmed by later sources. John Papa Ii, a Hawaiian scholar, wrote that the *moku* of Waialua had a large population. "The land was rich, and there were many trees in olden times," he wrote. John Whitman, a visitor to Hawai'i in 1813, described Waialua as "a large District on the N.E. [Northeast] extremity of the Island embracing a large quantity of taro land, many excellent fishing grounds and several large fish ponds, one of which deserves particular notice for its size and the labour bestowed in building the wall which encloses it." He described the fishpond ('Uko'a) as "about one mile in length and extends from the southern part of a small bay to a point of land jutting out about one mile into the sea." This certainly indicated that its size supported a large population. Whitman continued, "Walking over the wall we passed several gates of strong wicker work through which the water had free passage. Here we observed thousands offish some of which were apparently three feet long."

So, it is apparent that the eastern and western ends of the Waialua *moku* were culturally significant. What is unclear was the uses of the middle ahupua'a Mokolē'ia which appears not to host any significant fisheries, taro fields, or significant habitat. The project site has no streams or waterways outside of the ocean, and the land lies in a floodplain so was unlikely to be picked as singular residences.

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As well, the inter-lying lands between East and West Waialua have these generalizations common to shorelines. Based on the known fishing shrines, recorded interviews, and the number of stories, fishing was an important activity along this shoreline. Though Hawaiian reefs differ over times, the wave patterns and off-shore marine regimes of the project site would not have placed it as rich fishing grounds. Conversely, Ka'ena is noted as an excellent fishing ground, and one story describes how Maui caught a huge red fish, which left a trail from Pōhaku o Kauai to Kuakala heiau (up in the mountains) as he dragged it. The menehune found the fish and cut it into small pieces, which went back in the ocean when the sea covered the land, and is the reason why kūmū (goatfish, *Parapeneus porphyreus*) are now small.

Based on historic accounts and recorded traditions, there may be additional as-yet-un-identified historic properties in the region and would most likely reflect uses and customs associated with the area's rich fisheries and the lack of any other dominant land use in this waterless hot area. These could include additional ko'a, the remnants of shelters and settlements for fishermen, burials, canoe landings, and salt-making sites. However, later uses of the area have significantly reduced the probability of these properties surviving on the flatter portions of the region or along lower ridge slopes as there is no indication that they were heavily used by natives before (as common to the project area).

The third phase of historical use of the region is post-contact land use for pasturage. The first reference to lands in this region being used for pasturage appear in various survey notes by J.S. Emerson. These government grants reflect a district-wide attempt by Waialua residents to secure land for pasturage and may also provide evidence that permanent settlements were absent along this coast in 1850. Most of the government lands and private lands in this region were leased for ranching during the second half of the 1800s and the first half of the 1900s. Most privately-owned lands along the coast were acquired or owned by ranching interests or by families with ranching interests in the area.

Despite references to Ka'ena Point and adjacent Waialua lands being used for pasturage, none of the stone features or sites generally associated with grazing or ranching have been identified at the project site, nearby regions or within the project area outside of modern fencing. There are no stone wall enclosures or corrals, nor do the boundaries of the grants appear to have been walled to contain grazing cattle or horses.

This third use of the region also was centered in the same period. The former alignment and features of the O'ahu Railway and Land Company (OR&L) railway are among the most visible historic properties at Ka'ena Point. Completed in 1898, the railway connected Honolulu to Kahuku, via Wai'anae and Waialua. It was meant to serve plantation towns and ranches, but also became a scenic tour. Railway service ended and the railway was

Cultural Impact Assessment – Pueo Farm

abandoned in 1947, after damage by a 1946 tsunami and a decline in railroad use caused by the increase of personal vehicles. The main railway bed is still visible through its route through Ka'ena, but no traces of the tracks or railroad ties remain, though it is believed that the Farrington Highway is based over portions of the train line. Today, the railway sub-terrain bed forms the primary path used by visitors hiking out to the Point. Rock-work features associated with the railway such as bridge foundations, culverts, and rock retaining walls can still be observed along the railroad track in the NAR.

After the railway closed, a rough track followed the rail grade. A nine-mile dirt road was constructed around the point from 1954-1956, using prison labor. In 1971, the State Department of Transportation developed plans for a two-lane paved road around Ka'ena Point. Due to significant opposition from the public, the concept was shelved and efforts shifted towards protection of this area. During the 1970s, the State began to purchase lands in the area for a proposed Ka'ena Point State Park. In 1978, a Ka'ena Point State Park Conceptual Plan was completed. In 1984, a portion of Ka'ena Point Military Reservation was declared excess property and deeded to the State for park purposes.

Finally, Ka'ena, and Dillingham in Mokuleia all contain historic features associated with its military use. Ka'ena Point Military Reservation was established in 1923; construction of military defense facilities began in 1924 and continued through 1946, capitalizing on the strategic location of Ka'ena Point. Dillingham Airfield hosted a multi-missile Nike launch stations during the cold wars in the 1950s – all now deemed archaeological sites.

Historical Documentation Conclusion

Analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place

In general, construction on the site which has likely not been utilized in historic past or even in the past 70 years as shown in the historical aerial photography in the ESA section of the EA minimizes the impact to any potential archaeological resources in the project area, which have not been detected.

After publication of the Draft EA, consideration of public comments, and further consultation with cultural practitioners and lineal descendants from the Waialua and Mokulē'ia communities, a decision will be made if our conclusion that there will be no cultural impact to the project site needs to be re-visited. It is not anticipated.

Cultural Impact Assessment – Pueo Farm

While archaeological features or cultural sites are not anticipated to be significantly impacted by the proposed action, should evidence of any archaeological or cultural properties be encountered during construction, vegetation clearing and construction would immediately cease and the appropriate parties would be consulted immediately. If necessary, the planned construction will be adjusted to reduce or eliminate impact to any features located during surveys or construction or as recommended during EA consultation to be conducted for this project.

INTERVIEW/CONSULTATION SUMMARIES

As explained in the Methods section, we reached out to a few people to ask if they would like to participate in interviews for this CIA.

Our contact list is as follows:

Thomas Shiria
Kanoelani Wicker
Buddie Crabbe

Thomas Shiria

Thomas Shirai Jr. traces his genealogy in Waialua at least seven generations, was raised in Mokulē‘ia, and remains active in the Waialua moku. His ancestors, including his great-great-grandfather Kaaemoku Kakulu, his great-great-grandmother Annie Keahipaka, and his great-grandfather David Keao, provided information about Ka‘ena during previous endeavors to record traditional Hawaiian knowledge (Handy’s The Hawaiian Planter and McAlister’s Archaeology of Oahu). Mr. Shirai continues the tradition by sharing family stories that illustrate the importance of Ka‘ena for marine resources.

Previous sharing for nearby EAs by Mr. Shirai contained the following comments:

Mr. Shirai shared that he and his grandparents would periodically go to Ka‘ena to gather shellfish (‘opihi and pipipi), seaweed (limu kohu), sea cucumber (loli), sea urchin (wana, hā‘uke‘uke, and hāwa‘e), and other resources, and that they would make pa‘akai (salt) on a parcel of land his family owned at Ka‘ena. His grandfather was a taro farmer and lobster fisherman, who used Ka‘ena as one of his fishing grounds. His grandfather learned his skills from his grandfather, Kaaemoku Kakulu, the last konohiki of Kawaihāpai, located between Waialua and Ka‘ena.

In an article published in the Hawai‘i Fishing News, Mr. Shirai connected old family

Cultural Impact Assessment – Pueo Farm

stories to modern events. After relaying a family version of the story of how the Pōhaku o Kauaʻi was formed (repeated below), he tells a story of how Maui caught a huge red fish (kūmū) at Kaʻena and dragged it to Kuakala Heiau, where the menehune found it, named it Kumunuiakea, and cut it into small pieces. When the sea covered the land, pieces of the fish went back into the ocean, and since then kūmū at Kaʻena are small. Mr. Shirai then recalls a 1994 Hawaiʻi Fishing News story remembering how three scuba divers discovered a pristine kūmū fishing ground, catching many of this species, but of an average size of five pounds, back in 1957.

Mr. Shirai shared a third story, about an octopus called Kakaheʻe that lived at Kaʻena. Piikoi-a-ak-Alala and his father were traveling to Oʻahu where they sighted a huge octopus. They took aim and shot at Kakaheʻe with a bow and arrow, then landed at Waiakaaiea and proceeded to beat it to death. Kakaheʻe is reported to have shared the same fate as Kumunuiakea, thus creating an abundance of heʻe (octopus). Mr. Shirai then notes that the State record for largest octopus was caught at Kaʻena, and that the February 1994 issue of Hawaiʻi Fishing News featured a fisherman who caught a large octopus at Kaʻena.

Mr. Shirai further shared his thoughts that Kaʻena could have further importance as the birthplace of the Hawaiian islands, based on one *moʻolelo* of the demigod Maui. Maui went fishing with his brothers, and with his fishing hook *Manaiakalani*, Maui caught something large. They paddled hard to land it, but when one brother looked back, the line snapped, the hook disappeared beneath the ocean, and the islands of Hawaii remained above water. As discussed further below, there are other versions of this *moʻolelo* (that explain how Maui attempted to join Kauaʻi and Oʻahu, forming the Pōhaku o Kauaʻi), and there are other versions of the story detailing the creation of the Hawaiian islands; thus the relationship of Kaʻena to the birth of the Hawaiian islands is a rich area for further discussion and research.

Interview with Thomas Shiria 10-27-2021

A very pleasant hour-long conversation was had with Thomas by Bonnie and Mark Howland. Thomas confirmed that the main activities culturally either centered around Soul's Leap at Keana Point or the taro-rich lands around present day Haleiwa (U'koa Wetlands). He pointed out that the current appellation *North Shore* that most used to describe the area between Kahuku Point and Kaena Point was not the same in olden days. The North Shore was used to describe Kahuku Point to the Anahula River in present-day Haleiwa. From that divide point to Keana Point, the region was called the NorthWest Shore and was considered a geographically distinct area.

PUEO FARM - Agricultural Operations and Farm Structures Construction

APPENDIX I

AGENCIES, BOARDS,
AND STAKEHOLDER
LETTERS - COMMENTS
AND RESPONSES

Draft Environmental Assessment – Pucio Farm Property -

APPENDIX I - Responses to Board, Stakeholders and Agency Comments

The DPP Pre-Consult Version for this project was mailed or provided via email – or digital transfer to the parties listed in the Distribution List (page 79) with a pre-consult submittal request. We send out a cover letter and disk containing support documents for the development of this Draft Environmental Assessment for review and comment.

We request email responses, but sometimes get paper mail. Responses received have been scanned into .pdfs and are located in this appendix and for each response received, our comments follow on those responses. We also ask for a 30 day comment period, but also in every case grant a 30 day extension for comments which brings the comment period for the pre-consult version to 60 days. We are of the understanding that upon acceptance of the draft EA and subsequent publication of the DEA in the *Environmental Notice*; we will be responsible to return the revised DEA to the responsive agencies to show we incorporated their comments in the DEA. Meanwhile, the compilations below are the result of receiving verbal or written comments and our plan of action.

Some of these plans of actions require:

- Changes to the language of the DEA
- Changes to the proposed action
- Changes to mitigation strategies

Notification was of three types:

- Board hearings such as the North Shore Neighborhood Board hearing held for this project
- Verbal conversations with abutters, neighbors and even agency individuals
- Emailed or mailed correspondence with agencies and boards.



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850

In Reply Refer To:
2022-0038645-S7-001

May 4, 2022

Mr. Mark Howland
WHALE Environmental Services LLC
P.O. Box 455, Kahuku, HI 96731

Subject: 2022-0038645-S7-001 Species List for Pueo Farm Agricultural Operation and Farm Dwellings Construction

Dear Mr. Howland:

Thank you for your letter of May 2, 2022, requesting our comments for the proposed Pueo Farm Agricultural Operation and Farm Dwellings Construction. The proposed project consists of 7.2 acres located at TMK (1) 6-8-003:045, Waialua, on the island of O'ahu. The proposed project would be a multi-acre agricultural farm operations development with one associated farm barn and garage; as well as two farm residential dwellings placed on the site.

This letter has been prepared under the authority of and in accordance with provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), as amended (ESA). We have reviewed the information you provided and pertinent information in our files, as it pertains to federally listed species in accordance with section 7 of the ESA. Our data indicate the following federally listed species may occur or transit through the vicinity of the proposed project area: the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*); endangered Hawaiian petrel (*Pterodroma sandwichensis*), threatened Newell's shearwater (*Puffinus auricularis newelli*), and endangered Hawaii DPS band-rumped storm-petrel (*Oceanodroma castro*) (hereafter collectively referred to as Hawaiian seabirds); the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot, (*Fulica alai*) Hawaiian gallinule (*Gallinula galeata sandvicensis*), and Hawaiian duck (*Anas wyvilliana*) (hereafter collectively referred to as Hawaiian waterbirds).

Hawaiian hoary bat

The Hawaiian hoary bat roosts in both exotic and native woody vegetation across all islands and will leave young unattended in trees and shrubs when they forage. If trees or shrubs 15 feet or taller are cleared during the pupping season, there is a risk that young bats could inadvertently be harmed or killed since they are too young to fly or may not move away.

INTERIOR REGION 9 COLUMBIA-PACIFIC NORTHWEST

IDAHO, MONTANA*, OREGON*, WASHINGTON

*PARTIAL

INTERIOR REGION 12 PACIFIC ISLANDS

AMERICAN SAMOA, GUAM, HAWAI'I,
NORTHERN MARIANA ISLANDS

To avoid and minimize impacts to the endangered Hawaiian hoary bat we recommend you consider incorporating the following applicable measure into your project description:

- Do not disturb, remove, or trim woody plants greater than 15 feet tall during the bat birthing and pup rearing season (June 1 through September 15).
- Do not use barbed wire for fencing.

Hawaiian seabirds

Hawaiian seabirds may traverse the project area at night during the breeding, nesting and fledging seasons (March 1 to December 15). Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Seabirds are attracted to lights and after circling the lights they may become exhausted and collide with nearby wires, buildings, or other structures or they may land on the ground. Downed seabirds are subject to increased mortality due to collision with automobiles, starvation, and predation by dogs, cats, and other predators. Young birds (fledglings) traversing the project area between September 15 and December 15, in their first flights from their mountain nests to the sea, are particularly vulnerable.

To avoid and minimize potential project impacts to seabirds we recommend you incorporate the following applicable measures into your project description:

- Fully shield all outdoor lights so the bulb can only be seen from below bulb height and only use when necessary.
- Install automatic motion sensor switches and controls on all outdoor lights or turn off lights when human activity is not occurring in the lighted area.
- Avoid nighttime construction during the seabird fledging period, September 15 through December 15.

Hawaiian waterbirds

Hawaiian waterbirds are currently found in a variety of wetland habitats including freshwater marshes and ponds, coastal estuaries and ponds, artificial reservoirs, kalo or taro (*Colocasia esculenta*) lo'i or patches, irrigation ditches, sewage treatment ponds, and in the case of the Hawaiian duck, montane streams and marshlands. Hawaiian stilts may also be found wherever ephemeral or persistent standing water may occur. Threats to these species include non-native predators, habitat loss, and habitat degradation. Hawaiian ducks are also subject to threats from hybridization with introduced mallards.

Based on the project details provided, your project may result in the creation of standing water or open water that could attract Hawaiian waterbirds to the project site. In particular, the Hawaiian stilt is known to nest in sub-optimal locations (e.g. any ponding water), if water is present. Hawaiian waterbirds attracted to sub-optimal habitat may suffer adverse impacts, such as predation and reduced reproductive success, and thus the project may create an attractive nuisance. Therefore, we recommend you work with our office during project planning so that we may assist you in developing measures to avoid impacts to listed species (e.g., fencing, vegetation control, predator management).

To avoid and minimize potential project impacts to Hawaiian waterbirds we recommend you incorporate the following measures into your project description:

- In areas where waterbirds are known to be present, post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.
- If water resources are located within or adjacent to the project site, incorporate applicable best management practices regarding work in aquatic environments into the project design (see enclosure).
- Have a biological monitor that is familiar with the species' biology conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the proposed project site prior to project initiation. Repeat surveys again within 3 days of project initiation and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found:
 - Contact the Service within 48 hours for further guidance.
 - Establish and maintain a 100-foot buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.
 - Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.

We appreciate your efforts to conserve protected species. If you have questions regarding this response, please contact Elyse Sachs, Fish and Wildlife Biologist (phone: 808-792-9420, email: Elyse_Sachs@fws.gov). When referring to this project, please include this reference number: 2022-0038645-S7-001.

Sincerely,

Island Team Manager
O'ahu, Kaua'i, Northwestern Hawaiian
Islands, and American Samoa

Enclosures (1)

**U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices**

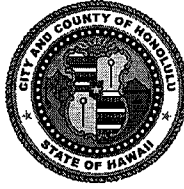
The U.S. Fish and Wildlife Service (USFWS) recommends the following measures to be incorporated into project planning to avoid or minimize impacts to fish and wildlife resources. Best Management Practices (BMPs) include the incorporation of procedures or materials that may be used to reduce either direct or indirect negative impacts to aquatic habitats that result from project construction-related activities. These BMPs are recommended in addition to, and do not over-ride any terms, conditions, or other recommendations prepared by the USFWS, other federal, state or local agencies. If you have questions concerning these BMPs, please contact the USFWS Aquatic Ecosystems Conservation Program at 808-792-9400.

1. Authorized dredging and filling-related activities that may result in the temporary or permanent loss of aquatic habitats should be designed to avoid indirect, negative impacts to aquatic habitats beyond the planned project area.
2. Dredging/filling in the marine environment should be scheduled to avoid coral spawning and recruitment periods, and sea turtle nesting and hatching periods. Because these periods are variable throughout the Pacific islands, we recommend contacting the relevant local, state, or federal fish and wildlife resource agency for site specific guidance.
3. Turbidity and siltation from project-related work should be minimized and contained within the project area by silt containment devices and curtailing work during flooding or adverse tidal and weather conditions. BMPs should be maintained for the life of the construction period until turbidity and siltation within the project area is stabilized. All project construction-related debris and sediment containment devices should be removed and disposed of at an approved site.
4. All project construction-related materials and equipment (dredges, vessels, backhoes, silt curtains, etc.) to be placed in an aquatic environment should be inspected for pollutants including, but not limited to; marine fouling organisms, grease, oil, etc., and cleaned to remove pollutants prior to use. Project related activities should not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats. Implementing both a litter-control plan and a Hazard Analysis and Critical Control Point plan (HACCP – see <https://www.fws.gov/policy/A1750fw1.html>) can help to prevent attraction and introduction of non-native species.
5. Project construction-related materials (fill, revetment rock, pipe, etc.) should not be stockpiled in, or in close proximity to aquatic habitats and should be protected from erosion (*e.g.*, with filter fabric, etc.), to prevent materials from being carried into waters by wind, rain, or high surf.
6. Fueling of project-related vehicles and equipment should take place away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the project should be developed. The plan should be retained on site with the person responsible for compliance with the plan. Absorbent pads and containment booms should be stored on-site to facilitate the clean-up of accidental petroleum releases.
7. All deliberately exposed soil or under-layer materials used in the project near water should be protected from erosion and stabilized as soon as possible with geotextile, filter fabric or native or non-invasive vegetation matting, hydro-seeding, etc.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

RICK BLANGIARDI
MAYOR



ALEX KOZLOV, P.E.
DIRECTOR

HAKU MILLES, P.E.
DEPUTY DIRECTOR

May 6, 2022

SENT VIA EMAIL

Mr. Mark Howland
Markahowland@hawaii.rr.com

Dear Mr. Howland:

Subject: Draft Environmental Assessment (EA) - Pueo Farm Property in
Waialua, Oahu, Hawaii at 68-431 Farrington Highway
TMK (1)-6-8-003:045

Thank you for the opportunity to review and comment. The Department of
Design and Construction has no comments to offer at this time.

Should you have any questions, please contact me at (808) 768-8480.

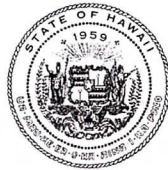
Sincerely,

A handwritten signature in black ink, appearing to read "Alex Kozlov".

Alex Kozlov, P.E.
Director

AK:krm (879038)

DAVID Y. IGE
GOVERNOR



CURT T. OTAGURO
COMPTROLLER
AUDREY HIDANO
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)22.064

APR 25 2022

Mark Howland
WHALE Environmental Services, LLC
P.O. Box 455
Kahuku, HI 96731

Dear Mr. Howland:

Subject: Draft Environment Assessment for
Pueo Farm, 68-431 Farrington Hwy.
Waialua, Oahu, Hawaii
TMK: (1) 6-8-003: 045

Thank you for the opportunity to comment on the subject project. We have no comment to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

If you have any questions, your staff may call Ms. Gayle Takasaki of the Planning Branch at 586-0584.

Sincerely,

CHRISTINE L. KINIMAKA
Public Works Administrator

GT:mo

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII



WILLIAM J. AILĀ, JR.
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOSH GREEN
LT GOVERNOR
STATE OF HAWAII

TYLER L. GOMES
DEPUTY TO THE CHAIRMAN

**STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS**

P O BOX 1879
HONOLULU, HAWAII 96805

May 19, 2022

Ref.:PO-22-118

Mark Howland
WHALE Environmental Services LLC
P.O. Box 455
Kahuku, HI 96731
www.whalees.com
markaholand@hawaii.rr.com

Aloha Mark:

Subject: Draft Environmental Assessment (DEA) Consultation
Pueo Farm Property
68-431 Farrington Highway
Waialua, O'ahu, Hawai'i
TMK: (1) 6-8-003:045

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project.

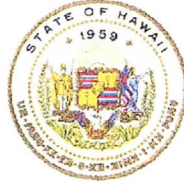
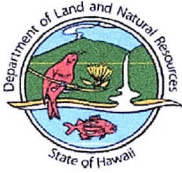
However, we highly encourage all agencies to consult with Hawaiian Homestead community associations and other (N)ative Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians.

Mahalo for the opportunity to provide comments. If you have any questions, please contact the Planning Office at (808)620-9500, or via email at: dhhl.planning@hawaii.gov.

Me ke aloha,

William J. Ailā, Jr., Chairman
Hawaiian Homes Commission

DAVID Y. IGE
GOVERNOR OF HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE
MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

June 02, 2022

LD 0396

Mark Howland
WHALE Environmental Services LLC
P.O. Box 455
Kahuku, HI 96731

Via email: markahowland@hawaii.rr.com

Dear Sirs:

SUBJECT: Draft Environmental Assessment for Pueo Farm Agricultural Operations and Farm Dwelling Construction
68-431 Farrington Highway, Waialua, Island of Oahu, Hawaii
TMK: (1) 6-8-003:045

Thank you for the opportunity to review and comment on the subject project. The Land Division of the Department of Land and Natural Resources (DLNR) distributed copies of your request to DLNR's various divisions for their review and comment.

Enclosed are responses/comments received from our (a) Division of Aquatic Resources and (b) Engineering Division. Should you have any questions, please feel free to contact Barbara Lee via email at barbara.j.lee@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Attachments
cc: Central Files

DAR# AR0185

Comments

The proposed project area is not known to contain any streams or bodies of water containing aquatic resources. However, the close proximity of the proposed activities to the marine environment warrants that extreme caution be taken to prevent any adverse impacts. Adverse impacts include (but aren't limited to) the introduction of silt, sediment, waste, debris, chemicals, or any other byproducts of the proposed activities into the surrounding areas. DAR acknowledges that the DEA includes a ESCP, which addresses many of these concerns. Should a spill, accident, or any other unforeseen event that may result in the introduction of materials into the marine environment take place, DAR requests that they be contacted immediately. Additionally, DAR notes that because of the close proximity of the proposed project are to the marine environment, care must be taken to limit unnecessary loud noise and unnatural light that may disturb or disorient marine life, especially during hours of darkness. Should the applicants find the need to perform nighttime work requiring artificial light or work that exceeds approved noise guidelines, DAR requests that they be informed beforehand. Lastly, in the unlikely but possible event that endangered or threatened marine life such as a Hawaiian monk seal or green sea turtle enter the property during construction, DAR requests that they be notified immediately.

DAR notes that within the DEA there are multiple inconsistencies between visual representations of the project offered in the various appendices. For example, in Appendix One B, the barn structure appears to be makai of the property center line, with the reservoir on its mauka side. However, in the Farm Design and Operational Plan and Appendix Four, the barn appears at the approximate center of the parcel, with the reservoir on the makai side. Please provide clarification as to which is the correct proposed layout. Additionally, there appears to be a stark difference between the proposed agricultural use of the property as depicted in the Farm Design and Operational Plan versus Appendix C. Whereas on page 318/503 the cultivation of plants appears to be quite intense, on page 94/503 the proposed agricultural use appears to be much lighter. While DAR recognizes that these are just conceptual renderings, they seem to convey two very different intended uses of the property. Please provide clarification as to which is more accurate.

The flow (above or below ground) of wai, or fresh water to the kai, or salt water is an crucial ecosystem component the importance of which we are only beginning to realize. As such, DAR is growing increasingly concerned about wasteful or unnecessary water usage. In reviewing the DEA, DAR was unable to find any attempt to quantify the water usage of the proposed development and its continued agricultural use, need for the proposed well and estimated draw from that source, and the specific need for the proposed 50,000 gallon reservoir.

DAR# AR0185

Comments

Please provide some mention of estimated water use. DAR also recommends that if a reservoir is shown to be a necessity, an above ground tank or closed alternative be used over the open pond as its depicted in some of the figures in the DEA. If an open earthen pond or some open variation is deemed necessary, DAR requests clarification as to why given the inherent downsides of an open reservoir including water loss to evaporation.

Lastly, in Appendix One B, it is stated that the nearest critical habitat for threatened or endangered species is 2.5 miles away from the property. Critical habitat can be marine as well as terrestrial, and in the case of the Hawaiian monk seal spans the shoreline to the 200 m contour for the near entirety of the Main Hawaiian Islands (CFR §226.201). Please correct this error.

Mahalo for the opportunity to provide comment

**DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION**

LD/Russell Y. Tsuji

**Ref: Draft Report of Draft Environmental Assessment for Pueo Farm
Agricultural Operations and Farm Dwelling Construction
Location: 68-431 Farrington Highway, Waialua, Island of Oahu, Hawaii
TMK(s): (1) 6-8-003:045
Applicant: WHALE Environmental Services LLC on behalf of Agent Mark
Woodfield**

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (<http://gis.hawaiiinfip.org/FHAT>) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4849.

Signed: 
CARTY S. CHANG, CHIEF ENGINEER

Date: May 23, 2022

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honoluluupd.org

RICK BLANGIARDI
MAYOR



RADE K VANIG
INTERIM CHIEF

OUR REFERENCE **EO-DK**

May 17, 2022

SENT VIA EMAIL

Mr. Mark Howland
markahowland@hawaii.rr.com

Dear Mr. Howland:

This is in response to your letter received on April 22, 2022, informing the Honolulu Police Department (HPD) of a delay in notification regarding the Draft Environmental Assessment for the development of the Pueo Farm Property at 68-431 Farrington Highway in Waialua.

The HPD has reviewed the project and anticipates short-term impacts to traffic in the area. The HPD recommends that adequate notification be made to area residents due to the potential ingress and egress of construction vehicles, equipment, and deliveries during the construction phase of the project.

If there are any questions, please call Major Gregory Osbun of District 2 (Wahiawa) at (808) 723-8700.

Thank you for the opportunity to review this project.

Sincerely,

A handwritten signature in black ink, appearing to read "Darren Chun", is written over the printed name.

DARREN CHUN
Assistant Chief of Police
Support Services Bureau



**STATE OF HAWAII
OFFICE OF PLANNING
& SUSTAINABLE DEVELOPMENT**

DAVID Y. IGE
GOVERNOR

MARY ALICE EVANS
DIRECTOR

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: <http://planning.hawaii.gov/>

DTS 202204251156NA

Coastal Zone
Management
Program

May 16, 2022

Environmental
Review Program

Mr. Mark Howland
WHALE Environmental Services LLC
P.O. Box 455
Kahuku, Hawaii 96731

Land Use
Commission

Land Use Division

Special Plans
Branch

Dear Mr. Howland:

State Transit-
Oriented
Development

Subject: Draft Environmental Assessment for Pueo Farm Agricultural
Operation Facility and Farm Dwelling Construction, Waialua, Oahu;
Tax Map Key: (1) 6-8-003: 045

Statewide
Geographic
Information System

Statewide
Sustainability Branch

The Office of Planning and Sustainable Development (OPSD) is in receipt of your review request, received April 25, 2022, on the Draft Environmental Assessment (Draft EA), for Pueo Farm agricultural operations and farm dwelling construction at 68-431 Farrington Highway, Waialua, Oahu.

According to the Draft EA, the proposed action, would be a multi-acre agricultural farm operation facility development with one associated farm barn and garage, as well as two farm residential dwellings placed on a 7.9-acre shoreline parcel. The project site is a current vacant lot with a mostly dominant tree and shrub canopy with a grassed underlay.

The subject EA is prepared in accordance with the procedural steps set forth in Hawaii Revised Statutes (HRS) Chapter 343 pursuant to Chapter 25, Revised Ordinances of Honolulu, to support the SMA Use Permit application.

The OPSD has reviewed the Draft EA, and has the following comments to offer:


1. Pursuant to HRS § 205A-43, as amended, setbacks along shorelines are established of not less than 40 feet inland from the shoreline. The Final EA should correct the statement, on page 12, that shoreline setbacks extend not less than 20 feet and not more than 60 feet from the shoreline.
2. The OPSD suggests that the Final EA provide a site plan with the distance of the proposed dwelling structures from the certified

shoreline to ensure that no structure or associated construction activities including any staging area will be proposed within the shoreline area as defined in HRS § 205A-41. Given the deep depth of the parcel, the OPSD recommends that the Final EA consider site-specific mitigation measures to mitigate the impacts of waves, storm surges, high tide and shoreline erosion for the proposed dwelling structures, including design elevation and setbacks from the shoreline (e.g., erosion line under 3.2-foot sea level rise) during the life of the proposed structures.

3. Pursuant to HRS § 205A-2(c)(9), as amended, enacted by Act 160, SLH 2010 and Act 120, SLH 2013, the Final EA should discuss the current situation of vegetation along the shoreline, with site-specific measures as to how to prevent a public nuisance from inducing or cultivating vegetation along the beach transit corridor, and maintain vegetation at the property site to avoid interference or encroachment upon the beach transit corridor.
4. The exterior lighting and lamp posts associated with the proposed residence project shall be cut-off luminaries to provide the necessary shielding to mitigate potential light pollution in the coastal areas, and lessen possible seabird strikes. No artificial light, except as provided in HRS §§ 205A-30.5(b) and 205A-71(b), shall be directed to travel across property boundaries toward the shoreline and ocean.
5. The typo Chapter 11-200:1, and Chapter 200-10, Title 11, Hawaii Administrative Rules (HAR) in the Draft EA should be corrected as HAR Chapter 11-200.1, which has been in effect since August 9, 2019.
6. Please note that Conservation Plan for Pueo Farm from pages 185 to 220, and Conservation Plan for Pueo Farm from pages 277 to 308 are redundant information and repeated copies.

If you have any questions regarding this comment letter, please contact Shichao Li of our office at (808) 587-2841 or by email at shichao.li@hawaii.gov.

Sincerely,



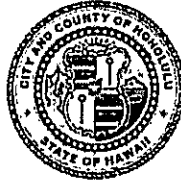
Mary Alice Evans
Director

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honolulu.gov • CITY WEB SITE: www.honolulu.gov

FIVE

RICK BLANGIARDI
MAYOR



DEAN UCHIDA
DIRECTOR
DAWN TAKEUCHI APUNA
DEPUTY DIRECTOR
EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

December 29, 2021

2021/ELOG-2457(CK)

Mr. Mark Howland
WHALE Environmental Services, LLC
P.O. Box 455
Kahuku, Hawaii 96731

Dear Mr. Howland:

SUBJECT: Request for Pre-Consultation Comments
Environmental Assessment (EA) for Agriculture and Farm
Dwellings on Shoreline Lot
Pueo Farm (Project)
68-431 Farrington Highway - Mokuleia
Tax Map Key 6-8-003: 045

This is in response to your letter, received December 18, 2021, requesting comments on the scope and content to be addressed in a Draft EA, as required under Chapter 343, Hawaii Revised Statutes (HRS), for the construction of two new farm dwellings in support of proposed agricultural operations on a 348,480-square-foot shoreline lot in Mokuleia. We have the following comments:

1. State Content, Format, and Processing Requirements: The Draft EA must be prepared in accordance with the following State regulations:
 - Chapter 343 and 205A, HRS
 - Chapter 11-200.1, Hawaii Administrative Rules (HAR)
 - Chapters 11-55 and 11-54, HAR
2. Pre-Draft EA Agency Outreach: In order to have accurate information upon which the data and analysis in the Draft EA are founded, early outreach to responsible agencies to obtain input on sensitive resources and/or issues areas at the subject property is required under the above-mentioned HAR sections. For example, do the U.S. Fish and Wildlife Service (USFWS) or State Department of Land and Natural Resources identify the presence of any

protected species at the site? Will the State Historic Preservation Division (SHPD) require archaeological monitoring as a part of any proposed activities?

3. Long-term Planning Policies and Objectives: The Draft EA must address in an itemized manner the proposed Project's consistency with the relevant policies of the General Plan and the Koolaupoko Sustainable Communities Plan.
4. State Land Use Agricultural District: The subject property is located within the State Land Use Agricultural District. Therefore, the proposal must be evaluated for compliance with related State development and use standards.
5. Land Use Ordinance (LUO), Chapter 21, Revised Ordinances of Honolulu (ROH): Based on a review of our records, the Project site consists of a 348,480-square-foot shoreline zoning lot located in the AG-2 General Agricultural District. Development activities must comply with the development standards of the AG-2 General Agricultural District and compliance with these standards should be presented and evaluated in the Draft EA. The LUO is available on our website at: www.honolulu.gov/ApplicationsForms/ZoningandLandUsePermits

In addition, Article 10 of the LUO defines "farm dwelling" as "*a dwelling located on and used in connection with a farm where agricultural activity provides income to the family occupying the dwelling.*" Therefore, the Draft EA must describe the principal agricultural uses to which the farm dwellings will be accessory, who will reside in the farm dwellings, and the relationship between the residents and the agricultural uses.
6. Onsite Structures: The Draft EA should describe all existing and proposed structures on the site, including agricultural structures, farm dwellings, pavement, fences, shoreline hardening structures, etc. If any existing structures are proposed to remain in place, the Draft EA should describe what and where they are located, whether they were lawfully established (permitted), and whether they are located within any required setback areas. Such structures should be included in the Draft EA's analysis of compliance with the applicable development standards in the LUO.
7. Special Management Area (SMA): On September 15, 2020, Governor Ige signed Act 16 (2020) into law. The stated purpose of Act 16 (2020) is to strengthen the State's coastal zone management policy by amending Chapter 205A, HRS, to protect state beaches, and to reduce residential exposure to coastal hazards. The Draft EA should include an analysis of all of the required components for an SMA Use Permit under both Chapter 205A, HRS, as revised, and Chapter 25, ROH.

The text of Act 16 (2020) is available online at:
https://www.capitol.hawaii.gov/session2020/bills/SB2060_HD2_.htm

Chapter 25, ROH, is available online at:
www.honolulu.gov/rep/site/ocs/roh/ROH_Chapter_25_article_1_12.pdf

8. **Shoreline Setback:** All development must be located outside of the shoreline setback area, which currently extends 60 feet mauka of the Certified Shoreline for the subject property. Your request for review included a shoreline survey map certified by the State on April 14, 2021. This Certified Shoreline and setback distance from the shoreline must be reflected in the plans submitted for the SMA Use Permit to confirm compliance with the Shoreline Setback Ordinance (Chapter 23, ROH). The *Certified Shoreline* should be included in the EA and SMA Use Permit Application package.

Chapter 23, ROH, is available online at:
www.honolulu.gov/rep/site/ocs/roh/ROH_Chapter_23_.pdf

The DPP Rules Relating to Shoreline Setbacks and the SMA are available online at:
www.honoluludpp.org/Portals/0/AboutDPP/administrativerules/DppRules03Shoreline.pdf

9. **Flood Zone:** The Draft EA should identify the subject property's Flood Zone, as mapped by the Federal Emergency Management Agency, and evaluate the proposed Project's compliance with the City's Flood Hazard Areas Ordinance (Chapter 21A, ROH), which is available online at:
https://www.honolulu.gov/rep/site/ocs/roh/ROH_Chapter_21A_.pdf

10. **Coastal Hazards:** The Project site, as a shoreline lot, may be susceptible to coastal hazards associated with Sea Level Rise (SLR), tsunamis, and storm surge. Mayor's Directive 18-2, issued on July 16, 2018, requires all City departments and agencies to use the Hawaii SLR *Vulnerability and Adaptation Report*, the *SLR Guidance* and the *Climate Change Brief* in planning decisions. As a result, proposed development activities within the SMA must be evaluated not only for potential impacts to sensitive SMA resources, but also for current and future susceptibility to coastal hazards such as flooding, SLR, wave action, tsunami, and storm surge.

The recent amendments to Chapter 205A, HRS, under Act 16 (2020), further reiterate the need to evaluate potential impacts related to coastal hazards and SLR. As such, the following items need to be evaluated at a site-specific level, and analyzed in both the Draft EA and SMA Use Permit application prepared for

the Project. This analysis should evaluate the site's existing topographic, geologic, and shoreline environment, discuss whether and how the proposed development can safely be located outside of the 3.2-foot SLR-Exposure Area (XA), and discuss any design features and/or mitigation measures proposed to avoid impacts associated with other coastal hazards. This study should include analysis of the following, but not limited to, potential coastal hazards issue areas.

- SLR - Potential impacts relating to SLR at the subject property, based on review of the various layers in the State's SLR-XA Mapping Tool.
- Storm Surge - Potential impacts and hurricane storm surge inundation levels at the subject property during Category 1 through 4 hurricane events, based on review of the National Oceanic and Atmospheric Administration's (NOAA) National Hurricane Storm Surge Hazard Maps.
- Potential cumulative impacts of coastal hazards and property inundation should SLR exacerbate existing flooding, coastal erosion, wave-action, or other coastal hazards that may occur at the subject property.

The Draft EA should also explore Project alternatives, site design (siting and configuring the proposed dwelling as far from the shoreline as possible), project design features (elevated structures, alternative foundations, etc.), Best Management Practices, and appropriate mitigation measures to reduce potential impacts related to coastal hazards to the extent possible. Relevant sources of information are available online at the following links:

- Mayor's Directive No. 18-2 (2018) regarding climate change and SLR: www.honolulu.gov/rep/site/dppto/climate_docs/MAYORS_DIRECTIVE_18-2.pdf
- SLR Vulnerability and Adaptation Report: http://climate.hawaii.gov/wp-content/uploads/2019/02/SLR-Report_Dec2017-with-updated-disclaimer.pdf
- State SLR-XA Mapping Tool: www.pacioos.hawaii.edu/shoreline/slr-hawaii/
- Guidance for Using the SLR-XA: <https://climate.hawaii.gov/wp-content/uploads/2020/12/Guidance-for-Using-the-Sea-Level-Rise-Exposure-Area.pdf>

- Honolulu Office of Climate Change, Sustainability and Resiliency Climate Ready Oahu Web Explorer:
www.resilientoahu.org/water
- NOAA Storm Surge Mapping tool:
<https://www.nhc.noaa.gov/nationalsurge/>

11. Wetlands and Sensitive Species:

The Draft EA should identify the presence or potential presence of any protected wetlands, sensitive habitat, flora species, and fauna species. The Department of Planning and Permitting (DPP) recommends reaching out to the USFWS to obtain a list of species that are known to occur, or may potentially occur, in the Project vicinity. Known, mapped wetlands can be viewed on the USFWS National Wetlands Inventory *Wetlands Mapper*. The Draft EA must evaluate potential impacts to each identified sensitive species and propose appropriate, detailed mitigation measures. The Wetlands Mapper is available online at: <https://www.fws.gov/wetlands/data/mapper.html>.

12. Historic, Archaeological, and Cultural Resources:

Please be advised that in December 2020, the SHPD began using a new online system to better track consultation requests:
<https://shpd.hawaii.gov/hicris/landing>.

Because the new tracking system requires agency-to-agency requests, the DPP has created a generic request letter that consultant's or property owners may use for projects that will eventually require DPP approval. This letter may be completed by a consultant or property owner and submitted to SHPD directly via their online system to initiate requests before permit applications are submitted to the DPP. The letter includes a general DPP contact number and email, as well as blank fields where the property owner or their consultant can enter their contact information. The generic request letter is available online at: <https://tinyurl.com/h7yvc7vp>.

13. Pursuant to Section 25-5.1(b), ROH, prior to submitting an application for an SMA Use Permit, the Applicant must present the Project to the applicable Neighborhood Board (NB) and/or Community Association unless the NB or Community Association fails to provide the Applicant with an opportunity to present the Project within 60 days of the date of the written request or they provide the Applicant with written notice that it has no objection to the Project or no presentation is necessary. Therefore, the Applicant must contact the North Shore NB No. 27 and any relevant neighborhood associations or commissions to

Mr. Mark Howland
December 29, 2021
Page 6

request an opportunity to present the Project proposal at the next available meeting.

Thank you for the opportunity to comment on this proposal. Should you have any questions, please contact Christi Keller, of our staff, at (808) 768-8087 or via email at c.keller@honolulu.gov.

Very truly yours,


for Dean Uchida
Director

State of Hawaii – Department of Planning and Permitting
650 S. King Street 7th floor
Honolulu HI 96813

RESPONSE COMMENTS FROM DPP PRE-CONSULT LETTER OF 12/29/2021

Draft Environmental Assessment – Pueo Farm Property

Thank you for your response and review of the Draft Environmental Assessment (EA) for the Pueo Farm Property in Waialua, Oahu, Hawaii at 68-431 Farrington Highway – TMK (1)-6-8-003:045.

We have no record of receiving this letter from DPP. We feel it would have saved us a lot of time but appreciated the provision. In subsequent DPP consultation letters of April 2022, and August 2022, substantially the same recommendations, issues, questions, and such were requested which we feel as of this October 2022 submission has been addressed, answered or provided as requested in the three communications now received. We trust the issues raised in this 12/29/2022 have been adequately addressed.

Mahalo nui loa for your response.

Mark Howland 10/28/22

Mark Howland (environmental agent for the owners)
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii – Department of Accounting and General Services
PO Box 118
Honolulu HI 96810

RESPONSE COMMENTS FROM AGENCY NOTIFICATION

Draft Environmental Assessment – Pueo Farm Property

Thank you for your response and review of the Draft Environmental Assessment (EA) for the Pueo Farm Property in Waiialua, Oahu, Hawaii at 68-431 Farrington Highway – TMK (1)-6-8-003:045. We acknowledge that DAGS has no comments related to the site development.

Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii – Department of Design and Construction
650 S. King Street 11th floor
Honolulu HI 96813

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Mahalo nui loa for your response.

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markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii – Department of Hawaiian Homelands
PO Box 1879
Honolulu HI 96805

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Draft Environmental Assessment – Pueo Farm Property

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Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii, Department of Land and Natural Resources – Land Division
PO Box 621
Honolulu HI 66809

RESPONSE COMMENTS FROM AGENCY NOTIFICATION
RESPONSE COMMENTS FROM AGENCY NOTIFICATION

Draft Environmental Assessment – Pueo Farm Property

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Mahalo nui loa for your response.

Our response to comments are as follows:

DAR Division acknowledges that the ESCP addresses concerns regarding shoreline entry of pollutants

Architect will review the ESCP and ensure pollution safe guards are in place.

DAR addressed lighting concerns. The architect will be advised to insure Dark Sky provisions by having no outward or upward bound lighting on the property. This was also suggested by OPSD (architect was advised).

Address monk seal or other endangered species intrusion into property, We have informed the applicant that upon the unlikely event of an endangered species entering the work site, work will halt and DAR/DLNR and USFW notified before further construction is done for guidance.

Project locations and well data is now available in DPP plans

Mark Howland (environmental agent for the owners
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii, Office of Planning and Sustainable Development
235 South Beretania Street, 6th floor
Honolulu HI 96804

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We acknowledge that the OPSD has comments related to the site development.

Mahalo nui loa for your response.

Our responses are as follows:

1. A regional map has been added to the Executive Summary showing the SMA position
2. Building plans in Appendix 3 of the DEA provide the information requested
3. The project area is in excess of 60' from the existing shoreline determination.
4. No structures are in the sensitive shoreline area or the shoreline. No intrusion in the shoreline setback is proposed nor any structures. Building plan and survey delineate shoreline determination and shows setback distances. As for beach vegetation, there will be no disturbance of the dense naupaka lining the shoreline. All shoreline vegetation to remain intact. No public beach access available to this shoreline.
5. The building will conform to modern *Dark Sky* lighting requirements, USFW has already been notified with conformity with this standard.
6. Typo error has been corrected.

Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
markahowland@hawaii.rr.com www.whalees.com 808-294-9254

City and County of Honolulu, Police Department
South Beretania Street
Honolulu HI 96813

RESPONSE COMMENTS FROM AGENCY NOTIFICATION
RESPONSE COMMENTS FROM AGENCY NOTIFICATION

Draft Environmental Assessment – Pueo Farm Property

Thank you for your response and review of the Draft Environmental Assessment (EA) for the Pueo Farm Property in Waialua, Oahu, Hawaii at 68-431 Farrington Highway – TMK (1)-6-8-003:045.

We acknowledge that the Police Department had limited comments related to the site development. For the Police and Fire department, DTS, BOWS and other agencies, we recognize community notification is vital for impact reduction. As such, we will advise community members of traffic impact and construction schedule.

Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii, Department of Land and Natural Resources – Land Division
PO Box 621
Honolulu HI 66809

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Honolulu HI 96810

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Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
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markahowland@hawaii.rr.com www.whalees.com 808-294-9254

State of Hawaii – Department of Design and Construction
650 S. King Street 11th floor
Honolulu HI 96813

RESPONSE COMMENTS FROM AGENCY NOTIFICATION

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Mahalo nui loa for your response.

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Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
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State of Hawaii, Office of Planning and Sustainable Development
235 South Beretania Street, 6th floor
Honolulu HI 96804

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Mahalo nui loa for your response.

Our responses are as follows:

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2. Building plans in Appendix 3 of the DEA provide the information requested
3. The project area is in excess of 60' from the existing shoreline determination.
4. No structures are in the sensitive shoreline area or the shoreline. No intrusion in the shoreline setback is proposed nor any structures. Building plan and survey delineate shoreline determination and shows setback distances. As for beach vegetation, there will be no disturbance of the dense naupaka lining the shoreline. All shoreline vegetation to remain intact. No public beach access available to this shoreline.
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Mahalo nui loa for your response.

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City and County of Honolulu, Police Department
South Beretania Street
Honolulu HI 96813

RESPONSE COMMENTS FROM AGENCY NOTIFICATION

Draft Environmental Assessment – Pueo Farm Property

Thank you for your response and review of the Draft Environmental Assessment (EA) for the Pueo Farm Property in Waiialua, Oahu, Hawaii at 68-431 Farrington Highway – TMK (1)-6-8-003:045.

We acknowledge that the Police Department had limited comments related to the site development. For the Police and Fire department, DTS, BOWS and other agencies, we recognize community notification is vital for impact reduction. As such, we will advise community members of traffic impact and construction schedule.

Mahalo nui loa for your response.

Mark Howland (environmental agent for the owners)
WHALE Environmental Services LLC, P.O. Box 455, Kahuku, HI 96731
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U.S. Fish and Wildlife
300 Ala Moana Blvd. Room 3-122
Honolulu HI 66850

RESPONSE COMMENTS FROM AGENCY NOTIFICATION

Draft Environmental Assessment – Pueo Farm Property

Thank you for your response and review of the Draft Environmental Assessment (EA) for the Pueo Farm Property in Waialua, Oahu, Hawaii at 68-431 Farrington Highway – TMK (1)-6-8-003:045.

We acknowledge the comments as related to the site development. Our responses are as follows:

We appreciate the provision of federal protected species and habitat listings. We have conducted botanical and fauna appraisals of the site and have not encountered species on the site. There are nearby species along the shoreline and the in ocean waters and we are not planning any activities along the shoreline. We have advised the owners/builders to immediately halt work and notify DLNR and USFW in the event any species are encountered for mitigation guidance.

Mahalo nui loa for your response.

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